Exhibit K: Technical Report for MICN0023

FCC ID: QYT-4120

Measurement/Technical Report

Micron Communications, Inc.
Microstamp Interrogator

FCC ID: LC6-4120

February 21, 1998

This report concerns (check one): Original Grant__X__ Class II Change____

Equipment Type: Microstamp Interrogator Model 4120/Intentional Radiator

Deferred grant requested per 47 CFR 0.457 (d)(1)(ii)? yes____ no X

If yes, defer until: ____N/A____ date

Micron Communications, Inc. agrees to notify the Commission by: ____N/A____ date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37: yes____ no__X__

If no, assumed Part 15, Subpart B for unintentional radiators - new 47 CFR [10-1-92] provision.

Report prepared by:

Northwest EMC, Inc.
120 South Elliott Road, Suite 300
Newberg, OR 97132
(503) 537-0728
fax: (503) 537-0735

Report No. MICN0023

Table of Contents

1.0 General Information

1.1 Product Description

Manufactured By .....Micron Communications, Inc.

Address.....3176 South Denver Way Boise, ID 83705

Test Requested By: .....Joe Hofstra

Model .....Microstamp Interrogator Model 4120

FCC ID LC6-4120

Serial Number(s).....BETA 02

Date of Test .....January 20, 1998 through February 21, 1998

Job Number MICN0023

The Equipment Under Test (EUT) is the Micron Communications Microstamp Interrogator, Model 4120. The Microstamp system employs both direct sequencing and frequency hopping techniques, operating in the 2400 to 2483.5 MHz band. The transmitter and receiver are contained in a box called the Microstamp Interrogator. The Interrogator is DC powered and has a serial port interface for PC connection. The Interrogator also has six transmit ports and six receive ports. Six transmit antennas and six receive antennas are connected to these ports via coaxial cable.

The EUT was tested with Standard TNC Connectors.

The directional gain of the antennas do not exceed 6dBi.

Hardware Description (For further detail, reference Appendix IV, Hardware Specification):

- Clocks/Oscillators Frequencies: 2400 MHz - 2483.5 MHz
- Ports: R1, R2, R3, R4, R5, R6, T1, T2, T3, T4, T5, T6, Serial I/O

1.2 Related Submittals/Grants

The EUT is similar to FCC ID LC65269U. The grant of approval was issued for that unit 5/15/97.

1.3 Tested System Details

EUT and Peripherals

Item	FCC ID	Description and Serial No.
EUT	LC6-4120	Micron Communications Microstamp Interrogator Serial No. BETA02.
PC	EJMLP486CYC	Intel Model S486SX254F, Serial No. A00140785.
Monitor	AK8GDM17SE2T	IBM Model P70, Serial No. 23-92863.
Keyboard	E8HKB-5923	IBM Model KB-8923, Serial No. 0191364.
Mouse	DZLMSF14R	Compaq Model M-SF14-6MD, Serial No. LT042R10707.
Parallel Printer	BKMP850A	Epson Model LX300, Serial No. 1YLY179974. .
Antennas (12)		Antennas America Model M2-45SPRPA.
DC Power Supply		Instek, Model PC303RM, Serial No. 9565963.

Cables:

Item	Descriptions
Mouse	1.8 meters in length. Unshielded and no ferrites attached. PS/2 style connectors. Permanently attached to the mouse and connected to the mouse port of the PC.
Keyboard	1.8 meters in length. Unshielded and no ferrites attached. PS/2 style connectors. Permanently attached to the keyboard and connected the keyboard port of the PC.
Video	1.8 meters in length. Shielded and no ferrites attached. Metal connector backshells. Permanently attached to the monitor and connected to the video port of the PC.
Serial Cable	1.0 meter in length. unshielded and no ferrites attached. Plactic connector backshells. Connected from the I/O port of the EUT to the COM1 port of the PC.
Power	1.5 meters in length. Unshielded and no ferrites attached. Connected from the EUT to the external power supply.
Antenna	Twelve cables. 3.0 meters in length. Shielded and no ferrites attached. TNC connectors. Connected from the transmit and receive ports on the EUT to the antennas.

1.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (1992). Radiated testing was performed at an antenna to EUT distance of 3 meters. Please reference Appendix I for further detail on Test Methodology.

1.5 Test Facility

The Open Area Test Site and conducted measurement facility used to collect the radiated and conducted data is located at

Northwest EMC, Inc.
30475 NE Trails End Ln
Newberg, OR 97132
(503) 537-5564
Fax: 537-5562

The Open Area Test Site, and conducted measurement facility is located in Newberg, OR, at the address shown above. These sites have been fully described in reports filed with the FCC (Federal Communications Commission), and accepted by the FCC in letters maintained in our files.

Northwest EMC, Inc. is recognized under the United States Department of Commerce, National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. NVLAP Lab Code: 200059-0.

Northwest EMC, Inc. has been assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).

2.0 Product Labeling

Figure 2.1 FCC ID Label

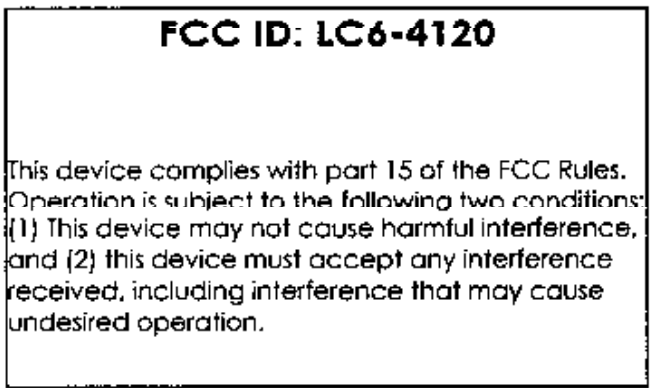
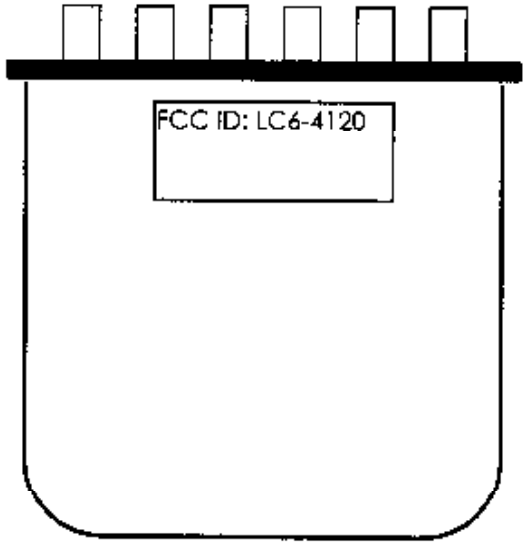


Figure 2.2 Location of Label on EUT



Bottom of EUT

3.0 System Test Configuration

3.1 Justification

All operating modes of the EUT were investigated. Data was taken with the EUT configured for low, mid, and high XMIT frequencies.

The EUT has six identical transmit ports and six identical receive ports. Only one transmit and one receive port can be active at a time. Pre-scans were performed to evaluate different combinations of transmit and receive antennas. Antenna conducted emissions data, as well as bandwidth occupancy and power output data were measured for all transmit ports, though Port 6 and Port 1 exhibited all of the highest emission levels and were used for some measurements.

Antenna conducted emissions and radiated emissions in the restricted bands of 15.205 were measured with the EUT transmitting a CW, no hopping signal for low, mid, and high frequencies. Antenna conducted emissions and restricted band data was submitted for all transmit ports.

Radiated emissions were measured with all the antenna ports connected to a coaxial cable and antenna.

Note: The EUT was tested with TNC connectors. Units offered for sale will incorporate Reverse Polarity TNC connectors on the transmit ports for units not intended for professional installation.

3.2 EUT Exercise Software

A **Windows™** based program called *Microstamp Standard Assist V3.45 (3.4600)* was run off the hard-disk in the PC. It allows the EUT to be configured for hopping or no hopping (C/W) transmit modes. A typical frequency application is simulated by a routine called "Data Animation".

3.3 Special Accessories

A power/serial test cable was used.

3.4 Equipment Modifications

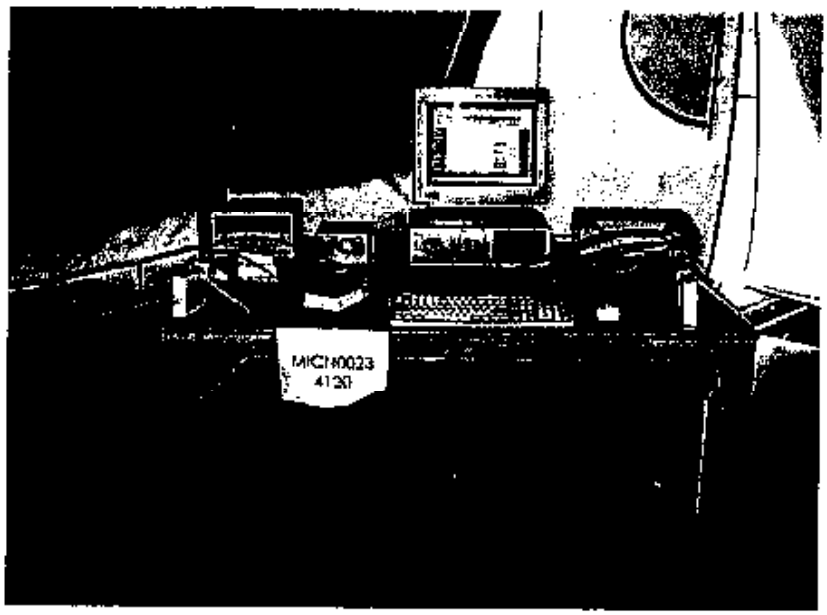
None.

3.5 Configuration of Tested System

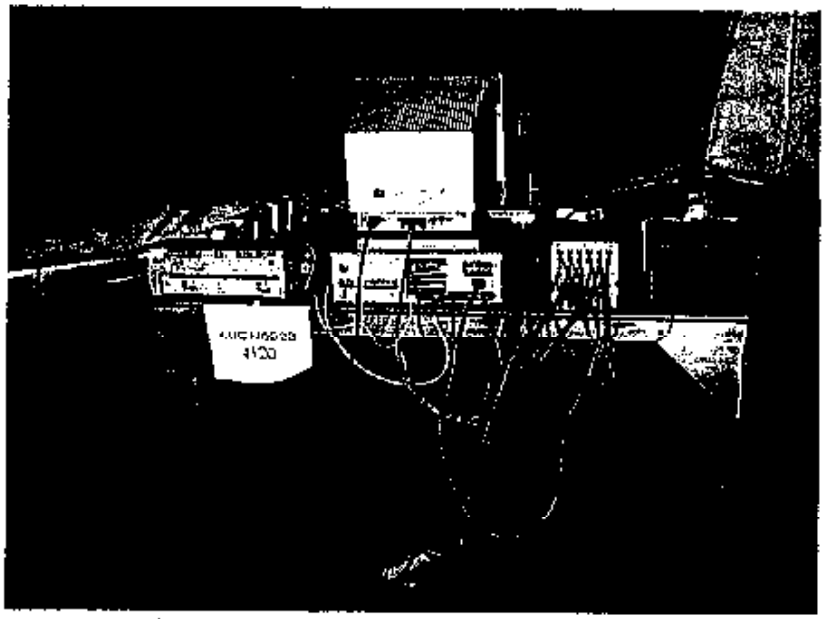
A minimum system configuration was utilized per ANSI C63.4 (section 11.2), consisting of a Personal Computer, keyboard, mouse, monitor, and printer. The EUT was the serial device. The test software which exercised the EUT was run off the hard disk inside the PC.

5.0 Photographs

Radiated Emissions, Test Setup.



Radiated Emissions, Test Setup.

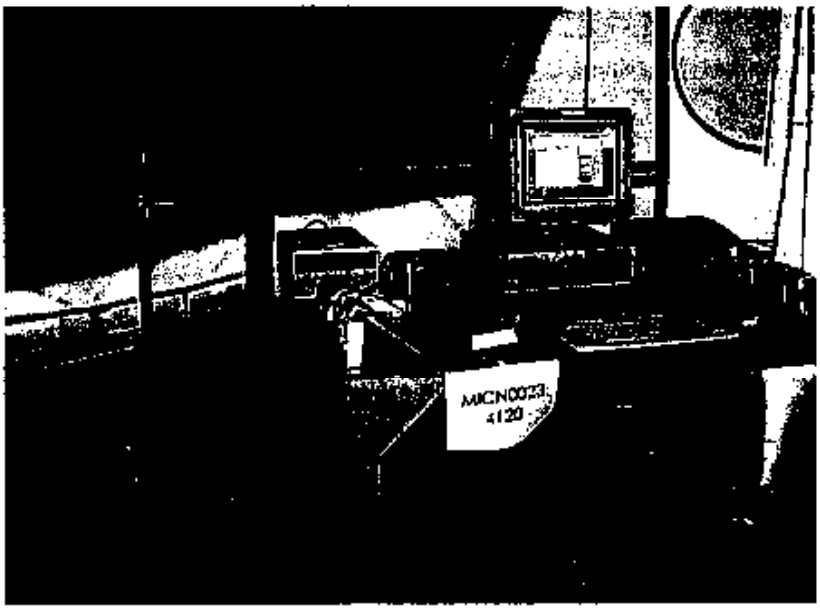


5.0 Photographs

Interface Cables, Test Setup.

5.0 Photographs

Conducted Emissions, Test Setup.



Conducted Emissions, Test Setup.

6.0 Conducted Emissions Data

6.1 The initial step in collecting conducted data is a spectrum analyzer, peak scan of the entire measurement range. All signals with less than 3 dB margin are then measured using a quasi-peak detector. Complete graphs and data sheets may be referenced on the following page. Minimum margins are listed below:

FCC Part 15 Specification Limits

Frequency (MHz)	Detector	Measured Level (dBuV)	Adjusted Level (Meas.Level - 13dB)	Limit (dBuV)	Margin (dB)*	Lead
0.457	QP	52.2	39.2	48	8.8	High
0.495	QP	49.8	36.8	48	11.2	High
0.537	QP	48.0	35	48	13.0	High
0.603	QP	44.3	31.3	48	16.7	High

Frequency (MHz)	Detector	Measured Level (dBuV)	Adjusted Level (Meas.Level - 13dB)	Limit (dBuV)	Margin (dB)*	Lead
0.450	QP	52.3	39.3	48.0	8.7	Low
0.465	QP	51.7	38.7	48.0	9.3	Low
0.487	QP	50.4	37.4	48.0	10.6	Low
0.505	QP	49.6	36.6	48.0	11.4	Low
0.550	QP	46.7	33.7	48.0	14.3	Low
0.632	QP	41.7	28.7	48.0	19.3	Low

The emission levels shown above were made using a Quasi-Peak detector. Measurements were also made using an average detector. Since the difference in those measurements was greater than 6 dB, a 13 dB relaxation was applied to the Quasi-Peak measurements. (Reference 15.107 (3d)).

All readings listed above are Quasi-Peak, using an IF Bandwidth of 9 kHz, a video filter was not used.

Judgment: Passed, minimum margin of 8.7 dB.

Test Personnel:

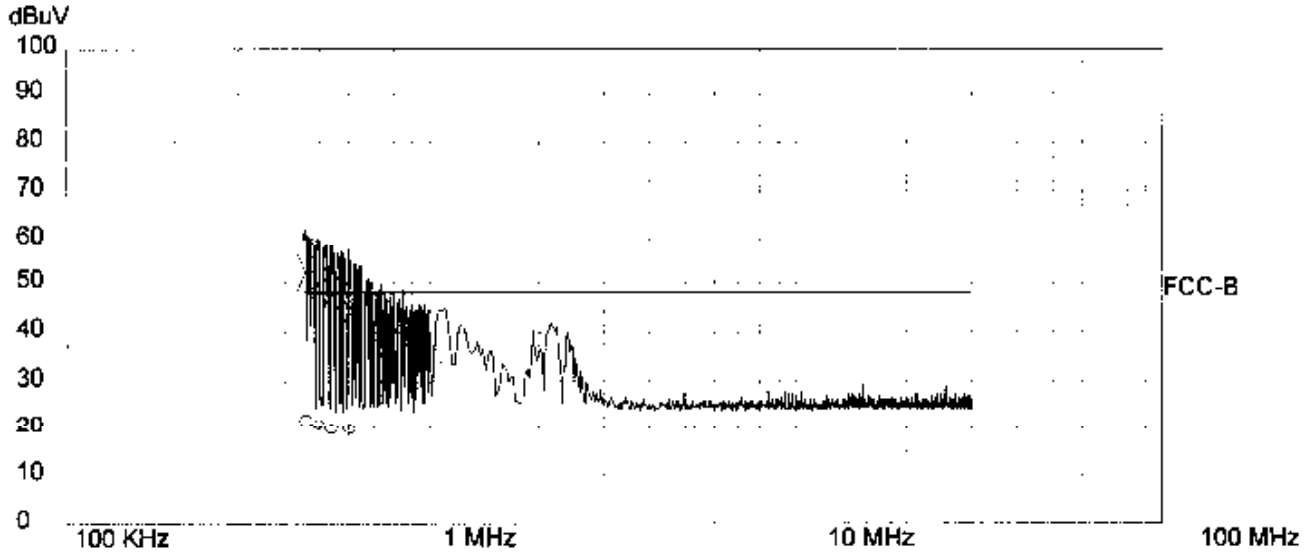
Tester Signature: _____ Date: 3/6/98

Typed/Printed Name: Dean Ghizzone

Northwest EMC, Inc.

Equipment Tested: 4120
Serial Number: BETA02
Manufacturer: Micron Communications, Inc.
Job Number: MICN0023
Date/Time: 02-21-1998 14:44
Tested By: Dean Ghizzone, TE30
Comments: Full System Configuration, Dots Animation, All Ports Operating Sequentially
115 VAC, 60 Hz

FCC Part 15 Class B Conducted Emissions Limits High Line

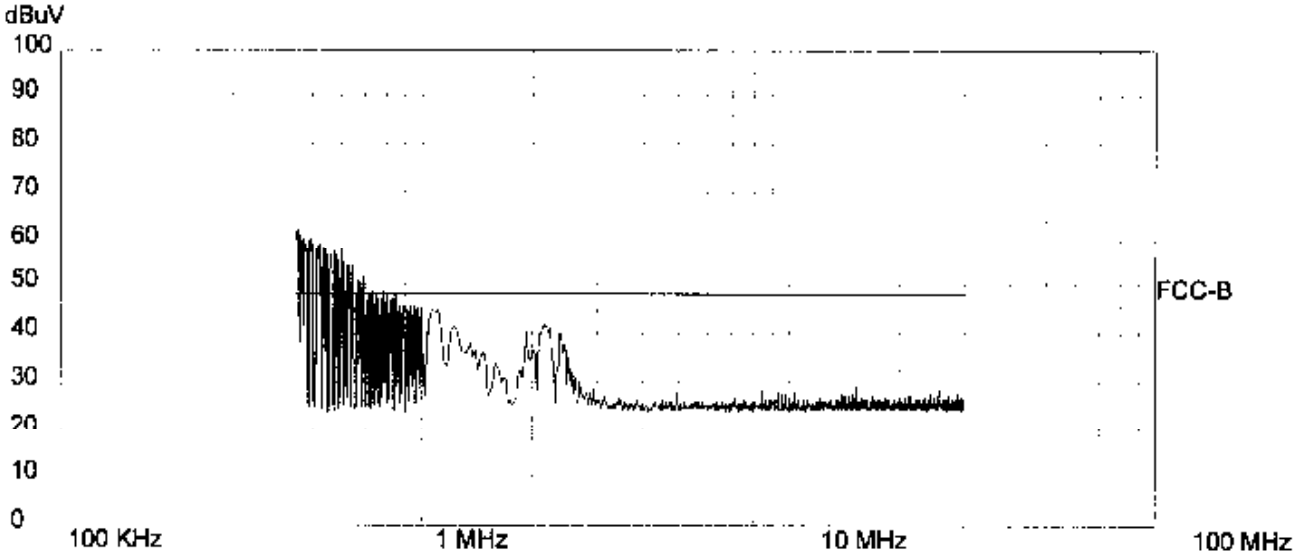


Frequency (MHz)	Meter Reading (dBuV)	Detector Function	Correction Factor (dB)	Line Tested	Adjusted Level (dBuV)	Spec. Limit (dBuV)	Compared To Limit (dB)
0.603	0.0	AV	20.0	High	20.0	48.0	-28.0
0.537	0.0	AV	20.0	High	20.0	48.0	-28.0
0.496	1.0	AV	20.0	High	21.0	48.0	-27.0
0.457	2.0	AV	20.0	High	22.0	48.0	-26.0
0.457	32.2	QP	20.0	High	52.2		
0.495	29.8	QP	20.0	High	49.8		
0.537	28.0	QP	20.0	High	48.0		
0.603	24.3	QP	20.0	High	44.3		

Northwest EMC, Inc.

Equipment Tested: 4120
Serial Number: BETA02
Manufacturer: Micron Communications, Inc.
Job Number: MICN0023
Date/Time: 02-21-1998 14:44
Tested By: Dean Ghizzone, TE30
Comments: Full System Configuration, Dots Animation, All Ports Operating Sequentially
115 VAC, 60 Hz

FCC Part 15 Class B Conducted Emissions Limits High Line — Peak data.



Frequency (MHz)	Meter Reading (dBuV)	Line Tested	Cable Loss (dB)	Adjusted Level (dBuV)	Spec Limit (dBuV)	Compared To Limit (dB)
0.457	42.3	High	20.0	62.3	48.0	14.3
0.465	41.0	High	20.0	61.0	48.0	13.0
0.475	40.7	High	20.0	60.7	48.0	12.7
0.495	40.3	High	20.0	60.3	48.0	12.3
0.490	40.0	High	20.0	60.0	48.0	12.0
0.523	39.3	High	20.0	59.3	48.0	11.3
0.479	39.1	High	20.0	59.1	48.0	11.1
0.516	38.7	High	20.0	58.7	48.0	10.7
0.537	38.4	High	20.0	58.4	48.0	10.4
0.510	37.7	High	20.0	57.7	48.0	9.7
0.603	37.3	High	20.0	57.3	48.0	9.3
0.577	37.2	High	20.0	57.2	48.0	9.2
0.560	36.5	High	20.0	56.5	48.0	8.5
0.548	36.4	High	20.0	56.4	48.0	8.4
0.582	36.3	High	20.0	56.3	48.0	8.3
0.589	35.2	High	20.0	55.2	48.0	7.2
0.526	34.8	High	20.0	54.8	48.0	6.8
0.632	34.2	High	20.0	54.2	48.0	6.2
0.622	34.0	High	20.0	54.0	48.0	6.0
0.648	33.9	High	20.0	53.9	48.0	5.9

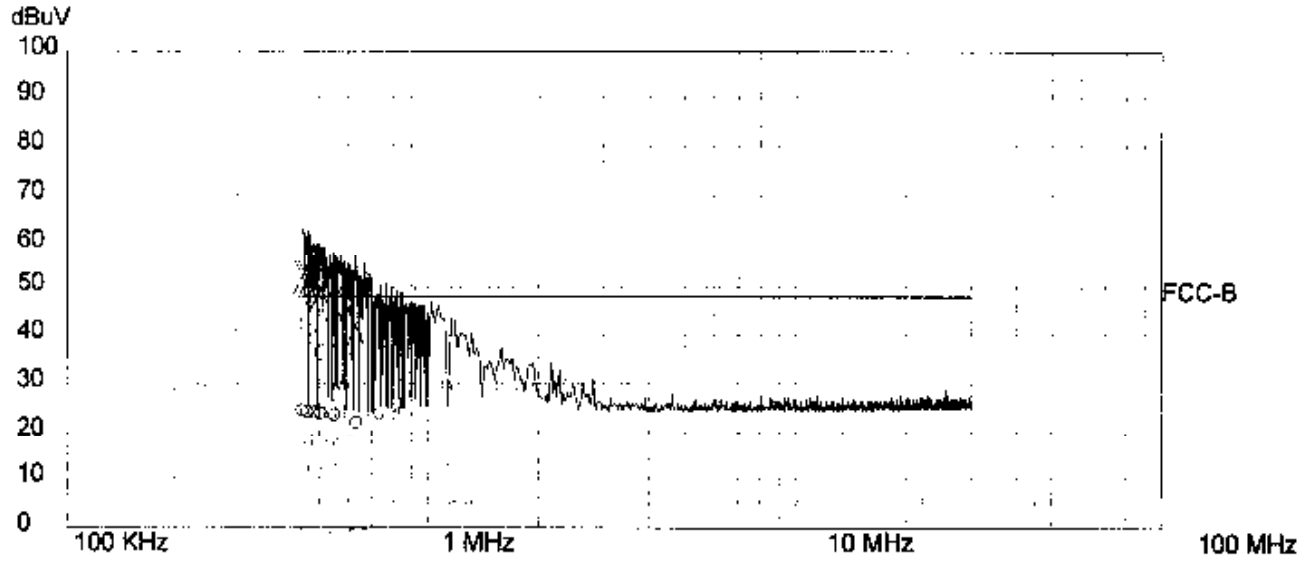
Signature

Temperature 70F 44% Humidity

Northwest EMC, Inc.

Equipment Tested: 4120
Serial Number: BETA02
Manufacturer: Micron Communications, Inc.
Job Number: MICN0023
Date/Time: 02-21-1998 14:55
Tested By: Dean Ghizzone, TE30
Comments: Full System Configuration, Dots Animation, All Ports Operating Sequentially
115 VAC, 60 Hz

FCC Part 15 Class B Conducted Emissions Limits Low Line

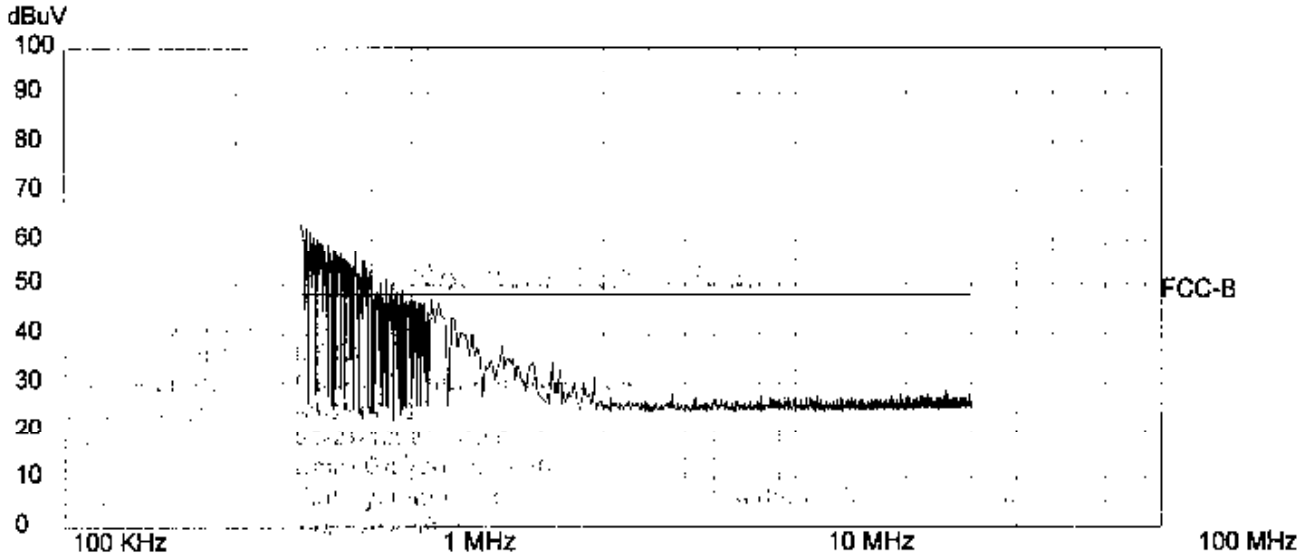


Frequency (MHz)	Meter Reading (dBuV)	Detector Function	Correction Factor (dB)	Line Tested	Adjusted Level (dBuV)	Spec. Limit (dBuV)	Compared To Limit (dB)
0.632	2.0	AV	20.0	Low	22.0	48.0	-26.0
0.550	3.6	AV	20.0	Low	23.6	48.0	-24.4
0.505	4.0	AV	20.0	Low	24.0	48.0	-24.0
0.487	4.1	AV	20.0	Low	24.1	48.0	-23.9
0.465	4.3	AV	20.0	Low	24.3	48.0	-23.7
0.450	4.5	AV	20.0	Low	24.5	48.0	-23.5
0.450	32.3	QP	20.0	Low	52.3		52.3
0.465	31.7	QP	20.0	Low	51.7		51.7
0.487	30.4	QP	20.0	Low	50.4		50.4
0.505	29.6	QP	20.0	Low	49.6		49.6
0.550	26.7	QP	20.0	Low	46.7		46.7
0.632	21.7	QP	20.0	Low	41.7		41.7

Northwest EMC, Inc.

Equipment Tested: 4120
Serial Number: BETA02
Manufacturer: Micron Communications, Inc.
Job Number: MICN0023
Date/Time: 02-21-1998 14:55
Tested By: Dean Ghizzone, TE30
Comments: Full System Configuration, Dots Animation, All Ports Operating Sequentially
115 VAC, 60 Hz

FCC Part 15 Class B Conducted Emissions Limits Low Line — Peak data.



Frequency (MHz)	Meter Reading (dBuV)	Line Tested	Cable Loss (dB)	Adjusted Level (dBuV)	Spec Limit (dBuV)	Compared To Limit (dB)
0.450	43.4	Low	20.0	63.4	48.0	15.4
0.465	42.7	Low	20.0	62.7	48.0	14.7
0.457	42.2	Low	20.0	62.2	48.0	14.2
0.475	42.0	Low	20.0	62.0	48.0	14.0
0.487	40.5	Low	20.0	60.5	48.0	12.5
0.499	40.1	Low	20.0	60.1	48.0	12.1
0.497	40.0	Low	20.0	60.0	48.0	12.0
0.480	39.7	Low	20.0	59.7	48.0	11.7
0.505	39.4	Low	20.0	59.4	48.0	11.4
0.519	39.4	Low	20.0	59.4	48.0	11.4
0.534	39.0	Low	20.0	59.0	48.0	11.0
0.550	38.1	Low	20.0	58.1	48.0	10.1
0.556	37.5	Low	20.0	57.5	48.0	9.5
0.632	37.0	Low	20.0	57.0	48.0	9.0
0.575	36.7	Low	20.0	56.7	48.0	8.7
0.539	36.5	Low	20.0	56.5	48.0	8.5
0.564	36.3	Low	20.0	56.3	48.0	8.3
0.586	35.6	Low	20.0	55.6	48.0	7.6
0.571	35.6	Low	20.0	55.6	48.0	7.6
0.663	35.3	Low	20.0	55.3	48.0	7.3

Signature

Temperature 70F 44% Humidity

7.0 Radiated Emissions Data

7.1 The following data lists the six most significant emission frequencies, total (corrected) levels, and specification margins. Correction factors, antenna height, table azimuth, etc., are contained in the data sheets immediately following. Explanation of the correction factors is given in paragraph 7.2 of this report. Complete graphs and data sheets may be referenced on the following pages. Minimum margins are listed below:

FCC Part 15 Specification Limits

Frequency (MHz)	Detection	Total Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)*	Polarization
331.584	QP	45.1	46.0	0.9	Horizontal
729.487	QP	43.8	46.0	2.2	Vertical
65.401	QP	35.8	40.0	4.2	Horizontal
61.271	QP	35.4	40.0	4.6	Vertical
464.217	QP	41.0	46.0	5.0	Vertical
862.114	QP	38.4	46.0	7.6	Horizontal

Judgment: Passed, minimum margin of 0.9 dB.

Test Personnel:

Tester Signature:  Date: 3/6/98

Typed/Printed Name: Dean Ghizzone

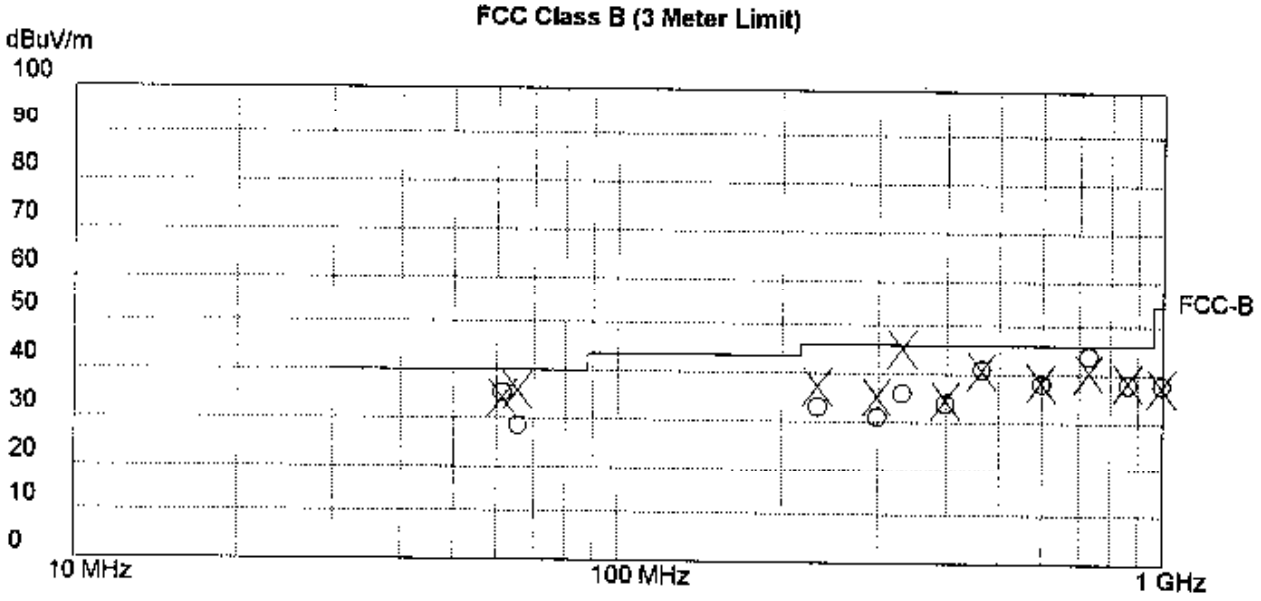
Northwest EMC, Inc.

Version 5.2, Jan. 1998

EUT Name:	4120
Serial Number:	BETA02
Manufacturer:	Micron Communications, Inc.
Job Number:	MICN0023
Test Date:	02-17-1998
Tested By:	Donald Facteau, TE30
Test Distance:	3 meters.
Comments:	Full System Configuration, Dots Animation, All Ports Operating Sequentially Microstamp system connected running Dots animation

Horizontal= X
Vertical = O

FCC Class B (3 Meter Limit)



Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Horizontal Vertical	Preamp Gain (dB)	Cable Loss (dB)	Adjusted Level (dBuV/m)	Spec Limit (dBuV/m)	Table Azimuth (degree)	Antenna Height (meters)	Compared (To Limit) (dB)
331.584	24.6	QP	18.8	HDIP	0.0	1.7	45.1	46.0	43.0	1.0	-0.9
729.487	19.3	QP	22.0	VLPA	0.0	2.5	43.8	46.0	341.0	1.0	-2.2
65.401	26.4	QP	9.0	HBIC	0.0	0.4	35.8	40.0	334.0	3.5	-4.2
61.271	25.6	QP	9.5	VBIC	0.0	0.3	35.4	40.0	0.0	1.0	-4.6
464.217	21.8	QP	17.0	VLPA	0.0	2.2	41.0	46.0	0.0	1.5	-5.0
862.114	12.8	QP	23.0	HLPA	0.0	2.6	38.4	46.0	140.0	1.0	-7.6
596.850	17.2	QP	18.8	HLPA	0.0	2.3	38.3	46.0	186.0	1.0	-7.7
232.109	24.5	QP	11.5	HLPA	0.0	1.3	37.3	46.0	115.0	1.3	-8.7
298.425	19.4	QP	14.4	HLPA	0.0	1.5	35.3	46.0	197.0	1.0	-10.7
397.903	16.0	QP	15.8	HLPA	0.0	2.0	34.6	46.0	294.0	1.0	-11.4
994.750	10.7	QP	24.8	VLPA	0.0	2.5	38.0	54.0	165.0	1.0	-16.0

Signature

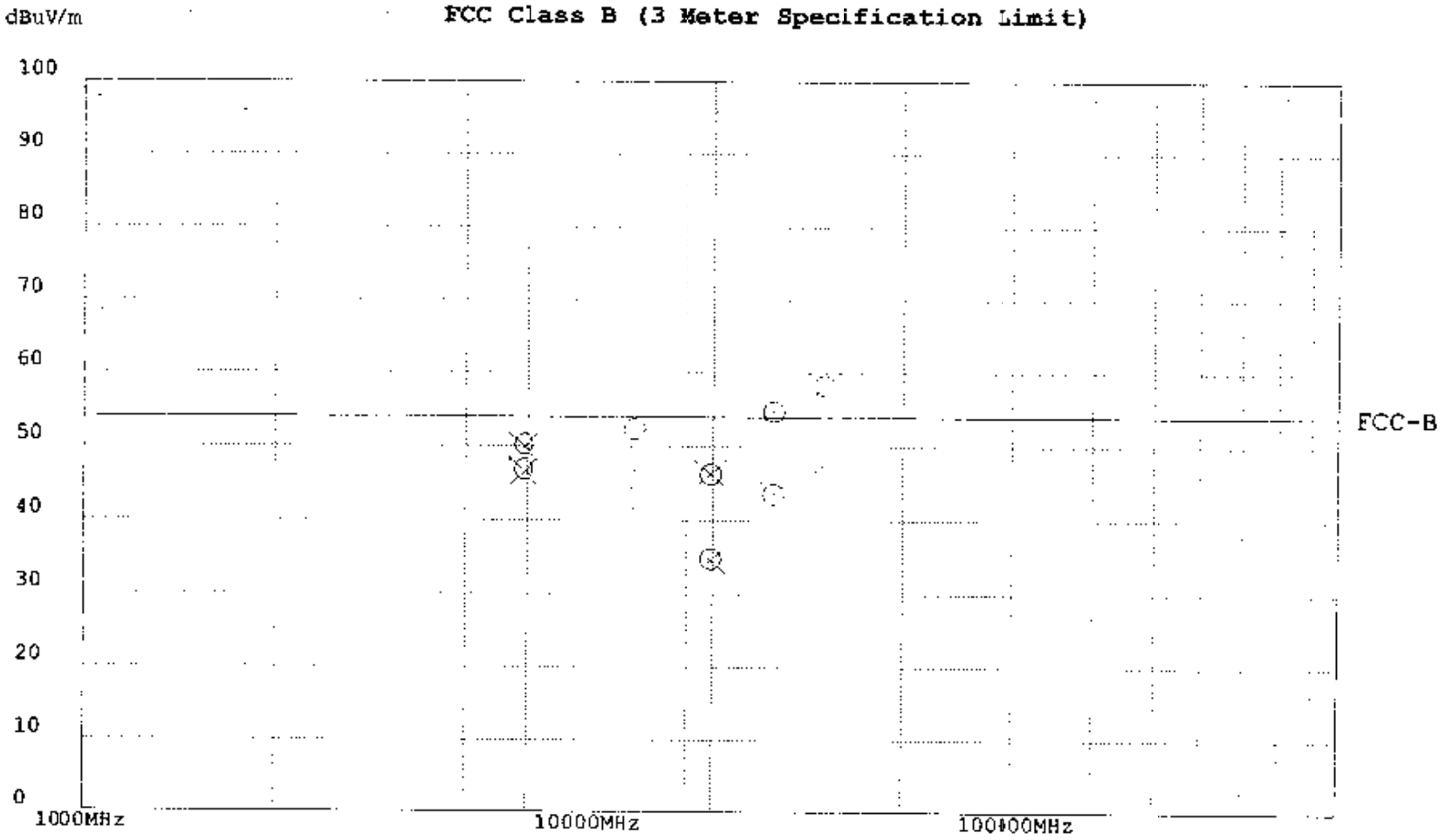
Temperature 70F 44% Humidity

Northwest EMC

Version 4.2 Nov, 1996

EUT Name: 4120
Serial Number: MICN0023
Test Date: 01-20-1998 21:43:41
Tested By: W. J. Robicheaux
Comments: T1, High Frequency, Not Hopping

Horizontal= X
Vertical = O



Northwest EMC

Version 4.2 Nov. 1996

Equipment Tested: 4120
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-20-1998 21:43:41
Tested By: W. J. Robicheaux
Comments: T1, High Frequency, Not Hopping

Job Number: MICN0023

FCC Class B (3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)	Table degree	Antenna height	
4960.700	49.4	AV	34.2	HHRN40.2		3.2	46.6	54.0	7.4	45.0	135.0	
4960.700	52.7	PK	34.2	HHRN40.2		3.2	49.9	54.0	4.1	45.0	135.0	
4960.700	53.1	PK	34.2	VHRN40.2		3.2	50.3	54.0	3.7	50.0	114.0	
4960.700	49.7	AV	34.2	VHRN40.2		3.2	46.9	54.0	7.1	50.0	114.0	
7440.963	49.3	PK	37.6	VHRN38.8		4.3	52.4	54.0	1.6	75.0	120.0	
7440.963	40.0	AV	37.6	VHRN38.8		4.3	43.1	54.0	10.9	75.0	120.0	
7440.963	43.7	AV	37.6	HHRN38.8		4.3	46.8	54.0	7.2	295.0	117.0	
7440.963	50.5	PK	37.6	HHRN38.8		4.3	53.7	54.0	0.3	295.0	117.0	
9921.100	33.8	AV	39.3	HHRN43.6		5.1	34.6	54.0	19.4	80.0	117.0	Noise Floor
9921.100	45.5	PK	39.3	HHRN43.6		5.1	46.3	54.0	7.7	80.0	117.0	Noise Floor
9921.100	34.0	AV	39.3	VHRN43.6		5.1	34.8	54.0	19.2	80.0	117.0	Noise Floor
9921.100	45.5	PK	39.3	VHRN43.6		5.1	46.3	54.0	7.7	80.0	117.0	Noise Floor
12401.100	45.7	PK	40.1	VHRN36.7		5.7	54.8	54.0	-0.8	80.0	117.0	Noise Floor
12401.100	34.5	AV	40.1	VHRN36.7		5.7	43.6	54.0	10.4	80.0	117.0	Noise Floor
12401.100	34.7	AV	40.1	HHRN36.7		5.7	43.8	54.0	10.2	80.0	117.0	Noise Floor
12401.100	45.5	PK	40.1	HHRN36.7		5.7	54.7	54.0	-0.7	80.0	117.0	Noise Floor
14881.100	36.2	AV	39.7	HHRN36.3		6.2	45.8	54.0	8.2	80.0	117.0	Noise Floor
14881.100	48.6	PK	39.7	HHRN36.3		6.2	58.2	54.0	-4.2	80.0	117.0	Noise Floor
14881.100	36.4	AV	39.7	VHRN36.3		6.2	46.0	54.0	8.0	80.0	117.0	Noise Floor
14881.100	48.7	PK	39.7	VHRN36.3		6.2	58.3	54.0	-4.3	80.0	117.0	Noise Floor

W. J. Robicheaux 01/20/98
Signature

Temperature 70F 50% Humidity

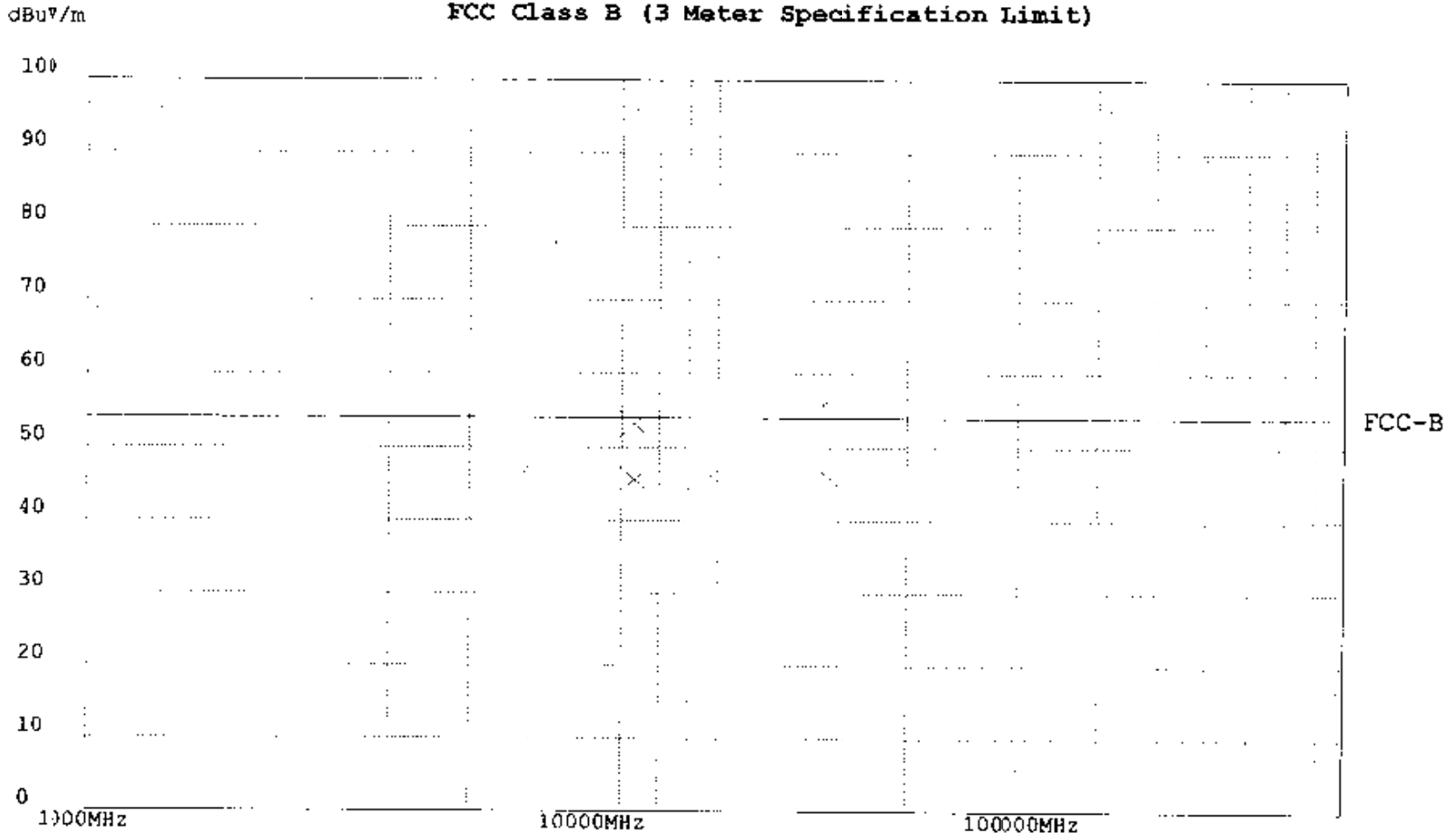
Northwest EMC

Version 4.2 Nov, 1996

EUT Name: 4120
Serial Number: MICN0023
Test Date: 01-20-1998 22:40:33
Tested By: W. J. Robicheaux
Comments: T1, Mid Frequency, Not Hopping

Horizontal= X
Vertical = O

FCC Class B (3 Meter Specification Limit)



Northwest EMC

Version 4.2 Nov, 1996

Equipment Tested: 4120
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-20-1998 22:40:33
Tested By: W. J. Robicheaux
Comments: T1, Mid Frequency, Not Hopping

Job Number: MICN0023

FCC Class B (3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)	Table degree	Antenna height	
4883.875	49.6	AV	34.1	HHRN40.2		3.1	46.6	54.0	7.4	80.0	140.0	
4883.875	52.5	PK	34.1	HHRN40.2		3.1	49.5	54.0	4.5	80.0	140.0	
7325.863	43.1	AV	37.3	HHRN39.0		4.2	45.6	54.0	8.4	280.0	117.0	
7325.863	50.7	PK	37.3	HHRN39.0		4.2	53.2	54.0	0.8	280.0	117.0	
9768.100	34.1	AV	39.3	HHRN43.3		5.0	35.1	54.0	18.9	80.0	117.0	Noise Floor
9768.100	45.2	PK	39.3	HHRN43.3		5.0	46.2	54.0	7.8	80.0	117.0	Noise Floor
12210.200	34.3	AV	40.3	HHRN36.8		5.6	43.4	54.0	10.6	80.0	117.0	Noise Floor
12210.200	45.8	PK	40.3	HHRN36.8		5.6	54.9	54.0	-0.9	80.0	117.0	Noise Floor
14652.200	36.3	AV	40.4	HHRN36.3		6.1	46.5	54.0	7.5	80.0	117.0	Noise Floor
14652.200	45.6	PK	40.4	HHRN36.3		6.1	55.8	54.0	-1.8	80.0	117.0	Noise Floor

W. J. Robicheaux 01/20/98
Signature

Temperature 70F 50% Humility

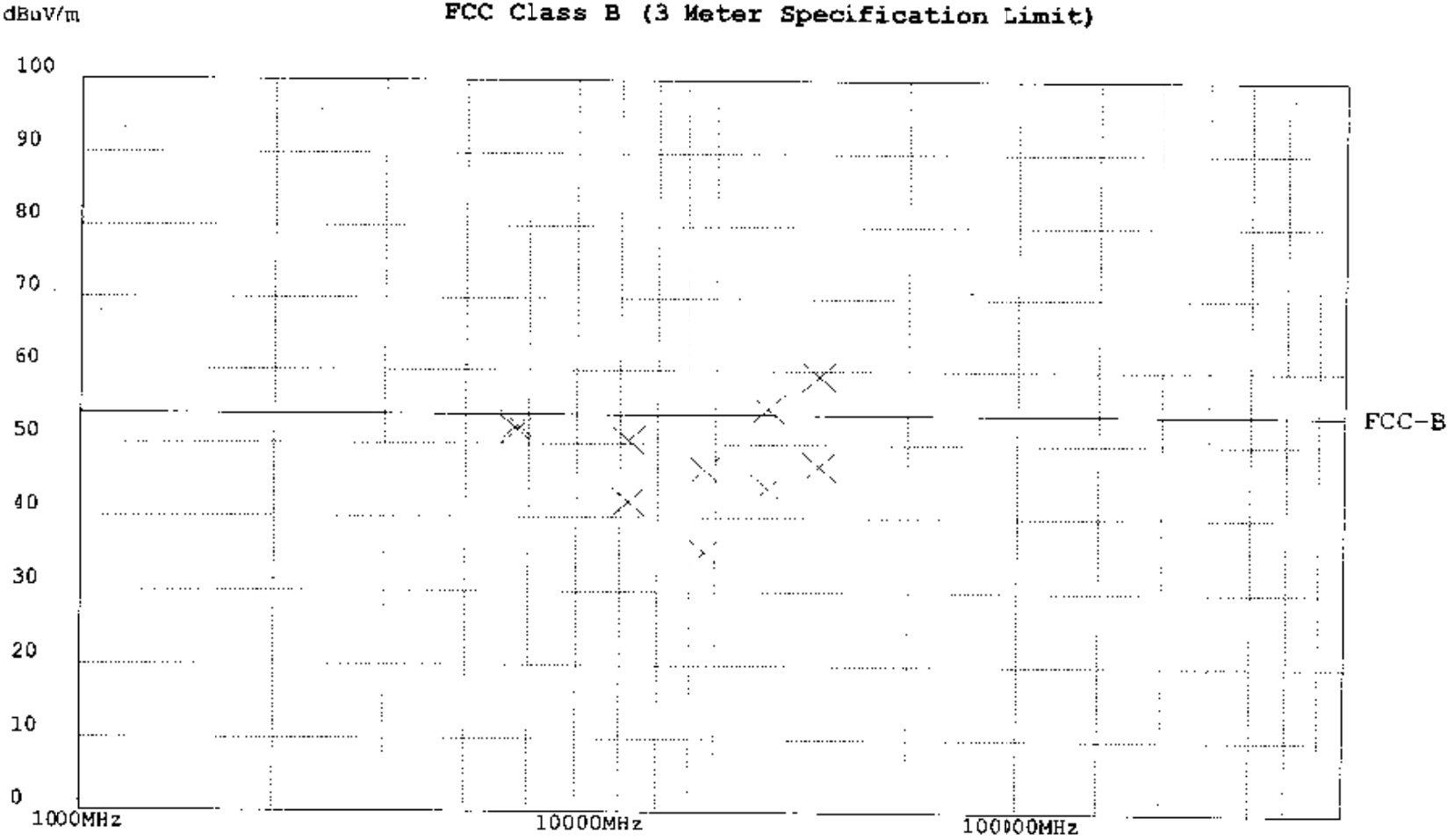
Northwest EMC

Version 4.2 Nov, 1996

EUT Name: 4120
Serial Number: MICN0023
Test Date: 01-20-1998 23:20:42
Tested By: W. J. Robicheaux
Comments: T1, Low Frequency, Not Hopping

Horizontal= X
Vertical = O

FCC Class B (3 Meter Specification Limit)



Northwest EMC

Version 4.2 Nov, 1996

Equipment Tested: 4120
Job Number: MICN0023
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-20-1998 23:20:42
Tested By: W. J. Robicheaux
Comments: T1, Low Frequency, Not Hopping

FCC Class B (3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)	Table degree	Antenna height	
4807.113	55.0	AV	34.0	HHRN40.2		3.1	51.9	54.0	2.1	115.0	144.0	
4807.113	55.6	PK	34.0	HHRN40.2		3.1	52.5	54.0	1.5	115.0	144.0	
7210.600	40.1	AV	36.9	HHRN39.1		4.2	42.1	54.0	11.9	280.0	117.0	
7210.600	48.5	PK	36.9	HHRN39.1		4.2	50.5	54.0	3.5	280.0	117.0	
9614.600	45.2	PK	39.2	HHRN42.9		5.0	46.5	54.0	7.5	80.0	117.0	Noise Floor
9614.600	34.0	AV	39.2	HHRN42.9		5.0	35.3	54.0	18.7	80.0	117.0	Noise Floor
12017.600	34.7	AV	40.5	HHRN36.8		5.6	44.0	54.0	10.0	80.0	117.0	Noise Floor
12017.600	45.5	PK	40.5	HHRN36.8		5.6	54.8	54.0	-0.8	80.0	117.0	Noise Floor
14421.600	36.5	AV	40.8	HHRN36.4		6.1	47.0	54.0	7.0	80.0	117.0	Noise Floor
14421.600	48.8	PK	40.8	HHRN36.4		6.1	59.3	54.0	-5.3	80.0	117.0	Noise Floor

W. J. Robicheaux 01/20/98
Signature

Temperature 70F 50% Humidity

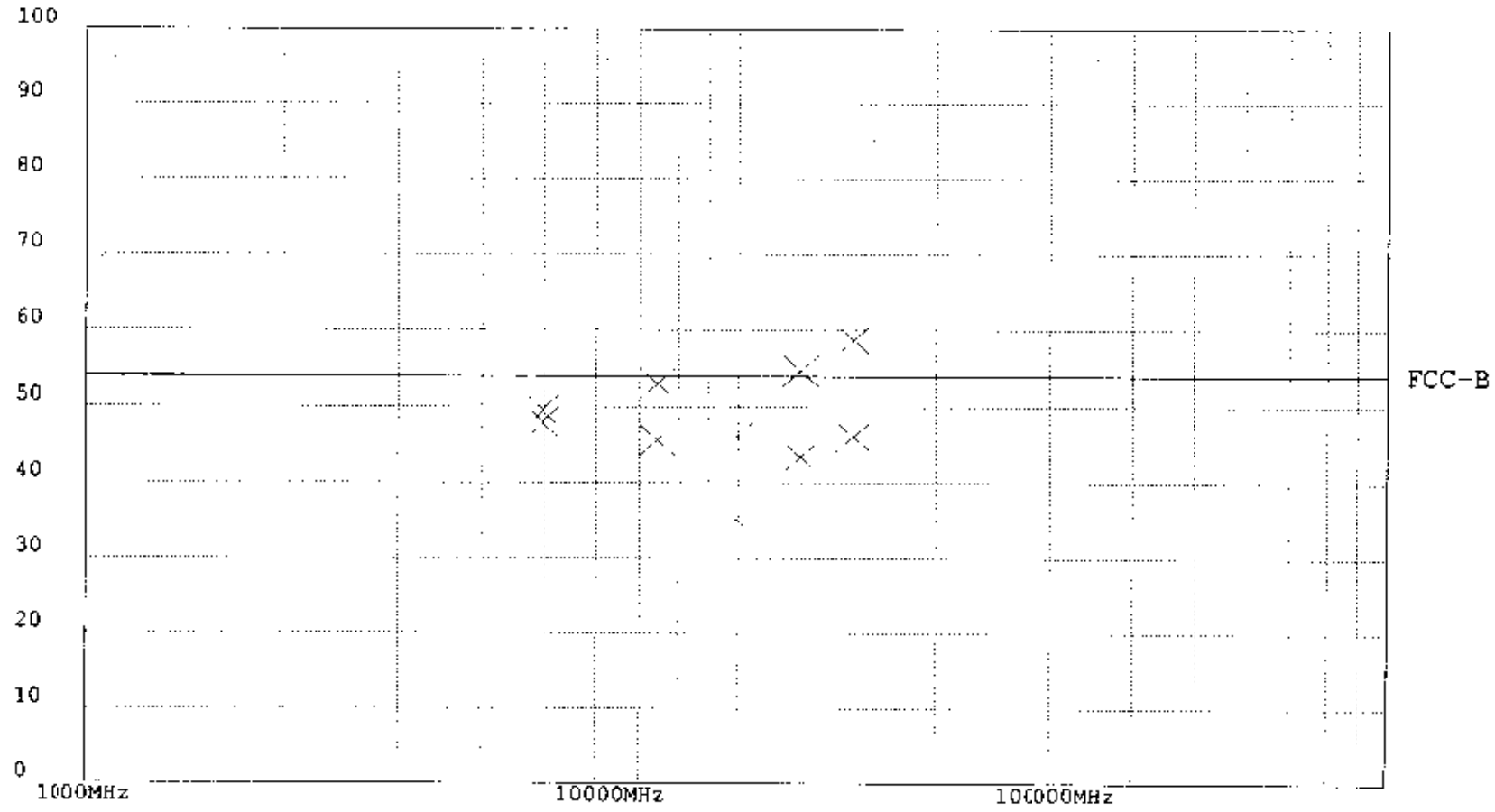
Northwest EMC

Version 4.2 Nov, 1996

EUT Name: 4120
Serial Nunber: MICN0023
Test Date 01-20-1998 23:47:31
Tested By W. J. Robicheaux
Comments: T2, High Frequency, Not Hopping

Horizontal= X
Vertical = O

FCC Class B (3 Meter Specification Limit)



Northwest EMC

Version 4.2 Nov, 1996

Equipment Tested: 4120
Job Number: MICN0023
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-20-1998 23:47:31
Tested By: W. J. Robicheaux
Comments: T2, High Frequency, Not Hopping

FCC Class B (3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)	Table degree	Antenna height	
4950.675	50.7	AV	34.2	HHRN40.2	3.2	47.9	54.0	6.1	70.0	140.0	
4950.675	52.3	PK	34.2	HHRN40.2	3.2	49.5	54.0	4.5	70.0	140.0	
7441.013	42.5	AV	37.6	HHRN38.8	4.3	45.6	54.0	8.4	280.0	117.0	
7441.013	49.9	PK	37.6	HHRN38.8	4.3	53.0	54.0	1.0	280.0	117.0	
9921.100	34.4	AV	39.3	HHRN43.6	5.1	35.2	54.0	18.8	80.0	117.0	Noise Floor
9921.100	45.3	PK	39.3	HHRN43.6	5.1	46.1	54.0	7.9	80.0	117.0	Noise Floor
12401.100	34.3	AV	40.1	HHRN36.7	5.7	43.4	54.0	10.6	80.0	117.0	Noise Floor
12401.100	45.6	PK	40.1	HHRN36.7	5.7	54.7	54.0	-0.7	80.0	117.0	Noise Floor
14881.100	36.5	AV	39.7	HHRN36.3	6.2	46.1	54.0	7.9	80.0	117.0	Noise Floor
14881.100	49.1	PK	39.7	HHRN36.3	6.2	58.7	54.0	-4.7	80.0	117.0	Noise Floor

W. J. Robicheaux 01/20/98
Signature

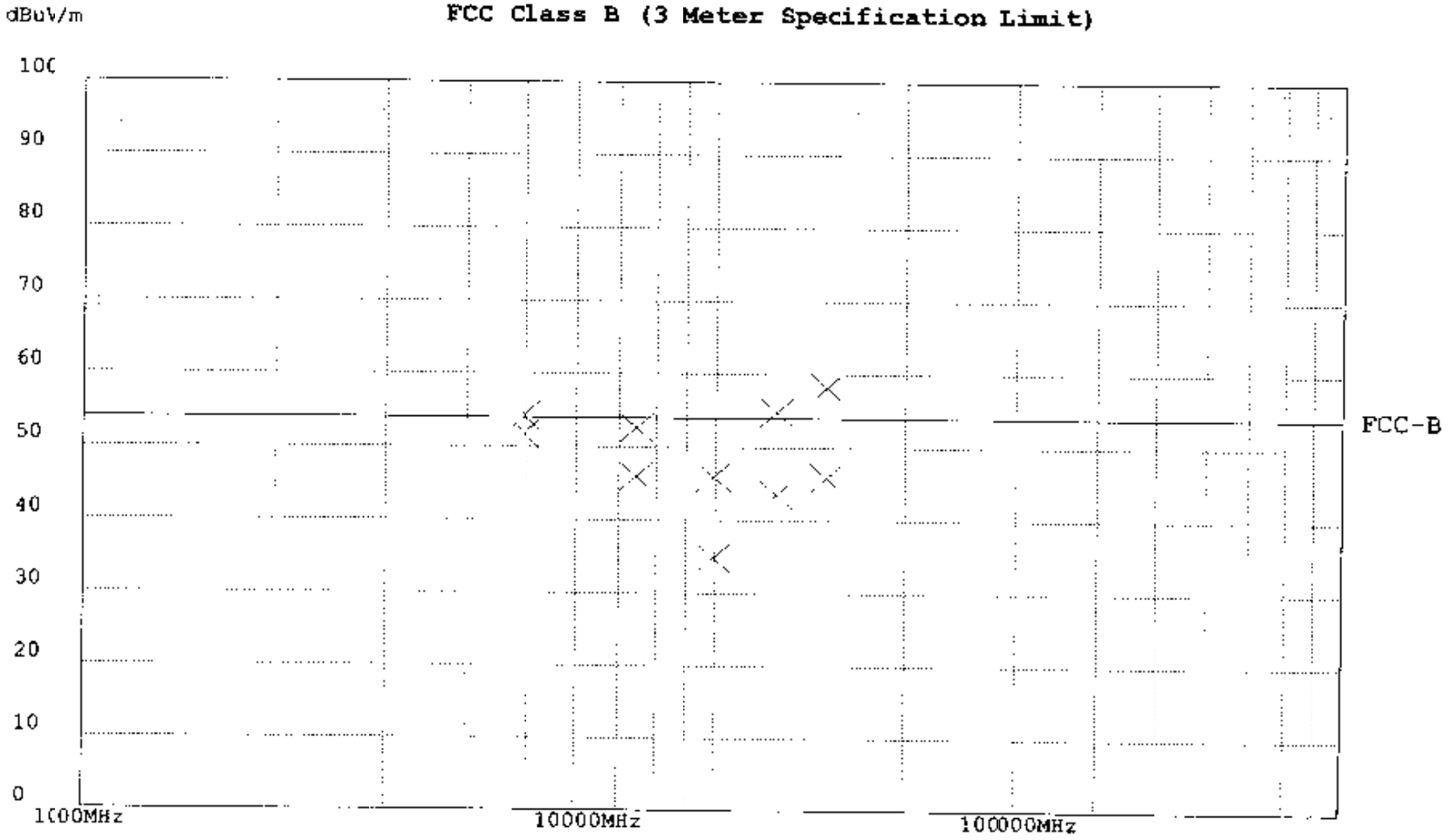
Temperature 70F 50% Humidity

Northwest EMC

Version 4.2 Nov, 1996

EUT Name: 4120
Serial Number: MICN0023
Test Date: 01-20-1998 00:11:51
Tested By: W. J. Robicheaux
Comments: T3, High Frequency, Not Hopping

Horizontal= X
Vertical = O



Northwest EMC

Version 4.2 Nov, 1996

Equipment Tested: 4120
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-20-1998 00:11:51
Tested By: W. J. Robicheaux
Comments: T3, High Frequency, Not Hopping

Job Number: MICN0023

FCC Class B (3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)	Table degree	Antenna height	
4960.675	57.0	PK	34.2	HHRN40.2		3.2	54.2	54.0	-0.2	105.0	142.0	
4960.675	54.5	AV	34.2	HHRN40.2		3.2	51.7	54.0	2.3	105.0	142.0	
7441.013	42.9	AV	37.6	HHRN38.8		4.3	46.0	54.0	8.0	280.0	117.0	
7441.013	49.5	PK	37.6	HHRN38.8		4.3	52.6	54.0	1.4	280.0	117.0	
9921.100	34.1	AV	39.3	HHRN43.6		5.1	34.9	54.0	19.1	80.0	117.0	Noise Floor
9921.100	45.2	PK	39.3	HHRN43.6		5.1	46.0	54.0	8.0	80.0	117.0	Noise Floor
12401.100	34.5	AV	40.1	HHRN36.7		5.7	43.6	54.0	10.4	80.0	117.0	Noise Floor
12401.100	45.7	PK	40.1	HHRN36.7		5.7	54.8	54.0	-0.8	80.0	117.0	Noise Floor
14881.100	36.3	AV	39.7	HHRN36.3		6.2	45.9	54.0	8.1	80.0	117.0	Noise Floor
14881.100	48.6	PK	39.7	HHRN36.3		6.2	58.2	54.0	-4.2	80.0	117.0	Noise Floor

W. J. Robicheaux 01-20-98
Signature

Temperature 70F 50% Humidity

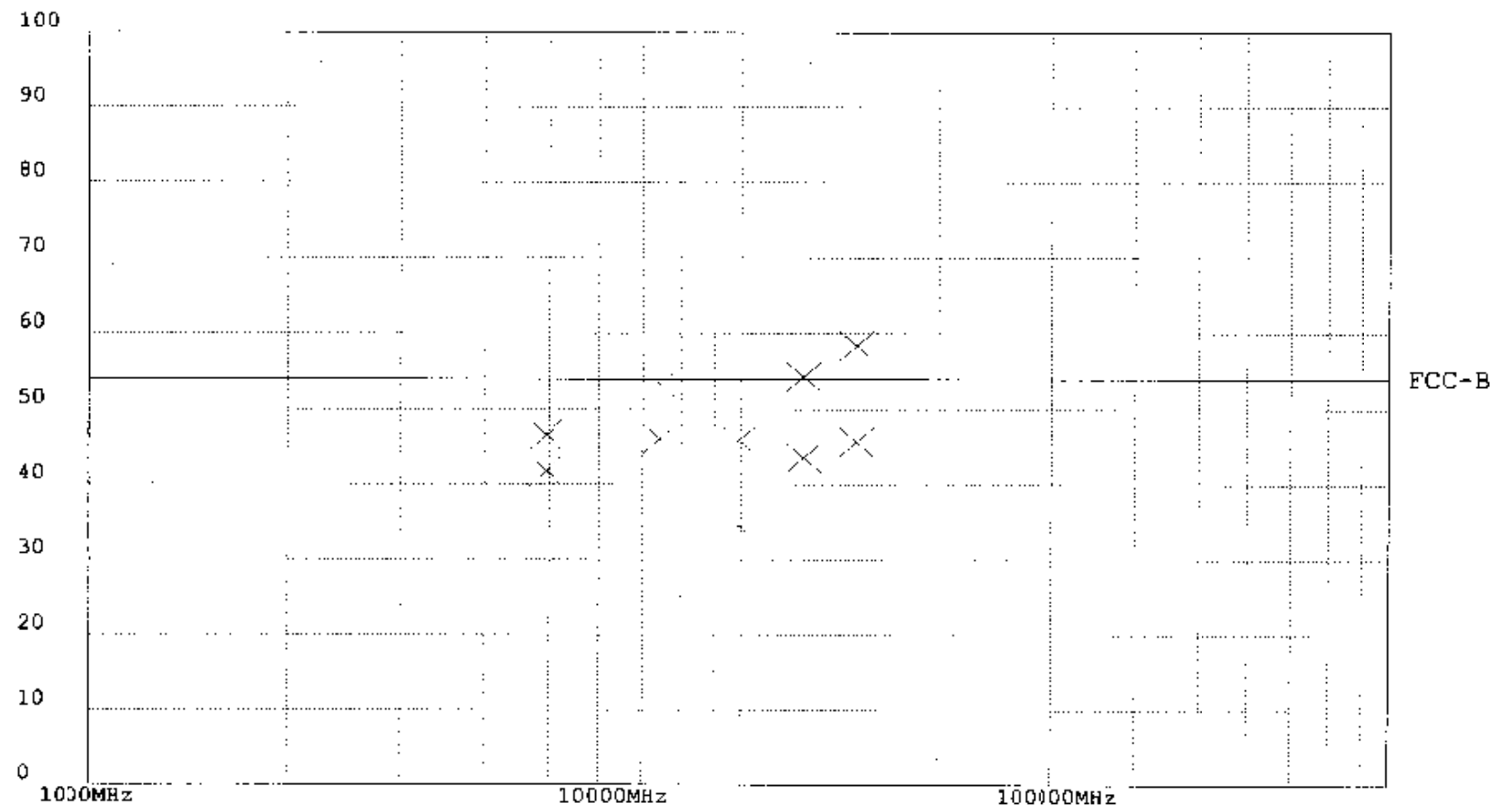
Northwest EMC

Version 4.2 Nov, 1996

EUT Name: 4120
Serial Number: MICN0023
Test Date: 01-21-1998 00:33:52
Tested By: W. J. Robicheaux
Comments: T4, High Frequency, Not Hopping

