SUBMITTAL APPLICATION REPORT

FOR
GRANT OF CERTIFICATION

FOR

MODEL: CRD
2400-2483.5 MHz
Broadband Wireless Data Transmitter

FOR

MIKROTIKLS SIA

Pernavas 46
Riga, Latvia LV-1009

Test Report Number: 070626

ROGERS LABS, INC.
4405 West 259th Terrace
Louisburg, KS 66053
Phone / Fax (913) 837-3214

ENGINEERING TEST REPORT
FOR
APLLICATION of
GRANT of CERTIFICATION

FOR

CFR 47, PART 15C - INTENTIONAL RADIATORS
CFR47 Paragraph 15.247
License Exempt Intentional Radiator

For

MIKROTIKLS SIA
Pernavas 46
Riga, Latvia LV-1009

BROADBAND WIRELESS DATA TRANSMITTER
Model: CRD
Frequency Range 2400-2483.5 MHz
FCC ID#: TV7-CRD

Test Date: June 26, 2007

Certifying Engineer: Scot D Rogers

Scot D. Rogers
ROGERS LABS, INC.
4405 West 259th Terrace
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FORWARD

The following information is submitted for consideration in obtaining a Grant of Certification for a License Exempt Intentional Radiator operating under CFR47 Paragraph 15.247.

Name of Applicant:

MIKROTIKLS SIA
Pernavas 46
Riga, Latvia LV-1009

Model: CRD

FCC I.D.: TV7-CRD FRN: 0014 43 1100.

Frequency Range: 2400-2483.5 MHz.

Operating Power: 400 mW conducted power (Restricted to channels between 2422-2457).
250 Mw operations on channels 2412-2462 MHz.

1) Applicable Standards & Test Procedures

a) In accordance with the Federal Communications Code of Federal Regulations, dated October 1, 2006, Part 2, Subpart J, Paragraphs 2.907, 2.911, 2.913, 2.925, 2.926, 2.1031 through 2.1057, and applicable parts of paragraph 15, Part 15C Paragraph 15.247 the following information is submitted.

b) Test procedures used are the established Methods of Measurement of Radio-Noise Emissions as described in the ANSI 63.4-2003 Document FCC, documents DA00-1407 and DA00-705 and/or TIA/EIA 603-1. Testing for the line-conducted emissions were performed as defined in section 13.1.3, testing of the radiated emissions was performed as defined in section 13.1.4 of ANSI C63.4. Testing of the intentional radiated emissions was performed as defined in section 13 of ANSI C63.4.

2.1033(b) Application for Certification

(1) Manufacturer: MIKROTIKLS SIA
Pernavas 46
Riga, Latvia LV-1009

(2) Identification: Model: CRD
FCC I.D.: TV7-CRD

(3) Instruction Book:
Refer to Exhibit for Instruction Manual.

(4) Description of Circuit Functions:
Refer to Exhibit of Operational Description.

(5) Block Diagram with Frequencies:
Refer to Exhibit of Operational Description.

(6) Report of Measurements:
Report of measurements follows in this Report.

(7) Photographs: Construction, Component Placement, etc.:
Refer to Exhibit for photographs of equipment.

(8) No Peripheral Equipment was Necessary for operation. A laptop computer was used for testing purposes.

(9) Transition Provisions of 15.37 are not being requested.

(10) Not Applicable. The unit is not a scanning receiver.

(11) Not Applicable. The EUT does not operate in the 59 – 64 GHz frequency band.

2) Equipment Tested

Equipment	Models	FCC I.D.#
EUT	CRD	TV7-CRD
CPU	Dell PP02X	DoC

3) Equipment Function and Testing Procedures

The EUT is a 2400-2483.5 MHz radio transmitter used to transmit data to and form remote locations offering broadband wireless internet connectivity. The unit is marketed for use to incorporate a wireless link to exchange data information from one point to another. For testing purposes the transceiver was powered from the AC power adapter supply and set to transmit in all maximum data modes available. The unit operates from external supplied direct current supplied from the AC/DC adapter and "Power Over Ethernet" (POE) adapter. The device is professionally installed and thus complies with the antenna connection requirements.

4) Equipment and Cable Configurations

Conducted Emission Test Procedure

The unit typically operates from the manufacturer supplied AC/DC power supply. For testing purposes, the manufacturer supplied AC/DC power supply was used to power the unit. Testing for the AC line-conducted emissions testing was performed as defined in section 13.1.3 of ANSI C63.4. The test setup including the EUT was arranged in a typical equipment configuration and placed on a 1 x 1.5-meter wooden bench, 0.8 meters high located in a screen room. The power lines of the system were isolated from the power source using a standard LISN with a 50 µHy choke. EMI was coupled to the spectrum analyzer through a 0.1 µF capacitor internal to the LISN. The LISN was positioned on the floor beneath the wooden bench supporting the EUT. The power lines and cables were draped over the back edge of the table.

Radiated Emission Test Procedure:

The EUT was placed on a rotating 1 x 1.5-meter wooden platform, 0.8 meters above the ground plane at a distance of 3 meters from the FSM antenna. Testing for the unintentional radiated emissions was performed as defined in section 13.1.4 of ANSI C63.4. EMI energy was maximized by equipment placement, raising and lowering the FSM antenna, changing the antenna polarization, and by rotating the turntable. Each emission was maximized before data was taken using a spectrum analyzer. Refer to photographs in the test setup exhibits for EUT placement during testing.

5) List of Test Equipment

A Hewlett Packard 8591EM Spectrum Analyzer was used as the measuring device for the emissions testing of frequencies below 1 GHz. A Hewlett Packard 8562A Spectrum Analyzer was used as the measuring device for testing the emissions at frequencies above 1 GHz. The analyzer settings used are described in the following table. Refer to the appendix for a complete list of test equipment.

HP 8591 EM ANALYZER SETTINGS		
CONDUCTED EMISSIONS:		
RBW	AVG. BW	DETECTOR FUNCTION
9 kHz	30 kHz	Peak / Quasi Peak
RADIATED EMISSIONS:		
RBW	AVG. BW	DETECTOR FUNCTION
120 kHz	300 kHz	Peak / Quasi Peak
HP 8562A ANALYZER SETTINGS		
RBW	VIDEO BW	DETECTOR FUNCTION
100 kHz	100 kHz	PEAK
1 MHz	1 MHz	Peak / Average

EQUIPMENT	MFG.	MODEL	CAL. DATE	DUE.
LISN	Comp. Design	FCC-LISN-2-MOD.CD	10/06	10/07
LISN	Comp. Design	1762	2/07	2/08
Antenna	ARA	BCD-235-B	10/06	10/07
Antenna	EMCO	3147	10/06	10/07
Antenna	EMCO	3143	5/07	5/08
Analyzer	HP	8591EM	5/07	5/08
Analyzer	HP	8562A	2/07	2/08

6) Units of Measurements

Conducted EMI Data is in dBµV; dB referenced to one microvolt.

Radiated EMI Data is in dBµV/m; dB/m referenced to one microvolt per meter.

7) Test Site Locations

Conducted EMI	The AC power line conducted emissions tests were performed in a shielded screen room located at Rogers Labs, Inc., 4405 W. 259th Terrace, Louisburg, KS.
Radiated EMI	The radiated emissions tests were performed at the 3 meters, Open Area Test Site (OATS) located at Rogers Labs, Inc., 4405 W. 259th Terrace, Louisburg, KS.
Site Approval	Refer to Appendix for FCC Site Approval Letter, Reference # 90910.

8) SUBPART B – UNINTENTIONAL RADIATORS

Conducted EMI

The EUT was arranged in a typical equipment configuration and placed on a 1 x 1.5-meter wooden bench 80 cm above the conducting ground plane, floor of a screen room. The bench was positioned 40 cm away from the wall of the screen room. The LISN was positioned on the floor of the screen room 80-cm from the rear of the EUT. The manufacturer supplied AC power adapter for the EUT was connected to the LISN. A second LISN was positioned on the floor of the screen room 80-cm from the rear of the supporting equipment of the EUT. All power cords except the EUT were then powered from the second LISN. EMI was coupled to the spectrum analyzer through a 0.1 µF capacitor, internal to the LISN. Power line conducted emissions testing were carried out individually for each current carrying conductor of the EUT. The excess length of lead between the system and the LISN receptacle was folded back and forth to form a bundle not exceeding 40 cm in length. The screen room, conducting ground plane, analyzer, and LISN were bonded together to the protective earth ground. Preliminary testing was performed to identify the frequency of each radio frequency emission displaying the highest amplitude. The cables were repositioned to obtain maximum amplitude of measured EMI level. Once the worst-case configuration was identified, plots were made of the EMI from 0.15 MHz to 30 MHz then the data was recorded with maximum conducted emissions levels. Refer to figures one and two for plots of the AC Line conducted emissions.

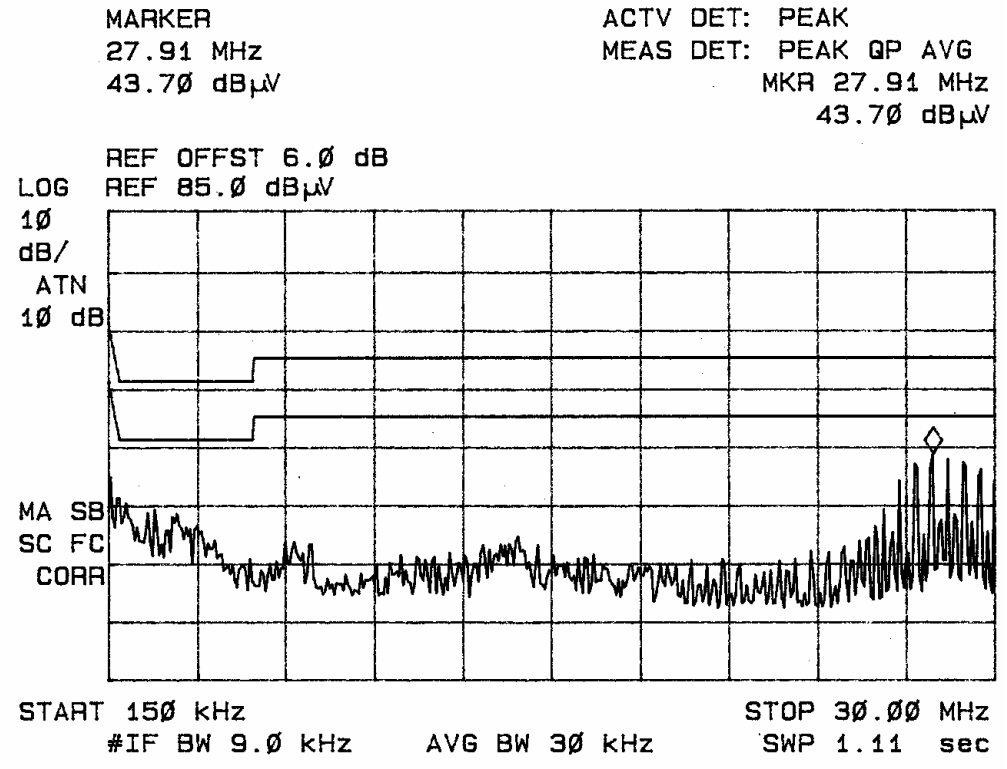

Figure 1 Conducted Emissions Line 1.

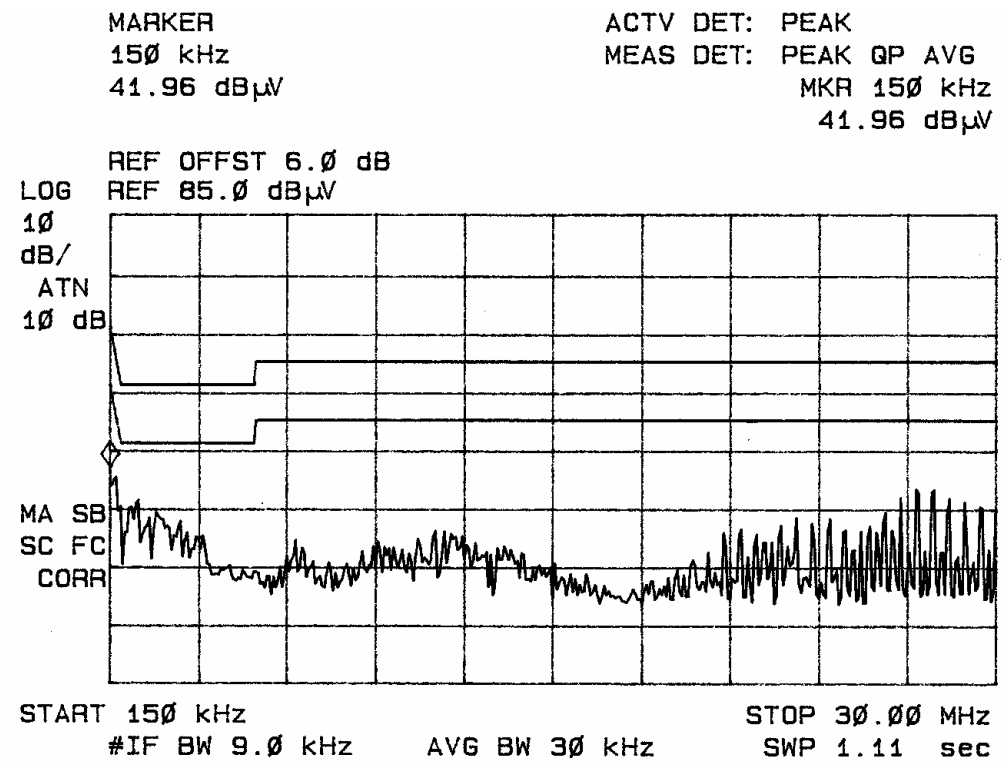

Figure 2 Conducted Emissions Line 2.

Radiated EMI

The EUT was arranged in a typical equipment configuration and operated through all available modes with worst-case data recorded. The antenna port was connected to a 50-ohm load and operated through all available modes for general radiated emissions testing. Preliminary testing was performed in a screen room with the EUT positioned 1 meter from the FSM. Radiated emissions measurements were performed to identify the frequencies, which produced the highest emissions. Plots were made of the radiated frequency spectrum from 30 MHz to 22,000 MHz for the preliminary testing. Refer to figures three through eight for plots of the general radiated emissions spectrum taken in a screen room. The highest radiated emission was then re-maximized at the OATS location before final radiated emissions measurements were performed. Final data was taken with the EUT located at the OATS at a distance of 3 meters between the EUT and the receiving antenna. The frequency spectrum from 30 MHz to 22,000 MHz was searched for general radiated emissions. Measured emission levels were maximized by EUT placement on the table, rotating the turntable through 360 degrees, varying the antenna height between 1 and 4 meters above the ground plane and changing antenna position between horizontal and vertical polarization. Antennas used were Broadband Biconical from 30 to 200 MHz, Biconilog from 30 to 1000 MHz, Log Periodic from 200 MHz to 5 GHz and or, pyramidal horns and mixers from 4 GHz to 40 GHz, notch filters and appropriate amplifiers were utilized.

