Engineering and Testing for EMC and Safety Compliance

CERTIFICATION APPLICATION REPORT
FCC PART 15.247 CERTIFICATION & INDUSTRY CANADA CERTIFICATION

Test Lab:	Applicant Information:
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FCC ID:	GU67410	**GRANTEE FRN NUMBER:**	0003583150
PLAT FORM:	N/A	**RTL WORK ORDER NUMBER:**	2002180 & 2002181
MODEL(S):	7410	**RTL QUOTE NUMBER:**	QRTL02-594 & -595
DATE OF TEST REPORT:	October 23, 2002		

American National Standard Institute:	ANSI C63.4: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
FCC Classification:	DSS – Part 15 Spread Spectrum Transmitter
FCC Rule Part(s):	Part 15.247: Operation within the bands 920-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System 97-114: Amendment of Parts 2 and 15 of the Commission's Rules Regarding Spread Spectrum Transmitters; ET Docket No. 96-8
Industry Canada Standard:	RSS-210: Low Power License-Exempt Radio Communication Devices (All Frequency Bands)
Digital Interface Information	Digital Interface was found to be compliant
Receiver Information	Receiver was found to be compliant

Printer Housing	Frequency Range (MHz)	Output Power* (W)	Frequency Tolerance	Emission Designator
Plastic	2412-2462	0.037	N/A	N/A
Metal	2412-2462	0.034	N/A	N/A

* output power is maximum peak conducted

We, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report.

No modifications were made to the equipment during testing in order to achieve compliance with these standards. Furthermore, there was no deviation from, additions to, or exclusions from the FCC Part 2, FCC Part 15, Industry Canada RSS-210, ANSI C63.4, and FCC 97-114.

Signature: 

Date: October 23, 2002

Typed/Printed Name: Desmond A. Fraser

Position: President

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1 GENERAL INFORMATION

1.1 SCOPE

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz.

IC RSS-210 Section 6.2.2(o): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz.

A direct sequence (DS) system is a spread spectrum (SS) system in which the carrier has been modulated by a high speed spreading code and an information data stream. The high-speed code sequence dominates the "modulating function" and is the direct cause of the wide spreading of the transmitted signal.

1.2 TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 1992).

1.3 RELATED SUBMITTAL(S)/GRANT(S)

This is an original application for modular approval certification for Monarch Marking Systems, Inc. dba Paxar Corporation, wireless print server, Model 7410, FCC ID: GU67410. This print server can be used inside a printer with a plastic housing or inside a printer with a metal housing, with either a right angle antenna or a stub antenna. It is the intention of Paxar to continue to use the Model 7410 wireless print server in printers with either a plastic or metal housing. The IF, LO and up to the 2nd LO were investigated and tested.

2 TEST INFORMATION

2.1 TEST JUSTIFICATION

The EUT was tested in all three orthogonal planes in order to determine worst-case emissions by orienting the antenna. Channel 1 at 2412 MHz, Channel 6 at 2437 MHz and channel 11 at 2462 MHz were tested and investigated from 9 kHz to 24 GHz. Data for all three channels in each configuration (i.e. the EUT housed in a metal case or a plastic case, with either a right angle antenna or a stub antenna) is included in this report.

The worst-case data taken in this report represents the highest data rate at 11 Mbps. Data rates of 1 Mbps, 2 Mbps, and 5.5 Mbps were investigated and found to be in compliance. The change in envelope did not cause the EUT to be non-compliant in any of the aforementioned modes.

2.2 EXERCISING THE EUT

The EUT was provided with software to continuously transmit during testing. The carrier was also checked to verify that information was being transmitted.

2.3 TEST RESULT SUMMARY

TABLE 2-1: TEST RESULT SUMMARY WITH FCC RULES AND REGULATIONS

STANDARD	TEST	PASS/FAIL OR N/A
FCC 15.205	Compliance with the Restricted Band Edge	Pass
FCC 15.207	Conducted Emissions	Pass
FCC 15.209	Radiated Emissions	Pass
FCC 15.247(a)(2)	Modulated Bandwidth	Pass
FCC 15.247(b)	Power Output	Pass
FCC 15.247(c)	Antenna Conducted Spurious Emissions	Pass
FCC 15.247(d)	Power Spectral Density	Pass

2.4 TEST SYSTEM DETAILS

The FCC Identifiers for all equipment, plus descriptions of all cables used in the tested system are identified below.

TABLE 2-2: EQUIPMENT UNDER TEST (EUT)

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
WIRELESS PRINT SERVER	PAXAR	7410	00860005	GU67410	UNSHIELDED	N/A

TABLE 2-3 INTERNAL COMPONENTS IN TEST SYSTEM

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
WLAN PCMCIA CARD	ZCOM	XI-325	X32524NU04299	N/A	N/A	N/A
PRINT SERVER MOUNTING ADAPTER PCB	TROY GROUP	N/A	00860005	N/A	N/A	N/A
PRINT SERVER PCB	TROY GROUP	N/A	123-00157-10	N/A	N/A	N/A
ADAPTER ANTENNA CABLE	PAXAR	124560	N/A	N/A	COAXIAL CABLE	N/A

TABLE 2-4: EXTERNAL COMPONENTS IN TEST SYSTEM

PLASTIC HOUSING WITH RIGHT ANGLE ANTENNA						
PART	**MANUFACTURER**	**MODEL**	**SERIAL NUMBER**	**FCC ID**	**CABLE DESCRIPTION**	**RTL BAR CODE**
PRINTER	PAXAR	98XX	00-40-17-0D-1F-66	N/A	UNSHIELDED	14748
RIGHT-ANGLE ANTENNA	MAXRAD	MHWS2400MSMA	N/A	N/A	COAXIAL CABLE	N/A
NETWORK HUB (AUXILLARY EQUIPMENT)	DLINK	DSS-8+	0205E2A68287	N/A	UNSHIELDED	14740
METAL HOUSING WITH STUB ANTENNA						
PRINTER	PAXAR	98XX	00-40-17-0D-1F-65	N/A	UNSHIELDED	14746
STUB ANTENNA	MAXRAD	MMSO2300	N/A	N/A	COAXIAL CABLE	N/A
NETWORK HUB (AUXILIARY EQUIPMENT)	DLINK	DSS-8+	0205E2A68287	N/A	UNSHIELDED	14740
STACKER (AUXILIARY EQUIPMENT)	PAXAR	928	N/A	SAMPLE	N/A	14745
KEYPAD (AUXILIARY EQUIPMENT)	PAXAR	917	222461	N/A	UNSHIELDED	14742
CUTTER (AUXILIARY EQUIPMENT)	PAXAR	926	02090189	N/A	N/A	14747
NETWORK HUB (AUXILLARY EQUIPMENT)	DLINK	DSS-8+	0205E2A68287	N/A	UNSHIELDED	14740

2.5 CONFIGURATION OF TESTED SYSTEMS

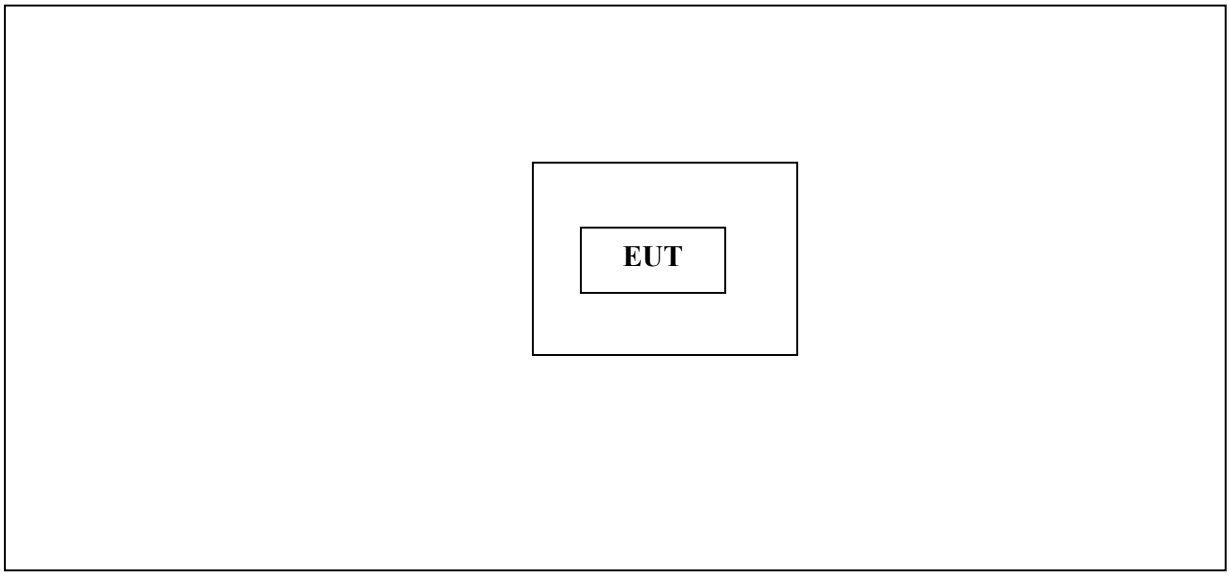


FIGURE 1: WORST CASE CONFIGURATION OF SYSTEMS UNDER TEST

3 COMPLIANCE WITH THE RESTRICTED BAND EDGE - §15.205

3.1 TEST PROCEDURE

Compliance with the band edges was performed using the FCC's "Radiated Measurement at a Band Edge" guidance document. The data taken in this report represents the worst case at 11 Mbps. Data rates of 5.5 Mbps, 2 Mbps and 1 Mbps were investigated and found to be in compliance.

3.2 BAND EDGE TEST EQUIPMENT

TABLE 3-1: BAND EDGE TEST EQUIPMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER	CALIBRATION DUE DATE
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	N/A
900913	Hewlett Packard	85462A	EMI Receiver RF Section, 9 KHz - 6.5 GHz	3325A00159	12/5/02
900914	Hewlett Packard	8546OA	RF Filter Section, 100 KHz to 6.5 GHz	3330A00107	12/5/02
900814	Electro-Metrics	EM-6961 (RGA-60)	Double Ridged Guide Antenna 1-18 GHz	2310	2/26/03
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	N/A
901231	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	N/A
901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	N/A
900931	HP	8566B	Spectrum Analyzer (100Hz – 22 GHz)	3138A07771	5/10/03

3.3 COMPLIANCE WITH THE RESTRICTED BAND EDGE TEST DATA – PLASTIC HOUSING

Calculation of Lower Band Edge

The level 104.9 dBuV/m is the peak Field Strength measurement (worst case), from which the delta measurement of 51.8 dB is subtracted (reference plots), which is equivalent to a level of 53.1 dB. This level has a margin of 0.9 dB below the limit of 54 dBuV/m

Calculation: 104.9 dBuV/m - 51.8 dB – 54 dBuV/m = -0.9 dB

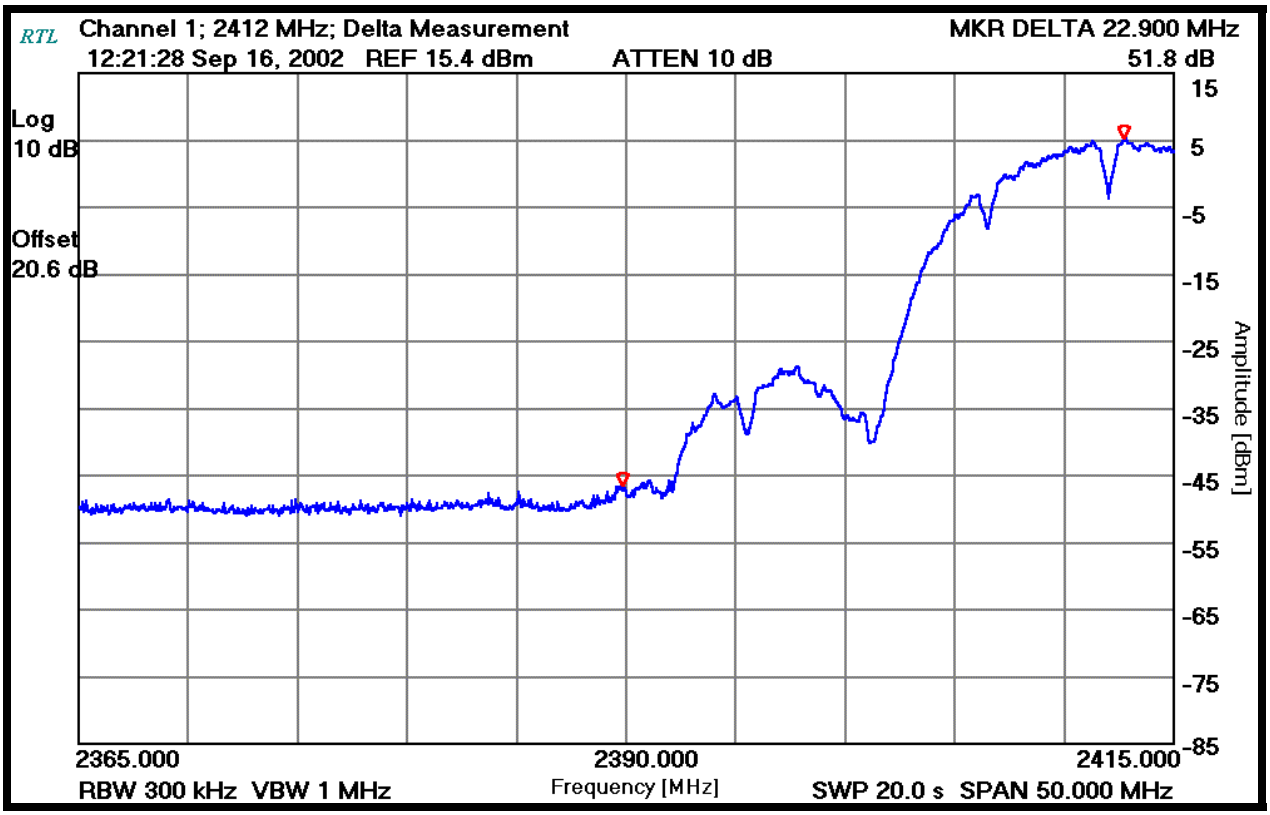
Average absolute measurement yields: 47.4 dBuV/m –54 dBuV/m (limit) = -6.6 dB below limit.