Horizontal= X
Vertical = O

FCC Class B (3 Meter Specification Limit)



Northwest EMC

Version 4.2 Nov. 1996

Equipment Tested: 4120
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-21-1998 00:33:52
Tested By: W. J. Robicheaux
Comments: T4, High Frequency, Not Hopping

Job Number: MICN0023

FCC Class B (3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)	Table degree	Antenna height	
4960.675	44.6	AV	34.2	HHRN40.2		3.2	41.8	54.0	12.2	275.0	144.0	
4960.675	49.4	PK	34.2	HHRN40.2		3.2	46.6	54.0	7.4	275.0	144.0	
7441.013	43.0	AV	37.6	HHRN38.8		4.3	46.1	54.0	7.9	80.0	120.0	
7441.013	50.2	PK	37.6	HHRN38.8		4.3	53.3	54.0	0.7	80.0	120.0	
9921.100	33.7	AV	39.3	HHRN43.6		5.1	34.5	54.0	19.5	250.0	117.0	Noise Floor
9921.100	45.1	PK	39.3	HHRN43.6		5.1	45.9	54.0	8.1	250.0	117.0	Noise Floor
12401.100	34.5	AV	40.1	HHRN36.7		5.7	43.6	54.0	10.4	250.0	117.0	Noise Floor
12401.100	45.2	PK	40.1	HHRN36.7		5.7	54.3	54.0	-0.3	250.0	117.0	Noise Floor
14881.100	36.1	AV	39.7	HHRN36.3		6.2	45.7	54.0	8.3	250.0	117.0	Noise Floor
14881.100	48.8	PK	39.7	HHRN36.3		6.2	58.4	54.0	-4.4	250.0	117.0	Noise Floor

W. J. Robicheaux 01/21/98
Signature

Temperature 70F 50% Humidity

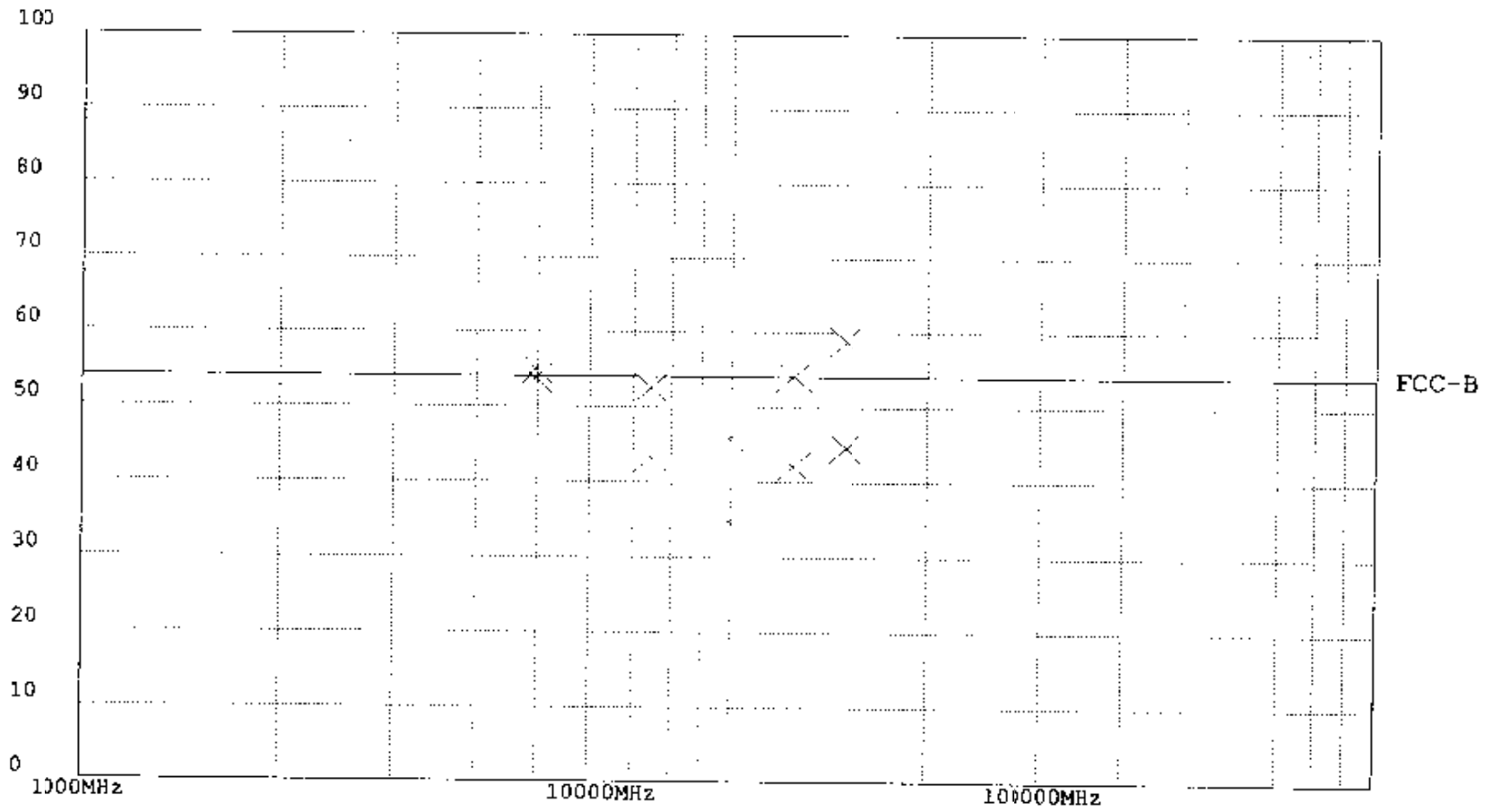
Northwest EMC

Version 4.2 Nov, 1996

EUT Name: 402[illegible]
Serial Number: MICN0023
Test Date: 01-21-1998 21:46:19
Tested By: W. J. Robicheaux
Comments: T5, High Frequency, Not Hopping

Horizontal= X
Vertical = O

FCC Class B (3 Meter Specification Limit)



Northwest EMC

Version 4.2 Nov, 1996

Equipment Tested: 4021 **Job Number: MICN0023**
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-21-1998 21:46:19
Tested By: W. J. Robicheaux
Comments: T5, High Frequency, Not Hopping

FCC Class B (3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)	Table degree	Antenna height	
4960.675	56.5	AV	34.2	HHRN40.2		3.2	53.7	54.0	0.3	232.0	145.0	
4960.675	57.7	PK	34.2	HHRN40.2		3.2	54.9	54.0	-0.9	232.0	145.0	
7441.013	40.2	AV	37.6	HHRN38.8		4.3	43.3	54.0	10.7	297.0	115.0	
7441.013	49.4	PK	37.6	HHRN38.8		4.3	52.5	54.0	1.5	297.0	115.0	
9921.100	34.0	AV	39.3	HHRN43.6		5.1	34.8	54.0	19.2	250.0	115.0	Noise Floor
9921.100	45.0	PK	39.3	HHRN43.6		5.1	45.8	54.0	8.2	250.0	115.0	Noise Floor
12401.100	33.0	AV	40.1	HHRN36.7		5.7	42.1	54.0	11.9	250.0	115.0	Noise Floor
12401.100	45.0	PK	40.1	HHRN36.7		5.7	54.1	54.0	-0.1	250.0	115.0	Noise Floor
14881.100	35.0	AV	39.7	HHRN36.3		6.2	44.6	54.0	9.4	250.0	115.0	Noise Floor
14881.100	49.2	PK	39.7	HHRN36.3		6.2	58.8	54.0	-4.8	250.0	115.0	Noise Floor

W. J. Robicheaux 01/21/98
Signature

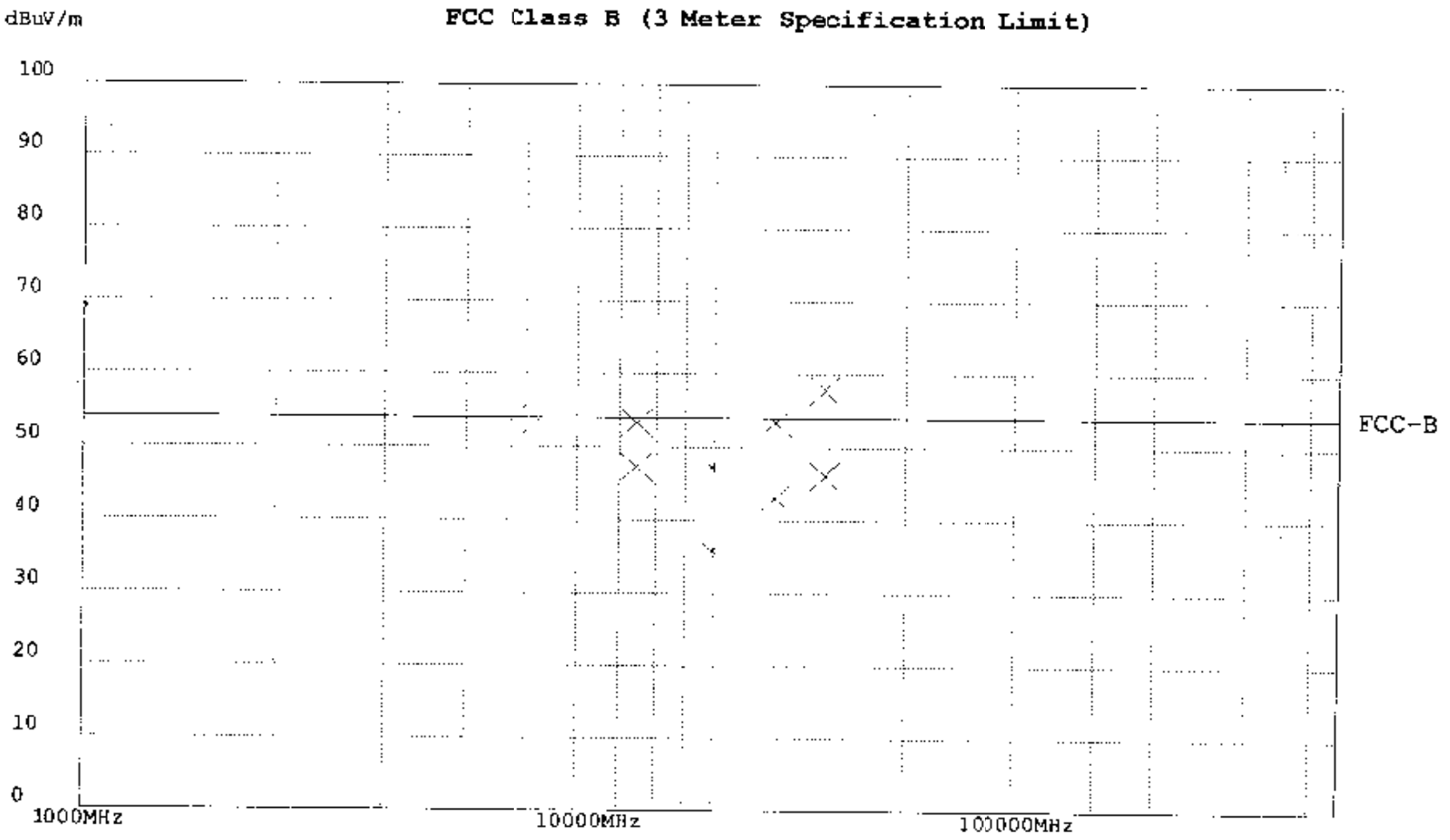
Temperature 70F 50% Humidity

Northwest EMC

Version 4.2 Nov, 1996

EUT Name 4120
Serial Number: MICN0023
Test Date: 01-21-1998 22:18:20
Tested By: W. J. Robicheaux
Comments: T6, High Frequency, Not Hopping

Horizontal= X
Vertical = O



Northwes: EMC

Version 4.2 Nov, 1996

Equipment Tested: 4120 **Job Number:** MICN0023
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-21-1998 22:18:20
Tested By: W. J. Robicheaux
Comments: T6, High Frequency, Not Hopping

FCC Class B (3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin dB	Table degree	Antenna height	
4960.675	54.7	AV	34.2	HHRN40.2		3.2	51.9	54.0	2.1	275.0	145.0	
4960.675	58.2	PK	34.2	HHRN40.2		3.2	55.4	54.0	-1.4	275.0	145.0	
7441.013	44.2	AV	37.6	HHRN38.8		4.3	47.3	54.0	6.7	48.0	136.0	
7441.013	50.2	PK	37.6	HHRN38.8		4.3	53.3	54.0	0.7	48.0	136.0	
9921.100	35.0	AV	39.3	HHRN43.6		5.1	35.8	54.0	-18.2	250.0	115.0	Noise Floor
9921.100	46.5	PK	39.3	HHRN43.6		5.1	47.3	54.0	6.7	250.0	115.0	Noise Floor
12401.100	34.0	AV	40.1	HHRN36.7		5.7	43.1	54.0	-10.9	250.0	115.0	Noise Floor
12401.100	44.3	PK	40.1	HHRN36.7		5.7	53.4	54.0	0.6	250.0	115.0	Noise Floor
14881.100	36.5	AV	39.7	HHRN36.3		6.2	46.1	54.0	7.9	250.0	115.0	Noise Floor
14881.100	48.2	PK	39.7	HHRN36.3		6.2	57.8	54.0	-3.8	250.0	115.0	Noise Floor

W. J. Robicheaux 01/21/98
Signature

Temperature 70F 50% Humidity

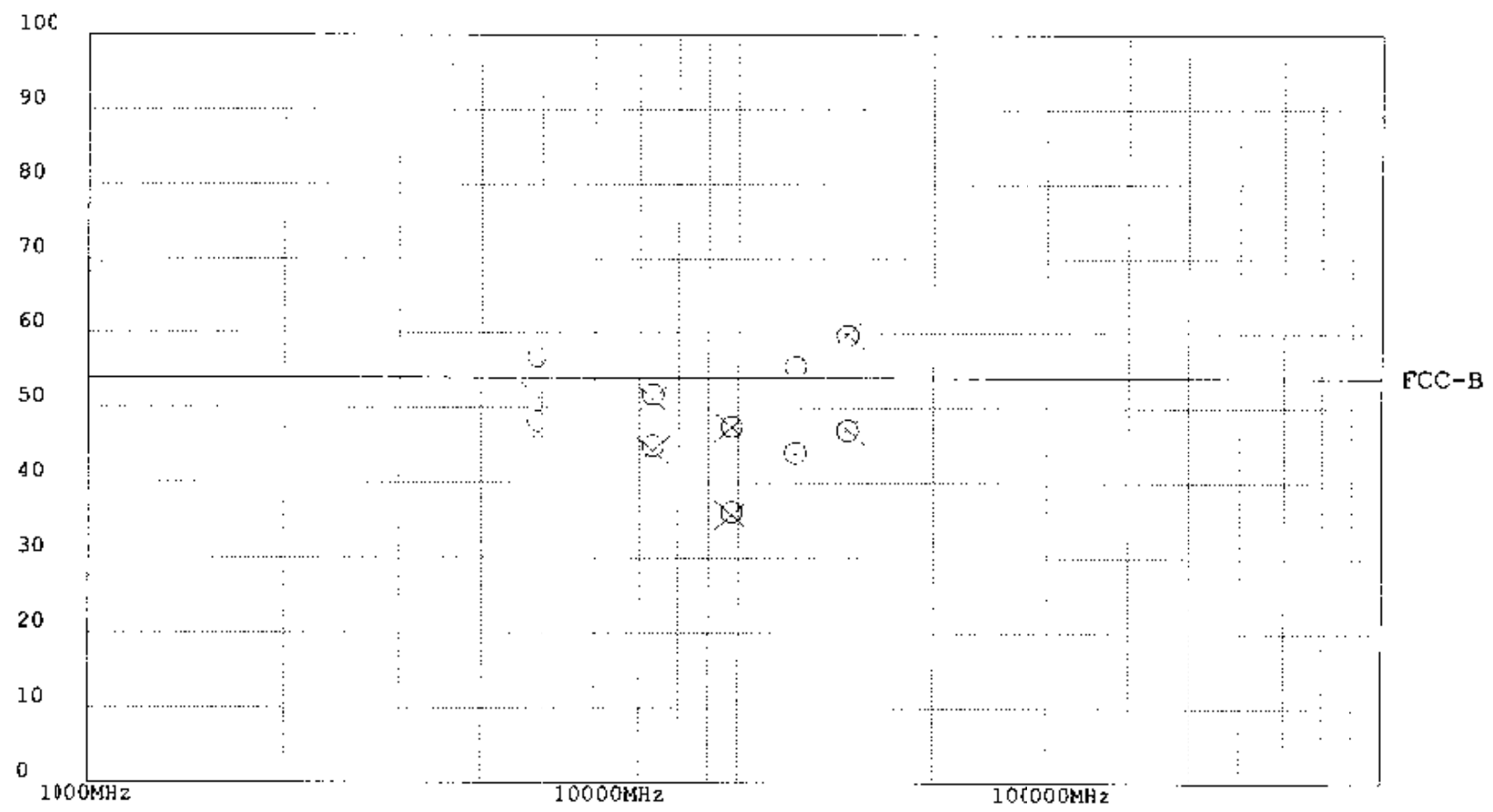
Northwest EMC

Version 4.2 Nov. 1996

EUT Name: 4120
Serial Number: MICN0023
Test Date: 01-21-1998 00:24:57
Tested By: W. J. Robicheaux
Comments: T6, FWD PA, Low Band, Not Hopping

Horizontal= X
Vertical = O

FCC Class B (3 Meter Specification Limit)



Northwest EMC

Version 4.2 Nov, 1996

Equipment Tested: 4120 **Job Number: MICN0023**
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-21-1998 00:24:57
Tested By: W. J. Robicheaux
Comments: T6, FWD PA, Low Band, Not Hopping

FCC Class B (3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)	Table degree	Antenna height	
4883.850	48.6	AV	34.1	HHRN40.2		3.1	45.6	54.0	8.4	225.0	135.0	
4883.850	54.3	PK	34.1	HHRN40.2		3.1	51.3	54.0	2.7	225.0	135.0	
4883.850	51.2	AV	34.1	VHRN40.2		3.1	48.2	54.0	5.8	285.0	115.0	
4883.850	59.8	PK	34.1	VHRN40.2		3.1	56.8	54.0	-2.8	285.0	115.0	
7325.775	41.8	AV	37.3	HHRN39.0		4.2	44.3	54.0	9.7	297.0	127.0	
7325.775	48.7	PK	37.3	HHRN39.0		4.2	51.2	54.0	2.8	297.0	127.0	
7325.775	42.5	AV	37.3	VHRN39.0		4.2	45.0	54.0	9.0	245.0	115.0	
7325.775	49.3	PK	37.3	VHRN39.0		4.2	51.8	54.0	2.2	245.0	115.0	
9757.675	34.7	AV	39.3	HHRN43.3		5.0	35.7	54.0	18.3	256.0	115.0	Noise Floor
9757.675	46.4	PK	39.3	HHRN43.3		5.0	47.4	54.0	6.6	256.0	115.0	Noise Floor
9757.675	35.1	AV	39.3	VHRN43.3		5.0	36.1	54.0	17.9	256.0	115.0	Noise Floor
9757.675	46.5	PK	39.3	VHRN43.3		5.0	47.5	54.0	6.5	256.0	115.0	Noise Floor
12209.580	34.3	AV	40.3	HHRN36.8		5.6	43.9	54.0	10.1	256.0	115.0	Noise Floor
12209.580	46.5	PK	40.3	HHRN36.8		5.6	55.6	54.0	-1.6	256.0	115.0	Noise Floor
12209.580	34.9	AV	40.3	VHRN36.8		5.6	44.0	54.0	10.0	256.0	115.0	Noise Floor
12209.580	46.4	PK	40.3	VHRN36.8		5.6	55.5	54.0	-1.5	256.0	115.0	Noise Floor
14651.470	36.9	AV	40.4	HHRN36.3		6.1	47.1	54.0	6.9	256.0	115.0	Noise Floor
14651.470	49.6	PK	40.4	HHRN36.3		6.1	59.8	54.0	-5.8	256.0	115.0	Noise Floor
14651.470	36.8	AV	40.4	VHRN36.3		6.1	47.0	54.0	7.0	256.0	115.0	Noise Floor
14651.470	49.3	PK	40.4	VHRN36.3		6.1	59.7	54.0	-5.7	256.0	115.0	Noise Floor

W. J. Robicheaux 01/21/98
Signature

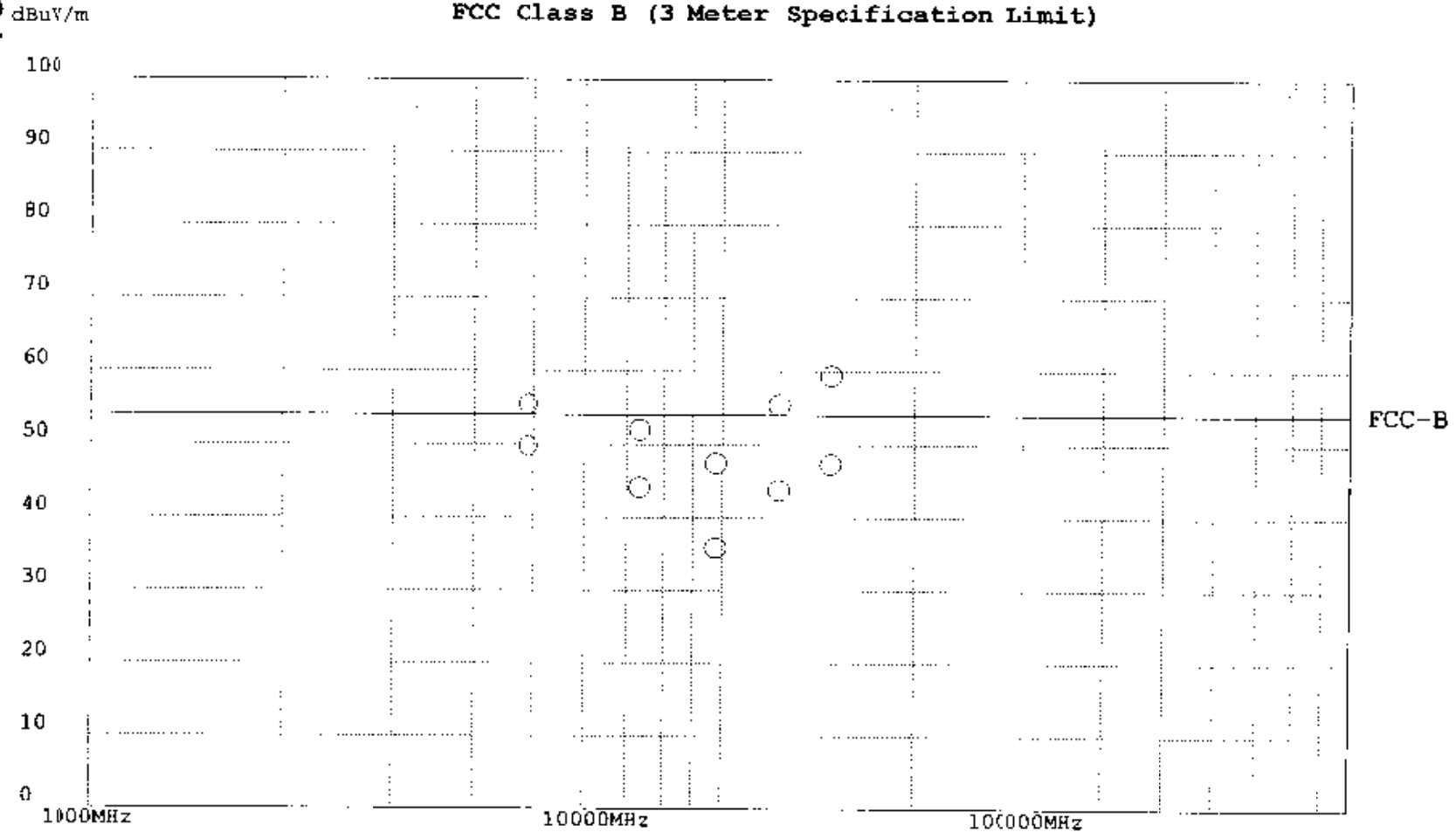
Temperature 70F 50% Humidity

Northwest EMC Version 4.2 Nov, 1996

EUT Name: 4120
Serial Number: MICN0023
Test Date: 01-22-1998 21:10:52
Tested By: W. J. Robicheaux
Comments: T6, FWD PA, High Band, Not Hopping

Horizontal= X
Vertical = O

FCC Class B (3 Meter Specification Limit)



Northwest EMC

Version 4.2 Nov, 1996

Equipment Tested: 4120
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-22-1998 21:10:52
Tested By: W. J. Robicheaux
Comments: T6, FWD PA, High Band, Not Hopping

Job Number: MICN0023

FCC Class B (3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)	Table degree	Antenna height	
4383.850	52.8	AV	34.1	VHRN40.2		5.1	49.8	54.0	4.2	287.0	116.0	
4383.850	58.4	PK	34.1	VHRN40.2		5.1	55.4	54.0	-1.4	287.0	116.0	
7325.775	41.7	AV	37.3	VHRN39.0		4.2	44.2	54.0	9.8	262.0	118.0	
7325.775	49.5	PK	37.3	VHRN39.0		4.2	52.0	54.0	2.0	262.0	118.0	
9767.675	34.9	AV	39.3	VHRN43.3		5.0	35.9	54.0	18.1	260.0	115.0	Noise Floor
9767.675	46.5	PK	39.3	VHRN43.3		5.0	47.5	54.0	6.5	260.0	115.0	Noise Floor
12209.580	34.7	AV	40.3	VHRN36.8		5.6	43.8	54.0	10.2	260.0	115.0	Noise Floor
12209.580	46.3	PK	40.3	VHRN36.8		5.6	55.4	54.0	-1.4	260.0	115.0	Noise Floor
14551.470	37.2	AV	40.4	VHRN36.3		6.1	47.4	54.0	6.6	260.0	115.0	Noise Floor
14551.470	49.2	PK	40.4	VHRN36.3		6.1	59.4	54.0	-5.4	260.0	115.0	Noise Floor

W. J. Robicheaux 01/22/98
Signature

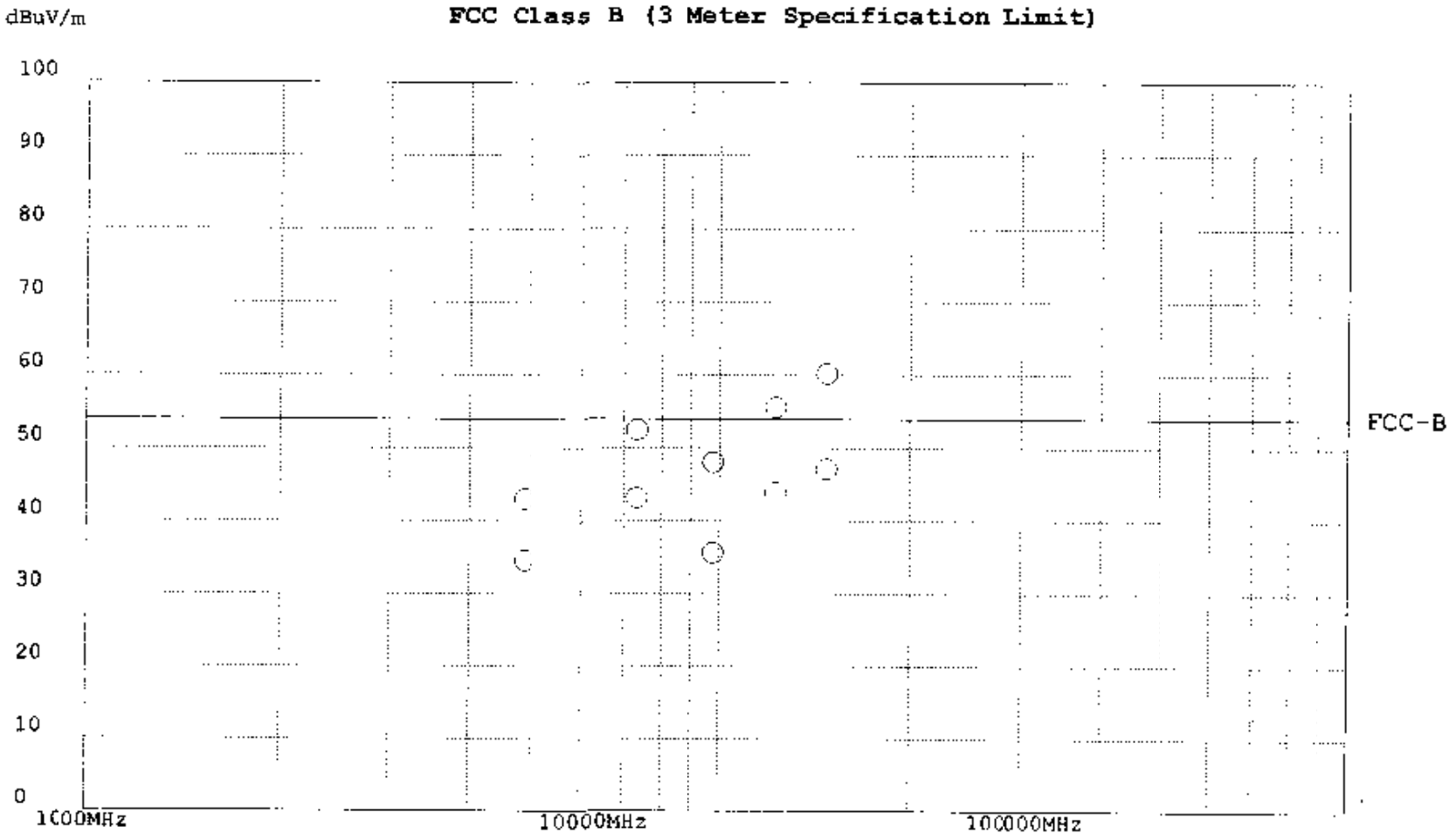
Temperature 70F 50% Humdity

Northwest EMC

Version 4.2 Nov 1996

EUT Name: 4120
Serial Number: MICN0023
Test Date: 01-22-1998 21:50:51
Tested By: W. J. Robicheaux
Comments: T1, FWD PA, Low Band, Not Hopping

Horizontal= X
Vertical = O



Northwest EMC

Version 4.2 Nov, 1996

Equipment Tested: 4120
Job Number: MICN0023
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-22-1998 21:50:51
Tested By: W. J. Robicheaux
Comments: T1, FWD PA, Low Band, Not Hopping

FCC Class B (3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)	Table degree	Antenna height	
4883.850	37.6	AV	34.1	VHRN40.2	3.1	34.6	54.0	19.4	60.0	115.0		
4883.850	46.1	PK	34.1	VHRN40.2	3.1	43.1	54.0	10.9	60.0	115.0		
7325.775	40.7	AV	37.3	VHRN39.0	4.2	43.2	54.0	10.8	70.0	115.0		
7325.775	50.0	PK	37.3	VHRN39.0	4.2	52.5	54.0	1.5	70.0	115.0		
9767.675	34.6	AV	39.3	VHRN43.3	5.0	35.6	54.0	18.4	80.0	115.0	Noise Floor	
9767.675	47.1	PK	39.3	VHRN43.3	5.0	48.1	54.0	5.9	80.0	115.0	Noise Floor	
12209.580	34.9	AV	40.3	VHRN36.8	5.6	44.0	54.0	10.0	80.0	115.0	Noise Floor	
12209.580	46.5	PK	40.3	VHRN36.8	5.6	55.6	54.0	-1.6	80.0	115.0	Noise Floor	
14651.470	37.0	AV	40.4	VHRN36.3	6.1	47.2	54.0	6.8	80.0	115.0	Noise Floor	
14651.470	50.0	PK	40.4	VHRN36.3	6.1	60.2	54.0	-6.2	80.0	115.0	Noise Floor	

W. J. Robicheaux 01/22/98
Signature

Temperature 70F 50% Humdity

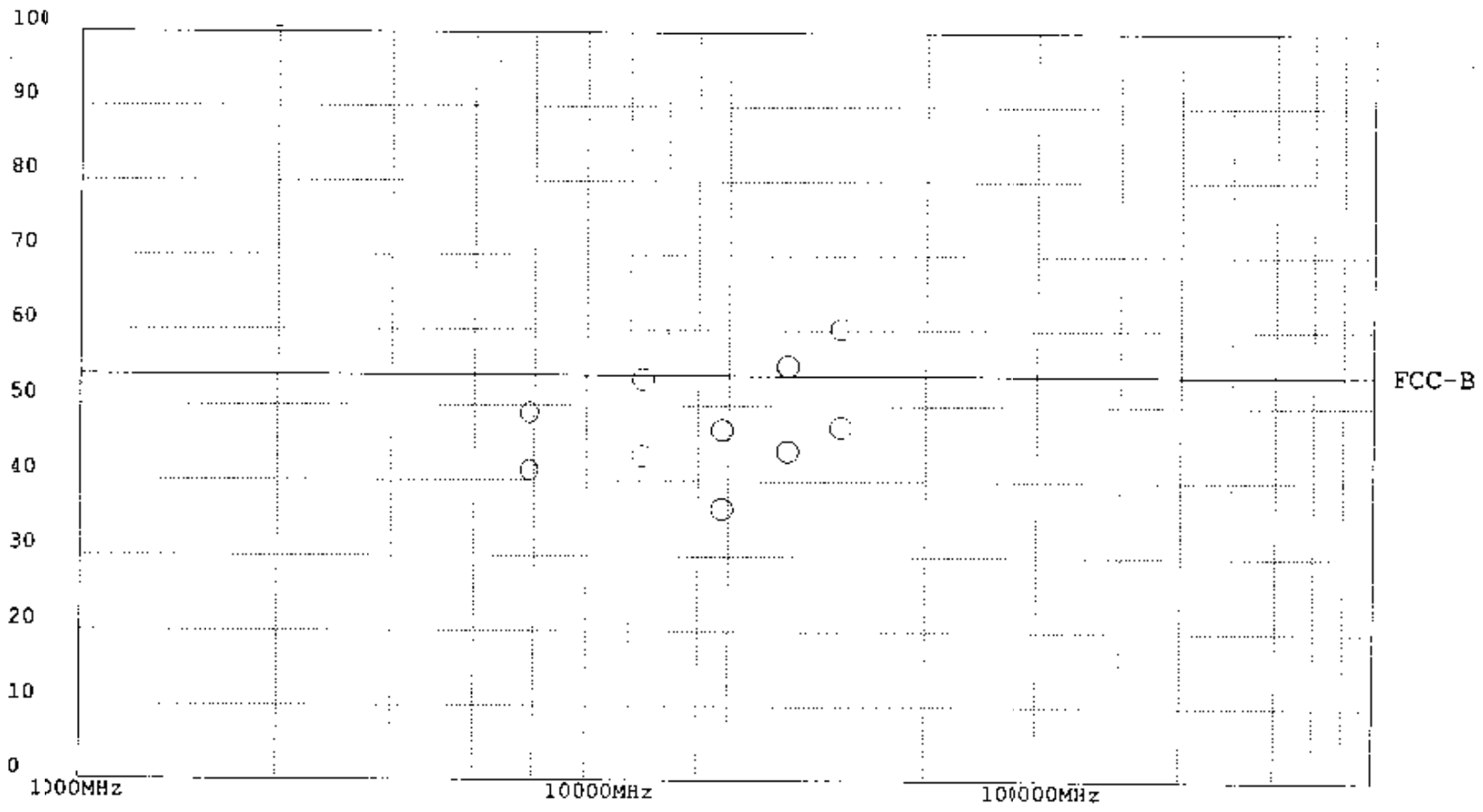
Northwest EMC

Version 4.2 Nov, 1996

EUT Name: 4120
Serial Number: MICN0023
Test Date: 01-22-1998 22:13:12
Tested By: W. J. Robicheaux
Comments: T2, FWD PA, Low Band, Not Hopping

Horizontal= X
Vertical = O

FCC Class B (3 Meter Specification Limit)



Northwest EMC

Version 4.2 Nov, 1996

Equipment Tested: 4120
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-22-1998 22:13:12
Tested By: W. J. Robicheaux
Comments: T2, FWD PA, Low Band, Not Hopping

Job Number: MICN0023

FCC Class B @3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)	Table degree	Antenna height	
4383.850	44.4	AV	34.1	VHRN40.2		3.1	41.4	54.0	12.6	70.0	115.0	
4383.850	52.0	PK	34.1	VHRN40.2		3.1	49.0	54.0	5.0	70.0	115.0	
7325.775	40.8	AV	37.3	VHRN39.0		4.2	43.3	54.0	10.7	70.0	115.0	
7325.775	51.0	PK	37.3	VHRN39.0		4.2	53.5	54.0	0.5	70.0	115.0	
9767.675	35.3	AV	39.3	VHRN43.3		5.0	36.3	54.0	17.7	80.0	115.0	Noise Floor
9767.675	45.8	PK	39.3	VHRN43.3		5.0	46.8	54.0	7.2	80.0	115.0	Noise Floor
12209.580	34.9	AV	40.3	VHRN36.8		5.6	44.0	54.0	10.0	80.0	115.0	Noise Floor
12209.580	46.2	PK	40.3	VHRN36.8		5.6	55.3	54.0	-1.3	80.0	115.0	Noise Floor
14551.470	37.0	AV	40.4	VHRN36.3		6.1	47.2	54.0	6.8	80.0	115.0	Noise Floor
14551.470	50.0	PK	40.4	VHRN36.3		6.1	60.2	54.0	-6.2	80.0	115.0	Noise Floor

W. J. Robicheaux 01/22/98
Signature

Temperature 70F 50% Humidity

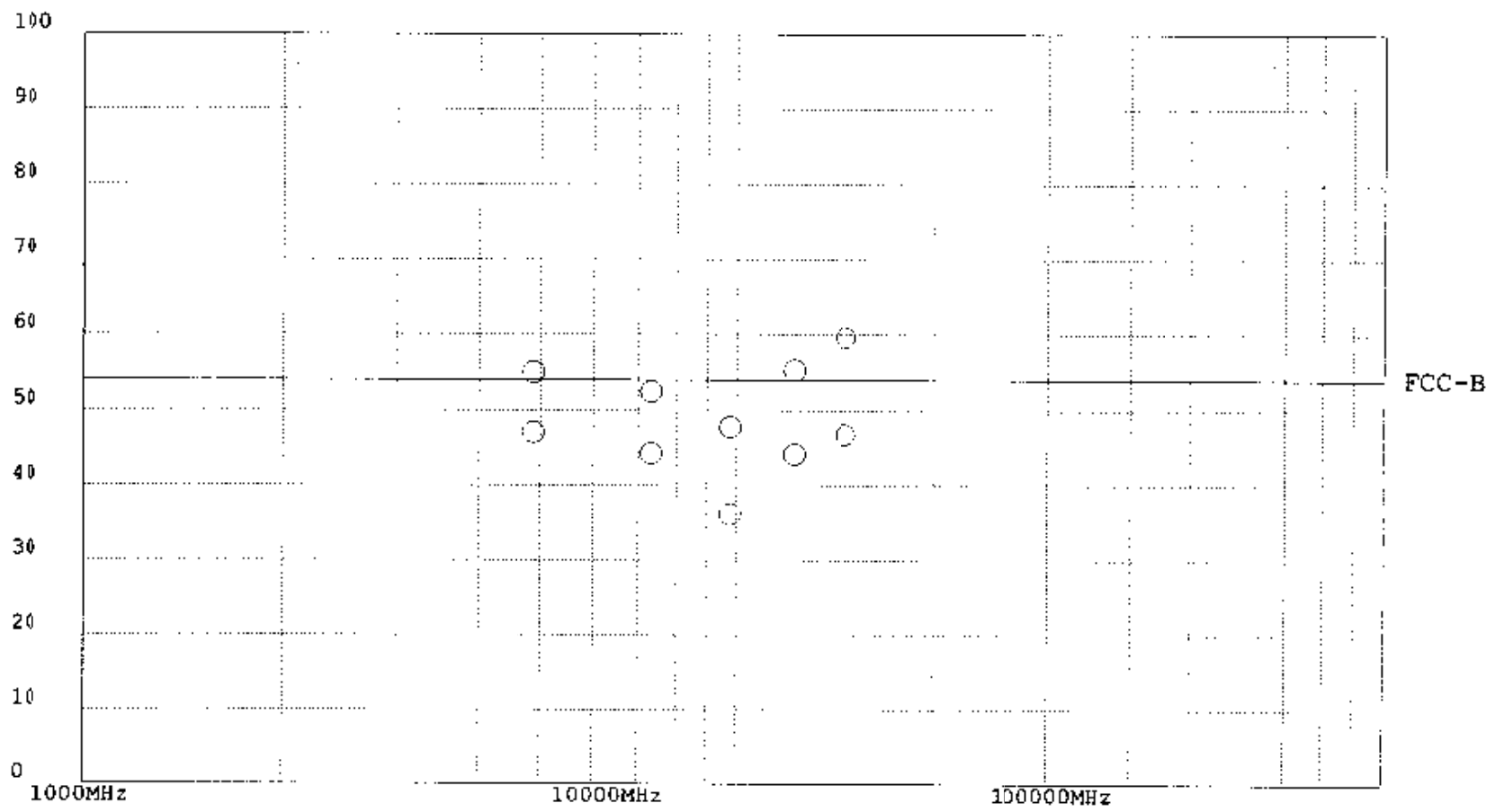
Northwest EMC

Version 4.2 Nov, 1996

EUT Name: 4120
Serial Number: MICN0023
Test Date: 01-22-1998 22:34:37
Tested By: W. J. Robicheaux
Comments: T3, FWD PA, Low Band, Not Hopping

Horizontal= X
Vertical = O

FCC Class B (3 Meter Specification Limit)



Northwest EMC

Version 4.2 Nov, 1996

Equipment Tested: 4120 **Job Number:** MICN0023
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-22-1998 22:34:37
Tested By: W. J. Robicheaux
Comments: T3, FWD PA, Low Band, Not Hopping

FCC Class B (3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)	Table degree	Antenna height	
4883.850	50.1	AV	34.1	VHRN40.2	3.1		47.1	54.0	6.9	130.0	130.0	
4883.850	58.0	PK	34.1	VHRN40.2	3.1		55.0	54.0	-1.0	130.0	130.0	
7325.775	41.8	AV	37.3	VHRN39.0	4.2		44.3	54.0	9.7	266.0	115.0	
7325.775	50.0	PK	37.3	VHRN39.0	4.2		52.5	54.0	1.5	266.0	115.0	
9767.675	35.2	AV	39.3	VHRN43.3	5.0		36.2	54.0	17.8	80.0	115.0	Noise Floor
9767.675	46.8	PK	39.3	VHRN43.3	5.0		47.8	54.0	6.2	80.0	115.0	Noise Floor
12209.580	35.1	AV	40.3	VHRN36.8	5.6		44.2	54.0	9.8	80.0	115.0	Noise Floor
12209.580	46.2	PK	40.3	VHRN36.8	5.6		55.3	54.0	-1.3	80.0	115.0	Noise Floor
14651.470	36.6	AV	40.4	VHRN36.3	6.1		46.8	54.0	7.2	80.0	115.0	Noise Floor
14651.470	49.4	PK	40.4	VHRN36.3	6.1		59.6	54.0	-5.6	80.0	115.0	Noise Floor

W. J. Robicheaux 01/22/98
Signature

Temperature 70F 50% Humidity

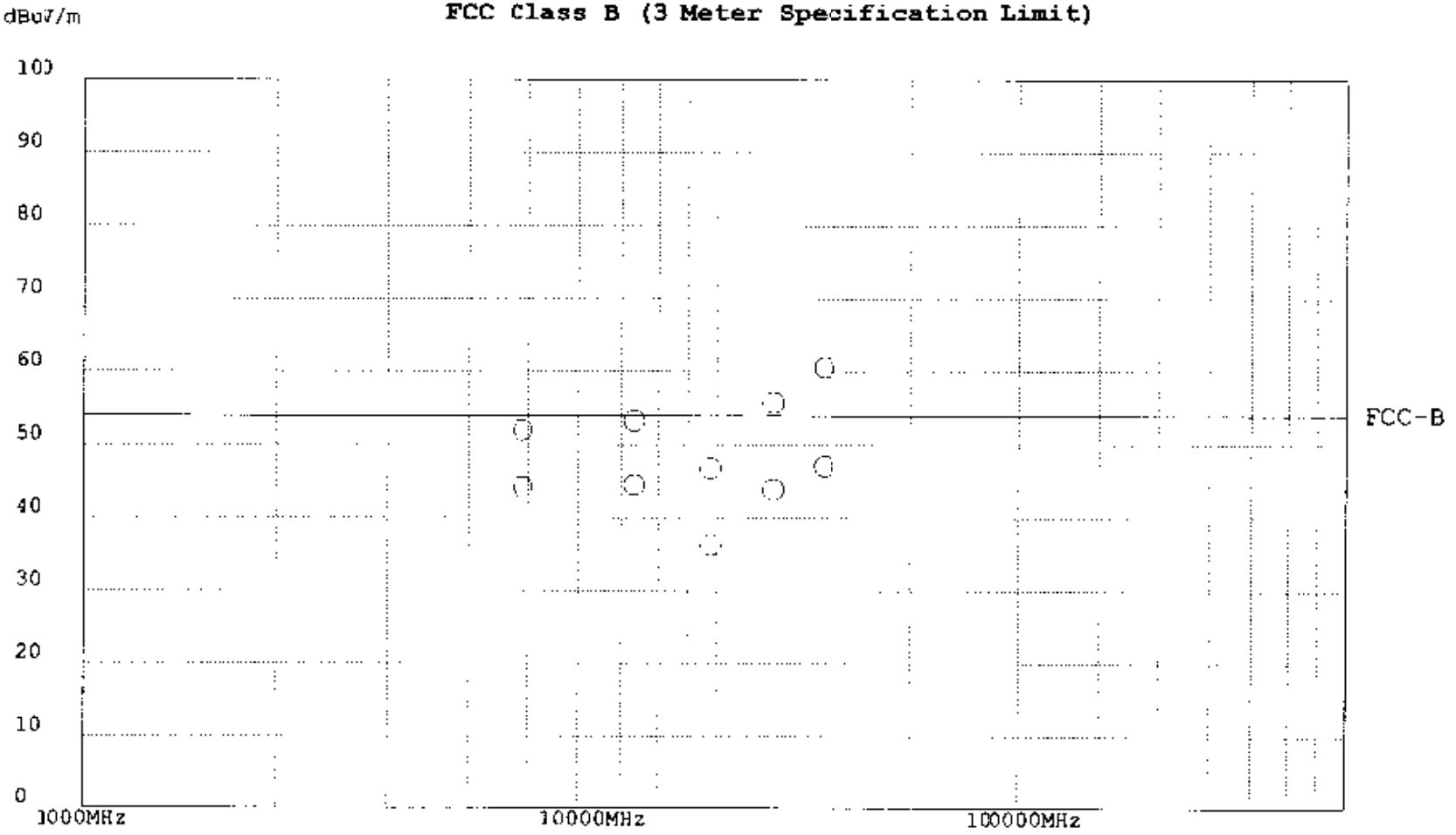
Northwest EMC

Version 4.2 Nov, 1996

EUT Name: 4120
Serial Number: MICN0023
Test Date: 01-22-1998 22:59:47
Tested By: W. J. Robicheaux
Comments: T4, FWD PA, Low Band, Not Hopping

Horizontal= X
Vertical = O

FCC Class B (3 Meter Specification Limit)



Northwest EMC

Version 4.2 Nov, 1996

Equipment Tested: 4120 **Job Number:** MICN0023
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-22-1998 22:59:47
Tested By: W. J. Robicheaux
Comments: T4, FWD PA, Low Band, Not Hopping

FCC Class B (3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)	Table degree	Antenna height	
4883.850	47.2	AV	34.1	VHRN40.2		3.1	44.2	54.0	9.8	246.0	115.0	
4883.850	55.0	PK	34.1	VHRN40.2		3.1	52.0	54.0	2.0	246.0	115.0	
7325.775	42.0	AV	37.3	VHRN39.0		4.2	44.5	54.0	9.5	267.0	115.0	
7325.775	50.8	PK	37.3	VHRN39.0		4.2	53.3	54.0	0.7	267.0	115.0	
9767.675	35.3	AV	39.3	VHRN43.3		5.0	36.3	54.0	17.7	260.0	115.0	Noise Floor
9767.675	45.8	PK	39.3	VHRN43.3		5.0	46.8	54.0	7.2	260.0	115.0	Noise Floor
12209.580	34.8	AV	40.3	VHRN36.8		5.6	43.9	54.0	10.1	260.0	115.0	Noise Floor
12209.580	46.7	PK	40.3	VHRN36.8		5.6	55.8	54.0	-1.8	260.0	115.0	Noise Floor
14651.470	36.9	AV	40.4	VHRN36.3		6.1	47.1	54.0	6.9	260.0	115.0	Noise Floor
14651.470	50.4	PK	40.4	VHRN36.3		6.1	60.6	54.0	-6.6	260.0	115.0	Noise Floor

W. J. Robicheaux 01/22/98
Signature

Temperature 70F 50% Humidity

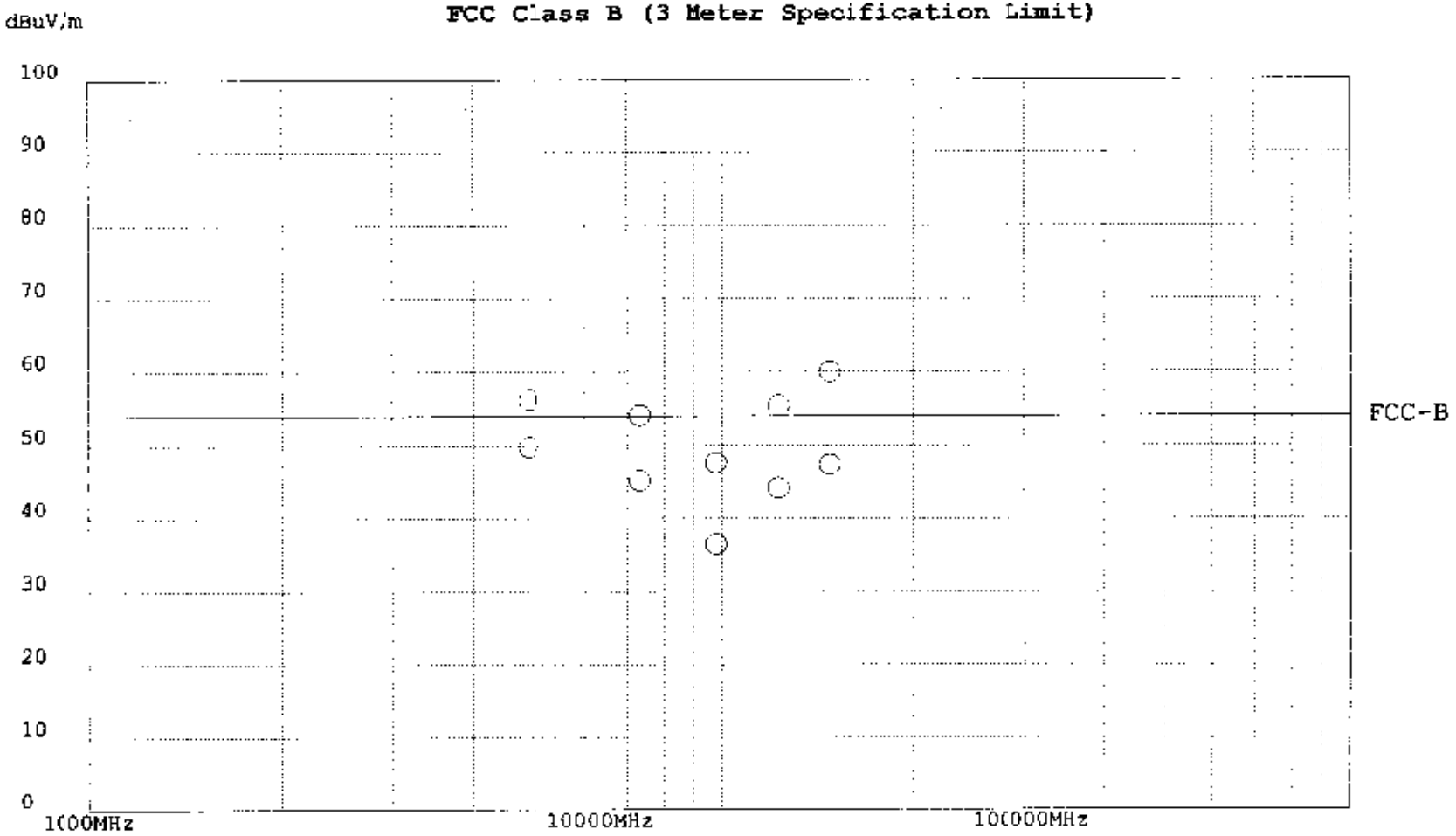
Northwest EMC

Version 4.2 Nov, 1996

EUT Name: 4120
Serial Number: MICN0023
Test Date: 01-22-1998 23:24:45
Tested By: W. J. Robicheaux
Comments: T5, FWD PA, Low Band, Not Hopping

Horizontal= X
Vertical = O

FCC Class B (3 Meter Specification Limit)



Northwest EMC

Version 4.2 Nov. 1996

Equipment Tested: 4120
Job Number: MICN0023
Serial Number:
Manufacturer: Micron Communications
Test Date: 01-22-1998 23:24:45
Tested By: W. J. Robicheaux
Comments: T5, FWD PA, Low Band, Not Hopping

FCC Class B (3 Meter Specification Limit)

Frequency (MHz)	Ampl. (dBuV)	Detect.	AntFact (dB)	Ant. Pol.	Preamp (dB)	Cable Loss	Adjusted (dBuV/m)	Spec (dBuV/m)	Margin (dB)	Table degree	Antenna height	
4883.850	52.8	AV	34.1	VHRN40.2	3.1	49.8	54.0	4.2	300.0	120.0		
4883.850	59.2	PK	34.1	VHRN40.2	3.1	56.2	54.0	-2.2	300.0	120.0		
7325.775	42.7	AV	37.3	VHRN39.0	4.2	45.2	54.0	8.8	363.0	120.0		
7325.775	51.6	PK	37.3	VHRN39.0	4.2	54.1	54.0	-0.1	363.0	120.0		
9767.675	35.5	AV	39.3	VHRN43.3	5.0	36.5	54.0	17.5	260.0	115.0	Noise Floor	
9767.675	46.6	PK	39.3	VHRN43.3	5.0	47.6	54.0	6.4	260.0	115.0	Noise Floor	
12209.580	35.1	AV	40.3	VHRN36.8	5.6	44.2	54.0	9.8	260.0	115.0	Noise Floor	
12209.580	46.3	PK	40.3	VHRN36.8	5.6	55.4	54.0	-1.4	260.0	115.0	Noise Floor	
14651.470	37.2	AV	40.4	VHRN36.3	6.1	47.4	54.0	6.6	260.0	115.0	Noise Floor	
14651.470	49.8	PK	40.4	VHRN36.3	6.1	60.0	54.0	-6.0	260.0	115.0	Noise Floor	

W. J. Robicheaux 01/22/98
Signature

Temperature 70F 50% Humidity

7.2 Occupied Bandwidth (Frequency Hopping)

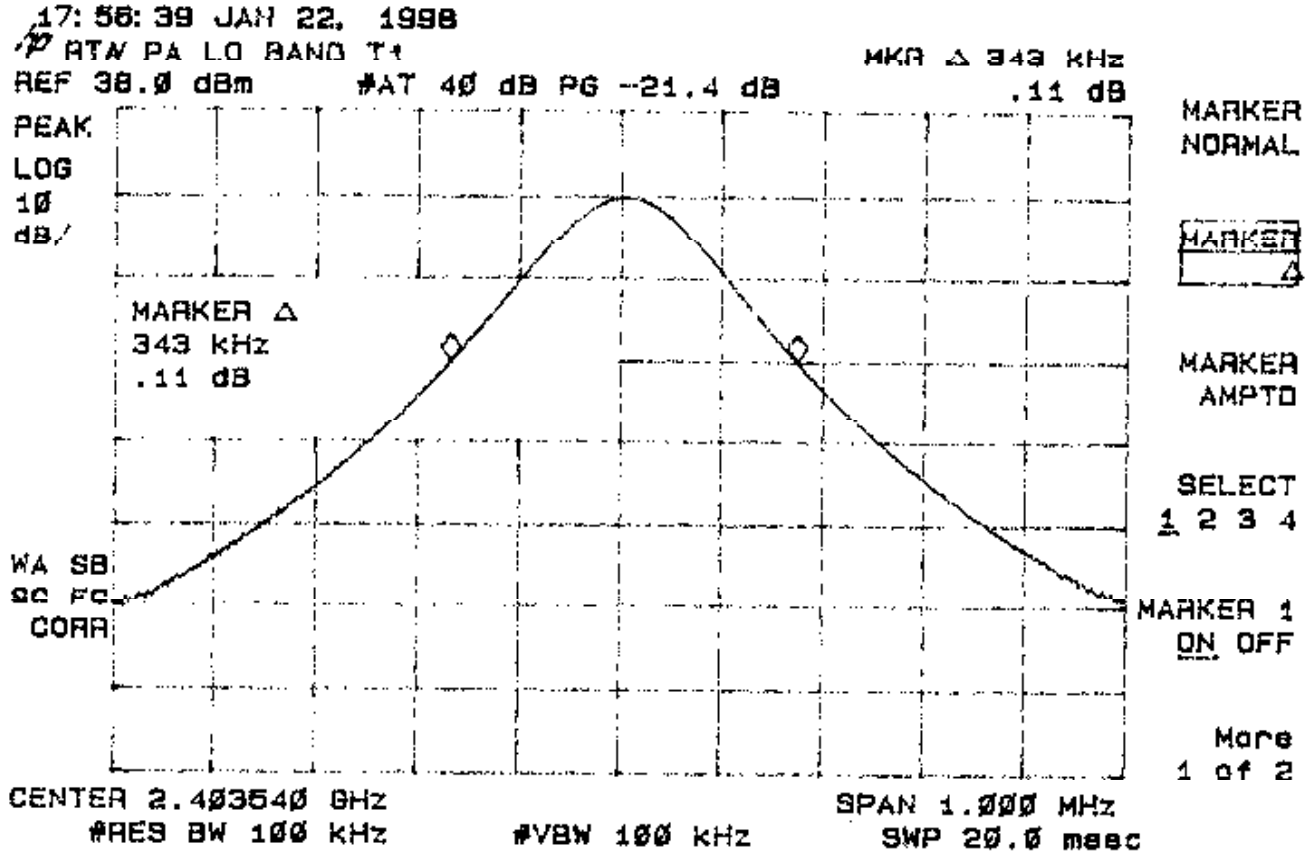
As per Section 15.247 (a1i) , the following graphs show that the minimum 20dB bandwidth is less than the channel separation of 400 kHz. The bandwidth was measured with the EUT set to low, mid, and high transmit frequencies. The measurement was made with the spectrum analyzer's resolution bandwidth = 100 kHz. The span was set to 1 MHz. Measurements are also included that demonstrate the all of the hopping frequencies fall within the allowed frequency band.

