Engineering and Testing for EMC and Safety Compliance

CERTIFICATION APPLICATION REPORT
FCC PART 15.247

Test Lab	Applicant
Rhein Tech Laboratories, Inc. Phone: 703-689-0368 360 Herndon Parkway Fax: 703-689-2056 Suite 1400 Web Site:www.rheintech.com Herndon, VA 20170 E-Mail: ATCBINFO@rheintech.com	3e Technologies International, Inc. Phone: 301-944-1410 700 King Farm Blvd. Fax: 301-670-6989 Rockville, MD 20850 Email: fli@3eti.com Contact: Frank Li

FCC ID:	QVT-528	**GRANTEE FRN NUMBER:**	0003583150
PLATFORM:	N/A	**RTL WORK ORDER NUMBER:**	2004120
MODEL(S):	3e-528	**RTL QUOTE NUMBER:**	QRTL04-198
DATE OF TEST REPORT:	February 14, 2005		

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
Digital Interface Information	Digital Interface was found to be compliant

Frequency Range (MHz)	Output Power* (W)	Frequency Tolerance	Emission Designator
2412-2462	0.060	N/A	N/A

* output power is maximum peak conducted

I, 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, FCC 97-114, and ANSI C63.4.

Signature: _____ Date: February 14, 2005

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 2003).

1.3 RELATED SUBMITTAL(S)/GRANT(S)

This is an original application for Certification for 3e Technologies International, Inc. Model 3e-528, Multi-port Wireless Video Server, FCC ID: QVT-528. The IF, LO, and up to the 2nd LO, were investigated and tested, and a separate DoC has been prepared which details passing digital testing information.

Three modularly approved 802.11g radios are included in this device: FCC ID QVT-WLAN-MP1.

1.4 MODIFICATIONS

No modifications were made to the EUT.

2 TEST INFORMATION

2.1 TEST JUSTIFICATION

The EUT was tested in all three orthogonal planes in order to determine worst-case emissions. 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 is presented in this report.

The EUT uses a 5 dBi omni antenna connected to the Local Antenna Port and transmits and receives 802.11b, which is the device tested in this report. The EUT also contains three previously modularly approved 801.11g radios (FCC ID QVT-WLAN-MP1). The 802.11g modularly approved devices were transmitting simultaneously while data was obtained for this report to account for intermod and any additional spurious emissions.

Data rates of 1 Mbps, 2 Mbps, 5.5 Mbps, and 11 Mbps were investigated and found to be in compliance; data for 11 Mbps is shown in this report. 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. There were no deviations from the test standard(s) and/or methods. The test results reported relate only to the item tested.

2.3 TEST RESULT SUMMARY

TABLE 2-1: TEST RESULT SUMMARY FOR 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 test sample was received on August 6, 2004. The FCC identifiers for all applicable equipment, plus descriptions of all cables used in the tested system, are identified in Table 2-2.

TABLE 2-2: EQUIPMENT UNDER TEST (EUT)

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
Videon Server	3e Technologies International	3e-528	00005	QVT-528	1m unshielded serial, 2m unshielded power	016090
Antenna	N/A	5 dBi	NA	NA	N/A	016095
Laptop	Dell	PPOIL	TW-09F775-12800-16K-7819	NA	2m shielded RJ-45 CAT5 network	016091

2.5 CONFIGURATION OF TESTED SYSTEM

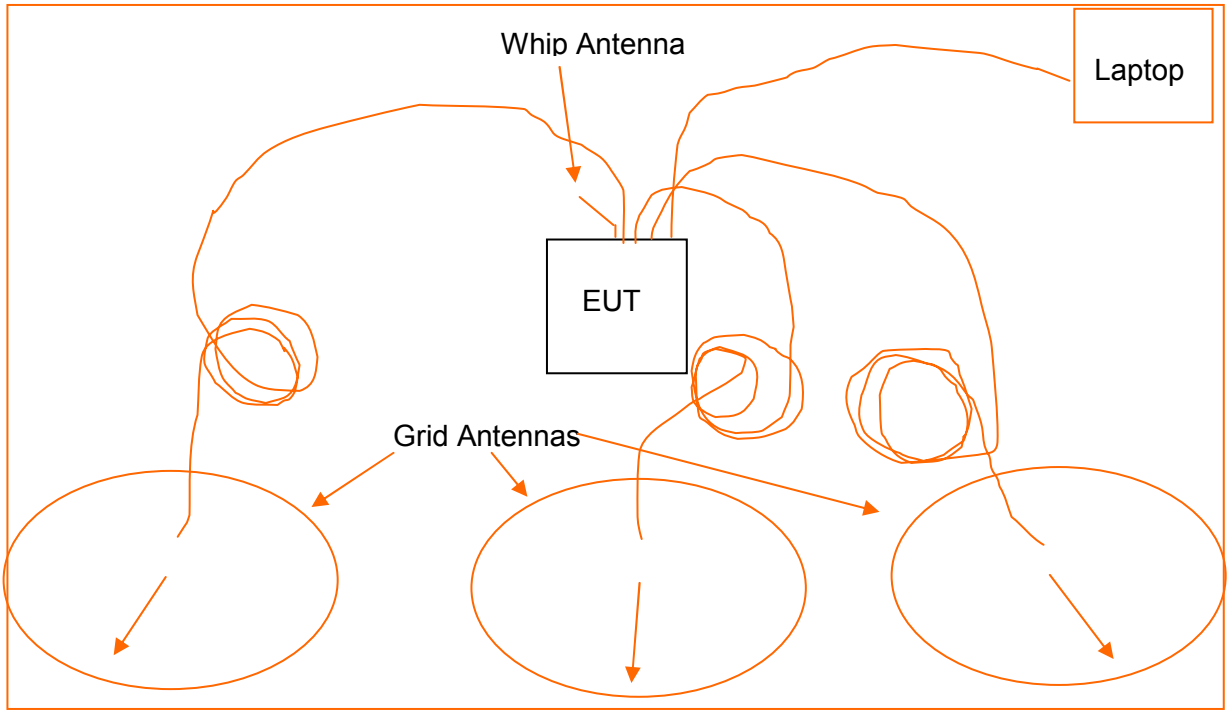


FIGURE 2-1: WORST CASE CONFIGURATION OF SYSTEM UNDER TEST

3 COMPLIANCE WITH FCC §15.31(M)

In accordance with FCC 15.31(m), and because the EUT utilizes an operating band greater than 10 MHz, three frequencies were investigated and tested: 2412 MHz, 2437 MHz, and 2462 MHz.

4 COMPLIANCE WITH FCC §15.203

The device will be professionally installed.

5 COMPLIANCE WITH FCC §15.204

Please see Appendix B for antenna specifications.

6 COMPLIANCE WITH THE BAND EDGE – FCC §15.247(C), §15.205

6.1 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 operation.

6.2 BAND EDGE TEST EQUIPMENT

TABLE 6-1: BAND EDGE TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901215	Hewlett Packard	8596EM	Spectrum Analyze (9 kHz - 12.8 GHz)r	3826A00144	9/8/05
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	5/20/07

6.3 RESTRICTED BAND EDGE PLOTS

Calculation of Upper Band Edge

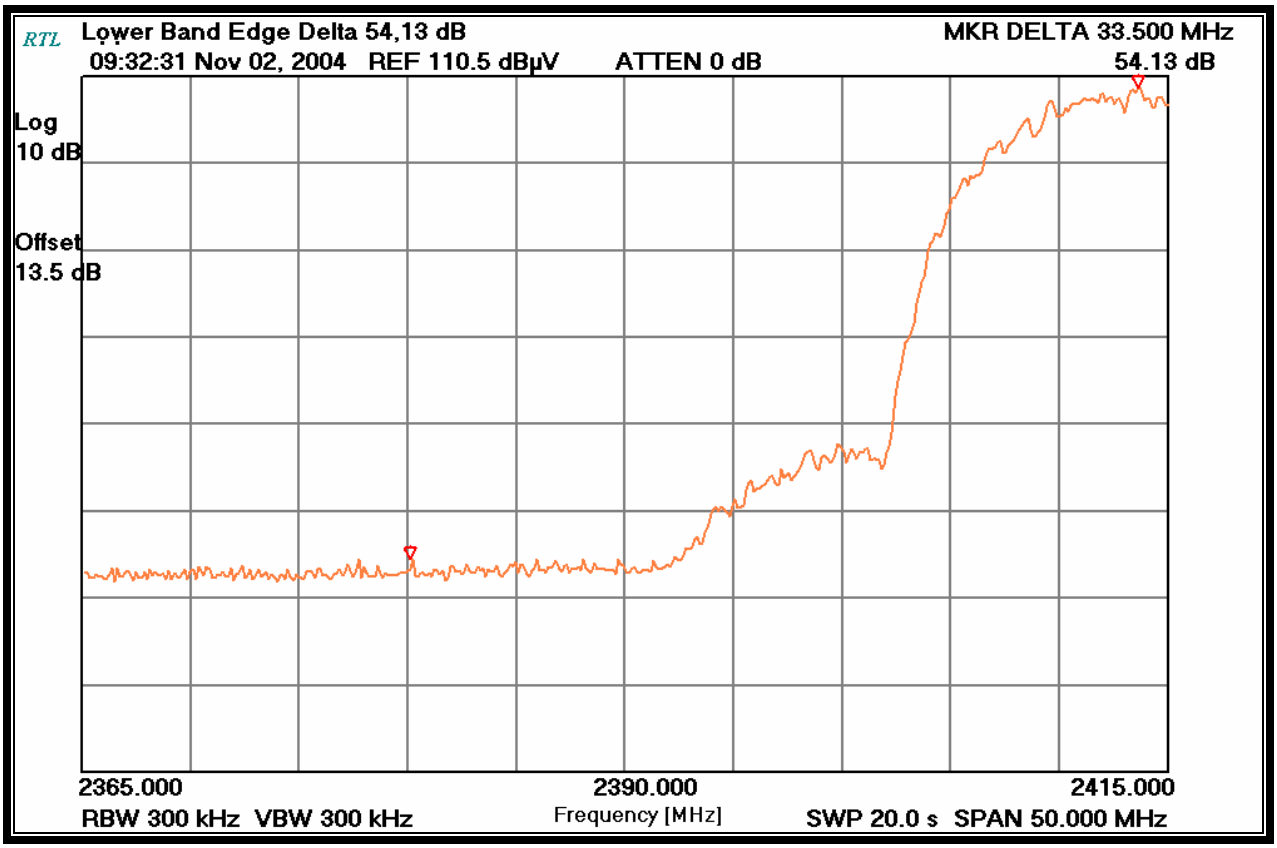
The level 103.6 dBuV/m is the average field strength measurement, from which the delta measurement of 54.1 dB is subtracted (reference plots), which is equivalent to a level of 49.5 dB. This level has a margin of 4.5 dB below the limit of 54 dBuV/m.

