

# EMI Test Report

Tested in accordance with  
Federal Communications Commission (FCC)  
Personal Communications Services  
CFR 47, Part 15 Subpart C  
&  
Industry Canada (IC) RSS-210, RSS-GEN




**A division of Research In Motion Limited**

**REPORT NO.:** RTS-2671-1004-30

**PRODUCT MODEL NO.:** RDA71UW  
**TYPE NAME:** BlackBerry® smartphone  
**FCC ID:** L6ARDA70UW  
**IC:** 2503A-RDB70UW

**DATE:** 25 May, 2010

	EMI Test Report for the BlackBerry® smartphone Model RDA71UW	
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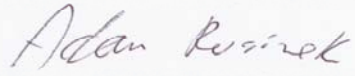
**Statement of Performance:**

The BlackBerry® smartphone, model RDA71UW, part number CER-30953-001 Rev 2, and its accessories perform within the requirements of the test standards when configured and operated under RIM's operation instructions.

**Declaration:**

We hereby certify that:  
 The test data reported herein is an accurate record of the performance of the sample(s) tested.  
 The test results are valid for the tested unit (s) only.  
 The test equipment used was suitable for the tests performed and within manufacturer's published specifications and operating parameters.  
 The test methods were consistent with the methods described in the relevant standards.

Documented by:



Adam Rusinek  
 Regulatory Compliance Associate  
 Date: May 25, 2010

Reviewed by:




Michael Cino  
 Regulatory Compliance Associate  
 Date: May 27, 2010

Reviewed and Approved by:




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 Manager, Regulatory Compliance  
 Date: June 03, 2010

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## A. Scope

This report details the results of compliance tests which were performed in accordance to the requirements of:

- o FCC CFR 47 Part 15, Subpart C, October, 2009
- o Industry Canada, RSS-210, Issue 7, June 2007, Low Power Licence-Exempt Radiocommunication Devices
- o Industry Canada, RSS-GEN, Issue 2, June 2007, General Requirements and Information for the Certification of Radiocommunication Equipment

## B. Associated Documents

1. 9300\_RDA71UW\_HW\_Declaration\_CER-30953\_Rev2

## C. Product Identification

Manufactured by Research In Motion Limited whose headquarters is located at:

295 Phillip Street  
 Waterloo, Ontario  
 Canada, N2L 3W8  
 Phone: 519 888 7465  
 Fax: 519 888 6906


The equipment under test (EUT) was tested at the following locations:

### RIM Testing Services EMI test facilities

305 Phillip Street  
 Waterloo, Ontario  
 Canada, N2L 3W8  
 Phone: 519 888 7465  
 Fax: 519 888 6906

440 Phillip Street  
 Waterloo, Ontario  
 Canada, N2L 5R9  
 Phone: 519 888 7465  
 Fax: 519 888 6906

The testing was performed from April 07 to May 07, 2010.

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The sample EUT included:

SAMPLE	MODEL	CER NUMBER	PIN	Software
1	RDA71UW	CER-30953-001 Rev 1	22163F06	V5.0.0.606 (Platform 6.3.0.1) Bundle: 1019
2	RDA71UW	CER-30953-001 Rev 1	222B8704	V5.0.0.606 (Platform 6.3.0.2) MFI 1041
3	RDA71UW	CER-30953-001 Rev 1	22163F44	V 5.0.0.606 (Platform 6.3.0.1) bundle 1019
4	RDA71UW	CER-30953-001 Rev 2	222B87D1	V5.0.0.606 (Platform 6.3.0.2) MFI 1041

Sample 1 was used for Bluetooth and 802.11b/g/n Radiated Emissions testing.  
Sample 1 was used for Bluetooth and 802.11b/g/n Conducted Emissions testing.  
Sample 2 and 4 were used for 802.11b/g/n Radiated Emissions testing.  
Sample 3 was used for Bluetooth Radiated Emissions testing.

To view the differences between CER-30953-001 Rev 1 and CER-30953-001 Rev 2, see document 9300\_RDA71UW\_HW\_Declaration\_CER-30953\_Rev2.


Only the characteristics that may have been impacted by the changes from Rev 1 to Rev 2 were retested.

#### BlackBerry® smartphone Accessories Tested

- 1) Fixed Blade Charger, part number HDW-24481-001, with an output voltage of 5.0 volts dc, 700 mA and attached USB cable with a lead length of 1.80 metres.
- 2) Folding Blade Charger, part number HDW-17955-001 with an output voltage of 5.0 volts dc, 700 mA and attached USB cable with a lead length of 1.80 metres.
- 3) Alternate Stereo Headset, part number HDW-24529-001, with a lead length of 1.1 metres.
- 4) USB Data Cable, part number HDW-06610-005, 1.50 metres long.


#### **D. Support Equipment Used for the Testing of the EUT**

No support equipment used. See section *G. Compliance Test Equipment Used.*

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### E. Test Results Chart

SPECIFICATION		TEST TYPE	Meets Requirements	TEST DATA
FCC CFR 47	IC			APPENDIX
Part 15.207	RSS-210 RSS-GEN	Conducted AC Line Emission	Pass	1
Part 15.209 Part 15.247	RSS-210 RSS-GEN	BT Radiated Spurious Emissions and Radiated Band Edge Compliance	Pass	2
Part 15.209 Part 15.247	RSS-210 RSS-GEN	802.11 b/g/n Radiated Spurious Emissions and Radiated Band Edge Compliance	Pass	2
Part 15.247(a)	RSS-210	BT, 20 dB Bandwidth	Pass	3
Part 15.247(a)	RSS-210	BT, Carrier Frequency Separation	Pass	3
Part 15.247(a)	RSS-210	BT, Number of Hopping Frequencies	Pass	3
Part 15.247(a)	RSS-210	BT, Time of Occupancy (Dwell Time)	Pass	3
Part 15.247(b)	RSS-210	BT, Maximum Peak Conducted Output Power	Pass	3
Part 15.247(c)	RSS-210	BT, Band-Edge Compliance of RF Conducted Emissions	Pass	3
Part 15.247(c)	RSS-210	BT, Spurious RF Conducted Emissions	Pass	3
Part 15.247(b)	RSS-210	802.11b/g/n, 6 dB Bandwidth	Pass	4
Part 15.247(b)	RSS-210	802.11b/g/n, Maximum Conducted Output Power	Pass	4
Part 15.247(b)	RSS-210	802.11b/g/n, Band-Edge	Pass	4
Part 15.247(b)	RSS-210	802.11b/g/n, Peak Power Spectral Density	Pass	4
Part 15.247(b)	RSS-210	802.11b/g/n, Spurious RF Conducted Emissions	Pass	4

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## F. Summary of Results

### 1) AC LINE CONDUCTED EMISSIONS

The conducted emissions were measured using the test procedure outlined in CISPR Recommendation 22 through a 50 Ohm Line Impedance Stabilization Network (LISN), which was inserted in the power line to the equipment to provide the specified impedance for measurements. The EUT was placed on a nonconductive wooden table, 80 cm high that was positioned 40 cm from a vertical ground plane. The RF output of the network was connected to an EMI receiver system with characteristics that duplicate those of the receiver specified in CISPR Publication 16.

BlackBerry® smartphone was in battery charging mode. The input voltage was 120 V, 60 Hz.


The following test configurations were measured:

Test Configuration	Operating Mode(s)	Charger + Accessories
1	802.11b Tx	Folding Blade Charger + Alternate Stereo Headset
2	Bluetooth Tx, Audio Playback	Fixed Blade Charger + 1.5m USB Cable

The sample EUT's conducted emissions were compared with respect to the FCC CFR 47 Part 15, Subpart C and IC RSS-210 limits. The sample EUT had a worst case test margin of -12.77dB below the QP limit at 0.159 MHz using the quasi-peak detector with the Folding Blade Charger in Test Configuration 1.

See APPENDIX 1 for the test data

### Measurement Uncertainty ±3.0 dB

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## 2) RADIATED EMISSIONS

### a) Radiated Spurious and Harmonic Emissions

The EUT was placed on a nonconductive styrofoam table, 80 cm high that was positioned on a remotely controlled turntable. The test distance used between the EUT and the receiving antenna was three metres. The turntable was rotated to determine the azimuth of the peak emissions. Then the emissions were maximized by elevating the antenna in the range of 1 to 4 metres. The maximum emission level was recorded. The frequency range measured was from 30 MHz to 25.0 GHz. Both the horizontal and vertical polarizations of the emissions were measured.

The measurements were done in a semi-anechoic chamber (SAC) below 1 GHz and a fully-anechoic room (FAR) above 1 GHz. The SAC's FCC registration number is **778487** and the Industry Canada (IC) file number is **2503B-1**. The FAR's FCC registration number is **959115** and the IC file number is **2503C-1**.

The EUT was configured and operated to produce the maximum radiated emissions while still keeping within RIM's specifications.

The BlackBerry® smartphone was measured in standalone configuration with Bluetooth transmitting in single frequency mode at low channel (0), middle channel (39) and high channel (78) for packet type "DH5", "2-DH5" and "3-DH5". The system's radiated emission levels were compared with respect to the FCC CFR 47 Part 15, Subpart C, 15.247 and RSS-210.

The BlackBerry® smartphone was measured in standalone configuration with Wi-Fi transmitting on channels 1, 6 & 11 at 1 Mbps, MCS 0 and MCS 7, and on channel 6 at 6 Mbps for 802.11b/g/n modes. The system's radiated emission levels were compared with respect to the FCC CFR 47 Part 15 Subpart C, 15.247 and RSS-210.

The Bluetooth harmonics were investigated up to the 10th harmonic. All emissions were in the noise floor.

The 802.11b/g/n harmonics were investigated up to the 10th harmonic. The worst case emission was 54.63 dBµV/m, or 19.37 dB margin below the limit, at 2484.856MHz.

See APPENDIX 2 for the test data


### b) Band-Edge Compliance of RF Radiated Emissions

The BlackBerry® smartphone met the requirements for band-edge compliance of RF radiated emissions for Bluetooth and 802.11b/g/n as per the requirements of 15.247, 15.209, and RSS-210/RSS-GEN.

### Measurement Uncertainty ±4.6 dB

See APPENDIX 2 for the test data



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### 3) BLUETOOTH RF CONDUCTED EMISSIONS

The Bluetooth conducted RF emissions from the BlackBerry® smartphone were measured using the methods outlined in FCC CFR 47 Part 15, Subpart C.

a) 20 dB Bandwidth

The BlackBerry® smartphone met the requirements of the 20 dB bandwidth as per 47 CFR 15.247(a) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured. The result includes both normal data rate and EDR. The worst case 20 dB bandwidth was 1.317 MHz on channel 0 using EDR. See APPENDIX 3 for the test data.

b) Carrier Frequency Separation

The BlackBerry® smartphone met the requirements of the carrier frequency separation as per 47 CFR 15.247(a) and RSS-210. Channel 38 to 39 was measured. The result includes both normal data rate and EDR. See APPENDIX 3 for the test data.

c) Number of Hopping Frequencies

The BlackBerry® smartphone met the requirements of the number of hopping frequencies as per 47 CFR 15.247(a) and RSS-210. The number of hopping channels measured was 79. See APPENDIX 3 for the test data.

d) Time of Occupancy (Dwell Time)


The EUT met the requirements of the dwell time as per 47 CFR 15.247(a) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured in DH1, DH3 and DH5 modes. Bluetooth was operating in frequency hopping (Euro/US) mode during the measurements. See APPENDIX 3 for the test data.

e) Maximum Peak Conducted Output Power

The BlackBerry® smartphone met the requirements of the maximum peak conducted output power as per 47 CFR 15.247(b) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured. The result includes both normal data rate and EDR. The worst case conducted power level was 9.67 dBm (0.00927 W) on channel 78 using normal data rate. See APPENDIX 3 for the test data.

f) Band-Edge Compliance of RF Conducted Emissions

The BlackBerry® smartphone met the requirements of the band-edge compliance of RF conducted emissions as per 47 CFR 15.247(c) and RSS-210. Channels 0 and 78 were measured in frequency hopping (Euro/US) mode and single frequency mode. The result includes both normal data rate and EDR. See APPENDIX 3 for the test data.

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g) Spurious RF Conducted Emissions

The BlackBerry® smartphone met the requirements of the spurious RF conducted emissions as per 47 CFR 15.247(c) and RSS-210. The frequency range measured was 10 MHz to 26 GHz. Low channel (0), middle channel (39) and high channel (78) were measured in single frequency mode and frequency hopping (Euro/US) mode. The result includes both normal data rate and EDR. See APPENDIX 3 for the test data.

4) 802.11b/g/n RF CONDUCTED EMISSIONS

The 802.11b/g/n conducted RF emissions from the BlackBerry® smartphone were measured using the methods outlined in FCC CFR 47 Part 15, Subpart C.

a) 6dB Bandwidth

The EUT met the requirements of the 6 dB bandwidth as per 47 CFR 15.247(b) and RSS-210. Low channel (1), middle channel (6) and high channel (11) were measured. The worst case 6dB bandwidth was 17.73 MHz on each of channels 1, 6 and 11. See APPENDIX 4 for the test data.

b) Maximum Conducted Output Power

The EUT met the requirements of the maximum conducted output power as per 47 CFR 15.247(b) and RSS-210. Low channel (1), middle channel (6) and high channel (11) were measured. The worst case conducted power level was 18.10 dBm (0.06457 W) on channel 1 using a data rate of 1 Mbps. See APPENDIX 4 for the test data

c) Band-Edge Compliance of RF Conducted Emissions


The EUT met the requirements of band-edge compliance of RF conducted emissions as per 47 CFR 15.247(b) and RSS-210. Low channel (1) and high channel (11) were measured. See APPENDIX 4 for the test data.

d) Peak Power Spectral Density

The EUT met the requirements of peak power spectral density as per 47 CFR 15.247(b) and RSS-210. Low channel (1), middle channel (6) and high channel (11) were measured. See APPENDIX 4 for the test data.


e) Spurious RF Conducted Emissions

The EUT met the requirements of the spurious RF conducted emissions as per 47 CFR 15.247(c) and RSS-210. The frequency range measured was 30 MHz to 26 GHz. Low channel (1), middle channel (6) and high channel (11) were measured. See APPENDIX 4 for the test data.

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## G. Compliance Test Equipment Used

<u>UNIT</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SERIAL NUMBER</u>	<u>CAL DUE DATE</u> (YY MM DD)	<u>USE</u>
EMI Test Receiver	Rohde & Schwarz	ESIB 40	100255	10-12-01	Conducted/Radiated Emissions
EMI Test Receiver	Rohde & Schwarz	ESU 40	100162	10-11-29	Conducted/Radiated Emissions
Hybrid Log Antenna	EMC Automation	HLP-3003C	017401	10-09-26	Radiated Emissions
Horn Antenna	CMT	LHA 0180	R52734-001	12-01-21	Radiated Emissions
Horn Antenna	ETS-Lindgren	3117	47563	11-07-15	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA4-SP	001	11-02-17	Radiated Emissions
Preamplifier	Sonoma	310N/11909A	185831	10-11-14	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA-SP	001	11-02-19	Radiated Emissions
L.I.S.N.	Rohde & Schwarz	ENV216	100060	10-12-11	Conducted Emissions
Environment Monitor	Control Company	1870	230355190	11-01-08	Radiated Emissions
EMC Analyzer	Agilent	E7405A	US40240226	10-12-10	Radiated Emissions
Spectrum Analyzer	HP	8563E	3745A08112	11-09-30	RF Conducted Emissions
DC Power Supply	HP	6632B	US37472178	10-09-03	RF Conducted Emissions
Environment Monitor	Control Company	1870	80117164	11-01-08	RF Conducted Emissions
Temperature Probe	Control Company	15-077-21	51129471	11-04-29	Frequency Stability
Environmental Chamber	ESPEC Corp.	SH-240S1	91005607	N/R	Frequency Stability
Bluetooth Tester	Rohde & Schwarz	CBT	100034	10-11-10	RF Conducted Emissions
Bluetooth Tester	Rohde & Schwarz	CBT35	100368	10-11-25	Radiated Emissions
Bluetooth Tester	Rohde & Schwarz	CBT35	100370	10-11-26	Radiated Emissions
Power Meter	Agilent	N1911A	MY45100905	11-01-05	RF Conducted / Frequency Stability
Power Sensor	Agilent	N1921A	SG45240281	10-05-08	RF Conducted / Frequency Stability
Digital Multimeter	Hewlett Packard	34401A	US36042324	10-10-08	Conducted/Radiated Emissions
Environment Monitor	Control Company	1870	230355159	11-01-08	Radiated Emissions

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## APPENDIX 1 – AC CONDUCTED EMISSIONS TEST DATA/PLOTS

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AC Conducted Emissions Test Results

Test configuration: 1

Date of the test: April 24, 2010

The environmental conditions were:

Temperature: 26 °C  
 Pressure: 1023 mB  
 Humidity: 24 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dBµV)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.159	N	41.58	11.17	52.75	65.52	55.52	-12.77
0.213	L1	36.27	10.77	47.04	63.09	53.09	-16.05
0.213	N	34.28	10.79	45.07	63.09	53.09	-18.01
0.236	N	32.45	10.63	43.08	62.25	52.25	-19.17
0.249	L1	34.72	10.51	45.23	61.79	51.79	-16.56
0.249	N	32.38	10.54	42.92	61.79	51.79	-18.88
0.321	L1	29.67	10.13	39.80	59.68	49.68	-19.88
0.348	N	26.35	10.10	36.45	59.01	49.01	-22.56
0.380	L1	26.49	10.04	36.53	58.29	48.29	-21.76
0.456	L1	24.95	9.93	34.89	56.77	46.77	-21.88
1.784	N	29.02	9.82	38.84	56.00	46.00	-17.16
2.036	L1	30.42	9.83	40.25	56.00	46.00	-15.75
2.810	N	21.16	9.87	31.03	56.00	46.00	-24.97
3.768	L1	23.88	9.90	33.78	56.00	46.00	-22.22
9.551	L1	25.13	9.97	35.10	60.00	50.00	-24.90

All other emission levels test margins greater than 25 dB.

Measurements were done with the quasi-peak detector.

See figure 1-1 and figure 1-2 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

### AC Conducted Emissions Test Graphs

#### Test Configuration 2

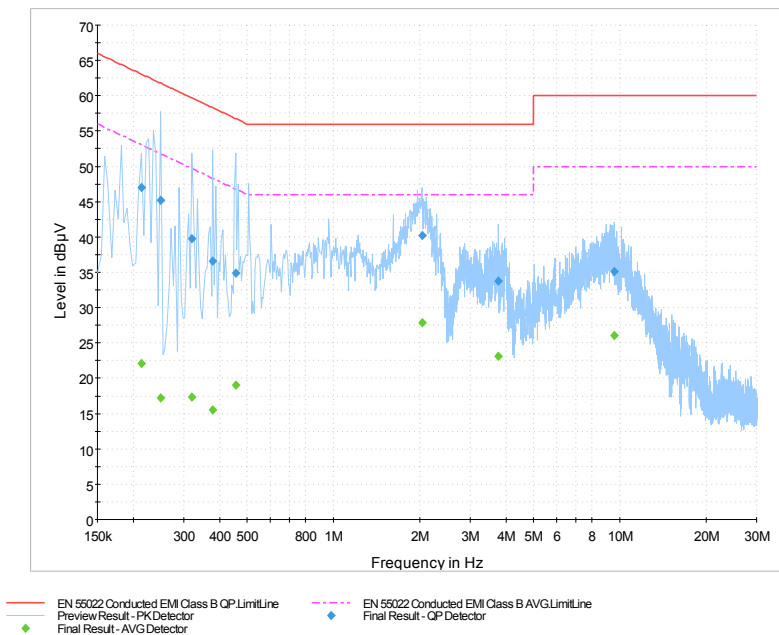


Figure 1-1: L1 lines

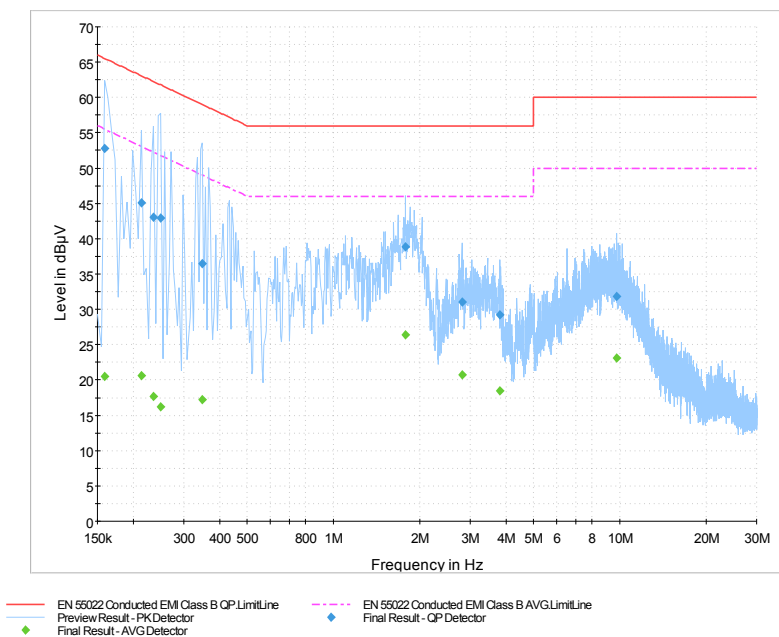


Figure 1-2: N Lines



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AC Conducted Emissions Test Results cont'd

Test configuration: 2

Date of the test: April 24, 2010  
 The environmental conditions were:

Temperature: 26 C  
 Pressure: 1023mB  
 Humidity: 24%

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dBµV)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.155	N	35.47	11.20	46.67	65.75	55.75	-19.08
0.164	N	34.49	11.14	45.63	65.28	55.28	-19.65
0.182	L1	30.77	10.99	41.75	64.42	54.42	-22.67
0.200	N	29.76	10.89	40.64	63.63	53.63	-22.99

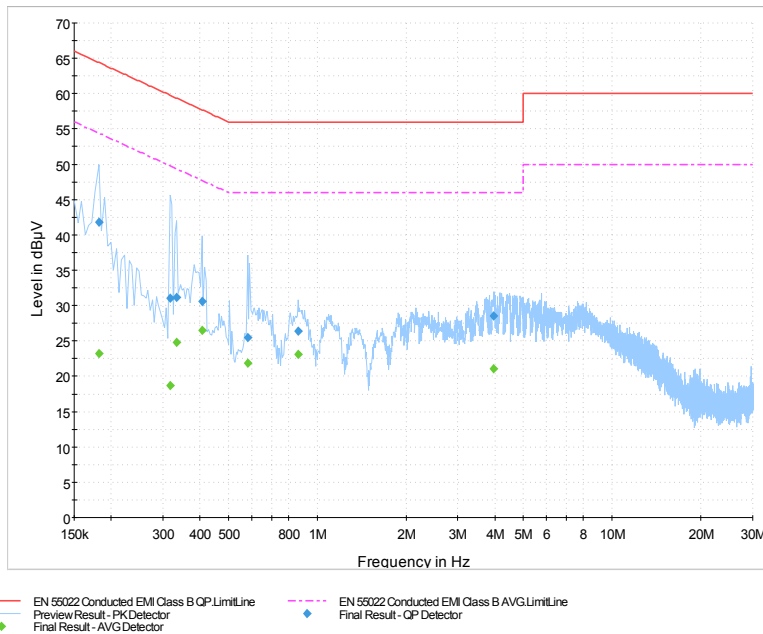
All other emission levels had test margins greater than 25 dB.

Measurements were done with the quasi-peak detector.

