125 Technology Parkway
Norcross, Georgia, US 30092

Test Report

LXE Model: 6726

FCC ID: KDZLXE6726P

Direct Sequence Spread Spectrum Transmitter

Portable Equipment Certification

Applicant: LXE Inc.
125 Technology Parkway
Norcross, GA 30092

Purpose of Testing: To demonstrate compliance with FCC Part 15 Subpart C

Prepared By:_____
D. C. Massey
Lead Regulatory Engineer

Issue Date: October 17, 2001

Table of Contents

1.0 GENERAL

1.1 Introduction

The purpose of this report is to demonstrate compliance with Part 15, Subpart C of the FCC's Code of Federal Regulations.

1.2 Product Description

1.2.1 General

The Equipment Under Test(EUT) is the LXE Model 6726, 2.4GHz Spread Spectrum transceiver. It is offered with 128 bit Wired Equivalent Privacy(WEP). The LXE part number for this radio model is 480631-5010; this part number will appear on the radio and on the host device labels, identifying the transceiver used in the host.

The LXE 6726 is an OEM Direct Sequence Spread Spectrum product manufactured by Cisco Systems. It is IEEE 802.11b compliant and operates in the band of 2400-2483.5 GHz. The radio is capable of 4 data rates and self adjusts to the most appropriate rate depending on the performance required. The data rates are 11, 5.5, 2 and 1 Mbps, where 11 Mbps gives the maximum throughput for data transfer, and 1 Mbps gives the best coverage where only small data packets are sent.

The radio has 2 ports, each capable of TX/RX. The card can be used either with a single antenna scheme in one port, or a diverse antenna scheme using both ports. The radio is housed in a PCMCIA Type II card.

1.2.2 Intended Use

The LXE 6726 transceiver will be integrated into the MX3 Series products. The MX3 is defined as portable according to section 2.1093 of the FCC rules. A separate certification has been obtained for this same radio for LXE devices defined as mobile according to section 2.1091 of the FCC rules. The FCC ID for this certification is KDZLXE6726M.

The MX3 Series is a handheld data collection terminal that accepts the 6526 radio in its PCMCIA slot. The MX3 Series encompasses a variety of terminal variations, with different options for memory, storage, operating system, software loads, and LCD display. The MX3 is considered portable because an accessory is offered that allows the operator to use the device from a hip position. In this configuration the antenna is approximately 15 cm from the users torso. Photographs of the operating configuration and exposure conditions are included separately in this filing as part of the RF exposure submittal.

The MX3 has been evaluated to, and found to comply with, FCC Part 15, Subpart B, Class A.

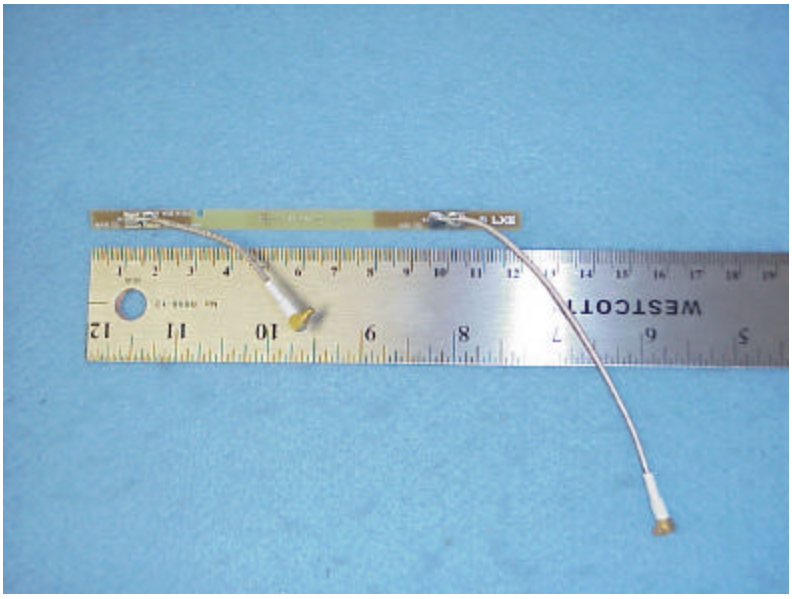
1.2.3 Technical Specifications

Table 1: Specifications

Frequency Band	2400-2483.5 MHz
Number of Channels	11
Modulation Technique	BPSK 1 Mbps QPSK 2 Mbps CCK 5.5 and 11 Mbps
Interface	PC Card Type II Size
Dimensions	85.0 mm X 53.95 mm X 5.0 mm (PC Card)
Output power	14 dBm nominal
Power Consumption PC Card	Doze mode 10 mA
	Receive mode 280 mA
	Transit mode 400 mA at max output power
Temperature Range (operational)	0-70ºC 95% max. humidity (non condensing)
Operating Systems	DOS Windows 95 Windows 98 Windows NT® Windows 2000
Standards	IEEE 802.11b
Regulations	FCC Part 15 Subpart C
	RSS 139 & RSS 102
	ETS 300 328 & 300 826

1.2.4 Antenna

The MX3 Series uses a proprietary, 0dBi patch antenna, identified as LXE part number 157368-0001.



2.0 LOCATION OF TEST FACILTY

The LXE test facility is located at the following address:

LXE, Inc.
An Electromagnetic Sciences Company
125 Technology Parkway
Norcross, GA US 30092-2993

2.1 DESCRIPTION OF OPEN AREA TEST SITE

All tests were conducted at the manufacture's test facility at a location specifically prepared for this testing. The radiated emissions test site meets the characteristics of ANSI C63.4:1992, CISPR 16 and EN 55022:1998-. This site has been fully described and submitted to the FCC, and accepted in their letter marked 31040/SIT, 1300F2.

The open area test site(OATS) is located in the center of the rooftop of the building. The roof is located at a height of approximately 8 meters above the ground. The 3 meter radiated emissions test site is an open, flat area approximately 6.2m x 9.2m in dimension. All reflecting objects including test personnel lie outside the perimeter of the ellipse. The site has a ground plane which extends 2 meters past the mast and equipment under test(EUT). Material of the ground plane, comprised of individual 1/4" metal screen mesh rolls, were soldered at the seams with gaps smaller than 1/10 of the wavelength at 1000MHz. The ground plane is connected to the earth ground by ground rods. All wiring is done at floor level around the test site periphery.

A nonconductive remotely controlled turntable approximately 0.91m x 1.2m x 0.8m was used to measure radiated emissions from all sides of the EUT. The turntable has a center opening that allows cabling to be routed directly down to the conducting ground plane.

The radiated emissions test setup is shown in figure 1.

2.2 Radiated Emissions Testing Facility Drawing

All dimensions are in meters(m)

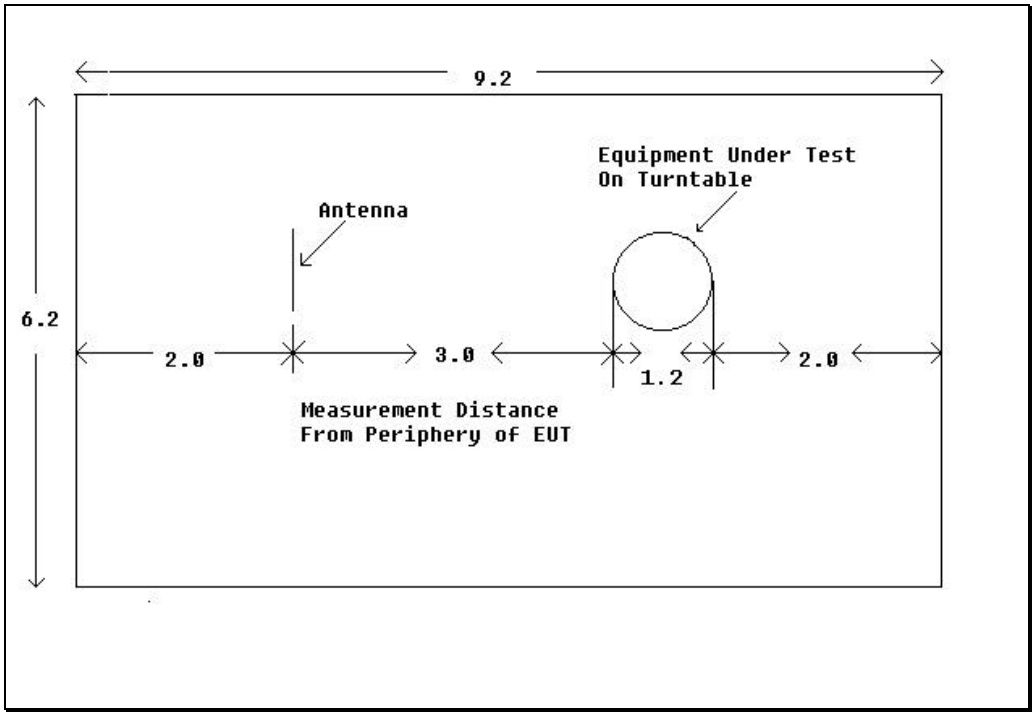


Figure 1: Open Area Test Site(OATS)

3.0 APPLICABLE STANDARD REFERENCES

The following standards were used:

1 - ANSI C63.4-1992: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz

2 - US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators (October 1997)

3 - FCC Bulletin 97-114 Appendix C - Guidance on Measurements for Direct Sequence Spread Spectrum Systems

4 - FCC OET Bulletin 65 Appendix C - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

4.0 LIST OF TEST EQUIPMENT

All test equipment used for regulatory testing is calibrated yearly or according to manufacturers specifications. The equipment shown below in table 2 was used during this testing.

Table 2: Test Equipment

Cal #	MFG Name	Item Name	Model #:	Serial #	Recal Date:
53	Hewlett Packard	Spectrum Analyzer	8563E	3304A00657	6/1/02
134	Hewlett Packard	Power Meter	436A	1803A03368	2/9/02
202	Hewlett Packard	Amp, .01-26.5 GHz	83006A	3104A00543	11/30/01
228	Electro-Metrics	Antenna	RGA-60	6165	8/3/02
234	EMCO	Antenna, Log Periodic	3146	9011-2946	7/5/02
238	Hewlett Packard	Spectrum Analyzer	8591A	3131A02254	5/23/02
239	LXE	Pre-Amp	20-1000GHz	001	4/30/02
333	Hewlett Packard	Power Sensor	8482H	2704A03933	2/9/02
404	Microwave Circuits	High-Pass Filter	H04G18G2	0002	1/12/2002
450	LXE	RF Cables (High Freq. Short)	none	Copper	11/17/01
451	LXE	RF Cables (High Freq. Double)	7015/6986	MFR-57500	11/17/01
452	EMCO	Mast, Antenna, Mini	2075	PN399235	N/A
453	EMCO	Turntable	2065	PN399230	N/A
515	Tensor	Antenna, Biconical	4104	2157	5/10/02
99998	Lindgren Enclosure	RF Enclosure	14-2/2-0	8147	N/A

5.0 SUPPORT EQUIPMENT

Table 3: Support Equipment

Manufacturer	Equipment Type	Model Number	Serial Number	FCC ID
Gateway2000	LapTop Computer	DX4-100	950300865	EF7J2P

6.0 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

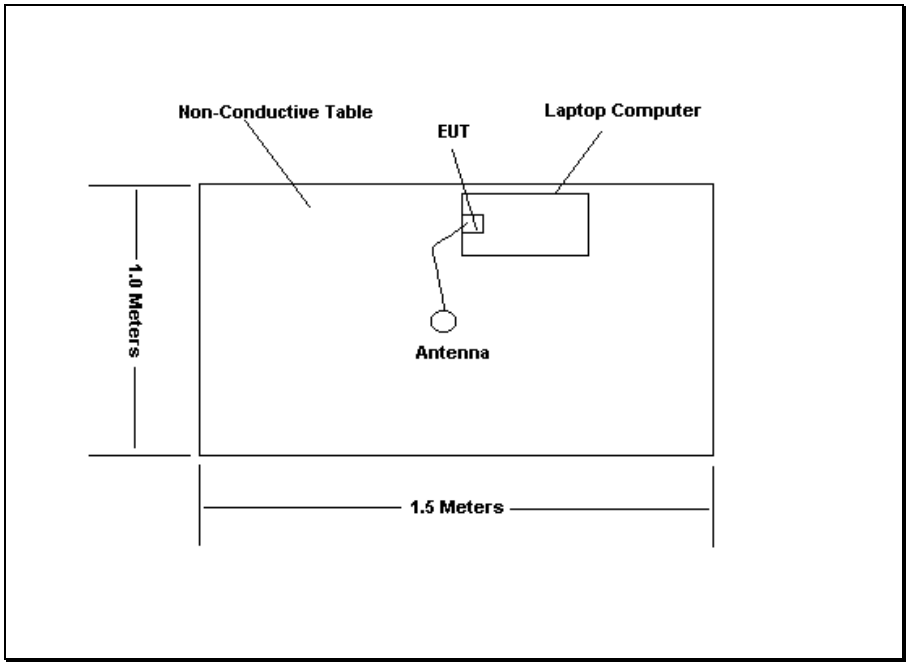


Figure 2: EUT Test Setup

7.0 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Antenna Requirement - FCC Section 15.203

The antenna is designed with a unique and/or proprietary connectors and are not interchangeable with standard antennas without electrical and mechanical modification of the radio card or host unit. In addition, the antenna is integral to the unit and requires disassembly to access it.