Calculation: 103.6 dBuV/m – 54.1 dB – 54 dBuV/m = -4.5 dB

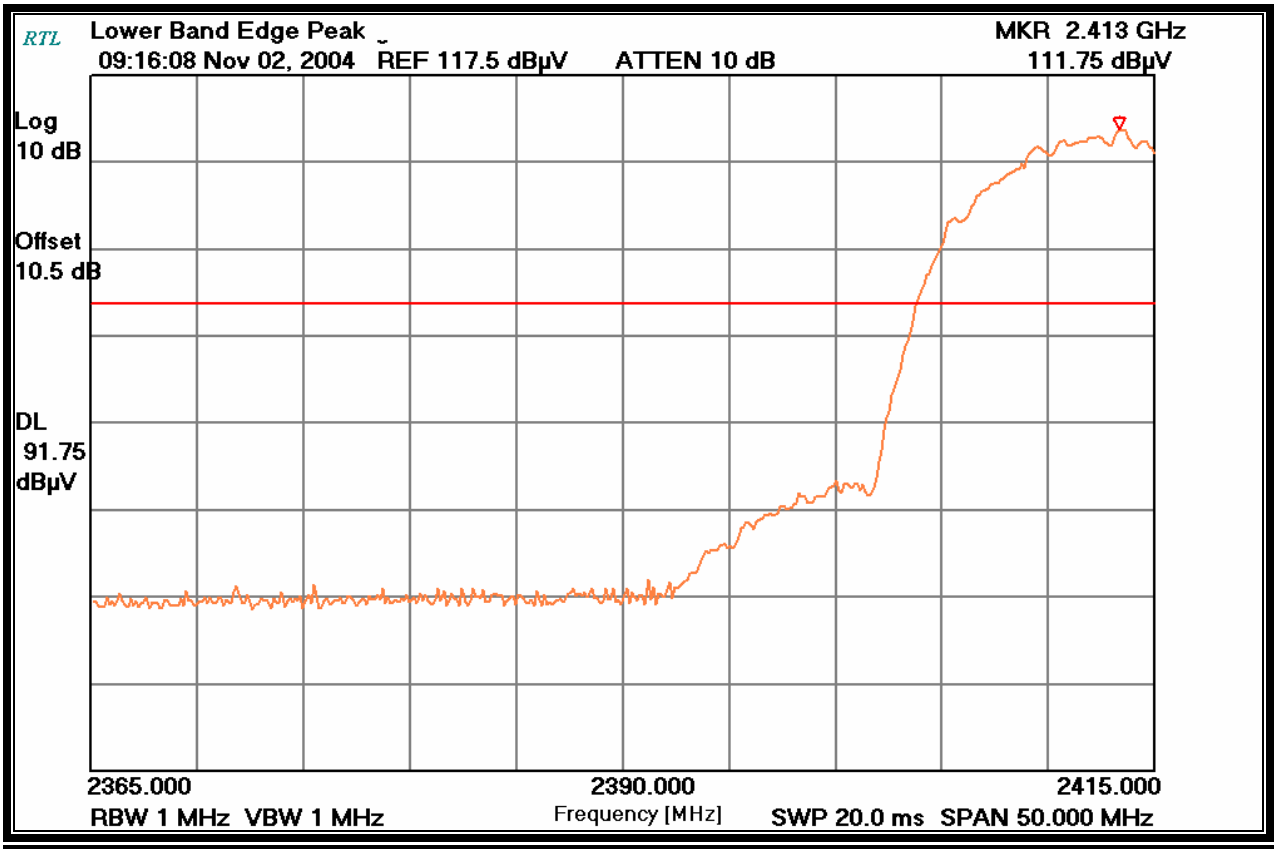
Peak field strength of Upper Band Edge (1 MHz RBW/1 MHz VBW) = 111.8 dBuV/m
Average field strength of Upper Band Edge (1 MHz RBW/10 Hz VBW) = 103.6 dBuV/m

Delta measurement = 54.1 dB

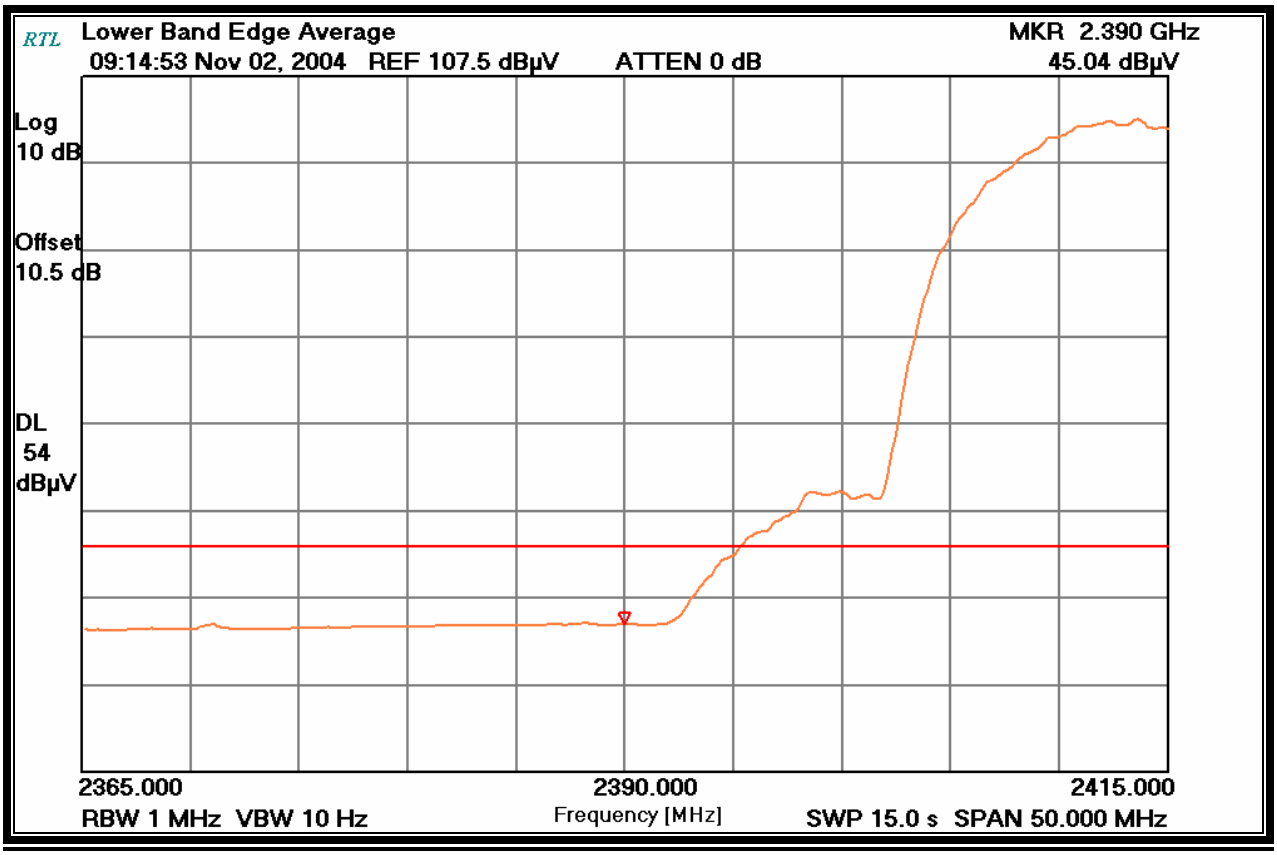
PLOT 6-1: LOWER BAND EDGE: MARKER-DELTA METHOD (TX FREQUENCY: 2412 MHZ)



PLOT 6-2: LOWER BAND EDGE: PEAK MEASUREMENT (TX FREQUENCY: 2412 MHZ)



PLOT 6-3: LOWER BAND EDGE: AVERAGE MEASUREMENT (TX FREQUENCY: 2412 MHZ)



