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Report 11490B
August 2000

AEROJET

Integrated Advanced Microwave Sounding Unit-A (AMSU-A)

Performance Verification Report

METSAT (S/N 108) AMSU-A1 Receiver Assemblies

P/N 1356429-1 S/N F05 and P/N 1356409-1 S/N F05

[redacted]

Contract No. NAS 5-32314
CDRL 208

Submitted to:

National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

Submitted by:

Aerojet
1100 West Hollyvale Street
Azusa, California 91702

Aerojet

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Report 11490A
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PERFORMANCE VERIFICATION TEST REPORT METSAT (S/N: 108) AMSU-A1 RECEIVER ASSEMBLIES FOR INTEGRATED ADVANCED MICROWAVE SOUNDING UNIT-A (AMSU-A)

CONTRACT NO. NAS5-32314
CDRL PAR 3.3.2.1

JUNE 1999

SUBMITTED TO

NATIONAL AERONAUTICS AND SPACE ADMINISTERATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND 20771

SUBMITTED BY

AEROJET ELECTRONIC SYSTEMS PLANT
1100 WST HOLLYVALE STREET
AZUSA, CALIFORNIA 91702

Report 11490A
September 1999

AMSU-A RECEIVER VERIFICATION TEST REPORT

LEVEL OF ASSEMBLY:	**SUBASSEMBLY**
TEST ITEM:	**AMSU-A1 RECEIVER ASSEMBLY** **P/N: 1356429-1, S/N: F05** **P/N: 1356409-1, S/N: F05**
TYPE OF HARDWARE:	**METSAT FLIGHT MODEL (FM)**
TYPE OF TEST:	**FUNCTIONAL PERFORMANCE**
VERIFICATION TEST PROCEDURE:	**AE-26002/6A**
TEST FACILITY LOCATION:	**AESP** **AZUSA, CALIFORNIA**

SIGNATURE:

TEST ENGINEER: _____ **DATE:** 6/10/1999

1.0 INTRODUCTION

The AMSU-A receiver subsystem comprises two separated receiver assemblies; AMSU-A1 and AMSU-A2 (P/N 1356441-1). The AMSU-A1 receiver contains 13 channels and the AMSU-A2 receiver 2 channels. The AMSU-A1 receiver assembly is further divided into two parts; AMSU-A1-1 (P/N 1356429-1) and AMSU-A1-2 (P/N 1356409-1), which contain 9 and 4 channels, respectively. Figures 1 and 2 illustrate the functional block diagrams of the AMSU-A1 and AMSU-A2 receivers.

The AMSU-A receiver subsystem is located in between the antenna and signal processing subsystems of the AMSU-A instrument and comprises the RF and IF components from isolators to attenuators as shown in Figures 1 and 2. It receives the RF signals from the antenna subsystem, down-converts the RF signals to IF signals, amplifies and defines the IF signals to proper power level and frequency bandwidth as specified for each channel, and inputs the IF signals to the signal processing subsystem.

The test reports for the METSAT AMSU-A receiver subsystem are prepared separately for A1 and A2 receivers so that each receiver stands alone during integration of instruments into the spacecraft. This test report presents the test data of the METSAT AMSU-A1 Flight Model No. 5 (FM-5) receiver subsystem. The tests are performed per the Acceptance Test Procedure (ATP) for the AMSU-A Receiver Subsystem, AE-26002/6A. The functional performance tests are conducted either at the component or subsystem level. While the component-level tests are performed over the entire operating temperature range predicted by thermal analysis, most subsystem-level tests are conducted at ambient temperature only. The receiver performances were verified over the operating temperature range by measuring a couple of key receiver performance parameters at extended temperature extremes (-20°C and +50°C) as well as room ambient temperature during two cycles of thermal cycling test.

2.0 REASON FOR TEST

The ATP for the AMSU-A Receiver Subsystem, AE-26002/6A, is prepared to describe in detail the configuration of the test setups and the procedures of tests to verify that the receiver subsystem meets the specifications as required either in the AMSU-A Instrument Performance and Operation Specification, S-480-80, or in AMSU-A Receiver Subsystem Specification, AE-26608, derived by the Aerojet System Engineering. Test results that verify the conformance to the specifications demonstrate the acceptability of that particular receiver subsystem.

3.0 ACCEPTANCE TEST

The acceptance tests for the AMSU-A receiver subsystem are performed either at the component or subsystem level. The component-level tests are conducted per the ATP of

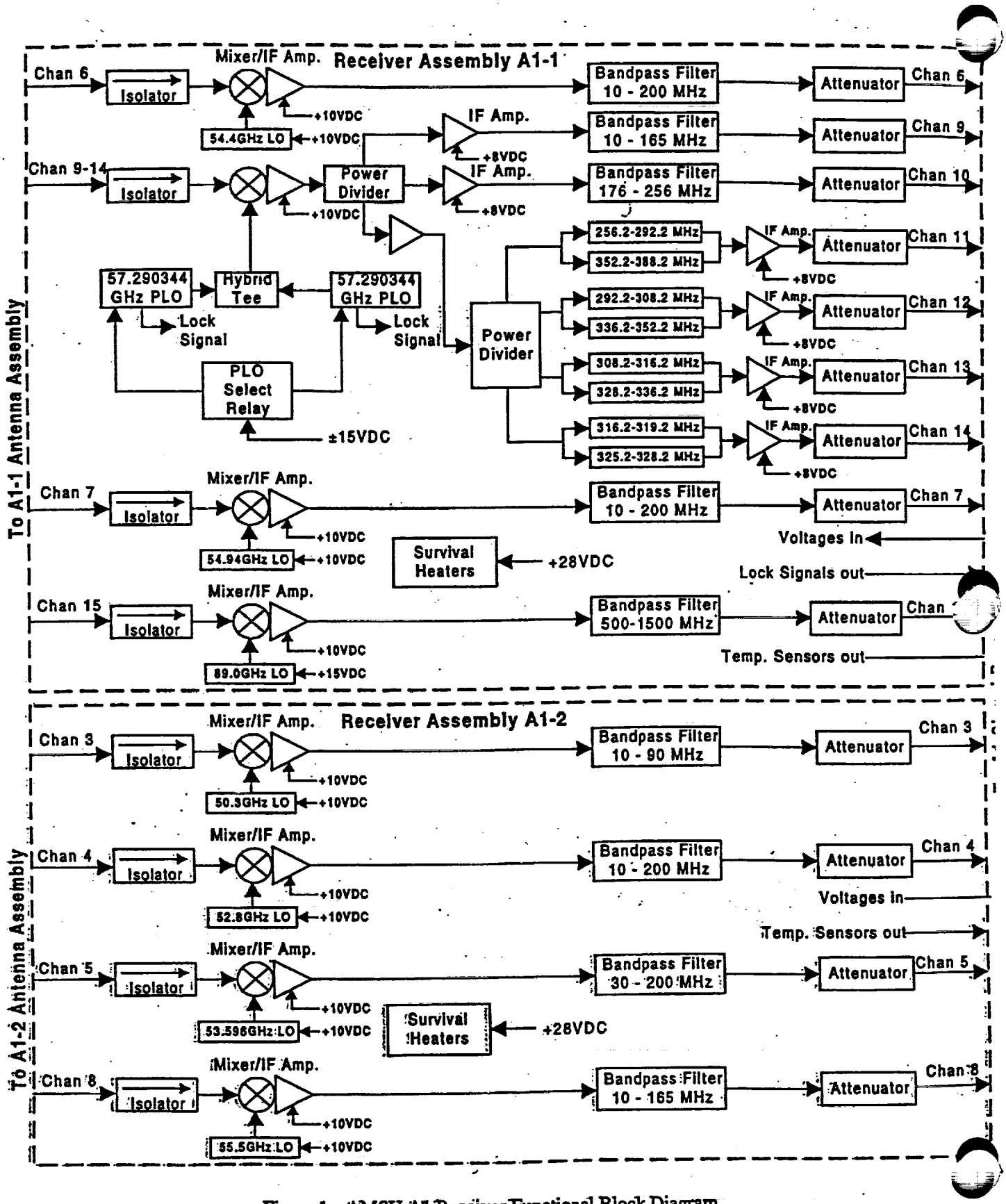


Figure 1. AMSU-A1 Receiver Functional Block Diagram

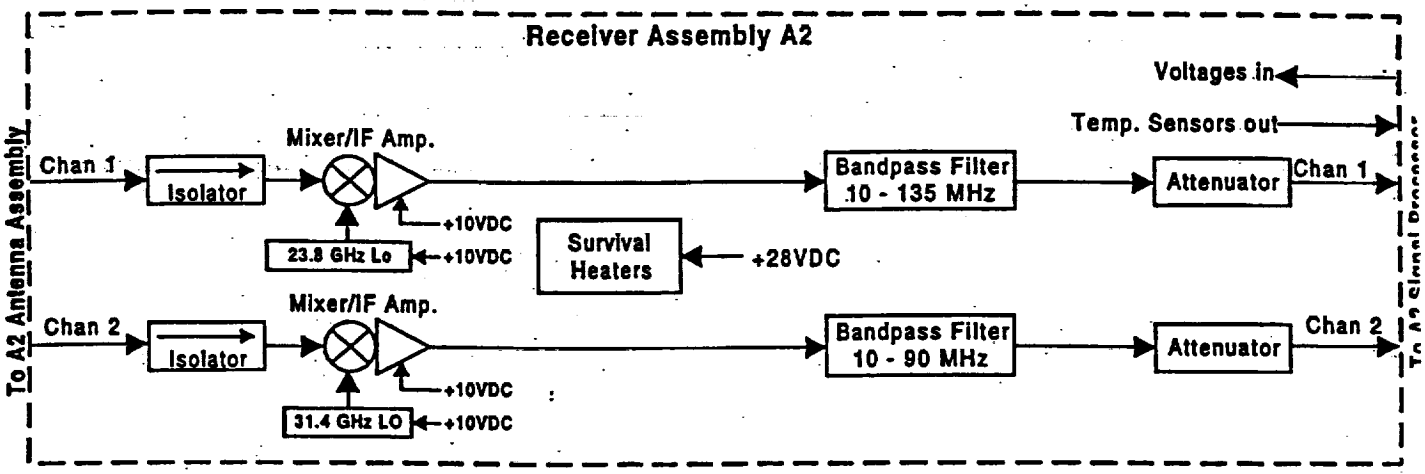


Figure 2. AMSU-A2 Receiver Functional Block Diagram

each component at supplier's facilities. The subsystem-level tests are conducted per the ATP, AE-26002/6A at Aerojet Azusa facility.

The component-level tests include the center frequency, center frequency stability, bandpass characteristics, gain stability, and gain compression among others. Although the bandpass characteristics can change slightly in subsystem level, these performances are mainly dependent on the component characteristics. The subsystem-level tests include the center frequency, IF output power, bandpass characteristics, noise figure, noise power stability, and the tunable short test (for one unit only).

The subsystem-level tests are performed on AMSU-A1 receivers: AMSU-A1-1 and AMSU-A1-2. However, since the multiplexers of the AMSU-A1 system are integrated to the receivers, the acceptance tests are conducted with the feedhorns directly connected to respective multiplexers that precede the receiver subsystem.

Wire connections between the D-sub connectors and platinum resistance temperature (PRT) sensors and thermistors, D-sub connector and PLO lock detection terminals, and D-sub connector and survival heaters through the thermal switches are verified by measuring either the resistances between the respective two pins or the voltages across the respective two pins. The component bias voltages are verified by measuring the voltages across the two respective banana jacks of the breakout box that are connected to corresponding pins of the D-sub connector.

The receiver tests actually consist of three different tests: engineering evaluation tests, thermal cycling tests and acceptance tests. The engineering evaluation tests were conducted on temporarily mounted receivers prior to the acceptance tests. The tests included the bandpass characteristics, noise figure and noise power stability. The receivers were then subjected to two cycles of thermal cycling test between -20°C and +50°C. During thermal cycling, the bandpass characteristics and noise figures of the channels were measured at two temperature extremes of -20°C and +50°C as well as at room ambient temperature. Operation of the thermal switches was also verified during the thermal cycling test. The acceptance tests were performed per the ATP, AE-26002/6A, at room ambient temperature. Only the acceptance test results are included in this test report.

During engineering evaluation tests of the A1-2 receiver, a high noise figure of 6.27dB and a high noise power stability of 0.475K were measured for the channel 3 against the specifications of 5.1dB and 0.12K respectively. The bandpass characteristics of this channel showed a peak (~8dB) at lower end of the passband. This problem was resolved by replacing the DRO (P/N: 1336610-3, S/N: 85097) by another unit (S/N: 85095) resulting in a noise figure of 3.99dB and a noise power stability of 0.06K. Marginal noise power stability (0.09K at first and 0.08K at the second time for a specification of 0.08K) was measured for the channel 8. The noise power stability was improved to an acceptable level (0.06K) by adjusting the LO power level of the DRO.

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The A1-2 receiver was subjected to thermal cycling prior to the acceptance test. The tests were performed for channels 3 and 4 during the first thermal cycle and for channels 5 and 8 during the second cycle. No anomaly was observed during temperature cycling of this receiver. Then, the A1-2 receiver passed the acceptance tests.

The engineering evaluation tests for A1-1 receiver went smoothly. The noise power stability of the channel 15 was higher than those of the previous units but still within the specification. Two failures were encountered during the thermal cycling tests of the A1-1 receiver. The PLO #1 (P/N: 1348360-4, S/N: F05) lost lock during the temperature transition from ambient temperature to -20°C (Refer F/AR No.192). This failure was repeated when the receiver power conditioner was replaced by the EM DC-DC converter to simulate real operating condition. The PLO (S/N: F05) was replaced by another (S/N: F11). During the second thermal cycle, significant IF power drop was observed on channel 7 at -20°C. Ensuing test revealed that the IF power decreased continuously as the temperature decreased from ambient temperature to -20°C and increased continuously as the temperature increased from -20°C to ambient temperature. The measured noise figure started to deviate from normal trend at ~+7°C in downward temperature transition and recovered to normal at ~+22°C. The problem was traced to the DRO (P/N: 1336610-7, S/N: 85017) and the DRO was replaced by another unit (S/N: 85023). This issue was addressed in F/AR No. 193.

Engineering evaluation tests were conducted on the receiver channels affected by the replacements of afore-mentioned PLO and DRO, without any problem. At ~+50°C during thermal cycling, however, the bandpass characteristics of the channel 7 became erratic and the IF power also began fluctuating (Refer F/AR No. 194). The performance of the channel 7 returned to normal at +44°C but the IF power dropped to -33.6dBm at room ambient temperature. The thermal cycling test was discontinued at this point. The problem was traced to the DRO (P/N: 1336610-7, S/N: 85023) and the unit was replaced by another (S/N: 85022). Engineering evaluation and thermal cycling tests were conducted again on the receiver shelf with the new DRO and no anomaly was observed during these tests.

Higher noise power stability (>0.6K) was measured for the channel 15 during the acceptance tests. The problem was resolved by replacing the mixer/IF amplifier (P/N: 1331562-20, S/N: 7A50) and GDO (P/N: 1336610-10, S/N: PFM) with another set (S/N: 7A70 and S/N: FM3) and setting the LO power level at +5.0dBm. The new mixer/IF amplifier and GDO set was subjected to two cycles of thermal cycling from -20°C to +50°C prior to the acceptance tests. No other problem/anomaly was observed

4.0 ORGANIZATION OF TEST DATA

The test data are organized in the following formats. The test data obtained at the component level are first summarized for each category for all applicable receiver

channels. The bandpass characteristics of the filters are summarized only for the data measured at mid-temperature. Supporting component test data over the operating temperature range then follow the summaries.

The test data for the reworked channel 7 DRO (P/N: 1336610-7, S/N: 85017) were not complete as limited acceptance tests were performed on this unit. The frequency characteristics of the DRO should not change since the rework was done in the tripler. Test data for both original and reworked DRO are included in the test report.

The subsystem-level test data are organized for each receiver (A1-1 and A1-2), but not necessarily in sequential order of tests performed. The test data recorded in the test sheet as prepared in the ATP and related data plots are included in this test report. For the A1-1 receiver, another set of the test data is attached at the end for the channel 15 with new mixer/IF amplifier (P/N: 1331562-20, S/N: 7A70) and GDO (P/N: 1336610-10, S/N: FM3).

5.0 SUMMARY AND RECOMMENDATIONS

The METSAT AMSU-A1 FM-5 receiver subsystem successfully passed all performance requirements and is delivered to System Engineering for system integration and test. The test data, in most cases, indicated adequate margins for key performance specifications.

The engineering evaluation and thermal cycling tests incorporated prior to the acceptance tests indeed helped the receiver subsystem tests. During engineering evaluation tests of the A1-2 receiver, the channel 3 DRO (P/N: 1336610-3, S/N: 85097) was replaced by another unit (S/N: 85095) and the LO power level of the channel 8 DRO was adjusted to improve the noise figures/noise power stabilities of these channels. We encountered three failures (one PLO (P/N: 1348360-4, S/N: F05) and two DROs (P/N: 1336610-7, S/N: 85017 and S/N: 85023)) during thermal cycling tests of the A1-1 receiver. If these problems/failures occurred during the acceptance tests, it would have taken much longer time to correct them as we have to go through the lengthy processes involved with disassembling and reassembling the completely assembled receiver hardware and associated document preparations.

6.0 TEST DATA

In the following, the component and subsystem-level test data are organized as delineated in Paragraph 4.0.

CENTER FREQUENCY OF LOs

Channel No.	3	4	5	6	7	8	9-14 *	15
Specification (GHz)	50.3	52.8	53.596	54.4	54.94	55.5	57.290344	89.0
Setting Accuracy (+/-GHz)	0.002	0.001	0.001	0.001	0.001	0.002	0.000086	0.03
Measured (GHz)	50.30008	52.80050	53.59646	54.40015	54.93986	55.50030	57.290325 57.290322	89.005

* Measured for PLO No. 1 and No. 2.

FREQUENCY STABILITY OF LOs

Channel No.	3	4	5	6	7	8	9-14 *	15
Short-Term Specification (+/-MHz)	8	3	3	3	3	6	0.086	80
Setting Accuracy (+/-MHz)	2	1	1	1	1	2		30
W/ Temp. & Voltage (+/-MHz)	6	2	2	2	2	6		50
Measured (MHz) Total	+2.80, -3.22	+1.52 -0.77	+2.11, -1.99	+0.28, -2.29	+0.81, -1. 50	+0.33, -0.48	+0.038, -0.057 +0.004, -0.036	+11., -13
Long-Term Specification (+/-MHz)	2	2	2	2	2	2	0.114	50
By Design or Analysis ** (+/-MHz)	0.1	0.1	0.1	0.1	0.1	0.1	0.115	76

* Measured for PLO No. 1 and No. 2.

** Based on accelerated life-test data for DROs.

Note: Additional +/-0.1MHz frequency stability reserved for safety margin for channels 11-14.

COMPONENT-LEVEL TEST DATA

CENTER FREQUENCY AND FREQUENCY STABILITY

FOR

LOCAL OSCILLATORS (LOs)
(DROs, PLOs, & GDO)

Channel 3 LO

DRO (P/N: 1336610-3, S/N: 85095)

LITTON
Solid State

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AM
SERIAL NUMBER: 85095 QUAL TEST N/A AESD 1336610-3 ACCEPT TEST ✓

Basic Electrical Test: Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	174	mA	Table IIIB
Input Power, P_{diss}	1.74	W DC	P_{diss} max
Frequency, f_{Tnom}	50.30008	GHz	Table IIIB
RF Output Power, P_{Tnom}	13.1	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.08	MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	172	mA	Table IIIB
Frequency, f_{meas}	50.30009	GHz	Table IIIB
RF Output Power, P_{meas}	13.1	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	174	mA	Table IIIB
Frequency, f_{meas}	50.30010	GHz	Table IIIB
RF Output Power, P_{meas}	13.1	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$

Δf_V at 9.5 VDC or at 9.5 VDC = .01 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = .02 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB

Accept ✓ Reject

Test Performed by DM Date 7-17-98
Litton QA LITTON M64 Date 7-21-98

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AM — AESD 1336610- 3
SERIAL NUMBER: 85095 — QUAL TEST N/A — ACCEPT TEST ✓

Temperature Testing at T=10°C. Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	174	mA	Table IIIB
Input Power, P_{diss}	1.74	W DC	Pdiss max
Frequency, $f_{10°C}$	50.29920	GHz	Table IIIB
RF Output Power, $P_{10°C}$	13.1	dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage. Ref. Test Para 5.2.5.1			
Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	172	mA	Table IIIB
Frequency, f_{meas}	50.29912	GHz	Table IIIB
RF Output Power, P_{meas}	13.1	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	173	mA	Table IIIB
Frequency, f_{meas}	50.29907	GHz	Table IIIB
RF Output Power, P_{meas}	13.1	dBm	12 to 17 dBm

Calculate Frequency Variation. $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-.08	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-.13	MHz
Δf_T at 10.0 VDC ($=f_{10°C} - f_{Tnom}$)	=	-.88	MHz

Calculate RF Output Power Variation. $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC ($=P_{10°C} - P_{Tnom}$)	=	0	dB

Accept ✓ Reject _____

Test Performed by [illegible] LITTON M64 Date 7-17-98
Litton Q.A. _____ Date 7-20-98

LITTON
Solid State

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AM AESD 1336610- 3
SERIAL NUMBER: 85095 QUAL TEST N/A ACCEPT TEST ✓

Temperature Extreme Testing at Tmin. Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin =1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	173	mA	Table IIIB
Input Power, P_{diss}	1.73	W DC	Pdiss max
Frequency, f_{Tmin}	50.29702	GHz	Table IIIB
RF Output Power. P_{Tmin}	13.0	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage. Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	171	mA	Table IIIB
Frequency, f_{meas}	50.29697	GHz	Table IIIB
RF Output Power. P_{meas}	13.0	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	172	mA	Table IIIB
Frequency, f_{meas}	50.29692	GHz	Table IIIB
RF Output Power. P_{meas}	13.0	dBm	12 to 17 dBm

Calculate Frequency Variation. $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-.05	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-.10	MHz
Δf_T at 10.0 VDC (=$f_{Tmin} - f_{Tnom}$)		-3.06	MHz

Calculate RF Output Power Variation. $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=$P_{Tmin} - P_{Tnom}$)	=	-.1	dB

Accept ✓ Reject

Test Performed by DM LITTON M&T Date 7-17-98
Litton Q.A. Date 7-20-98

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AM
SERIAL NUMBER: 85095
QUAL TEST N/A
AESD 1336610- 3
ACCEPT TEST ✓

Temperature Testing at T=30°C. Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	175	mA	Table IIIB
Input Power, P_{diss}	1.75	W DC	Pdiss max
Frequency, $f_{30°C}$	50.30049	GHz	Table IIIB
RF Output Power, $P_{30°C}$	13.0	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage. Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	172	mA	Table IIIB
Frequency, f_{meas}	50.30053	GHz	Table IIIB
RF Output Power, P_{meas}	13.0	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	173	mA	Table IIIB
Frequency, f_{meas}	50.30058	GHz	Table IIIB
RF Output Power, P_{meas}	13.0	dBm	12 to 17 dBm

Calculate Frequency Variation. $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	.04	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	.09	MHz
Δf_T at 10.0 VDC (=$f_{30°C}$ - f_{Tnom})	=	.41	MHz

Calculate RF Output Power Variation. $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=$P_{30°C}$ - P_{Tnom})	=	-.1	dB

Accept ✓ Reject _____

Test Performed by [signature] Date 7-17-98
Litton Q.A. [signature] Date 7-20-98

LITTON M64

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 41 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AM AESD 1336610- 3
SERIAL NUMBER: 85095 QUAL TEST N/A ACCEPT TEST ✓

Temperature Extreme Testing at Tmax. Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax =1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	176	mA	Table IIIB
Input Power, P_{diss}	1.76	W DC	Pdiss max
Frequency, f_{Tmax}	50.30269	GHz	Table IIIB
RF Output Power, P_{Tmax}	12.8	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage. Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	173	mA	Table IIIB
Frequency, f_{meas}	50.30273	GHz	Table IIIB
RF Output Power, P_{meas}	12.8	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	175	mA	Table IIIB
Frequency, f_{meas}	50.30275	GHz	Table IIIB
RF Output Power, P_{meas}	12.8	dBm	12 to 17 dBm

Calculate Frequency Variation. $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	.04	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	.06	MHz
Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$)	=	2.61	MHz

Calculate RF Output Power Variation. $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$)	=	-0.3	dB

Accept ✓ Reject

Test Performed by DM Date 7-15-98
Litton Q.A. LITTON M64 Date 7-20-98

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AM AESD 1336610- 3
SERIAL NUMBER: 85095 QUAL TEST N/A ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	174	mA	Table IIIB
Input Power	1.74	W DC	Pdiss max
Frequency (f_{Tnom})	50.30008	GHz	Table IIIB
RF Output Power	13.1	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_s (= f_{Tnom}-F_o)	0.08	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	174	mA	Table IIIB
Input Power	1.74	W DC	Pdiss max
Frequency	50.30006	GHz	Table IIIB
RF Output Power	13.1	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	-28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	174	mA	Table IIIB
Input Power	1.74	W DC	Pdiss max
Frequency	50.30001	GHz	Table IIIB
RF Output Power	13.1	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	174	mA	Table IIIB
Input Power	1.74	W DC	Pdiss max
Frequency, f_{Tnom}	50.30007	GHz	Table IIIB
RF Output Power	13.1	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_s (= f_{Tnom}-F_o)	.07	MHz	

Accept ✓ Reject ____

Test Performed by [illegible] Date 7-17-98

Litton Q.A. [illegible] Date 7-20-98

LITTON M&P

LITTON
Solid State

TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AM AESD 1336610-3
SERIAL NUMBER: 85095 QUAL TEST N/A ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION		LIMITS
1. Initial Performance at Tnom ± 1°C		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{Tnom}	50.30009 GHz	Table IIIB
RF Output Power, P_{Tnom}	13.1 dBm	12 to 17 dBm
Input Voltage, V_B	10 VDC	10 ± 0.2 VDC
Input Current, I_B	174 mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	.09 MHz	
2. Performance at Tnom ± 1°C after +60°C soak.		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{meas}	50.30007 GHz	Table IIIB
RF Output Power, P_{meas}	12.9 dBm	12 to 17 dBm
Input Voltage	10 VDC	V_B ± .005 VDC
Input Current	174 mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{meas}	50.30006 GHz	Table IIIB
RF Output Power, P_{meas}	12.9 dBm	12 to 17 dBm
Input Voltage	10 VDC	V_B ± .005 VDC
Input Current	174 mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = -.02 MHz
Δf_H after -30°C soak = -.03 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = -.2 dB
ΔP_H = after -30°C soak = -.2 dB

Test Performed by MM Accept ✓ Reject
Litton Q.A. Date 7-17-98
Date 7-20-98

LITTON M64

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 58 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AM AESD 1336610- 3
SERIAL NUMBER: 85095 QUAL TEST N/A ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Initial Measurement. Ref Test Par. 5.9.1			
Temperature	23	°C	24°C ± 5°C
Frequency	50.30006	GHz	Table IIIB
RF Output Power	13.1	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current	174	mA	Table IIIB
Reference test. Ref. Test Para. 5.9.3			
Frequency, f_{Ref}	50.30006	GHz	Table IIIB
RF Output Power, P_{Ref}	-2.1	dBm	
Load Pulling Test. Ref. Test Para. 5.9.4			
Maximum Frequency, f_{meas}	50.30007	GHz	Table IIIB
Minimum Frequency, f_{meas}	50.30006	GHz	Table IIIB
Maximum RF Output Power P_{meas}	-1.7	dBm	
Minimum RF Output Power, P_{meas}	-2.4	dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation, $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = .01 MHz
Maximum Negative Δf_L = 0 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation, $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = .04 dB
Maximum Negative ΔP_L = -0.3 dB

Accept ✓ Reject _____

Test Performed by _____ LITTON M64 Date 7-17-98
Litton Q.A. _____ Date 7-20-98

LITTON
Solid State

TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AF/A
SERIAL NUMBER: 85043 QUAL TEST N/A
AESD 1336610-4
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION		LIMITS
1. Initial Performance at Tnom ± 1°C		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{Tnom}	52.80050 GHz	Table IIIB
RF Output Power, P_{Tnom}	13.3 dBm	12 to 17 dBm
Input Voltage, V_B	10 VDC	10 ± 0.2 VDC
Input Current, I_B	181 mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.50 MHz	
2. Performance at Tnom ± 1°C after +60°C soak.		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{meas}	52.80040 GHz	Table IIIB
RF Output Power, P_{meas}	13.2 dBm	12 to 17 dBm
Input Voltage	10 VDC	V_B ± .005 VDC
Input Current	181 mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{meas}	52.80069 GHz	Table IIIB
RF Output Power, P_{meas}	13.3 dBm	12 to 17 dBm
Input Voltage	10 VDC	V_B ± .005 VDC
Input Current	180 mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = −0.1 MHz
Δf_H after -30°C soak = 0.19 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = −0.1 dB
ΔP_H = after -30°C soak = ϕ dB

Test Performed by VN Accept ✓ Reject
Litton Q.A. Date 7-3-98
Date JUL 14 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 58 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AF/A AESD 1336610-4
SERIAL NUMBER: 85043 QUAL TEST N/A ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Initial Measurement. Ref Test Par. 5.9.1			
Temperature	22	°C	24°C ± 5°C
Frequency	52.80059	GHz	Table IIIB
RF Output Power	13.4	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Reference test. Ref. Test Para. 5.9.3			
Frequency, f_{Ref}	52.80060	GHz	Table IIIB
RF Output Power, P_{Ref}	-3.5	dBm	
Load Pulling Test. Ref. Test Para. 5.9.4			
Maximum Frequency, f_{meas}	52.80061	GHz	Table IIIB
Minimum Frequency, f_{meas}	52.80059	GHz	Table IIIB
Maximum RF Output Power P_{meas}	-3.4	dBm	
Minimum RF Output Power, P_{meas}	-3.8	dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation. $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = 0.01 MHz
Maximum Negative Δf_L = -0.01 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation. $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = 0.1 dB
Maximum Negative ΔP_L = -0.3 dB

Accept ✓ Reject _____

Test Performed by VN Date 7-3-98
Litton Q.A. NOV Date JUL 14 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 60 OF 68
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LITTON
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TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AF/A
SERIAL NUMBER: 85043 QUAL TEST N/A

AESD 1336610-4
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Output Open and Short. Ref. Test Para. 5.9.5		
Temperature	22 °C	24°C ± 5°C
Frequency:	52.80061 GHz	Table IIIB
RF Output Power:	13.4 dBm	12 to 17 dBm
Input Voltage	10 VDC	10 ± 0.2 VDC
Input Current:	180 mA	Table IIIB
Results:	✓ Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.87 MHz (Positive)	Table IIIB
	− 0.11 MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	0.49 MHz (Positive)	Table IIIB
	− 0.66 MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.1 dB (Positive)	1.0 dB
	− 0.5 dB (Negative)	-1.0 dB

Accept ✓ Reject _____

Test Performed by VN Date 7-3-98

Litton Q.A. _____ Date JUL 14 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 61 OF 68
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Report No. 11490
June 1999

Channel 4 LO

DRO (P/N: 1336610-4, S/N: 85043)

LITTON
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TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AF/A
SERIAL NUMBER: 85043 QUAL TEST N/A
AESD 1336610-4
ACCEPT TEST ✓

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	181	mA	Table IIIB
Input Power, P_{diss}	1.81	W DC	P_{diss} max
Frequency, f_{Tnom}	52.80050	GHz	Table IIIB
RF Output Power, P_{Tnom}	13.3	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.50	MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	182	mA	Table IIIB
Frequency, f_{meas}	52.80049	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	182	mA	Table IIIB
Frequency, f_{meas}	52.80049	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$

Δf_V at 9.5 VDC or at 9.5 VDC = −0.01 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = −0.01 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$

ΔP_V at 9.5 VDC or at 9.5 VDC = ϕ dB
ΔP_V at 10.5 VDC or at 10.5 VDC = ϕ dB

Accept ✓ Reject _____

Test Performed by _____ Date 7-2-98
Litton QA LITTON MEO Date JUL 14 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 38 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AF/A
SERIAL NUMBER: 85043 QUAL TEST N/A
AESD 1336610- 4
ACCEPT TEST ✓

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	181	mA	Table IIIB
Input Power, P_{diss}	1.81	W DC	Pdiss max
Frequency, $f_{10°C}$	52.80066	GHz	Table IIIB
RF Output Power, $P_{10°C}$	13.3	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	181	mA	Table IIIB
Frequency, f_{meas}	52.80066	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	182	mA	Table IIIB
Frequency, f_{meas}	52.80066	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	ϕ	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	ϕ	MHz
Δf_T at 10.0 VDC (=$f_{10°C}$ - f_{Tnom})	=	0.16	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	ϕ	dB
ΔP_T at 10.0 VDC (=$P_{10°C}$ - P_{Tnom})	=	ϕ	dB

Accept ✓ Reject _____

Test Performed by VN Date 7-2-98
Litton Q.A. LITTON Date JUL 14 1998

LITTON
Solid State

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AF/A
SERIAL NUMBER: 85043 QUAL TEST N/A
AESD 1336610- 4
ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C :		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power, P_{diss}	1.79	W DC	Pdiss max
Frequency, f_{Tmin}	52.80113	GHz	Table IIIB
RF Output Power, P_{Tmin}	13.3	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	52.80113	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	52.80114	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5 VDC =	ϕ	MHz
Δf_V at 10.5 VDC or at 10.5 VDC =	0.01	MHz
Δf_T at 10.0 VDC (=f_{Tmin} -f_{Tnom})	0.48	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5 VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at 10.5 VDC =	ϕ	dB
ΔP_T at 10.0 VDC (=P_{Tmin} -P_{Tnom}) =	ϕ	dB

Accept ✓ Reject

Test Performed by LITTON Date 7-3-98
Litton Q.A. MCQ Date JUL 14 1998

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AF/A — AESD 1336610- 4
SERIAL NUMBER: 85043 — QUAL TEST N/A — ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power, P_{diss}	1.82	W DC	Pdiss max
Frequency, $f_{30°C}$	52.80026	GHz	Table IIIB
RF Output Power, $P_{30°C}$	13.3	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	182	mA	Table IIIB
Frequency, f_{meas}	52.80026	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	183	mA	Table IIIB
Frequency, f_{meas}	52.80025	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	ϕ	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	−0.01	MHz
Δf_T at 10.0 VDC (=$f_{30°C} - f_{Tnom}$)	=	−0.24	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	ϕ	dB
ΔP_T at 10.0 VDC (=$P_{30°C} - P_{Tnom}$)	=	ϕ	dB

Accept ✓ Reject _____

Test Performed by _____ Date 7-2-98
Litton Q.A. LITTON A.I.D. Date JUL 14 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 41 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AF/A — AESD 1336610- 4
SERIAL NUMBER: 85043 — QUAL TEST N/A — ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power, P_{diss}	1.82	W DC	Pdiss max
Frequency, f_{Tmax}	52.79991	GHz	Table IIIB
RF Output Power, P_{Tmax}	13.2	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	184	mA	Table IIIB
Frequency, f_{meas}	52.79989	GHz	Table IIIB
RF Output Power, P_{meas}	13.2	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	184	mA	Table IIIB
Frequency, f_{meas}	52.79984	GHz	Table IIIB
RF Output Power, P_{meas}	13.2	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.02	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.07	MHz
Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$)	=	-0.59	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	ϕ	dB
ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$)	=	-0.1	dB

Accept ✓ Reject ____

Test Performed by VN Date 7-2-98
Litton Q.A. LITTON M 30 Date JUL 14 1998

LITTON
Solid State

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AF/A AESD 1336610- 4
SERIAL NUMBER: 85043 QUAL TEST N/A ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power	1.80	W DC	Pdiss max
Frequency (f_{Tnom})	52.80067	GHz	Table IIIB
RF Output Power	13.3	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.67	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power	1.80	W DC	Pdiss max
Frequency	52.80067	GHz	Table IIIB
RF Output Power	13.3	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power	1.80	W DC	Pdiss max
Frequency	52.80067	GHz	Table IIIB
RF Output Power	13.3	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	−10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power	1.80	W DC	Pdiss max
Frequency, f_{Tnom}	52.80068	GHz	Table IIIB
RF Output Power	13.3	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.68	MHz	

Accept ✓ Reject
Test Performed by VN Date 7-3-98
Litton Q.A. LITTON M.S. Date JUL 14 1998

Channel 5 LO

DRO (P/N: 1336610-5, S/N: 85036)

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TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AG/A AESD 1336610- 5
SERIAL NUMBER: 85036 QUAL TEST N/A ACCEPT TEST ✓

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power, P_{diss}	1.80	W DC	P_{diss} max
Frequency, f_{Tnom}	53.59646	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.2	dBm	11.5 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.46	MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	53.59646	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	11.5 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	53.59646	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	11.5 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 VDC = Ø MHz
Δf_V at 10.5 VDC or at 10.5 VDC = Ø MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 VDC = Ø dB
ΔP_V at 10.5 VDC or at 10.5 VDC = Ø dB

Accept ✓ Reject _____

Test Performed by VN Date 7-29-98
Litton QA _____ Date JUL 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 38 OF 68
56348	A	1300823	C	

LITTON
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TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A AESD 1336610- 5
SERIAL NUMBER: 85036 QUAL TEST N/A ACCEPT TEST ✓

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power, P_{diss}	1.80	W DC	Pdiss max
Frequency, $f_{10°C}$	53.59703	GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.2	dBm	11.5 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1			
Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	177	mA	Table IIIB
Frequency, f_{meas}	53.59703	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	11.5 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	53.59702	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	11.5 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	∅	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.01	MHz
Δf_T at 10.0 VDC (=$f_{10°C} - f_{Tnom}$)	=	0.57	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	∅	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	∅	dB
ΔP_T at 10.0 VDC (=$P_{10°C} - P_{Tnom}$)	=	∅	dB

Accept ✓ Reject _____

Test Performed by VV Date 7-29-98
Litton Q.A. LITTON Date JUL 30 1998

LITTON
Solid State

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AG/A
SERIAL NUMBER: 85036 QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	−1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power, P_{diss}	1.79	W DC	Pdiss max
Frequency, f_{Tmin}	53.59783	GHz	Table IIIB
RF Output Power, P_{Tmin}	12.1	dBm	11.5 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	−1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	53.59783	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	11.5 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	−1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	53.59783	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	11.5 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	ϕ	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	ϕ	MHz
Δf_T at 10.0 VDC (=$f_{Tmin} - f_{Tnom}$)		1.37	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	ϕ	dB
ΔP_T at 10.0 VDC (=$P_{Tmin} - P_{Tnom}$)	=	−0.1	dB

Accept ✓ Reject ____

Test Performed by VN Date 7-29-98
Litton Q.A. MED Date JUL 30 1998

LITTON
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TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AG/A
SERIAL NUMBER: 85036 QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power, P_{diss}	1.80	W DC	Pdiss max
Frequency, $f_{30°C}$	53.59624	GHz	Table IIIB
RF Output Power, $P_{30°C}$	12.2	dBm	11.5 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	53.59624	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	11.5 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	53.59624	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	11.5 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	ϕ	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	ϕ	MHz
Δf_T at 10.0 VDC ($=f_{30°C} - f_{Tnom}$)	=	-0.22	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	ϕ	dB
ΔP_T at 10.0 VDC ($=P_{30°C} - P_{Tnom}$)	=	ϕ	dB

Accept ✓ Reject _____

Test Performed by VN Date 7-29-98
Litton Q.A. _____ Date JUL 30 1998

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A
SERIAL NUMBER: 85036 QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	181	mA	Table IIIB
Input Power, P_{diss}	1.81	W DC	Pdiss max
Frequency, f_{Tmax}	53.59481	GHz	Table IIIB
RF Output Power, P_{Tmax}	12.1	dBm	11.5 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	53.59481	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	11.5 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	53.59481	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	11.5 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	ϕ	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	ϕ	MHz
Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$)	=	-1.65	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	ϕ	dB
ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$)	=	-0.1	dB

Accept ✓ Reject _____

Test Performed by LN Date 7-29-98
Litton Q.A. LITTON Date JUL 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 42 OF 68
56348	A	1300823	C	

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A AESD 1336610- 5
SERIAL NUMBER: 85036 QUAL TEST N/A ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C	LIMIT
Initial Measurement		
Temperature	22 °C	Table IIIB
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	180 mA	Table IIIB
Input Power	1.80 W DC	Pdiss max
Frequency (f_{Tnom})	53.59658 GHz	Table IIIB
RF Output Power	12.2 dBm	11.5 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	VN 0.58 MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	180 mA	Table IIIB
Input Power	1.80 W DC	Pdiss max
Frequency	53.59649 GHz	Table IIIB
RF Output Power	12.2 dBm	11.5 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28 VDC	+28V

Performance After Input Overvoltage

Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	180 mA	Table IIIB
Input Power	1.80 W DC	Pdiss max
Frequency	53.59657 GHz	Table IIIB
RF Output Power	12.2 dBm	11.5 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10 VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	180 mA	Table IIIB
Input Power	1.80 W DC	Pdiss max
Frequency, f_{Tnom}	53.59657 GHz	Table IIIB
RF Output Power	12.2 dBm	11.5 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.43 MHz	

Test Performed by DAI LITTON
Litton Q.A. MCG

Accept ✓ Reject
Date 7-29-98
Date JUL 30 1999

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TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AG/A AESD 1336610-5
SERIAL NUMBER: 85036 QUAL TEST N/A ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION		LIMITS
1. Initial Performance at Tnom ± 1°C		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{Tnom}	53.59646 GHz	Table IIIB
RF Output Power, P_{Tnom}	12.2 dBm	11.5 to 17 dBm
Input Voltage, V_B	10 VDC	10 ± 0.2 VDC
Input Current, I_B	180 mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.46 MHz	
2. Performance at Tnom ± 1°C after +60°C soak.		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{meas}	53.59614 GHz	Table IIIB
RF Output Power, P_{meas}	12.3 dBm	11.5 to 17 dBm
Input Voltage	10 VDC	V_B ± .005 VDC
Input Current	181 mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{meas}	53.59661 GHz	Table IIIB
RF Output Power, P_{meas}	12.2 dBm	11.5 to 17 dBm
Input Voltage	10 VDC	V_B ± .005 VDC
Input Current	179 mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = -0.32 MHz
Δf_H after -30°C soak = +0.15 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = 0.1 dB
ΔP_H = after -30°C soak = 0 dB

Accept ✓ Reject ____

Test Performed by DM Date 7-29-98
Litton Q.A. [signature] Date JUL 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 58 OF 68
56348	A	1300823	C	

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS ∈ 9036AG/A AESD 1336610- 5
SERIAL NUMBER: 85036 QUAL TEST N/A ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Initial Measurement. Ref Test Par. 5.9.1			
Temperature	22	°C	24°C ± 5°C
Frequency	53.59635	GHz	Table IIIB
RF Output Power	12.3	dBm	11.5 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Reference test. Ref. Test Para. 5.9.3			
Frequency, f_{Ref}	53.59635	GHz	Table IIIB
RF Output Power, P_{Ref}	-4.0	dBm	
Load Pulling Test. Ref. Test Para. 5.9.4			
Maximum Frequency, f_{meas}	53.59636	GHz	Table IIIB
Minimum Frequency, f_{meas}	53.59634	GHz	Table IIIB
Maximum RF Output Power P_{meas}	-3.6	dBm	
Minimum RF Output Power, P_{meas}	-4.3	dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation, $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = 0.01 MHz
Maximum Negative Δf_L = -0.01 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation, $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = 0.4 dB
Maximum Negative ΔP_L = -0.3 dB

Accept ✓ Reject _____

Test Performed by VN Date 7-30-98
Litton Q.A. _____ Date JUL 30 1998

LITTON
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TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036AG/A
SERIAL NUMBER: 85036 QUAL TEST N/A
AESD 1336610-5
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Output Open and Short. Ref. Test Para. 5.9.5		
Temperature	22 °C	24°C ± 5°C
Frequency:	5359636 GHz	Table IIIB
RF Output Power:	123 dBm	11.5 to 17 dBm
Input Voltage	10 VDC	10 ± 0.2 VDC
Input Current:	180 mA	Table IIIB
Results:	✓ Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.74 MHz (Positive)	Table IIIB
	−0.33 MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	1.37 MHz (Positive)	Table IIIB
	−1.66 MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.5 dB (Positive)	1.0 dB
	−0.4 dB (Negative)	-1.0 dB

Accept ✓ Reject _____

Test Performed by VN Date 7-30-98

Litton Q.A. _____ Date JUL 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 61 OF 68
56348	A	1300823	C	

Channel 6 LO

DRO (P/N: 1336610-6, S/N: 85028)

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A AESD 1336610- 6
SERIAL NUMBER: 85028 QUAL TEST N/A ACCEPT TEST ✓

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	194	mA	Table IIIB
Input Power, P_{diss}	1.94	W DC	P_{diss} max
Frequency, f_{Tnom}	54.40009	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.3	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.09	MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	192	mA	Table IIIB
Frequency, f_{meas}	54.40010	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	193	mA	Table IIIB
Frequency, f_{meas}	54.40010	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 VDC = 0.01 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0.01 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 VDC = Ø dB
ΔP_V at 10.5 VDC or at 10.5 VDC = Ø dB

Accept ✓ Reject _____

Test Performed by VN Date 7-25-98
Litton QA LITTON MES Date JUL 28 1998

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AH/A
SERIAL NUMBER: 85028 QUAL TEST N/A
AESD 1336610- 6
ACCEPT TEST ✓

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	193	mA	Table IIIB
Input Power, P_{diss}	1.93	W DC	Pdiss max
Frequency, $f_{10°C}$	54.39982	GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.4	dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1			
Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	191	mA	Table IIIB
Frequency, f_{meas}	54.39986	GHz	Table IIIB
RF Output Power, P_{meas}	12.4	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	191	mA	Table IIIB
Frequency, f_{meas}	54.39986	GHz	Table IIIB
RF Output Power, P_{meas}	12.4	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0.04	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0.04	MHz
Δf_T at 10.0 VDC (=$f_{10°C} - f_{Tnom}$)	=	-0.27	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	Ø	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	Ø	dB
ΔP_T at 10.0 VDC (=$P_{10°C} - P_{Tnom}$)	=	0.1	dB

Accept ✓ Reject _____

Test Performed by VN Date 7-25-98
Litton Q.A. LITTON M 61 Date JUL 2 8 1998

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AH/A AESD 1336610- 6
SERIAL NUMBER: 85028 QUAL TEST N/A ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	193	mA	Table IIIB
Input Power, P_{diss}	1.93	W DC	Pdiss max
Frequency, f_{Tmin}	54.39870	GHz	Table IIIB
RF Output Power, P_{Tmin}	12.5	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	190	mA	Table IIIB
Frequency, f_{meas}	54.39868	GHz	Table IIIB
RF Output Power, P_{meas}	12.5	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	191	mA	Table IIIB
Frequency, f_{meas}	54.39865	GHz	Table IIIB
RF Output Power, P_{meas}	12.5	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.02	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.05	MHz
Δf_T at 10.0 VDC (=$f_{Tmin} - f_{Tnom}$)		-1.39	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	ϕ	dB
ΔP_T at 10.0 VDC (=$P_{Tmin} - P_{Tnom}$)	=	0.2	dB

Accept ✓ Reject ____

Test Performed by VN Date 7-25-98
Litton Q.A. LITTON Date JUL 28 1998

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AH/A AESD 1336610- 6
SERIAL NUMBER: 85028 QUAL TEST N/A ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	195	mA	Table IIIB
Input Power, P_{diss}	1.95	W DC	Pdiss max
Frequency, $f_{30°C}$	54.40023	GHz	Table IIIB
RF Output Power, $P_{30°C}$	12.2	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	193	mA	Table IIIB
Frequency, f_{meas}	54.40023	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	193	mA	Table IIIB
Frequency, f_{meas}	54.40023	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	ϕ	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	ϕ	MHz
Δf_T at 10.0 VDC (=$f_{30°C} - f_{Tnom}$)	=	0.14	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	ϕ	dB
ΔP_T at 10.0 VDC (=$P_{30°C} - P_{Tnom}$)	=	−0.1	dB

Accept ✓ Reject _____

Test Performed by VN Date 7-25-98
Litton Q.A. LITTON Date JUL 28 1998

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A AESD 1336610- 6
SERIAL NUMBER: 85028 QUAL TEST N/A ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	196	mA	Table IIIB
Input Power, P_{diss}	1.96	W DC	Pdiss max
Frequency, f_{Tmax}	54.40012	GHz	Table IIIB
RF Output Power, P_{Tmax}	12.1	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	194	mA	Table IIIB
Frequency, f_{meas}	54.40010	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	194	mA	Table IIIB
Frequency, f_{meas}	54.40011	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.02	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.01	MHz
Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$)	=	0.03	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$)	=	-0.2	dB

Accept ✓ Reject ____

Test Performed by VM Date 7-25-98
Litton Q.A. LITTON M 60 Date JUL 28 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 42 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A AESD 1336610- 6
SERIAL NUMBER: 85028 QUAL TEST N/A ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	194	mA	Table IIIB
Input Power	1.94	W DC	Pdiss max
Frequency (f_{Tnom})	54.39985	GHz	Table IIIB
RF Output Power	12.3	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	-0.15	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	194	mA	Table IIIB
Input Power	1.94	W DC	Pdiss max
Frequency	54.39985	GHz	Table IIIB
RF Output Power	12.3	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	194	mA	Table IIIB
Input Power	1.94	W DC	Pdiss max
Frequency	54.39985	GHz	Table IIIB
RF Output Power	12.3	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	194	mA	Table IIIB
Input Power	1.94	W DC	Pdiss max
Frequency, f_{Tnom}	54.39984	GHz	Table IIIB
RF Output Power	12.3	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	-0.16	MHz	

Accept ✓ Reject ____

Test Performed by VN Date 7-25-98
Litton Q.A. LITTON Date JUL 28 1998

LITTON
Solid State

TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AH/A AESD 1336610-6
SERIAL NUMBER: 85028 QUAL TEST N/A ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION			LIMITS
1. Initial Performance at Tnom ± 1°C			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{Tnom}	54.40009	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.3	dBm	12 to 17 dBm
Input Voltage, V_B	10	VDC	10 ± 0.2 VDC
Input Current, I_B	194	mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.09	MHz	
2. Performance at Tnom ± 1°C after +60°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	54.39941	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	12 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	194	mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	54.39979	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	194	mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = −0.68 MHz
Δf_H after -30°C soak = −0.30 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = −0.1 dB
ΔP_H = after -30°C soak = ø dB

Accept ✓ Reject ____

Test Performed by VN Date 7-25-98
Litton Q.A. LITTON M 60 Date JUL 28 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 58 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AH/A
SERIAL NUMBER: 85028 QUAL TEST N/A
AESD 1336610- 6
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Initial Measurement. Ref Test Par. 5.9.1			
Temperature	22	°C	24°C ± 5°C
Frequency	54.40000	GHz	Table IIIB
RF Output Power	12.3	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current	194	mA	Table IIIB
Reference test. Ref. Test Para. 5.9.3			
Frequency, f_{Ref}	54.39996	GHz	Table IIIB
RF Output Power, P_{Ref}	−30 (−3.0)	dBm	
Load Pulling Test. Ref. Test Para. 5.9.4			
Maximum Frequency, f_{meas}	54.39997	GHz	Table IIIB
Minimum Frequency, f_{meas}	54.39995	GHz	Table IIIB
Maximum RF Output Power P_{meas}	−2.7	dBm	
Minimum RF Output Power, P_{meas}	−3.4	dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation, $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = 0.01 MHz
Maximum Negative Δf_L = −0.01 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation, $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = 0.3 dB
Maximum Negative ΔP_L = −0.4 dB

Accept ✓ Reject _____

Test Performed by VN (LITTON) Date 7-27-98
Litton Q.A. (MG) Date JUL 28 1998

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A — AESD 1336610-6
SERIAL NUMBER: 85028 QUAL TEST N/A — ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Output Open and Short. Ref. Test Para. 5.9.5			
Temperature	22	°C	24°C ± 5°C
Frequency:	54.39999	GHz	Table IIIB
RF Output Power:	12.3	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current:	194	mA	Table IIIB
Results:	✓	Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.10	MHz (Positive)	Table IIIB
	−0.84	MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	0.18	MHz (Positive)	Table IIIB
	−1.44	MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.5	dB (Positive)	1.0 dB
	−0.9	dB (Negative)	-1.0 dB

Accept ✓ Reject _____

Test Performed by VN Date 7-27-98

Litton Q.A. _____ Date JUL 28 1998

LITTON

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 61 OF 68
56348	A	1300823	B3	

Channel 7 LO

DRO (P/N: 1336610-7, S/N: 85022)

TEST DATA FOR REWORKED UNIT

LITTON
Solid State

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET — FINAL DATA SET ✓

LITTON TYPE LS E-9036 AJ/A — AESD 1336610-7
SERIAL NUMBER: 85022 — QUAL TEST — — ACCEPT TEST ✓

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	23	°C	Table IIIB
Input Voltage	10.0	VDC	10.0 ± 0.2 VDC
Input Current	194	mA	Table IIIB
Input Power, P_{diss}	1.94	W DC	P_{diss} max
Frequency, f_{Tnom}	54.94015	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.4	dBm	11.5 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	.15	MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at — VDC			
Temperature	23	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	192	mA	Table IIIB
Frequency, f_{meas}	54.94015	GHz	Table IIIB
RF Output Power, P_{meas}	12.4	dBm	11.5 to 17 dBm
Measurement at 10.5 VDC or at — VDC			
Temperature	23	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	192	mA	Table IIIB
Frequency, f_{meas}	54.94015	GHz	Table IIIB
RF Output Power, P_{meas}	12.4	dBm	11.5 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$

Δf_V at 9.5 VDC or at —	VDC =	0.00	MHz
Δf_V at 10.5 VDC or at —	VDC =	0.00	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$

ΔP_V at 9.5 VDC or at —	VDC =	0.0	dB
ΔP_V at 10.5 VDC or at —	VDC =	0.0	dB

Accept ✓ Reject ____

Test Performed by D. WILLIAMS — Date 3-30-99
Litton QA — Date 3-31-99

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 38 OF 68
56348	A	1300823	C	

LITTON
Solid State

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET — FINAL DATA SET ✓

LITTON TYPE LS E-9036 AJ/A — AESD 1336610-7
SERIAL NUMBER: 85022 — QUAL TEST — — ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10.0	VDC	10.0 ± 0.2 VDC
Input Current	192	mA	Table IIIB
Input Power, P_{diss}	1.92	W DC	Pdiss max
Frequency, f_{Tmin}	54.93885	GHz	Table IIIB
RF Output Power, P_{Tmin}	12.2	dBm	11.5 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at — VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	190	mA	Table IIIB
Frequency, f_{meas}	54.93885	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	11.5 to 17 dBm
Measurement at 10.5 VDC or at — VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	190	mA	Table IIIB
Frequency, f_{meas}	54.93885	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	11.5 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at —	VDC =	0.00	MHz
Δf_V at 10.5 VDC or at —	VDC =	0.00	MHz
Δf_T at 10.0 VDC (=$f_{Tmin} - f_{Tnom}$)		-1.3	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at —	VDC =	0.0	dB
ΔP_V at 10.5 VDC or at —	VDC =	0.0	dB
ΔP_T at 10.0 VDC (=$P_{Tmin} - P_{Tnom}$)	=	-.2	dB

Accept ✓ Reject —

Test Performed by D. Williams — Date 3-30-99
Litton Q.A. BLM SSJ — Date 3-31-99

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 40 OF 68
56348	A	1300823	C	

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET — FINAL DATA SET ✓

LITTON TYPE LS E-9036AJ/A — AESD 1336610-7
SERIAL NUMBER: 85022 — QUAL TEST — — ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	45	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	196	mA	Table IIIB
Input Power, P_{diss}	1.96	W DC	Pdiss max
Frequency, f_{Tmax}	54.94036	GHz	Table IIIB
RF Output Power, P_{Tmax}	12.3	dBm	11.5 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at — VDC			
Temperature	45	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	194	mA	Table IIIB
Frequency, f_{meas}	54.94036	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	11.5 to 17 dBm

Measurement at 10.5 VDC or at — VDC			
Temperature	45	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	194	mA	Table IIIB
Frequency, f_{meas}	54.94036	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	11.5 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at —	VDC =	0.00	MHz
Δf_V at 10.5 VDC or at —	VDC =	0.00	MHz
Δf_T at 10.0V (=f_{Tmax} -f_{Tnom})	=	.21	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at —	VDC =	0.0	dB
ΔP_V at 10.5 VDC or at —	VDC =	0.0	dB
ΔP_T at 10.0 VDC (=P_{Tmax}-P_{Tnom})	=	-.1	dB

Accept ✓ Reject —

Test Performed by D. WILLIAMS — Date 3-30-99
Litton Q.A. SLW SSJ — Date 3-31-99

TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET ___ FINAL DATA SET ✓

LITTON TYPE LS E-9036 A5/A
SERIAL NUMBER: 85022 QUAL TEST ___
AESD 1336610-7
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION		LIMITS
1. Initial Performance at Tnom ± 1°C		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{Tnom}	54.73995 GHz	Table IIIB
RF Output Power, P_{Tnom}	12.3 dBm	11.5 to 17 dBm
Input Voltage, V_B	10.000 VDC	10 ± 0.2 VDC
Input Current, I_B	197 mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	-.05 MHz	
2. Performance at Tnom ± 1°C after +60°C soak.		
Temperature	21 °C	Tnom ± 1°C
Frequency, f_{meas}	54.94016 GHz	Table IIIB
RF Output Power, P_{meas}	12.2 dBm	11.5 to 17 dBm
Input Voltage	10.002 VDC	V_B ± .005 VDC
Input Current	195 mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.		
Temperature	21 °C	Tnom ± 1°C
Frequency, f_{meas}	54.93918 GHz	Table IIIB
RF Output Power, P_{meas}	12.3 dBm	11.5 to 17 dBm
Input Voltage	10.003 VDC	V_B ± .005 VDC
Input Current	195 mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = .21 MHz
Δf_H after -30°C soak = .23 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = -.1 dB
ΔP_H = after -30°C soak = 0.0 dB

Accept ✓ Reject ___
Test Performed by D. WILLIAMS Date 3-30-99
Litton Q.A. ___ Date 3-31-99

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET — FINAL DATA SET ✓

LITTON TYPE LS E-9036A5/A
SERIAL NUMBER: 85022 QUAL TEST —

AESD 1336610-7
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Initial Measurement. Ref Test Par. 5.9.1		
Temperature	22 °C	24°C ± 5°C
Frequency	54.94088 GHz	Table IIIB
RF Output Power	12.4 dBm	11.5 to 17 dBm
Input Voltage	10.0 VDC	10 ± 0.2 VDC
Input Current	195 mA	Table IIIB

Reference test. Ref. Test Para. 5.9.3

Frequency, f_{Ref}	54940438 ~~54.9403~~ DW GHz	Table IIIB
RF Output Power, P_{Ref}	-12.1 dBm	

Load Pulling Test. Ref. Test Para. 5.9.4

Maximum Frequency, f_{meas}	54.940433 GHz	Table IIIB
Minimum Frequency, f_{meas}	54.940423 GHz	Table IIIB
Maximum RF Output Power P_{meas}	-11.7 dBm	
Minimum RF Output Power, P_{meas}	-12.4 dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation, $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = .053 MHz
Maximum Negative Δf_L = -.043 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation, $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = +.4 dB
Maximum Negative ΔP_L = -.3 dB

Accept ✓ Reject —

Test Performed by D. Williams Date 3-30-99
Litton Q.A. FSS MTR Date 3-31-99

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET ——— FINAL DATA SET ✓

LITTON TYPE LS E 9036 A05/A — AESD 1336610-7
SERIAL NUMBER: 85022 — QUAL TEST ——— — ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Output Open and Short. Ref. Test Para. 5.9.5			
Temperature	22	°C	24°C ± 5°C
Frequency:	54.94033	GHz	Table IIIB
RF Output Power:	12.4	dBm	11.5 to 17 dBm
Input Voltage	10.0	VDC	10 ± 0.2 VDC
Input Current:	195	mA	Table IIIB
Results:	✓	Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	+.283	MHz (Positive)	Table IIIB
	-.093	MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	+.21	MHz (Positive)	Table IIIB
	-1.3	MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	+.4	dB (Positive)	1.0 dB
	-.6	dB (Negative)	-1.0 dB

Accept ✓ Reject ———

Test Performed by D. WILLIAMS — Date 3-30-99

Litton Q.A. FSS 4/4/18 — Date 3-31-99

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 61 OF 68
56348	A	1300823	C	

TEST DATA FOR ORIGINAL UNIT

LITTON
Solid State

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET_____ FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A (QC 209) AESD 1336610-7
SERIAL NUMBER: 85002 (85022) QUAL TEST _____ ACCEPT TEST ✓
Basic Electrical Test: Ref. Test Para. 5.2.2 OCT 14 1997

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10.02	VDC	10.0 ± 0.2 VDC
Input Current	194	mA	Table IIIB
Input Power, P_{diss}	1.94	W DC	P_{diss} max
Frequency, f_{Tnom}	5494 0262	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.6	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	+.262	MHz	
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3			
Measurement at 9.5 VDC or at 9.49 VDC			
Temperature	21.7	°C	Table IIIB
Input Voltage	9.49	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	1.92	mA	Table IIIB
Frequency, f_{meas}	5494 0240	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.50 VDC			
Temperature	21.6	°C	Table IIIB
Input Voltage	10.50	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	192	mA	Table IIIB
Frequency, f_{meas}	5494 0236	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$

Δf_V at 9.5 VDC or at 9.49 VDC = -0.027 MHz
Δf_V at 10.5 VDC or at 10.50 VDC = -0.026 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$

ΔP_V at 9.5 VDC or at 9.49 VDC = ϕ dB
ΔP_V at 10.5 VDC or at 10.50 VDC = ϕ dB

Accept ✓ Reject _____

Test Performed by _____ Date 9/16/97
Litton QA _____ Date SEP 25 1997

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 38 OF 68
56348	A	1300823	B1	

LITTON
Solid State

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET ~~F&~~ FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A — AESD 1336610- 7
SERIAL NUMBER: 85022 — QUAL TEST _____ — ACCEPT TEST ✓

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10.5	°C	10° ± 1°C
Input Voltage	10.00	VDC	10.0 ± 0.2 VDC
Input Current	193	mA	Table IIIB
Input Power, P_{diss}	1.93	W DC	Pdiss max
Frequency, $f_{10°C}$	54939692	GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.5	dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1			
Measurement at 9.5 VDC or at 9.50 VDC			
Temperature	10.5	°C	Table IIIB
Input Voltage	9.50	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	191	mA	Table IIIB
Frequency, f_{meas}	54939682	GHz	Table IIIB
RF Output Power, P_{meas}	12.5	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.50 VDC			
Temperature	10.5	°C	Table IIIB
Input Voltage	10.50	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	191	mA	Table IIIB
Frequency, f_{meas}	54939680	GHz	Table IIIB
RF Output Power, P_{meas}	12.5	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at _____	VDC =	−0.010	MHz
Δf_V at 10.5 VDC or at _____	VDC =	−0.012	MHz
Δf_T at 10.0 VDC (=$f_{T_{min}} - f_{10°C}$) T10°C - TMIN	=	−0.57	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at _____	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at _____	VDC =	ϕ	dB
ΔP_T at 10.0 VDC (=$P_{T_{min}} - P_{10°C}$) T10C TMIN	=	−0.1	dB

Accept ✓ Reject _____

Test Performed by DM — Date 9/16/97
Litton Q.A. _____ — Date SEP 25 1997

LITTON
Solid State

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET _____ FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A — AESD 1336610- 7
SERIAL NUMBER: 85022 — QUAL TEST _____ — ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1.6	°C	Table IIIB
Input Voltage	10.01	VDC	10.0 ± 0.2 VDC
Input Current	192	mA	Table IIIB
Input Power, P_{diss}	1.92	W DC	Pdiss max
Frequency, f_{Tmin}	54939120	GHz	Table IIIB
RF Output Power, P_{Tmin}	12.5	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.50 VDC			
Temperature	-1.6	°C	Table IIIB
Input Voltage	9.50	VDC	9.5 VDC or Para 5.2.3.2
Input Current	190	mA	Table IIIB
Frequency, f_{meas}	54939109	GHz	Table IIIB
RF Output Power, P_{meas}	12.5	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.50 VDC			
Temperature	-1.5	°C	Table IIIB
Input Voltage	10.50	VDC	10.5 VDC or Para 5.2.3.3
Input Current	190	mA	Table IIIB
Frequency, f_{meas}	54939106	GHz	Table IIIB
RF Output Power, P_{meas}	12.5	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at _____	VDC =	-0.011	MHz
Δf_V at 10.5 VDC or at _____	VDC =	-0.014	MHz
Δf_T at 10.0 VDC (=f_{Tmin} -f_{Tnom})		-1.142	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at _____	VDC =	∅	dB
ΔP_V at 10.5 VDC or at _____	VDC =	∅	dB
ΔP_T at 10.0 VDC (=P_{Tmin} -P_{Tnom})	=	-0.1	dB

Accept ✓ Reject _____

Test Performed by _____ Date 9/16/97
Litton Q.A. _____ Date SEP 25 1997

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 40 OF 68
56348	A	1300823	B1	

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET _____ FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A — AESD 1336610- 7
SERIAL NUMBER: 85022 — QUAL TEST _____ — ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30.4	°C	30° ± 1°C
Input Voltage	10.00	VDC	10.0 ± 0.2 VDC
Input Current	194	mA	Table IIIB
Input Power, P_{diss}	1.94	W DC	Pdiss max
Frequency, $f_{30°C}$	54940571	GHz	Table IIIB
RF Output Power, $P_{30°C}$	12.6	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.50 VDC			
Temperature	30.1	°C	Table IIIB
Input Voltage	9.50	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	192	mA	Table IIIB
Frequency, f_{meas}	54940505	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.50 VDC			
Temperature	29.9	°C	Table IIIB
Input Voltage	10.50	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	192	mA	Table IIIB
Frequency, f_{meas}	54940560	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at _____	VDC =	-0.006	MHz
Δf_V at 10.5 VDC or at _____	VDC =	-0.011	MHz
Δf_T at 10.0 VDC ($=f_{T_{min}} - f_{30°C}$) T30°C T Min/Max	=	+0.309	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at _____	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at _____	VDC =	ϕ	dB
ΔP_T at 10.0 VDC ($=P_{T_{min}} - P_{30°C}$) T30°C T Min/Max	=	ϕ	dB

Accept ✓ Reject _____

Test Performed by DH — Date 9/16/97
Litton Q.A. _____ — Date SEP 25 1997

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 41 OF 68
56348	A	1300823	B1	

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET_____ FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A
SERIAL NUMBER: 85022 QUAL TEST _____
AESD 1336610- 7
ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44.2	°C	Table IIIB
Input Voltage	10.01	VDC	10.0 ± 0.2 VDC
Input Current	195	mA	Table IIIB
Input Power, P_{diss}	1.95	W DC	Pdiss max
Frequency, f_{Tmax}	5494046 4	GHz	Table IIIB
RF Output Power, P_{Tmax}	12.6	dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4			
Measurement at 9.5 VDC or at 9.50 VDC			
Temperature	43.8	°C	Table IIIB
Input Voltage	9.50	VDC	9.5 VDC or Para 5.2.3.2
Input Current	193	mA	Table IIIB
Frequency, f_{meas}	5494046 5	GHz	Table IIIB
RF Output Power, P_{meas}	12.6	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.50 VDC			
Temperature	43.6	°C	Table IIIB
Input Voltage	10.50	VDC	10.5 VDC or Para 5.2.3.3
Input Current	193	mA	Table IIIB
Frequency, f_{meas}	5494046 6	GHz	Table IIIB
RF Output Power, P_{meas}	12.5	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at _____	VDC =	+0.001	MHz
Δf_V at 10.5 VDC or at _____	VDC =	+0.002	MHz
Δf_T at 10.0V ($=f_{meas}$ (Tmax) $-f_{Tmax}$ (TNORM))	=	+0.207	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at _____	VDC =	0	dB
ΔP_V at 10.5 VDC or at _____	VDC =	0	dB
ΔP_T at 10.0 VDC ($=P_{meas}$ (Tmax) $-P_{Tmax}$ (TNORM))	=	0	dB

Accept ✓ Reject _____

Test Performed by DM Date 9/16/97
Litton Q.A. [illegible] Date SEP 25 1997

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 42 OF 68
56348	A	1300823	B1	

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET_____ FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A AESD 1336610- 7
SERIAL NUMBER: 85022 QUAL TEST _____ ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	21.4	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	194	mA	Table IIIB
Input Power	1.94	W DC	Pdiss max
Frequency (f_{Tnom})	54.940 130	GHz	Table IIIB
RF Output Power	12.6	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_s (= f_{Tnom}-F_o)	+ 0.130	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	194	mA	Table IIIB
Input Power	1.94	W DC	Pdiss max
Frequency	54.940135	GHz	Table IIIB
RF Output Power	12.6	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	194	mA	Table IIIB
Input Power	1.94	W DC	Pdiss max
Frequency	54.940142	GHz	Table IIIB
RF Output Power	12.6	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	194	mA	Table IIIB
Input Power	1.94	W DC	Pdiss max
Frequency, f_{Tnom}	54.940137	GHz	Table IIIB
RF Output Power	12.6	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_s (= f_{Tnom}-F_o)	+0.137	MHz	

Accept ✓ Reject _____

Test Performed by DM Date 9/17/97
Litton Q.A. _____ Date SEP 25 1997

LITTON
Solid State

TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET _____ FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A
SERIAL NUMBER: 85022 QUAL TEST _____

AESD 1336610-7
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION		LIMITS
1. Initial Performance at Tnom ± 1°C		
Temperature	21.9 °C	Tnom ± 1°C
Frequency, f_{Tnom}	54.940085 GHz	Table IIIB
RF Output Power, P_{Tnom}	12.6 dBm	12 to 17 dBm
Input Voltage, V_B	10.00 VDC	10 ± 0.2 VDC
Input Current, I_B	194 mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	+0.085 MHz	
2. Performance at Tnom ± 1°C after +60°C soak.		
Temperature	21.9 °C	Tnom ± 1°C
Frequency, f_{meas}	54.940003 GHz	Table IIIB
RF Output Power, P_{meas}	12.6 dBm	12 to 17 dBm
Input Voltage	10.01 VDC	V_B ± .005 VDC
Input Current	194 mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.		
Temperature	21.9 °C	Tnom ± 1°C
Frequency, f_{meas}	54.940319 GHz	Table IIIB
RF Output Power, P_{meas}	12.6 dBm	12 to 17 dBm
Input Voltage	10.00 VDC	V_B ± .005 VDC
Input Current	194 mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = -0.082 MHz
Δf_H after -30°C soak = +0.234 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = 0 dB
ΔP_H = after -30°C soak = 0 dB

Accept ✓ Reject _____

Test Performed by _____ Date 9/18/97
Litton Q.A. _____ Date SEP 25 1997

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 58 OF 68
56348	A	1300823	B2	

LITTON
Solid State

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET _____ FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A
SERIAL NUMBER: 85022 QUAL TEST _____
AESD 1336610- 7
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Initial Measurement. Ref Test Par. 5.9.1			
Temperature		24.4 °C	24°C ± 5°C
Frequency		54.940145 GHz	Table IIIB
RF Output Power	DH	13.5 ~~12.5~~ dBm	12 to 17 dBm
Input Voltage		10 VDC	10 ± 0.2 VDC
Input Current		194 mA	Table IIIB
Reference test. Ref. Test Para. 5.9.3			
Frequency, f_{Ref}		54.940146 GHz	Table IIIB
RF Output Power, P_{Ref}		-14.6 dBm	
Load Pulling Test. Ref. Test Para. 5.9.4			
Maximum Frequency, f_{meas}		54.940148 GHz	Table IIIB
Minimum Frequency, f_{meas}		54.940144 GHz	Table IIIB
Maximum RF Output Power P_{meas}		-14.1 dBm	
Minimum RF Output Power, P_{meas}		-15.1 dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation, $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = .002 MHz
Maximum Negative Δf_L = -.002 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation, $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = .5 dB
Maximum Negative ΔP_L = -.5 dB

Accept ✓ Reject _____

Test Performed by DH Date 9/18/97
Litton Q.A. _____ Date SEP 25 1997

LITTON
Solid State

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET _____ FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A — AESD 1336610-7
SERIAL NUMBER: 85022 — QUAL TEST _____ — ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Output Open and Short. Ref. Test Para. 5.9.5		
Temperature	24.4 °C	24°C ± 5°C
Frequency:	54.940148 GHz	Table IIIB
RF Output Power:	12.5 dBm	12 to 17 dBm
Input Voltage	10 VDC	10 ± 0.2 VDC
Input Current:	194 mA	Table IIIB
Results:	✓ Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	+0.498 MHz (Positive)	Table IIIB
	−0.084 MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	+0.309 ~~+1.168~~ MHz (Positive)	Table IIIB
	−1.168 MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	1.5 LL ~~+~~ dB (Positive)	1.0 dB
	~~-0.1~~ −.6 LL dB (Negative)	-1.0 dB

Accept ✓ Reject _____

Test Performed by DM Date 9/18/97

Litton Q.A. _____ Date SEP 25 1997

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 61 OF 68
56348	A	1300823	B1	

Channel 8 LO

DRO (P/N: 1336610-8, S/N: 85079)

LITTON
Solid State

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AK/A AESD 1336610- 8
SERIAL NUMBER: 85079 QUAL TEST N/A ACCEPT TEST ✓

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power, P_{diss}	1.79	W DC	P_{diss} max
Frequency, f_{Tnom}	55.50030	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.3	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.30	MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	177	mA	Table IIIB
Frequency, f_{meas}	55.50030	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	55.50030	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 VDC = Ø MHz
Δf_V at 10.5 VDC or at 10.5 VDC = Ø MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 VDC = Ø dB
ΔP_V at 10.5 VDC or at 10.5 VDC = Ø dB

Accept ✓ Reject ____

Performed by [illegible] Date 7-27-98
Litton QA LITTON Date JUL 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 38 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AK/A AESD 1336610- 8
SERIAL NUMBER: 85079 QUAL TEST N/A ACCEPT TEST ✓

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power, P_{diss}	1.79	W DC	Pdiss max
Frequency, $f_{10°C}$	55.50024	GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.3	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	176	mA	Table IIIB
Frequency, f_{meas}	55.50022	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	55.50022	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.02	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.01	MHz
Δf_T at 10.0 VDC ($=f_{10°C} - f_{Tnom}$)	=	-0.06	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	∅	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	∅	dB
ΔP_T at 10.0 VDC ($=P_{10°C} - P_{Tnom}$)	=	∅	dB

Accept ✓ Reject _____

Test Performed by VJ Date 7-27-98
Litton Q.A. LITTON M 60 Date JUL 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 39 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AK/A AESD 1336610- 8
SERIAL NUMBER: 85079 QUAL TEST N/A ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power, P_{diss}	1.79	W DC	Pdiss max
Frequency, f_{Tmin}	55.50013	GHz	Table IIIB
RF Output Power, P_{Tmin}	12.3	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	-1	°C	Table IIIB
ut Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
nput Current	177	mA	Table IIIB
Frequency, f_{meas}	55.50014	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	55.50013	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0.01	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	∅	MHz
Δf_T at 10.0 VDC (=$f_{Tmin} - f_{Tnom}$)		-0.17	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	∅	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	∅	dB
ΔP_T at 10.0 VDC (=$P_{Tmin} - P_{Tnom}$)	=	∅	dB

Accept ✓ Reject ____

Test Performed by VN Date 7-27-98
Litton Q.A. LITTON M 60 Date JUL 30 1998

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AK/A AESD 1336610- 8
SERIAL NUMBER: 85079 QUAL TEST N/A ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power, P_{diss}	1.80	W DC	Pdiss max
Frequency, $f_{30°C}$	55.50030	GHz	Table IIIB
RF Output Power, $P_{30°C}$	12.3	dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3			
Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	55.50031	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	55.50030	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0.01	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	ϕ	MHz
Δf_T at 10.0 VDC (=$f_{30°C}$ -f_{Tnom})	=	ϕ	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	ϕ	dB
ΔP_T at 10.0 VDC (=$P_{30°C}$ -P_{Tnom})	=	ϕ	dB

Accept ✓ Reject _____

Test Performed by VN Date 7-27-98
Litton Q.A. LITTON MCO Date JUL 30 1998

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AK/A AESD 1336610- 8
SERIAL NUMBER: 85079 QUAL TEST N/A ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	181	mA	Table IIIB
Input Power, P_{diss}	1.81	W DC	Pdiss max
Frequency, f_{Tmax}	55.50008	GHz	Table IIIB
RF Output Power, P_{Tmax}	12.1	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	55.50006	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	180	mA	Table IIIB
Frequency, f_{meas}	55.50004	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.02	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.04	MHz
Δf_T at 10.0V (=f_{Tmax} -f_{Tnom})	=	-0.22	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	∅	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	∅	dB
ΔP_T at 10.0 VDC (=P_{Tmax}-P_{Tnom})	=	-0.2	dB

Accept ✓ Reject ____

Test Performed by VN Date 7-27-98
Litton Q.A. LITTON JUL 30 1998 Date JUL 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 42 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AK/A AESD 1336610- 8
SERIAL NUMBER: 85079 QUAL TEST N/A ACCEPT TEST ✓

Power Supply Immunity. Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power	1.79	W DC	Pdiss max
Frequency (f_{Tnom})	55.50021	GHz	Table IIIB
RF Output Power	12.3	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.21	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power	1.79	W DC	Pdiss max
Frequency	55.50018	GHz	Table IIIB
RF Output Power	12.3	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power	1.79	W DC	Pdiss max
Frequency	55.50016	GHz	Table IIIB
RF Output Power	12.3	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power	1.79	W DC	Pdiss max
Frequency, f_{Tnom}	55.50016	GHz	Table IIIB
RF Output Power	12.3	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.16	MHz	

Accept ✓ Reject ____

Test Performed by VN Date 7-27-98
Litton Q.A. ____ Date JUL 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 43 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS € 9036 AK/A
SERIAL NUMBER: 85079 QUAL TEST N/A
AESD 1336610- 8
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION		LIMITS
1. Initial Performance at Tnom ± 1°C		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{Tnom}	55.50030 GHz	Table IIIB
RF Output Power, P_{Tnom}	12.3 dBm	12 to 17 dBm
Input Voltage, V_B	10 VDC	10 ± 0.2 VDC
Input Current, I_B	179 mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.30 MHz	
2. Performance at Tnom ± 1°C after +60°C soak.		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{meas}	55.50008 GHz	Table IIIB
RF Output Power, P_{meas}	12.3 dBm	12 to 17 dBm
Input Voltage	10 VDC	V_B ± .005 VDC
Input Current	180 mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{meas}	55.50031 GHz	Table IIIB
RF Output Power, P_{meas}	12.3 dBm	12 to 17 dBm
Input Voltage	10 VDC	V_B ± .005 VDC
Input Current	179 mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = -0.22 MHz
Δf_H after -30°C soak = 0.01 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = ϕ dB
ΔP_H = after -30°C soak = ϕ dB

Test Performed by VN Accept ✓ Reject
Litton Q.A. LITTON QCI Date 7-27-98 Date JUL 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 58 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AK/A
SERIAL NUMBER: 85079 QUAL TEST N/A
AESD 1336610- 8
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Initial Measurement. Ref Test Par. 5.9.1		
Temperature	23 °C	24°C ± 5°C
Frequency	BH 55.500 23 GHz	Table IIIB
RF Output Power	12.4 dBm	12 to 17 dBm
Input Voltage	10 VDC	10 ± 0.2 VDC
Input Current	181 mA	Table IIIB
Reference test. Ref. Test Para. 5.9.3		
Frequency, f_{Ref}	55.50023 GHz	Table IIIB
RF Output Power, P_{Ref}	-3.2 dBm	
Load Pulling Test. Ref. Test Para. 5.9.4		
Maximum Frequency, f_{meas}	55.50024 GHz	Table IIIB
Minimum Frequency, f_{meas}	55.50023 GHz	Table IIIB
Maximum RF Output Power P_{meas}	-2.8 dBm	
Minimum RF Output Power, P_{meas}	-3.7 dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation, $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = 0.01 MHz
Maximum Negative Δf_L = 0 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation, $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = 0.4 dB
Maximum Negative ΔP_L = -0.5 dB

Accept ✓ Reject _____

Test Performed by BH Date 7-28-98
Litton Q.A. LITTON Date JUL 30 1998

LITTON
Solid State

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AK/A
SERIAL NUMBER: 85079 QUAL TEST N/A
AESD 1336610- 8
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Output Open and Short. Ref. Test Para. 5.9.5		
Temperature	23 °C	24°C ± 5°C
Frequency:	55.50027 GHz	Table IIIB
RF Output Power:	12.4 dBm	12 to 17 dBm
Input Voltage	10 VDC	10 ± 0.2 VDC
Input Current:	181 mA	Table IIIB
Results:	✓ Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.32 MHz (Positive)	Table IIIB
	-0.22 MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	0.01 MHz (Positive)	Table IIIB
	-0.26 MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.4 dB (Positive)	1.0 dB
	-0.7 dB (Negative)	-1.0 dB

Accept ✓ Reject _____

Test Performed by _____ Date 7-28-98

Litton Q.A. _____ LITTON M 60 Date JUL 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 61 OF 68
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Channels 9-14 LOs

PLO No. 1 (P/N: 1348360-4, S/N: F11)

PLO N0. 2 (P/N: 1348360-4, S/N: F06)

Summary of Test Results for AMSU-A Phase Locked Oscillator Testing
Serial Numbers F06 and F11

Paragraph	Description	Requirements	F06	F11
3.2.1.1	Input Voltage and Current	600 mA max, +15V 100 mA max, -15V	511 mA for +15V, 72 mA for -15V	503 mA for +15V, 71 mA for -15V
3.2.1.2	Operating Temperature	+1°C to 44°C	-1°C to +46°C	-6°C to 54°C
3.2.1.3	Start-up	All loads, +60°C and -30°C; in vacuum	Verified at +60 and -30°C, ambient	Verified at +60 and -30°C, ambient
3.2.1.4 & 3.2.1.5	Frequency Stability from 57.290344 GHz	±200 kHz	+21 kHz, -0 kHz	+15 kHz to -61 kHz
3.2.1.6	RF Output Power	17 to 20 dBm	18.40 dBm	19.50 dBm
3.2.1.7	Output Power Stability	<1.5 dB	1.50 dB	1.32 dB
3.2.1.8	Load VSWR	2.01:1 or less	Verified	Verified
3.2.1.9	AM Noise	<-130 dBc/Hz @ 1 MHz	-154 dBc/Hz @ 1MHz	-160 dBc/Hz @ 1Mhz
3.2.1.10	FM Noise	<-100 dBc/Hz @ 1 MHz	-101 dBc/Hz @ 1 MHz	<-103 dBc/Hz @ 1 MHz
3.2.1.11	Spurious and Sub-Harmonic Signals	<-90 dBc	< -91 dBc	< -91dBc
3.2.1.12	Harmonics	<-30 dBc	-65 dBc	-46 dBc
3.2.1.14	Warm-up Time	< 30 minutes	Verified	Verified
3.2.1.15	Grounding and Shielding		By Design	By Design
3.2.1.16	Input Voltage Protection		By Design	By Design
3.2.1.17	Reverse Polarity Protection		By Design	By Design
Environmental Testing				
Microphonics		AE-26633	TCXO Test	TCXO Test
Radiation Hardness		AE-26633	By Analysis	By Analysis
EMI/RFI		AE-26633	Not Required	Not Required
Vibration		AE-26633	Acceptance Level	Acceptance Level
Thermal Vacuum		AE-26633	Verified at Ambient Pressure Only	Verified at Ambient Pressure Only
Weight		2.0 lbs	2.0 lbs	2.0 lbs

TEST DATA SHEET 6C (Sheet 1 of 4)
Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Test Setup Verified: _____
Signature

Paragraph 4.2.1.3, Functional Testing:

Step	Test	Expected	Measured	Pass/ Fail
1	Potential Difference from ± 15 V RTN to:			
	PLO Base Plate	< 1.0 Vac	0.1	Pass
	Spectrum Analyzer	< 1.0 Vac	0.1	Pass
	Frequency Counter Chassis	< 1.0 Vac	0.1	Pass
	Power Meter Chassis	< 1.0 Vac	0.1	Pass
4	Evacuate vacuum chamber and record pressure	$<10^{-2}$ torr	Pressure = N/A torr	*
5	Thermal couple readings	TC1 = 22 ± 2 °C	TC1 = 22.7 °C	Pass
			TC2 = 23.2 °C	N/A
			TC3 = 22.9 °C	N/A
6	DRO L/A	0 to 1V	DRO L/A = .210 V	Pass
	PLO L/A	S/N: F06, F08 = 14.6 ± 0.4V S/N: F07 = 0 to 1V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.48 V	Pass
	Is PLO locked?	Yes	Yes X No _____	Pass
7	PLO Frequency	57.290344 ± .0002 GHz	Freq. = 57.290 3246 GHz	PASS
	PLO Power	17 to 20 dBm	P = 19.50 dBm	PASS
8	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = 15.0 V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.0 V	Pass
	IM1 Current	600 mA max.	IM1 = 503 mA	Pass
	IM2 Current	100 mA max.	IM2 = 71 mA	Pass
	DRO L/A Voltage	0 to 1V	DRO L/A = 43 mV	Pass
	PLO L/A Voltage	S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.48 V	Pass
12	RF Output Power and Frequency	17 to 20 dBm	P = 19.50 dBm	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290 3246 GHz	Pass
	Baseplate Temp. (TC1)	TC1 = 22 ±2°C	TC1 = 22.7 °C	Pass

*Record data only if performing test under vacuum

TEST DATA SHEET 6C (Sheet 2 of 4)
Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/ Fail
13	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.2 V	Pass
		-15.2 ± 0.05 V	-Voltage = -15.2 V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290329 GHz	Pass
		17 to 20 dBm	P = 19.5 dBm	Pass
14	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.8 V	Pass
		-14.8 ± 0.05 V	-Voltage = -14.8 V	Pass
		57.290344 ± .0002 GHz	Freq. = 57 290 3295 GHz	Pass
		17 to 20 dBm	P = 19.5 dBm	Pass
15	Spurious and Sub	-200 to -90 dBc	See Atch	Pass
16	Power level of 114.58 GHz signal	<-10 dBm	-53 dBm	Pass
17	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 5 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = ½ dB Peak	N/A
18	Operating Temperature @ 1°C baseplate	TC1 = 1 ±2°C	TC1 = 1.0	Pass
			TC2 = 1.7	N/A
			TC3 = -.5	N/A
		0 - 1V	DRO L/A = .032 V	PASS
		S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.41 V	PASS
19	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = 15.0 V	PASS
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.0 V	PASS
	IM1 Current	600 mA max.	IM1 = 491 mA	PASS
	IM2 Current	100 mA max.	IM2 = -69 mA	PASS
	DRO L/A Voltage	0 to 1V	DRO L/A = .031 V	PASS
	PLO L/A Voltage	S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.41 V	PASS
	RF Output Power	17 to 20 dBm	Power = 20 dBm	PASS
	Frequency	57.290344 ± .0002 GHz	Freq. = 57.290 287 GHz	PASS

TEST DATA SHEET 6C (Sheet 3 of 4)
Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/ Fail
19 (Cont)	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.2 V	PASS
		-15.2 ± 0.05 V	-Voltage = -15.2 V	PASS
		57.290344 ± .0002 GHz	Freq. = 57.29028875 GHz	PASS
		17 to 20 dBm	Power = 20 dBm	PASS
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.8 V	PASS
		-14.8 ± 0.05 V	-Voltage = -14.8 V	PASS
		57.290344 ± .0002 GHz	Freq. = 57.290287 GHz	PASS
		17 to 20 dBm	Power = 20 dBm	PASS
	Spurious and Sub	-200 to -90 dBc	See Plots	
	Power level of 114.58 GHz signal	<-10 dBm	-46 dBm dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 7 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = -5 dB	N/A
21	Operating Temperature @ +44°C Baseplate	TC1 = 44 ±2°C	TC1 = 43.4°C	Pass
			TC2 = 43.3°C	N/A
			TC3 = 43.6°C	N/A
		0 - 1V	DRO L/A = .071 V	Pass
		S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.46 V	Pass
22	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = 15.0 V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.0 V	Pass
	IM1 Current	600 mA max.	IM1 = 511 mA	Pass
	IM2 Current	100 mA max.	IM2 = 72 mA	Pass
	DRO L/A Voltage	0 to 1V	DRO L/A = .071 V	Pass
	PLO L/A Voltage	S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.46 V	Pass
	RF Output Power and	17 to 20 dBm	Power = 18.75 dBm	Pass
	Frequency	57.290344 ± .0002 GHz	Freq. = 57.290355 GHz	Pass

TEST DATA SHEET 6C (Sheet 4 of 4)
Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
22 (Cont)	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.2 V	Pass
		-15.2 ± 0.05 V	-Voltage = -15.2 V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290355 GHz	Pass
		17 to 20 dBm	Power = 19.7 dBm	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.8 V	Pass
		-14.8 ± 0.05 V	-Voltage = -14.8 V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290355 GHz	Pass
		17 to 20 dBm	Power = 18.7 dBm	Pass
	Spurious and Sub	-200 to -90 dBc	See Plots	Pass
	Power level of 114.58 GHz signal	<-10 dBm	-56 dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 10 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = 11.2 dB Peak	N/A

Shop Order No.: 620000

Operation: 0170

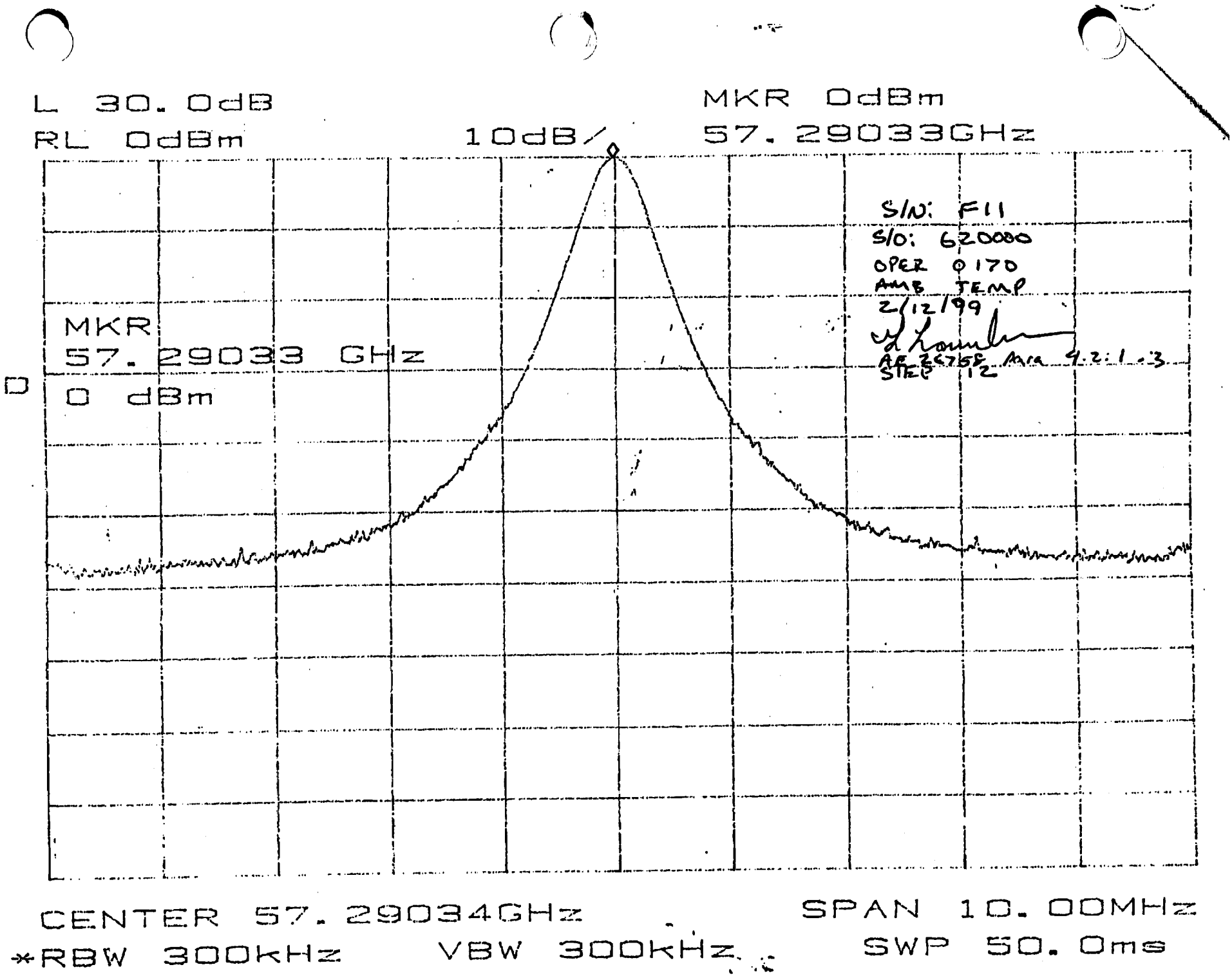
Unit Serial No.: F4

Date: 2-12-99

Test Engineer: [signature]

Quality Control: [signature] FEB 15 99

Govt. Rep.: [signature] 2/15/99


L 30.0dB
RL 0dBm
10dB/
MKR 0dBm
57.29033GHz
S/N: F11
S/O: 620080
OPER 0170
AMB TEMP
2/12/99
AR 36758 Mrg 4.2:1.3
STEP 12
MKR
57.29033 GHz
0 dBm
CENTER 57.29034GHz
SPAN 10.00MHz
*RBW 300kHz
VBW 300kHz
SWP 50.0ms

TEST DATA SHEET 7 (Sheet 1 of 3)
Temperature Cycling (Paragraph 4.2.2)

Test Setup Verified: Mark Ogland
Signature

Temperature Cycle	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6
Frequency 57.290344 GHz ±200 kHz	57.290 33127	57.290 33337	57.290 33389	57.290 33570	N/A	
Output Power 17 to 20 dBm	19.39	19.46	19.27	19.35	Mark Ogland	
Frequency 57.290344 GHz ±200 kHz	57.290 33821	57.290 33817	57.290 33889			
Output Power 17 to 20 dBm	19.35	19.40	19.42			

Shop Order No.: 620000
Operation: 0170
Unit Serial No.: F11
Date: 2-12-99

Test Engineer: Mark Ogland
Quality Control: 268 FEB 12 '99
Govt. Rep.: 2/19/99

ECN 1956

TEST DATA SHEET 6C (Sheet 1 of 4)
Functional Testing (Paragraph 4.2.1)

Test Setup Verified: S. Nguyen Post-Thermal Cycling CPT
Signature

Paragraph 4.2.1.3, Functional Testing:

Step	Test	Expected	Measured	Pass/Fail
1	Potential Difference from ± 15 V RTN to:			
	PLO Base Plate	< 1.0 Vac	0.0 Vac	Pass
	Spectrum Analyzer	< 1.0 Vac	0.01 Vac	Pass
	Frequency Counter Chassis	< 1.0 Vac	0.01 Vac	Pass
	Power Meter Chassis	< 1.0 Vac	0.01 Vac	Pass
4	Evacuate vacuum chamber and record pressure	$<10^{-2}$ torr	Pressure = NA torr S. Nguyen 9-18-98 CC 227	*
5	Thermal couple readings	TC1 = 22 ± 2 °C	TC1 = 23.0 °C	
			TC2 = 23.0 °C	N/A
		STET	TC3 = 22.5 °C	N/A
6	DRO L/A	~~14.6V 0 to 1V ± 0.4V~~	DRO L/A = ~~48 m~~ V 96mV S. Nguyen 9-21-98	Pass
	PLO L/A	14.6V ~~0 to 1V~~ ± 0.4V	PLO L/A = ~~15.36~~ V 14.30 V	Pass
	Is PLO locked?	S. Nguyen 9-21-98 Yes CC 227	Yes Yes No	Pass
7	PLO Frequency	57.290344 ± .0002 GHz	Freq. = 57.290322 GHz	Pass
	PLO Power	17 to 20 dBm	P = 18.4 dBm	Pass
8	Input Voltage and Current			
	VM1 Voltage	* +15 ± 0.1 V	VM1 = ~~15.2~~ V 15.0V	Pass
	VM2 Voltage	* -15 ± 0.1 V	VM2 = ~~-15.2~~ V 15.0V	Pass
	IM1 Current	600 mA max.	IM1 = 511 mA	Pass
	IM2 Current	100 mA max. S. Nguyen 9-21-98	IM2 = 71.6 mA	Pass
	DRO L/A Voltage	0 to 1V S. Nguyen 9-21-98 CC 227	DRO L/A = 96 m V	Pass
	PLO L/A Voltage	* ~~14.6V 0 to 1V ± 0.4V~~	PLO L/A = 14.30 V	Pass
12	RF Output Power and	17 to 20 dBm	P = 18.4 dBm	Pass
	Frequency	57.290344 ± .0002 GHz	Freq. = 57.290322 GHz	Pass
	Baseplate Temp. (TC1)	TC1 = 22 ±2°C	TC1 = 23.0 °C	Pass
13	Frequency vs. Voltage			
	± 15 V Supplies	* +15.2 ± 0.05 V	+Voltage = ~~15.39~~ V 15.19V	Pass
		* -15.2 ± 0.05 V	-Voltage = ~~15.39~~ V 15.19V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290322 GHz	Pass
		17 to 20 dBm	P = 18.4 dBm	Pass

AMSU 9 SEIT 9-22-98

AMSU 9 SEIT 9-22-98

AMSU 9 SEIT 9-22-98

*Record data only if performing test under vacuum

~~* WITH THE ADDITION OF THE EXTERNAL RESISTOR a ΔV of 0.2V is added.~~

* Enter in error -

ECN 1956

TEST DATA SHEET 6C (Sheet 2 of 4)
Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
14	Frequency vs. Voltage			
	± 15 V Supplies	* +14.8 ± 0.05 V	+Voltage = ~~15.0~~ V 14.8V	Pass
		* -14.8 ± 0.05 V	-Voltage = ~~-15.0~~ V -14.8V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290322 GHz	Pass
		17 to 20 dBm	P = 18.4 dBm	Pass
15	Spurious and Sub	-200 to -90 dBc	see plots	Pass
16	Power level of 114.58 GHz signal	<-10 dBm	-69 dBm	Pass
17	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 6 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = 0.7 dB Peak	N/A
18	Operating Temperature @ 1°C baseplate	TC1 = 1 ±2°C	TC1 = 1.7°C	Pass
			TC2 = 1.6°C	N/A
			TC3 = 1.1°	N/A
		0 - 1V	DRO L/A = 0.41 V	Pass
		* ~~14.6V 0 - 1V~~ 14.6V ± 0.4V	PLO L/A = 14.38V	Pass
19	Input Voltage and Current			
	VM1 Voltage	* +15 ± 0.1 V	VM1 = ~~15.14~~ V 15.09V	Pass
	VM2 Voltage	* -15 ± 0.1 V	VM2 = ~~-15.22~~ V -15.02V	Pass
	IM1 Current	600 mA max.	IM1 = 492 mA	Pass
	IM2 Current	100 mA max.	IM2 = -70 mA	Pass
	DRO L/A Voltage	0 to 1V	DRO L/A = 0.38 V	Pass
	PLO L/A Voltage	14.6V ~~0 to 1V~~ ± .04V	PLO L/A = 14.37V	Pass
	RF Output Power	17 to 20 dBm	Power = 18.9 dBm	Pass
	Frequency	57.290344 ± .0002 GHz	Freq. = 57.290310 GHz	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	* +15.2 ± 0.05 V	+Voltage = ~~15.39~~ V 15.19V	Pass
		* -15.2 ± 0.05 V	-Voltage = ~~-15.40~~ V -15.20V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290310 GHz	Pass
		17 to 20 dBm	Power = 18.9 dBm	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	* +14.8 ± 0.05 V	+Voltage = ~~15.02~~ V 14.82V	Pass
		* -14.8 ± 0.05 V	-Voltage = ~~-15.02~~ V -14.82V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290310 GHz	Pass
		17 to 20 dBm	Power = 18.9 dBm	Pass

* entered in error

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TEST DATA SHEET 6C (Sheet 3 of 4)
Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
19 (Cont)	Spurious and Sub	-200 to -90 dBc	see plots	Pass
	Power level of 114.58 GHz signal	<-10 dBm	-65 dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 6 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = 0.6 dB	N/A
21	Operating Temperature @ +44°C Baseplate	TC1 = 44 ±2°C	TC1 = 45.0°C	Pass
			TC2 = 45.0°C	N/A
			TC3 = 44.0°C	N/A
		0 - 1V	DRO L/A = 2.31 mV	Pass
		14.6 V ~~0 - 1V ± 0.4 V~~	PLO L/A = 14.29 V	Pass
22	Input Voltage and Current			
	VM1 Voltage	~~+15 ± 0.1 V~~	VM1 = ~~+15.18~~ V +5.08V	Pass
	VM2 Voltage	~~-15 ± 0.1 V~~	VM2 = ~~-15.19~~ V -14.99V	Pass
	IM1 Current	600 mA max.	IM1 = 530 mA	Pass
	IM2 Current	100 mA max.	IM2 = -73 mA	Pass
	DRO L/A Voltage	0 to 1V	DRO L/A = 2.31 mV	Pass
	PLO L/A Voltage	14.6V ~~0 to 1V ± 0.4 V~~	PLO L/A = 14.29 V	Pass
	RF Output Power and	17 to 20 dBm	Power = 17.46 dBm	Pass
	Frequency	57.290344 ± .0002 GHz	Freq. = 57.290323 GHz	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	~~+15.2 ± 0.05 V~~	+Voltage = ~~+15.39~~ V 15.19V	Pass
		~~-15.2 ± 0.05 V~~	-Voltage = ~~-15.40~~ V -15.20V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290323 GHz	Pass
		17 to 20 dBm	Power = 17.42 dBm	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	~~+14.8 ± 0.05 V~~	+Voltage = ~~+15.00~~ V 14.80V	Pass
		~~-14.8 ± 0.05 V~~	-Voltage = ~~-14.99~~ V -14.79V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290323 GHz	Pass
		17 to 20 dBm	Power = 17.42 dBm	Pass

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AM3U 9 SEIT 9-22-98

AM3U 9 SEIT 9-22-98

~~ entered in error

TEST DATA SHEET 6C (Sheet 4 of 4)
Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
22 (Cont)	Spurious and Sub	-200 to -90 dBc	see plots	Pass
	Power level of 114.58 GHz signal	<-10 dBm	-68 dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 0 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = 0.6 dB	N/A

Shop Order No.: 500271

Operation: 0170

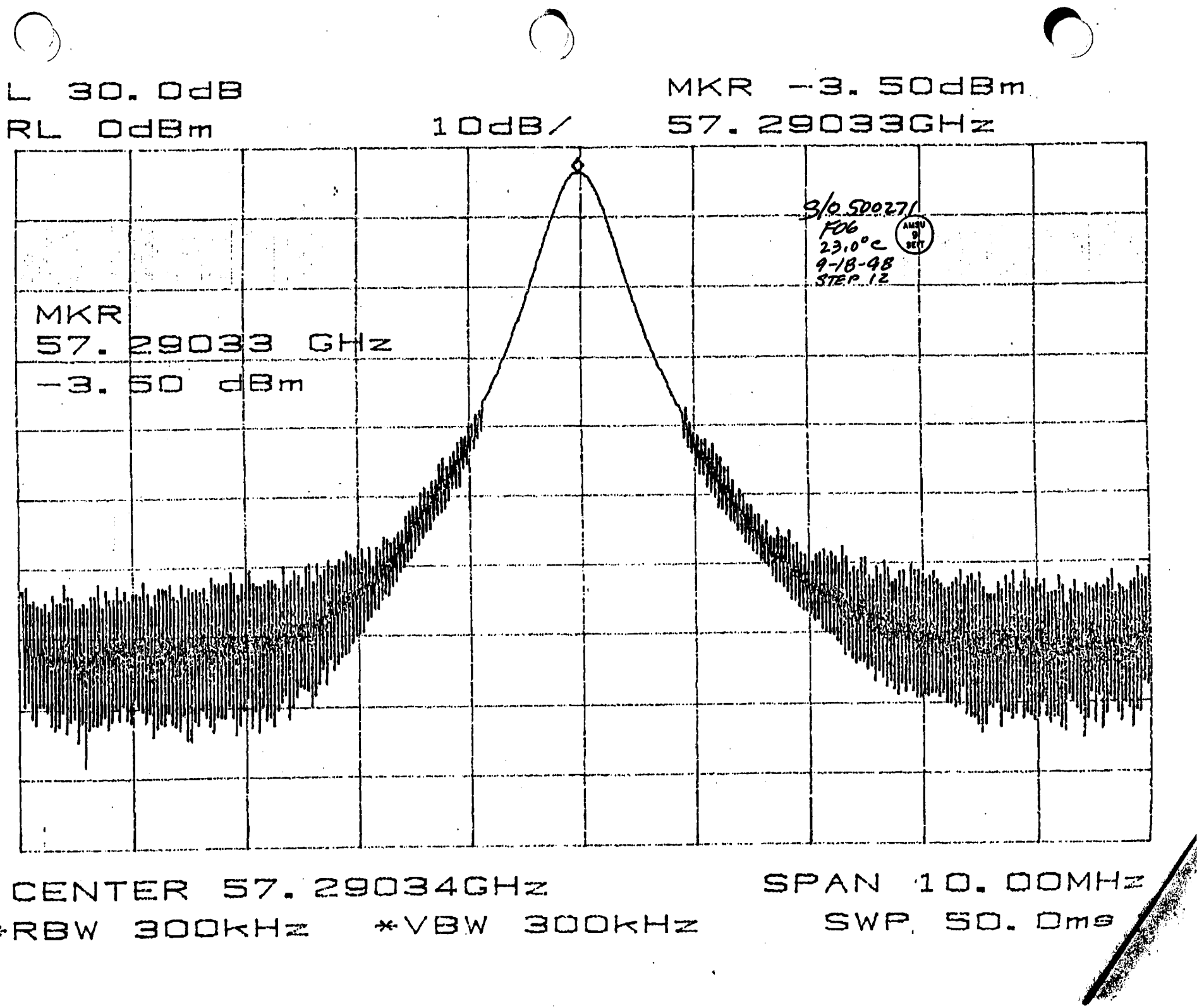
Unit Serial No.: F06

Date: 9-18-98

Test Engineer: AMSU 9 REFT 9-21-98

Quality Control: 7A 268 9-22-98

Govt. Rep.: SEP 94 '98


L 30.0dB
RL 0dBm
10dB/
MKR -3.50dBm
57.29033GHz
S/O SD0271
FD6
23.0°C
9-18-98
STEP 12
AMSU 9 DET
MKR
57.29033 GHz
-3.50 dBm
CENTER 57.29034GHz
SPAN 10.00MHz
*RBW 300kHz
*VBW 300kHz
SWP 50.0ms

TEST DATA SHEET 7 (Sheet 1 of 3)
Temperature Cycling (Paragraph 4.2.2)

Test Setup Verified: _____
Signature

Temperature Cycle	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6
Frequency 57.290344 GHz ±200 kHz	57.290321 GHz	57.290~~322~~ 319 GHz	57.290319 GHz			
Output Power 17 to 20 dBm	18.4dBm	18.4dBm	18.4dBm		NA [signature] 9-17-98	
Frequency 57.290344 GHz ±200 kHz	57.290321 GHz	57.290324 GHz	57.290323 GHz			
Output Power 17 to 20 dBm	18.4dBm	18.4dBm	18.4dBm			

Shop Order No.: 500271

Operation: 0170

Unit Serial No.: F06

Date: 9-15-98

Test Engineer: [signature] 9-17-98

Quality Control: [signature] SEP 18 '98

Govt. Rep.: [signature] SEP 24 '98

Channel 15 LO

GDO (P/N: 1336610-10, S/N: FM3)

AMSU-A GDO Data Sheet 1

Sequence Description: +20.5°C Comm Test Date: 4/16/97
Millitech Part Number 9050160001; Serial Number FM3 Operator: CSX
Aerojet Part Number 1336610-10 QC Verify Set-up: MTC A4 QA

A. Output Power direct: 15.76 dBm; Output Power in test set-up: 13.30 dBm
Output Power Delta: 2.46 dB

B. Unit Temperature: +20° °C; Vacuum level: 20 mTorr

C. Baseline Measurements

Vb (volts)	15.0	14.25	15.75	min limit	max limit	Pass/Fail
Vb meas. (Volts)	15.00	14.25	15.75	-.05	+.05	Pass
Ib (mA)	178	178	178	–	230	Pass
fo (GHz)	89.005	89.005	89.005	–	–	
Po (dBm, meas)	13.30	13.30	13.30			
Po (dBm, corr)	15.76	15.76	15.76	13	17	Pass

D. Frequency Pulling, Vb = 15.0 volts; measured 15.00 V

Fref (GHz)	89.005			min limit	max limit	Pass/Fail
Fmax (GHz)	89.006	+Δ (MHz)	+1 MHz	–	+ 5 MHz	Pass
Fmin (GHz)	89.004	- Δ (MHz)	-1 MHz	-5 MHz	–	Pass

E. Power Pulling

Pref (dBm)	-6.46			min limit	max limit	Pass/Fail
Pmax (dBm)	-6.39	+Δ (dB)	+0.07	–	+0.2dB	Pass
Pmin (dBm)	-6.61	- Δ (dB)	-0.15	-0.2 dB	–	Pass

F. Turn-on current

Vb (volts)	15.0	min limit	max limit	Pass/Fail
Measured Vb	+15.00 Vdc			Pass
Turn-on current (mA)	178 ma	–	345	Pass
time to peak (ms)	11			
time to settle (ms)	11			

G. Unit Temperature: +20 °C Vacuum level: 20 mTorr

DATA SHEET ACCEPT/REJECT

Accept	MTC A4 QA	Reject	
		Test Failure Report No.	
		Report Date	

SIZE	CAGE CODE	DWG. NO.	
A	8V456	TP501600-2	
SCALE	REV. LTR.	A00	SHEET 29 OF 41

AMSU-A GDO Data Sheet 1

Sequence Description: +43°C Comp Test Date: 4/19/97 - 4/20/97
Millitech Part Number 9050160001; Serial Number FM3 Operator: CSY
Aerojet Part Number 1336610-10 QC Verify Set-up: MTC A4 QA

A. Output Power direct: 15.76 dBm; Output Power in test set-up: 13.30 dBm
Output Power Delta: 2.46 dB

B. Unit Temperature: 43 °C; Vacuum level: 18 mTorr

C. Baseline Measurements

Vb (volts)	15.0	14.25	15.75	min limit	max limit	Pass/Fail
Vb meas. (Volts)	15.00	14.25	15.75	-.05	+.05	Pass
Ib (mA)	185	185	185	–	230	Pass
fo (GHz)	89.011	89.011	89.011	–	–	
Po (dBm, meas)	13.31	13.31	13.29			
Po (dBm, corr)	15.77	15.77	15.75	13	17	Pass

D. Frequency Pulling, Vb = 15.0 volts; measured 15.00V

Fref (GHz)	89.011			min limit	max limit	Pass/Fail
Fmax (GHz)	89.012	+Δ (MHz)	+1	–	+ 5 MHz	Pass
Fmin (GHz)	89.010	-Δ (MHz)	-1	-5 MHz	–	Pass

E. Power Pulling

Pref (dBm)	-6.54			min limit	max limit	Pass/Fail
Pmax (dBm)	-6.36	+Δ (dB)	+0.18	–	+0.2dB	Pass
Pmin (dBm)	-6.73	-Δ (dB)	-0.19	-0.2 dB	–	Pass

F. Turn-on current

Vb (volts)	15.0	min limit	max limit	Pass/Fail
Measured Vb	15.00			Pass
Turn-on current (mA)	185	–	345	
time to peak (ms)	10.6			
time to settle (ms)	10.6			

G. Unit Temperature: 43 °C Vacuum level: 18 mTorr

DATA SHEET ACCEPT/REJECT

Accept	(MTC A4 QA)	Reject	
		Test Failure Report No.	
		Report Date	

AMSU-A GDO Data Sheet 1

Sequence Description: -2°C Comprehensive Test Date: 4/20/97 - 4/21/97
Millitech Part Number 9050160001; Serial Number FM3 Operator: CSY
Aerojet Part Number 1336610-10 QC Verify Set-up: _____ MTC A4 QA

A. Output Power direct: 15.76 dBm; Output Power in test set-up: 13.30 dBm
Output Power Delta: 2.46 dB

B. Unit Temperature: -2 °C; Vacuum level: 15 mTorr

C. Baseline Measurements

Vb (volts)	15.0	14.25	15.75	min limit	max limit	Pass/Fail
Vb meas. (Volts)	+15.00	+14.25	+15.75	-.05	+.05	Pass
Ib (mA)	170	170	170	–	230	Pass
fo (GHz)	88.994	88.994	88.994	–	–	
Po (dBm, meas)	+13.15	+13.15	+13.15			
Po (dBm, corr)	+15.61	+15.61	+15.61	13	17	Pass

D. Frequency Pulling, Vb = 15.0 volts; measured 15.00V

Fref (GHz)	88.994			min limit	max limit	Pass/Fail
Fmax (GHz)	88.996	+Δ (MHz)	+2	–	+ 5 MHz	Pass
Fmin (GHz)	88.992	-Δ (MHz)	-2	-5 MHz	–	Pass

E. Power Pulling

Pref (dBm)	-6.58			min limit	max limit	Pass/Fail
Pmax (dBm)	-6.52	+Δ (dB)	+0.06	–	+0.2dB	Pass
Pmin (dBm)	-6.66	-Δ (dB)	-0.09	-0.2 dB	–	Pass

F. Turn-on current

Vb (volts)	15.0	min limit	max limit	Pass/Fail
Measured Vb	+15.00			Pass
Turn-on current (mA)	170	–	345	Pass
time to peak (ms)	10.8			
time to settle (ms)	10.8			

G. Unit Temperature: -2 °C Vacuum level: 15 mTorr

DATA SHEET ACCEPT/REJECT

Accept	MTC A4 QA	*Reject*	
		Test Failure Report No.	
		Report Date	

SIZE	CAGE CODE	DWG. NO.	
A	8V456	TP501600-2	
SCALE	REV. LTR.	A00	SHEET 29 OF 4

AMSU-A GDO Data Calculation Sheet 8

Sequence Description: Frequency Accuracy & Stability Calculations Date: 4/23/97
Millitech Part Number 9050160001; Serial Number FM3 Operator: CSX
Aerojet Part Number 1336610-10

A. Frequency Accuracy from Thermal Vacuum, CPT and Final LPT Data

	Parameter, Vb = 15.0 volts	Data Sheet, Section	Date, mm/dd/yy	Measurement
1	+Δ, pulling, +20.5°C, MHz	1, D	4/16/97	+1
2	-Δ, pulling, +20.5°C, MHz	1, D	4/16/97	-1
3	+Δ, pulling, +43°C	1, D	4/19/97	+1
4	-Δ, pulling, +43°C	1, D	4/19/97	-1
5	+Δ, pulling, -2°C	1, D	4/20/97	+2
6	-Δ, pulling, -2°C	1, D	4/20/97	-2
7	Set point w / max Hysteresis, GHz	6, E	4/11/97	89.003
8	Set point w / min Hysteresis, GHz	6, E	4/11/97	89.000
9	(Maximum of lines 1, 3, and 5) +7	89.005		GHz
10	(Maximum of lines 2, 4, and 6) +8	88.998		GHz

B. Frequency Accuracy Result

	Result	min limit	max limit	Pass/Fail
A9, GHz	89.005	–	89.030	Pass
A10, GHz	88.998	88.970	–	Pass

CONTINUED, GO TO NEXT PAGE

AMSU-A GDO Data Calculation Sheet 8, continued

Sequence Description: Frequency Accuracy & Stability Calculations Date: 4/23/97
Millitech Part Number 9050160001; Serial Number FM3 Operator: CSY
Aerojet Part Number 1336610-10

C. Frequency Stability from Comprehensive Performance Test Data

	Bias Voltage, volts	Data Sheet, Section	Date, mm/dd/yy	Tcase, °C	Measurement, GHz
1	14.25	1, C	4/16/97	+20.5	89.005
2	15.0	1, C	4/16/97	+20.5	89.005
3	15.75	1, C	4/16/97	+20.5	89.005
4	14.25	1, C	4/20/97	-2	88.994
5	15.0	1, C	4/20/97	-2	88.994
6	15.75	1, C	4/20/97	-2	88.994
7	14.25	1, C	4/19/97	+43	89.011
8	15.0	1, C	4/19/97	+43	89.011
9	15.75	1, C	4/19/97	+43	89.011
10	((Maximum of 1 through 9) -C2)		* 1000 MHz		CSY +6 +11 MHz
11	((Minimum of 1 through 9) -C2)		* 1000 MHz		-11 CSY -6 MHz

D. Frequency Stability Result

	Result	min limit	max limit	Pass/Fail
C10, MHz	CSY +11 +6	--	+50	Pass
C11, MHz	CSY -6 -11	-50	--	Pass

DATA SHEET ACCEPT/REJECT

Accept	MTC A&QA	*Reject*	
		Test Failure Report No.	
		Report Date	

FREQUENCY STABILITY OF SAW FILTERS

Channel No.	11	12	13	14
Specification (+/-MHz)	0.9	0.9	0.2	0.2
Short-Term Measured (MHz)	+0.658, -0.518	+0.163, -0.257	+0.081, -0.000	+0.045, -0.039
Long-Term By Analysis (+/-MHz)	+0.02	+0.02	+0.02	+0.02
Total	+0.678, -0.518	+0.183, -0.257	+0.101, -0.000	+0.065, -0.039

Note: Additional +/-0.1 MHz frequency stability reserved for safety margin for channels 11-14.

REFER TO TEST DATA OF SAW FILTERS PREPARED

IN THE SECTION OF BANDPASS CHARACTERISTICS

BANDPASS CHARACTERISTICS

FOR

IF FILTERS AND SAW FILTERS

3 dB BANDWIDTH OF IF FILTERS

Channel No.	3	4	5	6	7	8	9	10	15
Specification (MHz)	90	200	170	200	200	165	165	78	6000
3 dB bandwidth (MHz) *	82	192	170	192	192	157	157	78	1020
f_L - f_H (MHz)	8-90	8-200	30-200	8-200	8-200	8-165	8-165	178-256	490-1510
Measured (MHz)									
3 dB bandwidth (MHz)	80.30	190.29	167.70	190.31	190.19	155.05	154.99	76.13	995.62
f_L - f_H (MHz)	8.79-89.09	9.07-199.36	31.30-199.00	9.07-199.38	9.13-199.32	9.14-164.19	9.15-164.14	179.14-255.27	491.29-1486.91

* Actual specifications for IF filters.

3 dB BANDWIDTH FOR SAW FILTERS

Channel No.	11	12	13	14
Specification				
3 dB Bandwidth (MHz)	72	32	16	6
f_{L1} - f_{H1} (MHz)	256.2-292.2	292.2-308.2	308.2-316.2	316.2-319.2
f_{L2} - f_{H2} (MHz)	352.2-388.2	336.2-352.2	328.2-336.2	325.2-328.2
Measured				
3 dB Bandwidth (MHz)	70.160	30.881	15.689	5.871
f_{L1} - f_{H1} (MHz)	256.977-291.873	292.565-307.998	308.312-316.124	316.278-319.208
f_{L2} - f_{H2} (MHz)	352.628-387.892	336.332-351.781	328.339-336.215	325.201-328.140

Channel 3 Bandpass Filter

IF Filter (S/N: 1331559-3, S/N: P229-014)

APPENDIX C **ACCEPTANCE TEST REPORT**

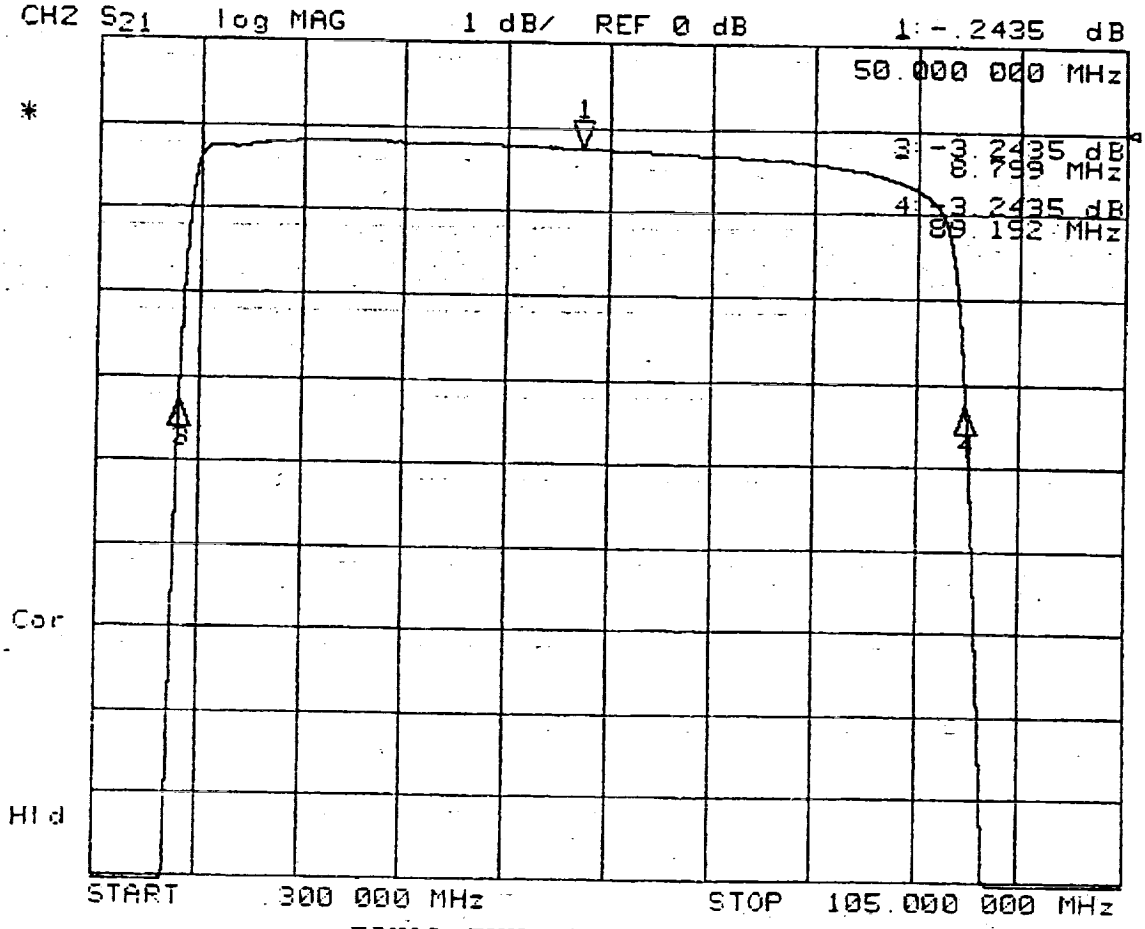
BANDPASS FILTER MODEL HL50-80-10SS1 S/N P229-014
AEROJET 1331559-3 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	89.19 MHz (88.0-90.0)	89.09 Mhz (88.0-90.0)	88.97 MHz (88.0-90.0)
{8} LOWER 3.0 dB BANDEDGE	8.80 MHz (8.0-10.0)	8.79 Mhz (8.0-10.0)	8.79 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	80.39 MHz (78.0-82.0)	80.3 Mhz (78.0-82.0)	80.18 MHz (78.0-82.0)
{10} ADD {7} AND {8} ÷ 2 =	49.00 MHz (50.0 NOM)	48.94 MHz (50.0 NOM)	48.88 Mhz (50.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-12.4 °C (-15.0 TO -10.0)	+14.5 °C (12.5 TO 17.5)	+44.0 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

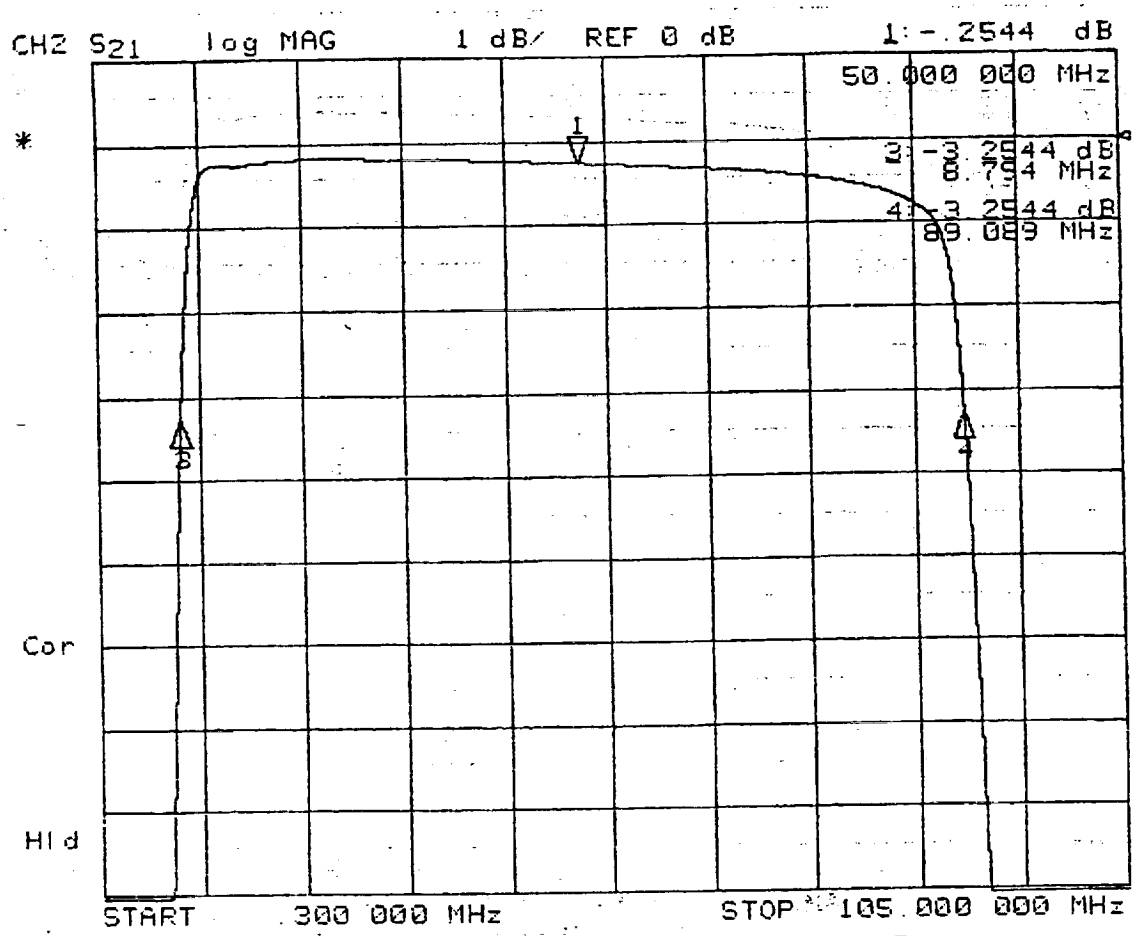
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	24.90 MHz	23.86 Mhz	23.86 MHz
MIN INSERTION LOSS PERFORMANCE	-0.17 dB	-0.17 dB	-0.18 dB
{11b} 75% BW LOWER BANDEDGE FREQ	10.89 MHz	10.79 Mhz	10.76 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.37 dB	-0.39 dB	-0.42 dB
{11c} 75% BW UPPER BANDEDGE FREQ	70.89 MHz	70.79 Mhz	70.76 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.37 dB	-0.39 dB	-0.42 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.20 dB	0.22 dB	0.24 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.20 dB	0.22 dB	0.24 dB



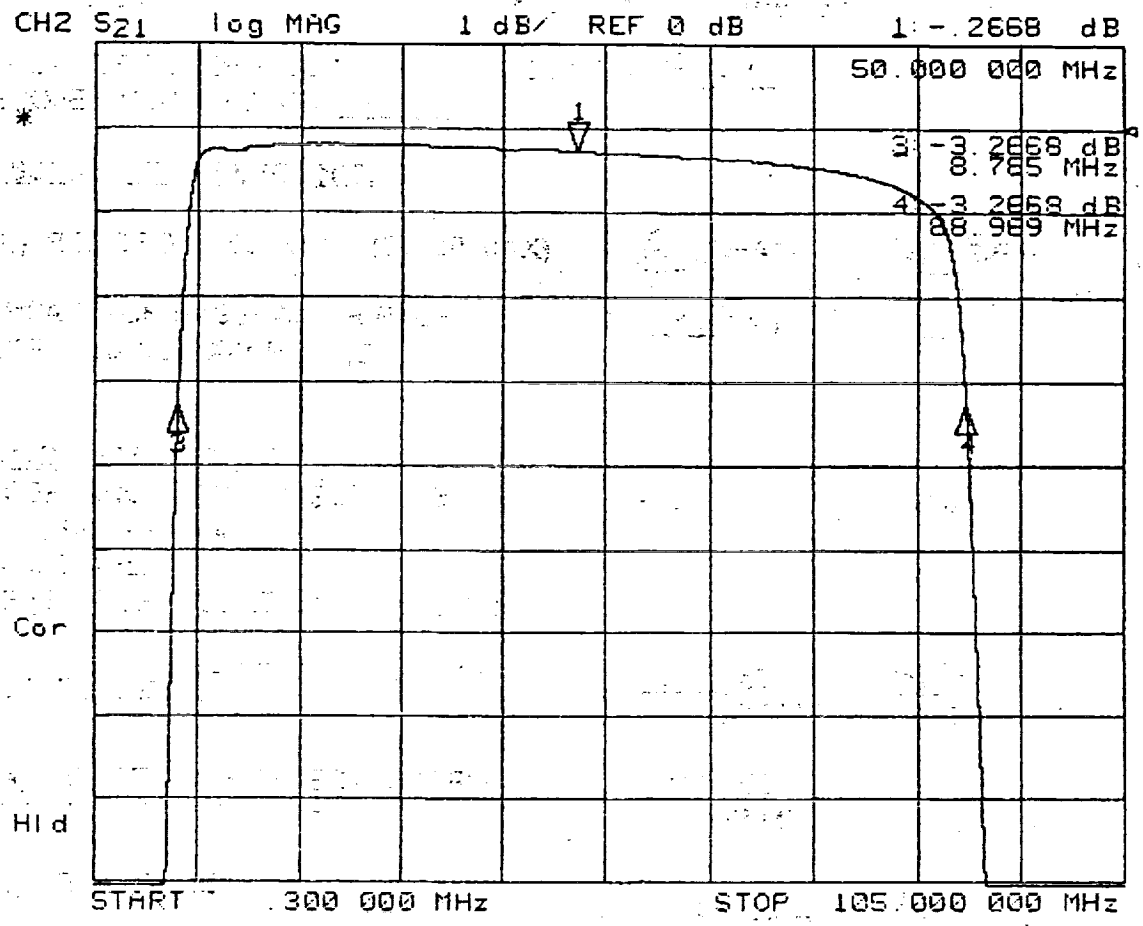
FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P229-014
-10C DATA
OPR: R. HOGGATT DATE DEC 18 1996

MARKER PARAME...		Channel 2
MARKER 1	14.000000 MHz OFF	50.000000 MHz -.2435 dB
MARKER 2	86.000000 MHz OFF	48.995983 MHz OFF
MARKER 3	20.000000 MHz OFF	8.799322 MHz -3.2435 dB
MARKER 4	80.000000 MHz OFF	89.192444 MHz -3.2435 dB
NKP STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
MARKER TRACKING	OFF OFF	OFF OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P229-014
+15C DATA
OPR: R. HOGGATT DATE DEC 18 1996

MARKER PARAME...	...nnel 2	
MARKER 1	14.000000 MHz OFF	50.000000 MHz -.2544 dB
MARKER 2	86.000000 MHz OFF	48.941854 MHz OFF
MARKER 3	20.000000 MHz OFF	8.794563 MHz -3.2544 dB
MARKER 4	80.000000 MHz OFF	89.089146 MHz -3.2544 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P229-014
+40C DATA
OPR: R. HOGGATT DATE DEC 18 1996

	Channel 1	Channel 2
MARKER 1	14.000000 MHz OFF	50.000000 MHz -.2668 dB
MARKER 2	86.000000 MHz OFF	48.877757 MHz OFF
MARKER 3	20.000000 MHz OFF	8.785589 MHz -3.2668 dB
MARKER 4	80.000000 MHz OFF	88.969926 MHz -3.2668 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX C

ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL50-80-10SS1 S/N P229-014
EROJET 1331559-3 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5
Fc=50.0 MHz.
REF {5A} FOR INSERTION LOSS @ Fc

	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	>100 dB (40.0 dB MIN)	>100 dB (40.0 dB MIN)	>100 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 102.0 MHz TO 1000.0 MHz	-54.6 dB (40.0 dB MIN)	-55.3 dB (40.0 dB MIN)	-56.1 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-12.3 °C (-15.0 TO -10.0)	+14.2 °C (12.5 TO 17.5)	+43.7 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

TEST PERFORMED BY R. HOGGATT DATE 12/18/96

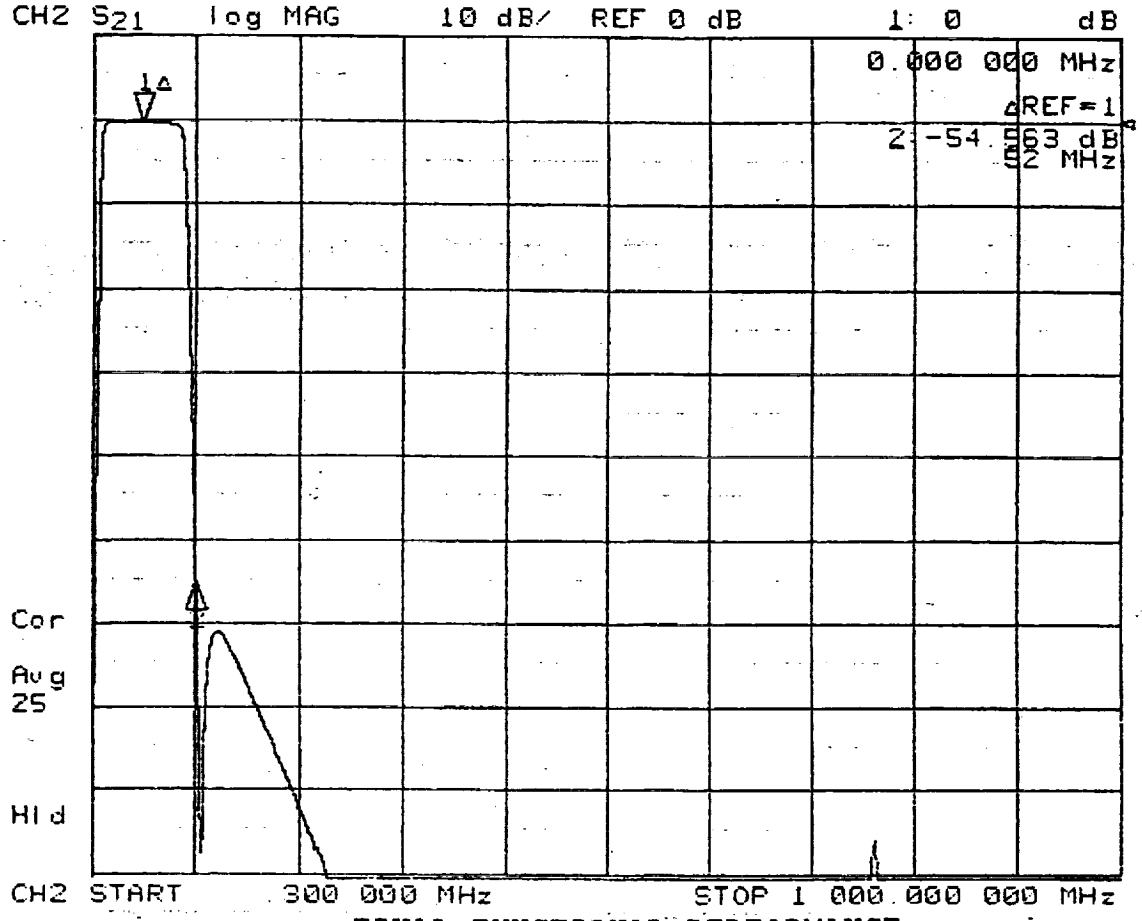
NOTE IF TEST WITNESSED BY AESD: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

{16} REFERENCE CUSTOMER DRAWING 1331559

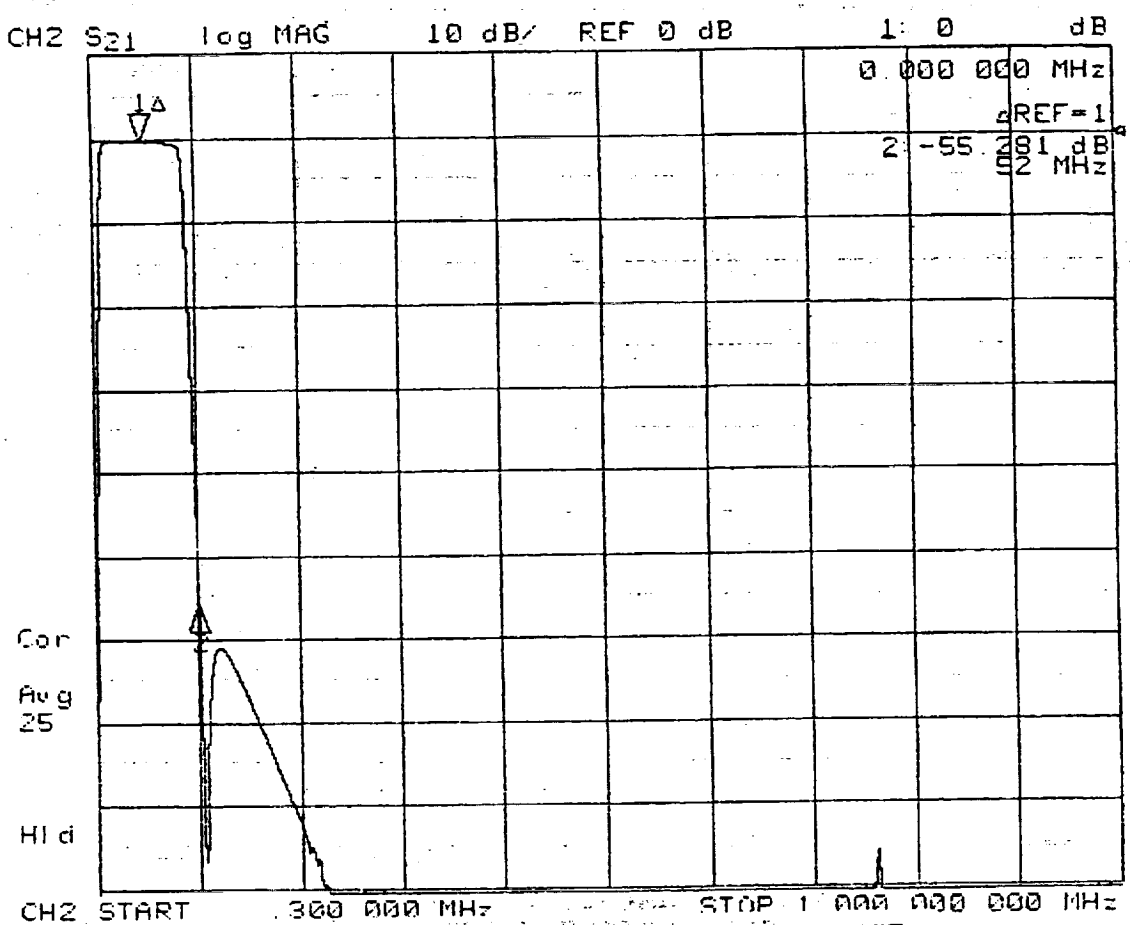
DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.500
MOUNTING HOLE CENTER	0.125 ± .010	0.124
BETWEEN UPPER MOUNTING HOLES	3.250	3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.250



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P229-014
-10C DATA
OPR: R. HOGGATT DATE DEC 18 1996

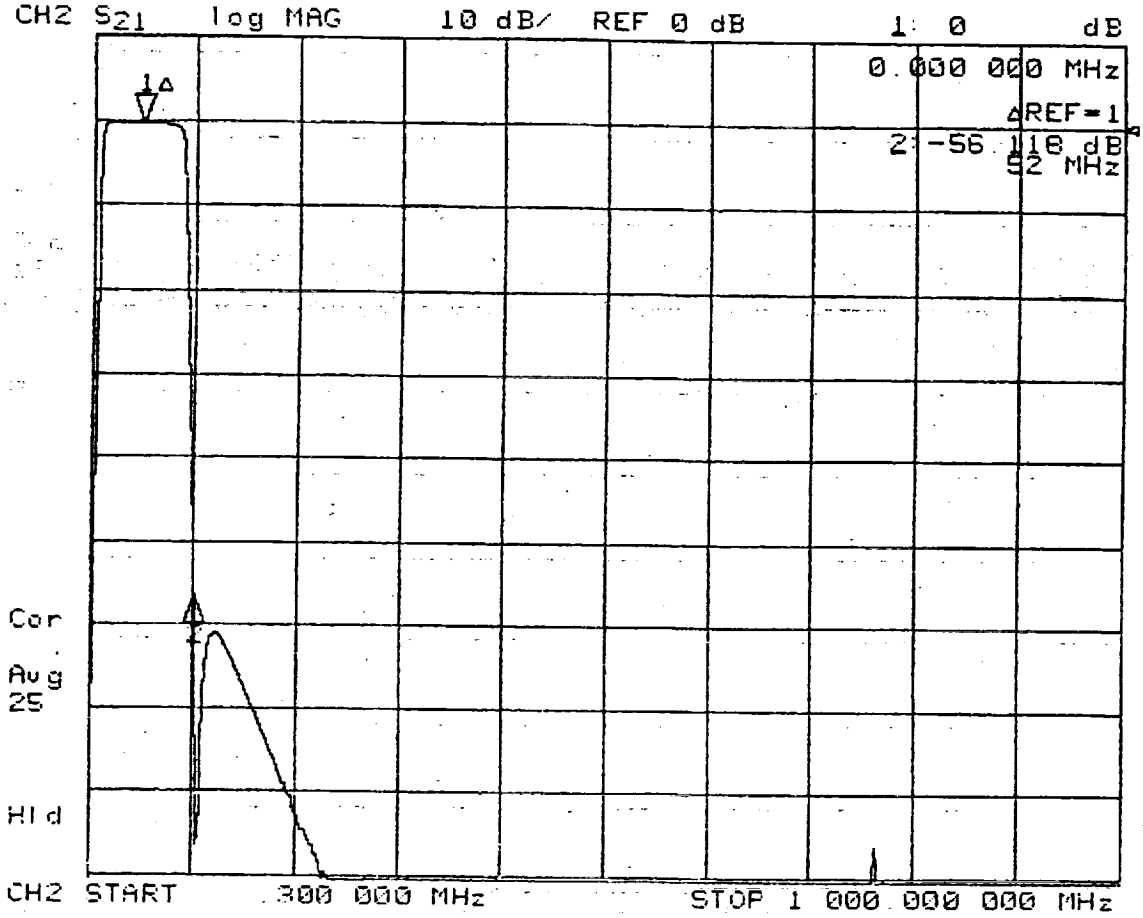
MARKER PARAME... ...annel 2

MARKER 1	1.000000 MHz OFF	50.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	102.000000 MHz -54.563 dB
MARKER 3	5.000000 MHz OFF	102.000000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P229-014
+15C DATA
OPR: R. HOGGATT DATE DEC 18 1996

MARKER PARAME...	...annel 1	Channel 2
MARKER 1	1.000000 MHz OFF	50.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	102.000000 MHz -55.281 dB
MARKER 3	5.000000 MHz OFF	102.000000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P229-014
+40C DATA
OPR: R. HOGGATT DATE DEC 18 1996

MARKER PARAME...	...nel 2	
MARKER 1	1.000000 MHz OFF	50.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	102.000000 MHz -56.118 dB
MARKER 3	5.000000 MHz OFF	102.000000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

BANDPASS FILTER MODEL HL50-80-10SS1 S/N P229-014
PROJET 1331559-3 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT
PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE +23.5 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-102.4 dB	F11	(*) 60.0	MHz	-0.32 dB
F2	1.0	MHz	-94.0 dB	F12	(*) 70.0	MHz	-0.39 dB
F3	5.0	MHz	-30.4 dB	F13	80.0	MHz	-0.60 dB
F4	7.5	MHz	-9.71 dB	F14	85.0	MHz	-0.85 dB
F5	10.0	MHz	-1.21 dB	F15	90.0	MHz	-5.79 dB
F6	15.0	MHz	-0.27 dB	F16	100.0	MHz	-45.1 dB
F7	20.0	MHz	-0.20 dB	F17	200.0	MHz	-82.3 dB
F8	(*) 30.0	MHz	-0.19 dB	F18	300.0	MHz	-102.3 dB
F9	(*) 40.0	MHz	-0.22 dB	F19	500.0	MHz	-104.5 dB
F10	50.0	MHz	-0.25 dB	F20	1000.0	MHz	-95.7 dB

TEST PERFORMED BY: R. HOGGATT DA 5 DATE 12/18/96

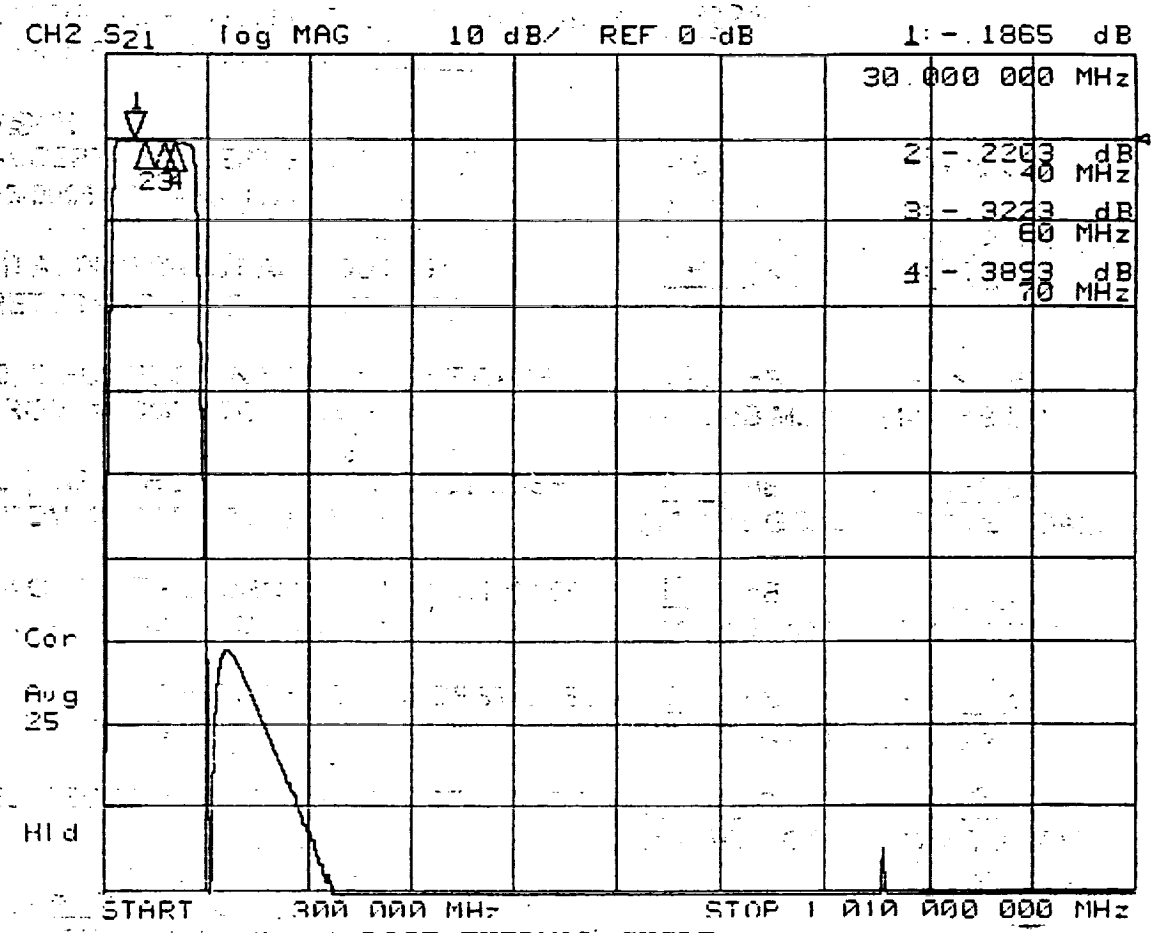
NOTE IF TEST WITNESSED BY AESD Not witnessed this time. DLD

***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST
ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX C PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P229-014
AMBIENT
OPR: R. HOGGATT DATE DEC 18 1996

MARKER PARAMETERS	Channel 1	Channel 2
MARKER 1	30.000000 MHz OFF	30.000000 MHz -.1865 dB
MARKER 2	40.000000 MHz OFF	40.000000 MHz -.2203 dB
MARKER 3	60.000000 MHz OFF	60.000000 MHz -.3223 dB
MARKER 4	70.000000 MHz OFF	70.000000 MHz -.3893 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Channel 4 Bandpass Filter

IF Filter (S/N: 1331559-2, S/N: P228-002)

APPENDIX B QUALIFICATION TEST REPORT

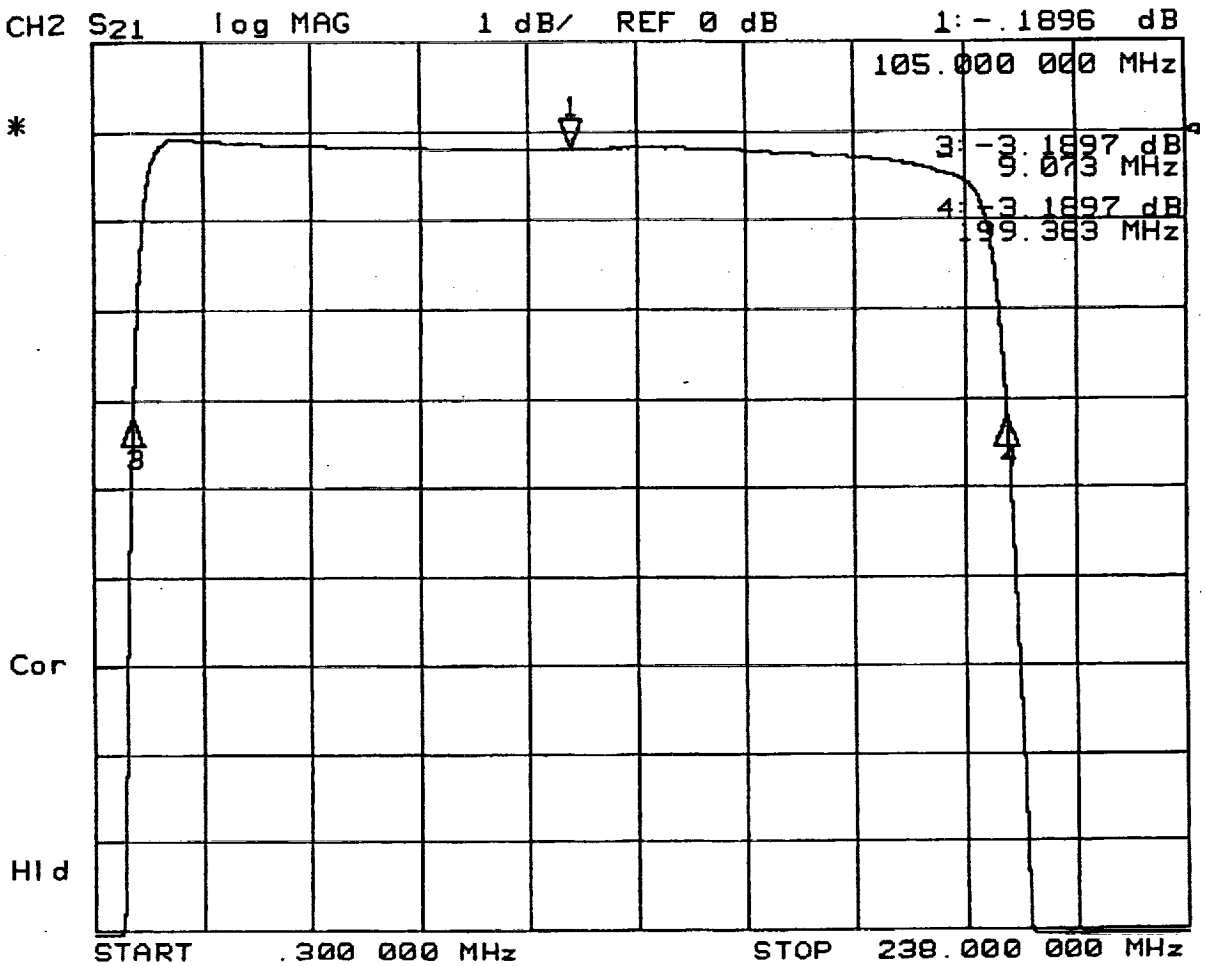
BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228 -002
AEROJET 1331559-2 REV. E

3.0 dB BANDWIDTH

QUALIFICATION TEST PROCEDURE 63-0005-010 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	199.36 MHz (198.0-200.0)	199.00 Mhz (198.0-200.0)	198.66 MHz (1480.01500.0)
{8} LOWER 3.0 dB BANDEDGE	9.07 MHz (8.0-10.0)	9.07 Mhz (8.0-10.0)	9.06 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	190.29 MHz (188.0-192.0)	189.93 Mhz (188.0-192.0)	189.60 MHz (188.0-192.0)
{10} ADD {7} AND {8} ÷ 2 =	104.22 MHz (105.0 NOM)	104.04 MHz (105.0 NOM)	103.86 Mhz (105.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-13.6 °C (-15.0 TO -10.0)	+15.0 °C (12.5 TO 17.5)	+43.8 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

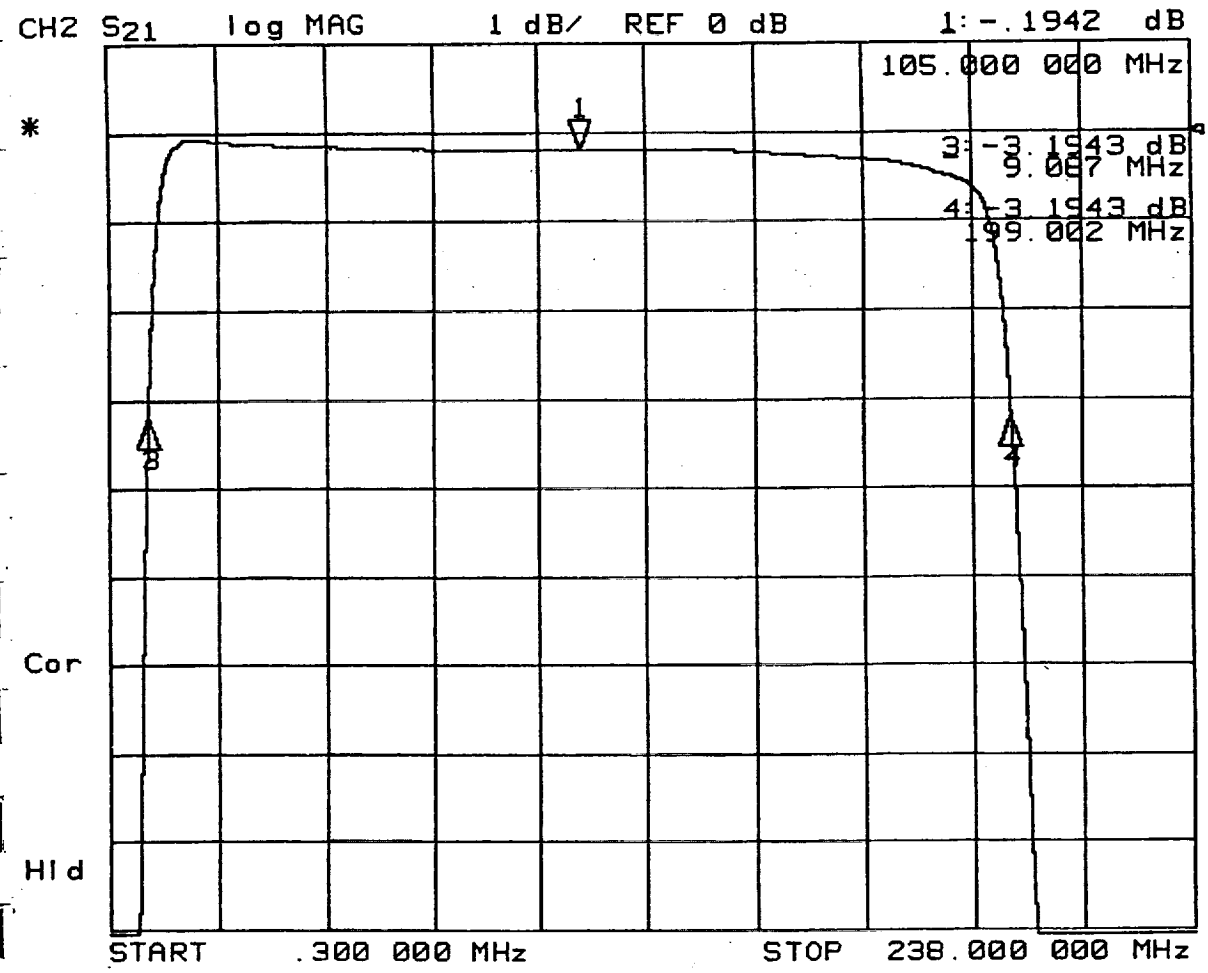
PASSBAND RIPPLE

QUALIFICATION TEST PROCEDURE 63-0005-010 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	18.72 MHz	18.72 Mhz	18.13 MHz
MIN INSERTION LOSS PERFORMANCE	-0.08 dB	-0.08 dB	-0.08 dB
{11b} 75% BW LOWER BANDEDGE FREQ	13.82 MHz	13.66 Mhz	13.49 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.25 dB	-0.26 dB	-0.28 dB
{11c} 75% BW UPPER BANDEDGE FREQ	156.32 MHz	156.16 Mhz	155.99 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.25 dB	-0.26 dB	-0.28 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.17 dB	0.18 dB	0.20 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.17 dB	0.18 dB	0.20 dB



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-002
-10C DATA
OPR: R. HOGGATT DATE DEC 27 1998

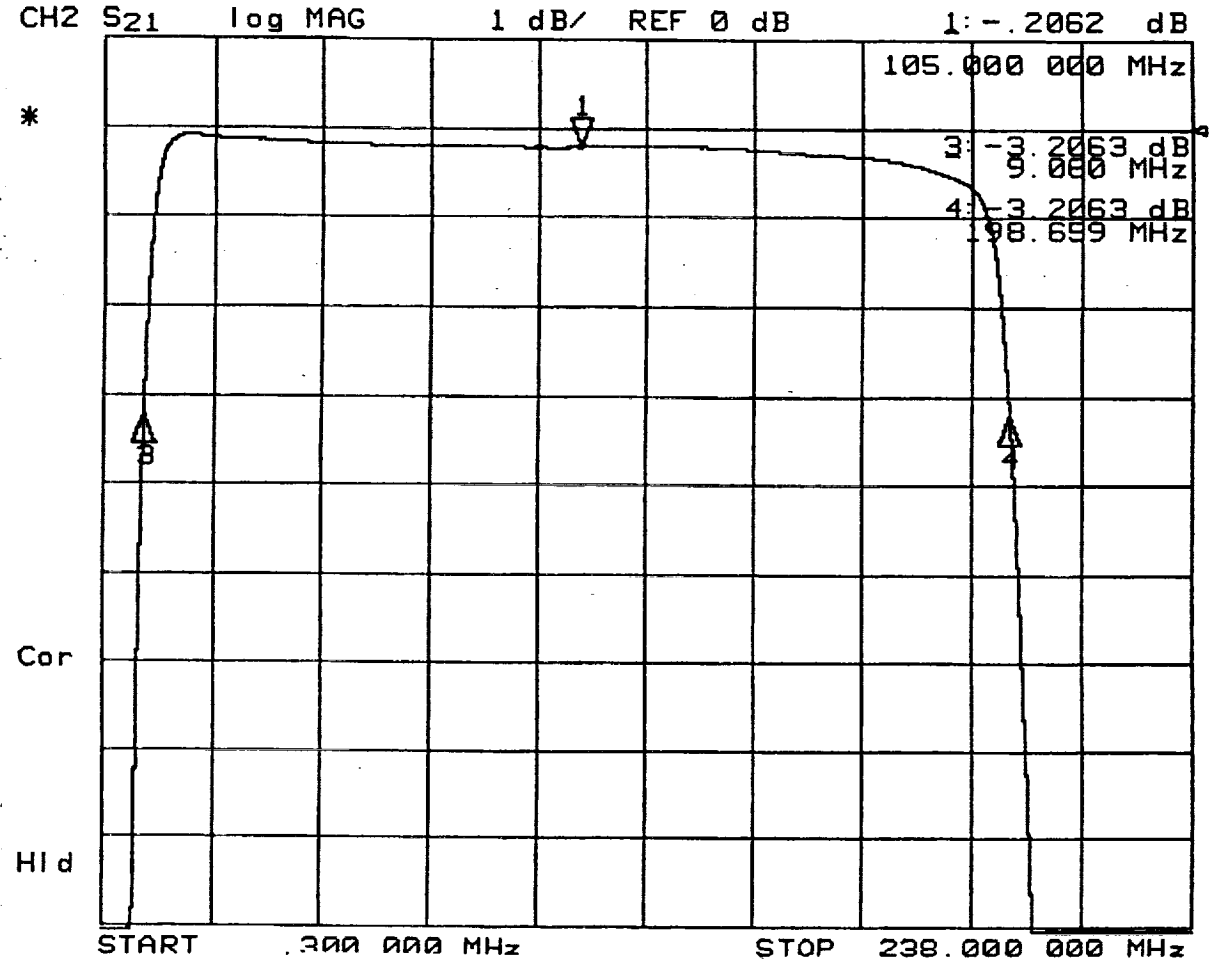
MARKER PARAMETER		
MARKER 1	19.500000 MHz OFF	105.000000 MHz -.1896 dB
MARKER 2	190.500000 MHz OFF	104.218472 MHz OFF
MARKER 3	33.750000 MHz OFF	9.073110 MHz -3.1897 dB
MARKER 4	176.250000 MHz OFF	199.363834 MHz -3.1897 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-002
+15C DATA

MARKER PARAMET OPR: R. HOGGATT DATE DEC 27 1996 annel 2

MARKER 1	19.500000 MHz OFF	105.000000 MHz -.1942 dB
MARKER 2	190.500000 MHz OFF	104.035144 MHz OFF
MARKER 3	33.750000 MHz OFF	9.067773 MHz -3.1943 dB
MARKER 4	176.250000 MHz OFF	199.002515 MHz -3.1943 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-002
+40C DATA
OPR: R. HOGGATT DATE DEC 27 1996

MARKER PARAMETERS	Channel 1	Channel 2
MARKER 1	19.500000 MHz OFF	105.000000 MHz -.2062 dB
MARKER 2	190.500000 MHz OFF	103.860164 MHz OFF
MARKER 3	33.750000 MHz OFF	9.060779 MHz -3.2063 dB
MARKER 4	176.250000 MHz OFF	198.659549 MHz -3.2063 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-002
AEROJET 1331559-2 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	PASS/FAIL	PASS/FAIL	PASS/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

QUALIFICATION TEST PROCEDURE 63-0005-010 PARA 4.5.5 Fc=105.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-59.1 dB (40.0 dB MIN)	-59.1 dB (40.0 dB MIN)	-59.1 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 228.5 MHz TO 1000.0 MHz	-41.5 dB (40.0 dB MIN)	-41.6 dB (40.0 dB MIN)	-41.6 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-13.6 °C (-15.0 TO -10.0)	+15.0°C (12.5 TO 17.5)	+43.7 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

TEST PERFORMED BY R. HOGGATT DATE 12/27/96

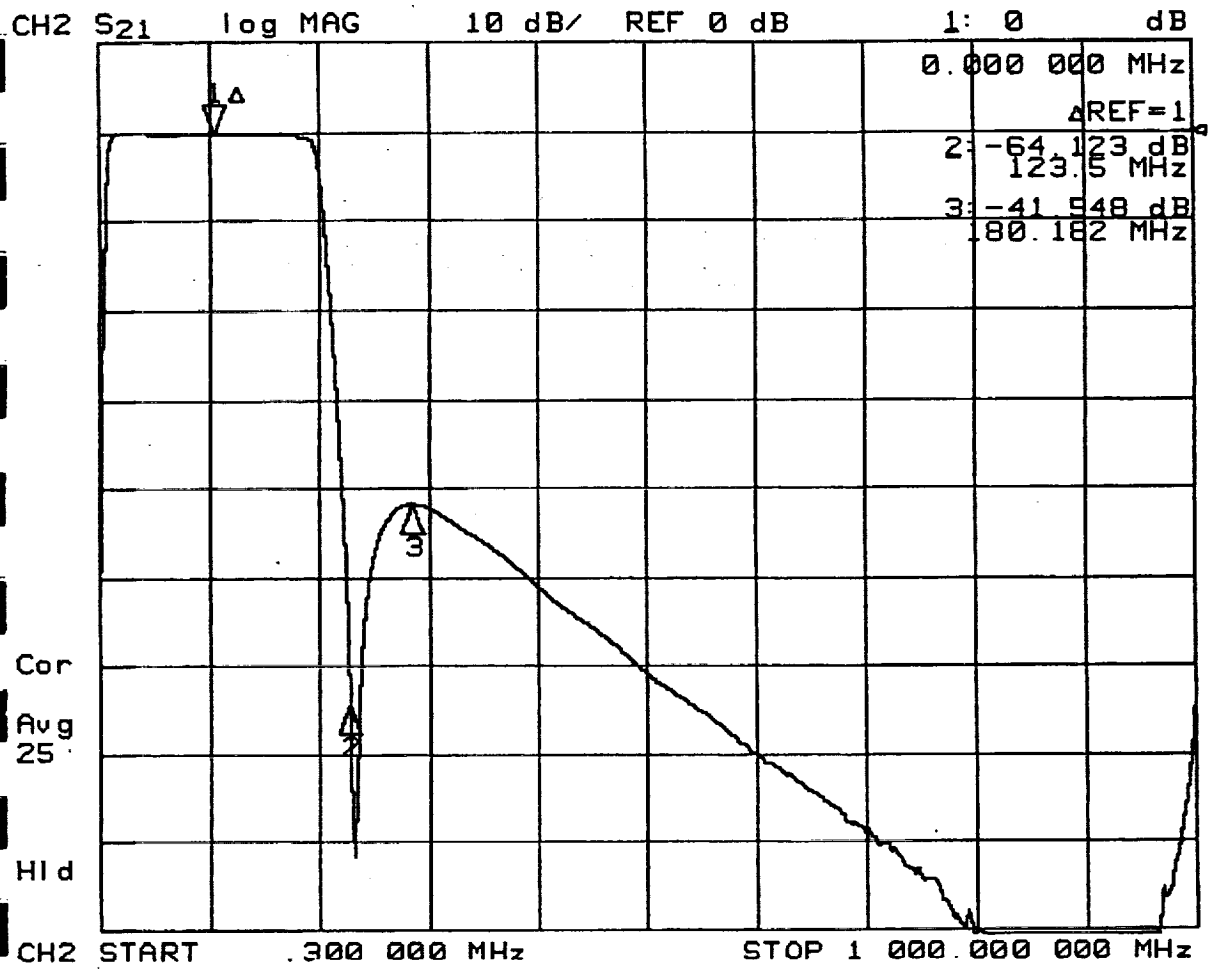
NOTE IF TEST WITNESSED BY AESD: _____ GSI: _____ Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST *****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

{16} REFERENCE CUSTOMER DRAWING 1331559

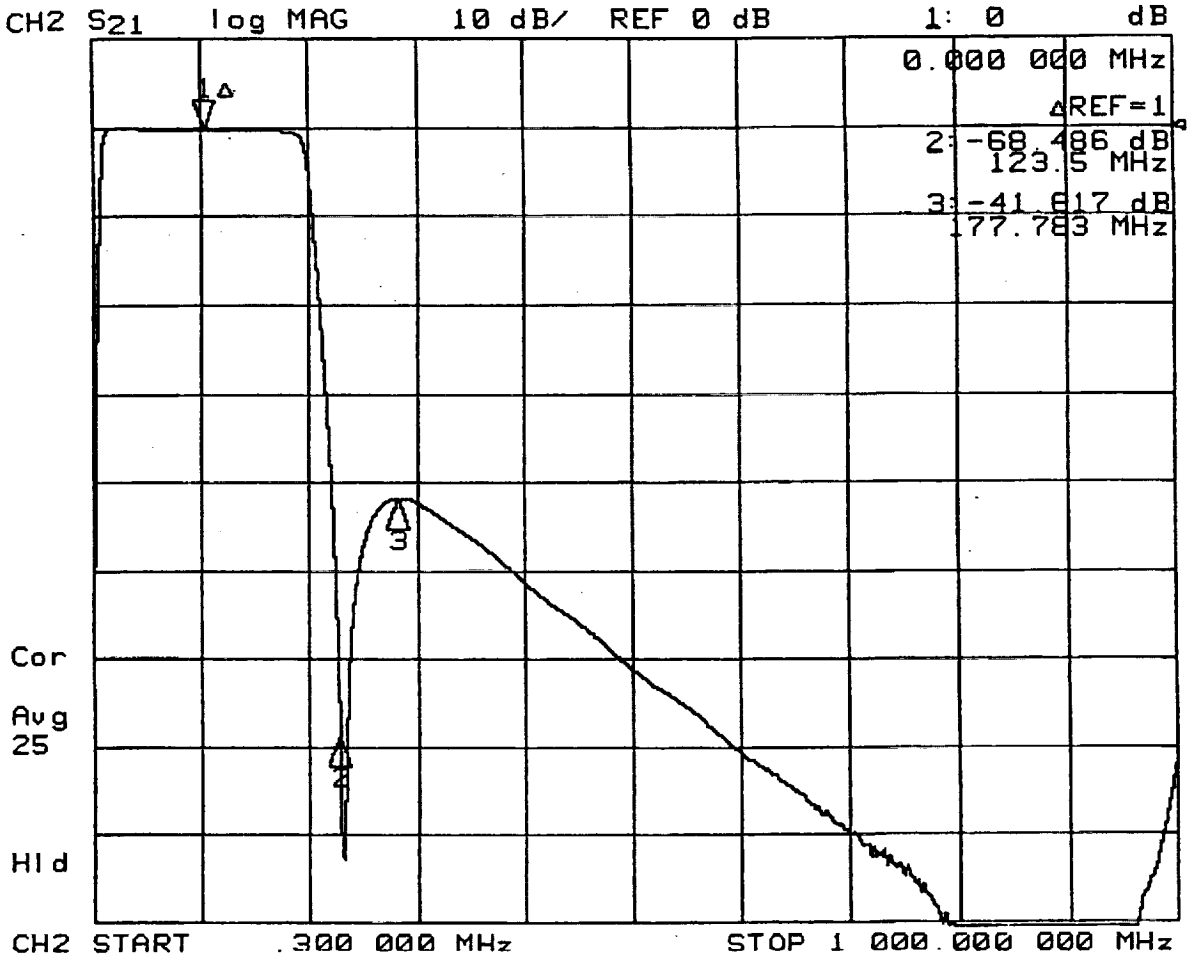
DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.501
MOUNTING HOLE CENTER	0.125 ± .010	0.125
BETWEEN UPPER MOUNTING HOLES	3.250	JE 3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.251



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-002
-10C DATA
OPR: R. HOGGATT DATE DEC 27 1996

MARKER PARAMET annel 2

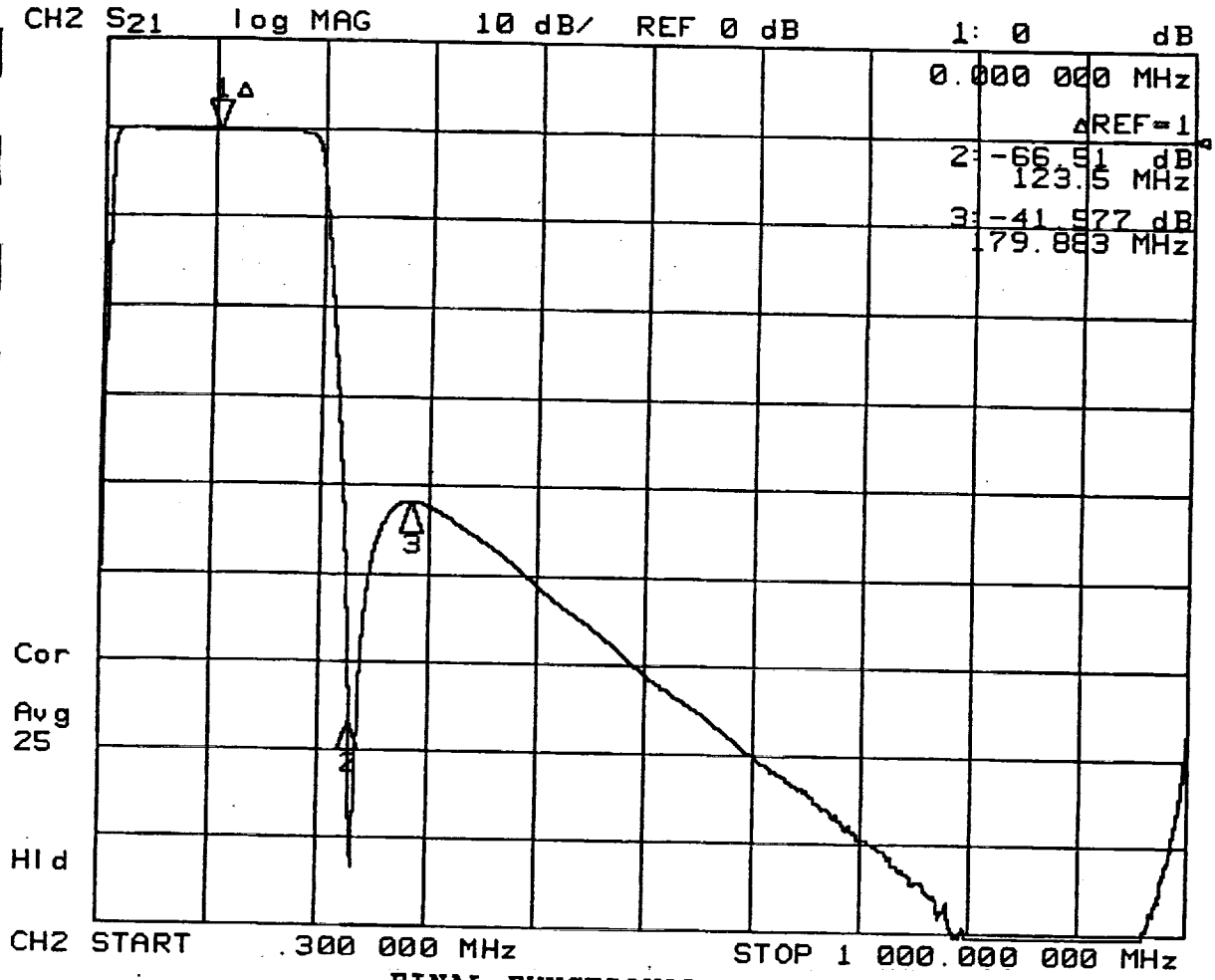
MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -64.123 dB
MARKER 3	5.000000 MHz OFF	285.182992 MHz -41.548 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-002
+40C DATA

MARKER PARAME OPR: R. HOGGATT DATE DEC 27 1996 annel 2

MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -68.486 dB
MARKER 3	5.000000 MHz OFF	282.783712 MHz -41.617 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-002
+15C DATA
OPR: R. HOGGATT DATE DEC 27 1996 annel 2

MARKER PARAMET		
MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -66.51 dB
MARKER 3	5.000000 MHz OFF	284.883082 MHz -41.577 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
MARKER TRACKING	OFF OFF	OFF OFF

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-002
EROJET 1331559-2 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT

PER QTP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +22.1 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-82.6 dB	F11	(*) 130.0	MHz	-0.19 dB
F2	1.0	MHz	-66.2 dB	F12	(*) 150.0	MHz	-0.27 dB
F3	5.0	MHz	-17.6 dB	F13	180.0	MHz	-0.42 dB
F4	7.5	MHz	-7.21 dB	F14	190.0	MHz	-0.61 dB
F5	10.0	MHz	-1.68 dB	F15	200.0	MHz	-4.21 dB
F6	20.0	MHz	-0.08 dB	F16	250.0	MHz	-47.4 dB
F7	40.0	MHz	-0.11 dB	F17	300.0	MHz	-42.3 dB
F8	(*) 60.0	MHz	-0.18 dB	F18	400.0	MHz	-51.2 dB
F9	(*) 80.0	MHz	-0.21 dB	F19	500.0	MHz	-61.1 dB
F10	105.0	MHz	-0.21 dB	F20	1000.0	MHz	-70.4 dB

DA 5

TEST PERFORMED BY: R. Hoggatt DATE 12/27/96

NOTE IF TEST WITNESSED BY AESD _____ GSI _____ Not witnessed this time. DLD

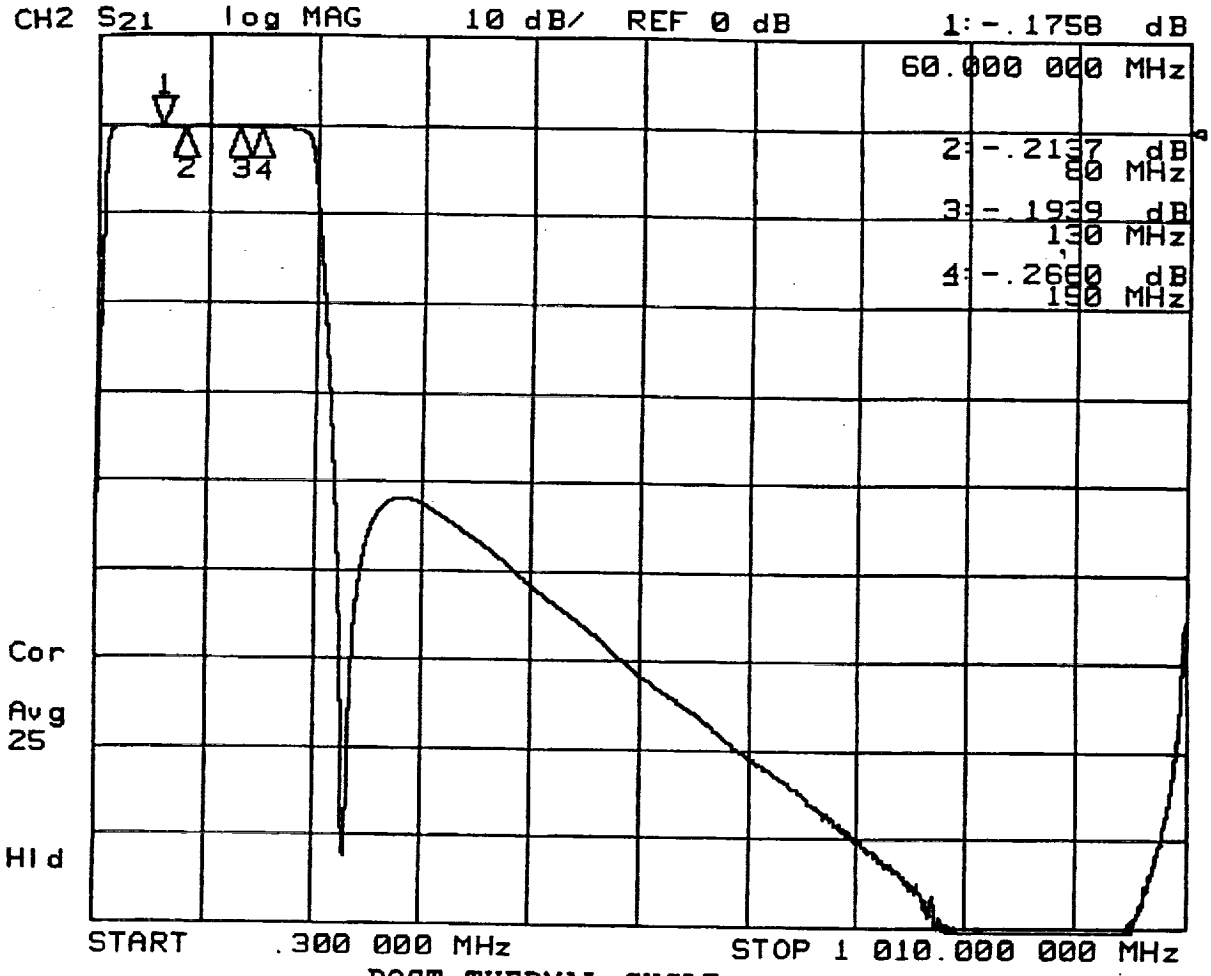
***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST

QUALIFICATION TEST PROCEDURE
63-0005-010 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX B PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER QTP PARA 4.5.1.
b.) INSERTION LOSS PER QTP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER QTP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER QTP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER QTP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER QTP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER QTP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P228-002
AMBIENT
OPR: R. HOGGATT DATE DEC 27 1996

MARKER PARAME annel 2

MARKER 1	17.750000 MHz OFF	60.000000 MHz -.1758 dB
MARKER 2	157.250000 MHz OFF	80.000000 MHz -.2137 dB
MARKER 3	29.375000 MHz OFF	130.000000 MHz -.1939 dB
MARKER 4	145.625000 MHz OFF	150.000000 MHz -.2660 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
MARKER TRACKING	OFF OFF	OFF OFF

Channel 5 Bandpass Filter

IF Filter (S/N: 1331559-5, S/N: P231-006)

APPENDIX E **ACCEPTANCE TEST REPORT**

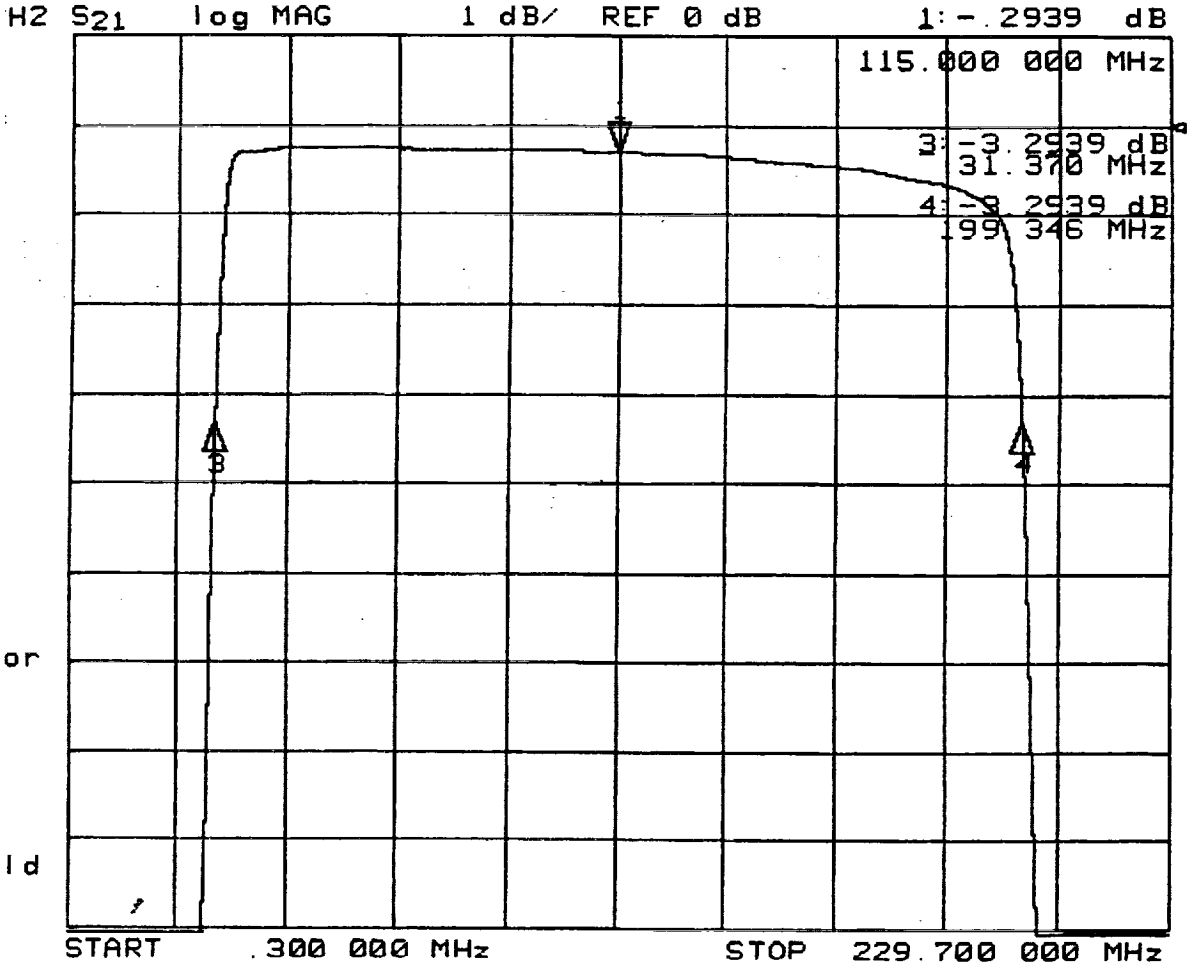
BANDPASS FILTER MODEL HL115-170-10SS1 S/N P231-006
EROJET 1331559-5 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-010 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	199.35 MHz (198.0-200.0)	199.00 Mhz (198.0-200.0)	198.70 MHz (198.0-200.0)
{8} LOWER 3.0 dB BANDEDGE	31.37 MHz (30.0-32.0)	31.30 Mhz (30.0-32.0)	31.25 MHz (30.0-32.0)
{9} 3.0 dB RELATIVE BANDWIDTH	167.98 MHz (166.0-170.0)	167.70 Mhz (166.0-170.0)	167.45 MHz (166.0-170.0)
{10} ADD {7} AND {8} ÷ 2 =	115.36 MHz (115.0 NOM)	115.15 MHz (115.0 NOM)	114.98 Mhz (115.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-12.0 °C (-15.0 TO -10.0)	+16.1 °C (12.5 TO 17.5)	+43.4 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

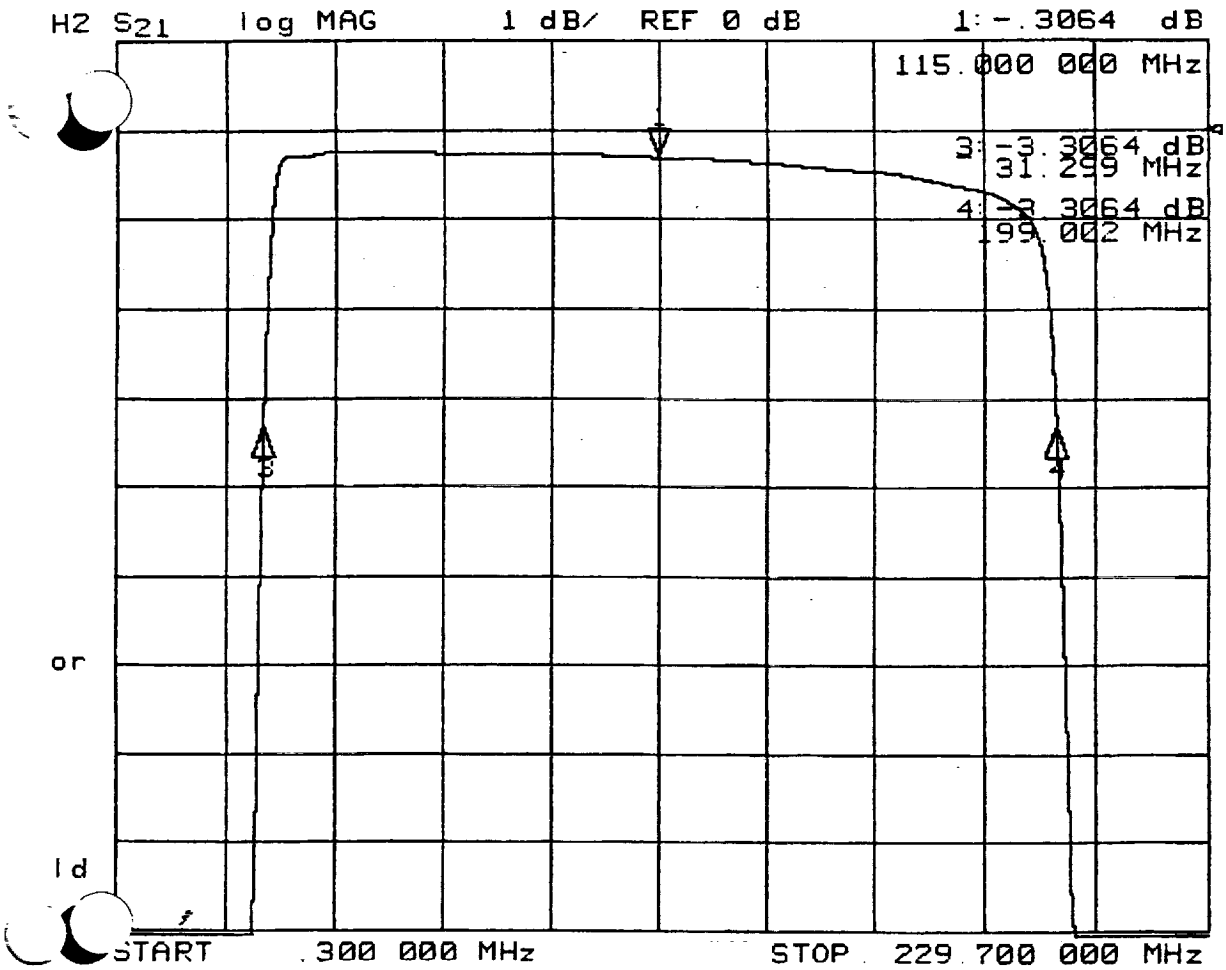
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-010 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	49.62 MHz	57.65 Mhz	55.93 MHz
MIN INSERTION LOSS PERFORMANCE	-0.24 dB	-0.24 dB	-0.25 dB
{11b} 75% BW LOWER BANDEDGE FREQ	34.38 MHz	34.22 Mhz	34.11 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.45 dB	-0.47 dB	-0.49 dB
{11c} 75% BW UPPER BANDEDGE FREQ	161.88 MHz	161.72 Mhz	161.61 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.45 dB	-0.47 dB	-0.49 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.21 dB	0.23 dB	0.24 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.21 dB	0.23 dB	0.24 dB



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P231-006
-10C DATA
OPR: R. HOGGATT DATE DEC 27 1996

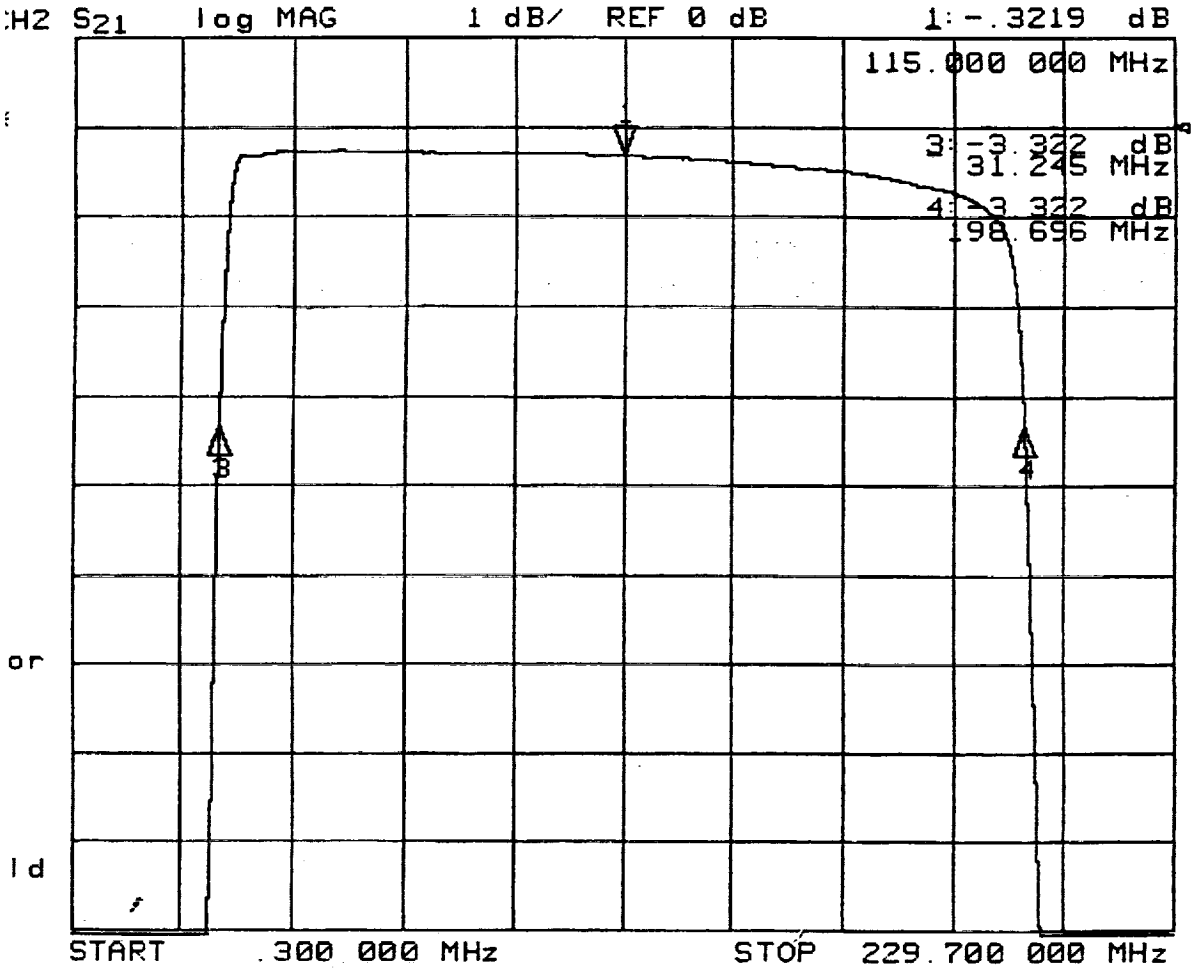
ARKER PARAME	annel 2	
ARKER 1	38.500000 MHz OFF	115.000000 MHz -.2939 dB
ARKER 2	191.500000 MHz OFF	115.358319 MHz OFF
ARKER 3	51.250000 MHz OFF	31.370179 MHz -3.2939 dB
ARKER 4	178.750000 MHz OFF	199.346459 MHz -3.2939 dB
<R STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
EFERENCE MARKER	OFF	OFF
_ACEMENT	CONTINUOUS	CONTINUOUS
ARKER SEARCH	OFF	OFF
ARGET VALUE	-14 dB	-3 dB
ARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
ARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P231-006
+15C DATA

ARKER PARAMET OPR: R. HOGGATT DATE DEC 27 1996 annel 2

ARKER 1	38.500000 MHz OFF	115.000000 MHz -.3064 dB
ARKER 2	191.500000 MHz OFF	115.151050 MHz OFF
ARKER 3	51.250000 MHz OFF	31.299775 MHz -3.3064 dB
ARKER 4	178.750000 MHz OFF	199.002325 MHz -3.3064 dB
KR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
EFERENCE MARKER	OFF	OFF
LACEMENT	CONTINUOUS	CONTINUOUS
R SEARCH	OFF	OFF
T VALUE	-14 dB	-3 dB
ARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
ARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P231-006
+40C DATA
ARKER PARAME OPR: R. HOGGATT DATE DEC 27 1996 annel 2

ARKER 1	38.500000 MHz OFF	115.000000 MHz -.3219 dB
ARKER 2	191.500000 MHz OFF	114.971067 MHz OFF
ARKER 3	51.250000 MHz OFF	31.245970 MHz -3.322 dB
ARKER 4	178.750000 MHz OFF	198.696165 MHz -3.322 dB
KR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
EFERENCE MARKER	OFF	OFF
LACEMENT	CONTINUOUS	CONTINUOUS
ARKER SEARCH	OFF	OFF
ARGET VALUE	-14 dB	-3 dB
ARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
ARKER TRACKING	OFF	OFF

BANDPASS FILTER MODEL HL115-170-10SS1 S/N P231-006
AEROJET 1331559-5 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-010 PARA 4.5.5 Fc=115.0 MHz REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 4.5 MHz	>90 dB (40.0 dB MIN)	>90 dB (40.0 dB MIN)	>90 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 225.5 MHz TO 1000.0 MHz	-61.1 dB (40.0 dB MIN)	-62.2 dB (40.0 dB MIN)	-63.1 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-12.2 °C (-15.0 TO -10.0)	+15.9 °C (12.5 TO 17.5)	+43.3 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

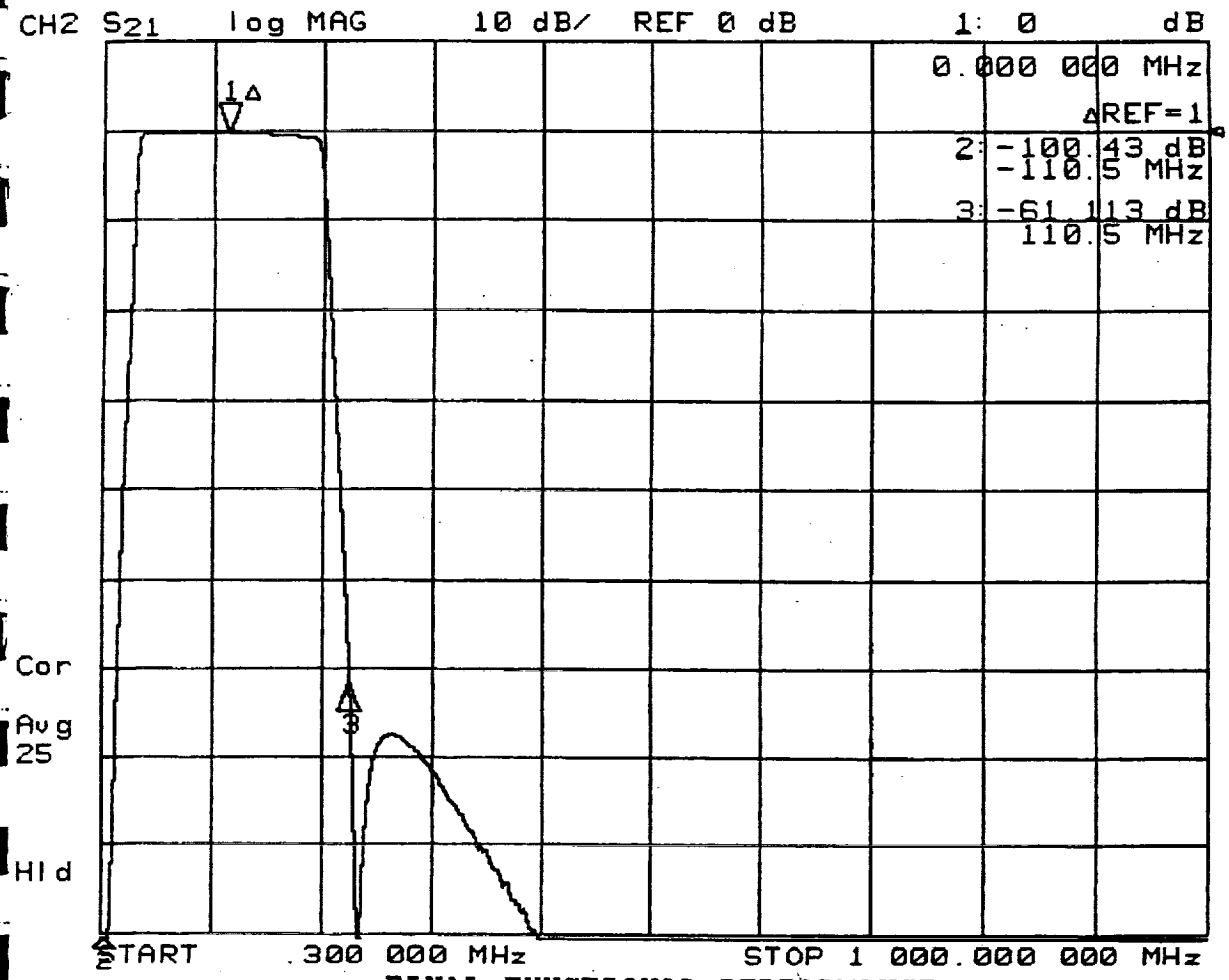
TEST PERFORMED BY T. HOGGATT DATE 12/27/96

NOTE IF TEST WITNESSED BY AESD: _____ GSI: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST *****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION
{16} REFERENCE CUSTOMER DRAWING 1331559

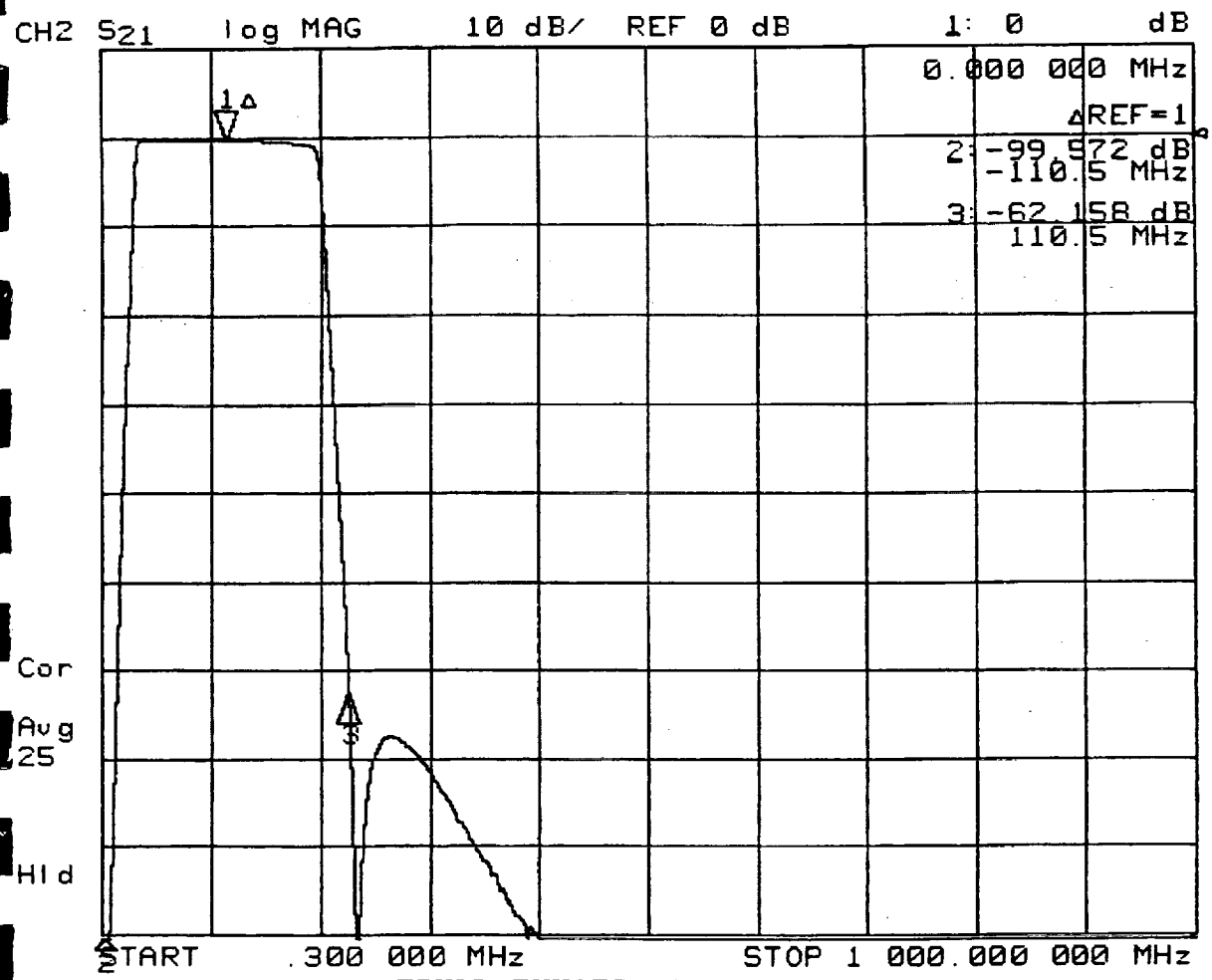
DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.502
MOUNTING HOLE CENTER	0.125 ± .010	0.126
BETWEEN UPPER MOUNTING HOLES	3.250	3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.250



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P231-006
-10C DATA
OPR: R. HOGGATT DATE DEC 27 1996

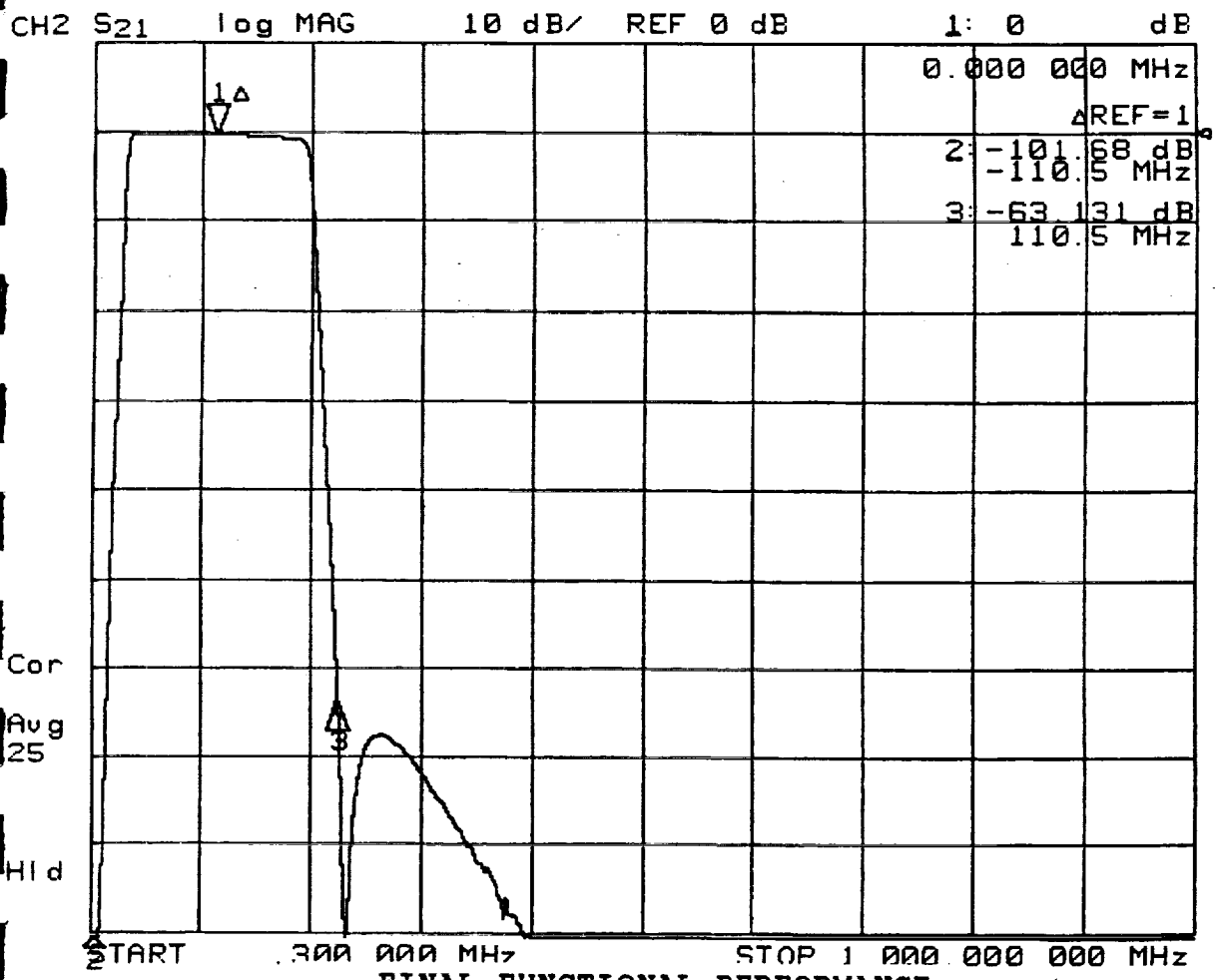
MARKER PARAME annel 2

MARKER 1	1000.000000 MHz OFF	115.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	4.500000 MHz -100.43 dB
MARKER 3	1000.000000 MHz OFF	225.500000 MHz -61.113 dB
MARKER 4	1000.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P231-006
+15C DATA
OPR: R. HOGGATT DATE DEC 27 1996

MARKER PARAMET	annel 2	
MARKER 1	1000.000000 MHz OFF	115.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	4.500000 MHz -99.572 dB
MARKER 3	1000.000000 MHz OFF	225.500000 MHz -62.158 dB
MARKER 4	1000.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P231-006
+40C DATA

MARKER PARAMET OPR: R. HOGGATT DATE DEC 27 1996 annel 2

MARKER 1	1000.000000 MHz OFF	115.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	4.500000 MHz -101.68 dB
MARKER 3	1000.000000 MHz OFF	225.500000 MHz -63.131 dB
MARKER 4	1000.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

BANDPASS FILTER MODEL HL115-170-10SS1 S/N P231-006
AEROJET 1331559-5 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT
PER ATP PARA 4.6
(REF: AE-24687 PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +22.5 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-101.2 dB	F11	(*) 130.0	MHz	-0.33 dB
F2	1.0	MHz	-102.4 dB	F12	(*) 155.0	MHz	-0.46 dB
F3	10.0	MHz	-82.6 dB	F13	180.0	MHz	-0.65 dB
F4	20.0	MHz	-39.5 dB	F14	190.0	MHz	-0.93 dB
F5	30.0	MHz	-6.75 dB	F15	200.0	MHz	-4.70 dB
F6	40.0	MHz	-0.31 dB	F16	210.0	MHz	-26.2 dB
F7	50.0	MHz	-0.24 dB	F17	300.0	MHz	-71.7 dB
F8	(*) 75.0	MHz	-0.28 dB	F18	400.0	MHz	-90.7 dB
F9	(*) 100.0	MHz	-0.26 dB	F19	500.0	MHz	-98.2 dB
F10	115.0	MHz	-0.29 dB	F20	1000.0	MHz	-104.5 dB

TEST PERFORMED BY: R. HOGGATT DA 5 DATE 12/21/96

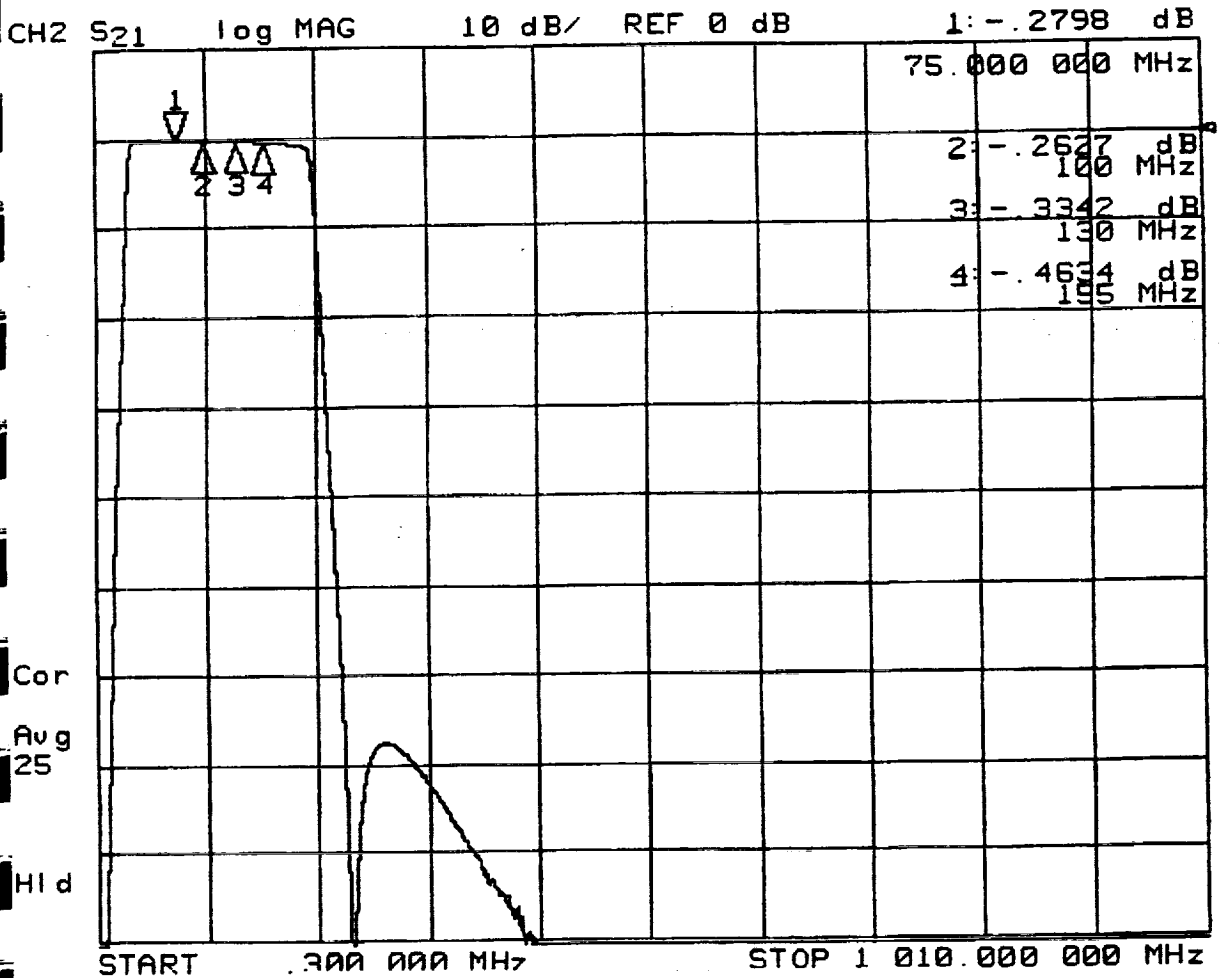
NOTE IF TEST WITNESSED BY AESD _____ GSI Not witnessed this time. DLD

***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST
ACCEPTANCE TEST PROCEDURE
63-0005-010 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX E PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P231-006
AMBIENT
MARKER PARAME OPR: R. HOGGATT DATE DEC 21 1996 annel 2

MARKER 1	17.750000 MHz OFF	75.000000 MHz -.2798 dB
MARKER 2	157.250000 MHz OFF	100.000000 MHz -.2627 dB
MARKER 3	29.375000 MHz OFF	130.000000 MHz -.3342 dB
MARKER 4	145.625000 MHz OFF	155.000000 MHz -.4634 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Channel 6 Bandpass Filter

IF Filter (S/N: 1331559-2, S/N: P228-009)

APPENDIX B **ACCEPTANCE TEST REPORT**

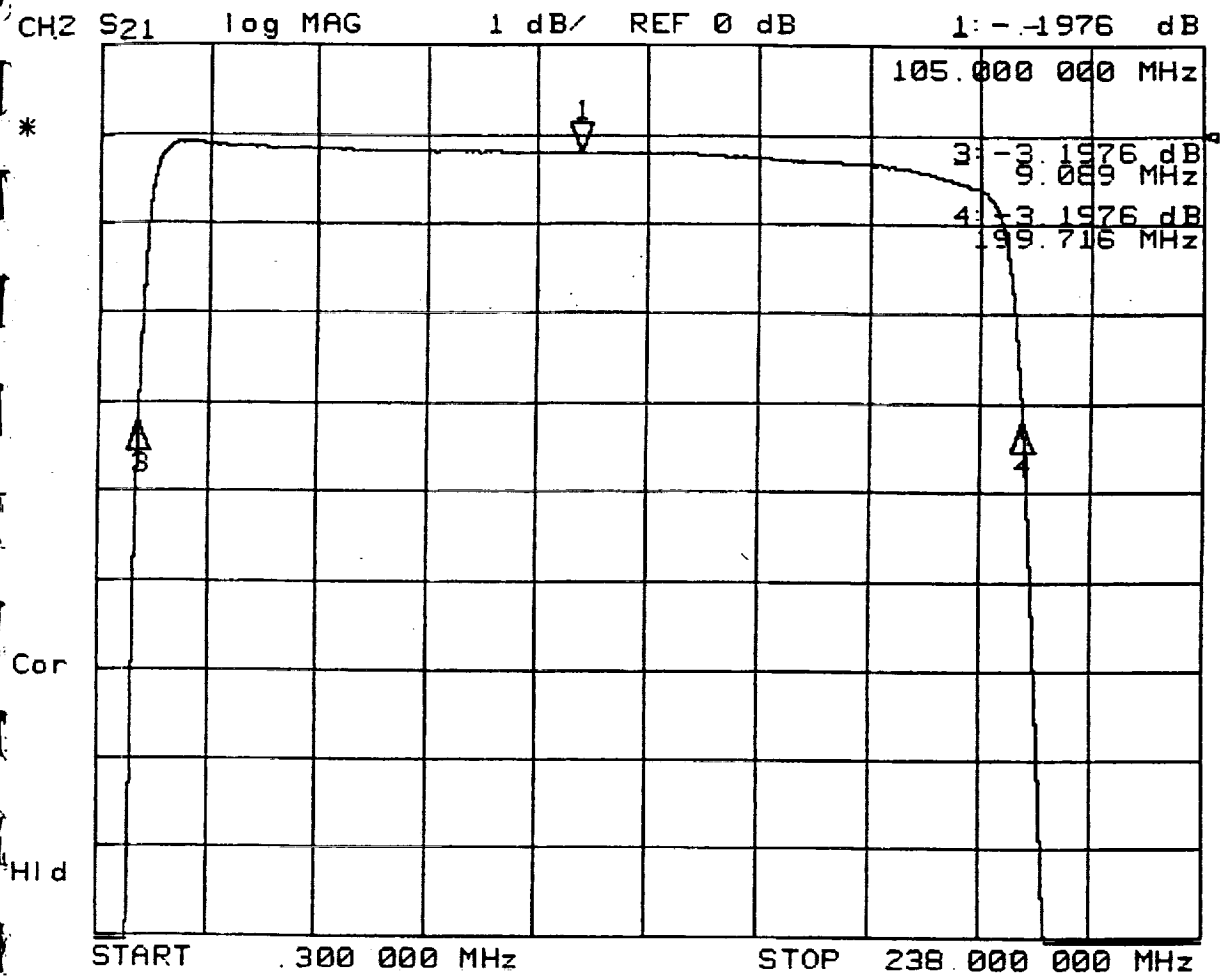
BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-009
PROJET 1331559-2 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	199.72 MHz (198.0-200.0)	199.38 Mhz (198.0-200.0)	199.06 MHz (1480.01500.0)
{8} LOWER 3.0 dB BANDEDGE	9.09 MHz (8.0-10.0)	9.07 Mhz (8.0-10.0)	9.07 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	190.63 MHz (188.0-192.0)	190.31 Mhz (188.0-192.0)	189.99 MHz (188.0-192.0)
{10} ADD {7} AND {8} ÷ 2 =	104.41 MHz (105.0 NOM)	104.23 MHz (105.0 NOM)	104.07 Mhz (105.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-12.6 °C (-15.0 TO -10.0)	-15.4 °C (12.5 TO 17.5)	+42.9 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

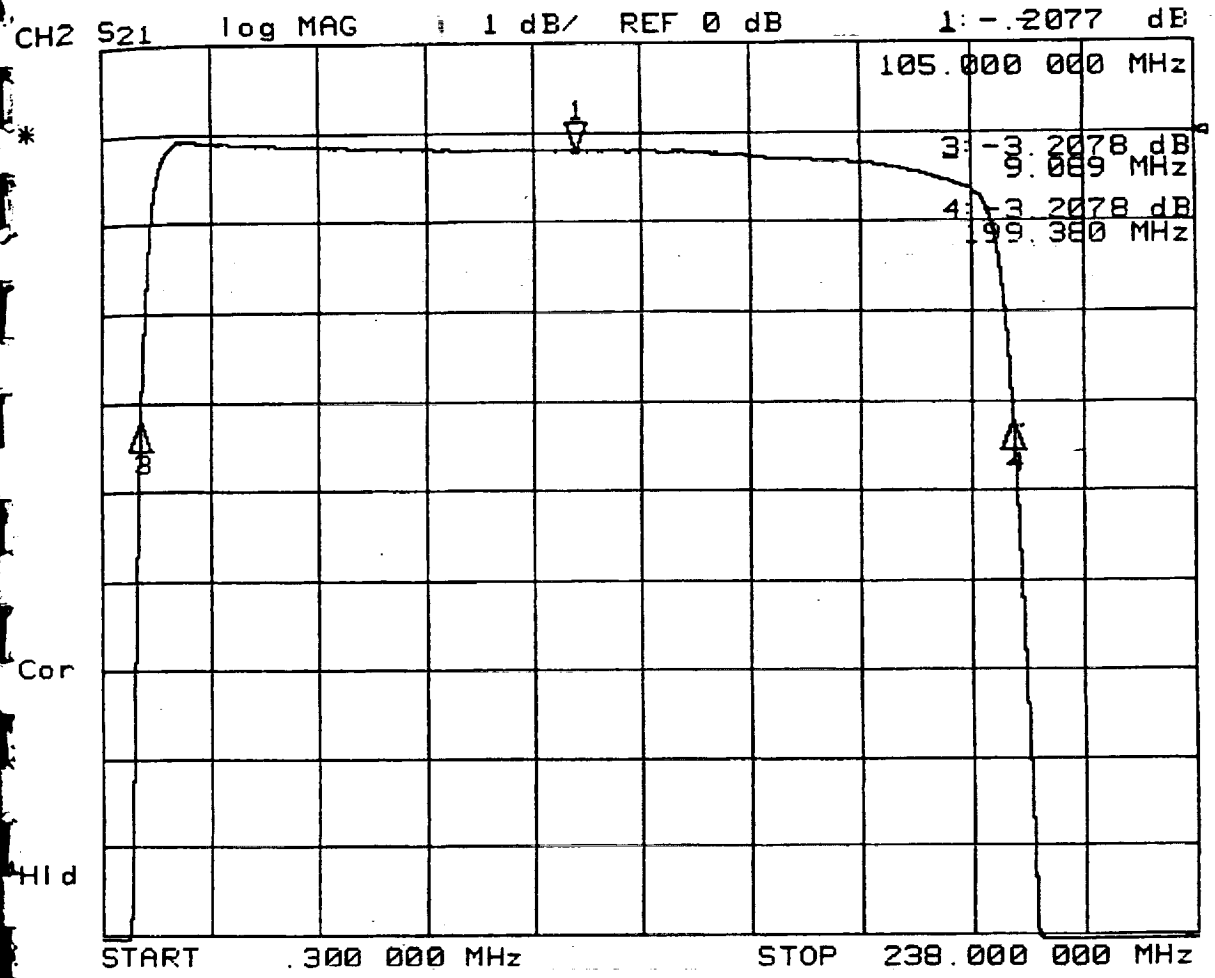
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	19.32 MHz	18.13 Mhz	19.32 MHz
MIN INSERTION LOSS PERFORMANCE	-0.08 dB	-0.08 dB	-0.08 dB
{11b} 75% BW LOWER BANDEDGE FREQ	13.51 MHz	13.38 Mhz	13.29 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.28 dB	-0.30 dB	-0.32 dB
{11c} 75% BW UPPER BANDEDGE FREQ	156.01 MHz	155.88 Mhz	155.79 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.28 dB	-0.30 dB	-0.32 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.20 dB	0.22 dB	0.24 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.20 dB	0.22 dB	0.24 dB



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-009
-10C DATA
OPR: R. HOGGATT DATE DEC 28 1996 annel 2

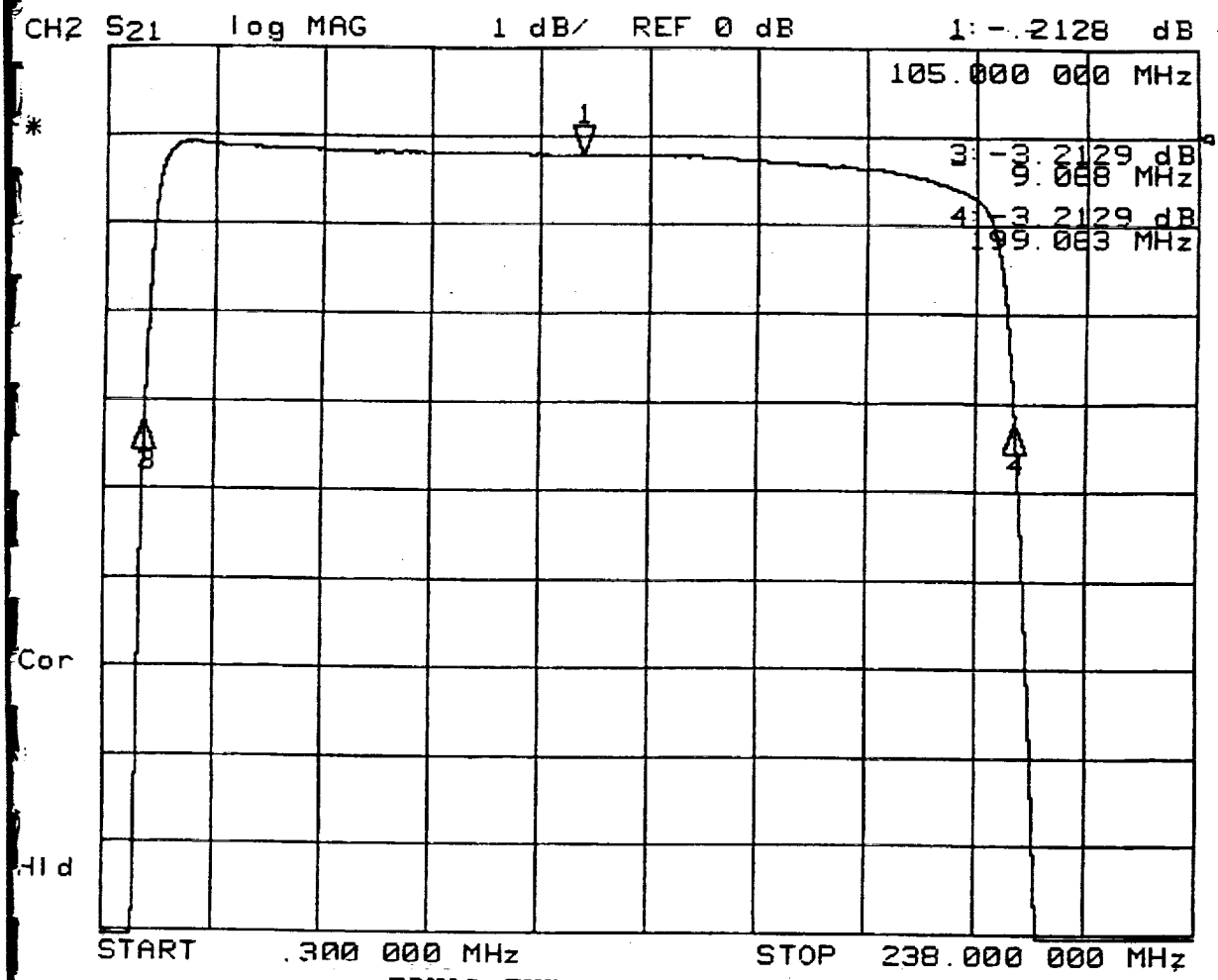
MARKER PARAMET		
MARKER 1	19.500000 MHz OFF	105.000000 MHz -.1976 dB
MARKER 2	190.500000 MHz OFF	104.403006 MHz OFF
MARKER 3	33.750000 MHz OFF	9.089467 MHz -3.1976 dB
MARKER 4	176.250000 MHz OFF	199.716546 MHz -3.1976 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-009
+15C DATA
OPR: R. HOGGATT DATE DEC 28 1996

MARKER PARAMET! nnel 2

MARKER 1	19.500000 MHz OFF	105.000000 MHz -.2077 dB
MARKER 2	190.500000 MHz OFF	104.225061 MHz OFF
MARKER 3	33.750000 MHz OFF	9.069272 MHz -3.2078 dB
MARKER 4	176.250000 MHz OFF	199.380850 MHz -3.2078 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-009
+40C DATA
OPR: R. HOGGATT DATE DEC 28 1996

MARKER PARAMET	annel 2	
MARKER 1	19.500000 MHz OFF	105.000000 MHz -.2128 dB
MARKER 2	190.500000 MHz OFF	104.066019 MHz OFF
MARKER 3	33.750000 MHz OFF	9.068112 MHz -3.2129 dB
MARKER 4	176.250000 MHz OFF	199.063927 MHz -3.2129 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX B **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-009
PROJET 1331559-2 REV. F

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=105.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-59.1 dB (40.0 dB MIN)	-59.1 dB (40.0 dB MIN)	-59.0 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 228.5 MHz TO 1000.0 MHz	-42.7 dB (40.0 dB MIN)	-42.8 dB (40.0 dB MIN)	-42.8 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-12.8 °C (-15.0 TO -10.0)	+15.4 °C (12.5 TO 17.5)	+42.9 °C (40.0 TO 45.0)
} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

DA 8

TEST PERFORMED BY R. Hoggatt DATE 12/28/96

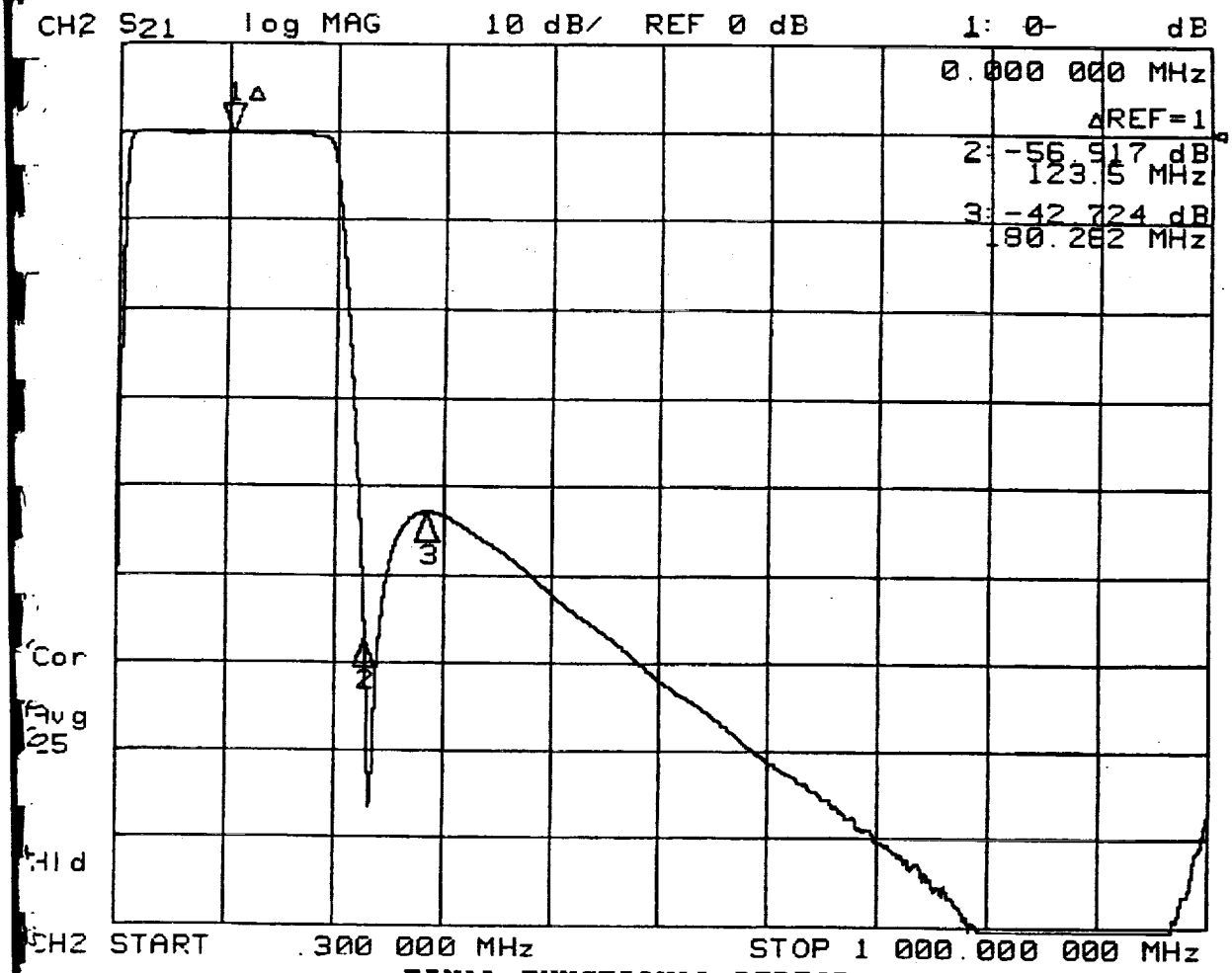
NOTE IF TEST WITNESSED BY AESD: _____ GSI: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST *****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

{16} REFERENCE CUSTOMER DRAWING 1331559

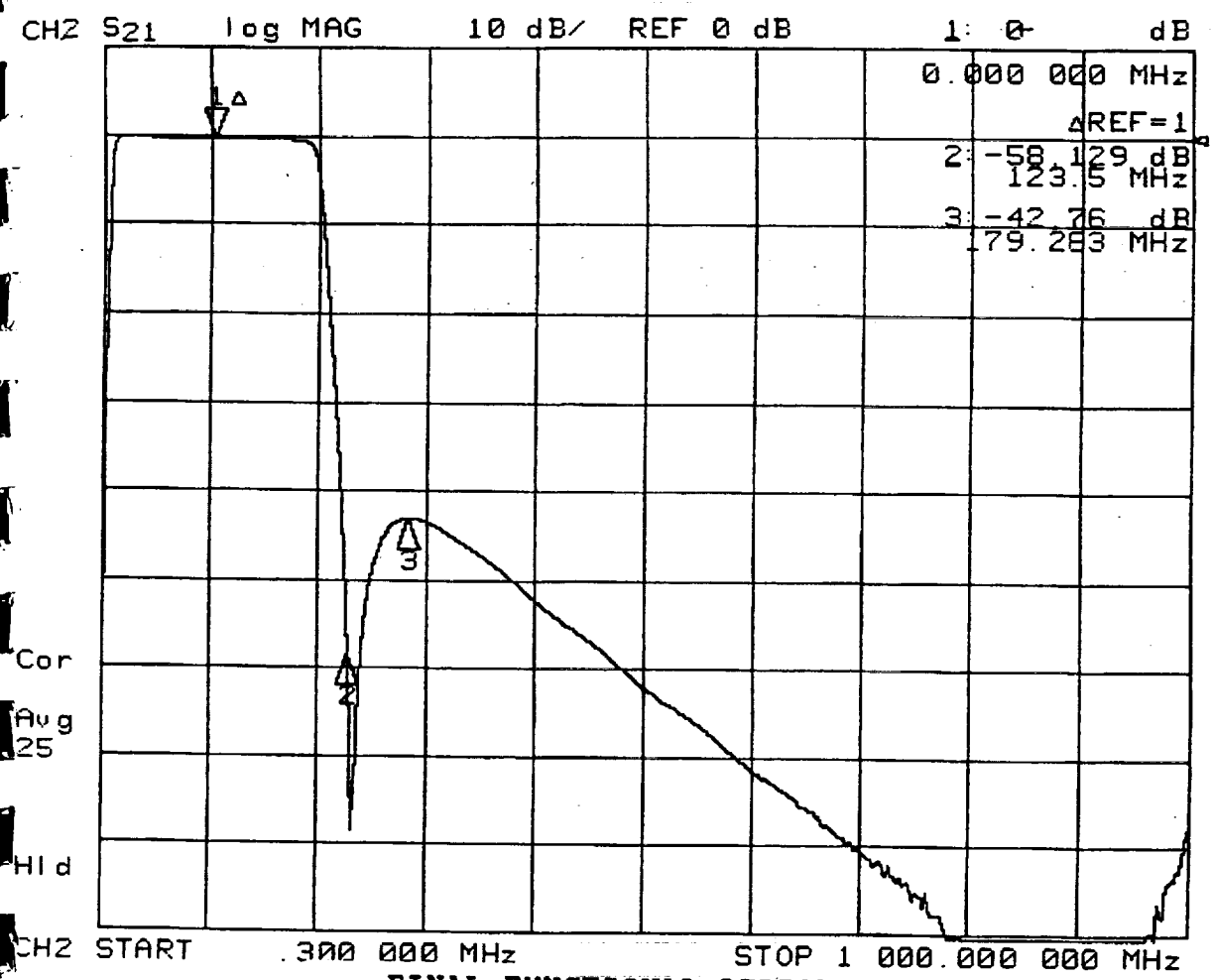
DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.500
MOUNTING HOLE CENTER	0.125 ± .010	0.125
BETWEEN UPPER MOUNTING HOLES	3.250	3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.250



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-009
-10C DATA
OPR: R. HOGGATT DATE DEC 28 1996

annel 2

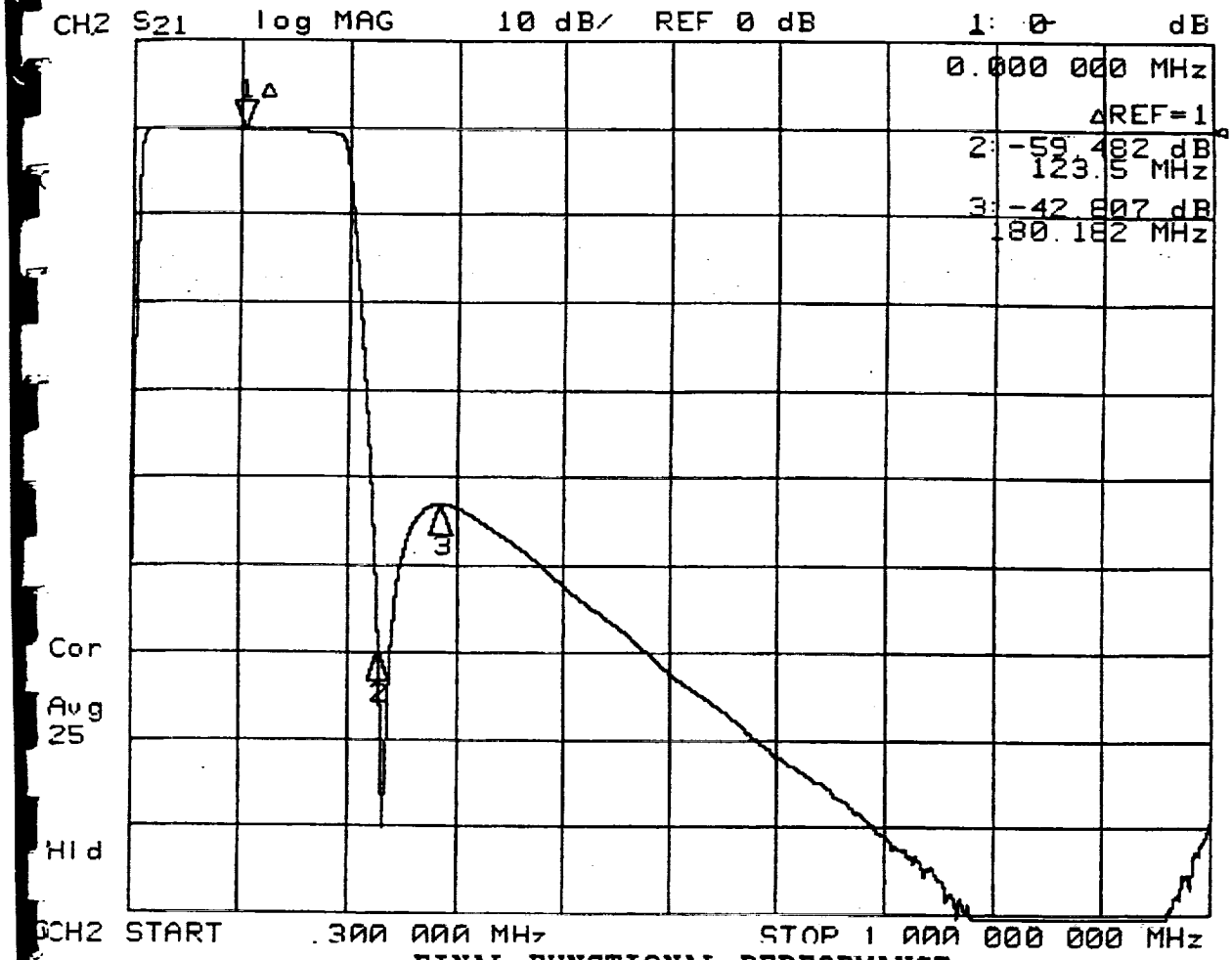
MARKER PARAMET		
MARKER 1	1.000000 MHz	105.000000 MHz
	OFF	0 dB
MARKER 2	5.000000 MHz	228.500000 MHz
	OFF	-56.917 dB
MARKER 3	5.000000 MHz	285.282962 MHz
	OFF	-42.724 dB
MARKER 4	5.000000 MHz	.300000 MHz
	OFF	OFF
MKR STIMULUS OFFSET	0.000000 MHz	0.000000 MHz
	0 dB	0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-009
+15C DATA
OPR: R. HOGGATT DATE DEC 28 1996

annel 2

MARKER PARAMET		
MARKER 1	1.000000 MHz	105.000000 MHz
	OFF	0 dB
MARKER 2	5.000000 MHz	228.500000 MHz
	OFF	-58.129 dB
MARKER 3	5.000000 MHz	284.283262 MHz
	OFF	-42.76 dB
MARKER 4	5.000000 MHz	.300000 MHz
	OFF	OFF
MKR STIMULUS OFFSET	0.000000 MHz	0.000000 MHz
	0 dB	0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
MARKER TRACKING	OFF	OFF
	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-009
+40C DATA

MARKER PARAMET **OPR: R. HOGGATT DATE** DEC 28 1996 annel 2

MARKER 1	1.000000 MHz	105.000000 MHz
	OFF	0 dB
MARKER 2	5.000000 MHz	228.500000 MHz
	OFF	-59.482 dB
MARKER 3	5.000000 MHz	285.182992 MHz
	OFF	-42.807 dB
MARKER 4	5.000000 MHz	.300000 MHz
	OFF	OFF
MKR STIMULUS OFFSET	0.000000 MHz	0.000000 MHz
	0 dB	0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX B **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-009
EROJET 1331559-2 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT
PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE: +23.3 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-82.4 dB	F11	(*) 130.0	MHz	-0.21 dB
F2	1.0	MHz	-66.1 dB	F12	(*) 150.0	MHz	-0.30 dB
F3	5.0	MHz	-17.6 dB	F13	180.0	MHz	-0.45 dB
F4	7.5	MHz	-7.21 dB	F14	190.0	MHz	-0.65 dB
F5	10.0	MHz	-1.69 dB	F15	200.0	MHz	-3.85 dB
F6	20.0	MHz	-0.09 dB	F16	250.0	MHz	-49.2 dB
F7	40.0	MHz	-0.10 dB	F17	300.0	MHz	-43.4 dB
F8	(*) 60.0	MHz	-0.16 dB	F18	400.0	MHz	-52.2 dB
F9	(*) 80.0	MHz	-0.18 dB	F19	500.0	MHz	-62.1 dB
F10	105.0	MHz	-0.20 dB	F20	1000.0	MHz	-78.7 dB

DA 8

TEST PERFORMED BY: R. HOGGAN DATE 12/27/96

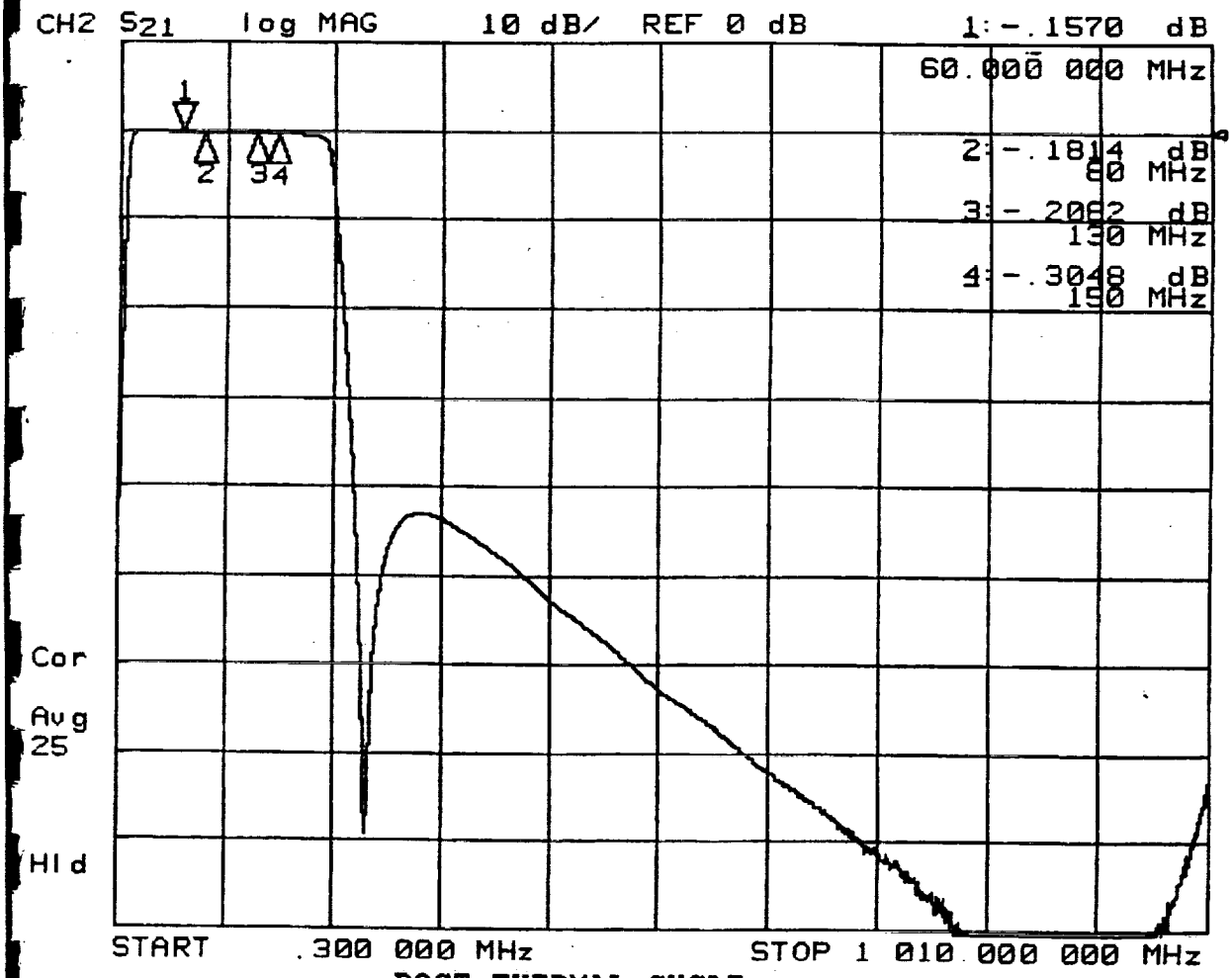
NOTE IF TEST WITNESSED BY AESD _____ GSI - Not witnessed this time. DLD

***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST
ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX B PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P228-009
AMBIENT
OPR: R. HOGGATT DATE DEC 27 1996 annel 2

MARKER 1	17.750000 MHz OFF	60.000000 MHz -.1570 dB
MARKER 2	157.250000 MHz OFF	80.000000 MHz -.1814 dB
MARKER 3	29.375000 MHz OFF	130.000000 MHz -.2062 dB
MARKER 4	145.625000 MHz OFF	150.000000 MHz -.3048 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Channel 7 Bandpass Filter

IF Filter (S/N: 1331559-2, S/N: P228-006)

APPENDIX B **ACCEPTANCE TEST REPORT**

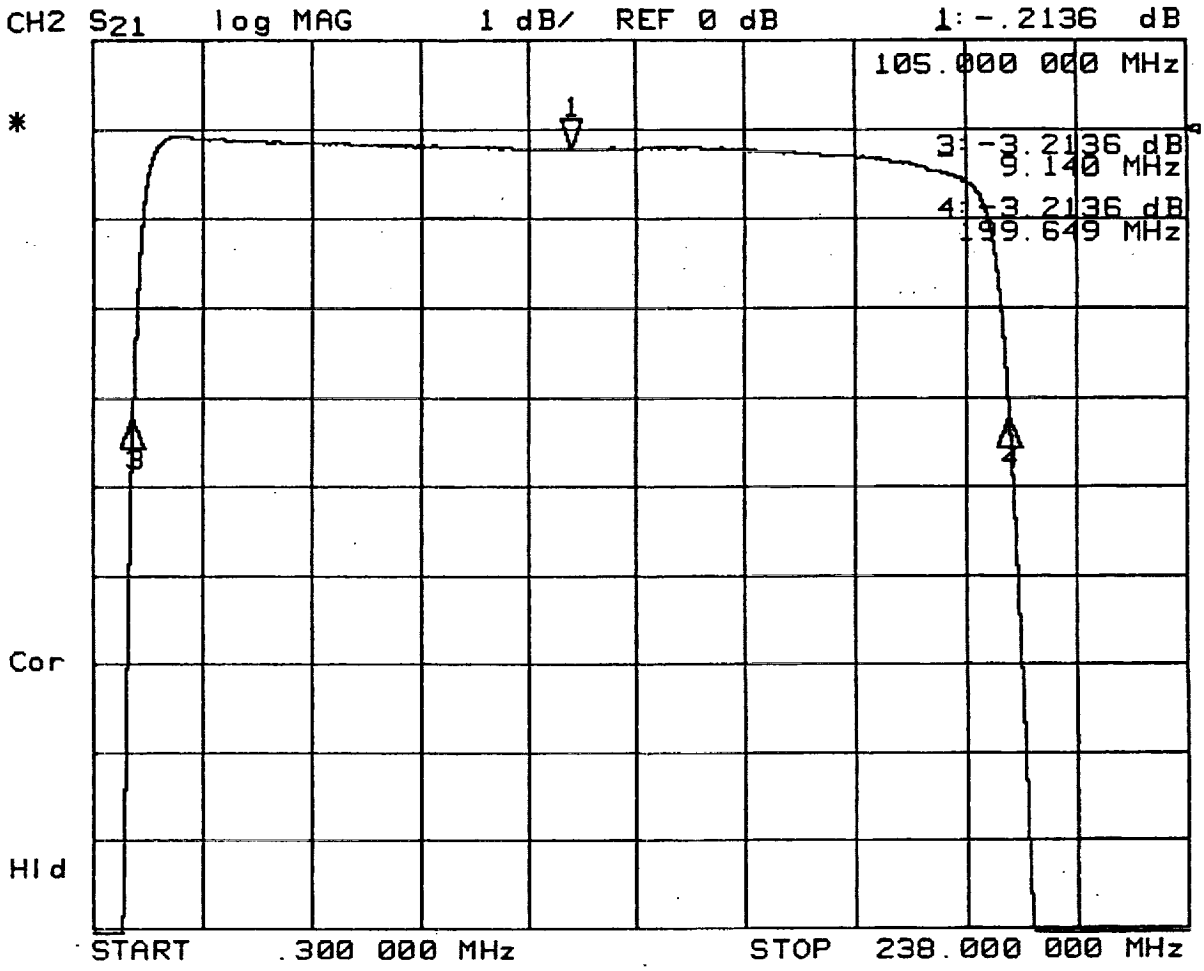
BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-006
AEROJET 1331559-2 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	199.65 MHz (198.0-200.0)	199.32 Mhz (198.0-200.0)	198.98 MHz (1480.01500.0)
{8} LOWER 3.0 dB BANDEDGE	9.14 MHz (8.0-10.0)	9.13 Mhz (8.0-10.0)	9.12 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	190.51 MHz (188.0-192.0)	190.19 Mhz (188.0-192.0)	189.86 MHz (188.0-192.0)
{10} ADD {7} AND {8} ÷ 2 =	104.40 MHz (105.0 NOM)	104.23 MHz (105.0 NOM)	104.05 Mhz (105.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-13.0 °C (-15.0 TO -10.0)	+15.9 °C (12.5 TO 17.5)	+43.0 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

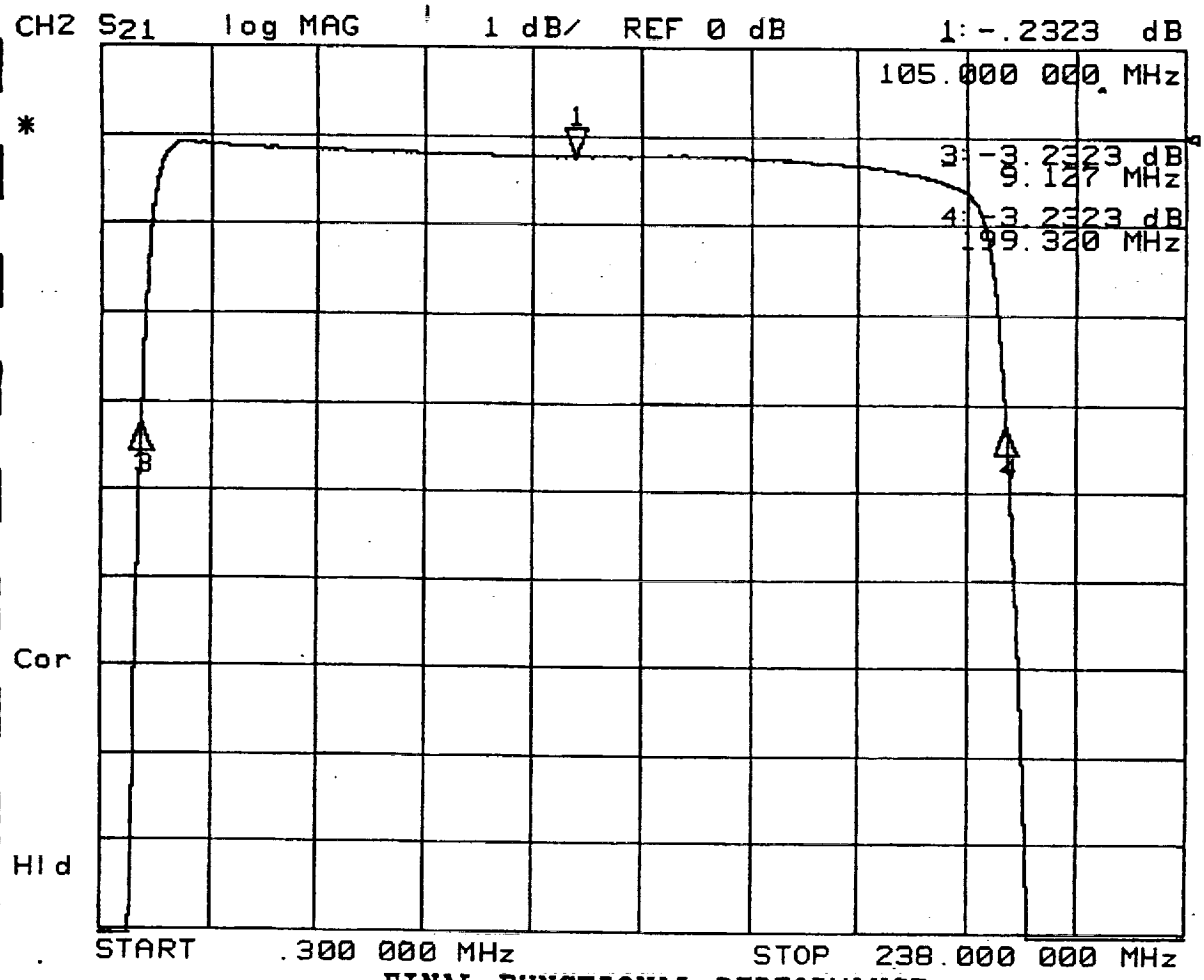
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	19.32 MHz	19.91 Mhz	19.32 MHz
MIN INSERTION LOSS PERFORMANCE	-0.08 dB	-0.08 dB	-0.08 dB
{11b} 75% BW LOWER BANDEDGE FREQ	13.88 MHz	13.78 Mhz	13.61 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.26 dB	-0.27 dB	-0.30 dB
{11c} 75% BW UPPER BANDEDGE FREQ	156.38 MHz	156.28 Mhz	156.11 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.26 dB	-0.27 dB	-0.30 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.18 dB	0.19 dB	0.22 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.18 dB	0.19 dB	0.22 dB



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-006
-10C DATA
OPR: R. HOGGATT DATE DEC 28 1996 annel 2

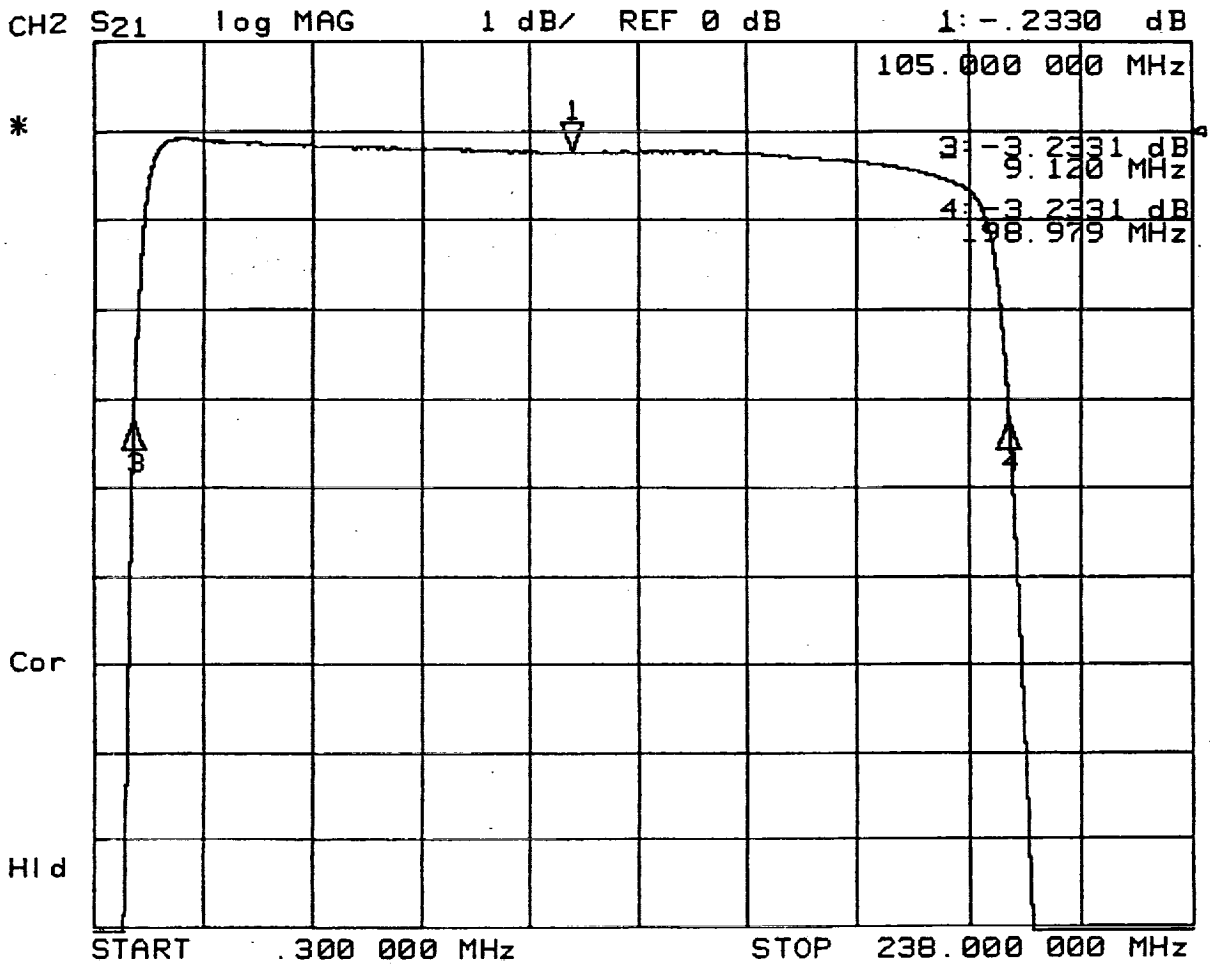
MARKER PARAMET		
MARKER 1	19.500000 MHz OFF	105.000000 MHz -.2136 dB
MARKER 2	190.500000 MHz OFF	104.395021 MHz OFF
MARKER 3	33.750000 MHz OFF	9.140851 MHz -3.2136 dB
MARKER 4	176.250000 MHz OFF	199.649192 MHz -3.2136 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-006
+15C DATA
OPR: R. HOGGATT DATE DEC 28 1996

MARKER PARAMET annel 2

MARKER 1	19.500000 MHz OFF	105.000000 MHz -.2323 dB
MARKER 2	190.500000 MHz OFF	104.224021 MHz OFF
MARKER 3	33.750000 MHz OFF	9.127191 MHz -3.2323 dB
MARKER 4	176.250000 MHz OFF	199.320851 MHz -3.2323 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-006
+40C DATA

MARKER PARAMET OPR: R. HOGGATT DATE DEC 28 1996 annel 2

MARKER 1	19.500000 MHz OFF	105.000000 MHz -.2330 dB
MARKER 2	190.500000 MHz OFF	104.050054 MHz OFF
MARKER 3	33.750000 MHz OFF	9.120665 MHz -3.2331 dB
MARKER 4	176.250000 MHz OFF	198.979444 MHz -3.2331 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-006
AEROJET 1331559-2 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	____ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=105.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-59.2 dB (40.0 dB MIN)	-59.2 dB (40.0 dB MIN)	-59.1 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 228.5 MHz TO 1000.0 MHz	-42.0 dB (40.0 dB MIN)	-42.0 dB (40.0 dB MIN)	-42.1 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-13.0 °C (-15.0 TO -10.0)	+15.7 °C (12.5 TO 17.5)	+42.9 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

TEST PERFORMED BY R. HOGGATT DATE 12/23/96

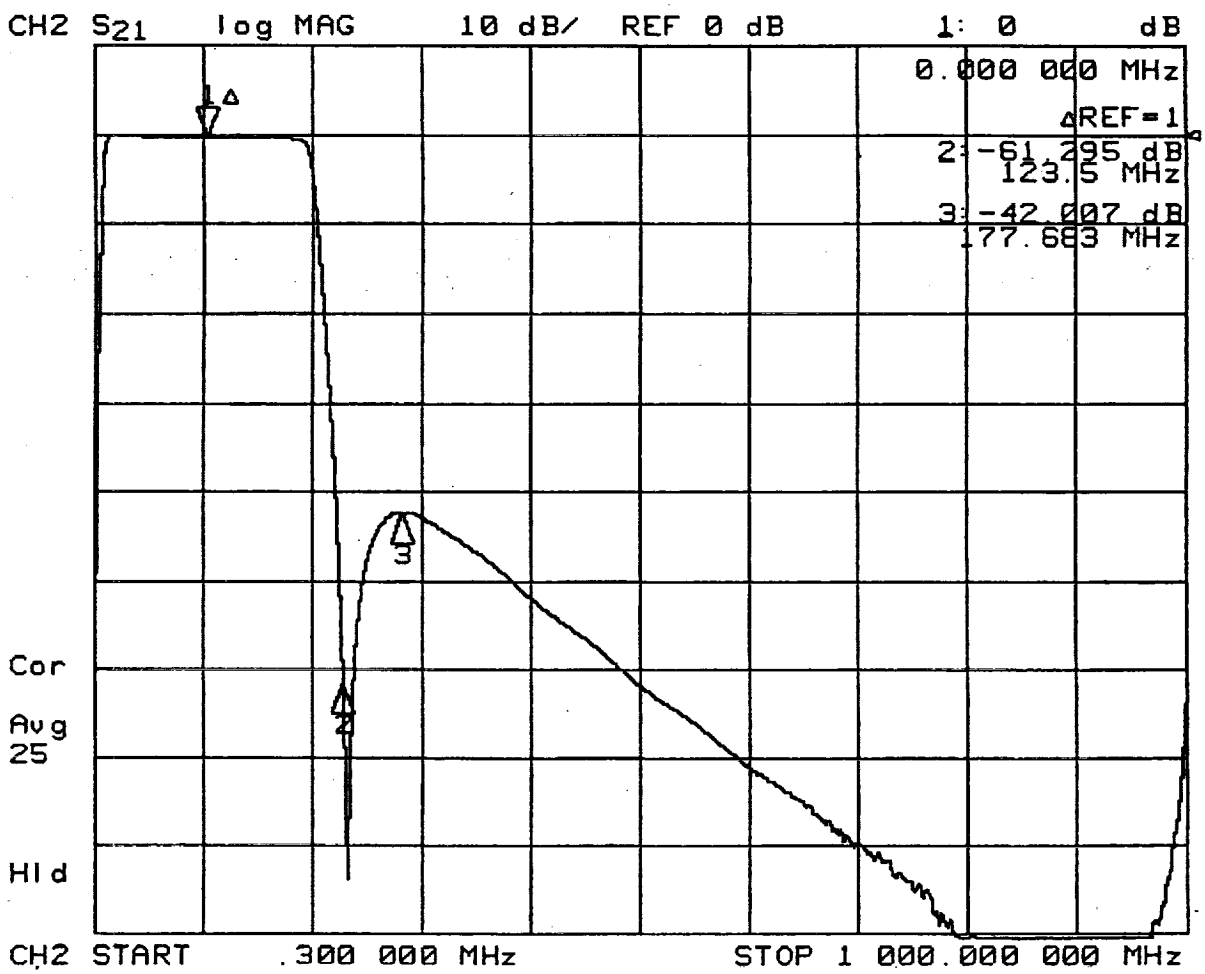
NOTE IF TEST WITNESSED BY AESD: _____ GSI: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST *****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

{16} REFERENCE CUSTOMER DRAWING 1331559

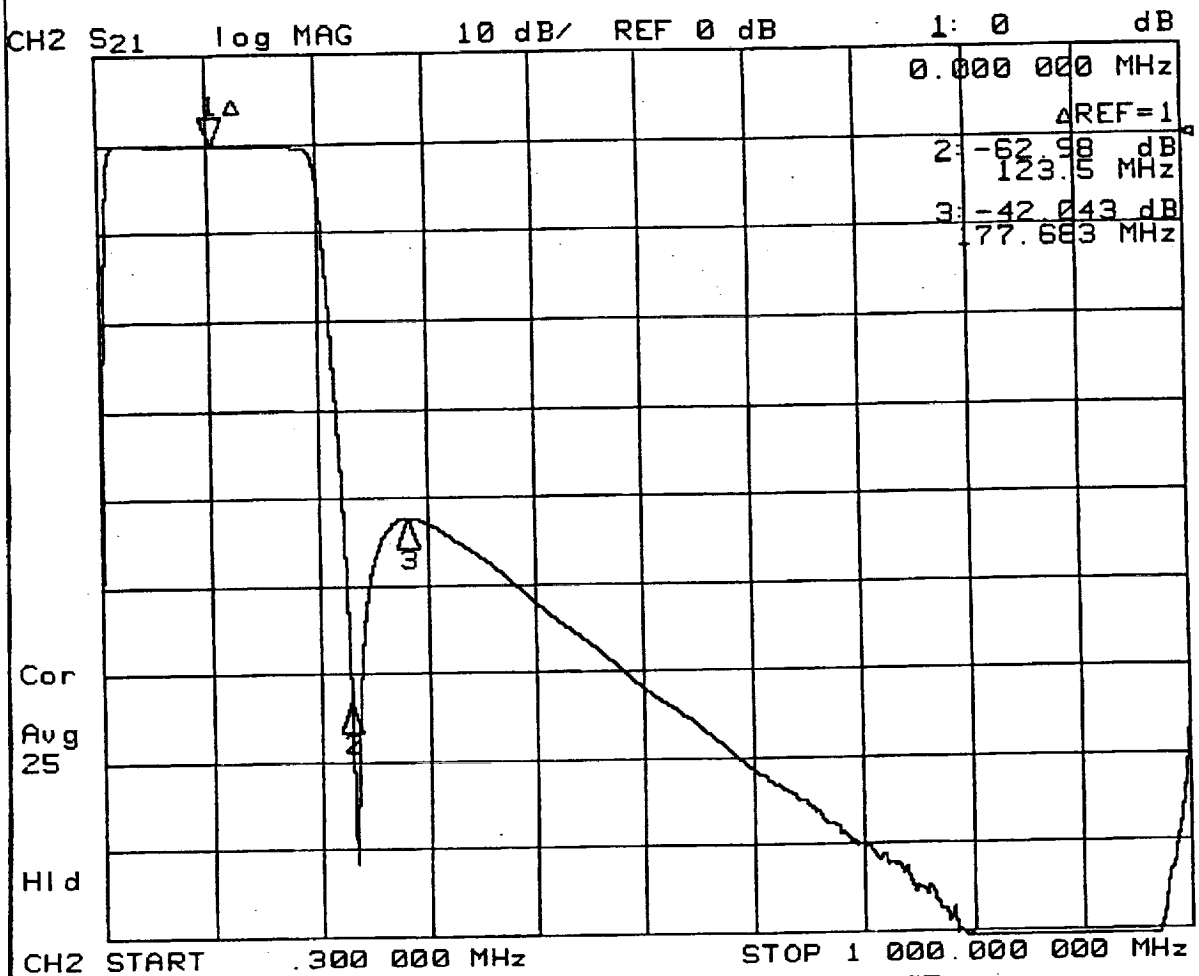
DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.500
MOUNTING HOLE CENTER	0.125 ± .010	0.127
BETWEEN UPPER MOUNTING HOLES	3.250	3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.251



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-006
-10C DATA
OPR: R. HOGGATT DATE DEC 28 1996

MARKER PARAMETER annel 2

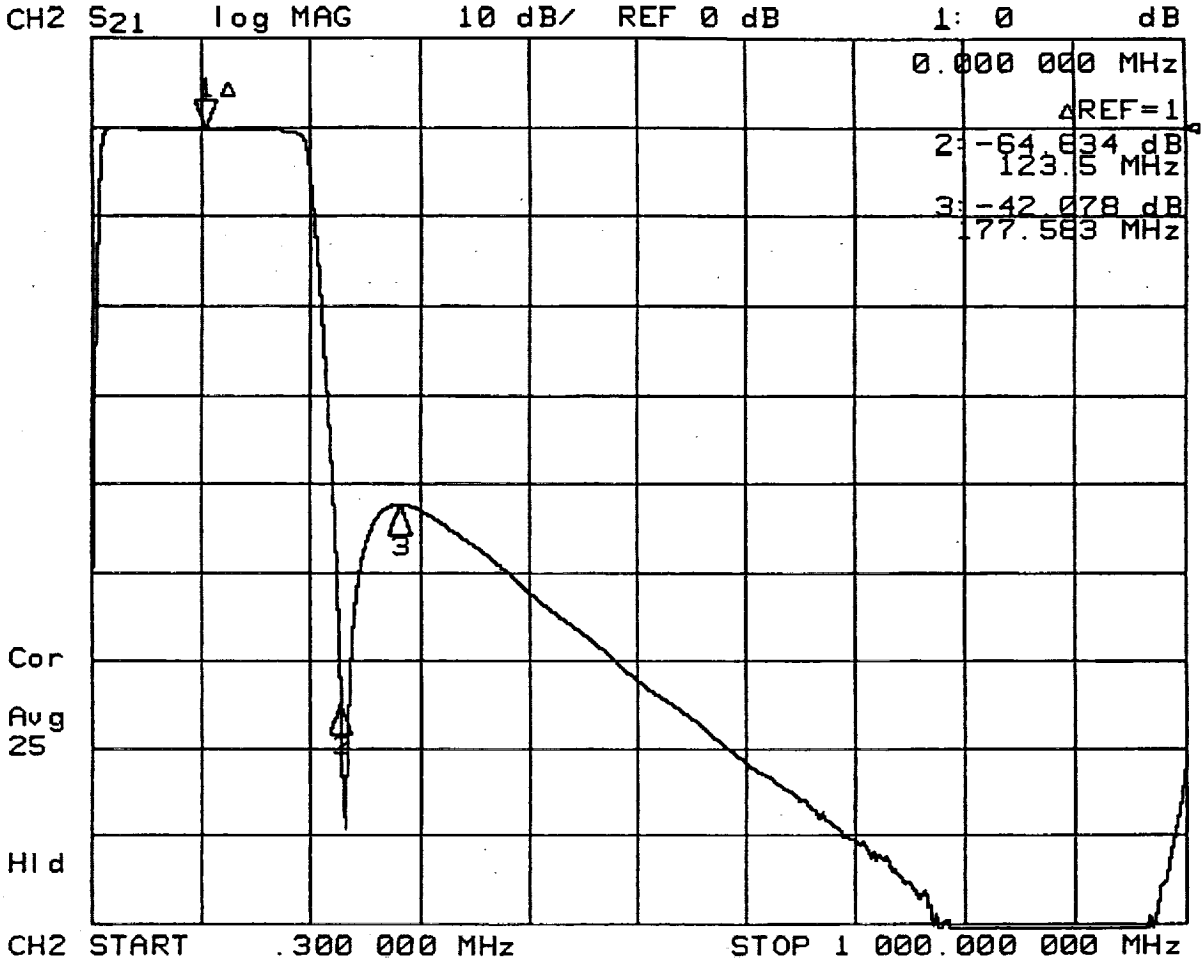
MARKER 1	1.000000 MHz	105.000000 MHz
	OFF	0 dB
MARKER 2	5.000000 MHz	228.500000 MHz
	OFF	-61.295 dB
MARKER 3	5.000000 MHz	282.683742 MHz
	OFF	-42.007 dB
MARKER 4	5.000000 MHz	.300000 MHz
	OFF	OFF
MKR STIMULUS OFFSET	0.000000 MHz	0.000000 MHz
	0 dB	0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-006
+15C DATA

MARKER PARAMET **OPR: R. HOGGATT DATE** DEC 28 1996 annel 2

MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -62.98 dB
MARKER 3	5.000000 MHz OFF	282.683742 MHz -42.043 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-006
+40C DATA
OPR: R. HOGGATT DATE DEC 28 1996

MARKER PARAMETER annel 2

MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -64.634 dB
MARKER 3	5.000000 MHz OFF	282.583772 MHz -42.078 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB

REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-006
TELEDYNE PROJET 1331559-2 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT
PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE +22.9 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-82.4 dB	F11	(*) 130.0	MHz	-0.21 dB
F2	1.0	MHz	-66.1 dB	F12	(*) 150.0	MHz	-0.26 dB
F3	5.0	MHz	-17.7 dB	F13	180.0	MHz	-0.41 dB
F4	7.5	MHz	-7.36 dB	F14	190.0	MHz	-0.62 dB
F5	10.0	MHz	-1.78 dB	F15	200.0	MHz	-3.93 dB
F6	20.0	MHz	-0.07 dB	F16	250.0	MHz	-47.5 dB
F7	40.0	MHz	-0.10 dB	F17	300.0	MHz	-42.9 dB
F8	(*) 60.0	MHz	-0.16 dB	F18	400.0	MHz	-52.1 dB
F9	(*) 80.0	MHz	-0.19 dB	F19	500.0	MHz	-62.0 dB
F10	105.0	MHz	-0.23 dB	F20	1000.0	MHz	-70.7 dB

DM 8

TEST PERFORMED BY: R. HOGGATT DATE 12/27/96

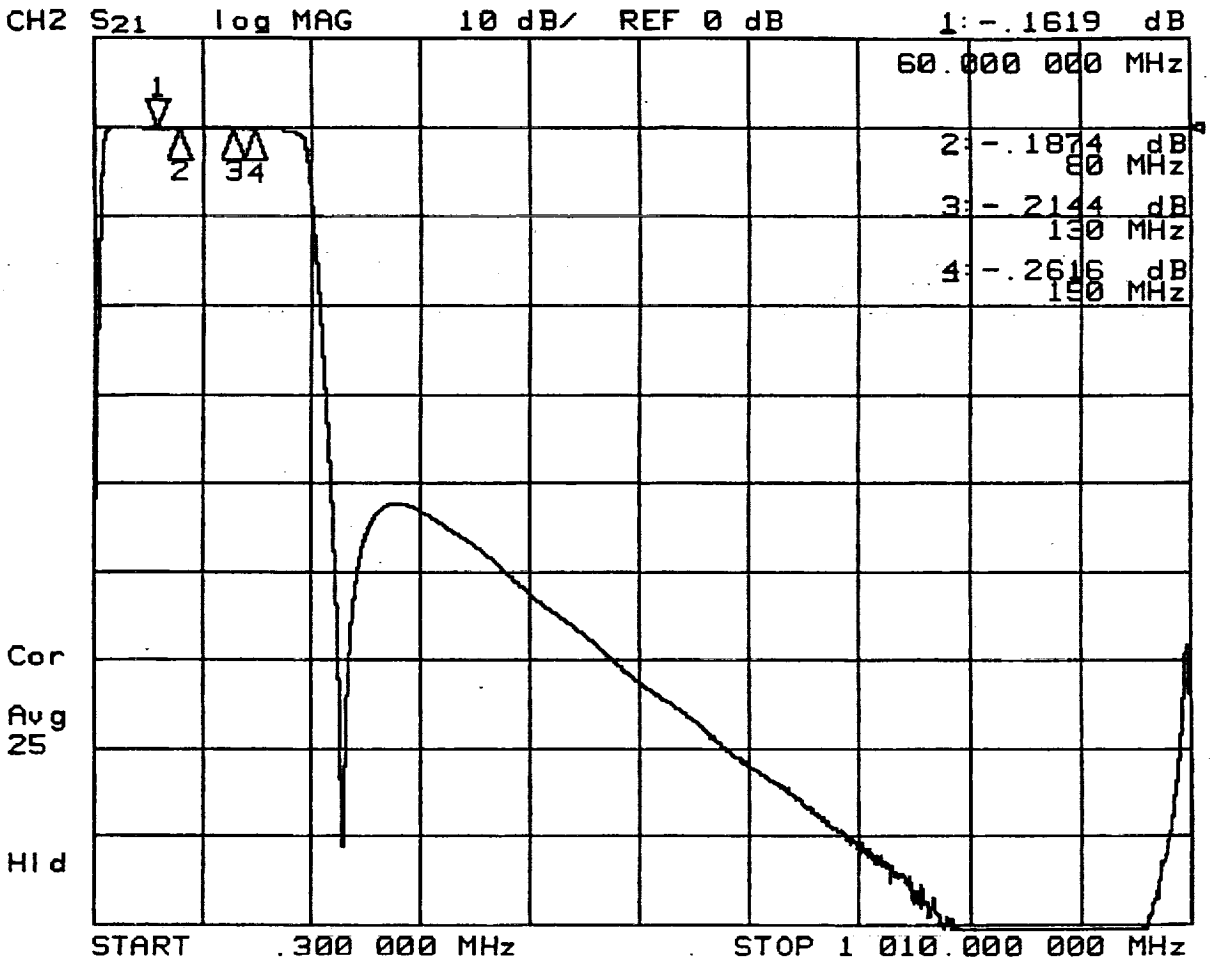
NOTE IF TEST WITNESSED BY AESD _____ GSI Not witnessed this time. DLD

***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST
ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX B PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P228-006
AMBIENT
MARKER PARAME OPR: R. HOGGATT DATE DEC 27 1996 annel 2

MARKER 1	17.750000 MHz OFF	60.000000 MHz -.1619 dB
MARKER 2	157.250000 MHz OFF	80.000000 MHz -.1874 dB
MARKER 3	29.375000 MHz OFF	130.000000 MHz -.2144 dB
MARKER 4	145.625000 MHz OFF	150.000000 MHz -.2616 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Channel 8 Bandpass Filter

IF Filter (S/N: 1331559-4, S/N: P230-010)

APPENDIX D **ACCEPTANCE TEST REPORT**

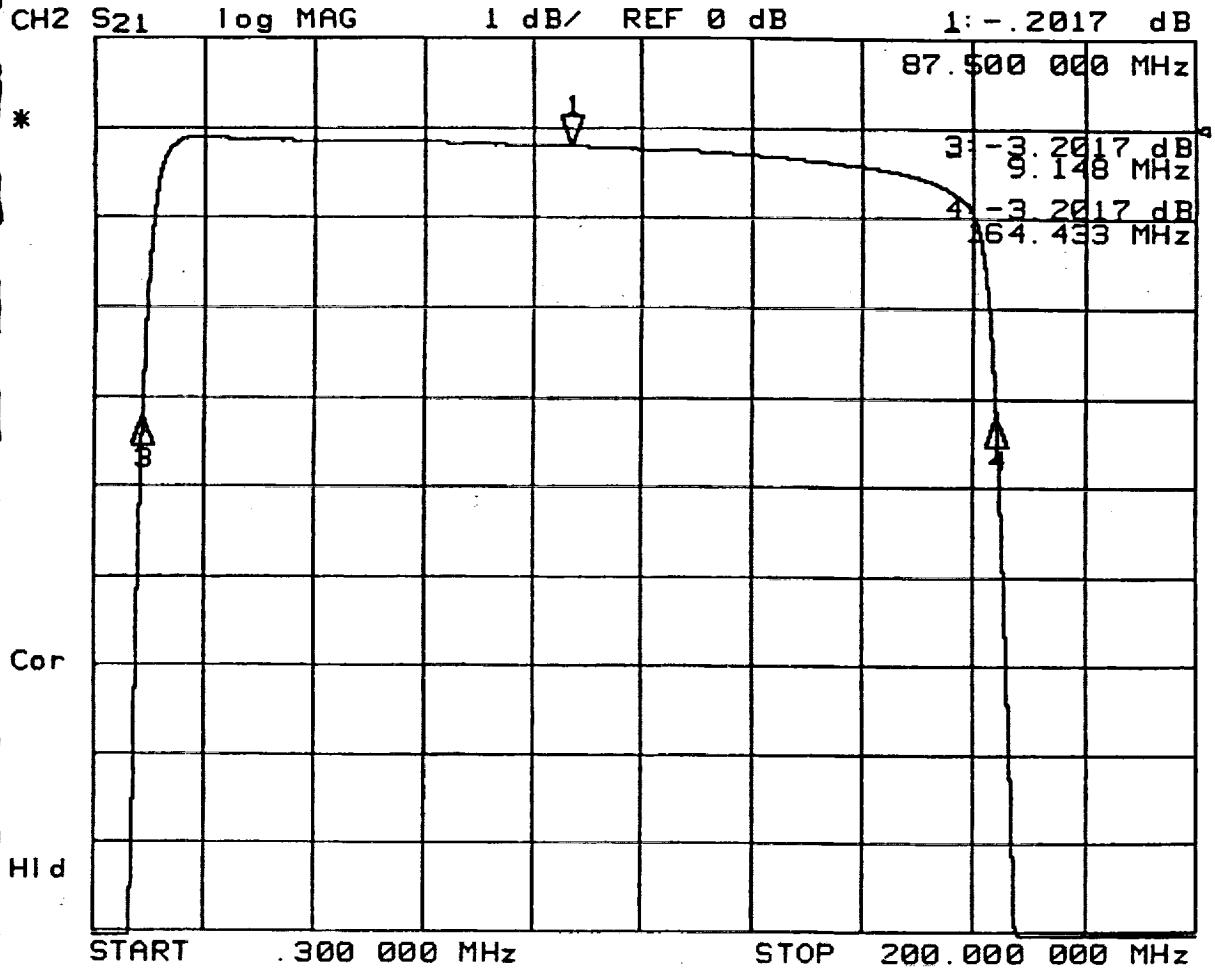
BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-010
AEROJET 1331559-4 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	164.43 MHz (163.0-165.0)	164.19 Mhz (163.0-165.0)	163.91 MHz (163.0-165.0)
{8} LOWER 3.0 dB BANDEDGE	9.15 MHz (8.0-10.0)	9.14 Mhz (8.0-10.0)	9.12 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	155.28 MHz (153.0-157.0)	155.05 Mhz (153.0-157.0)	154.79 MHz (153.0-157.0)
{10} ADD {7} AND {8} ÷ 2 =	86.79 MHz (87.5 NOM)	86.67 MHz (87.5 NOM)	86.52 Mhz (87.5 NOM)
{10a} RECORD MEASURED TEMPERATURE	-11.0 °C (-15.0 TO -10.0)	+12.8 °C (12.5 TO 17.5)	+43.5 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

PASSBAND RIPPLE

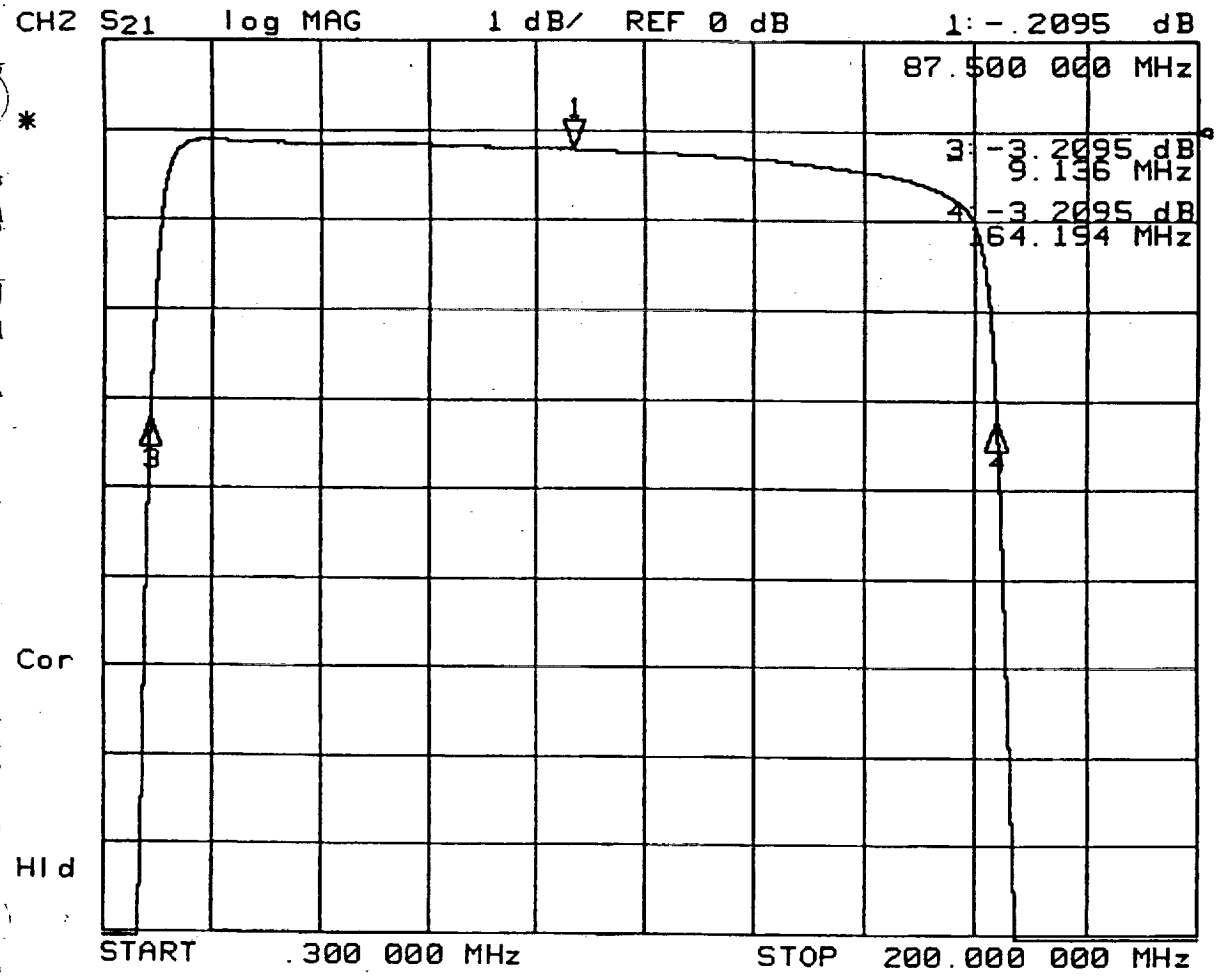
ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	19.27 MHz	19.27 Mhz	19.27 MHz
MIN INSERTION LOSS PERFORMANCE	-0.16 dB	-0.10 dB	-0.11 dB
{11b} 75% BW LOWER BANDEDGE FREQ	13.24 MHz	13.12 Mhz	12.96 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.35 dB	-0.36 dB	-0.39 dB
{11c} 75% BW UPPER BANDEDGE FREQ	129.49 MHz	129.37 Mhz	129.21 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.35 dB	-0.36 dB	-0.39 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.25 dB	0.26 dB	0.28 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.25 dB	0.26 dB	0.28 dB



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-010
-10C DATA

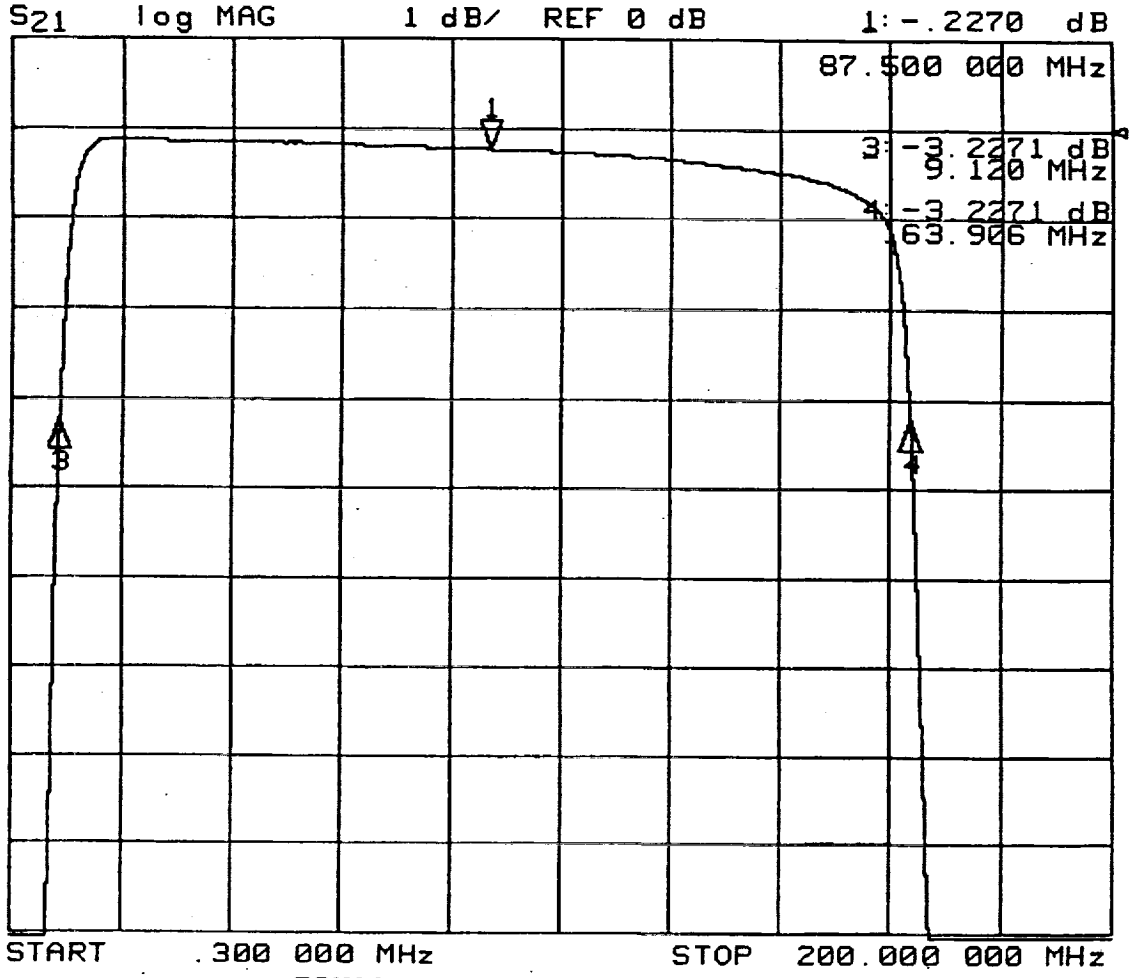
MARKER PARAMET OPR: R. HOGGATT DATE DEC 20 1996 annel 2

MARKER 1	17.750000 MHz OFF	87.500000 MHz -.2017 dB
MARKER 2	157.250000 MHz OFF	86.791303 MHz OFF
MARKER 3	29.375000 MHz OFF	9.148935 MHz -3.2017 dB
MARKER 4	145.625000 MHz OFF	164.433671 MHz -3.2017 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-010
+15C DATA
OPR: R. HOGGATT DATE DEC 20 1996 annel 2

MARKER PARAMET		
MARKER 1	17.750000 MHz OFF	87.500000 MHz -.2095 dB
MARKER 2	157.250000 MHz OFF	86.665624 MHz OFF
MARKER 3	29.375000 MHz OFF	9.136459 MHz -3.2095 dB
MARKER 4	145.625000 MHz OFF	164.194790 MHz -3.2095 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-010
+40C DATA
OPR: R. HOGGATT DATE DEC 20 1996

annel 2

MARKER PARAMET		
MARKER 1	17.750000 MHz OFF	87.500000 MHz -.2270 dB
MARKER 2	157.250000 MHz OFF	86.513599 MHz OFF
MARKER 3	29.375000 MHz OFF	9.120635 MHz -3.2271 dB
MARKER 4	145.625000 MHz OFF	163.906564 MHz -3.2271 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-010
PROJET 1331559-4 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=87.5 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-60.4 dB (40.0 dB MIN)	-60.4 dB (40.0 dB MIN)	-60.3 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 188.25 MHz TO 1000.0 MHz	-62.2 dB (40.0 dB MIN)	-63.1 dB (40.0 dB MIN)	-64.1 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-11.0 °C (-15.0 TO -10.0)	+12.5 °C (12.5 TO 17.5)	+43.5 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

DA 5

TEST PERFORMED BY R. Hoggatt DATE 12/20/96

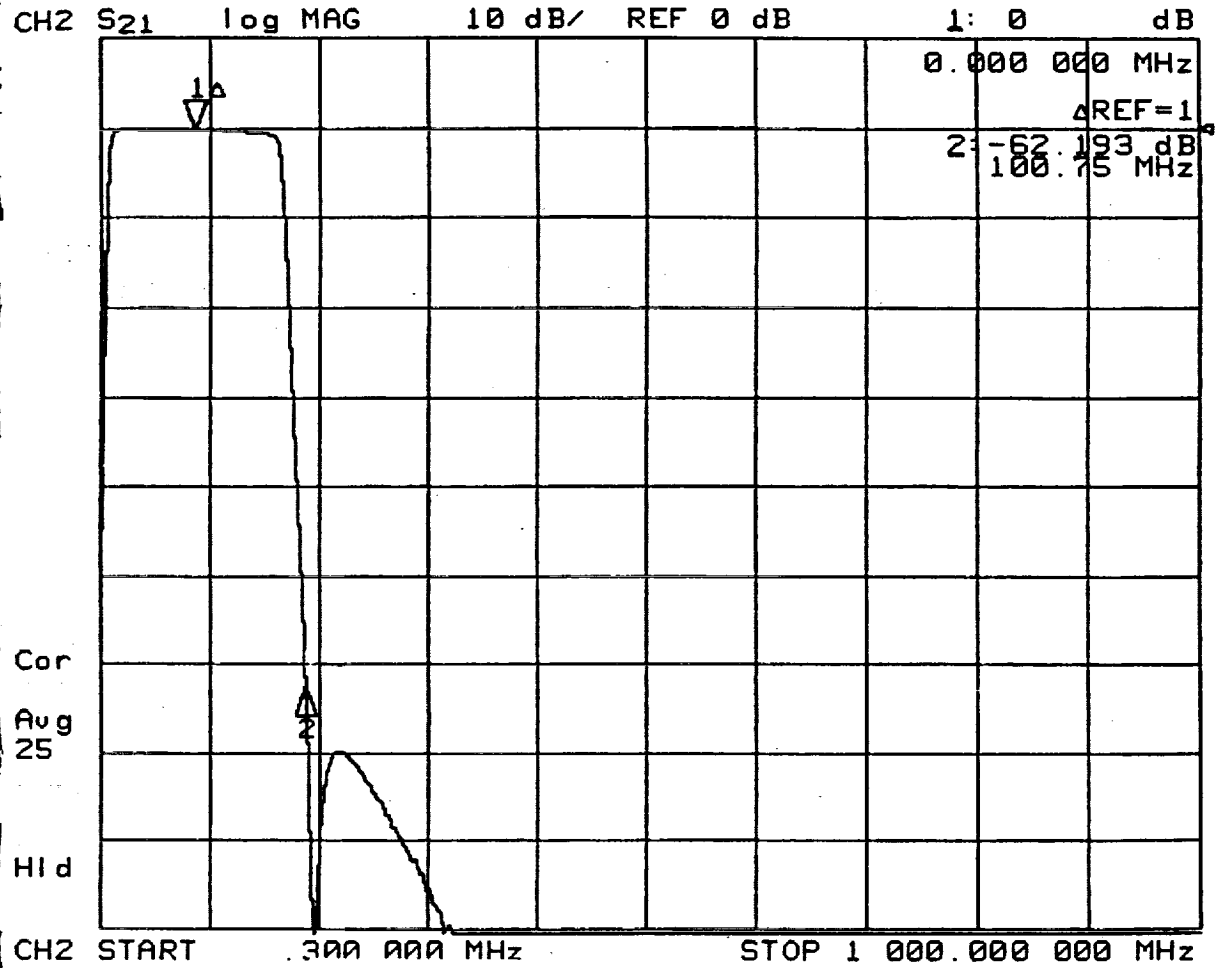
NOTE IF TEST WITNESSED BY AESD: _____ GSI Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST *****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

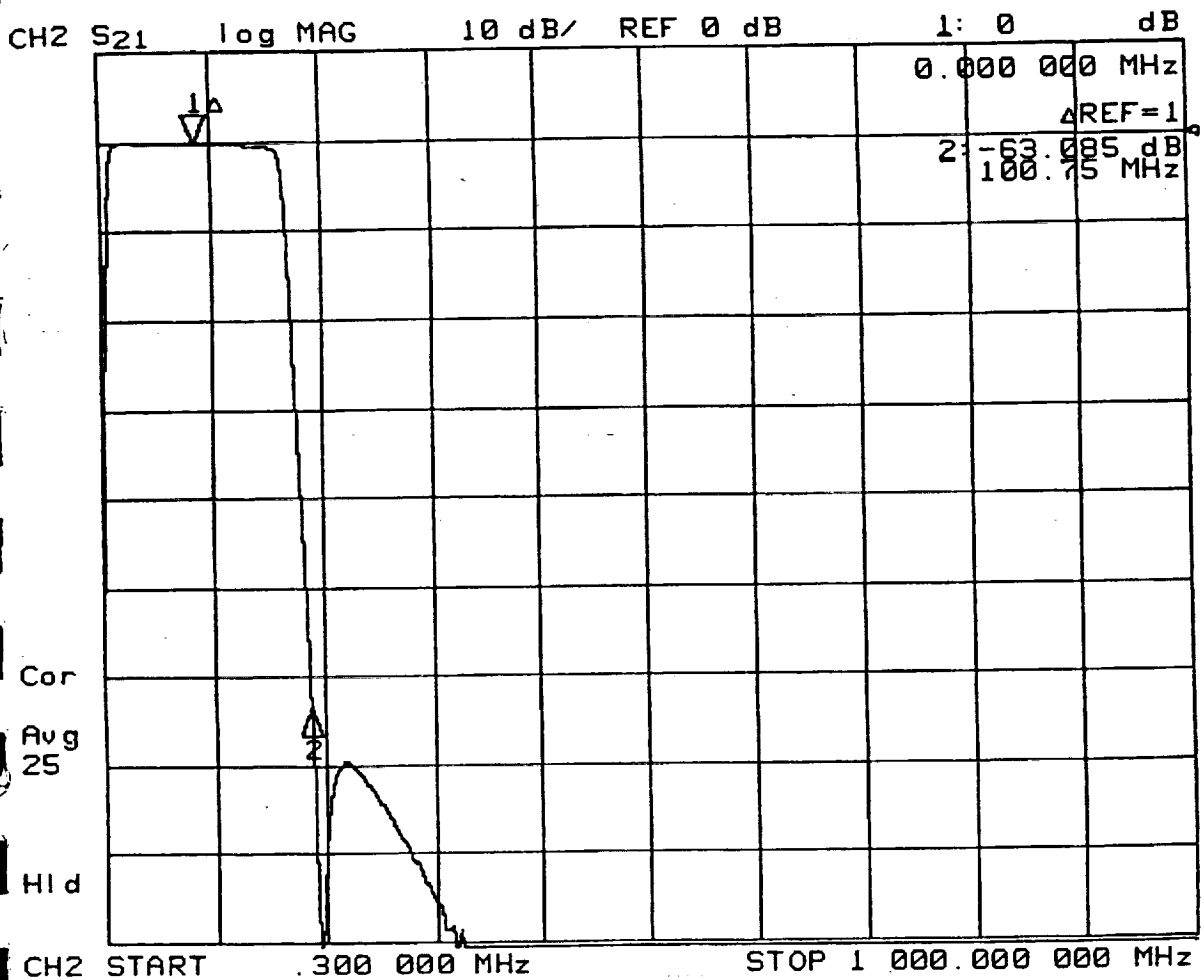
{16} REFERENCE CUSTOMER DRAWING 1331559

DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.500
MOUNTING HOLE CENTER	0.125 ± .010	0.124
BETWEEN UPPER MOUNTING HOLES	3.250	3.251
BETWEEN LOWER MOUNTING HOLES	3.250	3.251



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-010
-10C DATA
OPR: R. HOGGATT DATE DEC 20 1996 annel 2

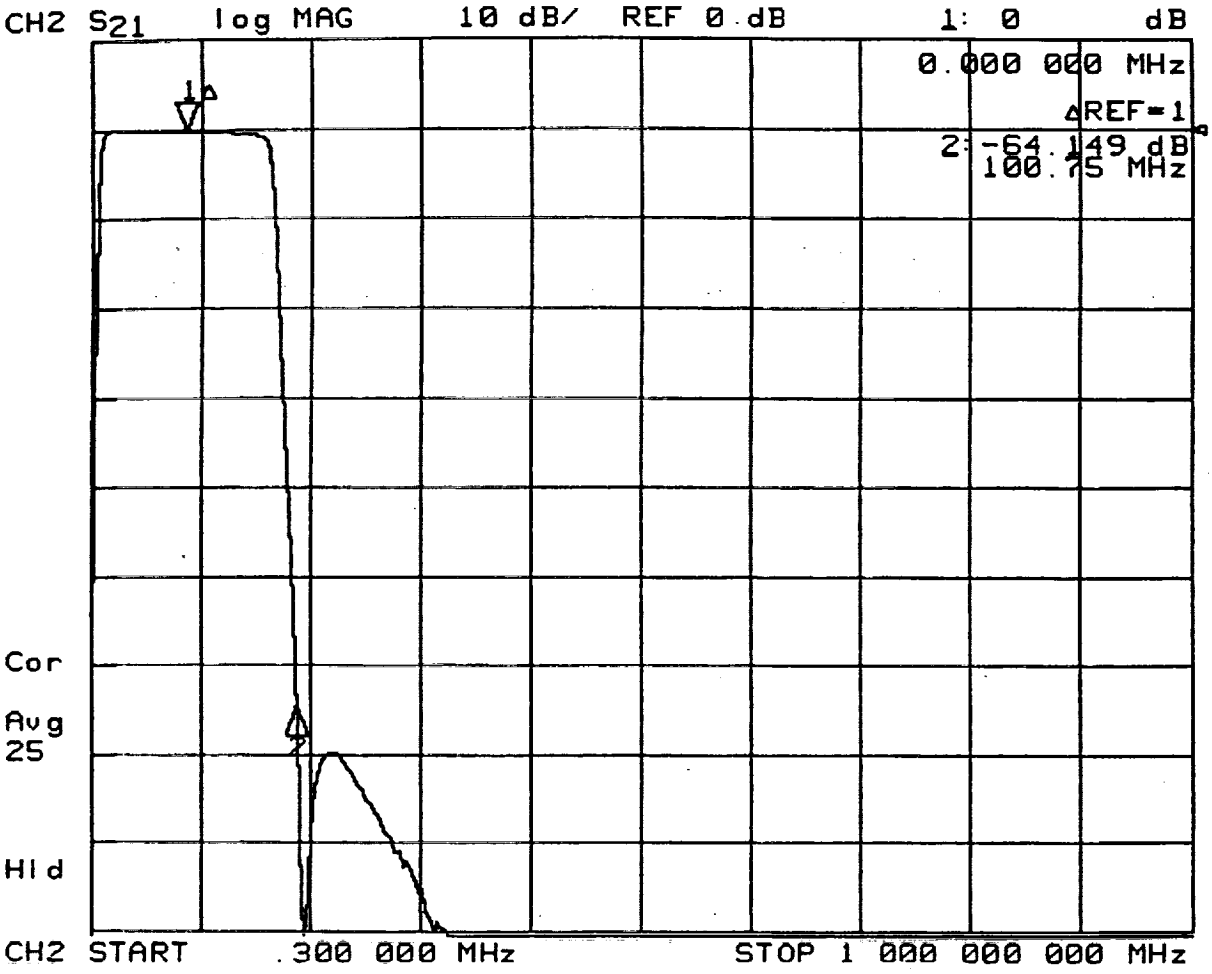
MARKER PARAMET		
MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -62.193 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-010
+15C DATA
OPR: R. HOGGATT DATE DEC 20 1996

MARKER PARAME annel 2

MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -63.085 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-010
+40C DATA
OPR: R. HOGGATT DATE DEC 20 1996

MARKER PARAMET		annel 2
MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -64.149 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-010
PROJET 1331559-4 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT

PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +22.4 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-83.6 dB	F11	(*) 100.0	MHz	-0.25 dB
F2	1.0	MHz	-67.3 dB	F12	(*) 125.0	MHz	-0.33 dB
F3	5.0	MHz	-18.5 dB	F13	150.0	MHz	-0.58 dB
F4	7.5	MHz	-7.59 dB	F14	160.0	MHz	-1.04 dB
F5	10.0	MHz	-1.78 dB	F15	165.0	MHz	-4.35 dB
F6	15.0	MHz	-0.21 dB	F16	170.0	MHz	-15.5 dB
F7	25.0	MHz	-0.11 dB	F17	200.0	MHz	-81.8 dB
F8	(*) 50.0	MHz	-0.15 dB	F18	300.0	MHz	-85.5 dB
F9	(*) 75.0	MHz	-0.20 dB	F19	500.0	MHz	-102.0 dB
F10	87.5	MHz	-0.25 dB	F20	1000.0	MHz	-99.7 dB

TEST PERFORMED BY: R. HOGGATT (DA 5) DATE 12/20/96

NOTE IF TEST WITNESSED BY AESD _____ GSI Not witnessed this time. DLD

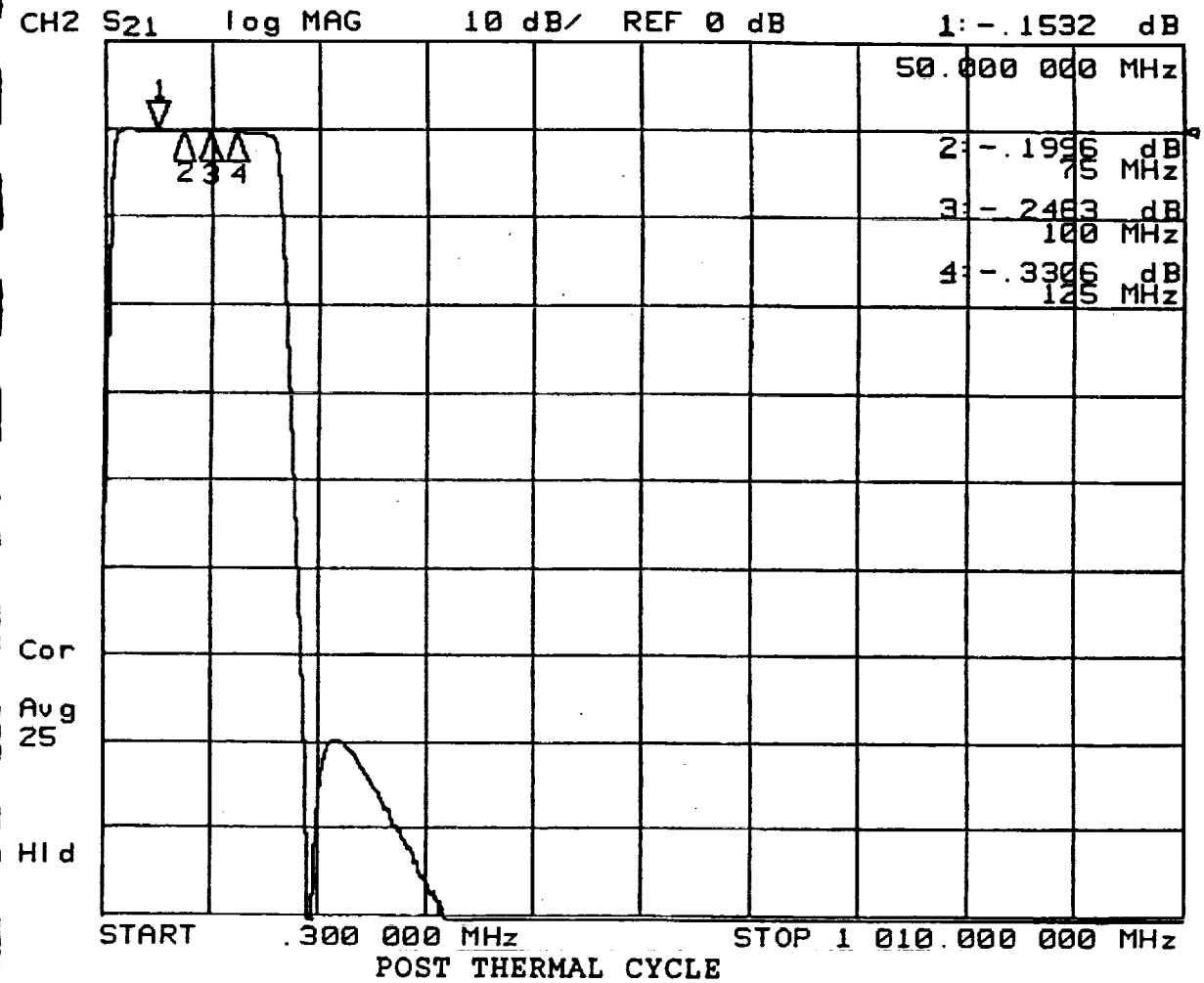
***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST

ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX D PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a .) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
b.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
c.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.
d) INSERTION LOSS PER ATP PARA 4.5.2
e) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) VSWR PER ATP PARA 4.5.1.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P230-010
AMBIENT
OPR: R. HOGGATT DATE DEC 20 1996

MARKER PARAME annel 2

MARKER 1	17.750000 MHz OFF	50.000000 MHz -.1532 dB
MARKER 2	157.250000 MHz OFF	75.000000 MHz -.1996 dB
MARKER 3	29.375000 MHz OFF	100.000000 MHz -.2463 dB
MARKER 4	145.625000 MHz OFF	125.000000 MHz -.3306 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Channel 9 Bandpass Filter

IF Filter (S/N: 1331559-4, S/N: P230-006)

APPENDIX D **ACCEPTANCE TEST REPORT**

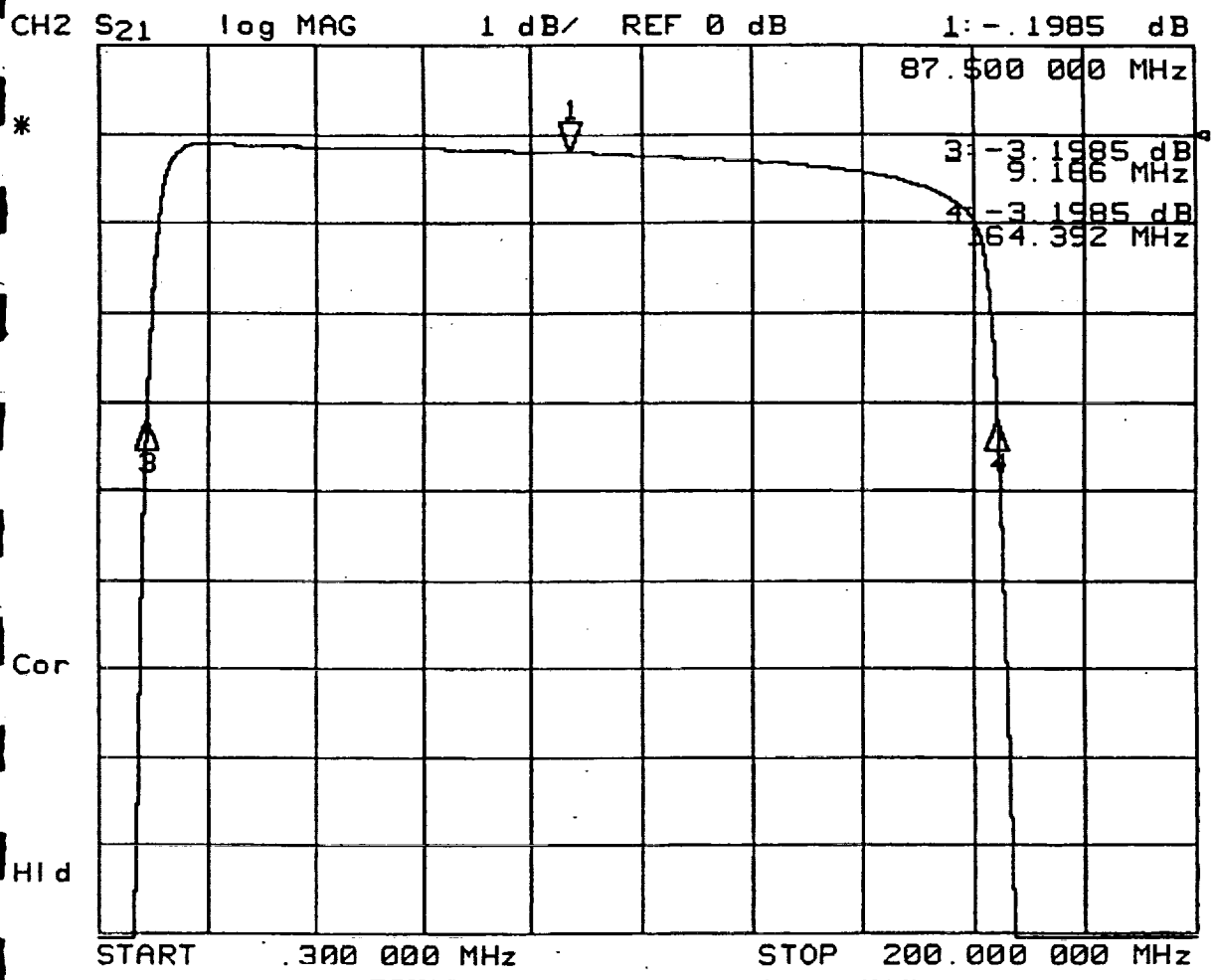
BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-006
AEROJET 1331559-4 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	164.39 MHz (163.0-165.0)	164.14 Mhz (163.0-165.0)	163.85 MHz (163.0-165.0)
{8} LOWER 3.0 dB BANDEDGE	9.17 MHz (8.0-10.0)	9.15 Mhz (8.0-10.0)	9.14 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	155.22 MHz (153.0-157.0)	154.99 Mhz (153.0-157.0)	154.71 MHz (153.0-157.0)
{10} ADD {7} AND {8} ÷ 2 =	86.78 MHz (87.5 NOM)	86.65 MHz (87.5 NOM)	86.50 Mhz (87.5 NOM)
{10a} RECORD MEASURED TEMPERATURE	-11.9 °C (-15.0 TO -10.0)	+13.7 °C (12.5 TO 17.5)	+42.9 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

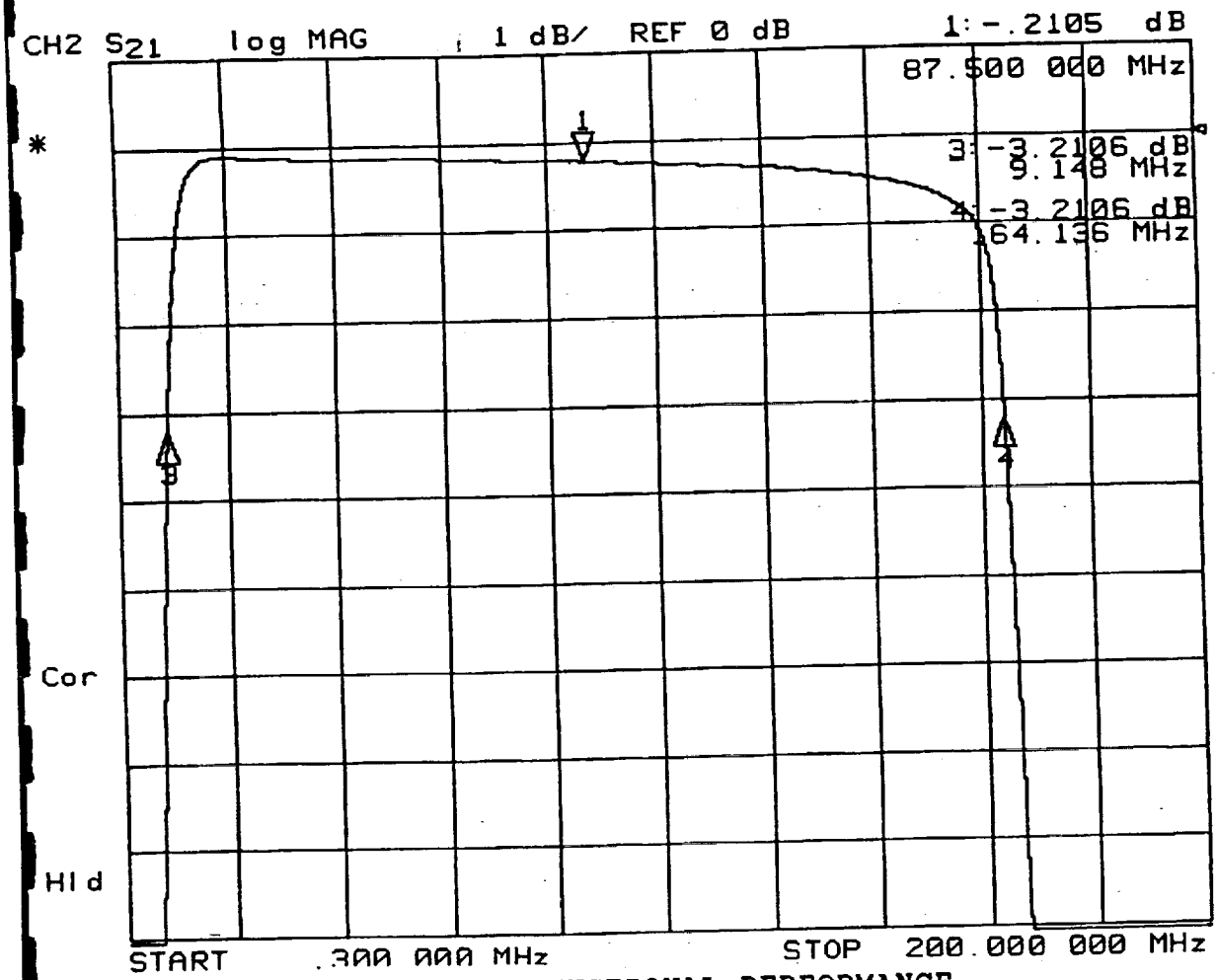
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	19.27 MHz	19.27 Mhz	19.27 MHz
MIN INSERTION LOSS PERFORMANCE	-0.09 dB	-0.10 dB	-0.11 dB
{11b} 75% BW LOWER BANDEDGE FREQ	13.25 MHz	13.17 Mhz	13.01 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.35 dB	-0.37 dB	-0.40 dB
{11c} 75% BW UPPER BANDEDGE FREQ	129.50 MHz	129.42 Mhz	129.26 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.35 dB	-0.37 dB	-0.40 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.26 dB	0.27 dB	0.29 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.26 dB	0.27 dB	0.29 dB



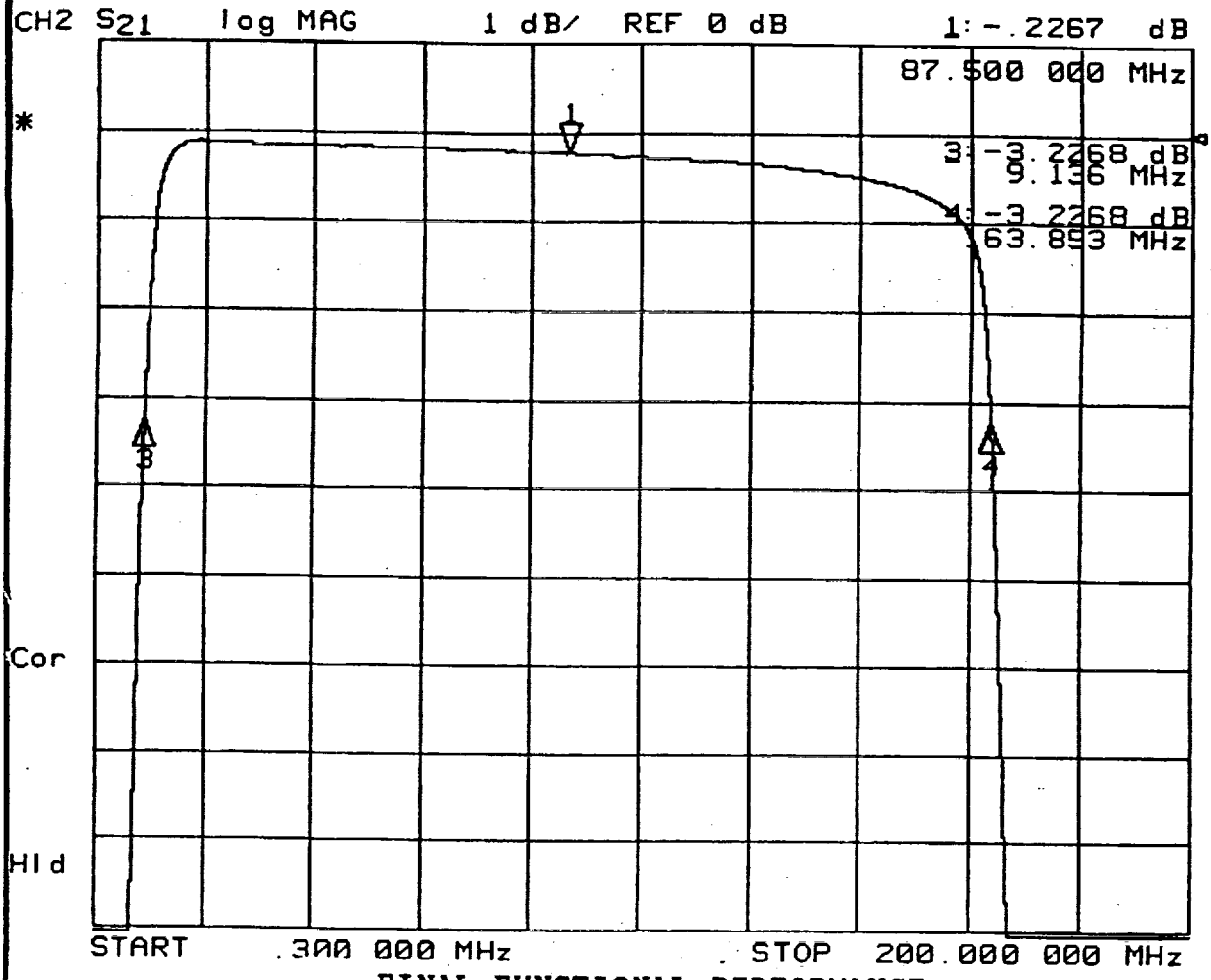
FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-006
-10C DATA
OPR: R. HOGGATT DATE DEC 20 1996

MARKER PARAME	annel 2	
MARKER 1	17.750000 MHz OFF	87.500000 MHz -.1985 dB
MARKER 2	157.250000 MHz OFF	86.779282 MHz OFF
MARKER 3	29.375000 MHz OFF	9.166482 MHz -3.1985 dB
MARKER 4	145.625000 MHz OFF	164.392082 MHz -3.1985 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-006
+15C DATA
OPR: R. HOGGATT DATE DEC 20 1996 annel 2

MARKER PARAME		
MARKER 1	17.750000 MHz OFF	87.500000 MHz -.2105 dB
MARKER 2	157.250000 MHz OFF	86.642087 MHz OFF
MARKER 3	29.375000 MHz OFF	9.148071 MHz -3.2106 dB
MARKER 4	145.625000 MHz OFF	164.136104 MHz -3.2106 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-006
+40C DATA
OPR: R. HOGGATT DATE DEC 20 1996

MARKER PARAMET annel 2

MARKER 1	17.750000 MHz OFF	87.500000 MHz -.2267 dB
MARKER 2	157.250000 MHz OFF	86.494949 MHz OFF
MARKER 3	29.375000 MHz OFF	9.136009 MHz -3.2268 dB
MARKER 4	145.625000 MHz OFF	163.853890 MHz -3.2268 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX D ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-006
AEROJET 1331559-4 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5
Fc=87.5 MHz.
REF {5A} FOR INSERTION LOSS @ Fc

	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-60.5 dB (40.0 dB MIN)	-60.4 dB (40.0 dB MIN)	-60.3 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 188.25 MHz TO 1000.0 MHz	-66.4 dB (40.0 dB MIN)	-67.5 dB (40.0 dB MIN)	-68.7 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-11.8 °C (-15.0 TO -10.0)	+13.7 °C (12.5 TO 17.5)	+42.7 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S) (DA 5)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

TEST PERFORMED BY R. HOGGATT DATE 12/20/96

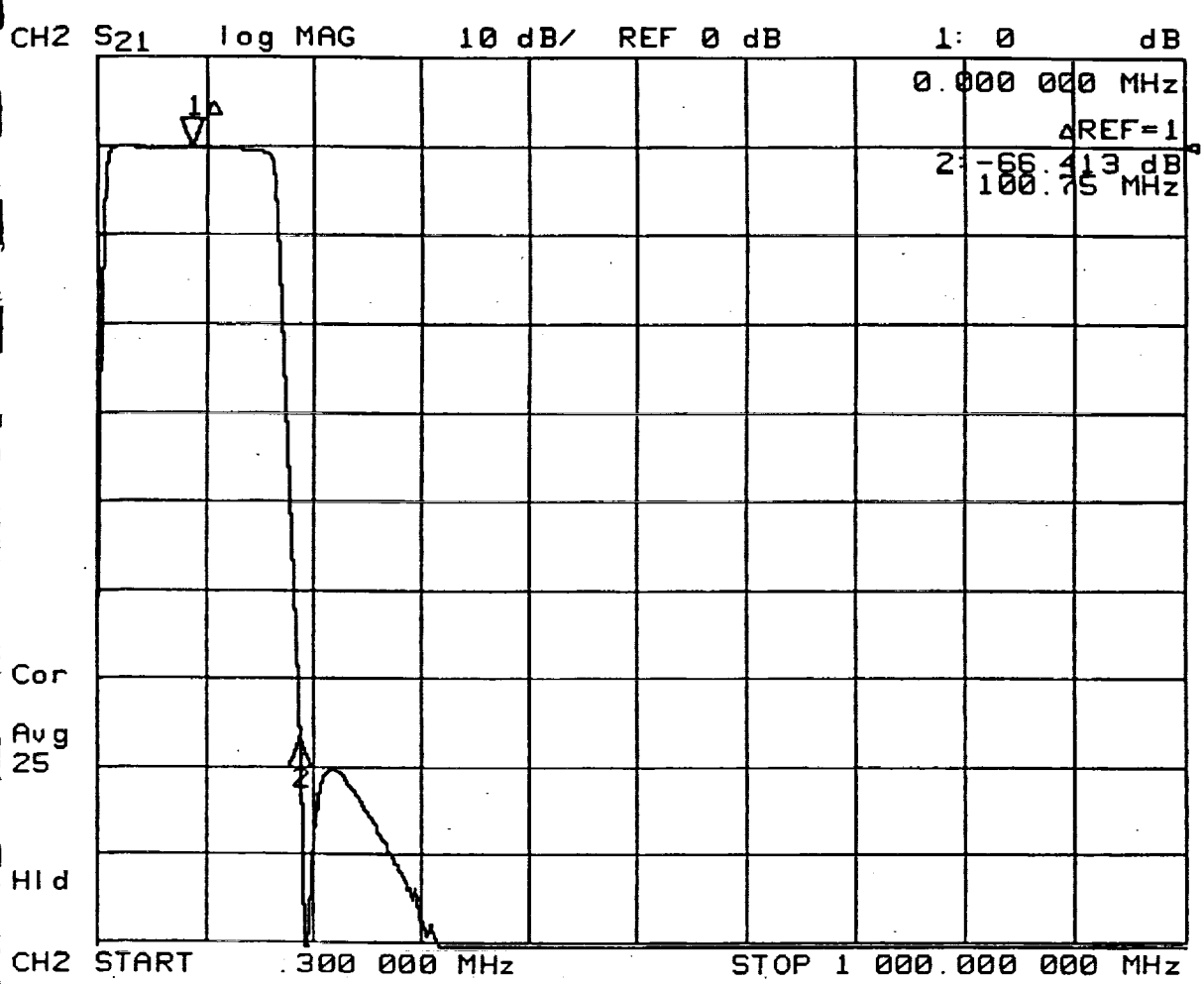
NOTE IF TEST WITNESSED BY AESD: _____ GSI: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

{16} REFERENCE CUSTOMER DRAWING 1331559

DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.502
MOUNTING HOLE CENTER	0.125 ± .010	0.126
BETWEEN UPPER MOUNTING HOLES	3.250	3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.251

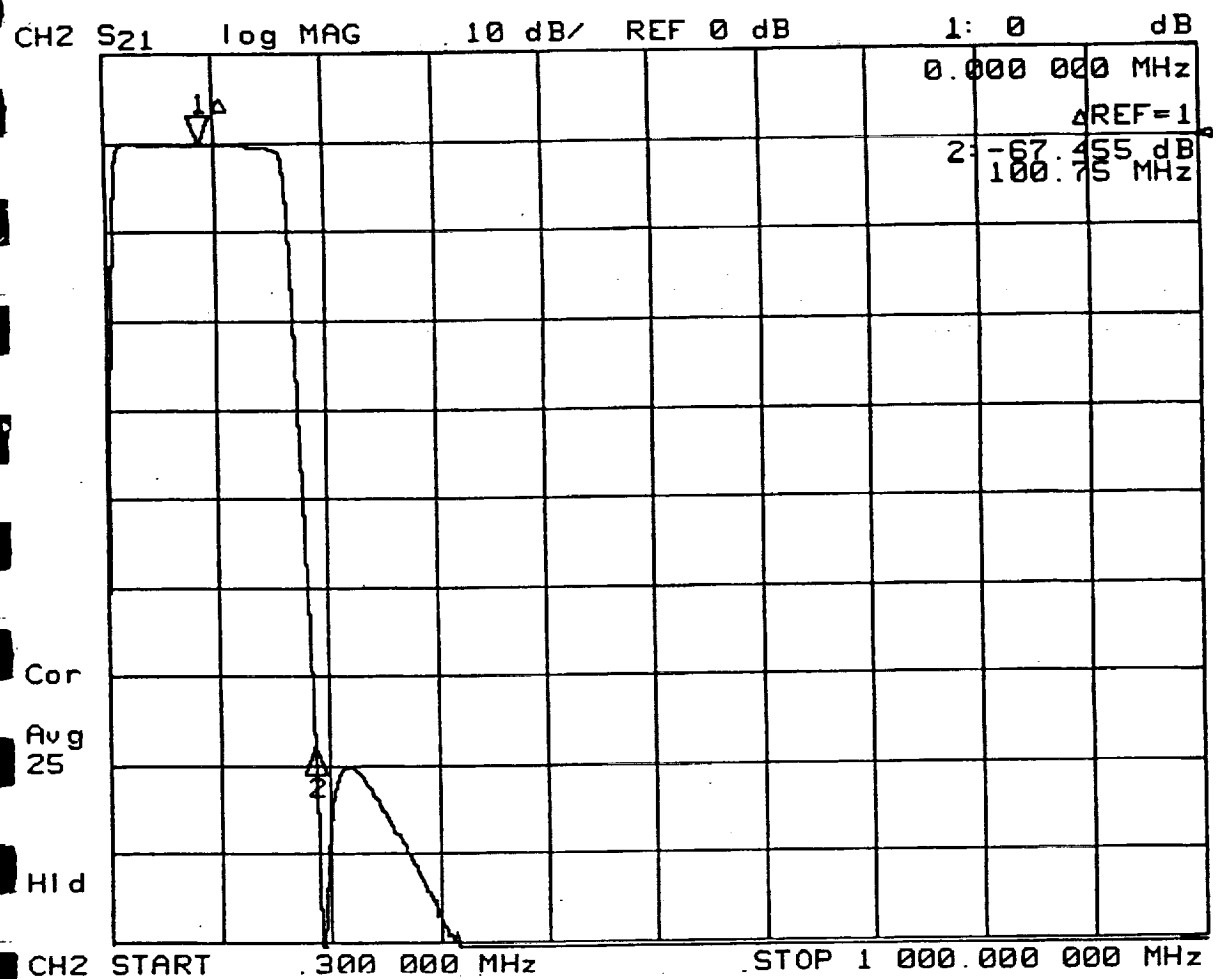


FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-006
-10C DATA
OPR: R. HOGGATT DATE DEC 20 1998

MARKER PARAME annel 2

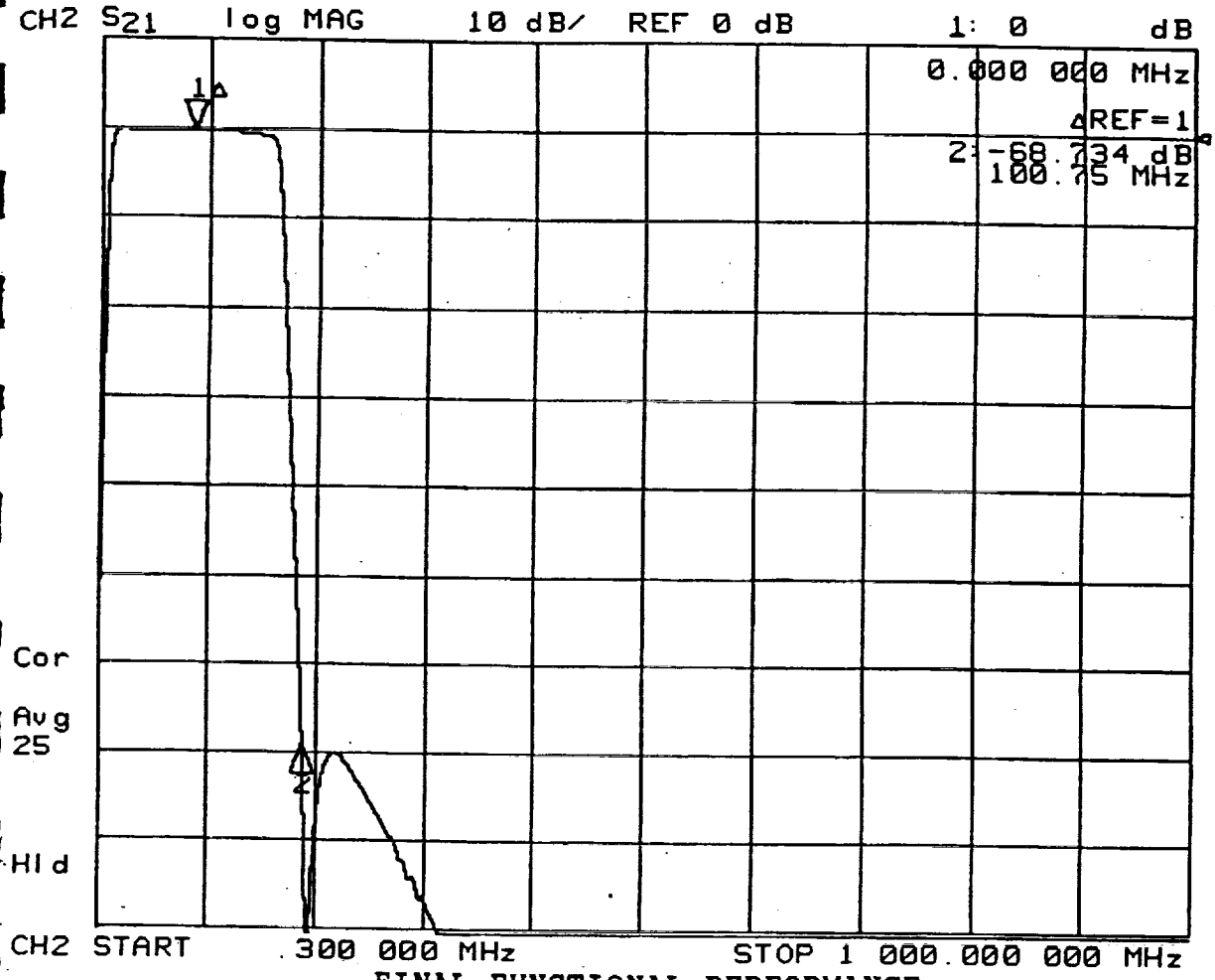
MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -66.413 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB

REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-006
+15C DATA
OPR: R. HOGGATT DATE DEC 20 1996

MARKER PARAMET	annel 2	
MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -67.455 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-006
+40C DATA
OPR: R. HOGGATT DATE DEC 20 1996

annel 2

MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -68.734 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
MARKER TRACKING	OFF OFF	OFF OFF

BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-006
AEROJET 1331559-4 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT
PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE +22.9 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-84.2 dB	F11	(*) 100.0	MHz	-0.26 dB
F2	1.0	MHz	-67.6 dB	F12	(*) 125.0	MHz	-0.34 dB
F3	5.0	MHz	-18.5 dB	F13	150.0	MHz	-0.61 dB
F4	7.5	MHz	-7.62 dB	F14	160.0	MHz	-1.07 dB
F5	10.0	MHz	-1.80 dB	F15	165.0	MHz	-4.57 dB
F6	15.0	MHz	-0.22 dB	F16	170.0	MHz	-16.6 dB
F7	25.0	MHz	-0.11 dB	F17	200.0	MHz	-78.9 dB
F8	(*) 50.0	MHz	-0.16 dB	F18	300.0	MHz	-87.0 dB
F9	(*) 75.0	MHz	-0.20 dB	F19	500.0	MHz	-101.3 dB
F10	87.5	MHz	-0.23 dB	F20	1000.0	MHz	-106.8 dB

TEST PERFORMED BY: R. Hoggan (DA 5) DATE 12/20/96

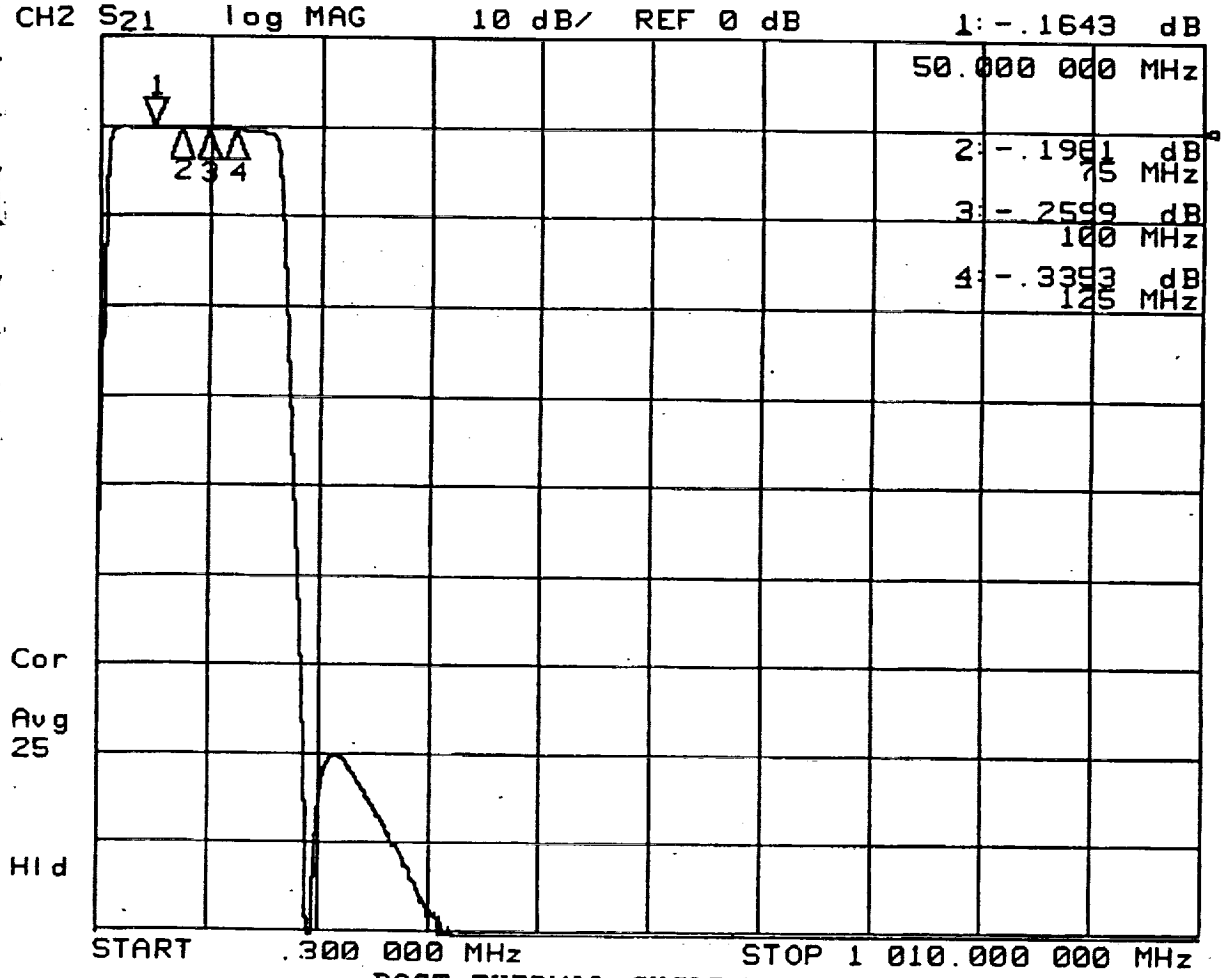
NOTE IF TEST WITNESSED BY AESD _____ GSI Not witnessed this time. DLD

***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST
ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX D PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a .) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
b.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
c.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.
d) INSERTION LOSS PER ATP PARA 4.5.2
e) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) VSWR PER ATP PARA 4.5.1.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P230-006
AMBIENT
MARKER PARAME OPR: R. HOGGATT DATE DEC 20 1996 Channel 2

MARKER 1	17.750000 MHz OFF	50.000000 MHz -.1643 dB
MARKER 2	157.250000 MHz OFF	75.000000 MHz -.1961 dB
MARKER 3	29.375000 MHz OFF	100.000000 MHz -.2599 dB
MARKER 4	145.625000 MHz OFF	125.000000 MHz -.3353 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
MARKER TRACKING	OFF OFF	OFF OFF

Channel 10 Bandpass Filter

IF Filter (S/N: 1331559-7, S/N: P233-008)

APPENDIX G ACCEPTANCE TEST REPORT

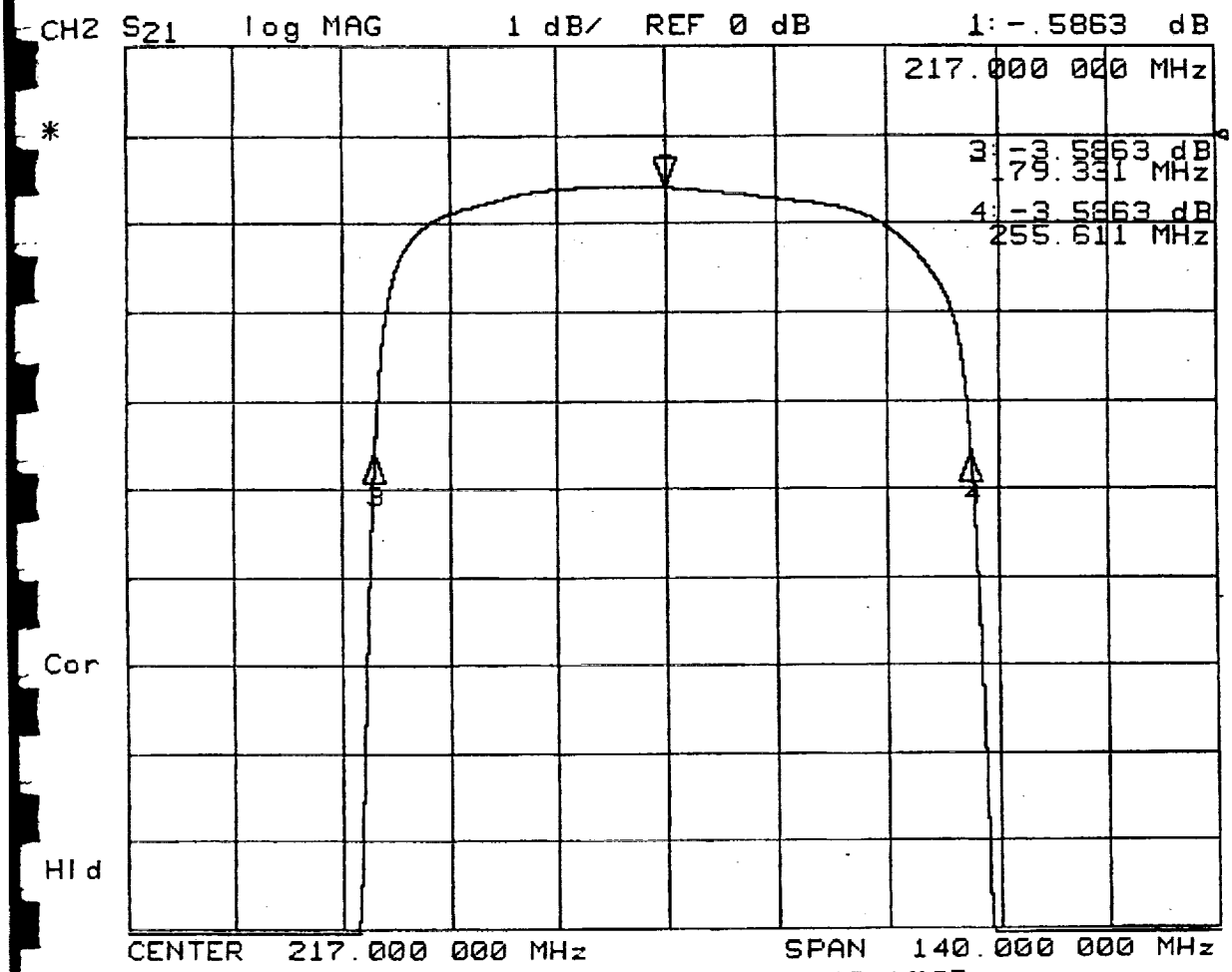
BANDPASS FILTER MODEL FX217-78-10SS1 S/N P233-008
AEROJET 1331559-7 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	255.61 MHz (254.0-256.0)	255.27 Mhz (254.0-256.0)	254.91 MHz (254.0-256.0)
{8} LOWER 3.0 dB BANDEDGE	179.33 MHz (178.0-180.0)	179.14 Mhz (178.0-180.0)	178.97 MHz (178.0-180.0)
{9} 3.0 dB RELATIVE BANDWIDTH	76.28 MHz (74.0-78.0)	76.13 Mhz (74.0-78.0)	75.94 MHz (74.0-78.0)
{10} ADD {7} AND {8} ÷ 2 =	217.47 MHz (217.0 NOM)	217.21 MHz (217.0 NOM)	216.94 Mhz (217.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-12.1 °C (-15.0 TO -10.0)	+16.1 °C (12.5 TO 17.5)	+41.7 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

PASSBAND RIPPLE

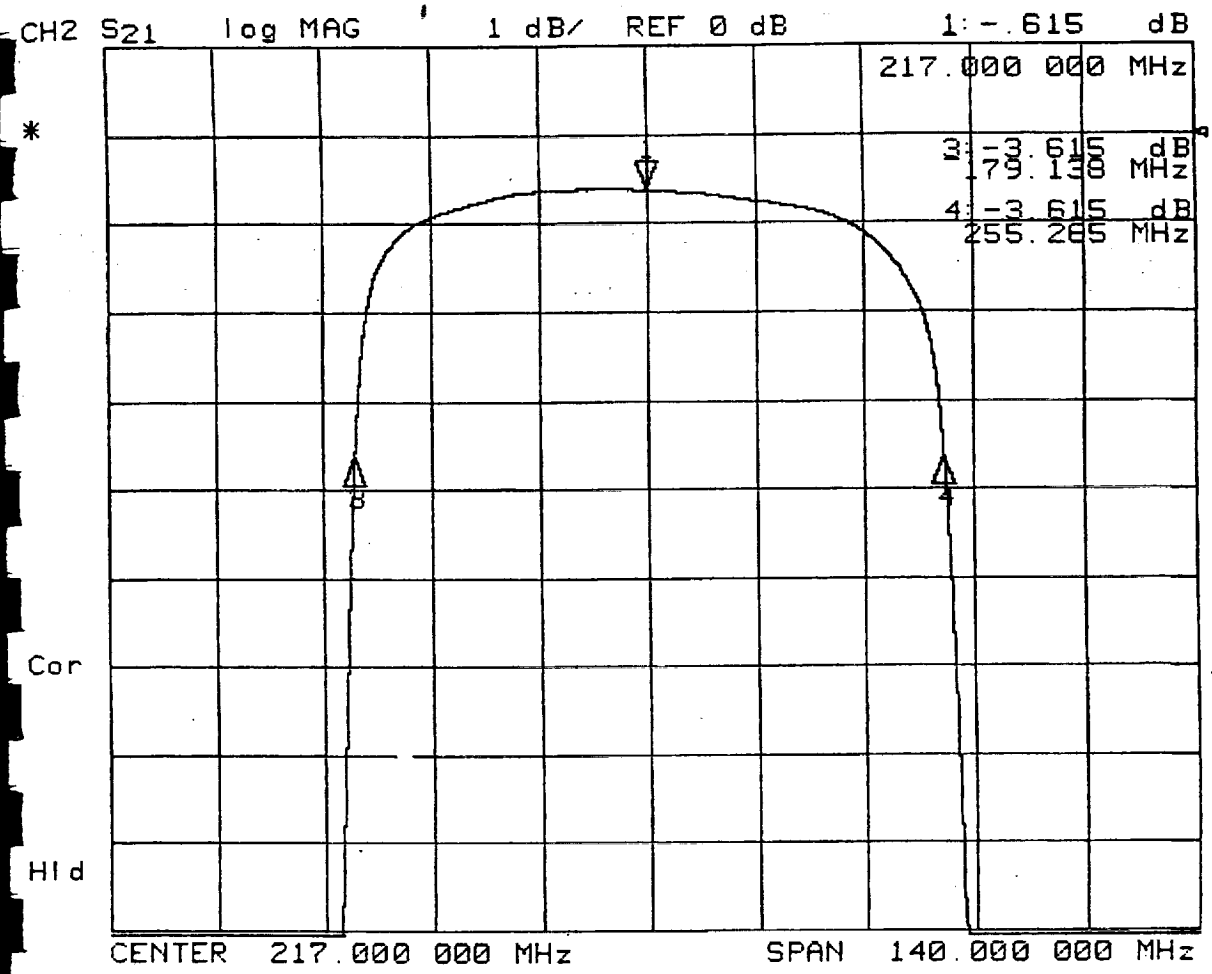
ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	213.50 MHz	211.05 Mhz	212.45 MHz
MIN INSERTION LOSS PERFORMANCE	-0.58 dB	-0.61 dB	-0.64 dB
{11b} 75% BW LOWER BANDEDGE FREQ	186.15 MHz	185.98 Mhz	185.82 MHz
75% BW LOWER BANDEDGE I.L. PERF	-1.01 dB	-1.06 dB	-1.12 dB
{11c} 75% BW UPPER BANDEDGE FREQ	244.65 MHz	244.48 Mhz	244.32 MHz
75% BW UPPER BANDEDGE I.L. PERF	-1.01 dB	-1.06 dB	-1.12 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.43 dB	0.45 dB	0.48 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.43 dB	0.45 dB	0.48 dB



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P233-008
-10C DATA
OPR: R. HOGGATT DATE JAN 31 1997