Sample Calculations:

RFS = Radiated Field Strength
dBµV/m @ 3m = dBµV + A.F. - Amplifier Gain
dBµV/m @ 3m = 49.5 + 7.0 - 30
= 26.5

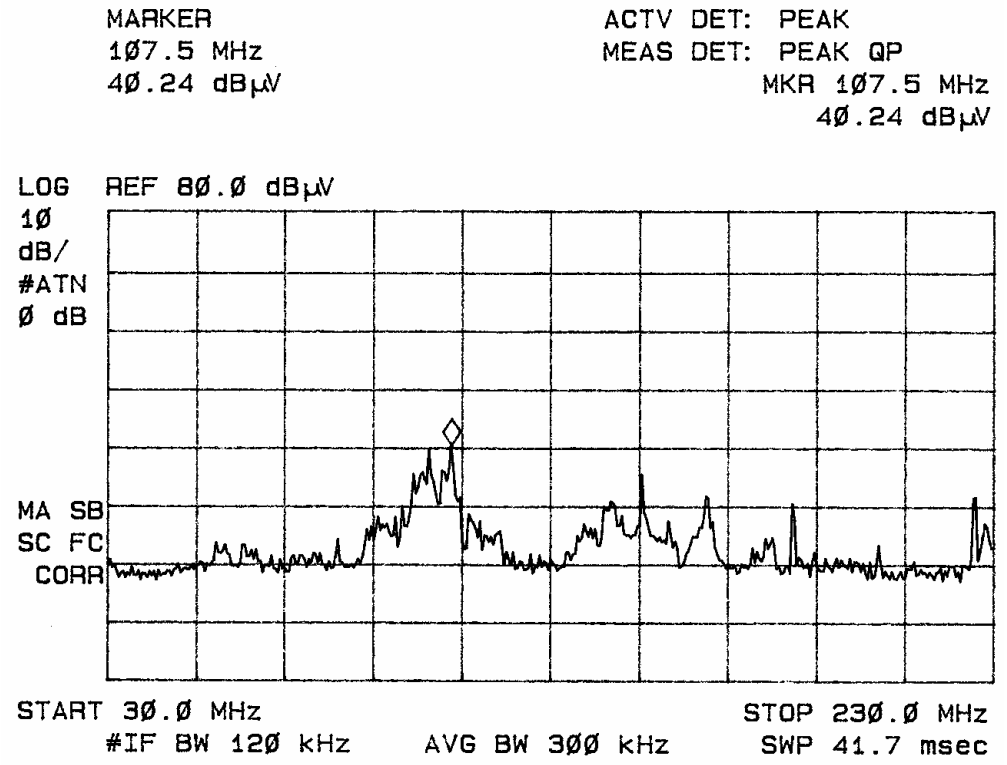

Figure three Radiated Emissions taken at 1 meter in screen room.

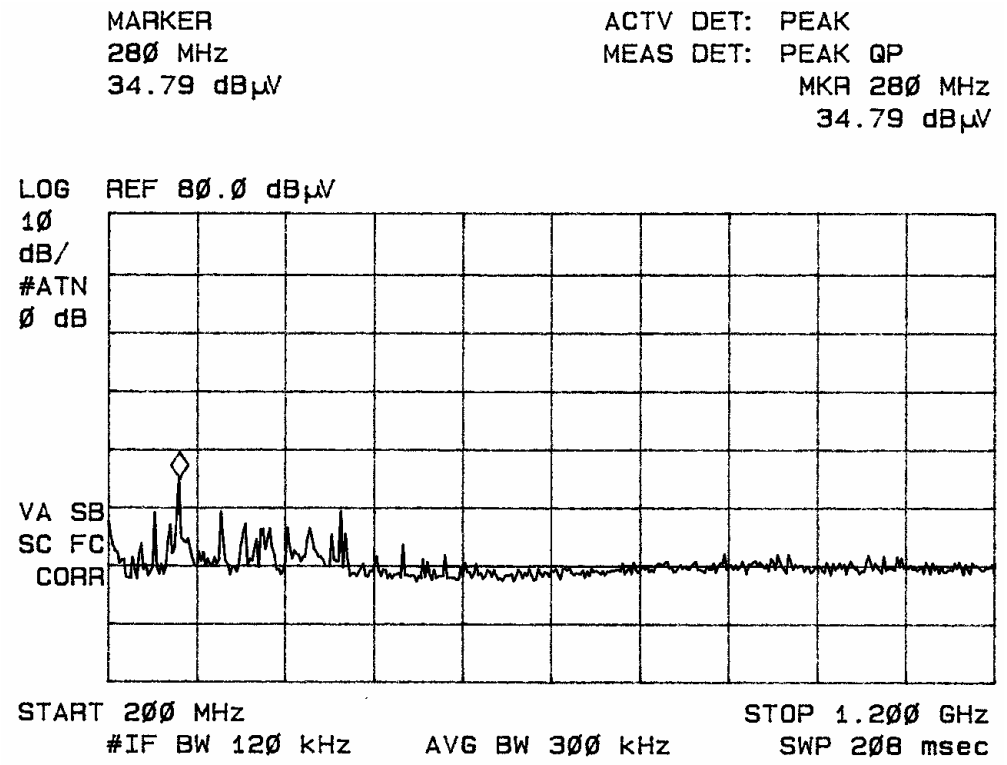

Figure four Radiated Emissions taken at 1 meter in screen room.

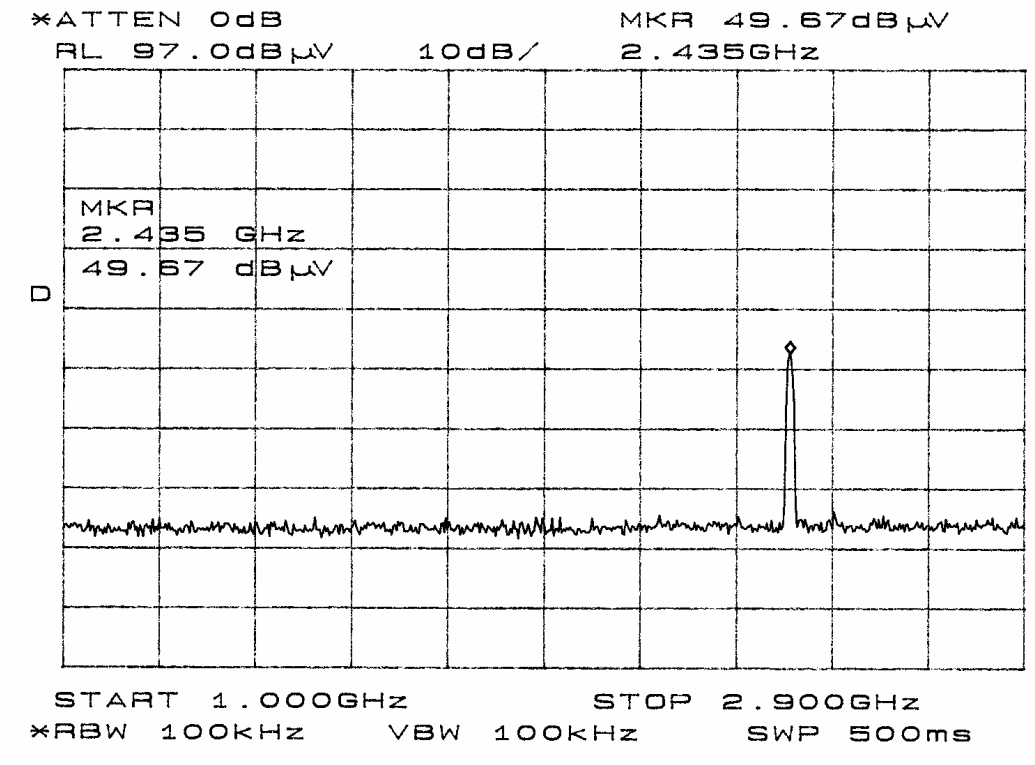

Figure five Radiated Emissions taken at 1 meter in screen room.

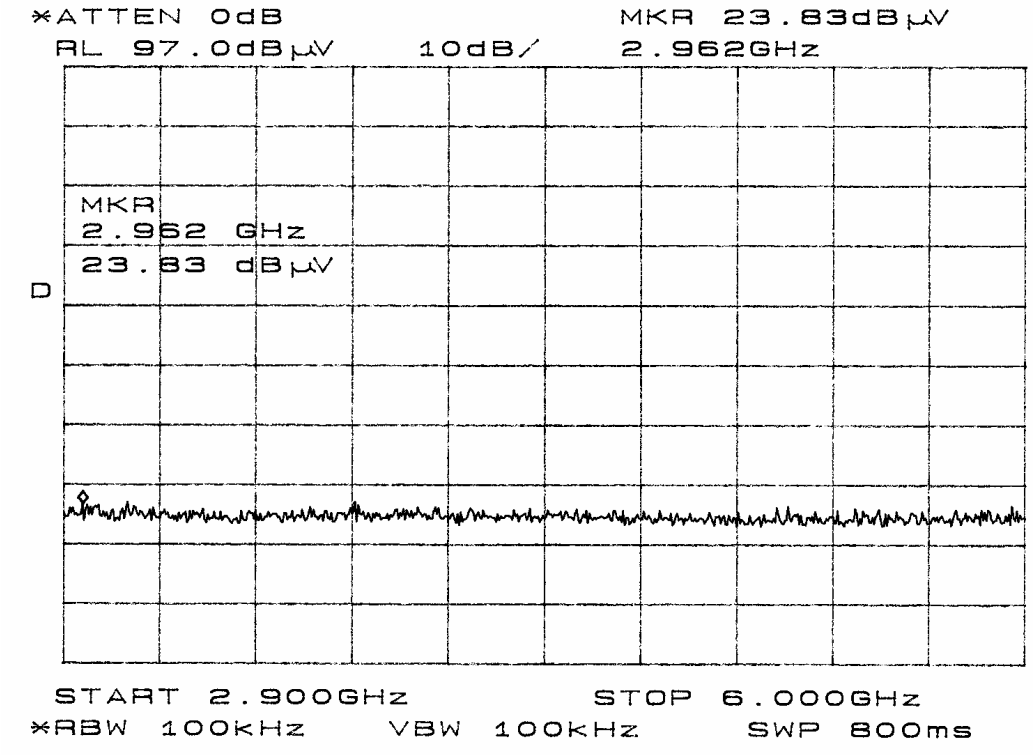

Figure six Radiated Emissions taken at 1 meter in screen room.

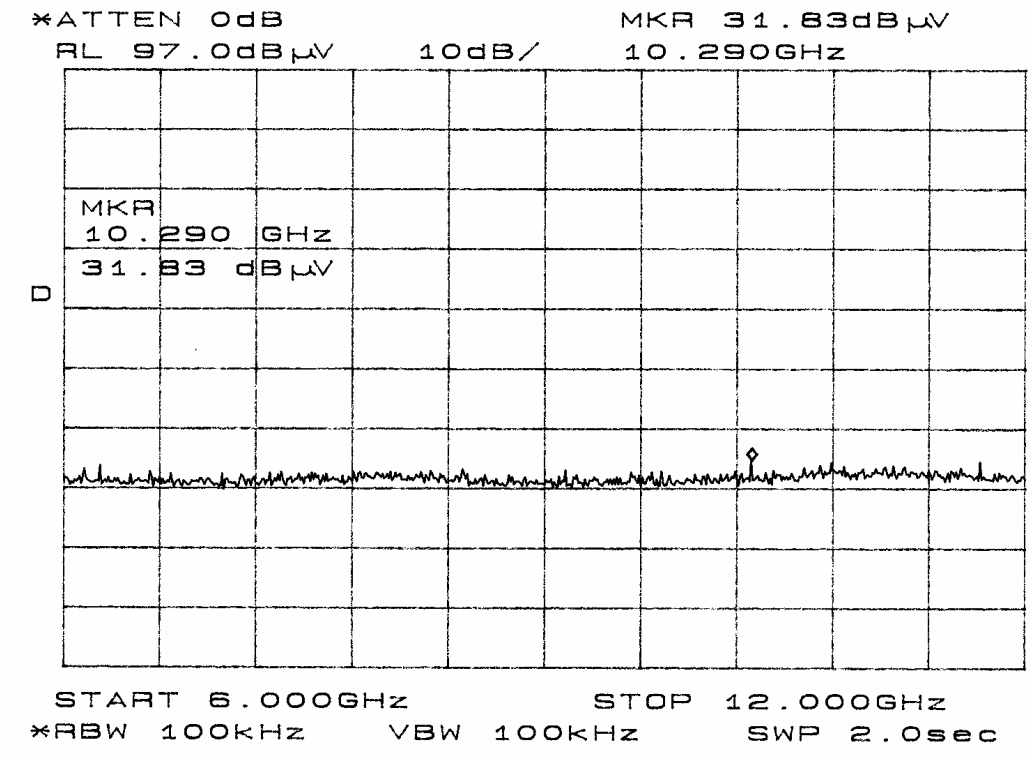

Figure seven Radiated Emissions taken at 1 meter in screen room.

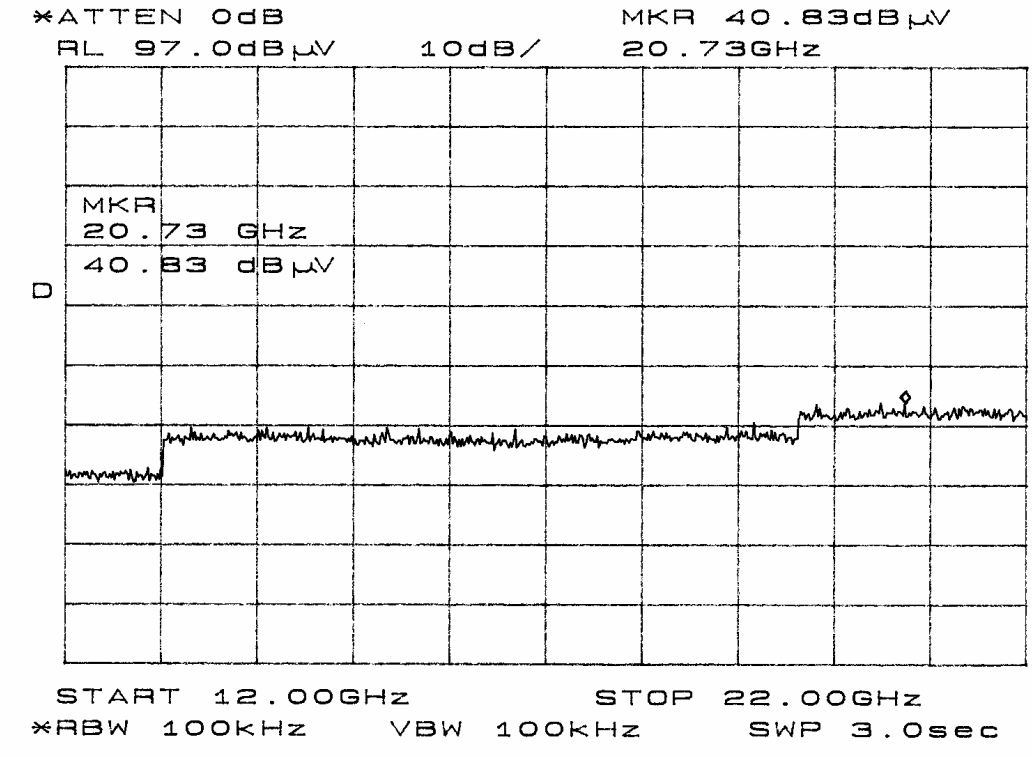

Figure eight Radiated Emissions taken at 1 meter in screen room.