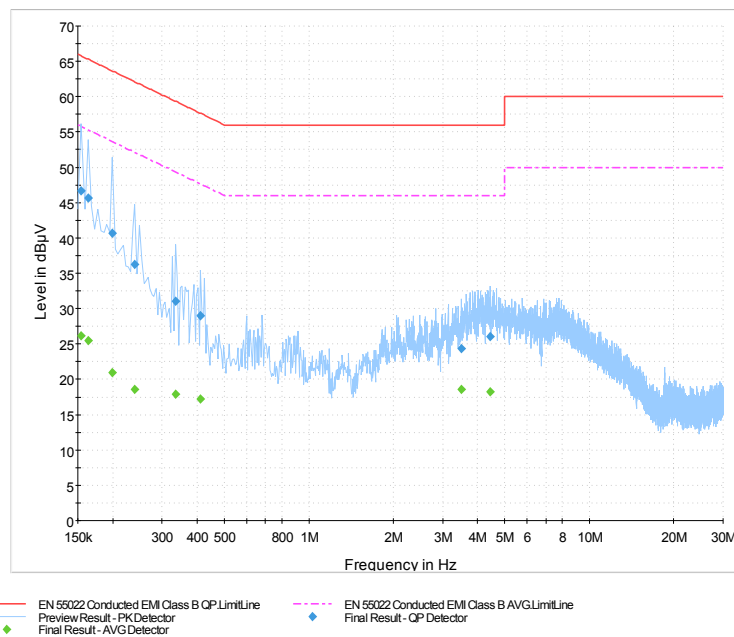
See figure 1-3 and figure 1-4 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

AC Conducted Emissions Test Graphs

Test Configuration 5




**Figure 1-3: L1 lines**




**Figure 1-4: N Lines**



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**APPENDIX 2 – BLUETOOTH AND 802.11b/g/n RADIATED EMISSIONS TEST DATA**

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Radiated Emissions Test Results  
Bluetooth Band

Date of Test: April 10, 2010  
Measurements were performed by Kevin Rose.

The environmental test conditions were: Temperature: 23-25 °C  
Pressure: 998 – 1009 mb  
Relative Humidity: 25 %- 28%

The test distance was 3.0 metres with a EUT height of 0.8 metres, sweep frequency of 30 MHz to 1 GHz.

The BlackBerry® smartphone in Bluetooth Tx mode was in USB down.

The frequency sweep measurements were performed in single frequency mode on channels 0, 39 and 78 using packet types “DH5”, “2-DH5” and “3-DH5”.

All emissions had a test margin of greater than 25.0 dB.


Date of Test: April 07 to May 03, 2010  
Measurements were performed by Steven Wang.

The environmental test conditions were: Temperature: 23 – 26 °C  
Pressure: 1003 – 1022 mb  
Relative Humidity: 23 – 32 %

The measurements were performed in single frequency Tx mode using packet types “DH5”, “2-DH5” and “3-DH5” on channels 0, 39 and 78. The BlackBerry® smartphone was in standalone, USB down position.

The test distance was 3.0 metres with a height of 0.8 metres, 1GHz to 25GHz.

All emissions had a test margin of greater than 25.0 dB.

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Band-Edge Compliance of RF Radiated Emissions Test Results  
Bluetooth Band


Date of test: May 06, 2010  
Measurements were performed by Kevin Rose

The environmental test conditions were: Temperature: 22 °C  
Pressure: 1002 mb  
Relative Humidity: 24 %

The BlackBerry® smartphone was in standalone, vertical, Pattern type “Static PRBS” in “DH5”, “2-DH5” and “3-DH5” modulation during the measurements.

The test distance was 3.0 metres.

Channel	Freq. (MHz)	Rx Antenna Type	POL.	Detector (PK, AVE.)	VBW (MHz)	Corrected Reading (dBuV/m)	Delta Marker (dB)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Low Channel, Packet Type DH5										
0	2402	Horn	V	PK	1 MHz	101.92	50.69	51.23	74	-22.77
0	2402	Horn	H	PK	1 MHz	102.94	54.94	48	74	-26.00
0	2402	Horn	V	AVE.	10 Hz	72.6	50.69	21.91	54	-32.09
0	2402	Horn	H	AVE.	10 Hz	69.03	54.94	14.09	54	-39.91
High Channel, Packet Type DH5										
78	2480	Horn	V	PK	1 MHz	94.79	55.97	38.82	74	-35.18
78	2480	Horn	H	PK	1 MHz	103.88	62.91	40.97	74	-33.03
78	2480	Horn	V	AVE.	10 Hz	65.08	55.97	9.11	54	-44.89
78	2480	Horn	H	AVE.	10 Hz	69.66	62.91	6.75	54	-47.25
Low Channel, Packet Type 2-DH5										
0	2402	Horn	V	PK	1 MHz	99.94	41.25	58.69	74	-15.31
0	2402	Horn	H	PK	1 MHz	100.89	42.3	58.59	74	-15.41
0	2402	Horn	V	AVE.	10 Hz	70.98	41.25	29.73	54	-24.27
0	2402	Horn	H	AVE.	10 Hz	67.54	42.3	25.24	54	-28.76
High Channel, Packet Type 2-DH5										
78	2480	Horn	V	PK	1 MHz	92.05	50.79	41.26	74	-32.74
78	2480	Horn	H	PK	1 MHz	100.92	55.07	45.85	74	-28.15
78	2480	Horn	V	AVE.	10 Hz	62.94	50.79	12.15	54	-41.85
78	2480	Horn	H	AVE.	10 Hz	67.62	55.07	12.55	54	-41.45

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Band-Edge Compliance of RF Radiated Emissions Test Results cont'd  
Bluetooth Band

Channel	Freq. (MHz)	Rx Antenna		Detector	VBW	Corrected Reading	Delta Marker	Corrected Band edge	Limit	Diff. To Limit
		Type	POL.	(PK, AVE.)	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
Low Channel, Packet Type 3-DH5										
0	2402	Horn	V	PK	1 MHz	99.89	40.25	59.64	74	-14.36
0	2402	Horn	H	PK	1 MHz	100.84	42.45	58.39	74	-15.61
0	2402	Horn	V	AVE.	10 Hz	70.9	40.25	30.65	54	-23.35
0	2402	Horn	H	AVE.	10 Hz	67.46	42.45	25.01	54	-28.99
High Channel, Packet Type 3-DH5										
78	2480	Horn	V	PK	1 MHz	92.01	51.28	40.73	74	-33.27
78	2480	Horn	H	PK	1 MHz	100.91	55.23	45.68	74	-28.32
78	2480	Horn	V	AVE.	10 Hz	62.88	51.28	11.6	54	-42.40
78	2480	Horn	H	AVE.	10 Hz	67.55	55.23	12.32	54	-41.68

See figures 2-1 to 2-12 for the plots of the Bluetooth band-edge compliance.

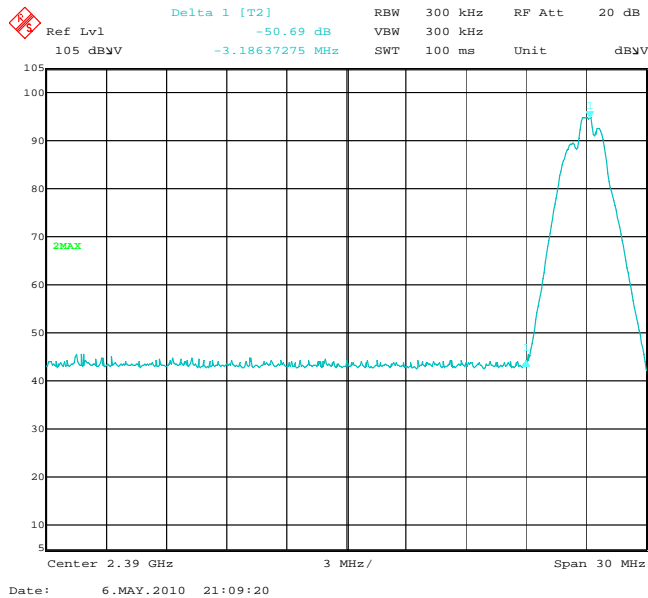
Test Report No.  
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Dates of Test  
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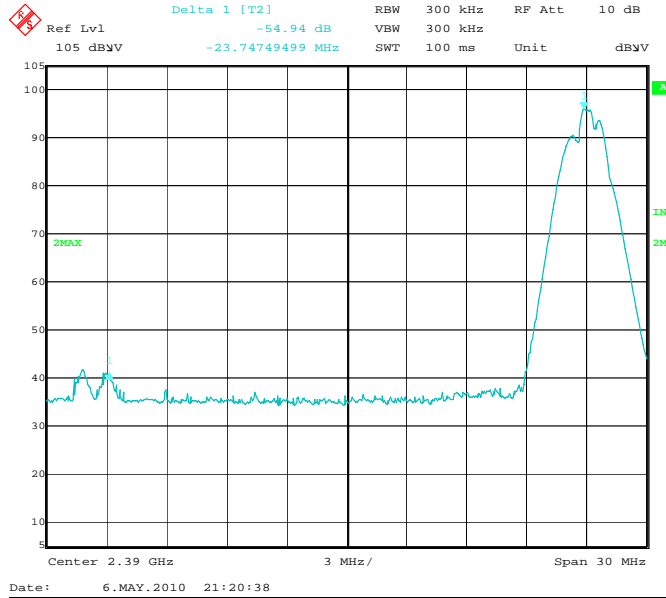
Author Data  
 Adam Rusinek

Bluetooth Band-Edge Compliance of RF Radiated Emissions cont'd

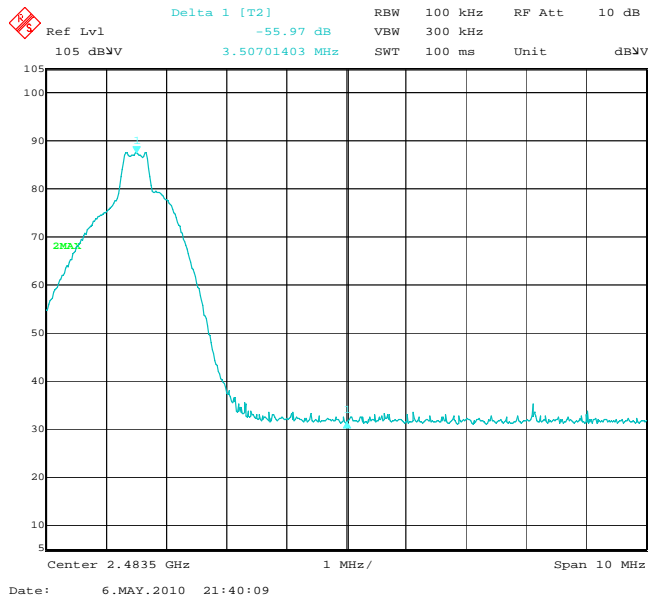
**Figure 2-1: Band-Edge Compliance of RF Rad. Emissions.**  
 Bluetooth, Single freq., Static PRBS,  
 DH5, Channel 0, Pol: V, Detector: PK



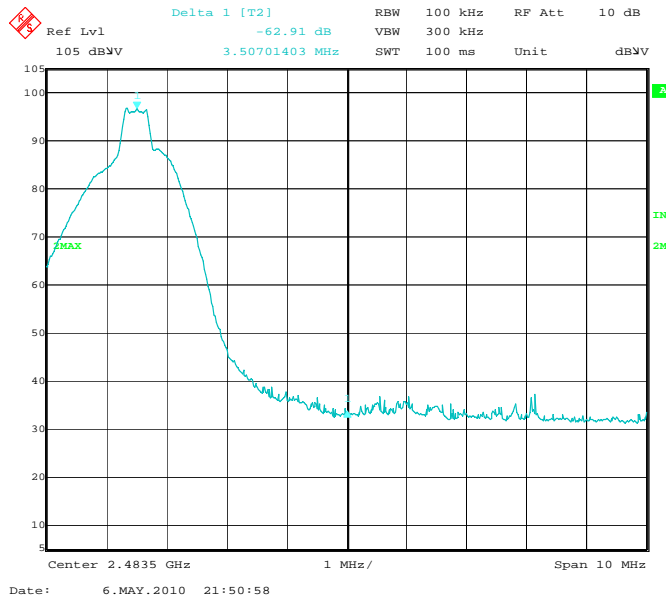
**Figure 2-2: Band-Edge Compliance of RF Rad. Emissions.**  
 Bluetooth, Single freq., Static PRBS,  
 DH5, Channel 0, Pol: H, Detector: PK



**Figure 2-3: Band-Edge Compliance of RF Rad. Emissions.**  
 Bluetooth, Single freq., Static PRBS,  
 DH5, Channel 78, Pol: V, Detector: PK



**Figure 2-4: Band-Edge Compliance of RF Rad. Emissions**  
 Bluetooth, Single freq., Static PRBS,  
 DH5, Channel 78, Pol: H, Detector: PK



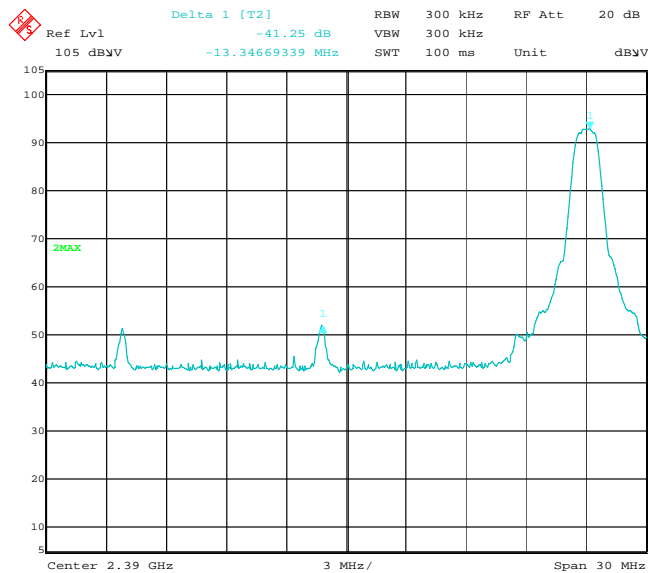
Test Report No.  
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 Adam Rusinek

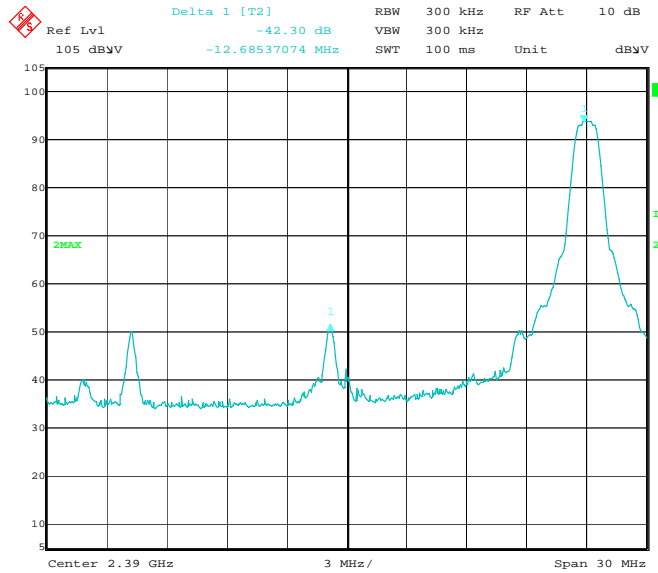
Bluetooth Band-Edge Compliance of RF Radiated Emissions cont'd

**Figure 2-5: Band-Edge Compliance of RF Rad. Emissions.**  
 Bluetooth, Single freq., Static PRBS,  
 2-DH5, Channel 0, Pol: V, Detector: PK



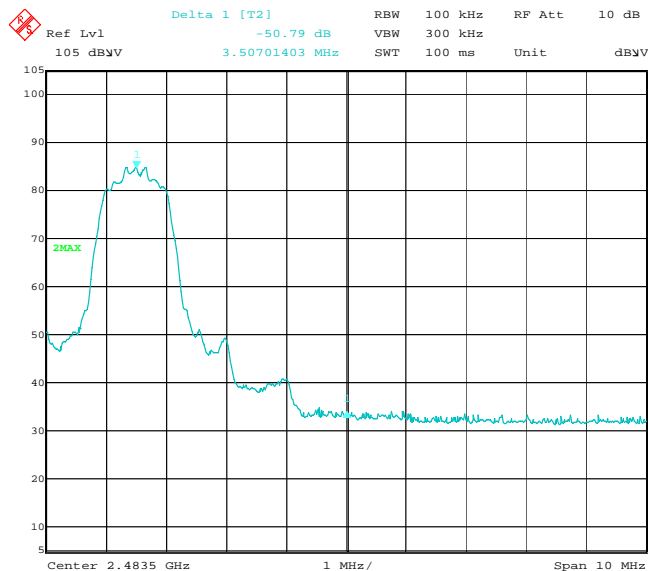
Date: 6.MAY.2010 21:12:34

**Figure 2-6: Band-Edge Compliance of RF Rad. Emissions.**  
 Bluetooth, Single freq., Static PRBS,  
 2-DH5, Channel 0, Pol: H, Detector: PK



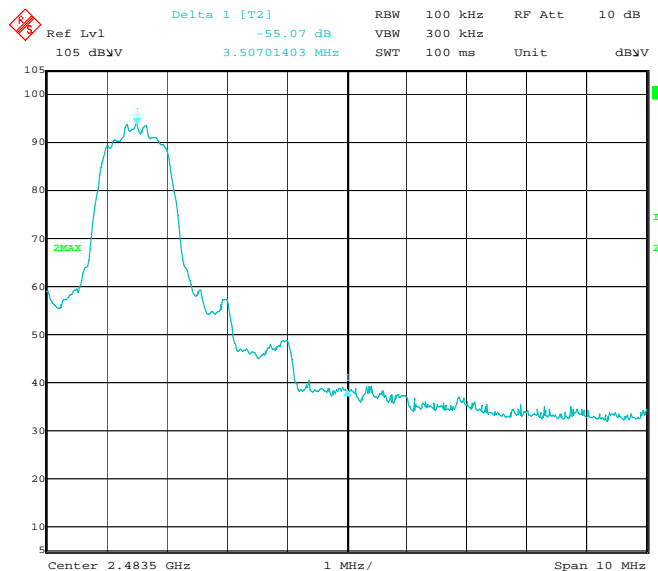
Date: 6.MAY.2010 21:22:08

**Figure 2-7: Band-Edge Compliance of RF Rad. Emissions.**  
 Bluetooth, Single freq., Static PRBS,  
 2-DH5, Channel 78, Pol: V, Detector: PK



Date: 6.MAY.2010 21:38:15

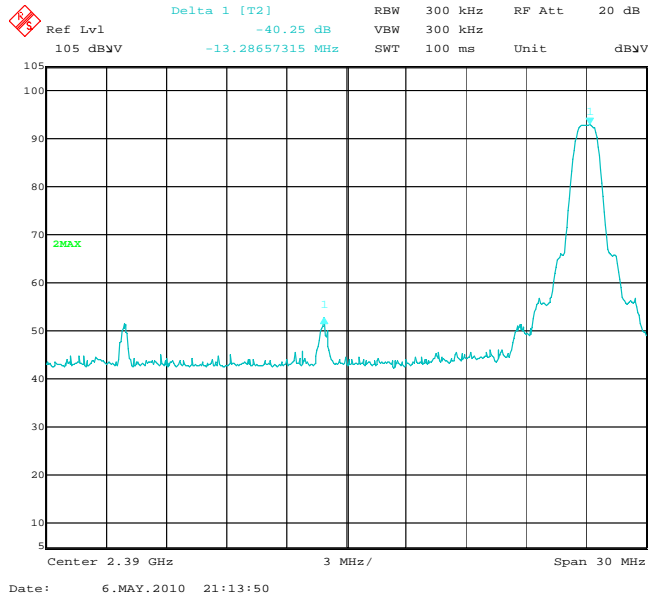
**Figure 2-8: Band-Edge Compliance of RF Rad. Emissions.**  
 Bluetooth, Single freq., Static PRBS,  
 2-DH5, Channel 78, Pol: H, Detector: PK



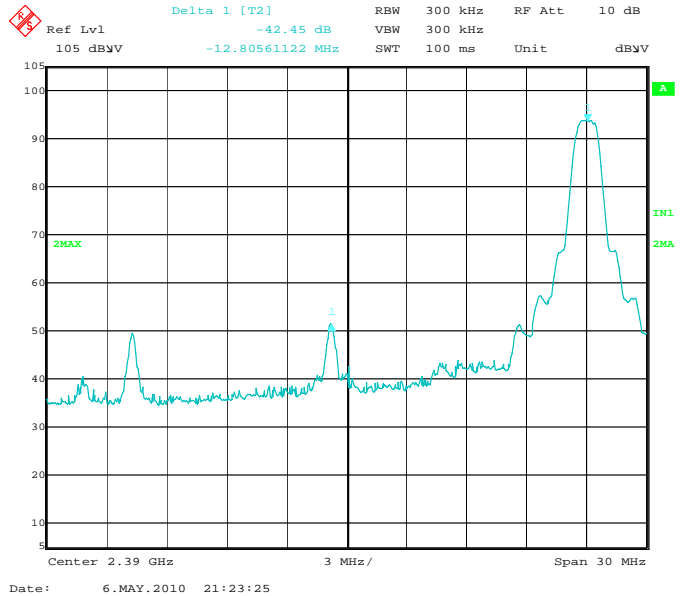
Date: 6.MAY.2010 21:48:10

Bluetooth Band-Edge Compliance of RF Radiated Emissions cont'd

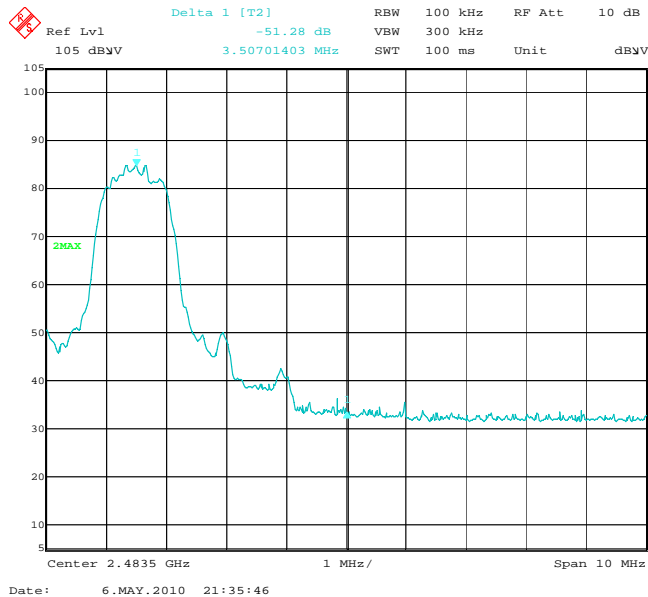
**Figure 2-9: Band-Edge Compliance of RF Rad. Emissions.**  
 Bluetooth, Single freq., Static PRBS,  
 3-DH5, Channel 0, Pol: V, Detector: PK



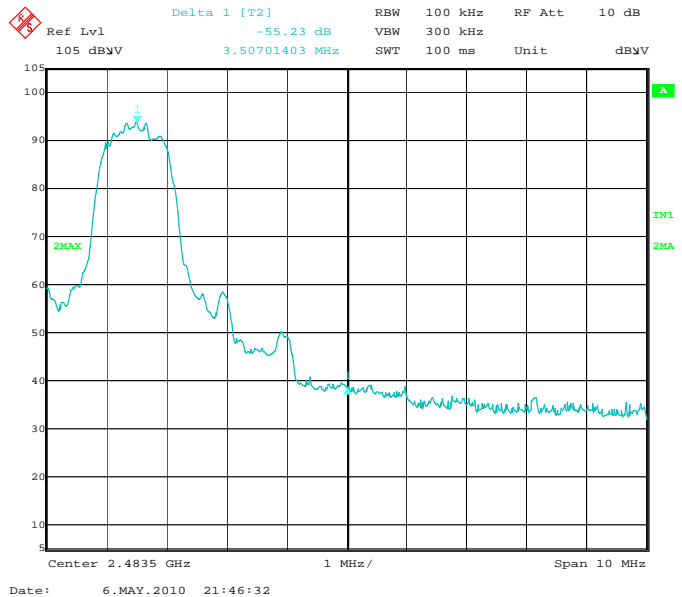
**Figure 2-10: Band-Edge Compliance of RF Rad. Emissions.**  
 Bluetooth, Single freq., Static PRBS,  
 3-DH5, Channel 0, Pol: H, Detector: PK




**Figure 2-11: Band-Edge Compliance of RF Rad. Emissions.**  
 Bluetooth, Single freq., Static PRBS,  
 3-DH5, Channel 78, Pol: V, Detector: PK



**Figure 2-12: Band-Edge Compliance of RF Rad. Emissions.**  
 Bluetooth, Single freq., Static PRBS,  
 3-DH5, Channel 78, Pol: H, Detector: PK



	EMI Test Report for the BlackBerry® smartphone Model RDA71UW	
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Radiated Emissions Test Results cont'd  
802.11b/g/n Band

Date of Test: May 10, 2010  
Measurements were performed by Kevin Rose

The environmental test conditions were: Temperature: 21 °C  
Pressure: 1005 – 1013 mb  
Relative Humidity: 31 %

The test distance was 3.0 metres with a height of 0.8 metres, 30 MHz to 1000 MHz.  
The BlackBerry® smartphone was in standalone, vertical upside down position.