MARKER PARAMET annel 2

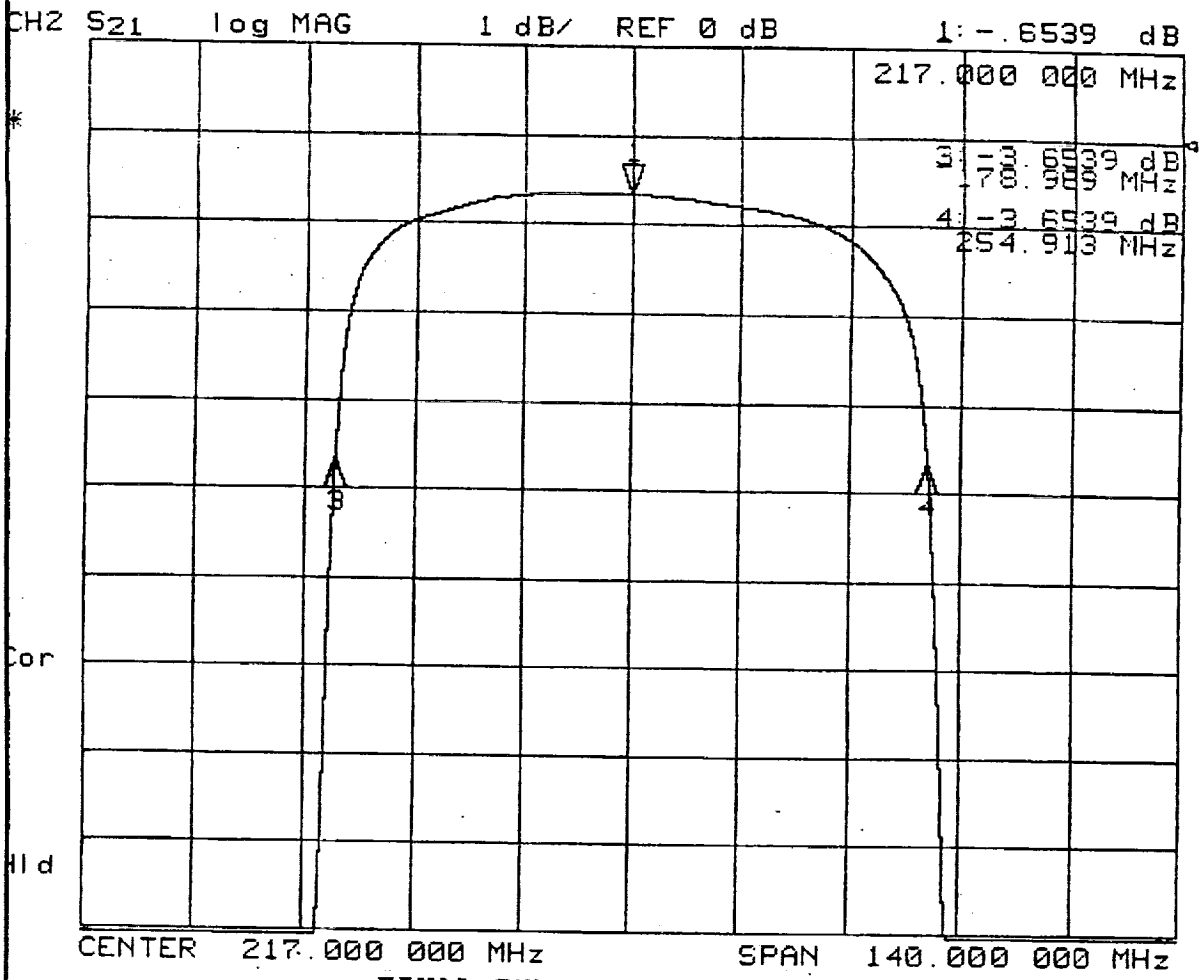
MARKER 1	181.900000 MHz OFF	217.000000 MHz -.5863 dB
MARKER 2	252.100000 MHz OFF	217.471683 MHz OFF
MARKER 3	187.750000 MHz OFF	179.331782 MHz -3.5863 dB
MARKER 4	246.250000 MHz OFF	255.611584 MHz -3.5863 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P233-008
+15C DATA
OPR: R. HOGGATT DATE JAN 31 1997

MARKER PARAMET		
MARKER 1	181.900000 MHz OFF	217.000000 MHz -.615 dB
MARKER 2	252.100000 MHz OFF	217.201980 MHz OFF
MARKER 3	187.750000 MHz OFF	179.138680 MHz -3.615 dB
MARKER 4	246.250000 MHz OFF	255.265281 MHz -3.615 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

nnel 2



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P233-008
+40C DATA
OPR: R. HOGGATT DATE JAN 31 1997

MARKER PARAMET		nnel 2
MARKER 1	181.900000 MHz OFF	217.000000 MHz -.6539 dB
MARKER 2	252.100000 MHz OFF	216.941130 MHz OFF
MARKER 3	187.750000 MHz OFF	178.969127 MHz -3.6539 dB
MARKER 4	246.250000 MHz OFF	254.913133 MHz -3.6539 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

BANDPASS FILTER MODEL FX217-78-10SS1 S/N P233-008
AEROJET 1331559-7 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.7 dB MAX)	(PASS)/FAIL ✓ (√)	(PASS)/FAIL ✓ (√)	(PASS)/FAIL ✓ (√)
{11g} ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)			

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=217.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 166.3 MHz	-44.9 dB (40.0 dB MIN)	-44.9 dB (40.0 dB MIN)	-45.1 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 267.7 MHz TO 1000.0 MHz	-44.1 dB (40.0 dB MIN)	-44.3 dB (40.0 dB MIN)	-44.3 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-12.3 °C (-15.0 TO -10.0)	+16.0°C (12.5 TO 17.5)	+41.7 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

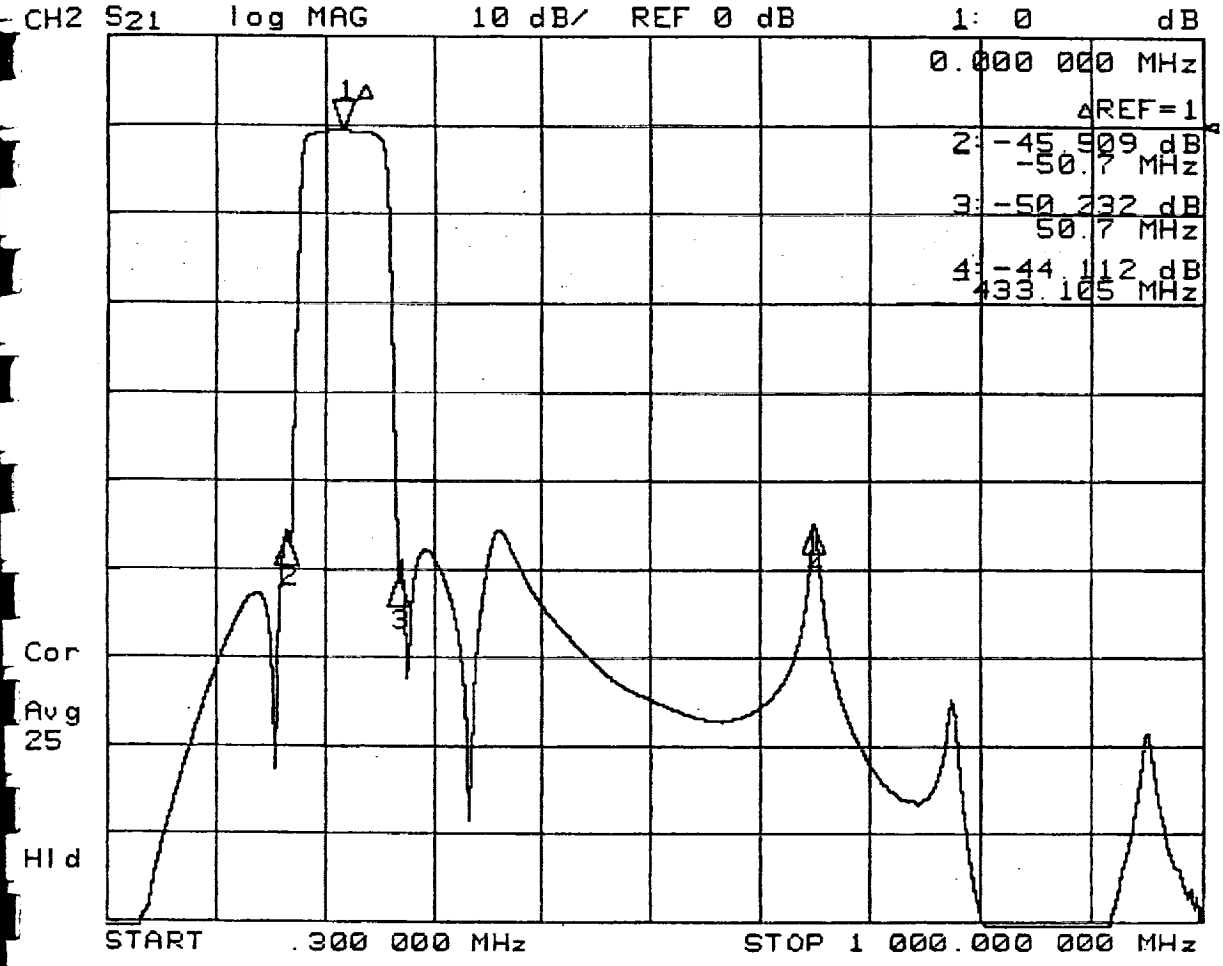
TEST PERFORMED BY R. Hoggatt DATE 1/31/97 (DA 5)

NOTE IF TEST WITNESSED BY AESD: _____ GSI: _____ Not Witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST *****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION
{16} REFERENCE CUSTOMER DRAWING 1331559

DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	5.50 ± .03	5.505
MOUNTING HOLE CENTER	0.125 ± .010	.125
BETWEEN UPPER MOUNTING HOLES	5.250	5.248
BETWEEN LOWER MOUNTING HOLES	5.250	5.247

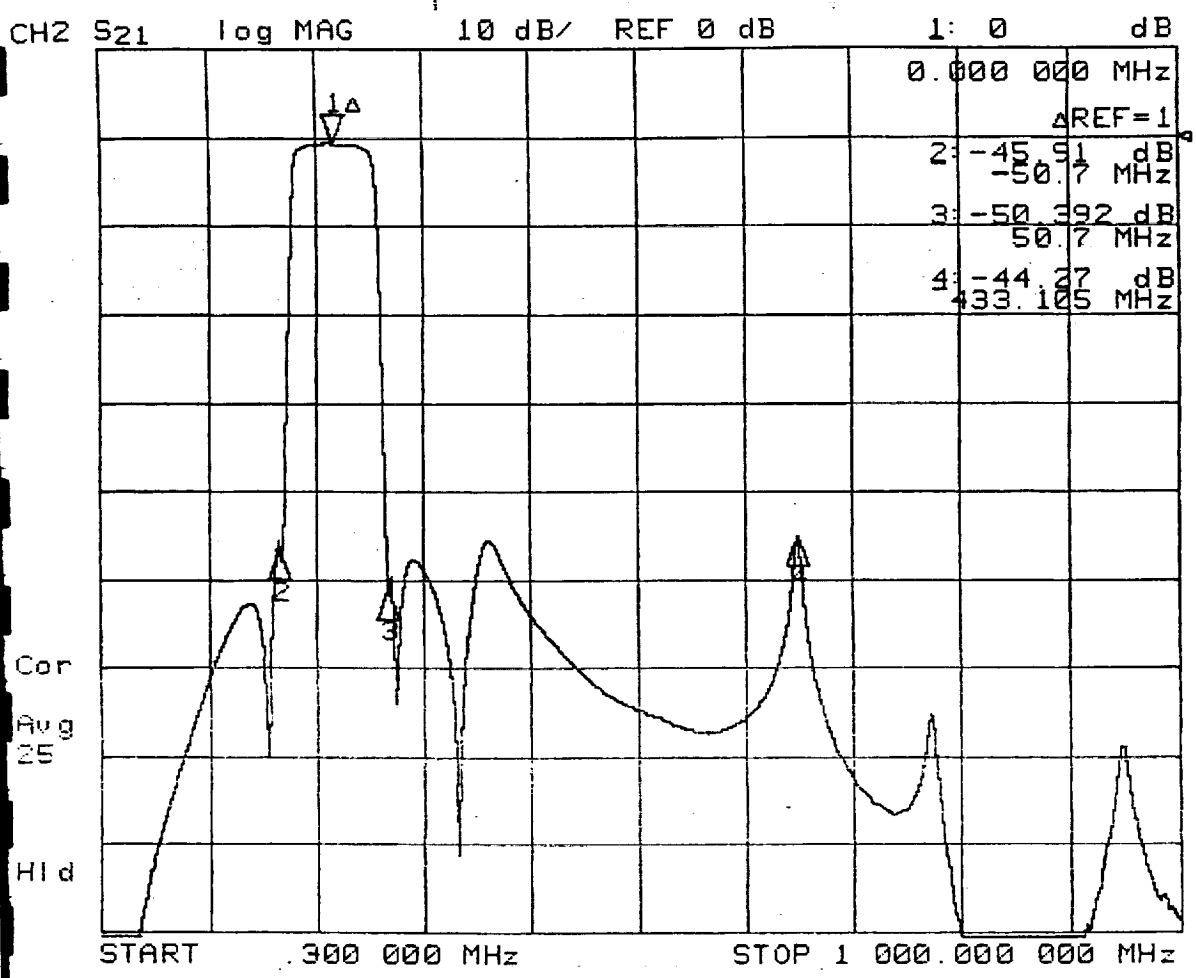


FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P233-008
-10C DATA
OPR: R. HOGGATT DATE JAN 31 1997

MARKER PARAMET nnel 2

MARKER 1	1000.000000 MHz OFF	217.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	166.300000 MHz -45.509 dB
MARKER 3	1000.000000 MHz OFF	267.700000 MHz -50.232 dB
MARKER 4	1000.000000 MHz OFF	650.105044 MHz -44.112 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB

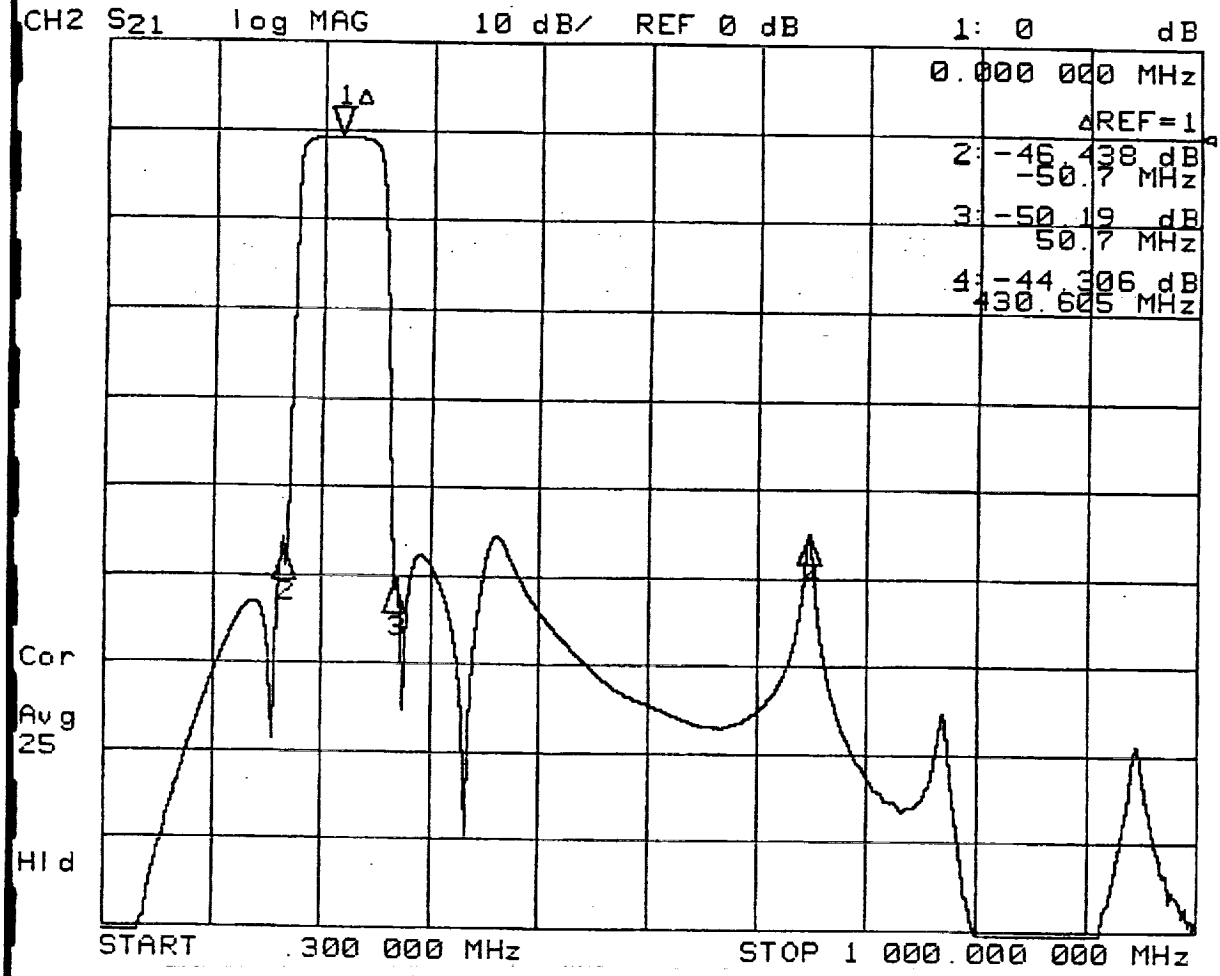
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P233-008
+15C DATA
OPR: R. HOGGATT DATE JAN 31 1997

MARKER PARAMET innel 2

MARKER 1	1000.000000 MHz OFF	217.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	166.300000 MHz -45.91 dB
MARKER 3	1000.000000 MHz OFF	267.700000 MHz -50.392 dB
MARKER 4	1000.000000 MHz OFF	650.105029 MHz -44.27 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P233-008
+40C DATA
OPR: R. HOGGATT DATE JAN 31 1997

nnel 2

MARKER PARAMETE		
MARKER 1	1000.000000 MHz	217.000000 MHz
	OFF	0 dB
MARKER 2	1000.000000 MHz	166.300000 MHz
	OFF	-46.438 dB
MARKER 3	1000.000000 MHz	267.700000 MHz
	OFF	-50.19 dB
MARKER 4	1000.000000 MHz	647.605803 MHz
	OFF	-44.306 dB
MKR STIMULUS OFFSET	0.000000 MHz	0.000000 MHz
	0 dB	0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

BANDPASS FILTER MODEL FX217-78-10SS1 S/N P233-008
AEROJET 1331559-7 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT

PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE +24.2 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	1.0	MHz	-100.6 dB	F11	217.0	MHz	-0.61 dB
F2	10.0	MHz	-104.5 dB	F12	(*) 224.0	MHz	-0.64 dB
F3	100.0	MHz	-61.3 dB	F13	(*) 230.0	MHz	-0.70 dB
F4	150.0	MHz	-58.0 dB	F14	240.0	MHz	-0.88 dB
F5	170.0	MHz	-45.7 dB	F15	250.0	MHz	-1.56 dB
F6	178.0	MHz	-6.79 dB	F16	256.0	MHz	-5.71 dB
F7	184.0	MHz	-1.32 dB	F17	264.0	MHz	-36.2 dB
F8	194.0	MHz	-0.80 dB	F18	300.0	MHz	-48.7 dB
F9	(*) 204.0	MHz	-0.63 dB	F19	500.0	MHz	-64.6 dB
F10	(*) 210.0	MHz	-0.60 dB	F20	1000.0	MHz	-87.9 dB

TEST PERFORMED BY: R. HOGGATT DATE 1/31/97 DA 5

NOTE IF TEST WITNESSED BY AESD _____ GSI _____ Not Witnessed this time. DLD

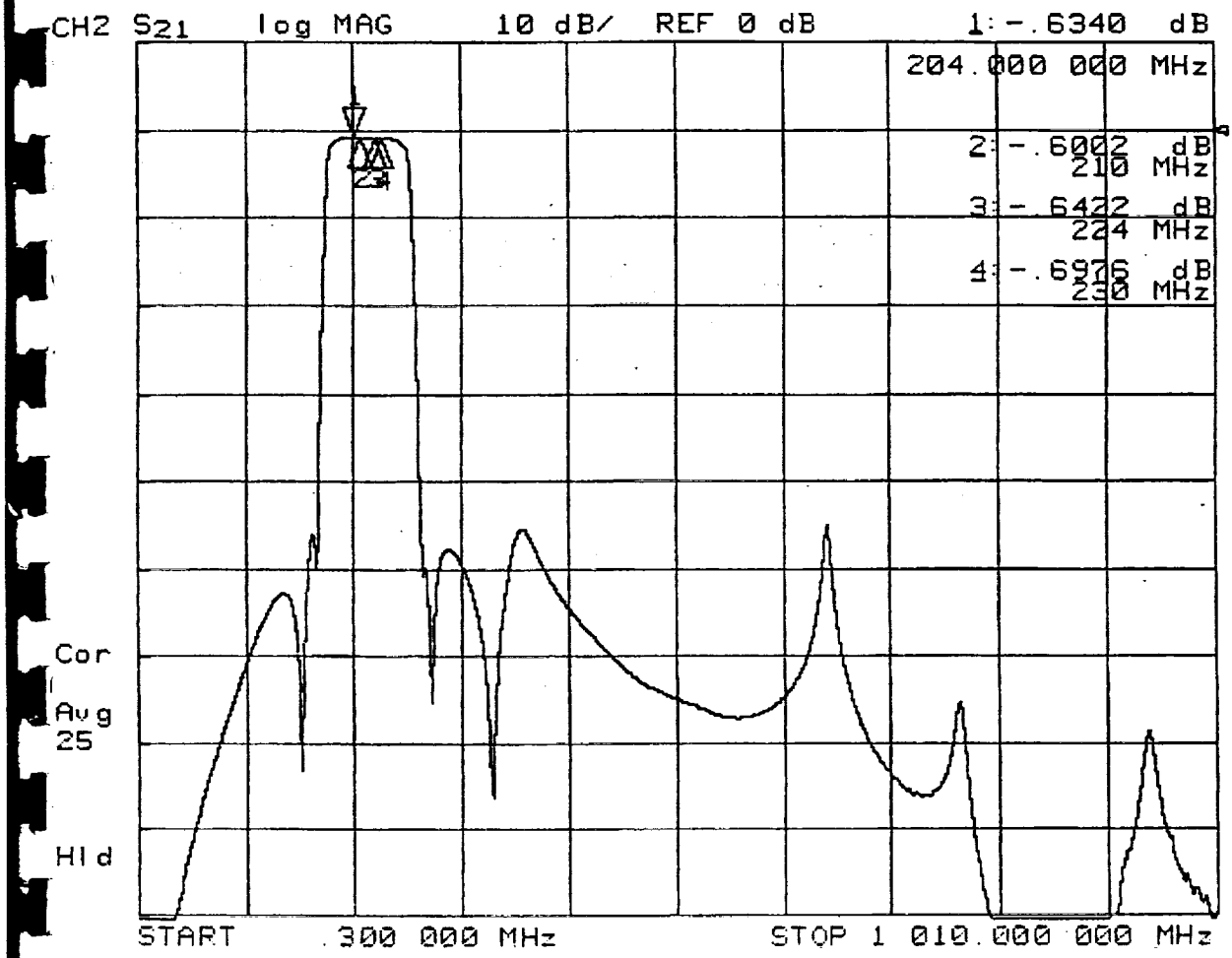
***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST

ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX G PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P233-008
AMBIENT
MARKER PARAMETI **OPR: R. HOGGATT DATE** JAN 3 1 1997 nnel 2

MARKER 1	1000.000000 MHz OFF	204.000000 MHz -.6340 dB
MARKER 2	1000.000000 MHz OFF	210.000000 MHz -.6002 dB
MARKER 3	1000.000000 MHz OFF	224.000000 MHz -.6422 dB
MARKER 4	1000.000000 MHz OFF	230.000000 MHz -.6976 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Channel 11 Bandpass Filter

SAW Filter (S/N: 1331576-1, S/N: B07)

ELECTRICAL TEST DATA SHEET

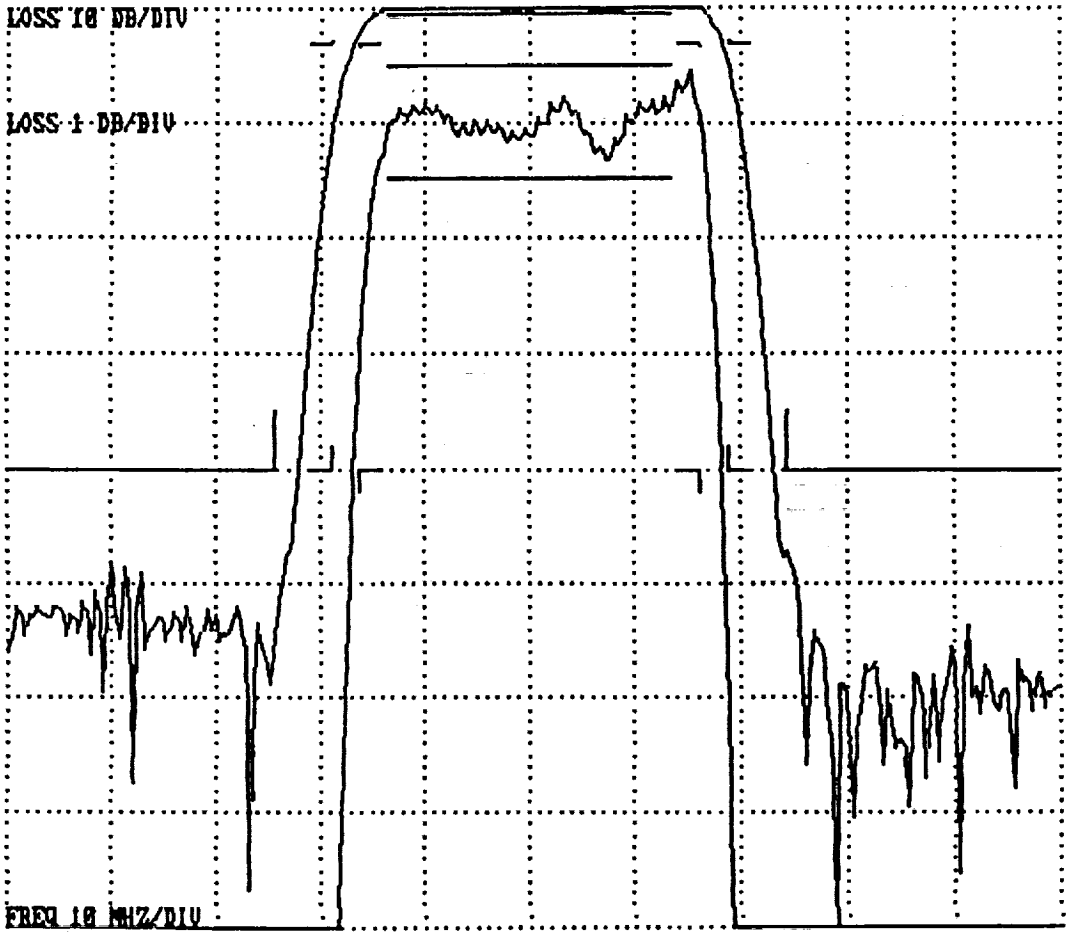
AEROJET PART: 1331576-1 PHONON PART: 100823 SERIAL: 007
TESTED BY: 210 TITLE: Test tech DATE: 6/15/98 TIME: 4:30 pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	-4.6	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 273.335/275.065 MHz	274.855	MHz	P
		HI: 369.335/371.065 MHz	370.850	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 34/36 MHz	34.945	MHz	P
		HI: 34/36 MHz	35.311	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.2	dB	P
		HI: /0.5 dB	0.2	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		260.7-287.7 MHz: /1.0 dB	0.5	dB	P
		356.7-383.7 MHz: /1.0 dB	0.4	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.0/30.2 dB	28.4	dB	P
		HI: 27.0/30.2 dB	28.6	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	-0.1	dB	P
		HI: -0.4/0.4 dB	0.1	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.2	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-225,420-1000 MHz:	41.1	0.000	
		DUAL: 225.000-249.935, 298.465-345.935, 394.465-420.00 MHz:	43.8	0.000	
		PEAK: 35.0/ dB	41.1 dB		P
		WIDTH: /7.2 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.29	Unitless	P
		HI: /1.30 Unitless	1.27	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		260.7-287.7,356.7-383.7 MHz			
		DUAL S11: 7.5/ dB	16.8	dB	P
		DUAL S22: 7.5/ dB	9.6	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.72/0.72 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (DP)		

PHONON CORPORATION
7 MERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-8211
FAX: 203-651-8618

PHUNUN CURG-PURGHITUN
FILE=1ACA867A.DAT 10:16:55 06-16-1998
PN_100828_823 FINAL_FUNCTIONAL TEMP:C FLIGHT7_3FUNCT /N DUAL_SCX
06-15-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 274.2 WIDTH= 100 INCR.= .4 SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 28.37187 PHASE(DEG)= 5816.12 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1323785 PHASE(DEG)= 1171.944
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 10 MHZ/DIV



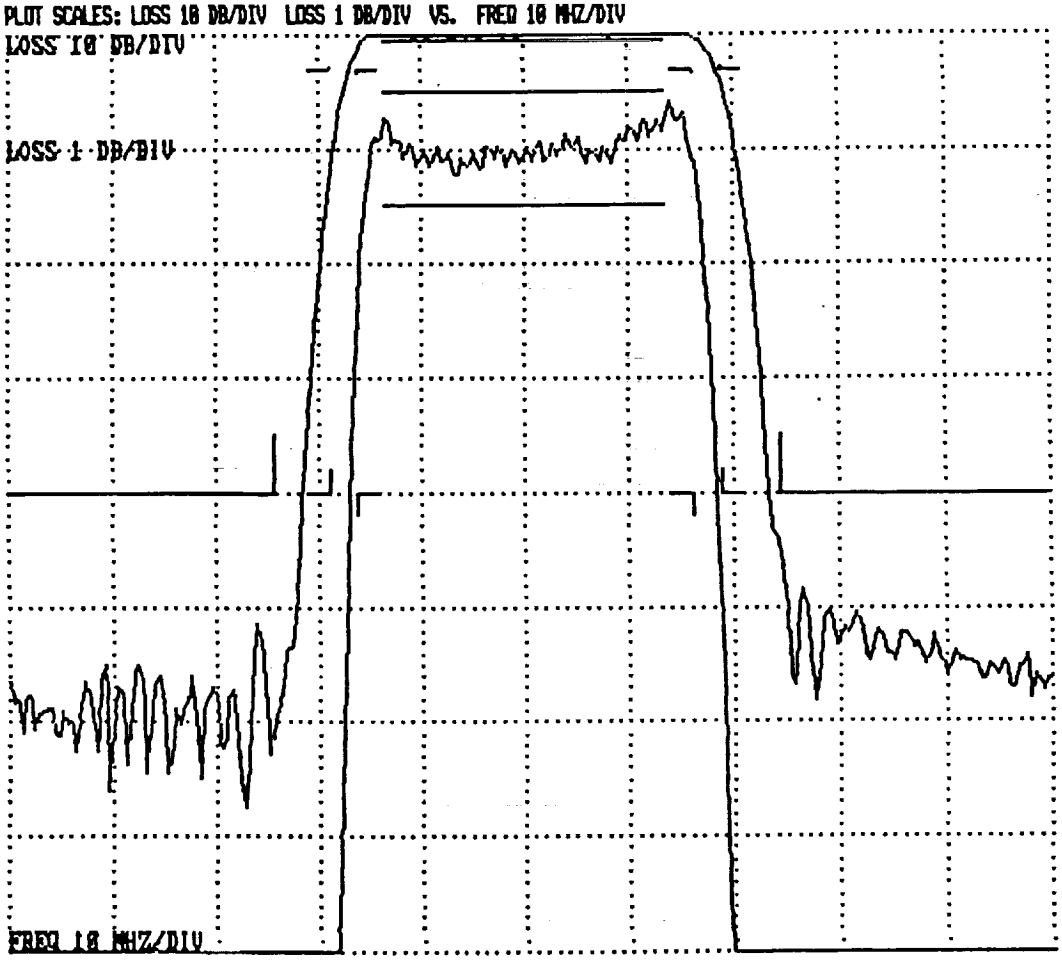
PEAK: LEVEL(DB)= 27.91179 FREQ(MHZ)= 289.342 DELAY(US)=-.4191838 SIDELOBE(DB)=-47.59316
ENERGY: LEVEL(DB)= 28.53471 CENTER(MHZ)= 274.9684 WIDTH(MHZ)= 36.55852 SKEW(MHZ)=-.1396954

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.46	289.34281	289.34281	289.34281	0.00000	289.34281	0.00000	0.00	289.34281	289.34281
0.50	259.36969	290.95679	275.16324	31.58710	275.10931	31.69330	-12.92	259.36969	290.95679
1.00	258.78137	291.34891	275.06116	32.55954	275.11725	32.37663	-13.00	258.78137	291.34891
2.00	257.96243	291.92361	274.94302	33.96118	275.11325	33.54827	-16.01	257.96243	291.92361
3.00	257.38297	292.32748	274.85522	34.94452	274.99655	34.19650	-18.12	257.38297	292.32748
4.00	256.94812	292.66537	274.80676	35.71725	274.99588	34.52850	-19.79	256.94812	292.66537
5.00	256.60886	292.94693	274.77398	36.34687	274.99588	34.52850	-19.75	256.60886	292.94693
6.00	256.30829	293.18833	274.74830	36.88004	274.99142	34.77551	-21.68	256.30829	293.18833
10.00	255.41197	293.97285	274.69282	38.56087	274.97782	35.86157	-26.30	255.41197	293.97285
20.00	253.95697	295.33148	274.64423	41.37451	274.95987	35.19597	-37.45	253.95697	295.33148
30.00	253.01151	296.34866	274.68008	43.33716	274.96863	35.28553	-47.30	253.01151	296.34866
40.00	252.17427	297.26581	274.71964	45.09074	274.96848	35.28637	-54.01	252.17427	297.26581

BAND(MHZ)	268.700	287.700
LMIN(DB)	-0.23	
LMAX(DB)	0.33	
LDEL(DB)	0.56	
PMIN(DEG)	-1997.19	
PMAX(DEG)	1997.81	
PDEL(DEG)	3995.00	

File: 1ACA867A.DAT Passband Symmetry = 0.2 dB

PHUNKUN CUMPUNICATION
FILE=1CC8807A.DAT 10:19:09 06-16-1998
PN_100828_823 FINAL_FUNCTIONAL TEMP:C FLIGHT7_3FUNCT /N DUAL_SXX
06-15-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 378.2 WIDTH= 100 INCR.= .4 SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 28.5627 PHASE(DEG)=-3724.818 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1102556 PHASE(DEG)= 1129.194
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 10 MHZ/DIV



PEAK: LEVEL(DB)= 28.14378 FREQ(MHZ)= 384.1733 DELAY(US)=-.4868109 SIDELOBE(DB)=-48.68587
ENERGY: LEVEL(DB)= 28.78711 CENTER(MHZ)= 378.9873 WIDTH(MHZ)= 36.88556 SKEW(MHZ)=-.1736884

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.42	384.17334	384.17334	384.17334	0.00000	384.17334	0.00000	0.00	384.17334	384.17334
0.50	354.57977	386.93887	370.75934	32.35910	370.74136	32.52331	-13.34	354.57977	386.93887
1.00	354.15436	387.39130	370.77283	33.23694	370.75189	33.19882	-14.33	354.15436	387.39130
2.00	353.63638	388.06107	370.84872	34.42468	370.91418	34.07249	-16.13	353.63638	388.06107
3.00	353.19446	388.58516	370.84979	35.31070	370.91852	34.53487	-17.55	353.19446	388.58516
4.00	352.87879	388.91666	370.89374	36.04587	370.92419	34.98129	-19.18	352.87879	388.91666
5.00	352.58765	389.23792	370.91278	36.65027	370.93521	35.18822	-21.86	352.58765	389.23792
6.00	352.34888	389.52832	370.93468	37.18744	370.93384	35.29231	-22.13	352.34888	389.52832
10.00	351.58689	390.36649	370.97629	38.78040	370.98676	35.56149	-27.19	351.58689	390.36649
20.00	350.32147	391.77068	371.04682	41.44913	370.98642	35.66883	-37.20	350.32147	391.77068
30.00	349.37277	392.71237	371.04257	43.33960	370.98718	35.67870	-50.12	349.37277	392.71237
40.00	348.64100	393.37494	371.00800	44.73386	370.98718	35.67899	-53.22	348.64100	393.37494

BAND(MHZ)	356.700	383.700
LMIN(DB)	-0.26	
LMAX(DB)	0.22	
LDEL(DB)	0.49	
PMIN(DEG)	-1929.36	
PMAX(DEG)	1921.30	
PDEL(DEG)	3850.66	

File: 1CC8807A.DAT Passband Symmetry = 0.2 dB

ELECTRICAL TEST DATA SHEET

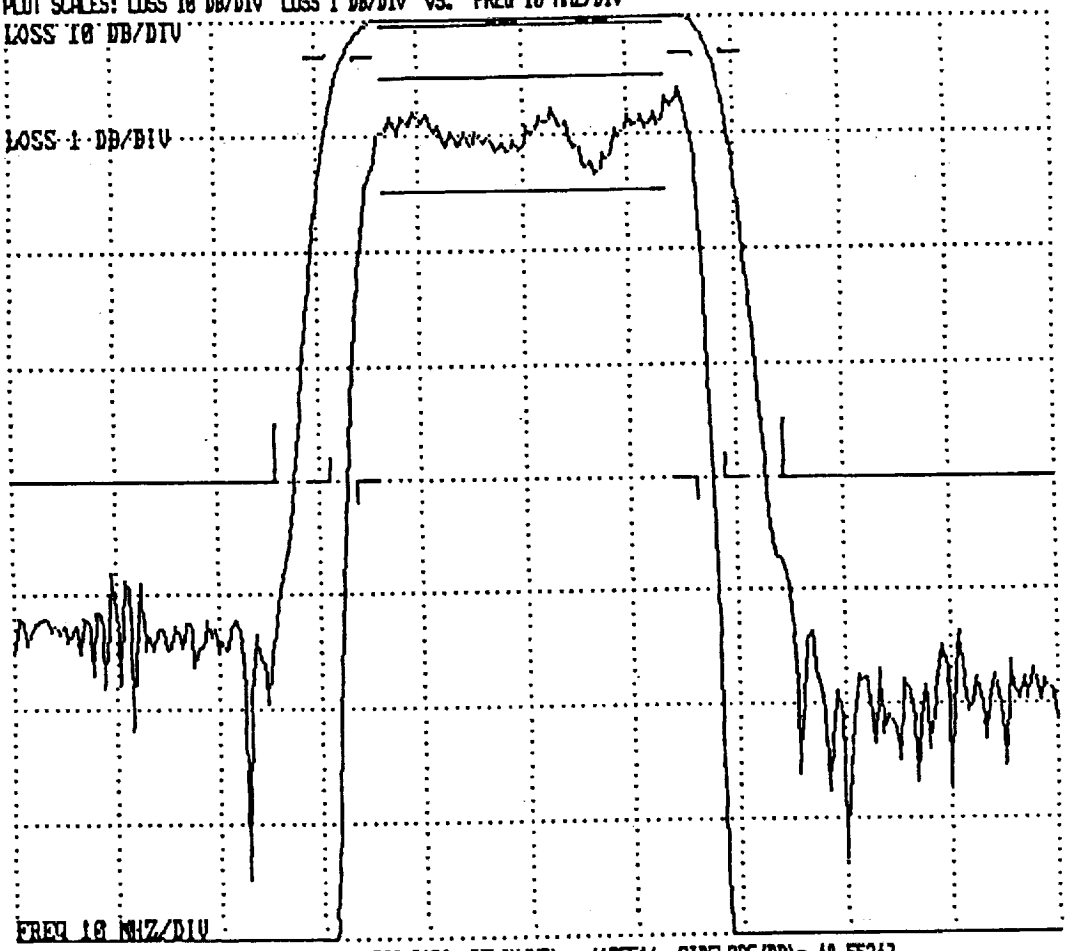
ROJET PART: 1331576-1 PHONON PART: 100823 SERIAL: 007
TESTED BY: 210 TITLE: Test Teh DATE: 6/15/98 TIME: 4:30 pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	14.6	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 273.335/275.065 MHz	274.425	MHz	P
		HI: 369.335/371.065 MHz	370.260	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 34/36 MHz	34.897	MHz	P
		HI: 34/36 MHz	35.264	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.2	dB	P
		HI: /0.5 dB	0.1	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		268.7-287.7 MHz: /1.0 dB	0.5	dB	P
		356.7-383.7 MHz: /1.0 dB	0.3	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.5	dB	P
		HI: 27.8/30.2 dB	28.5	dB	P
2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.0	dB	P
		HI: -0.4/0.4 dB	0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.0	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-225,420-1000 MHz:	43.5	0.000	
		DUAL: 225.000-249.935, 298.465-345.935, 394.465-420.00 MHz:	46.4	0.000	
		PEAK: 35.0/ dB	43.5 dB		P
		WIDTH: /7.2 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.29	Unitless	P
		HI: /1.30 Unitless	1.27	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		268.7-287.7,356.7-383.7 MHz			
		DUAL S11: 7.5/ dB	15.8	dB	P
		DUAL S22: 7.5/ dB	9.5	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	±0.007	MHz	P
		3 dB BANDWIDTH: -0.72/0.72 MHz	±0.020	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (DP)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-8211
FAX: 203-651-8618

PHONON CORPORATION
FILE=1AR8B07A.DAT 10:29:48 06-16-1998
PN_100828_823 FINAL_FUNCTIONAL TEMP:R FLIGHT7_3FUNCT /N DUAL_SCX
06-15-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 274.2 WIDTH= 100 INCR.= .4 SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 28.50965 PHASE(DEG)= 4597.216 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1330855 PHASE(DEG)= 1173.739
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 10 MHZ/DIV

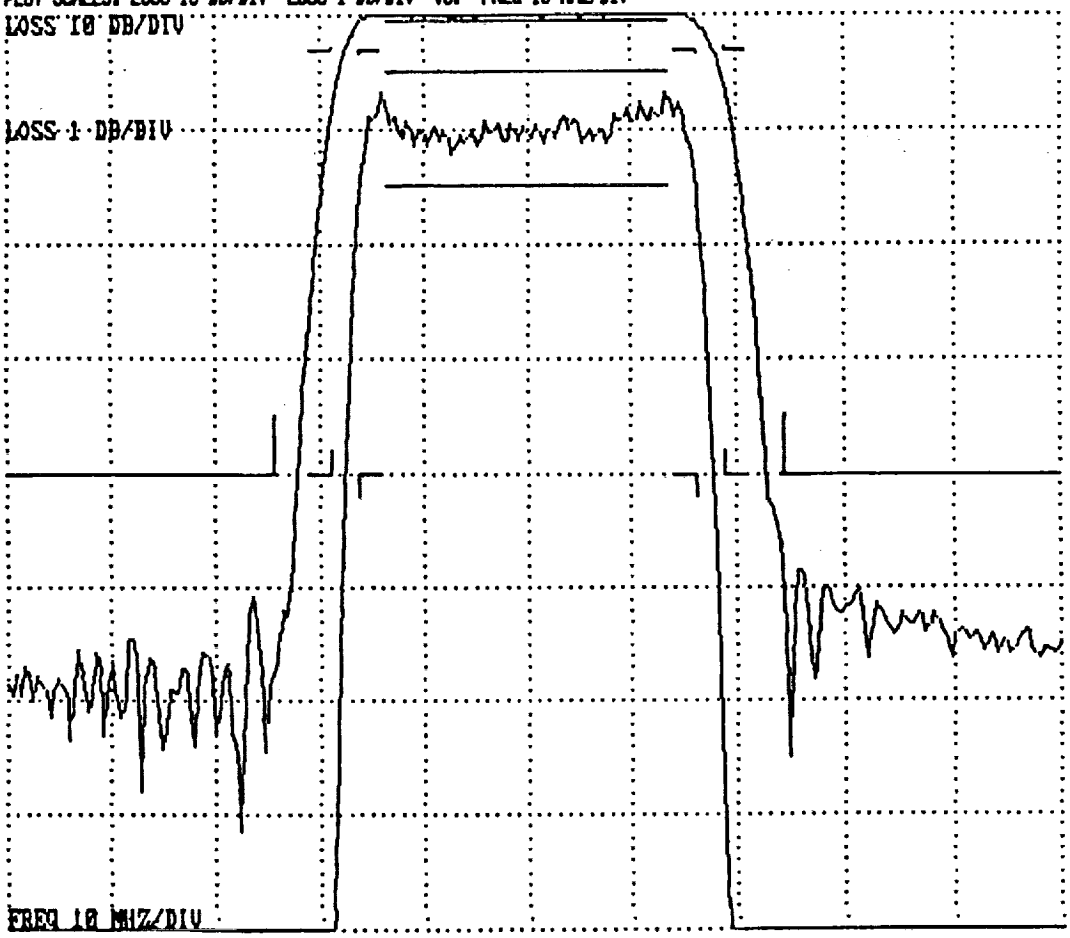


PEAK: LEVEL(DB)= 28.0998 FREQ(MHZ)= 288.9198 DELAY(US)=-.4195514 SIDELOBE(DB)=-48.55243
ENERGY: LEVEL(DB)= 28.67992 CENTER(MHZ)= 274.4963 WIDTH(MHZ)= 36.51664 SKEW(MHZ)=-7.683288E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.41	288.91977	288.91977	288.91977	0.00000	288.91977	0.00000	0.00	288.91977	288.91977
0.50	258.97258	290.49186	274.73178	31.51855	274.66628	31.64735	-12.98	258.97258	290.49186
1.00	258.38898	290.88229	274.63165	32.50131	274.67163	32.32362	-13.86	258.38898	290.88229
2.00	257.55569	291.47385	274.51477	33.91815	274.66245	33.47546	-16.09	257.55569	291.47385
3.00	256.97672	291.87326	274.42499	34.89655	274.54242	34.12591	-18.22	256.97672	291.87326
4.00	256.54672	292.21451	274.38062	35.66779	274.53912	34.45211	-19.91	256.54672	292.21451
5.00	256.28129	292.48856	274.34491	36.28726	274.53912	34.45211	-19.87	256.28129	292.48856
6.00	255.98143	292.73348	274.31741	36.83197	274.53226	34.69367	-21.81	255.98143	292.73348
10.00	255.81616	293.52648	274.27127	38.51824	274.51483	34.97248	-26.45	255.81616	293.52648
20.00	253.56215	294.88141	274.22177	41.31926	274.49683	35.18261	-37.78	253.56215	294.88141
30.00	252.61658	295.98382	274.25388	43.28644	274.49655	35.11168	-47.38	252.61658	295.98382
40.00	251.76428	296.83466	274.29347	45.07837	274.49637	35.11248	-53.72	251.76428	296.83466

BAND(MHZ) 260.700 287.700
LMIN(DB) -0.22
LMAX(DB) 0.36
LDEL(DB) 0.58
PMIN(DEG) -1998.49
PMAX(DEG) 2002.68
PDEL(DEG) 4001.17
File: 1AR8B07A.DAT Passband Symmetry = 0.2 dB

PHONON CORPORATION
FILE=1CRA807A.DAT 10:30:28 06-16-1998
PN_100828_823 FINAL_FUNCTIONAL TEMP:R FLIGHT7_3FUNCT /N DUAL_SCX
06-15-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 370.2 WIDTH= 100 INCR.= .4 SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 28.49179 PHASE(DEG)=-3881.918 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 9.832318E-02 PHASE(DEG)= 1131.049
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 10 MHZ/DIV

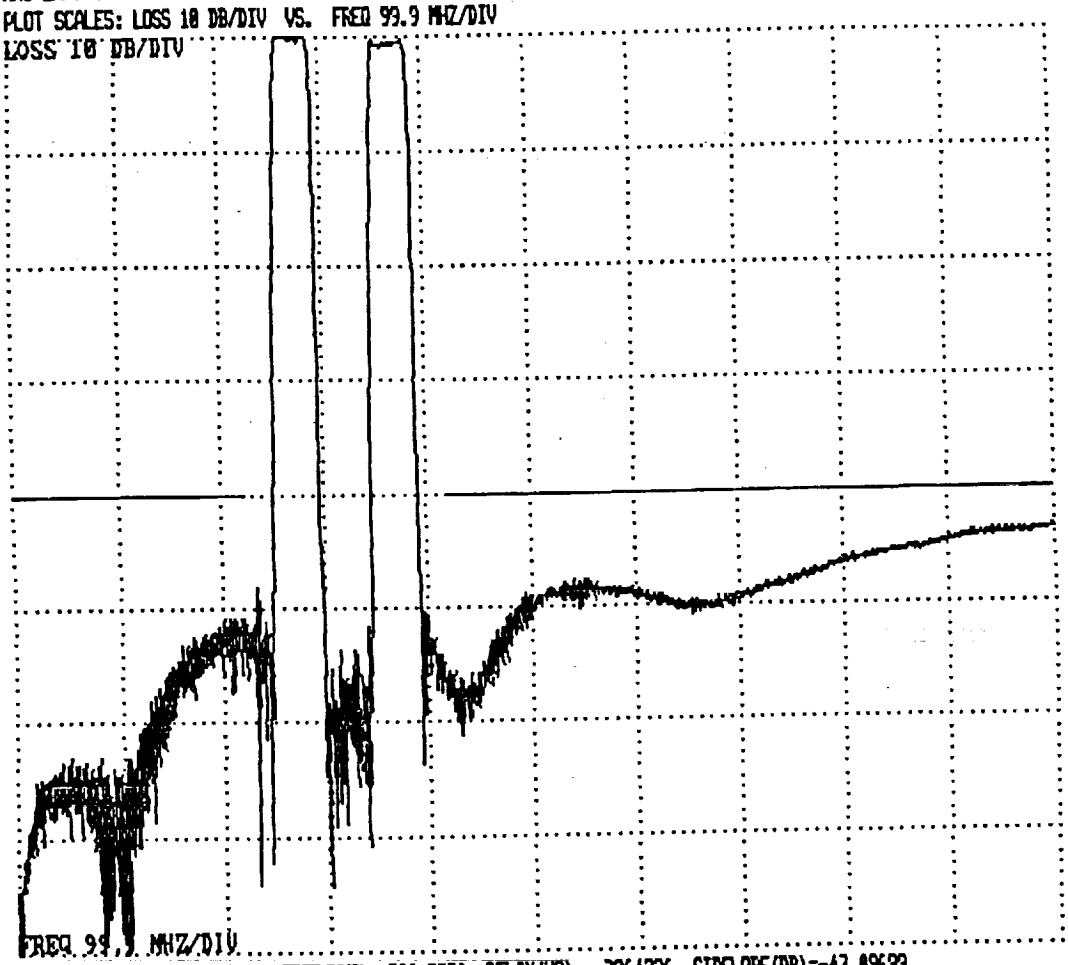


PEAK: LEVEL(DB)= 28.1645 FREQ(MHZ)= 356.2143 DELAY(US)=-.4846631 SIDELOBE(DB)=-48.73773
ENERGY: LEVEL(DB)= 28.64751 CENTER(MHZ)= 370.3518 WIDTH(MHZ)= 36.85229 SKEW(MHZ)=-9.347854E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.33	356.21426	356.21426	356.21426	0.00000	356.21426	0.00000	0.00	356.21426	356.21426
0.50	354.82466	386.29196	370.15833	32.26730	370.26675	32.45150	-13.42	354.82466	386.29196
1.00	353.61295	386.73887	370.17551	33.12512	370.25867	33.12891	-14.42	353.61295	386.73887
2.00	353.07834	387.45392	370.26611	34.37558	370.39163	33.97193	-16.20	353.07834	387.45392
3.00	352.62823	387.89194	370.26007	35.26370	370.37506	34.42577	-17.61	352.62823	387.89194
4.00	352.31100	388.38521	370.34811	35.99420	370.36130	34.79236	-19.27	352.31100	388.38521
5.00	352.02646	388.64258	370.33453	36.61612	370.35342	35.07013	-21.20	352.02646	388.64258
6.00	351.78339	388.92142	370.35242	37.13803	370.29956	35.17228	-22.19	351.78339	388.92142
10.00	351.02487	389.77914	370.40201	38.75427	370.34821	35.39596	-25.90	351.02487	389.77914
20.00	349.76416	391.17832	370.47156	41.41476	370.35835	35.54747	-39.32	349.76416	391.17832
30.00	348.81741	392.13383	370.47522	43.31561	370.35165	35.55343	-47.82	348.81741	392.13383
40.00	348.06439	392.83514	370.44977	44.77875	370.35175	35.55412	-53.31	348.06439	392.83514

BAND(MHZ) 356.700 383.700
LMIN(DB) -0.31
LMAX(DB) 0.22
LDEL(DB) 0.53
PMIN(DEG) -1931.26
PMAX(DEG) 1926.29
PDEL(DEG) 3857.55
File: 1CRA807A.DAT Passband Symmetry = 0.1 dB

PHONON CORPORATION
FILE=1ER8807A.DAT 10:31:09 06-16-1998
PN 100828_823 FINAL_FUNCTIONAL TEMP:R FLIGHT7_3FUNCT /N WIDE_S21
06-15-1998 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 500.5 WIDTH= 999 INCR.= .288125 SYSTEM BANDWIDTH= 999
REFERENCES: LOSS(DB)= 28.58872 PHASE(DEG)= 1955.791 DELAY(US)= 5.743086E-02 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 15.93412 PHASE(DEG)= 4727.23
PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 99.9 MHZ/DIV



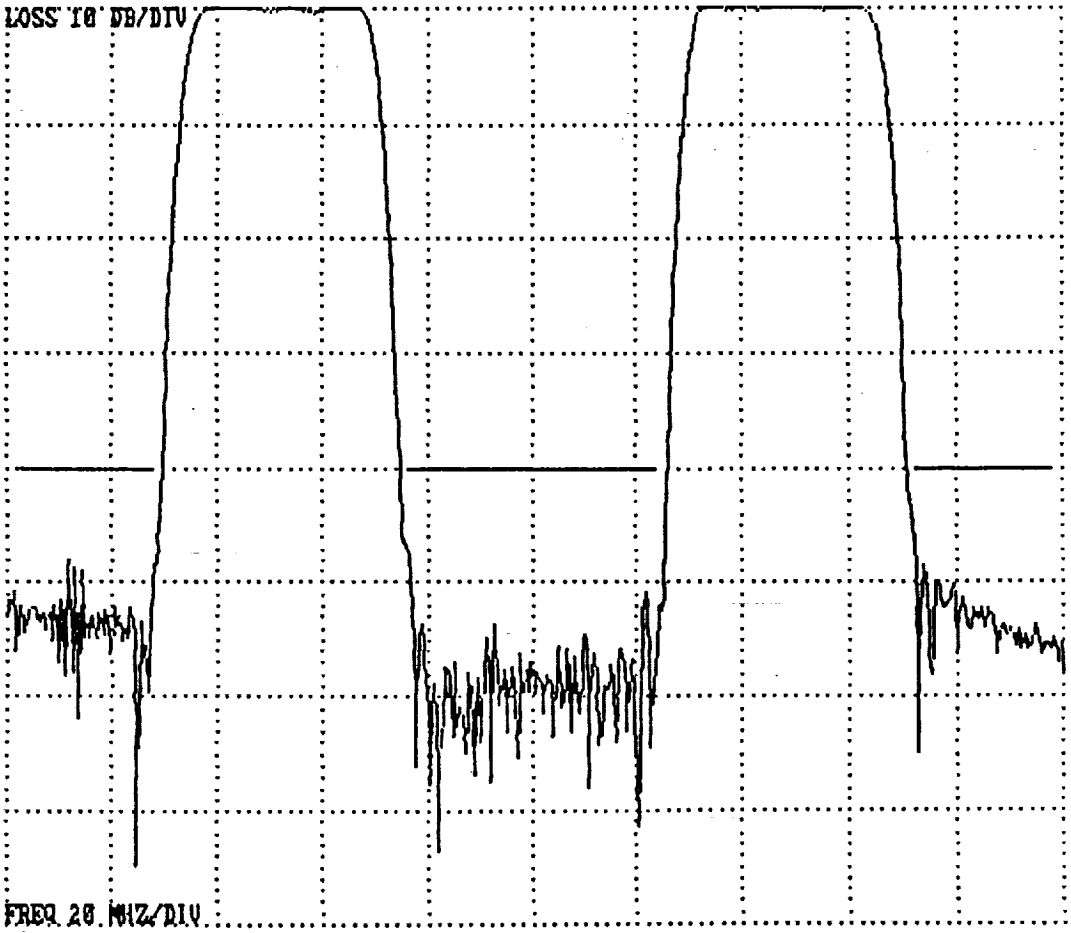
PEAK: LEVEL(DB)= 28.89281 FREQ(MHZ)= 288.9228 DELAY(US)=-.3864226 SIDELOBE(DB)=-43.89699
ENERGY: LEVEL(DB)= 28.9481 CENTER(MHZ)= 319.4828 WIDTH(MHZ)= 73.83752 SKEW(MHZ)= 15.66655

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.41	288.92282	288.92282	288.92282	0.00000	288.92282	0.00000	0.00	288.92282	288.92282
0.50	258.98831	290.51443	274.75137	31.52612	274.83438	31.64143	-14.51	258.98831	385.04254
1.00	258.48527	290.88394	274.64459	32.47867	274.65848	32.33776	-14.60	258.48527	386.19838
2.00	257.56489	291.48700	274.52554	33.92291	274.58847	33.38863	-14.73	257.56489	387.18623
3.00	256.98694	291.88611	274.43652	34.89917	274.53427	33.97199	-14.80	256.98694	387.63568
4.00	256.55689	292.22675	274.39142	35.67865	274.53644	34.33684	-14.85	256.55689	388.06763
5.00	256.21457	292.50583	274.36820	36.29126	274.53595	34.48413	-14.87	256.21457	388.45888
6.00	255.91431	292.74774	274.33102	36.83344	274.58548	34.66296	-14.89	255.91431	388.76547
10.00	255.82587	293.54481	274.28455	38.51894	274.58967	34.94586	-14.92	255.82587	389.66882
20.00	253.57413	294.89798	274.23685	41.32385	274.58838	35.86581	-14.92	253.57413	391.11661
30.00	252.62759	295.91635	274.27197	43.28876	274.58889	35.87294	-14.92	252.62759	392.10068
40.00	251.77892	296.86423	274.31757	45.08331	274.58886	35.87365	-14.91	251.77892	392.76895

BAND(MHZ)	1.000	225.000	428.000	1000.000
LMIN(DB)	58.77	-8.48	43.49	
LMAX(DB)	91.35	74.21	61.14	
LDEL(DB)	48.59	74.61	17.65	
PMIN(DEG)	3883.46	-4289.66	-3638.74	
PMAX(DEG)	8127.31	8319.87	8278.94	
PDEL(DEG)	4243.85	12528.73	11917.69	

FILE: 1ER8807A.DAT Out-of-band Rejection: PEAK= 43.5 dB WIDTH= 0.000 MHz

PHONON CORPORATION
FILE=1FR8807A.DAT 10:31:28 06-16-1998
PN_100828_823 FINAL_FUNCTIONAL TEMP:R FLIGHT7_3FUNCT /N DUAL_SCX
06-15-1998 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 322.2 WIDTH= 200 INCR.= .4 SYSTEM BANDWIDTH= 200
REFERENCES: LOSS(DB)= 28.58072 PHASE(DEG)= 149.1268 DELAY(US)= .2586865 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 26.74852 PHASE(DEG)= 911.9368
PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 20 MHZ/DIV



PEAK: LEVEL(DB)= 28.8998 FREQ(MHZ)= 288.9198 DELAY(US)= 8.165142E-02 SIDELOBE(DB)=-48.55243
ENERGY: LEVEL(DB)= 28.66354 CENTER(MHZ)= 322.8221 WIDTH(MHZ)= 73.36762 SKEW(MHZ)=-.7065575

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-8.48	288.91977	288.91977	288.91977	8.88888	288.91977	8.88888	8.88	288.91977	288.91977
8.58	258.98291	298.48419	274.73355	31.58128	274.66628	31.58236	-6.36	258.98291	386.29353
1.88	258.39172	298.87549	274.63361	32.48376	274.67163	32.25724	-6.41	258.39172	386.74771
2.88	257.56119	291.47821	274.51569	33.98983	274.66245	33.48672	-6.58	257.56119	387.45782
3.88	256.98117	291.86993	274.42554	34.88876	274.54242	34.85584	-6.55	256.98117	387.83587
4.88	256.54388	292.21284	274.38832	35.66223	274.53912	34.38136	-6.57	256.54388	388.38856
5.88	256.28438	292.48688	274.34521	36.28171	274.53912	34.38136	-6.55	256.28438	388.64585
6.88	255.98392	292.73138	274.31766	36.82747	274.53226	34.62243	-6.57	255.98392	388.92389
18.88	255.81793	293.52498	274.27142	38.58697	274.51483	34.98859	-6.56	255.81793	389.78885
28.88	253.56319	294.88837	274.22177	41.31718	274.49683	35.83853	-6.58	253.56319	391.17999
38.88	252.61732	295.98216	274.25974	43.28484	274.49655	35.83949	-6.44	252.61732	392.13367
48.88	251.76526	296.83389	274.29956	45.86863	274.49637	35.84838	-6.39	251.76526	392.83585

BAND(MHZ)	268.788	287.788	356.788	383.788
LMIN(DB)	-8.21	-8.39	-8.32	
LMAX(DB)	8.37	73.46	8.21	
LDEL(DB)	8.58	73.86	8.53	
PMIN(DEG)	-689.92	-1778.32	-361.88	
PMAX(DEG)	929.54	1648.84	1114.76	
PDEL(DEG)	1619.46	3419.16	1475.84	

FILE: 1FR8807A.DAT Out-of-band Rejection: PEAK= 46.4 dB WIDTH= 8.888 MHz

PHONON CORPORATION
FILE: 1FR8807A.DAT (+SSCF)
PN_100828_823 FINAL_FUNCTIONAL TEMP:R FLIGHT7_3FUNCT /N DUAL_SXX
06-15-1990 HP8753,SSREF,SSREF,SSCF
REFERENCES: LOSS(DB)= 28.50872 PHASE(DEG)= 149.1268
DELAY(US)= .2506005 SLOPE(US/MHZ)= 0

BANDPASS CHARACTERISTICS MEASUREMENT

FREQUENCY(MHZ)	LOSS(DB)	PHASE(DEG)
248.600	54.60	968.17
248.760	57.78	1322.87
256.920	3.12	1172.19
265.080	-0.17	688.13
273.240	0.08	175.84
281.400	0.34	-325.23
289.560	-0.11	-819.46
297.720	46.72	-1402.71
305.880	57.76	-1569.63
314.040	64.42	-861.66
322.200	57.00	-149.13
330.360	57.17	558.61
338.520	58.20	1318.77
346.680	51.89	1639.64
354.840	-0.03	1231.38
363.000	0.21	781.87
371.160	-0.06	323.59
379.320	-0.09	-132.52
387.480	2.03	-577.52
395.640	49.87	-777.84
403.800	52.89	-85.55

TESTED BY: [illegible] TITLE: [illegible] DATE: [illegible]

TEST: FINAL FUNCTIONAL

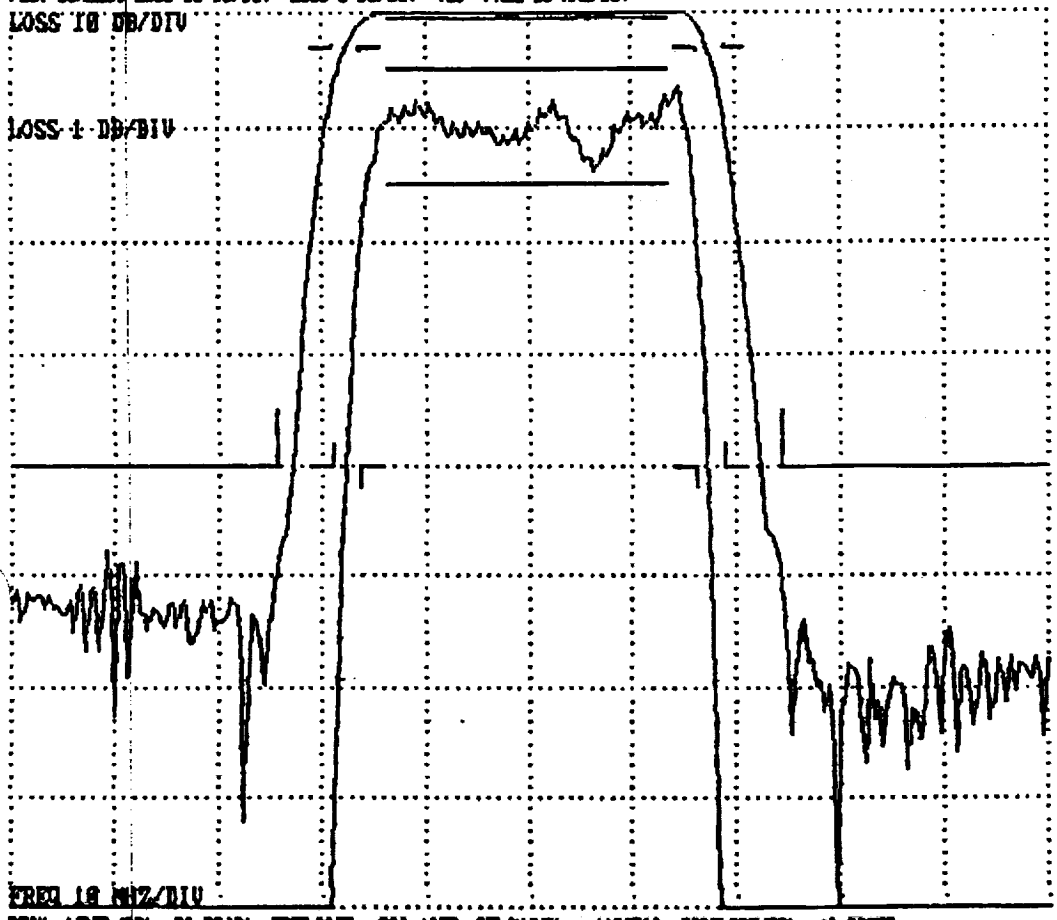
EQUIPMENT: HP 8753D SERIAL:3410A04374 CAL DUE:1/29/99
HP 3478A SERIAL:2136A03127 CAL DUE:7/7/98

PARAGRAPH	Q/ATP	REQUIREMENT TITLE	DATA		P/F
.1.1	5.2.1	OPERATING TEMPERATURE	35.0	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 273.335/275.865 MHz	274.803	MHz	P
		HI: 369.335/371.865 MHz	369.682	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 34/36 MHz	34.855	MHz	P
		HI: 34/36 MHz	35.207	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.1	dB	P
		HI: /0.5 dB	0.1	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		268.7-287.7 MHz: /1.0 dB	0.5	dB	P
		356.7-383.7 MHz: /1.0 dB	0.2	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.0/30.2 dB	28.7	dB	P
		HI: 27.0/30.2 dB	28.5	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.1	dB	P
		HI: -0.4/0.4 dB	-0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.2	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-225,420-1000 MHz:	42.9	0.000	
		DUAL: 225.000-249.935, 298.465-345.935, 394.465-420.00 MHz:	47.3	0.000	
		PEAK: 35.0/ dB	42.9 dB		P
		WIDTH: /7.2 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.29	Unitless	P
		HI: /1.30 Unitless	1.27	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		268.7-287.7,356.7-383.7 MHz			
		DUAL S11: 7.5/ dB	15.3	dB	P
		DUAL S22: 7.5/ dB	9.3	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.72/0.72 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P	DP	

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-8211
FAX: 203-651-8618

PHONON CORPORATION
FILE=1A980B7A.DAT 10:41:38 05-16-1998
PN_100826_823 FINAL_FUNCTIONAL TEMP:H FLIGHT7_3FUNCT /N DUAL_SIX
05-15-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY (MHZ): CENTER= 274.2 WIDTH= 100 INCR.= .4 SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 28.65621 PHASE(DEG)= 4982.966 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1388622 PHASE(DEG)= 1175.457
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 10 MHZ/DIV

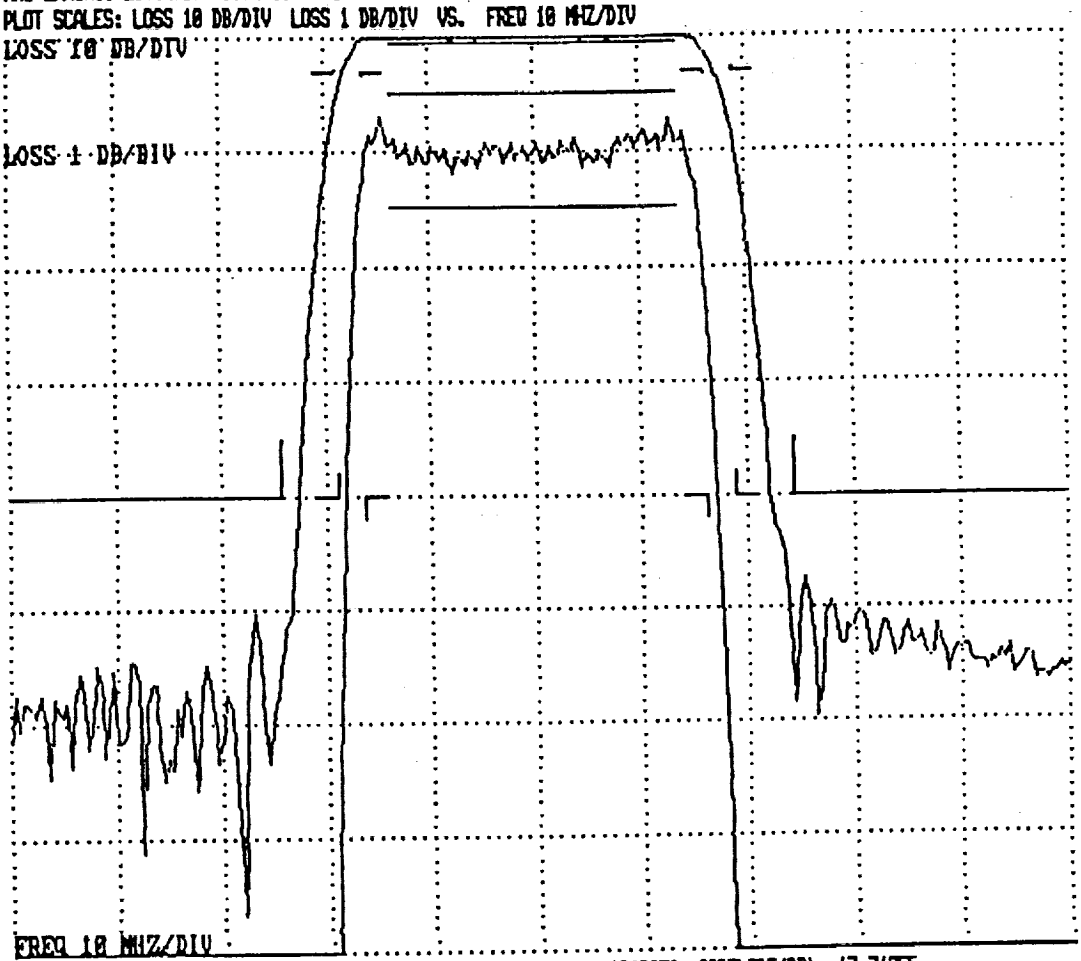


PEAK: LEVEL(DB)= 28.29421 FREQ(MHZ)= 288.4827 DELAY(US)=.4190066 SIDELOBE(DB)=-48.23673
ENERGY: LEVEL(DB)= 28.03393 CENTER(MHZ)= 274.8395 WIDTH(MHZ)= 36.47685 SKEW(MHZ)=-1.655864E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.36	288.48278	288.48278	288.48278	0.00000	288.48278	0.00000	0.00	288.48278	288.48278
0.50	258.57281	298.03223	274.30252	31.45941	274.22556	31.39243	-13.04	258.57281	298.03223
1.00	257.97632	298.42826	274.29230	32.45197	274.22685	32.26234	-13.93	257.97632	298.42826
2.00	257.15552	291.03836	274.09344	33.87384	274.21530	33.48365	-16.16	257.15552	291.03836
3.00	256.57516	291.42981	274.00250	34.85464	274.09314	34.84865	-18.32	256.57516	291.42981
4.00	256.15009	291.77332	273.96178	35.62323	274.00782	34.21331	-19.86	256.15009	291.77332
5.00	255.80523	292.04263	273.92444	36.23648	274.00760	34.36935	-19.98	255.80523	292.04263
6.00	255.50693	292.29123	273.89588	36.78430	274.07901	34.68578	-21.93	255.50693	292.29123
10.00	254.62291	293.00781	273.85495	38.46418	274.05927	34.87774	-26.59	254.62291	293.00781
20.00	253.17162	294.44138	273.80649	41.26976	274.03948	35.00397	-37.93	253.17162	294.44138
30.00	252.22835	295.47864	273.84549	43.25029	274.03973	35.01249	-47.54	252.22835	295.47864
40.00	251.37894	296.39337	273.86214	45.02243	274.03958	35.01328	-53.98	251.37894	296.39337

BAND(MHZ) 258.788 287.788
LMIN(DB) -0.27
LMAX(DB) 0.38
LDEL(DB) 0.65
PMIN(DEG) -2001.01
PMAX(DEG) 2006.55
PDEL(DEG) 4008.06
File: 1A980B7A.DAT Passband Symetry = 0.1 dB

PHONON CORPORATION
FILE=1CH8807A.DAT 10:42:17 06-16-1998
PN_100828_823 FINAL_FUNCTIONAL TEMP:H FLIGHT7_3FUNCT /N DUAL_SXX
06-15-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 370.2 WIDTH= 100 INCR.= .4 SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 28.45717 PHASE(DEG)=-4234.467 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 8.744384E-02 PHASE(DEG)= 1132.799
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 10 MHZ/DIV



PEAK: LEVEL(DB)= 28.14651 FREQ(MHZ)= 355.7129 DELAY(US)=-.4843876 SIDELOBE(DB)=-47.74255
ENERGY: LEVEL(DB)= 28.62295 CENTER(MHZ)= 369.7299 WIDTH(MHZ)= 36.8159 SKEW(MHZ)=-2.398132E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.31	355.71292	355.71292	355.71292	0.00000	355.71292	0.00000	0.00	355.71292	355.71292
0.50	353.43311	385.61458	369.52388	32.18148	369.62366	32.02619	-13.01	353.43311	385.61458
1.00	353.05851	386.03311	369.57181	33.04268	369.61728	32.72263	-13.95	353.05851	386.03311
2.00	352.52635	386.82645	369.67670	34.29958	369.62418	33.88433	-16.29	352.52635	386.82645
3.00	352.07867	387.28574	369.68219	35.20706	369.63383	34.33384	-17.72	352.07867	387.28574
4.00	351.75253	387.70724	369.72989	35.95471	369.64441	34.68823	-19.35	351.75253	387.70724
5.00	351.48059	388.03842	369.75952	36.55783	369.72278	34.83862	-20.28	351.48059	388.03842
6.00	351.23044	388.33588	369.78314	37.10544	369.72831	35.06926	-22.36	351.23044	388.33588
10.00	350.47983	389.18578	369.83237	38.70667	369.72266	35.32599	-27.45	350.47983	389.18578
20.00	349.21198	390.59653	369.90424	41.38455	369.72812	35.42636	-37.41	349.21198	390.59653
30.00	348.26877	391.54904	369.98891	43.28027	369.72986	35.43615	-47.89	348.26877	391.54904
40.00	347.58613	392.23114	369.86865	44.72501	369.72974	35.43679	-53.02	347.58613	392.23114

BAND(MHZ) 356.700 383.700
LMIN(DB) -0.27
LMAX(DB) 0.20
LDEL(DB) 0.47
PMIN(DEG) -1933.79
PMAX(DEG) 1929.67
PDEL(DEG) 3863.46
File: 1CH8807A.DAT Passband Symmetry = 0.1 dB

Channel 12 Bandpass Filter

SAW Filter (S/N: 1331576-2, S/N: B04)

ELECTRICAL TEST DATA SHEET

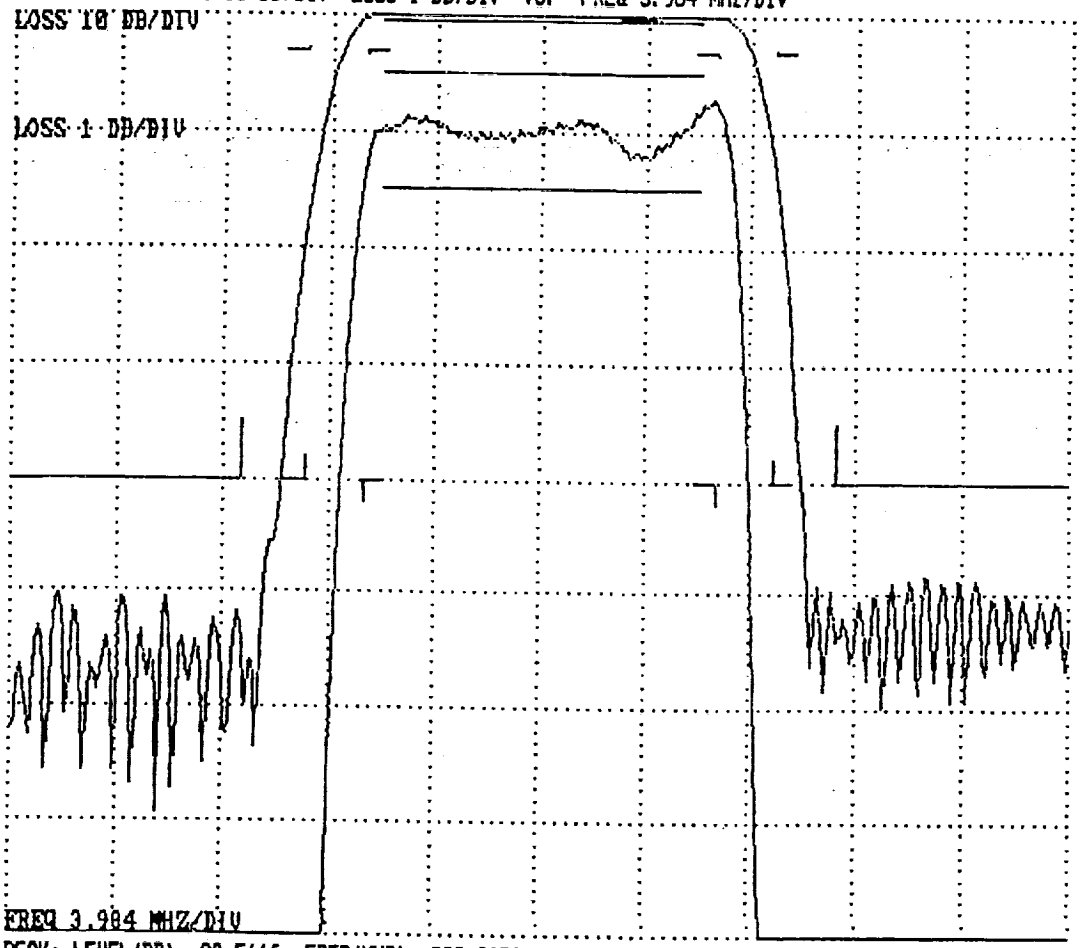
AEROJET PART: 1331576-2 PHONON PART: 100824 SERIAL: B04
TESTED BY: RM TITLE: Test Tech DATE: 2/3/98 TIME: 5:00pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A07982 CAL DUE: 2/10/98
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	-4.9	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 299.335/301.065 MHz	300.363	MHz	P
		HI: 343.335/345.065 MHz	344.139	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 15/16 MHz	15.436	MHz	P
		HI: 15/16 MHz	15.452	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.1	dB	P
		HI: /0.5 dB	0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		294.2-306.2 MHz: /1.0 dB	0.4	dB	P
		338.2-350.2 MHz: /1.0 dB	0.6	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.9	dB	P
		HI: 27.8/30.2 dB	29.0	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	-0.1	dB	P
		HI: -0.4/0.4 dB	0.1	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-286,359-1000 MHz:	43.3	0.000	
		DUAL: 286.000-288.935, 311.465-332.935, 355.465-359.00 MHz:	45.9	0.000	
		PEAK: 35.0/ dB	43.3 dB		P
		WIDTH: /3.2 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.28	Unitless	P
		HI: /1.30 Unitless	1.30	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		294.2-306.2,338.2-350.2 MHz			
		DUAL S11: 7.5/ dB	16.2	dB	P
		DUAL S22: 7.5/ dB	9.3	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.32/0.32 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P	(DP)	

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHUNUN CORPORATION
FILE=2AC8B04B.DAT 09:22:27 02-04-1998
PN_100830_824 FINAL_FUNCTIONAL TEMP:C FLIGHT4_FUNCT3 /N DUAL_SXX
02-03-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 300.2 WIDTH= 39.84 INCR.= .12 SYSTEM BANDWIDTH= 12
REFERENCES: LOSS(DB)= 28.8566 PHASE(DEG)=-6276.239 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 9.131524E-02 PHASE(DEG)= 1737.307
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 3.984 MHZ/DIV



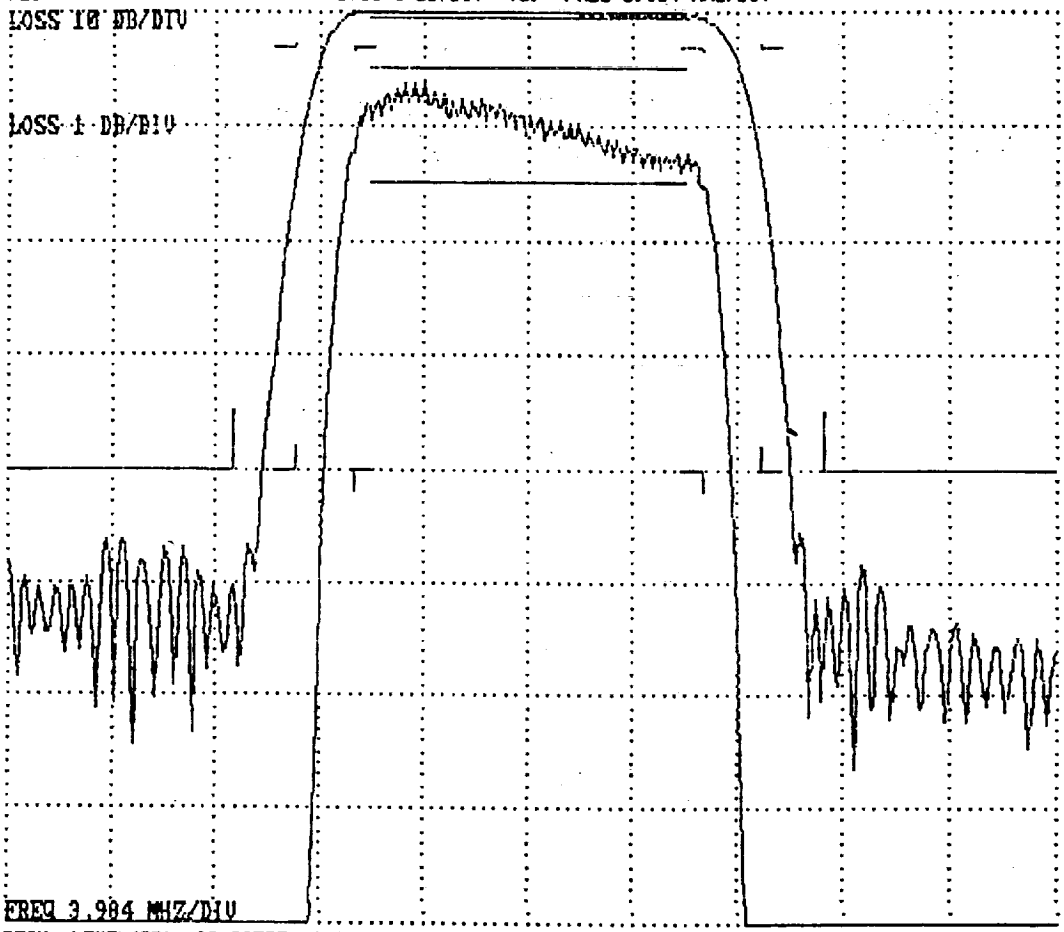
PEAK: LEVEL(DB)= 28.5416 FREQ(MHZ)= 306.6434 DELAY(US)=-1.381305 SIDELOBE(DB)=-48.70308
ENERGY: LEVEL(DB)= 29.02403 CENTER(MHZ)= 300.3678 WIDTH(MHZ)= 16.14979 SKEW(MHZ)= 3.354258E-03

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.32	306.64343	306.64343	306.64343	0.00000	305.64343	0.00000	0.00	306.64343	306.64343
0.50	293.39450	307.44910	300.42181	14.05460	300.44186	14.05572	-12.42	293.39450	307.44910
1.00	293.16443	307.62936	300.39691	14.46494	300.39041	14.36314	-13.36	293.16443	307.62936
2.00	292.85352	307.87970	300.36661	15.02618	300.35178	14.79916	-15.28	292.85352	307.87970
3.00	292.64493	308.08133	300.36313	15.43640	300.38879	15.01035	-16.66	292.64493	308.08133
4.00	292.47110	308.23221	300.35165	15.76111	300.36075	15.17839	-18.27	292.47110	308.23221
5.00	292.32687	308.36169	300.34430	16.03482	300.38266	15.30650	-20.12	292.32687	308.36169
6.00	292.20261	308.47400	300.33832	16.27139	300.36423	15.34142	-20.79	292.20261	308.47400
10.00	291.83432	308.84317	300.33875	17.00885	300.37332	15.48669	-26.42	291.83432	308.84317
20.00	291.21817	309.43213	300.32513	18.21396	300.36785	15.53417	-36.52	291.21817	309.43213
30.00	290.75531	309.81882	300.28705	19.06351	300.36789	15.53866	-47.61	290.75531	309.81882
40.00	290.38535	310.14566	300.26550	19.76031	300.36783	15.53891	-52.50	290.38535	310.14566

BAND(MHZ)	294.200	306.200
LMIN(DB)	-0.23	
LMAX(DB)	0.22	
LDEL(DB)	0.45	
PMIN(DEG)	-2976.95	
PMAX(DEG)	2981.68	
PDEL(DEG)	5958.64	

File: 2AC8B04B.DAT Passband Symmetry = 0.1 dB

PHONON CORPORATION
FILE=2CC8304B.DAT 09:23:21 02-04-1998
PN_100830_824 FINAL_FUNCTIONAL TEMP:C FLIGHT4_FUNCT3 /N DUAL_SXX
02-03-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 344.2 WIDTH= 39.84 INCR.= .12 SYSTEM BANDWIDTH= 12
REFERENCES: LOSS(DB)= 28.98352 PHASE(DEG)=-17673.79 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1994356 PHASE(DEG)= 1715.229
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 3.984 MHZ/DIV



PEAK: LEVEL(DB)= 28.60797 FREQ(MHZ)= 339.4937 DELAY(US)=-1.374119 SIDELOBE(DB)=-45.86445
ENERGY: LEVEL(DB)= 29.19447 CENTER(MHZ)= 343.9946 WIDTH(MHZ)= 16.21052 SKEW(MHZ)= .2683218

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.38	339.49371	339.49371	339.49371	0.00000	339.49371	0.00000	0.00	339.49371	339.49371
0.50	337.18442	350.69449	343.93945	13.51007	343.81467	13.52143	-11.39	337.18442	350.69449
1.00	336.92960	351.25488	344.09222	14.32529	343.92654	14.13297	-12.92	336.92960	351.25488
2.00	336.62680	351.62421	344.12549	14.99741	343.93646	14.64659	-14.97	336.62680	351.62421
3.00	336.41351	351.86523	344.13937	15.45172	343.97607	14.85708	-16.22	336.41351	351.86523
4.00	336.24072	352.05756	344.14914	15.81683	343.97928	15.07791	-18.22	336.24072	352.05756
5.00	336.10165	352.20837	344.15503	16.10672	343.98096	15.16370	-19.33	336.10165	352.20837
6.00	335.97662	352.35126	344.16394	16.37463	343.98282	15.23374	-20.54	335.97662	352.35126
10.00	335.58841	352.76358	344.17599	17.17517	343.99628	15.38230	-25.82	335.58841	352.76358
20.00	334.94815	353.41656	344.18237	18.46841	343.99423	15.43810	-37.49	334.94815	353.41656
30.00	334.49969	353.82422	344.16196	19.32452	343.99472	15.44145	-46.32	334.49969	353.82422
40.00	334.01495	354.16614	344.09055	20.15118	343.99466	15.44181	-52.21	334.01495	354.16614

BAND(MHZ) 338.200 350.200
LMIN(DB) -0.37
LMAX(DB) 0.39
LDEL(DB) 0.76
PMIN(DEG) -2938.64
PMAX(DEG) 2944.36
PDEL(DEG) 5883.00
File: 2CC8B04B.DAT Passband Symmetry = 0.3 dB

ELECTRICAL TEST DATA SHEET

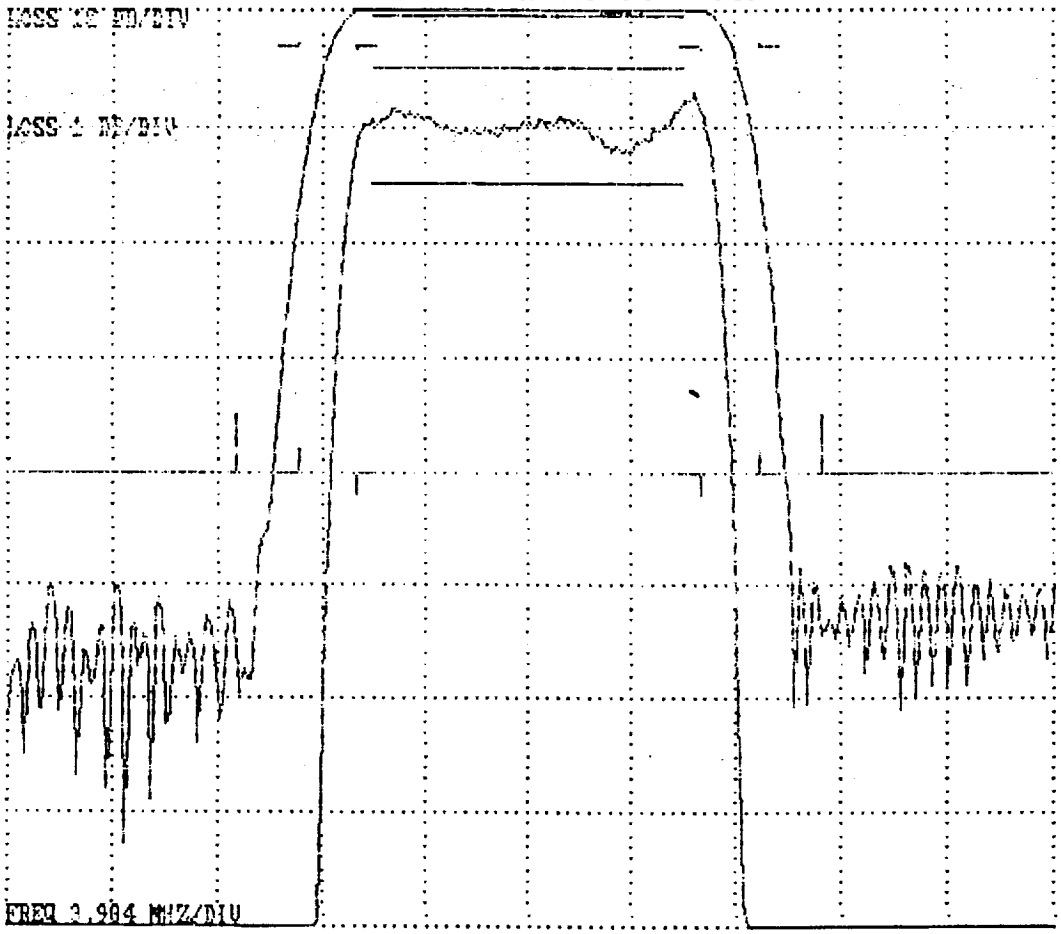
AEROJET PART: 1331576-2 PHONON PART: 100824 SERIAL: B04
TESTED BY: [illegible] TITLE: Test Tech DATE: 3/3/98 TIME: 5:00 pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A07982 CAL DUE: 2/10/98
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	15.0	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 299.335/301.065 MHz	300.282	MHz	P
		HI: 343.335/345.065 MHz	344.056	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 15/16 MHz	15.433	MHz	P
		HI: 15/16 MHz	15.448	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.1	dB	P
		HI: /0.5 dB	0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		294.2-306.2 MHz: /1.0 dB	0.4	dB	P
		338.2-350.2 MHz: /1.0 dB	0.6	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	29.0	dB	P
		HI: 27.8/30.2 dB	28.9	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.0	dB	P
		HI: -0.4/0.4 dB	0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-286,359-1000 MHz:	42.8	0.000	
		DUAL: 286.000-288.935, 311.465-332.935, 355.465-359.00 MHz:	45.9	0.000	
		PEAK: 35.0/ dB	42.8 dB		P
		WIDTH: /3.2 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.28	Unitless	P
		HI: /1.30 Unitless	1.30	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		294.2-306.2,338.2-350.2 MHz			
		DUAL S11: 7.5/ dB	15.7	dB	P
		DUAL S22: 7.5/ dB	9.3	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	-0.008	MHz	P
		3 dB BANDWIDTH: -0.32/0.32 MHz	-0.001	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	+0.1	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P	OP	

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION
FILE=2AR8B24B.DAT 09:37:12 02-04-1998
PN_100838_824 FINAL_FUNCTIONAL TEMP:R FLIGHT4_FUNCT3 /N DUAL_SXX
23-03-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 300.2 WIDTH= 39.84 INCR.= .12 SYSTEM BANDWIDTH= 12
REFERENCES: LOSS(DB)= 28.97896 PHASE(DEG)= 1191.695 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 5.508794E-02 PHASE(DEG)= 1727.746
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 3.984 MHZ/DIV

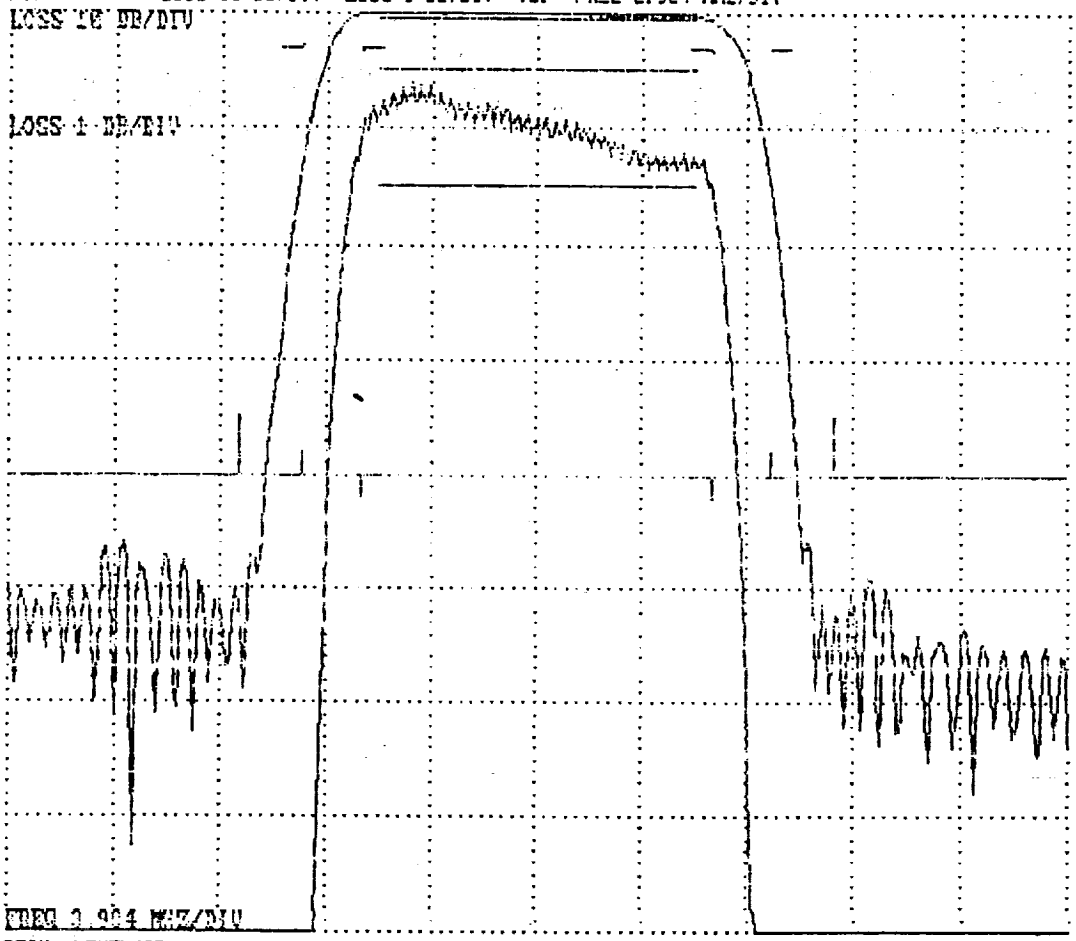


PEAK: LEVEL(DB)= 28.68736 FREQ(MHZ)= 305.5511 DELAY(US)=-1.38311 SIDELOBE(DB)=-48.27855
ENERGY: LEVEL(DB)= 29.14828 CENTER(MHZ)= 300.2718 WIDTH(MHZ)= 16.14902 SKEW(MHZ)= 2.579763E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.29	306.55106	306.55106	306.55106	0.00000	306.55105	0.00000	0.00	306.55105	306.55105
0.50	293.30432	307.35980	300.33206	14.05548	300.31094	14.04879	-12.43	293.30432	307.35980
1.00	293.07986	307.54123	300.31055	14.46136	300.31100	14.45179	-13.74	293.07986	307.54123
2.00	292.76807	307.79581	300.28192	15.02774	300.30789	14.79212	-15.30	292.76807	307.79581
3.00	292.56516	307.99799	300.28156	15.43283	300.27133	15.00250	-16.69	292.56516	307.99799
4.00	292.39243	308.14792	300.27017	15.75549	300.27358	15.21784	-18.91	292.39243	308.14792
5.00	292.24887	308.27756	300.26321	16.02869	300.27399	15.29858	-20.17	292.24887	308.27756
6.00	292.12457	308.38925	300.25630	16.26468	300.27383	15.36305	-21.56	292.12457	308.38925
10.00	291.75534	308.75900	300.25717	17.00366	300.27310	15.47737	-25.51	291.75534	308.75900
20.00	291.14026	309.34735	300.24380	18.20709	300.27200	15.52512	-37.93	291.14026	309.34735
30.00	290.67599	309.73044	300.20322	19.05444	300.27176	15.52827	-47.68	290.67599	309.73044
40.00	290.29205	310.07663	300.18423	19.78458	300.27173	15.52852	-52.85	290.29205	310.07663

BAND(MHZ) 294.200 306.200
LMIN(DB) -0.23
LMAX(DB) 0.23
LDEL(DB) 0.45
PMIN(DEG) -2978.04
PMAX(DEG) 2982.51
PDEL(DEG) 5960.54
File: 2AR8B04B.DAT Passband Symmetry = 0.1 dB

PHONON CORPORATION
FILE=2CR8B04B.DAT 09:38:15 02-04-1998
PN_100830_824 FINAL_FUNCTIONAL TEMP:R FLIGHT4_FUNCTS /N DUAL_SXX
02-03-1998 MP8753,SSCF,SSFIX,SSREF
FREQUENCY(MHZ): CENTER= 344.2 WIDTH= 39.84 INCR.= .12 SYSTEM BANDWIDTH= 12
REFERENCES: LOSS(DB)= 28.9179 PHASE(DEG)=-10572.56 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .2019174 PHASE(DEG)= 1715.725
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 3.984 MHZ/DIV



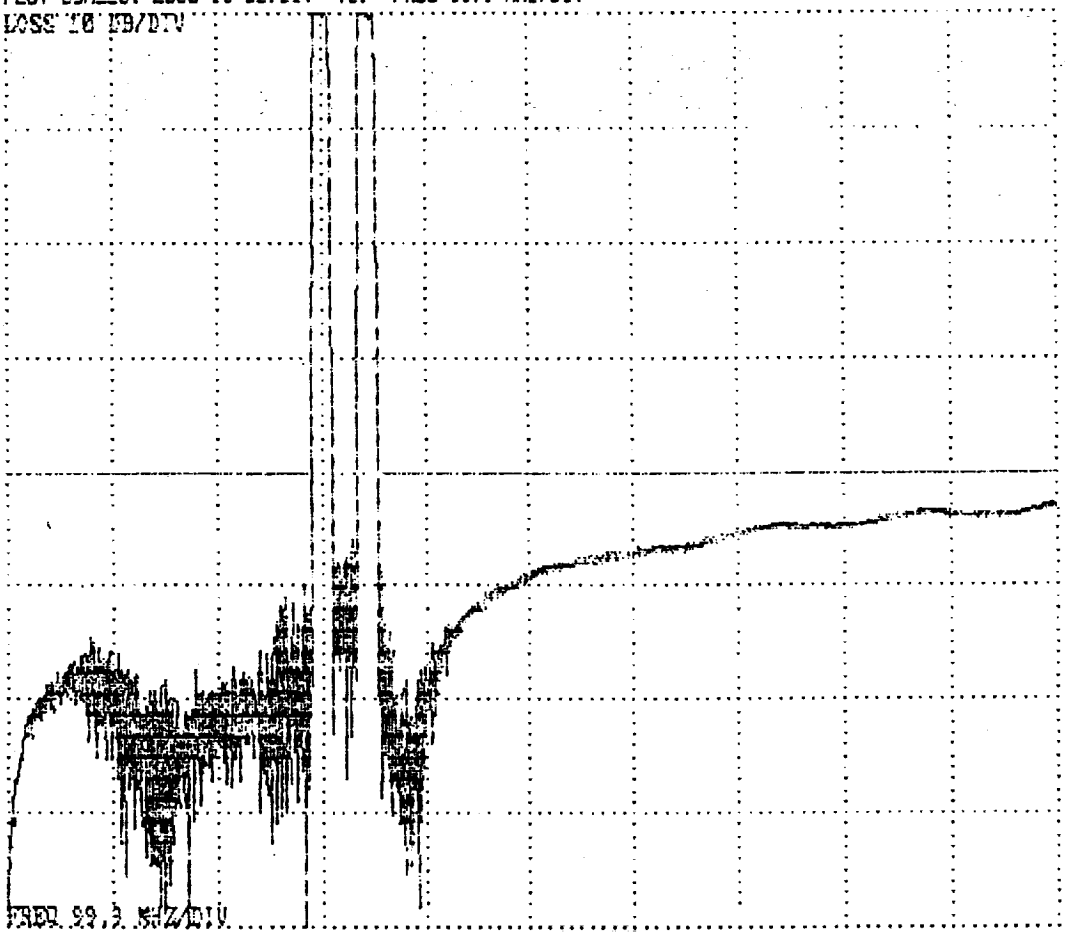
PEAK: LEVEL(DB)= 28.52385 FREQ(MHZ)= 329.3907 DELAY(US)=-1.37519 SIDELOBE(DB)=-46.01279
ENERGY: LEVEL(DB)= 29.12559 CENTER(MHZ)= 343.9142 WIDTH(MHZ)= 15.20662 SKEW(MHZ)= .265841

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.39	339.39075	339.39075	339.39075	0.00000	339.39075	0.00000	0.00	339.39075	339.39075
0.50	337.09692	350.81497	343.95593	13.71805	343.81003	13.74362	-11.87	337.09692	350.81497
1.00	336.85861	351.17657	344.01758	14.31796	343.86597	14.23552	-13.26	336.85861	351.17657
2.00	336.54889	351.53888	344.04388	14.98999	343.91031	14.55597	-14.98	336.54889	351.53888
3.00	336.33200	351.78049	344.05624	15.44849	343.90872	14.92748	-16.72	336.33200	351.78049
4.00	336.15866	351.97189	344.06528	15.81323	343.88443	15.08581	-18.22	336.15866	351.97189
5.00	336.01849	352.12354	344.07101	16.10504	343.90921	15.20942	-19.97	336.01849	352.12354
6.00	335.89603	352.26453	344.08025	16.36850	343.90991	15.27251	-21.25	335.89603	352.26453
10.00	335.50427	352.67630	344.09027	17.17203	343.91202	15.39029	-25.86	335.50427	352.67630
20.00	334.85367	353.32764	344.09515	18.46497	343.91492	15.44564	-37.50	334.85367	353.32764
30.00	334.41235	353.73877	344.07556	19.32542	343.91434	15.44899	-46.47	334.41235	353.73877
40.00	333.91756	354.07336	343.99551	20.15570	343.91431	15.44935	-52.56	333.91755	354.07336

BAND(MHZ)	330.200	350.200
LMIN(DB)	-0.39	
LMAX(DB)	0.36	
LDEL(DB)	0.76	
PMIN(DEG)	-2939.57	
PMAX(DEG)	2945.97	
PDEL(DEG)	5885.54	

File: 2CR8B04B.DAT Passband Symmetry = 0.3 dB

PHONON CORPORATION
FILE=2ER8B04B.DAT 09:39:12 02-04-1998
PN_100030_824 FINAL_FUNCTIONAL TEMP:R FLIGHT4_FUNCT3 /N WIDE_S21
02-03-1998 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 500.5 WIDTH= 999 INCR.= .208125 SYSTEM BANDWIDTH= 999
REFERENCES: LOSS(DB)= 28.94838 PHASE(DEG)=-8293.627 DELAY(US)= .1225986 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 12.4946 PHASE(DEG)= 8744.289
PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 99.9 MHZ/DIV



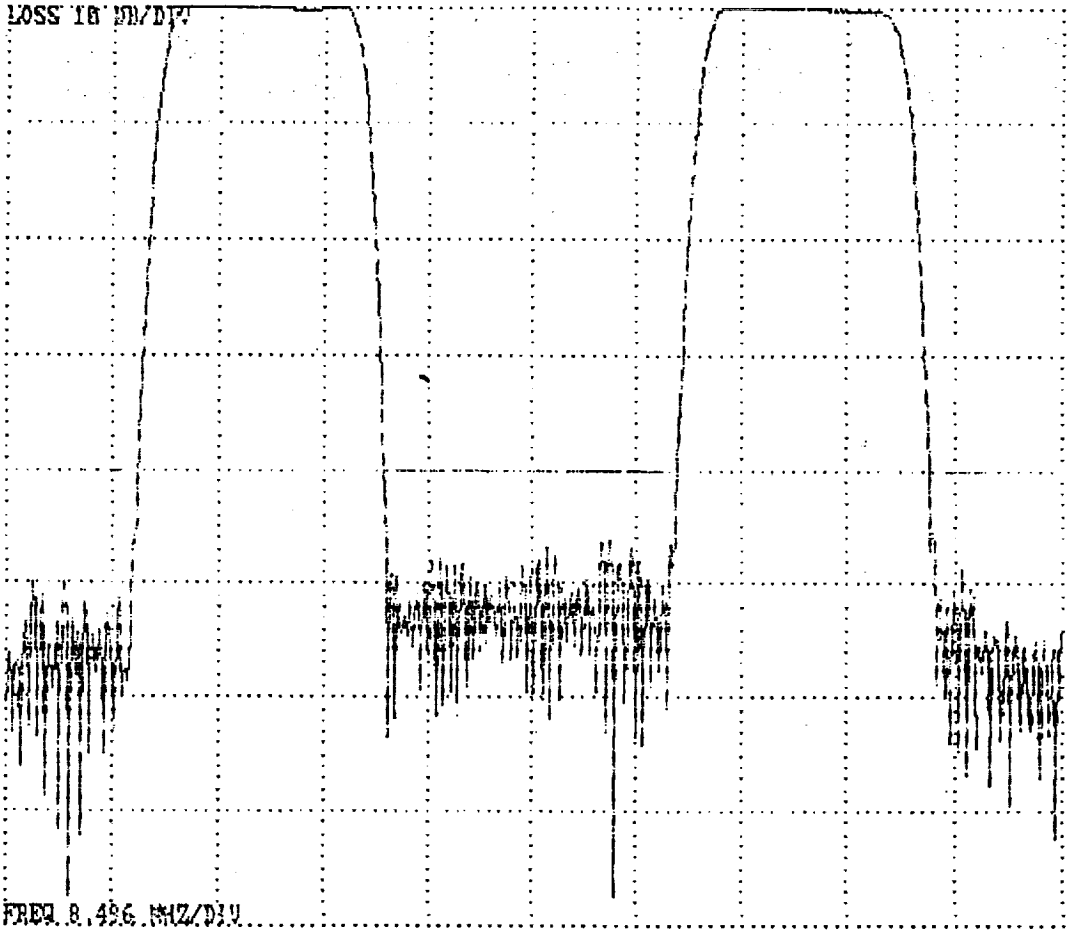
PEAK: LEVEL(DB)= 28.5374 FREQ(MHZ)= 339.4139 DELAY(US)=-1.155482 SIDELOBE(DB)=-43.2029
ENERGY: LEVEL(DB)= 29.14921 CENTER(MHZ)= 322.3776 WIDTH(MHZ)= 32.3835 SKEW(MHZ)= 105.5359

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.41	339.41388	339.41388	339.41388	0.00000	339.41388	0.00000	0.00	339.41388	339.41388
0.50	337.07986	350.64371	343.86179	13.56384	343.64783	13.53217	-17.53	293.32251	350.64371
1.00	336.87472	351.13989	344.00732	14.26517	343.84105	14.24149	-17.71	293.10010	351.13989
2.00	335.53696	351.53229	344.03461	14.99533	343.91895	14.58225	-17.83	292.77750	351.53229
3.00	335.33609	351.78345	344.05975	15.44736	343.91516	14.92250	-17.99	292.57022	351.78345
4.00	336.15732	351.97043	344.06387	15.81311	343.91412	15.11347	-17.94	292.39573	351.97043
5.00	336.01935	352.12308	344.07123	16.10373	343.91245	15.25488	-17.98	292.25183	352.12308
6.00	335.89518	352.26584	344.08099	16.36965	343.91245	15.25488	-17.98	292.12868	352.26584
12.00	335.50632	352.57288	344.08990	17.15599	343.91245	15.41581	-18.02	291.75790	352.67288
20.00	334.85200	353.32751	344.09476	18.46552	343.91321	15.47895	-18.03	291.14127	353.32751
30.00	334.41724	353.74011	344.07867	19.32288	343.91324	15.48380	-18.03	290.67740	353.74011
40.00	333.92324	354.06570	343.99887	20.13367	343.91321	15.45435	-18.02	290.29024	354.06570

BAND(MHZ)	1.000	286.000	359.000	1000.000
LMIN(DB)	49.95	-0.41	42.79	
LMAX(DB)	83.42	68.51	78.45	
LDEL(DB)	33.47	68.92	35.66	
PMIN(DEG)	5515.92	-6382.14	-7495.99	
PMAX(DEG)	9999.00	9999.00	9999.00	
PDEL(DEG)	3483.08	16321.14	17494.99	

FILE: 2ER8B04B.DAT Out-of-band Rejection: PEAK= 42.8 dB WIDTH= 0.000 MHz

PHONON CORPORATION
FILE=2FR8B24B.DAT 09:39:38 02-24-1998
PN_100830_B24 FINAL_FUNCTIONAL TEMP:R FLIGHT4_FUNCT3 /N DUAL_SXX
02-03-1998 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 322.2 WIDTH= 84.96 INCR.= .12 SYSTEM BANDWIDTH= 85
REFERENCES: LOSS(DB)= 28.94039 PHASE(DEG)=-4545.38 DELAY(US)= .7974963 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 26.38259 PHASE(DEG)= 1424.219
PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 8.496 MHZ/DIV



PEAK: LEVEL(DB)= 28.58125 FREQ(MHZ)= 339.3715 DELAY(US)= .2177372 SIDELOBE(DB)=-45.9692
ENERGY: LEVEL(DB)= 29.13649 CENTER(MHZ)= 322.1914 WIDTH(MHZ)= 32.35046 SKEW(MHZ)=-.1953978

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.45	339.37145	339.37145	339.37145	0.00000	339.37145	0.00000	0.00	339.37145	339.37145
0.50	337.08670	350.82782	343.95728	13.74112	343.82687	13.73405	-6.17	293.32324	350.82782
1.00	336.82261	351.18402	344.00330	14.35141	343.82441	14.33949	-6.28	293.09171	351.18402
2.00	336.54501	351.54565	344.04535	15.00064	343.89467	14.75169	-6.36	292.77762	351.54565
3.00	336.32581	351.79126	344.05853	15.46545	343.88818	15.02377	-6.40	292.57077	351.79126
4.00	336.15323	351.97778	344.06549	15.82455	343.91732	15.19371	-6.42	292.39962	351.97778
5.00	336.01459	352.12845	344.07153	16.11386	343.91589	15.28005	-6.43	292.25287	352.12845
6.00	335.89334	352.27005	344.08170	16.37671	343.91513	15.35123	-6.43	292.12778	352.27005
10.00	335.58208	352.68391	344.09149	17.17883	343.91428	15.51115	-6.42	291.75772	352.68391
20.00	334.96111	353.32974	344.09543	18.46863	343.91443	15.55567	-6.35	291.14139	353.32974
30.00	334.41412	353.73955	344.07684	19.32544	343.91428	15.55895	-6.30	290.67613	353.73955
40.00	333.92123	354.07397	343.99762	22.15274	343.91428	15.55932	-6.24	290.29178	354.07397

BAND(MHZ)	294.200	306.200	338.200	350.200
LMIN(DB)	-0.15	-2.25	-0.45	
LMAX(DB)	0.25	77.53	0.36	
LDEL(DB)	0.43	77.78	0.81	
PMIN(DEG)	-2175.54	-3095.60	-919.32	
PMAX(DEG)	313.30	2473.76	1496.28	
PDEL(DEG)	2489.83	5570.37	2415.60	

FILE: 2FR8B24B.DAT Out-of-band Rejection: PEAK= 45.9 dB WIDTH= 0.000 MHz

PHONON CORPORATION
FILE: 2FR0B34B.DAT (+SSCF)
PN_100830_324 FINAL_FUNCTIONAL TEMP;R FLIGHT4_FUNCT3 /N DUAL_SYX
02-03-1998 HP8753,SSREF,SSREF,SSCF
REFERENCES: LOSS(DB)= 28.94838 PHASE(DEG)= -4546.18
DELAY(US)= .7974983 SLOPE(US/MHZ)= 0

BANDPASS CHARACTERISTICS MEASUREMENT

FREQUENCY(MHZ)	LOSS(DB)	PHASE(DEG)
285.400	54.86	-73.78
289.080	59.86	968.25
292.760	2.06	523.55
296.440	-0.05	-149.53
300.120	0.01	-931.22
303.800	0.24	-1696.22
307.480	0.85	-2462.58
311.160	49.24	-2792.73
314.840	52.53	-1776.66
318.520	52.03	-700.55
322.200	49.83	355.91
325.880	52.01	1430.49
329.560	51.93	1715.73
333.240	51.52	2455.04
336.922	0.88	1771.28
340.600	-0.92	1031.53
344.280	-0.01	272.51
347.960	0.33	-475.17
351.640	0.35	-1215.69
355.320	59.62	-2208.56
359.000	60.52	-1683.70

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-2 PHONON PART: 100824 SERIAL: B04
TESTED BY: [illegible] TITLE: Test Tech DATE: 3/3/98 TIME: 5:00 p.m
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A07982 CAL DUE: 2/10/98
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	35.3	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 299.335/301.065 MHz	300.167	MHz	P
		HI: 343.335/345.065 MHz	343.943	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 15/16 MHz	15.429	MHz	P
		HI: 15/16 MHz	15.448	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.0	dB	P
		HI: /0.5 dB	0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		294.2-306.2 MHz: /1.0 dB	0.4	dB	P
		338.2-350.2 MHz: /1.0 dB	0.6	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	29.2	dB	P
		HI: 27.8/30.2 dB	28.9	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.3	dB	P
		HI: -0.4/0.4 dB	-0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.4	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-286,359-1000 MHz:	43.1	0.000	
		DUAL: 286.000-288.935, 311.465-332.935, 355.465-359.00 MHz:	45.6	0.000	
		PEAK: 35.0/ dB	43.1 dB		P
		WIDTH: /3.2 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.28	Unitless	P
		HI: /1.30 Unitless	1.30	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		294.2-306.2,338.2-350.2 MHz			
		DUAL S11: 7.5/ dB	15.0	dB	P
		DUAL S22: 7.5/ dB	9.0	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	8	MHz	P
		3 dB BANDWIDTH: -0.32/0.32 MHz	8	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (OP)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION

FILE=2AH88043.DAT 09:52:35 02-04-1993

PN_100830_824 FINAL_FUNCTIONAL TEMP:H FLIGHT4_FUNCT2 /N DUAL_SXX

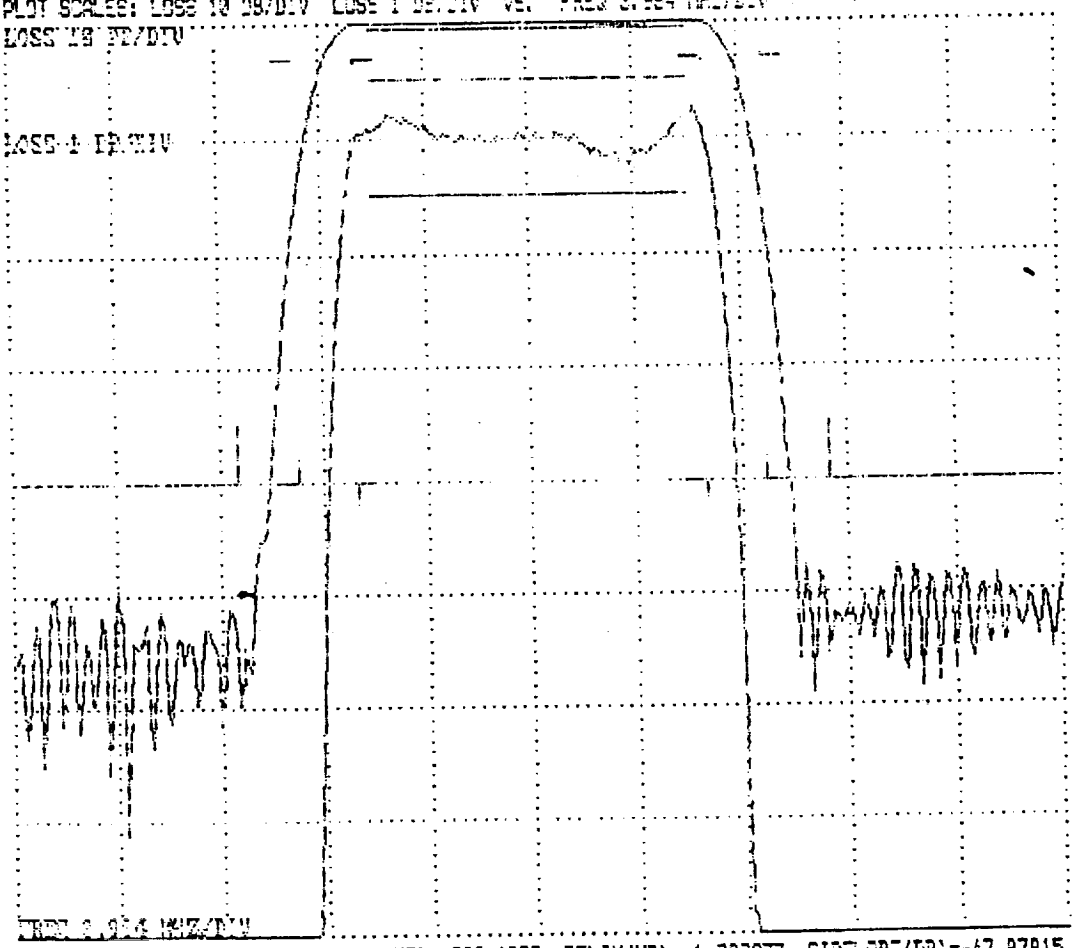
22-03-1993 HP8753,SSCF,SSFFIX,SSREF

FREQUENCY(MHZ): CENTER= 300.2 WIDTH= 19.84 INCR.= .10 SYSTEM BANDWIDTH= 12

REFERENCES: LOSS(DB)= 29.24543 PHASE(DEG)= 8436.461 DELAY(US)= 0 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= .102779 PHASE(DEG)= 1738.401

PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 3.984 MHZ/DIV



PEAK: LEVEL(DB)= 28.99294 FREQ(MHZ)= 306.4399 DELAY(US)=-1.383277 SIDELOBE(DB)=-47.87815

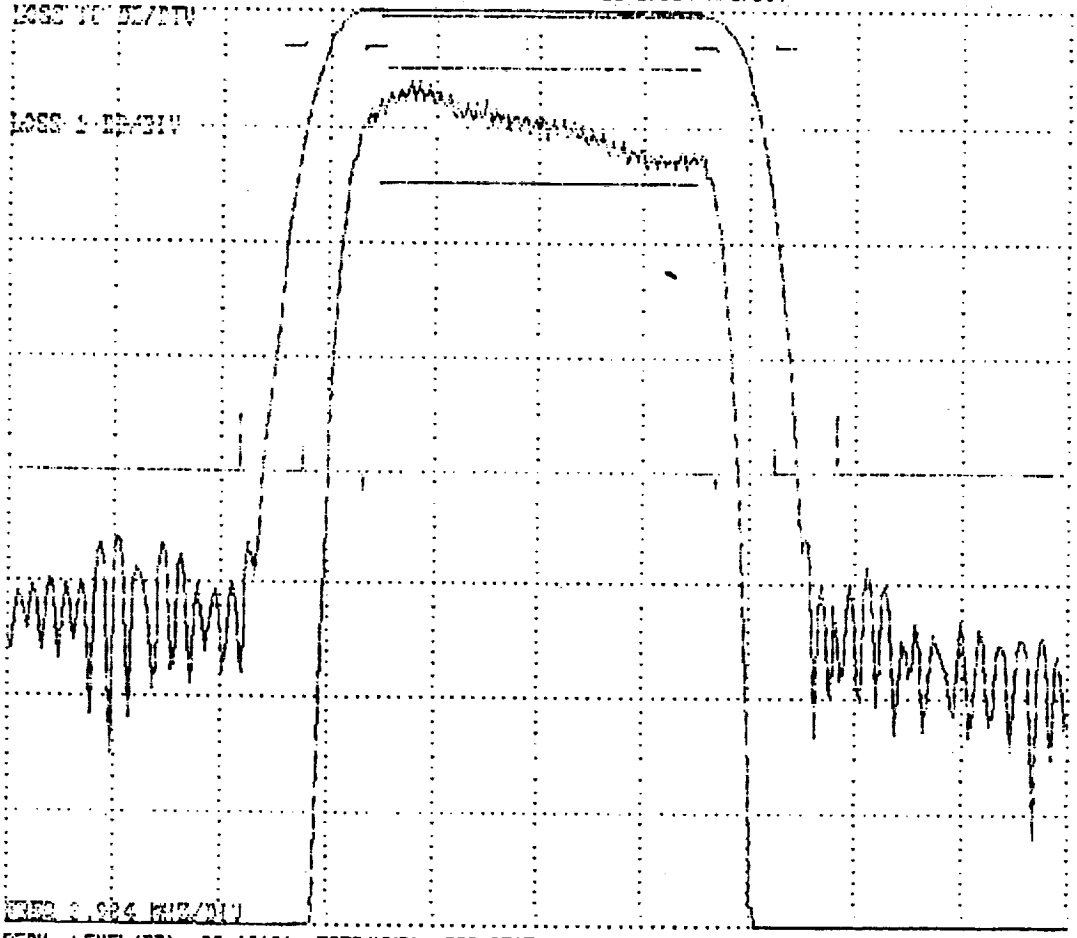
ENERGY: LEVEL(DB)= 23.41625 CENTER(MHZ)= 300.1346 WIDTH(MHZ)= 15.13543 SKEW(MHZ)= 6.589217E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.25	306.42988	306.42988	306.42988	0.00000	306.42988	0.00000	0.00	306.42988	306.42988
0.50	293.18317	307.83557	300.20935	14.65240	300.15687	14.64524	-13.45	293.18317	307.23557
1.00	292.96149	307.41858	300.19003	14.45709	300.16745	14.44779	-13.77	292.96149	307.41858
2.00	292.65527	307.57938	300.16733	14.92411	300.15532	14.78792	-15.23	292.65527	307.57938
3.00	292.45288	307.88144	300.15718	15.42856	300.16077	15.05765	-17.25	292.45288	307.88144
4.00	292.28238	308.03255	300.15747	15.75018	300.15902	15.16424	-18.24	292.28238	308.03255
5.00	292.13931	308.15866	300.14899	16.01935	300.13431	15.29212	-20.23	292.13931	308.15866
6.00	292.01544	308.27151	300.14349	16.25607	300.13467	15.35698	-21.62	292.01544	308.27151
10.00	291.64852	308.64185	300.14523	16.99333	300.13519	15.46914	-26.50	291.64852	308.64185
20.00	291.03186	309.22891	300.13037	18.19705	300.13488	15.51901	-38.04	291.03185	309.22891
30.00	290.56491	309.60587	300.08588	19.04196	300.13461	15.51906	-47.57	290.56491	309.60587
40.00	290.17963	310.00214	300.09088	19.82251	300.13458	15.51930	-52.15	290.17963	310.00214

BAND(MHZ)	294.200	306.200
LMIN(DB)	-0.20	
LMAX(DB)	0.23	
LDEL(DB)	0.43	
PMIN(DEG)	-2979.43	
PMAX(DEG)	2983.83	
PDEL(DEG)	5963.25	

File: 2AH88043.DAT Passband Symmetry = 0.0 dB

PHONON CORPORATION
FILE=2CH3B348.DAT 09:53:29 22-04-1998
PN_103830_824 FINAL_FUNCTIONAL TEMP:H FLIGHT4_FUNCTS /N DUAL_SAX
28-JUL-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 344.2 WIDTH= 38.84 INCR.= .12 SYSTEM BANDWIDTH= 12
REFERENCES: LOSS(DB)= 29.87507 PHASE(DEG)=-3363.902 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .2038612 PHASE(DEG)= 1716.511
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 3.884 MHZ/DIV



PEAK: LEVEL(DB)= 28.48101 FREQ(MHZ)= 339.2547 DELAY(US)=-1.374526 SIDELOBE(DB)=-45.7946
ENERGY: LEVEL(DB)= 29.27753 CENTER(MHZ)= 343.9009 WIDTH(MHZ)= 16.1987 SKEW(MHZ)= .3637209

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.39	339.25473	339.25473	339.25473	0.00000	339.25473	0.00000	0.00	339.25473	339.25473
0.50	335.97787	350.71515	343.84650	13.73727	343.59850	13.75294	-11.88	335.97737	350.71515
1.00	336.75415	351.06329	343.90872	14.30914	343.75027	14.25490	-13.28	335.75415	351.05329
2.00	336.44245	351.42450	343.93395	14.98105	343.79535	14.57367	-15.01	336.44245	351.42450
3.00	336.21924	351.66769	343.94348	15.44845	343.79462	14.94311	-16.75	336.21924	351.66769
4.00	336.04773	351.84985	343.94879	15.80212	343.79517	15.05310	-17.73	336.04773	351.84985
5.00	335.90408	352.00256	343.95331	16.09848	343.79572	15.22328	-22.02	335.90408	352.00256
6.00	335.78217	352.14233	343.95225	16.36017	343.79651	15.23592	-21.38	335.78217	352.14233
10.00	335.38940	352.55109	343.97025	17.16169	343.79974	15.40247	-25.91	335.38940	352.55109
20.00	334.74380	353.20187	343.97284	18.45807	343.80148	15.45707	-37.52	334.74380	353.20187
30.00	334.28976	353.62009	343.95493	19.33032	343.80087	15.45042	-45.42	334.28976	353.62009
40.00	333.79059	353.94708	343.86884	20.15649	343.80084	15.45075	-52.55	333.79059	353.94708

BAND(MHZ)	338.200	350.200
LMIN(DB)	-0.39	
LMAX(DB)	0.37	
LDEL(DB)	0.76	
PMIN(DEG)	-2939.91	
PMAX(DEG)	2946.54	
PDEL(DEG)	5886.45	

File: 2CH3B042.DAT Passband Symmetry = 2.3 dB

Channel 13 Bandpass Filter

SAW Filter (S/N: 1331576-3, S/N: B03)

ELECTRICAL TEST DATA SHEET

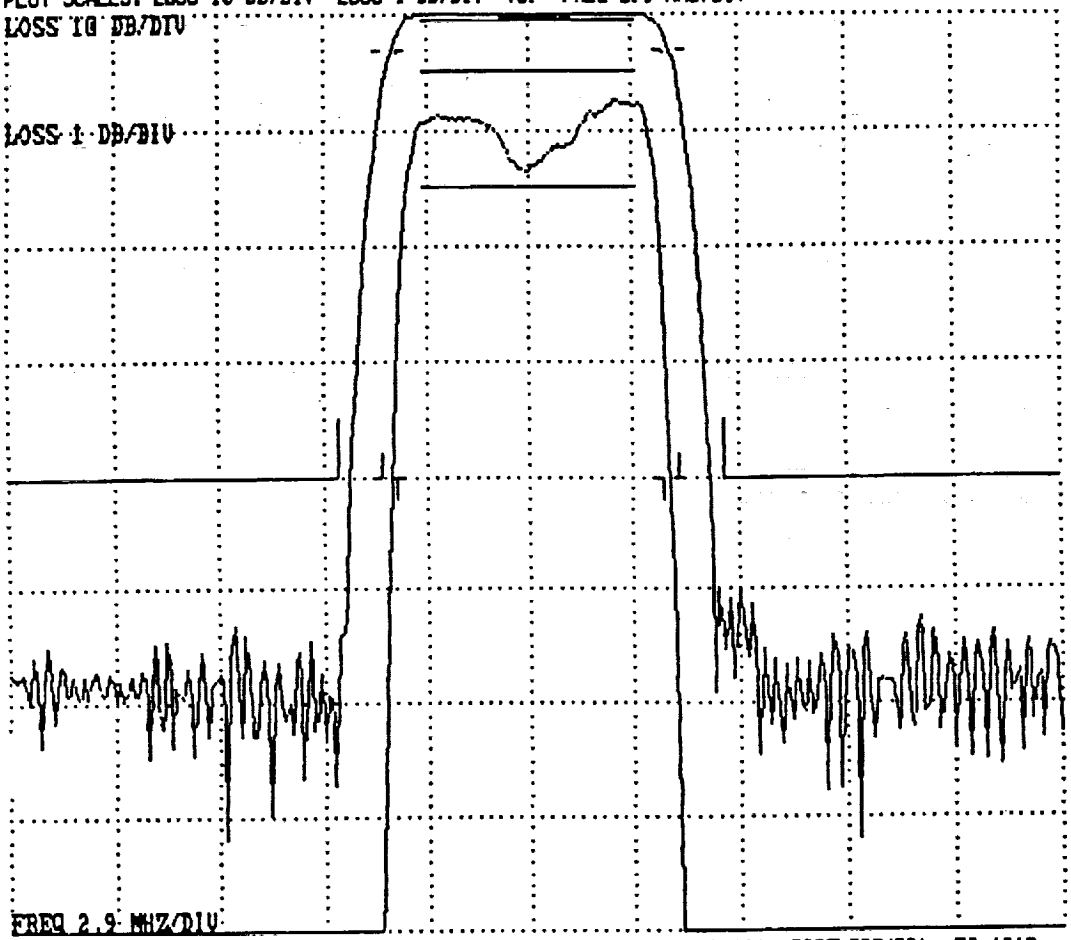
AEROJET PART: 1331576-3 PHONON PART: 100825 SERIAL: B03
TESTED BY: MM TITLE: TECT DATE: 11/5/98 TIME: 1:00 p.m.
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A07982 CAL DUE: 2/10/98
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	-5.6	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 312.035/312.365 MHz	312.207	MHz	P
		HI: 332.035/332.365 MHz	332.266	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 7.8/8.0 MHz	7.815	MHz	P
		HI: 7.8/8.0 MHz	7.876	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.1	dB	P
		HI: /0.5 dB	0.0	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		309.2-315.2 MHz: /1.0 dB	0.6	dB	P
		329.2-335.2 MHz: /1.0 dB	0.4	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.0	dB	P
		HI: 27.8/30.2 dB	28.3	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	-0.2	dB	P
		HI: -0.4/0.4 dB	-0.2	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.2	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-303,342-1000 MHz:	47.8	0.000	
		DUAL: 303.000-306.835, 317.565-326.835, 337.565-342.00 MHz:	49.2	0.000	
		PEAK: 35.0/ dB	47.8 dB		P
		WIDTH: /1.6 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.28	Unitless	P
		HI: /1.30 Unitless	1.27	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		309.2-315.2,329.2-335.2 MHz			
		DUAL S11: 7.5/ dB	10.6	dB	P
		DUAL S22: 7.5/ dB	10.1	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.1/0.1 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.16/0.16 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P	DP	

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
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FAX: 203-651-8618

PHONON CORPORATION
FILE=3AC8B03B.DAT 18:01:46 01-05-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:C REWORK TRAVELLER 06 /N DUAL_5XX
01-05-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 312.2 WIDTH= 29 INCR.= .1 SYSTEM BANDWIDTH= 6
REFERENCES: LOSS(DB)= 28.03315 PHASE(DEG)= 19531.32 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1769674 PHASE(DEG)= 1647.192
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 2.9 MHZ/DIV



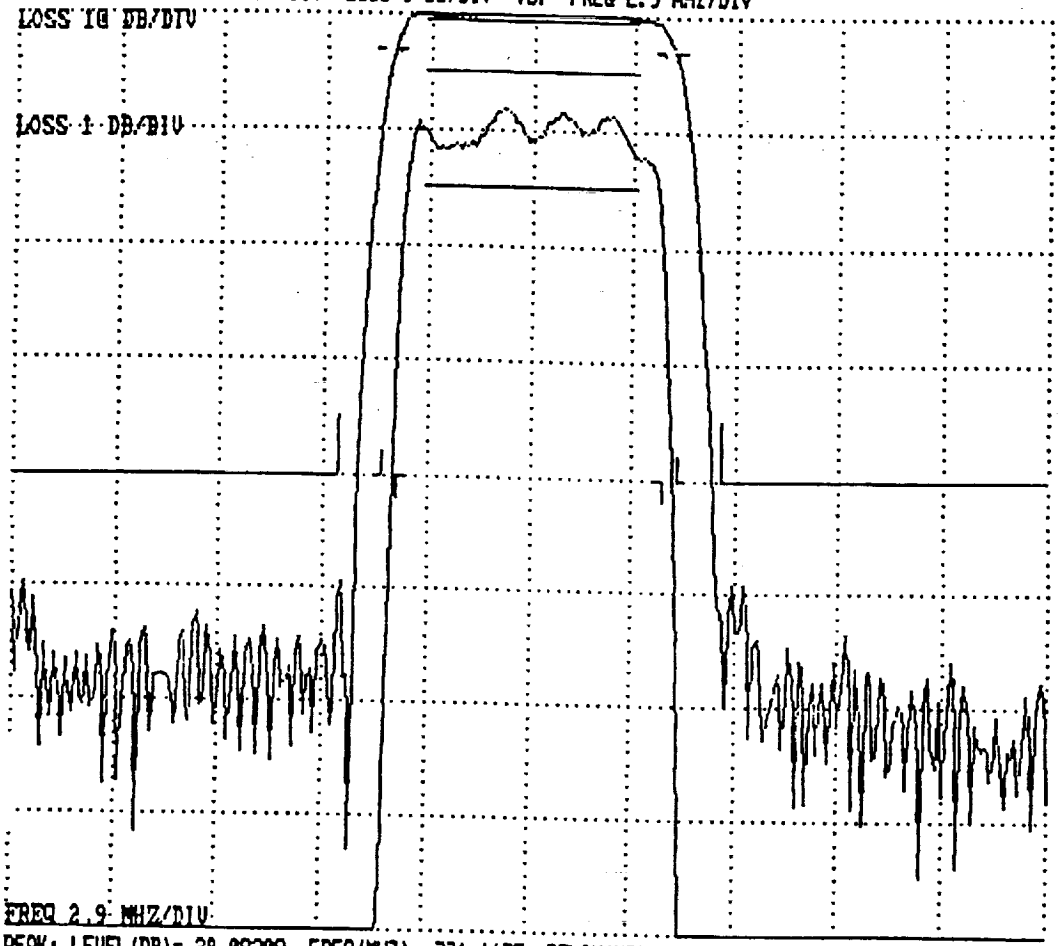
PEAK: LEVEL(DB)= 27.77092 FREQ(MHZ)= 314.6494 DELAY(US)=-2.69301 SIDELOBE(DB)=-50.1049
ENERGY: LEVEL(DB)= 28.21683 CENTER(MHZ)= 312.2216 WIDTH(MHZ)= 8.189925 SKEW(MHZ)=-1.876869E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.26	314.64935	314.64935	314.64935	0.00000	314.64935	0.00000	0.00	314.64935	314.64935
0.50	308.71796	315.73584	312.22690	7.01788	312.26190	7.00216	-14.15	308.71796	315.73584
1.00	308.58264	315.85141	312.21704	7.26877	312.21866	7.25545	-15.64	308.58264	315.85141
2.00	308.41351	316.00421	312.20886	7.59070	312.25192	7.46555	-17.47	308.41351	316.00421
3.00	308.29977	316.11453	312.20715	7.81476	312.22101	7.62921	-19.83	308.29977	316.11453
4.00	308.21051	316.19952	312.20502	7.98901	312.22101	7.62921	-19.79	308.21051	316.19952
5.00	308.13901	316.26868	312.20386	8.12967	312.22137	7.70758	-21.66	308.13901	316.26868
6.00	308.07187	316.33395	312.20291	8.26208	312.22156	7.76389	-23.80	308.07187	316.33395
10.00	307.87177	316.53326	312.20251	8.66150	312.22171	7.82574	-29.12	307.87177	316.53326
20.00	307.54694	316.84723	312.19708	9.30029	312.22168	7.84898	-40.47	307.54694	316.84723
30.00	307.33453	317.03842	312.18646	9.70389	312.22162	7.85060	-50.77	307.33453	317.03842
40.00	307.14667	317.18405	312.16534	10.03738	312.22159	7.85072	-57.35	307.14667	317.18405

BAND(MHZ)	309.200	315.200
LMIN(DB)	-0.26	
LMAX(DB)	0.34	
LDEL(DB)	0.60	
PMIN(DEG)	-2805.28	
PMAX(DEG)	2903.76	
PEL(DEG)	5709.04	

File: 3AC8B03B.DAT Passband Symmetry = 0.1 dB

PHONON CORPORATION
FILE=3CC8B03B.DAT 18:02:02 01-05-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:C REWORK TRAVELLER 06 /N DUAL_SXX
01-05-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 332.2 WIDTH= 29 INCR.= .1 SYSTEM BANDWIDTH= 6
FERENCES: LOSS(DB)= 28.26727 PHASE(DEG)= 6443.357 DELAY(US)= 0 SLOPE(US/MHZ)= 0
S ERRORS: LOSS(DB)= .1115194 PHASE(DEG)= 1626.277
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 2.9 MHZ/DIV



PEAK: LEVEL(DB)= 28.09209 FREQ(MHZ)= 331.4435 DELAY(US)=-2.649313 SIDELOBE(DB)=-49.29031
ENERGY: LEVEL(DB)= 28.46838 CENTER(MHZ)= 332.2623 WIDTH(MHZ)= 8.236679 SKEW(MHZ)=-6.359897E-03

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.18	331.44348	331.44348	331.44348	0.00000	331.44348	0.00000	0.00	331.44348	331.44348
0.50	328.67499	335.77008	332.22253	7.09509	332.20355	7.05644	-14.35	328.67499	335.77008
1.00	328.56308	335.92261	332.24286	7.35953	332.24646	7.30894	-15.93	328.56308	335.92261
2.00	328.42215	336.09555	332.25885	7.67340	332.24677	7.45467	-17.19	328.42215	336.09555
3.00	328.32837	336.20416	332.26627	7.87579	332.27426	7.62808	-19.54	328.32837	336.20416
4.00	328.24756	336.28976	332.26868	8.04221	332.25012	7.67470	-20.46	328.24756	336.28976
5.00	328.18121	336.36230	332.27176	8.18109	332.25259	7.74720	-22.53	328.18121	336.36230
6.00	328.12390	336.42450	332.27420	8.30060	332.26730	7.77481	-23.68	328.12390	336.42450
10.00	327.94769	336.61353	332.28061	8.66583	332.26367	7.83991	-29.29	327.94769	336.61353
20.00	327.65976	336.92145	332.29059	9.26169	332.26236	7.86253	-41.42	327.65976	336.92145
30.00	327.46219	337.13721	332.29968	9.67502	332.26230	7.86382	-51.43	327.46219	337.13721
40.00	327.31564	337.30728	332.31146	9.99164	332.26233	7.86392	-57.00	327.31564	337.30728

BAND(MHZ) 329.200 335.200
LMIN(DB) -0.17
LMAX(DB) 0.22
LDEL(DB) 0.39
PMIN(DEG) -2774.44
PMAX(DEG) 2862.28
EL(DEG) 5636.71
..le: 3CC8B03B.DAT Passband Symmetry = 0.0 dB

ELECTRICAL TEST DATA SHEET

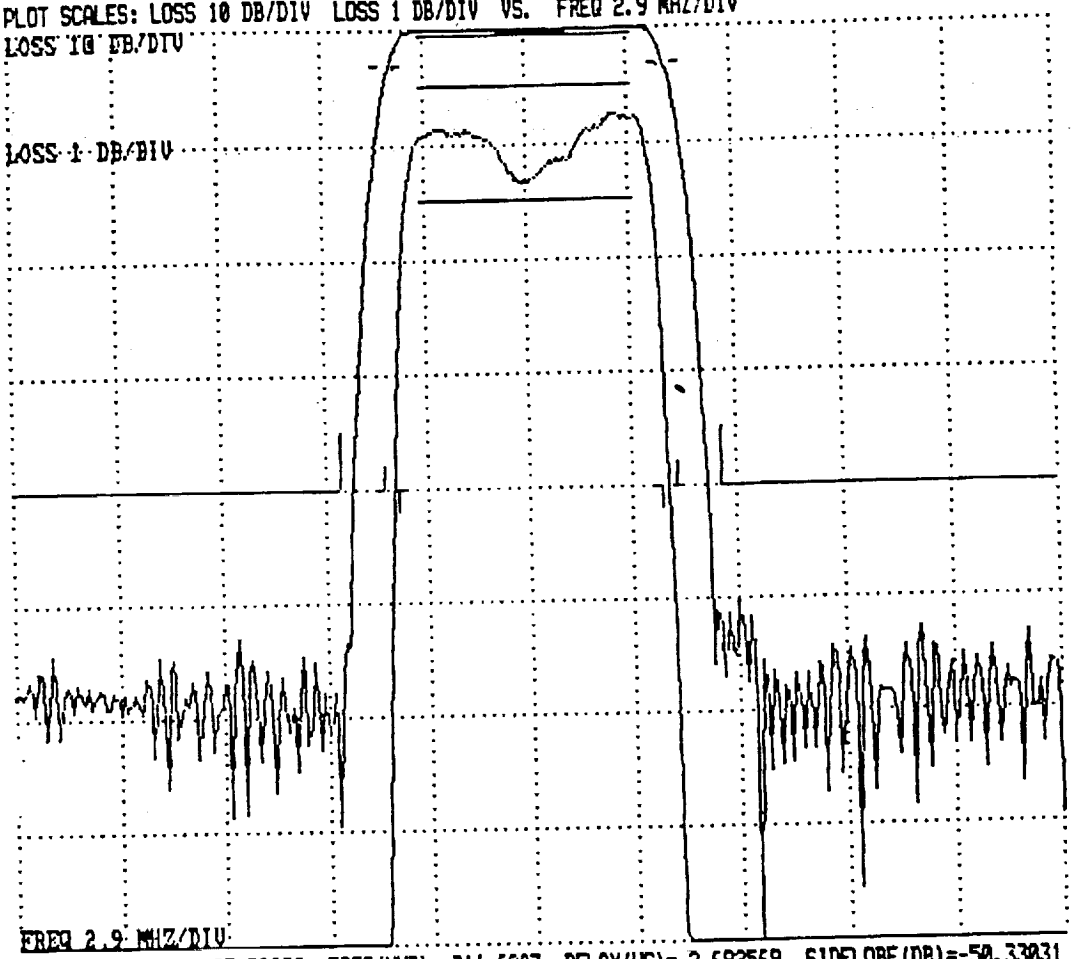
AEROJET PART: 1331576-3 PHONON PART: 100825 SERIAL: B03
TESTED BY: mlm TITLE: DEM DATE: 1/15/98 TIME: 1:00 p.m
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A07982 CAL DUE: 2/10/98
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	15.2	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 312.035/312.365 MHz	312.218	MHz	P
		HI: 332.035/332.365 MHz	332.277	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 7.8/8.0 MHz	7.813	MHz	P
		HI: 7.8/8.0 MHz	7.876	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.1	dB	P
		HI: /0.5 dB	0.0	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		309.2-315.2 MHz: /1.0 dB	0.6	dB	P
		329.2-335.2 MHz: /1.0 dB	0.4	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.2	dB	P
		HI: 27.8/30.2 dB	28.5	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.0	dB	P
		HI: -0.4/0.4 dB	0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.2	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-303,342-1000 MHz:	47.6	0.000	
		DUAL: 303.000-306.835, 317.565-326.835, 337.565-342.00 MHz:	49.7	0.000	
		PEAK: 35.0/ dB	47.6 dB		P
		WIDTH: /1.6 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.28	Unitless	P
		HI: /1.30 Unitless	1.27	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		309.2-315.2,329.2-335.2 MHz			
		DUAL S11: 7.5/ dB	10.7	dB	P
		DUAL S22: 7.5/ dB	10.3	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.1/0.1 MHz	-0.001	MHz	P
		3 dB BANDWIDTH: -0.16/0.16 MHz	+0.002	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P (OP)		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION
FILE=3AR8B03B.DAT 18:06:36 01-05-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:R REWORK TRAVELLER 06 /N DUAL_SXX
01-05-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 312.2 WIDTH= 29 INCR.= .1 SYSTEM BANDWIDTH= 6
DIFFERENCES: LOSS(DB)= 28.24454 PHASE(DEG)= 21097.79 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1765236 PHASE(DEG)= 1647.091
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 2.9 MHZ/DIV



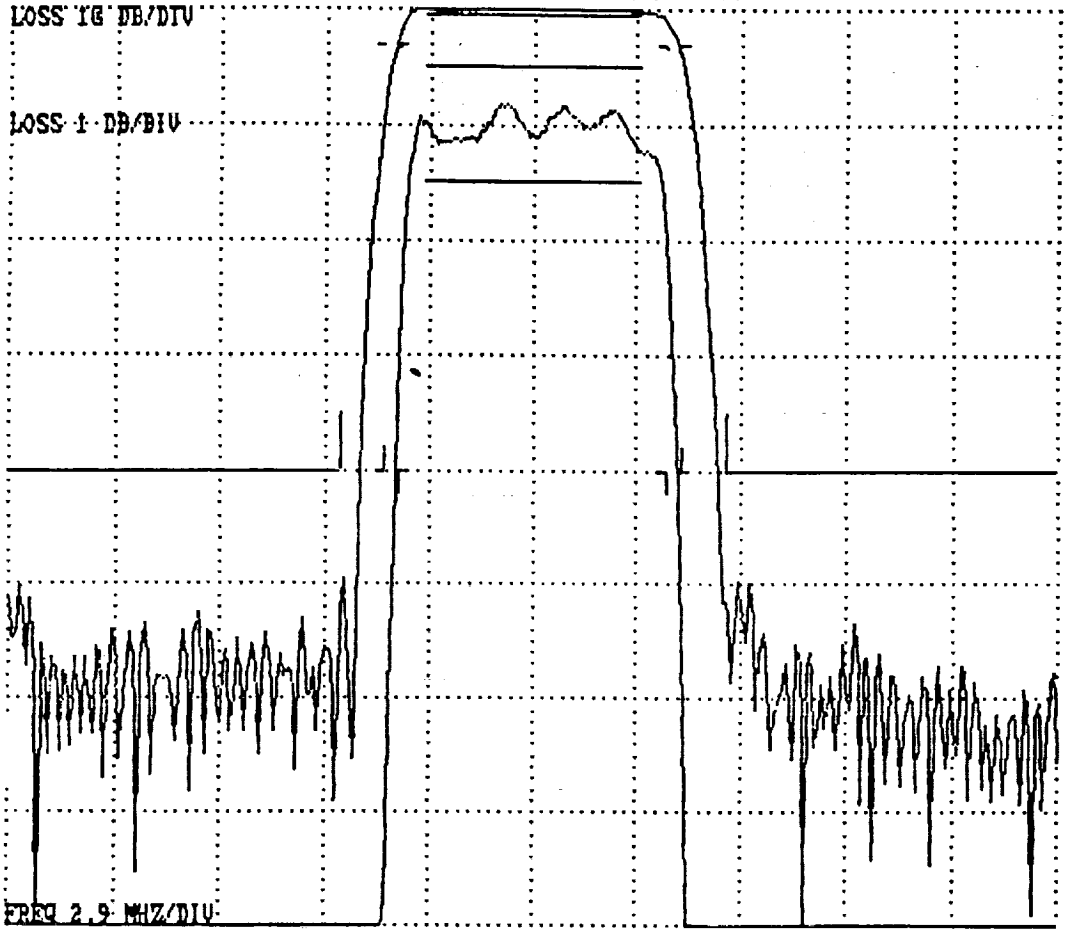
PEAK: LEVEL(DB)= 27.98292 FREQ(MHZ)= 314.6287 DELAY(US)=-2.692569 SIDELOBE(DB)=-50.33031
ENERGY: LEVEL(DB)= 28.42754 CENTER(MHZ)= 312.2322 WIDTH(MHZ)= 8.189822 SKEW(MHZ)=-.0155469

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.26	314.62869	314.62869	314.62869	0.00000	314.62869	0.00000	0.00	314.62869	314.62869
0.50	308.72852	315.74744	312.23798	7.01892	312.26117	7.00328	-14.15	308.72852	315.74744
1.00	308.59244	315.86609	312.22925	7.27365	312.21930	7.25606	-15.64	308.59244	315.86609
2.00	308.42514	316.01514	312.22015	7.59000	312.25443	7.46772	-17.48	308.42514	316.01514
3.00	308.31168	316.12439	312.21802	7.81271	312.25082	7.58146	-18.96	308.31168	316.12439
4.00	308.22598	316.21045	312.21820	7.98447	312.24692	7.67138	-20.68	308.22598	316.21045
5.00	308.14969	316.28189	312.21579	8.13220	312.22745	7.70846	-21.65	308.14969	316.28189
6.00	308.08450	316.34677	312.21564	8.26227	312.22894	7.76489	-23.79	308.08450	316.34677
10.00	307.88419	316.54614	312.21515	8.66196	312.23105	7.82679	-29.11	307.88419	316.54614
20.00	307.56223	316.86014	312.21118	9.29791	312.23212	7.85012	-40.46	307.56223	316.86014
30.00	307.34567	317.04907	312.19739	9.70340	312.23218	7.85174	-50.87	307.34567	317.04907
40.00	307.16135	317.19284	312.17709	10.03149	312.23218	7.85187	-57.35	307.16135	317.19284

BAND(MHZ)	309.200	315.200
LMIN(DB)	-0.26	
LMAX(DB)	0.34	
LDEL(DB)	0.60	
PMIN(DEG)	-2825.05	
PMAX(DEG)	2903.67	
PDEL(DEG)	5708.72	

File: 3AR8B03B.DAT Passband Symmetry = 0.1 dB

PHONON CORPORATION
FILE=3CR8B03B.DAT 18:07:49 01-05-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:R REWORK TRAVELLER 06 /N DUAL_SXX
01-05-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 332.2 WIDTH= 29 INCR.= .1 SYSTEM BANDWIDTH= 6
REFERENCES: LOSS(DB)= 28.46454 PHASE(DEG)= 7289.478 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1082915 PHASE(DEG)= 1626.218
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 2.9 MHZ/DIV



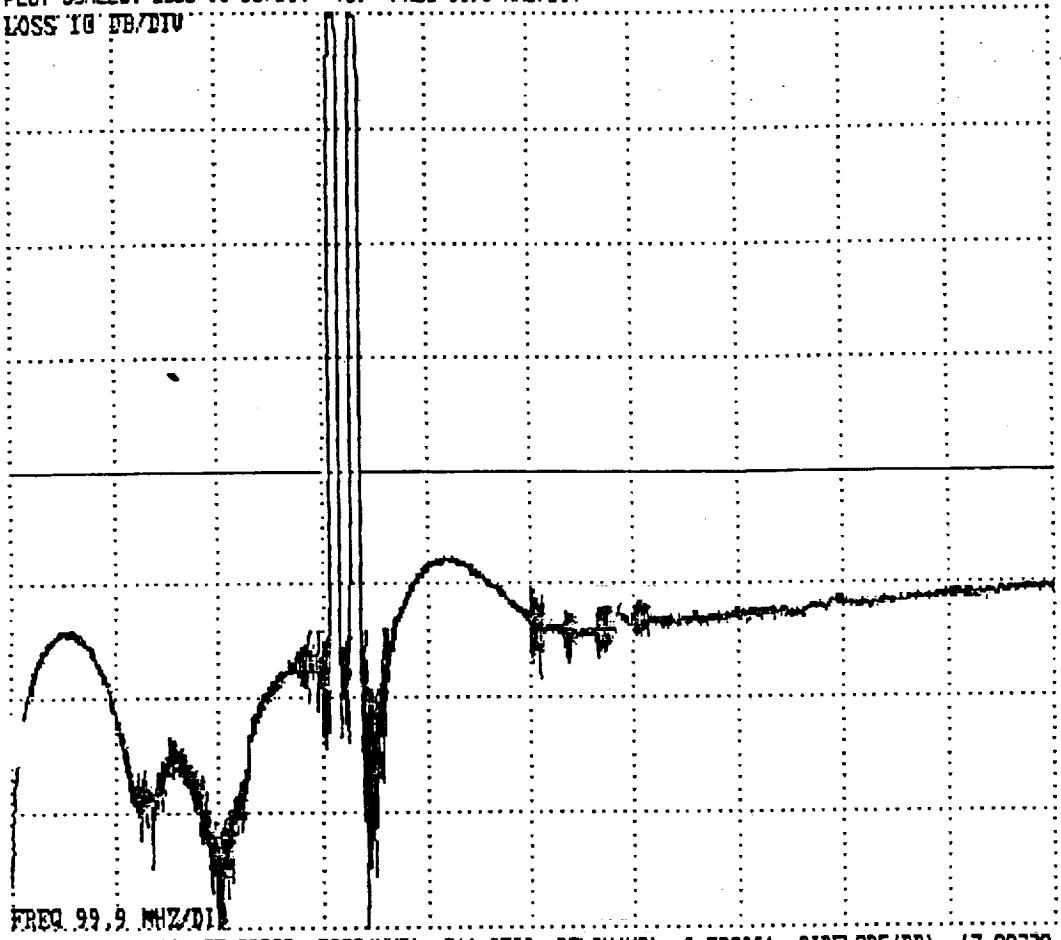
PEAK: LEVEL(DB)= 28.27973 FREQ(MHZ)= 331.49 DELAY(US)=-2.647898 SIDELOBE(DB)=-49.57628
ENERGY: LEVEL(DB)= 28.66668 CENTER(MHZ)= 332.2735 WIDTH(MHZ)= 8.236001 SKEW(MHZ)=-3.085858E-03

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.18	331.48999	331.48999	331.48999	0.00000	331.48999	0.00000	0.00	331.48999	331.48999
0.50	328.68802	335.78717	332.23761	7.09915	332.20303	7.05435	-14.36	328.68802	335.78717
1.00	328.57516	335.93475	332.25494	7.35959	332.24738	7.30712	-15.93	328.57516	335.93475
2.00	328.43616	336.10736	332.27176	7.67120	332.28183	7.51650	-17.93	328.43616	336.10736
3.00	328.33905	336.21469	332.27686	7.87564	332.27890	7.62695	-19.57	328.33905	336.21469
4.00	328.26096	336.30139	332.28119	8.04044	332.27658	7.71181	-21.48	328.26096	336.30139
5.00	328.19461	336.37445	332.28455	8.17984	332.25961	7.74408	-22.51	328.19461	336.37445
6.00	328.13721	336.43692	332.28705	8.29971	332.27499	7.77297	-23.71	328.13721	336.43692
10.00	327.96094	336.62622	332.29358	8.66528	332.27356	7.83761	-29.33	327.96094	336.62622
20.00	327.67227	336.93384	332.30304	9.26157	332.27341	7.86003	-41.45	327.67227	336.93384
30.00	327.47522	337.14984	332.31253	9.67462	332.27347	7.86132	-51.51	327.47522	337.14984
40.00	327.33322	337.31912	332.32617	9.98590	332.27350	7.86142	-57.55	327.33322	337.31912

BAND(MHZ)	329.200	335.200
LMIN(DB)	-0.18	
LMAX(DB)	0.21	
LDEL(DB)	0.39	
PMIN(DEG)	-2774.30	
PMAX(DEG)	2862.36	
PDEL(DEG)	5636.66	

File: 3CR8B03B.DAT Passband Symmetry = 0.0 dB

PHONON CORPORATION
FILE=3ER8B03B.DAT 18:08:58 01-05-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:R REWORK TRAVELLER 06 /N WIDE_S21
01-05-1998 HP8753,SSREF,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 500.5 WIDTH= 999 INCR.= .208125 SYSTEM BANDWIDTH= 999
FERENCES: LOSS(DB)= 28.35454 PHASE(DEG)=-44177.67 DELAY(US)= 4.746004 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 9.690324 PHASE(DEG)= 5418.918
PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 99.9 MHZ/DIV



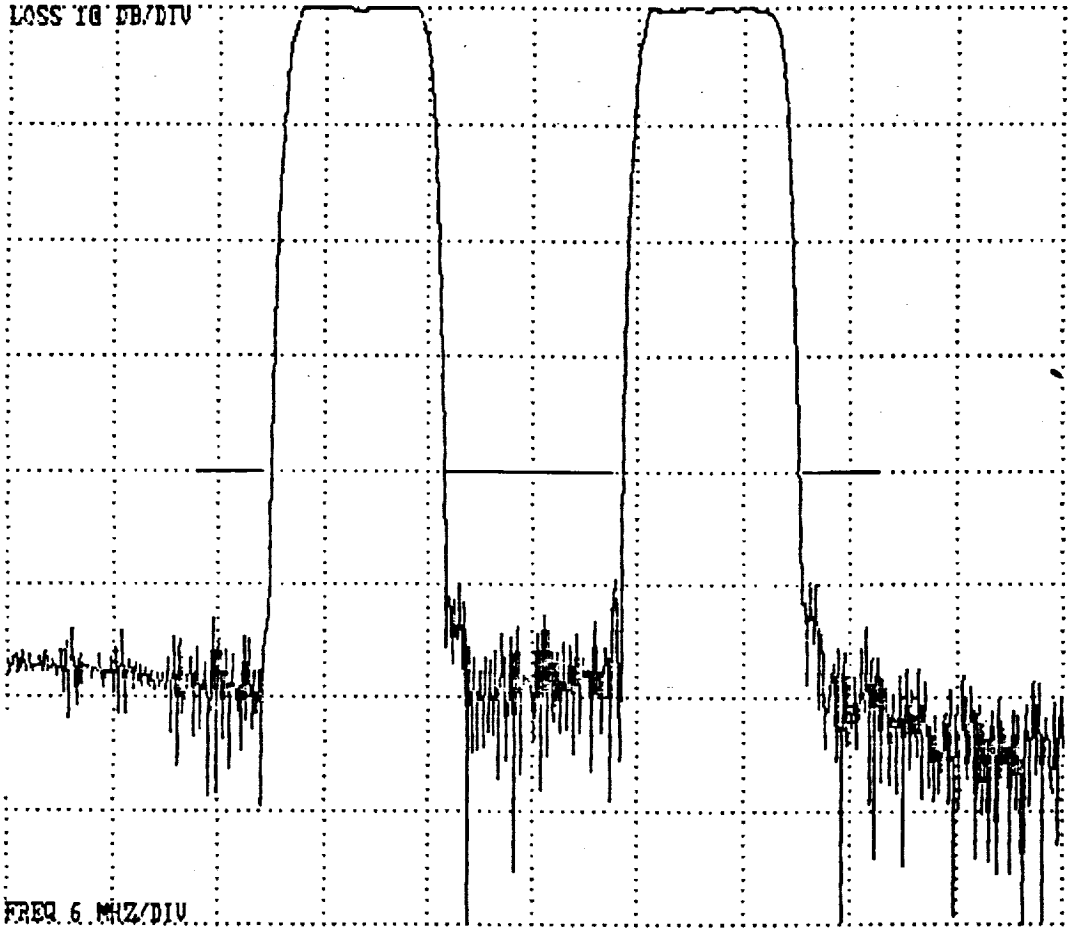
PEAK: LEVEL(DB)= 27.99793 FREQ(MHZ)= 314.6566 DELAY(US)= 6.799861 SIDELOBE(DB)=-47.99339
ENERGY: LEVEL(DB)= 28.54233 CENTER(MHZ)= 322.1145 WIDTH(MHZ)= 16.4255 SKEW(MHZ)= 161.2707

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.36	314.65656	314.65656	314.65656	0.00000	314.65656	0.00000	0.00	314.65656	314.65656
0.50	308.68582	315.78082	312.23334	7.09500	312.26108	7.25107	-20.68	308.68582	335.71475
1.00	308.56830	315.88644	312.22736	7.31815	312.17603	7.42397	-20.77	308.56830	335.90649
2.00	308.41071	316.03262	312.22168	7.62192	312.25629	7.58782	-20.86	308.41071	336.09338
3.00	308.30219	316.13605	312.21912	7.83386	312.24860	7.83020	-20.99	308.30219	336.20609
4.00	308.21521	316.21939	312.21729	8.00418	312.24860	7.83020	-20.99	308.21521	336.29282
5.00	308.14194	316.29022	312.21606	8.14828	312.20892	7.90758	-21.03	308.14194	336.36633
6.00	308.07675	316.35272	312.21472	8.27597	312.24054	7.96904	-21.06	308.07675	336.43048
10.00	307.87903	316.55005	312.21454	8.67102	312.23495	8.02948	-21.09	307.87903	336.62308
20.00	307.55856	316.86353	312.21106	9.30496	312.23105	8.04951	-21.10	307.55856	336.93097
30.00	307.34430	317.05585	312.20007	9.71155	312.23145	8.05075	-21.10	307.34430	337.14325
40.00	307.15894	317.18036	312.16965	10.02142	312.23148	8.05081	-21.10	307.15894	337.31705

BAND(MHZ)	1.000	303.000	342.000	1000.000
LMIN(DB)	53.93	-0.36	47.64	
LMAX(DB)	80.97	70.58	90.21	
LDEL(DB)	27.04	70.94	42.58	
PMIN(DEG)	-9999.00	-9999.00	-8665.08	
PMAX(DEG)	-3623.86	5761.92	5687.27	
PDEL(DEG)	6375.14	15760.92	14352.36	

FILE: 3ER8B03B.DAT Out-of-band Rejection: PEAK= 47.6 dB WIDTH= 0.000 MHz

PHONON CORPORATION
FILE=3FR8B03B.DAT 18:09:37 01-05-1998
PN_102832_825 FINAL_FUNCTIONAL TEMP:R REWORK TRAVELLER 06 /N DUAL_SYX
01-05-1998 HP8753,SSREF,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 322.2 WIDTH= 60 INCR.= .1 SYSTEM BANDWIDTH= 60
REFERENCES: LOSS(DB)= 28.35454 PHASE(DEG)= 14073.33 DELAY(US)= 1.646077 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 27.2888 PHASE(DEG)= 1926.233
PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 6 MHZ/DIV



PEAK: LEVEL(DB)= 27.98293 FREQ(MHZ)= 314.6287 DELAY(US)= .5997151 SIDELOBE(DB)=-49.87309
ENERGY: LEVEL(DB)= 28.5425 CENTER(MHZ)= 322.0052 WIDTH(MHZ)= 16.41336 SKEW(MHZ)= .462887

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.37	314.62869	314.62869	314.62869	0.00000	314.62859	0.00000	0.00	314.62869	314.62869
0.50	308.69150	315.77643	312.23395	7.08493	312.21725	7.27263	-7.98	308.69150	335.71194
1.00	308.57230	315.88702	312.22968	7.31473	312.21930	7.44219	-8.05	308.57230	335.90530
2.00	308.41052	316.02921	312.21985	7.61868	312.25443	7.65928	-8.14	308.41052	336.09198
3.00	308.30109	316.13412	312.21759	7.83304	312.25082	7.77594	-8.18	308.30109	336.20514
4.00	308.21671	316.21832	312.21753	8.00162	312.24692	7.86816	-8.22	308.21671	336.29199
5.00	308.14212	316.28973	312.21594	8.14761	312.22745	7.90620	-8.23	308.14212	336.36697
6.00	308.07776	316.35339	312.21558	8.27563	312.22894	7.96407	-8.25	308.07776	336.43042
10.00	307.87988	316.55066	312.21527	8.67078	312.23102	8.02756	-8.25	307.87988	336.62180
20.00	307.55954	316.86282	312.21118	9.30328	312.23212	8.05149	-8.21	307.55954	336.93130
30.00	307.34348	317.05078	312.19714	9.70731	312.23218	8.05315	-8.18	307.34348	337.14755
40.00	307.15970	317.19391	312.17682	10.03421	312.23218	8.05328	-8.15	307.15970	337.31778

BAND(MHZ)	309.200	315.200	329.200	335.200
LMIN(DB)	-0.37	-0.33	-0.07	
LMAX(DB)	0.23	90.06	0.32	
LDEL(DB)	0.60	90.39	0.39	
PMIN(DEG)	-745.81	-2133.45	-1913.77	
PMAX(DEG)	1466.83	1451.68	226.62	
PDEL(DEG)	2212.65	3585.13	2140.39	

FILE: 3FR8B03B.DAT Out-of-band Rejection: PEAK= 49.7 dB WIDTH= 0.000 MHz

PHONON CORPORATION
FILE: 3FR8B03B.DAT (+SSCF)
PN_100832_825 FINAL_FUNCTIONAL TEMP:R REWORK TRAVELLER 05 /N DUAL_SXX
01-05-1998 HP8753,SSREF,SSREF,SSREF,SSCF
^EFERENCES: LOSS(DB)= 28.35454 PHASE(DEG)= 14073.33
DELAY(US)= 1.646077 SLOPE(US/MHZ)= 0

BANDPASS CHARACTERISTICS MEASUREMENT

FREQUENCY(MHZ)	LOSS(DB)	PHASE(DEG)
324.600	58.36	1433.23
326.360	59.74	2080.30
328.120	5.33	1908.83
329.880	-0.25	1247.87
311.640	0.06	588.17
313.400	0.02	-69.97
315.160	-0.33	-730.67
316.920	22.54	-1394.93
318.680	56.22	-2130.69
320.440	56.92	-1025.71
322.200	60.49	-406.08
323.960	56.30	-50.40
325.720	55.06	1011.77
327.480	29.85	866.22
329.240	0.13	212.10
331.000	0.08	-424.32
332.760	0.01	-1060.95
334.520	-0.01	-1701.67
336.280	3.84	-2342.32
338.040	53.89	-3046.24
339.800	57.13	-2550.07

ELECTRICAL TEST DATA SHEET

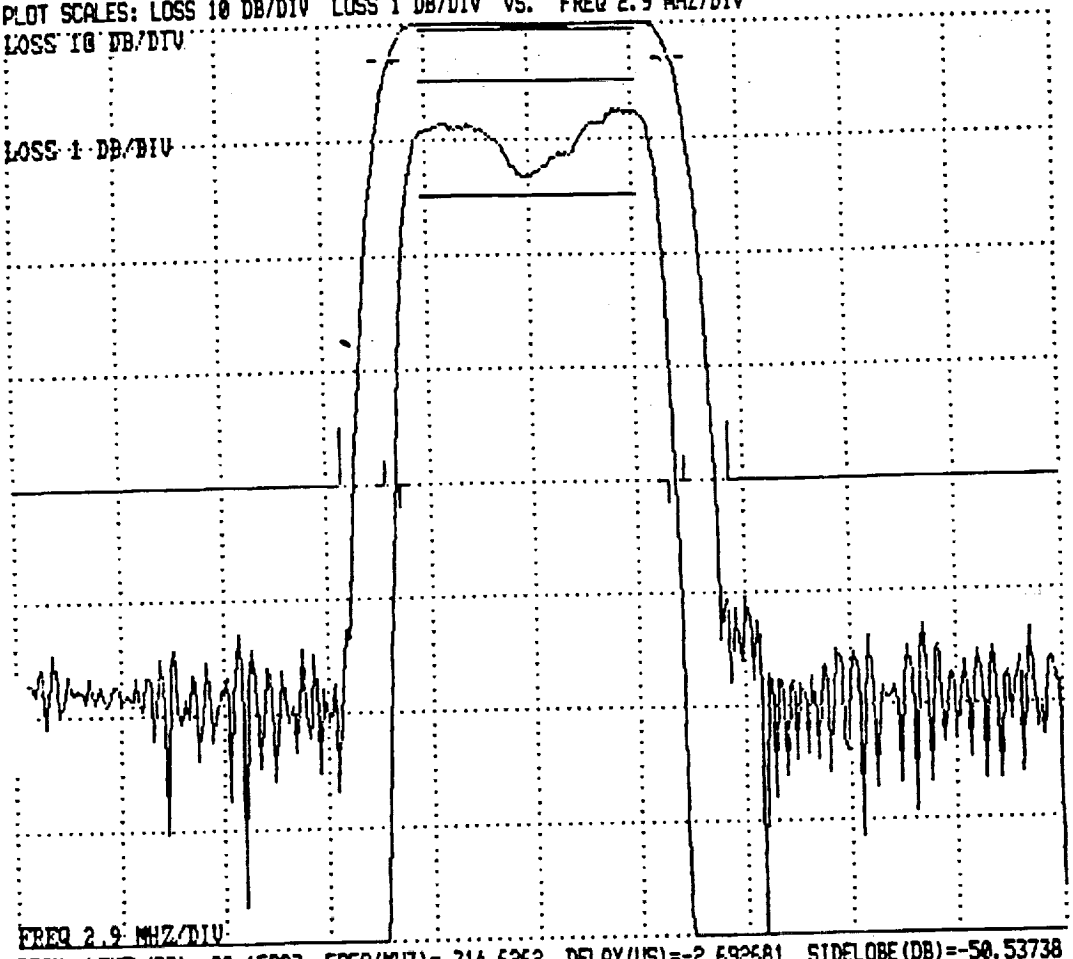
AEROJET PART: 1331576-3 PHONON PART: 100825 SERIAL: B03
TESTED BY: JMM TITLE: TECH DATE: 1/5/98 TIME: 1:15 pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A07982 CAL DUE: 2/10/98
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	35.7	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 312.035/312.365 MHz	312.223	MHz	P
		HI: 332.035/332.365 MHz	332.281	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 7.8/8.0 MHz	7.812	MHz	P
		HI: 7.8/8.0 MHz	7.875	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.1	dB	P
		HI: /0.5 dB	0.0	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		309.2-315.2 MHz: /1.0 dB	0.6	dB	P
		329.2-335.2 MHz: /1.0 dB	0.4	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.4	dB	P
		HI: 27.8/30.2 dB	28.7	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.2	dB	P
		HI: -0.4/0.4 dB	0.2	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.3	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-303,342-1000 MHz:	47.2	0.000	
		DUAL: 303.000-306.835, 317.565-326.835, 337.565-342.00 MHz:	49.8	0.000	
		PEAK: 35.0/ dB	47.2 dB		P
		WIDTH: /1.6 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.28	Unitless	P
		HI: /1.30 Unitless	1.27	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		309.2-315.2,329.2-335.2 MHz			
		DUAL S11: 7.5/ dB	10.8	dB	P
		DUAL S22: 7.5/ dB	10.4	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.1/0.1 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.16/0.16 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P		P

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION
FILE=3AH8B03B.DAT 18:12:26 01-05-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:H REWORK TRAVELLER 05 /N DUAL_SXX
-05-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 312.2 WIDTH= 29 INCR.= .1 SYSTEM BANDWIDTH= 6
REFERENCES: LOSS(DB)= 28.42219 PHASE(DEG)= 20988.99 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1762456 PHASE(DEG)= 1647.037
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 2.9 MHZ/DIV



PEAK: LEVEL(DB)= 28.15923 FREQ(MHZ)= 314.6262 DELAY(US)=-2.692681 SIDELOBE(DB)=-50.53738
ENERGY: LEVEL(DB)= 28.60492 CENTER(MHZ)= 312.2373 WIDTH(MHZ)= 8.189415 SKEW(MHZ)=-1.569333E-02

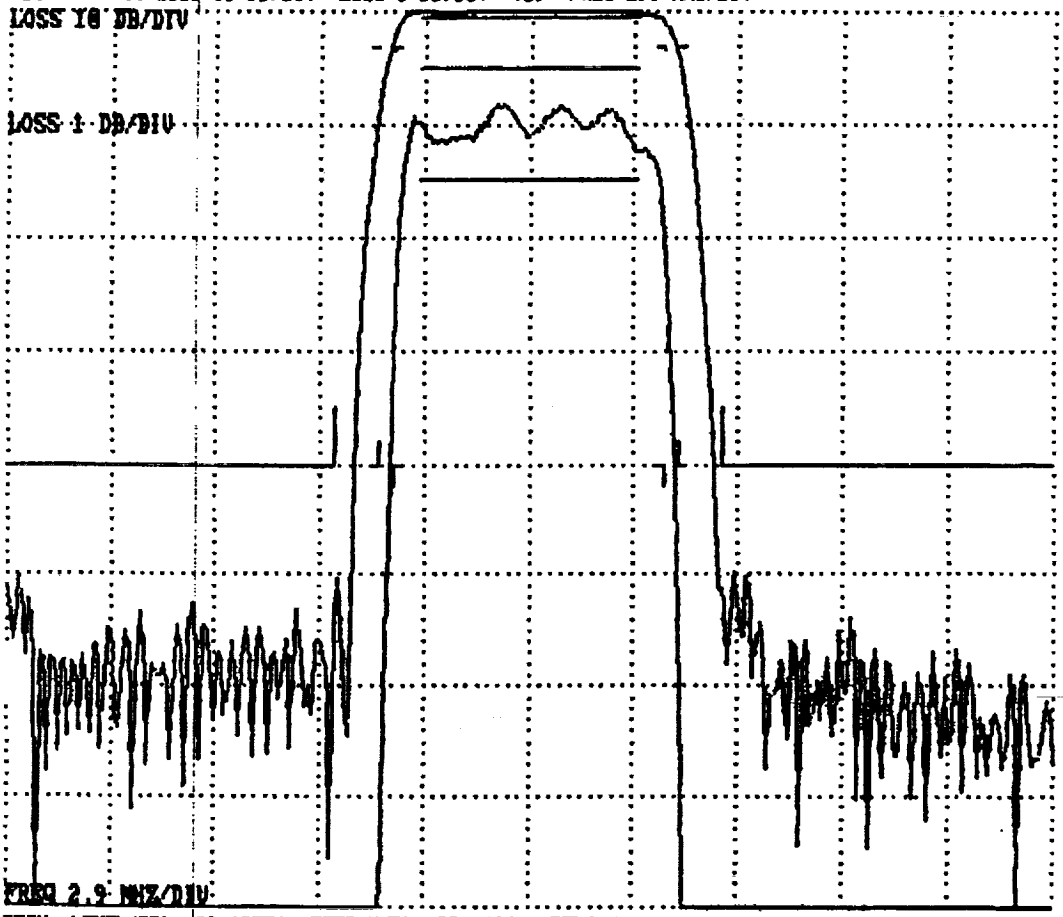
L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.26	314.62622	314.62622	314.62622	0.00000	314.62622	0.00000	0.00	314.62622	314.62622
0.50	308.73273	315.75183	312.24228	7.01910	312.26169	7.00369	-14.15	308.73273	315.75183
1.00	308.59714	315.87103	312.23407	7.27390	312.22040	7.25613	-15.64	308.59714	315.87103
2.00	308.43115	316.02060	312.22589	7.58945	312.25623	7.46845	-17.49	308.43115	316.02060
3.00	308.31680	316.12912	312.22296	7.81232	312.25327	7.58210	-18.97	308.31680	316.12912
4.00	308.23175	316.21530	312.22351	7.98355	312.24997	7.67205	-20.69	308.23175	316.21530
5.00	308.15515	316.28714	312.22113	8.13199	312.23883	7.70849	-21.65	308.15515	316.28714
6.00	308.08960	316.35159	312.22058	8.26199	312.23282	7.76495	-23.79	308.08960	316.35159
10.00	307.88928	316.55103	312.22015	8.66174	312.23566	7.82685	-29.10	307.88928	316.55103
20.00	307.56757	316.86472	312.21613	9.29715	312.23718	7.85022	-40.46	307.56757	316.86472
30.00	307.35068	317.05362	312.20215	9.70294	312.23734	7.85185	-50.85	307.35068	317.05362
40.00	307.17041	317.19501	312.18271	10.02460	312.23730	7.85197	-57.26	307.17041	317.19501