Data: Conducted Emissions (7 Highest Emissions)

Frequency band (MHz)	L1 Level (dBµV)			L2 Level (dBµV)			CISPR 22 Limit Q.P. Ave(dBµV)
	Peak	Q.P.	AVE	Peak	Q.P.	AVE	
0.15 – 0.5	42.7	40.4	34.5	42.0	39.1	30.1	66 / 56
0.5 – 5	37.5	35.9	27.0	36.4	33.8	21.2	56 / 46
5 – 10	29.1	21.9	18.0	27.3	24.3	20.8	60 / 50
10 – 15	29.5	23.5	18.6	32.9	29.5	26.7	60 / 50
15 – 20	29.9	26.4	23.1	28.9	25.5	21.6	60 / 50
20 – 25	28.4	25.7	21.9	33.7	31.4	29.8	60 / 50
25 – 30	43.7	42.5	41.3	38.3	37.0	33.7	60 / 50

Other emissions present had amplitudes at least 10 dB below the limit.

Data: General Radiated Emissions from EUT (7 Highest Emissions)

Frequency in MHz	FSM Horz. (dBµV)	FSM Vert. (dBµV)	A.F. (dB/m)	Amp. Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	FCC Class B Limit @ 3m (dBµV/m)
106.7	49.5	53.5	7.0	30	26.5	30.5	43.5
150.0	42.6	54.4	10.2	30	22.8	34.6	43.5
184.0	56.2	54.9	9.8	30	36.0	34.7	43.5
225.0	55.8	54.4	11.2	30	37.0	35.6	46.0
280.7	55.4	56.3	12.9	30	38.3	39.2	46.0
400.0	53.1	53.5	16.6	30	39.7	40.1	46.0
460.0	49.0	46.6	17.7	30	36.7	34.3	46.0

Other emissions present had amplitudes at least 15 dB below the limit.

Summary of Results for Conducted Emissions

The conducted emissions for the EUT meet the requirements for CISPR 22 and FCC Part 15B CLASS B Digital Devices. The EUT had a 17.5 dB (Quasi-Peak) minimum margin below the Quasi-Peak limit, and an 8.7 dB (average) minimum margin below the CISPR average limit. Measurements were taken using the peak, quasi peak, and average, measurement function for each emissions amplitude and were below the limits stated in the specification. Other emissions were present with recorded data representing worst-case amplitudes.

Summary of Results for Radiated Emissions

The general radiated emissions for the EUT meet the requirements for CISPR 22 and FCC Part 15B CLASS B Digital Devices. The EUT had a 5.9 dB minimum margin below the quasi-peak limit. Other emissions were present with amplitudes at least 20 dB below the limit.

Statement of Modifications and Deviations

No modifications to the EUT were required for the unit to meet the CISPR 22 or FCC Part 15B CLASS B emissions standards. There were no deviations or exceptions to the specifications.

9) Subpart C - Intentional Radiators

As per CFR 47, Subpart C, paragraph 15.247 the following information is submitted.

15.203 Antenna Requirements

The unit is marketed and sold for professional installation only and thus complies with the antenna connection requirements. The requirements of 15.203 are fulfilled and there are no deviations or exceptions to the specification.

15.205 Restricted Bands of Operation

Spurious emissions falling in the restricted frequency bands of operation were measured at a distance of three meters at the OATS. The EUT utilizes frequency, determining circuitry, which generates harmonics falling in the restricted bands. Emissions were checked at the OATS, using appropriate antennas or pyramidal horns, amplification stages, and a spectrum analyzer. No other significant emission was observed which fell into the restricted bands of operation.

Sample Calculations:

RFS (dBµV/m @ 3m) = FSM(dBµV) + A.F.(dB) - Gain(dB)
= 41.7 + 6.8 - 30
= 18.5

Data: Emissions in Restricted Bands (worst-case)

Frequency in MHz	FSM Horz. (dBµV)	FSM Vert. (dBµV)	A.F. (dB/m)	Amp. Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	FCC Class B Limit @ 3m (dBµV/m)
111.7	41.7	55.2	6.8	30	18.5	32.0	43.5
150.0	42.6	54.4	10.2	30	22.8	34.6	43.5
164.7	40.7	47.0	8.7	30	19.4	25.7	43.5
250.0	43.9	42.9	12.3	30	26.2	25.2	46.0
266.1	42.7	48.8	13.1	30	25.8	31.9	46.0
275.9	51.1	38.7	12.7	30	33.8	21.4	46.0
280.7	55.4	56.3	12.9	30	38.3	39.2	46.0
325.0	48.7	43.1	12.9	30	38.3	39.2	46.0
400.0	53.1	53.5	16.6	30	39.7	40.1	46.0
4824.0	33.8	35.2	39.8	35	38.6	40.0	54.0
4844.0	31.0	30.7	40.1	35.0	36.1	35.8	54.0
4874.0	34.5	36.3	39.8	35	39.3	41.1	54.0
4914.0	30.2	31.7	39.9	35	35.1	36.6	54.0
4924.0	34.6	35.3	39.7	35	39.3	40.0	54.0
7311.0	34.5	36.7	36.0	35	35.5	33.7	54.0
7371.0	35.0	36.5	36.0	35	36.0	37.5	54.0
7386.0	36.6	37.7	36.0	35	37.6	38.7	54.0
12060.0	35.8	35.6	30.5	32	34.3	34.1	54.0
12110.0	36.2	37.2	40.8	32	45.0	46.0	54.0
12185.0	35.2	35.5	40.8	32	44.0	44.3	54.0
12285.0	37.2	36.3	40.8	32	46.0	45.1	54.0
12310.0	36.2	36.8	40.8	32	45.0	45.6	54.0

Other emissions present had amplitudes at least 20 dB below the limit.

Summary of Results for Radiated Emissions in Restricted Bands

The radiated emissions for the EUT meet the requirements for FCC Part 15C Intentional Radiators. The EUT had an 8.0 dB (peak) minimum margin below the limits. Peak, Quasi-peak, and average amplitudes were checked for compliance with the regulations.

No other emissions where found in the restricted frequency bands. Other emissions were present with amplitudes at least 20 dB below the FCC Limits.

Statement of Modifications and Deviations

No modifications to the EUT were required for the unit to meet the FCC Part 15C paragraph 15.205 emissions requirements. There were no deviations or exceptions to the specifications.

15.209 Radiated Emissions Limits; General Requirements

The EUT was arranged in a typical equipment configuration and operated through all of its various modes. Preliminary testing was performed in a screen room with the EUT positioned 1 meter from the FSM. Radiated emissions measurements were performed to identify the frequencies, which produced the highest emissions. Radiated emissions were observed in the screen room from 30 to 22,000 MHz and plots were made of the radiated emissions frequency spectrum from 30 MHz to 22,000 MHz for the preliminary testing. The highest radiated emission was then re-maximized at the OATS location before final radiated emissions measurements were performed. Final data was taken with the EUT located at the open area test site at a distance of 3 meters between the EUT and the receiving antenna. The frequency spectrum from 30 MHz to 25,000 MHz was searched for radiated emissions. Measured emission levels were maximized by EUT placement on the table, rotating the turntable through 360 degrees, varying the antenna height between 1 and 4 meters above the ground plane and changing antenna polarization between horizontal and vertical. Antennas used were Broadband Biconical from 30 MHz to 200 MHz, Biconilog from 30 MHz to 1000 MHz, Log Periodic from 200 MHz to 5 GHz, and/or Pyramidal Horns from 4 GHz to 40 GHz.

Sample Calculations:

RFS = Radiated Field Strength

dBµV/m @ 3m = dBµV + A.F. - Amplifier Gain

dBµV/m @ 3m = 49.5 + 7.0 - 30

= 26.5

Data: General Radiated Emissions from EUT (Highest Emissions)

Frequency in MHz	FSM Horz. (dBµV)	FSM Vert. (dBµV)	A.F. (dB/m)	Amp. Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	FCC Class B Limit @ 3m (dBµV/m)
106.7	49.5	53.5	7.0	30	26.5	30.5	43.5
150.0	42.6	54.4	10.2	30	22.8	34.6	43.5
184.0	56.2	54.9	9.8	30	36.0	34.7	43.5
225.0	55.8	54.4	11.2	30	37.0	35.6	46.0
280.7	55.4	56.3	12.9	30	38.3	39.2	46.0
400.0	53.1	53.5	16.6	30	39.7	40.1	46.0
460.0	49.0	46.6	17.7	30	36.7	34.3	46.0

Other emissions present had amplitudes at least 20 dB below the limit.

Summary of Results for Radiated Emissions

The radiated emissions for the EUT meet the requirements for FCC Part 15C paragraph 15.209 Intentional Radiators. The EUT had a 5.9 dB minimum margin below the limits. Other emissions were present with amplitudes at least 20 dB below the FCC Limits.

15.247 Operation in the Band 2400-2483.5 MHz

The power output was measured both at the antenna connection and at the open area test site at a three-meter distance. Data was taken per Paragraph 2.1046(a) and 15.247. Figures nine through eleven demonstrate compliance with maximum output power requirements of 15.247(a)(2) for Mode B and G operation. Figures twelve through seventeen demonstrate compliance with the minimum 6 db bandwidth requirements of 15.247(A)(2). Figures eighteen through twenty-three demonstrate compliance to power spectral density per 15.247(d). Figures twenty-four through twenty-eight demonstrate antenna conducted emissions and compliance with the requirements of 15.247(c) for emission limitations. Figures twenty-nine through thirty-four demonstrate compliance to band edge requirements per 15.209 and 15.247. Multiple models were tested for compliance utilizing available antenna options. Antenna option configurations tested for compliance ranged in gain from 13 dBi to 24 dBi with worst case emissions presented in this document.

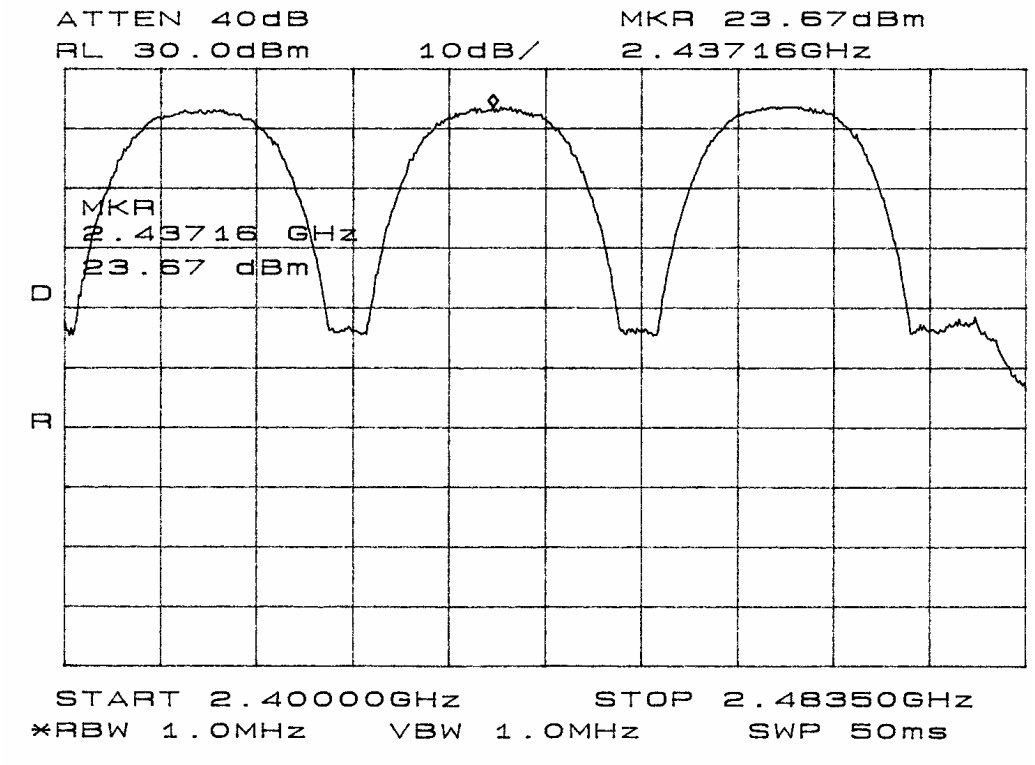

Figure 9 maximum power (250 mW) plot taken in screen room (Mode B).

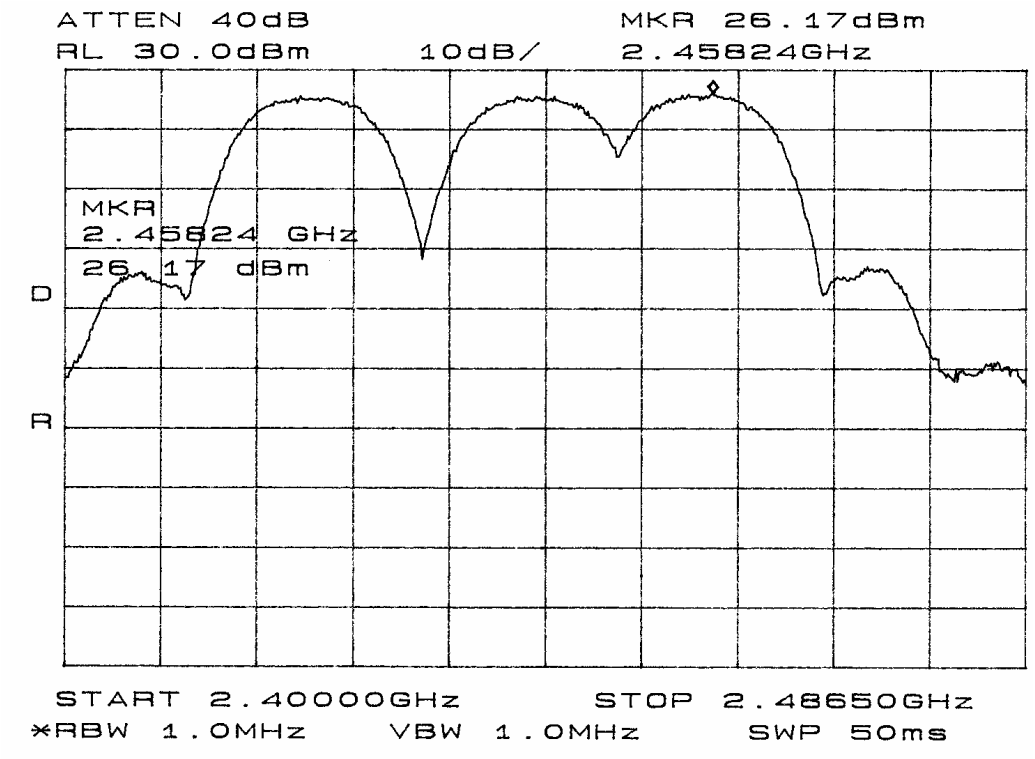

Figure 10 maximum power (400 mW) plot taken in screen room (Mode B).