The frequency sweep measurements were performed in 802.11b Tx mode at 1 Mbps on channels 1, 6 and 11, in 802.11g Tx mode at 6 Mbps on channel 6, and in 802.11n Tx mode at MCS 0 and MCS7 on channels 1, 6, and 11.  
All emissions had a test margin greater than 25.0 dB.

Date of Test: May 4 to May 7, 2010  
Measurements were performed by Michael Cino.

The environmental test conditions were: Temperature: 24 – 25 °C  
Pressure: 1012 – 1020 mb  
Relative Humidity: 26 – 30 %


The test distance was 1.0 metres with a height of 0.8 metres, 1GHz to 25GHz.  
The BlackBerry® smartphone was in standalone, vertical position.

The frequency sweep measurements were performed in 802.11b Tx mode at 1 Mbps on channels 1, 6 and 11, in 802.11g Tx mode at 6 Mbps on channel 6, and in 802.11n Tx mode at MCS 0 and MCS 7 on channels 1, 6, and 11 as well.

Frequency (MHz)	Channel	Antenna		Test Angle (Deg.)	RBW / VBW	Measured Level (dBµV)	Correction Factor for preamp/antenna/ cables/ filter (dB)	Field Strength Level (reading+corr) (dBµV/m)	Limit @ 3.0 m (dBµV/m)	Test Margin (dB)
		Pol. (V/H)	Height (metres)							
2484.856	6	V	4.00	145.00	PK	44.36	10.26	54.63	74.00	<b>-19.37</b>

All other emissions, including harmonics, had a test margin greater than 25.0 dB.



	EMI Test Report for the BlackBerry® smartphone Model RDA71UW	
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802.11b/g/n Band-Edge Compliance of RF Radiated Emissions

Date of Tests: May 6, 2010  
Measurements performed by Kevin Rose.

The environmental test conditions were: Temperature: 22 °C  
Pressure: 1002 mb  
Relative Humidity: 24 %

802.11b Band

The measurements were performed on BlackBerry® smartphone in standalone, vertical configuration on channels 1 and 11 for 802.11b mode at 1 Mbps.

The test distance was 3 metres.

Channel	Freq. (MHz)	Rx Antenna		Detector (MHz)	VBW For Peak (dBuV/m)	Peak Corrected Reading (dBuV/m)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
		Type	POL.						
1.0	2412.00	Horn	V	PK	1 MHz	49.30	49.30	74.00	-24.70
1.0	2412.00	Horn	H	PK	1 MHz	55.07	55.07	74.00	-18.93
1.0	2412.00	Horn	V	AV	10 Hz	39.00	39.00	54.00	-15.00
1.0	2412.00	Horn	H	AV	10 Hz	46.44	46.44	54.00	-7.56

Channel	Freq. (MHz)	Rx Antenna		Detector (MHz)	VBW For Peak (dBuV/m)	Peak Corrected Reading (dBuV/m)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
		Type	POL.						
11.0	2480.00	Horn	V	PK	1 MHz	45.64	45.64	74.00	-28.36
11.0	2480.00	Horn	H	PK	1 MHz	54.90	54.90	74.00	-19.10
11.0	2480.00	Horn	V	AV	10 Hz	34.77	34.77	54.00	-19.23
11.0	2480.00	Horn	H	AV	10 Hz	45.17	45.17	54.00	-8.83

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802.11g Band

The measurements were performed on the BlackBerry® smartphone in standalone, vertical configuration on channels 1 and 11 for 802.11g mode at 6 Mbps.

The test distance was 3 metres.

Channel	Freq. (MHz)	Rx Antenna		Detector (MHz)	VBW For Peak (dBuV/m)	Peak Corrected Reading (dBuV/m)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
		Type	POL.						
1.0	2412.00	Horn	V	PK	1 MHz	49.32	49.32	74.00	-24.68
1.0	2412.00	Horn	H	PK	1 MHz	55.31	55.31	74.00	-18.69
1.0	2412.00	Horn	V	AV	10 Hz	39.16	39.16	54.00	-14.84
1.0	2412.00	Horn	H	AV	10 Hz	46.60	46.60	54.00	-7.40

Channel	Freq. (MHz)	Rx Antenna		Detector (MHz)	VBW For Peak (dBuV/m)	Peak Corrected Reading (dBuV/m)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
		Type	POL.						
11.0	2480.00	Horn	V	PK	1 MHz	50.34	50.34	74.00	-23.66
11.0	2480.00	Horn	H	PK	1 MHz	64.04	64.04	74.00	-9.96
11.0	2480.00	Horn	V	AV	10 Hz	36.50	36.50	54.00	-17.50
11.0	2480.00	Horn	H	AV	10 Hz	45.96	45.96	54.00	-8.04

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### 802.11n Band

The measurements were performed on the BlackBerry® smartphone in standalone, vertical configuration on channels 1 and 11 for 802.11n mode at MCS 0.

The test distance was 3 metres.

Channel	Freq. (MHz)	Rx Antenna		Detector (MHz)	VBW For Peak (dBuV/m)	Peak Corrected Reading (dBuV/m)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
		Type	POL.						
1.0	2412.00	Horn	V	PK	1 MHz	63.11	63.11	74.00	-10.89
1.0	2412.00	Horn	H	PK	1 MHz	68.84	68.84	74.00	-5.16
1.0	2412.00	Horn	V	AV	10 Hz	43.18	43.18	54.00	-10.82
1.0	2412.00	Horn	H	AV	10 Hz	44.89	44.89	54.00	-9.11

Channel	Freq. (MHz)	Rx Antenna		Detector (MHz)	VBW For Peak (dBuV/m)	Peak Corrected Reading (dBuV/m)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
		Type	POL.						
11.0	2480.00	Horn	V	PK	1 MHz	53.93	53.93	74.00	-20.07
11.0	2480.00	Horn	H	PK	1 MHz	65.42	65.42	74.00	-8.58
11.0	2480.00	Horn	V	AV	10 Hz	37.34	37.34	54.00	-16.66
11.0	2480.00	Horn	H	AV	10 Hz	47.55	47.55	54.00	-6.45

See figures 2-13 to 2-16 for the plots of the 802.11b band-edge compliance.

See figures 2-17 to 2-20 for the plots of the 802.11g band-edge compliance.

See figures 2-21 to 2-24 for the plots of the 802.11n band-edge compliance.

**802.11b/g/n Band-Edge Compliance of RF Radiated Emissions cont'd**

Figure 2-13: Band-Edge Compliance of RF Radiated Emission  
 802.11b, Channel 1, 2412 MHz, Max Pol: V,  
 Detector: PK

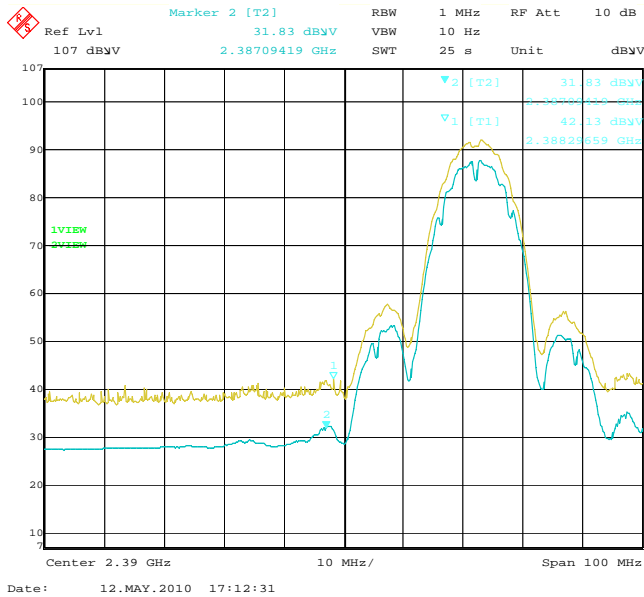


Figure 2-14: Band-Edge Compliance of RF Radiated Emission  
 802.11b, Channel 1, 2412 MHz, Max Pol: H,  
 Detector: PK

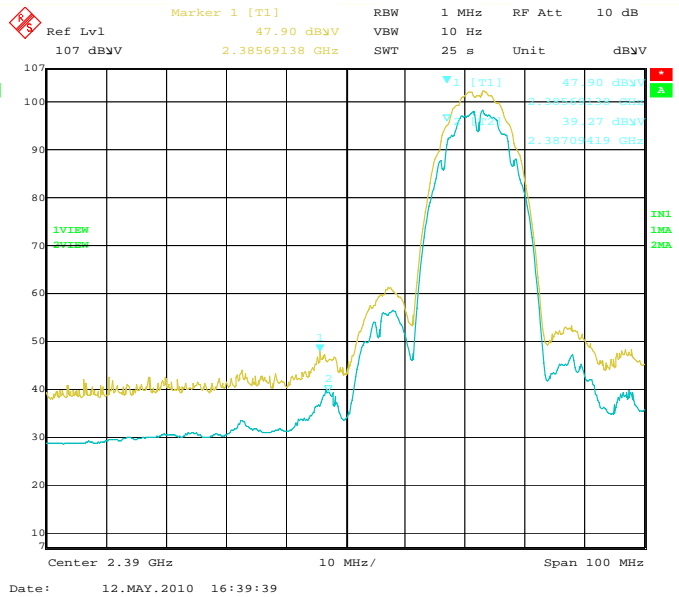


Figure 2-15: Band-Edge Compliance of RF Radiated Emission  
 802.11b, Channel 11, 2462 MHz, Max Pol: V,  
 Detector: PK

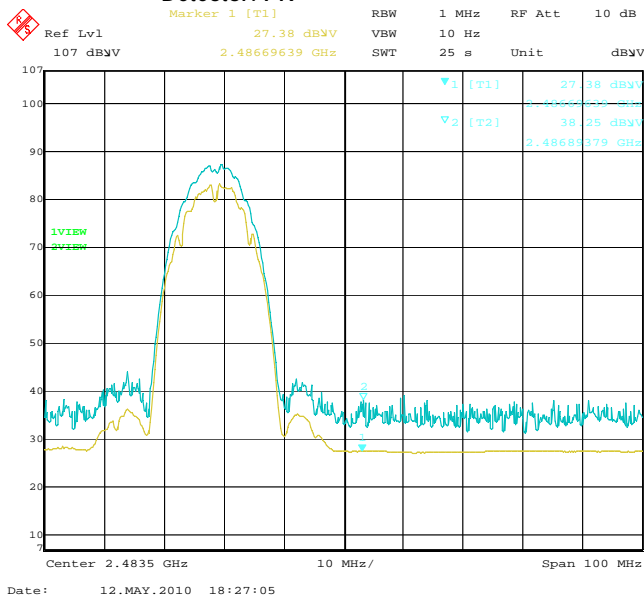
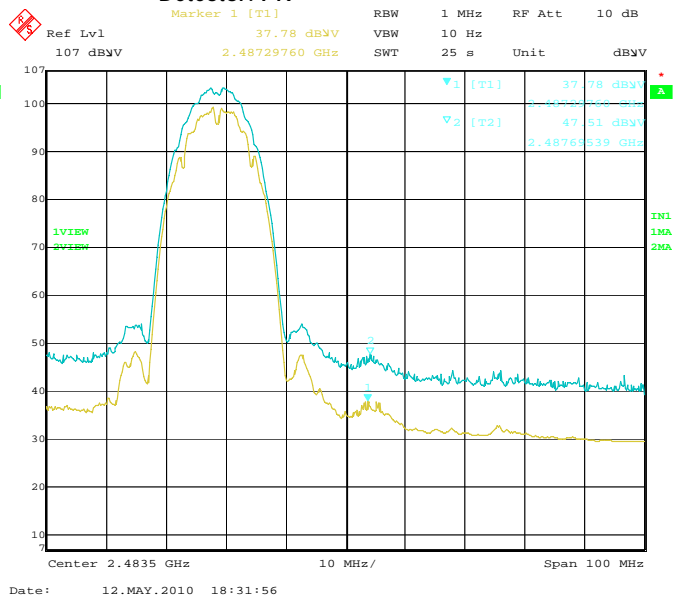


Figure 2-16: Band-Edge Compliance of RF Radiated Emission  
 802.11b, Channel 11, 2462 MHz, Max Pol: H,  
 Detector: PK



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Figure 2-17: Band-Edge Compliance of RF Radiated Emission  
 802.11g, Channel 1, 2412 MHz, Max Pol: V,  
 Detector: PK

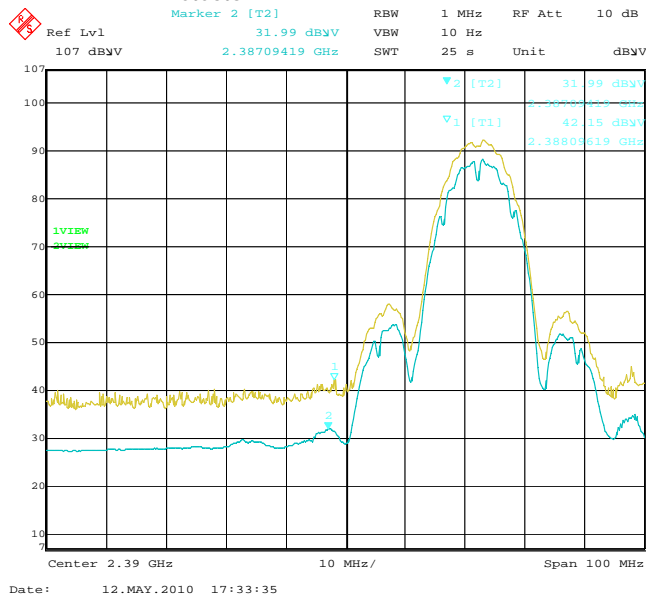


Figure 2-18: Band-Edge Compliance of RF Radiated Emission  
 802.11g, Channel 1, 2412 MHz, Max Pol: H,  
 Detector: PK

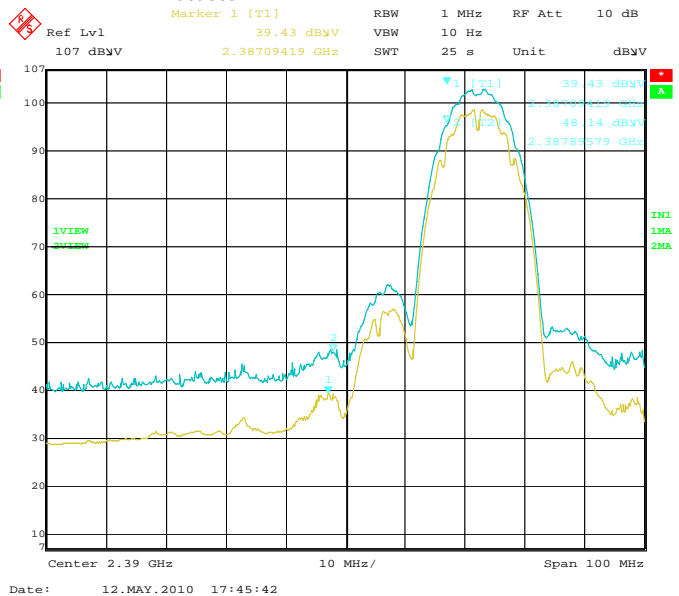


Figure 2-19: Band-Edge Compliance of RF Radiated Emission  
 802.11g, Channel 11, 2462 MHz, Max Pol: V,  
 Detector: PK

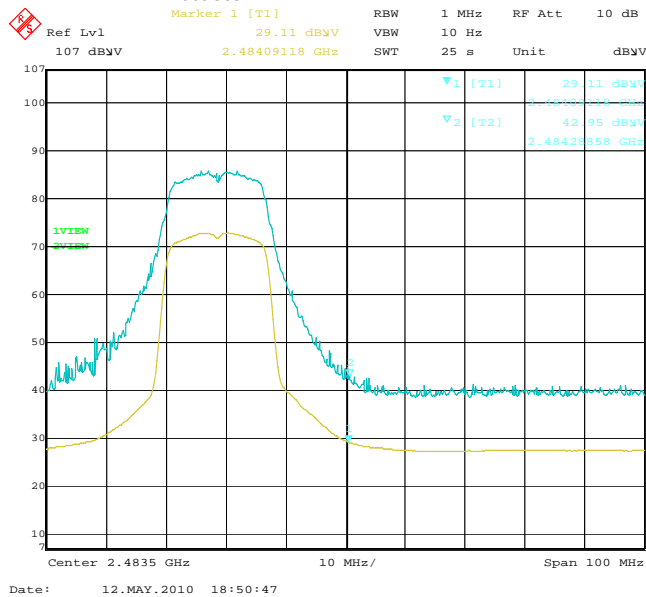
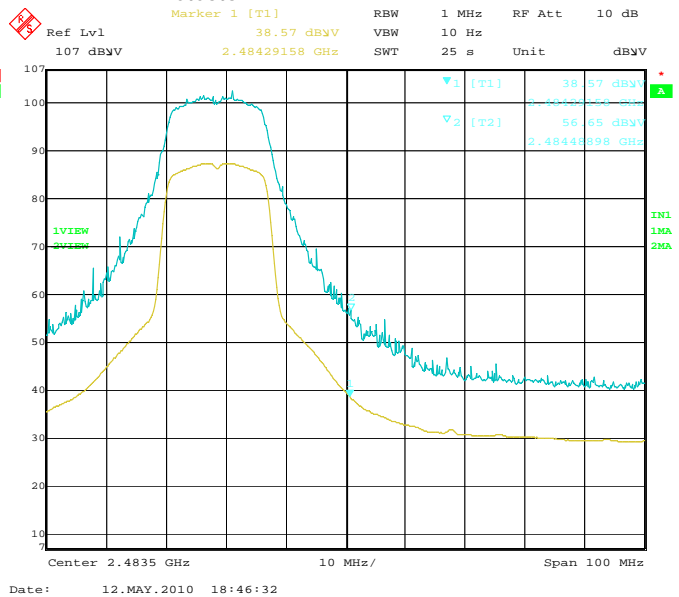


Figure 2-20: Band-Edge Compliance of RF Radiated Emission  
 802.11g, Channel 11, 2462 MHz, Max Pol: H,  
 Detector: PK



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Figure 2-21: Band-Edge Compliance of RF Radiated Emission  
 802.11n, Channel 1, 2412 MHz, Max Pol: V,  
 Detector: PK

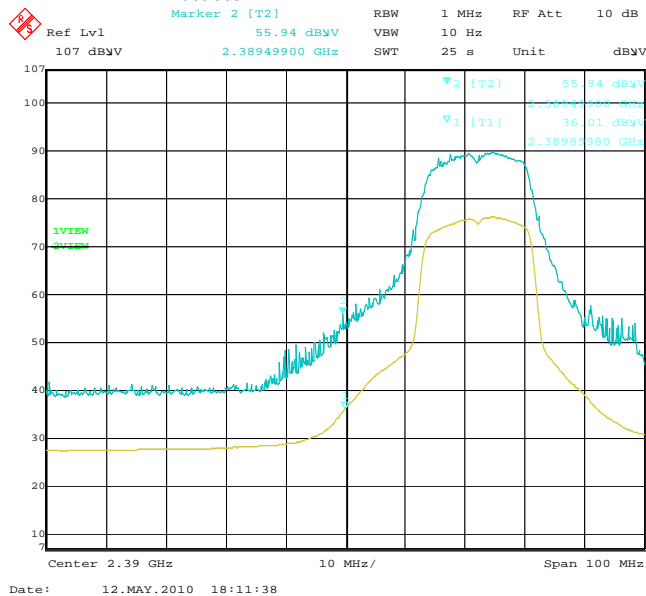


Figure 2-22: Band-Edge Compliance of RF Radiated Emission  
 802.11n, Channel 1, 2412 MHz, Max Pol: H,  
 Detector: PK

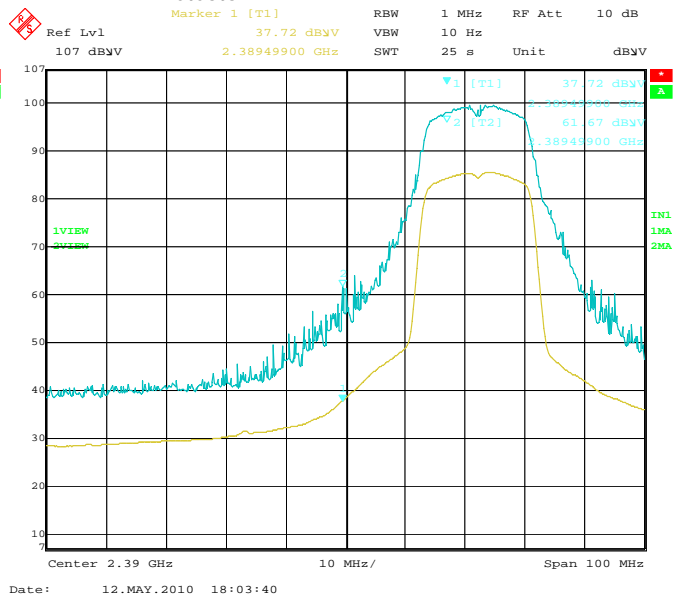


Figure 2-23: Band-Edge Compliance of RF Radiated Emission  
 802.11n, Channel 11, 2462 MHz, Max Pol: V,  
 Detector: PK

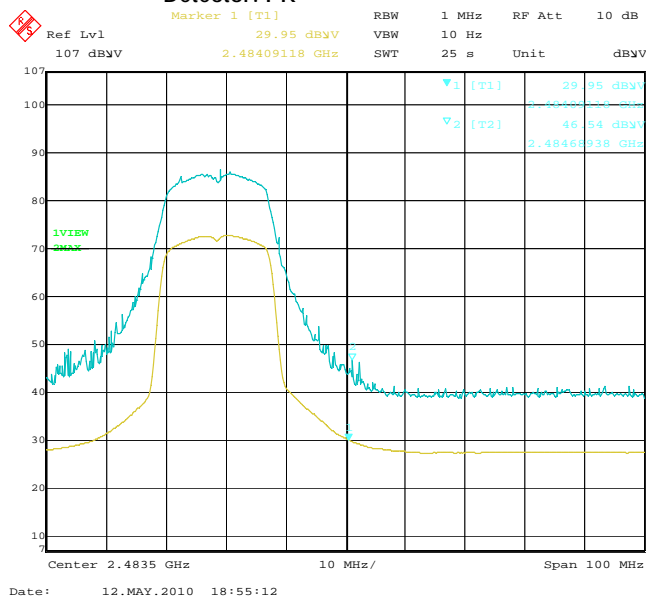
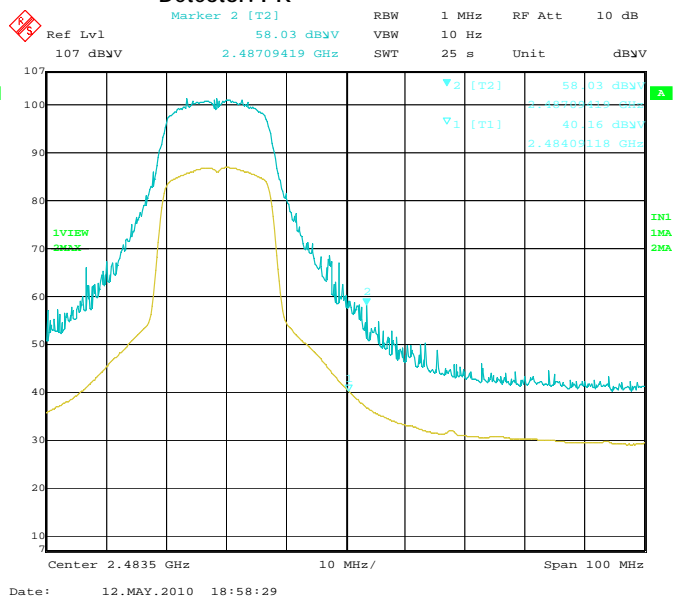




Figure 2-24: Band-Edge Compliance of RF Radiated Emission  
 802.11n, Channel 11, 2462 MHz, Max Pol: H,  
 Detector: PK



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## APPENDIX 3 – BLUETOOTH CONDUCTED EMISSIONS TEST DATA/PLOTS

	EMI Test Report for the BlackBerry® smartphone Model RDA71UW	
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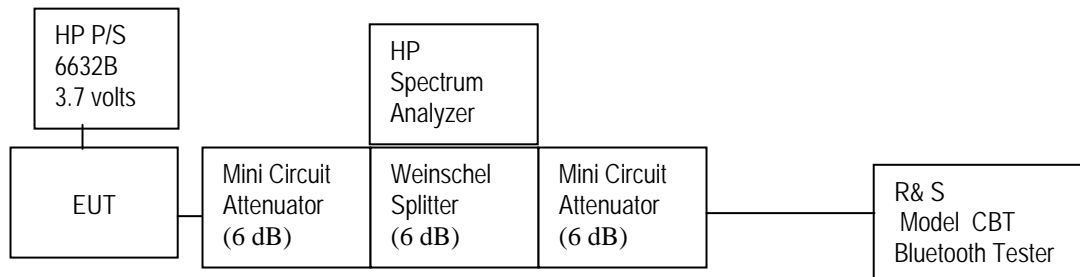
Bluetooth RF Conducted Emission Test Results

Bluetooth power output from BlackBerry® smartphone was at maximum for all the recorded measurements shown below.