7.2 Power Line Conducted Emissions - FCC Section 15.207

The EUT is powered by a PCMCIA bus of host device supplying 3.3 or 5VDC, and has no connection to the AC Mains. Conducted emissions are not required.

7.3 Radiated Emissions - FCC Section 15.209

Radiated emissions tests were attempted over the frequency range of 30MHz to 25GHz, 10 times the highest fundamental frequency. Measurements of the radiated field strength were made at a distance of 3m from the boundary of the equipment under test (EUT)and the receiving antenna. The antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. Radiated measurements were made with the Spectrum Analyzer's resolution bandwidth set to 120KHz for measurements above 30MHz.

The EUT was caused to go into a "Receive Only" mode of operation for this test. No emissions attributed to the EUT could be detected in the band.

7.4 6dB Bandwidth Requirement - FCC Section 15.247(a)(2)

For the 6dB bandwidth test, the EUT was caused to generate a continuous carrier on the high, middle and low channels at all available data rates. Tabulated data is shown below in table 4 and a plot of the worst case is shown in figure 3 below. The plot is of the mid channel(2442 MHz) at a data rate of 11Mbps.

Table 4: 6dB Bandwidth

Data Rate (Mbps)	Channel 1 – 2412MHz (MHz)	Channel 7 – 2442MHz (MHz)	Channel 11 – 2462MHz (MHz)
1	9.79	9.96	8.37
2	9.83	9.42	9.25
5.5	9.00	9.54	8.74
11	10.29	8.00	8.96

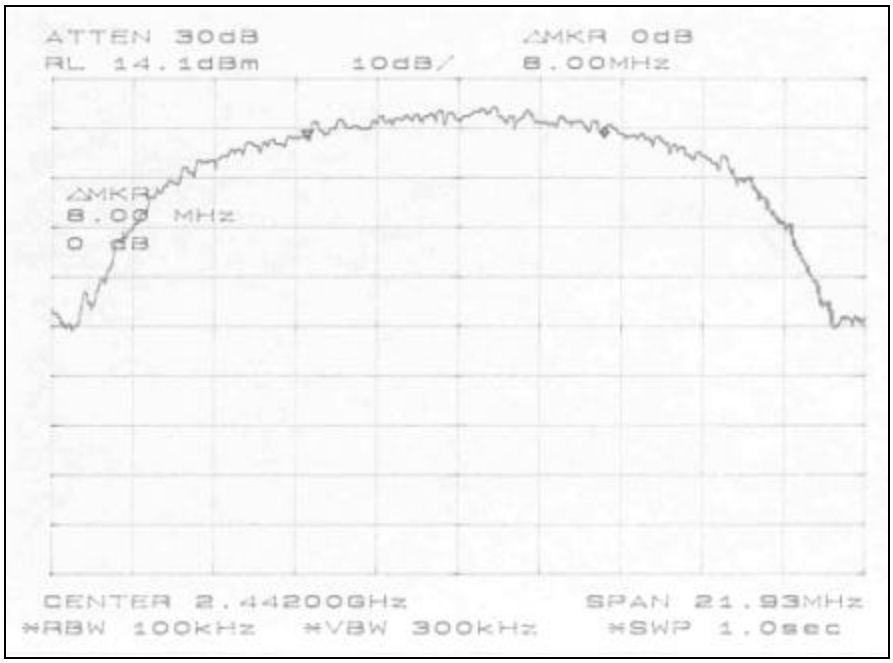


Figure 3: Worst Case 6dB Bandwidth

7.5 Peak Output Power Requirement - FCC Section 15.247(b)

The peak output power of the EUT was made at the antenna connector using an HP436A power meter and an HP8482H power sensor. The EUT was caused to generate a constant carrier on high, mid and low channels of the device. On each channel the EUT was then cycled through each of it's data rates. Table 5 below shows the results of this test.

Table 5: Peak Output Power

Data Rate (Mbps)	Channel 1 - 2412 MHz (dBm)	Channel 7 - 2442 MHz (dBm)	Channel 11 - 2462 MHz (dBm)
1	16.57	16.98	17.17
2	16.43	16.99	17.15
5.5	15.33	15.68	16.05
11	15.09	15.60	15.89

7.6 Spurious Emissions - FCC Section 15.247(c)

7.6.1 RF Conducted Spurious Emissions

The EUT was investigated for conducted spurious emissions from 30MHz to 25GHz, 10 times the highest fundamental frequency. For each measurement, the spectrum analyzer's VBW was set to 100kHz and the RBW was set to 1MHz.

The RF conducted spurious emissions found in the band of 30MHz to 25GHz are reported in Table 6 below. Each emission was compared to the fundamental reference level, also reported in the table below, to determine if they were at least 20dB below the reference level. Plots of the emissions were taken and filed separately as Appendix A

Table 6: Conducted Spurious Emissions

Channel	Fundamental Frequency (MHz)	Fundamental Reference Level (dBm)	Frequency of Spurious Emissions (MHz)	Level (dBm)	D (dB)
1	2412	7.10	457	-45.50	52.60
			1663	-49.50	56.60
			4824	-53.67	60.77
7	2442	7.90	487	-53.83	61.73
			1708	-46.00	53.9
			4884	-53.33	61.23
11	2462	7.83	507	-47.50	55.33
			1738	-44.00	51.83
			4924	-54.00	61.83

7.6.2 Radiated Spurious Emissions(Restricted Bands) - FCC Section 15.205

Radiated emissions tests were made over the frequency range of 30MHz to 25GHz, 10 times the highest fundamental frequency. For convenience, peak measurements were taken and compared to the average limits. If the peak measurement did not meet the average limit, then an average measurement was made and compared to the average limit.

Due to high ambient noise levels and small EUT size, radiated emission measurements were made at a distance of 1 meter. An inverse proportionality factor of 20 dB per decade was used to normalize the measured data to the specified distance to determine compliance. The formula used to calculate an inverse proportionality factor is 20 log (D1/D2), where D1 is the distance used and D2 is the specified distance. A correction factor of 9.54dB applied to the measurements.

The antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. The spectrum analyzer's video and resolution bandwidths were set to 1MHz.

The EUT was caused to generate a constant carrier on the high, mid and low channels of operation at each of the data rates available. Table 7 below shows the results of all detectable points in the band of evaluation. Plots of each significant signal were taken and were filed separately as Appendix B.

Table 7: Peak Measurements Compared to Average Limits

Frequency (MHz)	Antenna Distance (m)	Level (dBm)	Detector Function (P/A)	Correction Factors (dB)	Corrected Level (dBm)	Corrected Level (uV/m)	Limit (uV/m)	Margin (dB)	Final Result (Pass/Fail)
Bit Rate 1 Mb/s									
4824	1	-66.17	P	5.67	-60.50	211.33	500	288.67	**PASS**
4884	1	-61.17	P	5.80	-55.37	381.61	500	118.39	**PASS**
4924	1	-63.00	P	5.89	-57.11	312.29	500	187.71	**PASS**
Bit Rate 2 Mb/s									
4824	1	-66.33	P	5.67	-60.66	207.47	500	292.53	**PASS**
4884	1	-62.67	P	5.80	-56.87	321.09	500	178.91	**PASS**
4924	1	-62.33	P	5.89	-56.44	337.34	500	162.66	**PASS**
Bit Rate 5.5 Mb/s									
4824	1	-67.50	P	5.67	-61.83	181.33	500	318.67	**PASS**
4879	1	-64.83	P	5.79	-59.04	250.07	500	249.93	**PASS**
4918	1	-65.17	P	5.88	-59.29	242.88	500	257.12	**PASS**
Bit Rate 11 Mb/s									
4824	1	-67.17	P	5.67	-61.50	188.35	500	311.65	**PASS**
4884	1	-64.00	P	5.80	-58.20	275.50	500	224.50	**PASS**
4924	1	-64.33	P	5.89	-58.44	267.96	500	232.04	**PASS**
Peak values found at antenna hieght 147cm, vertical polarity, turntable at 357 degrees.									

Correction Factors

AF = Antenna Factor
CA = Cable Attenuation
AG = Amplifier Gain
RL = Receiver Level
RC = Range Correction = 20Log(D1/D2) Where D1 is the specified distance used and D2 is the distance used to make measurements = [20Log(3/1)] = 9.54 dB

Therefore:

CF_T = Total Correction Factor = RL+AF+CA -AG-RC

Sample Calculations

Corrected Level(dBm) = RL+ CF_T

Conversion from dBm to uV/m = Antilog(dBm + 107)/20)

7.7 Power Spectral Density - FCC Section 15.247(d)

The spectral density was measured in accordance with OET bulletin 97-114, appendix C. The EUT was caused to generate a constant carrier on a high, middle and low channels at all the available data rates. The results are recorded in Table 8 below. A plot of the worst case measurement was taken of each of the emissions and is shown in figure 4 below.

Table 8: Spectral Density

Channel	Data Rate (Mbps)	Receiver Level (dBm)	Limit (dBm)	Margin (dB)
1 (2412 MHz)	1	-9.47	8	17.47
	2	-5.47	8	13.47
	5.5	-5.97	8	13.97
	11	-6.13	8	14.13
7 (2442 MHz)	1	-10.70	8	18.70
	2	-4.53	8	12.53
	5.5	-5.53	8	13.53
	11	-5.37	8	13.57
11 (2462 MHz)	1	-10.70	8	18.70
	2	-4.37	8	12.37
	5.5	-5.20	8	13.20
	11	-5.03	8	13.03

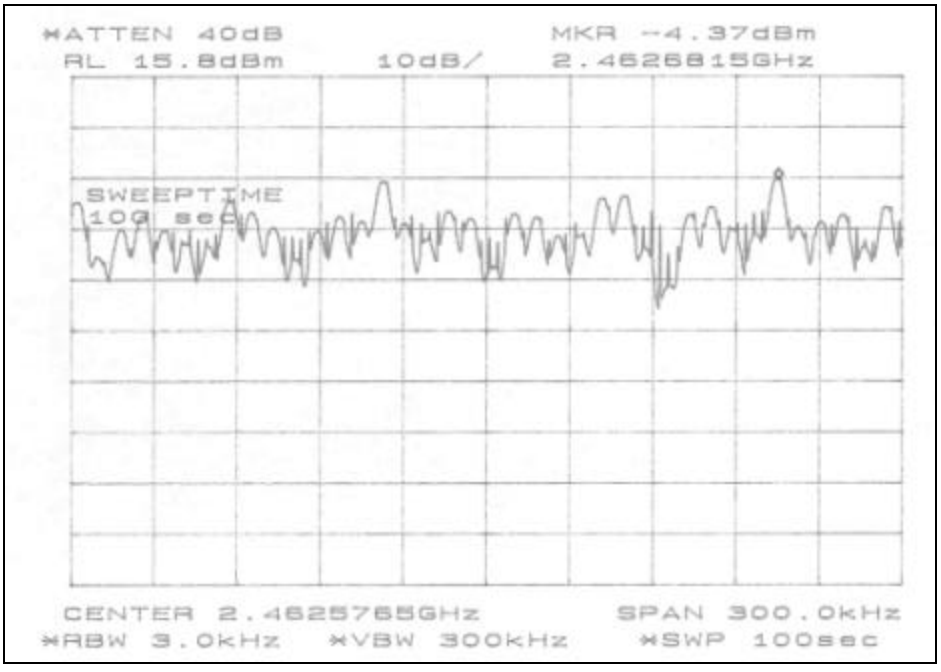


Figure 4: Worst Case Spectral Density Measurement

9.0 Processing Gain – FCC Section 15.247(e)

The processing gain of this device is greater than the 10db requirement. The test report can be found in Appendix C of this report.

10.0 Sample Label

The label shown below will be placed directly on the EUT and on the exterior of the host device.

11.0 RF Safety Notice

One of the following RF Safety Notices appears in the beginning of the Operator's Guide for each host considered to be a mobile device incorporating this radio.

