



Engineering and Testing for EMC and Safety Compliance

CERTIFICATION APPLICATION REPORT
FCC PART 15.247 CERTIFICATION & INDUSTRY CANADA CERTIFICATION

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FCC ID:	E2XSWL-2200U	GRANTEE FRN NUMBER:	0006-9029-36
PLAT FORM:	N/A	RTL WORK ORDER NUMBER:	2002055
MODEL(S):	SWL-2200U	RTL QUOTE NUMBER:	QRTL02-413DDF
DATE OF TEST REPORT:	November 1, 2002		
American National Standard Institute:	ANSI/TIA/EIA603 and ANSI/TIA/EIA 603-1		
FCC Classification:	DTS – 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		
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		
Frequency Range (MHz)	Power (W)	Frequency Tolerance	Emission Designator
2412-2462	0.040	N/A	N/A

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, ANSI/TIA/EIA603, and ANSI/TIA/EIA 603-1.

Signature: 

Date: November 1, 2002

Typed/Printed Name: Desmond A. Fraser

Position: President

TABLE OF CONTENTS

1	GENERAL INFORMATION	5
1.1	SCOPE	5
1.2	TEST FACILITY	5
1.3	RELATED SUBMITTAL(S)/GRANT(S).....	5
2	TEST INFORMATION.....	6
2.1	TEST JUSTIFICATION	6
2.2	EXERCISING THE EUT	6
2.3	TEST RESULT SUMMARY	6
2.4	TEST SYSTEM DETAILS	7
2.5	CONFIGURATION OF TESTED SYSTEM	8
3	COMPLIANCE WITH THE RESTRICTED BAND EDGE - §15.205	9
3.1	TEST PROCEDURE.....	9
3.2	COMPLIANCE WITH THE RESTRICTED BAND EDGE TEST DATA	9
3.3	COMPLIANCE WITH RESTRICTED BAND EDGE PLOTS	10
4	CONDUCTED LIMITS - §15.207	14
4.1	TEST METHODOLOGY FOR CONDUCTED EMISSIONS MEASUREMENTS	14
4.2	CONDUCTED EMISSION TEST	14
4.3	CONDUCTED EMISSION TEST DATA	15
5	RADIATED EMISSION LIMITS RECEIVER/DIGITAL INTERFACE - §15.209	18
5.1	RADIATED EMISSION LIMITS TEST PROCEDURE.....	18
5.2	RADIATED EMISSION LIMITS TEST DATA	18
6	RADIATED EMISSION LIMITS RADIATED HARMONICS - §15.247	19
6.1	RADIATED EMISSION LIMITS TEST PROCEDURE.....	19
6.2	TEST EQUIPMENT USED FOR TESTING	21
7	MODULATED BANDWIDTH - §15.247(A)(2)	22
7.1	MODULATED BANDWIDTH TEST PROCEDURE	22
7.2	TEST EQUIPMENT USED FOR TESTING	22
7.3	MODULATED BANDWIDTH TEST DATA	22
7.4	MODULATED BANDWIDTH PLOTS	23
8	POWER OUTPUT - §15.247(B)	26
8.1	POWER OUTPUT TEST PROCEDURE	26
8.2	TEST EQUIPMENT USED FOR TESTING	26
8.3	POWER OUTPUT TEST DATA	26
9	ANTENNA CONDUCTED SPURIOUS EMISSIONS - §15.247(C)	27
9.1	ANTENNA CONDUCTED SPURIOUS EMISSIONS TEST PROCEDURES	27
10	POWER SPECTRAL DENSITY - §15.247(D).....	28
10.1	POWER SPECTRAL DENSITY TEST PROCEDURE	28
10.2	TEST EQUIPMENT USED FOR TESTING	28
10.3	POWER SPECTRAL DENSITY TEST DATA	28
10.4	POWER SPECTRAL DENSITY PLOTS	29
11	CONCLUSION	32

FIGURE INDEX

FIGURE 1:	WORST CASE CONFIGURATION OF TESTED SYSTEM	8
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TABLE INDEX

TABLE 2-1:	TEST RESULT SUMMARY WITH FCC RULES AND REGULATIONS	6
TABLE 2-2:	EQUIPMENT UNDER TEST (EUT).....	7
TABLE 2-3:	EXTERNAL COMPONENTS IN TEST CONFIGURATION	7
TABLE 3-1:	COMPLIANCE WITH THE RESTRICTED BAND EDGE TEST DATA	9
TABLE 4-1:	CONDUCTED SPURIOUS EMISSIONS TEST EQUIPMENT.....	14
TABLE 4-2:	CONDUCTED EMISSIONS (NEUTRAL SIDE) TRANSMITTING CH 1	15
TABLE 4-3:	CONDUCTED EMISSIONS (PHASE SIDE) TRANSMITTING CH 1	15
TABLE 4-4:	CONDUCTED EMISSIONS (PHASE SIDE) RECEIVING CH 6	16
TABLE 4-5:	CONDUCTED EMISSIONS (NEUTRAL SIDE) RECEIVING CH 6	16
TABLE 4-6:	CONDUCTED EMISSIONS (PHASE SIDE) RECEIVING CH 11	17
TABLE 4-7:	CONDUCTED EMISSIONS (NEUTRAL SIDE) RECEIVING CH 11	17
TABLE 5-1:	RADIATED EMISSIONS TRANSMITTING CH 1	18
TABLE 5-2:	RADIATED EMISSIONS RECEIVING CH 1	18
TABLE 6-1:	RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 1).....	19
TABLE 6-2:	RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 6).....	20
TABLE 6-3:	RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 11).....	21
TABLE 6-4:	RADIATED SPURIOUS EMISSIONS TEST EQUIPMENT.....	21
TABLE 7-1:	TEST EQUIPMENT USED FOR TESTING (MODULATED BANDWIDTH)	22
TABLE 7-2:	MINIMUM 6 DB MODULATED BANDWIDTHS	22
TABLE 8-1:	TEST EQUIPMENT USED FOR TESTING (RADIATED RF OUTPUT – EIRP).....	26
TABLE 8-2:	POWER OUTPUT TEST DATA	26
TABLE 8-3:	POWER OUTPUT TEST DATA	26
TABLE 10-1:	TEST EQUIPMENT USED FOR TESTING (POWER SPECTRAL DENSITY)	28
TABLE 10-2:	POWER SPECTRAL DENSITY	28
TABLE 11-1:	RF EXPOSURE SEPARATION DISTANCE FROM MEASURED EIRP	33
TABLE 11-2:	TEST EQUIPMENT USED FOR TESTING (MODULATED BANDWIDTH)	56
TABLE 11-3:	MINIMUM 20DB MODULATED BANDWIDTHS	56

PLOT INDEX

PLOT 3-1:	BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 1	10
PLOT 3-2:	BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 1	11
PLOT 3-3:	BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 11	12
PLOT 3-4:	BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 11	13
PLOT 7-1:	MODULATED BANDWIDTH CHANNEL 1	23
PLOT 7-2:	MODULATED BANDWIDTH CHANNEL 6	24
PLOT 7-3:	MODULATED BANDWIDTH CHANNEL 11	25
PLOT 10-1:	POWER SPECTRAL DENSITY: CHANNEL 1.....	29
PLOT 10-2:	POWER SPECTRAL DENSITY: CHANNEL 6.....	30
PLOT 10-3:	POWER SPECTRAL DENSITY: CHANNEL 11.....	31
PLOT 11-1:	MODULATED BANDWIDTH CHANNEL 1	57
PLOT 11-2:	MODULATED BANDWIDTH CHANNEL 6	58
PLOT 11-3:	MODULATED BANDWIDTH CHANNEL 11	59

APPENDIX INDEX

APPENDIX A:	RF EXPOSURE CALCULATIONS FOR HIGH GAIN ANTENNAS	33
APPENDIX B:	ANTENNA SPECIFICATIONS	34
APPENDIX C:	AGENCY AUTHORIZATION LETTER.....	35
APPENDIX D:	CONFIDENTIALITY REQUEST LETTER (IF APPLICABLE)	36
APPENDIX E:	ATTESTATION LETTERS (IF APPLICABLE)	37
APPENDIX F:	PRODUCT DESCRIPTION	38
APPENDIX G:	LABEL AND LABEL LOCATION	39
APPENDIX H:	SCHEMATICS	40
APPENDIX I:	BLOCK DIAGRAM.....	41
APPENDIX J:	MANUAL	42
APPENDIX K:	TEST PHOTOGRAPHS	43
APPENDIX L:	EXTERNAL PHOTOGRAPHS.....	47
APPENDIX M:	INTERNAL PHOTOGRAPHS.....	50
APPENDIX N:	ADDITIONAL INFORMATION FOR CANADIAN CERTIFICATION	56