Calculation of Upper Band Edge

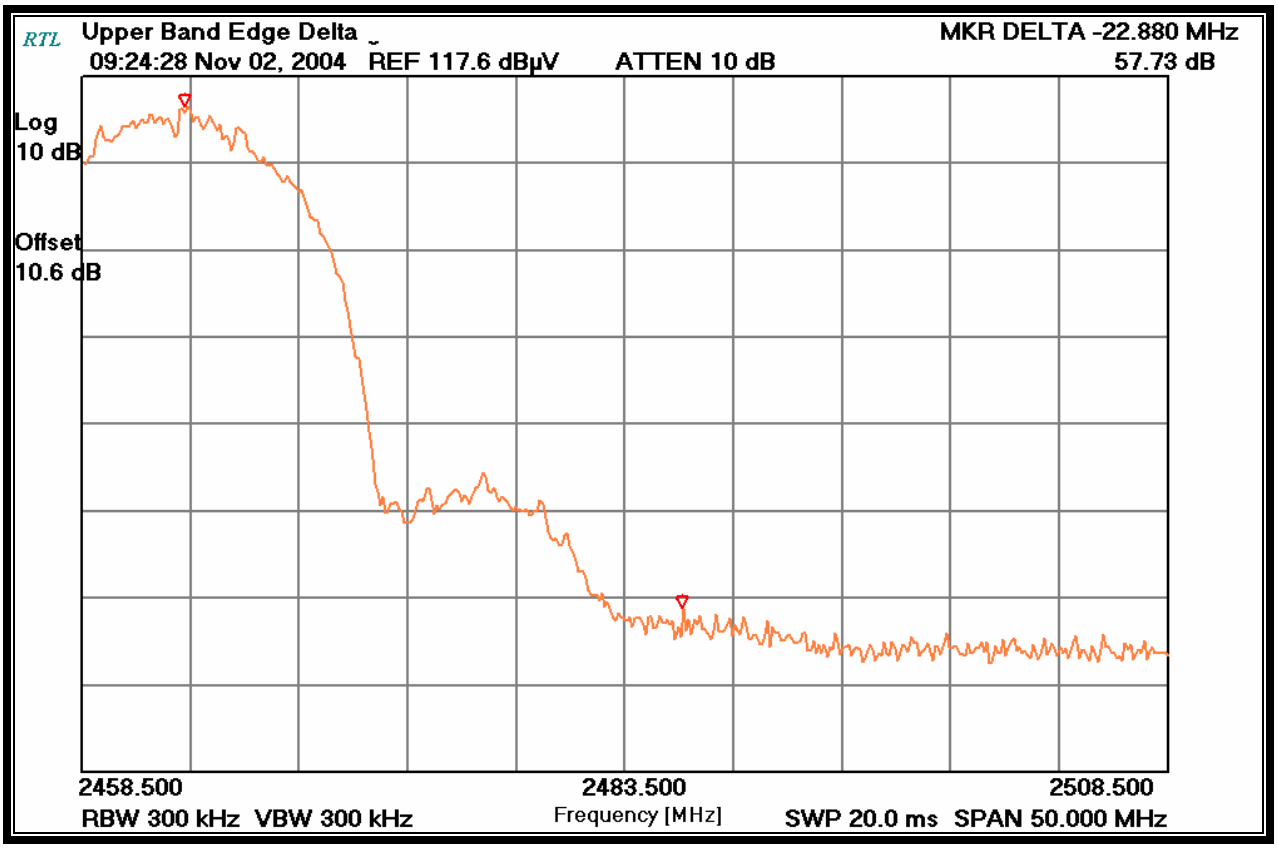
The level 108.9 dBuV/m is the average field strength measurement, from which the delta measurement of 57.7 dB is subtracted (reference plots), which is equivalent to a level of 51.2 dB. This level has a margin of 2.8 dB below the limit of 54 dBuV/m.

Calculation: 108.9 dBuV/m – 57.7 dB – 54 dBuV/m = -2.8 dB

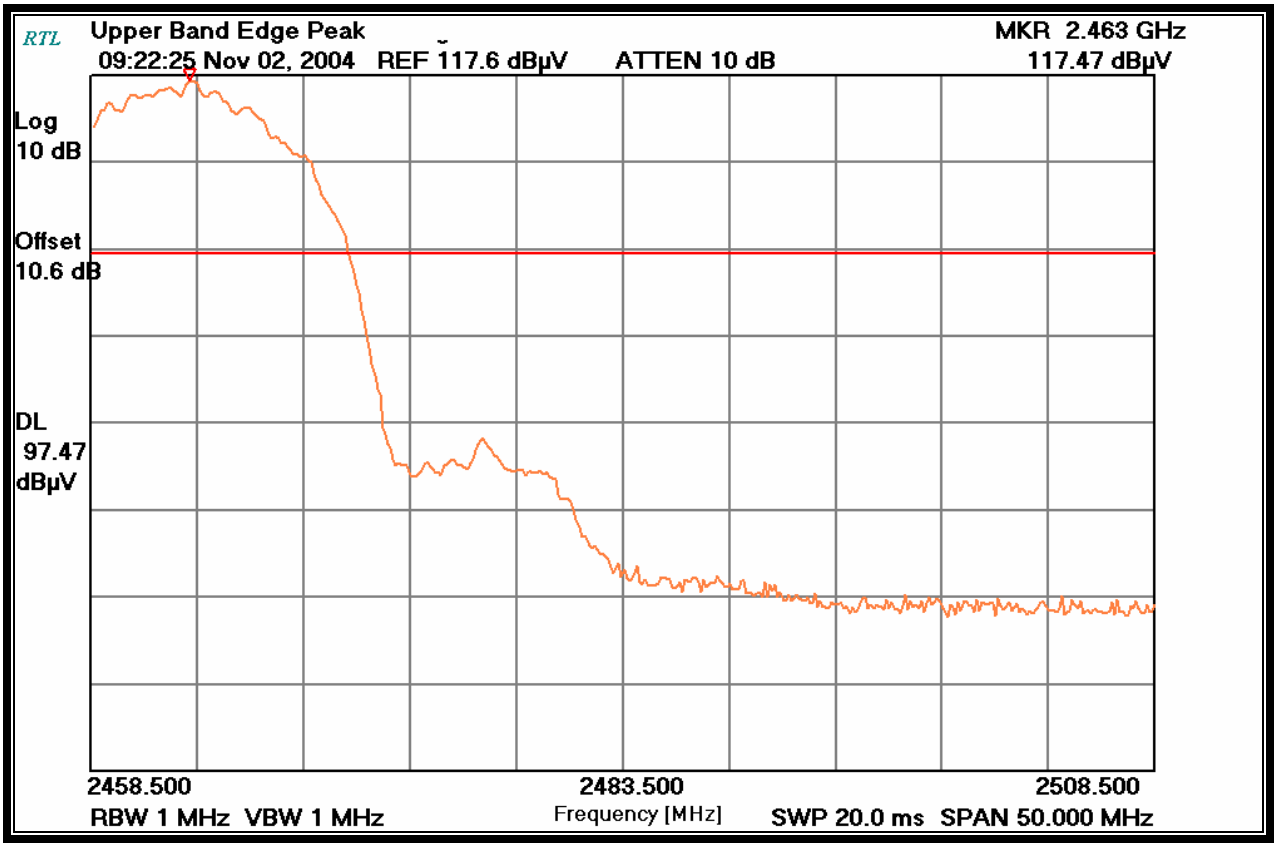
Peak field strength of Upper Band Edge (1 MHz RBW/1 MHz VBW) = 117.5 dBuV/m
Average field strength of Upper Band Edge (1 MHz RBW/10 Hz VBW) = 108.9 dBuV/m

Delta measurement = 57.7 dB

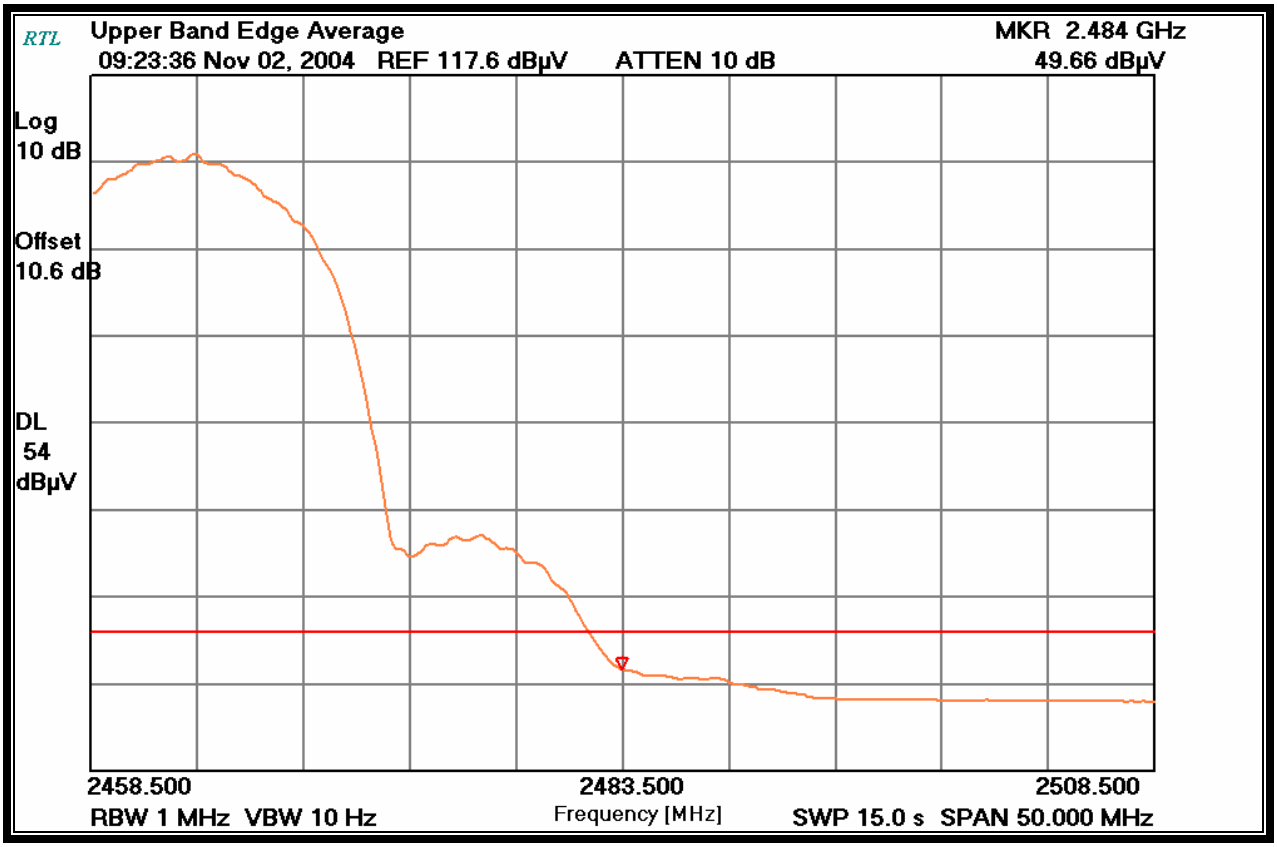
PLOT 6-4: UPPER BAND EDGE: MARKER-DELTA METHOD (TX FREQUENCY: 2462 MHZ)