BAND(MHZ)	309.200	315.200
LMIN(DB)	-0.26	
LMAX(DB)	0.34	
LDEL(DB)	0.60	
PMIN(DEG)	-2804.96	
PMAX(DEG)	2903.62	
PDEL(DEG)	5708.58	

File: 3AH8B03B.DAT Passband Symmetry = 0.1 dB

PHONON CORPORATION

FILE=3CH88038.DAT 18:13:39 01-05-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:H REWORK TRAVELLER 06 /N DUAL_SXI
-05-1998 HP8753,SSCF,SSFFIX,SSREF
rnEQUENCY(MHZ): CENTER= 332.2 WIDTH= 29 INCR.= .1 SYSTEM BANDWIDTH= 6
REFERENCES: LOSS(DB)= 28.67972 PHASE(DEG)= 6819.579 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1081485 PHASE(DEG)= 1626.171
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ 2.9 MHZ/DIV



PEAK: LEVEL(DB)= 28.49574 FREQ(MHZ)= 331.4944 DELAY(US)=-2.646883 SIDELOBE(DB)=-49.81491
ENERGY: LEVEL(DB)= 28.88193 CENTER(MHZ)= 332.2771 WIDTH(MHZ)= 8.23551 SKEW(MHZ)=-2.513392E-03

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.18	331.49435	331.49435	331.49435	0.00000	331.49435	0.00000	0.00	331.49435	331.49435
0.50	328.69083	335.79080	332.24081	7.09998	332.28279	7.05399	-14.36	328.69083	335.79080
1.00	328.57648	335.93954	332.25800	7.36307	332.24768	7.30666	-15.94	328.57648	335.93954
2.00	328.44834	336.11145	332.27588	7.67111	332.28275	7.51645	-17.94	328.44834	336.11145
3.00	328.34357	336.21878	332.28119	7.87521	332.28048	7.62685	-19.58	328.34357	336.21878
4.00	328.26535	336.30511	332.28522	8.03976	332.27859	7.71156	-21.49	328.26535	336.30511
5.00	328.19894	336.37827	332.28860	8.17932	332.26187	7.74331	-22.58	328.19894	336.37827
6.00	328.14169	336.44067	332.29120	8.29898	332.27747	7.77261	-23.72	328.14169	336.44067
10.00	327.96518	336.63019	332.29767	8.66501	332.27673	7.83709	-29.34	327.96518	336.63019
20.00	327.67636	336.93744	332.30688	9.26108	332.27695	7.85943	-41.45	327.67636	336.93744
30.00	327.47964	337.15381	332.31671	9.67416	332.27704	7.86872	-51.55	327.47964	337.15381
40.00	327.34042	337.32248	332.33145	9.98206	332.27707	7.86882	-57.86	327.34042	337.32248

BAND(MHZ) 329.200 335.200
LMIN(DB) -0.18
LMAX(DB) 0.20
'DEL(DB) 0.39
IN(DEG) -2774.13
MAX(DEG) 2862.38
PDEL(DEG) 5636.51
File: 3CH88038.DAT Passband Symmetry = 0.0 dB

Channel 14 Bandpass Filter

SAW Filter (S/N: 1331576-4, S/N: B04)

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-4 PHONON PART: 100826 SERIAL: B04
TESTED BY: [illegible] TITLE: [illegible] DATE: [illegible] TIME: [illegible]
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A07982 CAL DUE: 12/10/97
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	-4.7	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 317.535/317.865 MHz	317.735	MHz	P
		HI: 326.535/326.865 MHz	326.661	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 2.8/3.0 MHz	2.932	MHz	P
		HI: 2.8/3.0 MHz	2.940	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.2	dB	P
		HI: /0.5 dB	0.2	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		316.575-318.825 MHz: /1.0 dB	0.7	dB	P
		325.575-327.825 MHz: /1.0 dB	0.4	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.4	dB	P
		HI: 27.8/30.2 dB	28.2	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	-0.2	dB	P
		HI: -0.4/0.4 dB	-0.2	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.2	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-313,331-1000 MHz:	43.4	0.000	
		DUAL: 313.000-315.585, 319.815-324.585, 328.815-331.0 MHz:	40.4	0.000	
		PEAK: 35.0/ dB	40.4 dB		P
		WIDTH: /0.6 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.24	Unitless	P
		HI: /1.30 Unitless	1.31	Unitless	F *
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		316.575-318.825,325.575-327.825 MHz			
		DUAL S11: 7.5/ dB	10.4	dB	P
		DUAL S22: 7.5/ dB	10.6	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.1/0.1 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.06/0.06 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	F (OP)		P (OP)

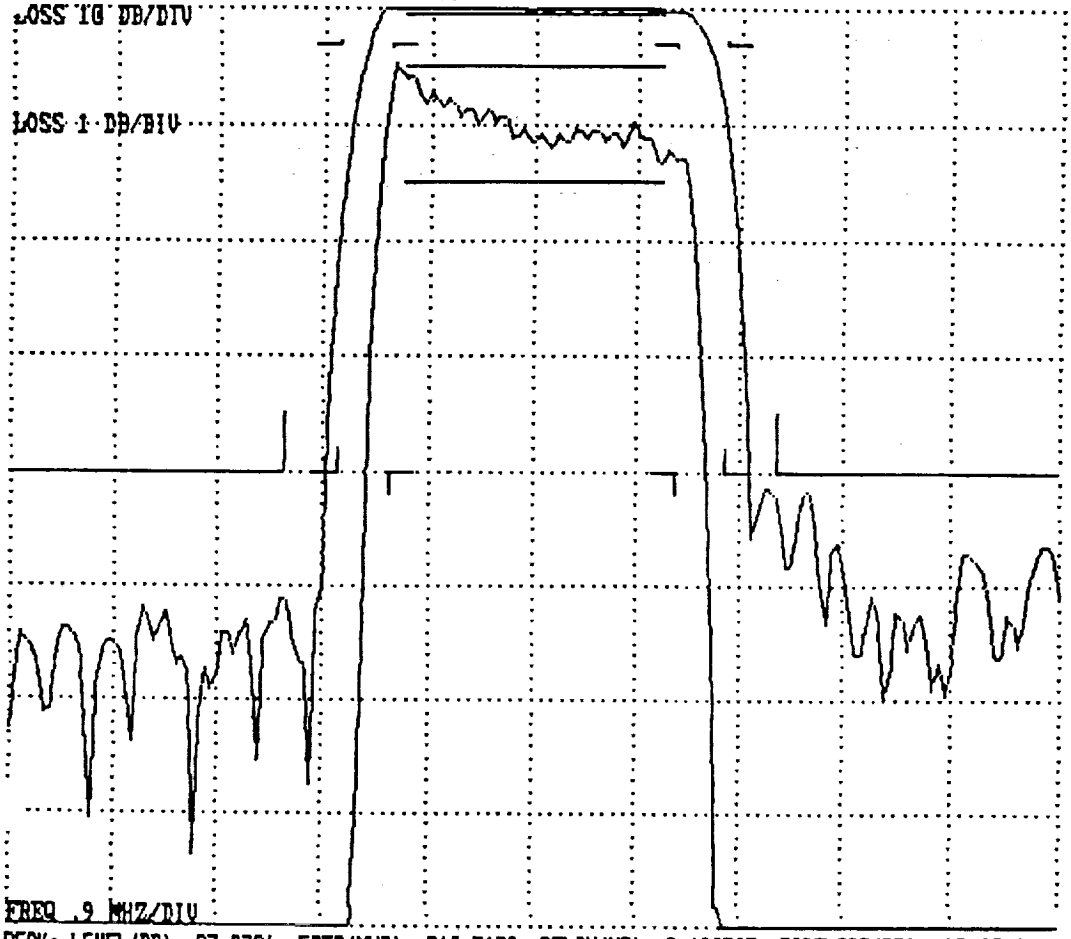
* Accept Per SDAR 97-222 & ECO! CAM-SN-1550

QC 2/5 1-14-98

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

FILE=4AC8B04A.DAT 09:08:53 10-28-1997
PN_100834_826 FINAL_FUNCTIONAL TEMP:C FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 317.7 WIDTH= 9 INCR.= .05 SYSTEM BANDWIDTH= 2.25
REFERENCES: LOSS(DB)= 28.42117 PHASE(DEG)=-43531.52 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1652106 PHASE(DEG)= 743.9338
DT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ .9 MHZ/DIV



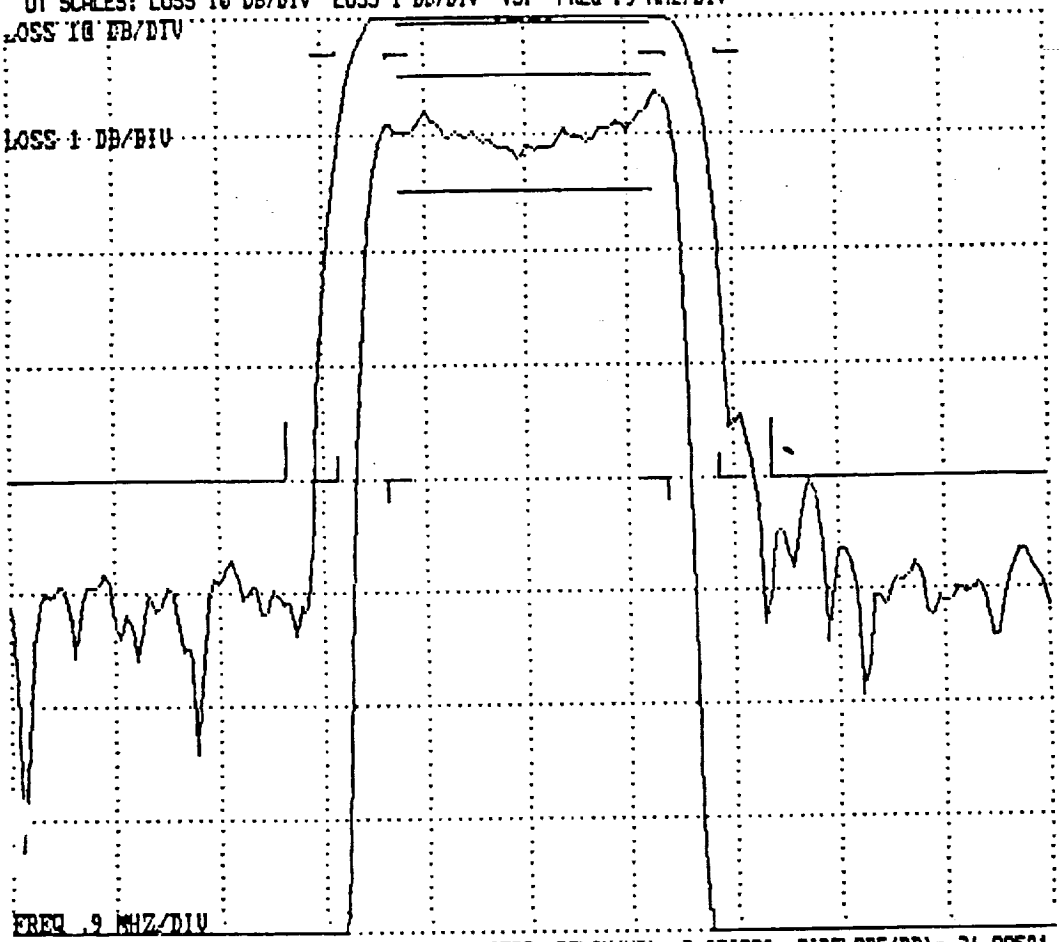
PEAK: LEVEL(DB)= 27.8724 FREQ(MHZ)= 316.5138 DELAY(US)=-3.186707 SIDELOBE(DB)=-42.18101
ENERGY: LEVEL(DB)= 28.57938 CENTER(MHZ)= 317.7039 WIDTH(MHZ)= 3.057306 SKEW(MHZ)= 4.634067E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.55	316.51379	316.51379	316.51379	0.00000	316.51379	0.00000	0.00000	316.51379	316.51379
0.50	316.36783	319.03598	317.70190	2.66815	317.67035	2.65359	-13.36085	316.36783	319.03598
1.00	316.34106	319.08896	317.71503	2.74789	317.67227	2.73907	-14.79631	316.34106	319.08896
2.00	316.29987	319.15948	317.72968	2.85962	317.69354	2.84219	-17.67468	316.29987	319.15948
3.00	316.26859	319.20105	317.73480	2.93246	317.70682	2.86745	-18.80878	316.26859	319.20105
4.00	316.24225	319.23093	317.73657	2.98858	317.69601	2.88883	-20.10948	316.24225	319.23093
5.00	316.21893	319.25928	317.73911	3.04034	317.70520	2.90601	-21.56392	316.21893	319.25928
6.00	316.19864	319.28305	317.74084	3.08441	317.69864	2.91878	-23.10966	316.19864	319.28305
10.00	316.13498	319.35504	317.74500	3.22006	317.70398	2.94101	-29.25183	316.13498	319.35504
20.00	316.03293	319.46652	317.74973	3.43359	317.70389	2.94749	-40.99071	316.03293	319.46652
30.00	315.97070	319.53531	317.75299	3.56461	317.70389	2.94784	-47.58074	315.97070	319.53531
40.00	315.93265	319.57764	317.75513	3.64499	317.70389	2.94788	-50.08321	315.93265	319.57764

BAND(MHZ)	316.575	318.825
LMIN(DB)	-0.42	
LMAX(DB)	0.33	
LDEL(DB)	0.75	
PMIN(DEG)	-1255.77	
PMAX(DEG)	1264.53	
PDEL(DEG)	2520.30	

File: 4AC8B04A.DAT Passband Symmetry = 0.2 dB

FILE=4CC8B04A.DAT 09:10:12 10-28-1997
PN_100834_826 FINAL_FUNCTIONAL TEMP:C FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 326.7 WIDTH= 9 INCR.= .05 SYSTEM BANDWIDTH= 2.25
REFERENCES: LOSS(DB)= 28.24733 PHASE(DEG)=-49556.14 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1044251 PHASE(DEG)= 742.5666
DT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ .9 MHZ/DIV



PEAK: LEVEL(DB)= 27.86648 FREQ(MHZ)= 327.8539 DELAY(US)=-3.076392 SIDELOBE(DB)=-34.99581
ENERGY: LEVEL(DB)= 28.39113 CENTER(MHZ)= 326.6683 WIDTH(MHZ)= 3.063062 SKEW(MHZ)=-7.859999E-03

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.38	327.85394	327.85394	327.85394	0.00000	327.85394	0.00000	0.00000	327.85394	327.85394
0.50	325.32333	328.02518	326.67426	2.70184	326.68201	2.70760	-13.94913	325.32333	328.02518
1.00	325.28250	328.05679	326.66965	2.77429	326.68130	2.79054	-15.60229	325.28250	328.05679
2.00	325.22900	328.09872	326.66388	2.86972	326.66360	2.82544	-16.51562	325.22900	328.09872
3.00	325.19107	328.13074	326.66089	2.93967	326.66568	2.88337	-18.83351	325.19107	328.13074
4.00	325.16174	328.15680	326.65927	2.99506	326.67651	2.90459	-20.13435	325.16174	328.15680
5.00	325.13699	328.17908	326.65802	3.04208	326.66718	2.92251	-21.68231	325.13699	328.17908
6.00	325.11523	328.19870	326.65698	3.08347	326.66718	2.92251	-21.65229	325.11523	328.19870
10.00	325.04623	328.26132	326.65378	3.21509	326.66833	2.95673	-29.48919	325.04623	328.26132
20.00	324.93280	328.36084	326.64682	3.42804	326.66833	2.96281	-40.65480	324.93280	328.36084
30.00	324.86017	328.42044	326.64032	3.56027	326.66827	2.96314	-45.32778	324.86017	328.42044
40.00	324.82159	328.66455	326.74307	3.84296	326.66830	2.96323	-48.92093	324.82159	328.66455

BAND(MHZ) 325.575 327.825
LMIN(DB) -0.29
LMAX(DB) 0.20
LDEL(DB) 0.50
PMIN(DEG) -1247.21
PMAX(DEG) 1267.04
PDEL(DEG) 2514.25
File: 4CC8B04A.DAT Passband Symmetry = 0.2 dB

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-4 PHONON PART: 100826 SERIAL: B04
TESTED BY: [illegible] TITLE: [illegible] DATE: [illegible] TIME: [illegible]
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A07962 CAL DUE: 12/10/97
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	14.9	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 317.535/317.865 MHz	317.743	MHz	P
		HI: 326.535/326.865 MHz	326.670	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 2.8/3.0 MHz	2.931	MHz	P
		HI: 2.8/3.0 MHz	2.940	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.2	dB	P
		HI: /0.5 dB	0.2	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		316.575-318.825 MHz: /1.0 dB	0.7	dB	P
		325.575-327.825 MHz: /1.0 dB	0.4	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.6	dB	P
		HI: 27.8/30.2 dB	28.4	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.0	dB	P
		HI: -0.4/0.4 dB	0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.2	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			

BAND	PEAK(dB)	WIDTH(MHz)
WIDE: 1-313,331-1000 MHz:	44.8	0.000
DUAL: 313.000-315.585, 319.815-324.585, 328.815-331.0 MHz:	39.9	0.011

PEAK: 35.0/ dB	39.9	dB	P
WIDTH: /0.6 MHz	0.011	MHz	P
3.2.1.12 5.2.11 SHAPE FACTOR			
LO: /1.30 Unitless	1.25	Unitless	P
HI: /1.30 Unitless	1.31	Unitless	F
3.2.1.14 5.2.12 VSWR (RETURN LOSS)			
316.575-318.825, 325.575-327.825 MHz			
DUAL S11: 7.5/ dB	10.4	dB	P
DUAL S22: 7.5/ dB	10.6	dB	P
4.8.2 5.2.14 LIMITED FUNCTIONAL TESTS			
CENTER FREQUENCY: -0.1/0.1 MHz	0	MHz	P
3 dB BANDWIDTH: -0.06/0.06 MHz	0.001	MHz	P
INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE 5.2.15 DATA SHEET SUMMARY (PASS/FAIL)	F	(DP)	P (DP)

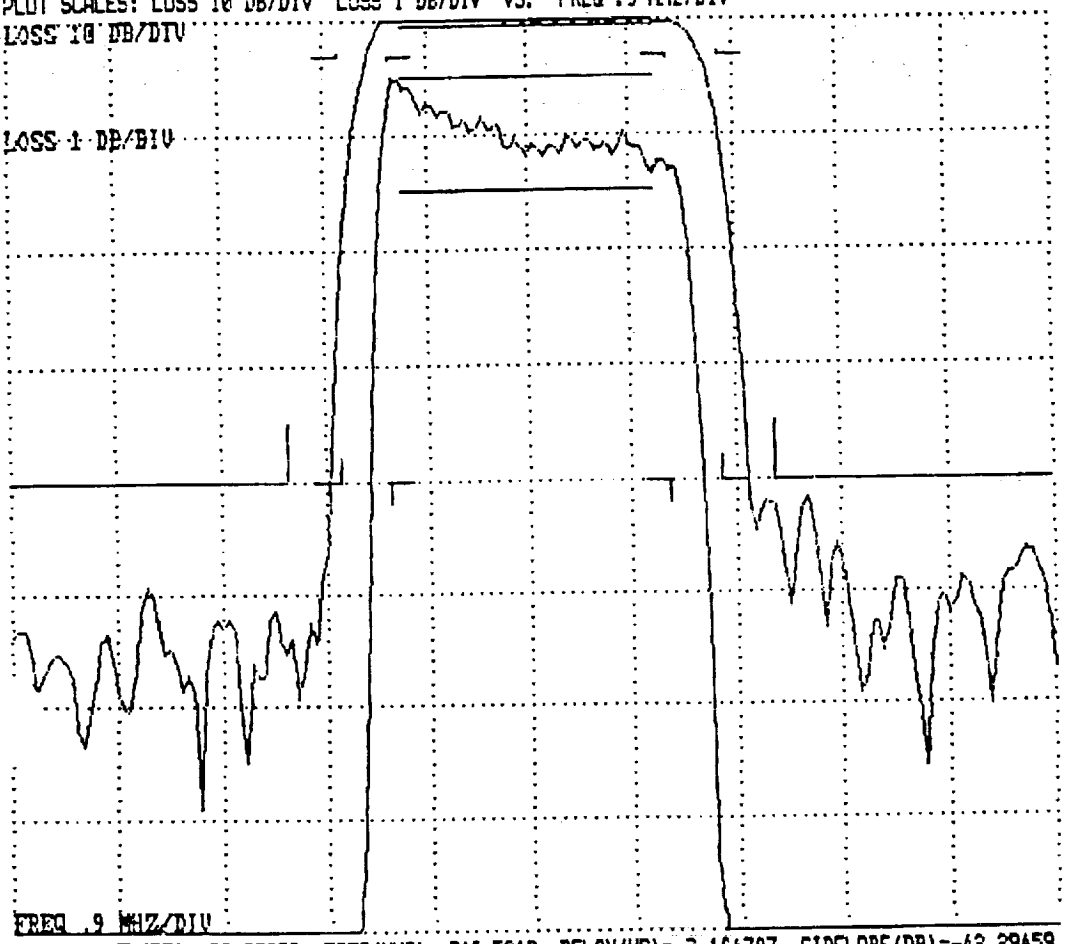
& Acceptable Per SDAR 97-222 ECO: EAm3u-1551

SQ 1-14-98

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION
FILE=4AR8B04A.DAT 09:30:43 10-28-1997
PN_:00834_826 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N DUAL_EXX
-23-1997 HP8753,SSCF,SSFFIX,SSREF
.EQUENCY(MHZ): CENTER= 317.7 WIDTH= 9 INCR.= .05 SYSTEM BANDWIDTH= 2.25
/EFERENCES: LOSS(DB)= 28.58615 PHASE(DEG)=-18431.77 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1684636 PHASE(DEG)= 744.0331
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ .9 MHZ/DIV



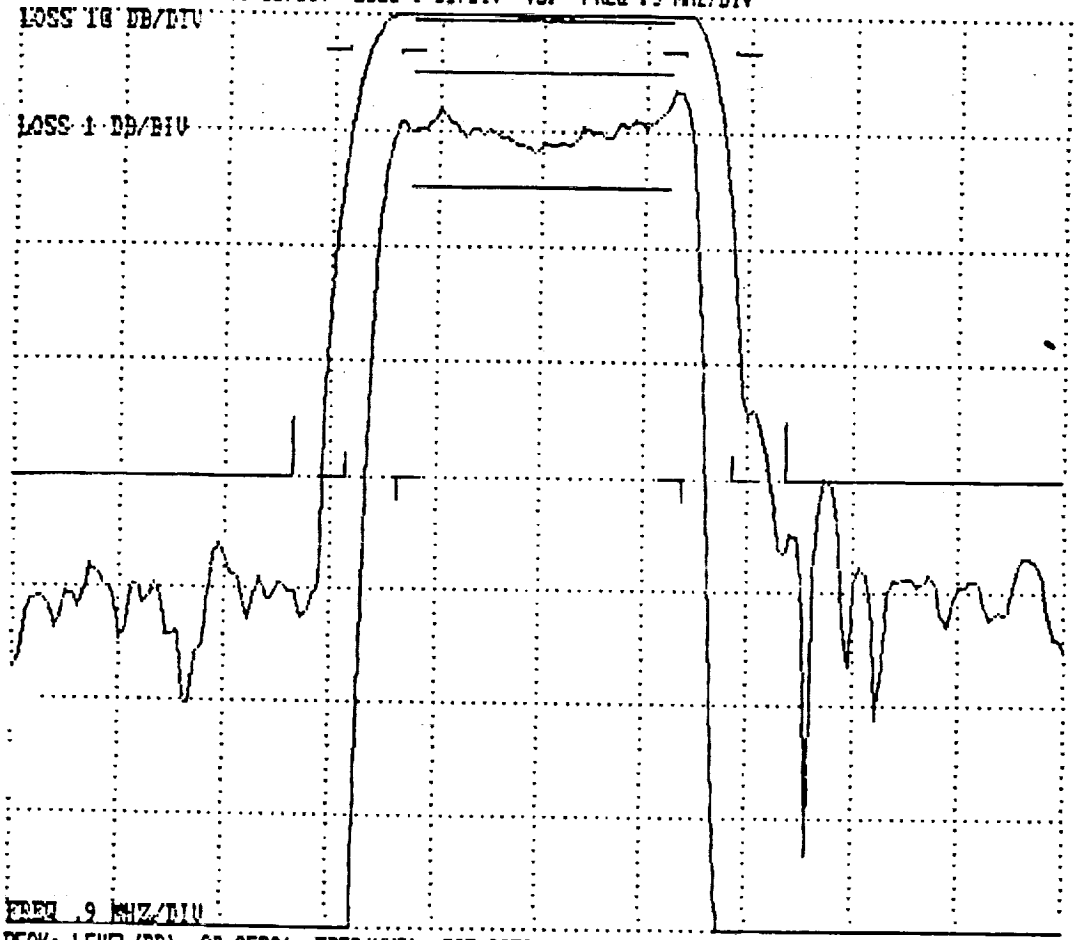
PEAK: LEVEL(DB)= 28.03896 FREQ(MHZ)= 316.5219 DELAY(US)=-3.184787 SIDELOBE(DB)=-42.29459
ENERGY: LEVEL(DB)= 28.74655 CENTER(MHZ)= 317.7123 WIDTH(MHZ)= 3.056498 SKEW(MHZ)= 4.742732E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)	
-0.55	316.52188	316.52188	316.52188	0.00000	316.52188	0.00000	0.00000	316.52188	316.52188	
0.50	316.37683	319.04773	317.71228	2.67090	317.67041	2.65192	-13.36769	316.37683	319.04773	
1.00	316.34833	319.09775	317.72302	2.74942	317.67343	2.73644	-14.78747	316.34833	319.09775	
2.00	316.31052	319.16742	317.73895	2.85690	317.71133	2.80988	-16.59040	316.31052	319.16742	
3.00	316.27795	319.20847	317.74323	2.93051	317.71060	2.86611	-18.86014	316.27795	319.20847	
4.00	316.25146	319.24030	317.74588	2.98883	317.71050	2.86611	-18.81855	316.25146	319.24030	
5.00	316.22858	319.26843	317.74850	3.03986	317.71054	2.90430	-21.62127	316.22858	319.26843	
6.00	316.20825	319.29218	317.75021	3.08392	317.71054	2.90430	-21.58931	316.20825	319.29218	
10.00	316.14490	319.36420	317.75455	3.21930	317.71152	2.93881	-29.28928	316.14490	319.36420	
20.00	316.04376	319.47610	317.75995	3.43234	317.71216	2.94521	-40.81379	316.04376	319.47610	
30.00	315.98434	319.54565	317.76501	3.56131	317.71225	2.94557	-47.15528	315.98434	319.54565	
40.00	315.93561	319.59106	317.76334	3.65546	317.71228	2.94562	-49.89126	315.93561	319.59106	

BAND(MHZ)	316.575	318.825
LMIN(DB)	-0.42	
LMAX(DB)	0.35	
LDEL(DB)	0.77	
`N(DEG)	-1255.67	
AX(DEG)	1265.00	
DEL(DEG)	2520.67	

File: 4AR8B04A.DAT Passband Symmetry = 0.2 dB

PHONON CORPORATION
FILE=4CR8B04A.DAT 09:32:14 10-28-1997
PN_102834_826 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N DUAL_SXX
23-1997 HP8753,SSCF,SSFFIX,SSREF
..QUENCY(MHZ): CENTER= 326.7 WIDTH= 9 INCR.= .05 SYSTEM BANDWIDTH= 2.25
REFERENCES: LOSS(DB)= 28.43309 PHASE(DEG)=-24096.42 DELAY(US)= 0 SLOPE(US/MHZ)= 0
MS ERRORS: LOSS(DB)= 9.677628E-02 PHASE(DEG)= 742.7139
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ .9 MHZ/DIV

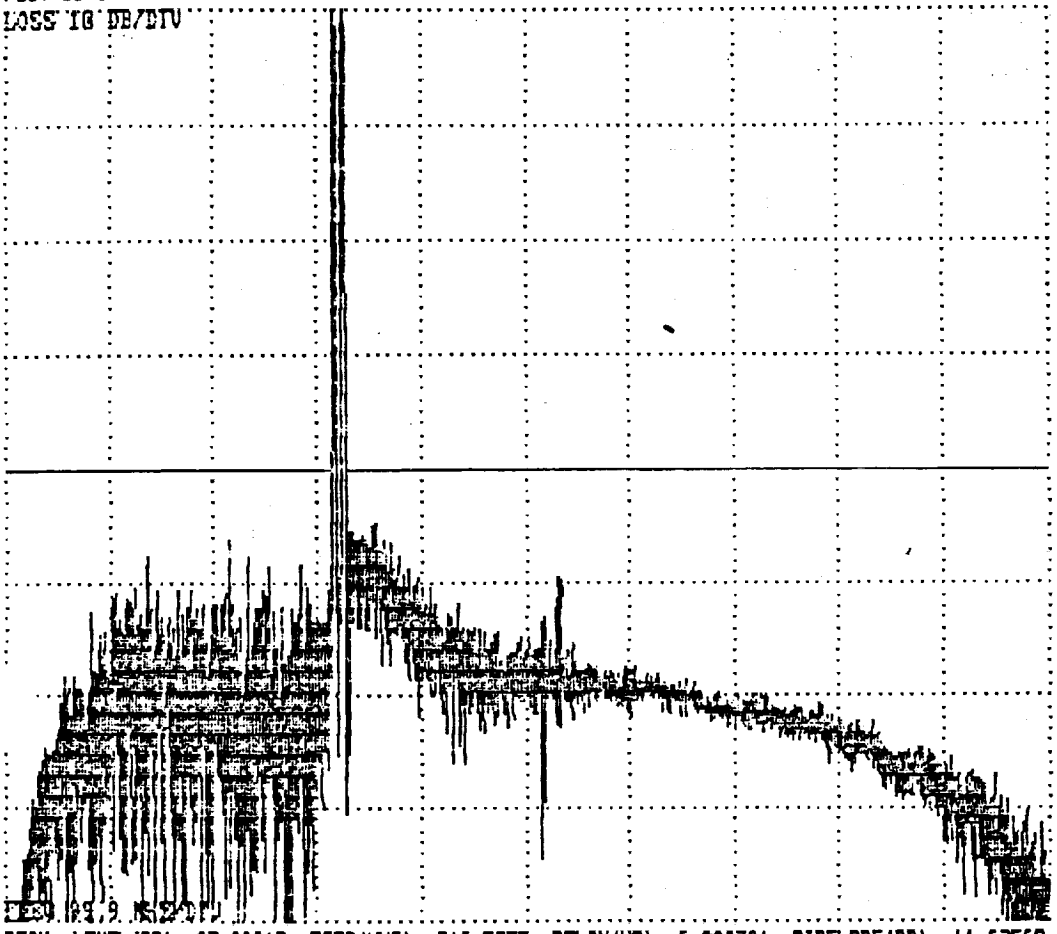


PEAK: LEVEL(DB)= 28.05921 FREQ(MHZ)= 327.8658 DELAY(US)=-3.080875 SIDELOBE(DB)=-34.43773
ENERGY: LEVEL(DB)= 28.5759 CENTER(MHZ)= 326.6779 WIDTH(MHZ)= 3.063341 SKEW(MHZ)=-8.071379E-03

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.37	327.86584	327.86584	327.86584	0.00000	327.86584	0.00000	0.00000	327.86584	327.86584
0.50	325.33292	328.03885	326.68588	2.70593	326.68295	2.70905	-13.93788	325.33292	328.03885
1.00	325.29230	328.06696	326.67963	2.77466	326.68369	2.79153	-15.60291	325.29230	328.06696
2.00	325.23886	328.10843	326.67365	2.86957	326.68341	2.85816	-17.65361	325.23886	328.10843
3.00	325.20059	328.14038	326.67047	2.93979	326.68341	2.85816	-17.60398	325.20059	328.14038
4.00	325.17120	328.16626	326.66873	2.99506	326.68234	2.90622	-20.18504	325.17120	328.16626
5.00	325.14642	328.18854	326.66748	3.04211	326.67377	2.92261	-21.59184	325.14642	328.18854
6.00	325.12460	328.20810	326.66635	3.08350	326.68097	2.93545	-23.31899	325.12460	328.20810
10.00	325.05545	328.27075	326.66309	3.21530	326.67969	2.95285	-27.09018	325.05545	328.27075
20.00	324.94168	328.37082	326.65625	3.42914	326.67783	2.96373	-40.38814	324.94168	328.37082
30.00	324.86823	328.43301	326.65063	3.56479	326.67785	2.96407	-45.00677	324.86823	328.43301
40.00	324.82990	328.67737	326.75363	3.84747	326.67789	2.96418	-48.79482	324.82990	329.15115

BAND(MHZ) 325.575 327.825
LMIN(DB) -0.25
LMAX(DB) 0.20
LDEL(DB) 0.45
..N(DEG) -1247.46
..AX(DEG) 1267.60
DEL(DEG) 2515.06
..le: 4CR8B04A.DAT Passband Symmetry = 0.2 dB

PHONON CORPORATION
FILE=4ER8B04A.DAT 09:33:33 10-28-1997
PN_100824_826 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N WIDE_S21
23-1997 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 500.5 WIDTH= 999 INCR.= .200125 SYSTEM BANDWIDTH= 999
REFERENCES: LOSS(DB)= 28.50952 PHASE(DEG)= 8075.912 DELAY(US)= 4.6993 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 9.201436 PHASE(DEG)= 13940.99
PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 99.9 MHZ/DIV



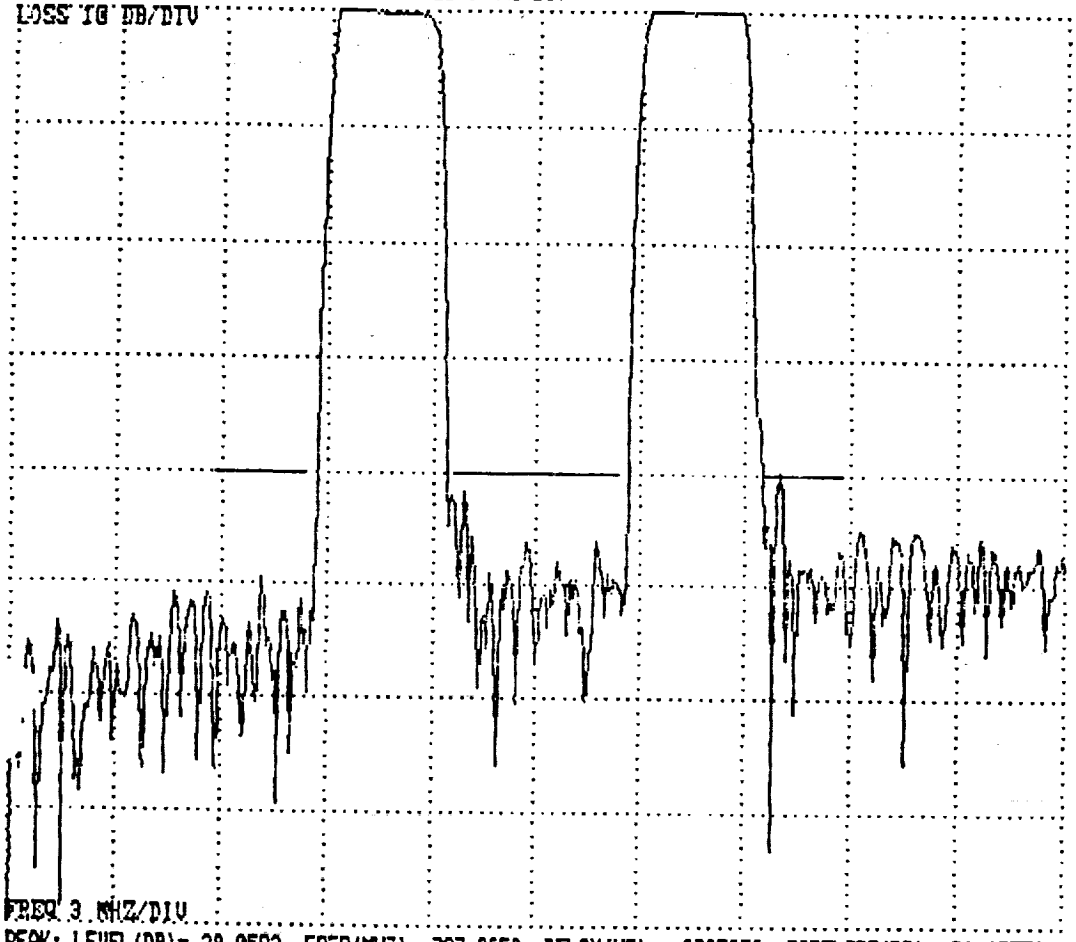
PEAK: LEVEL(DB)= 27.82013 FREQ(MHZ)= 316.5977 DELAY(US)= 6.208784 SIDELOBE(DB)=-41.63569
ENERGY: LEVEL(DB)= 28.65895 CENTER(MHZ)= 322.2968 WIDTH(MHZ)= 6.122151 SKEW(MHZ)= 34.93101

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.69	316.59766	316.59766	316.59766	0.00000	316.59766	0.00000	0.00000	316.59766	316.59766
0.50	316.37500	319.02893	317.70197	2.65393	317.72894	2.65915	-24.85908	316.59766	328.04025
1.00	316.34902	319.09988	317.72394	2.75186	317.72894	2.65915	-24.85765	316.59766	328.07443
2.00	316.31152	319.17041	317.74097	2.85889	317.72894	2.65915	-24.85719	316.59766	328.11758
3.00	316.28174	319.20995	317.74536	2.92722	317.66321	2.78829	-25.03264	316.28174	328.14648
4.00	316.25293	319.23758	317.74524	2.98465	317.71381	2.88172	-25.16413	316.25293	328.16879
5.00	316.22717	319.25462	317.74591	3.03745	317.71381	2.88172	-25.16390	316.22717	328.18240
6.00	316.20499	319.28967	317.74731	3.08469	317.71381	2.88172	-25.16370	316.20499	328.19464
10.00	316.14114	319.36575	317.75345	3.22461	317.71381	2.88172	-25.16309	316.14114	328.24350
20.00	316.05152	319.46274	317.76215	3.40121	317.71240	2.89658	-25.18364	316.05152	328.35563
30.00	315.99844	319.53143	317.76495	3.53299	317.71240	2.89658	-25.18307	315.99844	328.50925
40.00	315.93539	319.60010	317.76776	3.66470	317.71240	2.89658	-25.18250	315.93539	328.69077

BAND(MHZ)	1.000	313.000	331.000	1000.000
LMIN(DB)	46.17	-0.48	44.81	
LMAX(DB)	103.30	70.52	93.94	
LDEL(DB)	57.13	71.00	49.12	
MIN(DEG)	-9999.00	1498.81	-9999.00	
MAX(DEG)	5237.76	5312.33	5228.70	
DEL(DEG)	15236.76	3813.52	15227.70	

FILE: 4ER8B04A.DAT Out-of-band Rejection: PEAK= 44.8 dB WIDTH= 0.000 MHz

PHONON CORPORATION
FILE=4FR8B04A.DAT 09:34:12 10-28-1997
PN_100834_826 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N DUAL_SXX
23-1997 HP8753,SSREF,SSREF
.EQUENCY(MHZ): CENTER= 322.2 WIDTH= 30 INCR.= .05 SYSTEM BANDWIDTH= 30
EFERENCES: LOSS(DB)= 28.50952 PHASE(DEG)=-21423.51 DELAY(US)= 1.421155 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 22.30308 PHASE(DEG)= 937.2166
PLOT SCALES: LOSS 10 DB/DIV VS. FREQ 3 MHZ/DIV
LOSS 10 DB/DIV



FREQ 3 MHZ/DIV
PEAK: LEVEL(DB)= 28.0592 FREQ(MHZ)= 327.8558 DELAY(US)=-.2385676 SIDELOBE(DB)=-34.43774
ENERGY: LEVEL(DB)= 28.65869 CENTER(MHZ)= 322.2883 WIDTH(MHZ)= 6.117685 SKEW(MHZ)=-.1760197

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.45	327.86584	327.86584	327.86584	0.00000	327.86584	0.00000	0.00000	327.86584	327.86584
0.50	325.32538	328.04370	326.68454	2.71832	326.68295	2.75519	-9.37657	316.38248	328.04370
1.00	325.28726	328.07068	326.67896	2.78342	326.68369	2.84115	-9.48477	316.35156	328.07069
2.00	325.23547	328.11115	326.67331	2.87567	326.68341	2.90897	-9.56706	316.31342	328.11115
3.00	325.19812	328.14255	326.67035	2.94443	326.67059	2.93437	-9.59295	316.28018	328.14255
4.00	325.16916	328.16806	326.66851	2.99890	326.68234	2.95789	-9.61867	316.25333	328.16806
5.00	325.14468	328.19009	326.66739	3.04541	326.67377	2.97456	-9.63578	316.23022	328.19009
6.00	325.12302	328.20950	326.66626	3.08649	326.68097	2.98867	-9.65007	316.20972	328.20950
10.00	325.05432	328.27176	326.66302	3.21744	326.67966	3.00534	-9.65378	316.14594	328.27176
20.00	324.94098	328.37140	326.65619	3.43042	326.67783	3.01642	-9.63576	316.04434	328.37140
30.00	324.86777	328.43344	326.65060	3.56567	326.67783	3.01677	-9.61416	315.98468	328.43344
40.00	324.82965	328.67844	326.75403	3.84879	326.67789	3.01688	-9.56765	315.93604	329.15921

BAND(MHZ)	316.575	318.825	325.575	327.825
LMIN(DB)		-0.34	-0.17	-0.33
LMAX(DB)		0.43	65.73	0.12
LDEL(DB)		0.77	65.90	0.45
MIN(DEG)		-3.42	-797.86	-1055.33
MAX(DEG)		1391.69	1034.16	334.17
DEL(DEG)		1395.11	1832.02	1389.50

FILE: 4FR8B04A.DAT Out-of-band Rejection: PEAK= 39.9 dB WIDTH= 0.011 MHz

PHONON CORPORATION
FILE: 4FR8B04A.DAT (+SSCF)
PN_100834_826 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N DUAL_SXX
-23-1997 HP8753,SSREF,SSREF,SSCF
FERENCES: LOSS(DB)= 28.50962 PHASE(DEG)= -21423.51
DELAY(US)= 1.421155 SLOPE(US/MHZ)= 0

BANDPASS CHARACTERISTICS MEASUREMENT

FREQUENCY(MHZ)	LOSS(DB)	PHASE(DEG)
315.000	53.11	1517.99
315.720	54.60	1921.18
316.440	-0.06	1492.62
317.160	-0.04	1032.51
317.880	0.20	575.75
318.600	0.14	120.59
319.320	7.44	-314.57
320.040	43.15	-545.92
320.760	55.17	-588.83
321.480	50.20	-246.06
322.200	57.01	-18.67
322.920	48.76	127.11
323.640	58.90	458.55
324.360	50.53	954.57
325.080	8.35	668.79
325.800	-0.28	203.13
326.520	0.05	-255.92
327.240	-0.04	-710.46
327.960	-0.28	-1150.00
328.680	40.11	-1353.71
329.400	48.97	-1603.45

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-4 PHONON PART: 100826 SERIAL: B04

TESTED BY: [illegible] TITLE: [illegible] DATE: [illegible] TIME: [illegible]

TEST: FINAL FUNCTIONAL

EQUIPMENT: HP 8753D SERIAL: 3410A07982 CAL DUE: 12/10/97

HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	PARAGRAPH Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	35.3	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 317.535/317.865 MHz	317.745	MHz	P
		HI: 326.535/326.865 MHz	326.672	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 2.8/3.0 MHz	2.929	MHz	P
		HI: 2.8/3.0 MHz	2.938	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.2	dB	P
		HI: /0.5 dB	0.2	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		316.575-318.825 MHz: /1.0 dB	0.7	dB	P
		325.575-327.825 MHz: /1.0 dB	0.4	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.8	dB	P
		HI: 27.8/30.2 dB	28.6	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.2	dB	P
		HI: -0.4/0.4 dB	0.2	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-313,331-1000 MHz:	43.9	0.000	
		DUAL: 313.000-315.585, 319.815-324.585, 328.815-331.0 MHz:	40.4	0.000	
		PEAK: 35.0/ dB	40.4 dB		P
		WIDTH: /0.6 MHz		0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.25	Unitless	P
		HI: /1.30 Unitless	1.30	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		316.575-318.825, 325.575-327.825 MHz			
		DUAL S11: 7.5/ dB	10.1	dB	P
		DUAL S22: 7.5/ dB	10.6	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.1/0.1 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.06/0.06 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P	(DP)	

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION

E=4AH8804A.DAT 09:52:32 10-28-1997

_100824_826 FINAL_FUNCTIONAL TEMP:H FLIGHT3_FUNCT3 /N DUAL_SXX

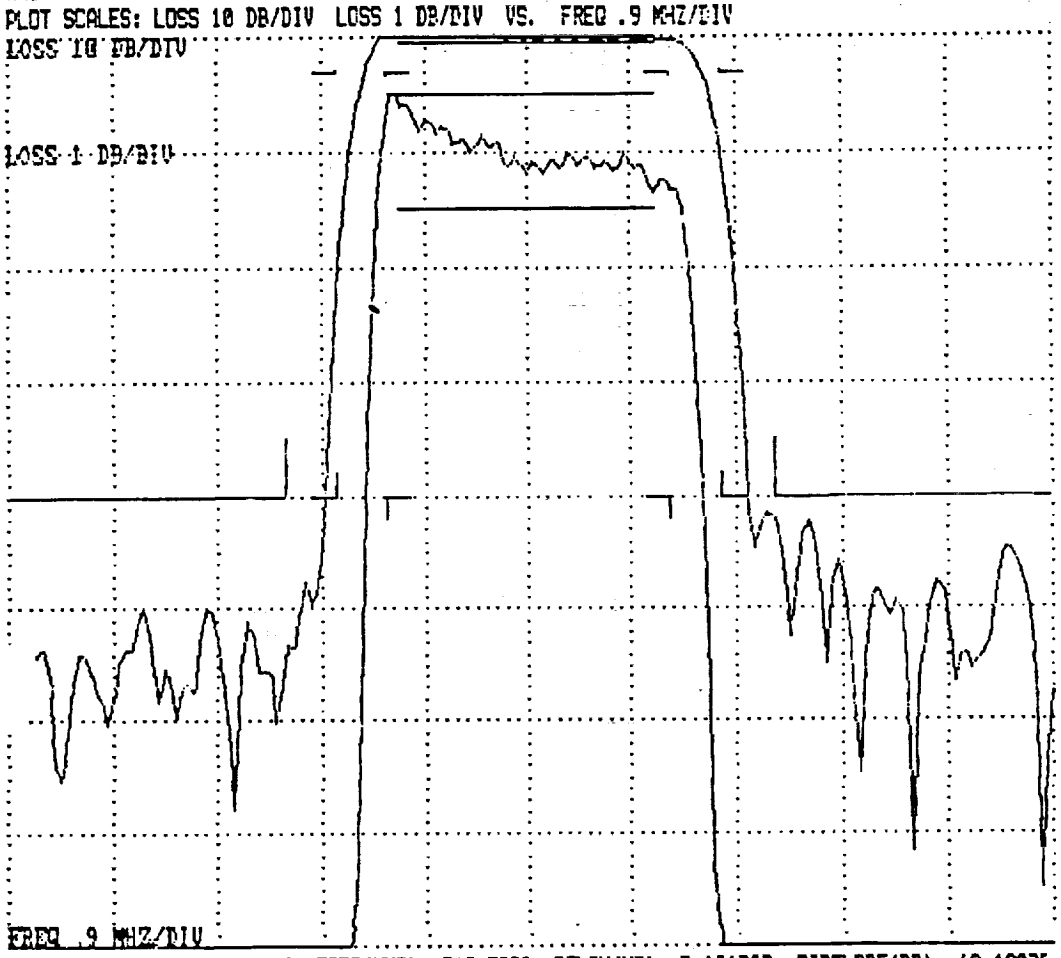
10-23-1997 HP8753,SSCF,SSFFIX,SSREF

FREQUENCY(MHZ): CENTER= 317.7 WIDTH= 9 INCR.= .05 SYSTEM BANDWIDTH= 2.25

REFERENCES: LOSS(DB)= 28.76936 PHASE(DEG)= 35008.66 DELAY(US)= 0 SLOPE(US/MHZ)= 0

RMS ERRORS: LOSS(DB)= .1692828 PHASE(DEG)= 744.0988

PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ .9 MHZ/DIV



PEAK: LEVEL(DB)= 28.21873 FREQ(MHZ)= 316.5232 DELAY(US)=-3.181363 SIDELOBE(DB)=-42.12036

ENERGY: LEVEL(DB)= 28.93067 CENTER(MHZ)= 317.7131 WIDTH(MHZ)= 3.055254 SKEW(MHZ)= 4.800827E-02

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.55	316.52316	316.52316	316.52316	0.00000	316.52316	0.00000	0.00000	316.52316	316.52316
0.50	316.37860	319.04785	317.71323	2.66925	317.67007	2.65128	-13.38535	316.37860	319.04785
1.00	316.34982	319.09775	317.72379	2.74792	317.67328	2.73545	-14.80576	316.34982	319.09775
2.00	316.31259	319.16776	317.74017	2.85516	317.71121	2.80989	-16.61817	316.31259	319.16776
3.00	316.27991	319.20917	317.74454	2.92926	317.71072	2.86485	-18.89127	316.27991	319.20917
4.00	316.25339	319.24121	317.74731	2.98782	317.71072	2.86485	-18.84952	316.25339	319.24121
5.00	316.23059	319.26932	317.74994	3.03873	317.71094	2.90280	-21.65601	316.23059	319.26932
6.00	316.21036	319.29303	317.75171	3.08267	317.71094	2.90280	-21.62415	316.21036	319.29303
10.00	316.14688	319.36502	317.75595	3.21814	317.71225	2.93701	-29.30633	316.14688	319.36502
20.00	316.04495	319.47681	317.76085	3.42185	317.71298	2.94338	-40.68107	316.04495	319.47681
30.00	315.98260	319.54654	317.76459	3.56393	317.71307	2.94374	-46.77075	315.98260	319.54654
40.00	315.92599	319.59253	317.75928	3.66653	317.71310	2.94379	-49.46841	315.92599	319.59253

BAND(MHZ) 316.575 318.825

LMIN(DB) -0.41

LMAX(DB) 0.36

LDEL(DB) 0.77

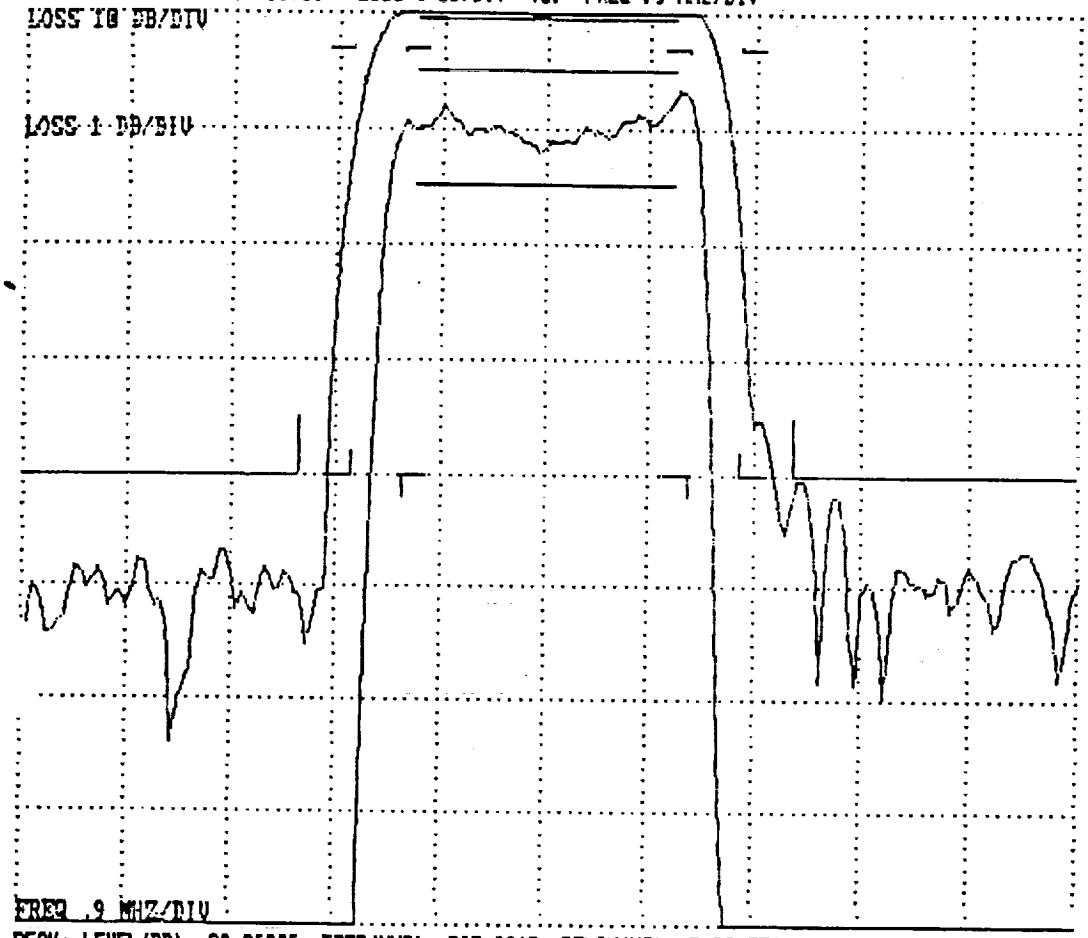
PMIN(DEG) -1255.54

PMAX(DEG) 1265.44

PDEL(DEG) 2520.99

File: 4AH8804A.DAT Passband Symmetry = 0.2 dB

PHONON CORPORATION
FILE=4CH8B04A.DAT 09:53:51 10-28-1997
_:00834_826 FINAL_FUNCTIONAL TEMP:H FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 326.7 WIDTH= 9 INCR.= .05 SYSTEM BANDWIDTH= 2.25
REFERENCES: LOSS(DB)= 28.62834 PHASE(DEG)= 29343.76 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 9.720663E-02 PHASE(DEG)= 742.7763
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ .9 MHZ/DIV



PEAK: LEVEL(DB)= 28.26885 FREQ(MHZ)= 327.8649 DELAY(US)=-3.061974 SIDELOBE(DB)=-35.6443
ENERGY: LEVEL(DB)= 28.7782 CENTER(MHZ)= 326.6792 WIDTH(MHZ)= 3.062313 SKEW(MHZ)=-8.811479E-03

L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.36	327.86493	327.86493	327.86493	0.00000	327.86493	0.00000	0.00000	327.86493	327.86493
0.50	325.33636	328.03876	326.68756	2.70239	326.68359	2.70622	-13.96162	325.33636	328.03876
1.00	325.29449	328.06696	326.68073	2.77246	326.68445	2.78939	-15.62809	325.29449	328.06696
2.00	325.24066	328.10858	326.67462	2.86792	326.68433	2.85576	-17.68268	325.24066	328.10858
3.00	325.20248	328.14050	326.67151	2.93802	326.68433	2.85576	-17.63316	325.20248	328.14050
4.00	325.17276	328.16635	326.66956	2.99359	326.68341	2.90352	-20.21386	325.17276	328.16635
5.00	325.14777	328.18863	326.66821	3.04086	326.67493	2.91568	-21.60899	325.14777	328.18863
6.00	325.12585	328.20822	326.66705	3.08237	326.68215	2.93356	-23.34681	325.12585	328.20822
10.00	325.05634	328.27103	326.66370	3.21469	326.68094	2.94983	-27.11277	325.05634	328.27103
20.00	324.94208	328.37195	326.65701	3.42987	326.67917	2.96065	-40.41019	324.94208	328.37195
30.00	324.86853	328.43484	326.65167	3.56531	326.67917	2.95101	-45.31786	324.86853	328.43484
40.00	324.83157	328.65109	326.74133	3.81952	326.67920	2.96110	-48.72263	324.83157	328.65109

BAND(MHZ)	325.575	327.825
LMIN(DB)	-0.24	
LMAX(DB)	0.20	
DL(DB)	0.45	
PMIN(DEG)	-1247.23	
PMAX(DEG)	1267.96	
PDEL(DEG)	2515.18	

File: 4CH8B04A.DAT Passband Symmetry = 0.2 dB

Channel 15 Bandpass Filter

IF Filter (S/N: 1331559-1, S/N: 227-003)

APPENDIX A **ACCEPTANCE TEST REPORT**

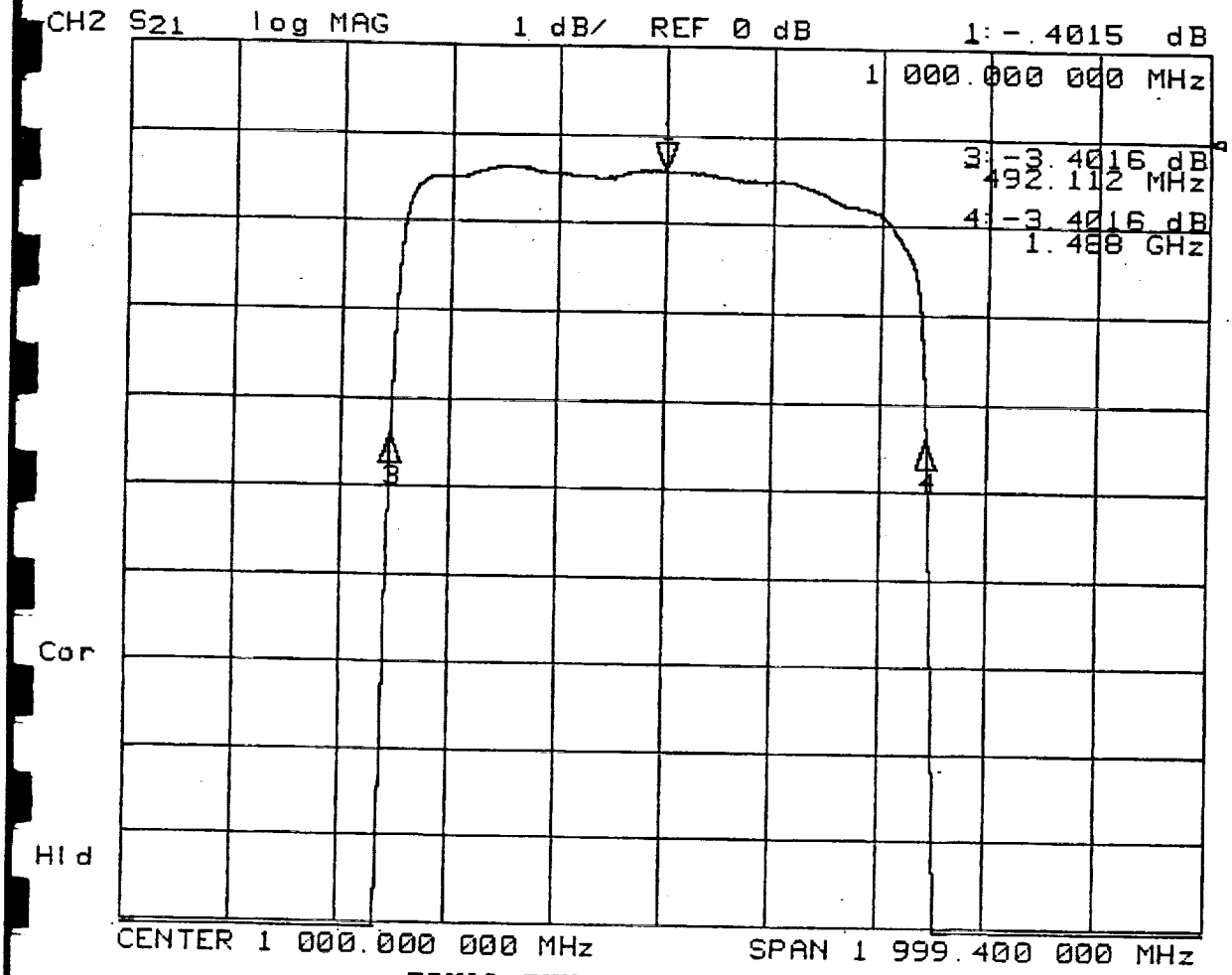
BANDPASS FILTER MODEL HL1000-1000-10SS1 S/N P227-003
AEROJET 1331559-1 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	1498.13 MHz (1480.0-1500.0)	1486.91 Mhz (1480.0-1500.0)	1485.84 MHz (1480.01500.0)
{8} LOWER 3.0 dB BANDEDGE	492.11 MHz (480.0-500.0)	491.29 Mhz (480.0-500.0)	490.38 MHz (480.0-500.0)
{9} 3.0 dB RELATIVE BANDWIDTH	996.02 MHz (980.0-1020.0)	995.62 Mhz (980.0-1020.0)	995.46 MHz (980.0-1020.0)
{10} ADD {7} AND {8} ÷ 2 =	990.12 MHz (1000.0 NOM)	989.10 MHz (1000.0 NOM)	988.11 Mhz (1000.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-11.1 °C (-15.0 TO -10.0)	+15.8 °C (12.5 TO 17.5)	+40.8 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

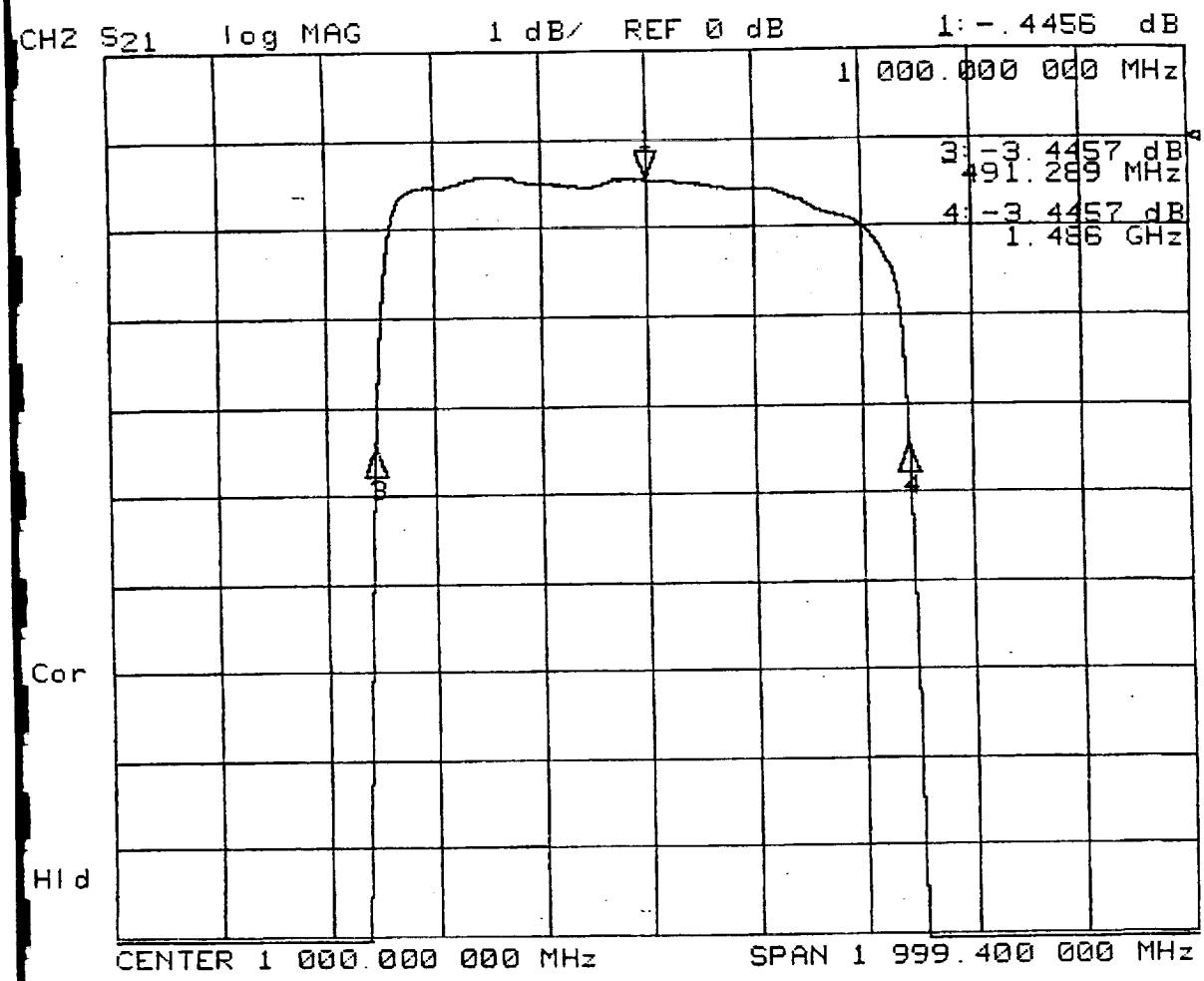
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	720.08 MHz	730.06 Mhz	715.09 MHz
MIN INSERTION LOSS PERFORMANCE	-0.36 dB	-0.40 dB	-0.47 dB
{11b} 75% BW LOWER BANDEDGE FREQ	535.86 MHz	533.84 Mhz	532.25 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.62 dB	-0.68 dB	-0.75 dB
{11c} 75% BW UPPER BANDEDGE FREQ	1285.86 MHz	1283.84 Mhz	1282.25 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.62 dB	-0.68 dB	-0.75 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.26 dB	0.28 dB	0.28 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.26 dB	0.28 dB	0.28 dB



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P227-003
-10C DATA
OPR: R. HOGGATT DATE FEB 03 1997 annel 2

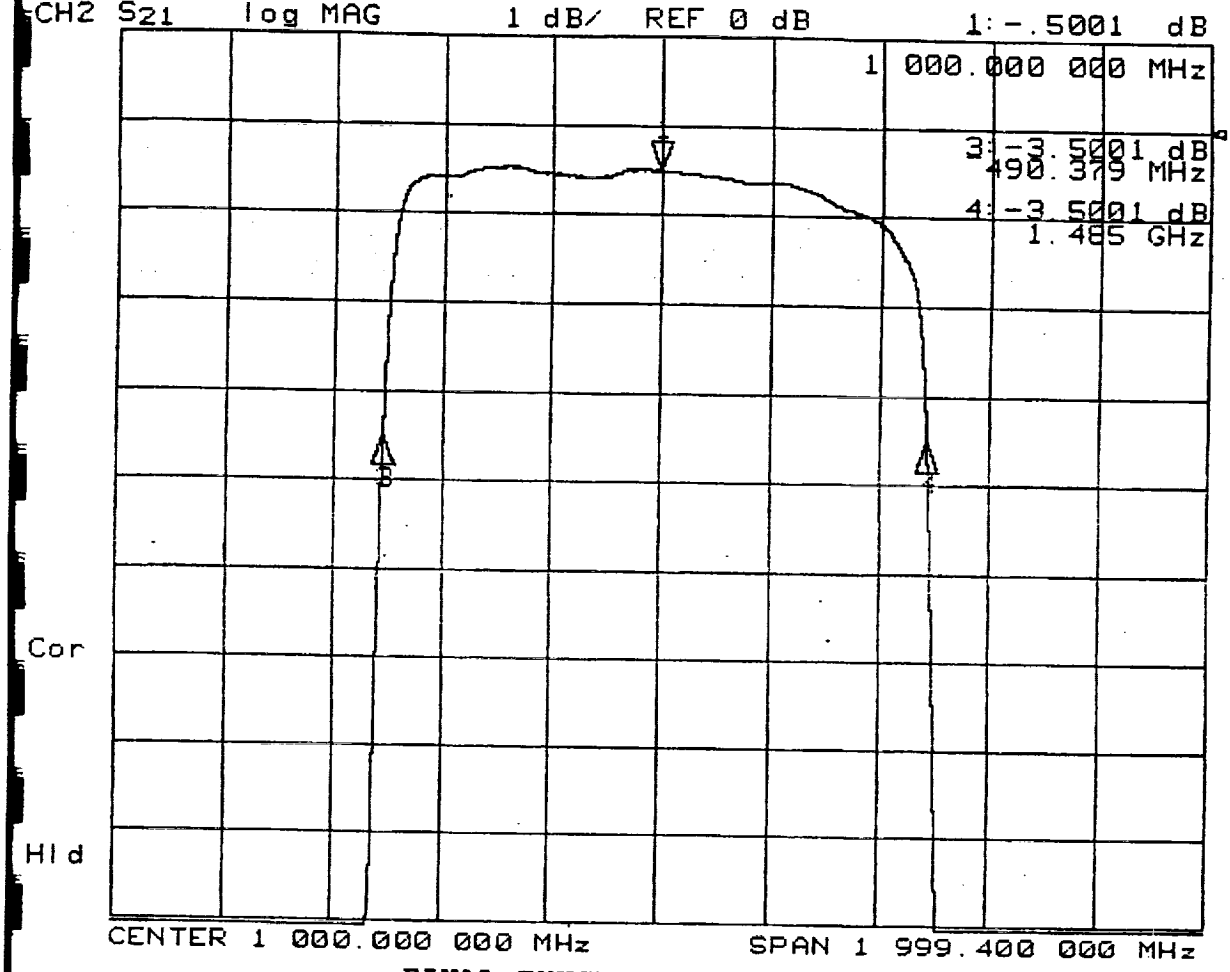
MARKER PARAMET		
MARKER 1	550.000000 MHz OFF	1000.000000 MHz -.4015 dB
MARKER 2	1450.000000 MHz OFF	990.122734 MHz OFF
MARKER 3	625.000000 MHz OFF	492.112209 MHz -3.4016 dB
MARKER 4	1375.000000 MHz OFF	1488.133259 MHz -3.4016 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
MARKER TRACKING	OFF OFF	OFF OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P227-003
+15C DATA
OPR: R. HOGGATT DATE FEB 03 1997

MARKER PARAMET annel 2

MARKER 1	550.000000 MHz OFF	1000.000000 MHz -.4456 dB
MARKER 2	1450.000000 MHz OFF	989.100336 MHz OFF
MARKER 3	625.000000 MHz OFF	491.289738 MHz -3.4457 dB
MARKER 4	1375.000000 MHz OFF	1486.910934 MHz -3.4457 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P227-003
+40C DATA
OPR: R. HOGGATT DATE FEB 03 1997 annel 2

MARKER PARAMET		
MARKER 1	550.000000 MHz	1000.000000 MHz
	OFF	-.5001 dB
MARKER 2	1450.000000 MHz	988.109165 MHz
	OFF	OFF
MARKER 3	625.000000 MHz	490.379348 MHz
	OFF	-3.5001 dB
MARKER 4	1375.000000 MHz	1485.838983 MHz
	OFF	-3.5001 dB
MKR STIMULUS OFFSET	0.000000 MHz	0.000000 MHz
	0 dB	0 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX A ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL1000-1000-10SS1 S/N P227-003
AEROJET 1331559-1 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	(PASS)/FAIL	(PASS)/FAIL	(PASS)/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5
Fc=1000.0 MHz.
REF {5A} FOR INSERTION LOSS @ Fc

	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 350.0 MHz	-68.6 dB (40.0 dB MIN)	-68.9 dB (40.0 dB MIN)	-68.8 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 1650.0 MHz TO 3000.0 MHz	-63.6 dB (40.0 dB MIN)	-63.6 dB (40.0 dB MIN)	-63.7 dB (40.0 dB MIN)
{13b} WORST CASE REJECTION FROM 3000.0 MHz TO 8000.0 MHz	-54.1 dB (40.0 dB MIN)	-54.2 dB (40.0 dB MIN)	-54.5 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-11.5 °C (-15.0 TO -10.0)	+15.8 °C (12.5 TO 17.5)	+40.8 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

TEST PERFORMED BY R. Hoggatt DATE 2/3/97 (DA 5)

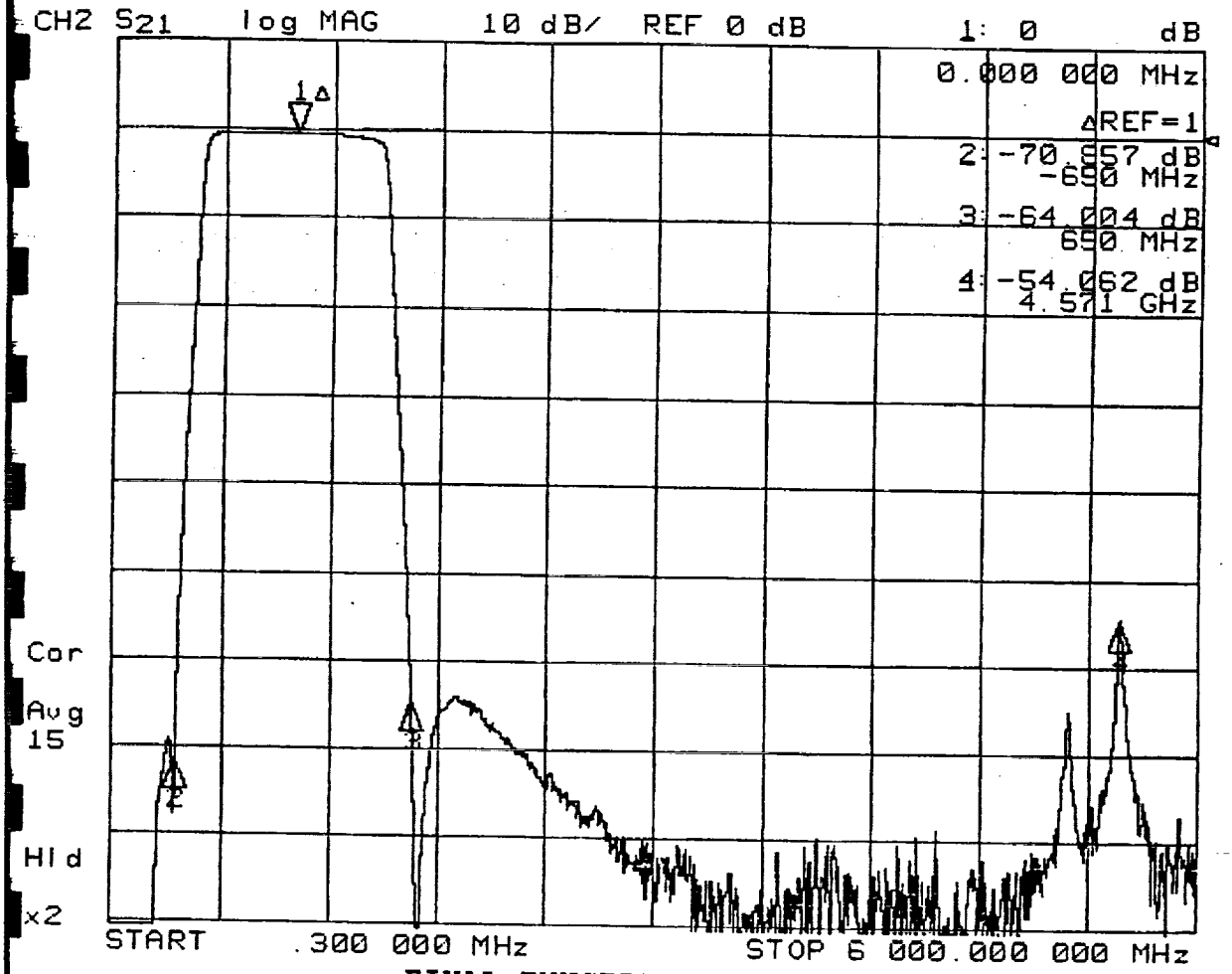
NOTE IF TEST WITNESSED BY AESD: _____ GSI: ___ Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

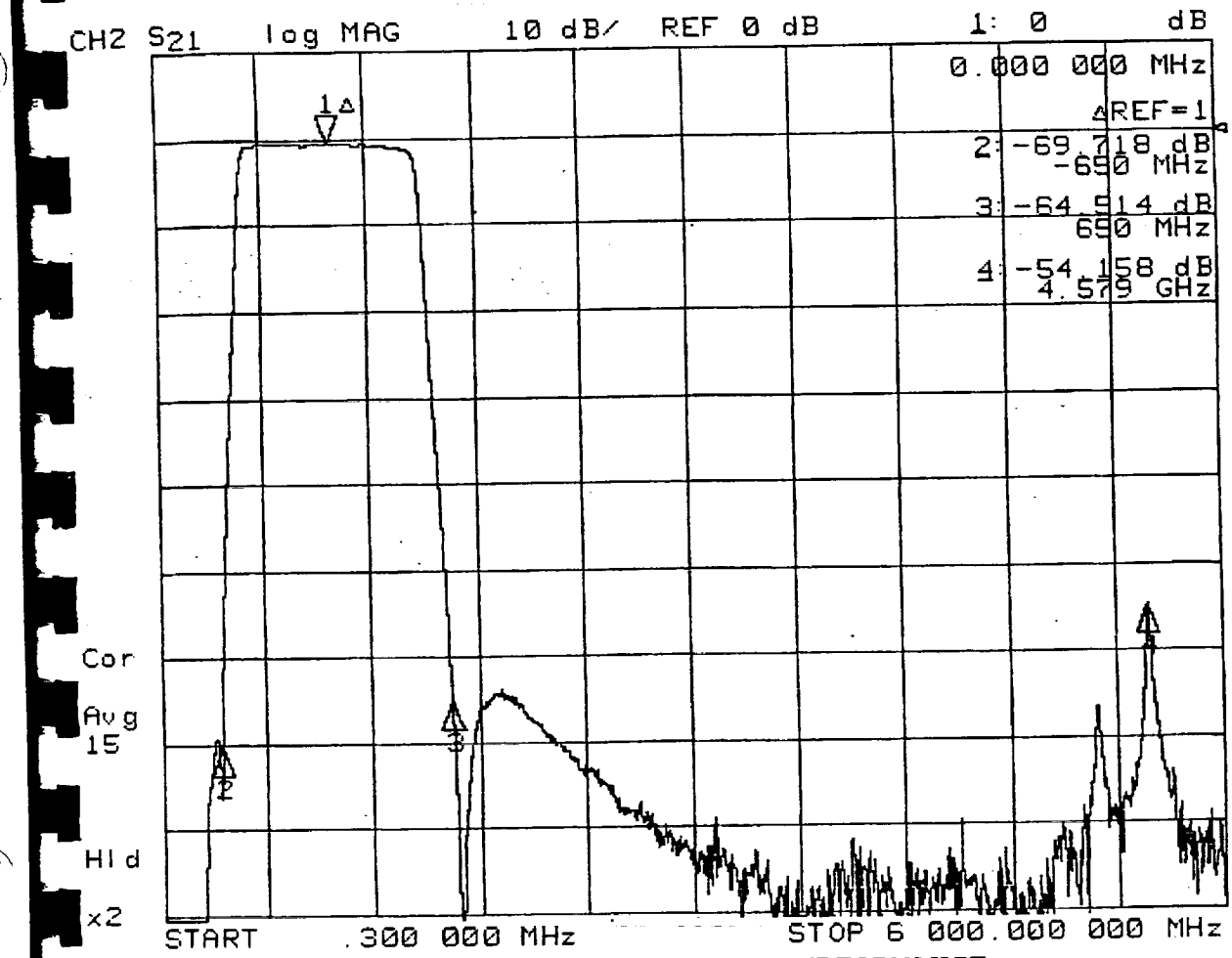
{16} REFERENCE CUSTOMER DRAWING 1331559

DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.501
MOUNTING HOLE CENTER	0.125 ± .010	.125
BETWEEN UPPER MOUNTING HOLES	3.250	3.248
BETWEEN LOWER MOUNTING HOLES	3.250	3.247



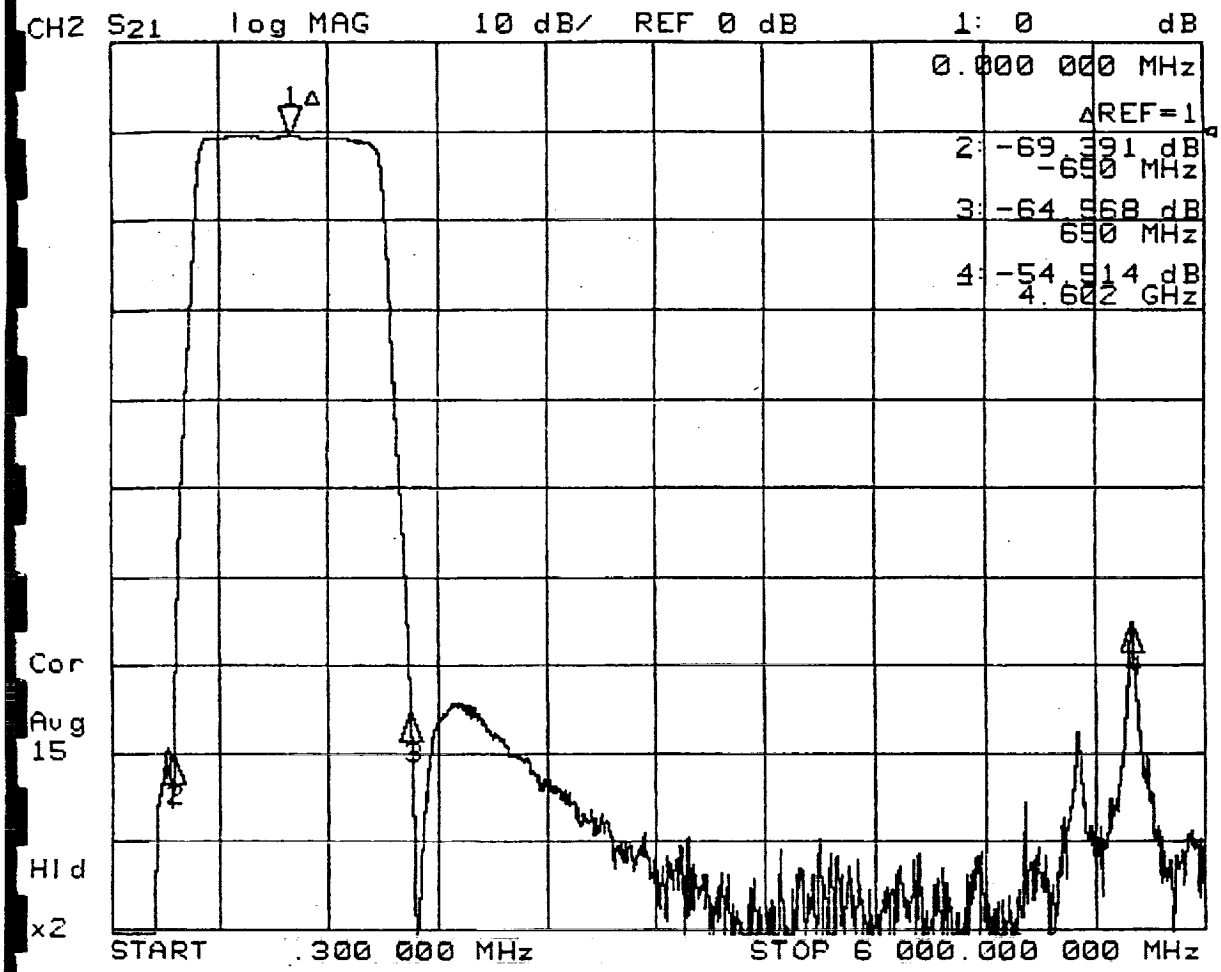
FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P227-003
-10C DATA
OPR: R. HOGGATT DATE FEB 03 97 annel 2

MARKER PARAMET		
MARKER 1	1000.000000 MHz OFF	1000.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	350.000000 MHz -70.857 dB
MARKER 3	1000.000000 MHz OFF	1650.000000 MHz -64.004 dB
MARKER 4	1000.000000 MHz OFF	5571.556164 MHz -54.062 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P227-003
+15C DATA
OPR: R. HOGGATT DATE FEB 03 1997

MARKER PARAMET		annel 2
MARKER 1	1000.000000 MHz OFF	1000.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	350.000000 MHz -69.718 dB
MARKER 3	1000.000000 MHz OFF	1650.000000 MHz -64.514 dB
MARKER 4	1000.000000 MHz OFF	5579.955868 MHz -54.158 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P227-003
+40C DATA
OPR: R. HOGGATT DATE FEB 03 1997 annel 2

MARKER PARAMET		
MARKER 1	1000.000000 MHz OFF	1000.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	350.000000 MHz -69.391 dB
MARKER 3	1000.000000 MHz OFF	1650.000000 MHz -64.568 dB
MARKER 4	1000.000000 MHz OFF	5602.154444 MHz -54.514 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

BANDPASS FILTER MODEL HL1000-1000-10SS1 S/N P227-003
PROJET 1331559-1 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT
PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +21.5 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	1.0	MHz	-79.0 dB	F11	1000.0	MHz	-0.51 dB
F2	10.0	MHz	-92.7 dB	F12	(*) 1100.0	MHz	-0.57 dB
F3	100.0	MHz	-86.9 dB	F13	(*) 1200.0	MHz	-0.62 dB
F4	300.0	MHz	-71.3 dB	F14	1300.0	MHz	-0.81 dB
F5	400.0	MHz	-37.5 dB	F15	1400.0	MHz	-1.06 dB
F6	500.0	MHz	-2.18 dB	F16	1500.0	MHz	-6.72 dB
F7	600.0	MHz	-0.58 dB	F17	1600.0	MHz	-42.8 dB
F8	700.0	MHz	-0.48 dB	F18	1700.0	MHz	-82.1 dB
F9	(*) 800.0	MHz	-0.55 dB	F19	2000.0	MHz	-65.8 dB
F10	(*) 900.0	MHz	-0.58 dB	F20	5000.0	MHz	-87.6 dB

TEST PERFORMED BY: R. Hoggatt DATE 2/4/97 DA 5

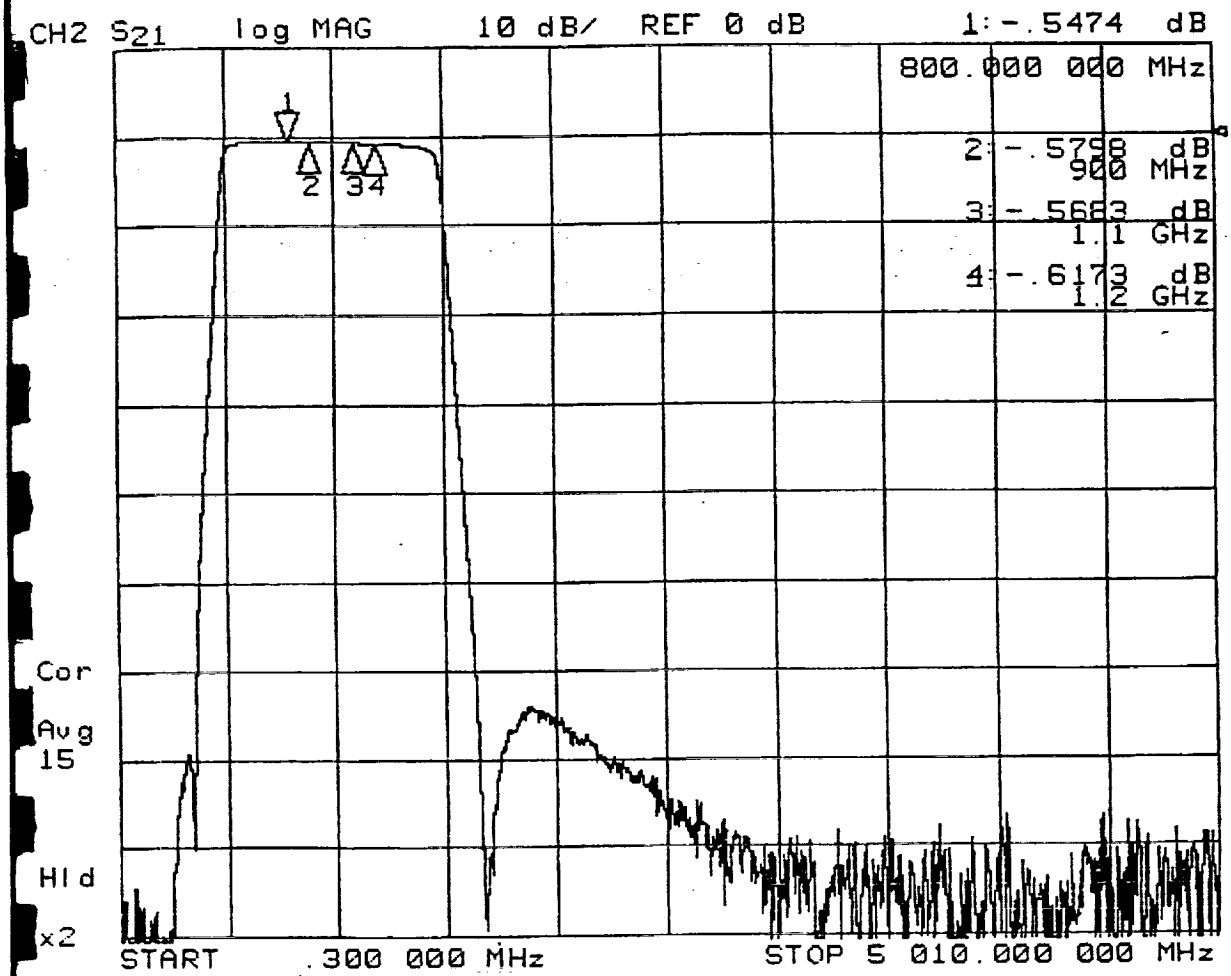
NOTE IF TEST WITNESSED BY AESD _____ GSI _____ Not witnessed this time. DLD

***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST
ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX A PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P227-003
AMBIENT
OPR: R. HOGGATT DATE FEB 04 1997 annel 2

MARKER PARAMET		
MARKER 1	1000.000000 MHz OFF	800.000000 MHz -.5474 dB
MARKER 2	1000.000000 MHz OFF	900.000000 MHz -.5798 dB
MARKER 3	1000.000000 MHz OFF	1100.000000 MHz -.5683 dB
MARKER 4	1000.000000 MHz OFF	1200.000000 MHz -.6173 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

GAIN STABILITY AND GAIN COMPRESSION

FOR

MIXER/AMPLIFIERS AND IF AMPLIFIERS

GAIN-TEMPERATURE SENSITIVITY FOR MIXER/AMPLIFIERS AND IF AMPLIFIERS

Channel No.	3	4	5	6	7	8	9	10	11	12	13	14	15
Specification (+/-dB/°C)	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.06	0.06	0.06	0.06	0.02
Measured (dB/°C)	-0.015	-0.017	-0.013	-0.016	-0.020	-0.015	-0.017 +0.005	-0.017 +0.005	-0.017 +0.005, -0.005 -0.016	-0.017 +0.005, -0.005 -0.016	-0.017 +0.005. -0.005 -0.009	-0.017 +0.005, -0.005 +0.001 -0.014	-0.020
Total (dB/°C)	-0.015	-0.017	-0.013	-0.016	-0.020	-0.015	+0.005, -0.017	+0.005, -0.017	+0.005, -0.036	+0.005, -0.036	+0.005, -0.031	+0.006, -0.036	-0.020

Channel 3 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-13, S/N: 7A53)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.37	0.50	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	70.62	1.88	2.0	QA 1	
10.00	70.70				
10.04	70.77				
ΔGv =	0.15 dB				

	DATE	ACC	REJ
SPACEK QA	10-28-98	QA 1	

PART NO. 1331562-136

SER NO. 7A53

TESTED BY: [illegible]

END DATE: 6-5-98

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

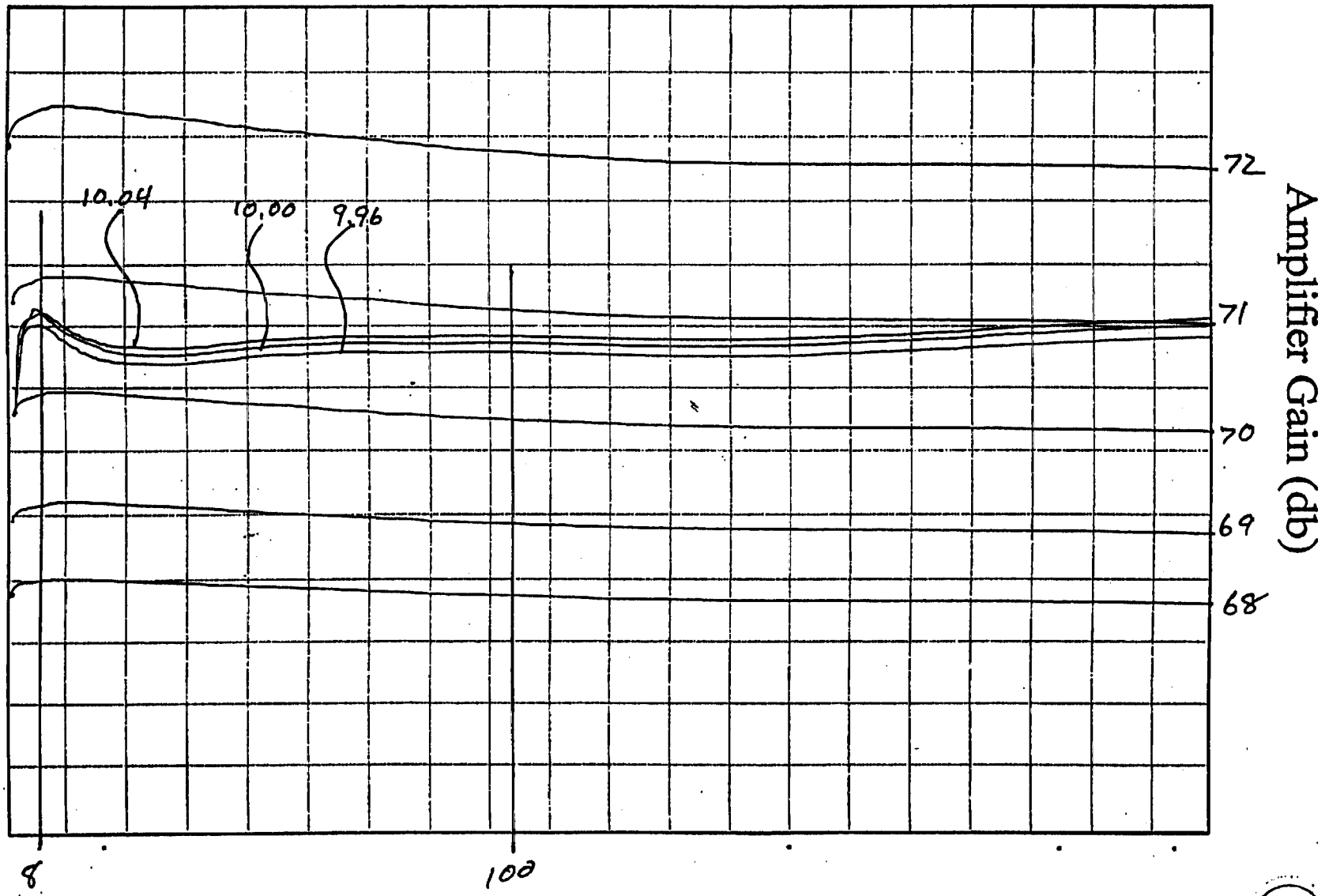
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-13
Serial No. 7A53
Date 6-5-98
Tested By TTT

Amb Temp +23°C



QA

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 −6	GT1 71.23				
		* 0.021	0.035dB/°C	QA 1	
T2 +8	GT2 71.02				
		* 0.026	0.020dB/°C		QA 1
T3 +28	GT3 70.51				
		* 0.021	0.035dB/°C	QA 1	
T4 +40	GT4 70.26				

• Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \qquad i = 1,2,3,4$$

ΔG_T = 0.97 dB

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 1.52 dB Spec 1.4dB " ACC____ REJ____ QA 1

	DATE	ACC	REJ
SPACEK QA	10-28-98		QA 1

ENGINEERING DATA ONLY, SEE AE24869C PARA. 3.2.1.15.1 acceptable

PART NO. 1331562-13G

SER NO. 7A53

TESTED BY: 777

END DATE: 6-5-98

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

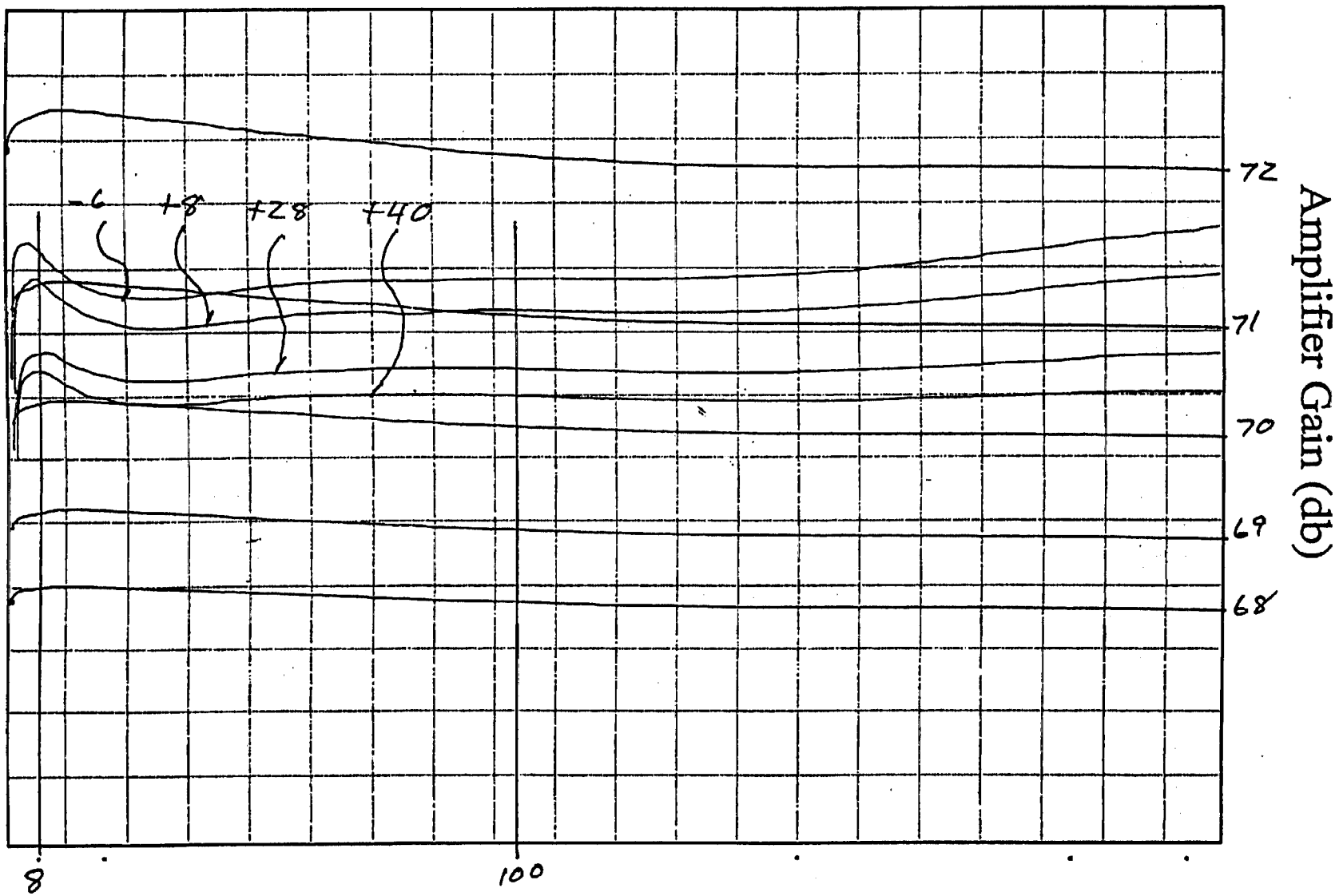
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Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-13
Serial No. 7A53
Date 6-5-98
Tested By 777

Amb Temp +23°C



TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.4	0.6	1.0	QA 1	
				X						20					
	X	X								50	-2.5	0.5	1.0	QA 1	
X	X	X	X	X	X	X	X			100	-2.5	0.5	1.0	QA 1	
X										150					
			X	X	X	X	X	X		200					
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 6-5-98 AMBIENT ROOM TEMPERATURE °C: 23°C

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-24.6	-28.3	3.7	1.11

Above data taken with Daden filter attached (except -19).

Intermediate test results for information only

		DATE	ACC	REJ
PART NO. 1331562-13E	SPACEK QA	10-28-98	QA 1	
SER NO. 7A53	TEST FAILURE:			
TESTED BY: [signature]	FAILURE ANALYSIS NO.			
END DATE: 6-5-98				
END TIME: 1600				

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212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 11-18-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	42.6	-23.40	-25.40	2.00	3.1	3.8	QA 1	
+8	42.7	-23.60	-25.55	1.95	3.2	3.8	QA 1	
+28	42.8	-23.90	-25.85	1.95	3.2	3.8	QA 1	
+40	42.9	-24.10	-26.05	1.95	3.2	3.8	QA 1	

Noise figure change 0.1 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ _____

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 11-23-98 Ambient Room Temperature °C: 25

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.053

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ _____

PART NO. 1331562-13F

SPACEK QA DATE 11-25-98 ACC QA 1 REJ ___

SER NO. 7A53

TEST FAILURE: _____

TESTED BY: DH

FAILURE ANALYSIS NO. _____

END DATE: 11-25-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Channel 4 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-14, S/N: 7A34)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.55	0.50	___	QA 1

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
~~70.93~~ 9.96	70.93	1.875	2.0	QA 1	___
~~71.0~~ 10.00	71.00				
10.04	~~71.08~~				
ΔGv =	0.15 dB				

	DATE	ACC	REJ
SPACEK QA	___	___	QA 1

PART NO. 1331562-145

SER NO. 7A34

TESTED BY: [illegible]

END DATE: 6-5-98

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

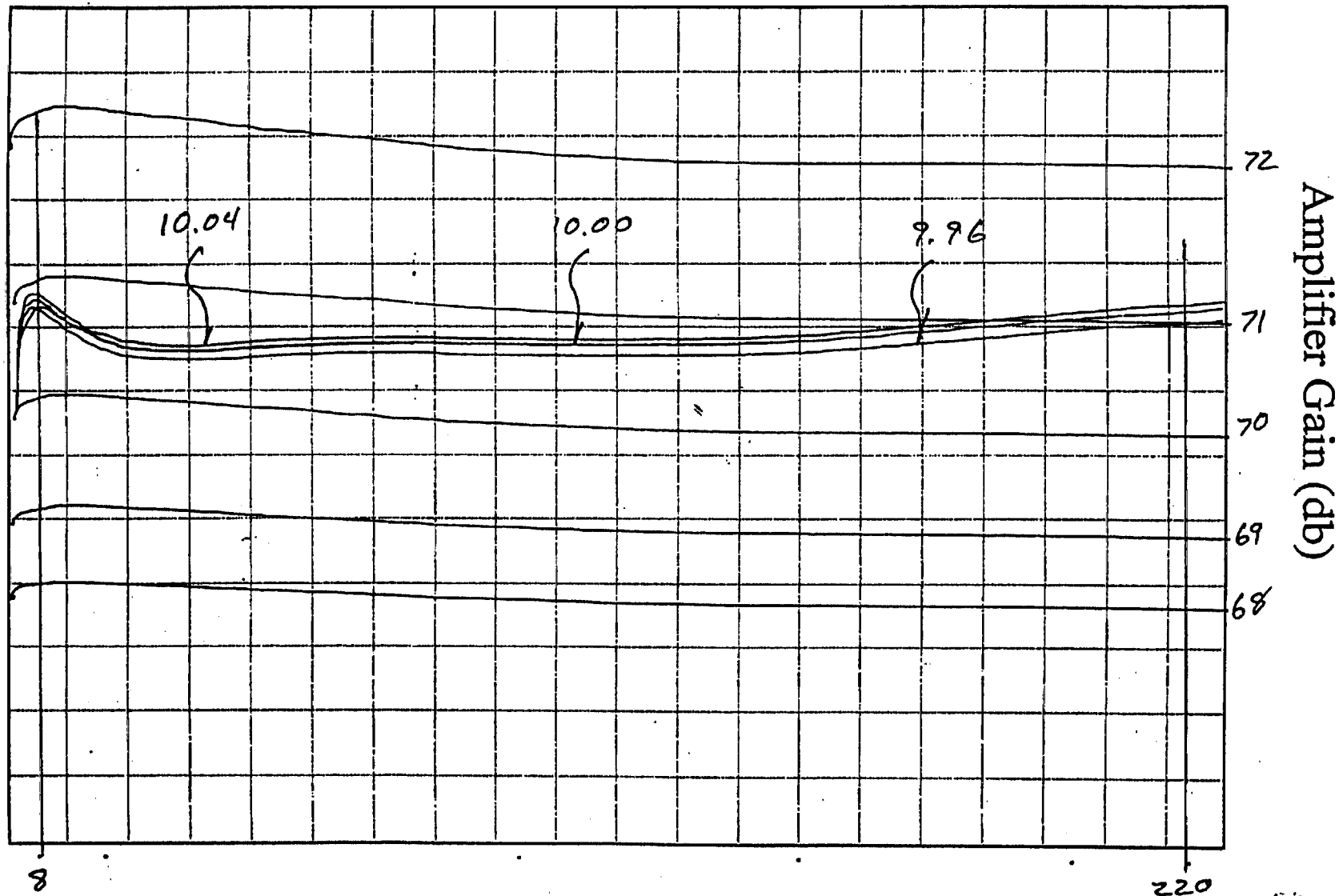
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212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-14G
Serial No. 7A34
Date 6-6-98
Tested By TTT

Amb Temp +23°C



04

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 −6	G_{T1} 71.72				
		* 0.019	0.035dB/°C	QA 1	
T2 +8	G_{T2} 71.145				QA 1
		* 0.023	0.020dB/°C		
T3 +28	G_{T3} 71.00				
		* 0.032	0.035dB/°C	QA 1	
T4 +40	G_{T4} 70.62				

ECN CAMSV-1352

• Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \quad i = 1,2,3,4 \qquad \Delta G_T = 1.10 \text{ dB}$$

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 1.65 dB Spec 1.4dB " ACC____ REJ____ QA 1

ECN CAMSV-1352

	DATE	ACC	REJ
PART NO. 1331562-14B	SPACEK QA 6-29-98	QA 1	

SER NO. 7A34 TEST FAILURE: _____

TESTED BY: JJY FAILURE ANALYSIS NO. _____

END DATE: 6-5-98

END TIME: 1600

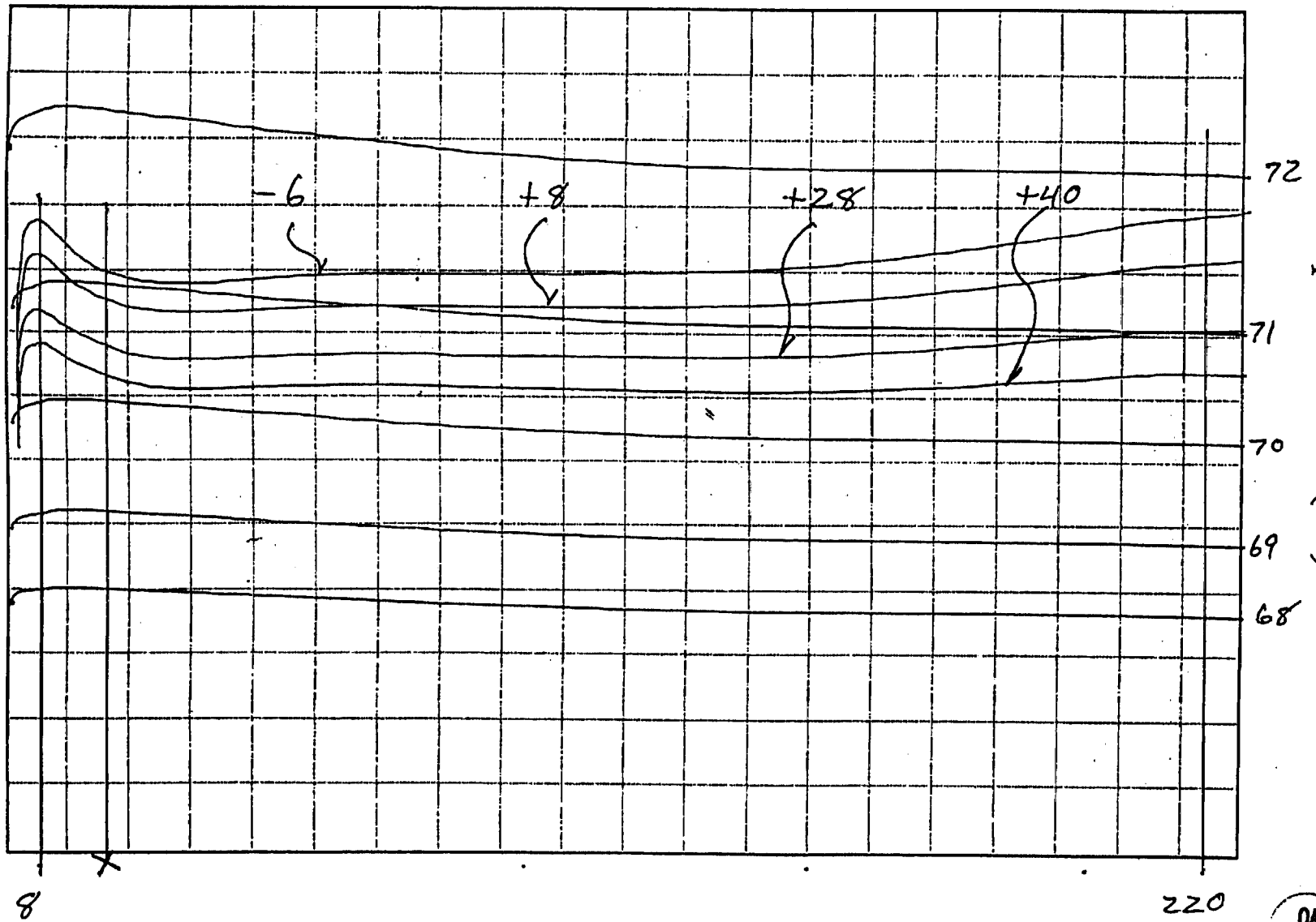
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212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-14L2
Serial No. 7A34
Date 6-6-98
Tested By 777

Amb Temp 23°C



QA

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.3	0.7	1.0	QA	
				X						20					
		X	X							50					
X	X	X	X	X	X	X	X			100	-2.4	0.6	1.0	QA	
X										150					
			X	X	X	X	X	X		200	-2.3	0.7	1.0	QA	
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 6/5/98 AMBIENT ROOM TEMPERATURE °C: 23°C

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-20.6	-24.2	3.6	1.19

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

		DATE	ACC	REJ
PART NO. 1331562-146	SPACEK QA	6-22-98	QA	

SER NO. 7A34 TEST FAILURE: _____

TESTED BY: [illegible] FAILURE ANALYSIS NO. _____

END DATE: 6-5-98

END TIME: ~1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 6-24-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.5	-18.50	-20.20	1.70	3.6	3.8	QA 1	
+8	43.6	-18.80	-20.45	1.65	3.7	3.8	QA 1	
+28	43.7	-19.00	-20.65	1.65	3.7	3.8	QA 1	
+40	43.8	-19.30	-20.95	1.65	3.7	3.8	QA 1	

Noise figure change 0.1 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ _____

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 6-23-98 Ambient Room Temperature °C: 24

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.045

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ _____

DATE ACC REJ

PART NO. 1331562-145 SPACEK QA 6-29-98 QA 1 _____

SER NO. 7A34 TEST FAILURE: _____

TESTED BY: 7FH FAILURE ANALYSIS NO. _____

END DATE: 6-24-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Channel 5 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-15, S/N: 7A45)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.38	0.5	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

ENGINEERING DATA ONLY. SEE AE24869C PARA. 3.2.1.15.2

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	70.47	2.38	2.0	QA 1	
10.00	70.56				
10.04	70.66				
ΔGv =	0.19 dB				

	DATE	ACC	REJ
SPACEK QA	6-8-98	QA 1	

PART NO. 1331562-15 E

SER NO. 7A45

TESTED BY: 777

END DATE: 6-6-98

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

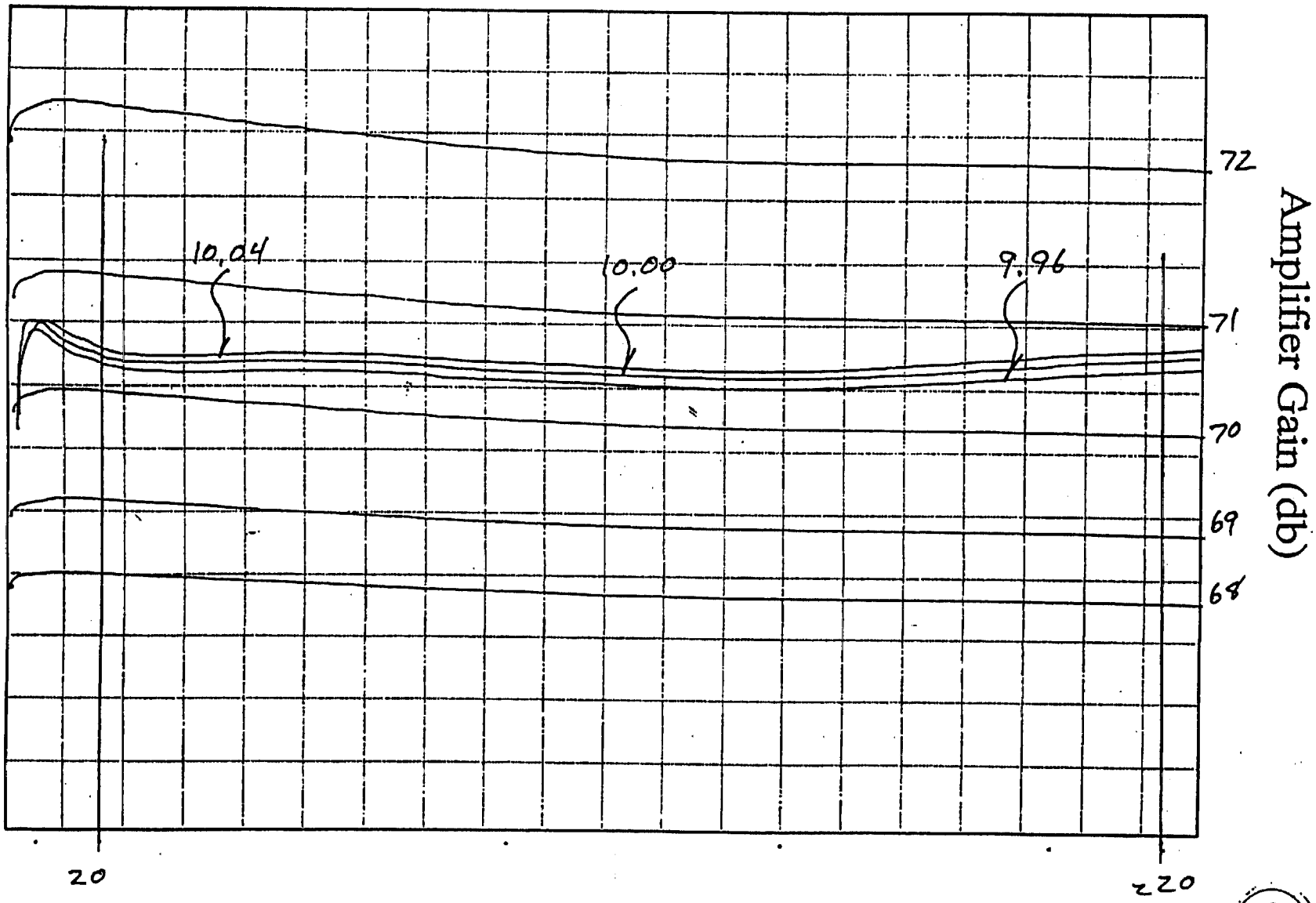
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-15G
Serial No. 7A 45
Date 6-6-98
Tested By TTV

Amb Temp +23°C



QA

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)		Relative Gain		ΔG/ΔT	SPEC	ACC	REJ
T1	-6	G_{T1}	71.32				
				* 0.016	0.035dB/°C	QA 1	
T2	+8	G_{T2}	71.10				
				* 0.024	0.020dB/°C		QA 1
T3	+28	G_{T3}	70.62				
				* 0.038	0.035dB/°C		QA 1
T4	+40	G_{T4}	70.17				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \qquad i = 1,2,3,4$$

ΔG_T = 1.15 dB

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4$ = 1.74 dB Spec 1.4dB ACC____ REJ____ QA 1

DATE ACC REJ ENGINEERING DATA ONLY. SEE AE2486 PARA. 3.2.1.15.1

PART NO. 1331562-15F SPACEK QA 8-28-98 ___ QA 1

SER NO. 7A45 TEST FAILURE: _____

TESTED BY: 777 FAILURE ANALYSIS NO. _____

END DATE: 8-28-98

END TIME: 1600

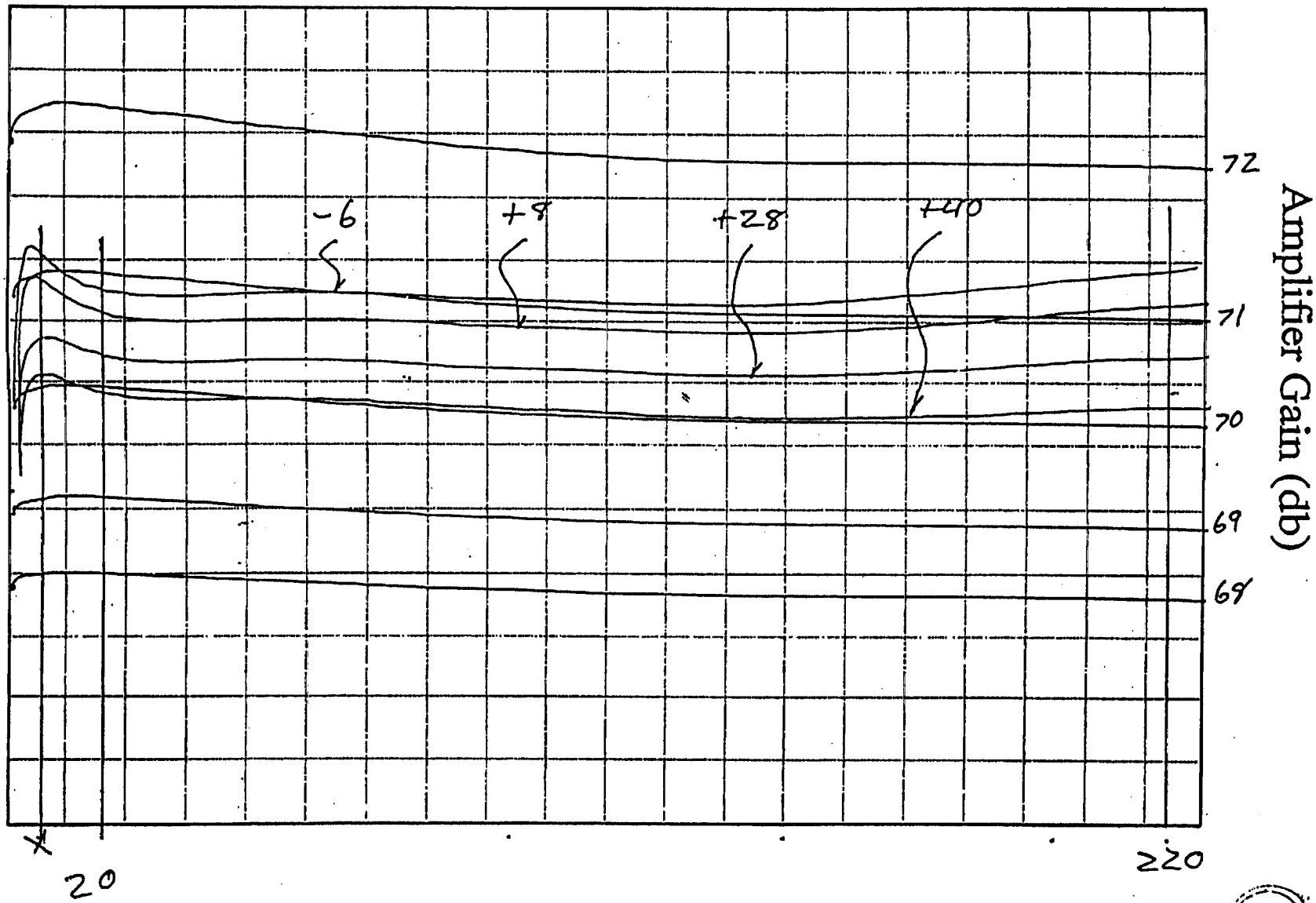
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 133562-15G
Serial No. 7A45
Date 6-6-98
Tested By 7ZF

Amb Temp 23°C



TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10					
				X						20	-2.3	0.70	1.0	QA	
	X	X								50					
X	X	X	X	X	X	X	X			100	-2.3	0.70	1.0	QA	
X										150					
			X	X	X	X	X	X		200	-2.2	0.80	1.0	QA	
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 6-6-98 AMBIENT ROOM TEMPERATURE °C: 23°C

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-21.7	-25.4	3.7	1.11

Above data taken with Daden filter attached (except -19).

Intermediate test results for information only

PART NO. 1331562-15G

SER NO. 7A45

TESTED BY: 777

END DATE: 6-5-98

END TIME: 1600

	DATE	ACC	REJ
SPACEK QA	6-8-98	S...	

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 8-20-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.2	-20.20	-22.15	1.95	3.2	3.8	QA 1	
+8	43.3	-20.40	-22.35	1.95	3.2	3.8	QA 1	
+28	43.4	-20.50	-22.40	1.90	3.3	3.8	QA 1	
+40	43.5	-20.80	-22.70	1.90	3.3	3.8	QA 1	

Noise figure change 0.1 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ _____

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 8/25/98 Ambient Room Temperature °C: +24

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.052

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ _____

PART NO. 1331562-156 SPACEK QA DATE 8-21-98 ACC QA 1 REJ _____

SER NO. 7A45 TEST FAILURE: _____

TESTED BY: DA FAILURE ANALYSIS NO. _____

END DATE: 8-20-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Channel 6 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-16, S/N: 7A46)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.47	0.50	S-	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

ENGINEERING DATA ONLY. SEE AE2486 PARA. 3.2.1.15.2

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	71.06	2.25	2.0		QA 1
10.00	71.15				
10.04	71.24				
ΔGv =	0.18 dB				

	DATE	ACC	REJ
SPACEK QA	6-8-98		QA 1

PART NO. 1331562-16

SER NO. 7A46

TESTED BY: [illegible]

END DATE: 6-6-98

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

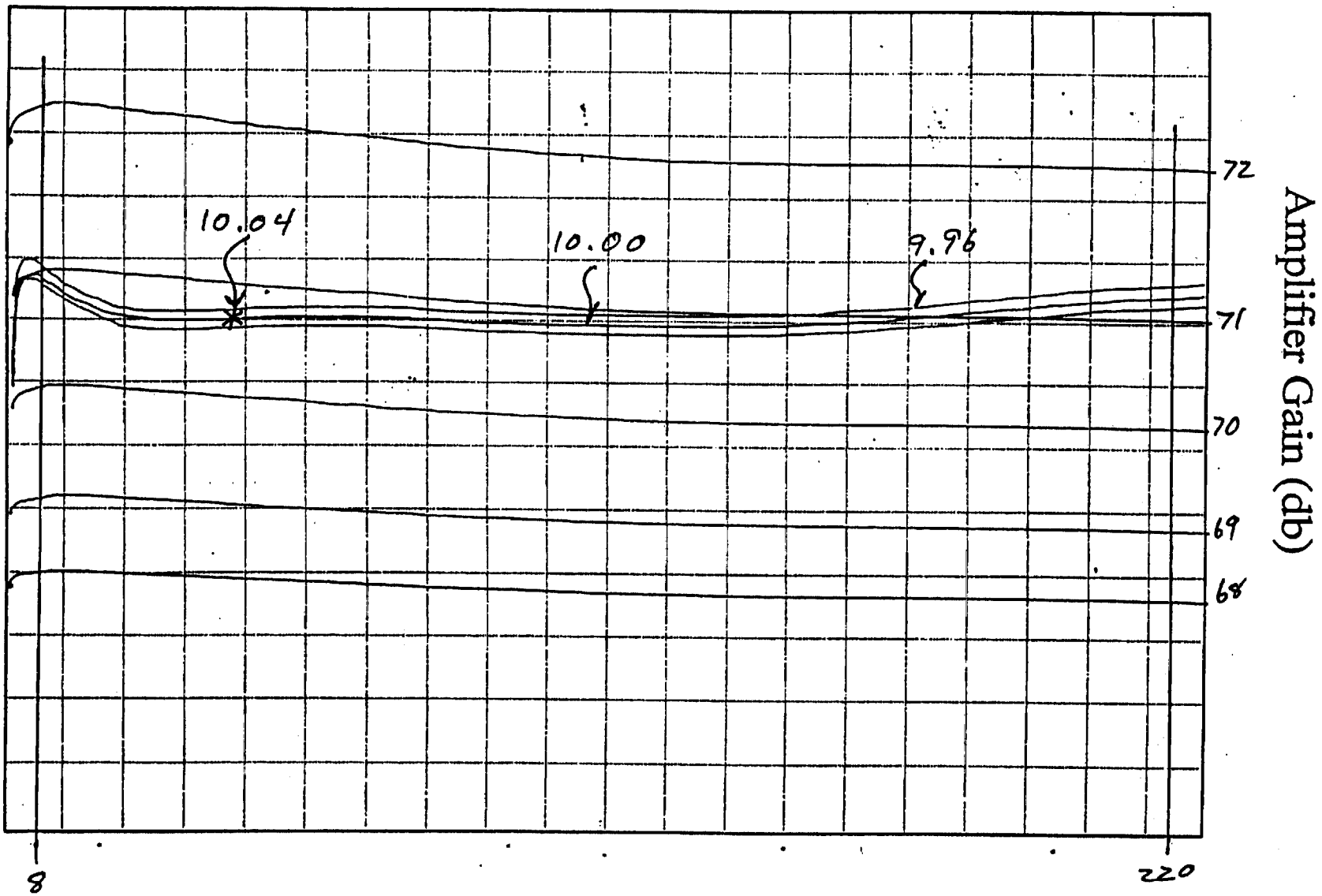
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-16G
Serial No. 7A46
Date 6-6-98
Tested By TT

Amb Temp +23°C



TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 -6	G_{T1} 71.88				
		* 0.021	0.035dB/°C	QA 1	
T2 +8	G_{T2} 71.58				
		* 0.020	0.020dB/°C	QA 1	
T3 +28	G_{T3} 71.18				
		* 0.044	0.035dB/°C		QA 1
T4 +40	G_{T4} 70.65				

• Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \quad i = 1,2,3,4$$

ΔG_T = 1.23 dB

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4$ = 1.81 dB Spec 1.4dB ACC____ REJ____ QA 1

	DATE	ACC	REJ	
SPACEK QA	6-8-98		QA 1	ENGINEERING DAT ONLY, SEE AE2486 PARA. 3.2.1.15.1

PART NO. 1331562-16G

SER NO. 7A46

TESTED BY: TTT

END DATE: 6-6-98

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

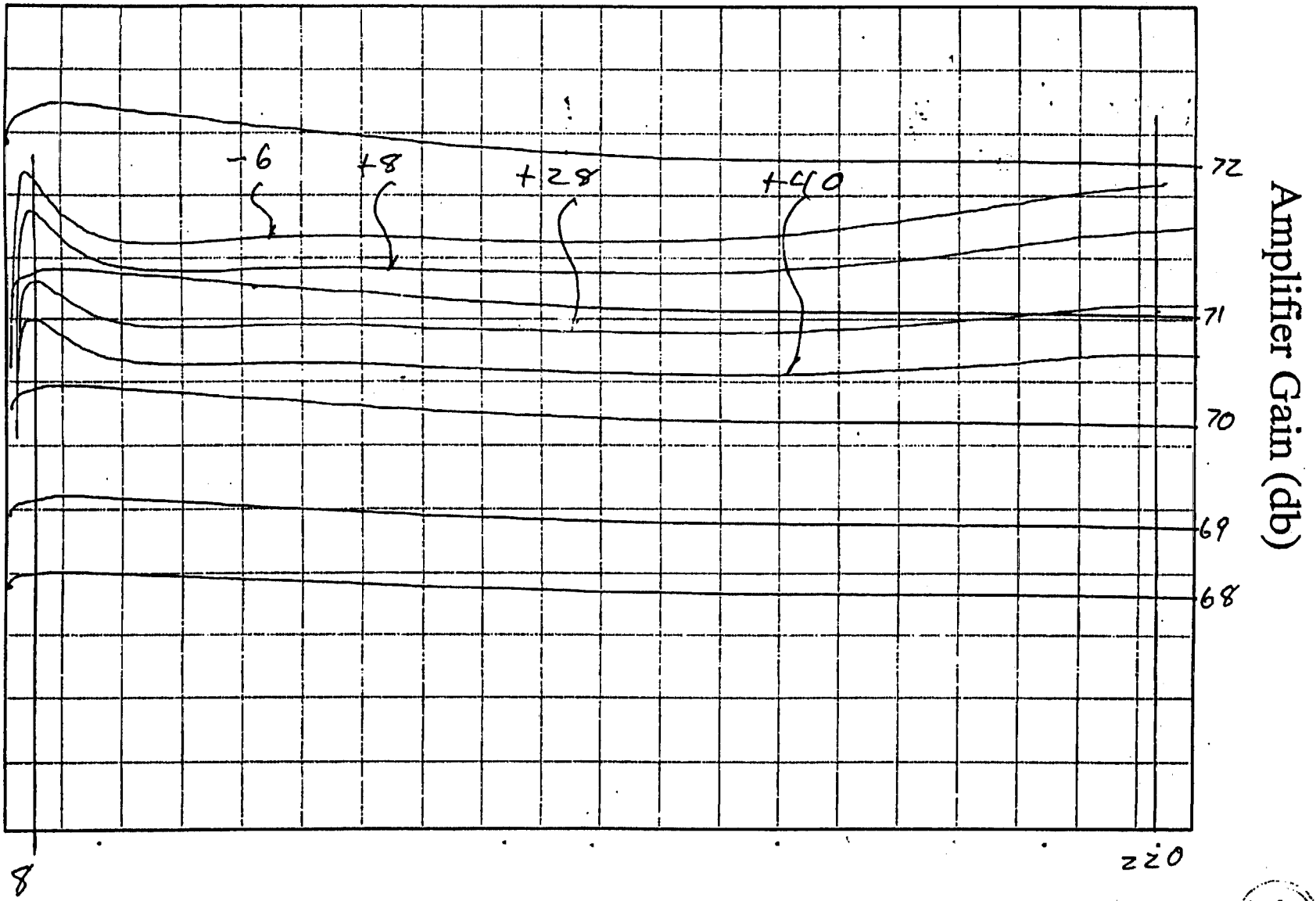
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-16 G
Serial No. 7A46
Date 6-6-98
Tested By 277

Amb Temp 23°C



TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.5	-0.5	1.0	QA	
				X						20					
	X	X								50					
X	X	X	X	X	X	X	X			100	-2.7	0.3	1.0	QA	
X										150					
			X	X	X	X	X	X		200	-2.6	0.4	1.0	QA	
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 6-5-98 AMBIENT ROOM TEMPERATURE °C: 23°C

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-20.5	-24.1	3.6	1.19

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

PART NO. 1331562-16G

SER NO. 7A46

TESTED BY: [illegible]

END DATE: 6-6-98

END TIME: 1600

	DATE	ACC	REJ
SPACEK QA	6-8-98	[illegible]	

TEST FAILURE:

FAILURE ANALYSIS NO.

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 8-20-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.6	-19.10	-21.10	2.00	3.1	3.8	QA 1	
+8	43.6	-19.30	-21.30	2.00	3.1	3.8	QA 1	
+28	43.7	-19.60	-21.60	2.00	3.1	3.8	QA 1	
+40	43.8	-19.90	-21.90	2.00	3.1	3.8	QA 1	

Noise figure change 0 dB Spec is .5dB peak to peak on -20 ACC: QA 1 REJ ____

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 8-25-98 Ambient Room Temperature °C: +25

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.051

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA REJ ____

PART NO. 1331562-166 SPACEK QA DATE 8-21-98 ACC QA REJ ____

SER NO. 7A46 TEST FAILURE: ____

TESTED BY: DL FAILURE ANALYSIS NO. ____

END DATE: 8-20-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Channel 7 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-17, S/N: 7A07)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.42	0.5	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
10.04	70.71	2.0	2.0	QA 1	
10.00	70.65				
9.96	70.55				
ΔGv =	0.16 dB				

	DATE	ACC	REJ
PART NO. 1331562-17F SPACEK QA	4-21-97	QA 1	

SER NO. 7AD7 TEST FAILURE: _____

TESTED BY: [signature] FAILURE ANALYSIS NO. _____

END DATE: 4-21-97

END TIME: 4:00 PM

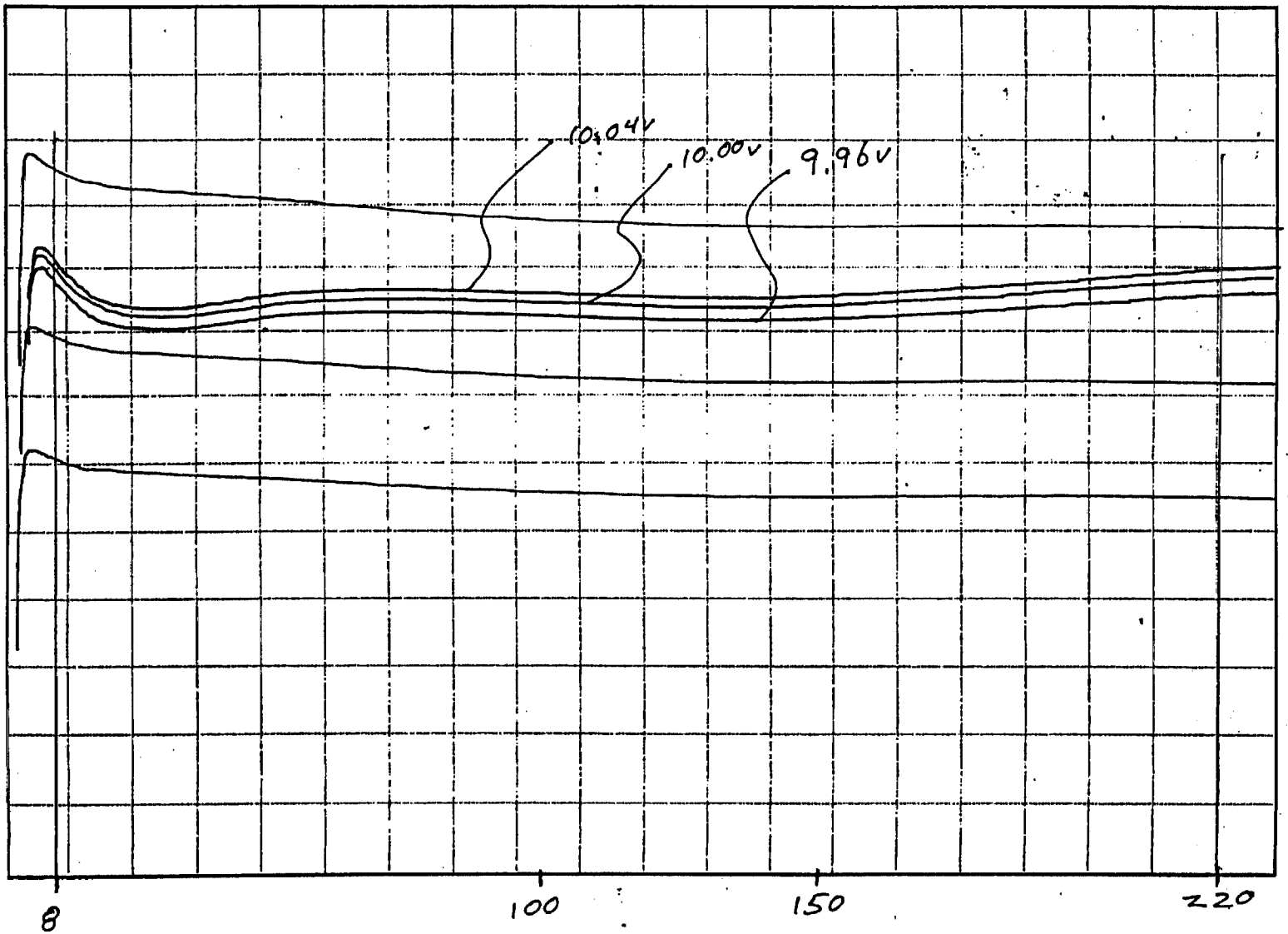
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Model No. 1331562-17F
Serial No. 7A07
Date 4-21-97
Tested By ZFK

Amplifier Gain

+23°C



TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 +40	G_{T1} 70.45				
		* 0.021	0.035dB/°C	QA 1	
T2 +28	G_{T2} 70.70				
		* 0.030	0.020dB/°C		QA 1
T3 +8	G_{T3} 71.30				
		* 0.018	0.035dB/°C	QA 1	
T4 −6	G_{T4} 71.55				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \quad i = 1,2,3,4 \qquad \Delta G_T = 1.10 \text{ dB}$$

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 = 1.66$ dB Spec 1.4dB ACC____ REJ QA 1

	DATE	ACC	REJ
PART NO. 1331562-17F	SPACEK QA	4-24-97	QA 1

SER NO. 7A07 TEST FAILURE: _____

TESTED BY: [signature] FAILURE ANALYSIS NO. _____

END DATE: 4-24-97

END TIME: 4:00PM

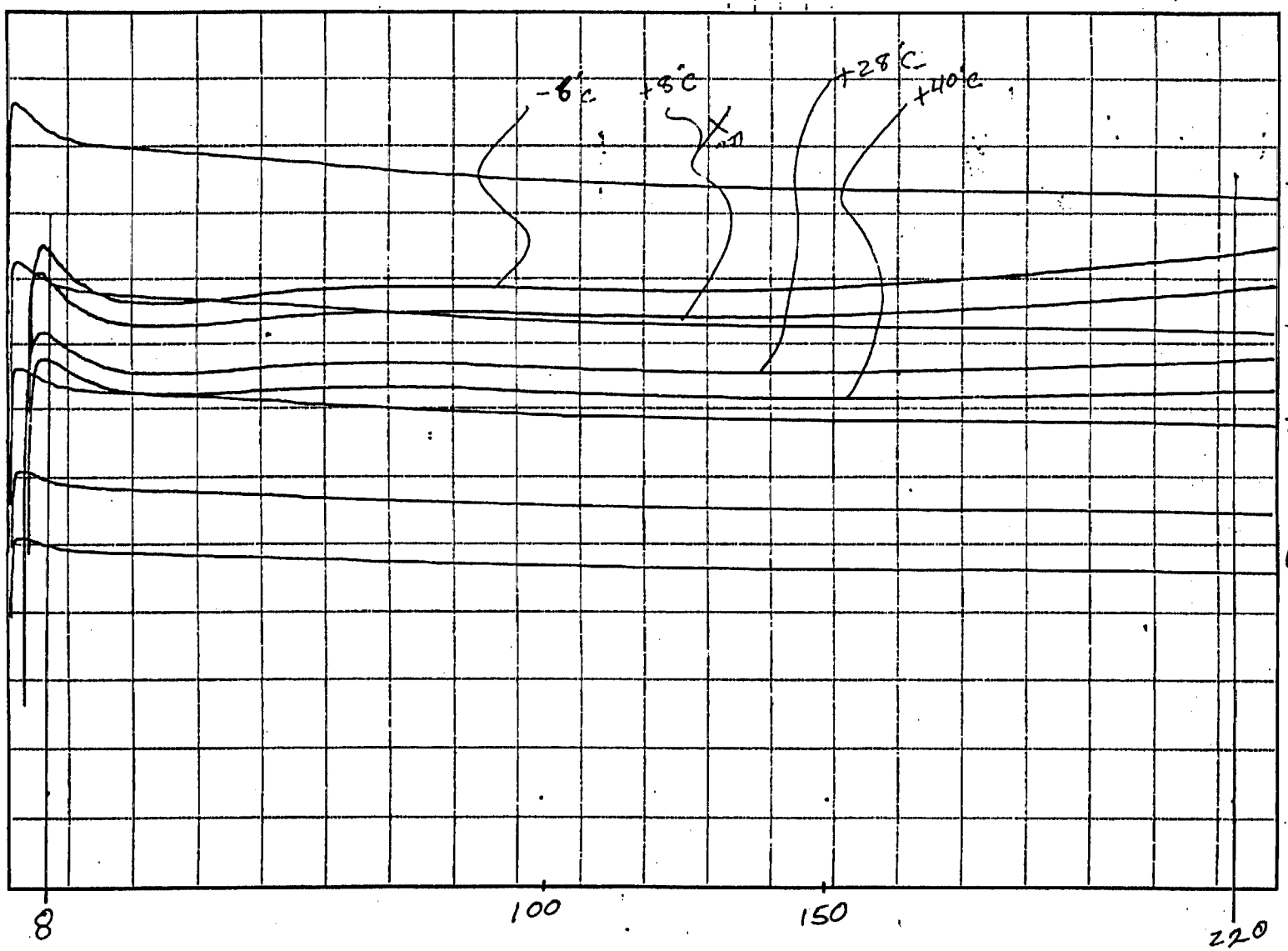
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-17
Serial No. 7A07
Date 4-24-97
Tested By TTT

Amb Temp +23°C



TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X	X	X	X	X	X	X	10	0.70	1.0	QA	
	X	X								50	—	—		
X	X	X	X	X	X	X	X	X		100	0.55	1.0	QA	
X										150	—	—		
			X	X	X	X	X	X		200	0.60	1.0	QA	
							X			400	—	—		
								X		500	—	—		
								X		1000	—	—		
								X		1500	—	—		

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 4-20-97 AMBIENT ROOM TEMPERATURE °C: +23

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-20.1	-23.7	3.6	1.17

Above data taken with Daden filter attached (except -19).

Intermediate test results for information only

		DATE	ACC	REJ
PART NO. 1331562-17F	SPACEK QA	4-24-97	QA	
SER NO. 7A07	TEST FAILURE:			
TESTED BY: [signature]	FAILURE ANALYSIS NO.			
END DATE: 4-24-97				
END TIME: 4:00 Pm				

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 7-3-97 AMBIENT ROOM TEMPERATURE °C: +22

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	42.8	-19.50	-21.80	2.30	2.6	3.8	QA 1	
+8	42.9	-19.60	-21.85	2.25	2.7	3.8	QA 1	
+28	43.0	-19.80	-22.00	2.20	2.8	3.8	QA 1	
+40	43.1	-20.40	-22.60	2.20	2.8	3.8	QA 1	

Noise figure change 0.2 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ _____

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 7-1-97 Ambient Room Temperature °C: +25

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.167

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC _____ REJ [illegible]

DATE ACC REJ

PART NO. 1331562-17F SPACEK QA 7-3-97 ___ [illegible]

SER NO. 7A07 TEST FAILURE: _____

TESTED BY: [illegible] FAILURE ANALYSIS NO. _____

END DATE: 7-3-97

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Channel 8 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-18, S/N: 7A38)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.60	0.50		

QA 1

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	70.86	1.0	2.0		
10.00	90.90				
10.04	70.94				
ΔGv =	0.08 dB				

QA 1

	DATE	ACC	REJ
SPACEK QA	6-29-98	QA 1	QA 1

PART NO. 1331562-185

SER NO. 7A38

TESTED BY: [signature]

END DATE: 6-5-98

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

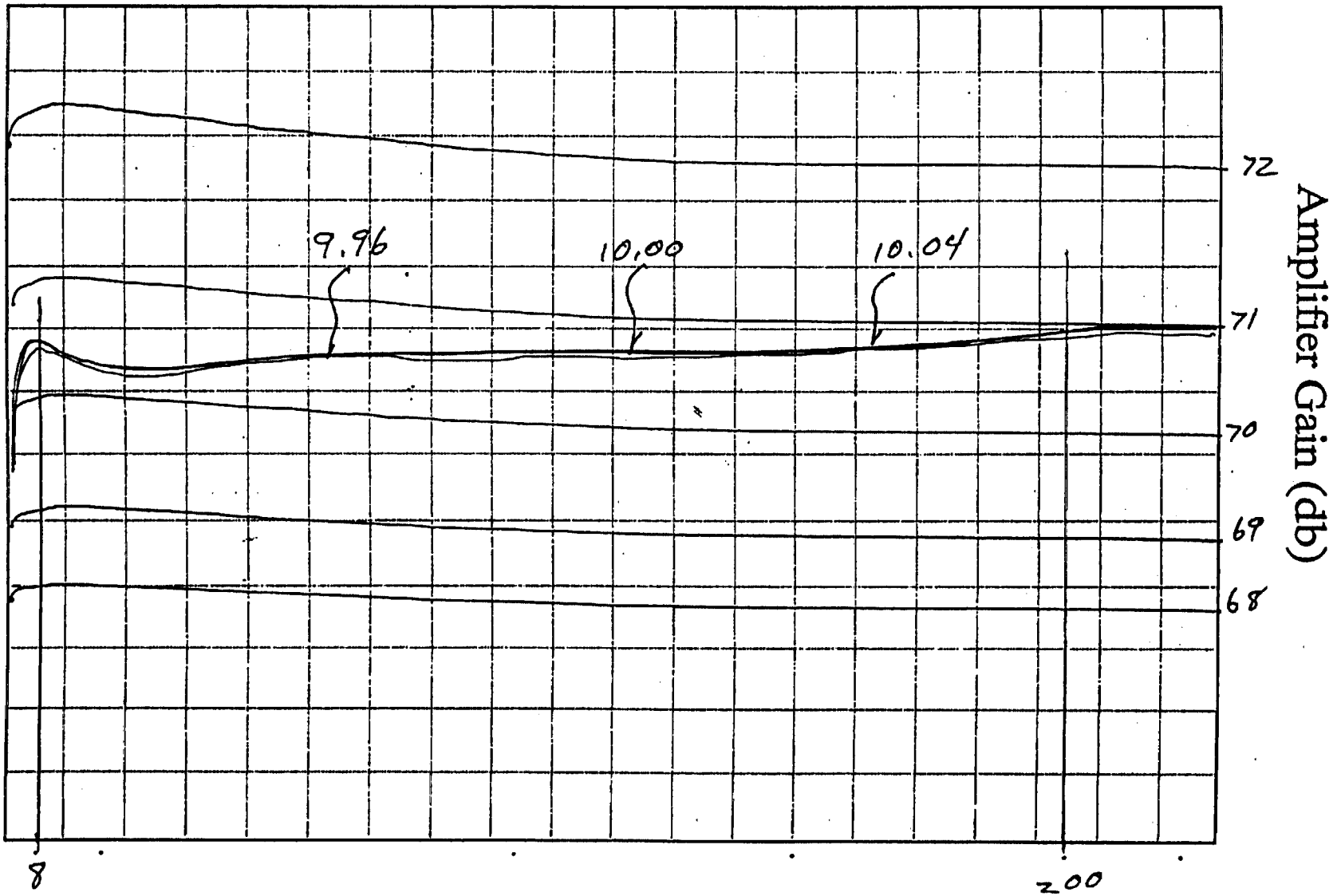
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-186
Serial No. 7A38
Date 6-6-98
Tested By TTT

Amb Temp 23°C



TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 −6	G_{T1} 71.63				
		* 0.015	0.035dB/°C	QA 1	
T2 +4	G_{T2} 71.42				
		* 0.029	0.020dB/°C		QA 1
T3 +28	G_{T3} 70.85				
		* 0.029	0.035dB/°C	QA 1	
T4 +40	G_{T4} 70.50				

ECN CAMSU-1352

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \qquad i = 1,2,3,4$$

ΔG_T = 1.13 dB

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4$ = 1.61 dB Spec 1.4dB " ACC____ REJ QA 1

ECN CAMSU-1352

	DATE	ACC	REJ
PART NO. 1331562-185	SPACEK QA	C-27-98	QA 1

SER NO. 7A38

TESTED BY: TTT

END DATE: 6-5-98

END TIME: * 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

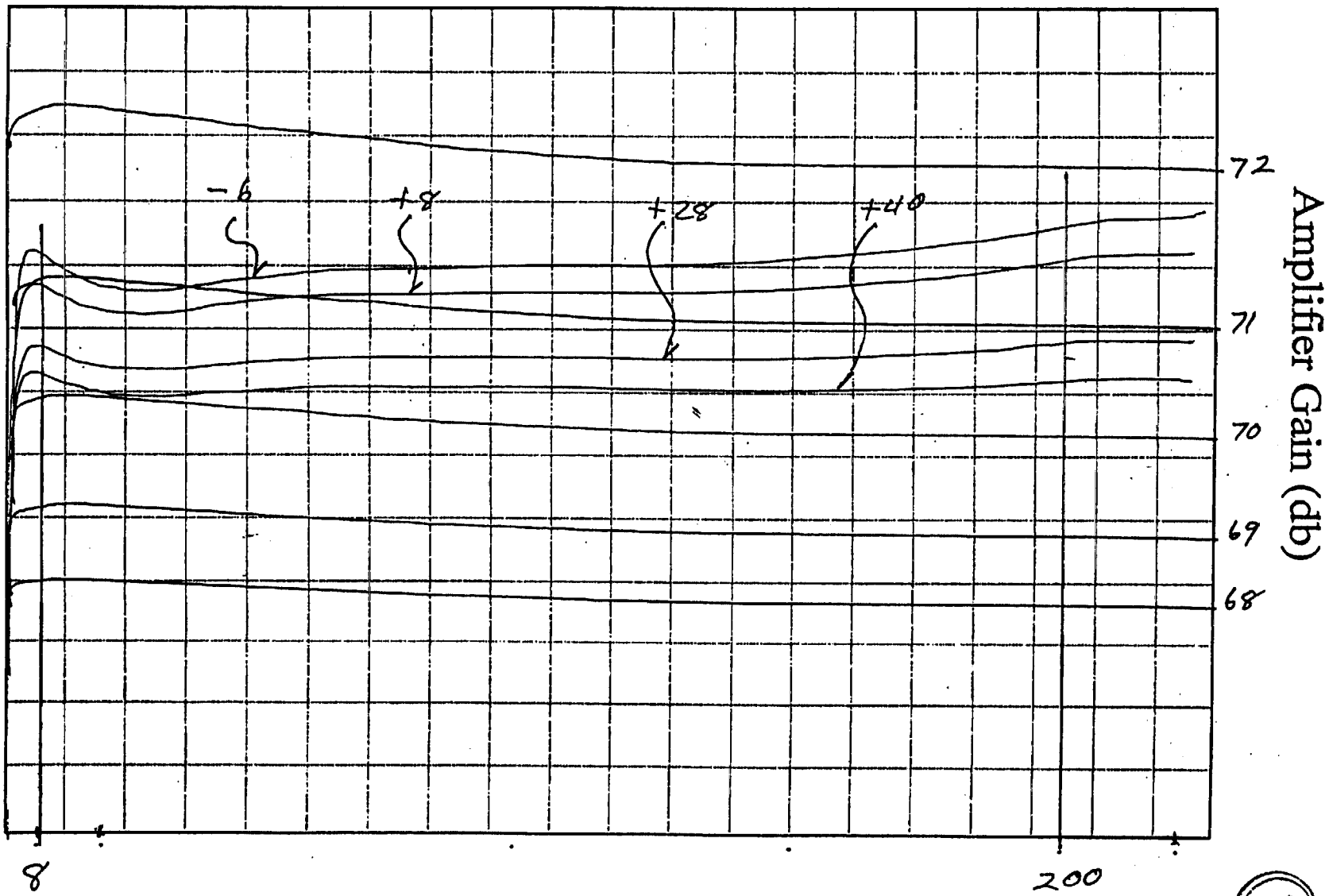
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-186
Serial No. 7A 38
Date 6-6-98
Tested By TT

Amb Temp 23°C



TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.3	0.7	1.0	04 1	
				X						20					
	X	X								50					
X	X	X	X	X	X	X	X			100	-2.4	0.6	1.0	04 1	
X										150					
			X	X	X	X	X	X		200	-2.3	0.7	1.0	04 1	
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 5/6/98 AMBIENT ROOM TEMPERATURE °C: 23°

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-21.4	-25.1	3.7	1.11

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

		DATE	ACC	REJ
PART NO. 1331562-185	SPACEK QA	6-29-98	04 1	

SER NO. 7A38 TEST FAILURE: _____

TESTED BY: [signature] FAILURE ANALYSIS NO. _____

END DATE: 6/5/98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 6-24-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.3	-18.70	-20.4	1.70	3.6	3.8	QA 1	
+8	43.4	-19.00	-20.70	1.70	3.6	3.8	QA 1	
+28	43.5	-19.20	-20.90	1.70	3.6	3.8	QA 1	
+40	43.6	-19.40	-21.05	1.65	3.7	3.8	QA 1	

Noise figure change 0.1 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 6-22-98 Ambient Room Temperature °C: 24

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.040

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ

PART NO. 1331562-186

SER NO. 7A38

TESTED BY: [signature]

END DATE: 6-26-98

END TIME: 1600

SPACEK QA DATE 6-29-98 ACC QA 1 REJ

TEST FAILURE:

FAILURE ANALYSIS NO.

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Channels 9-14 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-19, S/N: 7A49)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

REF: SDAR#29

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.75	0.50		QA 1

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	60.38	1.875	2.0	QA 1	
10.00	60.45				
10.04	60.53				
ΔGv =	0.15 dB				

DATE	ACC	REJ
5-28-98	QA 1	

PART NO. 1331562-196 SPACEK QA

SER NO. 7A49 TEST FAILURE: _____

TESTED BY: [illegible] FAILURE ANALYSIS NO. _____

END DATE: 5-27-98

END TIME: 1600

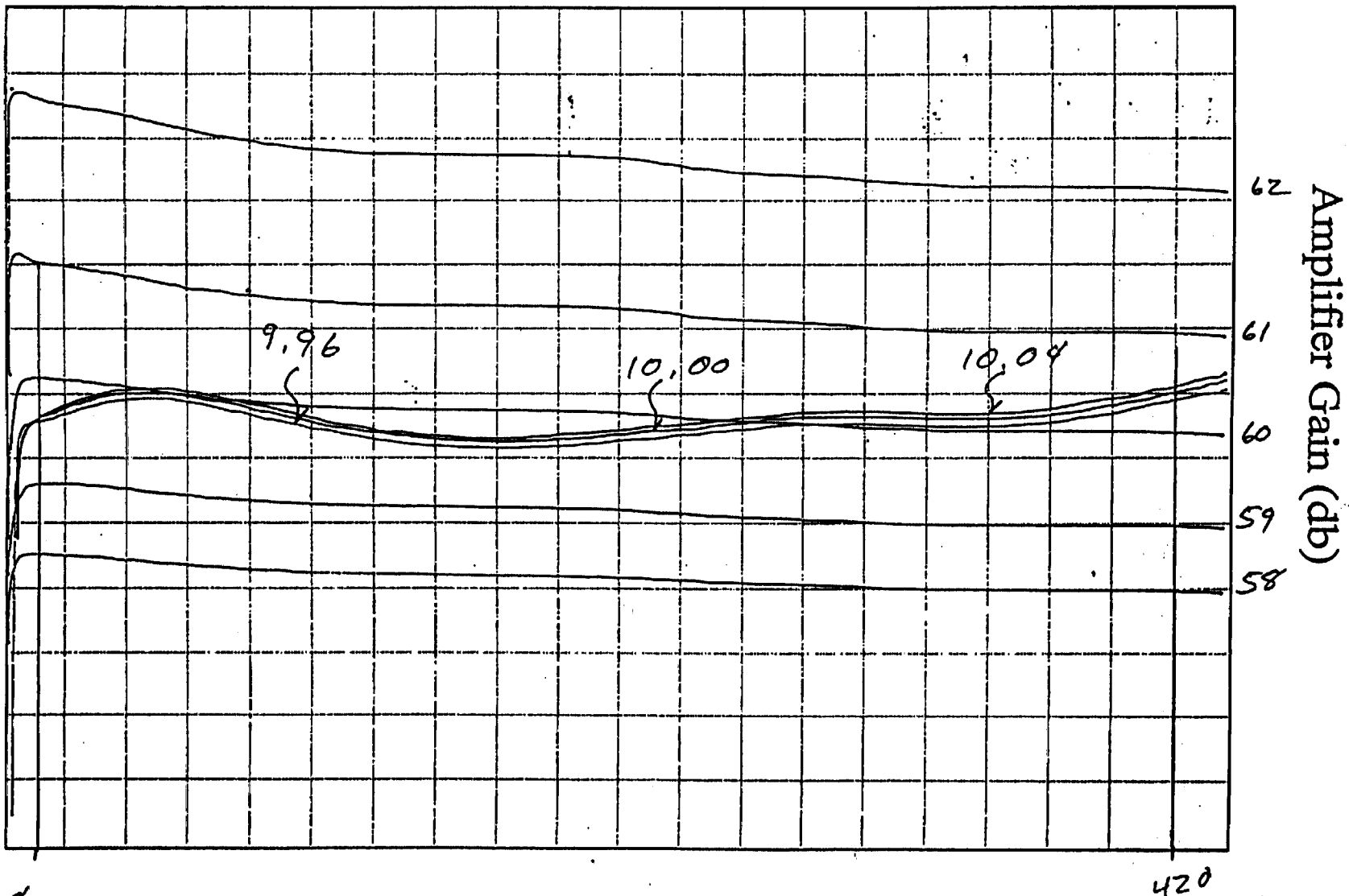
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-19
Serial No. 7A49
Date 5-27-98
Tested By 7FH

Amb Temp 23°C



TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 −6	G_{T1} 61.60				
		* 0.029	0.035dB/°C	QA 1	
T2 +8	G_{T2} 61.20				
		* 0.039	0.020dB/°C		QA 1
T3 +28	G_{T3} 60.46				
		* 0.053	0.035dB/°C		QA 1
T4 +40	G_{T4} 59.83				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \qquad i = 1,2,3,4$$

ΔG_T = 1.77 dB

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4$ = 2.32 dB Spec 1.4dB ACC____ REJ QA 1

DATE ACC REJ ENGINEERING DAT ONLY. SEE AE2480 PARA. 3.2.1.15.1

PART NO. 1331562-196 SPACEK QA 5-28-98 QA 1

SER NO. 7A49 TEST FAILURE: _____

TESTED BY: 777 FAILURE ANALYSIS NO. _____

END DATE: 5-27-98

END TIME: 1600

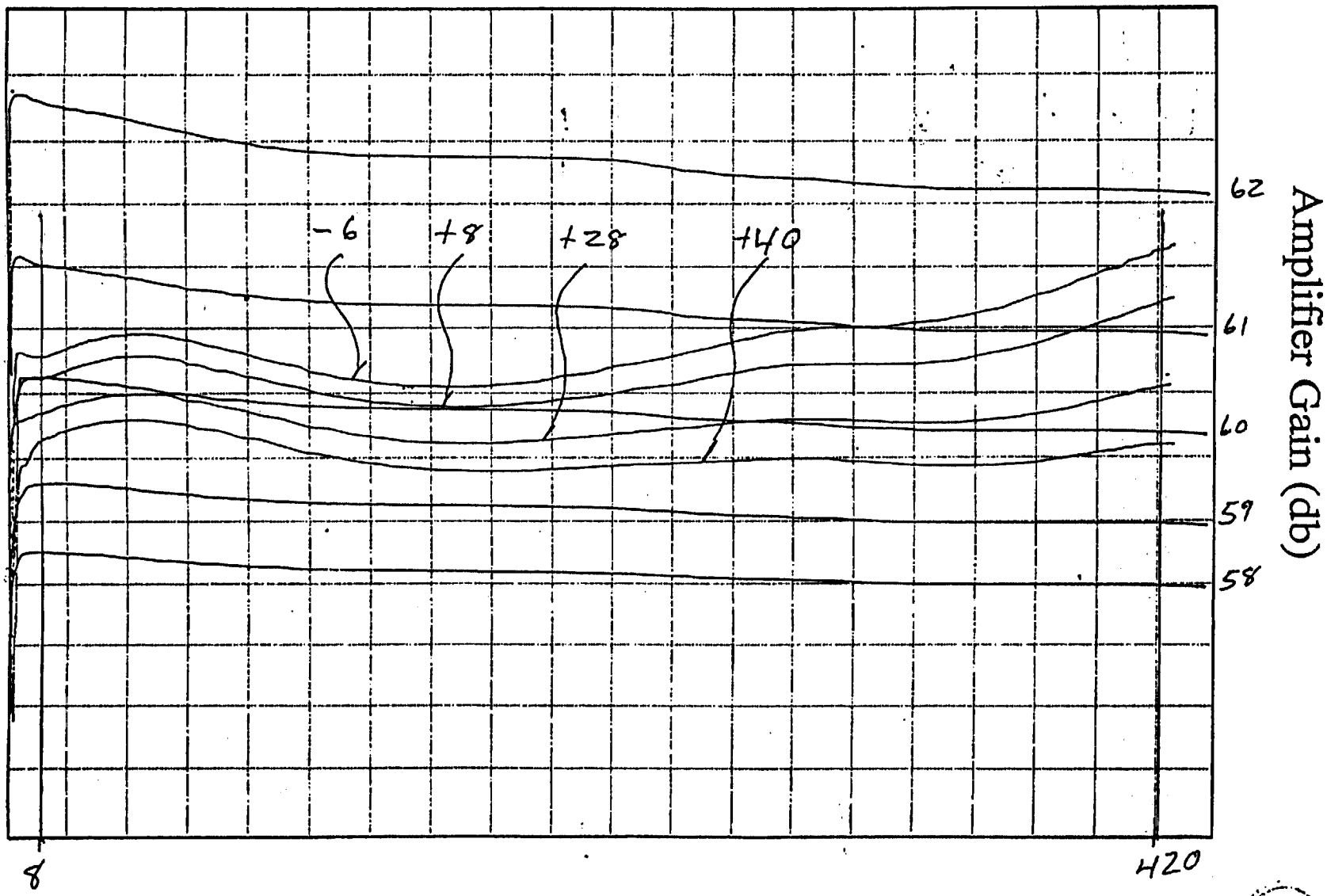
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-196
Serial No. 7A49
Date 5-27-98
Tested By [illegible]

Amb Temp 23°C



TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.4	0.6	1.0	QA	
				X						20					
	X	X								50					
X	X	X	X	X	X	X	X			100					
X										150					
			X	X	X	X	X	X		200	-2.4	0.6	1.0	QA	
							X			400	-2.1	0.9	1.0		
								X		500					
								X		1000					
								X		1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 6-5-98 AMBIENT ROOM TEMPERATURE °C: 23°C

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-26.5	-29.9	3.4	1.36

Above data taken with Daden filter attached (except -19).

Intermediate test results for information only

		DATE	ACC	REJ
PART NO. 1331562-196	SPACEK QA	6-8-98	QA	
SER NO. 7A49	TEST FAILURE:			
TESTED BY: [illegible]	FAILURE ANALYSIS NO.			
END DATE: 6-5-98				
END TIME: 1600				

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 8-20-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	50.2	-25.20	-27.10	1.90	3.3	3.5	QA 1	
+8	50.2	-25.50	-27.40	1.90	3.3	3.5	QA 1	
+28	50.3	-25.70	-27.60	1.90	3.3	3.5	QA 1	
+40	50.4	-26.00	-27.85	1.85	3.4	3.5	QA 1	

Noise figure change 0.1 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ _____

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 8/24/98 Ambient Room Temperature °C: +24

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.035

Record Nps(K) 0.07 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ _____

	DATE	ACC	REJ
SPACEK QA	8-21-98	QA 1	

PART NO. 1331562-196

SER NO. 7A49

TESTED BY: [illegible]

END DATE: 8-20-98

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Channel 9 Amplifier

IF Amplifier (P/N:1331579-8, S/N: 109)

APPENDIX C
ATP1772 DATA SHEET
MODEL NUMBER VD722301
AEROJET P/N 1331579-8

S/N 109

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject			3-11-97
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			3-11-97
4.4	Electrical Test					
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject			3-11-97
	Short Open Protection	No Damage	Accept X Reject			3-11-97
	Output Coupling	Output shall be AC coupled	Accept X Reject			3-11-97
4.4.2	Gain vs. Freq. 5 MHz to 200 MHz	14.5dB Min., 15.5dB Max. -4°C to +40°C Attach x-y plot	Max 15.28 dB Min 15.10 dB Accept X Reject	Max 15.21 dB Min 15.01 dB Accept X Reject	Max 15.33 dB Min 15.15 dB Accept X Reject	3-11-97
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject 0.18 dB	Accept X Reject 0.20 dB	Accept X Reject 0.18 dB	3-11-97
	Gain Temp. Sensitivity	±.22 dB from -4°C to +40°C Worse Case	Accept X Reject	Accept X Reject 0.10 dB	Accept X Reject 0.07 dB	3-11-97
4.4.3	Gain-Voltage Sensitivity	≤.5dB/v Worse Case	0.01 dB	0.01 dB	0.01 dB	
	Input Currents	± .2dB for 7.6 to 8.4 Vdc 40ma MAX. 7.6v 8.0v 8.4v	32.2 mA 32.8 mA 33.5 mA	29.3 mA 30.4 mA 30.6 mA	34.6 mA 35.3 mA 35.9 mA	
		Attach X-Y Plot	Accept X Reject	Accept X Reject	Accept X Reject	3-11-97

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1772 DATA SHEET
MODEL NUMBER VD722301
AEROJET P/N 1331579-8

S/N 109

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept X Reject ___			
		5 MHz	0.60 dB	0.40 dB	0.30 dB	
		102.5 MHz	0.60 dB	0.40 dB	0.30 dB	
		200 MHz	0.40 dB	0.20 dB	0.20 dB	3-11-97
4.4.8	Stability	Stable with the input terminated into a 2.5:1 mismatch and the output at all impedance's.	Accept X Reject ___			3-11-97
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 45 mA	Accept X Reject ___			
		Maximum Current	36.9 mA			3-13-97

NOTE: Review all recorded data and signify acceptance below.

Technician S Hoffman (TH43) Date: 3-13-97

Quality Assurance Steve Jans Date: 3-17-97

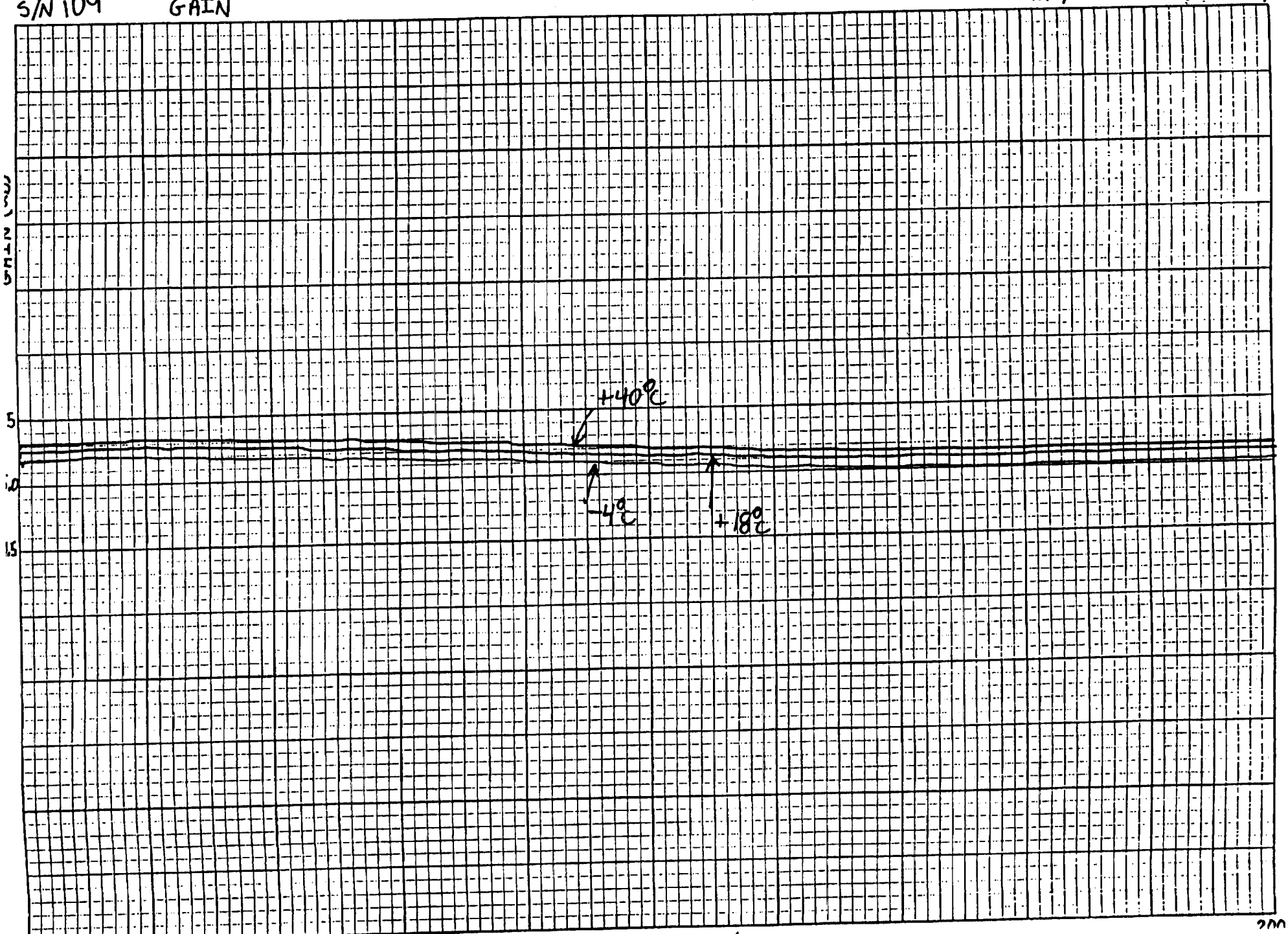
CSI: _____ Date: _____

GSI: _____ Date: 3/12/97

Amplica, Inc. Newbury Park, CA 91320	SIZE	FSCM NO.		REV.
DRAWN	A	51025	ATP1772	

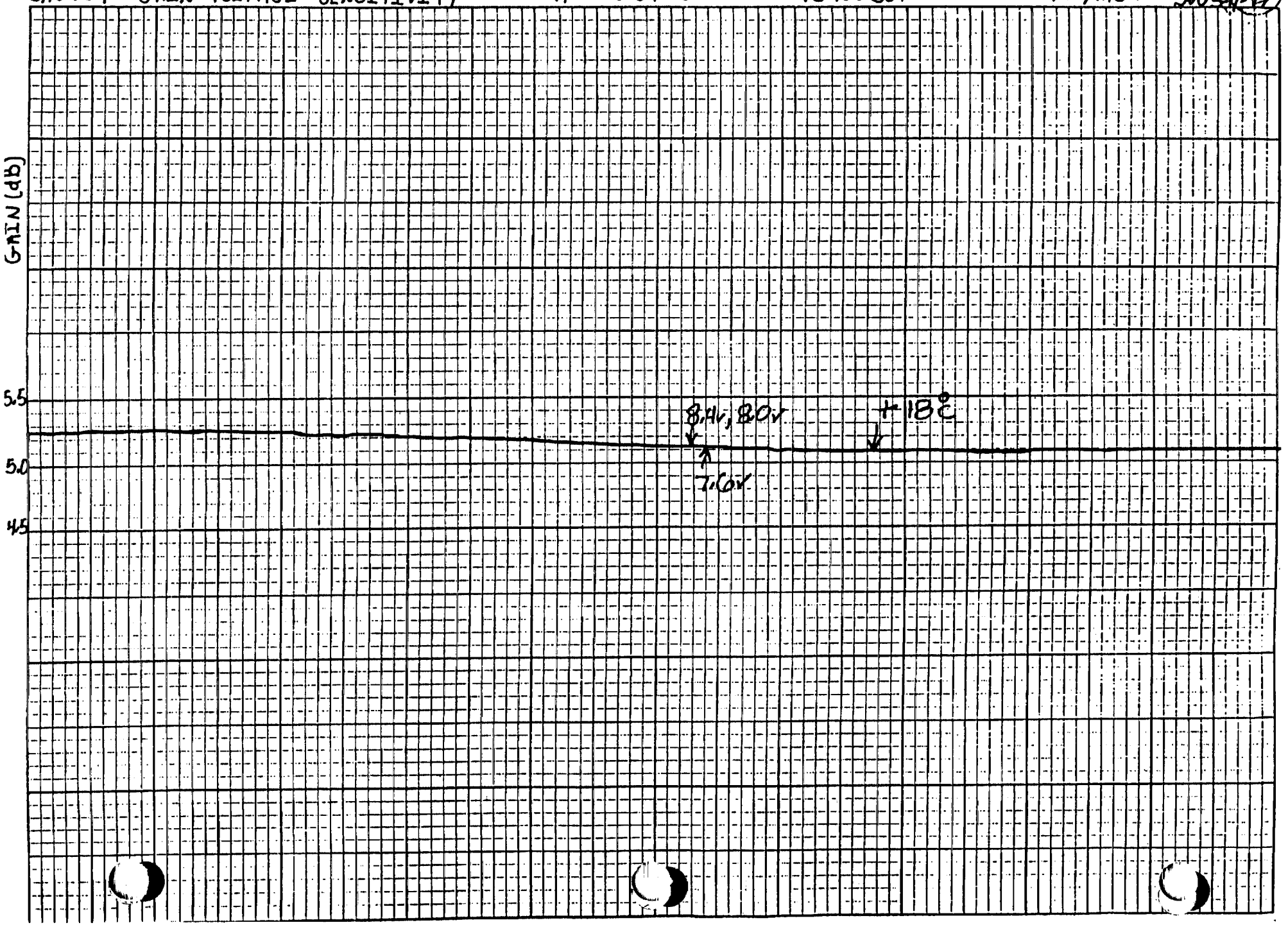
HEWLETT-PACKARD 9270-1007

S/N 109 GAIN P/N 1331579-8 VD722301 1dB/inch S06 5-11-97

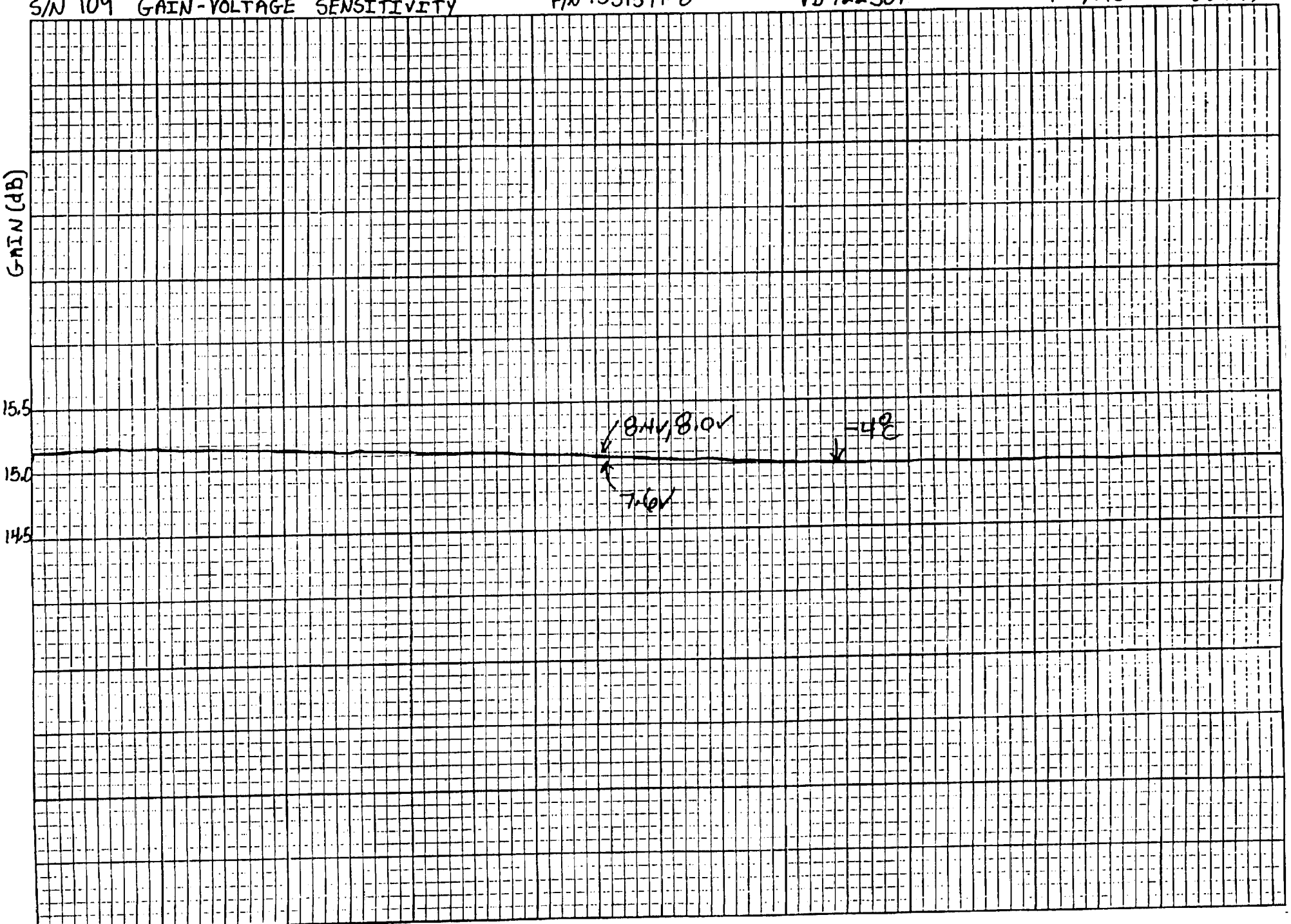


HEWLETT-PACKARD 9270-1007

S/N 109 GAIN-VOLTAGE SENSITIVITY P/N 1331579-8 VD 722301 1dB/inch S46241-57

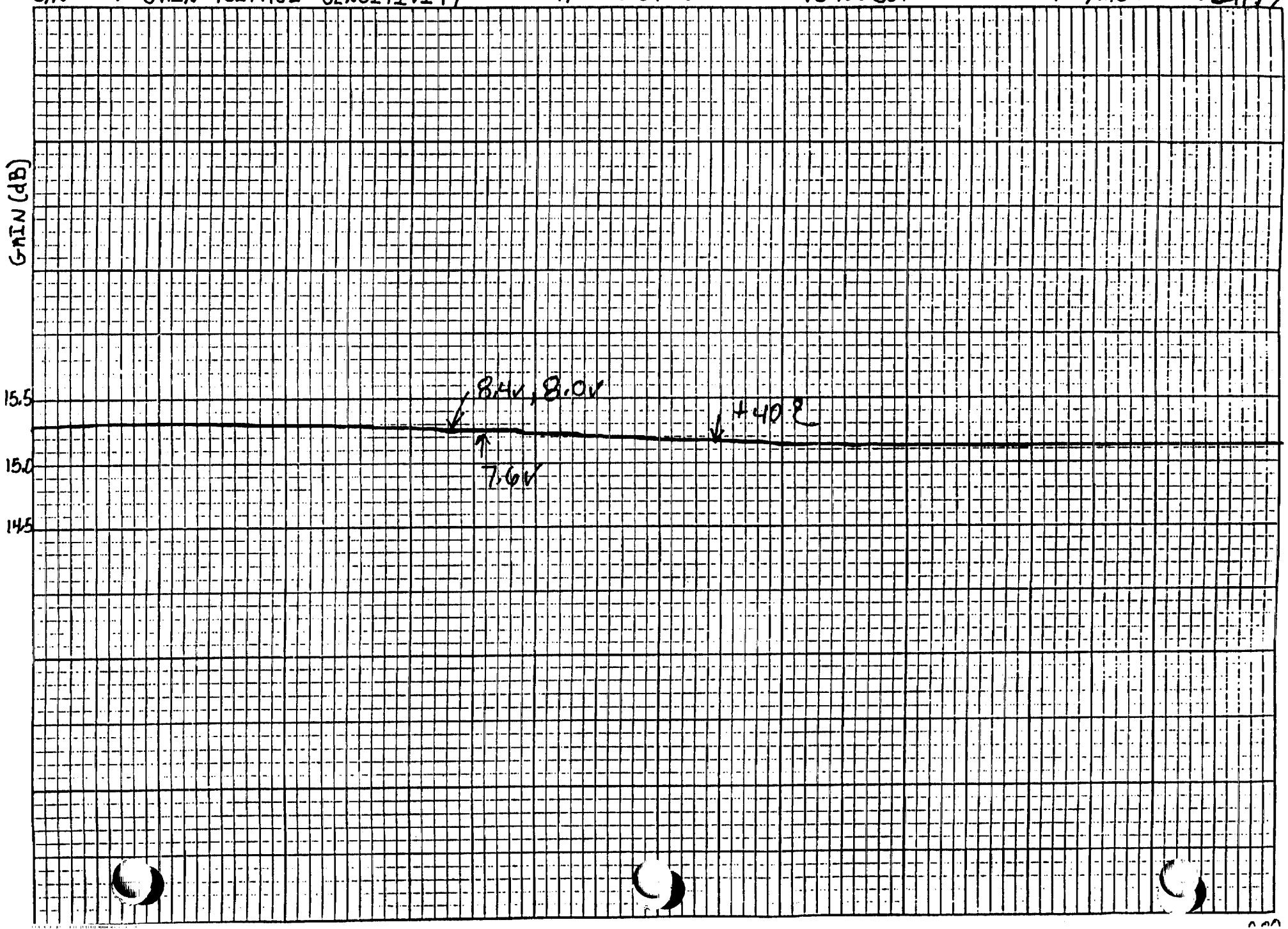


S/N 109 GAIN-VOLTAGE SENSITIVITY P/N 1331579-8 VD 722301 1dB/inch



HEWLETT-PACKARD 9270-1007

S/N 109 GAIN-VOLTAGE SENSITIVITY P/N 1331579-8 VD 722301 1dB/inch



Channel 10 Amplifier

IF Amplifier (P/N:1331579-9, S/N: 105)

APPENDIX C
ATP1773 DATA SHEET
MODEL NUMBER VD622301
AEROJET P/N 1331579-9

S/N 105

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject			12-3-96
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= 6.60 VDC Total R= 59.8 ohm max. current draw =	110.4 mA			9-19-96
4.4	Electrical Test					
4.4.1	* Polarity Reversal Protection	No Damage	Current 35.1 mA Accept X Reject			12-3-96
	Short Open Protection	No Damage	Accept X Reject			12-3-96
	Output Coupling	Output shall be AC coupled	Accept X Reject			12-3-96
4.4.2	Gain vs. Freq. 150 MHz to 300 MHz	17.5dB Min., 18.5dB Max. -4°C to +40°C Attach x-y plot	Max 18.13 dB Min 17.91 dB Accept X Reject	Max 18.03 dB Min 17.84 dB Accept X Reject	Max 18.20 dB Min 17.93 dB Accept X Reject	12-3-96
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject 0.23 dB	Accept X Reject 0.20 dB	Accept X Reject 0.26 dB	12-3-96
	Gain Temp. Sensitivity	±.22 dB from -4°C to +40°C Worse Case	Accept X Reject	Accept X Reject 0.10 dB	Accept X Reject 0.07 dB	12-3-96
4.4.3	Gain-Voltage Sensitivity Input Currents	≤.5dB/v Worse Case ± .2dB for 7.6 to 8.4 Vdc 7.6v 40ma MAX. 8.0v 8.4v Attach X-Y Plot	0.01 dB 34.4 mA 35.1 mA 35.8 mA Accept X Reject	0.01 dB 30.6 mA 31.3 mA 31.9 mA Accept X Reject	0.01 dB 37.5 mA 38.2 mA 38.9 mA Accept X Reject	12-3-96

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1773 DATA SHEET
MODEL NUMBER VD622301
AEROJET P/N 1331579-9

S/N 105

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept X Reject ___			
		150 MHz 225 MHz 300 MHz	0.30 dB 0.25 dB 0.25 dB	0.60 dB 0.45 dB 0.42 dB	0.25 dB 0.22 dB 0.25 dB	12/5/96
4.4.8	Stability	Stable with the input terminated into a 2.5:1 mismatch and the output at all impedance's.	Accept X Reject ___			12-5-96
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 45 mA	Accept X Reject ___			
		Maximum Current	41.3 mA			12-5-96

NOTE: Review all recorded data and signify acceptance below.