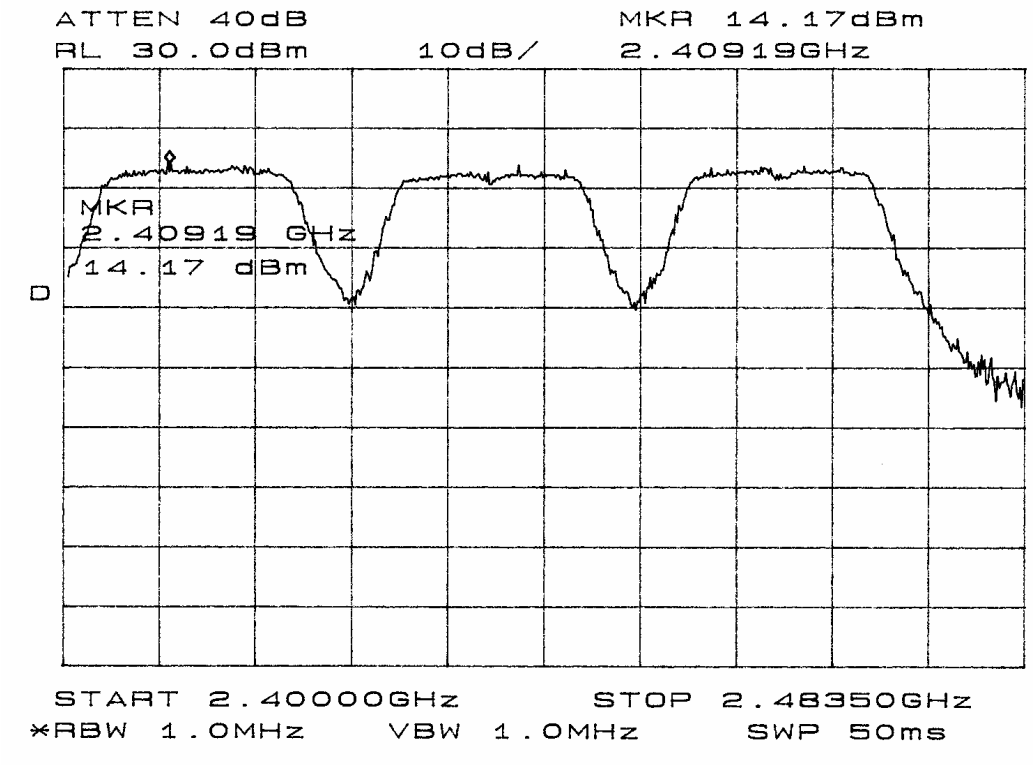

Figure 11 maximum power plot taken in screen room (Mode G).

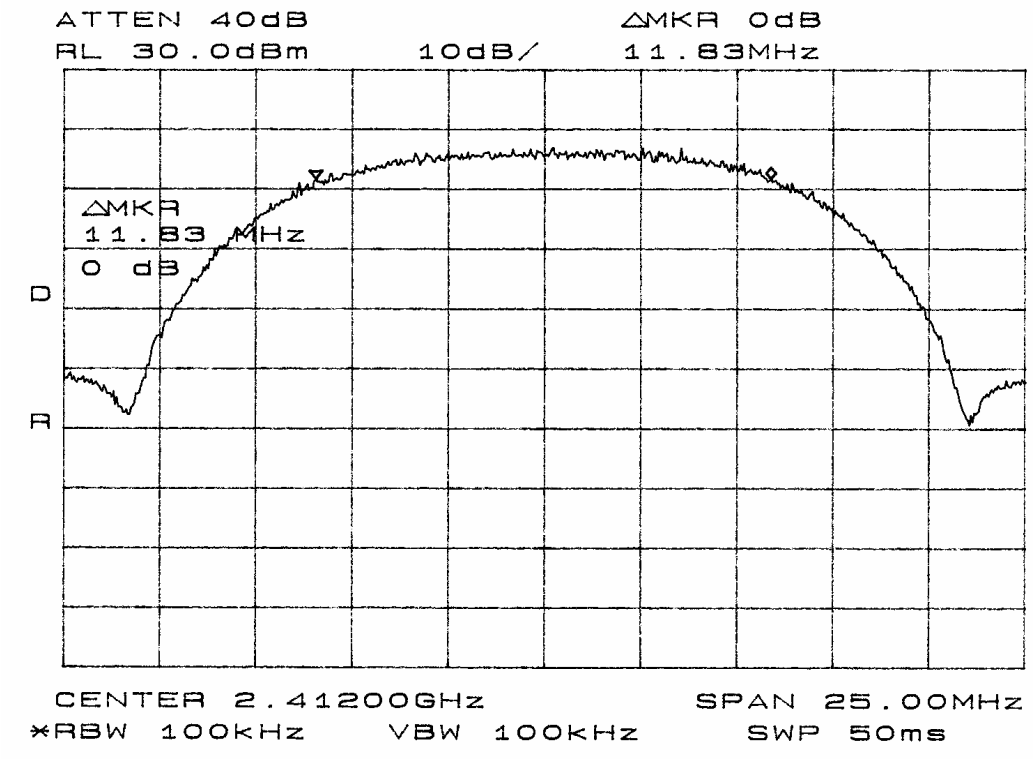

Figure 12 6dB Band width Requirement plot taken in screen room (Mode B).

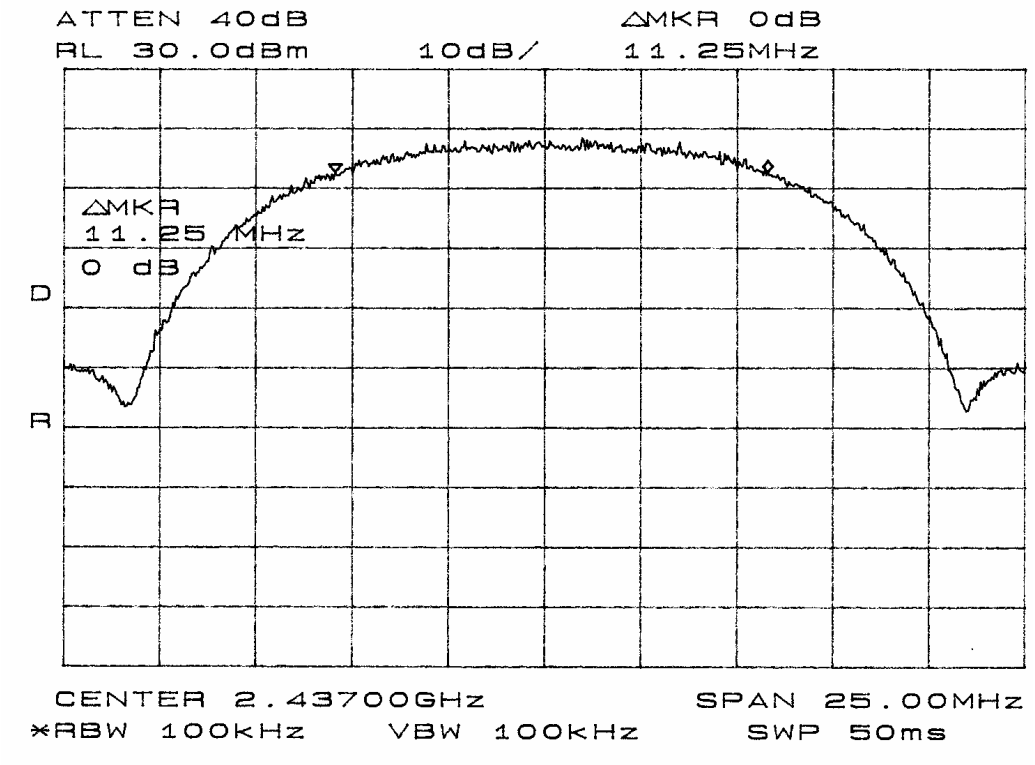

Figure 13 6dB Band width Requirement plot taken in screen room (Mode B).

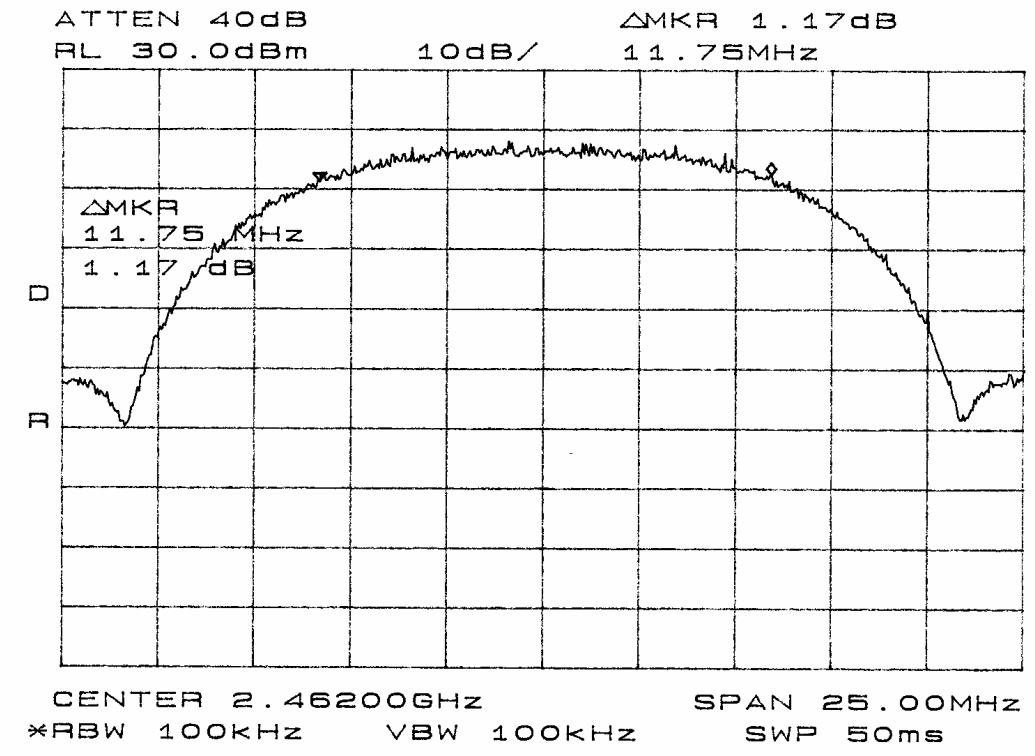

Figure 14 6dB Band width Requirement plot taken in screen room (Mode B).

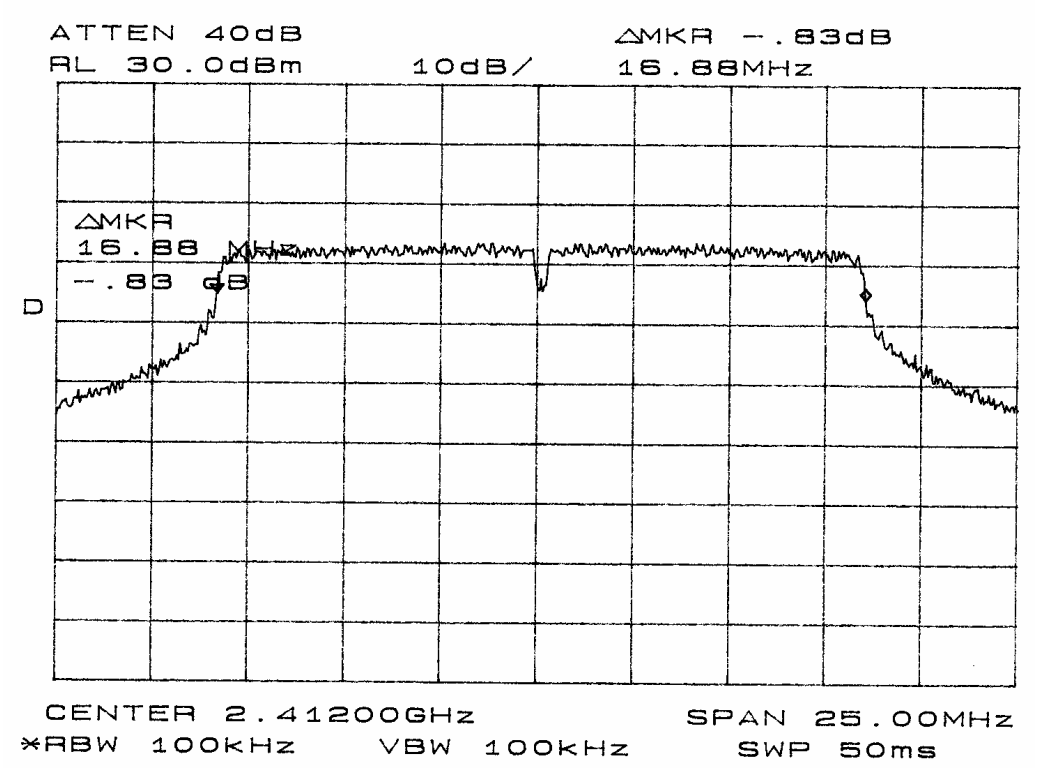

Figure 15 6dB Band width Requirement plot taken in screen room (Mode G).

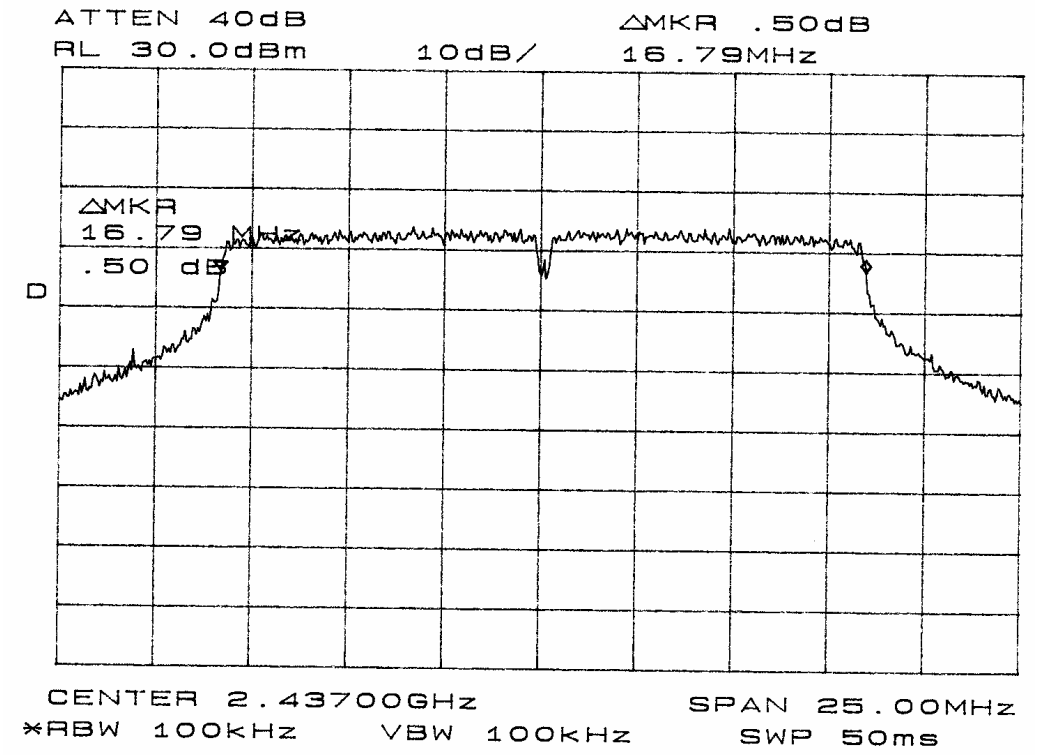

Figure 16 6dB Band width Requirement plot taken in screen room (Mode G).