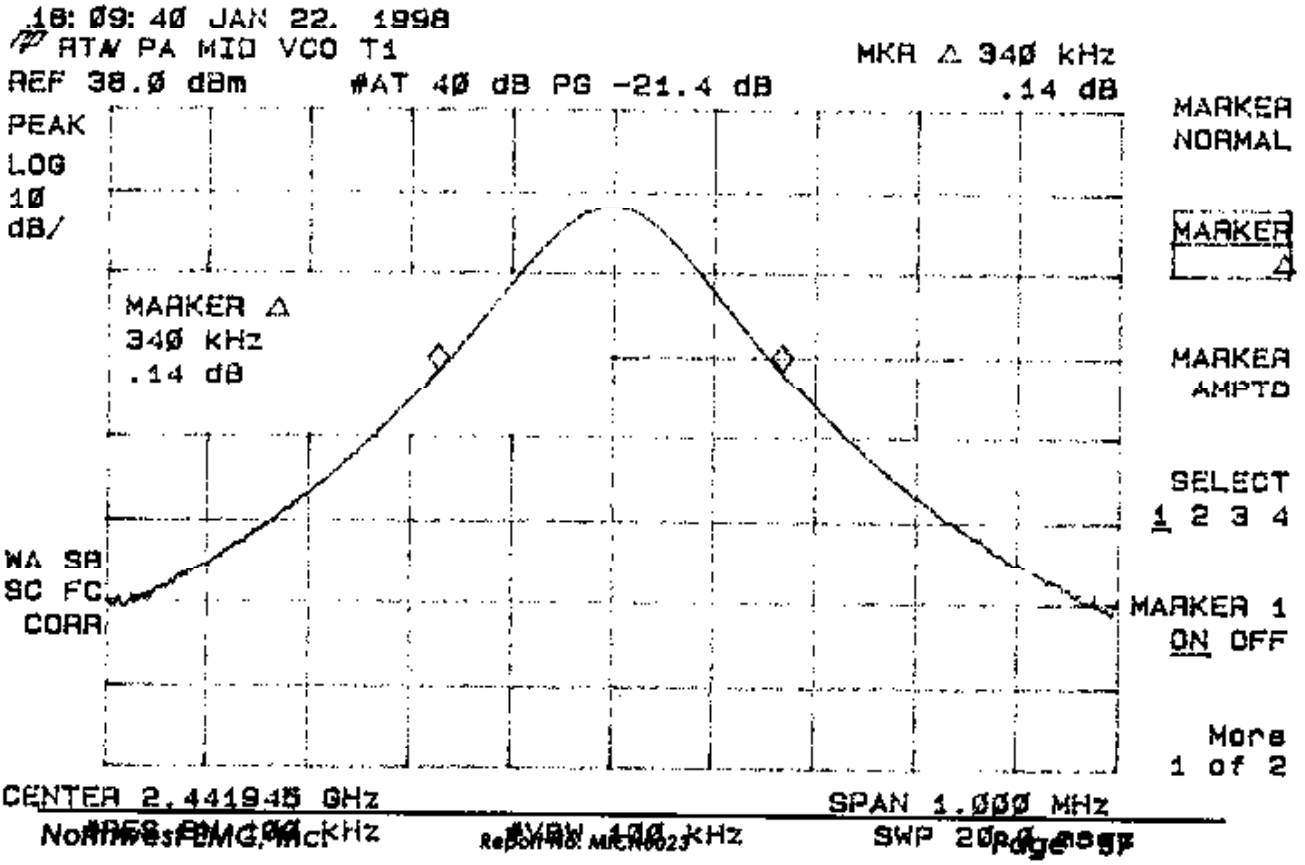
Center Frequency (GHz)	Transmit Port	Bandwidth (kHz)
2400 -2483.5	T1	≤345
2400 -2483.5	T2	≤343
2400 -2483.5	T3	≤348
2400 -2483.5	T4	≤345
2400 -2483.5	T5	≤345
2400 -2483.5	T6	≤345

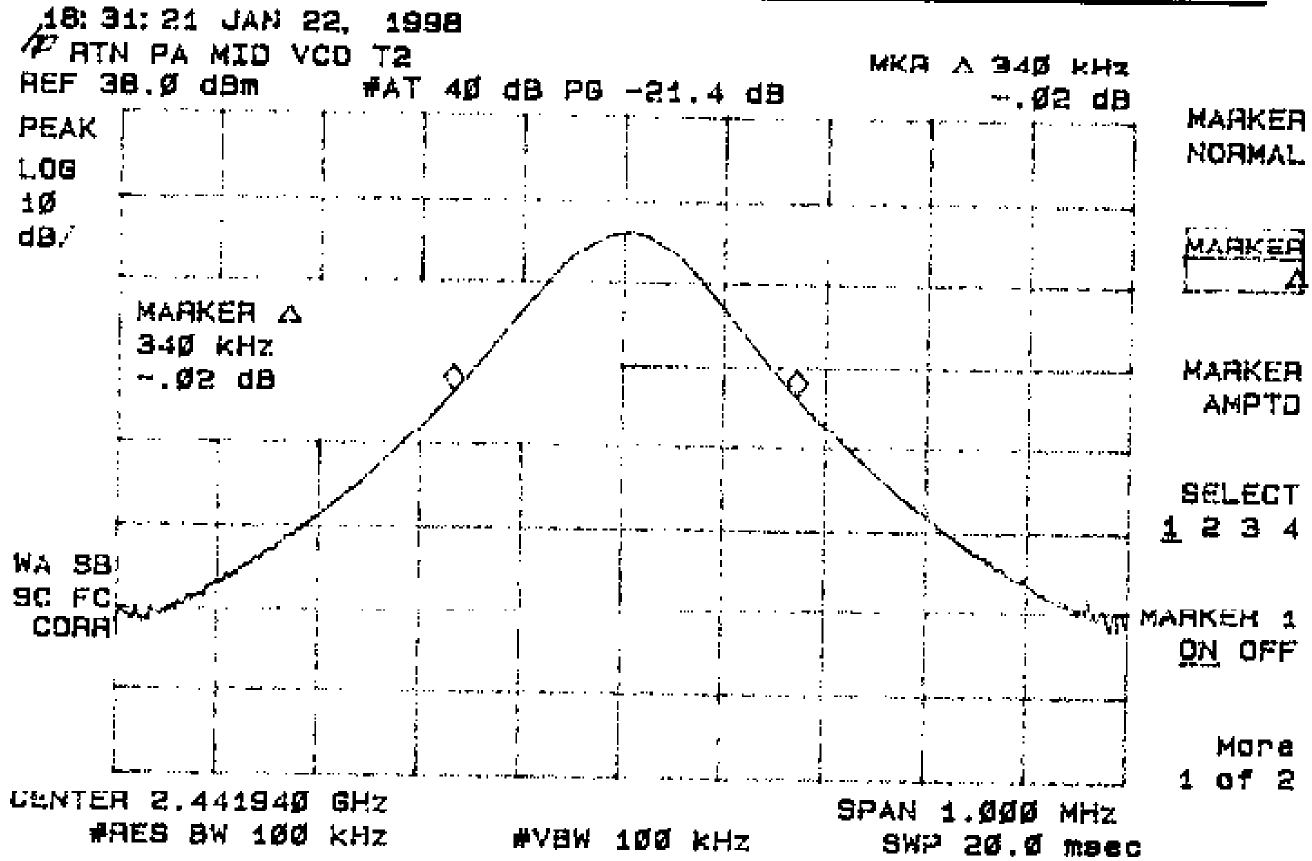
Test Personnel:

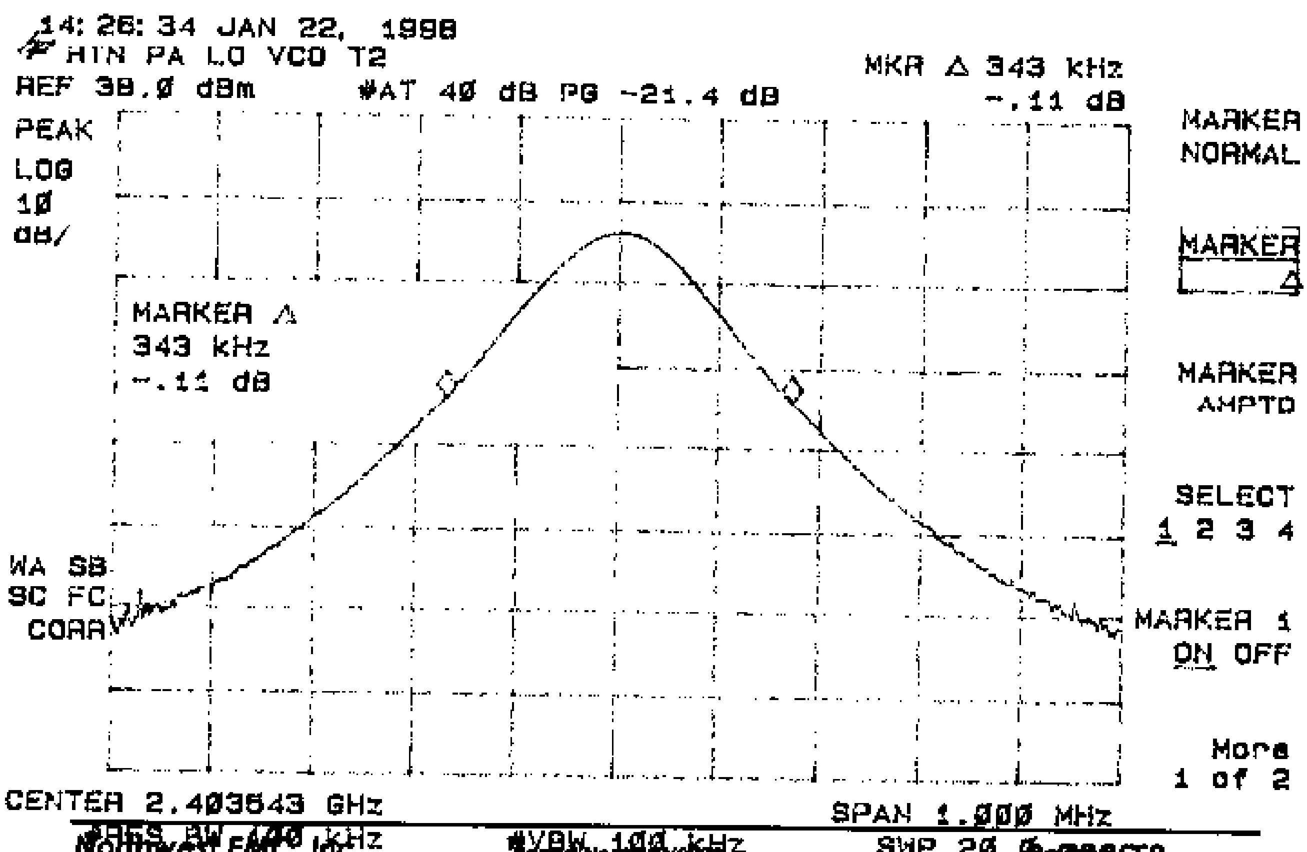
Tester Signature: _____ Date: 3/6/98

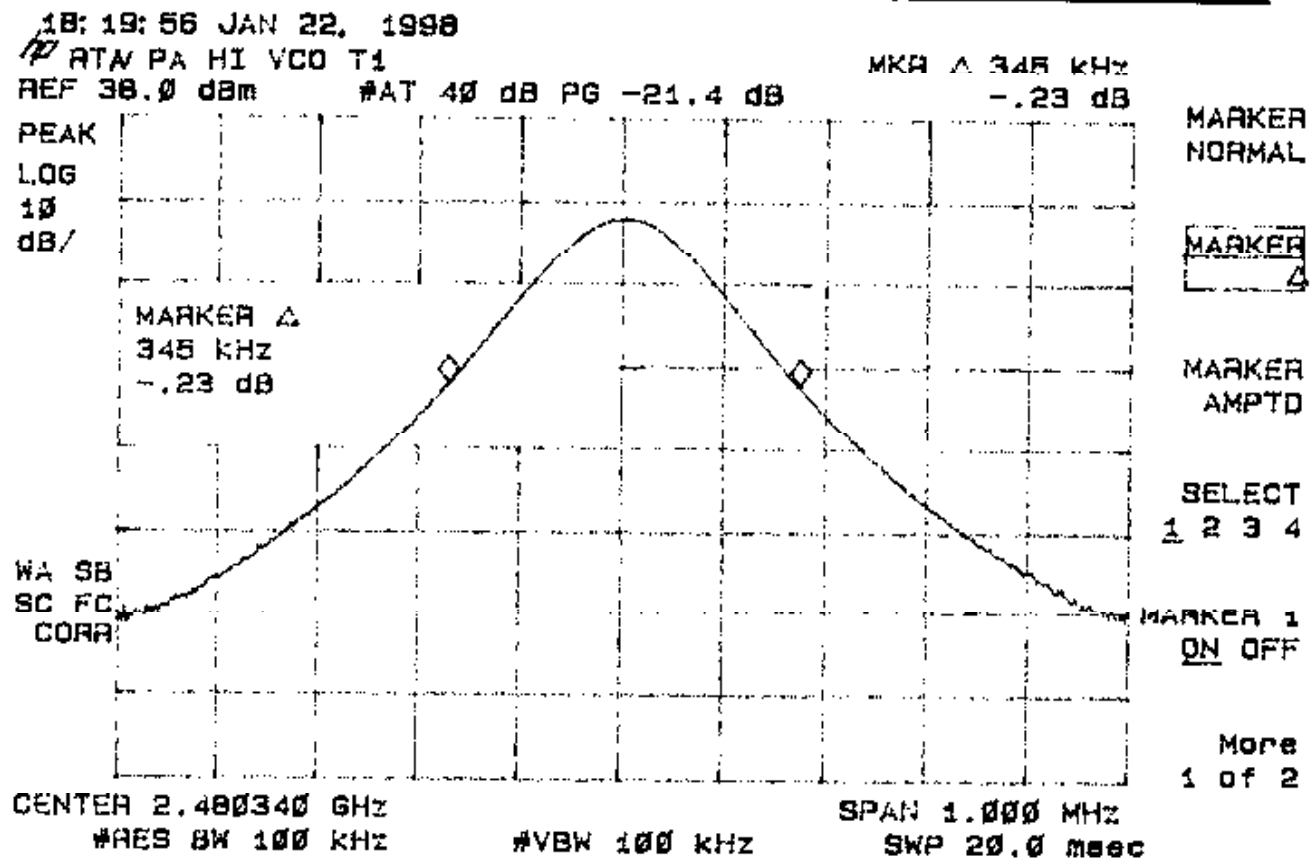
Typed/Printed Name: Dean Ghizzone

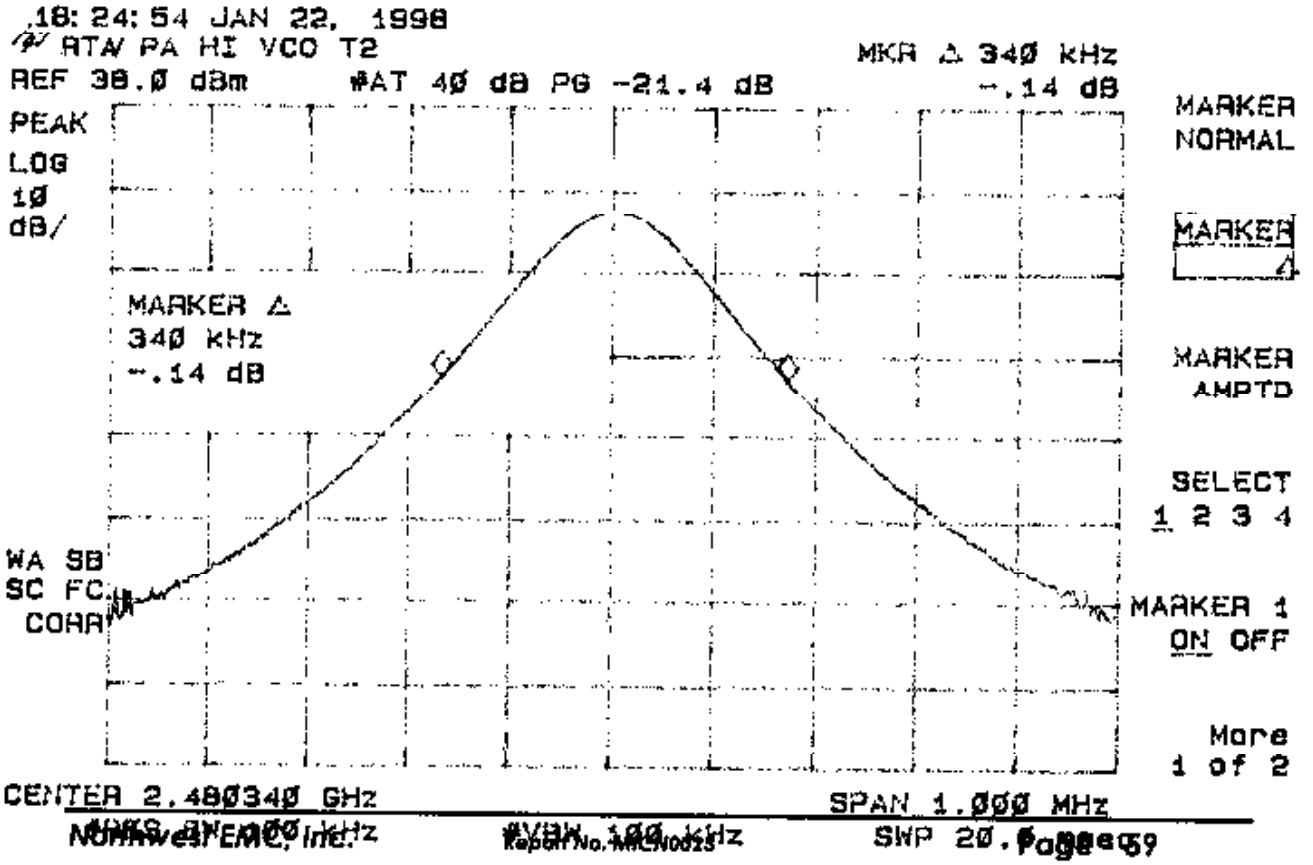

17: 56: 39 JAN 22, 1998
RTN PA LO BAND T1
MKR Δ 343 kHz
REF 38.0 dBm
#AT 40 dB PG -21.4 dB
.11 dB
PEAK
LOG
10
dB/
MARKER
NORMAL
MARKER Δ
343 kHz
.11 dB
MARKER
Δ
MARKER
AMPTD
SELECT
1 2 3 4
WA SB
SC FC
CORR
MARKER 1
ON OFF
More
1 of 2
CENTER 2.403540 GHz
SPAN 1.000 MHz
#RES BW 100 kHz
#VBW 100 kHz
SWP 20.0 msec

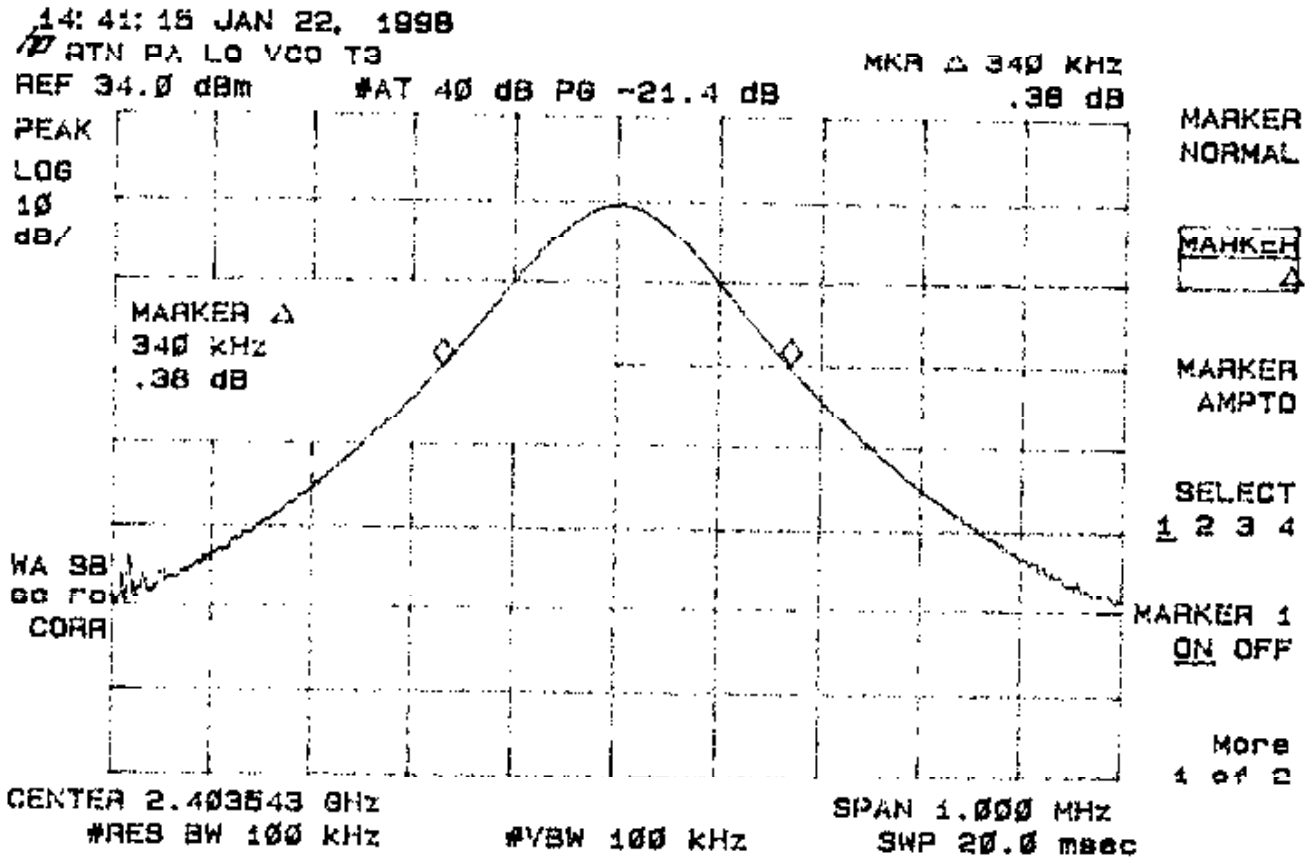

16: 09: 40 JAN 22, 1998
RTN PA MID VCO T1
MKR Δ 340 kHz
REF 38.0 dBm
#AT 40 dB PG -21.4 dB
.14 dB
PEAK
LOG
10
dB/
MARKER
NORMAL
MARKER Δ
340 kHz
.14 dB
MARKER
Δ
MARKER
AMPTD
SELECT
1 2 3 4
WA SB
SC FC
CORR
MARKER 1
ON OFF
More
1 of 2
CENTER 2.441945 GHz
SPAN 1.000 MHz
#RES BW 100 kHz
#VBW 100 kHz
SWP 20.0 msec

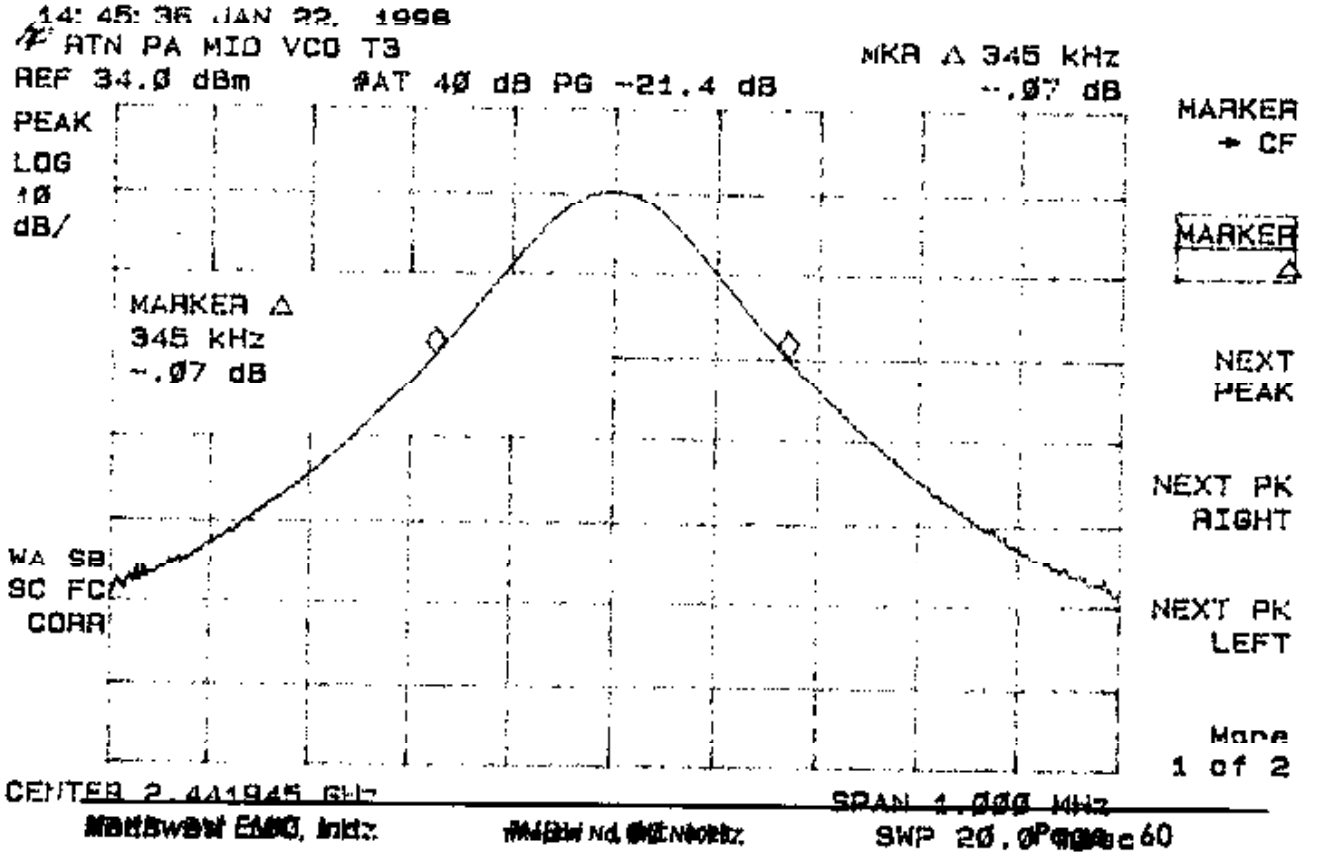

18: 31: 21 JAN 22, 1998
RTN PA MID VCO T2
REF 38.Ø dBm
#AT 4Ø dB PG -21.4 dB
MKR Δ 34Ø kHz
-.Ø2 dB
PEAK
LOG
1Ø
dB/
MARKER Δ
34Ø kHz
-.Ø2 dB
WA SB
SC FC
CORR
CENTER 2.44194Ø GHz
#RES BW 1ØØ kHz
#VBW 1ØØ kHz
SPAN 1.ØØØ MHz
SWP 2Ø.Ø msec
MARKER
NORMAL
MARKER
Δ
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2

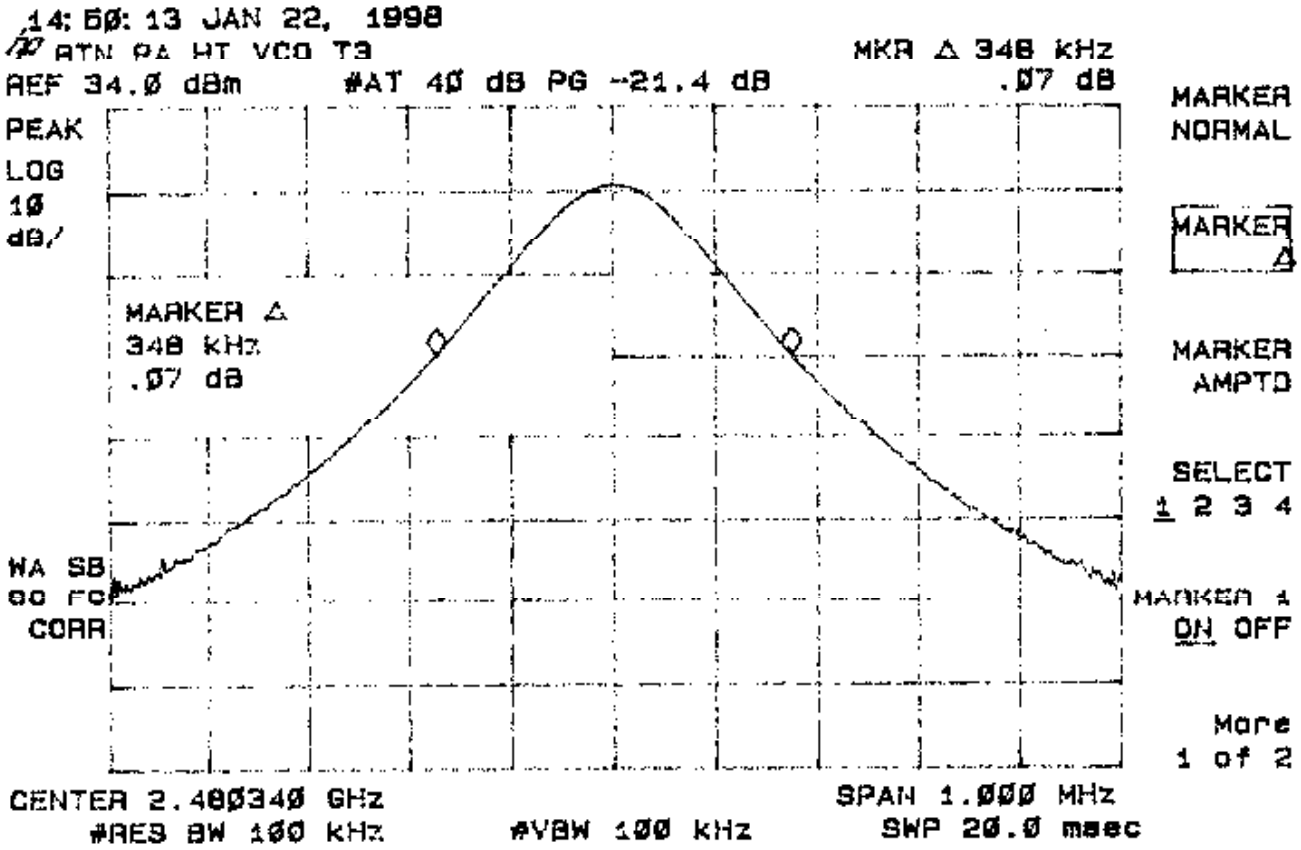

14: 26: 34 JAN 22, 1998
RTN PA LO VCO T2
REF 38.Ø dBm
#AT 4Ø dB PG -21.4 dB
MKR Δ 343 kHz
-.11 dB
PEAK
LOG
1Ø
dB/
MARKER Δ
343 kHz
-.11 dB
WA SB
SC FC
CORR
CENTER 2.4Ø3643 GHz
#RES BW 1ØØ kHz
#VBW 1ØØ kHz
SPAN 1.ØØØ MHz
SWP 2Ø.Ø msec
MARKER
NORMAL
MARKER
Δ
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2

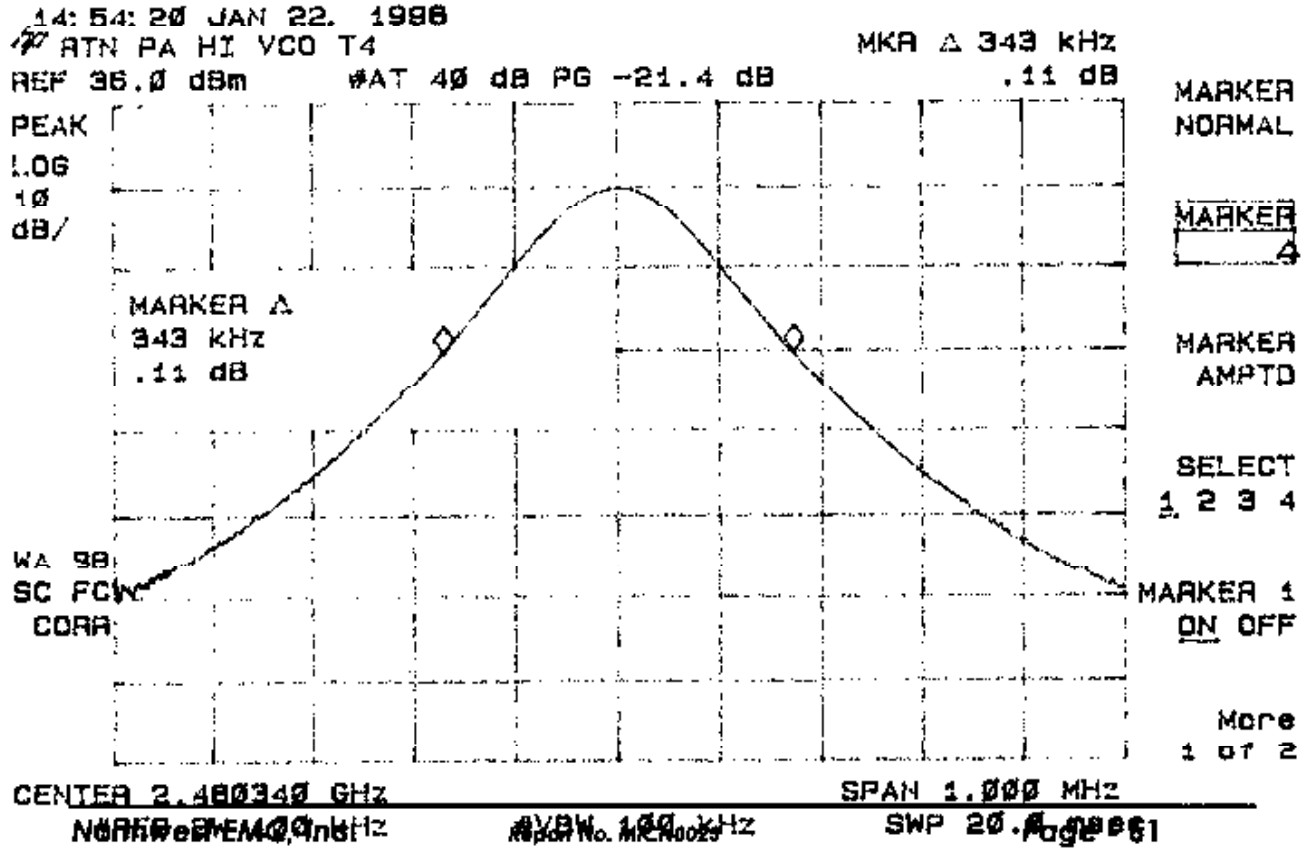

18: 19: 56 JAN 22, 1998
RTA PA HI VCO T1
MKR Δ 345 kHz
REF 38.Ø dBm
#AT 4Ø dB PG -21.4 dB
-.23 dB
PEAK
LOG
1Ø
dB/
MARKER
NORMAL
MARKER
MARKER Δ
345 kHz
-.23 dB
MARKER
AMPTD
SELECT
1 2 3 4
WA SB
SC FC
CORR
MARKER 1
ON OFF
More
1 of 2
CENTER 2.48Ø34Ø GHz
SPAN 1.ØØØ MHz
#RES BW 1ØØ kHz
#VBW 1ØØ kHz
SWP 2Ø.Ø msec

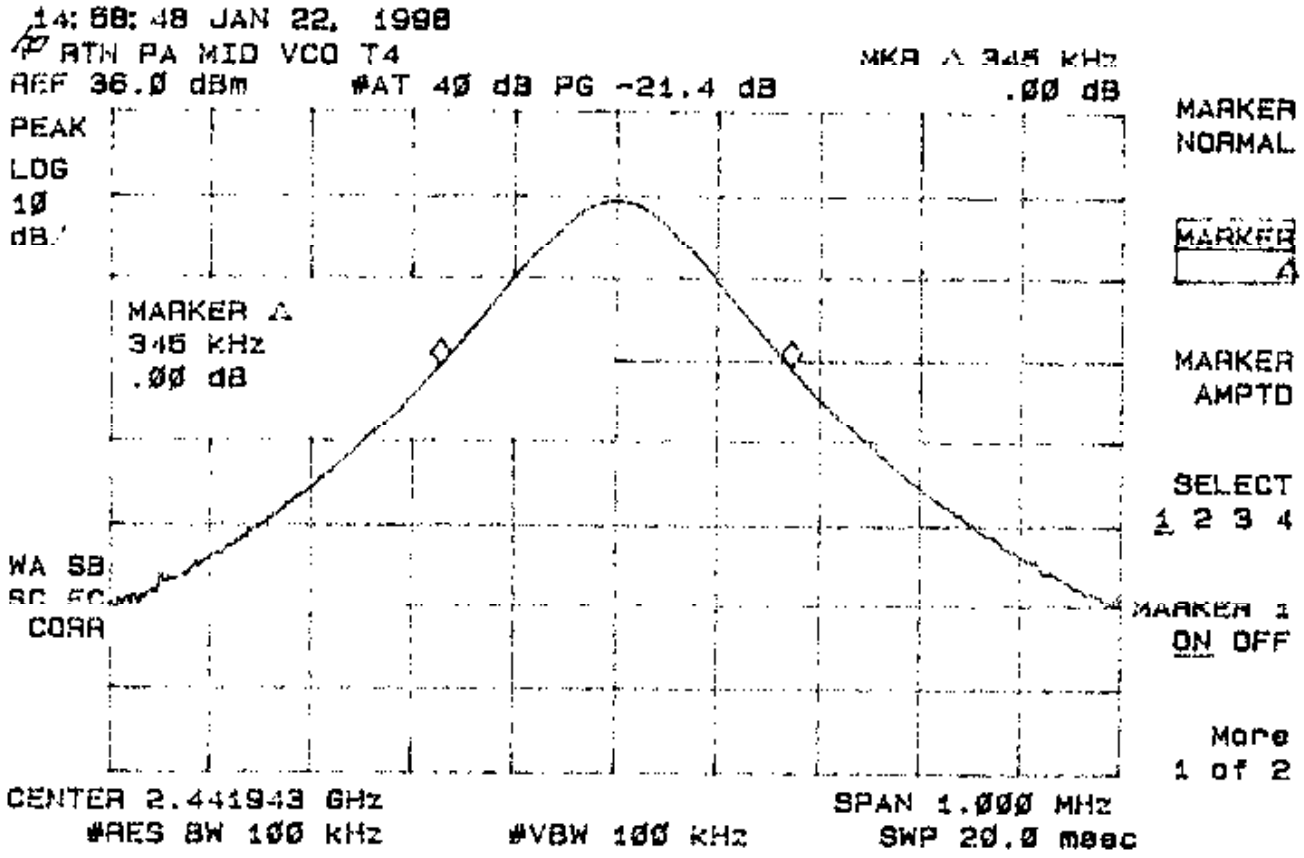

18: 24: 54 JAN 22, 1998
RTA PA HI VCO T2
MKR Δ 34Ø kHz
REF 38.Ø dBm
#AT 4Ø dB PG -21.4 dB
-.14 dB
PEAK
LOG
1Ø
dB/
MARKER
NORMAL
MARKER
MARKER Δ
34Ø kHz
-.14 dB
MARKER
AMPTD
SELECT
1 2 3 4
WA SB
SC FC
CORR
MARKER 1
ON OFF
More
1 of 2
CENTER 2.48Ø34Ø GHz
SPAN 1.ØØØ MHz
#RES BW 1ØØ kHz
#VBW 1ØØ kHz
SWP 2Ø.Ø msec

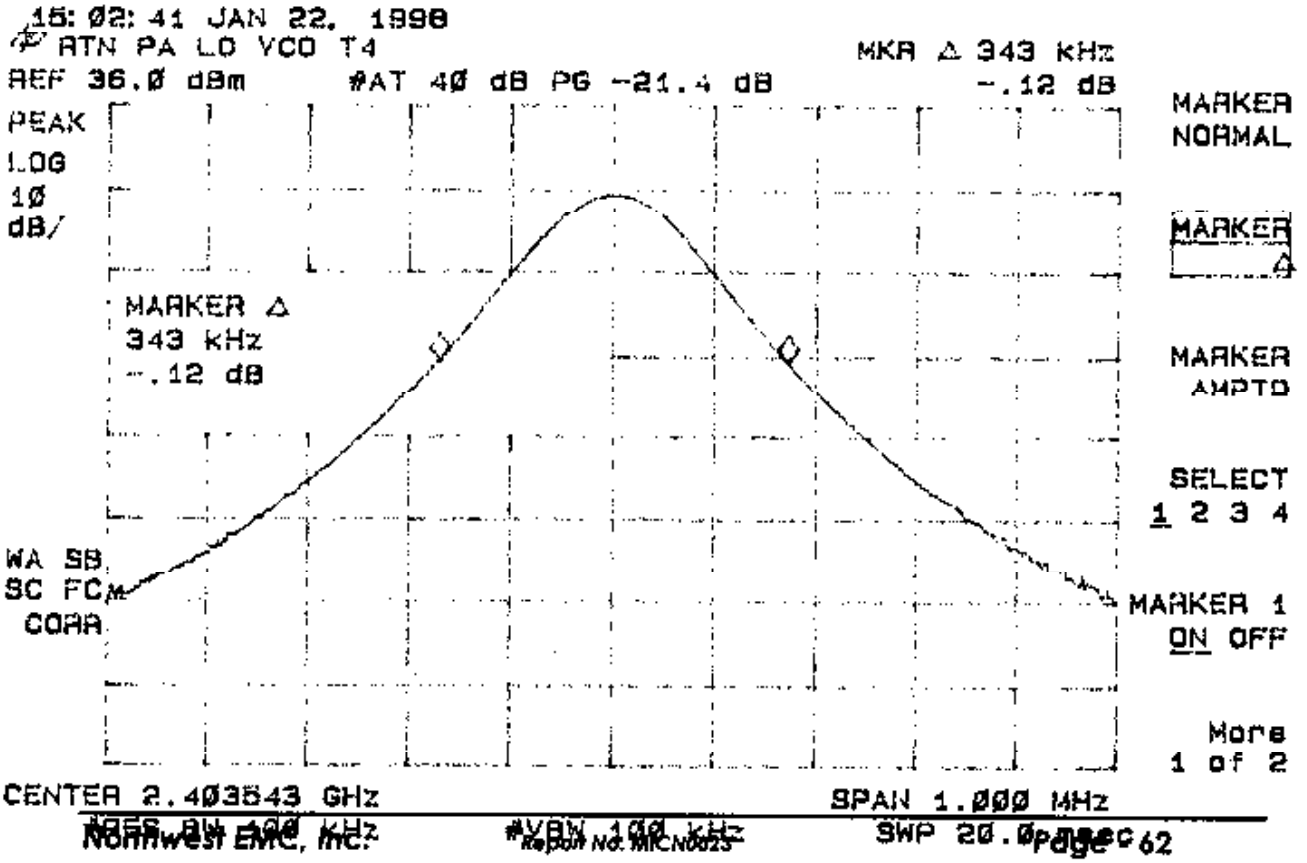

14: 41: 15 JAN 22, 1998
ATN PA LO VCO T3
REF 34.Ø dBm
#AT 4Ø dB PG -21.4 dB
MKR Δ 34Ø kHz
.38 dB
PEAK
LOG
1Ø
dB/
MARKER Δ
34Ø kHz
.38 dB
MARKER
NORMAL
MARKER
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
CENTER 2.4Ø3543 GHz
#RES BW 1ØØ kHz
#VBW 1ØØ kHz
SPAN 1.ØØØ MHz
SWP 2Ø.Ø msec

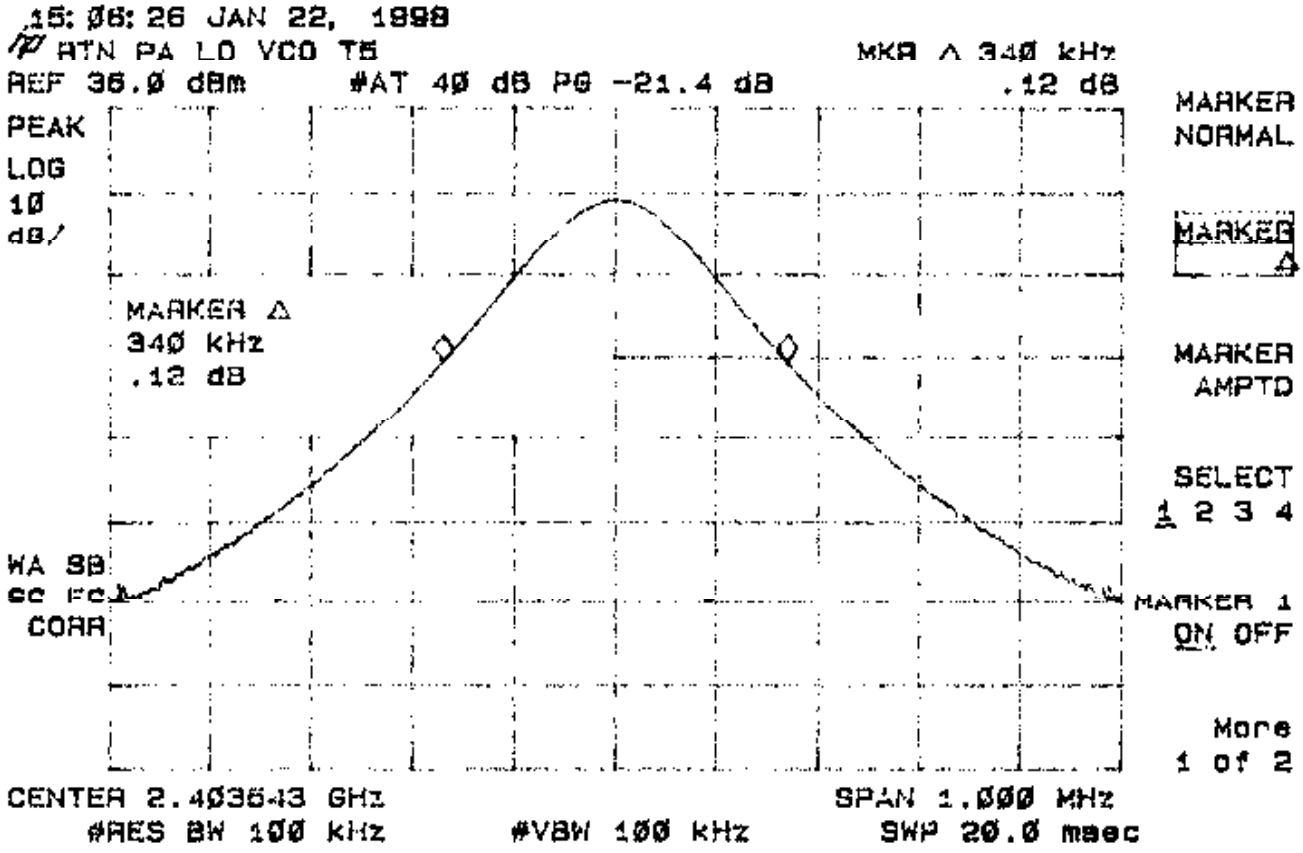

14: 45: 36 JAN 22, 1998
ATN PA MID VCO T3
REF 34.Ø dBm
#AT 4Ø dB PG -21.4 dB
MKR Δ 345 kHz
-.Ø7 dB
PEAK
LOG
1Ø
dB/
MARKER Δ
345 kHz
-.Ø7 dB
MARKER
→ CF
MARKER
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
SPAN 1.ØØØ MHz
SWP 2Ø.ØPage 60

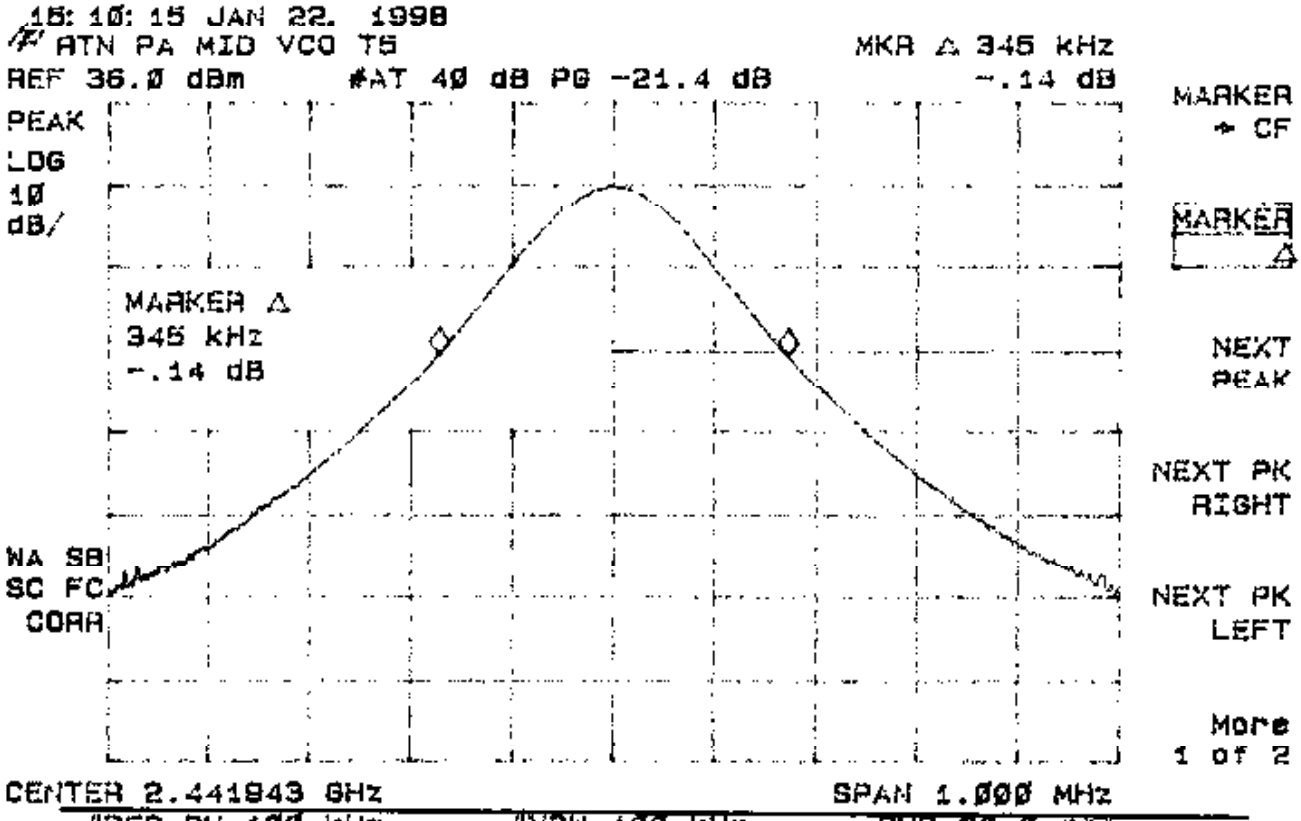

14: 50: 13 JAN 22, 1998
RTN PA HI VCO T3
MKR Δ 348 kHz
REF 34.0 dBm
#AT 40 dB PG -21.4 dB
.07 dB
PEAK
LOG
10
dB/
MARKER Δ
348 kHz
.07 dB
MARKER
NORMAL
MARKER
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
CENTER 2.480340 GHz
SPAN 1.000 MHz
#RES BW 100 kHz
#VBW 100 kHz
SWP 20.0 msec

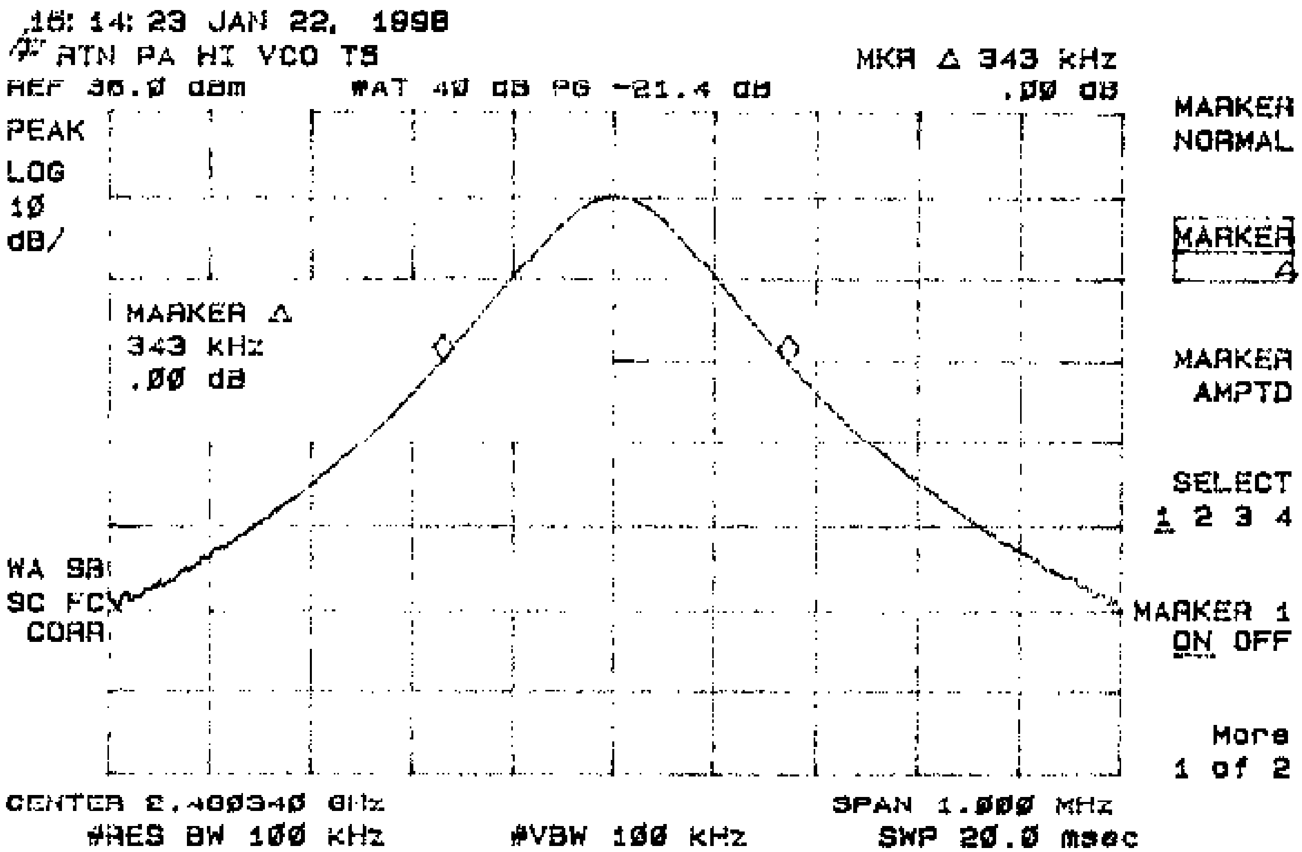

14: 54: 20 JAN 22, 1998
RTN PA HI VCO T4
MKR Δ 343 kHz
REF 36.0 dBm
#AT 40 dB PG -21.4 dB
.11 dB
PEAK
LOG
10
dB/
MARKER Δ
343 kHz
.11 dB
MARKER
NORMAL
MARKER
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
CENTER 2.480340 GHz
SPAN 1.000 MHz
#VBW 100 kHz
SWP 20.0 msec

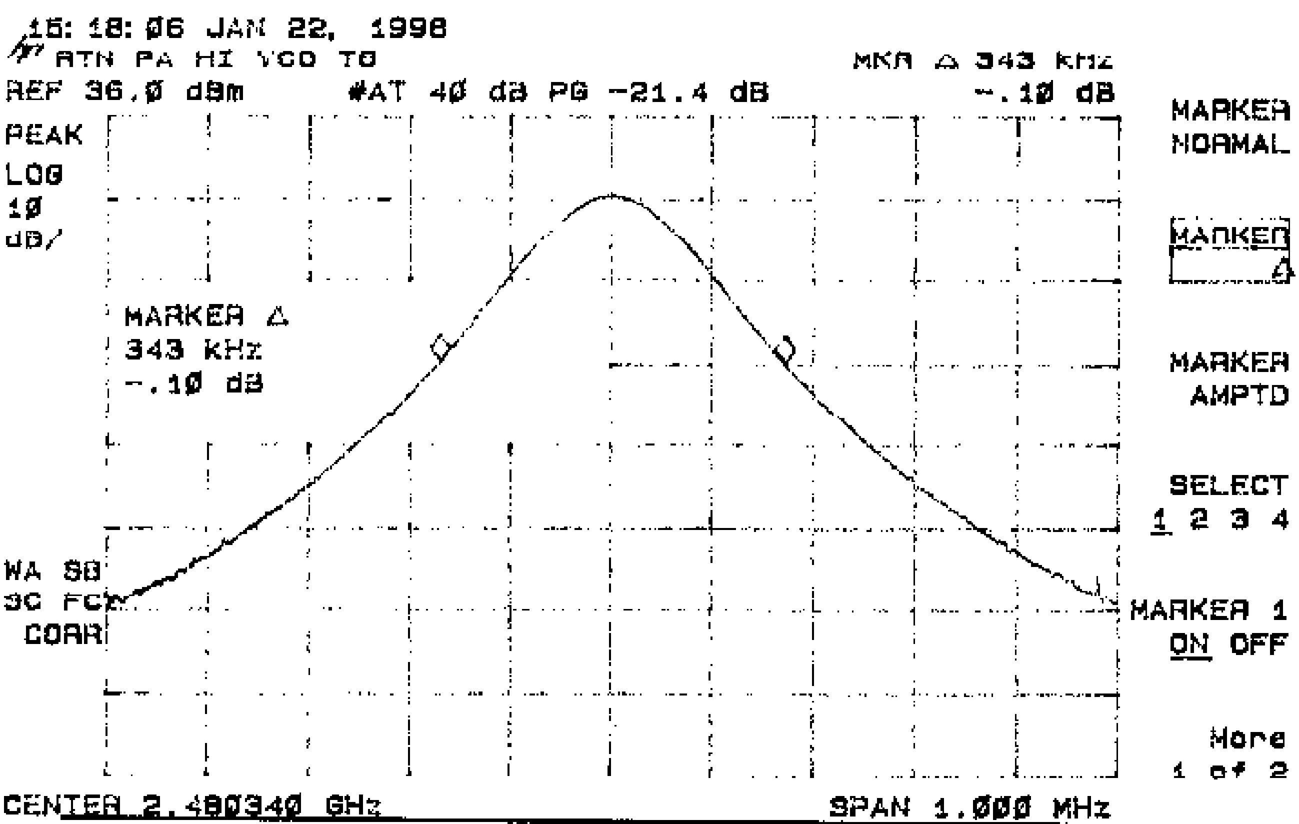

14: 58: 48 JAN 22, 1998
RTN PA MID VCO T4
MKR Δ 345 kHz
REF 36.Ø dBm
#AT 4Ø dB PG -21.4 dB
.ØØ dB
PEAK
LOG
1Ø
dB/
MARKER Δ
345 kHz
.ØØ dB
MARKER
NORMAL
MARKER
MARKER
AMPTD
SELECT
1 2 3 4
WA SB
SC FC
CORR
MARKER 1
ON OFF
More
1 of 2
CENTER 2.441943 GHz
SPAN 1.ØØØ MHz
#RES BW 1ØØ kHz
#VBW 1ØØ kHz
SWP 2Ø.Ø msec

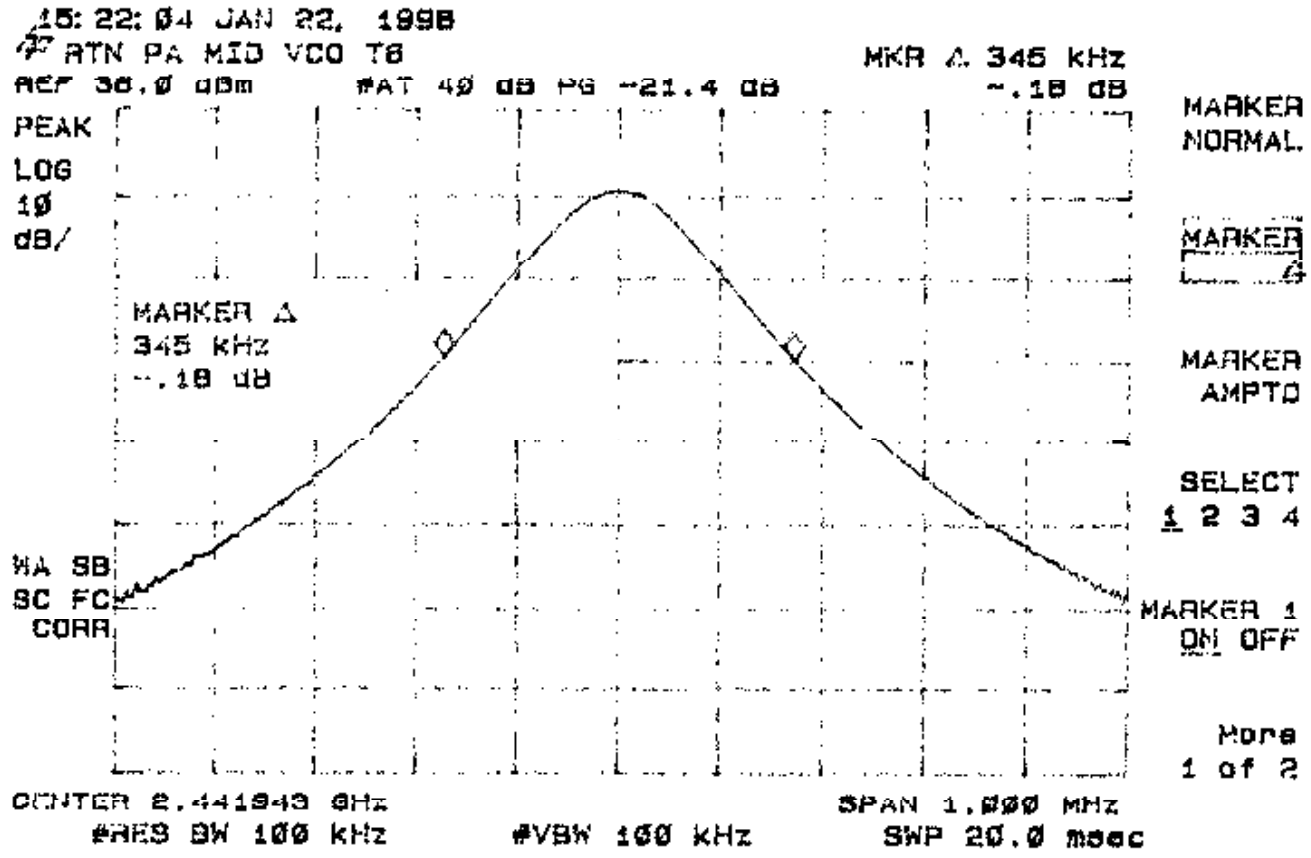

15: Ø2: 41 JAN 22, 1998
RTN PA LO VCO T4
MKR Δ 343 kHz
REF 36.Ø dBm
#AT 4Ø dB PG -21.4 dB
-.12 dB
PEAK
LOG
1Ø
dB/
MARKER Δ
343 kHz
-.12 dB
MARKER
NORMAL
MARKER
MARKER
AMPTD
SELECT
1 2 3 4
WA SB
SC FC
CORR
MARKER 1
ON OFF
More
1 of 2
CENTER 2.4Ø3543 GHz
SPAN 1.ØØØ MHz
#RES BW 1ØØ kHz
#VBW 1ØØ kHz
SWP 2Ø.Ø msec

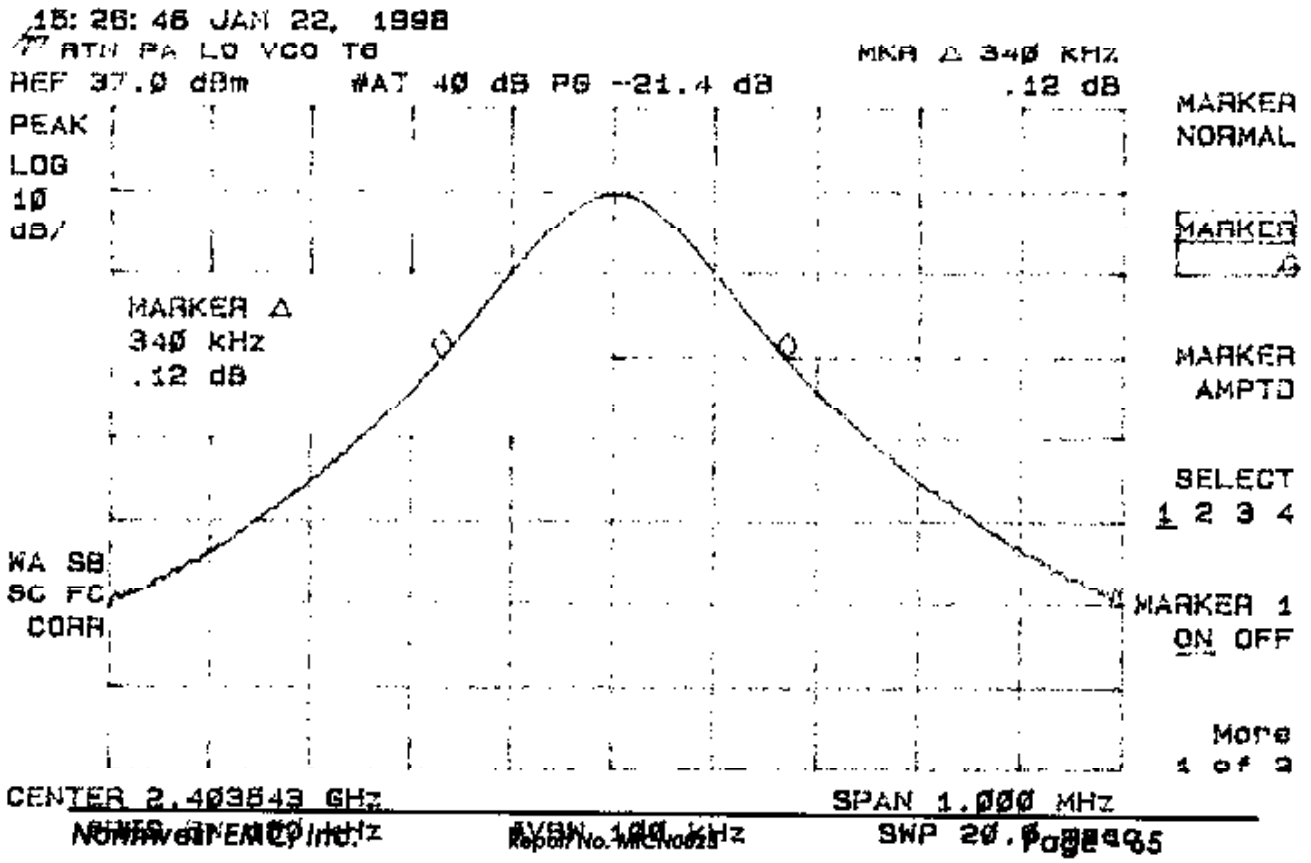

15: Ø6: 26 JAN 22, 1998
ATN PA LO VCO T5
MKR Δ 34Ø kHz
REF 36.Ø dBm
#AT 4Ø dB PG -21.4 dB
.12 dB
PEAK
LOG
1Ø
dB/
MARKER Δ
34Ø kHz
.12 dB
MARKER
NORMAL
MARKER
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
WA SB
SC FC
CORR
CENTER 2.4Ø3643 GHz
SPAN 1.ØØØ MHz
#RES BW 1ØØ kHz
#VBW 1ØØ kHz
SWP 2Ø.Ø msec

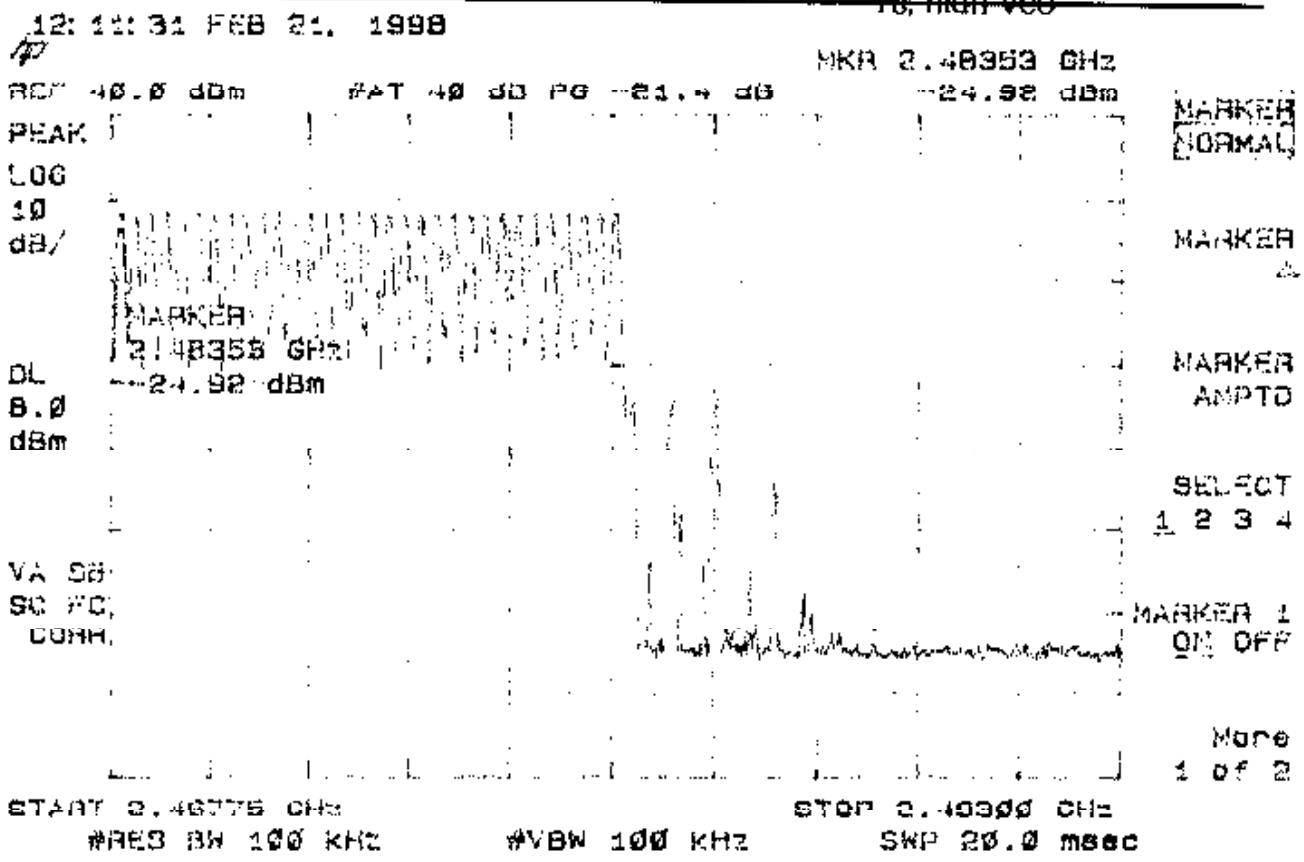

15: 1Ø: 15 JAN 22, 1998
ATN PA MID VCO T5
MKR Δ 345 kHz
REF 36.Ø dBm
#AT 4Ø dB PG -21.4 dB
-.14 dB
PEAK
LOG
1Ø
dB/
MARKER Δ
345 kHz
-.14 dB
MARKER
→ CF
MARKER
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
WA SB
SC FC
CORR
CENTER 2.441943 GHz
SPAN 1.ØØØ MHz
#RES BW 1ØØ kHz
#VBW 1ØØ kHz
SWP 2Ø.Ø msec


16: 14: 23 JAN 22, 1998
RTN PA HI VCO TS
MKR Δ 343 kHz
REF 36.0 dBm #AT 40 dB PG -21.4 dB
.00 dB
PEAK
LOG
10
dB/
MARKER Δ
343 kHz
.00 dB
WA SB
SC FC
CORR
MARKER NORMAL
MARKER Δ
MARKER AMPTD
SELECT 1 2 3 4
MARKER 1 ON OFF
More 1 of 2
CENTER 2.480340 GHz
SPAN 1.000 MHz
#RES BW 100 kHz
#VBW 100 kHz
SWP 20.0 msec

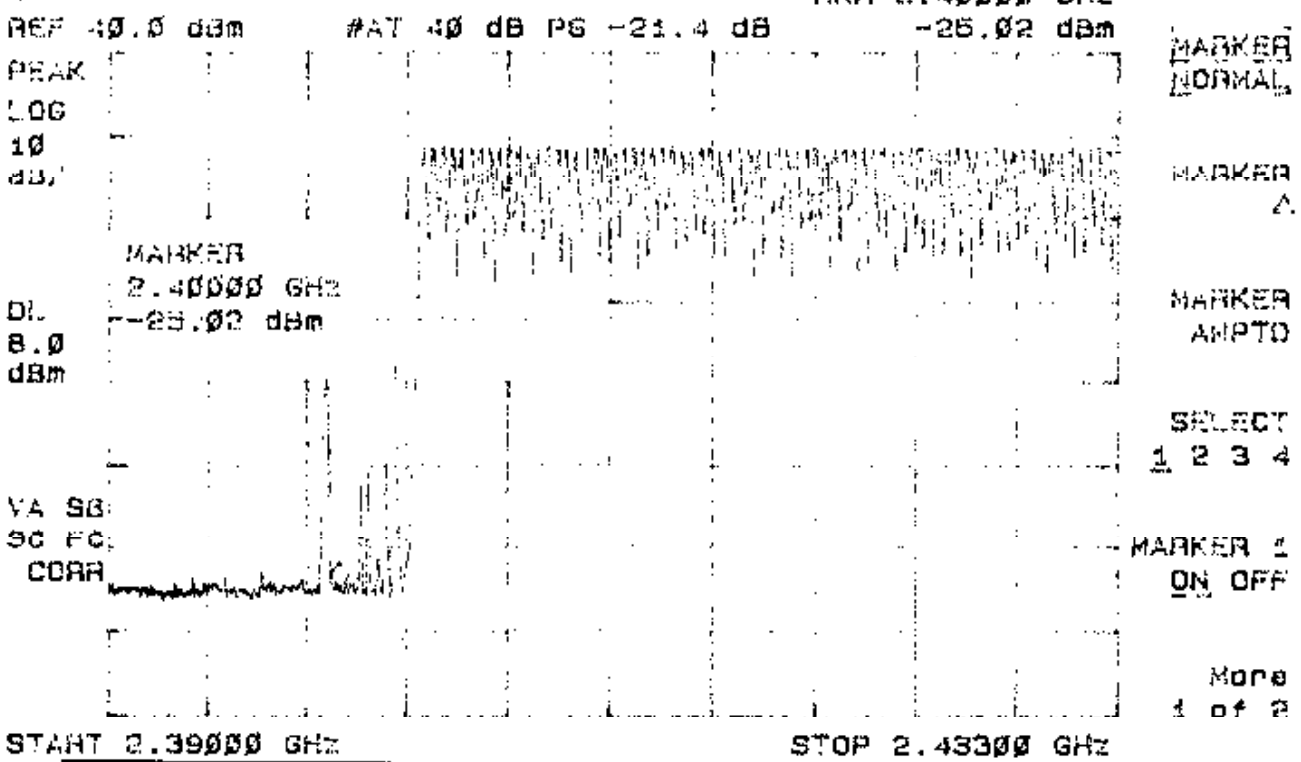

16: 18: 06 JAN 22, 1998
RTN PA HI VCO TS
MKR Δ 343 kHz
REF 36.0 dBm #AT 40 dB PG -21.4 dB
-.10 dB
PEAK
LOG
10
dB/
MARKER Δ
343 kHz
-.10 dB
WA SB
SC FC
CORR
MARKER NORMAL
MARKER Δ
MARKER AMPTD
SELECT 1 2 3 4
MARKER 1 ON OFF
More 1 of 2
CENTER 2.480340 GHz
SPAN 1.000 MHz
SWP 20.0 msec


15: 22: 04 JAN 22, 1998
RTN PA MID VCO T6
MKR Δ 345 kHz
REF 30.0 dBm
#AT 40 dB PG -21.4 dB
-.18 dB
PEAK
LOG
10
dB/
MARKER Δ
345 kHz
-.18 dB
MARKER
NORMAL
MARKER
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
CENTER 2.441943 GHz
SPAN 1.000 MHz
#RES BW 100 kHz
#VBW 100 kHz
SWP 20.0 msec

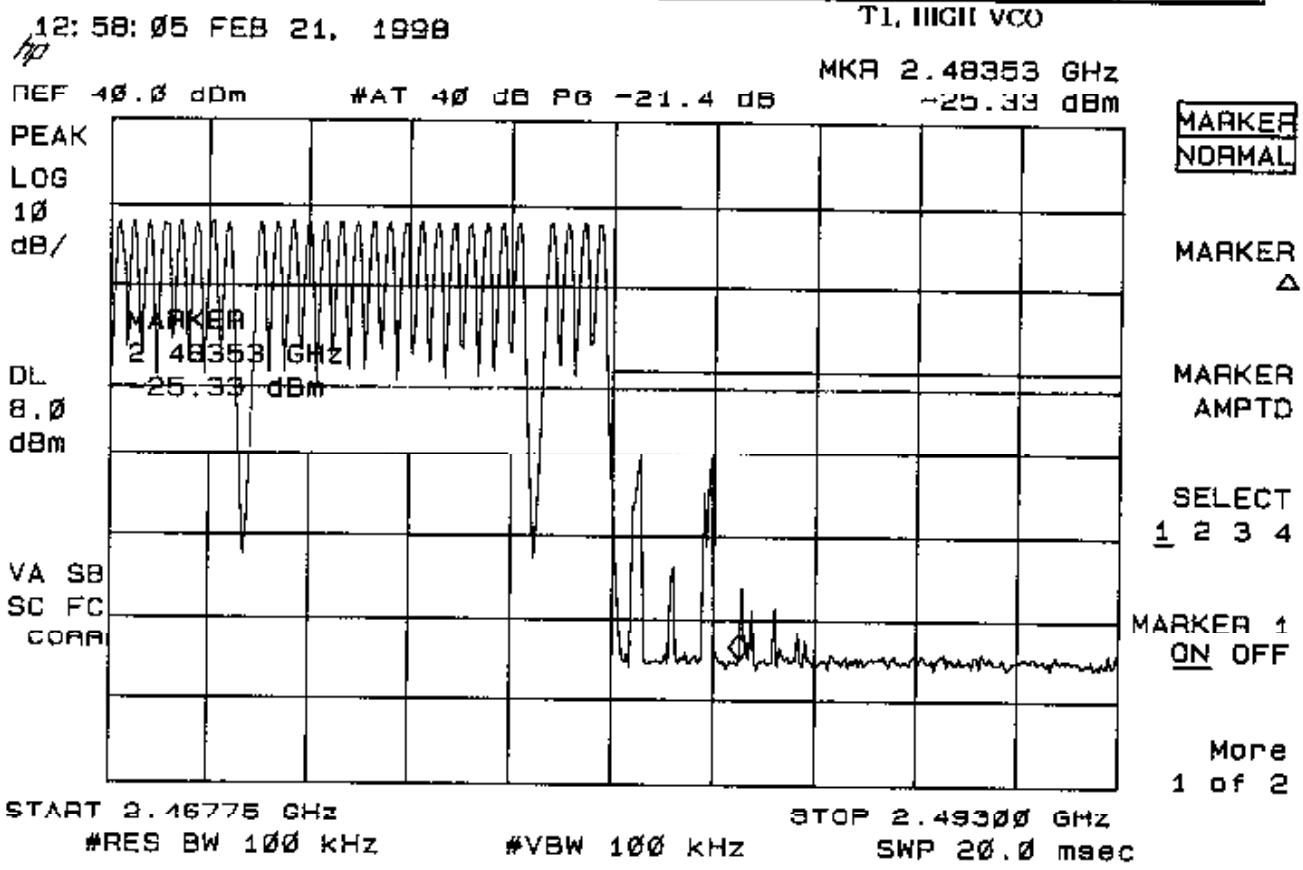

15: 26: 46 JAN 22, 1998
RTN PA LO VCO T6
MKR Δ 340 kHz
REF 37.0 dBm
#AT 40 dB PG -21.4 dB
.12 dB
PEAK
LOG
10
dB/
MARKER Δ
340 kHz
.12 dB
MARKER
NORMAL
MARKER
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
CENTER 2.403843 GHz
SPAN 1.000 MHz
#VBW 100 kHz
SWP 20.0 msec


12: 11: 31 FEB 21, 1998
MKR 2.48353 GHz
REF 40.0 dBm
#AT 40 dB PG -21.4 dB
-24.92 dBm
PEAK
LOG
10
dB/
MARKER
2.48353 GHz
-24.92 dBm
DL
8.0
dBm
VA SB
SC FC
CORR
MARKER
NORMAL
MARKER
Δ
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
START 2.46775 GHz
#RES BW 100 KHz
#VBW 100 KHz
STOP 2.48300 GHz
SWP 20.0 msec

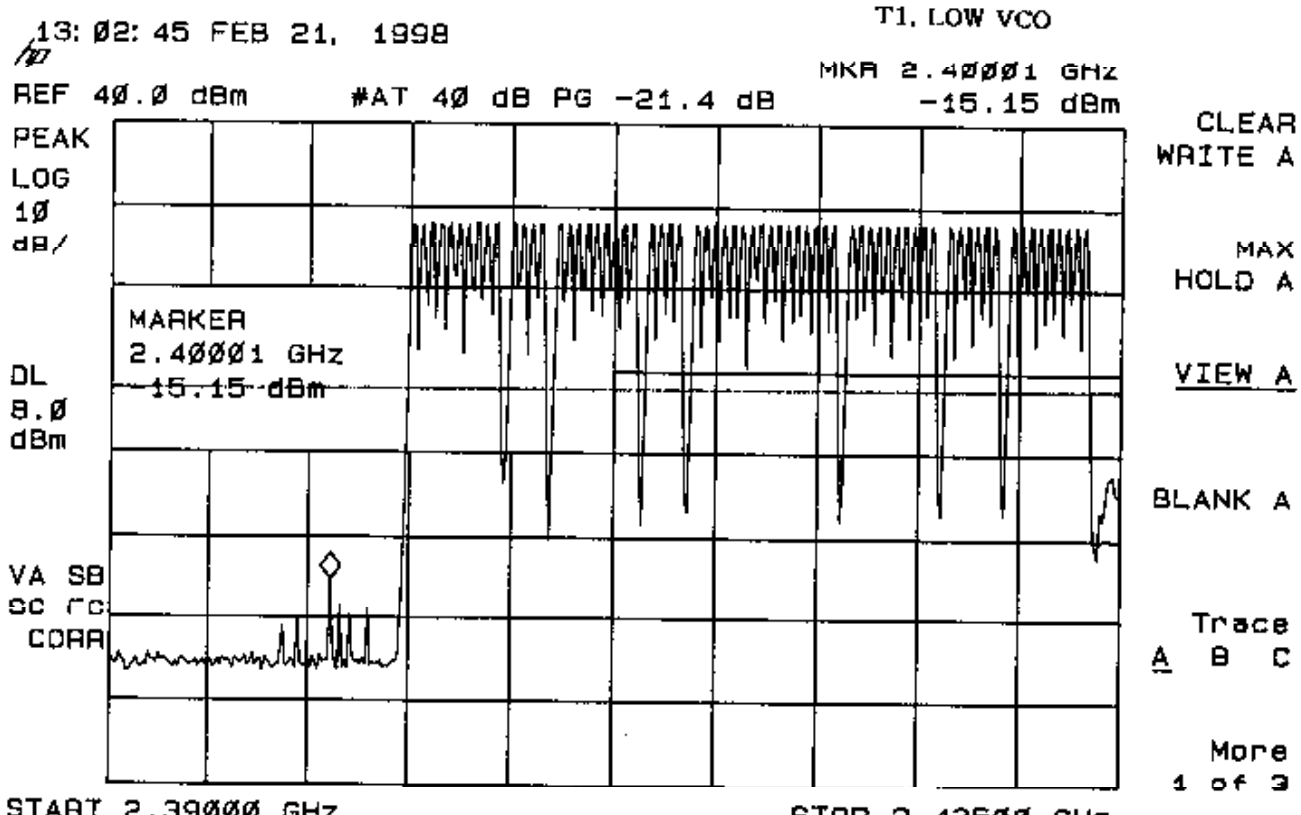
T6,LOW VCO


12: 04: 49 FEB 21, 1998
MKR 2.40000 GHz
REF 40.0 dBm
#AT 40 dB PG -21.4 dB
-25.02 dBm
PEAK
LOG
10
dB/
MARKER
2.40000 GHz
-25.02 dBm
DL
8.0
dBm
VA SB
SC FC
CORR
MARKER
NORMAL
MARKER
Δ
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
START 2.39000 GHz
#RES BW 100 KHz
#VBW 100 KHz
STOP 2.43300 GHz
SWP 20.0 msec

T1, HIGH VCO



T1, LOW VCO



7.2.1 Occupied Bandwidth (Direct Sequence)

As per Section 15.247 (a2) , the following graphs show that the minimum 6dB bandwidth is greater 500 kHz. The bandwidth was measured with the EUT set to low and high band frequencies. The measurement was made with the spectrum analyzer's resolution bandwidth = 100 kHz. The span was set to 2 MHz.

