

FCC PART 15, SUBPART C
TEST METHOD: ANSI C63.4-1992

for

**MPCI TYPE 3A 802.11B
WIRELESS + V.92 MODEM CARD**

Model: M3AWE56GA

Prepared for

XIRCOM, INC.
2300 CORPORATE CENTER DRIVE
THOUSAND OAKS, CALIFORNIA 91320

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DATE: NOVEMBER 13, 2001

	REPORT BODY	APPENDICES				TOTAL
		<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	
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FIGURE	TITLE
1	Conducted Emissions Test Setup
2	Plot Map And Layout of Test Site



GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Device Tested: MPC1 Type 3A 802.11B Wireless + V.92 Modem Card
Model: M3AWEB56GA
S/N: N/A

Modifications: The EUT was not modified in order to meet the specifications.

Manufacturer: Xircom, Inc.
2300 Corporate Center Drive
Thousand Oaks, California 91320

Test Date: November 8, 2001

File # For Canada IC2154-D

Test Specifications: EMI requirements
FCC Title 47, Part 15 Subpart B; and Subpart C, sections 15.205, 15.207,
15.209, and 15.247

Test Procedure: ANSI C63.4: 1992

Test Deviations: The test procedure was not deviated from during the testing.



SUMMARY OF TEST RESULTS

<i>TEST</i>	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 450 kHz – 30 MHz	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.207
2	Spurious Radiated RF Emissions, 10 kHz – 25000 MHz	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247(c)
3	Fundamental and Emissions produced by the intentional radiator in non-restricted bands, 10 kHz – 25 GHz	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247(c)
4	Emissions produced by the intentional radiator in restricted bands, 10 kHz – 25 GHz	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.205 and 15.209(a)
5	6 dB Bandwidth	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (a)(2)
6	Maximum Peak Output Power	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (b)(1)
7	RF Antenna Conducted	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (c)
8	Peak Power Spectral Density Conducted from the Intentional Radiator to the Antenna	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (d)
9	Processing Gain	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (e)



1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the MPCl Type 3A 802.11B Wireless + V.92 Modem Card Model: M3AWEB56GA. Only the RF module itself is being approved. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 1992. The tests were performed in order to determine whether the electromagnetic emissions from the MPCl Type 3A 802.11B Wireless + V.92 Modem Card, referred to as EUT hereafter, are within the specification limits defined by FCC Title 47, Part 15, Subpart C, sections 15.207, 15.209, and 15.247.



2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California 92823.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Xircom, Inc.

James K. Baer	Manager Global Compliance Engineer
Robert W. Paxman	Compliance Engineer

Compatible Electronics Inc.

Kyle Fujimoto	Test Engineer
Scott McCutchan	Lab Manager

2.4 Date Test Sample was Received

The test sample was received on October 30, 2001

2.5 Disposition of the Test Sample

The test sample was returned to Xircom, Inc. on November 9, 2001.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network



3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
FCC Title 47, Part 15 Subpart C	FCC Rules - Radio frequency devices (including digital devices) – Intentional Radiators.
ANSI C63.4 1992	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.
FCC Title 47, Part 15 Subpart B	FCC Rules - Radio frequency devices (including digital devices) – Unintentional Radiators.



4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

Specifics of the EUT and Peripherals Tested

The MPCI Type 3A 802.11B Wireless + V.92 Modem Card Model: M3AWEB56GA (EUT) was connected to a Mini-PCI to CardBus extender via the Mini PCI connector. The Mini PCI to CardBus extender was then connected to a CardBus to PCI adapter, which was connected to the PCI Bus of the Desktop computer. The extender and adapter were used so that the EUT could be placed outside of the computer and tested as a stand alone unit. The computer was also connected to the monitor, modem, printer, keyboard, and mouse via its video, serial, parallel, keyboard, and mouse ports, respectively. The EUT had a Rangestar antenna with a unique MMCX style micro-miniature connector. The low (channel 1), medium (channel 6), and high (channel 11) channels were tested. The EUT was transmitting and receiving on a continuous basis. The radiated as well as the conducted data was taken in this mode of operation. All initial investigations were performed with the spectrum analyzer in manual mode scanning the frequency range continuously. The cables were bundled and routed as shown in the photographs in Appendix C. The data sheets are located in Appendix D.

Note: also included in the data sheets per request of Xircom, Inc is a typical configuration using the Foxconn omni-directional, monopole antenna. The low, medium, and high channels were also tested for this configuration. This configuration is NOT part of the modular approval. The setup was the same as described above, except the EUT was in a typical configuration (installed inside the computer in one of the PCI slots, with the backplate having a reverse thread SMA connector) instead of being tested as a stand alone unit. The connector on the Foxconn antenna was a reverse thread SMA. The Foxconn antenna has a gain of at least -9 dBi. The data sheets for these will be at the end of Appendix D.



4.1.1 Cable Construction and Termination

- Cable 1** This is a 2 meter braid and foil shielded cable connecting the computer to the monitor. It has a high density D-15 pin metallic connector at the computer end and is hard wired into the monitor. The cable was bundled to a length of 1 meter. The shield of the cable was grounded to the chassis via the connector.
- Cable 2** This is a 5 foot braid and foil shielded cable connecting the computer to the printer. It has a D-25 pin metallic connector the computer end and a Centronics metallic type connector at the printer end. The shield of the cable was grounded to the chassis via the connectors.
- Cable 3** This is a 4 foot foil shielded cable connecting the computer to the keyboard. It has a 6 pin mini DIN metallic connector the computer end and is hard wired into the keyboard. The shield of the cable was grounded to the chassis via the connector.
- Cable 4** This is a 6 foot foil shielded cable connecting the computer to the mouse. It has a 6 pin mini DIN metallic connector the computer end and is hard wired into the mouse. The shield of the cable was grounded to the chassis via the connector.
- Cable 5** This is a 5 foot braid and foil shielded cable connecting the computer to the modem. It has a D-9 pin metallic connector the computer end and a D-25 pin metallic connector at the modem end. The cable was bundled to a length of 1 meter. The shield of the cable was grounded to the chassis via the connectors.



5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
MPCI Type 3A 802.11B Wireless + V.92 Modem Card (EUT)	XIRCOM, INC.	M3AWEB56GA	N/A	J3OM3AWEB56GA
MONITOR	OPTIQUEST	VCDS21375-1M	5D81800672	GSS15016
COMPUTER	DELL	MCM	CLFHF	DoC
MODEM	HAYES	6802US	A05968023117	BFJ9D96802US
PRINTER	CITIZEN	LSP-10	1262247-73	DLK66TLSP-10
MOUSE	MICROSOFT	P/N: 68874	02640236	C3KKZB1
KEYBOARD	DELL	SK-1000RE	M950529075	GYUR10SK
RANGESTAR ANTENNA (EUT)	RANGESTAR	N/A	N/A	N/A
MINI PCI TO CARDBUS EXTENDER	N/A	N/A	N/A	N/A
CARDBUS TO PCI ADAPTER	N/A	N/A	N/A	N/A



5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Radiated Emissions Manual Test – Radiated	Compatible Electronics, Inc.	N/A	N/A	N/A	N/A
Conducted Emissions Program	Compatible Electronics, Inc.	N/A	N/A	N/A	N/A
Spectrum Analyzer	Hewlett Packard	8566B	3701A22262	June 15, 2001	June 15, 2002
Preamplifier	Com Power	PA-102	1017	Jan. 5, 2001	Jan. 5, 2002
Quasi-Peak Adapter	Hewlett Packard	85650A	2811A01363	June 15, 2001	June 15, 2002
RF Attenuator	Weinschel Corp.	2	BJ6396	Aug. 1, 2001	Aug. 1, 2002
LISN	Com-Power	LI-215	12078	Nov. 11, 2000	Nov. 11, 2001
LISN	Com-Power	LI-215	12082	Nov. 21, 2000	Nov. 21, 2001
Biconical Antenna	Com Power	AB-100	1548	Oct. 11, 2001	Oct. 11, 2002
Log Periodic Antenna	Com Power	AL-100	16089	Oct. 11, 2001	Oct. 11, 2002
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Hewlett Packard	D5251A 888	US74458128	N/A	N/A
Printer	Hewlett Packard	C5886A	SG7CM1P090	N/A	N/A
Monitor	Hewlett Packard	D5258A	DK74889705	N/A	N/A
Loop Antenna	Com-Power	AL-130	25309	May 21, 2001	May 21, 2002
Horn Antenna	Antenna Research	DRG-118/A	1053	Jan. 15, 2001	Jan. 15, 2002
Horn Antenna	Antenna Research	MWH-1826/B	1004	Jan. 21, 1997	N.C.R.



EMI Test Equipment (Continued)

EQUIPMENT TYPE	MANU- FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Microwave Preamplifier	Com-Power	PA-122	25195	Jan. 9, 2001	Jan. 9, 2002
Amplifier	Hewlett Packard	11975A	2403A00202	Feb. 5, 2001	Feb. 5, 2002
Harmonic Mixer	Hewlett Packard	11970K	3003A05460	Feb. 17, 2001	Feb. 17, 2002
Power Meter	Hewlett Packard	436A	2236A15362	May 26, 2001	May 26, 2002
Power Sensor	Hewlett Packard	8482H	GG00000006	May 26, 2001	May 26, 2002



6. TEST SITE DESCRIPTION

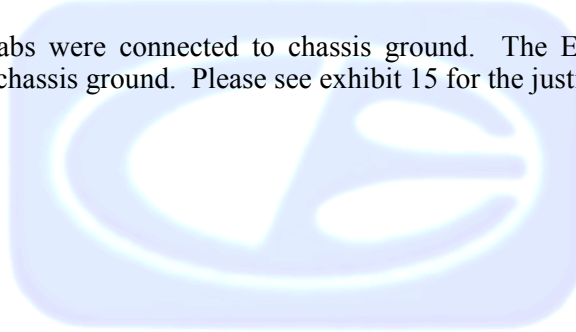
6.1 Test Facility Description

Please refer to section 2.1 and 8.1.2 of this report for EMI test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT's tabs were connected to chassis ground. The EUT's RF shielding was NOT connected to chassis ground. Please see exhibit 15 for the justification letter.



7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Transmitter Power

Transmit power is herein defined as the power delivered to a 50 Ohm load at the proprietary antenna connector on the EUT.

Power	Channel Number	Accuracy
15.11 dBm	1	+1/-1 dB
15.21 dBm	6	+1/-1 dB
15.30 dBm	11	+1/-1 dB

7.2 Channel Number and Frequencies

Channel Number	Channel center Frequency (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

7.3 Chipping Rate

11 chips / bits by IEEE 802.11 Standard

7.4 Spreading Gain

The theoretical spreading gain, is 11.2 dB.

7.5 Antenna Gain

0 dBi for the Rangestar antenna, -9 to -11 dBi for the Foxconn antenna.



7.6 Processing Gain

NOTE: This information is from the Intersil MiniPCI 2.4 GHz WLAN transceiver Radio. This testing was performed by Carl Andren of Intersil Corporation.

The same exact design of the Intersil MiniPCI 2.4 GHz WLAN transceiver Radio is incorporated in the product being certified.

Jamming Margin Method

Please see page 6 of the Intersil Corporation Processing Gain Report. The report is located in Exhibit 11 of this FCC Application.



8. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

8.1 RF Emissions

8.1.1 Conducted Emissions Test

The spectrum analyzer was used as a measuring meter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak was used only where indicated in the data sheets. A 10 dB attenuation pad was used for the protection of the spectrum analyzer input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4: 1992. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the Compatible Electronics conducted emissions software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave. The final qualification data is located in Appendix D.



8.1.2 Radiated Emissions (Spurious and Harmonics) Test

The spectrum analyzer was used as a measuring meter along with the quasi-peak adapter. Amplifiers were used to increase the sensitivity of the instrument. The Com Power Preamplifier Model: PA-102 was used for frequencies from 30 MHz to 1 GHz, and the Com-Power Microwave Preamplifier Model: PA-122 was used for frequencies above 1 GHz. The spectrum analyzer was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps. The quasi-peak adapter was used only for those readings which are marked accordingly on the data sheets. The frequencies above 1 GHz were averaged manually by narrowing the video filter down to 10 Hz and putting the sweep time on AUTO on the spectrum analyzer to keep the amplitude reading calibrated. The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
10 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 300 MHz	120 kHz	Biconical Antenna
300 MHz to 1 GHz	120 kHz	Log Periodic Antenna
1 GHz to 25 GHz	1 MHz	Horn Antenna

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4: 1992. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results. The loop antenna was also rotated in the horizontal and vertical axis in order to ensure accurate results.



Radiated Emissions (Spurious and Harmonics) Test (con't)

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance to obtain final test data.

For the 22 GHz – 25 GHz span, the Hewlett Packard 11970K Harmonic Mixer and the Hewlett Packard 11975A Amplifier were used to allow the spectrum analyzer to scan up to 25 GHz.



8.2 6 dB Bandwidth for Direct Sequence Systems

The 6 dB Bandwidth was taken using the spectrum analyzer. The bandwidth was measured using a direct connection from the RF out on the RF board. The resolution bandwidth was 100 kHz, and the video bandwidth 300 kHz.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.209 (a)(2). The bandwidth is at least 500 kHz. Please see the data sheets located in Appendix D.

8.3 Peak Output Power

The peak output power was taken using the Hewlett Packard 436A Power Meter and the Hewlett Packard 8482H Power Sensor. The low (channel 1), middle (channel 6), and high (channel 11) were taken.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.209 (b)(1). The maximum peak output power is less than 1 watt.

8.4 Spectral Density Output

The power spectral density test was performed using the spectrum analyzer. The power spectral density was measured using a direct connection from the RF out on the RF board into the input of the analyzer. The resolution bandwidth was 3 kHz, and the video bandwidth 10 kHz. The highest 4.5 MHz of the signal was used as the frequency span with the sweep rate being 1 second for every 3 kHz of span.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.209 (d). The spectral density output does not exceed 8 dBm in any 3 kHz band.



8.5 RF Antenna Conducted Test

The RF antenna conducted test was performed using the spectrum analyzer. The RF antenna conducted test was measured using a direct connection from the RF out on the RF board into the input of the analyzer. The resolution bandwidth was 100 kHz, and the video bandwidth 300 kHz. The spans were wide enough to include all the harmonics and emissions that were produced by the intentional radiator.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.209 (c). The RF power that is produced by the intentional radiator is at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power.

8.6 RF Band Edges

The RF band edges were taken at the edges of the ISM spectrum (2400 MHz when the EUT was on channel 1 and 2483.5 MHz when the EUT was on channel 11) using the spectrum analyzer. It was also verified that the transmitted signals were not above the limits in section 15.209 in the restricted bands below 2390 MHz and above 2843.5 MHz. A spectral plot of the band edges are included to prove no emissions were found at these frequencies.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.205, 15.209, and 15.247 (c).



8.7 Processing Gain

Please see section 7.7 of this test report.



9. CONCLUSIONS

The MPCII Type 3A 802.11B Wireless + V.92 Modem Card Model: M3AWEB56GA meets all of the specification limits defined in FCC Title 47, Part 15, Subpart C, sections 15.205, 15.207, 15.209, and 15.247.



APPENDIX A

MODIFICATIONS TO THE EUT



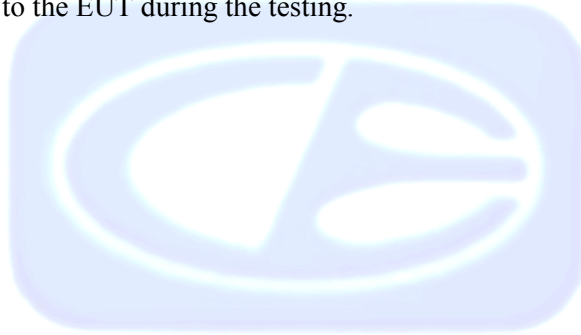
MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC Subpart C specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

Modifications:

No Modifications were made to the EUT during the testing.



APPENDIX B

***ADDITIONAL MODELS COVERED
UNDER THIS REPORT***



ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

MPCI Type 3A 802.11B Wireless + V.92 Modem Card
Model: M3AWEB56GA
Card Assembly:
PCB: 200-0903-001 Rev. A
PCBA: 100-0903-001 Rev. 04A
TLA: 170-1478-001 Rev. 1

ALSO APPROVED UNDER THIS REPORT

MPCI Type 3A 802.11B Wireless Card
Model: M3AWEB
Card Assembly:
PCB: 200-0903-001 Rev. A
PCBA: 100-0903-002 Rev. 3
TLA: 170-1493-001 Rev. 2

The M3AWEB is similar to the M3AWEB56GA except the components for the modem portion have been removed.