PLOT 6-5: UPPER BAND EDGE: PEAK MEASUREMENT (TX FREQUENCY: 2462 MHZ)



PLOT 6-6: UPPER BAND EDGE: AVERAGE MEASUREMENT (TX FREQUENCY: 2462 MHZ)



TEST PERSONNEL

Daniel W. Baltzell	Daniel W. Baltzell	November 2, 2004
Test Engineer	Signature	Dates Of Test

7 CONDUCTED LIMITS - FCC §15.207

7.1 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 was assembled on a wooden table 80 centimeters high. Power was fed to the EUT through a 50 ohm / 50 microhenry 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 high-pass filter. The filter is used to prevent overload of the spectrum analyzer from noise below 100 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 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.

7.2 CONDUCTED LINE EMISSION TEST

The conducted test was performed with the EUT exercise program loaded, and the emissions were scanned between 150 kHz to 30 MHz on the NEUTRAL SIDE and PHASE SIDE.

7.3 CONDUCTED LINE TEST EQUIPMENT

TABLE 7-1: 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	6/23/05
901083	AFJ international	LS16	16A LISN	16010020080	3/24/06

7.4 CONDUCTED LINE EMISSION TEST DATA – DIGITAL RECEIVER MODE

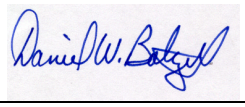
TABLE 7-2: CONDUCTED EMISSIONS (NEUTRAL SIDE); MODE: DIGITAL-RECEIVER

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.207	Av	37.7	1.6	39.3	63.3	-24.0	53.3	-14.0
0.207	Qp	45.2	1.6	46.8	63.3	-16.5	53.3	-6.5
0.278	Av	37.6	1.2	38.8	60.9	-22.1	50.9	-12.1
0.281	Qp	41.0	1.2	42.2	60.8	-18.6	50.8	-8.6
0.346	Av	33.0	1.0	34.0	59.1	-25.1	49.1	-15.1
0.346	Qp	36.5	1.0	37.5	59.1	-21.6	49.1	-11.6
4.480	Pk	41.1	1.9	43.0	56.0	-13.0	46.0	-3.0
13.630	Pk	31.8	3.3	35.1	60.0	-24.9	50.0	-14.9
23.360	Pk	20.6	4.2	24.8	60.0	-35.2	50.0	-25.2

TABLE 7-3: CONDUCTED EMISSIONS (PHASE SIDE); MODE: DIGITAL-RECEIVER

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.208	Av	36.1	1.6	37.7	63.3	-25.6	53.3	-15.6
0.212	Qp	42.7	1.6	44.3	63.1	-18.8	53.1	-8.8
0.277	Av	36.6	1.2	37.8	60.9	-23.1	50.9	-13.1
0.279	Qp	41.7	1.2	42.9	60.8	-17.9	50.8	-7.9
0.345	Av	32.7	1.0	33.7	59.1	-25.4	49.1	-15.4
0.350	Qp	35.1	1.0	36.1	59.0	-22.9	49.0	-12.9
4.450	Pk	41.7	1.9	43.6	56.0	-12.4	46.0	-2.4
9.440	Pk	34.7	2.6	37.3	60.0	-22.7	50.0	-12.7
23.510	Pk	22.0	4.2	26.2	60.0	-33.8	50.0	-23.8

TEST PERSONNEL



Daniel W. Baltzell		November 2, 2004
EMC Test Engineer	Signature	Date Of Test

7.5 CONDUCTED LINE EMISSION TEST DATA – CHANNEL 1 TRANSMIT

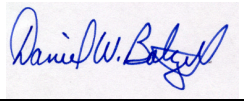
TABLE 7-4: CONDUCTED EMISSIONS (NEUTRAL SIDE); MODE: CH 1 TRANSMIT

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.206	Qp	44.3	1.6	45.9	63.4	-17.5	53.4	-7.5
0.207	Av	38.5	1.6	40.1	63.3	-23.2	53.3	-13.2
0.220	Qp	50.1	1.5	51.6	62.8	-11.2	52.8	-1.2
0.220	Av	30.8	1.5	32.3	62.8	-30.5	52.8	-20.5
0.423	Pk	44.7	1.0	45.7	57.4	-11.7	47.4	-1.7
2.450	Pk	37.9	1.5	39.4	56.0	-16.6	46.0	-6.6
9.350	Pk	29.6	2.6	32.2	60.0	-27.8	50.0	-17.8
24.190	Pk	21.6	4.2	25.8	60.0	-34.2	50.0	-24.2

TABLE 7-5: CONDUCTED EMISSIONS (PHASE SIDE); MODE: CH 1 TRANSMIT

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.205	Av	34.1	1.6	35.7	63.4	-27.7	53.4	-17.7
0.206	Qp	48.5	1.6	50.1	63.4	-13.3	53.4	-3.3
0.273	Av	35.3	1.2	36.5	61.0	-24.5	51.0	-14.5
0.273	Qp	45.9	1.2	47.1	61.0	-13.9	51.0	-3.9
0.410	Pk	43.1	1.0	44.1	57.6	-13.5	47.6	-3.5
0.530	Pk	38.9	0.8	39.7	56.0	-16.3	46.0	-6.3
9.080	Pk	39.6	2.6	42.2	60.0	-17.8	50.0	-7.8
23.600	Pk	20.0	4.2	24.2	60.0	-35.8	50.0	-25.8

TEST PERSONNEL



Daniel W. Baltzell		November 2, 2004
EMC Test Engineer	Signature	Date Of Test

7.6 CONDUCTED LINE EMISSION TEST DATA – CHANNEL 6 TRANSMIT

TABLE 7-6: CONDUCTED EMISSIONS (NEUTRAL SIDE); MODE: CH 6 TRANSMIT

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.207	Av	39.6	1.6	41.2	63.3	-22.1	53.3	-12.1
0.207	Qp	45.0	1.6	46.6	63.3	-16.7	53.3	-6.7
0.346	Qp	34.4	1.0	35.4	59.1	-23.7	49.1	-13.7
0.346	Av	33.5	1.0	34.5	59.1	-24.6	49.1	-14.6
0.413	Pk	45.6	1.0	46.6	57.6	-11.0	47.6	-1.0
0.680	Pk	39.5	0.9	40.4	56.0	-15.6	46.0	-5.6
9.730	Pk	29.6	2.7	32.3	60.0	-27.7	50.0	-17.7
23.070	Pk	23.6	4.2	27.8	60.0	-32.2	50.0	-22.2

TABLE 7-7: CONDUCTED EMISSIONS (PHASE SIDE); MODE: CH 6 TRANSMIT

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.278	Qp	42.4	1.2	43.6	60.9	-17.3	50.9	-7.3
0.278	Av	36.5	1.2	37.7	60.9	-23.2	50.9	-13.2
0.346	Av	33.2	1.0	34.2	59.1	-24.9	49.1	-14.9
0.346	Qp	36.4	1.0	37.4	59.1	-21.7	49.1	-11.7
0.444	Pk	39.0	0.9	39.9	57.0	-17.1	47.0	-7.1
4.570	Pk	41.0	1.9	42.9	56.0	-13.1	46.0	-3.1
13.270	Pk	35.9	3.3	39.2	60.0	-20.8	50.0	-10.8
23.390	Pk	22.6	4.2	26.8	60.0	-33.2	50.0	-23.2

TEST PERSONNEL

Daniel W. Baltzell		November 2, 2004
EMC Test Engineer	Signature	Date Of Test

7.7 CONDUCTED LINE EMISSION TEST DATA – CHANNEL 11 TRANSMIT

TABLE 7-8: CONDUCTED EMISSIONS (NEUTRAL SIDE); MODE: CH 11 TRANSMIT

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.208	Av	40.7	1.6	42.3	63.3	-21.0	53.3	-11.0
0.208	Qp	50.5	1.6	52.1	63.3	-11.2	53.3	-1.2
0.277	Qp	46.5	1.2	47.7	60.9	-13.2	50.9	-3.2
0.277	Av	37.0	1.2	38.2	60.9	-22.7	50.9	-12.7
0.349	Pk	42.8	1.0	43.8	59.0	-15.2	49.0	-5.2
4.480	Pk	39.7	1.9	41.6	56.0	-14.4	46.0	-4.4
13.360	Pk	36.4	3.3	39.7	60.0	-20.3	50.0	-10.3
28.230	Pk	20.2	4.4	24.6	60.0	-35.4	50.0	-25.4

