Report 11528
22 July 1999

GenCorp
Aerojet

Integrated Advanced Microwave Sounding Unit-A (AMSU-A)
Performance Verification Report
Antenna Drive Subsystem
METSAT AMSU-A2 (PN: 1331200-2, SN: 109)

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

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AMSU-A VERIFICATION TEST REPORT

TEST ITEM:	METSAT AMSU- A2 ANTENNA DRIVE SUBSYSTEM PART OF P/N: 1331200-2 SERIAL NUMBER: 109
LEVEL OF ASSEMBLY:	SUBASSEMBLY AND COMPLETE INSTRUMENT ASSEMBLY
TYPE HARDWARE:	FLIGHT
PROCEDURE NO:	AE-26002/2E
TEST COMPLETION DATE:	6 JUNE 1999

TABLE OF CONTENTS

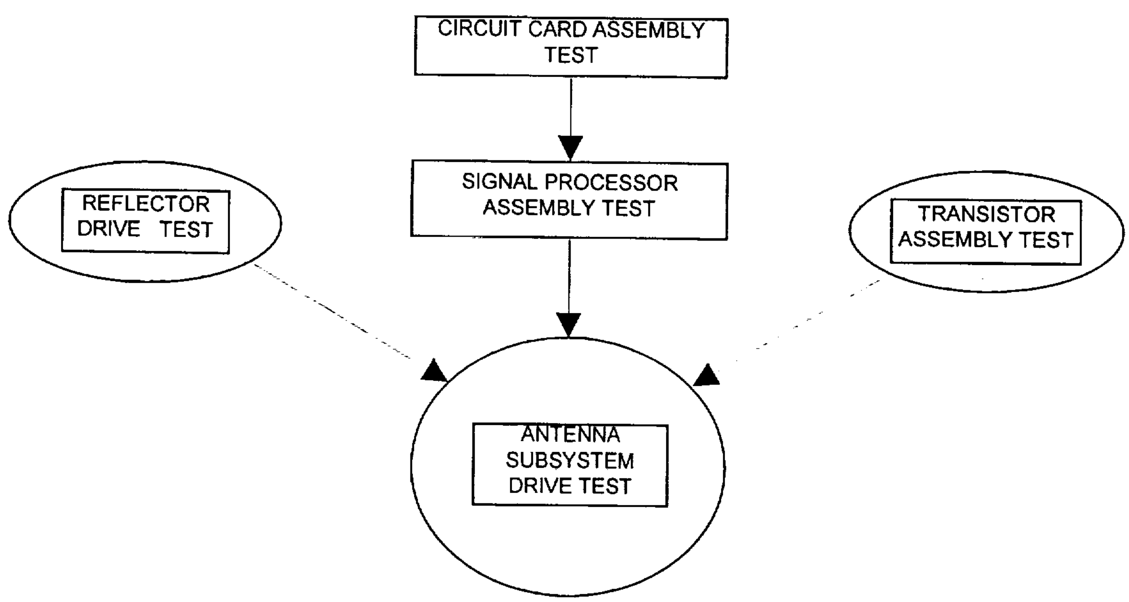
1.0 INTRODUCTION

The antenna drive subsystem test was performed on the METSAT AMSU-A2 S/N 109 (P/N 1331200-2) instrument. The objective of the test was to demonstrate compliance with applicable paragraphs of AMSU-A specification S-480-80 when tested using AE-26002/2E. Tests were conducted at both the subassembly and subsystem (instrument) level.

2.0 SUMMARY

The performance verification tests include 1) scan motion and jitter, 2) pulse load bus peak current and risetime, 3) resolver reading and position error, 4) gain and phase margin and 5) operational gain margin.

Subassembly tests are performed on the drive assembly, compensator assembly, circuit card assemblies (CCAs), signal processor and the transistor assembly. The transistor assembly was tested during the W3 cable assembly (1356946-1) test. Refer to Figure 1 for test flow.



Antenna Subsystem and Subsystem Component Test Flow
Figure 1.

The antenna drive subsystem satisfactorily passed all tests to verify the performance requirements. There were no failures in any of the antenna drive components during subsystem testing. There were several anomalies during subassembly testing. Refer to paragraph 5.0 for a discussion of test results.

3.0 TEST CONFIGURATION – SUBASSEMBLIES

Subassemblies are tested using a variety of test fixtures as required to perform the necessary tests.

Drive Assembly – Prior to complete buildup of this assembly, a starting torque test is performed on the rotating part of the assembly. The test is performed at temperatures of 23, 4, and –10 °C. The tests performed on the completed assembly are 1) motor commutation, 2) resolver operation and no-load speed, 3) temperature sensor resistance and output voltage and 4) random vibration. Motor commutation and resolver operation and no-load speed are repeated after vibration.

Compensator Assembly – The tests performed on this assembly are 1) motor commutation, 2) temperature sensor resistance and output voltage and 3) random vibration. Motor commutation is repeated after vibration.

CCAs – All CCAs are tested prior to being incorporated into the signal processor. They are tested to verify functionality and the derived performance requirements.

Signal Processor – Part of the signal processor test is associated with the antenna drive subsystem. The test includes all applicable CCAs installed in the signal processor card cage, the STE with the associated cabling to the signal processor, and a test motor and inertia wheel to simulate the antenna drive motor and reflector load. This test demonstrates that all signal processor scan drive circuitry is functioning as a subsystem prior to assembly into the instrument. During the tests, qualitative reflector position for the various scan modes is verified by visually observing an index mark on the inertia wheel.

Transistor Assembly – The W3 cable is first tested on the CKT 1000 (continuity and hi-pot tester). The transistor assembly is then mated with the W3 cable, and tested using a special test fixture. The test assures that the transistors saturate when turned on, and that they turn off.

4.0 TEST CONFIGURATION – SUBSYSTEM

The antenna drive subsystem tests are performed after all of the scan drive subassemblies are assembled into the instrument, and the subsystem is tested in accordance with AE-26002/2 during system integration. At the beginning of system integration testing, the instrument is first proven electrically safe by ground isolation and power distribution checks. The instrument is supplied with 28 Vdc from the STE, and the DC-DC converter is installed to supply the other required voltages to the CCAs.

The tests performed to verify performance are 1) scan motion and jitter, 2) pulse load bus peak current and risetime, 3) resolver reading and position error, 4) gain and phase margin and 5) operational gain margin. In order to verify scan motion and jitter, it is necessary to obtain real time measurement of the drive assembly shaft position. This is done by using a continuous rotation potentiometer (pot) mechanically coupled to the drive assembly shaft, and connecting a source of dc voltage across the pot. The voltage at the pot wiper then gives a voltage analog of shaft position for each revolution of the shaft.

Prior to the performance verification tests, there are five operations performed. These are described as follows:

1. An EPROM is programmed with the reflector position commands (14-bit digital words) which are calculated from the nadir position obtained on the antenna range. This PROM is one of the components on the memory board in the signal processor, and it is under microprocessor control for positioning the reflector. Reprogramming may be necessary if the measured reflector positions are not within the specified limits. (See 5.5.3).

2. After obtaining the PROM, the instrument is powered, and scan motion is qualitatively checked to conform to the pattern as shown in Appendix B1.

3. The motor (drive and compensator) current limits are set with select at test (SAT) resistors.

4. The individual steps in the scan are tailored for risetime, overshoot and jitter with SAT resistors which are part of circuits in the rate loop.

5. The mechanical resonant frequencies of the drive assembly and reflector are identified. They are then nullified by selecting the appropriate frequencies for three notch filters.

The antenna drive subsystem subassemblies designated for use in the METSAT AMSU-A2 S/N 109 instrument are shown in Table 1.

CCAs	S/N
Resolver Data Isolator	F24
Interface Converter	F24
Motor Driver 3-Hall Sensor	F07
Motor Driver 3-Hall Sensor	F08
R/D Converter/Oscilator	F12

OTHER	S/N
Antenna Drive Assembly	F08
Compensator Assembly	F09
Signal Processor	F05
Transistor Assembly (W3 Cable)	NONE

Table 1. A2 109 Subassembly S/N

5.0 TEST RESULTS

The test results for the subassemblies are first presented in paragraphs 5.1 through 5.4. The subsystem test results are presented in 5.5.

5.1 DRIVE AND COMPENSATOR ASSEMBLIES

When the F08 drive assembly was vibrated, it was found to have natural frequencies about 13 % lower than the average tested drive assembly (TAR 005089). Investigation revealed no anomaly and the TAR was closed.

Also on the drive assembly, a clicking noise was heard when the motor commutation was run (TAR 002684). Excessive slack in one wire in a wire bundle caused the wire to contact the rotating assembly. A spot tie was removed, the slack was taken out and the tie was redone.

When the temperature sensor output voltage on the compensator assembly was measured, it was found to be out of limits (TAR 002750). Troubleshooting revealed a miswiring. After rework, the output voltage was within limits.

5.2 CCAs

There were no test anomalies or failures during testing of the CCAs for this instrument. The test data sheets (TDSs) for the CCAs are presented in Appendicies A1 trhrough A4.

5.3 SIGNAL PROCESSOR

There were no test anomalies or failures during the scan drive part of the testing of the signal processor for this instrument.

5.4 TRANSISTOR ASSEMBLY

There were no test anomalies or failures during testing of the transistor assembly for this instrument.

5.5 ANTENNA SUBSYSTEM

There were no test anomalies or failures during testing of the antenna drive subsystem for this instrument. A discussion of test results is given in paragraphs 5.5.1 through 5.5.5.

5.5.1 SCAN MOTION AND JITTER

In this test, the antenna position is measured in a series of five full scans. The measurement was made with the continuous rotation test pot temporarily affixed to the motor shaft. A Dynamic Signal Analyzer (DSA) is connected to the pot wiper to record the antenna position. Five scans were captured and stored on the AMSU-A2 Test Data File disc. One representative pattern is presented in Appendix B1.

Each 3.33 degree scene step was expanded in order to verify risetime, overshoot and jitter. The risetime limit is 42 ms, the jitter limits are ± 5 % and the overshoot limit is 4 % above the upper jitter limit. The expanded waveforms were plotted and are presented in Appendicies B2 through B30. All of the scene steps meet the step response requirements.

Slew periods to the cold and warm calibration stations were measured and met requirements. A time of 0.21 s is allowed for the 35 degree slew to cold cal, and 0.4 s for the 96.67 degree slew to warm cal. Calibration station jitter is less than the ± 5 % maximum allowed. Expanded waveforms were plotted and are presented in Appendicies B31 and B32. The waveforms are also stored on the AMSU-A2 Test Data File disc. The test data sheet is presented in Appendix B33.

5.5.2 PULSE LOAD BUS PEAK CURRENT AND RISE TIME

The peak current must be less than 2 A at any beam position along the scan, and it was measured to be 1.997 A. The current risetime while transitioning from one beam position to the next, and the risetime at the start and stop of the slew to warm cal position must be greater than 70 μs. One 3.33° step was selected, and the risetime is 2.344 ms. For the slew to warm cal, the times are 3.906 ms and 1.953 ms for start and stop respectively.

The full scan pulse load bus current waveform is presented in Appendix C1, and the TDS is presented in Appendix C2. The waveform is also stored on the AMSU-A2 Test Data File disc.

5.5.3 RESOLVER READING AND POSITION ERROR

Reflector positions are obtained by using the STE, which displays the resolver readings to be compared with the position commands. Two readings are taken, one at the start of integration (LOOK 1), and the other halfway into the integration period (LOOK 2). The limits on the difference between the reported position (actual) and the command are ±10 counts for LOOK 1 and ±5 counts for LOOK 2. A table of reflector position commands and the reported position obtained from the STE computer printout is shown in Table 2, together with the differences between actual and command.

		Actual		Difference*				Actual		Difference*	
BP	Command	Look 1	Look 2	Look 1	Look 2	BP	Command	Look 1	Look 2	Look 1	Look 2
1	5595	5954	5954	-1	-1	19	3225	3226	3224	1	-1
2	5803	5807	5804	4	1	20	3073	3073	3073	0	0
3	5651	5655	5652	4	1	21	2921	2923	2920	2	-1
4	5500	5504	5501	4	1	22	2770	2771	2770	1	0
5	5348	5352	5349	4	1	23	2618	2619	2618	1	0
6	5196	5200	5197	4	1	24	2466	2467	2466	1	0
7	5045	5048	5046	3	1	25	2315	2317	2315	2	0
8	4893	4896	4894	3	1	26	2163	2163	2163	0	0
9	4741	4746	4742	5	1	27	2010	2013	2011	3	1
10	4590	4594	4591	4	1	28	1860	1861	1860	1	0
11	4438	4441	4440	3	2	29	1708	1708	1708	0	0
12	4286	4289	4287	3	1	30	1556	1558	1556	2	0
13	4135	4137	4135	2	0	WC	11948	11948	11949	0	1
14	3983	3984	3983	1	0	CC1	16347	16346	16347	-1	0
15	3830	3833	3831	3	1	CC2	38	40	40	2	2
16	3680	3682	3680	2	0	CC3	115	117	117	2	2
17	3528	3529	3528	1	0	CC4	266	268	268	2	2
18	3376	3378	3375	3	-1						

BP = Beam position *Actual - Command

Table 2. Reflector (Beam) Position Commands and Measurements

5.5.4 GAIN AND PHASE MARGIN

The gain and phase margin test is performed on the position control loop of the antenna drive subsystem. Three separate open loop gain and phase plots (measured with the loop closed) are obtained. The DSA is used to make the plots using the swept sine mode. Gain margin is measured at the $-180°$ phase crossover frequency, and phase margin is measured at the 0 dB gain crossover frequency. The margins on each of the three plots are above the minimum specification requirement of 12 dB and 25 degrees for the gain and phase respectively. The plots are presented in Appendices D1 through D3, and the TDS is presented in Appendix D4. The plots are also stored on the AMSU-A2 Test Data File disc.

5.5.5 OPERATIONAL GAIN MARGIN

The operational gain margin test is also done three times. This test consists of increasing the gain inside the rate loop until oscillation occurs. The gain increase is calculated and the frequency of oscillation is measured from the spectrum plot using the DSA. An increase in gain greater than 9 dB is required, and the frequency of oscillation is just recorded.

To increase the gain, a 50 kΩ pot is connected in series with the R58 feedback resistor on amplifier AR8 on the R/D Converter/Oscillator CCA. The resistance of the test pot is slowly added to the feedback resistor while observing the reflector for oscillations. The reflector begins to produce an audible sound as gain is increased to the point of oscillation. Table 3 shows the added resistance values and the calculated gain margin.

Resistance (kΩ)	Gain Margin (dB)
38.58	9.3
41.20	9.7
42.88	9.9

Table 3. Pot Resistance and Operational Gain Margin

The first mode mechanical resonance of the shaft and reflector is about 228 Hz as shown in the power spectrum. The spectrum was plotted and is presented in Appendix E1, and the TDS is presented in Appendix E2. The spectrum plot is also stored on the AMSU-A2 Test Data File disc.

6.0 CONCLUSION

Based on the test results, it can be concluded that the METSAT AMSU-A2 S/N 109 antenna drive subsystem meets the AMSU-A specification requirements.

7.0 TEST DATA

Test data for the CCAs and the antenna drive subsystem is presented in the appendices as outlined in the Appendix Index on the following page.

APPENDIX INDEX

TEST DATA SHEET B-6 (Sheet 1 of 2)

RESOLVER DATA ISOLATOR CCA (P/N 1334972) (Paragraph 6.6.7)

Date: 4/14/97
S/N: F-24
1334972-1

6.6.7.1 Supply Voltages

Supply*	Measured Value (V)	Limits (Vdc)	Pass/Fail
+5 V (I)	5.01	± 0.25	P
+5 V (U)	5.00	± 0.25	P

6.6.7.2 Supply Currents

Steps 1 and 2:

Supply*	Measured Value (mA)	Limits (mA)	Pass/Fail
+5 V (I)	53.38	100 max	P
+5 V (U)	333.00	400 max	P

PWD 4-16-97

Steps 3 and 4:

Supply*	Measured Value (mA)	Limits (mA)	Pass/Fail
+5 V (I)	83.60	150 max	P
+5 V (U)	11.06	30 max	P

* I = Isolated, U = Unisolated

6.6.7.3 Resolver Data

Bit No.	Pass/Fail
API 0 - AP Bit 0	P
API 1 - AP Bit 1	P
API 2 - AP Bit 2	P
API 3 - AP Bit 3	P
API 4 - AP Bit 4	P
API 5 - AP Bit 5	P
API 6 - AP Bit 6	P
API 7 - AP Bit 7	P
API 8 - AP Bit 8	P
API 9 - AP Bit 9	P
API 10 - AP Bit 10	P
API 11 - AP Bit 11	P
API 12 - AP Bit 12	P
API 13 - AP Bit 13	P

6.6.7.4 Converter Busy Pulse

Converter Busy Pulse	Measured Value (µsec)	Limits (µsec)	Pass/Fail
15.0	14.75	± 3.0	P

A1

TEST DATA SHEET B-6 (Sheet 2 of 2)

RESOLVER DATA ISOLATOR CCA (P/N 1334972) (Paragraph 6.6.7)

Comments: NONE

Conducted by: Test Engineer — Date 4/14/97

Verified by: Quality Control Inspector — QA 269 — Date 4-16-97

Approved by: DCMC — Date 4/16/97

A1

TEST DATA SHEET B-13 (Sheet 1 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

Date: 8/5/97
CCA S/N: F24
1331697-1

6.13.7.1 Supply Voltages

Supply	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
+5V (U)	5.00	+5V± 0.05	P
+15V (I)	15.01	+15V± 0.15	P
-15V (I)	-14.98	-15V± 0.15	P
+5V (I)	5.02	+5V± 0.05	P

6.13.7.2 Supply Currents

Step 1 (CP and API Low):

Supply	Measured Value (mA)	Limits (mA)	Pass/Fail
+5V (U)	86.55	70 - 110	P
+5V (I)	3.38	1.5 - 5.5	P
+15V (I)	17.76	15 - 23	P
-15V (I)	20.46	18 - 26	P

Step 2 (CP and API High):

Supply	Measured Value (mA)	Limits (mA)	Pass/Fail
+5V (U)	56.58	40 - 70	P
+5V (I)	23.96	18 - 30	P
+15V (I)	17.76	15 - 23	P
-15V (I)	20.46	18 - 26	P

6.13.7.3 Amplifier Offsets

Amplifier	Measured Value (mV)	Limits (mV)	Pass/Fail
AR1	-0.07	0.0 ±0.15	P
AR2	-0.20	0.0 ±2.0	P

A2

TEST DATA SHEET B-13 (Sheet 2 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

6.13.7.4 Subtraction and D-A Conversion

wmHummel 9-10-97

± 0.00015
± 0.00060
± 0.00030

Step 1:

Actual Position (API) MSB LSB	Command Position (CP) MSB LSB	AR1 Output* Voltage Required (Vdc)	Test Result (Vdc)	Pass/Fail
00000000000000	00000000000000	0.00000	-0.000081	P
00000000000001	00000000000000	-0.00061	-0.000729	P
00000000000010	00000000000000	-0.00122	-0.001355	P
00000000000011	00000000000000	-0.00184	-0.001982	P
00000000000100	00000000000000	-0.00245	-0.00260	P
00000000001000	00000000000000	-0.00490 *	-0.005135	P
00000000010000	00000000000000	-0.00979 *	-0.010175	P
00000000100000	00000000000000	-0.01958 *	-0.020260	P
00000001000000	00000000000000	-0.03917 *	-0.040419	P
00000010000000	00000000000000	-0.07834 *	-0.080745	P
00000100000000	00000000000000	-0.15667 *	-0.16138	P
00001000000000	00000000000000	-0.31334 *	-0.32270	P
00010000000000	00000000000000	-0.62669 *	-0.64541	P
00100000000000	00000000000000	-1.25338 *	-1.2909	P
01000000000000	00000000000000	-2.50675 *	-2.5817	P
10000000000000	00000000000000	-5.01350 *	-5.1633	P

* Tolerance on output voltage is ± 10%

wmHummel 9-10-97

± 0.00015
± 0.00060
± 0.00030

Step 2:

Actual Position (API) MSB LSB	Command Position (CP) MSB LSB	AR1 Output* Voltage Required (Vdc)	Test Result (Vdc)	Pass/Fail
00000000000000	00000000000000	0.00000	-0.00007	P
00000000000000	00000000000001	0.00061	0.000541	P
00000000000000	00000000000010	0.00122	0.001180	P
00000000000000	00000000000011	0.00184	0.001794	P
00000000000000	00000000000100	0.00245	0.002440	P
00000000000000	00000000001000	0.00490 *	0.004969	P
00000000000000	00000000010000	0.00979 *	0.010036	P
00000000000000	00000000100000	0.01958 *	0.020110	P
00000000000000	00000001000000	0.03917 *	0.040281	P
00000000000000	00000010000000	0.07834 *	0.080590	P
00000000000000	00000100000000	0.15667 *	0.16131	P
00000000000000	00001000000000	0.31334 *	0.32269	P
00000000000000	00010000000000	0.62669 *	0.64551	P
00000000000000	00100000000000	1.25338 *	1.2908	P
00000000000000	01000000000000	2.50675 *	2.5816	P
00000000000000	10000000000000	-5.01350 *	-5.1633	P

* Tolerance on output voltage is ± 10%

A2

TEST DATA SHEET B-13 (Sheet 3 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

6.13.7.5 Strobe Function

Step 1: Strobe Low

	Pass/Fail
No E11 Change with Input CP Changes	P

Step 2: Strobe High

	Pass/Fail
E11 Change with Input CP Changes	P

6.13.7.6 Amplifier Gain

	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
E11	0.32269	-	P
E10	3.5530	-	P
~~E10 Voltage~~ E11 Voltage	11.0	10.7 - 11.3	~~11.0~~ P DL44

6.13.7.7 Ground Isolation

	Measured Value (MΩ)	Limits (MΩ)	Pass/Fail
Pin 91 to Pin 7 DC Resistance	larger than 170MΩ	>20	P

Comments:
NONE

Conducted by: Dennis Lee — Test Engineer — Date: 8/5/97

Verified by: [signature] 7A 190 — Quality Control Inspector — Date: OCT 13 '97

Approved by: [signature] — DCMC — Date: 10/14/97

TEST DATA SHEET B-4 (Sheet 1 of 2)

MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

S/N: F08
Date: 4/21/97
1331694-4

6.4.3.2 Input Signal Offset

Step No.	Test Results	Limits
4	1.05 mV	0.0 ±1 mVdc
6	1.35 mV	0.0 ±1 mVdc
8	1.12 mV	0.0 ±1 mVdc

Step No.	Test Resistor	Resistance Measured
13	E7-E8 (R25)	3.16K
	E9-E10 (R52)	4.48K
	E11-E12 (R33)	2.80K
	E13-E14 (R53)	4.24K
	E15-E16 (R42)	3.16K
	E17-E18 (R54)	4.52K

Step No.	Resistors	Selected Trim Resistors
14	R25	RNC55J3161FS
	R52	RNC55J4531FS
	R33	RNC55J2801FS
	R53	RNC55J4221FS
	R42	RNC55J3161FS
	R54	RNC55J4531FS

Step No.	E Point	Test Results	Limits	Pass/Fail
19	E19	+0.04 mV	0.0 ±1 mVdc	P
	E20	+0.11 mV	0.0 ±1 mVdc	P
	E21	+0.13 mV	0.0 ±1 mVdc	P

6.4.3.3 Motor Driver Operation

Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
2	+5.00V	+5V±0.05Vdc	P
	49.1 mA	70mAdc max	P
	+15.07 V	+15V±0.15Vdc	P
	1.5 mA	3.0mAdc max	P
	-14.98 V	-15V±0.15Vdc	P
	18.6 mA	25mAdc max	P
	28.03 V	+28V±0.5Vdc	P
	5.6 mA	8mAdc max	P
3	287 mV	400mVdc max	P
4	43.0 mA	50mAdc max	P
5	47.7 mA	50mAdc max	P

A3

TEST DATA SHEET B-4 (Sheet 2 of 2)

MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

Counter Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
3	269 mV	400mVdc max	P
4	36.6 mA	50mAdc max	P
5	39.8 mA	50mAdc max	P

6.4.3.4 Current Limit Test

Step No.	Test Results	Limits	Pass/Fail
2	440 mA	350-500mAdc	P

Comments: NONE

Conducted by:	[signature] Test Engineer	4/21/97 Date
Verified by:	[signature] Quality Control Inspector (7A 269)	04/28/97 Date
Approved by:	[signature] DCMC	4/29/97 Date

A3

TEST DATA SHEET B-4 (Sheet 1 of 2)

MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

S/N: F07
Date: 4/21/97

1331694-4

6.4.3.2 Input Signal Offset

Step No.	Test Results	Limits
4	0.93 mV	0.0 ±1 mVdc
6	0.92 mV	0.0 ±1 mVdc
8	0.94 mV	0.0 ±1 mVdc

Step No.	Test Resistor	Resistance Measured
13	E7-E8 (R25)	3.16K
	E9-E10 (R52)	4.25K
	E11-E12 (R33)	3.16K
	E13-E14 (R53)	4.30K
	E15-E16 (R42)	3.40K
	E17-E18 (R54)	4.75K