APPENDIX C

DIAGRAMS, CHARTS AND PHOTOS



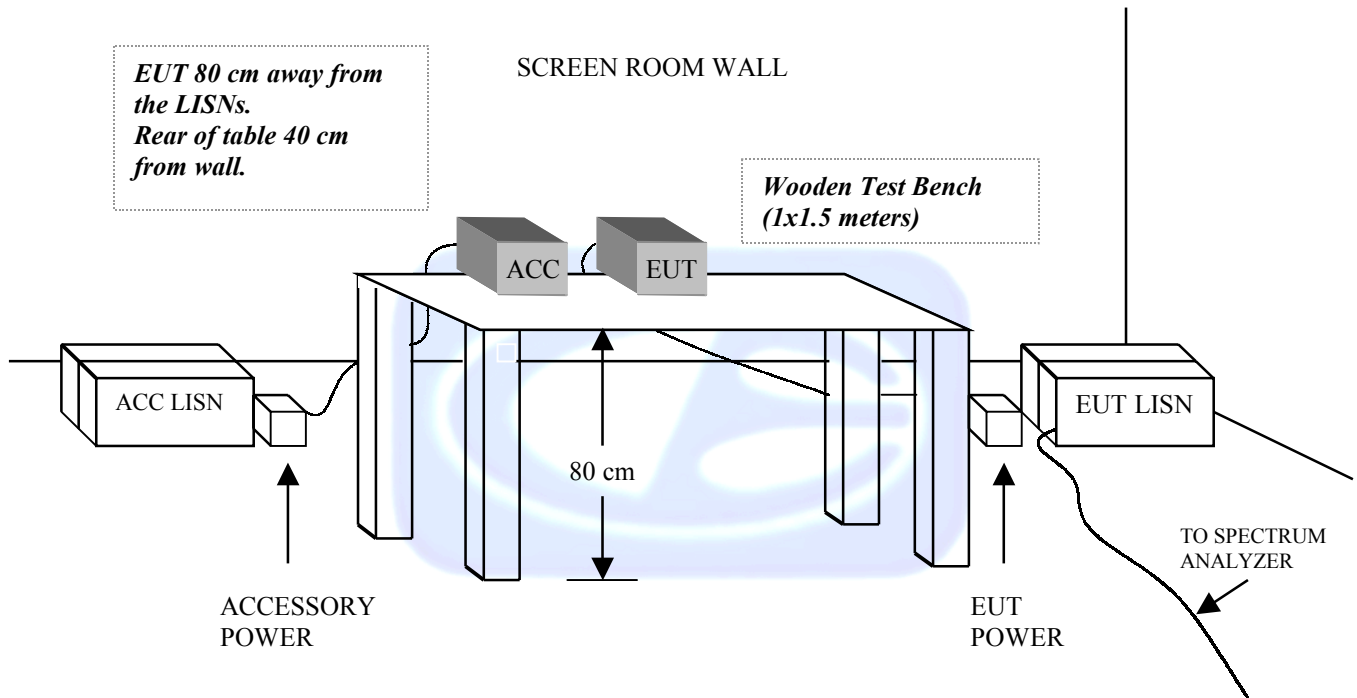
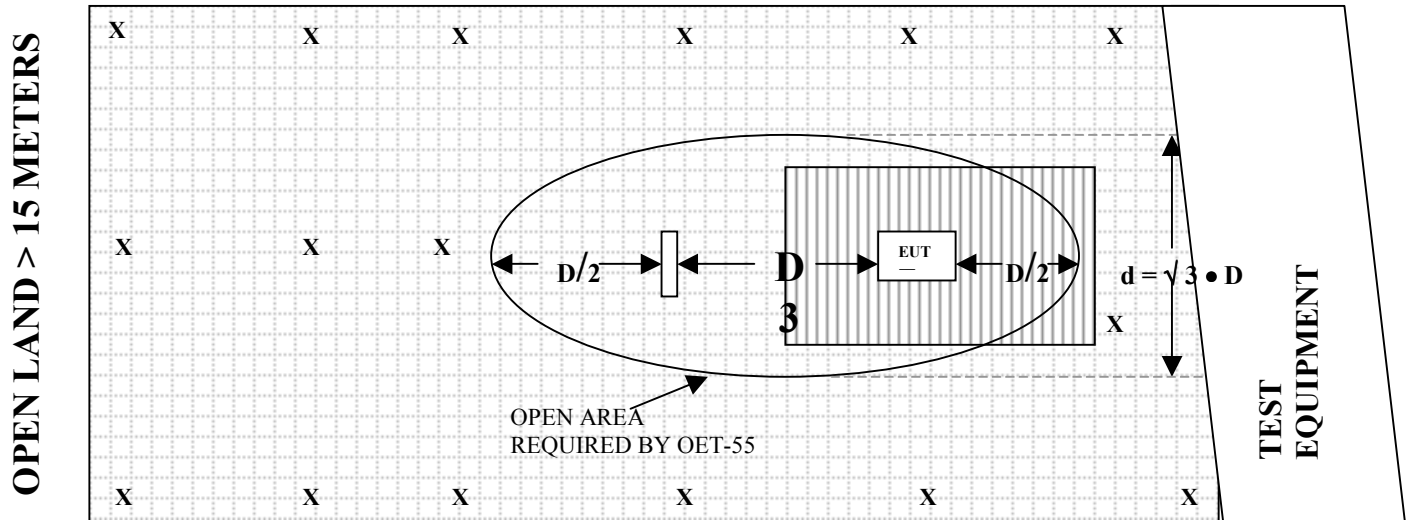
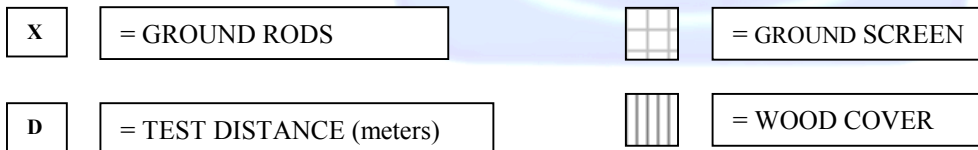
FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

FIGURE 2: PLOT MAP AND LAYOUT OF RADIATED SITE

OPEN LAND > 15 METERS



OPEN LAND > 15 METERS





FRONT VIEW

XIRCOM, INC.
MPCI TYPE 3A 802.11B WIRELESS + V.92 MODEM CARD
Model: M3AWEB56GA
FCC SUBPART C - RADIATED EMISSIONS – 11-08-01

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**





REAR VIEW

XIRCOM, INC.
MPCI TYPE 3A 802.11B WIRELESS + V.92 MODEM CARD
Model: M3AWEB56GA
FCC SUBPART C - RADIATED EMISSIONS – 11-08-01

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**





FRONT VIEW

XIRCOM, INC.
MPCI TYPE 3A 802.11B WIRELESS + V.92 MODEM CARD
Model: M3AWEB56GA
FCC SUBPART C – CONDUCTED EMISSIONS – 11-08-01

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**





REAR VIEW

XIRCOM, INC.
MPCI TYPE 3A 802.11B WIRELESS + V.92 MODEM CARD
Model: M3AWEB56GA
FCC SUBPART C – CONDUCTED EMISSIONS – 11-08-01

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



COM-POWER AB-100
BICONICAL ANTENNA
S/N: 01548

CALIBRATION DATE: OCTOBER 11, 2001

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	13.70	120	11.00
35	13.70	125	11.20
40	11.80	140	12.50
45	12.30	150	13.20
50	11.00	160	13.50
60	10.40	175	14.60
70	8.60	180	14.40
80	8.30	200	15.90
90	8.30	250	17.60
100	8.80	300	19.90



COM-POWER AL-100

LOG PERIODIC ANTENNA

S/N: 16089

CALIBRATION DATE: OCTOBER 11, 2001

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	14.10	700	20.60
400	15.10	800	22.40
500	16.60	900	22.70
600	19.90	1000	26.50



COM-POWER PA-102

PREAMPLIFIER

S/N: 1017

CALIBRATION DATE: JANUARY 11, 2000

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	38.3	300	38.6
40	38.6	350	38.6
50	38.7	400	38.6
60	38.8	450	38.1
70	38.9	500	37.9
80	38.8	550	39.2
90	38.6	600	38.3
100	38.6	650	38.4
125	38.8	700	38.3
150	38.8	750	38.2
175	38.7	800	37.7
200	38.8	850	37.5
225	38.6	900	37.5
250	38.6	950	37.7
275	38.5	1000	37.3

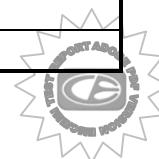


COM-POWER PA-122
MICROWAVE PREAMPLIFIER

S/N: 25195

CALIBRATION DATE: JANUARY 9, 2001

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	33.1	9.5	30.7
1.1	33.0	10.0	31.6
1.2	33.2	11.0	30.6
1.3	33.0	12.0	28.5
1.4	32.4	13.0	31.5
1.5	32.3	14.0	33.2
1.6	32.1	15.0	31.5
1.7	32.0	16.0	30.2
1.8	31.8	17.0	31.6
1.9	32.2	18.0	31.7
2.0	32.6		
2.5	31.9		
3.0	31.7		
3.5	31.7		
4.0	32.3		
4.5	31.5		
5.0	32.3		
5.5	34.2		
6.0	30.9		
6.5	32.0		
7.0	32.1		
7.5	33.0		
8.0	31.9		
8.5	31.9		
9.0	31.3		



ANTENNA RESEARCH DRG-118/A

HORN ANTENNA

S/N: 1053

CALIBRATION DATE: JANUARY 15, 2001

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	25.4	9.5	39.6
1.5	26.7	10.0	39.7
2.0	29.6	10.5	40.8
2.5	30.7	11.0	40.4
3.0	31.2	11.5	42.2
3.5	32.3	12.0	43.0
4.0	33.2	12.5	42.6
4.5	33.2	13.0	41.3
5.0	34.8	13.5	40.3
5.5	35.4	14.0	40.9
6.0	36.6	14.5	44.0
6.5	36.6	15.0	43.3
7.0	38.7	15.5	42.7
7.5	38.6	16.0	42.6
8.0	37.9	16.5	42.8
8.5	37.9	17.0	43.5
9.0	39.9	17.5	44.6
		18.0	42.2



ANTENNA RESEARCH
11317 Frederick Avenue, Beltsville, MD 20705, USA
TEL: (301)937-8888 FAX: (301)937-2796

E-FIELD ANTENNA FACTOR CALIBRATION

$$E \text{ (dB V/m)} = V_o \text{ (dB V)} + AFE \text{ (dB 1/m)}$$

Model Number : MWH-1826/B

Frequency (GHz)	AFE (dB 1/m)	Gain (dBi)
18.000	23.1	32.2
18.850	23.2	32.5
19.700	23.6	32.6
20.550	23.5	33.0
21.400	23.7	33.1
22.250	24.0	33.2
23.100	24.0	33.5
23.950	24.1	33.7
24.800	24.1	34.0
25.650	24.3	34.1
26.500	24.4	34.3

Serial Number : 1004

Com-Power Corporation

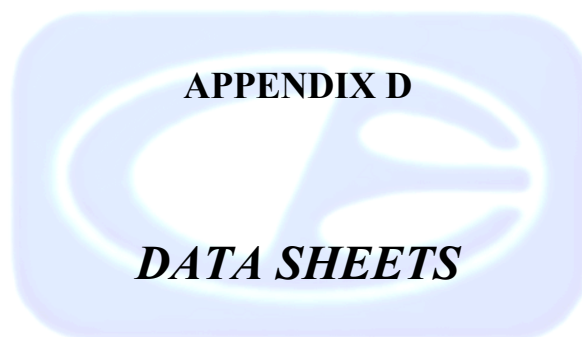
(949) 587-9800

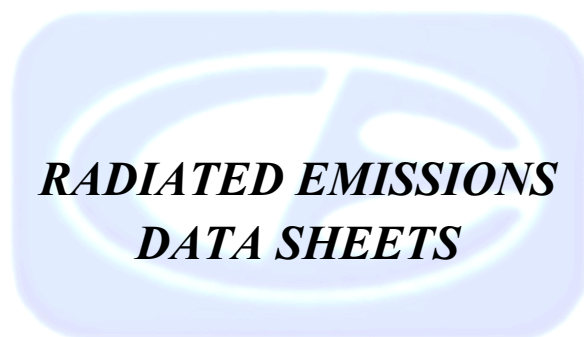
Antenna Calibration

Antenna Type:	Active Loop Antenna	
Model:	AL-130	
Serial Number:	25309	
Calibration Date:	(mm/dd/yy) 05/21/01	
Certificate Number:	071014-R	
Frequency MHz	Magnetic (dB/m)	Electric dB/m
0.009	-40.2	11.3
0.01	-40.2	11.3
0.02	-40.9	10.6
0.03	-39.3	12.2
0.04	-39.7	11.8
0.05	-41.0	10.5
0.06	-40.6	10.9
0.07	-40.8	10.7
0.08	-41.1	10.4
0.09	-41.2	10.3
0.1	-41.2	10.3
0.2	-43.5	8.0
0.3	-41.1	10.4
0.4	-41.0	10.5
0.5	-41.0	10.5
0.6	-40.9	10.6
0.7	-40.8	10.7
0.8	-40.8	10.7
0.9	-40.8	10.7
1	-40.3	11.2
2	-39.7	11.8
3	-40.0	11.5
4	-40.2	11.3
5	-39.6	11.9
6	-39.6	11.9
7	-40.0	11.5
8	-40.3	11.2
9	-39.8	11.7
10	-40.6	10.9
12	-40.7	10.8
14	-40.6	10.9
15	-40.7	10.8
16	-40.7	10.8
18	-40.8	10.7
20	-41.6	9.9
25	-42.8	8.7
30	-43.3	8.2

Separation Distance:

1 meter





RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	Xircom, Inc.	DATE	11/8/01
EUT	MPCI Type 3A 802.11B Wireless + V.92 Modem Card	DUTY CYCLE	N/A
MODEL	M3AWEB56GA	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2412.0000	106.1	A	H	1.0	180	X	LOW	30.5	3.6	32.0	108.2			
2412.0000	101.2	A	V	1.0	180	X	LOW	30.5	3.6	32.0	103.3			
2438.0000	106.3	A	H	1.5	180	X	MID	30.6	3.5	32.0	108.4			
2438.0000	101.6	A	V	1.0	90	X	MID	30.6	3.5	32.0	103.7			
2462.0000	106.9	A	H	1.5	180	X	HIGH	30.6	3.5	32.0	109.0			
2462.0000	104.9	A	V	1.0	180	X	HIGH	30.6	3.5	32.0	107.0			

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

PAGE 1

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	Xircom, Inc.	DATE	11/8/01
EUT	MPCI Type 3A 802.11B Wireless + V.92 Modem Card	DUTY CYCLE	N/A
MODEL	M3AWEB56GA	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
4824.0000	35.2	A	H	1.0	90	X	LOW	34.2	5.4	32.0	42.9	-11.1	54.0	
4824.0000	41.2	A	V	1.0	90	X	LOW	34.2	5.4	32.0	48.9	-5.1	54.0	
4884.0000	35.9	A	H	1.5	90	X	MID	34.4	5.6	32.1	43.8	-10.2	54.0	
4884.0000	36.2	A	V	1.5	90	X	MID	34.4	5.6	32.1	44.1	-9.9	54.0	
4924.0000	38.2	A	H	1.5	180	X	HIGH	34.6	5.6	32.2	46.2	-7.8	54.0	
4924.0000	38.6	A	V	1.5	90	X	HIGH	34.6	5.6	32.2	46.6	-7.4	54.0	

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
 ** DELTA = SPEC LIMIT - CORRECTED READING

Note: No Harmonics Nor Emissions Found
 After the 2nd Harmonic

PAGE 2

Test location: Compatible Electronics
 Customer : XIRCOM, INC. Date : 11/ 8/2001
 Manufacturer : XIRCOM, INC. Time : 8.12
 EUT name : MPC1 TYPE 3A 802.11 B WIRELESS + V.92 MODEM CARD
 Model : M3AWEB56GA
 Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
 Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00
 Test Mode : WITH RANGESTAR ANTENNA
 TEMPERATURE 68 DEGREES F., RELATIVE HUMIDITY 58%
 VERTICAL POLARIZATION 30 MHz TO 300 MHz
 TESTED BY: KYLE FUJIMOTO

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	limit = L dBuV/m	Delta R-L dB
1V	42.82	56.70	1.03	12.08	39.20	30.61	40.00	-9.39
2V	52.42	55.70	1.12	10.85	39.20	28.48	40.00	-11.52
3V	58.82	54.20	1.19	10.47	39.20	26.66	40.00	-13.34
4V	63.00	51.40	1.23	9.86	39.08	23.41	40.00	-16.59
5V	68.48	59.00	1.28	8.87	38.86	30.30	40.00	-9.70
6V	74.30	51.80	1.30	8.47	38.71	22.86	40.00	-17.14
7V	79.01	52.30	1.30	8.33	38.62	23.31	40.00	-16.69
8V	81.21	49.80	1.31	8.30	38.59	20.82	40.00	-19.18
9V	83.72	54.60	1.34	8.30	38.56	25.67	40.00	-14.33
10V	120.91	46.40	1.67	11.04	39.12	19.99	43.50	-23.51
11V	133.32	49.50	1.80	11.92	39.07	24.15	43.50	-19.35
12V	165.90	53.30	2.00	13.93	38.80	30.43	43.50	-13.07
13V	232.18	60.30	2.29	16.99	38.80	40.78	46.00	-5.22
14V	265.40	45.70	2.68	18.31	38.92	27.77	46.00	-18.23

Test location: Compatible Electronics
 Customer : XIRCOM, INC. Date : 11/ 8/2001
 Manufacturer : XIRCOM, INC. Time : 8.26
 EUT name : MPC1 TYPE 3A 802.11 B WIRELESS + V.92 MODEM CARD
 Model : M3AWEB56GA
 Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
 Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00
 Test Mode : WITH RANGESTAR ANTENNA
 TEMPERATURE 68 DEGREES F., RELATIVE HUMIDITY 58%
 HORIZONTAL POLARIZATION 30 MHz TO 300 MHz
 TESTED BY: KYLE FUJIMOTO

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	limit = L dBuV/m	Delta R-L dB
1H	66.47	54.20	1.26	9.24	38.94	25.76	40.00	-14.24
2H	99.74	57.30	1.50	8.79	38.69	28.89	43.50	-14.61
3H	136.83	45.80	1.84	12.23	39.01	20.86	43.50	-22.64
4H	166.56	59.50	2.00	13.98	38.80	36.68	43.50	-6.82
5H	199.91	61.30	2.20	15.89	39.00	40.39	43.50	-3.11
6H	233.19	57.50	2.30	17.03	38.80	38.03	46.00	-7.97
7H	266.41	46.50	2.70	18.36	38.93	28.62	46.00	-17.38
8H	298.47	45.00	2.80	19.83	38.91	28.72	46.00	-17.28

Test location: Compatible Electronics
 Customer : XIRCOM, INC. Date : 11/ 8/2001
 Manufacturer : XIRCOM, INC. Time : 9.13
 EUT name : MPC1 TYPE 3A 802.11 B WIRELESS + V.92 MODEM CARD
 Model : M3AWEB56GA
 Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
 Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00
 Test Mode : WITH RANGESTAR ANTENNA
 TEMPERATURE 68 DEGREES F., RELATIVE HUMIDITY 58%
 VERTICAL POLARIZATION 300 MHz TO 1000 MHz
 TESTED BY: KYLE FUJIMOTO