PHOTOGRAPH INDEX

PHOTOGRAPH 1:	FCC ID LABEL ON EUT.....	39
PHOTOGRAPH 2:	RADIATED EMISSIONS FRONT VIEW WORST CASE CONFIGURATION	43
PHOTOGRAPH 3:	RADIATED EMISSIONS REAR VIEW WORST CASE CONFIGURATION	44
PHOTOGRAPH 4:	CONDUCTED EMISSIONS FRONT VIEW WORST CASE CONFIGURATION.....	45
PHOTOGRAPH 5:	CONDUCTED EMISSIONS REAR VIEW WORST CASE CONFIGURATION	46
PHOTOGRAPH 6:	FRONT VIEW OF EUT	47
PHOTOGRAPH 7:	BACK VIEW OF EUT	48
PHOTOGRAPH 8:	SIDE VIEW OF EUT.....	49
PHOTOGRAPH 9:	TOP VIEW OF RF BOARD	50
PHOTOGRAPH 10:	BOTTOM VIEW OF RF BOARD WITH SHIELD	51
PHOTOGRAPH 11:	BOTTOM VIEW OF RF BOARD WITHOUT SHIELD	52
PHOTOGRAPH 12:	TOP VIEW OF DIGITAL BOARD.....	53
PHOTOGRAPH 13:	BOTTOM VIEW OF DIGITAL BOARD.....	54
PHOTOGRAPH 14:	INSIDE VIEW OF FRONT AND BACK COVERS	55

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 Certification for the Samsung Electro-Mechanics Co., LTD, USB WLAN Adapter Card, Model: SWL-2200U, FCC ID: E2XSWL-2200U. 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. 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 are presented in this report.

The EUT contains an integral patch antenna. The integral patch antenna transmits and receives. The EUT does not have any accessible antenna ports.

The worst-case data taken in this report represents the highest data rate at 11 MBPS. Data rates of 5.5 MBPS, 2 MBPS and 1 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 the software to continuously transmit during testing. The carrier was also checked to verify that the information was being transmitted.

2.3 TEST RESULT SUMMARY

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

STANADARD	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:

TABLE 2-2: EQUIPMENT UNDER TEST (EUT)

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
USB WLAN ADAPTER CARD	SAMSUNG ELECTRO-MECHANICS CO., LTD	SWL-2200U	N/A	E2XSWL-2200U	N/A	14243

TABLE 2-3: EXTERNAL COMPONENTS IN TEST CONFIGURATION

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
DESKTOP PC	GATEWAY	N/A	N/A	DOC	INTERNAL	12515
KEYBOARD	DELL	RT9410	5167703627283	DOC	SHIELDED I/O	12544
MONITOR	VIEWSONIC	VG150B	IQ20651279	DOC	VIDEO/POWER SUPPLY	14596

2.5 CONFIGURATION OF TESTED SYSTEM

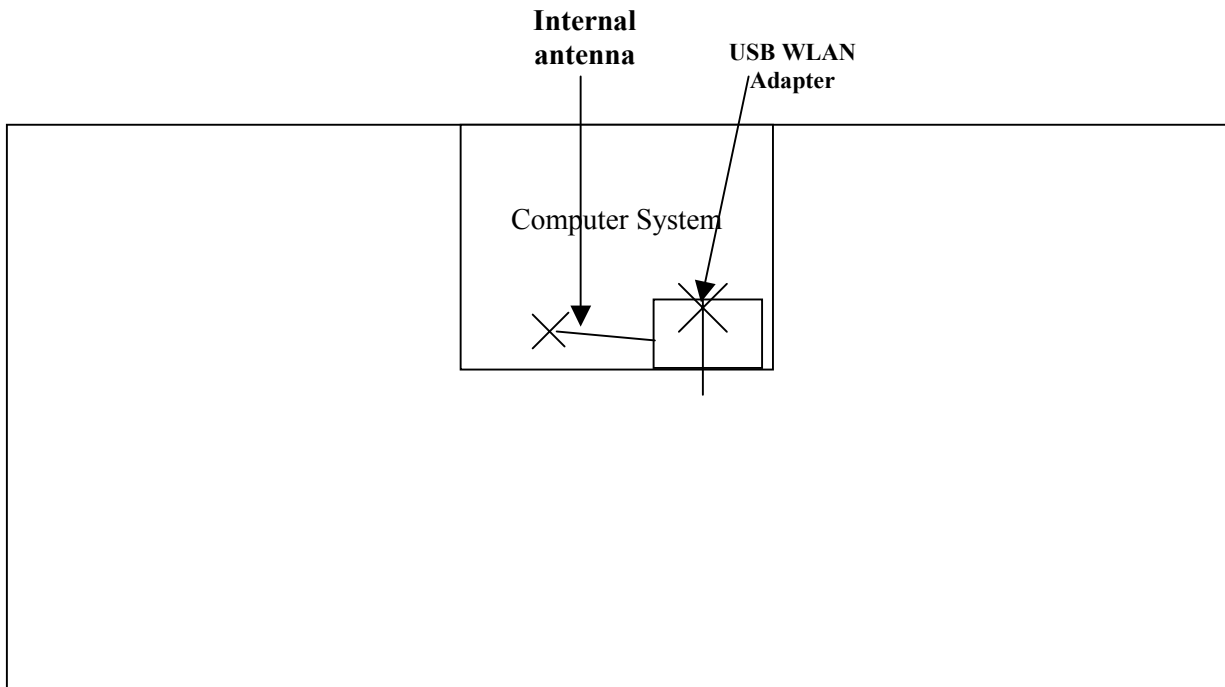


FIGURE 1: WORST CASE CONFIGURATION OF TESTED SYSTEM

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 final data derived below are from radiated measurements only. The data taken in this report represents the worst case at 11 MBPS. Data rates of 5.5MBPS, 2 MBPS and 1 MBPS were investigated and found to be in compliance.

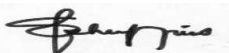
3.2 COMPLIANCE WITH THE RESTRICTED BAND EDGE TEST DATA

Operating Frequency (MHz): 2412-2462
Channel: 1 & 11
Distance (m): 3
Limit (dBuV/m): 54

TABLE 3-1: COMPLIANCE WITH THE RESTRICTED BAND EDGE TEST DATA

Channel Set to	Frequency tested MHz	Detector	Field Strength Level (dBuV/m)	Level Corrected (dBuV/m)	FCC Limit (dBuV/m)	FCC Margin (dB)
1	2390.0	Absolute measurement	36.0	49.1	54.0	-4.6
11	2483.5	Absolute measurement	33.0	44.1	54.0	-9.9

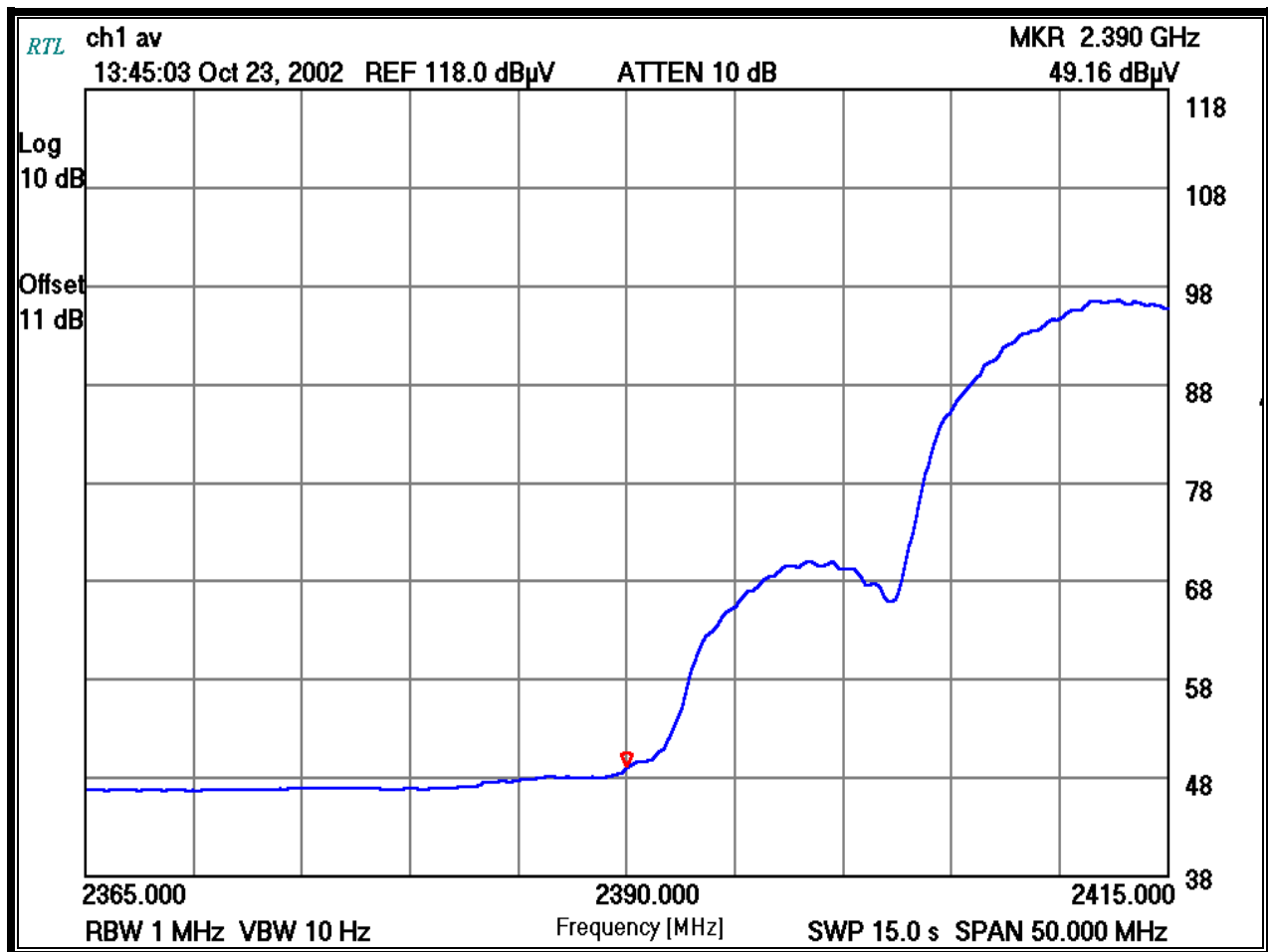
TEST PERSONNEL:

Franck Schuppis Test Technician/Engineer	 Signature	10/23/2002 Date Of Test
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3.3 COMPLIANCE WITH RESTRICTED BAND EDGE PLOTS

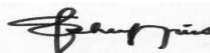
Channel Number: 1
 Frequency (MHz): 2412
 Resolution Bandwidth (MHz): 1
 Video Bandwidth (Hz): 10
 Sweep Time (s): 15.0

PLOT 3-1: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 1



TEST PERSONNEL:

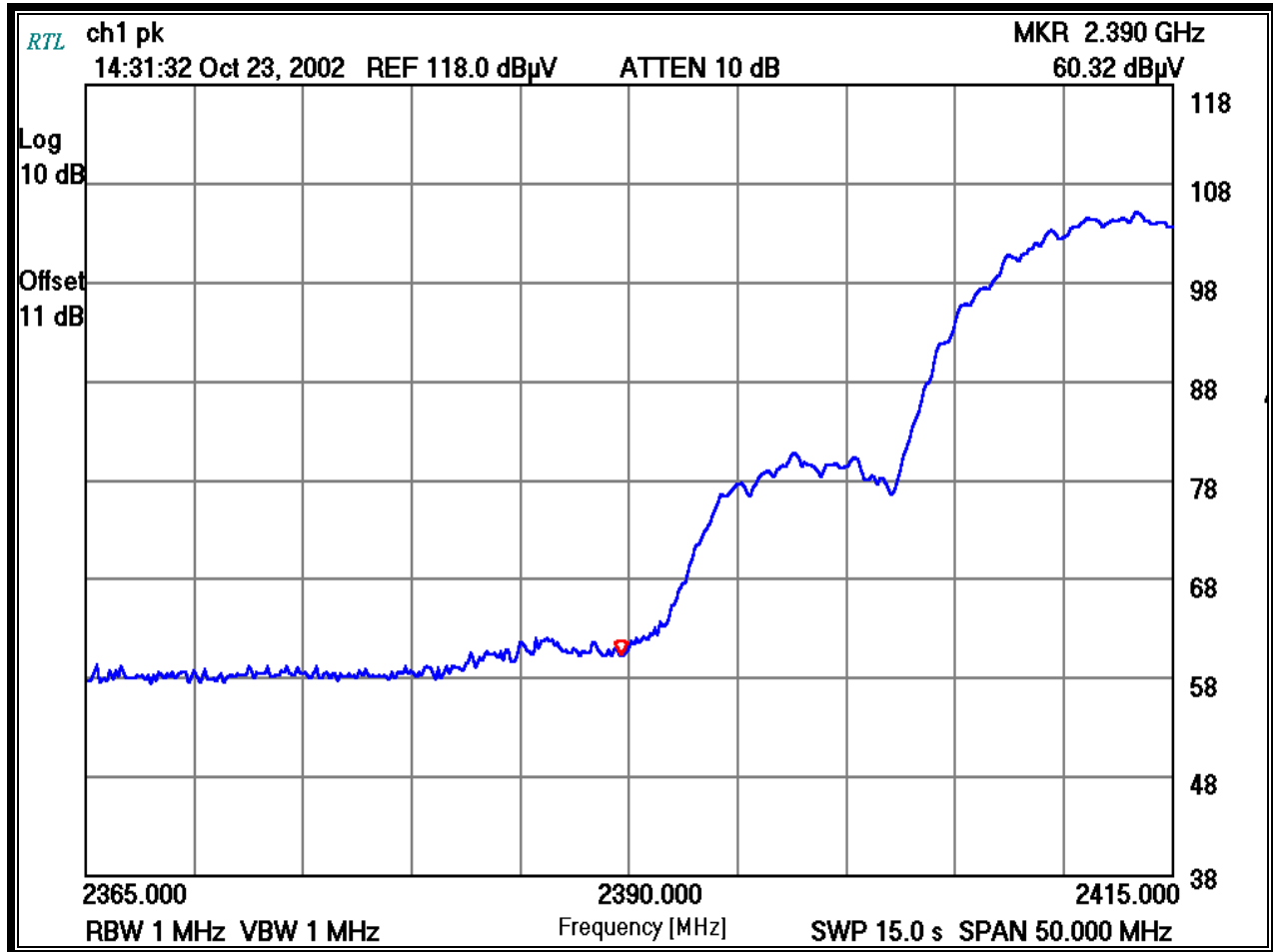
Franck Schuppis
 Test Technician/Engineer


 Signature

10/23/2002
 Date Of Test

Channel Number: 1
 Frequency (MHz): 2412
 Bandwidth Resolution (MHz): 1
 Video Bandwidth (MHz): 1
 Sweep Time (s): 15.0

PLOT 3-2: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 1



TEST PERSONNEL:

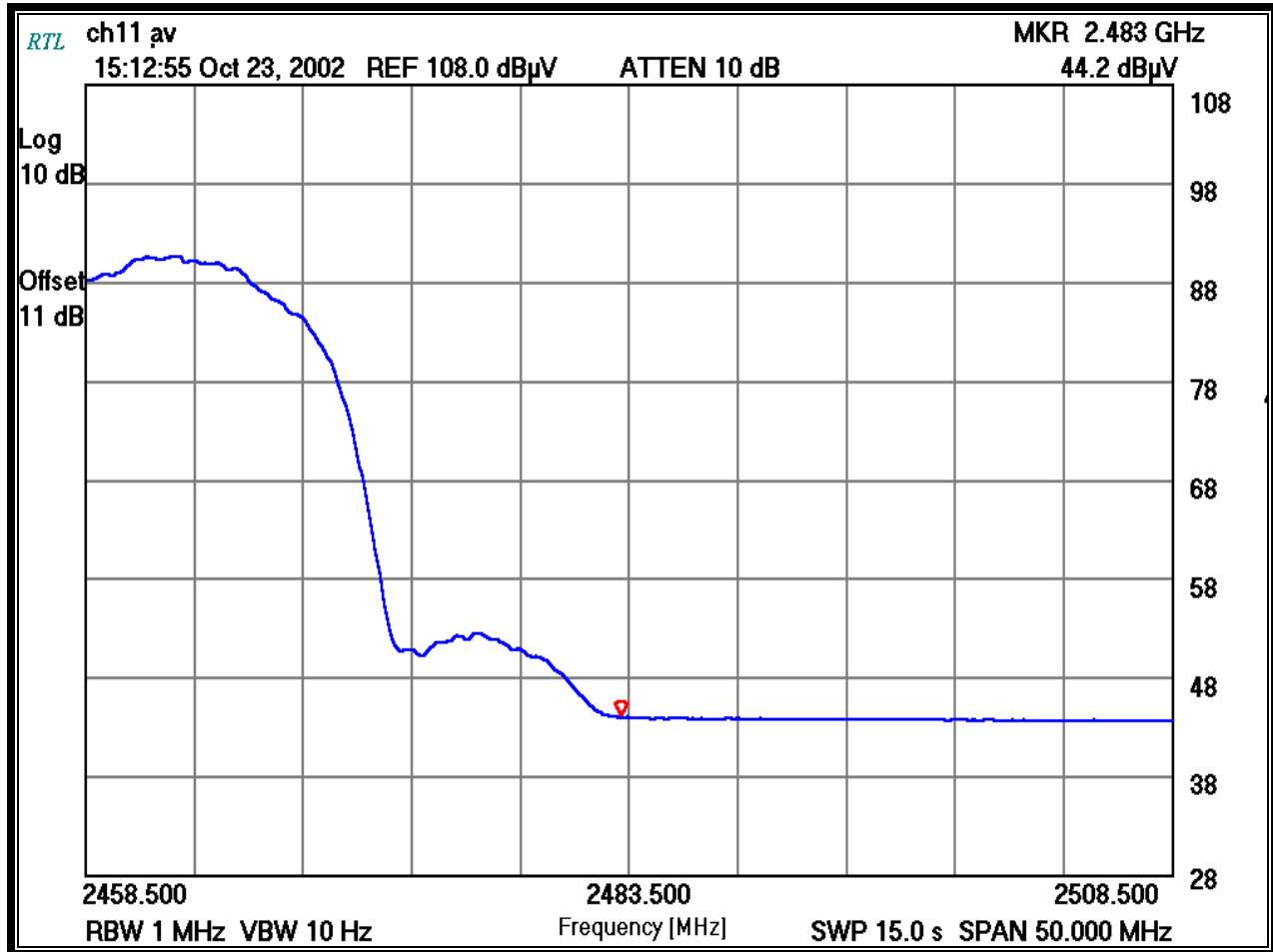
Franck Schuppis
 Test Technician/Engineer