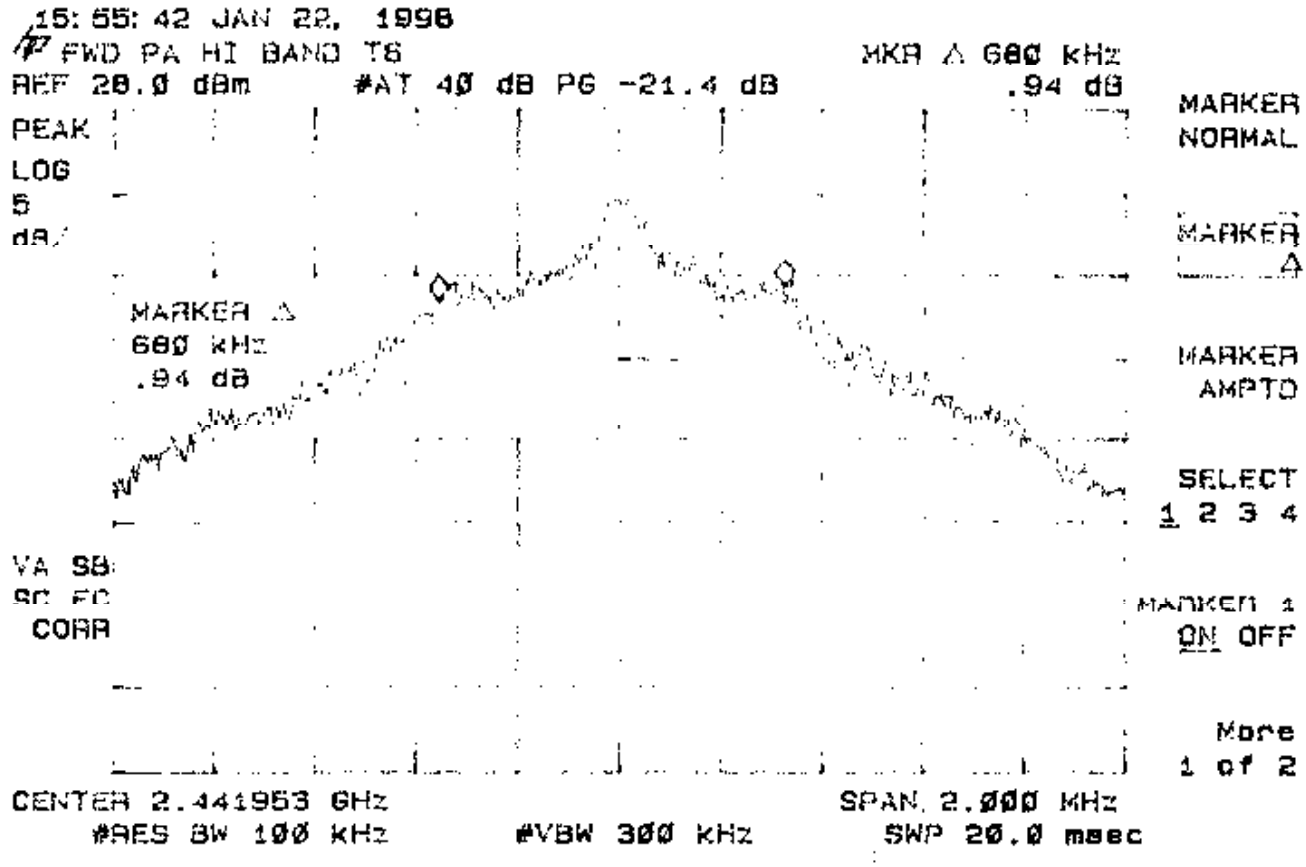
Band	Port	Bandwidth (kHz)
Low	T1	660
High	T1	700
Low	T2	650
High	T2	680
Low	T3	690
High	T3	710
Low	T4	650
High	T4	685
Low	T5	635
High	T5	675
Low	T6	680
High	T6	680

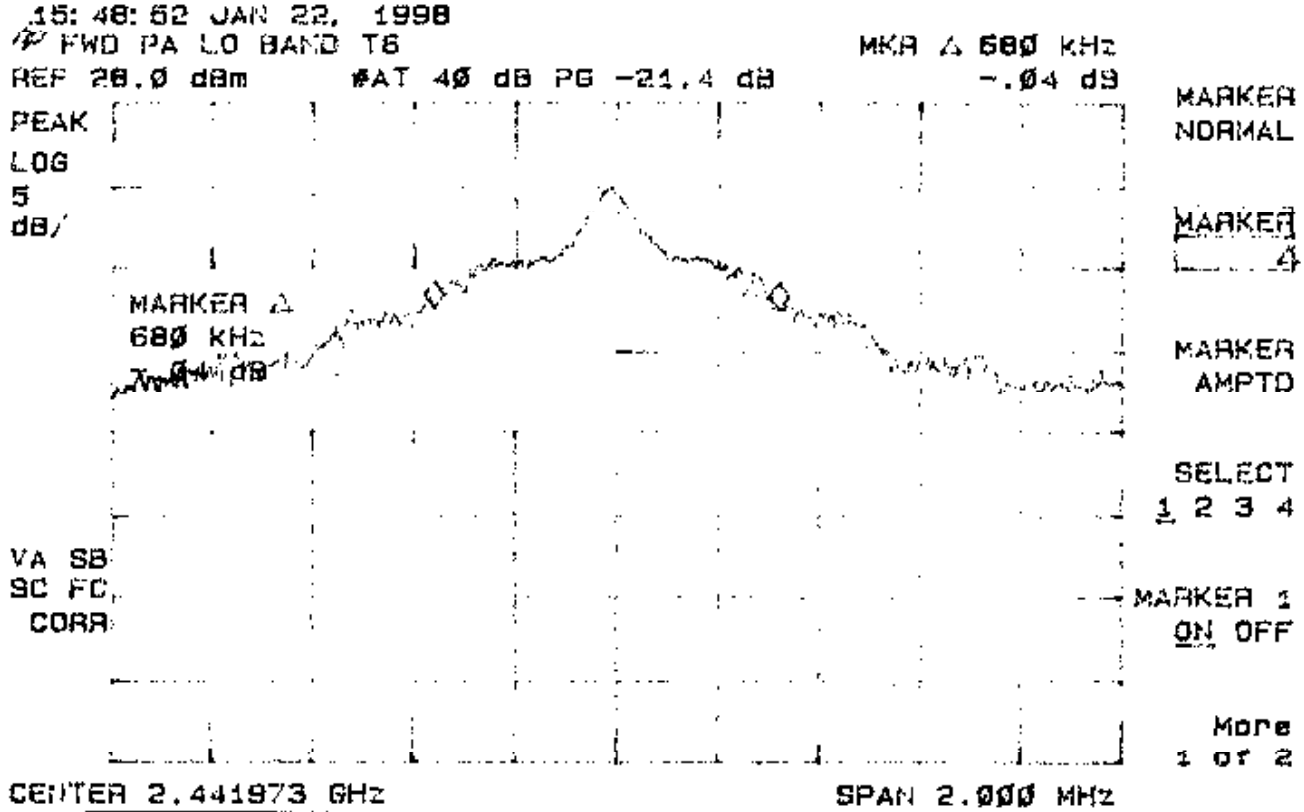
Additional high and low band plots show the direct sequence emission is greater than 20 dB down at the band edges.

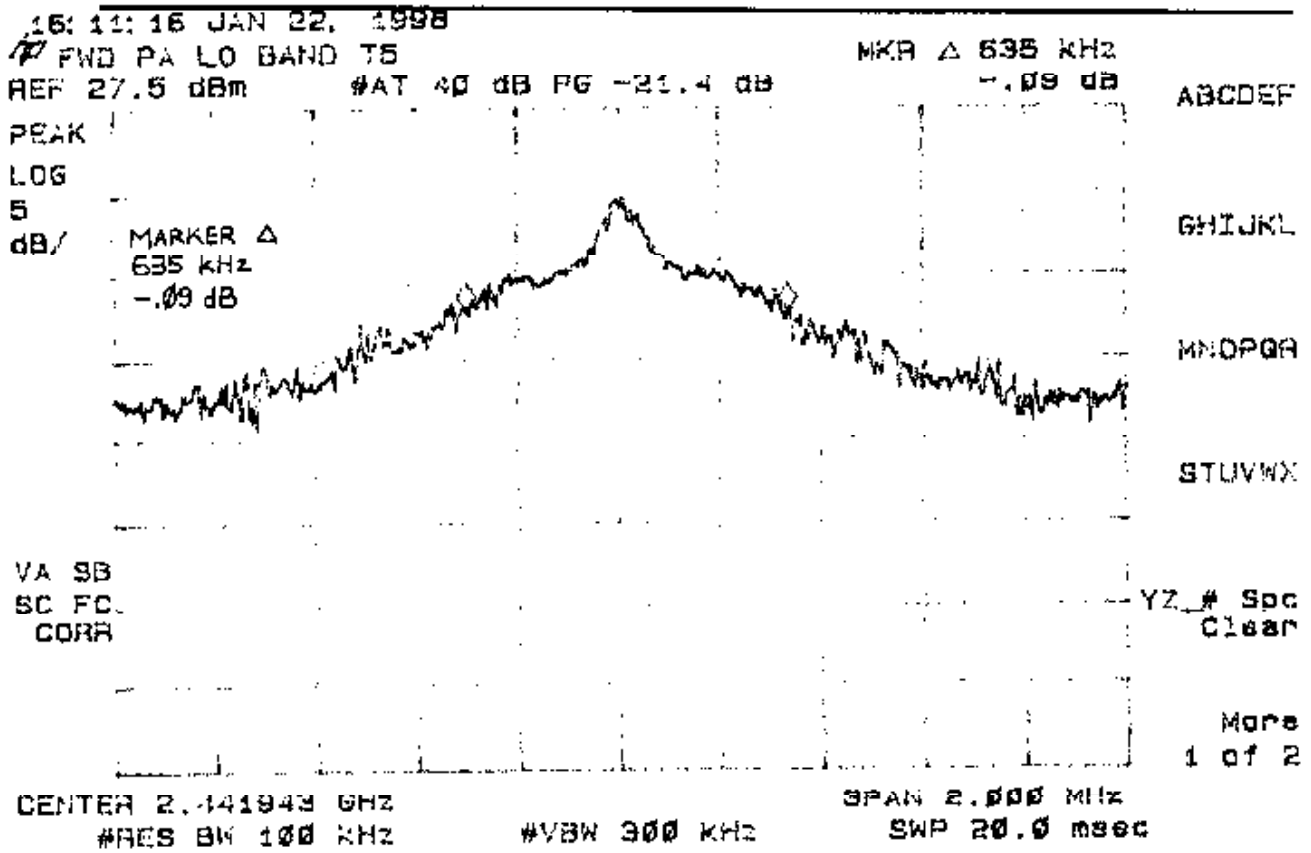
Test Personnel:

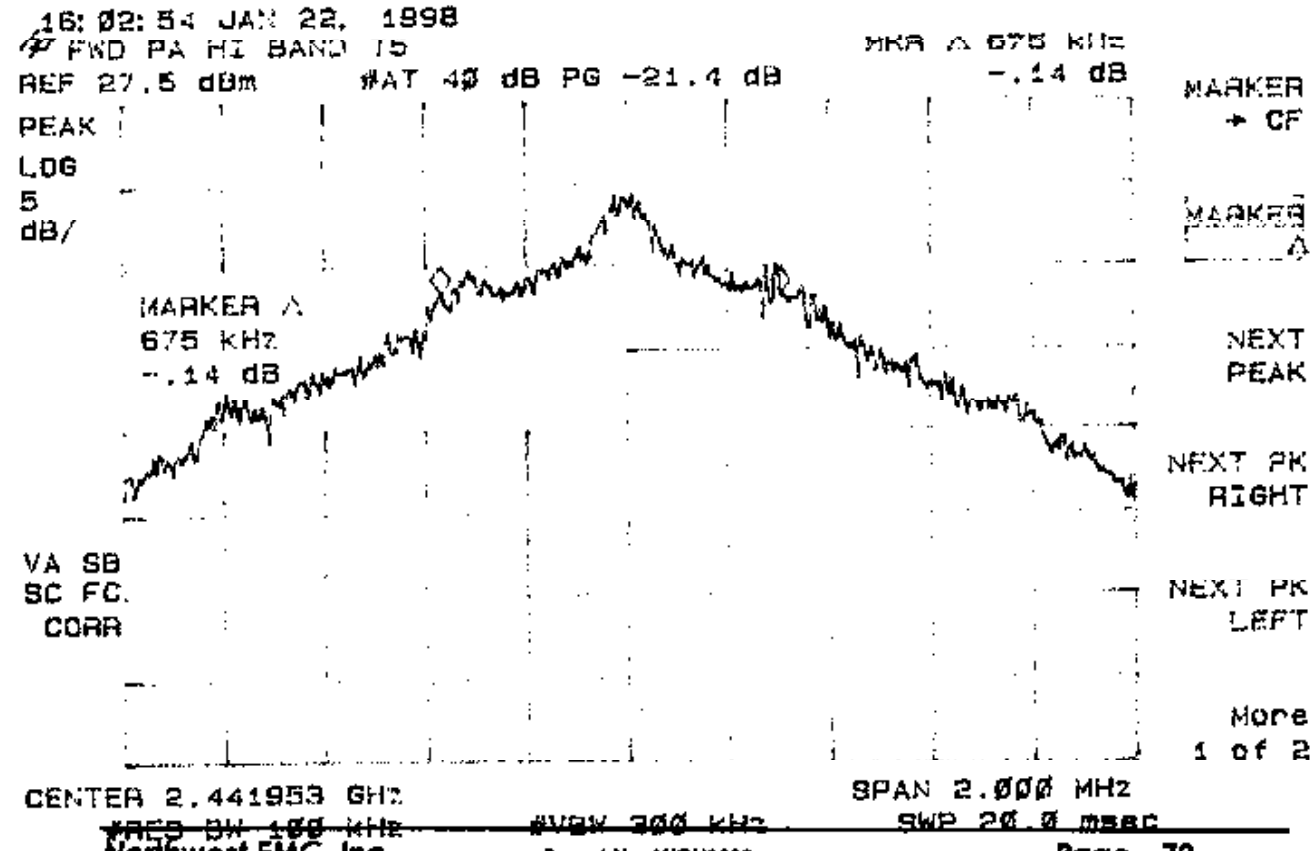
Tester Signature:_____ Date:_____

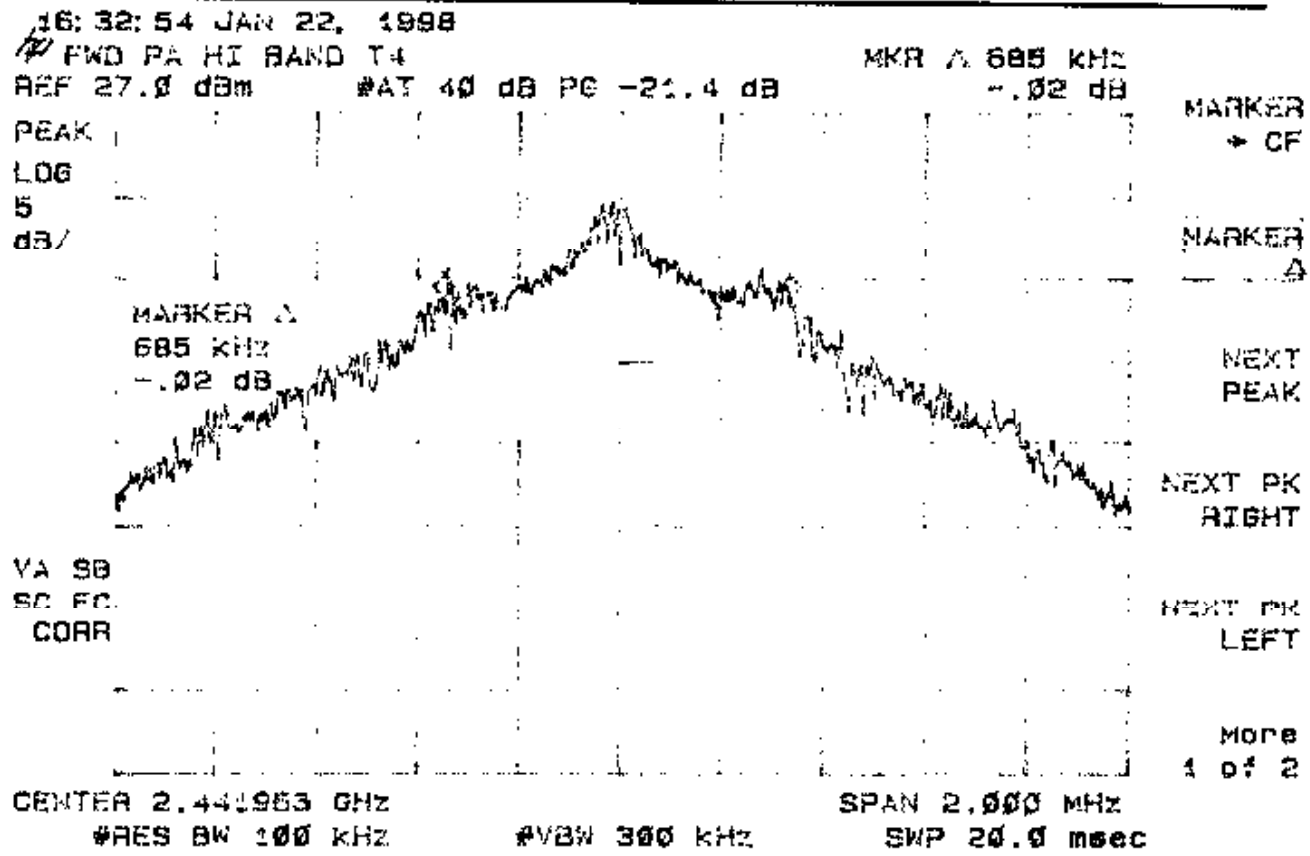
Typed/Printed Name: Dean Ghizzone

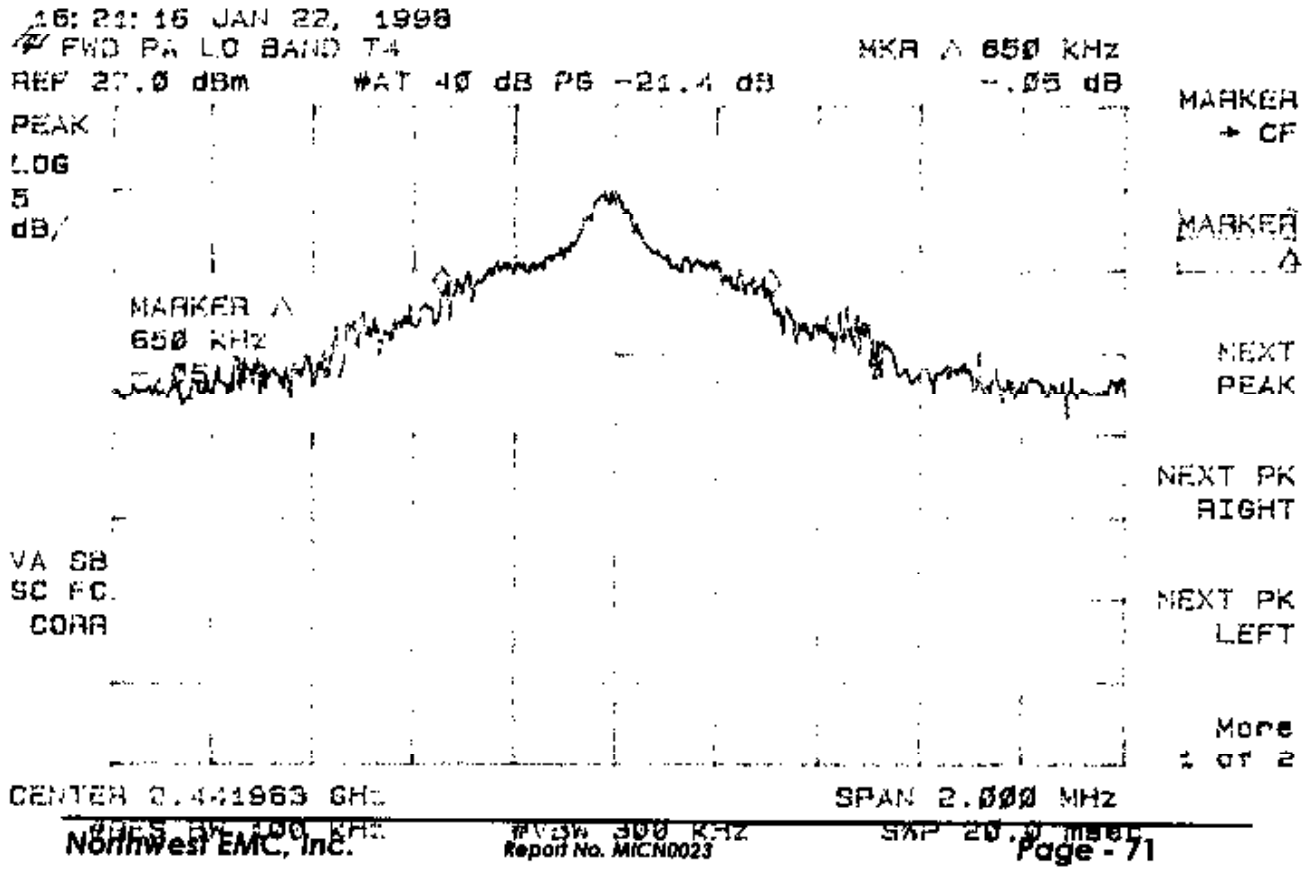

15: 55: 42 JAN 22, 1998
FWD PA HI BAND T6
MKR Δ 680 kHz
REF 28.0 dBm
#AT 40 dB PG -21.4 dB
.94 dB
PEAK
LOG
5
dB/
MARKER Δ
680 kHz
.94 dB
MARKER
NORMAL
MARKER
Δ
MARKER
AMPTD
SELECT
1 2 3 4
VA SB
SC FC
CORR
MARKER 1
ON OFF
More
1 of 2
CENTER 2.441953 GHz
SPAN 2.000 MHz
#RES BW 100 kHz
#VBW 300 kHz
SWP 20.0 msec


15: 48: 52 JAN 22, 1998
FWD PA LO BAND T6
MKR Δ 680 kHz
REF 28.0 dBm
#AT 40 dB PG -21.4 dB
-.04 dB
PEAK
LOG
5
dB/
MARKER Δ
680 kHz
MARKER
NORMAL
MARKER
Δ
MARKER
AMPTD
SELECT
1 2 3 4
VA SB
SC FC
CORR
MARKER 1
ON OFF
More
1 of 2
CENTER 2.441973 GHz
SPAN 2.000 MHz
#VBW 300 kHz
SWP 20.0 msec

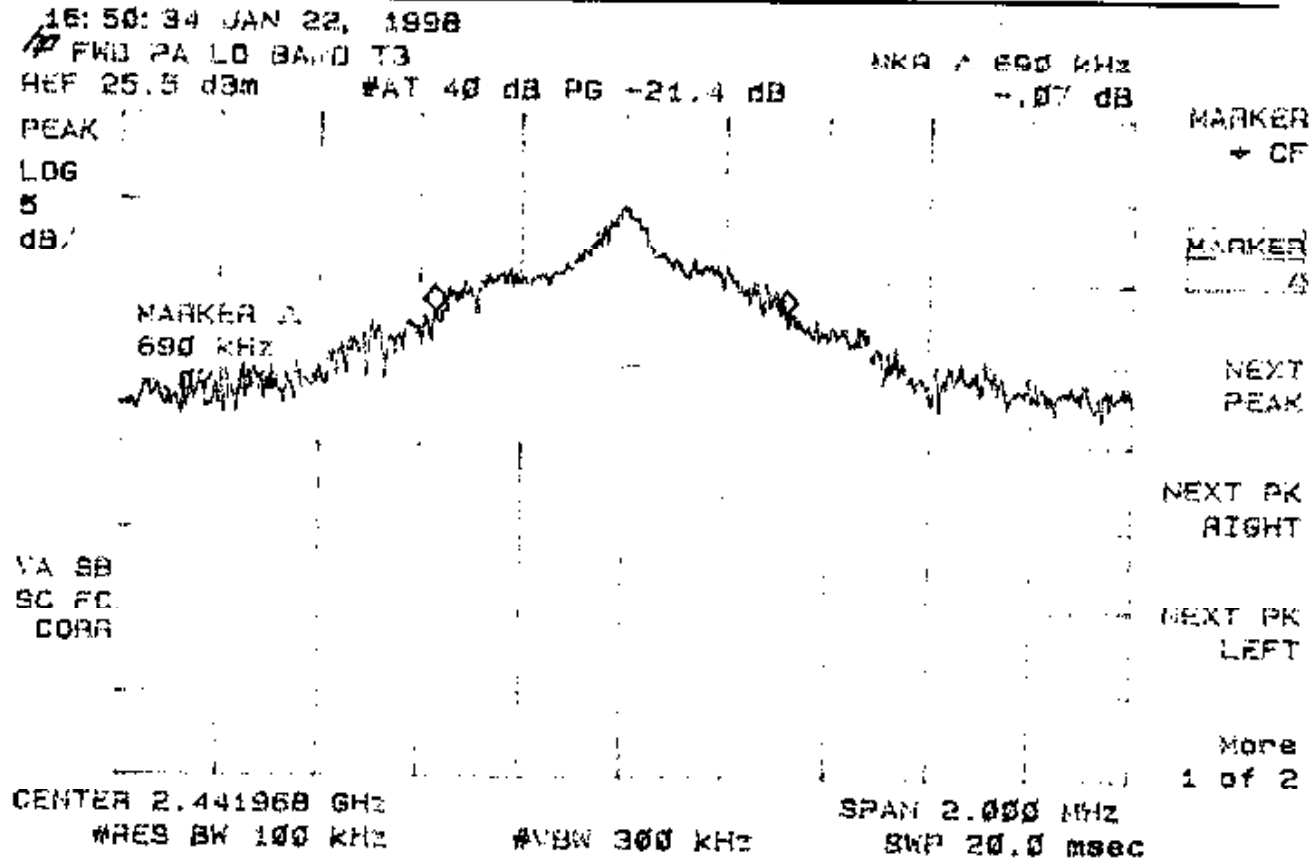

16: 11: 16 JAN 22, 1998
FWD PA LO BAND T5
REF 27.5 dBm
#AT 40 dB PG -21.4 dB
MKR Δ 635 kHz
-.09 dB
PEAK
LOG
5
dB/
MARKER Δ
635 kHz
-.09 dB
ABCDEF
GHIJKL
MNOPQR
STUVWX
VA SB
SC FC
CORR
YZ_# Spc
Clear
More
1 of 2
CENTER 2.441943 GHz
#RES BW 100 kHz
#VBW 300 kHz
SPAN 2.000 MHz
SWP 20.0 msec

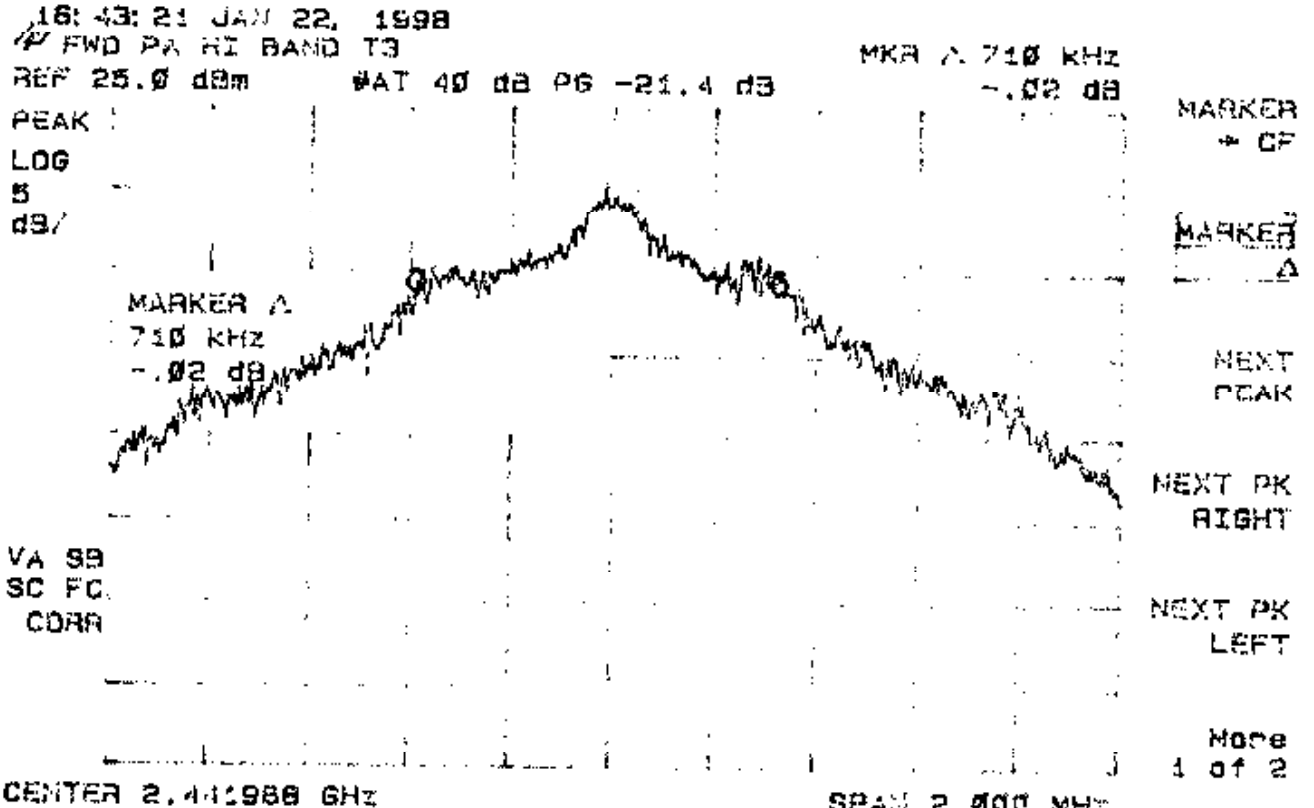

16: 02: 54 JAN 22, 1998
FWD PA HI BAND T5
REF 27.5 dBm
#AT 40 dB PG -21.4 dB
MKR Δ 675 kHz
-.14 dB
PEAK
LOG
5
dB/
MARKER Δ
675 kHz
-.14 dB
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
VA SB
SC FC
CORR
More
1 of 2
CENTER 2.441953 GHz
#RES BW 100 kHz
#VBW 300 kHz
SPAN 2.000 MHz
SWP 20.0 msec

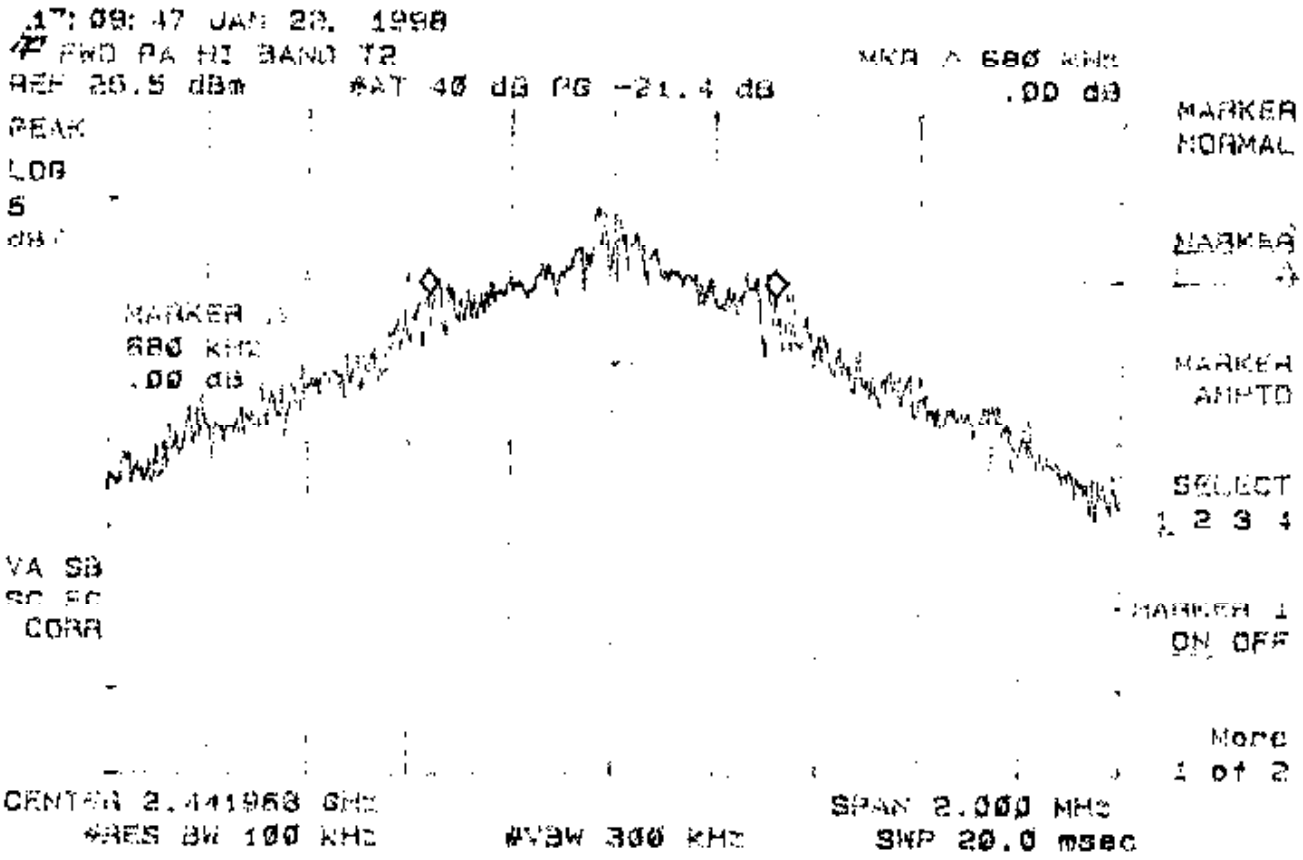

16: 32: 54 JAN 22, 1998
FWD PA HI BAND T4
MKR Δ 685 kHz
REF 27.Ø dBm
#AT 4Ø dB PG -21.4 dB
-.Ø2 dB
PEAK
LOG
5
dB/
MARKER
→ CF
MARKER
Δ
MARKER Δ
685 kHz
-.Ø2 dB
NEXT
PEAK
NEXT PK
RIGHT
VA SB
SC FC
CORR
NEXT PK
LEFT
More
1 of 2
CENTER 2.441953 GHz
SPAN 2.ØØØ MHz
#RES BW 1ØØ kHz
#VBW 3ØØ kHz
SWP 2Ø.Ø msec

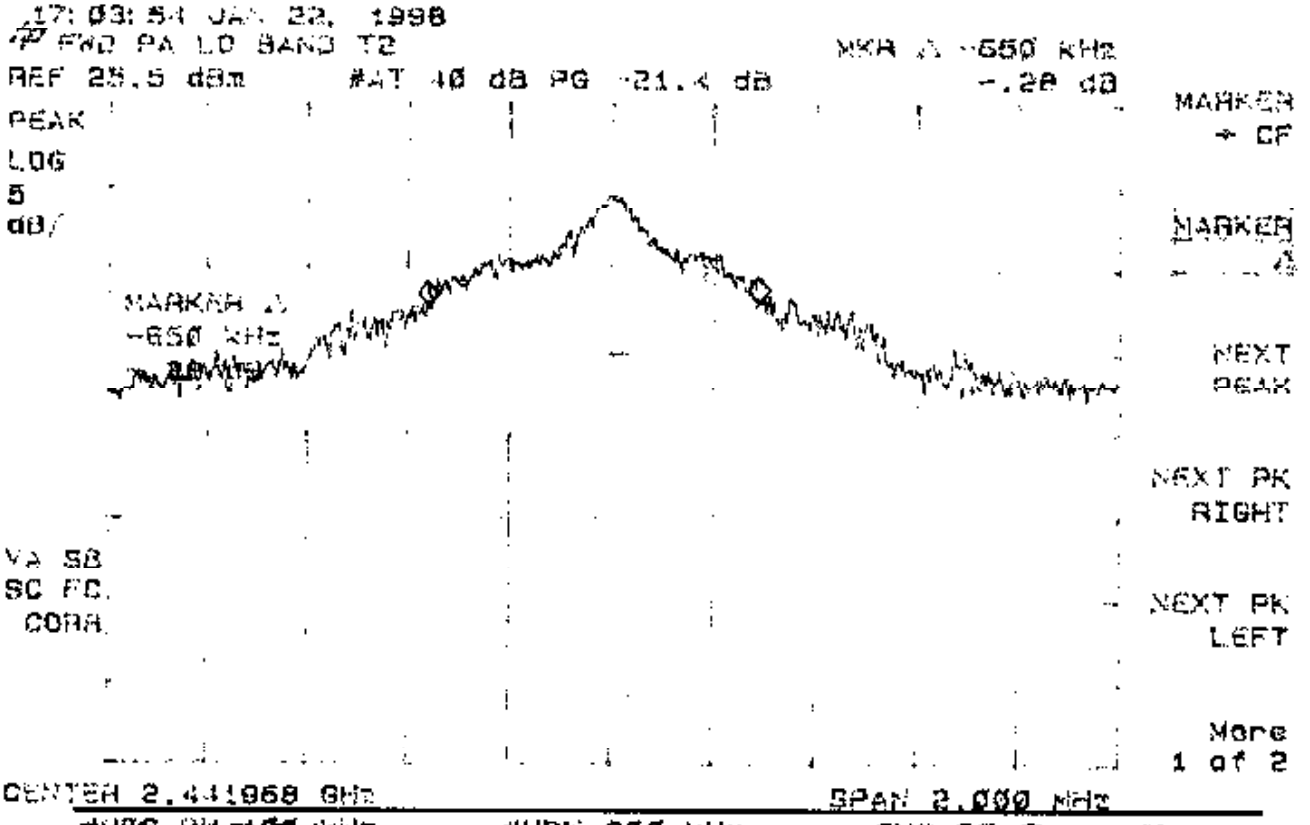

16: 21: 16 JAN 22, 1998
FWD PA LO BAND T4
MKR Δ 65Ø kHz
REF 27.Ø dBm
#AT 4Ø dB PG -21.4 dB
-.Ø5 dB
PEAK
LOG
5
dB/
MARKER
→ CF
MARKER
Δ
MARKER Δ
65Ø kHz
NEXT
PEAK
NEXT PK
RIGHT
VA SB
SC FC
CORR
NEXT PK
LEFT
More
1 of 2
CENTER 2.441963 GHz
SPAN 2.ØØØ MHz
#RES BW 1ØØ kHz
#VBW 3ØØ kHz
SWP 2Ø.Ø msec

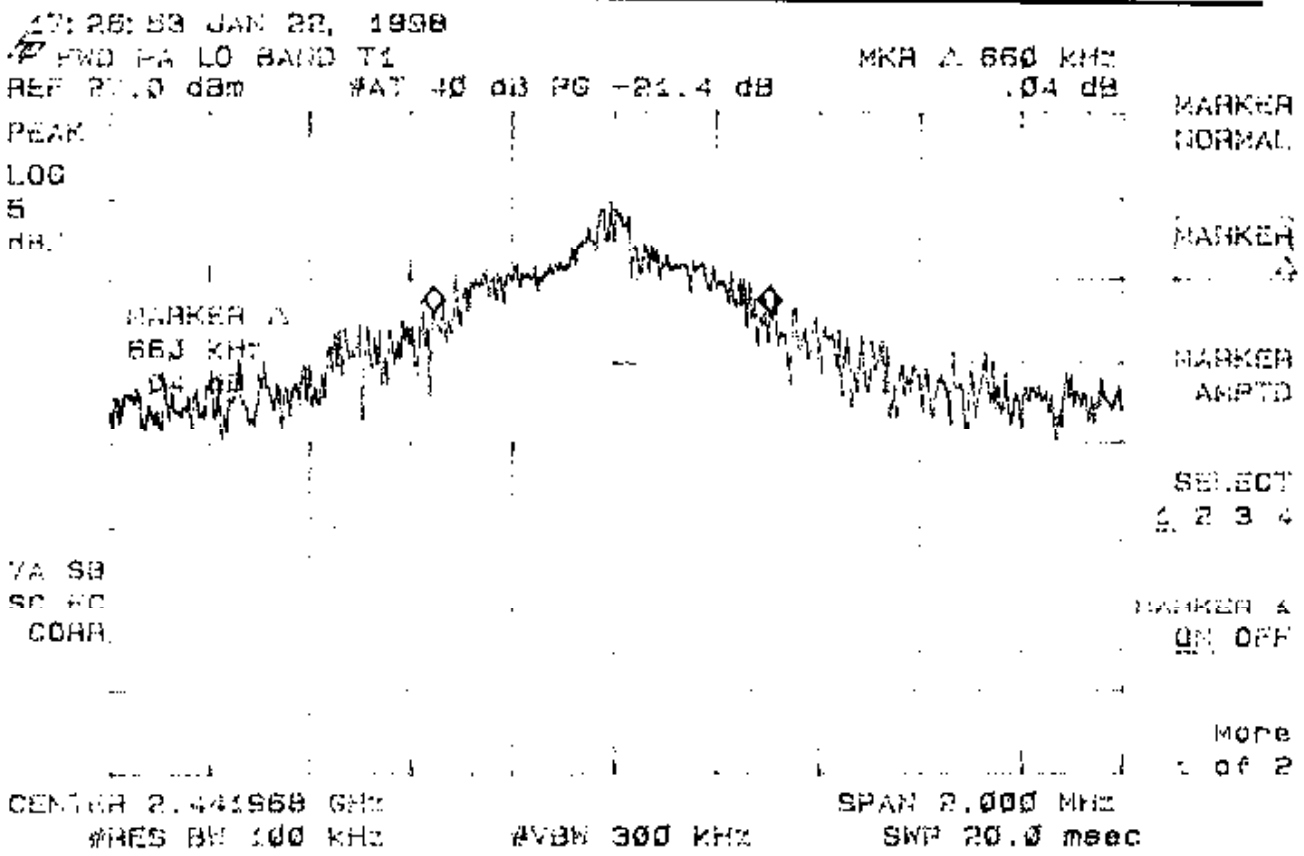
3

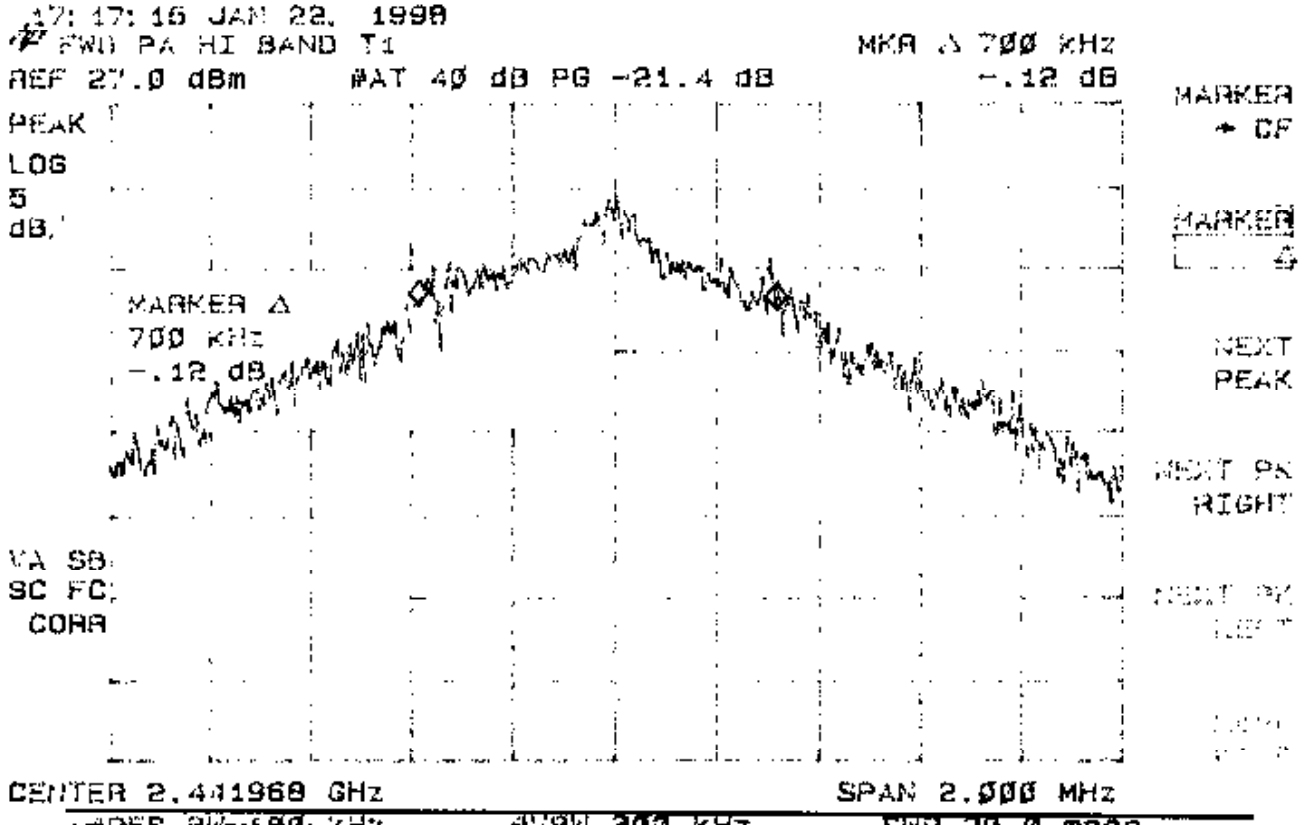

16:50:34 JAN 22, 1998
FWD PA LO BAND T3
REF 25.5 dBm
#AT 40 dB PG -21.4 dB
MKR Δ 690 kHz
-.07 dB
PEAK
LOG
5
dB/
MARKER Δ
690 kHz
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
VA SB
SC FC
CORR
CENTER 2.441968 GHz
#RES BW 100 kHz
#VBW 300 kHz
SPAN 2.000 MHz
SWP 20.0 msec

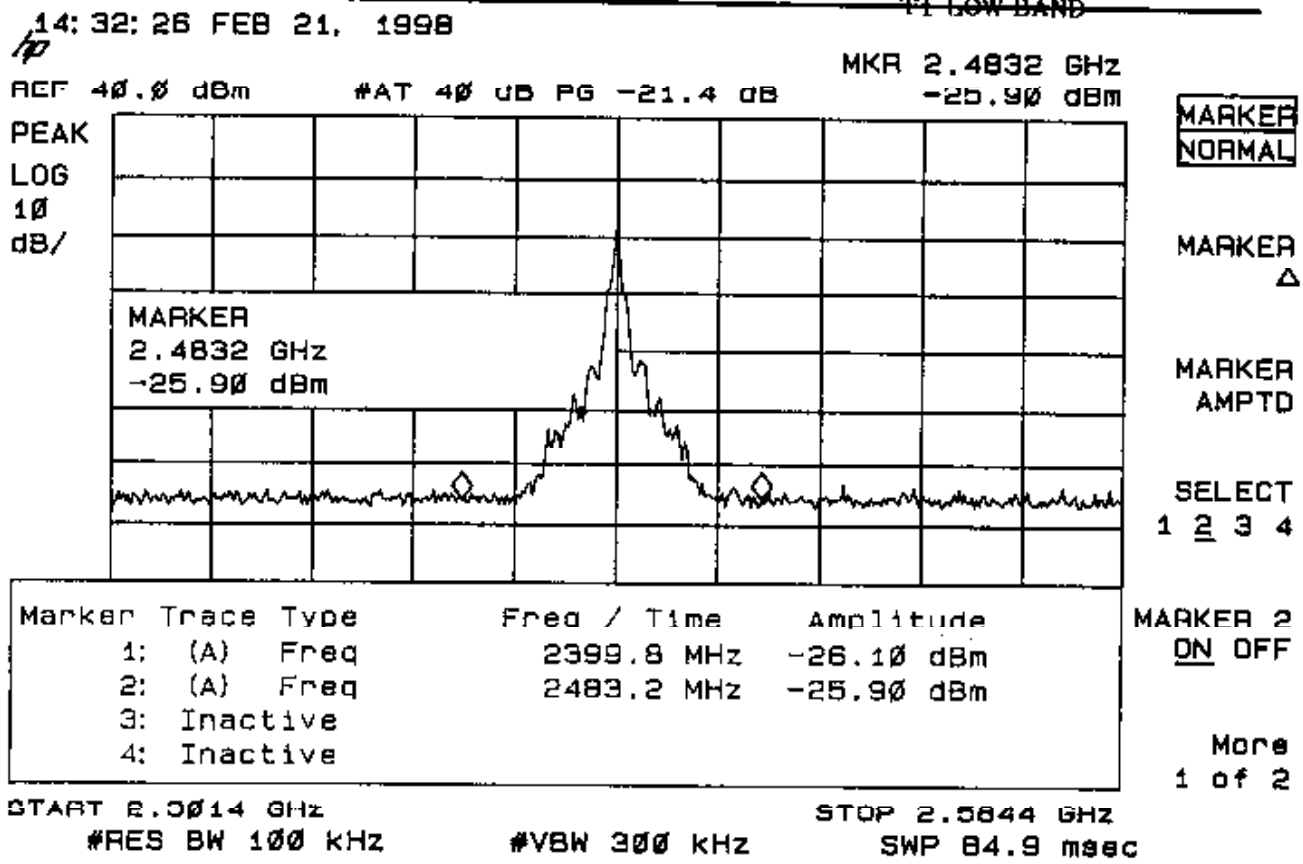

16:43:21 JAN 22, 1998
FWD PA HI BAND T3
REF 25.0 dBm
#AT 40 dB PG -21.4 dB
MKR Δ 710 kHz
-.02 dB
PEAK
LOG
5
dB/
MARKER Δ
710 kHz
-.02 dB
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
VA SB
SC FC
CORR
CENTER 2.441988 GHz
#RES BW 100 kHz
#VBW 300 kHz
SPAN 2.000 MHz
SWP 20.0 msec


17: 09: 47 JAN 22, 1998
FWD PA HI BAND T2
MKR Δ 680 KHz
REF 25.5 dBm
#AT 40 dB PG -21.4 dB
.00 dB
PEAK
LOG
5
dB/
MARKER
NORMAL
MARKER Δ
680 KHz
.00 dB
MARKER
AMPTD
SELECT
1 2 3 4
VA SB
SC FC
CORR
MARKER 1
ON OFF
More
1 of 2
CENTER 2.441968 GHz
SPAN 2.000 MHz
#RES BW 100 KHz
#VBW 300 KHz
SWP 20.0 msec

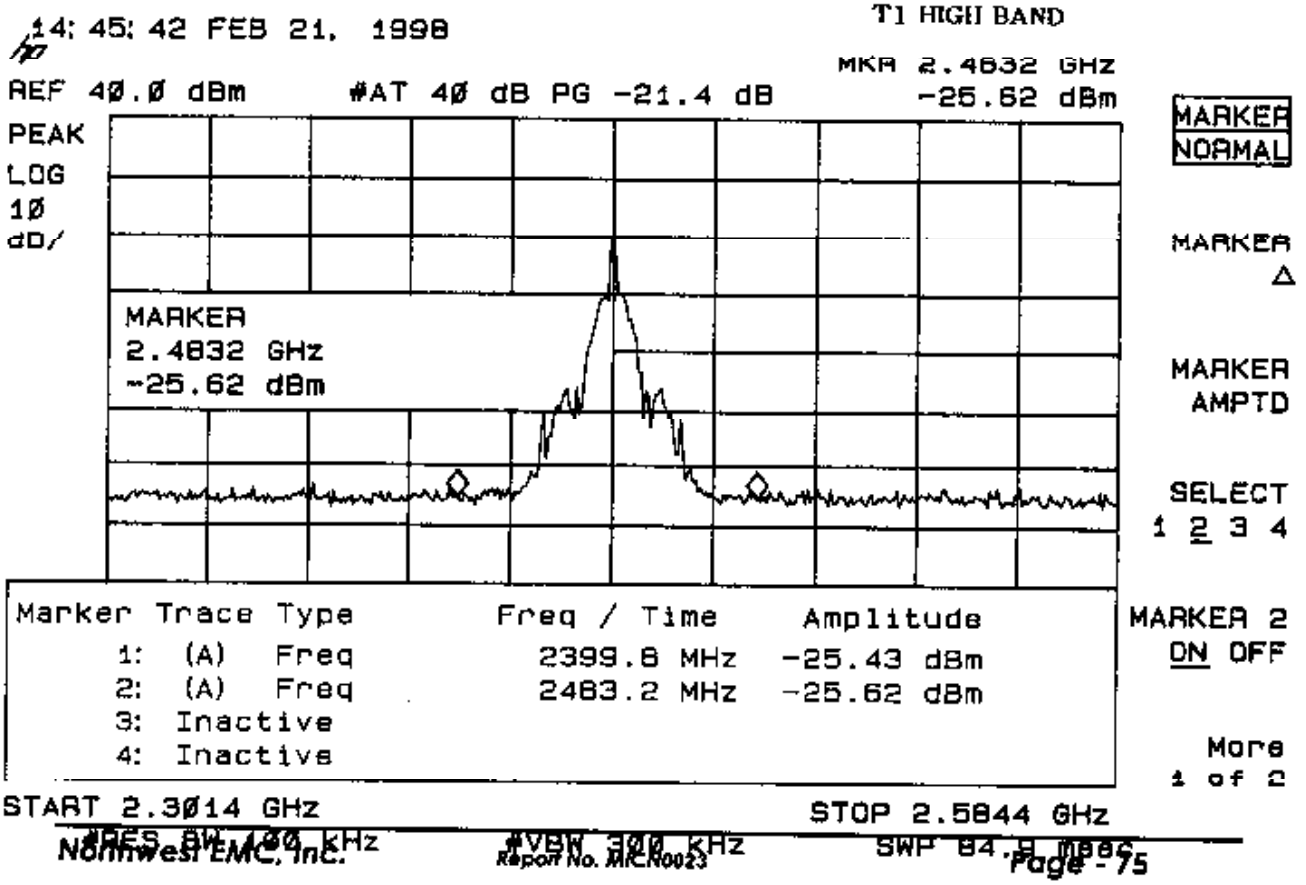

17: 03: 54 JAN 22, 1998
FWD PA LO BAND T2
MKR Δ -650 KHz
REF 25.5 dBm
#AT 40 dB PG -21.4 dB
-.20 dB
PEAK
LOG
5
dB/
MARKER
→ CF
MARKER Δ
-650 KHz
NEXT
PEAK
NEXT PK
RIGHT
VA SB
SC FC
CORR
NEXT PK
LEFT
More
1 of 2
CENTER 2.441968 GHz
SPAN 2.000 MHz
#RES BW 100 KHz
#VBW 300 KHz
SWP 20.0 msec

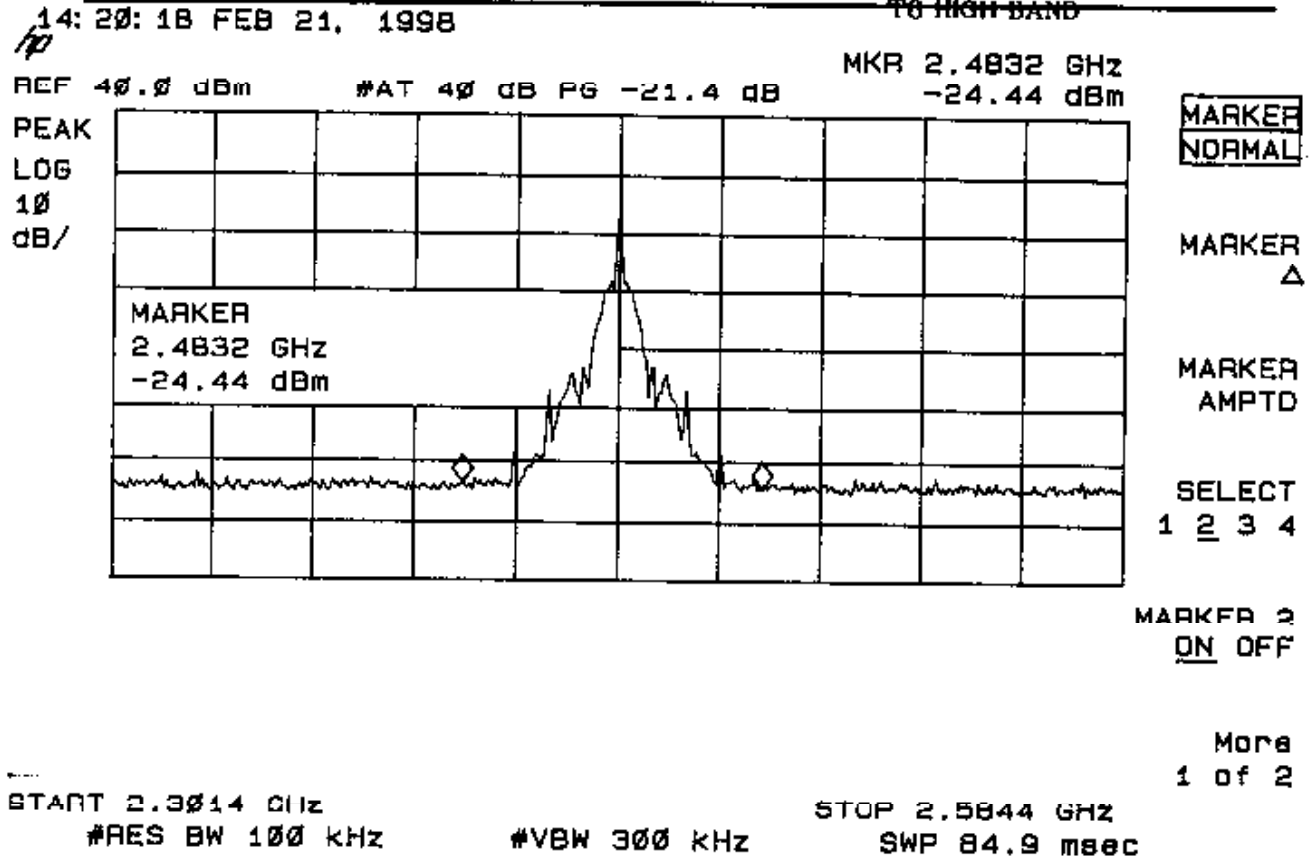

17:26:53 JAN 22, 1998
FWD PA LO BAND T1
MKR Δ 660 KHz
REF 27.0 dBm
#AT 40 dB PG -21.4 dB
.04 dB
PEAK
LOG
5
dB/
MARKER Δ
660 KHz
MARKER
NORMAL
MARKER
MARKER
AMPTD
SELECT
1 2 3 4
VA SB
SC FC
CORR
MARKER Δ
ON OFF
More
1 of 2
CENTER 2.441968 GHz
SPAN 2.000 MHz
#RES BW 100 KHz
#VBW 300 KHz
SWP 20.0 msec


17:17:15 JAN 22, 1998
FWD PA HI BAND T1
MKR Δ 700 KHz
REF 27.0 dBm
#AT 40 dB PG -21.4 dB
-.12 dB
PEAK
LOG
5
dB/
MARKER Δ
700 KHz
-.12 dB
MARKER
→ CF
MARKER
NEXT
PEAK
NEXT PK
RIGHT
VA SB
SC FC
CORR
CENTER 2.441968 GHz
SPAN 2.000 MHz
#RES BW 100 KHz
#VBW 300 KHz
SWP 20.0 msec

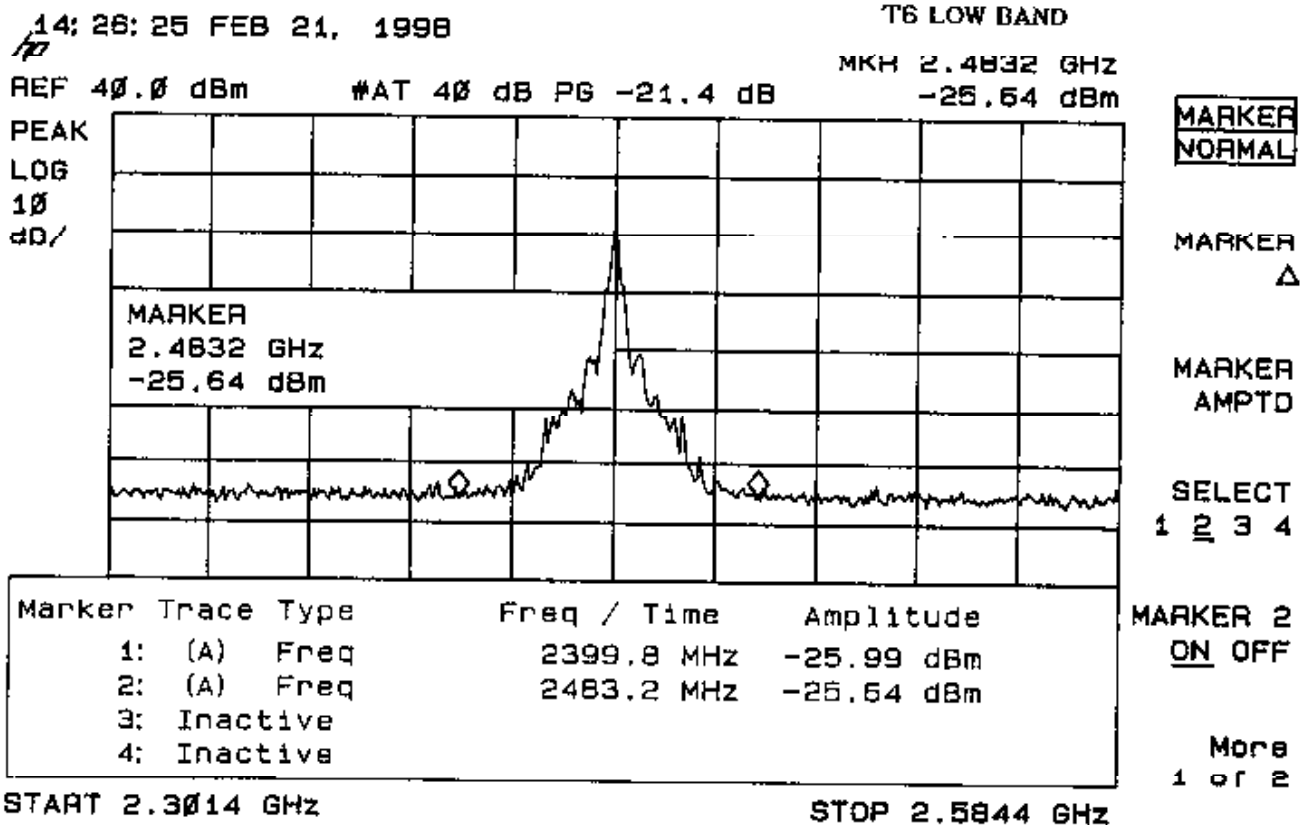

14: 32: 26 FEB 21, 1998
MKR 2.4832 GHz
REF 40.0 dBm
#AT 40 dB PG -21.4 dB
-25.90 dBm
PEAK
LOG
10
dB/
MARKER
NORMAL
MARKER
Δ
MARKER
2.4832 GHz
-25.90 dBm
MARKER
AMPTD
SELECT
1 2 3 4
Marker Trace Type
Freq / Time
Amplitude
1: (A) Freq
2399.8 MHz
-26.10 dBm
2: (A) Freq
2483.2 MHz
-25.90 dBm
3: Inactive
4: Inactive
MARKER 2
ON OFF
More
1 of 2
START 2.3014 GHz
STOP 2.5844 GHz
#RES BW 100 kHz
#VBW 300 kHz
SWP 84.9 msec

T1 HIGH BAND


14: 45: 42 FEB 21, 1998
MKR 2.4832 GHz
REF 40.0 dBm
#AT 40 dB PG -21.4 dB
-25.62 dBm
PEAK
LOG
10
dB/
MARKER
NORMAL
MARKER
Δ
MARKER
2.4832 GHz
-25.62 dBm
MARKER
AMPTD
SELECT
1 2 3 4
Marker Trace Type
Freq / Time
Amplitude
1: (A) Freq
2399.8 MHz
-25.43 dBm
2: (A) Freq
2483.2 MHz
-25.62 dBm
3: Inactive
4: Inactive
MARKER 2
ON OFF
More
1 of 2
START 2.3014 GHz
STOP 2.5844 GHz
#RES BW 100 kHz
#VBW 300 kHz
SWP 84.9 msec


14: 20: 18 FEB 21, 1998
MKR 2.4832 GHz
REF 40.0 dBm
#AT 40 dB PG -21.4 dB
-24.44 dBm
PEAK
LOG
10
dB/
MARKER
NORMAL
MARKER
Δ
MARKER
2.4832 GHz
-24.44 dBm
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 2
ON OFF
More
1 of 2
START 2.3014 GHz
#RES BW 100 kHz
#VBW 300 kHz
STOP 2.5844 GHz
SWP 84.9 msec

T6 LOW BAND


14: 26: 25 FEB 21, 1998
MKR 2.4832 GHz
REF 40.0 dBm
#AT 40 dB PG -21.4 dB
-25.64 dBm
PEAK
LOG
10
dB/
MARKER
NORMAL
MARKER
Δ
MARKER
2.4832 GHz
-25.64 dBm
MARKER
AMPTD
SELECT
1 2 3 4
Marker Trace Type
Freq / Time
Amplitude
1: (A) Freq
2399.8 MHz
-25.99 dBm
2: (A) Freq
2483.2 MHz
-25.64 dBm
3: Inactive
4: Inactive
MARKER 2
ON OFF
More
1 of 2
START 2.3014 GHz
#RES BW 100 kHz
#VBW 300 kHz
STOP 2.5844 GHz
SWP 84.9 msec

7.3 Power Output

As per Section 15.247 (b), the following graphs show that the maximum peak output power of the EUT does not exceed 1 watt. The output power was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the antenna port of the EUT and the spectrum analyzer. The resolution bandwidth was set to 1 MHz. The data below also includes the cable loss of 1.4 dB and a 20 dB attenuator.