3.4 COMPLIANCE WITH RESTRICTED BAND EDGE PLOTS – PLASTIC HOUSING

Channel Number: 1
Frequency (MHz): 2412
Resolution Bandwidth (kHz): 300
Video Bandwidth (MHz): 1
Sweep Time (s): 20

PLOT 3-1: LOWER BAND EDGE: DELTA MEASUREMENT (CHANNEL 1)

Delta measurement: 51.8 dB



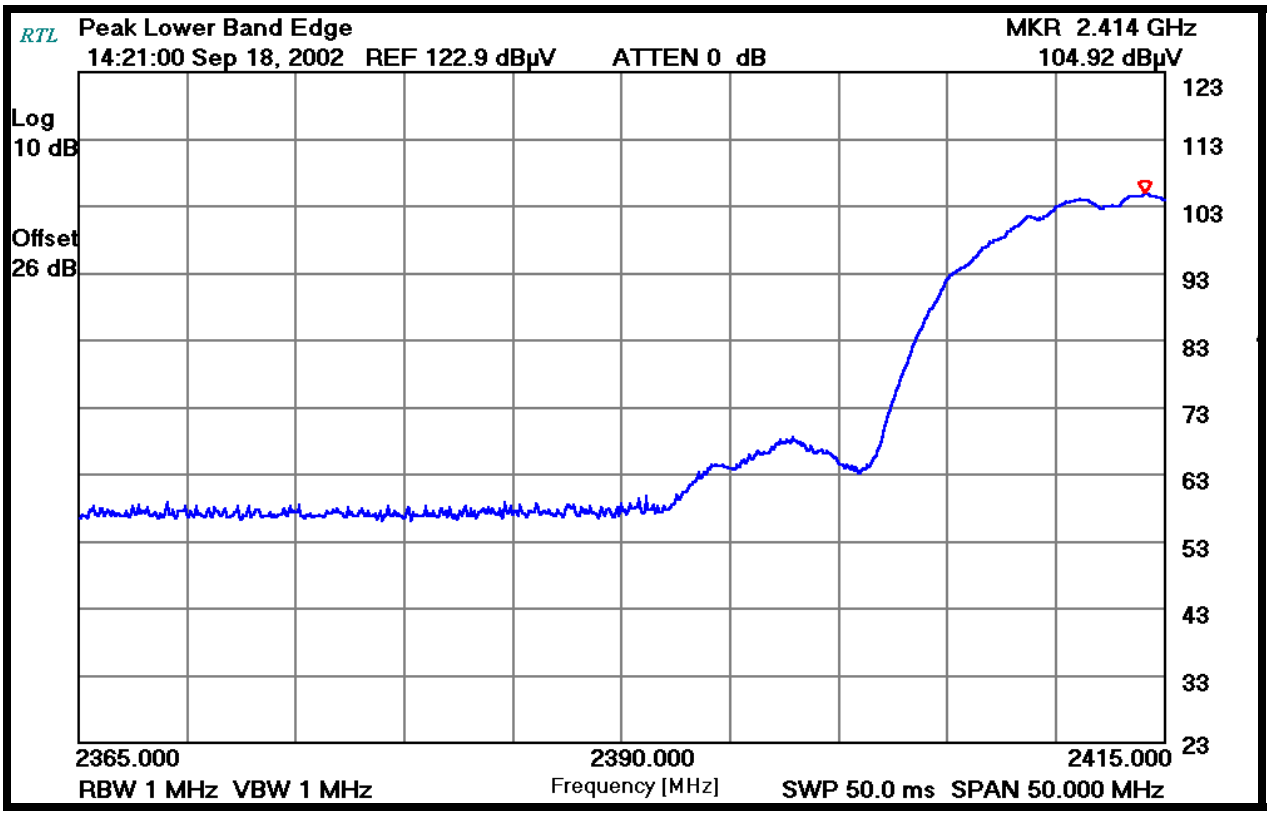
TEST PERSONNEL:

Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

Channel Number:	1
Frequency (MHz):	2412
Resolution Bandwidth (MHz):	1
Video Bandwidth (MHz):	1
Sweep Time (ms):	50

PLOT 3-2: PEAK MEASUREMENT (CHANNEL 1)

Peak field strength of Channel 1 = 104.92 dBuV/m



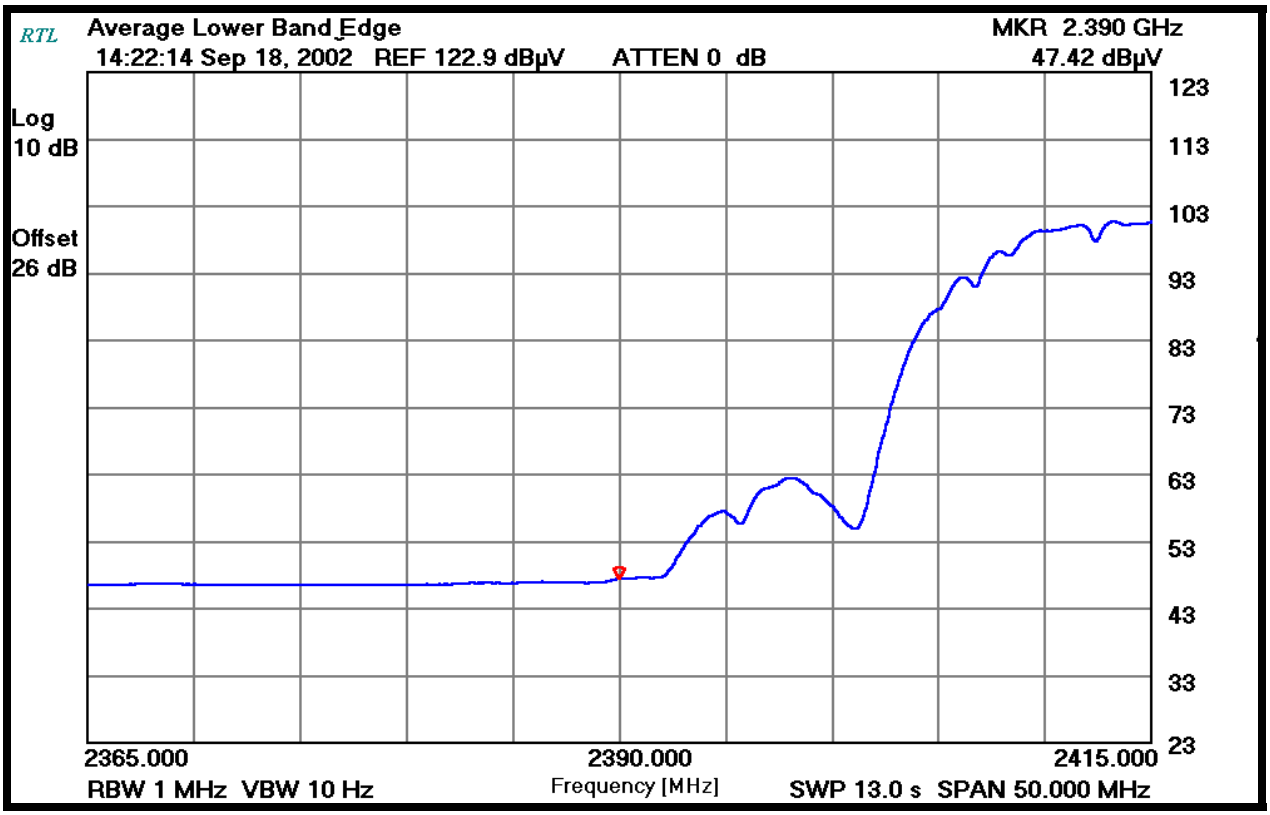
TEST PERSONNEL:

Daniel W. Baltzell		September 18, 2002
EMC Test Engineer	Signature	Date Of Test

Channel Number:	1
Frequency (MHz):	2412
Resolution Bandwidth (MHz):	1
Video Bandwidth (Hz):	10
Sweep Time (s):	13

PLOT 3-3: LOWER BAND EDGE: AVERAGE MEASUREMENT (CHANNEL 1)

Average field strength at lower band edge = 47.42 dBuV/m



TEST PERSONNEL:

Daniel W. Baltzell		September 18, 2002
EMC Test Engineer	Signature	Date Of Test

Calculation of Upper Band Edge

The level 104.3 dBuV/m is the peak Field Strength measurement (worst case), from which the delta measurement of 50.7 dB is subtracted (reference plots), which is equivalent to a level of 53.6 dB. This level has a margin of 0.4 dB below the limit of 54 dBuV/m.

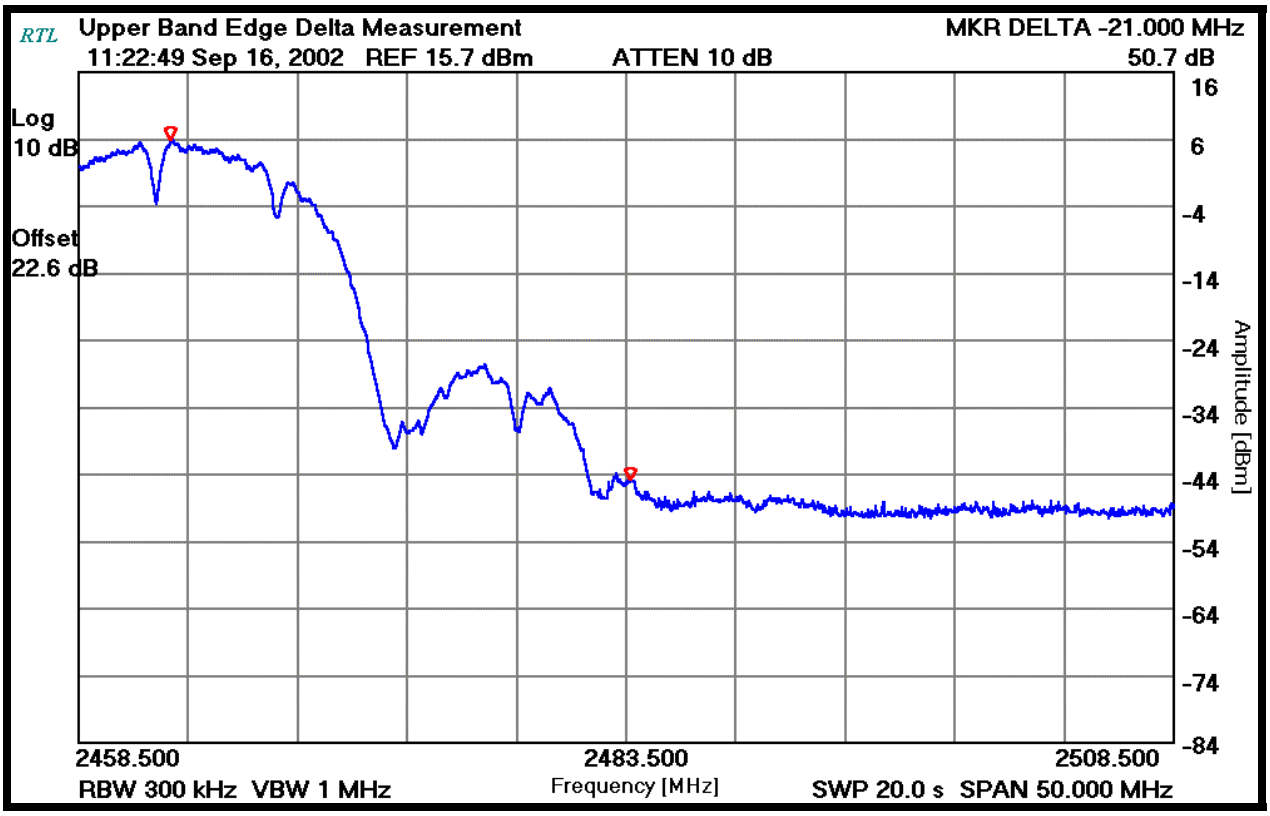
Calculation: 104.3 dBuV/m – 50.7 dB – 54 dBuV/m = -0.4 dB

Average absolute measurement yields: 48.1 dBuV/m –54 dBuV/m (limit) = -5.9 dB below limit.