Step No.	Resistors	Selected Trim Resistors
14	R25	RNC55J3161FS
	R52	RNC55J4221FS
	R33	RNC55J3161FS
	R53	RNC55J4221FS
	R42	RNC55J3401FS
	R54	RNC55J4751FS

Step No.	E Point	Test Results	Limits	Pass/Fail
19	E19	-0.02 mV	0.0 ±1 mVdc	P
	E20	+0.02 mV	0.0 ±1 mVdc	P
	E21	-0.02 mV	0.0 ±1 mVdc	P

6.4.3.3 Motor Driver Operation

Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
2	5.00V	+5V±0.05Vdc	P
	52.5 mA	70mAdc max	P
	+15.07V	+15V±0.15Vdc	P
	1.5mA	3.0mAdc max	P
	-14.98V	-15V±0.15Vdc	P
	13.7mA	25mAdc max	P
	28.04V	+28V±0.5Vdc	P
	5.6mA	8mAdc max	P
3	235mV	400mVdc max	P
4	42.6mA	50mAdc max	P
5	47.6mA	50mAdc max	P

43

TEST DATA SHEET B-4 (Sheet 2 of 2)

MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

Counter Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
3	299mV	400mVdc max	P
4	37.1mA	50mAdc max	P
5	39.7mA	50mAdc max	P

6.4.3.4 Current Limit Test

Step No.	Test Results	Limits	Pass/Fail
2	440mA	350-500mAdc	P

Comments: NONE

Conducted by: [signature] 4/21/97
Test Engineer Date

Verified by: [signature] 04/28/97
Quality Control Inspector Date

Approved by: [signature] 4/29/97
DCMC Date

A3

TEST DATA SHEET B-5 (Sheet 1 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

Date 8/26/97
CCA S/N F12
1337739-2

6.5.7.1 UUT Pre-Test

Step 2:

Supply Currents (Without UUT)

Supply (Vdc)	(Baseline) Measured Value (mA) (Without UUT)	Limits (mA)	Pass/Fail
+15	0.06	0-1	P
-15	-0.28	-1 - 0	P
+5	0.06	0-1	P

Supply Voltages (Without UUT)

Supply	Measured Value (V)	Limits (V)	Pass/Fail
+15V (I)	15.02	± 0.50	P
-15V (I)	-15.01	± 0.50	P
+5V (I)	5.03	±0.25	P

Step 6:

Supply Currents (UUT Installed)

Supply (Vdc)	Measured Value (mA) (UUT Installed)	Difference (mA) (Measured - Baseline)	Limits (mA)	Pass/Fail
+15	27.02	26.96	20-40	P
-15	-36.27	-35.99	-30 - -50	P
+5	55.84	55.78	30-70	P

6.5.7.2 Supply Voltages (UUT Installed)

Supply	Measured Value (V)	Limits (V)	Pass/Fail
+15V (I)	15.01	± 0.50	P
-15V (I)	-14.97	± 0.50	P
+5V (I)	5.02	±0.25	P

6.5.7.3 Oscillator Frequency, Duty Cycle, and Output Voltage

Parameter	Measured Value	Limits	Pass/Fail
Frequency	1617 Hz	1550-1650 Hz	P
Duty Cycle	51.4 %	45-55 %	P
Output Voltage	7.86V	7.6-8.4 Vrms	P

A4

TEST DATA SHEET B-5 (Sheet 2 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

6.5.7.4 R-D Converter Operation

Step 1:

Bit Number/ Test Fixture Label	CW Pass/Fail	CCW Pass/Fail
API 0/1	P	P
API 1/2	P	P
API 2/3	P	P
API 3/4	P	P
API 4/5	P	P
API 5/6	P	P
API 6/7	P	P
API 7/8	P	P
API 8/9	P	P
API 9/10	P	P
API 10/11	P	P
API 11/12	P	P
API 12/13	P	P
API 13/14	P	P
Converter Busy	P	P

Step 2:

RS (E10)	Measured Value (Vdc)	Calculated Value (Vdc) * CCA -1 Assy	Calculated Value (Vdc) * CCA -2 Assy	Pass/Fail
CW Rotation**	1.627V	(+) N/A	(+) 1.790	P
CCW Rotation**	-1.757V	(-) N/A	(-) 1.790	P

* Signal level function of test and calibration gain resistors. Record calculated value and measured value. Measured value shall be within ±~~10~~ 20 percent of calculated value. The equation is as follows:

20 wmtf 8-26-97

$$V = \pm 0.155\left(\frac{R20}{R17}\right) \pm \cancel{10}\ 20\% = 0.155\left(\frac{59k}{5.11k}\right) = 1.790\,V$$

wmtf 8-26-97

6.5.7.5 Amplifier Gain

PES-RS	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
PES = +0.300 Vdc	1.091 V	1.00 to1.30	P
PES = -0.300 Vdc	1.164 V	1.00 to 1.30	P

6.5.7.6 Direction Control Signal

DIR CNTRL	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
CW Rotation	5.000 V	4.5 to 5.5	P
CCW Rotation	0.125V	0.0 to 0.4	P

A4

TEST DATA SHEET B-5 (Sheet 3 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

6.5.7.7 Notch Filter Frequency Response

Frequency	Measured Value (Hz)	Calculated Value (Hz) * CCA -1 Assy	Calculated Value (Hz) * CCA -2 Assy	Pass/Fail
AR3 Notch	N/A	N/A	N/A	N/A
AR4 Notch	↓	↓	↓	↓
AR5 Notch	↓			

* Notch frequencies shall be within ±3 percent of values determined by test and calibration resistors. Record calculated and measured values.

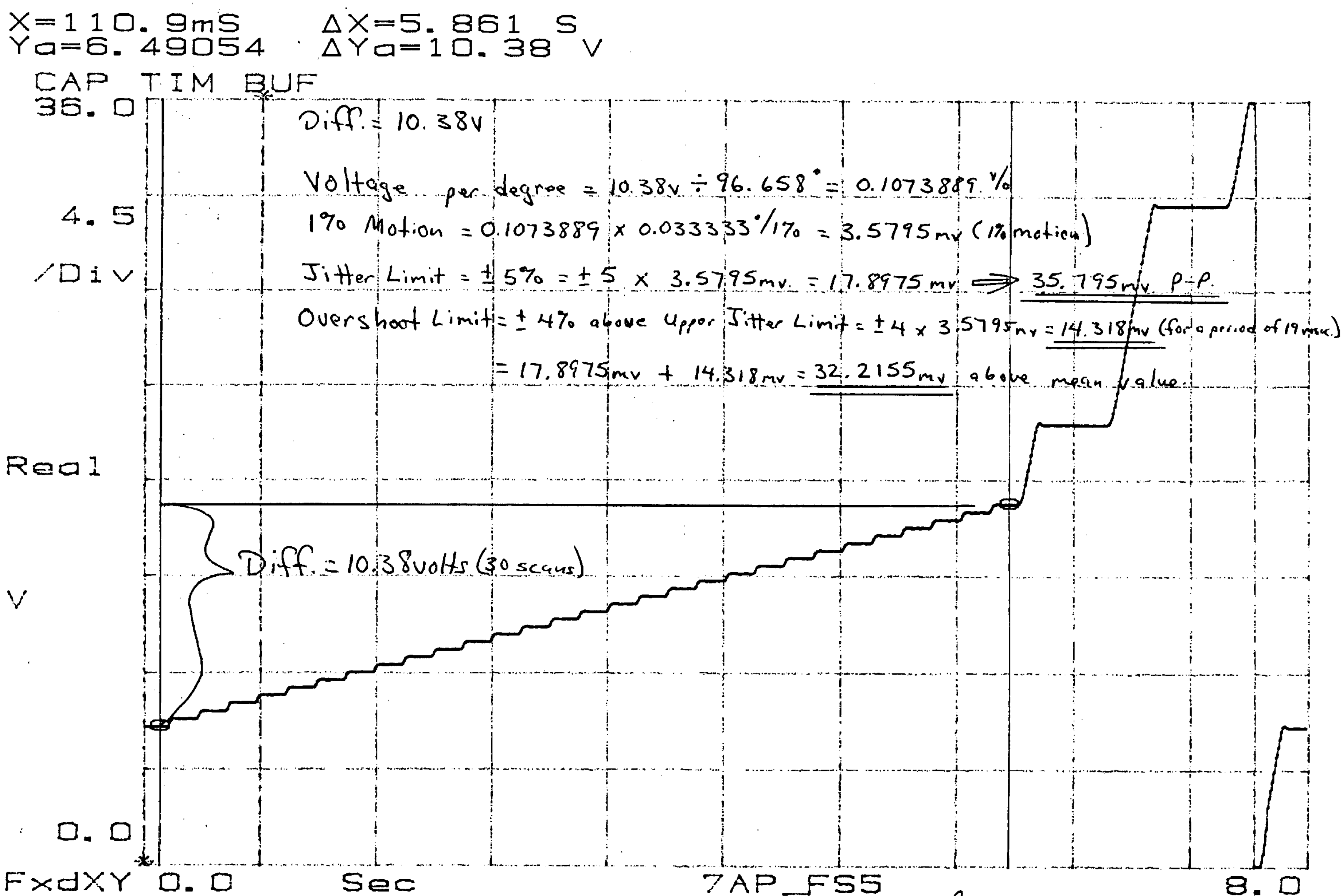
Comments: NONE

Conducted by: Denise Lee (Test Engineer) Date: 8/26/97

Verified by: 7A 268 (Quality Control Inspector) Date: NOV 19 '97

Approved by: (DCMC) Date: 11-19-97

A4



SO: 727181

SCAN MOTION AND JITTER
3.4.5.5

PN: 1331200-2-IT SN: 109

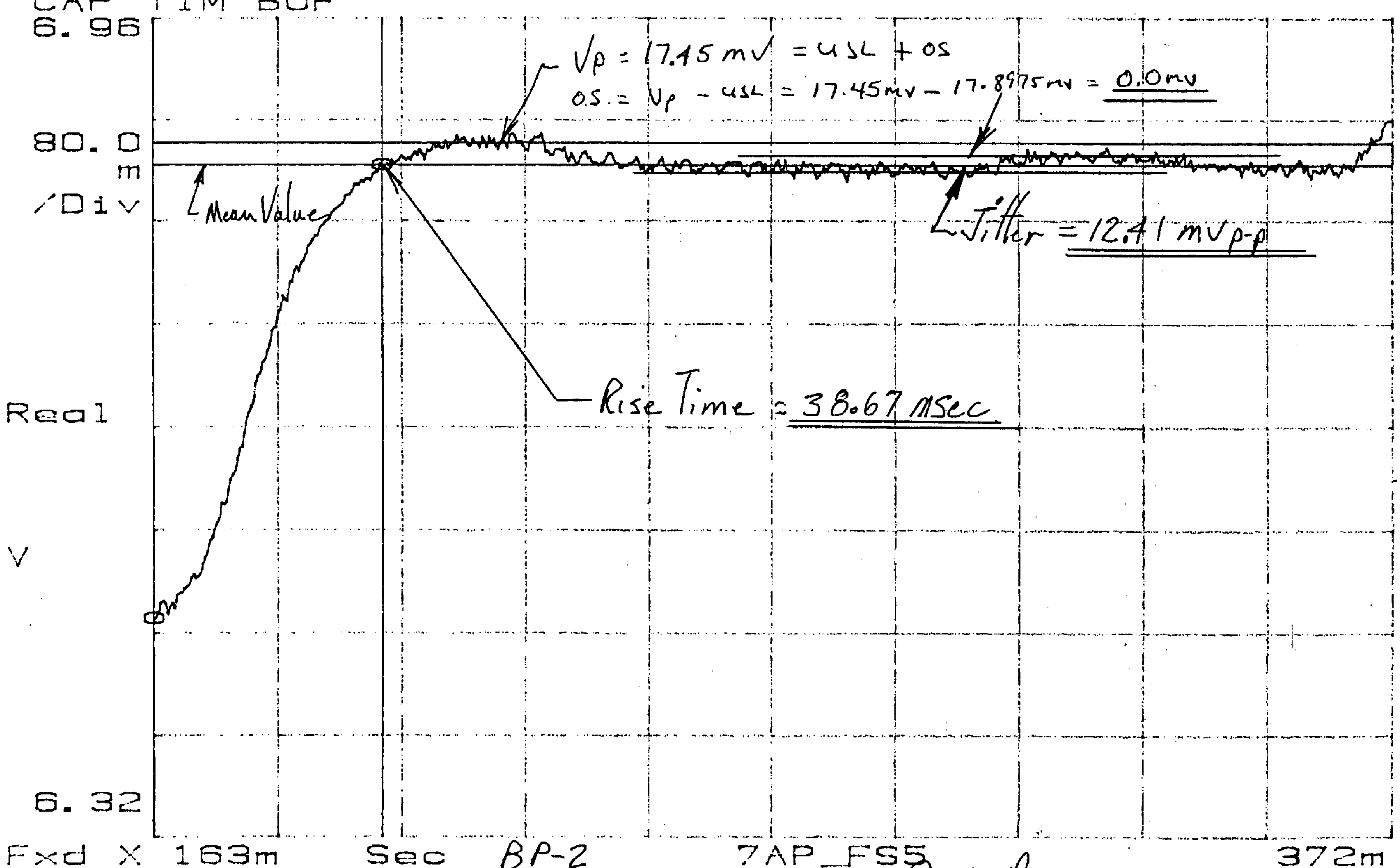
B1

TEST ENG: [signature] DATE: 6-15-99

QUALITY: 7A 268

B1

X=163.3mS ΔX=38.67mS Y=6.84402 ΔY=17.45mV
Ya=6.49054 ΔYa=353.6mV
CAP TIM BUF



SO: 727181

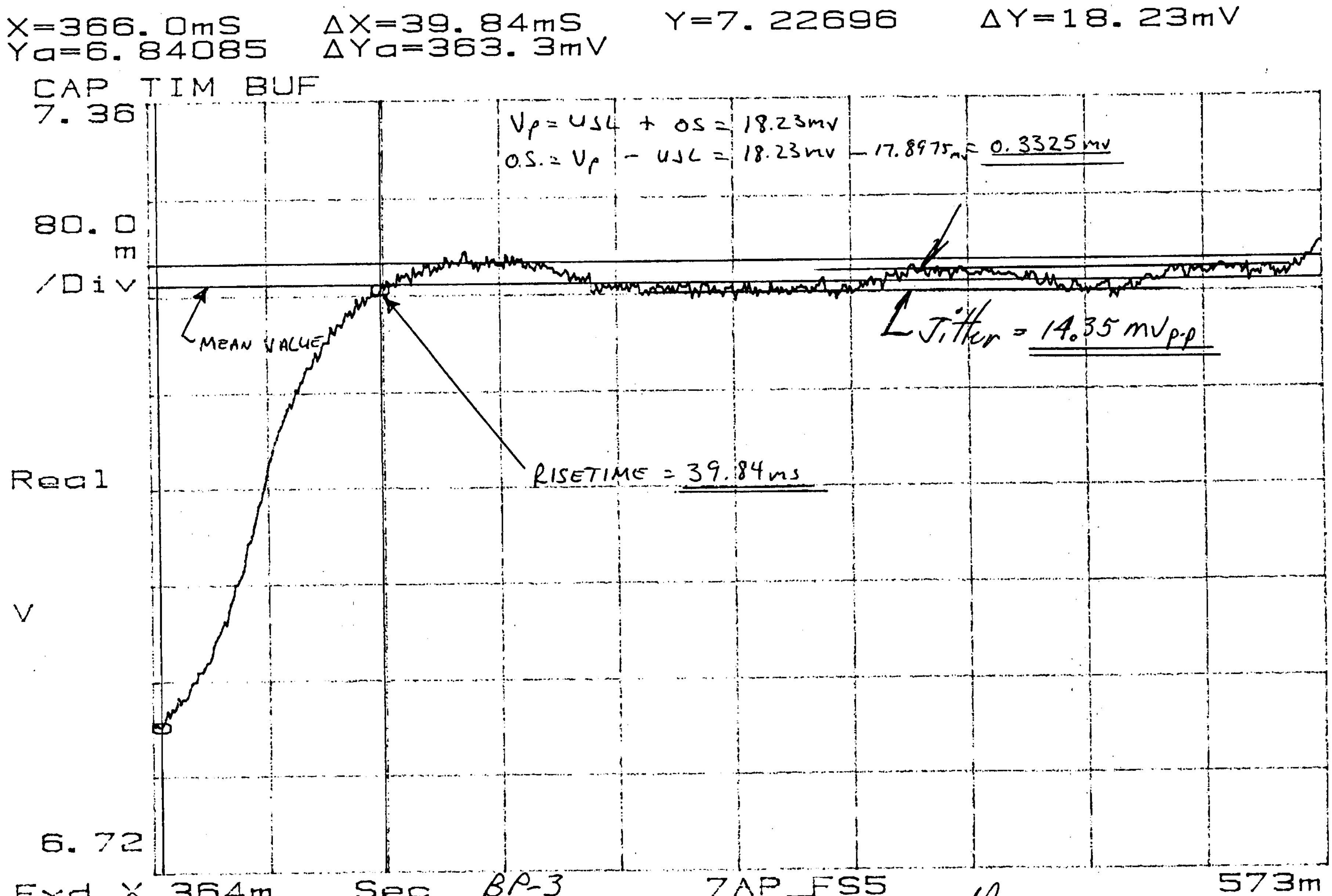
3455 B2

TEST ENG: Ray Herzberg DATE: 6-15-99

PN: 1231200-2-IT SN: 109

QUALITY:

R2



BP-3 7AP_FS5

SO: 727181

PN: 1331200-2-IT SN: 109

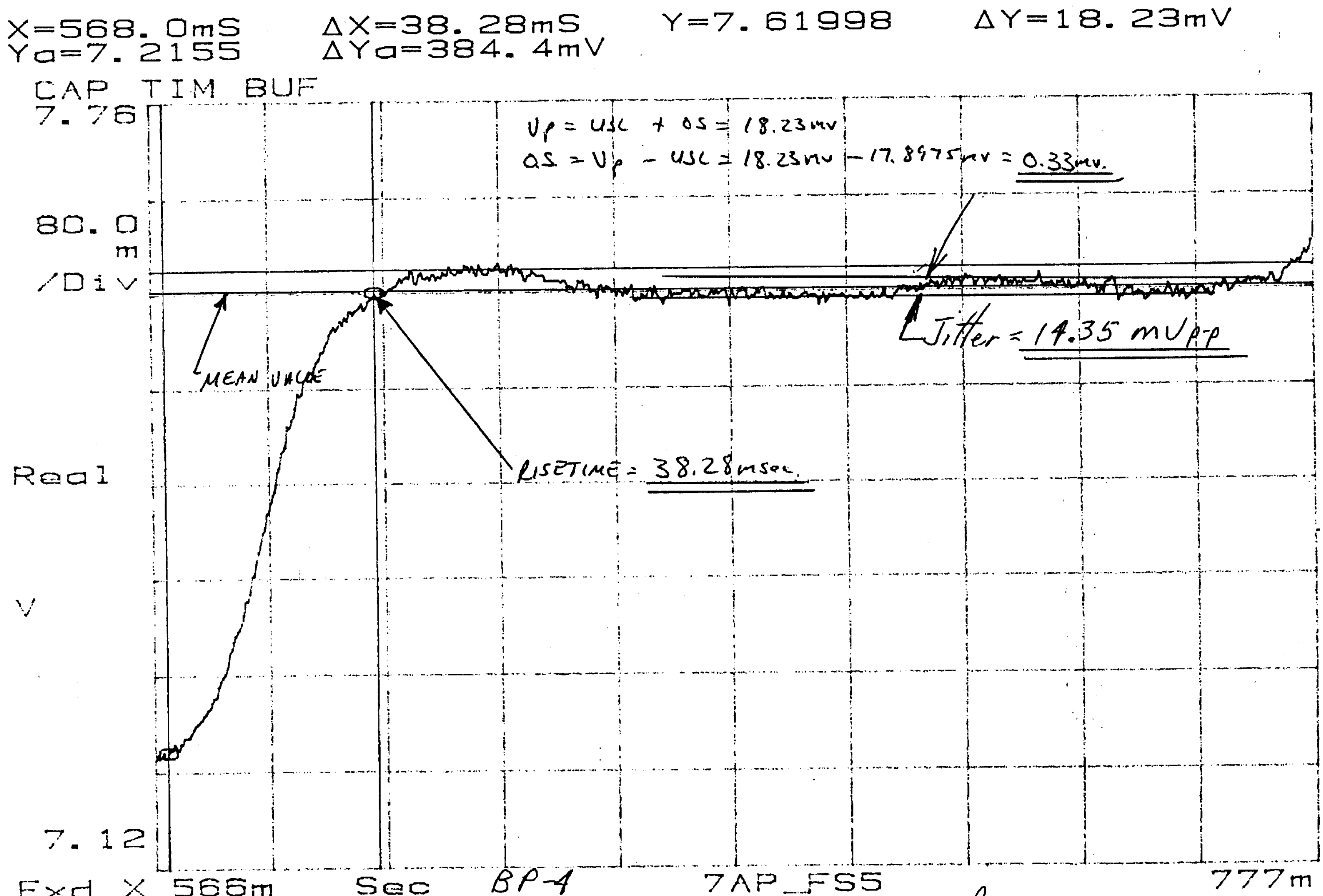
3.4.5.5 B3

TEST ENG: [signature]

QUALITY:

DATE: 6-15-99

B3



SO: 727181

3.4.5.5 B4

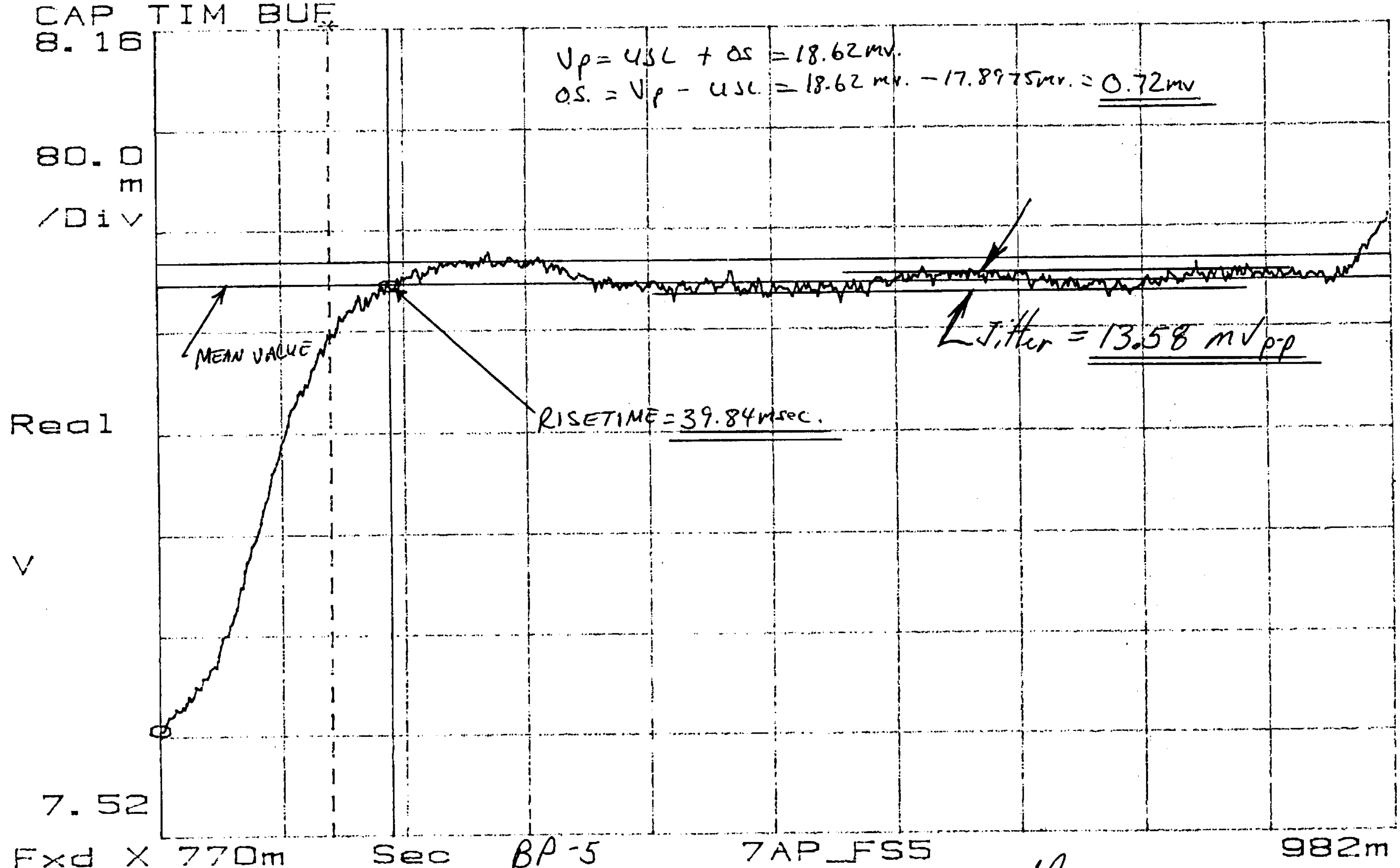
TEST ENG: [signature]