TABLE 7-9: CONDUCTED EMISSIONS (PHASE SIDE); MODE: CH 11 TRANSMIT

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.208	Qp	46.9	1.6	48.5	63.3	-14.8	53.3	-4.8
0.208	Av	37.9	1.6	39.5	63.3	-23.8	53.3	-13.8
0.277	Av	35.4	1.2	36.6	60.9	-24.3	50.9	-14.3
0.277	Qp	40.6	1.2	41.8	60.9	-19.1	50.9	-9.1
0.412	Pk	38.8	1.0	39.8	57.6	-17.8	47.6	-7.8
4.600	Pk	40.6	1.9	42.5	56.0	-13.5	46.0	-3.5
8.470	Pk	42.8	2.5	45.3	60.0	-14.7	50.0	-4.7
20.290	Pk	23.5	3.8	27.3	60.0	-32.7	50.0	-22.7

TEST PERSONNEL

Daniel W. Baltzell		November 2, 2004
EMC Test Engineer	Signature	Date Of Test

8 RADIATED EMISSION; DIGITAL/RECEIVER INTERFACE – FCC §15.209

8.1 DIGITAL/RECEIVER INTERFACE RADIATED EMISSION LIMITS TEST PROCEDURE

Emissions from the digital portion of the transceiver circuitry of the EUT were tested and found to comply with the requirements of FCC Part 15.209.

8.2 DIGITAL/RECEIVER INTERFACE RADIATED EMISSIONS TEST EQUIPMENT

TABLE 8-1: DIGITAL/RECEIVER INTERFACE RADIATED EMISSIONS TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900905	Rhein Tech Labs	PR-1040	Amplifier	900905	9/1/05
900969	Hewlett Packard	85650A	Quasi-Peak Adapter	2412A00414	6/23/05
901053	Schaffner Chase	CBL6112B	Bi-Log Antenna (20 MHz - 2 GHz)	2648	9/20/05
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	6/23/05

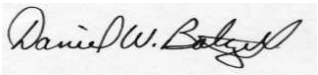
8.3 DIGITAL/RECEIVER INTERFACE RADIATED EMISSION LIMITS TEST DATA

TABLE 8-2: DIGITAL/RECEIVER INTERFACE RADIATED EMISSION

Temperature: 77°F Humidity: 90%									
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)**
263.990	Qp	H	175	2.8	48.2	-7.5	40.7	46.4	-5.7
300.027	Qp	H	305	3.5	51.0	-7.0	44.0	46.4	-2.4
307.997	Qp	H	300	2.8	50.0	-6.7	43.3	46.4	-3.1
362.989	Qp	H	120	2.2	46.9	-4.2	42.7	46.4	-3.7
395.990	Qp	H	120	2.0	48.7	-3.5	45.2	46.4	-1.2
428.986	Qp	V	170	1.0	47.1	-2.3	44.8	46.4	-1.6
494.983	Qp	V	80	1.0	42.6	-0.9	41.7	46.4	-4.7
527.990	Qp	H	130	1.8	42.6	0.8	43.4	46.4	-3.0
560.990	Qp	V	240	1.0	41.5	1.9	43.4	56.9	-13.5
626.983	Qp	V	130	1.0	38.9	3.1	42.0	56.9	-14.9
659.987	Qp	H	40	2.4	36.6	2.9	39.5	46.4	-6.9

QP: RES. =100 KHZ, VID= 100 KHZ

TEST PERSONNEL

Daniel W. Baltzell		August 12, 2004
EMC Test Engineer	Signature	Date Of Test

9 RADIATED EMISSION; SPURIOUS AND HARMONICS – FCC §15.247(C)

9.1 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 EUT was tested in the 3 orthogonal planes

9.2 RADIATED SPURIOUS TEST EQUIPMENT

TABLE 9-1: RADIATED SPURIOUS EMISSIONS TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	5/20/07
900323	EMCO	3160-7	Horn Antennas (8.2 - 12.4 GHz)	9605-1054	5/20/07
900356	EMCO	3160-08	Horn Antennas (12.4 – 18 GHz)	9607-1044	5/20/07
900325	EMCO	3160-9	Horn Antennas (18 - 26.5 GHz)	9605-1051	5/20/07
900321	EMCO	3161-03	Horn Antenna (4.0 - 8.2 GHz)	9508-1020	5/20/07
901053	Schaffner & Chase	CBL6112B	Bilog Antenna (20 MHz - 2 GHz)	2648	9/20/05
900932	Hewlett Packard	8449B	Microwave Preamplifier (1 - 26.5 GHz)	3008A00505	5/5/05
901215	Hewlett Packard	8596EM	Spectrum Analyzer (9 kHz - 12.8 GHz)	3826A00144	9/8/05
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	8/11/05
901232	IW Microwave Products	KPW-1503-2400-KPS	High Frequency RF Cables	240"	1/30/05
901235	IW Microwave Products	KPS-1503-360-KPS	High Frequency RF Cables	36"	1/30/05

9.3 RADIATED EMISSIONS HARMONICS/SPURIOUS TEST DATA

Field Strength = 104.4 – 20 = 84.4 limit for non-restricted band spurious emissions.

TABLE 9-2: RADIATED EMISSIONS HARMONICS/SPURIOUS (TX FREQUENCY: 2412 MHZ)

Emission Frequency (MHz)	Analyzer Reading (dBuV) Peak	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4824.000	44.5	4.3	48.8	54.0	-5.2
7236.000	35.5	2.8	38.3	84.4	-46.1
9648.000	36.2	8.3	44.5	84.4	-39.9
12060.000	37.5	8.4	45.9	54.0	-8.1

PEAK: RES. =1 MHZ, VID= 1MHZ

Field Strength = 103.4 – 20 = 83.4 limit for non-restricted band spurious emissions.

TABLE 9-3: RADIATED EMISSIONS HARMONICS/SPURIOUS (TX FREQUENCY: 2437 MHZ)

Emission Frequency (MHz)	Analyzer Reading (dBuV) Peak	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4874.0	35.2	4.4	39.6	54.0	-14.4
7311.0	30.0	2.9	32.9	54.0	-21.1
9748.0	37.6	7.8	45.4	83.4	-38.0
12185.0	37.2	8.0	45.2	54.0	-8.8

PEAK: RES. =1 MHZ, VID= 1MHZ

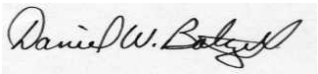
Field Strength = 102 – 20 = 82 limit for non-restricted band spurious emissions.

TABLE 9-4: RADIATED EMISSIONS HARMONICS/SPURIOUS (TX FREQUENCY: 2462 MHZ)

Emission Frequency (MHz)	Analyzer Reading (dBuV) Peak	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4924.0	40.2	4.6	44.8	54.0	-9.2
7386.0	39.9	2.8	42.7	54.0	-11.3
9848.0	40.6	8.0	48.6	82.0	-33.4
12310.0	40.3	10.0	50.3	54.0	-3.7

PEAK: RES. =1 MHZ, VID= 1MHZ

TEST PERSONNEL

Daniel W. Baltzell		November 2, 2004
EMC Test Engineer	Signature	Date Of Test

10 MODULATED BANDWIDTH - §15.247(A)(2)

10.1 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 1 MHz. The device was modulated using the maximum 11 Mbps data rate. The minimum 6 dB bandwidths are presented in Table 10-2.

TABLE 10-1: 6 DB BANDWIDTH TEST EQUIPMENT

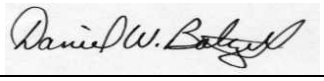
RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER	CALIBRATION DUE DATE
901215	Hewlett Packard	8596EM	Spectrum Analyzer (9 kHz - 12.8 GHz)	3826A00144	9/8/05

