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

Test Report, Electromagnetic Interference (EMI)/ Electromagnetic Radiation (EMR) and Electromagnetic Compatibility (EMC) For the EOS/AMSU-A2

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TABLE OF CONTENTS

Paragraph		Page
1.	INTRODUCTION	1
1.1	Purpose	1
1.2	Scope	1
1.3	Summary of text results	1
1.3.1	Conducted emissions, per test method CE01, 30 Hz to 20 kHz	1
1.3.2	Conducted emissions, per test method CE03, 20 kHz to 50 MHz	1
1.3.3	Radiated emissions, per test method RE02, 14 KHz to 18 GHz	2
1.3.4	Conducted susceptibility, per test method CS01, 30 Hz to 50 kHz	2
1.3.5	Conducted susceptibility, per test method CS02, 50 kHz to 400 MHz	2
1.3.6	Conducted susceptibility, per test method CS06, transient spike	2
1.3.7	Radiated emissions, per test method RE01, Magnetic field 30 Hz to 50 kHz	2
1.3.8	Radiated emission, per test method RE04, magnetic static field, one meter from the wall of the instrument	2
1.3.9	Radiated susceptibility, per test method RS01, magnetic field 30 Hz to 200 kHz and a 2 gauss magnetic field	2
1.3.10	Radiated susceptibility, per test method RS03, electric field 14 kHz to 18 GHz	2
1.4	Tests performed	2
1.5	Susceptibility monitors	3
1.6	Pass/Fail criteria	3
2.	TEST CONDUCT/RESULTS	5
2.1	Conducted emission (CE01) test	5
2.1.1	Purpose of test	5
2.1.2	Date test started	5
2.1.3	Date test completion	5
2.1.4	Test procedure	5
2.1.5	Test comment	7
2.1.6	Test results	7
2.2	Conducted emissions (CE03) test	8
2.2.1	Purpose of test	8
2.2.2	Date test started	8
2.2.3	Date test completion	8
2.2.4	Test procedure	8
2.2.5	Test results	8
2.3	Radiated emissions (RE01) test	9
2.3.1	Purpose of test	9
2.3.2	Date test started	9
2.3.3	Date test completion	9
2.3.4	Test procedure	9
2.3.5	Test comment	10
2.3.6	Test results	10
2.4	Radiated emissions (RE04) test	10
2.4.1	Purpose of test	10
2.4.2	Date test started	10
2.4.3	Date test completion	11
2.4.4	Test procedure	11
2.4.5	Test comment	11
2.4.6	Test results	12
2.5	Radiated emissions (RE02) test	12

TABLE OF CONTENTS (Cont.)

Paragraph		Page
2.5.1	Purpose of test	12
2.5.2	Date test started	12
2.5.3	Date test completion	12
2.5.4	Test procedure	12
2.5.5	Test comment	14
2.5.6	Test results	14
2.6	Conducted susceptibility (CS01) test	14
2.6.1	Purpose of test	14
2.6.2	Date test started	14
2.6.3	Date test completion	15
2.6.4	Test procedure	15
2.6.5	Test comment	18
2.6.6	Test results	18
2.7	Conducted Susceptibility (CS02) test	19
2.7.1	Purpose of test	19
2.7.2	Date test started	19
2.7.3	Date test completion	19
2.7.4	Test procedure	19
2.7.5	Test comment	22
2.7.6	Test results	22
2.8	Conduct Susceptibility (CS06) test	22
2.8.1	Purpose of test	22
2.8.2	Date test started	22
2.8.3	Date test completion	22
2.8.4	Test procedure	23
2.8.5	Test comment	25
2.8.6	Test results	25
2.9	Radiated Susceptibility (RS01) test	25
2.9.1	Purpose of test	25
2.9.2	Date test started	25
2.9.3	Date test completion	25
2.9.4	Test procedure	25
2.9.5	Radiated susceptibility, static magnetic field, test	26
2.9.6	Test comment	27
2.9.7	Test results	27
2.10	Radiated Susceptibility (RS03) test	27
2.10.1	Purpose of test	27
2.10.2	Date test started	27
2.10.3	Date test completion	27
2.10.4	Test procedure	28
2.10.5	Test comment	30
2.10.6	Test results	30
3.	SUPPLEMENTARY INFORMATION	31

FIGURES

Figure 1 Narrowband Conducted Emissions on Power Leads 6
Figure 2 Broadband Conducted Emission Limits on Power Lines 6
Figure 3 Limits RE01 10
Figure 4 Radiated Narrowband Limits for Electric-Field Emission 13
Figure 5 Radiated Broadband Limits for Electric-Field Emissions 13
Figure 6 Ripple and Noise Susceptibility Limit 16
Figure 7 CS06 Transient Waveform 23
Figure 8 RS01 Magnetic Field Limit 26
Figure 9 RS03 Limits 28

TABLES

Table I EMI/EMC Test Performance Matrix 3
Table II Monitors for Susceptibility Test 3
Table III Magnetic Field Applied Distance 26
Table IV Static Magnetic Field Applied Distance 26

SECTION 1

SUMMARY

1. INTRODUCTION

This document contains the procedure and the test results of the Advanced Microwave Sounding Unit - A (AMSU-A) Earth Observing System (EOS) Project, assembly part number 1356006-1, serial number 202, Electromagnetic Interference (EMI), Electromagnetic Susceptibility, and Electromagnetic Compatibility (EMC) qualification test. The test was conducted in accordance with the approved EMI/EMC Test Plan/Procedure, Specification number AE-26151/8A, dated 17 June 1998.

Aerojet intends that the presentation and submittal of this document, prepared in accordance with the objectives established by the aforementioned Test Plan/Procedure, document number AE-26151/8A, will satisfy the data requirement with respect to the AMSU-A/EOS instrument operational compliance of the EMI/EMC test requirement.

Test for the AMSU-A/EOS instrument have been completed and all the requirements per General Interface Requirement Document (GIRD), GSFC 422-11-12-01, for EOS Common Spacecraft/Instruments, paragraph 10.11, were met with the exceptions of the test methods CE03, RE01, and RE02, as described in this document.

1.1 Purpose

The purpose of this test report is to described each of the tests performed and to present the backup data collected to verify that the design objectives and specified requirements were evaluated and achieved.

1.2 Scope

This document describes the EMI/EMC test performed by Aerojet and it is presented in the following manner: Section 1 contains introductory material and a brief summary of the test results. Section 2 contains more detailed descriptions of the test plan, test procedure, and test results for each type of EMI/EMC test conducted. Section 3 contains supplementary information that includes test data sheets, plots, and calculations collected during the qualification testing.

1.3 Summary of test results

1.3.1 Conducted emissions, per test method CE01, 30 Hz to 20 kHz

The AMSU-A2/EOS instrument meets the requirements of CE01. The Noisy Bus exhibited the highest measured emissions and they were below the specification limit by more than 11 dB.

1.3.2 Conducted emissions, per test method CE03, 20 kHz to 50 MHz

The AMSU-A2/EOS instrument does not meet the conducted emissions requirements of the broadband and narrowband limits of test method CE03. In the narrowband emissions test, the Noisy Bus exceeds the limit by a maximum of 23 dB, and exhibits out-of-limit emissions throughout the frequency range of 20 kHz to 4.3 MHz. The power supply harmonics are most prominent in the frequency range above 200 kHz. The broadband emissions exceed the limit by more than 20 dB, however. These are the same narrowband frequencies in a broadband plot. The broadband envelope is 12 dB above the limit at a reduced frequency range. All the other power lines exhibit reduced levels above the limit and within a narrower frequency range.

1.3.3 Radiated emissions, per test method RE02, 14 kHz to 18 GHz

The AMSU-A2/EOS instrument does not meet the radiated emissions requirements of test method RE02 narrowband limits. Narrowband emissions, related directly to the instrument, exceeded the limits at 16.4, 18.6, and 48.5 MHz. There were some narrowband emissions at the frequency range of 31.6 to 223 kHz that were related to a ground loop between test equipment, STE, and shielded enclosure. In subsequent tests, these emissions were reduced, but not within the limits. Shielded enclosure leakage produced emissions above 72 MHz. At the time of the test, we were unsuccessful in reducing the reported ambient levels. The broadband emissions requirement at the 2.0 to 2.2 GHz frequency range were above the limit because of the stringent limit requirement. The measured level was at the minimum discernible signal (MDS) of the measuring equipment with amplifier.

1.3.4 Conducted susceptibility, per test method CS01, 30 Hz to 50 kHz

The AMSU-A2/EOS instrument meets the requirements of CS01.

1.3.5 Conducted susceptibility, per test method CS02, 50 kHz to 400 MHz

The AMSU-A2/EOS instrument meets the requirement of CS02.

1.3.6 Conducted susceptibility, per test method CS06, transient spike

The AMSU-A2/EOS instrument meets the requirement of CS06.

1.3.7 Radiated emissions, per test method RE01, magnetic field 30 Hz to 50 kHz

The AMSU-A2/EOS instrument does not meet the radiated emissions requirements at the base of the motor. The motor exhibits magnetic field emissions throughout the frequency range of 30 Hz to 1.635 kHz. The maximum recorded level was 104 dBpT at 30 Hz. The level at 1.635 kHz is 70 dBpT. The emissions are produced by the stepping motor, 7 cm from the center of the motor lateral wall.

1.3.8 Radiated emission, per test method RE04, magnetic static field, one meter from the wall of the instrument

The AMSU-A2/EOS instrument meets the radiated emissions requirements of RE04.

1.3.9 Radiated susceptibility, per test method RS01, magnetic field 30 Hz to 200 kHz and a 2 gauss magnetic field

The AMSU-A2/EOS instrument meets the requirements of RS01, with no exception.

1.3.10 Radiated susceptibility, per test method RS03, electric field 14 kHz to 18 GHz

The AMSU-A2/EOS instrument meets the requirements of RS03, with no exception.

1.4 Tests performed

The AMSU-A2/EOS instrument was subjected to the EMI/EMC tests on the power lines, under the normal, high, and low voltage condition as indicated in Table I .

Table I EMI/EMC Test Performance Matrix

Instrument Input Terminal	CE01/ CE03	CS01/ CS02	CS06	RE01/ RE04	RE02	RS01	RS03
+29V Quiet Power Bus (A)	Yes	No	Yes	No	No	No	No
+29V Quiet Power Bus Return (A)	Yes	No	No	No	No	No	No
+29V Noisy Power Bus (A)	Yes	No	Yes	No	No	No	No
+29V Noisy Power Bus Return (A)	Yes	No	No	No	No	No	No
+29V Survival Heater Bus (A & B)	Yes	No	A Only	No	No	No	No
+29V Survival Heater Bus Return (A & B)	Yes	No	No	No	No	No	No
+27V Quiet Power Bus (A)	No	Yes	No	No	No	No	No
+27V Quiet Power Bus Return (A)	No	Yes	No	No	No	No	No
+27V Noisy Power Bus (A)	No	Yes	No	No	No	No	No
+27V Noisy Power Bus Return (A)	No	Yes	No	No	No	No	No
+27V Survival Heater Bus (A)	No	Yes	No	No	No	No	No
+27V Survival Heater Bus Return (A)	No	Yes	No	No	No	No	No
+31V Quiet Power Bus (A)	No	Yes	No	No	No	No	No
+31V Quiet Power Bus Return (A)	No	Yes	No	No	No	No	No
+31V Noisy Power Bus (A)	No	Yes	No	No	No	No	No
+31V Noisy Power Bus Return (A)	No	Yes	No	No	No	No	No
+31V Survival Heater Bus (A)	No	Yes	No	No	No	No	No
+31V Survival Heater Bus Return (A)	No	Yes	No	No	No	No	No
EOS/AMSU-A Instrument System							
EOS/AMSU-A Instrument @ 29V Nominal Voltage	No	No	No	Yes	Yes	Yes	Yes

1.5 Susceptibility monitors

The monitors shown in Table II will be observed and their output recorded during the performance of the susceptibility testing:

Table II Monitors for Susceptibility Test

Susceptibility	Line/Item	Monitor
Conducted CS01, CS02, and CS06	+29V main power, Quiet Bus*	Data output all channels
	+29V Noisy Power Bus*	Antenna Position
Radiated RS01 and RS03	AMSU-A enclosure	Data output all channels

* CS01 & CS02 are to be performed at +27.0V and +31.0V bus. CS06 is performed at +29.0V bus.

1.6 Pass/Fail criteria

The pass/fail criteria for the conducted and radiated emissions test was determined by inspection of the recorded emissions levels when compared to the specifications limits. All emissions shall be on or below the specification limits. When narrowband emissions exceed the broadband limits or transient spikes

exceed the narrowband or broadband limits, the specific emission shall be identified and exempted from these criteria.

An STE EMI data collection program has been developed and is included in the bonded test software of the STE. Operation of the system and the EMI data collection program will be coordinated with operation of the EMI susceptibility signal sweeps.

The EMI data collected will provide about a five scan period at the beginning and end of each data collection period, which will allow comparison of each channel's normal radiometric response with and without the interference present. The data will be presented in the form of noise distribution plots for each of the radiometric channels and as a summary report for all channels. These data shall be reviewed as follows:

a. Review the summary data and identify channels with alarm counts greater than ten or channels that have sigma values that are a factor of two greater than observed in baseline checks made periodically during the test.

b. Examine the noise distribution plots for channels identified in (a), and look for disruptions during the period when the EMI signal sweep was made. If an EMI disruption results in a peak-to-peak increase in channel noise that is less than twice the normal level, then it is acceptable (pass); if the disruption creates a level shift in the noise data that is equal to or less than the normal noise level, then it is acceptable (pass).

c. Examine all remaining plots for disruptions and identify and file the data.

d. If any channel fails, additional sweeps will be made over a reduced frequency range and at reduced amplitudes as necessary to determine the threshold of the susceptibility.

The test will continue to establish an overall assessment of the behavior. On the Test Data Sheets, the EQUIPMENT LIMIT (EL) column will be checked when the test equipment cannot deliver the required level. Since the test equipment meets the power requirements of MIL-STD-461 and the AMSU-A instrument is not susceptible to the output of the signal source, a check on this column indicates the unit passed the test requirement. A check in the SPECIFICATION LIMIT (SL) column indicates the AMSU-A instrument met the requirements.

SECTION 2

TEST CONDUCT/RESULTS

2. TEST CONDUCT/RESULTS

2.1 Conducted emissions (CE01) test

2.1.1 Purpose of test

This test was conducted to demonstrate that the electromagnetic interference currents in the power lines do not exceed the limits in Figure 1.

2.1.2 Date test started

The test began on 4 May 1998.

2.1.3 Date test completion

The test was completed on 4 May 1998.

2.1.4 Test procedure

The test procedure specified that the test be conducted as indicated in the following steps:

1. Connect the current probe to the Quiet Bus A power line listed in Table III (AE-26151/8A) and as depicted in Figure 4 (also AE-26151/8A), between the feedthrough capacitor and the EOS/AMSU-A.

2. Verify that the measuring equipment is programmed to measure between 20 Hz and 20 kHz. If necessary, program the signal analyzer for multi-scan and compare the measurement to the single scan. Capture the highest level possible in each range.

3. Turn ON the Main Power switch on the STE front power panel and turn ON the Q/Main, N/Pulse and S/Analog switches.

4. Adjust the Q and N/S power supplies voltage levels on the STE to +29.0 V.

5. Using STE command "[9] SCANNER A2 POWER," turn on the scanner power (the state of the command should change from OFF to ON).

6. Enter the STE command "[10] ANTENNA FULL SCAN MODE." Verify that the command was received by observing that the state of that command has changed from NO to YES, and the instrument is scanning in full scan mode.

7. Allow the instrument to scan for 30 minutes so that all the temperature and power parameters have stabilized (the instrument must remain in full scan mode during the Quiet Bus 'A' and Quiet Bus RTN 'A' test).

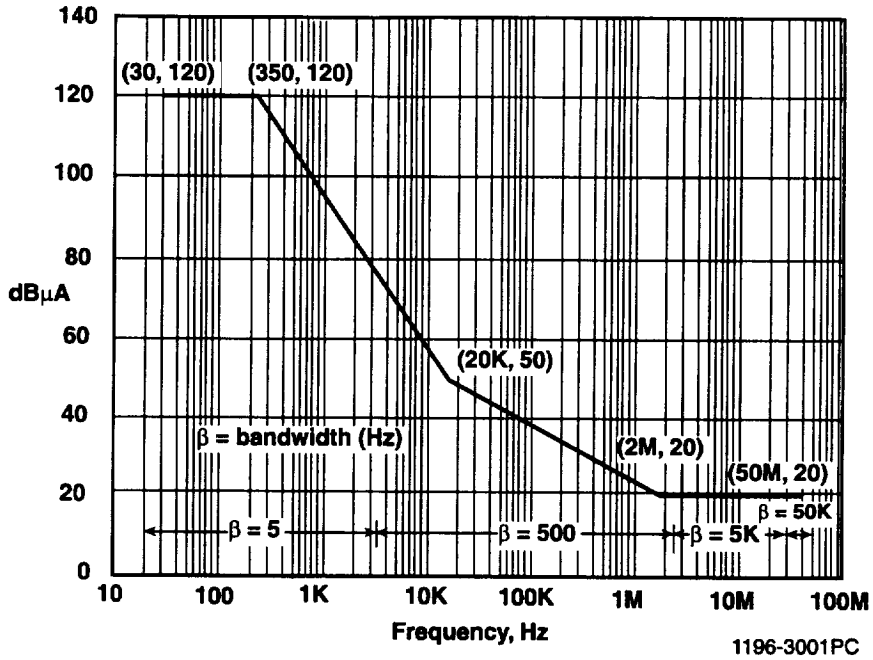


Figure 1 Narrowband Conducted Emissions on Power Leads

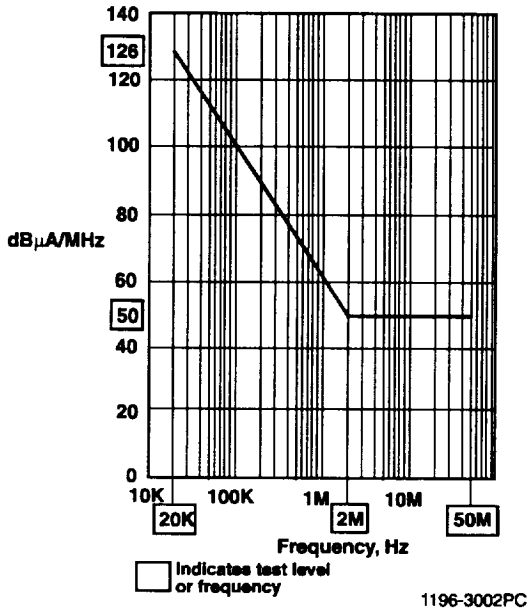


Figure 2 Broadband Conducted Emission Limits on Power Lines

8. Make an X-Y plot. All narrowband measured data should be below the limit shown in Figure 2 (AE-26151/8A). If any emissions exceed or near the limit, scan the frequency range that exhibits the over-the-limit levels, reduce the frequency span, reduce the measuring bandwidth to 5 or 500 Hz, and photograph the CRT presentation or make an X-Y plot.

9. Connect the current probe to the Quiet Bus RTN A line (terminal 3), indicated in Figure 4 (AE-26151/8A), between the feedthrough capacitor and the EOS/AMSU-A.

10. Repeat steps 2 and 8 for the Quiet Bus RTN A line. Record all conducted emissions generated by the EOS/AMSU-A.

11. Using the STE commands, place the Antenna in the Warm Cal position.

12. Connect the current probe to the Noisy Bus A power line (terminal 5) indicated in Figure 4 (AE-26151/8A), between the feedthrough capacitor and the EOS/AMSU-A.

13. Repeat steps 2 and 8 for the Noisy Bus A line. Record all conducted emissions generated by the EOS/AMSU-A.

14. Connect the current probe to the Noisy Bus RTN A power line (terminal 7), indicated in Figure 4 (AE-26151/8A), between the feedthrough capacitor and the EOS/AMSU-A.

15. Repeat steps 2 and 8 for the Noisy Bus RTN A line. Record all conducted emissions generated by the EOS/AMSU-A.

16. Connect the current probe to the Survival Bus A power line (terminal 9), indicated in Figure 4 (AE-26151/8A), between the feedthrough capacitor and the EOS/AMSU-A.

17. Repeat steps 2 and 8 for the Survival Bus A line. Record all conducted emissions generated by the EOS/AMSU-A.

18. Connect the current probe to the Survival Bus RTN A power line (terminal 10), indicated in Figure 4 (AE-26151/8A), between the feedthrough capacitor and the EOS/AMSU-A.

19. Repeat steps 2 and 8 for the Survival Bus RTN A line. Record all conducted emissions generated by the EOS/AMSU-A.

20. With the instrument powered OFF, move the test leads and jumpers from terminals 9 and 10 to terminals 22 and 23 on the Breakout Box, for the Survival Bus power redundancy, listed in Table III (AE-26151/8A).

21. Repeat steps 16 through 19 for the Survival Bus B redundancy of the instrument.

22. Command the instrument scanner OFF and turn off the Main Power switch on the STE, as described in paragraph 3.4.6.4.2, steps 1 and 2 (AE-26151/8A).

2.1.5 Test comment

This test was conducted in accordance with the above test plan, with no exceptions.

2.1.6 Test results

The emissions on the Quiet Bus are a minimum of 13 dB below the limit. The Noisy Bus exhibits emissions with a minimum of 18 dB below the limit. The Survival Heaters are a minimum of 28 dB below the limit. There is very little difference between the Bus A and Bus B emissions spectrum and levels.
The AMSU-A2 meets the requirements of test method CE01 without exception. See Test Data Sheet 1 and Plots 1 through 12.

2.2 Conducted emissions (CE03) test

2.2.1 Purpose of test

This test was conducted to demonstrate that the electromagnetic interference currents in the power lines do not exceed the limits in Figures 1 and 2.

2.2.2 Date test started

The test began on 9 May 1998.

2.2.3 Date test completion

The test was completed on 9 May 1998.

2.2.4 Test procedure

The test procedure specified that the test be conducted as indicated in the following steps:

1. Place the current probe (91550-1) on one of the power lines listed in Table III (AE-26151/8A).

2. Verify that the measuring equipment is programmed to measure between 20 kHz and 50 MHz.

3. Using the spectrum analyzer system (HP 8566B), automatically scan all narrowband data from 20 kHz to 50 MHz. Plot the CRT presentation.

4. All measured data should be below the limit shown in Figure 2 (AE-26151/8A). If any emissions are observed to exceed or near the limit line, reduce the measuring bandwidth to 500 Hz, 5 kHz, or 50 kHz, and command the computer to print the measured level of the signal.

5. Request the computer for all broadband data from 20 kHz to 50 MHz. Plot the CRT presentation.

6. All broadband measured data should be below the limit shown in Figure 3 (AE-26151/8A). If any emissions are observed to exceed the limit, determine if the signal is broadband, as indicated in MIL-STD-462.

7. If signals are broadband emissions, command the computer to print out the measured levels.

8. Repeat steps 1 through 7 for all the power lines listed in Table III (AE-26151/8A).

9. If any narrowband or broadband signals exceed the limits, perform an ambient test and determine the source of the emanation.

10. Affix all plots, photos, calculations, and related information to TDS 2.

2.2.5 Test results

The Quiet Bus and return lines exhibited narrowband emissions above the limit throughout the frequency range of 42 kHz to 420 kHz. The maximum conducted emission level was recorded at 14 dB

above the limit at 204 kHz. The broadband emissions are a product of pulsed CW and have the same frequencies as seen on the NB plot. The broadband envelope that exceeds the limit approximately covers the frequency range of 200 to 350 kHz with a maximum level of 6 dB above the limit. The Noisy Bus is the contributor of all the noise exhibited in all the power lines with exception of the power supply switching harmonics, i.e., the switching frequency of 104 kHz. The emissions cover a frequency range from 20 kHz to 2.6 MHz. The narrowband measured levels exceed the limits by a maximum of 26 dB at 104 kHz on the return line of Bus A. The broadband emissions are contained within the broadband envelope of 60 to 800 kHz with a maximum out-of-limit level of 14 dB at 208 kHz. The Survival Heater Bus conducted emissions exceed the limits by a maximum of 11 dB at 70 kHz. The frequency spectrum covers the frequency range of 47 to 408 kHz. The broadband envelope was below the limit in all the Survival Heater Bus power lines. Previous measured conducted emission data indicated that with the motor in the Warm Calibration position only the frequencies related to the power supply switching harmonics were above the limit. See Test Data Sheet 2, Plots 50 through 73.

2.3 Radiated emissions (RE01) test

2.3.1 Purpose of test

The test was conducted to demonstrate that the radiated magnetic fields from the test sample and associated cables do not exceed the limit in Figure 3.

2.3.2 Date test started

The test began on 9 May 1998. A partial retest began on 20 May 1998.

2.3.3 Date test completion

The test was completed on 9 May 1998. The partial retest was completed on 20 May 1998.

2.3.4 Test procedure

The test procedure specified that the test be conducted as indicated in the following steps:

1. Connect the Stoddart 902111-2 loop antenna to the input port of the HP 7080A spectrum analyzer or HP 3562 signal analyzer.

2. Adjust the spectrum analyzer sequentially to the frequency range and bandwidth specified below:

A.	30 Hz to 200 Hz	--	10 Hz Bandwidth
B.	200 Hz to 20 kHz	-	100 Hz Bandwidth
C.	20 kHz to 50 kHz	-	1 kHz Bandwidth

3. Locate the area of maximum interference and take data.

4. All measured data shall be below the limits shown in Figure 16 (AE-26151/8A)

5. Plot the CRT presentation, with limit.

6. Affix all plots, photos, calculations, and related information to TDS 8.

2.3.5 Test comment

This test was conducted in accordance to the above test plan, with no exceptions.

2.3.6 Test results

The AMSU-A2/EOS instrument does not meet the requirements of the test method RE01. The narrowband emissions exceed limits throughout the frequency range of 30 Hz to 1.635 kHz. The center of the motor, 7 cm away, exhibit emissions that exceed the limit. The frequency range of 30 to 120 Hz are related to the motor steps. The emissions are 43 dB above the limit, i.e., 103 dBpT. The motor also exhibits a strong narrowband frequency at 1.635 kHz that exceeds the limit by 10 dB, i.e., 70 dBpT. No emissions were detected from 20 to 50 kHz. No emissions were detected in any other position of the probe throughout the instrument. See Test Data Sheet 8, Plots 45 and 46.
The test was repeated because the initial substitution technique indicated levels were above the limit. A calibrated probe (Solar 7334-1) was used in the final test that confirmed the initial findings.

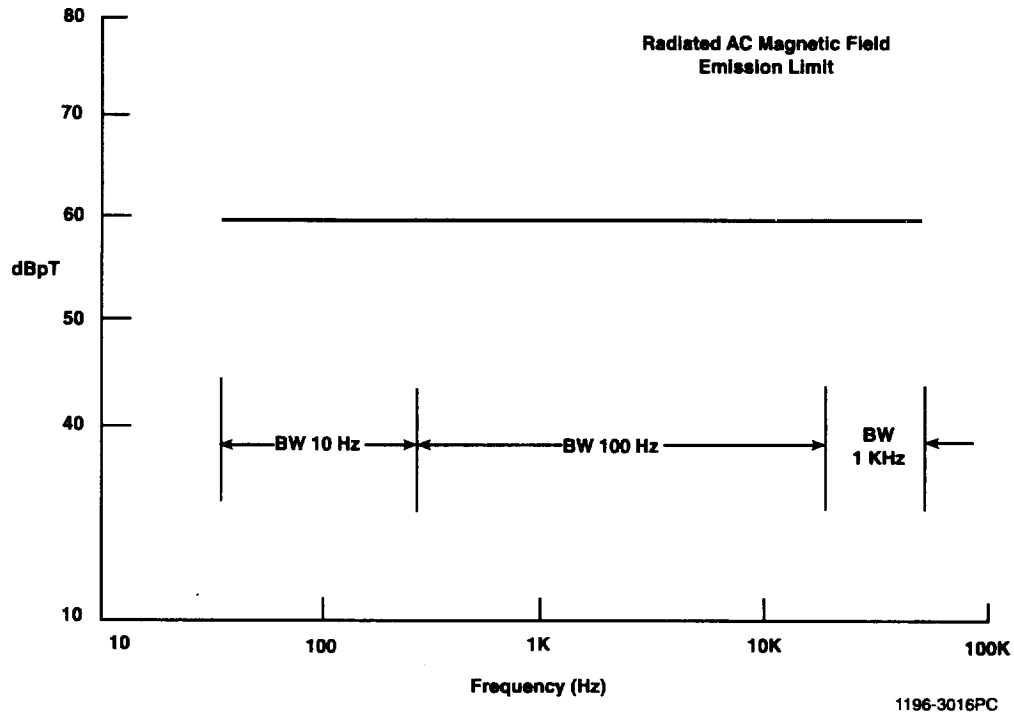


Figure 3 Limits RE01

2.4 Radiated emissions (RE04) test

2.4.1 Purpose of test

This test was conducted to demonstrate that the radiated magnetic fields from the test sample and associated cables do not exceed the limit of one milligauss at a distance of our meter from the lateral wall of the instrument in all directions.

2.4.2 Date test started

The test began on 5 May 1998.

2.4.3 Date test completion

The test was completed on 6 May 1998.

2.4.4 Test procedure

The test procedure specified that the test be conducted in the following steps:

1. Move the EOS/AMSU-A instrument, on the plastic cart, toward the probe to a distance of one meter from the wall of the instrument to the point of the probe.

2. Manually rotate the instrument.

3. With the unit deactivated, measure the magnetic field emissions of the EOS/AMSU-A instrument. Collect test data of the magnetic field intensity by rotating the equipment clockwise and taking measurements at intervals of not less than every 30 degrees. Record the results and note the level and location on TDS 9 (AE-26151/8A).

4. Perform paragraph 3.4.8.4 (AE-26151/8A) steps 2 to 5. Allow the instrument to scan for a 30 minute warm up.

5. At the point of maximum detection, repeat measurements with the instrument in the primary operating mode. Note difference in level. If levels exceed previous measurement levels, repeat step 2 with the unit activated.

6. Review recorded data. If measurement are below the 1 milligauss level at one meter from the instrument in all directions, the test is completed. If measurements exceed the limit, measure the ambient level and proceed to step 7 or step 8.

7. In the event that the ambient level does not meet the requirement and the ambient cannot be reduced further because of the facility or area limitations, a minimum of three correlatable measurements shall be made in the axis of maximum field intensity but at a shorter distance than one meter. The measured levels shall be able to provide an approximate field intensity. Ambient magnetic field shall be recorded and shall be part of the test data package.

8. In the event that the measured level exceeds the required level, the measurements shall be made to determine the location of the center of the magnetic dipole moment producing the out-of-limit condition. A minimum of three correlatable measurements along an axis are required to plot the magnetic field.

9. Record all measured data, indicating level and position of the probe. Note opposing magnetic dipole moments, shield leakage, and all other pertinent data.

10. Repeat measurement within ten inches above and below the mid-height probe placement of 3.4.11.3.1 (3) (of AE-26151/8A).

2.4.5 Test comment

This test was conducted in accordance to the above test plan, with no exceptions.

2.4.6 Test results

The AMSU-A2/EOS instrument meets the requirement without exception. The instrument was measured with the unit power "OFF" and in the "FULL SCAN" mode. Under both conditions, the instrument magnetic field level, at three heights, do not exhibit emissions above 0.54 milligauss one meter from the unit. See Test Data Sheet 9.

2.5 Radiated emissions (RE02) test

2.5.1 Purpose of test

This test was conducted to demonstrate that the radiated electric fields from the test sample and associated cables do not exceed the limits in Figures 4 and 5.

2.5.2 Date test started

The test began on 11 May 1998. A partial retest began on 20 May 1998.

2.5.3 Date test completion

The test was completed on 11 May 1998. The partial retest was completed on 20 May 1998.

2.5.4 Test procedure

The test procedure specified that the test be conducted as indicated in the following steps:

1. Connect the antenna to the proper receiver/amplifier port. Verify that the EOS/AMSU-A interface cables used for monitoring are shielded.

2. Allow the EMC test equipment to warm up for a minimum of 10 minutes.

3. Program the spectrum analyzer system (HP 8566B) to automatically scan and plot all narrowband data from 14 kHz to 1 GHz, switching the appropriate antenna/amplifier throughout the frequency range.

4. All data shall be below the limits shown in Figure 5 (AE-26151/8A). If any emissions are observed to exceed the limit line, command the computer to print the measured levels.

5. Request of the computer all broadband data from 14 kHz to 1 GHz. Plot the CRT presentation with limits.

6. All data shall be below the limits shown on Figure 6 (AE-26151/8A). If any emissions are observed to exceed the limit line, command the computer to print the measured levels.

7. If any signals, narrowband or broadband, exceed the limits, perform an ambient test and determine the source of the emanations. Reduce or eliminate the source, if external to the EOS/AMSU-A instrument, and repeat the test.

8. Set up the horn antenna (RGA-180) one meter from the point of maximum radiation.

9. Self-calibrate the signal analyzer (HP 71210C).

10. Sweep throughout the frequency range of 1 to 18 GHz in a minimum of three ranges, recording the observed narrowband emission levels. Plot emissions detected throughout each frequency range.

11. All data shall be below the limits shown on Figure 5 (AE-26151/8A); if not, perform step 7.

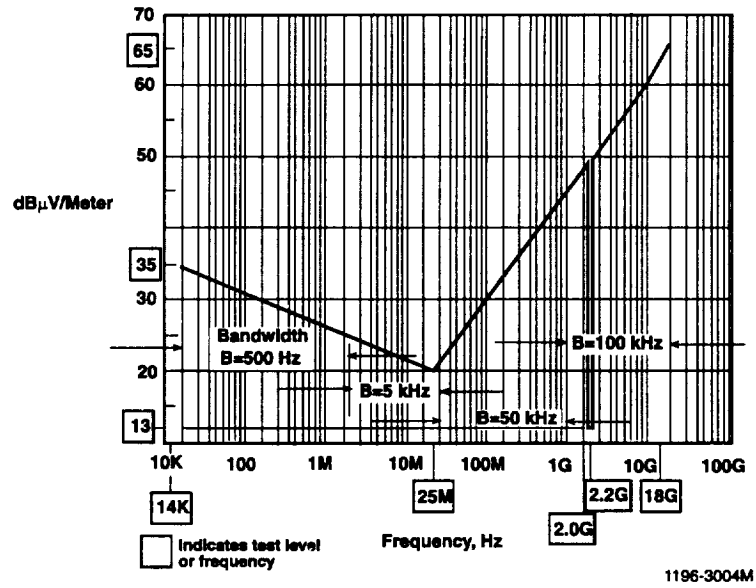


Figure 4 Radiated Narrowband Limits for Electric-Field Emission (Produced by Instrument)

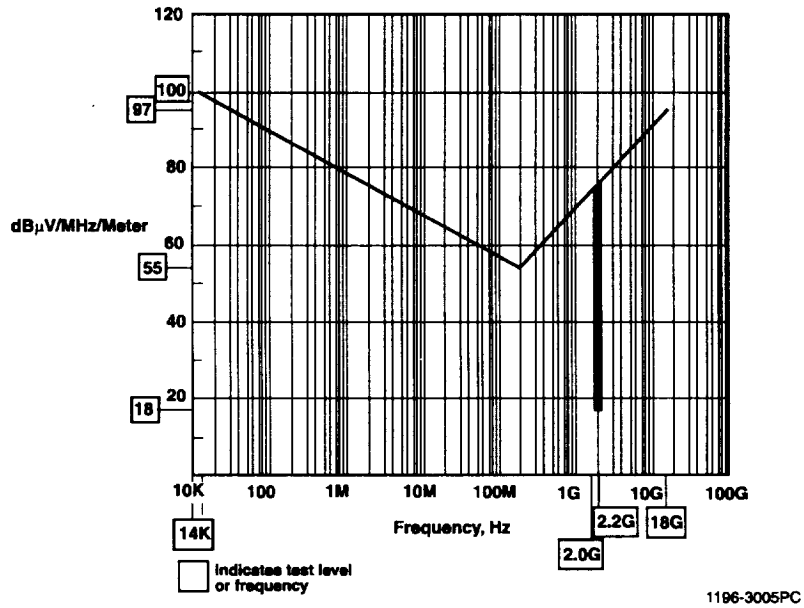


Figure 5 Radiated Broadband Limits for Electric-Field Emissions (Produced by Instrument)

12. Affix all plots, photos, calculations, and related information to TDS 3.

13. After disconnecting the horn antenna, set the signal analyzer (HP 71210C) to one of the four frequencies listed in 3.4.5 (AE-26151/8A) with the appropriate frequency span.

14. Activate the series preamplifier (HP 70620) and reduce the test equipment bandwidth to 10 kHz or less.

15. Program the signal analyzer (HP 71210C) for noise averaging to a minimum of eight times. Verify that the sensitivity noise level is below the required level.

16. Connect the antenna to the signal analyzer amplifier input.

17. The measurement should be within the ambient level, and no narrowband frequencies should be detected at the specified frequency above the sensitivity level specified in 3.4.5 (AE-26151/8A). Plot the screen presentation.

18. Repeat steps 13 through 17 while performing a measurement on the remaining frequencies.

19. Record the information regarding the test on TDS 3 and attach all plots, photos, calculations, and other related information.

2.5.5 Test comment

This test was conducted in accordance to the above test plan, with no exceptions.

2.5.6 Test results

The AMSU-A2/EOS instrument exceeds the limits at 16.4, 18.6, and 48.5 MHz. These frequencies are related directly to the instrument. They exceed the limit by a maximum of 5 dB above the limit at 48.5 MHz. There are several ambient emissions that were measured and recorded that are above the limit and are attributed to the STE, an AC power ground loop between the test equipment, STE, and shielded enclosure, and FM radio stations leaking into the chamber via the instrument cables. The test was repeated in another shielded enclosure, where the ambient emissions were lower. Efforts were made to reduce the ambient emissions but were not completely successful. Broadband emissions were below the limit except at 2 to 2.2 GHz. The electric field radiated emissions from 1 to 18 GHz exhibited no detectable emissions. The frequency band between 2.0 to 2.2 GHz, broadband limit is too stringent and could not be measured at 18 dBμV/m/MHz. This is an instrumentation problem that could not be resolved. All the special frequencies were within the specification sensitivity requirements. See Test Data Sheet 3, Plots 101 through 135, and 150 through 154.

2.6 Conducted susceptibility (CS01) test

2.6.1 Purpose of test

This test was conducted to demonstrate that the test sample is not susceptible to the transformer-coupled audio frequency conducted interference levels on the input power leads, to the levels indicated in Figure 6.

2.6.2 Date test started

The test began on 23 April 1998 (at +29 V). A retest began on 1 May 1998 (at +27 and +31 V).

2.6.3 Date test completion

The test was completed on 23 April 1998. The retest was completed on 1 May 1998.

2.6.4 Test procedure

The test procedure specified that the test be conducted as indicated in the following steps:

1. Apply power to all the test equipment and set the power amplifier to ON, and the "Right/Mono Gain" knob to min. (counterclockwise).

2. Set the function generator to sweep from 30 Hz to 50 kHz using the following discrete frequency ranges with a sweep rate of 90 seconds per range:

   A. 30 Hz to 1500 Hz
   B. 1.5 kHz to 10 kHz
   C. 10 kHz to 50 kHz.

3. Set the SCAN mode to SINGLE SWEEP.

Quiet Bus 'A'/Bus RTN 'A' Test

1. Connect the transformer secondary winding to the Breakout Box terminals as indicated in Table 1 of Figure 9 (AE-26151/8A)

2. Set the function generator amplitude to 500 mV p-p. Adjust the amplifier's amplitude using the "Right/Mono Gain" knob to obtain 500 mV on the scope.

3. Disable the function generator by pressing the signal "Rear only" button.

4. Using the STE command "[9] SCANNER A2 POWER," turn on the scanner power (the state of the command should change from OFF to ON).

5. Enter the STE command "[10] ANTENNA FULL SCAN MODE." Verify that the command was received by observing that the state of that command has changed from NO to YES, and the instrument is scanning in full scan mode.

6. Allow the instrument to scan for 30 minutes so that all the temperature and power parameters have stabilized (the instrument must remain in full scan mode during the Quiet Bus 'A' and Quiet Bus RTN 'A' test).

7. After the instrument has stabilized for 30 minutes, enable the function generator and perform the EMI test sequence by selecting command "[7] SPECIAL CYCLE CALIBRATION" from the STE main screen.

8. From the test initialization menu, select "[13] SCANS TO ACQUIRE." Enter the number of scans (24 for 90 sec. Sweep time).

9. Select "[16] START DATA ACQUISITION." Begin the test sweep (for the 30 Hz to 1500 Hz range) on the function generator. Manipulate the amplifier's amplitude to maintain the 500 mV p-p.

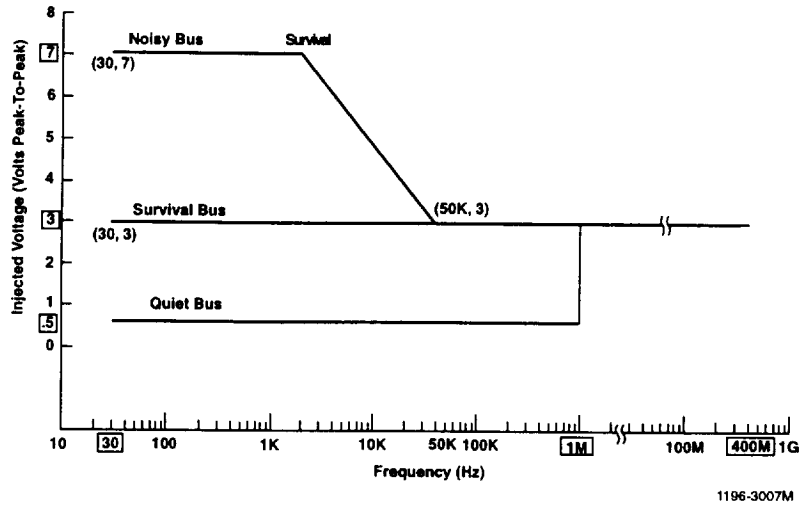


Figure 6 Ripple and Noise Susceptibility Limit

10. At the end of the sweep and 24 scans, the screen will change to the A2 DELTA T and CALIBRATION ACCURACY menu. From that screen, press "[1] RETURN." The display will prompt "Do you wish to save data on disk (Y/N)? Enter N for No.

11. The STE will return to the AMSU-A2 TEST INITIALIZTION menu. Enter 15 and press the return key, two times. The STE will return to the AMSU-A2 CALIBRATION PROCESS SELECTION menu.

12. Select "[12] PRINT DISTRIBUTION" to obtain the data plot.

13. Select "[1] RETURN" to return to the AMSU-A2 TEST INITIALIZATION menu.

14. Repeat steps 8 to 13 for each frequency range and power levels specified in TDS 4 and Table III (AE-26151/8A).

15. Repeat steps 1 to 3 and step 14 for Quiet Bus RTN 'A'.

16. Record the completion of scanning of each function generator's frequency sweep range on TDS 4.

17. If any failure occurs, record each frequency at which a failure occurs, and annotate the level of the threshold for the failure.

Noisy Bus 'A'/Bus RTN 'A' Test

1. Turn off the scanner power by entering the STE command "[9] SCANNER A2 POWER." The state of the command should change from ON to OFF.

2. Turn OFF the Main Power switch on the STE front panel.

3. Configure the Breakout Box for the Noisy Bus 'A' test in accordance with Table 1 of Figure 9 (AE-26151/8A).

4. Turn the STE Main Switch to ON (Q/Main and N/Pulse and S/Analog switches must be turned ON). Set the N/S supply on the STE to +27.0 V and the Q supply on the STE to +29.0 V.

5. Turn on the scanner power and place the instrument in Warm Cal position by entering the STE command "[11] ANTENNA IN WARM CAL POSIT." Verify that the command was received by observing that the state of that command has changed from NO to YES.

6. Set the function generator amplitude to 800 mV p-p, and adjust the power amplifier gain level to obtain 7 V p-p on the scope. Place the METER RANGE knob on the amplifier to the "WATTS" position.

7. Begin the test sweep on the function generator for the frequency ranges specified in TDS 4.

8. Enter the STE command "[10] SCIENCE DATA," and enter the STE command "[10] CHANNEL NN-ALL BEAM POSITIONS".

9. Enter channel number 1. Monitor the channel 1 radiometric data while sweeping through the frequency specified in TDS 4. Use STE commands "[21] UP" and "[22] DOWN" to monitor channels 1 and 2 during the test sweep.

10. Obtain a printout using STE command "[2] SCREEN ONLY" for each channel radiometric data at the completion of the test sweep.

11. Repeat steps 7 through 10 for each frequency range specified in TDS 4.

12. Turn off the power amplifier by placing the SPEAKER knob in the OFF position. Disable the function generator.

13. Set the N/S supply on the STE to +31.0 V. Turn on the power amplifier by placing the SPEAKER knob to the ON position. Enable the function generator.

14. Perform steps 7 to 11.

15. Perform steps 1 and 2. Configure the Breakout Box for Noisy Bus RTN 'A' test, in accordance with Table 1 of Figure 9 (AE-26151/8A).

16. Perform steps 4 to 14.

17. Record the completion of scanning of each function generator's frequency sweep range on TDS 4.

18. If any failure occurs, record each frequency at which a failure occurs, and annotate the level of the threshold for the failure.

Survival Bus 'A'/Bus RTN 'A' Test

1. Turn off the scanner power by entering the STE command "[9] SCANNER A2 POWER." The state of the command should change from ON to OFF.

2. Turn OFF the Main Power switch on the STE front panel.

3. Configure the Breakout Box for the Survival Bus 'A' test in accordance with Table 1 of Figure 9 (AE-26151/8A).

4. Set the N/S supply on the STE to +27.0 V and the Q supply on the STE to +29.0 V.

5. Turn on the scanner power and place the instrument in Warm Cal position by entering the STE Command "[11] ANTENNA IN WARM CAL POSIT." Verify that the command was received by observing that the state of that command has changed from NO to YES.

6. Adjust the function generator amplitude and the amplifier gain level to obtain 3 V p-p on the scope.

7. Begin the test sweep on the function generator for the frequency ranges specified in TDS 4 (AE-26151/8A).

8. Monitor the N/S supply current on the STE. Verify that the current does not reach minimum of 0.5 ampere during the test sweep.

9. Manipulate the amplifier gain control to maintain the 3 V p-p on the scope.

10. Repeat steps 7 to 9 for each frequency range specified in TDS 4, and the Bus Voltage levels of Table III (AE-26151/8A).

11. Turn off the power amplifier by placing the SPEAKER knob in the OFF position. Disable the function generator.

12. Set the N/S supply on the STE to +31.0 V. Turn on the power amplifier by placing the SPEAKER knob to the ON position. Enable the function generator.

13. Perform steps 7 to 10.

14. Perform steps 1 and 2. Configure the Breakout Box for the Survival Bus RTN 'A' test, in accordance with Table 1 of Figure 9 (AE-26151/8A).

15. Perform steps 4 to 13.

16. Record the completion of each function generator's frequency sweep range on TDS 4 (AE-26151/8A).

17. If any failure occurs, record each frequency at which a failure occurs, and annotate the level of the threshold for the failure.

2.6.5 Test comment

This test was conducted in accordance to the above test plan, with no exceptions.

2.6.6 Test results

The instrument meets the requirements of this test method. The test was performed at the high and minimum power levels without any indication of susceptibility. The test was repeated because initially all the lines were tested at 0.5 volts peak-to-peak and at the nominal input voltage. See Test Data Sheet 4.

2.7 Conducted Susceptibility (CS02) test

2.7.1 Purpose of test

The test was conducted to demonstrate that the test sample is not susceptible to the capacitor-injected radio frequency conducted interference levels on the input power leads, per Figure 6.

2.7.2 Date test started

The test began on 24 April 1998 (at +29 V). A retest began on 29 April 1998 (at +27 and +31 V).

2.7.3 Date test completion

The test was completed on 28 April 1998. The retest was completed on 1 May 1998.

2.7.4 Test procedure

The test procedure specified that the test be conducted as indicated in the following steps:

1. With the sensor in primary operating mode, apply power to all the test equipment except the power amplifier. Ensure that there is no connection between the Hi pass filter (HPF) and the Breakout Box.

2. Set the function generator to sweep from 50 kHz to 400 MHz, using the frequency ranges, the sweep time, and equipment changes as indicated in Table V (AE-26151/8A).

3. Apply power to the power amplifier.

Quiet Bus 'A'/Bus RTN 'A' Test.

1. Connect the HPF (line) to the scope channel 1. Adjust the amplitude level on the function generator being used in Table V (AE-26151/8A) so that a 3.0 V p-p (for frequency range of 1 MHz - 400 MHz only) AC signal is measured.

2. Remove the test cable from the scope and HPF (line) and connect to the spectrum analyzer and HPF (det).

3. Turn on the Display Line (DL) and enable the marker mode on the spectrum analyzer. Adjust the DL to obtain a –21.0 dBm reference line. The measured signal (unloaded) on the spectrum analyzer should be above the DL with the attenuator set to 0 dB.

4. Disable the function generator by pressing the signal "Rear only" button (RF ON/OFF on 83630B). Connect a test lead from the HPF (line) to terminal 1 (Quiet Bus 'A') on the Breakout Box. Enable the function generator.

5. Set the attenuator to attain –15 dB gain and readjust the amplitude level on the function generator being used so that the signal level is maintained above the DL of the spectrum analyzer.

6. Manipulate the attenuator to maintain a signal level at or above the DL during the test sweep.

7. Using STE command "[9] SCANNER A2 POWER," turn on the scanner power (the state of the command should change from OFF to ON).

8. Enter the STE command "[10] ANTENNA FULL SCAN MODE." Verify that the command was received by observing that the state of the command has changed from NO to YES, and the instrument is scanning in full scan mode.

9. Allow the instrument to scan for 30 minutes so that all the temperature and power parameters have stabilized (the instrument must remain in full scan mode during the Quiet Bus 'A' and Quiet Bus RTN 'A' test).

10. After the instrument has stabilized for 30 minutes, perform the EMI test by selecting command "[7] SPECIAL CYCLE CALIBRATION" from the STE main screen.

11. From the TEST INITIALIZATION menu, select "[13] SCANS TO ACQUIRE." Enter the number of scans (24 for 90 sec. sweep time or 16 for 60 sec. sweep time).