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	limit = L dBuV/m	Delta R-L dB
1V	308.04	43.90	2.83	14.18	38.90	22.01	46.00	-23.99
2V	333.11	51.10	2.93	14.43	38.90	29.56	46.00	-16.44
3V	352.07	50.50	3.01	14.62	38.89	29.25	46.00	-16.75
4V	364.81	52.10	3.09	14.75	38.81	31.13	46.00	-14.87
5V	396.10	48.70	3.28	15.06	38.62	28.41	46.00	-17.59
6V	398.04	43.80	3.29	15.08	38.61	23.56	46.00	-22.44
7V	418.10	47.40	3.26	15.37	38.56	27.47	46.00	-18.53
8V	429.10	50.40	3.24	15.54	38.54	30.64	46.00	-15.36
9V	431.25	44.40	3.24	15.57	38.54	24.67	46.00	-21.33
10V	440.09	53.00	3.22	15.70	38.52	33.40	46.00	-12.60
11V	451.09	45.70	3.21	15.87	38.50	26.27	46.00	-19.73
12V	462.09	47.40	3.27	16.03	38.55	28.16	46.00	-17.84
13V	462.10	48.00	3.27	16.03	38.55	28.76	46.00	-17.24
14V	473.09	48.30	3.34	16.20	38.59	29.24	46.00	-16.76
15V	550.10	47.30	3.90	18.25	38.40	31.05	46.00	-14.95
16V	596.84	43.60	3.81	19.80	38.77	28.43	46.00	-17.57
17V	795.76	52.70	4.88	22.32	37.92	41.99	46.00	-4.01

Test location: Compatible Electronics
 Customer : XIRCOM, INC. Date : 11/ 8/2001
 Manufacturer : XIRCOM, INC. Time : 8.55
 EUT name : MPC1 TYPE 3A 802.11 B WIRELESS + V.92 MODEM CARD
 Model : M3AWEB56GA
 Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
 Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00
 Test Mode : WITH RANGESTAR ANTENNA
 TEMPERATURE 68 DEGREES F., RELATIVE HUMIDITY 58%
 HORIZONTAL POLARIZATION 300 MHz TO 1000 MHz
 TESTED BY: KYLE FUJIMOTO

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	limit = L dBuV/m	Delta R-L dB
1H	300.00	38.30	2.80	14.10	38.90	16.30	46.00	-29.70
2H	308.10	54.30	2.83	14.18	38.90	32.41	46.00	-13.59
3H	319.06	46.30	2.88	14.29	38.90	24.57	46.00	-21.43
4H	319.59	53.60	2.88	14.30	38.90	31.87	46.00	-14.13
5H	330.11	49.90	2.92	14.40	38.90	28.32	46.00	-17.68
6H	352.11	55.90	3.01	14.62	38.89	34.65	46.00	-11.35
7H	364.80	48.70	3.09	14.75	38.81	27.73	46.00	-18.27
8H	396.11	56.90	3.28	15.06	38.62	36.61	46.00	-9.39
9H	417.89	52.90	3.26	15.37	38.56	32.97	46.00	-13.03
10H	418.11	54.00	3.26	15.37	38.56	34.07	46.00	-11.93
11H	429.09	54.10	3.24	15.54	38.54	34.34	46.00	-11.66
12H	429.57	49.40	3.24	15.54	38.54	29.64	46.00	-16.36
13H	440.08	59.80	3.22	15.70	38.52	40.20	46.00	-5.80
14H	462.08	52.90	3.27	16.03	38.55	33.66	46.00	-12.34
15H	473.08	51.00	3.34	16.20	38.59	31.94	46.00	-14.06
16H	484.07	51.60	3.40	16.36	38.64	32.73	46.00	-13.27
17H	497.68	43.50	3.49	16.57	38.69	24.86	46.00	-21.14
18H	506.07	54.30	3.55	16.80	38.66	35.99	46.00	-10.01
19H	517.07	54.40	3.64	17.16	38.60	36.60	46.00	-9.40
20H	550.07	53.20	3.90	18.25	38.40	36.95	46.00	-9.05
21H	616.07	39.90	3.93	20.01	38.70	25.14	46.00	-20.86
22H	663.78	42.60	4.26	20.35	38.53	28.67	46.00	-17.33
23H	799.48	51.80	4.90	22.39	37.90	41.19	46.00	-4.81
24H	799.48	50.07	4.90	22.39	37.90	39.46Qp	46.00	-6.54
25H	831.71	37.30	4.77	22.50	37.96	26.60	46.00	-19.40
26H	997.81	38.60	5.40	26.42	38.14	32.27	54.00	-21.73

Test location: Compatible Electronics
Customer : XIRCOM, INC. Date : 11/ 8/2001
Manufacturer : XIRCOM, INC. Time : 11.11
EUT name : MPC1 TYPE 3A 802.11 B WIRELESS + V.92 MODEM CARD
Model : M3AWEB56GA
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00
Test Mode : WITH RANGESTAR ANTENNA
TEMPERATURE 68 DEGREES F., RELATIVE HUMIDITY 58%
VERTICAL AND HORIZONTAL POLARIZATION 10 KHZ TO 30 MHZ
TESTED BY: KYLE FUJIMOTO

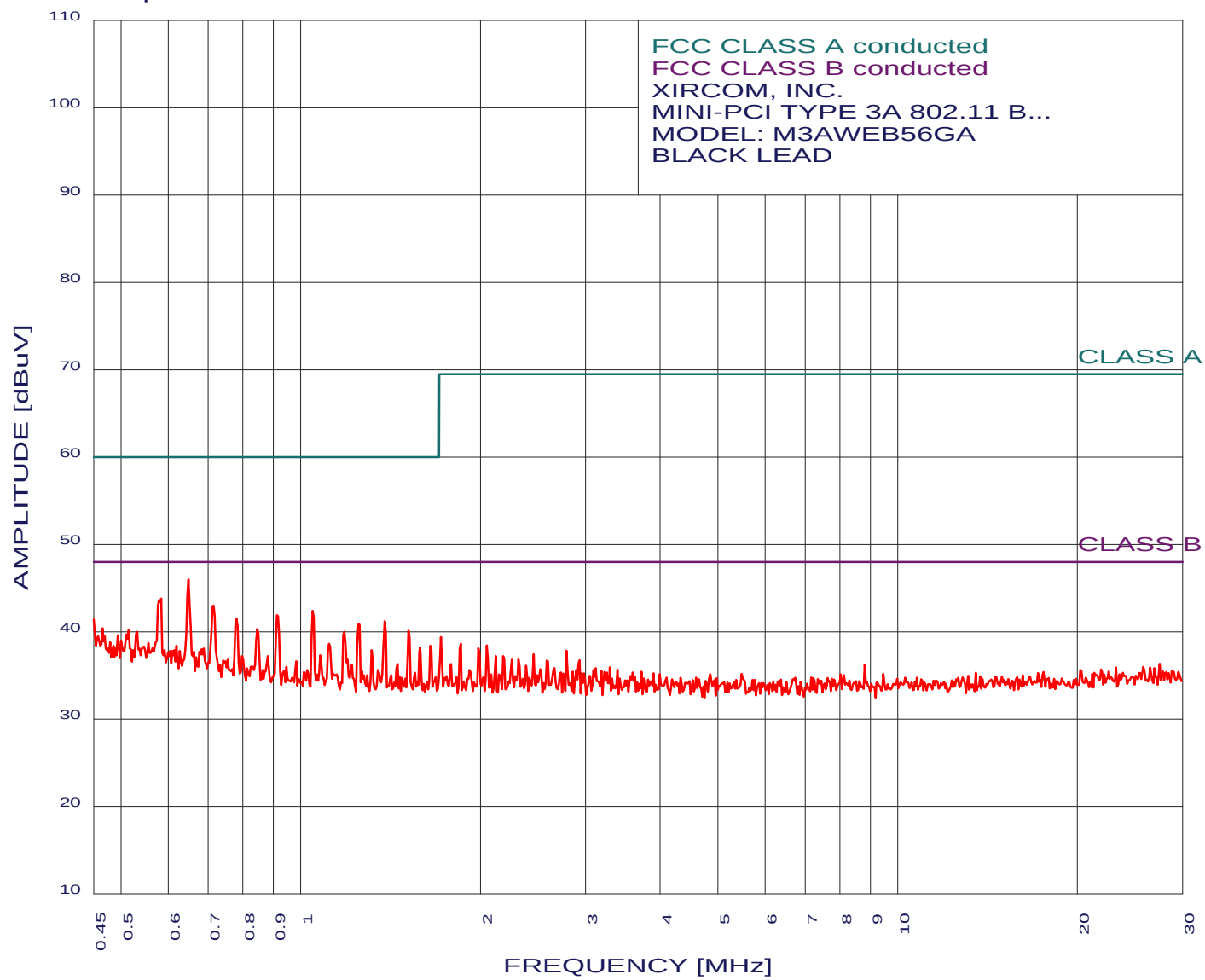
NO EMISSIONS FOUND FROM 10 KHZ TO 30 MHZ
IN EITHER POLARIZATION

***AC CONDUCTED EMISSIONS
DATA SHEETS***



EMISSION LEVEL [dBuV] PEAK
Graph for Peak

11/08/2001 7:56:24





11/08/2001 7:56:24

XIRCOM, INC.

MINI-PCI TYPE 3A 802.11B WIRELESS + V.92 MODEM CARD

MODEL: M3AWEB56GA

FCC B - BLACK LEAD

TEST ENGINEER : KYLE FUJIMOTO

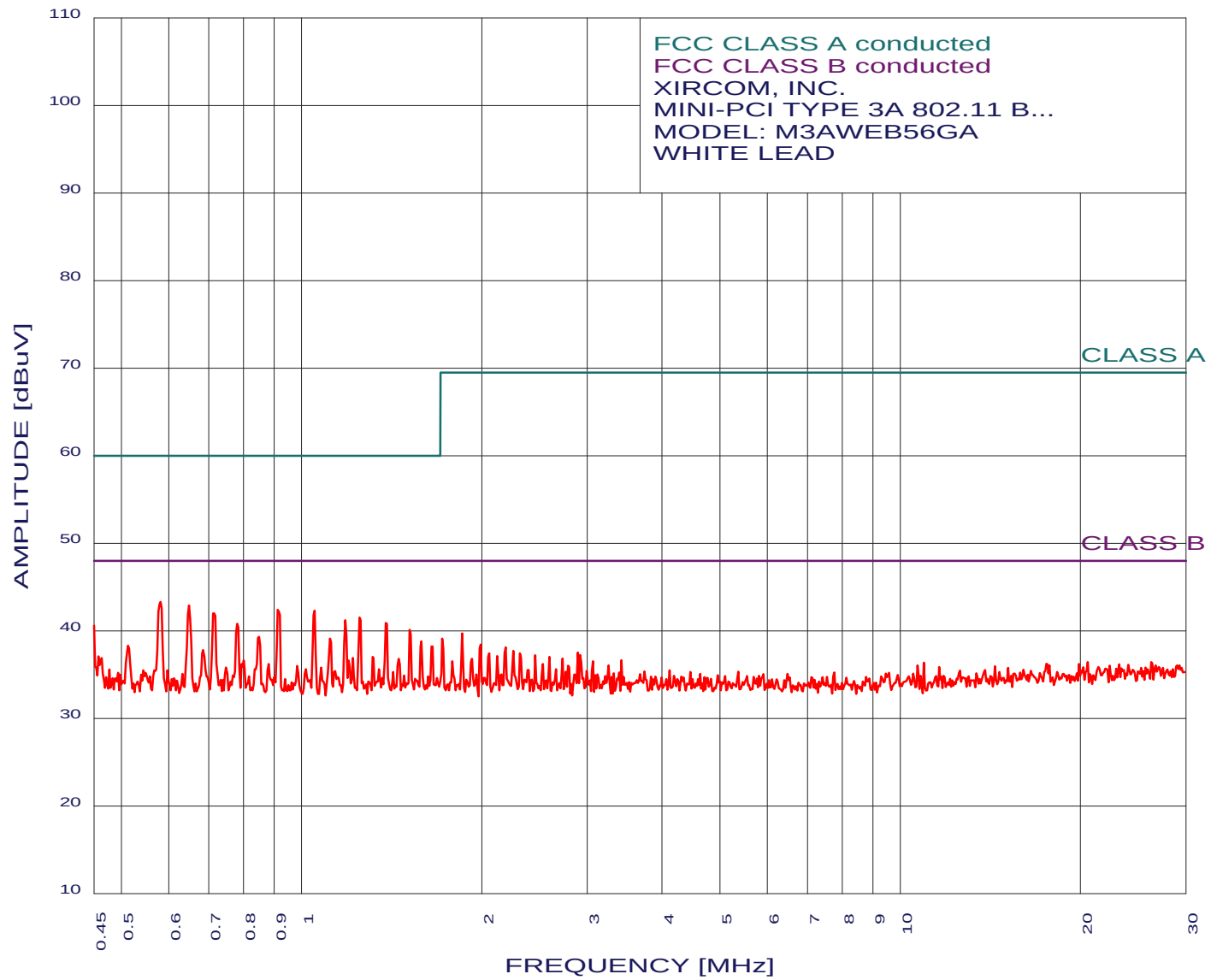
30 highest peaks above -50.00 dB of CLASS B limit line

Peak criteria : 1.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.649	45.99	48.00	-2.01
2	0.584	43.79	48.00	-4.21
3	0.715	42.99	48.00	-5.01
4	1.047	42.40	48.00	-5.60
5	0.912	41.90	48.00	-6.10
6	0.781	41.49	48.00	-6.51
7	1.382	41.20	48.00	-6.80
8	1.249	40.90	48.00	-7.10
9	0.466	40.39	48.00	-7.61
10	0.846	40.30	48.00	-7.70
11	0.515	40.19	48.00	-7.81
12	1.516	40.10	48.00	-7.90
13	1.183	40.00	48.00	-8.00
14	0.532	39.99	48.00	-8.01
15	0.494	39.59	48.00	-8.41
16	0.458	39.49	48.00	-8.51
17	1.718	39.41	48.00	-8.59
18	0.500	38.99	48.00	-9.01
19	0.480	38.79	48.00	-9.21
20	0.556	38.69	48.00	-9.31
21	1.854	38.61	48.00	-9.39
22	1.115	38.60	48.00	-9.40
23	2.050	38.41	48.00	-9.59
24	1.649	38.41	48.00	-9.59
25	0.620	38.39	48.00	-9.61
26	0.485	38.39	48.00	-9.61
27	0.546	38.29	48.00	-9.71
28	1.586	38.20	48.00	-9.80
29	1.983	38.11	48.00	-9.89
30	0.688	38.09	48.00	-9.91

EMISSION LEVEL [dBuV] PEAK
Graph for Peak

11/08/2001 7:58:40





**COMPATIBLE
ELECTRONICS**

11/08/2001 7:58:40

XIRCOM, INC.

MINI-PCI TYPE 3A 802.11B WIRELESS + V.92 MODEM CARD

MODEL: M3AWEB56GA

FCC B - WHITE LEAD

TEST ENGINEER : KYLE FUJIMOTO

30 highest peaks above -50.00 dB of CLASS B limit line

Peak criteria : 1.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.581	43.29	48.00	-4.71
2	0.649	42.89	48.00	-5.11
3	0.912	42.40	48.00	-5.60
4	1.051	42.30	48.00	-5.70
5	0.715	41.99	48.00	-6.01
6	1.249	41.50	48.00	-6.50
7	1.183	41.20	48.00	-6.80
8	1.382	40.90	48.00	-7.10
9	0.781	40.79	48.00	-7.21
10	1.516	40.10	48.00	-7.90
11	1.854	39.71	48.00	-8.29
12	0.849	39.30	48.00	-8.70
13	1.718	39.11	48.00	-8.89
14	1.115	39.10	48.00	-8.90
15	1.586	38.80	48.00	-9.20
16	1.992	38.41	48.00	-9.59
17	0.513	38.29	48.00	-9.71
18	1.656	38.21	48.00	-9.79
19	2.193	38.11	48.00	-9.89
20	0.685	37.79	48.00	-10.21
21	2.259	37.71	48.00	-10.29
22	2.893	37.52	48.00	-10.48
23	2.317	37.41	48.00	-10.59
24	2.059	37.41	48.00	-10.59
25	2.918	37.22	48.00	-10.78
26	2.457	37.21	48.00	-10.79
27	2.121	37.11	48.00	-10.89
28	0.458	37.09	48.00	-10.91
29	2.594	37.02	48.00	-10.98
30	1.314	37.00	48.00	-11.00