TABLE 10-2: MODULATED BANDWIDTH TEST DATA LOCAL ANTENNA PORT

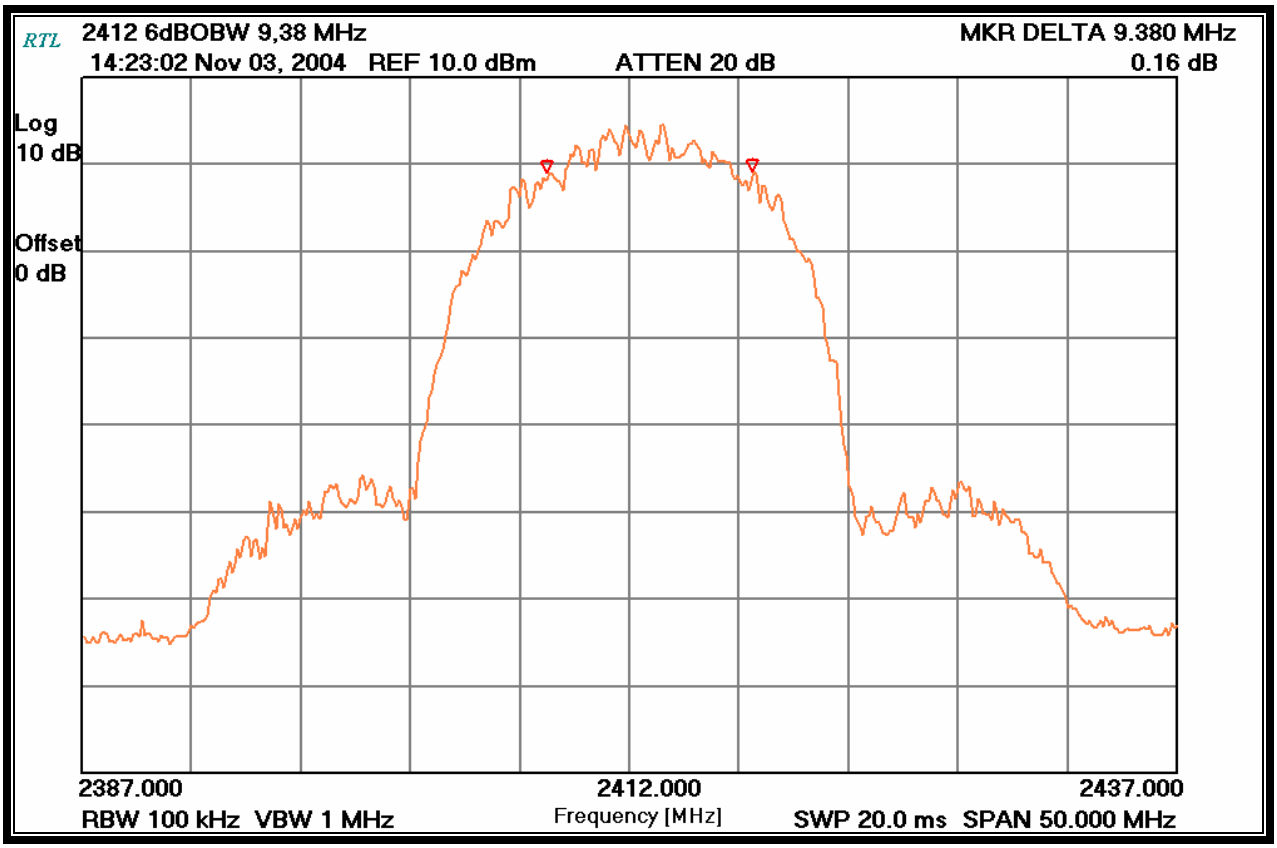
Minimum 6 dB bandwidths

FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)
2412	9.38
2437	8.20
2462	8.20

TEST PERSONNEL

Daniel W. Baltzell		August 3, 2004
EMC Test Engineer	Signature	Date Of Test

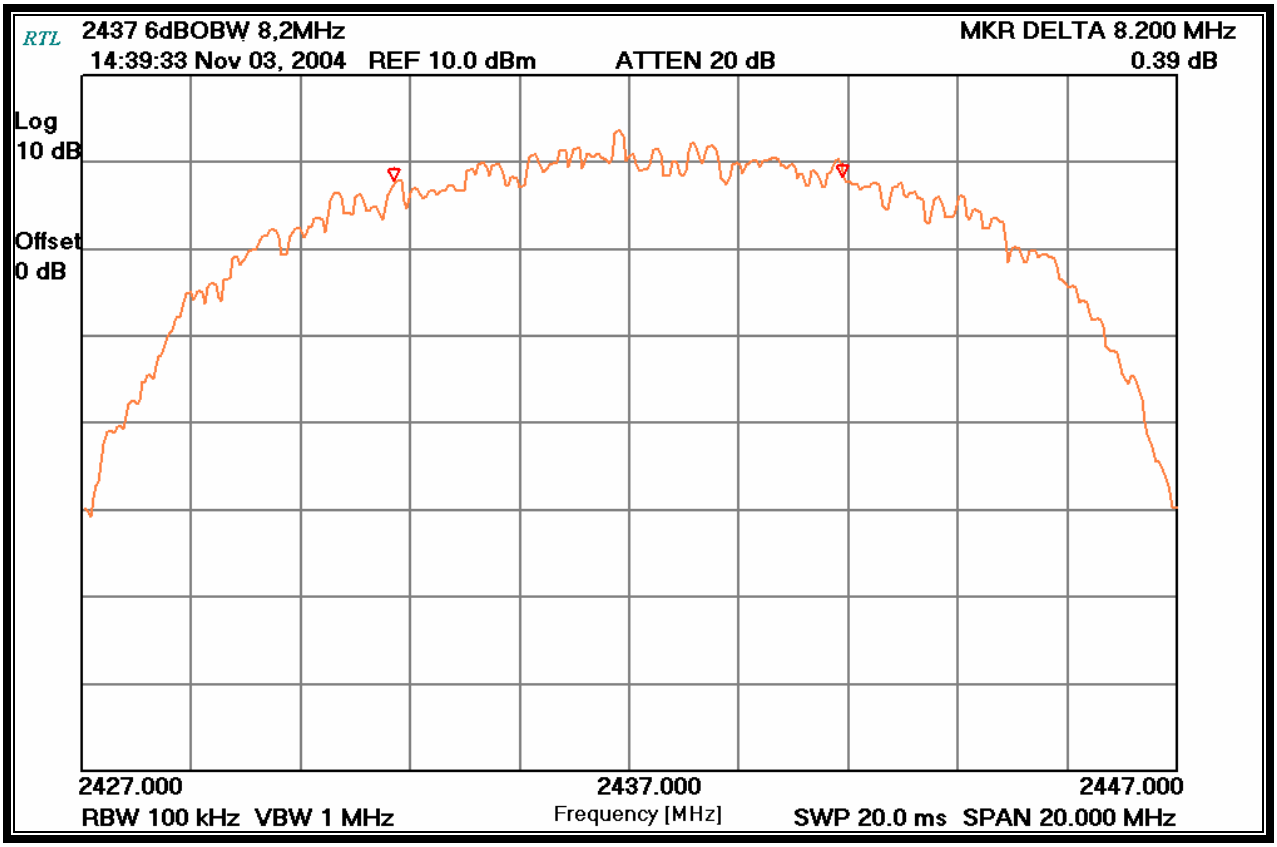
PLOT 10-1: 6 DB BANDWIDTH (TX FREQUENCY: 2412 MHZ) LOCAL ANTENNA PORT



TEST PERSONNEL

Daniel W. Baltzell		November 3, 2004
EMC Test Engineer	Signature	Date Of Test

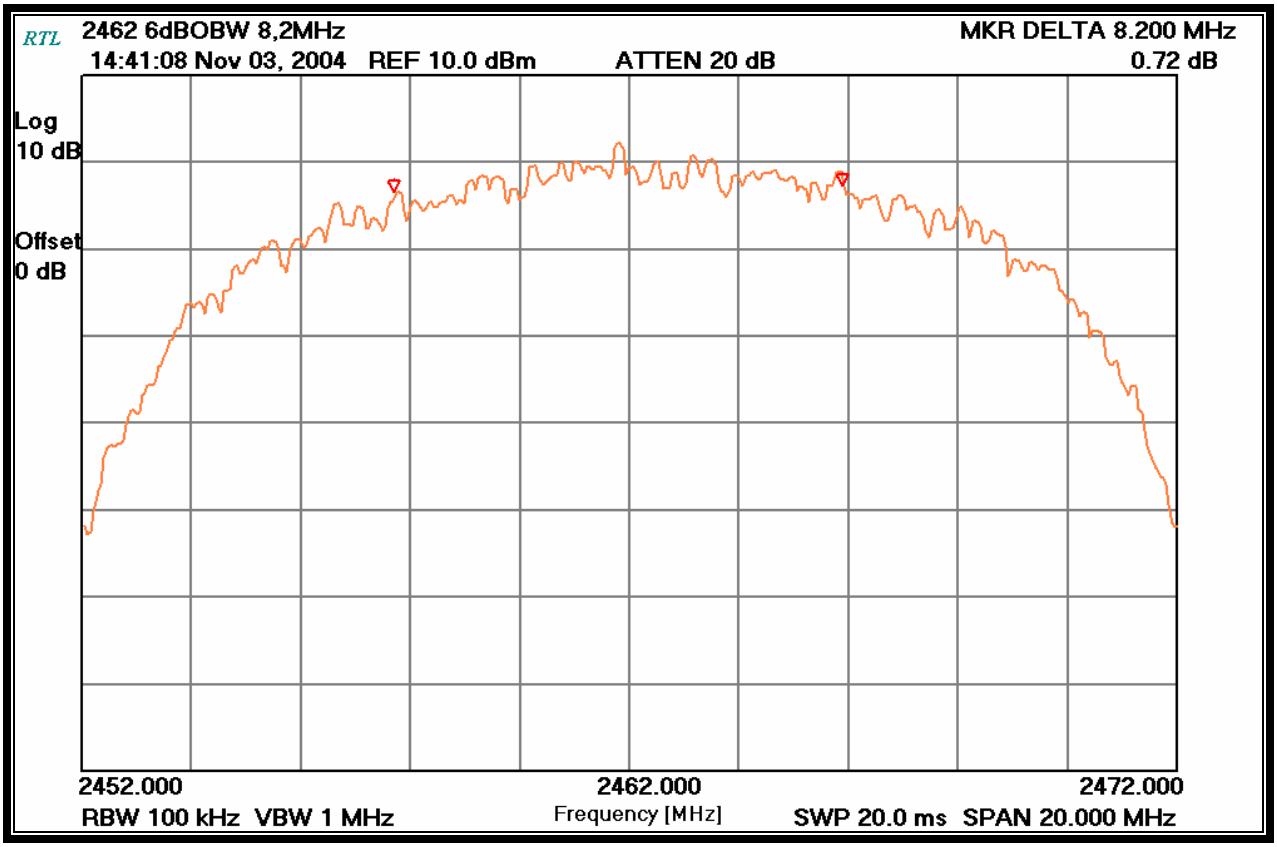
PLOT 10-2: 6 DB BANDWIDTH (TX FREQUENCY: 2437 MHZ) LOCAL ANTENNA PORT



TEST PERSONNEL

Daniel W. Baltzell		November 3, 2004
EMC Test Engineer	Signature	Date Of Test

PLOT 10-3: 6 DB BANDWIDTH (TX FREQUENCY: 2462 MHZ) LOCAL ANTENNA PORT



TEST PERSONNEL

Daniel W. Baltzell	Daniel W. Baltzell	November 3, 2004
EMC Test Engineer	Signature	Date Of Test

11 PEAK OUTPUT POWER - §15.247(B)(1)

11.1 POWER OUTPUT TEST PROCEDURE

A conducted power measurement of the EUT was measured using an Agilent 4416A EPM-P Series Power Meter with an E9323A Peak and Average Power Sensor.