QUALITY:

DATE: 6-15-99

B4

X=770.3mS ΔX=39.84mS Y=7.97498 ΔY=18.62mV
Ya=7.60473 ΔYa=350.3mV



SO: 727181

3.4.5.5 B5

TEST ENG: Ray Hertzberg DATE: 6-15-99

QUALITY: 268

PN: 1331200 2-IT SN: 109

X=973.4mS ΔX=40.23mS Y=8.32756 ΔY=17.84mV
Ya=7.95829 ΔYa=350.3mV

CAP TIM BUF

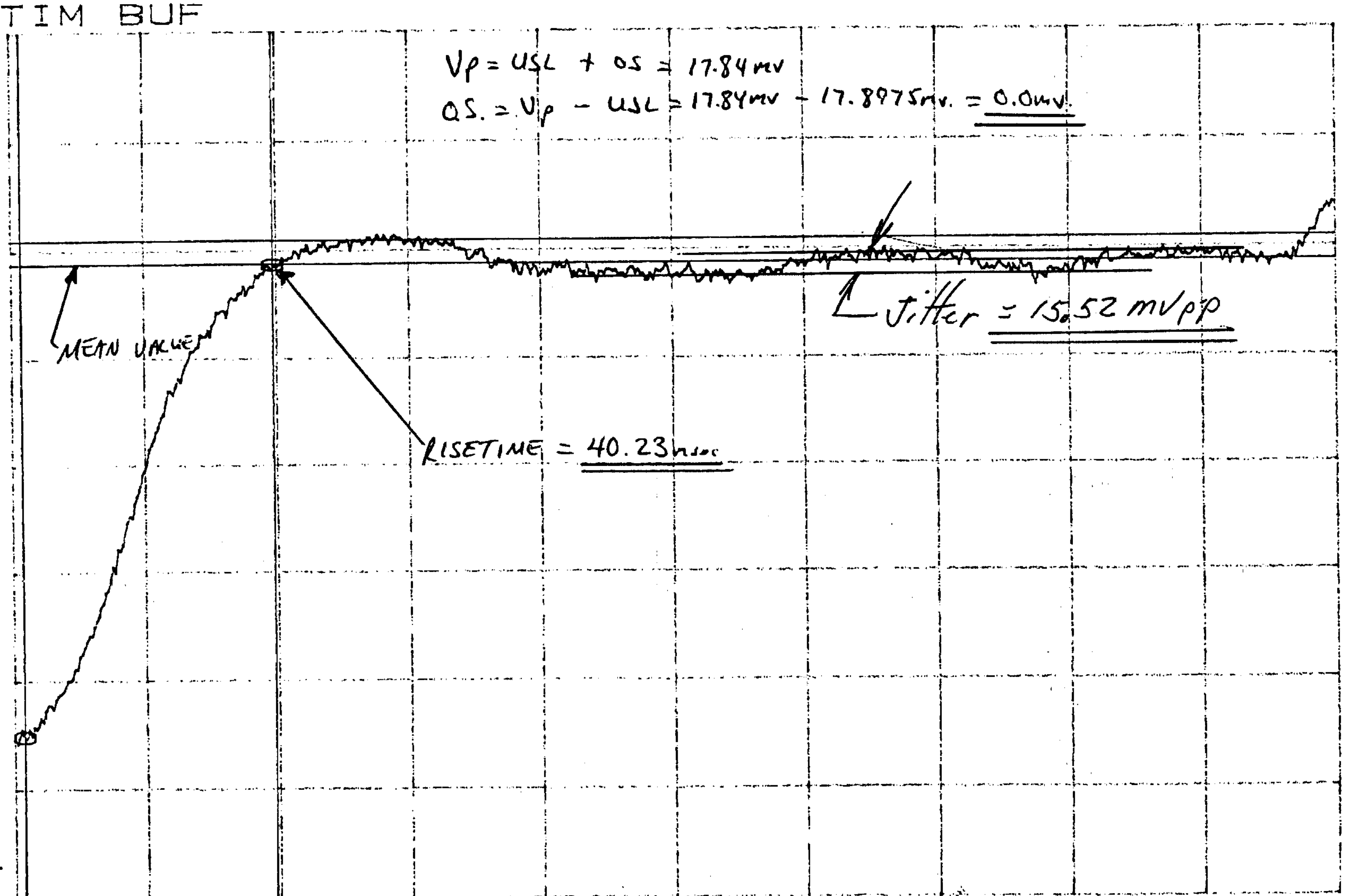
8.48

80.0 m /Div

Real

V

7.84



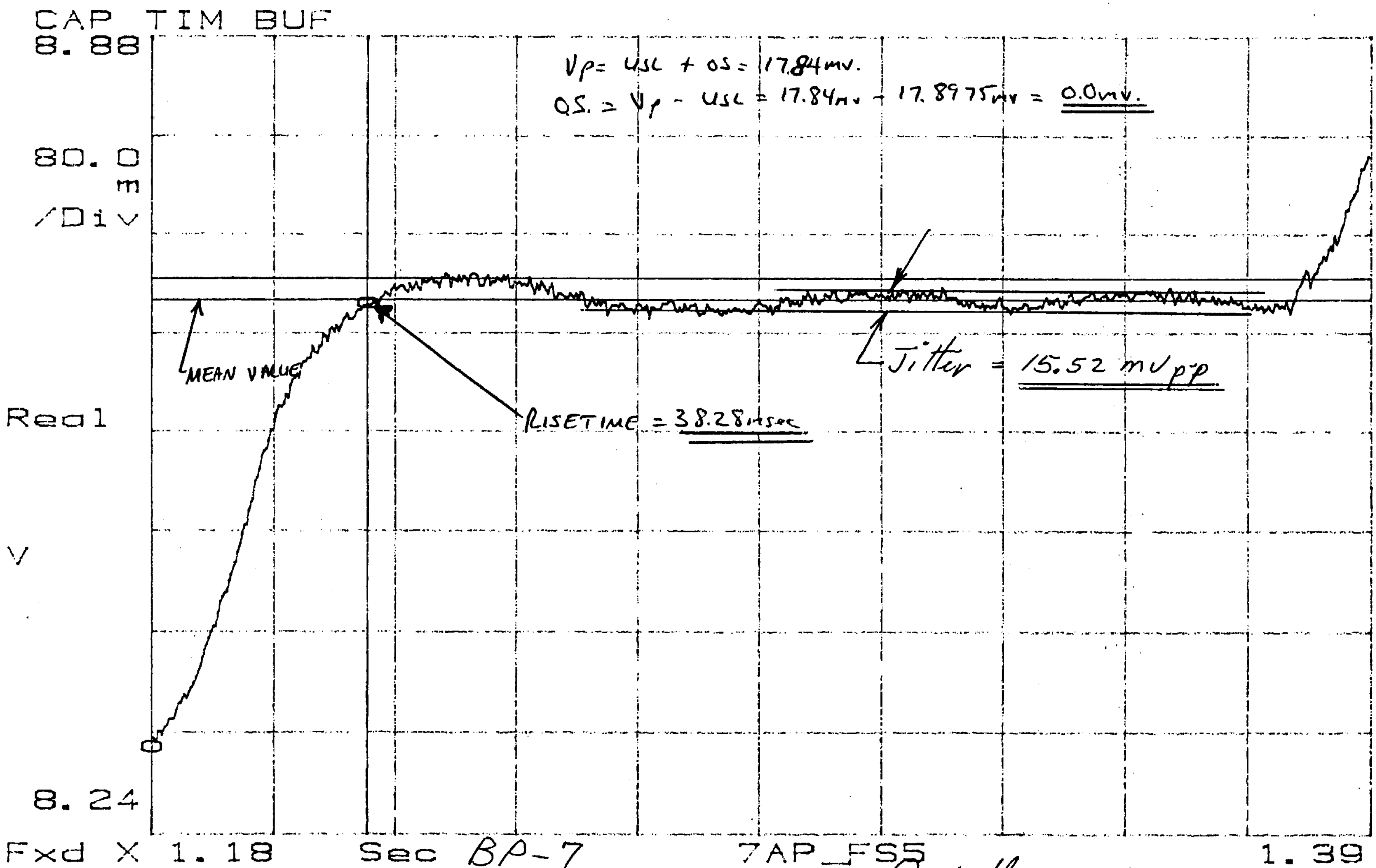
Fxd X 972m Sec BP-6 7AP_FS5 1.18

SO: 727181 3.4.5.5 B6

TEST ENG: [signature] DATE: 6-15-99

QUALITY:

X=1.177 S ΔX=38.28mS Y=8.68412 ΔY=17.84mV
Ya=8.30861 ΔYa=355.2mV



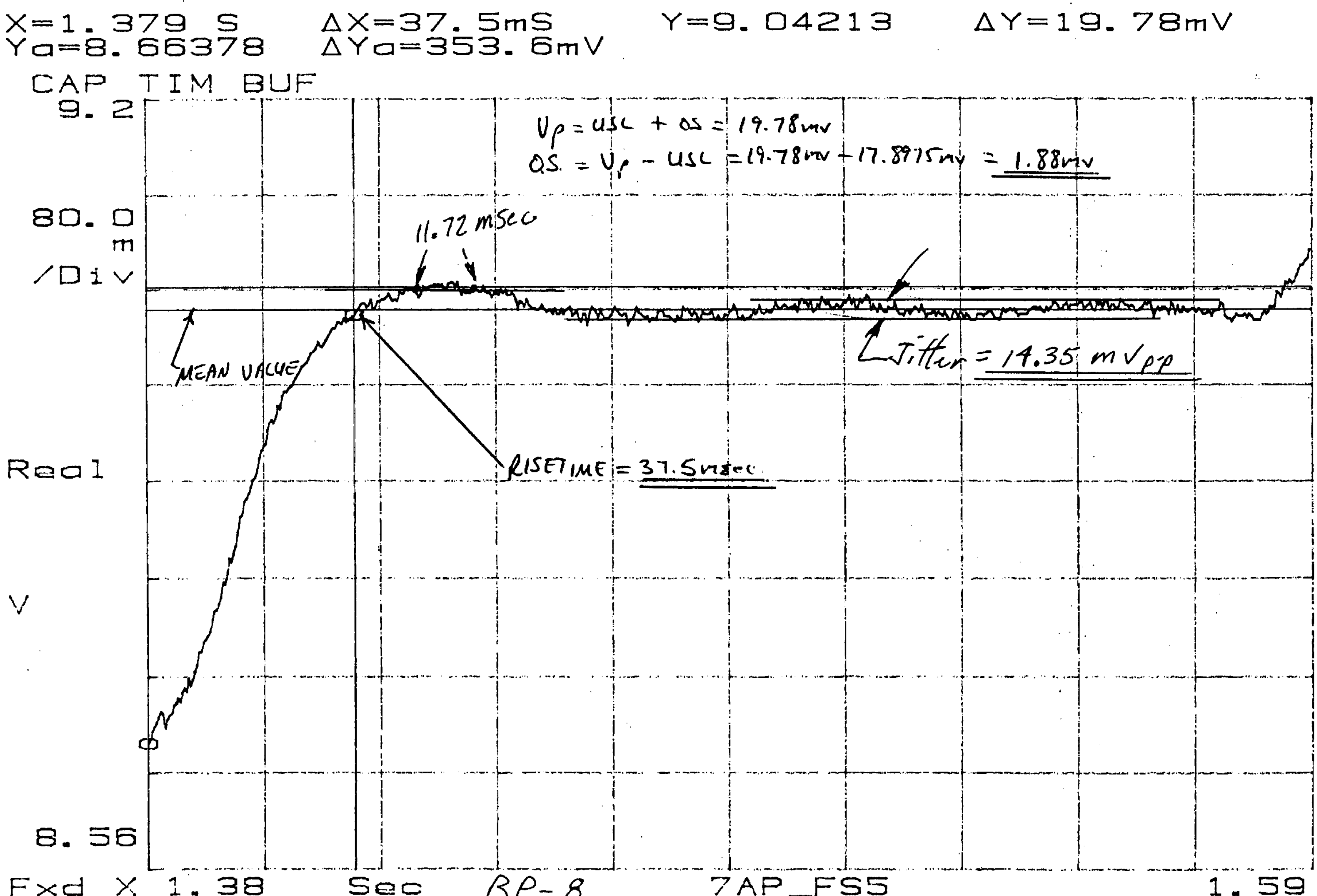
SO: 727181

PN: 1331200-2-IT SN: 109

3.4.5.5. B7

TEST ENG: [signature] DATE: 6-15-99

QUALITY:

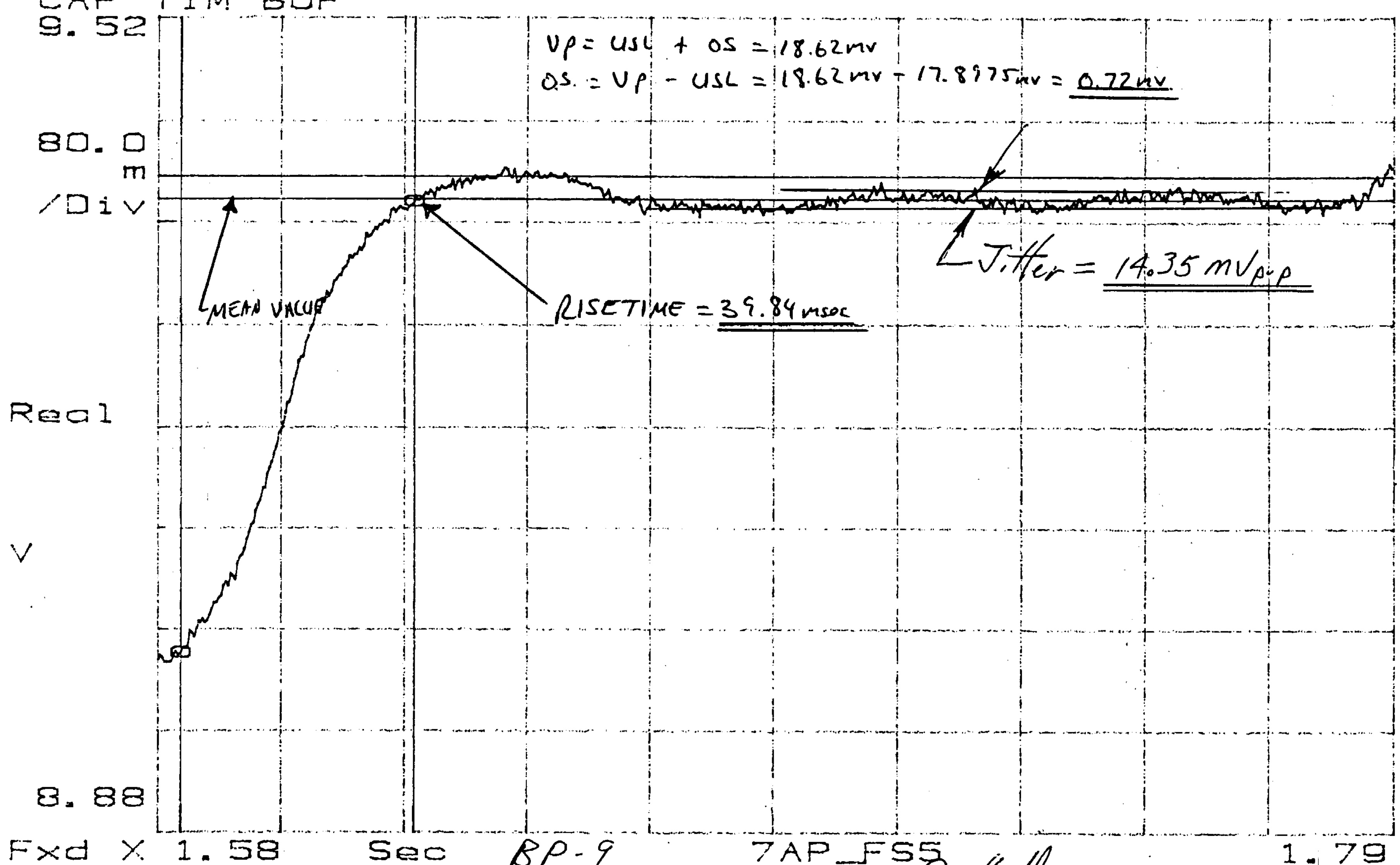


SO: 727181 3.4.5.5. B8 TEST ENG: [signature] DATE: 6-15-99

PN: 1221200-2 IT SN: 109 QUALITY: (002)

X=1.581 S ΔX=39.84mS Y=9.39627 ΔY=18.62mV
Ya=9.02058 ΔYa=355.2mV

CAP TIM BUF



SO: 727181

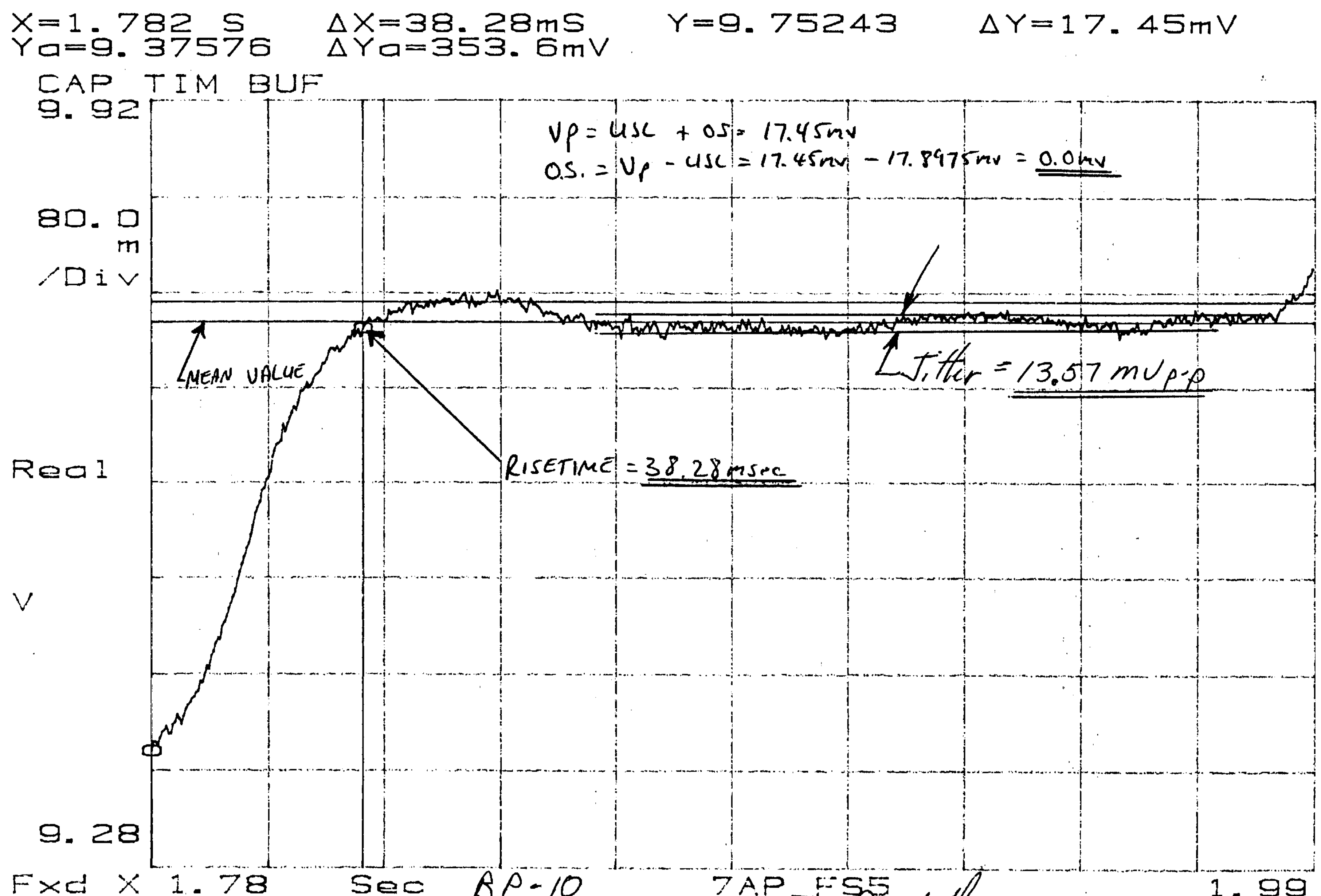
PN: 1331200-2-IT SN: 109

3.4.5.5. B9

TEST ENG: [signature]

DATE: 6-15-99

QUALITY:



3.4.55. B10

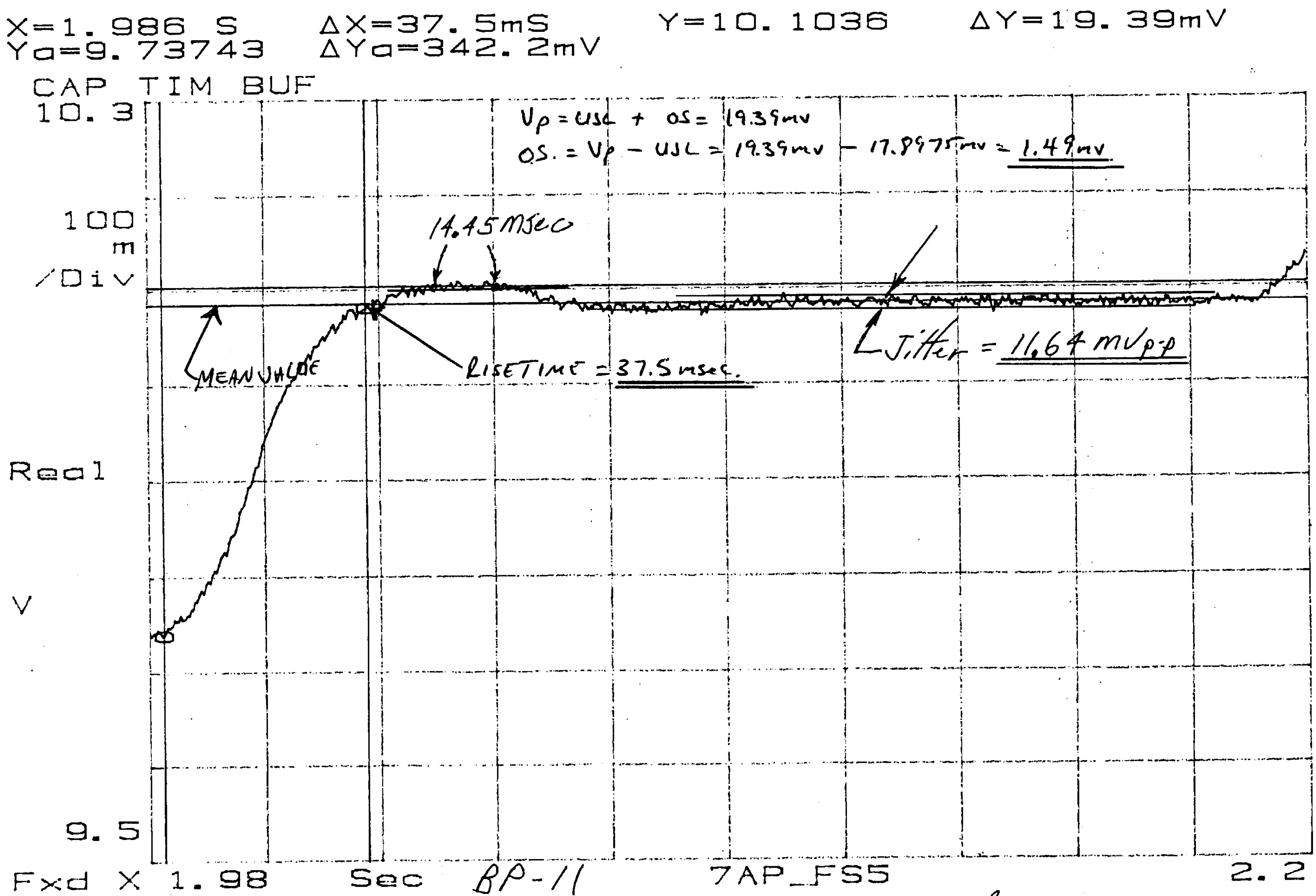
SO: 727181

PN: 1331200-2-IT SN: 109

TEST ENG: [signature]

QUALITY:

DATE: 6-15-99



BP-11 7AP_FS5

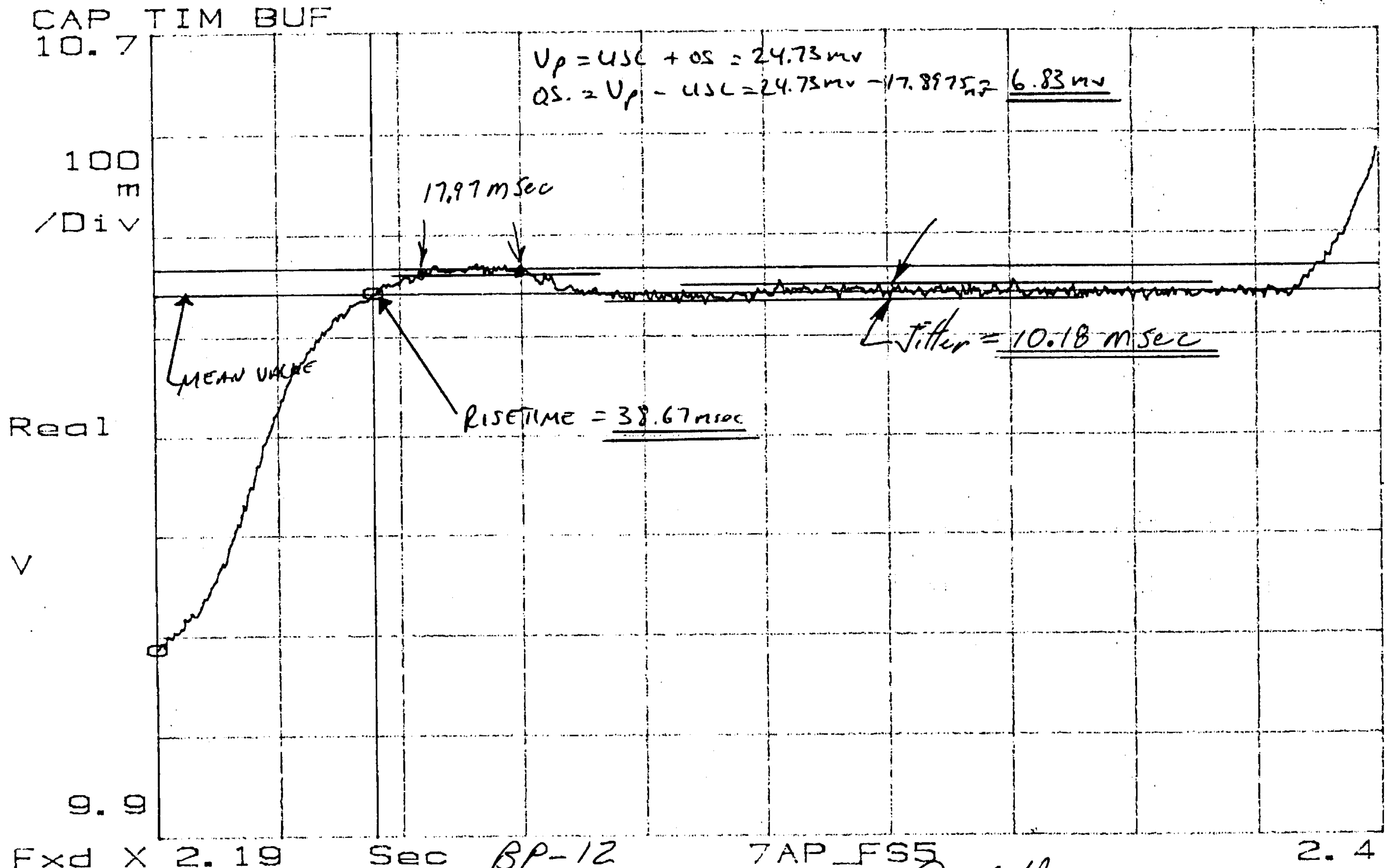
SO: 727181

3.4.5.5. B11

TEST ENG: Ray Hertzberg DATE: 6-15-99

QUALITY:

X=2.188 S ΔX=38.67mS Y=10.4421 ΔY=24.73mV
Ya=10.0861 ΔYa=356.8mV



BP-12 7AP_FS5

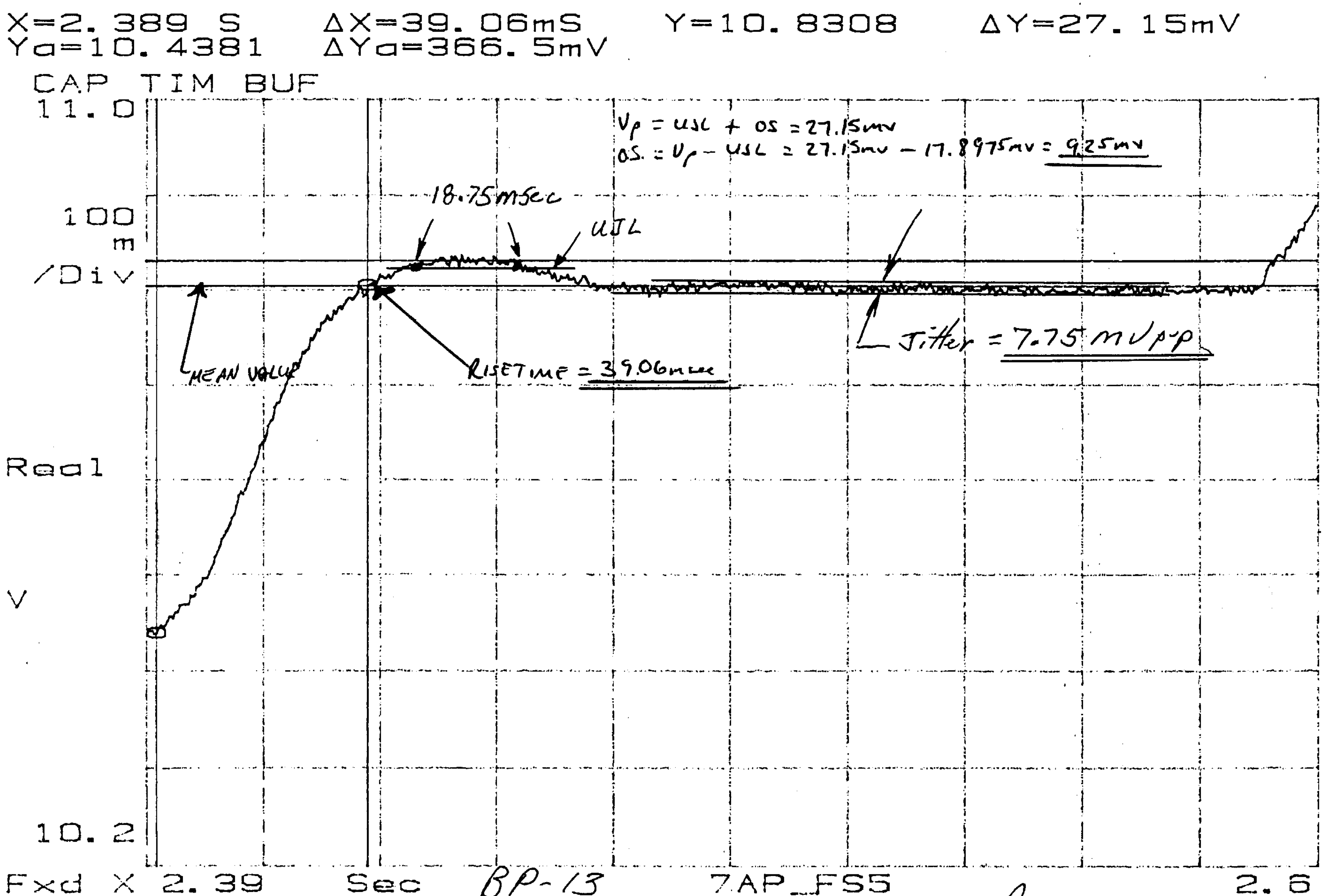
3.455. B12

SO: 727181

PN: 1331200-2-IT SN: 109

TEST ENG: Ray Hertzberg DATE: 6-15-99

QUALITY:

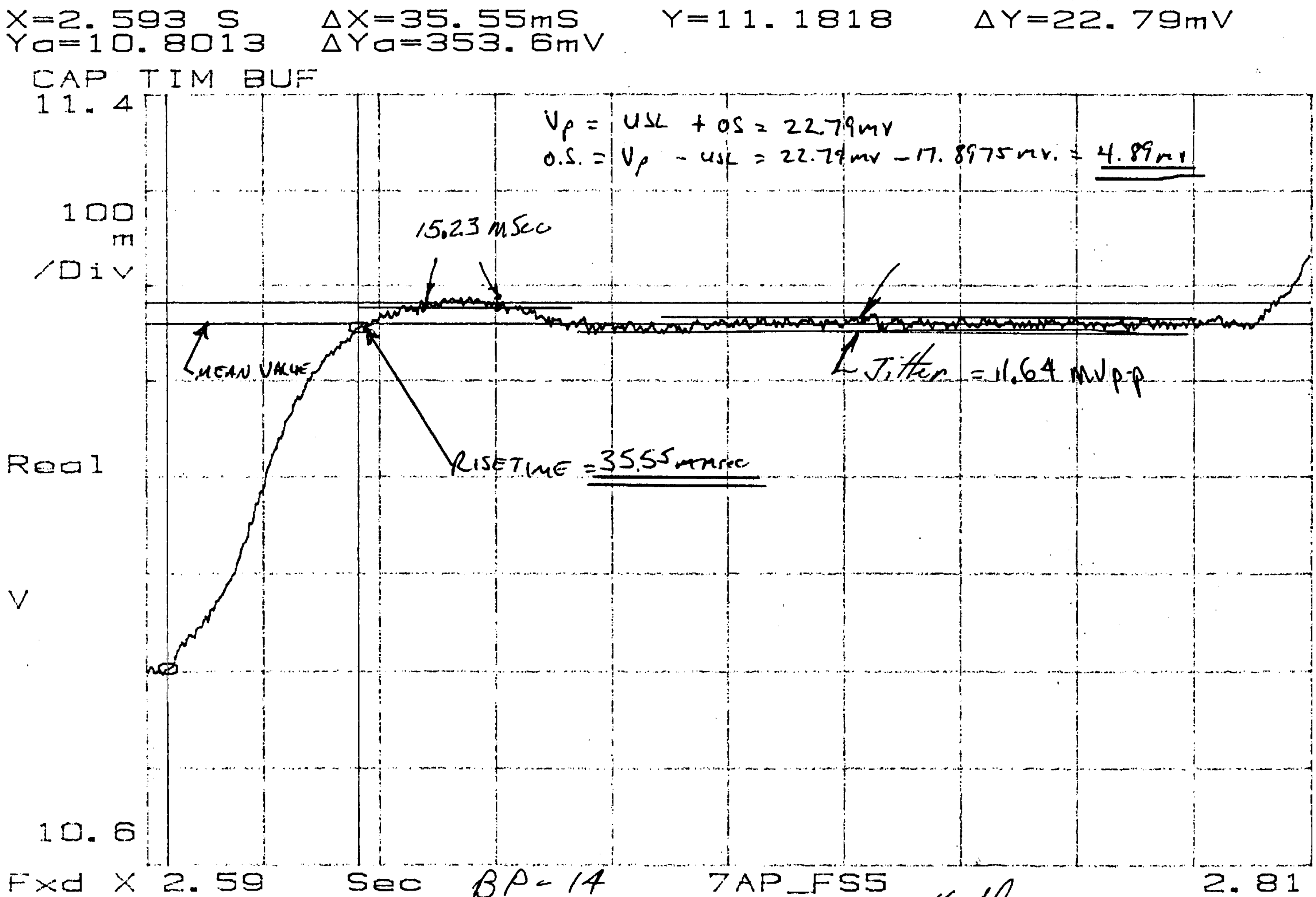


SO: 727181

3.4.5.5 B13

TEST ENG: Ray Hertzberg DATE: 6-15-99

QUALITY:



SO: 727181

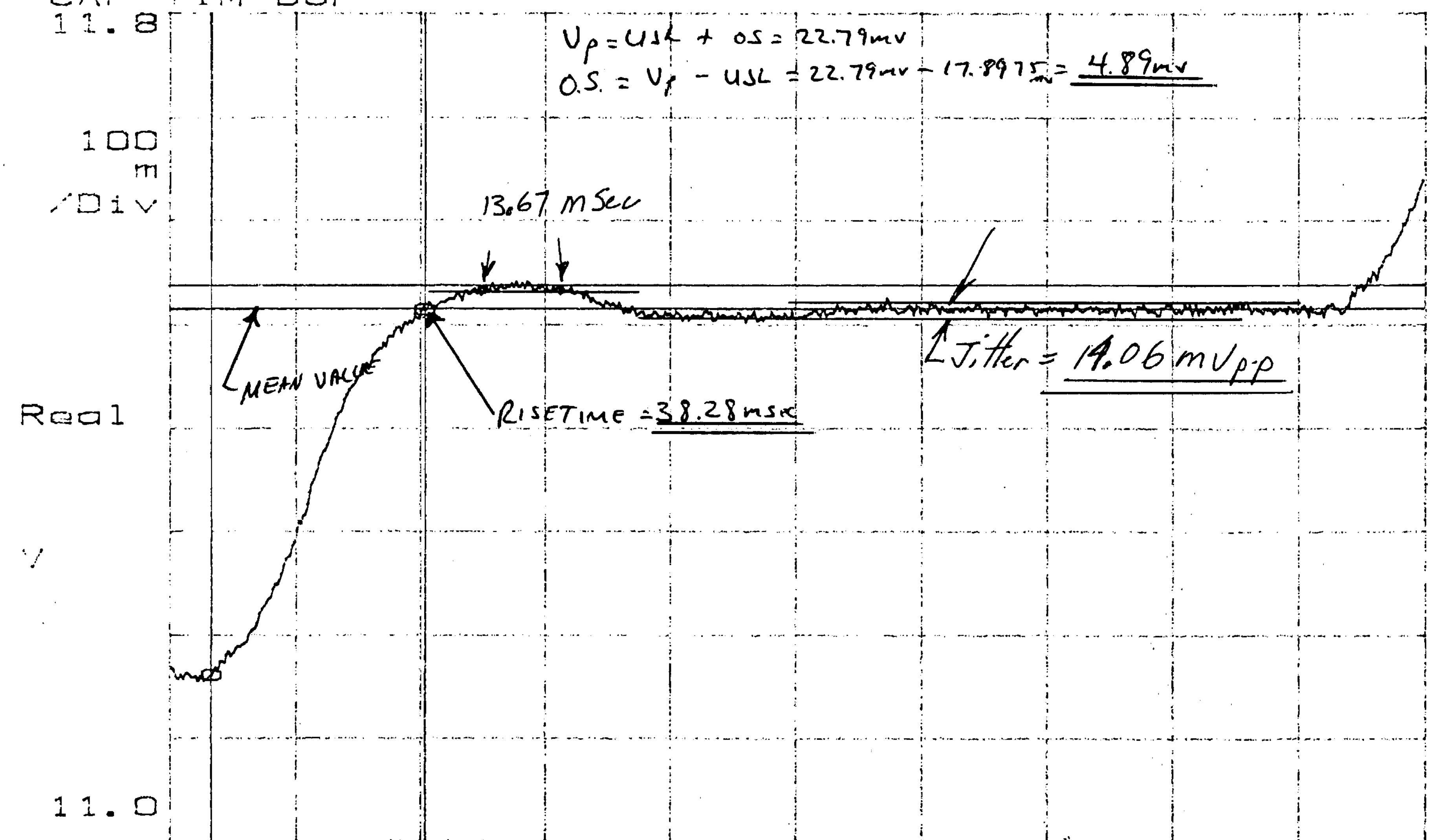
3.4.55 B14

TEST ENG: Ray Hertzberg DATE: 6-15-99

QUALITY:

X=2.796 S ΔX=38.28mS Y=11.5372 ΔY=22.79mV
Ya=11.1598 ΔYa=353.6mV

CAP TIM BUF



Fxd X 2.79 Sec BP-15 7AP_FS5 3.01

SO: 727181

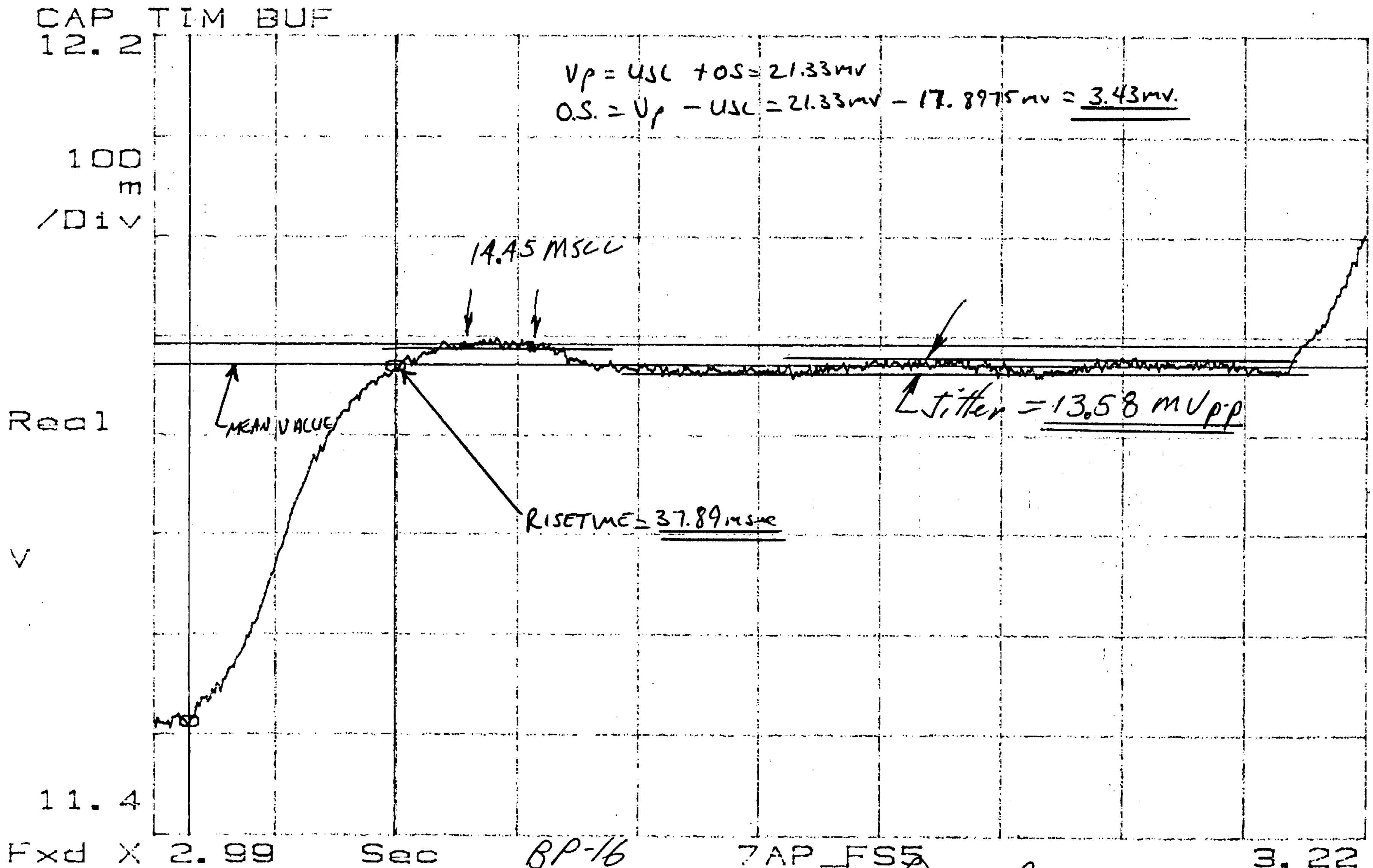
PN: 1331200-2-IT SN: 109

3.4.5.5 B15

TEST ENG: Ray Burgberg DATE: 6-15-99

QUALITY:

X=2.998 S ΔX=37.89mS Y=11.8916 ΔY=21.33mV
Ya=11.5117 ΔYa=356.8mV



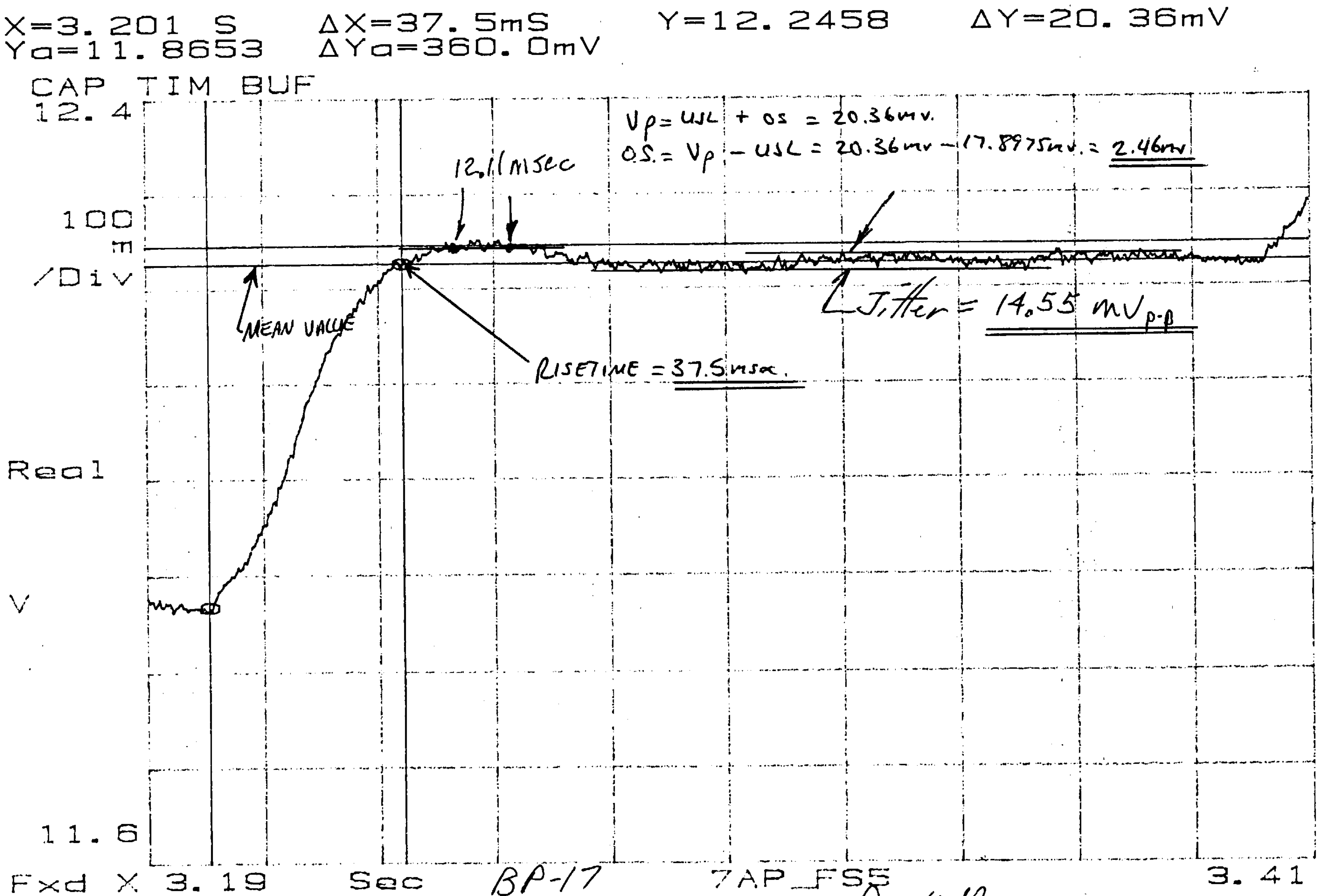
3.4.5.5. B16

SO: 727181

PN: 1331200-2-IT SN: 109

TEST ENG: Ray Hedberg DATE: 6-15-99

QUALITY:



SO: 727181

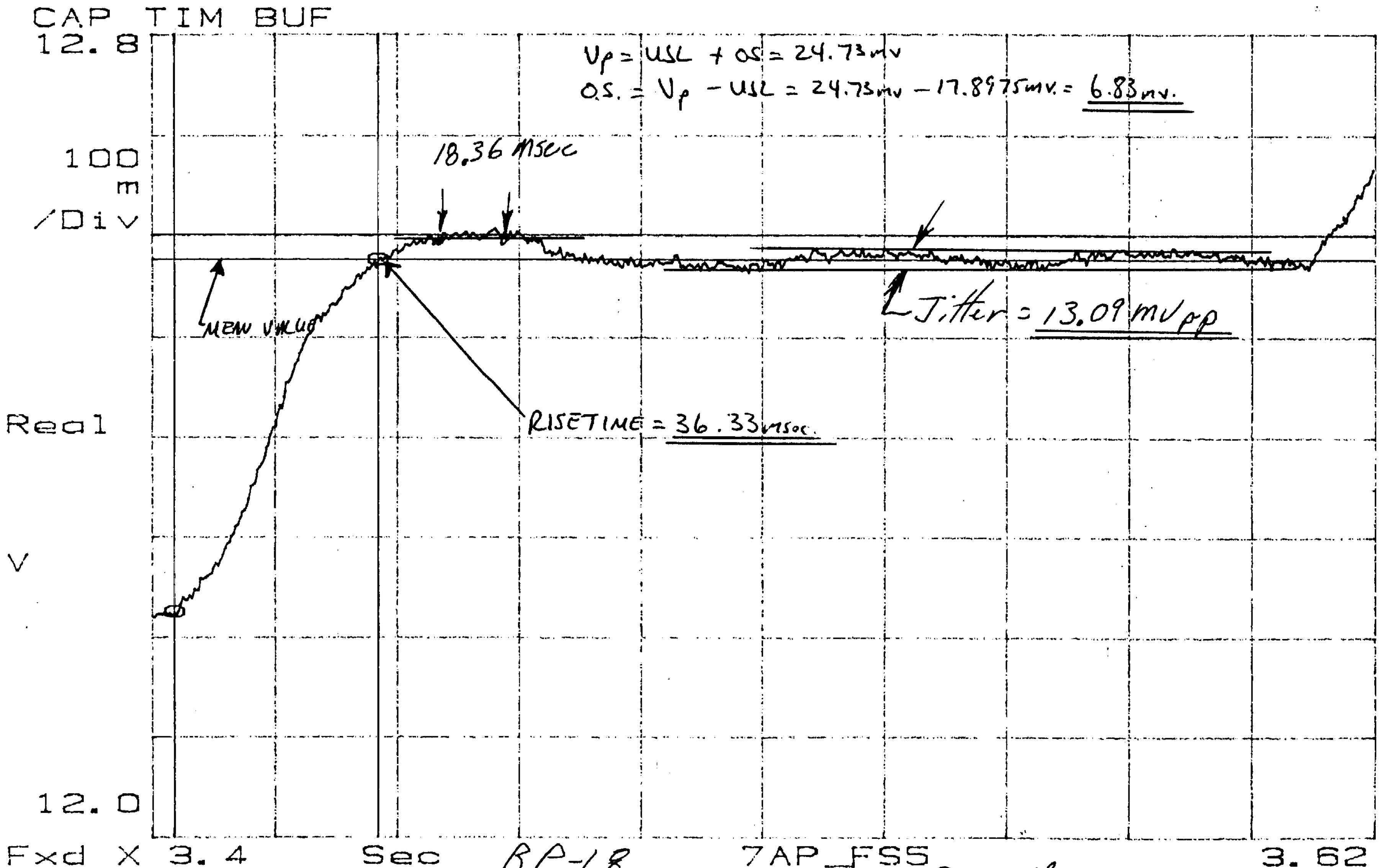
PN: 1331200-2-IT SN: 109

3.4.5.5. B17

TEST ENG: Ray Heffley DATE: 6-15-99

QUALITY:

X=3.404 S　ΔX=36.33mS　Y=12.6007　ΔY=24.73mV
Ya=12.2237　ΔYa=351.9mV

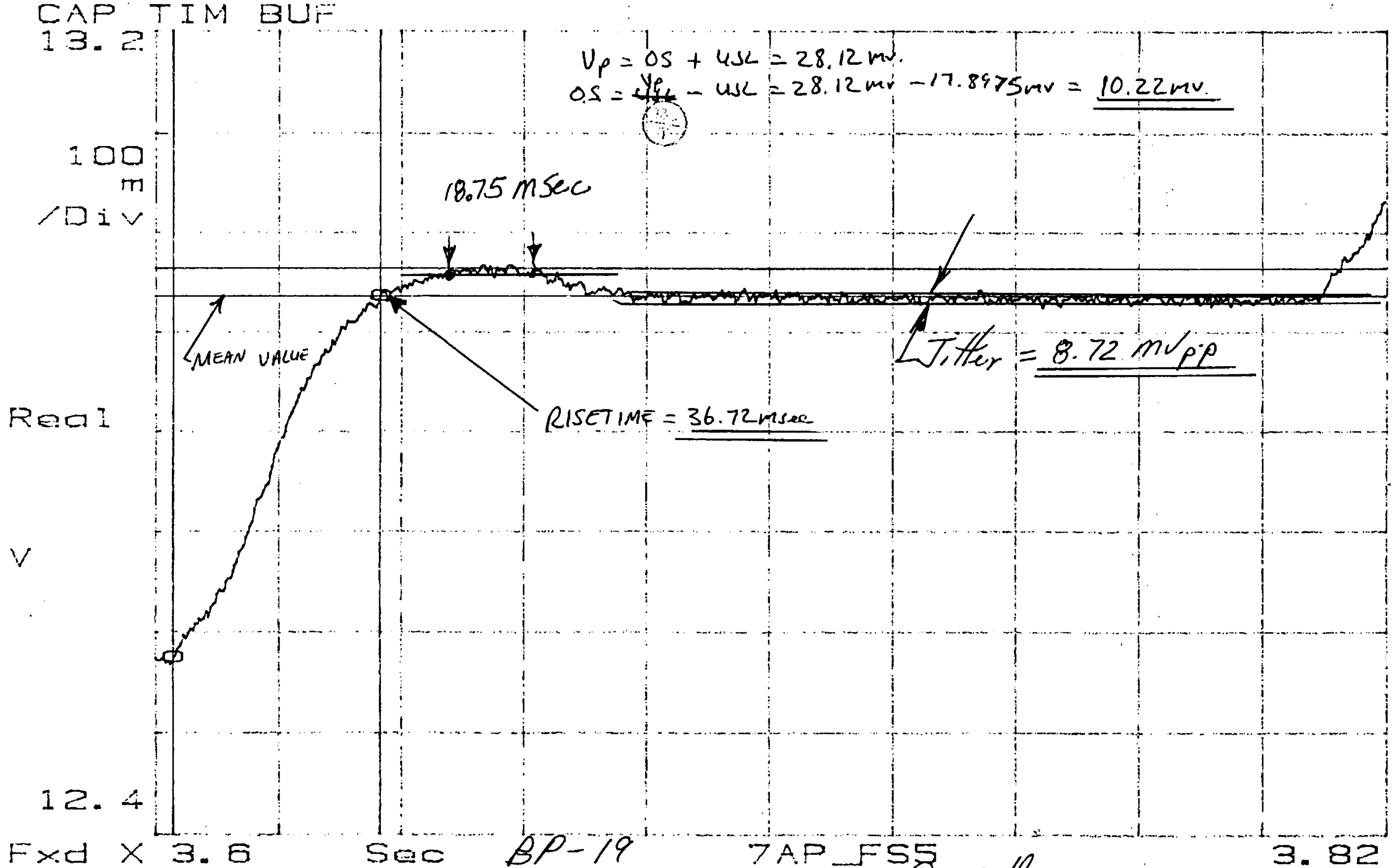


BP-18　7AP_FSS

SO: 727181　3.155- B18　TEST ENG: [signature]　DATE: 6-15-99

QUALITY:

X=3.606 S ΔX=36.72mS Y=12.9348 ΔY=28.12mV
Ya=12.574 ΔYa=361.7mV



BP-19 7AP_FS5

SO: 727181

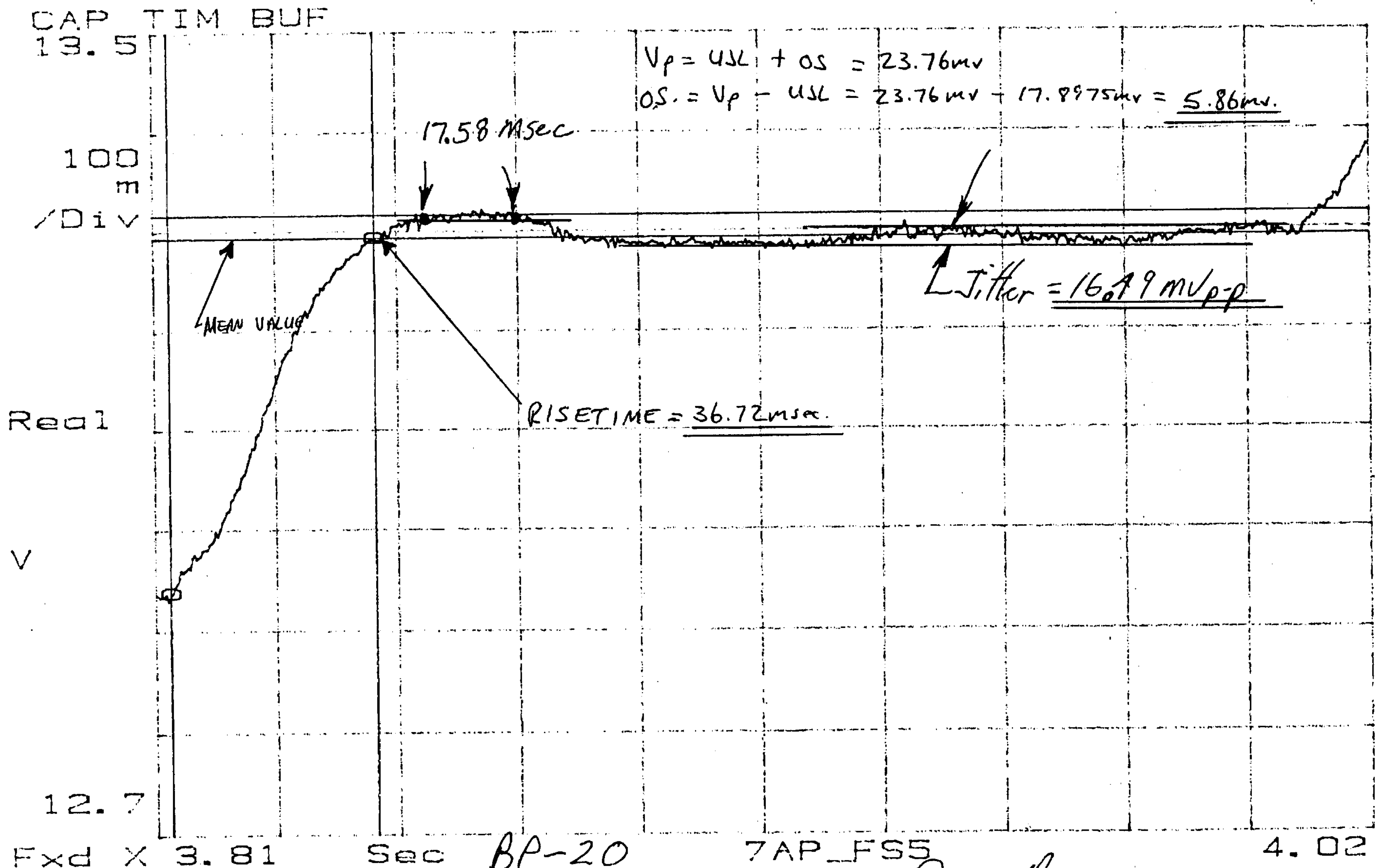
3.4.5.5. B19

TEST ENG: [signature] DATE: 6-15-99

QUALITY:

PN: 1331200-2-IT SN: 109

X=3.809 S   ΔX=36.72mS   Y=13.3158   ΔY=23.76mV
Ya=12.9357   ΔYa=356.8mV

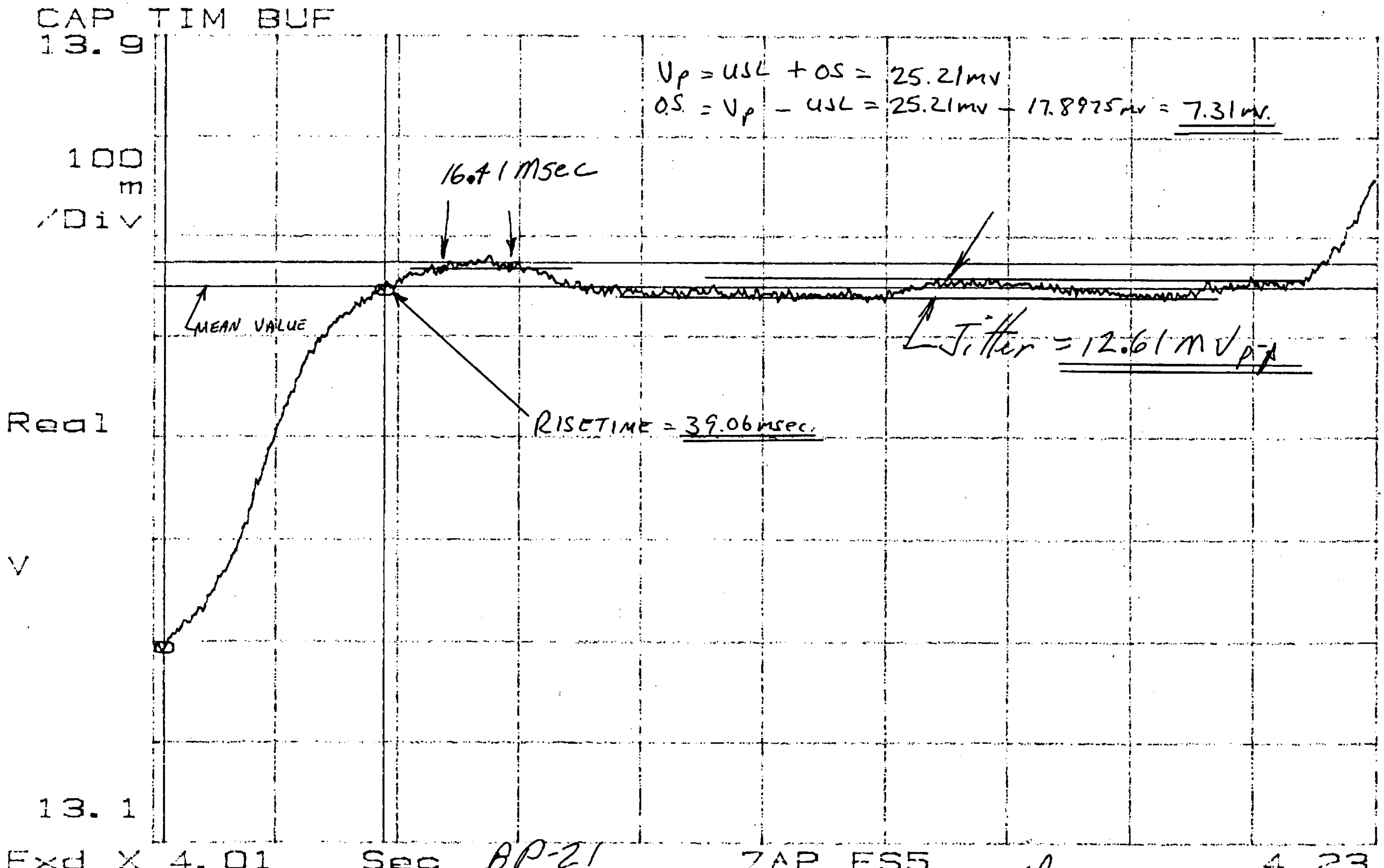


BP-20   7AP_FS5

SO: 727181   3.4.5.5. B20   TEST ENG: Ray Herzberg   DATE: 6-15-99

PN: 1221200-2 IT   SN: 100   QUALITY: 7A 26

X=4.011 S ΔX=39.06mS Y=13.6731 ΔY=25.21mV
Ya=13.2925 ΔYa=351.9mV



BP-21

SO: 727181

PN: 1331200-2-IT SN: 109

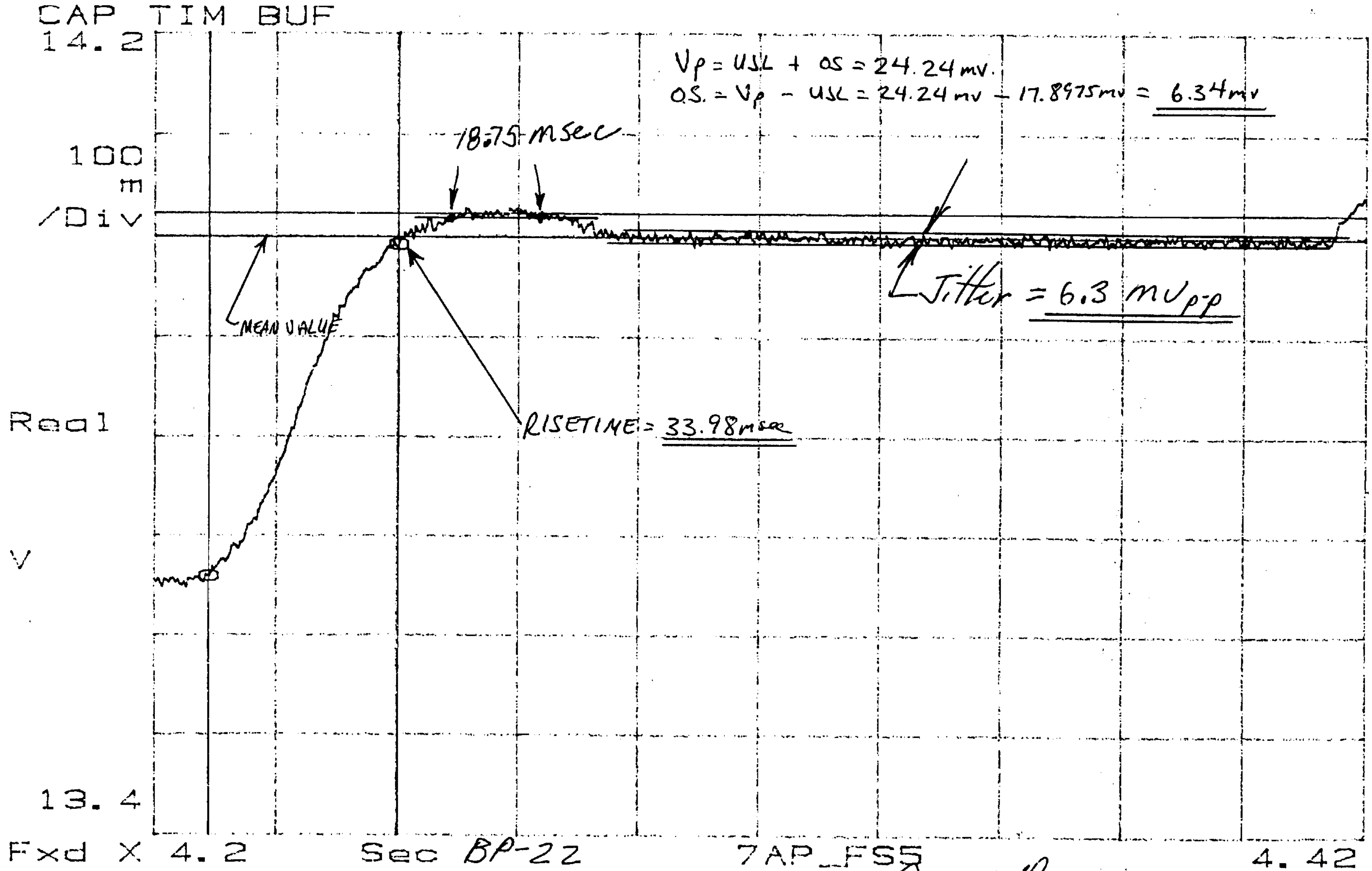
3.455. B21

TEST ENG: Ray Herzberg

QUALITY: TA 268

DATE: 6-15-99

X=4.214 S ΔX=33.98mS Y=14.0216 ΔY=24.24mV
Ya=13.6574 ΔYa=332.5mV



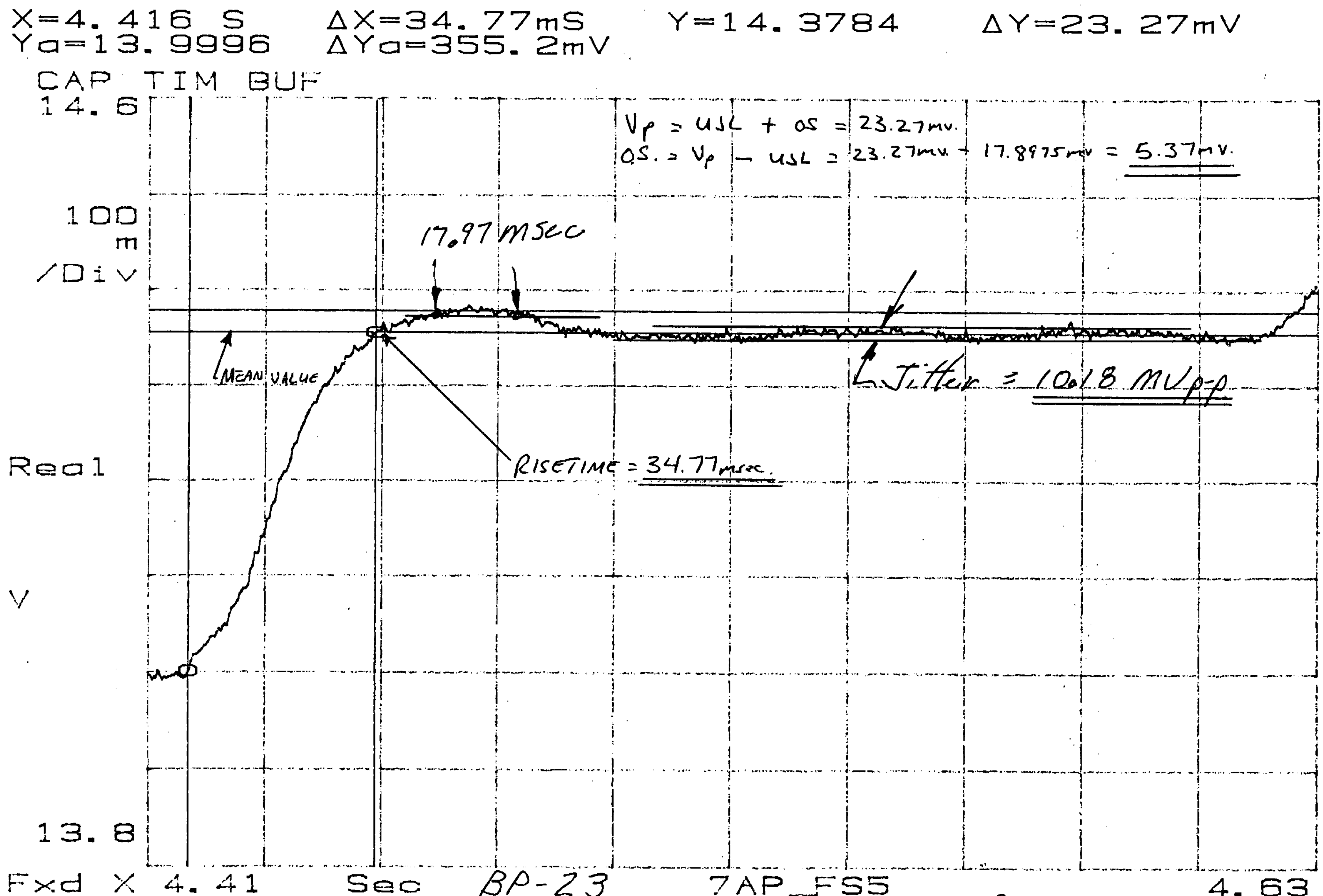
SO: 727181

PN: 1331200-2-IT SN: 109

3.4.5.5. B22

TEST ENG: Ray Berfberg DATE: 6-15-99

QUALITY: TA 268

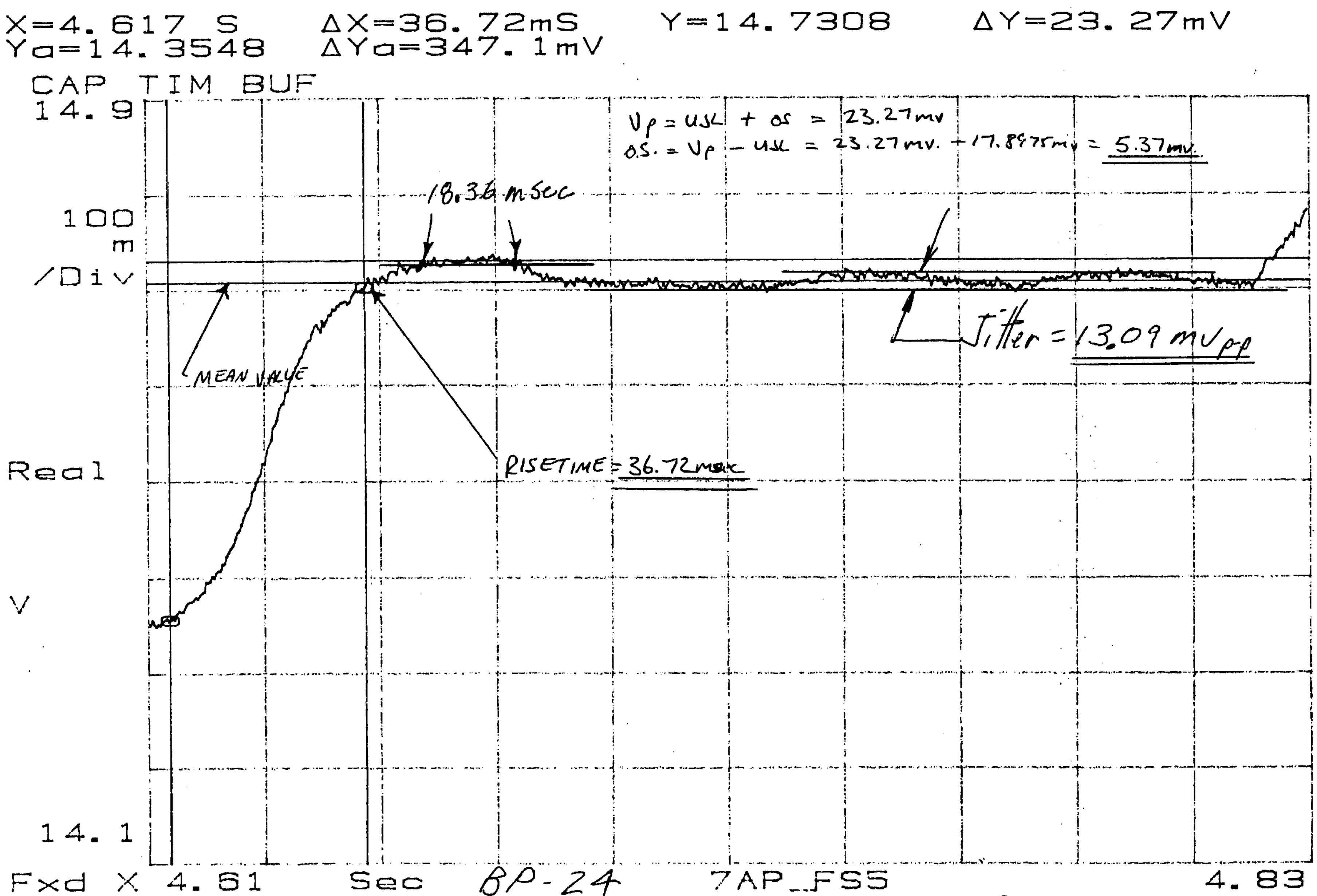


SO: 727181

3.4.5.5. B23

TEST ENG: Ray Hertzberg DATE: 6-15-99

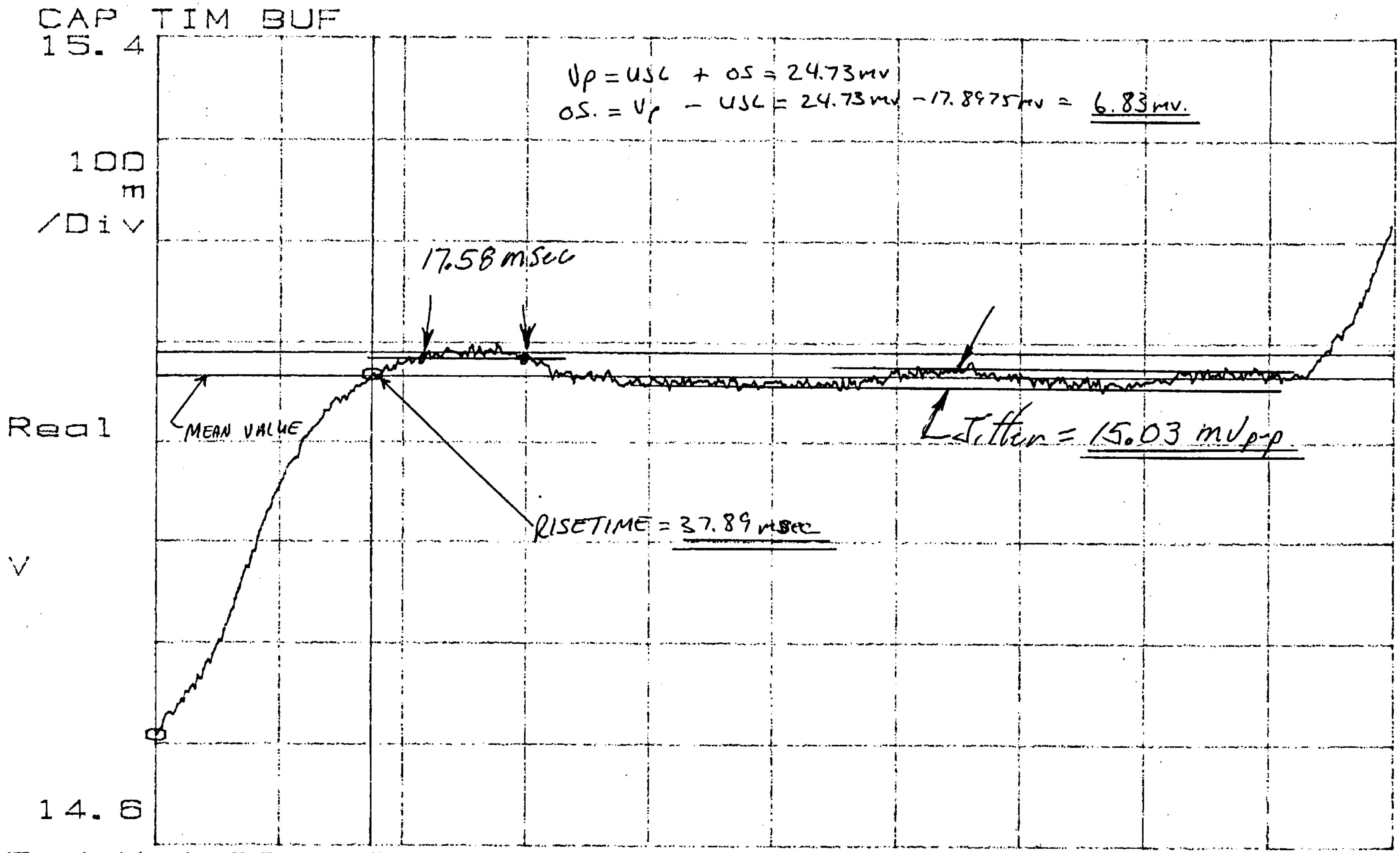
QUALITY:



SO: 727181 3.4.5.5. B24 TEST ENG: [signature] DATE: 6-15-99

PN: 1231200-2 IT SN: 109 QUALITY:

X=4.821 S ΔX=37.89mS Y=15.0897 ΔY=24.73mV
Ya=14.7083 ΔYa=358.4mV



BP-25 7AP_FS5

3.4.5.5. B25

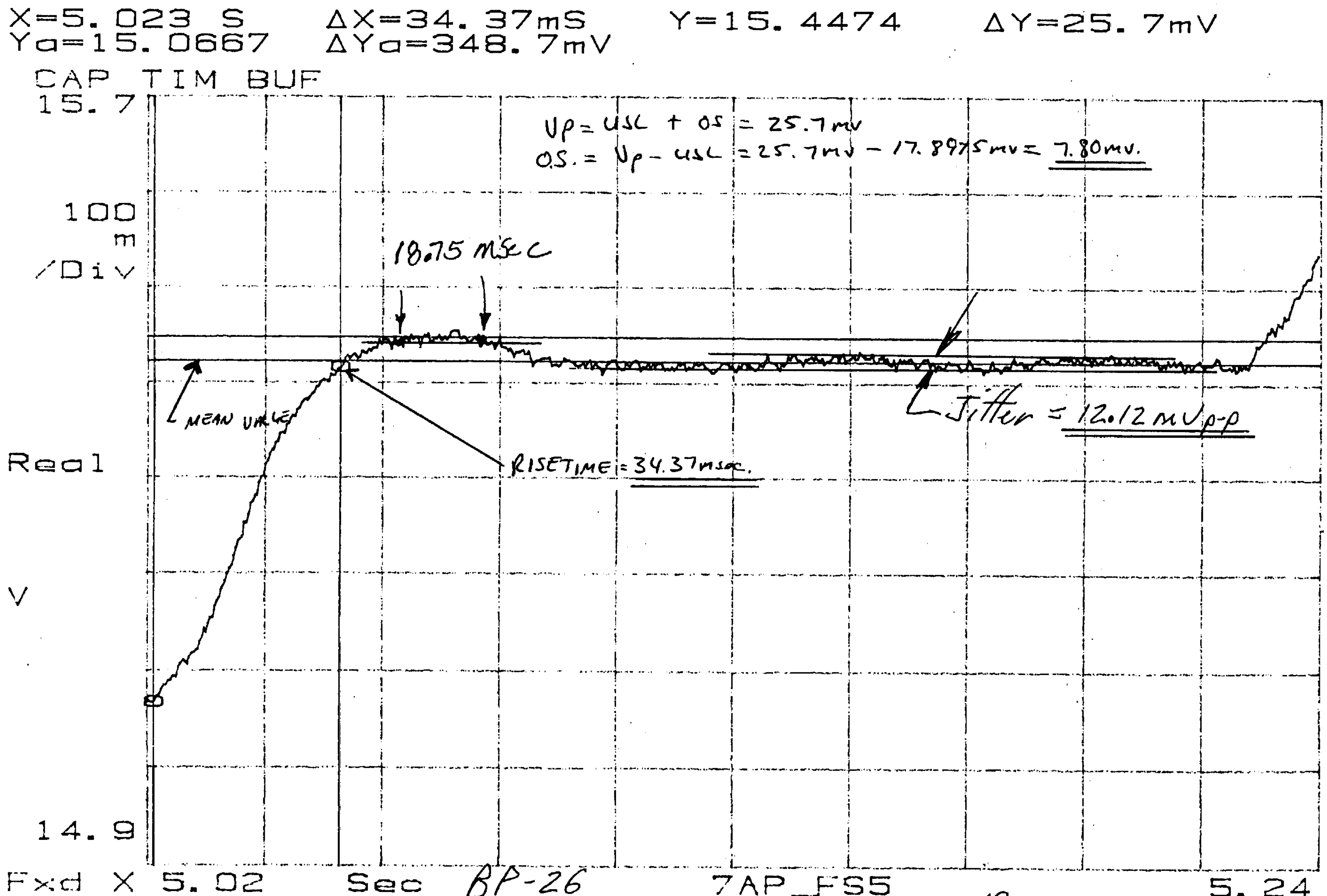
SO: 727181

PN: 1331200-2-IT SN: 109

TEST ENG: Ray [signature]

QUALITY: TA 262

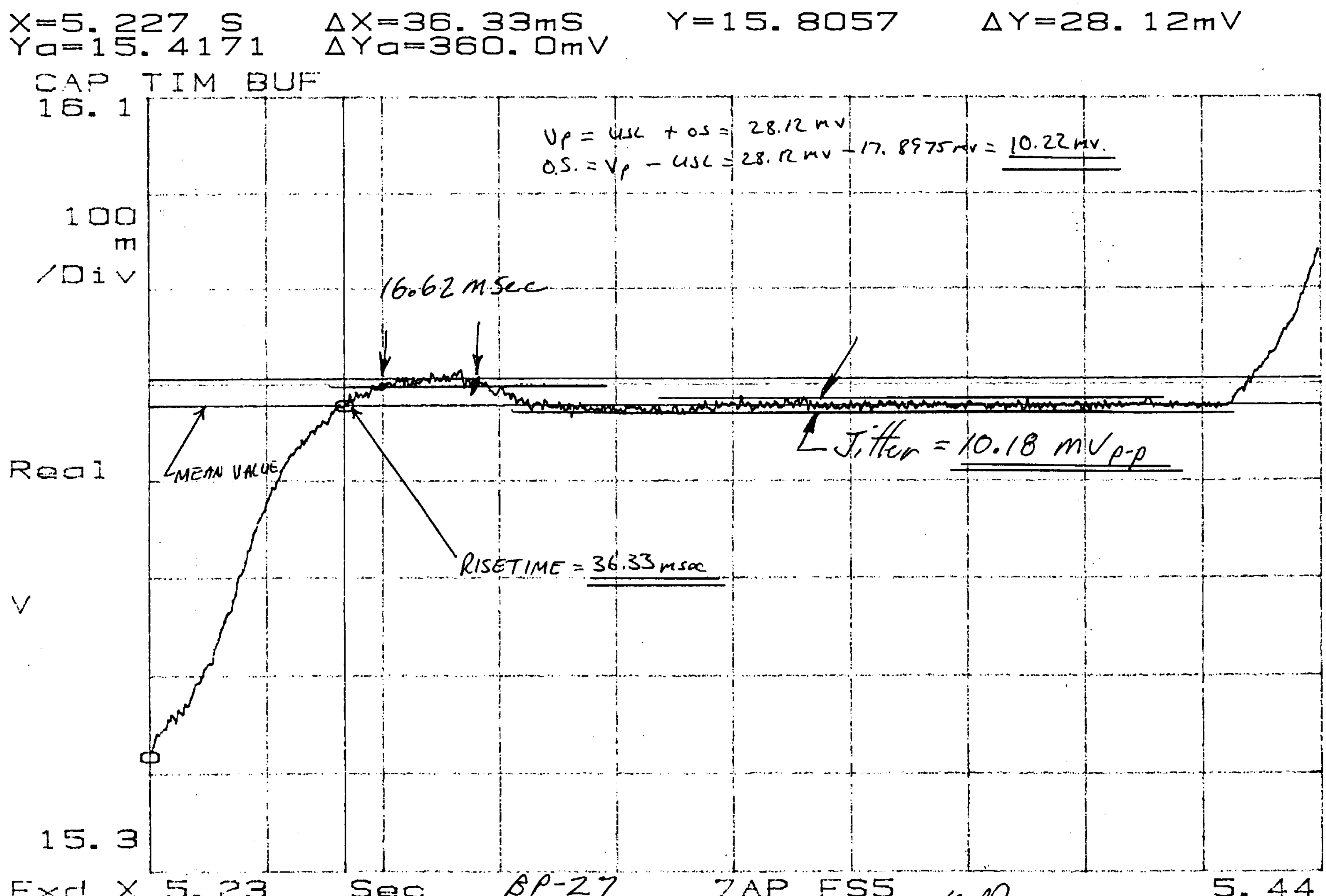
DATE: 6-15-99



SO: 727181

3.4.5.5. B26

TEST ENG: Ray Herzberg DATE: 6-15-99



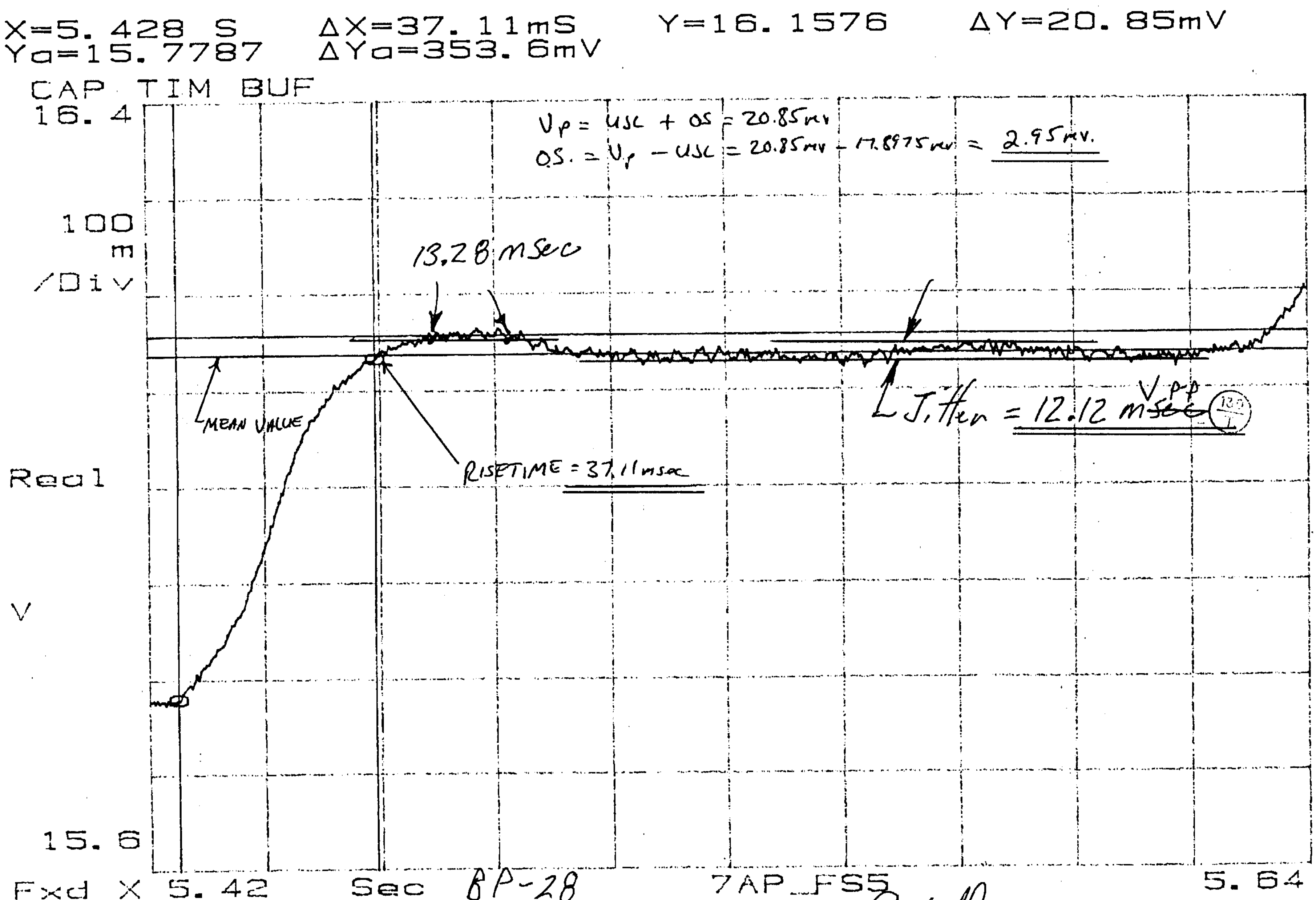
SO: 727181

PN: 1331200-2-IT SN: 109

3.4.55. B27

TEST ENG: [signature] DATE: 6-15-99

QUALITY: 268



SO: 727181

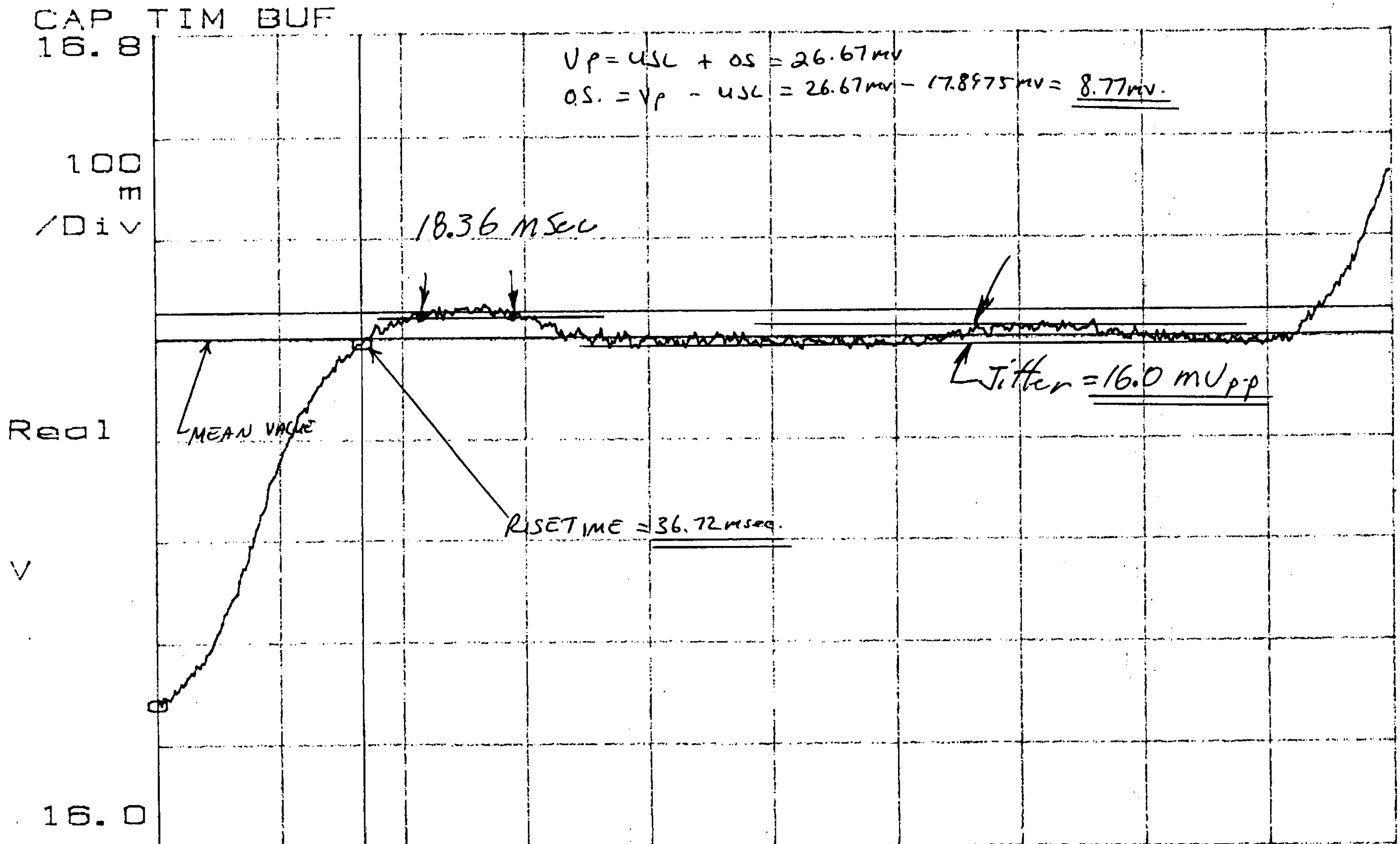
3455. B28

TEST ENG: Ray Herzberg DATE: 6-15-99

PN: 1331200-2-JT SN: 109

QUALITY:

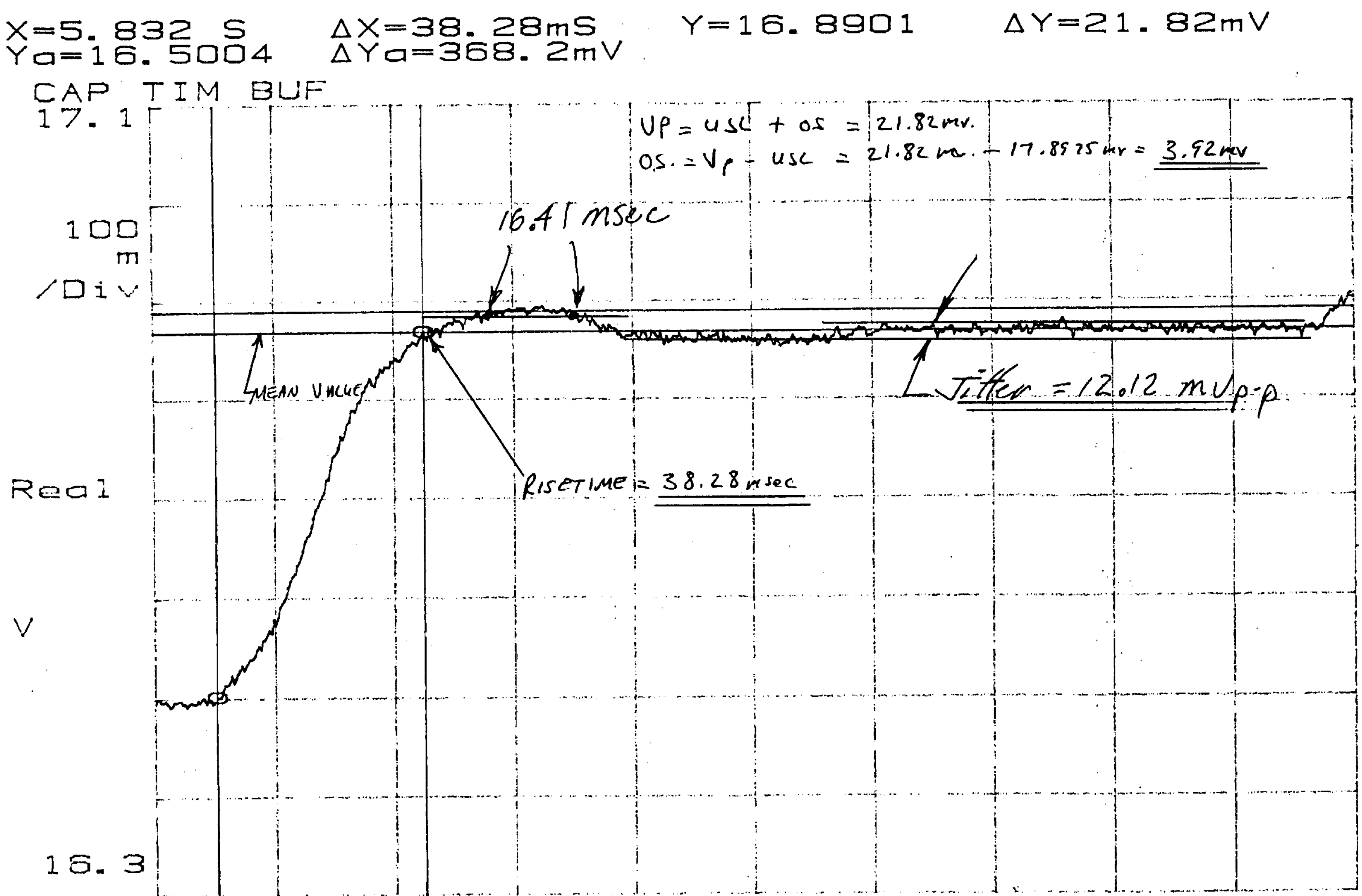
X=5.629 S ΔX=36.72mS Y=16.528 ΔY=26.67mV
Ya=16.1388 ΔYa=356.8mV