Technician T143 Date: 12-5-96

Quality Assurance A23 Date: 12/9/96

CSI: ___ Date: ___

GSI: ___ Date: 2/10/97

MODEL VD622301 105

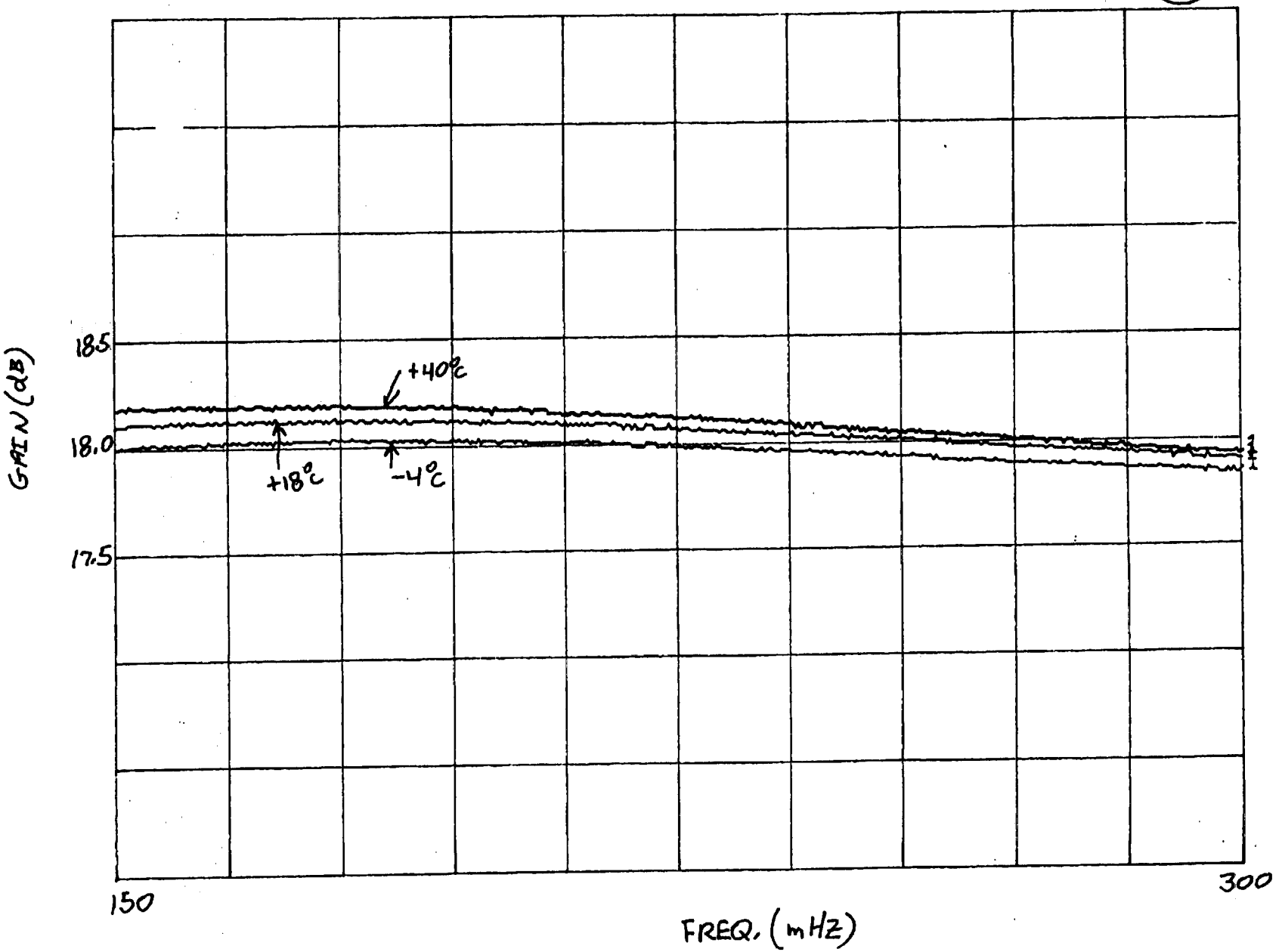
GAIN VS FREQUENCY

VERTICAL CALIBRATION .5 dB INCH

TEMPERATURE AS NOTED DEG.C.

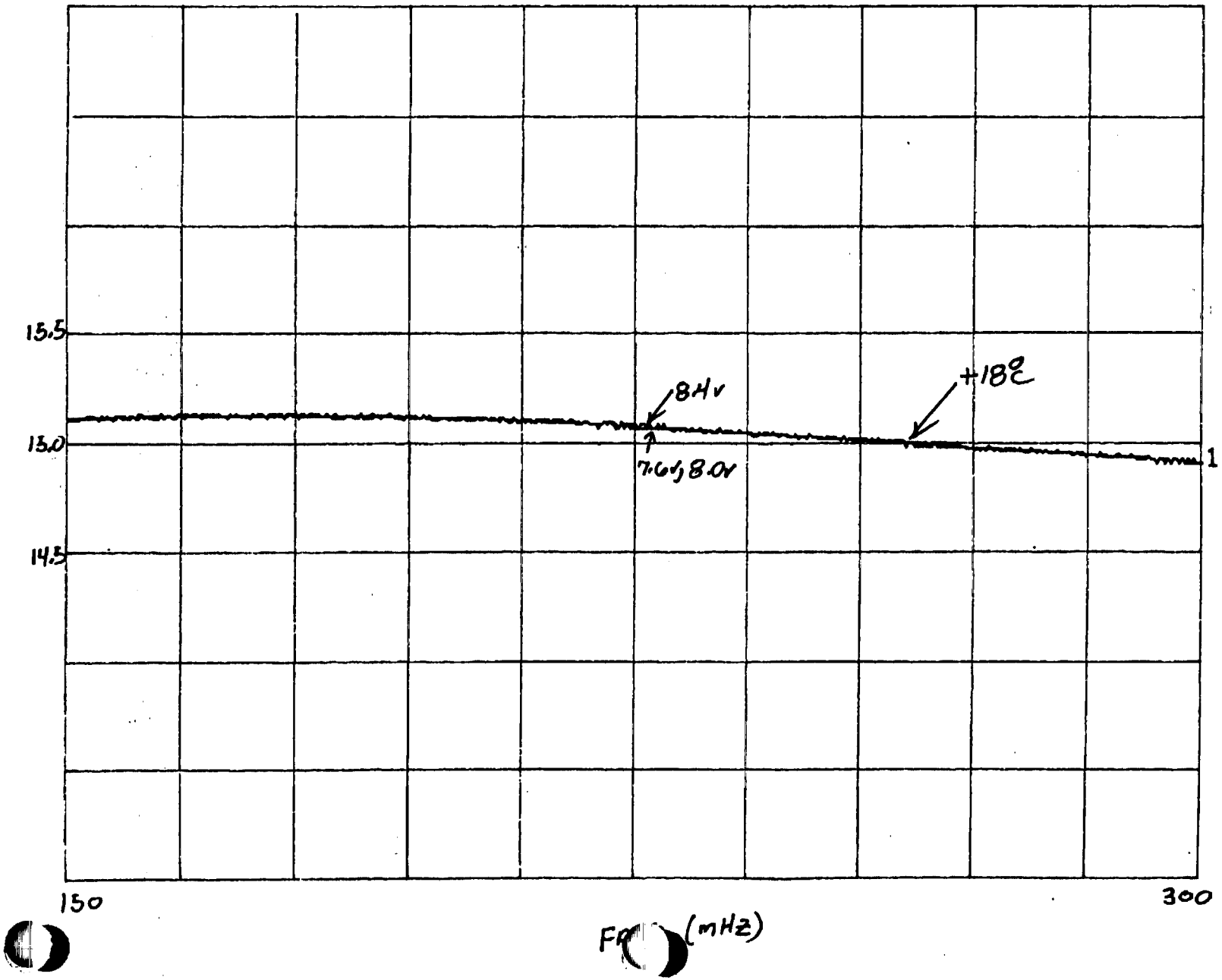
TECH SMT143 DATE 12-3-96

P/N 1331579-9



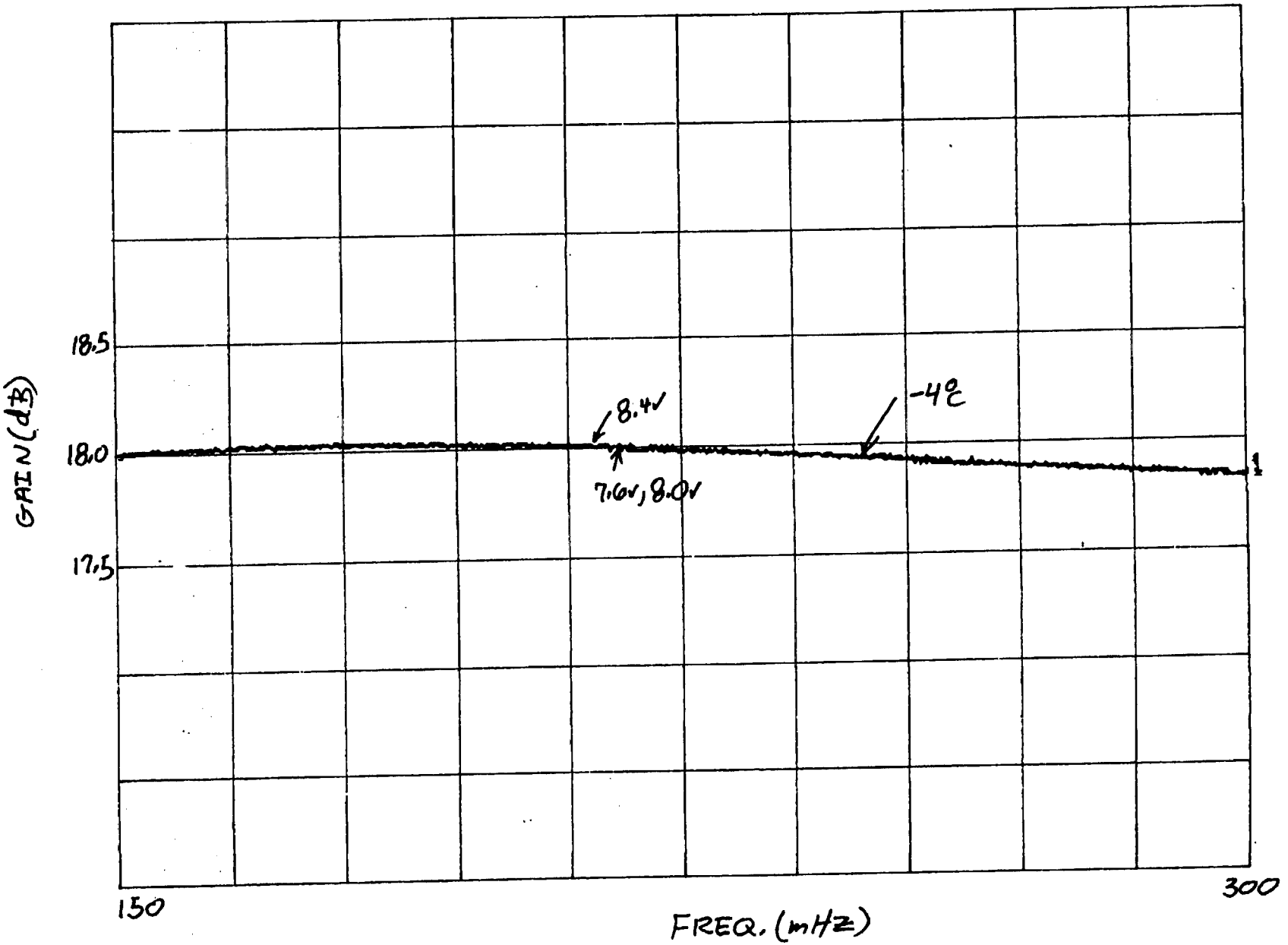
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE as noted DEG.C.
TECH SNST143 DATE 12-3-96

P/N 1331579-9



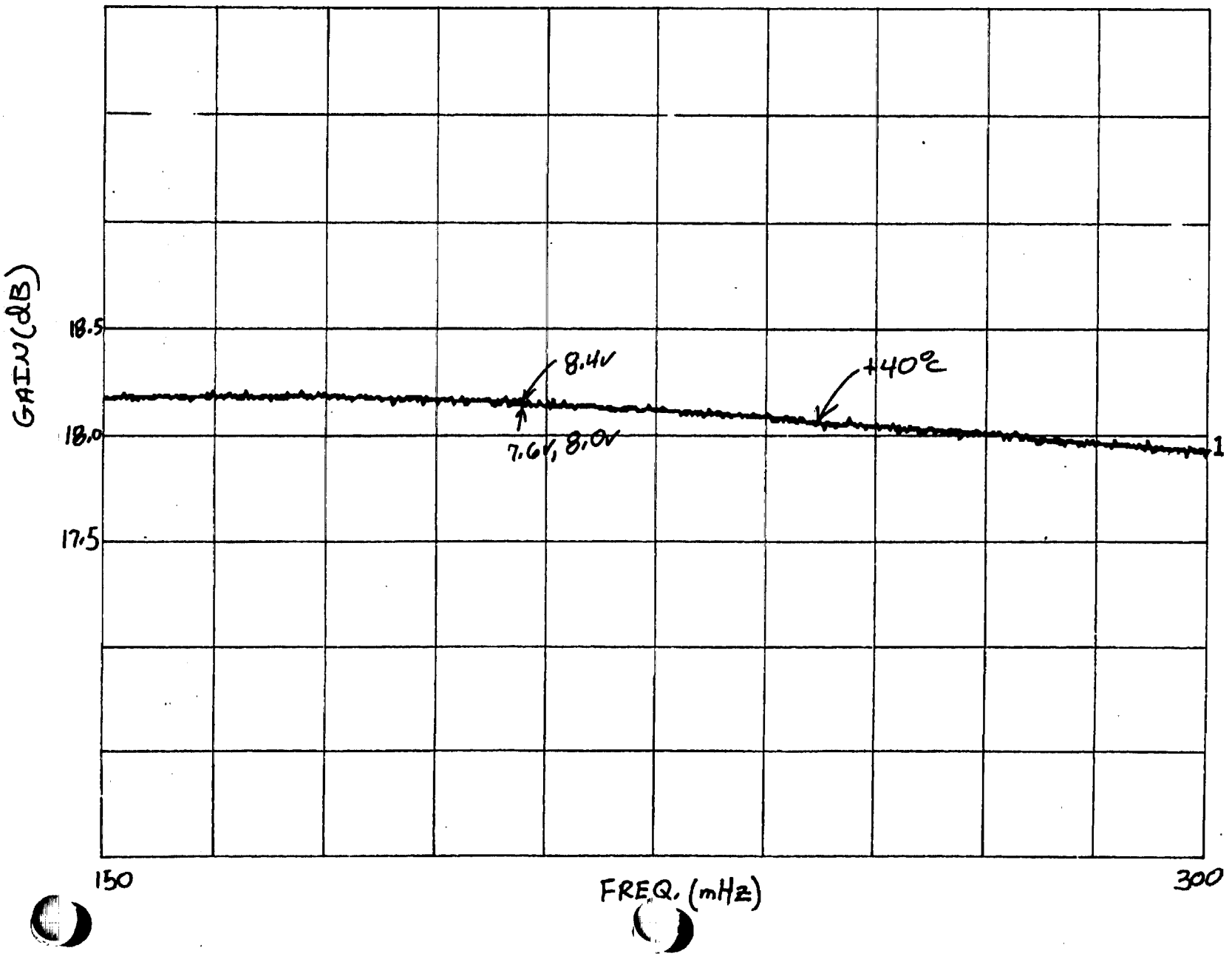
GAIN-VOLTAGE SEN[illegible]FTY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE as noted DEG.C.
TECH SM (T143) DATE 12-3-96

P/N 1331579-9



GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE as noted DEG.C.
TECH T143 DATE 12-3-94

P/N 1331579-9



Channels 11-14 Amplifier

IF Amplifier (P/N:1331579-7, S/N: 105)

APPENDIX C
ATP1771 DATA SHEET
MODEL NUMBER UD122301
AEROJET P/N 1331579-7

S/N 105

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject			12-3-96
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= 6.59 VDC Total R= 38.6 ohm max. current draw =	170.7 mA			
4.4	Electrical Test					9-19-96
4.4.1	* Polarity Reversal Protection	No Damage	Current 356mA ~~36.2~~ mA SN Accept X Reject			12-3-96
	Short Open Protection	No Damage	Accept X Reject			12-3-96
	Output Coupling	Output shall be AC coupled	Accept X Reject			12-3-96
4.4.2	Gain vs. Freq. 255 MHz to 390 MHz	14.5dB Min., 15.5dB Max. -4°C to +40°C Attach x-y plot ①	Max 15.15 dB Min 14.77 dB Accept X Reject	Max 15.11 dB Min 14.70 dB Accept X Reject	Max 15.14 dB Min 14.75 dB Accept X Reject	12-3-96
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject 0.40 dB	Accept X Reject 0.40 dB	Accept X Reject 0.42 dB	12-3-96
	Gain Temp. Sensitivity	±.22 dB from -4°C to +40°C Worse Case	Accept X Reject	Accept X Reject 0.09 dB	Accept X Reject 0.10 dB	12-3-96
4.4.3	Gain-Voltage Sensitivity	≤.5dB/v Worse Case	0.0 dB	0.01 dB	dB	
	Input Currents	± .2dB for 7.6 to 8.4 Vdc 40ma MAX. 7.6v 8.0v 8.4v Attach X-Y Plot ②	35.0 mA 35.6 mA 36.3 mA Accept X Reject	30.7 mA 31.2 mA 31.8 mA Accept X Reject	38.7 mA 39.4 mA 39.9 mA Accept X Reject	12-3-96

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1771 DATA SHEET
MODEL NUMBER UD122301
AEROJET P/N 1331579-7

S/N 105

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept X Reject ____			
		255 MHz	0.2 dB	0.35 dB	0.20 dB	
		322.5 MHz	0.2 dB	0.30 dB	0.20 dB	12-3-96
		390 MHz	0.2 dB	0.30 dB	0.20 dB	
4.4.8	Stability	Stable with the input terminated into a 2.5:1 mismatch and the output at all impedance's.	Accept X Reject ____			12-3-96
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 45 mA	Accept X Reject ____			
		Maximum Current	41.9 mA			12-3-96

NOTE: Review all recorded data and signify acceptance below.

Technician Stoffm (T143) ! Date: 12-3-96

Quality Assurance J. Flemmer (A23) Date: 12-9-96

CSI: _____ Date: _____

GSI: _____ Date: 2/10/97

MODEL UD122301 S/N 105

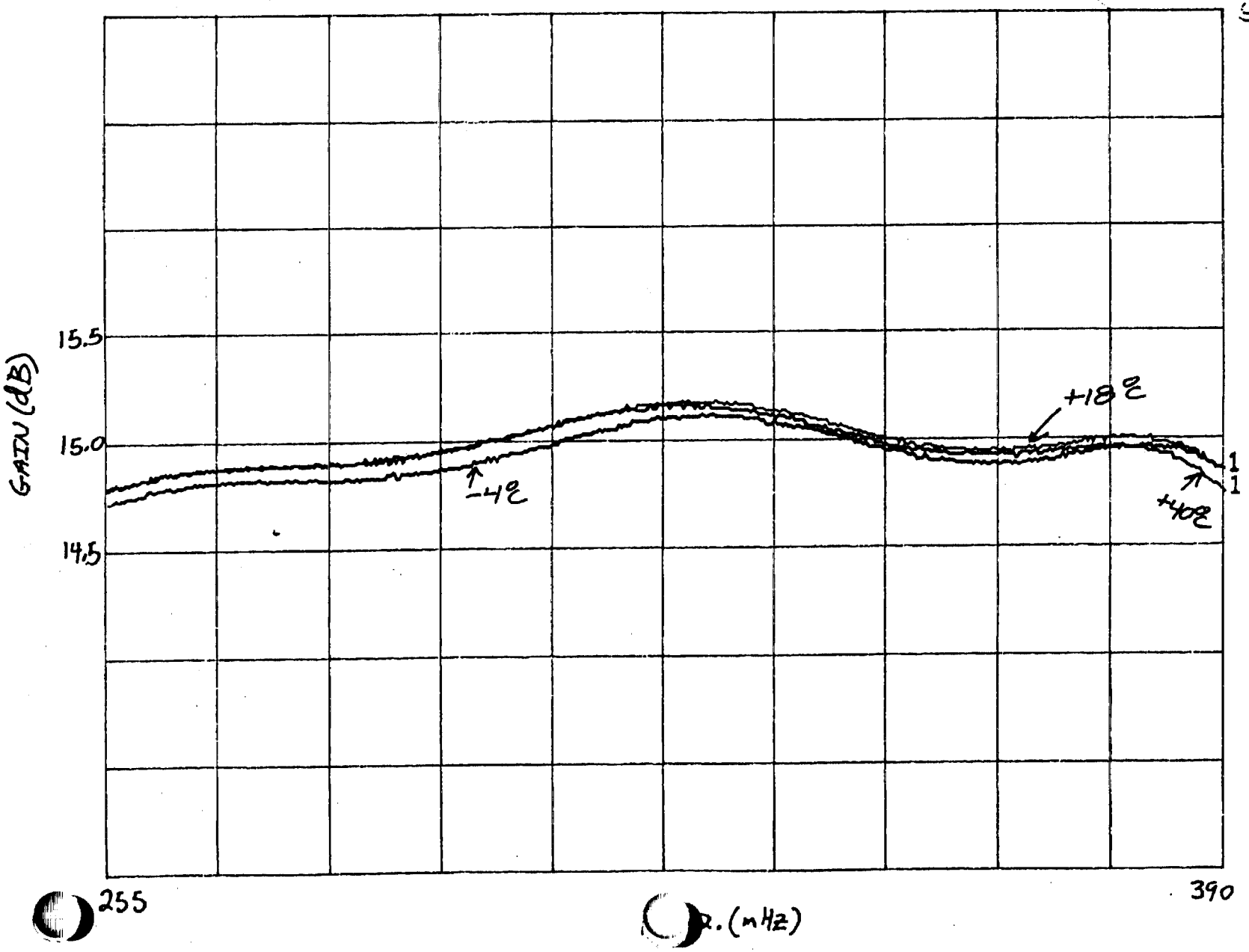
GAIN VS FREQUENCY

VERTICAL CALIBRATION .5 dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH T143 DATE 12-3-96

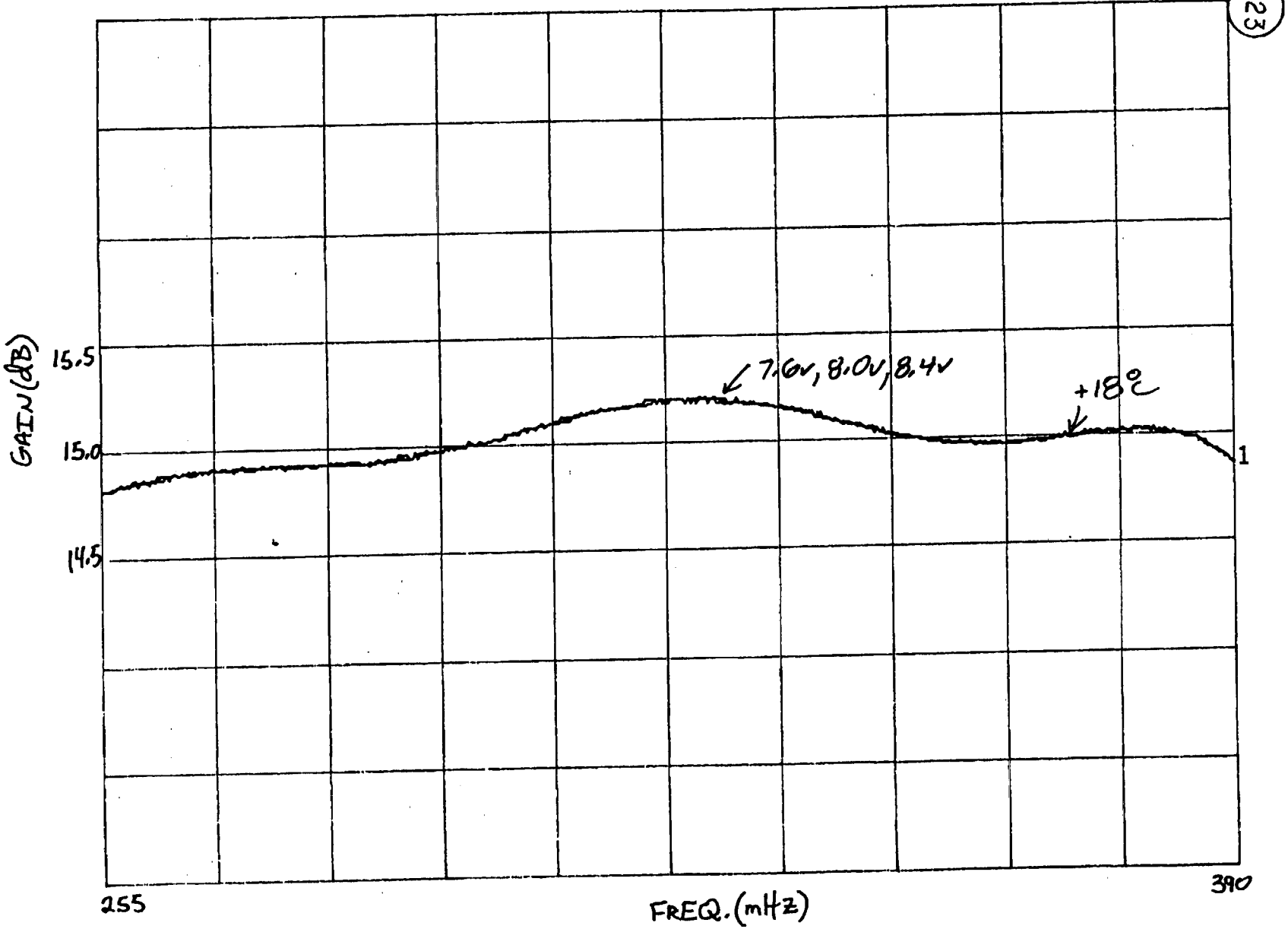
P/N 1331579-7



GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH.
TEMPERATURE as noted DEG.C.
TECH T143 SM DATE 12-3-96

P/N 1331579-7

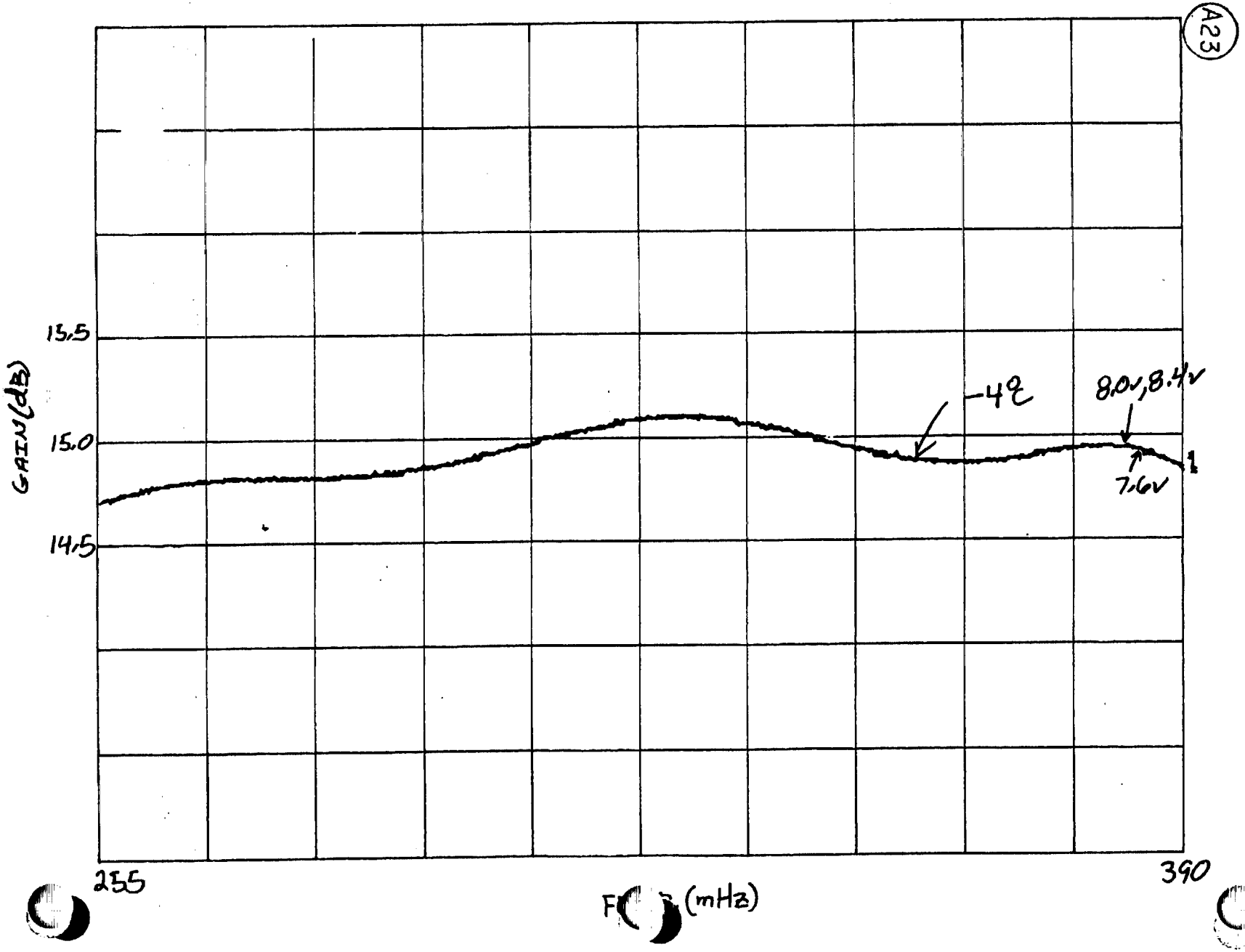
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GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE as noted DEG.C.
TECH T143 SH DATE 12-3-96

P/N 1331579-7

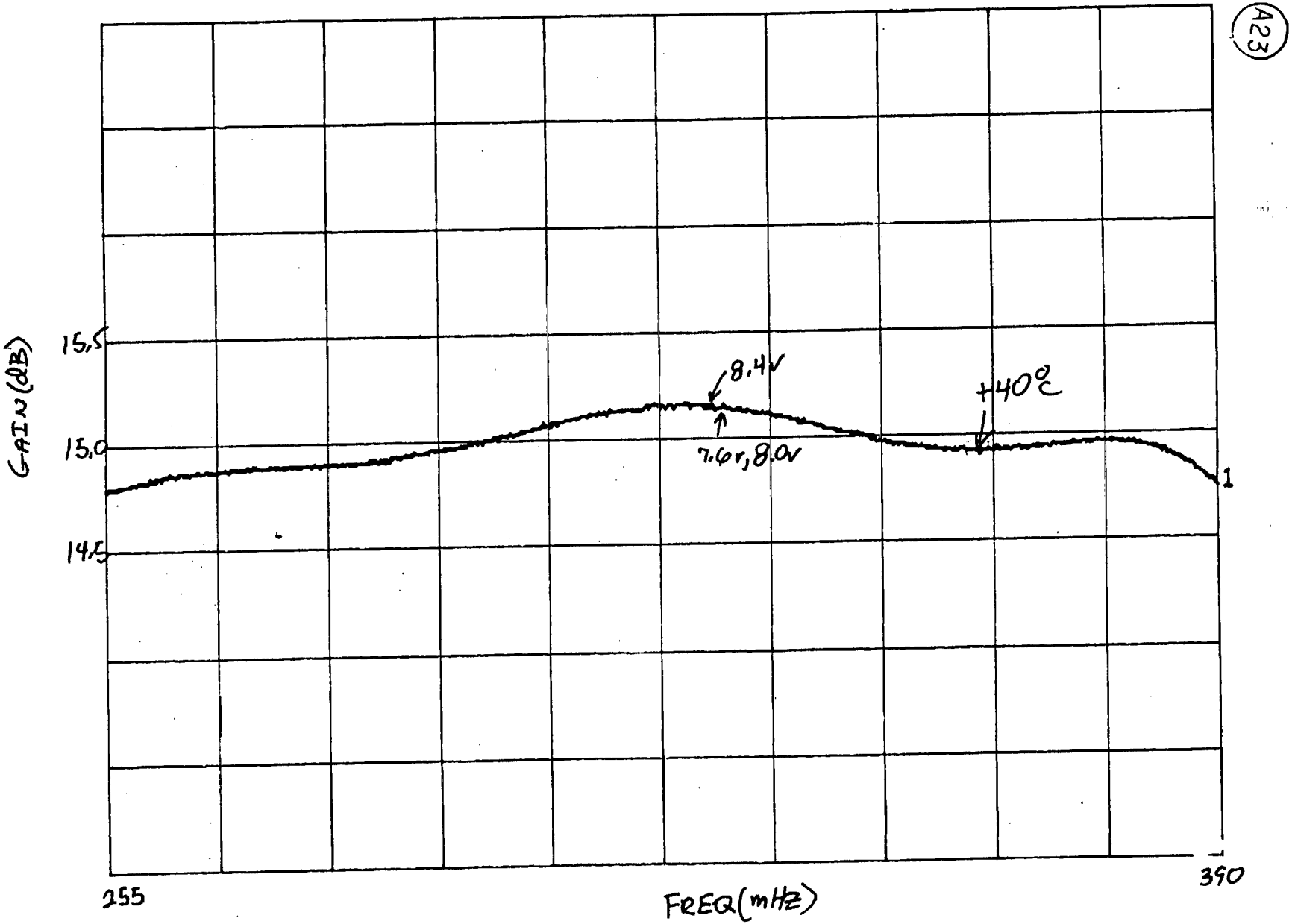
A23



GAIN-VOLTAGE SENS[illegible]TY VS. FREQ.
VERTICAL CALIBRATION 0.5 dB INCH
TEMPERATURE as noted DEG.C.
TECH T143 SM DATE 12-3-96

P/N 1331579-7

A23



Channel 11 Amplifier

IF Amplifier (P/N:1331579-10, S/N: 109)

APPENDIX C
ATP1774 DATA SHEET
MODEL NUMBER UD114302
AEROJET P/N 1331579-10

S/N 109

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept ✓ Reject			3-12-97
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			3-12-97
4.4	Electrical Test					
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject			3-12-97
	Short Open Protection	No Damage	Accept ✓ Reject			3-12-97
	Output Coupling	Output shall be AC coupled	Accept ✓ Reject			3-12-97
4.4.2	Gain vs. Freq. 255 MHz to 390 MHz	38.5dB Min., 39.5dB Max. -4°C to +40°C Attach x-y plot	Max 39.34 dB Min 38.90 dB Accept ✓ Reject	Max 39.41 dB Min 38.97 dB Accept ✓ Reject	Max 39.06 dB Min 38.61 dB Accept ✓ Reject	3-12-97
	Gain Flatness	.5 dB Maximum Worse Case	Accept ✓ Reject 0.44 dB	Accept ✓ Reject 0.44 dB	Accept ✓ Reject 0.45 dB	3-12-97
	Gain Temp. Sensitivity	±.44 dB from -4°C to +40°C Worse Case	Accept ✓ Reject	Accept ✓ Reject 0.09 dB	Accept ✓ Reject 0.32 dB	3-12-97
4.4.3	Gain-Voltage Sensitivity	≤.5dB/v Worse Case	0.04 dB	0.05 dB	0.03 dB	
	Input Currents	± .2dB for 7.6v 7.6 to 8.4 Vdc 8.0v 45ma MAX. 8.4v	38.0 mA 38.8 mA 39.3 mA Accept ✓	36.9 mA 37.5 mA 38.1 mA Accept ✓	39.4 mA 40.1 mA 40.9 mA Accept ✓	
		Attach X-Y Plot	Reject	Reject	Reject	3-12-97

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1774 DATA SHEET
MODEL NUMBER UD114302
AEROJET P/N 1331579-10

S/N 109

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept ✓ Reject ___			
		255 MHz	0.65 dB	0.80 dB	0.60 dB	
		322.5 MHz	0.50 dB	0.65 dB	0.50 dB	
		390 MHz	0.75 dB	0.85 dB	0.65 dB	3-12-97
4.4.8	Stability	Unconditionally Stable	Accept X Reject ___			3-12-97
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 50 mA	Accept X Reject ___			
		Maximum Current	40.9 mA			3-13-97

NOTE: Review all recorded data and signify acceptance below.

Technician Stoltzfus (1143) Date: 3-13-97

Quality Assurance Steve Fiore Date: 3-17-97

CSI: _____ Date: _____

GSI: _____ Date: 3/13/97

Amplica, Inc. Newbury Park, CA 91320	SIZE A	FSCM NO. 51025	ATP1774	REV.
DRAWN				
ISSUED	SCALE		SHEET 37 OF 39	

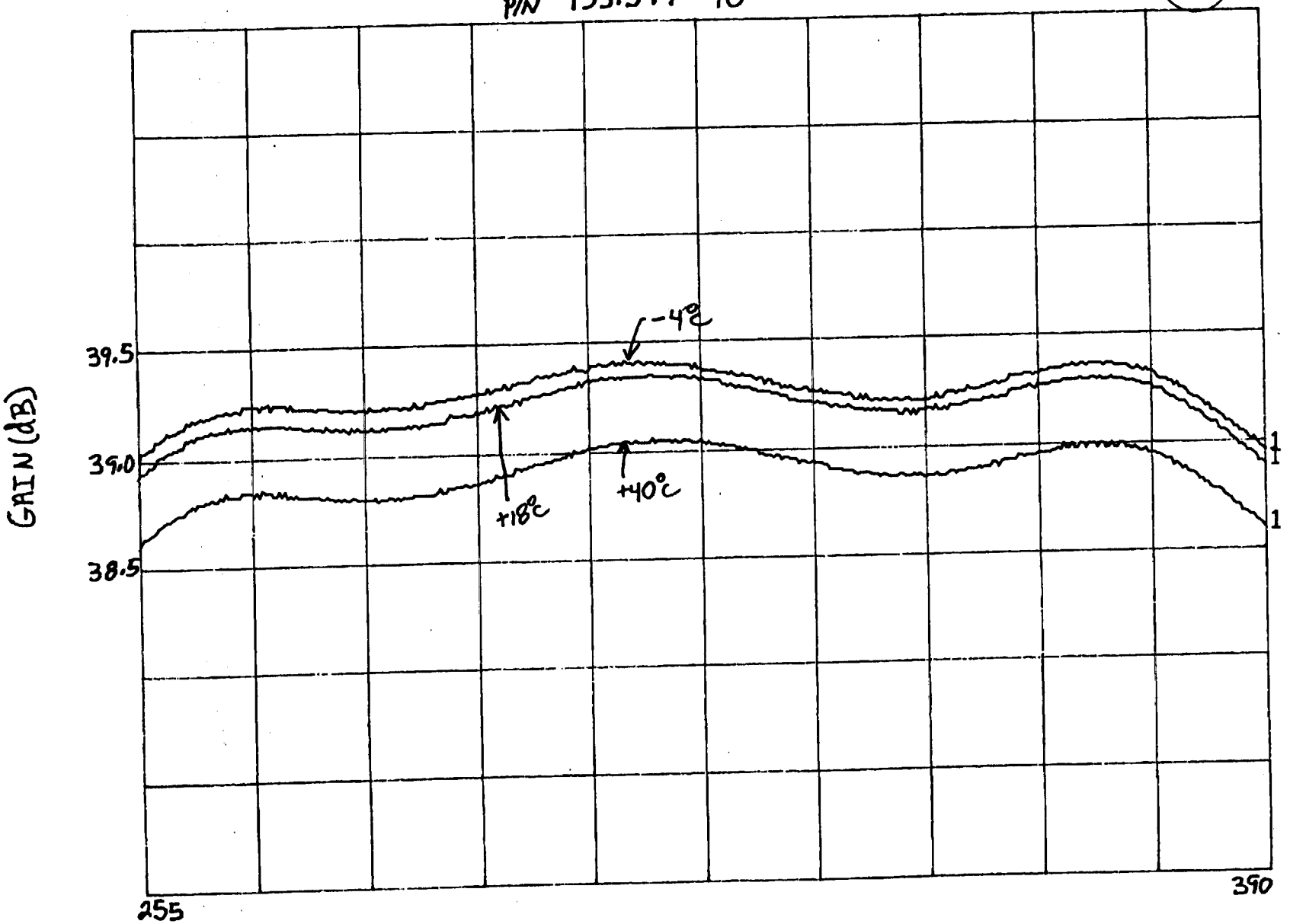
GAIN VS FREQUENCY

VERTICAL CALIBRATION .5 DB INCH

TEMPERATURE AS NOTED DEG.C.

TECH 1143 DATE 3-12-97

P/N 1331579-10



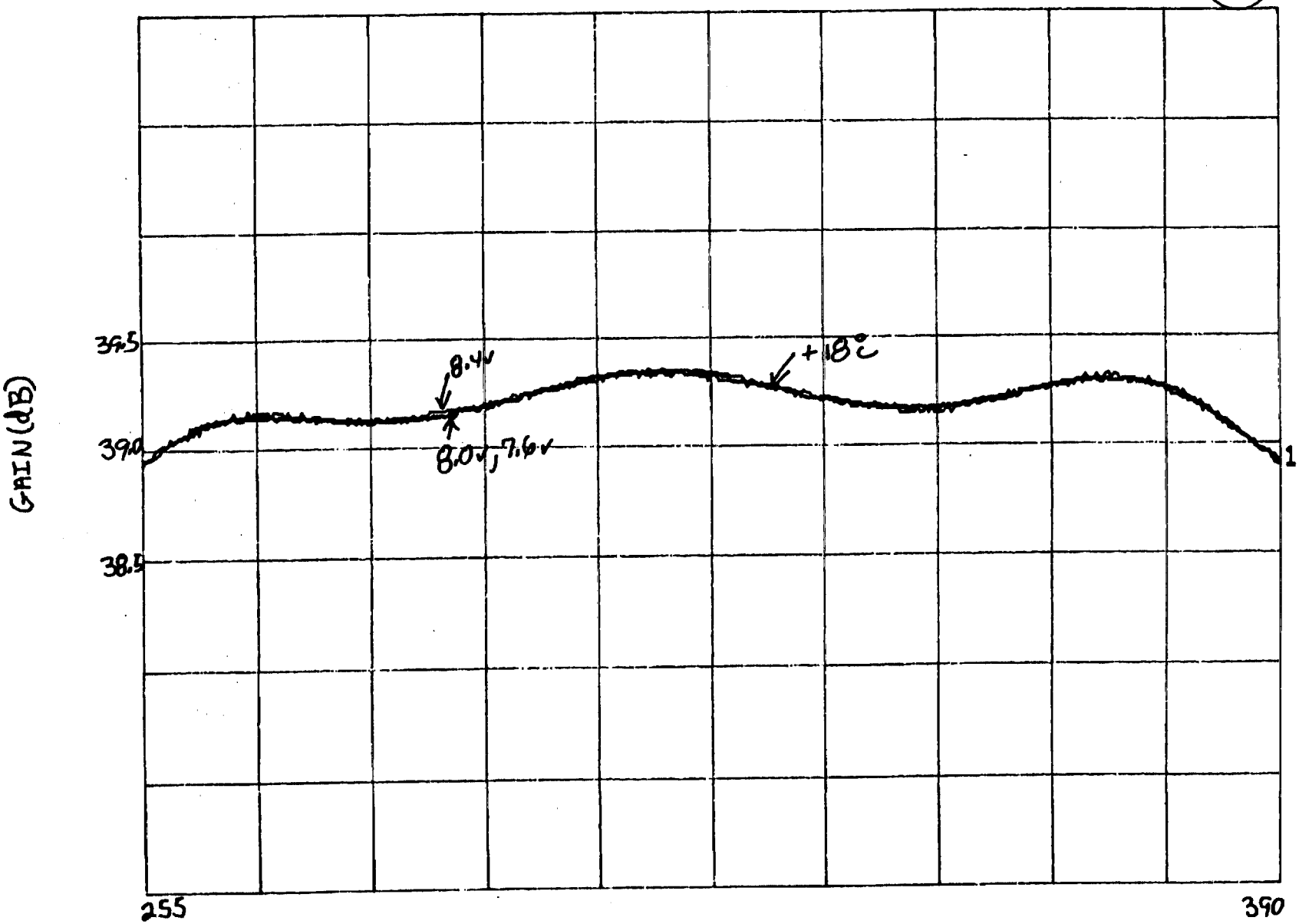
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH CVB T143 DATE 3-12-97

P/N 1331579-10



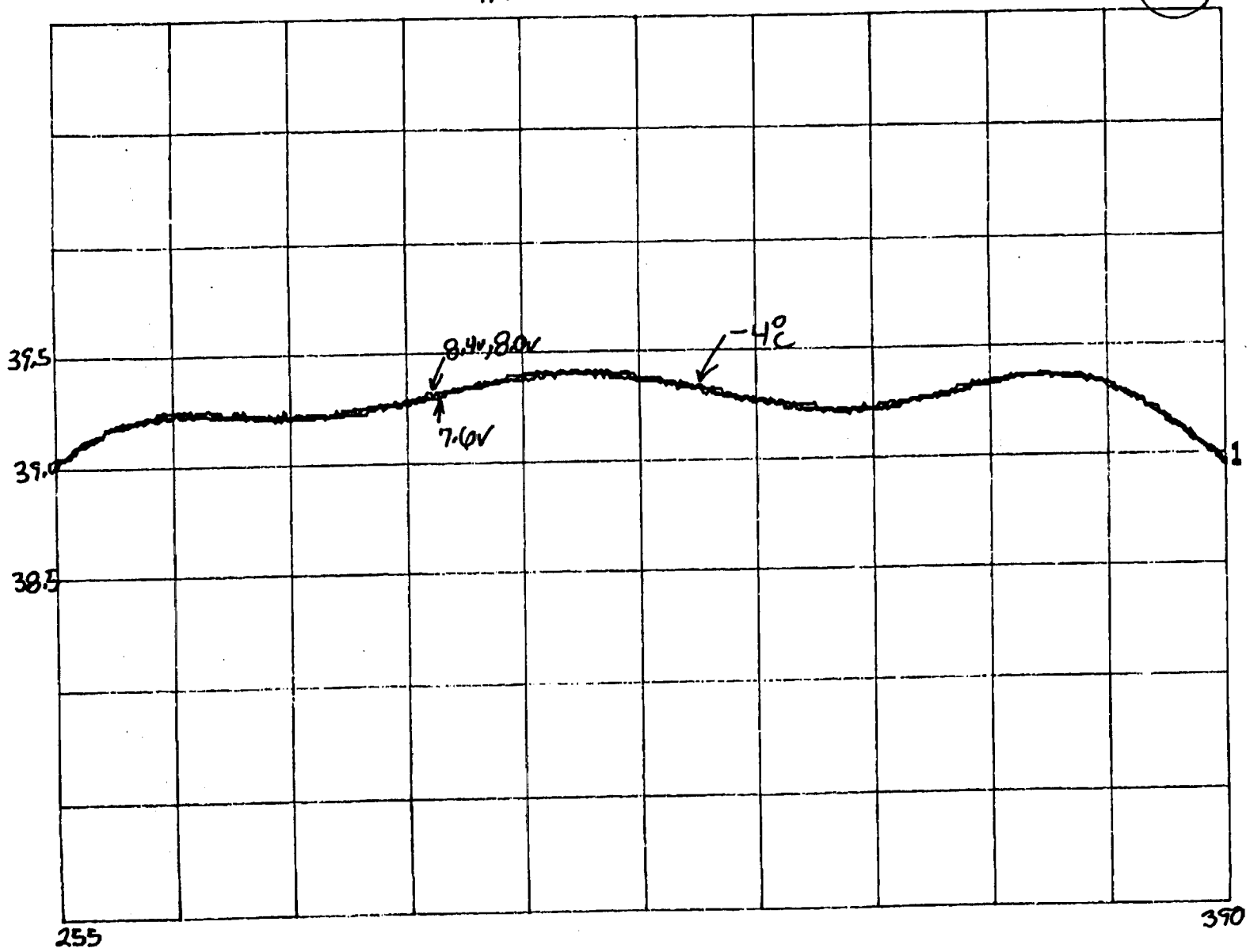
GAIN-VOLTAGE SENSITIV[illegible] FREQ.

VERTICAL CALIBRATION 0.5 dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH [illegible] DATE 3-12-97

P/N 1331579-10



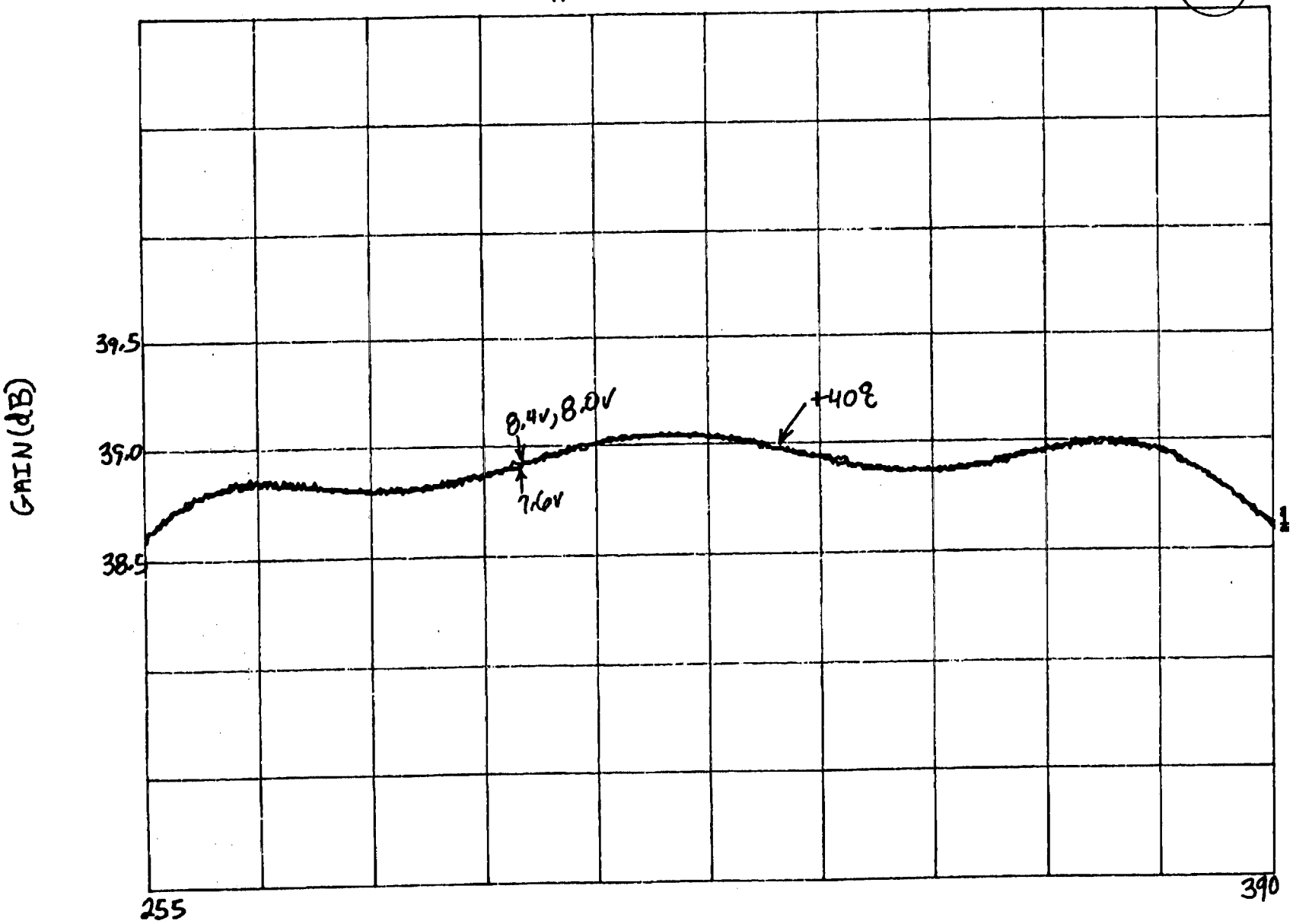
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH [illegible] DATE 3-12-97

P/N 1331579-10



Channel 12 Amplifier

IF Amplifier (P/N:1331579-11, S/N: 106)

APPENDIX C
ATP1775 DATA SHEET
MODEL NUMBER UD415301
AEROJET P/N 1331579-11

S/N 104

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject			12/4/96
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			N/A
4.4	Electrical Test					
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject			N/A
	Short Open Protection	No Damage	Accept X Reject			12-6-96
	Output Coupling	Output shall be AC coupled	Accept X Reject			12-6-96
.4.2	Gain vs. Freq. 290 MHz to 355 MHz	42.5dB Min., 43.5dB Max. -4°C to +40°C Attach x-y plot	Max 43.46 dB Min 43.28 dB Accept X Reject	Max 43.55 dB Min 43.34 dB Accept X Reject	Max 43.15 dB Min 42.96 dB Accept X Reject	12-6-96
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject 0.18 dB	Accept X Reject 0.21 dB	Accept X Reject 0.20 dB	12-6-96
	Gain Temp. Sensitivity	±.44 dB from -4°C to +40°C Worse Case	Accept X Reject	Accept X Reject 0.10 dB	Accept X Reject 0.20 dB	12-6-96
4.4.3	Gain-Voltage Sensitivity Input Currents	≤.5dB/v Worse Case ± .2dB for 7.6 to 8.4 Vdc 50ma MAX. Attach X-Y Plot	0.03 dB 36.0 mA 7.6v 36.7 mA 8.0v 37.4 mA 8.4v Accept X Reject	0.05 dB 34.3 mA 35.1 mA 35.7 mA Accept X Reject	0.03 dB 37.5 mA 38.1 mA 38.8 mA Accept X Reject	12-6-96

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1775 DATA SHEET
MODEL NUMBER UD415301
AEROJET P/N 1331579-11

S/N 106

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept ✓ Reject ___			
		290 MHz	.45 dB	.60 dB	.40 dB	
		322.5 MHz	.45 dB	.60 dB	.40 dB	
		355 MHz	.55 dB	.65 dB	.45 dB	12/5/96
4.4.8	Stability	Unconditionally Stable	Accept X Reject ___			12-6-96
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 55 mA	Accept X Reject ___			
		Maximum Current	40.2 mA			12-6-96

NOTE: Review all recorded data and signify acceptance below.

Technician Shoffner (T143) Date: 12-6-96

Quality Assurance Irene Jara Date: 12-9-96

CSI: _____ Date: _____

GSI: _____ Date: 2-10-97

Amplica, Inc. Newbury Park, CA 91320	SIZE A	FSCM NO. 51025	ATP1775	REV. B
DRAWN				
ISSUED	SCALE		SHEET 37 OF 39	

MODEL VD415301 S/N 106

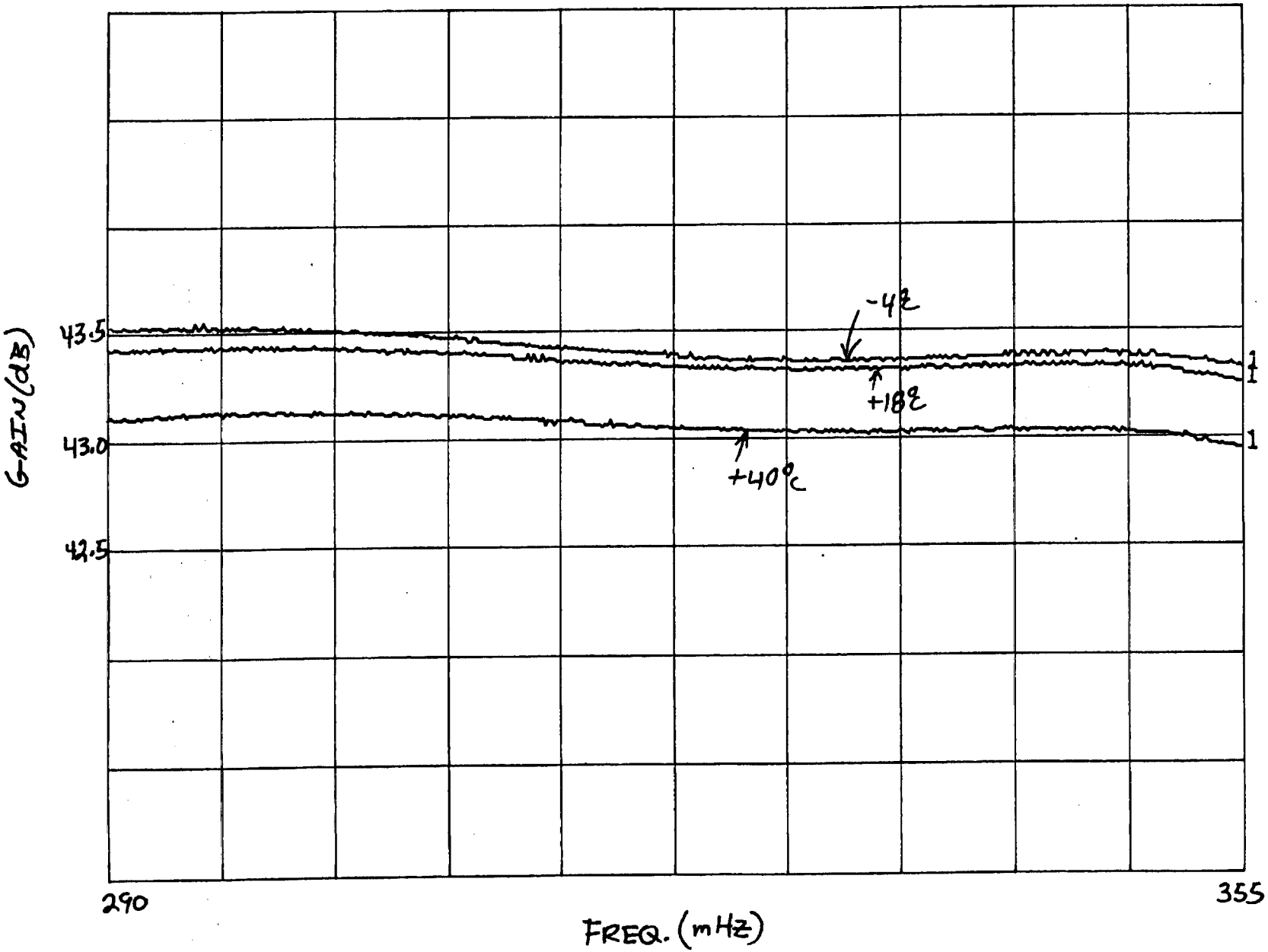
GAIN VS FREQUENCY

VERTICAL CALIBRATION .5 dB INCH

TEMPERATURE AS NOTED DEG.C.

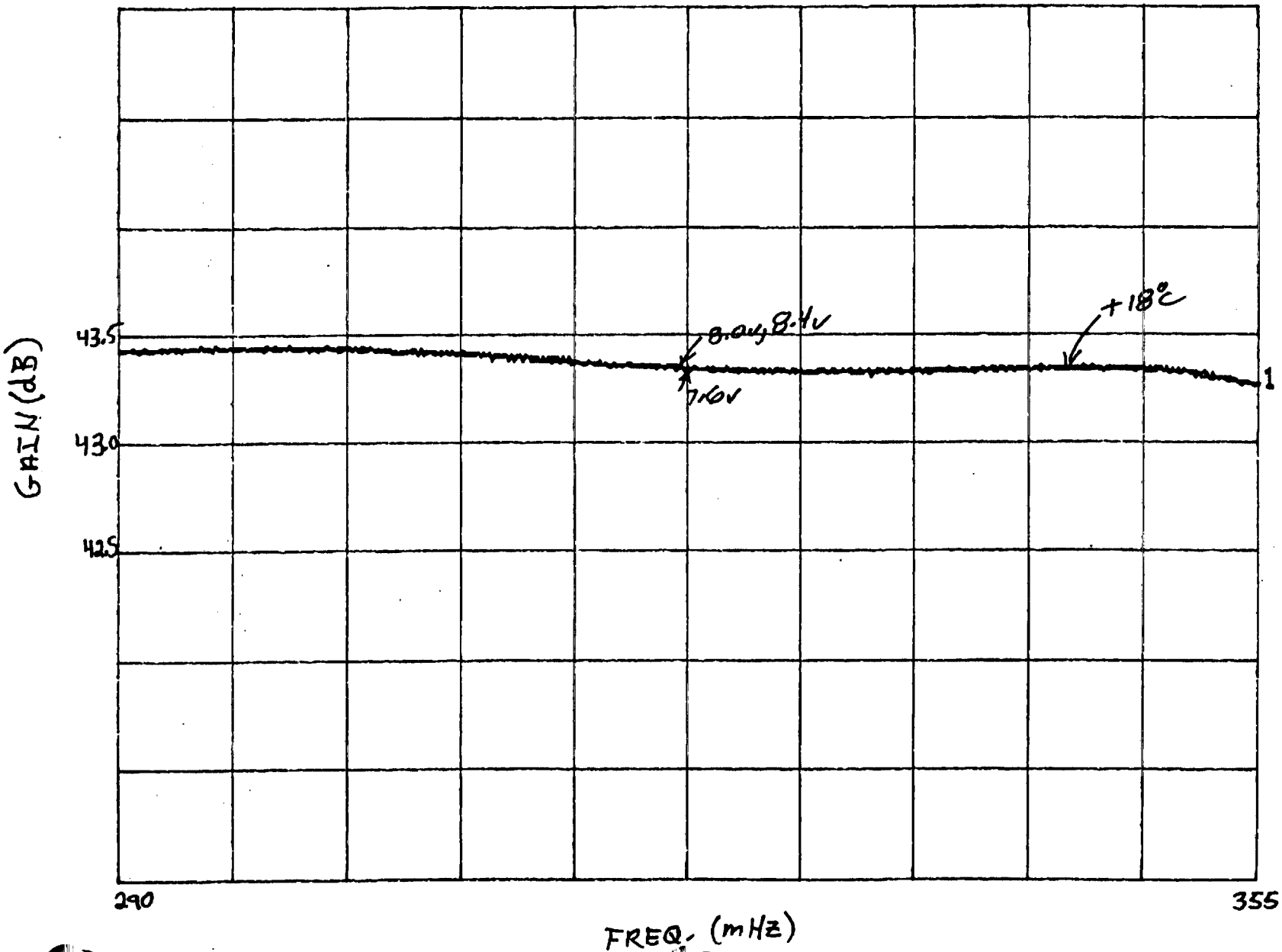
TECH (TIA) SM DATE 12-6-96

P/N 1331579-11



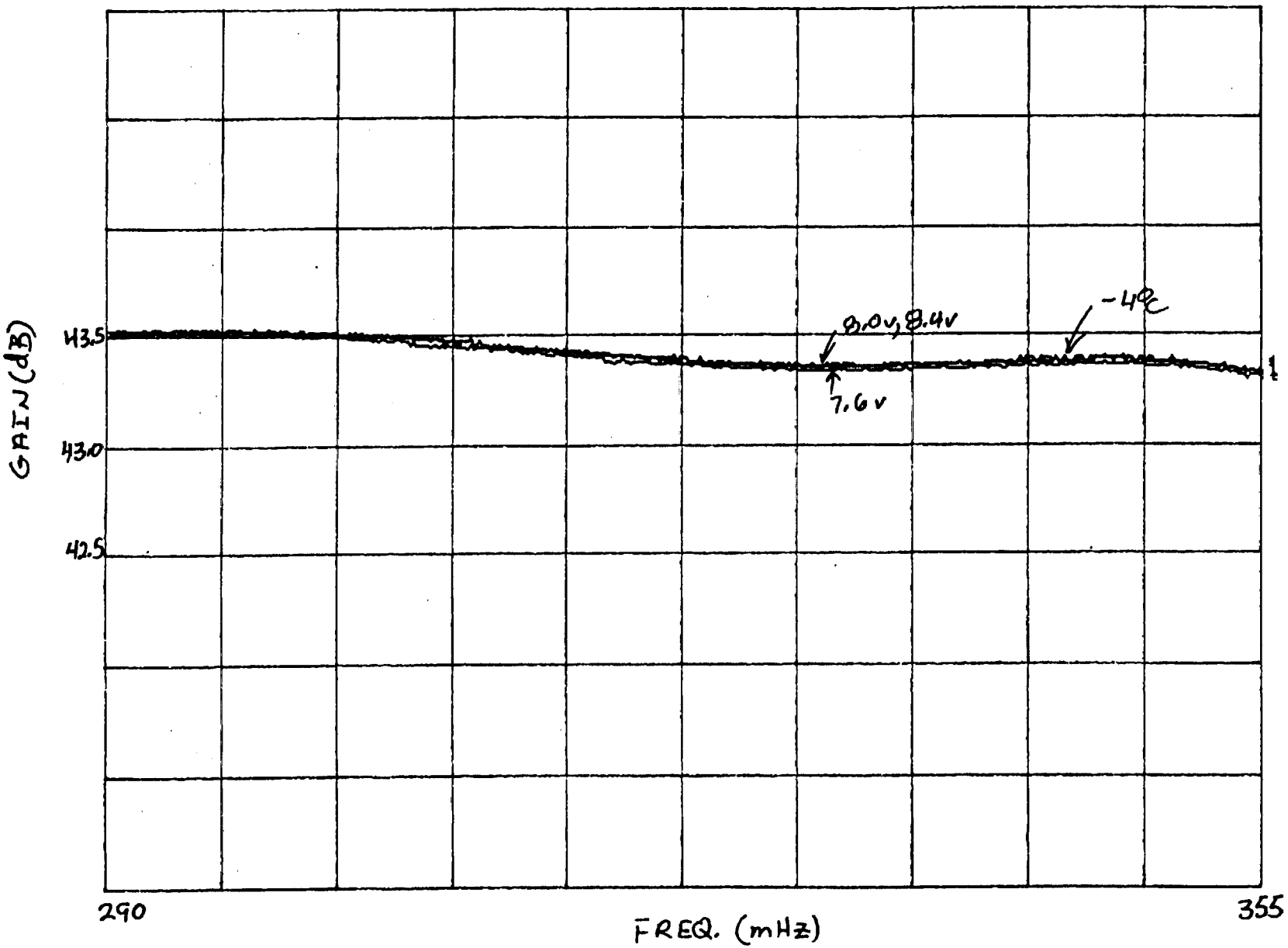
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE as noted DEG.C.
TECH 1143 DATE 12-6-96

P/N 1331579-11



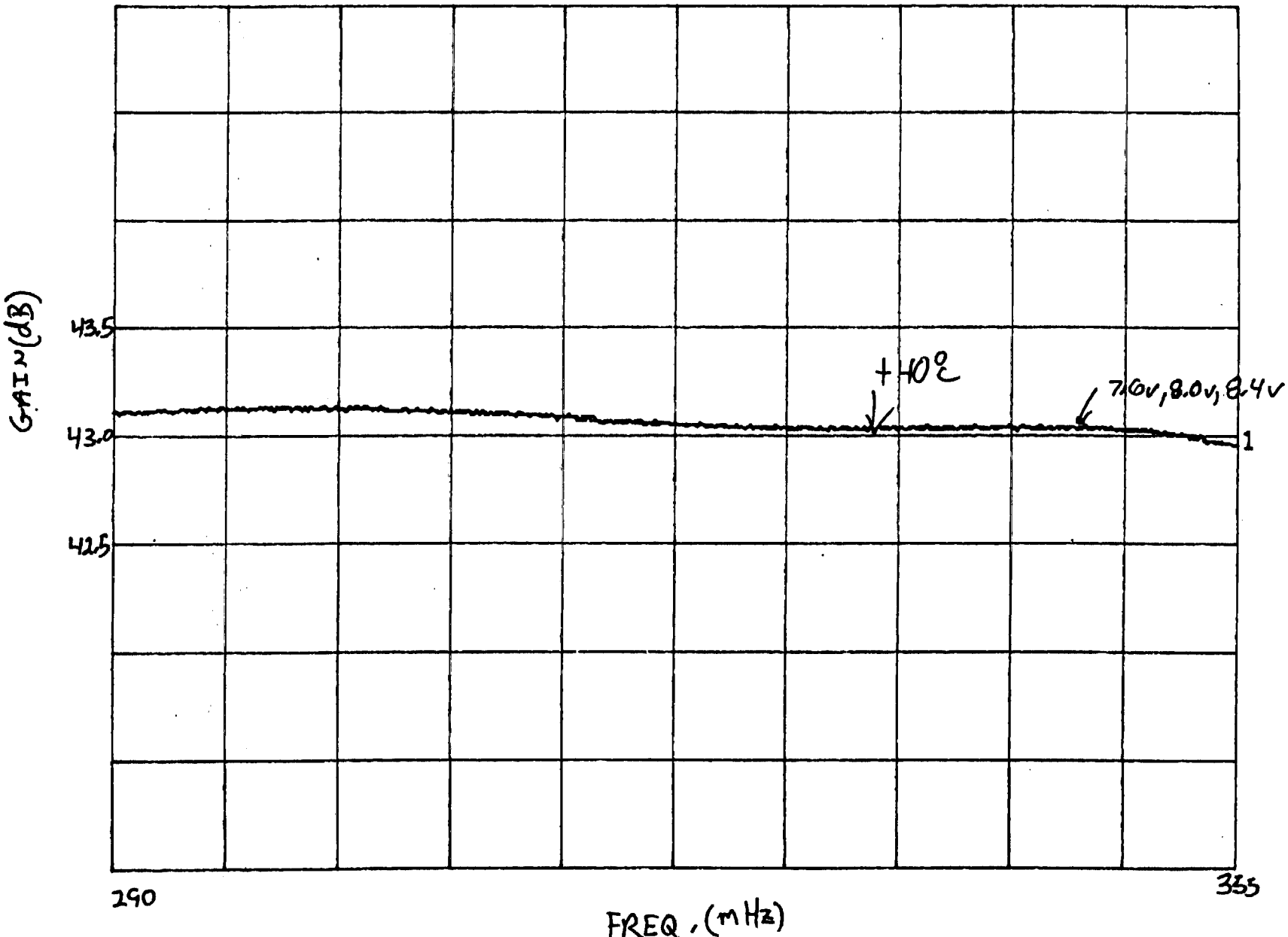
GAIN-VOLTAGE SENSITI[illegible] VS. FREQ.
VERTICAL CALIBRATION [illegible] dB INCH
TEMPERATURE as noted DEG.C.
TECH (1143) DATE 12-6-96

P/N 1331579-11



GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE as noted DEG.C.
TECH 1143 DATE 12-6-96

P/N 1331579-11



Channel 13 Amplifier

IF Amplifier (P/N:1331579-12, S/N: 109)

APPENDIX C
ATP1776 DATA SHEET
MODEL NUMBER UD315301
AEROJET P/N 1331579-12

S/N 109

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject			3-13-97
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			
4.4	Electrical Test					3-13-97
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject			3-13-97
	Short Open Protection	No Damage	Accept X Reject			3-13-97
	Output Coupling	Output shall be AC coupled	Accept X Reject			3-13-97
4.4.2	Gain vs. Freq. 305 MHz to 340 MHz	44.5dB Min., 45.5dB Max. -4°C to +40°C Attach x-y plot	Max 45.18 dB Min 44.85 dB Accept X Reject	Max 45.21 dB Min 44.86 dB Accept X Reject	Max 44.99 dB Min 44.69 dB Accept X Reject	3-13-97
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject 0.33 dB	Accept X Reject 0.35 dB	Accept X Reject 0.30 dB	3-13-97
	Gain Temp. Sensitivity	±.44 dB from -4°C to +40°C Worse Case	Accept X Reject	Accept X Reject 0.03 dB	Accept X Reject 0.19 dB	3-13-97
4.4.3	Gain-Voltage Sensitivity	≤.5dB/v Worse Case	0.02 dB	0.03 dB	0.02 dB	
	Input Currents	± .2dB for 7.6 to 8.4 Vdc 50ma MAX. 7.6v 8.0v 8.4v	41.3 mA 42.0 mA 42.6 mA	39.9 mA 40.6 mA 41.2 mA	42.5 mA 43.2 mA 43.8 mA	
		Attach X-Y Plot	Accept X Reject	Accept X Reject	Accept X Reject	3-13-97

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1776 DATA SHEET
MODEL NUMBER UD315301
AEROJET P/N 1331579-12

S/N 109

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept X Reject ____			
		305 MHz 322.5 MHz 340 MHz	0.45 dB 0.45 dB 0.50 dB	0.50 dB 0.45 dB 0.55 dB	0.40 dB 0.40 dB 0.45 dB	3-13-97
4.4.8	Stability	Unconditionally Stable	Accept X Reject ____			3-13-97
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 55 mA	Accept X Reject ____			
		Maximum Current	44.0 mA			3-13-97

NOTE: Review all recorded data and signify acceptance below.

Technician T143 Date: 3-13-97

Quality Assurance Date: 3-17-97

CSI: Date:

GSI: Date: 3/13/97

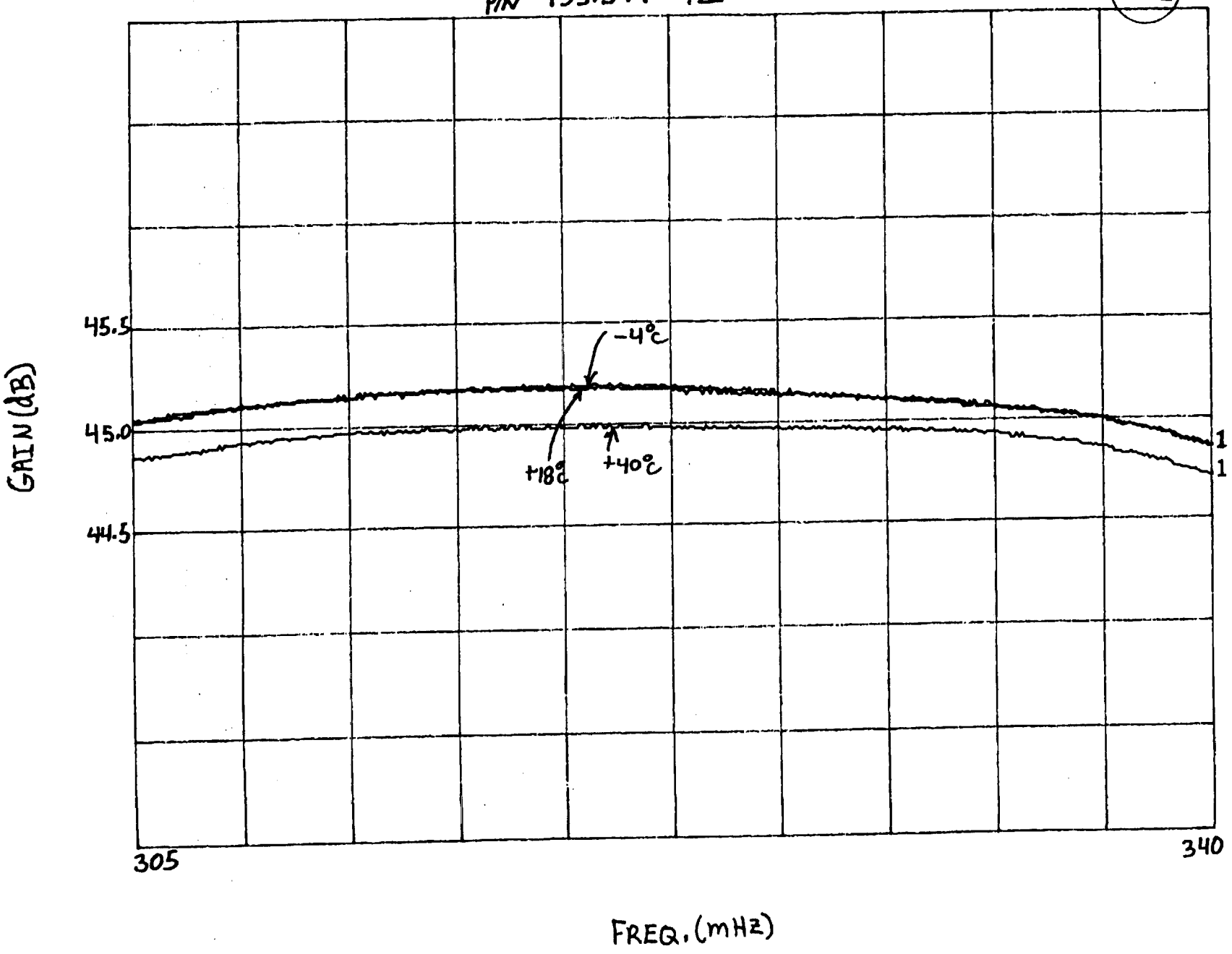
GAIN VS FREQUENCY

VERTICAL CALIBRATION .1 dB INCH

TEMPERATURE As Noted DEG.C.

TECH SMC DATE 3-13-97

P/N 1331579-12



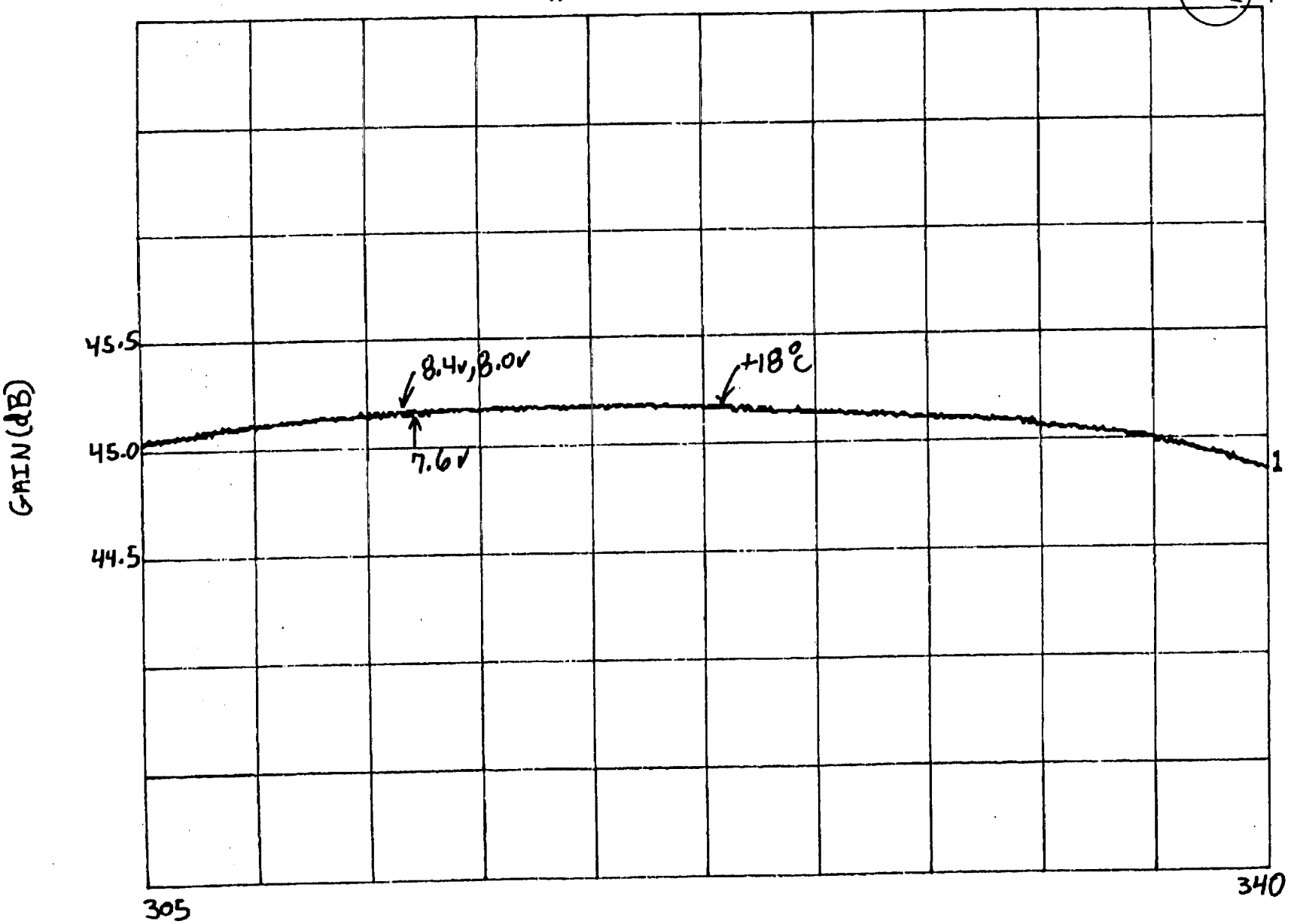
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SAS DATE 3-13-97

P/N 1331579-12



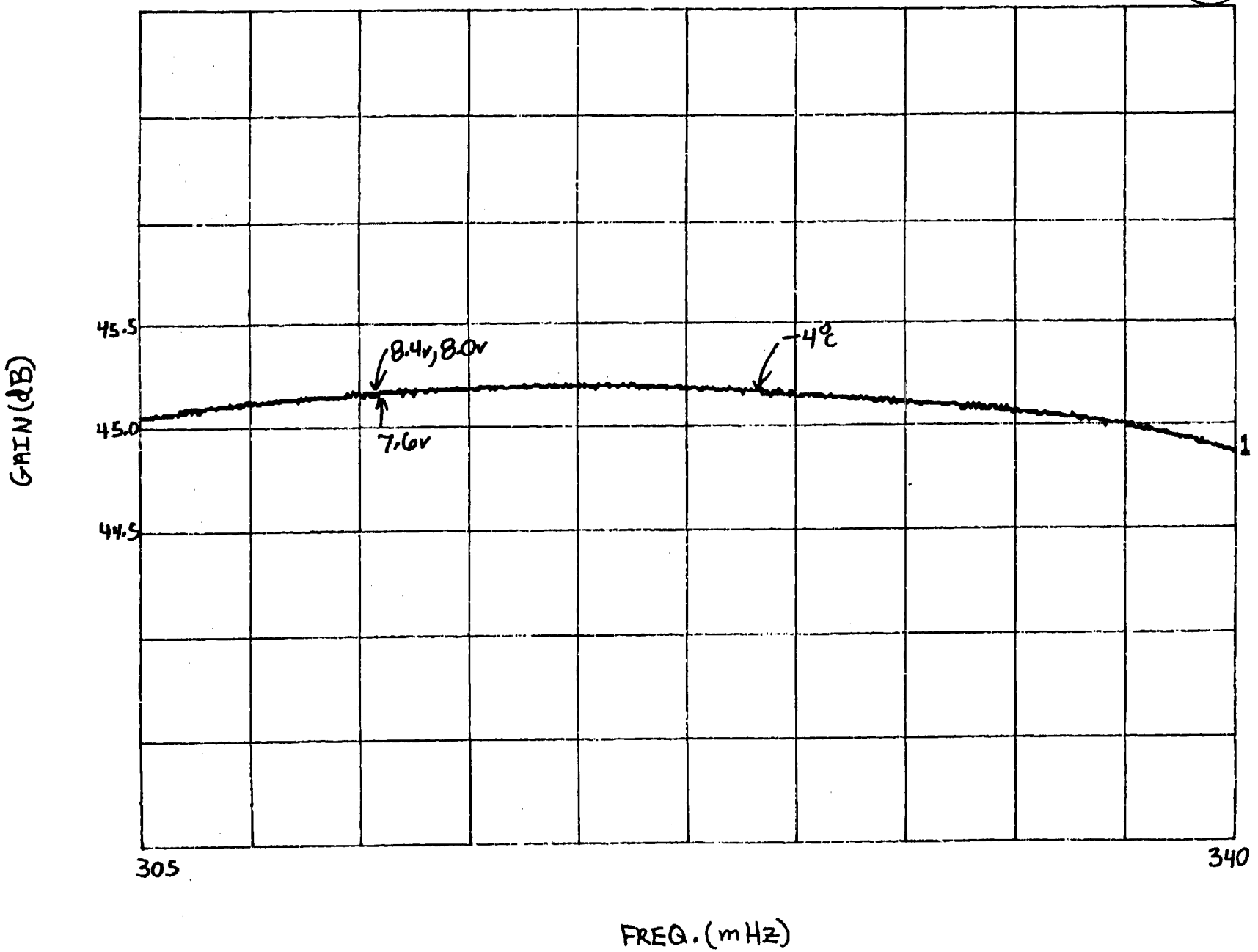
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH S.S. (143) DATE 3-13-97

P/N 1331579-12



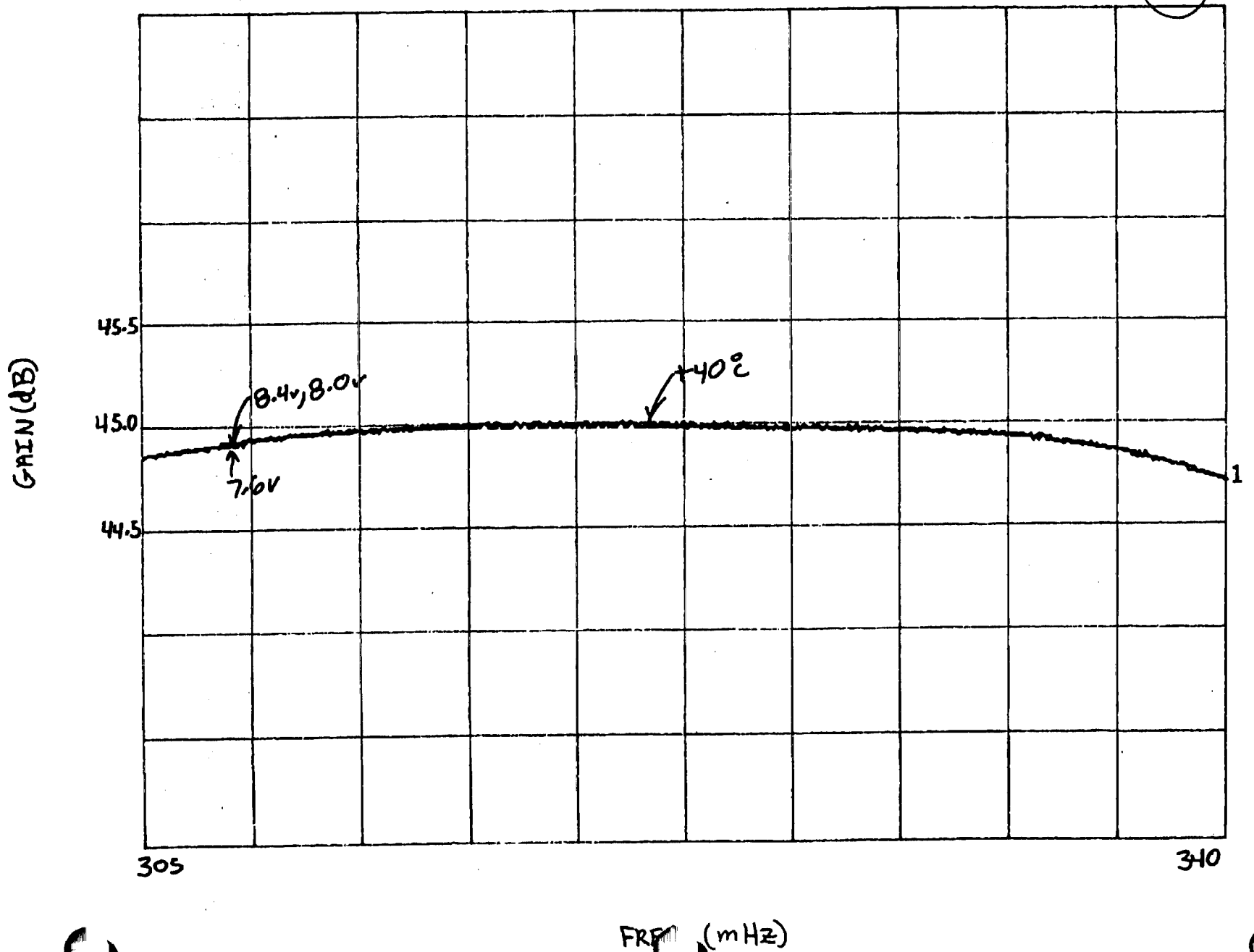
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH 1143 DATE 3-13-97

P/N 1331579-12



Channel 14 Amplifier

IF Amplifier (P/N:1331579-13, S/N: 105)

APPENDIX C
ATP1777 DATA SHEET
MODEL NUMBER UD315302
AEROJET P/N 1331579-13

S/N 105

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject			12-5-96
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= 6.60 VDC Total R= 43.3 ohm max. current draw =	152.4 mA			9-19-96
4.4	Electrical Test					
4.4.1	* Polarity Reversal Protection	No Damage	Current 51.9 mA Accept X Reject			12-5-96
	Short Open Protection	No Damage	Accept X Reject			12-5-96
	Output Coupling	Output shall be AC coupled	Accept X Reject			12-5-96
4.4.2	Gain vs. Freq. 315 MHz to 330 MHz	48.5dB Min., 49.5dB Max. -4°C to +40°C Attach x-y plot	Max 49.24 dB Min 49.13 dB Accept X Reject	Max 49.15 dB Min 49.02 dB Accept X Reject	Max 49.83 dB Min 48.71 dB Accept X Reject	12-5-96
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject 0.12 dB	Accept X Reject 0.12 dB	Accept X Reject 0.11 dB	12-5-96
	Gain Temp. Sensitivity	±.44 dB from -4°C to +40°C Worse Case	Accept X Reject	Accept X Reject 0.12 dB	Accept X Reject 0.42 dB	12-5-96
4.4.3	Gain-Voltage Sensitivity Input Currents	≤.5dB/v Worse Case ± .2dB for 7.6 to 8.4 Vdc 55ma MAX. Attach X-Y Plot	0.02 dB 7.6v 51.2 mA 8.0v 51.9 mA 8.4v 52.5 mA Accept X Reject	0.02 dB 49.6 mA 50.3 mA 50.9 mA Accept X Reject	.001 dB 52.6 mA 53.3 mA 53.9 mA Accept X Reject	12-5-96

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1777 DATA SHEET
MODEL NUMBER UD315302
AEROJET P/N 1331579-13

S/N 105

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept ✓ Reject ___			
		315 MHz	.50 dB	.60 dB	.50 dB	
		322.5 MHz	.50 dB	.55 dB	.50 dB	12/4/96
		330 MHz	.50 dB	.60 dB	.45 dB	
4.4.8	Stability	Unconditionally Stable	Accept ✓ Reject ___			12-5-96
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 60 mA	Accept ✓ Reject ___			
		Maximum Current	55.6 mA			12-5-96

NOTE: Review all recorded data and signify acceptance below.

Technician JHolt (T143) Date: 12-5-96

Quality Assurance JHoffman (A23) Date: 12/9/96

CSI: _____ Date: _____

GSI: _____ Date: 2/10/97

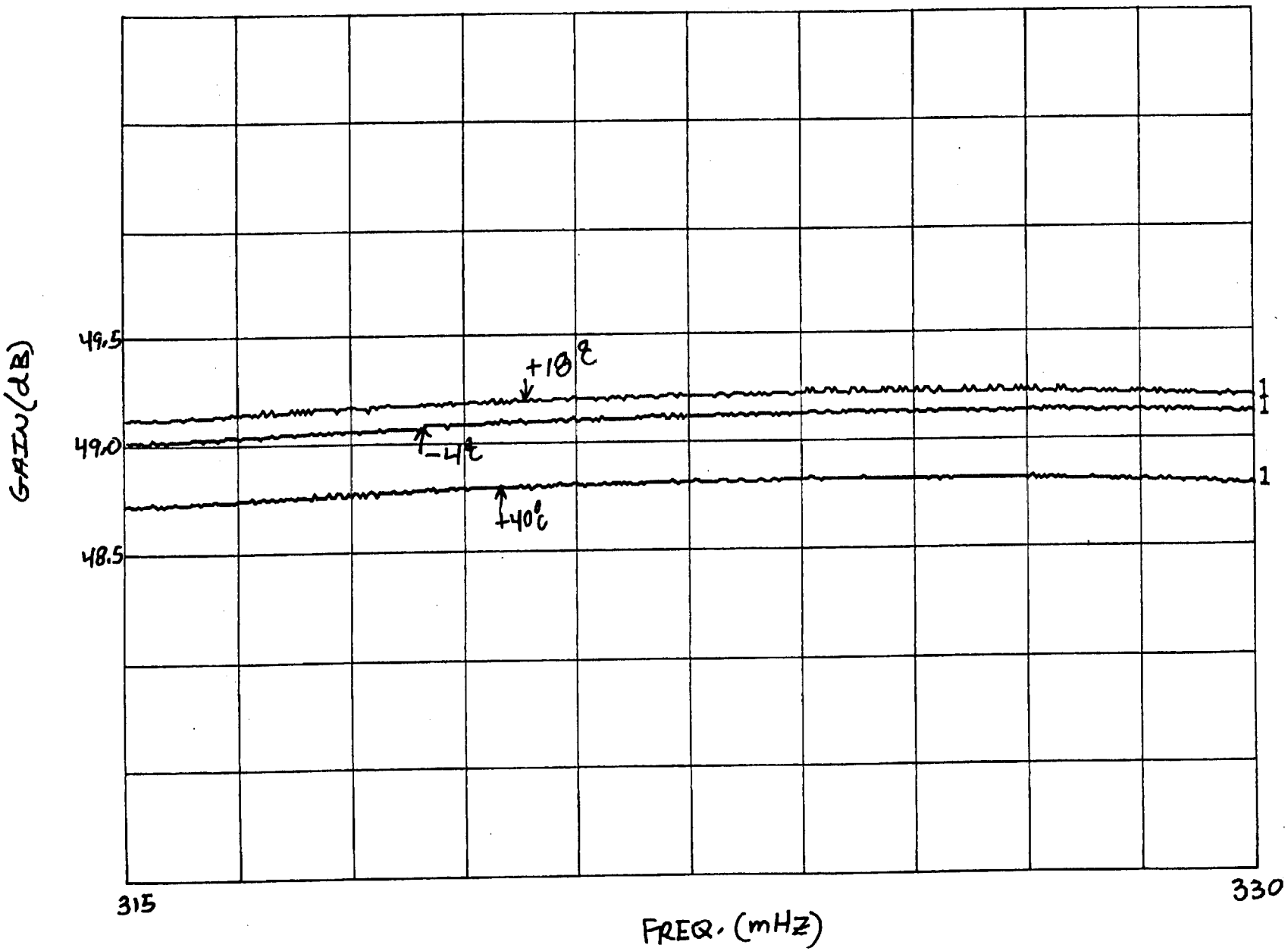
GAIN VS FREQUENCY

VERTICAL CALIBRATION .5 dB INCH

TEMPERATURE ~~AS~~ NOTED DEG.C.

TECH SW T143 DATE 12-5-96

P/N 1331579-13



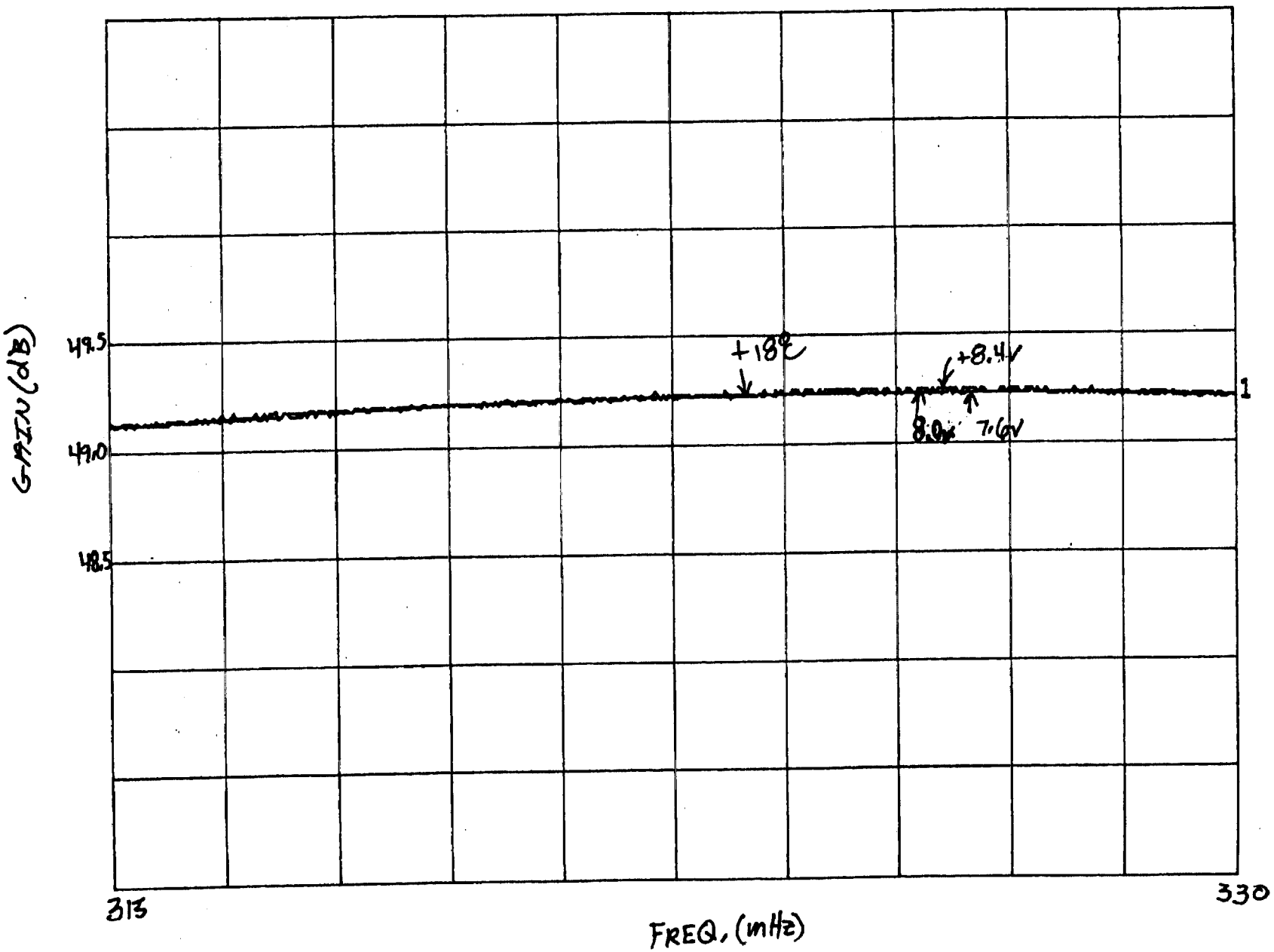
GAIN VOLTAGE SENSITIVITY, VERTICAL

VERTICAL CALIBRATION 0.5 dB INC

TEMPERATURE as noted DEG.C.

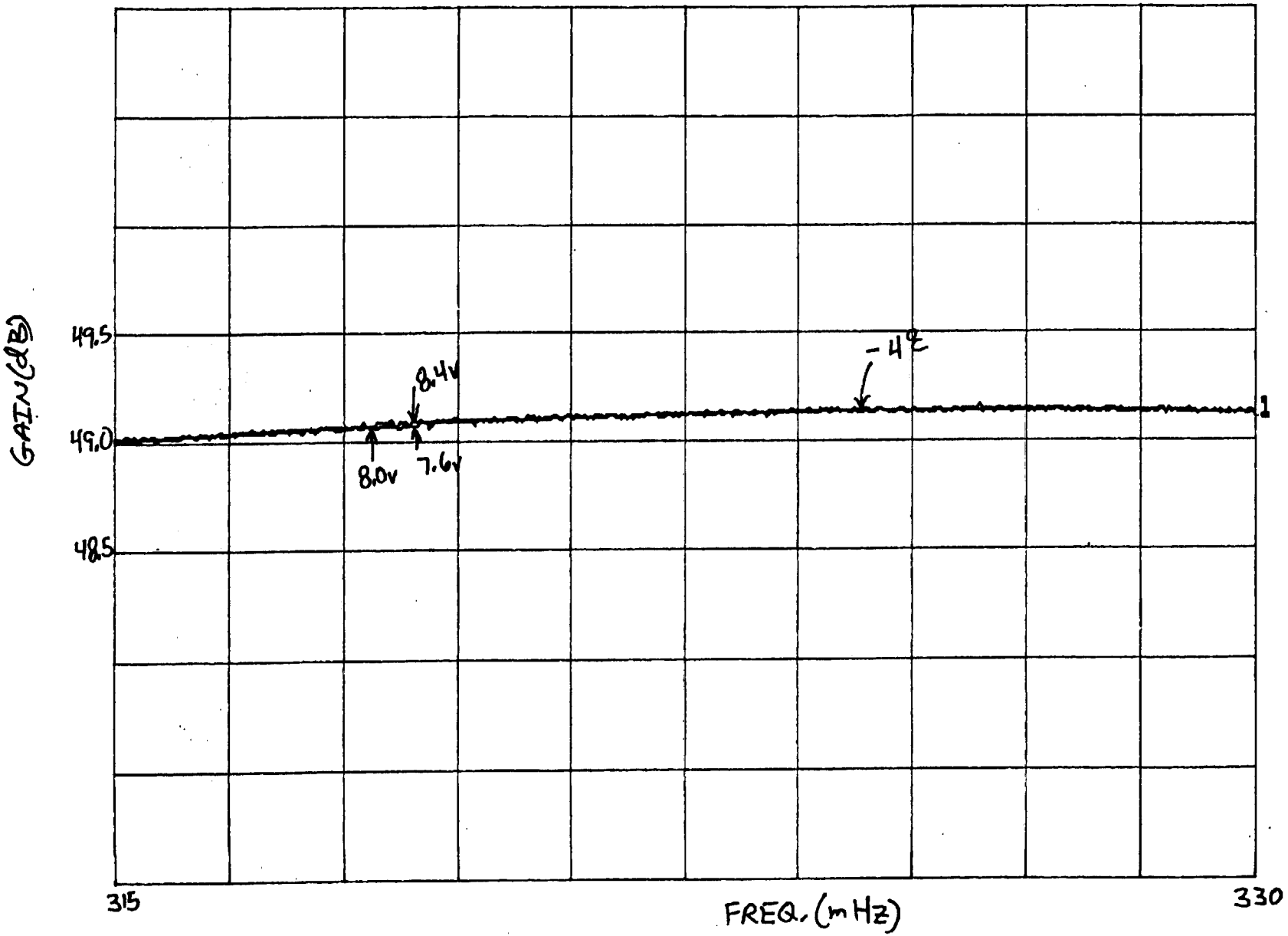
TECH SW J143 DATE 12-5-96

P/N 1331579-13



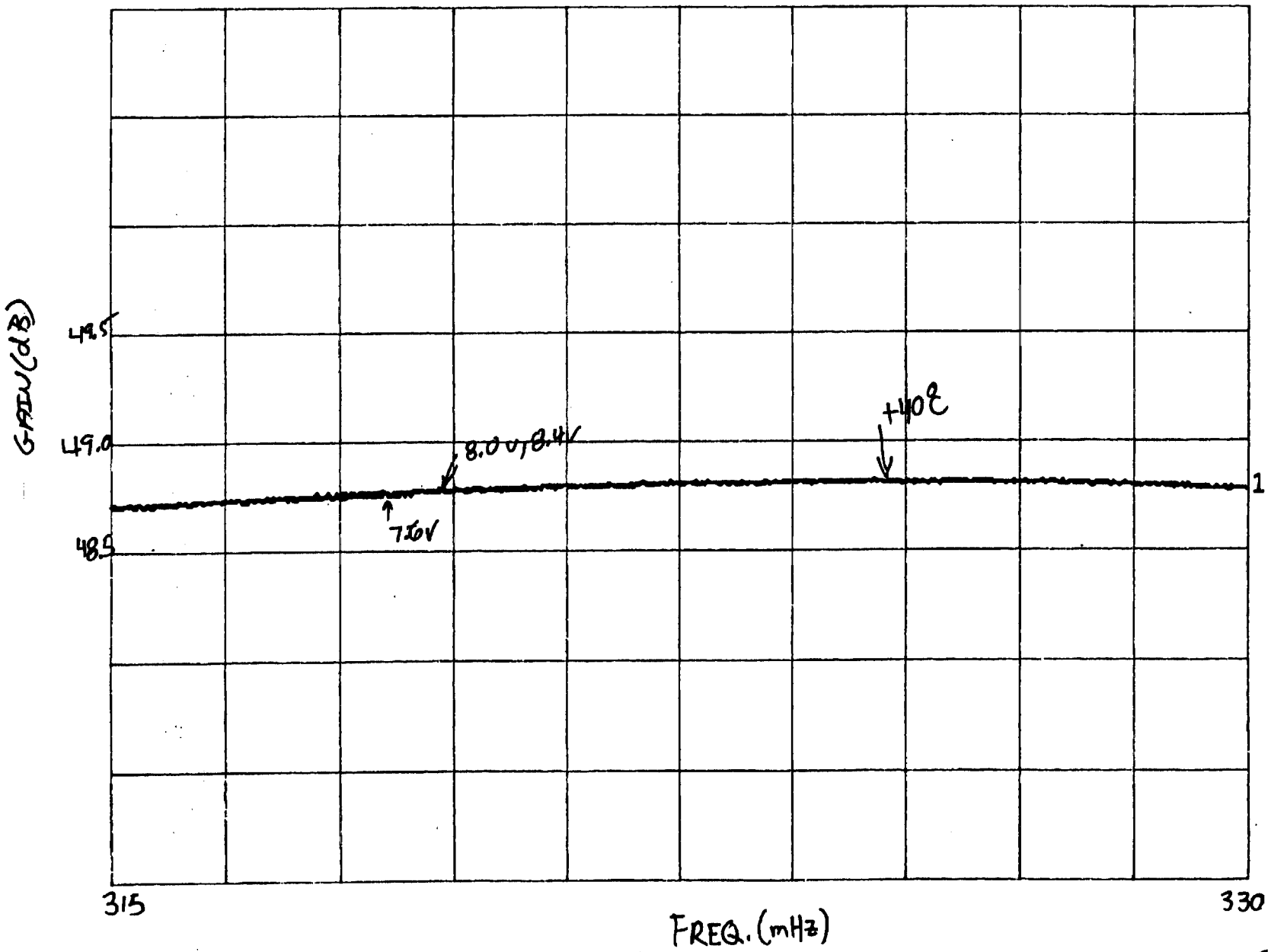
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION .5dB INCH
TEMPERATURE as noted DEG.C.
TECH T143 DATE 12-5-90

P/N 1331579-13



GAIN-VOLTAGE SENSITIVITY VS. FR
VERTICAL CALIBRATION 0.5dB I
TEMPERATURE as noted DEG.C.
TECH SK (T143) DATE 12-5-96

P/N 1331579-13



Channel 15 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-20, S/N: 7A70)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.85	1.00	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	60.10	1.25	2.0	QA 1	
10.00	60.15				
10.04	61.20				
ΔGv =	0.10 dB				

	DATE	ACC	REJ
SPACEK QA	10-28-98	QA 1	

PART NO. 1331562-205

SER NO. 7A70

TESTED BY: TTT

END DATE: 6-5-98

END TIME: 1600

TEST FAILURE:

FAILURE ANALYSIS NO.

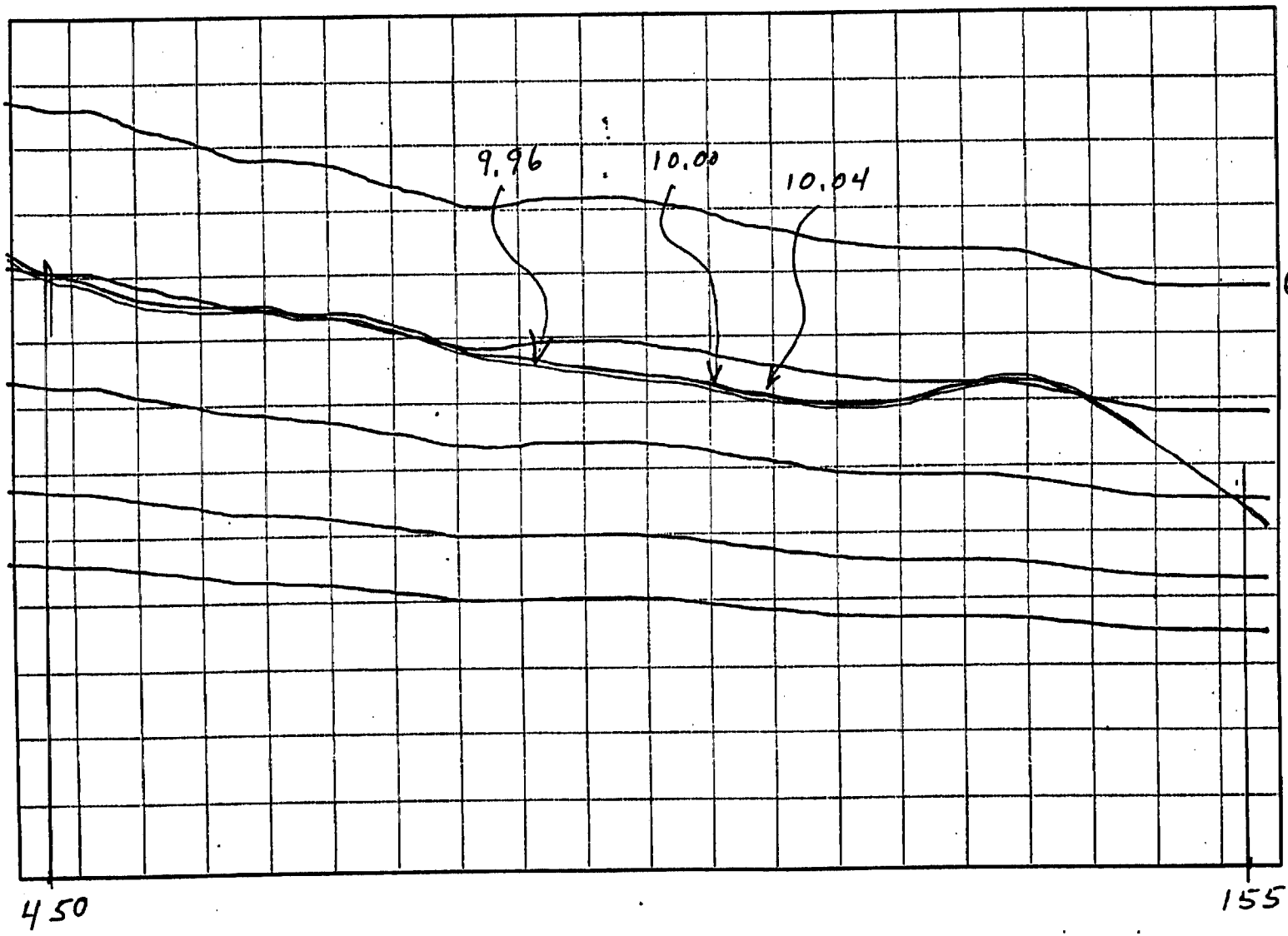
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-206
Serial No. 7A70
Date 5-27-98
Tested By 777

Amb Temp +23°C



QA 1

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 −6	G_{T1} 60.13				
		* 0.006	0.035dB/°C	QA 1	
T2 +8	G_{T2} 60.05				
		* 0.023	0.020dB/°C		QA 1
T3 +29	G_{T3} 59.60			QA 1	
		* 0.027	0.035dB/°C		
T4 +40	G_{T4} 59.28				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \qquad i = 1,2,3,4$$

ΔG_T = 0.85 dB

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4$ = 1.35 dB Spec 1.4dB ACC QA 1 REJ_____

	DATE	ACC	REJ
SPACEK QA	11-25-98	QA 1	

ENGINEERING DATA ONLY. SEE AE2486 PARA. 3.2.1.15.1 acceptable

PART NO. 1331562-20F

SER NO. 7A70

TESTED BY: [illegible]

END DATE: 6-5-98

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

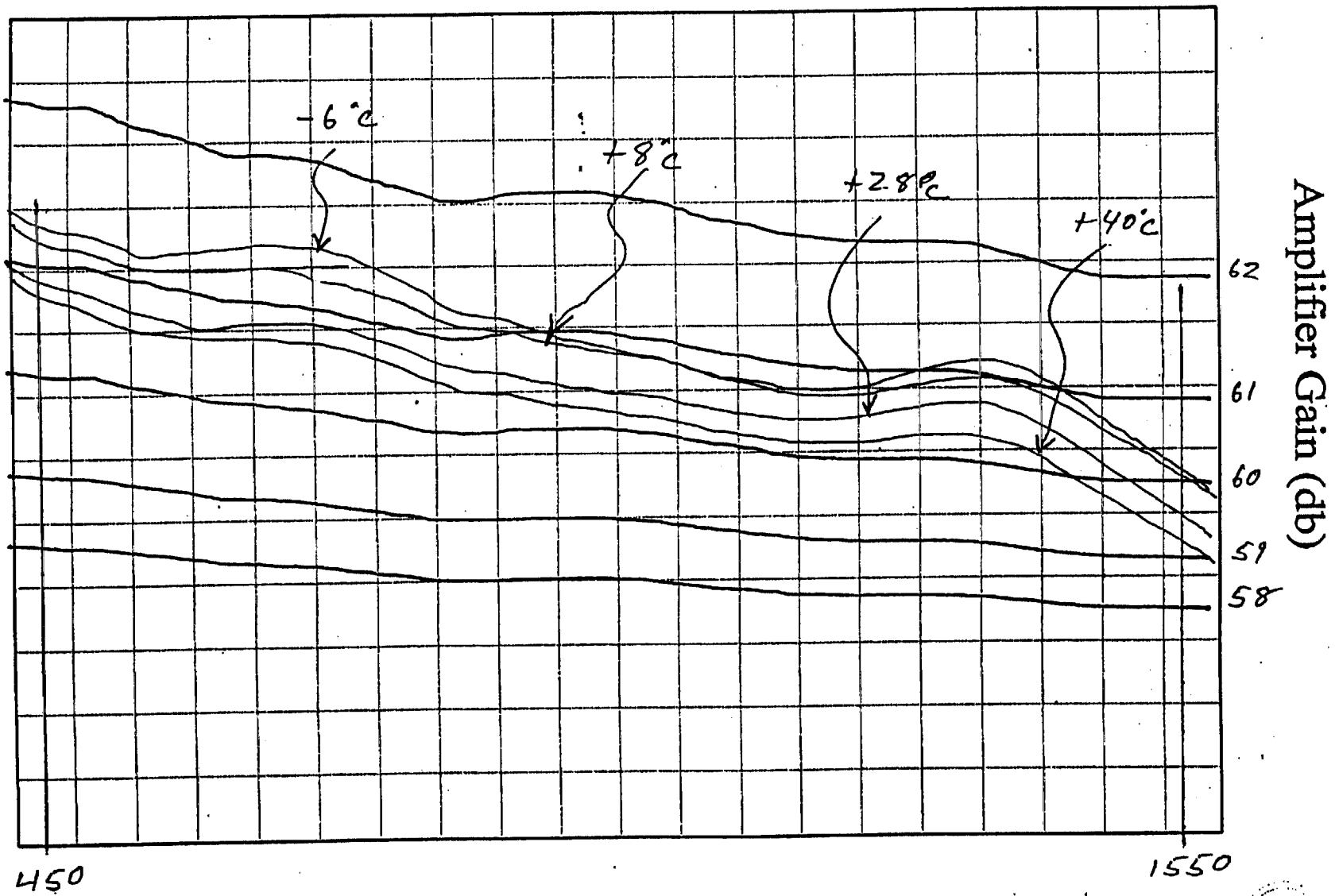
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-206
Serial No. 7A70
Date 5-27-98
Tested By 7TH

Amb Temp 23°C



QA

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC: COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10					
				X						20					
	X	X								50					
X	X	X	X	X	X	X	X			100					
X										150					
			X	X	X	X	X	X		200					
								X		400					
									X	500	-2.8	0.2	1.0	QA 1	
									X	1000	-2.7	0.3	1.0		
									X	1500	-2.6	0.4	1.0	QA 1	

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 6-5-98 AMBIENT ROOM TEMPERATURE °C: 23°C

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-24.1	-27.1	3.0	1.73

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

		DATE	ACC	REJ
PART NO. 1331562-205	SPACEK QA	10-28-98	QA 1	

SER NO. 7A70 TEST FAILURE:

TESTED BY: FAILURE ANALYSIS NO.

END DATE: 6-5-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 11-19-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	110.3	-22.30	-23.20	0.95	5.8	6.5	QA 1	
+8	110.5	-22.60	-23.50	0.90	6.0	6.5	QA 1	
+28	110.7	-22.90	-23.80	0.90	6.0	6.5	QA 1	
+40	110.9	-23.20	-24.10	0.90	6.0	6.5	QA 1	

Noise figure change 0.2 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ _____

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 11-25-98 Ambient Room Temperature °C: 24

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.095

Record Nps(K) 0.15 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ _____

	DATE	ACC	REJ
SPACEK QA	11-25-98	QA 1	

PART NO. 1331562-20G

SER NO. 7A70

TESTED BY: 777

END DATE: 11-25-98

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SUBSYSTEM-LEVEL TEST DATA

CENTER FREQUENCY OF LOs

Channel No.	3	4	5	6	7	8	9-14 ***	15
Specification (GHz) *	50.3	52.8	53.596	54.4	54.94	55.5	57.290344	89.0
Setting Accuracy (+/-GHz)	0.008	0.003	0.003	0.003	0.003	0.008	0.000086	0.08
Measured (GHz) **	50.30088	52.80039	53.59590	54.39962	54.94025	55.50039	57.290343 57.290326	88.9557

* Specification in vacuum condition.

** Measured at ambient pressure (standard atmosphere).

*** Measured data for PLO No. 1 and No.2.

TEST DATA

FOR

AMSU-A1-2 (P/N: 1356409-1, S/N: F05)

TEST DATA SHEET 2

LO Frequency Test Data (Paragraph 3.5.1) (A1-2)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 26.0 °C

Component	Channel No.	V_b(V)	I_b(mA)	P_{dc}(mW)			f_o(GHz)		
				Required (Max)	Measured	Pass/ Fail	Required	Measured	Pass/ Fail
LO	3	9.98	172.4	2,700	1720.6	P	50.300 ± 0.008	50.300875	P
	4	10.02	180.9	2,700	1812.6	P	52.800 ± 0.003	52.800373	P
	5	10.0	180.6	2,700	1806.0	P	53.596 ± 0.003	53.595899	P
	8	9.99	179.6	2,700	1794.2	P	55.500 ± 0.008	55.500370	P
Mixer/ Amps	All	10.02	172.5	1,800	1728.5				
TOTAL				12,600	8861.9				

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F05

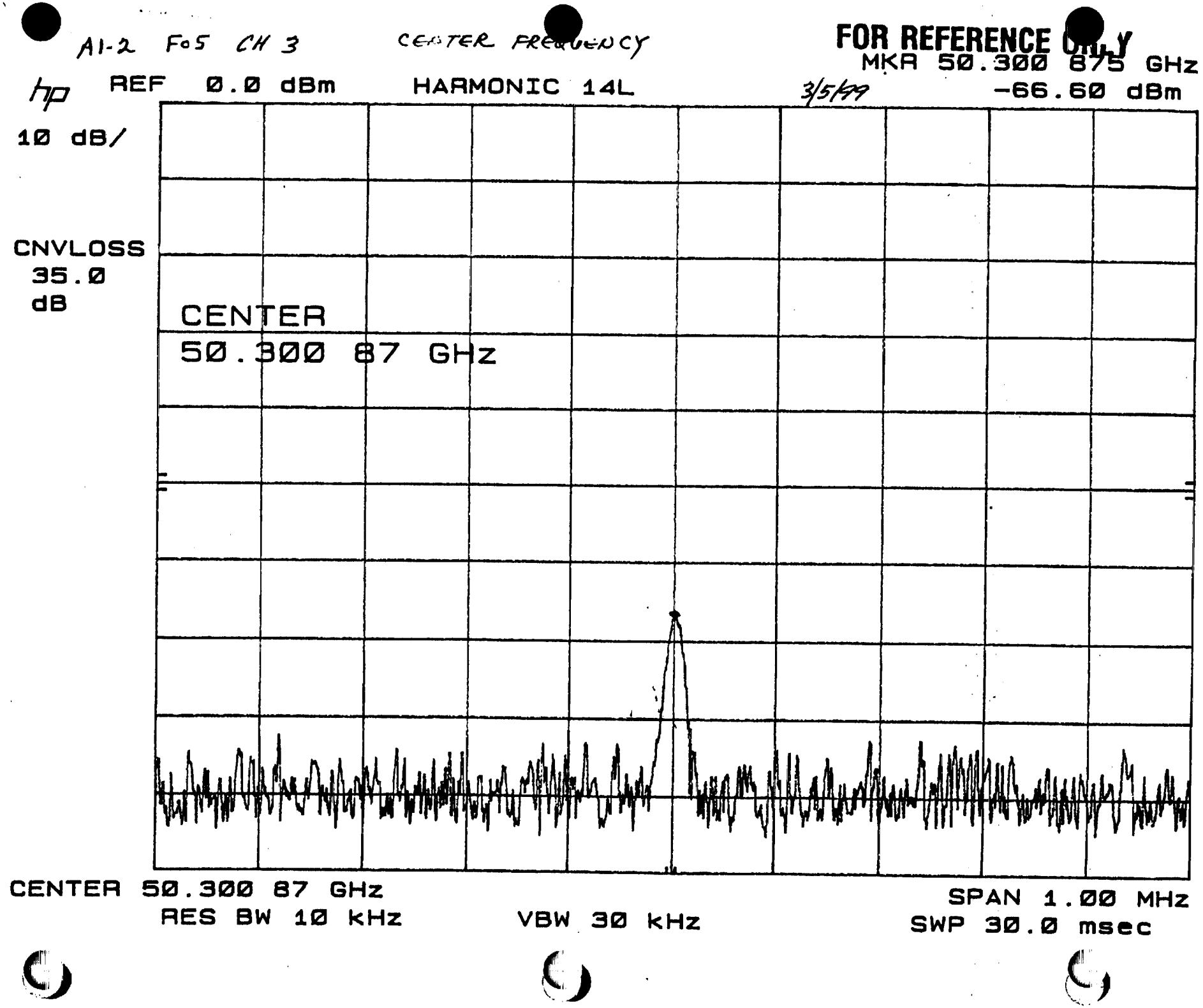
Test Engineer: Y. Trinh

Quality Assurance: 7A 268 MAR 8 '99

Date: 3/05/99

A1-2 FoS CH 3 CENTER FREQUENCY

FOR REFERENCE ONLY



A1-2 F05 CH 4 CENTER FREQUENCY

FOR REFERENCE

MKR 52.800 393 GHz

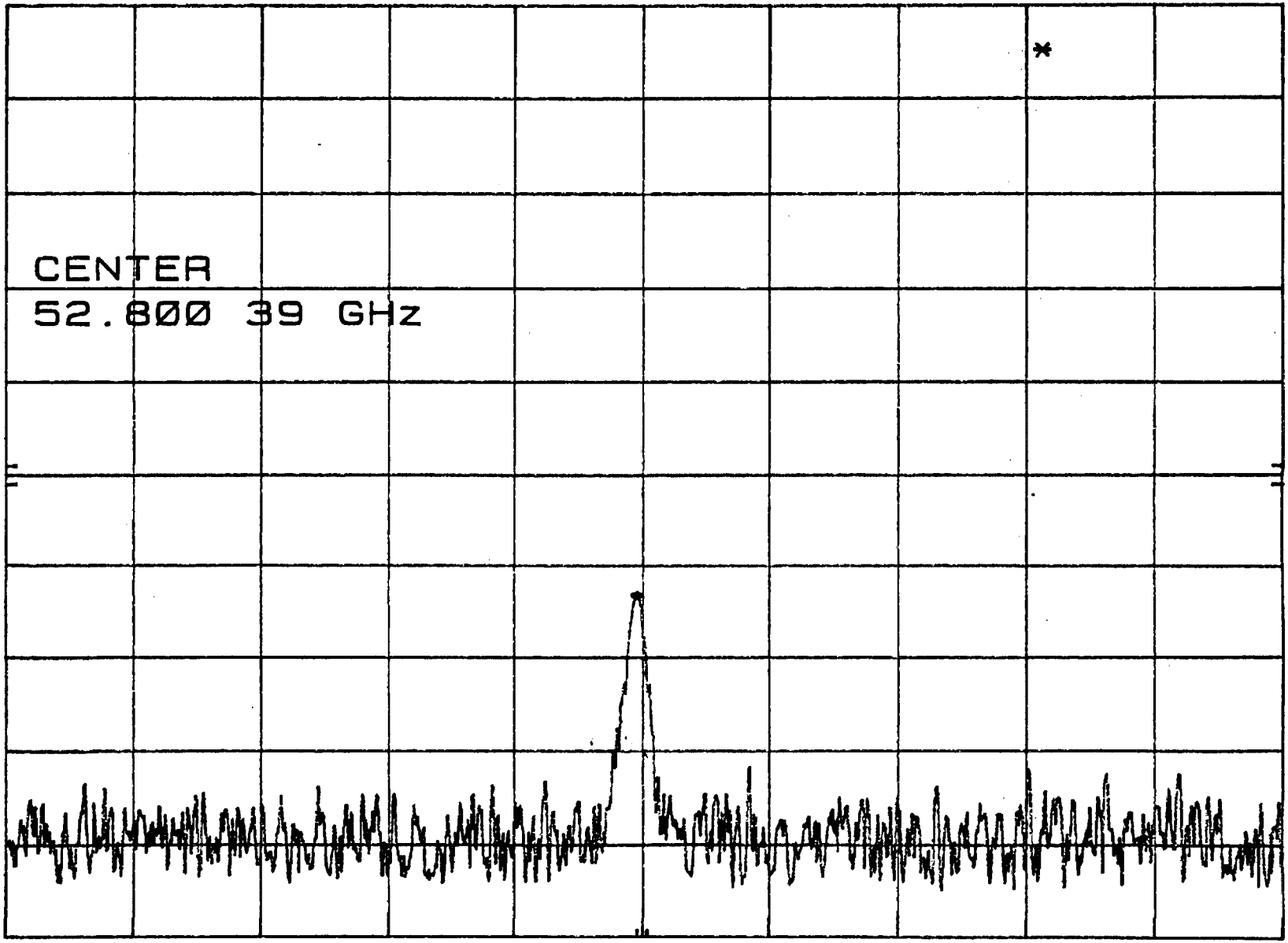
-63.30 dBm

hp REF 0.0 dBm HARMONIC 14L 3/5/99

10 dB/

CNVLOSS
35.0
dB

CENTER
52.800 39 GHz



CENTER 52.800 39 GHz SPAN 1.00 MHz

RES BW 10 kHz VBW 30 kHz SWP 30.0 msec

A1-2 Fo5 CH5 CENTER FREQUENCY

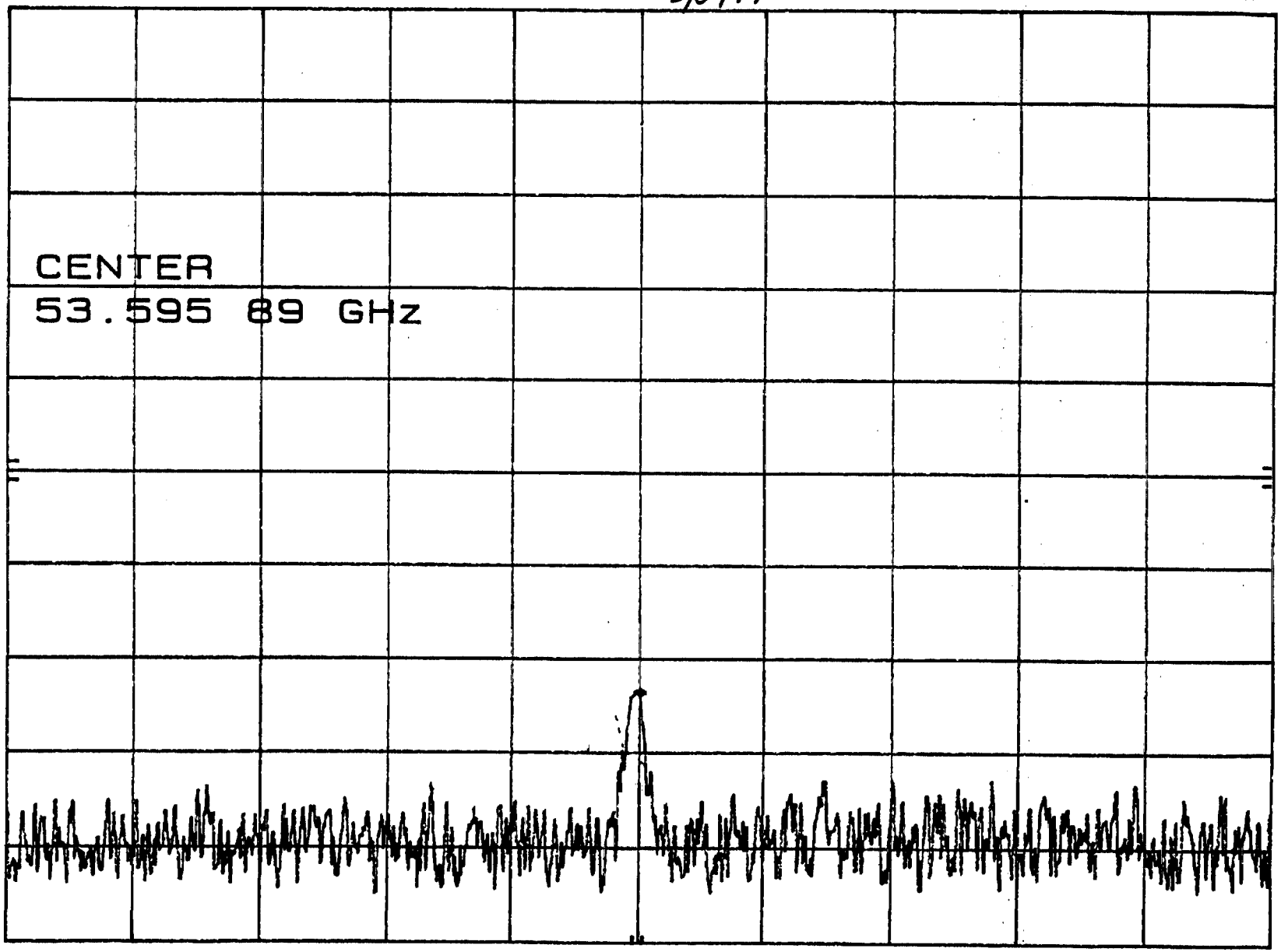
FOR REFERENCE ONLY

hp REF 0.0 dBm HARMONIC 14L 3/5/99

MKR 53.595 899 GHz
-73.60 dBm

10 dB/

CNVLOSS
35.0
dB



CENTER 53.595 89 GHz
RES BW 10 kHz
VBW 30 kHz
SPAN 1.00 MHz
SWP 30.0 msec

A1-2 FOR CH 8 CENTER FREQUENCY

FOR REFERENCE ONLY

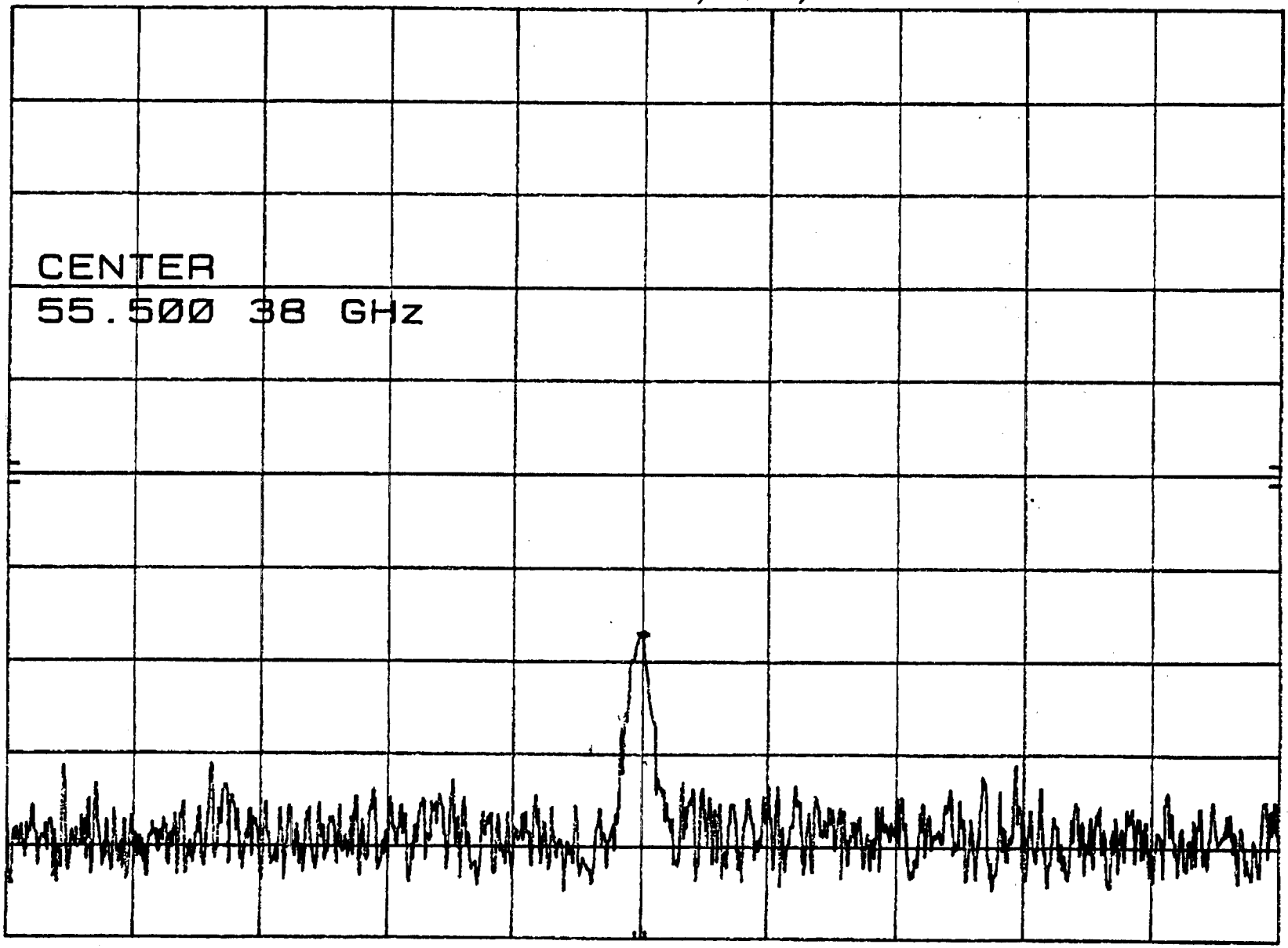
hp REF 0.0 dBm HARMONIC 14L 3/5/99

MKR 55.500 390 GHz
-67.10 dBm

10 dB/

CNVLOSS
35.0
dB

CENTER
55.500 38 GHz



CENTER 55.500 38 GHz
RES BW 10 kHz
VBW 30 kHz
SPAN 1.00 MHz
SWP 30.0 msec

TEST DATA SHEET 5

IF Output Test Data (Paragraph 3.5.2) (A1-2)

Test Setup Verified: Y. Yrink (Signature) Baseplate Temperature (T_B) 26 °C

Component	Channel No.	V_b(V)	I_b(mA)	P_o(dBm)	Atten (dB)	P_o(dBm)		
						Required	Measured	Pass/ Fail
LO	3	9.98	172.4	-23.99	3.0	-27.0 ± 1.0	-26.92	P
	4	10.03	180.9	-19.68	7.0	-27.0 ± 1.0	-26.87	P
	5	10.00	180.6	-20.10	7.0	-27.0 ± 1.0	-27.30	P
	8	9.99	179.6	-20.50	6.0	-27.0 ± 1.0	-26.43	P
Mixer/ Amps	All	10.02	172.5					

Pass = P, Fail = F

Part No.: 1356407-1

Serial No.: F05

Test Engineer: Y. Yrink

Quality Assurance: 268 MAR 8 '99

Date: 3/05/99

TEST DATA SHEET 8 (Sheet 1 of 2)
Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-2)

Test Setup Verified: Y. Yrizh (Signature) Baseplate Temperature (T_B) 27 °C

Component	Channel No.	V_b(V)	I_b(mA)	3 dB BW Frequency (MHz) Lower	3 dB BW Frequency (MHz) Higher	3 dB BW Frequency (MHz) Required Max.	3 dB BW Frequency (MHz) Measured	Pass/ Fail
LO	3	9.98	172.4	8.8	88.3	90	79.5	P
	4	10.03	180.9	7.0	199.0	200	192.0	P
	5	10.00	180.6	31.0	198.8	170	167.8	P
	8	9.99	179.6	7.7	163.7	163	156.0	P
Mixer/ Amps	All	10.02	172.6					

Part No.: 13564/09-1
Serial No.: F05

Test Engineer: Y. Yrizh
Quality Assurance: 268 MAR 8 '99
Date: 3/5/99

TEST DATA SHEET 8 (Sheet 2 of 2)
Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-2)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 27 °C

Compo-nent	Channel No.	V_b(V)	I_b(mA)	40 dB BW Frequency (MHz)		40 dB BW Frequency (MHz) (Ref. Only)		Pass/ Fail
				Lower	Higher	Required Max.	Measured	
LO	3	9.98	172.4	3.6	98.7	234	95.1	P
	4	10.03	180.9	2.0	221.5	234	219.5	P
	5	10.00	180.6	19.0	216.0	221	197.0	P
	8	9.99	179.6	2.2	180.8	429	178.6	P
Mixer/ Amps	All	10.02	172.6					

Part No.: 1356409-1

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 MAR 8 99

Date: 3/5/99

FOR REFERENCE ONLY

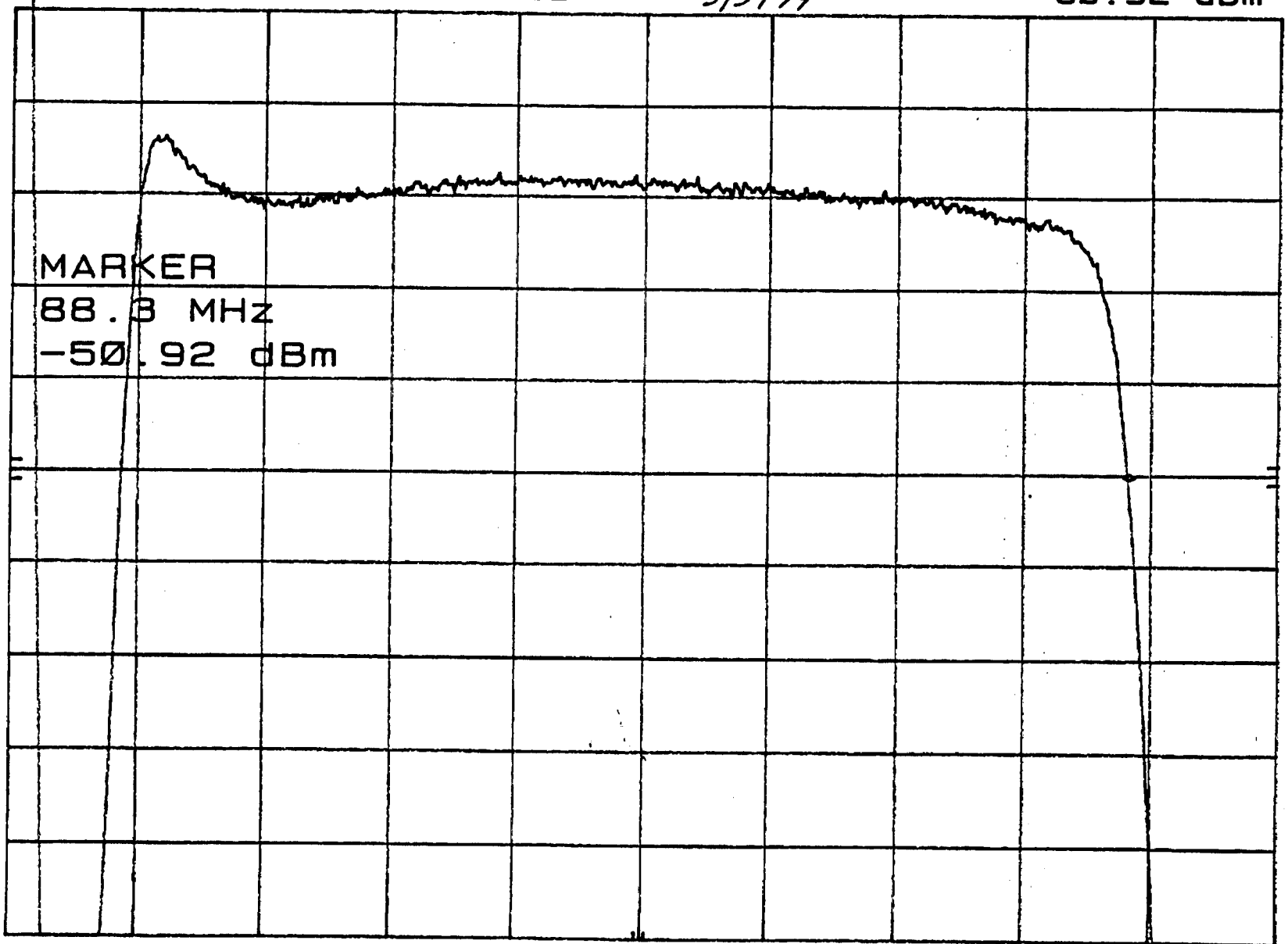
A1-2 F05 CH3

hp

REF -45.9 dBm ATTEN 10 dB 3/5/99

MKR 88.3 MHz
-50.92 dBm

1 dB/



CENTER 50 MHz

SPAN 100 MHz

RES BW 1 MHz VBW 30 Hz SWP 10.0 sec

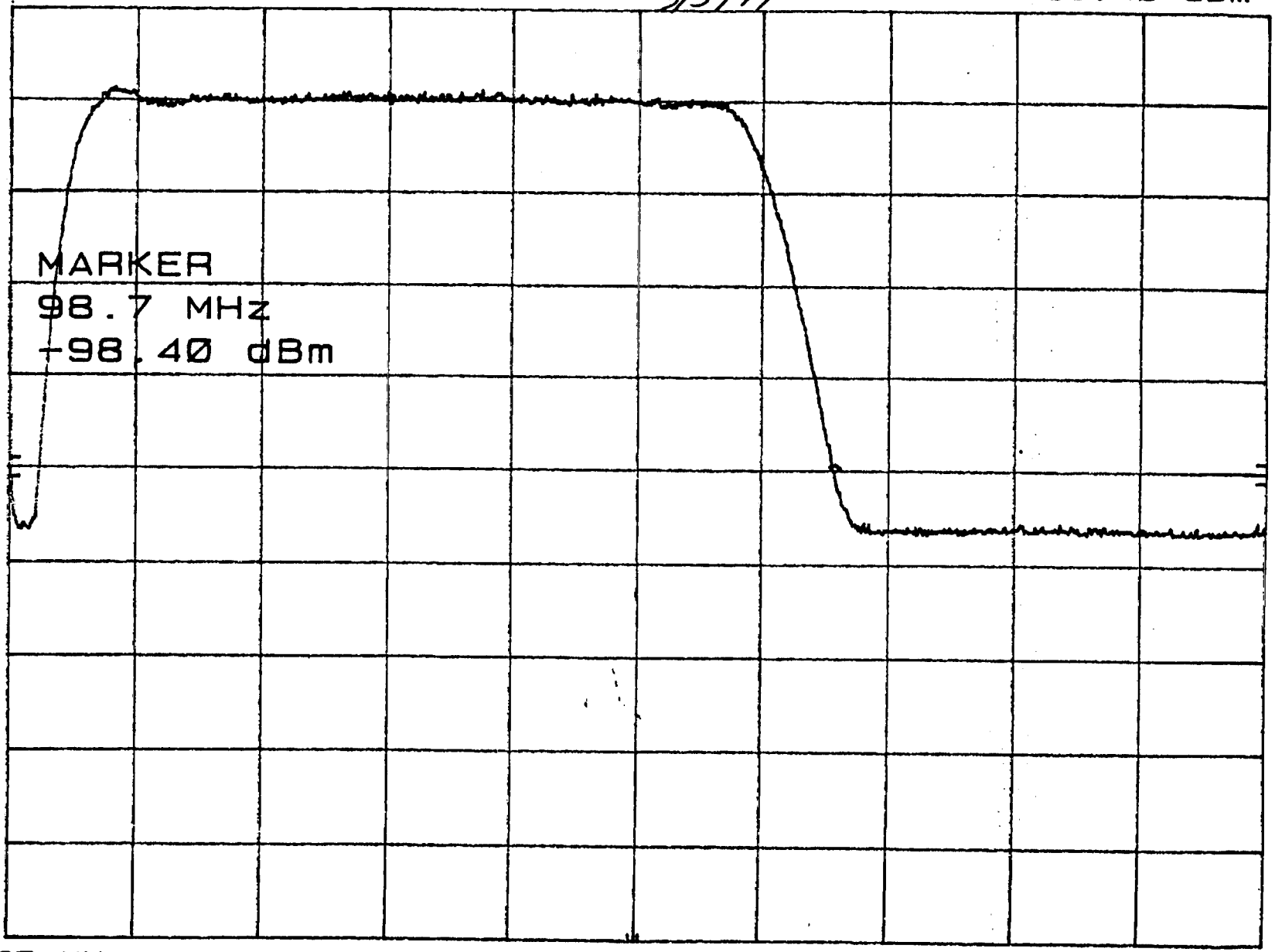
FOR REFERENCE ONLY

A1-2 Fo5 CH3 40 dB BAND REJ

hp REF -48.7 dBm ATTEN 0 dB 3/5/99

MKR 98.7 MHz
-98.40 dBm

10 dB/



CENTER 75 MHz

SPAN 150 MHz

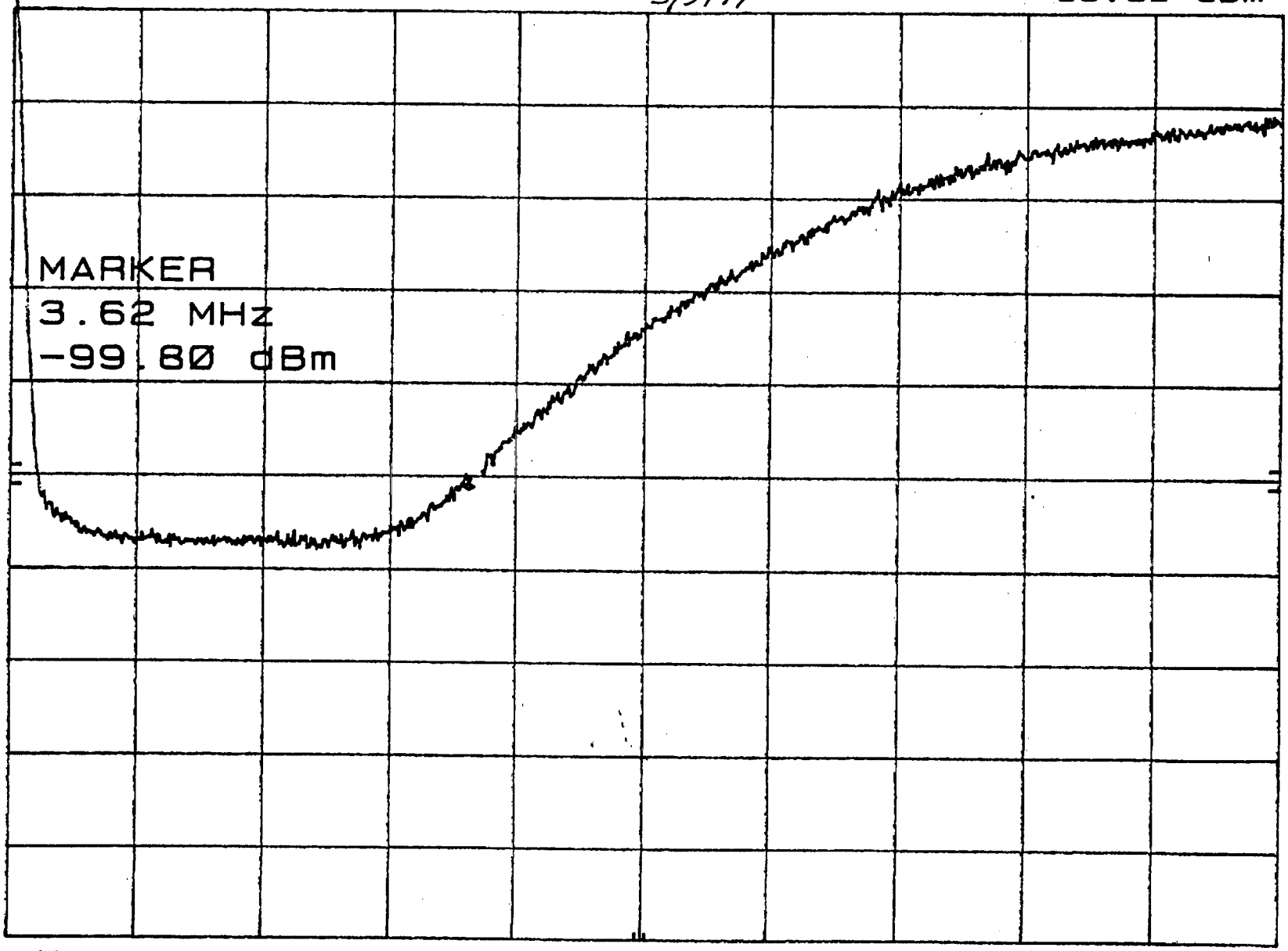
RES BW 30 kHz VBW 300 Hz SWP 45.0 sec

FOR REFERENCE ONLY

A1-2 F05 CH3 STOP BAND

hp REF -48.7 dBm ATTEN 0 dB 3/5/99 MKR 3.62 MHz -99.80 dBm

10 dB/

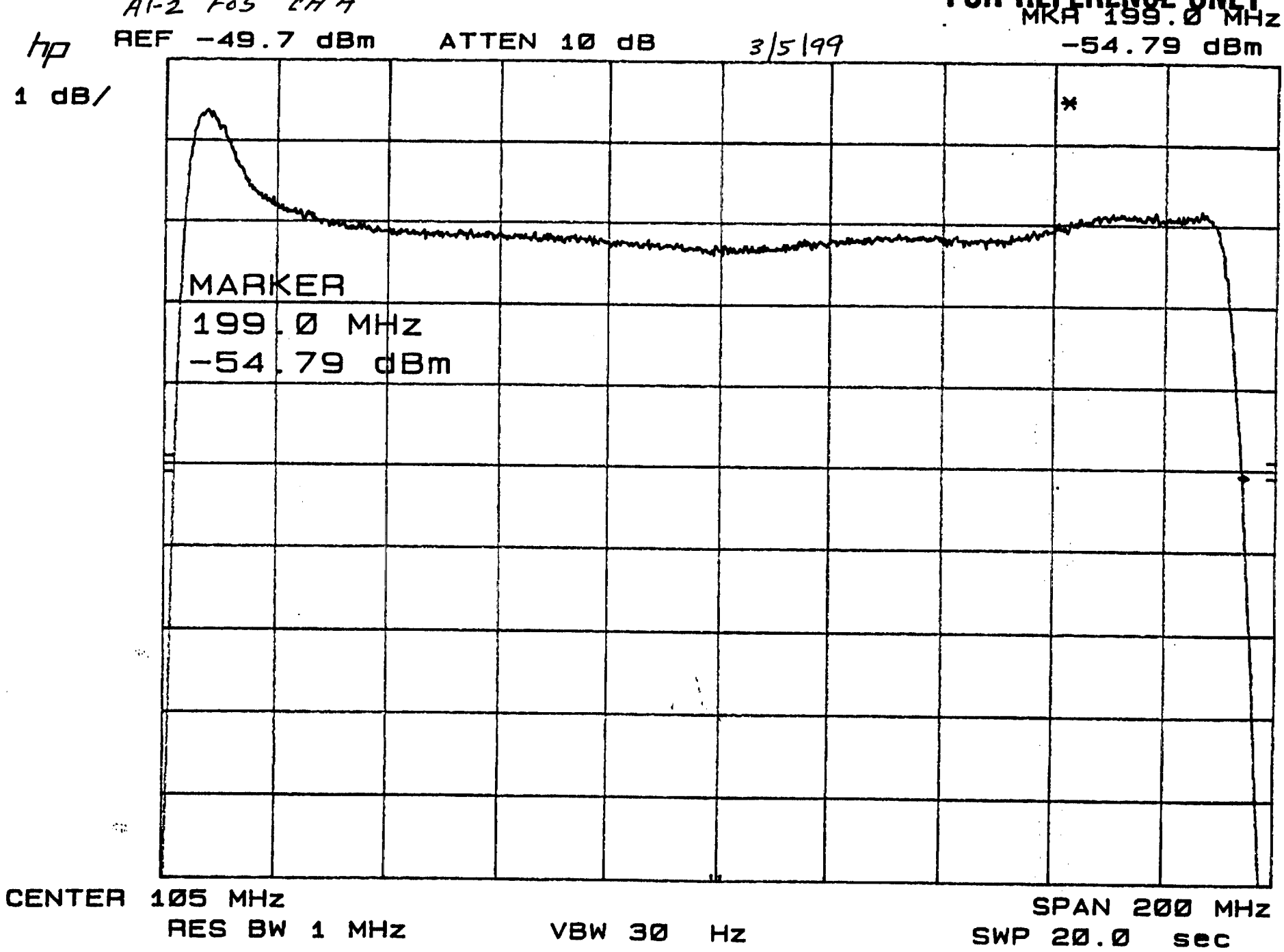


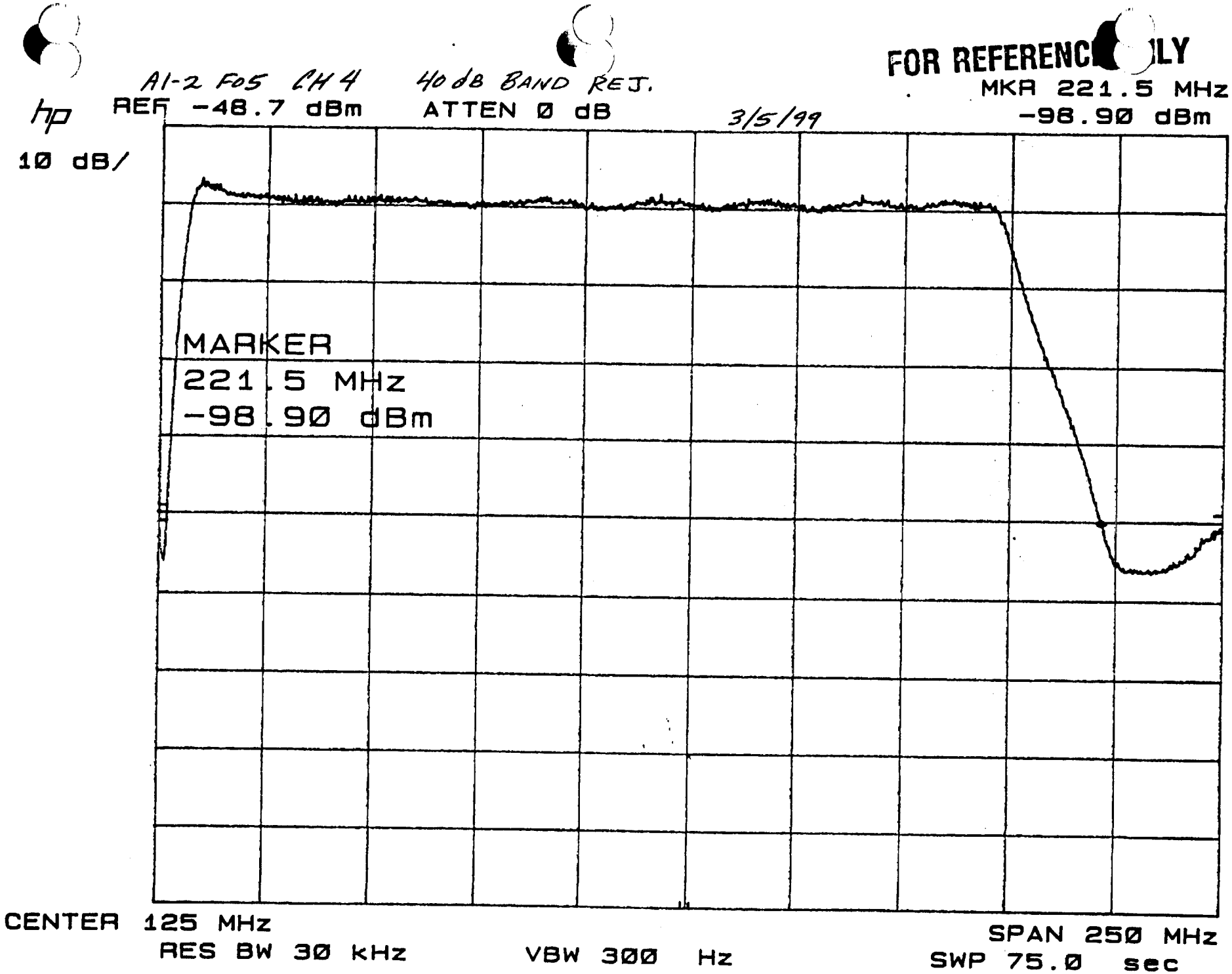
START 0 Hz STOP 10.0 MHz

RES BW 30 kHz VBW 300 Hz SWP 3.00 sec

A1-2 F05 CH 4

FOR REFERENCE ONLY




A1-2 FOS CH 4
40 dB BAND REJ.
FOR REFERENCE ONLY
hp
REF -48.7 dBm
ATTEN 0 dB
3/5/99
MKR 221.5 MHz
-98.90 dBm
10 dB/
MARKER
221.5 MHz
-98.90 dBm
CENTER 125 MHz
RES BW 30 kHz
VBW 300 Hz
SPAN 250 MHz
SWP 75.0 sec

FOR REFERENCE ONLY

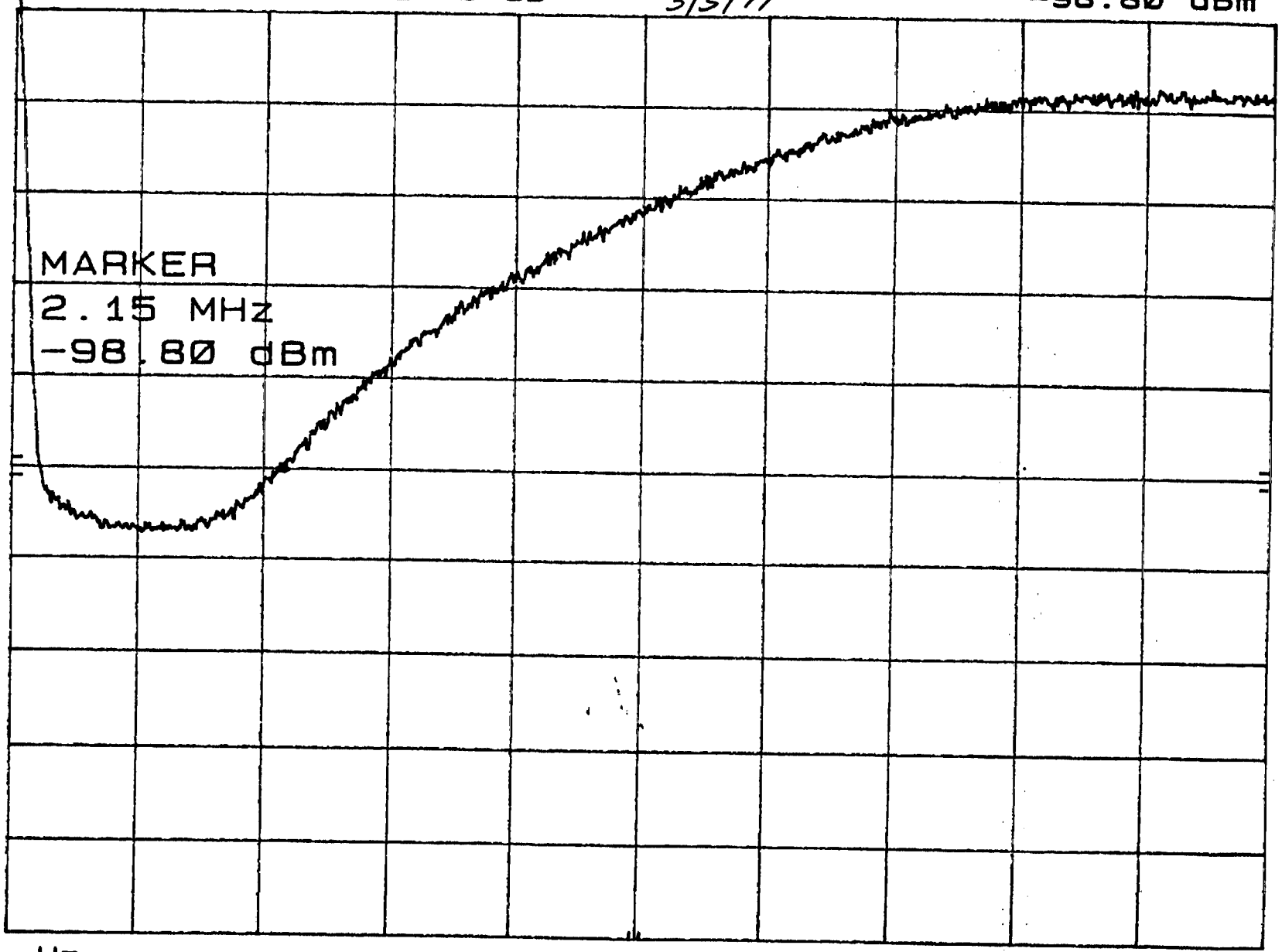
AI-2 FOS CH4 40 dB BAND REJ

hp

REF -48.7 dBm ATTEN 0 dB 3/5/99

MKA 2.15 MHz
-98.80 dBm

10 dB/



START 0 Hz

STOP 10.0 MHz

RES BW 30 kHz VBW 300 Hz SWP 3.00 sec

FOR REFERENCE ONLY

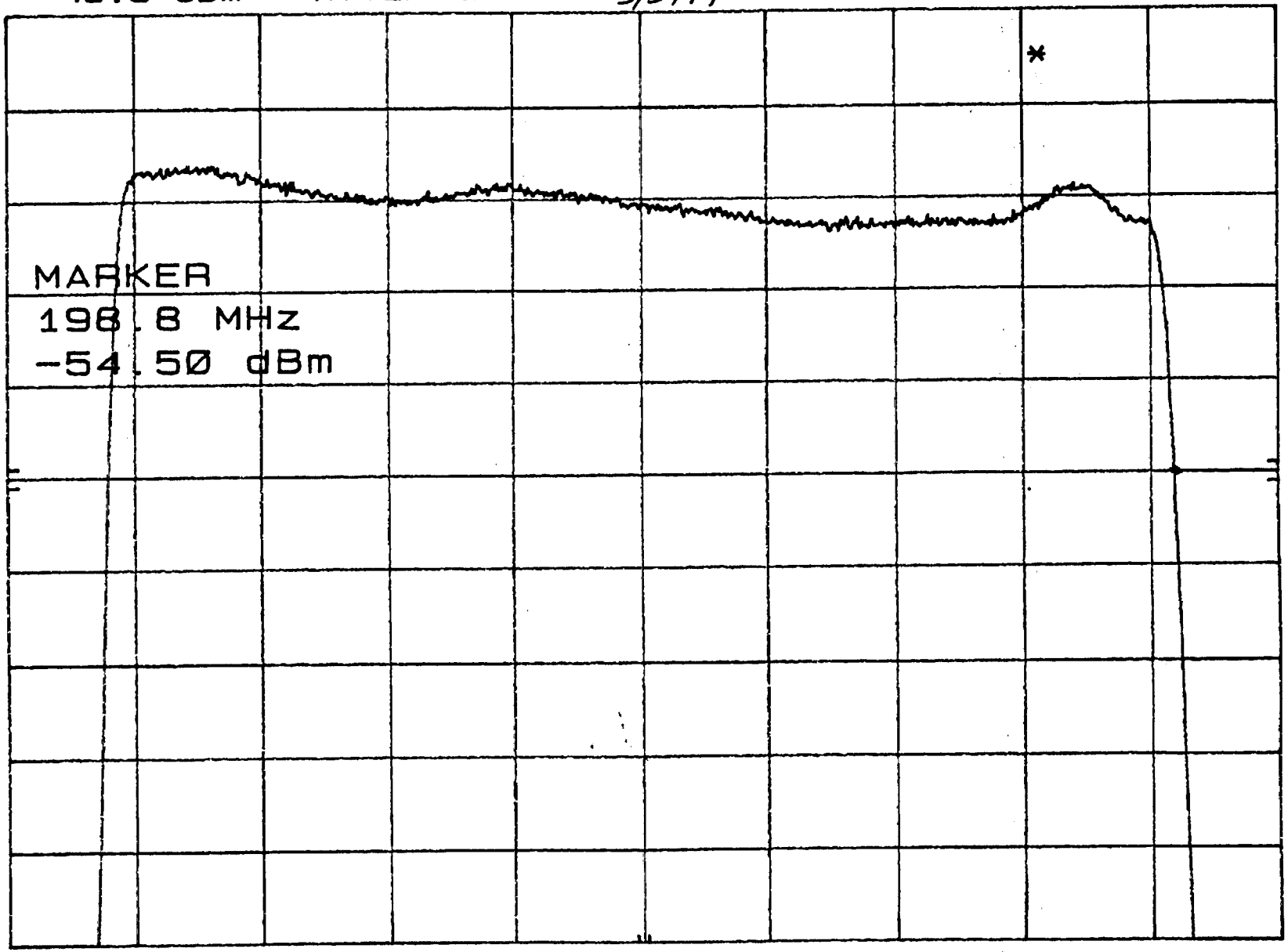
A1-2 F05 CH 5

hp

REF -49.5 dBm ATTEN 10 dB 3/5/99

MKR 198.8 MHz
-54.50 dBm

1 dB/



CENTER 115 MHz
RES BW 1 MHz
VBW 30 Hz
SPAN 200 MHz
SWP 20.0 sec

FOR REFERENCE ONLY

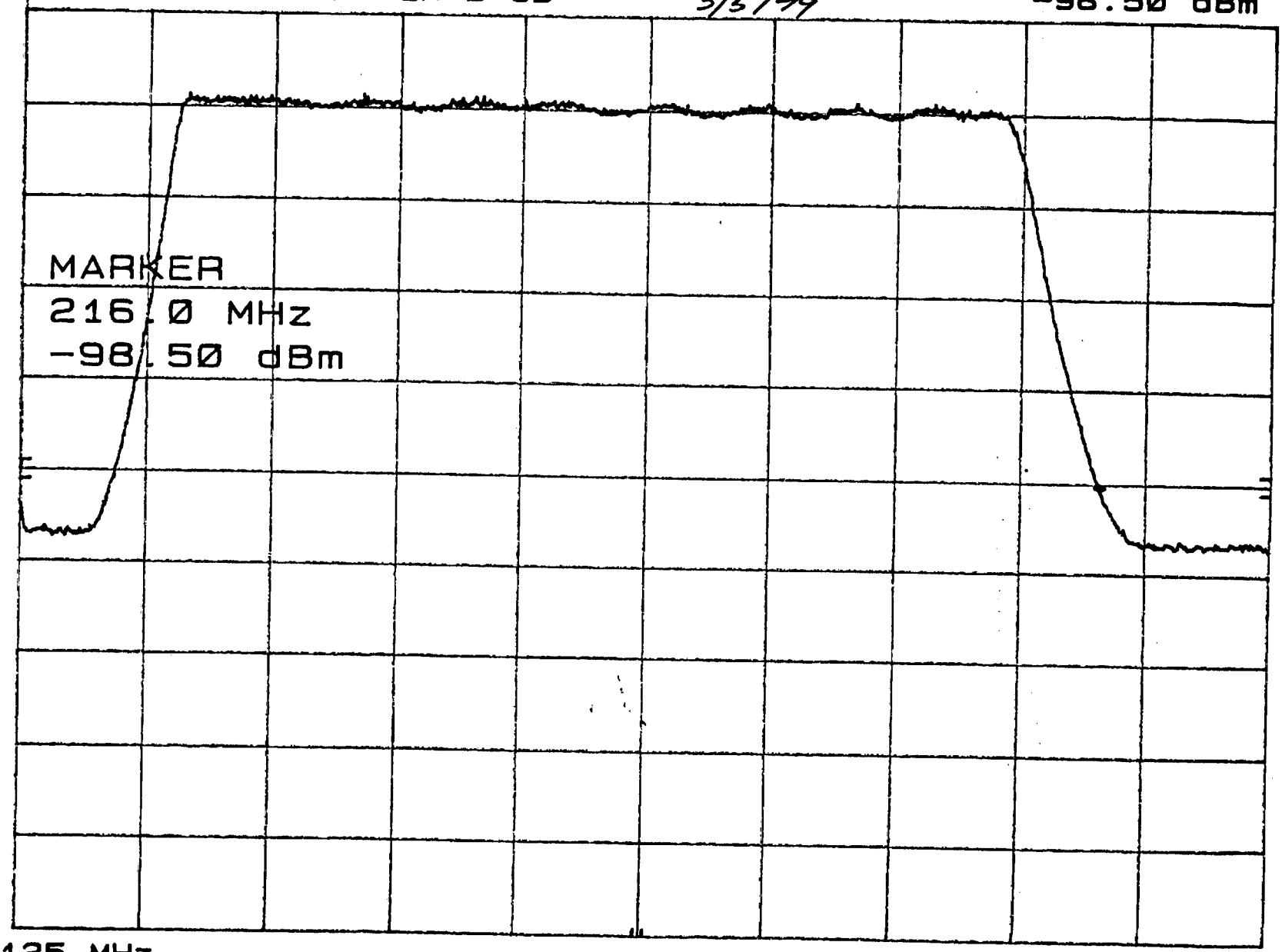
A1-2 F05 CH5 40dB BAND REJ

hp

REF -48.1 dBm ATTEN 0 dB 3/5/99

MKR 216.0 MHz
-98.50 dBm

10 dB/



CENTER 125 MHz

RES BW 30 kHz VBW 300 Hz SPAN 250 MHz

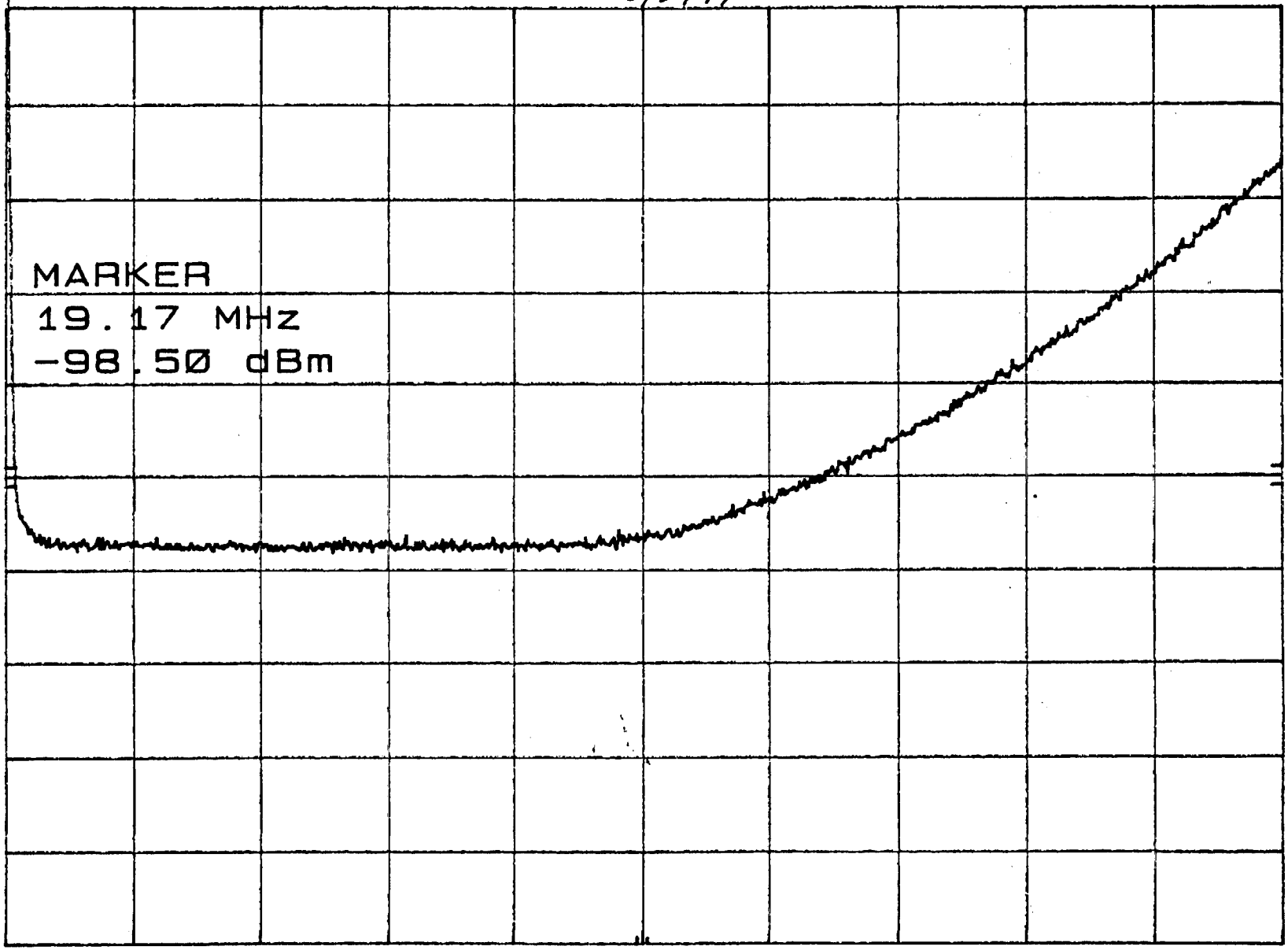
SWP 75.0 sec

A1-2 F05 CH5 40 dB BAND REJ

FOR REFERENCE ONLY

hp REF -48.1 dBm ATTEN 0 dB 3/5/99 MKR 19.17 MHz -98.50 dBm

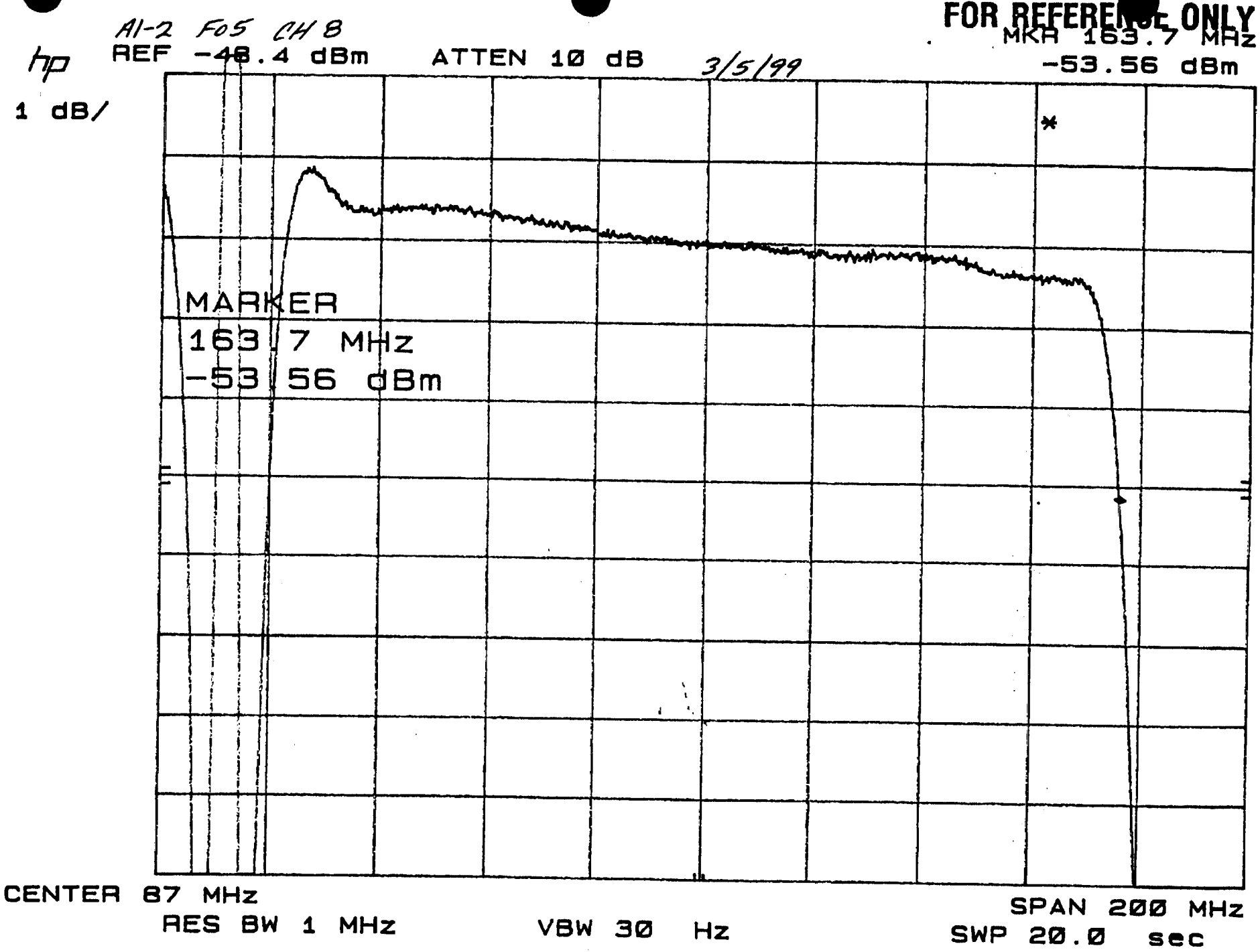
10 dB/



START 0 Hz STOP 30.0 MHz

RES BW 30 kHz VBW 300 Hz SWP 9.00 sec

FOR REFERENCE ONLY

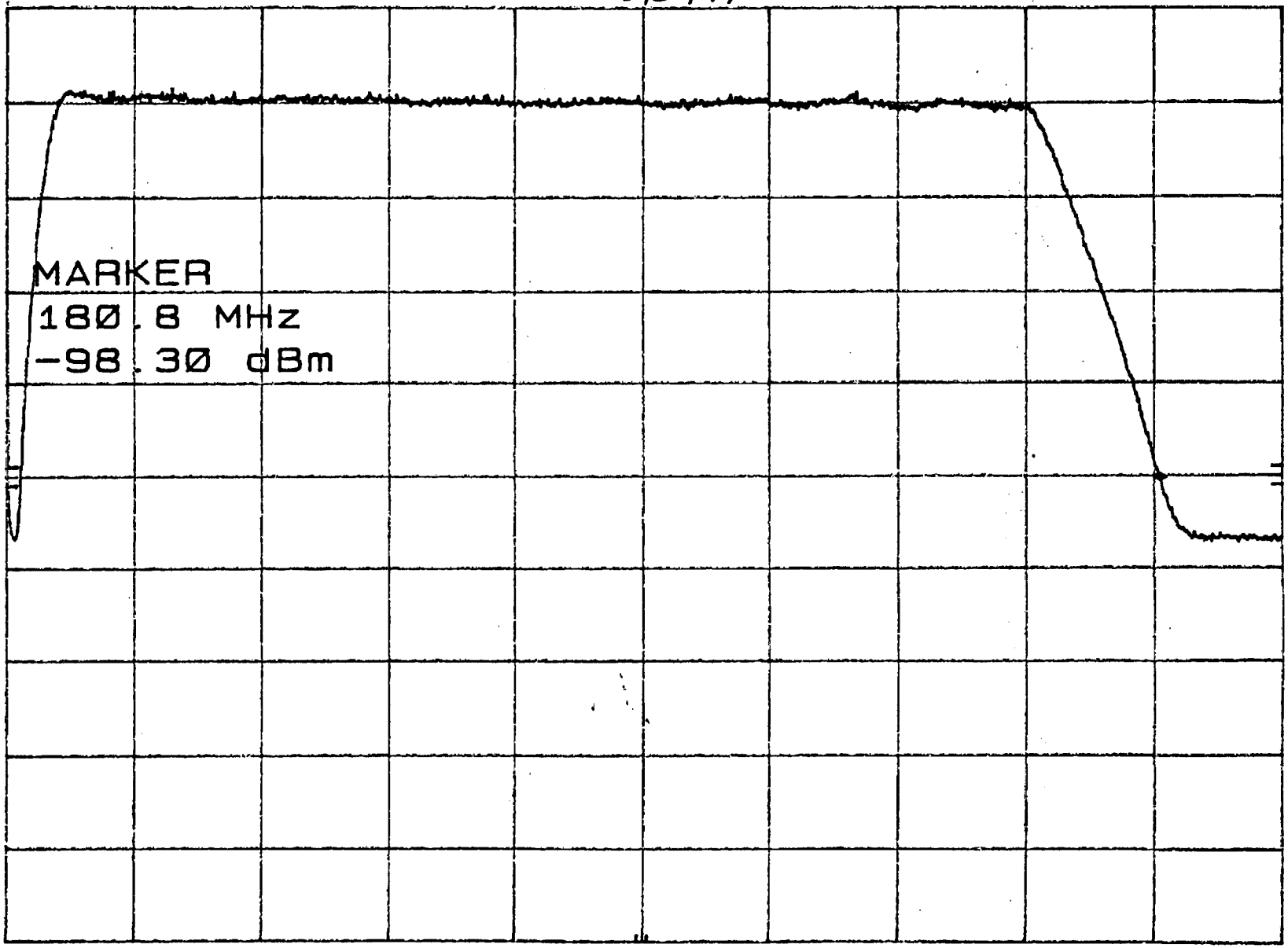


FOR REFERENCE ONLY

A1-2 F05 CHB 40dB BAND REJ

hp REF -48.1 dBm ATTEN 0 dB 3/5/99 MKR 180.8 MHz -98.30 dBm

10 dB/

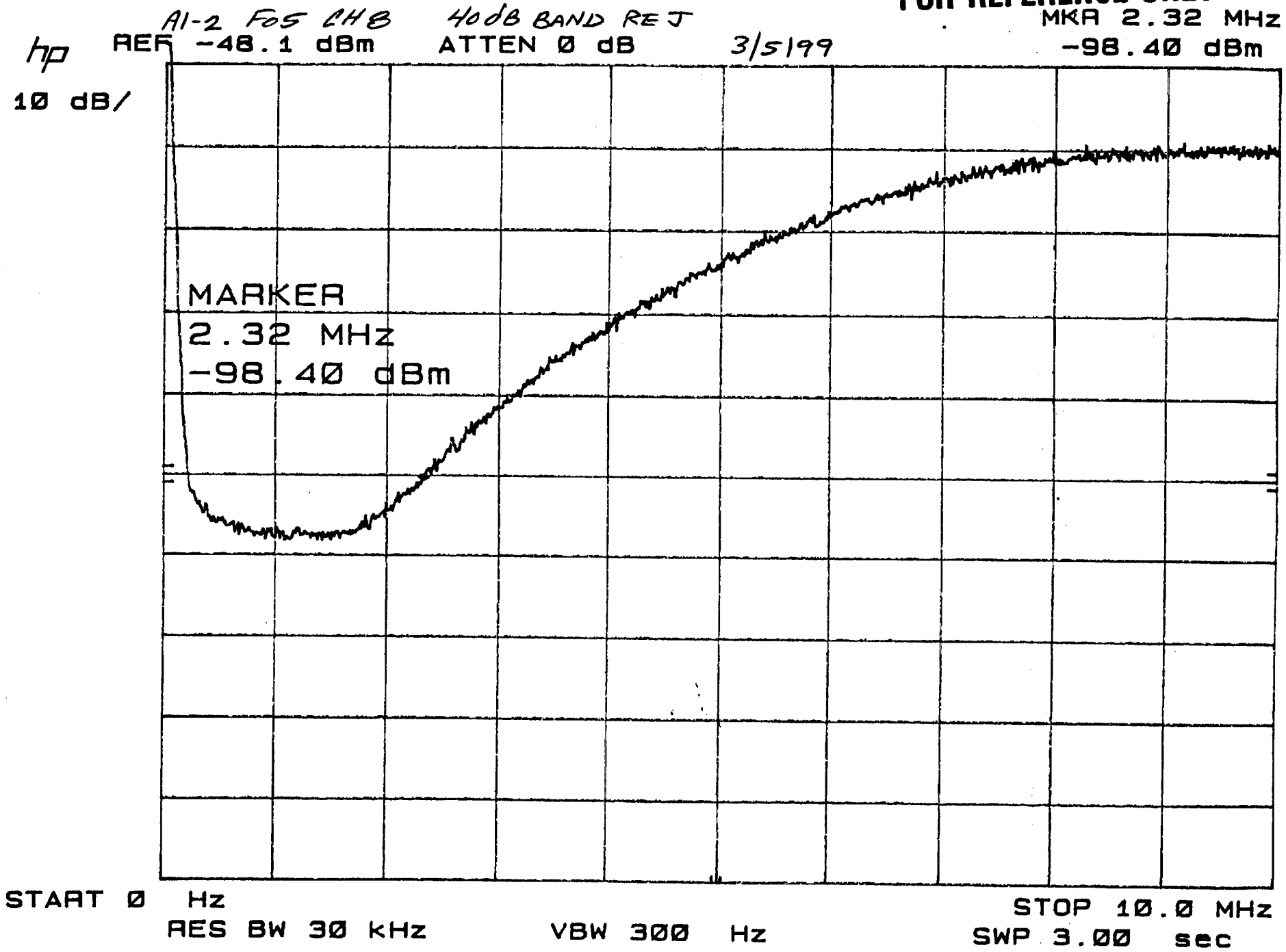


CENTER 100 MHz SPAN 200 MHz

RES BW 30 kHz VBW 300 Hz SWP 60.0 sec

FOR REFERENCE ONLY

A1-2 FOS CHB 40dB BAND REJ



TEST DATA SHEET 11 (Sheet 1 of 8)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 27.0 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	3	9.98	172.4	22.0	-.9233	.000279	-194.0	-.6466	.000193
				22.0	-.9235	.000258	-194.0	-.6460	.000260
				22.0	-.9237	.000254	-194.0	-.6461	.000228
				22.0	-.9240	.000248	-194.0	-.6460	.000208
				22.0	-.9234	.000238	-194.0	-.6464	.000238
				22.0	-.9239	.000270	-194.0	-.6460	.000217
				22.0	-.9240	.000221	-194.0	-.6465	.000242
				22.0	-.9240	.000298	-194.0	-.6460	.000189
				22.0	-.9239	.000270	-194.0	-.6461	.000195
				22.0	-.9237	.000255	-194.0	-.6465	.000229
Mixer/ Amps	All	10.02	172.5						

Part No.: 1356409-1
Serial No.: F05

Test Engineer: Y. Trinh
Quality Assurance: 7A 268 MAR 8 '99
Date: 3/05/99

TEST DATA SHEET 11 (Sheet 5 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 27.0 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
3		3.92				0.089			
		3.91				0.030			
		3.91				0.017			
		3.91				0.047			
		3.91				0.072			
		3.91				0.069			
		3.91				0.099			
		3.91				0.119			
		3.91				0.065			
		3.92				0.008			
	5.1		3.91	P	0.12		0.062	0.110	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 892 V2 MAR 8 '99

Date: 3/05/99

AMSU-A TEST **FOR REFERENCE ONLY**

A1-2. F05 ATP; CHAN 03 NF & NPS TEST; TP-270; 3/05/99

SEQ	TEMP	TEST	TEST TEMP	VOLTAGE	STD DEV	NF (dB)	NPS(K)
1	WARM	TEST	295.15	-.92331021	.00027932	----------	----------
2	COLD	TEST	79.15	-.84659827	.00019335	3.92251089	.08910173
3	WARM	TEST	295.15	-.92354491	.00025799	----------	----------
4	COLD	TEST	79.15	-.84595214	.00026039	3.90997947	.03049826
5	WARM	TEST	295.15	-.92357379	.00025405	----------	----------
6	COLD	TEST	79.15	-.84613273	.00022832	3.91124595	.01731753
7	WARM	TEST	295.15	-.92397097	.00024799	----------	----------
8	COLD	TEST	79.15	-.84601704	.00020805	3.90515192	.04651839
9	WARM	TEST	295.15	-.92391257	.00023757	----------	----------
10	COLD	TEST	79.15	-.84635197	.00023765	3.91206867	.07232009
11	WARM	TEST	295.15	-.92395622	.00027009	----------	----------
12	COLD	TEST	79.15	-.84599539	.00021711	3.90597842	.05899537
13	WARM	TEST	295.15	-.92399909	.00022148	----------	----------
14	COLD	TEST	79.15	-.84649354	.00024235	3.91329954	.09955060
15	WARM	TEST	295.15	-.92400001	.00029757	----------	----------
15	COLD	TEST	79.15	-.84604632	.00018564	3.90529199	.11903679
17	WARM	TEST	295.15	-.92391895	.00025972	----------	----------
18	COLD	TEST	79.15	-.84606712	.00019549	3.90751164	.05809709
19	WARM	TEST	295.15	-.92398193	.00025533	----------	----------
20	COLD	TEST	79.15	-.84652474	.00022919	3.91513043	.00862000

CH. 3 .79.5 MHz MHz

NOISE FIGURE AVERAGE (dB) - 3.91112948674

NOISE POWER STABILITY (K) - .05190559239995

NOISE POWER STABILITY DELTA (K) - .11041678935?