 Signature

10/23/2002
 Date Of Test

Channel Number: 11
Frequency (MHz): 2462
Resolution Bandwidth (MHz): 1
Video Bandwidth (Hz): 10
Sweep Time (s): 15.0

PLOT 3-3: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 11



TEST PERSONNEL:

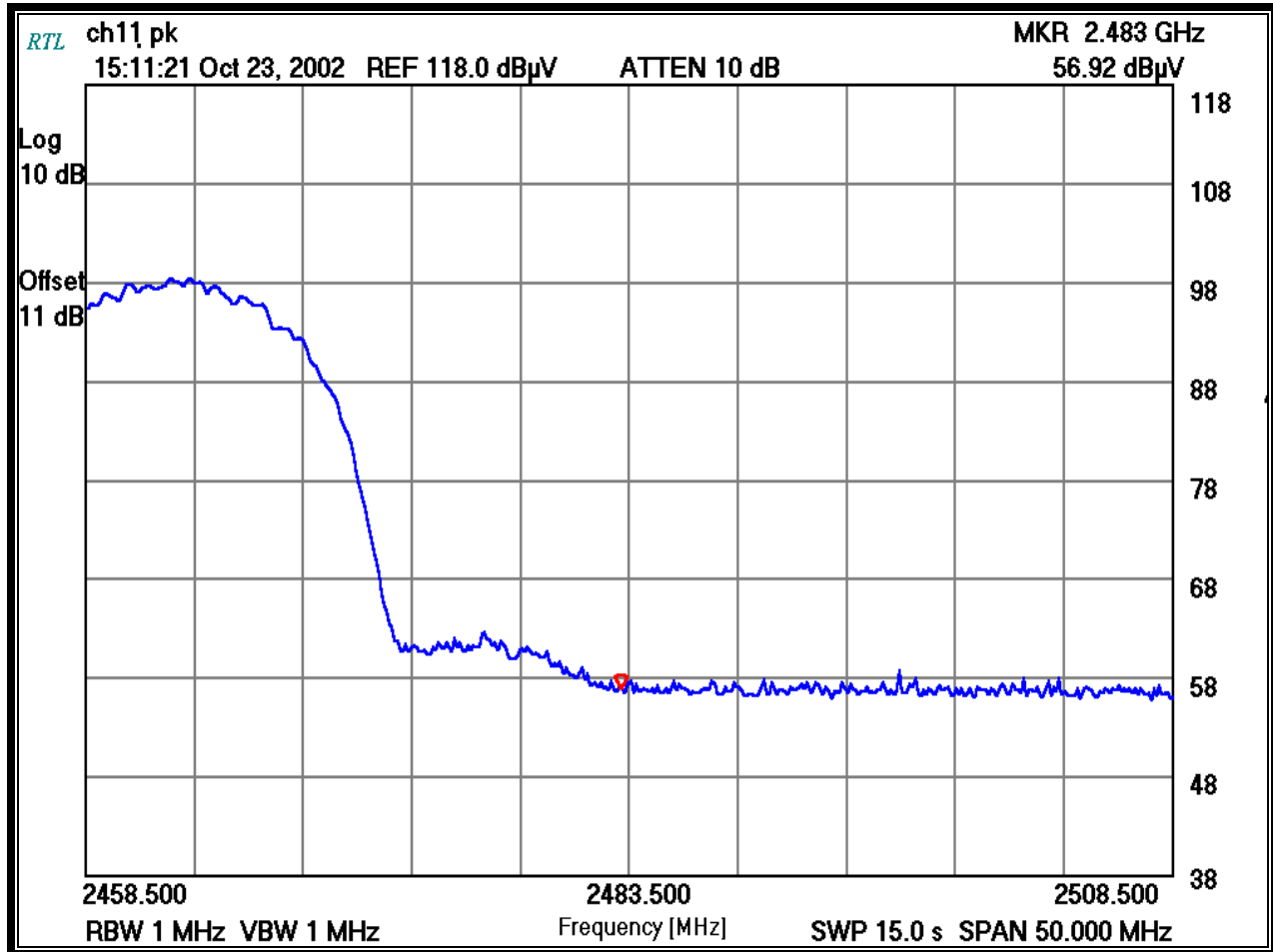
Franck Schuppis
Test Technician/Engineer


Signature

10/23/2002
Date Of Test

Channel Number: 11
 Frequency (MHz): 2462
 Resolution Bandwidth (MHz): 1
 Video Bandwidth (MHz): 1
 Sweep Time (s): 15.0

PLOT 3-4: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 11



TEST PERSONNEL:

Franck Schuppis
 Test Technician/Engineer


 Signature

10/23/2002
 Date Of Test

4 CONDUCTED LIMITS - §15.207

4.1 TEST METHODOLOGY FOR CONDUCTED 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 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 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. The two antennas have been tested and the worst case is listed below.

TABLE 4-1: CONDUCTED SPURIOUS EMISSIONS TEST EQUIPMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER
900931	HewlettPackard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771
900070	Solar		LISN	

4.3 CONDUCTED EMISSION TEST DATA

TABLE 4-2: CONDUCTED EMISSIONS (NEUTRAL SIDE) TRANSMITTING CH 1

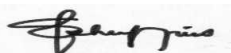
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)
0.510	Pk	25.5	0.7	26.2	48.0	-21.8	48.0	-21.8
4.410	Pk	35.3	1.5	36.8	48.0	-11.2	48.0	-11.2
5.330	Pk	37.1	1.6	38.7	48.0	-9.3	48.0	-9.3
8.310	Pk	35.2	2.0	37.2	48.0	-10.8	48.0	-10.8
19.950	Pk	30.7	3.1	33.8	48.0	-14.2	48.0	-14.2
25.510	Pk	33.6	3.4	37.0	48.0	-11.0	48.0	-11.0

TABLE 4-3: CONDUCTED EMISSIONS (PHASE SIDE) TRANSMITTING CH 1

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)
0.480	Pk	29.8	0.7	30.5	48.0	-17.5	48.0	-17.5
4.290	Pk	37.9	1.5	39.4	48.0	-8.6	48.0	-8.6
7.480	Pk	36.2	2.0	38.2	48.0	-9.8	48.0	-9.8
12.860	Pk	33.1	2.5	35.6	48.0	-12.4	48.0	-12.4
18.240	Pk	33.6	3.0	36.6	48.0	-11.4	48.0	-11.4
25.690	Pk	34.2	3.4	37.6	48.0	-10.4	48.0	-10.4

TEST PERSONNEL:

Franck Schuppius
Test Technician/Engineer


Signature

4/04/2002
Date Of Test

TABLE 4-4: CONDUCTED EMISSIONS (PHASE SIDE) RECEIVING CH 6

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)
0.480	Pk	24.7	0.7	25.4	48.0	-22.6	48.0	-22.6
5.210	Pk	38.3	1.6	39.9	48.0	-8.1	48.0	-8.1
7.720	Pk	36.5	2.0	38.5	48.0	-9.5	48.0	-9.5
11.470	Pk	29.8	2.3	32.1	48.0	-15.9	48.0	-15.9
19.240	Pk	30.0	3.1	33.1	48.0	-14.9	48.0	-14.9
25.690	Pk	33.1	3.4	36.5	48.0	-11.5	48.0	-11.5

TABLE 4-5: CONDUCTED EMISSIONS (NEUTRAL SIDE) RECEIVING CH 6

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)
0.480	Pk	28.1	0.7	28.8	48.0	-19.2	48.0	-19.2
2.810	Pk	32.7	1.3	34.0	48.0	-14.0	48.0	-14.0
5.090	Pk	38.3	1.7	40.0	48.0	-8.0	48.0	-8.0
16.670	Pk	31.5	2.8	34.3	48.0	-13.7	48.0	-13.7
19.720	Pk	32.9	3.1	36.0	48.0	-12.0	48.0	-12.0
25.330	Pk	33.4	3.4	36.8	48.0	-11.2	48.0	-11.2

TEST PERSONNEL:

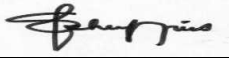
Franck Schuppis Test Technician/Engineer	 Signature	4/04/2002 Date Of Test
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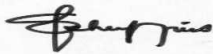
TABLE 4-6: CONDUCTED EMISSIONS (PHASE SIDE) RECEIVING CH 11