11.2 POWER OUTPUT TEST EQUIPMENT

TABLE 11-1: POWER OUTPUT TEST EQUIPMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER	CALIBRATION DUE DATE
901186	Agilent Technologies	E9323A	Peak & Average Power Sensor (50 MHz - 6 GHz)	US40410380	7/30/05
901184	Agilent Technologies	E4416A	EPM-P Power Meter, Single Channel	GB41050573	7/30/05
901140	Weinschel Corp.	47-10-34 DC-18GHz	Attenuator, 50W 10 dB	BK6203	5/13/05

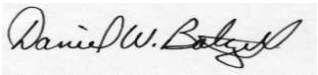
11.3 POWER OUTPUT TEST DATA

TABLE 11-2: POWER OUTPUT TEST DATA

Local Antenna Port

FREQUENCY (MHZ)	CHANNEL	PEAK POWER CONDUCTED OUTPUT (dBm)
2412	1	17.4
2437	6	17.8
2462	11	16.4

TEST PERSONNEL

Daniel W. Baltzell		November 2, 2004
EMC Test Engineer	Signature	Date Of Test

12 ANTENNA CONDUCTED SPURIOUS EMISSIONS - §15.247(C)

12.1 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 the following frequencies: 2412 MHz, 2437 MHz, and 2462 MHz. No other harmonics or spurs were found within 20 dB of the carrier level from 9 kHz to the carrier 10th harmonic. See the Antenna Conducted Spurious Noise Table. The low, middle, and high frequencies were investigated and tested.

12.2 ANTENNA CONDUCTED SPURIOUS TEST EQUIPMENT

TABLE 12-1: ANTENNA CONDUCTED SPURIOUS TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz – 22 GHz)	3138A07771	6/23/05

12.3 ANTENNA CONDUCTED SPURIOUS EMISSIONS (TX FREQUENCY: 2412 MHz); Local Antenna Port

Operating Frequency (MHz): 2412
Measured Level with 100 kHz RBW (dBm): 3.7
Limit (dBm): -16.3

TABLE 12-2: CONDUCTED SPURIOUS EMISSIONS (TX FREQUENCY: 2412 MHZ)

Frequency (MHz)	Measured Level (dBm)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
452.000	-59.6	63.3	20.0	-43.3
748.502	-45.4	49.1	20.0	-29.1
1657.500	-60.2	63.9	20.0	-43.9
2037.710	-54.7	58.4	20.0	-38.4
4824.000	-66.3	70.0	20.0	-50.0
7236.000	-69.5	73.2	20.0	-53.2
9648.000	-72.2	75.9	20.0	-55.9
12060.000	-72.8	76.5	20.0	-56.5

12.4 ANTENNA CONDUCTED SPURIOUS EMISSIONS (TX FREQUENCY: 2437 MHz); Local Antenna Port

Operating Frequency (MHz): 2437
Measured Level at 100 kHz RBW(dBm): 4.1
Limit (dBm): -15.9

TABLE 12-3: CONDUCTED SPURIOUS EMISSIONS (TX FREQUENCY: 2437 MHZ)

Frequency (MHz)	Measured Level (dBm)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
477.750	-59.7	63.8	20.0	-43.8
748.465	-45.0	49.1	20.0	-29.1
1694.060	-57.6	61.7	20.0	-41.7
2062.700	-54.5	58.6	20.0	-38.6
4874.000	-63.1	67.2	20.0	-47.2
7311.000	-56.3	60.4	20.0	-40.4
9748.000	-55.1	59.2	20.0	-39.2
12185.000	-55.4	59.5	20.0	-39.5

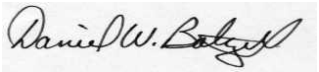
12.5 ANTENNA CONDUCTED SPURIOUS EMISSIONS (TX FREQUENCY: 2462 MHz); Local Antenna Port

Operating Frequency (MHz): 2462
Measured Level at 100 kHz RBW (dBm): 4.2
Limit (dBm): -15.8

TABLE 12-4: CONDUCTED SPURIOUS EMISSIONS (TX FREQUENCY: 2462 MHZ)

Frequency (MHz)	Measured Level (dBm)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
500.250	-62.2	66.4	20.0	-46.4
748.502	-44.5	48.7	20.0	-28.7
1496.963	-61.0	65.2	20.0	-45.2
2087.688	-52.6	56.8	20.0	-36.8
2462.000	4.2	0.0	20.0	20.0
4924.000	-66.6	70.8	20.0	-50.8
7386.000	-74.5	78.7	20.0	-58.7
9848.000	-77.8	82.0	20.0	-62.0
12310.000	-77.0	81.2	20.0	-61.2

TEST PERSONNEL

Daniel W. Baltzell		November 3, 2004
EMC Test Engineer	Signature	Date Of Test

13 POWER SPECTRAL DENSITY - §15.247(D)

13.1 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 10 kHz, and the sweep time set at 100 seconds. The spectral lines were resolved for the modulated carriers at 2.412 GHz, 2.437 GHz, and 2.462 GHz respectively. These levels are below the +8 dBm limit. See the power spectral density table and plots.

13.2 POWER SPECTRAL DENSITY TEST EQUIPMENT

TABLE 13-1: POWER SPECTRAL DENSITY TEST EQUIPMENT

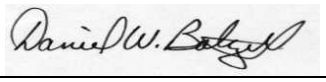
RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER	CALIBRATION DUE DATE
901215	Hewlett Packard	8596EM	Spectrum Analyzer (9 kHz - 12.8 GHz)	3826A00144	9/8/05