NPS MAX (K) - .11903678849? NPS MIN (K) - .00861999913243

INTEGRATION TIME - .155

TEST DATA SHEET 11 (Sheet 2 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 27.0 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	4	10.03	181.0	22.0	-1.053	.000203	-194.0	-.7590	.000166
				22.0	-1.053	.000186 ~~.000166~~ T. Trinh 3/5/99	-194.0	-.7585	.000200
				22.0	-1.053	.000212	-194.0	-.7585	.000200
				22.0	-1.053	.000194	-194.0	-.7585	.000234
				22.0	-1.053	.000205	-194.0	-.7586	.000210
				22.0	-1.053	.000215	-194.0	-.7584	.000209
				22.0	-1.053	.000227	-194.0	-.7582	.000154
				22.0	-1.053	.000187	-194.0	-.7582	.000218
				22.0	-1.053	.000215	-194.0	-.7583	.000146
				22.0	-1.053	.000196	-194.0	-.7585	.000139
Mixer/ Amps	All	10.02	172.5						

Part No.: 1356409-1

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 268 MAR 8 99

Date: 3/05/99

TEST DATA SHEET 11 (Sheet 6 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: T. Trinh (Signature) Baseplate Temperature (T_B) 27.0 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
4		4.24				0.059			
		4.23				0.017			
		4.23				0.073			
		4.22				0.038			
		4.23				0.062			
		4.23				0.078			
		4.22				0.095			
		4.22				0.008			
		4.22				0.077			
		4.23				0.043			
	4.95		4.23	P	0.08		0.055	0.087	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F05

Test Engineer: T. Trinh

Quality Assurance: 7A 268 MAR 8 '99

Date: 3/05/99

AMSU-A TEST

FOR REFERENCE ONLY

A1-2, F05 ATP; CHAN 04 NF & NPS TEST; TB-270; 03/05/99

SEQ	TEMP	TEST	TEST TEMP	VOLTAGE	STD DEV	NF (dB)	NPS(K)
1	WARM	TEST	295.15	-1.05255053	.00020342	----------	----------
2	COLD	TEST	79.15	-.75904224	.00016635	4.23573739	.05887021
3	WARM	TEST	295.15	-1.05274725	.00019558	----------	----------
4	COLD	TEST	79.15	-.75949709	.00020010	4.22759239	.01713011
5	WARM	TEST	295.15	-1.05299097	.00021185	----------	----------
6	COLD	TEST	79.15	-.75954933	.00020043	4.22574659	.07293520
7	WARM	TEST	295.15	-1.05300552	.00019401	----------	----------
8	COLD	TEST	79.15	-.75947150	.00023389	4.22443771	.03757779
9	WARM	TEST	295.15	-1.05295191	.00020527	----------	----------
10	COLD	TEST	79.15	-.75960758	.00020954	4.22593617	.05199951
11	WARM	TEST	295.15	-1.05292059	.00021502	----------	----------
12	COLD	TEST	79.15	-.75941433	.00020953	4.22557733	.07780227
13	WARM	TEST	295.15	-1.05301401	.00022747	----------	----------
14	COLD	TEST	79.15	-.75917437	.00015447	4.21995029	.09478529
15	WARM	TEST	295.15	-1.05282950	.00019574	----------	----------
16	COLD	TEST	79.15	-.75822057	.00021797	4.22251894	.00799939
17	WARM	TEST	295.15	-1.05290782	.00021451	----------	----------
18	COLD	TEST	79.15	-.75829549	.00014576	4.22288129	.07895999
19	WARM	TEST	295.15	-1.05273089	.00019512	----------	----------
20	COLD	TEST	79.15	-.75846024	.00018885	4.22722021	.04329570

CH. 4 .192 MHz MHz

NOISE FIGURE AVERAGE (dB) - 4.22597190679

NOISE POWER STABILITY (K) - .0549436450974

NOISE POWER STABILITY DELTA (K) - .0867968915247

NPS MAX (K) - .0947852849239 NPS MIN (K) - .0079993933992

INTEGRATION TIME - .165

TEST DATA SHEET 11 (Sheet 3 of 8)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 27.0 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	5	10.0	180.5	22.0	-.9715	.000190	-194.0	-.6899	.000177
				22.0	-.9714	.000205	-194.0	-.6897	.000182
				22.0	-.9713	.000172	-194.0	-.6899	.000149
				22.0	-.9713	.000189	-194.0	-.6901	.000194
				22.0	-.9712	.000221	-194.0	-.6897	.000180
				22.0	-.9711	.000167	-194.0	-.6896	.000167
				22.0	-.9710	.000206	-194.0	-.6898	.000225
				22.0	-.9709	.000193	-194.0	-.6900	.000168
				22.0	-.9710	.000184	-194.0	-.6901	.000192
				22.0	-.9709	.000197	-194.0	-.6896	.000168
Mixer/ Amps	All	10.02	172.5						

Part No.: 1356409-1
Serial No.: F05

Test Engineer: Y. Trinh
Quality Assurance: (7A 268) MAR 8 '99
Date: 3/05/99

TEST DATA SHEET 11 (Sheet 7 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 27.0 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
5		4.07				0.035			
		4.07				0.069			
		4.07				0.052			
		4.07				0.033			
		4.07				0.094			
		4.07				0.060			
		4.07				0.070			
		4.08				0.043			
		4.08				0.013			
		4.07				0.054			
	5.1		4.07	P	0.08		0.052	0.031	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 MAR 8 '99

Date: 3/05/99

AMSU-A TEST **FOR REFERENCE ONLY**

A1-2 F05 ATP CH 5 NOISE FIGURE AND NPS 5 MARCH 99; TB=27.0°C

SEQ	TEMP TEST	TEST TEMP	VOLTAGE	STD DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-.97145309	.00019011	----------	---------
2	COLD TEST	79.15	-.68999610	.00017703	4.05999746	.03478872
3	WARM TEST	295.15	-.97143350	.00020548	----------	---------
4	COLD TEST	79.15	-.68968991	.00018200	4.06501198	.06911869
5	WARM TEST	295.15	-.97128307	.00017186	----------	---------
6	COLD TEST	79.15	-.68992531	.00014992	4.07132757	.05171731
7	WARM TEST	295.15	-.97126140	.00018948	----------	---------
8	COLD TEST	79.15	-.69013430	.00019441	4.07491653	.03291137
9	WARM TEST	295.15	-.97119194	.00022142	----------	---------
10	COLD TEST	79.15	-.68967726	.00018041	4.06847899	.09394071
11	WARM TEST	295.15	-.97111747	.00016701	----------	---------
12	COLD TEST	79.15	-.68958192	.00016665	4.06791937	.06025525
13	WARM TEST	295.15	-.97096791	.00020595	----------	---------
14	COLD TEST	79.15	-.68983592	.00022514	4.07341986	.07026417
15	WARM TEST	295.15	-.97097733	.00019276	----------	---------
16	COLD TEST	79.15	-.68997993	.00016766	4.07668158	.04289869
17	WARM TEST	295.15	-.97097740	.00018375	----------	---------
18	COLD TEST	79.15	-.69010139	.00019182	4.07744526	.01301701
19	WARM TEST	295.15	-.97088446	.00019742	----------	---------
20	COLD TEST	79.15	-.68963114	.00016774	4.07115602	.05392991

CH. 5 .167.8 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.07161491575

NOISE POWER STABILITY (K) = .052264183405

NOISE POWER STABILITY DELTA (K) = .000237009748

NPS MAX (K) = .093940714431 NPS MIN (K) = .013017013456 3

INTEGRATION TIME = .165

TEST DATA SHEET 11 (Sheet 4 of 8)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 27.0 °C

Compo-nent	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	8	9.99	179.6	22.0	-1.146	.000253	-194.0	-.8434	.000234
				22.0	-1.146	.000223	-194.0	-.8435	.000320
				22.0	-1.146	.000211	-194.0	-.8430	.000203
				22.0	-1.146	.000231	-194.0	-.8434	.000213
				22.0	-1.145	.000208	-194.0	-.8430	.000273
				22.0	-1.146	.000230	-194.0	-.8432	.000264
				22.0	-1.146	.000252	-194.0	-.8438	.000268
				22.0	-1.146	.000235	-194.0	-.8433	.000263
				22.0	-1.146	.000229	-194.0	-.8433	.000281
				22.0	-1.146	.000244	-194.0	-.8436	.000199
Mixer/ Amps	All	10.02	172.6						

Part No.: 1356409-1
Serial No.: F05

Test Engineer: Y. Trinh
Quality Assurance: 7A 268 MAR 8 '99
Date: 3/05/99

TEST DATA SHEET 11 (Sheet 8 of 8)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 27.0 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
8		4.43				0.081			
		4.48				0.020			
		4.47				0.058			
		4.43				0.035			
		4.48				0.070			
		4.43				0.030			
		4.49				0.080			
		4.43				0.046			
		4.48				0.026			
		4.48				0.066			
	5.0		4.48	P	0.08		0.051	0.061	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 MAR 8 '99

Date: 3/05/99

FOR REFERENCE ONLY

AMSU-A TEST

A1-2 F05 ATP CH 8 NOISE FIGURE AND NPS 5 MARCH 99: TB=27.0 C

SEQ	TEMP TEST	TEST TEMP	VOLTAGE	STD DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-1.14605281	.00025272	----------	----------
2	COLD TEST	79.15	-.84338497	.00023446	4.47550825	.08087540
3	WARM TEST	295.15	-1.14605240	.00022763	----------	----------
4	COLD TEST	79.15	-.84350523	.00031980	4.47724955	.02007414
5	WARM TEST	295.15	-1.14578339	.00021057	----------	----------
6	COLD TEST	79.15	-.84304401	.00020298	4.47344775	.05824722
7	WARM TEST	295.15	-1.14554263	.00023106	----------	----------
8	COLD TEST	79.15	-.84339521	.00021315	4.48001877	.03500359
9	WARM TEST	295.15	-1.14544264	.00020331	----------	----------
10	COLD TEST	79.15	-.84297787	.00027297	4.47611401	.07010088
11	WARM TEST	295.15	-1.14557884	.00022968	----------	----------
12	COLD TEST	79.15	-.84318894	.00026428	4.47771568	.02997246
13	WARM TEST	295.15	-1.14551804	.00025207	----------	----------
14	COLD TEST	79.15	-.84379760	.00026855	4.48717010	.08023478
15	WARM TEST	295.15	-1.14583434	.00023498	----------	----------
16	COLD TEST	79.15	-.84326637	.00026259	4.47611738	.04630393
17	WARM TEST	295.15	-1.14579297	.00022872	----------	----------
18	COLD TEST	79.15	-.84331159	.00028136	4.47721054	.02583531
19	WARM TEST	295.15	-1.14580923	.00024403	----------	----------
20	COLD TEST	79.15	-.84355463	.00019883	4.48055047	.06606892

CH. 8 .156 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.47811174403

NOISE POWER STABILITY (K) = .0512716832287

NOISE POWER STABILITY DELTA (K) = .0608012645614

NPS MAX (K) = .0808754036576 NPS MIN (K) = .0200741390962

INTEGRATION TIME = .165

TEST DATA SHEET 17

Temperature Sensor and Thermistor Test Data (Paragraph 3.6.1) (A1-2)

Test Setup Verified: T. Trinh (Signature) Baseplate Temperature (T_B) 26 °C

Reference Designation	Specification	Measured Value	Pass/Fail
RT 41	2200 ± 100 Ω	2205.7 Ω	P
RT 42	2200 ± 100 Ω	2218.6 Ω	P
RT 43	2200 ± 100 Ω	2228.4 Ω	P
RT 44	2200 ± 100 Ω	2214.8 Ω	P
RT 12	2200 ± 100 Ω	2218.4 Ω	P
RT 17	2200 ± 100 Ω	2204.7 Ω	P
RT 18	2200 ± 100 Ω	2206.1 Ω	P
RT 19	2200 ± 100 Ω	2205.5 Ω	P
RT 22	2200 ± 100 Ω	2208.5 Ω	P
RT 33	2200 ± 100 Ω	2208.1 Ω	P
TB 58	3000 ± 100 Ω	2919.2 Ω	P
TB 59	3000 ± 100 Ω	2921.0 Ω	P
TB 54	4.1 – 4.6 V	4.425 V	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F05

Test Engineer: T. Trinh

Quality Assurance: 892 YL MAR 8 '99

Date: 3/05/99

TEST DATA SHEET 20

Survival Heater and Thermal Switch Test Data (Paragraph 3.6.2) (A1-2)

Test Setup Verified: T. Trinh
Signature

Baseplate Temperature (T_B) 26 °C

Reference Designation	Open Switch		Closed Switch		
	>10 MΩ	Pass/Fail	Specification	Measured Value	Pass/Fail
HR1/TS1	> 50	P	40 - 48 Ω	42.4	P
	> 50	P		43.2	P
HR2/TS2	> 50	P		41.6	P
	> 50	P		41.5	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F05

Test Engineer: T. Trinh

Quality Assurance: [signature] MAR 8 '99

Date: 3/05/99

TEST DATA SHEET 22 (Sheet 2 of 3)
Bias Voltage Verification Test Data (Paragraph 3.6.3) (A1-2)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 26 °C

Reference Designation	Specification	Measured Value (V)	Pass/Fail
Mixer/IF AMP Ch 3, 4, 5, 8	+10 ±0.1	10.00	Pass
DRO Ch 5	+10 ±0.1	9.99	Pass
DRO Ch 4	+10 ±0.1	10.01	Pass
DRO Ch 3	+10 ±0.1	9.96	Pass
DRO Ch 8	+10 ±0.1	9.97	Pass

Part No.: 1356409-1

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 268 MAR 8 '99

Date: 3/05/99

TEST DATA

FOR

AMSU-A1-1 (P/N: 1356429-1, S/N: F05)

TEST DATA SHEET 1

LO Frequency Test Data (Paragraph 3.5.1) (A1-1)

Test Setup Verified: Y. Yrinh (Signature) Baseplate Temperature (T_B) 27.0 °C

Component	Channel No.		V_b(V)	I_b(mA)	P_{dc}(mW) Required (Max)	P_{dc}(mW) Measured	Pass/ Fail	f_o(GHz) Required	f_o(GHz) Measured	Pass/ Fail
LO	6		+9.97	193.7	2,700	1931.19	P	54.400 ± 0.003	54.397621	P
	7		+9.93	194.3	2,700	1929.4	P	54.940 ± 0.003	54.940251	P
	LO No. 1	9	Positive		9,000 (13,500)*	7628.7	P	57.290344 ± 0.000086		
		10								
		11	+15.13	+504.2					57.290343	P
		12	Negative		1,500	1075.89	P			
		13								
		14	-15.13	-71.11						
	LO No. 2	9	Positive		9,000 (13,500)*			57.290344 ± 0.000086		
		10								
		11	+15.13	+516.55		7815.40	P		57.290326	P
		12	Negative		1,500					
		13								
		14	-15.13	-71.78	1086.03	1086.03	P			
	15		+14.38	176.7	3500	2629.3	P	88.980 ± 0.080	88.94650	P
Mixer/ Amps	All		+9.94	243.9	2,550	2424.37				
IF Amps	All		+7.95	265.5	5,500	2110.73				
TOTAL					Primary (LO #1) 24,510 (29,010)*	19729.53				
					Redundancy (LO #2) 24,510 (29,010)*	19926.42				

* Indicates required values for the PLO specified in AE-26660. Pass = P, Fail = F

PLO 1 Lock Detect ☑ 14.27V PLO 2 Lock Detect ☑ 14.23V

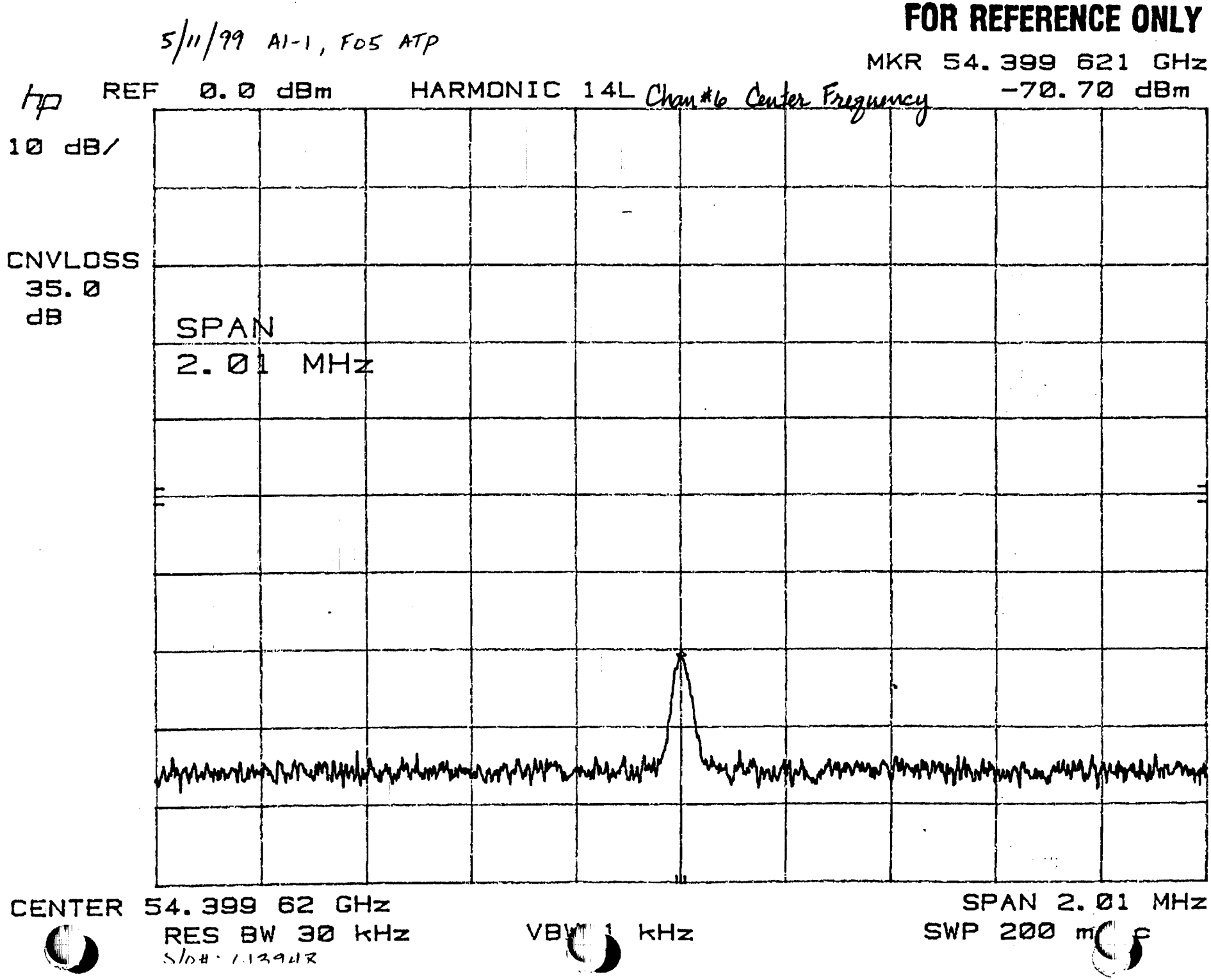
Part No.: 1356429-2 Test Engineer: Y. Yrinh

Serial No.: F05 Quality Assurance: 893 MAY 1999

Date: 5/11/99

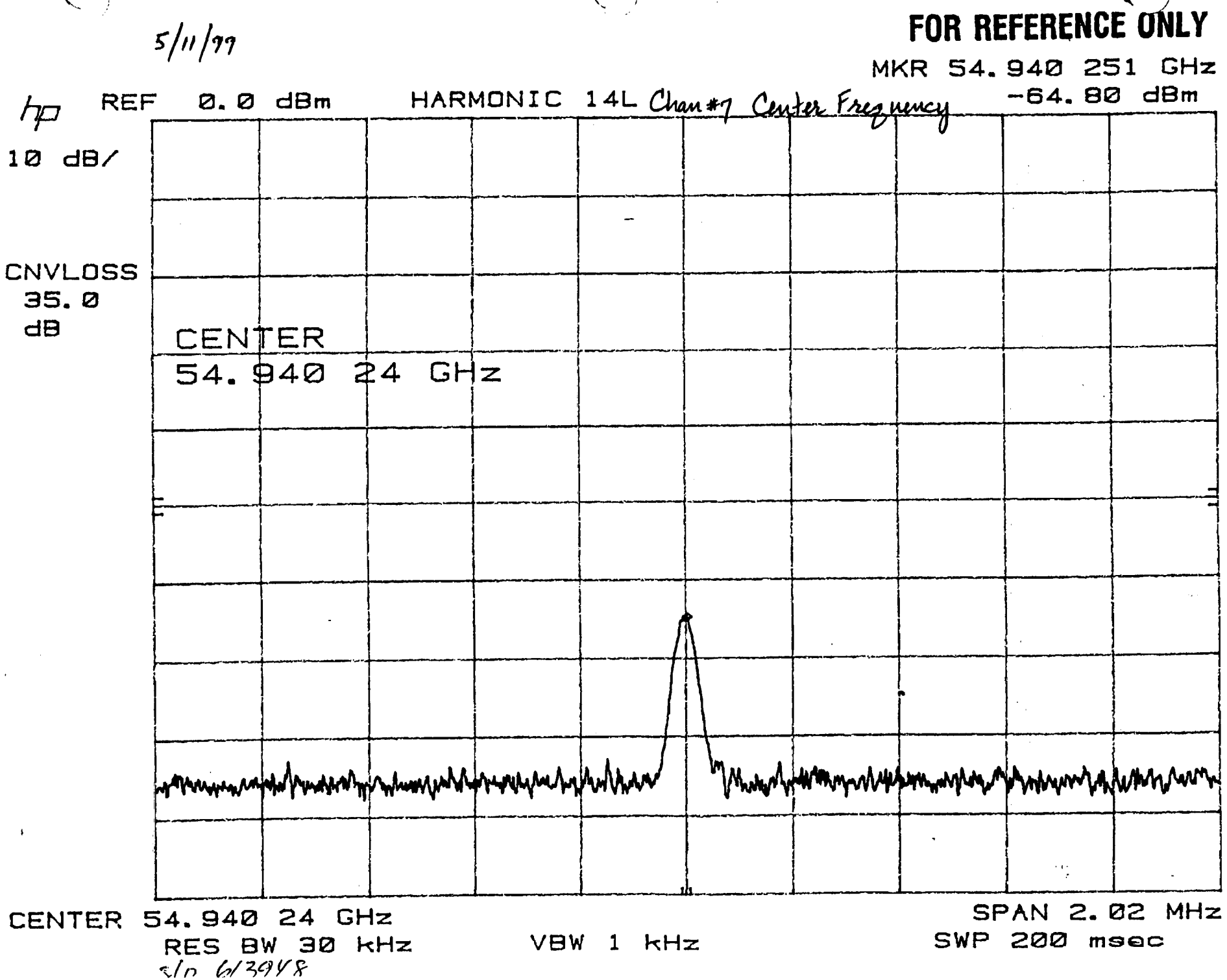
5/11/99 A1-1, FOS ATP

FOR REFERENCE ONLY



5/11/99

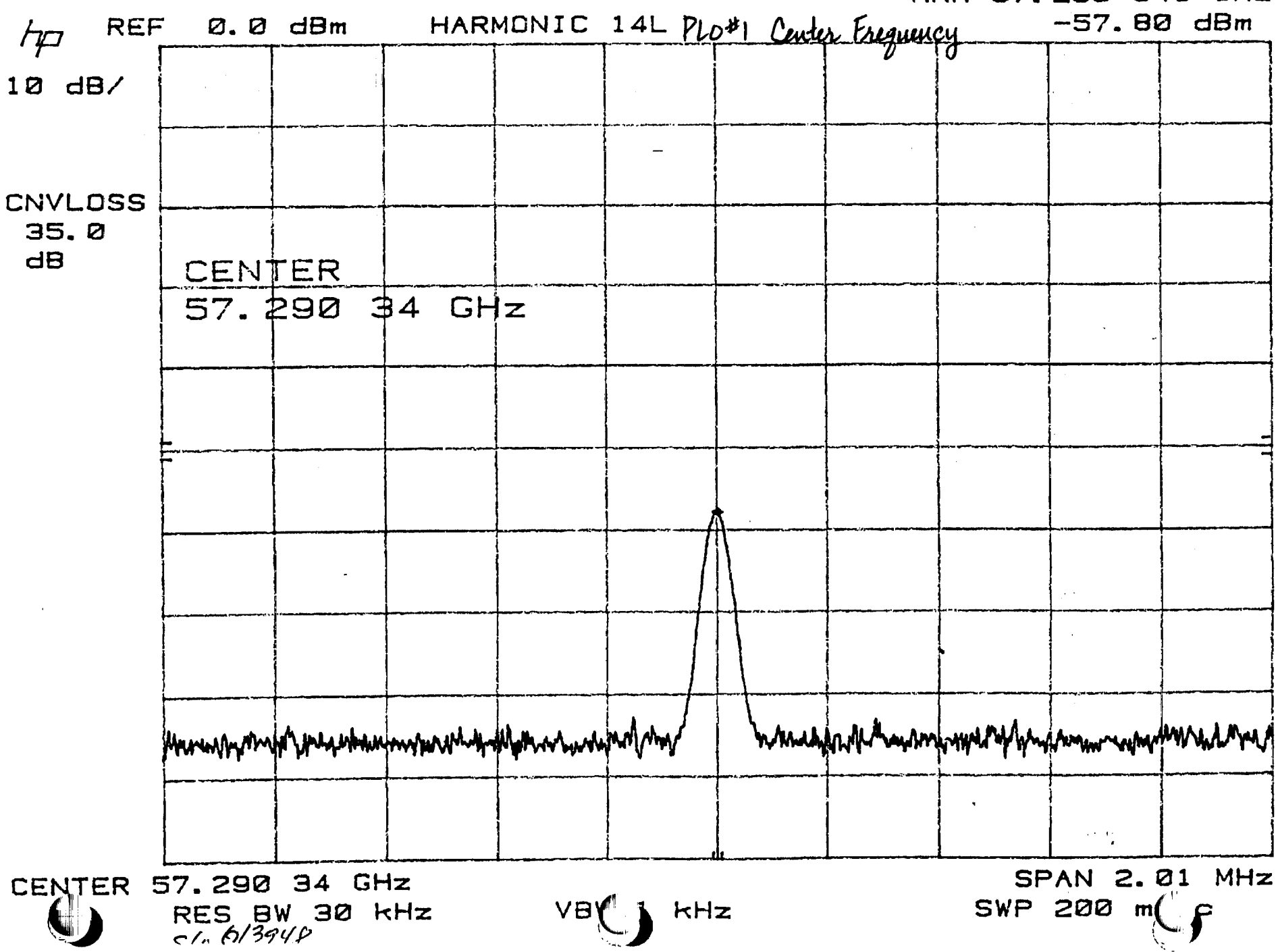
FOR REFERENCE ONLY



s/n 613948

5/11/99

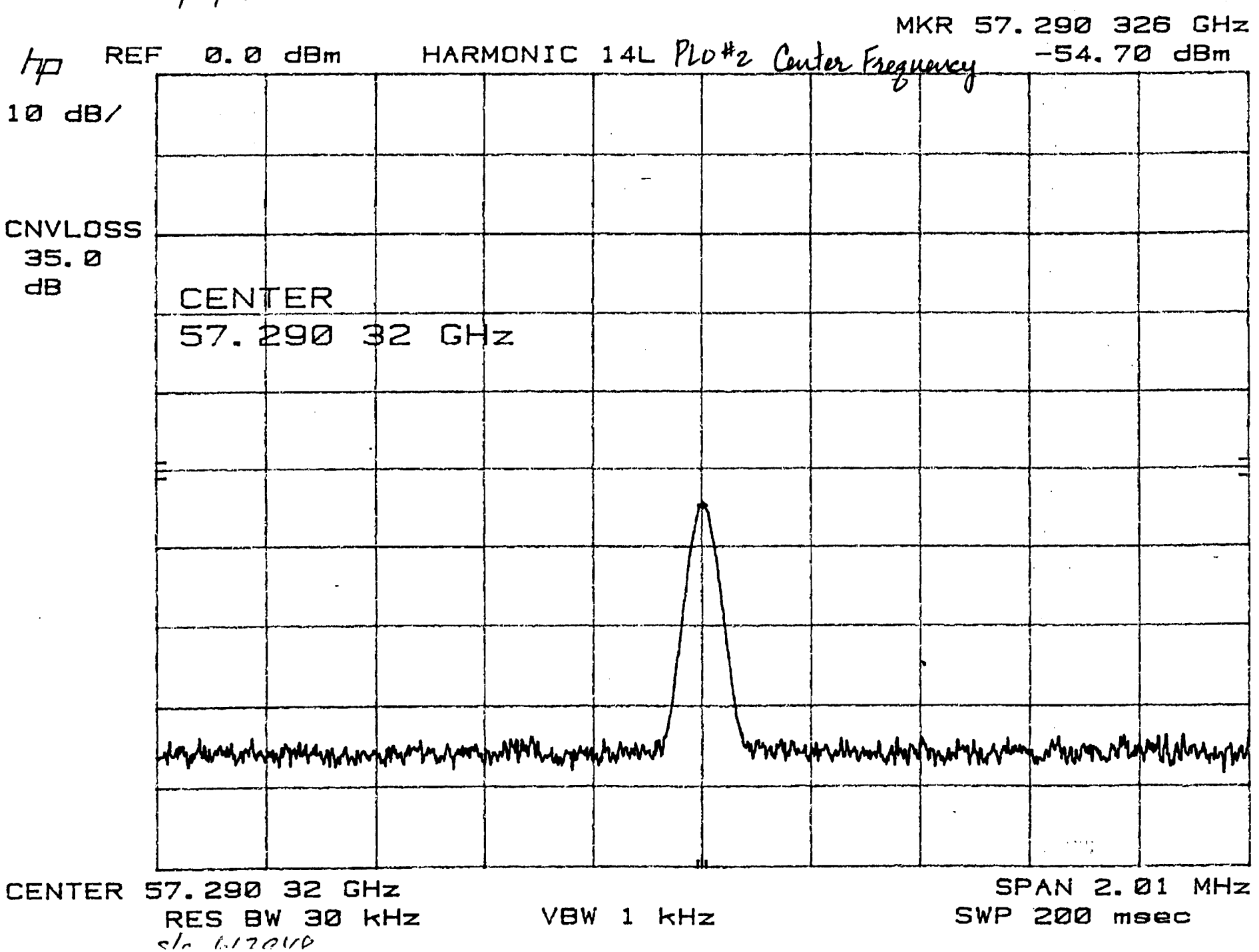
FOR REFERENCE ONLY



S/N 61394P

5/11/99

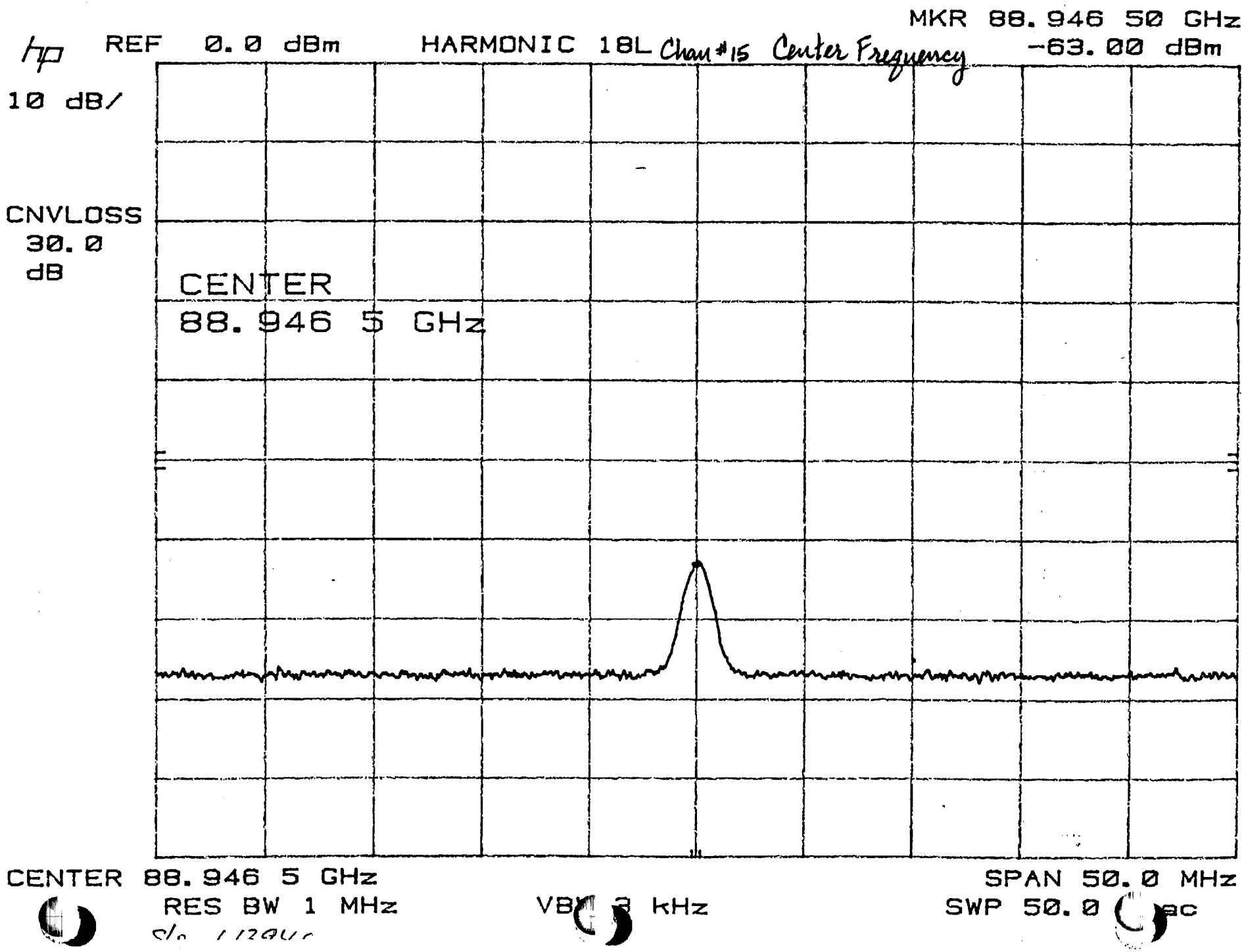
FOR REFERENCE ONLY



s/c 617210

5/11/99

FOR REFERENCE ONLY



S/N 11290C

TEST DATA SHEET 4

IF Output Power Test Data (Paragraph 3.5.2) (A1-1)

Test Setup Verified: Y. Yrink (Signature) Baseplate Temperature (T_B) 29.4 °C

Component	Channel No.		V_b(V)	I_b(mA)	P_o(dBm)	Atten (dB)	P_o(dBm) Required	P_o(dBm) Measured	Pass/ Fail
LO	6		4.96	193.8	-19.25	8	-27.0 ± 1.0	-27.47	P
	7		9.93	194.3	-20.17	7	-27.0 ± 1.0	-27.35	P
	LO No. 1	9	Positive		-21.93	5	-27.0 ± 1.0	-27.05	P
		10			-23.01	4	-27.0 ± 1.0	-27.13	P
		11	+15.13	505.57	-21.11	6	-27.0 ± 1.0	-27.05	P
		12	Negative		-20.88	6	-27.0 ± 1.0	-26.82	P
		13			-21.35	6	-27.0 ± 1.0	-27.32	P
		14	-15.13	-71.32	-21.42	6	-27.0 ± 1.0	-27.38	P
	LO No. 2	9	Positive		[redacted]		-27.0 ± 1.0	-26.94	P
		10					-27.0 ± 1.0	-26.99	P
		11	+15.13	519.4			-27.0 ± 1.0	-27.00	P
		12	Negative				-27.0 ± 1.0	-26.80	P
		13					-27.0 ± 1.0	-27.29	P
		14	-15.13	-71.98			-27.0 ± 1.0	-27.29	P
	15		14.88	177.1	-23.26	4	-27.0 ± 1.0	-27.40	P
Mixer/ Amps	All		9.93	243.5	[redacted]				
IF Amps	All		7.95	266.4					

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Yrink

Quality Assurance: TA 268 MAY 24 '99

Date: 5/11/99

TEST DATA SHEET 7 (Sheet 1 of 2)

Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-1)

Test Setup Verified: Y. Yinh (Signature) Baseplate Temperature (T_B) 28.4 °C

Component	Channel No.	V_b(V)	I_b(mA)	3 dB BW Frequency (MHz)		3 dB BW Frequency (MHz)		Pass/Fail
				Lower	Higher	Required MAX	Measured	
LO	6	9.97	193.7	7.8	200.2	200	192.4	P
	7	9.93	194.3	7.6	199.4	200	191.8	P
LO No. 1	9	Positive		8.9	162.9	165	154.0	P
	10			179.3	255.6	78	76.3	P
				257.4	291.8	36	34.4	P
	11	+15.13	505.33	352.8	387.3	36	34.5	P
	12	Negative		292.5	308.0	16	15.5	P
				336.2	351.7	16	15.5	P
	13			308.4	316.2	8	7.8	P
				328.4	336.25	8	7.85	P
				316.3	319.22	3	2.92	P
	14	-15.13	-71.29	325.24	328.16	3	2.92	P
LO No. 2	9	Positive		9.1	162.7	165	153.6	P
	10			179.2	255.3	78	76.1	P
				257.1	291.6	36	34.5	P
	11	+15.13	518.33	352.8	387.2	36	34.4	P
	12	Negative		292.5	308.0	16	15.5	P
				336.2	351.7	16	15.5	P
	13			308.35	316.20	8	7.85	P
				328.35	336.25	8	7.9	P
	14			316.25	319.2	3	2.92	P
		-15.13	-71.89	325.24	328.18	3	2.94	P
	15	14.88	176.88	481	1456	1000	975	P
Mixer/Amps	All							
IF Amps	All							

Part No.: 1356429-2 Test Engineer: Y. Yinh

Serial No.: F05 Quality Assurance: 74 268 MAY 04 '99

Date: 5/12/99

TEST DATA SHEET 7 (Sheet 2 of 2)

Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.4 °C

Component	Channel No.	V_b(V)	I_b(mA)	40 dB BW Frequency (MHz)		40 dB BW Frequency (MHz)		Pass/Fail
				Lower	Higher	Required MAX (Ref Only)	Measured	
LO	6	9.97	193.7	2.3	221.8	520	219.5	P
	7	9.93	194.3	2.3	221.3	520	219.0	P
LO No. 1	9	Positive		2.0	179.0	429	177.0	P
	10			170.2	265.2	101	95.0	P
	11	+15.13	505.33	N/A	N/A	47	N/A	N/A
	12	Negative		N/A	N/A	21	N/A	N/A
	13			N/A	N/A	10	N/A	N/A
	14	-15.13	-71.29	N/A	N/A	4	N/A	N/A
LO No. 2	9	Positive		2.0	179.2	429	177.2	P
	10			170.1	265.2	101	95.1	P
	11	+15.13	518.33	N/A	N/A	47	N/A	N/A
	12	Negative		N/A	N/A	21	N/A	N/A
	13			N/A	N/A	10	N/A	N/A
	14	-15.13	-71.89	N/A	N/A	4	N/A	N/A
	15	14.88	176.88	N/A	N/A	7800	N/A	N/A
Mixer/Amps	All							
IF Amps	All							

Part No.: 1356429-2

Serial No.: F05

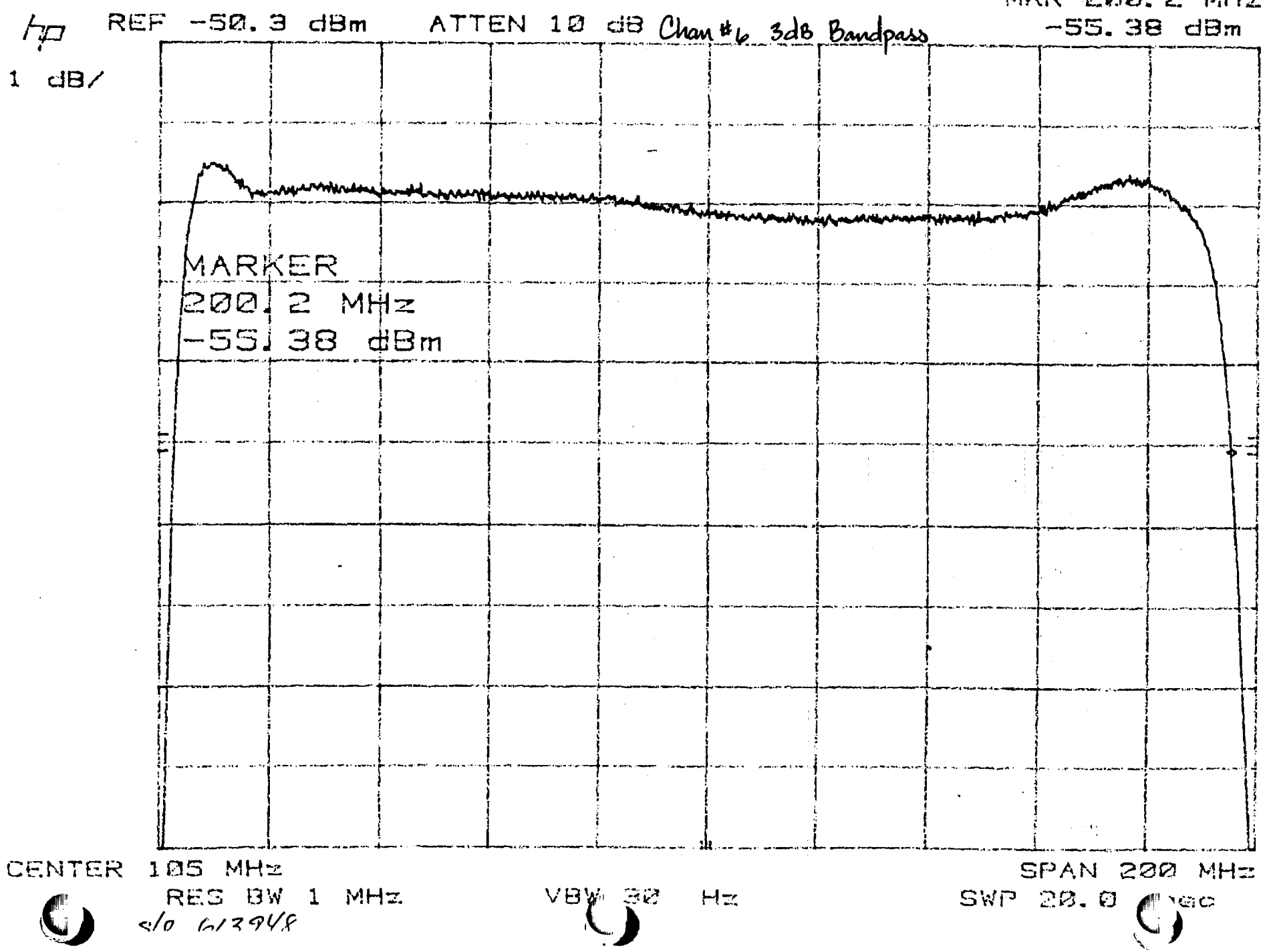
Test Engineer: Y. Trinh

Quality Assurance: 268 MAY 24 99

Date: 5/11/99

5/11/99
A1-1 FoS ATP

FOR REFERENCE ONLY



s/o G13948

5/11/99
AI-1 FOS ATP

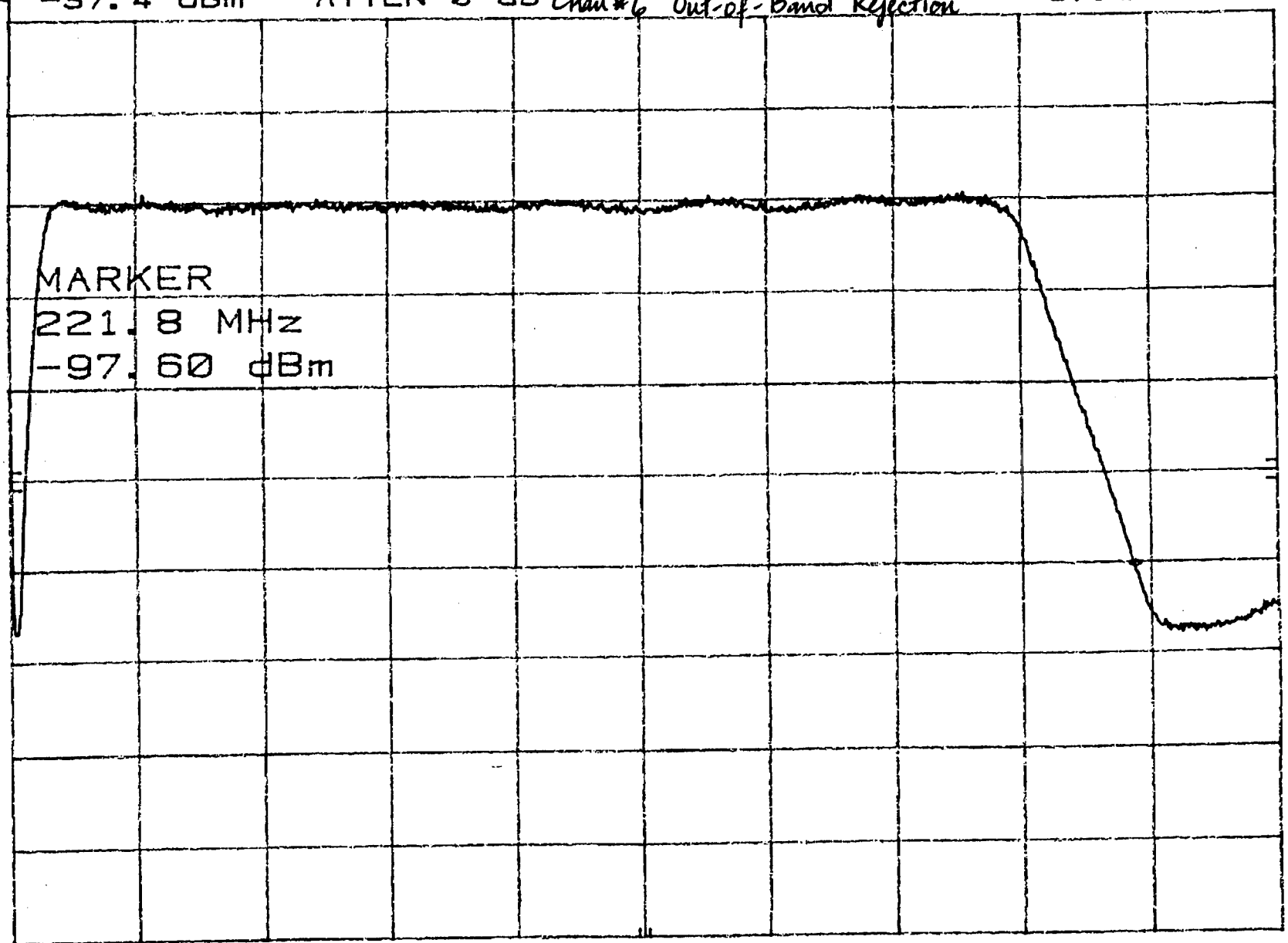
FOR REFERENCE ONLY

40 dB

MKR 221.8 MHz
-97.60 dBm

hp REF -37.4 dBm ATTEN 0 dB Chan #6 Out-of-Band Rejection

10 dB/

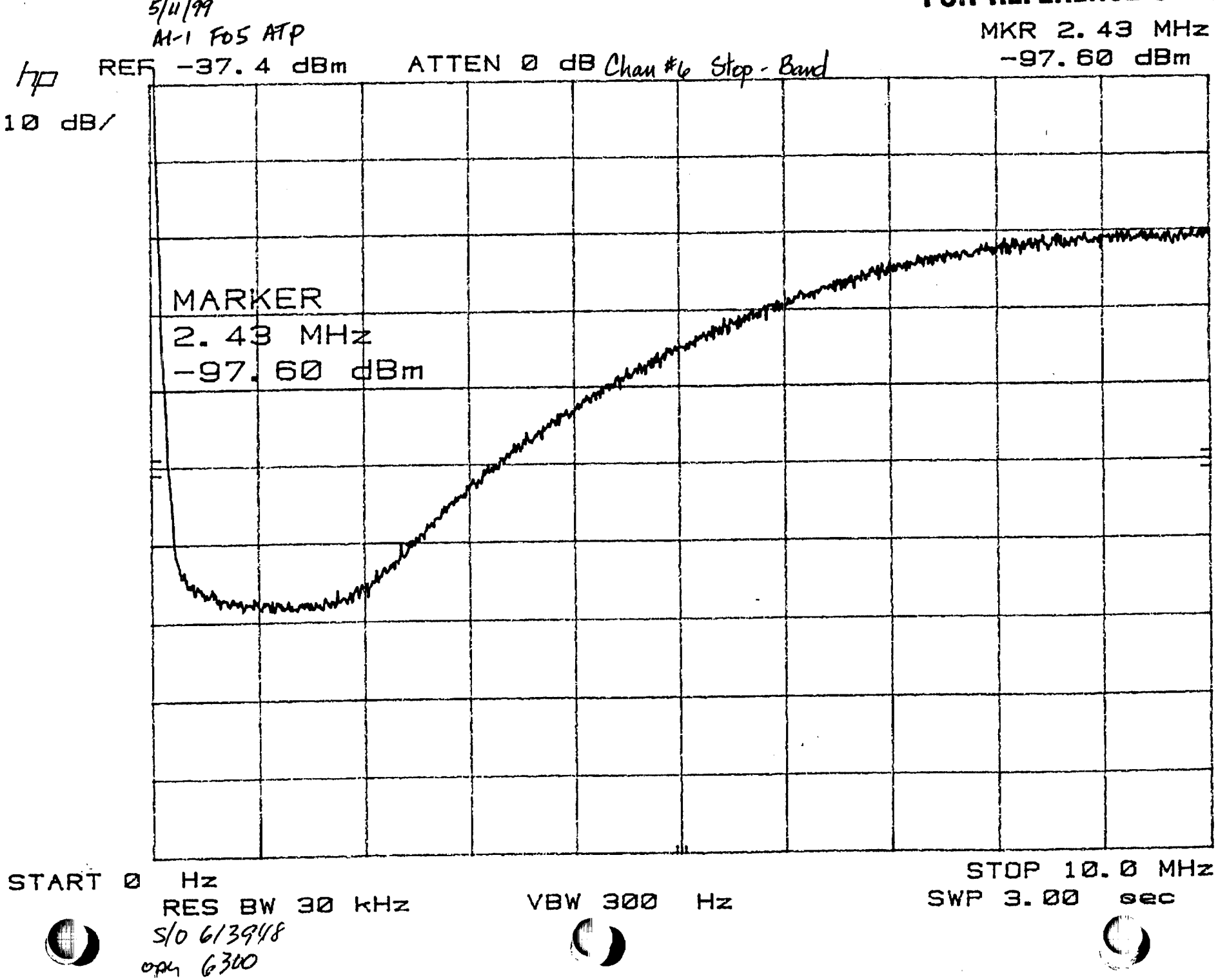


CENTER 125 MHz
SPAN 250 MHz
RES BW 30 kHz
VBW 300 Hz
SWP 75.0 sec

S/O 613948
opn 6300

FOR REFERENCE ONLY

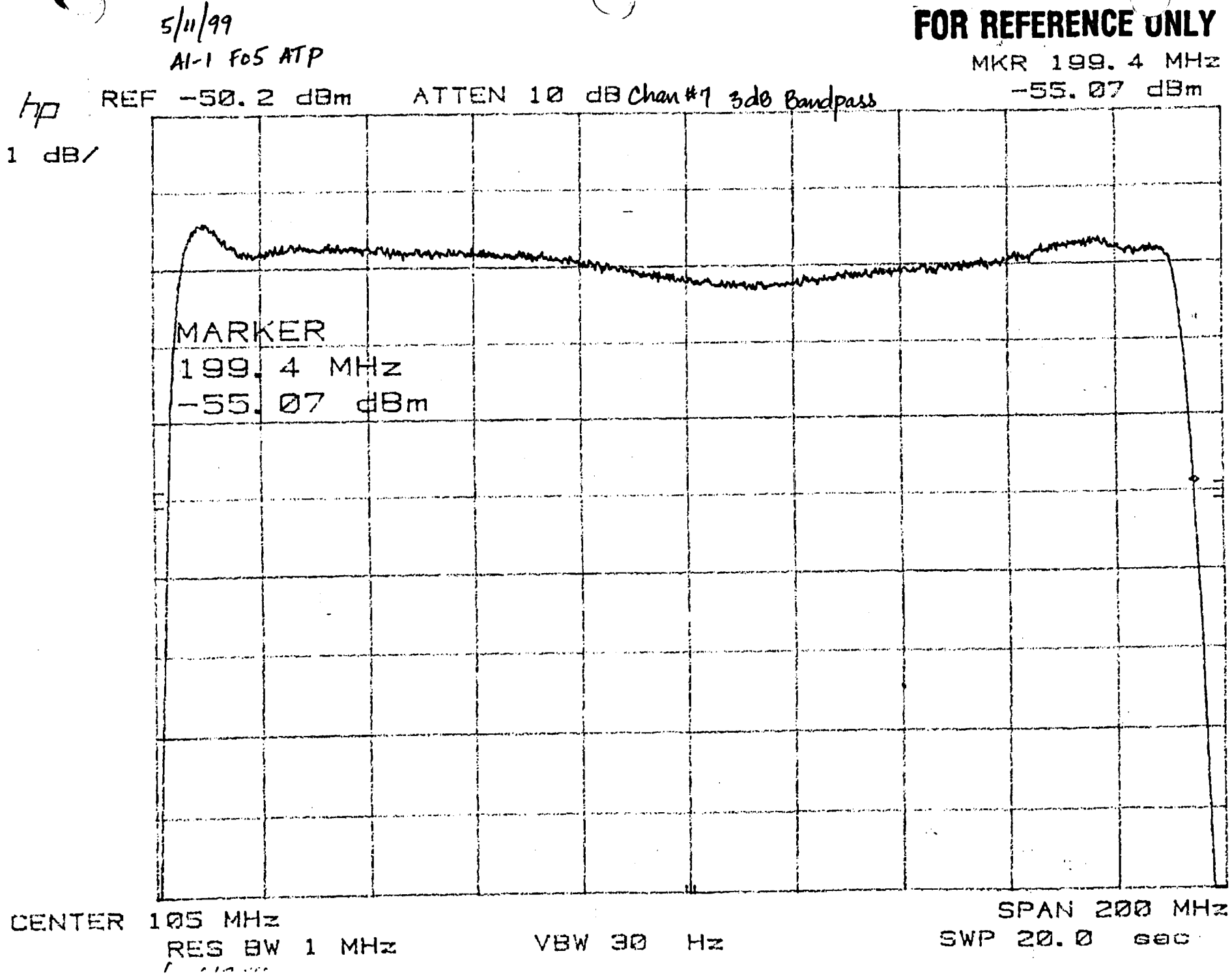
5/11/99
A1-1 FOS ATP



S/O 613948
opn 6300

5/11/99
AI-1 FoS ATP

FOR REFERENCE ONLY

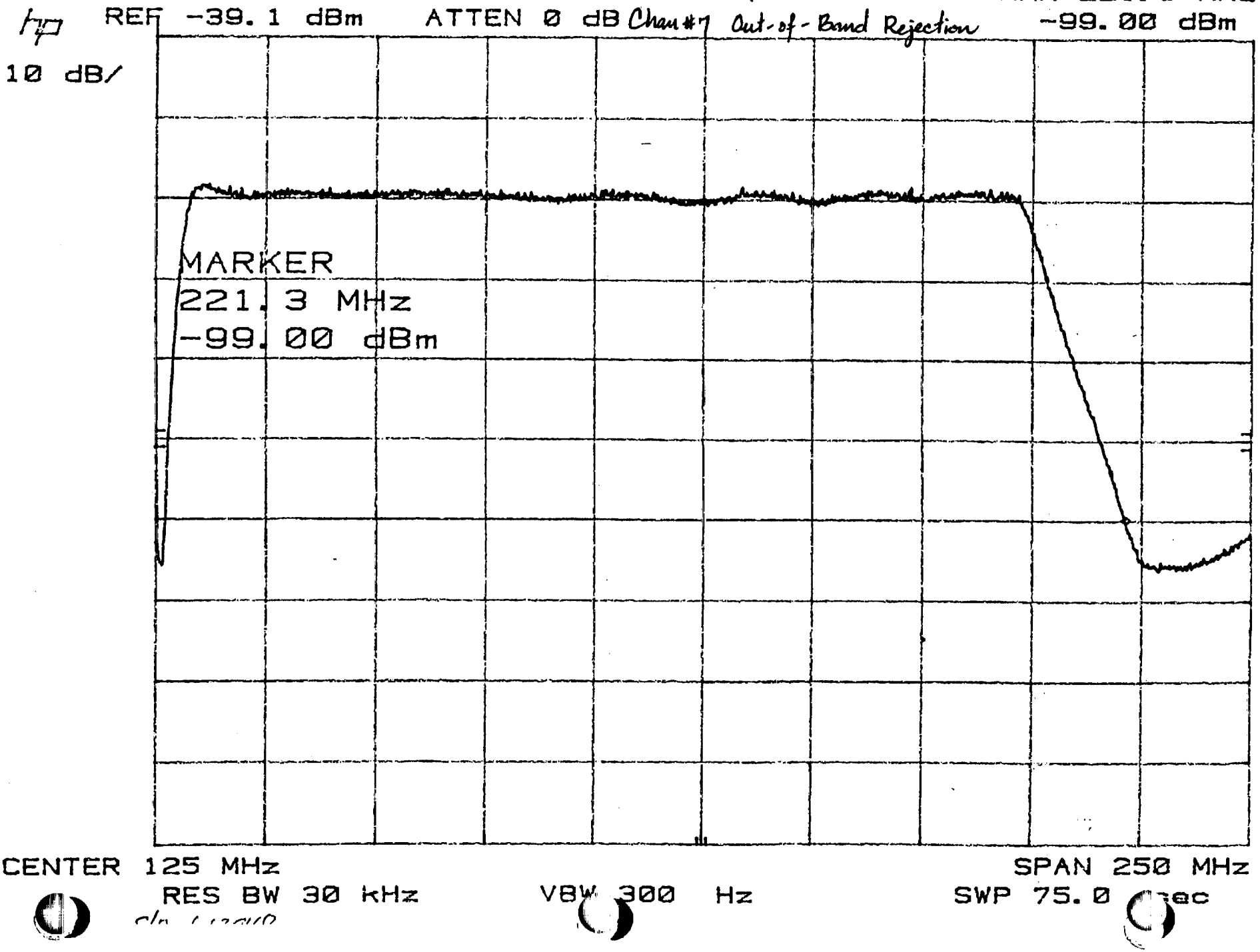


5/11/99

AI-1 FOS ATP

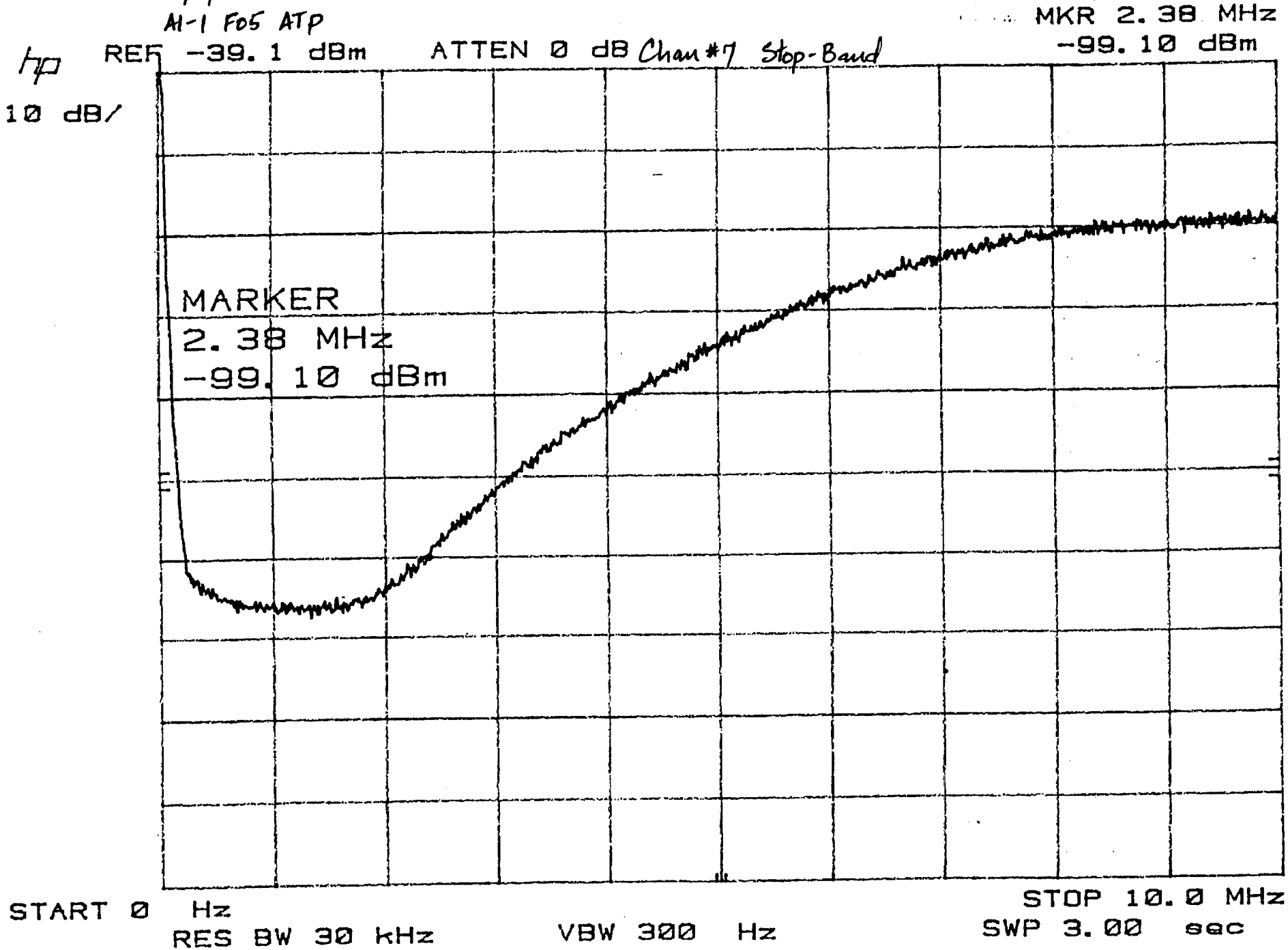
FOR REFERENCE ONLY

40dB



FOR REFERENCE ONLY

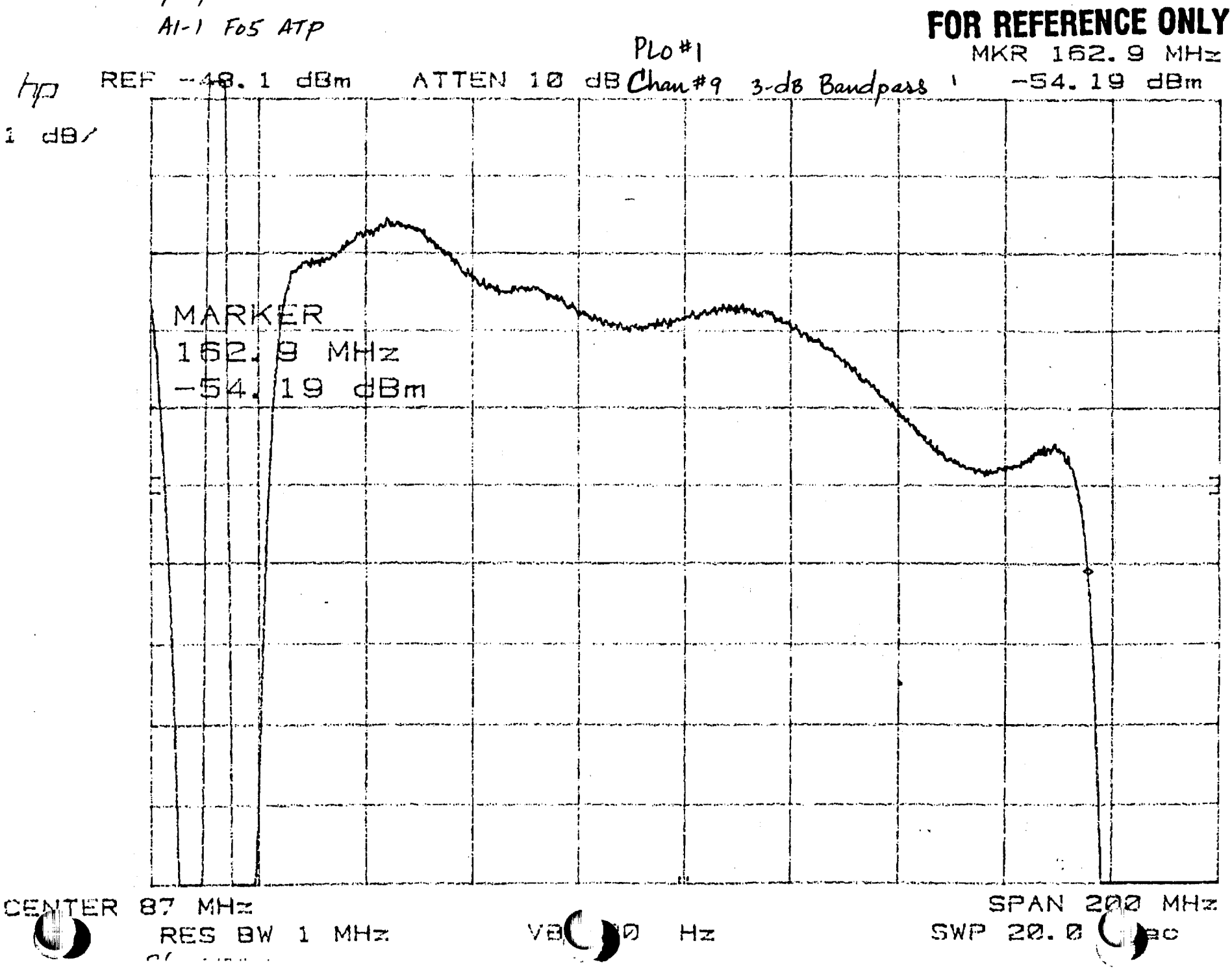
5/11/99
A1-1 FO5 ATP



5/12/99
A1-1 F05 ATP

PLO #1

FOR REFERENCE ONLY



5/11/99

AI-1 FO5 ATP

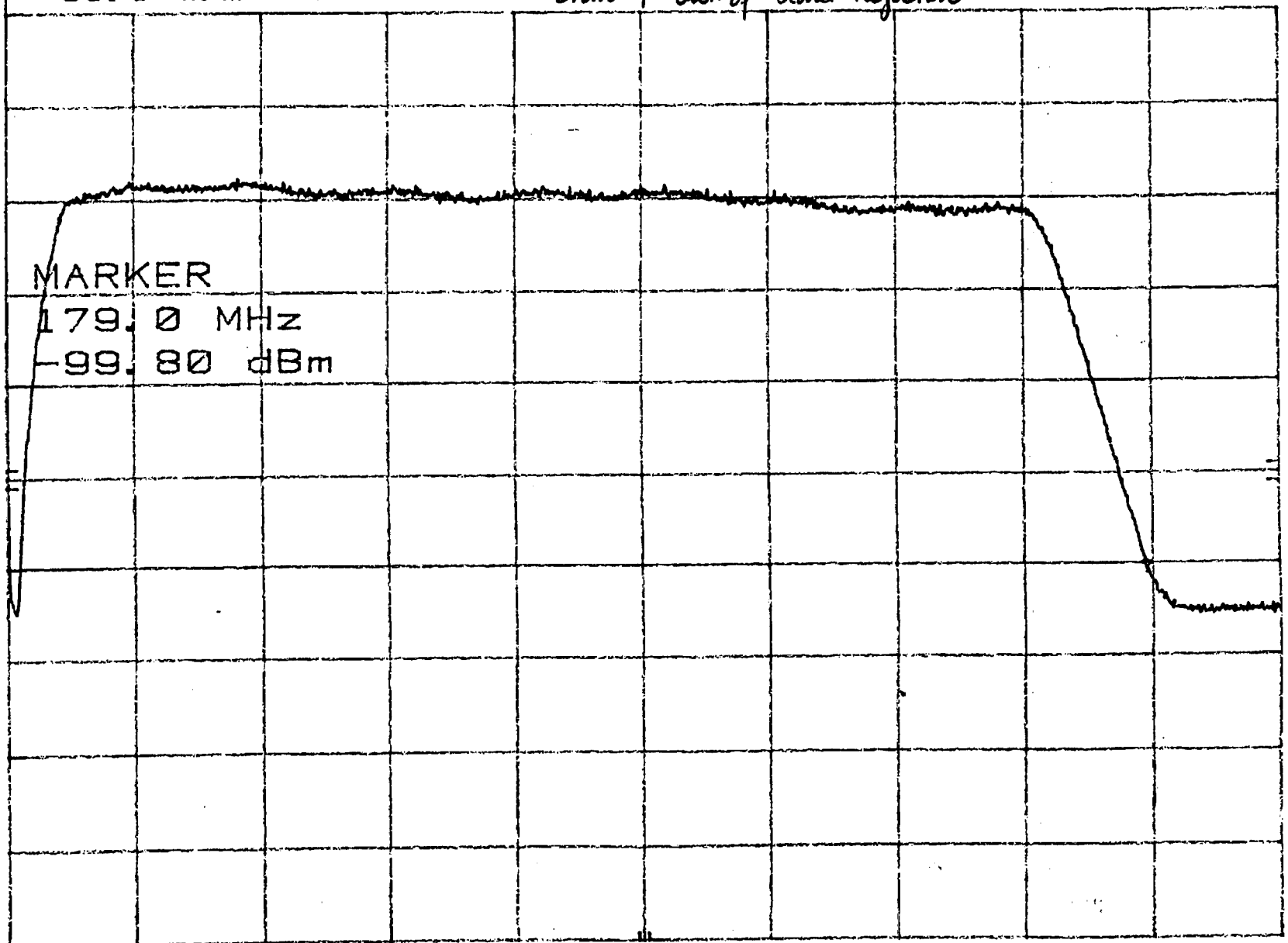
PLO#1 40dB

FOR REFERENCE ONLY

MKR 179.0 MHz

hp REF -39.8 dBm ATTEN 0 dB Chan#9 Out-of-Band Rejection -99.80 dBm

10 dB/



CENTER 100 MHz

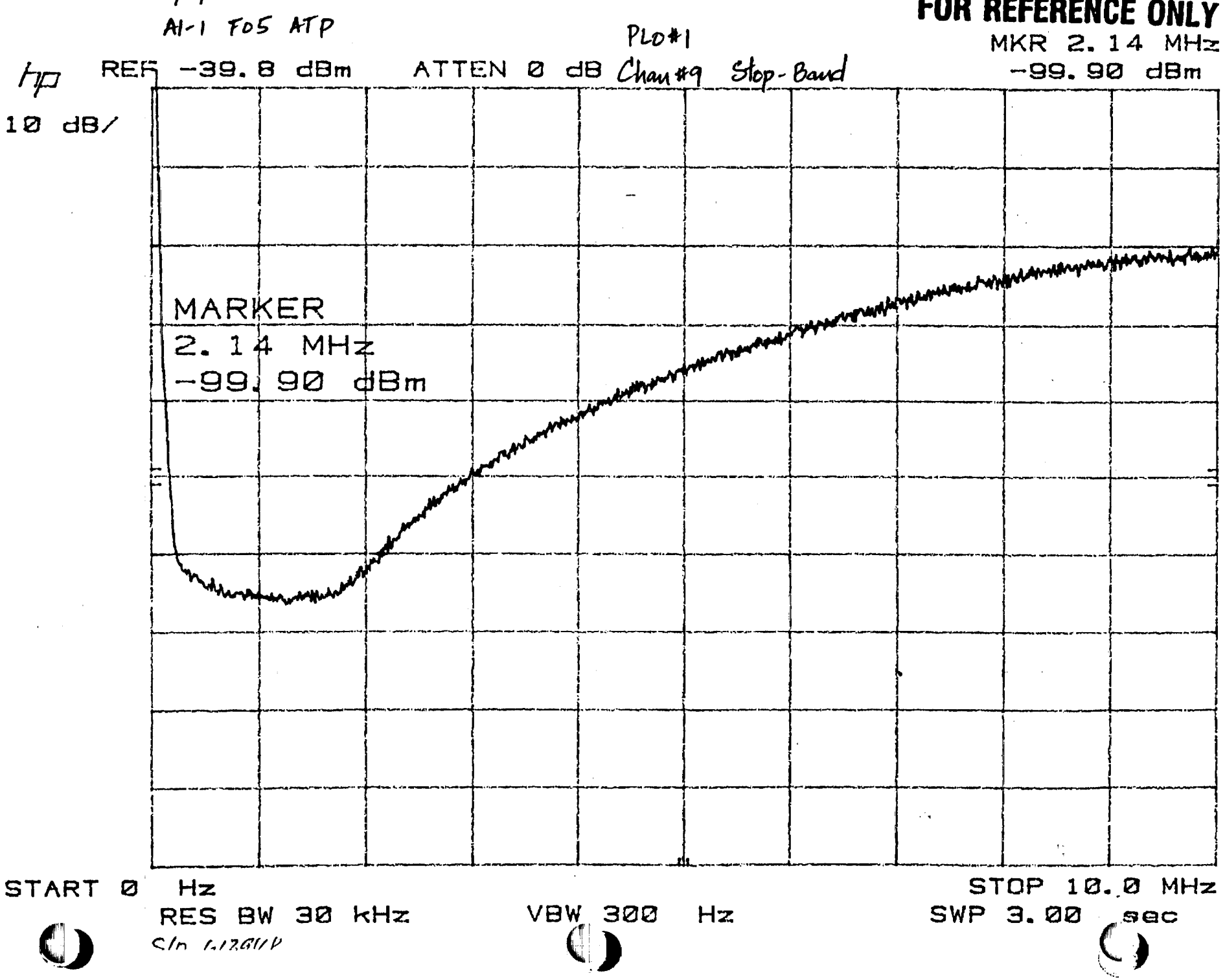
SPAN 200 MHz

RES BW 30 kHz VBW 300 Hz SWP 60.0 sec

5/11/99
AI-1 FOS ATP

PLOT#1

FOR REFERENCE ONLY

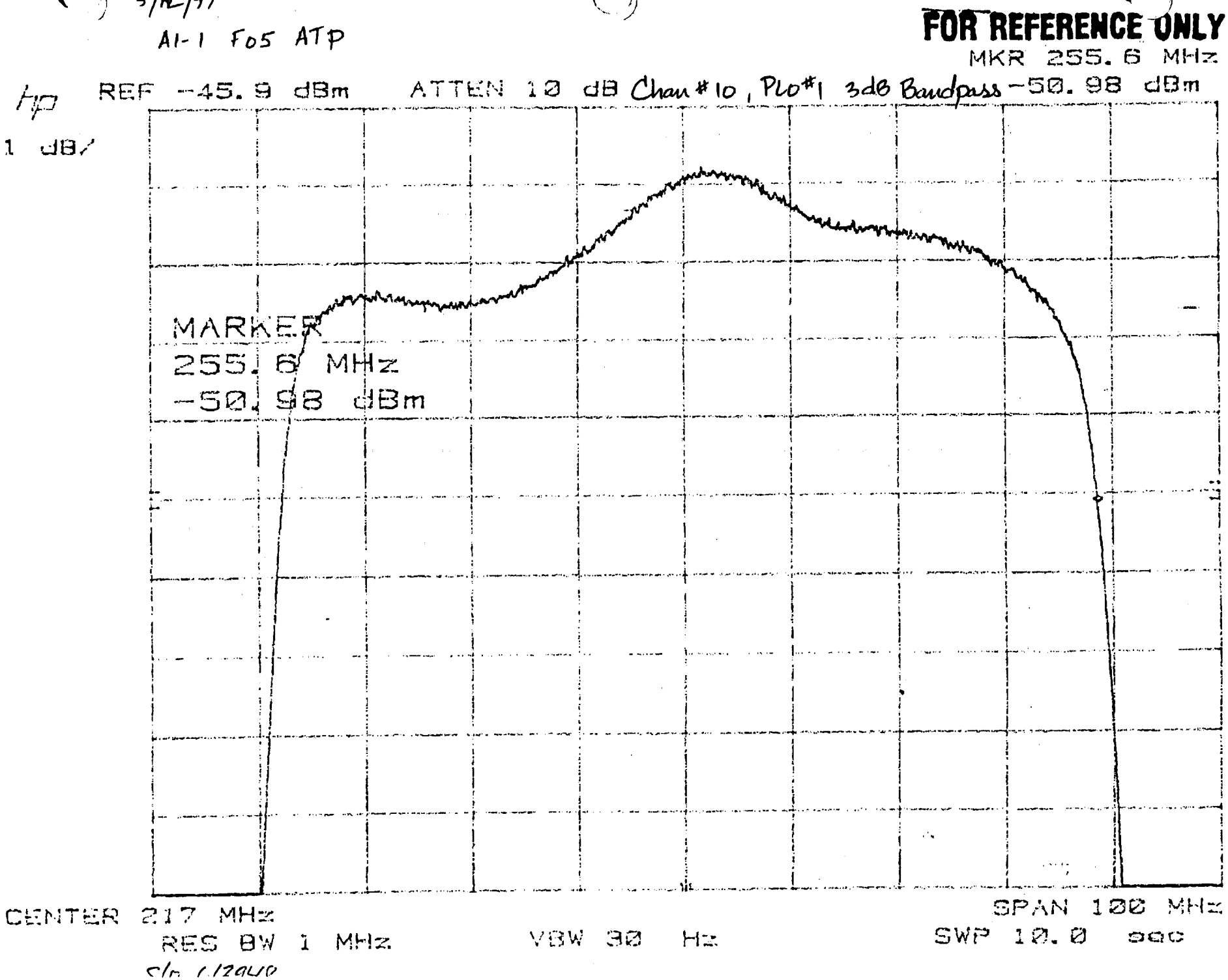


C/n LIZGIIV

5/12/99

A1-1 Fo5 ATP

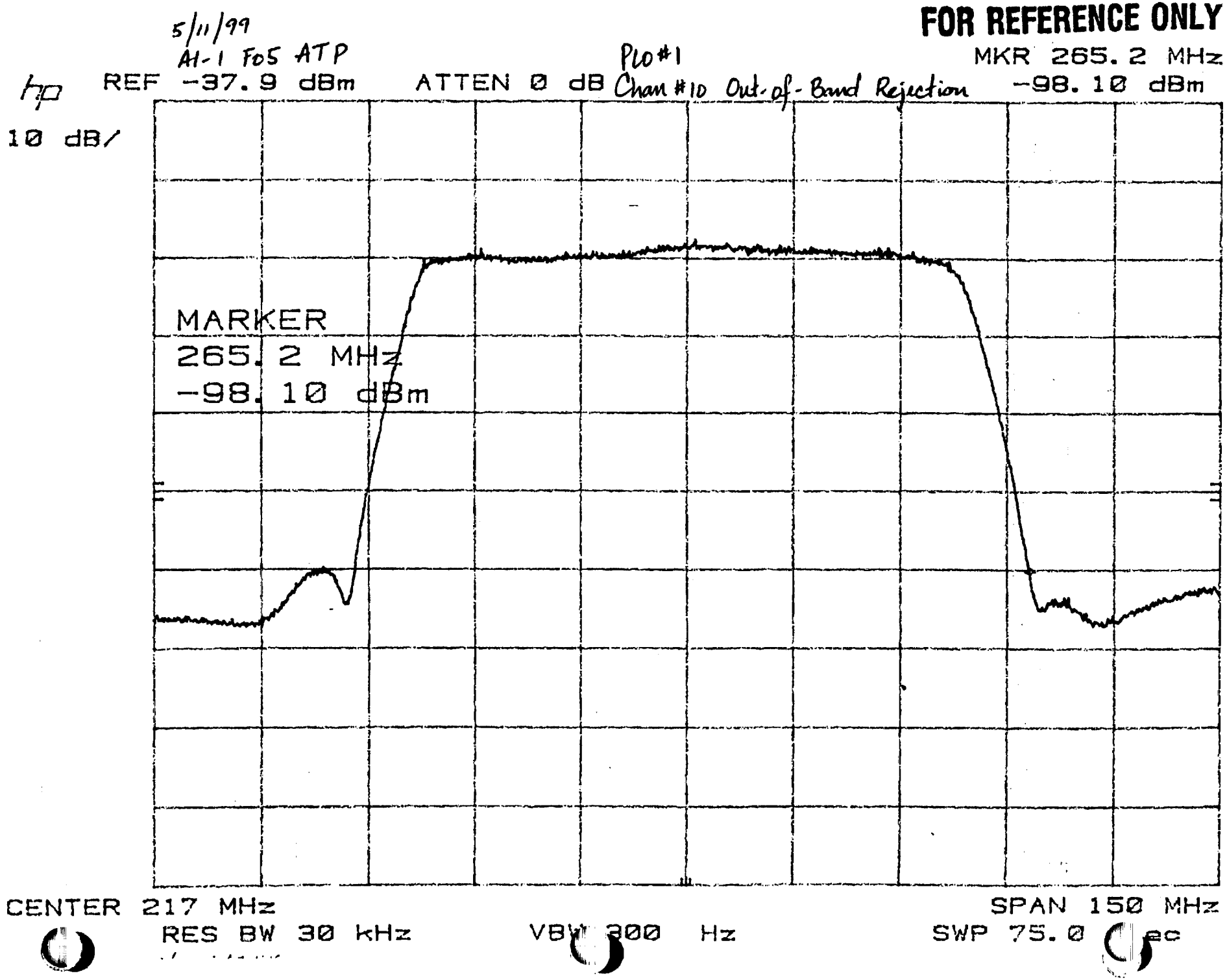
FOR REFERENCE ONLY



S/n 112040

FOR REFERENCE ONLY

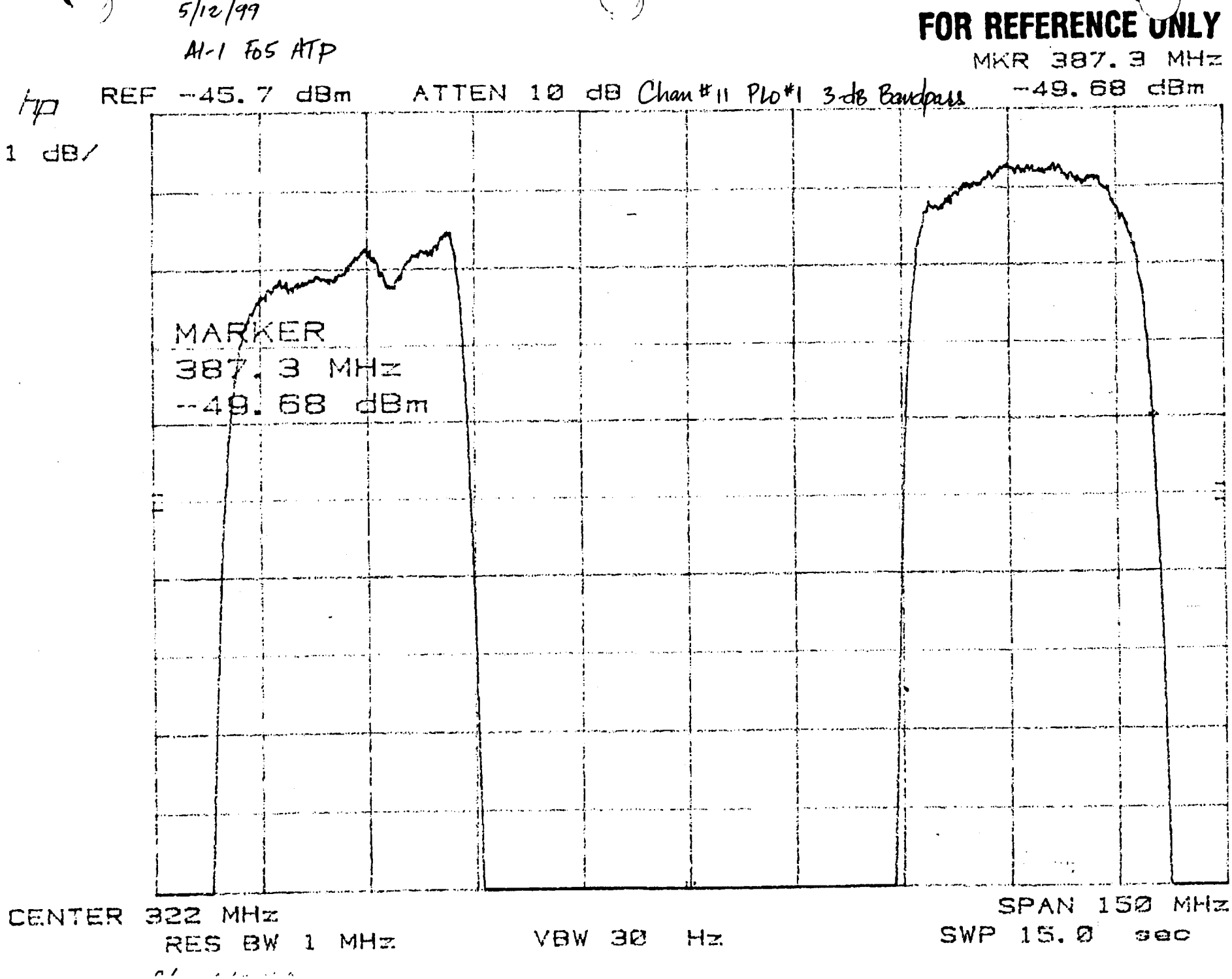
5/11/99
A1-1 FCC ATP
PLO #1
Chan #10 Out-of-Band Rejection



5/12/99

AI-1 FOS ATP

FOR REFERENCE ONLY



5/11/99
A1-1 F05 ATP

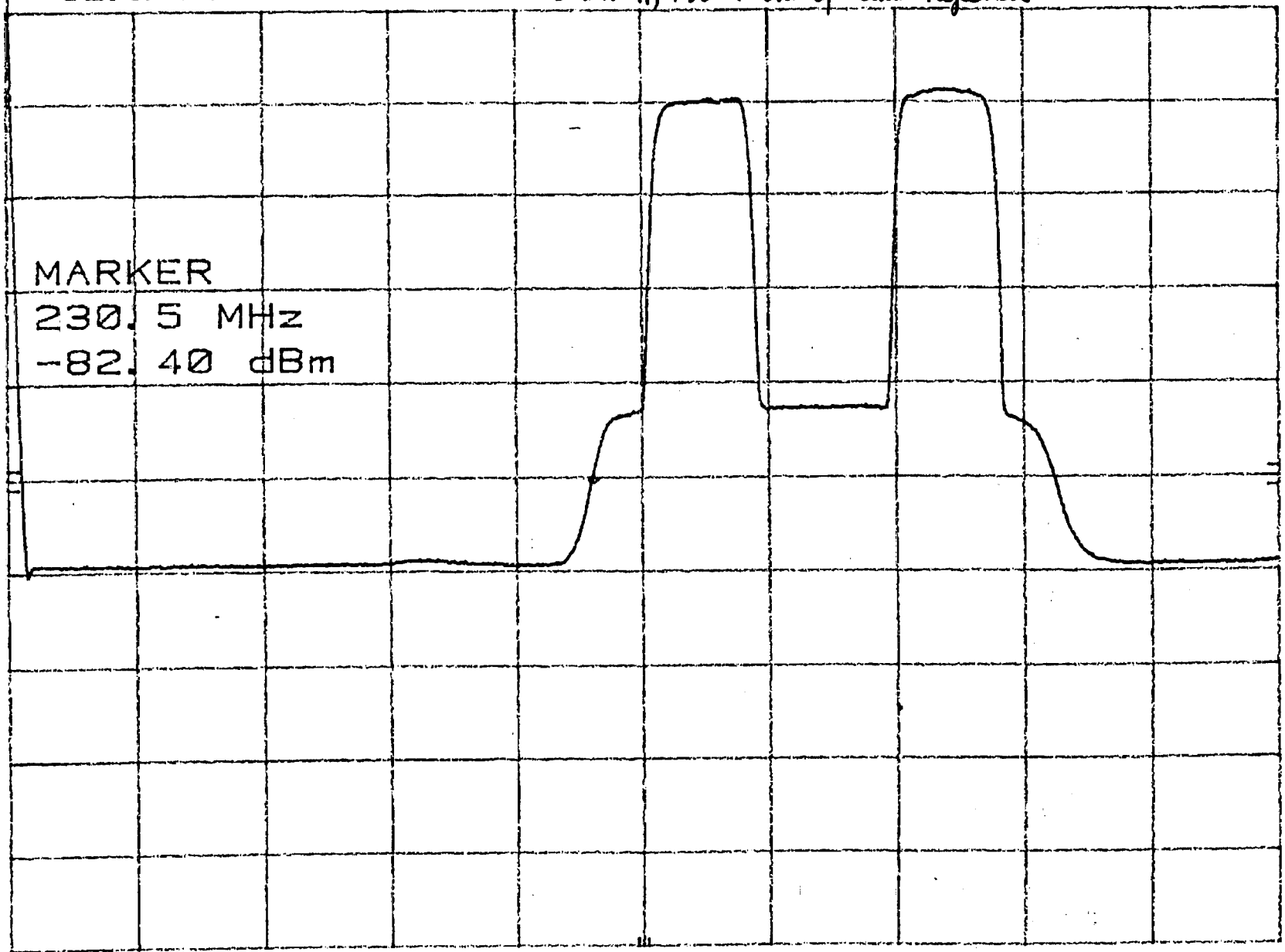
FOR REFERENCE ONLY

40dB

MKR 230.5 MHz

hp REF -32.2 dBm ATTEN 0 dB Chan#11, PLO#1 Out-of-Band Rejection -82.40 dBm

10 dB/



CENTER 250 MHz

SPAN 500 MHz

RES BW 1 MHz

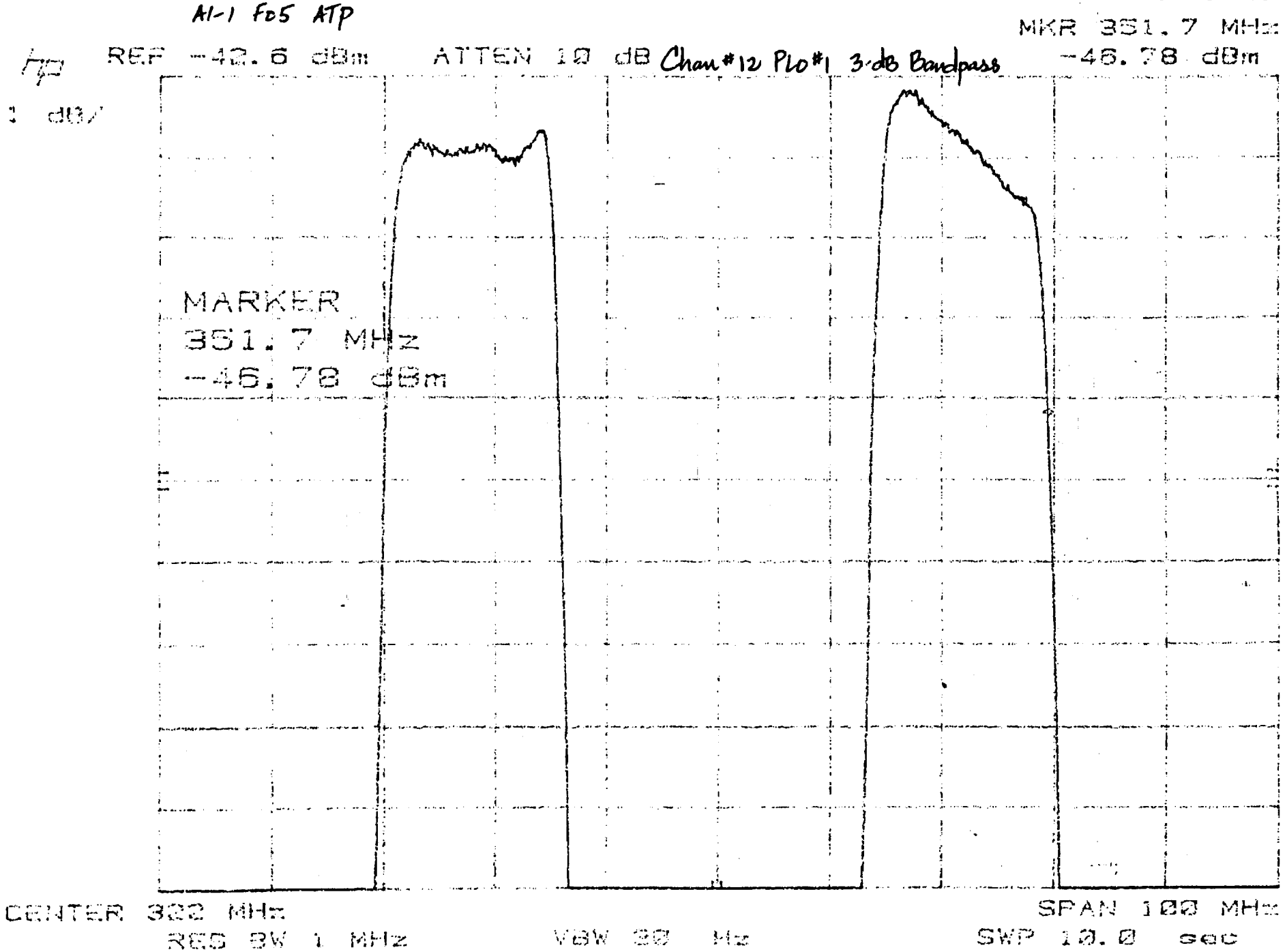
VBW 300 Hz

SWP 10.0 sec

5/12/99

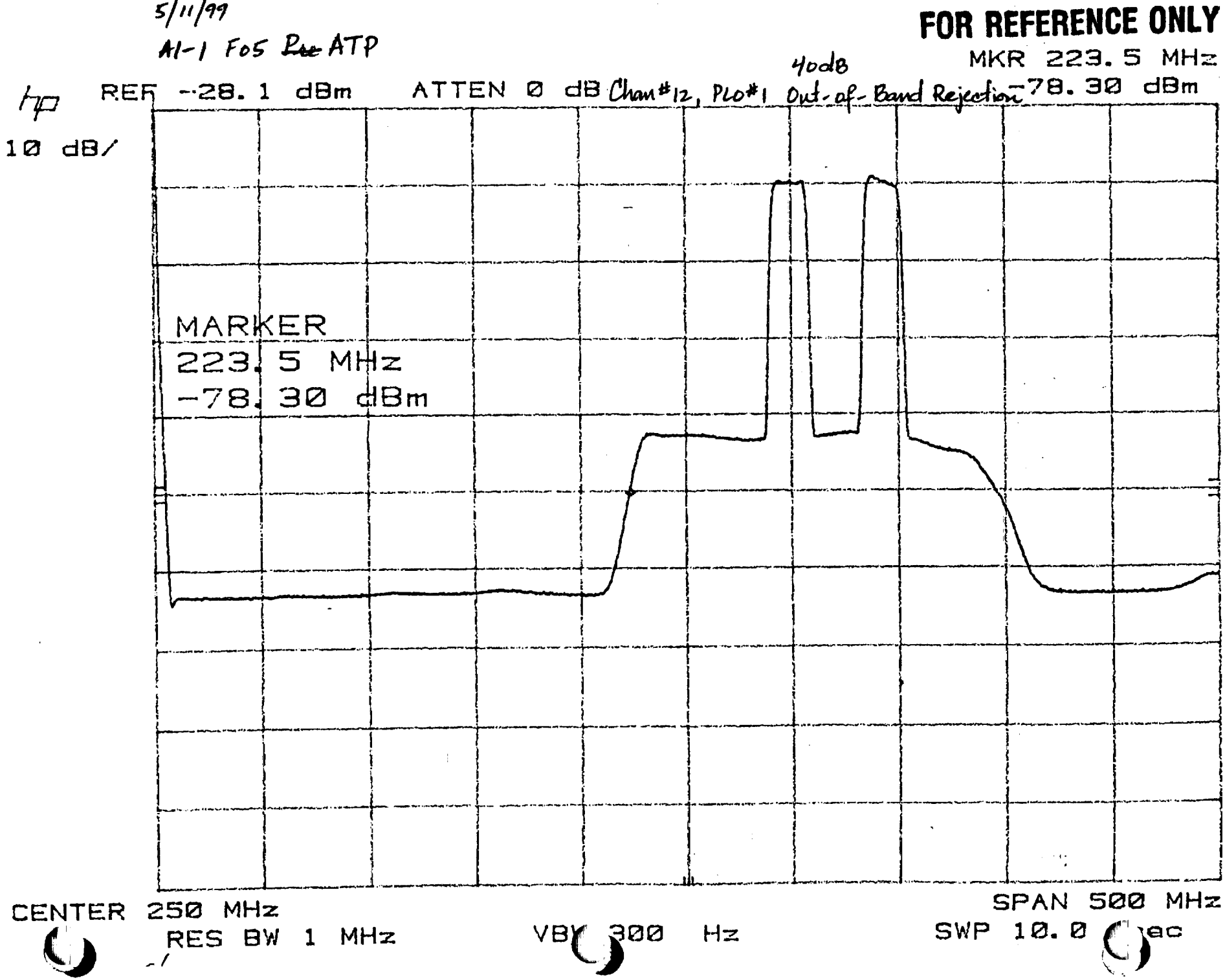
AI-1 FO5 ATP

FOR REFERENCE ONLY



5/11/99
A1-1 FOS ~~Rec~~ ATP

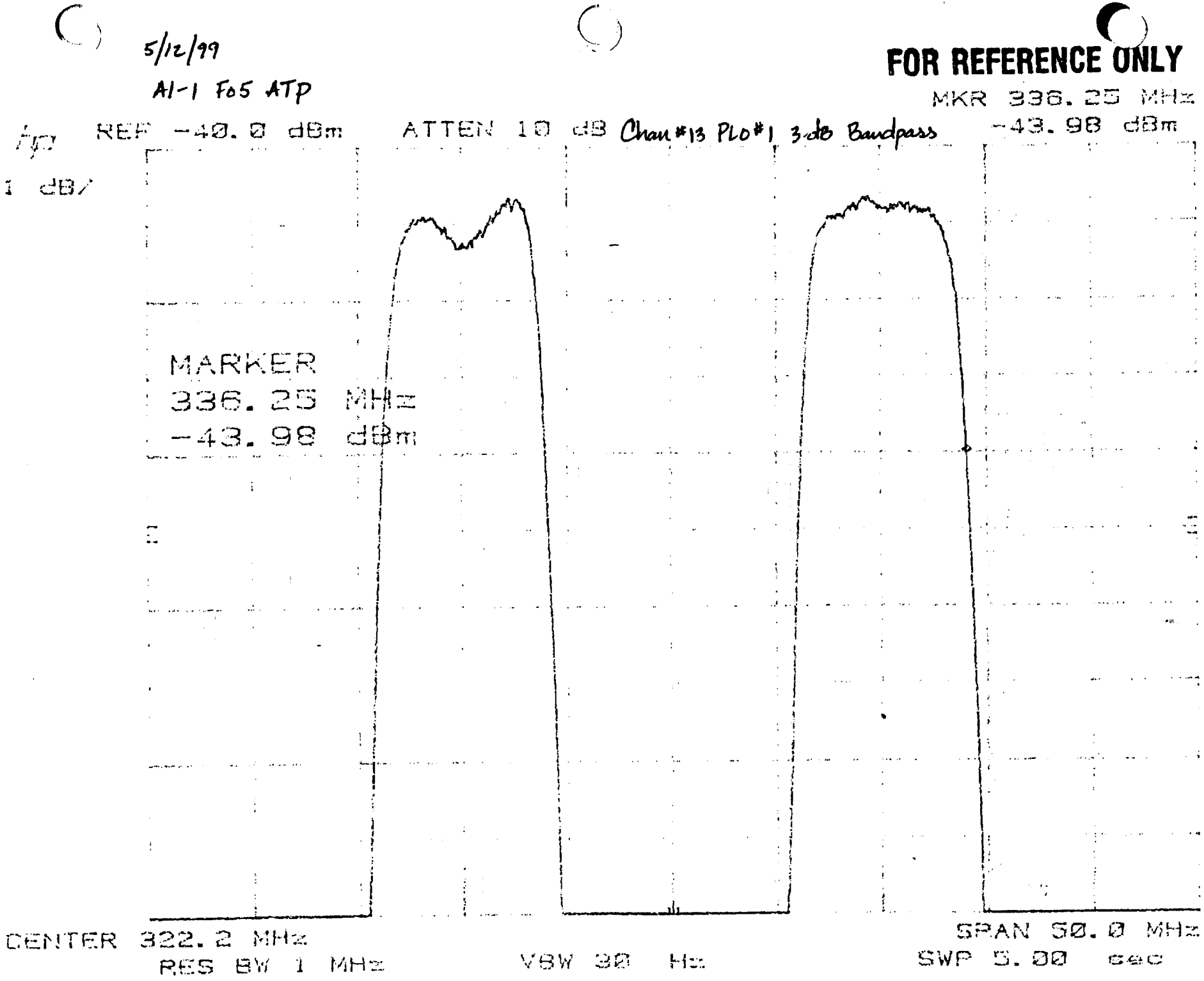
FOR REFERENCE ONLY



5/12/99

A1-1 Fo5 ATP

FOR REFERENCE ONLY



5/11/99

AI-1 FOS ATP

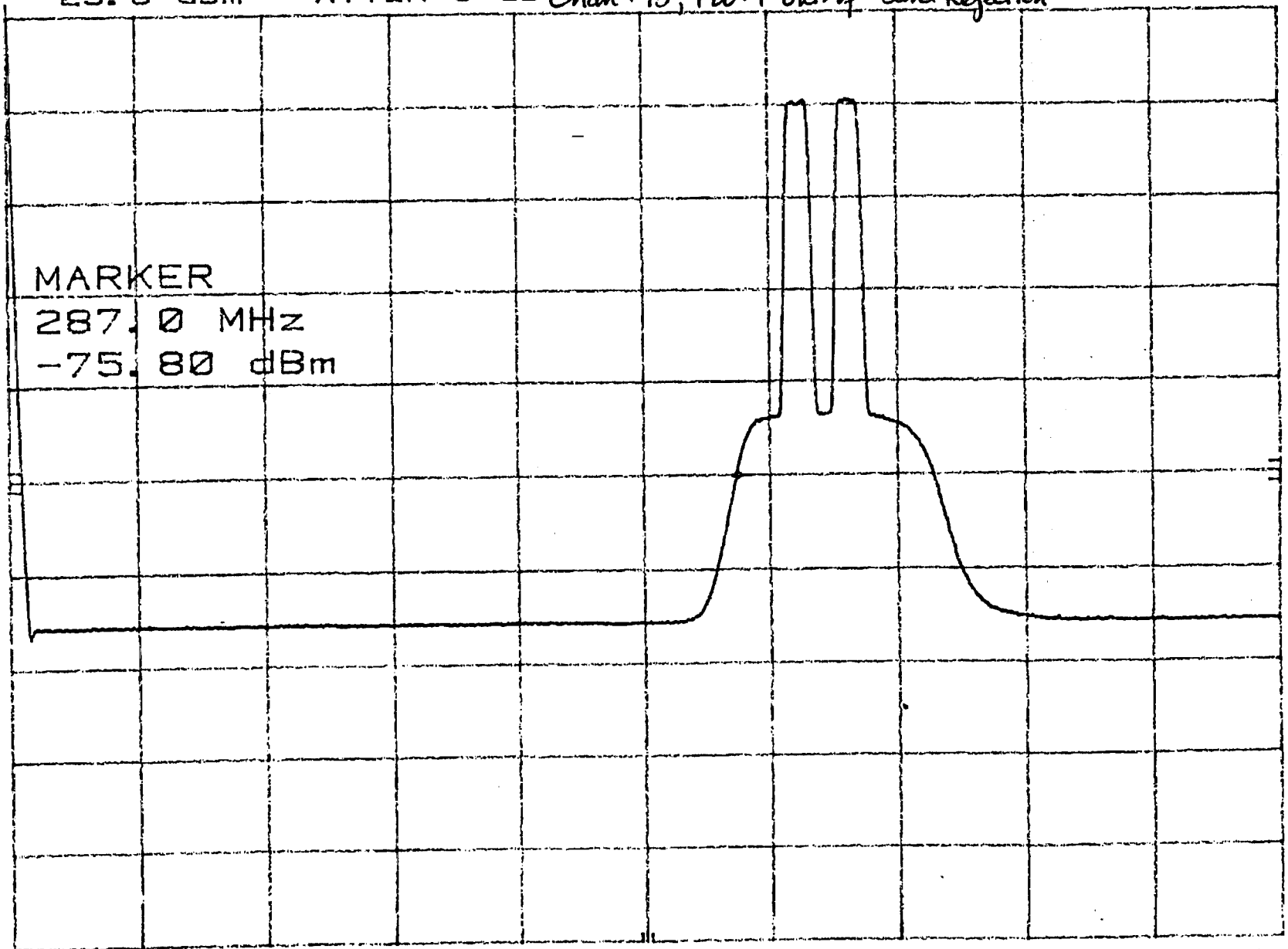
FOR REFERENCE ONLY

40dB

MKR 287.0 MHz

hp REF -25.8 dBm ATTEN 0 dB Chan #13, PLO#1 Out-of-Band Rejection 75.80 dBm

10 dB/



CENTER 250 MHz

SPAN 500 MHz

RES BW 1 MHz

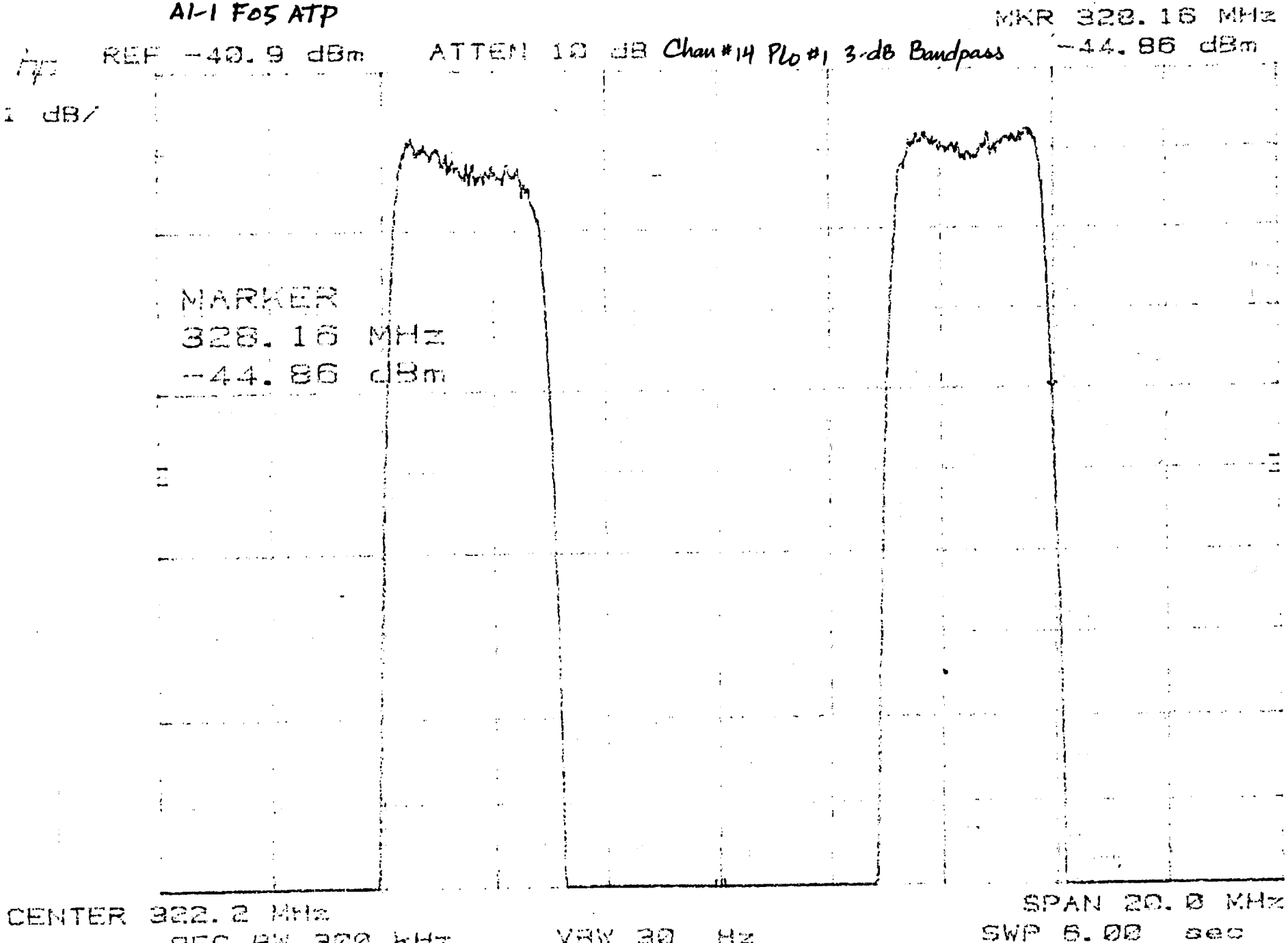
VBW 300 Hz

SWP 10.0 sec

5/12/99

AI-1 F05 ATP

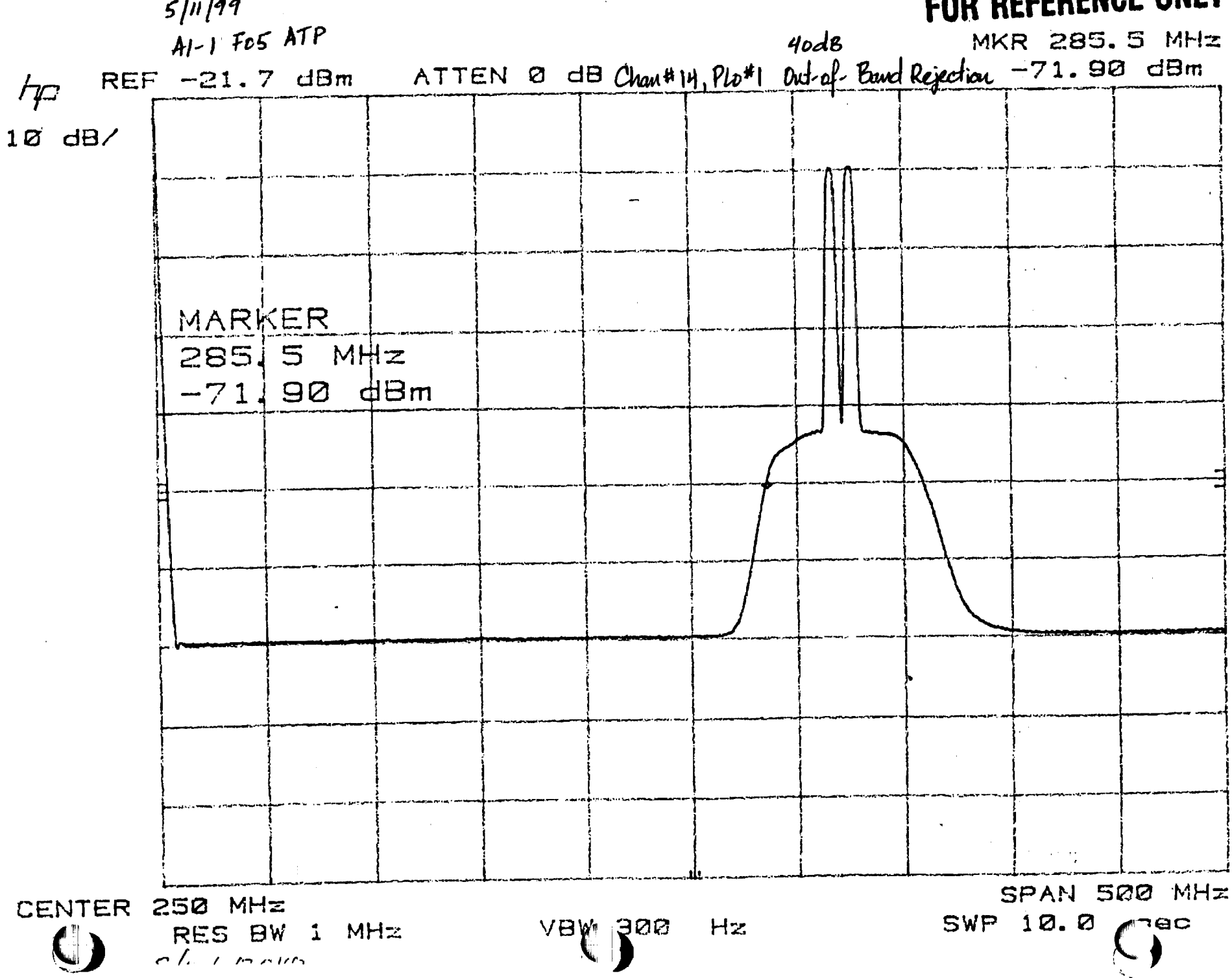
FOR REFERENCE ONLY



5/11/99
A1-1 F05 ATP

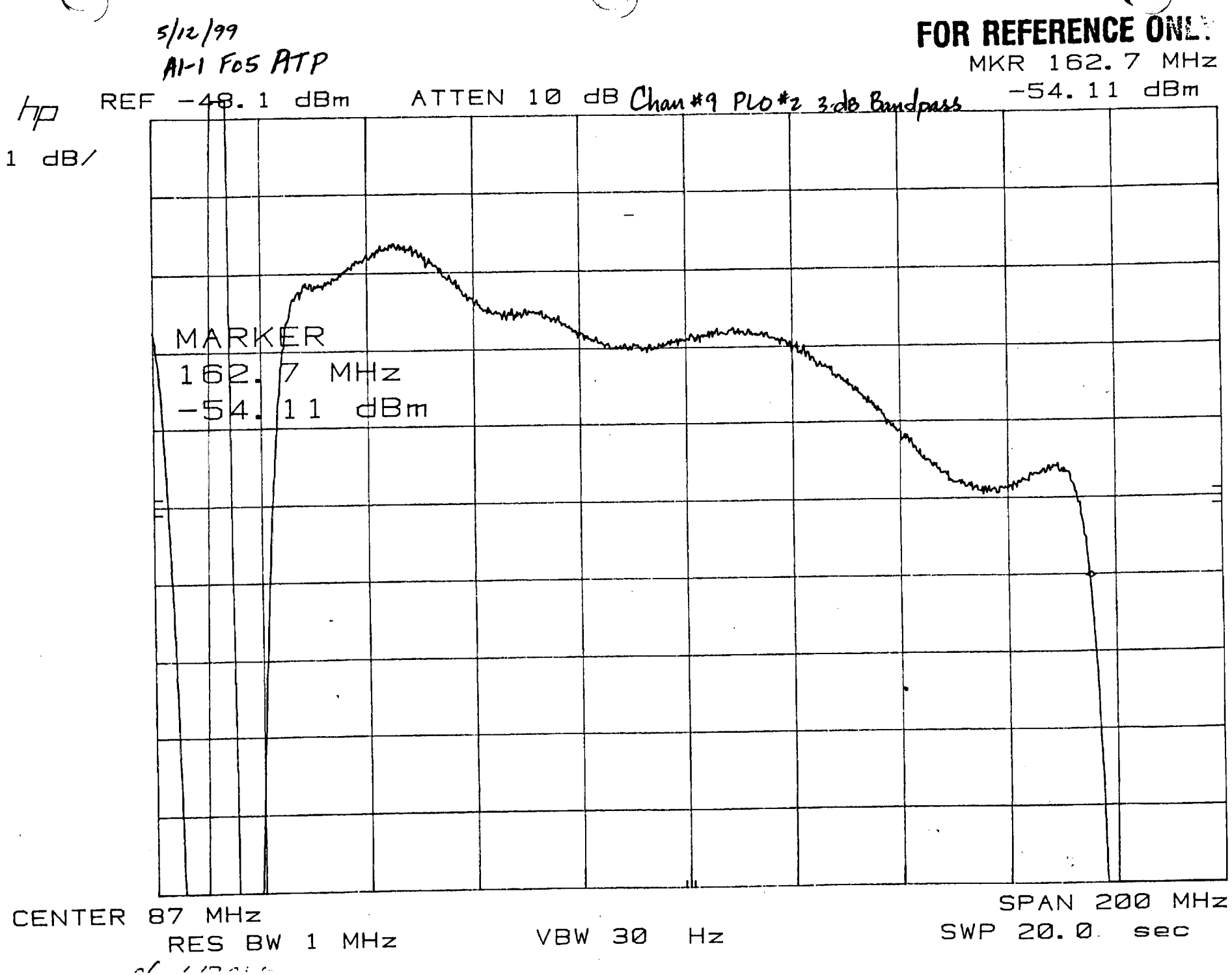
FOR REFERENCE ONLY

40dB



5/12/99
AI-1 FOS ATP

FOR REFERENCE ONLY



5/11/99

AI-1 FoS ATP

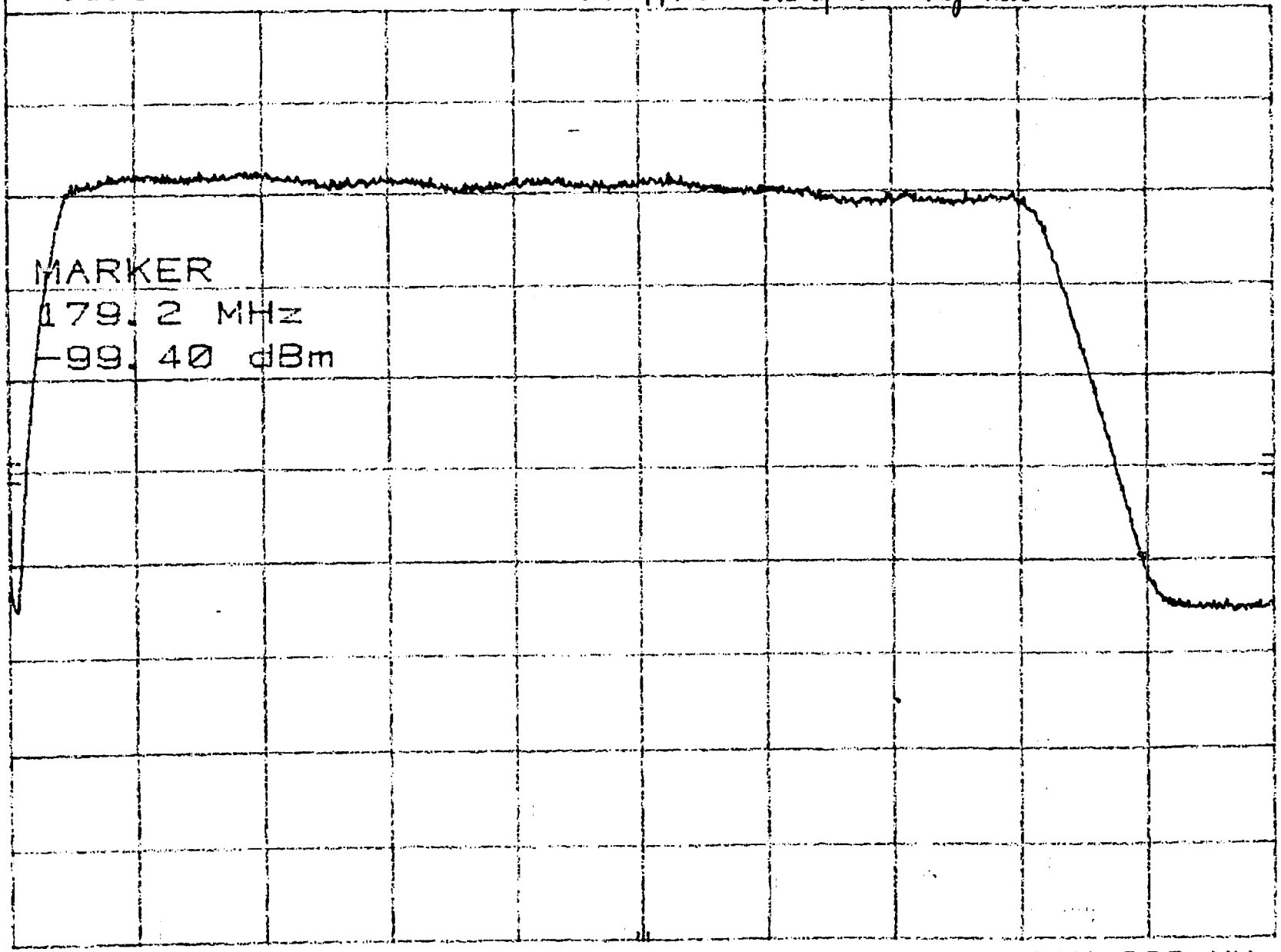
FOR REFERENCE ONLY

40dB

MKR 179.2 MHz

hp REF -39.8 dBm ATTEN 0 dB Chan #9, PLO #2 Out-of-Band Rejection -99.40 dBm

10 dB/



CENTER 100 MHz

SPAN 200 MHz

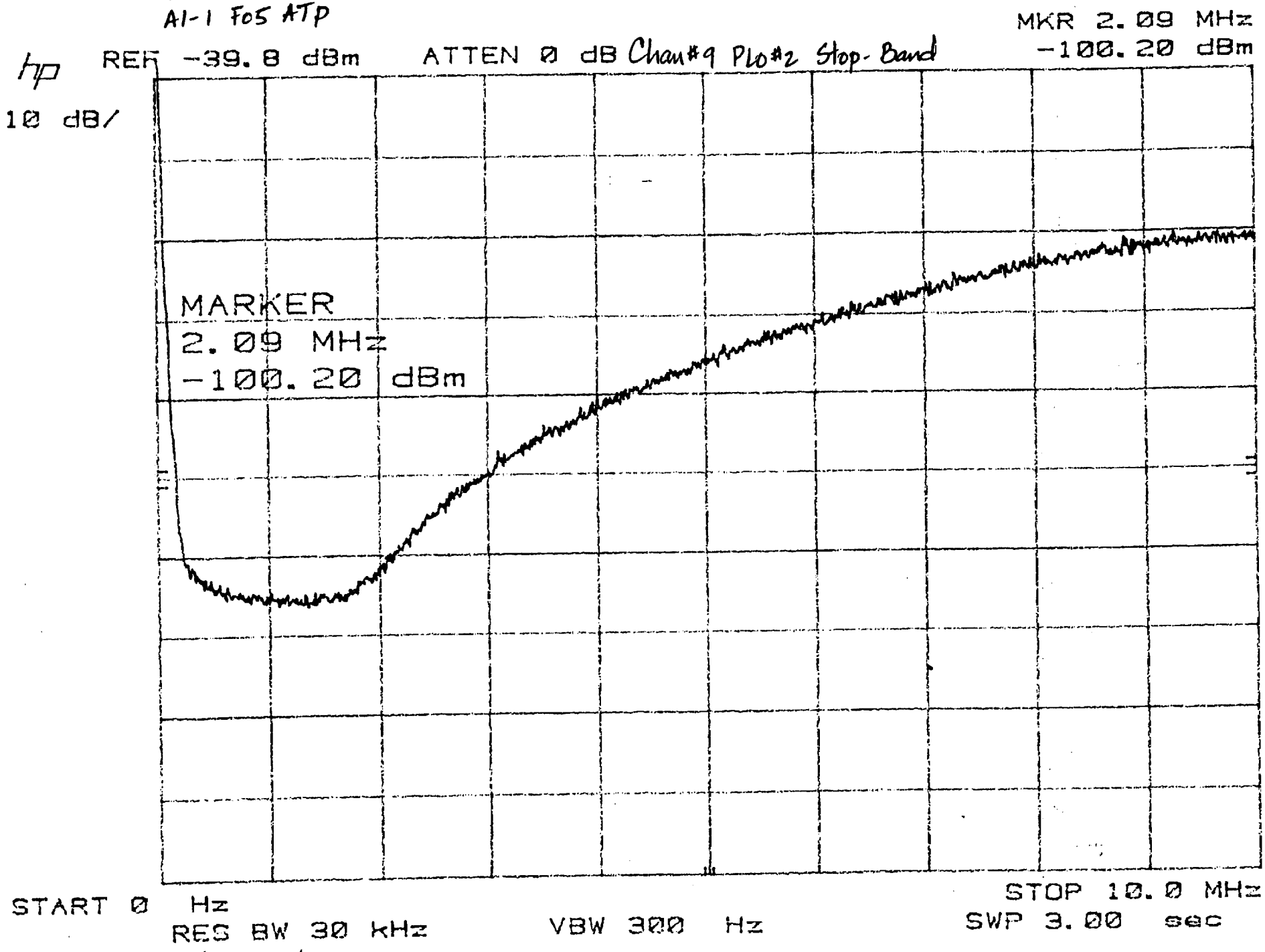
RES BW 30 kHz

VBW 300 Hz

SWP 60.0 sec

FOR REFERENCE ONLY

5/11/99
A1-1 FOS ATP



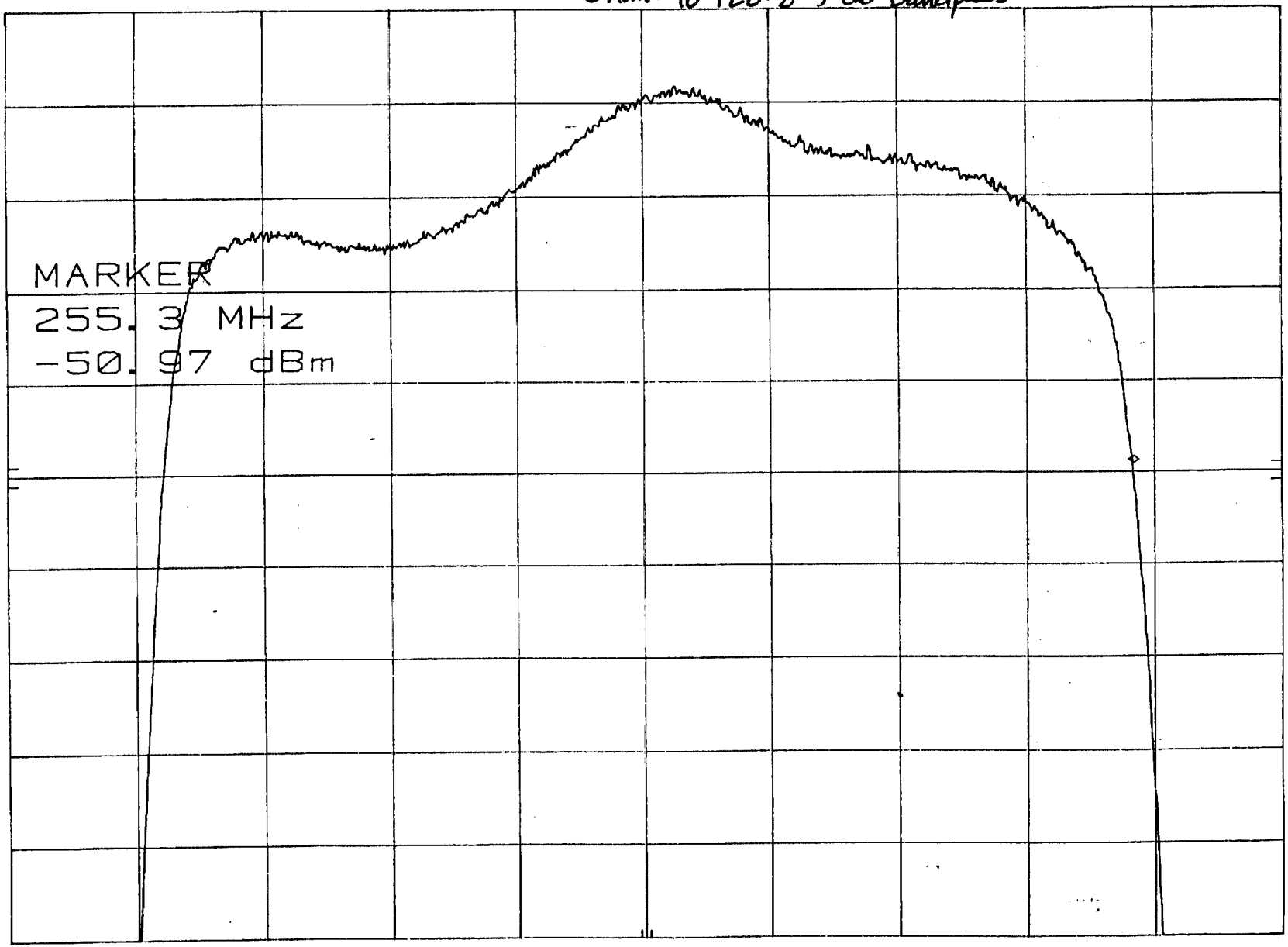
5/12/99

A1-1 Fo5 ATP

FOR REFERENCE ONLY

hp REF -46.1 dBm ATTEN 10 dB Chan #10 PLO #2 3-dB Bandpass MKR 255.3 MHz -50.97 dBm

1 dB/



CENTER 217 MHz SPAN 100 MHz

RES BW 1 MHz VBW 30 Hz SWP 10.0 sec

5/11/99
AI-1 FOS ATP

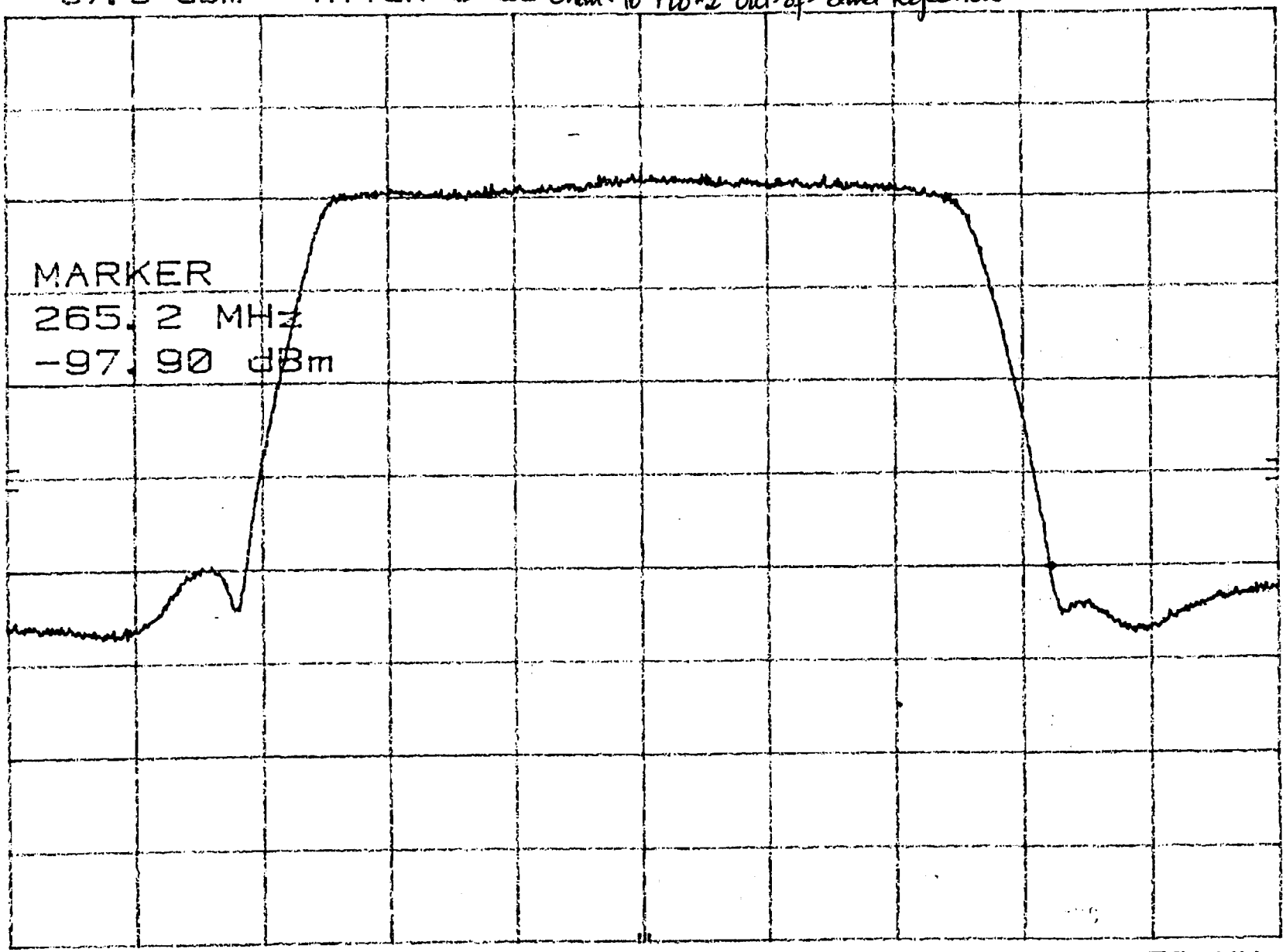
FOR REFERENCE ONLY

MKR 265.2 MHz

40dB

hp REF -37.9 dBm ATTEN 0 dB Chan #10 PLO #2 Out-of-Band Rejection -97.90 dBm

10 dB/



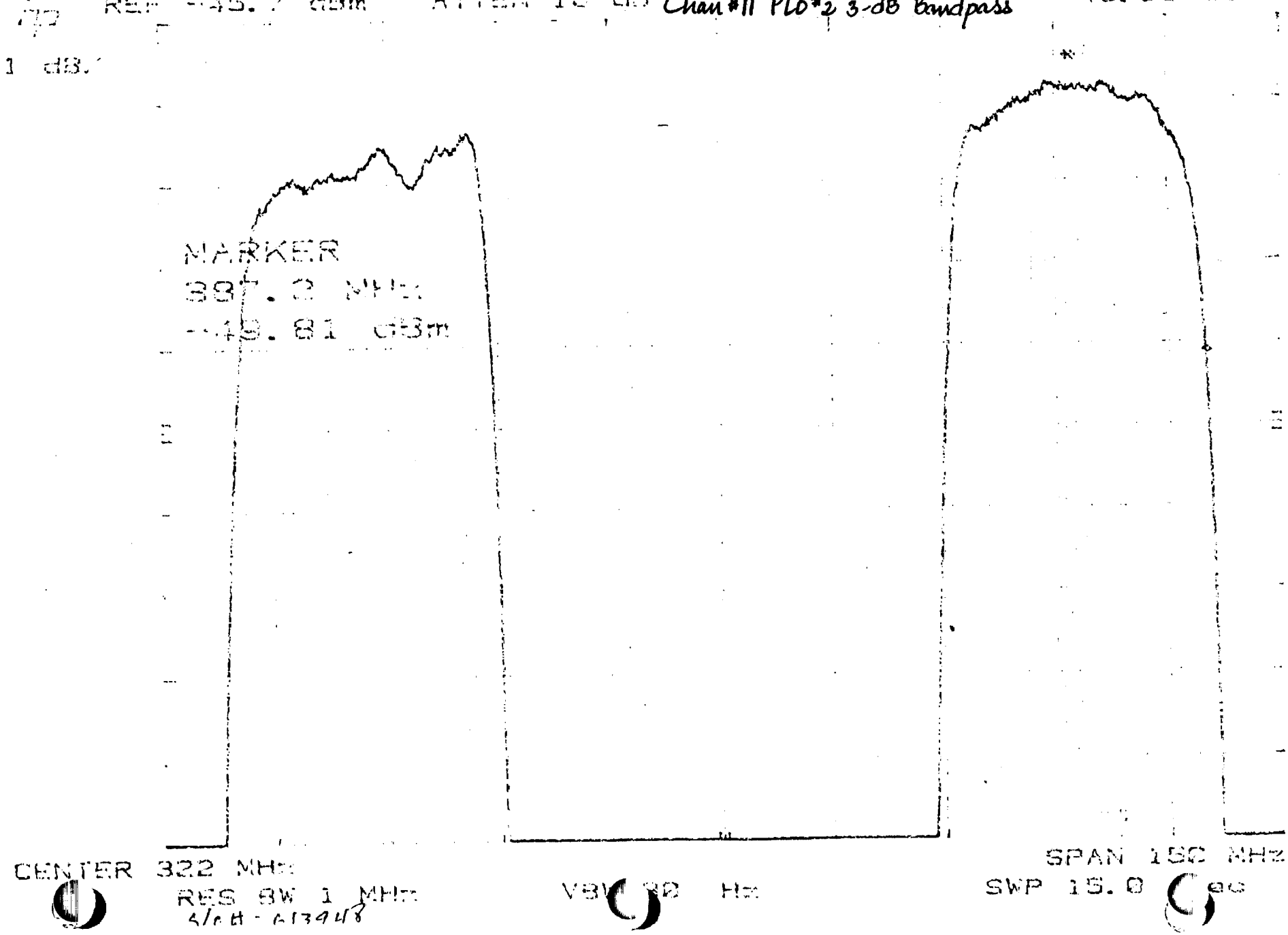
CENTER 217 MHz SPAN 150 MHz

RES BW 30 kHz VBW 300 Hz SWP 75.0 sec

s/o#: 613948

5/12/99
A1-1 F05 ATP

FOR REFERENCE ONLY

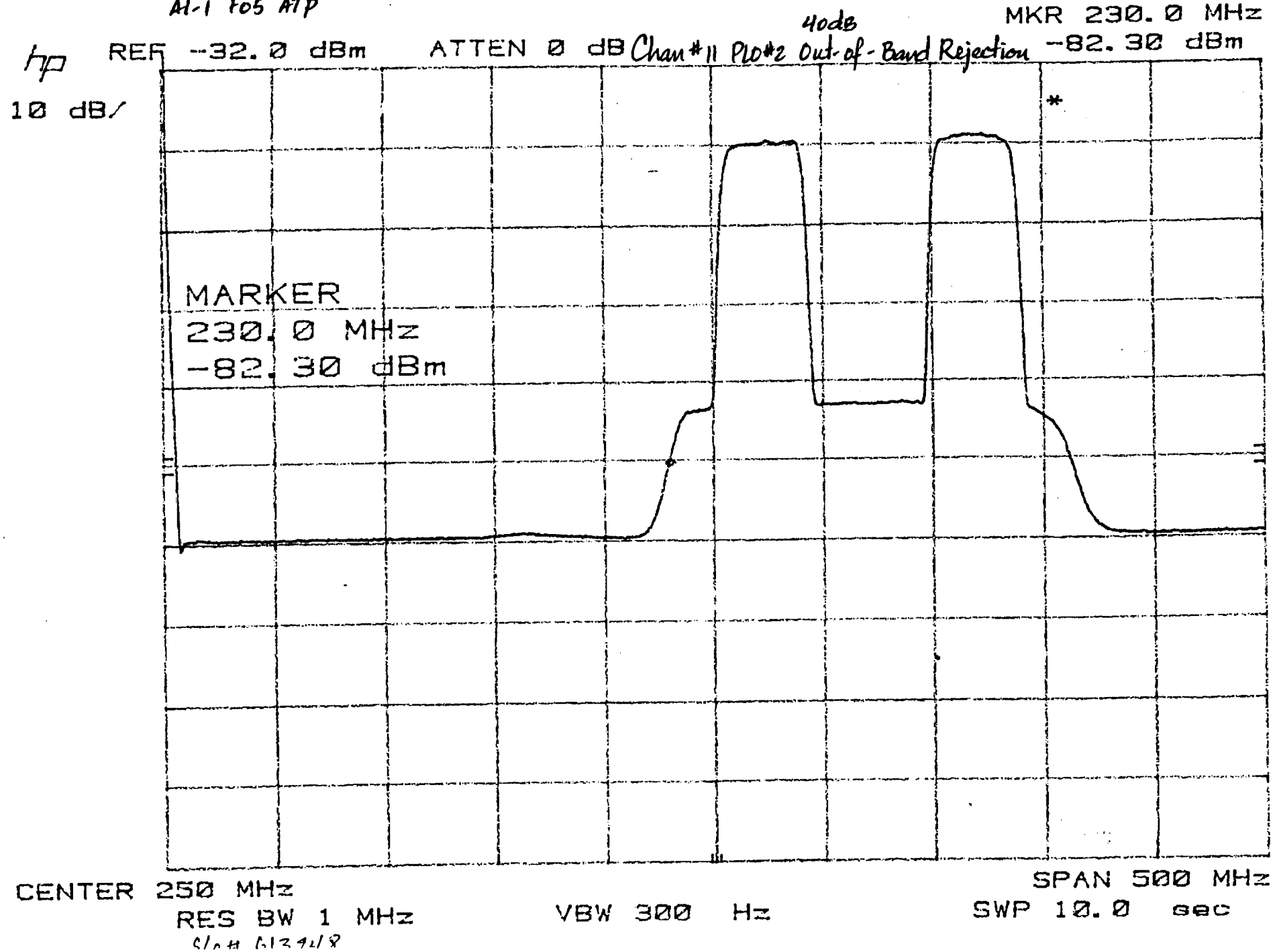


S/N H-613948

5/11/99
A1-1 F05 ATP

FOR REFERENCE ONLY

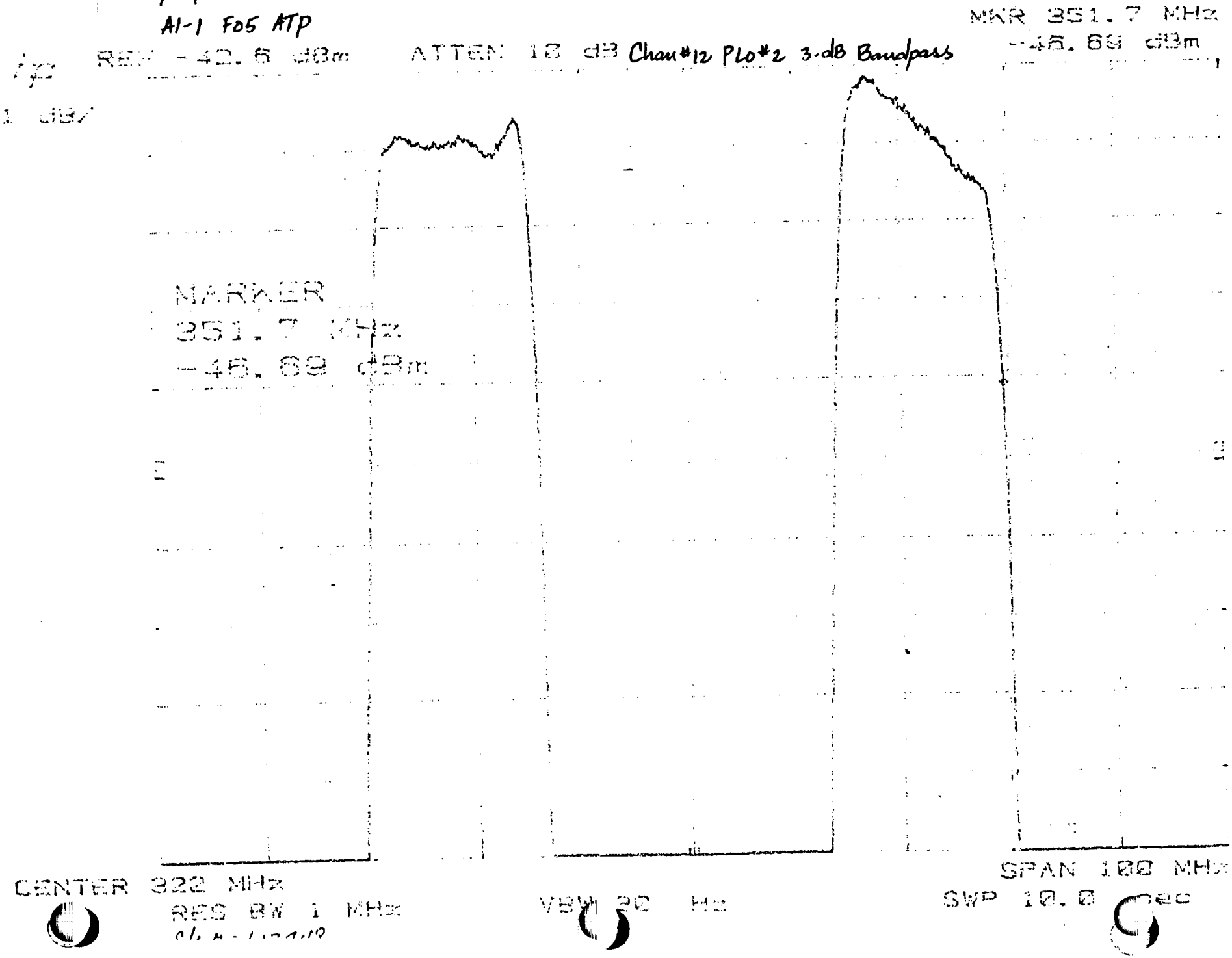
40dB



S/N M1341/8

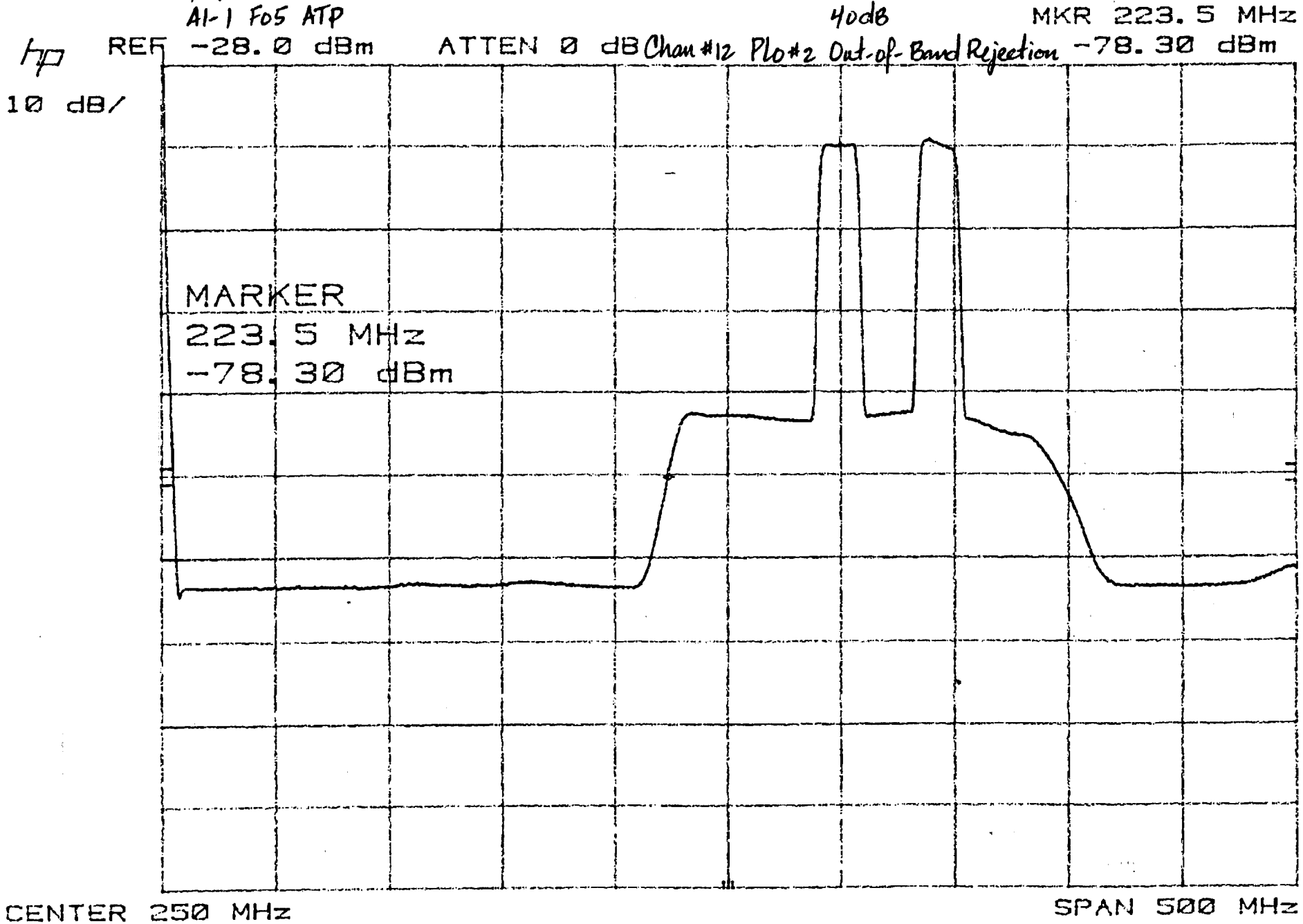
5/12/99

A1-1 F05 ATP



FOR REFERENCE ONLY

5/11/99
A1-1 FCC ATP
40dB
Chan #12 Plot #2 Out-of-Band Rejection

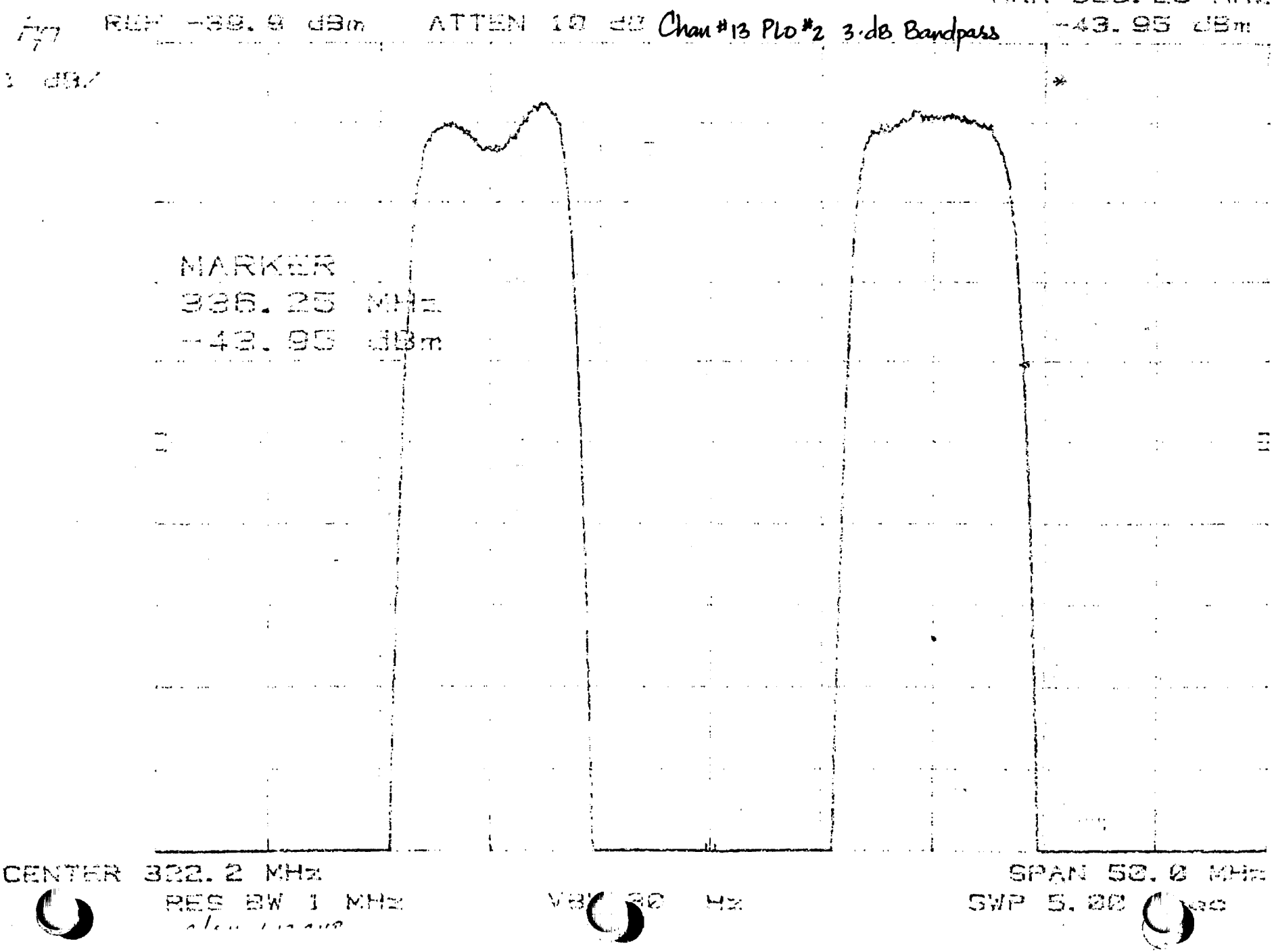


S/O #: 613948

5/12/99

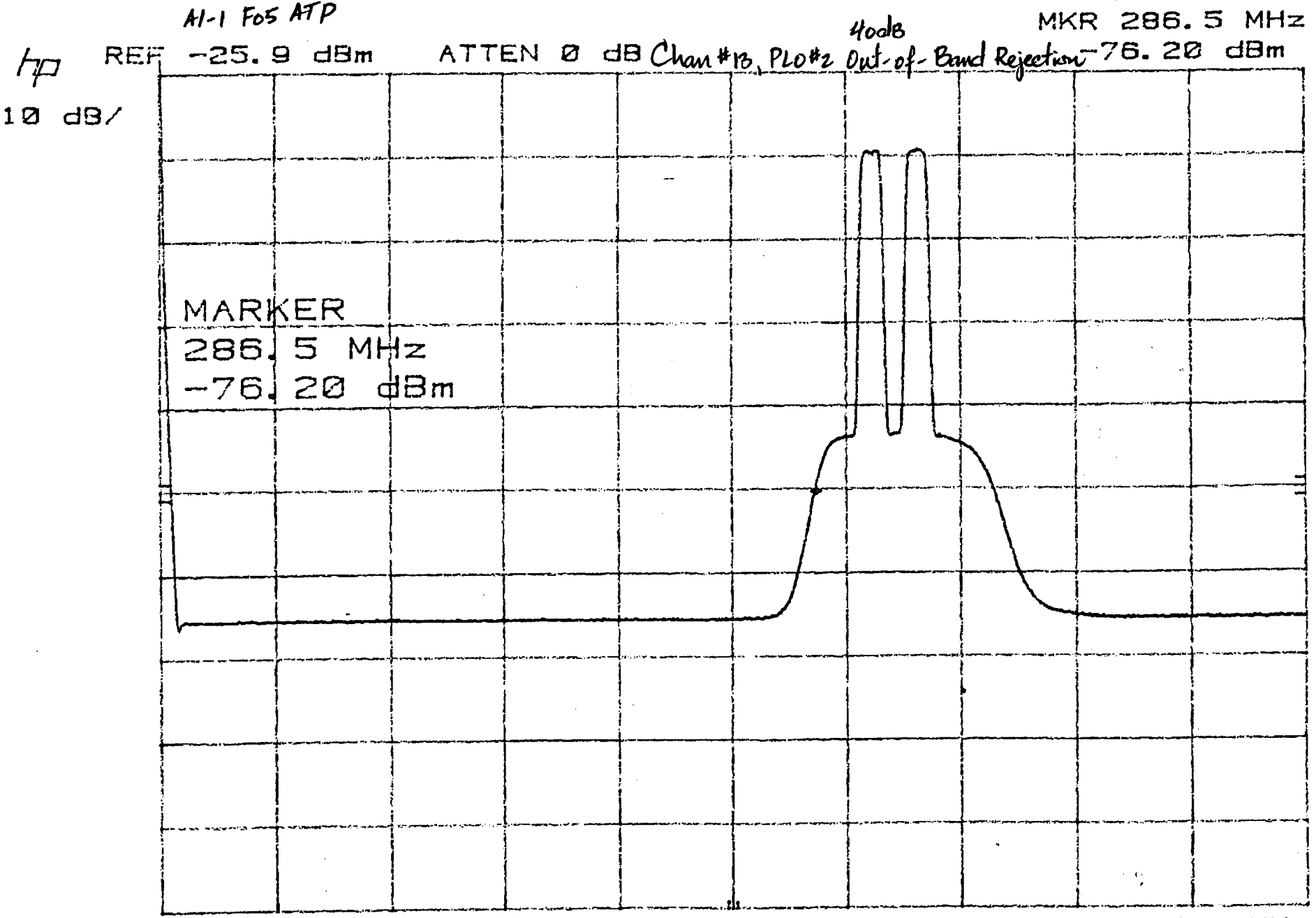
A1-1 F05 ATP

FOR REFERENCE ONLY



FOR REFERENCE ONLY

5/11/99
A1-1 FOS ATP

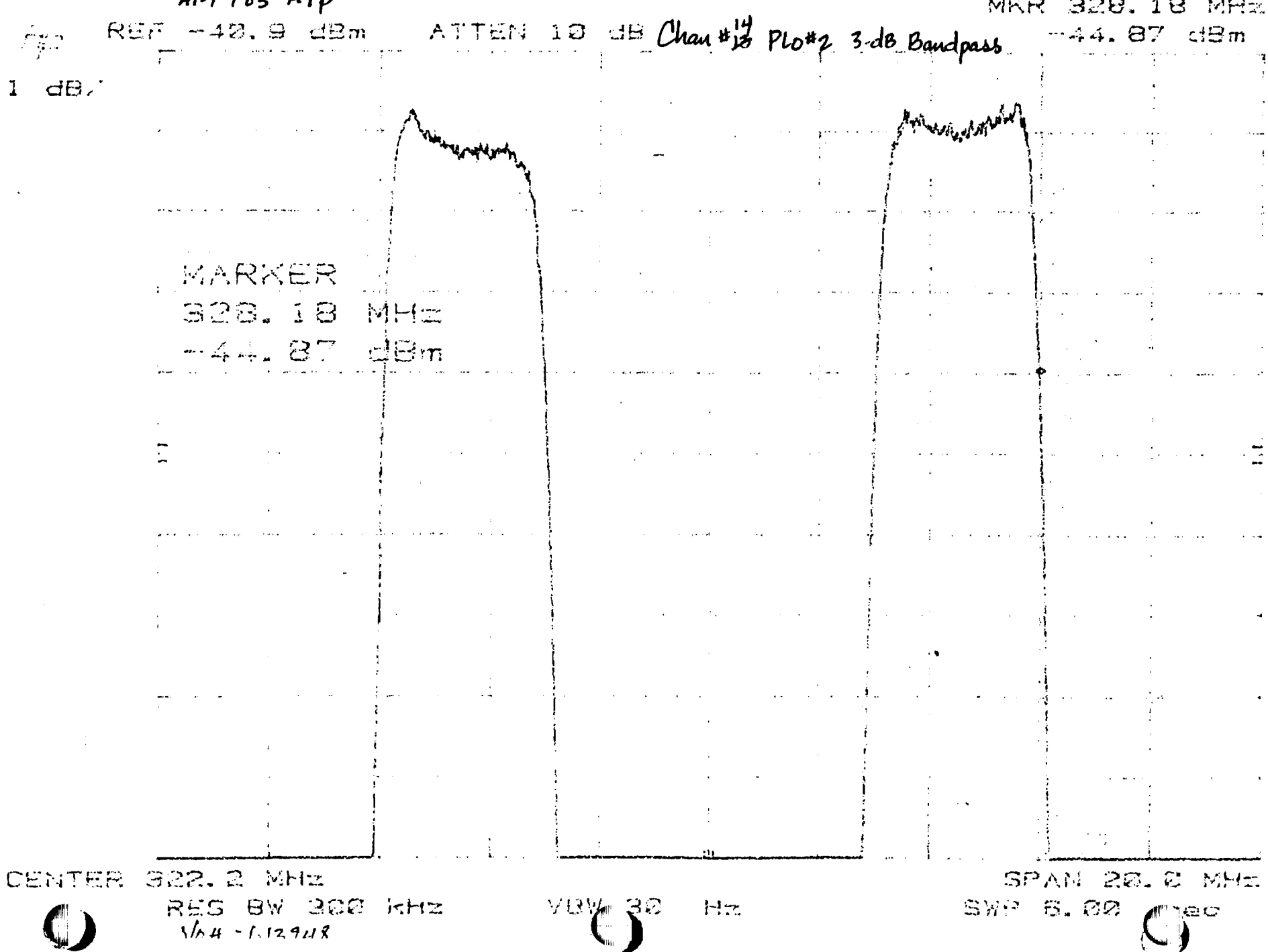


S/N: 117412

5/12/99

AI-1 F05 ATP

FOR REFERENCE ONLY



1/64 - 1.129 uR

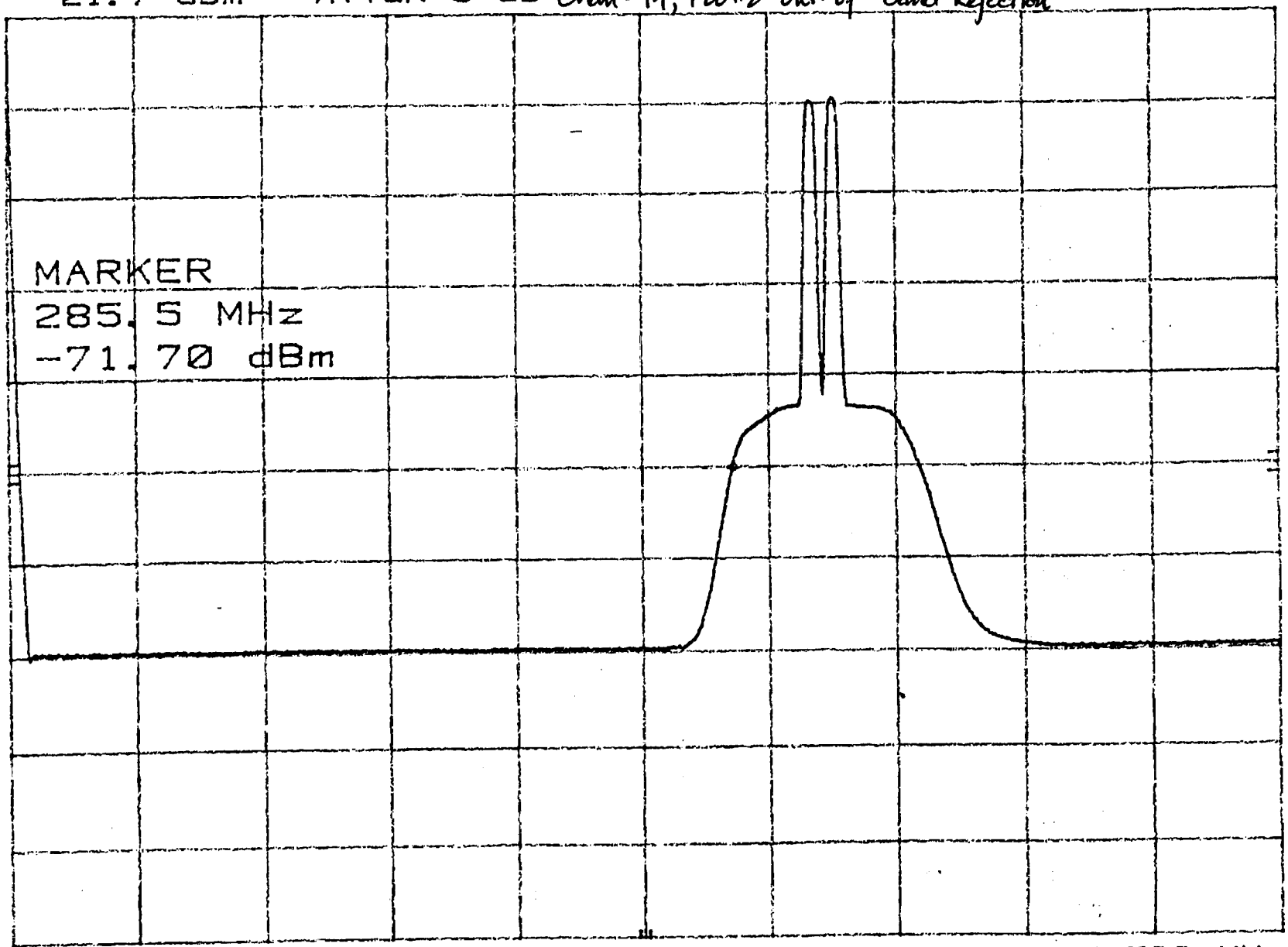
5/11/99
AI-1 FoS ATP

FOR REFERENCE ONLY

40dB

hp REF −21.7 dBm ATTEN 0 dB Chan #14, PLO #2 Out-of-Band Rejection MKR 285.5 MHz −71.70 dBm