The measurements were performed by Maurice Battler.

Date of test: April 09, 2010


**Test Setup Diagram**



A reference offset of 12.4 dB was applied to the spectrum analyzer reference level for the attenuators and coaxial cable loss in the test circuit.

The environmental test conditions were: Temperature: 23 °C  
 Pressure: 1003 mb  
 Relative Humidity: 23 %



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Bluetooth RF Conducted Emission Test Results cont'd

**20 dB Bandwidth**

The EUT met the requirements of the 20 dB bandwidth as per 47 CFR 15.247(a) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured. Bluetooth was operating in single frequency mode.

Using pattern type “Static PRBS” and packet type “DH5” during the measurements.

Bluetooth Channel	Limit (MHz)	Measured Level (MHz)
0	≤1.0	0.923
39	≤1.0	0.923
78	≤1.0	0.923

See figures 3-1 to 3-3 for the plots of the 20 dB bandwidth measurements.

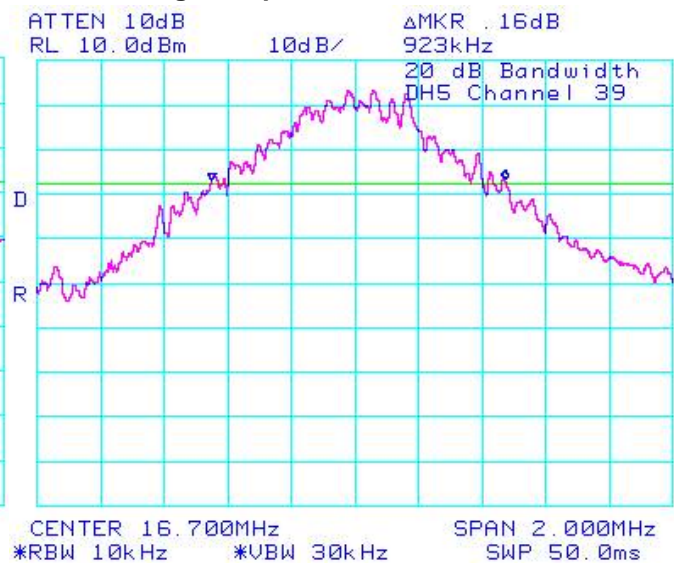
**Figure 3-1: 20 dB Bandwidth**


**Single freq., Static PRBS, DH5**



**Figure 3-2: 20 dB Bandwidth**

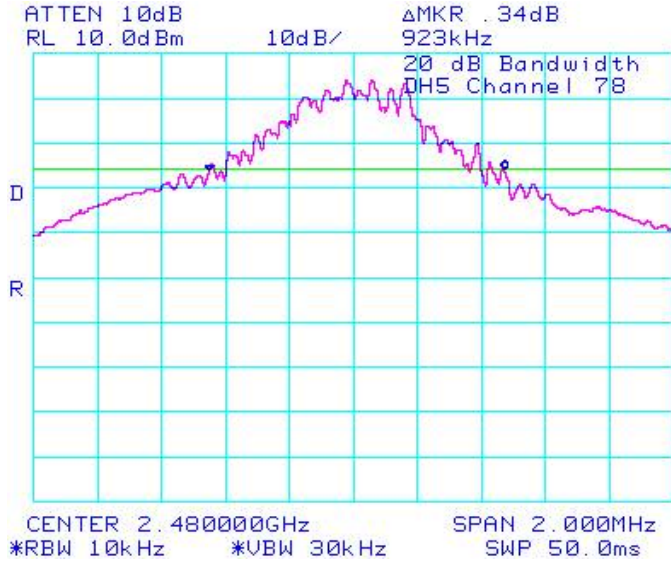
**Single freq., Static PRBS, DH5**



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Bluetooth RF Conducted Emission Test Results cont'd

**Figure 3-3: 20 dB Bandwidth**  
**Single freq., Static PRBS, DH5**



Using Pattern type “Static PRBS” and packet type “3-DH5” during the measurements.

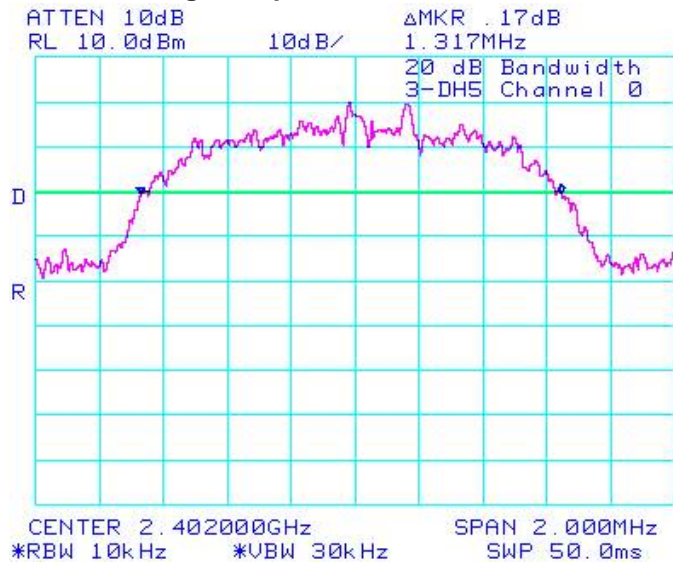
Bluetooth Channel	Limit (MHz)	Measured Level (MHz)
0	≤1.5	1.317
39	≤1.5	1.310
78	≤1.5	1.313

See figures 3-4 to 3-6 for the plots of the 20 dB bandwidth measurements.

Bluetooth RF Conducted Emission Test Results cont'd

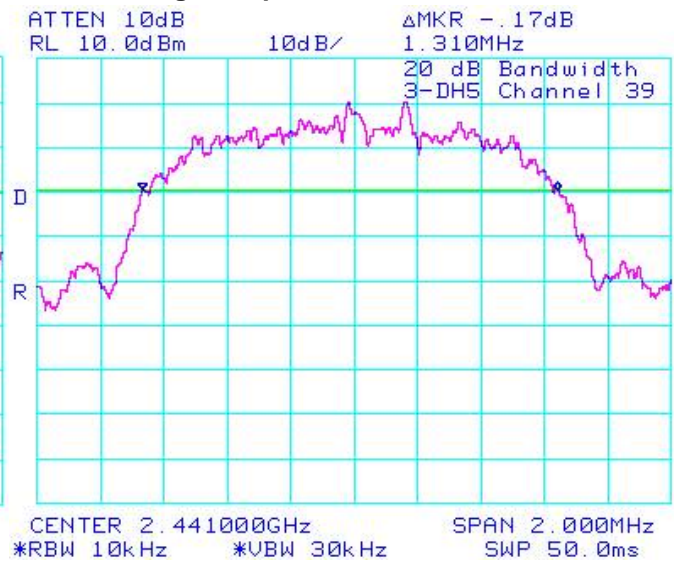
**Figure 3-4: 20 dB Bandwidth**

Single freq., Static PRBS, 3-DH5



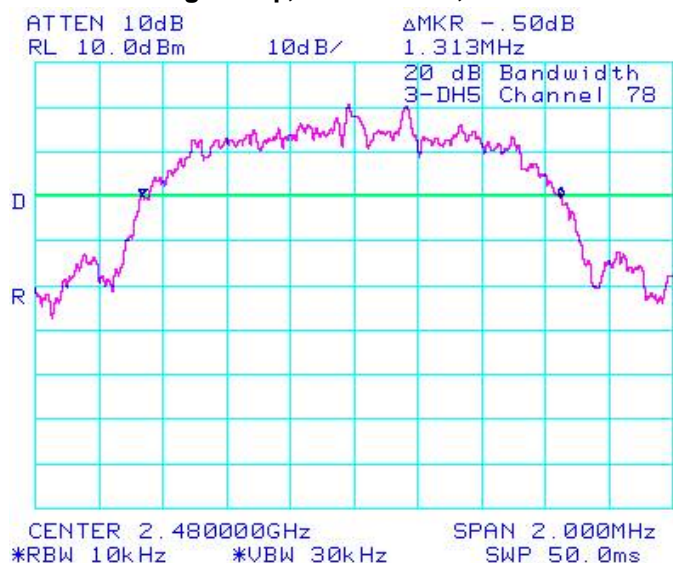
**Figure 3-5: 20 dB Bandwidth**


Single freq., Static PRBS, 3-DH5



**Figure 3-6: 20 dB Bandwidth**

Single freq., Static PRBS, 3-DH5



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**Carrier Frequency Separation**

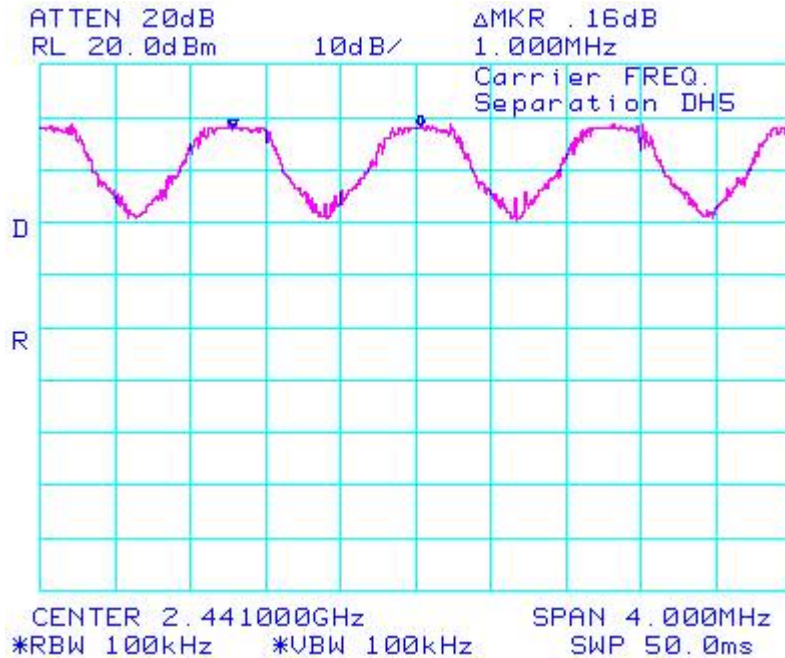
The EUT met the requirements of the Carrier Frequency Separation as per 47 CFR 15.247(a) and RSS-210. Channel 38 to 39 was measured. Bluetooth was operating in frequency hopping (Euro/US) mode.


Using pattern type “Static PRBS” and packet type “DH5” during the measurements.

Bluetooth Channels	Limit (MHz)	Measured Level (MHz)
38 to 39	≥ 0.025 or 20 dB bandwidth	1.000

See figure 3-7 for the plot of the Carrier Frequency Separation measurement.

**Figure 3-7: Carrier Frequency Separation, Freq. Hopping, Static PRBS, DH5, Channels 38 to 39**



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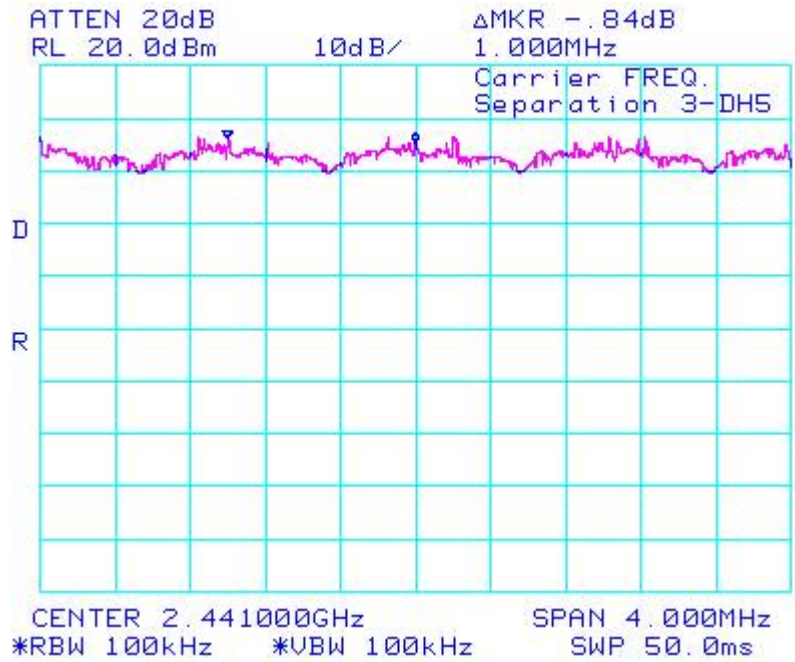
Bluetooth RF Conducted Emission Test Results cont'd


Using Pattern type “Static PRBS” and packet type “3-DH5” during the measurements.

Bluetooth Channels	Limit (MHz)	Measured Level (MHz)
38 to 39	≥ 0.025 or 20 dB bandwidth	1.000

See figure 3-8 for the plot of the Carrier Frequency Separation measurement.

**Figure 3-8: Carrier Frequency Separation, Freq. Hopping, Static PRBS, 3-DH5, Channels 38 to 39**



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**Number of Hopping Frequencies**

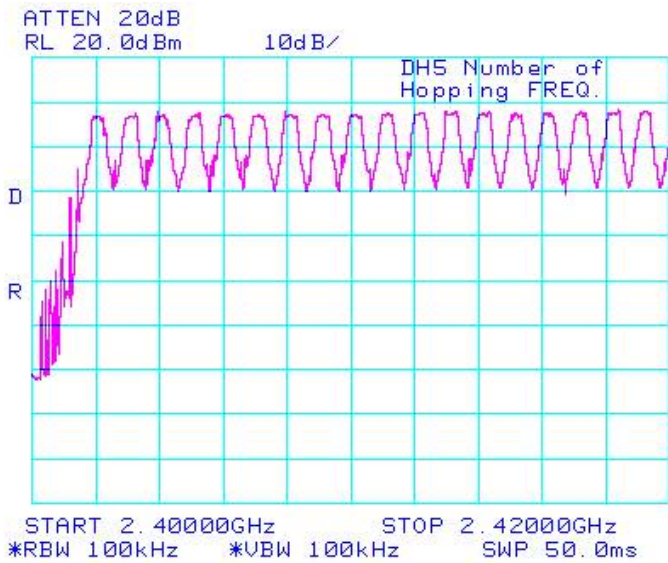
The EUT met the requirements of the number of hopping frequencies as per 47 CFR 15.247(a) and RSS-210. Bluetooth was operating in frequency hopping (Euro/US) mode.

Using pattern type “Static PRBS” and packet type “DH5” during the measurements.

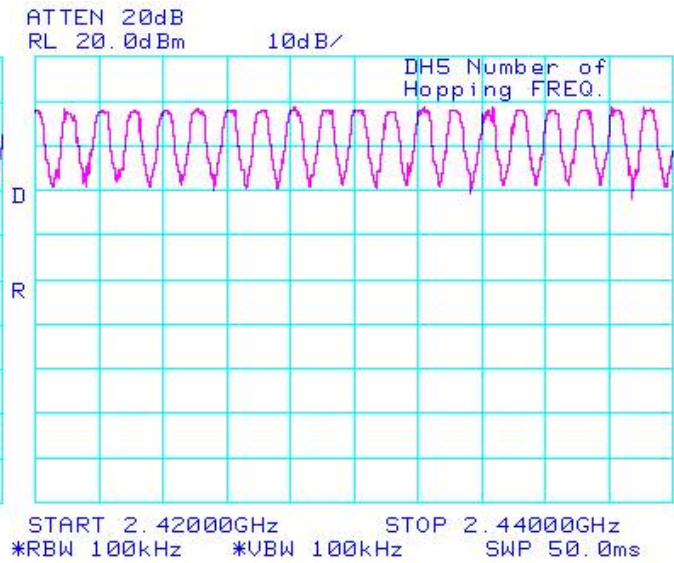
Limit (CH)	Number of Hopping Frequencies (CH)
≥75	79


See figures 3-9 to 3-12 for the plots of the number of hopping frequencies.

**Figure 3-6: Number of Hopping Frequencies  
Static PRBS, DH5**



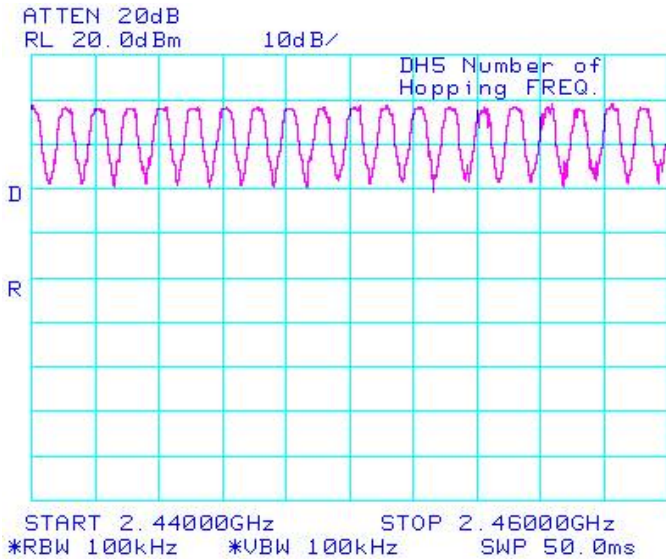
**Figure 3-7: Number of Hopping Frequencies  
Static PRBS, DH5**



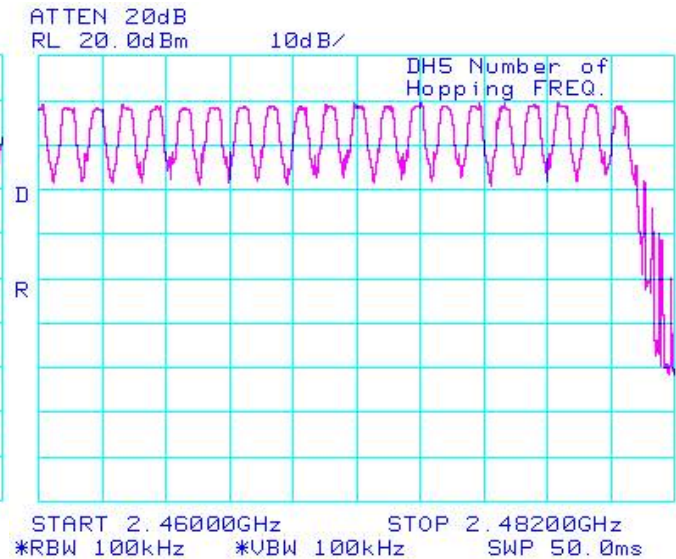
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**Figure 3-8: Number of Hopping Frequencies  
Static PRBS, DH5**



**Figure 3-9: Number of Hopping Frequencies  
Static PRBS, DH5**




**Time of Occupancy (Dwell Time)**

The EUT met the requirements of the time of occupancy (dwell time) as per 47 CFR 15.247(a) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured in packet types DH1, DH3 and DH5. Bluetooth was operating in frequency hopping (Euro/US) mode during the measurements. The frequency hopping is 1600 hops per second for a dwell time of 625 µsec for 79 channels.

A DH1 packet needs one time slot for transmitting and one time slot for receiving. The frequency hopping is 800 hops per second with 79 channels which is 10.127 times per second. As per 15.247(a) (iii) "The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed". Therefore for 31.6 seconds (79x0.4) there are 320.0 times of appearance.

A DH3 packet needs one time slot for transmitting and one time slot for receiving. The frequency hopping is 400 hops per second with 79 channels which is 5.06 times per second. Therefore for 31.6 seconds there are 159.9 times of appearance.

A DH5 packet needs one time slot for transmitting and one time slot for receiving. The frequency hopping is 266.7 hops per second with 79 channels which is 3.38 times per second. Therefore for 31.6 seconds there are 106.8 times of appearance.

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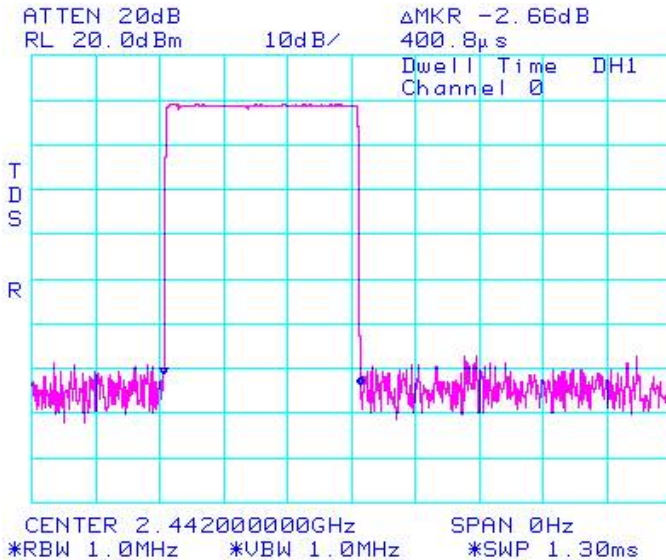
Bluetooth RF Conducted Emission Test Results cont'd

Bluetooth Channel	Mode	Tx Time (ms)	Dwell Time/31.6 sec. (msec.)	Limit (msec.)	Margin (msec.)
0	DH1	0.4008	0.4008 x 320.0 = 128.26	400	271.74
39	DH1	0.4008	0.4008 x 320.0 = 128.26	400	271.74
78	DH1	0.3965	0.3965 x 320.0 = 126.88	400	273.12
0	DH3	1.6550	1.6550 x 159.9 = 264.63	400	135.37
39	DH3	1.6600	1.6600 x 159.9 = 265.43	400	134.57
78	DH3	1.6550	1.6550 x 159.9 = 264.63	400	135.37
0	DH5	2.9100	2.9100 x 106.8 = 310.79	400	89.21
39	DH5	2.9100	2.9100 x 106.8 = 310.79	400	89.21
78	DH5	2.9400	2.9400 x 106.8 = 313.99	400	86.01

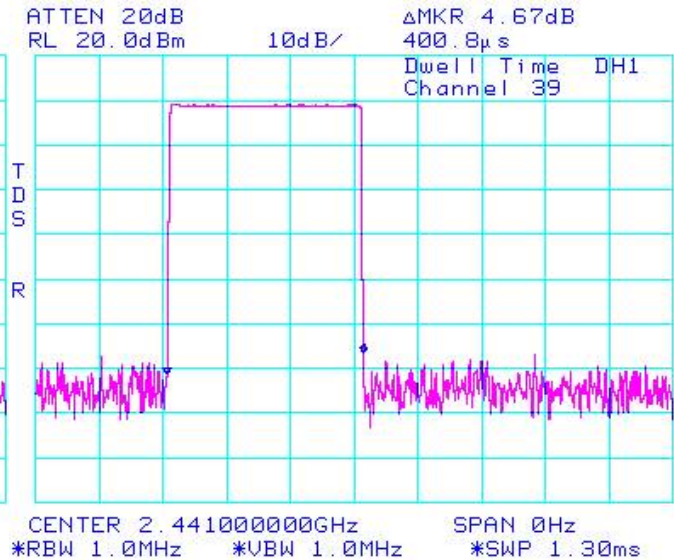
See figures 3-13 to 3-21 for the plots of the dwell time.