12. Select "[16] START DATA ACQUISITION." At the end of the 24 (16) scans the screen will change to the A2 DELTA T and CALIBRATION ACCURACY menu. From that screen, press "[1] RETURN." The display will prompt "Do you wish to save data on disk (Y/N)?" Enter N for No.

13. The STE program will return to the AMSU-A2 TEST INITIALIZATION menu. Enter 15 and press the RETURN key, two times. The STE will return to the AMSU-A2 CALIBRATION PROCESS SELECTION menu.

14. Select "[12] PRINT DISTRIBUTION" to obtain the data plot.

15. Select "[1] RETURN" to return the AMSU-A2 TEST INITIALIZATION menu.

16. Repeat steps 12 to 15 for each frequency range specified in Table V and Bus Voltage levels of Table III (AE-26151/8A). Obtain a printout of the monitored system output data.

17. Repeat steps 1 through 16 for the Quiet Bus RTN A using terminal 3 on the Breakout Box, and for the Bus Voltage levels indicated in Table III (AE-26151/8A).

18. Repeat steps 1 through 17 for the 50 kHz to 1 MHz frequency range at 0.5 V p-p amplitude level on the function generator.

19. If any failure occurs, record each frequency at which a failure occurs and annotate the threshold level of the failure.

20. Record the completion of scanning of each band on TDS 5 (AE-26151/8A).

Noisy Bus 'A'/Bus RTN 'A' Test (50 kHz - 400 MHz)

1. Connect the HPF (line) to the scope channel 1. Adjust the amplitude level on the function generator being used (see Table V of AE-26151/8A) so that a 3.0 V p-p (unloaded) Ac signal is measured (700 mV p-p amplitude on function generator).

2. Remove the test load from the HPF (line) and connect it to the (DET) on the HPF.

3. Remove the test load from the scope and connect to the spectrum analyzer "RF Inputs." Turn on the Display Line (DL) and enable the marker mode on the spectrum analyzer. Verify that the peak signal is approximately –42.0 dBm. Adjust the DL to be at the peak signal.

4. Set the attenuator to 50 dB. The measured signal on the spectrum analyzer (unloaded) should be at or above the DL (–42.0 dBm).

5. Disable the function generator by pressing the signal "Rear only" button (RF ON/OFF on 83630B). Connect the test lead from the HPF (line) to terminal 5 (Noisy Bus 'A') on the Breakout Box. Enable the function generator.

6. Enter the STE command "[10] SCIENCE DATA," and enter the STE command "[10] CHANNEL NN-ALL BEAM POSITIONS."

7. Enter channel number 1. Monitor the channel 1 radiometric data while sweeping through the frequency specified in TDS 5. Use STE command "[21] UP" and "[22] DOWN" to monitor channels 1 and 2 during the test sweep.

8. Manipulate the attenuator to maintain a signal level at or above the DL during the test sweep.

9. Obtain a printout using STE command "[12] SCREEN ONLY" for each channel radiometric data at the completion of the test sweep.

10. Repeat steps 6 through 9 for each frequency range specified in Table V (AE-26151/8A) and Bus Voltage levels of Table III.

11. Repeat steps 1 through 10 for the Noisy Bus RTN 'A' using terminal 7 on the Breakout Box, and for the Bus Voltage levels as indicated in Table III.

12. If any failure occurs, record each frequency at which a failure occurs and annotate the threshold level of the failure.

13. Record the completion of scanning of each band on TDS 5.

Survival Bus 'A'/Bus RTN 'A' Test (50 kHz - 400 MHz).

1. Connect the HPF (line) to the scope channel 1. Adjust the amplitude level on the function generator being used (see Table V of AE-26151/8A) so that a 3.0 V p-p (unloaded) AC signal is measured (700 mV p-p amplitude on function generator).

2. Remove the test load from the HPF (line) and connect it to the (DET) on the HPF.

3. Remove the test load from the scope and connect to the spectrum analyzer "RF Input." Turn on the Display Line (DL) and enable the marker mode on the spectrum analyzer. Verify that the peak signal is approximately –42.0 dBm. Adjust the DL to be at the peak signal.

4. Set the attenuator to 50 dB. The measured signal on the spectrum analyzer (unloaded) should be at or above the DL (–42.0 dBm).

5. Place the instrument in Warm Cal position by entering the STE command "[11] ANTENNA IN WARM CAL POSIT." Verify that the command was received by observing that the state of the command has changed from NO to YES.

6. Disable the function generator by pressing the signal "Rear only" button (RF ON/OFF on 83630B). Connect the test leads from the HPF (line) to terminal 9 (Survival Bus 'A' on the Breakout Box). Enable the function generator.

7. Turn on the S/Analog switch on the STE front panel. Monitor the N/S supply current on the STE. Verify that the current does not reach a minimum of 0.5 Amp during the test sweep.

8. Manipulate the attenuator to maintain a signal level at or above the DL (–42.0 dBm) during the test sweep.

9. Repeat steps 7 and 8 for each frequency range specified in Table V (AE-26151/8A) and Bus Voltage levels of Table III (AE-26151/8A).

10. Repeat steps 6 through 9 for the Survival Bus RTN 'A' using terminal 10 on the Breakout Box, and for the Bus Voltage levels indicated in Table III (AE-26151/8A).

11. If any failure occurs, record each frequency at which a failure occurs and annotate the threshold level of the failure.

12. Record the completion of scanning of each band on TDS 5.

2.7.5 Test comment

This test was conducted in accordance to the above test plan, with no exception.

2.7.6 Test results

The AMSU-A2/EOS instrument meets the requirements of test method CS02, as indicated in this report. The test was repeated because initially all the lines were tested at 0.5 volts peak-to-peak and at a nominal input voltage. See Test Data Sheet 5.

2.8 Conduct Susceptibility (CS06) test

2.8.1 Purpose of test

This test was conducted to demonstrate that the test sample is not susceptible to transient spike conducted interference on the input power leads, as shown in Figure 7.

2.8.2 Date test started

The test was started on 1 May 1998. A partial retest was started on 4 May 1998.

2.8.3 Date test completion

The test was completed on 4 May 1998. The partial retest was completed on 4 May 1998.

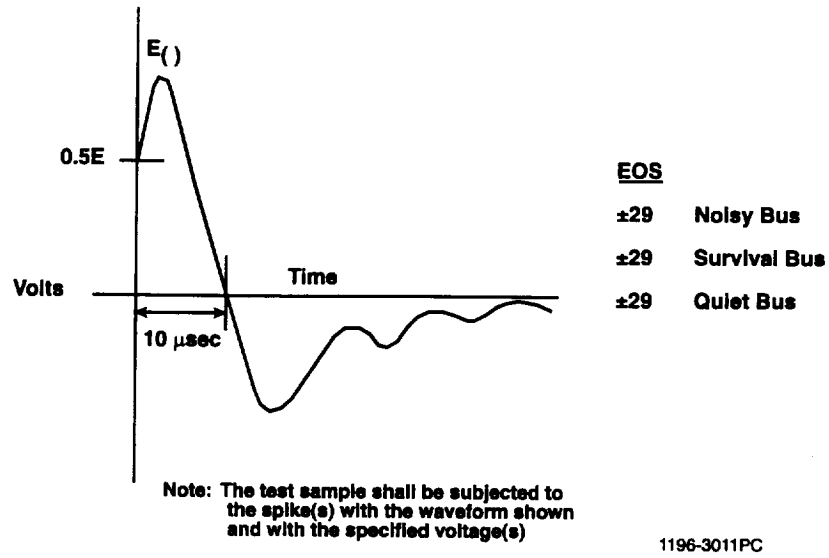


Figure 7 CS06 Transient Waveform

2.8.4 Test procedure

The test procedure specified that the test be conducted as indicated in the following steps:

1. Connect the test leads from the scope and the spike generator to the Quiet Bus terminals indicated in Figure 12 (AE-26151/8A).

2. Turn ON the Main Power switch on the STE front power panel and turn ON the Q/Main, N/Pulse and S/Analog switches.

3. Adjust the Q and N/S power supplies voltage levels on the STE to +29.0 V.

4. Using STE command "[9] SCANNER A2 POWER," turn on the scanner power (the state of the command should change from OFF to ON).

5. Enter the STE command "[10] ANTENNA FULL SCAN MODE." Verify that the command was received by observing that the state of that command has changed from NO to YES, and the instrument is scanning in full scan mode.

6. Allow the instrument to scan for 30 minutes so that all the temperature and power parameters have stabilized (the instrument must remain in full scan mode during the Quiet Bus 'A' and Quiet Bus RTN 'A' test).

7. After the instrument has stabilized for 30 minutes, perform the EMI test by selecting command "[7] SPECIAL CYCLE CALIBRATION" from the STE main screen.

8. From the TEST INITIALIZATION menu, select "[13] SCANS TO ACQUIRE." Enter the number of scans (58 for 5 sec/meter).

9. Select "[16] START DATA ACQUISITION." At the end of the 58 scans the screen will change to the A2 DELTA T and CALIBRATION ACCURACY menu. From that screen, press "[1] RETURN." The display will prompt "Do you wish to save data on disk (Y/N)?" Enter N for No.

10. Apply the spike at a 10 peaks per second (pps) rate for 5 minutes to the power line under test.

11. The STE program will return to the AMSU-A2 TEST INITIALIZATION menu. Enter 15 and press the RETURN key, two times. The STE will return to the AMSU-A2 CALIBRATION PROCESS SELECTION menu.

12. Select "[12] PRINT DISTRIBUTION" to obtain the data plot.

13. Select "[1] RETURN" to return the AMSU-A2 TEST INITIALIZATION menu.

14. If any failures are recorded, annotate the threshold level of the failure.

15. Reverse the spike polarity and repeat steps 10 to 14.

16. With the instrument powered OFF, remove the test leads from the Quiet Bus terminals and connect to the Noisy Bus terminals (5 and 7) as shown in Figure 12 (AE-26151/8A).

17. Turn ON the scanner power and place the antenna in Warm Cal position.

18. Enter the STE command "[10] SCIENCE DATA," and enter the STE command "[10] CHANNEL NN-ALL BEAM POSITIONS."

19. Enter channel number 1. Monitor the channel 1 radiometric data while applying the voltage spike per step 10. Use STE command "[21] UP" and "[22] DOWN" to monitor channels 1 and 2 during the test.

20. Repeat step 10.

21. Obtain a printout using STE command "[12] SCREEN ONLY" for each channel radiometric data at the completion of the spike test.

22. Reverse the spike polarity and repeat steps 19 to 21.

23. If any failures are recorded, annotate the threshold level of the failure.

24. With the instrument powered off, remove the test leads from the Noisy Bus terminals and connect across the Survival Bus terminals (9 and 10).

25. Turn ON the scanner power and place the antenna in Warm Cal position.

26. Turn on the S/Analog switch on the STE front panel. Monitor the N/S supply current on the STE. Verify that the current does not reach a minimum of 0.5 Amp during the test sweep.

27. If any failures are recorded, annotate the threshold level of the failure.

28. Remove the spike polarity and repeat steps 26 and 27.

29. Record the completion of each test on TDS 6. If failures occur, record the pulse amplitude, pulse width, and polarity.

2.8.5 Test comment

This test was conducted in accordance to the above test plan, with no exceptions.

2.8.6 Test results

The AMSU-A2/EOS instrument meets the requirement of test method CS06 without any exception. No malfunction or reduction of performance was noted during the entire conduct of this test. The test was repeated because during the initial test, the applied voltage level was less than the required voltage. See Test Data Sheet 6.

2.9 Radiated Susceptibility (RS01) test

2.9.1 Purpose of test

This test was performed to demonstrate that the test sample case and associated cables are not susceptible to the AC and DC magnetic fields shown in Figure 8 and Tables III and IV, respectively.

2.9.2 Date test started

The test began on 7 May 1988.

2.9.3 Date test completion

The test was completed on 7 May 1998.

2.9.4 Test procedure

The test procedure specified that the test be conducted as indicated in the following steps:

1. Power all the test equipment and set the power amplifier to standby.

2. Set the function generator to sweep from 30 Hz to 200 kHz using the frequency ranges below and a sweep rate of 90 seconds per range.

   a. 30 to 200 Hz

   b. 360 to 2000 Hz

   c. 2 to 20 kHz

   d. 20 to 200 kHz

3. Set the SCAN mode to SINGLE SWEEP and turn on the power amplifier.

4. Monitor the output signal with the digital voltmeter or the spectrum analyzer and adjust the output level to the required voltage equivalent to the limit shown in Figure 19 (AE-26151/8A).

5. Move the loop antenna along the wall of the instrument, cables, and connectors. Repeat the frequency range sweep, as required. Monitor the STE for indication of susceptibility.

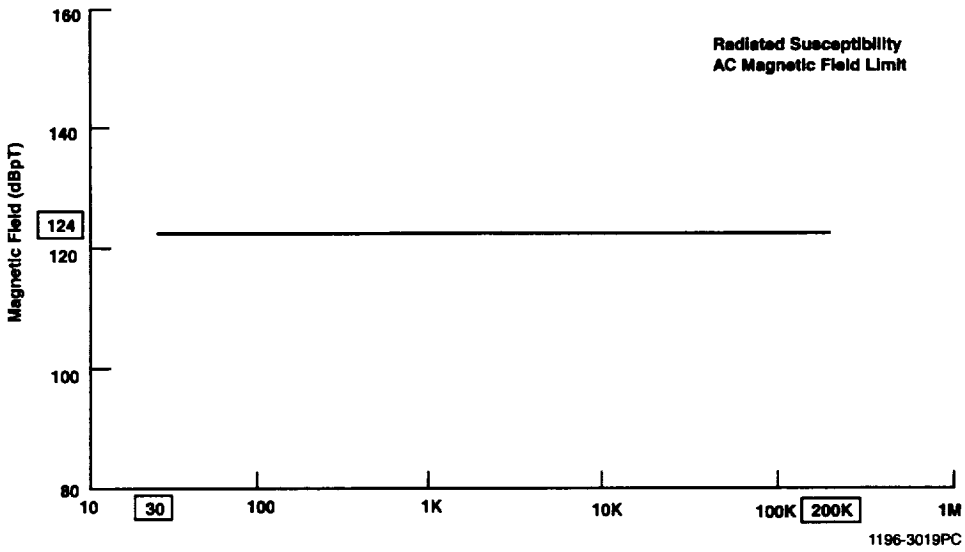


Figure 8 RS01 Magnetic Field Limit

Table III Magnetic Field Applied Distance

Unit	Distance (Inches)	Axis
AMSU-A2	16.75	+Y

Table IV Static Magnetic Field Applied Distance

Unit	Maximum Distance (Inches)	Axis
AMSU-A2	69.99	+Y

6. Using the EMI test menu on the STE, monitor the test sample for errors as described in the ATP. At each frequency range, obtain a printout of the monitored system output data.

7. Record on TDS 10 (AE-26151/8A) the completion of scanning of each function generator's frequency sweep range.

8. If any failure occurs, record the frequency and area at which a failure occurred. Note the voltage level of the threshold for the failure.

9. Convert the voltage level to the appropriate magnetic field equivalent.

2.9.5 Radiated susceptibility, static magnetic field, test

1. Power on all the test equipment.

2. Set the power to the current level that generates a 10 gauss field.

3. Using the EMI test menu on the STE, monitor the test sample for errors as described in the ATP.

4. Move the loop antenna along the lateral walls of the instrument, connectors, and cables.

5. Get a printout of the monitored system as the field is applied on each wall, connector, area, and cables.

6. If any failure occurs, record the malfunction and area at which a failure occurred. Note the voltage level of the threshold for the failure. Move the radiating loop antenna back until normal operation returns. Record the new distance of the loop antenna.

7. Convert the voltage level to the appropriate magnetic field equivalent.

8. Record on TDS 11 (AE-26151/8A) the completion of each area probed; i.e., lateral walls, connectors, and cables, and the distance between the applied field and the items described.

2.9.6 Test comment

The test was conducted in accordance to the above test plan, with one exception. All the applied levels were at 5 cm from the wall of the instrument, connectors, and cables.

2.9.7 Test results

The AMSU-A2/EOS instrument meets the requirement of test method RS01, AC and DC magnetic fields. The unit did not exhibit any malfunctions or reduction of performance during the conduct of the test. See Test Data Sheets 10 and 11.

2.10 Radiated Susceptibility (RS03) test

2.10.1 Purpose of test

This test was performed to demonstrate that the test sample and associated cables are not susceptible to the radiated electric fields shown in Figure 9.

2.10.2 Date test started

The test began on 12 May 1998. A partial retest was started on 20 May 1998.

2.10.3 Date test completion

The test was completed on 15 May 1998. The partial retest was completed on 20 May 1998.

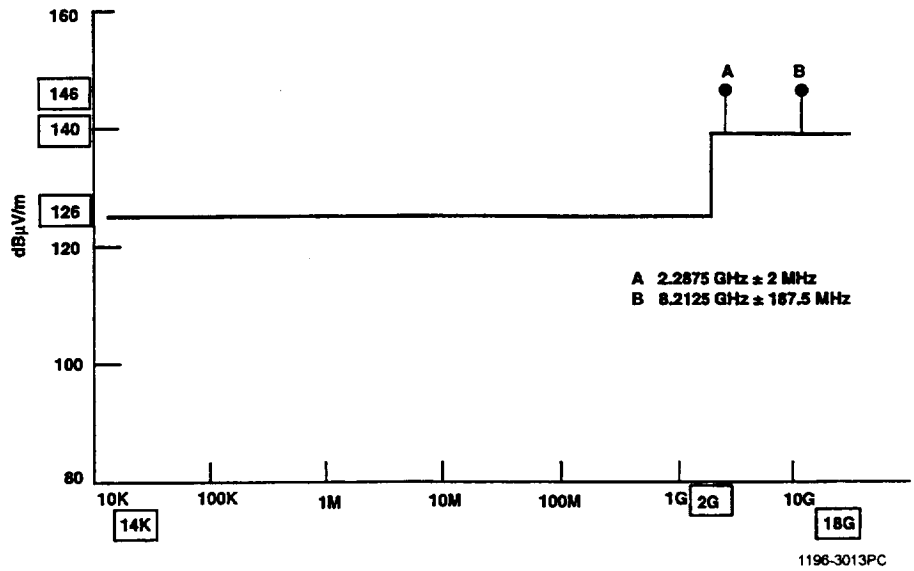


Figure 9 RS03 Limits

2.10.4 Test procedure

The test procedure specified that the test be conducted as indicated in the following steps:

1. Power on all test equipment and allow a 15 minute warm-up time before continuing.

2. Perform paragraph 3.4.8.4 (AE-26151/8A) steps 2 to 5. Allow the instrument to scan for a 30 minute warm-up.

3. Perform steps 4 through 15 for each of the frequency sweep ranges presented in Table VI of AE-26151/8A.

4. Using the test equipment as indicated in Figure 14 of AE-26151/8A, perform a level-verification sweep to ensure the electric fields for each frequency band scan.

5. Once a level is established, ensure that the EOS/AMSU-A data baseline level is as low as possible.

6. From the TEST INITIALIZATION menu, select "[13] SCANS TO ACQUIRE." Enter the number of scans (24 for 90 sec. sweep time or 16 for 60 sec. sweep time).

7. Select "[16] START DATA ACQUISITION."

8. Begin frequency sweep for 14 kHz to 30 MHz. Monitor the generated electric field.

9. At the end of the 24 scans the screen will change to the A2 DELTA T and CALIBRATION ACCURACY menu. From the screen, press "[1] RETURN." The display will prompt "Do you wish to save data on disk (Y/N)?" Enter N for No.

10. The STE program will return to the AMSU-A2 TEST INITIALIZATION menu. Enter 15 and press the RETURN KEY, two times. The program will return to the AMSU-A2 CALIBRATION PROCESS SELECTION menu.

11. Select "[12] PRINT DISTRIBUTION" to obtain the data plot.

12. Select "[1] RETURN" to return to the AMSU-A2 TEST INITIALIZATION menu.

13. After the sweep, verify that the baseline level did not increase beyond the specified limits.

14. If the baseline level increased above the limit, repeat the sweep at a lower radiated level or at a reduced frequency range until the threshold level is determined.

15. Record the threshold level on TDS 7 (AE-26151/8A).

16. Replace the parallel element antenna with the biconical antenna.

17. With the frequency set at 30 MHz, connect the equipment as shown in Figure 15 (AE-26151/8A). Adjust the output of the power amplifier for 2 volts per meter by monitoring the electric field with another biconical antenna 1 meter from the transmitting antenna, or by monitoring the input power to the antenna.

18. Operate the variable attenuator to control the output voltage level.

19. Repeat steps 8 to 15 for the frequency range between 30 MHz and 200 MHz.

20. Replace the biconical antenna with the log-conical antenna. Adjust the attenuator to the amplifier for 2 volts per meter field strength at 200 MHz. Sweep the frequencies from 200 MHz to 1 GHz at this level. If susceptibility occurs, reduce the output power and determine the susceptibility threshold.

21. Record the results on TDS 7 (AE-26151/8A).

22. Replace the log-conical antenna with the horn antenna, connect the horn antenna to the appropriate traveling wave tube (TWT), and radiate the electric fields between 1 GHz and 18 GHz at a level of 10 volts per meter. If susceptibility occurs between 1 and 2 GHz, reduce the level to 2 volts per meter and sweep the frequency range again.

23. Adjust the attenuator to the amplifier. Sweep the frequencies from 1GHz to 18 GHz at this level. If susceptibility occurs, reduce the output power and determine the threshold level.

24. Record all pertinent information on TDS 7 (AE-26151/8A).

25. Perform radiated susceptibility test for both antenna polarities at the two frequencies A and B presented in Figure 13 (AE-26151/8A).

26. Set the signal generator at frequency A (AE-26151/8A, Figure 13).

27. Increase the signal level until the generated electric field is verified. Plot the spectrum generator presentation.

28. Sweep through the frequency in a 90-second interval.

29. Verify that the baseline level did not increase beyond the specified limits.

30. Record the test results on TDS 7 (AE-26151/8A).

31. Repeat steps 25 through 30 for the other discrete frequency.

2.10.5 Test comment

This test was conducted in accordance to the above test plan, with no exceptions.

2.10.6 Test results

The AMSU-A2/EOS instrument meets the electric field radiated susceptibility requirements of test method RS03, without exception. No malfunction and/or degradation of performance was noted during the performance of this test. During the initial RS03 test, a susceptibility response was recorded at 18 MHz. The result of this failure was analyzed and the resonance of the shielded enclosure was considered a factor for this response. The subsequent test was performed in a smaller shielded enclosure and the failed frequency was applied without susceptibility. The frequency range of 14 to 20 MHz was repeated at the required electric field level without any indication of susceptibility. See Test Data Sheet 7.

SECTION 3

SUPPLEMENTARY INFORMATION

3. SUPPLEMENTARY INFORMATION

This section contains Test Data Sheets, Plots, factors, and calculations.

TEST DATA SHEET 1 (Sheet 1 of 2)
CE01 Test (Paragraph 3.4.4.4.1)

Test Setup Verified: Roger N. Khoury (Signature) 5/4/98

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
Current Probe	AIL Tech	91550-2B	L-509571	4-23-97	5-23-98
Plotter	HP	7470A	47618	N/A	N/A
Dynamic signal Analyzer	HP	3562A	51225	2-23-98	2-23-99
10uf feedthrough Cap.	Solar Elect.	6517-106R	N/A	N/A	N/A
25 Pin Breakout Box	Aerojet	SK1358704-2	743-5910	9-11-97	CNR

Emission Measurements

QC

~~Photo~~ Plot No.	Powerline Port-1 ~~+28V~~ +29V ENG 252 4/29/98	Band	Required	Emissions within limits? Yes	No	Comments/ Observations
1	~~+28V~~ Quiet Bus A	Narrow	Figure 2	✓		
2	~~+28V~~ Quiet Bus Rtn A	Narrow	Figure 2	✓		
3	~~+28V~~ Noisy Bus A	Narrow	Figure 2	✓		
4	~~+28V~~ Noisy Bus Rtn A	Narrow	Figure 2	✓		
5	~~+28V~~ Survival Bus A	Narrow	Figure 2	✓		
6	~~+28V~~ Survival Bus Rtn A	Narrow	Figure 2	✓		

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1 EMI

Serial No. S/N 202

Shop Order: 509649

Engineer: [signature] 5-4-98

Quality Assurance:

Operator: Ken Shaw 5/4/98

TEST DATA SHEET 1 (Sheet 2 of 2)
CE01 Test (Paragraph 3.4.4.4.1)

Test Setup Verified: Roger N. Khamy
(Signature)
5-4-98

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
Current Probe	AIL Tech	91550-2B	L-509571	4-23-97	5-23-98
Plotter	HP	7470A	47618	N/A	N/A
Dynamic Signal Analyzer	HP	3562A	51225	2-23-98	2-23-99
10MF Feedthrough Cap.	Solar Elect.	6512-106R	N/A	N/A	N/A
25 Pin Breakout Box	Aerojet	SK1358704-2	743-5910	9-11-97	CNR

Emission Measurements

QC 16

~~Photo~~ Plot No.	Powerline Port-1 +29V ENG 252 4/29/98	Band	Required	Emissions within limits? Yes	No	Comments/ Observations
7	~~+28V~~ Quiet Bus B	Narrow	Figure 2	✓		
8	~~+28V~~ Quiet Bus Rtn B	Narrow	Figure 2	✓		
9	~~+28V~~ Noisy Bus B	Narrow	Figure 2	✓		
10	~~+28V~~ Noisy Bus Rtn B	Narrow	Figure 2	✓		
11	~~+28V~~ Survival Bus B	Narrow	Figure 2	✓		
12	~~+28V~~ Survival Bus Rtn B	Narrow	Figure 2	✓		

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1 EMI

Engineer: [signature] 5-4-98

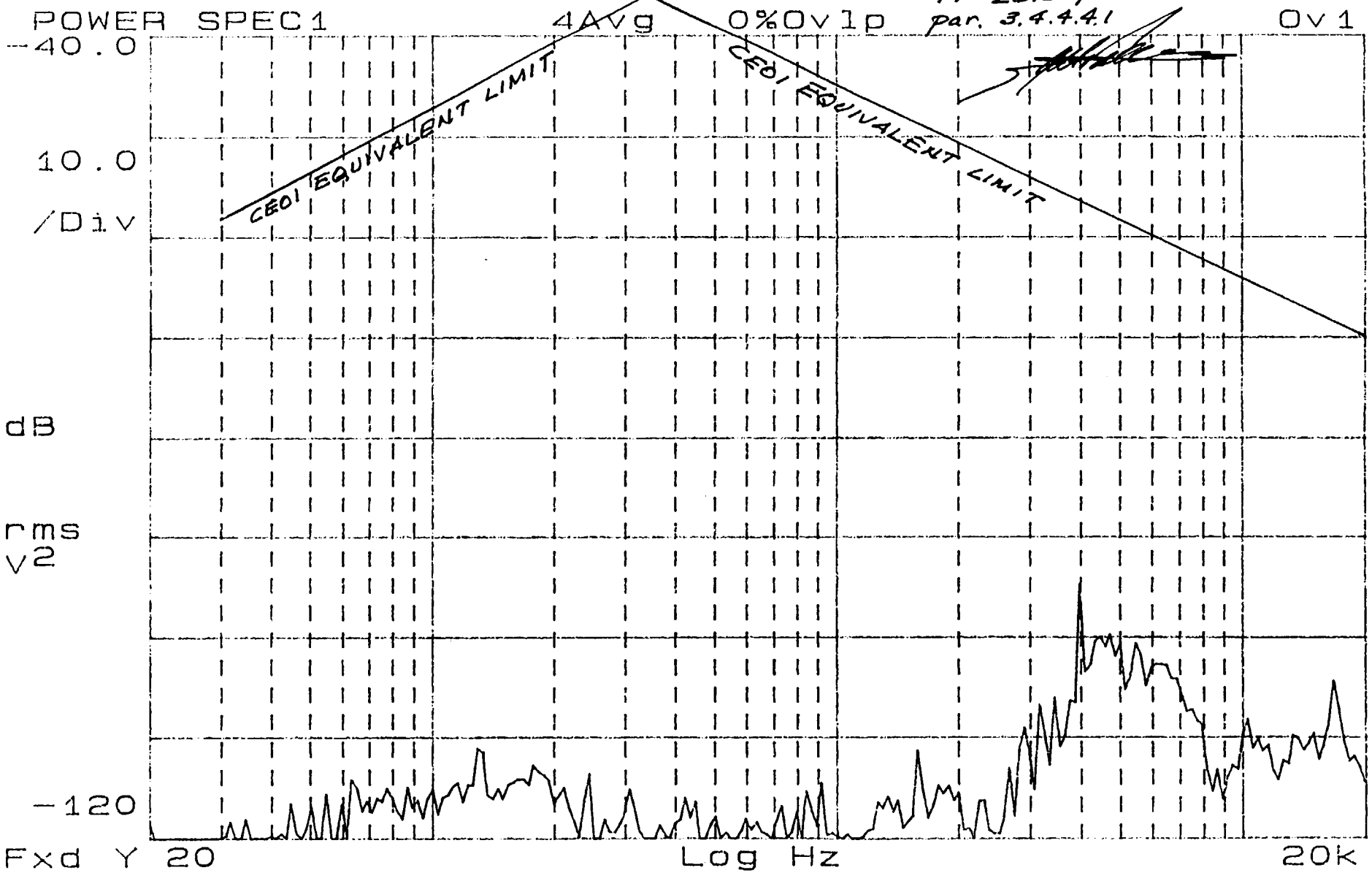
Serial No. S/N 202

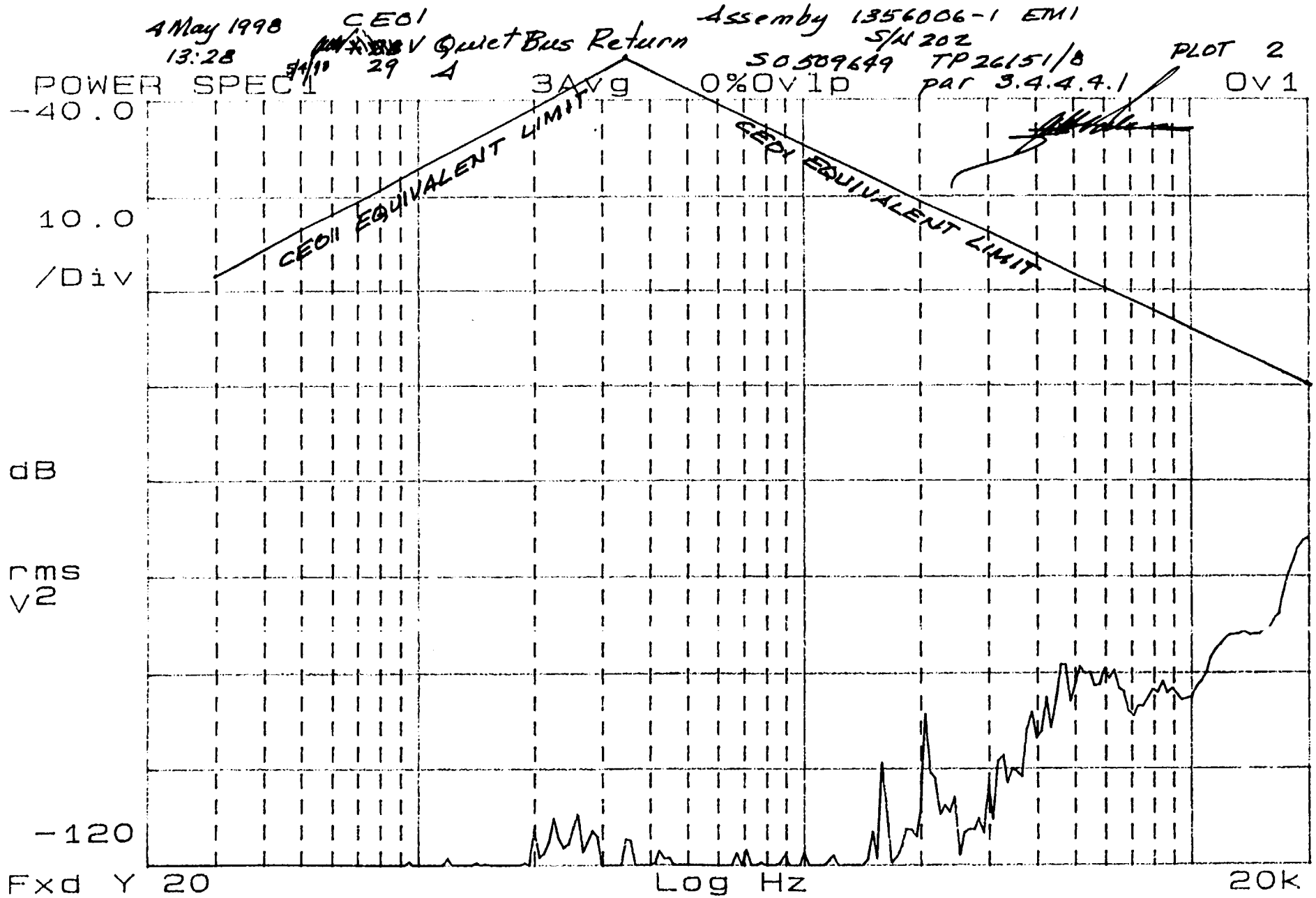
Quality Assurance: _____

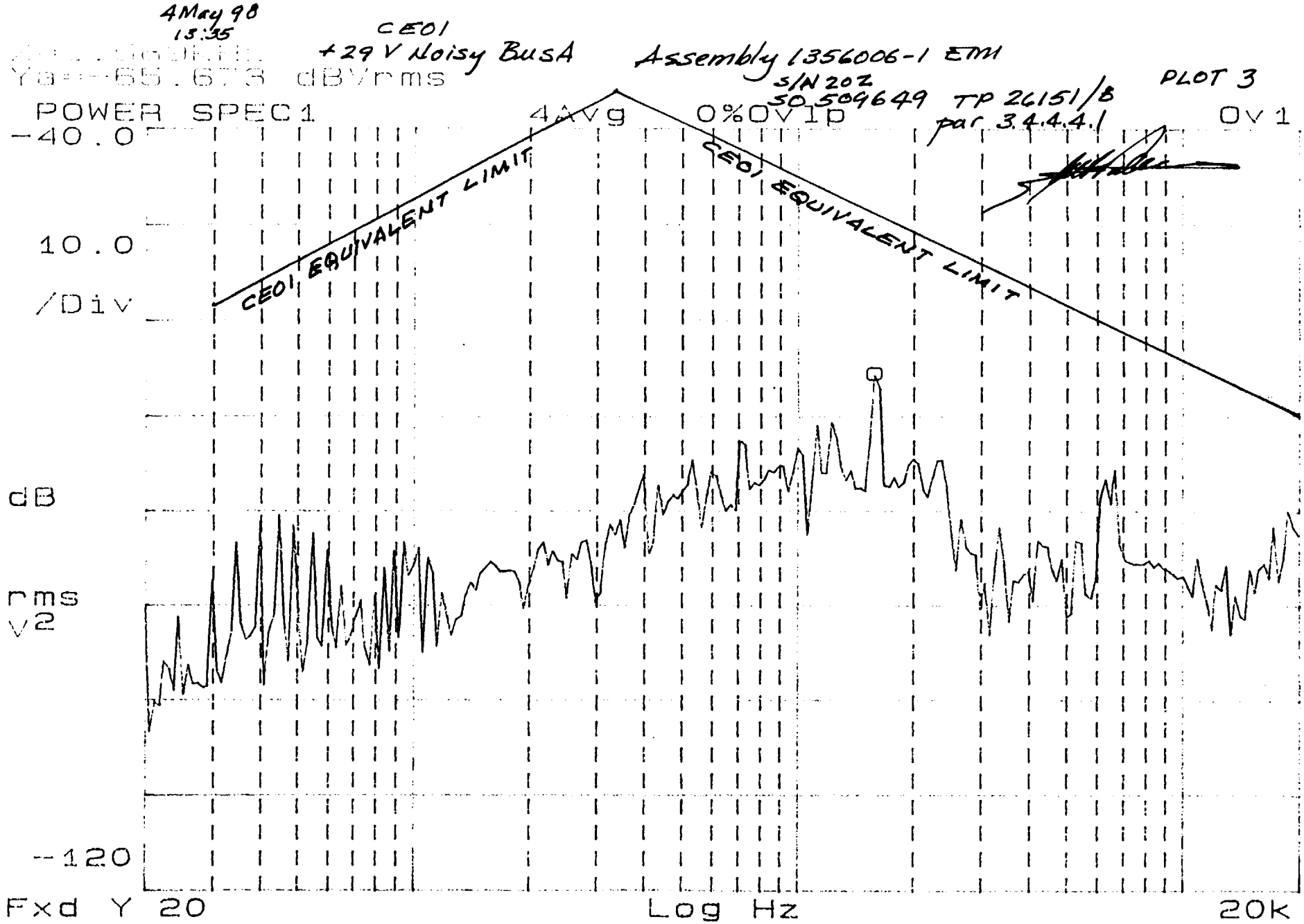
Shop Order: 509649

Operator: _____

4 May 1998 CEO1 Assembly 1356006-1 EM1
13:23 5/4/98 +29 Quiet Bus A S/N 202
SO 509649 TP 26151/B PLOT 1
par. 3.4.4.4.1




4 May 1998
13:28
CE01
29
Quiet Bus Return
Assemby 1356006-1 EMI
S/N 202
S0509649
TP26151/8
PLOT 2
POWER SPEC1
3Avg
0%Ovlp
par 3.4.4.4.1
Ov1
-40.0
10.0
/Div
CE01 EQUIVALENT LIMIT
CE01 EQUIVALENT LIMIT
dB
rms
V2
-120
Fxd Y 20
Log Hz
20k

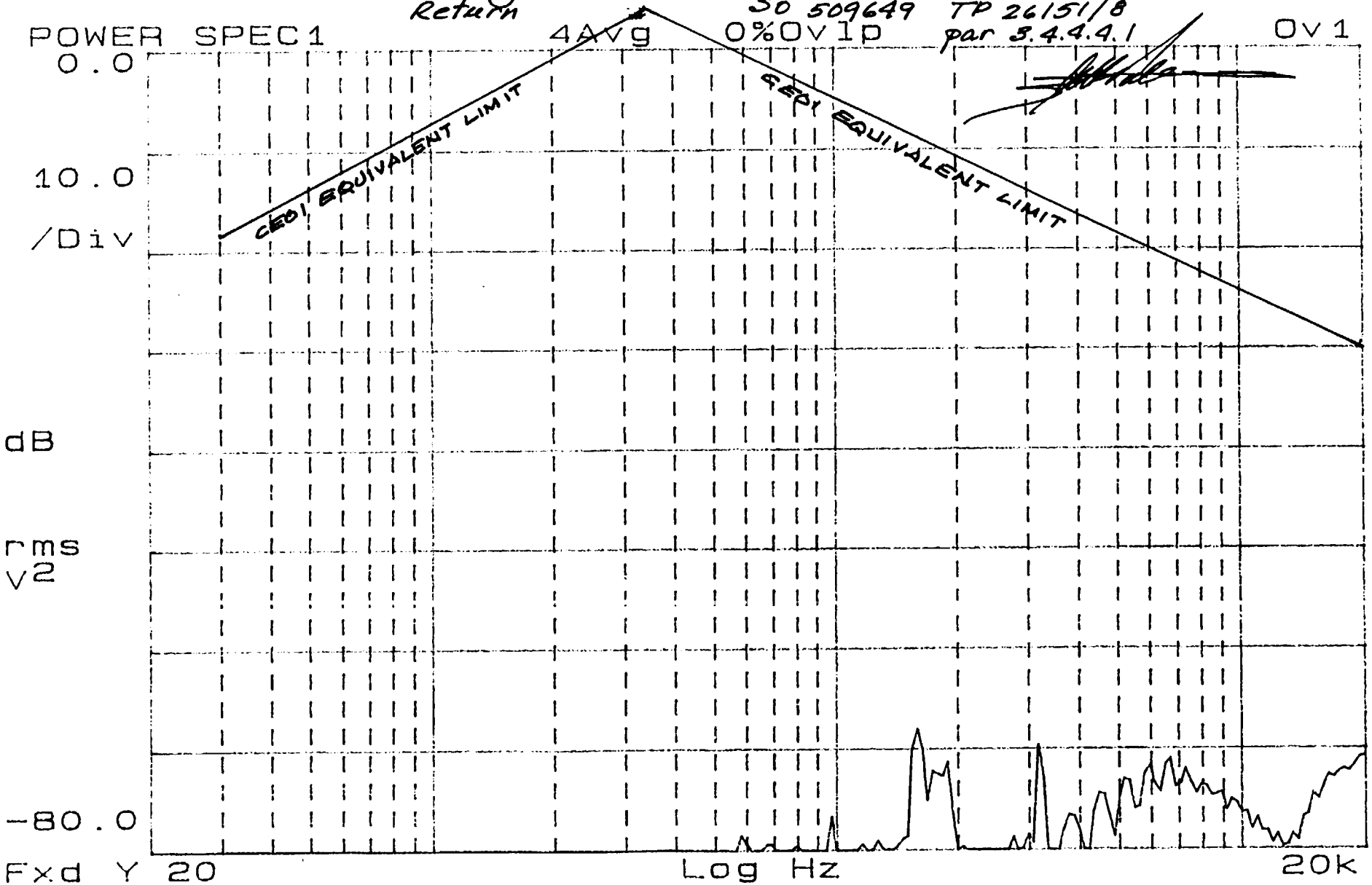

4 May 98
15:35
CE01
+29 V Noisy BusA
Assembly 1356006-1 EM1
S/N 202
50 509649
TP 26151/B
par 3.4.4.4.1
PLOT 3
Y8=-65.673 dBVrms
POWER SPEC1
4Avg
0%OVlp
0v1
-40.0
10.0
/Div
CE01 EQUIVALENT LIMIT
CE01 EQUIVALENT LIMIT
dB
rms
V2
-120
Fxd Y 20
Log Hz
20k

4 May 98
13:42

CE01
+29 V Noisy Bus A
Return

Assembly 1356006-1 EMI
S/N 202
SO 509649 TP 26151/8
par 3.4.4.4.1

PLOT 4



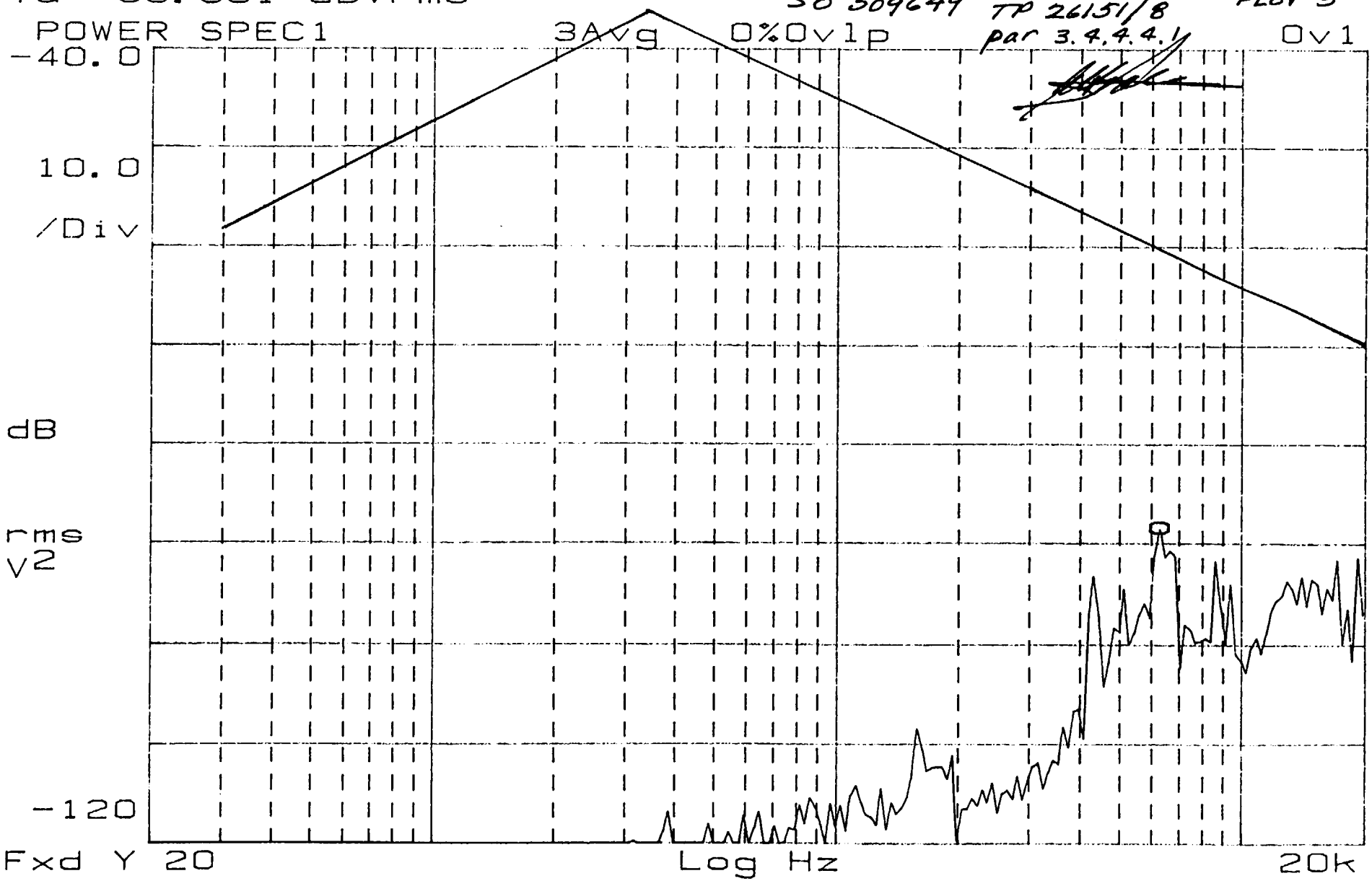
4 May 98
16:01

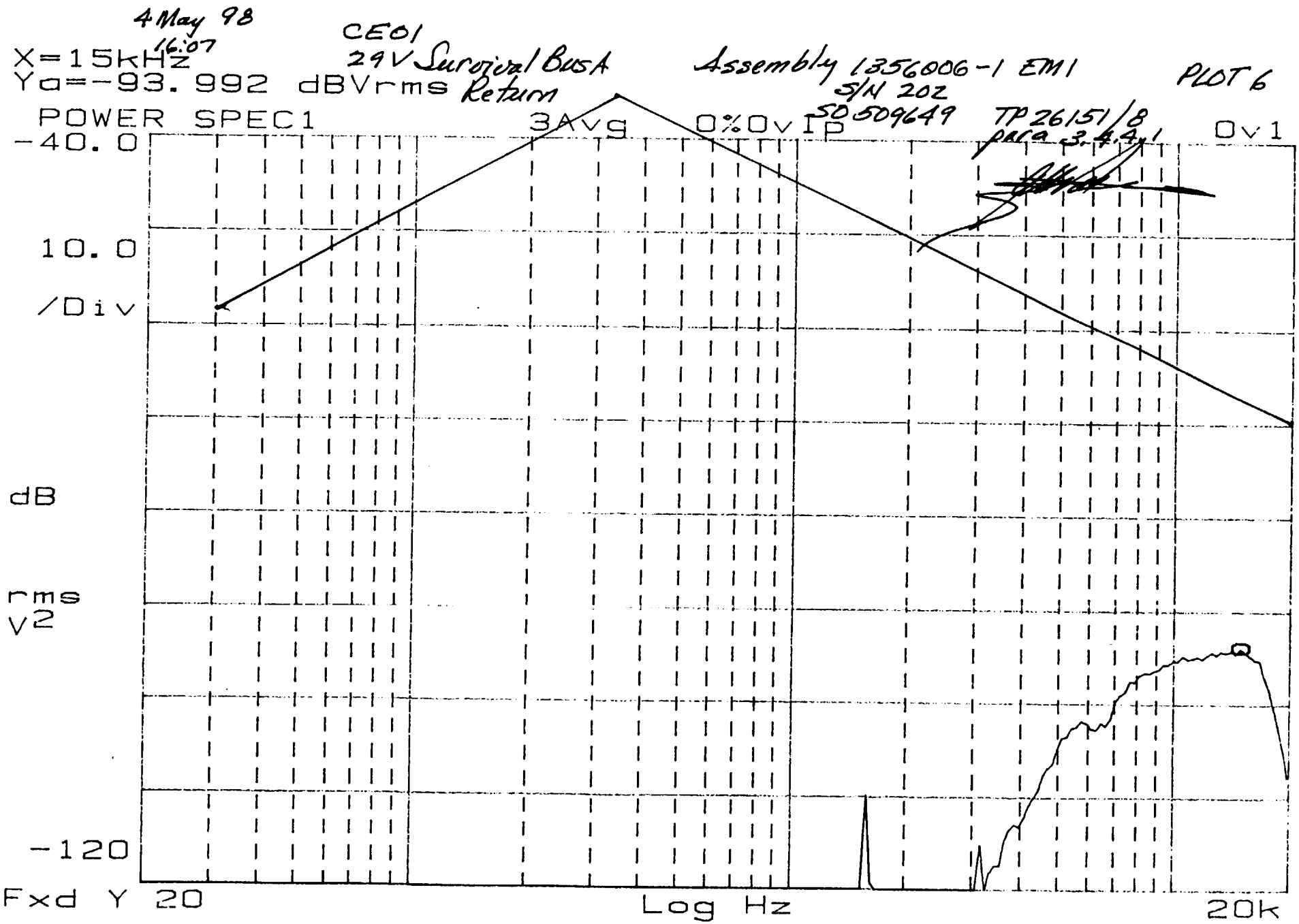
CE01
+29 V Survival Bus A

Assembly 1356006-1 EMI
S/N 202
SO 509649

TP 26151/8
par 3.4.4.4.1

PLOT 5




4 May 98
16:07
CE01
29V Survival Bus A
Return
Assembly 1356006-1 EMI
S/N 202
50509649
PLOT 6
TP 26151/8
para 3.4.4.1
X=15kHz
Ya=-93.992 dBVrms
POWER SPEC1
3Avg
0%Ovlp
0v1
-40.0
10.0
/Div
dB
rms
V2
-120
Fxd Y 20
Log Hz
20k