Channel Number:	11
Frequency (MHz):	2462
Resolution Bandwidth (kHz):	300
Video Bandwidth (MHz):	1
Sweep Time (ms):	20.0

PLOT 3-4: UPPER BAND EDGE: DELTA MEASUREMENT (CHANNEL 11)

Delta measurement = 50.7 dB



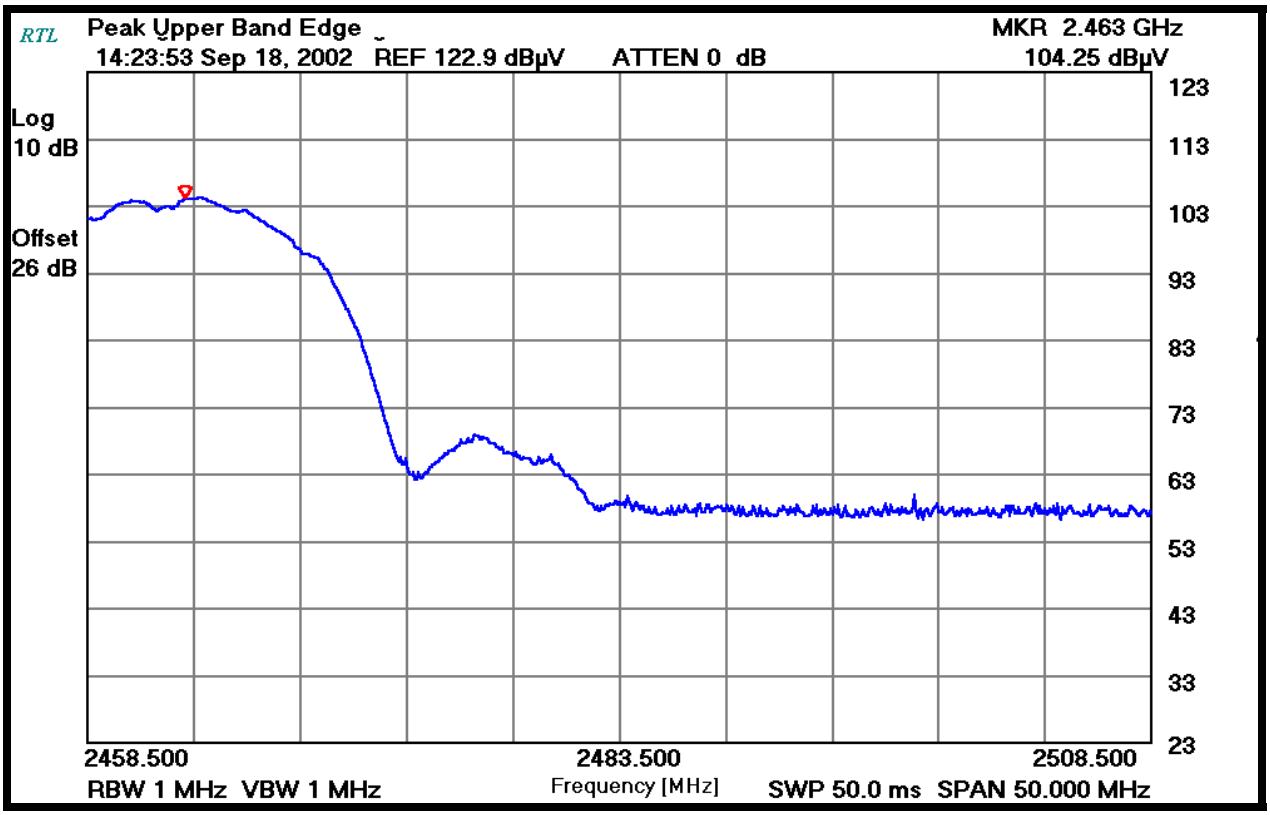
TEST PERSONNEL:

Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

Channel Number:	11
Frequency (MHz):	2462
Resolution Bandwidth (MHz):	1
Video Bandwidth (MHz):	1
Sweep Time (ms):	50

PLOT 3-5: PEAK MEASUREMENT (CHANNEL 11)

Peak field strength of Channel 1 = 104.25 dBuV/m



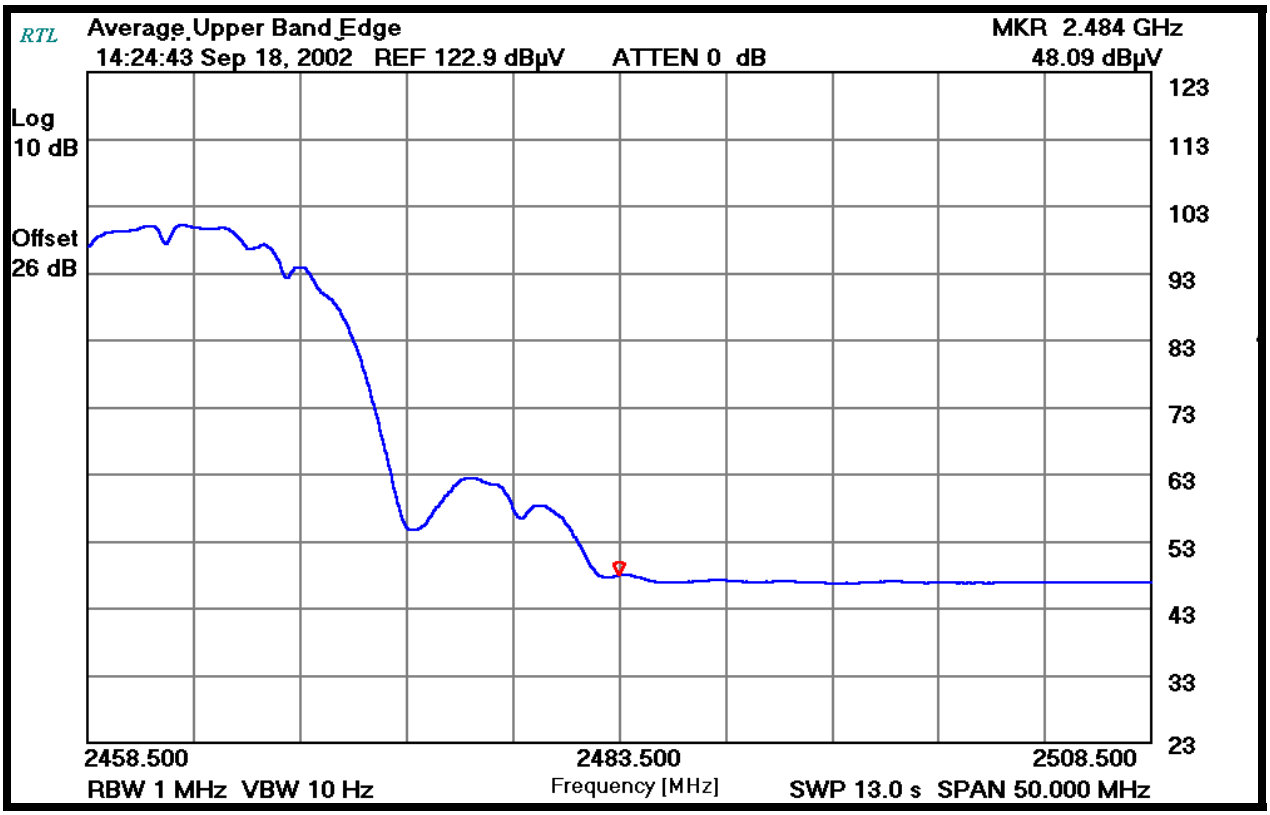
TEST PERSONNEL:

Daniel W. Baltzell		September 18, 2002
EMC Test Engineer	Signature	Date Of Test

Channel Number:	11
Frequency (MHz):	2462
Resolution Bandwidth (MHz):	1
Video Bandwidth (Hz):	10
Sweep Time (s):	13

PLOT 3-6: LOWER BAND EDGE: AVERAGE MEASUREMENT (CHANNEL 11)

Average field strength at lower band edge = 48.1 dBuV/m



TEST PERSONNEL:

Daniel W. Baltzell		September 18, 2002
EMC Test Engineer	Signature	Date Of Test

3.5 COMPLIANCE WITH THE RESTRICTED BAND EDGE TEST DATA – METAL HOUSING

Calculation of Lower Band Edge

The level 102.1 dBuV/m is the peak Field Strength measurement (worst case), from which the delta measurement of 52.6 dB is subtracted (reference plots), which is equivalent to a level of 49.5 dB. This level has a margin of 4.5 dB below the limit of 54 dBuV/m

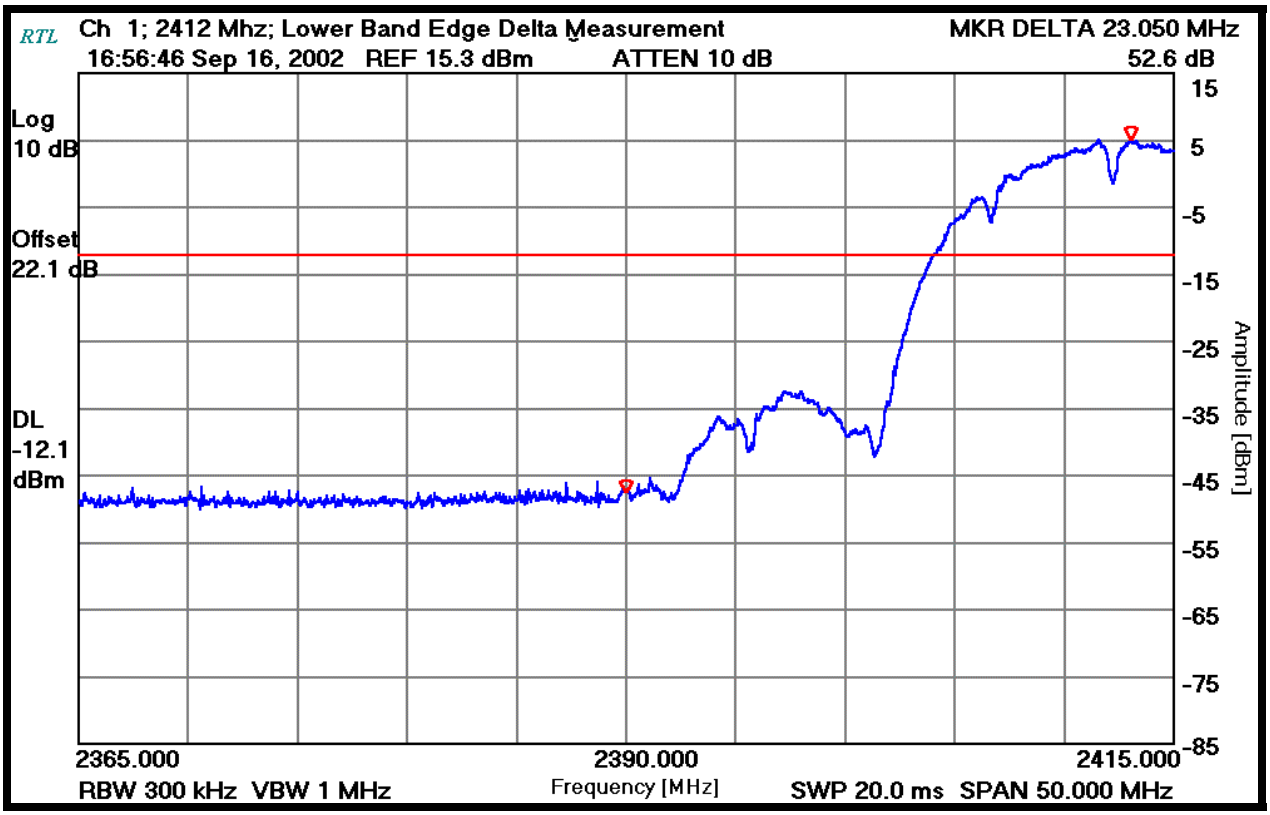
Calculation: 102.1 dBuV/m - 52.6 dB – 54 dBuV/m = -4.5 dB

3.6 COMPLIANCE WITH RESTRICTED BAND EDGE PLOTS – METAL HOUSING

Channel Number: 1
Frequency (MHz): 2412
Resolution Bandwidth (kHz): 300
Video Bandwidth (MHz): 1
Sweep Time (ms): 20

PLOT 3-7: LOWER BAND EDGE: DELTA MEASUREMENT (CHANNEL 1)

Delta measurement: 52.6 dB



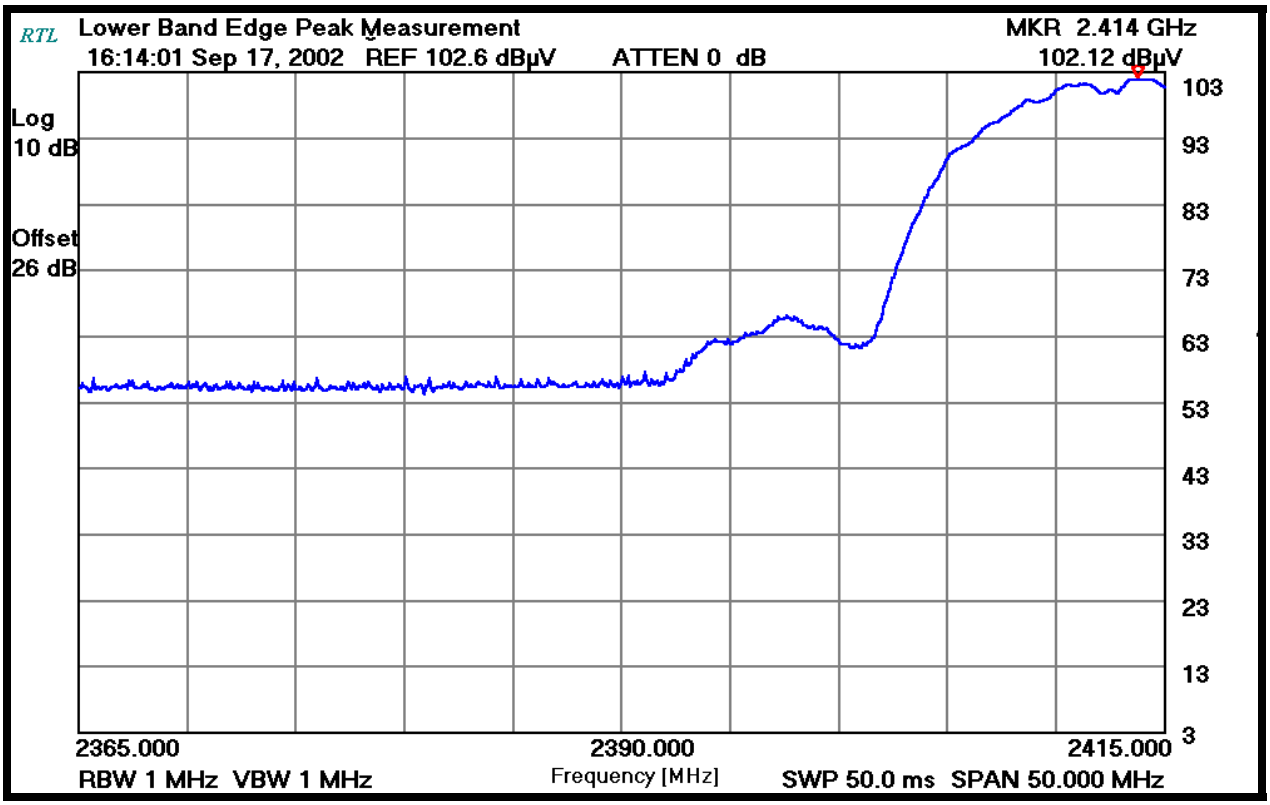
TEST PERSONNEL:

Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

Channel Number:	1
Frequency (MHz):	2412
Resolution Bandwidth (MHz):	1
Video Bandwidth (MHz):	1
Sweep Time (ms):	50