Data is included for all available EUT operations:
1. Return link (Rtn PA) High, Mid, and Low Bands
2. Forward link (Fwd PA) High, Mid and Low Bands

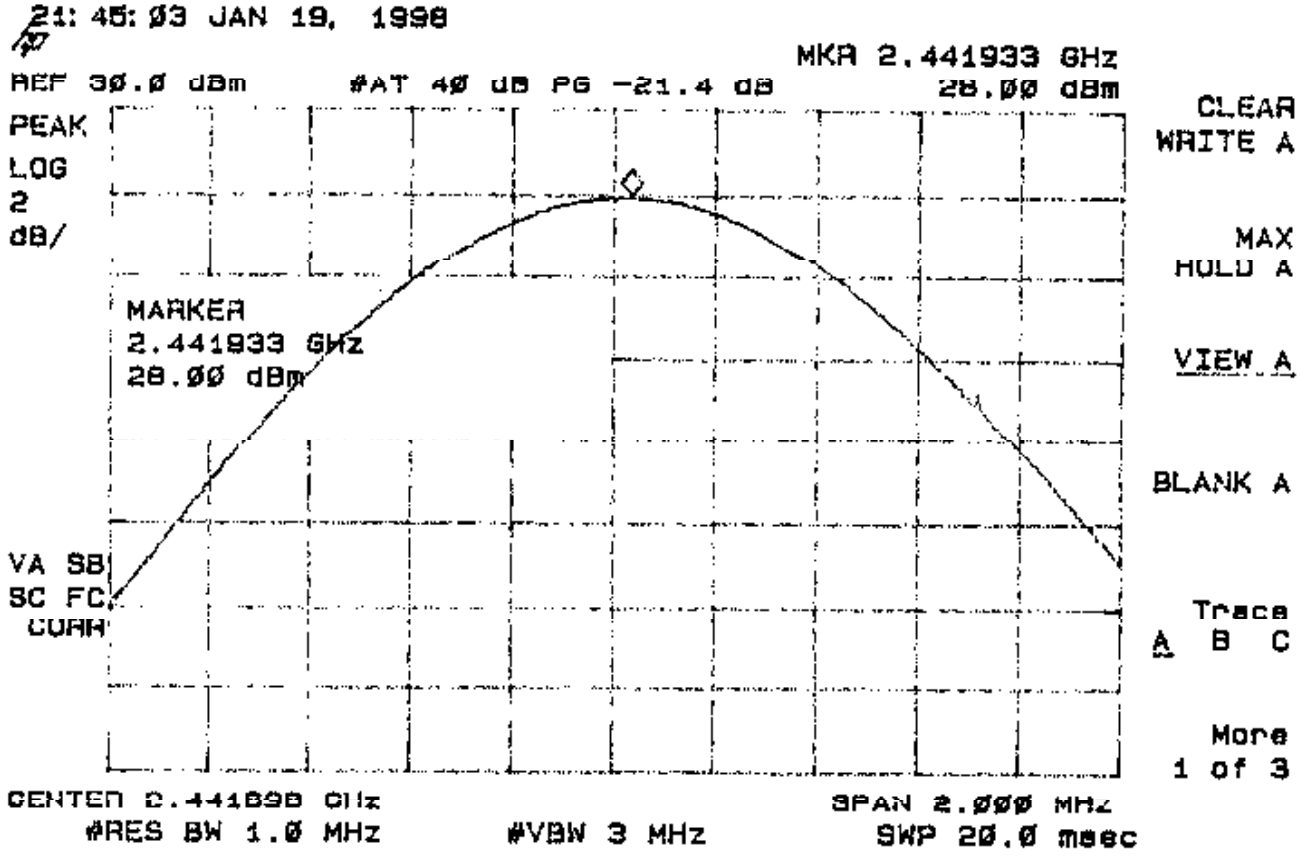
Only minimum readings are summarized below:

Frequency(GHz)	Transmit Port	Power Output(dBm)
2.403	T1	28.01
2.480	T2	27.47
2.480	T3	27.21
2.480	T4	27.94
2.480	T5	27.98
2.480	T6	28.10

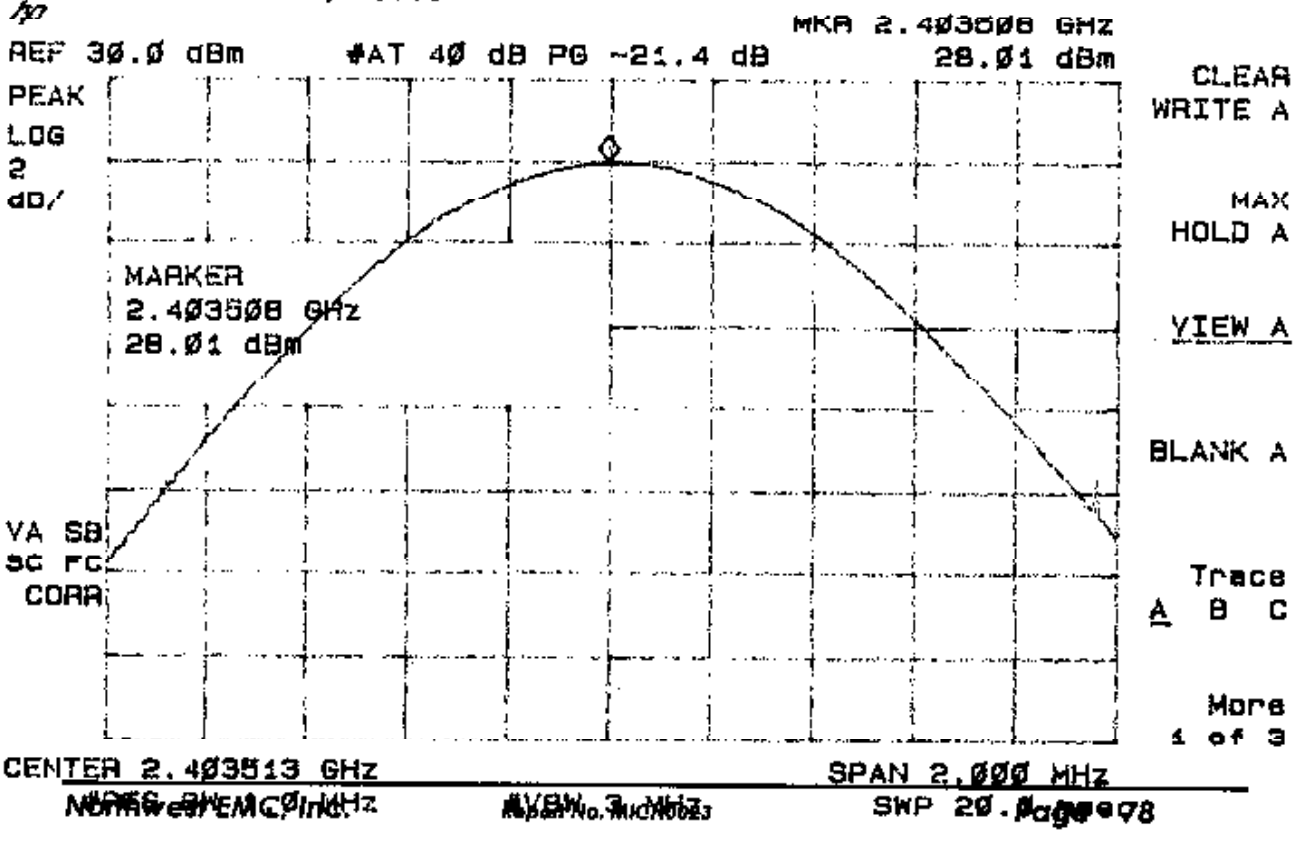
Test Personnel:

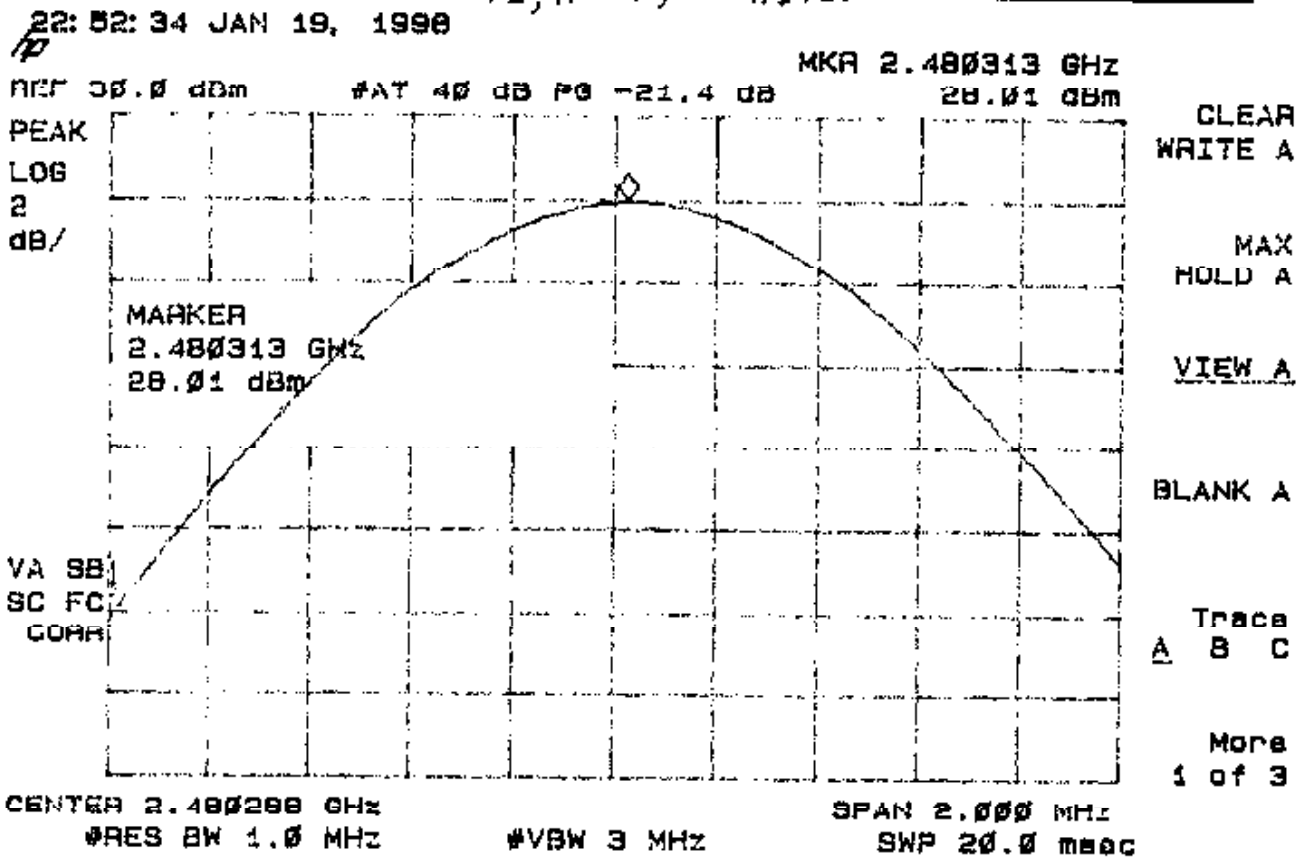
Tester Signature: _____ Date: 3/6/98

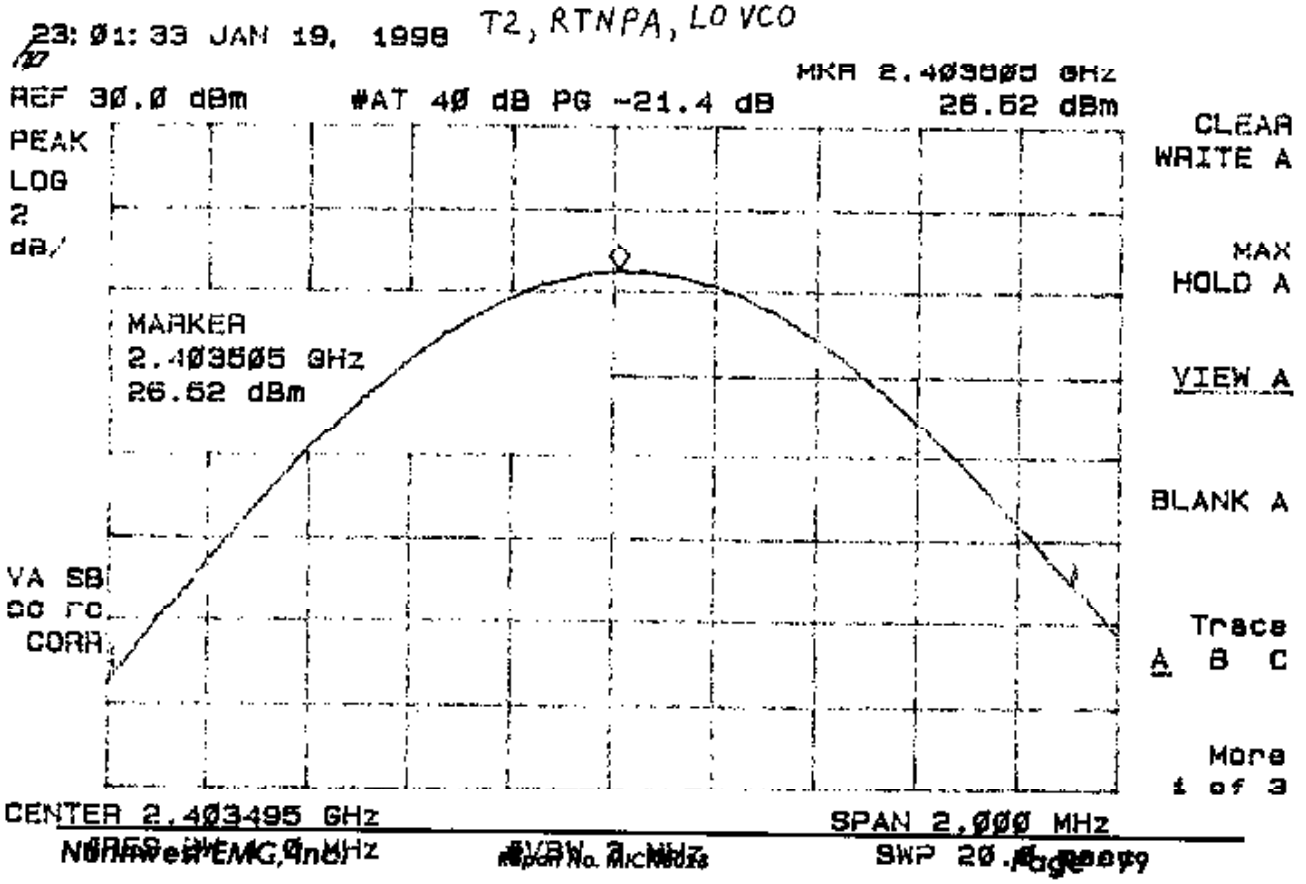
Typed/Printed Name: Dean Ghizzone



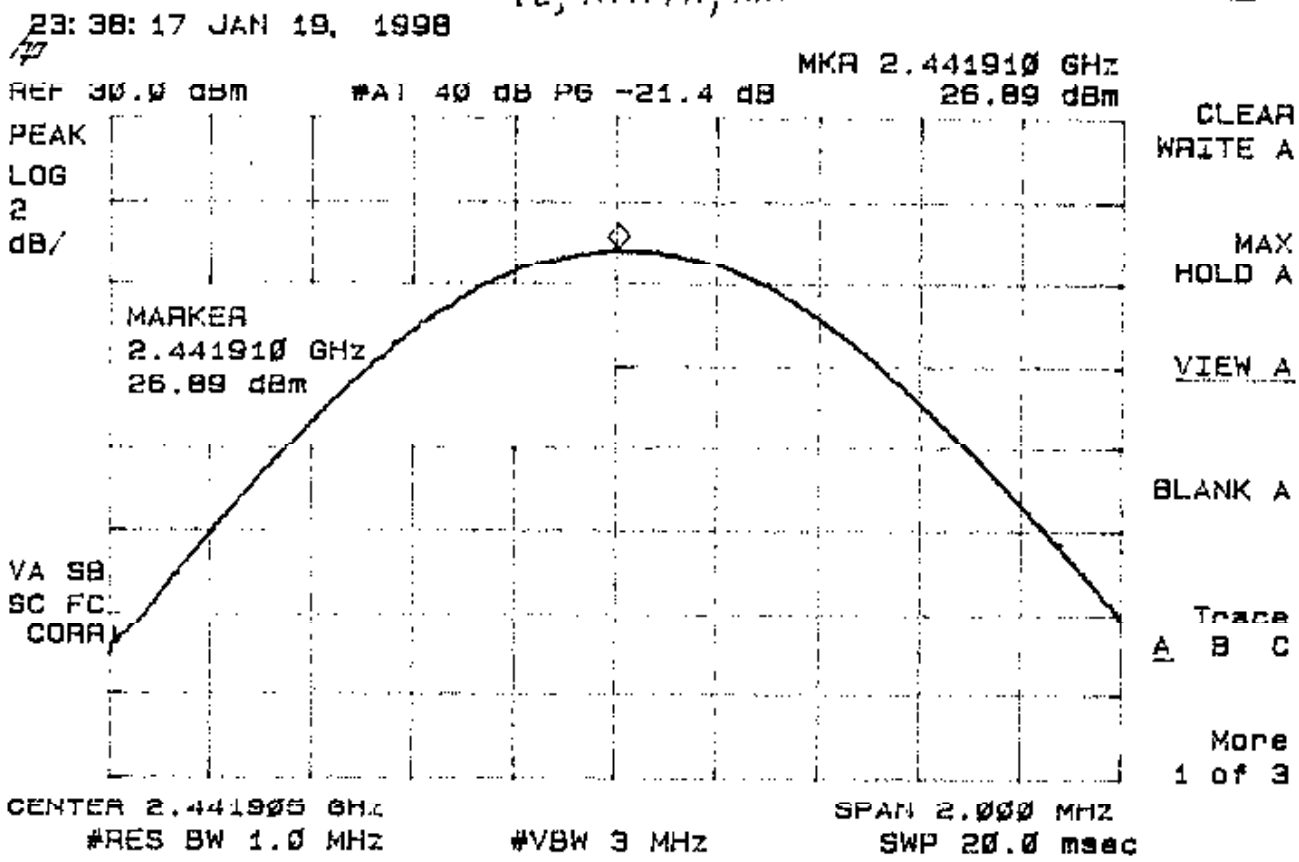
T1, RTNPA, LO VCO



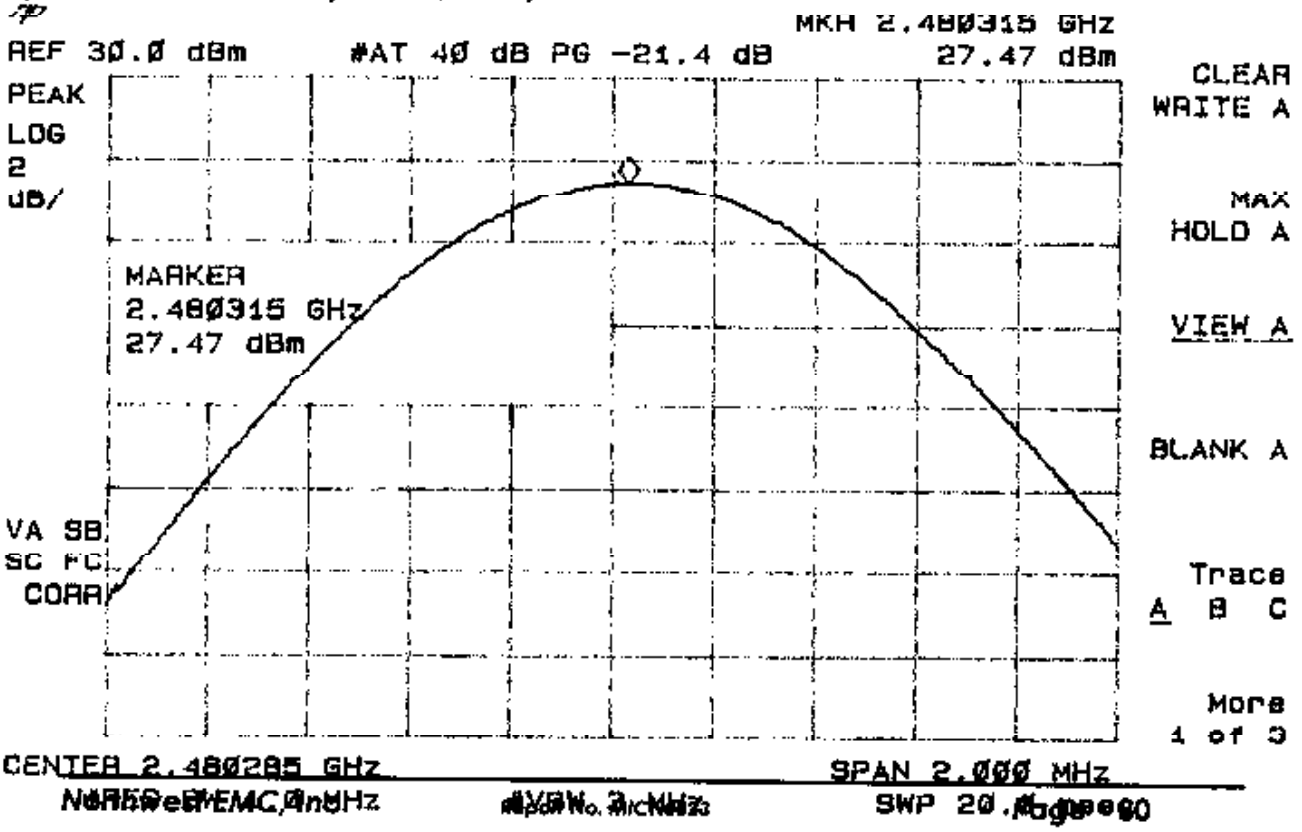

22: 52: 34 JAN 19, 1998
MKR 2.480313 GHz
REF 30.0 dBm
#AT 40 dB PG -21.4 dB
28.01 dBm
PEAK
LOG
2
dB/
MARKER
2.480313 GHz
28.01 dBm
CLEAR
WRITE A
MAX
HOLD A
VIEW A
BLANK A
VA SB
SC FC
CORR
Trace
A B C
More
1 of 3
CENTER 2.480200 GHz
#RES BW 1.0 MHz
#VBW 3 MHz
SPAN 2.000 MHz
SWP 20.0 msec

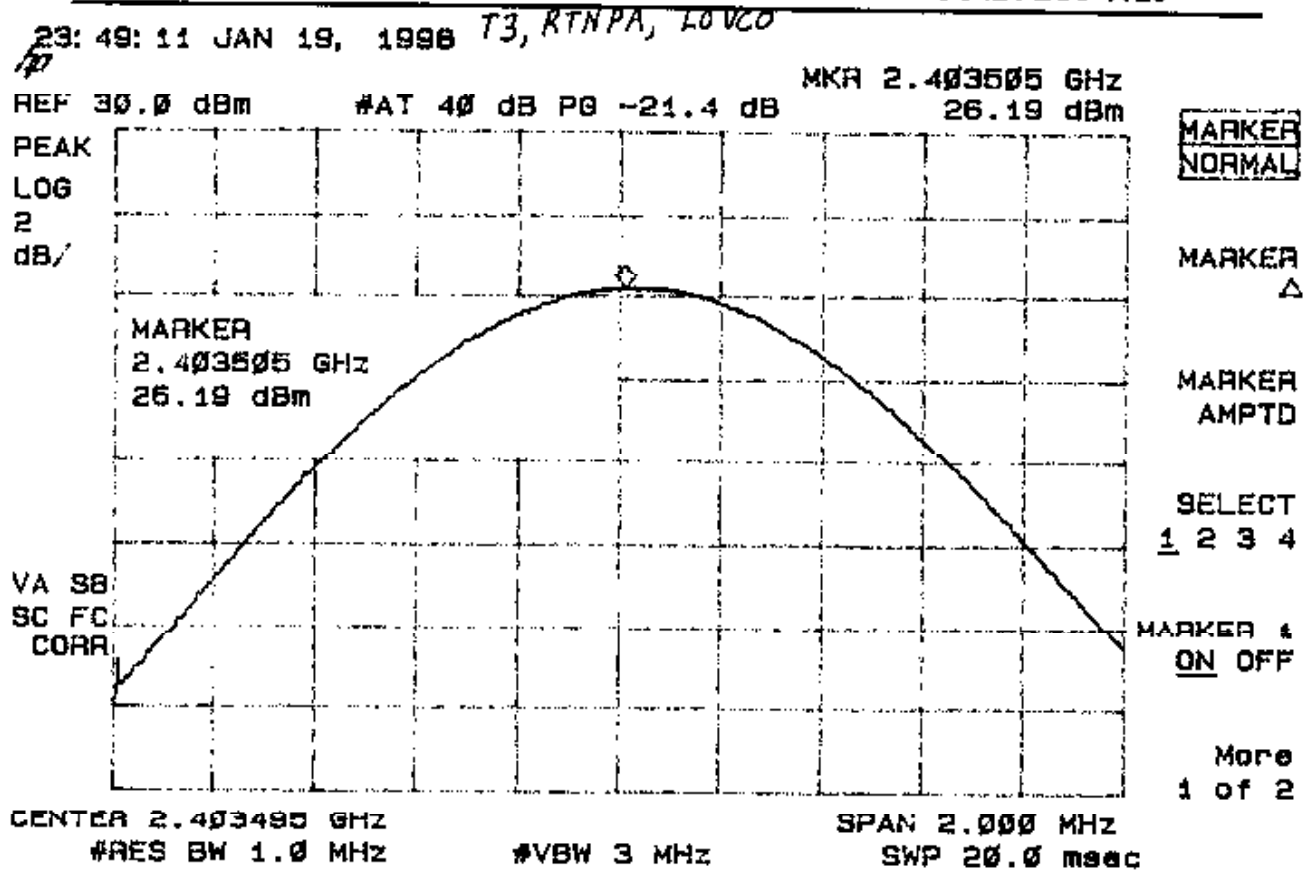

23: 01: 33 JAN 19, 1998
T2, RTNPA, LO VCO
MKR 2.403505 GHz
REF 30.0 dBm
#AT 40 dB PG -21.4 dB
26.62 dBm
PEAK
LOG
2
dB/
MARKER
2.403505 GHz
26.62 dBm
CLEAR
WRITE A
MAX
HOLD A
VIEW A
BLANK A
VA SB
SC FC
CORR
Trace
A B C
More
1 of 3
CENTER 2.403495 GHz
#RES BW 1.0 MHz
#VBW 3 MHz
SPAN 2.000 MHz
SWP 20.0 msec

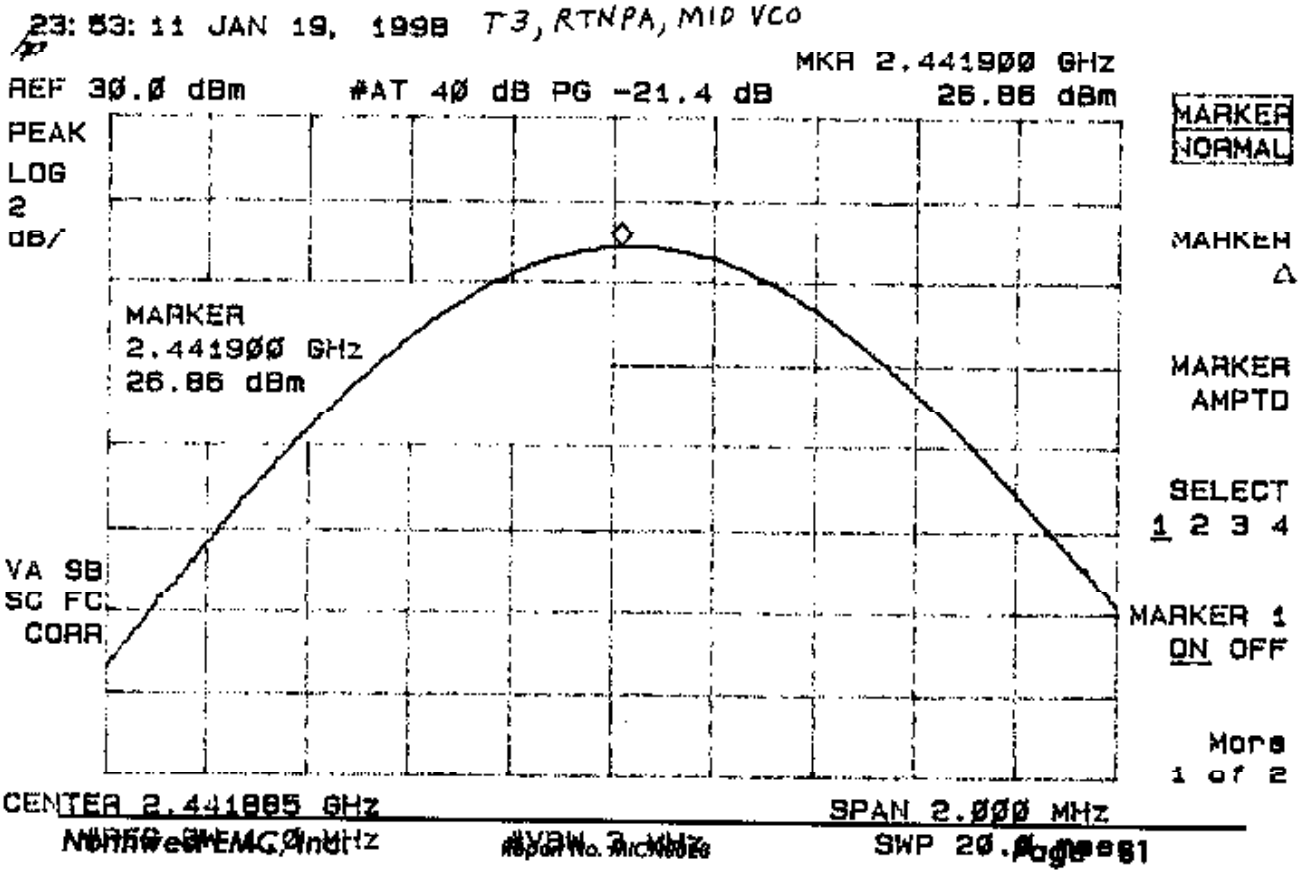
T2, RTN PA, MID VCO

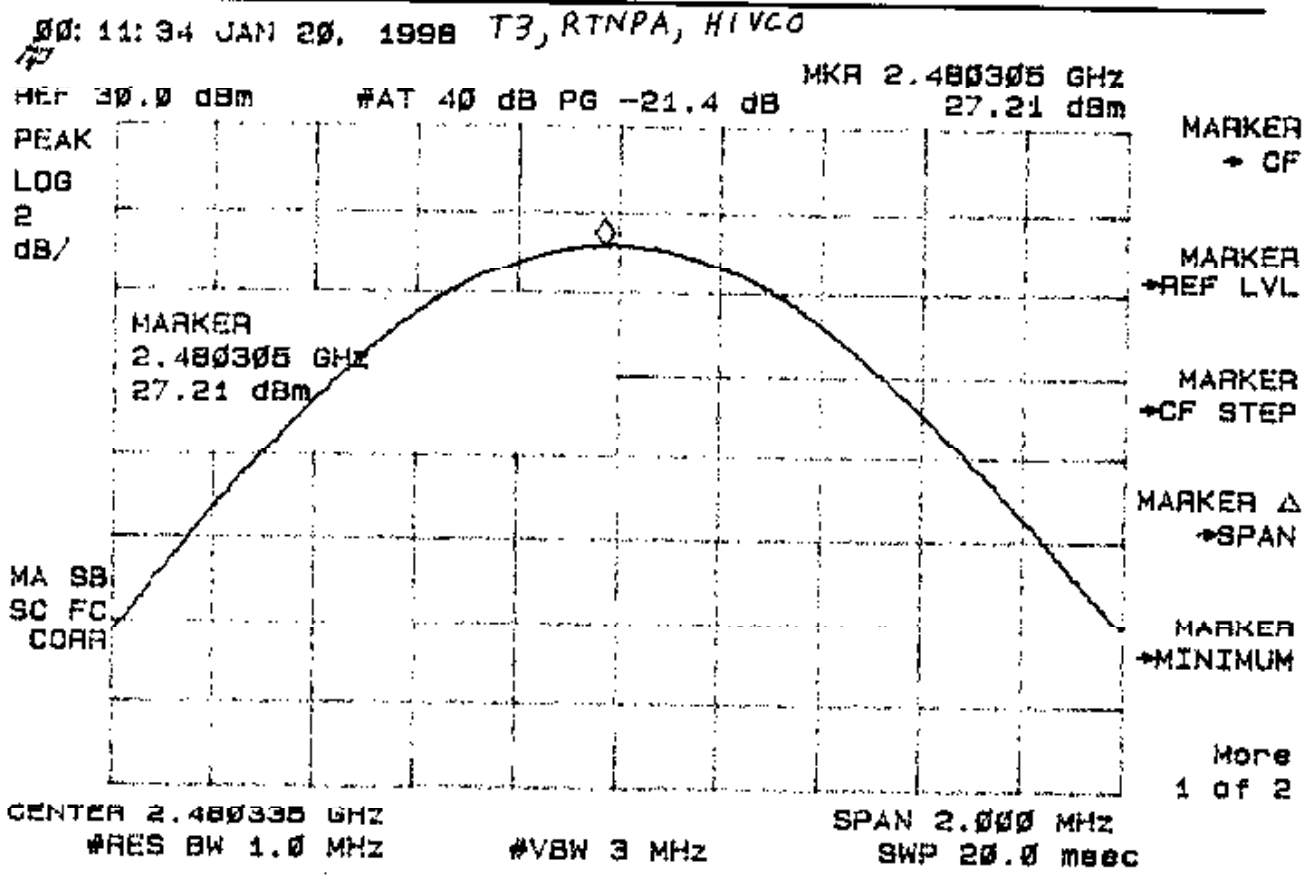


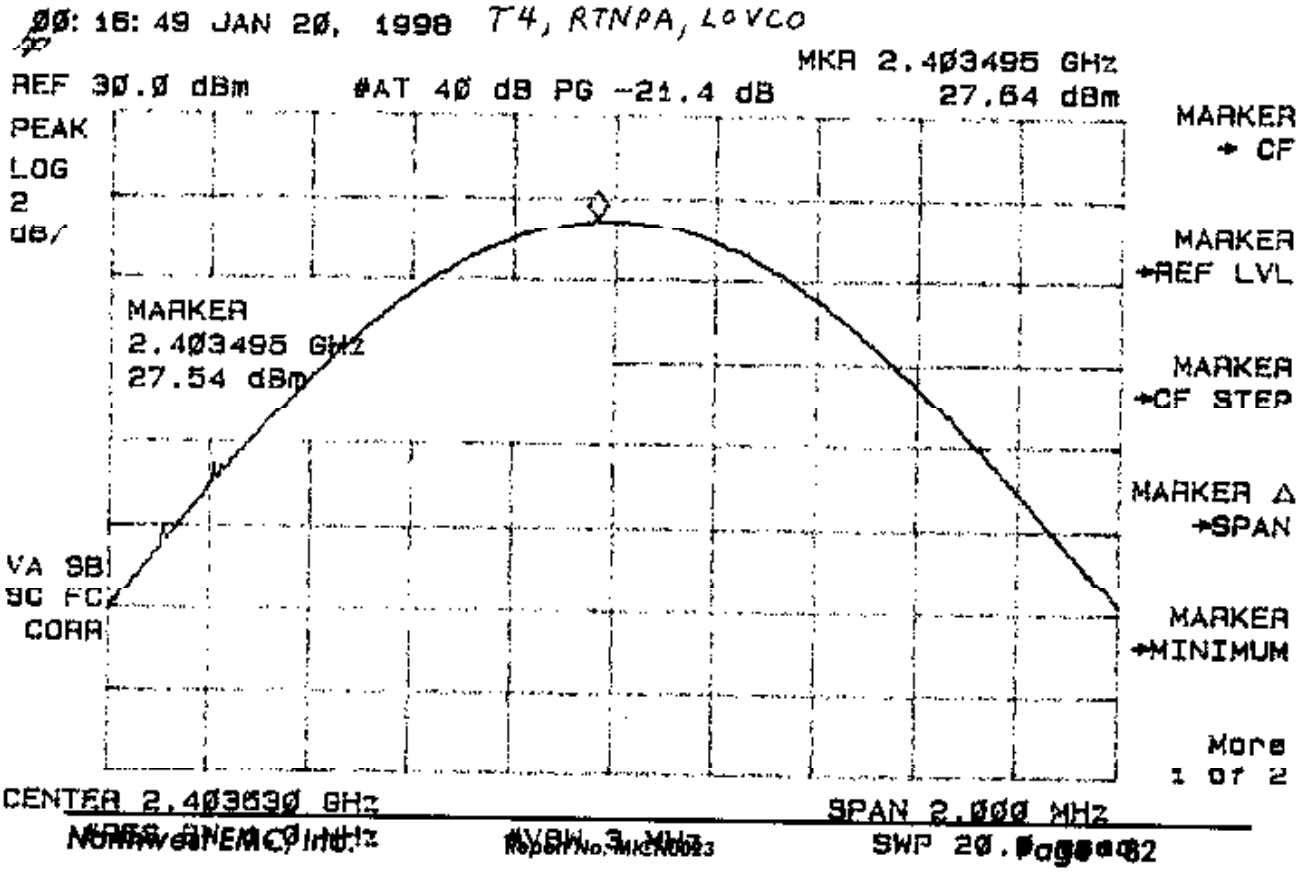
T2, RTNPA, HI VCO

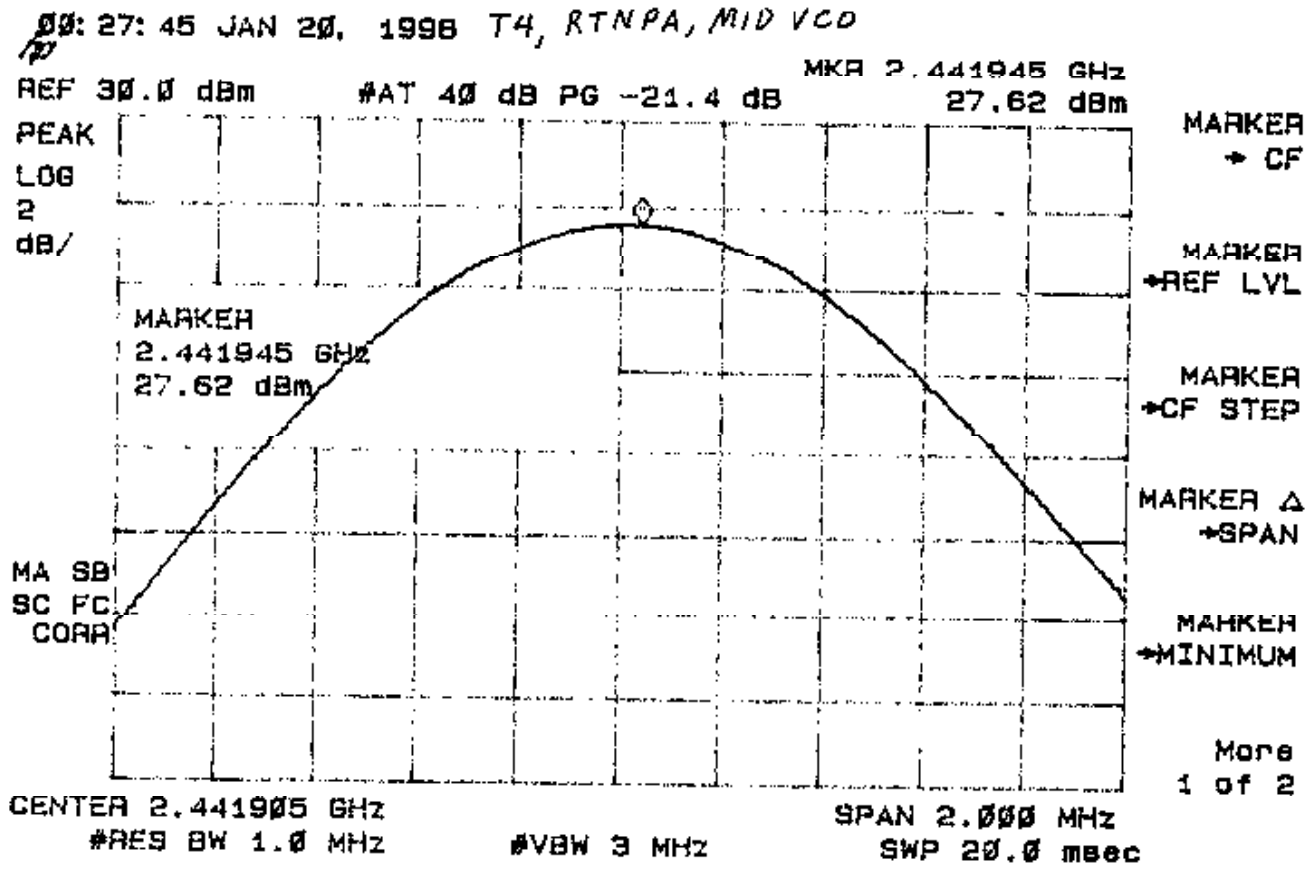


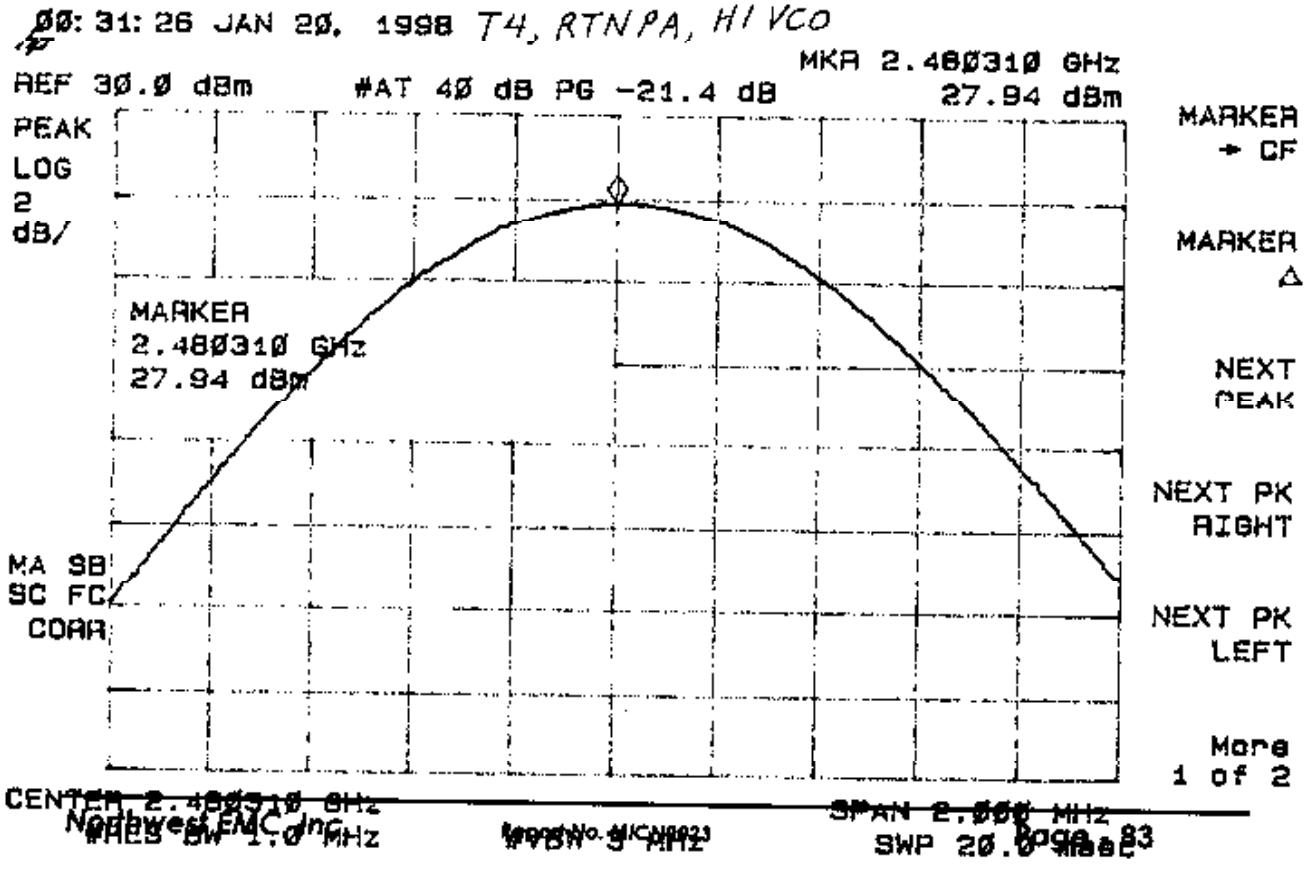

23: 49: 11 JAN 19, 1998
T3, RTNPA, LO VCO
MKR 2.403505 GHz
REF 30.0 dBm
#AT 40 dB PG -21.4 dB
26.19 dBm
PEAK
LOG
2
dB/
MARKER
NORMAL
MARKER
Δ
MARKER
2.403505 GHz
26.19 dBm
MARKER
AMPTD
SELECT
1 2 3 4
VA SB
SC FC
CORR
MARKER 1
ON OFF
More
1 of 2
CENTER 2.403495 GHz
SPAN 2.000 MHz
#RES BW 1.0 MHz
#VBW 3 MHz
SWP 20.0 msec

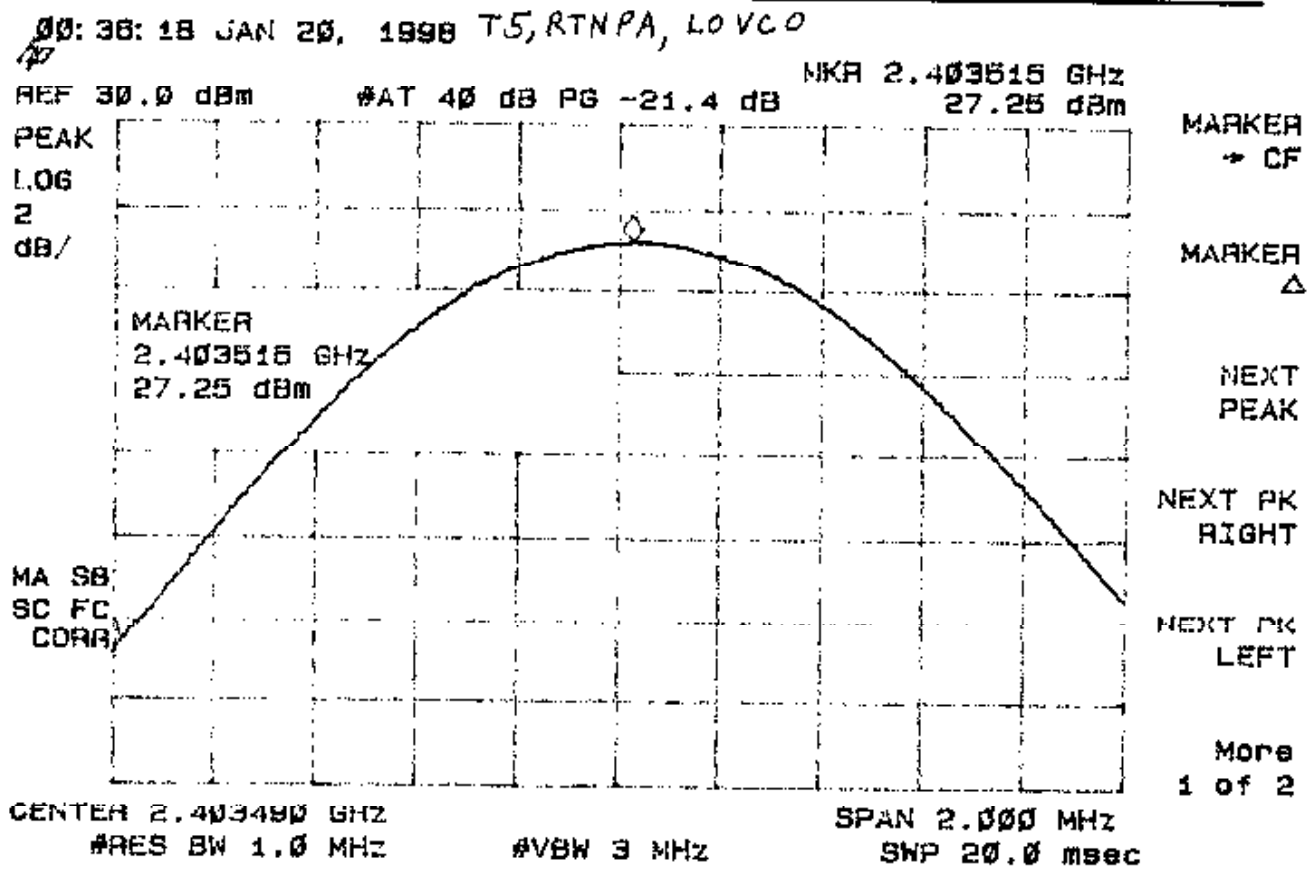

23: 53: 11 JAN 19, 1998
T3, RTNPA, MID VCO
MKR 2.441900 GHz
REF 30.0 dBm
#AT 40 dB PG -21.4 dB
26.86 dBm
PEAK
LOG
2
dB/
MARKER
NORMAL
MARKER
Δ
MARKER
2.441900 GHz
26.86 dBm
MARKER
AMPTD
SELECT
1 2 3 4
VA SB
SC FC
CORR
MARKER 1
ON OFF
More
1 of 2
CENTER 2.441885 GHz
SPAN 2.000 MHz
#RES BW 1.0 MHz
#VBW 3 MHz
SWP 20.0 msec

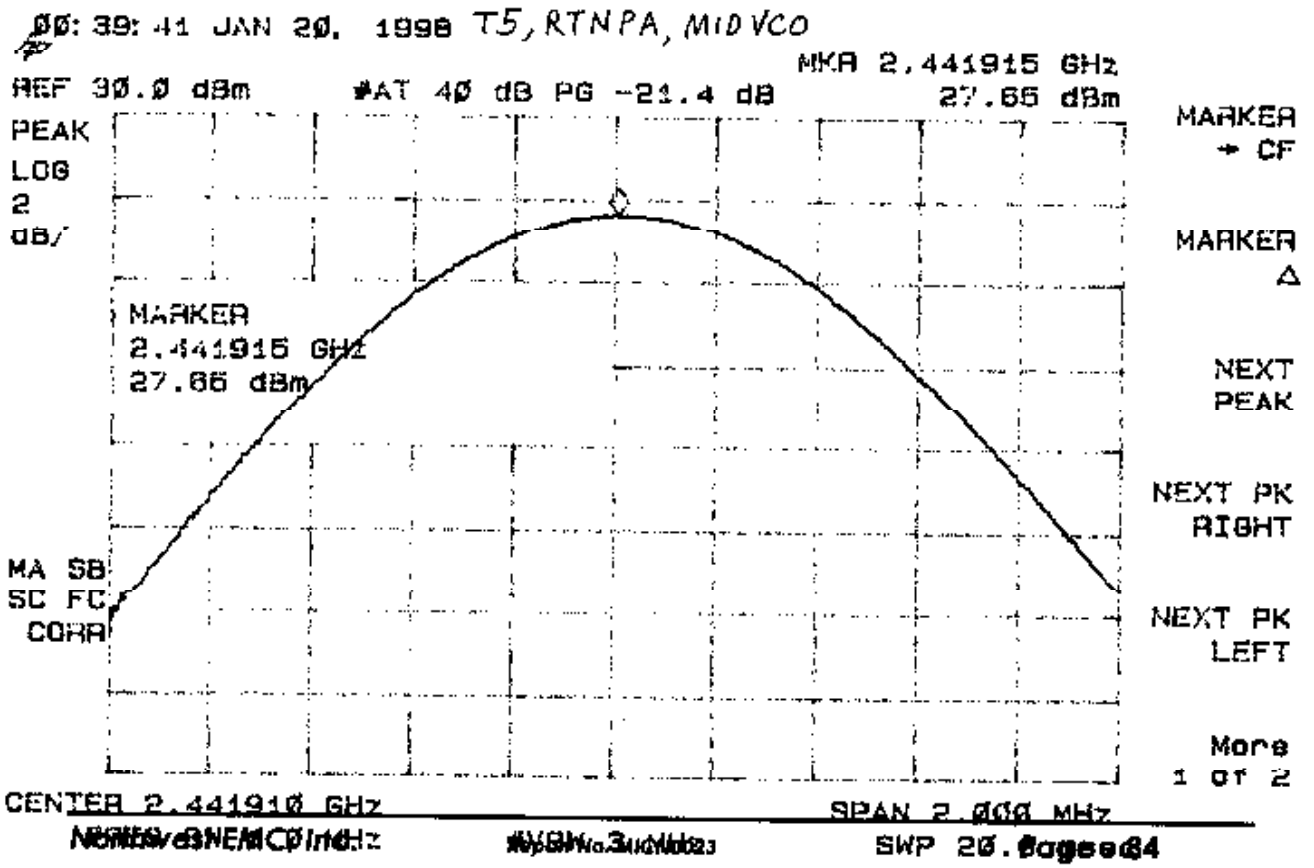

ØØ: 11: 34 JAN 2Ø, 1998 T3, RTNPA, HIVCO
MKR 2.48Ø3Ø5 GHz
REF 3Ø.Ø dBm
#AT 4Ø dB PG -21.4 dB
27.21 dBm
PEAK
LOG
2
dB/
MARKER
2.48Ø3Ø5 GHz
27.21 dBm
MARKER
→ CF
MARKER
→REF LVL
MARKER
→CF STEP
MARKER Δ
→SPAN
MARKER
→MINIMUM
More
1 of 2
MA SB
SC FC
CORR
CENTER 2.48Ø335 GHz
#RES BW 1.Ø MHz
#VBW 3 MHz
SPAN 2.ØØØ MHz
SWP 2Ø.Ø msec

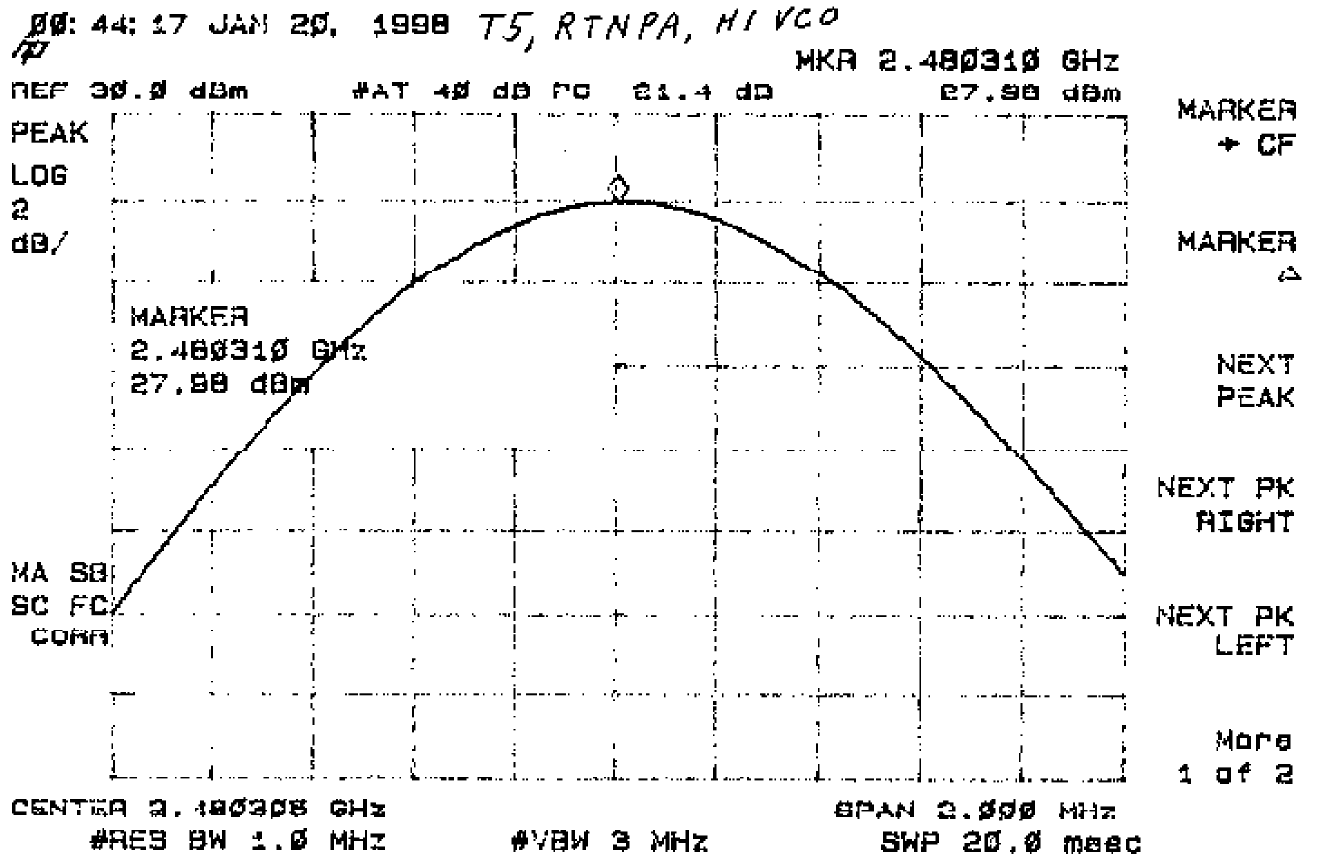

ØØ: 16: 49 JAN 2Ø, 1998 T4, RTNPA, LOVCO
MKR 2.4Ø3495 GHz
REF 3Ø.Ø dBm
#AT 4Ø dB PG -21.4 dB
27.64 dBm
PEAK
LOG
2
dB/
MARKER
2.4Ø3495 GHz
27.54 dBm
MARKER
→ CF
MARKER
→REF LVL
MARKER
→CF STEP
MARKER Δ
→SPAN
MARKER
→MINIMUM
More
1 of 2
VA SB
SC FC
CORR
CENTER 2.4Ø359Ø GHz
#RES BW 1.Ø MHz
#VBW 3 MHz
SPAN 2.ØØØ MHz
SWP 2Ø.Ø msec

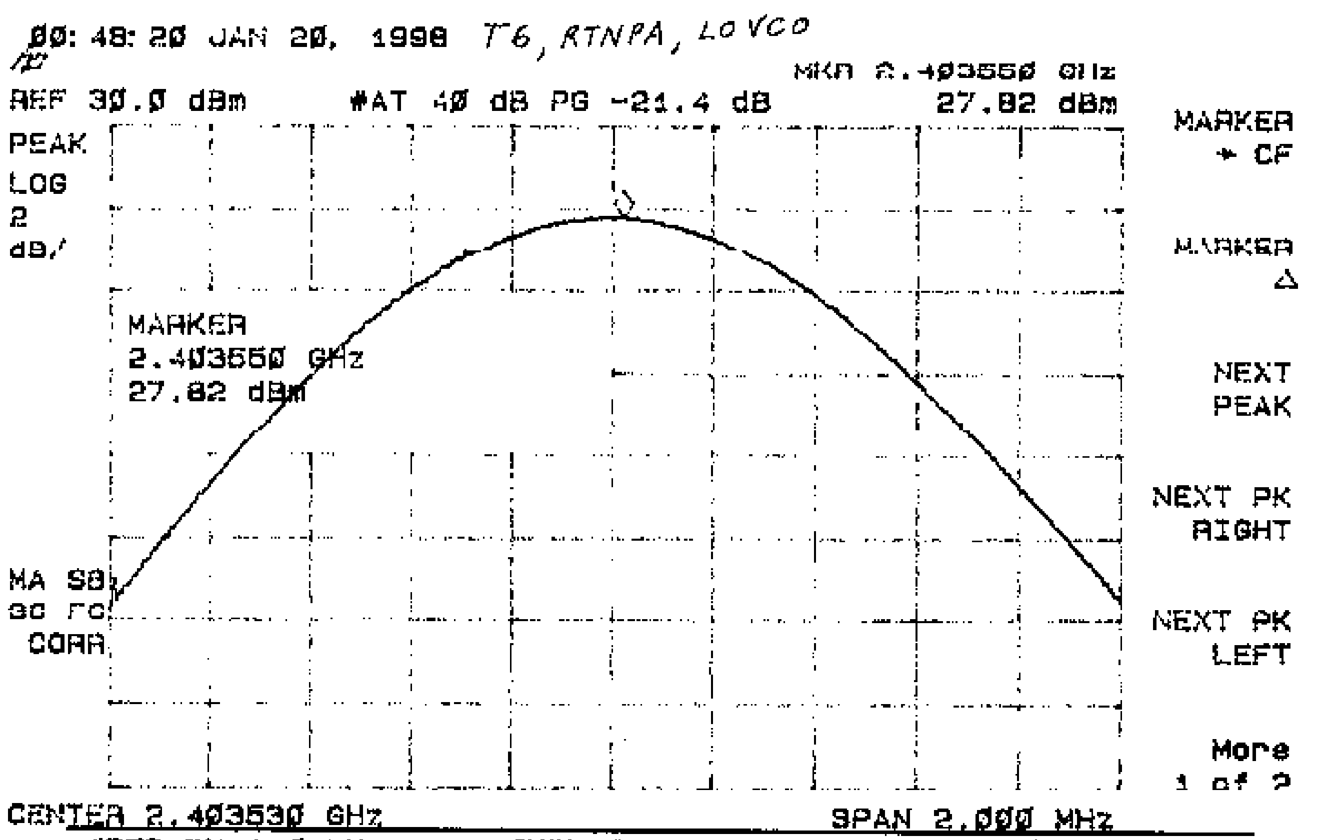

ØØ: 27: 45 JAN 2Ø, 1998 T4, RTNPA, MID VCO
MKR 2.441945 GHz
REF 3Ø.Ø dBm
#AT 4Ø dB PG -21.4 dB
27.62 dBm
PEAK
LOG
2
dB/
MARKER
2.441945 GHz
27.62 dBm
MA SB
SC FC
CORR
MARKER
→ CF
MARKER
→REF LVL
MARKER
→CF STEP
MARKER Δ
→SPAN
MARKER
→MINIMUM
More
1 of 2
CENTER 2.441905 GHz
#RES BW 1.Ø MHz
#VBW 3 MHz
SPAN 2.ØØØ MHz
SWP 2Ø.Ø msec

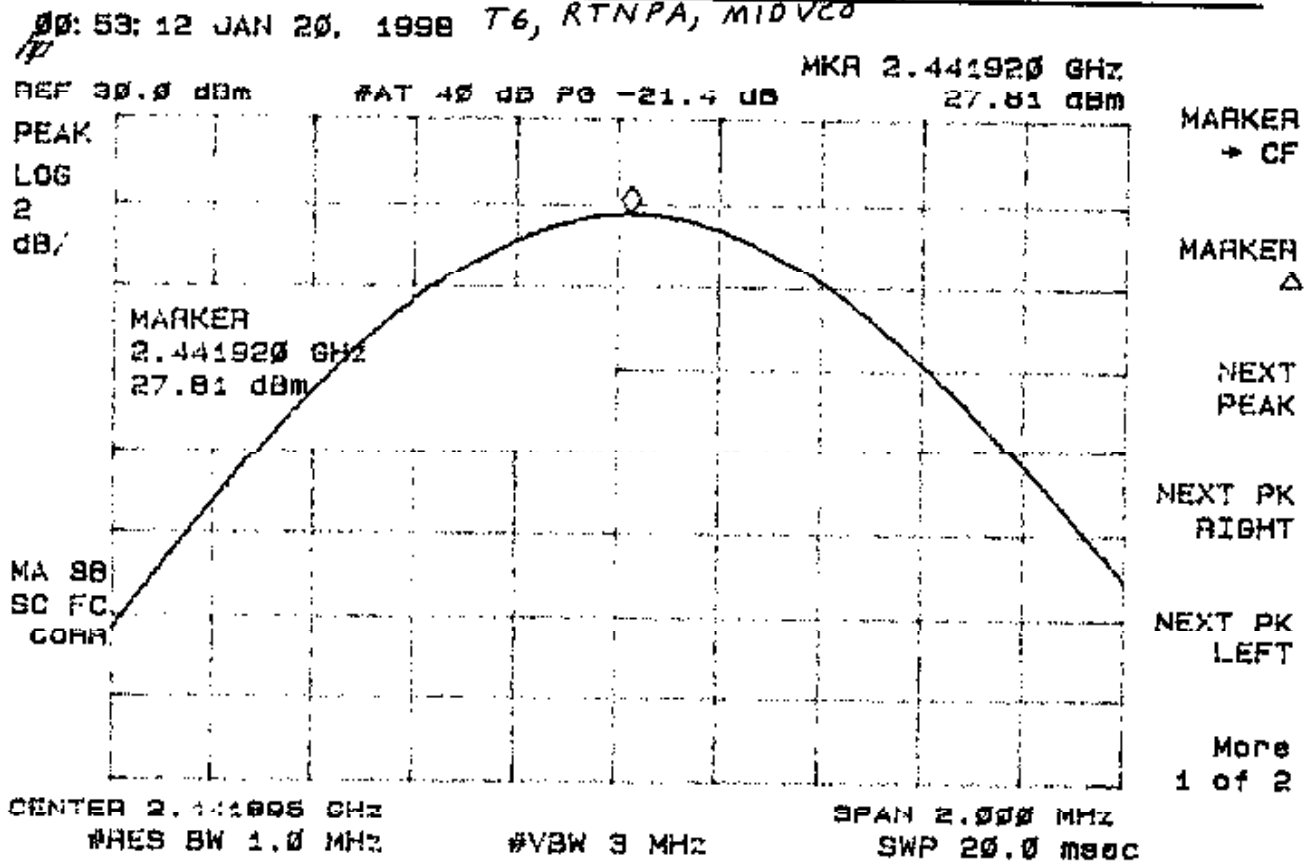

ØØ: 31: 26 JAN 2Ø, 1998 T4, RTNPA, HI VCO
MKR 2.48Ø31Ø GHz
REF 3Ø.Ø dBm
#AT 4Ø dB PG -21.4 dB
27.94 dBm
PEAK
LOG
2
dB/
MARKER
2.48Ø31Ø GHz
27.94 dBm
MA SB
SC FC
CORR
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
CENTER 2.48ØØ31Ø GHz
#RES BW 1.Ø MHz
#VBW 3 MHz
SPAN 2.ØØØ MHz
SWP 2Ø.Ø msec