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)
4.977	Pk	30.8	1.6	32.4	48.0	-15.6
9.500	Pk	36.4	2.1	38.5	48.0	-9.5
10.420	Pk	35.0	2.1	37.1	48.0	-10.9
10.870	Pk	41.6	2.2	43.8	48.0	-4.2
11.320	Pk	39.6	2.3	41.9	48.0	-6.1
12.220	Pk	38.9	2.5	41.4	48.0	-6.6
23.110	Pk	35.5	3.2	38.7	48.0	-9.3

TABLE 4-7: CONDUCTED EMISSIONS (NEUTRAL SIDE) RECEIVING CH 11

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)
4.982	Pk	29.9	1.7	31.6	48.0	-16.4
9.500	Pk	37.7	1.7	39.4	48.0	-8.6
10.870	Pk	41.6	2.2	43.8	48.0	-4.2
11.320	Pk	39.3	2.4	41.7	48.0	-6.3
12.220	Pk	39.0	2.5	41.5	48.0	-6.5
12.680	Pk	36.2	2.5	38.7	48.0	-9.3
23.100	Pk	36.6	3.3	39.9	48.0	-8.1

TEST PERSONNEL:

Franck Schuppious Test Technician/Engineer	 Signature	4/04/2002 Date Of Test
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5 RADIATED EMISSION LIMITS RECEIVER/DIGITAL INTERFACE - §15.209

5.1 RADIATED 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 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. The worst -case channel 11 in both modes is presented in the table below.

5.2 RADIATED EMISSION LIMITS TEST DATA

TABLE 5-1: RADIATED EMISSIONS TRANSMITTING CH 1

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)
144.000	Qp	H	315	1.0	41.7	-16.9	24.8	43.5	-18.7
240.035	Qp	H	270	1.4	47.5	-15.7	31.8	46.0	-14.2
256.496	Qp	V	180	1.0	35.1	-14.8	20.3	46.0	-25.7
277.995	Qp	V	45	1.0	38.9	-14.6	24.3	46.0	-21.7
360.000	Qp	H	170	1.0	31.1	-10.9	20.2	46.0	-25.8
384.056	Qp	H	215	1.0	39.3	-11.3	28.0	46.0	-18.0
479.994	Qp	H	45	1.0	33.4	-8.5	24.9	46.0	-21.1
748.492	Qp	H	340	1.0	38.9	-4.5	34.4	46.0	-11.6

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

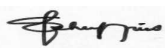
TABLE 5-2: RADIATED EMISSIONS RECEIVING CH 1

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)
144.000	Qp	H	132	2.0	41.4	-14.1	27.3	43.5	-16.2
240.000	Qp	H	243	2.5	43.6	-8.5	35.1	46.0	-10.9
407.949	Qp	V	2	1.0	42.3	-3.5	38.8	46.0	-7.2
660.000	Qp	H	98	2.0	28.8	4.1	32.9	46.0	-13.1
748.492	Qp	H	45	1.0	34.9	5.4	40.3	46.0	-5.7
836.000	Qp	H	67	2.0	28.4	7.2	35.6	46.0	-10.4

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

TEST PERSONNEL:

Franck Schuppis
Test Technician/Engineer


Signature

4/06/2002
Date Of Test

6 RADIATED EMISSION LIMITS RADIATED HARMONICS - §15.247

6.1 RADIATED 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 X-Y, X-Z and Y-Z orthogonal plane.

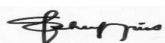
Operating Frequency (MHz): 2412
Channel: 1

TABLE 6-1: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 1)

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)
2412.00	Pk	V	71	1	92.3	11.3	103.6	Fundamental
2412.00	Av	V	71	1	83.9	11.3	95.2	Fundamental
2481.00	Pk	V	340	1.3	43.9	11.3	55.2	
2481.00	Av	V	340	1.3	40.1	11.3	51.4	54.0
4075.971	Av	V	10	1.0	NF			54.0
4824.000	Av	V	10	1.0	NF			54.0
7236.000	Av	V	20	1.0	NF			54.0
9648.000	Av	V	20	1.0	NF			54.0
12060.000	Av	V	10	1.0	NF			54.0
14472.000	Av	V	10	1.0	NF			54.0
16884.000	Av	V	10	1.0	NF			54.0
19296.000	Av	V	10	1.0	NF			54.0
21708.000	Av	V	10	1.0	NF			54.0
24120.000	Av	V	10	1.0	NF			54.0

PEAK: RES. =1 MHz, VID= 1MHz; AVERAGE: RES. =1 MHz, VID= 10Hz; NF = NOISE FLOOR

TEST PERSONNEL:

Franck Schuppis		4/06/2002
Test Technician/Engineer	Signature	Date Of Test

Operating Frequency (MHz): 2437
Channel: 6

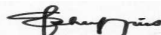
TABLE 6-2: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 6)

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)
2437.000	Pk	V	71	1	95.3	11.3	106.6	Fundamental
2437.000	Av	V	71	1	87.1	11.3	98.4	Fundamental
2481.000	Pk	V	340	1.5	43.1	11.3	54.4	
2481.000	Av	V	340	1.5	41.0	11.3	52.3	54.0
4874.000	Av	V	20	1.0	<20 dB			54.0
7311.000	Av	V	10	1.2	<20 dB			54.0
9748.000	Av	V	10	1.2	<20 dB			54.0
12185.000	Av	V	10	1.0	<20 dB			54.0
14622.000	Av	V	10	1.0	<20 dB			54.0
17059.000	Av	V	10	1.0	<20 dB			54.0
19496.000	Av	V	10	1.0	<20 dB			54.0
21933.000	Av	V	10	1.0	<20 dB			54.0
24370.000	Av	V	10	1.0	<20 dB			54.0

PEAK: RES. =1 MHz, VID= 1MHz; AVERAGE: RES. =1 MHz, VID= 10Hz; NF = NOISE FLOOR

TEST PERSONNEL:

Franck Schuppis
Test Technician/Engineer


Signature

4/06/2002
Date Of Test

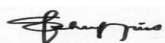
Operating Frequency (MHz): 2462
Channel: 11

TABLE 6-3: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 11)

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)
2462.000	Pk	V	73	1	94.1	11.3	105.4	Fundamental
2462.000	Av	V	73	1	86.6	11.3	97.9	Fundamental
2507.000	Pk	V	345	1	35.0	11.3	46.3	
2507.000	Av	V	345	1	31.0	11.3	42.3	54.0
4924.000	Av	V	20	1.2	<20 dB			54.0
7386.000	Av	V	10	1.2	<20 dB			54.0
9848.000	Av	V	10	1.0	<20 dB			54.0
12310.000	Av	V	10	1.0	<20 dB			54.0
14772.000	Av	V	10	1.2	<20 dB			54.0
17234.000	Av	V	10	1.0	<20 dB			54.0
19696.000	Av	V	10	1.0	<20 dB			54.0
22158.000	Av	V	10	1.0	<20 dB			54.0
24620.000	Av	V	10	1.0	<20 dB			54.0

PEAK: RES. =1 MHz, VID= 1MHz; AVERAGE: RES. =1 MHz, VID= 10Hz; NF = NOISE FLOOR

TEST PERSONNEL:

Franck Schuppis		4/06/2002
Test Technician/Engineer	Signature	Date Of Test

6.2 TEST EQUIPMENT USED FOR TESTING

TABLE 6-4: RADIATED SPURIOUS EMISSIONS TEST EQUIPMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER
900931	Hewlett Packard	8566B	Spectrum Analyzer (100Hz – 22 GHz)	3138A07771
900772	EMCO	3161-02	Horn Antenna (2-4 GHz)	900772
900321	EMCO	3161-03	Horn Antenna (4-8,2GHz)	9508-1020
900323	EMCO	3160-7	Horn Antenna (8,2-12,4 GHz)	9605-1054
900325	EMCO	3160-9	Horn Antenna (18 - 26.5 GHz)	9605-1051
900723	Miteq	NA	AMP 100MHz-26GHz	NA
900791	Schaffner - Chase	CBL6112	Antenna (25 MHz - 2 GHz)	2099

7 MODULATED BANDWIDTH - §15.247(A)(2)

7.1 MODULATED BANDWIDTH TEST PROCEDURE

The minimum 6 dB bandwidth per FCC 15.247 (a)(2) was measured using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 300 kHz. Since the EUT has an integral antenna, the test was performed as a radiated test. The 6dB value on the bandwidth plots were corrected using the site correction factor (i.e. cable loss, amplifier gain, and antenna factor) and the path loss at 3 meter distance; and referenced to the EIRP value measured in section 8 of this report. The minimum 6 dB modulated bandwidths are as follows:

7.2 TEST EQUIPMENT USED FOR TESTING

TABLE 7-1: TEST EQUIPMENT USED FOR TESTING (MODULATED BANDWIDTH)

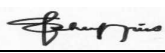
RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER
900931	HP	8566B	Spectrum Analyzer (100Hz – 22 GHz)	3138A07771