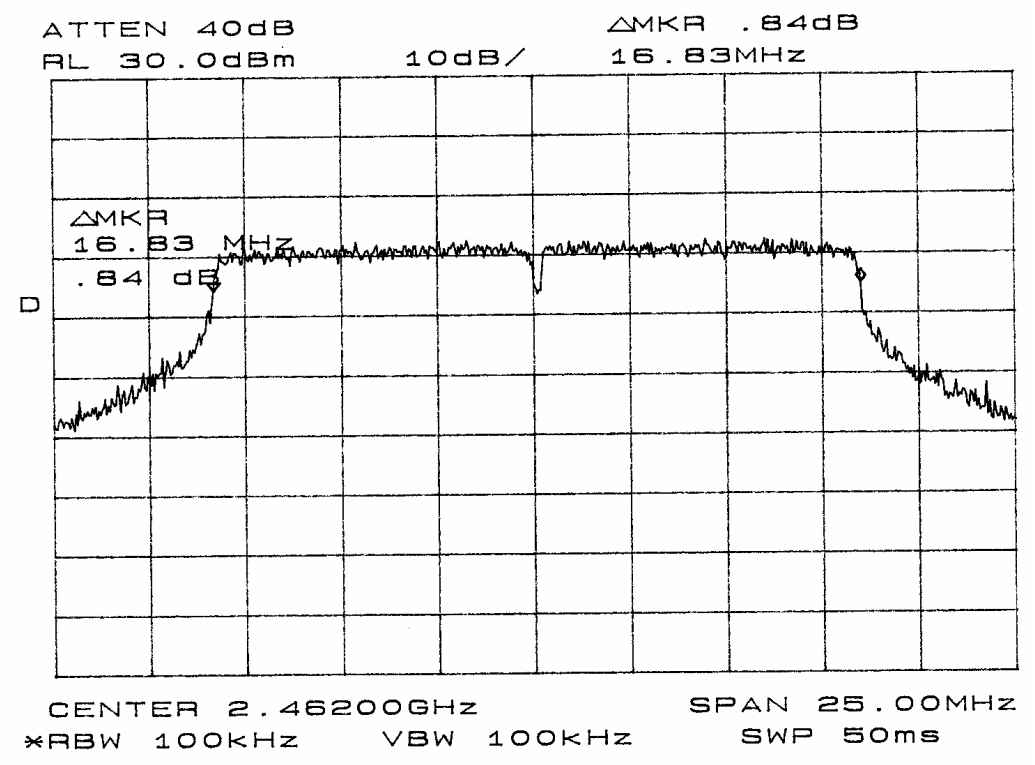

Figure 17 6dB Band width Requirement plot taken in screen room (Mode G).

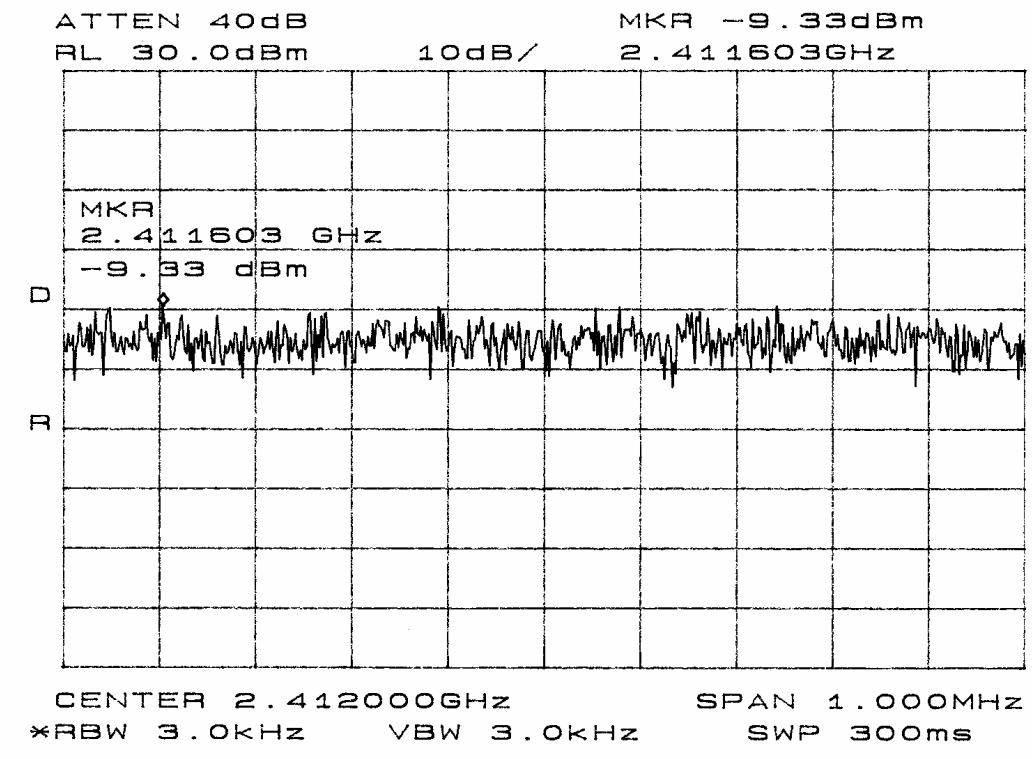

Figure 18 Power Spectral Density plot taken in screen room (Mode B).

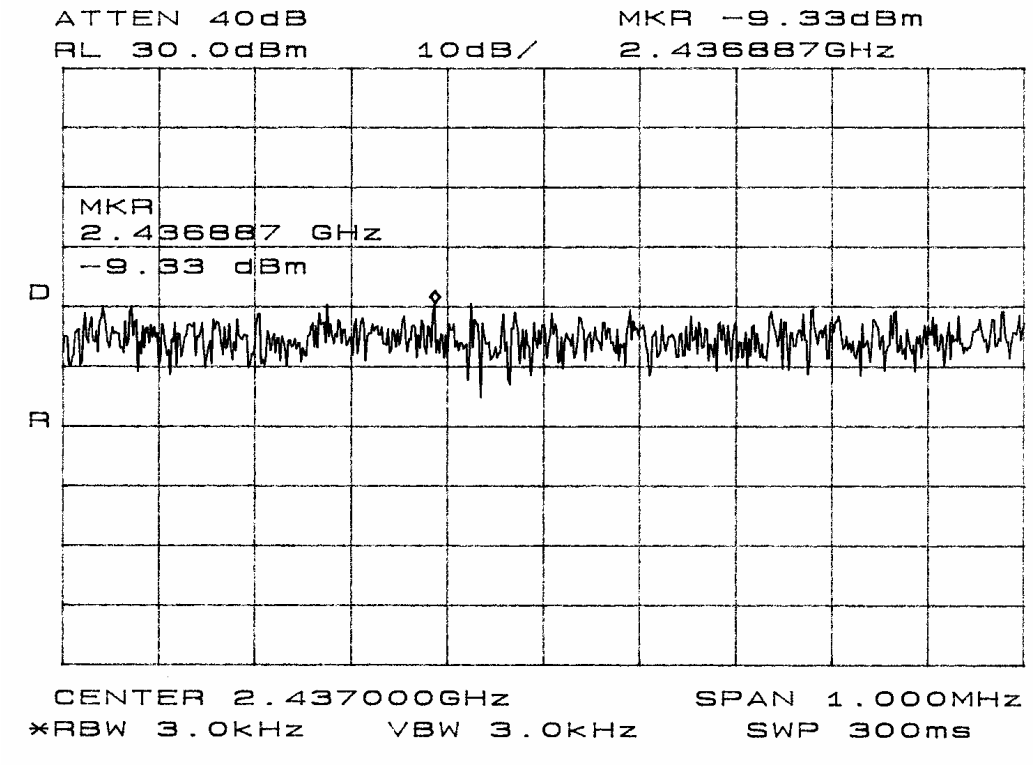

Figure 19 Power Spectral Density plot taken in screen room (Mode B).

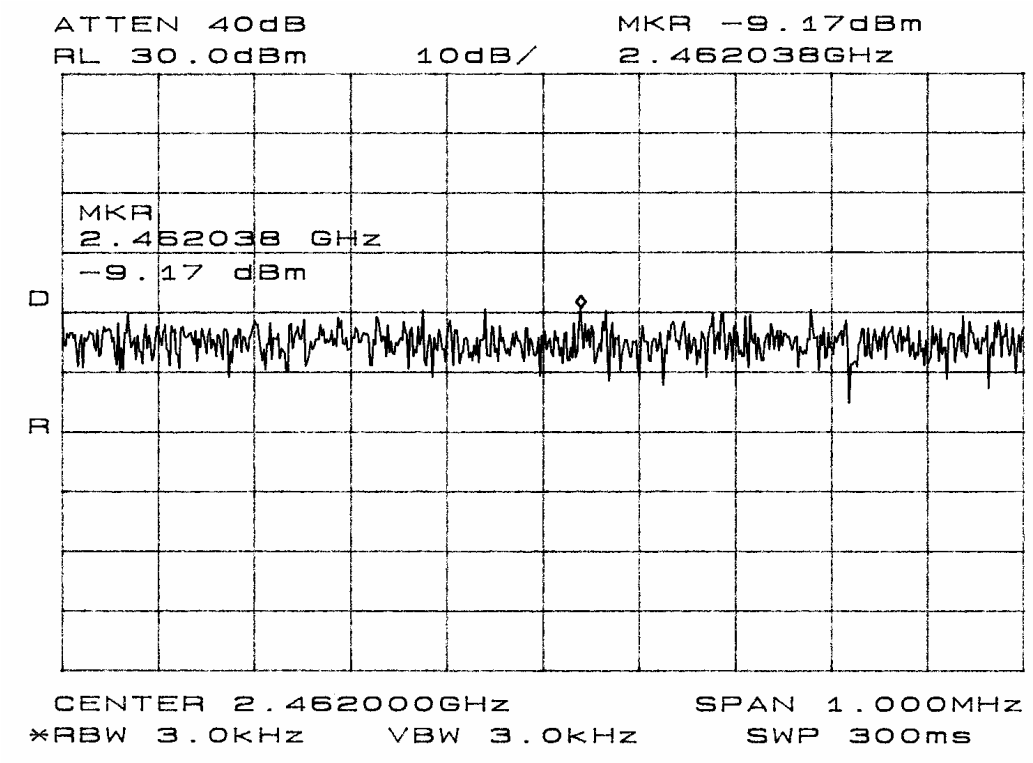

Figure 20 Power Spectral Density plot taken in screen room (Mode B).

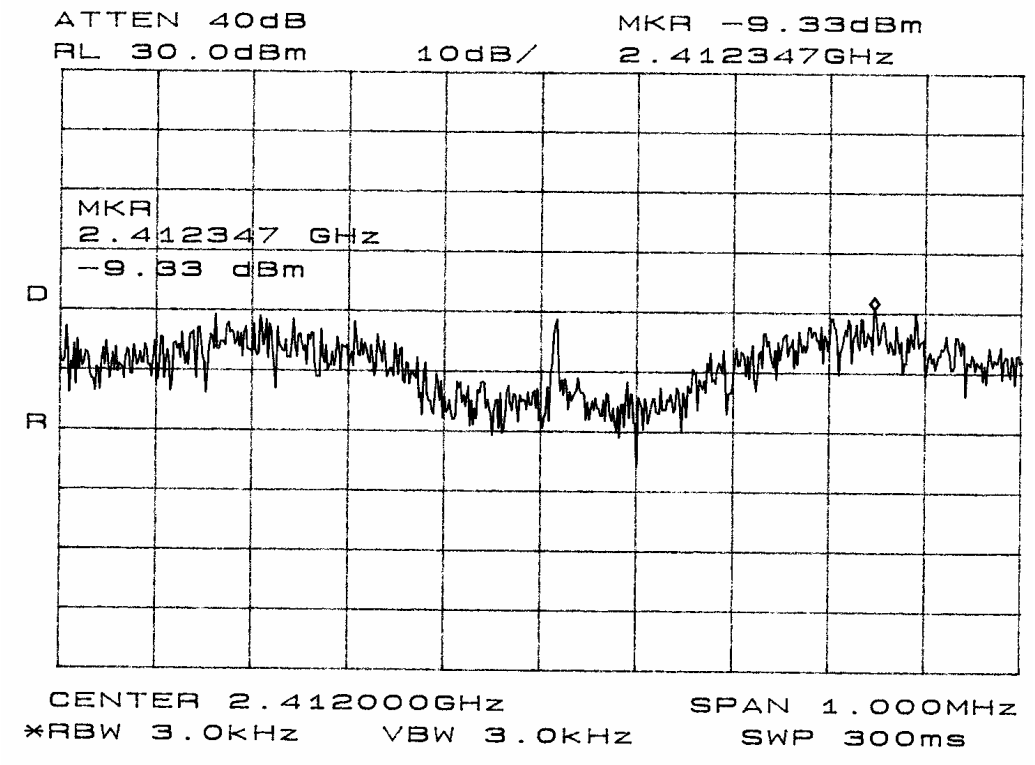

Figure 21 Power Spectral Density plot taken in screen room (Mode G).

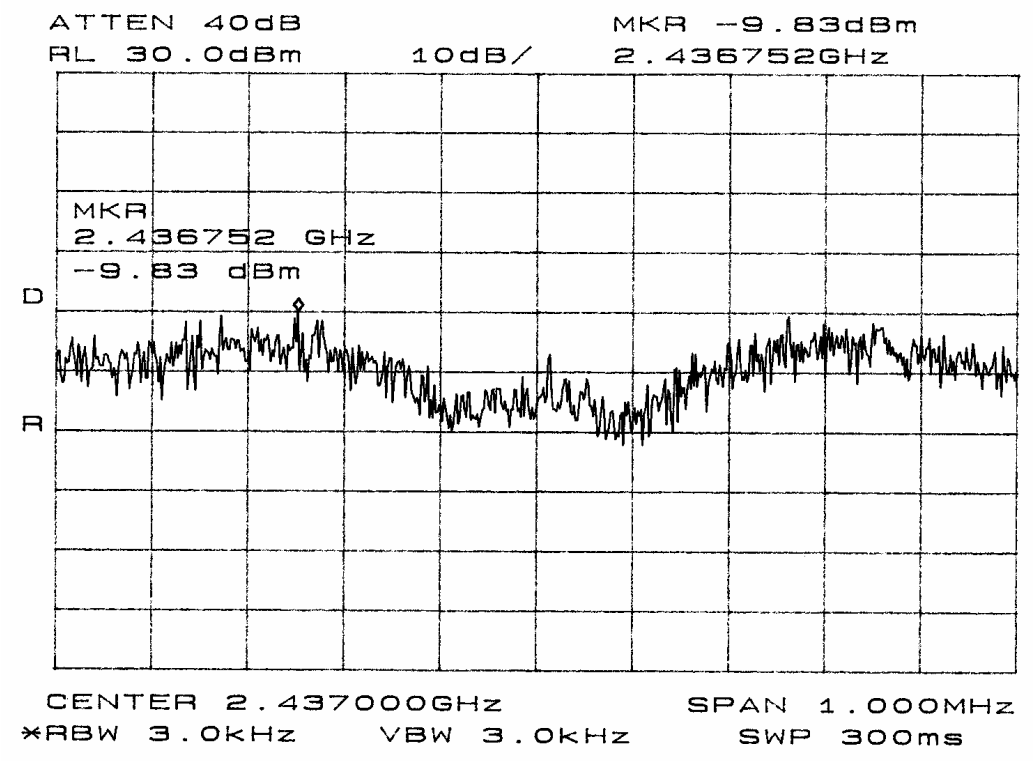

Figure 22 Power Spectral Density plot taken in screen room (Mode G).