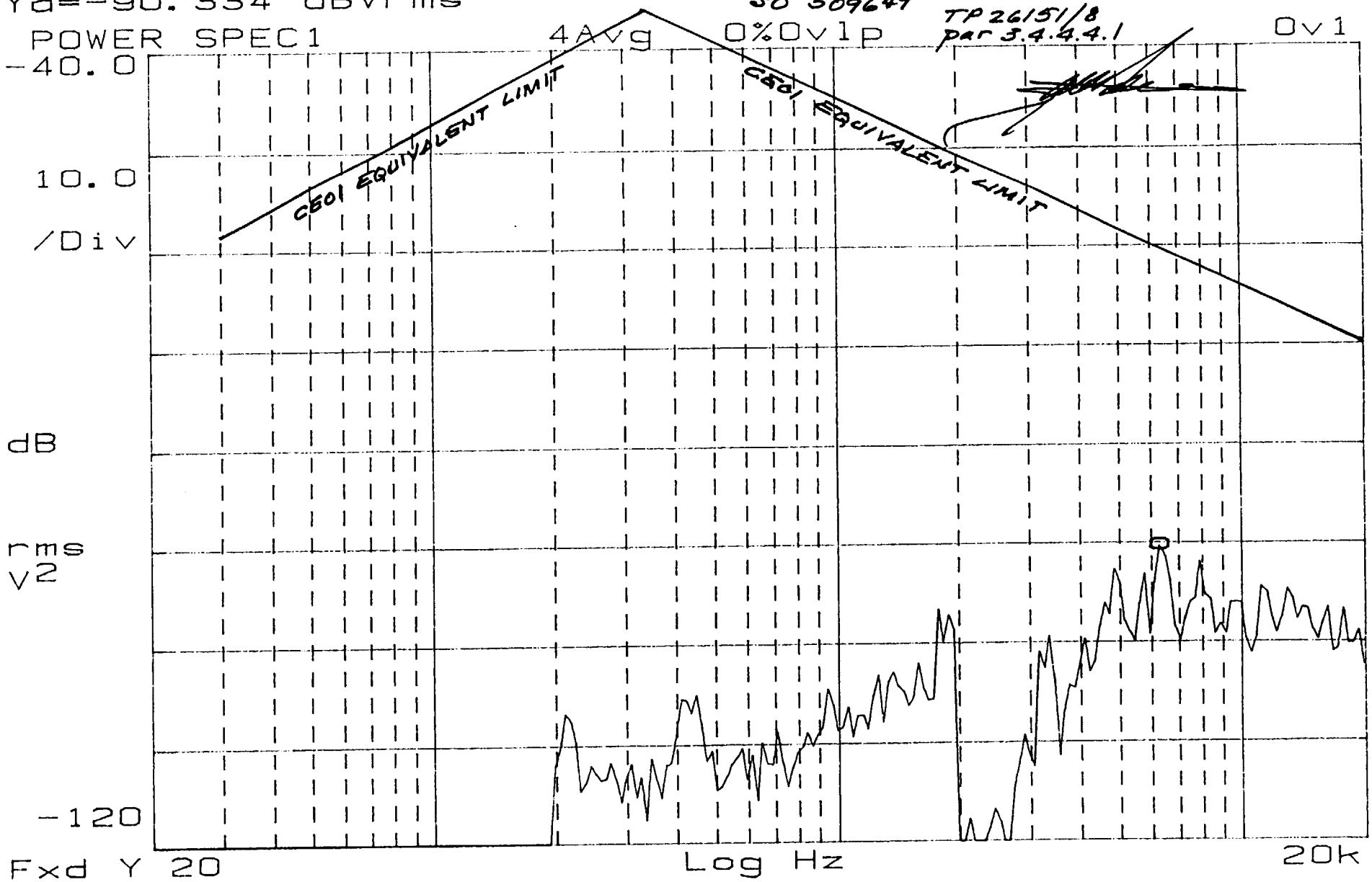
4 May 1998
15:35

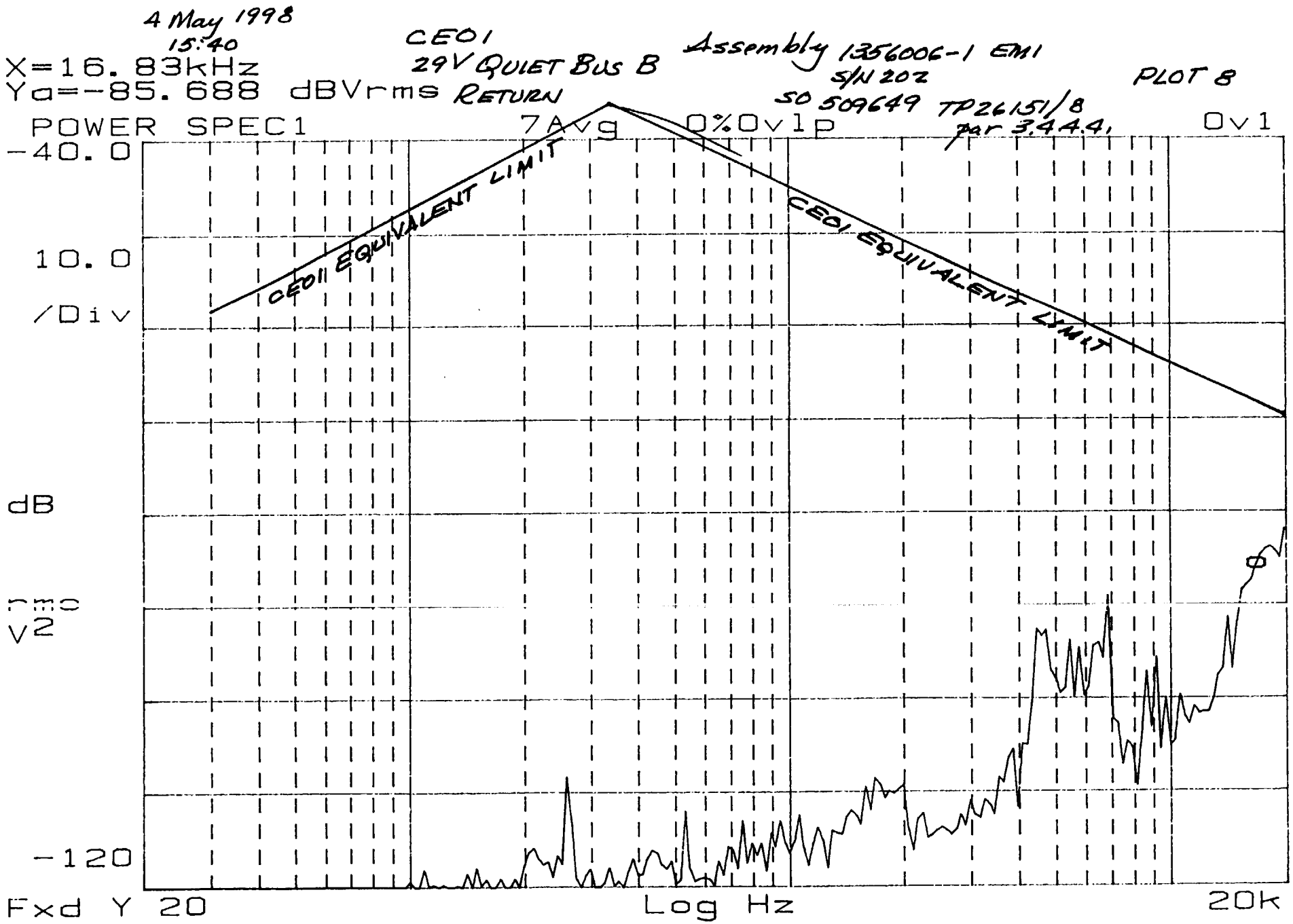
CE01
+29V Quiet Bus B

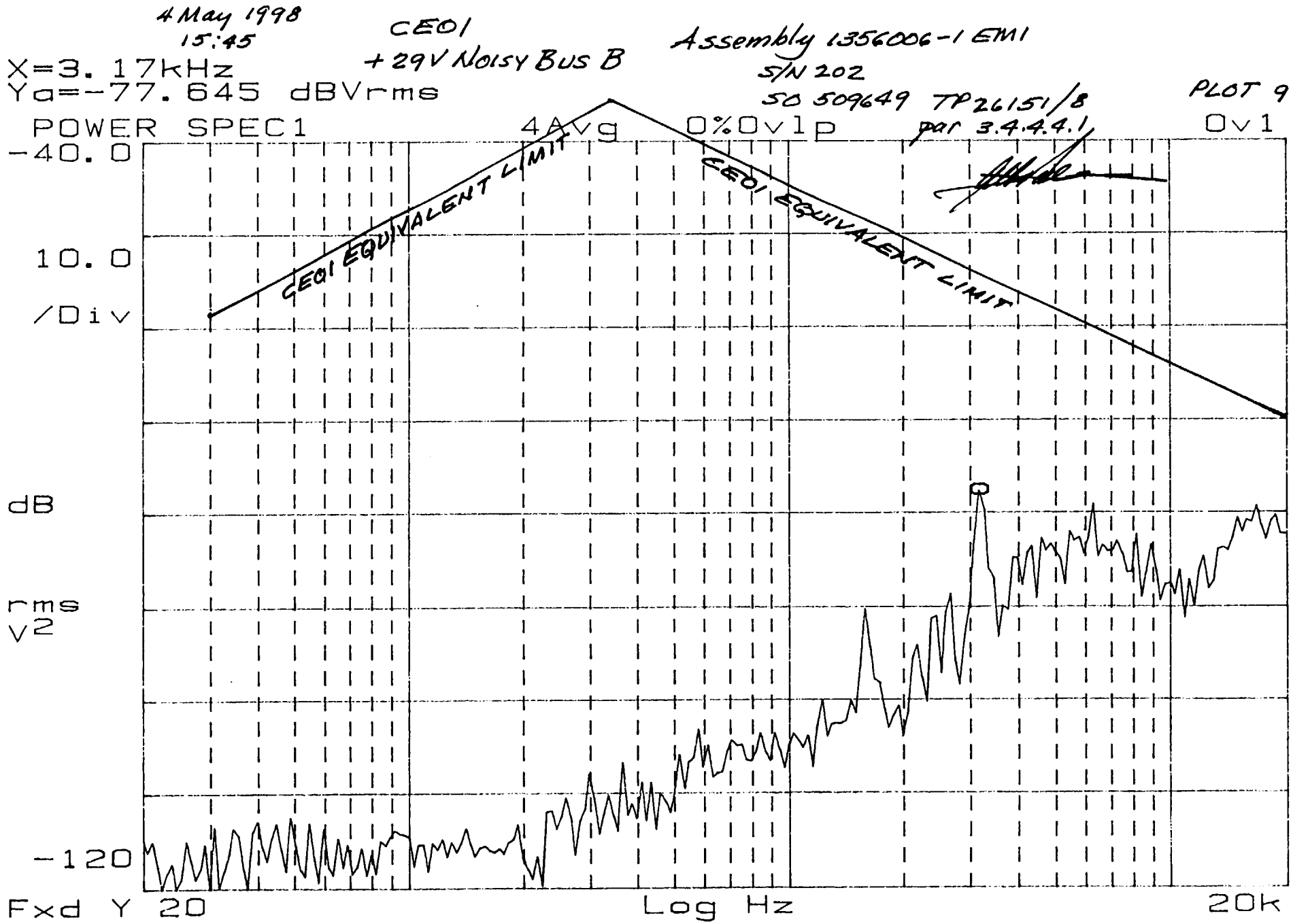
Assembly 1356006-1 EMI
S/N 202
SO 509649

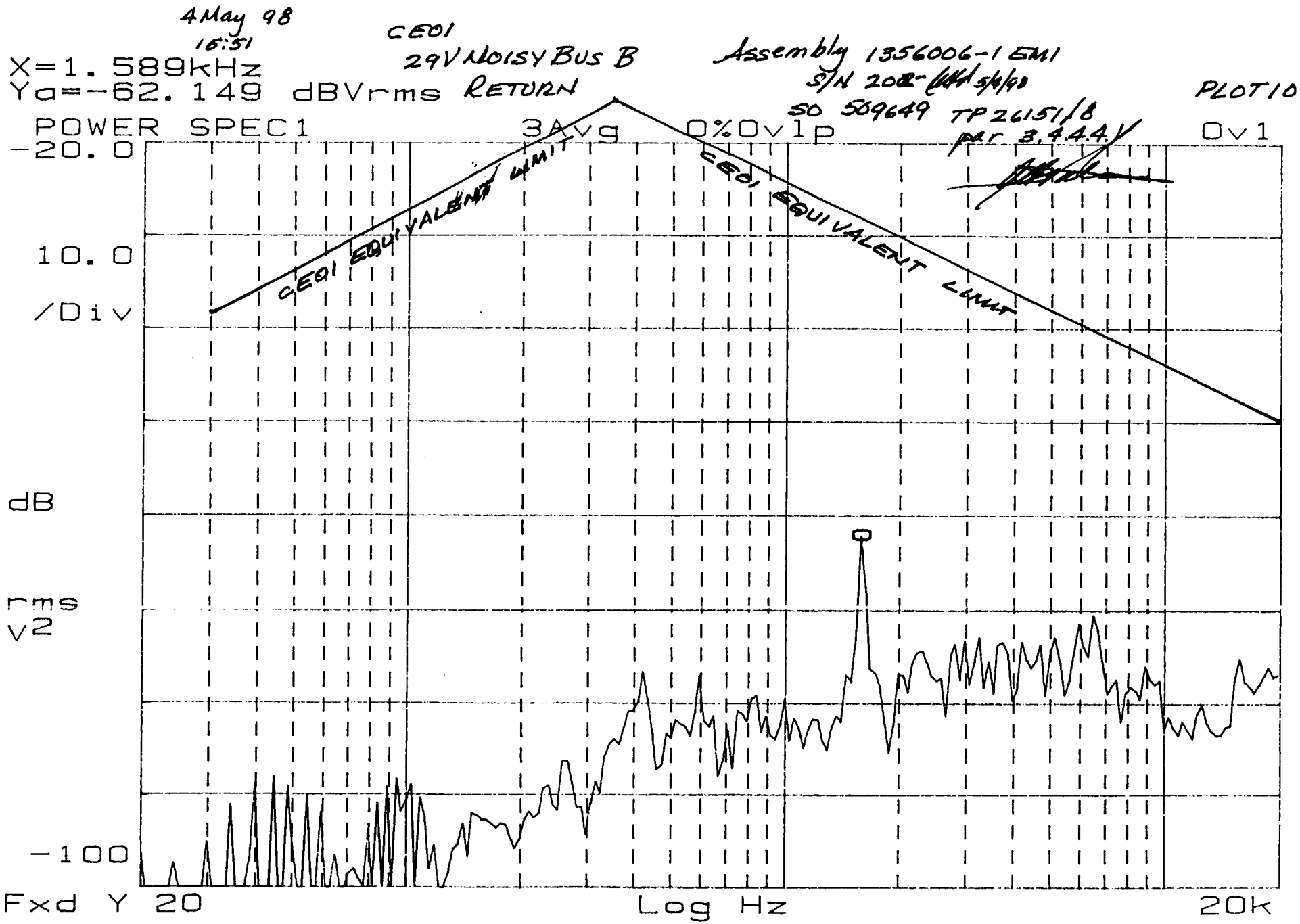
PLOT 7

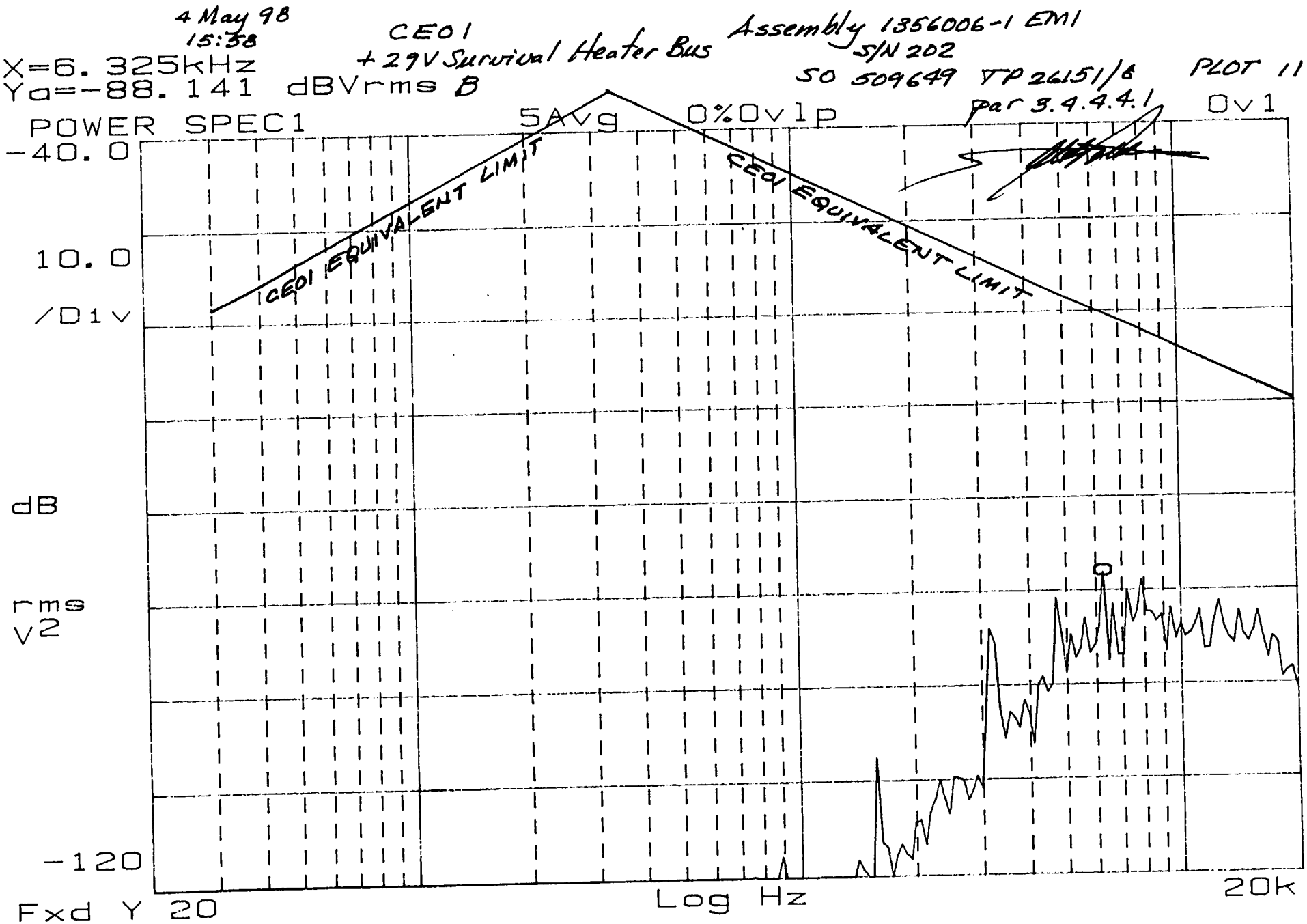
TP 26151/8
par 3.4.4.4.1




4 May 1998
15:40
CE01
29V QUIET BUS B
RETURN
Assembly 1356006-1 EMI
S/N 202
SO 509649 TP26151/8
par 3.4.4.4.
PLOT 8
X=16.83kHz
Ya=-85.688 dBVrms
POWER SPEC1
7Avg
0%Ovlp
0v1
-40.0
10.0
/Div
CE01 EQUIVALENT LIMIT
CE01 EQUIVALENT LIMIT
dB
rms
V2
-120
Fxd Y 20
Log Hz
20k


4 May 1998
15:45
CE01
+29V Noisy Bus B
Assembly 1356006-1 EMI
S/N 202
SO 509649 TP26151/8
par 3.4.4.4.1
PLOT 9
X=3.17kHz
Ya=-77.645 dBVrms
POWER SPEC1
4Avg
0%Ovlp
Ovl
-40.0
10.0
/Div
CE01 EQUIVALENT LIMIT
CE01 EQUIVALENT LIMIT
dB
rms
V2
-120
Fxd Y 20
Log Hz
20k


4 May 98
16:51
CE01
29V Noisy Bus B
Return
Assembly 1356006-1 EMI
S/N 20
SO 509649 TP26151/8
par 3.4.4.4
PLOT10
X=1.589kHz
Ya=-62.149 dBVrms
POWER SPEC1
3Avg
0%Ovlp
Ovl
-20.0
10.0
/Div
CEQI EQUIVALENT LIMIT
CEQI EQUIVALENT LIMIT
dB
rms
V2
-100
Fxd Y 20
Log Hz
20k


4 May 98
15:38
CE01
+29V Survival Heater Bus
Assembly 1356006-1 EMI
S/N 202
SO 509649 TP 26151/6
PLOT 11
X=6.325kHz
Ya=-88.141 dBVrms B
POWER SPEC1
5Avg
0%Ovlp
Par 3.4.4.4.1
0v1
-40.0
10.0
/D1v
CE01 EQUIVALENT LIMIT
CE01 EQUIVALENT LIMIT
dB
rms
V2
-120
Fxd Y 20
Log Hz
20k

4 May 98
16:04

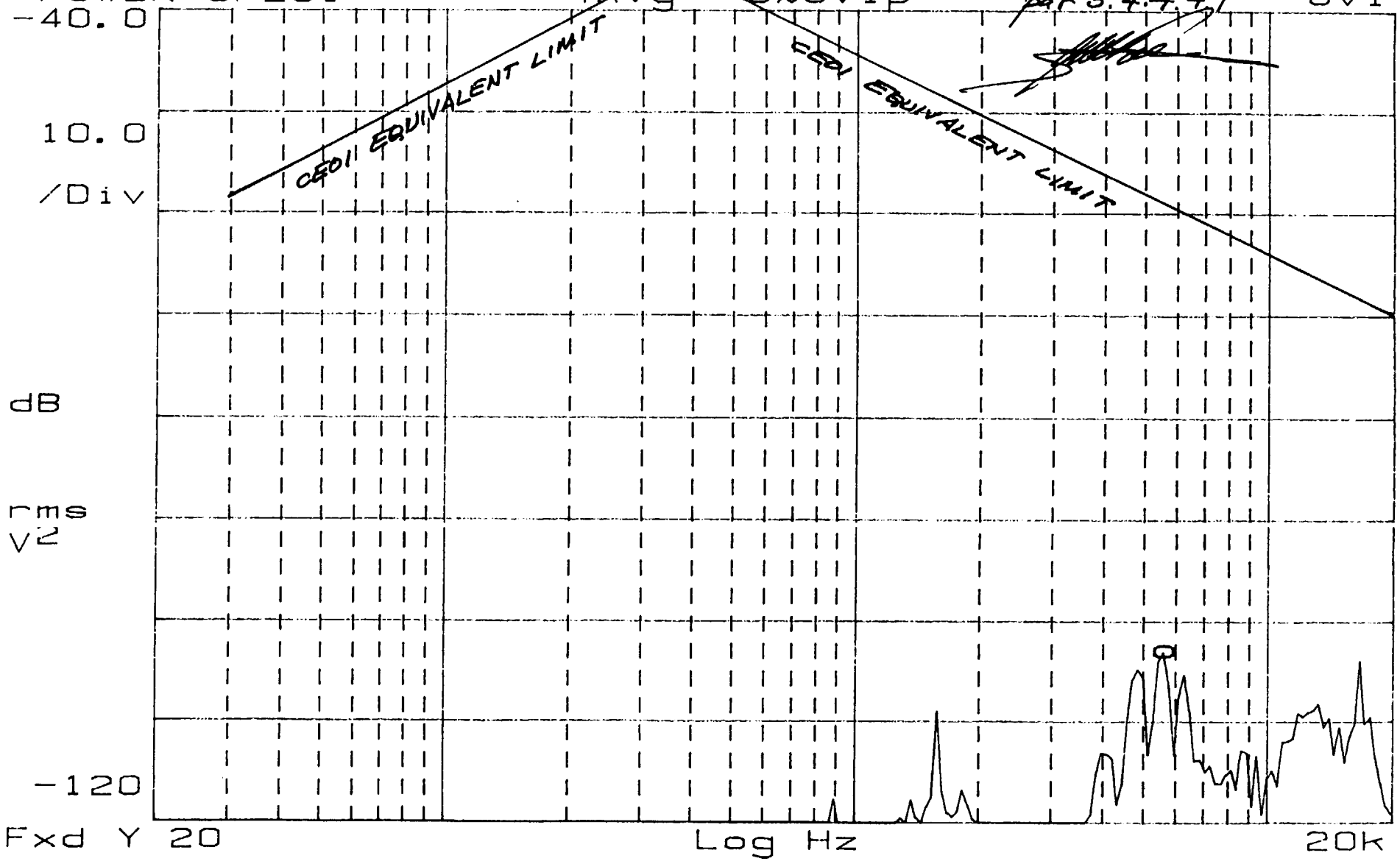
CE01
29V Survival Heater Bu
B Return

Assembly 1356006-1 EMI
S/N 202
SO 509649 TP 26151/8
par 3.4.4.4.1

PLOT 12

X=5.637kHz
Ya=-103.11 dBVrms

POWER SPEC1 4Avg 0%Ovlp 0v1



CE01 Limit Calculations for Equivalent Limit

Freq.	Limit	CP Factor	dBμV	μVolts	dBVrms	dBVpeak
33 Hz	120	-60.7	59.3	923	-60.7	-57.7
53 Hz	120	-54.6	65.4	1862	-54.6	-51.6
97 Hz	120	-47.5	72.5	4217	-47.5	-44.5
215 Hz	120	-42.3	77.7	7674	-42.3	-39.3
350 Hz	120	-38.3	81.7	12162	-38.3	-35.3
474 Hz	114.6	-35.6	79.0	8912	-41	-38.0
659 Hz	109.	-32.9	76.1	6383	-43.9	-40.9
910 Hz	103.2	-30.1	73.1	4518	-46.9	-43.9
2 kHz	89.6	-23.3	66.3	2065	-53.7	-50.7
5 kHz	74.1	-15.3	58.8	820	-61.2	-58.2
10 kHz	62	-9.96	52.0	398	-68.0	-65.0
20 kHz	50	-4.10	45.9	197	-74.1	-71.1

TEST DATA SHEET 2 (Sheet 1 of 4)
CE03 Test (Paragraph 3.4.4.4.2)

Test Setup Verified: Ken Tran 5/9/98
(Signature)

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
Dynamic Signal Analyzer	HP	3562A	51225	2-23-98	2-23-99
Plotter	HP	7475A	47417	4-17-92	CNR
Computer	HP	9836	46134-15	N/R	N/R
Spectrum Analyzer	HP	8566B	R300636	6-13-97	6-13-98
Amplifier	HP	8447F	L200230	1-14-98	1-14-99
Printer	HP	2671G	07202	N/R	N/R
Current Probe	Singer	91550/2B	L509571	4-23-97	5-23-98
Feed-Through Capacitors	Solar	6512-106R	N/A	N/A	N/A

Emission Measurements QC 16

Plot No.	Powerline Port-1 +29V ENG 252 4/29/98	Band	Required	Emissions within limits? Yes	No	Comments/ Observations
50	~~+28V~~ Quiet Bus A	Narrow	Figure 2		✓	
51	~~+28V~~ Quiet Bus A	Broad	Figure 3		✓	
52	~~-28V~~ Quiet Bus Rtn A	Narrow	Figure 2		✓	
53	~~-28V~~ Quiet Bus Rtn A	Broad	Figure 3		✓	
54	~~+28V~~ Noisy Bus A	Narrow	Figure 2		✓	
55	~~+28V~~ Noisy Bus A	Broad	Figure 3		✓	
56	~~+28V~~ Noisy Bus Rtn A	Narrow	Figure 2		✓	
57	~~+28V~~ Noisy Bus Rtn A	Broad	Figure 3		✓	

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1 EMI

Serial No. 202

Shop Order: 5096444

Engineer: 9 May 98

5/8/98 QC 16 ENG 252

Quality Assurance:

Operator: Ken Tran 5-9-98

Customer Rep:

TEST DATA SHEET 2 (Sheet 2 of 4)
CE03 Test (Paragraph 3.4.4.4.2)

Test Setup Verified: Ken Shaw 5/9/98
(Signature)

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date

Emission Measurements QC 6

Plot No.	Powerline Port-1 +29V ENG 252 4/29/98	Band	Required	Emissions within limits?		Comments/ Observations
				Yes	No	
58	~~+28V~~ Survival Bus A	Narrow	Figure 2		✓	
59	~~+28V~~ Survival Bus A	Broad	Figure 3		✓	
60	~~28V~~ Survival Bus Rtn A	Narrow	Figure 2		✓	
61	~~28V~~ Survival Bus Rtn A	Broad	Figure 3		✓	

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1 EMI

Engineer: [signature]

Serial No. 202

Quality Assurance: QC 16 5/12/98

Shop Order: 5096484

Operator: Ken Shaw 5/9/98

ENG 252

Customer Rep.:

TEST DATA SHEET 2 (Sheet 3 of 4)
CE03 Test (Paragraph 3.4.4.4.2)

Test Setup Verified: Ken Shane 5/9/98
(Signature)

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date

Emission Measurements QC 16

Plot No.	Powerline Port-1 +29V ENG 252 4/29/98	Band	Required	Emissions within limits? Yes	No	Comments/ Observations
62	~~+28V~~ Quiet Bus B	Narrow	Figure 2		✓	
63	~~+28V~~ Quiet Bus B	Broad	Figure 3		✓	
64	~~28V~~ Quiet Bus Rtn B	Narrow	Figure 2		✓	
65	~~28V~~ Quiet Bus Rtn B	Broad	Figure 3		✓	
66	~~±28V~~ Noisy Bus B	Narrow	Figure 2		✓	
67	~~±28V~~ Noisy Bus B	Broad	Figure 3		✓	
68	~~±28~~V Noisy Bus Rtn B	Narrow	Figure 2		✓	
69	~~+28V~~ Noisy Bus Rtn B	Broad	Figure 3		✓	

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356066-1 EMI

Engineer: [signature] 9 May 98

Serial No. 202

Quality Assurance: QC 16 5/8/98

Shop Order: 5096444

Operator: Ken Shane 5-9-98 ENG 252

Customer Rep:

TEST DATA SHEET 2 (Sheet 4 of 4)
CE03 Test (Paragraph 3.4.4.4.2)

Test Setup Verified: Ken Shan 5/9/98
(Signature)

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date

Emission Measurements QC 16

Plot No.	Powerline Port-1 +29V ENG 252 4/29/98	Band	Required	Emissions within limits?		Comments/ Observations
				Yes	No	
70	~~±28V~~ Survival Bus B	Narrow	Figure 2		✓	
71	~~±28V~~ Survival Bus B	Broad	Figure 3		✓	
72	~~28V~~ Survival Bus Rtn B	Narrow	Figure 2		✓	
73	~~28V~~ Survival Bus Rtn B	Broad	Figure 3		✓	

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1 EMI

Engineer: 9 May 98

Serial No. 202

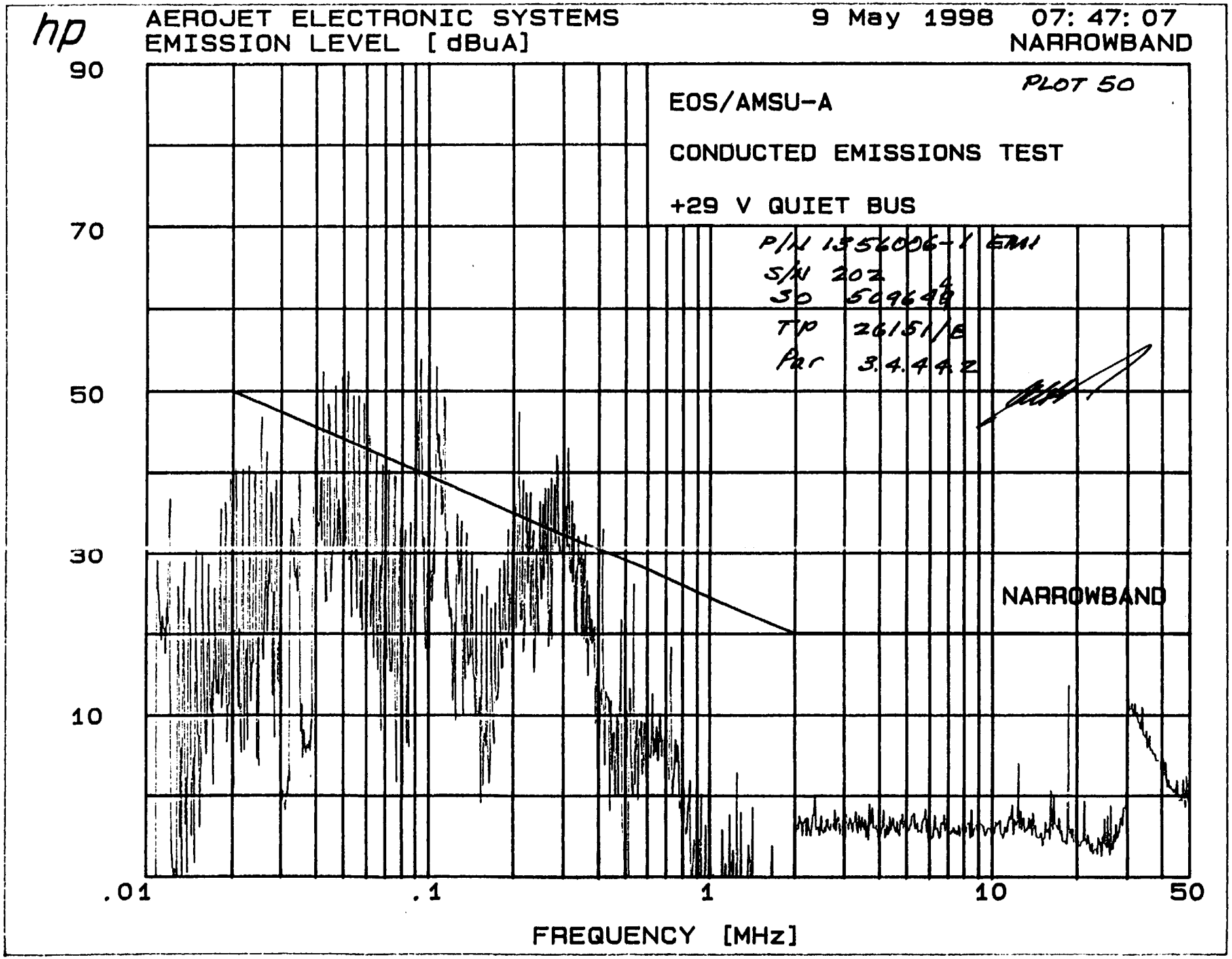
Quality Assurance:

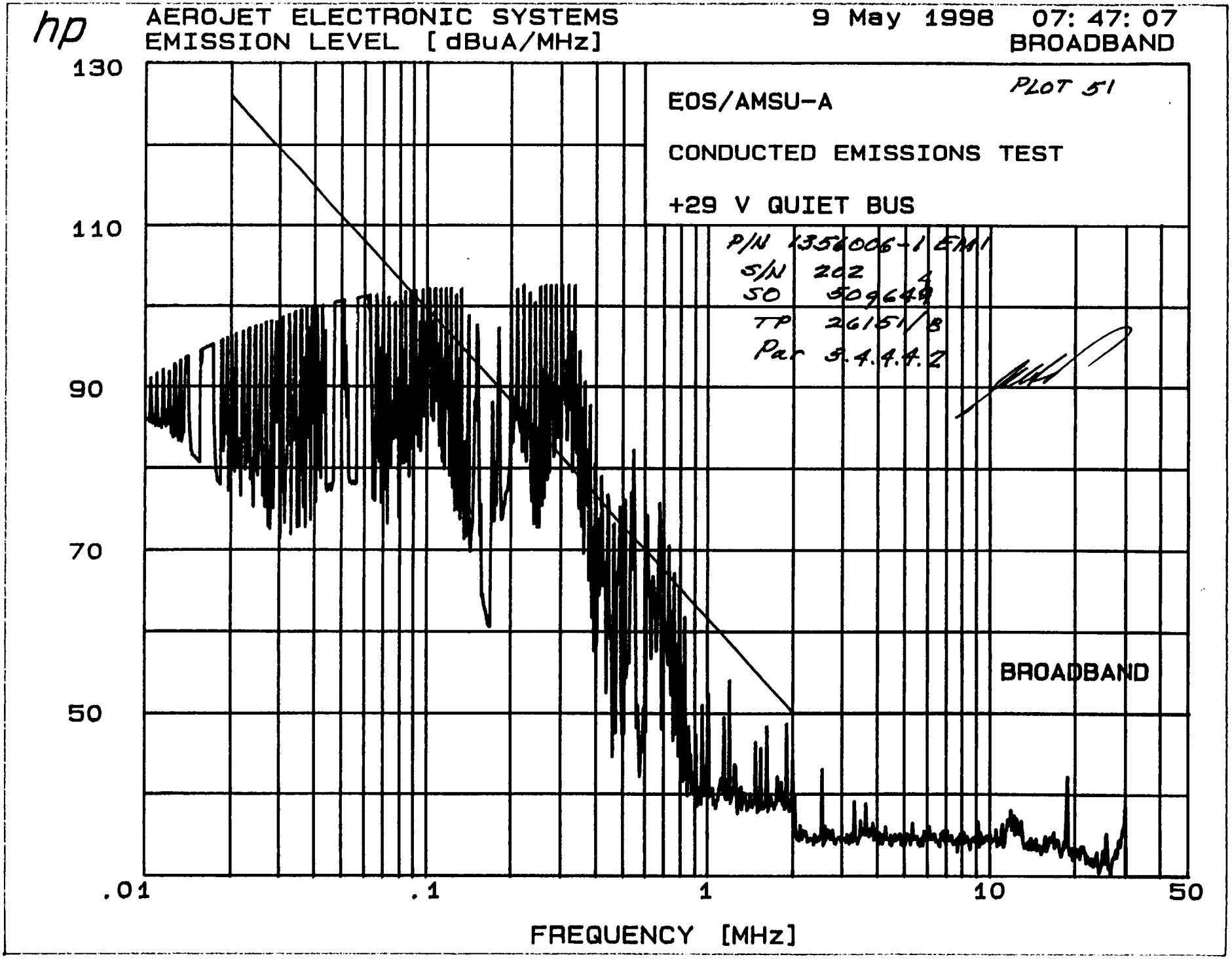
Shop Order: 5096494

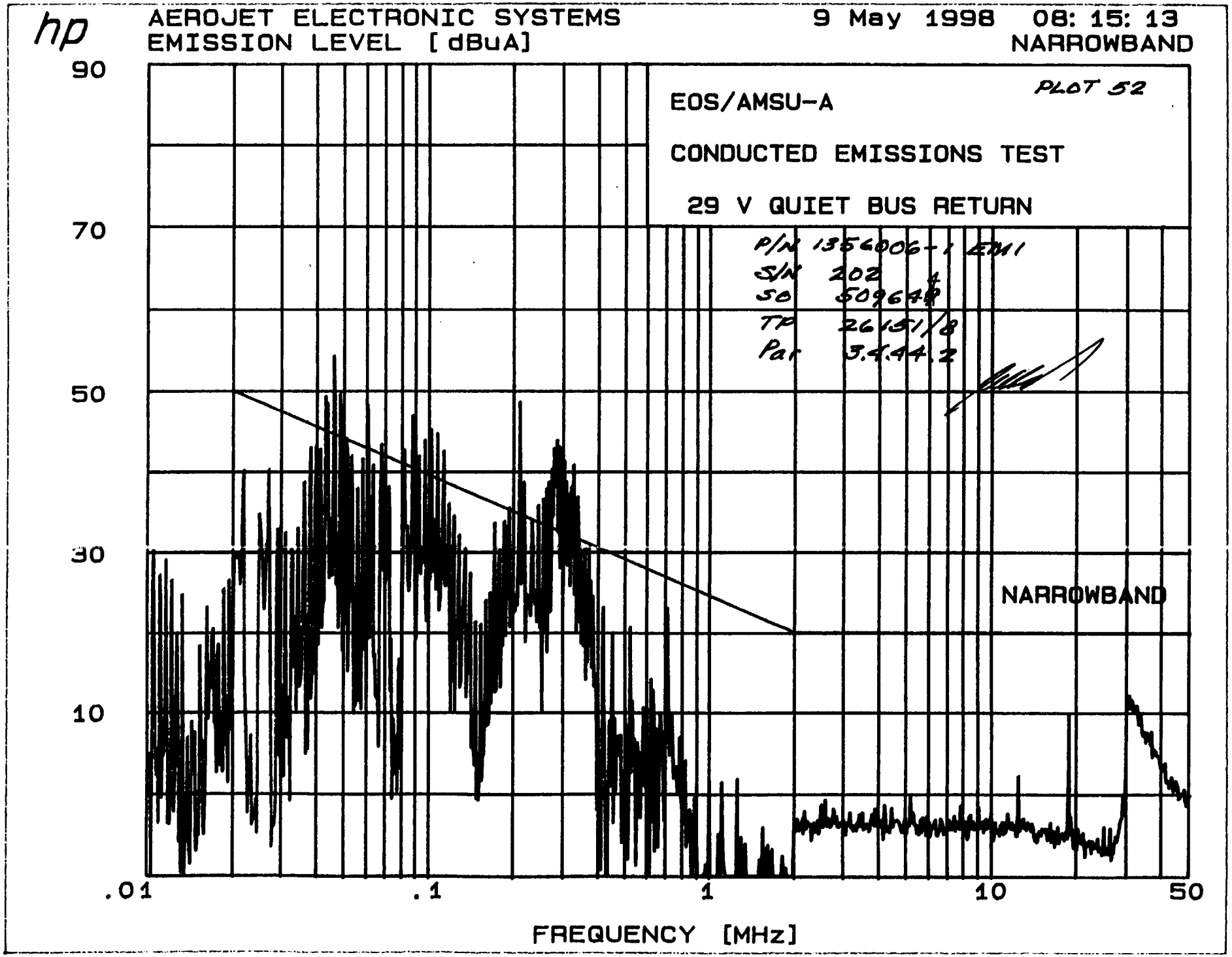
QC 5/9/98 ENG 252

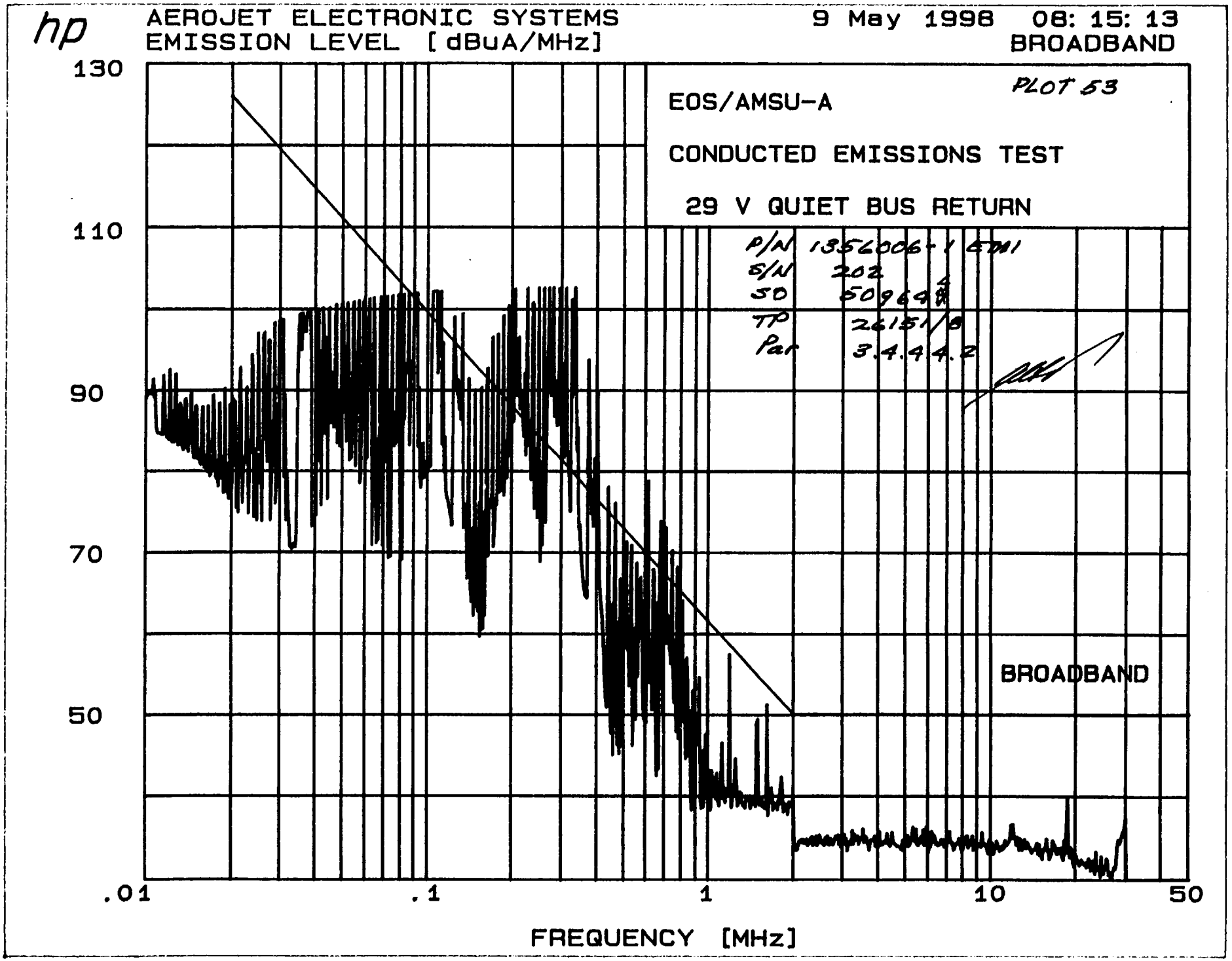
Operator: Ken Shan 5/9/98

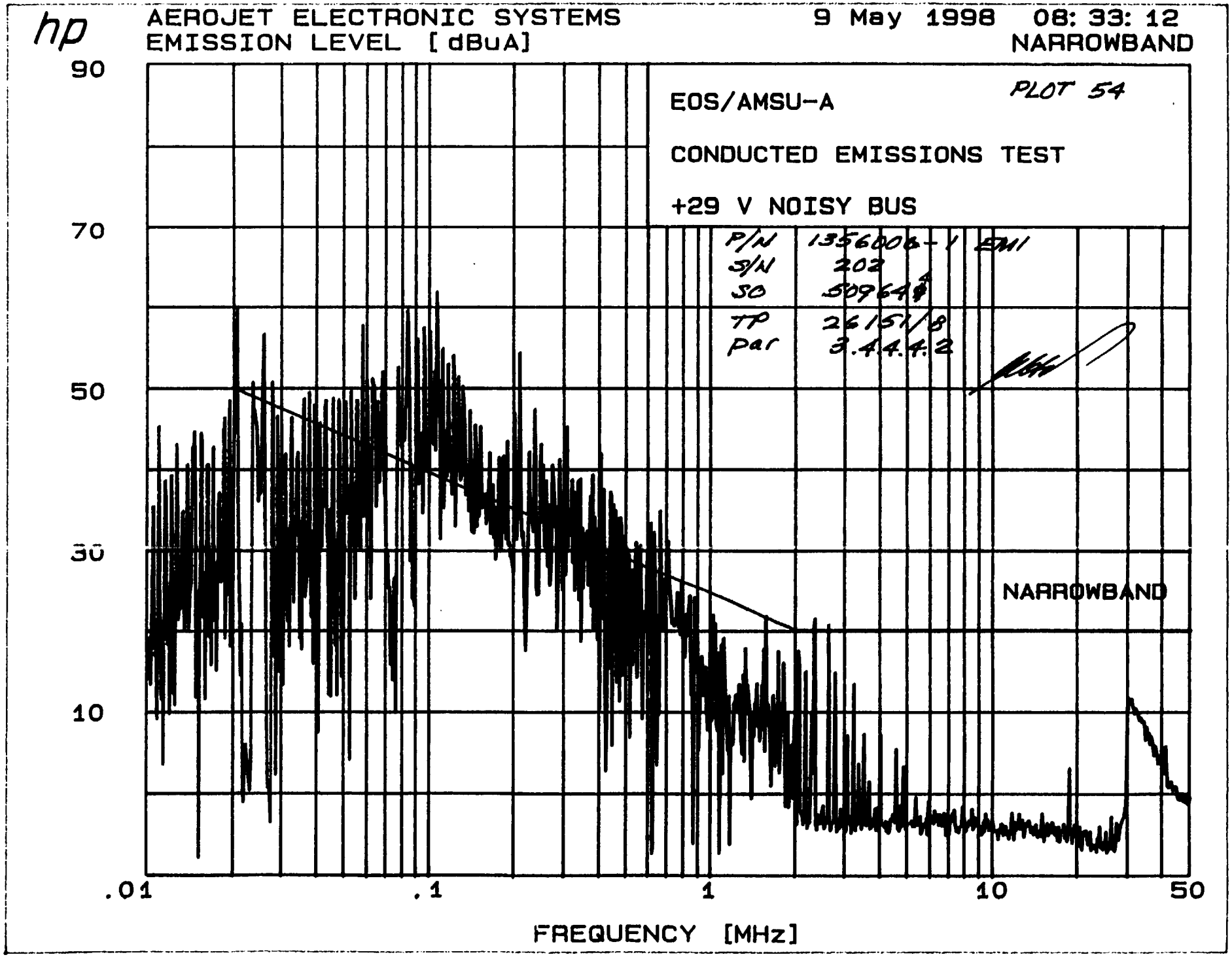
Customer Rep:

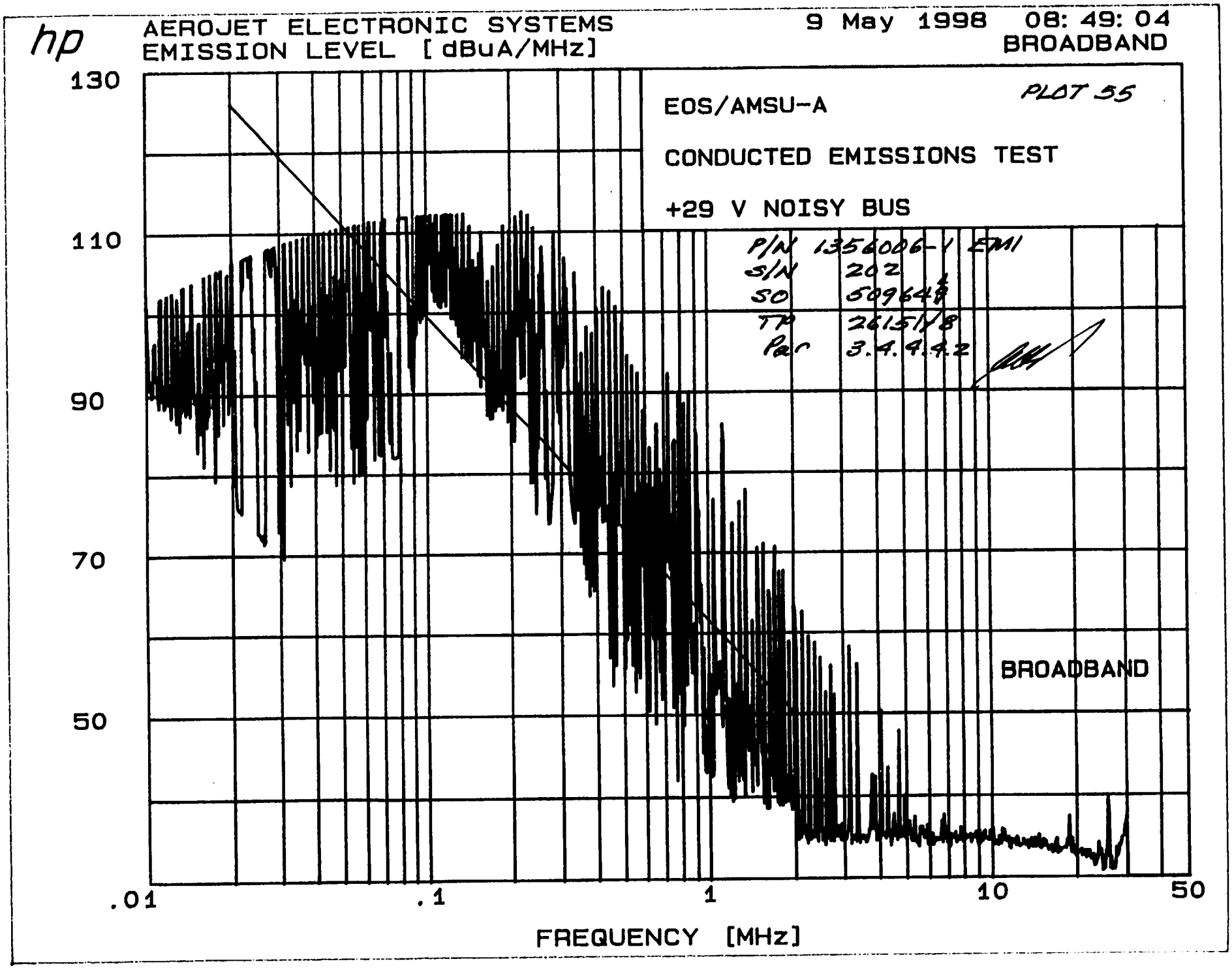

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA]
9 May 1998 07: 47: 07
NARROWBAND
PLOT 50
EOS/AMSU-A
CONDUCTED EMISSIONS TEST
+29 V QUIET BUS
P/N 1356006-1 EMI
S/N 202
SO 509649
TP 26151/B
Par 3.4.4.4.2
NARROWBAND
90
70
50
30
10
.01
.1
1
10
50
FREQUENCY [MHz]

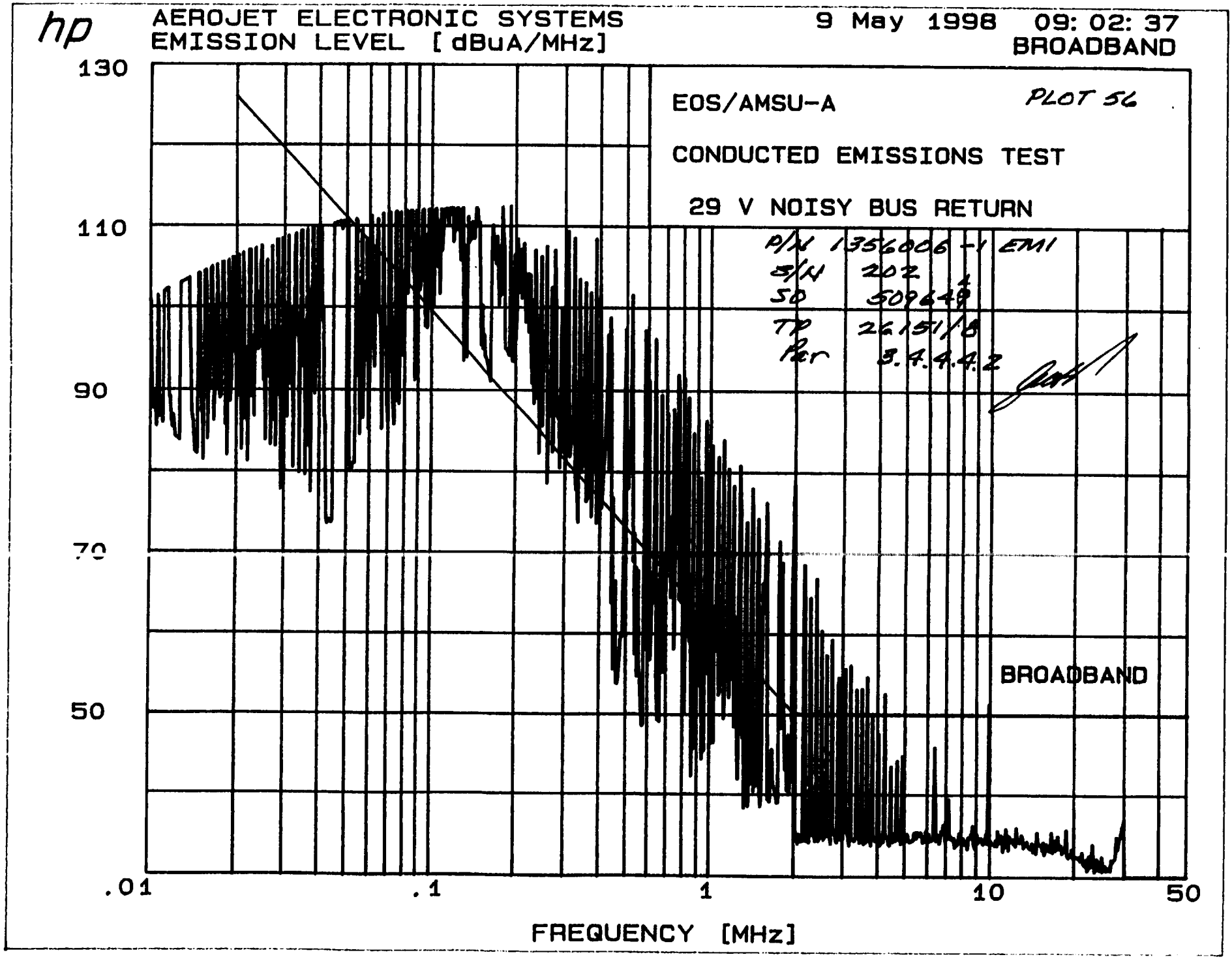

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA/MHz]
9 May 1998 07:47:07
BROADBAND
PLOT 51
EOS/AMSU-A
CONDUCTED EMISSIONS TEST
+29 V QUIET BUS
P/N 1358006-1 EM1
S/N 202
SO 509649
TP 26151/B
Par 5.4.4.4.2
BROADBAND
130
110
90
70
50
.01
.1
1
10
50
FREQUENCY [MHz]

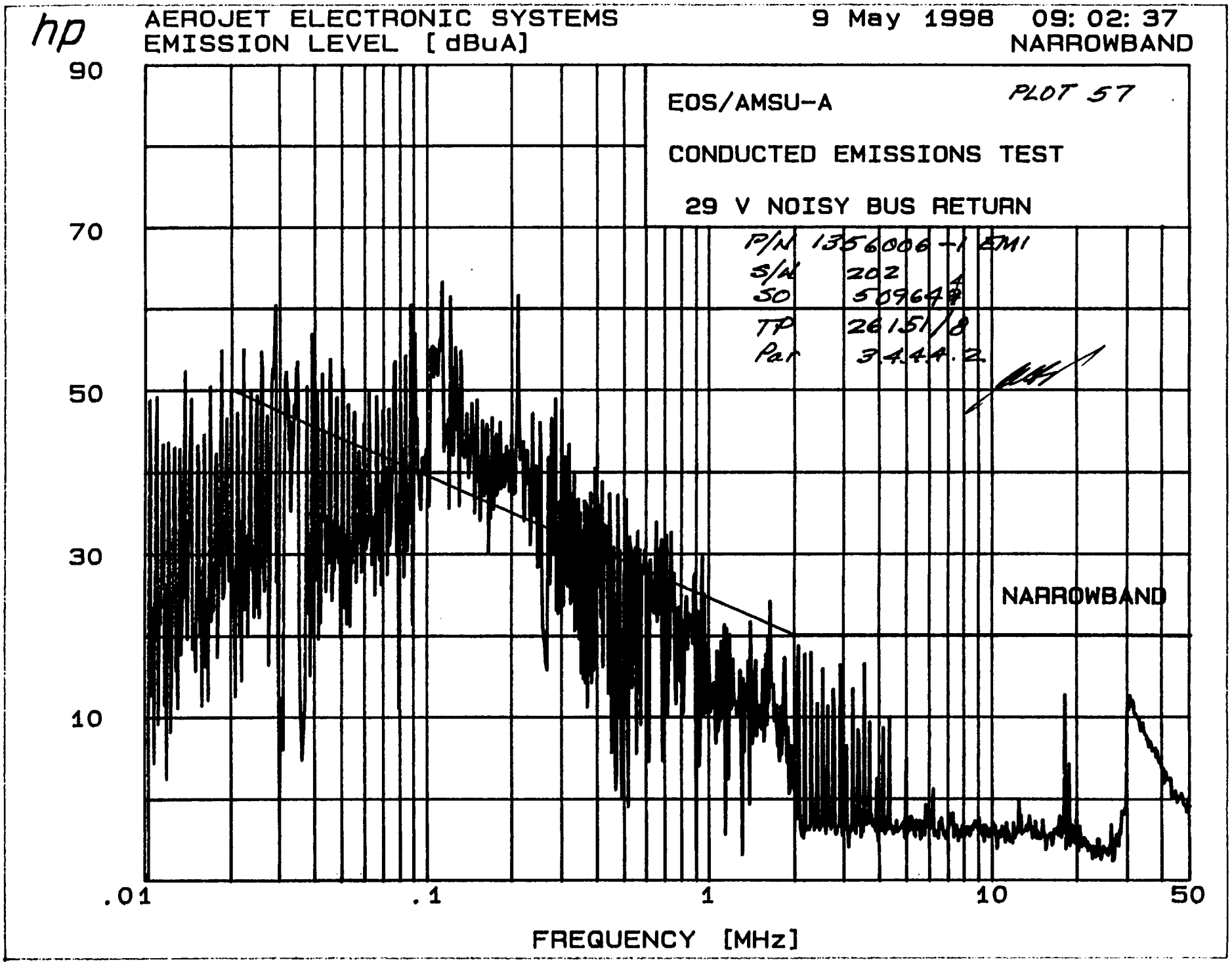

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA]
9 May 1998 08: 15: 13
NARROWBAND
PLOT 52
EOS/AMSU-A
CONDUCTED EMISSIONS TEST
29 V QUIET BUS RETURN
P/N 1356006-1 EMI
S/N 202
SO 509648
TP 26151/8
Par 3.4.44.2
NARROWBAND
90
70
50
30
10
.01
.1
1
10
50
FREQUENCY [MHz]

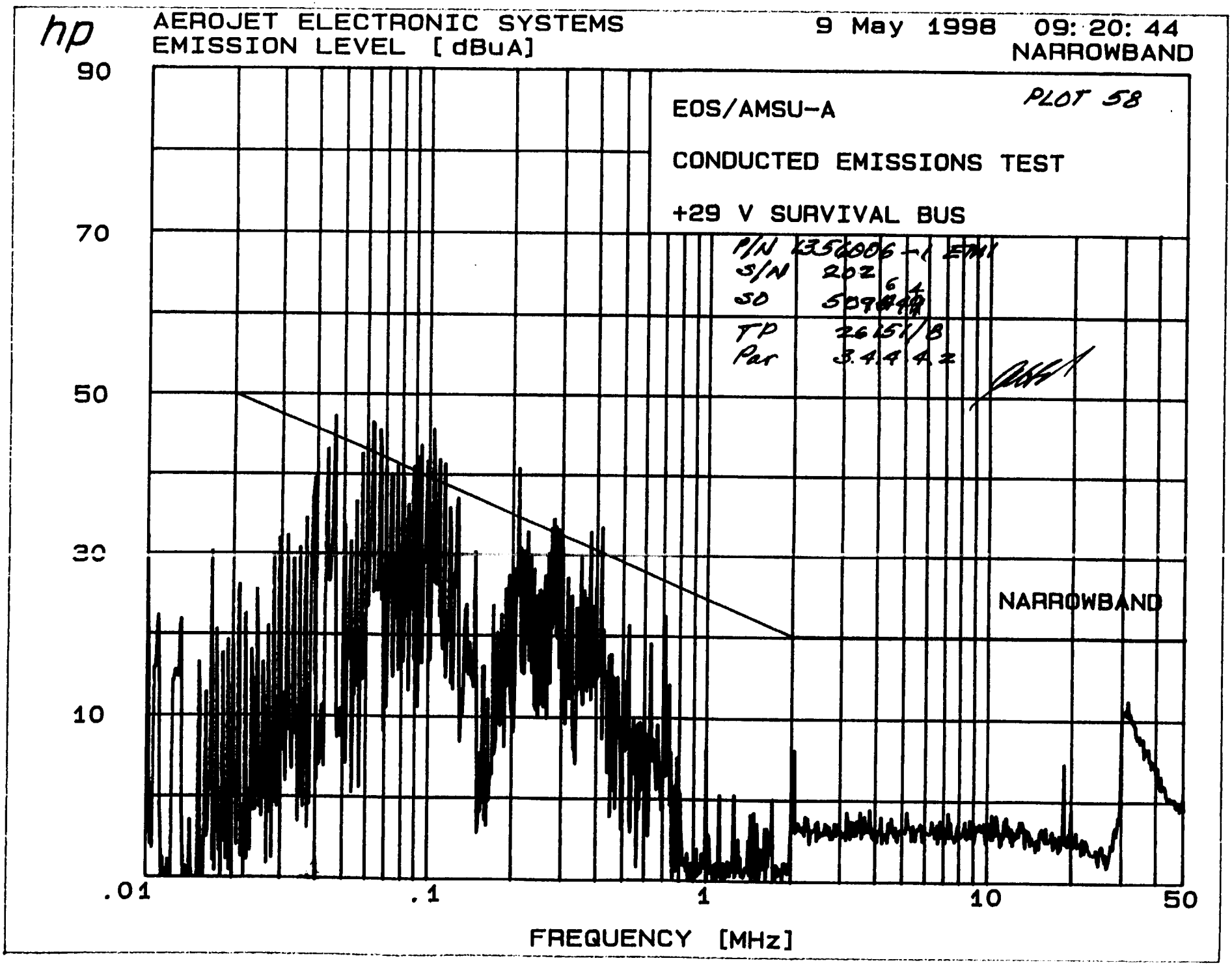

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA/MHz]
9 May 1998 08: 15: 13
BROADBAND
PLOT 53
EOS/AMSU-A
CONDUCTED EMISSIONS TEST
29 V QUIET BUS RETURN
P/N 1356006-1 EMI
S/N 202
SO 50964
TP 26151/8
Par 3.4.4.4.2
BROADBAND
130
110
90
70
50
.01
.1
1
10
50
FREQUENCY [MHz]

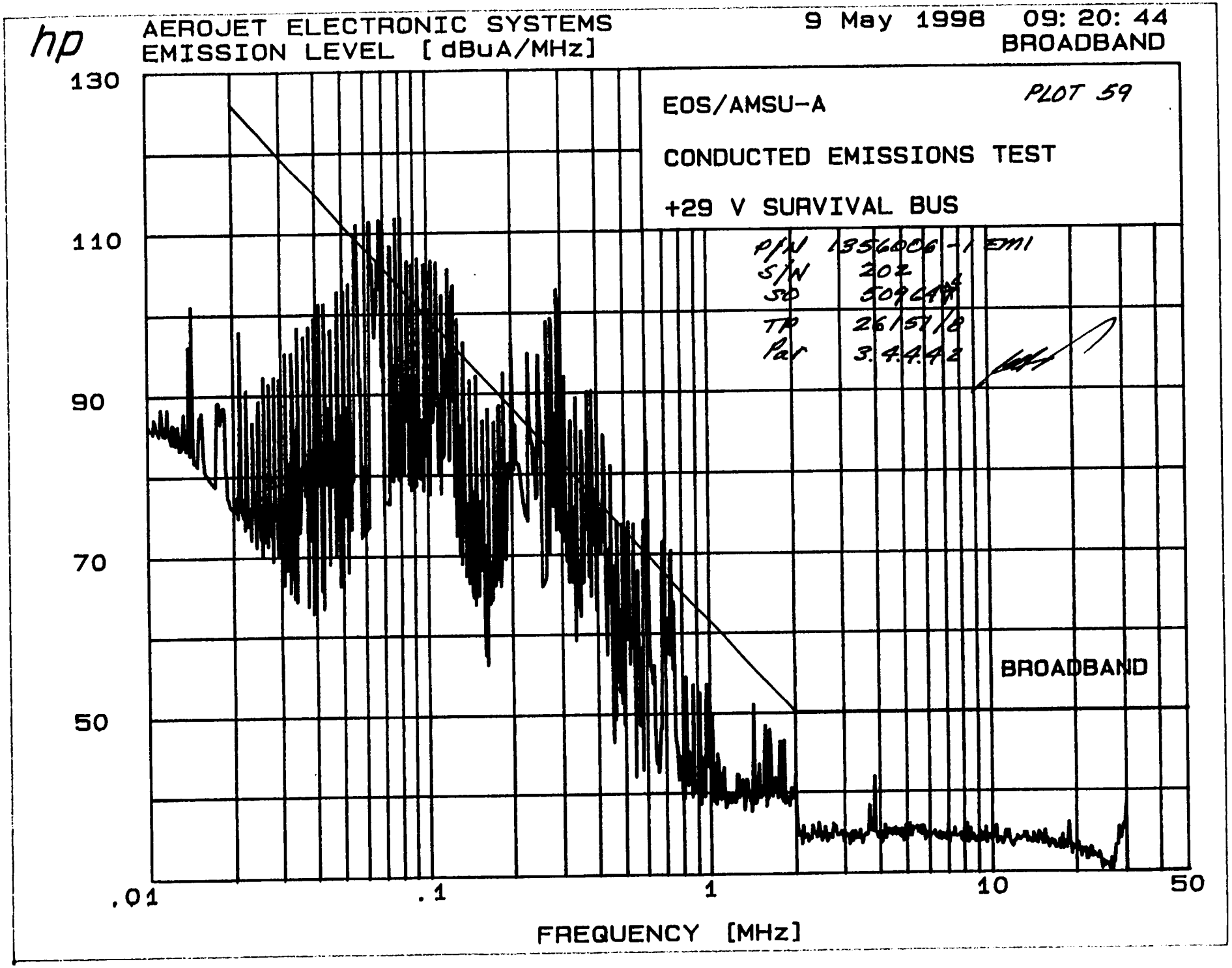

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA]
9 May 1998 08:33:12
NARROWBAND
PLOT 54
EOS/AMSU-A
CONDUCTED EMISSIONS TEST
+29 V NOISY BUS
P/N 1356006-1 EMI
S/N 202
SO 50964
TP 26151/8
par 3.4.4.4.2
NARROWBAND
90
70
50
30
10
.01
.1
1
10
50
FREQUENCY [MHz]

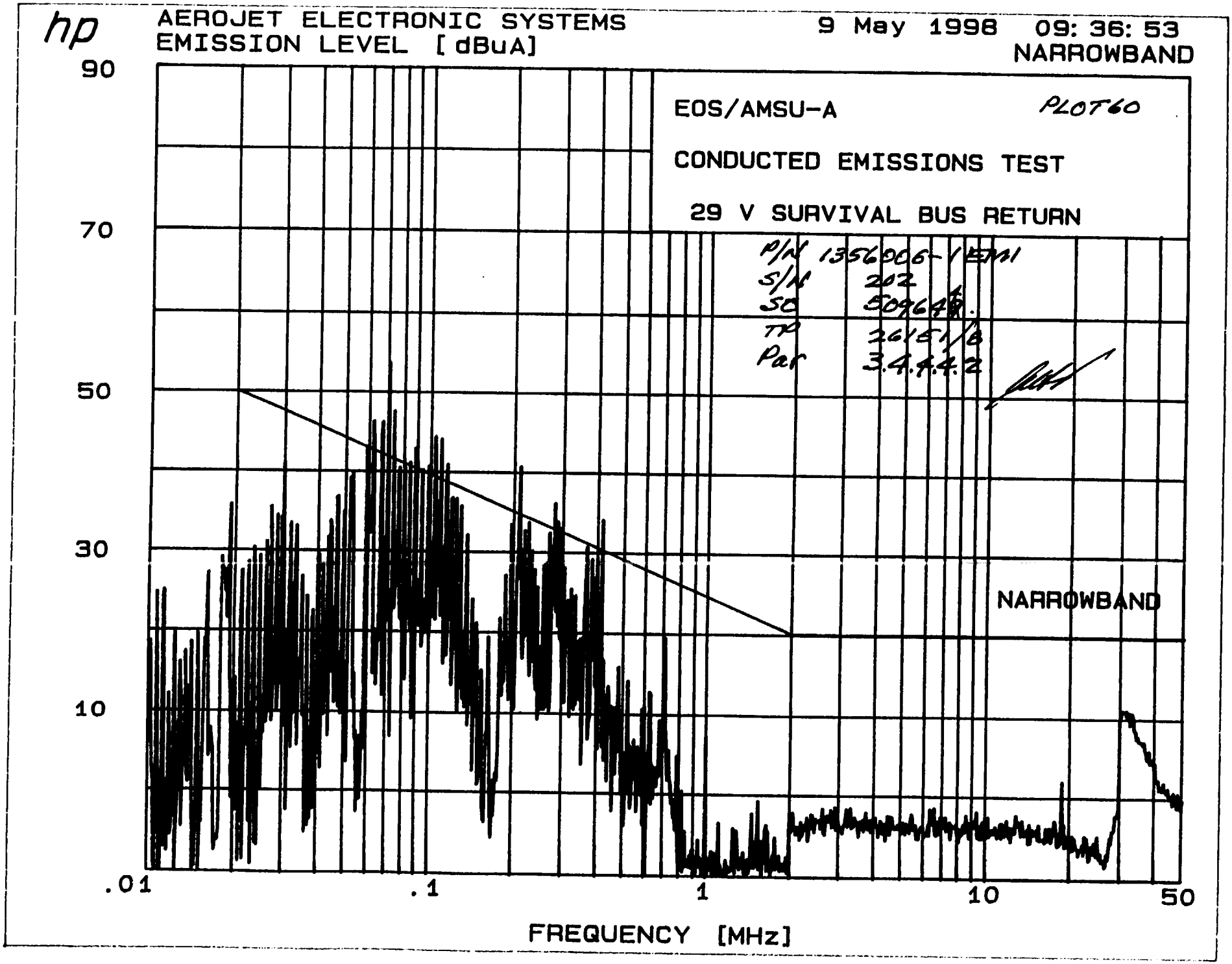

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA/MHz]
9 May 1998 08: 49: 04
BROADBAND
PLOT 55
EOS/AMSU-A
CONDUCTED EMISSIONS TEST
+29 V NOISY BUS
P/N 1356006-1 EMI
S/N 202
SO 509648
TP 261518
Par 3.4.4.4.2
BROADBAND
130
110
90
70
50
.01
.1
1
10
50
FREQUENCY [MHz]

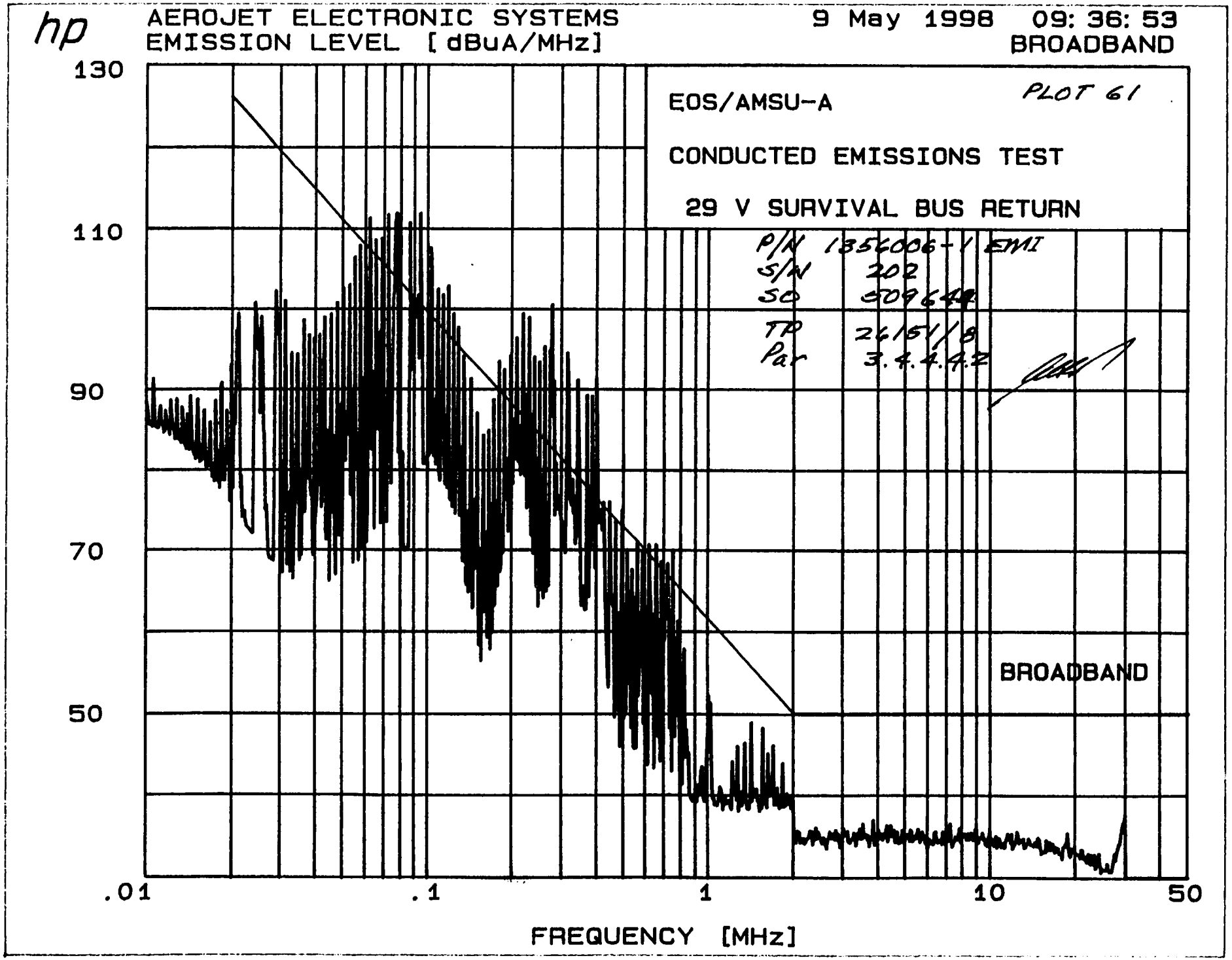

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA/MHz]
9 May 1998 09: 02: 37
BROADBAND
EOS/AMSU-A
PLOT 56
CONDUCTED EMISSIONS TEST
29 V NOISY BUS RETURN
P/N 1356006-1 EMI
S/N 202
SO 509649
TP 261511/B
Par 3.4.4.4.2
BROADBAND
130
110
90
70
50
.01
.1
1
10
50
FREQUENCY [MHz]

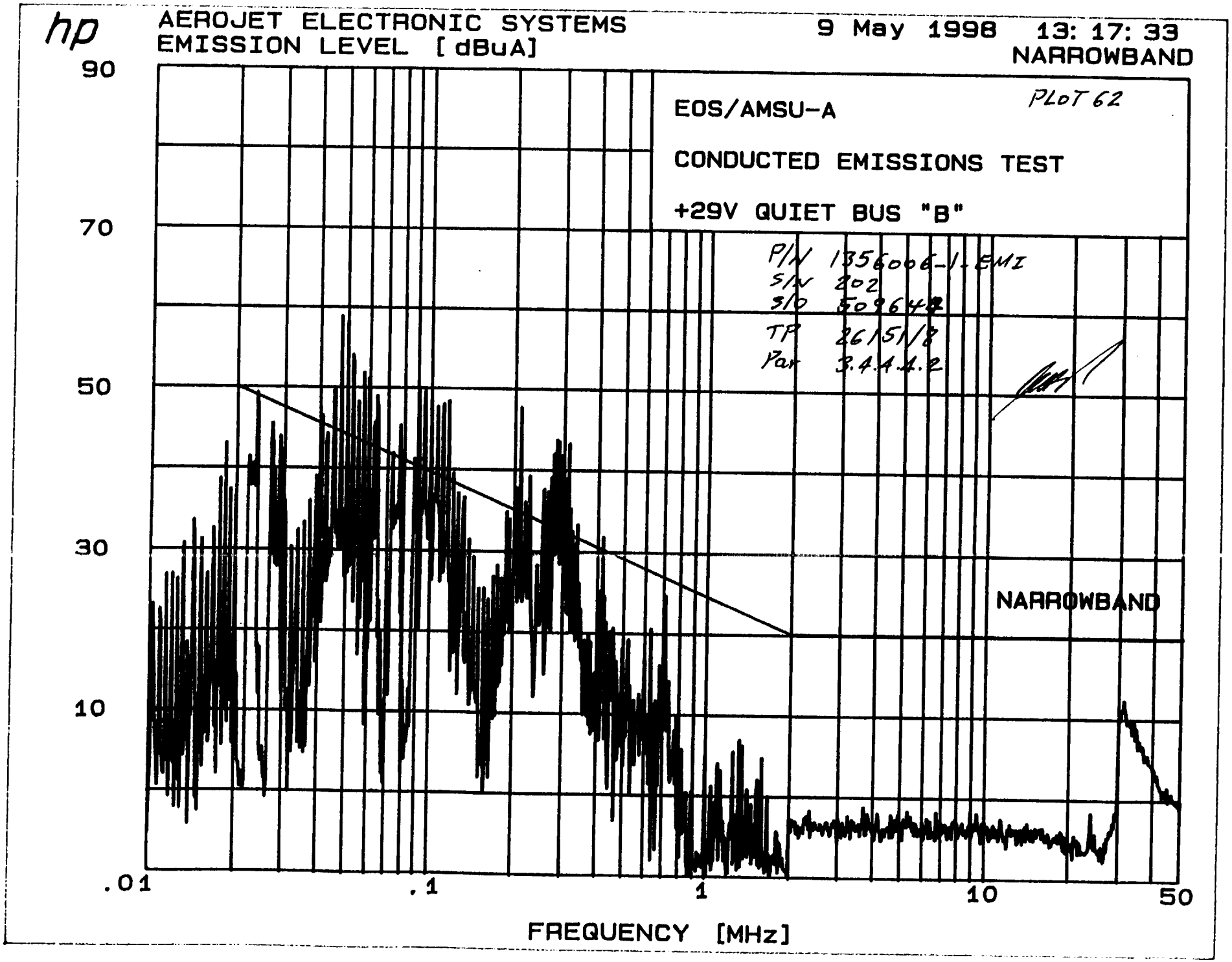

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA]
9 May 1998 09: 02: 37
NARROWBAND
EOS/AMSU-A
PLOT 57
CONDUCTED EMISSIONS TEST
29 V NOISY BUS RETURN
P/N 1356006-1 EMI
S/N 202
SO 509647
TP 261518
Par 3.4.4.2
NARROWBAND
90
70
50
30
10
.01
.1
1
10
50
FREQUENCY [MHz]

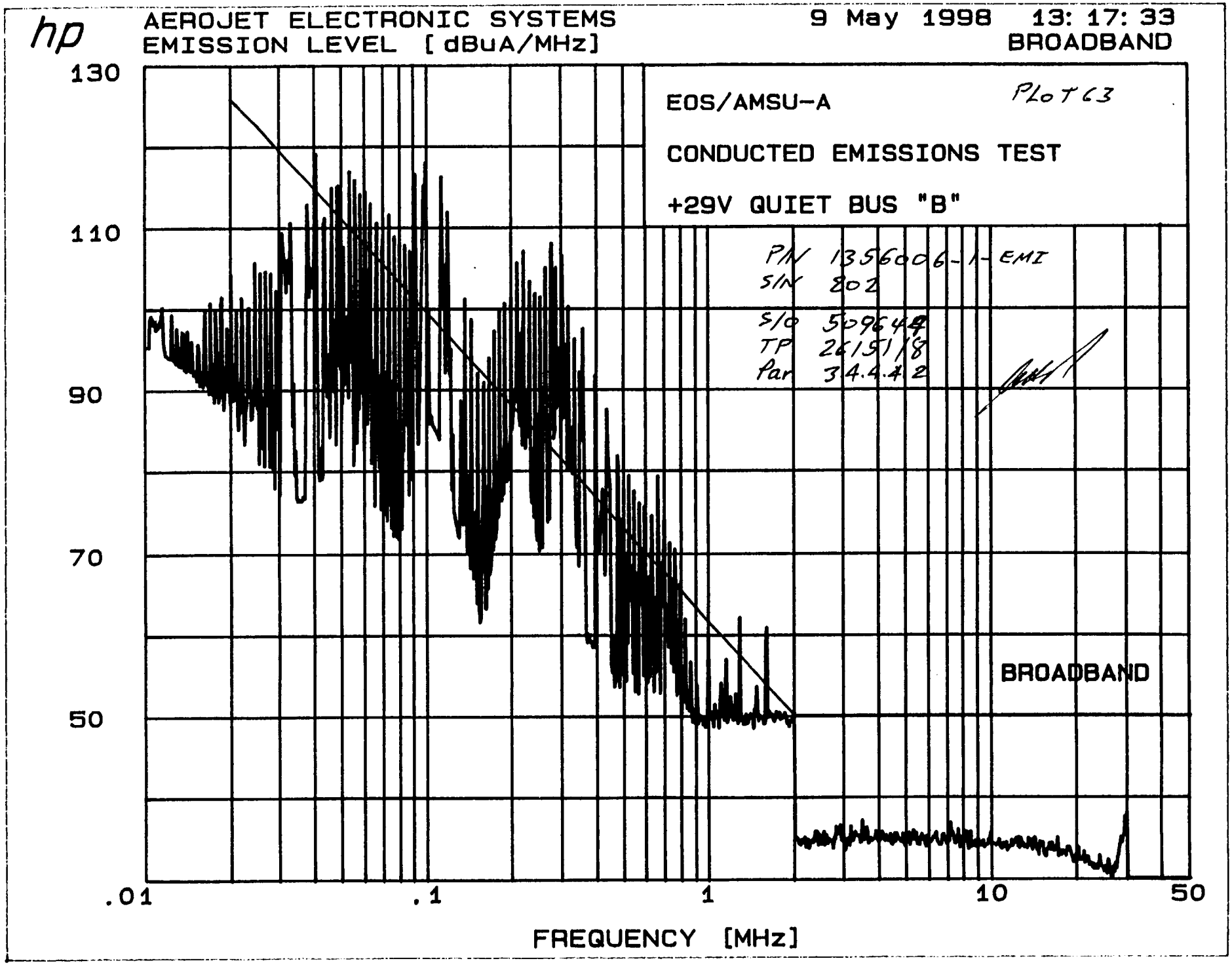

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA]
9 May 1998 09:20:44
NARROWBAND
PLOT 58
EOS/AMSU-A
CONDUCTED EMISSIONS TEST
+29 V SURVIVAL BUS
P/N 435G006-1 EMI
S/N 202
SO 509
TP 26151/B
Par 3.4.4.4.2
NARROWBAND
90
70
50
30
10
.01
.1
1
10
50
FREQUENCY [MHz]

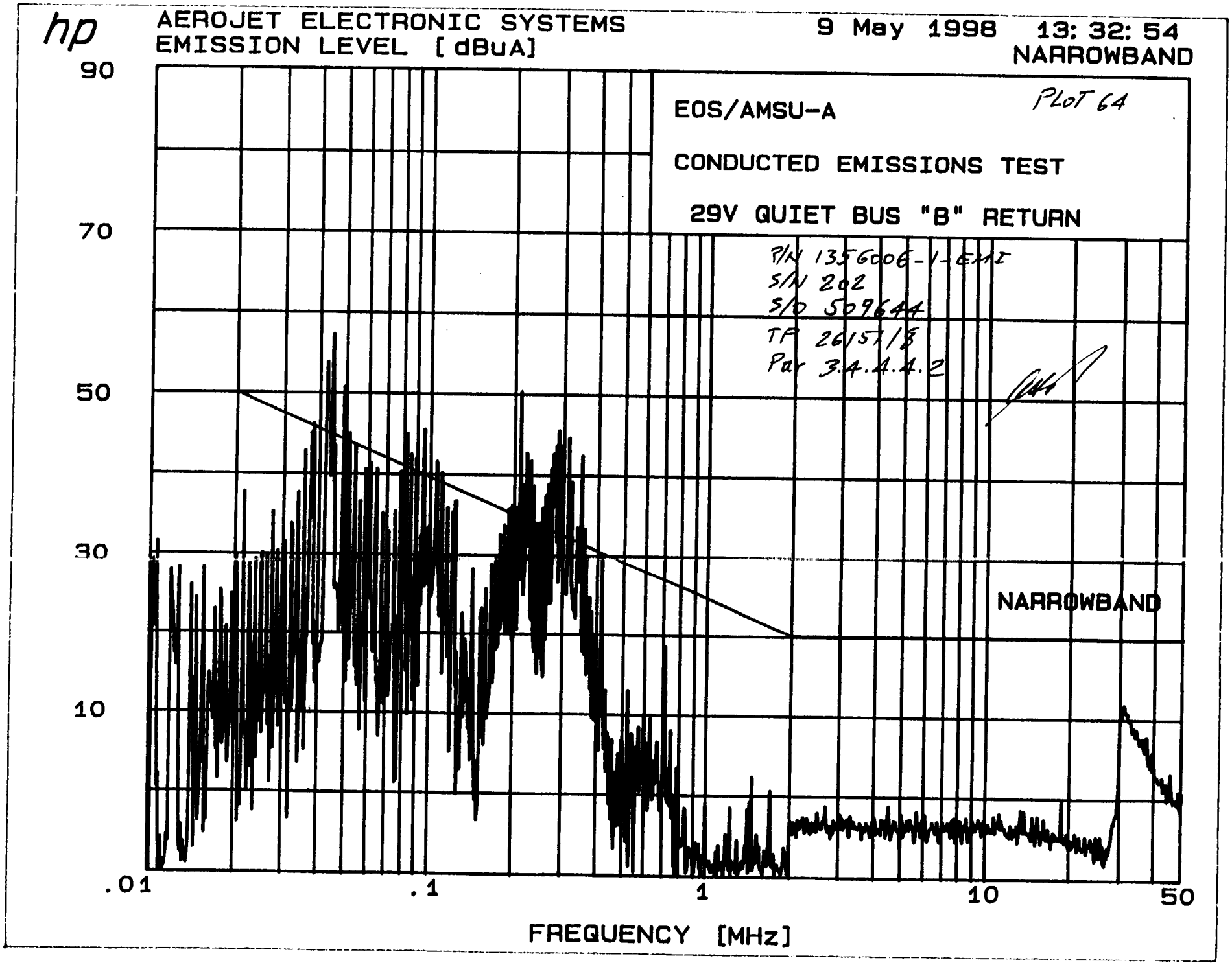

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA/MHz]
9 May 1998 09: 20: 44
BROADBAND
EOS/AMSU-A
PLOT 59
CONDUCTED EMISSIONS TEST
+29 V SURVIVAL BUS
P/N 1356006-1 EMI
S/N 202
SO 309444
TP 261518
Par 3.4.4.42
BROADBAND
130
110
90
70
50
.01
.1
1
10
50
FREQUENCY [MHz]

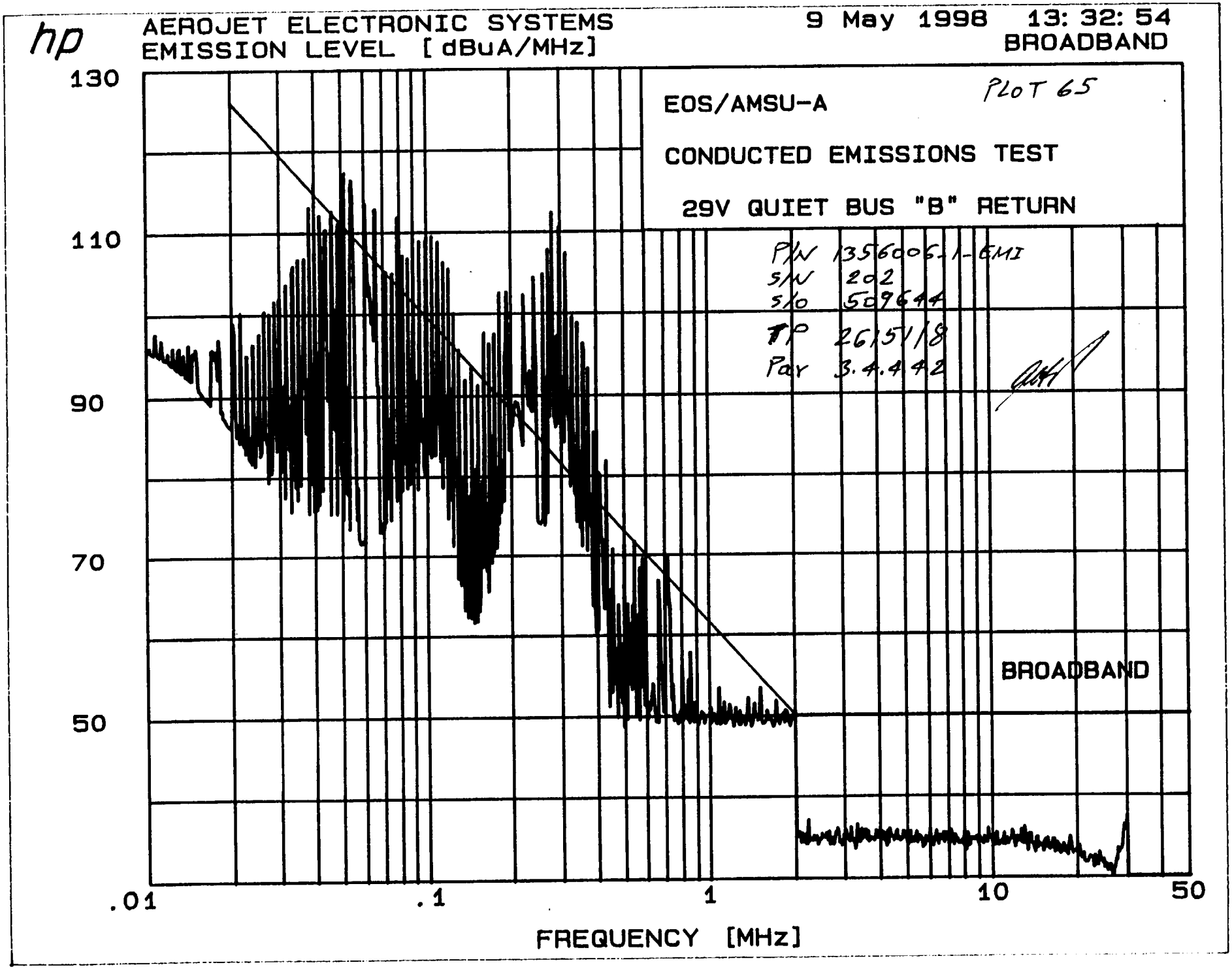

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA]
9 May 1998 09: 36: 53
NARROWBAND
EOS/AMSU-A
PLOT60
CONDUCTED EMISSIONS TEST
29 V SURVIVAL BUS RETURN
P/N 1356006-1 EMI
S/N 202
SO 309648
TP 26151/6
Par 3.4.4.4.2
NARROWBAND
90
70
50
30
10
.01
.1
1
10
50
FREQUENCY [MHz]

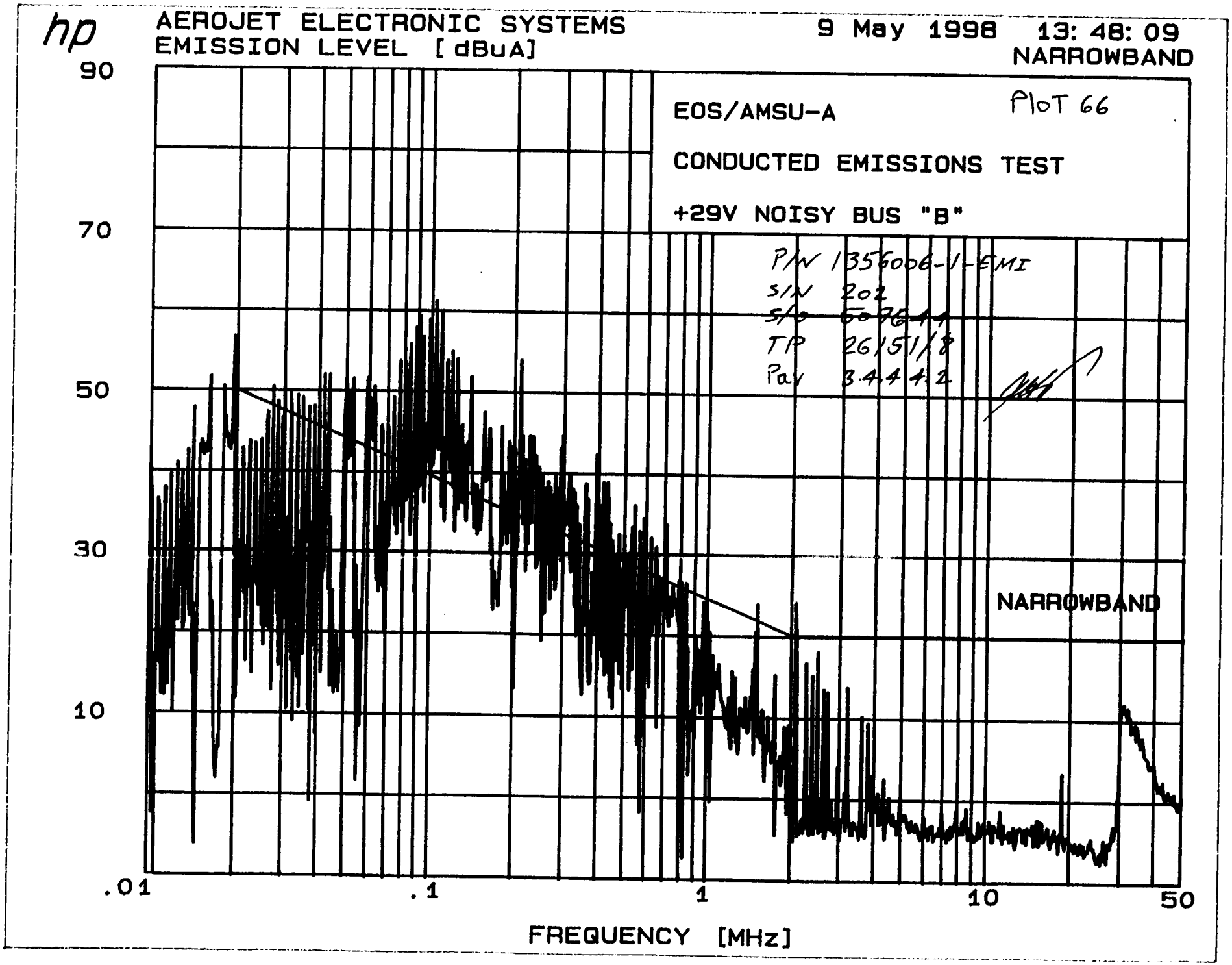

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA/MHz]
9 May 1998 09: 36: 53
BROADBAND
EOS/AMSU-A
PLOT 61
CONDUCTED EMISSIONS TEST
29 V SURVIVAL BUS RETURN
P/N 1356006-1 EMI
S/N 202
SO 009648
TP 26151/8
Par 3.4.4.4.2
BROADBAND
130
110
90
70
50
.01
.1
1
10
50
FREQUENCY [MHz]

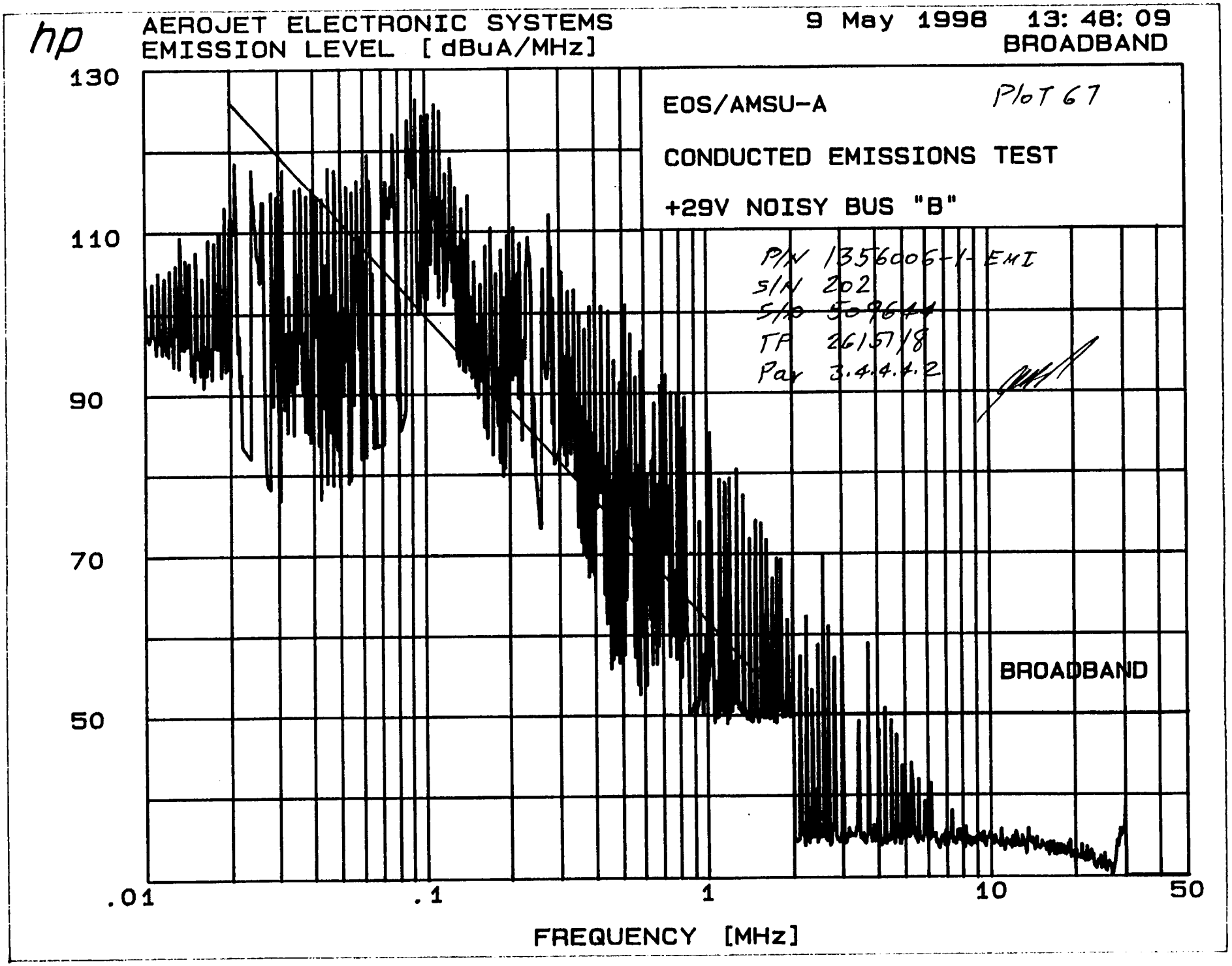

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA]
9 May 1998 13:17:33
NARROWBAND
PLOT 62
EOS/AMSU-A
CONDUCTED EMISSIONS TEST
+29V QUIET BUS "B"
P/N 1356006-1-EMI
S/N 202
S/O 509642
TP 26151/8
Par 3.4.4.1.2
NARROWBAND
90
70
50
30
10
.01
.1
1
10
50
FREQUENCY [MHz]