7.3 MODULATED BANDWIDTH TEST DATA

TABLE 7-2: MINIMUM 6 DB MODULATED BANDWIDTHS

CHANNEL	6dB BANDWIDTH (MHz)
1	9.3
6	9.8
11	10.1

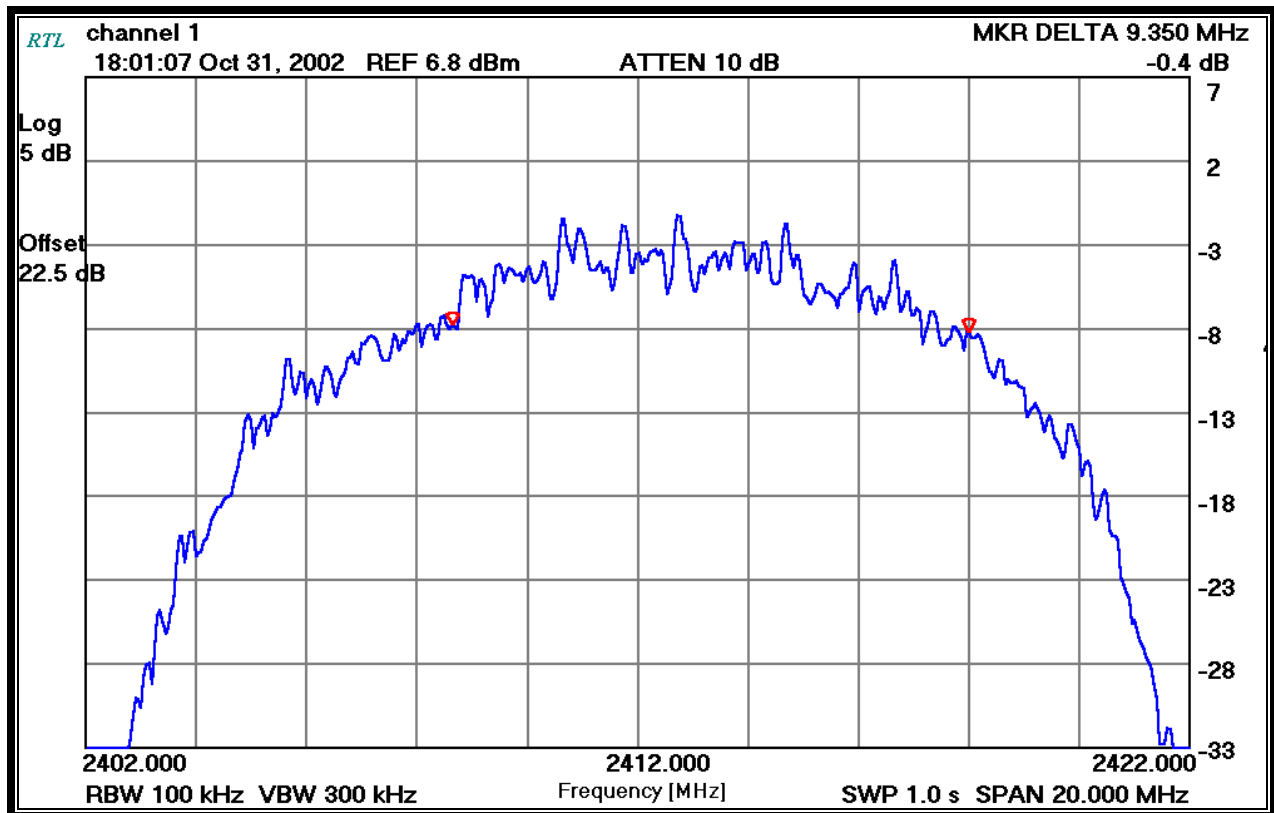
TEST PERSONNEL:

Franck Schuppis Test Technician/Engineer	 Signature	4/03/2002 Date Of Test
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7.4 MODULATED BANDWIDTH PLOTS

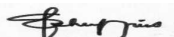
Channel Number: 1
Frequency (MHz): 2412
Resolution Bandwidth (kHz): 100
Video Bandwidth (kHz): 300
Sweep Time (s): 1.0

PLOT 7-1: MODULATED BANDWIDTH CHANNEL 1



TEST PERSONNEL:

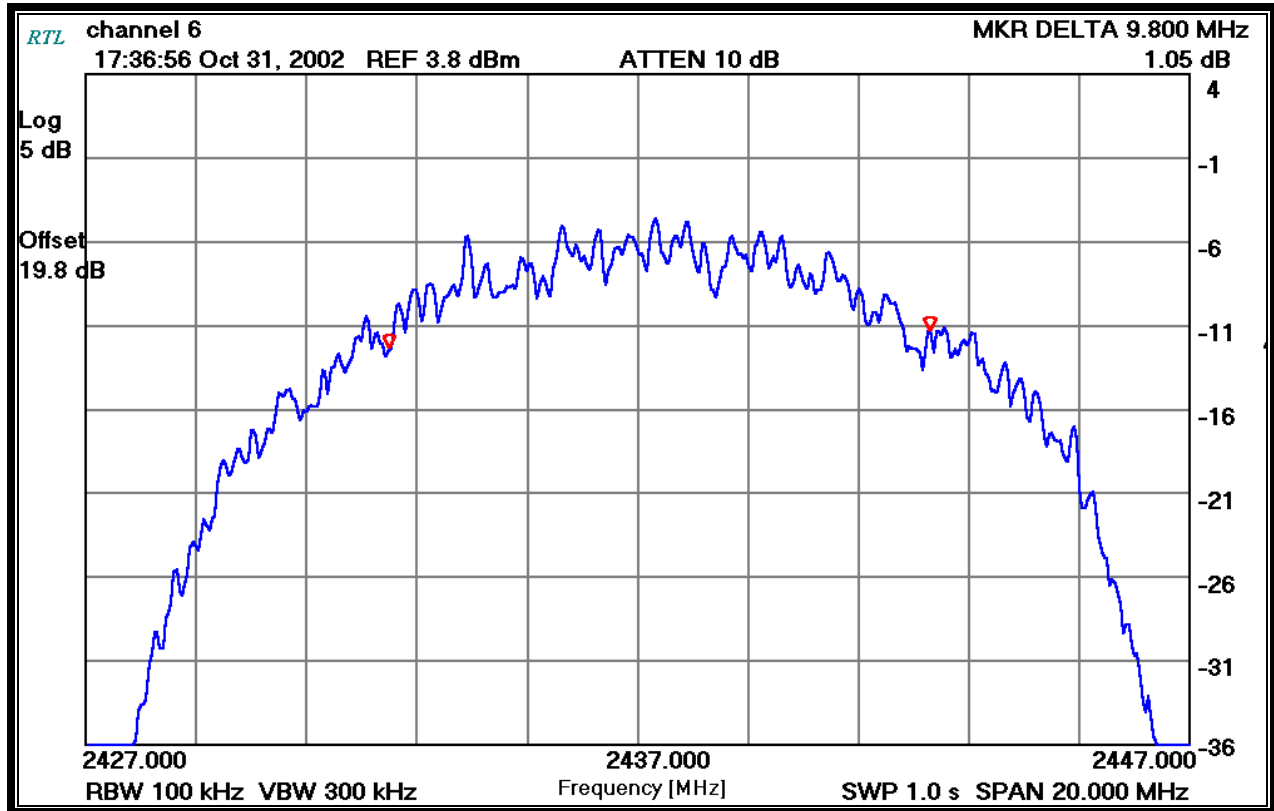
Franck Schuppis
Test Technician/Engineer


Signature

10/31/2002
Date Of Test

Channel Number: 6
Frequency (MHz): 2437
Resolution Bandwidth (kHz): 100
Video Bandwidth (kHz): 300
Sweep Time (s): 1.0

PLOT 7-2: MODULATED BANDWIDTH CHANNEL 6



TEST PERSONNEL:

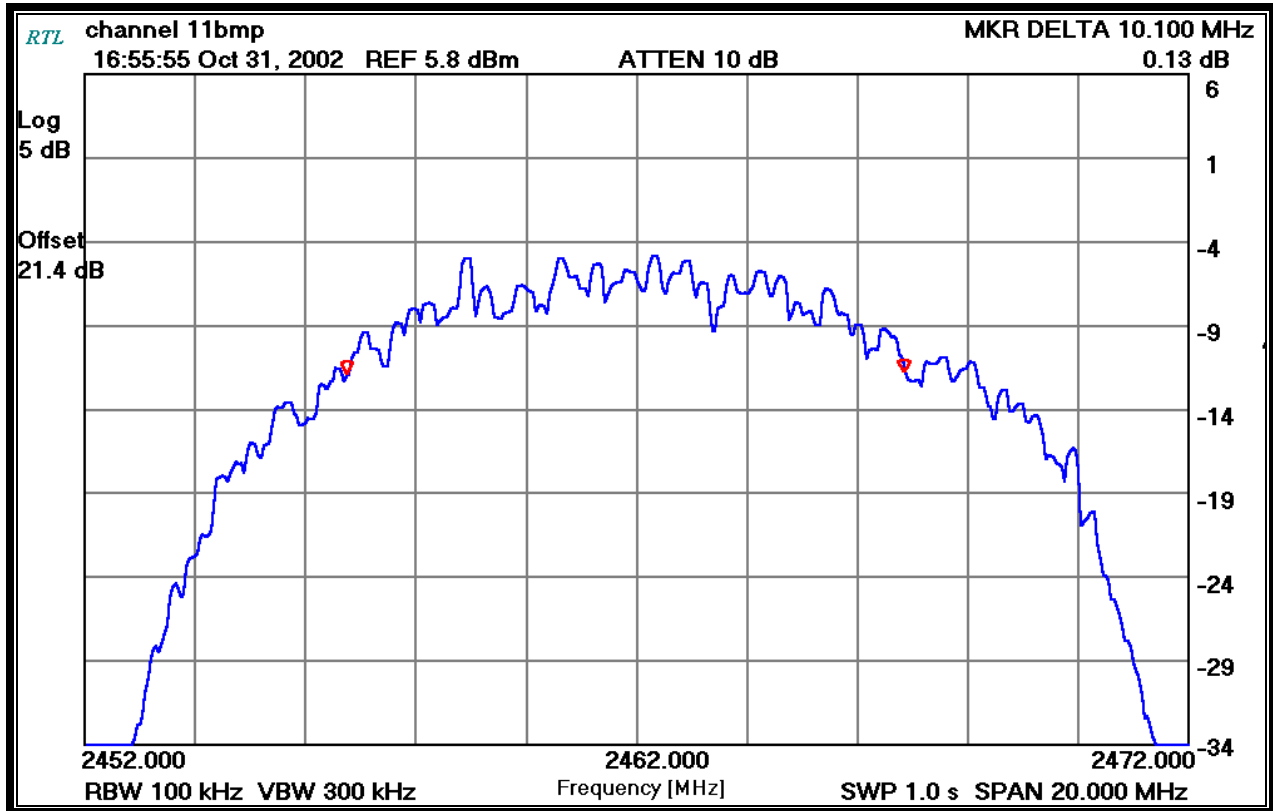
Franck Schuppius
Test Technician/Engineer


Signature

10/31/2002
Date Of Test

Channel Number: 11
Frequency (MHz): 2462
Resolution Bandwidth (kHz): 100
Video Bandwidth (kHz): 300
Sweep Time (s): 1.0

PLOT 7-3: MODULATED BANDWIDTH CHANNEL 11



TEST PERSONNEL:

Franck Schuppius
Test Technician/Engineer


Signature

10/31/2002
Date Of Test

8 POWER OUTPUT - §15.247(B)

8.1 POWER OUTPUT TEST PROCEDURE

The EIRP measurement was performed as a radiated test using the substitution method. The two antennas have been tested and the worst case is listed below.

8.2 TEST EQUIPMENT USED FOR TESTING

TABLE 8-1: TEST EQUIPMENT USED FOR TESTING (RADIATED RF OUTPUT – EIRP)

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER
901186	Agilent Technologies	E9323A (50MHz-6GHz)	Peak & Avg. Power Sensor	US40410380
901184	Agilent Technologies	E4416A	EPM-P Power Meter, single channel	GB41050573
900931	Hewlett Packard	8566B	Spectrum Analyzer (100Hz – 22 GHz)	3138A07771
900772	EMCO	3161-02	Horn Antenna (2-4 GHz)	900772
900723	Miteq	NA	AMP (100MHz-26GHz)	NA
900814	Electro-Metrics	RGA-60	Double Ridges Guide Antenna (1-18 GHz)	2310

8.3 POWER OUTPUT TEST DATA

TABLE 8-2: POWER OUTPUT TEST DATA

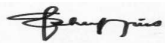
Operating Frequency (MHz): 2412, 2437, & 2462
Channel: 1, 6 & 11

TABLE 8-3: POWER OUTPUT TEST DATA

CHANNEL	EIRP (dBm)*
1	7.3
6	4.4
11	6.5

*Measurement accuracy is +/- 1.5 dB

TEST PERSONNEL:

Franck Schuppius		4/04/2002
Test Technician/Engineer	Signature	Date Of Test

Rhein Tech Laboratories
360 Herndon Parkway
Suite 1400
Herndon, VA 20170
www.rheintech.com

Client: Samsung EMC
Model: SWL-2200U
FCC ID: E2XSWL-2200U
FCC/IC: 15.247/RSS-210
Report #: 2002055

9 ANTENNA CONDUCTED SPURIOUS EMISSIONS - §15.247(C)

9.1 ANTENNA CONDUCTED SPURIOUS EMISSIONS TEST PROCEDURES

Not Applicable - no antenna port.

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 3kHz, the video bandwidth set at 30kHz, and the sweep time set at 1000 seconds. Since the EUT has an integral antenna, the test was performed as a radiated test. The spectral lines were resolved for the modulated carriers at 2.412GHz, 2.437GHz and 2.463GHz respectively. These levels are well below the +8dBm limit. See the power spectral density table and plots.

10.2 TEST EQUIPMENT USED FOR TESTING

TABLE 10-1: TEST EQUIPMENT USED FOR TESTING (POWER SPECTRAL DENSITY)

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER
900931	Hewlett Packard	8566B	Spectrum Analyzer (100Hz – 22 GHz)	3138A07771

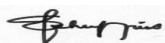
10.3 POWER SPECTRAL DENSITY TEST DATA

Operating Frequency (MHz): 2412MHz, 2437MHz & 2462MHz
Channel: 1, 6 & 11
Limit: 8dBm

TABLE 10-2: POWER SPECTRAL DENSITY

CHANNEL	POWER SPECTRAL DENSITY (dBm) (LIMIT = 8dBm)
1	-17.2
6	-17.5
11	-17.2

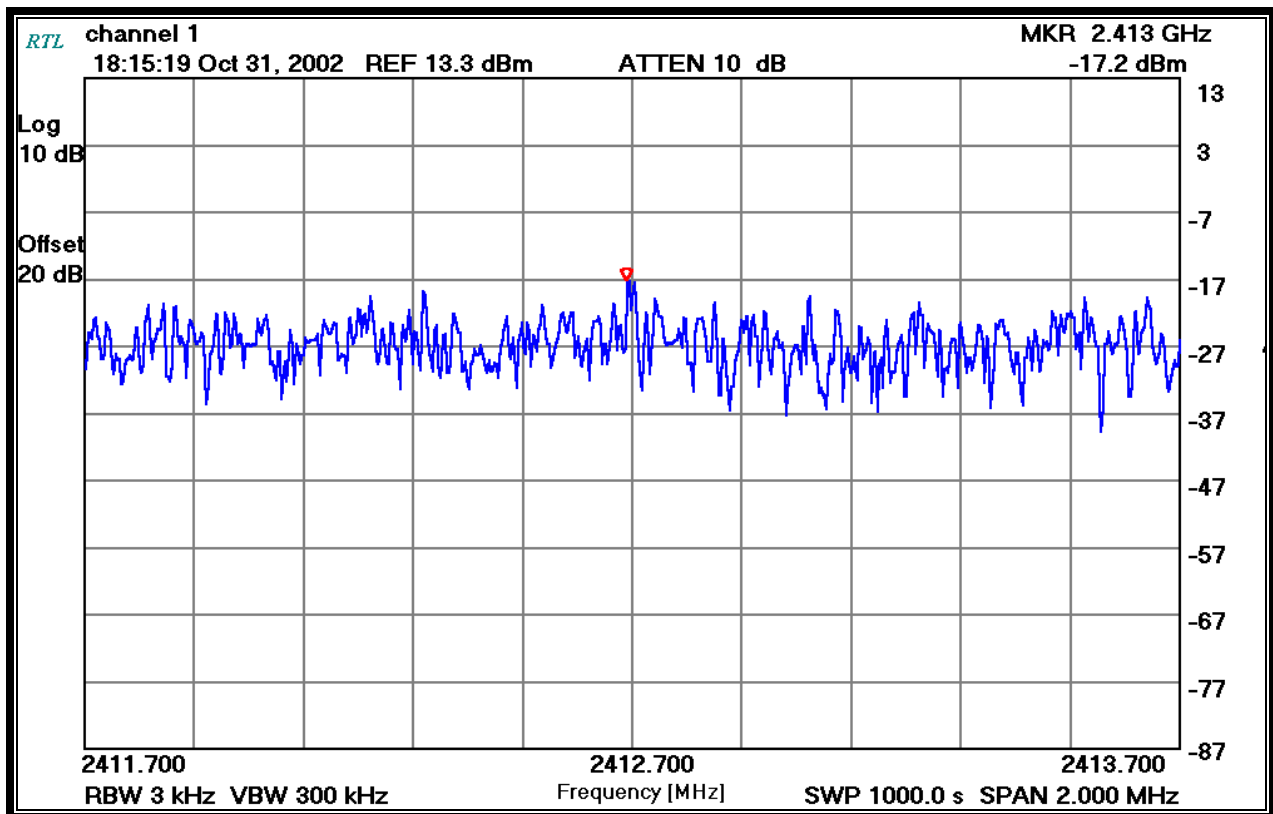
TEST PERSONNEL:

Franck Schuppius		10/31/2002
Test Technician/Engineer	Signature	Date Of Test

10.4 POWER SPECTRAL DENSITY PLOTS

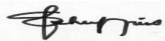
Operating Frequency (MHz): 2412
Channel: 1
Bandwidth Resolution (kHz): 3
Bandwidth Video (kHz): 300
Sweep Time (s): 1000.0

PLOT 10-1: POWER SPECTRAL DENSITY: CHANNEL 1



TEST PERSONNEL:

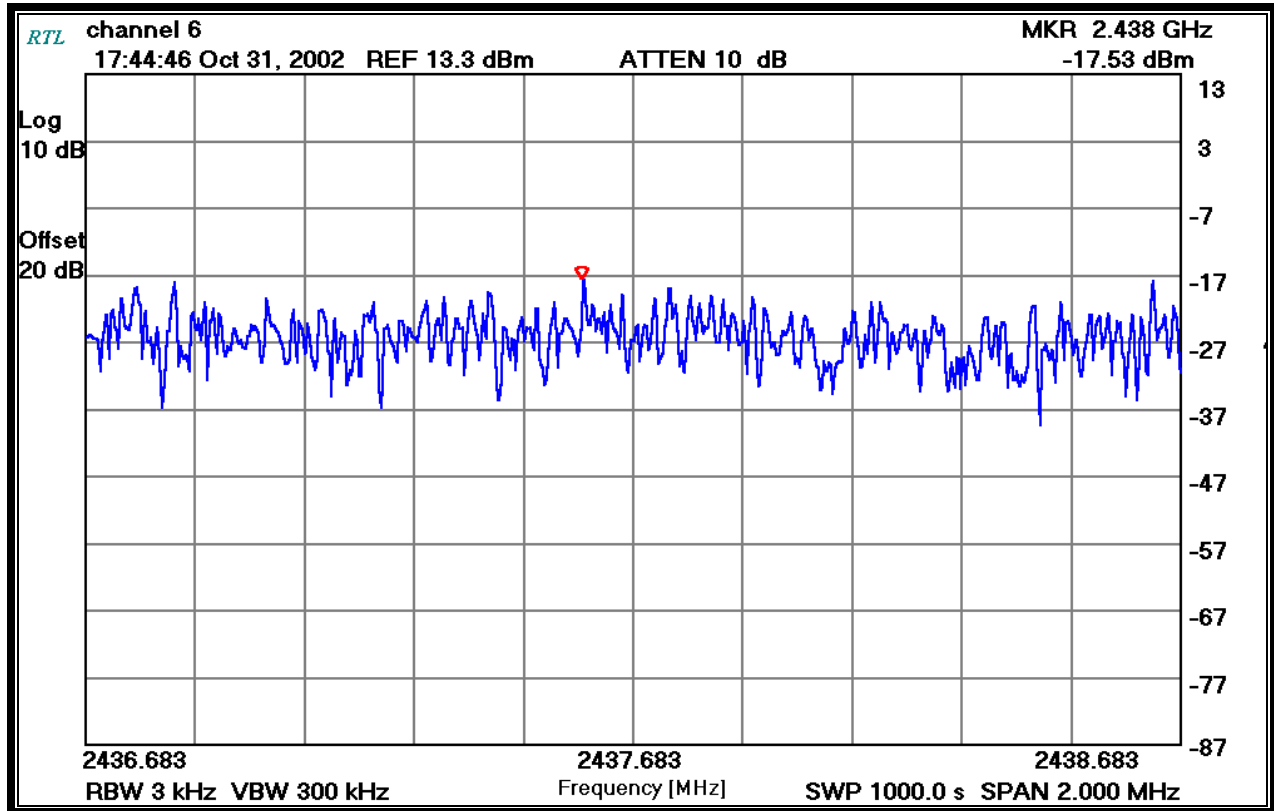
Franck Schuppis
Test Technician/Engineer


Signature

10/31/2002
Date Of Test

Operating Frequency (MHz): 2437
Channel: 6
Bandwidth Resolution (kHz): 3
Bandwidth Video (kHz): 300
Sweep Time (s): 1000.0

PLOT 10-2: POWER SPECTRAL DENSITY: CHANNEL 6



TEST PERSONNEL:

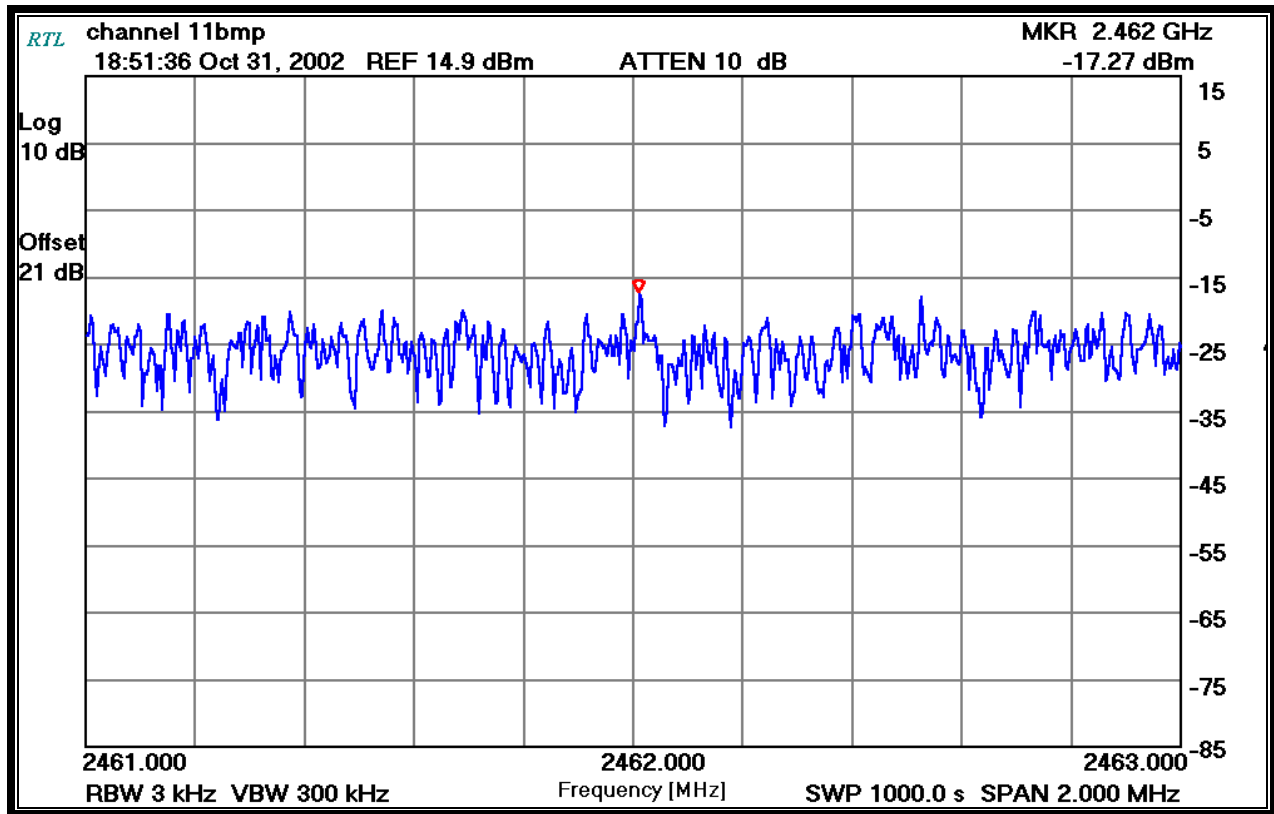
Franck Schuppius
Test Technician/Engineer


Signature

10/31/2002
Date Of Test

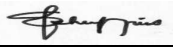
Operating Frequency (MHz): 2462
Channel: 11
Bandwidth Resolution (kHz): 3
Bandwidth Video (kHz): 300
Sweep Time (s): 1000.0

PLOT 10-3: POWER SPECTRAL DENSITY: CHANNEL 11



TEST PERSONNEL:

Franck Schuppis
Test Technician/Engineer


Signature

10/31/2002
Date Of Test

Rhein Tech Laboratories
360 Herndon Parkway
Suite 1400
Herndon, VA 20170
www.rheintech.com

Client: Samsung EMC
Model: SWL-2200U
FCC ID: E2XSWL-2200U
FCC/IC: 15.247/RSS-210
Report #: 2002055

11 CONCLUSION

The data in this measurement report shows that the Samsung Electro-Mechanics Co., LTD, USB WLAN Adapter Card, Model: SWL-2200U, FCC ID: E2XSWL-2200U, complies with all the requirements of Parts 2 and 15 of the FCC Rules and Industry Canada RSS-210.