For vehicle mounted hosts, and Access Point hosts mounted on walls or ceilings, the following statement appears:

Caution 	***This device is intended to transmit RF energy. For protection against excessive RF exposure to humans and in accordance with FCC rules and Industry Canada rules , this transmitter should be installed such that a minimum separation distance of at least 20cm is maintained between the antenna and the general population***

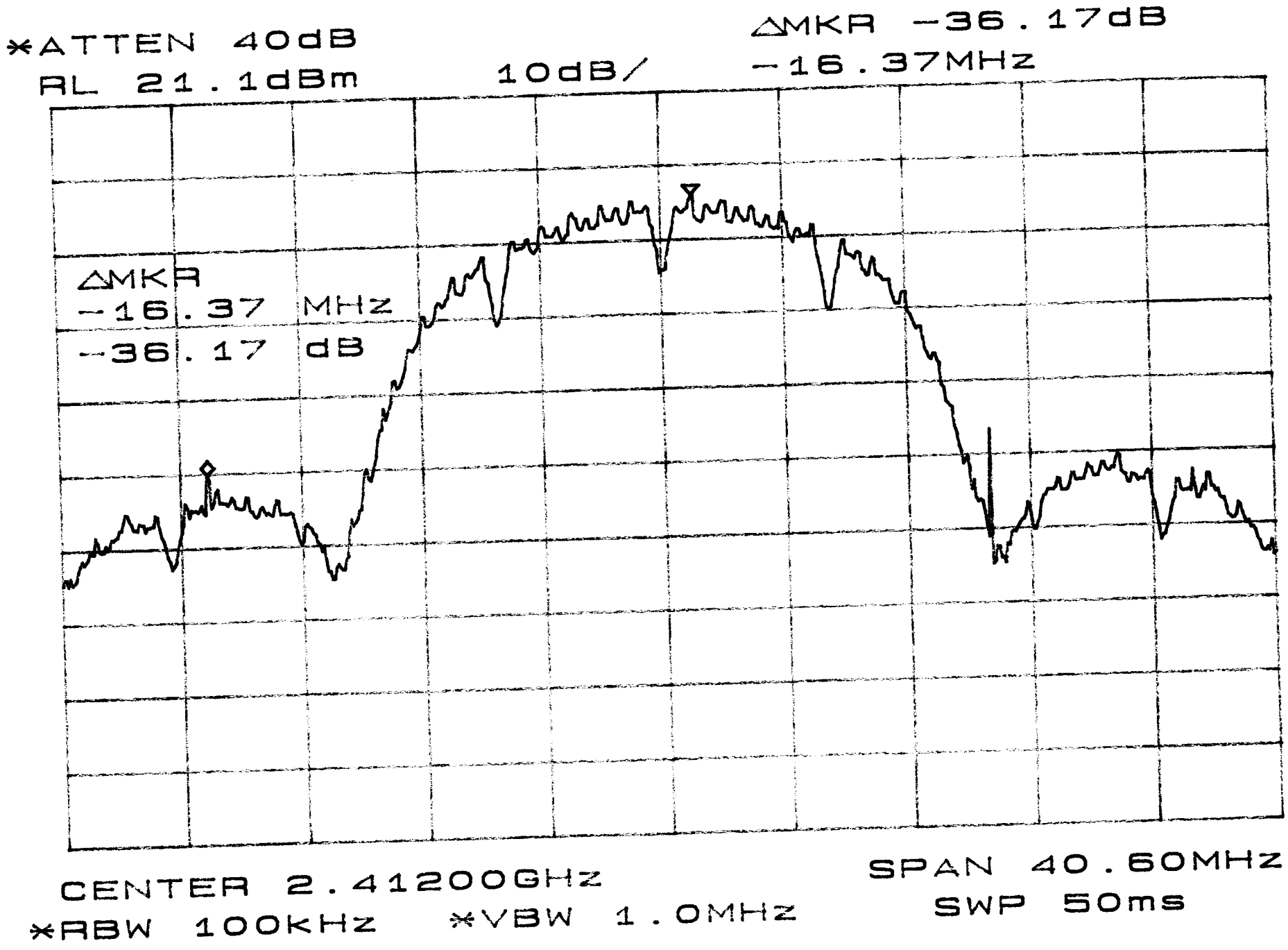
For handheld hosts, the following statement appears:

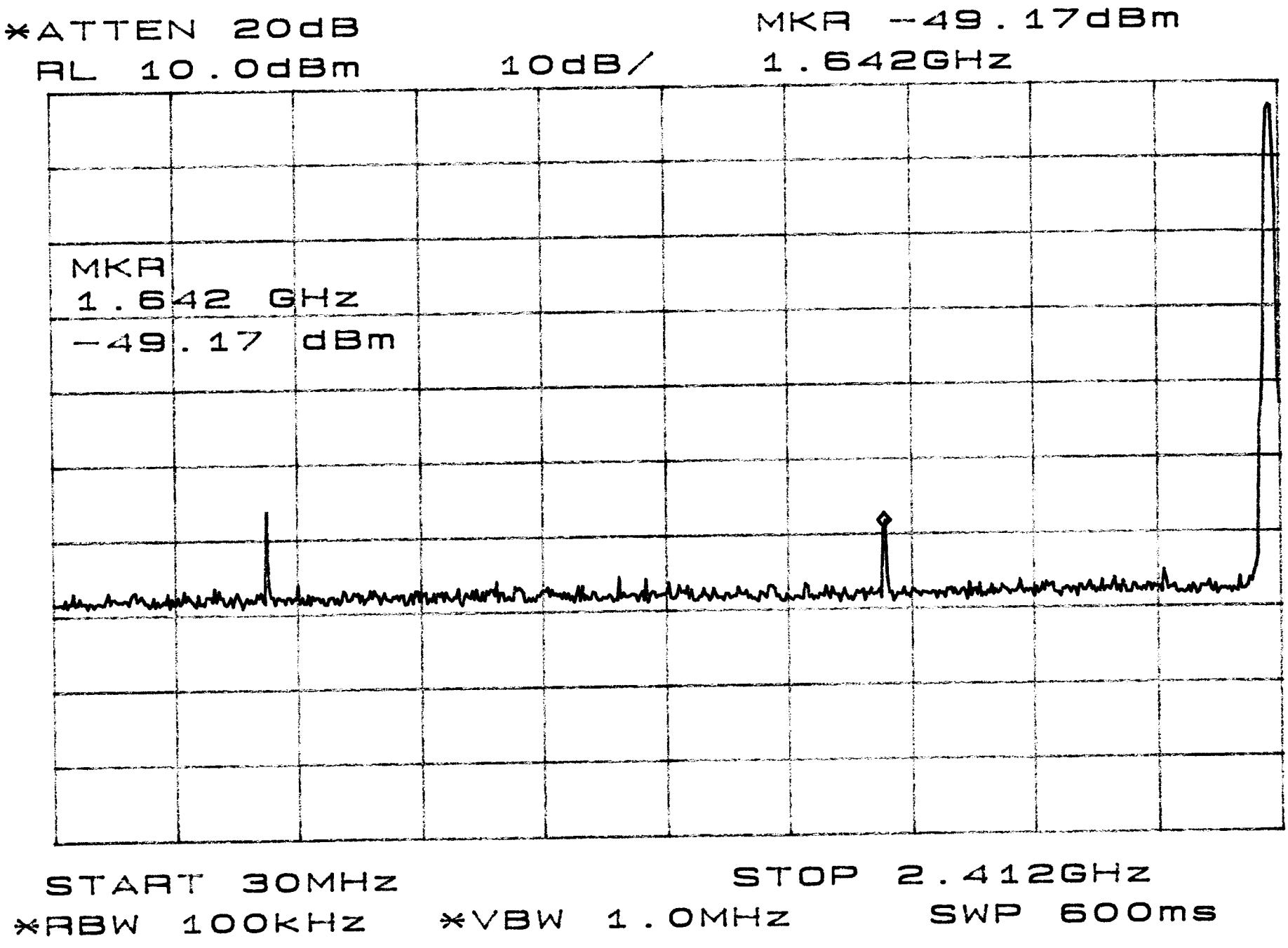
Caution 	***This device transmits RF energy and is designed for hand-held operation only. Use of this device in a manner not consistent with the users instructions can increase the risk of excessive RF exposure.***

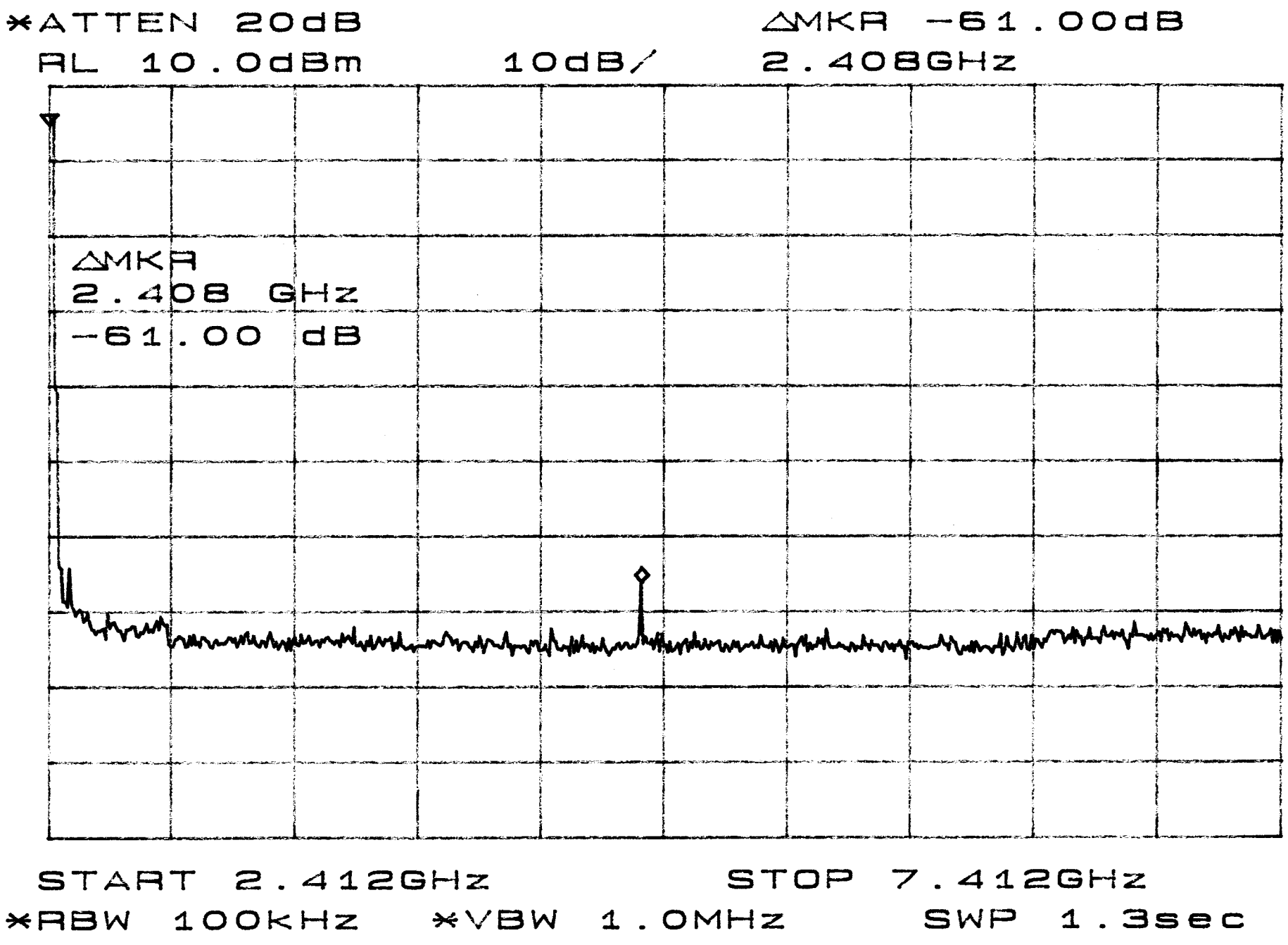
Detailed operating configurations and exposure conditions are included in Appendix D, the RF safety submittal of this filing.