Bluetooth RF Conducted Emission Test Results cont'd

**Figure 3-13: Time of Occupancy (Dwell Time)**  
Freq. Hopping, Static PRBS, DH1



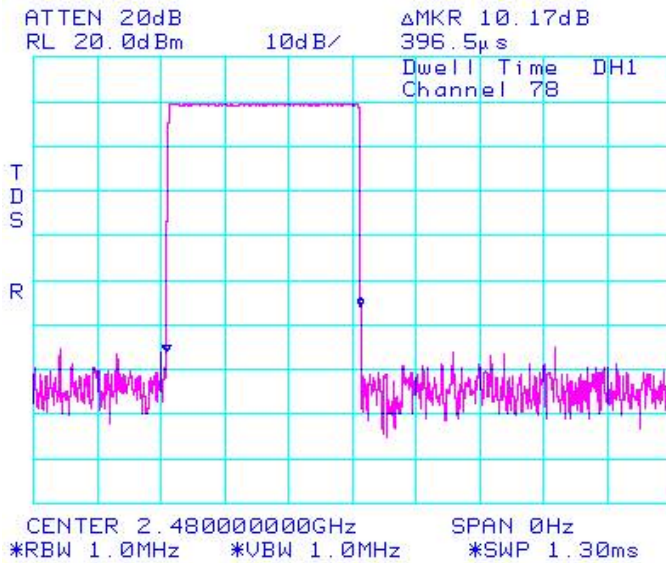
**Figure 3-14: Time of Occupancy (Dwell Time)**  
Freq. Hopping, Static PRBS, DH1



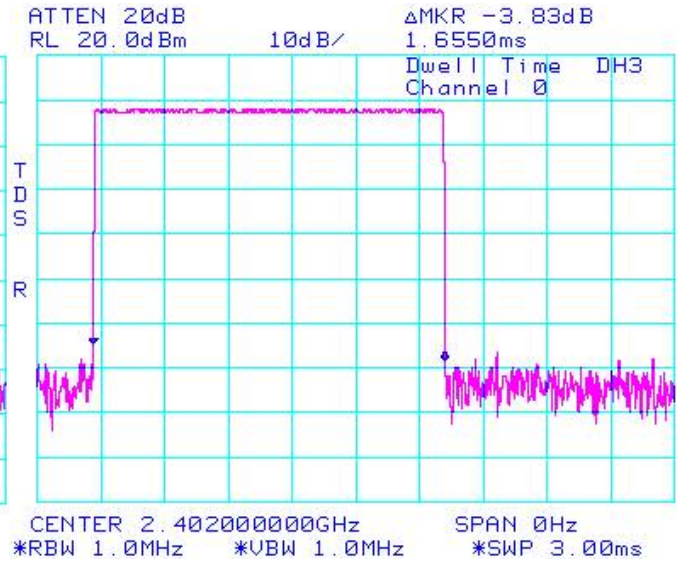


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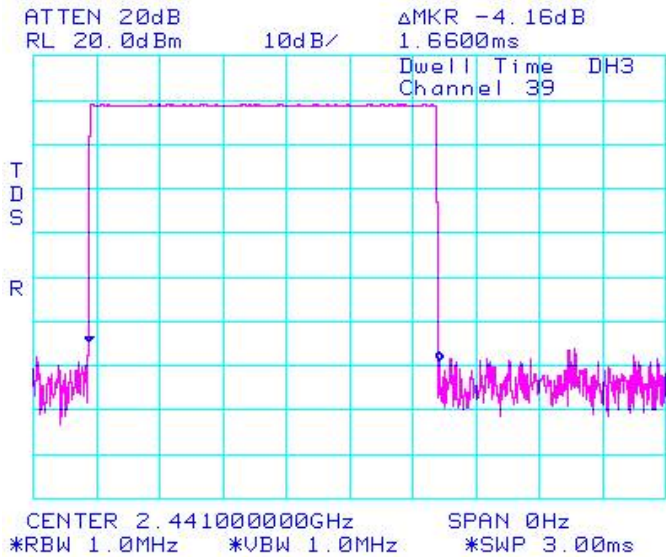
**Figure 3-15: Time of Occupancy (Dwell Time)**  
**Freq. Hopping, Static PRBS, DH1**



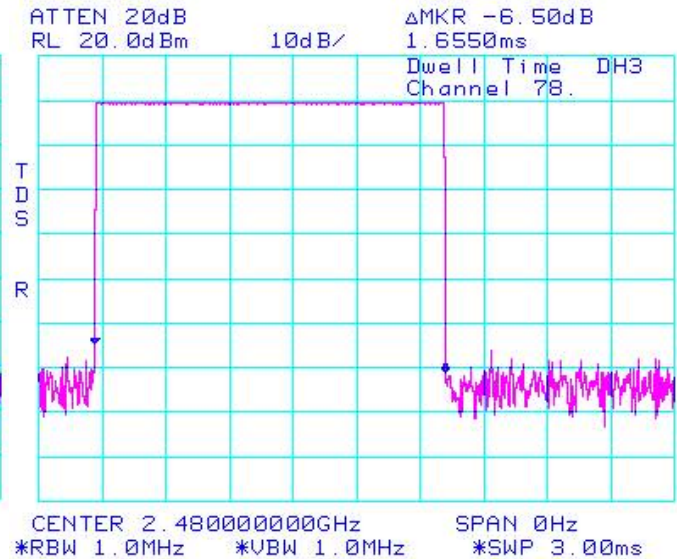
**Figure 3-16: Time of Occupancy (Dwell Time)**  
**Freq. Hopping, Static PRBS, DH3**




**Figure 3-17: Time of Occupancy (Dwell Time)**  
**Freq. Hopping, Static PRBS, DH3**



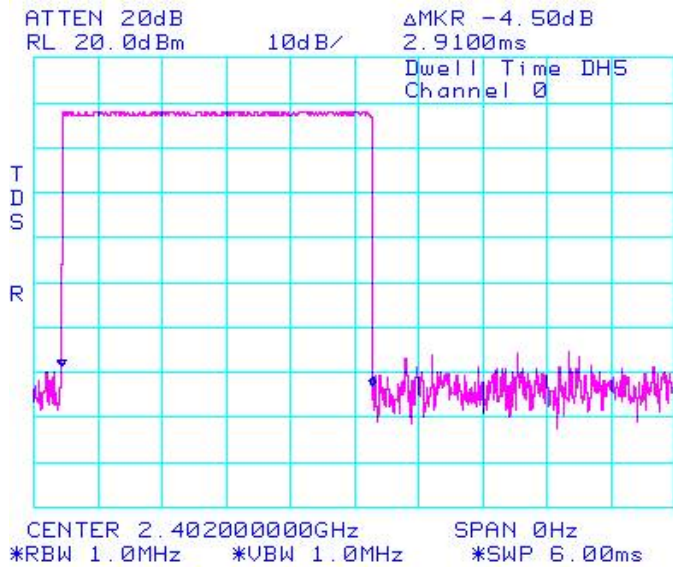
**Figure 3-18 : Time of Occupancy (Dwell Time)**  
**Freq. Hopping, Static PRBS, DH3**



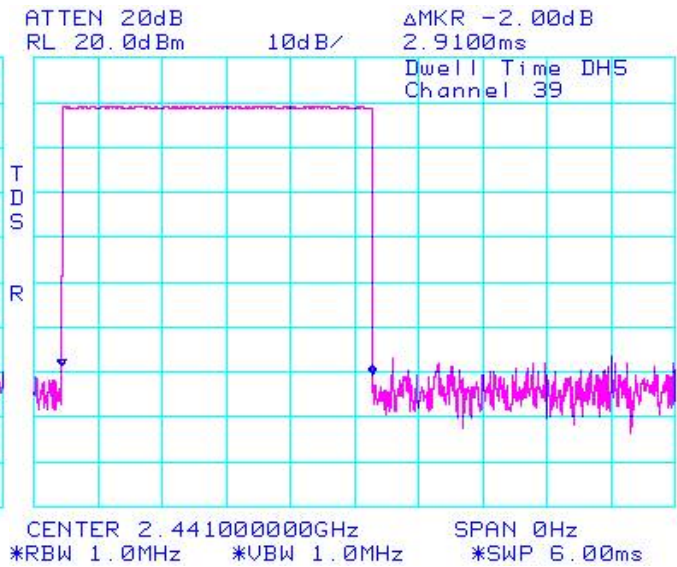
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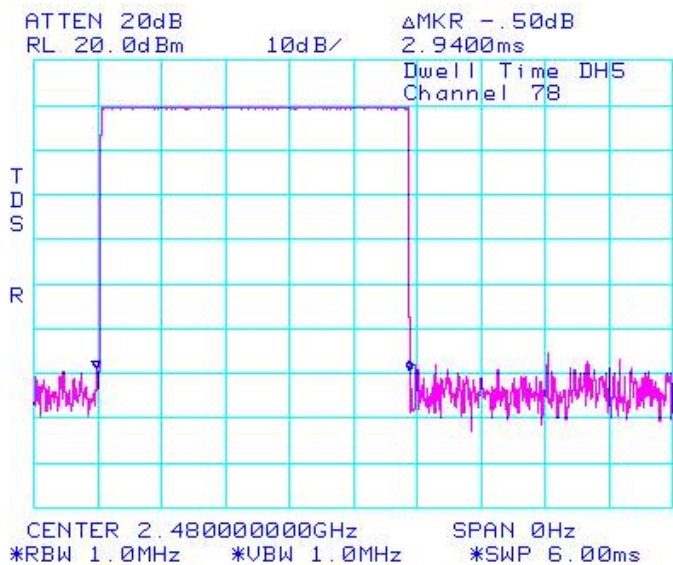
**Figure 3-19: Time of Occupancy (Dwell Time)**  
Freq. Hopping, Static PRBS, DH5




**Figure 3-20: Time of Occupancy (Dwell Time)**  
Freq. Hopping, Static PRBS, DH5



**Figure 3-21: Time of Occupancy (Dwell Time)**  
Freq. Hopping, Static PRBS, DH5



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Bluetooth RF Conducted Emission Test Results cont'd

**Maximum Peak Conducted Output Power**

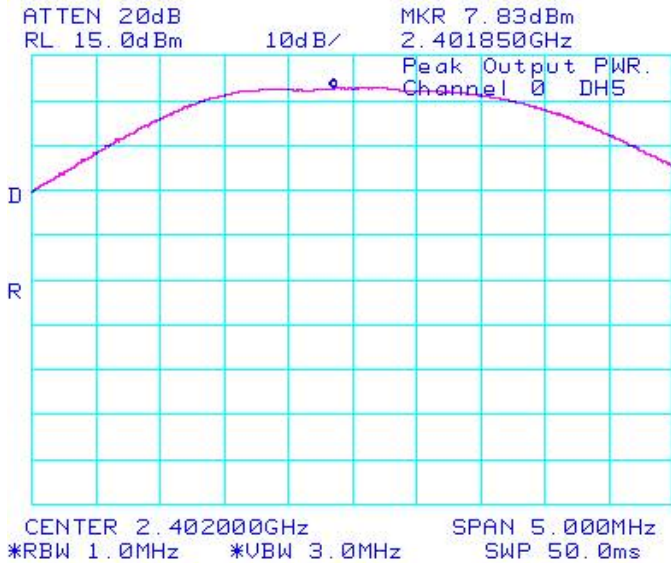
The EUT met the requirements of the maximum peak conducted output power of class 2 as per 47 CFR 15.247(b) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured. Bluetooth was operating in single frequency mode during the measurements. A reference offset of 12.4 dB was applied to the spectrum analyzer reference level for the coaxial cable loss and attenuators in the test circuit.

Using pattern type “Static PRBS” and packet type “DH5” during the measurements.

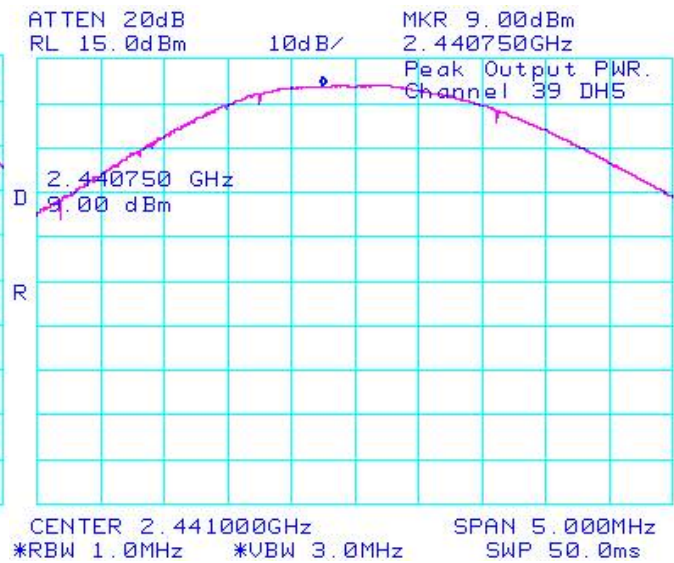
Bluetooth Channel	Measured Level (dBm)	Measured Level (W)	Class 1 Limit (dBm)
0	7.83	0.00607	0.0 to 20.0
39	9.00	0.00794	0.0 to 20.0
78	9.67	0.00927	0.0 to 20.0


See figures 3-22 to 3-24 for the plots of the maximum peak conducted output power.

**Figure 3-22: Max. Peak Conducted Output Power  
Single Freq., Static PRBS, DH5**



**Figure 3-23: Max. Peak Conducted Output Power  
Single Freq., Static PRBS, DH5**

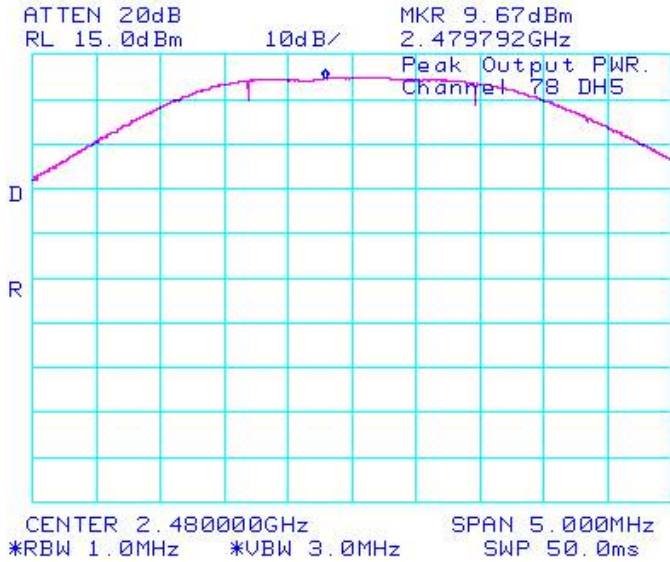


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**Figure 3-24: Max. Peak Conducted Output Power**


**Single Freq., Static PRBS, DH5**



Using Pattern type “Static PRBS” and packet type “3-DH5” during the measurements.

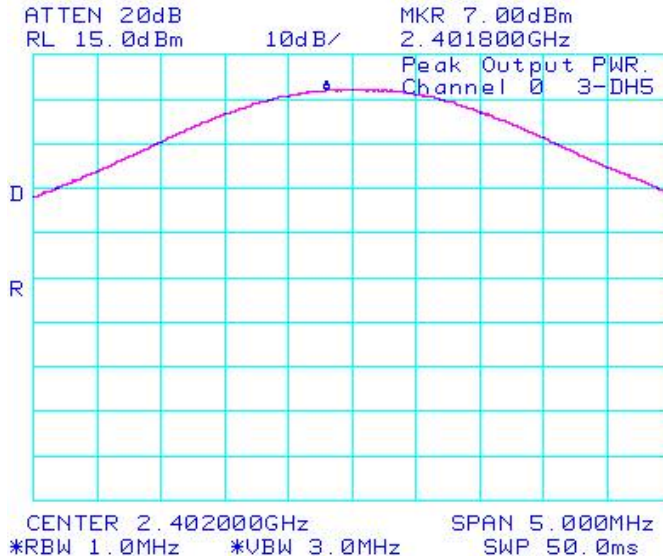
Bluetooth Channel	Measured Level (dBm)	Measured Level (W)	Class 1 Limit (dBm)
0	7.00	0.00501	0.0 to 20.0
39	8.17	0.00656	0.0 to 20.0
78	9.00	0.00794	0.0 to 20.0

See figures 3-25 to 3-27 for the plots of the maximum peak conducted output power.

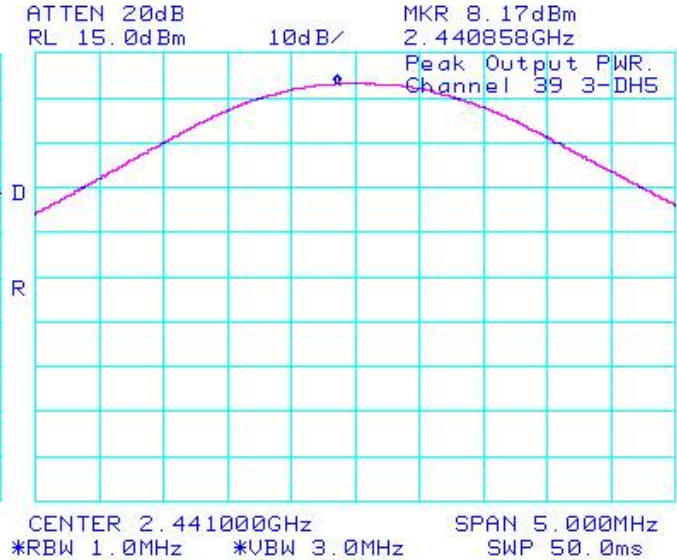
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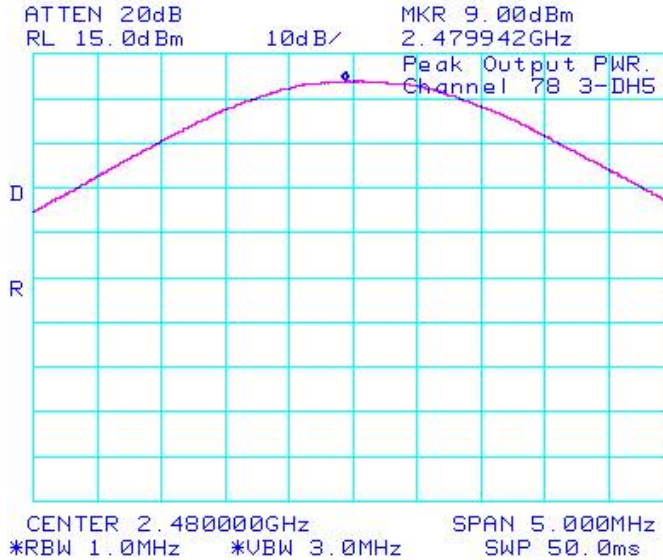
**Figure 3-25: Max. Peak Conducted Output Power  
Single Freq., Static PRBS, 3-DH5**




**Figure 3-26: Max. Peak Conducted Output Power  
Single Freq., Static PRBS, 3-DH5**



**Figure 3-27: Max. Peak Conducted Output Power  
Single Freq., Static PRBS, 3-DH5**



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Bluetooth RF Conducted Emission Test Results cont'd

**Band Edge Compliance**

The EUT met the requirements of the band edge compliance as per 47 CFR 15.247(c) and RSS-210. Low channel (0) and high channel (78) were measured. Bluetooth was operating in single frequency and hopping mode.

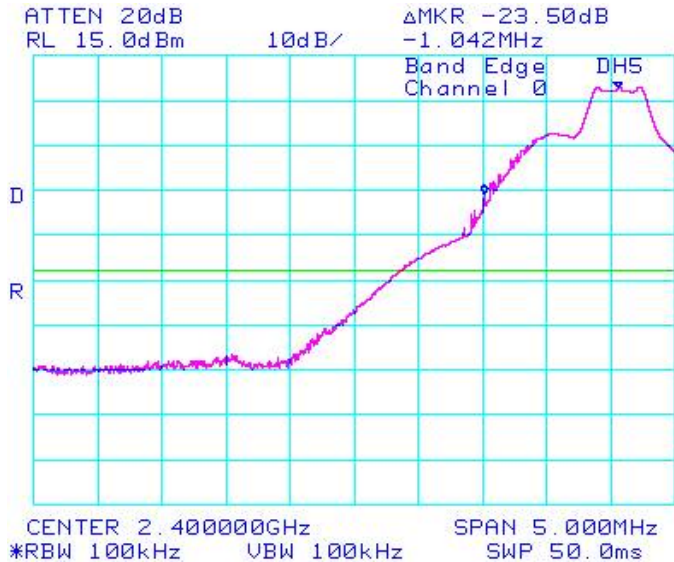
Using pattern type “Static PRBS” and packet type “DH5” during the measurements.

Bluetooth Channel	Operating Mode	Measured Level (dBc)	Limit (dBc)	Margin (dB)
0	Single Frequency	-23.50	-20	-3.50
78	Single Frequency	-20.16	-20	-0.16
0	Hopping	-20.84	-20	-0.84
78	Hopping	-20.33	-20	-0.33

See figures 3-28 to 3-31 for the plots of the band edge compliance measurements.