Fxd X 5.63 Sec BP-29 7AP_FS5 5.85

SO: 727181 3.4.5.5. B29 TEST ENG: [signature] DATE: 6-15-99

PN: 1331200-2-IT SN: 109 QUALITY: 268



SO: 727181

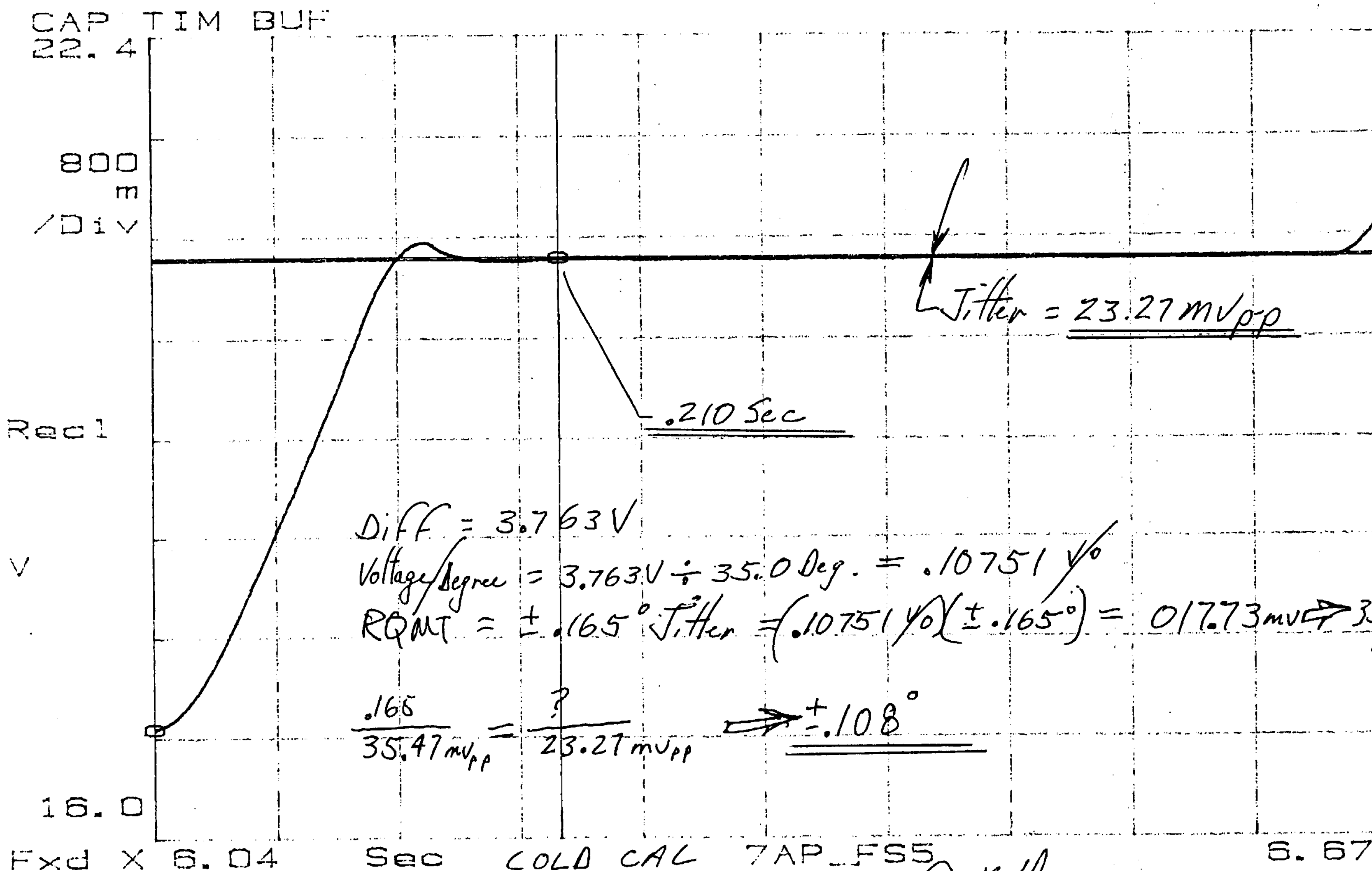
PN: 1331200-2-IT SN: 109

3455. B30

TEST ENG: Ray [signature] DATE: 6-15-99

QUALITY: TA 268

X=6.036 S ΔX=210.2mS Y=20.6429 ΔY=23.27mV
Ya=16.8702 ΔYa=3.763 V



SO: 727181

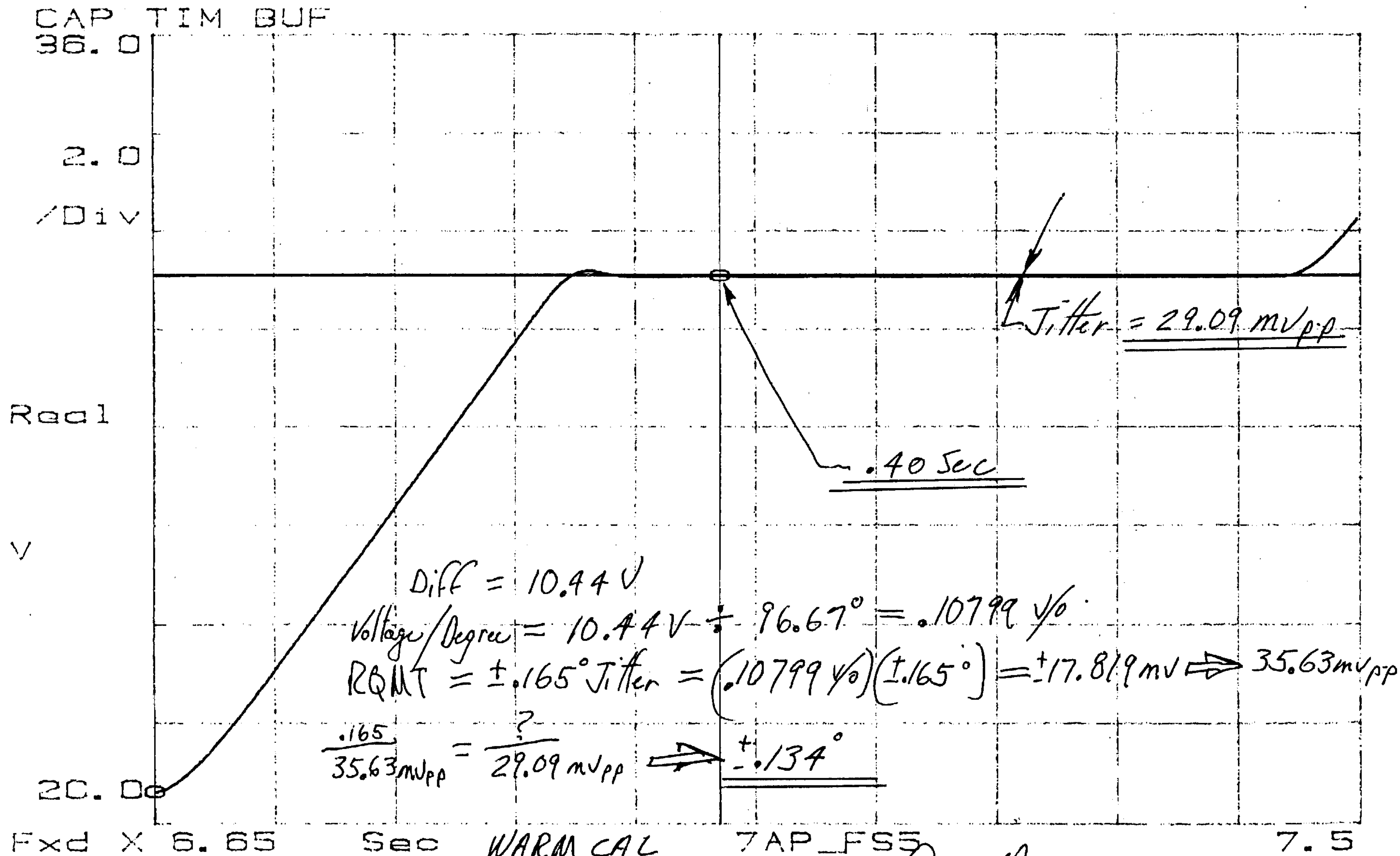
3.4.5.5. B31

TEST ENG: [signature] DATE: 6-15-99

PN: 1331200-2JT SN: 109

QUALITY:

X=6.648 S   ΔX=400.4mS   Y=31.0739   ΔY=29.09mV
Ya=20.6393   ΔYa=10.44 V



WARM CAL   7AP_FS5

SO: 727181   3.4.5.5.   B32   TEST ENG: Ray [signature]   DATE: 6-15-99

PN: 1331200-2 IT   SN: 109   QUALITY: (stamp)

TEST DATA SHEET 7 (SHEET 1 OF 4)
3.4.5.5: METSAT Scan Motion and Jitter Test

Test Setup Verified: [signature]
Signature

Shop Order No. 727181

Step No.	Description	Requirement	Test Result	Pass/Fail
7	--	Stepping Slewing < 8 sec period per Figure 25	< 8 sec period	P
9	Scene 1-2 3.33° step	<42 msec rise time per Figure 26	< 38.67 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.73% < 0%	P
10	Scene 2-3 3.33° step	<42 msec rise time per Figure 26	< 39.84 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 2.00% < 0.09%	P
11	Scene 3-4 3.33° step	<42 msec rise time per Figure 26	< 38.28 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 2.00% < 0.09%	P
12	Scene 4-5 3.33° step	<42 msec rise time per Figure 26	< 39.84 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.89% < 0.20%	P
13	Scene 5-6 3.33° step	<42 msec rise time per Figure 26	< 40.23 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 2.16% < 0%	P
14	Scene 6-7 3.33° step	<42 msec rise time per Figure 26	< 38.28 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 2.16% < 0%	P
15	Scene 7-8 3.33° step	<42 msec rise time per Figure 26	< 37.5 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 2.00% < 0.52%	P
16	Scene 8-9 3.33° step	<42 msec rise time per Figure 26	< 39.84 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 2.00% < 0.20%	P

Pass = P
Fail = F

B33a

TEST DATA SHEET 7 (SHEET 2 OF 4)
3.4.5.5: METSAT Scan Motion and Jitter Test

Step No.	Description	Requirement	Test Result	Pass/Fail
17	Scene 9-10 3.33° step	<42 msec rise time per Figure 26	< 38.28 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.89% < 0%	P
18	Scene 10-11 3.33° step	<42 msec rise time per Figure 26	< 37.5 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.62% < 0.42%	P
19	Scene 11-12 3.33° step	<42 msec rise time per Figure 26	< 38.67 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.42% < 1.90%	P
20	Scene 12-13 3.33° step	<42 msec rise time per Figure 26	< 39.06 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.08% < 2.58%	P
21	Scene 13-14 3.33° step	<42 msec rise time per Figure 26	< 35.55 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.62% < 1.36%	P
22	Scene 14-15 3.33° step	<42 msec rise time per Figure 26	< 38.28 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.96% 139/T ~~0.95%~~ < 1.36%	P
23	Scene 15-16 3.33° step	<42 msec rise time per Figure 26	< 37.89 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.89% < 0.95%	P
24	Scene 16-17 3.33° step	<42 msec rise time per Figure 26	< 37.5 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 2.03% < 0.68%	P

Pass = P
Fail = F

B33 b

TEST DATA SHEET 7 (SHEET 3 OF 4)
3.4.5.5: METSAT Scan Motion and Jitter Test

Step No.	Description	Requirement	Test Result	Pass/Fail
25	Scene 17-18 3.33° step	<42 msec rise time per Figure 26	< 36.33 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.82% < 1.90%	P
26	Scene 18-19 3.33° step	<42 msec rise time per Figure 26	< 36.72 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.21% < 2.85%	P
27	Scene 19-20 3.33° step	<42 msec rise time per Figure 26	< 36.72 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 2.30% < 1.63%	P
28	Scene 20-21 3.33° step	<42 msec rise time per Figure 26	< 39.06 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.76% < 2.04%	P
29	Scene 21-22 3.33° step	<42 msec rise time per Figure 26	< 33.98 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 0.88% < 1.77%	P
30	Scene 22-23 3.33° step	<42 msec rise time per Figure 26	< 34.77 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.42% < 1.50%	P
31	Scene 23-24 3.33° step	<42 msec rise time per Figure 26	< 36.72 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.82% < 1.50%	P
32	Scene 24-25 3.33° step	<42 msec rise time per Figure 26	< 37.89 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 2.09% < 1.90%	P

Pass = P
Fail = F

B33c

TEST DATA SHEET 7 (SHEET 4 OF 4)
3.4.5.5: METSAT Scan Motion and Jitter Test

Step No.	Description	Requirement	Test Result	Pass/Fail
33	Scene 25-26 3.33° step	<42 msec rise time per Figure 26	< 34.37 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.69% ~~[illegible]~~ 139 T < 2.18%	P
34	Scene 26-27 3.33° step	<42 msec rise time per Figure 26	< 36.33 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.42% < 2.85%	P
35	Scene 27-28 3.33° step	<42 msec rise time per Figure 26	< 37.11 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.69% < 0.82%	P
36	Scene 28-29 3.33° step	<42 msec rise time per Figure 26	< 36.72 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 2.23% < 2.45%	P
37	Scene 29-30 3.33° step	<42 msec rise time per Figure 26	< 38.28 msec	P
		< ±5% jitter per Figure 26 < +4% overshoot for 19 msec	< 1.69% < 1.09%	P
38	Scene 30-Cold Cal 35.0° slew	<0.21 sec slew time per Figure 29	139 T ~~0.108°~~ <0.21sec	P
		< ±5% jitter per Figure 30	<±0.108°	P
39	Cold Cal - Warm Cal 96.67° slew	<0.40 sec slew time per Figure 31	139 T ~~0.134°~~ <0.40sec	P
		< ±5% jitter per Figure 32	<±0.134°	P

Pass = P
Fail = F

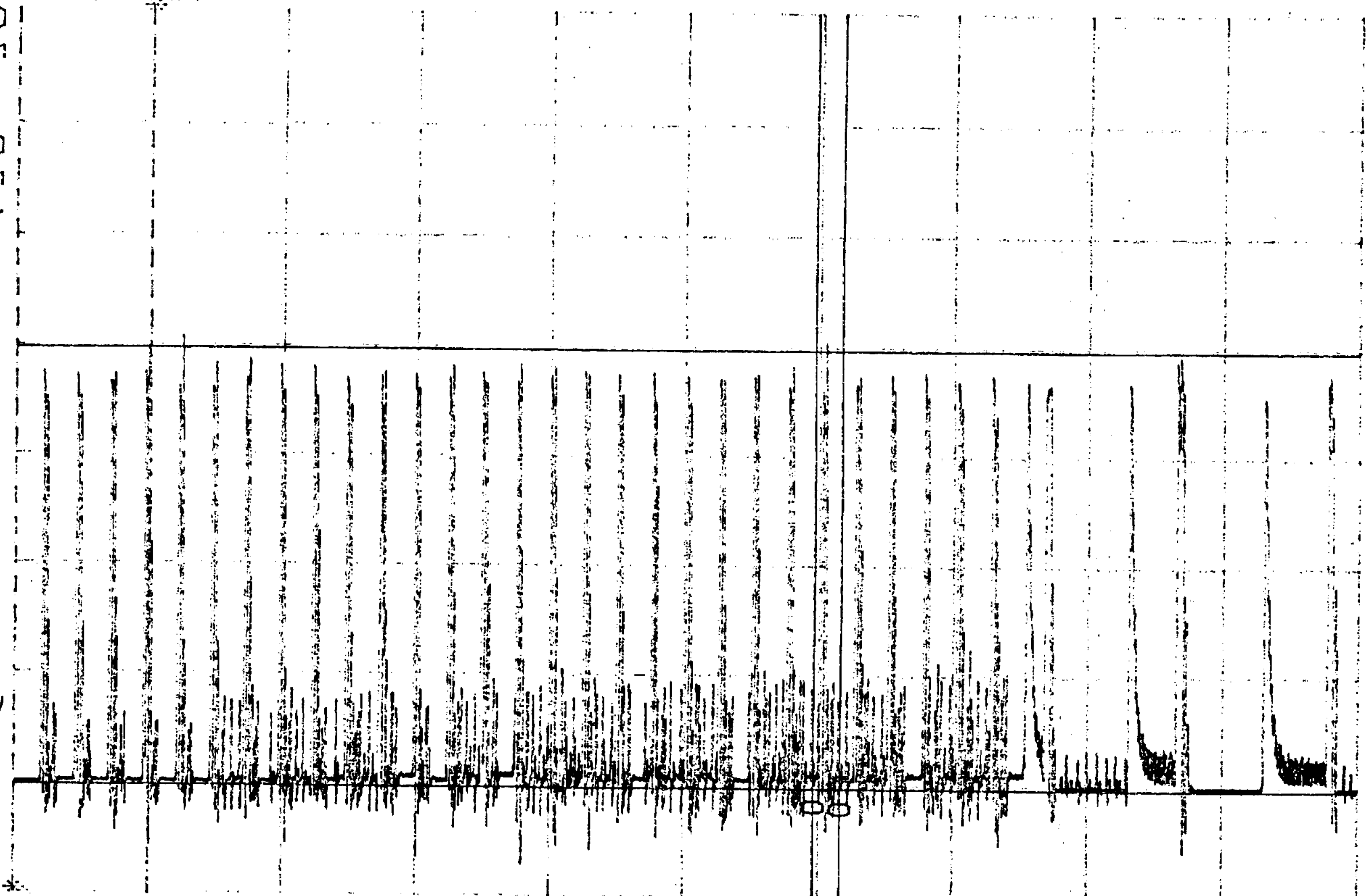
Unit: 1331200-2-1T
Serial No.: 109
Date: 6-15-99

Test Engineer: Ray Hertzberg
Quality Assurance: 268 [illegible] 99
Customer Representative: [illegible] 6-17-99

B33d

X=4.769 S ΔX=165.2mS Y=-303.03μ ΔY=39.95mV
Ya=-1.9152m ΔYa=206.2μV

CAP TIM BUF



4PLB-C
8.0 Sec SCAN
3.4.5.6.
C1

SO: 727181

PN: 1331200-2-IT SN: 109

TEST ENG: Ray Hertzberg

QUALITY:

DATE: 6-15-99

TEST DATA SHEET 8
3.4.5.6: METSAT Pulse Load Bus Current

Test Setup Verified: Ray Hertzberg (Signature) Shop Order No. 727181

3.4.5.6: 28V Bus Peak Current and Rise Time Test

Step No.	Requirement	Test Result	Pass/Fail
4	< 2 A peak any place in the scan	1.997A	P
5	> 70 μsec rise time, 3.33° step	2.344msec	P
6	> 70 μsec rise time, start of WC slew	3.906 msec	P
6	> 70 μsec rise time, end of WC slew	1.953 msec	P