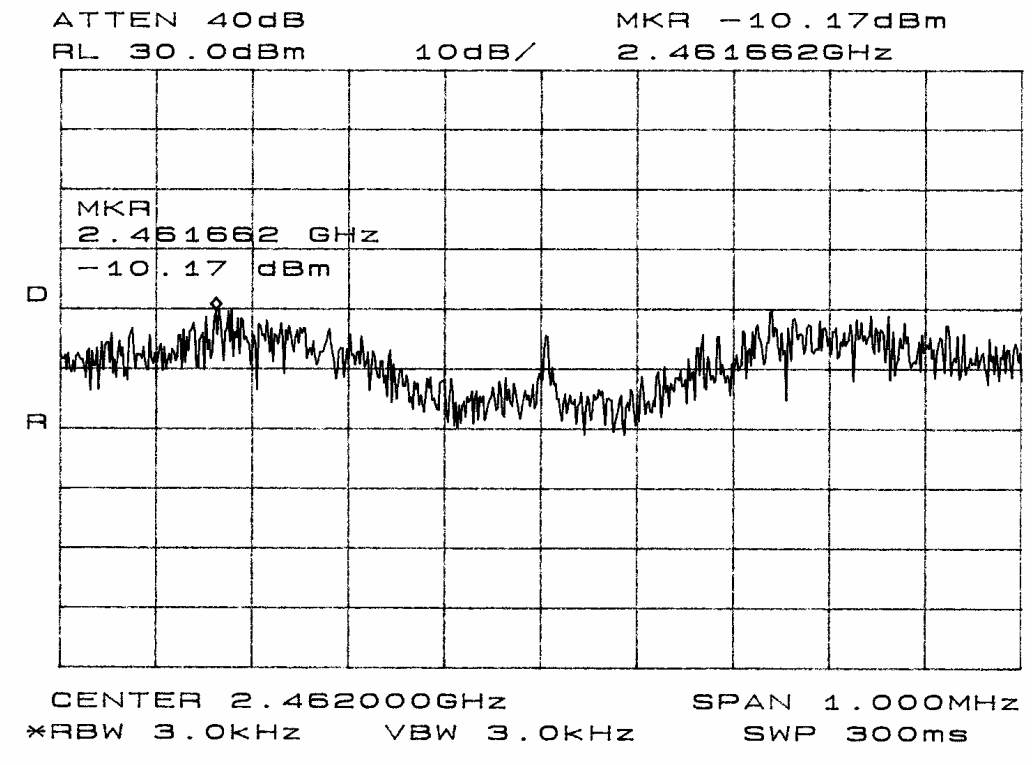

Figure 23 Power Spectral Density plot taken in screen room (Mode G).

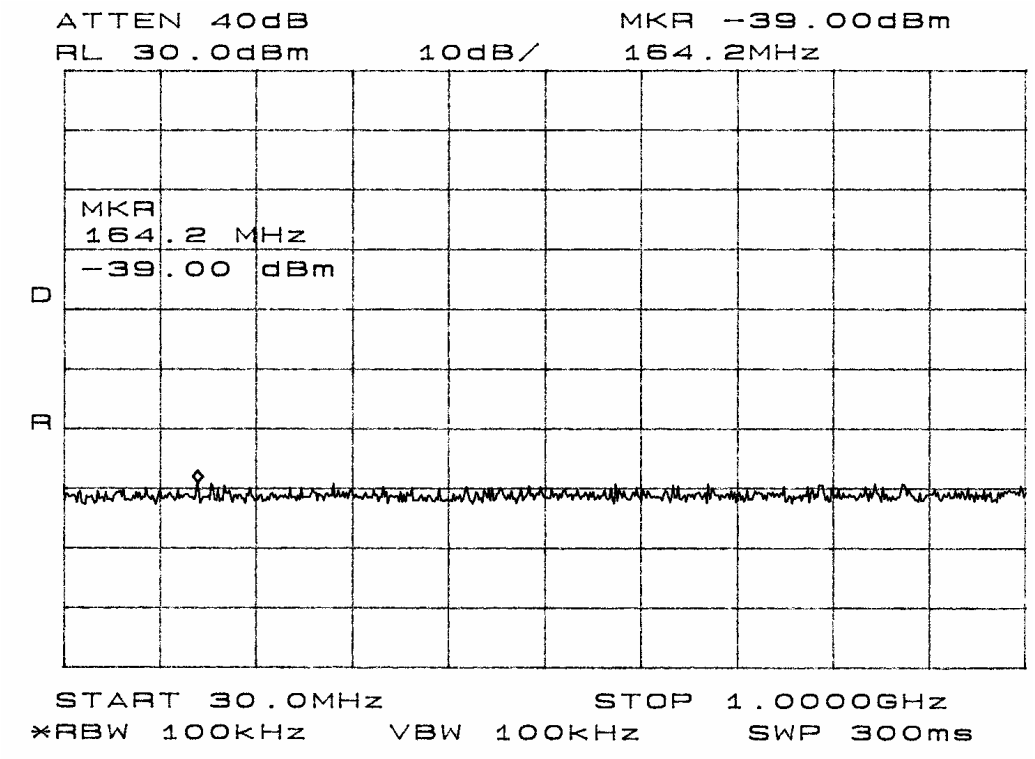

Figure 24 Antenna Emission plot taken in screen room.

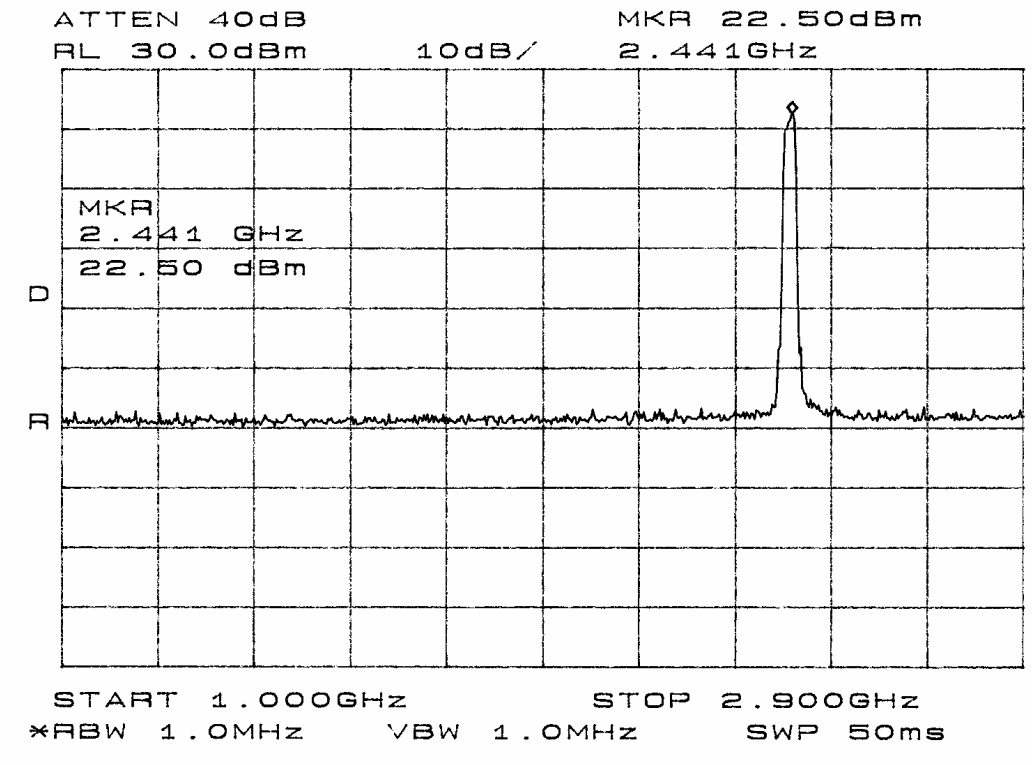

Figure 25 Antenna Emission plot taken in screen room.

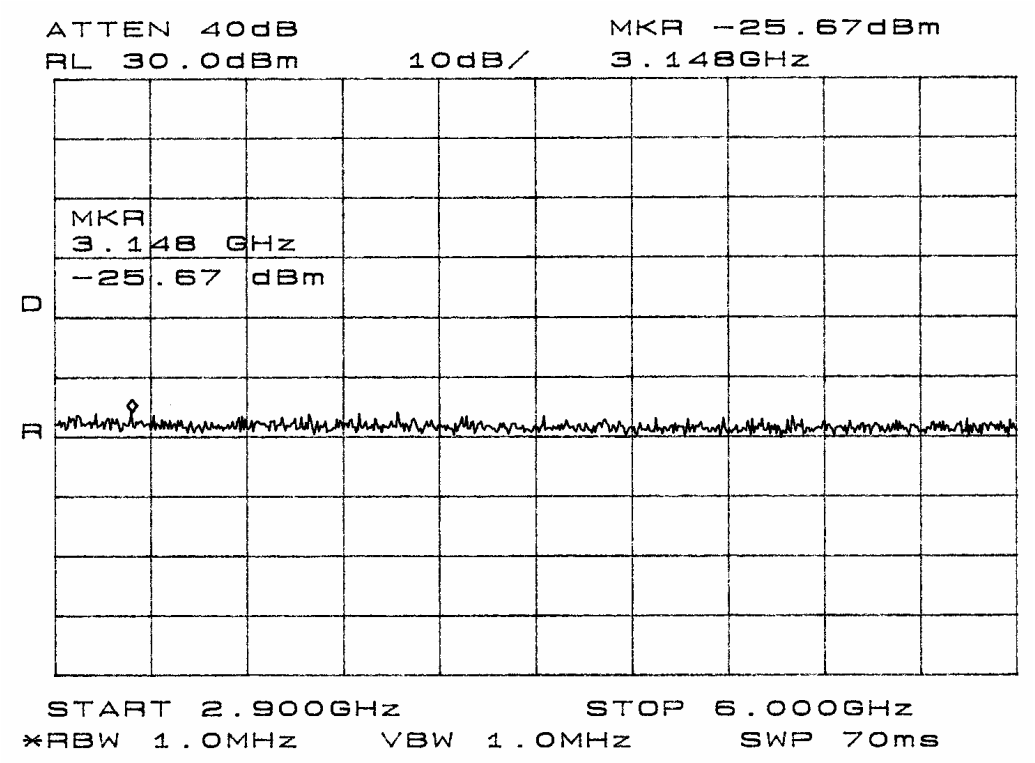

Figure 26 Antenna Emission plot taken in screen room.

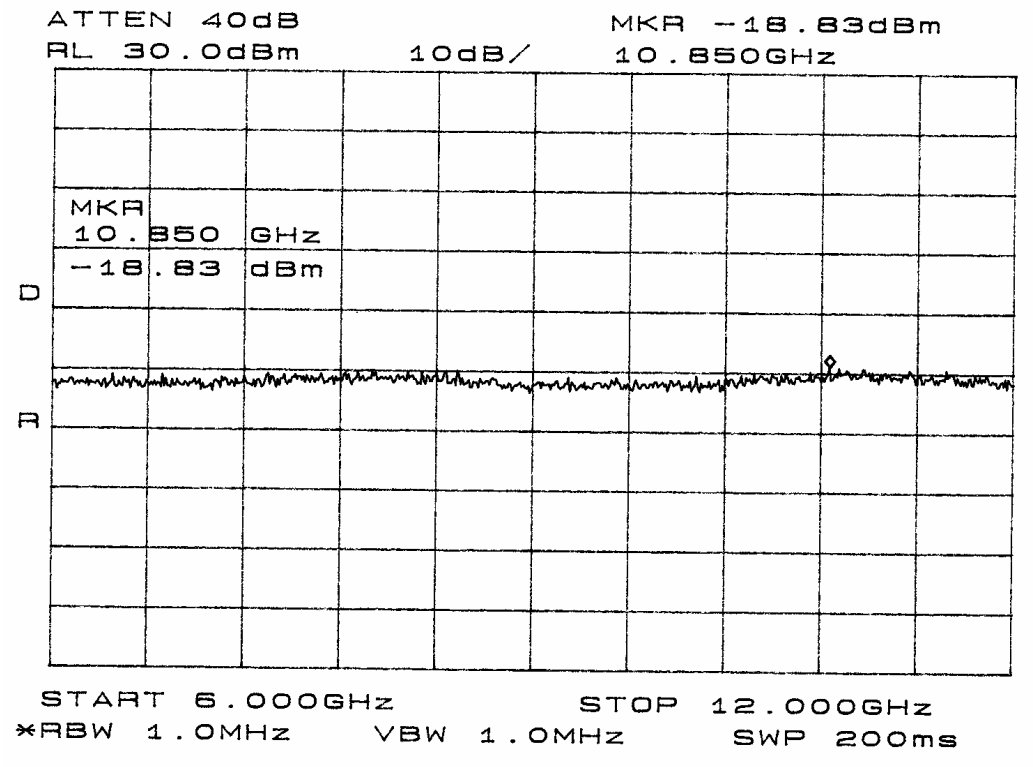

Figure 27 Antenna Emission plot taken in screen room.

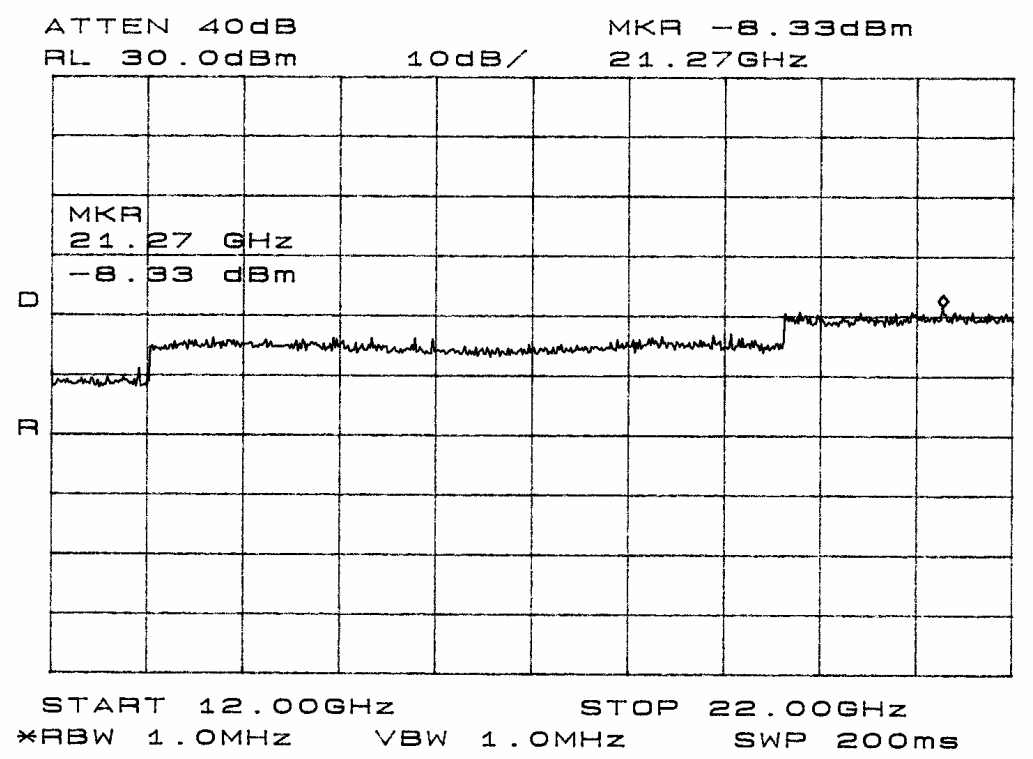

Figure 28 Antenna Emission plot taken in screen room.