Appendix A

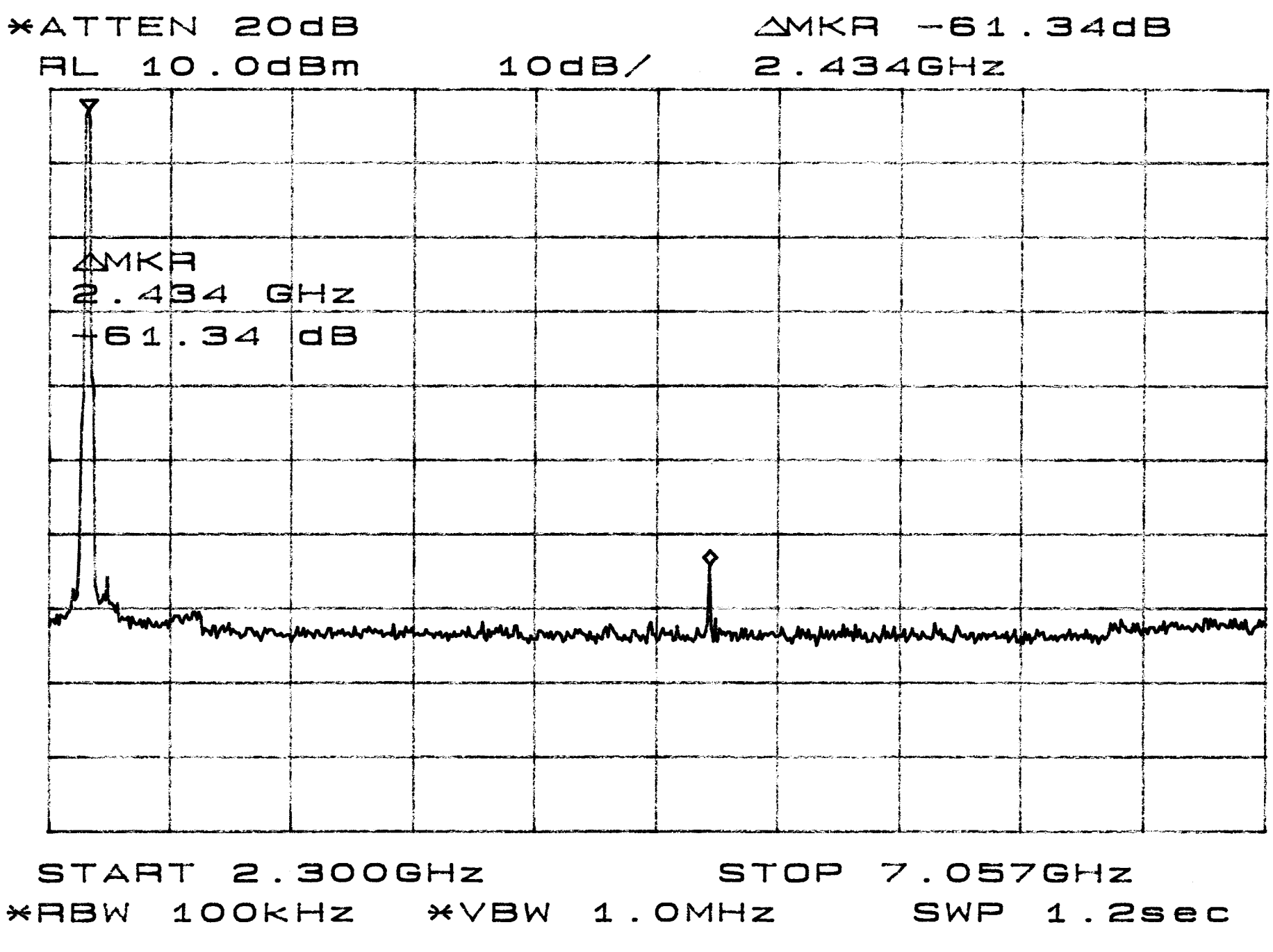
Conducted Spurious Emission Plots

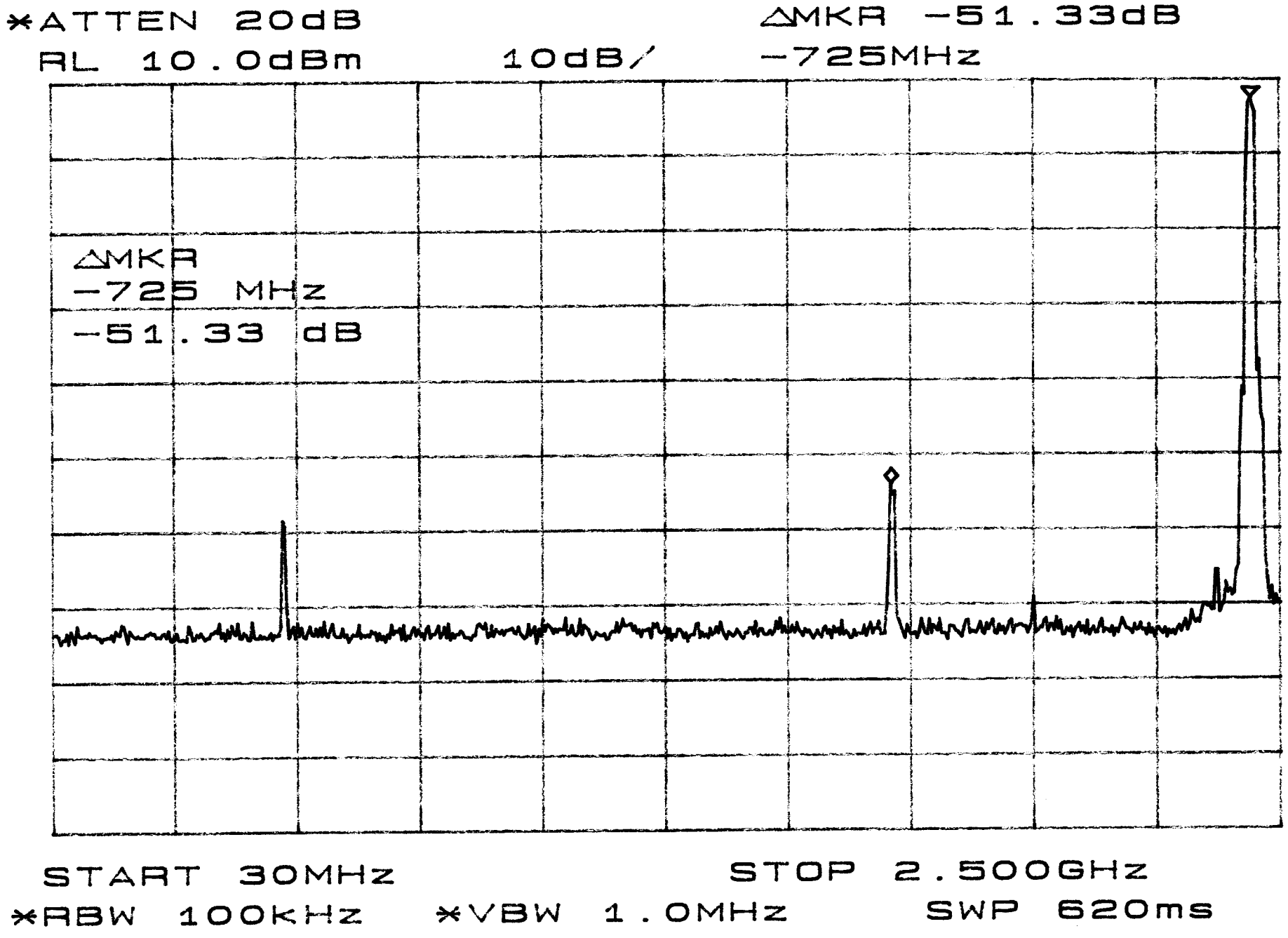

*ATTEN 40dB
RL 21.1dBm
10dB/
ΔMKR -36.17dB
-16.37MHz
ΔMKR
-16.37 MHz
-36.17 dB
CENTER 2.412000GHz
SPAN 40.60MHz
*RBW 100KHz
*VBW 1.0MHz
SWP 50ms

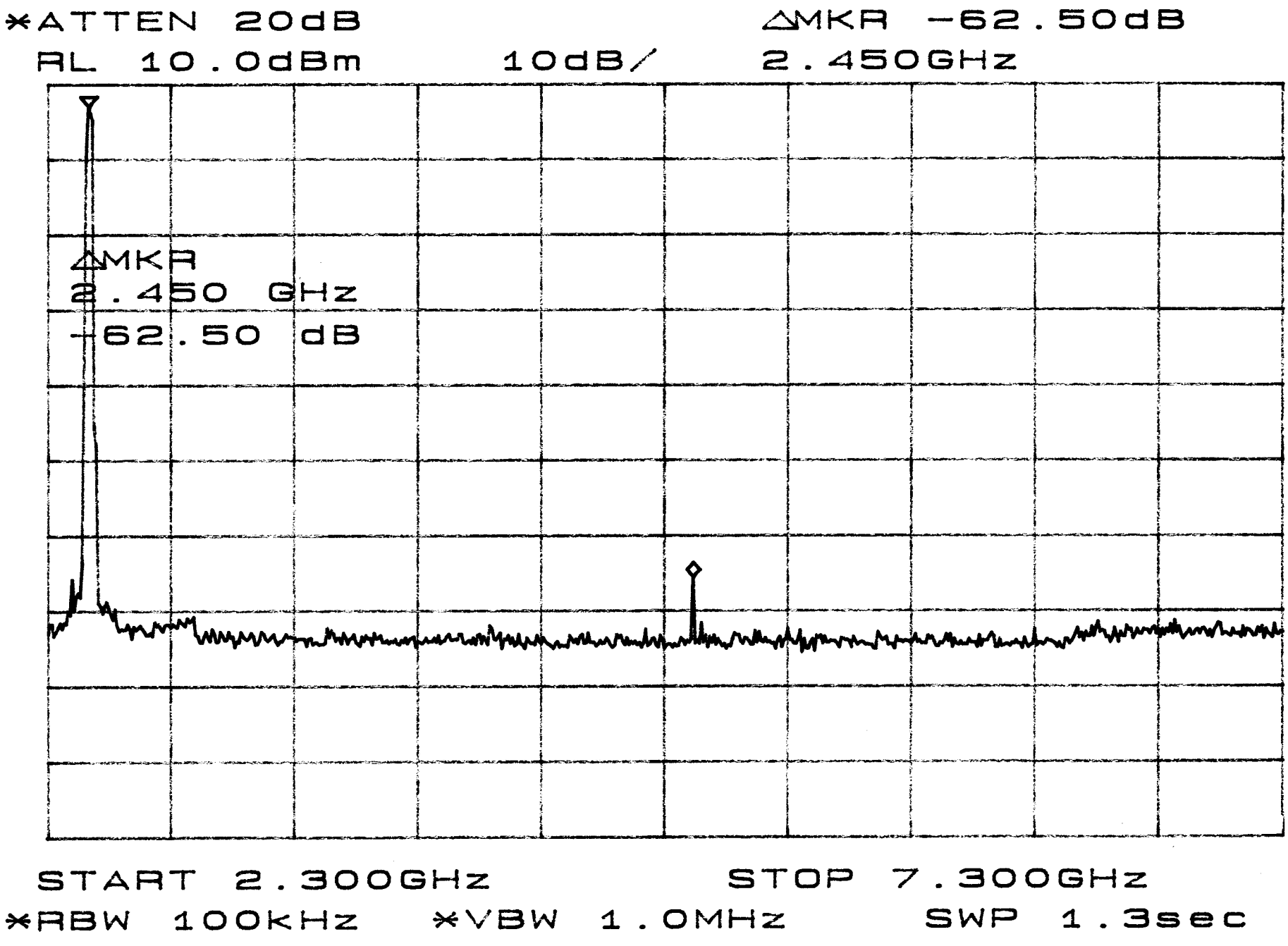

*ATTEN 20dB
RL 10.0dBm
10dB/
MKR -49.17dBm
1.642GHz
MKR
1.642 GHz
-49.17 dBm
START 30MHz
STOP 2.412GHz
*RBW 100KHz
*VBW 1.0MHz
SWP 600ms

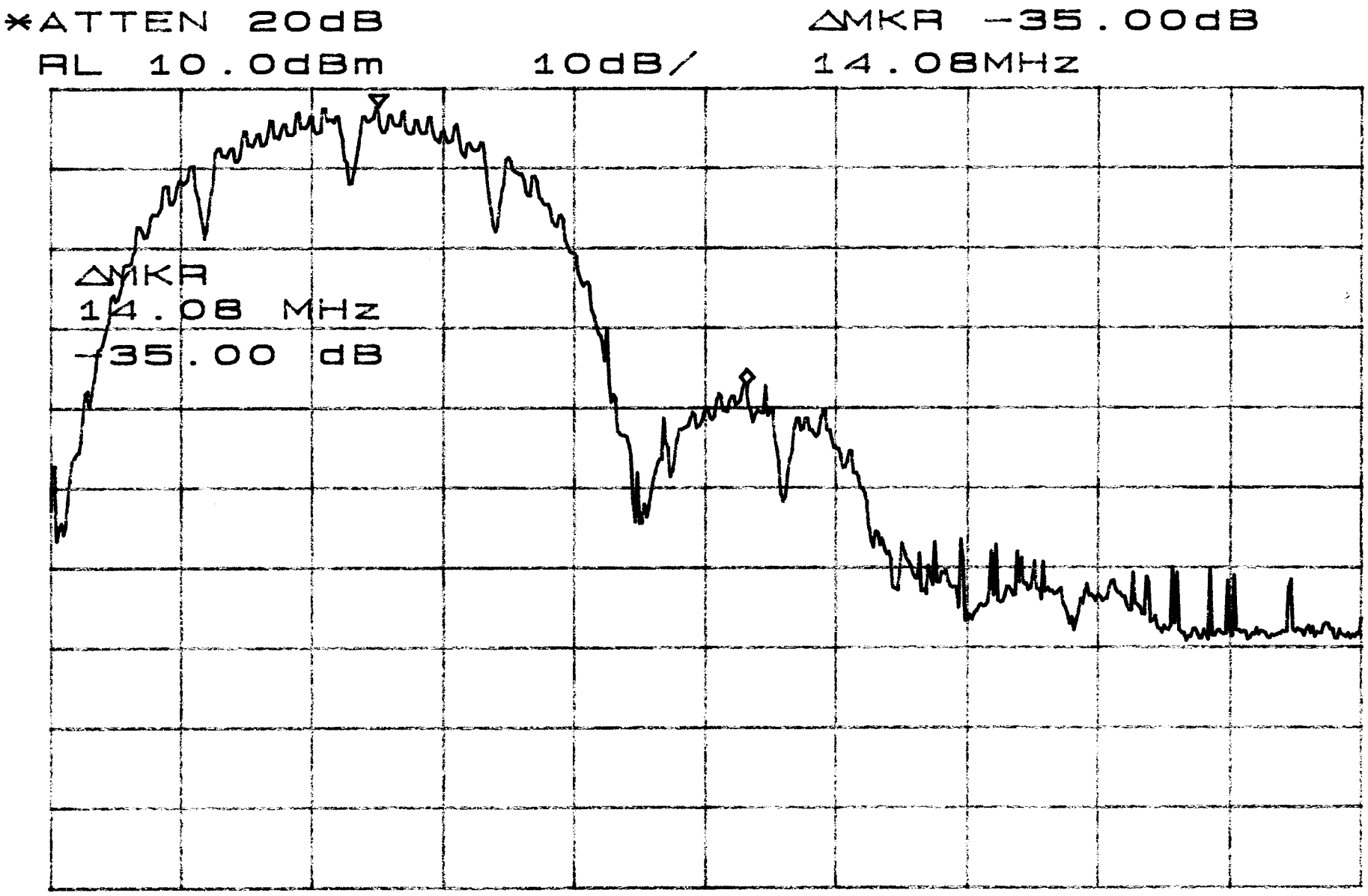

*ATTEN 20dB
ΔMKR -61.00dB
RL 10.0dBm
10dB/
2.408GHz
ΔMKR
2.408 GHz
-61.00 dB
START 2.412GHz
STOP 7.412GHz
*RBW 100kHz
*VBW 1.0MHz
SWP 1.3sec