hp -6 dB BANDWIDTH OF FUNDAMENTAL - LOW CH, MKR Δ 11.60 MHz
REF 10.0 dBm ATTN 20 dB 0.30 dB

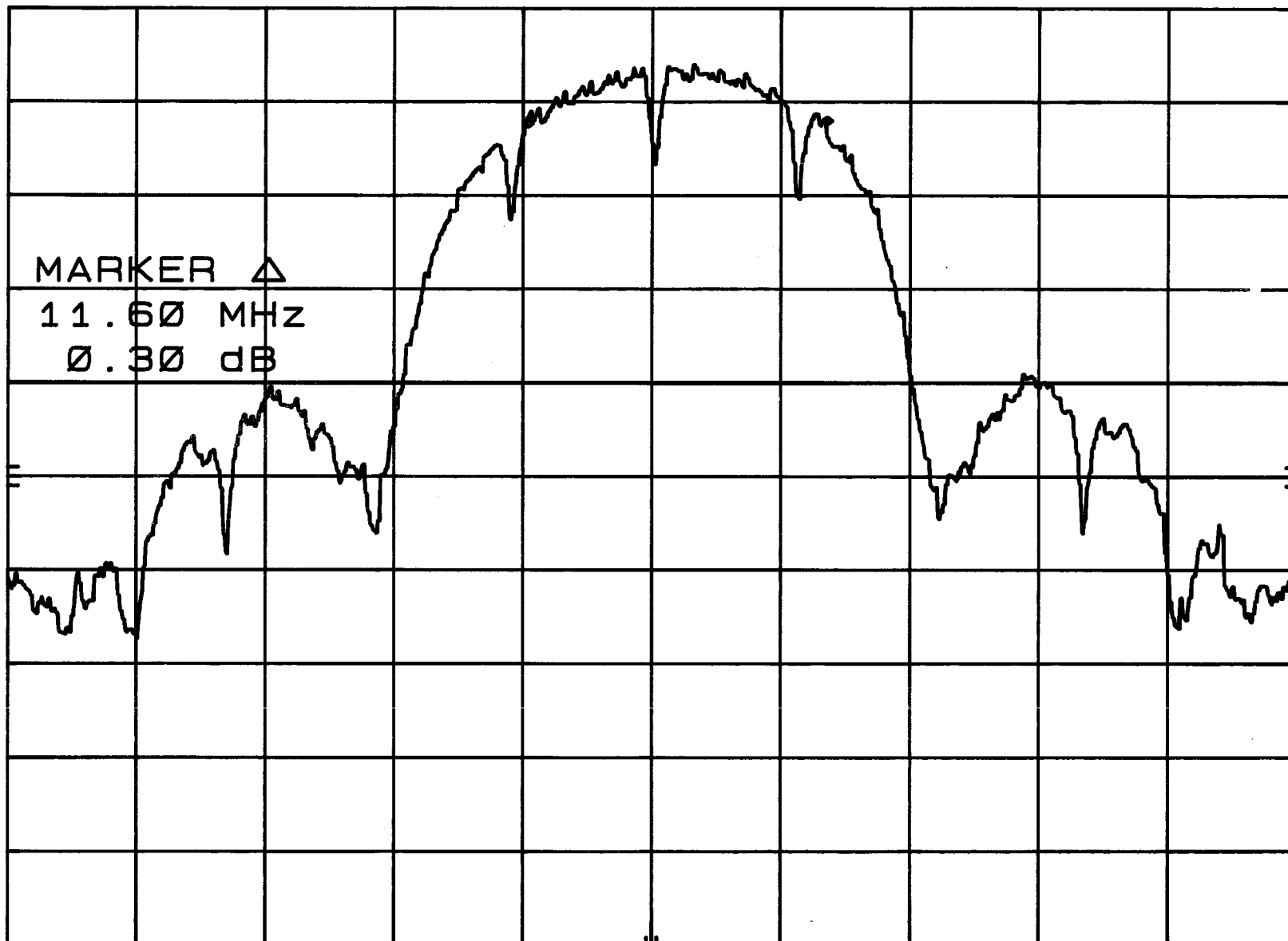
10 dB/

DL
-30.0
dBm

MARKER Δ
11.60 MHz
0.30 dB

CORR'D

CENTER 2.412 0 GHz SPAN 50.0 MHz
RES BW 100 kHz VBW 300 kHz SWP 20.0 msec



hp -6 dB BANDWIDTH OF FUNDAMENTAL - MID CH. MKR Δ 11.15 MHz
REF 10.0 dBm ATTN 20 dB -0.10 dB

10 dB/

DL
-30.0
dBm

MARKER Δ
11.15 MHz
-0.10 dB

CORR'D

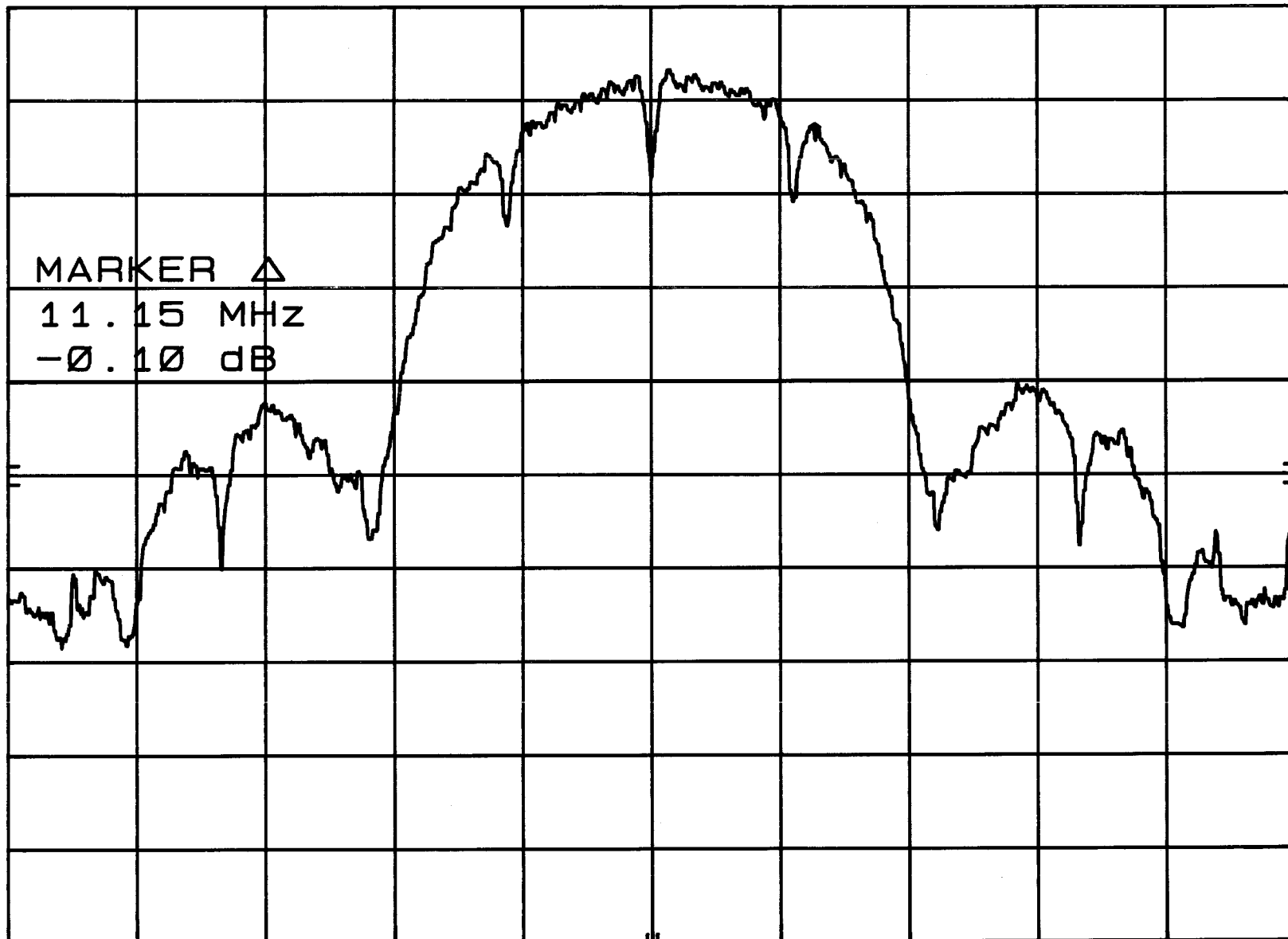
CENTER 2.437 2 GHz

RES BW 100 kHz

VBW 300 kHz

SPAN 50.0 MHz

SWP 20.0 msec



hp -6 dB BANDWIDTH OF FUNDAMENTAL - HIGH CH. MKR Δ 11.00 MHz
REF 10.0 dBm ATTEN 20 dB -0.20 dB

10 dB/

DL
-30.0
dBm

MARKER Δ
11.00 MHz
-0.20 dB

CORR'D

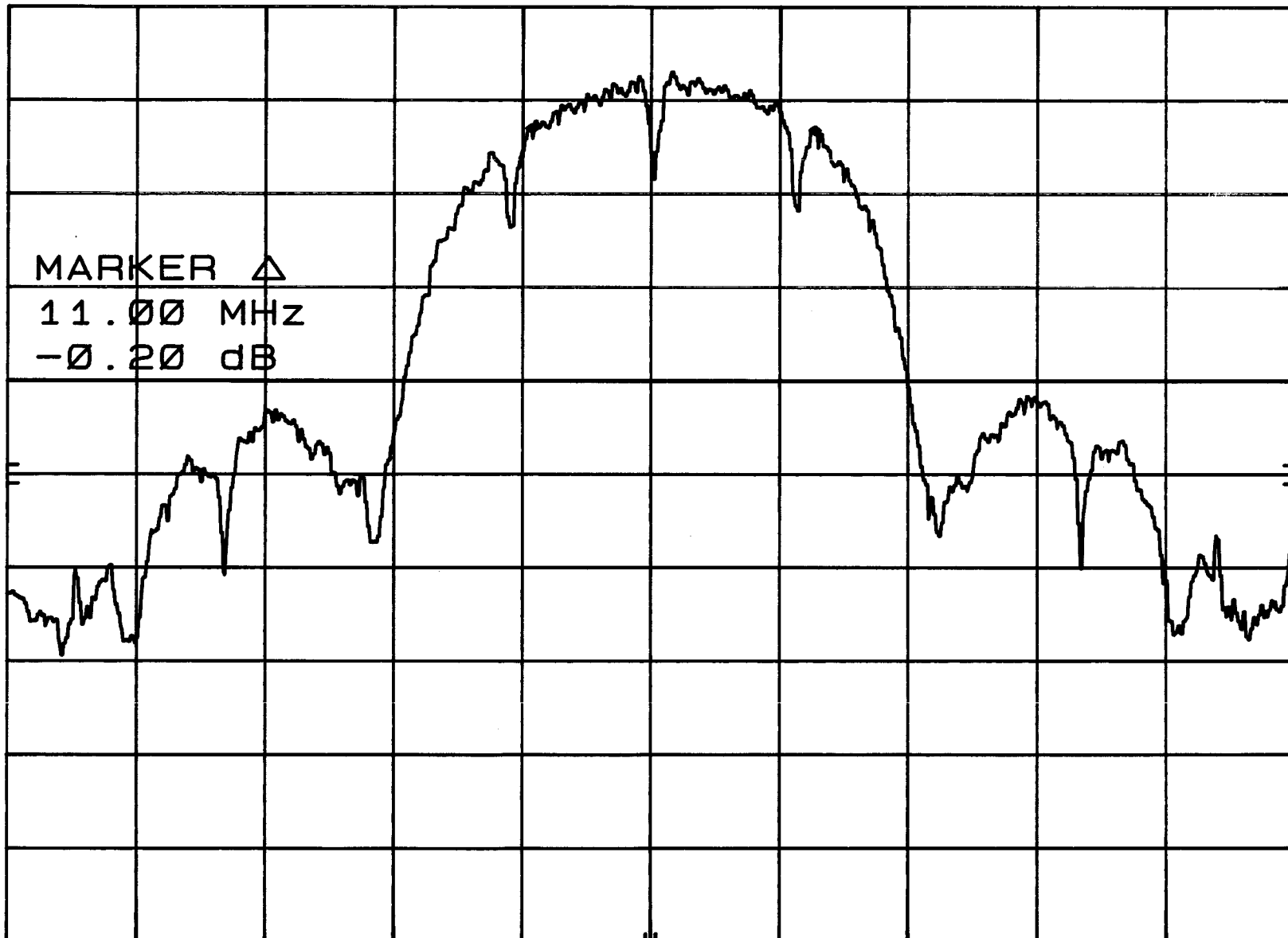
CENTER 2.462 1 GHz

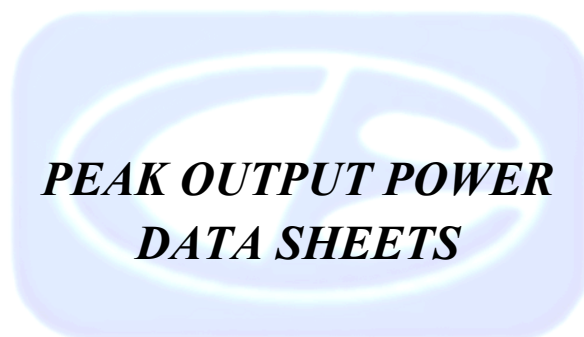
RES BW 100 kHz

VBW 300 kHz

SPAN 50.0 MHz

SWP 20.0 msec





PEAK OUTPUT POWER

XIRCOM, INC.