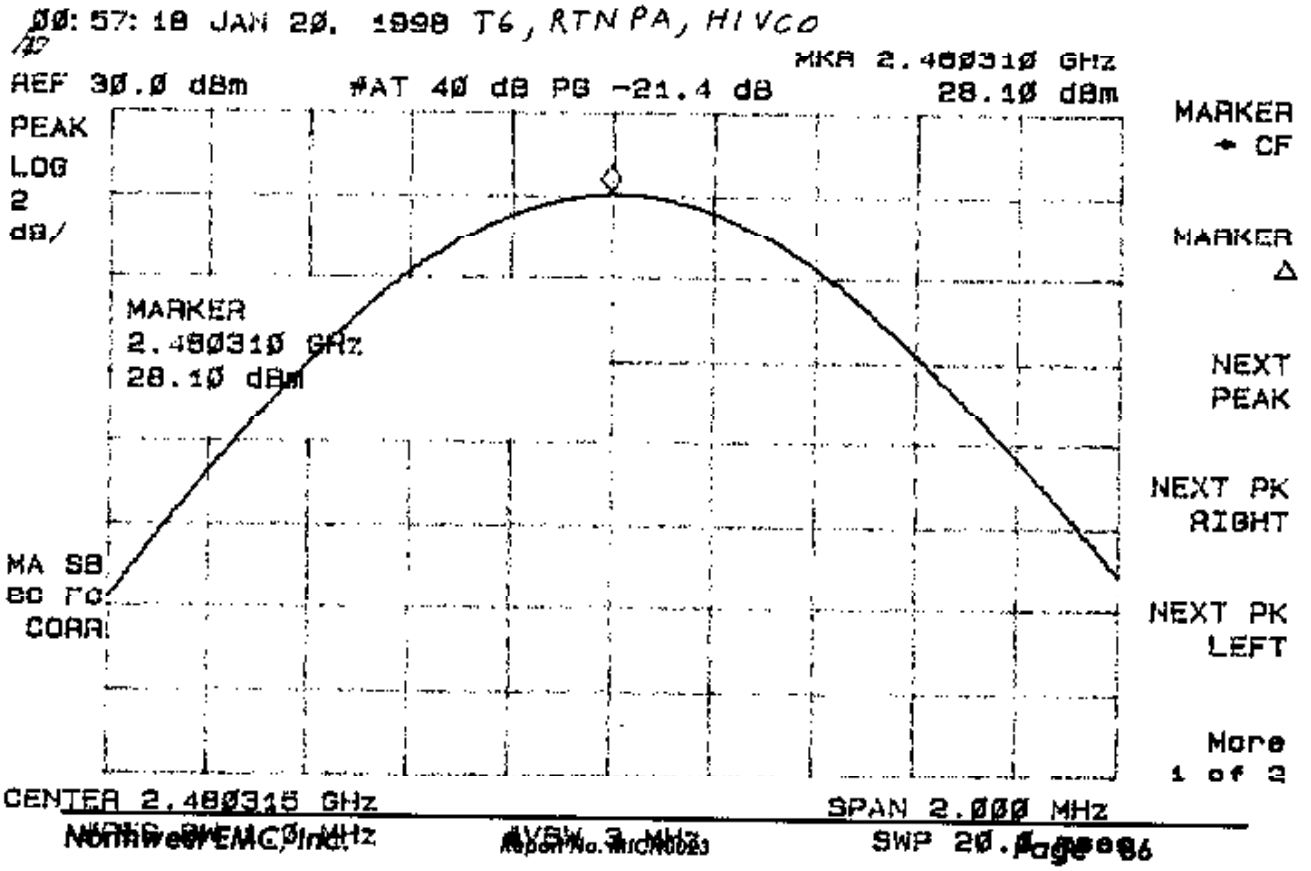

ØØ: 36: 18 JAN 2Ø, 1998 T5, RTNPA, LOVCO
MKR 2.4Ø3515 GHz
REF 3Ø.Ø dBm
#AT 4Ø dB PG -21.4 dB
27.25 dBm
PEAK
LOG
2
dB/
MARKER
2.4Ø3515 GHz
27.25 dBm
MA SB
SC FC
CORR
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
CENTER 2.4Ø3489Ø GHz
#RES BW 1.Ø MHz
#VBW 3 MHz
SPAN 2.ØØØ MHz
SWP 2Ø.Ø msec

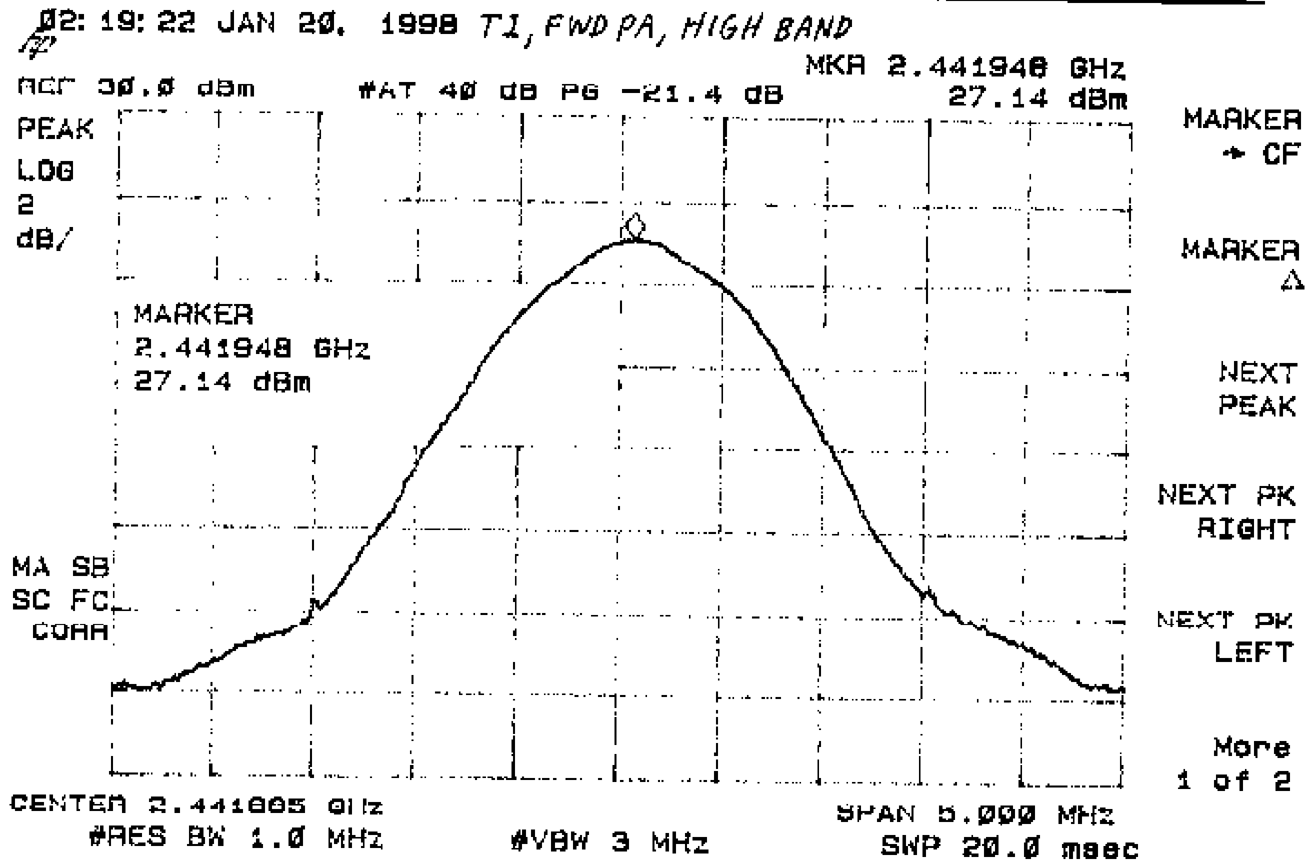

ØØ: 39: 41 JAN 2Ø, 1998 T5, RTNPA, MIDVCO
MKR 2.441915 GHz
REF 3Ø.Ø dBm
#AT 4Ø dB PG -21.4 dB
27.65 dBm
PEAK
LOG
2
dB/
MARKER
2.441915 GHz
27.66 dBm
MA SB
SC FC
CORR
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
CENTER 2.441910 GHz
SPAN 2.ØØØ MHz
SWP 2Ø.Øsec

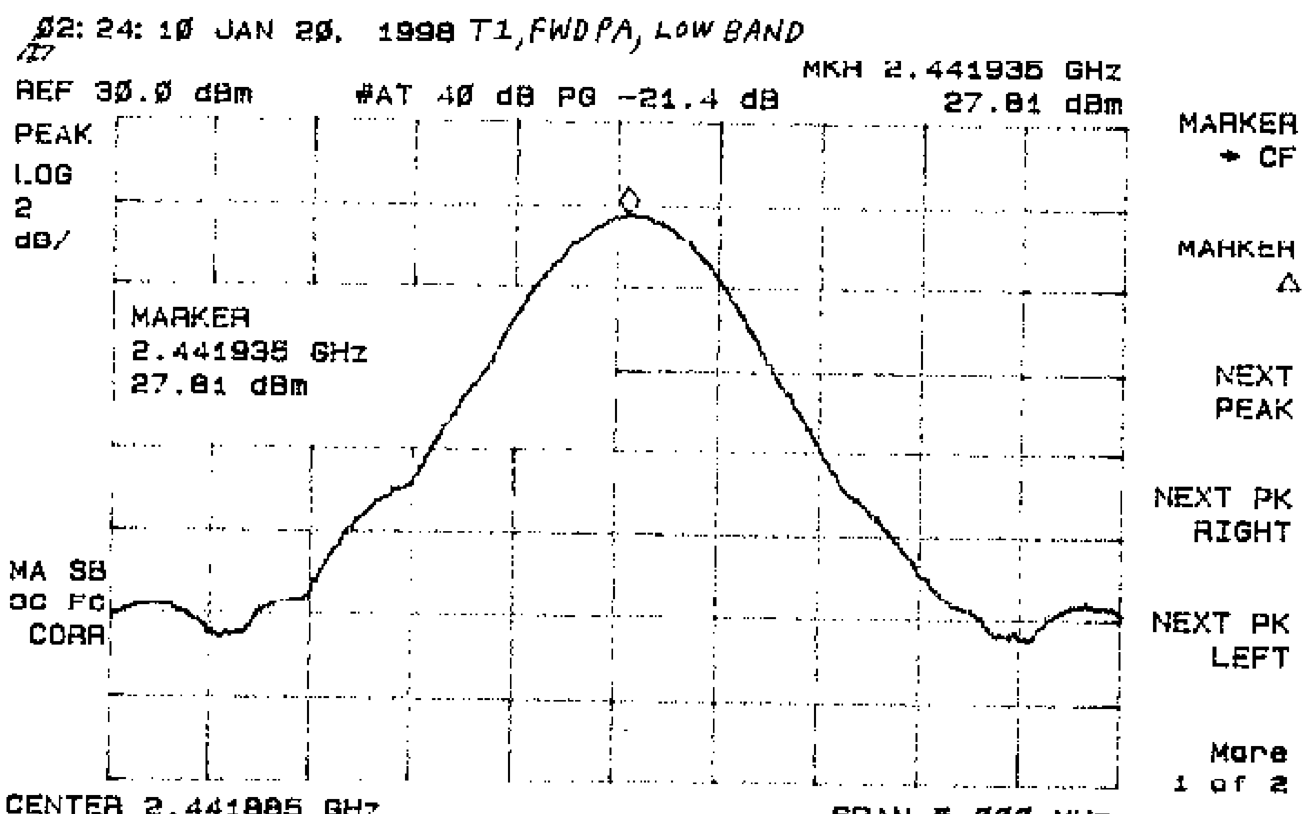

ØØ: 44: 17 JAN 2Ø, 1998 T5, RTNPA, HI VCO
MKR 2.48Ø31Ø GHz
REF 3Ø.Ø dBm #AT 4Ø dB PG 21.4 dB 27.98 dBm
PEAK
LOG
2
dB/
MARKER
2.48Ø31Ø GHz
27.98 dBm
MA SB
SC FC
CORR
CENTER 2.48Ø3Ø8 GHz
SPAN 2.ØØØ MHz
#RES BW 1.Ø MHz
#VBW 3 MHz
SWP 2Ø.Ø msec
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2

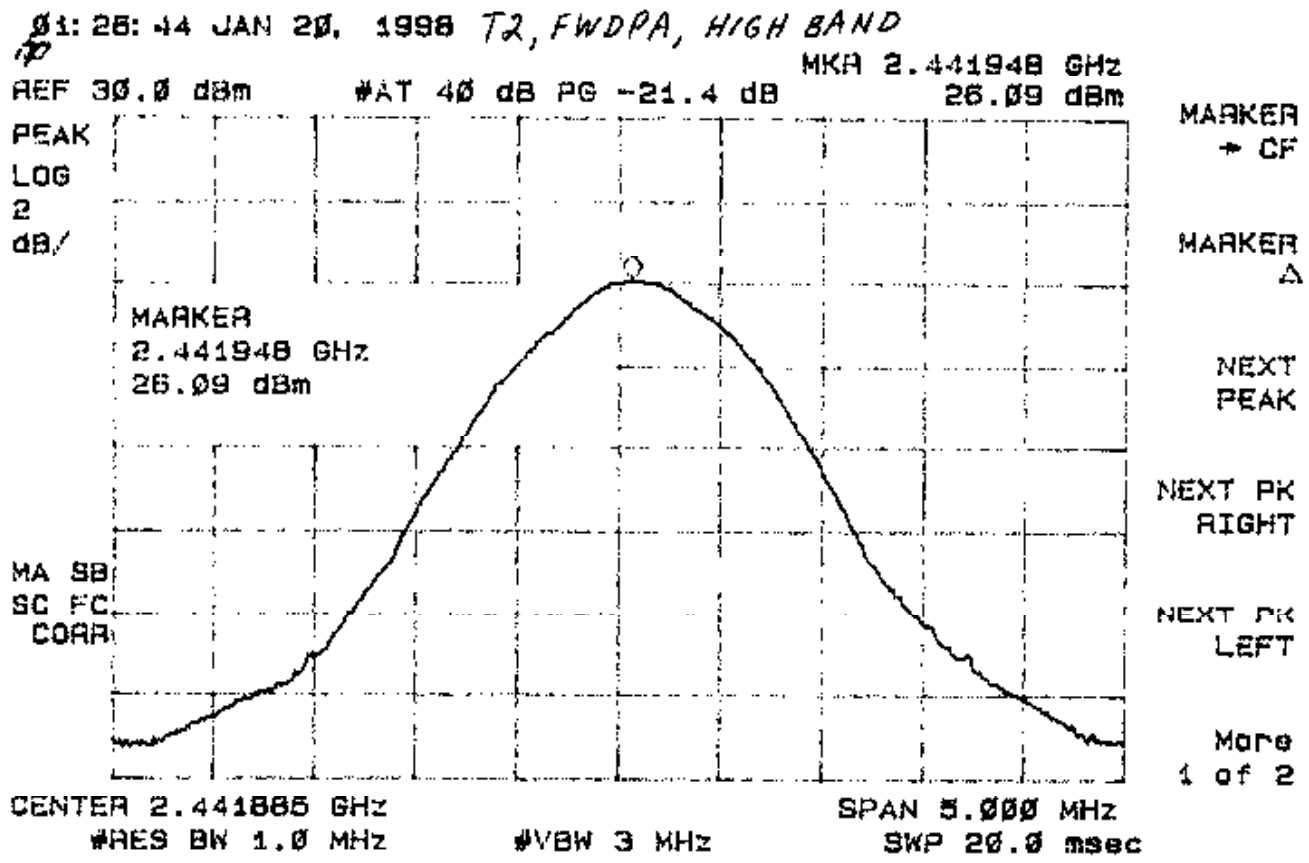

ØØ: 48: 2Ø JAN 2Ø, 1998 T6, RTNPA, LO VCO
MKR 2.4Ø355Ø GHz
REF 3Ø.Ø dBm #AT 4Ø dB PG -21.4 dB 27.82 dBm
PEAK
LOG
2
dB/
MARKER
2.4Ø355Ø GHz
27.82 dBm
MA SB
SC FC
CORR
CENTER 2.4Ø353Ø GHz
SPAN 2.ØØØ MHz
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2

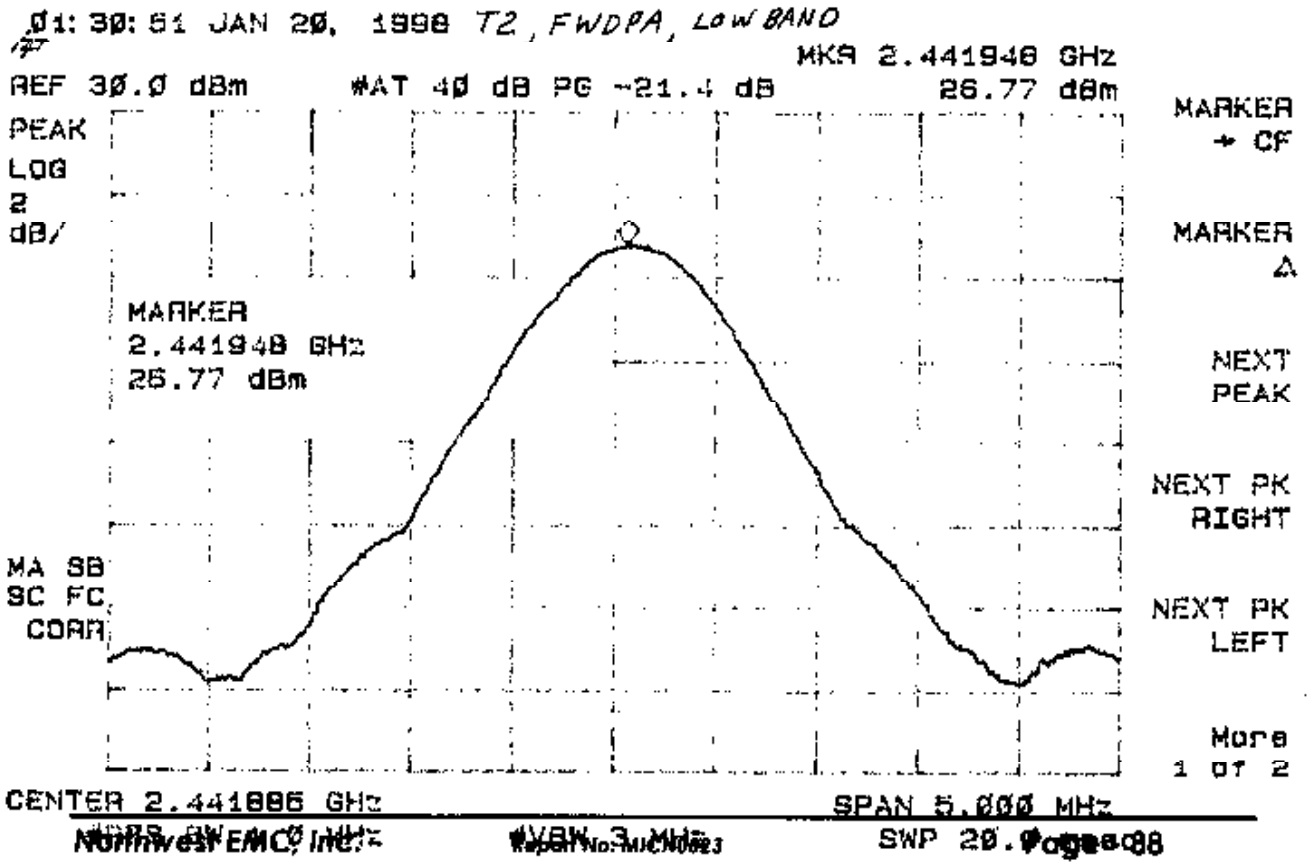

00: 53: 12 JAN 20, 1998 T6, RTNPA, MIDVCO
MKR 2.441920 GHz
REF 30.0 dBm
#AT 40 dB PG -21.4 dB
27.81 dBm
PEAK
LOG
2
dB/
MARKER
2.441920 GHz
27.81 dBm
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
MA SB
SC FC
CORR
CENTER 2.441995 GHz
SPAN 2.000 MHz
#RES BW 1.0 MHz
#VBW 3 MHz
SWP 20.0 msec

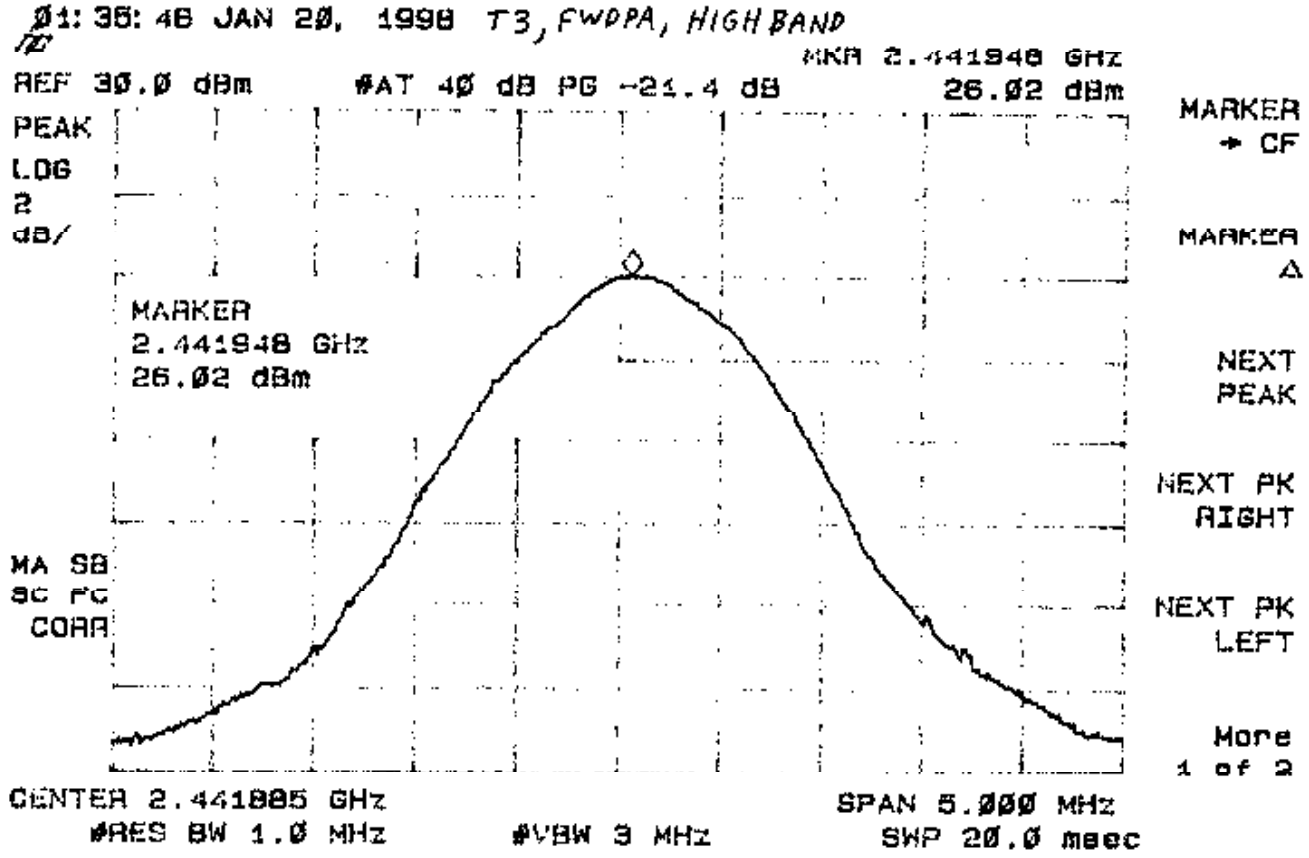

00: 57: 18 JAN 20, 1998 T6, RTNPA, HIVCO
MKR 2.480310 GHz
REF 30.0 dBm
#AT 40 dB PG -21.4 dB
28.10 dBm
PEAK
LOG
2
dB/
MARKER
2.480310 GHz
28.10 dBm
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
MA SB
SC FC
CORR
CENTER 2.480315 GHz
SPAN 2.000 MHz
#RES BW 1.0 MHz
#VBW 3 MHz
SWP 20.0

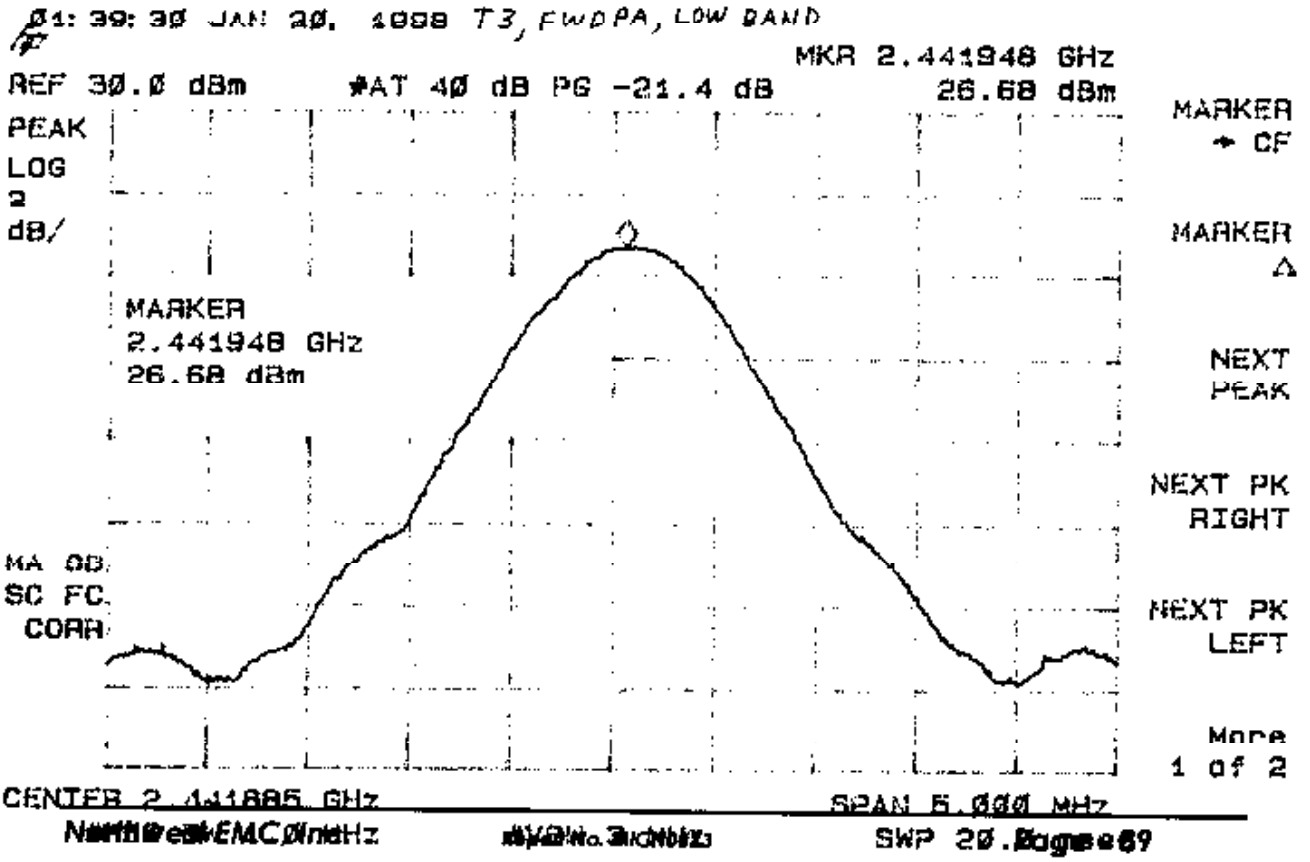

02: 19: 22 JAN 20, 1998 T1, FWD PA, HIGH BAND
MKR 2.441948 GHz
REF 30.0 dBm #AT 40 dB PG -21.4 dB 27.14 dBm
PEAK
LOG
2
dB/
MARKER
2.441948 GHz
27.14 dBm
MA SB
SC FC
CORR
CENTER 2.441885 GHz
#RES BW 1.0 MHz
#VBW 3 MHz
SPAN 5.000 MHz
SWP 20.0 msec
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2

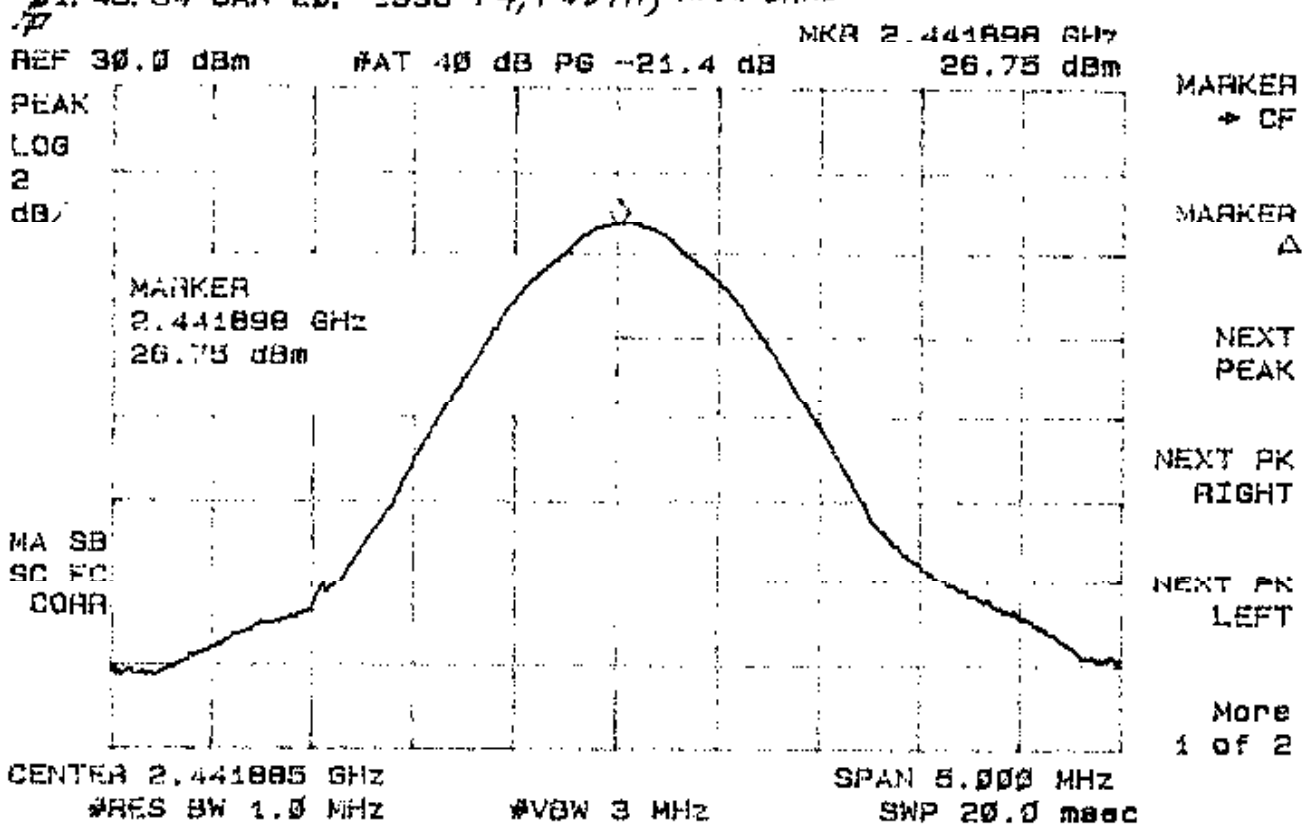

02: 24: 10 JAN 20, 1998 T1, FWD PA, LOW BAND
MKR 2.441935 GHz
REF 30.0 dBm #AT 40 dB PG -21.4 dB 27.81 dBm
PEAK
LOG
2
dB/
MARKER
2.441935 GHz
27.81 dBm
MA SB
SC FC
CORR
CENTER 2.441885 GHz
SPAN 5.000 MHz
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2

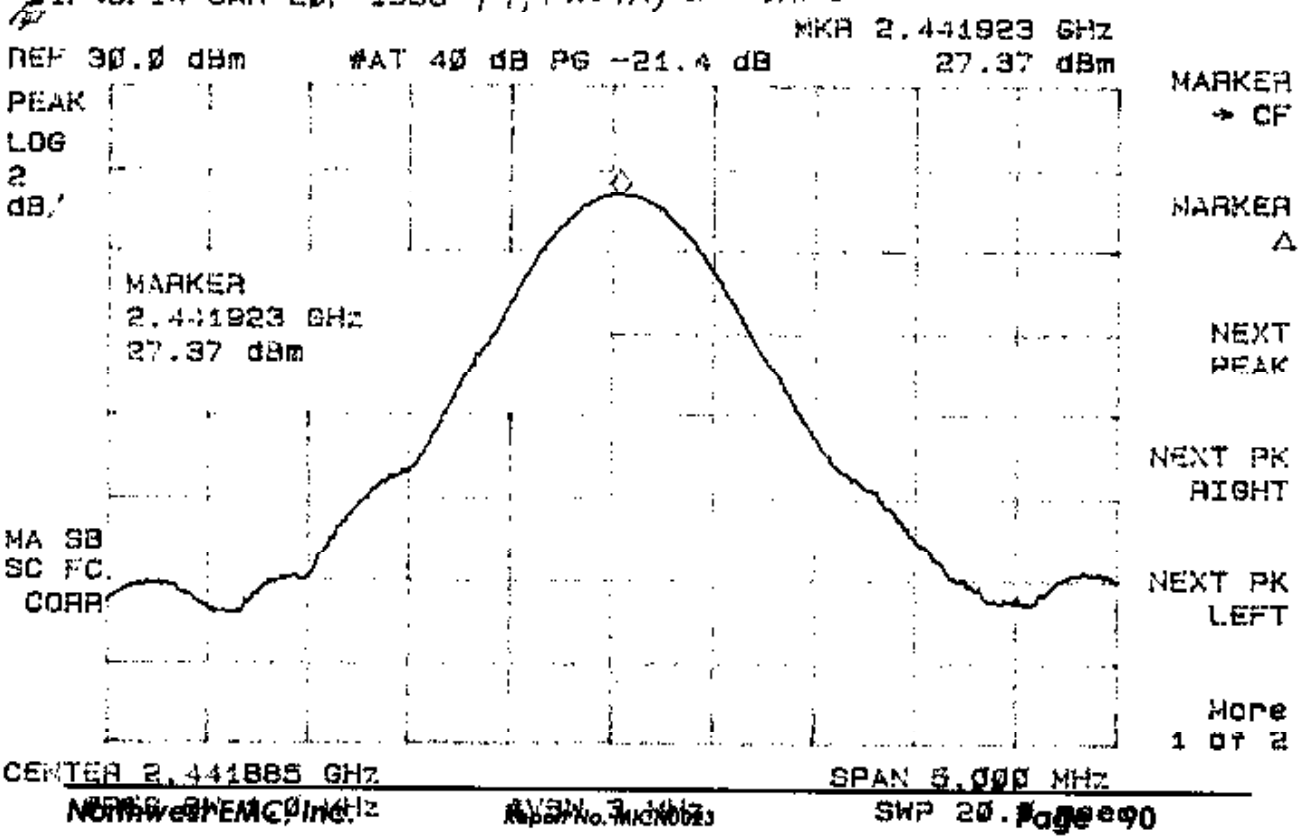

01: 26: 44 JAN 20, 1998 T2, FWDPA, HIGH BAND
MKR 2.441948 GHz
REF 30.0 dBm
#AT 40 dB PG -21.4 dB
26.09 dBm
PEAK
LOG
2
dB/
MARKER
2.441948 GHz
26.09 dBm
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
MA SB
SC FC
CORR
CENTER 2.441865 GHz
SPAN 5.000 MHz
#RES BW 1.0 MHz
#VBW 3 MHz
SWP 20.0 msec

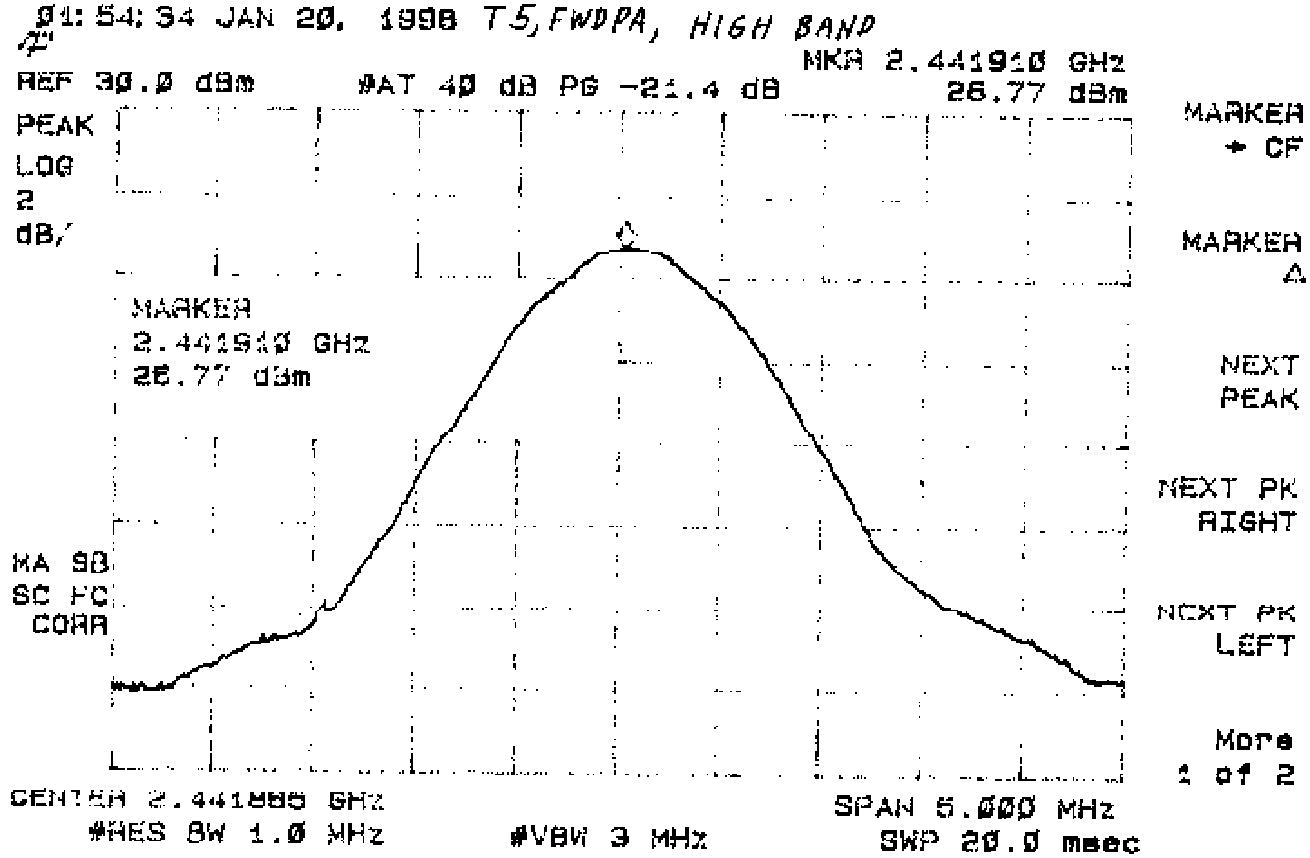

01: 30: 51 JAN 20, 1998 T2, FWDPA, LOW BAND
MKR 2.441948 GHz
REF 30.0 dBm
#AT 40 dB PG -21.4 dB
26.77 dBm
PEAK
LOG
2
dB/
MARKER
2.441948 GHz
26.77 dBm
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
MA SB
SC FC
CORR
CENTER 2.441886 GHz
SPAN 5.000 MHz
#VBW 3 MHz
SWP 20.0

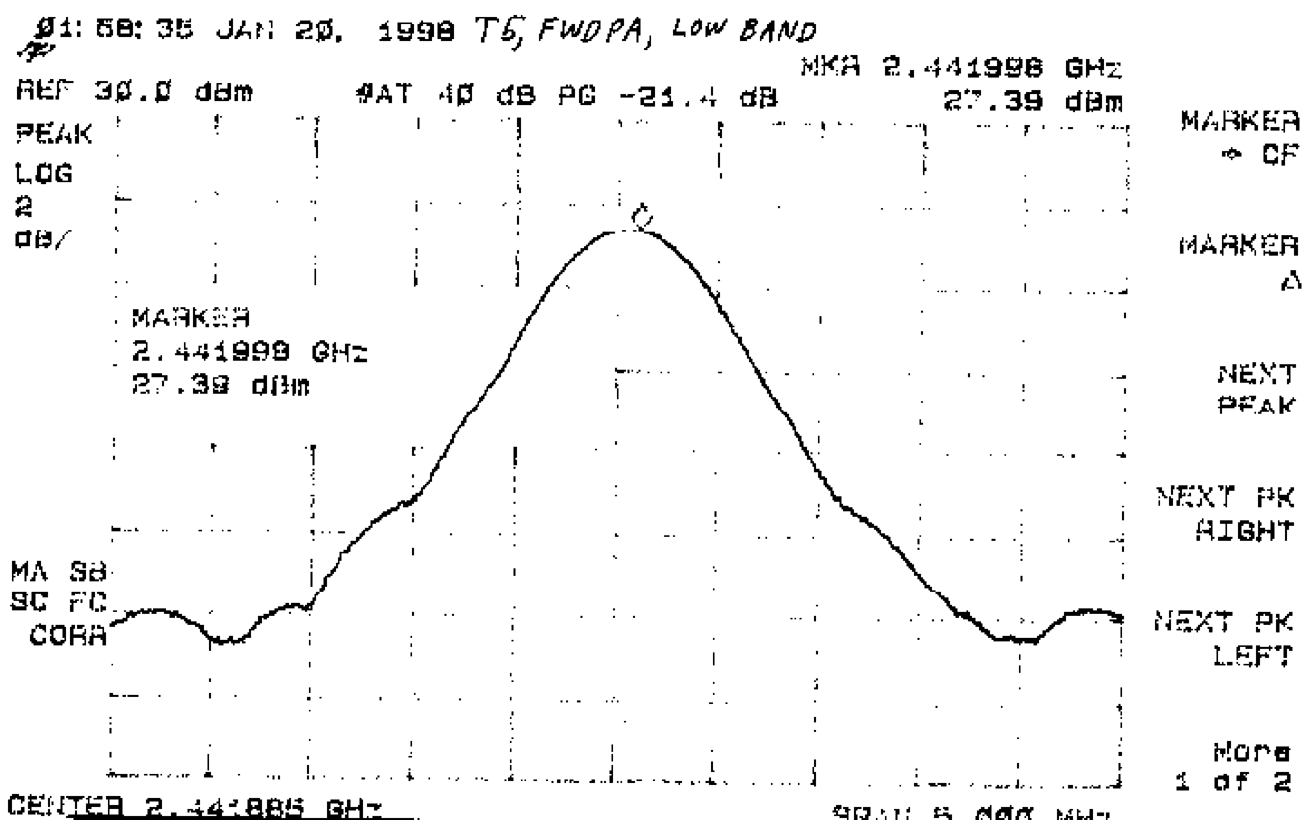

Ø1: 35: 48 JAN 2Ø, 1998 T3, FWDPA, HIGH BAND
MKR 2.441948 GHz
REF 3Ø.Ø dBm
#AT 4Ø dB PG -21.4 dB
26.Ø2 dBm
PEAK
LOG
2
dB/
MARKER
2.441948 GHz
26.Ø2 dBm
MA SB
SC FC
CORR
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
CENTER 2.441885 GHz
#RES BW 1.Ø MHz
#VBW 3 MHz
SPAN 5.ØØØ MHz
SWP 2Ø.Ø msec

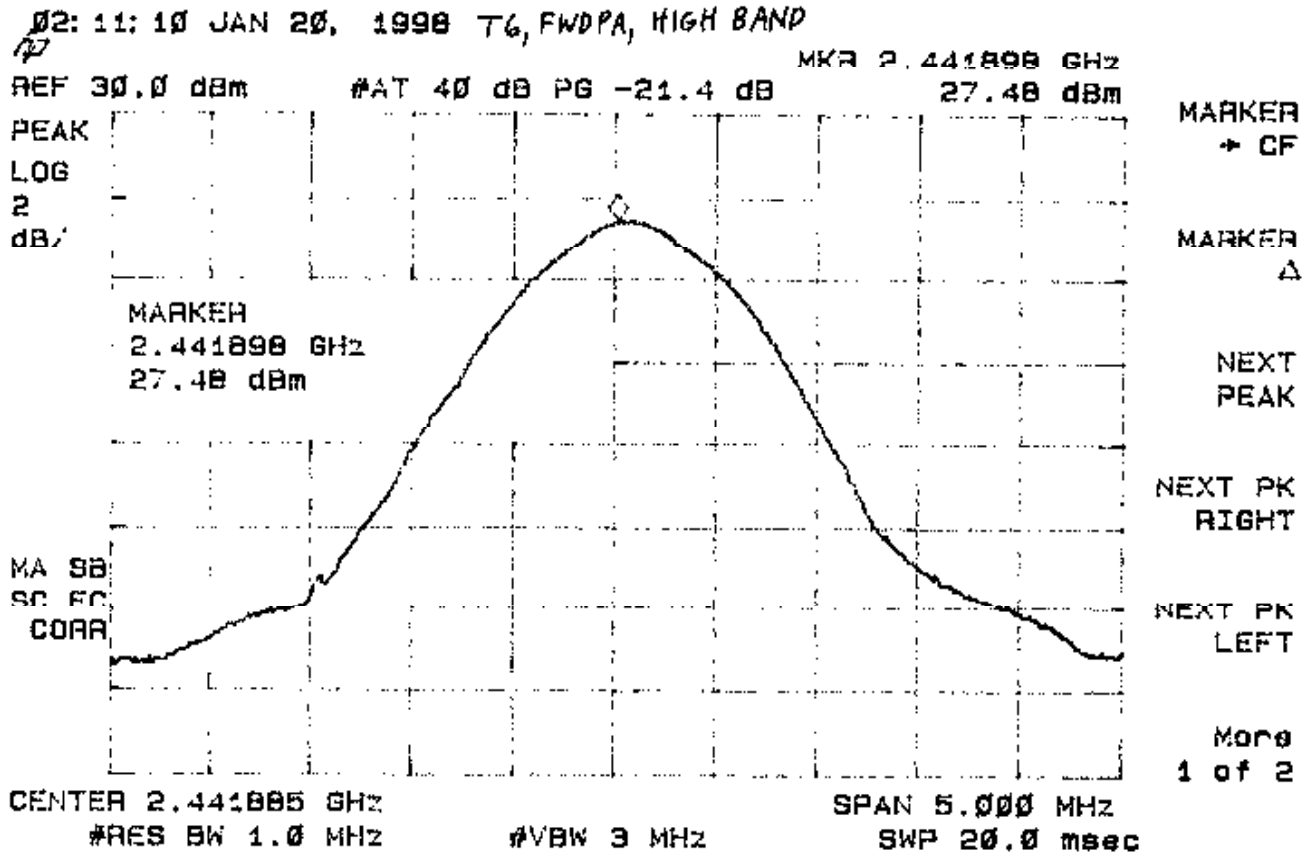

Ø1: 39: 3Ø JAN 2Ø, 1998 T3, FWDPA, LOW BAND
MKR 2.441948 GHz
REF 3Ø.Ø dBm
#AT 4Ø dB PG -21.4 dB
26.68 dBm
PEAK
LOG
2
dB/
MARKER
2.441948 GHz
26.68 dBm
MA SB
SC FC
CORR
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
CENTER 2.441885 GHz
#RES BW 1.Ø MHz
#VBW 3 MHz
SPAN 5.ØØØ MHz
SWP 2Ø.Ø msec

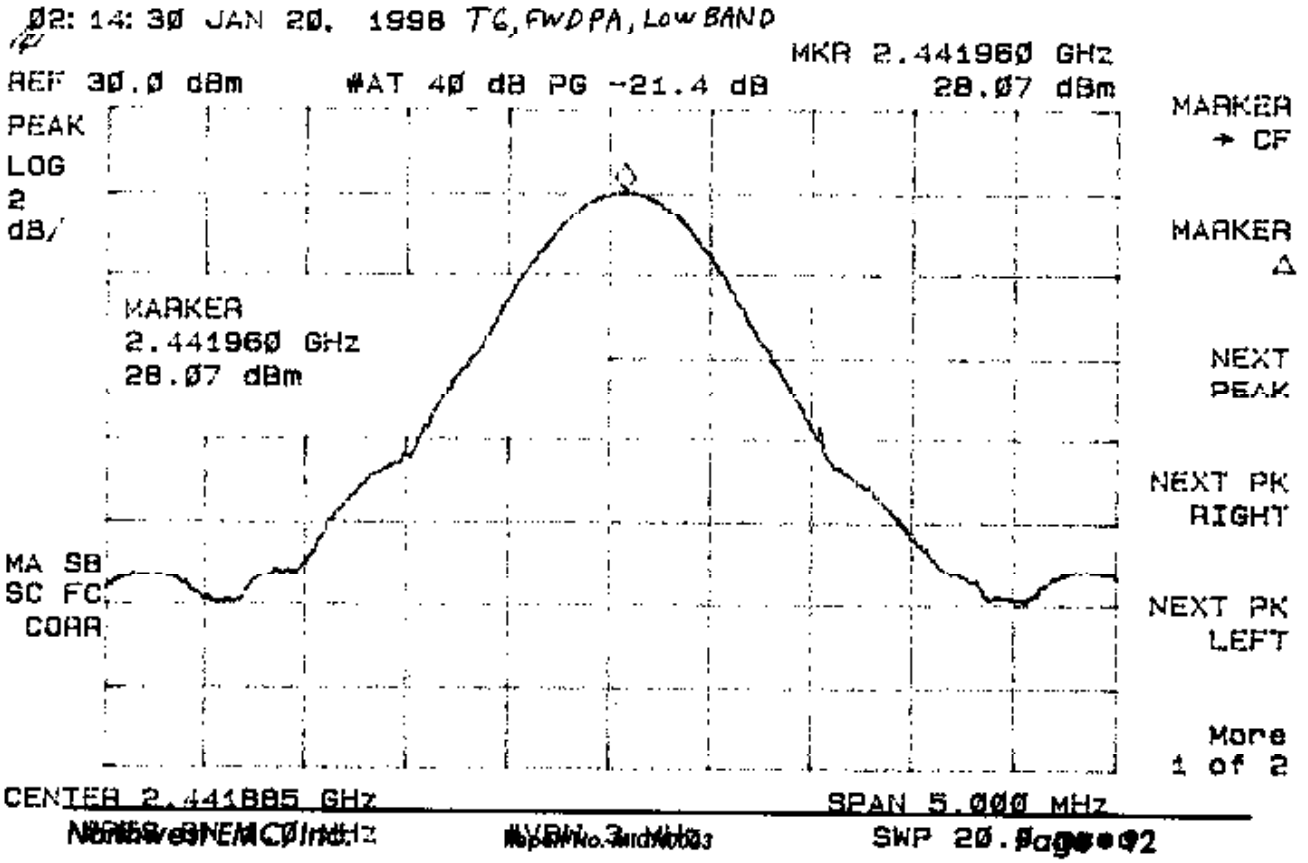

Ø1: 45: 34 JAN 2Ø, 1998 T4, FWD PA, HIGH BAND
MKR 2.441898 GHz
REF 3Ø.Ø dBm
#AT 4Ø dB PG -21.4 dB
26.75 dBm
PEAK
LOG
2
dB/
MARKER
2.441898 GHz
26.75 dBm
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
MA SB
SC FC
CORR
CENTER 2.441885 GHz
#RES BW 1.Ø MHz
#VBW 3 MHz
SPAN 5.ØØØ MHz
SWP 2Ø.Ø msec


Ø1: 49: 14 JAN 2Ø, 1998 T4, FWD PA, LOW BAND
MKR 2.441923 GHz
REF 3Ø.Ø dBm
#AT 4Ø dB PG -21.4 dB
27.37 dBm
PEAK
LOG
2
dB/
MARKER
2.441923 GHz
27.37 dBm
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
MA SB
SC FC
CORR
CENTER 2.441885 GHz
#VBW 3 MHz
SPAN 5.ØØØ MHz
SWP 2Ø.


01:54:34 JAN 20, 1998 T5, FWDPA, HIGH BAND
MKR 2.441910 GHz
26.77 dBm
REF 30.0 dBm
#AT 40 dB PG -21.4 dB
PEAK
LOG
2
dB/
MARKER
2.441910 GHz
26.77 dBm
MA SB
SC FC
CORR
CENTER 2.441885 GHz
#RES BW 1.0 MHz
#VBW 3 MHz
SPAN 5.000 MHz
SWP 20.0 msec
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2


01:58:35 JAN 20, 1998 T5, FWDPA, LOW BAND
MKR 2.441998 GHz
27.39 dBm
REF 30.0 dBm
#AT 40 dB PG -21.4 dB
PEAK
LOG
2
dB/
MARKER
2.441999 GHz
27.39 dBm
MA SB
SC FC
CORR
CENTER 2.441885 GHz
SPAN 5.000 MHz
SWP 20.
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2


Ø2: 11: 1Ø JAN 2Ø, 1998 TG, FWDPA, HIGH BAND
MKR 2.441898 GHz
REF 3Ø.Ø dBm
#AT 4Ø dB PG -21.4 dB
27.48 dBm
PEAK
LOG
2
dB/
MARKER
2.441898 GHz
27.48 dBm
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
MA SB
SC FC
CORR
CENTER 2.441885 GHz
#RES BW 1.Ø MHz
#VBW 3 MHz
SPAN 5.ØØØ MHz
SWP 2Ø.Ø msec


Ø2: 14: 3Ø JAN 2Ø, 1998 TG, FWDPA, Low BAND
MKR 2.441960 GHz
REF 3Ø.Ø dBm
#AT 4Ø dB PG -21.4 dB
28.Ø7 dBm
PEAK
LOG
2
dB/
MARKER
2.441960 GHz
28.Ø7 dBm
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
MA SB
SC FC
CORR
CENTER 2.441885 GHz
#RES BW 1.Ø MHz
#VBW 3 MHz
SPAN 5.ØØØ MHz
SWP 2Ø.Ø msec

7.4 Antenna Conducted Emissions

As per Section 15.247 (c), the following graphs show that the maximum level of harmonics/spurs are at least 20dB down from the highest emission level within the authorized band. The conducted emissions were measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the antenna port of the EUT and the spectrum analyzer. The resolution bandwidth was set to 100 kHz and the video bandwidth was set to 100 kHz. The EUT was scanned up to 25 GHz on all transmit ports.

Data is included for all available EUT operations:
1. Return link (Rtn PA) High, Mid, and Low Bands
2. Forward link (Fwd PA) High, Mid and Low Bands

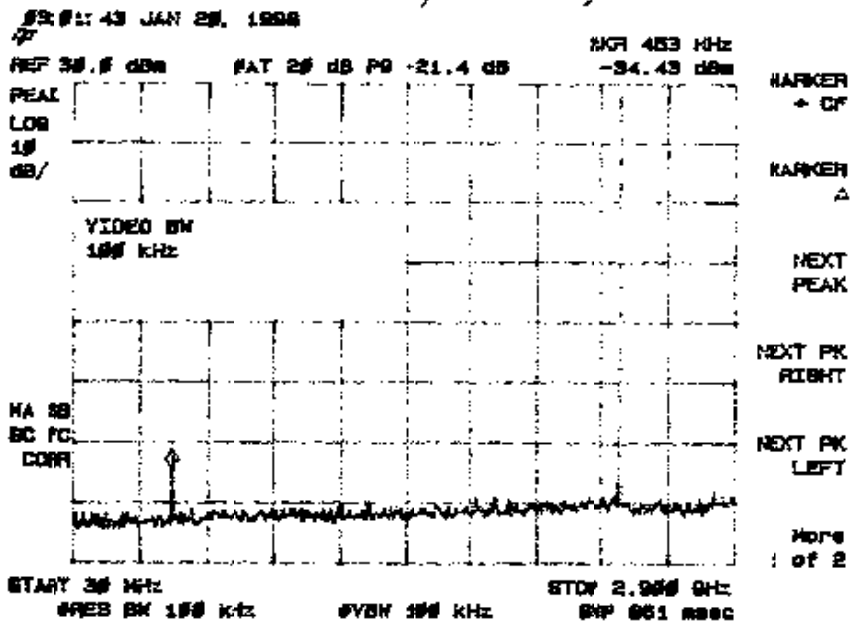
Results: All Harmonics or spurs are greater than 20dB below the level of the transmit frequency.

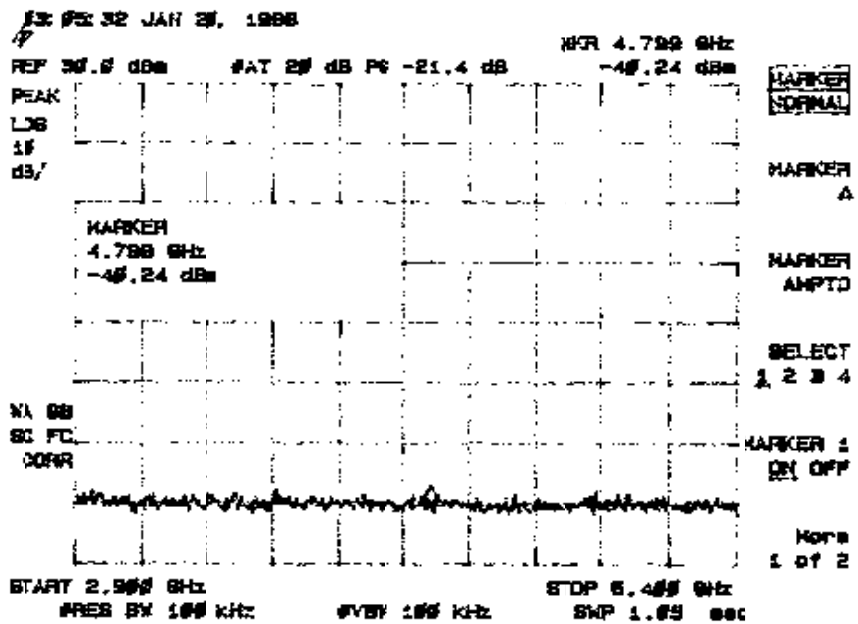
Test Personnel:

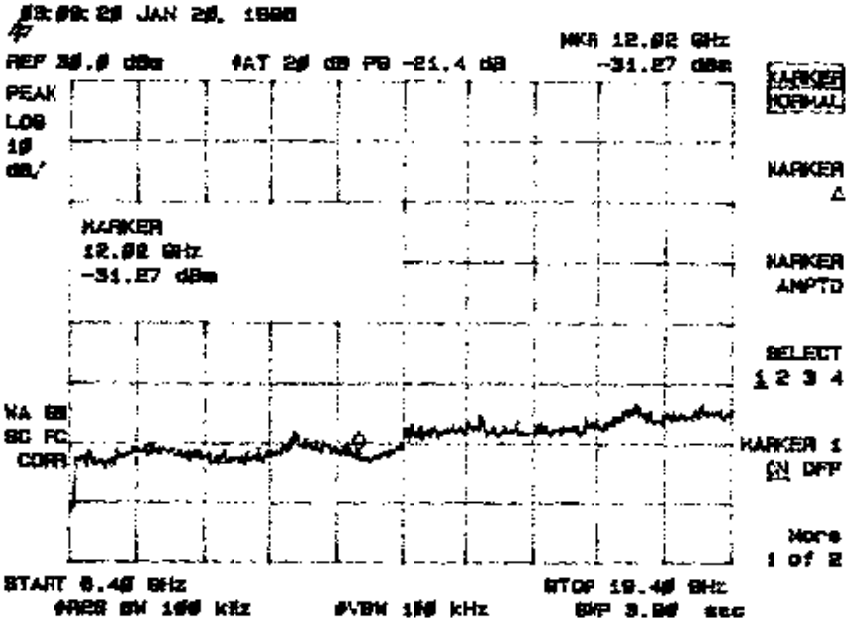
Tester Signature: _____ Date: 3/6/98

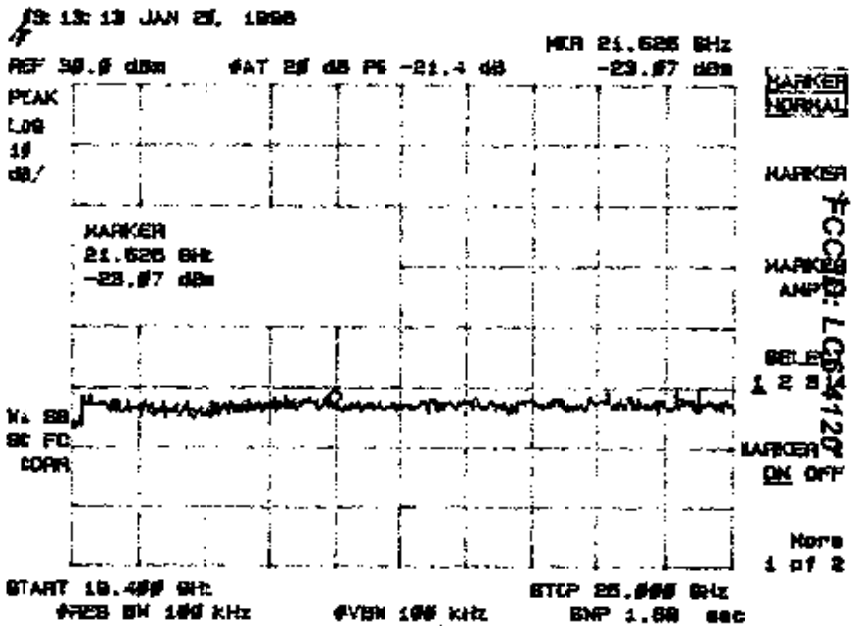
Typed/Printed Name: Dean Ghizzone

T1, RTN PA, LO VCO

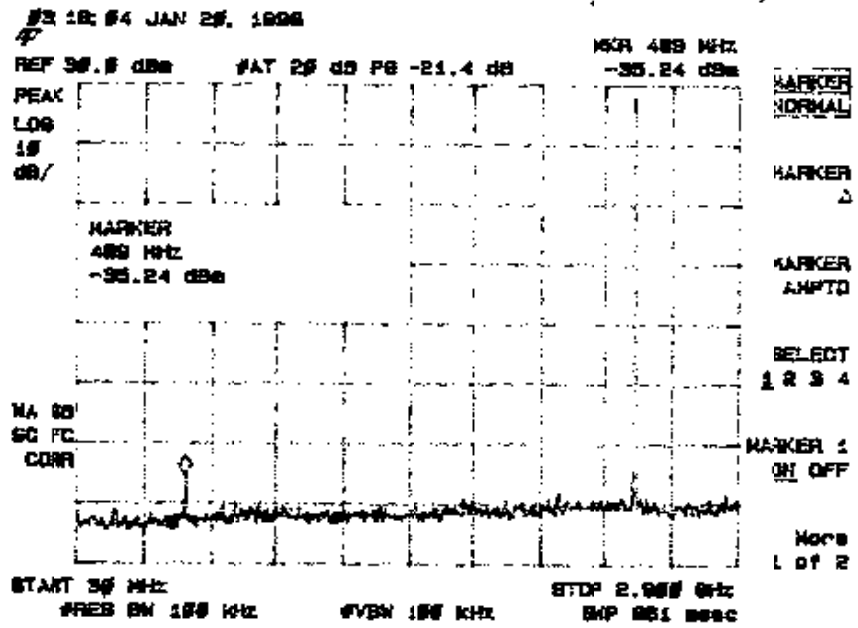


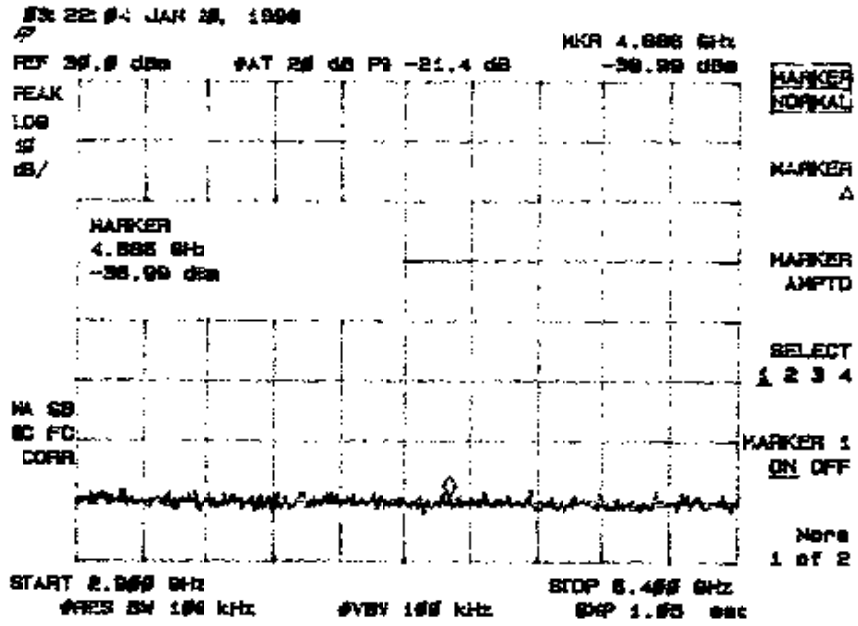


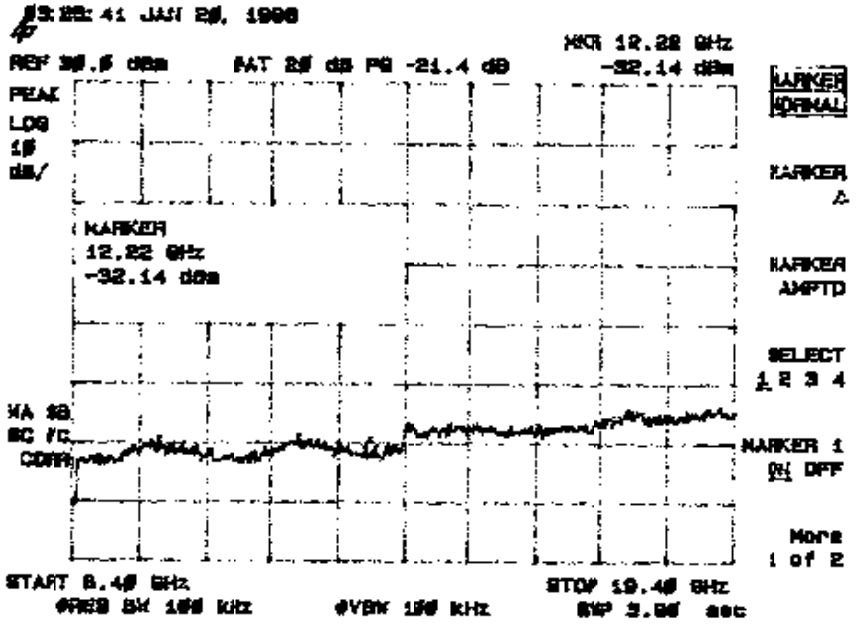


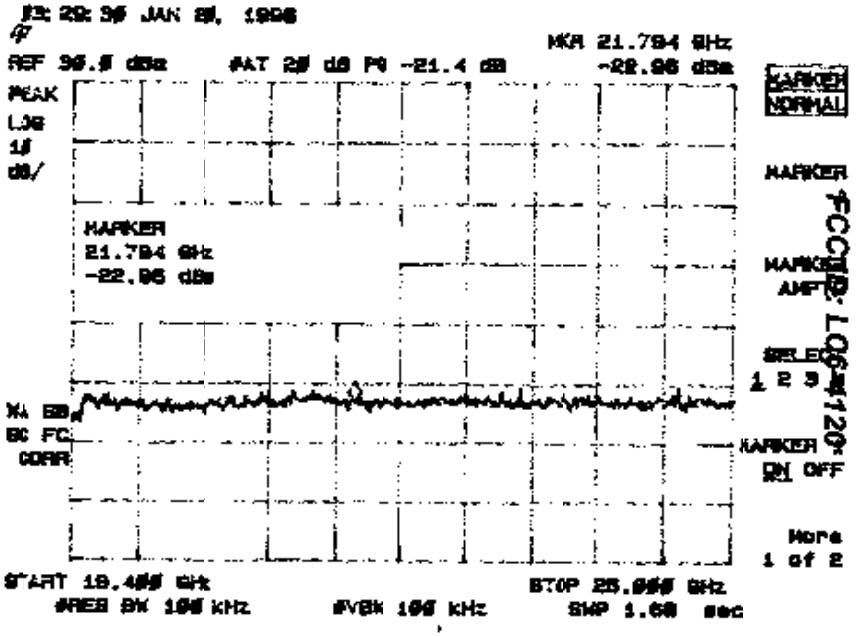


T1, RTN PA, MID VCO



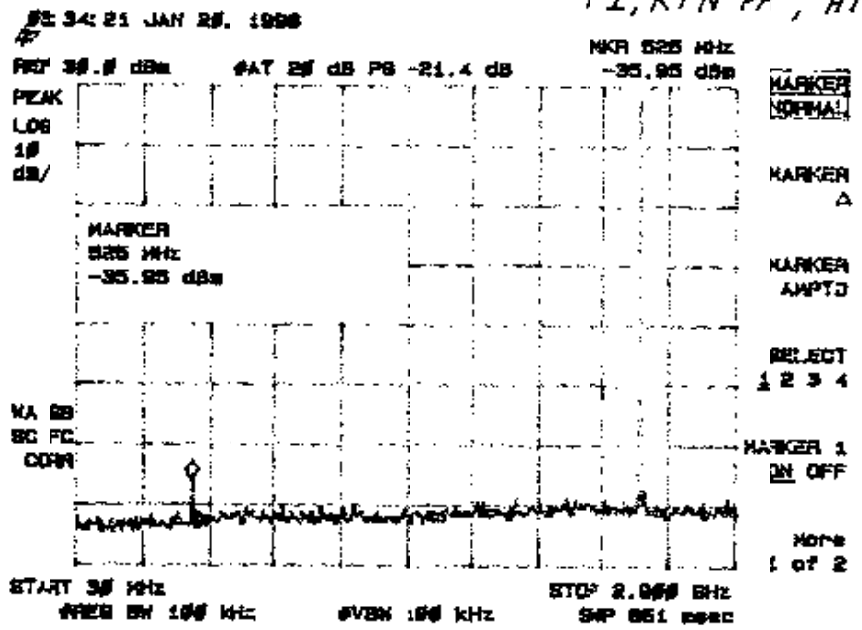


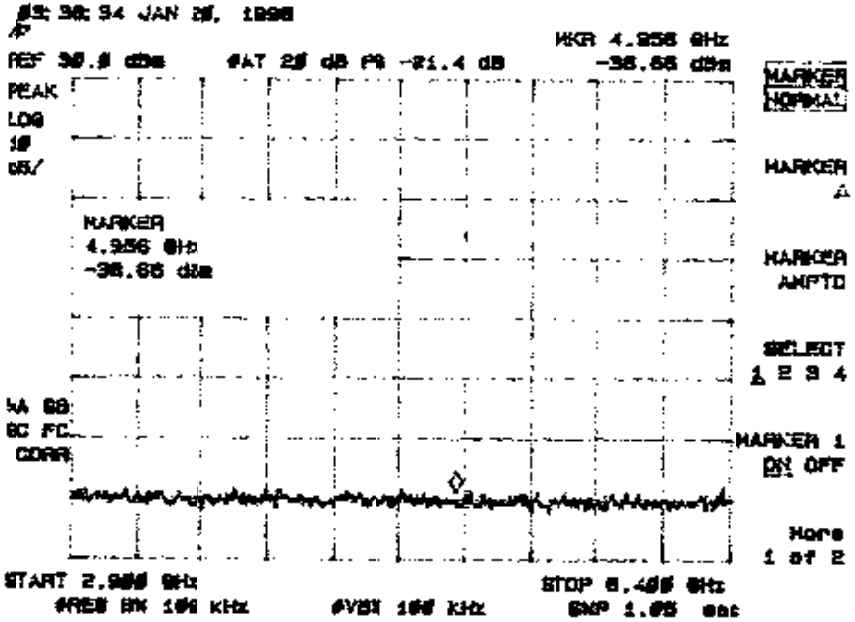


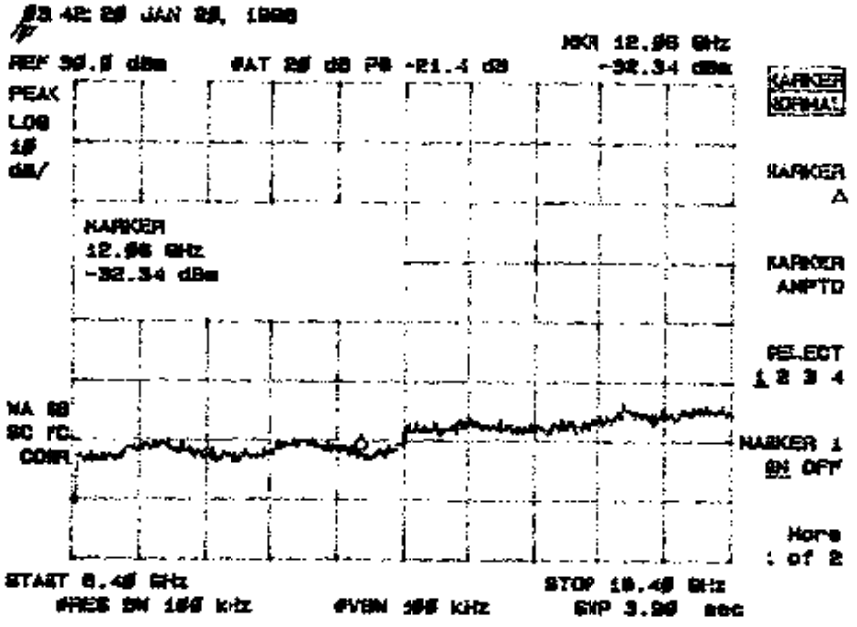


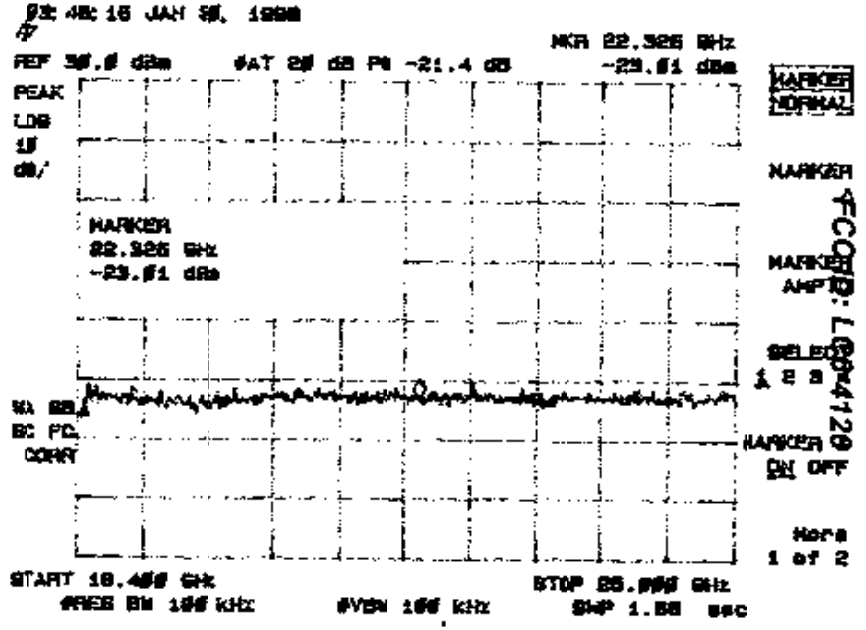
FCC ID: LQG-4120*

T1, RTN PA , HI VCO



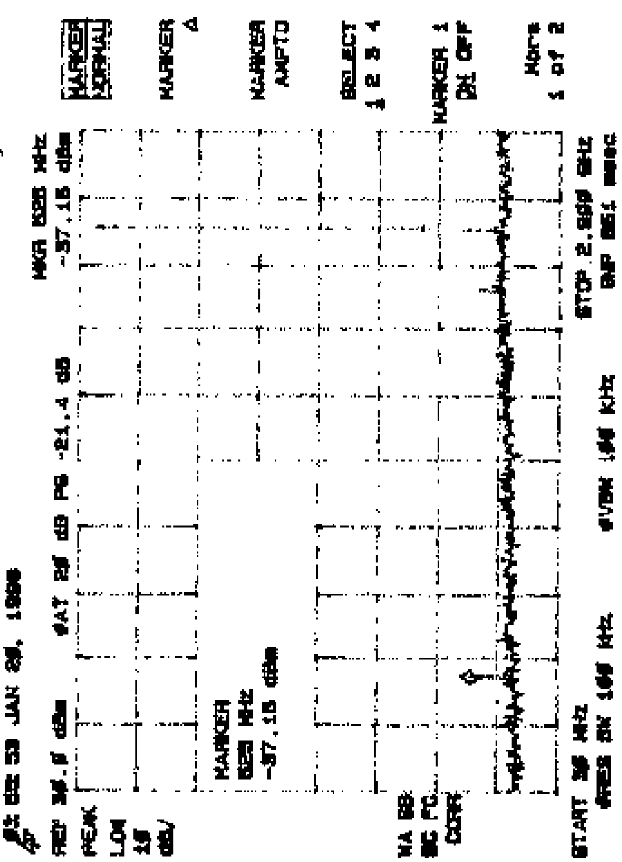


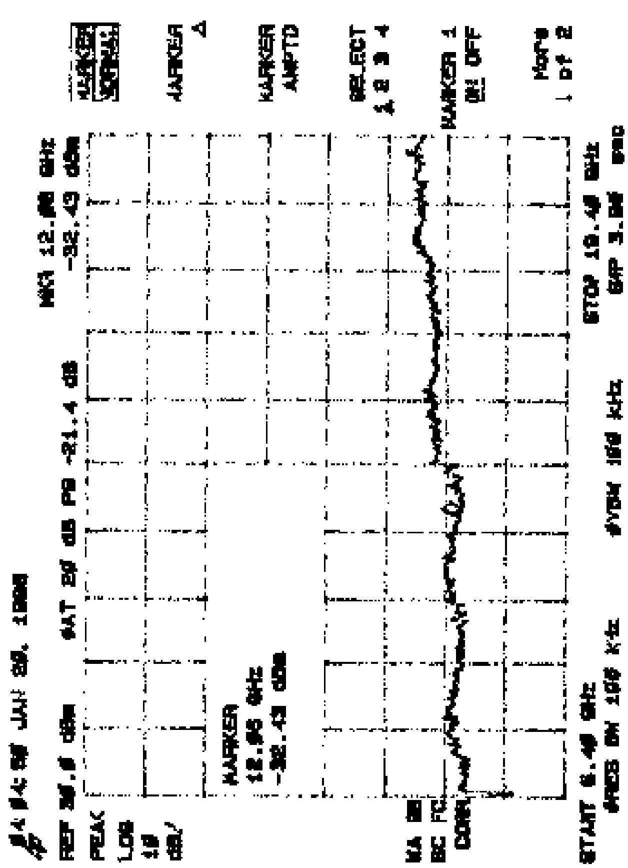


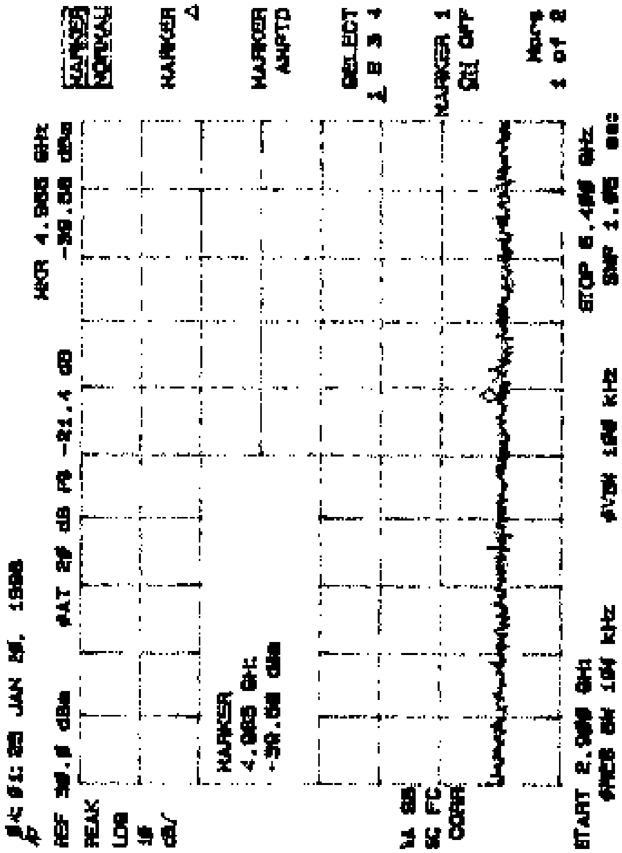


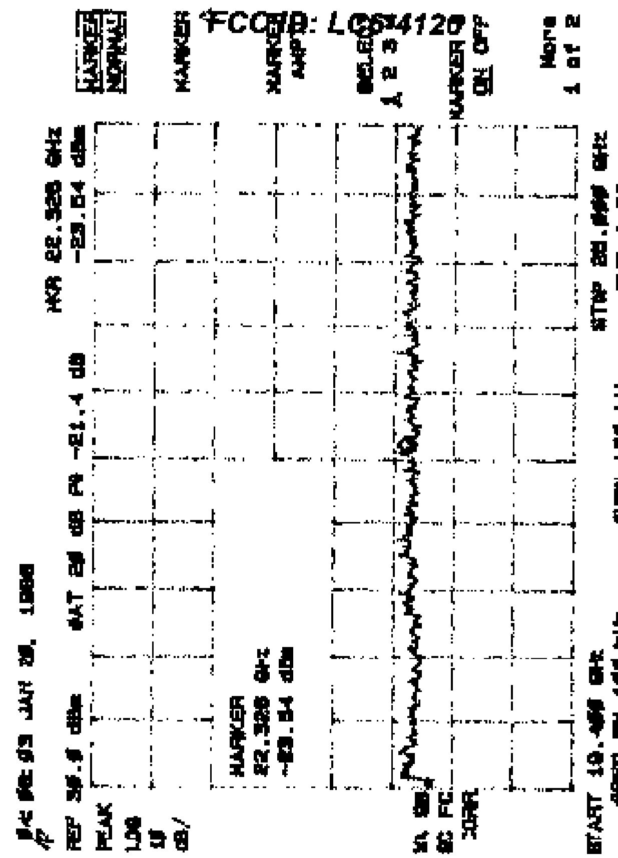
T2, RTN PA, HI VCO

FCCID: LC6*4120

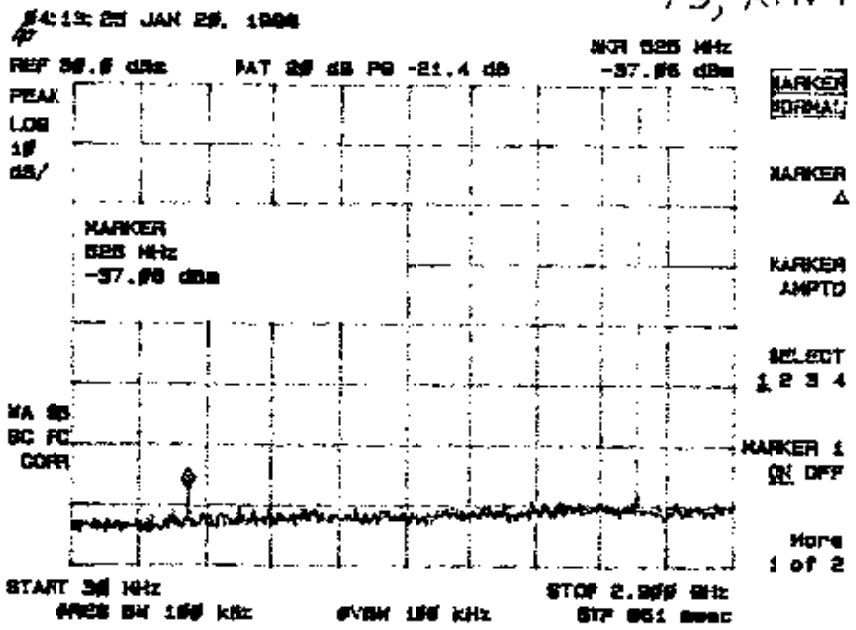


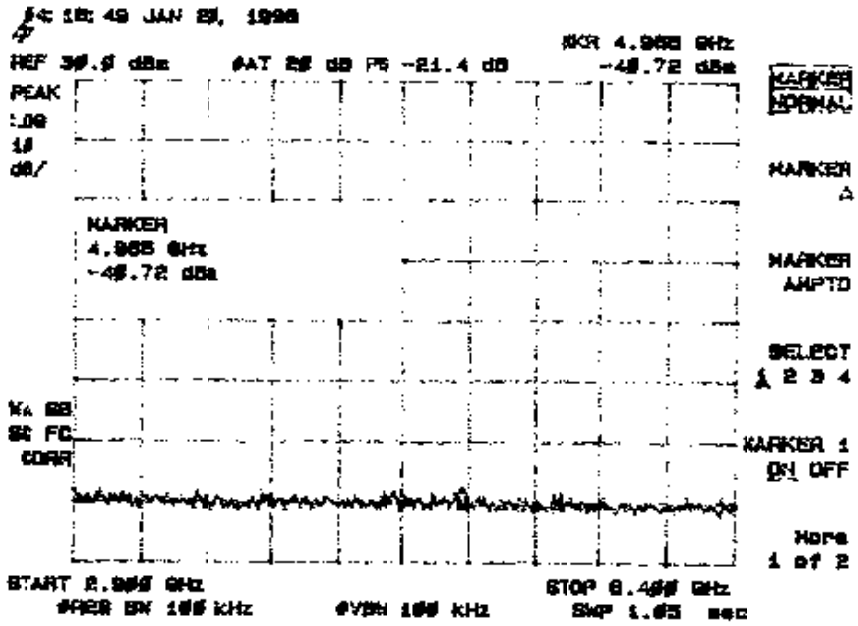


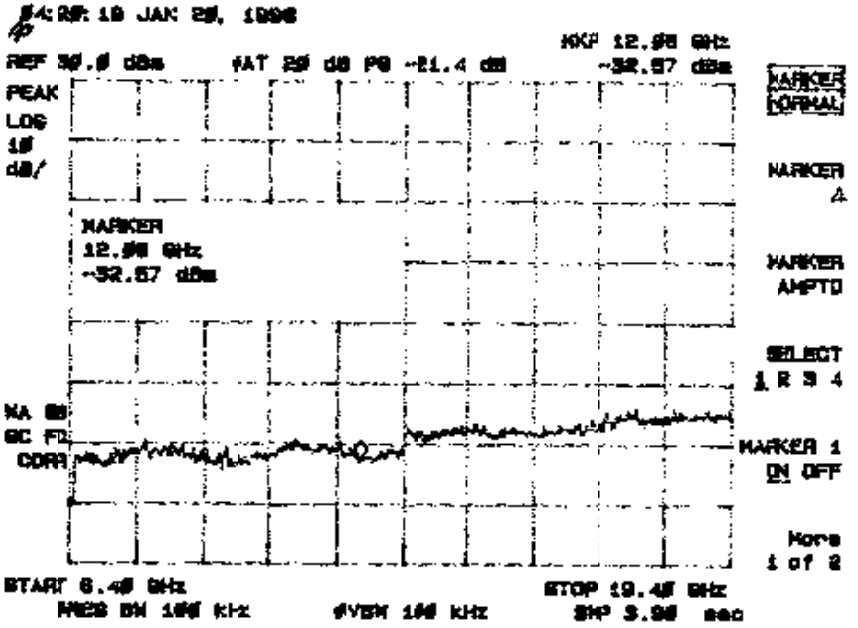


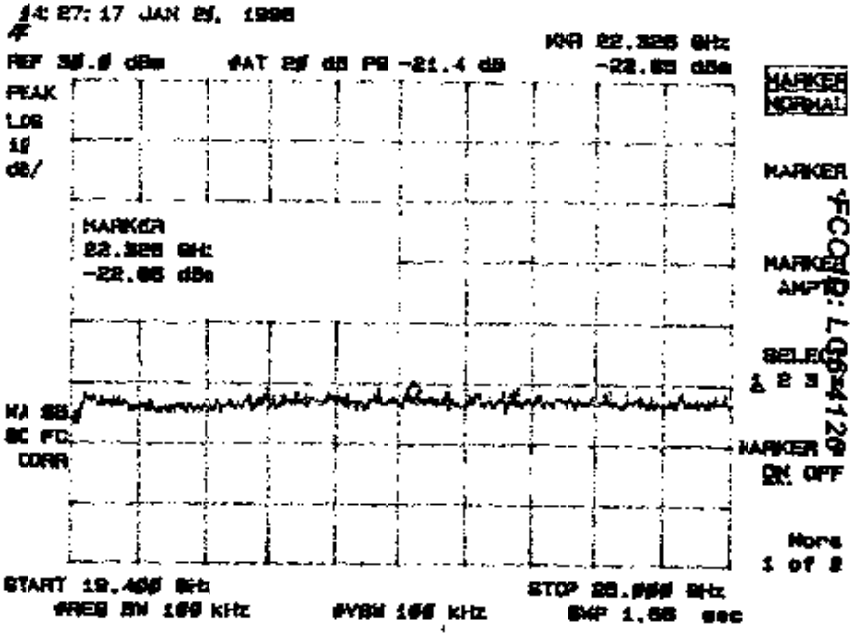


T3, RTN PA, HI VCO

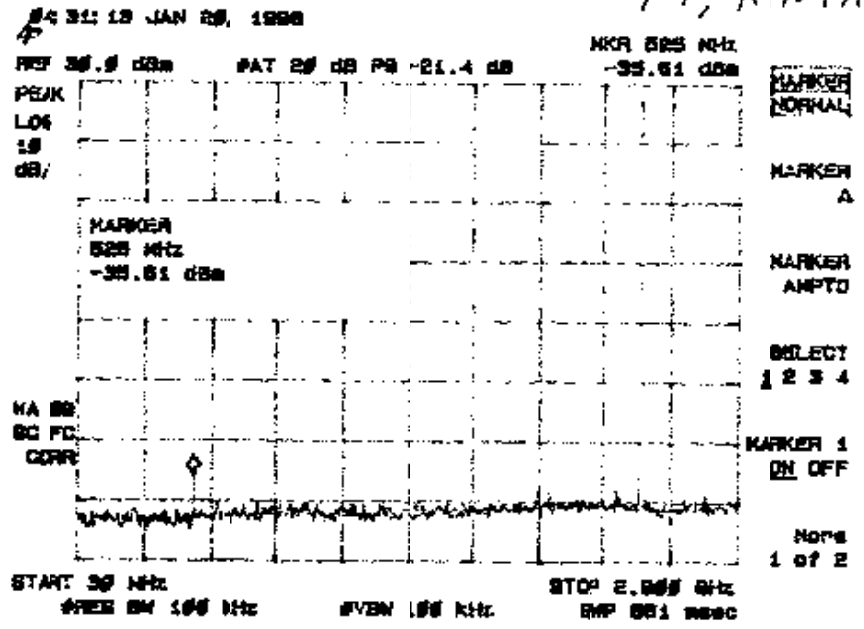


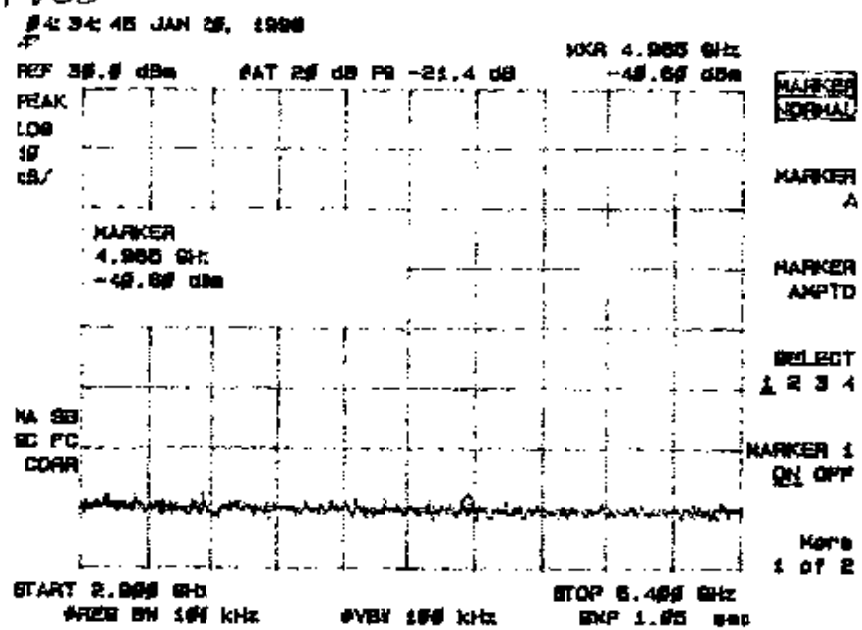


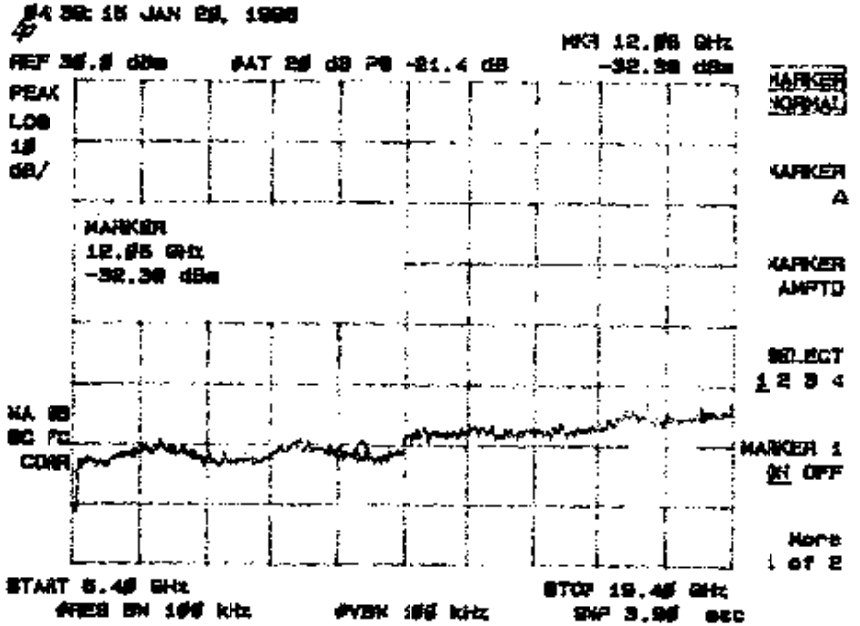


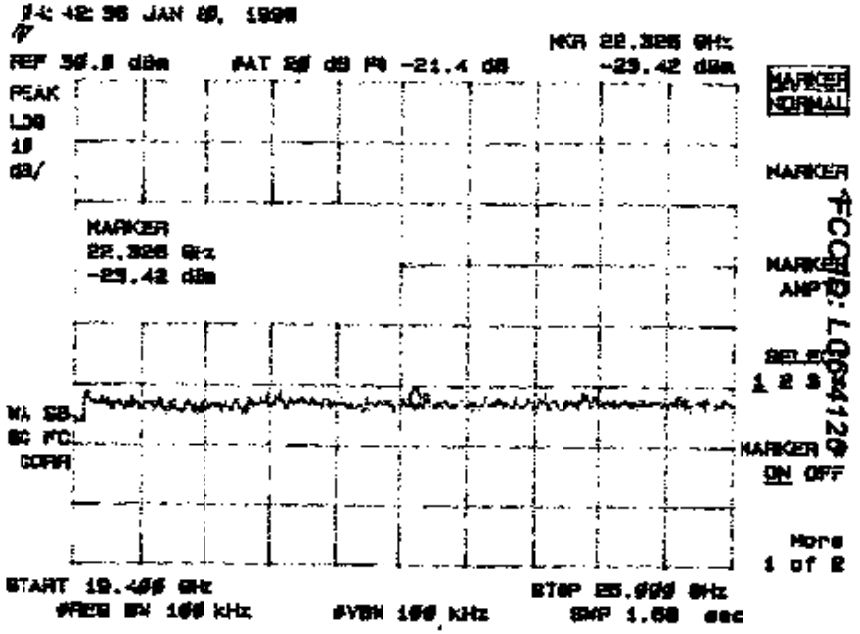


T4, RTN PA, HI VCO

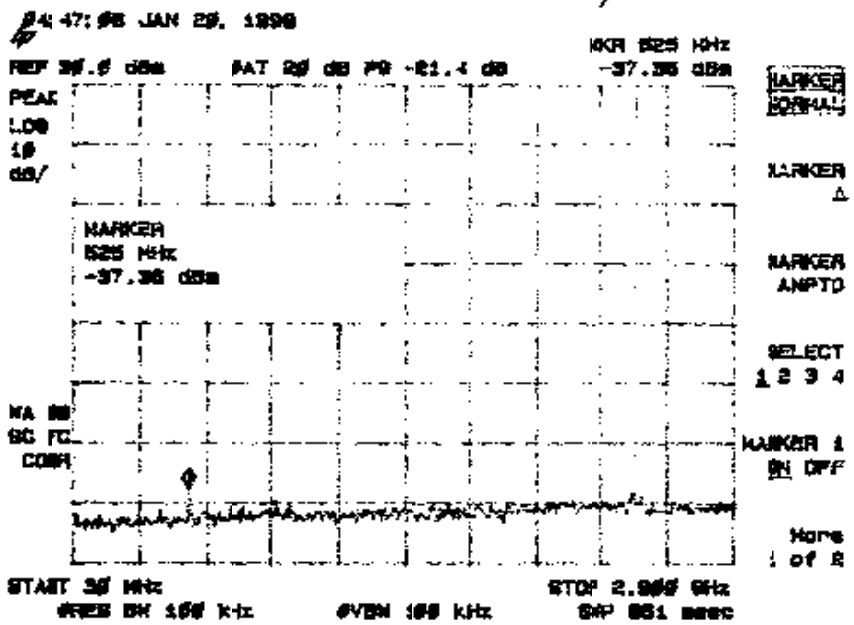


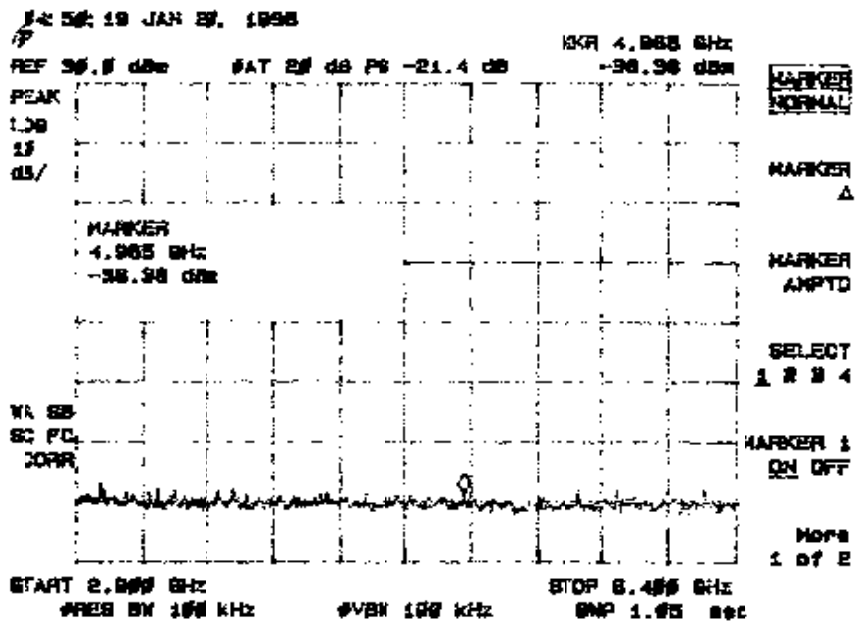


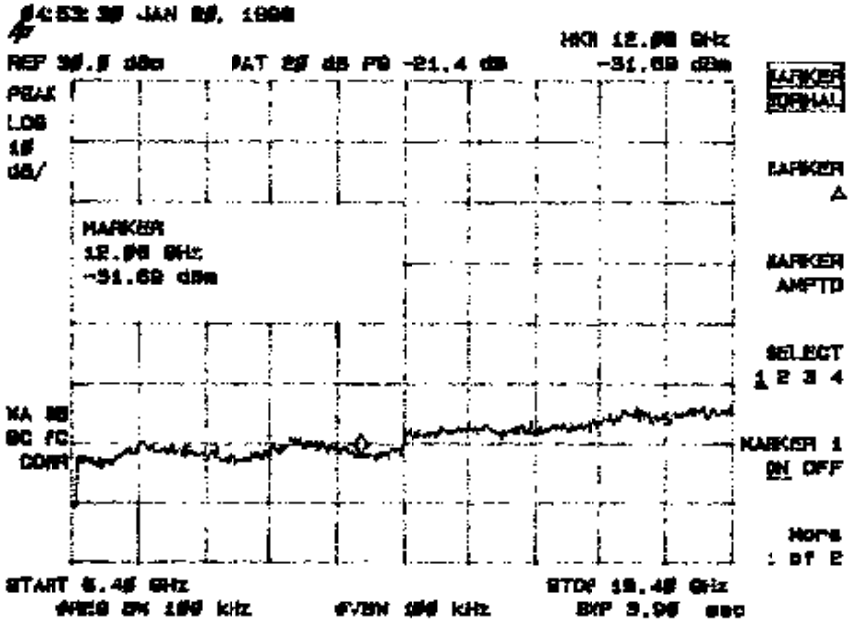


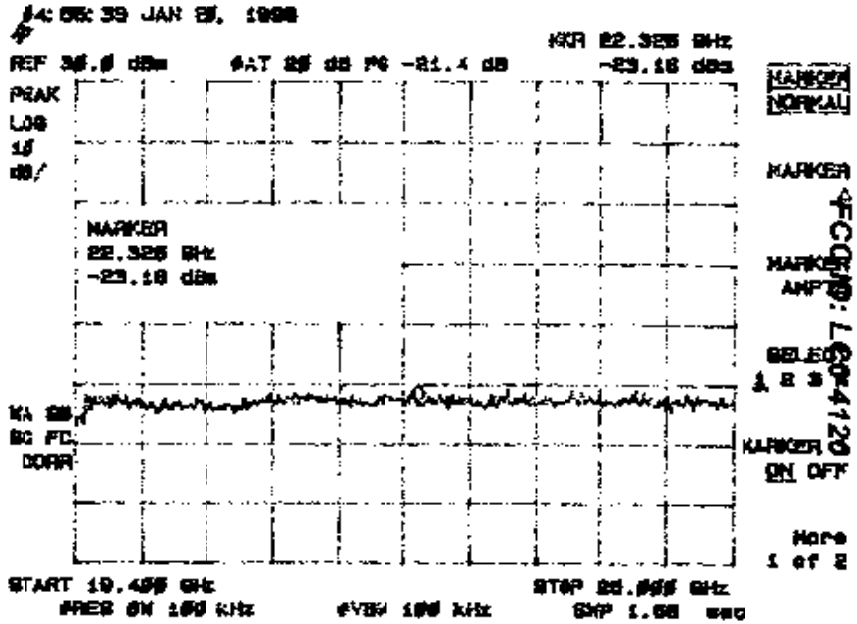


T5, RTN PA, HI VCO

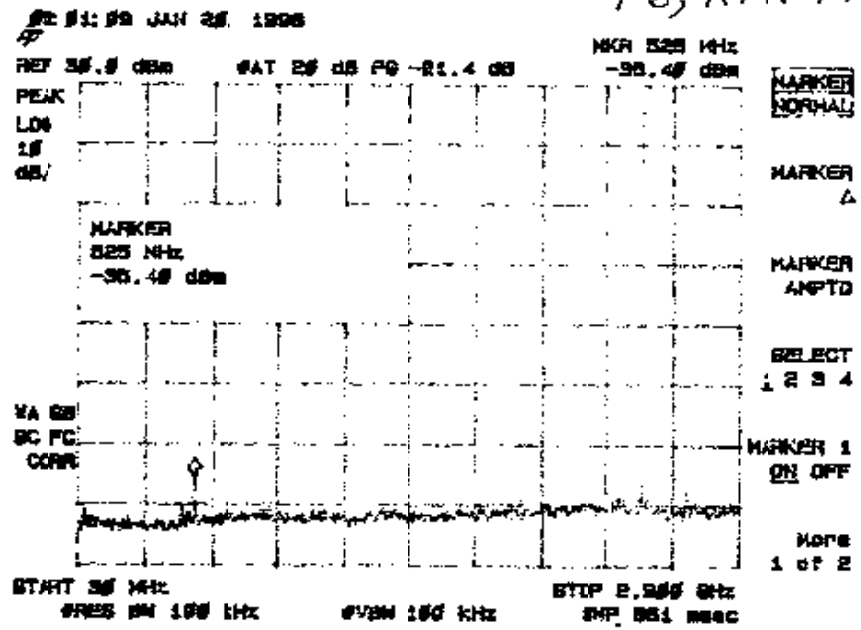


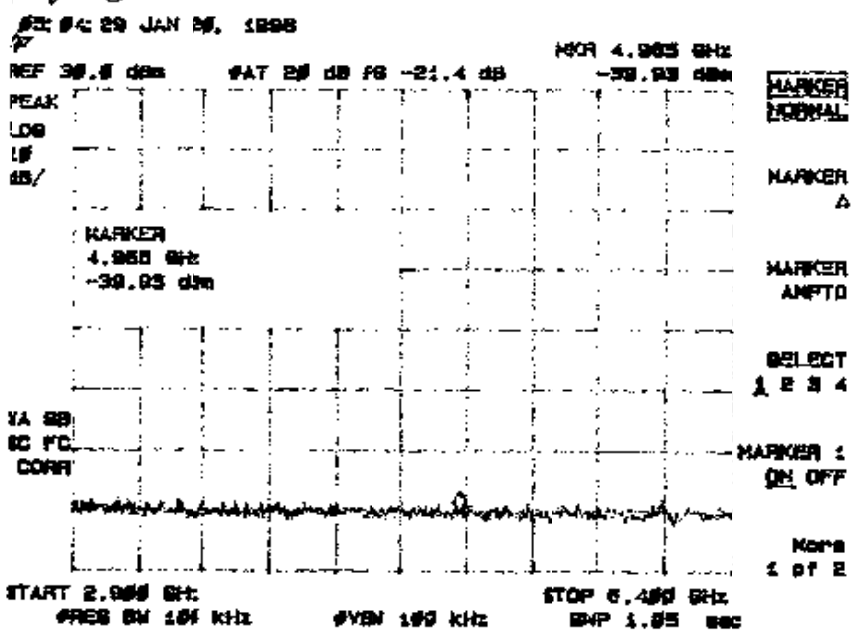


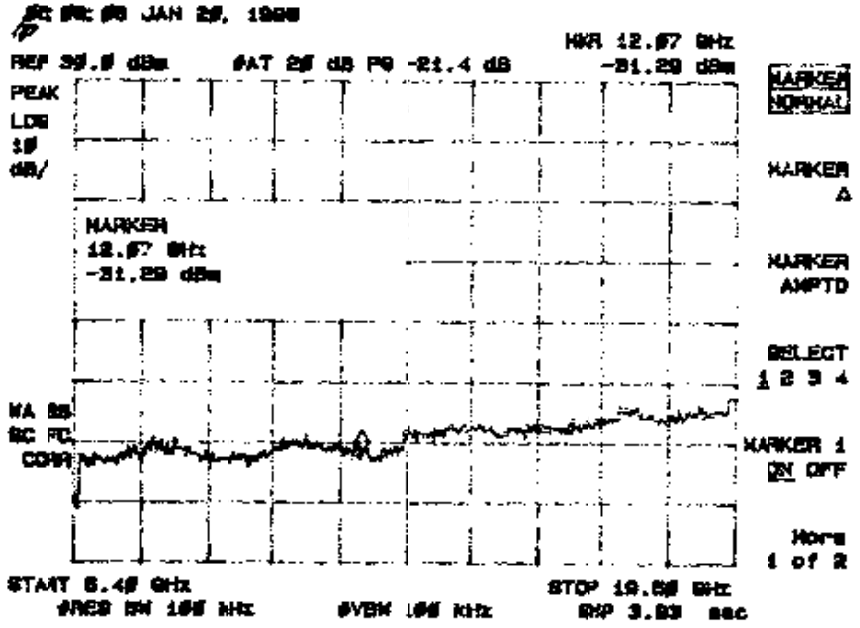


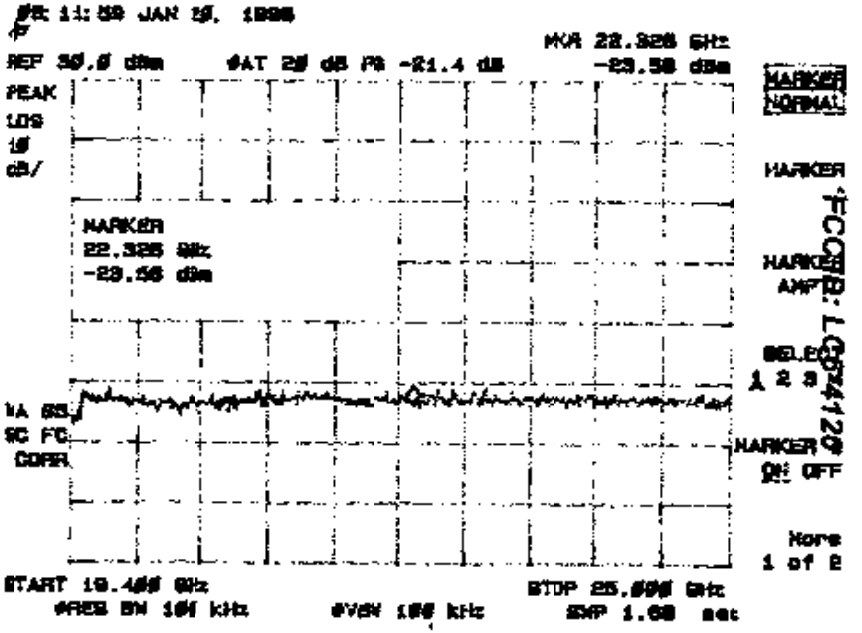


TG, RTN PA, HI VCO

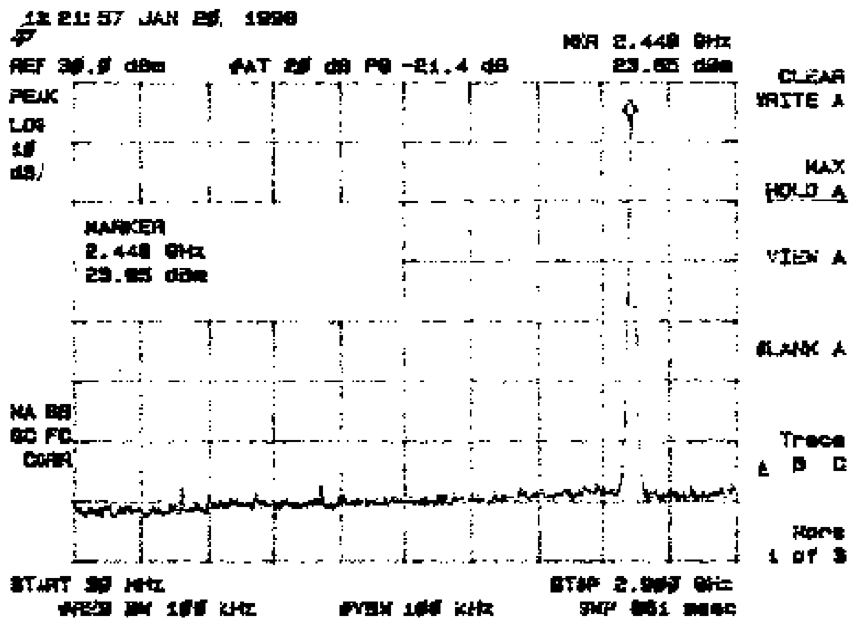


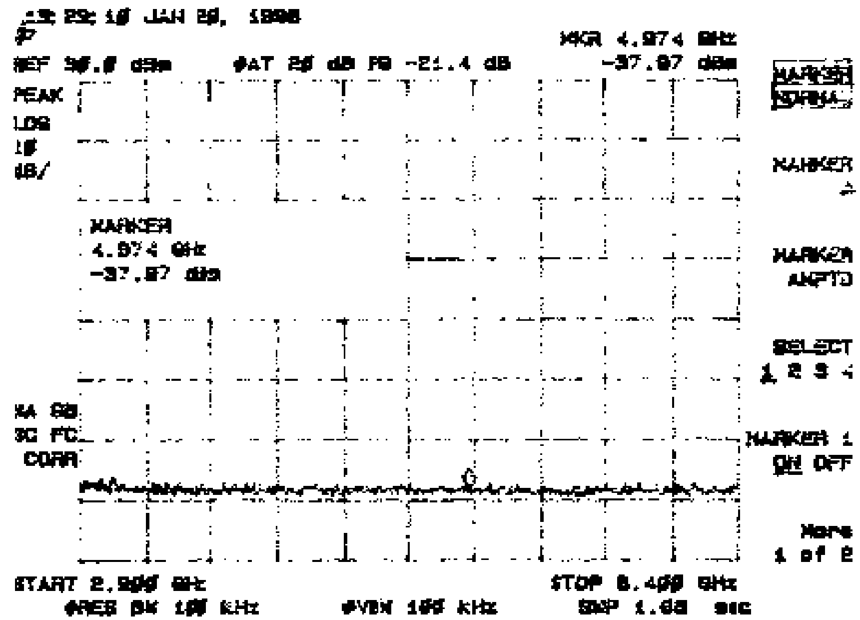


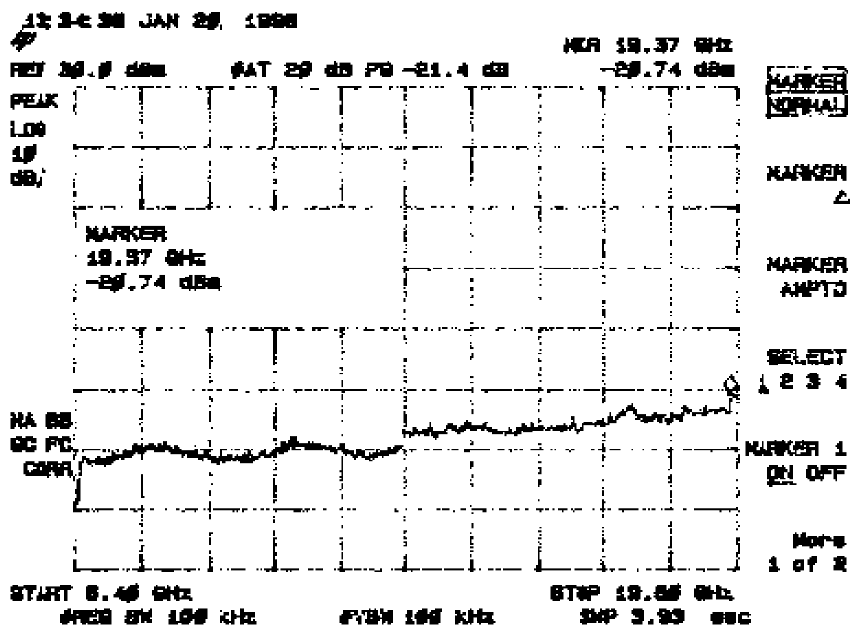


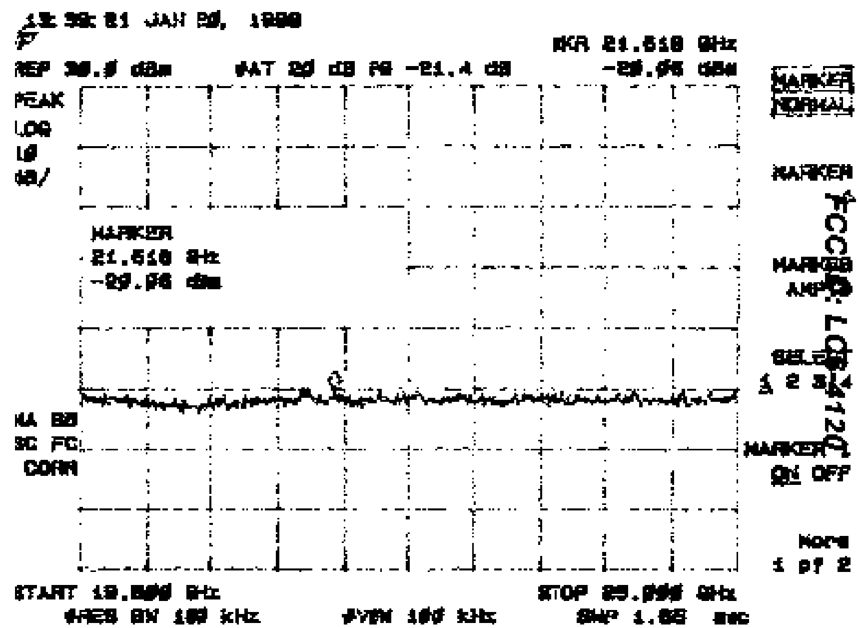


T6, FWD PA, LOW BAND





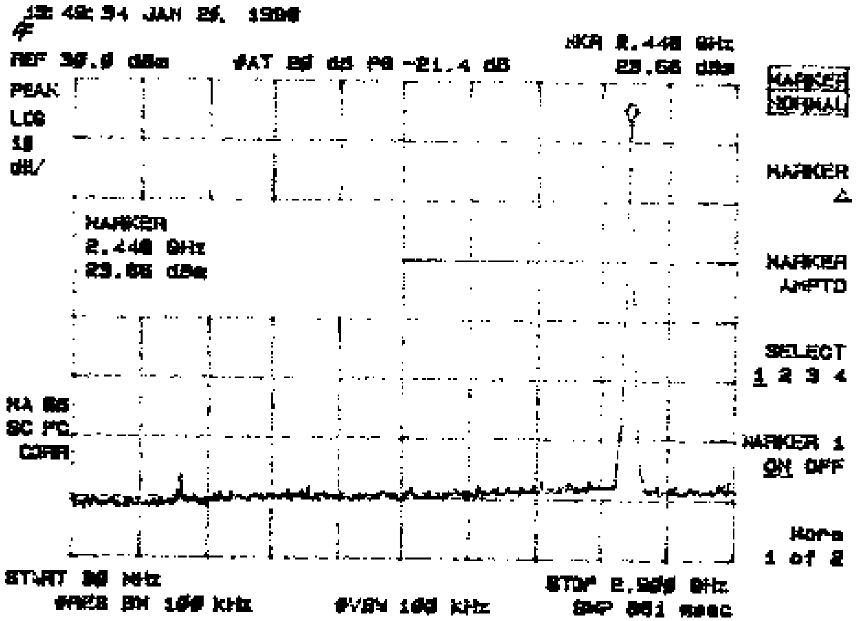


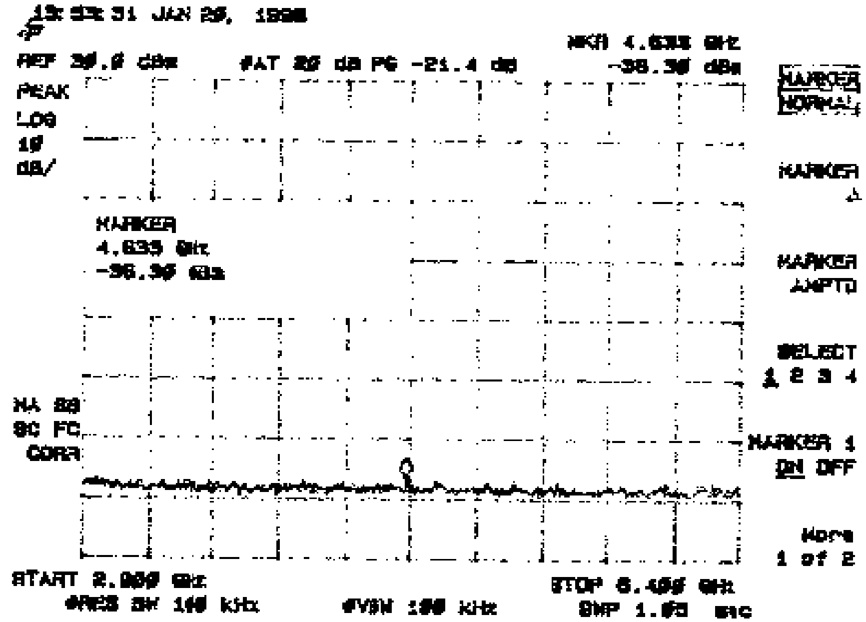


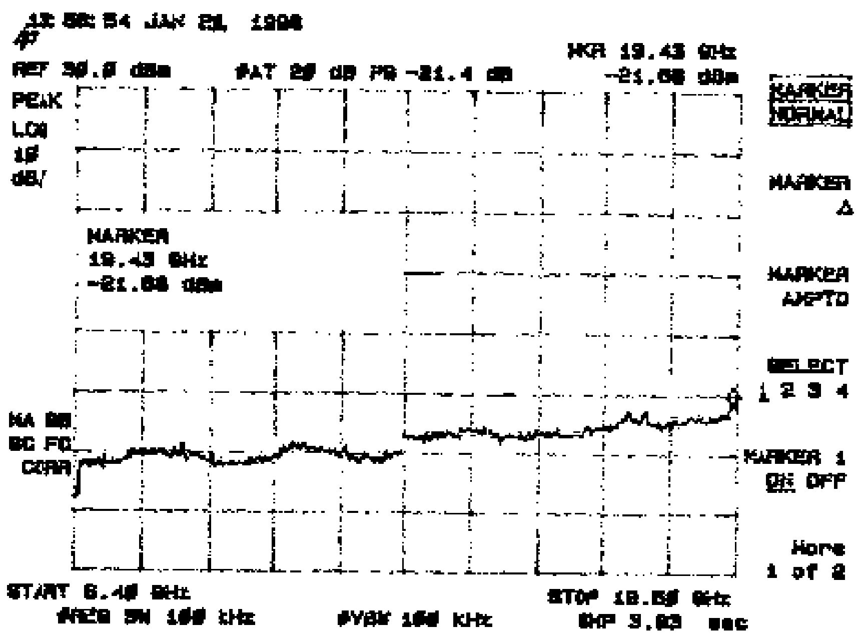
FCC ID: LO -4120

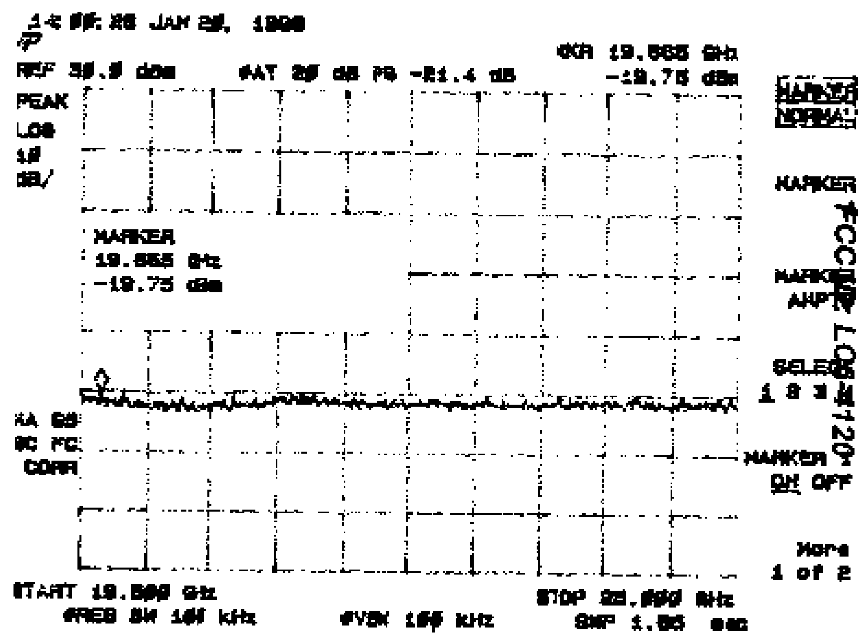
24

T6, FWD PA, HIGH BAND



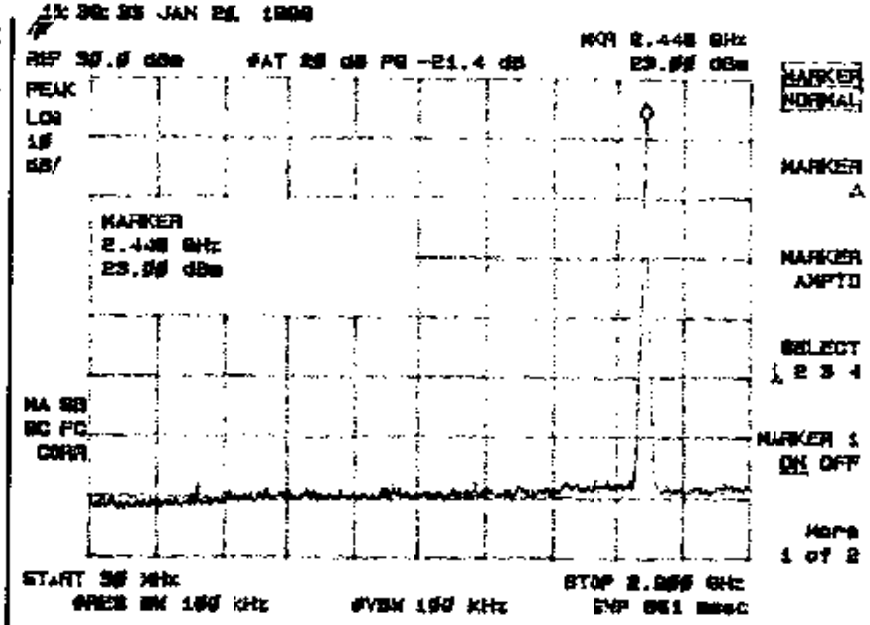


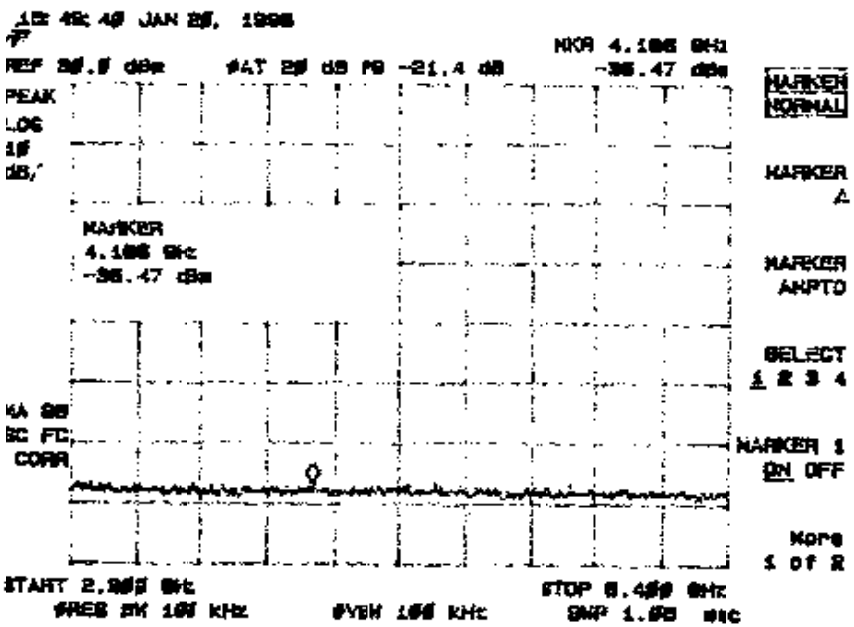


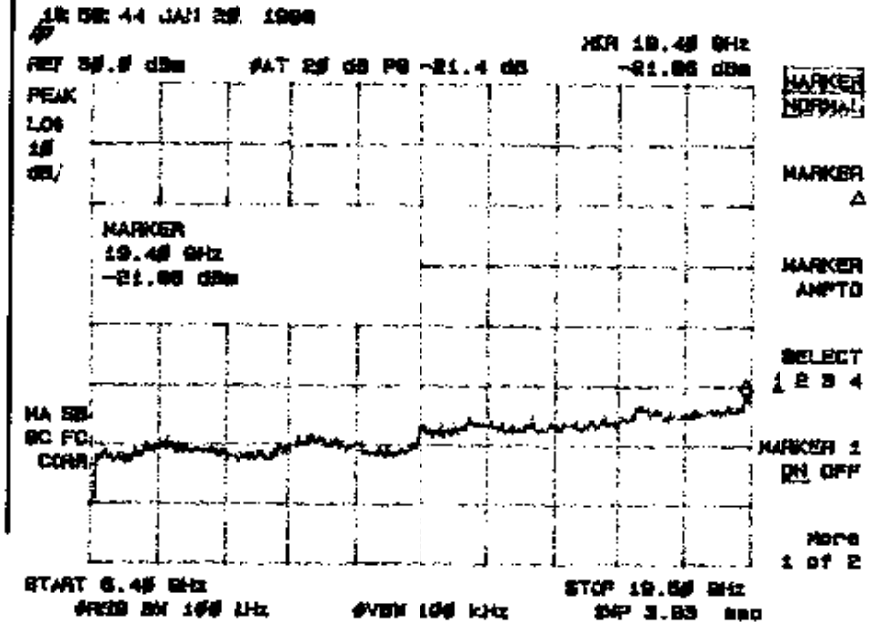


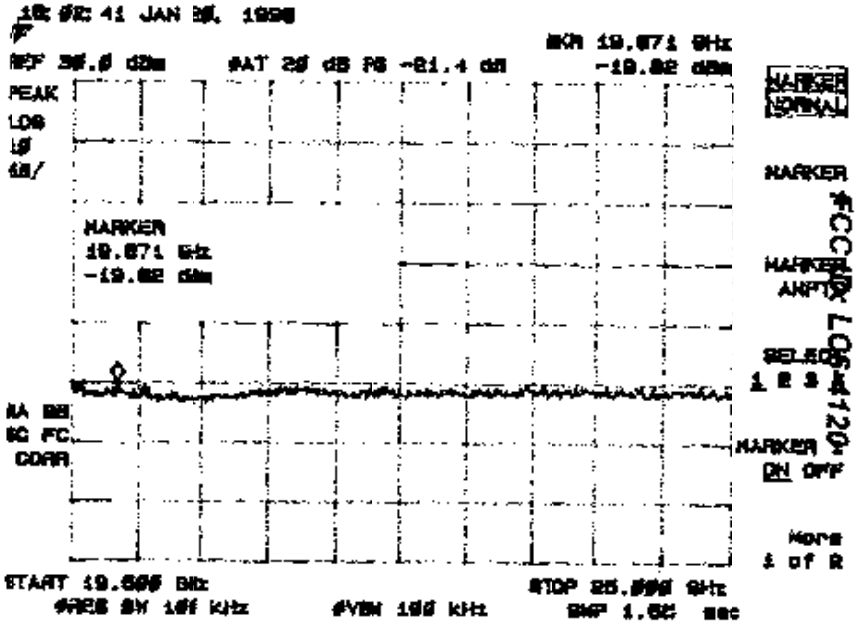
FCCID: LO6-120

T5, FWD PA, LOW BAND

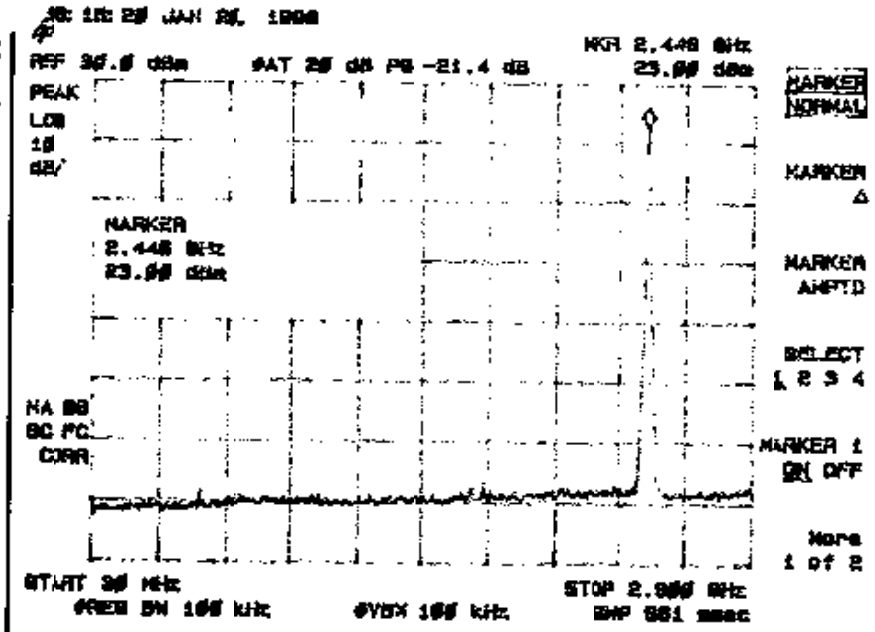


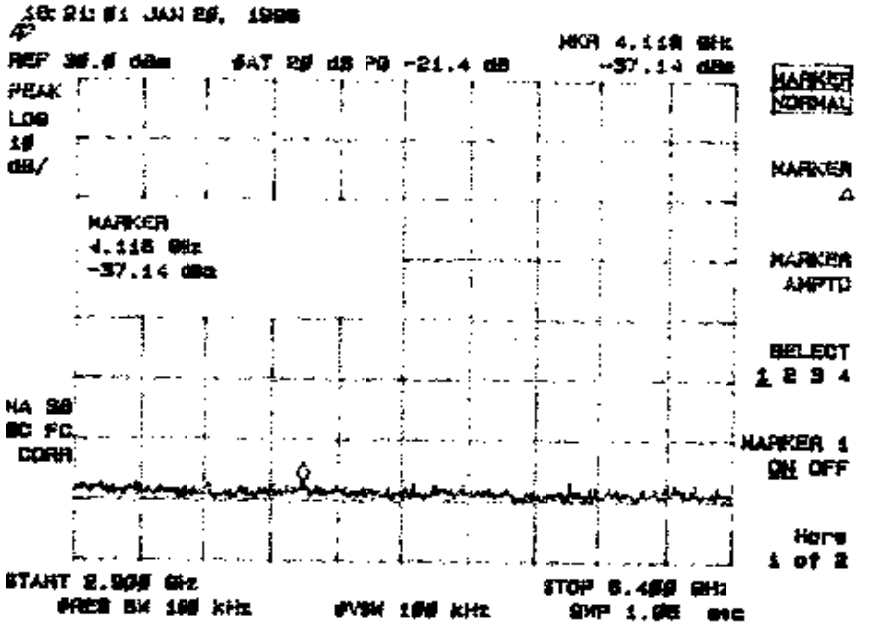


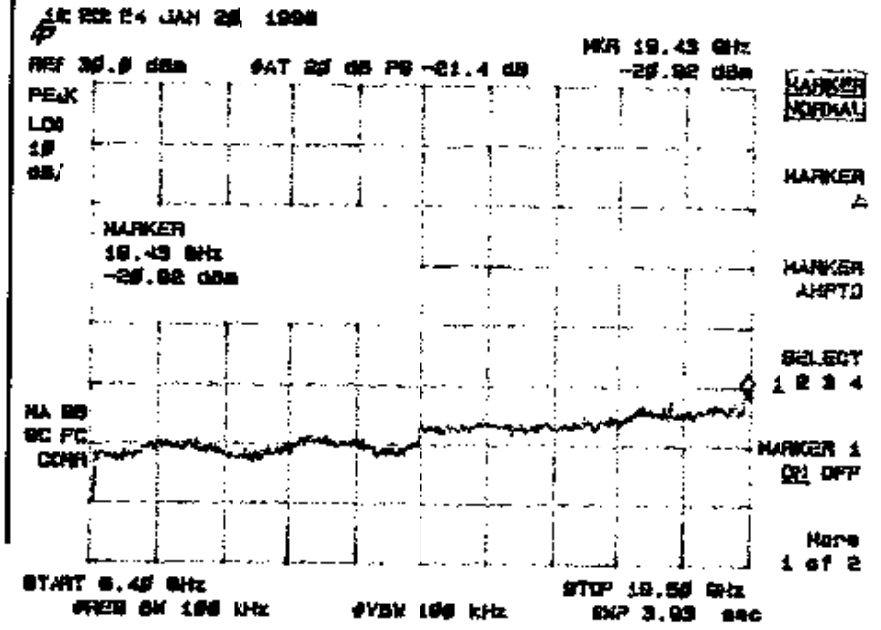


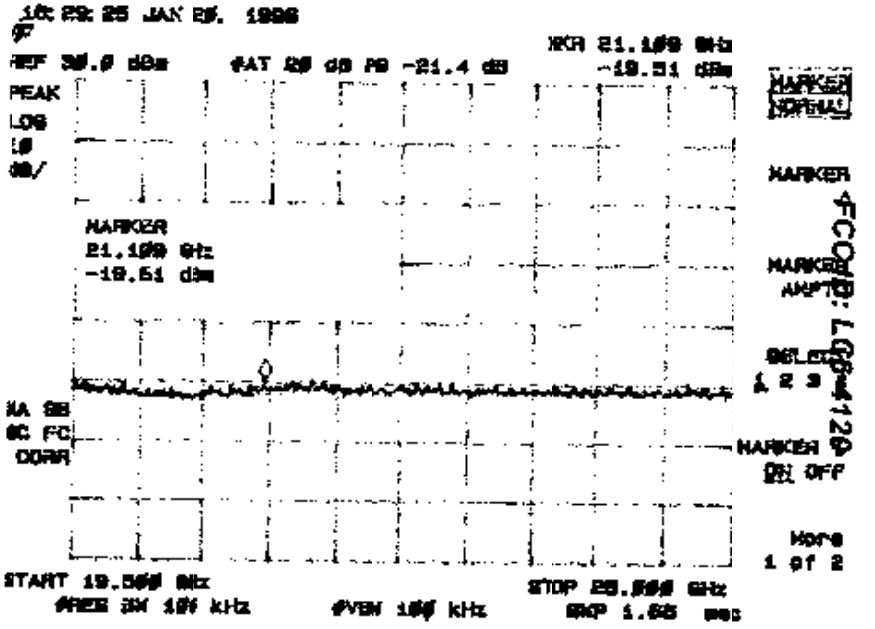


T4, FWD PA, LOW BAND



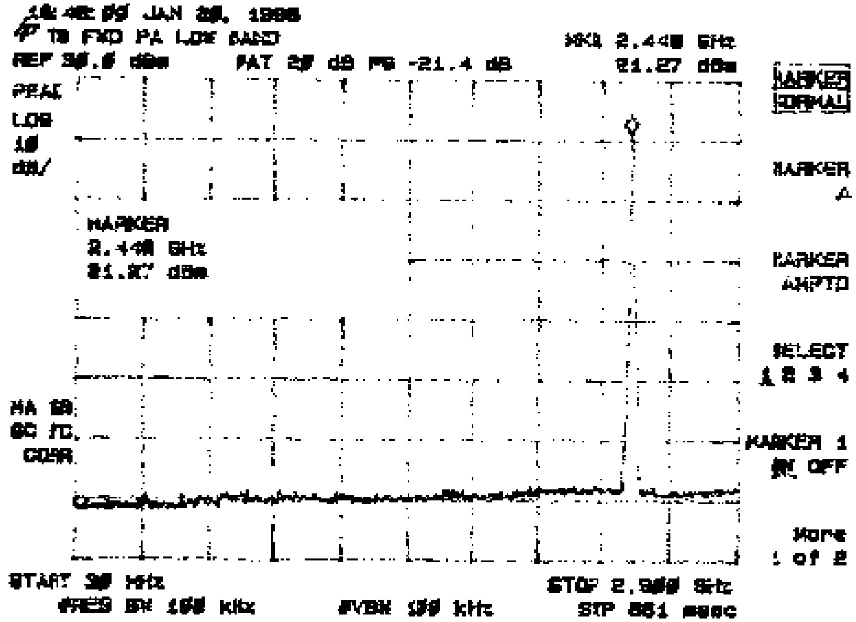


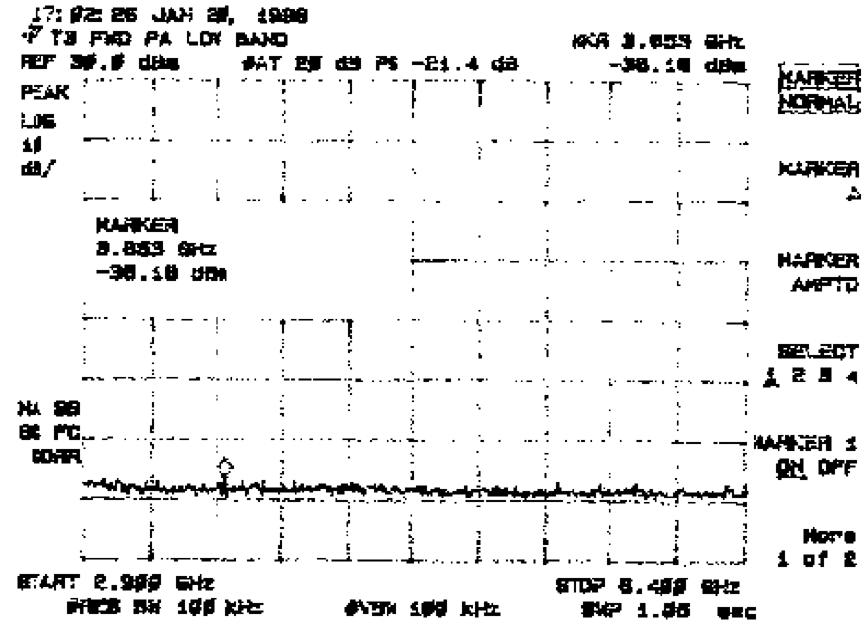


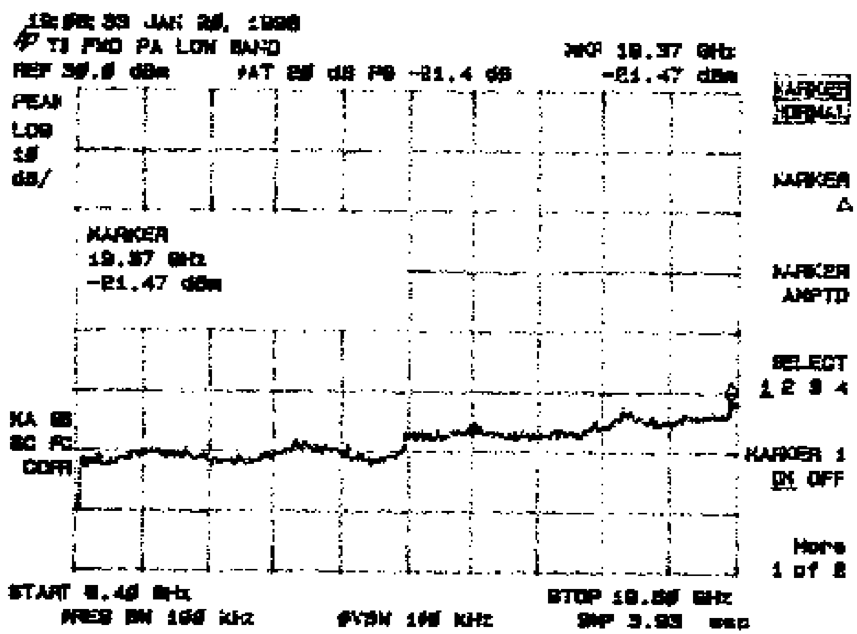


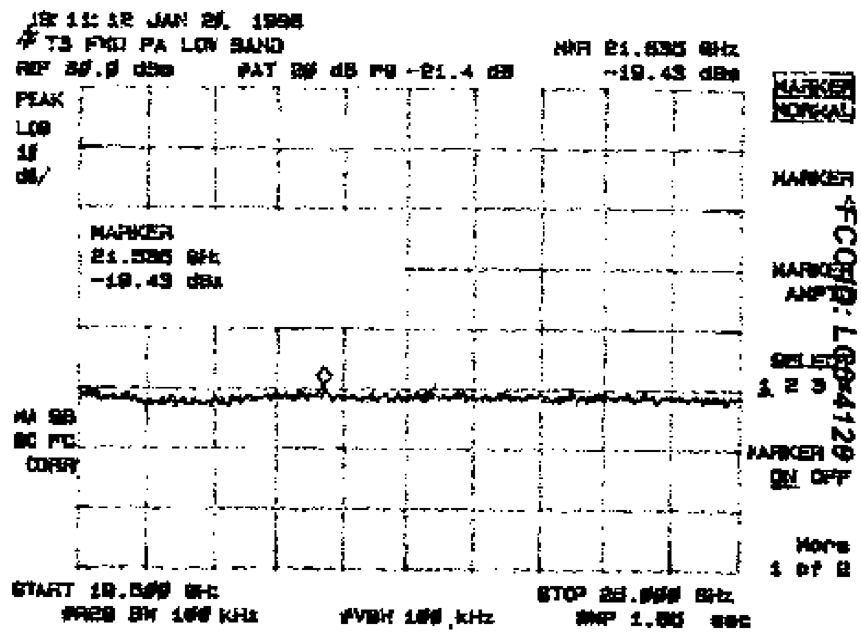
FCC ID: LQP4129

T3 , FWD PA , LOW BAND



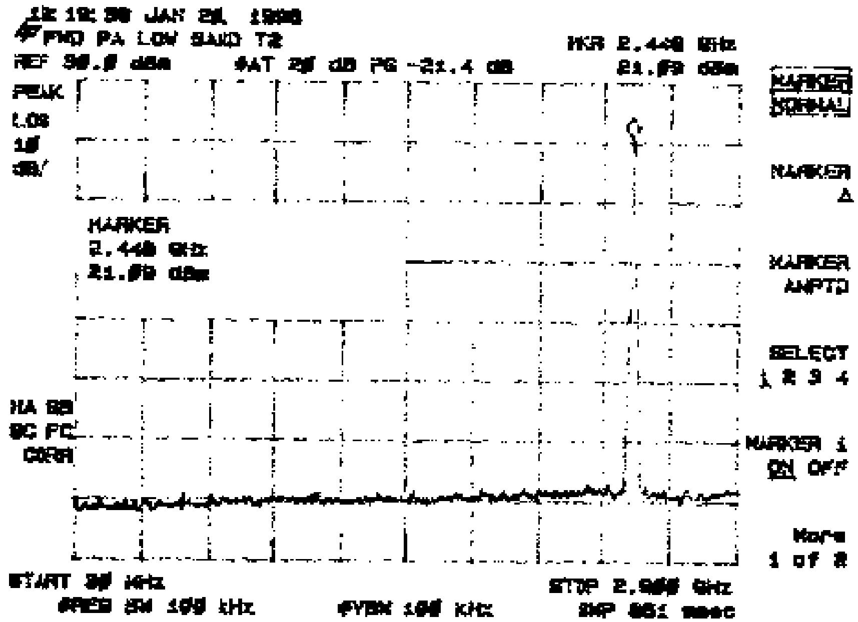


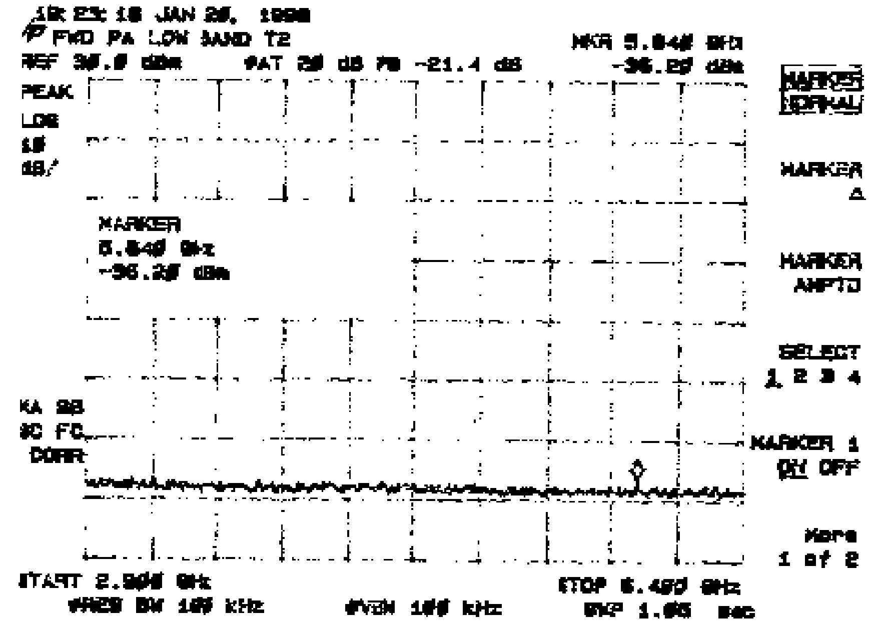


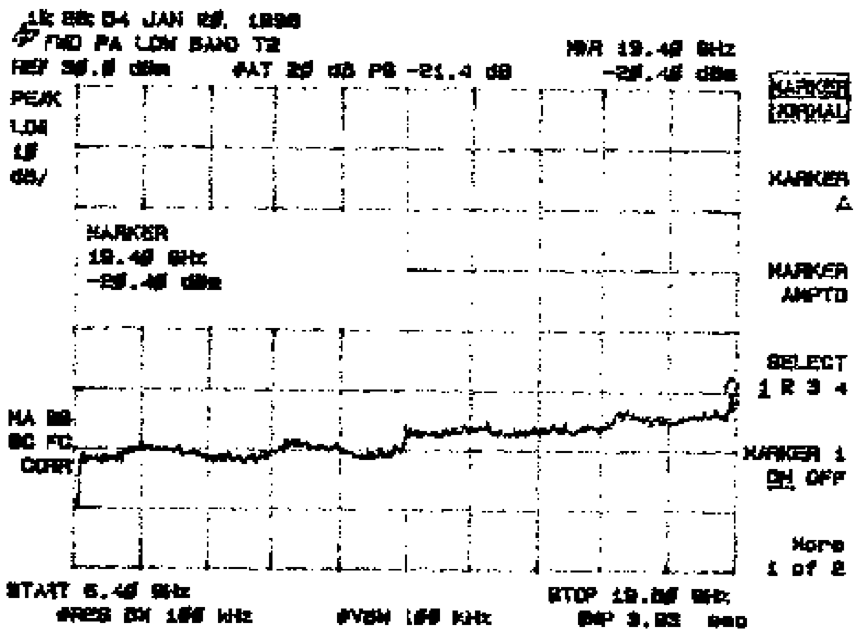


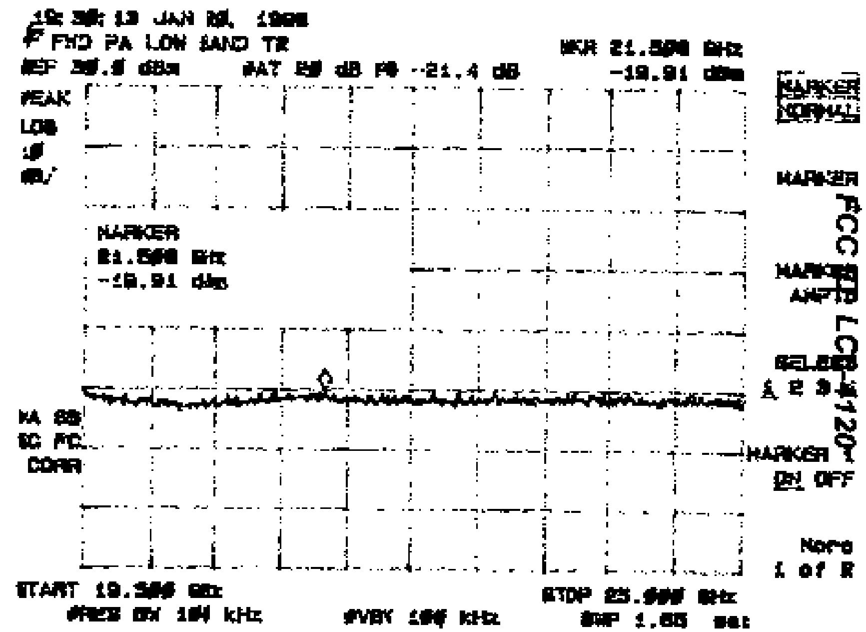
FCC ID: L6G-4120

T2, FWD PA, LOW BAND



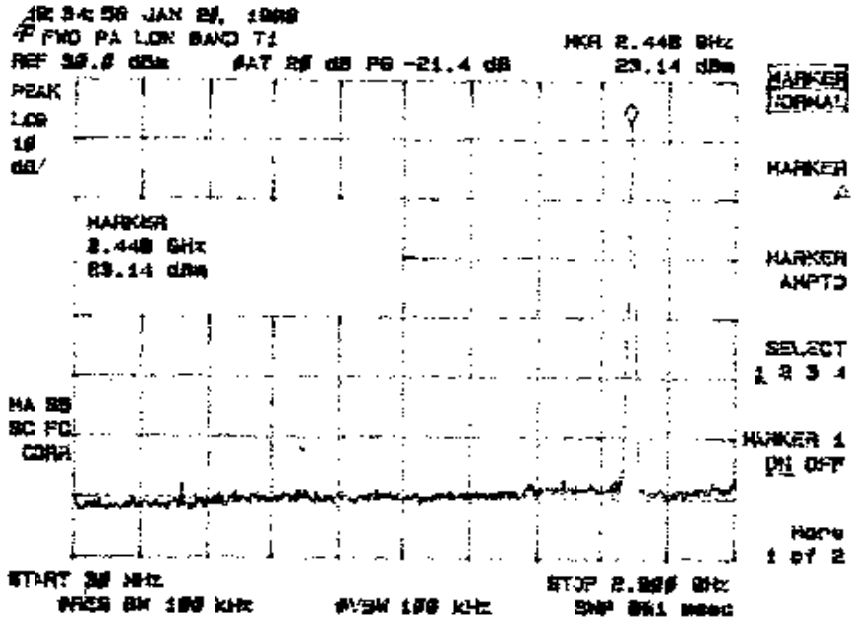


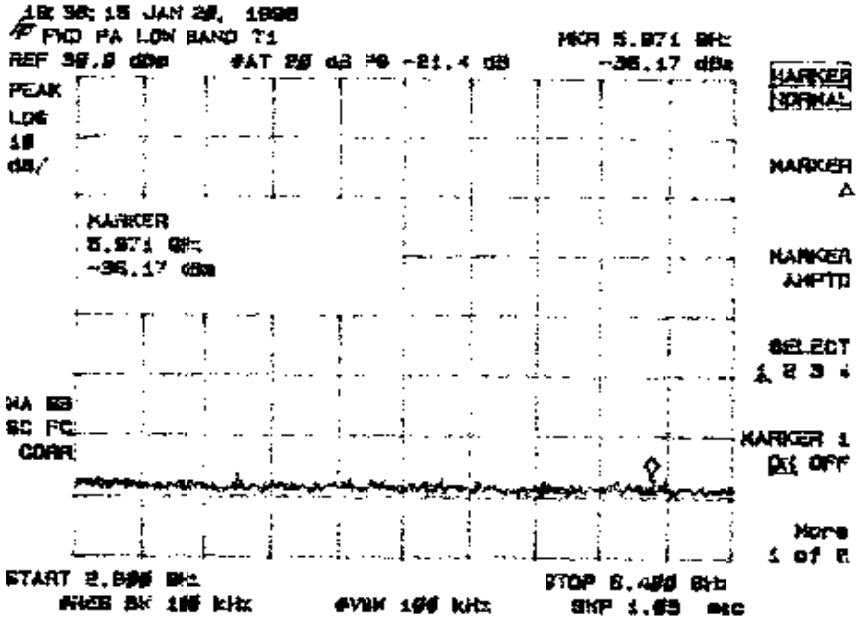


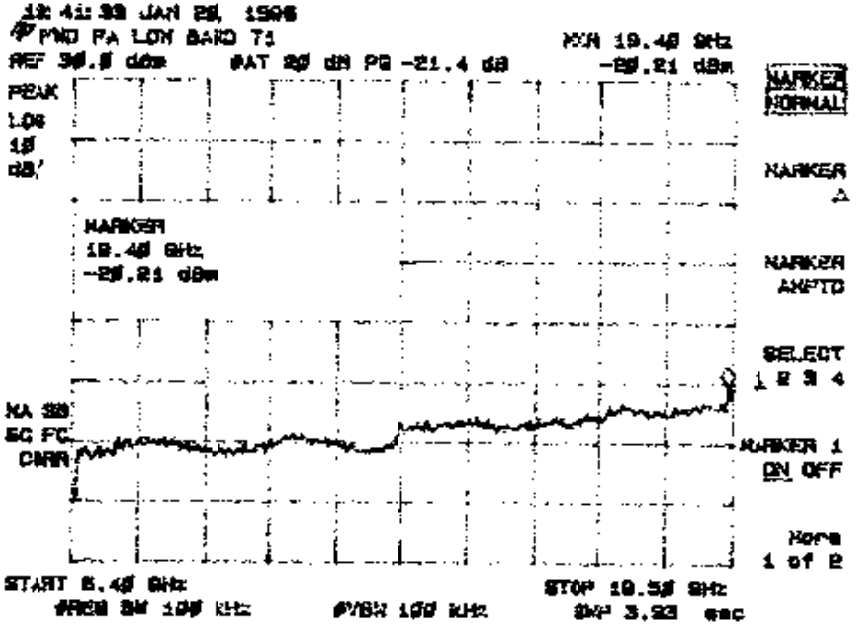


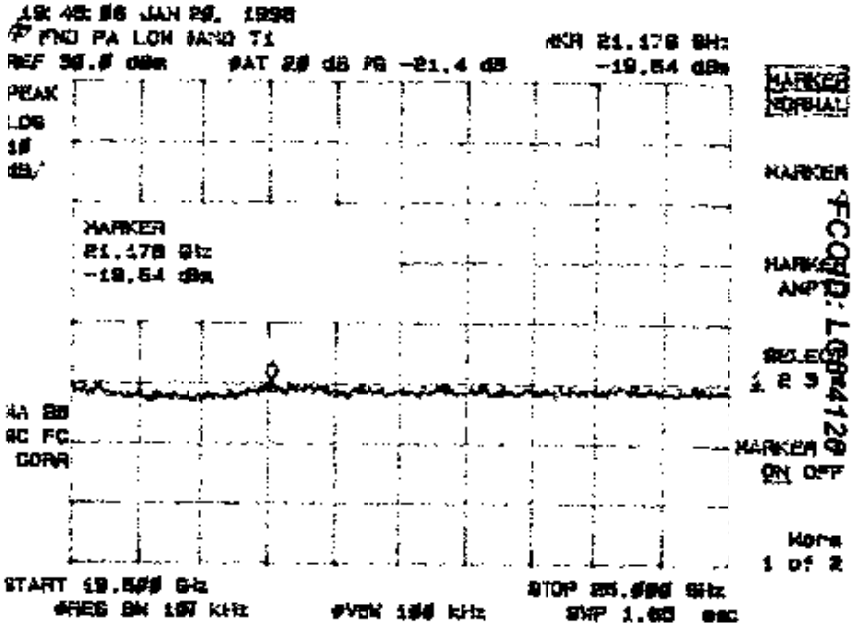
FCC [illegible] LCB-4120

T1 , FWD PA , LOW BAND









7.5 Frequency Hopping Channel Separation

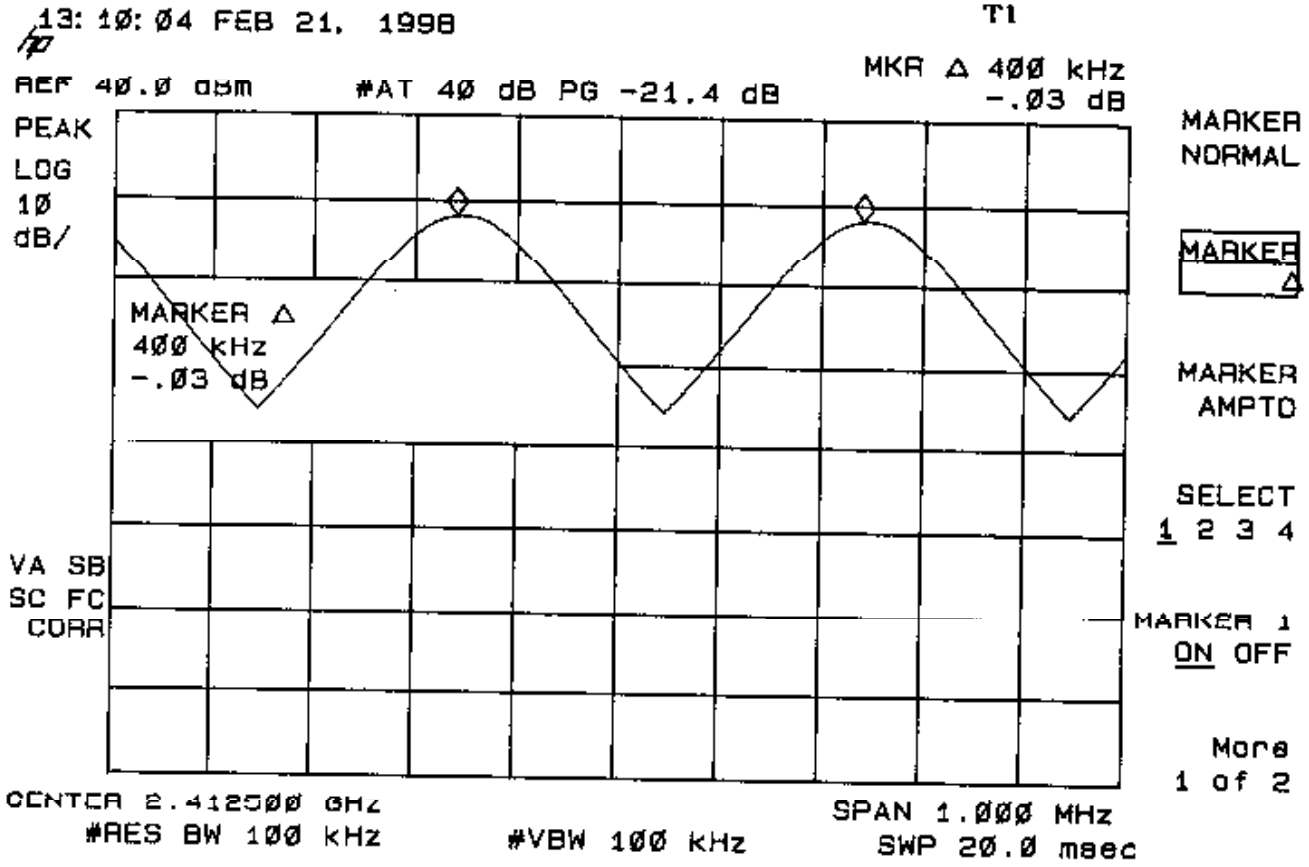
As per Section 15.247 (a1) , the following graphs show that the hopping channel carrier frequencies are separated by more than 25 kHz. The measurement was made with the spectrum analyzer's resolution bandwidth = 100 kHz. The span was set to 1 MHz.

Test Personnel:

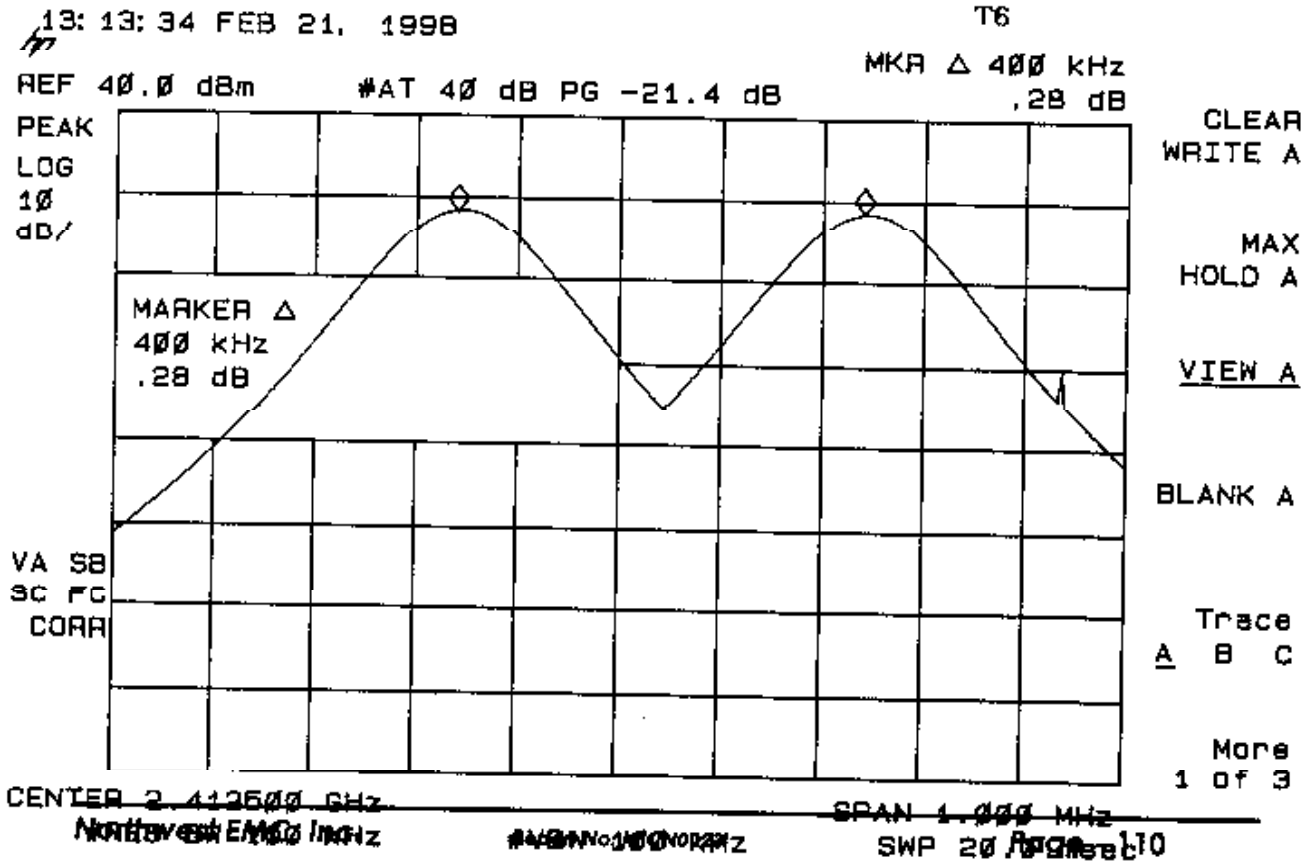
Tester Signature: _____ Date: 3/6/98

Typed/Printed Name: Dean Ghizzone

T1


13: 10: 04 FEB 21, 1998
MKR Δ 400 kHz
-.03 dB
REF 40.0 dBm
#AT 40 dB PG -21.4 dB
PEAK
LOG
10
dB/
MARKER Δ
400 kHz
-.03 dB
MARKER
NORMAL
MARKER
MARKER
AMPTD
SELECT
1 2 3 4
VA SB
SC FC
CORR
MARKER 1
ON OFF
More
1 of 2
CENTER 2.412500 GHz
#RES BW 100 kHz
#VBW 100 kHz
SPAN 1.000 MHz
SWP 20.0 msec

T6


13: 13: 34 FEB 21, 1998
MKR Δ 400 kHz
.28 dB
REF 40.0 dBm
#AT 40 dB PG -21.4 dB
PEAK
LOG
10
dB/
MARKER Δ
400 kHz
.28 dB
CLEAR
WRITE A
MAX
HOLD A
VIEW A
BLANK A
VA SB
SC FC
CORR
Trace
A B C
More
1 of 3
CENTER 2.412500 GHz
#RES BW 100 kHz
#VBW 100 kHz
SPAN 1.000 MHz
SWP 20.0 msec

7.6 Power Spectral Density

As per Section 15.247(d): Power spectral density, locate and zoom in on emission peak(s) within the passband. Set RBW = 3 kHz, VBW>RBW, sweep = (SPAN/3 kHz) e.g., for a span of 1.5 MHz, the sweep should be $1.5 \times 10^6 \div 3 \times 10^3 = 500$ seconds. The peak level measured must be no greater than +8 dBm. External attenuation was used and added this value to the reading. Use the following guidelines for modifying the power spectral density measurement procedure when necessary.

If the spectrum line spacing cannot be resolved on the available spectrum analyzer, the noise density function on most modern conventional spectrum analyzers will directly measure the noise power density normalized to a 1 Hz noise power bandwidth. Add 30 dB for correction to 3 kHz.

The data summary shown below includes the 34.7 dB correction to 3 kHz and the cable loss and external attenuation of 21.4 dB.

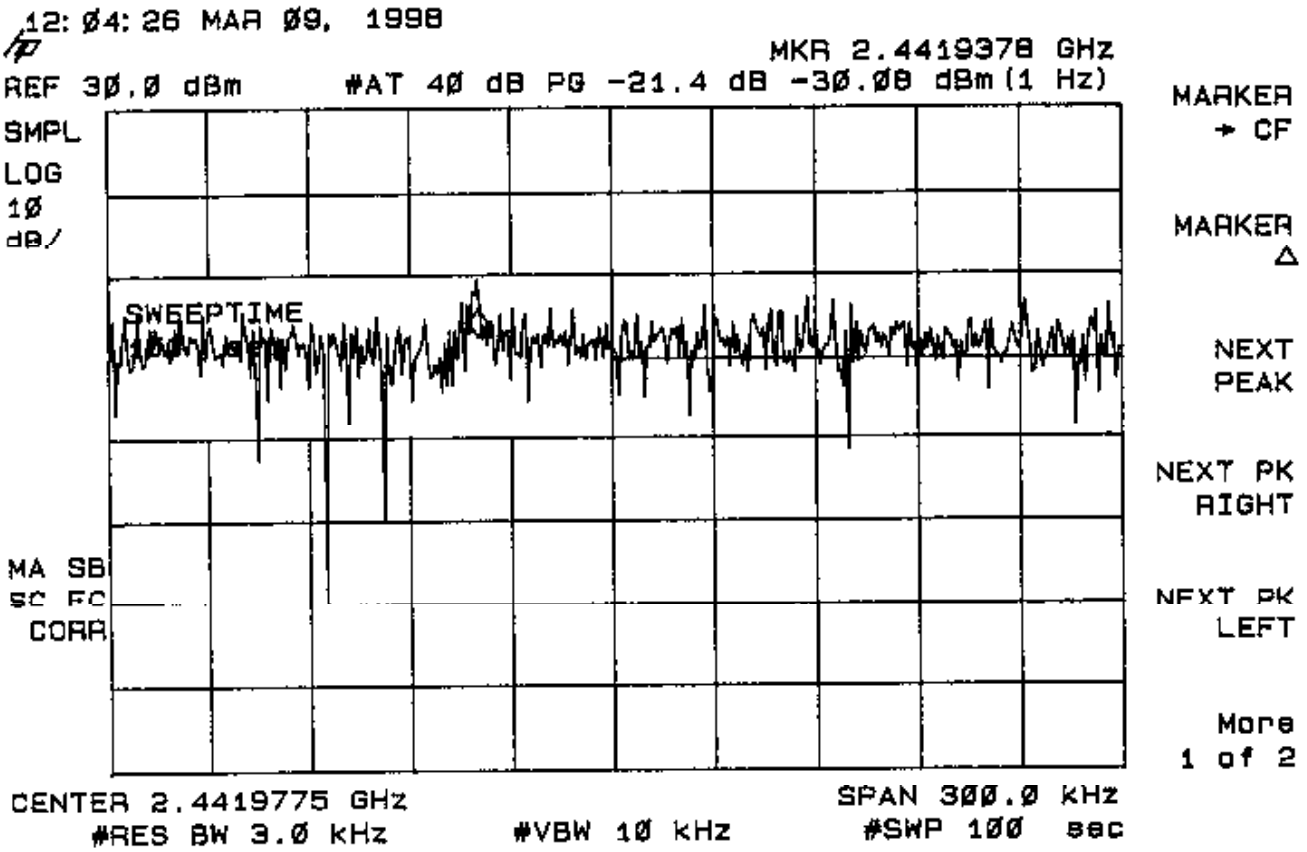
T1	3.9dBm	Low Band
T6	5.98dBm	Low Band
T1	6.98dBm	High Band
T6	7.38dBm	High Band

Test Personnel:

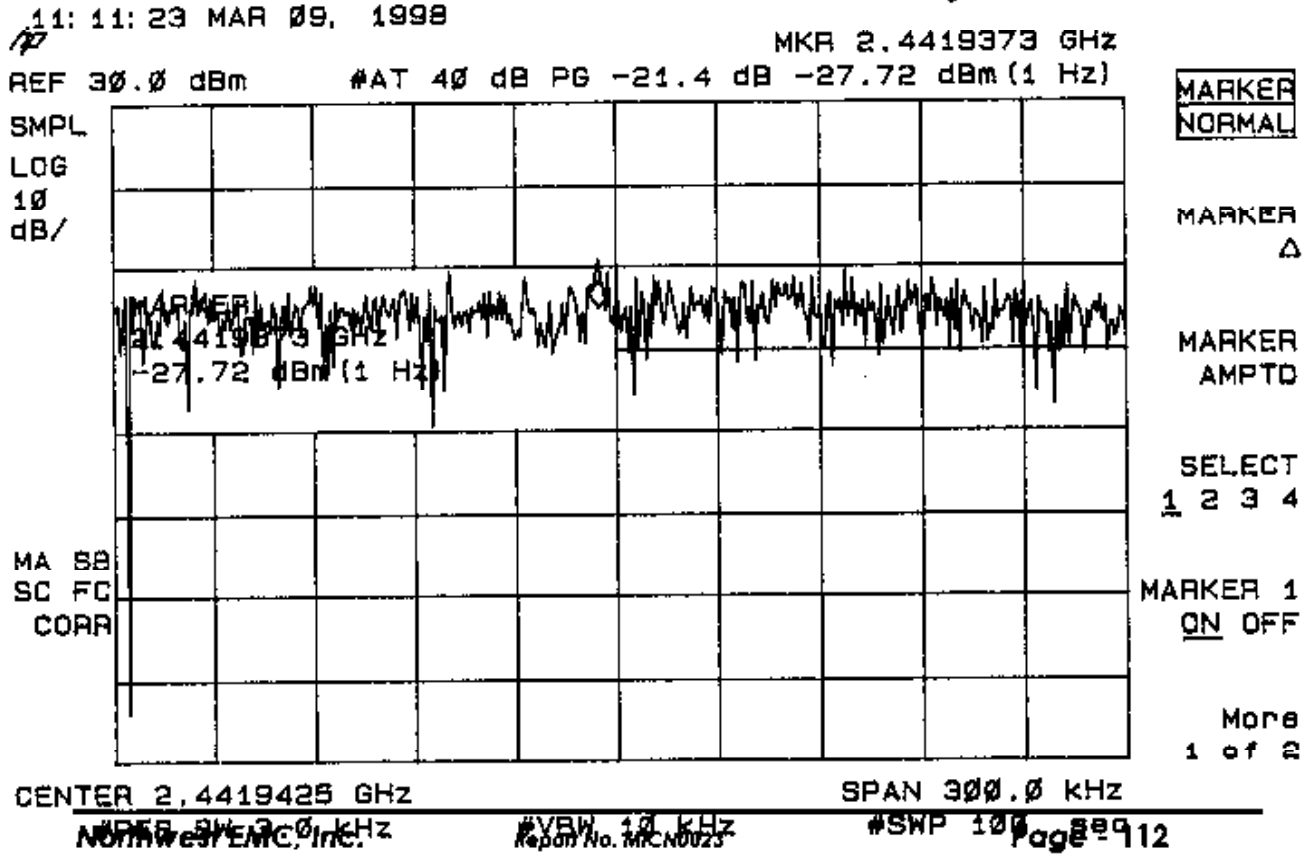
Tester Signature: _____ Date: 3/6/98

Typed/Printed Name: Dean Ghizzone

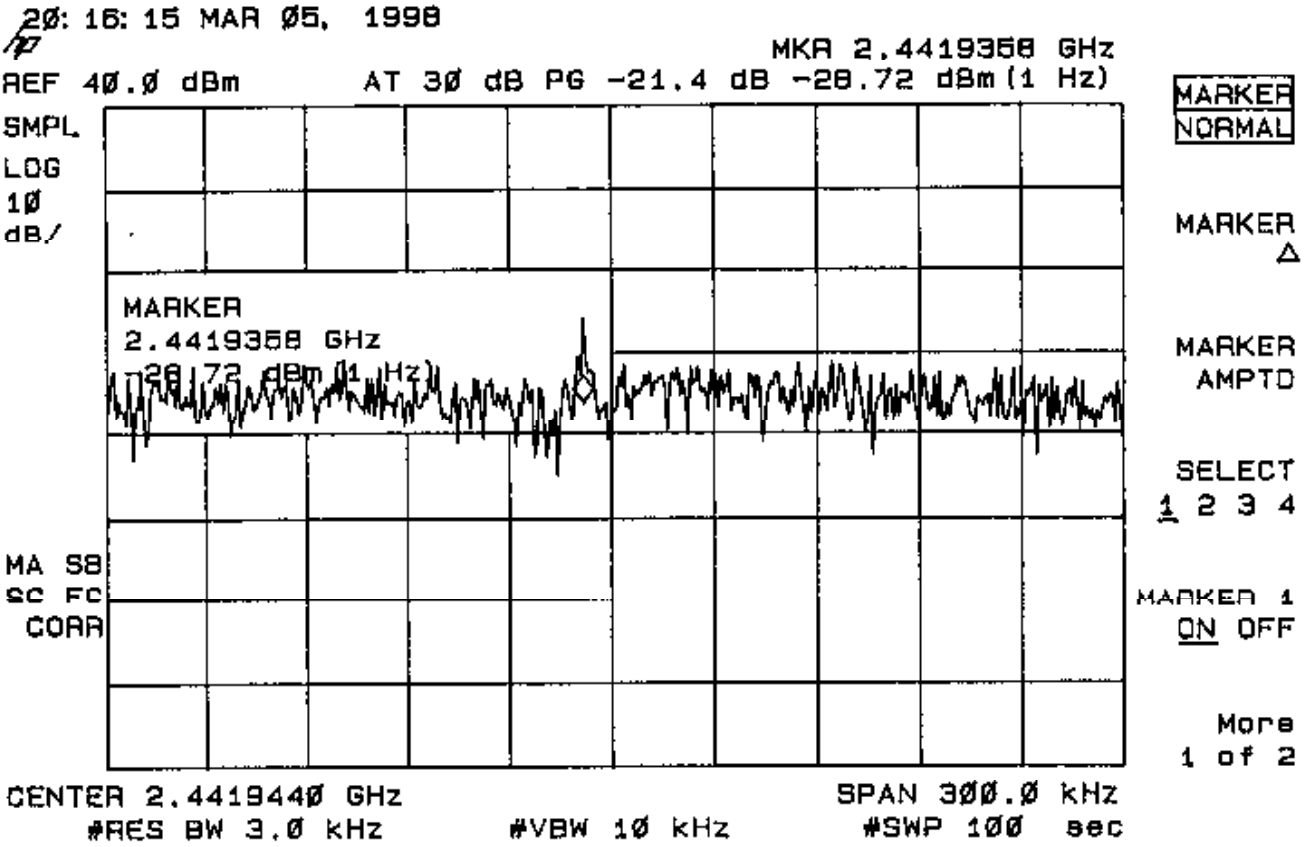
T1 Low Band



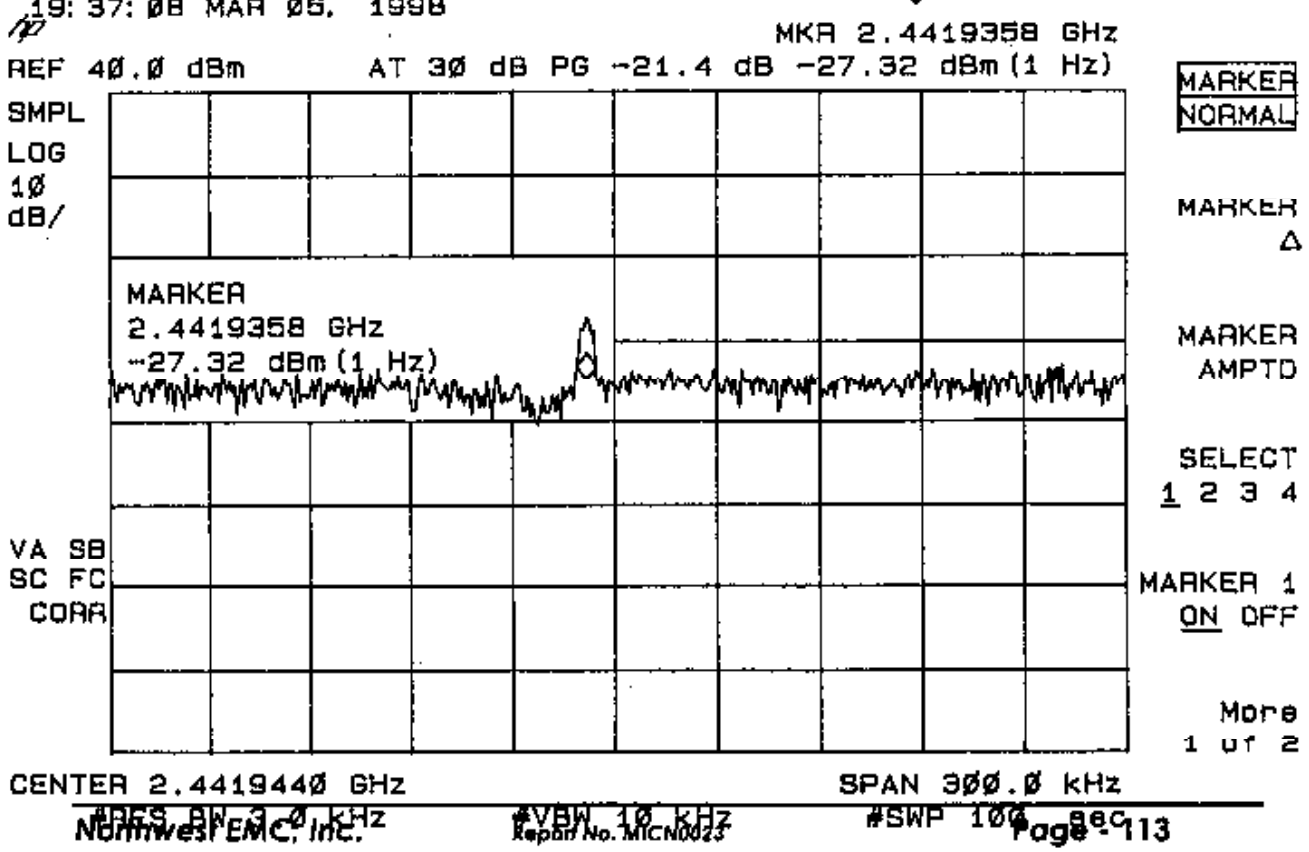
T1 High Band



T6 Low Band



T6 High Band



7.7 Processing Gain

There has been no change to the TAG; therefore the original Processing Gain data has been included in this submission.

Processing gain measurements were performed in accordance with the fax sent by Rich Fabina of the FCC to Terry Mahn of Fish & Richardson, dated March 21, 1997. The fax described the following test procedure:

Processing gain (G_P) is defined by the formula: $G_P = S/N_O + L_{SYS} + M_J$

where,

S/No is the signal to noise ratio in dB at the correlator output in the tag receiver,
Lsys is the system loss (typically 2 dB), and
MJ is the jamming margin or the difference in desired signal to interfering signal.

As per 15.247(e), the minimum processing gain shall be 10 dB. Using the processing gain formula shown above, assume a system loss of 2 dB and solve for jamming margin: $M_J = 8 - S/N_O$

The S/No is the minimum level of desired signal above the interfering signal needed to have the tag respond to a transmission. Micron determined the minimum signal to noise ratio required for the tag to respond is 13 dB. Using the formula above, the jamming margin is -5 dB.