*ATTEN 20dB
ΔMKR -53.84dB
RL 10.0dBm
10dB/
-733MHz
ΔMKR
-733 MHz
-53.84 dB
START 30MHz
STOP 2.500GHz
*RBW 100KHz
*VBW 1.0MHz
SWP 620ms


*ATTEN 20dB
ΔMKR -61.34dB
RL 10.0dBm
10dB/
2.434GHz
ΔMKR
2.434 GHz
+61.34 dB
START 2.300GHz
STOP 7.057GHz
*RBW 100KHz
*VBW 1.0MHz
SWP 1.2sec

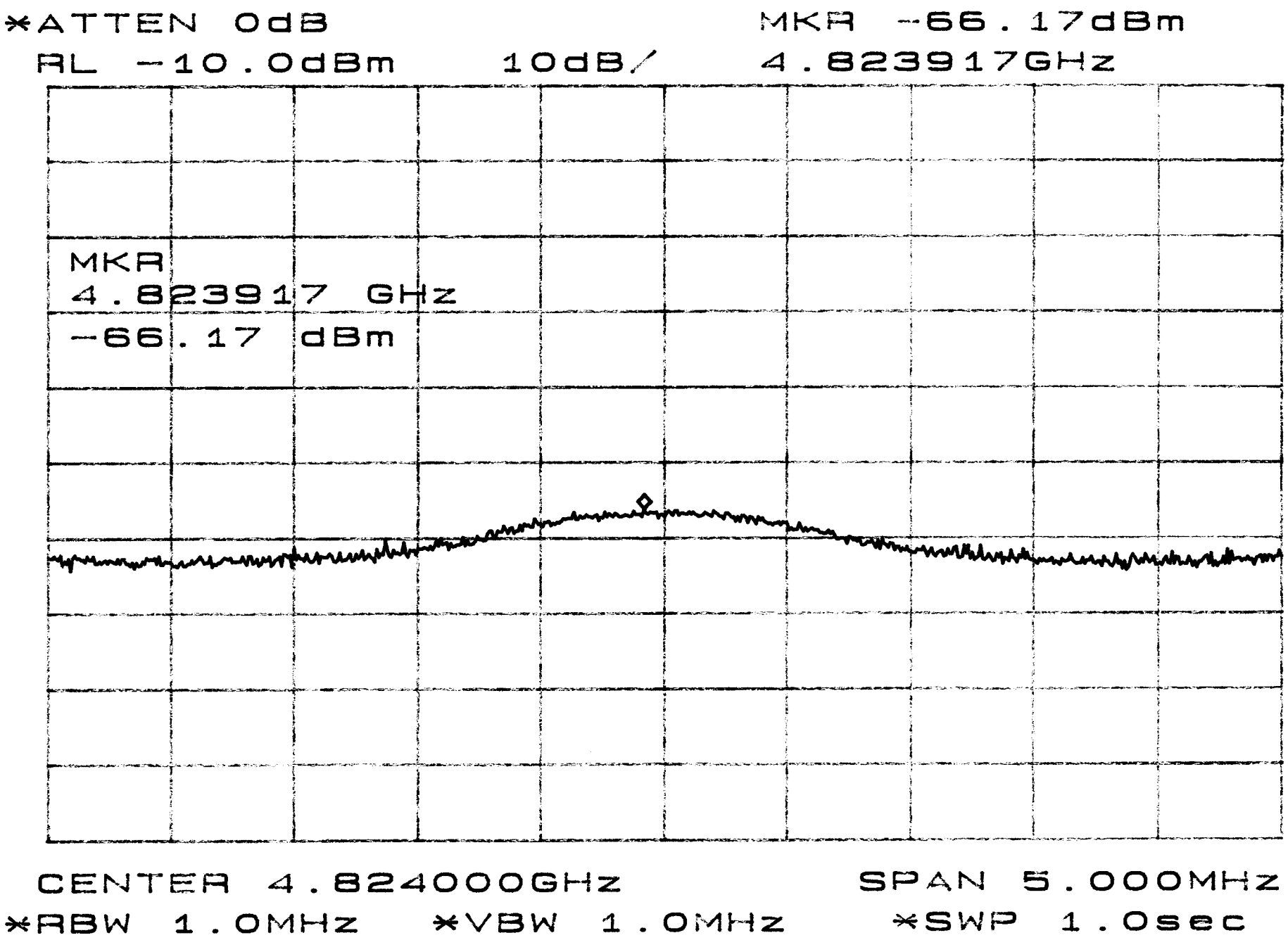

*ATTEN 20dB
ΔMKR -51.33dB
RL 10.0dBm
10dB/
-725MHz
ΔMKR
-725 MHz
-51.33 dB
START 30MHz
STOP 2.500GHz
*RBW 100KHz
*VBW 1.0MHz
SWP 620ms

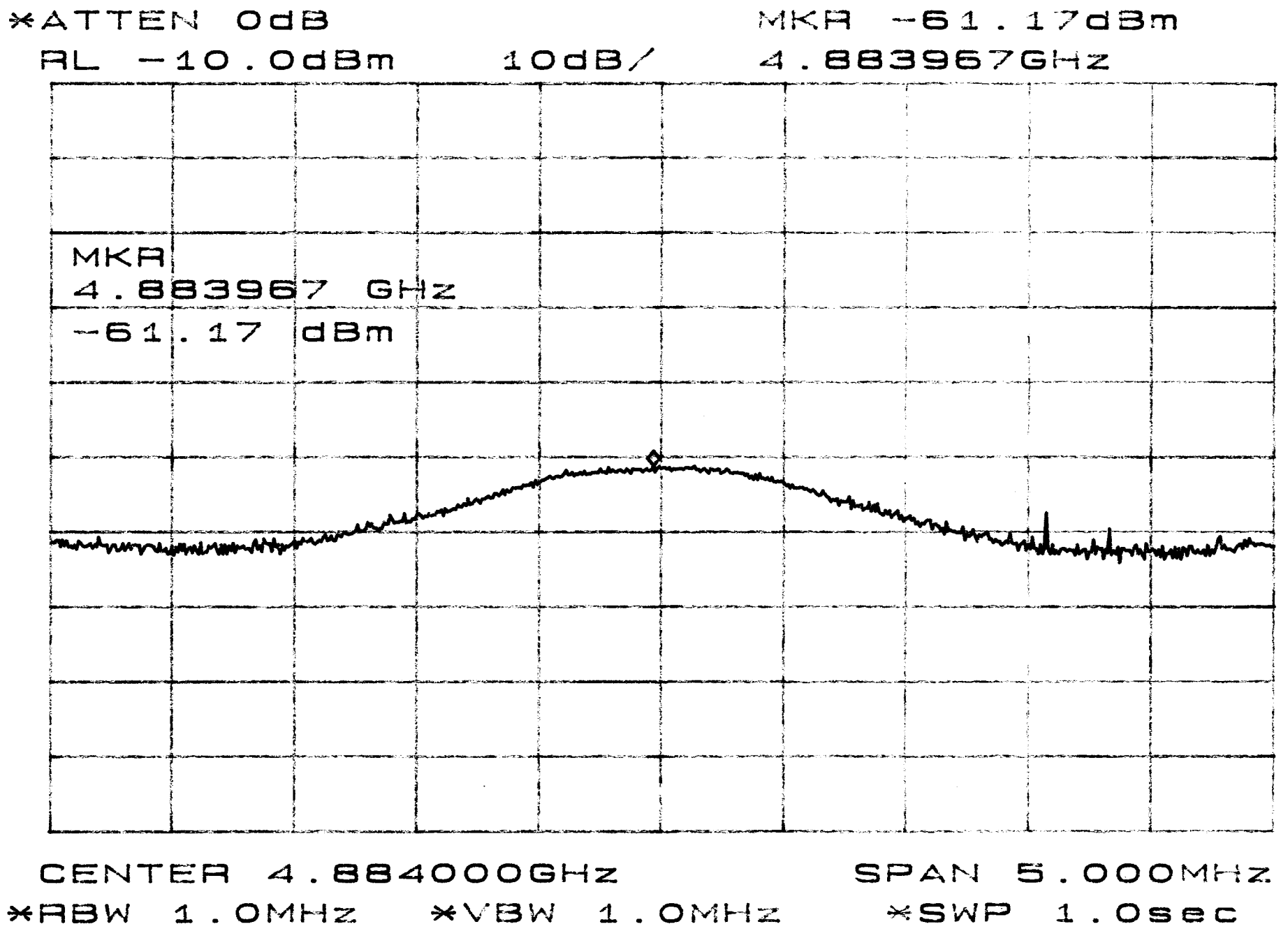

*ATTEN 20dB
ΔMKR -62.50dB
RL 10.0dBm
10dB/
2.450GHz
ΔMKR
2.450 GHz
-62.50 dB
START 2.300GHz
STOP 7.300GHz
*RBW 100kHz
*VBW 1.0MHz
SWP 1.3sec

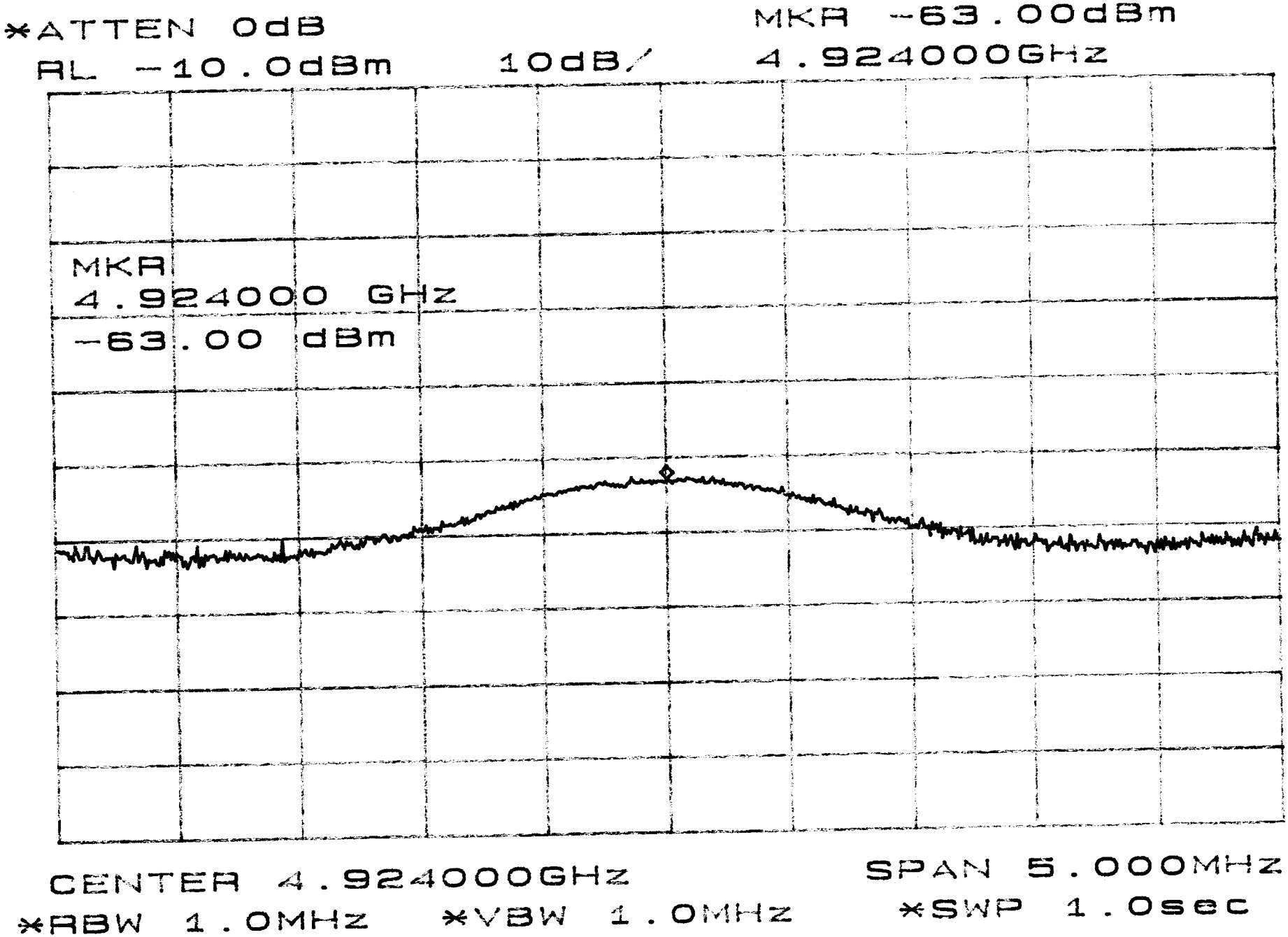

*ATTEN 20dB
ΔMKR -35.00dB
RL 10.0dBm
10dB/
14.08MHz
ΔMKR
14.08 MHz
-35.00 dB
CENTER 2.47550GHz
SPAN 50.00MHz
*RBW 100KHz
*VBW 1.0MHz
SWP 50ms