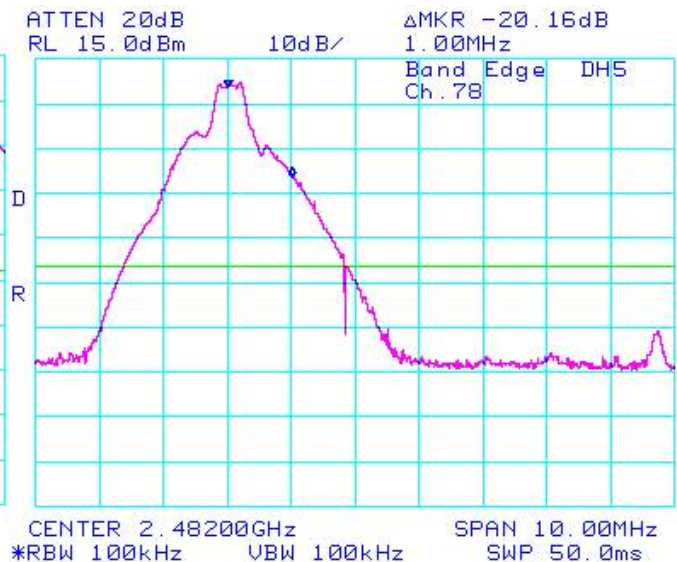
**Figure 3-28: Band Edge Compliance**


Single Freq., Static PRBS, DH5



**Figure 3-29: Band Edge Compliance**

Single Freq., Static PRBS, DH5

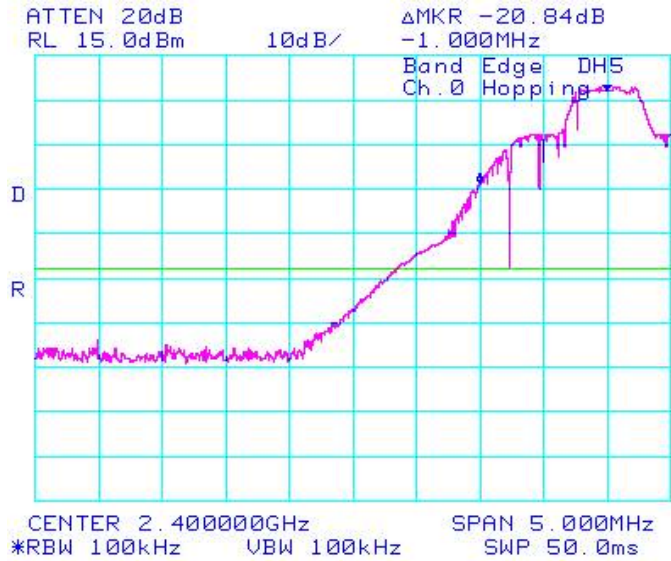


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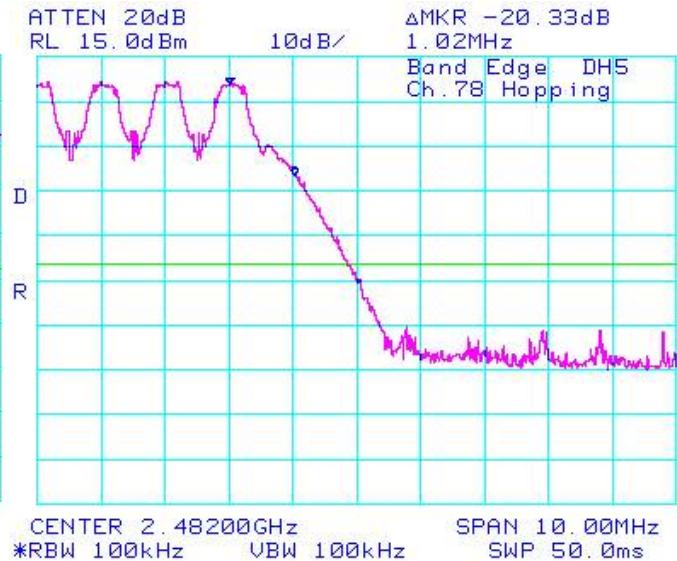
**Figure 3-30: Band Edge Compliance**

**Freq. Hopping, Static PRBS, DH5**



**Figure 3-31: Band Edge Compliance**

**Freq. Hopping, Static PRBS, DH5**



Using pattern type “Static PRBS” and packet type “3-DH5” during the measurements.

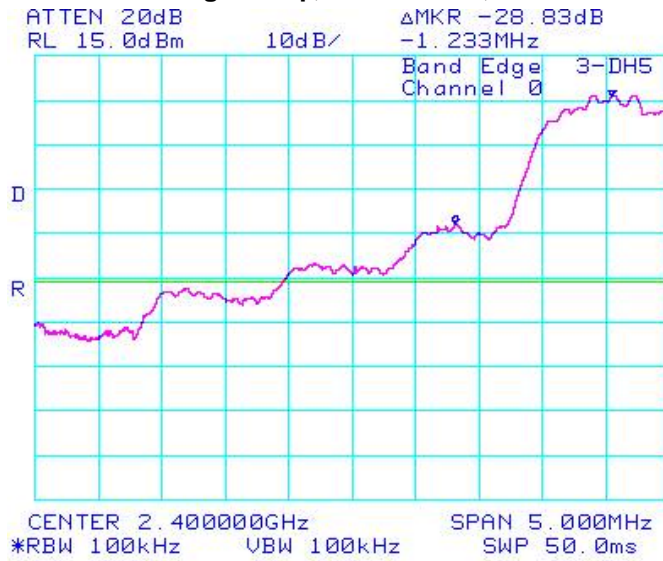
Bluetooth Channel	Operating Mode	Measured Level (dBc)	Limit (dBc)	Margin (dB)
0	Single Frequency	-28.83	-20	-8.83
78	Single Frequency	-35.66	-20	-15.66
0	Hopping	-29.33	-20	-9.33
78	Hopping	-34.84	-20	-14.84

See figures 3-32 to 3-35 for the plots of the band edge compliance measurements.

Bluetooth RF Conducted Emission Test Results cont'd

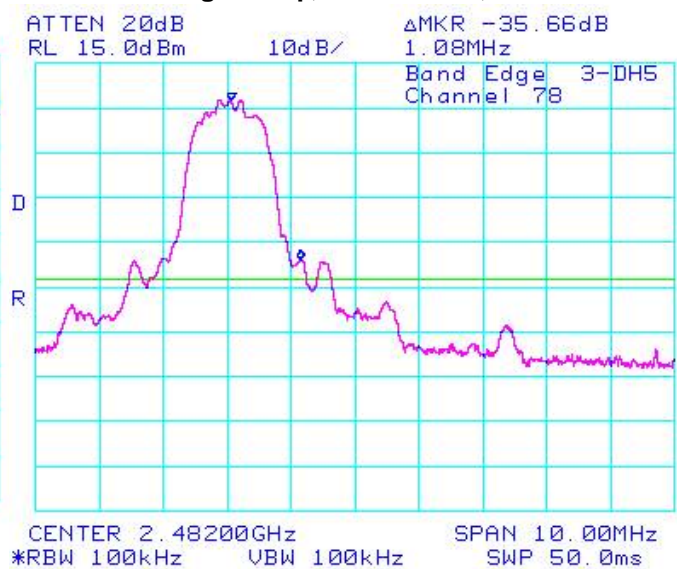
**Figure 3-32: Band Edge Compliance**

**Single Freq., Static PRBS, 3-DH5**



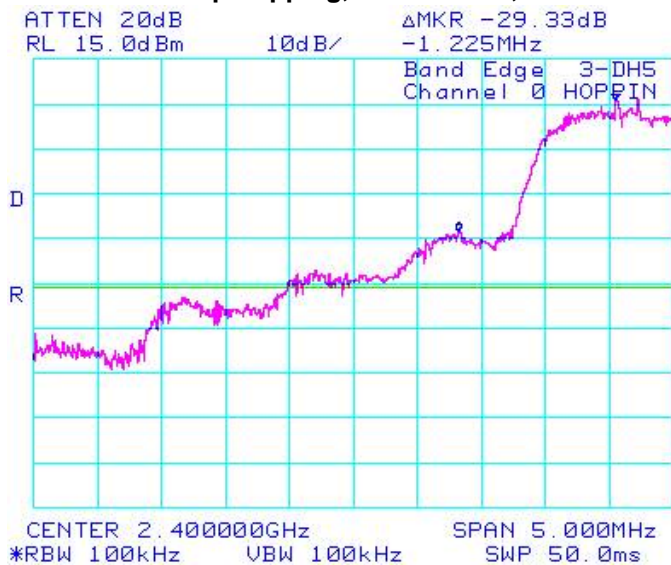
**Figure 3-33: Band Edge Compliance**

**Single Freq., Static PRBS, 3-DH5**



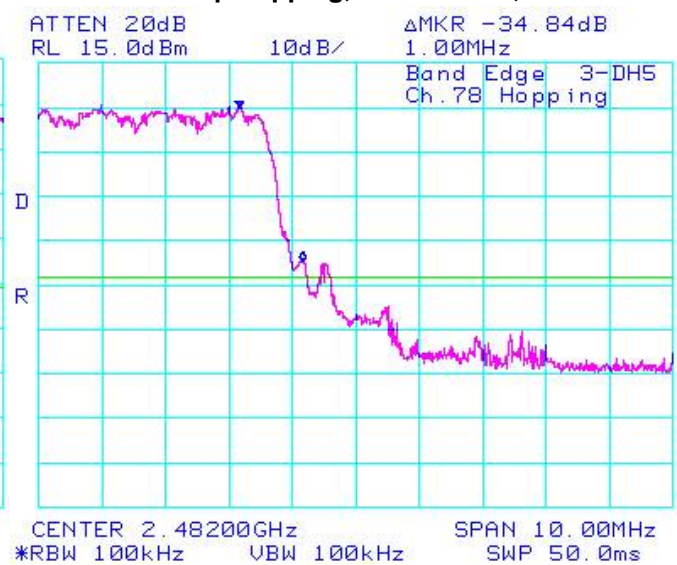
**Figure 3-34: Band Edge Compliance**

**Freq. Hopping, Static PRBS, 3-DH5**




**Figure 3-35: Band Edge Compliance**

**Freq. Hopping, Static PRBS, 3-DH5**





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Bluetooth RF Conducted Emission Test Results cont'd


**Spurious RF Conducted Emissions**

The EUT met the requirements of the spurious RF conducted emissions as per 47 CFR 15.247(c) and RSS-210. Low channel (0), mid channel (39) and high channel (78) were measured. Bluetooth was operating in single frequency and hopping mode. A reference offset of 12.4 dB was applied to the spectrum analyzer reference level for the attenuators and coaxial cable loss in the test circuit.

Using pattern type “Static PRBS” and packet type “DH5” during the measurements.

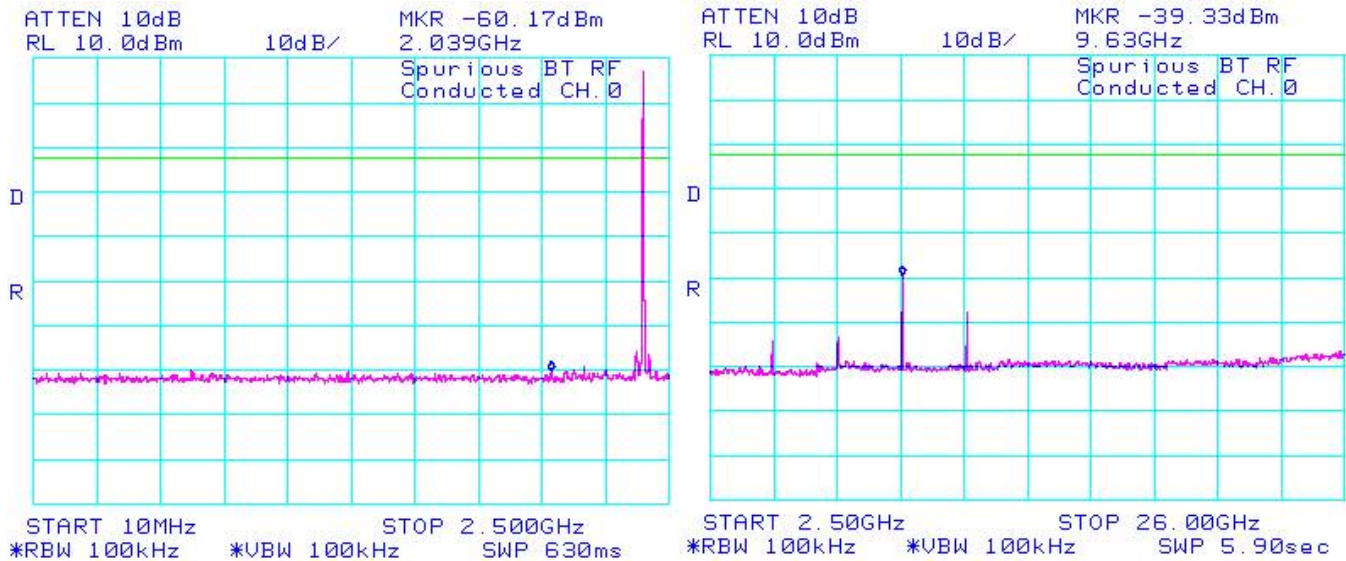
Bluetooth Channel	Channel Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from carrier (dBc)	Limit (dBc)
0	7.83	-39.33	-47.16	-20
39	9.00	-44.67	-53.67	-20
78	9.67	-51.50	-61.17	-20
Hopping mode	7.83	-44.67	-52.50	-20

See figures 2-36 to 2-39 for the plots of the spurious RF conducted emissions.

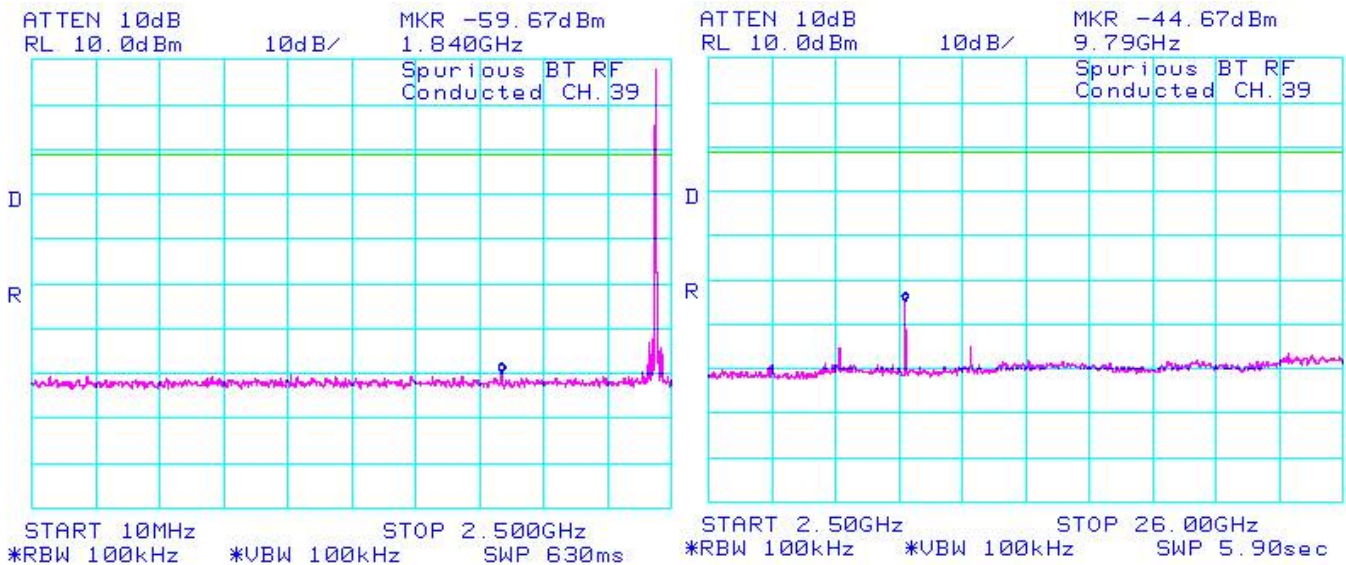
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**Figure 2-36: Spurious RF Conducted Emissions**  
Single Freq., Static PRBS, DH5,



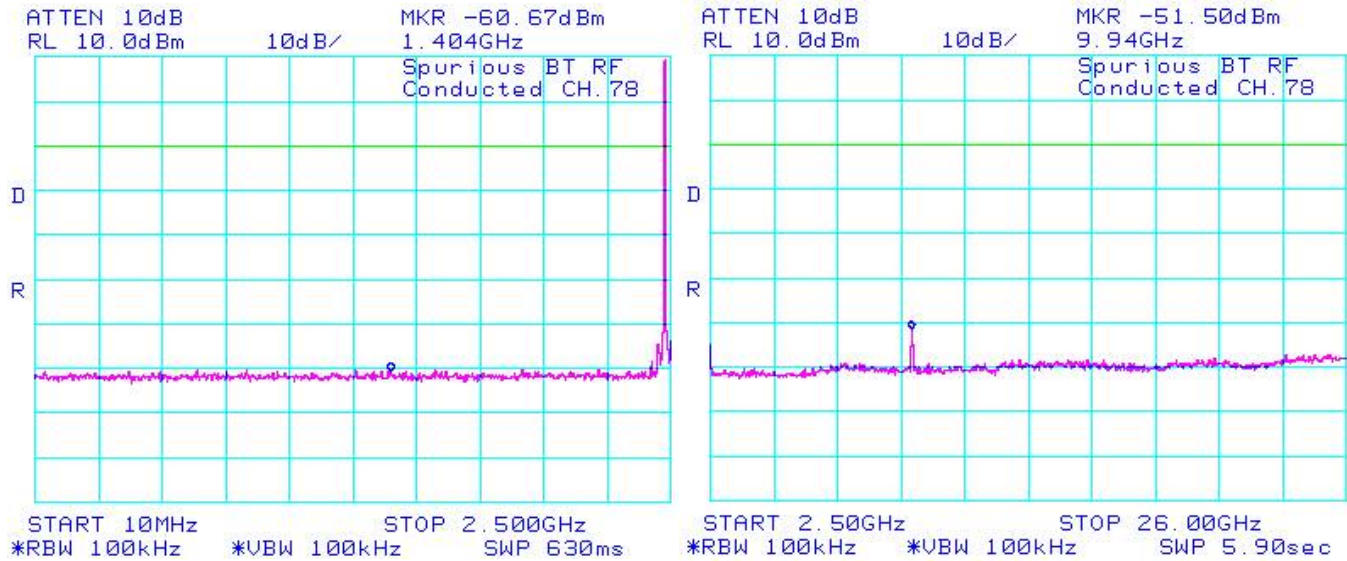
**Figure 2-37: Spurious RF Conducted Emissions**  
Single Freq., Static PRBS, DH5



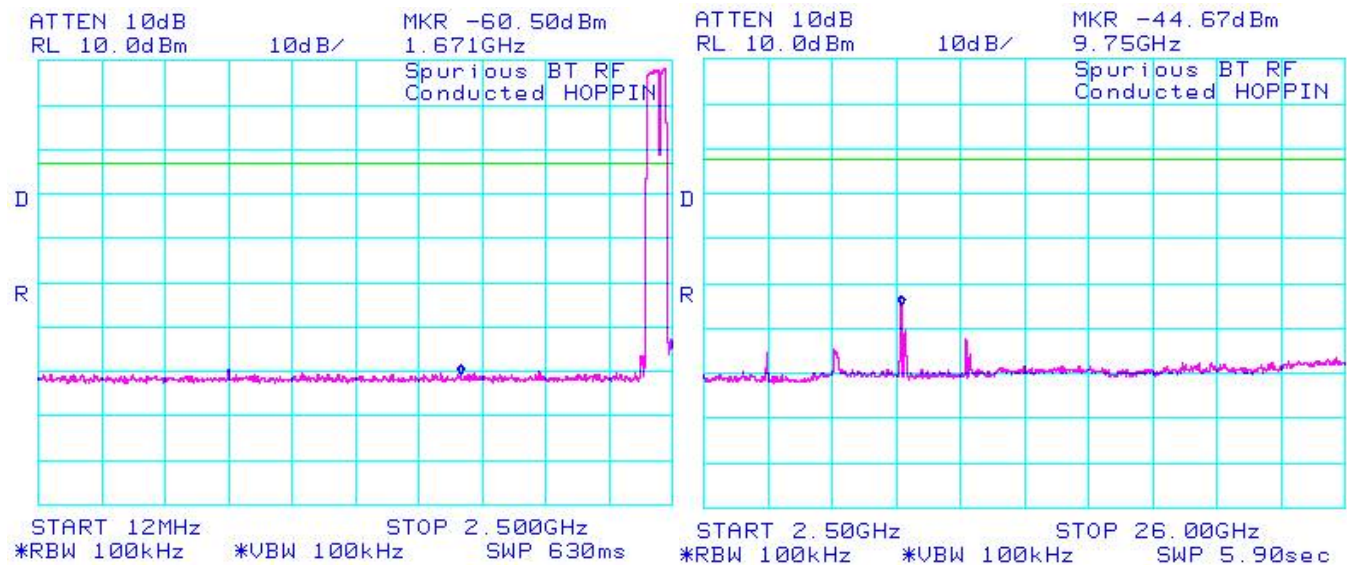
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Bluetooth RF Conducted Emission Test Results cont'd

**Figure 2-38: Spurious RF Conducted Emissions**  
Single Freq., Static PRBS, DH5



**Figure 2-39: Spurious RF Conducted Emissions**  
Freq. Hopping, Static PRBS, DH5




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Bluetooth RF Conducted Emission Test Results cont'd

Using pattern type “Static PRBS” and packet type “3-DH5” during the measurements.

Bluetooth Channel	Channel Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from carrier (dBc)	Limit (dBc)
0	7.00	-39.50	-46.50	-20
39	8.17	-45.67	-53.84	-20
78	9.00	-40.50	-49.50	-20
Hopping mode	7.00	-45.17	-52.17	-20

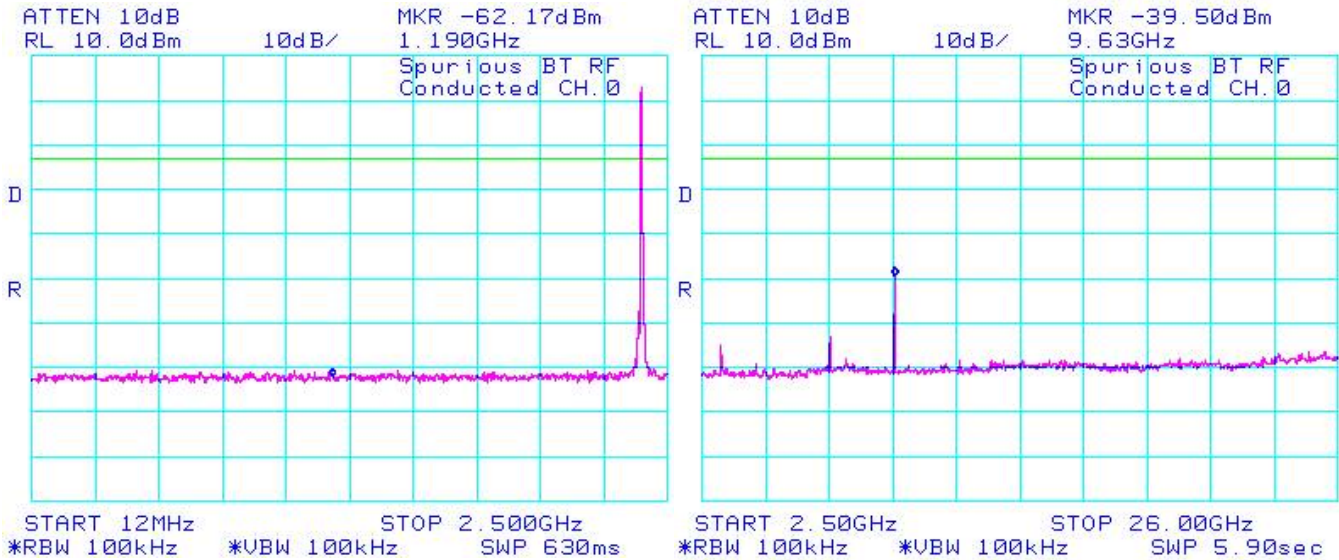
See figures 3-40 to 3-43 for the plots of the spurious RF conducted emissions.