PLOT 3-8: PEAK MEASUREMENT (CHANNEL 1)

Peak field strength of Channel 1 = 102.12 dBuV/m



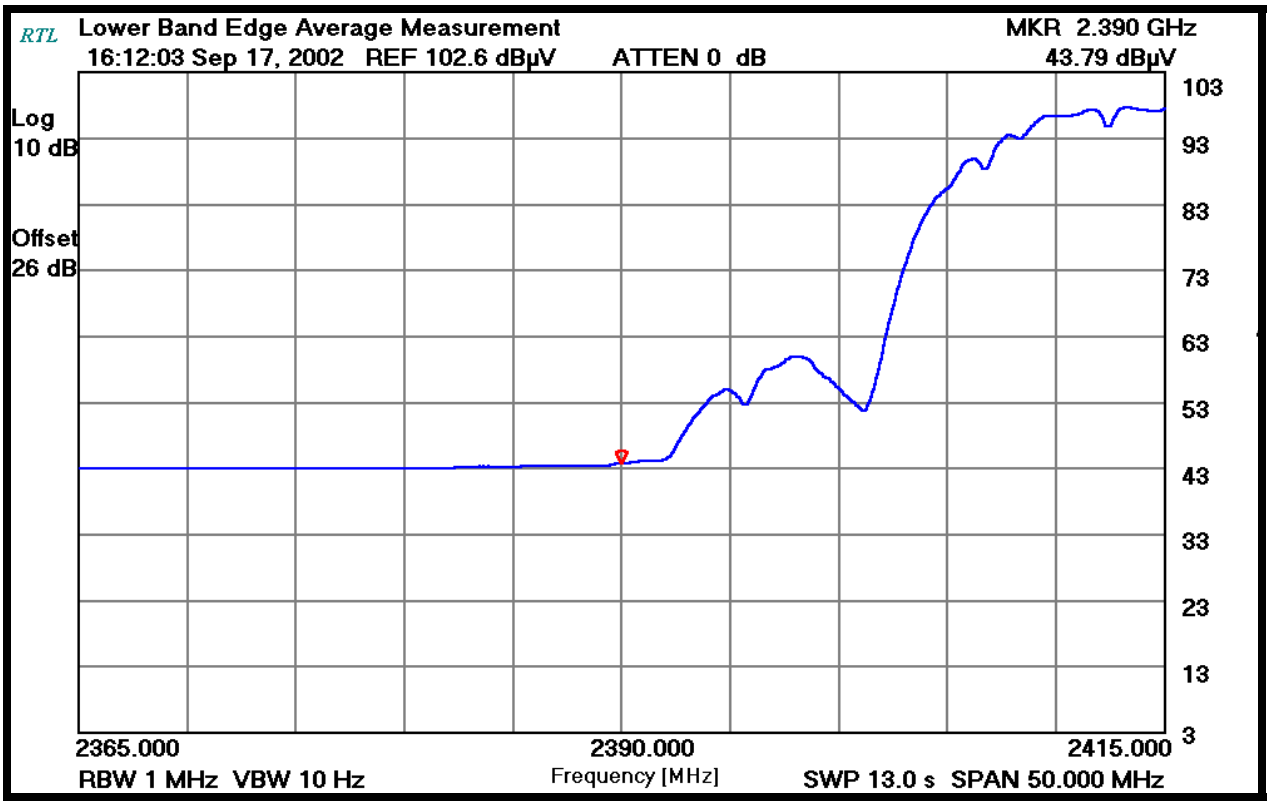
TEST PERSONNEL:

Daniel W. Baltzell		September 17, 2002
EMC Test Engineer	Signature	Date Of Test

Channel Number:	1
Frequency (MHz):	2412
Resolution Bandwidth (MHz):	1
Video Bandwidth (Hz):	10
Sweep Time (s):	13

PLOT 3-9: LOWER BAND EDGE: AVERAGE MEASUREMENT (CHANNEL 1)

Average field strength at lower band edge = 43.79 dBuV/m



TEST PERSONNEL:

Daniel W. Baltzell		September 17, 2002
EMC Test Engineer	Signature	Date Of Test

Calculation of Upper Band Edge

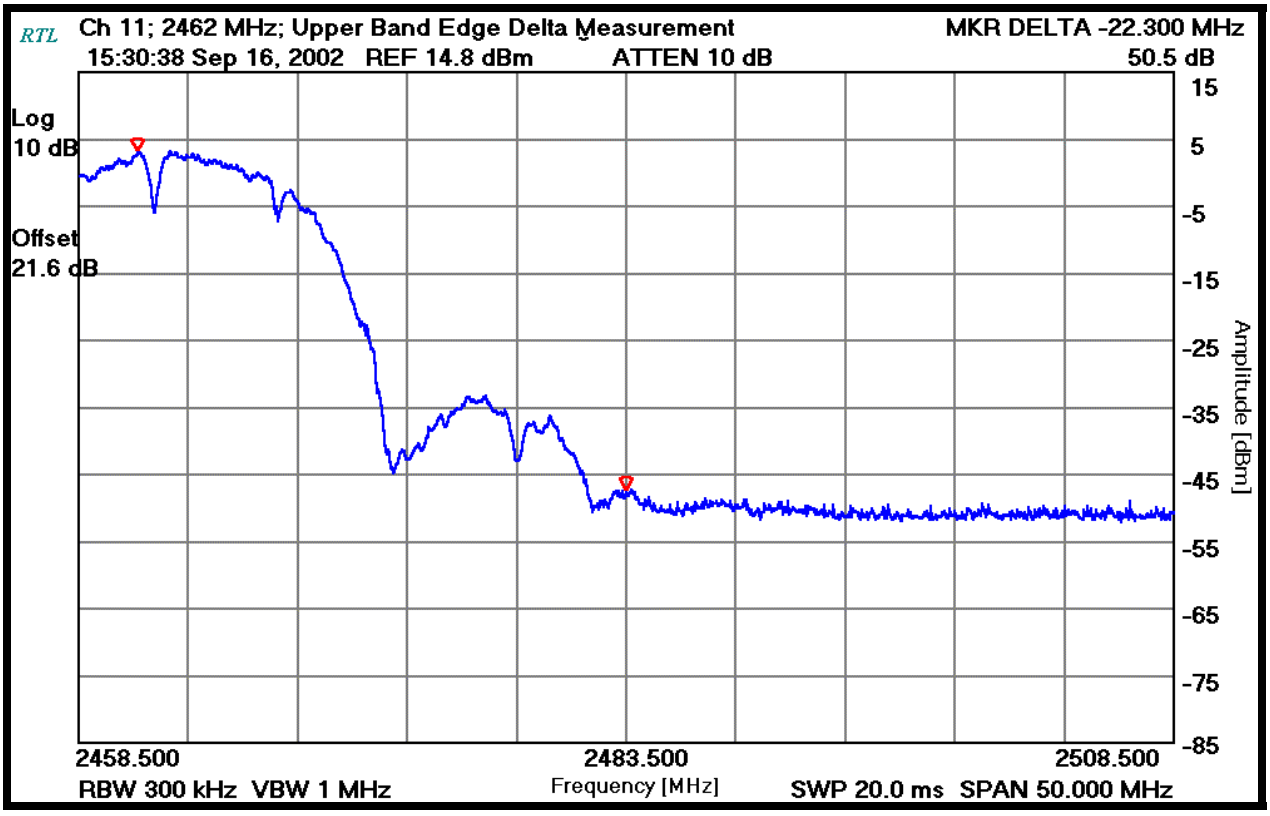
The level 100.2 dBuV/m is the peak Field Strength measurement (worst case), from which the delta measurement of 50.5 dB is subtracted (reference plots), which is equivalent to a level of 49.7 dB. This level has a margin of 4.3 dB below the limit of 54 dBuV/m.

Calculation: 100.2 dBuV/m – 50.5 dB – 54 dBuV/m = -4.3 dB

Channel Number:	11
Frequency (MHz):	2462
Resolution Bandwidth (kHz):	300
Video Bandwidth (MHz):	1
Sweep Time (ms):	20.0

PLOT 3-10: UPPER BAND EDGE: DELTA MEASUREMENT (CHANNEL 11)

Delta measurement = 50.5 dB



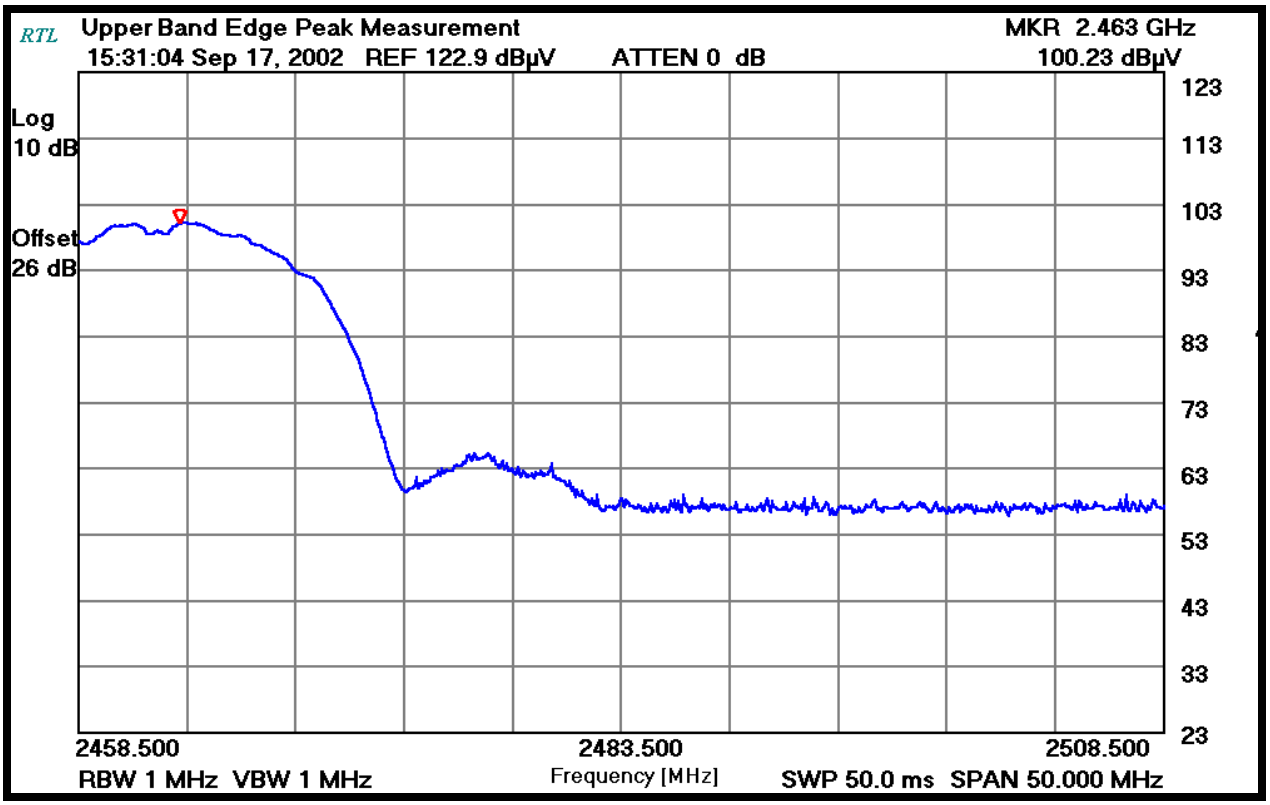
TEST PERSONNEL:

Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

Channel Number:	11
Frequency (MHz):	2462
Resolution Bandwidth (MHz):	1
Video Bandwidth (MHz):	1
Sweep Time (ms):	50

PLOT 3-11: PEAK MEASUREMENT (CHANNEL 11)

Peak field strength of Channel 11 = 100.2 dBuV/m



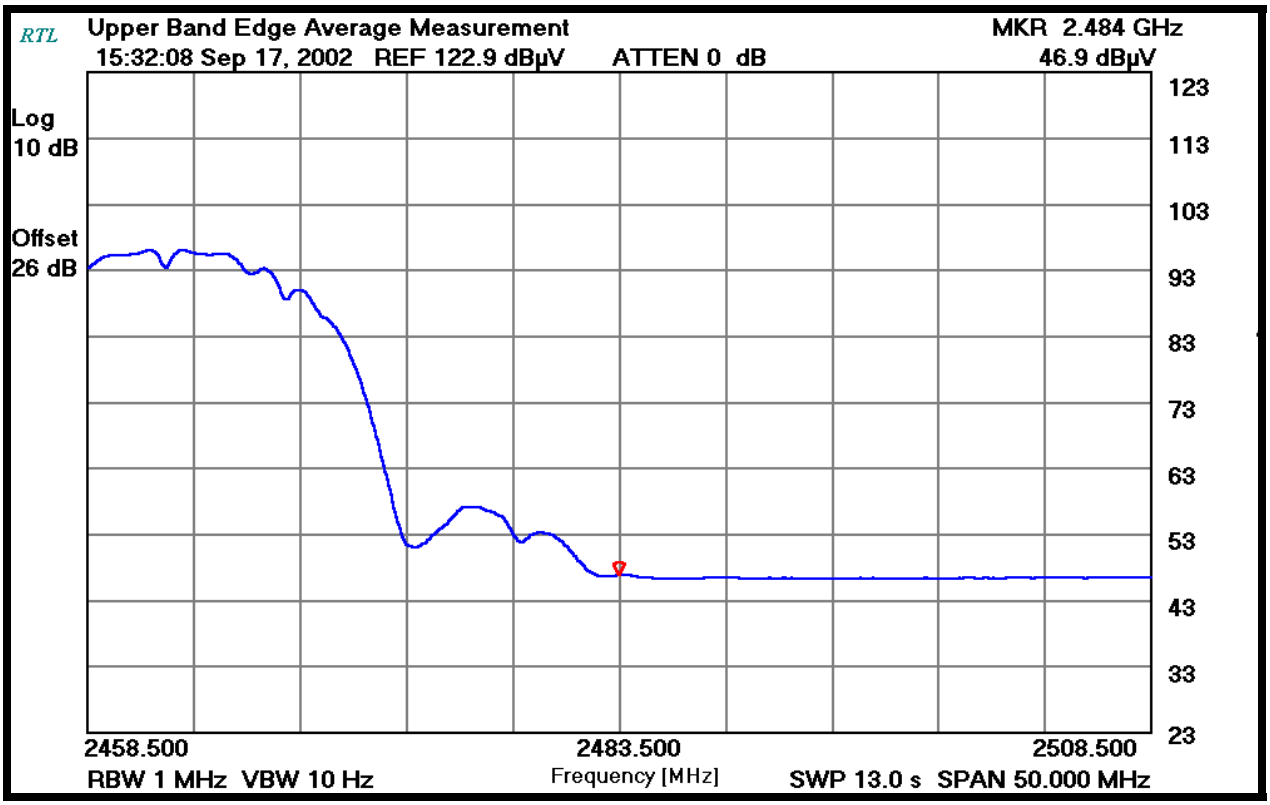
TEST PERSONNEL:

Daniel W. Baltzell		September 17, 2002
EMC Test Engineer	Signature	Date Of Test

Channel Number:	11
Frequency (MHz):	2462
Resolution Bandwidth (MHz):	1
Video Bandwidth (Hz):	10
Sweep Time (s):	13

PLOT 3-12: LOWER BAND EDGE: AVERAGE MEASUREMENT (CHANNEL 11)

Average field strength at lower band edge = 46.9 dBuV/m



TEST PERSONNEL:

Daniel W. Baltzell		September 17, 2002
EMC Test Engineer	Signature	Date Of Test

4 CONDUCTED LIMITS - §15.207

4.1 TEST METHODOLOGY FOR CONDUCTED LINE EMISSIONS MEASUREMENTS

The power line conducted emission measurements were performed in a Series 81 type shielded enclosure manufactured by Rayproof. The EUT, inside a plastic housing and inside a metal housing, was assembled on a wooden table 80 centimeters high. Power was fed to the host printer which powered the EUT through a 50 ohm / 50 micro Henry Line Impedance Stabilization Network (EUT LISN). The EUT LISN was fed power through an A.C. filter box on the outside of the shielded enclosure. The filter box and EUT LISN housing are bonded to the ground plane of the shielded enclosure. A second LISN, the peripheral LISN, provides isolation for the EUT test peripherals. This peripheral LISN was also fed A.C. power. A metal power outlet box, which is bonded to the ground plane and electrically connected to the peripheral LISN, powers the EUT host peripherals.

The spectrum analyzer was connected to the A.C. line through an isolation transformer. The 50-ohm output of the EUT LISN was connected to the spectrum analyzer input through a Solar 400 kHz high-pass filter. The filter is used to prevent overload of the spectrum analyzer from noise below 400 kHz. Conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The analyzer's 6 dB bandwidth was set to 9 kHz. No video filter less than 10 times the resolution bandwidth was used. Average measurements are performed in linear mode using a 10 kHz resolution bandwidth, a 1 Hz video bandwidth, and by increasing the sweep time in order to obtain a calibrated measurement. The emission spectrum was scanned from (150/450) kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in this report.

Note: Rhein Tech Laboratories, Inc. has implemented procedures to minimize errors that occur from test instruments, calibration, procedures, and test setups. Test instrument and calibration errors are documented from the manufacturer or calibration lab. Other errors have been defined and calculated within the Rhein Tech quality manual, section 6.1. Rhein Tech implements the following procedures to minimize errors that may occur: yearly as well as daily calibration methods, technician training, and emphasis to employees on avoiding error.

4.2 CONDUCTED LINE EMISSION TEST

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emissions exceed the limit with the instrument set to the quasi-peak mode, then measurements are made in the average mode. If the quasi-peak measurement is at least 6dB higher than the amplitude in the average mode, the level measured in the quasi-peak mode may be reduced by 13dB before comparing it to the limit.

The conducted test was performed with the EUT exercise program loaded, and the emissions were scanned between 450 kHz to 30 MHz on the NEUTRAL SIDE and PHASE SIDE.

4.3 CONDUCTED LINE TEST EQUIPMENT

TABLE 4-1: CONDUCTED LINE TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	5/10/03
901084	AFJ international	LS16	16A LISN	16010020082	9/5/03

4.4 CONDUCTED LINE EMISSION TEST DATA – PLASTIC HOUSING

TABLE 4-2: CONDUCTED EMISSIONS (NEUTRAL SIDE)

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Margin (dBuV)
0.510	Pk	32.2	0.9	33.1	48.0	-14.9
0.800	Pk	27.8	0.9	28.7	48.0	-19.3
3.550	Pk	26.3	1.6	27.9	48.0	-20.1
8.369	Qp	39.1	2.5	41.6	48.0	-6.4
8.370	Av	33.0	2.5	35.5	48.0	-12.5
10.440	Pk	39.3	2.8	42.1	48.0	-5.9
25.390	Pk	26.8	4.3	31.1	48.0	-16.9

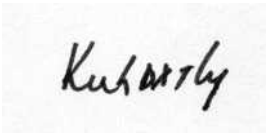
Pk = Peak; Qp = quasi-peak; Av = Average

TABLE 4-3: CONDUCTED EMISSIONS (PHASE SIDE)

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Margin (dBuV)
0.480	Pk	32.2	0.9	33.1	48.0	-14.9
0.750	Pk	28.9	0.9	29.8	48.0	-18.2
3.580	Pk	26.9	1.7	28.6	48.0	-19.4
8.369	Qp	38.4	2.5	40.9	48.0	-7.1
8.370	Av	33.4	2.5	35.9	48.0	-12.1
13.810	Pk	33.3	3.3	36.6	48.0	-11.4
26.040	Pk	28.9	4.3	33.2	48.0	-14.8

Pk = Peak; Qp = quasi-peak; Av = Average

TEST PERSONNEL:



Kinh Ly		September 17, 2002
EMC Test Engineer	Signature	Date Of Test

4.5 CONDUCTED LINE EMISSION TEST DATA – METAL HOUSING

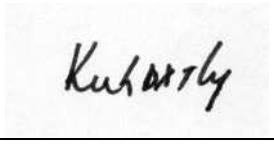
TABLE 4-4: CONDUCTED EMISSIONS (NEUTRAL SIDE)

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Margin (dBuV)
0.510	Pk	38.1	0.9	39.0	60.0	-21.0
3.760	Pk	28.9	1.7	30.6	69.5	-38.9
9.550	Pk	33.8	2.6	36.4	69.5	-33.1
14.810	Pk	35.1	3.4	38.5	69.5	-31.0
18.530	Pk	35.4	3.7	39.1	69.5	-30.4
25.980	Pk	22.7	4.2	26.9	69.5	-42.6

TABLE 4-5: CONDUCTED EMISSIONS (PHASE SIDE)

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Margin (dBuV)
0.510	Pk	38.1	0.9	39.0	60.0	-21.0
1.450	Pk	32.6	1.1	33.7	60.0	-26.3
8.460	Pk	31.1	2.5	33.6	69.5	-35.9
14.810	Pk	32.8	3.4	36.2	69.5	-33.3
18.530	Pk	36.0	3.7	39.7	69.5	-29.8
25.980	Pk	20.2	4.3	24.5	69.5	-45.0

TEST PERSONNEL:



Kinh Ly		September 17, 2002
EMC Test Engineer	Signature	Date Of Test

5 RADIATED EMISSION LIMITS RECEIVER/DIGITAL INTERFACE - §15.209

5.1 RECEIVER/DIGITAL INTERFACE RADIATED EMISSION LIMITS TEST PROCEDURE

Emissions apply to spurious emissions that fall in the restricted and non-restricted bands. The restricted bands are listed in Part 15.205. The maximum permitted average field strength for the restricted band is listed in Part 15.209. The IF, LO and up to the 2nd LO were investigated and tested. Channels 1, 6, and 11 were tested and investigated in the transmitting and receiving mode between 10kHz and 1GHz.

5.2 RECEIVER/DIGITAL INTERFACE RADIATED EMISSIONS TEST EQUIPMENT

TABLE 5-1: RECEIVER/DIGITAL INTERFACE RADIATED EMISSIONS TEST EQUIPMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER	CALIBRATION DUE DATE
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	N/A
900889	Hewlett Packard	85685A	RF Preselector for HP 8566B or 8568B (20Hz-2GHz)	3146A01309	11/21/02
900905	Rhein Tech Labs	PR-1040	Amplifier	900905	N/A
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	5/10/03
900969	Hewlett Packard	85650A	Quasi-Peak Adapter	2412A00414	5/10/03
901053	Schaffner Chase	CBL6112B	Bi-Log Antenna (20 MHz - 2 GHz)	2648	5/22/03
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	N/A

5.3 RECEIVER/DIGITAL INTERFACE RADIATED EMISSION LIMITS TEST DATA

TABLE 5-2: RECEIVER/DIGITAL INTERFACE RADIATED EMISSIONS

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
80.000	Qp	H	180	1.0	42.4	-22.3	20.1	40.0	-19.9
180.000	Qp	H	180	1.0	42.0	-19.7	22.3	43.5	-21.2
220.000	Qp	H	180	1.5	51.8	-13.8	38.0	46.0	-8.0
240.000	Qp	H	30	1.0	40.8	-16.8	24.0	46.0	-22.0
260.000	Qp	H	0	1.0	50.7	-15.4	35.3	46.0	-10.7
308.000	Qp	H	180	3.0	50.7	-10.4	40.3	46.0	-5.7

TEST PERSONNEL:

Dan Baltzell		October 10, 2002
EMC Test Engineer	Signature	Date Of Test

6 RADIATED EMISSION LIMITS; SPURIOUS AND HARMONICS - §15.247

6.1 RADIATED SPURIOUS EMISSION LIMITS TEST PROCEDURE

Radiated Spurious Emissions applies to harmonics and spurious emissions that fall in the restricted and non-restricted bands. The restricted bands are listed in Part 15.205. The maximum permitted average field strength for the restricted band is listed in Part 15.209. The antenna of the EUT, in a plastic housing and in a metal housing, was placed in the X-Y, X-Z and Y-Z orthogonal planes and tested.

6.2 RADIATED SPURIOUS TEST EQUIPMENT

TABLE 6-1: RADIATED SPURIOUS EMISSIONS TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900772	EMCO	3161-02	Horn Antenna	9804-1044	N/A
900321	EMCO	3161-03	Horn Antennas (4-8,2GHz)	9508-1020	N/A
900323	EMCO	3160-7	Horn Antennas (8,2-12.4 GHz)	9605-1054	N/A
900356	EMCO	3160-08	Horn Antennas (12.4 – 18 GHz)	9607-1044	N/A
900325	EMCO	3160-9	Horn Antennas (18 - 26.5 GHz)	9605-1051	N/A
900814	Electro-Metrics	EM-6961 (RGA-60)	Double Ridged Guide Antenna 1-18 GHz	2310	2/26/03
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	N/A
900889	Hewlett Packard	85685A	RF Preselector for HP 8566B or 8568B (20Hz-2GHz)	3146A01309	11/21/02
900905	Rhein Tech Labs	PR-1040	Amplifier	900905	N/A
900931	Hewlett Packard	8566B	Spectrum Analyzer	3138A07771	5/10/03
900666	Hewlett Packard	8449B	Microwave Preamplifier, 1 to 26.5 GHz	3008A00505	N/A
900969	Hewlett Packard	85650A	Quasi-Peak Adapter	2412A00414	5/10/03
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	N/A

6.3 RADIATED EMISSIONS HARMONICS/SPURIOUS TEST DATA – PLASTIC HOUSING

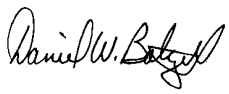
Operating Frequency (MHz): 2412
Channel: 1
Measured Level at 100kHz (dBm): 100.9
Limit (dBm): 80.9

TABLE 6-2: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 1; 2412 MHZ)

Emission Frequency (MHz)	Peak Test Detector (dBuV)	Average Test Detector (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2037.690	39.4	29.3	11.5	40.8	80.9	-40.1
2477.740	38.3	27.1	10.8	37.9	80.9	-43.0
2786.232	39.4	29.3	10.1	39.4	54.0	-14.6
4824.000	11.0	2.4	13.6	16.0	54.0	-38.0
12060.000	22.7	14.2	16.7	30.9	54.0	-23.1
14472.000	25.2	16.7	20.8	37.5	54.0	-16.5

PEAK: RES. =1 MHZ, VID= 1MHZ; AVERAGE: RES. =1 MHZ, VID= 10HZ

TEST PERSONNEL:



Daniel W. Baltzell		September 18, 2002
EMC Test Engineer	Signature	Date Of Test

Operating Frequency (MHz): 2437
Channel: 6
Measured Level at 100kHz (dBm): 99.8
Limit (dBm): 79.8

TABLE 6-3: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 6; 2437 MHZ)

Emission Frequency (MHz)	Peak Test Detector (dBuV)	Average Test Detector (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2062.751	42.4	34.4	10.5	44.9	79.8	-34.9
2502.740	25.6	23.3	11.0	34.3	79.8	-45.5
2811.220	24.8	22.8	10.2	33.0	54.0	-21.0
4872.000	10.5	1.3	13.9	15.2	54.0	-38.8
7308.000	20.4	11.8	12.0	23.8	54.0	-30.2

PEAK: RES. =1 MHZ, VID= 1MHZ; AVERAGE: RES. =1 MHZ, VID= 10HZ

TEST PERSONNEL:

Daniel W. Baltzell		September 18, 2002
EMC Test Engineer	Signature	Date Of Test

Operating Frequency (MHz): 2462
Channel: 11
Measured Level at 100kHz (dBm): 99.9
Limit (dBm): 79.9

TABLE 6-4: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 11; 2462 MHZ)

Emission Frequency (MHz)	Peak Test Detector (dBuV)	Average Test Detector (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2087.768	44.3	36.4	11.1	47.5	79.9	-32.4
2403.220	32.6	22.1	10.5	32.6	79.9	-47.3
2836.232	38.6	28.9	10.5	39.4	54.0	-14.6
4924.000	10.1	1.7	14.3	16.0	54.0	-38.0
7386.000	25.4	16.8	11.7	28.5	54.0	-25.5
12310.000	25.4	16.8	16.6	33.4	54.0	-20.6