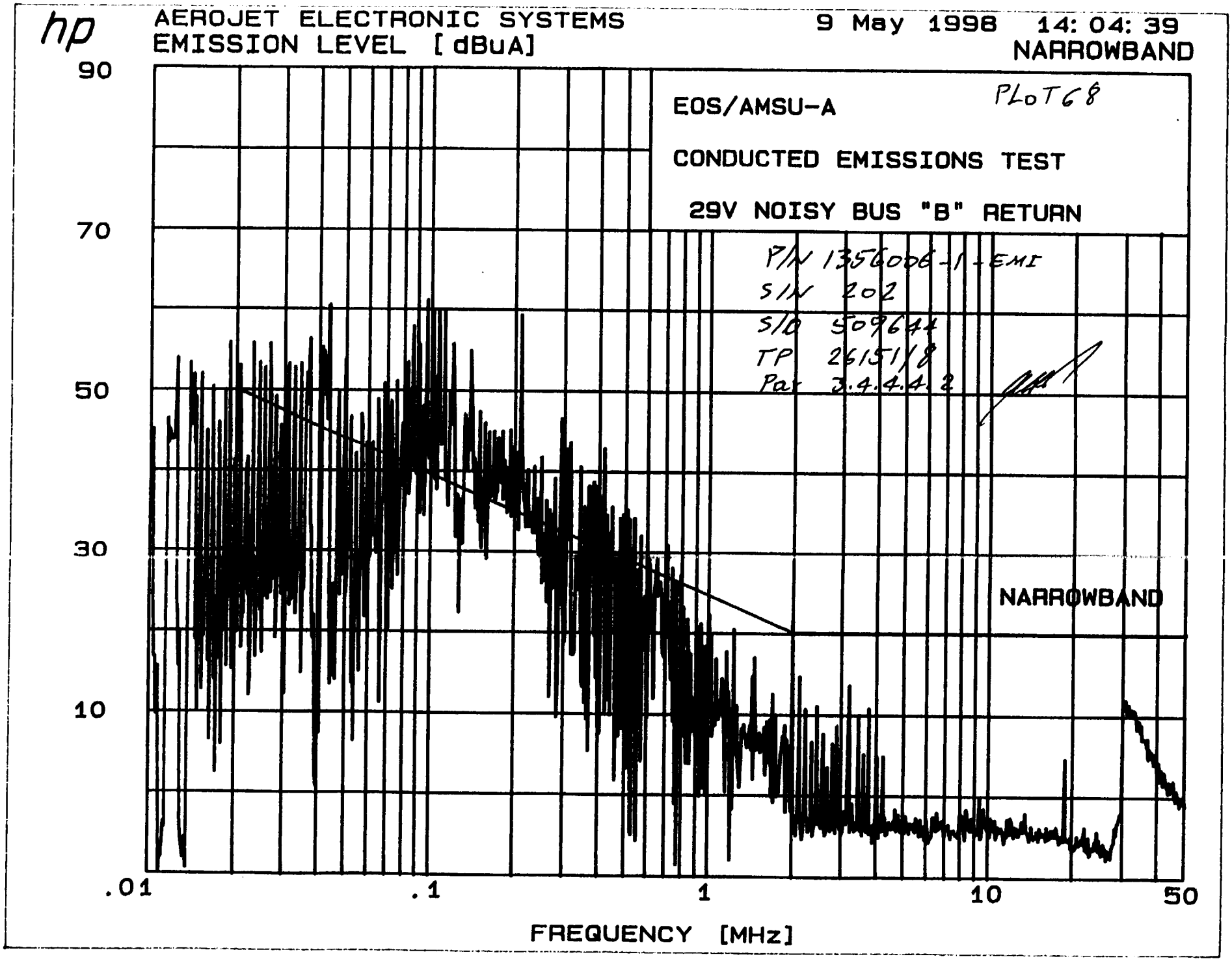

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA/MHz]
9 May 1998 13: 17: 33
BROADBAND
EOS/AMSU-A
PLOT 63
CONDUCTED EMISSIONS TEST
+29V QUIET BUS "B"
P/N 1356006-1-EMI
S/N 802
S/O 509644
TP 2615118
Par 3.4.4.4.2
BROADBAND
130
110
90
70
50
.01
.1
1
10
50
FREQUENCY [MHz]

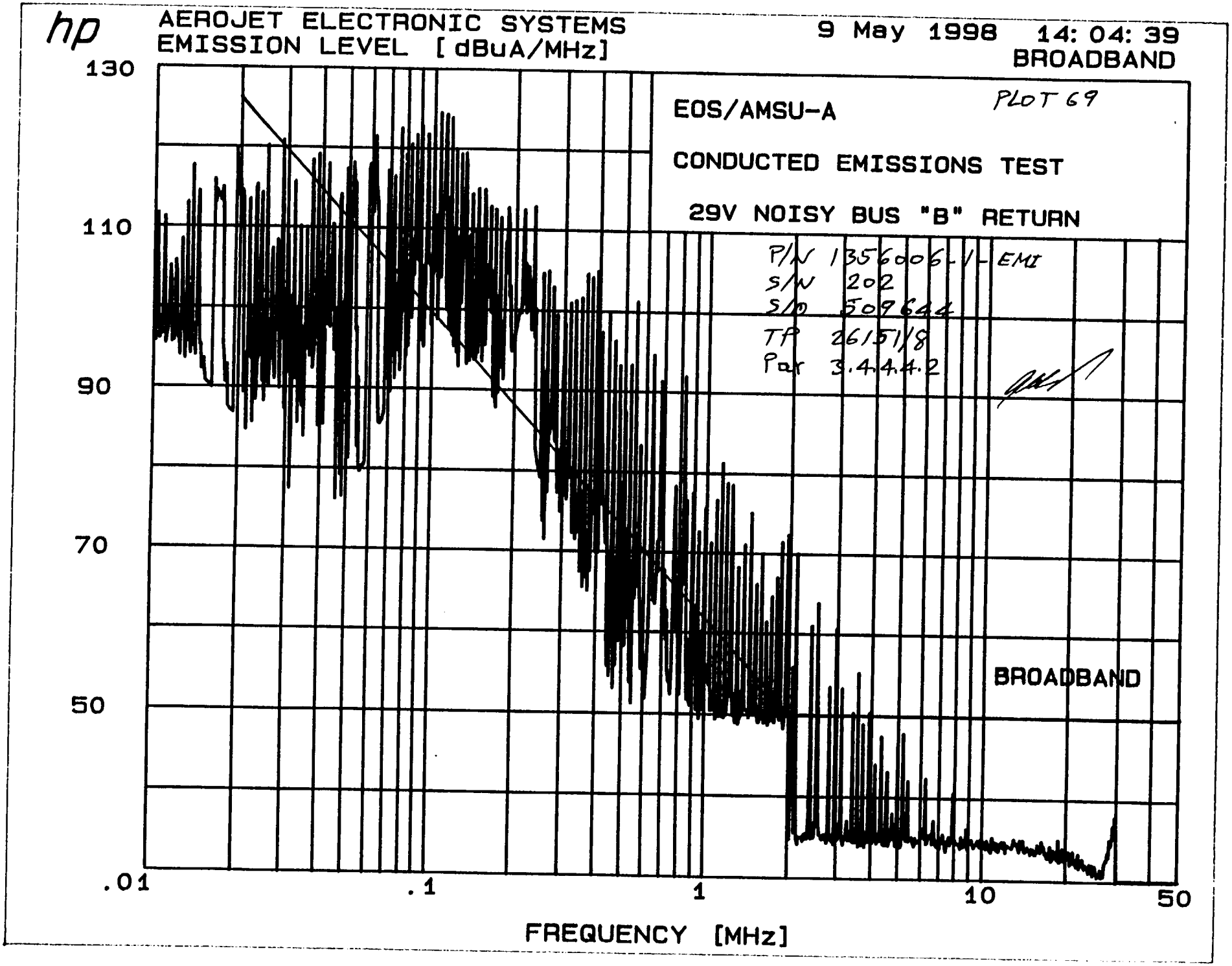

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA]
9 May 1998 13: 32: 54
NARROWBAND
EOS/AMSU-A
PLOT 64
CONDUCTED EMISSIONS TEST
29V QUIET BUS "B" RETURN
P/N 1356006-1-EMI
S/N 202
S/O 509644
TP 26157/8
Par 3.4.4.4.2
NARROWBAND
90
70
50
30
10
.01
.1
1
10
50
FREQUENCY [MHz]

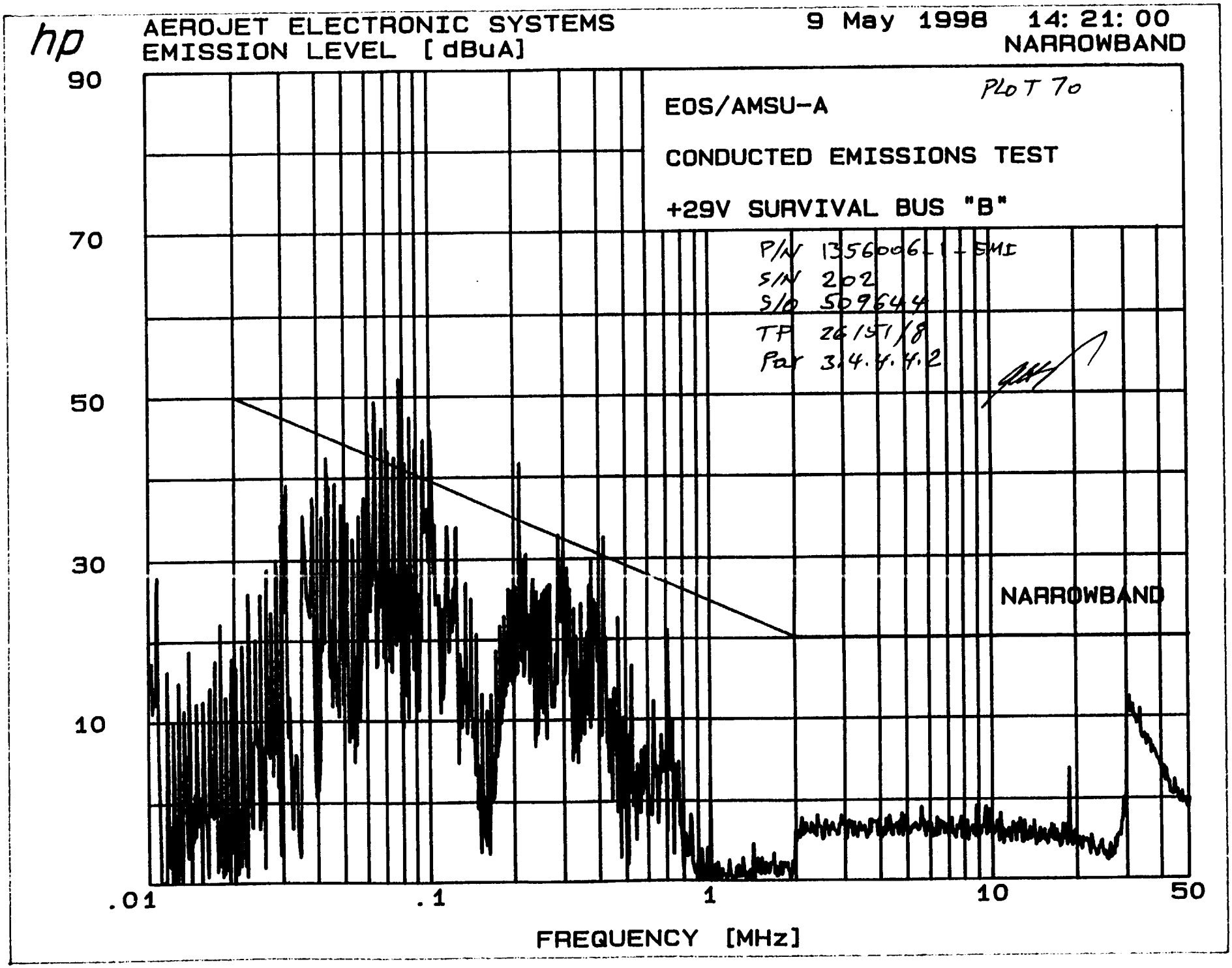

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA/MHz]
9 May 1998 13: 32: 54
BROADBAND
PLOT 65
EOS/AMSU-A
CONDUCTED EMISSIONS TEST
29V QUIET BUS "B" RETURN
P/N 1356006-1-EMI
S/N 202
S/O 509644
TP 261518
Par 3.4.4.4.2
BROADBAND
130
110
90
70
50
.01
.1
1
10
50
FREQUENCY [MHz]

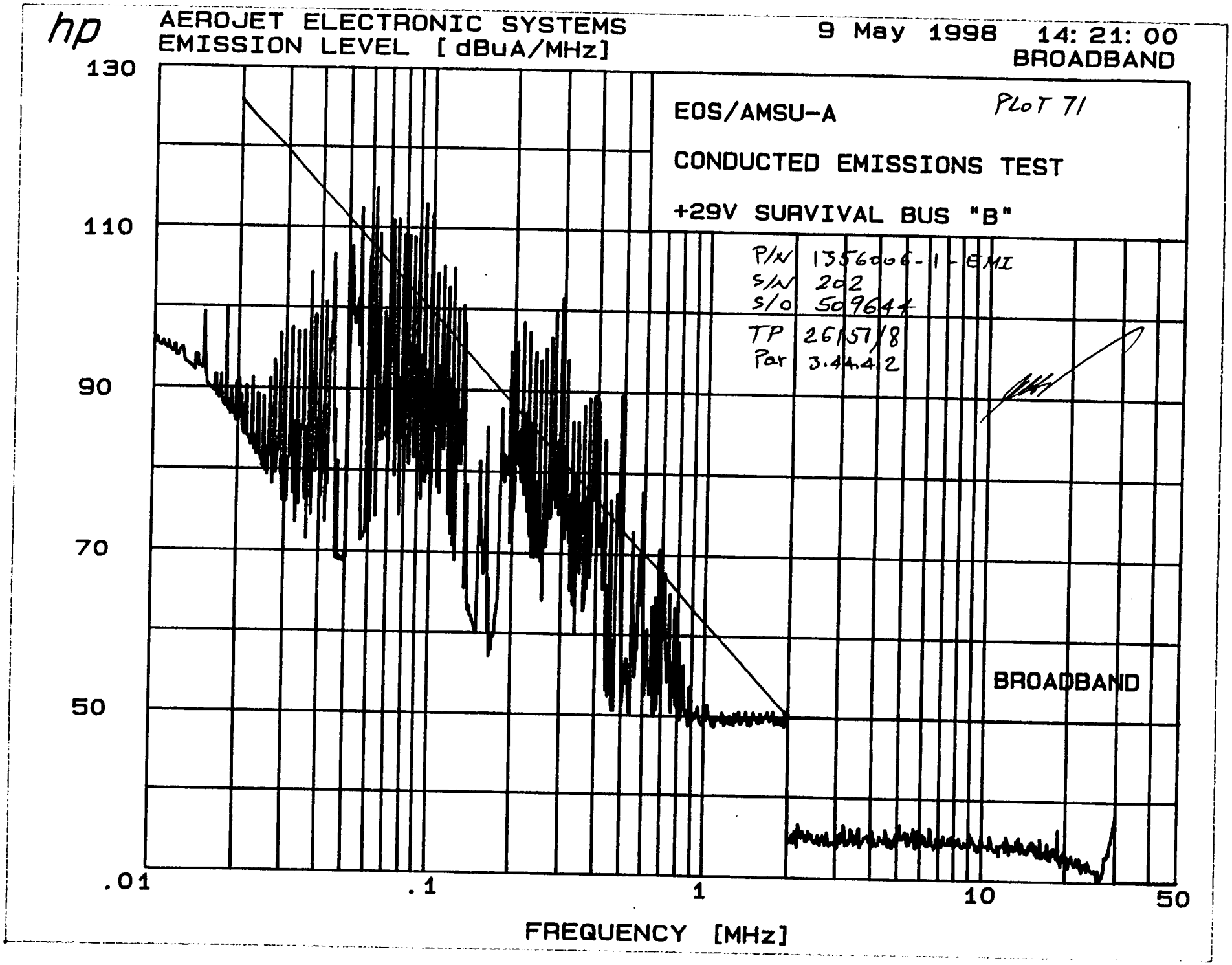

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA]
9 May 1998 13:48:09
NARROWBAND
EOS/AMSU-A
PlOT 66
CONDUCTED EMISSIONS TEST
+29V NOISY BUS "B"
P/N 1356006-1-EMI
S/N 202
TP 26/51/8
Pa 3.4.4.4.2
NARROWBAND
90
70
50
30
10
.01
.1
1
10
50
FREQUENCY [MHz]

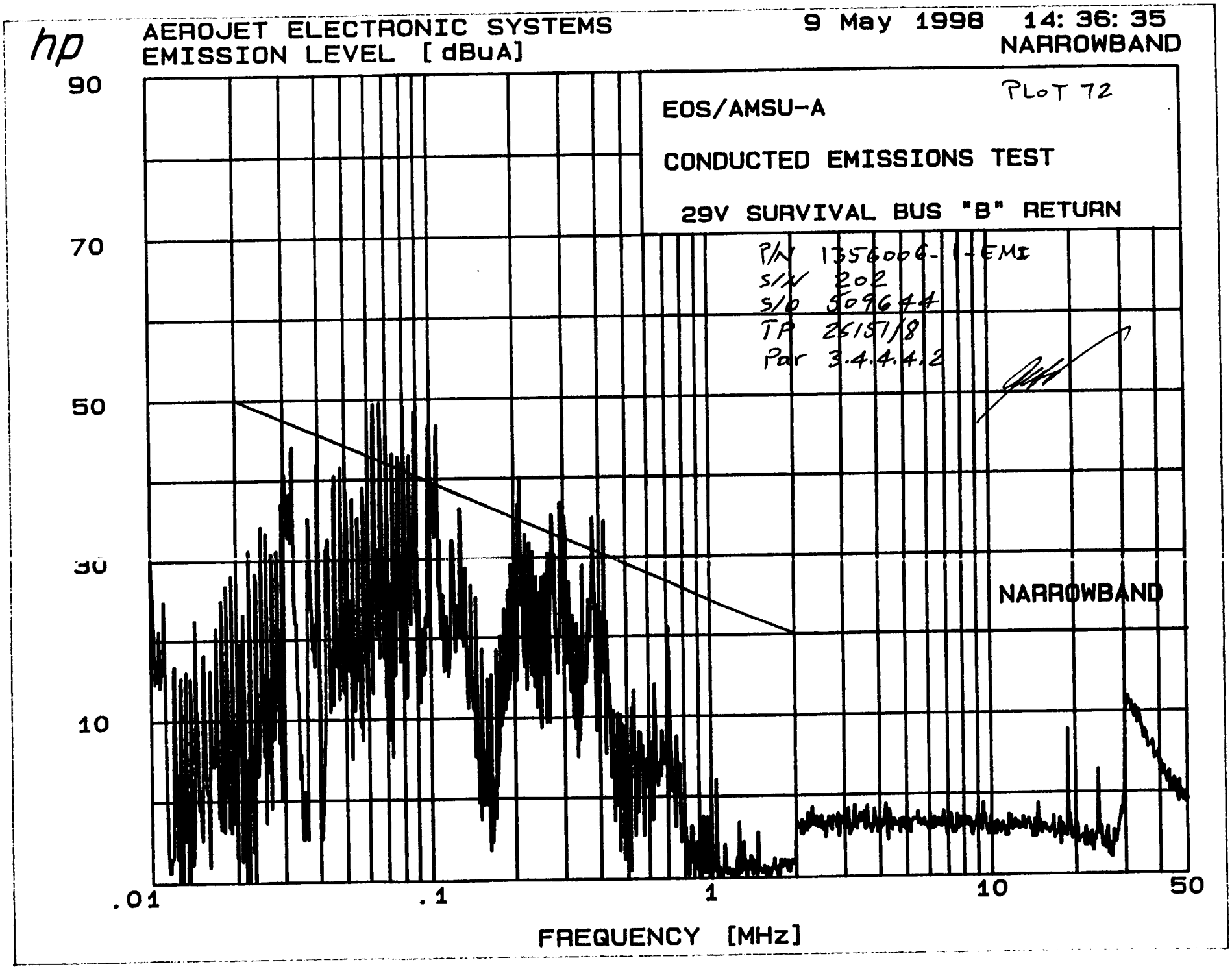

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA/MHz]
9 May 1998 13: 48: 09
BROADBAND
EOS/AMSU-A
Plot 67
CONDUCTED EMISSIONS TEST
+29V NOISY BUS "B"
P/N 1356006-1-EMI
S/N 202
S/O 509644
TP 26157/8
Par 3.4.4.4.2
BROADBAND
130
110
90
70
50
.01
.1
1
10
50
FREQUENCY [MHz]

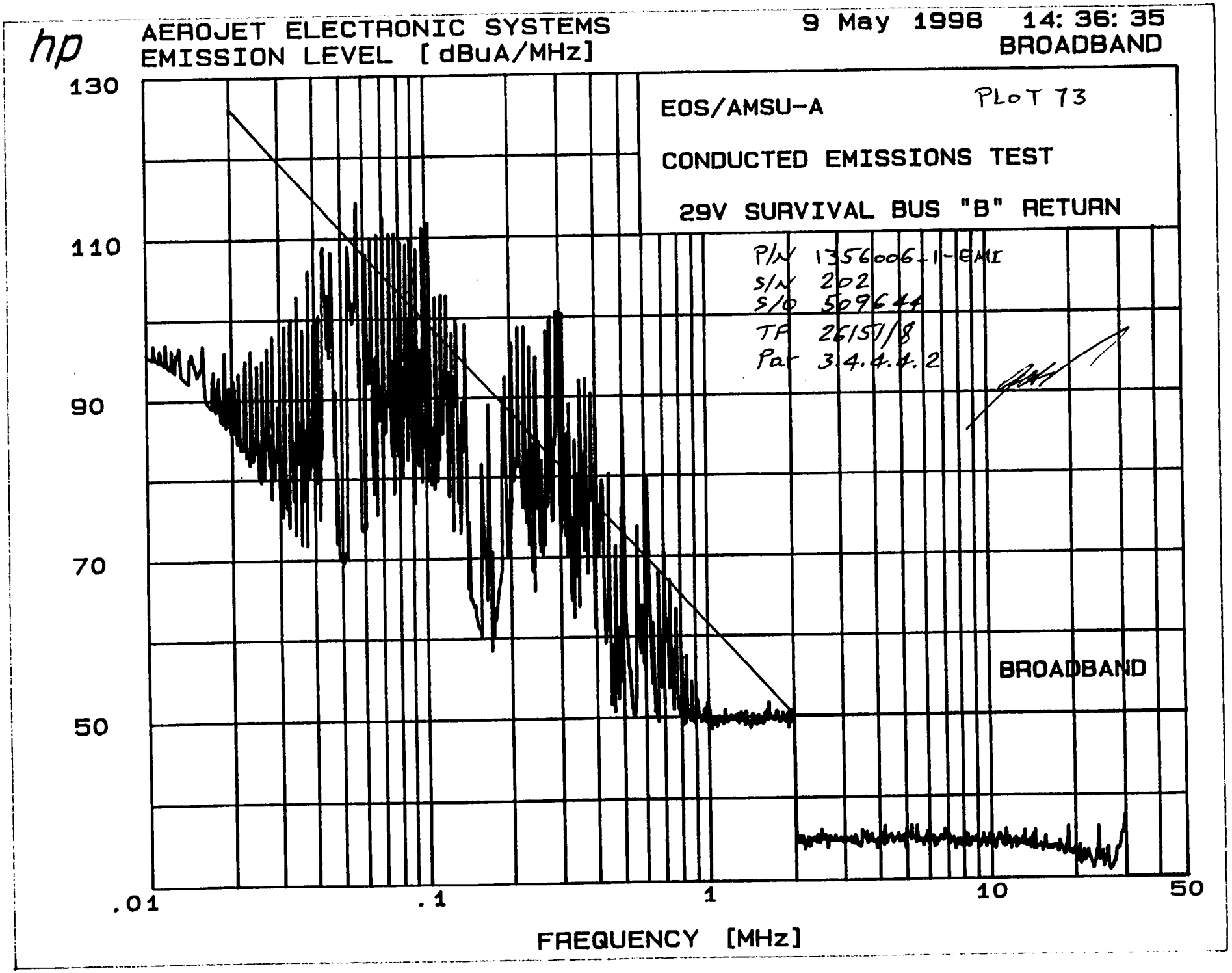

hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA]
9 May 1998 14:04:39
NARROWBAND
EOS/AMSU-A
PLOT 68
CONDUCTED EMISSIONS TEST
29V NOISY BUS "B" RETURN
P/N 1356006-1-EMI
S/N 202
S/O 509644
TP 2615118
Par 3.4.4.4.2
NARROWBAND
90
70
50
30
10
.01
.1
1
10
50
FREQUENCY [MHz]


hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA/MHz]
9 May 1998 14:04:39
BROADBAND
EOS/AMSU-A
PLOT 69
CONDUCTED EMISSIONS TEST
29V NOISY BUS "B" RETURN
P/N 1356006-1-EMI
S/N 202
S/O 509644
TP 261518
Par 3.4.4.4.2
BROADBAND
130
110
90
70
50
.01
.1
1
10
50
FREQUENCY [MHz]


hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA]
9 May 1998 14:21:00
NARROWBAND
PLOT 70
EOS/AMSU-A
CONDUCTED EMISSIONS TEST
+29V SURVIVAL BUS "B"
P/N 1356006-1-EMI
S/N 202
S/O 509644
TP 26/ST/8
Par 3.4.4.4.2
NARROWBAND
90
70
50
30
10
.01
.1
1
10
50
FREQUENCY [MHz]


hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA/MHz]
9 May 1998 14:21:00
BROADBAND
EOS/AMSU-A
PLOT 71
CONDUCTED EMISSIONS TEST
+29V SURVIVAL BUS "B"
P/N 1356006-1-EMI
S/N 202
S/O 509644
TP 26157/8
Par 3.4.4.2
BROADBAND
130
110
90
70
50
.01
.1
1
10
50
FREQUENCY [MHz]


hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA]
9 May 1998 14: 36: 35
NARROWBAND
PLOT 72
EOS/AMSU-A
CONDUCTED EMISSIONS TEST
29V SURVIVAL BUS "B" RETURN
P/N 1356006-1-EMI
S/N 202
S/O 509644
TP 2515118
Par 3.4.4.4.2
NARROWBAND
90
70
50
30
10
.01
.1
1
10
50
FREQUENCY [MHz]


hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuA/MHz]
9 May 1998 14: 36: 35
BROADBAND
EOS/AMSU-A
PLOT 73
CONDUCTED EMISSIONS TEST
29V SURVIVAL BUS "B" RETURN
P/N 1356006-1-EMI
S/N 202
S/O 509644
TP 26151/8
Par 3.4.4.4.2
BROADBAND
130
110
90
70
50
.01
.1
1
10
50
FREQUENCY [MHz]

AEROJET ELECTRONIC SYSTEMS

TEST SETUP TABLE PG 1 OF 5

LIBRARY FILE: -- CE-03 -- 15kHz to 50 MHz (461C)

AMSU-A / EOS
P/N 1356006-1
S/N 202
SO 509644
TP 26151/8
Par 3.4.4.4.2

DISPLAY TITLE 1:	EOS/AMSU-A
CONTROL PARAMETERS	
Test Type	NB/BB
Freq Uncert (%)	1
Min Sweep Time/Oct (sec)	3
NUMBER PAGES NOTES	0
NUMBER RANGES	3
START FREQUENCY (MHz)	.010

RNG	STOP FREQ(MHz)	TRANSDUCER
1	2.0	CURRENT PROBE 91550-2B S/N 774
2	30.0	CURRENT PROBE 91550-2B S/N 774
3	50.0	CURRENT PROBE 91550-2B S/N 774*

DISPLAY INFORMATION PG 2 OF 5

	NARROWBAND	BROADBAND
AMPLITUDE INFO		
Units Label	dBuA	dBuA/MHz
Disp Ref Level	90	130
TEST LIMITS		
Number Limits	1	1
Limit 1	NARROWBAND	BROADBAND

AEROJET ELECTRONIC SYSTEMS

AMSU-A/EOS
P/N 1356006-1
S/N 202
SO 509644
TP 26151/8
Par 3.4.4.4.2

RANGE 1: .010 TO 2.0 MHz — PG 3 OF 5

	NARROWBAND	BROADBAND
AMPLIFIER		
Name	HP8447F OPT H64	HP8447F OPT H64
Gain (dB)	28	28
INPUT PORT	RIGHT	RIGHT
MSMT STATES		
QP Bandwidth (Hz)	BYPASS	BYPASS
SA Res Bandw (Hz)	300	10000
Video Bandw. (Hz)	3000	100000
Ref. Level (dBuV)	100	120
Int. Atten. (dB)	20	30
Ext. Atten. (dB)	0	0
NO. OF SETUPS	1	same as NB
NO. SWEEPS/SETUP	1	same as NB
FIRST SETUP		
Msg,Sub,Continue	MESSAGE	

Msg: CONNECT CURRENT PROBE TO 28 dB GAIN INPT

RANGE 2: 2.0 TO 30.0 MHz — PG 4 OF 5

	NARROWBAND	BROADBAND
AMPLIFIER		
Name	HP8447F OPT H64	HP8447F OPT H64
Gain (dB)	28	28
INPUT PORT	RIGHT	RIGHT
MSMT STATES		
QP Bandwidth (Hz)	BYPASS	BYPASS
SA Res Bandw (Hz)	3000	30000
Video Bandw. (Hz)	30000	300000
Ref. Level (dBuV)	90	100
Int. Atten. (dB)	20	20
Ext. Atten. (dB)	0	0
NO. OF SETUPS	1	same as NB
NO. SWEEPS/SETUP	1	same as NB
FIRST SETUP		
Msg,Sub,Continue	CONTINUE	

AEROJET ELECTRONIC SYSTEMS

RANGE 3: 30.0 TO 50.0 MHz PG 5 OF 5

	NARROWBAND	BROADBAND
AMPLIFIER		
Name	HP8447F OPT H64	HP8447F OPT H64
Gain (dB)	28	28
INPUT PORT	RIGHT	RIGHT
MSMT STATES		
QP Bandwidth (Hz)	BYPASS	BYPASS
SA Res Bandw (Hz)	30000	1E+6
Video Bandw. (Hz)	300000	3.E+6
Ref. Level (dBuV)	90	90
Int. Atten. (dB)	20	20
Ext. Atten. (dB)	0	0
NO. OF SETUPS	1	same as NB
NO. SWEEPS/SETUP	1	same as NB
FIRST SETUP		
Msg,Sub,Continue	CONTINUE	

AMSU-A/EOS
P/N 1356006-1
S/N 202
SO 509644
TP 26151/8
Par. 3.4.4.4.2

AEROJET ELECTRONIC SYSTEMS

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TRANSDUCER TABLE

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AMSO-A/EOS
P/N 1356006-1
S/N 202
SO 509644
TP 26151/8
Par 3.4.4.4.2

TRANSDUCER TITLE CURRENT PROBE 91550-2B S/N 774
SIGN OF TRANSDUCER PLUS
NUMBER OF POINTS 45

POINT	FREQUENCY(MHz)	TRANSDUCER FACTOR
1	0.010000	-9.96
2	0.011247	-8.79
3	0.015616	-6.32
4	0.021575	-4.10
5	0.029641	-2.26
6	0.034461	-1.50
7	0.047612	-0.23
8	0.065409	0.61
9	0.076046	0.90
10	0.089266	1.14
11	0.105067	1.33
12	0.144342	1.59
13	0.167815	1.67
14	0.196987	1.75
15	0.231857	1.81
16	0.266727	1.85
17	0.318527	1.89
18	0.434701	1.96
19	0.511650	1.98
20	0.588599	2.01
21	0.702909	2.03
22	0.817218	2.05
23	0.959276	2.07
24	1.129084	2.08
25	1.551143	2.10
26	1.803395	2.12
27	2.116882	2.12
28	2.491605	2.12
29	3.422984	2.11
30	3.979641	2.08
31	4.671429	2.06
32	5.498349	2.02
33	6.325269	1.98
34	7.553670	1.92
35	8.782071	1.83
36	10.308674	1.72
37	12.133479	1.55
38	13.958285	1.34
39	16.669058	0.97
40	22.748663	-0.55
41	26.775552	-1.92
42	30.802441	6.10
43	36.784438	0.53
44	42.766435	-4.37
45	50.200602	-6.47

Ref. TAR # 4296
oper. 8010
Retest

AE-26151/8
23 Apr 98

TEST DATA SHEET 8 (Sheet 1 of 1)
RE01 Test (Paragraph 3.4.10.4)

Test Setup Verified: Roger Kheury (Signature) 5-20-98

Run # 2

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
LOOP ANTENNA	SOLAR	7334-1	L803461	5-12-98	5-12-99
Signal Analyzer	HP	3562A	51225	2-23-98	2-23-99
Plotter	HP	7470A	4761B	N/A	CNR
Spectrum Analyzer	H.P.	8566B	R300656	6-13-97	6-13-98
Amplifier	H.P.	8447F	C200230	1-14-98	1-14-99

Emission Measurements

Plot No.	Frequency Range	Requirement	Emissions within limits? Yes	No	Comments/ Observations
45	30 to ~~200 Hz~~ 20 KHz	Figure 16		✓	
	~~200 Hz to 20 kHz~~ N/A	~~Figure 16~~ N/A	N/A	N/A	N/A
46	20 kHz to 50 kHz	Figure 16	✓		

* Note: This step was completed in oper 0150

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1-EMI

Engineer: 20 May 98

Serial No. 202

Quality Assurance:

Shop Order: 509644
Amendment #1
oper 8460

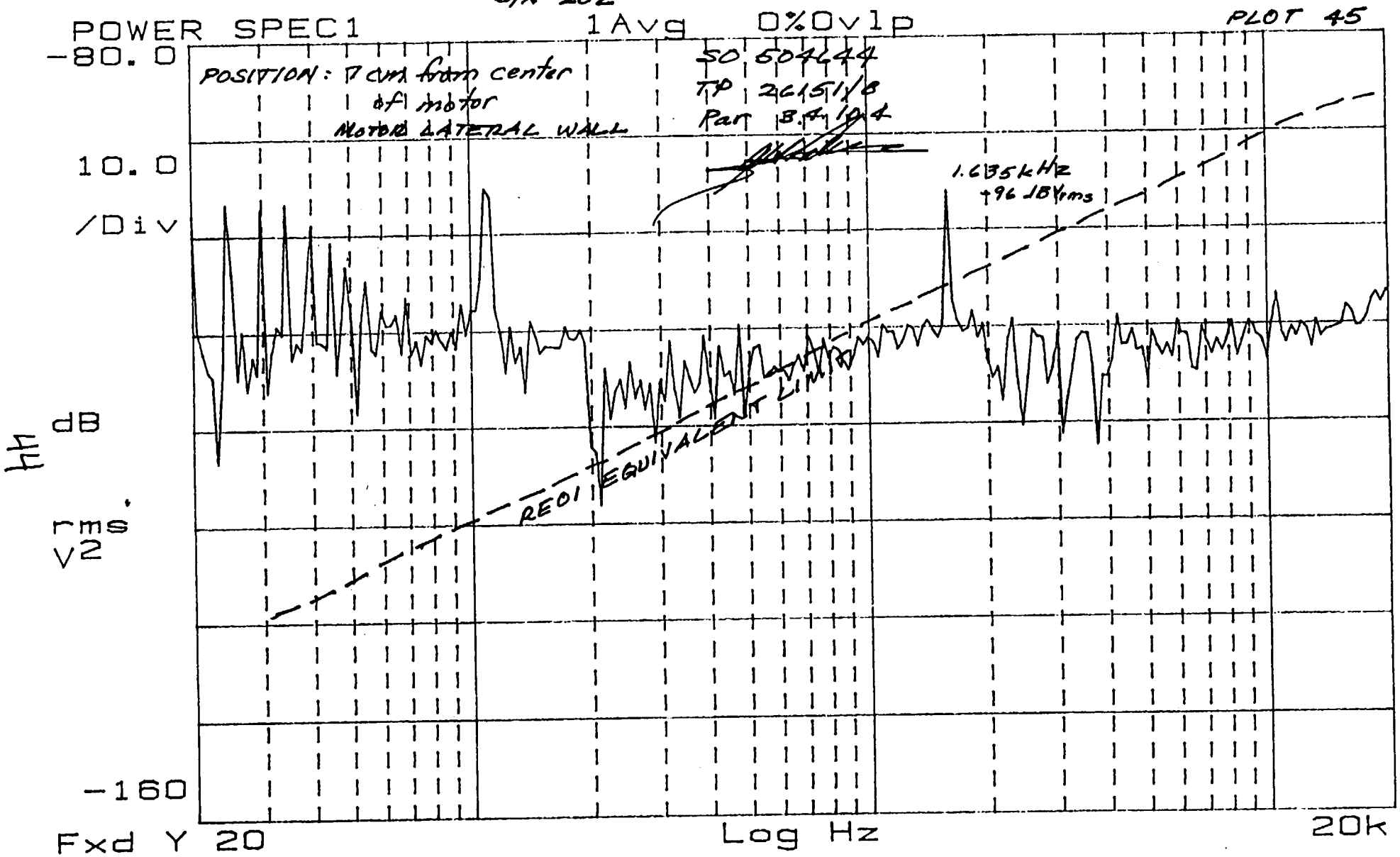
Operator: 5-20-98

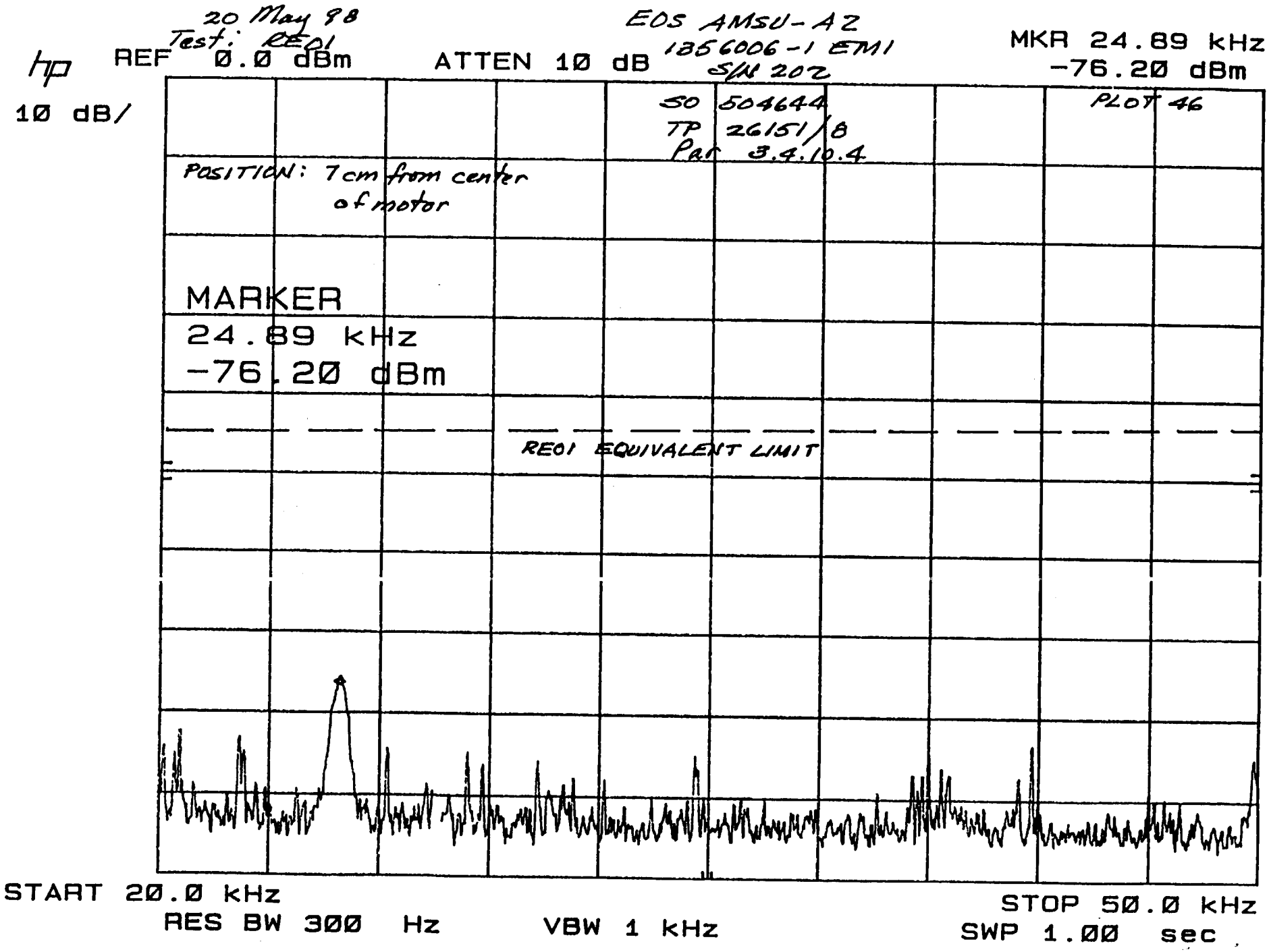
Customer Rep:

20 May 98

Test# RE01

EOS/AMSU-A2
1356006-1 EM1
S/N 202




20 May 98
Test: REO1
EOS AMSU-AZ
1856006-1 EMI
S/N 202
hp
REF 0.0 dBm
ATTEN 10 dB
MKR 24.89 kHz
-76.20 dBm
10 dB/
SO 504644
TP 26151/8
Par 3.4.10.4
PLOT 46
POSITION: 7cm from center of motor
MARKER
24.89 kHz
-76.20 dBm
REO1 EQUIVALENT LIMIT
START 20.0 kHz
RES BW 300 Hz
VBW 1 kHz
STOP 50.0 kHz
SWP 1.00 sec

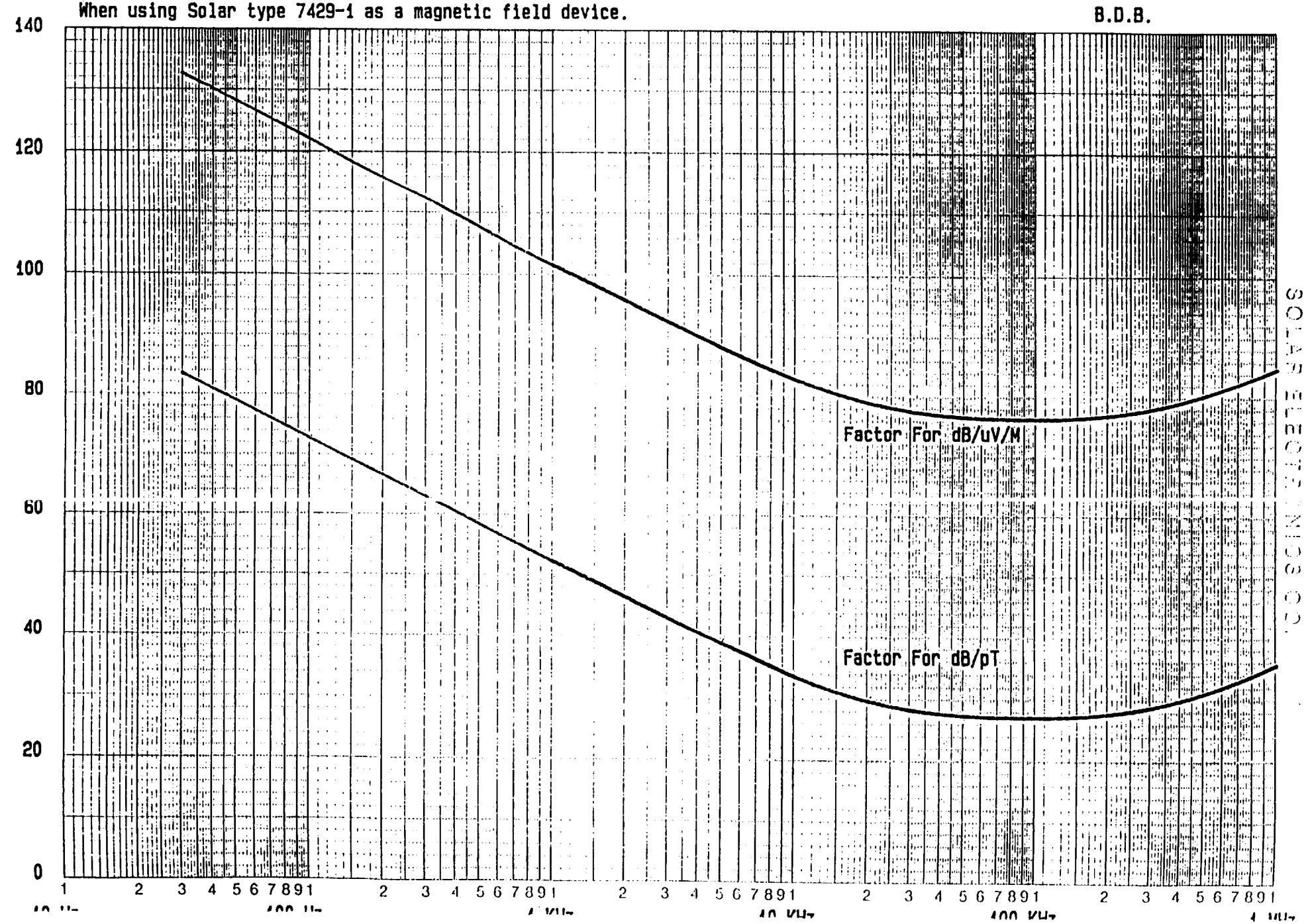
45

RE01 EQUIVALENT LIMIT CALCULATION

Freq Hz	Limit dBpT	Loop Factor dB	dBμV	μV	dBV_{rms}	Equivalent Limit dBVpeak
30	60	83	-23.0	0.07	-143	-140
100	60	72	-12.0	0.25	-132	-129
300	60	63	-3.0	0.71	-133	-130
1000	60	52	8.0	2.5	-112	-109
5000	60	39	21.0	11.22	-99	-96
10000	60	33	27.0	22.38	-93	-90
20000	60	29	31.0	35.48	-89	-86
50000	60	27	33.0	44.67	-86	-83

SOLAR TYPE 7334-1 LOOP SENSOR.
Factor in dB to be added to EMI meter reading in dB
When using Solar type 7429-1 as a magnetic field device.

S/N: 965322
B.D.B.



TEST DATA SHEET 9 (Sheet 1 of 3)
RE04 Test (Paragraph 3.4.11.4)

Test Setup Verified: Ron Shane 5/5/98
(Signature)

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
Gauss Probe	F.W. Bell	MOX99-2506	300643	4/27/98	4/27/99
Gauss Meter	F.W. Bell	9500	R300625	12/3/96	12/3/98

(Mid Height) Magnetic Field Emissions

Step	Direction*	Measured	Required	Mag field within limits?		Comments/ Observations
				Yes	No	
1	0 degrees	-0.09mG	See 3.4.11.2	✓		
2	30 degrees	-0.14mG	See 3.4.11.2	✓		
3	60 degrees	-0.08mG	See 3.4.11.2	✓		
4	90 degrees	-0.11mG	See 3.4.11.2	✓		
5	120 degrees	-0.25mG	See 3.4.11.2	✓		
6	150 degrees	-0.38mG	See 3.4.11.2	✓		
7	180 degrees	-0.54mG	See 3.4.11.2	✓		
8	210 degrees	-0.34mG	See 3.4.11.2	✓		
9	240 degrees	-0.31mG	See 3.4.11.2	✓		
10	270 degrees	-0.16mG	See 3.4.11.2	✓		
11	300 degrees	-0.42mG	See 3.4.11.2	✓		
12	330 degrees	-0.34mG	See 3.4.11.2	✓		

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

* Relative to instrument connector side.

Signature/Date

Assembly Part No. 1356006-1

Serial No. 202

Shop Order: 509644

Operator: Ron Shane 5-6-98

Engineer: R.M. [illegible] 5-6-98

Quality Assurance: Estella M. Bongalos 5/6/98

Customer Rep: [illegible] 5-6-98

TEST DATA SHEET 9 (Sheet 2 of 3)
RE04 Test (Paragraph 3.4.11.4)

Test Setup Verified: Ken Shaw 5-6-98
(Signature)

(10 inches above mid height) Magnetic Field Emissions

Step	Direction*	Measured	Required	Mag field within limits?		Comments/ Observations
				Yes	No	
1	0 degrees	+0.22mG	See 3.4.11.2	✓		
2	30 degrees	+0.30mG	See 3.4.11.2	✓		
3	60 degrees	+0.35mG	See 3.4.11.2	✓		
4	90 degrees	+0.03mG	See 3.4.11.2	✓		
5	120 degrees	+0.19mG	See 3.4.11.2	✓		
6	150 degrees	-0.19mG	See 3.4.11.2	✓		
7	180 degrees	-0.03mG	See 3.4.11.2	✓		
8	210 degrees	-0.04mG	See 3.4.11.2	✓		
9	240 degrees	-0.11mG	See 3.4.11.2	✓		
10	270 degrees	-0.06mG	See 3.4.11.2	✓		
11	300 degrees	-0.01mG	See 3.4.11.2	✓		
12	330 degrees	+0.05mG	See 3.4.11.2	✓		

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

*Relative to instrument connector side.