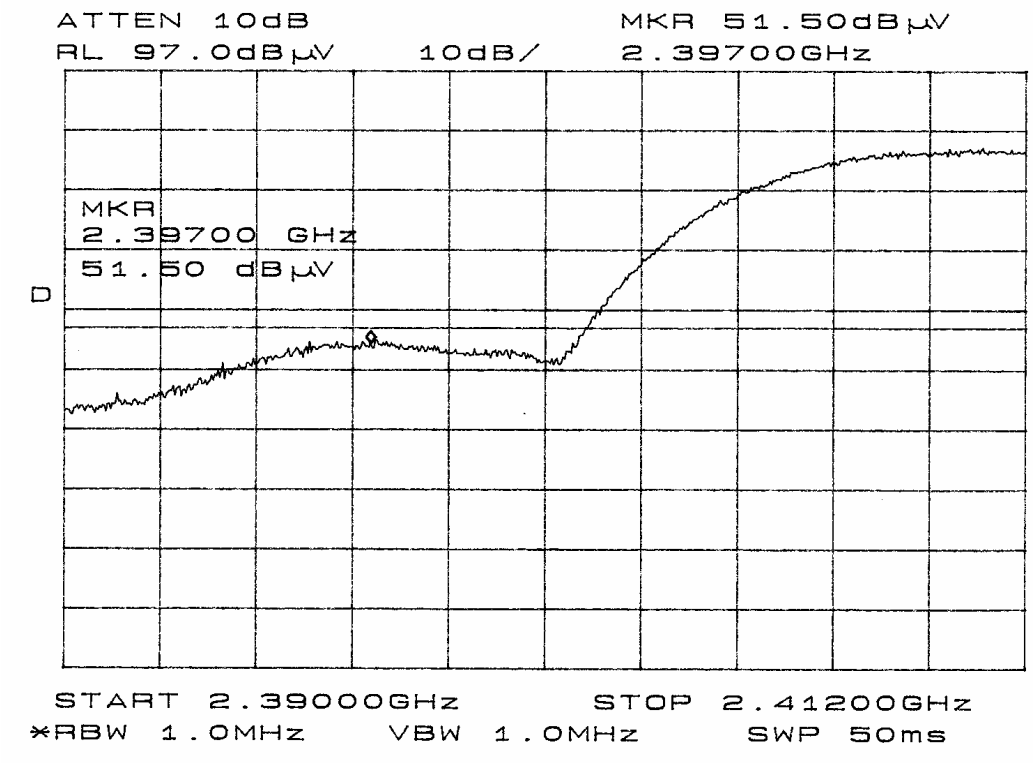

Figure 29 Radiated Emission Band Edge plot (Mode B) (250 mW Operation).

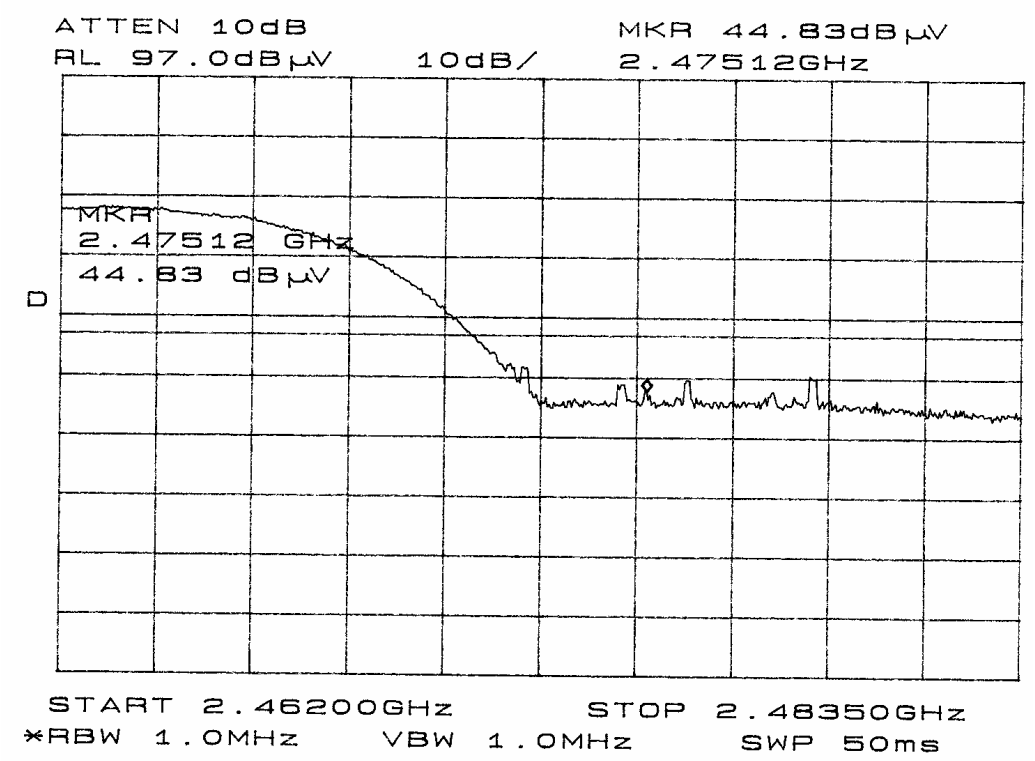

Figure 30 Radiated Emission Band Edge plot (Mode B) (250 mW Operation).

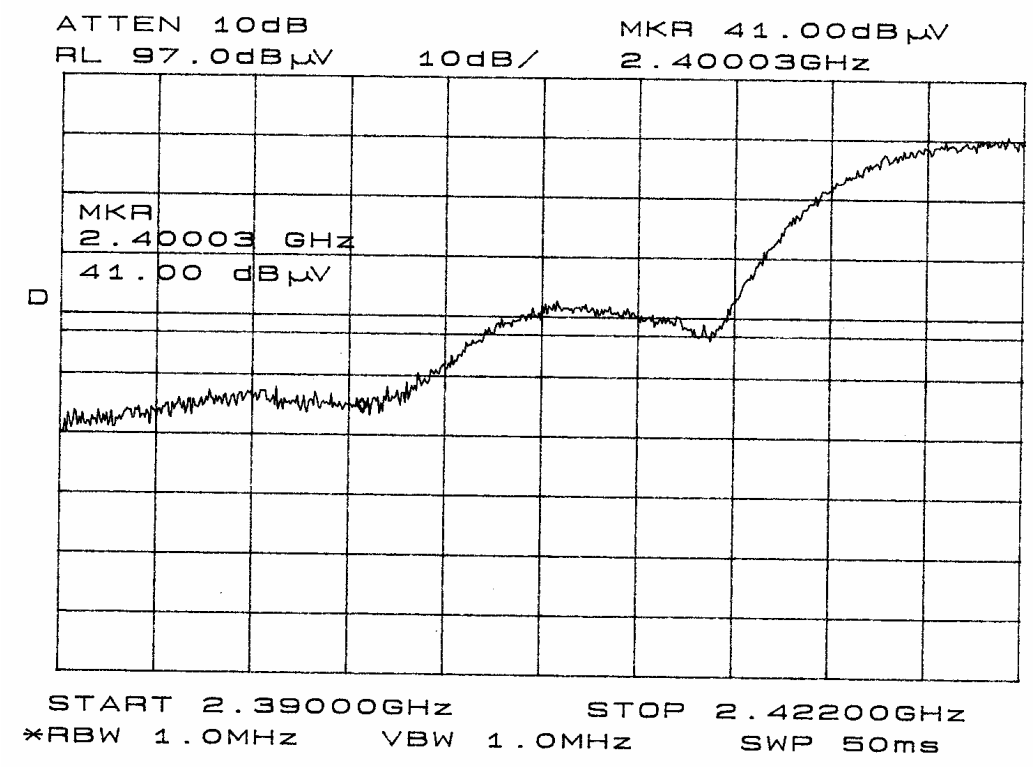

Figure 31 Radiated Emission Band Edge plot (Mode B) (400 mW Operation).

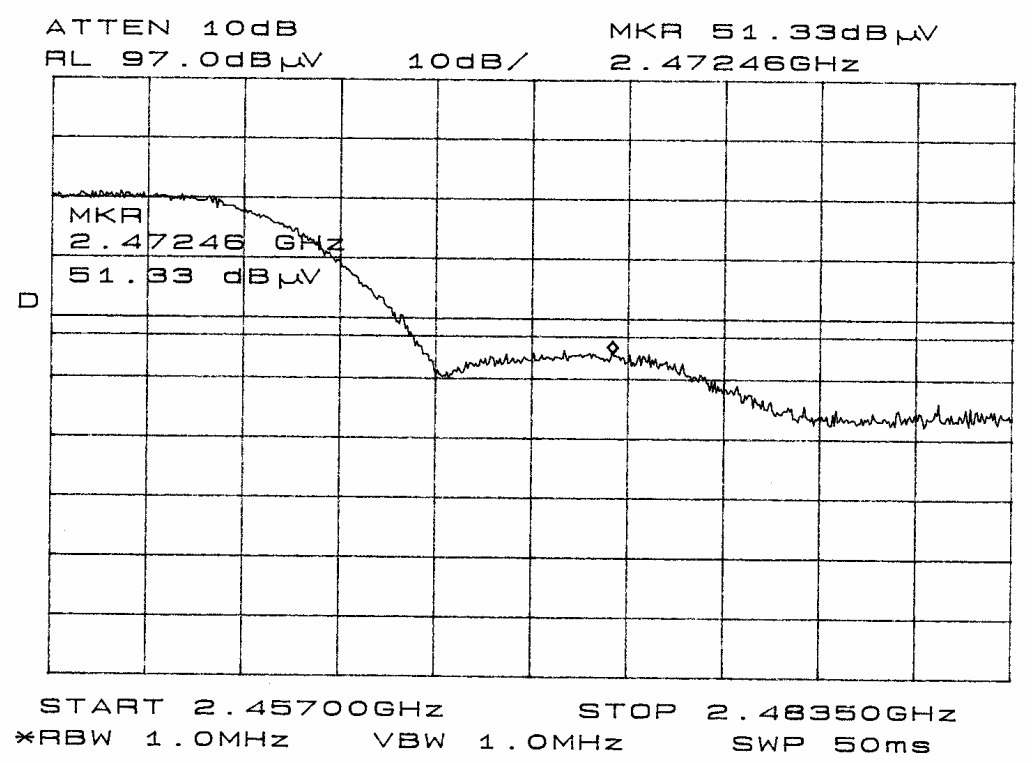

Figure 32 Radiated Emission Band Edge plot (Mode B) (400 mW Operation).

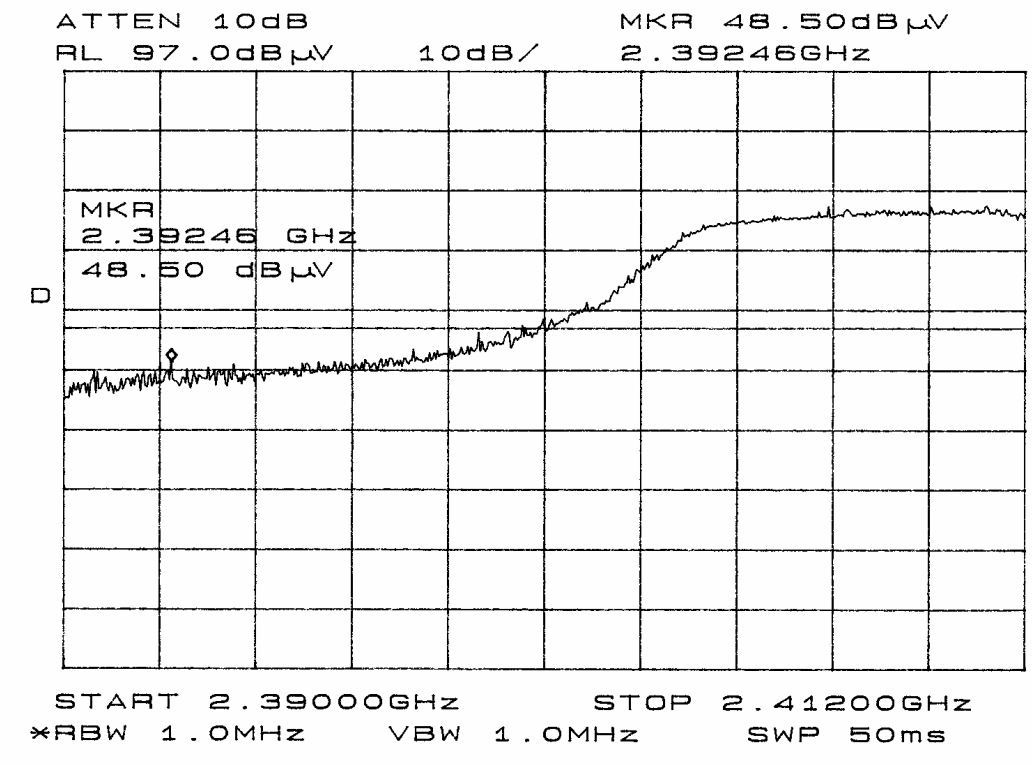

Figure 33 Radiated Emission Band Edge plot (Mode G).

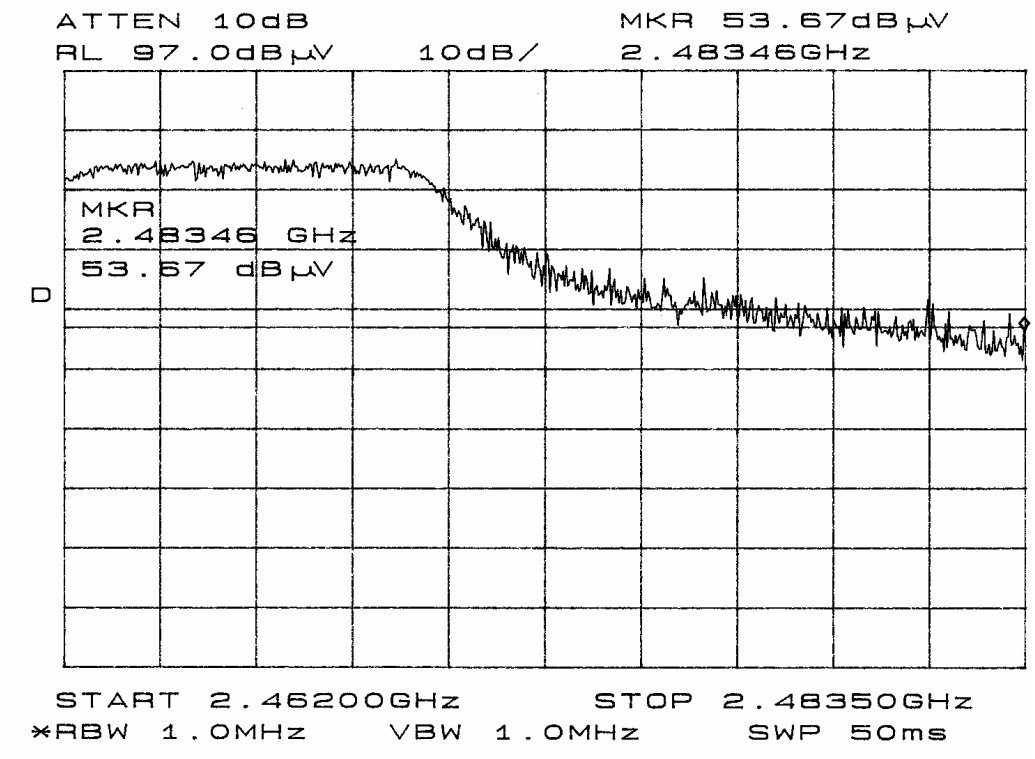

Figure 34 Radiated Emission Band Edge plot (Mode G).