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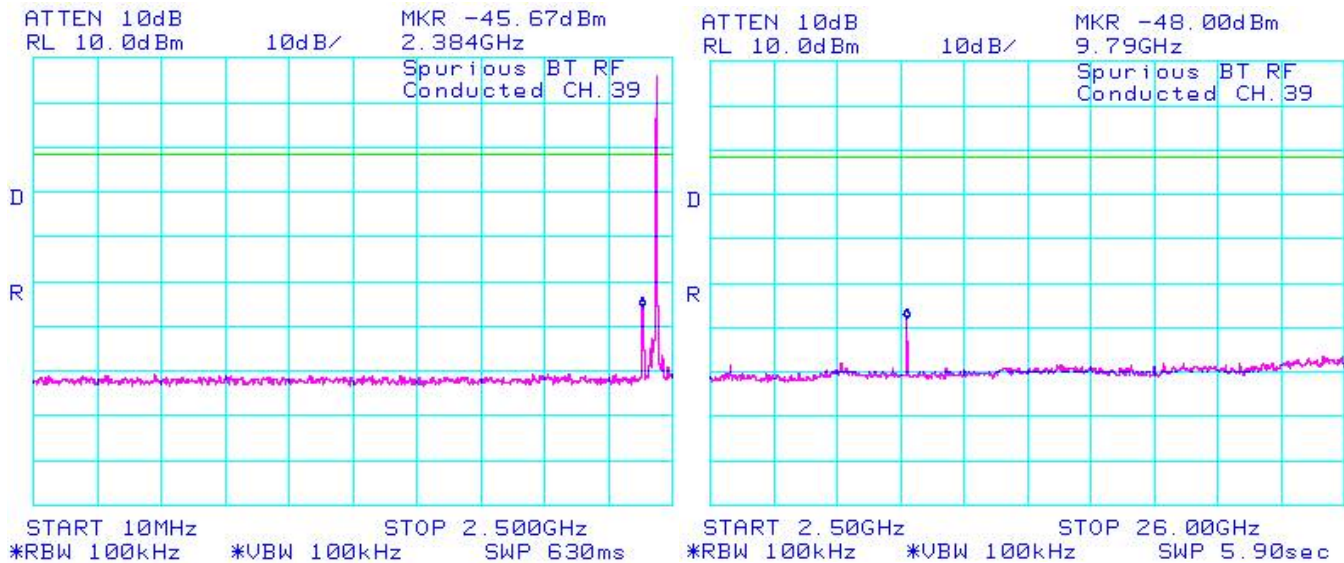
**Figure 3-40 : Spurious RF Conducted Emissions**


**Single Freq., Static PRBS, 3-DH5**



**Figure 3-41: Spurious RF Conducted Emissions**

**Single Freq., Static PRBS, 3-DH5**

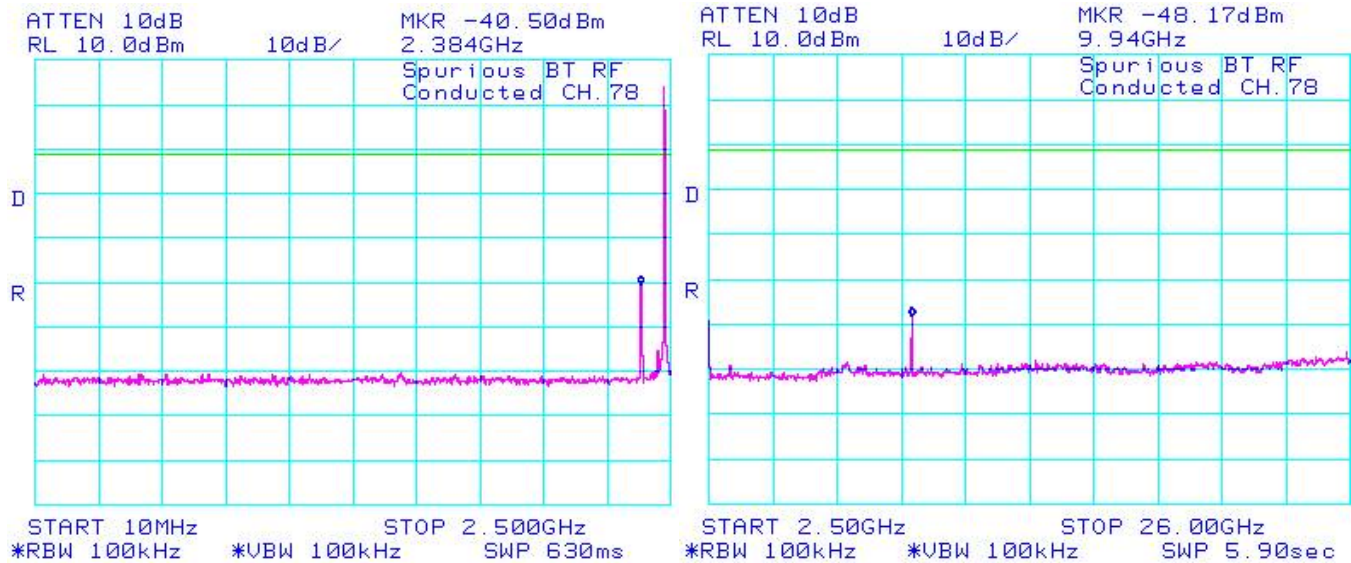


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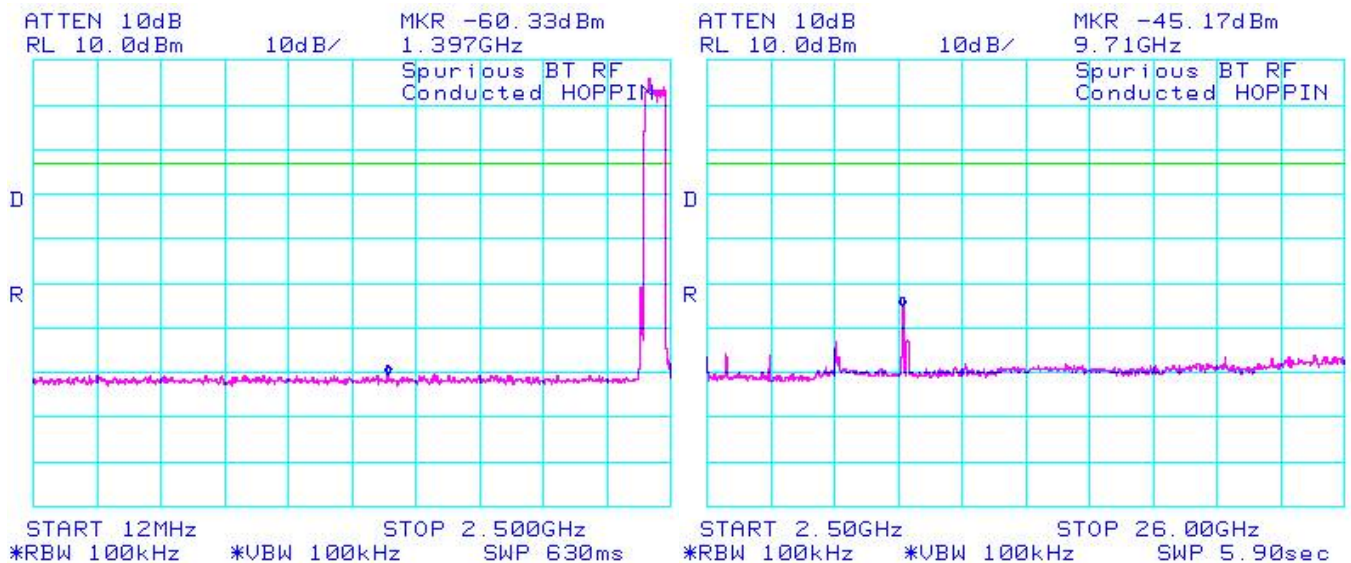
**Figure 3-42: Spurious RF Conducted Emissions**


**Single Freq., Static PRBS, 3-DH5**




**Figure 3-43 : Spurious RF Conducted Emissions**

**Freq. Hopping, Static PRBS, 3-DH5**



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## APPENDIX 4 – 802.11b/g/n CONDUCTED EMISSIONS TEST DATA/PLOTS

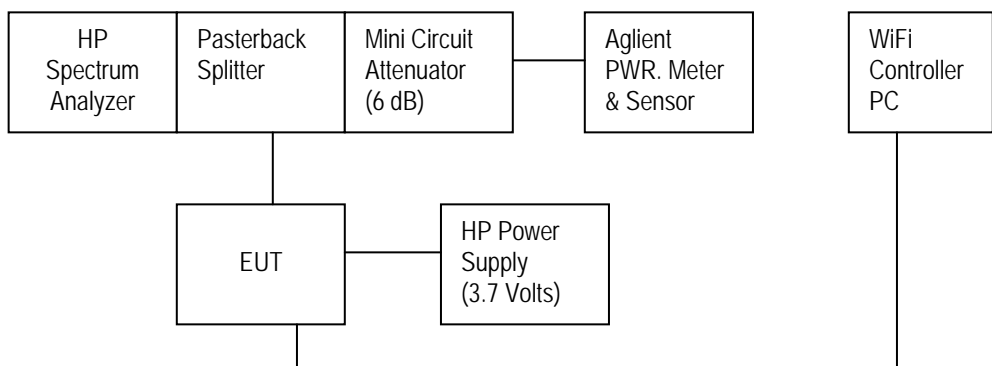
	EMI Test Report for the BlackBerry® smartphone Model RDA71UW	
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**802.11b/g/n RF Conducted Emission Test Results**

802.11b/g/n Target Power Output for all the recorded measurements shown below:

Channel	Frequency	802.11b		802.11g		802.11n	
		Data Rate	Power output (dBm)	Data Rate	Power output (dBm)	Data Rate	Power output (dBm)
1	2412 MHz	1 Mbps	18.0	6 Mbps	14.0	MCS 0	15.0
		5.5 Mbps	18.0	24 Mbps	14.0	MCS 4	14.5
		11 Mbps	18.0	54 Mbps	13.0	MCS 7	12.0
6	2437 MHz	1 Mbps	18.0	6 Mbps	17.0	MCS 0	17.0
		5.5 Mbps	18.0	24 Mbps	14.5	MCS 4	14.5
		11 Mbps	18.0	54 Mbps	13.0	MCS 7	12.0
11	2462 MHz	1 Mbps	18.0	6 Mbps	14.0	MCS 0	15.0
		5.5 Mbps	18.0	24 Mbps	14.0	MCS 4	14.5
		11 Mbps	18.0	54 Mbps	13.0	MCS 7	12.0

**Test Setup Diagram**



A reference offset of 20.4 dB was applied to the spectrum analyzer and 6.6 dB was applied to the Power Meter reference level for the attenuators and coaxial cable loss in the test circuit.

Date of test: April 30, 2010

The measurements on the BlackBerry® smartphone were performed by Maurice Battler.

The environmental test conditions were:      Temperature:            22 °C  
    Pressure:                 1006 mb  
    Relative Humidity:     31 %




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802.11b/g/n RF Conducted Emission Test Results cont'd

**6 dB Bandwidth**

The EUT met the requirements of the 6 dB bandwidth as per 47 CFR 15.247(a)(2) and RSS-210. Channels 1, 6 and 11 were measured at 1 Mbps, 5.5 Mbps, and 11Mbps each for 802.11b mode, 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11g mode, and MCS 0, 4, and 7 for 802.11n mode.

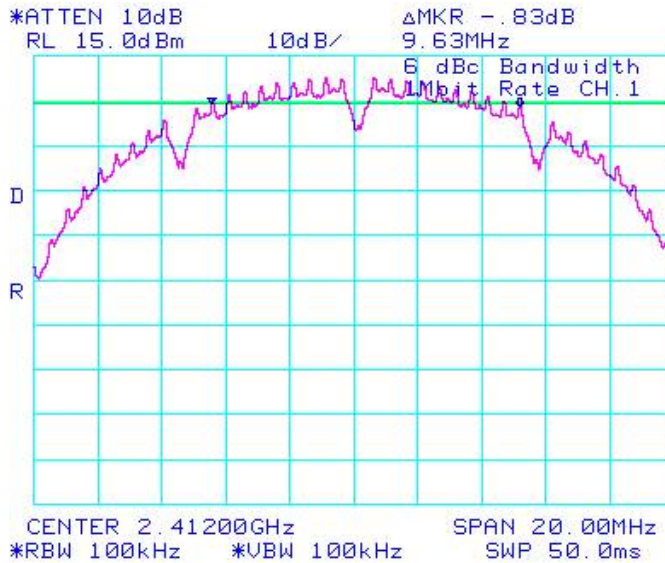
Channel	Data Rate	Limit (kHz)	Measured Level (MHz)
1	1 Mbps	≥ 500	9.63
	5.5 Mbps	≥ 500	10.57
	11 Mbps	≥ 500	10.77
	6 Mbps	≥ 500	16.20
	24 Mbps	≥ 500	16.57
	54 Mbps	≥ 500	16.57
	MCS 0	≥ 500	16.83
	MCS 4	≥ 500	17.73
	MCS 7	≥ 500	17.73
6	1 Mbps	≥ 500	10.13
	5.5 Mbps	≥ 500	10.60
	11 Mbps	≥ 500	10.63
	6 Mbps	≥ 500	16.17
	24 Mbps	≥ 500	16.60
	54 Mbps	≥ 500	16.57
	MCS 0	≥ 500	17.30
	MCS 4	≥ 500	17.70
	MCS 7	≥ 500	17.73
11	1 Mbps	≥ 500	10.16
	5.5 Mbps	≥ 500	10.33
	11 Mbps	≥ 500	10.47
	6 Mbps	≥ 500	16.40
	24 Mbps	≥ 500	16.60
	54 Mbps	≥ 500	16.63
	MCS 0	≥ 500	17.43
	MCS 4	≥ 500	17.67
	MCS 7	≥ 500	17.73

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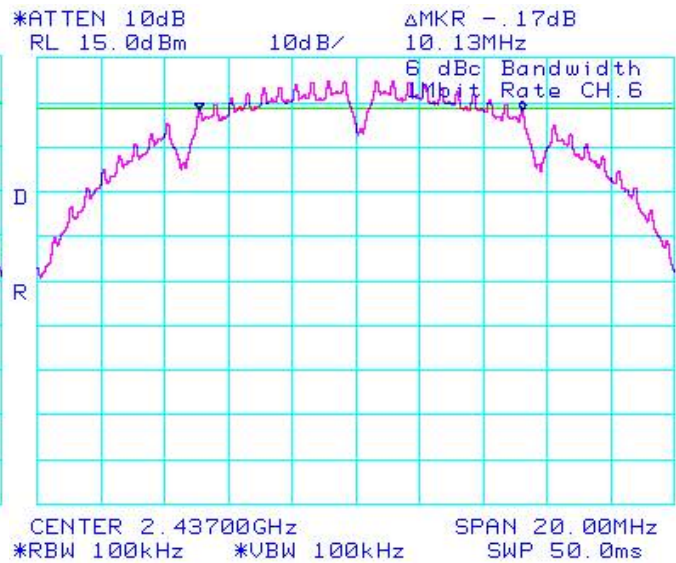
802.11b/g/n RF Conducted Emission Test Results cont'd

See figures 4-1 to 4-9 for the plots of the 6 dB bandwidth measurements for Channels 1, 6, and 11, at 1 Mbps each for 802.11b mode, 6 Mbps each for 802.11g mode, and MCS 0 each for 802.11n mode.

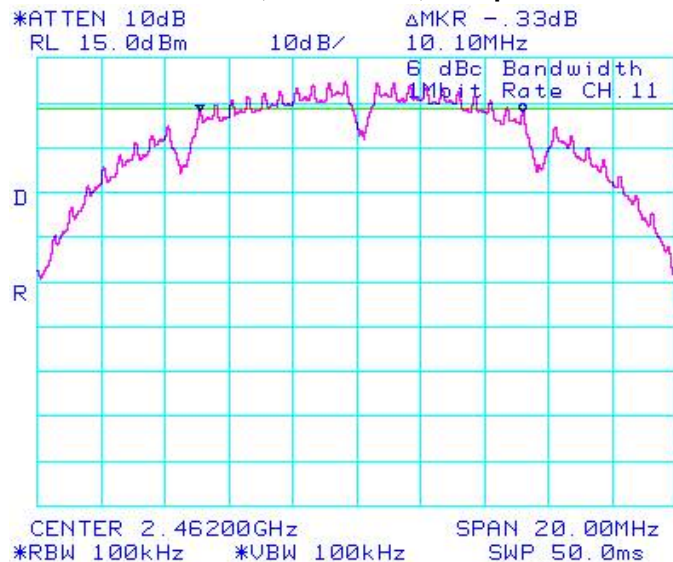
**Figure 4-1: 6 dB Bandwidth**  
802.11b, Channel 1, 1 Mbps



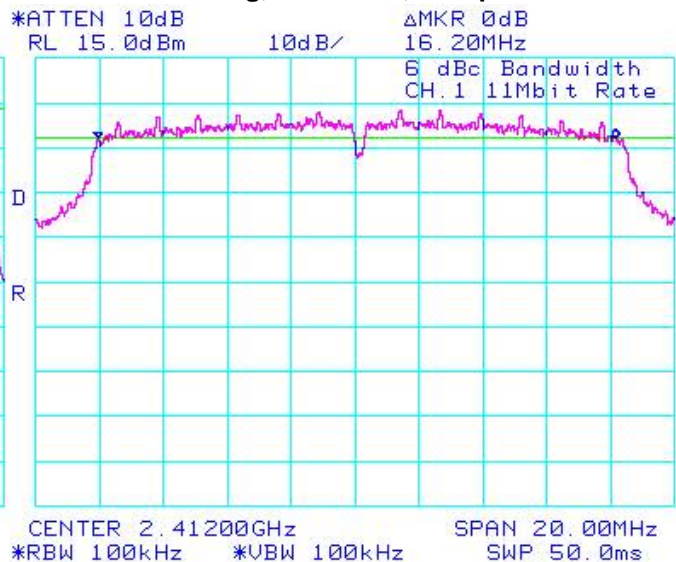
**Figure 4-2: 6 dB Bandwidth**  
802.11b, Channel 6, 1 Mbps




**Figure 4-3: 6 dB Bandwidth**  
802.11b, Channel 11, 1 Mbps



**Figure 4-4: 6 dB Bandwidth**  
802.11g, Channel 1, 6 Mbps

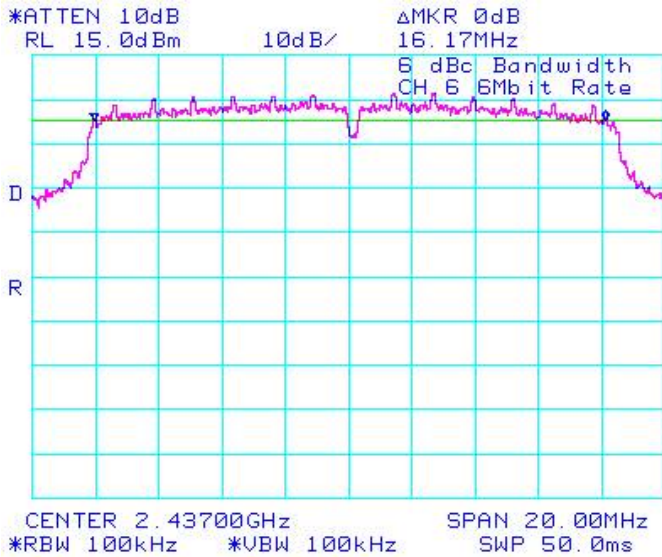


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802.11b/g/n RF Conducted Emission Test Results cont'd

**Figure 4-5: 6 dB Bandwidth**

**802.11g, Channel 6, 6 Mbps**



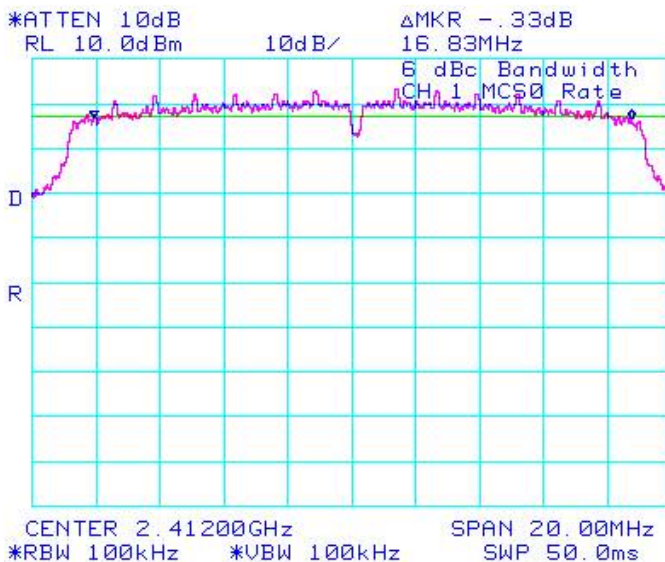
**Figure 4-6: 6 dB Bandwidth**

**802.11g, Channel 11, 6 Mbps**



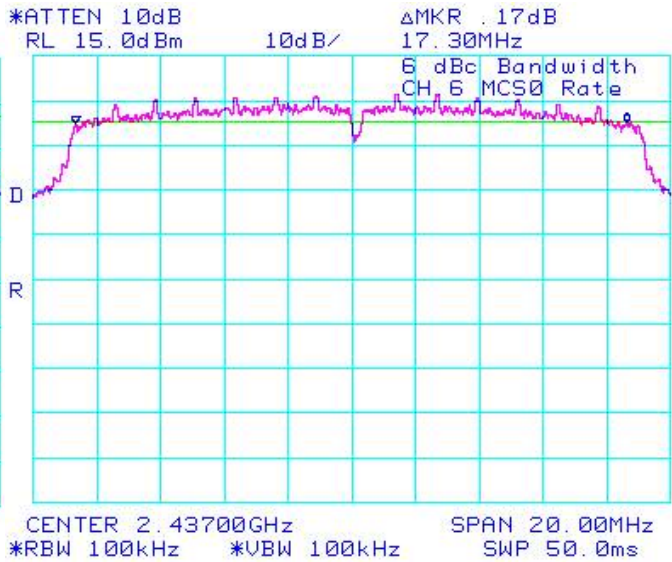
**Figure 4-7: 6 dB Bandwidth**

**802.11n, Channel 1, MCS 0**




**Figure 4-8: 6 dB Bandwidth**

**802.11n, Channel 6, MCS 0**





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802.11b/g/n RF Conducted Emission Test Results cont'd

**Maximum Conducted Output Power**

The EUT met the requirements of the maximum conducted output power of class 2 as per 47 CFR 15.247(b)(3) and RSS-210. Channels 1, 6 and 11 were measured at 1 Mbps, 5.5 Mbps, and 11 Mbps each for 802.11b mode, 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11g mode, and MCS 0, 4 and 7 for 802.11n mode using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 18.4 dB was applied to the power meter reference level for the coaxial cable loss and attenuators in the test circuit.

Channel	Data Rate	Class 2 Limit (W)	Measured Level (dBm)	Measured Level (mW)
1	1 Mbps	< 1.00	18.10	64.57
	5.5 Mbps	< 1.00	17.90	61.66
	11 Mbps	< 1.00	17.95	62.37
	6 Mbps	< 1.00	14.10	25.70
	24 Mbps	< 1.00	14.04	25.35
	54 Mbps	< 1.00	12.90	19.50
	MCS 0	< 1.00	13.95	24.83
	MCS 4	< 1.00	13.96	24.89
	MCS 7	< 1.00	11.85	15.31
6	1 Mbps	< 1.00	17.85	60.95
	5.5 Mbps	< 1.00	17.84	60.81
	11 Mbps	< 1.00	17.87	61.24
	6 Mbps	< 1.00	17.42	55.21
	24 Mbps	< 1.00	14.05	25.41
	54 Mbps	< 1.00	12.90	19.50
	MCS 0	< 1.00	17.52	56.49
	MCS 4	< 1.00	14.76	29.92
	MCS 7	< 1.00	11.95	15.67




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802.11b/g/n RF Conducted Emission Test Results cont'd

<b>Channel</b>	<b>Data Rate</b>	<b>Class 2 Limit (W)</b>	<b>Measured Level (dBm)</b>	<b>Measured Level (mW)</b>
11	1 Mbps	< 1.00	17.96	62.52
	5.5 Mbps	< 1.00	17.84	60.81
	11 Mbps	< 1.00	17.91	61.80
	6 Mbps	< 1.00	13.92	24.66
	24 Mbps	< 1.00	13.80	23.99
	54 Mbps	< 1.00	12.90	19.50
	MCS 0	< 1.00	13.81	24.04
	MCS 4	< 1.00	13.75	23.71
	MCS 7	< 1.00	10.72	11.80

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802.11b/g/n RF Conducted Emission Test Results cont'd

**Band Edge Compliance**

The EUT met the requirements of the band edge compliance as per 47 CFR 15.247(c) and RSS-210. Channels 1 and 11 were measured at 1 Mbps, 5.5 Mbps, and 11 Mbps each for 802.11b mode, 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11g mode, and MCS 0, 4 and 7 for 802.11n mode.