TEST DATA SHEET 9 (Sheet 3 of 3)
RE04 Test (Paragraph 3.4.11.4)

Test Setup Verified: Ken Shane 5-6-98
(Signature)

(10 inches below mid height) Magnetic Field Emissions

Step	Direction*	Measured	Required	Mag field within limits?		Comments/ Observations
				Yes	No	
1	0 degrees	+0.21 mG	See 3.4.11.2	✓		
2	30 degrees	+0.34 mG	See 3.4.11.2	✓		
3	60 degrees	+0.12 mG	See 3.4.11.2	✓		
4	90 degrees	+0.03 mG	See 3.4.11.2	✓		
5	120 degrees	−0.23 mG	See 3.4.11.2	✓		
6	150 degrees	−0.21 mG	See 3.4.11.2	✓		
7	180 degrees	−0.10 mG	See 3.4.11.2	✓		
8	210 degrees	−0.13 mG	See 3.4.11.2	✓		
9	240 degrees	−0.14 mG	See 3.4.11.2	✓		
10	270 degrees	−0.09 mG	See 3.4.11.2	✓		
11	300 degrees	−0.01 mG	See 3.4.11.2	✓		
12	330 degrees	+0.07 mG	See 3.4.11.2	✓		

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

* Relative to instrument connector side.

TEST DATA SHEET 3 (Sheet 2 of 2) TAR # 4297
RE02 Test (Paragraph 3.4.5.4)

Test Setup Verified: Ken Shaw 5-11-98
(Signature)

Emission Measurements

Plot No.	Antenna/Frequency	Band	Required	Emissions within limits? Yes	Emissions within limits? No	Comments/ Observations
101	Rod/Biconical/Log 14 kHz to 1 GHz	Narrow	Figure 5		✓	
102	Rod/Biconical/Log 14 kHz to 1 GHz	Broad	Figure 6	✓		
101 103	Biconical Antenna 30 MHz to 200 MHz Vert/Horz	Narrow	Figure 5		✓	
102	Biconical Antenna 30 MHz to 200 MHz Vert/Horz	Broad	Figure 6	✓		
101	Log Conical Antenna 200 MHz to 1 GHz	Narrow	Figure 5		✓	
102	Log Conical Antenna 200 MHz to 1 GHz	Broad	Figure 6	✓		
104 THRU	Horn: 1 GHz to 18 GHz	Narrow	Figure 5	✓		
127	Horn: 1 GHz to 18 GHz	Broad	Figure 6	✓		*
128 & 129	Special Frequency Horn: 6.800 GHz ± 100 MHz	Narrow	–130 dBm	✓		
130 & 131	Special Frequency Horn: 10.650 GHz ± 50 MHz	Narrow	–130 dBm	✓		
132 & 133	Special Frequency Horn: 18,700 GHz ± 100 MHz	Narrow	–126 dBm	✓		
134 & 135	Special Frequency Horn: 23,800 GHz ± 200 MHz	Narrow	–123 dBm	✓		

* 2 GHz to 2.2 GHz cannot meet existing requirements because of specification exceeds measurement capabilities.

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1

Engineer: [signature] 11 May 98

Serial No. 202

Quality Assurance:

Shop Order: 509644

5/8/98 ENG 252 QC 16

Operator: Ken Shaw 5/12/98

Customer Rep:

TAR # 4297
Oper 8010

TEST DATA SHEET 3 (Sheet 2 of 2)
RE02 Test (Paragraph 3.4.5.4)

Test Setup Verified: Ken Shem 5/20/98
(Signature)

Emission Measurements

Plot No.	Antenna/Frequency	Band	Required	Emissions within limits? Yes	Emissions within limits? No	Comments/ Observations
	Rod/Biconical/Log 14 kHz to 1 GHz	Narrow	Figure 5		✓	
	Rod/Biconical/Log 14 kHz to 1 GHz	Broad	Figure 6	✓		
	Biconical Antenna 30 MHz to 200 MHz Vert/Horz	Narrow	Figure 5		✓	
	Biconical Antenna 30 MHz to 200 MHz Vert/Horz	Broad	Figure 6	✓		
	Log Conical Antenna 200 MHz to 1 GHz	Narrow	Figure 5	✓		
	Log Conical Antenna 200 MHz to 1 GHz	Broad	Figure 6	✓		
	Horn: 1 GHz to 18 GHz	Narrow	Figure 5			
	Horn: 1 GHz to 18 GHz	Broad	Figure 6			
	Special Frequency Horn: 6.800 GHz ± 100 MHz	Narrow	–130 dBm			
	Special Frequency Horn: 10.650 GHz ± 50 MHz	Narrow	–130 dBm			
	Special Frequency Horn: 18,700 GHz ± 100 MHz	Narrow	–126 dBm			
	Special Frequency Horn: 23,800 GHz ± 200 MHz	Narrow	–123 dBm			

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1-EMI

Engineer: [signature] 20 May 98

Serial No. 202

Quality Assurance: [signature]

Shop Order: 509644
Amendment #1 oper 8460

5/8/98 ENG 252 QC 16

Operator: Ken Shem 5/20/98

Customer Rep: [signature]

Ref. TAR # 4297
Oper. 8010
Retest

TEST DATA SHEET 3 (Sheet 1 of 2)
RE02 Test (Paragraph 3.4.5.4)

Test Setup Verified: Roger V. Khoury (Signature) 5-20-98

RUN # 2

Test Equipment Log

5/20/98 ENG 252

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
ACTIVE MONO POLE	EMCO	3301 B	55363	9-25-97	9-25-98
RF ANTENNA	EMCO	3110B	55361 *	10-2-97	10-2-98
RF ANTENNA	ELECTRO-METRIC	LCA25	L508308	11-20-97	11-20-98
~~RF ANTENNA~~	~~ELECTRO-METRIC~~	~~RGA-180~~	~~L508357~~	~~10-6-97~~	~~10-6-98~~
COMPUTER	H.P.	9836	46134-15	N/A	N/A
PLOTTER	H.P.	7475A	47417	N/A	CNR
SPECTRUM ANALYZER	H.P.	8566B	R300636	6-13-97	6-13-98
PRINTER	H.P.	2671G	07202	N/A	N/A
AMPLIFIER	H.P.	8447F	L200230	1-14-98	1-14-99
AMPLIFIER	H.P.	8447F OPT. 010	46134-1	5-21-97	5-21-98
~~PLOTTER~~	~~H.P.~~	~~7470A~~	~~47618~~	~~N/A~~	~~N/A~~
~~SPECTRUM ANALYZER~~	~~HP~~	~~70004A~~	~~C202064~~	~~9-6-97~~	~~9-6-98~~
~~AMPLIFIER~~	~~H.P.~~	~~70620B~~	~~C200065~~	~~9-6-97~~	~~9-6-98~~

5-20-98 ENG 252

5-20-98 ENG 252

* Tripod ID# C200229 used ~~with~~ is Calibrated
As part of EMC Analyzer HP8591EM, ID# C200229
CAL. 1-16-98
Due: 1-16-99

5/20/98 ENG 252

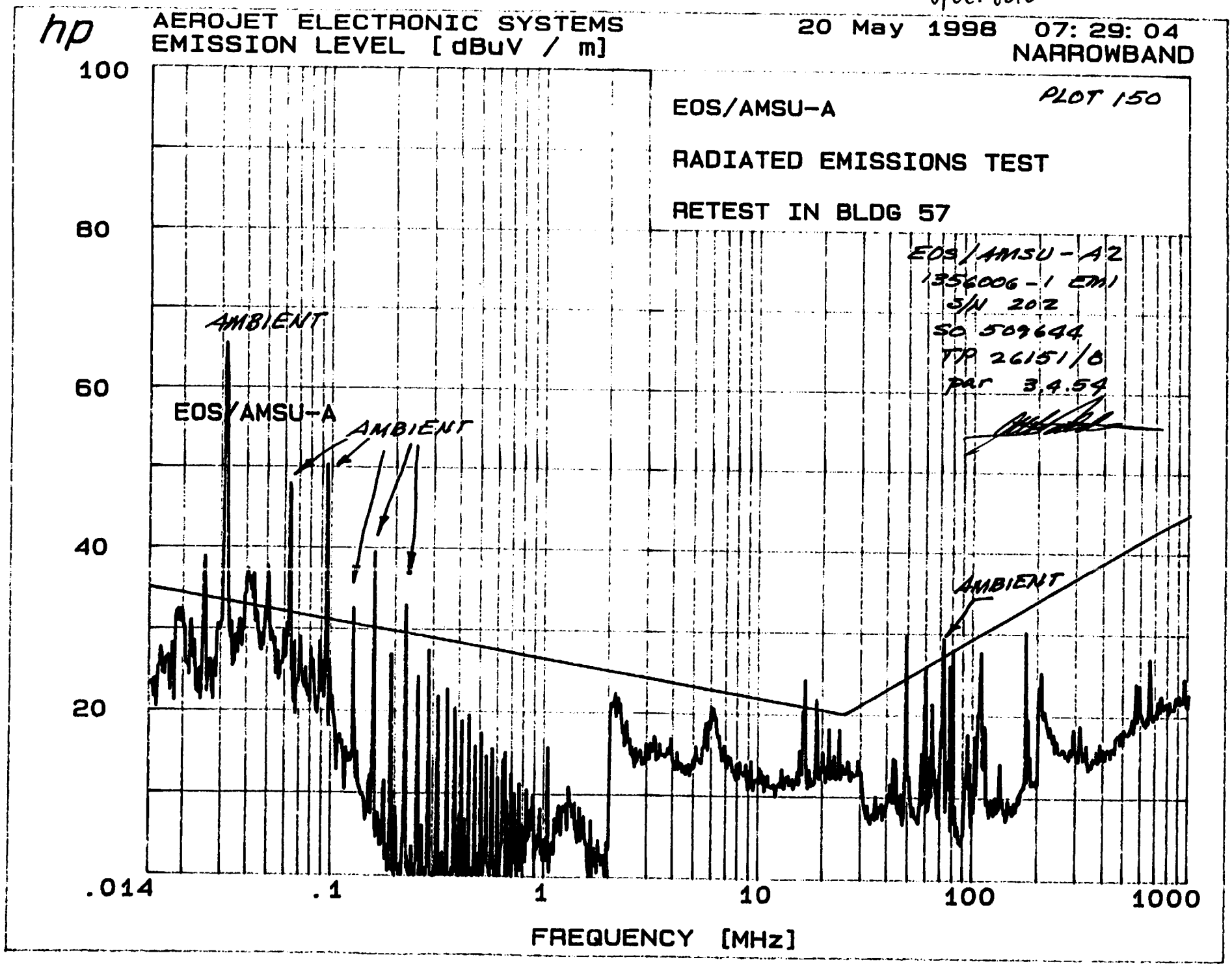
TEST DATA SHEET 3 (Sheet 1 of 2)
RE02 Test (Paragraph 3.4.5.4)

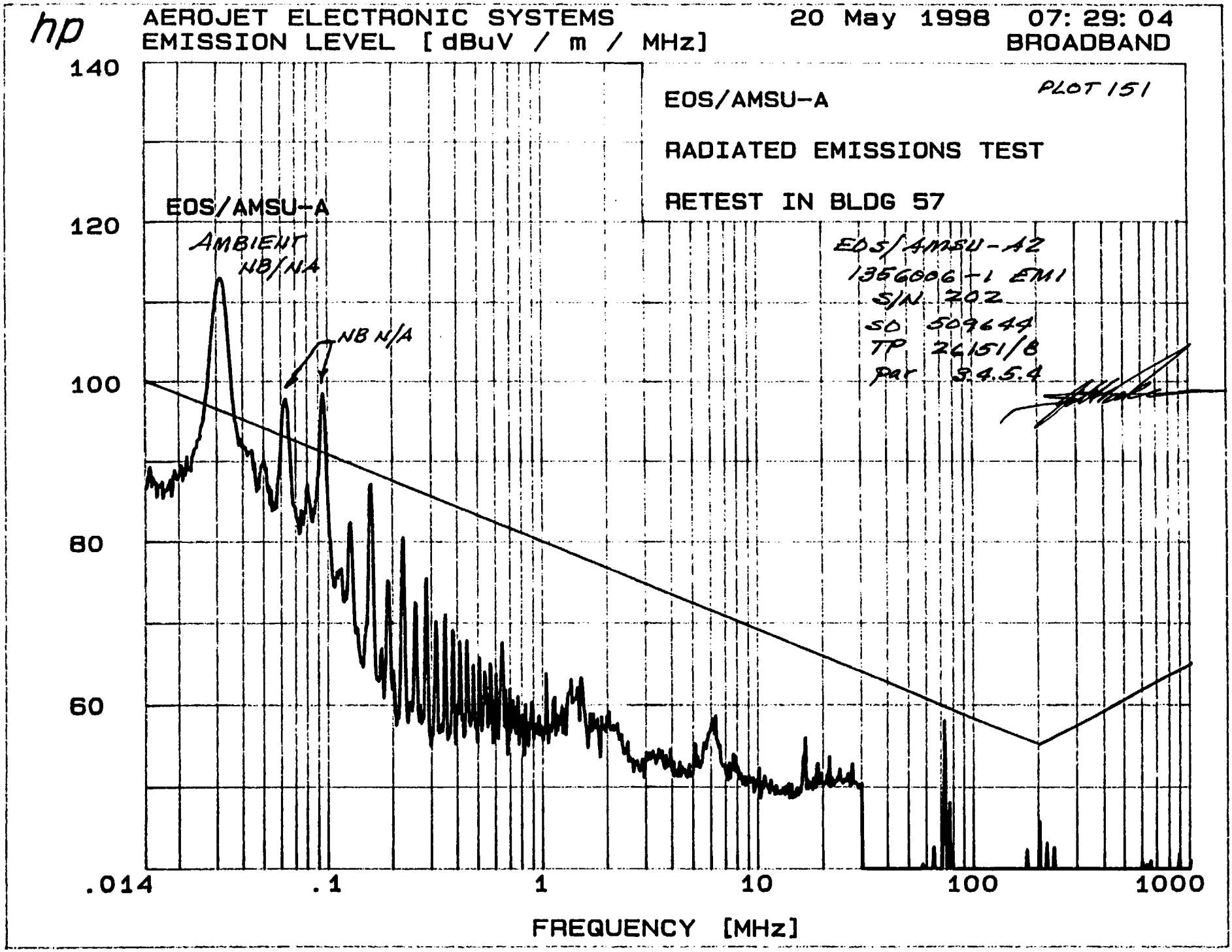
Test Setup Verified: Ken Shaw 5-11-97
(Signature)

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
ACTIVE MONO POLE	EMCO	3310B	55363	9-25-97	9-25-98
RF ANTENNA	EMCO	3110B	55361	10-2-97	10-2-98
RF ANTENNA	ELECTRO-METRIC	LCA25	L508308	11-20-97	11-20-98
RF ANTENNA	ELECTRO-METRIC	RGA-18C	L508357	10-6-97	10-6-98
COMPUTER	H.P.	9836	46134-15	N/A	N/A
PLOTTER	H.P.	7475A	47417	N/A	CNR
SPECTRUM ANALYZER	H.P.	8566B	R300636	6-13-97	6-13-98
PRINTER	H.P.	2671G	07202	N/A	N/A
AMPLIFIER	H.P.	8447F	L200230	1-14-98	1-14-99
AMPLIFIER	H.P.	8447F OPT. 010	46134-1	5-21-97	5-21-98
PLOTTER	H.P.	7470A	47618	N/A	N/A
SPECTRUM ANALYZER	H.P.	70004A	C200064	9-6-97	9-6-98
AMPLIFIER	H.P.	70620B	C200065	9-6-97	9-6-98

opt. 8010


hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuV / m]
20 May 1998 07: 29: 04
NARROWBAND
PLOT 150
EOS/AMSU-A
RADIATED EMISSIONS TEST
RETEST IN BLDG 57
EOS/AMSU-A2
1356006-1 EMI
S/N 202
SO 509644
TP 26151/8
par 3.4.54
AMBIENT
EOS/AMSU-A
AMBIENT
AMBIENT
100
80
60
40
20
.014
.1
1
10
100
1000
FREQUENCY [MHz]


hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuV / m / MHz]
20 May 1998 07: 29: 04
BROADBAND
PLOT 151
EOS/AMSU-A
RADIATED EMISSIONS TEST
RETEST IN BLDG 57
EOS/AMSU-A
AMBIENT
NB/NA
NB N/A
EOS/AMSU-A2
1356006-1 EMI
S/N 202
SO 509644
TP 26151/B
par 3.4.5.4
140
120
100
80
60
.014
.1
1
10
100
1000
FREQUENCY [MHz]

==========

ROJET ELECTRONIC SYSTEMS 20 May 1998 07:29:04

==========

. MIL-STD 461B--PART 2 (AIRCRAFT)
1.3 RE-02 -- 14kHz to 1000MHz (AF/N)

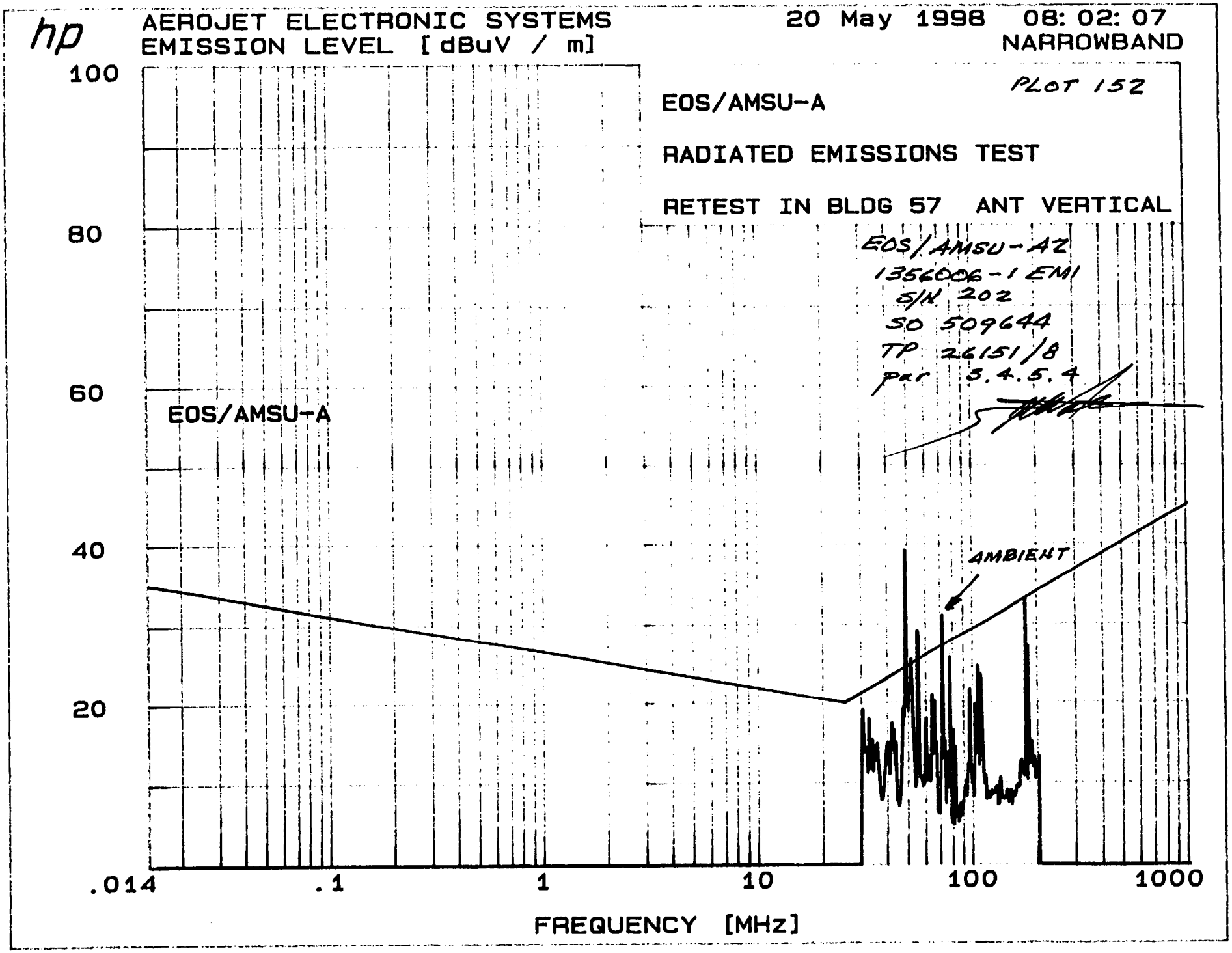
==========

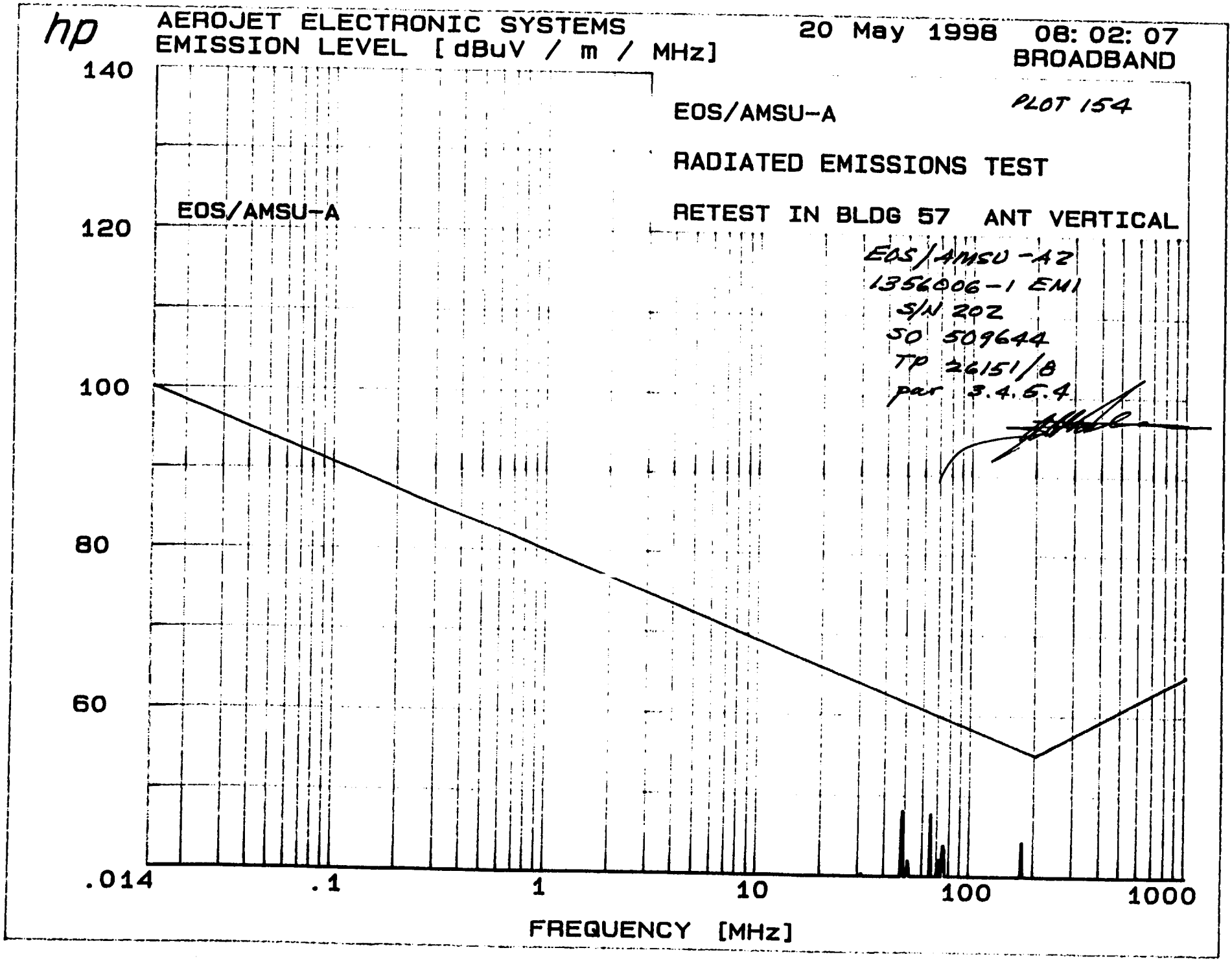
DIATED EMISSIONS TEST
~~ENCLOSURE~~ BLDG 57 ~~AMBIENT~~ 20May98
ETEST IN

EOE/AMSU-AZ
1356006-1 EMI
SN 202
30 509644
TP 26151/8
Par 3.4.5.4

AKS FOUND ABOVE 20dBuV / m

AK#	FREQ (Hz)	AMPL(dBuV / m)
	15.8E+03	28
2	17.9E+03	28
3	19.1E+03	32
4	21.9E+03	31
5	23.9E+03	25
6	25.3E+03	39
7	26.5E+03	26
8	31.6E+03	66
9	37.0E+03	31
0	40.4E+03	37
	43.2E+03	37
2	50.0E+03	38
3	59.8E+03	30
4	63.2E+03	48
5	66.8E+03	28
6	71.5E+03	29
7	79.9E+03	28
8	88.4E+03	28
9	91.4E+03	26
0	94.5E+03	50
	97.7E+03	26
2	12.6E+04	33
3	15.8E+04	40
4	18.9E+04	27
5	22.3E+04	33
6	25.5E+04	24
7	28.5E+04	27
8	31.6E+04	22
9	34.9E+04	23
0	37.7E+04	20
1	21.3E+05	22
2	60.1E+05	21
3	16.1E+06	20
4	16.4E+06	24
5	18.6E+06	22
6	48.5E+06	30
7	60.0E+06	26
8	64.1E+06	21
9	72.5E+06	29
0	77.5E+06	26
1	80.2E+06	28
2	10.8E+07	28
3	17.5E+07	30
4	20.7E+07	25
5	57.2E+07	24
6	59.2E+07	24
7	66.2E+07	27
8	95.6E+07	25


hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuV / m]
20 May 1998 08: 02: 07
NARROWBAND
PLOT 152
EOS/AMSU-A
RADIATED EMISSIONS TEST
RETEST IN BLDG 57 ANT VERTICAL
EOS/AMSU-AZ
1356006-1 EMI
S/N 202
SO 509644
TP 26151/8
par 3.4.5.4
EOS/AMSU-A
AMBIENT
100
80
60
40
20
.014
.1
1
10
100
1000
FREQUENCY [MHz]


hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuV / m / MHz]
20 May 1998 08: 02: 07
BROADBAND
PLOT 154
EOS/AMSU-A
RADIATED EMISSIONS TEST
RETEST IN BLDG 57 ANT VERTICAL
EOS/AMSU-A
EOS/AMSU-A2
1356006-1 EMI
S/N 202
SO 509644
TP 26151/8
par 3.4.5.4
140
120
100
80
60
.014
.1
1
10
100
1000
FREQUENCY [MHz]

==========

ROJET ELECTRONIC SYSTEMS 20 May 1998 08:02:07

==========

. MIL-STD 461B--PART 2 (AIRCRAFT)
  1.3 RE-02 -- 14kHz to 1000MHz (AF/N)

==========

DIATED EMISSIONS TEST
TEST IN BLDG 57 ANT VERTICAL

EOS/AMSU-A2

1356006-1 EMI

SN 202

SO 509644

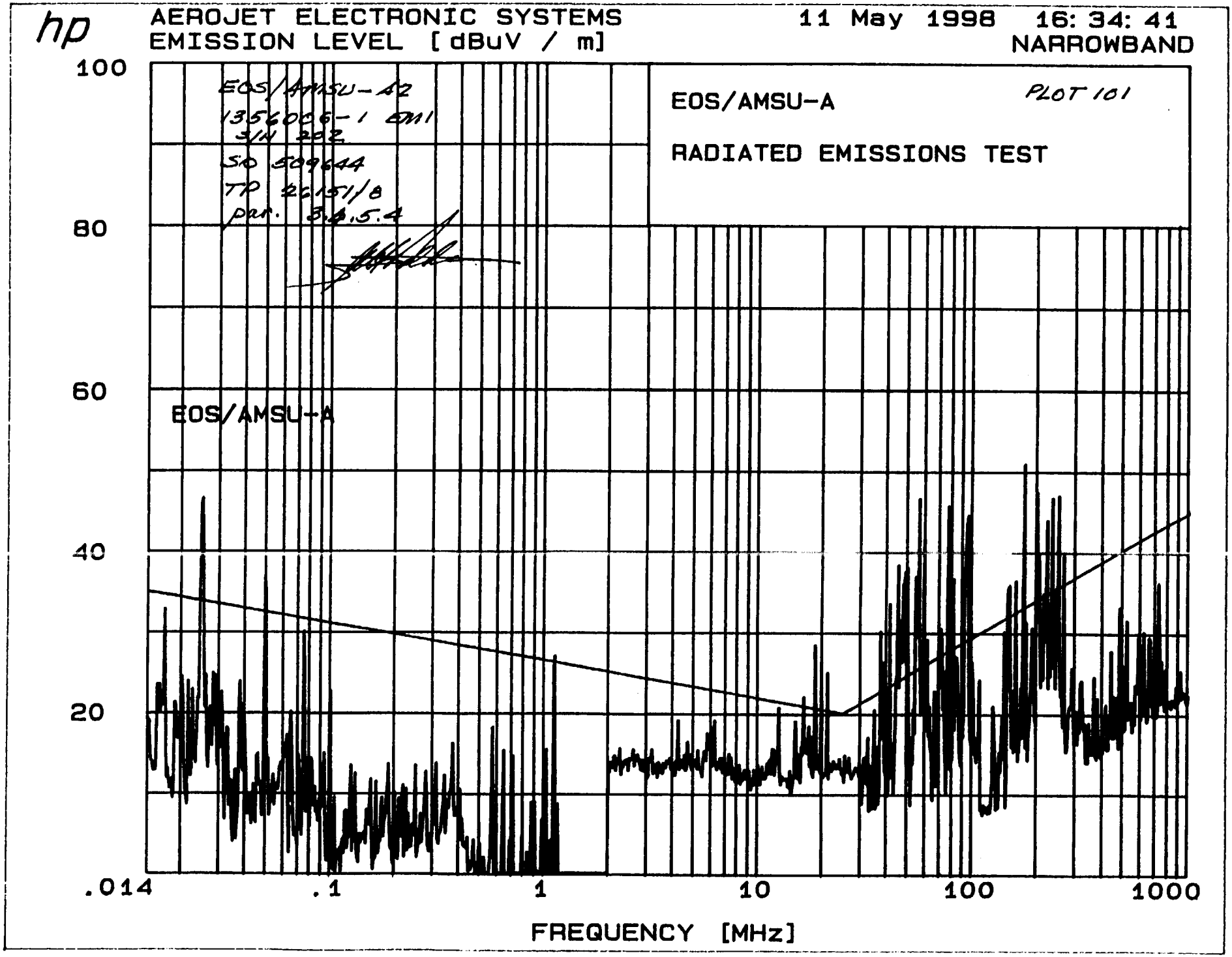
TP 26151/B

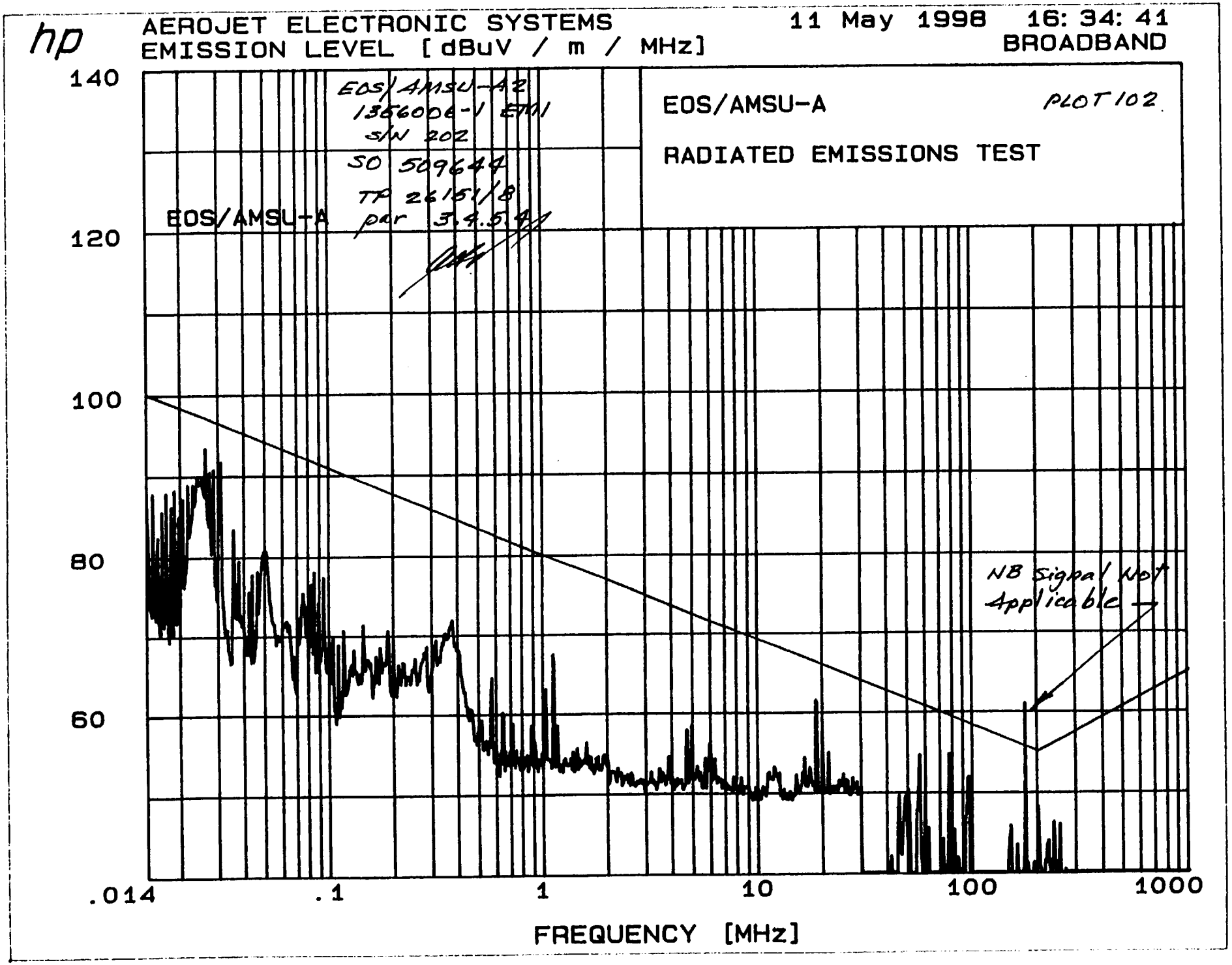
Par 3.4.5.4

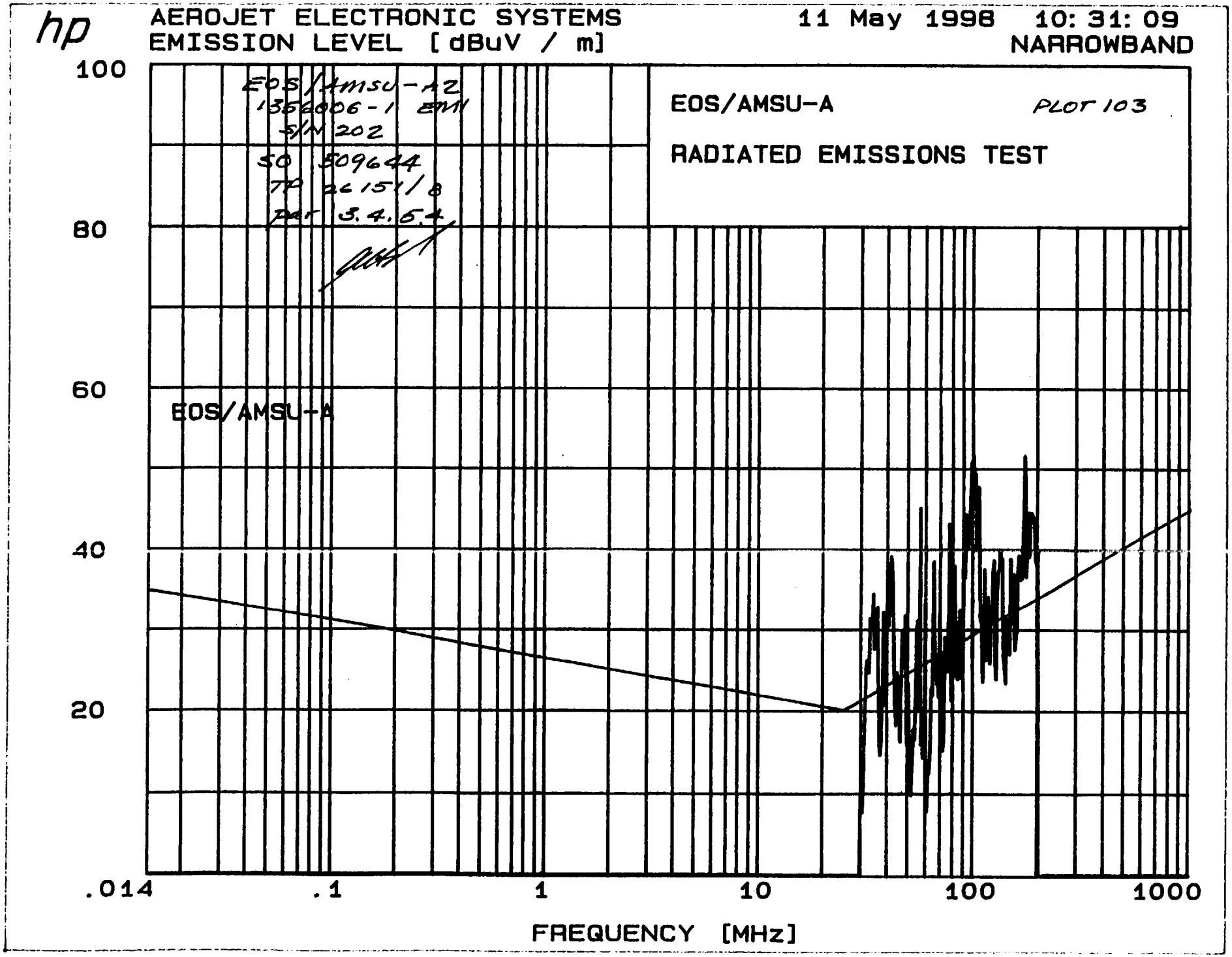
AKS FOUND ABOVE 20dBuV / m

AK#	FREQ (Hz)	AMPL(dBuV / m)
1	48.5E+06	39
2	51.3E+06	25
3	54.9E+06	29
4	64.1E+06	21
5	65.6E+06	20
6	71.7E+06	31
7	77.5E+06	26
8	95.9E+06	22
9	10.5E+07	25
0	10.7E+07	24
1	17.5E+07	33
2	17.9E+07	27

TAR # 4297


hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuV / m]
11 May 1998 16:34:41
NARROWBAND
EOS/AMSU-A2
1356006-1 EMI
S/N 202
SO 509644
TP 26151/8
par. 3.4.5.4
EOS/AMSU-A
PLOT 101
RADIATED EMISSIONS TEST
EOS/AMSU-A
100
80
60
40
20
.014
.1
1
10
100
1000
FREQUENCY [MHz]


hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuV / m / MHz]
11 May 1998 16:34:41
BROADBAND
EOS/AMSU-A
PLOT 102
RADIATED EMISSIONS TEST
EOS/AMSU-A
NB Signal Not Applicable
140
120
100
80
60
.014
.1
1
10
100
1000
FREQUENCY [MHz]


hp
AEROJET ELECTRONIC SYSTEMS
EMISSION LEVEL [dBuV / m]
11 May 1998 10:31:09
NARROWBAND
EOS/AMSU-A2
1356006-1 EMI
S/N 202
SO 509644
TP 26151/8
Date 3.4.5.4
EOS/AMSU-A
PLOT 103
RADIATED EMISSIONS TEST
EOS/AMSU-A
100
80
60
40
20
.014
.1
1
10
100
1000
FREQUENCY [MHz]

Horizontal Antenna

1

15:16:45 MAY 11, 1998 Ant: Horizontal PLOT 104

RL -40.00 dBm MKR #1 FRQ 1.500 GHz

ATTEN 10 dB -40.00 -112.79 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-50.00 UNCOR SAMPLE

RES BANDWIDTH

100 kHz -60.00

EOS/AMSU-A2
1356006-1 EMI
S/N 202
SO 509644
TP 26151/B
Par 3.4.5.4

-70.00

VIDAVG 8 -80.00

REQ2 EQUIVALENT LIMIT NARROWBAND

-90.00

-100.0

-110.0

-120.0

-130.0

START 1.000 GHz STOP 2.000 GHz

*RB 100 kHz VB 100 kHz ST 300.0 msec

Vertical Antenna

15:20:11 MAY 11, 1998 Ant: Vertical PLOT 105

RL -40.00 dBm MKR #1 FRQ 1.500 GHz

ATTEN 10 dB -40.00 -111.78 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-50.00 UNCOR SAMPLE

RES BANDWIDTH

EOS/AMSU-A
1356006-1 EM
S/N 202
SO 509644
TP 26151/B
Par 3.4.5.4

100 kHz -60.00

-70.00

VIDAVG 8 -80.00

RE02 EQUIVALENT LIMIT NARROWBAND

-90.00

-100.0

-110.0

-120.0

-130.0

START 1.000 GHz STOP 2.000 GHz

*RB 100 kHz VB 100 kHz ST 300.0 msec

Horizontal Antenna

15:29:03 MAY 11, 1998 Ant: Horizontal PLOT 106

RL -40.00 dBm MKR #1 FRQ 1.500 GHz

ATTEN 10 dB -40.00 -108.46 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-50.00 UNCOR SAMPLE

RES BANDWIDTH

1.00 MHz RE02 EQUIVALENT LIMIT BROADBAND -60.00

EOS/AMSU-A2
1356006-1 EMI
S/N 202
SO 509644
TP 24151/8
par 3.4.5.4

-70.00

VIDAVG 8 -80.00

-90.00

-100.0

-110.0

-120.0

-130.0

START 1.000 GHz STOP 2.000 GHz

*RB 1.00 MHz VB 1.00 MHz ST 13.92 msec

Vertical Antenna

15:24:25 MAY 11, 1998 Ant: Vertical PLOT 107

RL -40.00 dBm MKR #1 FRQ 1.500 GHz

ATTEN 10 dB
10.00 dB/DIV

AEROJET ELECTRONIC SYSTEMS

-40.00 -110.05 dBm

-50.00 UNCOR SAMPLE

RES BANDWIDTH
1.00 MHz

REO2 EQUIVALENT LIMIT BROADBAND

-60.00

EOS/AMSU-A2
1356006-1 EMI
S/N 202
SO 509644
TP 26151/8
par 3.8.5.4

-70.00

VIDAVG 8

-80.00

-90.00

-100.0

-110.0

-120.0

-130.0

START 1.000 GHz STOP 2.000 GHz

*RB 1.00 MHz VB 1.00 MHz ST 13.92 msec

Horizontal Antenna

1

14:51:44 MAY 11, 1998 Ant: Horizontal PLOT 108

RL -80.00 dBm MKR #1 FRQ 2.100 0 GHz

ATTEN 10 dB -80.00 -127.65 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-90.00 UNCOR SAMPLE

DISPLAY LINE

EOS/AMSU-A
1356006-1 BM1
S/N 202
SO 509644
TP 26151/8
Par. 3.4.5.4

-122.00 dBm

REQ2 EQUIVALENT
LIMIT NARROWBAND

-100.0

-110.0

DL VIDAVG 3

-120.0

-130.0

-140.0

-150.0

-160.0

-170.0

-122.0 dBm
+107.0 dB
- 15.0 dBμV
+ 28.0 dB/m
13.0 dBμV/m

START 2.000 0 GHz STOP 2.200 0 GHz

*RB 3.00 kHz VB 3.00 kHz ST 66.67 sec

Vertical Antenna

14:58:12 MAY 11, 1998 Ant: Vertical PLOT 109

RL -80.00 dBm MKR #1 FRQ 2.100 0 GHz

ATTEN 10 dB -80.00 -129.81 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-90.00 UNCOR SAMPLE

EOS/AMSU-A
1356006-1 EMI
S/N 202
SO 509644
TP 26151/8
par 3.4.5.4

DISPLAY LINE

-122.00 dBm

RE02 EQUIVALENT
LIMIT NARROWBAND

-100.0

-110.0

DL VIDAVG 5

-120.0

-130.0

-140.0

-150.0

-160.0

-170.0

-122 dBm
+107 dB
- 15 dBμV
+ 28 dB/m
13.0 dBμV/m

START 2.000 0 GHz STOP 2.200 0 GHz

*RB 3.00 kHz VB 3.00 kHz ST 66.67 sec

Horizontal Antenna

15:04:27 MAY 11, 1998 Ant: Horizontal PLOT 110

RL -80.00 dBm MKR #1 FRQ 2.100 0 GHz

ATTEN 10 dB -80.00 -110.67 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-90.00 UNCOR SAMPLE

DISPLAY LINE

-117.00 dBm -100.0

-110.0

REG2 EQUIVALENT LIMIT BROADBAND

DL

VIDAVG 8 -120.0

EOS/AMSU-A
1356006-1 EMI
S/N 202
SO 509644
TP 26151/8
par 3.4.5.4

-130.0

-140.0

-150.0

-160.0

-170.0

-117.0 dBm
+107.0 dB
-10.0 dBμV
+28.0 dB/m
18.0 dBμV/m
0.0 dB(BW)
18.0 dBμV/m/MHz

START 2.000 0 GHz STOP 2.200 0 GHz

*RB 1.00 MHz VB 1.00 MHz ST 10.00 msec

15:09:07 MAY 11, 1998 Ant: Vertical PLOT: 111

RL -80.00 dBm MKR #1 FRQ 2.100 0 GHz

ATTEN 10 dB -80.00 -107.03 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-90.00 UNCOR SAMPLE

DISPLAY LINE

-117.00 dBm -100.0

-110.0

REQ2 EQUIVALENT LIMIT BROADBAND

DL VIDAVG 8 -120.0 EOS/AMSU-A2 1356006-1 EMI S/N 202

-130.0 SO 509644 TP 3.4.5.4

-140.0

-150.0

-160.0

-170.0

-117 dBm
+107 dB
-10 dBμV
+28 dB/m
18 dBμV/m
0.0 dB(BW)
18.0 dBμV/m/MHz

START 2.000 0 GHz STOP 2.200 0 GHz

*RB 1.00 MHz VB 1.00 MHz ST 10.00 msec

Horizontal Polarization

15:43:40 MAY 11, 1998 Ant: Horizontal PLOT 112

RL -40.00 dBm MKR #1 FRQ 3.100 GHz

ATTEN 10 dB -113.78 dBm

10.00 dB/DIV

AEROJET ELECTRONIC SYSTEMS

UNCOR SAMPLE

EOS/AMSU-A2
1356006-1 EMI
S/N 202
SO 509644
TP 26151/8
Par 3.4.5.4

RES BANDWIDTH

100 kHz

VIDAVG 8

REQ2 EQUIVALENT LIMIT NARROWBAND

-40.00
-50.00
-60.00
-70.00
-80.00
-90.00
-100.0
-110.0
-120.0
-130.0

START 2.200 GHz STOP 4.000 GHz

*RB 100 kHz VB 100 kHz ST 540.0 msec

Vertical Antenna

1

15:46:46 MAY 11, 1998 Ant.: Vertical PLOT 113

RL -40.00 dBm MKR #1 FRQ 3.100 GHz

ATTEN 10 dB -40.00 -113.18 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-50.00 UNCOR SAMPLE

RES BANDWIDTH

EOS/AMSU-A2

100 kHz -60.00 1356006-1 EM

S/N 202

30 509644

-70.00 TP 26151/8

par 3.4.5.4

VIDAVG 8 -80.00

REQ2 EQUIVALENT LIMIT NARROWBAND

-90.00

-100.0

-110.0

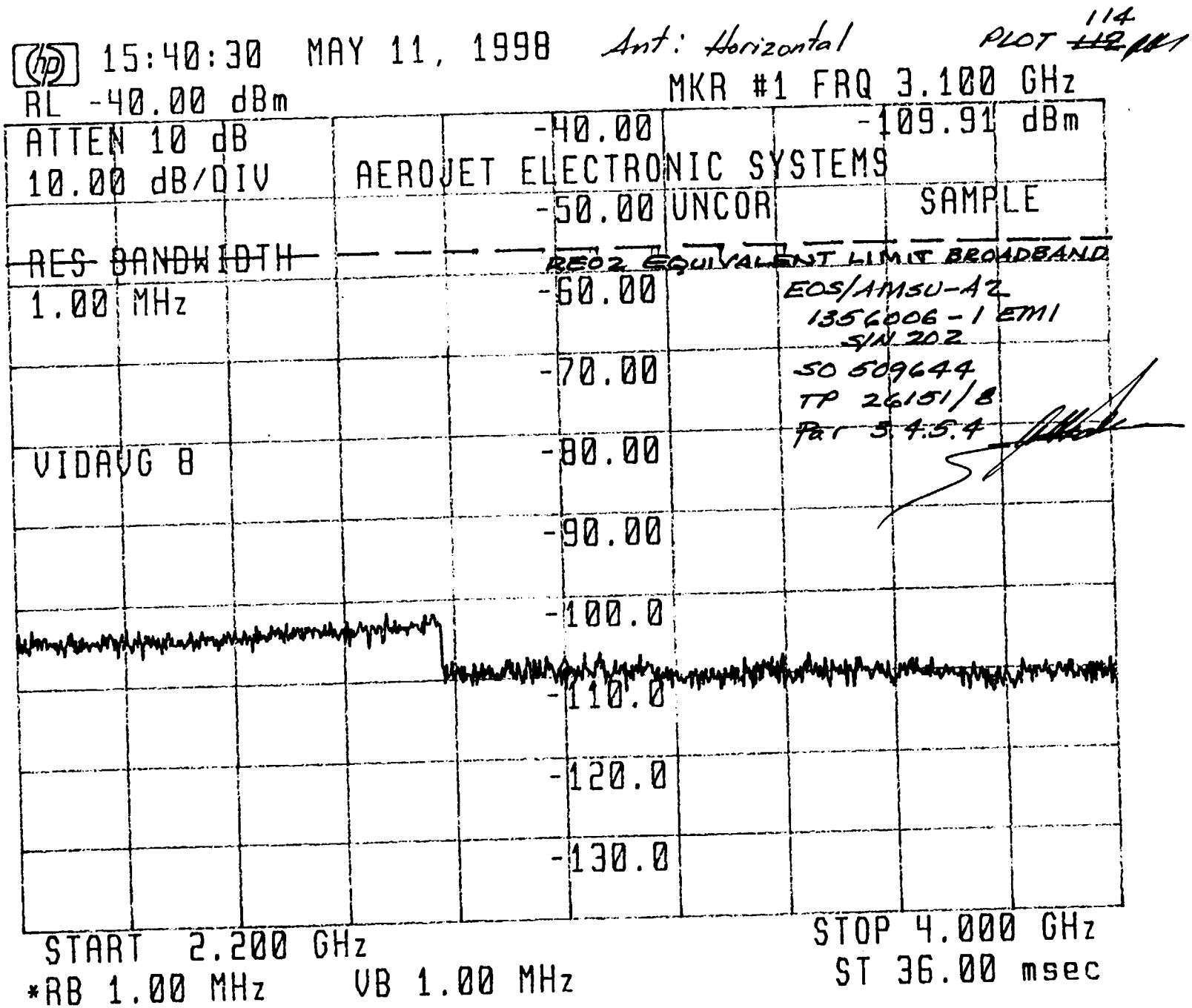
-120.0

-130.0

START 2.200 GHz STOP 4.000 GHz

*RB 100 kHz VB 100 kHz ST 540.0 msec

Horizontal Antenna



Vertical Antenna

15:36:58 MAY 11, 1998 Ant: Vertical PLOT 115

RL -40.00 dBm MKR #1 FRQ 3.100 GHz

ATTEN 10 dB -40.00 -109.23 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-50.00 UNCOR SAMPLE