PEAK: RES. =1 MHZ, VID= 1MHZ; AVERAGE: RES. =1 MHZ, VID= 10HZ

TEST PERSONNEL:

Daniel W. Baltzell		September 18, 2002
EMC Test Engineer	Signature	Date Of Test

6.4 RADIATED EMISSIONS HARMONICS/SPURIOUS TEST DATA – METAL HOUSING

Operating Frequency (MHz): 2412
Channel: 1
Measured Level at 100kHz (dBuV/m): 98.6
Limit (dBuV/m): 78.6

TABLE 6-5: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 1; 2412 MHZ)

Emission Frequency (MHz)	Peak Test Detector (dBuV)	Average Test Detector (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2037.751	27.1	19.1	21.0	40.1	78.6	-38.5
2477.740	23.4	16.5	21.4	37.9	78.6	-40.7
2786.249	22.0	12.5	28.6	41.1	54.0	-12.9
4824.000	11.0	2.4	13.6	16.0	54.0	-38.0
12060.000	22.7	14.2	16.7	30.9	54.0	-23.1
14472.000	25.2	16.7	20.8	37.5	54.0	-16.5

PEAK: RES. =1 MHZ, VID= 1MHZ; AVERAGE: RES. =1 MHZ, VID= 10HZ

TEST PERSONNEL:

Daniel W. Baltzell		September 18, 2002
EMC Test Engineer	Signature	Date Of Test

Operating Frequency (MHz): 2437
Channel: 6
Measured Level at 100kHz (dBuV/m): 97.1
Limit (dBuV/m): 77.1

TABLE 6-6: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 6; 2437 MHZ)

Emission Frequency (MHz)	Peak Test Detector (dBuV)	Average Test Detector (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2062.751	28.6	19.6	20.7	40.3	77.1	-36.8
2502.740	22.7	14.0	23.4	37.4	77.1	-39.7
2811.220	19.9	13.1	25.8	38.9	54.0	-15.1
4872.000	10.5	1.3	13.9	15.2	54.0	-38.8
7308.000	20.4	11.8	12.0	23.8	54.0	-30.2

PEAK: RES. =1 MHZ, VID= 1MHZ; AVERAGE: RES. =1 MHZ, VID= 10HZ

TEST PERSONNEL:

Daniel W. Baltzell		September 18, 2002
EMC Test Engineer	Signature	Date Of Test

Operating Frequency (MHz):	2412
Channel:	11
Measured Level at 100kHz (dBuV/m):	96.7
Limit (dBuV/m):	76.7

TABLE 6-7: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 11; 2462 MHZ)

Emission Frequency (MHz)	Peak Test Detector (dBuV)	Average Test Detector (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2087.730	24.6	21.8	20.4	42.2	76.7	-34.5
2403.222	27.9	17.4	20.7	38.1	76.7	-38.6
2836.230	22.9	13.9	22.6	36.5	54.0	-17.5
4924.000	10.1	1.7	14.3	16.0	54.0	-38.0
7386.000	25.4	16.8	11.7	28.5	54.0	-25.5
12310.000	25.4	16.8	16.6	33.4	54.0	-20.6

PEAK: RES. =1 MHZ, VID= 1MHZ; AVERAGE: RES. =1 MHZ, VID= 10HZ

TEST PERSONNEL:

Daniel W. Baltzell		September 18, 2002
EMC Test Engineer	Signature	Date Of Test

7 MODULATED BANDWIDTH - §15.247(A)(2)

7.1 MODULATED BANDWIDTH TEST PROCEDURE – MINIMUM 6 DB BANDWIDTH

The minimum 6 dB bandwidths per FCC 15.247 (a)(2) were measured using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 300 kHz. The device was modulated using the maximum 11Mbps data rate. The minimum 6 dB bandwidths are presented in Table 7-2. The 6 dB bandwidth test was measured directly from the EUT RF antenna port; the data presented represents both the metal and plastic housing configurations.

7.2 BANDWIDTH TEST EQUIPMENT

TABLE 7-1: BANDWIDTH TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	HP	8566B	Spectrum Analyzer (100Hz – 22 GHz)	3138A07771	5/10/03

7.3 BANDWIDTH TEST DATA

TABLE 7-2: MINIMUM 6 DB BANDWIDTH TEST DATA

CHANNEL	6 dB BANDWIDTH (MHz)
1	13.26
6	11.04
11	11.12

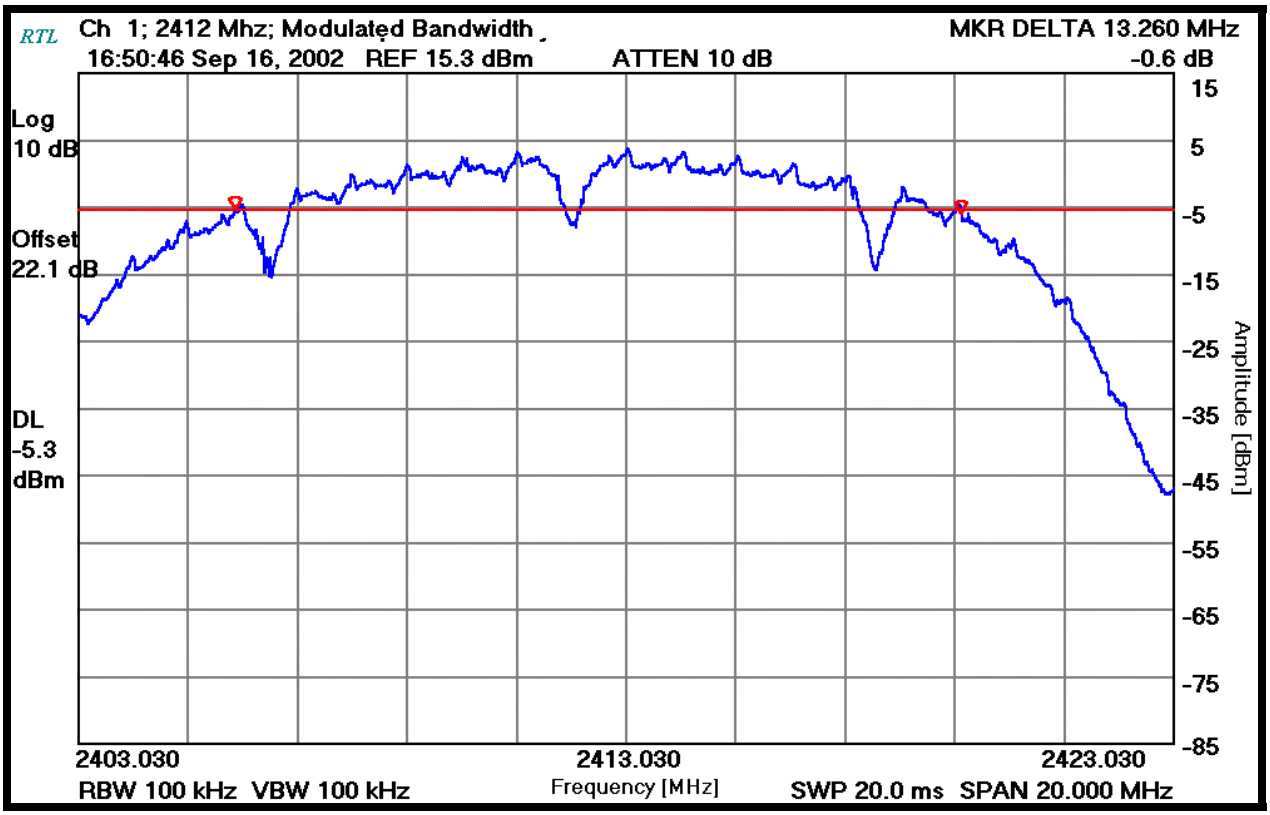
TEST PERSONNEL:

Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

7.4 MODULATED BANDWIDTH PLOTS

Channel Number:	1
Frequency (MHz):	2412
Resolution Bandwidth (kHz):	100
Video Bandwidth (kHz):	100
Sweep Time (ms):	20

PLOT 7-1: MODULATED BANDWIDTH CHANNEL 1

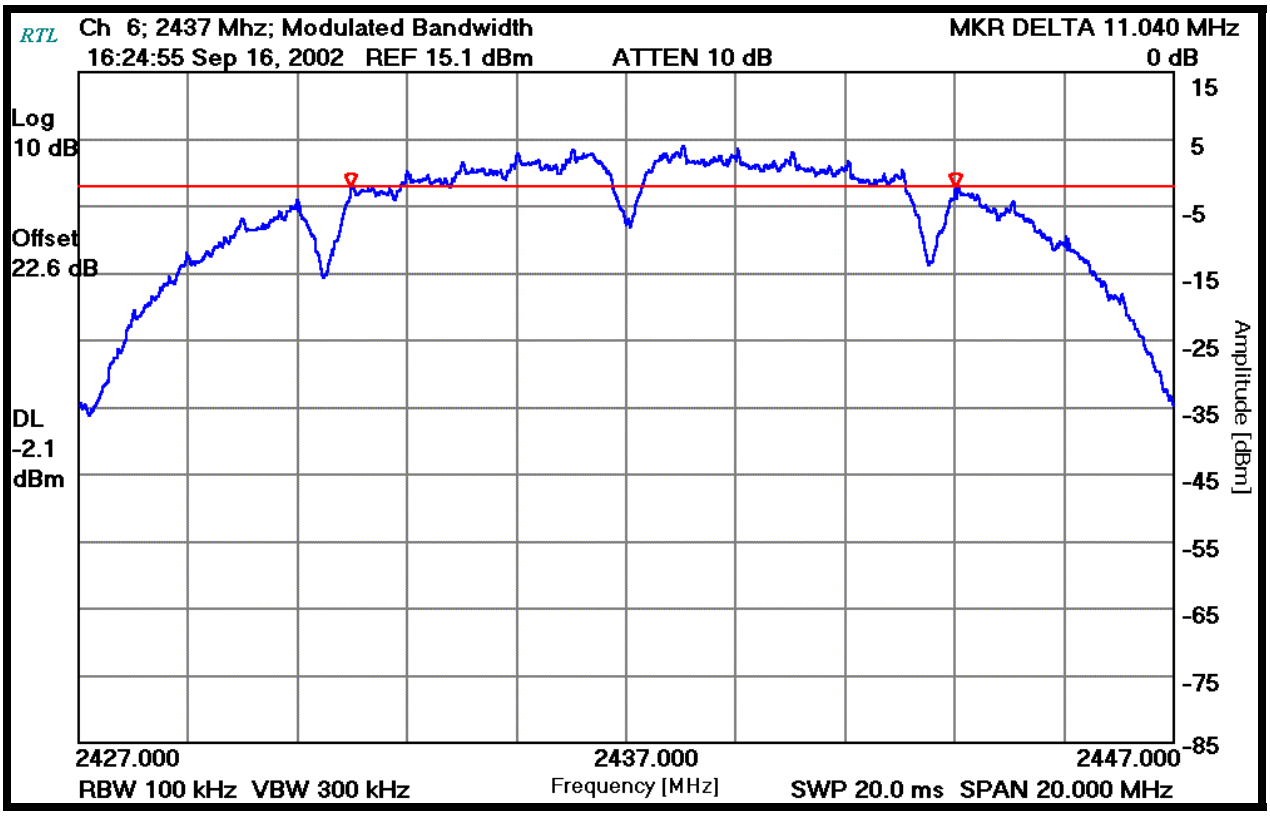


TEST PERSONNEL:

Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

Channel Number:	6
Frequency (MHz):	2437
Resolution Bandwidth (kHz):	100
Video Bandwidth (kHz):	300
Sweep Time (ms):	20.0

PLOT 7-2: MODULATED BANDWIDTH CHANNEL 6

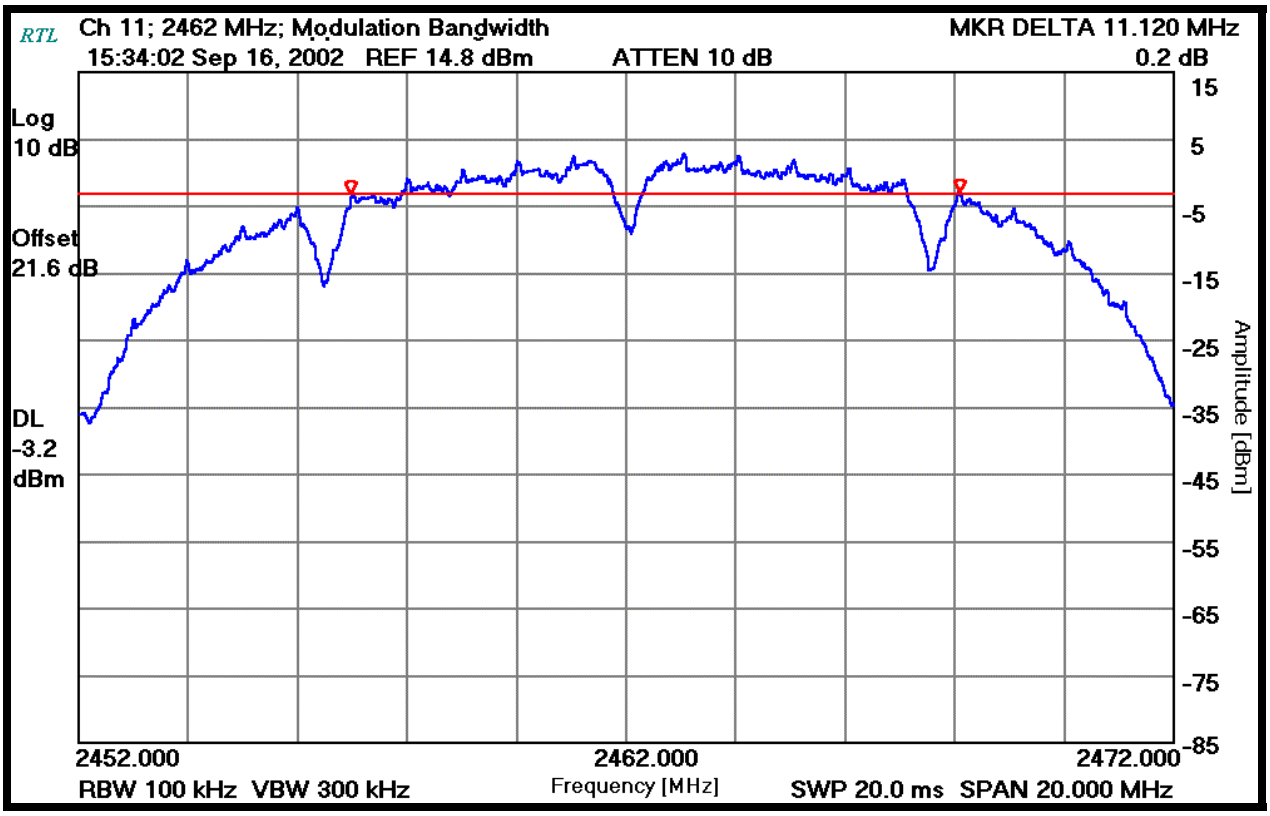


TEST PERSONNEL:

Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

Channel Number:	11
Frequency (MHz):	2462
Resolution Bandwidth (kHz):	100
Video Bandwidth (kHz):	300
Sweep Time (ms):	20.0

PLOT 7-3: MODULATED BANDWIDTH CHANNEL 11



TEST PERSONNEL:

Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

8 PEAK OUTPUT POWER - §15.247(B)(1)

8.1 POWER OUTPUT TEST PROCEDURE

A conducted power measurement of the EUT was measured using an Agilent 4416A EPM-P Series Power Meter with a E9323A Peak and Average Power Sensor. The conducted power test was measured directly from the EUT RF antenna port; the data presented represents both the metal and plastic housing configurations.