Pass = P
Fail = F

Unit: 1331200-2-IT

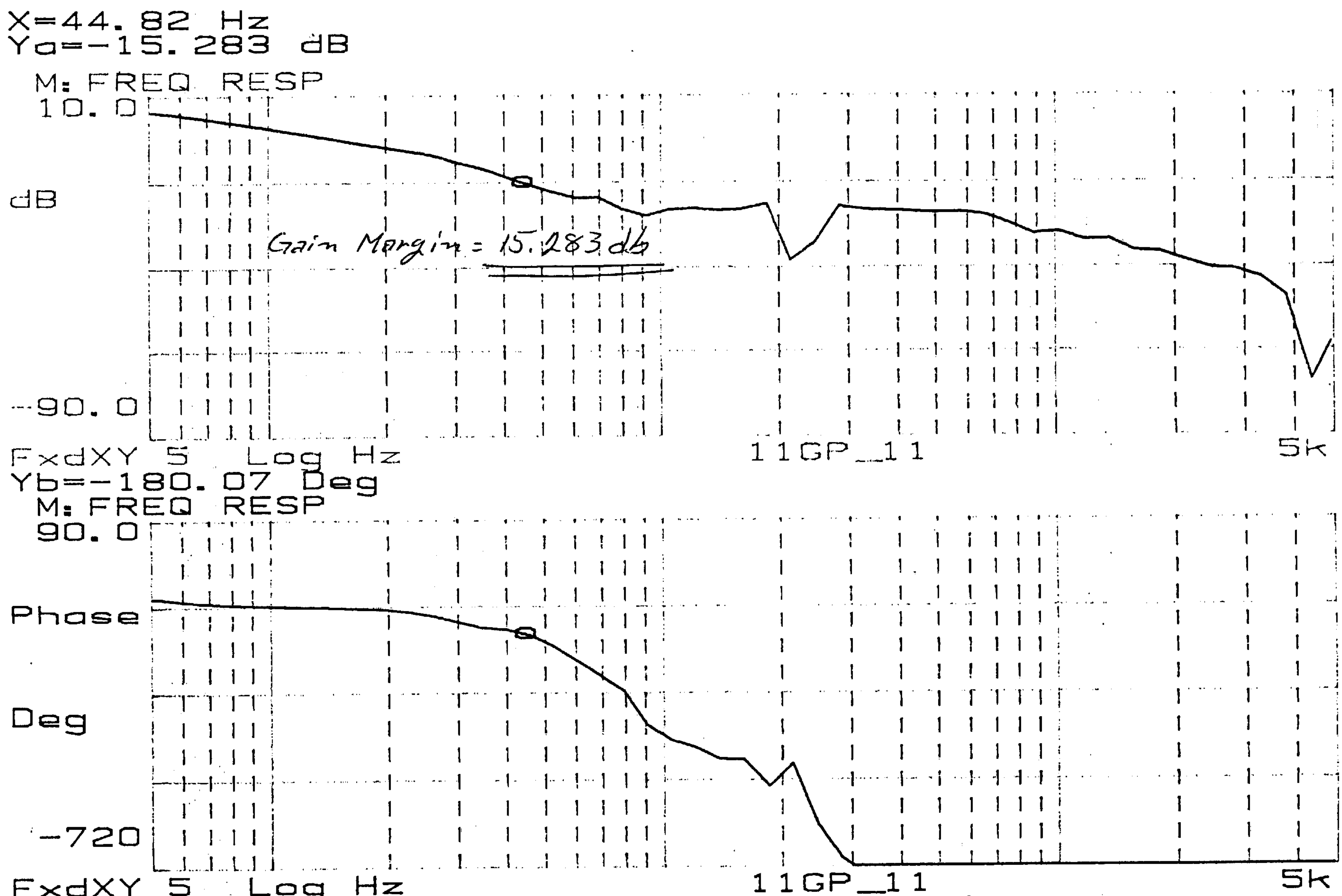
Serial No.: 109

Test Engineer: Ray Hertzberg

Quality Assurance: 7A 268 JUN 16 '99

Date: 6-15-99

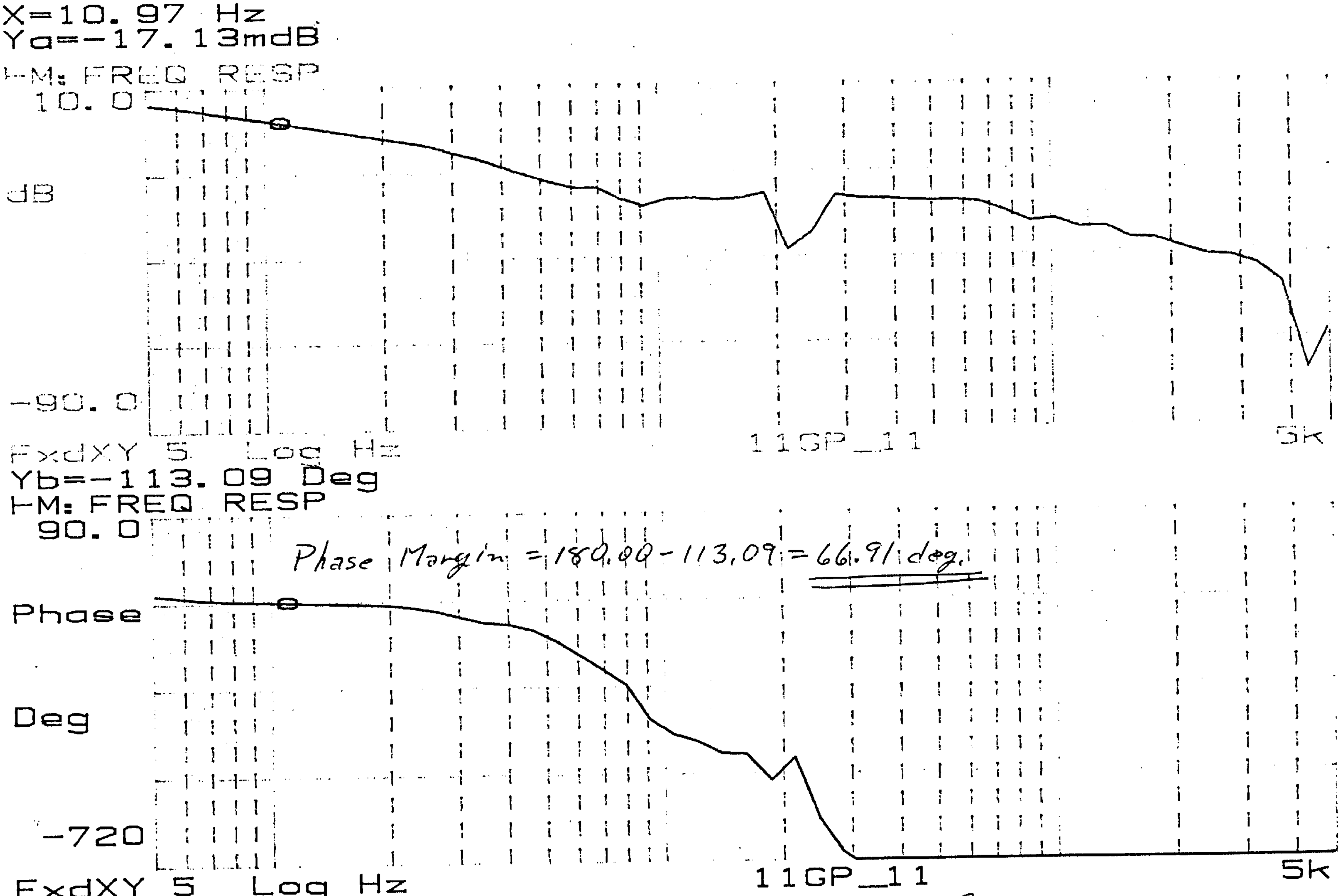
C2



SO: 727181 Gain Phase Margin TEST ENG: D Lund DATE: 6/16/99

PN: 1331200-2-IT SN: 109 P 3.4.5.8 QUALITY: 7A 268 JUN 17 '99

D1a



SO: 727181

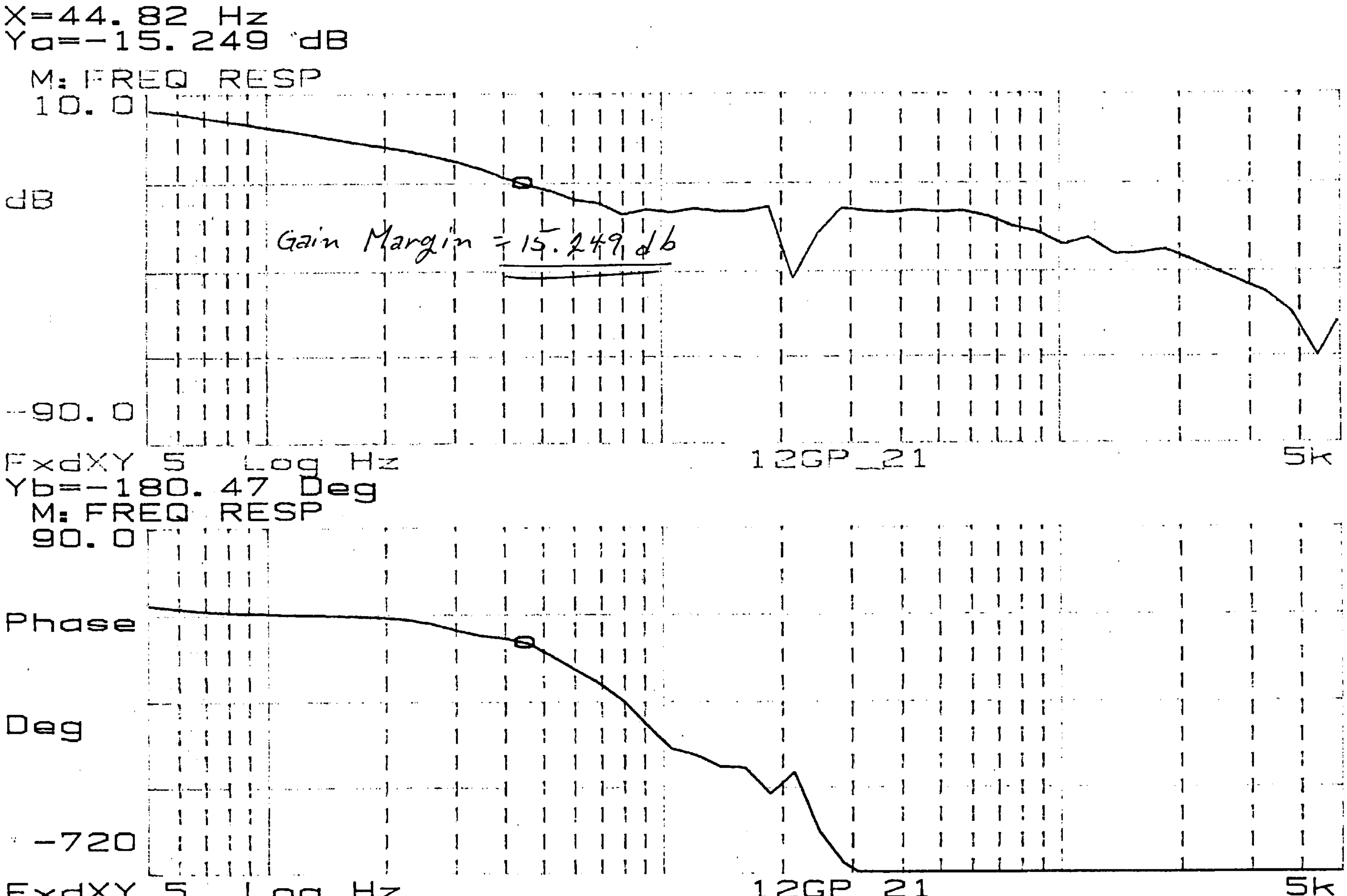
PN: 1331200-2-IT SN: 109

Gain Phase Margin

TP 3.4.5.8 D1b

TEST ENG: D Lund DATE: 6/16/99

QUALITY: TA 268 JUN 17 '99



Gain Phase Margin

TEST ENG: D Lund DATE: 6/16/99

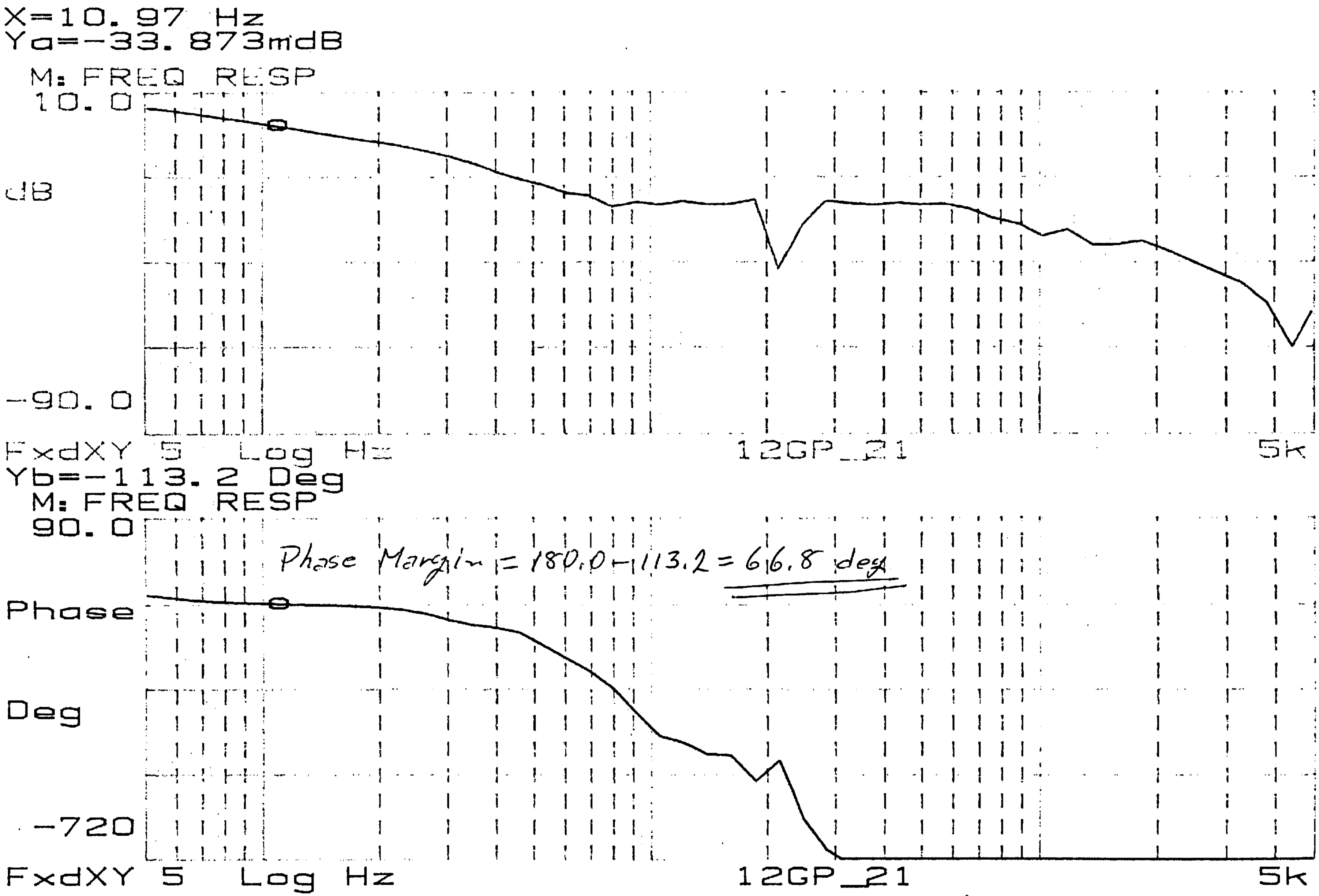
SO: 727181

PN: 1331200-2-IT SN: 109

P 3.4.5.8

12GP_BP21 D2a

QUALITY: 892 JUN 17 '99



SO: 727181

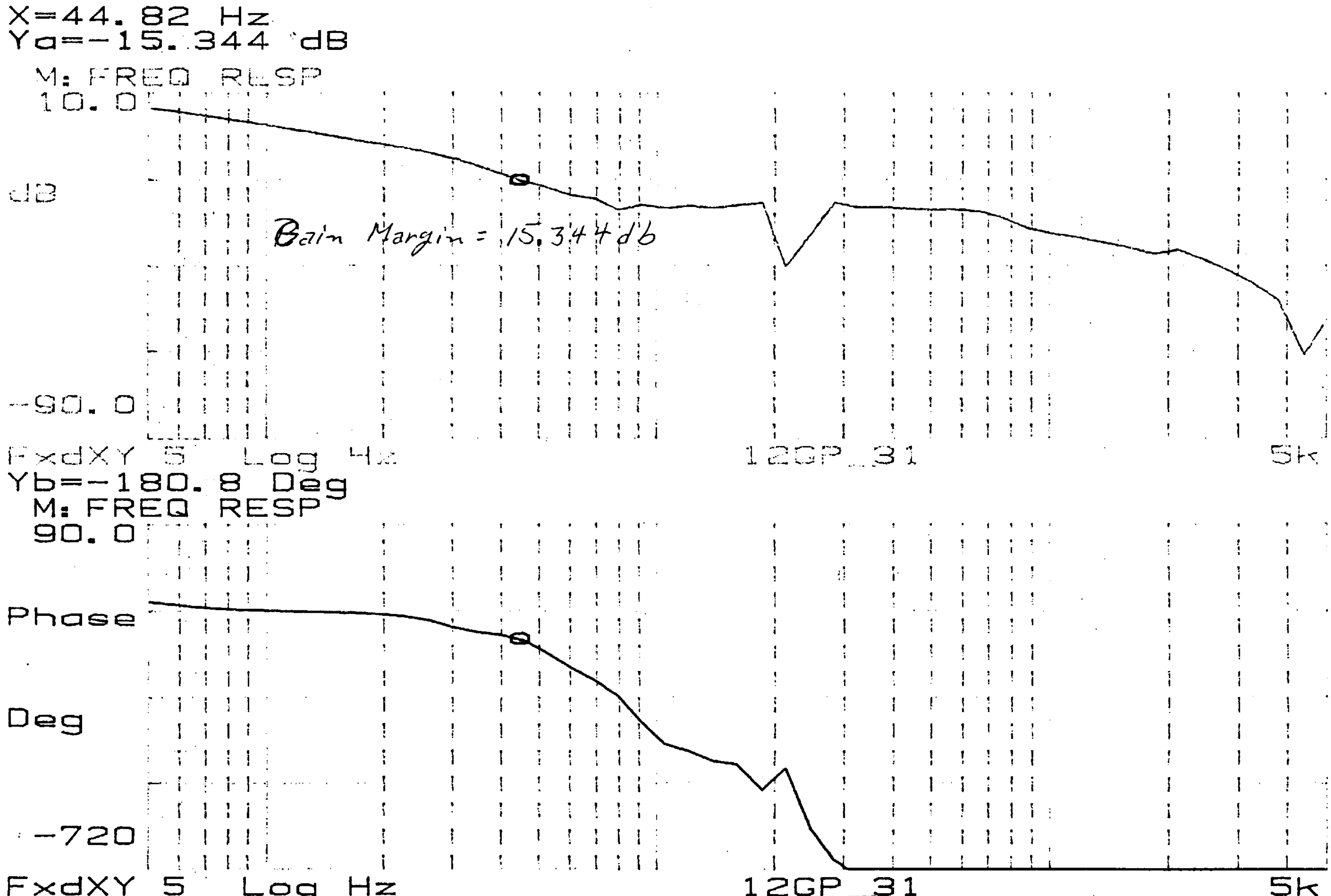
PN: 1331200-2-IT SN: 109

Gain Phase Margin
TP 3.4.5.8
12GP_BP21

D26

TEST ENG: D Lund DATE: 6/16/99

QUALITY: 892 JUN 17 '99



SO: 727181

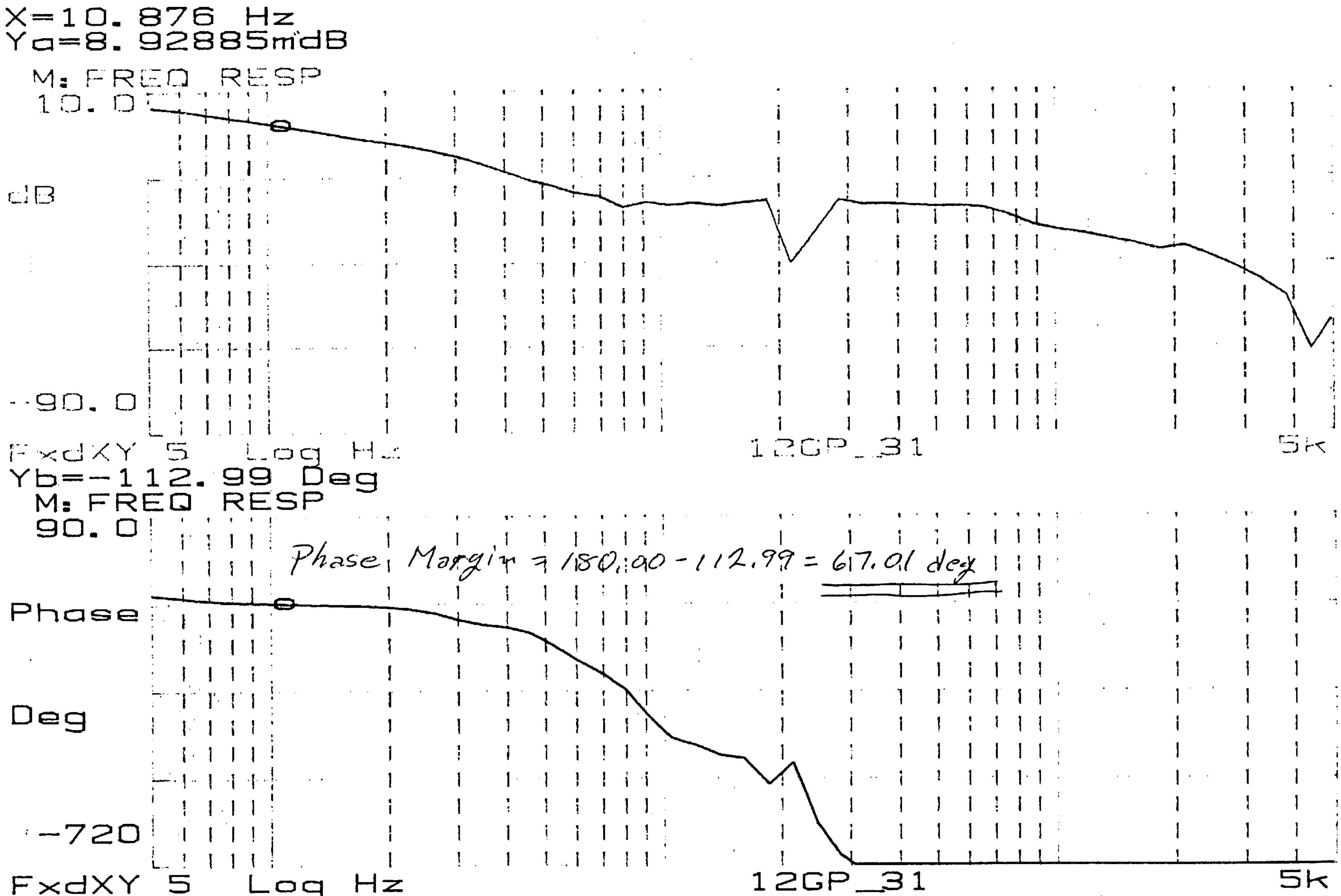
PN: 1331200-2-IT SN: 109

Gain Phase Margin
IT 3.4.5.8
12GP_BP31

D3a

TEST ENG: D Lud DATE: 6/16/99

QUALITY: (BSC) JUN 17 '99



SO: 727181

PN: 1331200-2-IT SN: 109

Gain Phase Margin
P 3.4.5.8
12GP_BP31

D36

TEST ENG: D Lund DATE: 6/16/99

QUALITY: JUN 17 '99

TEST DATA SHEET 9
3.4.5.8: METSAT Gain/Phase Margin Test

Test Setup Verified: Ray Hertzberg
Signature

Shop Order No. 727181

3.4.5.8 Step 12: Gain/Phase Margin Test

Requirement	Test Result		Pass/Fail
12 dB minimum	1	15.283 dB	P
	2	15.249 dB	P
	3	15.344 dB	P
25 degrees minimum	1	66.91 deg.	P
	2	66.8 deg	P
	3	67.01 deg	P

Pass = P
Fail = F

Unit: 133/200-2-1T

Serial No.: 109

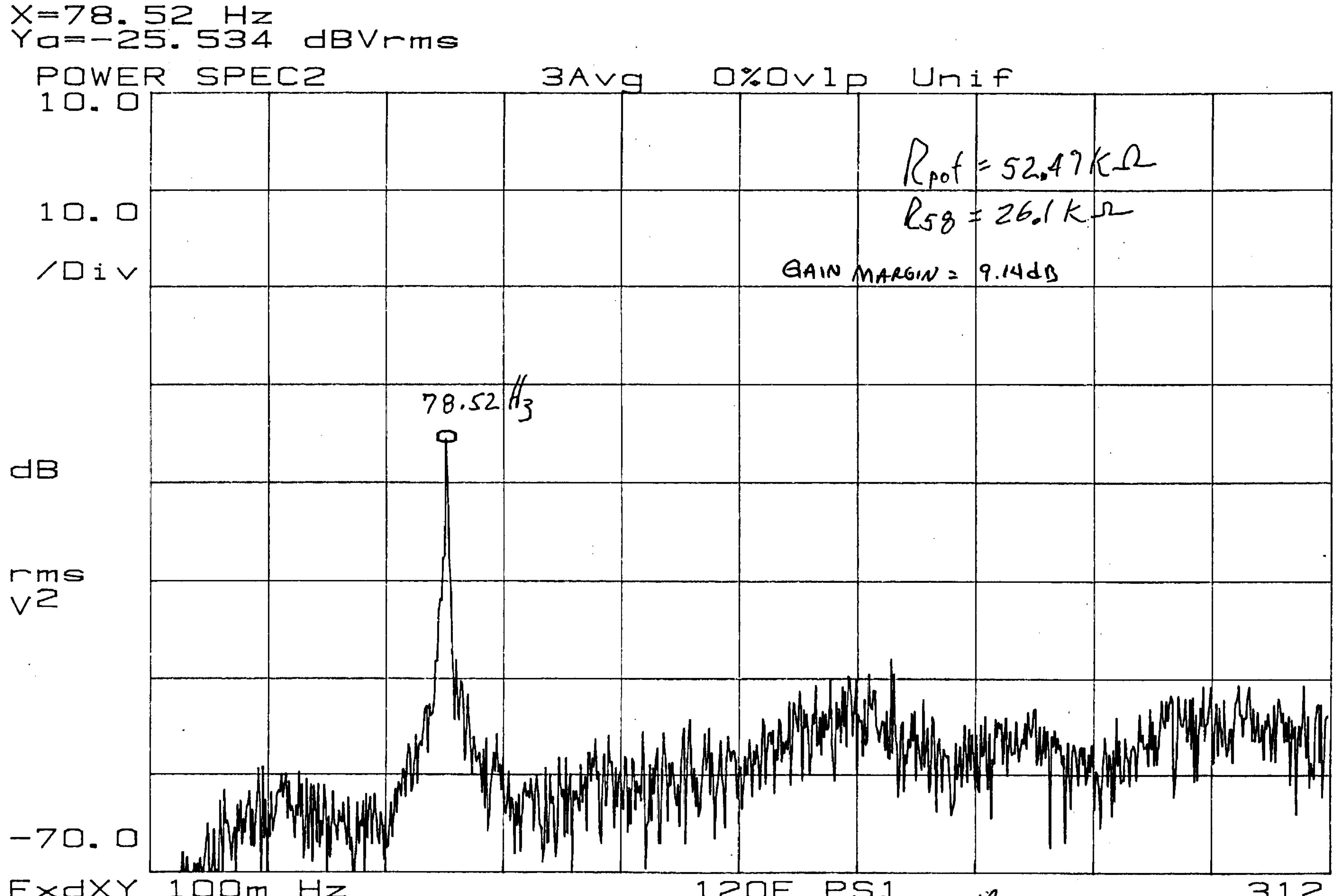
Date: 6-16-99

Test Engineer: Ray Hertzberg

Quality Assurance: TA 268 JUN 17 '99

Customer Representative: 6-17-99

D4



OPERATIONAL GAIN MARGIN
3.4.5.9

E1

SO: 727181

PN: 1331200-2-IT SN: 109

TEST ENG: Ray Hergberg

QUALITY: 892 JUN 17 '99

DATE: 6-16-99

TEST DATA SHEET 10
3.4.5.9: METSAT Operational Gain Margin Test

Test Setup Verified: ____________ Signature

Shop Order No. 727181

3.4.5.9: Operation Gain Margin Test

Step No.	Requirement	Test Result		Pass/Fail
11	R58 Resistance (Kohms)		26.1K	P
	Test Pot Resistance (Kohms)	1	52.47K	
		2	52.43K	
		3	52.59K	
12	Oscillation Frequency (Hz)	1	78.52 Hz	P
		2	78.52 Hz	
		3	78.52 Hz	
16	Gain Margin, 9 dB minimum	1	9.14dB	P
		2	9.14dB	
		3	9.16dB	

Pass = P
Fail = F

Unit: 1331200-2-IT

Serial No.: 109

Test Engineer: ____________

Quality Assurance: ____________ QA 268 17 '99

Date: 6-16-99

E2

NASA
National Aeronautics and Space Administration

Report Documentation Page

1. Report No. ---	2. Government Accession No. ---	3. Recipient's Catalog No. ---
4. Title and Subtitle Integrated Advanced Microwave Sounding Unit-A (AMSU-A), Performance Verification Report		5. Report Date 22 July 1999
		6. Performing Organization Code ---
7. Author(s) C. Haapala		8. Performing Organization Report No. 11528
		10. Work Unit No. ---
9. Performing Organization Name and Address Aerojet 1100 W. Hollyvale Azusa, CA 91702		11. Contract or Grant No. NAS 5-32314
12. Sponsoring Agency Name and Address NASA Goddard Space Flight Center Greenbelt, Maryland 20771		13. Type of Report and Period Covered Final
		14. Sponsoring Agency Code ---
15. Supplementary Notes ---		

16. ABSTRACT (*Maximum 200 words*)

This is the Performance Verification Report, Antenna Drive Subassembly, METSAT AMSU-A2 (P/N 1331200-2, S/N 109), for the Integrated Advanced Microwave Sounding Unit-A (AMSU-A).

17. Key Words (Suggested by Author(s)) EOS Microwave System		18. Distribution Statement Unclassified — Unlimited	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of pages	22. Price ---

NASA FORM 1626 OCT 86

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4. TITLE AND SUBTITLE Integrated Advanced Microwave Sounding Unit-A (AMSU-A), Performance Verification Report		5. FUNDING NUMBERS NAS 5-32314	
6. AUTHOR(S) C. Haapala			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Aerojet 1100 W. Hollyvale Azusa, CA 91702		8. PERFORMING ORGANIZATION REPORT NUMBER 11528 22 July 1999	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) NASA Goddard Space Flight Center Greenbelt, Maryland 20771		10. SPONSORING/MONITORING AGENCY REPORT NUMBER ---	
11. SUPPLEMENTARY NOTES ---			
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14. SUBJECT TERMS EOS Microwave System			15. NUMBER OF PAGES
			16. PRICE CODE ---
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298-102

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C. Haapala	208	N/A	

CHECKED BY:	DATE	JOB NUMBER:	DATE
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