MPCI TYPE 3A 802.11B
WIRELESS + V.92 MODEM CARD

MODEL: M3AWEB56GA

CHANNEL	PEAK POWER OUTPUT (dBm)
1	15.11
6	15.21
11	15.30

***SPECTRAL DENSITY OUTPUT
DATA SHEETS***



SPECTRAL DENSITY OUTPUT OF LOW CHANNEL

MKR 2.412 661 GHz

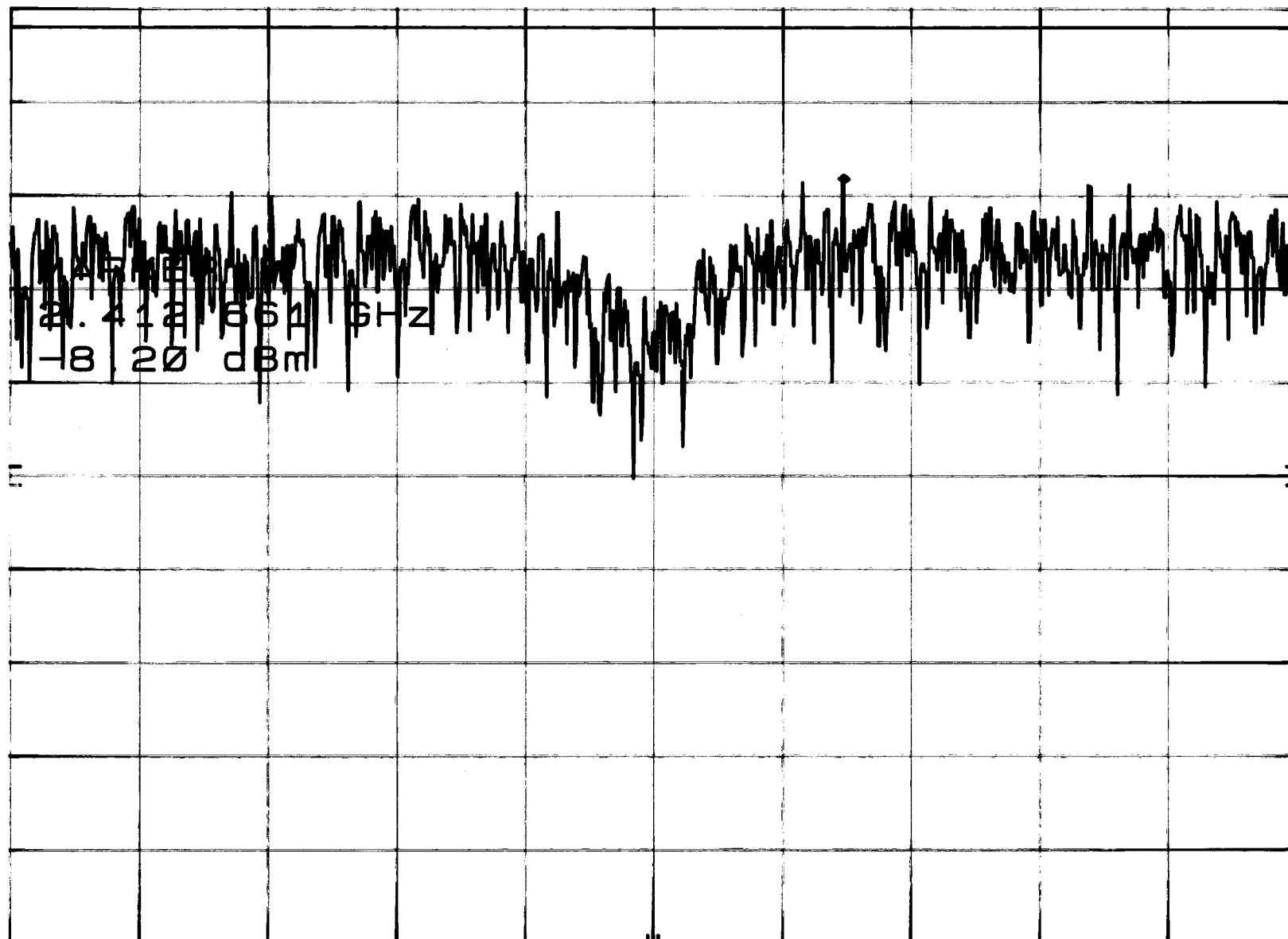
hp

REF 10.0 dBm ATTEN 20 dB

-8.20 dBm

10 dB/

DL
8.0
dBm



CORR'D

CENTER 2.412 00 GHz
RES BW 3 kHz

VBW 10 kHz

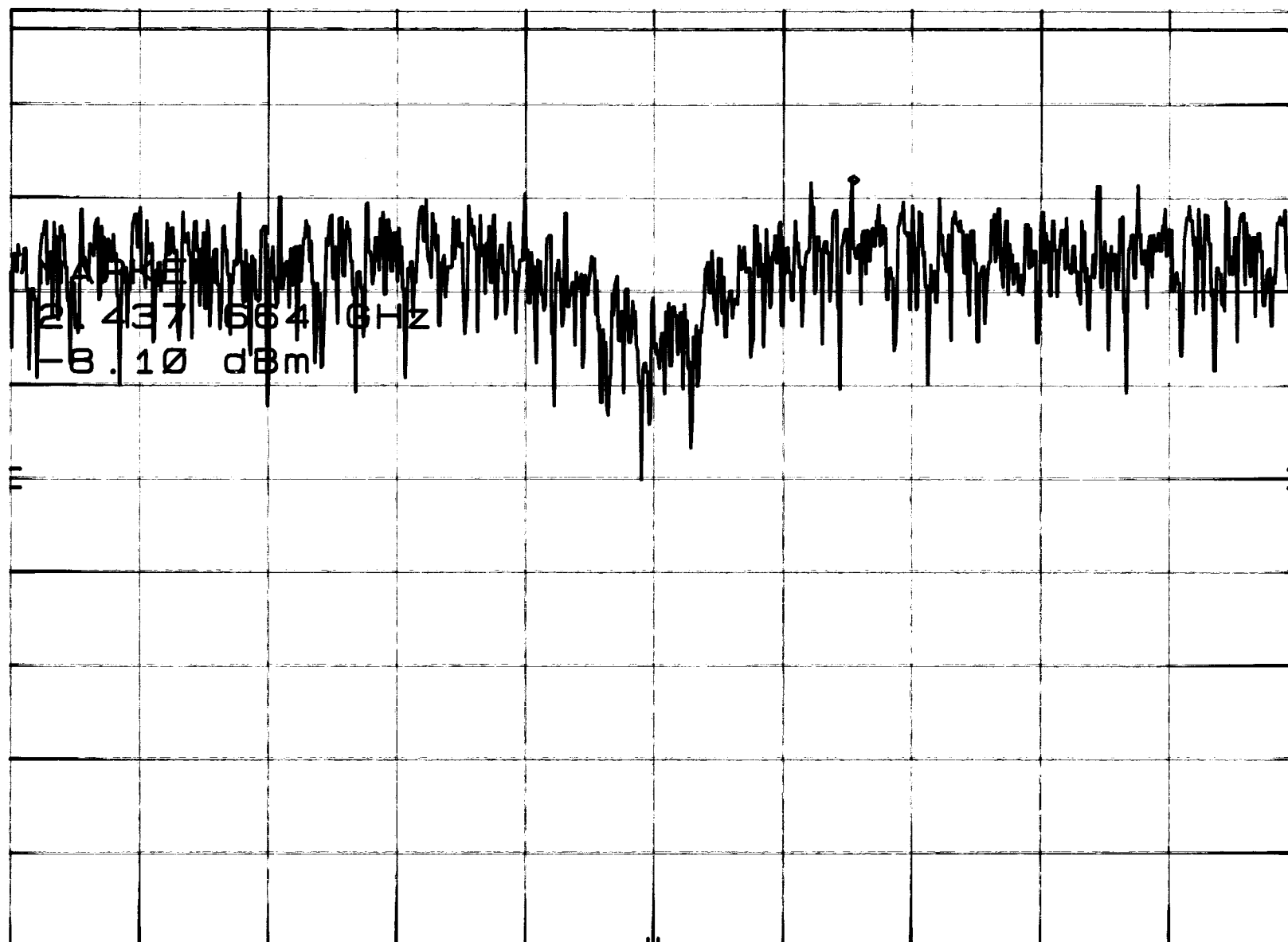
SPAN 4.50 MHz
SWP 1.50 ksec

SPECTRAL DENSITY OUTPUT OF MID. CHANNEL MKR 2.437 664 GHz
REF 10.0 dBm ATTEN 20 dB -8.10 dBm

hp

10 dB/

DL
8.0
dBm



CENTER 2.436 97 GHz
RES BW 3 KHz

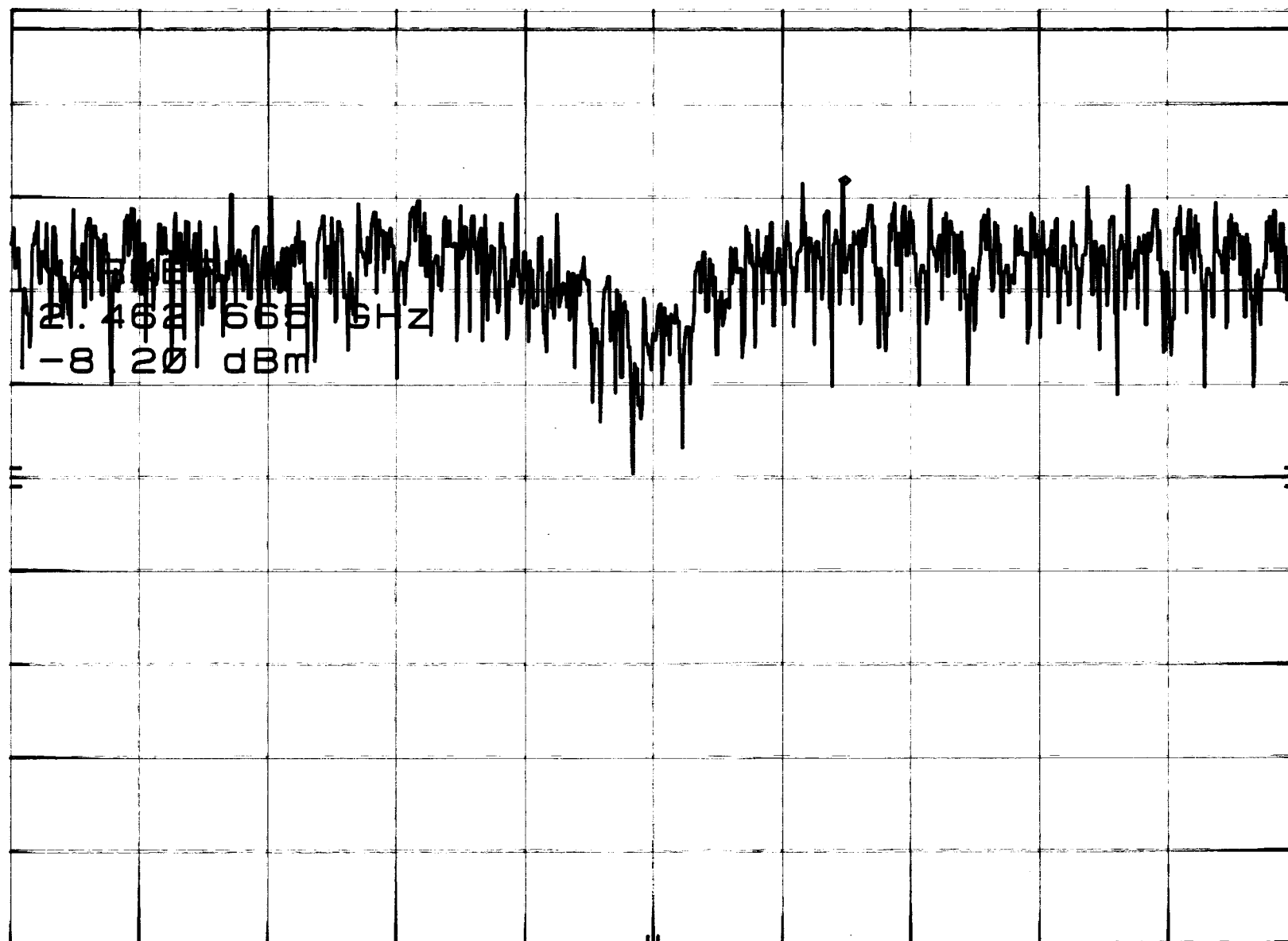
VBW 10 KHz

SPAN 4.50 MHz
SWP 1.50 ksec

SPECTRAL DENSITY OUTPUT OF HIGH CHANNEL MKR 2.462 665 GHz
REF 10.0 dBm ATTEN 20 dB -8.20 dBm

hp
10 dB/

DL
8.0
dBm



CENTER 2.462 00 GHz
RES BW 3 KHz

VBW 10 KHz

SPAN 4.50 MHz
SWP 1.50 Ksec

***RF ANTENNA CONDUCTED
DATA SHEETS***



RF ANT. COND. TEST OF LOW CH. 2MHZ-2GHZ

MKR 1.716 GHz

hp

REF 13.0 dBm ATTEN 30 dB

-55.40 dBm

10 dB/

DL
-18.6
dBm

MARKER

1.716 GHz

-55.40 dBm

START 2 MHz

RES BW 100 kHz

VBW 300 kHz

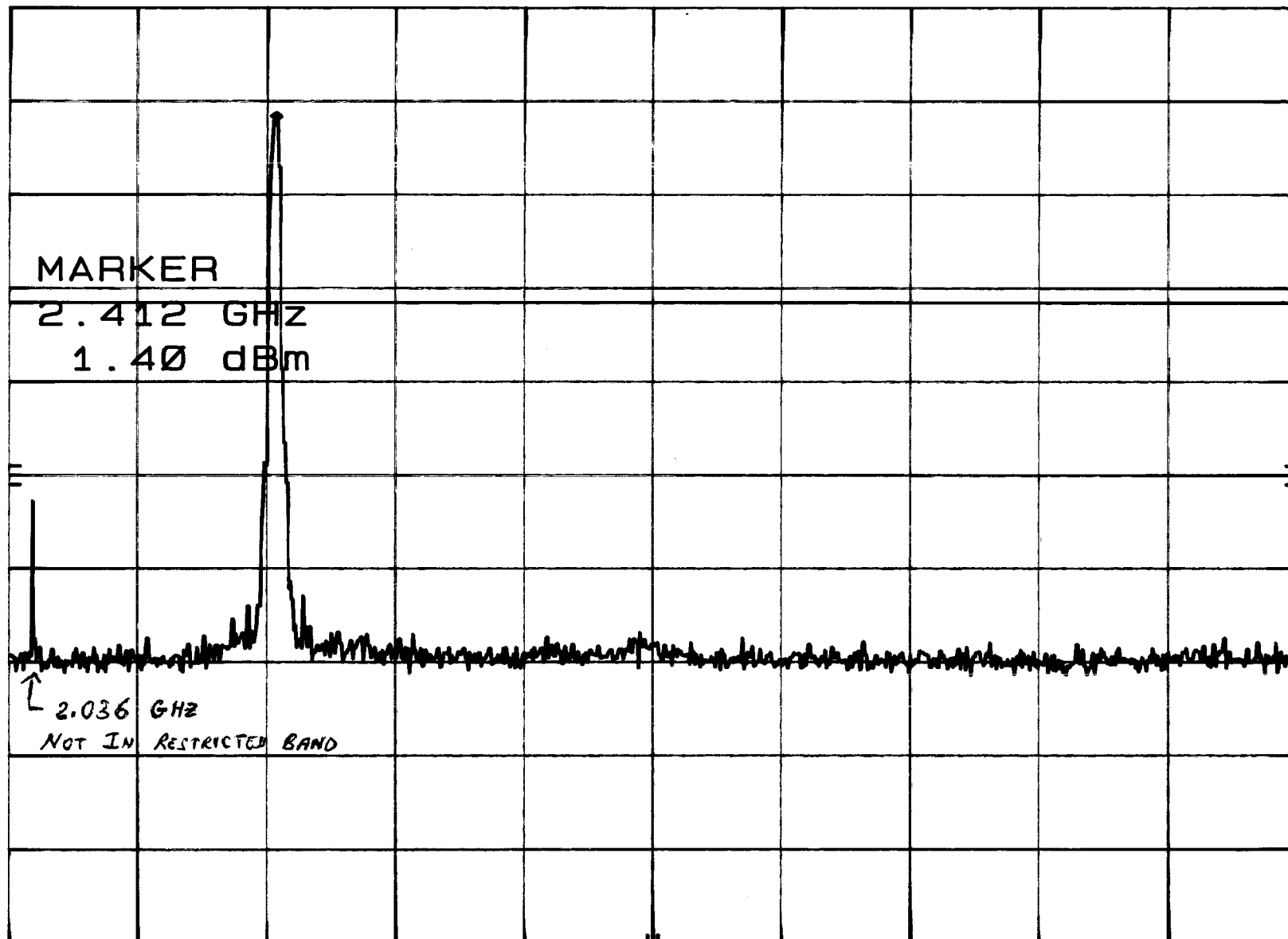
STOP 2.00 GHz

SWP 599 msec

RF ANT. COND. TEST OF LOW CH. 2-4GHZ
hp REF 13.0 dBm ATTEN 30 dB MKR 2.412 GHz
1.40 dBm

10 dB/

DL
-18.6
dBm



START 2.00 GHz RES BW 100 KHZ VBW 300 KHZ STOP 4.00 GHz
SWP 600 msec

RF ANT. COND. TEST OF LOW CH. 4GHZ-10GHZ

MKR 8.974 GHz

hp

REF 13.0 dBm ATTN 30 dB

-48.70 dBm

10 dB/

DL
-18.6
dBm

MARKER

8.974 GHz

-48.70 dBm

F

F

START 4.00 GHz

RES BW 100 kHz

VBW 300 kHz

STOP 10.00 GHz

SWP 1.80 sec

RF ANT. COND. TEST OF LOW CH. 10GHZ-20GHZ

MKR 19.24 GHz

hp

REF 13.0 dBm ATTEN 30 dB

-41.70 dBm

10 dB/

DL
-18.6
dBm

MARKER

19.24 GHz
-41.70 dBm

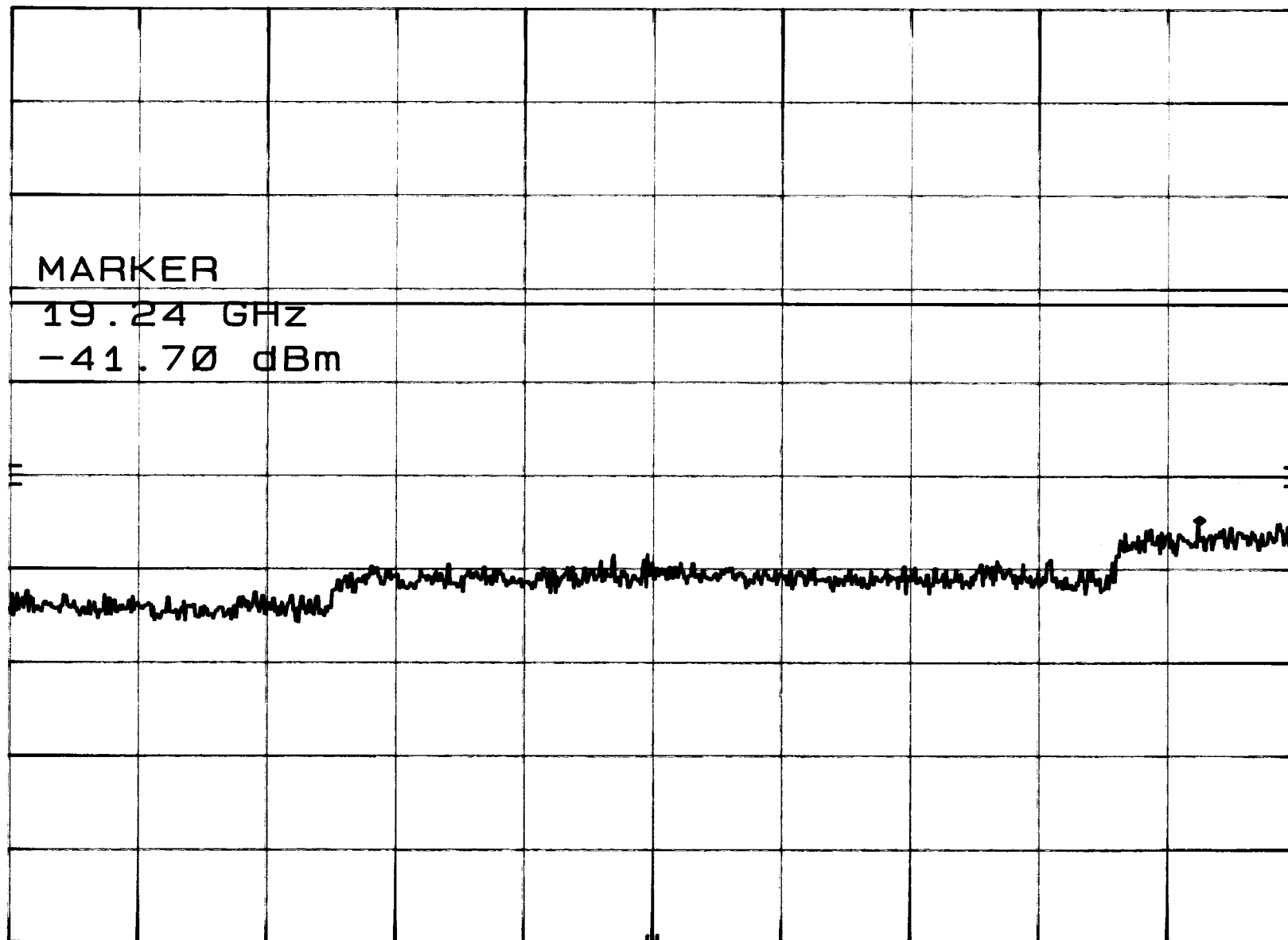
START 10.0 GHz

RES BW 100 kHz

VBW 300 kHz

STOP 20.0 GHz

SWP 3.00 sec



RF ANT. COND. TEST OF LOW CH. 20-26GHZ

MKR 23.222 GHz

hp

REF 0.0 dBm

HARMONIC 6L

-74.50 dBm

10 dB/

CNVLOSS

22.0

dB

DL

-18.6

dBm

MARKER

23.222 GHz

-74.50 dBm

E

F

START 20.00 GHz

RES BW 100 kHz

VBW 300 kHz

STOP 26.00 GHz

SWP 1.80 sec

RF ANT. COND. TEST OF MID CH. 2MHZ-2GHZ

MKR 1.213 GHz

hp

REF 13.0 dBm

ATTEN 30 dB

-54.50 dBm

10 dB/

MARKER

1.213 GHz

-54.50 dBm

DL
-16.6
dBm

CORR'D

START 2 MHz

RES BW 100 kHz

VBW 300 kHz

STOP 2.00 GHz

SWP 599 msec

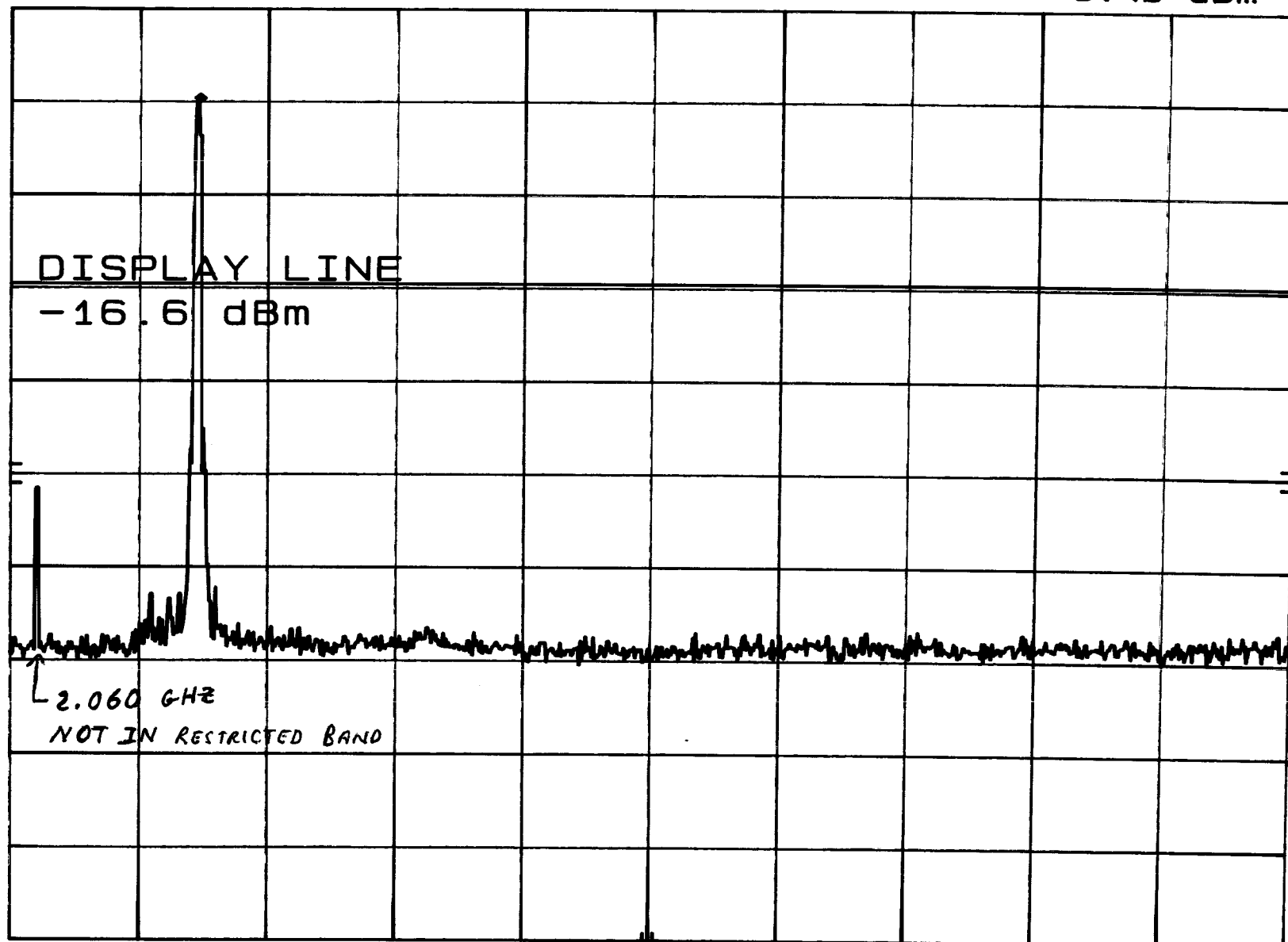
RF ANT. COND. TEST OF MID CH. 2-5GHZ
hp REF 13.0 dBm ATTEN 30 dB