8.2 POWER OUTPUT TEST EQUIPMENT

TABLE 8-1: POWER OUTPUT TEST EQUIPMENT

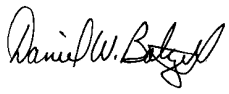
RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER	CALIBRATION DUE DATE
901186	Agilent Technologies	E9323A (50MHz-6GHz)	Peak & Avg. Power Sensor	US40410380	6/25/02
901184	Agilent Technologies	E4416A	EPM-P Power Meter, single channel	GB41050573	7/5/02

8.3 POWER OUTPUT TEST DATA

TABLE 8-2: POWER OUTPUT TEST DATA

FREQUENCY (MHZ)	CHANNEL	PEAK POWER CONDUCTED OUTPUT (dBm)
2412	1	15.42
2437	6	15.25
2462	11	15.68

TEST PERSONNEL:



Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

9 ANTENNA CONDUCTED SPURIOUS EMISSIONS - §15.247(C)

9.1 ANTENNA CONDUCTED SPURIOUS EMISSIONS TEST PROCEDURES

Antenna spurious emission per FCC 15.247(c) was measured from the EUT antenna port using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 300 kHz. The modulated carrier was identified at 2.412GHz for Channel 1, 2.437GHz for Channel 6 and 2.462GHz for Channel 11. No other harmonics or spurs were found within 20 dB of the carrier level from 9kHz to the carrier 10th harmonic. See the antenna conducted spurious noise table. Channels 1, 6, and 11 were investigated and tested. The notch filter listed was found to have no effect on corrected emission levels so it was not used in data presented. The antenna conducted spurious emission test was measured directly from the EUT RF antenna port; the data presented represents both the metal and plastic housing configurations.

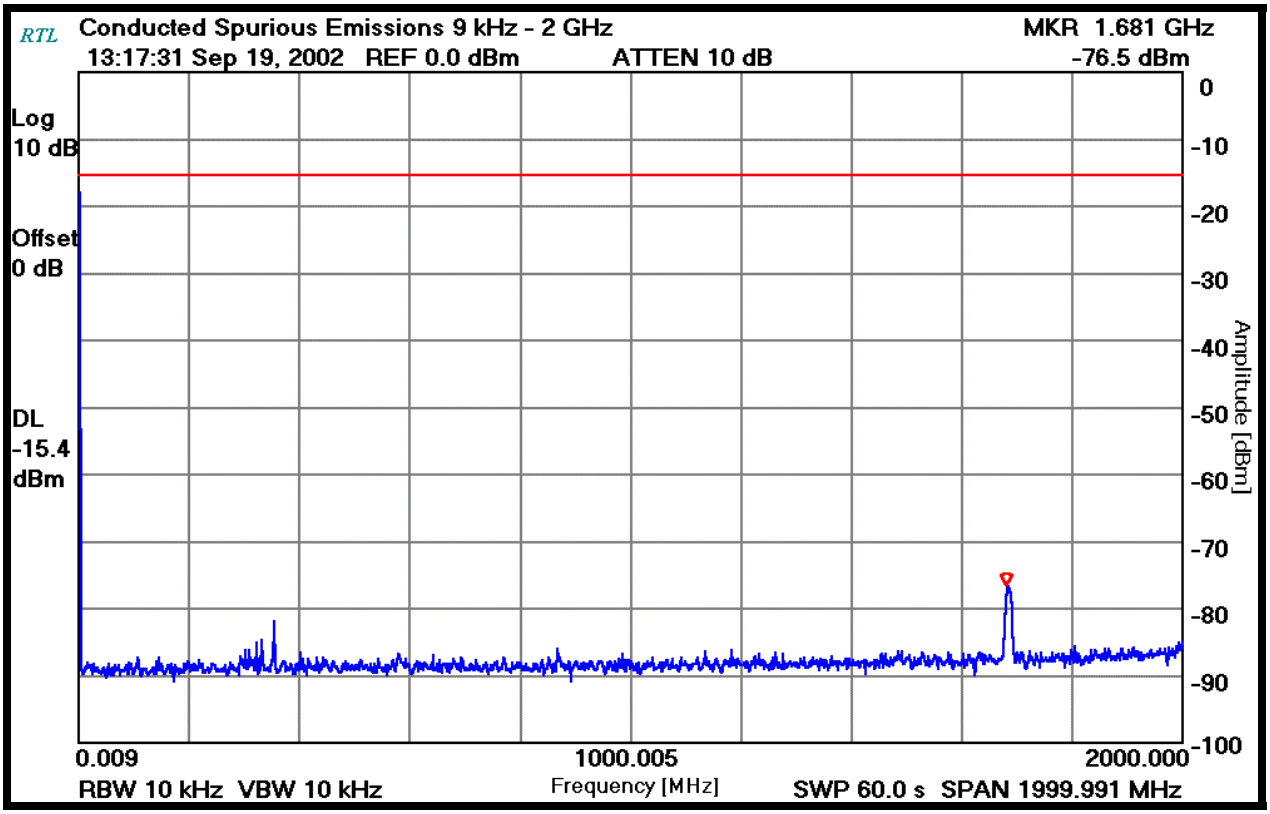
9.2 ANTENNA CONDUCTED SPURIOUS TEST EQUIPMENT

TABLE 9-1: ANTENNA CONDUCTED SPURIOUS TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100Hz – 22 GHz)	3138A07771	5/10/03
901137	Par Electronics	2.4-2.4850 GHz	Notch Filter	N/A	N/A

9.3 ANTENNA CONDUCTED SPURIOUS DATA PLOTS

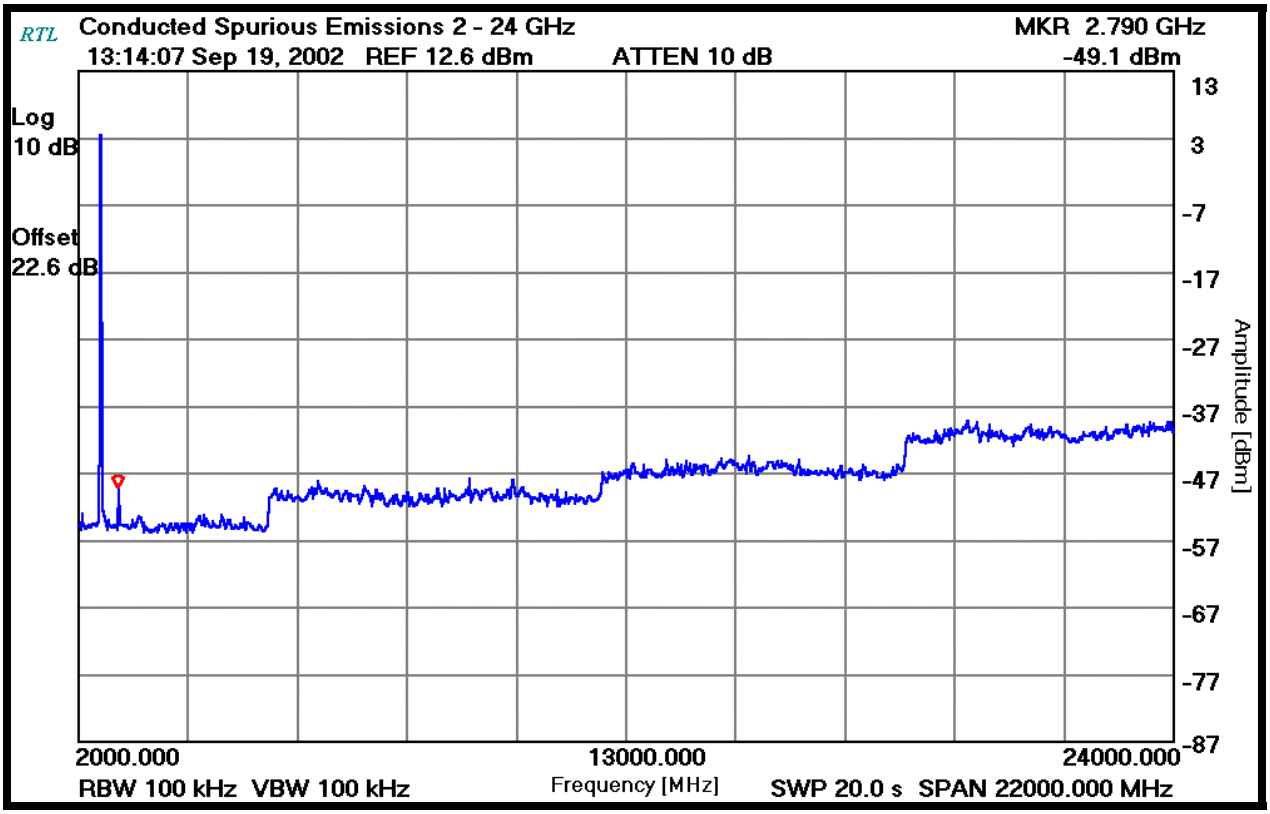
PLOT 9-1: ANTENNA CONDUCTED SPURIOUS (9 KHZ-2 GHZ) CHANNEL 6



TEST PERSONNEL:

Daniel W. Baltzell		September 19, 2002
EMC Test Engineer	Signature	Date Of Test

PLOT 9-2: ANTENNA CONDUCTED SPURIOUS (2-24 GHZ) CHANNEL 6



TEST PERSONNEL:

Daniel W. Baltzell		September 19, 2002
EMC Test Engineer	Signature	Date Of Test

9.4 ANTENNA CONDUCTED SPURIOUS EMISSIONS CHANNEL 1

Operating Frequency (MHz): 2412
Channel: 1
Measured Level at 100kHz (dBm): 5.7
Limit (dBm): -14.3

TABLE 9-2: ANTENNA CONDUCTED SPURIOUS EMISSIONS CHANNEL 1

Frequency (MHz)	Measured Level (dBm)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
351.000	-75.5	81.2	20.0	-61.2
1661.400	-69.4	63.7	20.0	-43.7
2037.730	-62.8	68.5	20.0	-48.5
2786.270	-66.1	71.8	20.0	-51.8
4824.000	-72.2	77.9	20.0	-57.9
7236.000	-74.7	78.7	20.0	-58.7
9648.000	-73.3	77.3	20.0	-57.3
12060.000	-71.7	75.7	20.0	-55.7
14472.000	-68.1	72.1	20.0	-52.1
16884.000	-68.0	72.0	20.0	-52.0
19296.000	-62.5	66.5	20.0	-46.5
21708.000	-62.6	66.6	20.0	-46.6
24120.000	-67.0	71.0	20.0	-51.0

TEST PERSONNEL:

Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

9.5 ANTENNA CONDUCTED SPURIOUS EMISSIONS CHANNEL 6

Operating Frequency (MHz): 2437
Channel: 6
Measured Level at 100kHz (dBm): 4
Limit (dBm): -16

TABLE 9-3: ANTENNA CONDUCTED SPURIOUS EMISSIONS CHANNEL 6

Frequency (MHz)	Measured Level (dBm)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
352.000	-79.2	83.8	20.0	-63.8
1686.400	-65.3	69.9	20.0	-49.9
2062.730	-72.5	77.1	20.0	-57.1
2811.270	-49.1	53.7	20.0	-33.7
4874.000	-72.5	77.1	20.0	-57.1
7311.000	-72.9	76.9	20.0	-56.9
9748.000	-74.1	78.1	20.0	-58.1
12185.000	-74.8	78.8	20.0	-58.8
14622.000	-69.3	73.3	20.0	-53.3
17059.000	-71.1	75.1	20.0	-55.1
19496.000	-64.2	68.2	20.0	-48.2
21933.000	-66.6	70.6	20.0	-50.6
24370.000	-63.3	67.3	20.0	-47.3

TEST PERSONNEL:

Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

9.6 ANTENNA CONDUCTED SPURIOUS EMISSIONS CHANNEL 11

Operating Frequency (MHz): 2462
Channel: 11
Measured Level at 100kHz (dBm): 5
Limit (dBc): -15

TABLE 9-4: ANTENNA CONDUCTED SPURIOUS EMISSIONS CHANNEL 11

Frequency (MHz)	Measured Level (dBm)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
1711.400	-66.6	71.3	20.0	-51.3
2087.730	-55.4	60.1	20.0	-40.1
2836.270	-49.5	54.2	20.0	-34.2
4924.000	-71.7	76.4	20.0	-56.4
7386.000	-73.7	78.7	20.0	-58.7
9848.000	-70.7	75.7	20.0	-55.7
12310.000	-79.0	84.0	20.0	-64.0
14772.000	-78.5	83.5	20.0	-63.5
17234.000	-79.8	84.8	20.0	-64.8
19696.000	-75.4	80.4	20.0	-60.4
22158.000	-75.6	80.6	20.0	-60.6
24620.000	-71.8	76.8	20.0	-56.8

TEST PERSONNEL:

Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

10 POWER SPECTRAL DENSITY - §15.247(D)

10.1 POWER SPECTRAL DENSITY TEST PROCEDURE

The Power spectral density per FCC 15.247(d) was measured using a 50 ohm spectrum analyzer with the resolution bandwidth set at 3 kHz, the video bandwidth set at 300 kHz, and the sweep time set at 1000 seconds. The spectral lines were resolved for the modulated carriers at 2.412GHz, 2.437GHz, and 2.462GHz respectively. These levels are below the +8 dBm limit. See the power spectral density table and plots. The power spectral density test was measured directly from the EUT RF antenna port; the data presented represents both the metal and plastic housing configurations.