10 dB/



CENTER 250 MHz SPAN 500 MHz

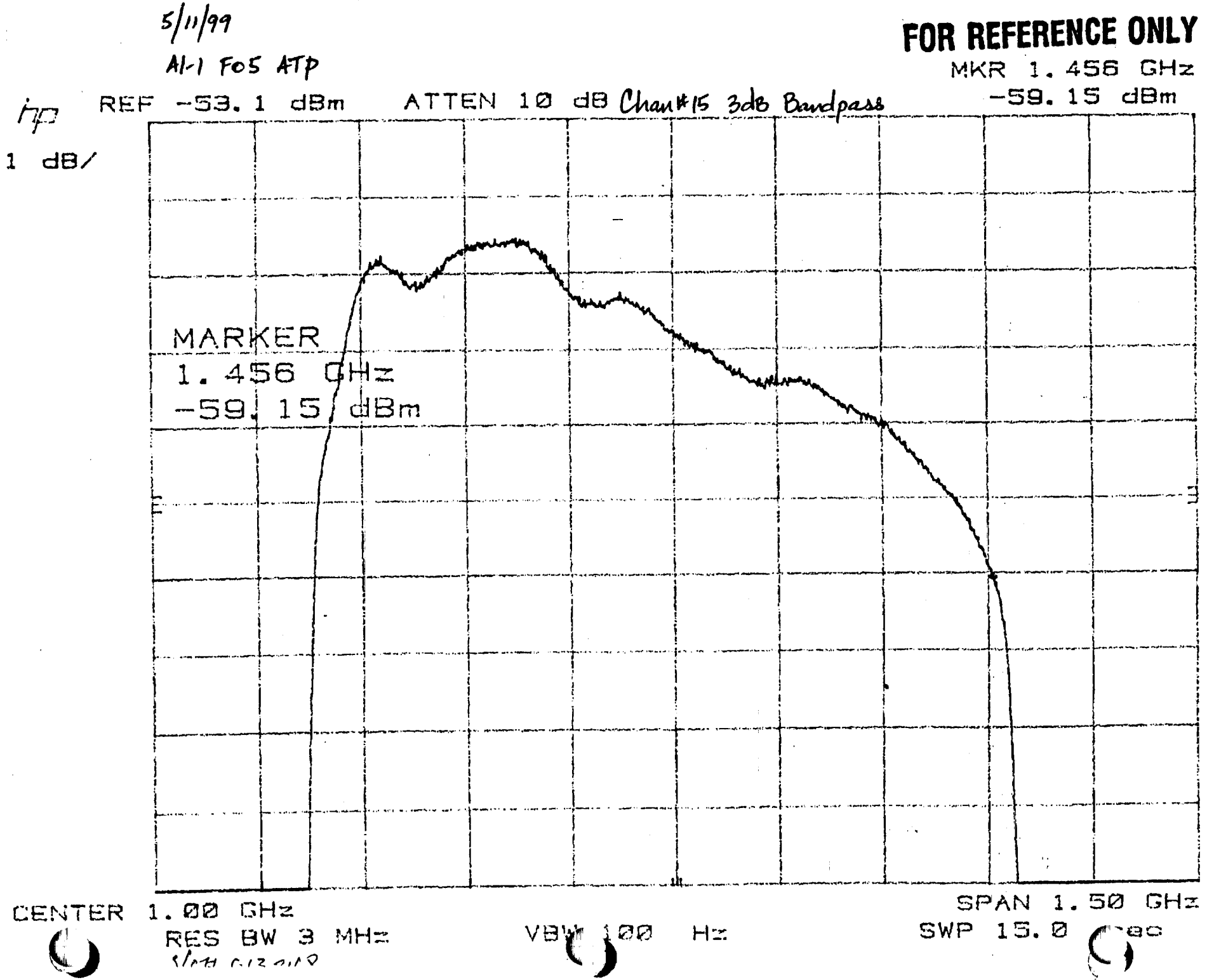
RES BW 1 MHz VBW 300 Hz SWP 10.0 sec

S/N #: 613948

5/11/99

Al-1 FoS ATP

FOR REFERENCE ONLY



5/11/99

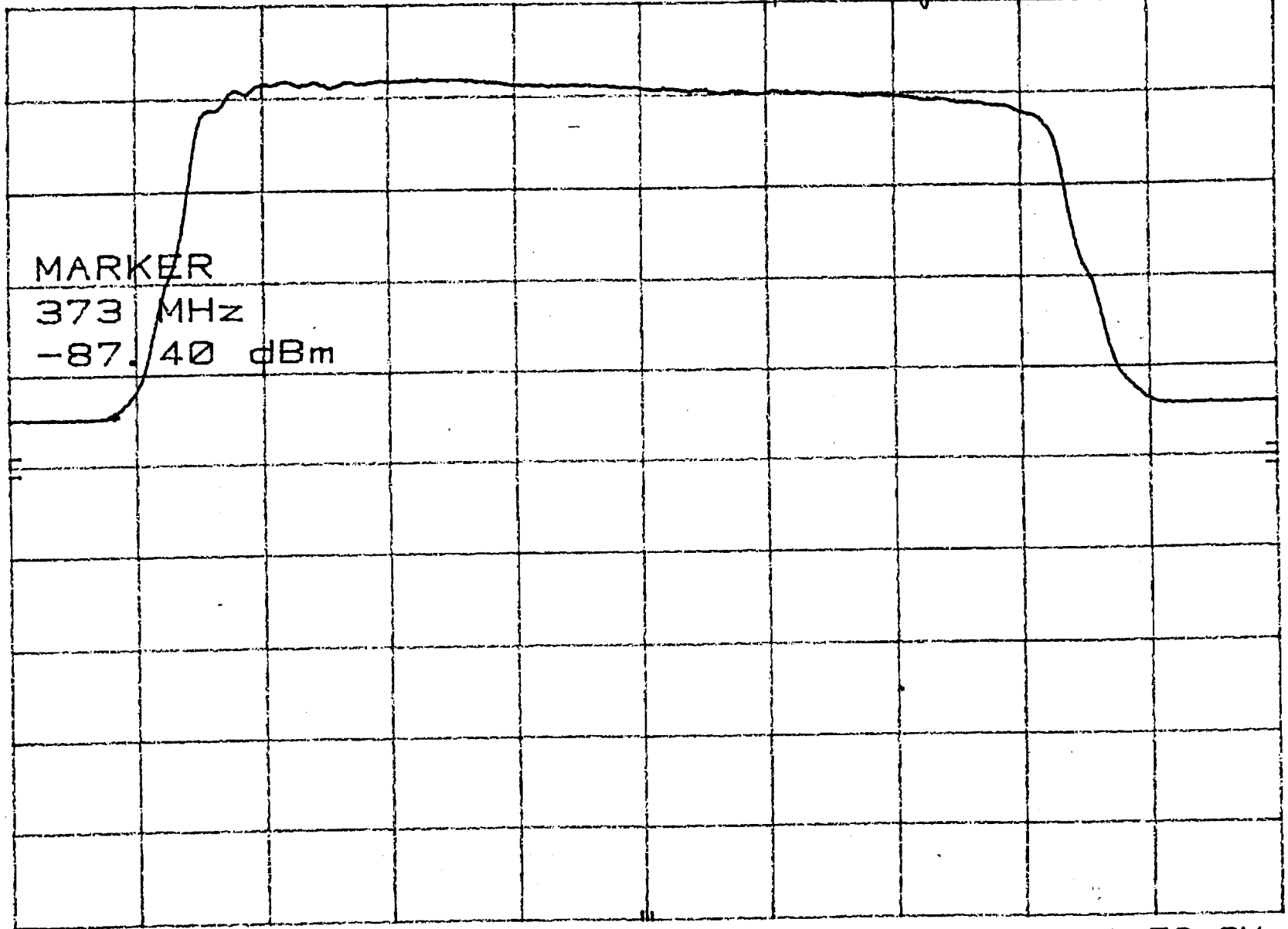
FOR REFERENCE ONLY

AI-1 F05 ATP

MKR 373 MHz

REF -42.8 dBm ATTEN 0 dB Chan #15 Out-of-Band Rejection -87.40 dBm

10 dB/



CENTER 1.00 GHz

SPAN 1.50 GHz

RES BW 3 MHz

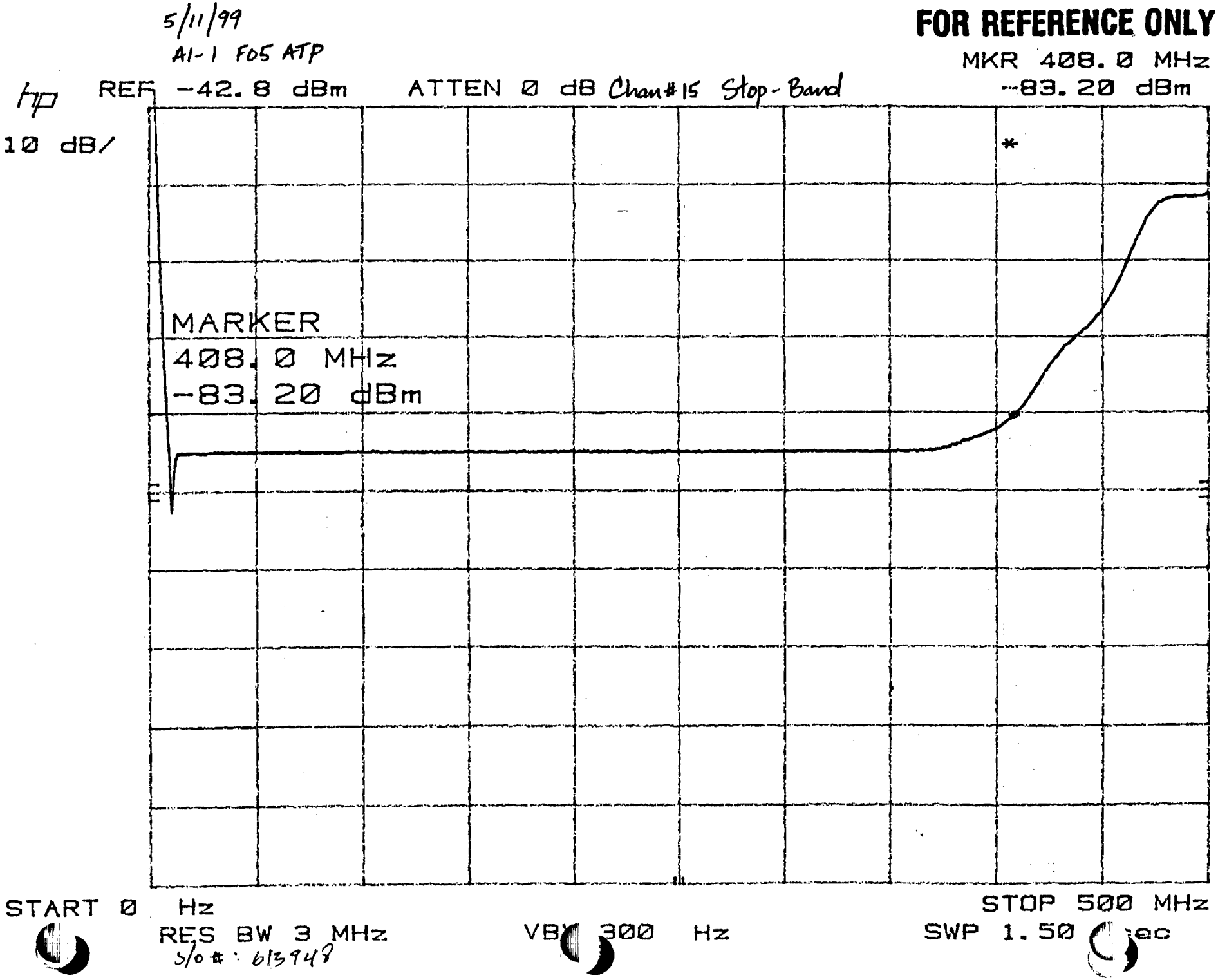
VBW 300 Hz

SWP 4.50 sec

S/O # 613948

5/11/99
A1-1 FOS ATP

FOR REFERENCE ONLY



S/O #: 613948

TEST DATA SHEET 10 (Sheet 1 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trink (Signature) Baseplate Temperature (T_B) 28.3 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	6	9.97	193.7	22.0	-.9331	.000166	-194.0	-.6199	.000218
				22.0	-.9325	.000176	-194.0	-.6502	.000236
				22.0	-.9321	.000177	-194.0	-.6525	.000331
				22.0	-.9325	.000177	-194.0	-.6531	.000336
				22.0	-.9327	.000167	-194.0	-.6512	.000304
				22.0	-.9329	.000180	-194.0	-.6551	.000190
				22.0	-.9323	.000172	-194.0	-.6562	.000388
				22.0	-.9326	.000179	-194.0	-.6569	.000322
				22.0	-.9328	.000207	-194.0	-.6597	.000366
				22.0	-.9332	.000172	-194.0	-.6600	.000338
Mixer/ Amps	All	9.94	244.0						
IF Amps	All	7.95	266.1						

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trink

Quality Assurance: 7A 268 MAY 24 '99

Date: 5/12/99

TEST DATA SHEET 10 (Sheet 16 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Zink (Signature) Baseplate Temperature (T_B) 28.3 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
6		3.86				0.003			
		3.88				0.046			
		3.92				0.048			
		3.93				0.049			
		3.94				0.017			
		3.95				0.056			
		3.98				0.038			
		3.98				0.054			
		4.02				0.093			
		4.02				0.036			
	5.15		3.95 3.92	P	.08		0.044	0.095	P

Pass = P, Fail = F

Part No.: 1356129-2

Serial No.: F05

Test Engineer: Y. Zink

Quality Assurance: 7A 268 MAY 24 '99

Date: 5/12/99

AMSU-A TEST **FOR REFERENCE ONLY**

A1-1 F0S ATP; CHAN 6 NF & NPS; TB= 28.3C, 05/12/99 S/O # 613948 oper# 6300

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-.93341567	.00016572	----------	---------
2	COLD TEST	79.15	-.64991971	.00021803	3.96127601	.00316917
3	WARM TEST	295.15	-.93251839	.00017602	----------	---------
4	COLD TEST	79.15	-.65049451	.00023605	3.98284331	.01590319
5	WARM TEST	295.15	-.93244976	.00017677	----------	---------
6	COLD TEST	79.15	-.65253849	.00033108	3.91541263	.01794879
7	WARM TEST	295.15	-.93254639	.00017707	----------	---------
8	COLD TEST	79.15	-.65343794	.00033641	3.92842971	.01869592
9	WARM TEST	295.15	-.93265248	.00016702	----------	---------
10	COLD TEST	79.15	-.65423932	.00030357	3.93983726	.01725512
11	WARM TEST	295.15	-.93286036	.00018016	----------	---------
12	COLD TEST	79.15	-.65507329	.00018955	3.95065942	.05582938
13	WARM TEST	295.15	-.93230590	.00017239	----------	---------
14	COLD TEST	79.15	-.65622748	.00038763	3.97503457	.03782852
15	WARM TEST	295.15	-.93263222	.00017922	----------	---------
16	COLD TEST	79.15	-.65690777	.00032466	3.98218783	.05383023
17	WARM TEST	295.15	-.93283982	.00020699	----------	---------
18	COLD TEST	79.15	-.65966167	.00036622	4.02373897	.09823043
19	WARM TEST	295.15	-.93319448	.00017179	----------	---------
20	COLD TEST	79.15	-.65998401	.00033751	4.02188419	.03605268

CH. 6 ,192.4 MHz MHz

NOISE FIGURE AVERAGE (dB) = 3.94903331313

NOISE POWER STABILITY (K) = .0444743432955

NOISE POWER STABILITY DELTA (K) = .0950612568962

NPS_MAX (K) = .098230128277 NPS_MIN (K) = .00316917138073

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 2 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.3 °C

Compo-nent	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	7	9.93	194.3	22.0	-.9418	.000161	-194.0	-.6652	.000314
				22.0	-.9418	.000191	-194.0	-.6659	.000338
				22.0	-.9417	.000184	-194.0	-.6658	.000324
				22.0	-.9418	.000201	-194.0	-.6645	.000331
				22.0	-.9416	.000175	-194.0	-.6650	.000257
				22.0	-.9417	.000193	-194.0	-.6640	.000278
				22.0	-.9419	.000165	-194.0	-.6635	.000298
				22.0	-.9419 -.9420	.000196	-194.0	-.6629	.000317
				22.0	-.9420	.000188	-194.0	-.6633	.000342
				22.0	-.9421	.000184	-194.0	-.6629	.000337
Mixer/ Amps	All	9.94	244.0						
IF Amps	All	7.95	266.1						

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 MAY 24 '99

Date: 5/12/99

TEST DATA SHEET 10 (Sheet 17 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Link (Signature) Baseplate Temperature (T_B) 23.3 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
7		4.01				0.037			
		4.02				0.073			
		4.02				0.060			
		4.00				0.087			
		4.01				0.041			
		3.99				0.074			
		3.98				0.022			
		3.97				0.079			
		3.98				0.066			
		3.97				0.059			
	5.15		4.00	P	.08		0.060	0.065	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Link

Quality Assurance: 7A 268 MAY 24 '99

Date: 5/12/99

AMSU-A TEST **FOR REFERENCE ONLY**

A1-1 F05 ATP, CHAN 7 NF & NPS; TB= 28.3C, 05/12/99 S/O# 613948, Opert# 6300

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-.94179764	.00016065	----------	---------
2	COLD TEST	79.15	-.66517223	.00031401	4.01069181	.03677185
3	WARM TEST	295.15	-.94184062	.00019139	----------	---------
4	COLD TEST	79.15	-.66587758	.00033798	4.02137636	.07259335
5	WARM TEST	295.15	-.94171154	.00018428	----------	---------
6	COLD TEST	79.15	-.66575456	.00032425	4.02087289	.06031728
7	WARM TEST	295.15	-.94177211	.00020147	----------	---------
8	COLD TEST	79.15	-.66448732	.00033067	4.00016059	.08731788
9	WARM TEST	295.15	-.94163856	.00017541	----------	---------
10	COLD TEST	79.15	-.66497368	.00025711	4.00932903	.04095386
11	WARM TEST	295.15	-.94169125	.00019277	----------	---------
12	COLD TEST	79.15	-.66402298	.00027831	3.99385002	.07137859
13	WARM TEST	295.15	-.94188425	.00016499	----------	---------
14	COLD TEST	79.15	-.66347599	.00029802	3.98299630	.02210221
15	WARM TEST	295.15	-.94185733	.00019574	----------	---------
16	COLD TEST	79.15	-.66294333	.00031739	3.97193322	.07853188
17	WARM TEST	295.15	-.94199975	.00018811	----------	---------
18	COLD TEST	79.15	-.66325890	.00034161	3.97831072	.05640947
19	WARM TEST	295.15	-.94205716	.00018412	----------	---------
20	COLD TEST	79.15	-.66288083	.00033707	3.97174608	.05921642

CH. 7 ,191.8 MHz MHz

NOISE FIGURE AVERAGE (dB) = 3.99616313515

NOISE POWER STABILITY (K) = .0598591788072

NOISE POWER STABILITY DELTA (K) = .0652156673413

NPS_MAX (K) = .0873178750539 NPS_MIN (K) = .0221022087126

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 3 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 29.3 °C PLO No. 1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	9	Positive +15.13	506.23	22.0	.9677	.000216	-194.0	.7068	.000161
				22.0	.9672	.000202	-194.0	.7046	.000159
				22.0	.9665	.000223	-194.0	.7047	.000144
				22.0	.9663	.000209	-194.0	.7065	.000128
		Negative -15.13	-71.48	22.0	.9664	.000196	-194.0	.7042	.000151
				22.0	.9660	.000188	-194.0	.7039	.000129
				22.0	.9657	.000210	-194.0	.7057	.000141
				22.0	.9657	.000193	-194.0	.7065	.000143
				22.0	.9654	.000199	-194.0	.7072	.000143
				22.0	.9656	.000213	-194.0	.7075	.000213
Mixer/ Amps	All	9.93	244.1						
IF Amps	All	7.95	266.4						

Part No.: 13564/29-2
Serial No.: F05

Test Engineer: Y. Trinh
Quality Assurance: 7A 268 MAY 24 99
Date: 5/12/99

TEST DATA SHEET 10 (Sheet 18 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: 27.3 A Hamlin Baseplate Temperature (T_B) 29.3 °C PLO No. 1

Signature 5/24/99

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
9		4.39				0.032			
		4.35				0.052			
		4.36				0.094			
		4.40				0.068			
		4.36				0.032			
		4.36				0.032			
		4.39				0.070			
		4.40				0.022			
		4.42				0.045			
		4.42				0.079			
	4.7		4.39	P	.08		0.053	0.072	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 268 MAY 28 '99

Date: 5/12/99

AMSU-A TEST **FOR REFERENCE ONLY**

A1-1 F05 ATP, CHAN 9, PLO#1 NF & NPS; TB= 29.3C, 05/12/99 S/O# L13748 Oper# L300

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-.96772397	.00021621	----------	---------
2	COLD TEST	79.15	-.70682288	.00016089	1.38530689	.08233702
3	WARM TEST	295.15	-.96720834	.00020187	----------	---------
4	COLD TEST	79.15	-.70456188	.00015875	1.35383263	.05158848
5	WARM TEST	295.15	-.96547812	.00022300	----------	---------
6	COLD TEST	79.15	-.70456120	.00014404	1.36440921	.09395711
7	WARM TEST	295.15	-.96628527	.00020858	----------	---------
8	COLD TEST	79.15	-.70653865	.00012843	1.39818805	.06838003
9	WARM TEST	295.15	-.96640147	.00019550	----------	---------
10	COLD TEST	79.15	-.70419261	.00015057	1.35747348	.03151953
11	WARM TEST	295.15	-.96597475	.00018760	----------	---------
12	COLD TEST	79.15	-.70392422	.00012869	1.35818320	.03223232
13	WARM TEST	295.15	-.96570502	.00020965	----------	---------
14	COLD TEST	79.15	-.70567205	.00014102	1.39074555	.07074322
15	WARM TEST	295.15	-.96567415	.00019337	----------	---------
16	COLD TEST	79.15	-.70649012	.00014322	1.40190020	.02196093
17	WARM TEST	295.15	-.96541032	.00019891	----------	---------
18	COLD TEST	79.15	-.70723650	.00014347	1.42077529	.04501582
19	WARM TEST	295.15	-.96557270	.00021332	----------	---------
20	COLD TEST	79.15	-.70746281	.00014231	1.42259289	.07856252

CH. 9 ,154 MHz MHz

NOISE FIGURE AVERAGE (dB) = 1.38571182345

NOISE POWER STABILITY (K) = .0576326980229

NOISE POWER STABILITY DELTA (K) = .0719961788209

NPS_MAX (K) = .0939571069588 NPS_MIN (K) = .0219609281379

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 4 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 29.3 °C PLO No. 1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	10	Positive +15.13	506.23	22.0	-.9382	.000294	-194.0	-.6072	.000207
				22.0	-.9370	.000280	-194.0	-.6748	.000223
				22.0	-.9366	.000270	-194.0	-.6753	.000215
				22.0	-.9370	.000290	-194.0	-.6765	.000191
		Negative -15.13	-71.48	22.0	-.9375	.000289	-194.0	-.6770	.000191
				22.0	-.9379	.000301	-194.0	-.6772	.000204
				22.0	-.9384	.000283	-194.0	-.6760	.000224
				22.0	-.9387	.000286	-194.0	-.6763	.000197
				22.0	-.9393	.000296	-194.0	-.6768	.000199
				22.0	-.9397	.000294	-194.0	-.6762	.000194
Mixer/ Amps	All	9.93	244.1 ~~243.8~~ Y. Trinh						
IF Amps	All	7.95	266.4						

Part No.: 1356429-2
Serial No.: F05

Test Engineer: Y. Trinh
Quality Assurance: 7A 268 MAY 24 '99
Date: 5/12/99

TEST DATA SHEET 10 (Sheet 19 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 29.3 °C PLO No. 1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
10		4.25				0.106			
		4.22				0.076			
		4.24				0.047			
		4.25				0.099			
		4.25				0.097			
		4.25				0.12			
		4.23				0.084			
		4.23				0.088			
		4.23				0.108			
		4.21				0.104			
	4.7		4.24	P	0.12		0.093	0.073	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 24 268 MAY 24 '99

Date: 5/12/99

AMSU-A TEST **FOR REFERENCE ONLY**

A1-1 F05 ATP, CHAN 10 PLOT1 NF & NPS, TB= 29.3C, 05/12/99 S/o # 613948 oper# 6300

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-.93819021	.00029370	----------	----------
2	COLD TEST	79.15	-.67723262	.00020663	1.21886973	.10581537
3	WARM TEST	295.15	-.93695538	.00027974	----------	----------
4	COLD TEST	79.15	-.67479779	.00022373	1.22305300	.07605681
5	WARM TEST	295.15	-.93662008	.00026998	----------	----------
6	COLD TEST	79.15	-.67537463	.00021198	1.23672566	.01682606
7	WARM TEST	295.15	-.93700236	.00029002	----------	----------
8	COLD TEST	79.15	-.67618922	.00019071	1.25078326	.09940797
9	WARM TEST	295.15	-.93746059	.00028978	----------	----------
10	COLD TEST	79.15	-.67701899	.00019111	1.25412139	.09667812
11	WARM TEST	295.15	-.93789614	.00030133	----------	----------
12	COLD TEST	79.15	-.67718819	.00020371	1.25168327	.11986105
13	WARM TEST	295.15	-.93842130	.00028311	----------	----------
14	COLD TEST	79.15	-.67597871	.00022100	1.22513800	.08388186
15	WARM TEST	295.15	-.93872614	.00028558	----------	----------
16	COLD TEST	79.15	-.67628150	.00019690	1.22652350	.08848918
17	WARM TEST	295.15	-.93931592	.00029571	----------	----------
18	COLD TEST	79.15	-.67683662	.00019938	1.22869203	.10842953
19	WARM TEST	295.15	-.93970457	.00029373	----------	----------
20	COLD TEST	79.15	-.67624900	.00019361	1.21426907	.10413928

CH. 10 ,76.3 MHz MHz

NOISE FIGURE AVERAGE (dB) = 1.23600710687

NOISE POWER STABILITY (K) = .0929589280956

NOISE POWER STABILITY DELTA (K) = .0730379961883

NPS_MAX (K) = .119861052727 NPS_MIN (K) = .0468260565383

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 5 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Yrish (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	11	Positive +15.13	505.33	22.0	-1.013	.000287	-194.0	-.7369	.000260
				22.0	-1.014	.000333	-194.0	-.7374	.000249
				22.0	-1.014	.000337	-194.0	-.7360	.000240
				22.0	-1.014	.000293	-194.0	-.7373	.000215
		Negative -15.13	-71.29	22.0	-1.015	.000276	-194.0	-.7363	.000221
				22.0	-1.015	.000289	-194.0	-.7364	.000200
				22.0	-1.015	.000317	-194.0	-.7356	.000239
				22.0	-1.016	.000343	-194.0	-.7362	.000239
				22.0	-1.016	.000305	-194.0	-.7346	.000242
				22.0	-1.016	.000298	-194.0	-.7373	.000193
Mixer/ Amps	All	9.94	244.0						
IF Amps	All	7.95	266.1						

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Yrish

Quality Assurance: (IA 268) MAY 24 '99

Date: 5/12/99

TEST DATA SHEET 10 (Sheet 20 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
11		4.34				0.070			
		4.34				0.112			
		4.31				0.119			
		4.33				0.054			
		4.31				0.093			
		4.31 ~~4.29~~ T. Trinh				0.065			
		4.29				0.077			
		4.30				0.127			
		4.27				0.036			
		4.31				0.032			
	4.7		4.31	P	.12		0.078	0.094	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 268 MAY 23 '99

Date: 5/12/99

AMSU-A TEST **FOR REFERENCE ONLY** S/N #: 613948
Oper # 6300

A1-1 F05 ATP, CHAN 11 PLO#1 NF & NPS; TB= 28.2C, 05/12/99

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-1.01313337	.00028676	----------	----------
2	COLD TEST	79.15	-.73692165	.00026010	4.33618045	.07019851
3	WARM TEST	295.15	-1.01350386	.00033291	----------	----------
4	COLD TEST	79.15	-.73713506	.00021929	4.34034106	.11195916
5	WARM TEST	295.15	-1.01386386	.00033727	----------	----------
6	COLD TEST	79.15	-.73602735	.00023959	4.31399202	.11875091
7	WARM TEST	295.15	-1.01417312	.00029279	----------	----------
8	COLD TEST	79.15	-.73729800	.00021482	4.33047788	.05374316
9	WARM TEST	295.15	-1.01457877	.00027606	----------	----------
10	COLD TEST	79.15	-.73634786	.00022073	4.31087217	.09295093
11	WARM TEST	295.15	-1.01510508	.00028924	----------	----------
12	COLD TEST	79.15	-.73644924	.00020002	4.30646797	.05474767
13	WARM TEST	295.15	-1.01519157	.00031726	----------	----------
14	COLD TEST	79.15	-.73558920	.00023883	4.29201627	.07725930
15	WARM TEST	295.15	-1.01551030	.00034275	----------	----------
16	COLD TEST	79.15	-.73618629	.00023992	4.29774290	.12650191
17	WARM TEST	295.15	-1.01559154	.00030185	----------	----------
18	COLD TEST	79.15	-.73462507	.00024214	4.27246174	.03613565
19	WARM TEST	295.15	-1.01581208	.00029838	----------	----------
20	COLD TEST	79.15	-.73727322	.00019310	4.31134713	.03228057

CH. 11 ,68.9 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.31126530417

NOISE POWER STABILITY (K) = .0784530798084

NOISE POWER STABILITY DELTA (K) = .094224341104

NPS_MAX (K) = .12650490707 NPS_MIN (K) = .032280565966

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 6 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	12	Positive +15.13	505.35	22.0	-1.058	.000444	-194.0	-.7685	.000347
				22.0	-1.059	.000454	-194.0	-.7685	.000371
				22.0	-1.059	.000484	-194.0	-.7657	.000338
				22.0	-1.059	.000498	-194.0	-.7669	.000355
				22.0	-1.059	.000469	-194.0	-.7657	.000352
		Negative -15.13	-71.29	22.0	-1.059	.000464	-194.0	-.7687	.000345
				22.0	-1.059	.000484	-194.0	-.7672	.000386
				22.0	-1.059	.000483	-194.0	-.7681	.000360
				22.0	-1.059	.000465	-194.0	-.7683	.000356
				22.0	-1.060	.000454	-194.0	-.7680	.000359
Mixer/ Amps	All	7.94	244.0						
IF Amps	All	7.95	266.1						

Part No.: 1356429-2
Serial No.: F05

Test Engineer: Y. Trinh
Quality Assurance: 7A 268 MAY 24 '99
Date: 5/12/99

TEST DATA SHEET 10 (Sheet 21 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
12		4.32				0.109			
		4.31				0.085			
		4.27				0.090			
		4.29				0.125			
		4.27				0.013			
		4.31				0.047			
		4.29				0.089			
		4.30				0.090			
		4.30				0.042			
		4.29				0.086			
	4.7		4.30	P	0.18		0.078	0.112	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 74 268 MAY 24 '99

Date: 5/12/99

AMSU-A TEST **FOR REFERENCE ONLY** S/O # 613948 open # 6300

A1-1 F05 ATP, CHAN 12, PLO#1; TB= 28.2C, 05/12/99

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-1.05830343	.00044433	----------	---------
2	COLD TEST	79.15	-.76854736	.00034679	4.31789074	.10940747
3	WARM TEST	295.15	-1.05855659	.00045405	----------	---------
4	COLD TEST	79.15	-.76845906	.00037105	4.31378780	.08459618
5	WARM TEST	295.15	-1.05858277	.00048356	----------	---------
6	COLD TEST	79.15	-.76565574	.00033812	4.27146321	.08953999
7	WARM TEST	295.15	-1.05865340	.00049776	----------	---------
8	COLD TEST	79.15	-.76691848	.00035546	4.28958253	.12532826
9	WARM TEST	295.15	-1.05902963	.00046861	----------	---------
10	COLD TEST	79.15	-.76574991	.00035180	4.26804763	.01335079
11	WARM TEST	295.15	-1.05895715	.00046388	----------	---------
12	COLD TEST	79.15	-.76871581	.00034482	4.31327515	.04736406
13	WARM TEST	295.15	-1.05897546	.00048356	----------	---------
14	COLD TEST	79.15	-.76716683	.00038580	4.28980785	.08939531
15	WARM TEST	295.15	-1.05912316	.00048339	----------	---------
16	COLD TEST	79.15	-.76811310	.00036042	4.30239750	.08895476
17	WARM TEST	295.15	-1.05940547	.00046500	----------	---------
18	COLD TEST	79.15	-.76828962	.00035617	4.30197365	.04194471
19	WARM TEST	295.15	-1.05972775	.00045392	----------	---------
20	COLD TEST	79.15	-.76797906	.00035921	4.29381044	.08607230

CH. 12 ,31 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.29623400496

NOISE POWER STABILITY (K) = .0775953837979

NOISE POWER STABILITY DELTA (K) = .111977473096

NPS_MAX (K) = .125328264666 NPS_MIN (K) = .013350791571

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 7 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	13	Positive +15.13	505.33	22.0	-.9453	.000633	-194.0	-.6841	.000430
				22.0	-.9438	.000572	-194.0	-.6814	.000457
				22.0	-.9432	.000579	-194.0	-.6825	.000409
				22.0	-.9428	.000582	-194.0	-.6795	.000477
				22.0	-.9426	.000464	-194.0	-.6820	.000458
		Negative -15.13	-71.29	22.0	-.9425	.000554	-194.0	-.6810	.000461
				22.0	-.9424	.000569	-194.0	-.6807	.000470
				22.0	-.9426	.000516	-194.0	-.6810	.000433
				22.0	-.9428	.000600	-194.0	-.6785	.000438
				22.0	-.9429	.000528	-194.0	-.6812	.000420
Mixer/ Amps	All	9.94	244.0						
IF Amps	All	7.95	266.1						

Part No.: 1356429-2
Serial No.: F05

Test Engineer: Y. Trinh
Quality Assurance: 7A 268 MAY 94 '99
Date: 5/12/99

TEST DATA SHEET 10 (Sheet 22 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Yrink (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
13		4.28				0.194			
		4.25				0.107			
		4.28				0.079			
		4.23				0.061			
		4.28				0.297			
		4.26				0.160			
		4.26				0.117			
		4.26				0.230			
		4.21				0.101			
		4.26				0.212			
	4.7		4.26	P	0.24		.156	.236	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Yrink

Quality Assurance: (7A 268) MAY 24 '99

Date: 5/12/99

AMSU-A TEST **FOR REFERENCE ONLY**

S/O # 613748
Oper# 6300

A1-1 F05 ATP; CHAN 13, PLO#1; TB= 28.2C, 05/12/99

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-.94532757	.00063347		
2	COLD TEST	79.15	-.68414273	.00043035	4.27819750	.19431877
3	WARM TEST	295.15	-.94375766	.00057273		
4	COLD TEST	79.15	-.68138717	.00045701	4.25112998	.10702074
5	WARM TEST	295.15	-.94316179	.00057909		
6	COLD TEST	79.15	-.68250360	.00040874	4.27699413	.07924165
7	WARM TEST	295.15	-.94277847	.00058199		
8	COLD TEST	79.15	-.67951313	.00047655	4.23170566	.06079490
9	WARM TEST	295.15	-.94258110	.00046434		
10	COLD TEST	79.15	-.68200886	.00045750	4.27574350	.29709677
11	WARM TEST	295.15	-.94252758	.00055373		
12	COLD TEST	79.15	-.68097410	.00046114	4.25906313	.15972462
13	WARM TEST	295.15	-.94242040	.00056921		
14	COLD TEST	79.15	-.68065758	.00047048	4.25506828	.11654799
15	WARM TEST	295.15	-.94261119	.00051597		
16	COLD TEST	79.15	-.68102954	.00043254	4.25898010	.23041481
17	WARM TEST	295.15	-.94276684	.00059959		
18	COLD TEST	79.15	-.67845158	.00043824	4.21425009	.10111607
19	WARM TEST	295.15	-.94286071	.00052753		
20	COLD TEST	79.15	-.68118551	.00041965	4.25857404	.21203600

CH. 13 ,15.65 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.25601325604

NOISE POWER STABILITY (K) = .155831233363

NOISE POWER STABILITY DELTA (K) = .236301868577

NPS_MAX (K) = .29709677311 NPS_MIN (K) = .0607949045333

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 8 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	14	Positive +15.13	505.33	22.0	-.9489	.000889	-194.0	-.6869	.000653
				22.0	-.9485	.000944	-194.0	-.6864	.000692
				22.0	-.9482	.000916	-194.0	-.6853	.000674
				22.0	-.9481	.000892	-194.0	-.6862	.000669
				22.0	-.9483	.001020	-194.0	-.6872	.000728
		Negative -15.13	71.29	22.0	-.9482	.000891	-194.0	-.6865	.000753
				22.0	-.9486	.000898	-194.0	-.6869	.000689
				22.0	-.9485	.000824	-194.0	-.6870	.000711
				22.0	-.9485	.001022 ~~.000~~ T. Trinh	-194.0	-.6869	.000717
				22.0	-.9486	.000866	-194.0	-.6869	.000664
Mixer/ Amps	All	9.94	244.0						
IF Amps	All	7.95	266.1						

Part No.: Y 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: TA 268 MAY 24 '99

Date: 5/12/99

TEST DATA SHEET 10 (Sheet 23 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
14		4.28				0.314			
		4.28				0.171			
		4.26				0.253			
		4.28				0.306			
		4.29				0.269			
		4.28				0.308			
		4.29				0.295			
		4.29				0.417			
		4.29				0.275			
		4.28				0.354			
	4.7		4.28	P	0.36		0.296	0.246	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: T. Trinh

Quality Assurance: [signature] MAY 24 '99

Date: 5/12/99

AMSU-A TEST **FOR REFERENCE ONLY**

S/O # 613948
Opn #: 6300

A1-1 F05 ATP, CHAN 14, PLO#1; TB= 28.2C; 05/12/99

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-.94885185	.00088869	----------	---------
2	COLD TEST	79.15	-.68691613	.00065264	4.28191507	.31353795
3	WARM TEST	295.15	-.94846264	.00094366	----------	---------
4	COLD TEST	79.15	-.68639075	.00069258	4.27784940	.17103481
5	WARM TEST	295.15	-.94818397	.00091555	----------	---------
6	COLD TEST	79.15	-.68528086	.00067446	4.26272064	.25294296
7	WARM TEST	295.15	-.94812399	.00089184	----------	---------
8	COLD TEST	79.15	-.68623572	.00066905	4.27935229	.30586231
9	WARM TEST	295.15	-.94834810	.00101954	----------	---------
10	COLD TEST	79.15	-.68723776	.00072762	4.29339078	.26949934
11	WARM TEST	295.15	-.94822845	.00089109	----------	---------
12	COLD TEST	79.15	-.68650444	.00075323	4.28257672	.30775182
13	WARM TEST	295.15	-.94855032	.00089773	----------	---------
14	COLD TEST	79.15	-.68693196	.00068903	4.28582551	.29517012
15	WARM TEST	295.15	-.94847370	.00082374	----------	---------
16	COLD TEST	79.15	-.68702649	.00071079	4.28833332	.41722819
17	WARM TEST	295.15	-.94851427	.00102192	----------	---------
18	COLD TEST	79.15	-.68687571	.00071659	4.28532192	.27462344
19	WARM TEST	295.15	-.94858077	.00086579	----------	---------
20	COLD TEST	79.15	-.68682795	.00066422	4.28371963	.35416741

CH. 14 ,5.84 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.28210736862

NOISE POWER STABILITY (K) = .296181835175

NOISE POWER STABILITY DELTA (K) = .246193380059

NPS_MAX (K) = .417228194282 NPS_MIN (K) = .171034814223

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 9 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	9	Positive		22.0	-.9882	.000202	-194.0	-.7242	.000185
				22.0	-.9883	.000186	-194.0	-.7209	.000182
				22.0	-.9882	.000185	-194.0	-.7210	.000183
		+15.13	518.33	22.0	-.9831	.000193	-194.0	-.7217	.000208
		Negative		22.0	-.9831	.000203	-194.0	-.7224	.000177
		-15.13	-71.89	22.0	-.9883	.000221	-194.0	-.7220	.000188
				22.0	-.9884	.000215	-194.0	-.7228	.000218
				22.0	-.9883	.000194	-194.0	-.7249	.000208
				22.0	-.9882	.000209	-194.0	-.7239	.000175
				22.0	-.9883	.000212	-194.0	-.7239	.000166
Mixer/ Amps	All	9.94	244.0						
IF Amps	All	7.95	266.1						

Part No.: 1356429-2
Serial No.: F05

Test Engineer: Y. Trinh
Quality Assurance: 7A 268 MAY 04 '99
Date: 5/13/99

TEST DATA SHEET 10 (Sheet 24 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 23.2 °C PLO No. 2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
9		4.43				0.037			
		4.37				0.051			
		4.37				0.053			
		4.39				0.028			
		4.40				0.043			
		4.39				0.082			
		4.40				0.071			
		4.43				0.025			
		4.42				0.059			
		4.42				0.069			
	4.7		4.40	P	.08		0.051	0.057	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 268 MAY 24 '99

Date: 5/13/99

AMSU-A TEST **FOR REFERENCE ONLY** S/O#: 613948 Oper#: 6300

A1-1 F05 ATP, CHAN 9 PLO#2, NF & NPS; TB=28.2C, 05/13/99

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-.98818922	.00020155		
2	COLD TEST	79.15	-.72419320	.00018467	4.42523367	.03740762
3	WARM TEST	295.15	-.98825972	.00018570		
4	COLD TEST	79.15	-.72093174	.00018245	4.37072372	.05142943
5	WARM TEST	295.15	-.98815479	.00018506		
6	COLD TEST	79.15	-.72097211	.00018277	4.37263602	.05288651
7	WARM TEST	295.15	-.98811445	.00019322		
8	COLD TEST	79.15	-.72172849	.00020756	4.38551139	.02800035
9	WARM TEST	295.15	-.98812260	.00020316		
10	COLD TEST	79.15	-.72243094	.00017696	4.39695473	.04261404
11	WARM TEST	295.15	-.98831269	.00022064		
12	COLD TEST	79.15	-.72200805	.00018816	4.38772275	.08167461
13	WARM TEST	295.15	-.98835759	.00021489		
14	COLD TEST	79.15	-.72284994	.00021811	4.40102229	.07107422
15	WARM TEST	295.15	-.98829803	.00019402		
16	COLD TEST	79.15	-.72486052	.00020844	4.43497152	.02451835
17	WARM TEST	295.15	-.98822388	.00020918		
18	COLD TEST	79.15	-.72393194	.00017528	4.42049046	.05907474
19	WARM TEST	295.15	-.98834132	.00021223		
20	COLD TEST	79.15	-.72388018	.00016593	4.41821246	.06585440

CH. 9 ,153.6 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.40140051958

NOISE POWER STABILITY (K) = .0514534279065

NOISE POWER STABILITY DELTA (K) = .0571562639771

NPS_MAX (K) = .0816746098818 NPS_MIN (K) = .0245183459047

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 10 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	10	Positive		22.0	-.9597	.000287	-194.0	-.6911	.000202
				22.0	-.9590	.000277	-194.0	-.6887	.000242
				22.0	-.9588	.000272	-194.0	-.6887	.000215
		+15.13	518.33	22.0	-.9586	.000248	-194.0	-.6878	.000209
		Negative		22.0	-.9587	.000287	-194.0	-.6887	.000215
		-15.13	-71.89	22.0	-.9590	.000282	-194.0	-.6903	.000204
				22.0	-.9590	.000264	-194.0	-.6891	.000202
				22.0	-.9591	.000274	-194.0	-.6899	.000200
				22.0	-.9592	.000293	-194.0	-.6911	.000214
				22.0	-.9594	.000300	-194.0	-.6903	.000180
Mixer/ Amps	All	9.94	244.0						
IF Amps	All	7.95	266.1						

Part No.: 1356429-2
Serial No.: F05

Test Engineer: Y. Trinh
Quality Assurance: TA 268 MAY 24 '99
Date: 5/13/99

TEST DATA SHEET 10 (Sheet 25 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
10		4.22				0.077			
		4.19				0.046			
		4.19				0.025			
		4.18				0.086			
		4.19				0.076			
		4.22				0.064			
		4.20				0.049			
		4.21				0.034			
		4.23				0.089			
		4.21				0.103			
	4.7		4.20	P	0.12		0.065	0.075	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 74 268 MAY 21 '99

Date: 5/13/99

AMSU-A TEST **FOR REFERENCE ONLY**

s/o# 613948

A1-1 F05 ATP, CHAN 10, PLO#2, TB=28.2C, 05/13/99 oper#: 6300

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-.95965102	.00028744	----------	---------
2	COLD TEST	79.15	-.69113008	.00020207	4.22283850	.07749708
3	WARM TEST	295.15	-.95897514	.00027678	----------	---------
4	COLD TEST	79.15	-.68867671	.00024248	4.19091135	.04638144
5	WARM TEST	295.15	-.95877799	.00027241	----------	---------
6	COLD TEST	79.15	-.68867763	.00021481	4.19321745	.02523273
7	WARM TEST	295.15	-.95855521	.00024807	----------	---------
8	COLD TEST	79.15	-.68775566	.00020940	4.18089752	.08605202
9	WARM TEST	295.15	-.95871024	.00028672	----------	---------
10	COLD TEST	79.15	-.68870613	.00021519	4.19446684	.07594072
11	WARM TEST	295.15	-.95895871	.00028225	----------	---------
12	COLD TEST	79.15	-.69026310	.00020399	4.21684009	.06446291
13	WARM TEST	295.15	-.95897822	.00026371	----------	---------
14	COLD TEST	79.15	-.68912647	.00020222	4.19815672	.04868707
15	WARM TEST	295.15	-.95905626	.00027392	----------	---------
16	COLD TEST	79.15	-.68986923	.00020015	4.20929585	.03383823
17	WARM TEST	295.15	-.95922488	.00029238	----------	---------
18	COLD TEST	79.15	-.69106349	.00021352	4.22675493	.08900776
19	WARM TEST	295.15	-.95939887	.00029980	----------	---------
20	COLD TEST	79.15	-.69026563	.00017957	4.21173131	.10333761

CH. 10 ,76.1 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.20453487819

NOISE POWER STABILITY (K) = .0650437558301

NOISE POWER STABILITY DELTA (K) = .0781048858268

NPS_MAX (K) = .103337614651 NPS_MIN (K) = .0252327288241

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 11 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	11	Positive +15.13	518.33	22.0	-1.027	.000325	-194.0	-.7454	.000224
				22.0	-1.028	.000319	-194.0	-.7458	.000278
				22.0	-1.028	.000290	-194.0	-.7438	.000277
				22.0	-1.028	.000305	-194.0	-.7442	.000326
		Negative -15.13	-71.89	22.0	-1.029	.000294	-194.0	-.7475	.000281
				22.0	-1.029	.000323	-194.0	-.7456	.000257
				22.0	-1.029	.000275	-194.0	-.7462	.000261
				22.0	-1.029	.000301	-194.0	-.7466	.000317
				22.0	-1.029	.000292	-194.0	-.7441	.000276
				22.0	-1.029	.000278	-194.0	-.7445	.000278
Mixer/ Amps	All	9.94	244.0						
IF Amps	All	7.95	266.1						

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: TA 268 MAY 26 '99

Date: 5/13/99

TEST DATA SHEET 10 (Sheet 26 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
11		4.31				0.087			
		4.31				0.073			
		4.28				0.072			
		4.28				0.013			
		4.33				0.062			
		4.29				0.081			
		4.30				0.101			
		4.31				0.039			
		4.27				0.066			
		4.27				0.095			
	4.7		4.29	P	.12		0.069	0.088	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 268 MAY 24 '99

Date: 5/13/99

AMSU-A TEST **FOR REFERENCE ONLY**

S/O#: 613948
Oper#: 6300

A1-1 F05 ATP; CHAN 11, PLO#2; TB=28.2C, 05/13/99

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-1.02723305	.00032492	----------	----------
2	COLD TEST	79.15	-.74540875	.00022426	4.30896123	.08656368
3	WARM TEST	295.15	-1.02761266	.00031944	----------	----------
4	COLD TEST	79.15	-.74578082	.00027810	4.31045948	.07332357
5	WARM TEST	295.15	-1.02797017	.00028972	----------	----------
6	COLD TEST	79.15	-.74377493	.00027738	4.27547296	.07216885
7	WARM TEST	295.15	-1.02840159	.00030455	----------	----------
8	COLD TEST	79.15	-.74424404	.00032590	4.27788724	.01275825
9	WARM TEST	295.15	-1.02853005	.00029426	----------	----------
10	COLD TEST	79.15	-.74753150	.00028052	4.32730459	.06181134
11	WARM TEST	295.15	-1.02894142	.00032329	----------	----------
12	COLD TEST	79.15	-.74564527	.00025663	4.29345388	.08135666
13	WARM TEST	295.15	-1.02906495	.00027502 ✓	----------	----------
14	COLD TEST	79.15	-.74616691	.00026138	4.30012647	.10104116
15	WARM TEST	295.15	-1.02905630	.00030101	----------	----------
16	COLD TEST	79.15	-.74655116	.00031724	4.30616526	.03852733
17	WARM TEST	295.15	-1.02921071	.00029242	----------	----------
18	COLD TEST	79.15	-.74412251	.00027635	4.26703076	.06634098
19	WARM TEST	295.15	-1.02923033	.00027812 ✓	----------	----------
20	COLD TEST	79.15	-.74454465	.00027847	4.27329102	.09545818

CH. 11 ,68.9 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.29405615368

NOISE POWER STABILITY (K) = .0689349986993

NOISE POWER STABILITY DELTA (K) = .0882829077884

NPS_MAX (K) = .101041156352 NPS_MIN (K) = .0127582485636

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 12 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	12	Positive +15.13	518.33	22.0	-1.071	.000501	-194.0	-.7755	.000340
				22.0	-1.071	.000516	-194.0	-.7743	.000383
				22.0	-1.071	.000477	-194.0	-.7744	.000437
				22.0	-1.071	.000466	-194.0	-.7727	.000393
				22.0	-1.071	.000466	-194.0	-.7735	.000410
		Negative -15.13	-71.89	22.0	-1.071	.000512	-194.0	-.7733	.000342
				22.0	-1.071	.000484	-194.0	-.7748	.000380
				22.0	-1.071	.000482	-194.0	-.7735	.000352
				22.0	-1.071	.000413	-194.0	-.7735	.000378
				22.0	-1.071	.000426	-194.0	-.7734	.000326
Mixer/ Amps	All	9.94	244.0						
IF Amps	All	7.95	266.1						

Part No.: 1356429-2
Serial No.: F05

Test Engineer: Y. Trinh
Quality Assurance: QA 268 MAY 24 '99
Date: 5/13/99

TEST DATA SHEET 10 (Sheet 27 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
12		4.28				0.120			
		4.27				0.150			
		4.27				0.045			
		4.25				0.062			
		4.25				0.061			
		4.25				0.140			
		4.27				0.074			
		4.26				0.067			
		4.25				0.168			
		4.25				0.150			
	4.7		4.26	P	0.18		0.104	0.122	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 853 YL MAY 24 '99

Date: 5/13/99

AMSU-A TEST **FOR REFERENCE ONLY**

s/o # 613948
iper# 6300

A1-1 F05 ATP; CHAN 12, PLO#2, NF & NPS; TB=28.2C, 05/13/99

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-1.07128678	.00050133	----------	---------
2	COLD TEST	79.15	-.77546177	.00034021	4.28057814	.11988501
3	WARM TEST	295.15	-1.07066015	.00051618	----------	---------
4	COLD TEST	79.15	-.77426221	.00038269	4.26956153	.14994152
5	WARM TEST	295.15	-1.07063118	.00047748	----------	---------
6	COLD TEST	79.15	-.77437557	.00043748	4.27154296	.04547411
7	WARM TEST	295.15	-1.07061548	.00046565	----------	---------
8	COLD TEST	79.15	-.77270319	.00039349	4.24709929	.06176523
9	WARM TEST	295.15	-1.07091874	.00046599	----------	---------
10	COLD TEST	79.15	-.77345432	.00040968	4.25491504	.06105469
11	WARM TEST	295.15	-1.07091336	.00051152	----------	---------
12	COLD TEST	79.15	-.77327092	.00034208	4.25227740	.14041481
13	WARM TEST	295.15	-1.07095986	.00048419	----------	---------
14	COLD TEST	79.15	-.77480317	.00038016	4.27434491	.07370027
15	WARM TEST	295.15	-1.07087117	.00048244	----------	---------
16	COLD TEST	79.15	-.77348173	.00035226	4.25582292	.06717233
17	WARM TEST	295.15	-1.07104930	.00041330 ✓	----------	---------
18	COLD TEST	79.15	-.77353902	.00037789	4.25477402	.16785819
19	WARM TEST	295.15	-1.07101940	.00042601 ✓	----------	---------
20	COLD TEST	79.15	-.77344461	.00032576	4.25370410	.15012333

CH. 12 ,31 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.26147549175

NOISE POWER STABILITY (K) = .10373894805

NOISE POWER STABILITY DELTA (K) = .122384084849

NPS_MAX (K) = .167858191825 NPS_MIN (K) = .0454741069761

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 13 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	13	Positive +15.13	518.33	22.0	-.9526	.000621	-194.0	-.6907	.000408
				22.0	-.9528	.000535	-194.0	-.6879	.000460
				22.0	-.9534	.000539	-194.0	-.6879	.000423
				22.0	-.9533	.000599	-194.0	-.6878	.000489
				22.0	-.9536	.000642	-194.0	-.6900	.000414
		Negative -15.13	-71.89	22.0	-.9536	.000629	-194.0	-.6911	.000454
				22.0	-.9538	.000620	-194.0	-.6904	.000476
				22.0	-.9538	.000607	-194.0	-.6910	.000432
				22.0	-.9538	.000550	-194.0	-.6908	.000469
				22.0	-.9540	.000599	-194.0	-.6885	.000599
Mixer/ Amps	All	9.94	244.0						
IF Amps	All	7.95	266.1						

Part No.: 1356429-2
Serial No.: F05

Test Engineer: Y. Trinh
Quality Assurance: 268 MAY 24 '99
Date: 5/13/99

TEST DATA SHEET 10 (Sheet 28 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
13		4.30				0.158			
		4.25				0.205			
		4.24				0.198			
		4.24				0.077			
		4.28				0.204			
		4.29				0.176			
		4.28				0.151			
		4.29				0.110			
		4.29				0.179			
		4.25				0.075			
	4.7		4.27	P	0.24		0.154	0.130	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: MAY 24 '99

Date: 5/13/99

AMSU-A TEST **FOR REFERENCE ONLY**

s/o # : 613948
Oper# : 6300

A1-1 F05 ATP; CHAN 13, PLO#2, NF & NPS; TB=28.2C, 05/13/99

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-.95264665	.00062117	----------	---------
2	COLD TEST	79.15	-.69073464	.00040827	4.29975988	.15785527
3	WARM TEST	295.15	-.95283632	.00053464	----------	---------
4	COLD TEST	79.15	-.68788469	.00045971	4.25018587	.20546359
5	WARM TEST	295.15	-.95339067	.00053882	----------	---------
6	COLD TEST	79.15	-.68788864	.00042283	4.24365584	.19834766
7	WARM TEST	295.15	-.95333616	.00059899	----------	---------
8	COLD TEST	79.15	-.68777337	.00048883	4.24240556	.07745070
9	WARM TEST	295.15	-.95363177	.00064202	----------	---------
10	COLD TEST	79.15	-.69002755	.00041351	4.27612372	.20443400
11	WARM TEST	295.15	-.95364730	.00062901	----------	---------
12	COLD TEST	79.15	-.69113339	.00045430	4.29431453	.17590078
13	WARM TEST	295.15	-.95381556	.00061980	----------	---------
14	COLD TEST	79.15	-.69039643	.00047611	4.28003692	.15136096
15	WARM TEST	295.15	-.95376360	.00060662	----------	---------
16	COLD TEST	79.15	-.69102838	.00043189	4.29116354	.11012334
17	WARM TEST	295.15	-.95377735	.00054989	----------	---------
18	COLD TEST	79.15	-.69081908	.00046872	4.28751689	.17934014
19	WARM TEST	295.15	-.95398434	.00059893	----------	---------
20	COLD TEST	79.15	-.68846004	.00041953	4.24601071	.07507557

CH. 13 ,15.75 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.27117237047

NOISE POWER STABILITY (K) = .153535201876

NOISE POWER STABILITY DELTA (K) = .130388020332

NPS_MAX (K) = .205463590784 NPS_MIN (K) = .0750755704515

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 14 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Yrink (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	14	Positive +15.13	518.33	22.0	-.9578	.000861	-194.0	-.6930	.000719
				22.0	-.9564	.000937	-194.0	-.6911	.000733
				22.0	-.9568	.000950	-194.0	-.6901	.000694
				22.0	-.9567	.001019	-194.0	-.6917	.000663
				22.0	-.9570	.000871	-194.0	-.6915	.000709
		Negative -15.13	-71.89	22.0	-.9572	.000964	-194.0	-.6930	.000701
				22.0	-.9572	.000970	-194.0	-.6933	.000619
				22.0	-.9571	.000966	-194.0	-.6916	.000708
				22.0	-.9574	.000968	-194.0	-.6941	.000632
				22.0	-.9578	.000943	-194.0	-.6945	.000618
Mixer/ Amps	All	9.94	244.0						
IF Amps	All	7.95	266.1						

Part No.: 1356429-2
Serial No.: F05

Test Engineer: Y. Yrink
Quality Assurance: 7A 268 MAY 24 '99
Date: 5/13/99

TEST DATA SHEET 10 (Sheet 29 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: T. Zrnik (Signature) Baseplate Temperature (T_B) 28.2 °C PLO No. 2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
14		4.27				0.371			
		4.26				0.211			
		4.24				0.171			
		4.27				0.247			
		4.26				0.353			
		4.28				0.109			
		4.29				0.068			
		4.26				0.095			
		4.30				0.083			
		4.30				0.201			
	4.7		4.27	P	0.36		0.191	0.304	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: T. Zrnik

Quality Assurance: (A 268) MAY 03 '99

Date: 5/13/99

AMSU-A TEST **FOR REFERENCE ONLY**

A1-1 F05 ATP; CHAN 14, PLO#2, NF & NPS; TB=28.2C, 05/13/99 S/O # 613948 Oper#: 6300

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-.95784768	.00086130	----------	---------
2	COLD TEST	79.15	-.69297531	.00071927	4.27442696	.37106964
3	WARM TEST	295.15	-.95635685	.00093742	----------	---------
4	COLD TEST	79.15	-.69110036	.00073318	4.26128166	.21104810
5	WARM TEST	295.15	-.95677450	.00094974	----------	---------
6	COLD TEST	79.15	-.69013024	.00069384	4.24037722	.17136999
7	WARM TEST	295.15	-.95671103	.00101896	----------	---------
8	COLD TEST	79.15	-.69173668	.00066283	4.26755308	.24677946
9	WARM TEST	295.15	-.95702993	.00087094	----------	---------
10	COLD TEST	79.15	-.69145620	.00070918	4.25913204	.35333605
11	WARM TEST	295.15	-.95718260	.00096417	----------	---------
12	COLD TEST	79.15	-.69299116	.00070139	4.28264361	.10949975
13	WARM TEST	295.15	-.95719198	.00096993	----------	---------
14	COLD TEST	79.15	-.69329630	.00061854	4.28758330	.06754069
15	WARM TEST	295.15	-.95711219	.00096627	----------	---------
16	COLD TEST	79.15	-.69159401	.00070823	4.26042244	.09535685
17	WARM TEST	295.15	-.95743495	.00096836	----------	---------
18	COLD TEST	79.15	-.69405181	.00063248	4.29719179	.08341165
19	WARM TEST	295.15	-.95778162	.00094285	----------	---------
20	COLD TEST	79.15	-.69450650	.00061837	4.30056769	.20059650

CH. 14 ,5.86 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.27315521479

NOISE POWER STABILITY (K) = .191000867504

NOISE POWER STABILITY DELTA (K) = .303528953243

NPS_MAX (K) = .371069642838 NPS_MIN (K) = .0675406895954

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 15 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: J. GAMBLES (Signature) Baseplate Temperature (T_B) 27 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	15	14.88	180.0	22.0	-1.0498	0.000085	-194.0	-0.9010	0.000088
				22.0	-1.0494	0.000102	-194.0	-0.9094	0.000150
				22.0	-1.0513	0.000085	-194.0	-0.9147	0.000135
				22.0	-1.0510	0.000085	-194.0	-0.9145	0.000137
				22.0	-1.051	0.000010	-194.0	-0.9140	0.000177
				22.0	-1.051	0.000085	-194.0	-0.9125	0.000163
				22.0	-1.050	0.000091	-194.0	-0.9113	0.000220
				22.0	-1.050	0.000130	-194.0	-0.9105	0.000135
				22.0	-1.050	0.000098	-194.0	-0.9122	0.000113
				22.0	-1.050	0.000098	-194.0	-0.9143	0.000112
Mixer/ Amps	All								
IF Amps	All	9.94	243.8						

Refer to Re-Test data for TAR #: 002339 Y. Yrmb. 5/21/99
oper#: 8090

Part No.: 1356429-2
Serial No.: F05

Test Engineer: Y. Yrmb
Quality Assurance: 892 MAY 24 '99
Date: 5/21/99

TEST DATA SHEET 10 (Sheet 30 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified:_____ Baseplate Temperature (T_B) _____°C
Signature

Channel No.	NF (dB) Required (Max)	NF (dB) Measured	NF (dB) Average	NF (dB) Pass/Fail	NPS (K) Required (Max)	NPS (K) Measured	NPS (K) Average	NPS (K) Delta	NPS (K) Pass/Fail
15									
						N/A			
						[illegible]			
						5/24/99			
						QC 229			
	9.05				0.15				

Refer to Re-Test Data for TAR #: 002339. J. Trinh 5/21/99
oper#: 8090

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: J. Trinh

Quality Assurance: N/A QC 229 5/24/99

Date: 5/21/99

TEST DATA SHEET 16

Temperature Sensor and Thermistor Test Data (Paragraph 3.6.1) (A1-1)

Test Setup Verified: Y. Yrink (Signature) Baseplate Temperature (T_B) 22.0 °C

Reference Designation	Specification	Measured Value		Pass/Fail
RT 40	2200 ± 100 Ω	2,169	Ω	P
RT 45	2200 ± 100 Ω	2,170	Ω	P
RT 11	2200 ± 100 Ω	2,171	Ω	P
RT 13	2200 ± 100 Ω	2,169	Ω	P
RT 15	2200 ± 100 Ω	2,171	Ω	P
RT 14	2200 ± 100 Ω	2,171	Ω	P
RT 20	2200 ± 100 Ω	2,171	Ω	P
RT 21	2200 ± 100 Ω	2,170	Ω	P
RT 23	2200 ± 100 Ω	2,170	Ω	P
RT 24	2200 ± 100 Ω	2,173	Ω	P
RT 25	2200 ± 100 Ω	2,170	Ω	P
RT 26	2200 ± 100 Ω	2,170	Ω	P
RT 27	2200 ± 100 Ω	2,171	Ω	P
RT 28	2200 ± 100 Ω	2,174	Ω	P
RT 29	2200 ± 100 Ω	2,171	Ω	P
RT 30	2200 ± 100 Ω	2,171	Ω	P
RT 31	2200 ± 100 Ω	2,171	Ω	P
RT 34	2200 ± 100 Ω	2,171	Ω	P
TB 56	3000 ± 100 Ω	3,006	Ω	P
TB 57	3000 ± 100 Ω	3,009	Ω	P
TB 53	4.1 – 4.6 V	4.34	V	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Yrink

Quality Assurance: 892

Date: 5/11/99

TEST DATA SHEET 19

Survival Heater and Thermal Switch Test Data (Paragraph 3.6.2) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 22.0 °C

	Open Switch		Closed Switch		
Reference Designation	>10 MΩ	Pass/Fail	Specification	Measured Value	Pass/Fail
HR1/TS1	>50.0 MΩ	P	25 - 35 Ω	27.31 Ω	P
	>50.0 MΩ	P		27.25 Ω	P
HR2/TS2	>50.0 MΩ	P		30.31	P
	>50.0 MΩ	P		30.77	P

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: (IA 268) MAY 24 '99

Date: 5/11/99

TEST DATA SHEET 22 (Sheet 1 of 3)
Bias Voltage Verification Test Data (Paragraph 3.6.3) (A1-1)

Test Setup Verified: Y. Trink (Signature) Baseplate Temperature (T_B) 22.0 °C

Reference Designation	Specification	Measured Value (V)	Pass/Fail
Mixer/IF AMP Ch 6, 7, 15, 9-14	+10 ±0.1	+9.91	P
DRO Ch 7	+10 ±0.1	+9.91	P
DRO Ch 15	+15 ±0.15	+14.87	P
PLO +15	+15 ±0.15	+15.09	P
PLO -15	-15 ±0.15	-15.15	P
IF AMP Ch 9-14	+8 ±0.08	+7.93	P
DRO Ch 6	+10 ±0.1	+9.94	P

Part No.: 1356427-2
Serial No.: F05

Test Engineer: Y. Trink
Quality Assurance: 268 MAY 24 '99
Date: 5/11/99

TEST DATA SHEET 1

LO Frequency Test Data (Paragraph 3.5.1) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 27.0 °C

Component	Channel No.		V_b(V)	I_b(mA)	P_{dc}(mW) Required (Max)	P_{dc}(mW) Measured	P_{dc}(mW) Pass/Fail	f_o(GHz) Required	f_o(GHz) Measured	f_o(GHz) Pass/Fail
LO	6		9.96	193.7	2,700	1929.3	P	54.400 ± 0.003	N/A	N/A
	7		9.93	194.3	2,700	1929.4	P	54.940 ± 0.003	N/A	N/A
	LO No. 1	9	Positive		9,000 (13,500)*					
		10								
		11	+15.13	505.3		7645.2	P	57.290344 ± 0.000086	N/A	N/A
		12	Negative		1,500					
		13								
		14	-15.13	-71.27	1078.3	1078.3	P			
	LO No. 2	9	Positive		9,000 (13,500)*					
		10								
		11	N/A	N/A		N/A	N/A	57.290344 ± 0.000086	N/A	N/A
		12	Negative		1,500					
		13								
		14	N/A	N/A	N/A	N/A	N/A			
	15		14.88	-180.0	3500	2678.4	P	88.980 ± 0.080	88.95566	P
Mixer/ Amps	All		9.93	-246.3	2,550	2445.8				
IF Amps	All		7.95	266.0	5,500	2114.7				
TOTAL			Primary (LO #1)		24,510 (29,010)*	19,821				
			Redundancy (LO #2)		24,510 (29,010)*	N/A				

* Indicates required values for the PLO specified in AE-26660. Pass = P, Fail = F

PLO 1 Lock Detect ☑ PLO 2 Lock Detect ☐

Part No.: 1356429-2

Serial No.: F05

Re-Test to TAR #002339
oper # 8090

Test Engineer: Y. Trinh

Quality Assurance: (IA 268) MAY 24 99

Date: 5/21/99

5/21/99 J. GAMBLES

5/24/99 J. GAMBLES

5/21/99 J. GAMBLE

5/21/99

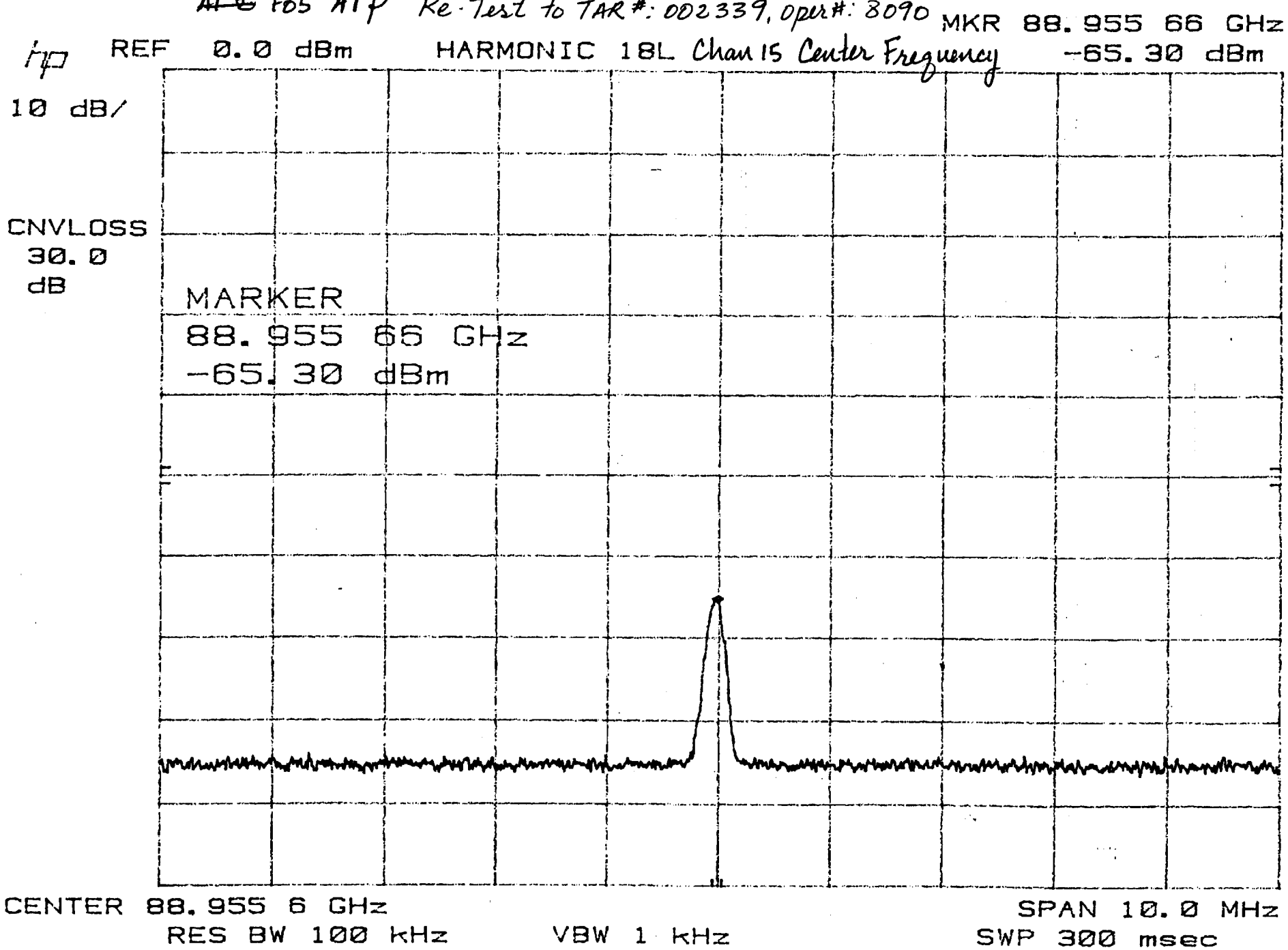
A1-1

~~A1-6~~ F05 ATP

S/O#: 613948, op.

Re-Test to TAR#: 002339, Oper#: 8090

FOR REFERENCE ONLY



TEST DATA SHEET 4

IF Output Power Test Data (Paragraph 3.5.2) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 27.0 °C

Component	Channel No.		V_b(V)	I_b(mA)	P_o(dBm)	Atten (dB)	P_o(dBm)		
							Required	Measured	Pass/ Fail
LO	6						-27.0 ± 1.0		
	7						-27.0 ± 1.0		
	LO No. 1	9	Positive				-27.0 ± 1.0		
		10					-27.0 ± 1.0		
		11					-27.0 ± 1.0		
		12	Negative				-27.0 ± 1.0		
		13					-27.0 ± 1.0		
		14					-27.0 ± 1.0		
	LO No. 2	9	Positive				-27.0 ± 1.0		
		10					-27.0 ± 1.0		
		11					-27.0 ± 1.0		
		12	Negative				-27.0 ± 1.0		
		13					-27.0 ± 1.0		
		14					-27.0 ± 1.0		
	15		14.88	180.0	-23.55	3	-27.0 ± 1.0	-26.50	P
Mixer/ Amps	All		9.94	243.8					
IF Amps	All		7.95	266.0					

N/A Y. Trinh 5/21/99 QC 229

Re-Test to TAR # 002339
oper #: 8090

Pass = P, Fail = F

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 892 MAY 24 '99

Date: 5/21/99

TEST DATA SHEET 7 (Sheet 1 of 2)

Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 27.0 °C

Component	Channel No.	V_b(V)	I_b(mA)	3 dB BW Frequency (MHz) Lower	3 dB BW Frequency (MHz) Higher	3 dB BW Frequency (MHz) Required MAX	3 dB BW Frequency (MHz) Measured	Pass/Fail
LO	6					200		
	7					200		
LO No. 1	9	Positive				165		
	10					78		
						36		
	11					36		
	12	Negative				16		
						16		
	13					8		
						8		
						3		
	14					3		
LO No. 2	9	Positive				165		
	10					78		
						36		
	11					36		
	12	Negative				16		
						16		
	13					8		
						8		
	14					3		
						3		
	15	14.88	180.0	483	1459	1000	976	P
Mixer/Amps	All							
IF Amps	All							

N/A 5/21/99

Part No.: 1351429-2

Serial No.: F05

Re-Test to TAR # 002339
oper # 8090

Test Engineer: Y. Trinh

Quality Assurance: 268 MAY 24 '99

Date: 5/21/99

TEST DATA SHEET 7 (Sheet 2 of 2)
Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 27.0 °C

Component	Channel No.	V_b(V)	I_b(mA)	40 dB BW Frequency (MHz)		40 dB BW Frequency (MHz)		Pass/Fail
				Lower	Higher	Required MAX (Ref Only)	Measured	
LO	6					520		
	7					520		
LO No. 1	9	Positive				429		
	10					101		
	11					47		
	12	Negative				21		
	13					10		
	14					4		
LO No. 2	9	Positive				429		
	10					101		
	11					47		
	12	Negative				21		
	13					10		
	14					4		
	15	14.88	180.0	N/A	N/A	7800	N/A	N/A
Mixer/Amps	All							
IF Amps	All							

N/A QC 229 5/21

Re-Test to TAR #: 002339
oper #: 8090

Part No.: 1356429-2
Serial No.: F05

Test Engineer: Y. Trinh
Quality Assurance: 7A 268 MAY 24 '99
Date: 5/21/99

5/21/99

S/O#: 613948

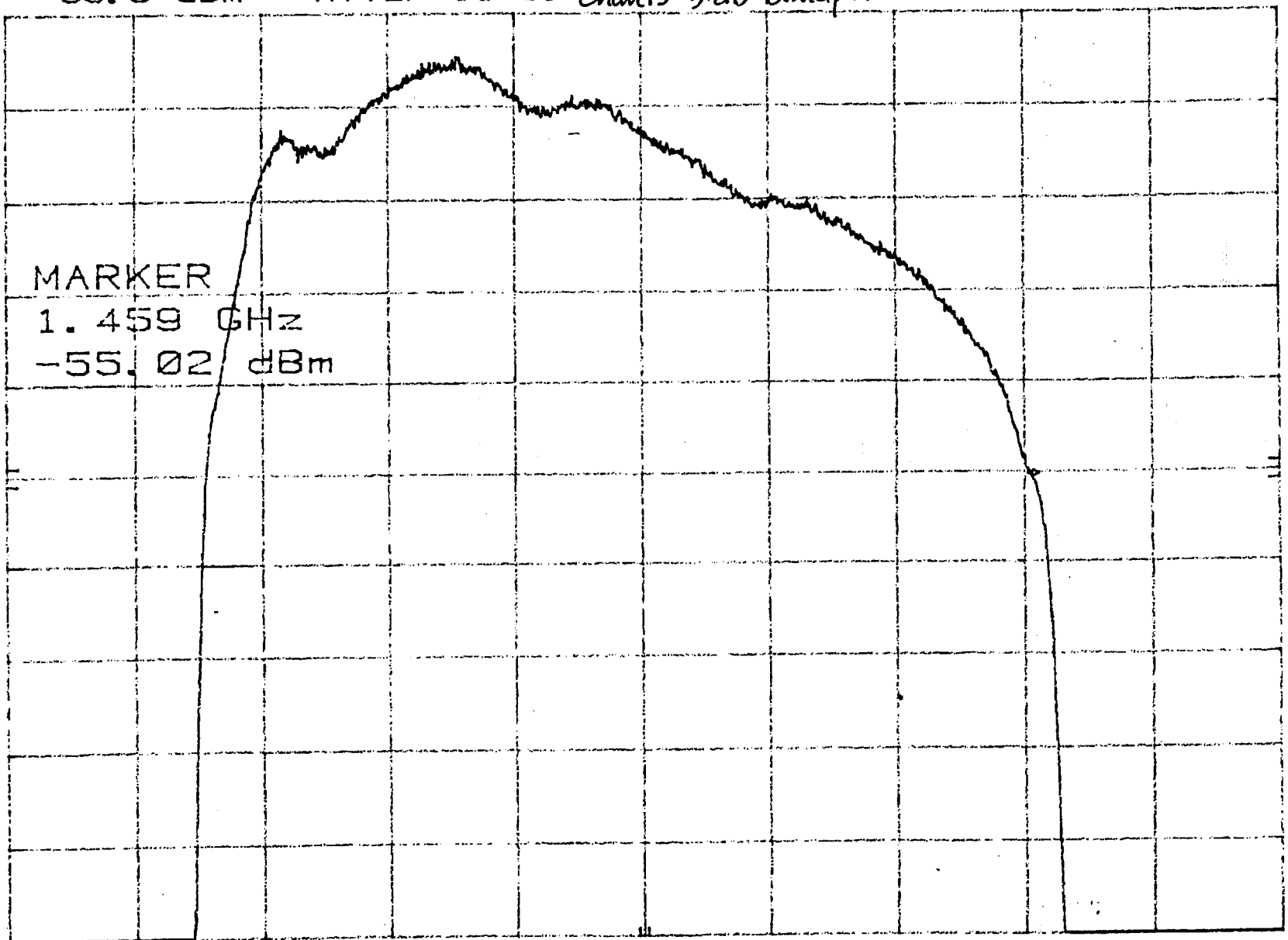
FOR REFERENCE ONLY

A1-1 F05 ATP Re-Test to TAR #002339, oper #: 8090

hp REF -50.0 dBm ATTEN 10 dB Chan15 3-dB Bandpass

MKR 1.459 GHz
-55.02 dBm

1 dB/



CENTER 1.00 GHz

SPAN 1.50 GHz

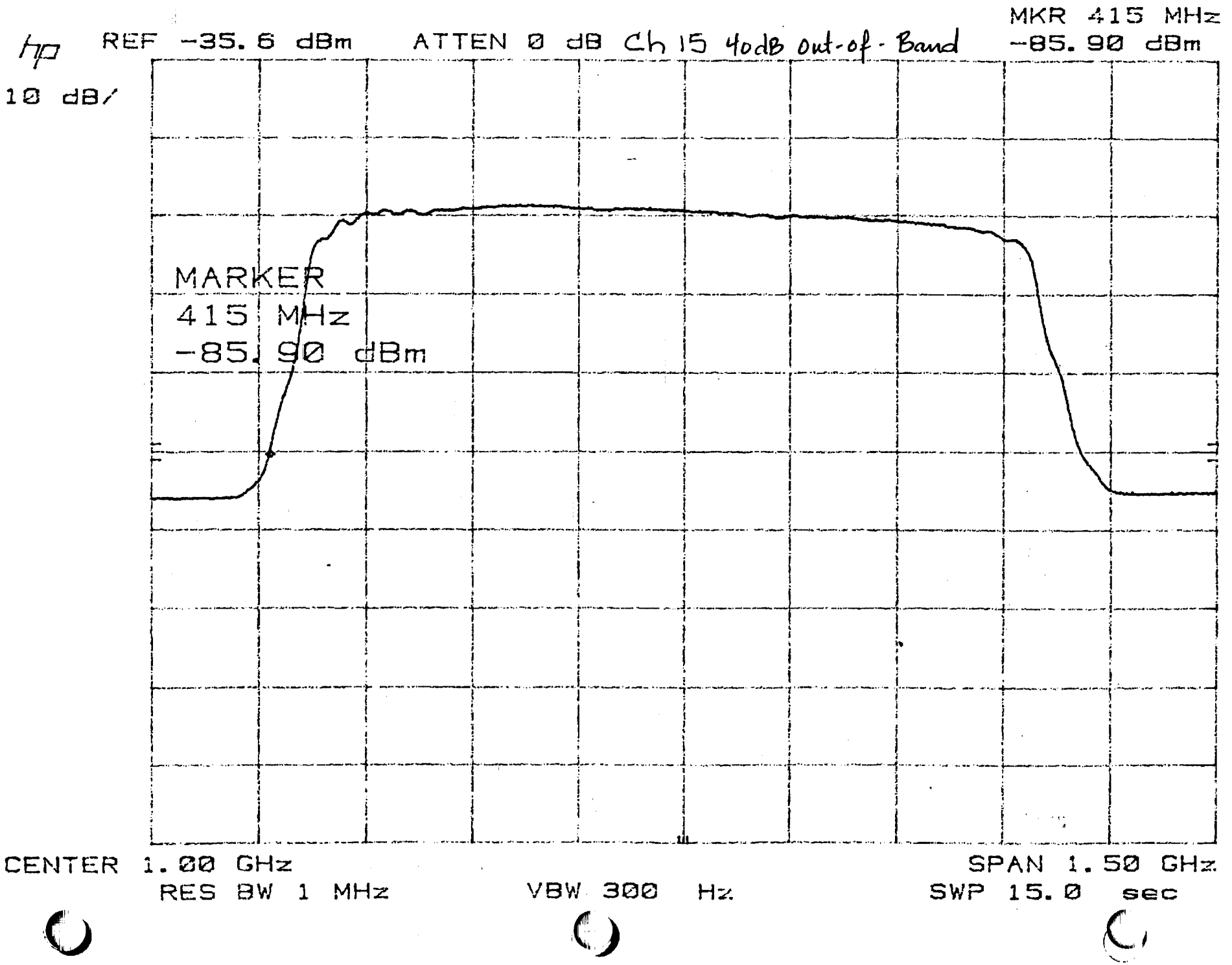
RES BW 3 MHz

VBW 100 Hz

SWP 15.0 sec

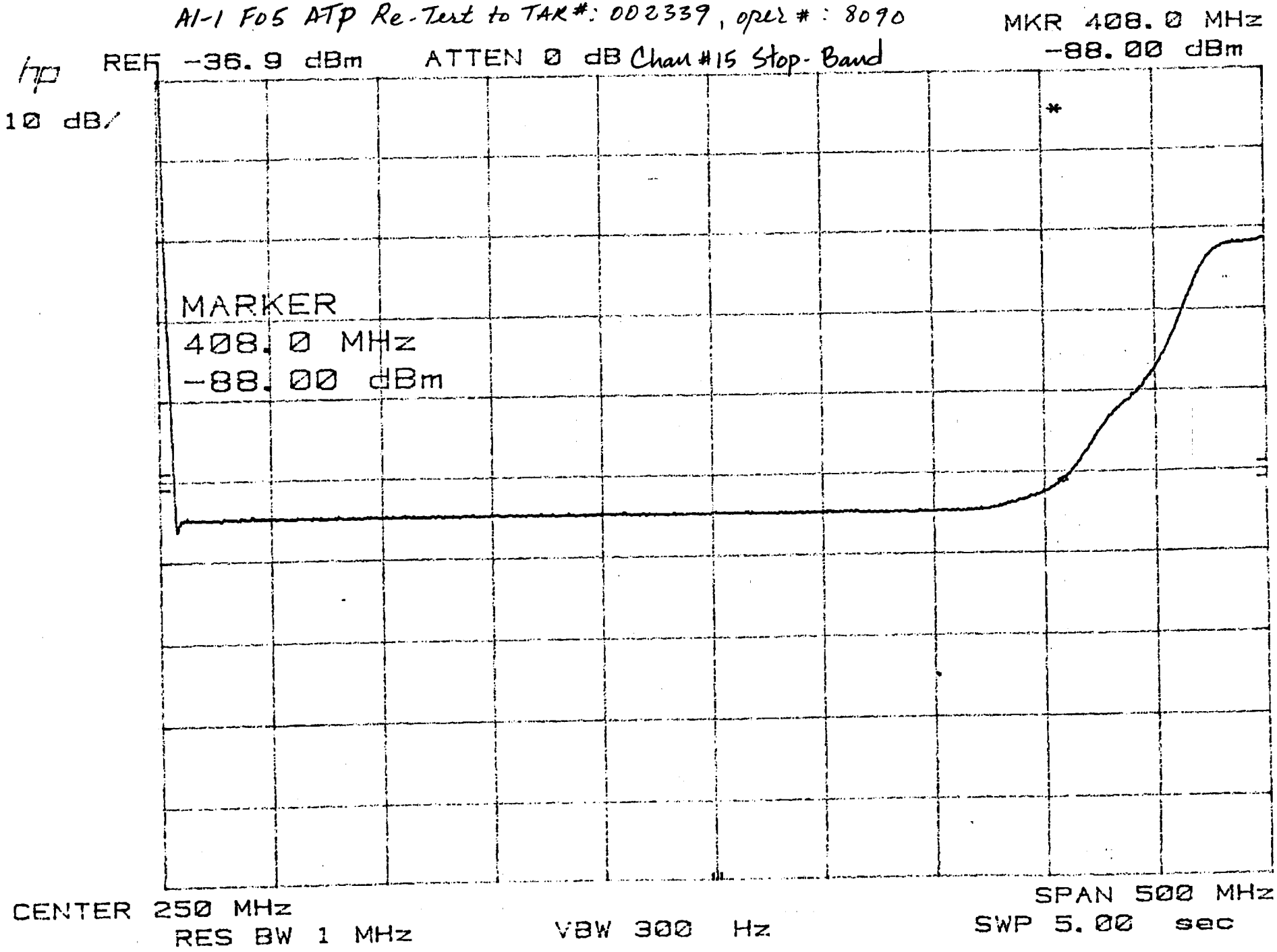
A1-1 F05 ATP Re-Test to TAR#: 002339, oper# 8090
S/O#: 613948

FOR REFERENCE ONLY



5/21/99 S/O #: 613948

AI-1 F05 ATP Re-Test to TAR#: 002339, oper #: 8090



TEST DATA SHEET 10 (Sheet 15 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 27.0 °C

Compo-nent	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	15	14.88	180.0	22.0	-1.050	.000085	-194.0	-.9100	.000088
				22.0	-1.049	.000102	-194.0	-.9094	.000146
				22.0	-1.051	.000085	-194.0	-.9147	.000135
				22.0	-1.051	.000085	-194.0	-.9145	.000137
				22.0	-1.051	.000100	-194.0	-.9137	.000177
				22.0	-1.051	.000085	-194.0	-.9125	.000163
				22.0	-1.050	.000091	-194.0	-.9113	.000220
				22.0	-1.050	.000127	-194.0	-.9105	.000135
				22.0	-1.050	.000098	-194.0	-.9122	.000114
				22.0	-1.050	.000098	-194.0	-.9143	.000112
Mixer/ Amps	All	9.94	243.8						
IF Amps	All	7.95	266.0						

Re-Test to TAR#: 002339
oper#: 8090

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: 7A 268

Date: 5/21/99

TEST DATA SHEET 10 (Sheet 30 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Yuh (Signature) Baseplate Temperature (T_B) 27.0 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
15		7.46				0.033			
		7.46				0.093			
		7.51				0.029			
		7.57				0.032			
		7.55				0.088			
		7.52				0.032			
		7.49				0.058			
		7.47				0.149			
		7.53				0.082			
		7.60				0.082			
	9.05		7.52	P	0.15		0.068	0.119	P

Pass = P, Fail = F

Re-Test to TAR #: 002339
oper#: 8090

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Yuh

Quality Assurance: TA 268 MAY 24 '99

Date: 5/21/99

AMSU-A TEST **FOR REFERENCE ONLY** S/O#: 613948

A1-1 F05, ATP TB 27, CHANNEL 15 5/21/99 Re-Test to TAR# 002339 oper#: 8090

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-1.04982464	.00008549	----------	----------
2	COLD TEST	79.15	-.90997515	.00008842	7.46130050	.03326597
3	WARM TEST	295.15	-1.04940833	.00010236	----------	----------
4	COLD TEST	79.15	-.90944687	.00014639	7.45608580	.09310692
5	WARM TEST	295.15	-1.05131989	.00008490	----------	----------
6	COLD TEST	79.15	-.91469446	.00013471	7.56911346	.02938301
7	WARM TEST	295.15	-1.05103365	.00008521	----------	----------
8	COLD TEST	79.15	-.91452798	.00013662	7.57174756	.03166578
9	WARM TEST	295.15	-1.05068766	.00009969	----------	----------
10	COLD TEST	79.15	-.91368230	.00017736	7.55439522	.08753467
11	WARM TEST	295.15	-1.05053056	.00008521	----------	----------
12	COLD TEST	79.15	-.91250426	.00016316	7.52139999	.03159219
13	WARM TEST	295.15	-1.05011938	.00009089	----------	----------
14	COLD TEST	79.15	-.91126765	.00022022	7.49371808	.05846858
15	WARM TEST	295.15	-1.04994586	.00012681	----------	----------
16	COLD TEST	79.15	-.91049828	.00013502	7.47434257	.14886194
17	WARM TEST	295.15	-1.04977830	.00009793	----------	----------
18	COLD TEST	79.15	-.91222058	.00011384	7.53309426	.08230357
19	WARM TEST	295.15	-1.04982370	.00009755	----------	----------
20	COLD TEST	79.15	-.91432340	.00011203	7.59893321	.08240632

CH. 15 .976 MHz MHz

NOISE FIGURE AVERAGE (dB) = 7.52367630158

NOISE POWER STABILITY (K) = .0678588945429

NOISE POWER STABILITY DELTA (K) = .119478925993

NPS_MAX (K) = .148861937252 NPS_MIN (K) = .0293830112591

INTEGRATION TIME = .165

TEST DATA SHEET 16

Temperature Sensor and Thermistor Test Data (Paragraph 3.6.1) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 22.0 °C

Reference Designation	Specification	Measured Value		Pass/Fail
RT 40	2200 ± 100 Ω	N/A	Ω	N/A
RT 45	2200 ± 100 Ω	N/A	Ω	N/A
RT 11	2200 ± 100 Ω	N/A	Ω	N/A
RT 13	2200 ± 100 Ω	2,175	Ω	P
RT 15	2200 ± 100 Ω	N/A	Ω	N/A
RT 14	2200 ± 100 Ω	N/A	Ω	N/A
RT 20	2200 ± 100 Ω	N/A	Ω	N/A
RT 21	2200 ± 100 Ω	N/A	Ω	N/A
RT 23	2200 ± 100 Ω	N/A	Ω	N/A
RT 24	2200 ± 100 Ω	2,172	Ω	P
RT 25	2200 ± 100 Ω	N/A	Ω	N/A
RT 26	2200 ± 100 Ω	N/A	Ω	N/A
RT 27	2200 ± 100 Ω	N/A	Ω	N/A
RT 28	2200 ± 100 Ω	N/A	Ω	N/A
RT 29	2200 ± 100 Ω	N/A	Ω	N/A
RT 30	2200 ± 100 Ω	N/A	Ω	N/A
RT 31	2200 ± 100 Ω	N/A	Ω	N/A
RT 34	2200 ± 100 Ω	N/A	Ω	N/A
TB 56	3000 ± 100 Ω	N/A	Ω	N/A
TB 57	3000 ± 100 Ω	N/A	Ω	N/A
TB 53	4.1 – 4.6 V	N/A	V	N/A

J. GAMBLES

5/21/99 J. GAMBLES

5-21-99 J. GAMBLES

Pass = P, Fail = F

Re-Test to TAR #: 002339
oper #: 8090

Part No.: 1356429-2

Serial No.: F05

Test Engineer: Y. Trinh

Quality Assurance: MAY 24 '99

Date: 5/21/99

TEST DATA SHEET 22 (Sheet 1 of 3)
Bias Voltage Verification Test Data (Paragraph 3.6.3) (A1-1)

Test Setup Verified: Y. Trinh (Signature) Baseplate Temperature (T_B) 22.0 °C

Reference Designation	Specification	Measured Value (V)	Pass/Fail
Mixer/IF AMP Ch 6, 7, 15, 9-14	+10 ±0.1	9.93	P
DRO Ch 7	+10 ±0.1	N/A	N/A
DRO Ch 15	+15 ±0.15	14.88	P
PLO +15	+15 ±0.15	N/A	N/A
PLO -15	-15 ±0.15	N/A	N/A
IF AMP Ch 9-14	+8 ±0.08	N/A	N/A
DRO Ch 6	+10 ±0.1	N/A	N/A

J. Granzow 5/21/99

Re-Test to TAR#: 002339
oper#: 8090

Part No.: 1356429-2
Serial No.: F05

Test Engineer: Y. Trinh
Quality Assurance: [signature] MAY 26 '99
Date: 5/21/99

7.0 ASSEMBLY INSTALLATION AND REPLACEMENT LOG

The assembly installation and replacement for this receiver subsystem are logged in the following pages.

F05

GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)			PAGE	OF
	PART DESCRIPTION: RECEIVER ASSEMBLY (A1-2)		PART NUMBER: 1356409-1	1	6
PLANNED BY: B. MULLIGAN	DATE: 9/22/98	REVISION: 02	NEXT ASSEMBLY: 1331720-2/1356008-1	OPER: 0004	

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	INS
17	1356680-1	B	ISOLATOR, CH 3	011	10/15/98					
18	1356680-2	B	ISOLATOR, CH 4	007	10/15/98					
19	1356680-3	B	ISOLATOR, CH 5	007	10/15/98					
20	1356680-6	B	ISOLATOR, CH 8	~~008~~	10/15/98			010	K.Hill	
22	1331507-1	G	MULTIPLEXER	4	10/15/98					
23	1331509-1	G	WAVEGUIDE ATTENUATOR	101	10/15/98					
24	1331509-2	G	WAVEGUIDE ATTENUATOR	106	10/15/98					
25	1331509-3	E	WAVEGUIDE ATTENUATOR	103	10/15/98					
26	1331509-6	G	WAVEGUIDE ATTENUATOR	~~103~~	10/15/98			104	K.Hill	
28	1336610-3	F	STABLE OSCILLATOR	85097	10/21/98		F	1-29-99 85095	Scott Ellard	
29	1336610-4	F	STABLE OSCILLATOR	85043	10/21/98					
30	1336610-5	F	STABLE OSCILLATOR	85036	10/15/98					

NOTES:

1. THIS LOG SHALL BE COMPLETED AT THE TIME THAT THE COMPONENT(S) OR PART(S) ARE BEING INSTALLED INTO THE ASSEMBLY. EACH LINE SHALL BE ENTERED AND STAMPED BY THE OPERATOR THAT INSTALLED THE COMPONENT(S) OR PART(S)
2. IF A COMPONENT(S) OR PART(S) ARE REMOVED AND REPLACED, RECORD THE REPLACEMENT PART ON IT'S RESPECTIVE LINE.
3. IF A COMPONENT(S) OR PART(S) HAVE BEEN REMOVED AND REPLACED MORE THAN ONCE, RECORD THE REPLACEMENT PA NUMBER AT THE END OF THE ASSEMBLY LOG .

FG5

GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)		PAGE	OF
	PART DESCRIPTION: RECEIVER ASSEMBLY (A1-2)	PART NUMBER: 1356409-1	2	6

PLANNED BY	DATE	REVISION	NEXT ASSEMBLY	OPER
B. MULLIGAN	9/22/98	02	1331720-2/1356008-1	0004

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	INS
31	1336610-8	F	STABLE OSCILLATOR	~~85079~~	16 10/15/98			85079		
37	1331562-13	G	MIXER/AMP CH 3	7A53	10/15/98					
38	1331562-14	G	MIXER/AMP CH 4	7A44	10/15/98 16 MFG		G	7A34	1-6-99 MFG 204	
39	1331562-15	G	MIXER/AMP CH 5	7A45	16 10/15/98					
40	1331562-18	G	MIXER/AMP CH 8	7A48	10/15/98		G	7A58 7A38		
86	1331559-2	E	FILTER, IF BAND PASS	P228-002	16 MFG 10/15/98				10/21/98	
87	1331559-3	E	FILTER, IF BAND PASS	P229-014	16 10/15/98					
88	1331559-4	E	FILTER, IF BAND PASS	P230-010	16 10/15/98					
89	1331559-5	E	FILTER, IF BAND PASS	P231-006	10/15/98					
9	1356406-1	D	THERMISTOR COMP. ASSY	F32	10/15/98 2-16-99 95 T					
9	1356406-1	D	THERMISTOR COMP. ASSY	F06	2-16-99					
98	1337651-1	D	THERMISTOR	Z10	2-16-99 75 T					

NOTES:

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F05

GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)			PAGE	OF
	PART DESCRIPTION: RECEIVER ASSEMBLY (A1-2)		PART NUMBER: 1356409-1	3	6
PLANNED BY: B. MULLIGAN	DATE: 9/22/98	REVISION: 02	NEXT ASSEMBLY: 1331720-2/1356008-1	OPER: 0004	

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	INSP

NOTES:

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F05

GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)		PAGE	OF
	PART DESCRIPTION: RECEIVER ASSEMBLY (A1-2)	PART NUMBER: 1356409-1	4	6
PLANNED BY: B. MULLIGAN	DATE: 9/22/98	REVISION: 02	NEXT ASSEMBLY: 1331720-2/1356008-1	OPER: 0004

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	INSP

NOTES:

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F05

GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)		PAGE	OF
	PART DESCRIPTION: RECEIVER ASSEMBLY (A1-2)	PART NUMBER: 1356409-1	5	6
PLANNED BY: B. MULLIGAN	DATE: 9/22/98	REVISION: 02	NEXT ASSEMBLY: 1331720-2/1356008-1	OPER: 0004

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

TEMPERATURE SENSORS & THERMISTORS

SENSOR	INITIAL INSTALLATION			REPLACEMENT		
	S/N	MFG	INSP	S/N	MFG	INSP
RT12	1224	2-17-99 (95 T)				
RT17	1212	2-17-99 (95 T)				
RT18	1214	2-17-99 (95 T)				
RT19	1213	2-17-99 (95 T)				
RT22	1217	2-17-99 (95 T)				
RT33	1216	2-17-99 (95 T)				
RT41	1241	2-17-99 (95 T)				
RT42	1211	2-17-99 (95 T)				
RT43	1223	2-17-99 (95 T)				
RT44	1210	2-17-99 (95 T)				

SENSOR	INITIAL INSTALLATION			REPLACEMENT		
	S/N	MFG	INSP	S/N	MFG	INSP
TB54	210	2-17-99 (95 T)				
TB58	F06 ~~E77~~	2-17-99 (95 T)				
TB59	F32	2-17-99 (95 T)				

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F05

GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)			PAGE	OF
	PART DESCRIPTION: RECEIVER ASSEMBLY (A1-2)		PART NUMBER: 1356409-1	6	6
PLANNED BY: B. MULLIGAN	DATE: 9/22/98	REVISION: 02	NEXT ASSEMBLY: 1331720-2/1356008-1	OPER: 0004	

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

IF ATTENUATORS

		INITIAL INSTALLATION					REPLACEMENT				
ATTEN-UATOR	ON MODULE	DASH NO.	S/N	AT NO.	MFG	INSP	DASH NO.	S/N	AT NO.	MFG	IN
A18	A5	-6	012		Y. Yuk 3/5/99						
A19	A9	-14	050		Y. Yuk 3/5/99						
A20	A13	-14	042		Y. Yuk 3/5/99						
A21	A17	-12	072		Y. Yuk 3/5/99						

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F05

GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)			PAGE	OF
	PART DESCRIPTION: RECEIVER ASSEMBLY (A1-1)		PART NUMBER: 1356429-2	1	6
PLANNED BY: B. MULLIGAN	DATE: 9/21/98	REVISION: 01	NEXT ASSEMBLY: 1331720-2	OPER: 0004	

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	INSP
9	1356680-4	B	ISOLATOR, CHAN 6	08	11/2/98 95 T					
10	1356680-5	B	ISOLATOR, CHAN 7	11	11/18/98 95 T					
11	1356680-7	B	ISOLATOR, CHAN 9-14	07	11/2/98 95 T					
12	1356680-8	B	ISOLATOR, CHAN 15	08	11-2-98 95 T					
14	1331509-4	G	WAVEGUIDE ATTENUATOR	~~106~~	10/28/98 95 T		B	107	3-24-99 95 T	
15	1331509-5	G	WAVEGUIDE ATTENUATOR	105	10/28/98 95 T					
16	1331509-7	E	WAVEGUIDE ATTENUATOR	104	1-28-99 95 T					
17	1331509-8	E	WAVEGUIDE ATTENUATOR	107	1-28-99 95 T					
18	1331509-9	E	WAVEGUIDE ATTENUATOR	103	10/28/98 95 T		E	5/20/99 107		
19	1331510-1	E	WAVEGUIDE A-1 (CHAN 9)	102	2-5-99 95 T		E	104	2-5-99 95 T	
20	1336610-6	F	STABLE OSCILLATOR (A39)	85028	10/28/98					
21	1336610-7	~~F~~	STABLE OSCILLATOR (A34)	~~85017~~	10/28/98		F SGE	85023 PAGE 4	3-22-99	

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GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)			PAGE	OF
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-1)		PART NUMBER 1356429-2	2	6
PLANNED BY B. MULLIGAN	DATE 9/24/98	REVISION 01	NEXT ASSEMBLY 1331720-2	OPER 0004	

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	INSP
22	1336610-10	E	STABLE OSCILLATOR (A29)	PFM	10/22/98 95 T		E	5/20/99 FM3		
23	1356669-1	B	POWER DIVIDER, 3 WAY	P234 06	11/19/98 95 T					
25	1331546-1	G	MULTIPLEXER	02	11-2-98 95 T					
26	1348360-4	P	PLO ASSEMBLY (A65)	F05	1-28-99 95 T	1	P	F11	2-23-99 95 T	
26	1348360-4	P	PLO ASSEMBLY (A66)	F06	1-28-99 95 T					
27	1331554-1	F	HYBRID TEE (A63)	05	12-2-98 95 T					
31	1331562-16	G	MIXER/AMP CHAN 6	7A46	11/3/98 95 T					
32	1331562-17	G	MIXER/AMP CHAN 7	7A07	11/18/98 95 T					
33	1331562-19	G	MIXER/AMP CHAN 9-14	7A49	11/19/98 95 T					
34	1331562-20	G	MIXER/AMP CHAN 15 (A25)	7A50	11-2-98 95 T		G	5/20/99 7A70		
35	1331576-1	C	SAW FILTER	B07	11/19/98 95 T					
36	1331576-2	C	SAW FILTER	B04	11/19/98					

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GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)		PAGE	OF
	PART DESCRIPTION: RECEIVER ASSEMBLY (A1-1)	PART NUMBER: 1356429-2	3	6
PLANNED BY: B. MULLIGAN	DATE: 9/21/98	REVISION: 01	NEXT ASSEMBLY: 1331720-2	OPER: 0004

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	INSP
37	1331576-3	C	SAW FILTER	B03	11/19/98 95 T					
38	1331576-4	C	SAW FILTER	B04	11/19/98 95 T					
39	1356670-1	A	POWER DIVIDER 4-WAY	8235 05	11/19/98 95 T					
40	1331579-7	F	AMPLIFIER, IF	105	11/19/98 95 T					
41	1331579-8	G	AMPLIFIER, IF	109	11/19/98 95 T					
42	1331579-9	F	AMPLIFIER, IF	105	11/19/98 95 T					
43	1331579-10	G	AMPLIFIER, IF	109	11/19/98 95 T					
44	1331579-11	F	AMPLIFIER, IF	106	11/19/98 95 T					
45	1331579-12	G	AMPLIFIER, IF	109	11/19/98 95 T					
46	1331579-13	F	AMPLIFIER, IF	105	11/19/98 95 T					
54	1331559-2	E	FILTER, I.F. BAND PASS	009	12-21-98 Bottom 98 T					
54		E		006						
55	1331559-1	E	FILTER, I.F. BAND PASS	003	12-21-98					

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GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)			PAGE	OF
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-1)		PART NUMBER 1356429-2	4	6
PLANNED BY B. MULLIGAN	DATE 9/21/98	REVISION 01	NEXT ASSEMBLY 1331720-2	OPER 0004	

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	INSP
56	1331559-7	E	FILTER, I.F. BAND PASS	P233 008	240-99 (95 T)					
57	1331559-4	E	FILTER, I.F. BAND PASS	P230 006	2-1049 (95 T)					
160	1357410-1		RELAY							
21	1336610-7	F	STABLE OSCILLATOR	85022	(MFG 178)					

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GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)			PAGE	OF
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-1)		PART NUMBER 1356429-2	5	6
PLANNED BY B. MULLIGAN	DATE 9/21/98	REVISION 01	NEXT ASSEMBLY 1331720-2	OPER 0004	

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

TEMPERATURE SENSORS & THERMISTORS

SENSOR	INITIAL INSTALLATION			REPLACEMENT		
	S/N	MFG	INSP	S/N	MFG	INSP
RT11	1234					
RT13	~~1239~~			1335	6-21-99 ME 39	
RT14	1231					
RT15	1238					
RT20	1230					
RT21	1240					
RT23	1222			~~1209~~		
RT24	~~1227~~			1209	5-21-99	
RT25	1229					
RT26	1235					
RT27	1237					

SENSOR	INITIAL INSTALLATION			REPLACEMENT		
	S/N	MFG	INSP	S/N	MFG	IN
RT28	1233					
RT29	1236					
RT30	1232					
RT31	1226					
RT34 SHELF	1228					
RT40	1218					
RT45	1225					
TB53	N/A					
TB56	N/A					
TB57	N/A					

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GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)			PAGE	OF
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-1)		PART NUMBER 1356429-2	6	6
PLANNED BY B. MULLIGAN	DATE 9/21/98	REVISION 01	NEXT ASSEMBLY 1331720-2	OPER 000	

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

IF ATTENUATORS

		INITIAL INSTALLATION					REPLACEMENT				
ATTEN-UATOR	ON MODULE	DASH NO.	S/N	AT NO.	MFG	INSP	DASH NO.	S/N	AT NO.	MFG	INSP
A28	A26	-6	015	3	5/21/99						
A33	A32	-14	059	7	5/11/99						
A38	A37	-16	011	8	5/11/99						
A47	A46	-10	027	5	5/11/99						
A50	A49	-8	005	4	5/11/99						
A53	A52	-12	023	6	5/11/99						
A56	A55	-12	026	6	5/11/99						
A59	A58	-12	025	6	5/11/99						
A62	A61	-12	027	6	5/11/99						

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ADDENDUM/AMENDMENT A

TO

REPORT 11490A

ADDENDUM/AMENDMENT
TO

PERFORMANCE VERIFICATION TEST REPORT
METSAT (S/N: 108) AMSU-A1 RECEIVER ASSEMBLIES
FOR
INTEGRATED ADVANCED MICROWAVE SOUNDING UNIT-A
(AMSU-A)

CONTRACT NO. NAS5-32314
CDRL PAR 3.3.2.1

SEPTEMBER 1999

SUBMITTED TO

NATIONAL AERONAUTICS AND SPACE ADMINISTERATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND 20771

SUBMITTED BY

AEROJET ELECTRONIC SYSTEMS PLANT
1100 WST HOLLYVALE STREET
AZUSA, CALIFORNIA 91702

1.0 Summary

During system integration testing of the METSAT/AMSU-A1 system (Assembly No. 1331720-2, S/N: 108), lower warm load counts of ~8,200 (instead of normal ~16,000) was measured on the channel 5. In troubleshooting, the pre-dectection power level was ~-35dBm instead of ~-27dBm. The whole RF section of the channel 5 (isolator (P/N: 1356680-3, S/N: 07), mixer/IF amplifier (P/N: 1331562-15, S/N: 7A45), DRO (P/N: 1336610-5, S/N: 85036) and waveguide attenuator (P/N: 1331562-3, S/N: 103)) was replaced by the spare RF section (isolator (S/N: 09), mixer/IF amplifier (S/N: 7A55), DRO (S/N: 85033) and waveguide attenuator (S/N: 106)). System tests were then continued with new (spare) channel 5 RF section. The spare RF section was already assembled and passed key performance tests. The DRO was disconnected and tested to be normal: f_0 = 53.5961GHz and P_o = 10.5dBm at V_B = 9.97 and I_B = 179.8mA. The problem was traced to the mixer/IF amplifier that was returned to the supplier for inspection and evaluation. This issue was addressed in FAR No. 208.

Later in Engineering CPT of the system, lower warm load counts of ~8,600 was also observed on the channel 6. The DRO (P/N: 1336610-6, S/N: 85028) of the channel 6 was disconnected from the system for evaluation. The measured oscillation frequency was 54.39956GHz and output power was -4.6dBm (instead of ~10.5dBm) at the bias voltage and current of 10.02V and 189.5mA, respectively. The DRO were replaced by the unit (S/N: 85025) that was disconnected from the previous system (P/N: 1331720-2, S/N: 107). The replaced DRO (S/N: 85025) was returned to the supplier for trouble-shooting. Subsequent system test indicated normal warm load counts for the channel 6. This issue was addressed in FAR No. 208.

The test data of new DROs (S/N: 85033 and 85027) for the channels 5 and 6, and mixer/IF amplifier (S/N: 7A55) for the channel 5 are included in this addendum/amendment to the Test Report (Report No. 11490). The tables for the center frequency and frequency stability of the LOs and for the gain-temperature sensitivity of the mixer/amplifiers and IF amplifiers are modified to reflect the replacement of the DROs and mixer/IF amplifier for

the subject channels. The test data for the new components are recorded in **bold.**

The spare receiver channels were assembled and tested using the spare receiver components as shown in Figure 1. An adapter was employed between the feedhorn and isolator instead of the multiplexer. Key receiver performances (bandpass characteristics, noise figure and noise power stability) were measured for each channel using the test procedure described in the Acceptance Test Procedure for the AMSU-A Receiver subsystem, AE-26002/6A. The performances were verified at room ambient and at two temperature extremes of -20°C and +50°C while the unit was subjected to temperature cycling from -20°C to +50°C. The spare channel 5 receiver components consisted of the isolator (P/N: 1356680-3, S/N: 09), mixer/IF amplifier (P/N: 1331562-15, S/N: 7A55), DRO (P/N: 1336610-5, S/N: 85033), and waveguide attenuator (P/N: 1331562-3, S/N: 106).

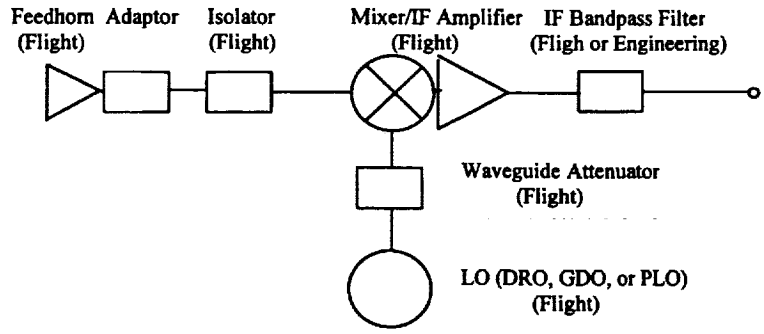


Figure 1. Configuration for spare receiver channels

The test data of the spare channel 5 are also included in this addendum/amendment to the Test Report. Note that the teat data were taken with an adapter replacing the multiplexer between the feedhorn and isolator. The measured oscillation frequency was 53.59610GHz.

CENTER FREQUENCY AND FREQUENCY STABILITY

FOR

LOCAL OSCILLATORS (LOs)
(DROs, PLOs, & GDO)

CENTER FREQUENCY OF LOs

Channel No.	3	4	5	6	7	8	9-14 *	15
Specification (GHz)	50.3	52.8	53.596	54.4	54.94	55.5	57.290344	89.0
Setting Accuracy (+/-GHz)	0.002	0.001	0.001	0.001	0.001	0.002	0.000086	0.03
Measured (GHz)	50.30008	52.80050	**53.59626**	**54.40004**	54.93986	55.50030	57.290325 57.290322	89.005

* Measured for PLO No. 1 and No. 2.

FREQUENCY STABILITY OF LOs

Channel No.	3	4	5	6	7	8	9-14 *	15
Short-Term Specification (+/-MHz)	8	3	3	3	3	8	0.086	80
Setting Accuracy (+/-MHz)	2	1	1	1	1	2		30
W/ Temp. & Voltage (+/-MHz)	6	2	2	2	2	6		50
Measured (MHz) Total	+2.80, -3.22	+1.52 -0.77	**+0.59, -1.30**	**+1.35, -1.55**	+0.81, -1. 50	+0.33, -0.48	+0.038, -0.057 +0.004, -0.036	+11., -13
Long-Term Specification (+/-MHz)	2	2	2	2	2	2	0.114	50
By Design or Analysis ** (+/-MHz)	0.1	0.1	0.1	0.1	0.1	0.1	0.115	76

* Measured for PLO No. 1 and No. 2.

** Based on accelerated life-test data for DROs.

Note: Additional +/-0.1MHz frequency stability reserved for safety margin for channels 11-14.

Channel 5 LO

DRO (P/N: 1336610-5, S/N: 85033)

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A AESD 1336610-5
SERIAL NUMBER: 85033 QUAL TEST N/A ACCEPT TEST ✓

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power, P_{diss}	1.82	W DC	P_{diss} max
Frequency, f_{Tnom}	✓ 5359626	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.0	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.26	MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	181	mA	Table IIIB
Frequency, f_{meas}	5359626	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	181	mA	Table IIIB
Frequency, f_{meas}	5359626	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB

Accept ✓ Reject

Test Performed by JED Date 7-22-98
QA LITTON 1160 Date JUL 28 1998

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG1A
SERIAL NUMBER: 85033 QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power, P_{diss}	1.82	W DC	Pdiss max
Frequency, $f_{10°C}$	5359625	GHz	Table IIIB
RF Output Power, $P_{10°C}$	11.9	dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1			
Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	180	mA	Table IIIB
Frequency, f_{meas}	5359625	GHz	Table IIIB
RF Output Power, P_{meas}	11.9	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	181	mA	Table IIIB
Frequency, f_{meas}	5359624	GHz	Table IIIB
RF Output Power, P_{meas}	11.9	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.01	MHz
Δf_T at 10.0 VDC ($=f_{10°C} - f_{Tnom}$)	=	-0.01	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC ($=P_{10°C} - P_{Tnom}$)	=	-0.1	dB

Accept ✓ Reject _____

Test Performed by JED Date 7.22.98
Litton Q.A. LITTON MED Date JUL 28 1998

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AG1A AESD 1336610- 5
SERIAL NUMBER: 85033 QUAL TEST N/A ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	181	mA	Table IIIB
Input Power, P_{diss}	1.81	W DC	Pdiss max
Frequency, f_{Tmin}	5359589	GHz	Table IIIB
RF Output Power, P_{Tmin}	11.9	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	5359588	GHz	Table IIIB
RF Output Power, P_{meas}	11.9	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	5359586	GHz	Table IIIB
RF Output Power, P_{meas}	11.9	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.01	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.03	MHz
Δf_T at 10.0 VDC (=$f_{Tmin} - f_{Tnom}$)		-0.37	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=$P_{Tmin} - P_{Tnom}$)	=	-0.1	dB

Accept ✓ Reject

Performed by JED Date 7-22-98
LITTON 11:03
Q.A. Date JUL 28 1998

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG1A AESD 1336610- 5
SERIAL NUMBER: 85033 QUAL TEST N/A ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power, P_{diss}	1.82	W DC	Pdiss max
Frequency, $f_{30°C}$	5359628	GHz	Table IIIB
RF Output Power, $P_{30°C}$	12.0	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	180	mA	Table IIIB
Frequency, f_{meas}	5359629	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	182	mA	Table IIIB
Frequency, f_{meas}	5359630	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0.01	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0.02	MHz
Δf_T at 10.0 VDC (=$f_{30°C} - f_{Tnom}$)	=	0.02	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=$P_{30°C} - P_{Tnom}$)	=	0	dB

Accept ✓ Reject _____

Test Performed by JEB Date 7-22-98
Litton Q.A. 09 NOV 11 Date JUL 28 1998

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A AESD 1336610- 5
SERIAL NUMBER: 85033 QUAL TEST N/A ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	184	mA	Table IIIB
Input Power, P_{diss}	1.84	W DC	Pdiss max
Frequency, f_{Tmax}	5359641	GHz	Table IIIB
RF Output Power, P_{Tmax}	11.9	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	182	mA	Table IIIB
Frequency, f_{meas}	5359641	GHz	Table IIIB
RF Output Power, P_{meas}	11.9	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	183	mA	Table IIIB
Frequency, f_{meas}	5359642	GHz	Table IIIB
RF Output Power, P_{meas}	11.9	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0.01	MHz
Δf_T at 10.0V (=f_{Tmax} -f_{Tnom})	=	0.15	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=P_{Tmax}-P_{Tnom})	=	-0.1	dB

Accept ✓ Reject

Test Performed by JED Date 7-22-98
on Q.A. LITTON M 60 Date JUL 28 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 42 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG1A AESD 1336610- 5
SERIAL NUMBER: 85033 QUAL TEST N/A ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	28	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power	1.82	W DC	Pdiss max
Frequency (f_{Tnom})	52.59627	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.27	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power	1.82	W DC	Pdiss max
Frequency	52.59624	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power	1.82	W DC	Pdiss max
Frequency	52.59627	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power	1.82	W DC	Pdiss max
Frequency, f_{Tnom}	52.59625	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.25	MHz	

Accept ✓ Reject _____

Test Performed by _____ Date 7-24-98
Litton Q.A. _____ LITTON M 69 Date JUL 28 1998

TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG1A AESD 1336610- 5
SERIAL NUMBER: 85033 QUAL TEST N/A ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION			LIMITS
1. Initial Performance at Tnom ± 1°C			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{Tnom}	5359640	GHz	Table IIIB
RF Output Power, P_{Tnom}	11.9	dBm	11.5 to 17 dBm
Input Voltage, V_B	10	VDC	10 ± 0.2 VDC
Input Current, I_B	184	mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.4	MHz	
2. Performance at Tnom ± 1°C after +60°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	5359641	GHz	Table IIIB
RF Output Power, P_{meas}	11.9	dBm	11.5 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	184	mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	5359550	GHz	Table IIIB
RF Output Power, P_{meas}	11.8	dBm	11.5 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	179	mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = 0.01 MHz
Δf_H after -30°C soak = -0.9 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = 0 dB
ΔP_H = after -30°C soak = -0.1 dB

Accept ✓ Reject ____

Test Performed by JED Date 7-22-98
Litton Q.A. LITTON INC. Date JUL 28 1998

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AG/A
SERIAL NUMBER: 85033 QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Initial Measurement. Ref Test Par. 5.9.1			
Temperature	23	°C	24°C ± 5°C
Frequency	53.59626	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Reference test. Ref. Test Para. 5.9.3			
Frequency, f_{Ref}	53.59626	GHz	Table IIIB
RF Output Power, P_{Ref}	-2.0	dBm	
Load Pulling Test. Ref. Test Para. 5.9.4			
Maximum Frequency, f_{meas}	53.59627	GHz	Table IIIB
Minimum Frequency, f_{meas}	53.59626	GHz	Table IIIB
Maximum RF Output Power P_{meas}	-1.7	dBm	
Minimum RF Output Power, P_{meas}	-2.3	dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation, $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = 0.01 MHz
Maximum Negative Δf_L = 0 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation, $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = 0.3 dB
Maximum Negative ΔP_L = -0.3 dB

Accept ✓ Reject _____

Test Performed by DM Date 7-24-98
Litton Q.A. LITTON M 60 Date JUL 2 8 1998

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A
SERIAL NUMBER: 85033 QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Output Open and Short. Ref. Test Para. 5.9.5			
Temperature	23	°C	24°C ± 5°C
Frequency:	53.59627	GHz	Table IIIB
RF Output Power:	12.0	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current:	182	mA	Table IIIB
Results:	✓	Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.42	MHz (Positive)	Table IIIB
	− 0.90	MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	0.17	MHz (Positive)	Table IIIB
	− 0.40	MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.4	dB (Positive)	1.0 dB
	− 0.5	dB (Negative)	-1.0 dB

Accept ✓ Reject _____

Test Performed by VN Date 7-27-98

QA LITTON M-69 Date JUL 2 8 1998

LITTON
Solid State

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036AH/A AESD 1336610-6
SERIAL NUMBER: 85027 QUAL TEST N/A ACCEPT TEST ✓

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	188 mA	Table IIIB
Input Power, P_{diss}	1.88 W DC	P_{diss} max
Frequency, f_{Tnom}	54.40004 GHz	Table IIIB
RF Output Power, P_{Tnom}	12.0 dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	.04 MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para. 5.2.3.2
Input Current	186 mA	Table IIIB
Frequency, f_{meas}	54.40004 GHz	Table IIIB
RF Output Power, P_{meas}	12.0 dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para. 5.2.3.3
Input Current	186 mA	Table IIIB
Frequency, f_{meas}	54.40005 GHz	Table IIIB
RF Output Power, P_{meas}	12.0 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$

Δf_V at 9.5 VDC or at 9.5 VDC = ~~0~~ MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0.01 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$

ΔP_V at 9.5 VDC or at 9.5 VDC = ~~0~~ dB
ΔP_V at 10.5 VDC or at 10.5 VDC = ~~0~~ dB

Accept ✓ Reject ____

Test Performed by [signature] Date 6-16-98
Litton QA [signature] Date JUN 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 38 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AH/A AESD 1336610- 6
SERIAL NUMBER: 85027 QUAL TEST N/A ACCEPT TEST ✓

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	188	mA	Table IIIB
Input Power, P_{diss}	1.88	W DC	Pdiss max
Frequency, $f_{10°C}$	54.39946	GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.0	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	186	mA	Table IIIB
Frequency, f_{meas}	54.39945	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	186	mA	Table IIIB
Frequency, f_{meas}	54.39944	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.01	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.02	MHz
Δf_T at 10.0 VDC (=$f_{10°C}$ - f_{Tnom})	=	-.58	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=$P_{10°C}$ - P_{Tnom})	=	0	dB

Accept ✓ Reject _____

Test Performed by SS Date 6-16-98
Litton Q.A. [signature] Date JUN 3 0 1998

LITTON
Solid State

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A AESD 1336610- 6
SERIAL NUMBER: 85027 QUAL TEST N/A ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	187	mA	Table IIIB
Input Power, P_{diss}	1.87	W DC	Pdiss max
Frequency, f_{Tmin}	54.39872	GHz	Table IIIB
RF Output Power, P_{Tmin}	12.0	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	185	mA	Table IIIB
Frequency, f_{meas}	54.39876	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	186	mA	Table IIIB
Frequency, f_{meas}	54.39876	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.01	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.01	MHz
Δf_T at 10.0 VDC (=f_{Tmin} -f_{Tnom})		-1.27	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	-0-	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	-0-	dB
ΔP_T at 10.0 VDC (=P_{Tmin} -P_{Tnom})	=	-0-	dB

Accept ✓ Reject

Test Performed by [signature] Date 6-16-98
Litton Q.A. [signature] 03 NOLU Date JUN 30 1998

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AH/A — AESD 1336610- 6
SERIAL NUMBER: 8527 — QUAL TEST N/A — ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	188	mA	Table IIIB
Input Power, P_{diss}	1.88	W DC	Pdiss max
Frequency, $f_{30°C}$	54.400053	GHz	Table IIIB
RF Output Power, $P_{30°C}$	11.9	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	186	mA	Table IIIB
Frequency, f_{meas}	54.400053	GHz	Table IIIB
RF Output Power, P_{meas}	11.9	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	186	mA	Table IIIB
Frequency, f_{meas}	54.400053	GHz	Table IIIB
RF Output Power, P_{meas}	11.9	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	0	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	0	MHz
Δf_T at 10.0 VDC ($=f_{30°C} - f_{Tnom}$)	=	0.49	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC ($=P_{30°C} - P_{Tnom}$)	=	0.2	dB

Accept ✓ Reject _____

Test Performed by _____ Date 6-17-98
Litton Q.A. LITTON M 60 Date JUN 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 41 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A
SERIAL NUMBER: 85027 QUAL TEST N/A
AESD 1336610- 6
ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	187	mA	Table IIIB
Input Power, P_{diss}	1.87	W DC	Pdiss max
Frequency, f_{Tmax}	54.40133	GHz	Table IIIB
RF Output Power, P_{Tmax}	11.7	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	186	mA	Table IIIB
Frequency, f_{meas}	54.40131	GHz	Table IIIB
RF Output Power, P_{meas}	11.7	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	186	mA	Table IIIB
Frequency, f_{meas}	54.40132	GHz	Table IIIB
RF Output Power, P_{meas}	11.7	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.02	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.01	MHz
Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$)	=	1.29	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	-0-	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	-0-	dB
ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$)	=	-0.3	dB

Accept ✓ Reject _____

Test Performed by _____ Date 6-17-98
Litton Q.A. LITTON Date JUN 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 42 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E9036AH/A AESD 1336610- 6
SERIAL NUMBER: 85027 QUAL TEST N/A ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	188	mA	Table IIIB
Input Power	1.88	W DC	Pdiss max
Frequency (f_{Tnom})	54.39996	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	-.04	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	188	mA	Table IIIB
Input Power	1.88	W DC	Pdiss max
Frequency	54.39984	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	188	mA	Table IIIB
Input Power	1.88	W DC	Pdiss max
Frequency	54.39984	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	188	mA	Table IIIB
Input Power	1.88	W DC	Pdiss max
Frequency, f_{Tnom}	54.39982	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	-.18	MHz	

Accept ✓ Reject _____
Test Performed by _____ Date 6-17-98
Litton Q.A. _____ Date JUN 30 1998

LITTON
Solid State

TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AH/A
SERIAL NUMBER: 85027 QUAL TEST N/A

AESD 1336610- 6
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION			LIMITS
1.	Initial Performance at Tnom ± 1°C		
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{Tnom}	54.40004	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.0	dBm	12 to 17 dBm
Input Voltage, V_B	10	VDC	10 ± 0.2 VDC
Input Current, I_B	188	mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	.04	MHz	
2.	Performance at Tnom ± 1°C after +60°C soak.		
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	54.40002	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	188	mA	Table IIIB
3.	Performance at Tnom ± 1°C after -30°C soak.		
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	54.39997	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	188	mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = -0.02 MHz
Δf_H after -30°C soak = -0.07 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = -0 dB
ΔP_H = after -30°C soak = -0 dB

Accept ✓ Reject ____

Test Performed by SB Date 6-17-98
Litton Q.A. LITTON Date JUN 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 58 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A
SERIAL NUMBER: 85027 QUAL TEST N/A

AESD 1336610- 6
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Initial Measurement. Ref Test Par. 5.9.1			
Temperature	22	°C	24°C ± 5°C
Frequency	54.39985	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current	185	mA	Table IIIB
Reference test. Ref. Test Para. 5.9.3			
Frequency, f_{Ref}	54.39993	GHz	Table IIIB
RF Output Power, P_{Ref}	-6.9	dBm	
Load Pulling Test. Ref. Test Para. 5.9.4			
Maximum Frequency, f_{meas}	54.39994	GHz	Table IIIB
Minimum Frequency, f_{meas}	54.39992	GHz	Table IIIB
Maximum RF Output Power P_{meas}	-6.3	dBm	
Minimum RF Output Power, P_{meas}	-7.3	dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation. $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = .01 MHz
Maximum Negative Δf_L = -.01 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation, $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = 0.6 dB
Maximum Negative ΔP_L = -0.4 dB

Accept ✓ Reject _____

Test Performed by SB Date 6-18-98
Litton Q.A. LITTON Date JUN 30 1998

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E9036AH/A AESD 1336610- 6
SERIAL NUMBER: 85027 QUAL TEST N/A ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Output Open and Short. Ref. Test Para. 5.9.5		
Temperature	22 °C	24°C ± 5°C
Frequency:	54.39989 GHz	Table IIIB
RF Output Power:	12.0 dBm	12 to 17 dBm
Input Voltage	10.0 VDC	10 ± 0.2 VDC
Input Current:	188 mA	Table IIIB
Results:	✓ Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.05 MHz (Positive)	Table IIIB
	-0.12 MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	1.3 MHz (Positive)	Table IIIB
	-1.29 MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.8 dB (Positive)	1.0 dB
	-0.7 dB (Negative)	-1.0 dB

Accept ✓ Reject _____

Test Performed by [illegible] Date 6-19-98

Litton Q.A. [illegible] Date JUN 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 61 OF 68
56348	A	1300823	B3	

Channel 6 LO

DRO (P/N: 1336610-6, S/N: 85027)

GAIN STABILITY AND GAIN COMPRESSION

FOR

MIXER/AMPLIFIERS AND IF AMPLIFIERS

GAIN-TEMPERATURE SENSITIVITY FOR MIXER/AMPLIFIERS AND IF AMPLIFIERS

Channel No.	3	4	5	6	7	8	9	10	11	12	13	14	15
Specification (+/-dB/°C)	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.06	0.06	0.06	0.06	0.02
Measured (dB/°C)	-0.015	-0.017	**-0.017**	-0.016	-0.020	-0.015	-0.017 +0.005	-0.017 +0.005	-0.017 +0.005, -0.005 -0.016	-0.017 +0.005, -0.005 -0.016	-0.017 +0.005. -0.005 -0.009	-0.017 +0.005, -0.005 +0.001 -0.014	-0.020
Total (dB/°C)	-0.015	-0.017	**-0.017**	-0.016	-0.020	-0.015	+0.005, -0.017	+0.005, -0.017	+0.005, -0.036	+0.005, -0.036	+0.005, -0.031	+0.006, -0.036	-0.020

Channel 5 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-15, S/N: 7A55)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.45	0.50	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	71.12	2.13	2.0		QA 1
10.00	71.20				
10.04	71.29				
ΔGv =	0.17 dB				

DATE	ACC	REJ
10-26-98	QA 1	

ENGINEERING DATA ONLY - SEE AE24869C PARA. 3.2.1.15.2 acceptable

PART NO. 1331562-15F

SPACEK QA

SER NO. 7A55

TEST FAILURE:

TESTED BY: 7A1

FAILURE ANALYSIS NO.

END DATE: 7A51

END TIME: 1600

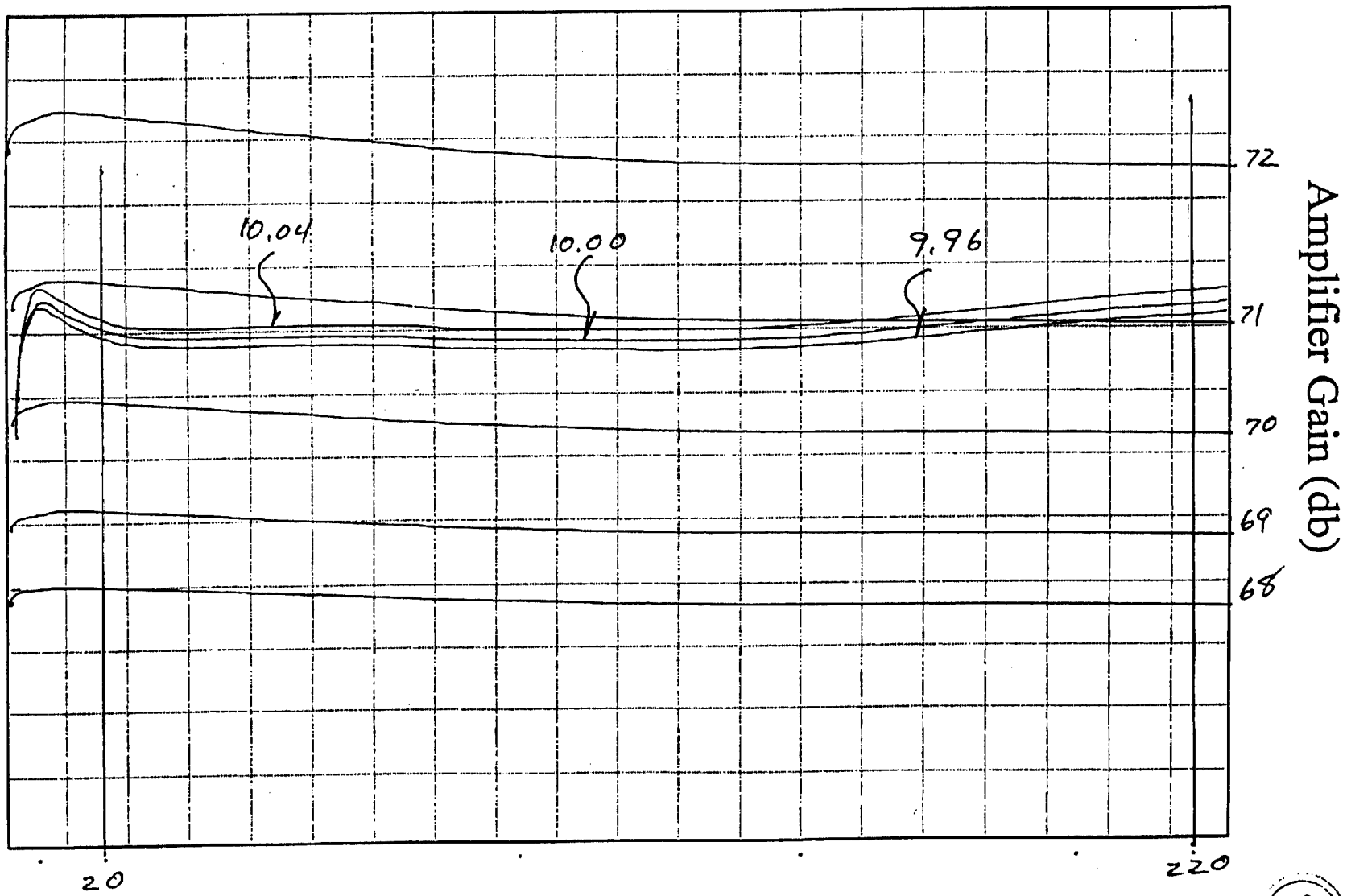
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-156
Serial No. 7A55
Date 6-6-98
Tested By TTT

Amb Temp +23°C



94
1

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 -C	GT1 71.79				
		* 0.014	0.035dB/°C	QA 1	
T2 +8	GT2 71.59				
		* 0.024	0.020dB/°C		QA 1
T3 +28	GT3 71.12				
		* 0.043	0.035dB/°C		QA 1
T4 +40	GT4 70.60				

• Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \quad i = 1,2,3,4 \qquad \Delta G_T = \underline{1.19}\ \text{dB}$$

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 1.76 dB Spec 1.4dB ACC____ REJ QA 1

DATE ACC REJ ENGINEERING DATA ONLY. SEE AE24869C PARA. 3.2.1.15.1 acceptable

PART NO. 1331562-5G SPACEK QA 10-28-98 ___ QA 1

SER NO. 7A55 TEST FAILURE: _____

TESTED BY: 777 FAILURE ANALYSIS NO. _____

END DATE: 6-5-98

END TIME: 1600

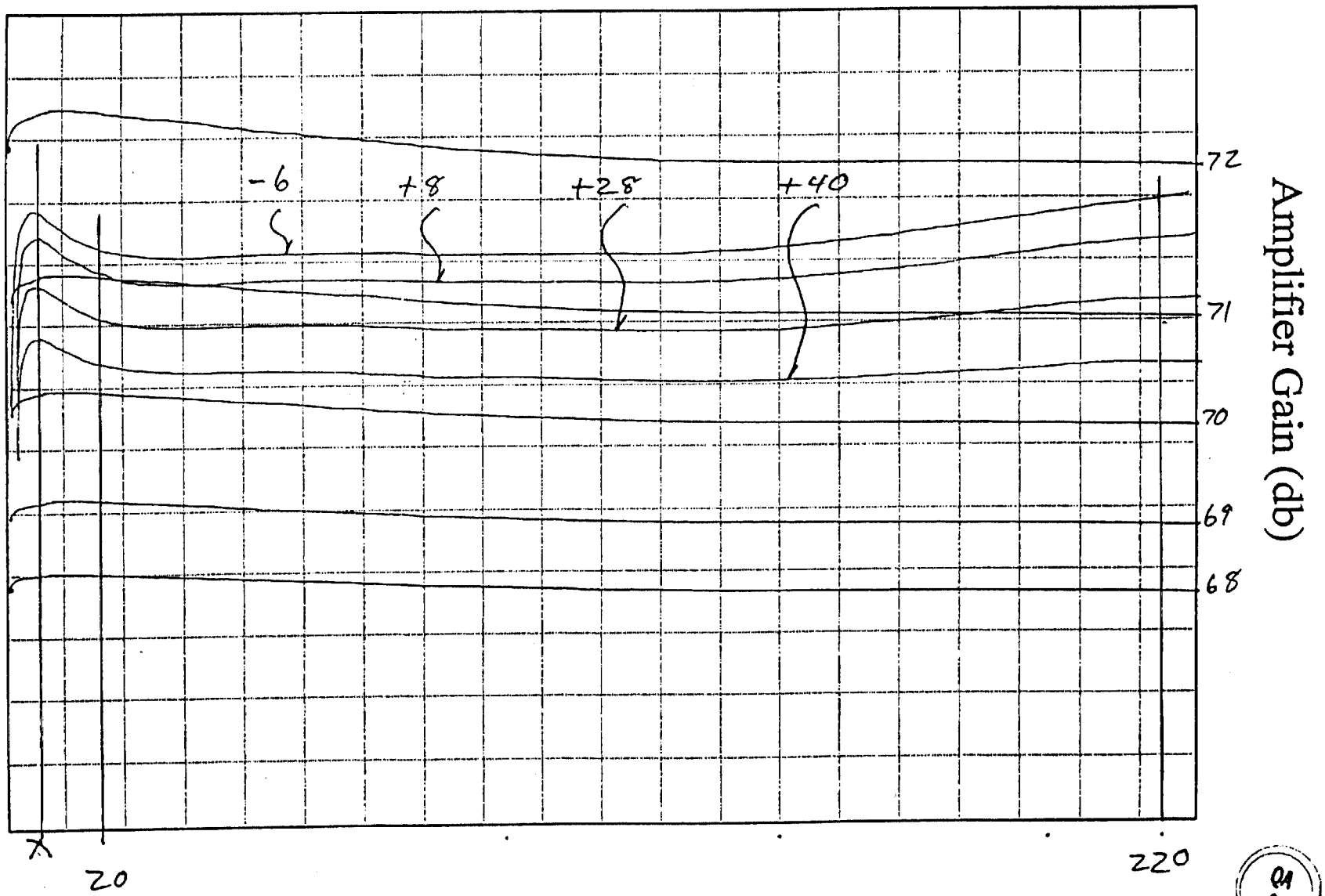
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-15G
Serial No. 7A55
Date 6-6-98
Tested By TTT

Amb Temp 23°C



Q1
1

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10					
			X							20	-2.2	0.8	1.0	QA 1	
	X	X								50					
X	X	X	X	X	X	X	X			100	-2.3	0.7	1.0	QA 1	
X										150					
			X	X	X	X	X	X		200	-2.2	0.8	1.0	QA 1	
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 6-5-98 AMBIENT ROOM TEMPERATURE °C: 23°C

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-21.2	-24.8	3.6	1.19

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

PART NO. 1331562-15G

SPACEK QA DATE 10-28-98 ACC QA 1 REJ

SER NO. 7A55

TEST FAILURE:

TESTED BY:

FAILURE ANALYSIS NO.

END DATE: 6-5-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 12. MIXER-AMPLIFIER ASSEMBLY TESTS

RF PORT RETURN LOSS TEST: ATP PARAGRAPH 5.4.6.

RF FREQ (GHZ)	TOTAL REFLECTED POWER (dBm)	UUT REFLECTED POWER (dBm)	RF RETURN LOSS (dB)	SPEC. RF RETURN LOSS (dB)	ACC	REJ
53.38	-3.7	-19.5	15.8	~~14.0~~ 11.73	QA 1	
53.60	-3.9	-19.0	15.1	~~14.0~~ 11.73	QA 1	
53.82	-3.6	-19.0	15.4	~~14.0~~ 11.73	QA 1	

AVERAGE NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.4.7.

DATE: 11-20-98 AMBIENT ROOM TEMPERATURE °C: +21

	TOTAL POWER @ AMBIENT (dBm)	TOTAL POWER @ 77.2 DEG K (dBm)	Y FACTOR (dB)	DSB NOISE FIGURE (dB)	SPEC. DSB NOISE FIGURE (dB)	ACC	REJ
LO power level at ~~±8.5dBm~~(with ripple) +7.0dBm							
1ST	-20.20	-21.95	1.75	3.6	3.8		
2ND	-20.20	-21.95	1.75	3.6	3.8		
3RD	-20.20	-21.95	1.75	3.6	3.8	QA 1	
AVG	-20.20	-21.95	1.75	3.6	3.8		
LO power level at ~~±10dBm~~(with ripple) +8.5dBm							
1ST	-19.80	-21.60	1.80	3.5	3.8		
2ND	-19.80	-21.60	1.80	3.5	3.8		
3RD	-19.80	-21.60	1.80	3.5	3.8	QA 1	
AVG	-19.80	-21.60	1.80	3.5	3.8		
LO power level at ~~+11.5dBm~~(with ripple) +10.0dBm							
1ST	-19.60	-21.35	1.75	3.6	3.8		
2ND	-19.60	-21.35	1.75	3.6	3.8		
3RD	-19.60	-21.35	1.75	3.6	3.8	QA 1	
AVG	-19.60	-21.35	1.75	3.6	3.8		

NOTE: *Above data was taken with the Daden filte, except on the -19 unit.*

		DATE	ACC	REJ
PART NO. 1331562-15F	SPACEK QA	11-23-98	QA 1	

SER NO. 7A55 TEST FAILURE: _____

TESTED BY: DA FAILURE ANALYSIS NO. _____

END DATE: 11-20-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 11-18-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.1	-19.40	-21.25	1.85	3.4	3.8	QA 1	
+8	43.2	-19.60	-21.40	1.80	3.5	3.8	QA 1	
+28	43.3	-19.90	-21.70	1.80	3.5	3.8	QA 1	
+46	43.4	-20.20	-22.00	1.80	3.5	3.8	QA 1	

Noise figure change 0.1 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ _____

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 11/24/98 Ambient Room Temperature °C: 24

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.041

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ _____

	DATE	ACC	REJ
SPACEK QA	11-25-98	QA 1	

PART NO. 1331562-15B

SER NO. 7A55

TESTED BY: [illegible]

END DATE: 11-25-98

END TIME: 1600

TEST FAILURE: _____

FAILURE ANALYSIS NO. _____

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA

FOR

SPARE CHANNEL 5

-26002/6C
2 Dec 98

TEST DATA SHEET 8 (Sheet 1 of 2)
Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-2)

Test Setup Verified: James E. Gamzee Baseplate Temperature (T_B) 24.6 °C
Signature

Compo-nent	Channel No.	V_b(V)	I_b(mA)	3 dB BW Frequency (MHz)		3 dB BW Frequency (MHz)		Pass/ Fail
				Lower	Higher	Required Max.	Measured	
LO	3			N/R		90		
	4					200		
	5			30.6MHz	199.6MHz	170	169.0MHz	P
	8			N/R		163		
Mixer/ Amps	All	N/R						

Part No.: 1336610-85 J. GAMZEES
Serial No.: 85033

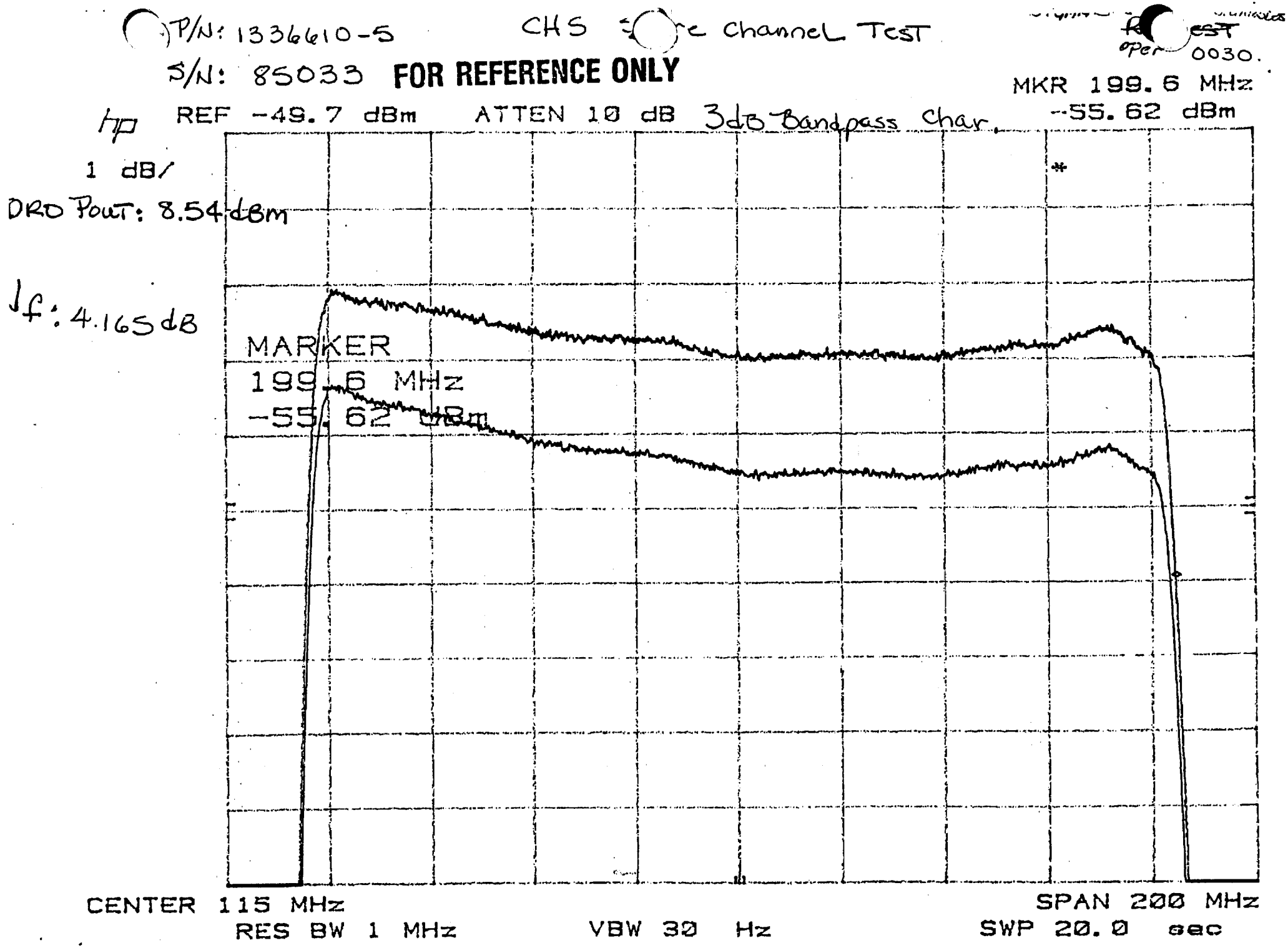
Test Engineer: James E. Gamzee
Quality Assurance: N/R
Date: 6/28/99

eng. test
spec data

P/N: 1336610-5 CHS [illegible]e Channel Test

S/N: 85033 **FOR REFERENCE ONLY**

oper 0030.



TEST DATA SHEET 11 (Sheet 7 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: [signature] Baseplate Temperature (T_B) 24.6 °C
Signature

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
5		4.383				.02238			
		4.422				.06648			
		4.369				.04435			
		4.432				.02920			
		4.443				.0946			
		4.383				.0329			
		4.409				.1161			
		4.422				.0242			
		4.367				.0810			
		4.366				.0774			
	5.1		4.399	P	0.08		.0586	.0937	P

Pass = P, Fail = F

Part No.: 1336610-5

Serial No.: 85033

Test Engineer: [signature]

Quality Assurance: N/R

Date: 6/28/99

* L.O. Pwr: 10.03 dBm

AMSU-A TEST

A1-2, CHANNEL 5, SPARE CHANNEL TEST, TB 24.6 6/28/99

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-4.21013616	.00080592	----------	----------
2	COLD TEST	79.15	-3.07443418	.00111214	4.38285265	.02238030
3	WARM TEST	295.15	-4.20887362	.00086905	----------	----------
4	COLD TEST	79.15	-3.06352129	.00091579	4.42155660	.06646505
5	WARM TEST	295.15	-4.20785287	.00082612	----------	----------
6	COLD TEST	79.15	-3.06925032	.00108419	4.36933191	.04135178
7	WARM TEST	295.15	-4.20702129	.00081100	----------	----------
8	COLD TEST	79.15	-3.08488572	.00085726	4.43214411	.02920041
9	WARM TEST	295.15	-4.20694263	.00093552	----------	----------
10	COLD TEST	79.15	-3.08753695	.00109145	4.44270824	.09462920
11	WARM TEST	295.15	-4.20575340	.00081497	----------	----------
12	COLD TEST	79.15	-3.07126951	.00073147	4.38259067	.03288929
13	WARM TEST	295.15	-4.20548495	.00100086	----------	----------
14	COLD TEST	79.15	-3.07784980	.00210479	4.40917866	.11611605
15	WARM TEST	295.15	-4.20552671	.00078637	----------	----------
16	COLD TEST	79.15	-3.08118895	.00082926	4.42202185	.02421970
17	WARM TEST	295.15	-4.20565859	.00090360	----------	----------
18	COLD TEST	79.15	-3.06694151	.00087208	4.36661221	.08104428
19	WARM TEST	295.15	-4.20451235	.00089462	----------	----------
20	COLD TEST	79.15	-3.06562989	.00107238	4.36555360	.07737582

CH. 5 .169 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.39958388175

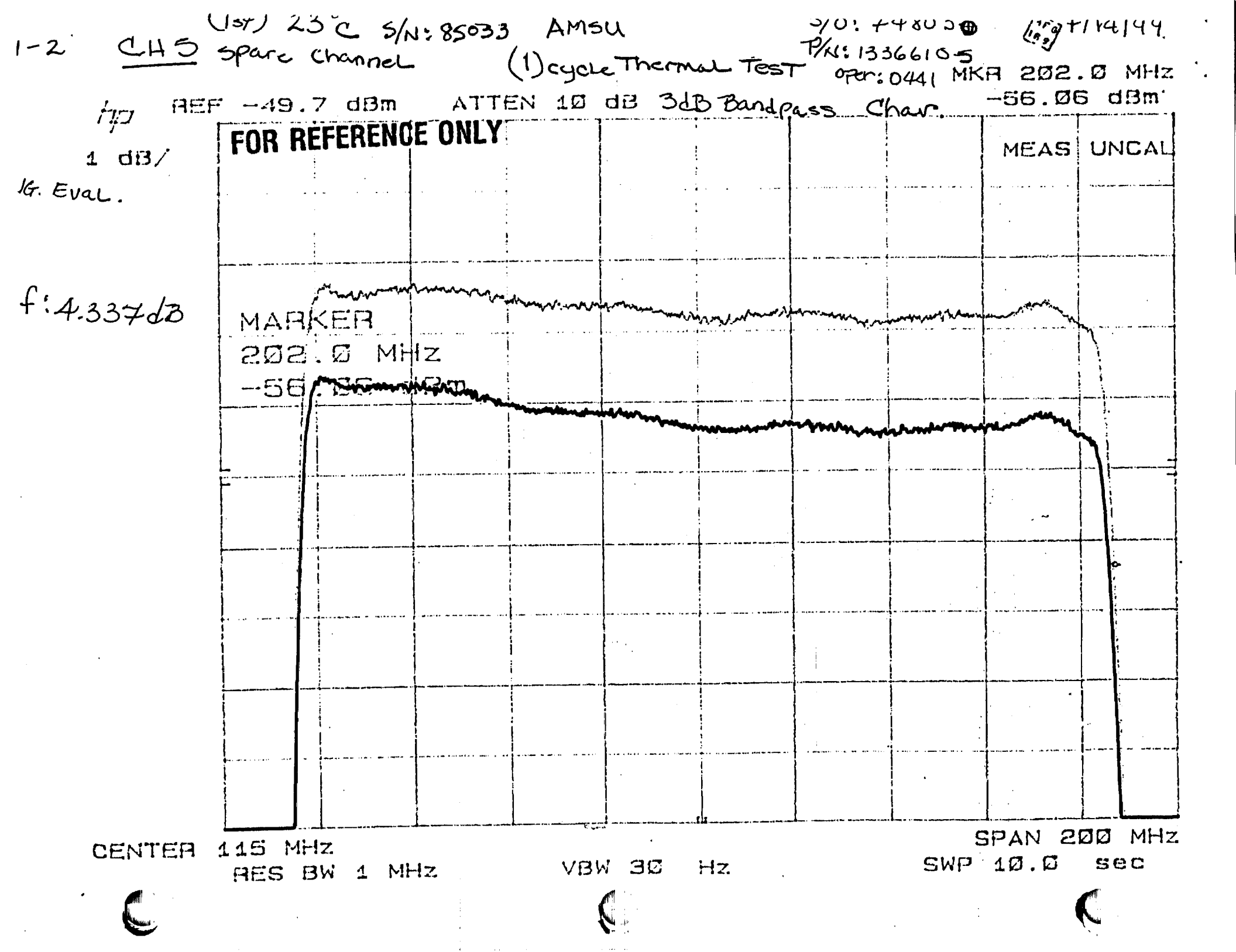
NOISE POWER STABILITY (K) = .0585691883508

NOISE POWER STABILITY DELTA (K) = .0937357566766

NPS_MAX (K) = .116116054271 NPS_MIN (K) = .0223802975943

INTEGRATION TIME = .165

1-2 CH5 spare channel (1st) 23°C S/N: 85033 AMSU (1) cycle Thermal Test S/O: 448053 P/N: 1336610-5 oper: 0441 Orig 7/14/94



1-2 CH 5 -20°C S/N: 85033 AMSU S/O: -48030 199

Thermal Test (1) cycle P/N: 1336610-5

OPER: 0441

REF -49.7 dBm ATTEN 10 dB 3dB Bandpass char. MKR 30.8 MHz -55.01 dBm

1 dB/

ENG. EVAL.

Nf: 4.364

FOR REFERENCE ONLY

MARKER
30.8 MHz
-55.01 dBm

CENTER 115 MHz SPAN 200 MHz

RES BW 1 MHz VBW 30 Hz SWP 20.0 sec

ch 5
+50 °C

T1-2 S/N:85033 AMSU

S/O: [illegible]
P/N: 1336610-5 Rev T 7/17/99
oper: 0441

CH5 Spare channel Thermal Test (1) cycle

MKR 175.0 MHz
-53.25 dBm

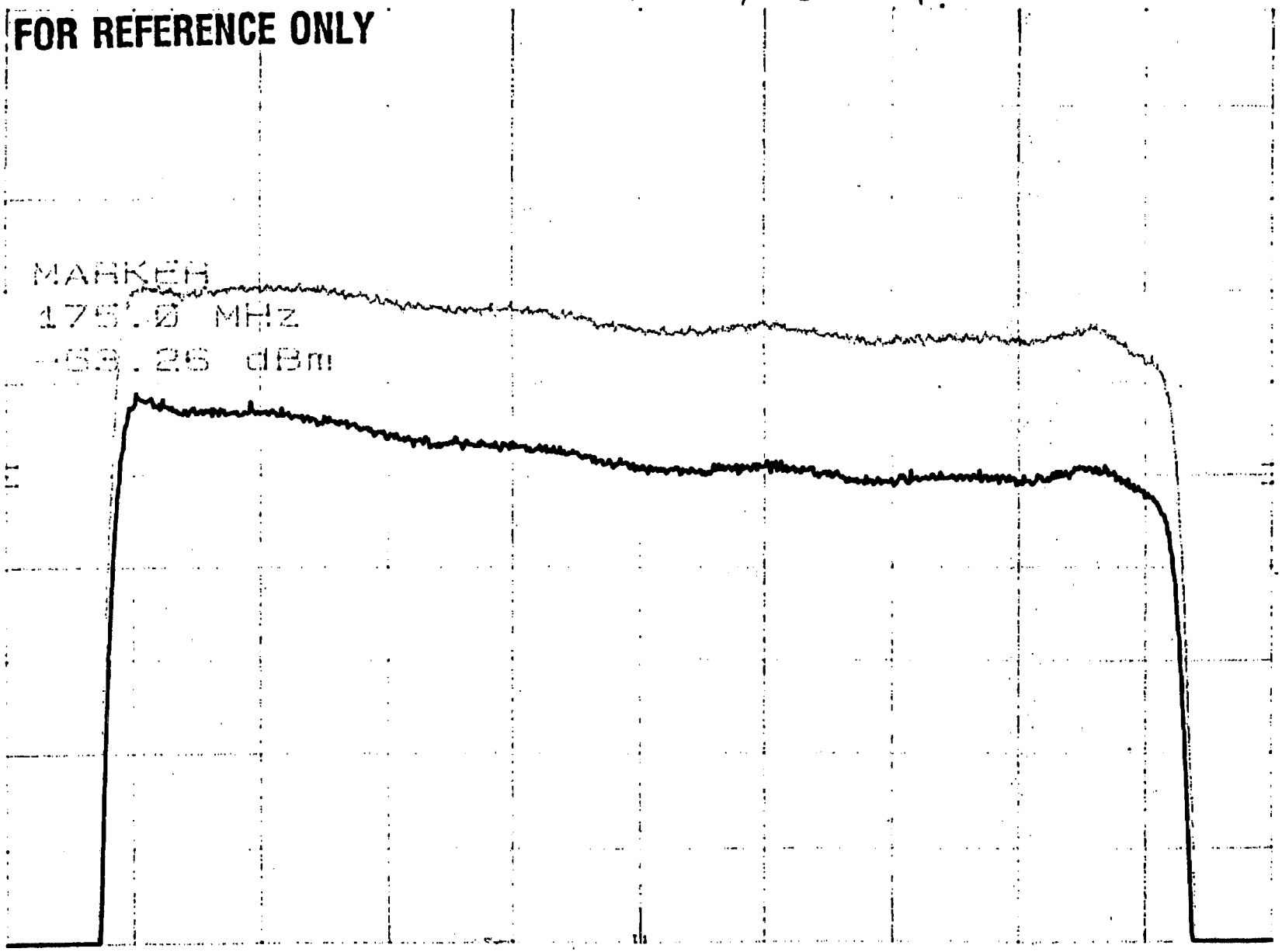
Ap

REF -19.7 dBm ATTEN 10 dB 3dB Bandpass Char.

1 dB/

NG. EVAL.

N.F = 4.364

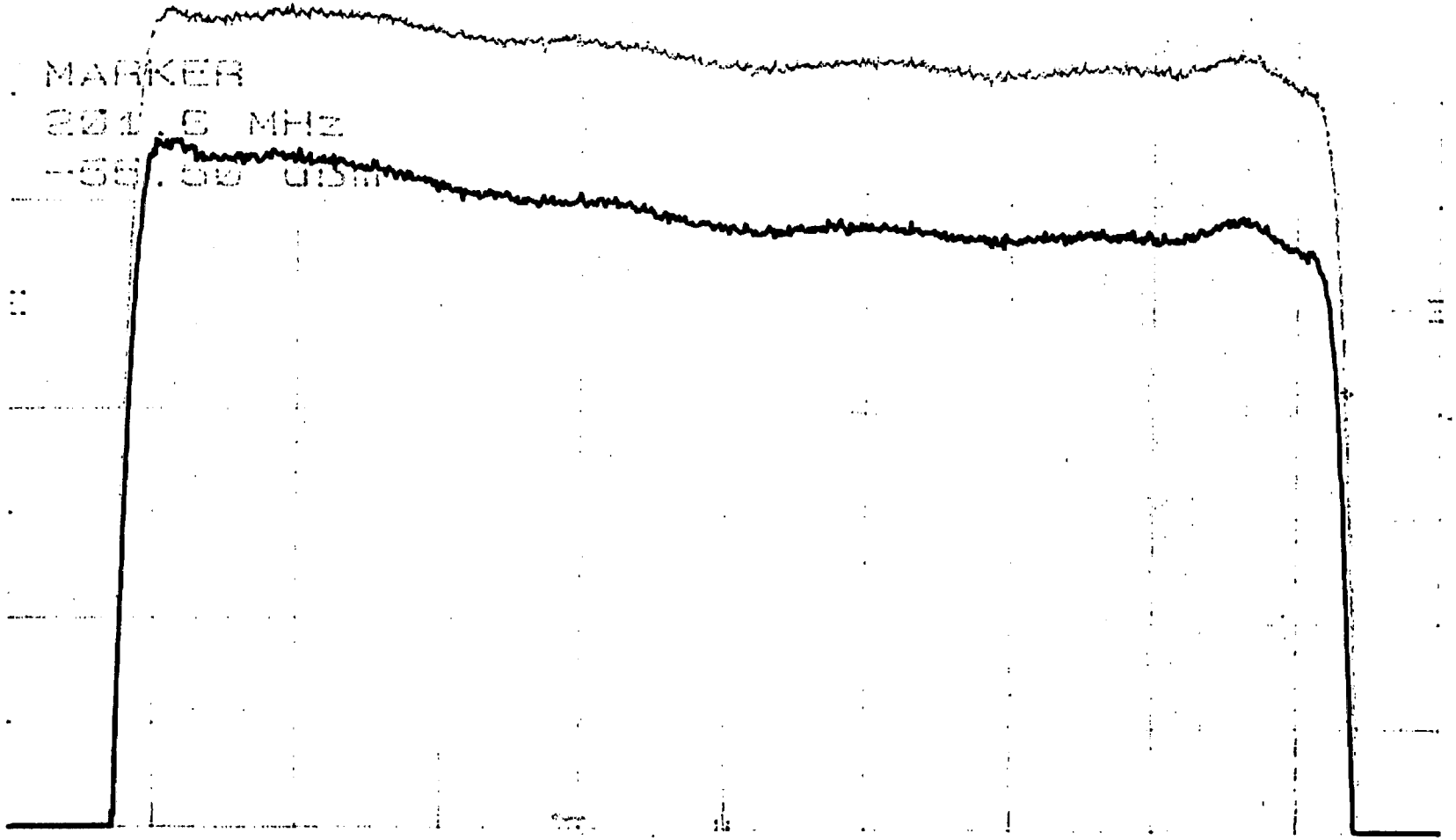


2 (2nd) S/N:85033 AMSU S/O: 448030
A1-2 HS Spare Channel Thermal Test P/N: 1336610-5
Oper: 0441
MFG 7 99

REF -19.7 dBm ATTEN 10 dB 3dB Bandpass Char, MKR 201.6 MHz
1 dB/ FOR REFERENCE ONLY -55.50 dBm

ENG. Eval.

Vf: 4.310 dB



CENTER 115 MHz SPAN 200 MHz
RES BW 1 MHz VBW 30 Hz SWP 20.0 sec

APPENDIX B

ADDENDUM/AMENDMENT
TO
PERFORMANCE VERIFICAITON TEST REPORT
METSAT (S/N: 108) AMSU-A1 RECEIVER ASSEMBLIES
FOR
INTEGRATED ADVANCED MICROWAVE SOUNDING UNIT-A
(AMSU-A)

CONTRACT NO. NAS5-32314
CDRL PAR. 3.3.2.2

MAY 2000

SUBMITEED TO
NATIONAL AERONAUTICS AND SPACE ADMINISTRERATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND 20771

SUBMITTED BY

AEROJET
100 WEST HOLLYVALE STREET
AZUSA, CALIFORNIA 91702

APPENDIX B

1.0 Summary

During engineering evaluation of the METSAT/AMSU-A1 instrument (Assembly No. 1331720-2, S/N: 108), Channel 8 output was observed to be unstable and noisy. The entire RF section of Channel 8, which consisted of a DRO (P/N: 1336610-8, S/N: 85079), Mixer-Amp (P/N: 1331562-18, S/N: 7A38), Waveguide (P/N: 1331509-6, S/N: 103), and isolator (P/N: 1356680-6, S/N: 08) were replaced by a spare RF section. The RF components consisted of an isolator (S/N: 010), mixer/IF amplifier (S/N: 7A58), DRO (S/N: 85078) and waveguide attenuator (S/N: 104). The replaced Channel 8 Bandpass RF power was verified to be –27.50 dBm (S/B: -17 dBm +/- 1 dBm). The instrument successfully passed Full Print, NEΔT, and distribution test along with an engineering CPT. The removed Channel 8 RF chain was re-adjusted with the L.O. power set to +10 dBm and passed Bandpass characteristics, Noise Figure, and Noise Power Stability tests per AE-26002/6 at room ambient and over temperature from –20°C to +50 °C. This Channel 8 RF chain was designated as a spare and subsequently installed into the METSAT/AMSU-A1 instrument (Assembly No. 1331720-2, S/N: 109).

During +38°C Thermal Vacuum Calibration Warm Load testing of the METSAT/AMSU-A1 instrument (Assembly No. 1331720-2, S/N: 108), it was observed that Channel 5 counts dropped to approximately 8,000 counts (instead of the normal approx. 16,000), indicating a failure in the channel. The entire RF section of channel 5, which consisted of an isolator (P/N: 1356680-3, S/N: 09), mixer/IF amplifier (P/N: 1331562-15, S/N: 7A55), DRO (P/N: 1336610-5, S/N: 85033) and waveguide attenuator (P/N: 1331562-3, S/N: 106) was replaced by a spare RF section (These components were the original ones installed at the receiver level). The spare RF section consisted of an isolator (S/N: 07), mixer/IF amplifier (S/N: 7A45), DRO (S/N: 85036) and waveguide attenuator (S/N: 103). An LPT was performed to verify instrument performance, and Thermal Vacuum Calibration testing was resumed with the new (spare) Channel 5 RF section. The test data of the DRO (S/N: 85036) and mixer/IF amplifier (S/N: 7A45) are included in the addendum/amendment of this Test Report 11490B. The tables for the center frequency and frequency stability of the LO, and for the gain-temperature sensitivity of the mixer/IF amplifier are modified to reflect the replacement of those components for that channel. The test data for the new components are recorded in **bold**.

The spare receiver channel was assembled and tested using the spare receiver components as shown in Figure 1. An adapter was employed between the feedhorn and

APPENDIX B

isolator instead of the multiplexer. Key receiver performance (bandpass characteristics, noise figure and noise power stability) were measured for the spare channel using the test procedure described in AE-26002/6A. The performance was verified at room ambient and at two temperature extremes of –20°C and +50°C while the unit was subjected to temperature cycling from –20°C and +50°C. The spare channel 5 receiver components consisted of an isolator (P/N: 1356680-3, S/N: 07), mixer/IF amplifier (P/N: 1331562-15, S/N: 7A45), DRO (P/N: 1336610-5, S/N: 85036, and waveguide attenuator (P/N: 1331562-3, S/N: 103).

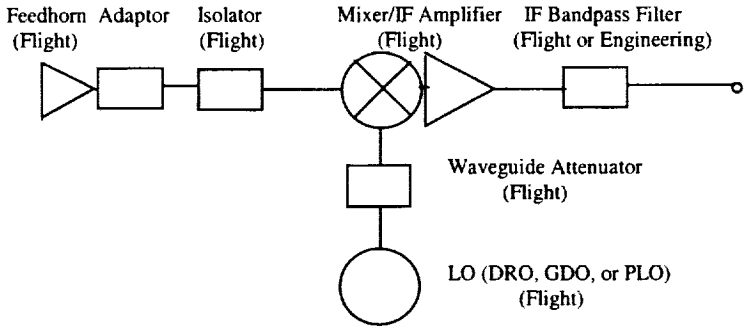


Figure 1. Configuration for spare receiver channels

The channel 5 test data is also included in this addendum/amendment. Note that the test data were taken with an adapter replacing the multiplexer between the feedhorn and isolator. The measured oscillation frequency was 53.59600GHz.

APPENDIX B

Channel 8 LO

DRO (P/N: 1336610-8, S/N: 85078)

TEST DATA SHEET 7.28
MECHANICAL MEASUREMENTS
FINAL DATA SET

LITTON TYPE LS E-9036 AK/A — AESD 1336610-8
SERIAL NUMBER: 85078 — QUAL TEST — — ACCEPT TEST ✓

Weight Ref. Test Para. 6.1.