~~RES BANDWIDTH~~ REQ2 EQUIVALENT LIMIT BROADBAND

1.00 MHz -60.00 EOS/AMSU-A 1356006-1 EM S/N 202

-70.00 SO 609644 TP 26151/8 Par 3.4.5.4

VIDAVG 8 -80.00

-90.00

-100.0

-110.0

-120.0

-130.0

START 2.200 GHz STOP 4.000 GHz

*RB 1.00 MHz VB 1.00 MHz ST 36.00 msec

Horizontal Antenna

15:58:20 MAY 11, 1998 Ant: Horizontal PLOT 116

RL -40.00 dBm MKR #1 FRQ 6.000 GHz

ATTEN 10 dB -40.00 -115.07 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-50.00 UNCOR SAMPLE

RES BANDWIDTH

EOS/AMSU-A
1356006-1 EMI
S/N 202
SO 509644
TP 26131/8
Par 3.4.5.4

100 kHz -60.00

-70.00

VIDAVG 8 -80.00

REQ EQUIVALENT LIMIT NARROWBAND

-90.00

-100.0

-110.0

-120.0

-130.0

START 4.000 GHz STOP 8.000 GHz

*RB 100 kHz VB 100 kHz ST 1.200 sec

Vertical Antenna

15:55:07 MAY 11, 1998 Ant: Vertical PLOT 117

RL -40.00 dBm MKR #1 FRQ 6.000 GHz

ATTEN 10 dB -40.00 -113.72 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-50.00 UNCOR SAMPLE

RES BANDWIDTH EOS/AMSU-A2

100 kHz -60.00 1356006-1 EM S/N202 SO 509644

-70.00 TP 26151/8 Par 3.4.5.4

VIDAVG 8 -80.00

REQ EQUIVALENT LIMIT NARROWBAND

-90.00

-100.0

-110.0

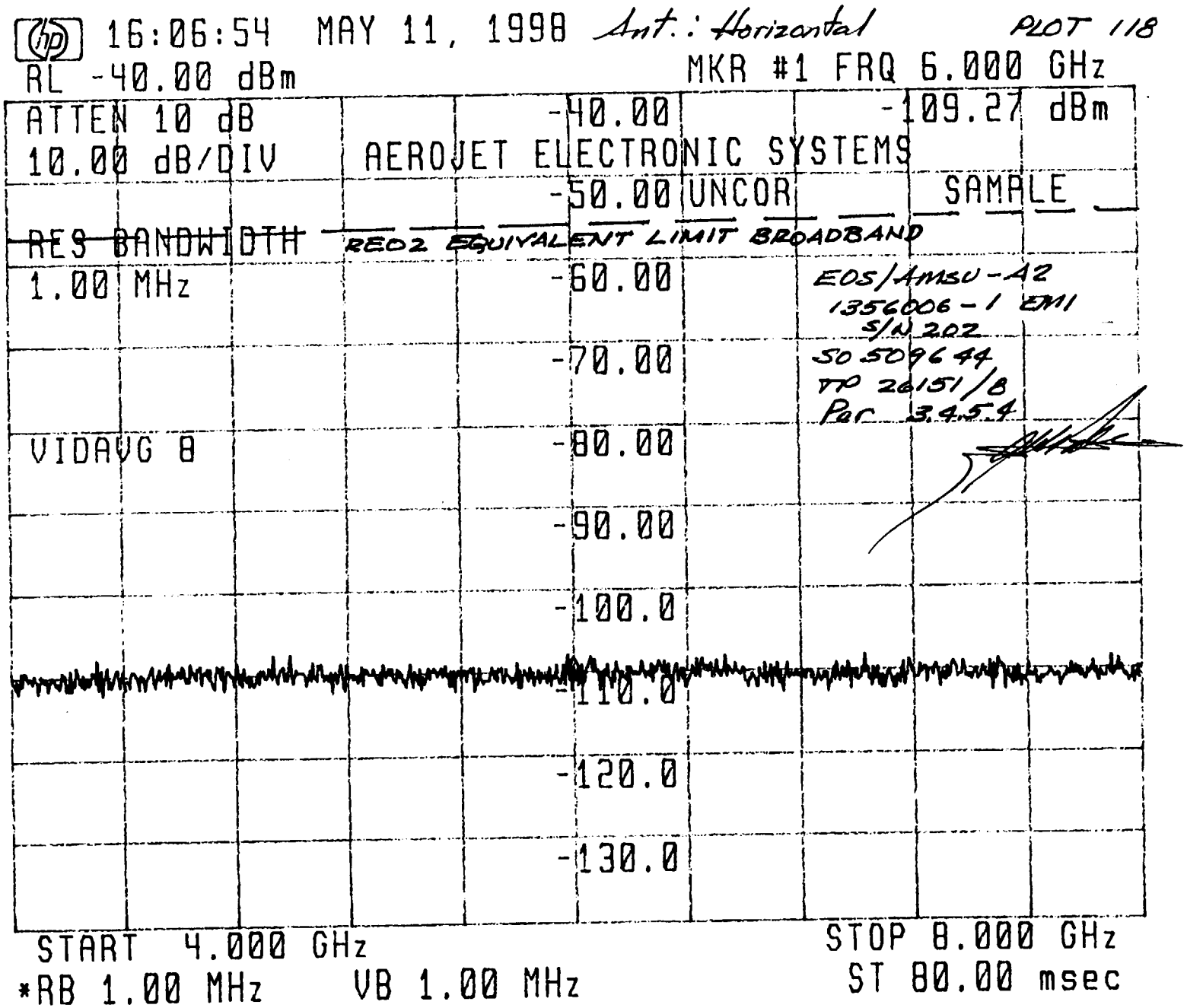
-120.0

-130.0

START 4.000 GHz STOP 8.000 GHz

*RB 100 kHz VB 100 kHz ST 1.200 sec

Horizontal Antenna



Vertical Antenna

1

16:01:45 MAY 11, 1998 Ant: Vertical PLOT 119

RL -40.00 dBm MKR #1 FRQ 6.000 GHz

ATTEN 10 dB -40.00 -110.18 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-50.00 UNCOR SAMPLE

~~RES BANDWIDTH~~ REO2 EQUIVALENT LIMIT BROADBAND

1.00 MHz -60.00 EOS/AMSU-A2 1356006-1 EMI S/N 202

-70.00 SO 609644 TP 26151/8 Par. 3.4.5.4

VIDAVG 8 -80.00

-90.00

-100.0

-110.0

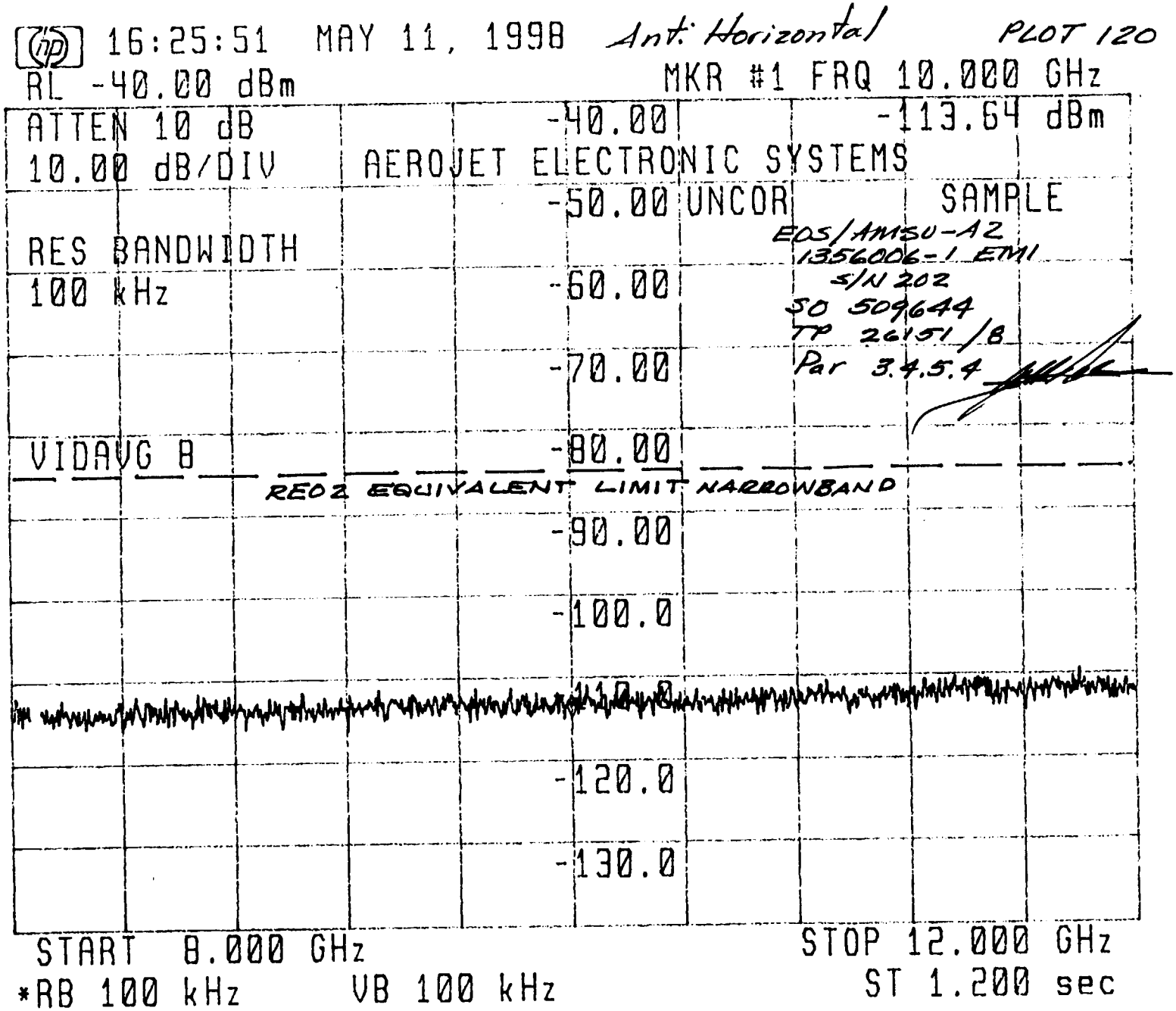
-120.0

-130.0

START 4.000 GHz STOP 8.000 GHz

*RB 1.00 MHz VB 1.00 MHz ST 80.00 msec

Horizontal Antenna



Vertical Antenna

16:18:32 MAY 11, 1998 Ant: Vertical PLOT 121

RL -40.00 dBm MKR #1 FRQ 10.000 GHz

ATTEN 10 dB -40.00 -113.44 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-50.00 UNCOR SAMPLE

RES BANDWIDTH

100 kHz -60.00

EOS/AMSU-A2
1356006-1 EMI
S/N 202
SO 509644
TP 26151/8
Para 3.4.5.4

-70.00

VIDAVG 8 -80.00

REQ2 EQUIVALENT LIMIT NARROWBAND

-90.00

-100.0

-110.0

-120.0

-130.0

START 8.000 GHz STOP 12.000 GHz

*RB 100 kHz VB 100 kHz ST 1.200 sec

Horizontal Antenna

1

16:11:02 MAY 11, 1998 Ant: Horizontal PLOT 122

RL -40.00 dBm MKR #1 FRQ 10.000 GHz

ATTEN 10 dB -40.00 -109.32 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-50.00 UNCOR SAMPLE

RES BANDWIDTH REO2 EQUIVALENT LIMIT REOS/AMSU-AZ

1.00 MHz BROADBAND -60.00 1356006-1 EMI

S/N 202

SO 509644

-70.00 TP 26151/8

Par 3.4.5.4

VIDAVG 8 -80.00

-90.00

-100.0

-110.0

-120.0

-130.0

START 8.000 GHz STOP 12.000 GHz

*RB 1.00 MHz VB 1.00 MHz ST 80.00 msec

Vertical Antenna

1

16:21:43 MAY 11, 1998 Ant: Vertical PLOT 123

RL -40.00 dBm MKR #1 FRQ 10.000 GHz

ATTEN 10 dB -40.00 -109.06 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-50.00 UNCOR SAMPLE

RES BANDWIDTH REQ'D EQUIVALENT LIMIT BROAD BAND

1.00 MHz -60.00

EOS/AMSU-A2
1356006-1 EMI
S/N 202
SO 509644
TP 26151/8
Par 3.4.5.4

-70.00

VIDAVG 8 -80.00

-90.00

-100.0

-110.0

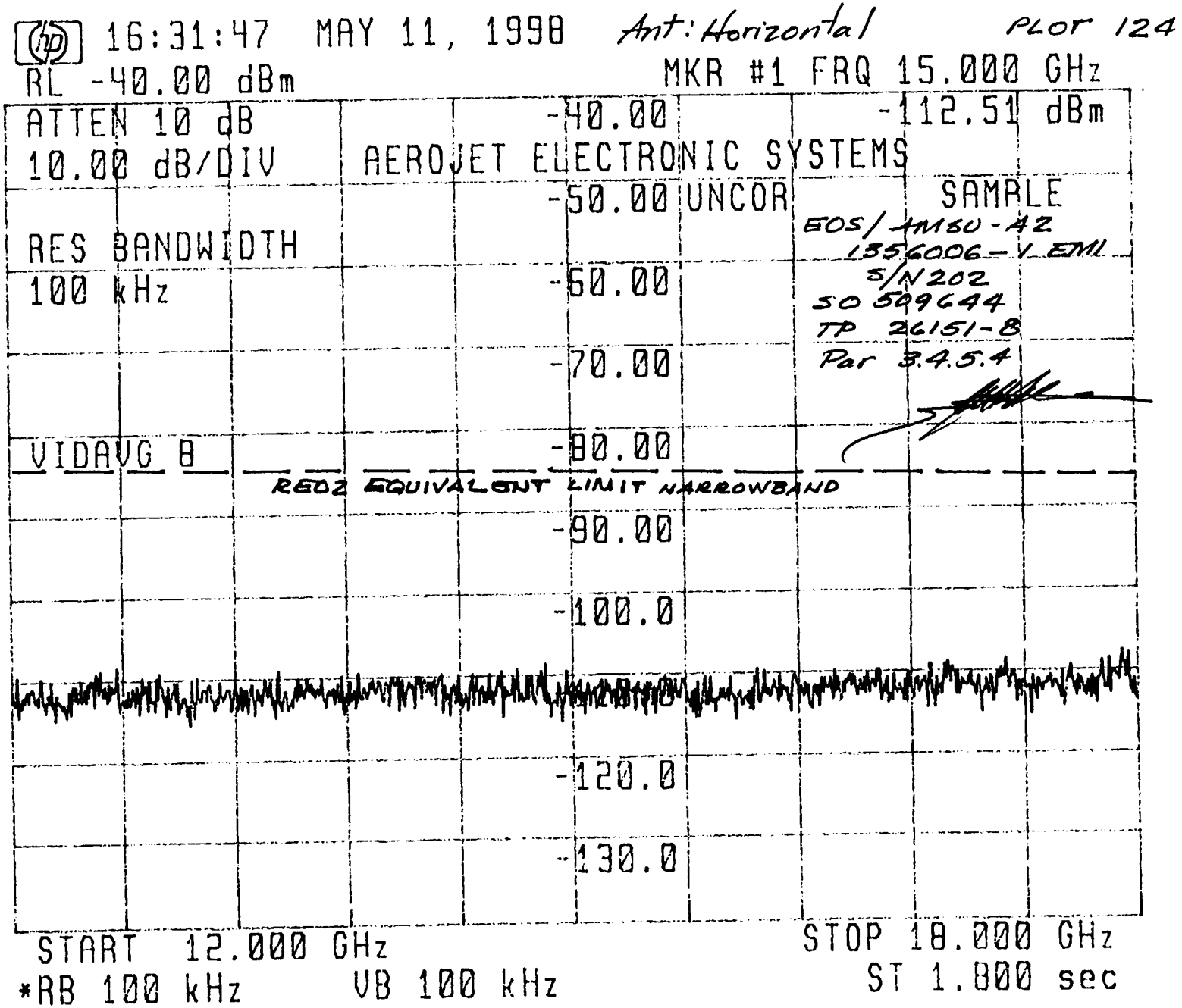
-120.0

-130.0

START 8.000 GHz STOP 12.000 GHz

*RB 1.00 MHz VB 1.00 MHz ST 80.00 msec

Horizontal Antenna



Vertical Antenna

16:39:16 MAY 11, 1998 Ant: Vertical PLOT 125

RL -40.00 dBm MKR #1 FRQ 15.000 GHz

ATTEN 10 dB -40.00 -112.75 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-50.00 UNCOR SAMPLE

RES BANDWIDTH

EOS/AMSU-A2

100 kHz -60.00

1356006-1 EMI

S/N 202

SO-509644

-70.00

TP 26151/8

Par 3.4.5.4

VIDAVG 8 -80.00

REQ2 EQUIVALENT LIMIT NARROWBAND

-90.00

-100.0

-110.0

-120.0

-130.0

START 12.000 GHz STOP 18.000 GHz

*RB 100 kHz VB 100 kHz ST 1.800 sec

Horizontal Antenna

16:35:16 MAY 11, 1998 Anti-Horizontal PLOT 126

RL -40.00 dBm MKR #1 FRQ 15.000 GHz

ATTEN 10 dB -40.00 -109.81 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-50.00 UNCOR SAMPLE

RES BANDWIDTH RE02 EQUIVALENT LIMIT BROADBAND

1.00 MHz -60.00 EOS/AMSU-A2

1356006-1 EMI

S/N 202

-70.00 50509644

TP 26151/8

Par 3.4.5.4

VIDAVG 8 -80.00

-90.00

-100.0

-110.0

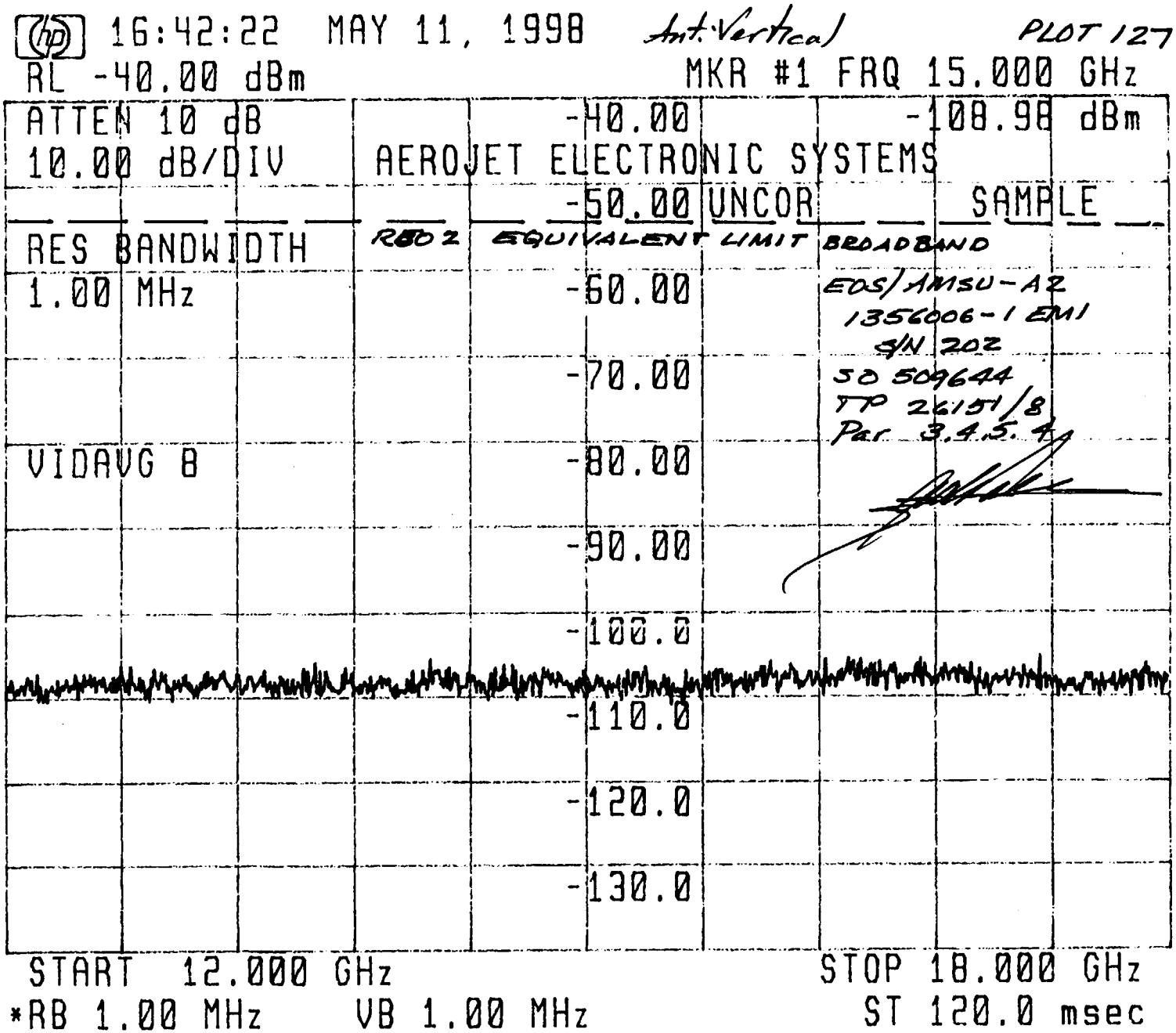
-120.0

-130.0

START 12.000 GHz STOP 18.000 GHz

*RB 1.00 MHz VB 1.00 MHz ST 120.0 msec

Vertical Diagram



12:30:22 MAY 11, 1998 Ant: Horizontal PLOT 128

RL -80.00 dBm MKR #1 FRQ 6.800 0 GHz

ATTEN 10 dB -80.00 -132.58 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-90.00 UNCOR SAMPLE

DISPLAY LINE

EOS/AMSU-A2
1356006-1 EMI
S/N 202
30509644
TP 26151/8
Par 3.4.6.4

-130.00 dBm -100.0

-110.0

VIDAVG 8 -120.0

-130 dBm -130.0

-140.0

-150.0

-160.0

-170.0

CENTER 6.800 0 GHz SPAN 200.0 MHz

*RB 3.00 kHz VB 3.00 kHz ST 66.67 sec

13:48:04 MAY 11, 1998 Ant: Vertical PLOT 129

RL -80.00 dBm MKR #1 FRQ 6.800 0 GHz

ATTEN 10 dB -80.00 -134.11 dBm
10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-90.00 UNCOR SAMPLE
DISPLAY LINE
EOS/AMSU-A2
1356006-1 EMI
S/N 202
50509644
TP 26151/8
-130.00 dBm -100.0
-110.0 Par 8.4.5.4
VIDAVG 8 -120.0
-130 dBm -130.0
-140.0
-150.0
-160.0
-170.0

CENTER 6.800 0 GHz SPAN 200.0 MHz
*RB 3.00 kHz VB 3.00 kHz ST 66.67 sec

11:37:29 MAY 11, 1998 Ant: Horizontal PLOT 130

RL -80.00 dBm MKR #1 FRQ 10.650 0 GHz

ATTEN 10 dB
10.00 dB/DIV

AEROJET ELECTRONIC SYSTEMS

-80.00 -133.64 dBm

-90.00 UNCOR

SAMPLE

EOS/AMSU-A2
1356006-1 EM1
S/N 202
SO 509644
TP 26151/8
Par 3.4.5.4

DISPLAY LINE
-130.00 dBm

VIDAVG 8

-100.0
-110.0
-120.0
-130.0
-140.0
-150.0
-160.0
-170.0

-130 dBm

CENTER 10.650 0 GHz SPAN 100.0 MHz

*RB 3.00 kHz VB 3.00 kHz ST 33.33 sec

13:55:07 MAY 11, 1998 Ant.: Vertical PLOT 131

RL -80.00 dBm MKR #1 FRQ 10.650 0 GHz

ATTEN 10 dB -80.00 -133.76 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-90.00 UNCOR SAMPLE

EOS/AMSU-A2
1356006-1 EM1
S/N 202
SO 509644
TP 261518
Par 3.4.5.4

DISPLAY LINE

-130.00 dBm -100.0

-110.0

VIDAVG 8 -120.0

-130 dBm

-140.0

-150.0

-160.0

-170.0

CENTER 10.650 0 GHz SPAN 100.0 MHz

*RB 3.00 kHz VB 3.00 kHz ST 33.33 sec

11:00:49 MAY 11, 1998 Ant: Horizontal PLOT 132

RL -80.00 dBm MKR #1 FRQ 18.700 0 GHz

ATTEN 10 dB -80.00 -133.08 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-90.00 UNCOR SAMPLE

DISPLAY LINE EOS/AMSU-A2

-126.00 dBm -100.0 1356006-1 EMI

S/N 202

SO 509644

-110.0 TP 26151/8

Par 3.4.5.4

VIDAVG 8 -120.0

-126 dBm

-130.0

-140.0

-150.0

-160.0

-170.0

CENTER 18.700 0 GHz SPAN 200.0 MHz

*RB 3.00 kHz VB 3.00 kHz ST 66.67 sec

14:32:25 MAY 11, 1998 Ant: Vertical PLOT 133

RL -80.00 dBm MKR #1 FRQ 18.700 0 GHz

ATTEN 10 dB -80.00 -129.90 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-90.00 UNCOR SAMPLE

EOS/AMSU-A2
1356006-1 EMI
S/N 202
SO 609644
TP 26151/B
Par 3.4.5.4

DISPLAY LINE

-126.00 dBm -100.0

-110.0

VIDAVG 8 -120.0

-126 dBm

-130.0

-140.0

-150.0

-160.0

-170.0

CENTER 18.700 0 GHz SPAN 200.0 MHz

*RB 3.00 kHz VB 3.00 kHz ST 66.67 sec

10:46:23 MAY 11, 1998 Ant: Horizontal PLOT 134

RL -80.00 dBm MKR #1 FRQ 23.800 0 GHz

ATTEN 10 dB -80.00 -133.06 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-90.00 UNCOR SAMPLE

DISPLAY LINE

-123.00 dBm

EDS/AMSU-A2
1356006-1 EMI
S/N 202
SO 509644
TP 26151/8
Par 3.4.5.4

-100.0

-110.0

-123 dBm

VIDAVG 8

-120.0

-130.0

-140.0

-150.0

-160.0

-170.0

CENTER 23.800 0 GHz SPAN 400.0 MHz

*RB 3.00 kHz VB 3.00 kHz ST 133.3 sec

14:47:16 MAY 11, 1998 Ant: Vertical PLOT 135

RL -80.00 dBm MKR #1 FRQ 23.800 0 GHz

ATTEN 10 dB -80.00 -128.37 dBm

10.00 dB/DIV AEROJET ELECTRONIC SYSTEMS

-90.00 UNCOR SAMPLE

DISPLAY LINE EOS/AMSU-A2

1356006-1 EMM

-123.00 dBm -100.0 S/N 202

SO 509644

TP 26151/8

-110.0 Par 3.4.5.4

VIDAVG 7 -120.0

-123 dBm

-130.0

-140.0

-150.0

-160.0

-170.0

CENTER 23.800 0 GHz SPAN 400.0 MHz

*RB 3.00 kHz VB 3.00 kHz ST 133.3 sec

AEROJET ELECTRONIC SYSTEMS

AMSU-A2/EOS
1356006-1 EMI
SN 202
SO 509644
TP 26151/8
Para 3.4.5.4

TEST SETUP TABLE

LIBRARY FILE: RE-02 -- 14kHz to 1000MHz (AF/N)

DISPLAY TITLE 1:	EOS/AMSU-A
CONTROL PARAMETERS	
Test Type	NB/BB
Freq Uncert (%)	1
Min Sweep Time/Oct (sec)	3
NUMBER PAGES NOTES	0
NUMBER RANGES	4
START FREQUENCY (MHz)	.014

RNG	STOP FREQ(MHz)	TRANSDUCER
1	0.1	EMCO 3301 - ACTIVE MONOPOLE
2	30.0	EMCO 3301 - ACTIVE MONOPOLE
3	200.0	EMCO 3110 - BICONICAL (1 meter)
4	1000.0	E-M LCA-25 - LOG SPIRAL @ 1m

DISPLAY INFORMATION

	NARROWBAND	BROADBAND
AMPLITUDE INFO		
Units Label	dBuV / m	dBuV / m / MHz
Disp Ref Level	100	140
TEST LIMITS		
Number Limits	1	1
Limit 1	EOS/AMSU-A	EOS/AMSU-A

AEROJET ELECTRONIC SYSTEMS

AMSU-A2/EOS
1356006-1 EMI
SN 202
SO 507644
TP 26151/8
Par 3.4.5.4

==========

RANGE 1: .014 TO 0.1 MHz PG 3 OF 6

==========

	NARROWBAND	BROADBAND
AMPLIFIER		
Name	HP 465A	HP465A
Gain (dB)	20	20
INPUT PORT	RIGHT	RIGHT
MSMT STATES		
QP Bandwidth (Hz)	BYPASS	BYPASS
SA Res Bandw (Hz)	300	3000
Video Bandw. (Hz)	3000	30000
Ref. Level (dBuV)	100	100
Int. Atten. (dB)	20	20
Ext. Atten. (dB)	0	0
NO. OF SETUPS	1	same as NB
NO. SWEEPS/SETUP	1	same as NB
FIRST SETUP		
Msg,Sub,Continue	MESSAGE	

Msg: CONNECT EMCO 3301 TO H465A 20dB INPUT

==========

RANGE 2: 0.1 TO 30.0 MHz PG 4 OF 6

==========

	NARROWBAND	BROADBAND
AMPLIFIER		
Name	HP8447F	HP8447F
Gain (dB)	22	22
INPUT PORT	RIGHT	RIGHT
MSMT STATES		
QP Bandwidth (Hz)	BYPASS	BYPASS
SA Res Bandw (Hz)	3E3	30E3
Video Bandw. (Hz)	30000	300000
Ref. Level (dBuV)	100	100
Int. Atten. (dB)	20	20
Ext. Atten. (dB)	0	0
NO. OF SETUPS	1	same as NB
NO. SWEEPS/SETUP	1	same as NB
FIRST SETUP		
Msg,Sub,Continue	MESSAGE	

Msg: CONNECT HP8447F, 22 dB GAIN AMPLIFIER

AEROJET ELECTRONIC SYSTEMS

AMSU-A2/EDS
1356006-1 EMI
S/N 202
50507644
TP 26151/8
Par 3.4.5.4

RANGE 3: 30.0 TO 200.0 MHz — PG 5 OF 6

	NARROWBAND	BROADBAND
AMPLIFIER		
Name	HP8447F	HP8447F
Gain (dB)	48	48
INPUT PORT	RIGHT	RIGHT
MSMT STATES		
QP Bandwidth (Hz)	BYPASS	BYPASS
SA Res Bandw (Hz)	30E3	300E3
Video Bandw. (Hz)	300000	3.E+6
Ref. Level (dBuV)	100	100
Int. Atten. (dB)	20	20
Ext. Atten. (dB)	0	0
NO. OF SETUPS	1	same as NB
NO. SWEEPS/SETUP	1	same as NB
FIRST SETUP		
Msg,Sub,Continue	MESSAGE	
Msg:	CONNECT BICON ANT/8447F(FULL GAIN)	

RANGE 4: 200.0 TO 1000.0 MHz — PG 6 OF 6

	NARROWBAND	BROADBAND
AMPLIFIER		
Name	HP8447F	HP8447F
Gain (dB)	46	46
INPUT PORT	RIGHT	RIGHT
MSMT STATES		
QP Bandwidth (Hz)	BYPASS	BYPASS
SA Res Bandw (Hz)	30E3	1E+6
Video Bandw. (Hz)	300000	3.E+6
Ref. Level (dBuV)	80	80
Int. Atten. (dB)	10	10
Ext. Atten. (dB)	0	0
NO. OF SETUPS	1	same as NB
NO. SWEEPS/SETUP	1	same as NB
FIRST SETUP		
Msg,Sub,Continue	MESSAGE	
Msg:	CONNECT LOG SPIRAL & 8447F FULL GAIN IN	

AEROJET ELECTROSYSTEMS

TRANSDUCER TABLE

AMSU-A2/EOS
1356006-1 EMI
S/N 202
SO 507644
TP 26151/8
Par 3.4.5.4

TRANSDUCER TITLE EMCO 3301 ACTIVE ROD, S/N 3758
SIGN OF TRANSDUCER PLUS
NUMBER OF POINTS 22

POINT	FREQUENCY(MHz)	TRANSDUCER FACTOR
1	.014	4.8
2	.020	4.8
3	0.03	4.6
4	0.05	4.6
5	0.06	4.5
6	0.100	4.5
7	.200	4.5
8	.400	4.5
9	.600	4.5
10	.850	4.5
11	1.000	4.5
12	2.000	4.8
13	3.000	4.9
14	4.000	5.0
15	5.000	5.2
16	6.000	5.3
17	7.0000	5.4
18	8.0000	5.5
19	9.0000	5.7
20	10.000	5.8
21	20.000	7.8
22	30.000	10.5

AEROJET ELECTROSYSTEMS

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TRANSDUCER TABLE
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AMSU-A2/EOS
1356006-1 EMI
S/N 202
SO 507644
TP 26151/8
Par 3.4.5.4

TRANSDUCER TITLE EMCO 3110 - BICONICAL (1 meter)
SIGN OF TRANSDUCER PLUS
NUMBER OF POINTS 24

POINT	FREQUENCY(MHz)	TRANSDUCER FACTOR
1	19	15.28
2	20	12.64
3	25	12.17
4	30	12.40
5	40	11.30
6	50	11.00
7	60	11.10
8	70	10.60
9	80	10.00
10	90	10.10
11	100	11.00
12	120	13.20
13	130	13.00
14	140	12.80
15	150	13.20
16	160	14.60
17	170	15.90
18	180	15.40
19	190	15.00
20	200	15.10
21	220	18.40
22	230	19.30
23	240	18.30
24	250	18.00

AEROJET ELECTROSYSTEMS

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TRANSDUCER TABLE

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AMSU-A2/EOS
1356006-1 EMI
S/N 202
SO 507644
TP 26151/8
Par 3.4.5.4

TRANSDUCER TITLE E-M LCA-25 - LOG SPIRAL @ 1m
SIGN OF TRANSDUCER PLUS
NUMBER OF POINTS 17

POINT	FREQUENCY(MHz)	TRANSDUCER FACTOR
1	200	24.01
2	250	19.28
3	300	18.71
4	350	17.24
5	400	18.02
6	450	18.33
7	500	19.84
8	550	20.46
9	600	21.33
10	650	21.63
11	700	22.05
12	750	23.15
13	800	24.08
14	850	24.35
15	900	25.14
16	950	25.88
17	1000	25.75

AMSU-A2/EOS
1356006-1 EMI
S/N 202
SO 507644
TP 26151/8
Par 3.4.5.4

EMC TEST SYSTEMS L.P.

A Subsidiary of ESCO Electronics Corporation

Gain and Antenna Factors for Double Ridged Guide Antenna
Manufactured by Electro-Metrics
Model Number: RGA-180 Serial Number: 2120
1.0 Meter Calibration

Frequency (MHz)	Antenna Factor (dB)	Gain Numeric	Gain dBi
1000	23.8	4.34	6.4
1500	25.2	7.15	8.5
2000	27.7	7.20	8.6
2500	28.8	8.62	9.4
3000	30.5	8.42	9.3
3500	31.6	8.82	9.5
4000	33.0	8.39	9.2
4500	32.6	11.59	10.6
5000	33.8	10.90	10.4
5500	34.7	10.71	10.3
6000	35.0	11.92	10.8
6500	35.3	13.17	11.2
7000	36.4	11.84	10.7
7500	37.6	10.24	10.1
8000	37.5	11.93	10.8
8500	37.7	12.87	11.1
9000	37.9	13.89	11.4
9500	38.0	14.92	11.7
10000	38.3	15.37	11.9
10500	38.4	16.78	12.2
11000	38.9	16.30	12.1
11500	39.3	16.28	12.1
12000	39.6	16.76	12.2
12500	39.4	18.97	12.8
13000	40.1	17.38	12.4
13500	41.1	14.97	11.8
14000	40.9	16.58	12.2
14500	41.5	15.61	11.9
15000	40.6	20.65	13.1
15500	38.6	34.53	15.4
16000	38.4	38.64	15.9
16500	40.0	28.66	14.6
17000	41.4	22.21	13.5
17500	43.2	15.27	11.8
18000	45.1	10.61	10.3

Specification compliance testing factor (1.0 meter spacing) to be added to receiver meter reading in dBμV to convert to field intensity in dBμV/meter. Calibrated 13 Jun 96 (DD/MM/YYYY). Calibration per ARP 958.

23 Apr 98

4/29/98

TEST DATA SHEET 4 (Sheet 1 of ~~3~~ 6) ENG 252 QC 16
CS01 Test (Paragraph 3.4.6.4)

Test Setup Verified: Ken Shaw 4/29/98
Signature)

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
Power Amplifier	McIntosh	MC2205	45071	NDG	NDG
Oscilloscope	Tektronix	TDS380	200079	4-7-98	4-1-99
Signal Generator	HP	3325A	462079	9-13-98	9-13-99
Transformer	Solar	6220-1A	—	NDG	NDG
25 Pin Breakout Box	Aerojet	SK13587042	743-5910	9-11-97	CNR

QC 16 4/29/98 ENG 252

Susceptibility to Injected Electromagnetic Energy on Power Leads, 30 Hz to 50 kHz

+27V
~~+28V~~ Quiet Bus A (Terminal 1 on B/O Box)

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
30 Hz	.5Vp-p	Sine			✓	Figure 8	T138 Baseline
30 Hz to 1500 Hz	.5Vp-p	Sine			✓	Figure 8	T139
1500 Hz to 10 kHz	.5Vp-p	Sine			✓	Figure 8	T140
10 kHz to 50 kHz	.5Vp-p	Sine			✓	Figure 8	T141

*ST = Susceptibility Threshold, EL = Equipment Limit, SL = Specification Limit

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1 EM1

Serial No. 202

Shop Order: 509649
Op 0150

Engineer: [redacted]

Quality Assurance: Stella M. Gonzalez 5/1/98

Operator: Ken Shaw 5/1/98

Customer Rep: [signature] 5-5-98

QC 16 R.M. [signature] 5-7-98

[redacted]

4/29/98 ENG 252

TEST DATA SHEET 4 (Sheet 2 of ~~3~~ 6) 4/29/98 ENG 252
CS01 Test (Paragraph 3.4.6.4)

+27V ENG 252 ~~28V~~ Quiet Bus Rtn A (Terminal 30 on B/O Box

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
30 Hz	.5Vp-p	Sine			✓	Figure 8	T138 Baseline
30 Hz to 1500 Hz	.5Vp-p	Sine			✓	Figure 8	T148
1500 Hz to 10 kHz	.5Vp-p	Sine			✓	Figure 8	T149
10 kHz to 50 kHz	.5Vp-p	Sine			✓	Figure 8	T150

4/29/98 ENG 252 +27V ~~+28V~~ Noisy Bus A (Terminal 5 on B/O Box)

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
30 Hz	7Vp-p	Sine			✓	Figure 8	15:44 Baseline
30 Hz to 1500 Hz	7Vp-p	Sine			✓	Figure 8	15:50
1500 Hz to 10 kHz	7Vp-p	Sine			✓	Figure 8	15:54
10 kHz to 50 kHz	7Vp-p	Sine			✓	Figure 8	15:59

4/29/98 ENG 252 +27V ~~28V~~ Noisy Bus Rtn A (Terminal 7 on B/O Box)

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
30 Hz	7Vpp	Sine			✓	Figure 8	7:10 Baseline
30 Hz to 1500 Hz	7Vp-p	Sine			✓	Figure 8	8:03
1500 Hz to 10 kHz	7Vp-p	Sine			✓	Figure 8	8:07
10 kHz to 50 kHz	7Vp-p	Sine			✓	Figure 8	8:11

[redacted]

4/29/98 ENG 252

4/29/98 ENG 252

TEST DATA SHEET 4 (Sheet 3 of ~~3~~ 6)
CS01 Test (Paragraph 3.4.6.4)

+27V ENG 252

~~+28V~~ Survival Bus A (Terminal 9 on B/O Box)

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
30 Hz	3V p-p	Sine			✓	Figure 8	Pass
30 Hz to 1500 Hz	3V p-p	Sine			✓	Figure 8	Pass
1500 Hz to 10 kHz	3V p-p	Sine			✓	Figure 8	Pass
10 kHz to 50 kHz	3V p-p	Sine			✓	Figure 8	Pass

29/98 ENG 252

+27V
~~28V~~ Survival Bus Rtn A (Terminal 10 on B/O Box)

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
30 Hz	3V p-p	Sine			✓	Figure 8	Pass
30 Hz to 1500 Hz	3V p-p	Sine			✓	Figure 8	Pass
1500 Hz to 10 kHz	3V p-p	Sine			✓	Figure 8	Pass
10 kHz to 50 kHz	3V p-p	Sine			✓	Figure 8	Pass

[redacted]

5/1/98 ENG 252 QC 236

TEST DATA SHEET 4 (Sheet ~~1~~ of ~~8~~)
CS01 Test (Paragraph 3.4.6.4)

Test Setup Verified: _____
Signature)

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date

QC 236 : Susceptibility to Injected Electromagnetic Energy on Power Leads, 30 Hz to 50 kHz

+31 ~~+28~~V Quiet Bus A (Terminal 1 on B/O Box)

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
30 Hz	.5 V_{p-p}	Sine			✓	Figure 8	T138 Baseline
30 Hz to 1500 Hz	.5 V_{p-p}	Sine			✓	Figure 8	T142
1500 Hz to 10 kHz	.5 V_{p-p}	Sine			✓	Figure 8	T143
10 kHz to 50 kHz	.5 V_{p-p}	Sine			✓	Figure 8	T144

*ST = Susceptibility Threshold, EL = Equipment Limit, SL = Specification Limit

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. _____ Engineer: _____

Serial No. _____ Quality Assurance: _____

Shop Order: _____ Operator: _____

[redacted]

TEST DATA SHEET 4 (Sheet ~~2 of 3~~)
CS01 Test (Paragraph 3.4.6.4)

+31

~~28~~V Quiet Bus Rtn A (Terminal 3 on B/O Box)

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
30 Hz	.5Vp-p	Sine			✓	Figure 8	T138 Baseline
30 Hz to 1500 Hz	.5Vp-p	Sine			✓	Figure 8	T145
1500 Hz to 10 kHz	.5Vp-p	Sine			✓	Figure 8	T146
10 kHz to 50 kHz	.5Vp-p	Sine			✓	Figure 8	T147

+31

~~+28~~V Noisy Bus A (Terminal 5 on B/O Box)

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
30 Hz	7Vp-p	Sine			✓	Figure 8	15:44 Baseline
30 Hz to 1500 Hz	7Vp-p	Sine			✓	Figure 8	16:07
1500 Hz to 10 kHz	7Vp-p	Sine			✓	Figure 8	16:16
10 kHz to 50 kHz	7Vp-p	Sine			✓	Figure 8	16:20

+31

~~28~~V Noisy Bus Rtn A (Terminal 7 on B/O Box)

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
30 Hz	7Vp-p	Sine			✓	Figure 8	7:10 Baseline
30 Hz to 1500 Hz	7Vp-p	Sine			✓	Figure 8	7:45
1500 Hz to 10 kHz	7Vp-p	Sine			✓	Figure 8	7:48
10 kHz to 50 kHz	7Vp-p	Sine			✓	Figure 8	7:57

[redacted]

TEST DATA SHEET 4 (Sheet ~~3~~ 6 of 3)
CS01 Test (Paragraph 3.4.6.4)

+~~26~~ 31V Survival Bus A (Terminal 9 on B/O Box)

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
30 Hz	3Vp-p	Sine			✓	Figure 8	Pass
30 Hz to 1500 Hz	3Vp-p	Sine			✓	Figure 8	Pass
1500 Hz to 10 kHz	3Vp-p	Sine			✓	Figure 8	Pass
10 kHz to 50 kHz		Sine				Figure 8	

+~~26~~ 31V Survival Bus Rtn A (Terminal 10 on B/O Box)

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
30 Hz	3Vp-p	Sine			✓	Figure 8	Pass
30 Hz to 1500 Hz	3Vp-p	Sine			✓	Figure 8	Pass
1500 Hz to 10 kHz	3Vp-p	Sine			✓	Figure 8	Pass
10 kHz to 50 kHz	3Vp-p	Sine			✓	Figure 8	Pass

SHEET 64 OF 1267

TEST DATA SHEET 4 (Sheet 1 of 3)
CS01 Test (Paragraph 3.4.6.4)

Test Setup Verified: Ken Shane 4/22/98
Signature)

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
Amplifier	McIntosh	MC2205	45071	NDG	NDG
Scope	Tek	TDS380	200079	4-7-98	4-1-99
Signal Generator	HP	3325 A	46279	9-13-97	9-13-98
Transformer	Solar	6220-1A	–	–	–
					–

Susceptibility to Injected Electromagnetic Energy on Power Leads, 30 Hz to 50 kHz

+28V Quiet Bus A

Frequency Range	Test Level Vp-p	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
30 Hz	.5V	Sine			✓	Figure 8	TO 80
30 Hz to 1500 Hz	.5V	Sine			✓	Figure 8	TO 81
1500 Hz to 10 kHz	.5V	Sine			✓	Figure 8	TO 81
10 kHz to 50 kHz	.5V	Sine			✓	Figure 8	TO 82

*ST = Susceptibility Threshold, EL = Equipment Limit, SL = Specification Limit

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1-EMI

Serial No. 202

Shop Order: 509644 OP#0150

Engineer: 4-23-98

Quality Assurance: (7A 200) 4/23/98

Operator: 4-23-98

Customer Rep.: 5-6-98

(QC 16) 5-7-98

SHEET 65 OF 1764

TEST DATA SHEET 4 (Sheet 2 of 3)
CS01 Test (Paragraph 3.4.6.4)

28V Quiet Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
	Vp-p						
30 Hz	.5	Sine			✓	Figure 8	~~1083~~ R.H.W.
30 Hz to 1500 Hz	.5	Sine			✓	Figure 8	1083R.H.W.
1500 Hz to 10 kHz	.5	Sine			✓	Figure 8	1088R.H.W.
10 kHz to 50 kHz	.5	Sine			✓	Figure 8	1085

+28V Noisy Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
	Vpp						
30 Hz	.5V	Sine			✓	Figure 8	—
30 Hz to 1500 Hz	.5V	Sine			✓	Figure 8	9:35:38
1500 Hz to 10 kHz	.5V	Sine			✓	Figure 8	9:44:18
10 kHz to 50 kHz	.5V	Sine			✓	Figure 8	9:47:06

28V Noisy Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
	Vp-p						
30 Hz	.5V	Sine			✓	Figure 8	—
30 Hz to 1500 Hz	.5V	Sine			✓	Figure 8	12:08:51
1500 Hz to 10 kHz	.5V	Sine			✓	Figure 8	12:10:51
10 kHz to 50 kHz	.5V	Sine			✓	Figure 8	12:13:31

SHEET 66 OF 1767

TEST DATA SHEET 4 (Sheet 3 of 3)
CS01 Test (Paragraph 3 4.6.4)

+28V Survival Bus A

Frequency Range	Test Level Vp-p	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
30 Hz	.5V	Sine			✓	Figure 8	No Susceptibility
30 Hz to 1500 Hz	.5V	Sine			✓	Figure 8	No Susceptibility
1500 Hz to 10 kHz	.5V	Sine			✓	Figure 8	No Susceptibility
10 kHz to 50 kHz	.5V	Sine			✓	Figure 8	No Susceptibility

28V Survival Bus Rtn A

Frequency Range	Test Level Vp-p	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
30 Hz	.5V	Sine			✓	Figure 8	No Susceptibility
30 Hz to 1500 Hz	.5V	Sine			✓	Figure 8	No Susceptibility
1500 Hz to 10 kHz	.5V	Sine			✓	Figure 8	No Susceptibility
10 kHz to 50 kHz	.5V	Sine			✓	Figure 8	No Susceptibility

TEST DATA SHEET 5 (Sheet 1 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

ENG 252 QC 16

Test Setup Verified: Roger W. Blaney 5/1/98
(Signature)

RUN #2 TAR# 4294

with Noisy BUS A/BUS RTN A @ 3 Vp-p.