10.2 POWER SPECTRAL DENSITY TEST EQUIPMENT

TABLE 10-1: POWER SPECTRAL DENSITY TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	HP	8566B	Spectrum Analyzer (100Hz – 22 GHz)	3138A07771	5/10/03

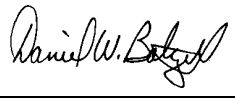
10.3 POWER SPECTRAL DENSITY TEST DATA

Operating Frequency (MHz): 2412, 2437 & 2462
Channel: 1, 6 & 11
Measured Cond. Pwr. (dBm): 15.4; 15.3; 15.7
Modulation Bandwidth (MHz): 13.3; 11.0; 11.1
Limit (dBm): 8

TABLE 10-2: POWER SPECTRAL DENSITY TEST DATA

CHANNEL	POWER SPECTRAL DENSITY LIMIT = +8dBm
1	-10.3
6	-9.0
11	-8.8

TEST PERSONNEL:

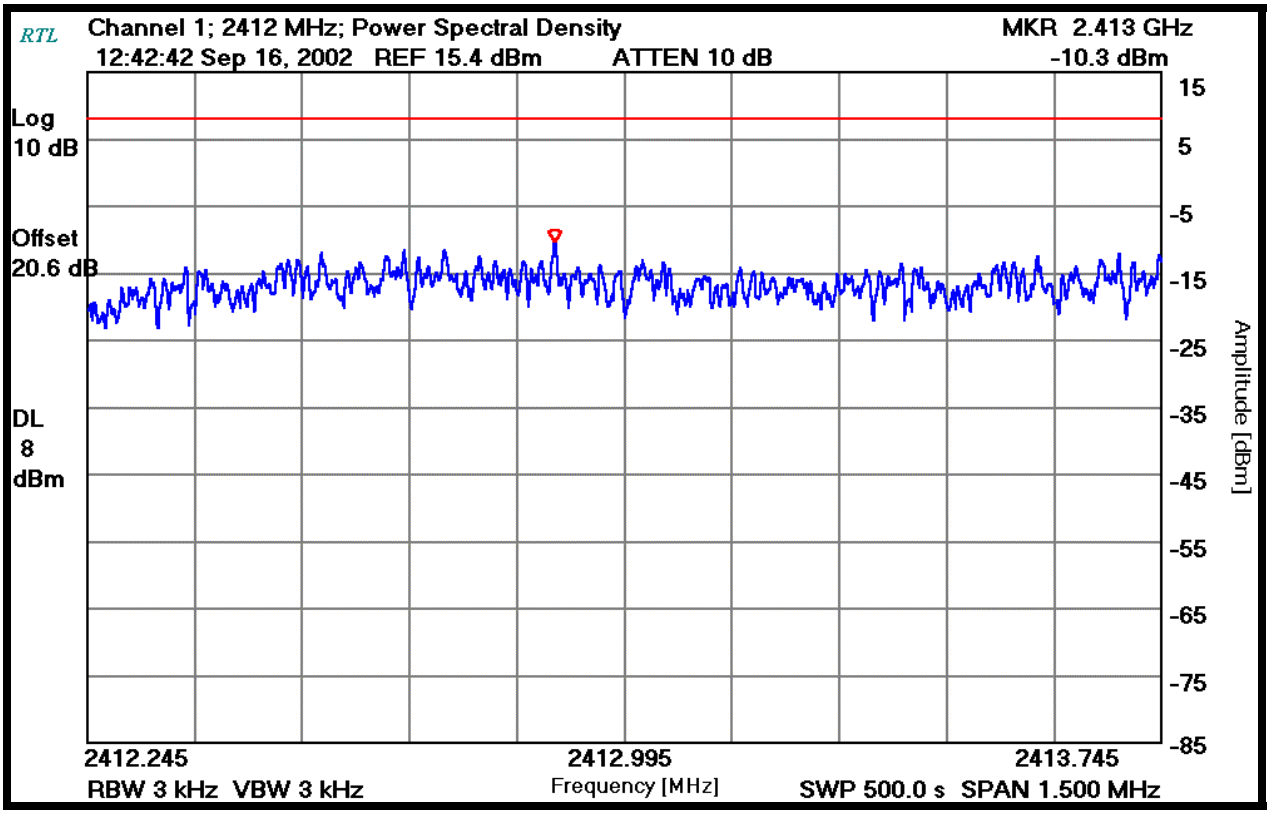


Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

10.4 POWER SPECTRAL DENSITY PLOTS

Operating Frequency (MHz):	2412
Channel:	1
Measured Cond. Pwr. (dBm):	15.42
Bandwidth Resolution (kHz):	3
Bandwidth Video (kHz):	3
Sweep Time (sec.):	500.0

PLOT 10-1: POWER SPECTRAL DENSITY: CHANNEL 1

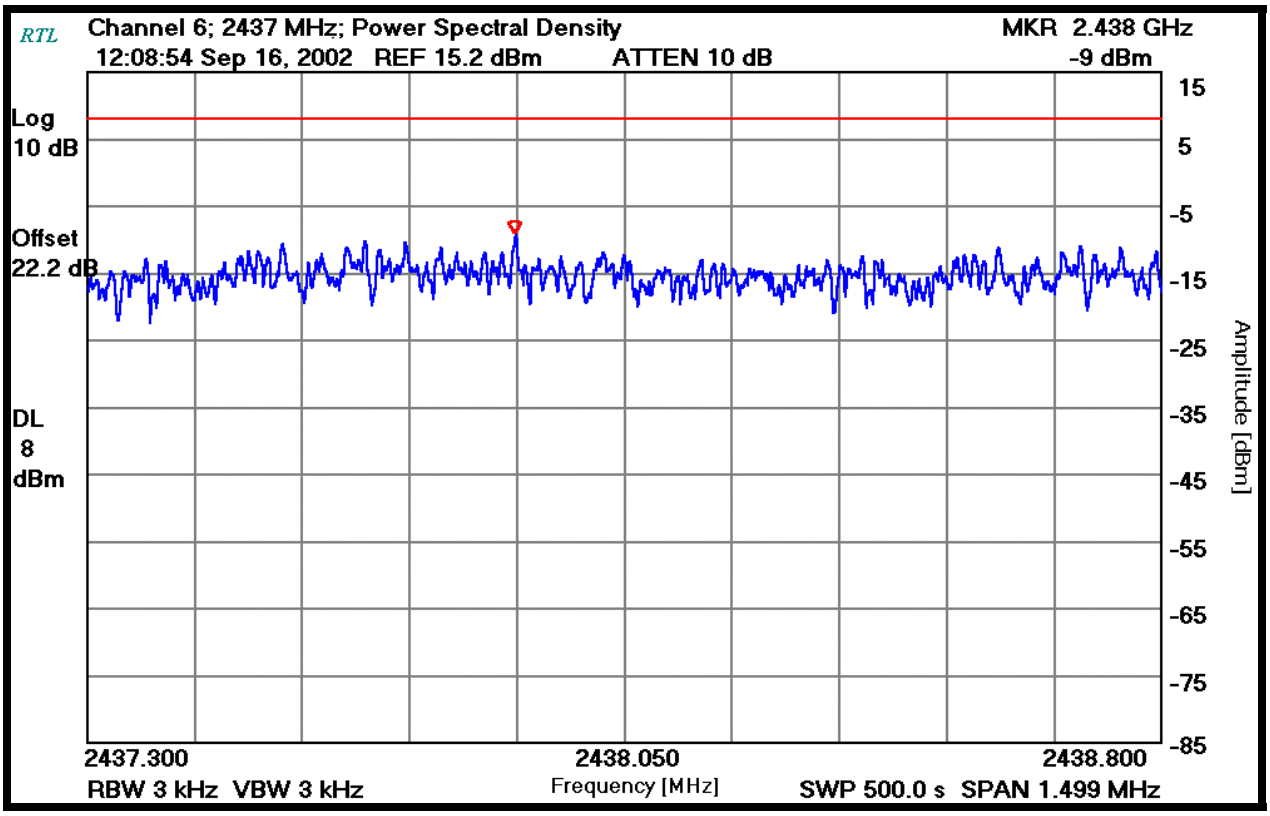


TEST PERSONNEL:

Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

Operating Frequency (MHz):	2437
Channel:	6
Measured Cond. Pwr. (dBm):	15.25
Bandwidth Resolution (kHz):	3
Bandwidth Video (kHz):	3
Sweep Time (sec.):	500.0

PLOT 10-2: POWER SPECTRAL DENSITY: CHANNEL 6

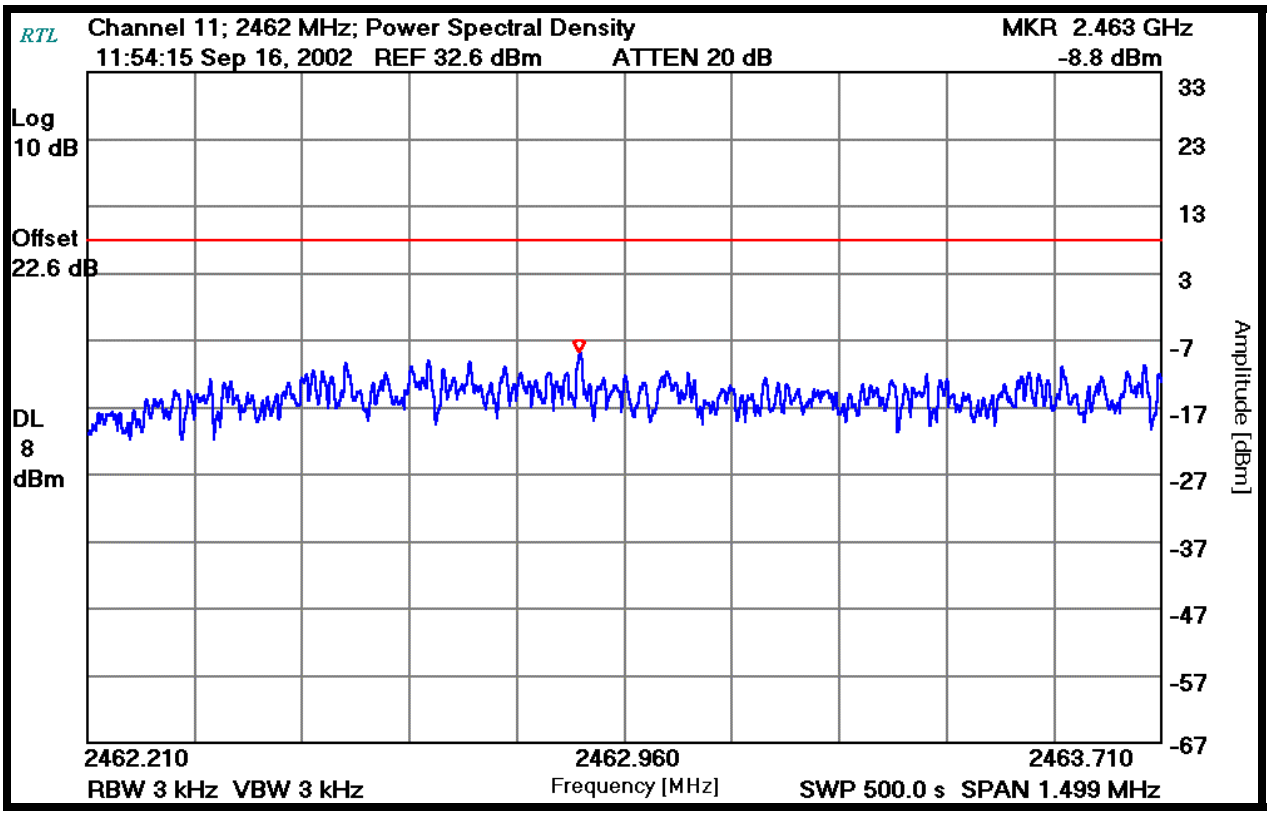


TEST PERSONNEL:

Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

Operating Frequency (MHz):	2462
Channel:	11
Measured Cond. Pwr. (dBm):	18.1
Bandwidth Resolution (kHz):	3
Bandwidth Video (kHz):	3
Sweep Time (sec.):	500.0

PLOT 10-3: POWER SPECTRAL DENSITY: CHANNEL 11



TEST PERSONNEL:

Daniel W. Baltzell		September 16, 2002
EMC Test Engineer	Signature	Date Of Test

11 CONCLUSION

The data in this measurement report shows that the Monarch Marking Systems, Inc. dba Paxar Corporation, wireless print server, Model: 7410, FCC ID: GU67410, complies with all the requirements of Parts 2 and 15 of the FCC Rules and Industry Canada RSS-210. This print server can be used inside a printer with a plastic housing or inside a printer with a metal housing, with either a right angle antenna or a stub antenna. It is the intention of Paxar to continue to use the Model 7410 wireless print server in similar printers with either a plastic or metal housing.