SPECIFICATION	MEASUREMENT	LIMIT
Weight:	1 lb 4.2 oz	1.5 pounds max.

Accept ✓ Reject ____

Inspection Performed By: 09 W NOLLI — Date: JUN 3 0 1998

Litton Q.A. 09 W NOLLI — Date: JUN 3 0 1998

Outline and Marking

Ref. Test Para. 6.2, Inspection to Outline drawing, Litton 1300316 B1

Accept ✓ Reject ____

Inspection Performed by: LITTON M 60 — Date: JUN 3 0 1998

Litton Q.A. LITTON M 60 — Date JUN 3 0 1998

LITTON
Solid State

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AK/A
SERIAL NUMBER: 85078 QUAL TEST N/A
AESD 1336610-8
ACCEPT TEST ✓

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	181	mA	Table IIIB
Input Power, P_{diss}	1.81	W DC	P_{diss} max
Frequency, f_{Tnom}	55.50042	GHz	Table IIIB
RF Output Power, P_{Tnom}	13.3	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	1.42	MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	55.50042	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	22	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	55.50141	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = −0.01 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB

Accept ✓ Reject _____

Test Performed by SB Date 6-19-98
Litton QA LITTON M&O Date JUN 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 38 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AK/A AESD 1336610- 8
SERIAL NUMBER: 85078 QUAL TEST N/A ACCEPT TEST ✓

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power, P_{diss}	1.80	W DC	Pdiss max
Frequency, $f_{10°C}$	55.50046	GHz	Table IIIB
RF Output Power, $P_{10°C}$	13.3	dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1			
Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	177	mA	Table IIIB
Frequency, f_{meas}	55.50045	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	55.50045	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.01	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.01	MHz
Δf_T at 10.0 VDC (=$f_{10°C} - f_{Tnom}$)	=	+0.04	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC (=$P_{10°C} - P_{Tnom}$)	=	0	dB

Accept ✓ Reject _____

Test Performed by SB Date 6-19-98
Litton Q.A. LITTON Date JUN 30 1998

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AK/A AESD 1336610- 8
SERIAL NUMBER: 85078 QUAL TEST N/A ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power, P_{diss}	1.79	W DC	Pdiss max
Frequency, f_{Tmin}	55.50030	GHz	Table IIIB
RF Output Power, P_{Tmin}	13.3	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	176	mA	Table IIIB
Frequency, f_{meas}	55.50027	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	177	mA	Table IIIB
Frequency, f_{meas}	55.50026	GHz	Table IIIB
RF Output Power, P_{meas}	13.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.03	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.04	MHz
Δf_T at 10.0 VDC (=f_{Tmin} -f_{Tnom})		-0.12	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	~~0~~	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	~~0~~	dB
ΔP_T at 10.0 VDC (=P_{Tmin} -P_{Tnom})	=	~~0~~	dB

Accept ✓ Reject _____

Test Performed by _____ Date 6-19-98
Litton Q.A. _____ Date JUN 30 1998

LITTON

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 40 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AK/A AESD 1336610- 8
SERIAL NUMBER: 85028 QUAL TEST N/A ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power, P_{diss}	1.82	W DC	Pdiss max
Frequency, $f_{30°C}$	55.50058	GHz	Table IIIB
RF Output Power, $P_{30°C}$	13.2	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	180	mA	Table IIIB
Frequency, f_{meas}	55.50048	GHz	Table IIIB
RF Output Power, P_{meas}	13.2	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	180	mA	Table IIIB
Frequency, f_{meas}	55.50048	GHz	Table IIIB
RF Output Power, P_{meas}	13.2	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.02	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.02	MHz
Δf_T at 10.0 VDC ($=f_{30°C} - f_{Tnom}$)	=	0.08	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at _____	VDC =	0	dB
ΔP_V at 10.5 VDC or at _____	VDC =	0	dB
ΔP_T at 10.0 VDC ($=P_{30°C} - P_{Tnom}$)	=	-0.1	dB

Accept ✓ Reject _____

Test Performed by SB Date 6-19-98
Litton Q.A. LITTON Date JUN 30 1998

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AK/A AESD 1336610- 8
SERIAL NUMBER: 85078 QUAL TEST N/A ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power, P_{diss}	1.82	W DC	Pdiss max
Frequency, f_{Tmax}	55.50035	GHz	Table IIIB
RF Output Power, P_{Tmax}	13.1	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	181	mA	Table IIIB
Frequency, f_{meas}	55.50034	GHz	Table IIIB
RF Output Power, P_{meas}	13.1	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	181	mA	Table IIIB
Frequency, f_{meas}	55.50032	GHz	Table IIIB
RF Output Power, P_{meas}	13.1	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	-0.01	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.03	MHz
Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$)	=	-0.07	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	0	dB
ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$)	=	-0.2	dB

Accept ✓ Reject _____

Test Performed by [signature] LITTON Date 6-19-98
Litton Q.A. _____ Date JUN 30 1998

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AK/A AESD 1336610-✓8
SERIAL NUMBER: 85078 QUAL TEST N/A ACCEPT TEST _____

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power	1.82	W DC	Pdiss max
Frequency (f_{Tnom})	55.50064	GHz	Table IIIB
RF Output Power	13.2	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	.64	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power	1.82	W DC	Pdiss max
Frequency	55.50062	GHz	Table IIIB
RF Output Power	13.2	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	181	mA	Table IIIB
Input Power	1.81	W DC	Pdiss max
Frequency	55.50058	GHz	Table IIIB
RF Output Power	13.3	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	181	mA	Table IIIB
Input Power	1.81	W DC	Pdiss max
Frequency, f_{Tnom}	55.50055	GHz	Table IIIB
RF Output Power	13.3	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	.55	MHz	

Accept ✓ Reject _____
Test Performed by _____ Date 6-19-98
Litton Q.A. _____ Date JUN 30 1998

LITTON

TEST DATA SHEET 7.8
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

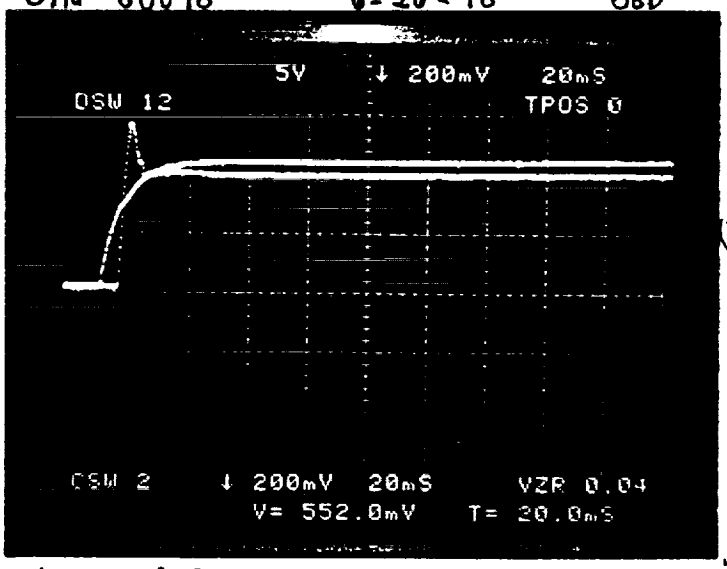
LITTON TYPE LS E 9036AK/A AESD 1336610- 8
SERIAL NUMBER: 85078 QUAL TEST N/A ACCEPT TEST ✓

Maximum Instantaneous Current, Ref. Test Para. 5.3

SPECIFICATION	MEASUREMENT AT Tnom ±1°C	LIMIT
Temperature:	22 °C	Tnom ± 1°C
Input Voltage:	10 VDC	10.0 ± 0.2 VDC
Maximum Instantaneous Current:	JED ~~182~~ 276 mA	Table IIIB

Attach photograph

S/N 85078 6-26-98 JED



MAXIMUM INT. CURRENT = 276 mA

Accept ✓ Reject _____

Tested by JED Date 6-26-98

Litton Q.A. LITTON Date JUN 30 1998

TEST DATA SHEET 7.9
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AK/A AESD 1336610- 8
SERIAL NUMBER: 85078 QUAL TEST N/A ACCEPT TEST ✓

Start up at Survival Temperature Extremes, Ref. Test Para. 5.4

Turn-On Characteristics at -30° ± 1°C
Ref. Test Para. 5.4.3

Temp °C	Vop VDC	Iop mA	Freq. GHz	Pout dBm
-30	10	176	55.50115	13.2

Turn-On Characteristics at +60° ± 1°C
Ref. Test Para. 5.4.5

Temp °C	Vop VDC	Iop mA	Freq. GHz	Pout dBm
60	10	183	55.50092	12.9

Test Performed by SB Date 6-19-98

itton Q.A. LITTON M.60 Date JUN 3 0 1998

TEST DATA SHEET 7.10
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E9036 AK/A AESD 1336610-8
SERIAL NUMBER: 85078 QUAL TEST N/A ACCEPT TEST ✓

Spurious Outputs: Ref. Test Para. 5.5.2

TEST DESCRIPTION			LIMITS
Temperature	22 °C		Tnom ± 1°C
Spurious Outputs Peaks observed:	YES	✓	NO
Value of peaks observed, if any:	None		-90 dBc min

Attach Spurious Signals plots from Spectrum Analyzer.

Accept ✓ Reject

Test Performed by JED Date 6-26-98

Litton Q.A. Date JUN 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 46 OF 68
56348	A	1300823	B3	

SPURR

25078

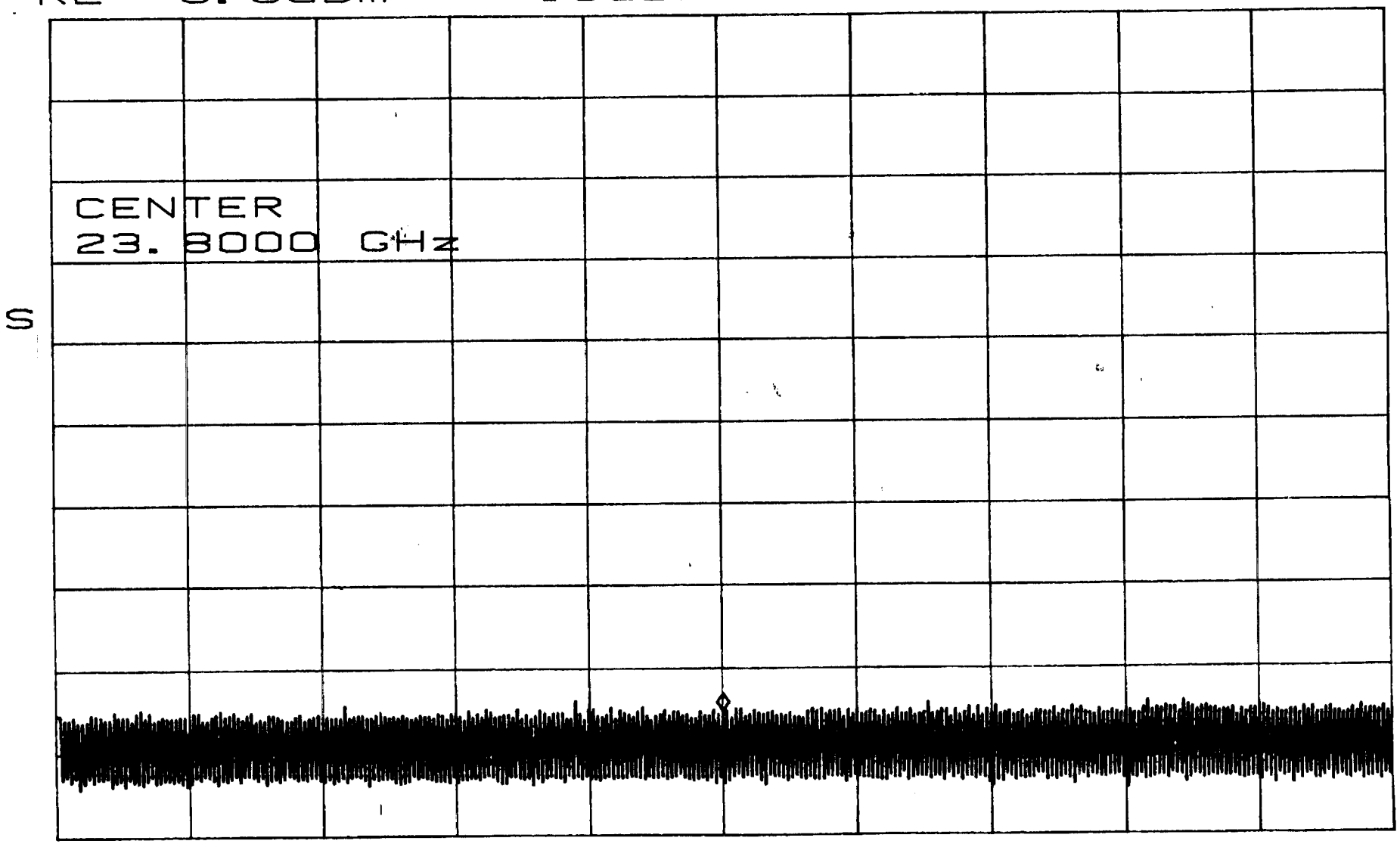
6-27-98 JED

CL 21.0dB

RL -9.0dBm 10dB/

MKR -94.00dBm

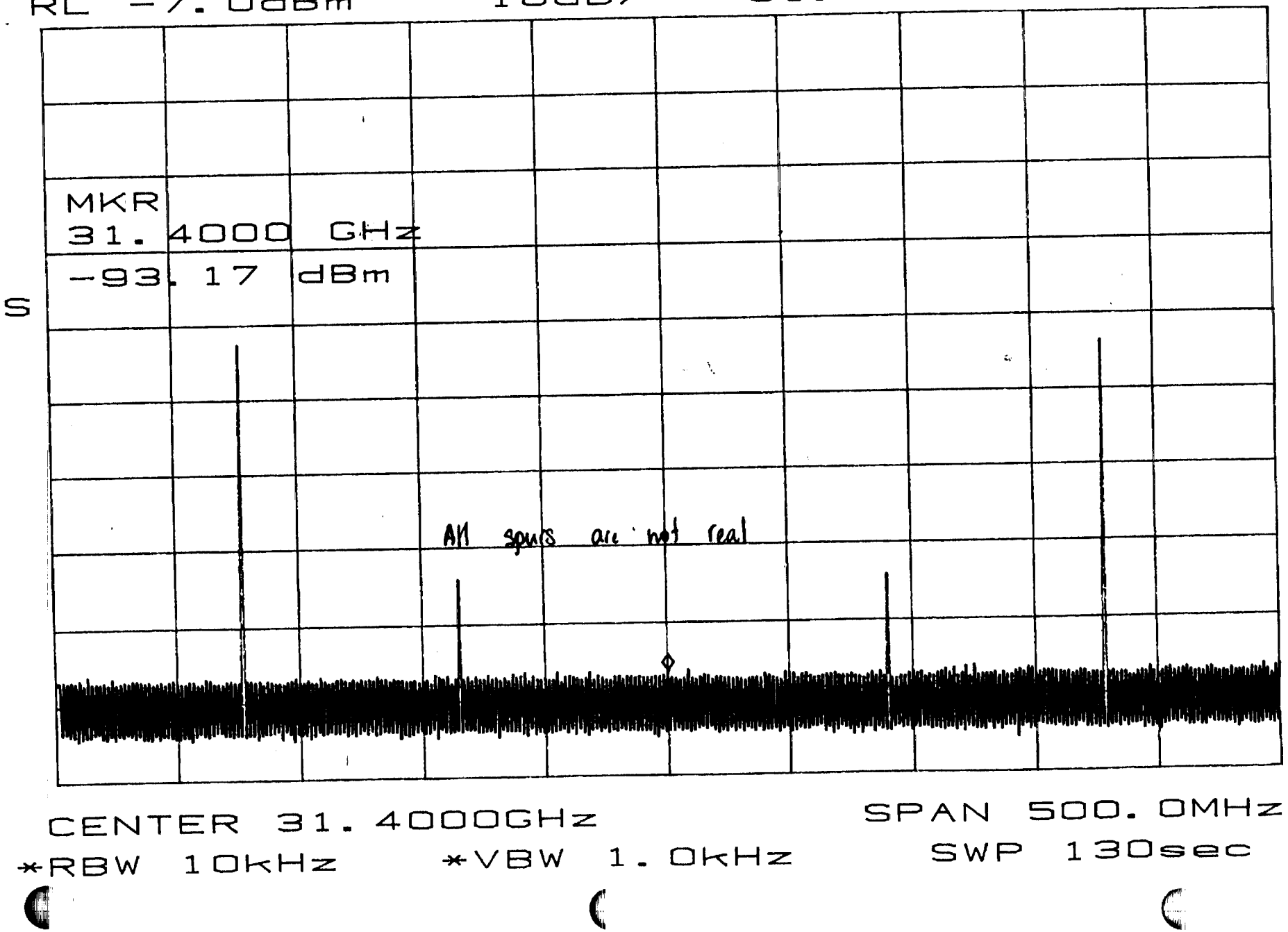
23.8000GHz



CENTER 23.8000GHz SPAN 250.0MHz

*RBW 10kHz *VBW 1.0kHz SWP 63.0sec

22"
5078
6-27-98 JED



VC,

85078

6-26-98 JCD

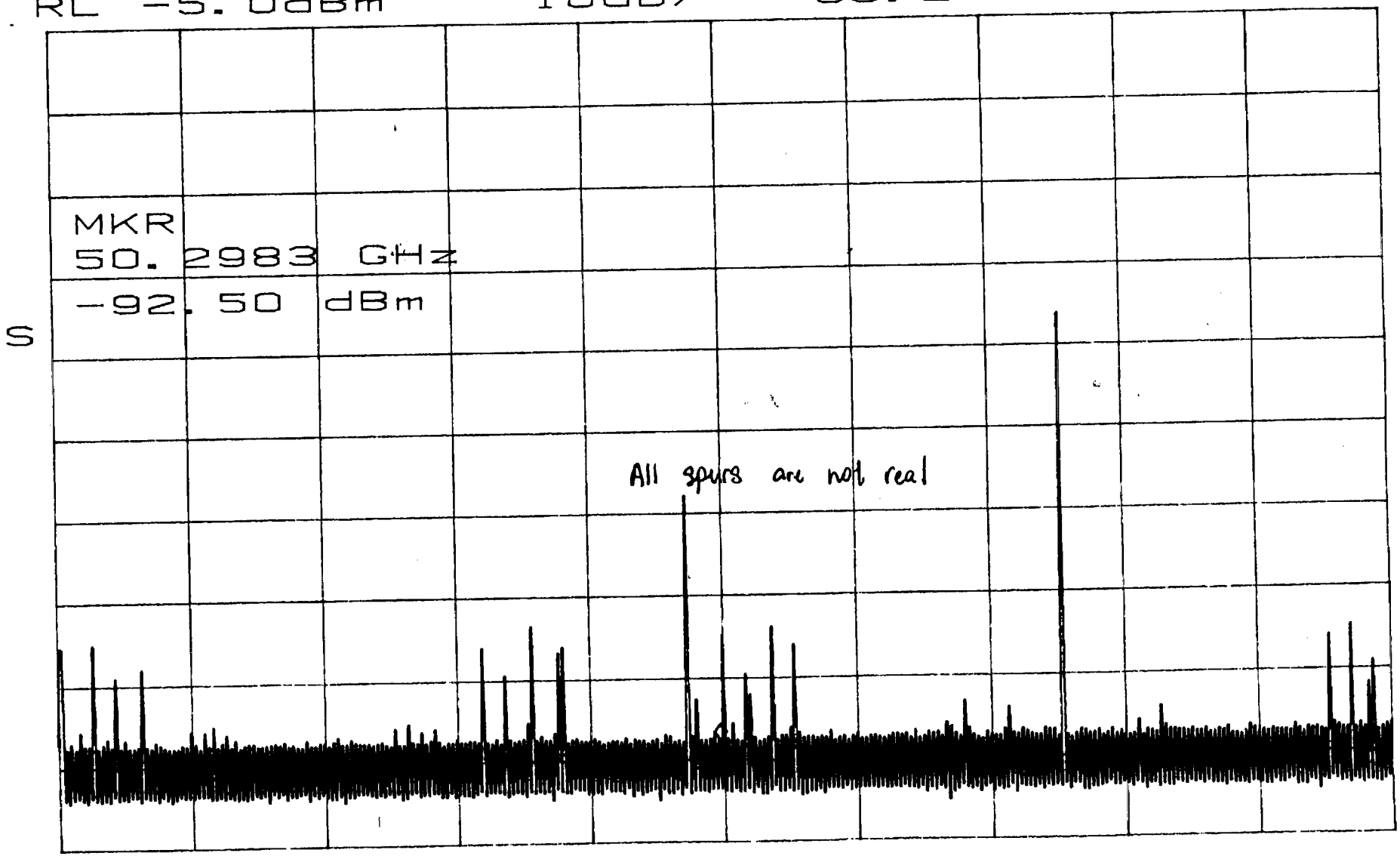
SPURII

CL 25.0dB

RL -5.0dBm 10dB/

MKR -92.50dBm

50.2983GHz



CENTER 50.3000GHz

SPAN 500.0MHz

*RBW 10kHz *VBW 1.0kHz

SWP 130sec

2nde

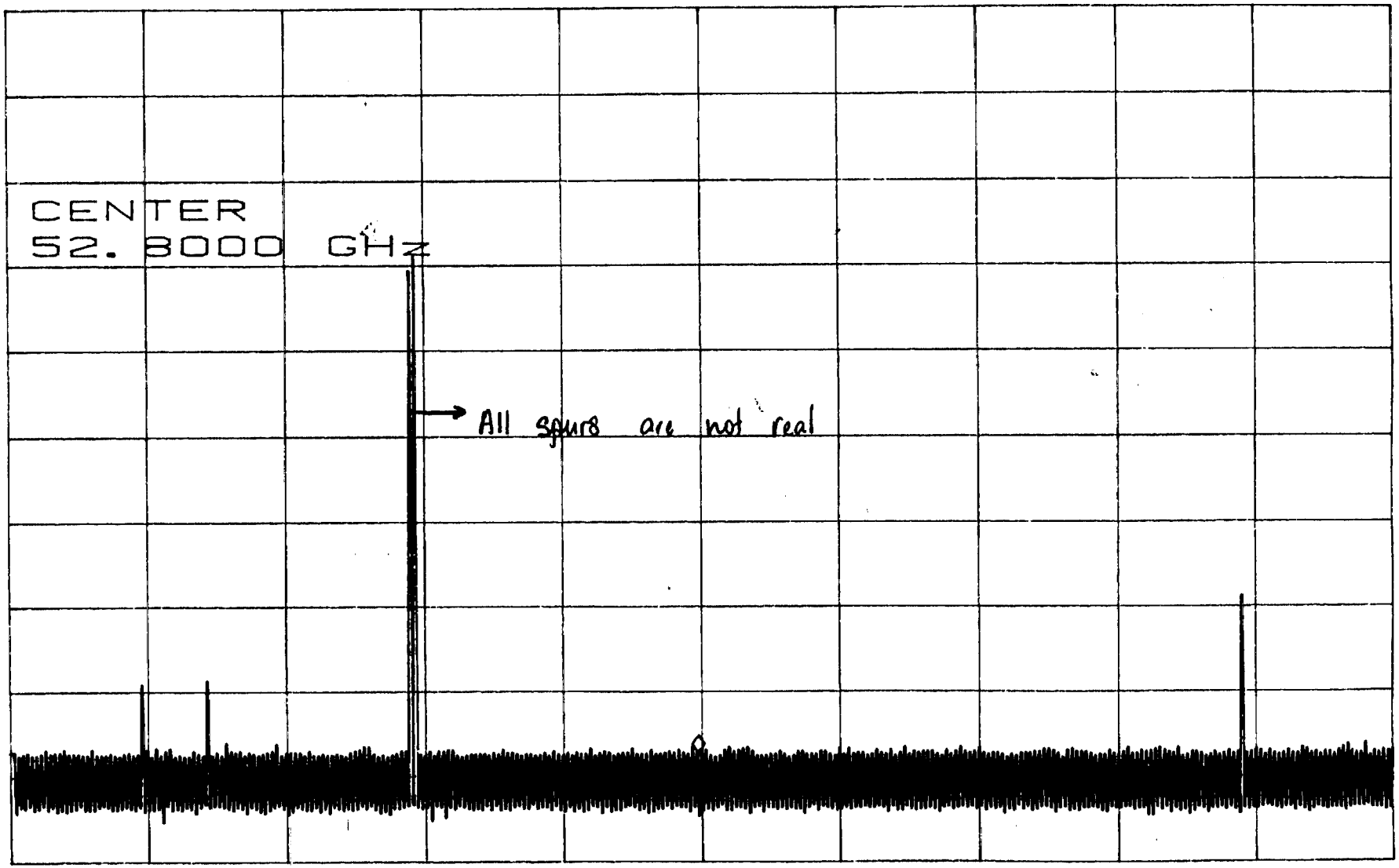
85078

6-24-98 JED

SPUR^

CL 25.0dB MKR -92.17dBm

RL -5.0dBm 10dB/ 52.7983GHz



CENTER 52.8000GHz SPAN 500.0MHz

*RBW 10kHz *VBW 1.0kHz SWP 130sec

SPURIA

5078

6-26-98 JED

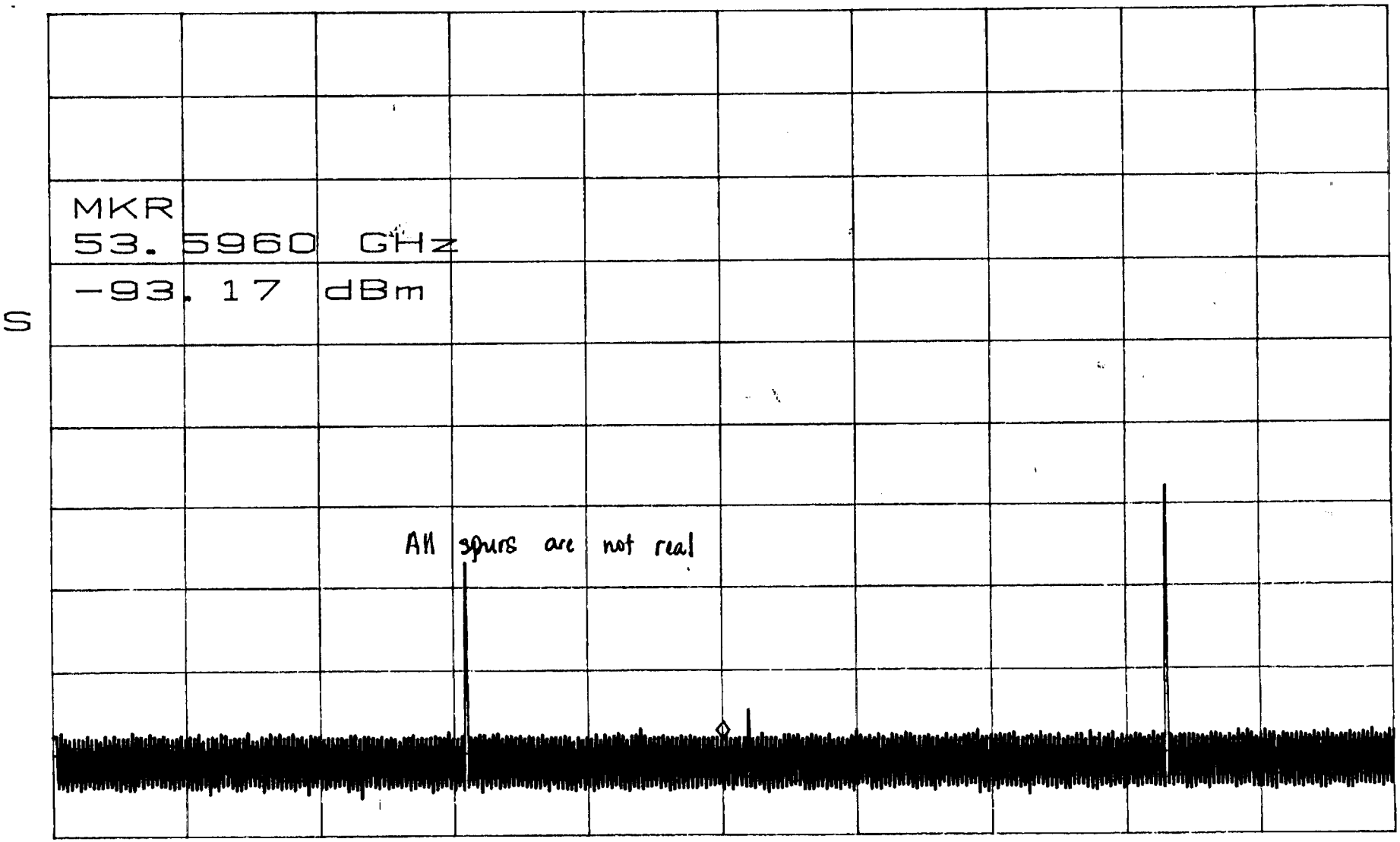
CL 25.0dB

RL -5.0dBm

10dB/

MKR -93.17dBm

53.5960GHz



CENTER 53.5960GHz

SPAN 500.0MHz

*RBW 10kHz

*VBW 1.0kHz

SWP 130sec

22°C

85078

6-26-98 JED

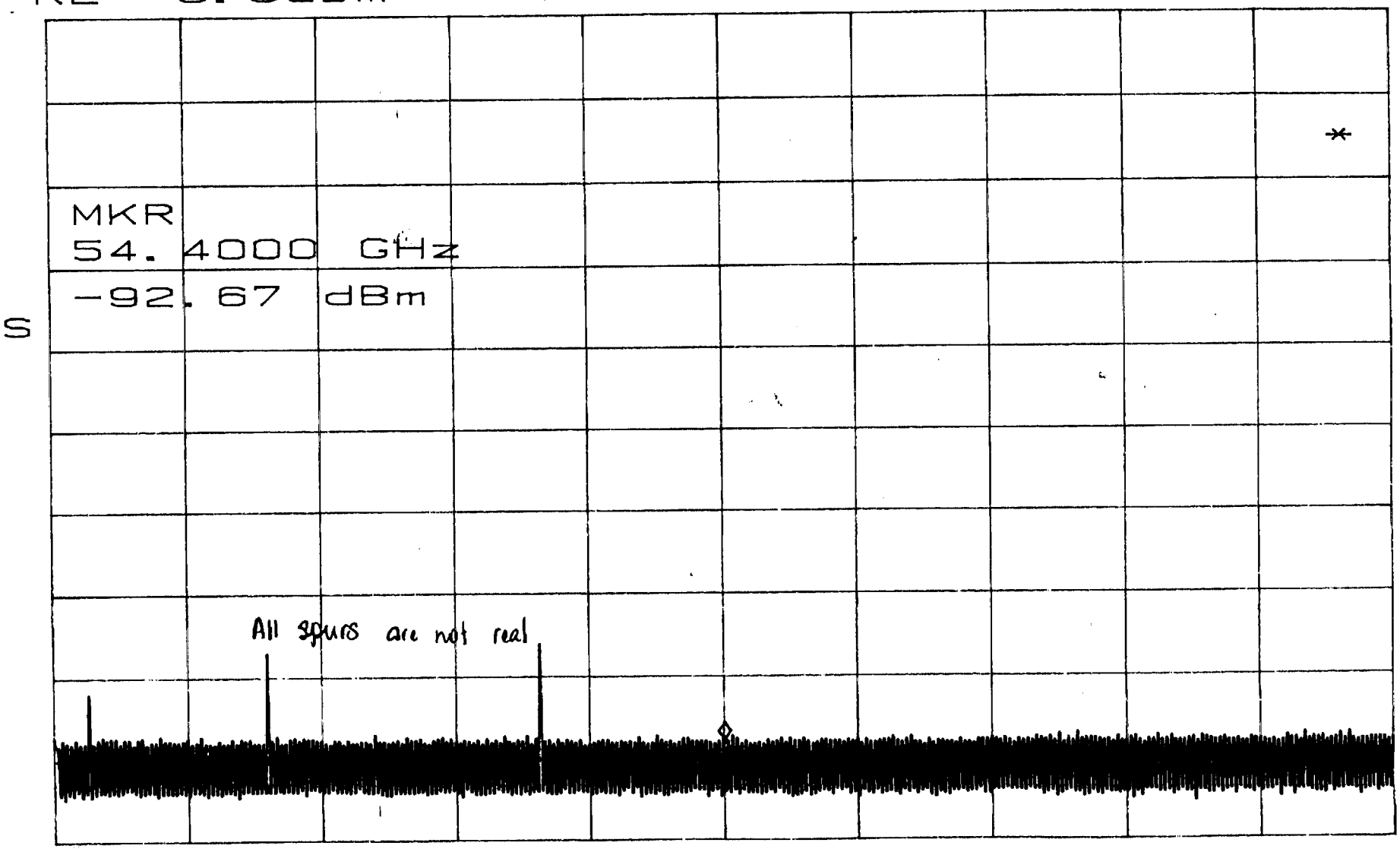
SPUR

CL 25.0dB

RL -5.0dBm 10dB/

MKR -92.67dBm

54.4000GHz



CENTER 54.4000GHz

SPAN 500.0MHz

*RBW 10kHz *VBW 1.0kHz SWP 130sec

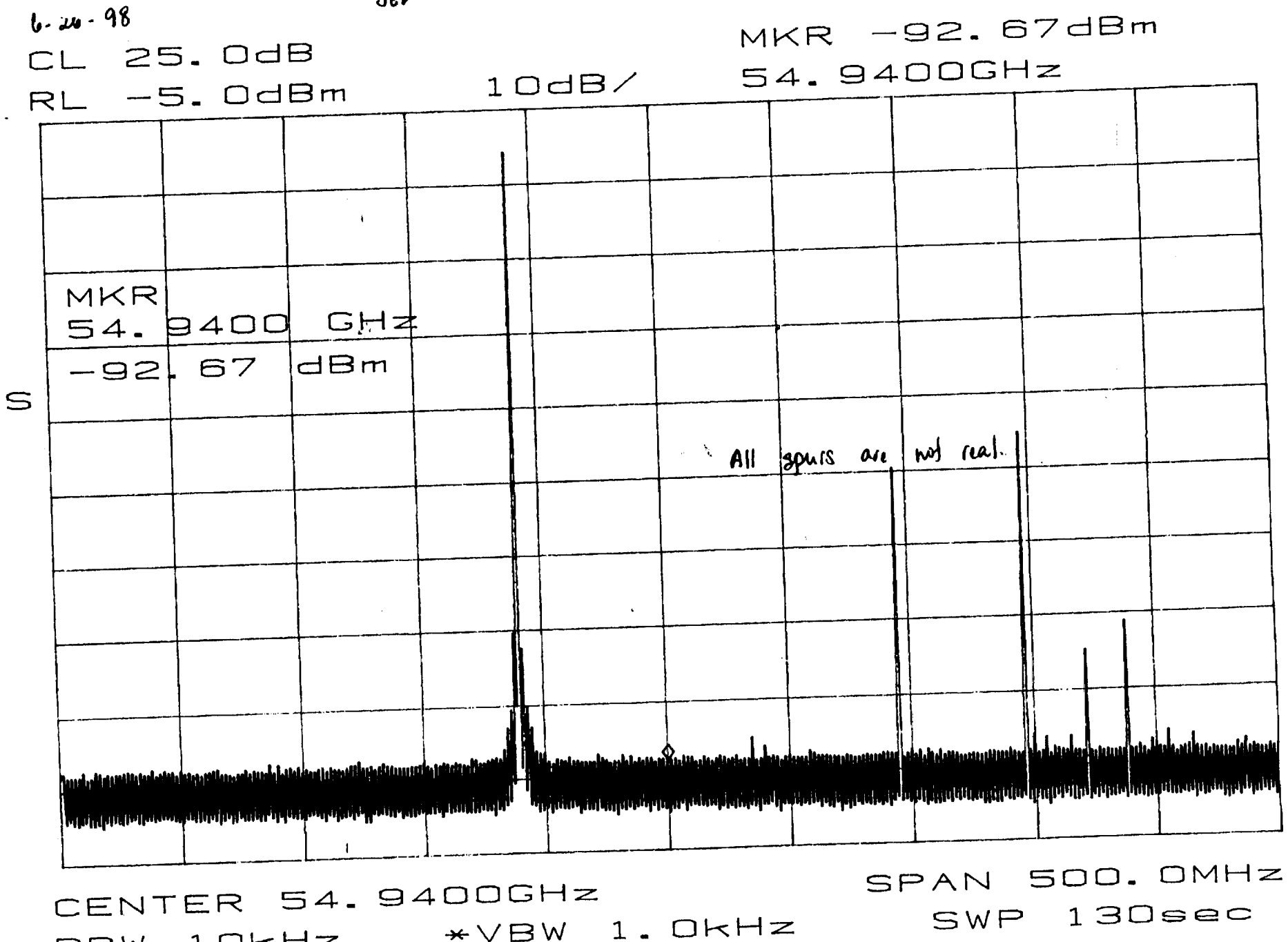
SPURI

c

5078

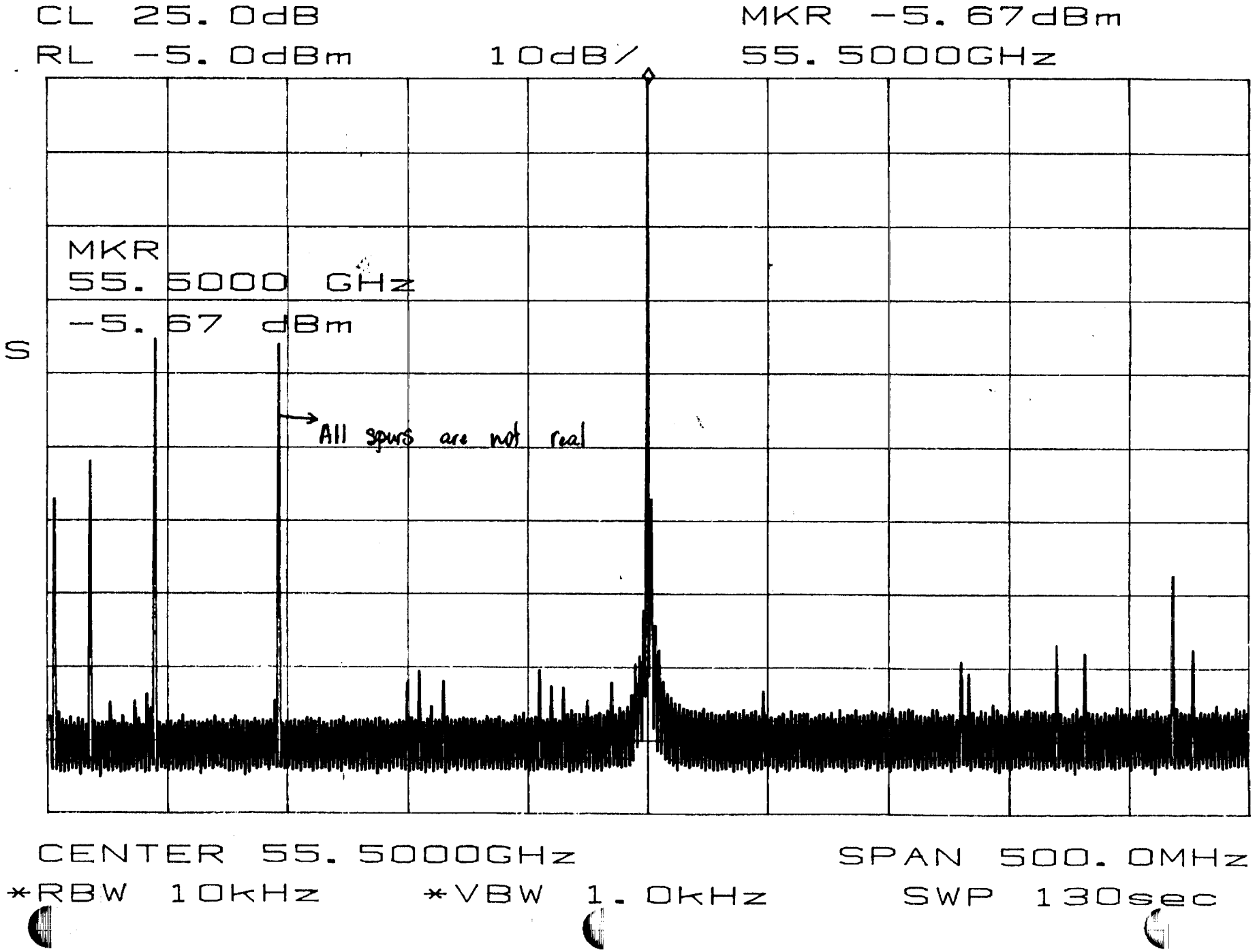
JED

6-26-98



SPURIOUS

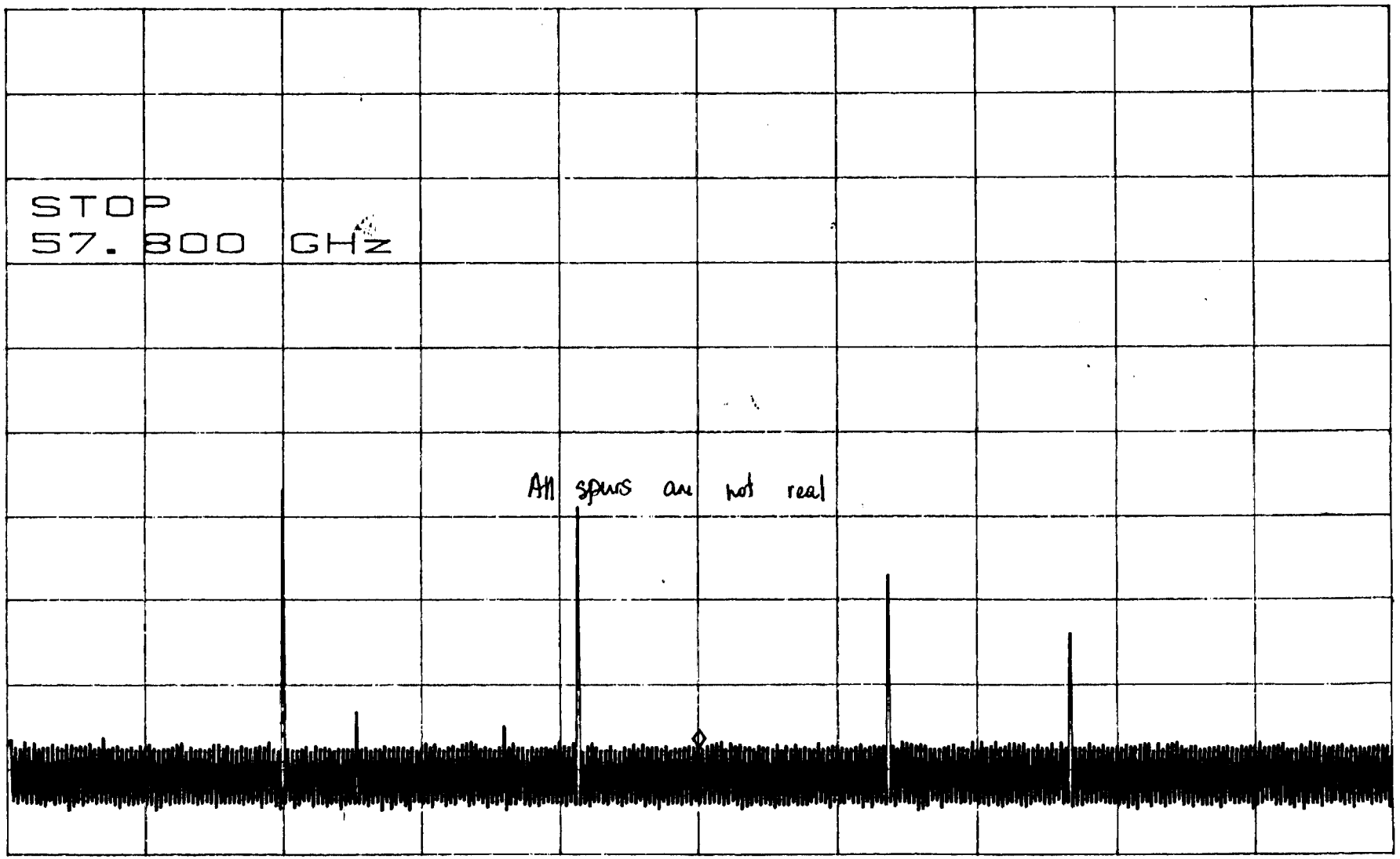
S/N 85078
6-26-98 JED



SPURIO

o. 65078
6-26-98 JGD

CL 25.0dB MKR -92.33dBm
RL -5.0dBm 10dB/ 57.300GHz



S

START 56.800GHz STOP 57.800GHz
*RBW 10kHz *VBW 1.0kHz SWP 250sec

2

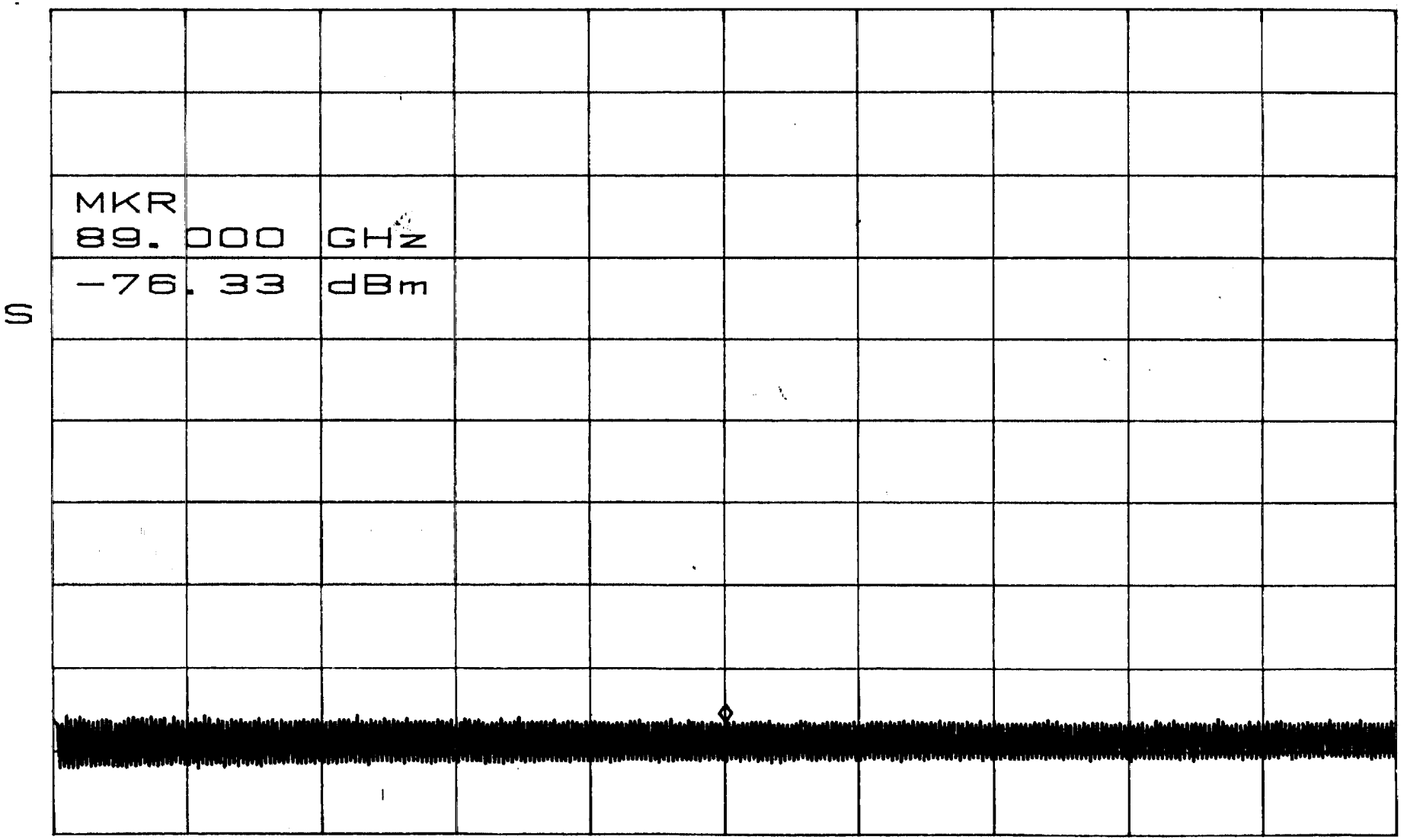
SPUR10

o.. 85078

6-22-98 JED

CL 40.0dB MKR −76.33dBm

RL 10.0dBm 10dB/ 89.000GHz



S

START 87.000GHz STOP 91.000GHz

*RBW 10kHz *VBW 1.0kHz SWP 1.0ksec

TEST DATA SHEET 7.13
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

.ITTON TYPE LS E 9036 AK/A
SERIAL NUMBER: 85078 QUAL TEST N/A
AESD 1336610- 8
ACCEPT TEST ✓

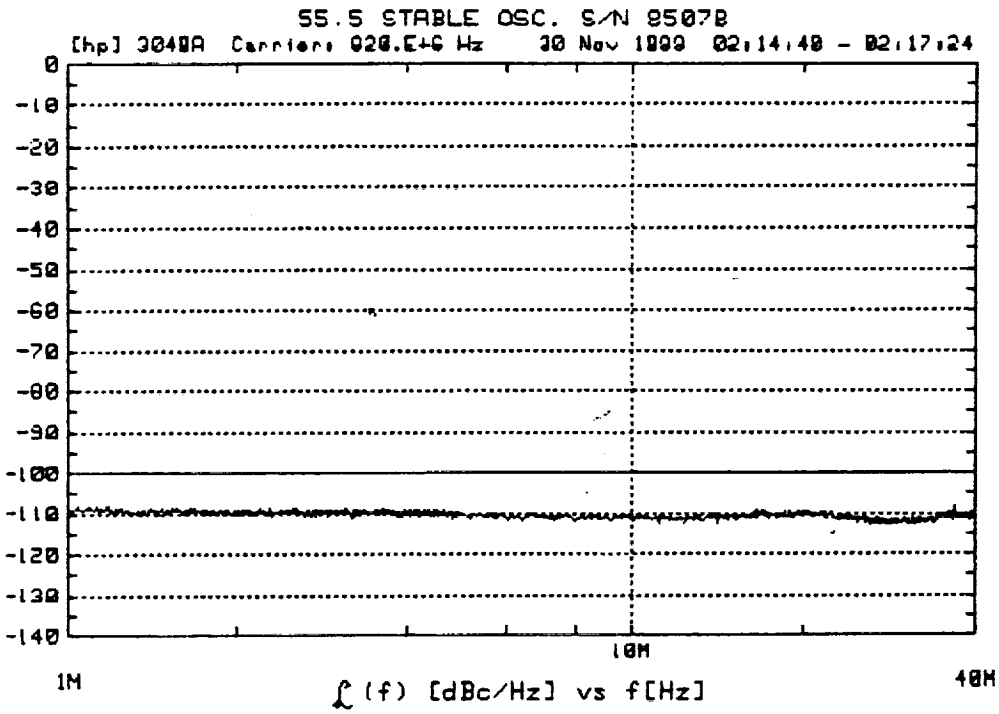
FM Noise: Ref. Test Para. 5.6.1

TEST DESCRIPTION			LIMITS
FM noise (Attach plot):			
Temperature		22 °C	Tnom ± 1°C
Measured	=	<-108 dBc/Hz 1 MHz to 40 MHz	-100 dBc/Hz max.
Measured	=	<-132 dBc/Hz 40 MHz to 400 MHz	-100 dBc/Hz max.

Accept ✓ Reject _____

Performed by JED Date 6-29-98

.tton Q.A. LITTON QA Date JUN 30 1998



6.26.98 JED

FM NOISE

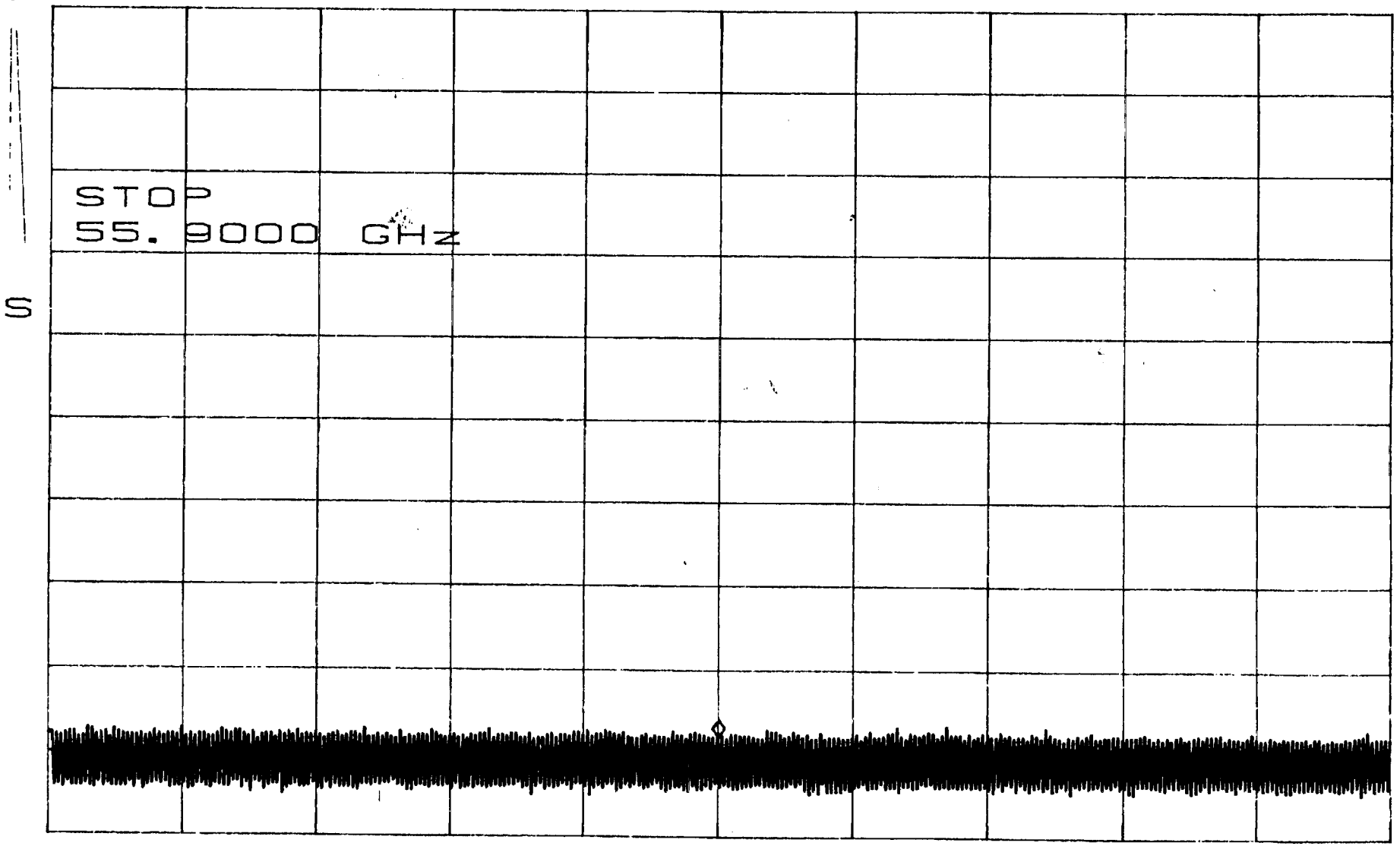
85078

FM NOISE 40 MHz → 400 MHz)

6-26-98 JGD

CL 25.0dB MKR -92.83dBm

RL -5.0dBm 10dB/ 55.7200GHz



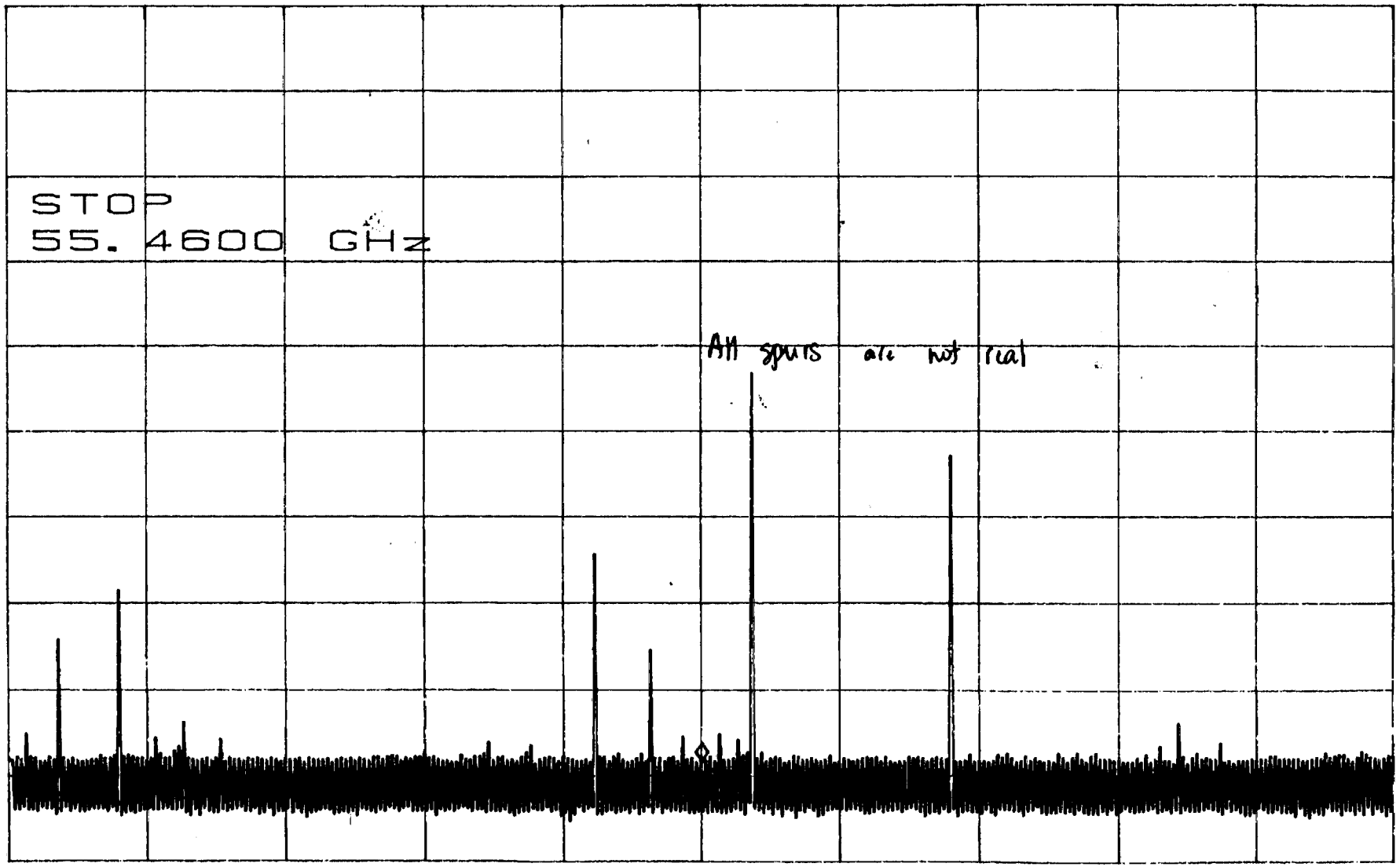
START 55.5400GHz STOP 55.9000GHz

*RBW 10kHz *VBW 1.0kHz SWP 90.0sec

FM NOISE (100 MHz → - 40 MHz)

S/N 85078
6-26-98 JGD

CL 25.0dB MKR -93.17dBm
RL -5.0dBm 10dB/ 55.2800GHz



S

START 55.1000GHz STOP 55.4600GHz
*RBW 10kHz *VBW 1.0kHz SWP 90.0sec

TEST DATA SHEET 7.16
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

TON TYPE LS E 9036 AK/A
IAL NUMBER: 85078 QUAL TEST N/A

AESD 1336610-8
ACCEPT TEST ✓

Noise: Ref. Test Para. 5.6.2

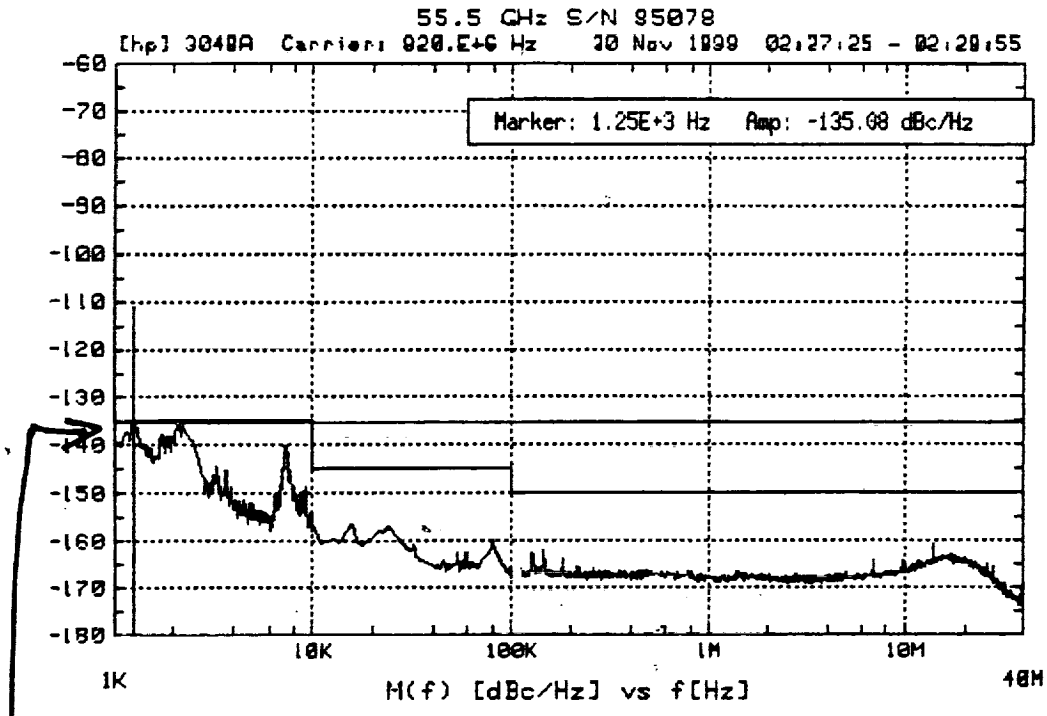
T DESCRIPTION		LIMITS
noise (Attach plot):		
iperature	22 °C	Tnom ± 1°C
asured =	< -135 dBc/Hz 1 kHz to 10 kHz	-135 dBc/Hz max.
asured =	< -155 dBc/Hz 10 kHz to 100 kHz	-145 dBc/Hz max.
asured =	< -163 dBc/Hz at 100 kHz to 40 MHz	-150 dBc/Hz max.
Power Input, Mixer (Nominal), P_{mixer}	7 dBm	0 to 7 dBm
Voltage, Termination (Nominal), $V_{carrier}$	0.076 V	
Voltage, Termination (attn -.5dB), $V_{-.5dB}$	0.082 V	
Voltage, Termination (attn +.5dB), $V_{+.5dB}$	0.069 V	
lculate mixer carrier power, $P_{carrier} = V^2_{carrier} / 50$: $P_{carrier}$ =	-9.4 dBm	
lculate -.5dB carrier power, $P_{-.5dB} = V^2_{-.5dB} / 50$: $P_{-.5dB}$ =	-8.7 dB	
lculate +.5dB carrier power, $P_{+.5dB} = V^2_{+.5dB} / 50$: $P_{+.5dB}$ =	-10.2 dBm	
.lculate Mixer Transfer Correction Factor, $CF_{mixer} = P_{-.5dB} - P_{+.5dB} - 1$ dB : CF_{mixer} =	-0.4 dB	
)ise (spectrum analyzer), Lmeas	-104 dB	
)tal Gain, LNA, G_{LNA}	64 dB	
ılculate Noise of UUT, $L_f = L_{meas} - P_{carrier} - G_{LNA} - CF_{mixer}$: L_f =	-158.2 dBc/Hz at 40 MHz to 400 MHz	-150 dBc/Hz max

Accept ✓ Reject _____

est F ormed by JED Date 6-29-98

itton Q.A. _____ Date JUN 3 0 1998

ODE IDENT NO.	SIZE	NUMBER	REV	SHEET 52 OF 68
56348	A	1300823	B3	



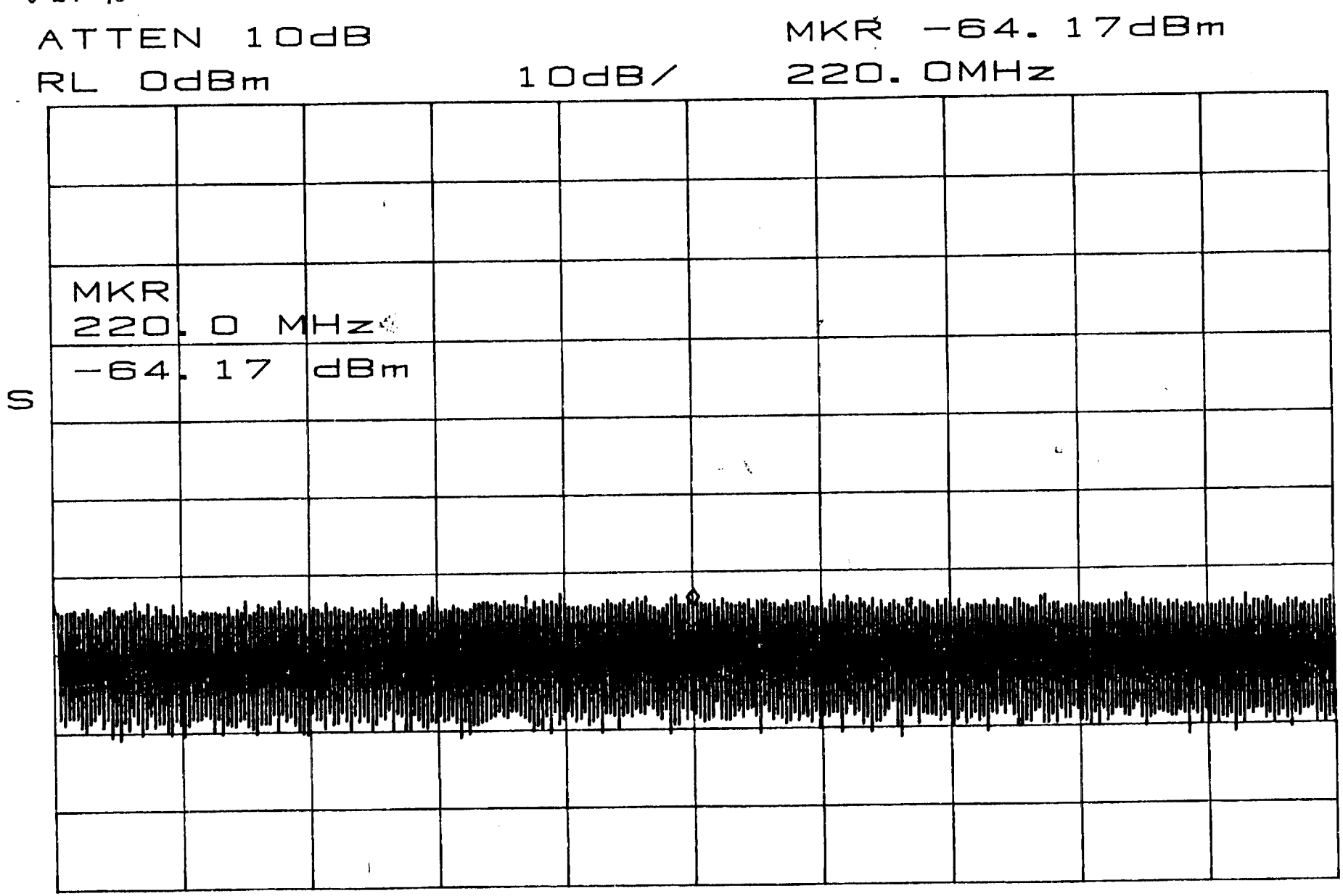
6.26.98 JGD AM NOISE

SYSTEM NOISE
NOT STAB. OSC.
DW 6/26/98

AM N0188 (40 MHz → 400 MHz)

D78

6-2-98 JED



TEST DATA SHEET 7.19
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E9036AK/A AESD 1336610-8
SERIAL NUMBER: 85078 QUAL TEST N/A ACCEPT TEST ✓

Harmonics Tests: Ref. Test Para. 5.7

TEST DESCRIPTION		LIMITS
Temperature	22 °C	Tnom ± 1°C
Frequency, per 5.7.1	5550042 GHz	Table IIIB
RF Output Power, per 5.7.1	13.3 dBm	12 to 17 dBm
Harmonics:		
Level of second Harmonic	-77 dBm	
Difference (2nd Harmonic)	-90 dB	-30 dBc min
Subharmonics:		
Level of Subharmonic	-96 dBm	
Difference (Subharmonic)	-109 dB	-90 dBc min

Accept ✓ Reject _____

Test Performed by JED Date 6-27-98

Litton Q.A. LITTON W 98 Date JUN 30 1998

°C

85078

JED

2ND HARMONIC

6-27-98

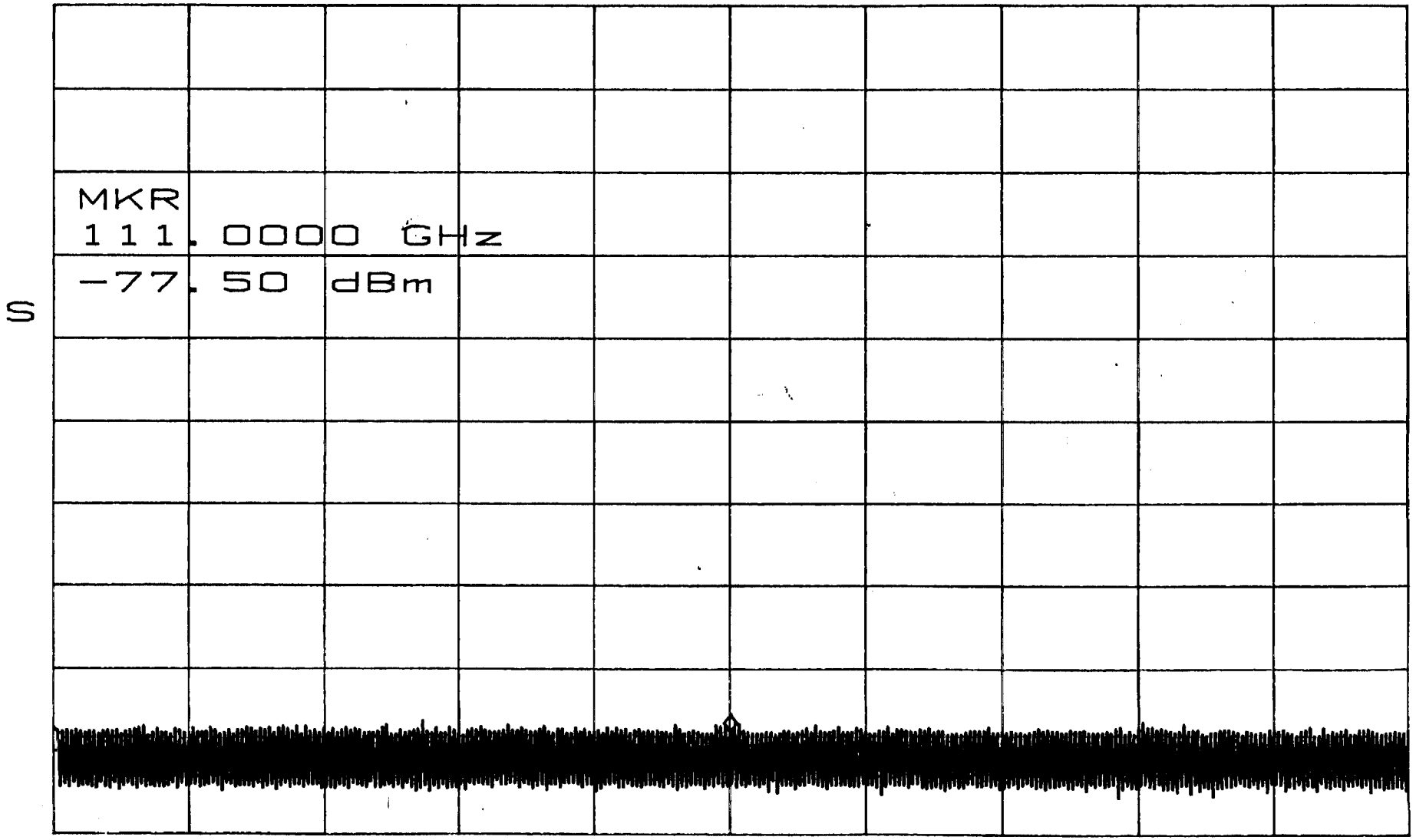
CL 40.0dB

MKR -77.50dBm

RL 10.0dBm

10dB/

111.0000GHz



CENTER 111.0000GHz

SPAN 500.0MHz

*RBW 10kHz

*VBW 1.0kHz

SWP 130sec

S/N 850018

6- 98 JED

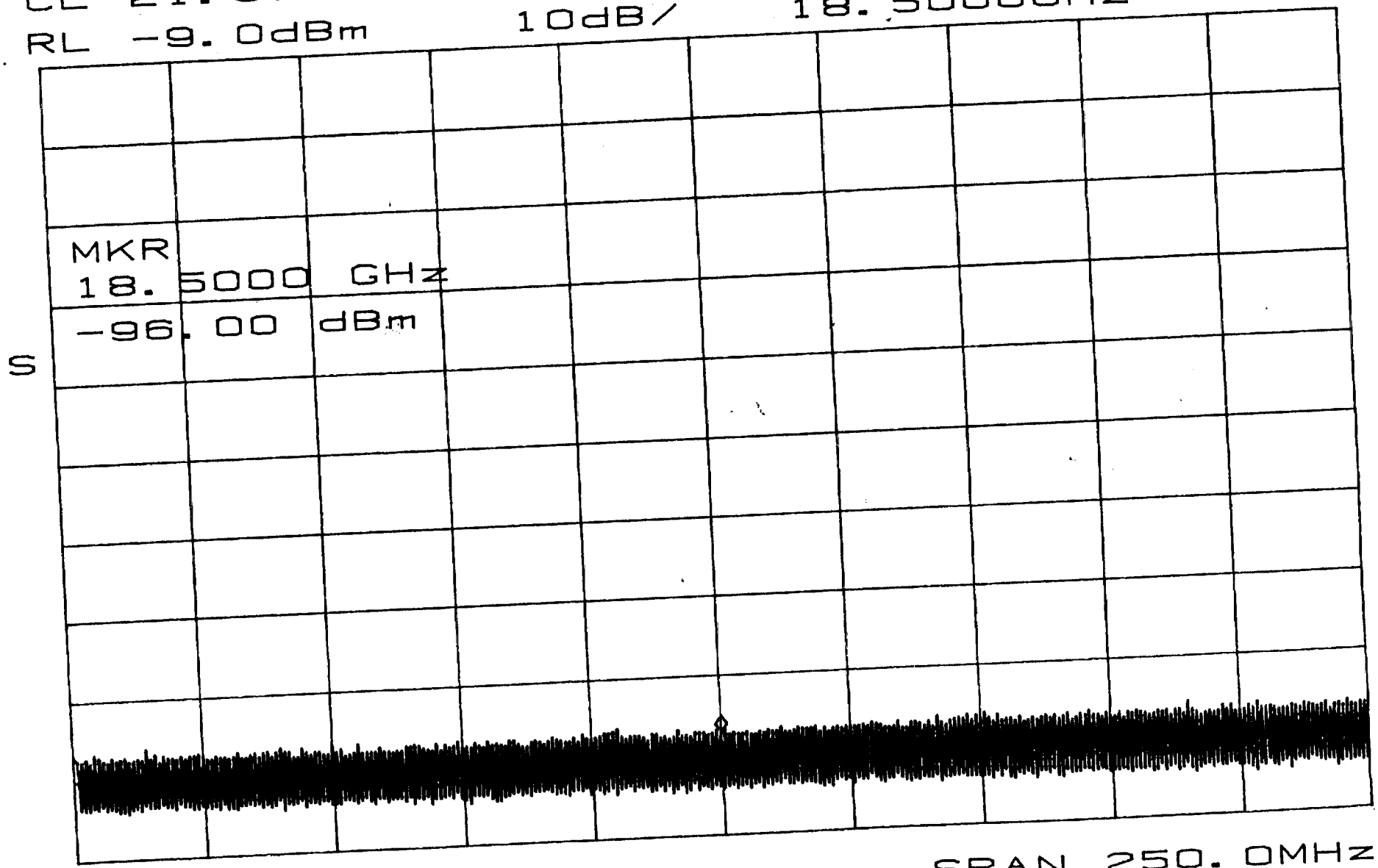
CL 21.0dB

RL -9.0dBm

10dB/

MKR -96.00dBm

18.5000GHz



CENTER 18.5000GHz

SPAN 250.0MHz

*RBW 10kHz

*VBW 1.0kHz

SWP 63.0sec

LITTON
Solid State

TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AK/A
SERIAL NUMBER: 85078 QUAL TEST N/A

AESD 1336610-8
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION		LIMITS
1. Initial Performance at Tnom ± 1°C		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{Tnom}	55.50069 GHz	Table IIIB
RF Output Power, P_{Tnom}	13.2 dBm	12 to 17 dBm
Input Voltage, V_B	10 VDC	10 ± 0.2 VDC
Input Current, I_B	182 mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.69 MHz	
2. Performance at Tnom ± 1°C after +60°C soak.		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{meas}	55499801 GHz	Table IIIB
RF Output Power, P_{meas}	13.2 dBm	12 to 17 dBm
Input Voltage	10 VDC	V_B ± .005 VDC
Input Current	184 mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{meas}	55.50068 GHz	Table IIIB
RF Output Power, P_{meas}	13.3 dBm	12 to 17 dBm
Input Voltage	10 VDC	V_B ± .005 VDC
Input Current	181 mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = -0.89 MHz
Δf_H after -30°C soak = -0.01 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = 0 dB
ΔP_H = after -30°C soak = 0.1 dB

Accept ✓ Reject ____

Performed by JED 09 Vi NQALIT Date 6-26-98
Litton Q.A. ____ Date JUN 3 0 1998

TEST DATA SHEET 7.22B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036AK/A
SERIAL NUMBER: 85078 QUAL TEST N/A

AESD 1336610-8
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION		LIMITS
4. Performance at Tnom ± 1°C at Ambient Pressure		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{meas}	5550026 GHz	Table IIIB
RF Output Power, P_{meas}	13.2 dBm	12 to 17 dBm
Input Voltage, V_B	10.0 VDC	V_B ± .0005 VDC
Input Current	182 mA	Table IIIB

Calculate frequency variation, $\Delta f_p = f_{meas} - f_{Tnom}$:

Δf_p = -0.43 MHz

Calculate RF output power variation, $\Delta P_p = P_{meas} - P_{Tnom}$:

ΔP_p = 0 dB

Accept ✓ Reject _____

Test Performed by JED Date 6-27-98

Litton Q.A. LITTON 09 FEB 1999 Date JUN 30 1998

LITTON
Solid State

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AK/A
SERIAL NUMBER: 85078 QUAL TEST N/A

AESD 1336610- 8
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Initial Measurement. Ref Test Par. 5.9.1			
Temperature	22	°C	24°C ± 5°C
Frequency	5550046	GHz	Table IIIB
RF Output Power	13.2	dBm	12 to 17 dBm
Input Voltage	10.0	VDC	10 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Reference test. Ref. Test Para. 5.9.3			
Frequency, f_{Ref}	5550007	GHz	Table IIIB
RF Output Power, P_{Ref}	-1.7	dBm	
Load Pulling Test. Ref. Test Para. 5.9.4			
Maximum Frequency, f_{meas}	5550008	GHz	Table IIIB
Minimum Frequency, f_{meas}	5550006	GHz	Table IIIB
Maximum RF Output Power P_{meas}	-1.2	dBm	
Minimum RF Output Power, P_{meas}	-2.1	dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation, $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = 0.01 MHz
Maximum Negative Δf_L = -0.01 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation, $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = 0.5 dB
Maximum Negative ΔP_L = -0.4 dB

Accept ✓ Reject _____

Test Performed by JED Date 6-27-98
Litton Q.A. 09:14 NOLLIT Date JUN 30 1998

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AK/A
SERIAL NUMBER: R5078 QUAL TEST N/A
AESD 1336610- 8
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Output Open and Short. Ref. Test Para. 5.9.5		
Temperature	22 °C	24°C ± 5°C
Frequency:	555007 GHz	Table IIIB
RF Output Power:	13.3 dBm	12 to 17 dBm
Input Voltage	10.0 VDC	10 ± 0.2 VDC
Input Current:	181 mA	Table IIIB
Results:	✓ Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.68 MHz (Positive)	Table IIIB
	-0.10 MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	0.12 MHz (Positive)	Table IIIB
	-1.01 MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.5 dB (Positive)	1.0 dB
	-0.7 dB (Negative)	-1.0 dB

Accept ✓ Reject _____

Test Performed by JED Date 6-29-98

Litton Q.A. 091 NOLLI Date JUN 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 61 OF 68
56348	A	1300823	B3	

APPENDIX B

Channel 5 LO

DRO (P/N: 1336610-5, S/N: 85036)

S/N: 85036 Was Replaced With DRO (P/N: 1336610-5, S/N: 85033) SEE APPENDIX-A

S/N: 85033 Was Replaced With Original DRO (P/N: 1336610-5, S/N: 85036) SEE APPENDIX-B

Channel 6 LO

DRO (P/N: 1336610-6, S/N: 85027)

LITTON
Solid State

TEST DATA SHEET 7.28
MECHANICAL MEASUREMENTS
FINAL DATA SET

LITTON TYPE LS E 9036 AG/A
SERIAL NUMBER: 85036 QUAL TEST N/A

AESD 1336610- 5
ACCEPT TEST ✓

Weight Ref. Test Para. 6.1.

SPECIFICATION	MEASUREMENT	LIMIT
Weight:	1 lb 4.203	1.5 pounds max.

Accept ✓ Reject _____

Inspection Performed By: _____ Date: JUL 30 1998

Litton Q.A. _____ Date: JUL 30 1998

Outline and Marking

Ref. Test Para. 6.2, Inspection to Outline drawing, Litton 1300316 B1

Accept ✓ Reject _____

Inspection Performed by: _____ Date: JUL 30 1998

Litton Q.A. _____ Date JUL 30 1998

ON
d State

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AG/A
SERIAL NUMBER: 85036 QUAL TEST N/A
AESD 1336610-5
ACCEPT TEST ✓

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	180 mA	Table IIIB
Input Power, P_{diss}	1.80 W DC	P_{diss} max
Frequency, f_{Tnom}	53.59646 GHz	Table IIIB
RF Output Power, P_{Tnom}	12.2 dBm	11.5 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.46 MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10 VDC	9.5 VDC or Para. 5.2.3.2
Input Current	178 mA	Table IIIB
Frequency, f_{meas}	53.59646 GHz	Table IIIB
RF Output Power, P_{meas}	12.2 dBm	11.5 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10 VDC	10.5 VDC or Para. 5.2.3.3
Input Current	179 mA	Table IIIB
Frequency, f_{meas}	53.59646 GHz	Table IIIB
RF Output Power, P_{meas}	12.2 dBm	11.5 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 VDC = ∅ MHz
Δf_V at 10.5 VDC or at 10.5 VDC = ∅ MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 VDC = ∅ dB
ΔP_V at 10.5 VDC or at 10.5 VDC = ∅ dB

Accept ✓ Reject ____

st Performed by VN Date 7-29-98
itton QA ____ Date JUL 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 38 OF 68
56348	A	1300823	C	

LITTON
Solid State

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A AESD 1336610- 5
SERIAL NUMBER: 85036 QUAL TEST N/A ACCEPT TEST ✓

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power, P_{diss}	1.80	W DC	Pdiss max
Frequency, $f_{10°C}$	53.59703	GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.2	dBm	11.5 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	177	mA	Table IIIB
Frequency, f_{meas}	53.59703	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	11.5 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	53.59702	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	11.5 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	Ø	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	-0.01	MHz
Δf_T at 10.0 VDC (=$f_{10°C} - f_{Tnom}$)	=	0.57	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	Ø	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	Ø	dB
ΔP_T at 10.0 VDC (=$P_{10°C} - P_{Tnom}$)	=	Ø	dB

Accept ✓ Reject _____

Test Performed by VV Date 7-29-98
Litton Q.A. LITTON Date JUL 30 1998

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A AESD 1336610- 5
SERIAL NUMBER: 85036 QUAL TEST N/A ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power, P_{diss}	1.79	W DC	Pdiss max
Frequency, f_{Tmin}	53.59783	GHz	Table IIIB
RF Output Power, P_{Tmin}	12.1	dBm	11.5 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	53.59783	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	11.5 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	53.59783	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	11.5 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	ϕ	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	ϕ	MHz
Δf_T at 10.0 VDC ($=f_{Tmin} - f_{Tnom}$)		1.37	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	ϕ	dB
ΔP_T at 10.0 VDC ($=P_{Tmin} - P_{Tnom}$)	=	-0.1	dB

Accept ✓ Reject

Test Performed by VN Date 7-29-98
Litton Q.A. LITTON M.E.D. Date JUL 30 1998

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AG/A AESD 1336610- 5
SERIAL NUMBER: 85036 QUAL TEST N/A ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power, P_{diss}	1.80	W DC	Pdiss max
Frequency, $f_{30°C}$	53.59624	GHz	Table IIIB
RF Output Power, $P_{30°C}$	12.2	dBm	11.5 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	53.59624	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	11.5 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	53.59624	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	11.5 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	∅	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	∅	MHz
Δf_T at 10.0 VDC (=$f_{30°C} - f_{Tnom}$)	=	-0.22	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	∅	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	∅	dB
ΔP_T at 10.0 VDC (=$P_{30°C} - P_{Tnom}$)	=	∅	dB

Accept ✓ Reject _____

Test Performed by VN Date 7-29-98
Litton Q.A. [signature] Date JUL 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 41 OF 68
56348	A	1300823	C	

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A
SERIAL NUMBER: 85036 QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	181	mA	Table IIIB
Input Power, P_{diss}	1.81	W DC	Pdiss max
Frequency, f_{Tmax}	53.59481	GHz	Table IIIB
RF Output Power, P_{Tmax}	12.1	dBm	11.5 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	53.59481	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	11.5 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	179	mA	Table IIIB
Frequency, f_{meas}	53.59481	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	11.5 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5	VDC =	ϕ	MHz
Δf_V at 10.5 VDC or at 10.5	VDC =	ϕ	MHz
Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$)	=	−1.65	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5	VDC =	ϕ	dB
ΔP_V at 10.5 VDC or at 10.5	VDC =	ϕ	dB
ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$)	=	−0.1	dB

Accept ✓ Reject _____

Test Performed by LN Date 7-29-98
Litton Q.A. LITTON Date JUL 30 1998

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A AESD 1336610- 5
SERIAL NUMBER: 85036 QUAL TEST N/A ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power	1.80	W DC	Pdiss max
Frequency (f_{Tnom})	53.59658	GHz	Table IIIB
RF Output Power	12.2	dBm	11.5 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	VN 0.58	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power	1.80	W DC	Pdiss max
Frequency	53.59649	GHz	Table IIIB
RF Output Power	12.2	dBm	11.5 to 17 dBm

ver Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power	1.80	W DC	Pdiss max
Frequency	53.59657	GHz	Table IIIB
RF Output Power	12.2	dBm	11.5 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power	1.80	W DC	Pdiss max
Frequency, f_{Tnom}	53.59657	GHz	Table IIIB
RF Output Power	12.2	dBm	11.5 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.43	MHz	

Test Performed by DM LITTON Accept ✓ Reject
Litton Q.A. M.C. Date 7-29-98
Date JUL 30 1998

TEST DATA SHEET 7.8
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

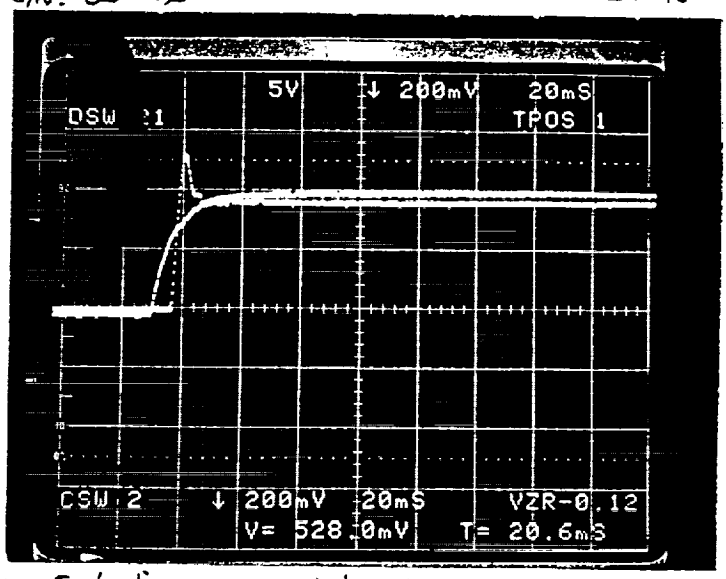
LITTON TYPE LS E 9036 AG/A
SERIAL NUMBER: 85036 QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Maximum Instantaneous Current, Ref. Test Para. 5.3

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Temperature:	22	°C	Tnom ± 1°C
Input Voltage:	10	VDC	10.0 ± 0.2 VDC
Maximum Instantaneous Current:	264	mA	Table IIIB

Attach photograph

S/N: 85036 7-29-98



Max Instantaneous current is 264 mA

Accept ✓ Reject

Test Performed by DM Date 7-29-98

Litton Q.A. LITTON MDJ Date JUL 30 1998

TEST DATA SHEET 7.9
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A
SERIAL NUMBER: 85036 QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Start up at Survival Temperature Extremes, Ref. Test Para. 5.4

Turn-On Characteristics at -30° ± 1°C
Ref. Test Para. 5.4.3

Temp °C	Vop VDC	Iop mA	Freq. GHz	Pout dBm
-30	10	178	53.59869	11.5

Turn-On Characteristics at +60° ± 1°C
Ref. Test Para. 5.4.5

Temp °C	Vop VDC	Iop mA	Freq. GHz	Pout dBm
60	10	181	53.59313	12.0

Test Performed by RH Date 7-29-98

Litton Q.A. LITTON Date JUL 30 1998

TEST DATA SHEET 7.10
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AG/A
SERIAL NUMBER: 85036 QUAL TEST N/A

AESD 1336610- 5
ACCEPT TEST ✓

Spurious Outputs: Ref. Test Para. 5.5.2

TEST DESCRIPTION		LIMITS
Temperature	22 °C	Tnom ± 1°C
Spurious Outputs Peaks observed:	YES ✓	NO
Value of peaks observed, if any:	<-90	-90 dBc min

Attach Spurious Signals plots from Spectrum Analyzer.

Accept ✓ Reject _____

Test Performed by _____ Date 7-29-98

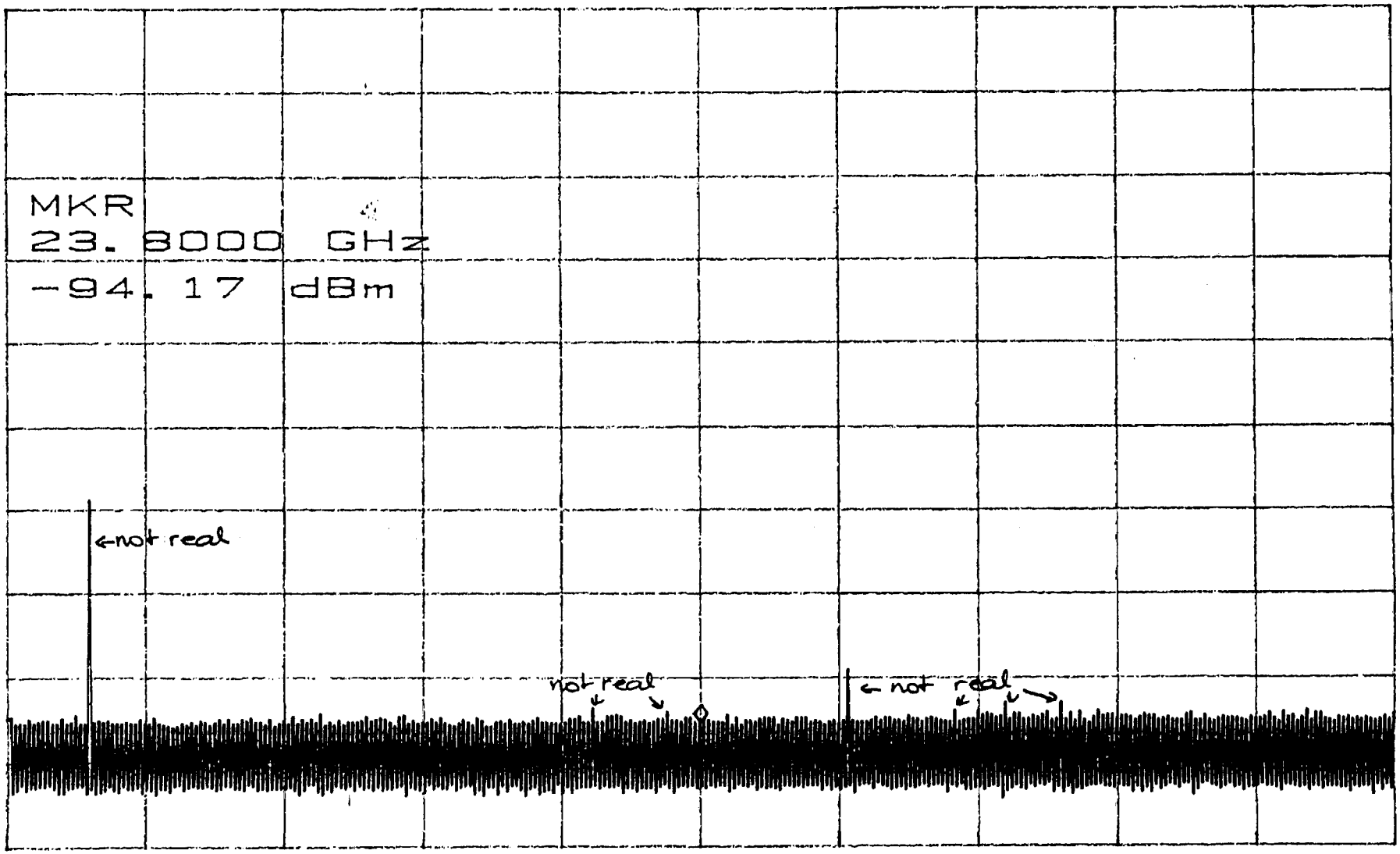
Litton Q.A. _____ Date JUL 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 46 OF 68
56348	A	1300823	C	

22
S/N 36
7-29-48
DM

SPURIOUS

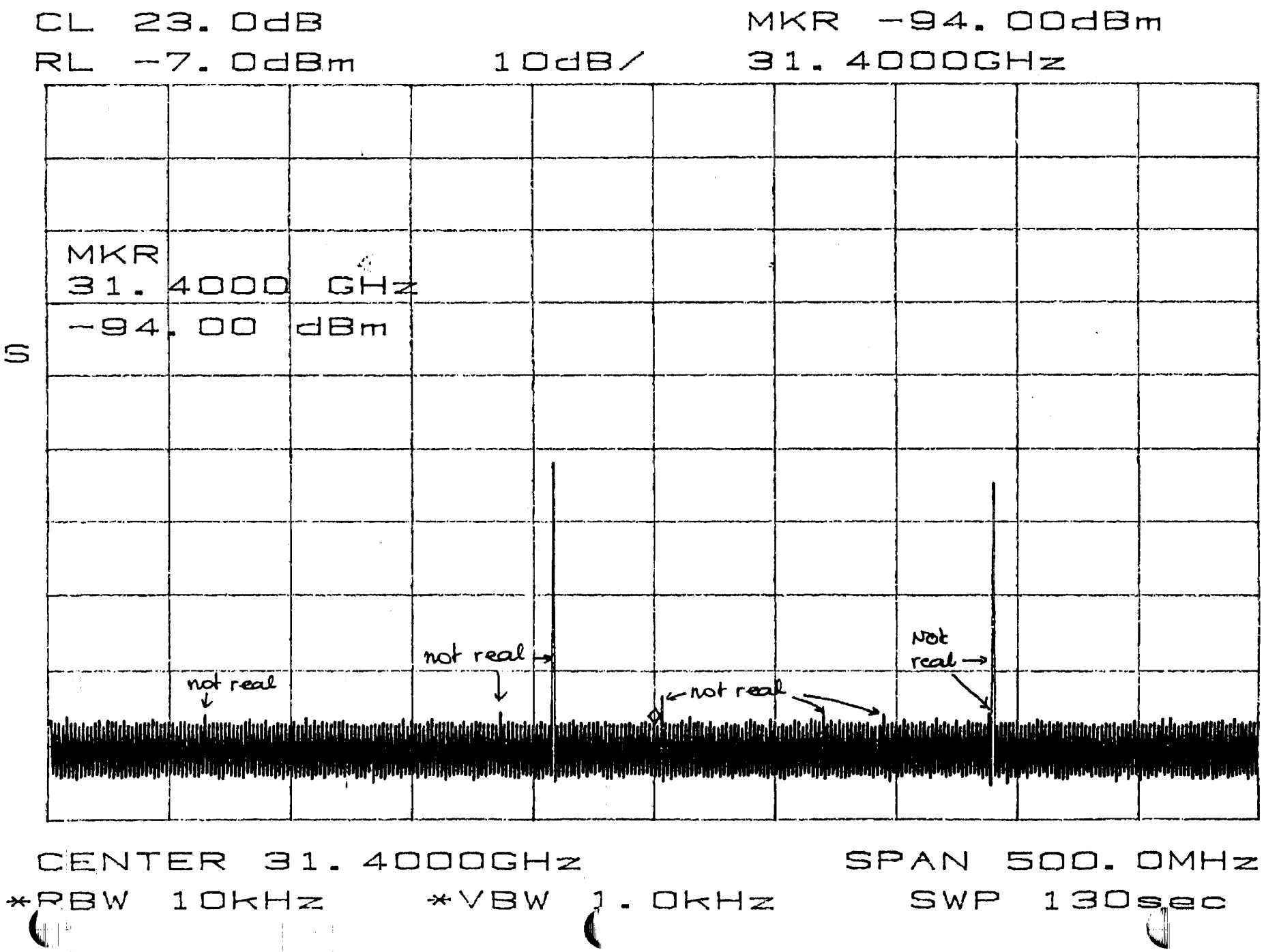
CL 21.0dB
RL -9.0dBm
10dB/
MKR -94.17dBm
23.8000GHz



CENTER 23.8000GHz
SPAN 500.0MHz
*RBW 10kHz
*VBW 1.0kHz
SWP 130sec

22°C
S/N, 1
7-29-98
DM

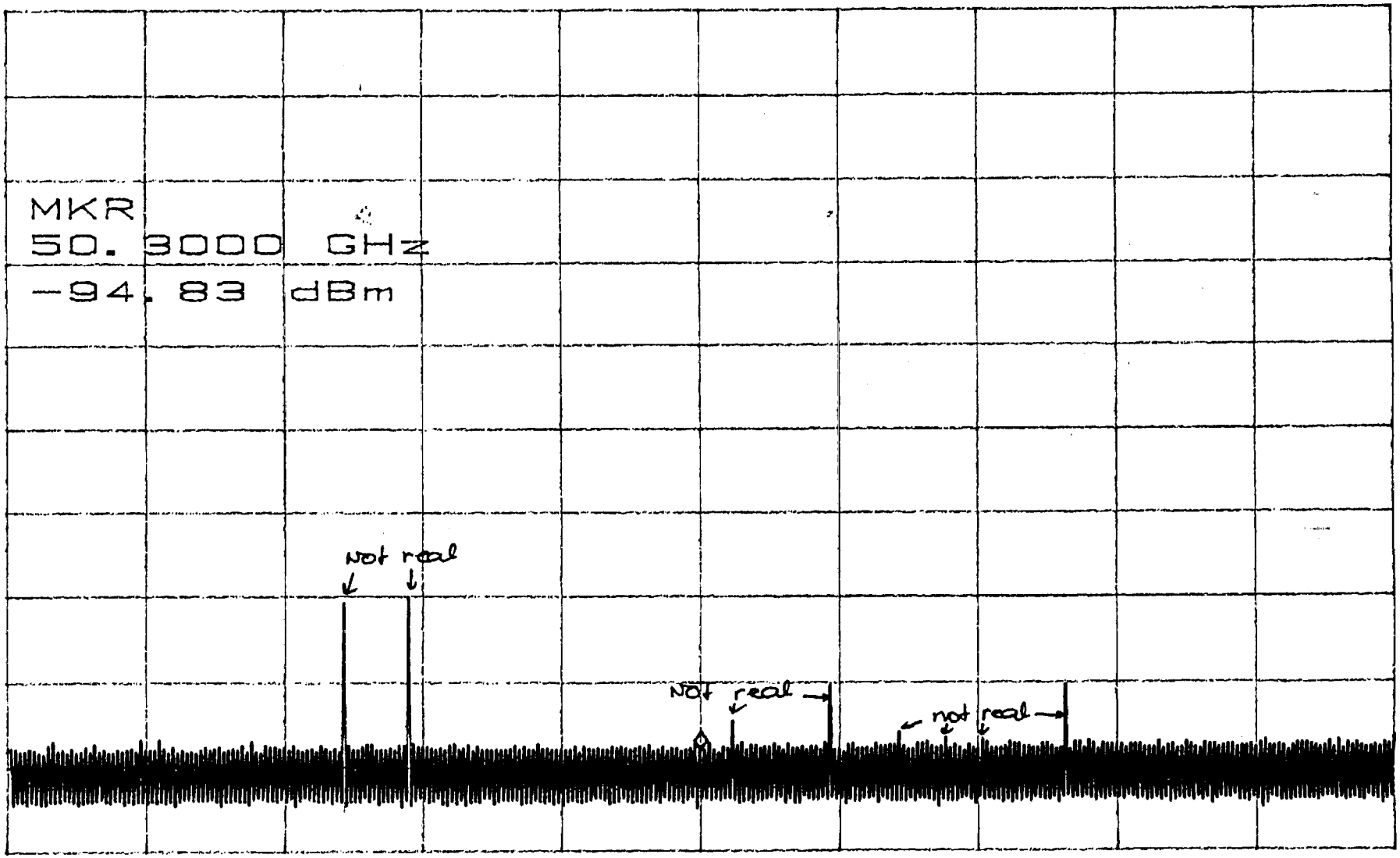
SPURIOUS



22
S/N 36
7-29-98
DM

SPURIOUS

CL 23.0dB
RL -7.0dBm
10dB/
MKR -94.83dBm
50.3000GHz

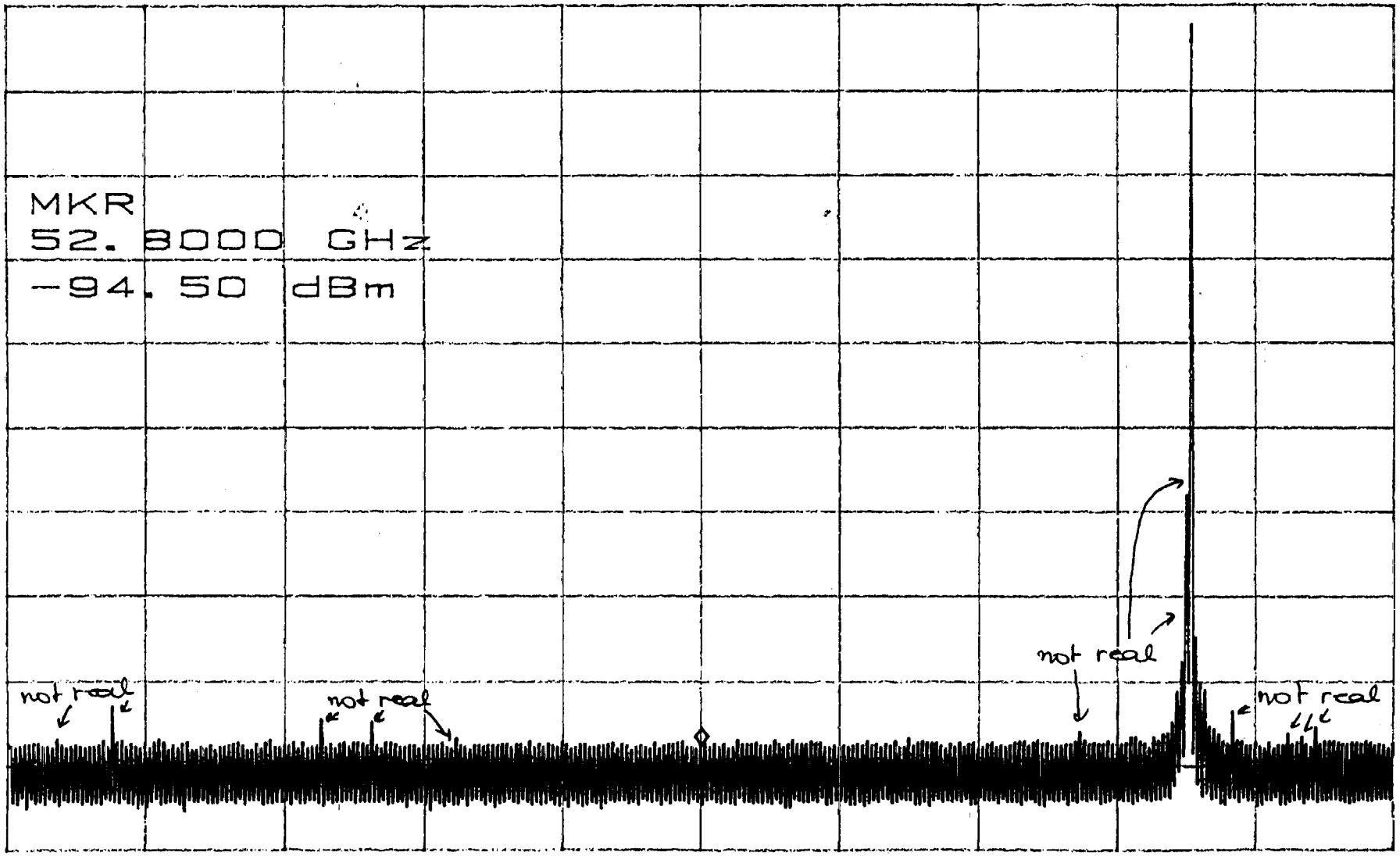


CENTER 50.3000GHz
SPAN 500.0MHz
*RBW 10kHz
*VBW 1.0kHz
SWP 130sec

22°C
S/N 036
7-29-98
001

SPURIOUS

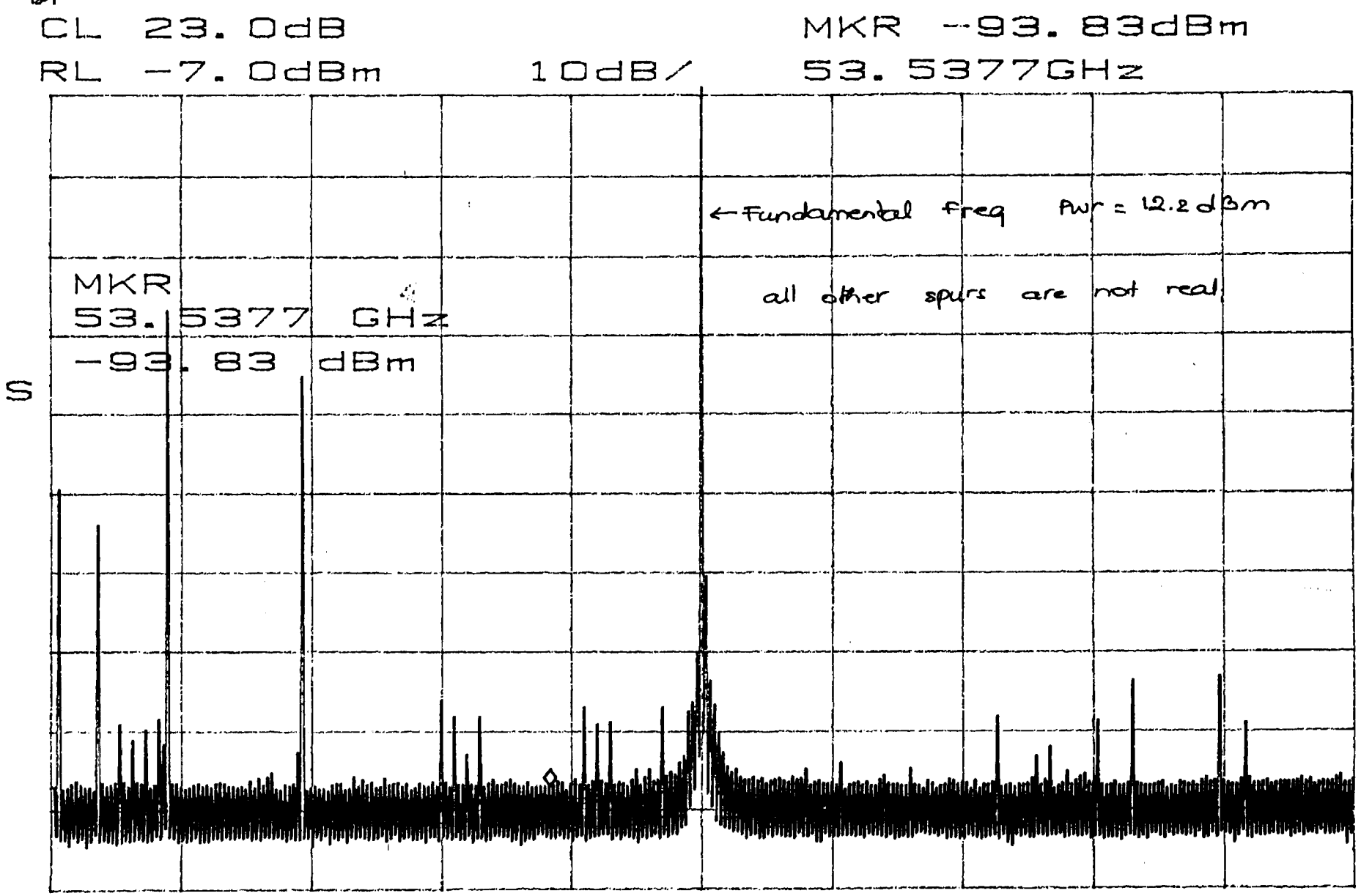
CL 23.0dB
RL -7.0dBm
10dB/
MKR -94.50dBm
52.8000GHz



CENTER 52.8000GHz
SPAN 500.0MHz
*RBW 10kHz
*VBW 1.0kHz
SWP 130sec

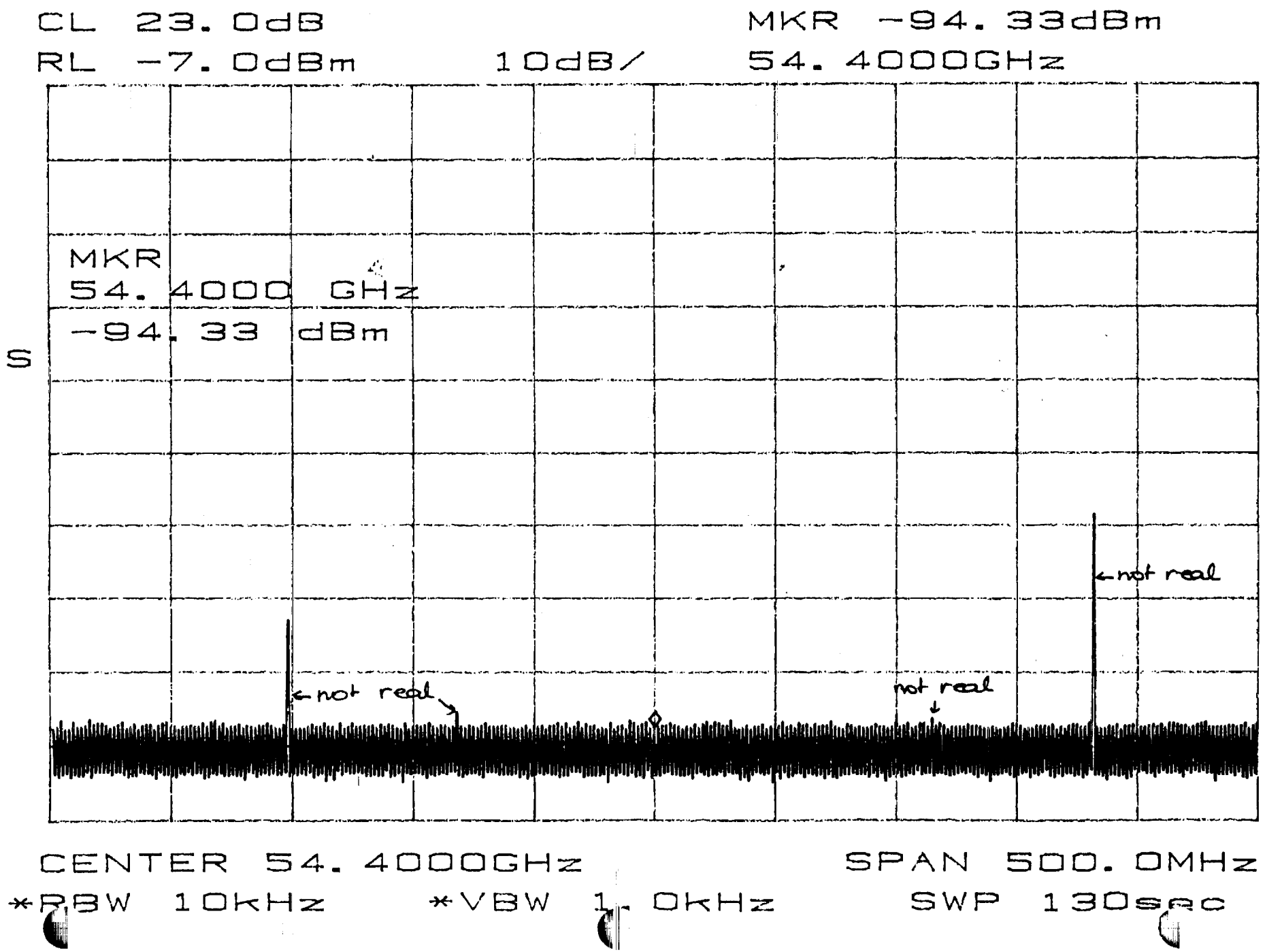
22°C
S/N: 2
7-29-98
DH

SPURIOUS



22°C
S/N :
7-29-9-
DM

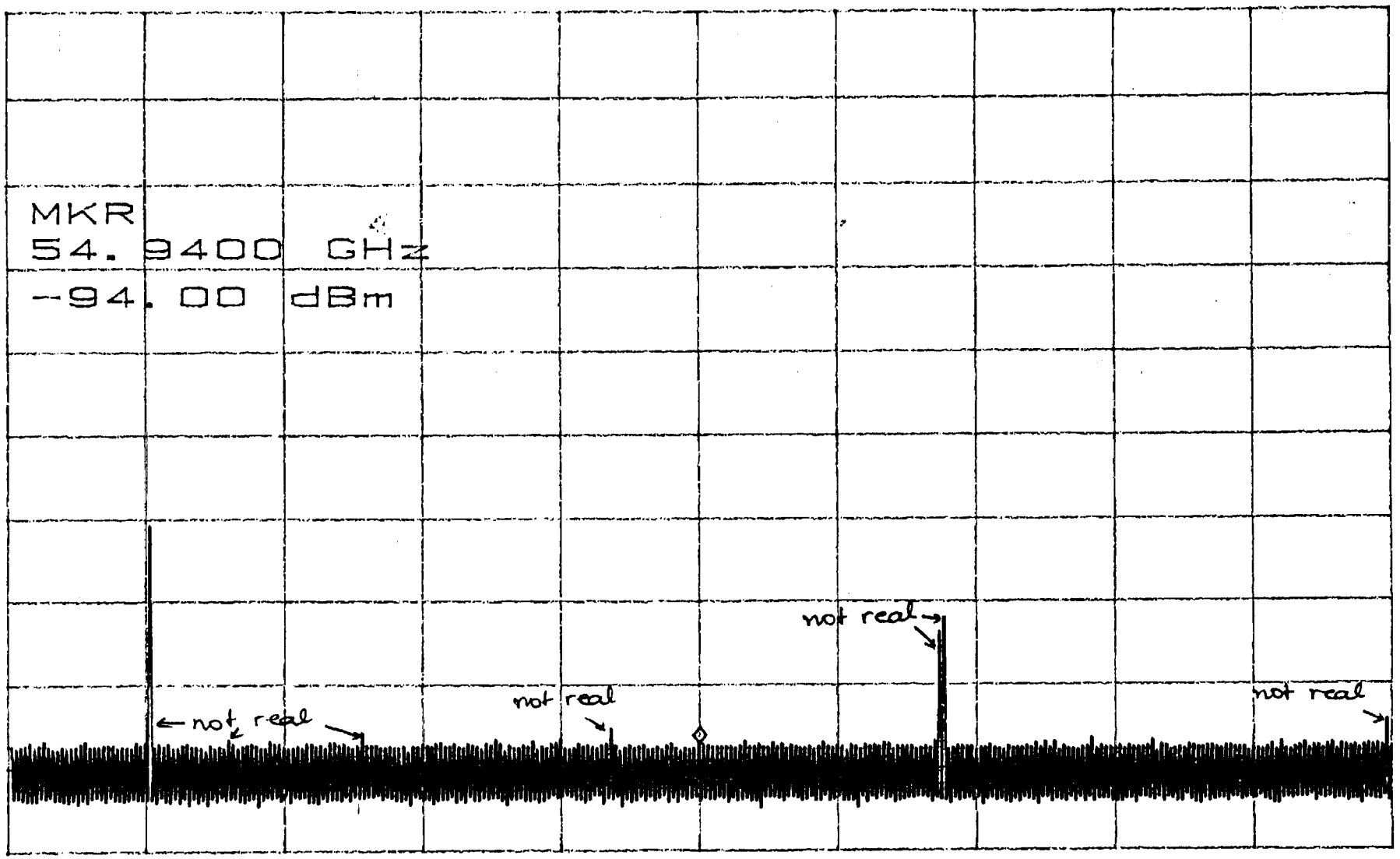
SPURIOUS



22°
S/N 3
7-29-78
DH

SPURIOUS

CL 23.0dB
RL -7.0dBm
10dB/
MKR -94.00dBm
54.9400GHz

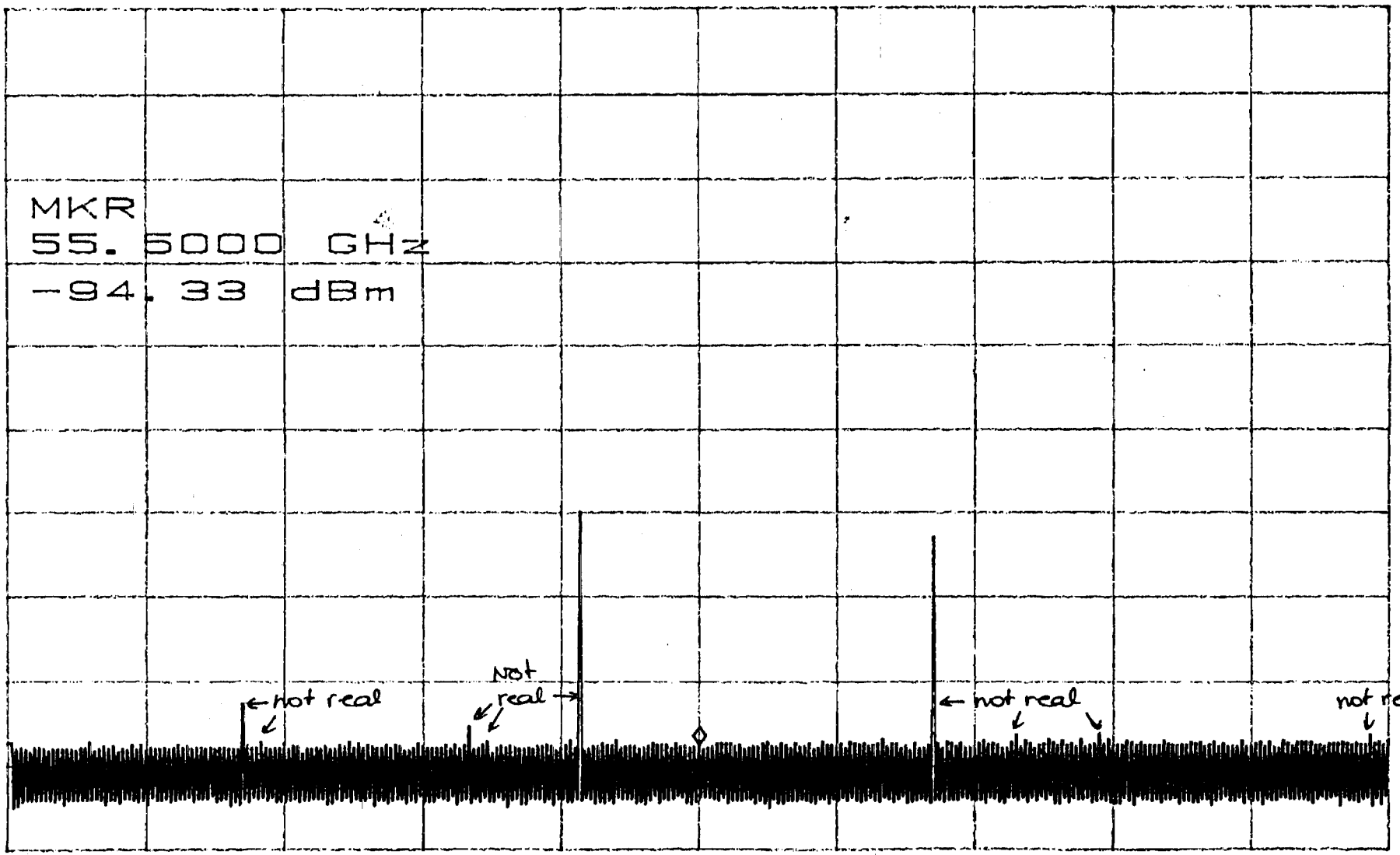


CENTER 54.9400GHz
SPAN 500.0MHz
*RBW 10kHz
*VBW 1.0kHz
SWP 130sec

22°C
S/A 36
7-29-98
DH

SPURIOUS

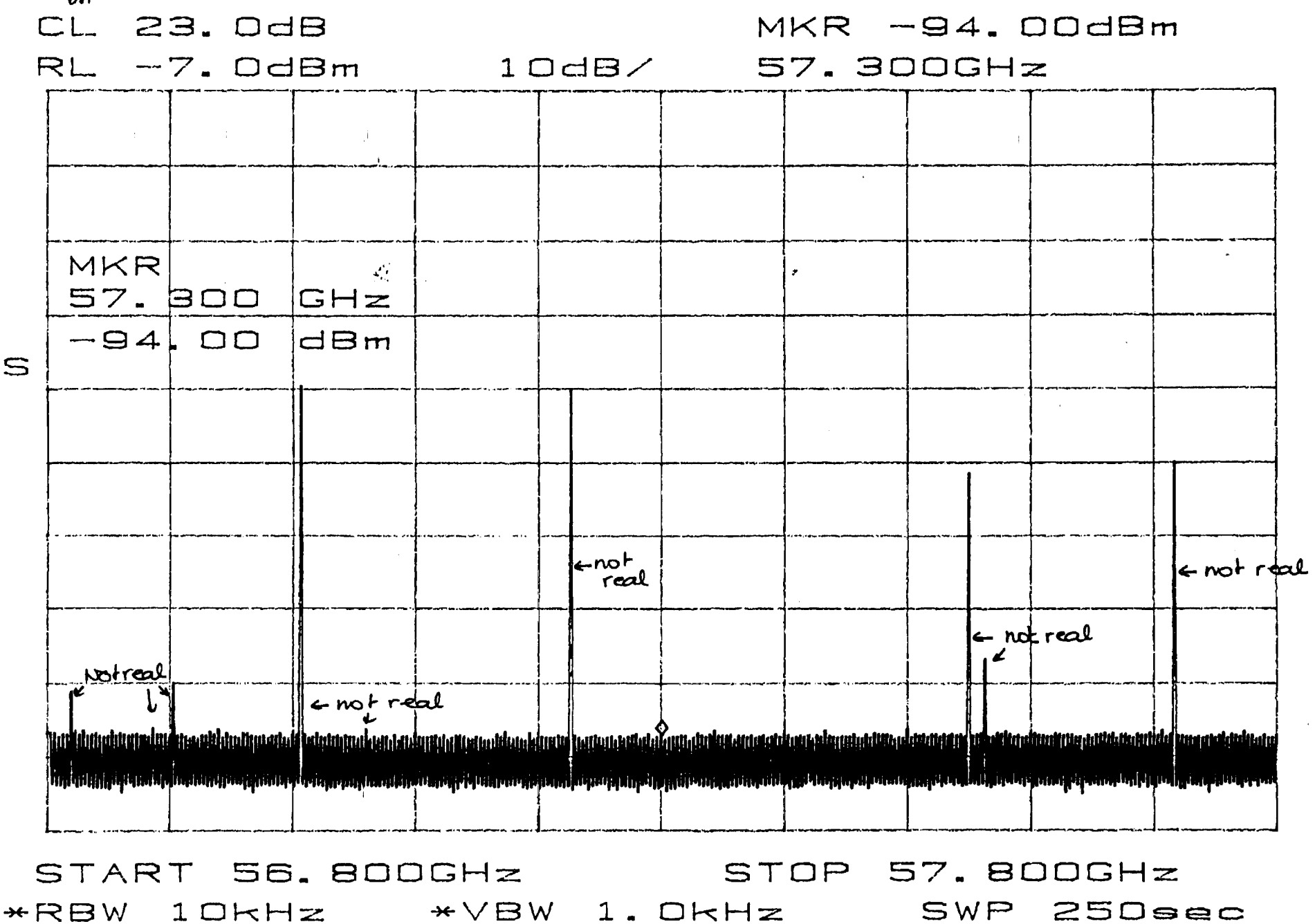
CL 23.0dB
RL -7.0dBm
10dB/
MKR -94.33dBm
55.5000GHz

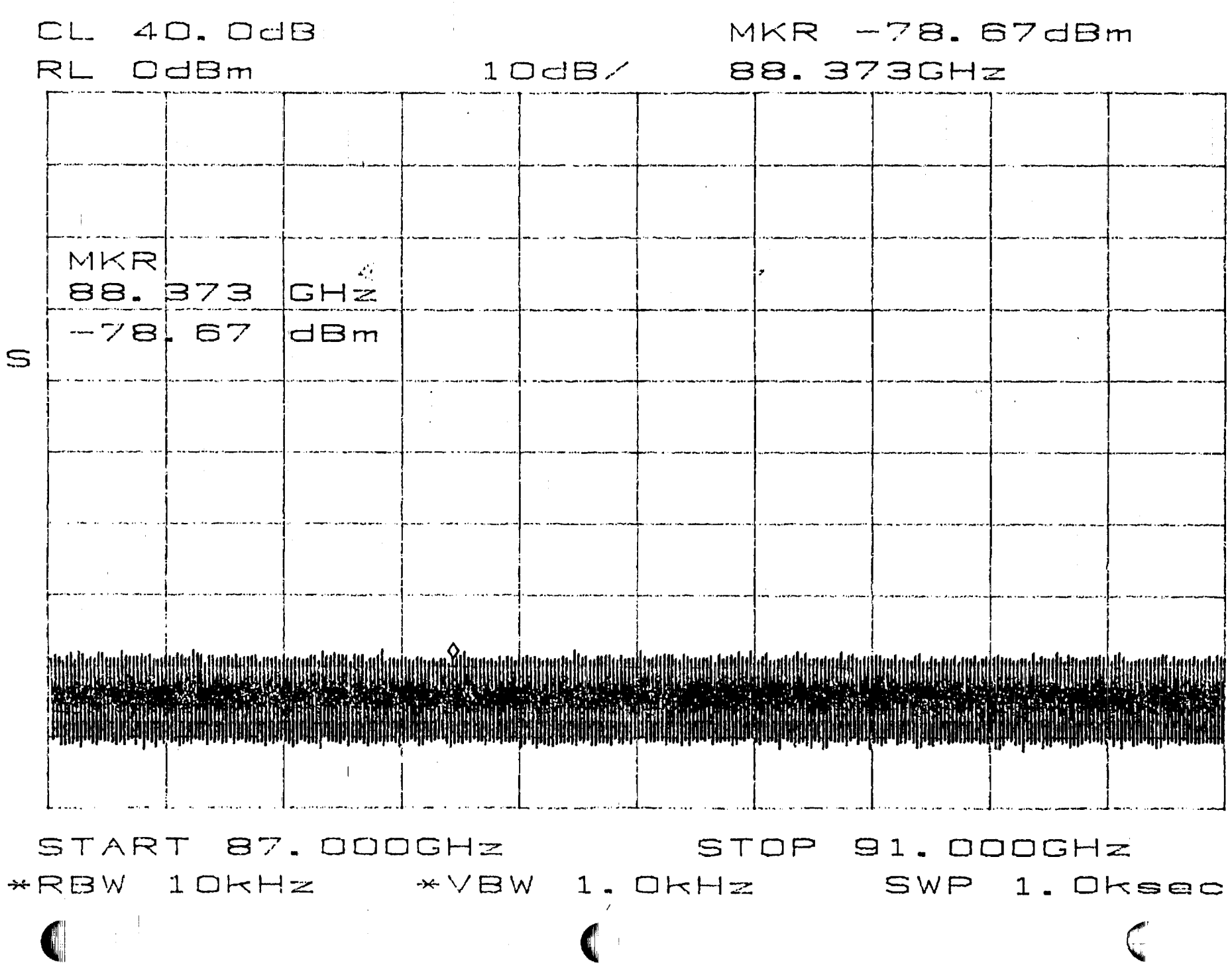


CENTER 55.5000GHz
SPAN 500.0MHz
*RBW 10kHz
*VBW 1.0kHz
SWP 130sec

S1 136
7-29-98
DM

SPURIOUS




CL 40.0dB
MKR -78.67dBm
RL 0dBm
10dB/
88.373GHz
MKR
88.373 GHz
-78.67 dBm
S
START 87.000GHz
STOP 91.000GHz
*RBW 10kHz
*VBW 1.0kHz
SWP 1.0ksec

TEST DATA SHEET 7.13
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS∈ 9036 AG/A
SERIAL NUMBER: 85036 QUAL TEST N/A

AESD 1336610- 5
ACCEPT TEST ✓

FM Noise: Ref. Test Para. 5.6.1

TEST DESCRIPTION			LIMITS
FM noise (Attach plot):			
Temperature		22 °C	Tnom ± 1°C
Measured	=	<-115 dBc/Hz 1 MHz to 40 MHz	-100 dBc/Hz max.
Measured	=	<-120 dBc/Hz 40 MHz to 400 MHz	-100 dBc/Hz max.

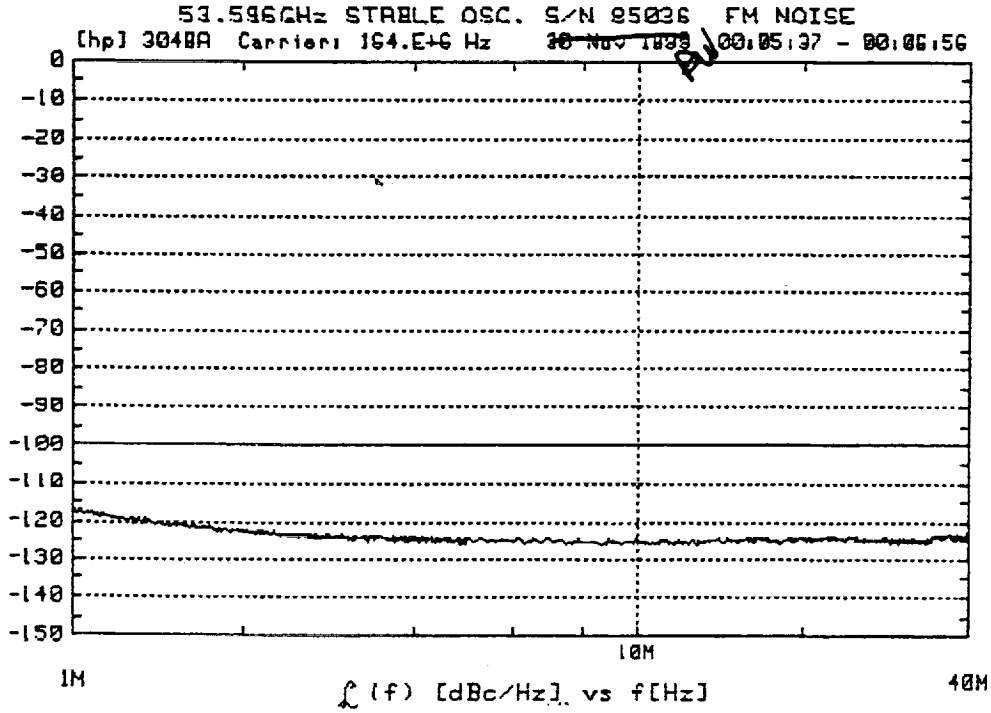
Accept ✓ Reject _____

Test Performed by DH Date 7-29-98

Litton Q.A. LITTON Date JUL 3 0 1998

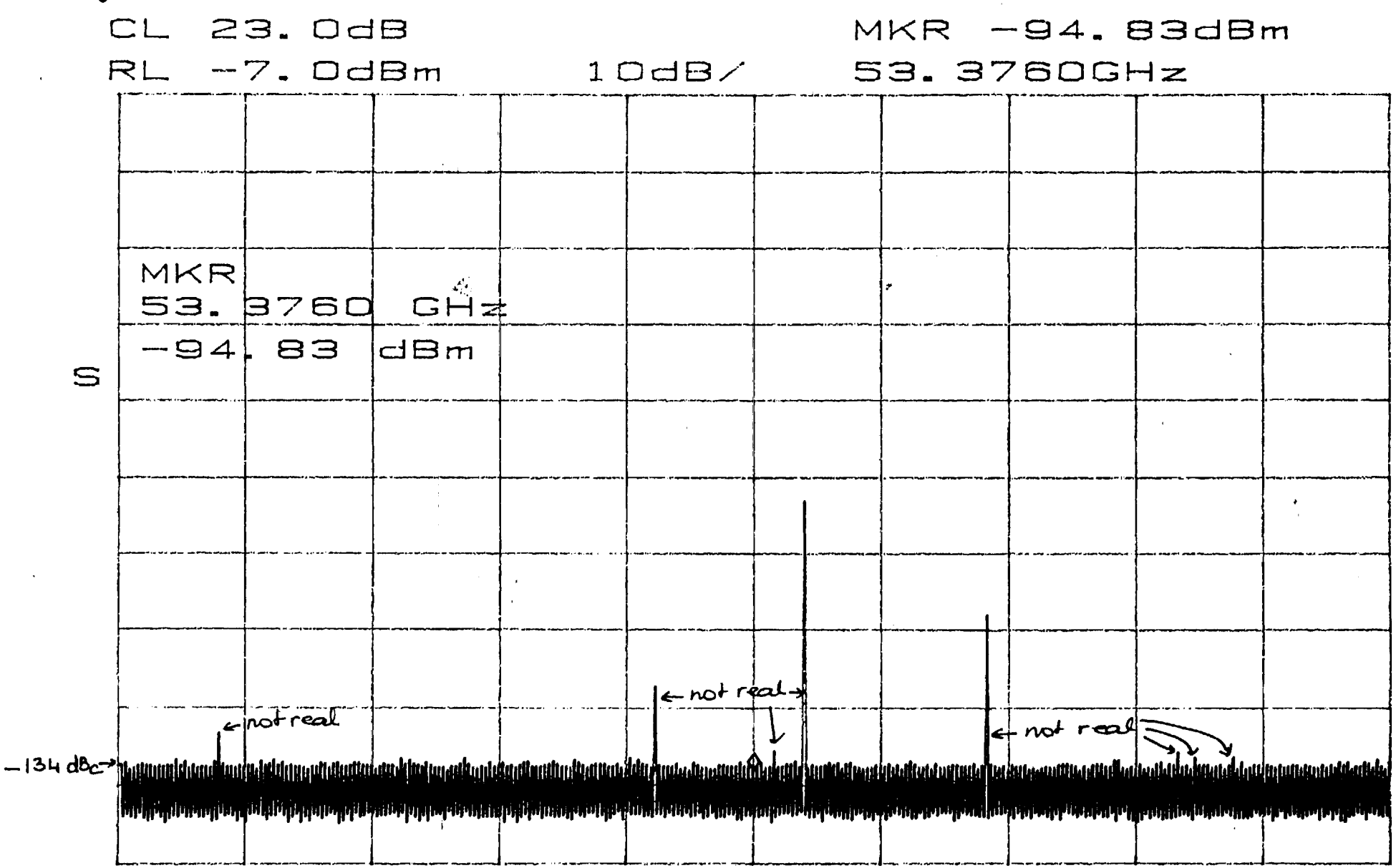
7-29-98

BH


53.596GHz STABLE OSC. S/N 95036 FM NOISE
[hp] 3048A Carrier: 164.E+6 Hz 30 Nov 1998 00:05:37 - 00:06:56
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
1M
10M
40M
ℒ(f) [dBc/Hz] vs f[Hz]

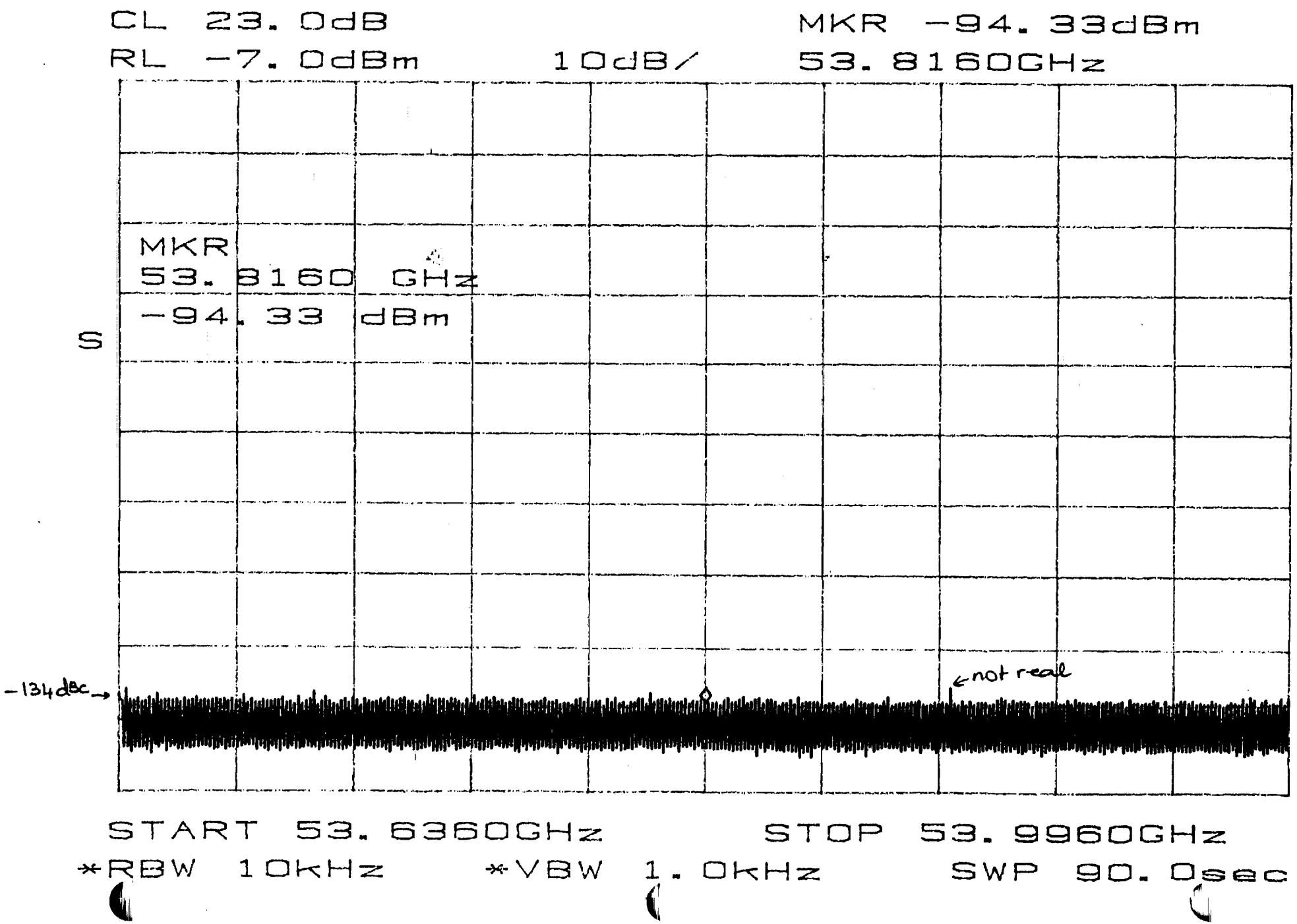
22°C
S/N:
7-29-98
DH

FM NOISE (from −400MHz → −40MHz)



22°C
S/N: 2
7-29-98
1001

FM NOISE (from 40MHz → 400MHz)



LITTON
Solid State

TEST DATA SHEET 7.16
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AG/A
SERIAL NUMBER: 85036 QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

AM Noise: Ref. Test Para. 5.6.2

TEST DESCRIPTION			LIMITS
AM noise (Attach plot):			
Temperature		22 °C	Tnom ± 1°C
Measured	=	<-140 (-135 OH) dBc/Hz 1 kHz to 10 kHz	-135 dBc/Hz max.
Measured	=	<-150 dBc/Hz 10 kHz to 100 kHz	-145 dBc/Hz max.
Measured	=	<-160 dBc/Hz at 100 kHz to 40 MHz	-150 dBc/Hz max.
RF Power Input, Mixer (Nominal), P_{mixer}		7 dBm	0 to 7 dBm
RF Voltage, Termination (Nominal), $V_{carrier}$		.083 V	
RF Voltage, Termination (attn -.5dB), $V_{-.5dB}$		.095 V	
RF Voltage, Termination (attn +.5dB), $V_{+.5dB}$		.074 V	
Calculate mixer carrier power, $P_{carrier} = V^2 / 50$: $P_{carrier}$ =		-8.61 dBm	
Calculate -.5dB carrier power, $P_{-.5dB} = V^{carrier} / 50$: $P_{-.5dB}$ =		-7.44 dB	
Calculate +.5dB carrier power, $P_{+.5dB} = V^{-.5dB} / 50$: $P_{+.5dB}$ =		-9.61 dBm	
Calculate Mixer Transfer Correction Factor, $CF_{mixer} = P_{-.5dB} - P_{+.5dB} - 1$ dB : CF_{mixer} =		1.17 dB	
Noise (spectrum analyzer), Lmeas		-103 dB	
Total Gain, LNA, G_{LNA}		64 dB	
Calculate Noise of UUT, $L_f = L_{meas} - P_{carrier} - G_{LNA} - CF_{mixer}$: L_f =		-159 dBc/Hz at 40 MHz to 400 MHz	-150 dBc/Hz max

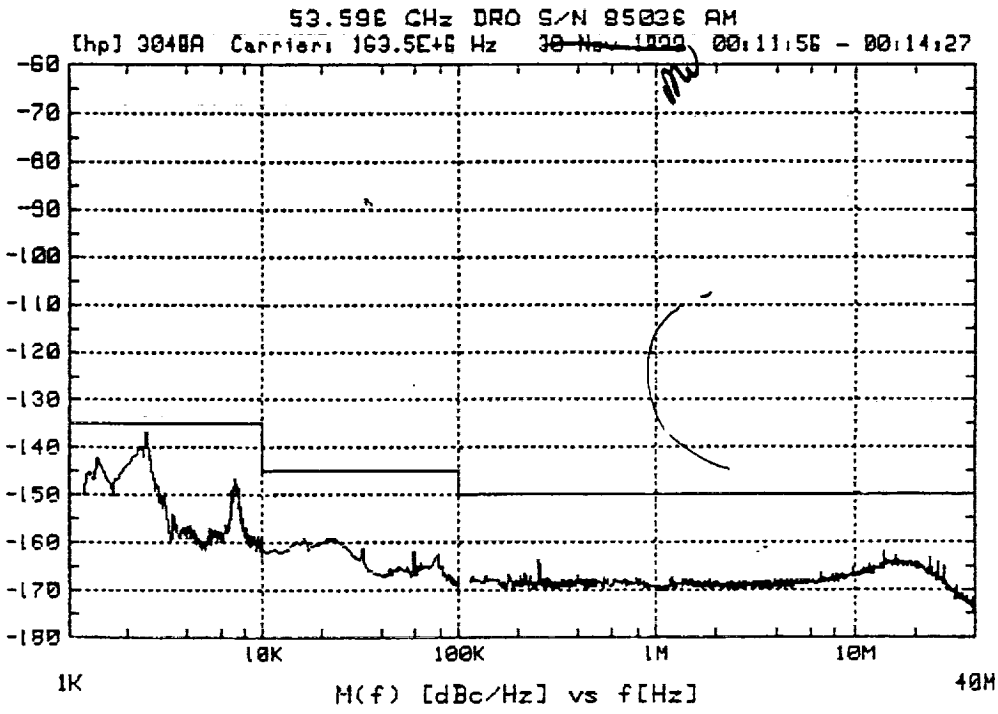
Accept ✓ Reject _____

Test Performed by [signature] Date 7-29-98

Litton Q.A. [signature] Date JUL 3 0 1998

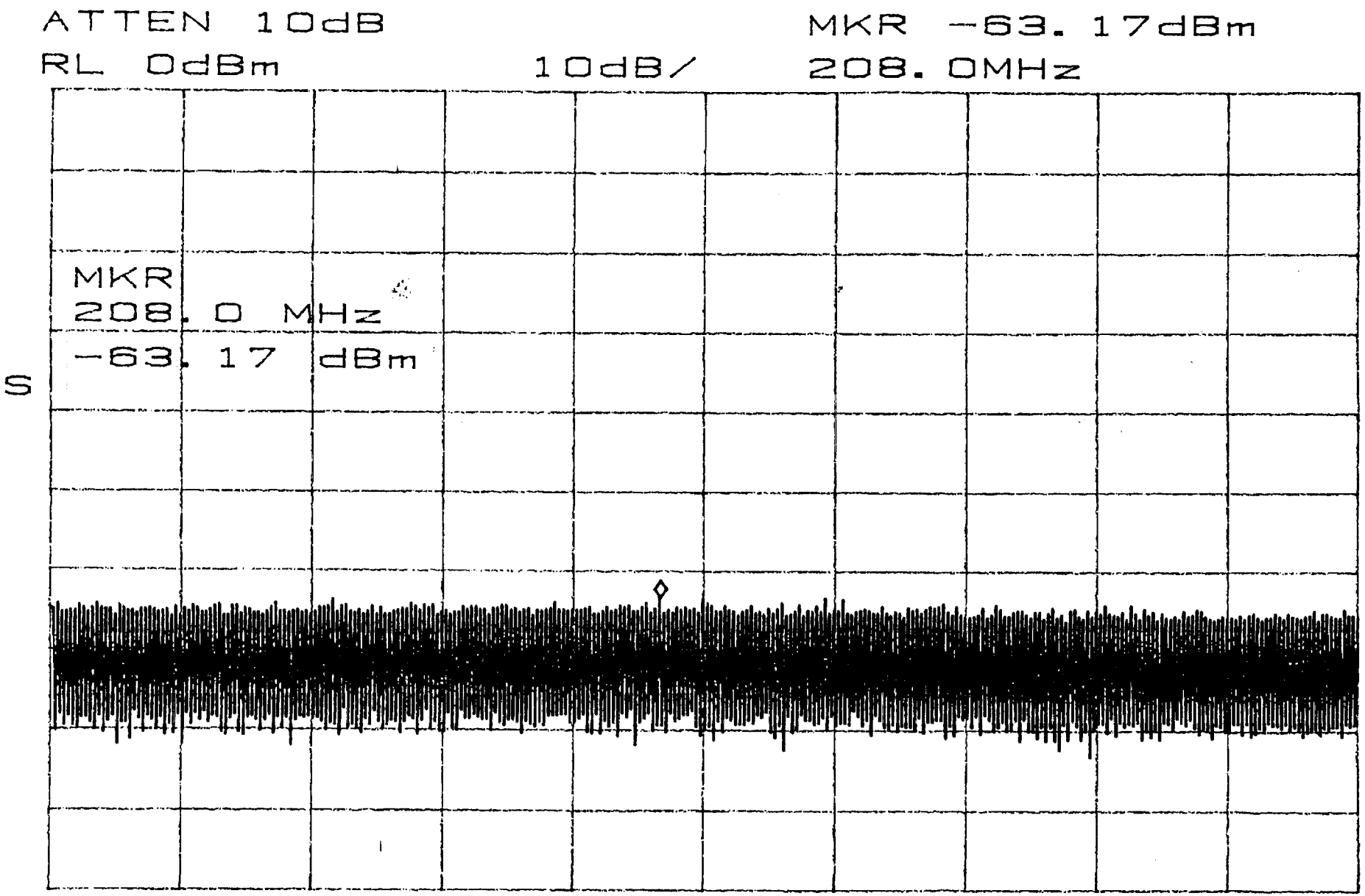
CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 52 OF 68
56348	A	1300823	C	

7-29-98


53.598 GHz DRO S/N 85028 AM
[hp] 3048A Carrier: 163.5E+6 Hz 30 Nov 1999 00:11:56 - 00:14:27
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
1K
10K
100K
1M
10M
40M
M(f) [dBc/Hz] vs f[Hz]

22(
S/N
7-29-98
DM

AM Noise (from 40MHz → 400MHz)



TEST DATA SHEET 7.19
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A AESD 1336610- 5
SERIAL NUMBER: 85036 QUAL TEST N/A ACCEPT TEST ✓

Harmonics Tests: Ref. Test Para. 5.7

TEST DESCRIPTION		LIMITS
Temperature	22 °C	Tnom ± 1°C
Frequency, per 5.7.1	53.59646 GHz	Table IIIB
RF Output Power, per 5.7.1	12.2 dBm	11.5 to 17 dBm
Harmonics:		
Level of second Harmonic	-74 dBm	
Difference (2nd Harmonic)	-86 dB	-30 dBc min
Subharmonics:		
Level of Subharmonic	-87 dBm	
Difference (Subharmonic)	-99 dB	-90 dBc min

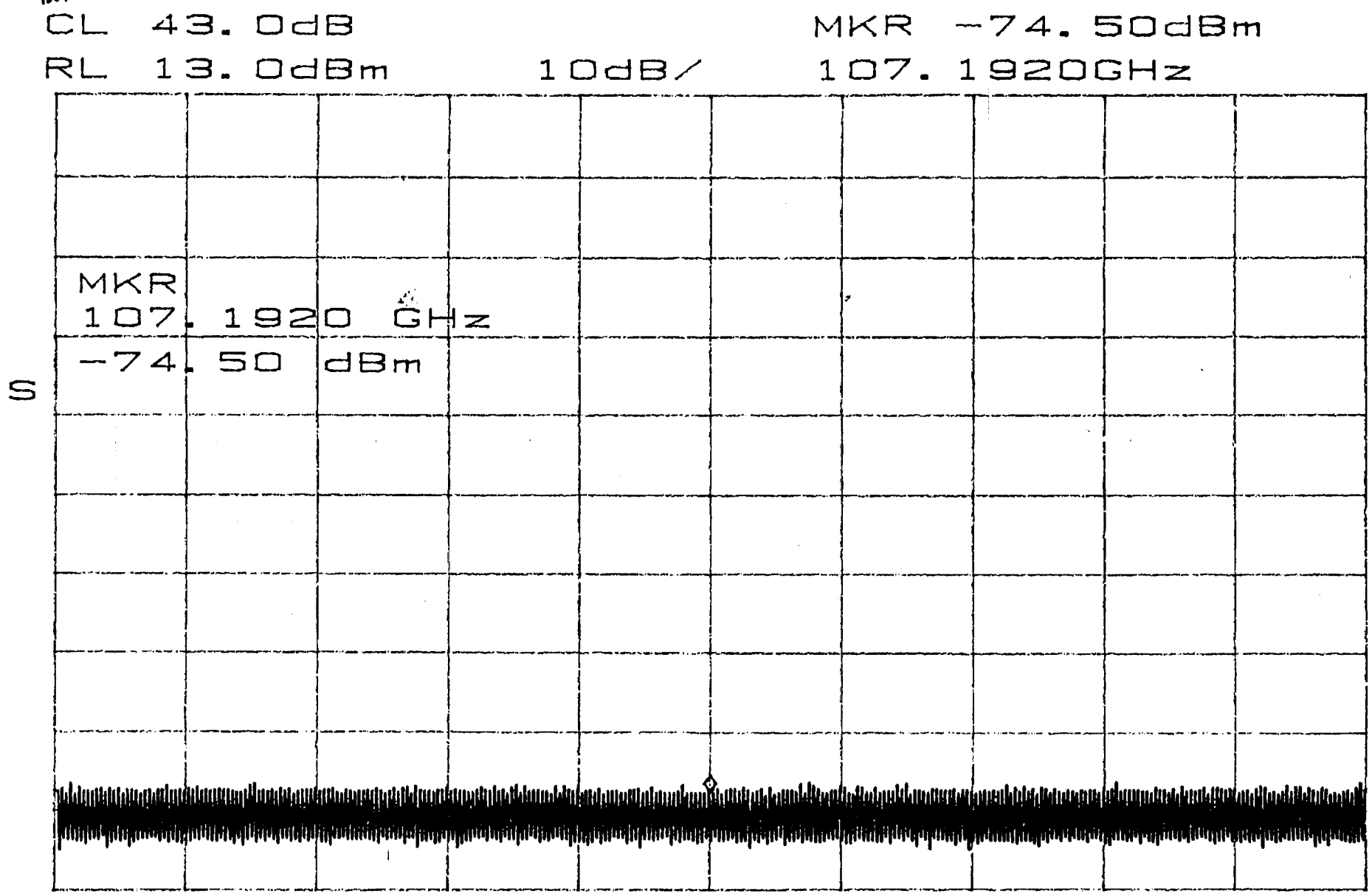
Accept ✓ Reject _____

Test Performed by DH Date 7-29-98

Litton Q.A. LITTON M 60 Date JUL 3 0 1998

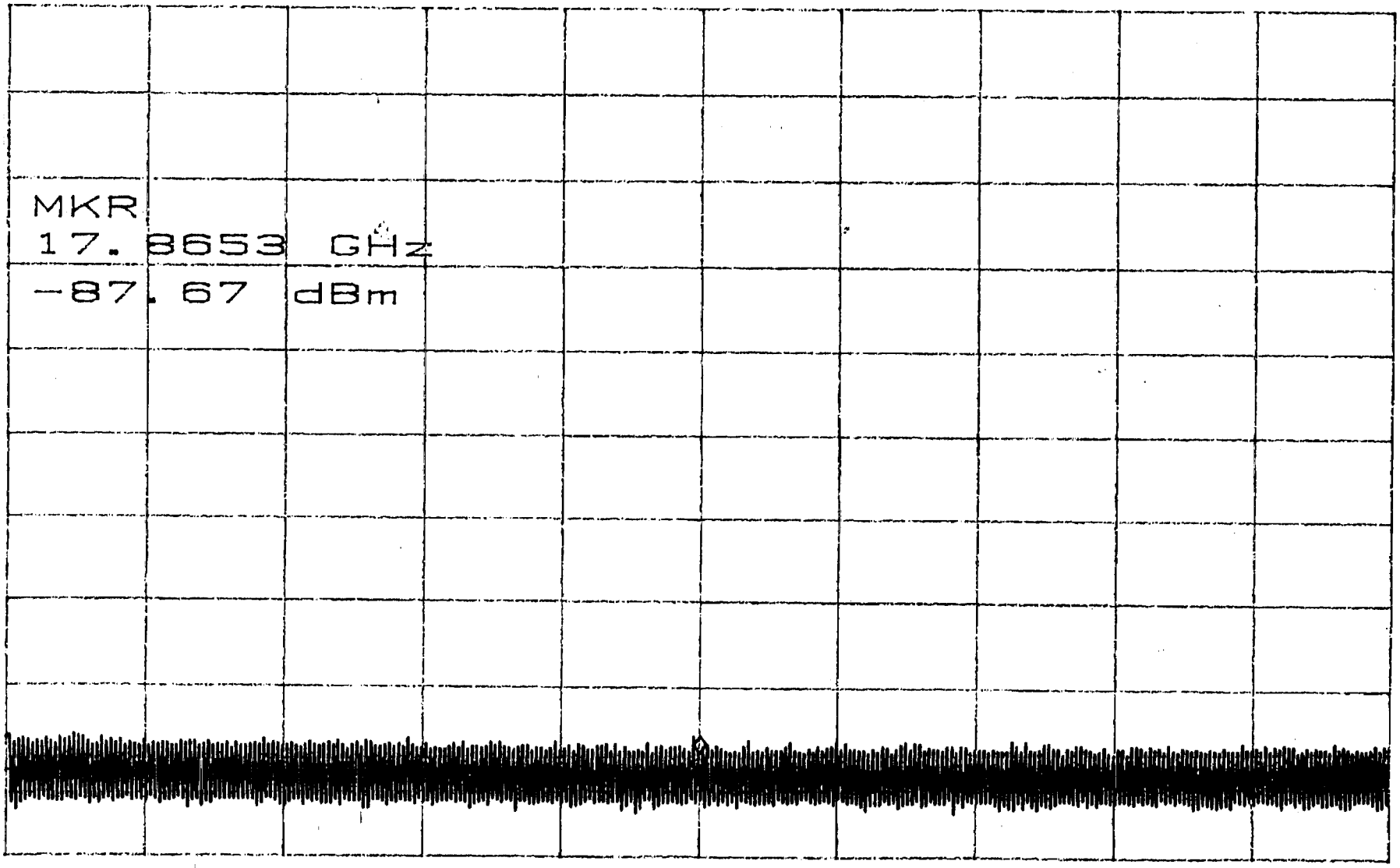
22°C
S/N.
7-29-98
pm

2nd harmonic



22°C
S/N :
7-29-98
DH

sub-harmonic



TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AG/A
SERIAL NUMBER: 85036 QUAL TEST N/A
AESD 1336610-5
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION			LIMITS
1. Initial Performance at Tnom ± 1°C			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{Tnom}	53.59646	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.2	dBm	11.5 to 17 dBm
Input Voltage, V_B	10	VDC	10 ± 0.2 VDC
Input Current, I_B	180	mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.46	MHz	
2. Performance at Tnom ± 1°C after +60°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	53.59614	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	11.5 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	181	mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	53.59661	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	11.5 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	179	mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = -0.32 MHz
Δf_H after -30°C soak = +0.15 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = 0.1 dB
ΔP_H = after -30°C soak = 0 dB

Accept ✓ Reject ____

Test Performed by DH Date 7-29-98
Litton Q.A. Date JUL 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 58 OF 68
56348	A	1300823	C	

TEST DATA SHEET 7.22B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A
SERIAL NUMBER: 85036 QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION		LIMITS
4. Performance at Tnom ± 1°C at Ambient Pressure		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{meas}	53.59635 GHz	Table IIIB
RF Output Power, P_{meas}	12.3 dBm	11.5 to 17 dBm
Input Voltage, V_B	10 VDC	V_B ± .0005 VDC
Input Current	180 mA	Table IIIB

Calculate frequency variation, $\Delta f_P = f_{meas} - f_{Tnom}$:

Δf_p = −0.11 MHz

Calculate RF output power variation, $\Delta P_p = P_{meas} - P_{Tnom}$:

ΔP_p = 0.1 dB

Accept ✓ Reject _____

Test Performed by VN Date 7-30-98

Litton Q.A. LITTON Date JUL 30 1998

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036AG/A AESD 1336610- 5
SERIAL NUMBER: 85036 QUAL TEST N/A ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Initial Measurement. Ref Test Par. 5.9.1			
Temperature	22	°C	24°C ± 5°C
Frequency	53.59635	GHz	Table IIIB
RF Output Power	12.3	dBm	11.5 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Reference test. Ref. Test Para. 5.9.3			
Frequency, f_{Ref}	53.59635	GHz	Table IIIB
RF Output Power, P_{Ref}	-4.0	dBm	
Load Pulling Test. Ref. Test Para. 5.9.4			
Maximum Frequency, f_{meas}	53.59636	GHz	Table IIIB
Minimum Frequency, f_{meas}	53.59634	GHz	Table IIIB
Maximum RF Output Power P_{meas}	-3.6	dBm	
Minimum RF Output Power, P_{meas}	-4.3	dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation, $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = 0.01 MHz
Maximum Negative Δf_L = -0.01 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation, $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = 0.4 dB
Maximum Negative ΔP_L = -0.3 dB

Accept ✓ Reject _____

Test Performed by VN Date 7-30-98
Litton Q.A. [signature] Date JUL 30 1998

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036AG/A AESD 1336610-5
SERIAL NUMBER: 85036 QUAL TEST N/A ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Output Open and Short. Ref. Test Para. 5.9.5		
Temperature	22 °C	24°C ± 5°C
Frequency:	5.59636 GHz	Table IIIB
RF Output Power:	123 dBm	11.5 to 17 dBm
Input Voltage	10 VDC	10 ± 0.2 VDC
Input Current:	180 mA	Table IIIB
Results:	✓ Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.74 MHz (Positive)	Table IIIB
	−0.33 MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	1.37 MHz (Positive)	Table IIIB
	−1.66 MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.5 dB (Positive)	1.0 dB
	−0.4 dB (Negative)	-1.0 dB

Accept ✓ Reject _____

Test Performed by VN Date 7-30-98

Litton Q.A. _____ Date JUL 30 1998

APPENDIX B

Channel 8 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-8, S/N: 7A38)

S/N: 7A38 Was Replaced With Mixer/Amplifier (P/N: 1331562-18, S/N: 7A58) SEE APPENDIX-A

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.58	0.05		QA 1

SDAR# 35
12/1/98

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	70.62	2.25	2.0		QA 1
10.00	70.71				
10.04	70.80				
ΔGv =	0.18 dB				

	DATE	ACC	REJ
SPACEK QA	10-28-98		QA 1

ENGINEERING DAT, ONLY. SEE AE2486 PARA. 3.2.1, 15.2 acceptable

PART NO. 1331562-18F

SER NO. 7A58

TESTED BY:

END DATE: 6-5-98

END TIME: 1600

TEST FAILURE:

FAILURE ANALYSIS NO.

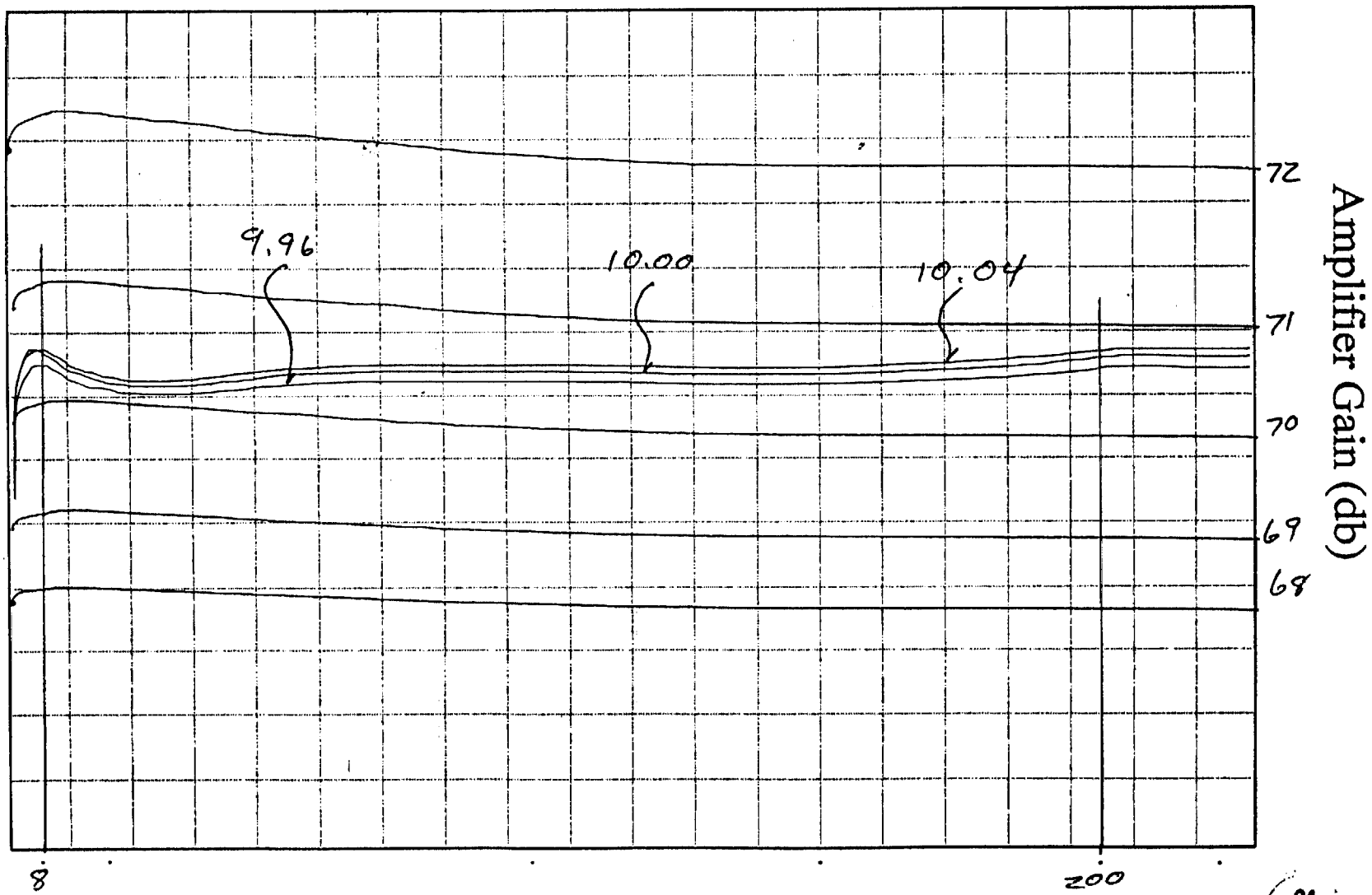
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-186
Serial No. 7A58
Date 6-6-98
Tested By TTV

Amb Temp 23°C



QA 1

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 −6	G_{T1} 71.30				
		* 0.011	0.035dB/°C	QA 1	
T2 +8	G_{T2} 71.15				
		* 0.023	0.020dB/°C		QA 1
T3 +28	G_{T3} 70.81				
		* 0.024	0.035dB/°C	QA 1	
T4 +40	G_{T4} 70.32				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \qquad i = 1,2,3,4$$

ΔG_T = 0.98 dB

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 1.56 dB Spec 1.4dB ACC____ REJ QA 1

	DATE	ACC	REJ
PART NO. 1331562-18	SPACEK QA 10-28-98		QA 1

ENGINEERING DATA ONLY, SEE AE 24869 PARA. 3.2.1.15.1 acceptable

SER NO. 7A58

TEST FAILURE: _____

TESTED BY: [illegible]

FAILURE ANALYSIS NO. _____

END DATE: 6-5-98

END TIME: 1600

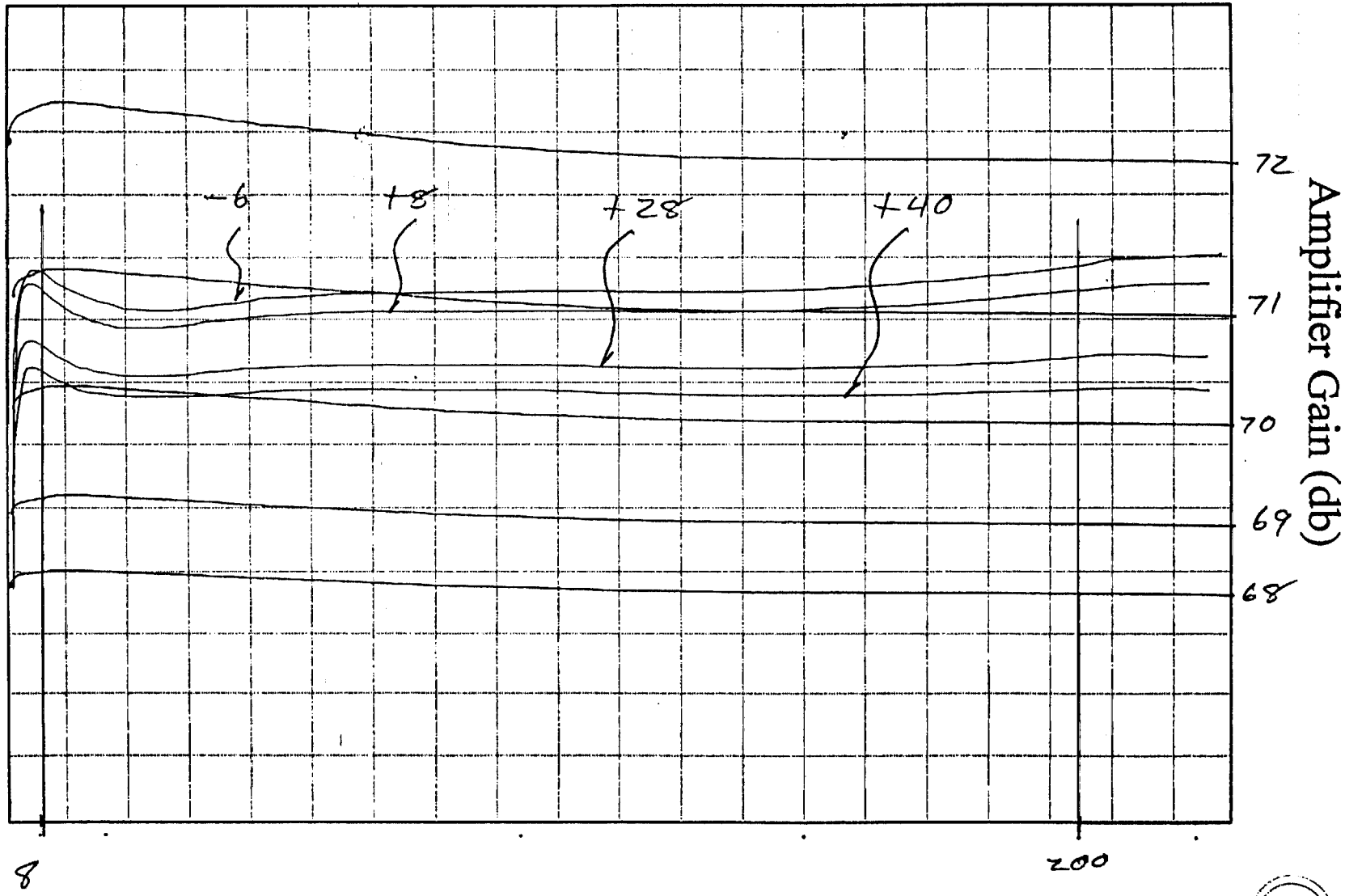
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-18G
Serial No. 7A58
Date 6-6-98
Tested By [illegible]

Amb Temp 23°C



TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.5	0.5	1.0	X	
				X						20	~~-2.6~~	~~0.4~~			
	X	X								50	~~-2.6~~	~~0.4~~			
X	X	X	X	X	X	X	X			100	-2.6	0.4	1.0	X	
X										150					
			X	X	X	X	X	X		200	-2.6	0.4	1.0	X	
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 10-26-98 AMBIENT ROOM TEMPERATURE °C: 23°C

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-20.8	-24.3	3.5	1.27

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

PART NO. 1331562-186

SER NO. 7A58

TESTED BY: 777

END DATE: 6-5-98

END TIME: 1600

SPACEK QA — DATE 10-28-98 — ACC (QA T) — REJ

TEST FAILURE:

FAILURE ANALYSIS NO.

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 11-19-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.6	-19.50	-21.40	1.90	3.3	3.8	QA 1	
+8	43.7	-19.70	-21.55	1.85	3.4	3.8	QA 1	
+28	43.8	-20.00	-21.85	1.85	3.4	3.8	QA 1	
+40	43.9	-20.20	-22.05	1.85	3.4	3.8	QA 1	

Noise figure change 0.1 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 11-24-98 Ambient Room Temperature °C: 24

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.057

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ

DATE ACC REJ

PART NO. 1331562-186 SPACEK QA 11-25-98 QA 1

SER NO. 7A58 TEST FAILURE:

TESTED BY: TTH FAILURE ANALYSIS NO.

END DATE: 11-25-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

APPENDIX B

Channel 5 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-15, S/N: 7A45)

S/N: 7A45 Was Replaced With Mixer/Amplifier (P/N: 1331562-15, S/N: 7A55) SEE APPENDIX-A

S/N: 7A55 Was Replaced With The Original Mixer/Amplifier (P/N: 1331562-15, S/N: 7A45) SEE APPENDIX-B

APPENDIX B

CENTER FREQUENCY AND FREQUENCY STABILITY

FOR

LOCAL OSCILLATORS (LO's)
(DRO's, PLO's, & GDO)

APPENDIX B

CENTER FREQUENCY OF LOs

Channel No.	3	4	5	6	7	8	9-14 *	15
Specification (GHz)	50.3	52.8	53.596	54.4	54.94	55.5	57.290344	89.0
Setting Accuracy (+/-GHz)	0.002	0.001	0.001	0.001	0.001	0.002	0.000086	0.03
Measured (GHz)	50.30008	52.80050	**53.59646**	54.40004	54.93986	55.50030	57.290325 57.290322	89.005

* Measured for PLO No. 1 and No. 2.

FREQUENCY STABILITY OF LOs

APPENDIX B

Channel No.	3	4	5	6	7	8	9-14 *	15
Short-Term Specification (+/-MHz)	8	3	3	3	3	8	0.086	80
Setting Accuracy (+/-MHz)	2	1	1	1	1	2		30
W/ Temp. & Voltage (+/-MHz)	6	2	2	2	2	6		50
Measured (MHz) Total	+2.80, -3.22	+1.52 -0.77	**+2.11, -1.99**	**+1.35, -1.99**	+0.81, -1. 50	**+0.80, -1.71**	+0.038, -0.057 +0.004, -0.036	+11, -13
Long-Term Specification (+/-MHz)	2	2	2	2	2	2	0.114	50
By Design or Analysis ** (+/-MHz)	0.1	0.1	0.1	0.1	0.1	0.1	0.115	76

* Measured for PLO No. 1 and No. 2.

** Based on accelerated life-test data for DROs.

Note: Additional +/-0.1MHz frequency stability reserved for safety margin for channels 11-14.

APPENDIX B

GAIN STABILITY AND GAIN COMPRESSION

FOR

MIXER/AMPLIFIERS AND IF AMPLIFIERS

APPE. .IX B

GAIN-TEMPERATURE SENSITIVITY FOR MIXER/AMPLIFIERS AND IF AMPLIFIERS

Channel No.	3	4	5	6	7	8	9	10	11	12	13	14	15
Specification (+/-dB/°C)	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.06	0.06	0.06	0.06	0.02
Measured (dB/°C)	-0.015	-0.017	**-0.013**	-0.016	-0.020	-0.015	-0.017 +0.005	-0.017 +0.005	-0.017 +0.005, -0.005 -0.016	-0.017 +0.005, -0.005 -0.016	-0.017 +0.005. -0.005 -0.009	-0.017 +0.005, -0.005 +0.001 -0.014	-0.020
Total (dB/°C)	-0.015	-0.017	**-0.013**	-0.016	-0.020	-0.015	+0.005, -0.017	+0.005, -0.017	+0.005, -0.036	+0.005, -0.036	+0.005, -0.031	+0.006, -0.036	-0.020

NASA
National Aeronautics and Space Administration

Report Documentation Page

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August 2000

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7. Author(s)
R. Haigh

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11490B

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Azusa, CA 91702

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Greenbelt, Maryland 20771

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15. Supplementary Notes
---

16. ABSTRACT (*Maximum 200 words*)

This is the Performance Verification Report, METSAT (S/N 108) AMSU-A1 Receiver Assemblies P/N 1356429-1 S/N F05 and P/N 1356409-1 S/N F05, for the Integrated Advanced Microwave Sounding Unit-A (AMSU-A).

17. Key Words (Suggested by Author(s))	18. Distribution Statement
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19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of pages	22. Price
Unclassified	Unclassified		---

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PREPARATION OF THE REPORT DOCUMENTATION PAGE

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14. SUBJECT TERMS
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15. NUMBER OF PAGES

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