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
Oscilloscope	Tektronix	TDS 380	200079	4-1-98	4-1-99
Signal Gen. (10MHz - 26.5GHz)	HP	83630B	200202	1-15-98	1-15-99
Function Generator	HP	3325A	46279	3-13-98	9-13-98
Spectrum Analyzer	HP	8566B	2300636	6-13-97	6-13-98
Plotter	HP	7475A	47447	4-17-92	CNR
BroadBand Power Amp.	Eaton	5001	300637	4-13-98	4-13-99

QC 16 ENG 252 4/29/98

Susceptibility to Injected Electromagnetic Energy on Power Leads, 30 hz to 50 kHz

+27V ~~+28V~~ Quiet Bus A (Terminal 1 on B/O Box)

Frequency Range	Test Level Vp-p	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 kHz	0.5	Sine			✓	Figure 8	T128 Baseline
50 kHz to 100 kHz	0.5	Sine			✓	Figure 8	T134
100 kHz to 500 kHz	0.5	Sine			✓	Figure 8	T133
500 kHz to 1000 kHz	0.5	Sine			✓	Figure 8	T132

*ST = Susceptibility Threshold, EL = Equipment Limit, SL = Specification Limit

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1 EMI

Engineer: [signature] 5-1-98

Serial No. 202

Quality Assurance: [signature] 5/1/98

Shop Order: 509644

Operator: Ken Shane 5-1-98

ENG 252 QC 16

Test Setup Verified: Roger W. Chowey
(Signature) 5-1-98

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
BroadBand Power Amp.	Eaton	5020B	46126	4-7-92	NDG
BroadBand Power Amp.	Eaton	3552B	46127	4-7-92	NDG
VHF Attenuator	HP	355C	L503307	9-24-97	12-24-98
VHF Attenuator (120dB)	HP	355D	L508667	11-25-97	11-25-98
High Pass Filter	Solar Elect.	7415-1	N/A	N/A	N/A
25 Pin Breakout Box	Aerojet	SK13587-4-2	713-5910	9-11-97	CNR

4/29/98 ENG 252

TEST DATA SHEET 5 (Sheet 2 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

4/29/98 ENG 252

+27V ~~+28V~~ Quiet Bus A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
1 MHz to 5 MHz	3.0	Sine			✓	Figure 8	T094
5 MHz to 10 MHz	3.0	Sine			✓	Figure 8	T095
10 MHz to 20 MHz	3.0	Sine			✓	Figure 8	T103
20 MHz to 50 MHz	3.0	Sine			✓	Figure 8	T104

ENG 252 4/29/98

+27V ~~+28V~~ Quiet Bus A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 MHz to 100 MHz	3.0	Sine			✓	Figure 8	T124
100 MHz to 200 MHz	3.0	Sine			✓	Figure 8	T113
200 MHz to 300 MHz	3.0	Sine			✓	Figure 8	T114
300 MHz to 400 MHz	3.0	Sine			✓	Figure 8	T115

ENG 252 4/29/98

+27V ~~28V~~ ~~Noisy~~ Quiet Bus Rtn A (Terminal 3 on B/O Box)

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 kHz	0.5	Sine			✓	Figure 8	Baseline
50 kHz to 100 kHz	0.5	Sine			✓	Figure 8	T135
100 kHz to 500 kHz	0.5	Sine			✓	Figure 8	T136
500 kHz to 1000 kHz	0.5	Sine			✓	Figure 8	T137

4/29/98 ENG 252 +27V

4/29/98 ENG 252

TEST DATA SHEET 5 (Sheet 3 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

~~28V~~ Quiet Bus Rtn A

Frequency Range	Test Level Vp-p	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
1 MHz to 5 MHz	3.0	Sine			✓	Figure 8	T100
5 MHz to 10 MHz	3.0	Sine			✓	Figure 8	T101
10 MHz to 20 MHz	3.0	Sine			✓	Figure 8	T109
20 MHz to 50 MHz	3.0	Sine			✓	Figure 8	T110

4/29/98 ENG 252 +27V

~~28V~~ Quiet Bus Rtn A

Frequency Range	Test Level Vp-p	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 MHz to 100 MHz	3.0	Sine			✓	Figure 8	T124
100 MHz to 200 MHz	3.0	Sine			✓	Figure 8	T125
200 MHz to 300 MHz	3.0	Sine			✓	Figure 8	T126
300 MHz to 400 MHz	3.0	Sine			✓	Figure 8	T127

4/29/98 ENG 252 +27V

~~+28V~~ Noisy Bus A (Terminal 5 on B/O Box)

Frequency Range	Test Level Vp-p	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 kHz	3.0	Sine			✓	Figure 8	11:38 Baseline
50 kHz to 100 kHz	3.0	Sine			✓	Figure 8	13:05
100 kHz to 500 kHz	3.0	Sine			✓	Figure 8	13:14
500 kHz to 1000 kHz	3.0	Sine			✓	Figure 8	13:21

R. Rhoads 4/29/98

ENG 252

TEST DATA SHEET 5 (Sheet 4 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

+27V ~~+28V~~ Noisy Bus A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
1 MHz to 5 MHz	3.0	Sine			✓	Figure 8	16:27
5 MHz to 10 MHz	3.0	Sine			✓	Figure 8	16:33
10 MHz to 20 MHz	3.0	Sine			✓	Figure 8	9:04
20 MHz to 50 MHz	3.0	Sine			✓	Figure 8	9:07

+27V ~~+28V~~ Noisy Bus A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 MHz to 100 MHz	3.0	Sine			✓	Figure 8	7:10
100 MHz to 200 MHz	3.0	Sine			✓	Figure 8	7:15
200 MHz to 300 MHz	3.0	Sine			✓	Figure 8	7:19
300 MHz to 400 MHz	3.0	Sine			✓	Figure 8	7:28

+27V ~~28V~~ Noisy Bus Rtn A (Terminal 7 on B/O Box)

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 kHz	3.0	Sine			✓	Figure 8	11:38 Baseline
50 kHz to 100 kHz	3.0	Sine			✓	Figure 8	11:42
100 kHz to 500 kHz	3.0	Sine			✓	Figure 8	11:50
500 kHz to 1000 kHz	3.0	Sine			✓	Figure 8	11:56

ENG 252 R. Khoury 4/29/98

TEST DATA SHEET 5 (Sheet 5 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

ENG 252

+27V ~~28V~~ Noisy Bus Rtn A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
1 MHz to 5 MHz	3.0	Sine			✓	Figure 8	16:19
5 MHz to 10 MHz	3.0	Sine			✓	Figure 8	16:23
10 MHz to 20 MHz	3.0	Sine			✓	Figure 8	9:39
20 MHz to 50 MHz	3.0	Sine			✓	Figure 8	9:43

QC 1.6

ENG 252

+27V ~~28V~~ Noisy Bus Rtn A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 MHz to 100 MHz	3.0	Sine			✓	Figure 8	7:34
100 MHz to 200 MHz	3.0	Sine			✓	Figure 8	7:39
200 MHz to 300 MHz	3.0	Sine			✓	Figure 8	7:43
300 MHz to 400 MHz	3.0	Sine			✓	Figure 8	7:47

QC 1.6

ENG 252

+27V ~~+28V~~ Survival Bus A (Terminal ~~8~~ 9 on B/O Box)

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 kHz	3.0	Sine			✓	Figure 8	
50 kHz to 100 kHz	3.0	Sine			✓	Figure 8	
100 kHz to 500 kHz	3.0	Sine			✓	Figure 8	
500 kHz to 1000 kHz	3.0	Sine			✓	Figure 8	

R. Khoury 4/29/98

TEST DATA SHEET 5 (Sheet 6 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

+27V ~~+28V~~ Survival A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
1 MHz to 5 MHz	3.0	Sine			✓	Figure 8	
5 MHz to 10 MHz	3.0	Sine			✓	Figure 8	
10 MHz to 20 MHz	3.0	Sine			✓	Figure 8	
20 MHz to 50 MHz	3.0	Sine			✓	Figure 8	

+27V ~~+28V~~ Survival Bus A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 MHz to 100 MHz	3.0	Sine			✓	Figure 8	
100 MHz to 200 MHz	3.0	Sine			✓	Figure 8	
200 MHz to 300 MHz	3.0	Sine			✓	Figure 8	
300 MHz to 400 MHz	3.0	Sine			✓	Figure 8	

+27V ~~+28V~~ Survival Bus Rtn A (Terminal 10 on B/O Box)

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 kHz	3.0	Sine			✓	Figure 8	
50 kHz to 100 kHz	3.0	Sine			✓	Figure 8	
100 kHz to 500 kHz	3.0	Sine			✓	Figure 8	
500 kHz to 1000 kHz	3.0	Sine			✓	Figure 8	

TEST DATA SHEET 5 (Sheet 7 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

+27V ~~28V~~ Survival Bus Rtn A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
1 MHz to 5 MHz	3.0	Sine			✓	Figure 8	
5 MHz to 10 MHz	3.0	Sine			✓	Figure 8	
10 MHz to 20 MHz	3.0	Sine			✓	Figure 8	
20 MHz to 50 MHz	3.0	Sine			✓	Figure 8	

+27V ~~28V~~ Survival Bus Rtn A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 MHz to 100 MHz	3.0	Sine			✓	Figure 8	
100 MHz to 200 MHz	3.0	Sine			✓	Figure 8	
200 MHz to 300 MHz	3.0	Sine			✓	Figure 8	
300 MHz to 400 MHz	3.0	Sine			✓	Figure 8	

TEST DATA SHEET 5 (Sheet ~~4 of 7~~)
CS02 Test (Paragraph 3.4.7.4)

RAJ 4/25/95

~~Test Setup Verified: _____~~
~~(Signature)~~

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date

Susceptibility to Injected Electromagnetic Energy on Power Leads, 30 hz to 50 kHz

+31 ~~+28~~V Quiet Bus A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 kHz	0.5	Sine			✓	Figure 8	T128 Baseline
50 kHz to 100 kHz	0.5	Sine			✓	Figure 8	T129
100 kHz to 500 kHz	0.5	Sine			✓	Figure 8	T130
500 kHz to 1000 kHz	0.5	Sine			✓	Figure 8	T131

*ST = Susceptibility Threshold, EL = Equipment Limit, SL = Specification Limit

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. _____ Engineer: _____

Serial No. _____ Quality Assurance: _____

Shop Order: _____ Operator: _____

TEST DATA SHEET 5 (Sheet ~~2~~ 9 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

+31 QC 236

+~~28~~V Quiet Bus A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
1 MHz to 5 MHz	3.0	Sine			✓	Figure 8	T096
5 MHz to 10 MHz	3.0	Sine			✓	Figure 8	T097
10 MHz to 20 MHz	3.0	Sine			✓	Figure 8	T105
20 MHz to 50 MHz	3.0	Sine			✓	Figure 8	T106

+31
+~~28~~V Quiet Bus A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 MHz to 100 MHz	3.0	Sine			✓	Figure 8	T116
100 MHz to 200 MHz	3.0	Sine			✓	Figure 8	T117
200 MHz to 300 MHz	3.0	Sine			✓	Figure 8	T118
300 MHz to 400 MHz	3.0	Sine			✓	Figure 8	T119

+31 Quiet
~~28V Noisy~~ Bus Rtn A ENG 252 4/24/98 QC 16

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 kHz	0.5	Sine			✓	Figure 8	T128 Baseline
50 kHz to 100 kHz	0.5	Sine			✓	Figure 8	T140
100 kHz to 500 kHz	0.5	Sine			✓	Figure 8	T139
500 kHz to 1000 kHz	0.5	Sine			✓	Figure 8	T138

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TEST DATA SHEET 5 (Sheet ~~8~~ of ~~7~~)
CS02 Test (Paragraph 3.4.7.4)

+31 ~~28~~V Quiet Bus Rtn A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
1 MHz to 5 MHz	3.0	Sine			✓	Figure 8	T098
5 MHz to 10 MHz	3.0	Sine			✓	Figure 8	T099
10 MHz to 20 MHz	3.0	Sine			✓	Figure 8	T107
20 MHz to 50 MHz	3.0	Sine			✓	Figure 8	T106

+31 ~~28~~V Quiet Bus Rtn A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 MHz to 100 MHz	3.0	Sine			✓	Figure 8	T120
100 MHz to 200 MHz	3.0	Sine			✓	Figure 8	T121
200 MHz to 300 MHz	3.0	Sine			✓	Figure 8	T122
300 MHz to 400 MHz	3.0	Sine			✓	Figure 8	T123

+31 ~~+28~~V Noisy Bus A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 kHz	3.0	Sine			✓	Figure 8	11:38 Baseline
50 kHz to 100 kHz	3.0	Sine			✓	Figure 8	12:32
100 kHz to 500 kHz	3.0	Sine			✓	Figure 8	12:40
500 kHz to 1000 kHz	3.0	Sine			✓	Figure 8	12:46

TEST DATA SHEET 5 (Shee ~~4~~ 11 of ~~7~~ 14)
CS02 Test (Paragraph 3.4 7.4)

+31 ~~+28~~V Noisy Bus A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
1 MHz to 5 MHz	3.0	Sine			✓	Figure 8	15:50
5 MHz to 10 MHz	3.0	Sine			✓	Figure 8	15:57
10 MHz to 20 MHz	3.0	Sine			✓	Figure 8	9:16
20 MHz to 50 MHz	3.0	Sine			✓	Figure 8	9:22

+31 ~~+28~~V Noisy Bus A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 MHz to 100 MHz	3.0	Sine			✓	Figure 8	6:40
100 MHz to 200 MHz	3.0	Sine			✓	Figure 8	6:44
200 MHz to 300 MHz	3.0	Sine			✓	Figure 8	6:52
300 MHz to 400 MHz	3.0	Sine			✓	Figure 8	6:57

+31 ~~28~~V Noisy Bus Rtn A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 kHz	3.0	Sine			✓	Figure 8	11:38 Baseline
50 kHz to 100 kHz	3.0	Sine			✓	Figure 8	12:04
100 kHz to 500 kHz	3.0	Sine			✓	Figure 8	12:14
500 kHz to 1000 kHz	3.0	Sine			✓	Figure 8	12:22

ROK 4/25/98

TEST DATA SHEET 5 (Sheet ~~5~~ 12 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

+31 ~~28~~V Noisy Bus Rtn A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
1 MHz to 5 MHz	3.0	Sine			✓	Figure 8	16:04
5 MHz to 10 MHz	3.0	Sine			✓	Figure 8	16:10
10 MHz to 20 MHz	3.0	Sine			✓	Figure 8	~~9:27~~ 9:27
20 MHz to 50 MHz	3.0	Sine			✓	Figure 8	5/1/98 9:33

+31 ~~28~~V Noisy Bus Rtn A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 MHz to 100 MHz	3.0	Sine			✓	Figure 8	8:06
100 MHz to 200 MHz	3.0	Sine			✓	Figure 8	8:01
200 MHz to 300 MHz	3.0	Sine			✓	Figure 8	7:57
300 MHz to 400 MHz	3.0	Sine			✓	Figure 8	7:52

+31 ~~+28~~V Survival Bus A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 kHz	3.0	Sine			✓	Figure 8	
50 kHz to 100 kHz	3.0	Sine			✓	Figure 8	
100 kHz to 500 kHz	3.0	Sine			✓	Figure 8	
500 kHz to 1000 kHz	3.0	Sine			✓	Figure 8	

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TEST DATA SHEET 5 (Sheet ~~8~~ 13 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

+~~28~~31V Survival A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
1 MHz to 5 MHz	3.0	Sine			✓	Figure 8	
5 MHz to 10 MHz	3.0	Sine			✓	Figure 8	
10 MHz to 20 MHz	3.0	Sine			✓	Figure 8	
20 MHz to 50 MHz	3.0	Sine			✓	Figure 8	

+~~28~~31V Survival Bus A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 MHz to 100 MHz	3.0	Sine			✓	Figure 8	
100 MHz to 200 MHz	3.0	Sine			✓	Figure 8	
200 MHz to 300 MHz	3.0	Sine			✓	Figure 8	
300 MHz to 400 MHz	3.0	Sine			✓	Figure 8	

+~~28~~31V Survival Bus Rtn A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations
50 kHz	3.0	Sine			✓	Figure 8	
50 kHz to 100 kHz	3.0	Sine			✓	Figure 8	
100 kHz to 500 kHz	3.0	Sine			✓	Figure 8	
500 kHz to 1000 kHz	3.0	Sine			✓	Figure 8	

TEST DATA SHEET 5 (Sheet ~~7~~ 14 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

+31

~~28~~V Survival Bus Rtn A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
1 MHz to 5 MHz	3.0	Sine			✓	Figure 8	
5 MHz to 10 MHz	3.0	Sine			✓	Figure 8	
10 MHz to 20 MHz	3.0	Sine			✓	Figure 8	
20 MHz to 50 MHz	3.0	Sine			✓	Figure 8	

+31

~~28~~V Survival Bus Rtn A

Frequency Range	Test Level V_{p-p}	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 MHz to 100 MHz	3.0	Sine			✓	Figure 8	
100 MHz to 200 MHz	3.0	Sine			✓	Figure 8	
200 MHz to 300 MHz	3.0	Sine			✓	Figure 8	
300 MHz to 400 MHz	3.0	Sine			✓	Figure 8	

1 of 14

TEST DATA SHEET 5 (Sheet ~~1 of 7~~)
CS02 Test (Paragraph 3.4.7.4)

Test Setup Verified: Roger N. Khouzy 4/24/98
(Signature)

RUN #1

TAR # 4294

Noisy Bus @ 0.5Vp-p.

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
Oscilloscope	Tektronix	TDS 380	200079	4-1-98	4-1-99
Signal Gen. (10MHz - 26.5GHz)	HP	83630B	200202	1-15-98	1-15-99
Function Generator	HP	3325A	46279	3-13-98	9-13-98
Spectrum Analyzer	HP	8566B	R300636	6-13-97	6-13-98
Plotter	HP	7475A	47417	4-17-92	CNR
Broadband Power Amp.	Calton	5001	300637	4-13-98	4-13-99

(238) RNRall 4/25/98

Susceptibility to Injected Electromagnetic Energy on Power Leads, 30 hz to 50 kHz

27V ~~+28~~V Quiet Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 kHz	.5Vp-p	Sine			✓	Figure 8	T128 Baseline
50 kHz to 100 kHz	.5Vp-p	Sine			✓	Figure 8	T134
100 kHz to 500 kHz	.5Vp-p	Sine			✓	Figure 8	T133
500 kHz to 1000 kHz	.5Vp-p	Sine			✓	Figure 8	T132

*ST = Susceptibility Threshold, EL = Equipment Limit, SL = Specification Limit

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1-EMI

Engineer: [signature] 4/24/98

Serial No. 202

Quality Assurance: Estella N. Gonzales 5/1/98

Shop Order: 509644

Operator: Ken Shane 4/24/98

1A

TEST DATA SHEET 5 (Sheet 1 of 7)
CS02 Test (Paragraph 3.4.7.4)

Test Setup Verified: Roger N. Hlousky
(Signature)

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
Broad Band Amplifier	Eaton	5020B	46126	4-7-92	NDG
Broad Band Amp.	Eaton	3552B	46127	4-7-92	NDG
VHF Attenuator	HP	355C	L503307	9-24-97	12-24-98
VHF Attenuator (120 dB)	HP	355D	L508667	11-25-97	11-25-98
High Pass Filter	Solar Elect.	7415-1	N/A	N/A	N/A
25 Pin Breakout Box	Aerojet	SK1358704-2	743-5910	9-11-97	CNR

TEST DATA SHEET 5 (Sheet 2 of 14)
CS02 Test (Paragraph 3.4.7.4)

~~27V~~ +28V Quiet Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
1 MHz to 5 MHz	3Vpk-pk	Sine			✓	Figure 8	T094
5 MHz to 10 MHz	3Vpk-pk	Sine			✓	Figure 8	T095
10 MHz to 20 MHz	3Vp-p	Sine			✓	Figure 8	T0105
20 MHz to 50 MHz	3Vp-p	Sine			✓	Figure 8	T0104

~~27~~ +28V Quiet Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 MHz to 100 MHz	3Vp-p	Sine			✓	Figure 8	T122/124
100 MHz to 200 MHz	3Vp-p	Sine			✓	Figure 8	T113
200 MHz to 300 MHz	3Vp-p	Sine			✓	Figure 8	T114
300 MHz to 400 MHz	3Vp-p	Sine			✓	Figure 8	T115

~~28V Noisy~~ 27 Quiet Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 kHz	.5Vp-p	Sine			✓	Figure 8	Baseline
50 kHz to 100 kHz	.5Vp-p	Sine			✓	Figure 8	T135
100 kHz to 500 kHz	.5Vp-p	Sine			✓	Figure 8	T136
500 kHz to 1000 kHz	.5Vp-p	Sine			✓	Figure 8	T137

R Ollett 4/25/98 SHEET 69 OF 1767

27 R Ollett 4/25/98

TEST DATA SHEET 5 (Sheet 3 of 14)
CS02 Test (Paragraph 3.4.7.4)

28V Quiet Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
1 MHz to 5 MHz	3V p-p	Sine			✓	Figure 8	T101
5 MHz to 10 MHz	3V p-p	Sine			✓	Figure 8	T101
10 MHz to 20 MHz	3V p-p	Sine			✓	Figure 8	T109
20 MHz to 50 MHz	3V p-p	Sine			✓	Figure 8	T110

R Ollett 4/25/98
27

28V Quiet Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 MHz to 100 MHz	3V p-p	Sine			✓	Figure 8	T124
100 MHz to 200 MHz	3V p-p	Sine			✓	Figure 8	T125
200 MHz to 300 MHz	3V p-p	Sine			✓	Figure 8	T126
300 MHz to 400 MHz	3V p-p	Sine			✓	Figure 8	T127

R Ollett 4/25/98
27

+28V Noisy Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 kHz	.5Vp-p	Sine			✓	Figure 8	15:26 Baseline
50 kHz to 100 kHz	.5Vp-p	Sine			✓	Figure 8	16:02
100 kHz to 500 kHz	.5Vpp	Sine			✓	Figure 8	15:53
500 kHz to 1000 kHz	.5Vpp	Sine			✓	Figure 8	15:46

RAP Platt 4/25/98 QC 235

RAP Platt 4/25/98 14

SHEET 70 OF 1767 EXH NO.

TEST DATA SHEET 5 (Sheet 4 of 7)
CS02 Test (Paragraph 3.4.7.4)

+28V Noisy Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
1 MHz to 5 MHz	3Vpk-pk	Sine			✓	Figure 8	PASS 16:27
5 MHz to 10 MHz	3Vpk-pk	Sine			✓	Figure 8	PASS 16:33
10 MHz to 20 MHz	3Vp-p	Sine			✓	Figure 8	9:04
20 MHz to 50 MHz	3Vp-p	Sine			✓	Figure 8	9:07

RAP Platt 4/25/98

+28V Noisy Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 MHz to 100 MHz	3Vp-p	Sine			✓	Figure 8	7:10
100 MHz to 200 MHz	3Vp-p	Sine			✓	Figure 8	7:15
200 MHz to 300 MHz	3Vp-p	Sine			✓	Figure 8	7:19
300 MHz to 400 MHz	3Vp-p	Sine			✓	Figure 8	7:28

QC 235

RAP Platt 4/25/98

28V Noisy Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 kHz	.5Vp-p	Sine			✓	Figure 8	15:26
50 kHz to 100 kHz		Sine				Figure 8	Ref TAR # 4294
100 kHz to 500 kHz		Sine				Figure 8	
500 kHz to 1000 kHz		Sine				Figure 8	

SHEET 71 OF
NO. L767

RAI Platt 27 4/25/98

TEST DATA SHEET 5 (Sheet 5 of 4) RAI Platt 4/25/98
CS02 Test (Paragraph 3.4.7.4)

28V Noisy Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
1 MHz to 5 MHz	3V pk-pk	Sine			✓	Figure 8	PASS 16:19
5 MHz to 10 MHz	3V pk-pk	Sine			✓	Figure 8	PASS 16:23
10 MHz to 20 MHz	3V p-p	Sine			✓	Figure 8	9:39
20 MHz to 50 MHz	3V p-p	Sine			✓	Figure 8	9:43

RAI Platt 27 4/25/98

28V Noisy Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 MHz to 100 MHz	3V p-p	Sine			✓	Figure 8	7:34
100 MHz to 200 MHz	3V p-p	Sine			✓	Figure 8	7:39
200 MHz to 300 MHz	3V p-p	Sine			✓	Figure 8	7:43
300 MHz to 400 MHz	3V p-p	Sine			✓	Figure 8	7:47

RAI Platt 27 4/25/98

+28V Survival Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 kHz		Sine				Figure 8	
50 kHz to 100 kHz		Sine				Figure 8	
100 kHz to 500 kHz		Sine				Figure 8	
500 kHz to 1000 kHz		Sine				Figure 8	

QC 236

SHEET 12 OF 17

TEST DATA SHEET 5 (Sheet 5 of 7)
CS02 Test (Paragraph 3.4.7.4)

+28V Survival A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
1 MHz to 5 MHz	3Vp-pk	Sine			✓	Figure 8	PASS
5 MHz to 10 MHz	3Vp-pk	Sine			✓	Figure 8	PASS
10 MHz to 20 MHz	3V p-p	Sine			✓	Figure 8	Pass
20 MHz to 50 MHz	3V p-p	Sine			✓	Figure 8	Pass

+28V Survival Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 MHz to 100 MHz	3Vp-p	Sine			✓	Figure 8	Pass
100 MHz to 200 MHz	3Vp-p	Sine			✓	Figure 8	Pass
200 MHz to 300 MHz	3V p-p	Sine			✓	Figure 8	Pass
300 MHz to 400 MHz	3Vp-p	Sine			✓	Figure 8	Pass

28V Survival Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 kHz		Sine				Figure 8	
50 kHz to 100 kHz		Sine				Figure 8	
100 kHz to 500 kHz		Sine				Figure 8	
500 kHz to 1000 kHz		Sine				Figure 8	

TEST DATA SHEET 5 (Sheet 7 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

~~28~~V Survival Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
1 MHz to 5 MHz	3 V p-p	Sine			✓	Figure 8	Pass
5 MHz to 10 MHz	3 V p-p	Sine			✓	Figure 8	Pass
10 MHz to 20 MHz	3 V p-p	Sine			✓	Figure 8	Pass
20 MHz to 50 MHz	3 V p-p	Sine			✓	Figure 8	Pass

~~28~~V Survival Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 MHz to 100 MHz	3 V p-p	Sine			✓	Figure 8	Pass
100 MHz to 200 MHz	3 V p-p	Sine			✓	Figure 8	Pass
200 MHz to 300 MHz	3 V p-p	Sine			✓	Figure 8	Pass
300 MHz to 400 MHz	3 V p-p	Sine			✓	Figure 8	Pass

8 of 14

TEST DATA SHEET 5 (Sheet ~~1 of 7~~)
CS02 Test (Paragraph 3.4.7.4)

RAJ 4/25/98

~~Test Setup Verified: _____ (Signature)~~

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date

Susceptibility to Injected Electromagnetic Energy on Power Leads, 30 hz to 50 kHz

31 ~~+28~~V Quiet Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 kHz	.5V pp	Sine			✓	Figure 8	T128 Baseline
50 kHz to 100 kHz	.5V p-p	Sine			✓	Figure 8	T129
100 kHz to 500 kHz	.5V pp	Sine			✓	Figure 8	T130
500 kHz to 1000 kHz	.5V pp	Sine			✓	Figure 8	T131

*ST = Susceptibility Threshold, EL = Equipment Limit, SL = Specification Limit

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. _____ Engineer: _____

Serial No. _____ Quality Assurance: _____

Shop Order: _____ Operator: _____

AE-26151/8
14 Aug 97

~~68~~ ~~1769~~

RJ Platt 4/25/98

TEST DATA SHEET 5 (Sheet ~~2~~ 9 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

31 QC 236

+~~28~~V Quiet Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
1 MHz to 5 MHz	3Vpk-pk	Sine			✓	Figure 8	T096
5 MHz to 10 MHz	3Vpk-pk	Sine			✓	Figure 8	T097
10 MHz to 20 MHz	3Vp-p	Sine			✓	Figure 8	T105
20 MHz to 50 MHz	3Vp-p	Sine			✓	Figure 8	T106

31
+~~28~~V Quiet Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 MHz to 100 MHz	3Vp-p	Sine			✓	Figure 8	T116
100 MHz to 200 MHz	3Vp-p	Sine			✓	Figure 8	T117
200 MHz to 300 MHz	3Vp-p	Sine			✓	Figure 8	T118
300 MHz to 400 MHz	3Vp-p	Sine			✓	Figure 8	T119

31 Quiet
~~28V Noisy~~ Bus Rtn A ENG 252 4/24/98 QC 16

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 kHz	.5Vp-p	Sine			✓	Figure 8	T128 Baseline
50 kHz to 100 kHz	.5Vp-p	Sine			✓	Figure 8	T140
100 kHz to 500 kHz	.5Vp-p	Sine			✓	Figure 8	T139
500 kHz to 1000 kHz	.5Vp-p	Sine			✓	Figure 8	T138

TEST DATA SHEET 5 (Sheet 8 of 7)
CS02 Test (Paragraph 3.4.7.4)

31 ~~28~~V Quiet Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
1 MHz to 5 MHz	3V p-pk	Sine			✓	Figure 8	T098
5 MHz to 10 MHz	3V p-pk	Sine			✓	Figure 8	T099
10 MHz to 20 MHz	3Vp-p	Sine			✓	Figure 8	T107
20 MHz to 50 MHz	3Vp-p	Sine			✓	Figure 8	T107

31 ~~28~~V Quiet Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 MHz to 100 MHz	3Vp-p	Sine			✓	Figure 8	T120
100 MHz to 200 MHz	3Vp-p	Sine			✓	Figure 8	T121
200 MHz to 300 MHz	3Vp-p	Sine			✓	Figure 8	T122
300 MHz to 400 MHz	3Vp-p	Sine				Figure 8	T123

31 ~~+28V~~ Noisy Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 kHz	.5Vp-p	Sine			✓	Figure 8	15:26 Baseline
50 kHz to 100 kHz	.5Vp-p	Sine			✓	Figure 8	15:29
100 kHz to 500 kHz	.5Vp-p	Sine			✓	Figure 8	15:36
500 kHz to 1000 kHz	.5Vp-p	Sine			✓	Figure 8	15:41

4/25/97

TEST DATA SHEET 5 (Sheet ~~7~~ 11 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

~~Sheet 70 of 1767~~

31 ~~+28V~~ Noisy Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
1 MHz to 5 MHz	3V pk-pk	Sine			✓	Figure 8	PASS 15:50
5 MHz to 10 MHz	3V pk-pk	Sine			✓	Figure 8	PASS 15:57
10 MHz to 20 MHz	3V p-p	Sine			✓	Figure 8	9:16 Pass
20 MHz to 50 MHz	3V p-p	Sine			✓	Figure 8	9:22 Pass

31 ~~+28V~~ Noisy Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 MHz to 100 MHz		Sine				Figure 8	6:40
100 MHz to 200 MHz		Sine				Figure 8	6:44
200 MHz to 300 MHz		Sine				Figure 8	6:52
300 MHz to 400 MHz		Sine				Figure 8	6:57

31 ~~28V~~ Noisy Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 kHz		Sine				Figure 8	
50 kHz to 100 kHz		Sine				Figure 8	
100 kHz to 500 kHz		Sine				Figure 8	
500 kHz to 1000 kHz		Sine				Figure 8	

TEST DATA SHEET 5 (Sheet ~~8~~ 12 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

~~28~~ 31V Noisy Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
1 MHz to 5 MHz	3V pk-pk	Sine			✓	Figure 8	PASS 16:04
5 MHz to 10 MHz	3V pk-pk	Sine			✓	Figure 8	PASS 16:10
10 MHz to 20 MHz	3V p-p	Sine			✓	Figure 8	9:27
20 MHz to 50 MHz	3V p-p	Sine			✓	Figure 8	9:33

~~28~~ 31V Noisy Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 MHz to 100 MHz	3V p-p	Sine			✓	Figure 8	8:06
100 MHz to 200 MHz	3V p-p	Sine			✓	Figure 8	8:01
200 MHz to 300 MHz	3V p-p	Sine			✓	Figure 8	7:57
300 MHz to 400 MHz	3V p-p	Sine			✓	Figure 8	7:52

~~+28~~ 31V Survival Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 kHz		Sine				Figure 8	
50 kHz to 100 kHz		Sine				Figure 8	
100 kHz to 500 kHz		Sine				Figure 8	
500 kHz to 1000 kHz		Sine				Figure 8	

[redacted]

~~SHEET 1 of 1~~ 1767

RAH Platt 4/25/98

TEST DATA SHEET 5 (Sheet ~~8~~ 13 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

~~+28~~ 31V Survival A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
1 MHz to 5 MHz	3V p-p	Sine			✓	Figure 8	PASS
5 MHz to 10 MHz	3V p-p	Sine			✓	Figure 8	PASS
10 MHz to 20 MHz	3V p-p	Sine			✓	Figure 8	Pass
20 MHz to 50 MHz	3V p-p	Sine			✓	Figure 8	Pass

~~+28~~ 31V Survival Bus A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 MHz to 100 MHz	3V p-p	Sine			✓	Figure 8	Pass
100 MHz to 200 MHz	3V p-p	Sine			✓	Figure 8	Pass
200 MHz to 300 MHz	3V p-p	Sine			✓	Figure 8	Pass
300 MHz to 400 MHz	3V p-p	Sine			✓	Figure 8	Pass

~~28~~ 31V Survival Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 kHz		Sine				Figure 8	
50 kHz to 100 kHz		Sine				Figure 8	
100 kHz to 500 kHz		Sine				Figure 8	
500 kHz to 1000 kHz		Sine				Figure 8	

[redacted]

TEST DATA SHEET 5 (Sheet ~~7~~ 14 of ~~7~~ 14)
CS02 Test (Paragraph 3.4.7.4)

31

~~28~~V Survival Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
1 MHz to 5 MHz	3Vp-p	Sine			✓	Figure 8	PAS
5 MHz to 10 MHz	3Vp-p	Sine			✓	Figure 8	PASS
10 MHz to 20 MHz	3Vp-p	Sine			✓	Figure 8	Pass
20 MHz to 50 MHz	3Vp-p	Sine			✓	Figure 8	Pass

31

~~28~~V Survival Bus Rtn A

Frequency Range	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
50 MHz to 100 MHz	3Vp-p	Sine			✓	Figure 8	Pass
100 MHz to 200 MHz	3Vp-p	Sine			✓	Figure 8	Pass
200 MHz to 300 MHz	3Vp-p	Sine			✓	Figure 8	Pass
300 MHz to 400 MHz	3Vp-p	Sine			✓	Figure 8	Pass

AE-26151/8
23 Apr 93

4/30/98 ENG 252

RUN #2

TEST DATA SHEET 6 (Sheet 1 of 2)
CS06 Test (Paragraph 3.4.8.4)

Test Setup Verified: Ken Shane 5/4/98
(Signature)

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
oscilloscope	Tektronix	TDS 380	200079	4-1-98	4-1-99
Spike Generator	Solar Elect.	7054-1	46/34-3	6-9-94	NDG
10MF feedthrough Capacitor	Solar Elect.	6572-106R	N/A	N/A	N/A
25 Pin Breakout Box	Aerojet	SK1358704-2	743-5910	9-11-97	CNR

+29
~~+28V~~ Quiet Bus A

Pulse Amplitude and Polarity	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		T141 Baseline
+29V pulse	30Vp	Spike 10µs 10pps			✓	Figure 11	T142
−29V pulse	30Vp	Spike 10µs 10pps			✓	" "	T143

+29V
~~+28V~~ Noisy Bus A

Pulse Amplitude and Polarity	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		9:20 Baseline
+29V pulse	30Vp	Spike 10µs 10pps			✓	Figure 11	9:22
−29V pulse	30Vp	Spike 10µs 10pps			✓		9:29

*ST = Susceptibility Threshold, EL = Equipment Limit, SL = Specification Limit

Assembly Part No. 1356006-1 EMI

Serial No. 202

Shop Order: 509649

Engineer: [signature] 5-4-98

Quality Assurance:

Operator: Ken Shane 5/4/98

TEST DATA SHEET 6 (Sheet 2 of 2)
CS06 Test (Paragraph 3.4.8.4)

1 QC 10 ENG 252 4/29/98

+29V
~~+28V~~ Survival Bus A

Pulse Amplitude and Polarity	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
+29V pulse	30Vp	Spike 10µs 10pps			✓	Figure 11	
−29V pulse	30Vp	Spike 10µs 10pps			✓		

TEST DATA SHEET 10 (Sheet 1 of 2)
RS01 Test (Paragraph 3.4.12.4)

Test Setup Verified: Ken Shane 5/6/98
(Signature)

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
Oscilloscope	Tek	TDJ380	20079	4-17-98	4-1-99
Function Generator	H.P	3325A	46279	3-13-98	9-13-98
Magnetic Field Loop	Stoddart	95055-1	L502039		CNR
Power Amp	Eaton	5001	300637	4-13-99	4-13-98
Power Amp	McIntosh	MC2205	45071	NDG	NDG
Resistor Precision	Solar	7144-1	L0502137	NDG	NDG
VHF Attenuator	HP	355D	L508667	11-25-97	11-25-98
VHF Attenuator	HP	355C	L503307	8-29-97	11-29-98

~~Susceptibility Magnetic Fields~~

Instrument Lateral Walls Distance _____ in.

Plot No.	Frequency Range	Test Level dBpT	Equivalent Volt Level	Limit Factor* ST	EL	SL	Spec Limit Criteria	Comments/ Observations T200 Baseline
—	30 Hz to 360 Hz	124	168 mV			✓	Figure 19	T201
—	360 Hz to 2000 Hz	124	243 mV			✓	Figure 19	T204
—	2 kHz to ~~20~~ 4 kHz	124	410 mV			✓	Figure 19	T207
—	~~20~~ 4 kHz to ~~200~~ 8 kHz	124	746 mV			✓	Figure 19	T210
—	8 kHz to 10 kHz	124	1.16 V			✓	Figure 19	T213
—	10 kHz to 50 kHz	124	116 mV			✓	Figure 19	T216
—	50 kHz to 200 kHz	124	110 mV			✓	Figure 19	T219

* ST = Susceptibility Threshold, EL = Equipment Limit, SL = Specification Limit

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1

Serial No. 202

Shop Order: 509644

Engineer: 9 May 98

Quality Assurance: Judy Harvey

Operator: Ken Shane 5/7/98

DCMC J. Sanford 5-8-98

RS01 Test (Paragraph 3.4.12.4)

Test Setup Verified: Roger Khouri
(Signature)

Instrument Connectors — Distance _____ in.

Plot No.	Frequency Range	Test Level dBpT	Equivalent Volt Level	Limit Factor* ST	Limit Factor* EL	Limit Factor* SL	Spec Limit Criteria	Comments/ Observations
—	30 Hz to 360 Hz	124	168 mV			✓	Figure 19	T202
—	360 Hz to 2000 Hz	124	243 mV			✓	Figure 19	T205
—	2 kHz to ~~20~~ 4 kHz	124	410 mV			✓	Figure 19	T208
—	~~20~~ 4 kHz to ~~200~~ 8 kHz	124	746 mV			✓	Figure 19	T211
—	8 kHz to 10 kHz	124	1.16 V			✓	Figure 19	T214
—	10 kHz to 50 kHz	124	116 mV			✓	Figure 19	T217
	50 kHz to 200 kHz		110 mV			✓	Figure 19	T220

Instrument Cables — Distance _____ in.

Plot No.	Frequency Range	Test Level dBpT	Equivalent Volt Level	Limit Factor* ST	Limit Factor* EL	Limit Factor* SL	Spec Limit Criteria	Comments/ Observations
—	30 Hz to 360 Hz	124	168 mV			✓	Figure 19	T203
—	360 Hz to 2000 Hz	124	243 mV			✓	Figure 19	T206
—	2 kHz to ~~20~~ 4 kHz	124	410 mV			✓	Figure 19	T209
—	~~20~~ 4 kHz to ~~200~~ 8 kHz	124	746 mV			✓	Figure 19	T212
—	8 kHz to 10 kHz	124	1.16 V			✓	Figure 19	T215
—	10 kHz to 50 kHz	124	116 mV			✓	Figure 19	T218
—	50 kHz to 200 kHz	124	110 mV			✓	Figure 19	T221

TEST DATA SHEET 11 (Sheet 1 of 2)
Static H Field (Paragraph 3.4.13.4)

Test Setup Verified: Ken Shane 5-7-98
(Signature)

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
Gauss Probe	F.W. Bell	MOX99-2506	R300643	4/27/98	4/27/99
Gaussmeter	F.W. Bell	9500	R300625	12/3/96	12/3/98
DC Power Supply	Power Designs	3650-S	39280	30 JAN 97	30 JAN 99
Load Coil	Eaton	96004	L503127	5-6-89	CNR

Susceptibility Magnetic Fields

Instrument Lateral Walls Distance _____ in.

Location	Test Level	Equivalent Volt Level	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
Lateral Walls	2.02G	+1.2VDC			✓	2 gauss	T300

* ST = Susceptibility Threshold, EL = Equipment Limit, SL = Specification Limit

Note: Attach all backup data generated during the test (photos, printouts plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1

Serial No. 202

Shop Order: 509644

Engineer: 7 May 98

Quality Assurance: MAY 8

Operator: Ken Shane 5/7/98

Customer Rep.: 5-8-98

R.M. Neal
5-7-98

TEST DATA SHEET 11 (Sheet 2 of 2)
Static H Field (Paragraph 3.4.13.4)

Test Setup Verified: Ken Shem 5/7/98
(Signature)

Instrument Connectors Distance _____ in.

Location	Test Level	Equivalent Volt Level	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
Instrument Connectors	2.02G	+1.2VDC			✓	2 gauss	T301

Instrument Cables Distance _____ in.

Location	Test Level	Equivalent Volt Level	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
Instrument Cables	2.02G	+1.2VDC			✓	2 gauss	T302

TAR # 4742

TEST DATA SHEET 7 (Sheet 1 of 3)
RS03 Test (Paragraph 3.4.9.4)

Test Setup Verified: Ken Shaw 5/12/98
(Signature)

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
SPECTRUM ANALYZER	HP	8566B	8300636	6-13-97	6-13-98
PROBE MEASUREMENT	Amp Research	FP2000	300642	N/A	N/A
O-SCOPE	TEKTRONIX	TDS 380	200079	4-1-98	4-1-99
SIGNAL GENERATOR	H.P.	8363B	200202	1-15-98	1-15-99
FUNCT. GEN	H.P.	3325A	46279	3-13-98	9-13-98
PLOTTER	H.P.	7475A	47417	4-17-92	CNR
BROADBAND PWR AMP	EATON	5601	300637	4-13-98	4-13-99
ANTENNA	AILTECH	96002	46134-7	4-21-98	CNR
ANTENNA	AILTECH	96003	46134-8	4-21-98	CNR
ISOTROPIC FIELD MONITOR	Amp Research	FM2000	300641	4-21-90	N/A
BROADBAND AMP	EATON	15008	46128	NDG	NDG
BROADBAND AMP	EATON	50206	46126	NDG	NDG
BROADBAND AMP	EATON	3552B	46127	NDG	NDG
VHF ATTENUATOR	H.P.	355C	L503367	9-24-97	12-24-98
VHF ATTENUATOR	H.P.	355D	L508667	11-25-97	11-25-98
AMP.	VARIAN	VZL6941	47556	4-7-92	NDG
AMP	VARIAN	VZC6961	47517	4-7-92	NDG
AMP.	VARIAN	VZJ6951	46957	2-6-97	NDG
AMP.	VARIAN	VZM6991	46833	3-16-98	NDG

Note: Attach all backup data generated during the test (photos, printouts, plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1 Engineer: [signature] 15 May 98

Serial No. 202 Quality Assurance: [signature] 5/14/98

Shop Order: 509644 Operator: Ken Shaw 5/15/98

QC 16 ENG 252 Customer Rep: _____

TEST DATA SHEET 7 (Sheet 2 of 3)
RS03 Test (Paragraph 3.4.9.4)

Susceptibility to Radiated Electric Fields

	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
14 kHz to 100 kHz	2 V/m	Sine			✓	2 V/m	
100 to 500 kHz	2 V/m	Sine			✓	2 V/m	
500 kHz to 1 MHz	2 V/m	Sine			✓	2 V/m	
1 to 5 MHz	2 V/m	Sine			✓	2 V/m	
5 to 8 MHz	2 V/m	Sine			✓	2 V/m	
8 to 12 MHz	2 V/m	Sine			✓	2 V/m	
12 to 14 MHz	2 V/m	Sine			✓	2 V/m	
14 to 20 MHz	2 V/m	Sine	✓			2 V/m	Failed
18 MHz	1.4 V/m	Sine	✓			2 V/m	Passed
20 to 30 MHz	2 V/m	Sine			✓	2 V/m	
30 to 50 MHz	2 V/m	Sine			✓	2 V/m	H&V Antenna
50 to 100 MHz	2 V/m	Sine			✓	2 V/m	H&V Antenna
100 to 200 MHz	2 V/m	Sine			✓	2 V/m	H&V Antenna
200 to 500 MHz	2 V/m	Sine			✓	2 V/m	
500 to 700 MHz	2 V/m	Sine			✓	2 V/m	
700 MHz to 1 GHz	2 V/m	Sine			✓	2 V/m	
1 to 2 GHz	2 V/m	SINE			✓	2 V/m	H&V Antenna
2 to 3 GHz	10 V/m	Sine			✓	10 V/m	H&V Antenna
3 to 4 GHz	10 V/m	Sine			✓	10 V/m	H&V Antenna
4 to 6 GHz	10 V/m	Sine			✓	10 V/m	H&V Antenna
6 to 8 GHz	10 V/m	Sine			✓	10 V/m	H&V Antenna
8 to 10 GHz	10 V/m	Sine			✓	10 V/m	H&V Antenna
10 to 12 GHz	10 V/m	Sine			✓	10 V/m	H&V Antenna
12 to 15 GHz	10 V/m	Sine			✓	10 V/m	H&V Antenna
15 to 18 GHz	10 V/m	Sine			✓	10 V/m	H&V Antenna
2.287 GHz ± 2 MHz	20 V/m	Sine			✓	20 V/m	H&V Antenna
8.2125 GHz ± 187.5 MHz	20 V/m	Sine			✓	20 V/m	H&V Antenna

* ST = Susceptibility Threshold, EL = Equipment Limit, SL = Specification Limit
Horizontal & Vertical Polarization (H&V)

TEST DATA SHEET 7 (Sheet 3 of 3)
RS03 Test (Paragraph 3.4.9.4)

Susceptibility to Radiated Electric Fields

	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		

* ST = Susceptibility Threshold, EL = Equipment Limit, SL = Specification Limit

AE-26151/8
23 Apr 98

TAR # 4742
oper 8010
Retest

TEST DATA SHEET 7 (Sheet 1 of 3)
RS03 Test (Paragraph 3.4.9.4)

Test Setup Verified: _____ 5/20/98
(Signature)

RUN # 2

Test Equipment Log

Item	Manufacturer	Model/Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
PROBE MEASUREMENT	AMP RESEARCH	FP2000	300642	4-22-98 ~~N/A~~	4-22-99 ~~N/A~~
SIGNAL GENERATOR	H.P.	83630B	200202	1-15-98	1-15-99
ANTENNA	AIL TECH	96003	46134-8 *	4-21-90	CNR
ISOTROPIC FIELD MONITOR	AMP RESEARCH	FM 2000	300641	4-22-98 ~~4-21-98~~ N/A	4-22-99 ~~N/A~~
BROADBAND AMP.	EATON	5020B	46126	NDE	NDE
VHF ATTENUATOR	HP	355C	L503307	9-24-97	12-24-98
VHF ATTENUATOR	HP	355D	L508667	11-25-97	11-25-98

* TRIPOD ID # C20029 USED IS CALIBRATED AS PART OF EMC ANALYZER HP8591EM, ID.# C200224 CAL. 1-16-98 DUE. 1-16-99

Note: Attach all backup data generated during the test (photos, printouts, plots, test logs, additional comments or observations, etc.) to this data sheet.

Signature/Date

Assembly Part No. 1356006-1 EM1 Engineer: _____ 20 May 98

Serial No. 202 Quality Assurance: _____

Shop Order: 509644 Operator: _____ 5/20/98
Amendment #1
oper 8460

Customer Rep: _____

TAR # 4742
oper 8010

TEST DATA SHEET 7 (Sheet 2 of 3)
RS03 Test (Paragraph 3.4.9.4)

Susceptibility to Radiated Electric Fields

	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
18 MHz	2 V/m	Sine			✓	2 V/m	
14 to 20 MHz	2 V/m	Sine			✓	2 V/m	
N/A							
See Previous Data Sheet for 1212 S/O 50964 Oper 0150 Dated 5/12/98 5-20-98 ENG 252							
N/A							

* ST = Susceptibility Threshold, EL = Equipment Limit, SL = Specification Limit

TAR # 4742
oper 8010

TEST DATA SHEET 7 (Sheet 3 of 3)
RS03 Test (Paragraph 3.4.9.4)

Susceptibility to Radiated Electric Fields

	Test Level	Signal Type or Waveform	Limit Factor*			Spec Limit Criteria	Comments/ Observations
			ST	EL	SL		
N/A							
See Previous Data Sheet Dated 5-12-98 Per S/O 5C9644 Oper. 0150 (ENG 162 5-26-98)							
N/A							

* ST = Susceptibility Threshold, EL = Equipment Limit, SL = Specification Limit

NASA
National Aeronautics and Space Administration

Report Documentation Page

1. Report No. ---	2. Government Accession No. ---	3. Recipient's Catalog No. ---
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		6. Performing Organization Code: ---
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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 Engineering Test Report, Electromagnetic Interference (EMI)/Electromagnetic Radiation (EMR) and Electromagnetic Compatibility (EMC) For The EOS/AMSU-A2, 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	
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11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

12b. DISTRIBUTION CODE

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13. ABSTRACT (*Maximum 200 words*)

This is the Engineering Test Report, Electromagnetic Interference (EMI)/Electromagnetic Radiation (EMR) and Electromagnetic Compatibility (EMC) For The EOS/AMSU-A2, for the Integrated Advanced Microwave Sounding Unit-A (AMSU-A).

14. SUBJECT TERMS

EOS
Microwave System

15. NUMBER OF PAGES

16. PRICE CODE

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17. SECURITY CLASSIFICATION OF REPORT

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18. SECURITY CLASSIFICATION OF THIS PAGE

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19. SECURITY CLASSIFICATION OF ABSTRACT

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20. LIMITATION OF ABSTRACT

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