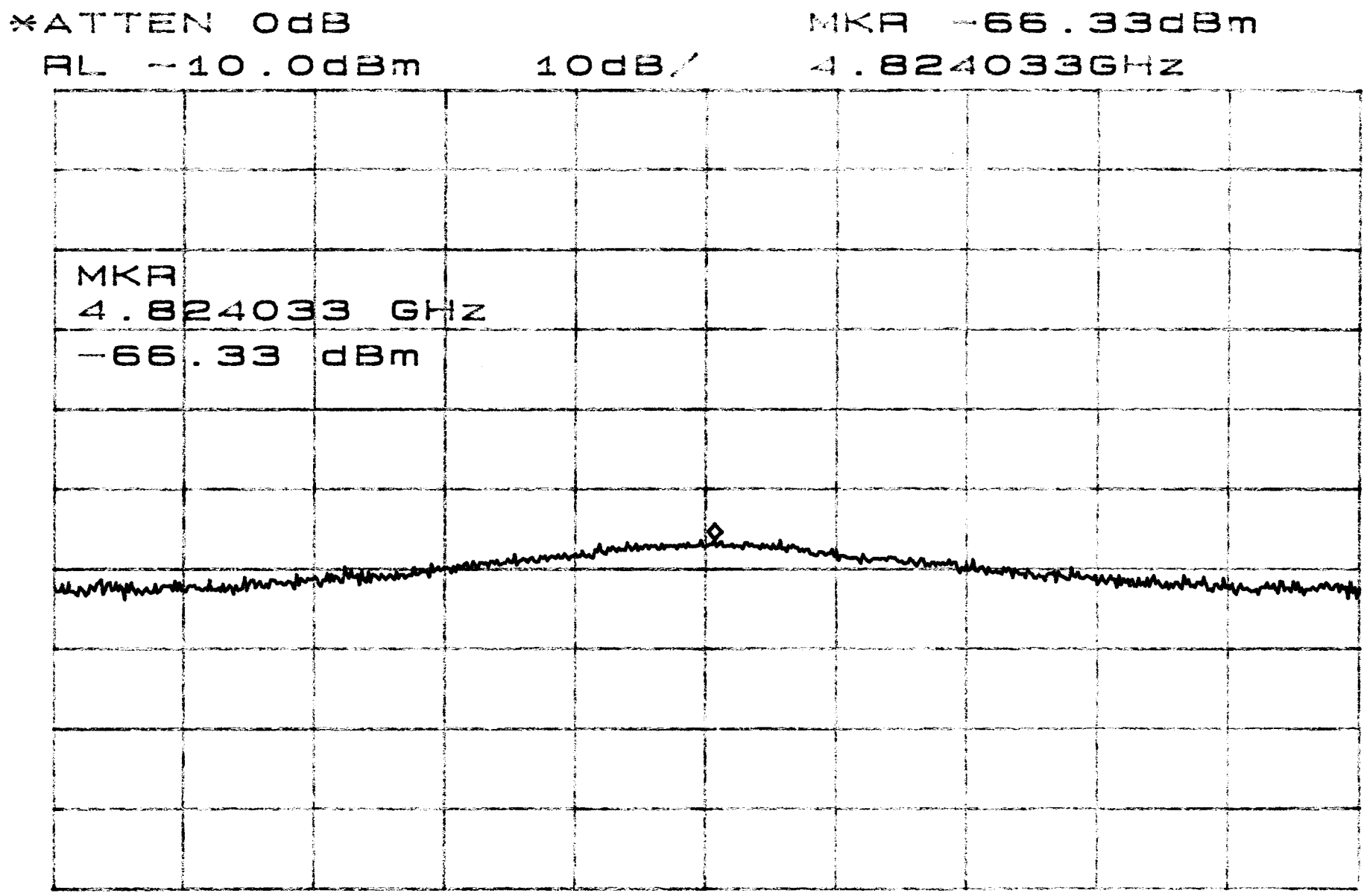
Appendix B

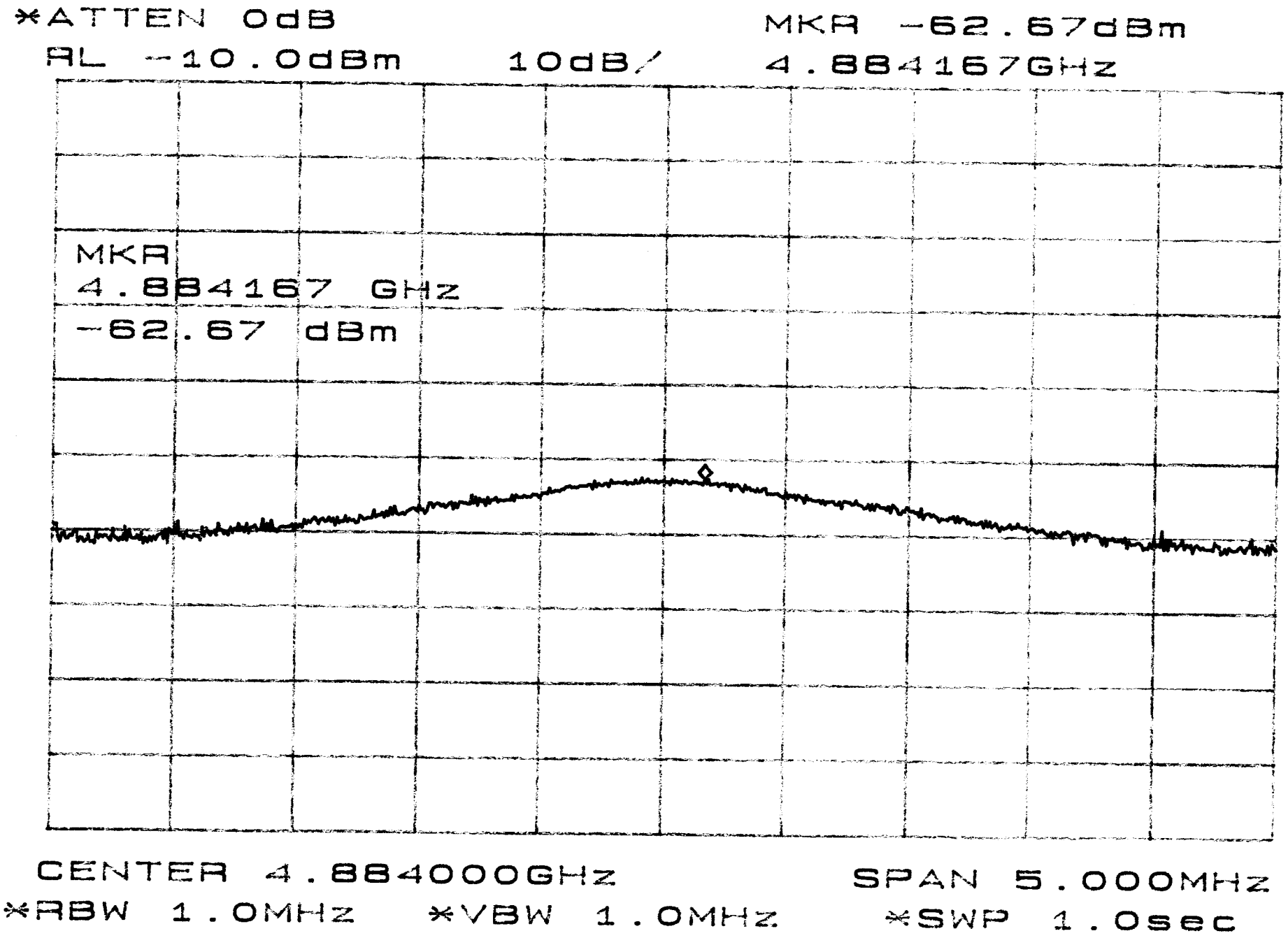
Radiated Spurious Emission Plots

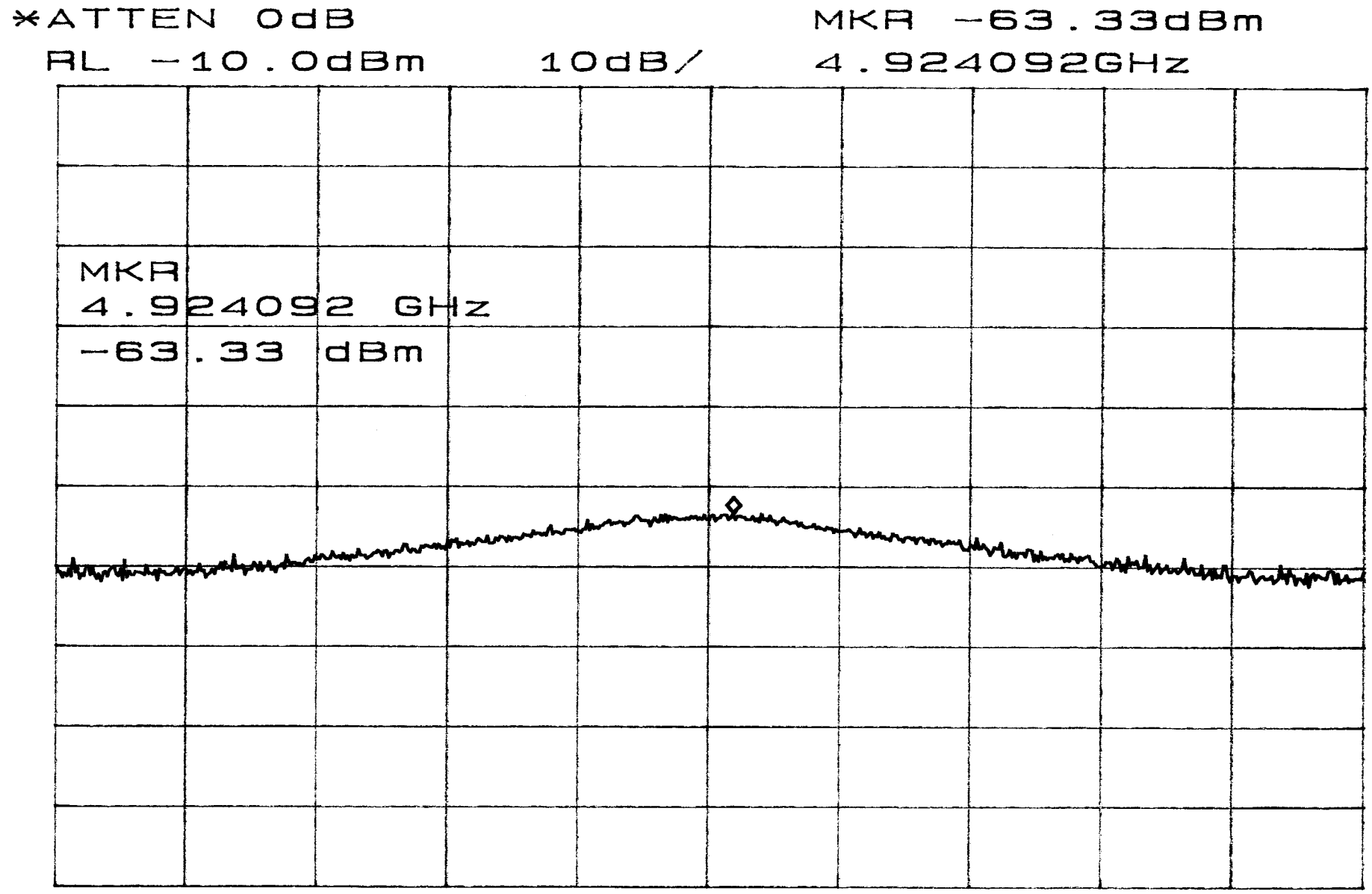

*ATTEN 0dB
MKR -66.17dBm
RL -10.0dBm
10dB/
4.823917GHz
MKR
4.823917 GHz
-66.17 dBm
CENTER 4.824000GHz
SPAN 5.000MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 1.0sec