Please reference the attached block diagram, "MicroStamp Processing Gain Test Setup". The output of the interrogator transmitter was connected to the output of a signal generator through a combiner. The combiner output was connected to the interrogator transmit antenna. Variable attenuators and a power amp were used on the combined signal to overcome cable loss.

Please reference the attached data graphs. Using a test program called "***Dots Animation***", the EUT transmitter was turned on so that it was transmitting a tag ID code in spread form. At the edge of the transmitter's null to null bandwidth (equal to 20 MHz - centered on the transmit frequency), the level of the desired signal was measured with a spectrum analyzer. Using the signal generator, an interfering signal was set up 5 dB below (equal to the jamming margin) the level of the desired signal. A tag was exposed to this combined signal. ***"Dots Animation"*** verified if the proper ID code was received by the interrogator. The response was recorded and the tag reset. The signal generator was tuned 50 kHz above the previous frequency, and the interfering signal level was readjusted to maintain the 5dB level below the desired signal. The process was repeated across the null to null bandwidth of the transmitter. The tag had to respond positively to the transmission 80% of the time to demonstrate a processing gain of at least 10 dB.

To reduce the time required for testing, the interfering signal was set 5 dB below the **highest** desired signal in the band. This same level was maintained, without readjustment, across the frequency range. The results were as follows:

Resolution Bandwidth = 215kHz

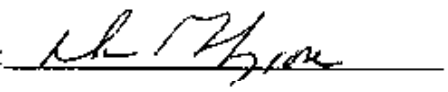
2.432 GHz to 2.452 GHz: (50 kHz steps)	no errors, responded positively 100% of the time (interfering signal set 5 dB below the desired signal at 2.44232 GHz)

Resolution Bandwidth = 1 MHz

2.4306 GHz to 2.44120 GHz: (50 kHz steps)	no errors, responded positively 100% of the time (interfering signal set 5dB below the desired signal at 2.44120 GHz)
2.44120 GHz to 2.44345 GHz: (50 kHz steps)	all errors, responded negatively 100% of the time (interfering signal set 5 dB below the desired signal at 2.44232 GHz)
2.44345 GHz to 2.4529 GHz: (50 kHz steps)	no errors, responded positively 100% of the time (interfering signal set 5 dB below the desired signal at 2.44345 GHz)

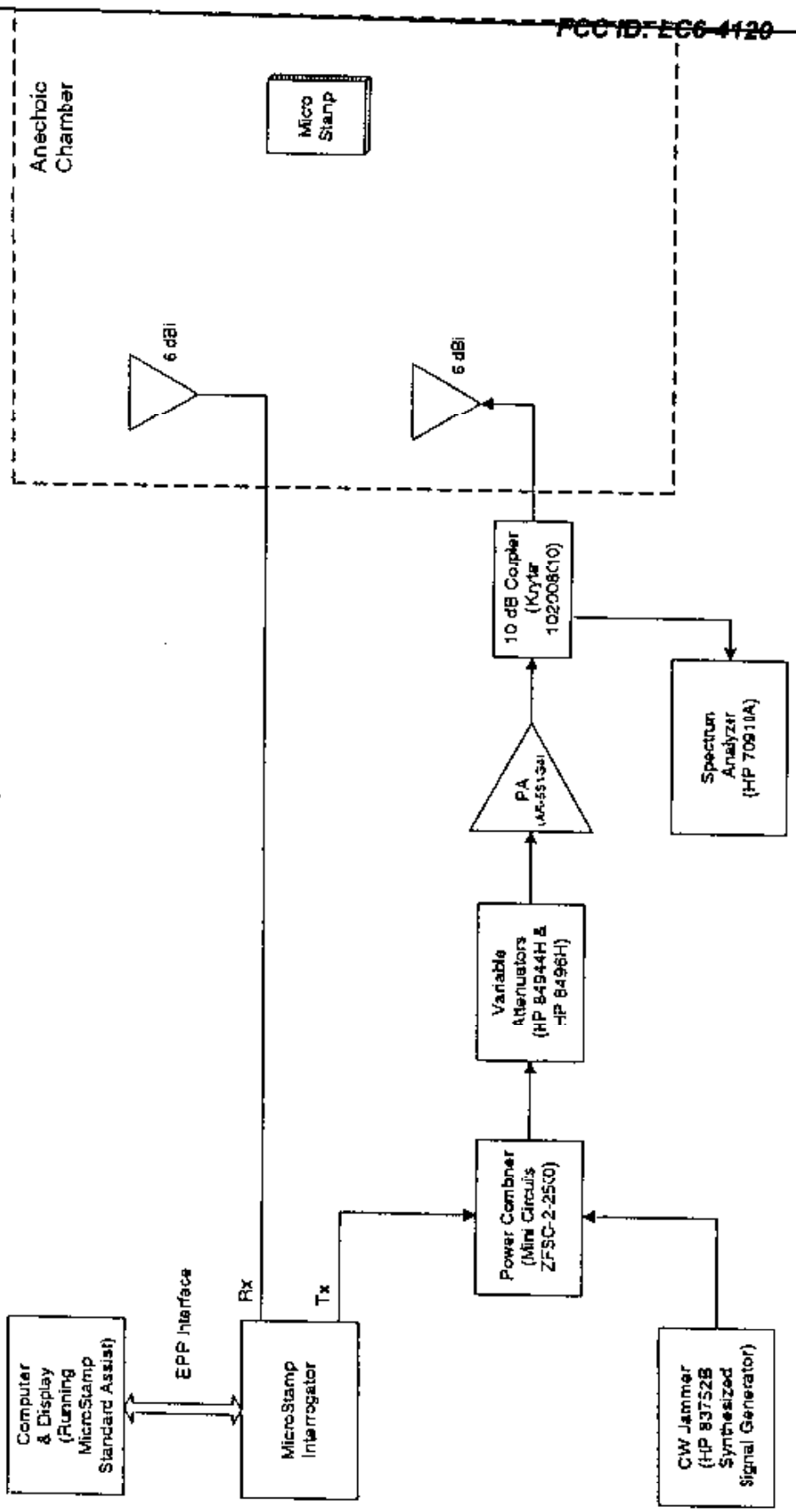
Judgment: The tag demonstrated a processing gain of at least 10 dB more than 80% of the time.

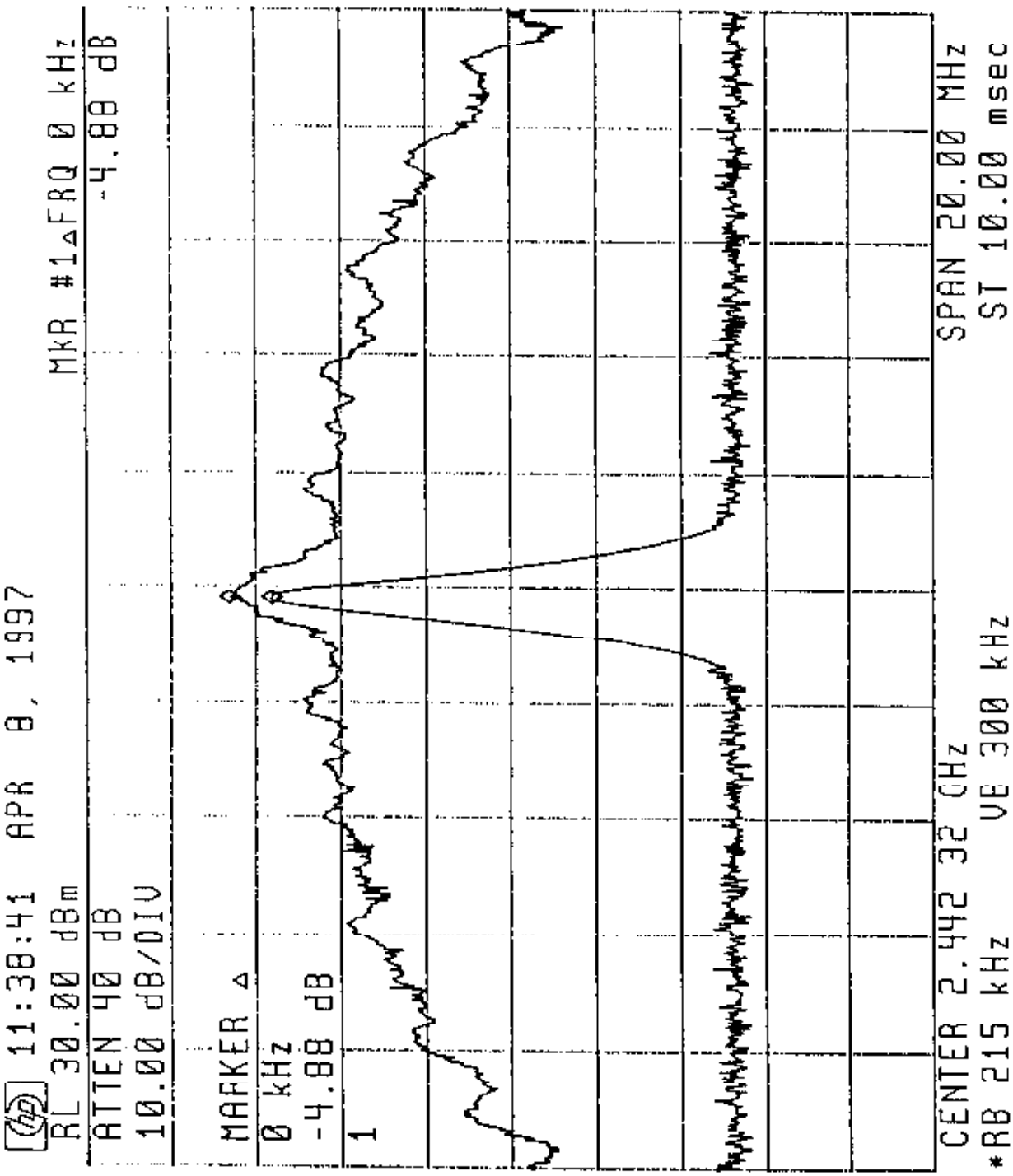
Test Personnel:

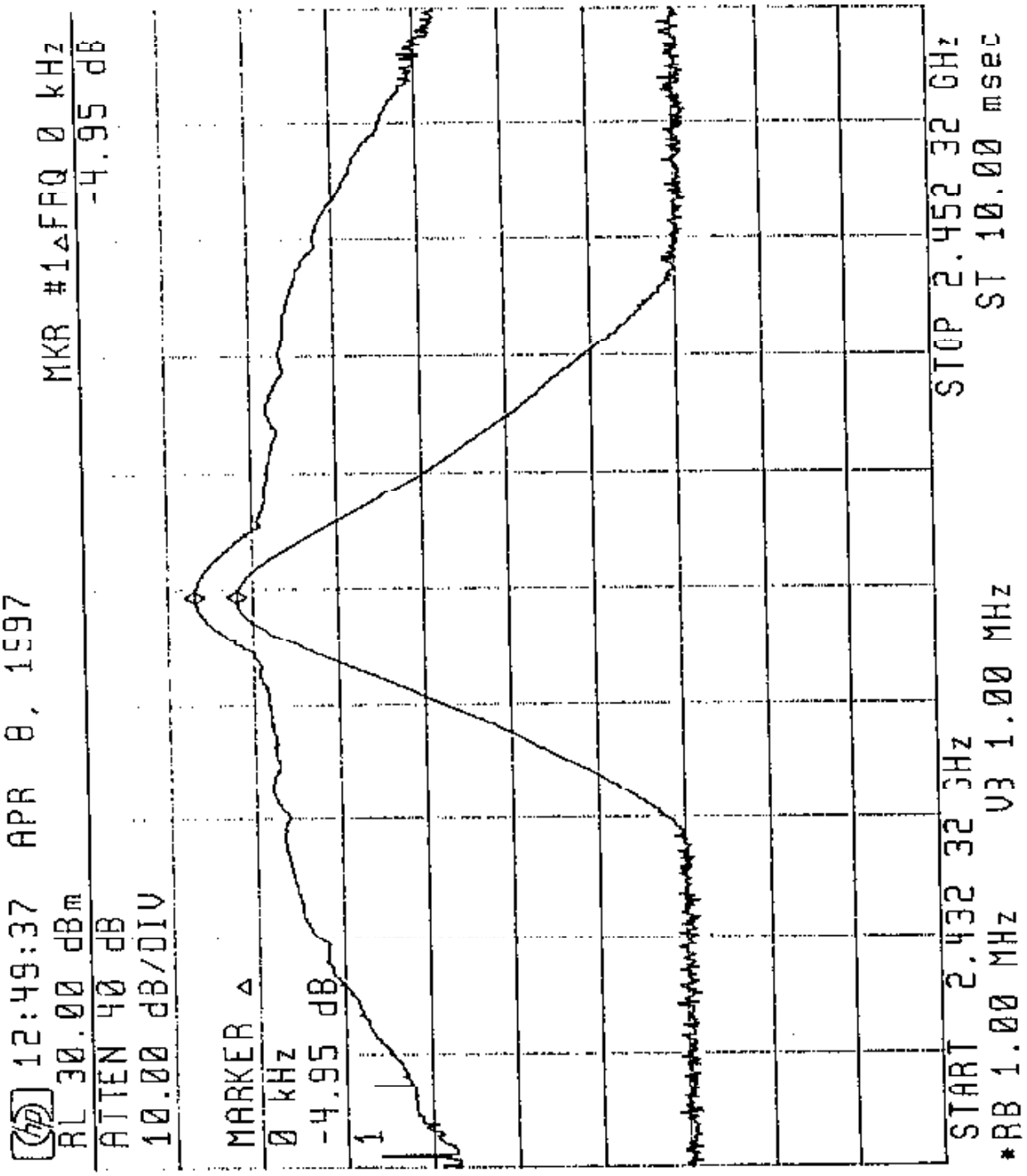
Tester Signature:  Date: 3/6/98

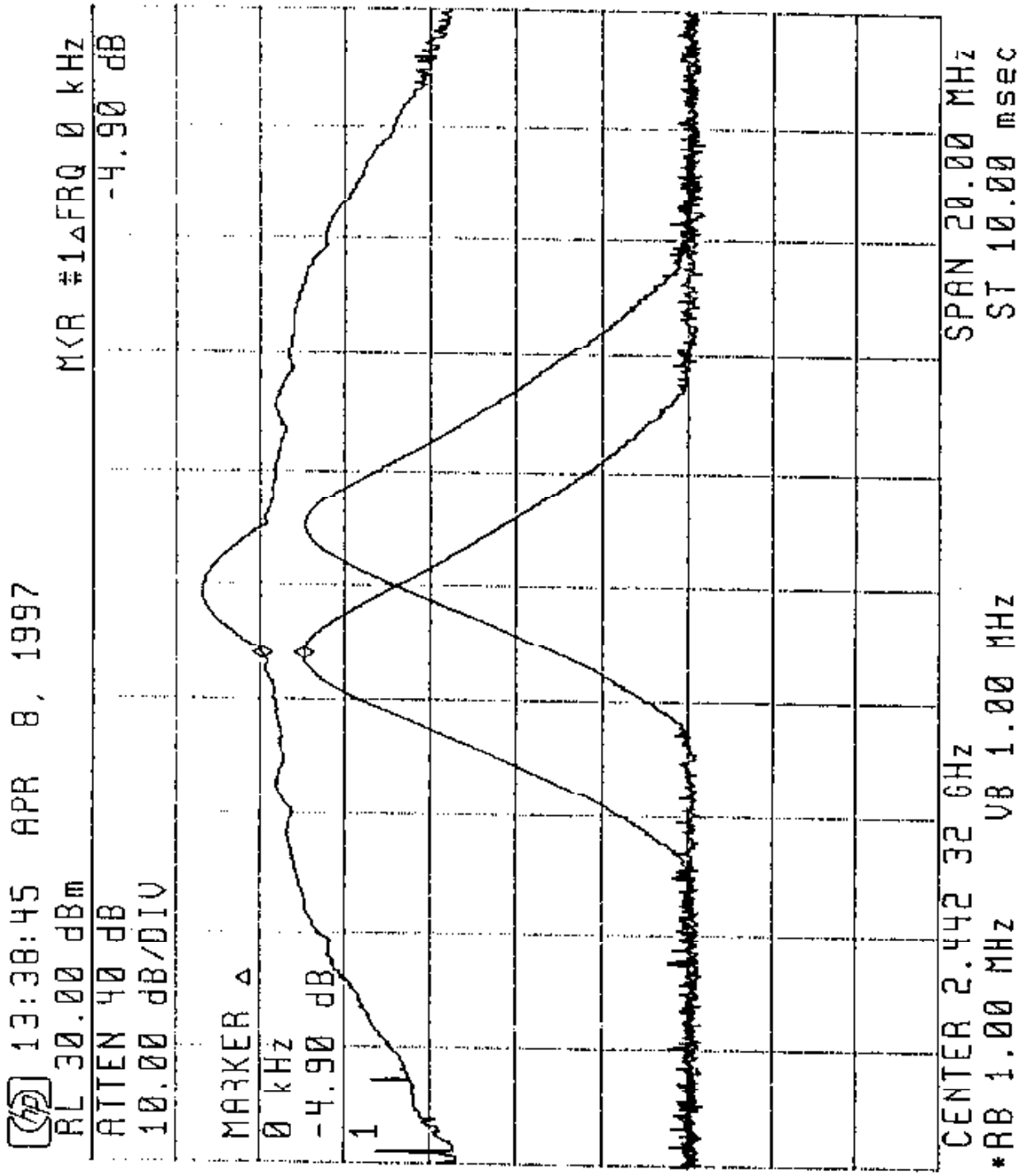
Typed/Printed Name: Dean Ghizzone

MicroStamp Processing Gain Test Setup




11:38:41 APR 8, 1997
RL 30.00 dBm
ATTEN 40 dB
10.00 dB/DIV
MKR #1ΔFRQ 0 kHz
-4.88 dB
MARKER Δ
0 kHz
-4.88 dB
1
CENTER 2.442 32 GHz
*RB 215 kHz
VB 300 kHz
SPAN 20.00 MHz
ST 10.00 msec


12:49:37 APR 8, 1997
RL 30.00 dBm
ATTEN 40 dB
10.00 dB/DIV
MKR #1ΔFFQ 0 kHz
-4.95 dB
MARKER Δ
0 kHz
-4.95 dB
1
START 2.432 32 GHz
*RB 1.00 MHz
STOP 2.452 32 GHz
ST 10.00 msec
V3 1.00 MHz


13:38:45 APR 8, 1997
RL 30.00 dBm
ATTEN 40 dB
10.00 dB/DIV
MKR #1ΔFRQ 0 kHz
-4.90 dB
MARKER Δ
0 kHz
-4.90 dB
1
CENTER 2.442 32 GHz
*RB 1.00 MHz
VB 1.00 MHz
SPAN 20.00 MHz
ST 10.00 msec

7.8 Field Strength Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured level. The basic equation with a sample calculation is as follows:
FS = RA + AF + CF - AG

where : FS = Field Strength

RA = Measured Level

AF = Antenna Factor

CF = Cable Attenuation Factor

AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4 and a Cable Factor of 1.1 is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBuV/meter.

FS = 52.5 + 7.4 + 1.1 - 29 = 32 dBuV/meter
Level in uV/m = Common Antilogarithm [(32 dBuV/m)/20] = 39.8 uV/m

7.9 Measurement Bandwidths

Peak Data

150 kHz - 30 MHz ..... 10 kHz
30 MHz - 1000 MHz..... 100 kHz
1000 MHz - 2000 MHz..... 1000 kHz

Quasi-peak Data

150 kHz - 30 MHz ..... 9 kHz
30 MHz - 1000 MHz..... 120 kHz

All radiated measurements are quasi-peak unless otherwise stated. A video filter was not used.
All conducted measurements are peak unless otherwise stated. A video filter was not used.

8.0 Measurement Equipment

Instrument	Model	Serial No.	Freq Range	Last Cal	Cal Due
Log Periodic Ant	EMCO 3146	4693	200 MHz - 1 GHz	01/31/98	01/31/99
Bicon Antenna	EMCO 3104	3600	30 MHz - 200 MHz	01/31/98	01/31/99
Receiver	R&S ESVS	DE10007	20 MHz - 1000 MHz	09/03/97	09/03/98
Pre-Amplifier	HP83017A	3123A00288	.5 GHz - 22 GHz	03/12/97	03/12/98
Spectrum Analyzer	HP 8568B	2601A02125	100 Hz - 1.5 GHz	07/22/97	07/22/98
Q-peak Adapter	HP 85650A	2043A00214	10 kHz - 1000 MHz	07/22/97	07/22/98
Pre-Amplifier	AR LN1000	15224	100 kHz-1300 MHz	07/19/97	07/19/98
Spectrum Analyzer	HP 8593E	3523A02557	9 kHz - 22 GHz	02/25/97	02/25/98
Horn Antenna	EMCO 3115	4074	100 Hz - 1.5 GHz	10/03/97	10/03/99
RF Section	HP 70910A	450222	100 Hz - 26.5 GHz	08/29/97	08/29/98
Local Oscillator	HP 70900B	450222	N/A	08/29/97	08/29/98
IF Section	HP 70903A	450222	100 kHz - 3 MHz	08/29/97	08/29/98
IF Section	HP 70902A	450222	10 Hz - 300 kHz	08/29/97	08/29/98
Precision Freq. Ref.	HP 70310A	450222	N/A	08/29/97	08/29/98
Display	HP 70004A	450222	N/A	08/29/97	08/29/98
Synthesized Sweeper	HP 83752B	3610A00599	.01 GHz - 20 GHz	NCR	NCR
Power Amp	AR 5 S1G4	19291	800 MHz - 4.2 GHz	NCR	NCR
Combiner	Mini Circuits ZFSC-2-2500	15542	.010 GHz - 2.5 GHz	NCR	NCR
Directional Coupler	Krytar 102008010	44725	2 GHz - 8 GHz	NCR	NCR
Attenuator	HP 8494H	3247A12576	DC - 18 GHz	NCR	NCR
Attenuator	HP 8494H	3247A11662	DC - 18 GHz	NCR	NCR

Appendix I: Measurement Procedures

Each frequency was measured in both the horizontal and vertical antenna polarization's.

The EUT position was maximized for each frequency, for both the horizontal and vertical antenna polarization's, using a remotely controlled turntable.

The antenna height was varied from 1 - 4 meters at each frequency, for both the horizontal and vertical positions to maximize the emission level.

The cable and peripheral positions were manipulated to ensure maximum levels at each frequency for both horizontal and vertical antenna polarization's.

Measurements are made at an antenna to EUT distance of 3 meters.