MKR 2.438 GHz
3.40 dBm

10 dB/

DL
-16.6
dBm

CORR'D



START 2.00 GHz

RES BW 100 KHz

VBW 300 KHz

STOP 5.00 GHz
SWP 900 msec

RF ANT. COND. TEST OF MID CH. 5-20GHZ

MKR 19.63 GHZ

hp

REF 13.0 dBm

ATTEN 30 dB

-41.40 dBm

10 dB/

MARKER

19.63 GHZ

-41.40 dBm

DL
-16.6
dBm

CORR'D

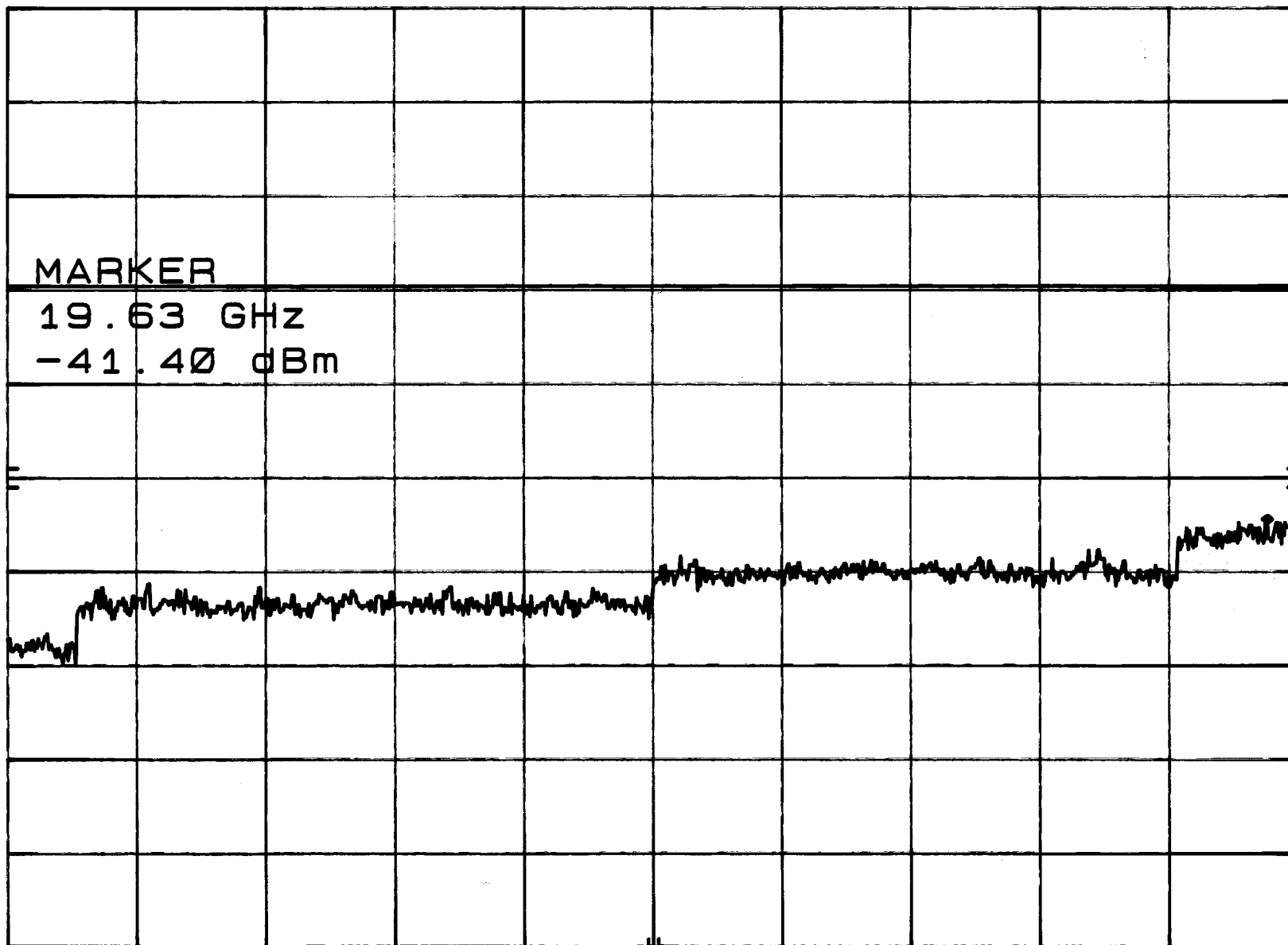
START 5.0 GHZ

RES BW 100 KHZ

VBW 300 KHZ

STOP 20.0 GHZ

SWP 4.50 sec



RF ANT. COND. TEST OF MID CH. 20-26GHz

MKR 20.846 GHz

hp

REF 0.0 dBm

HARMONIC 6L

-74.50 dBm

10 dB/

CNVLOSS

22.0

dB

DL

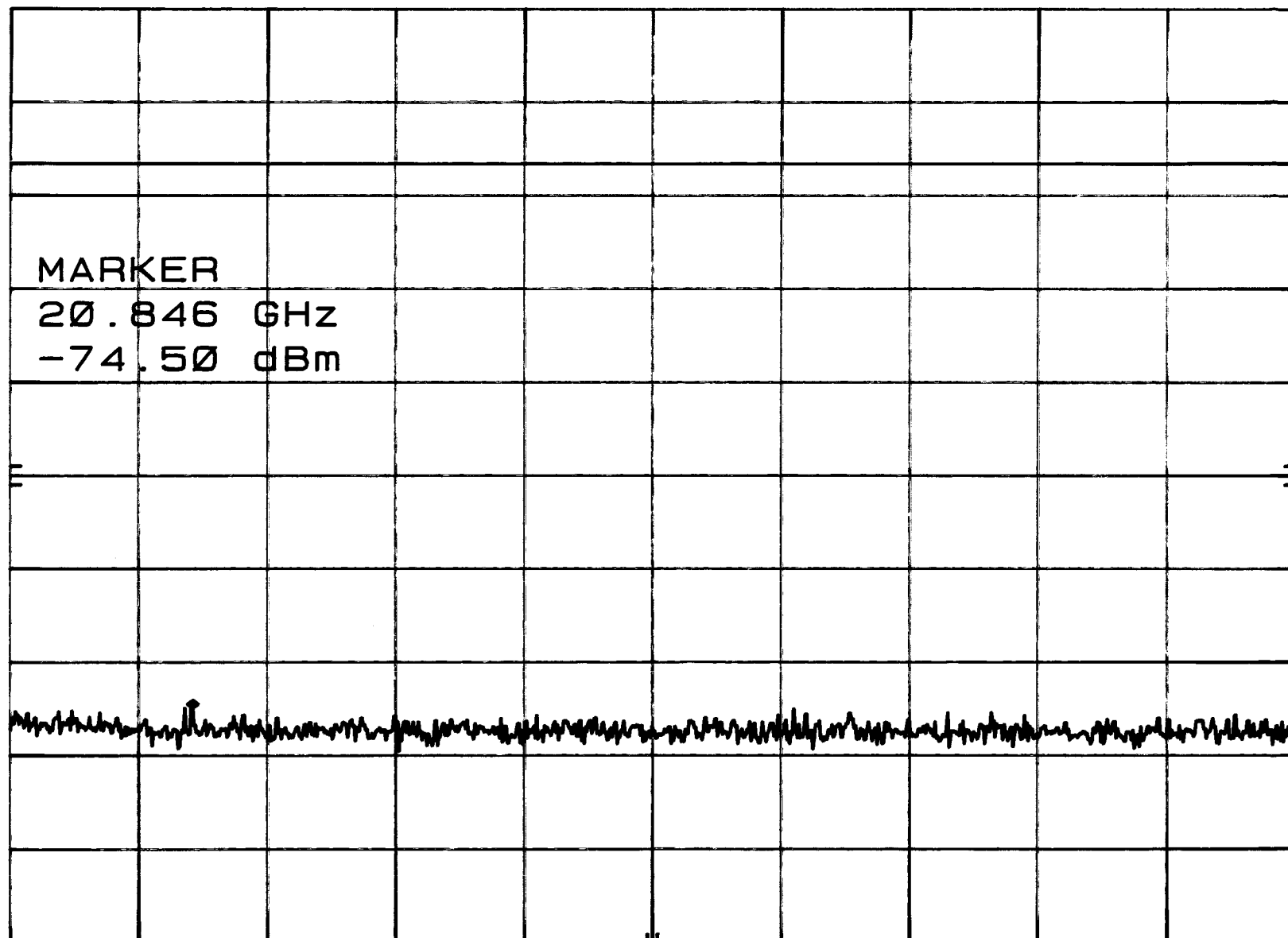
-16.6

dBm

MARKER

20.846 GHz

-74.50 dBm



START 20.00 GHz

RES BW 100 KHz

VBW 300 KHz

STOP 26.00 GHz

SWP 1.80 sec

RF ANT. COND. TEST OF HIGH CH. - 2MHZ-2GHZ MKR 1.223 GHz
hp REF 13.0 dBm ATTEN 30 dB -54.60 dBm

10 dB/

DL
-17.3
dBm

MARKER

1.223 GHz
-54.60 dBm

CORR'D

START 2 MHz

RES BW 100 kHz

VBW 300 kHz

STOP 2.00 GHz

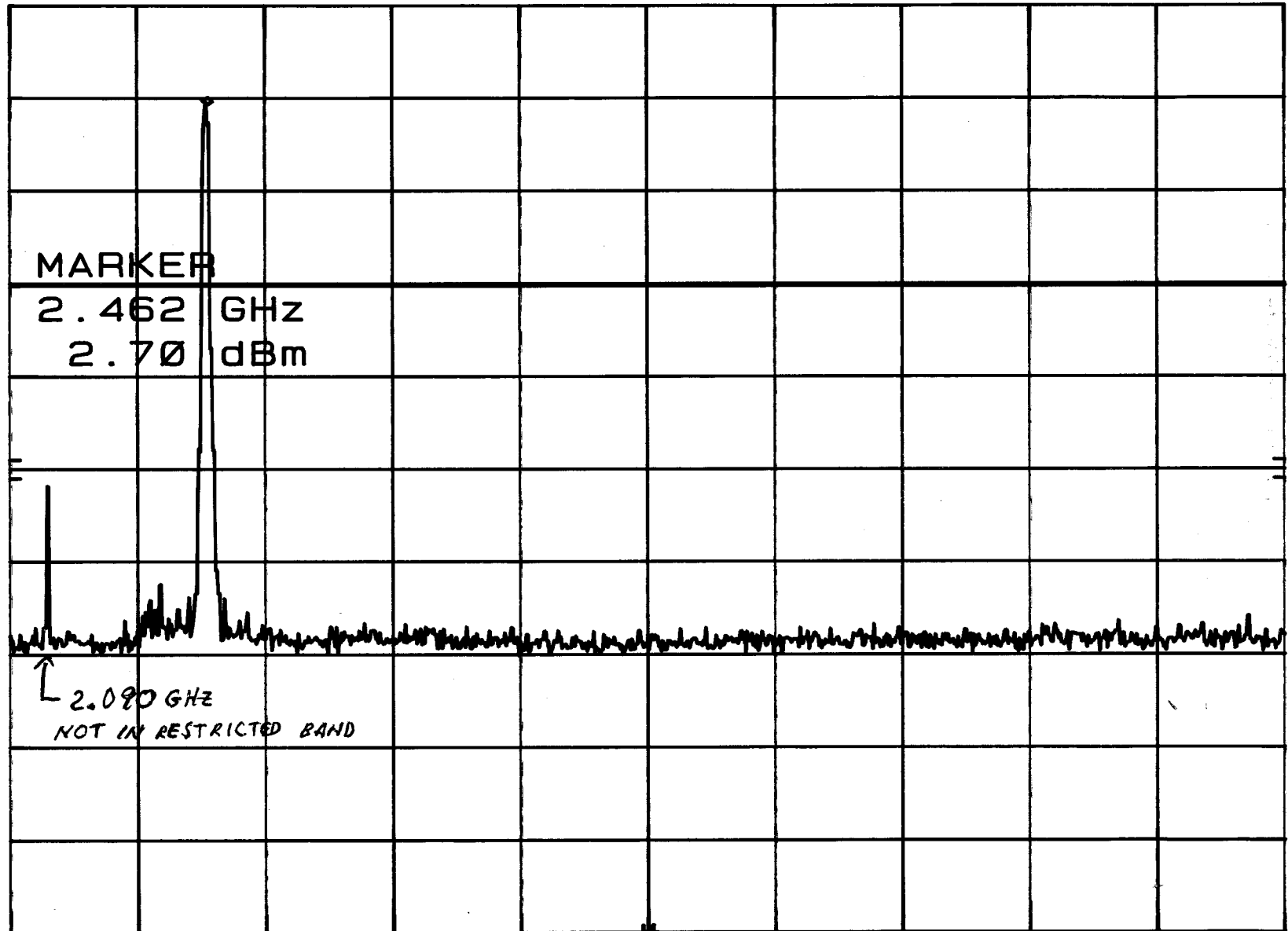
SWP 599 msec

RF ANT. COND. TEST OF HIGH CHANNEL 2-5GHZ
hp REF 13.0 dBm ATTEN 30 dB MKR 2.462 GHz
2.70 dBm

10 dB/

DL
-17.3
dBm

CORR'D



START 2.00 GHz RES BW 100 KHZ VBW 300 KHZ STOP 5.00 GHz
SWP 900 msec

RF ANT. COND. TEST OF HIGH CHANNEL - 5-20GHZ MKR 19.79 GHZ

REF 13.0 dBm ATTEN 30 dB

-41.50 dBm

hp

10 dB/

DL
-17.3
dBm

MARKER

19.79 GHz

-41.50 dBm

CORR'D

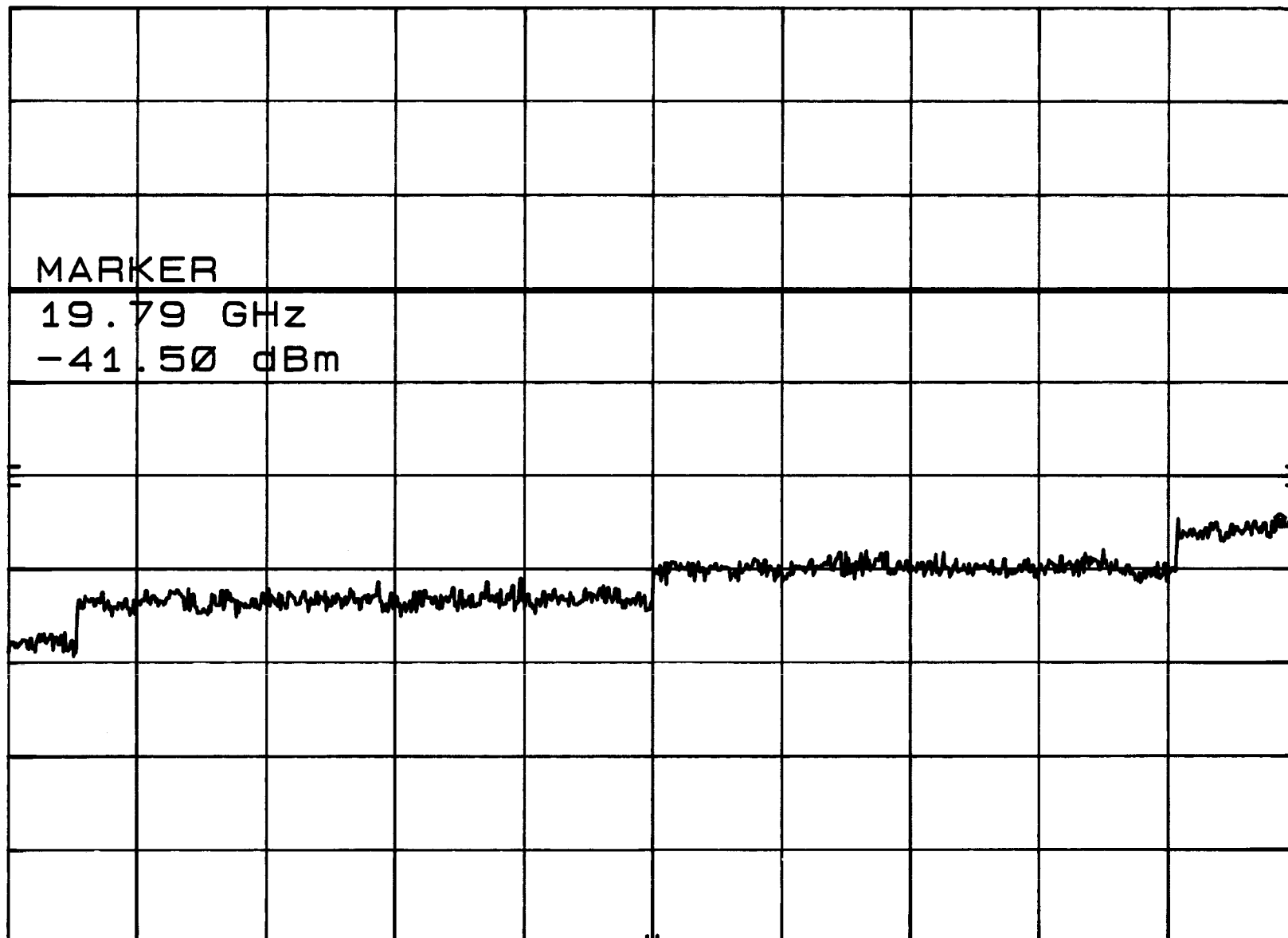
START 5.0 GHZ

RES BW 100 KHz

VBW 300 KHz

STOP 20.0 GHZ

SWP 4.50 sec



RF ANT. COND. TEST OF HIGH CH. - 20-26GHz

MKR 21.914 GHz

hp

REF 0.0 dBm

HARMONIC 6L

-74.50 dBm

10 dB/

CNVLOSS

22.0

dB

DL

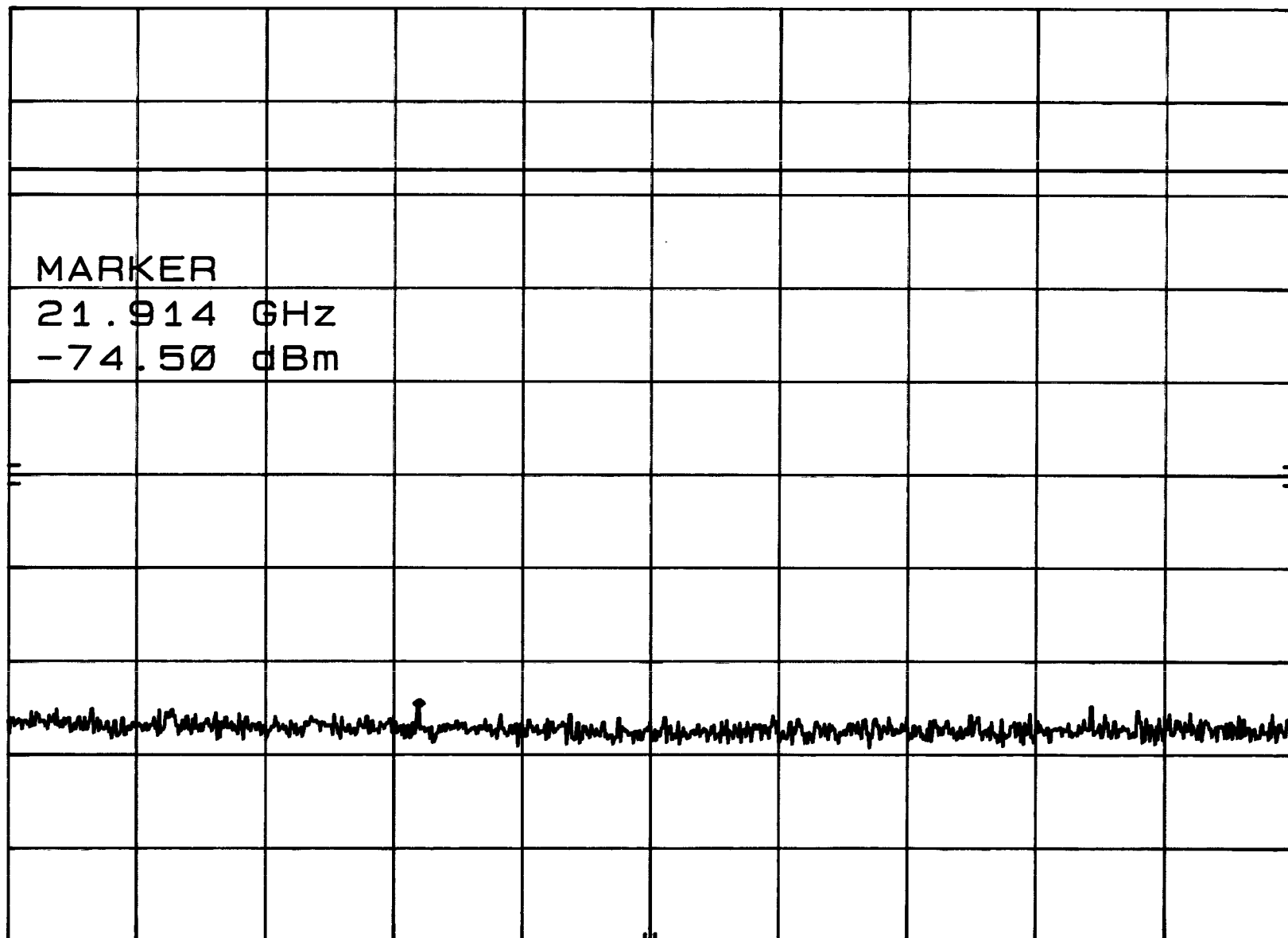
-17.3

dBm

MARKER

21.914 GHz

-74.50 dBm



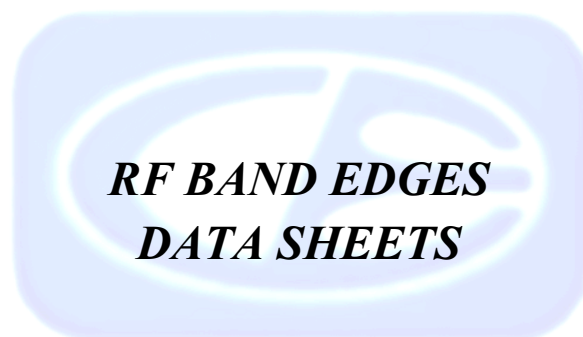
START 20.00 GHz

RES BW 100 kHz

VBW 300 kHz

STOP 26.00 GHz

SWP 1.80 sec



hp

BAND EDGE OF LOW CHANNEL
REF 117.0 dB μ V ATTEN 20 dB

MKR 2.390 12 GHz
52.10 dB μ V

10 dB/

DL
77.0
dB μ V

MARKER

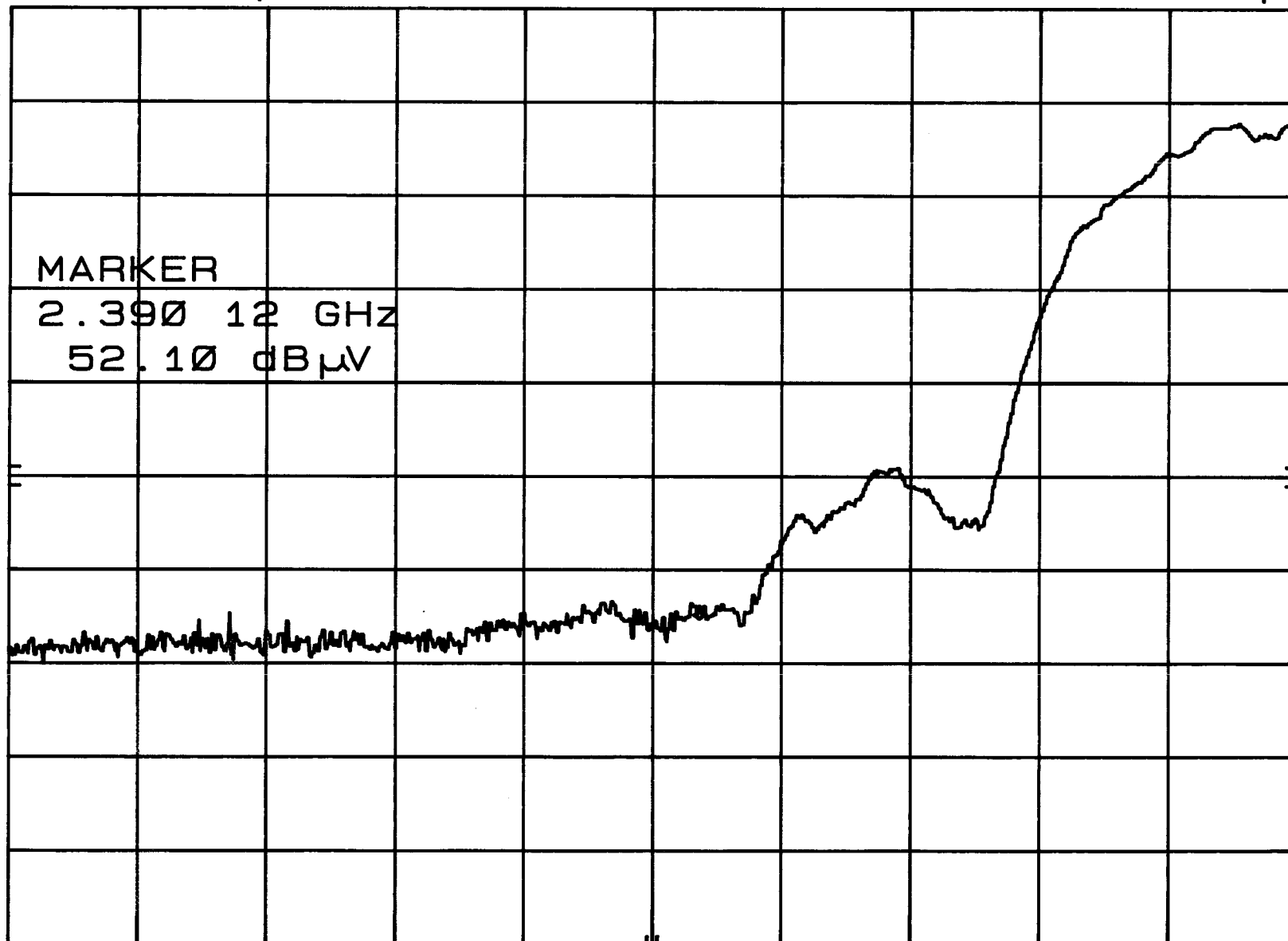
2.390 12 GHz
52.10 dB μ V

CORR'D

CENTER 2.388 3 GHz
RES BW 1 MHz

VBW 1 MHz

SPAN 50.0 MHz
SWP 20.0 msec



BAND EDGE OF LOW CHANNEL AVERAGE

MKR 2.390 654 8 GHz

hp

REF 46.9 dB μ V ATTN 20 dB

45.65 dB μ V

LINEAR

DL
42.4
dB μ V

MARKER

2.390 654 8 GHz

45.65 dB μ V

CORR'D

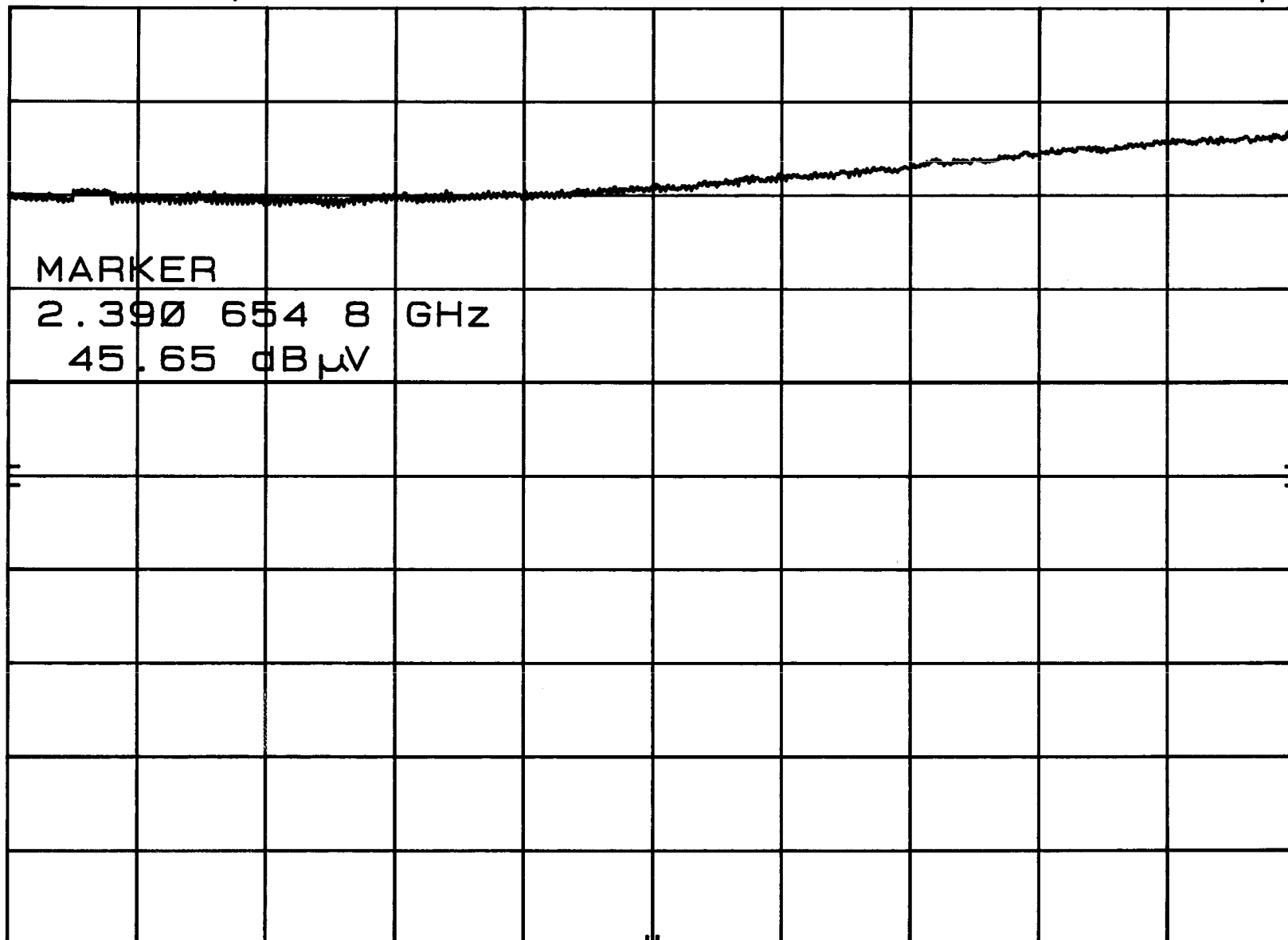
CENTER 2.390 333 GHz

RES BW 1 MHz

VBW 10 Hz

SPAN 650 kHz

SWP 50.0 sec



BAND EDGE OF HIGH CHANNEL

MKR 2.483 5 GHz

hp REF 117.0 dB μ V ATTEN 20 dB

55.20 dB μ V

10 dB/

DL
77.0
dB μ V

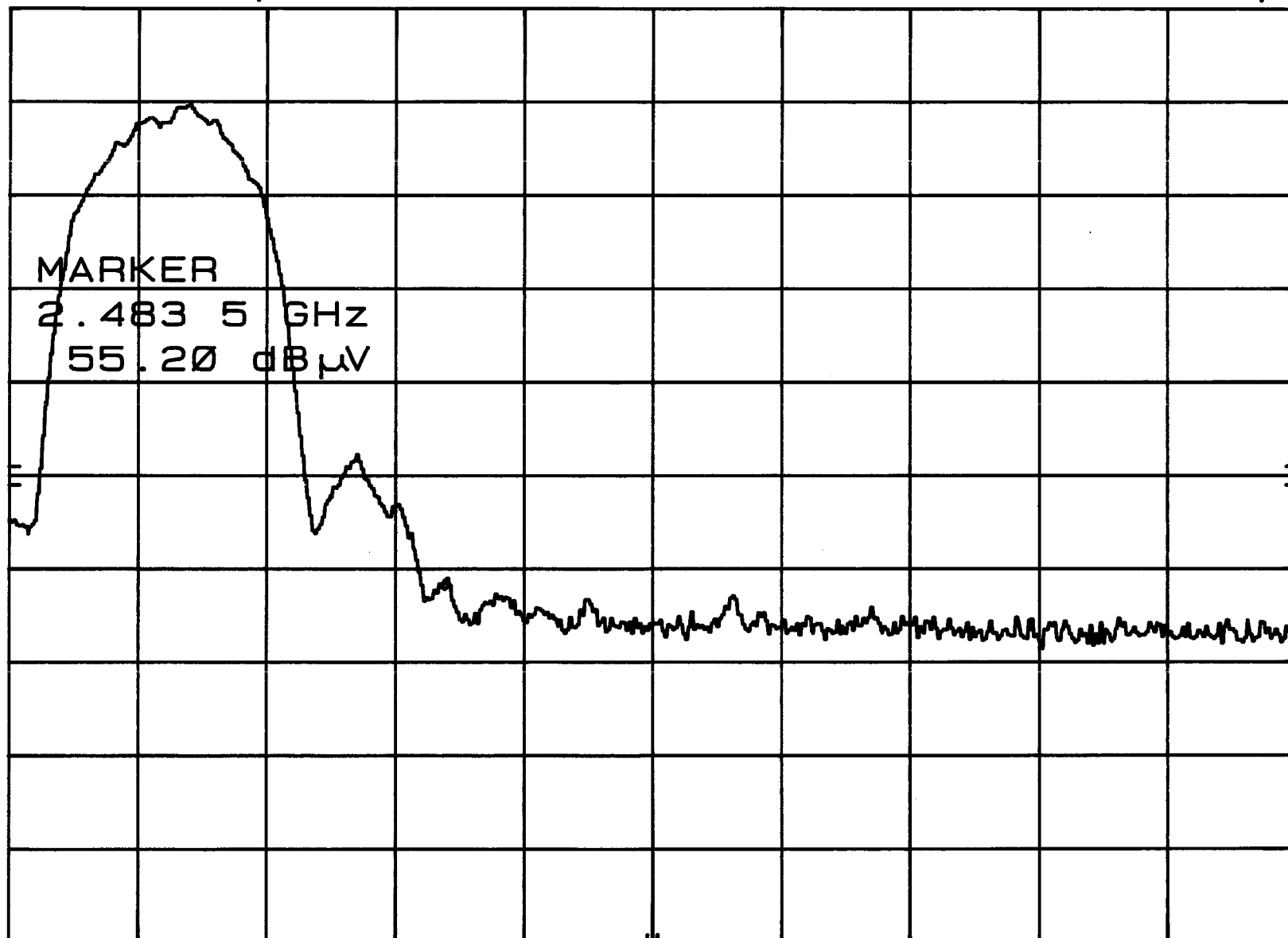
MARKER
2.483 5 GHz
55.20 dB μ V

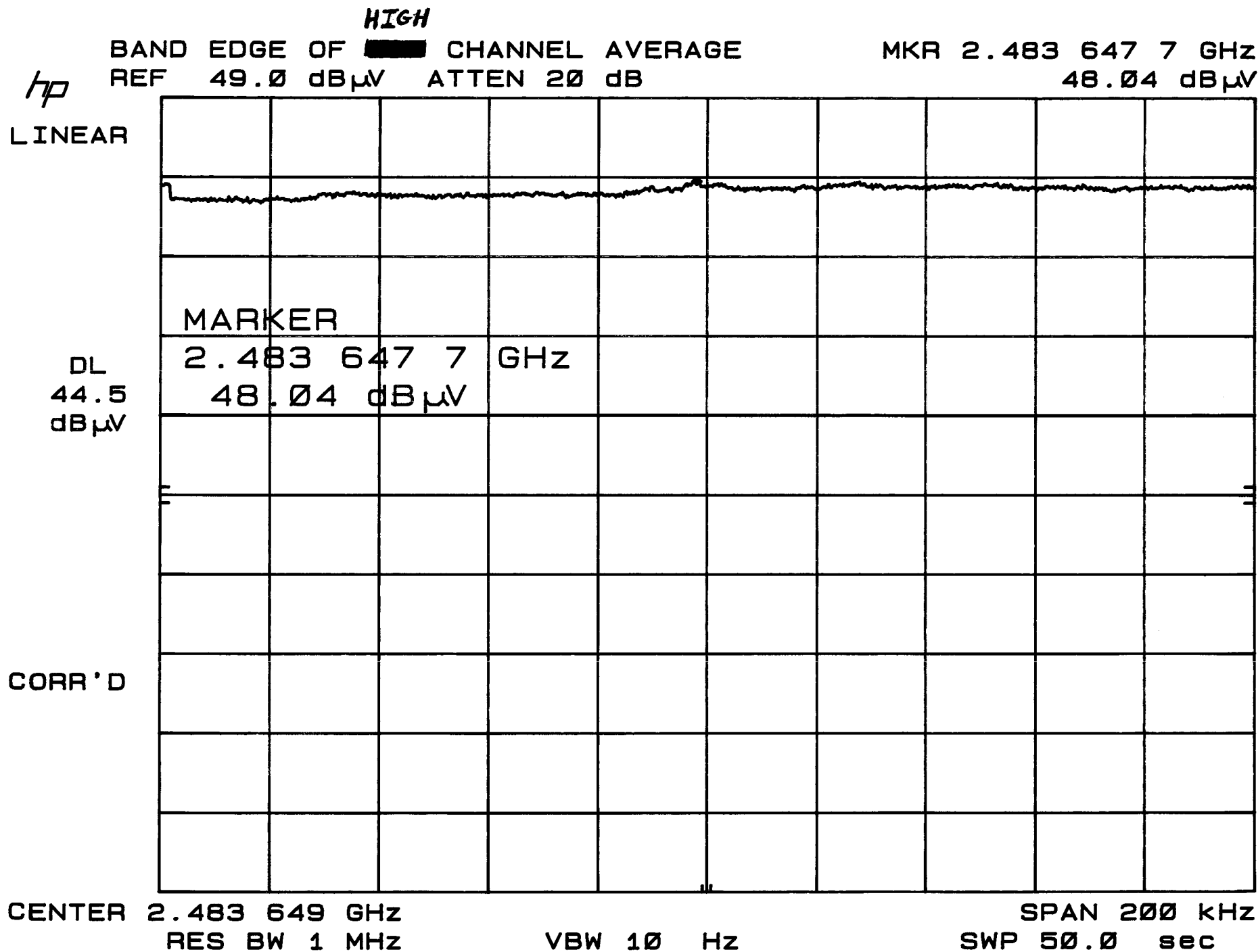
CORR'D

CENTER 2.499 GHz
RES BW 1 MHz

VBW 1 MHz

SPAN 100 MHz
SWP 20.0 msec





RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	Xircom, Inc.	DATE	11/8/01
EUT	MPCI Type 3A 802.11B Wireless + V.92 Modem Card	DUTY CYCLE	N/A
MODEL	M3AWEB56GA	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2370.0710	47.5	40.5 A	H	1.5	90	X	LOW	30.4	3.6	32.1	42.4	-11.6	54.0	BAND EDGE LOW CH.
2390.0000	52.1	45.7 A	H	1.5	90	X	LOW	30.5	3.6	32.1	47.7	-6.3	54.0	BAND EDGE LOW CH.
2483.5000	55.2	48.0 A	H	1.5	90	X	MID	30.7	3.5	31.9	50.3	-3.7	54.0	BAND EDGE HIGH CH.
2487.4350	51.9	45.2 A	H	1.5	90	X	MID	30.7	3.5	31.9	47.5	-6.5	54.0	BAND EDGE HIGH CH.
														NOTE: ABOVE READINGS
														ARE READINGS THAT ARE
														IN THE RESTRICTED BAND
														JUST OUTSIDE THE BAND
														EDGES.
														HORIZONTAL POLAR.
														IS WORST CASE

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

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***RADIATED DATA SHEETS