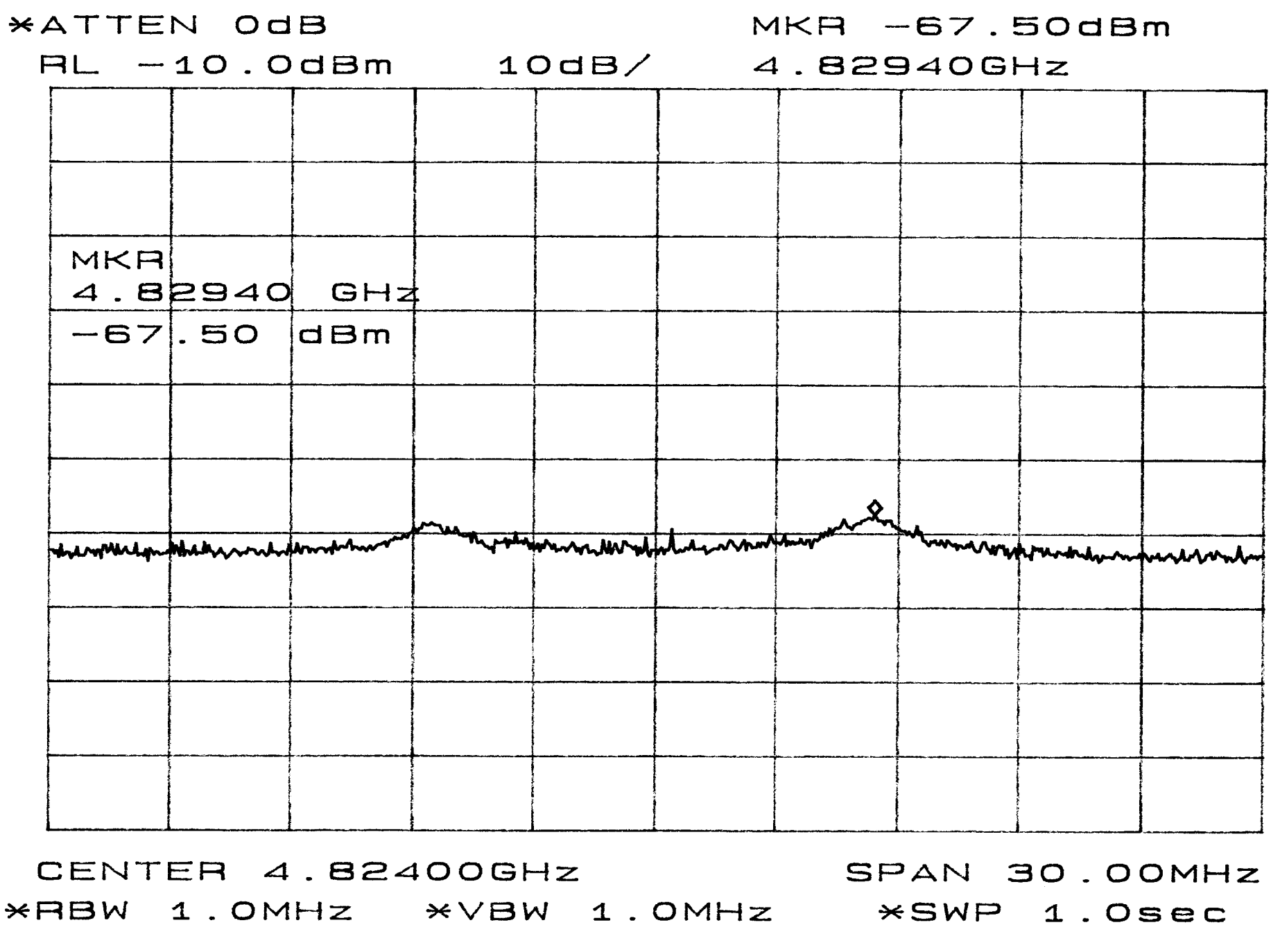

*ATTEN 0dB
MKR -61.17dBm
RL -10.0dBm
10dB/
4.883967GHz
MKR
4.883967 GHz
-61.17 dBm
CENTER 4.884000GHz
SPAN 5.000MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 1.0sec

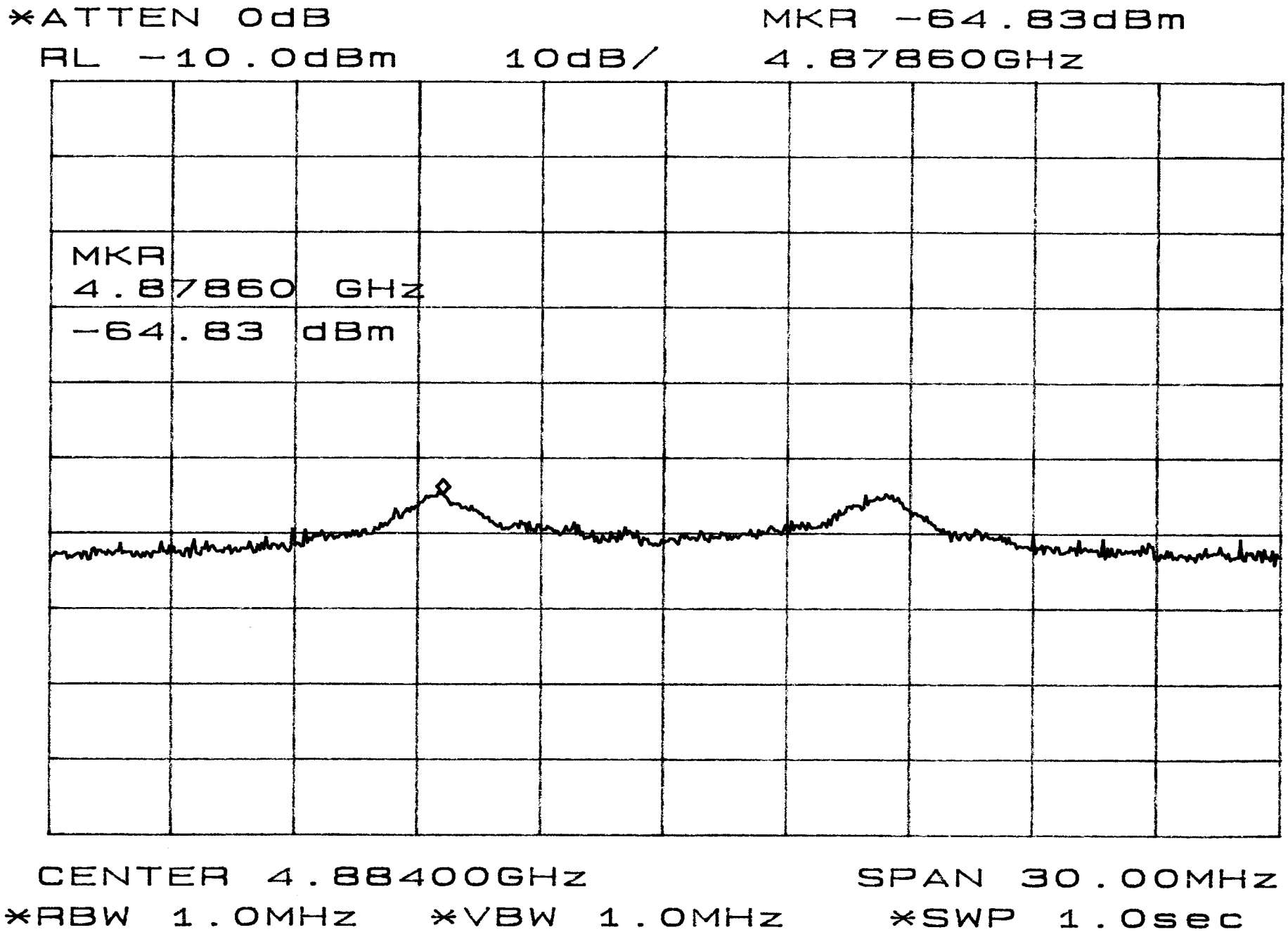

*ATTEN 0dB
MKR -63.00dBm
RL -10.0dBm
10dB/
4.924000GHz
MKR
4.924000 GHz
-63.00 dBm
CENTER 4.924000GHz
SPAN 5.000MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 1.0sec

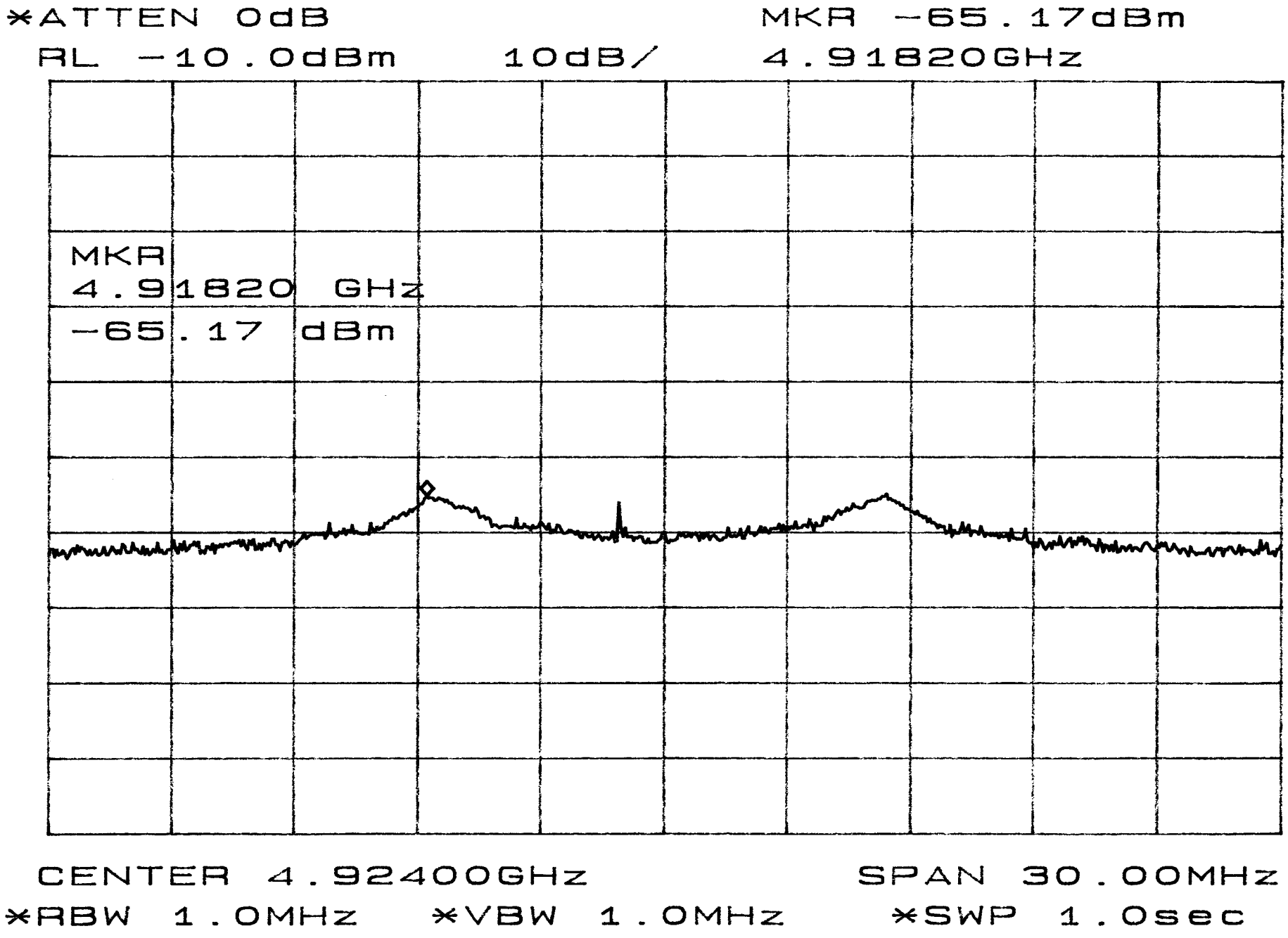

*ATTEN 0dB
MKR -66.33dBm
RL -10.0dBm
10dB/
4.824033GHz
MKR
4.824033 GHz
-66.33 dBm
CENTER 4.824000GHz
SPAN 5.000MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 1.0sec

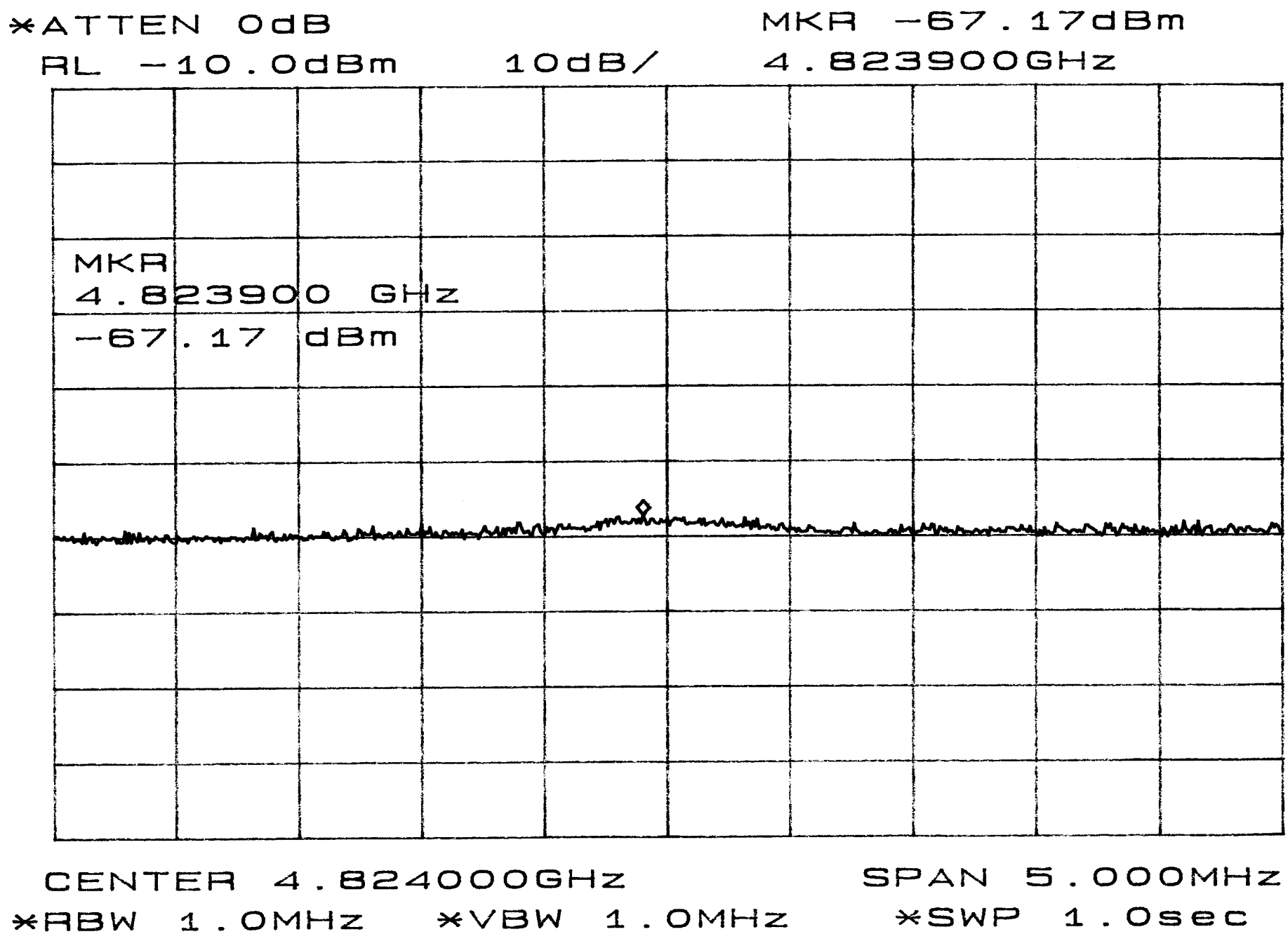

*ATTEN 0dB
MKR -62.67dBm
RL -10.0dBm
10dB/
4.884167GHz
MKR
4.884167 GHz
-62.67 dBm
CENTER 4.884000GHz
SPAN 5.000MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 1.0sec