Transmitter Information and Data

The antenna conducted output power, power spectral density, and 20-dB bandwidth were measured at three frequencies in the band of operation. The data reported below represents the worst-case operational conditions.

Frequency MHz	Antenna Conducted Output Power dBm	Occupied Bandwidth MHz	Power Spectral Density dBm	Operational Mode
2412.0	23.7	11.83	-9.3	B
2442.0	23.7	11.25	-9.3	B
2462.0	23.6	11.75	-9.2	B
2422.0	25.7	11.81	-9.2	B
2442.0	26.0	11.45	-9.3	B
2462.0	25.5	11.79	-9.3	B
2412.0	-19.6	16.88	-9.3	G
2442.0	-19.7	16.79	-9.8	G
2462.0	-19.3	16.83	-10.2	G

Data: Radiated Emissions from Intentional Radiator 13 dBi antenna (250 mW)

Emission Frequency (MHz)	FSM Horz. (dBµV)	FSM Vert. (dBµV)	Ant. Factor (dB)	Amp Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	Limit @ 3m (dBµV/m)
2412.0 (peak)	77.5	84.2	33.2	0	110.7	117.4	
4822.0 (peak)	30.8	28.7	39.8	35	35.6	33.5	54.0
7233.0 (peak)	31.3	38.6	36.0	35	32.3	39.6	54.0
9644.0 (peak)	32.6	30.7	38.1	34	36.7	34.8	54.0
12055.0 (peak)	32.5	33.5	30.5	32	31.0	32.0	54.0
2437.0 (peak)	75.7	84.3	33.6	0	109.3	117.9	
4874.0 (peak)	29.8	32.0	39.8	35	34.6	36.8	54.0
7311.0 (peak)	34.5	36.7	36.0	35	35.5	37.7	54.0
9748.0 (peak)	36.0	36.5	38.1	34	40.1	40.6	54.0
12185.0 (peak)	35.0	33.3	40.8	32	43.8	42.1	54.0
2462.0 (peak)	75.5	84.3	34.0	0	109.5	118.3	
4924.0 (peak)	33.7	33.0	39.7	35	38.4	37.7	54.0
7386.0 (peak)	33.8	36.0	36.0	35	34.8	37.0	54.0
9848.0 (peak)	34.5	35.5	38.1	34	38.6	39.6	54.0
12310.0 (peak)	34.5	34.8	40.8	32	43.3	43.6	54.0

Data: Radiated Emissions from Intentional Radiator 13 dBi antenna (400 mW)

Emission Frequency (MHz)	FSM Horz. (dBµV)	FSM Vert. (dBµV)	Ant. Factor (dB)	Amp Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	Limit @ 3m (dBµV/m)
2422.0 (peak)	80.3	88.5	33.2	0	113.5	121.7	
4844.0 (peak)	31.0	30.7	40.1	35	36.1	35.8	54.0
7266.0 (peak)	33.8	34.2	36.0	35	34.8	35.2	54.0
9688.0 (peak)	34.7	35.8	38.1	34	38.8	39.9	54.0
12110.0 (peak)	36.2	37.2	40.8	32	45.0	46.0	54.0
2457.0 (peak)	79.3	89.3	33.9	0	113.2	123.2	
4914.0 (peak)	30.2	31.7	39.9	35	35.1	36.6	54.0
7371.0 (peak)	35.0	36.5	36.0	35	36.0	37.5	54.0
9828.0 (peak)	34.0	36.2	38.1	34	38.1	40.3	54.0
12285.0 (peak)	37.2	36.3	40.8	32	46.0	45.1	54.0

Data: Radiated Emissions from Intentional Radiator using 17 dBi (Sector) antenna

Emission Frequency (MHz)	FSM Horz. (dBµV)	FSM Vert. (dBµV)	Ant. Factor (dB)	Amp Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	Limit @ 3m (dBµV/m)
2412.0 (Peak)	79.3	91.0	33.2	0	112.5	124.2	
4824.0 (Peak)	32.6	33.3	39.8	35	37.4	38.1	54.0
7236.0 (Peak)	34.5	36.8	36.0	35	35.5	37.8	54.0
9648.0 (Peak)	35.3	36.0	38.1	34	39.4	40.1	54.0
12060.0 (Peak)	35.8	35.6	30.5	32	34.3	34.1	54.0
2437.0 (peak)	79.2	90.5	33.6	0	112.8	124.1	
4874.0 (peak)	31.5	32.3	39.8	35	36.3	37.1	54.0
7311.0 (peak)	35.6	35.8	36.0	35	36.6	36.8	54.0
9748.0 (peak)	35.2	35.1	38.1	34	39.3	39.2	54.0
12185.0 (peak)	35.2	35.5	40.8	32	44.0	44.3	54.0
2462.0 (Peak)	80.0	91.5	34.0	0	114.0	125.5	
4924.0 (Peak)	32.6	33.8	39.7	35	37.3	38.5	54.0
7386.0 (Peak)	36.3	36.8	36.0	35	37.3	37.8	54.0
9848.0 (Peak)	36.2	37.0	38.1	34	40.3	41.1	54.0
12310.0 (Peak)	36.2	36.8	40.8	32	45.0	45.6	54.0

Data: Radiated Emissions from Intentional Radiator using 19 dBi (Panel) antenna

Emission Frequency (MHz)	FSM Horz. (dBµV)	FSM Vert. (dBµV)	Ant. Factor (dB)	Amp Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	Limit @ 3m (dBµV/m)
2412.0 (Peak)	80.1	91.5	33.2	0	113.3	124.7	
4824.0 (Peak)	31.5	34.0	39.8	35	36.3	38.8	54.0
7236.0 (Peak)	33.8	35.4	36.0	35	34.8	36.4	54.0
9648.0 (Peak)	35.0	35.5	38.1	34	39.1	39.6	54.0
12060.0 (Peak)	34.6	35.7	30.5	32	33.1	34.2	54.0
2437.0 (peak)	81.7	92.7	33.6	0	115.3	126.3	
4874.0 (peak)	32.5	36.4	39.8	35	37.3	41.2	54.0
7311.0 (peak)	34.4	35.2	36.0	35	35.4	36.2	54.0
9748.0 (peak)	35.5	35.7	38.1	34	39.6	39.8	54.0
12185.0 (peak)	34.8	35.0	40.8	32	43.6	43.8	54.0
2462.0 (Peak)	81.4	91.7	34.0	0	115.4	125.7	
4924.0 (Peak)	32.3	31.8	39.7	35	37.0	36.5	54.0
7386.0 (Peak)	36.6	37.7	36.0	35	37.6	38.7	54.0
9848.0 (Peak)	35.8	36.3	38.1	34	39.9	40.4	54.0
12310.0 (Peak)	35.0	35.8	40.8	32	43.8	44.6	54.0

Data: Radiated Emissions from Intentional Radiator using 24 dBi (Grid) antenna

Emission Frequency (MHz)	FSM Horz. (dBµV)	FSM Vert. (dBµV)	Ant. Factor (dB)	Amp Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	Limit @ 3m (dBµV/m)
2412.0 (Peak)	84.5	96.5	33.2	0	117.7	129.7	
4824.0 (Peak)	33.8	35.2	39.8	35	38.6	40.0	54.0
7236.0 (Peak)	34.7	35.3	36.0	35	35.7	36.3	54.0
9648.0 (Peak)	35.0	35.5	38.1	34	39.1	39.6	54.0
12060.0 (Peak)	34.8	35.7	30.5	32	33.3	34.2	54.0
2437.0 (peak)	84.3	97.2	33.6	0	117.9	130.8	
4874.0 (peak)	34.5	36.3	39.8	35	39.3	41.1	54.0
7311.0 (peak)	34.5	35.4	36.0	35	35.5	36.4	54.0
9748.0 (peak)	34.6	36.0	38.1	34	38.7	40.1	54.0
12185.0 (peak)	34.0	35.7	40.8	32	42.8	44.5	54.0
2462.0 (Peak)	85.2	96.9	34.0	0	119.2	130.9	
4924.0 (Peak)	34.6	35.3	39.7	35	39.3	40.0	54.0
7386.0 (Peak)	34.5	35.6	36.0	35	35.5	36.6	54.0
9848.0 (Peak)	34.8	35.9	38.1	34	38.9	40.0	54.0
12310.0 (Peak)	35.2	36.1	40.8	32	44.0	44.9	54.0

Summary of Results for Radiated Emissions of Intentional Radiator

The EUT had the highest emission of 130.9 dBµV/m at 3 meters at the fundamental frequency of operation. The EUT had a worst-case of 8.0 (Peak amplitude) dB margin below the limit for the harmonic emissions. The radiated emissions for the EUT meet the requirements for FCC Part 15.247 Intentional Radiators. There are no measurable emissions in the restricted bands other than those recorded in this report. Other emissions were present with amplitudes at least 20 dB below the FCC Limits. The specifications of 15.247 were met; there are no deviations or exceptions to the requirements.

Statement of Modifications and Deviations

No modifications to the EUT were required for the unit to meet the FCC Part 15C emissions standards. There were no deviations to the specifications.

APPENDIX

Model: CRD DATA TRANSMITTER

1. Test Equipment List
2. Rogers Qualifications
3. FCC Site Approval Letter

TEST EQUIPMENT LIST FOR ROGERS LABS, INC.

The test equipment used is maintained in calibration and good operating condition. Use of this calibrated equipment ensures measurements are traceable to national standards.

List of Test Equipment	Calibration Date
Oscilloscope Scope: Tektronix 2230	2/07
Wattmeter: Bird 43 with Load Bird 8085	2/07
Power Supplies: Sorensen SRL 20-25, SRL 40-25, DCR 150, DCR 140	2/07
H/V Power Supply: Fluke Model: 408B (SN: 573)	2/07
R.F. Generator: HP 606A	2/07
R.F. Generator: HP 8614A	2/07
R.F. Generator: HP 8640B	2/07
Spectrum Analyzer: HP 8562A, Mixers: 11517A, 11970A, 11970K, 11970U, 11970V, 11970W HP Adapters: 11518, 11519, 11520	2/07
Spectrum Analyzer: HP 8591EM	5/07
Frequency Counter: Leader LDC825	2/07
Antenna: EMCO Biconilog Model: 3143	5/07
Antenna: EMCO Log Periodic Model: 3147	10/06
Antenna: Antenna Research Biconical Model: BCD 235	10/06
Antenna: EMCO Dipole Set 3121C	2/07
Antenna: C.D. B-101	2/07
Antenna: Solar 9229-1 & 9230-1	2/07
Antenna: EMCO 6509	2/07
Audio Oscillator: H.P. 201CD	2/07
R.F. Power Amp 65W Model: 470-A-1010	2/07
R.F. Power Amp 50W M185- 10-501	2/07
R.F. PreAmp CPPA-102	2/07
LISN 50 µHy/50 ohm/0.1 µf	10/06
LISN Compliance Eng. 240/20	2/07
LISN Fischer Custom Communications FCC-LISN-50-16-2-08	2/07
Peavey Power Amp Model: IPS 801	2/07
Power Amp A.R. Model: 10W 1010M7	2/07
Power Amp EIN Model: A301	2/07
ELGAR Model: 1751	2/07
ELGAR Model: TG 704A-3D	2/07
ESD Test Set 2010i	2/07
Fast Transient Burst Generator Model: EFT/B-101	2/07
Current Probe: Singer CP-105	2/07
Current Probe: Solar 9108-1N	2/07
Field Intensity Meter: EFM-018	2/07
KEYTEK Ecat Surge Generator	2/07
Shielded Room 5 M x 3 M x 3.0 M	
5/2/2007	

QUALIFICATIONS

Of

SCOT D. ROGERS, ENGINEER

ROGERS LABS, INC.

Mr. Rogers has approximately 17 years experience in the field of electronics. Six years working in the automated controls industry and 6 years working with the design, development and testing of radio communications and electronic equipment.

POSITIONS HELD:

Systems Engineer:	A/C Controls Mfg. Co., Inc. 6 Years
Electrical Engineer:	Rogers Consulting Labs, Inc. 5 Years
Electrical Engineer:	Rogers Labs, Inc. Current

EDUCATIONAL BACKGROUND:

1) Bachelor of Science Degree in Electrical Engineering from Kansas State University.

2) Bachelor of Science Degree in Business Administration from Kansas State University.

3) Several Specialized Training courses and seminars pertaining to Microprocessors and Software programming.

Scot D Rogers

Scot D. Rogers

June 26, 2007
Date

FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

May 16, 2006

Registration Number: 90910

Rogers Labs, Inc.
4405 West 259th Terrace
Louisburg, KS 66053

Attention: Scot Rogers

Re: Measurement facility located at Louisburg
3 & 10 meter site
Date of Renewal: May 16, 2006

Dear Sir or Madam:

Your request for renewal of the registration of the subject measurement facility has been received. The information submitted has been placed in your file and the registration has been renewed. The name of your organization will remain on the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website www.fcc.gov under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

Phyllis Parrish
Information Technician

Industry Canada Industrie Canada

May 23rd, 2006

OUR FILE: 46405-3041
Submission No: 115252

Rogers Labs Inc.
4405 West 259th Terrace
Louisburg, KY
USA 66053

Dear Sir/Madame:

The Bureau has received your application for the Alternate Test Site or OATS and the filing is satisfactory to Industry Canada.

Please reference to the file number **(3041-1)** in the body of all test reports containing measurements performed on the site.

In the future, to obtain or renew a unique registration number, you may demonstrate that the site has been accredited to ANSI C63.4-2003 or later.

If the site is not accredited to ANSI C63.4-2003 or later, the test facility shall submit test data demonstrating conformance with the ANSI standard. The Department will evaluate the filing to determine if recognition shall be granted.

The frequency for re-validation of the test site and the information that is required to be filed or retained by the testing party shall comply with the requirements established by the accrediting organization. However, in all cases, test site re-validation shall occur on an interval not to exceed two years.

If you have any questions, you may contact the Bureau by e-mail at certification.bureau@ic.gc.ca
Please reference our file number above for all correspondence.

Yours sincerely,

Robert Corey
Manager Certification
Certification and Engineering Bureau
3701 Carling Ave., Building 94
Ottawa, Ontario K2H 8S2

Canada