FOR THE FOXCONN ANTENNA
NOT PART OF THE MODULAR APPROVAL***



RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	XIRCOM, INC.	DATE	11/15/01
EUT	MPCI Type 3A 802.11B Wireless + V.92 Modem Card	DUTY CYCLE	N/A
MODEL	M3AWEB56GA	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Ant. Axis	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2412.0000	101.7	A	H	1.5	180	X	LOW	30.5	3.6	32.0	103.8			
2412.0000	98.5	A	V	1.5	180	Y	LOW	30.5	3.6	32.0	100.6			
2438.0000	103.7	A	H	1.5	180	X	LOW	30.6	3.6	32.0	105.9			
2438.0000	98.5	A	V	1.5	180	Y	LOW	30.6	3.6	32.0	100.7			
2462.0000	104.1	A	H	1.5	180	X	LOW	30.5	3.6	32.0	106.2			
2462.0000	101.8	A	V	1.5	180	Y	LOW	30.5	3.6	32.0	103.9			

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
 ** DELTA = SPEC LIMIT - CORRECTED READING

PAGE 1

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	XIRCOM, INC.	DATE	11/15/01
EUT	MPCI Type 3A 802.11B Wireless + V.92 Modem Card	DUTY CYCLE	N/A
MODEL	M3AWEB56GA	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Ant. Axis	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
4824.0000	36.5	A	H	1.0	180	X	LOW	34.2	5.4	32.0	44.2	-9.8	54.0	
4824.0000	38.4	A	V	1.0	180	Y	LOW	34.2	5.4	32.0	46.1	-7.9	54.0	
4876.0000	36.8	A	H	1.5	180	X	MID	34.4	5.6	32.1	44.7	-9.3	54.0	
4876.0000	35.5	A	V	1.5	180	Y	MID	34.4	5.6	32.1	43.4	-10.6	54.0	
4924.0000	37.7	A	H	1.5	180	X	HIGH	34.6	5.6	32.2	45.7	-8.3	54.0	
4924.0000	38.6	A	V	1.5	180	Y	HIGH	34.6	5.6	32.2	46.6	-7.4	54.0	

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
 ** DELTA = SPEC LIMIT - CORRECTED READING

Note: No Harmonics Nor Emissions Found
 After the 2nd Harmonic

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RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	XIRCOM, INC.	DATE	11/15/01
EUT	MPCI Type 3A 802.11B Wireless + V.92 Modem Card	DUTY CYCLE	N/A
MODEL	M3AWEB56GA	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Ant. Axis	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2390.0000	51.3	42.8 A	H	1.5	180	X	LOW	30.5	3.6	32.0	44.9	-9.1	54.0	BAND EDGE LOW CH.
2370.2140	48.5	40.7 A	H	1.5	180	X	LOW	30.5	3.6	32.0	42.7	-11.3	54.0	BAND EDGE LOW CH.
2483.5000	54.2	49.1 A	H	1.0	180	X	HIGH	30.7	3.5	31.9	51.4	-2.6	54.0	BAND EDGE HIGH CH.
2486.7500	48.5	44.1 A	H	1.0	180	X	HIGH	30.7	3.5	31.9	46.4	-7.6	54.0	BAND EDGE HIGH CH.
														NOTE: ABOVE READINGS
														ARE READINGS THAT ARE
														IN THE RESTRICTED BAND
														JUST OUTSIDE THE BAND
														EDGES.
														WORST CASE WHEN BOTH
														EUT AND RX ANT. HORIZ.

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
 ** DELTA = SPEC LIMIT - CORRECTED READING

PAGE 3

Test location: Compatible Electronics

Customer : XIRCOM, INC.

Date : 11/14/2001

Manufacturer : XIRCOM, INC.

Time : 16.18

EUT name : MPC1 TYPE 3A 802.11 WIRELESS + V.92 MODEM CARD

Model : M3AWE56GA

Specification: Fcc_B Test distance: 3.0 mtrs Lab: D

Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00

Test Mode : SPURIOUS EMISSIONS FROM THE EUT

HORIZONTAL POLARIZATION 30 MHz TO 1000 MHz

TEMPERATURE 68 DEGREES F., RELATIVE HUMIDITY 75%

TESTED BY: KYLE FUJIMOTO

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	limit = L dBuV/m	Delta R-L dB
1H	40.16	48.40	1.00	11.82	39.20	22.02	40.00	-17.98
2H	79.90	47.10	1.30	8.30	38.60	18.10	40.00	-21.90
3H	144.06	46.10	1.93	12.78	38.90	21.92	43.50	-21.58
4H	148.06	54.80	1.98	13.06	38.83	31.01	43.50	-12.49
5H	165.85	53.30	2.00	13.93	38.80	30.43	43.50	-13.07
6H	204.51	43.60	2.20	16.05	38.96	22.89	43.50	-20.61