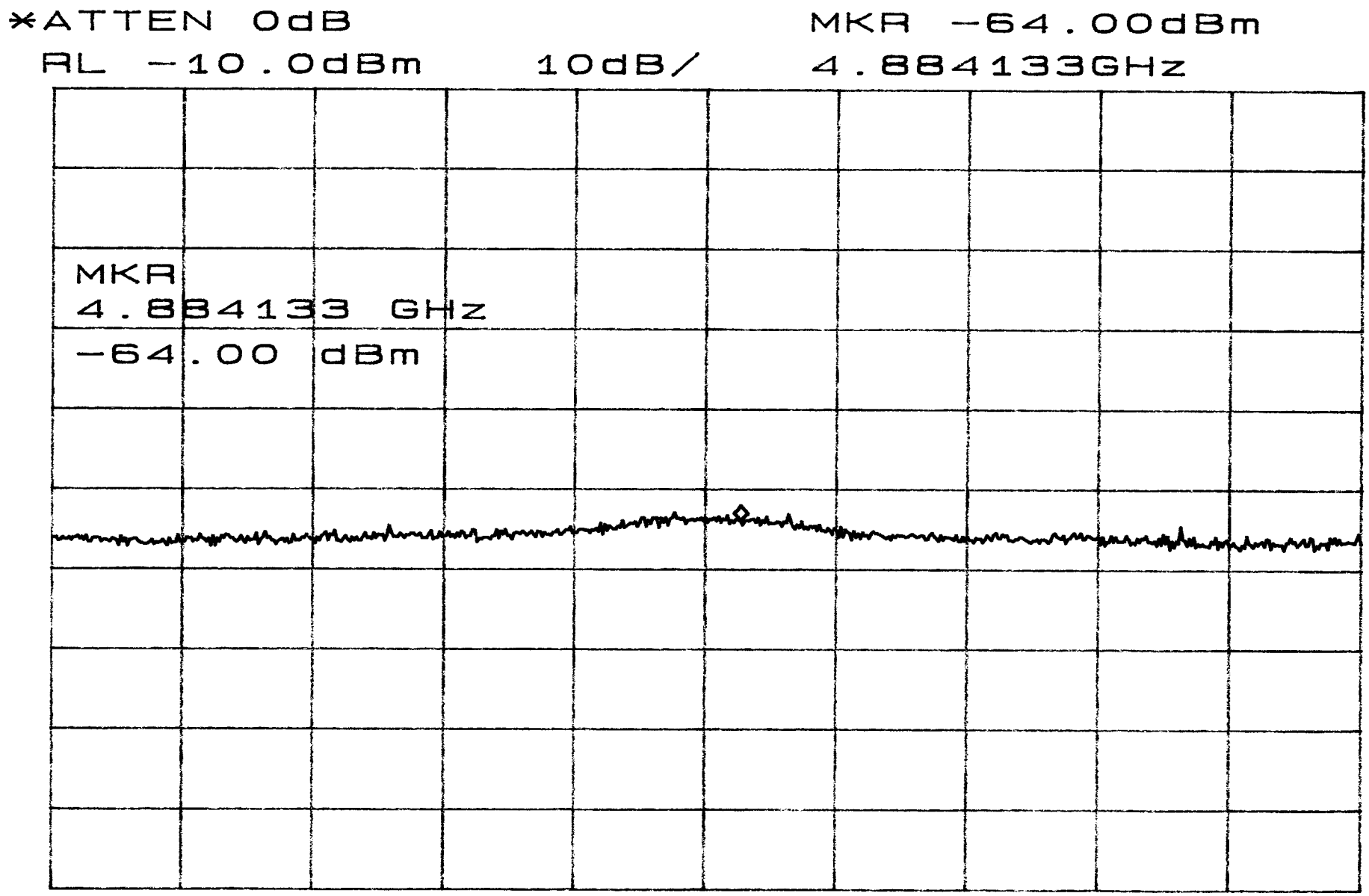

*ATTEN 0dB
MKR -63.33dBm
RL -10.0dBm
10dB/
4.924092GHz
MKR
4.924092 GHz
-63.33 dBm
CENTER 4.924000GHz
SPAN 5.000MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 1.0sec

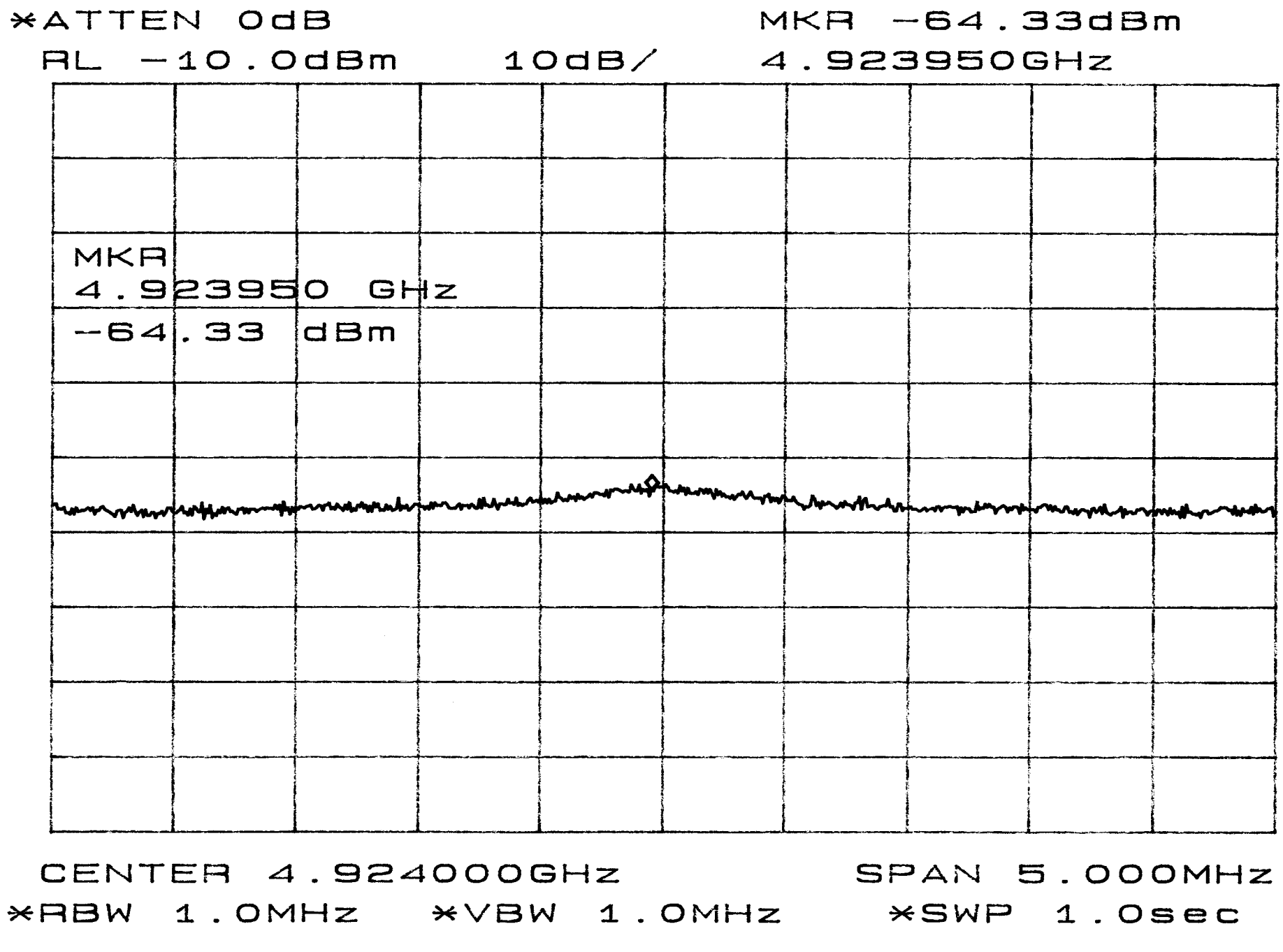

*ATTEN 0dB
MKR -67.50dBm
RL -10.0dBm
10dB/
4.82940GHz
MKR
4.82940 GHz
-67.50 dBm
CENTER 4.82400GHz
SPAN 30.00MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 1.0sec


*ATTEN 0dB
MKR -64.83dBm
RL -10.0dBm
10dB/
4.87860GHz
MKR
4.87860 GHz
-64.83 dBm
CENTER 4.88400GHz
SPAN 30.00MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 1.0sec


*ATTEN 0dB
MKR -65.17dBm
RL -10.0dBm
10dB/
4.91820GHz
MKR
4.91820 GHz
-65.17 dBm
CENTER 4.92400GHz
SPAN 30.00MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 1.0sec


*ATTEN 0dB
MKR -67.17dBm
RL -10.0dBm
10dB/
4.823900GHz
MKR
4.823900 GHz
-67.17 dBm
CENTER 4.824000GHz
SPAN 5.000MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 1.0sec


*ATTEN 0dB
MKR -64.00dBm
RL -10.0dBm
10dB/
4.884133GHz
MKR
4.884133 GHz
-64.00 dBm
CENTER 4.884000GHz
SPAN 5.000MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 1.0sec


*ATTEN 0dB
MKR -64.33dBm
RL -10.0dBm
10dB/
4.923950GHz
MKR
4.923950 GHz
-64.33 dBm
CENTER 4.924000GHz
SPAN 5.000MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 1.0sec

Appendix C

Processing Gain

PRODUCT NAME: Cisco Merucry Radio

NAME OF TEST: The Processing Gain of a Direct Sequence System.

FCC Part 15.247 (e) specifies:

The processing gain of a direct sequence system shall be at least 10 dB.

Guidance on measurement by FCC

The processing gain may be measured using the CW jamming margin method. The test consists of stepping a signal generator in 50khz increments across the passband of the system. At each point, the generator level required to the produce the recommended Bit Error Rate (10-5) is recorded. This is the jammer level. The output power of the transmitting unit is measured at the same point. The Jammer to Signal (J/S) ratio is then calculated. Discard the worst 20% of the J/S data points. Total losses in a system including transmitter and receiver, should be assumed to be no more than 2 dB.

therefore, processing gain = S/N + Mj + Lsys

Where :
S/N = Signal to noise ratio required at the receiver output for 10-5 error rate of a ideal receiver for your demodulation scheme

Mj = Jammer to signal ratio
Lsys = System losses (2dB max)

Test results :

for 1 mb data rate:
S/N = 13 dB ; taken from Wireless Information Networks by Pahlavan & Levesque
Mj = - 4.2 dB ; worst case jamming margin from tests in lab
Lsys = 2.0 dB ; system losses
therefore the processing gain at 1mb is 13 dB - 4.2 dB + 2.0 dB = 10.8 dB

for 2 mb data rate:
S/N = 13 dB ; taken from Wireless Information Networks by Pahlavan & Levesque
Mj = - 4.2 dB ; worst case jamming margin from tests in lab
Lsys = 2.0 dB ; system losses
therefore the processing gain at 2mb is 13 dB – 4.2 dB + 2.0 dB = 10.8 dB

for 5.5 mb data rate:

S/N = 13.6 dB ; taken from Harris CCK encoding modulation
Mj = - 4.4 dB ; worst case jamming margin from tests in lab (after 20% discard)
Lsys = 2.0 dB ; system losses

therefore the processing gain at 5.5mb is 13.6 dB - 4.4 dB + 2.0 dB = 11.2 dB

for 11 mb data rate:

S/N = 16.0 dB ; taken from Harris CCK encoding modulation
Mj = - 7.4 dB ; worst case jamming margin from tests in lab (after 20% discarded)
Lsys = 2.0 dB ; system losses

therefore the processing gain at 11mb is 16.0 dB - 7.4 dB + 2.0 dB = 10.6 dB