13.3 POWER SPECTRAL DENSITY TEST DATA

TABLE 13-2: POWER SPECTRAL DENSITY TEST DATA LOCAL ANTENNA PORT

CHANNEL	FREQUENCY (MHZ)	POWER SPECTRAL DENSITY LIMIT = +8dBm
1	2412	-10.71
6	2437	-9.64
11	2462	-12.82

TEST PERSONNEL

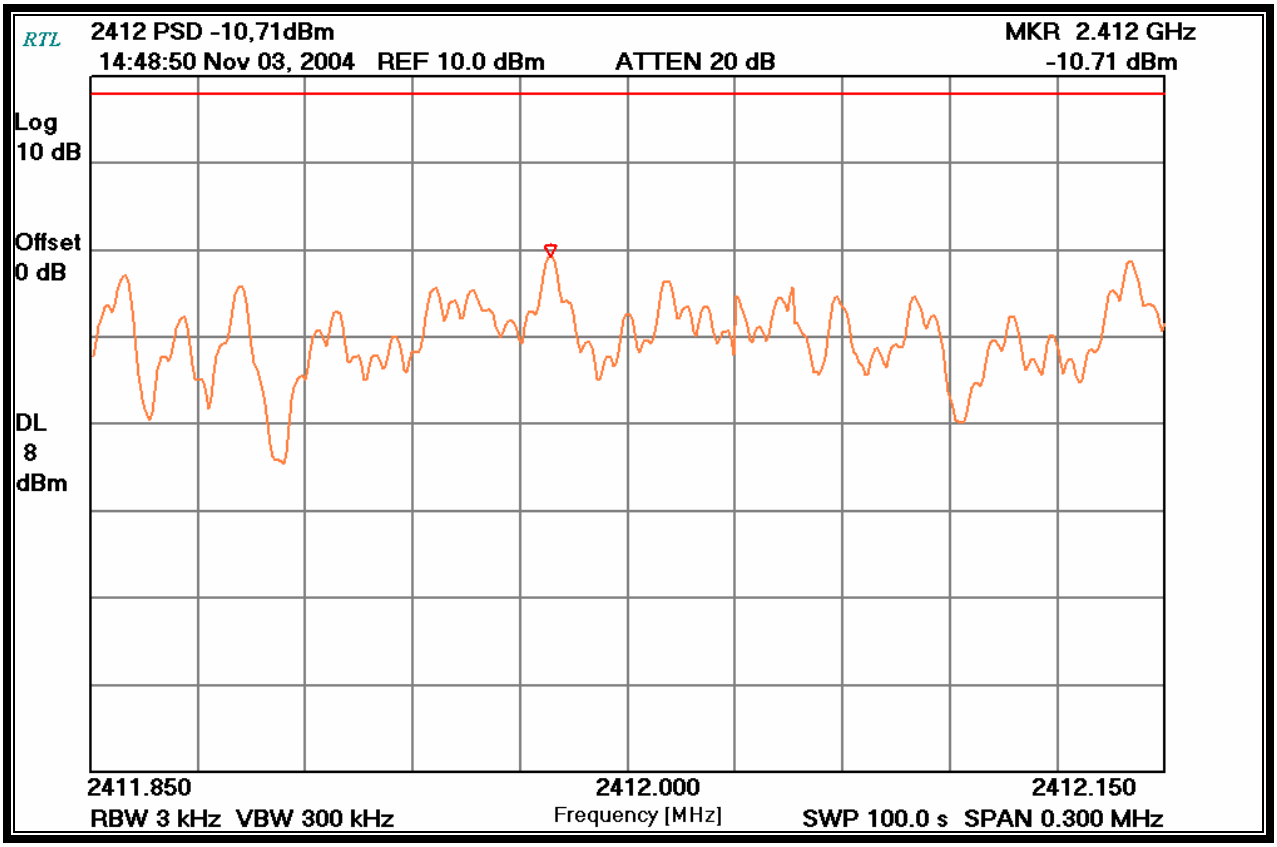


Daniel W. Baltzell		November 3, 2004
EMC Test Engineer	Signature	Date Of Test

13.4 POWER SPECTRAL DENSITY PLOTS - LOCAL ANTENNA PORT

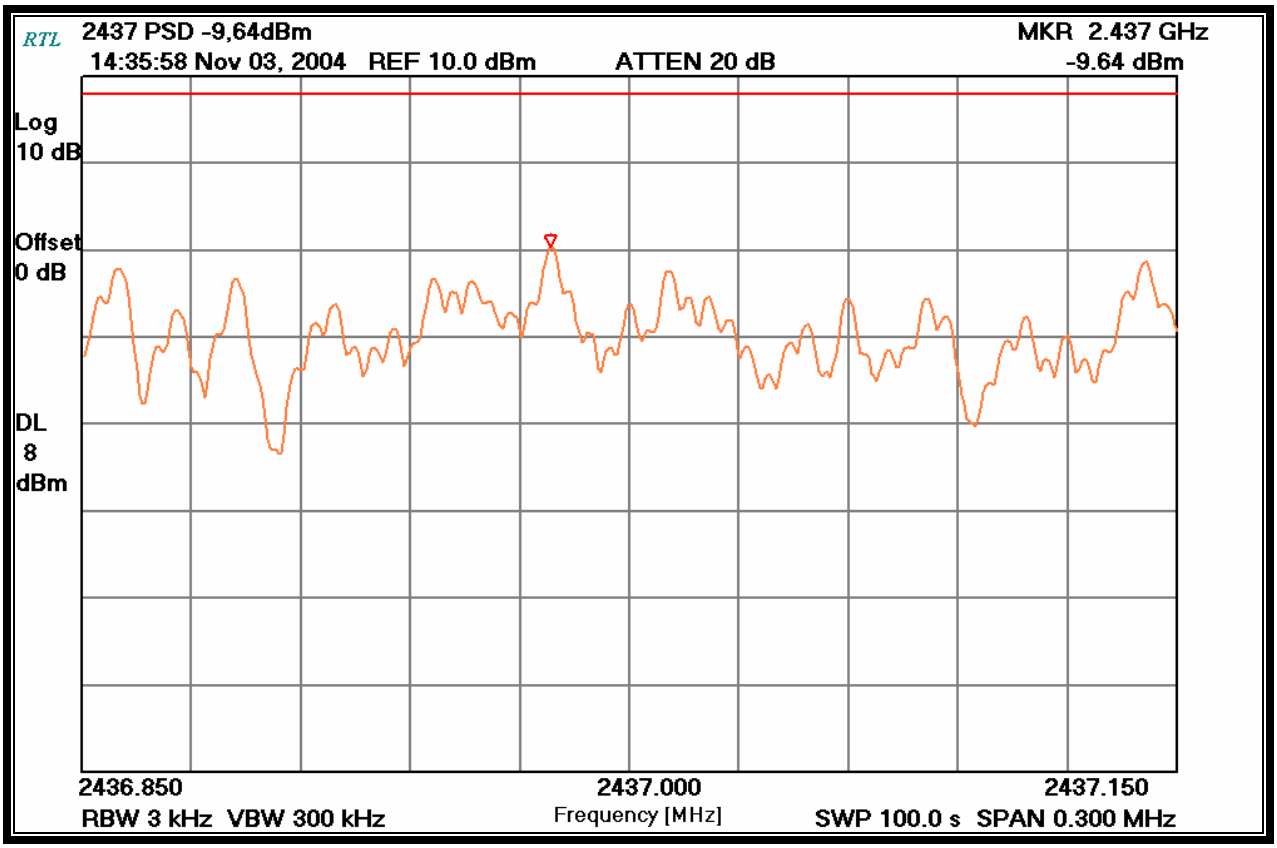
Operating Frequency (MHz):	2412
Channel:	1
Measured Cond. Pwr. (dBm):	17.4
Bandwidth Resolution (kHz):	3
Bandwidth Video (kHz):	300
Sweep Time (sec.):	100

PLOT 13-1: POWER SPECTRAL DENSITY: CHANNEL 1



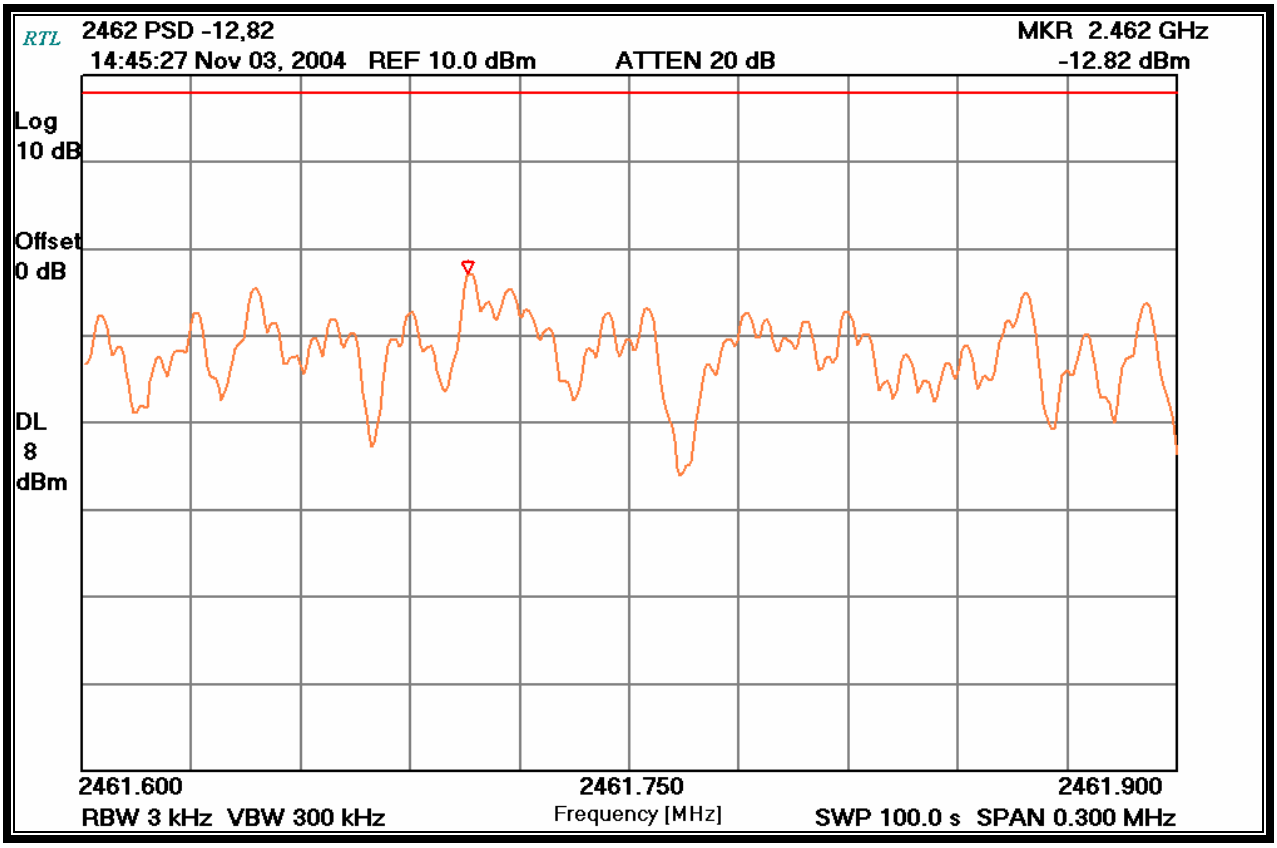
Operating Frequency (MHz):	2437
Channel:	6
Measured Cond. Pwr. (dBm):	17.8
Bandwidth Resolution (kHz):	3
Bandwidth Video (kHz):	300
Sweep Time (sec.):	100.0

PLOT 13-2: POWER SPECTRAL DENSITY: CHANNEL 6



Operating Frequency (MHz):	2462
Channel:	11
Measured Cond. Pwr. (dBm):	16.4
Bandwidth Resolution (kHz):	3
Bandwidth Video (kHz):	300
Sweep Time (sec.):	100

PLOT 13-3: POWER SPECTRAL DENSITY: CHANNEL 11



TEST PERSONNEL

Daniel W. Baltzell		November 3, 2004
EMC Test Engineer	Signature	Date Of Test

14 CONCLUSION

The data in this measurement report shows that the EUT as tested, FCC ID: QVT-528, complies with all the applicable requirements of Parts 2 and 15 of the FCC Rules and Regulations.