7H	233.20	54.00	2.30	17.03	38.80	34.53	46.00	-11.47
8H	237.33	38.70	2.35	17.17	38.80	19.42	46.00	-26.58
9H	342.07	36.00	2.97	14.52	38.90	14.59	46.00	-31.41
10H	364.98	47.50	3.09	14.75	38.81	26.53	46.00	-19.47
11H	397.75	49.90	3.29	15.08	38.61	29.65	46.00	-16.35
12H	430.87	35.90	3.24	15.56	38.54	16.16	46.00	-29.84
13H	430.97	40.20	3.24	15.56	38.54	20.46	46.00	-25.54
14H	460.47	34.60	3.26	16.01	38.54	15.33	46.00	-30.67
15H	464.52	41.90	3.29	16.07	38.56	22.70	46.00	-23.30
16H	497.75	38.60	3.49	16.57	38.69	19.96	46.00	-26.04
17H	499.67	42.80	3.50	16.60	38.70	24.19	46.00	-21.81
18H	530.97	41.90	3.75	17.62	38.51	24.76	46.00	-21.24
19H	532.47	36.50	3.76	17.67	38.51	19.43	46.00	-26.57
20H	558.87	36.40	3.88	18.54	38.47	20.35	46.00	-25.65
21H	564.18	36.50	3.87	18.72	38.51	20.58	46.00	-25.42
22H	597.40	39.20	3.81	19.81	38.78	24.04	46.00	-21.96
23H	630.62	39.10	4.04	20.11	38.62	24.64	46.00	-21.36
24H	663.85	39.70	4.26	20.35	38.53	25.77	46.00	-20.23
25H	671.67	35.50	4.29	20.40	38.54	21.65	46.00	-24.35
26H	697.07	36.40	4.39	20.58	38.59	22.77	46.00	-23.23
27H	799.36	46.50	4.90	22.39	37.90	35.88	46.00	-10.12
28H	832.58	37.50	4.77	22.50	37.97	26.80	46.00	-19.20
29H	899.02	34.00	4.99	22.70	37.80	23.89	46.00	-22.11
30H	930.35	33.70	5.18	23.85	37.25	25.48	46.00	-20.52

Test location: Compatible Electronics

Customer : XIRCOM, INC.

Date : 11/14/2001

Manufacturer : XIRCOM, INC.

Time : 16.56

EUT name : MPC1 TYPE 3A 802.11 WIRELESS + V.92 MODEM CARD

Model : M3AWEB56GA

Specification: Fcc_B Test distance: 3.0 mtrs Lab: D

Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00

Test Mode : SPURIOUS EMISSIONS FROM THE EUT

VERTICAL POLARIZATION 30 MHz TO 1000 MHz

TEMPERATURE 68 DEGREES F., RELATIVE HUMIDITY 75%

TESTED BY: KYLE FUJIMOTO

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	limit = L dBuV/m	Delta R-L dB
1V	33.93	57.00	0.94	13.70	39.08	32.56	40.00	-7.44
2V	43.08	50.10	1.03	12.11	39.20	24.04	40.00	-15.96
3V	49.23	52.90	1.09	11.20	39.20	25.99	40.00	-14.01
4V	61.48	50.70	1.21	10.13	39.14	22.91	40.00	-17.09
5V	67.88	64.40	1.28	8.98	38.88	35.78	40.00	-4.22
6V	68.80	46.60	1.29	8.82	38.85	17.86	40.00	-22.14
7V	99.86	60.60	1.50	8.79	38.70	32.19	43.50	-11.31
8V	110.64	56.60	1.59	9.97	38.91	29.24	43.50	-14.26
9V	122.96	53.40	1.68	11.12	39.16	27.04	43.50	-16.46
10V	136.28	41.90	1.84	12.18	39.02	16.89	43.50	-26.61
11V	155.26	45.50	2.00	13.36	38.80	22.06	43.50	-21.44
12V	166.54	52.60	2.00	13.98	38.80	29.78	43.50	-13.72
13V	217.74	43.20	2.20	16.50	38.86	23.05	46.00	-22.95
14V	233.16	55.30	2.30	17.03	38.80	35.83	46.00	-10.17
15V	299.83	46.20	2.80	19.89	38.90	29.99	46.00	-16.01
16V	332.92	44.70	2.93	14.43	38.90	23.16	46.00	-22.84
17V	364.77	50.80	3.09	14.75	38.81	29.82	46.00	-16.18
18V	497.38	47.40	3.48	16.56	38.69	28.76	46.00	-17.24
19V	530.47	48.00	3.74	17.61	38.52	30.83	46.00	-15.17
20V	566.31	49.30	3.87	18.79	38.53	33.43	46.00	-12.57
21V	596.73	45.70	3.81	19.79	38.77	30.52	46.00	-15.48
22V	732.96	42.50	4.60	21.19	38.27	30.02	46.00	-15.98
23V	799.47	43.70	4.90	22.39	37.90	33.09	46.00	-12.91

Test location: Compatible Electronics
Customer : XIRCOM, INC. Date : 11/14/2001
Manufacturer : XIRCOM, INC. Time : 17.21
EUT name : MPC1 TYPE 3A 802.11 WIRELESS + V.92 MODEM CARD
Model : M3AWEB56GA
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00
Test Mode : SPURIOUS EMISSIONS FROM THE EUT
VERTICAL AND HORIZONTAL POLARIZATION 10 kHz TO 30 MHz
TEMPERATURE 68 DEGREES F., RELATIVE HUMIDITY 75%
TESTED BY: KYLE FUJIMOTO

NO EMISSIONS FOUND FROM 10 kHz TO 30 MHz IN EITHER POLARIZATION
FOR THE EUT