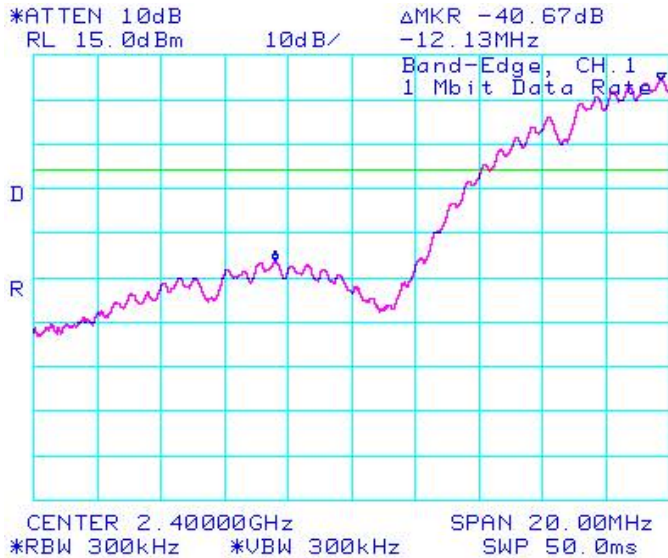
Channel	Data Rate	Limit (dBc)	Measured Level (dBc)	Margin (dBc)
1	1 Mbps	< -20	-40.67	-20.67
	5.5 Mbps	< -20	-40.83	-20.83
	11 Mbps	< -20	-41.00	-21.00
	6 Mbps	< -20	-26.83	-6.83
	24 Mbps	< -20	-28.50	-8.50
	54 Mbps	< -20	-29.17	-9.17
	MCS 0	< -20	-25.67	-5.67
	MCS 4	< -20	-27.16	-7.16
	MCS 7	< -20	-28.00	-8.00
11	1 Mbps	< -20	-43.66	-23.66
	5.5 Mbps	< -20	-48.66	-28.66
	11 Mbps	< -20	-49.00	-29.00
	6 Mbps	< -20	-42.66	-22.66
	24 Mbps	< -20	-41.50	-21.50
	54 Mbps	< -20	-46.17	-26.17
	MCS 0	< -20	-41.17	-21.17
	MCS 4	< -20	-44.50	-24.50
	MCS 7	< -20	-45.67	-25.67

See figures 4-10 to 4-15 for the plots of the band edge compliance measurements for Channels 1 and 11, at 1 Mbps each for 802.11b mode, 6 Mbps each for 802.11g mode, and MCS 0 each for 802.11n mode.

802.11b/g/n RF Conducted Emission Test Results cont'd

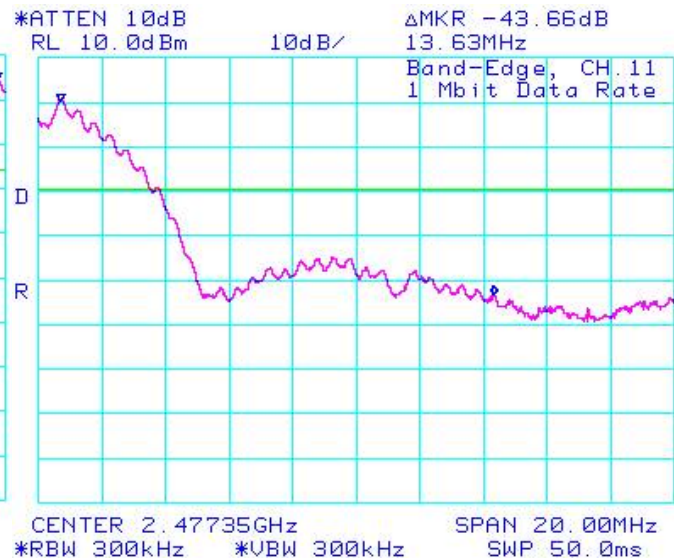
**Figure 4-10: Band Edge Compliance**

**802.11b, Channel 1, 1 Mbps**



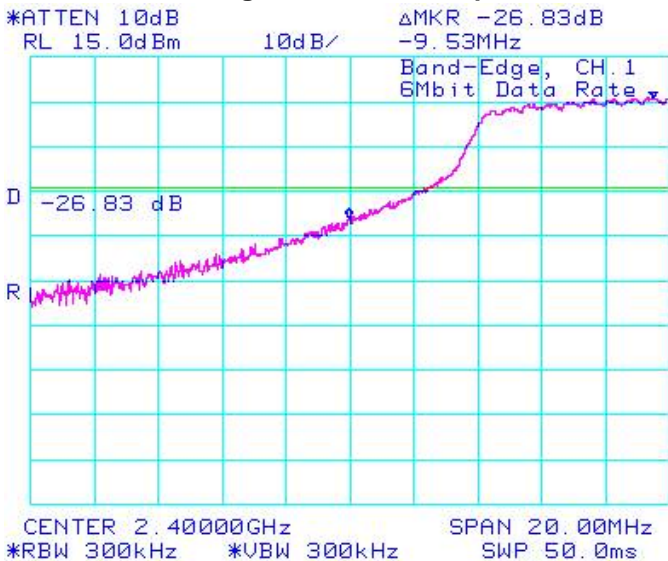
**Figure 4-11: Band Edge Compliance**

**802.11b, Channel 11, 1 Mbps**



**Figure 4-12: Band Edge Compliance**

**802.11g, Channel 1, 6 Mbps**




**Figure 4-13: Band Edge Compliance**

**802.11g, Channel 11, 6 Mbps**



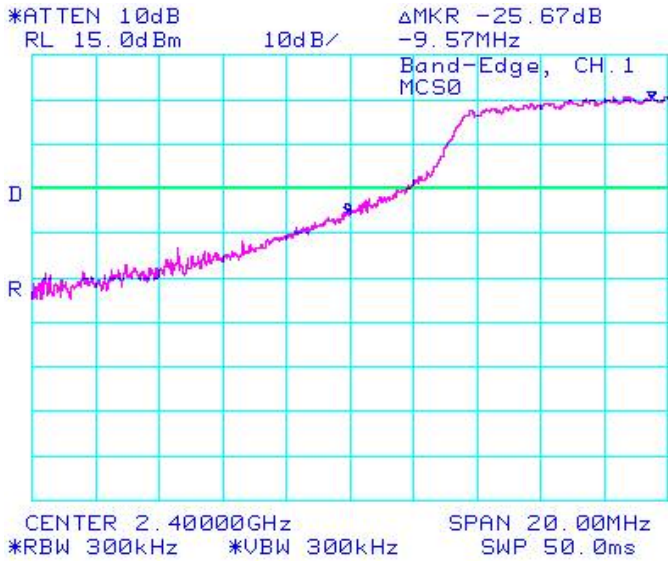


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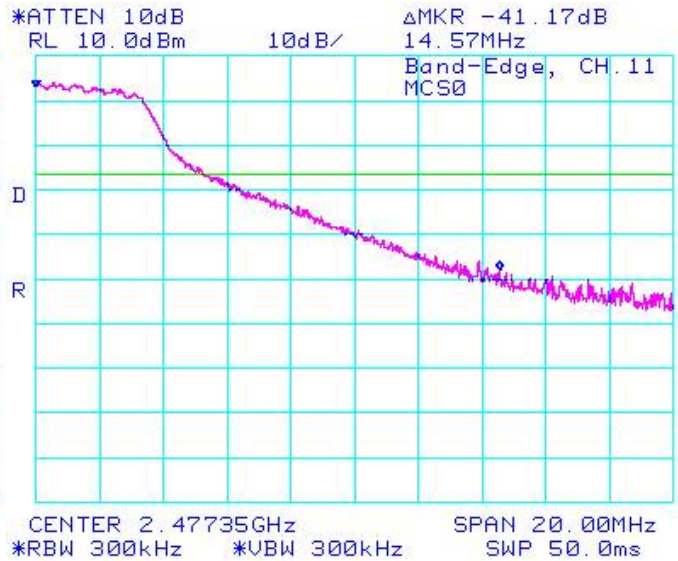
**Figure 4-14: Band Edge Compliance**

**802.11n, Channel 1, MCS 0**



**Figure 4-15: Band Edge Compliance**

**802.11n, Channel 11, MCS 0**




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802.11b/g/n RF Conducted Emission Test Results cont'd

**Peak Power Spectral Density**

The EUT met the requirements of the peak power spectral density as per 47 CFR 15.247(d) and RSS-210. Channels 1, 6 and 11 were measured at 1 Mbps, 5.5 Mbps, and 11 Mbps each for 802.11b mode, 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11g mode, and MCS 0, 4, and 7 for 802.11n mode.

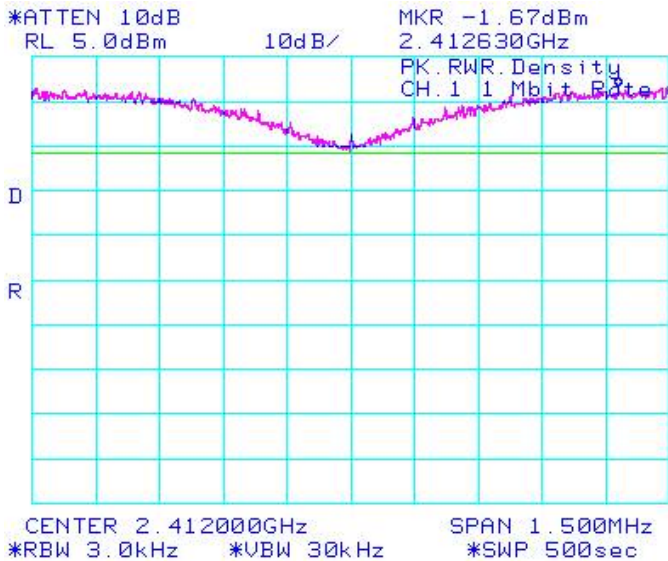
Channel	Data Rate	Limit (dBm)	Measured Level (dBm)	Margin (dBm)
1	1 Mbps	< 8.00	-1.67	-9.67
	5.5 Mbps	< 8.00	-3.50	-11.50
	11 Mbps	< 8.00	-2.83	-10.83
	6 Mbps	< 8.00	-9.33	-17.33
	24 Mbps	< 8.00	-9.00	-17.00
	54 Mbps	< 8.00	-10.50	-18.50
	MCS 0	< 8.00	-8.83	-16.83
	MCS 4	< 8.00	-9.67	-17.67
	MCS 7	< 8.00	-11.67	-19.67
6	1 Mbps	< 8.00	-2.17	-10.17
	5.5 Mbps	< 8.00	-4.00	-12.00
	11 Mbps	< 8.00	-3.17	-11.17
	6 Mbps	< 8.00	-6.33	-14.33
	24 Mbps	< 8.00	-8.33	-16.33
	54 Mbps	< 8.00	-10.83	-18.83
	MCS 0	< 8.00	-5.83	-13.83
	MCS 4	< 8.00	-9.33	-17.33
	MCS 7	< 8.00	-11.33	-19.33
11	1 Mbps	< 8.00	-2.33	-10.33
	5.5 Mbps	< 8.00	-4.33	-12.33
	11 Mbps	< 8.00	-3.50	-11.50
	6 Mbps	< 8.00	-10.17	-18.17
	24 Mbps	< 8.00	-9.67	-17.67
	54 Mbps	< 8.00	-10.83	-18.83
	MCS 0	< 8.00	-9.50	-17.50
	MCS 4	< 8.00	-10.17	-18.17
	MCS 7	< 8.00	-11.50	-19.50

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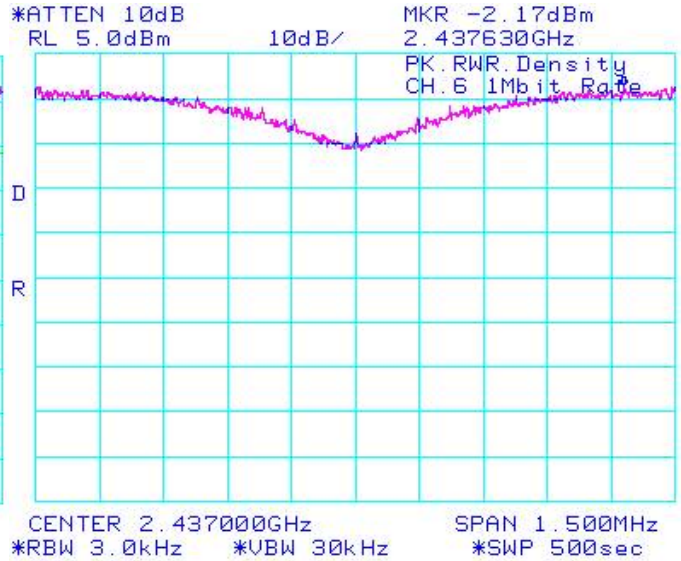
802.11b/g/n RF Conducted Emission Test Results cont'd

See figures 4-16 to 4-24 for the plots of the peak power spectral density for Channels 1, 6 and 11, at 1 Mbps each for 802.11b mode, 6 Mbps each for 802.11g mode, and MCS 0 for 802.11n mode.

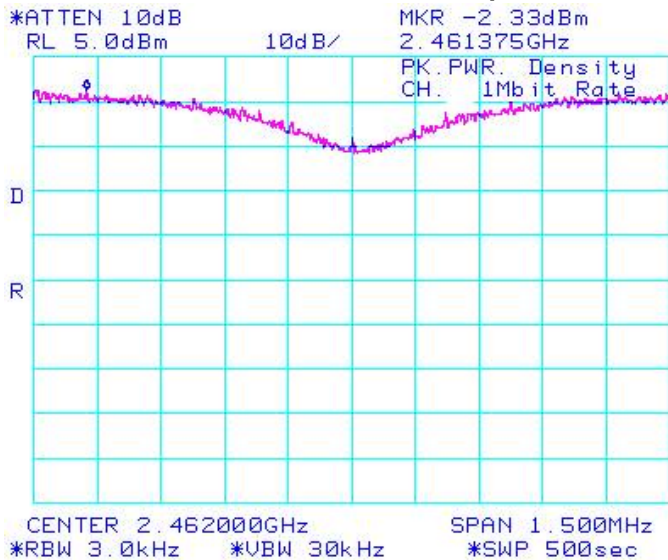
**Figure 4-16: Peak Power Spectral Density  
802.11b, Channel 1, 1 Mbps**



**Figure 4-17: Peak Power Spectral Density  
802.11b, Channel 6, 1 Mbps**

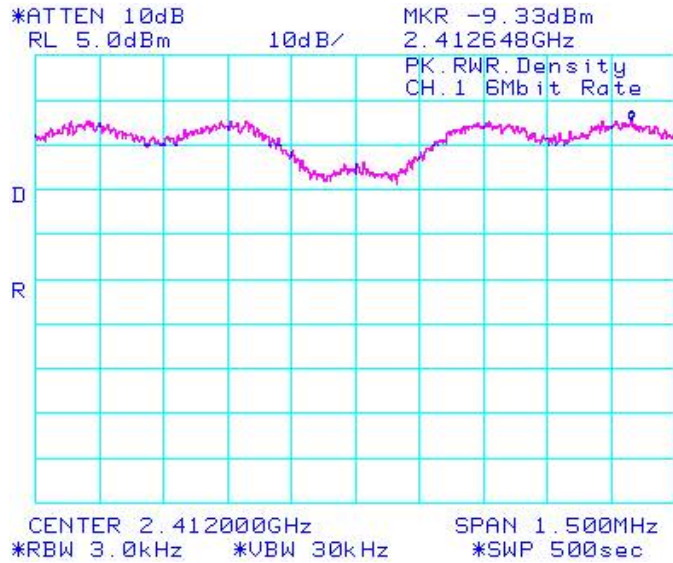


**Figure 4-18: Peak Power Spectral Density  
802.11b, Channel 11, 1 Mbps**

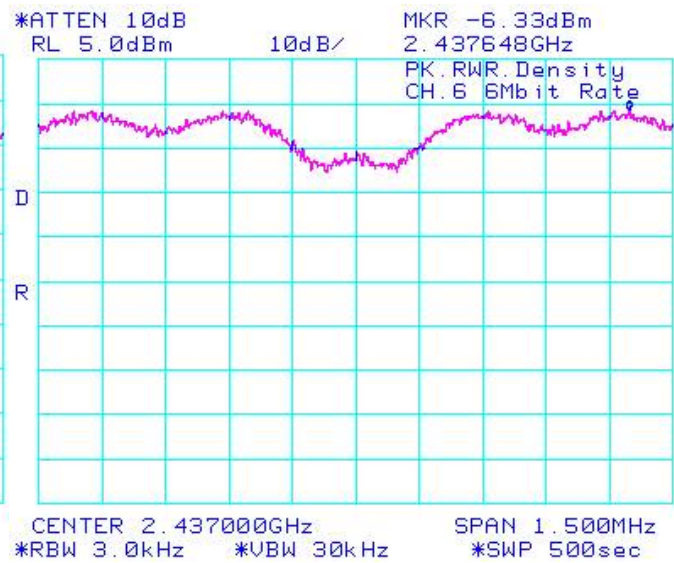


802.11b/g/n RF Conducted Emission Test Results cont'd

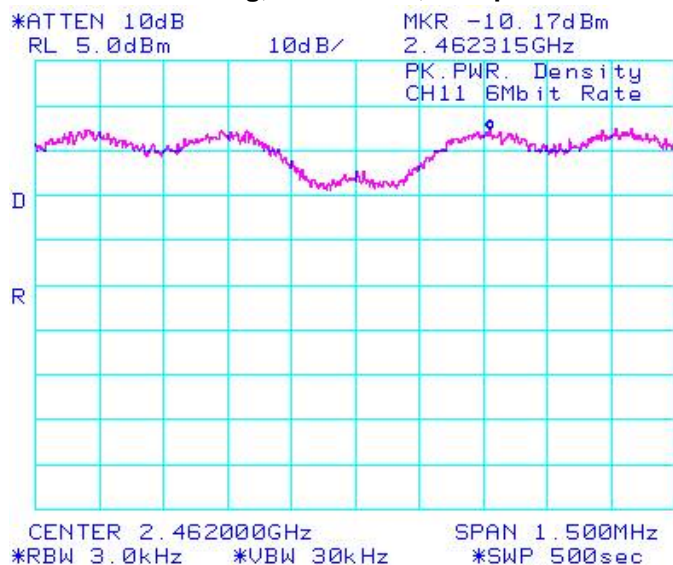
**Figure 4-19: Peak Power Spectral Density**  
**802.11g, Channel 1, 6 Mbps**




**Figure 4-20: Peak Power Spectral Density**  
**802.11g, Channel 6, 6 Mbps**



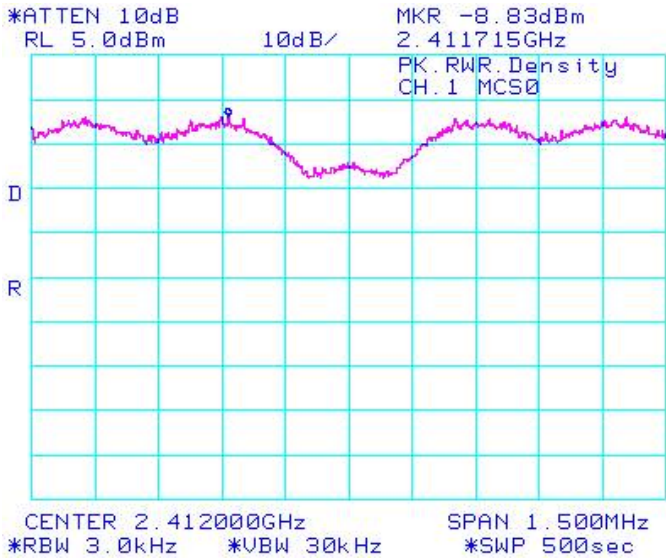
**Figure 4-21: Peak Power Spectral Density**  
**802.11g, Channel 11, 6 Mbps**



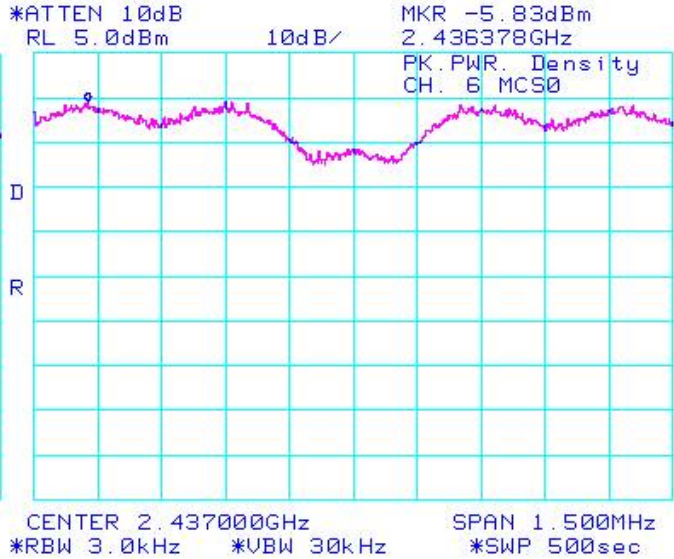
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802.11b/g/n RF Conducted Emission Test Results cont'd

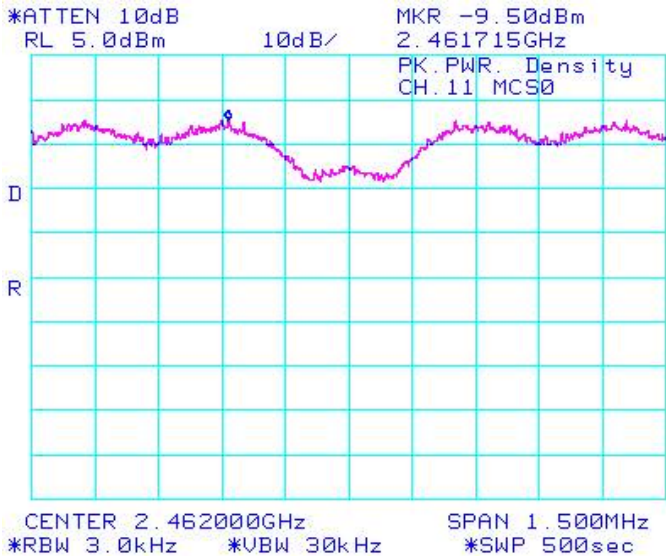
**Figure 4-22: Peak Power Spectral Density**  
802.11n, Channel 1, MCS 0




**Figure 4-23: Peak Power Spectral Density**  
802.11n, Channel 6, MCS 0



**Figure 4-24: Peak Power Spectral Density**  
802.11n, Channel 11, MCS 0




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802.11b/g/n RF Conducted Emission Test Results cont'd

**Spurious RF Conducted Emissions**

The EUT met the requirements of the spurious RF conducted emissions as per 47 CFR 15.247(c) and RSS-210. Channels 1, 6 and 11 were measured at 1 Mbps, 5.5 Mbps, and 11 Mbps each for 802.11b mode, 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11g mode, and MCS 0, 4, and 7 for 802.11n mode. Peak power was measured using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 18.4 dB was applied to the power meter reference level for the coaxial cable loss and attenuators in the test circuit.

Channel	Data Rate	Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from Carrier (dBc)	Limit (dBc)
1	1 Mbps	18.10	-48.67	-66.77	-20
	5.5 Mbps	17.90	-43.00	-60.90	-20
	11 Mbps	17.95	-38.67	-56.62	-20
	6 Mbps	14.10	-46.00	-60.10	-20
	24 Mbps	14.04	-43.67	-57.71	-20
	54 Mbps	12.90	-43.67	-56.57	-20
	MCS 0	13.95	-43.33	-57.28	-20
	MCS 4	13.96	-41.33	-55.29	-20
	MCS 7	11.85	-43.83	-55.68	-20
6	1 Mbps	17.85	-39.00	-56.85	-20
	5.5 Mbps	17.84	-38.33	-56.17	-20
	11 Mbps	17.87	-39.83	-57.70	-20
	6 Mbps	17.42	-39.17	-56.59	-20
	24 Mbps	14.05	-42.33	-56.38	-20
	54 Mbps	12.90	-43.50	-56.40	-20
	MCS 0	17.52	-41.17	-58.69	-20
	MCS 4	14.76	-43.67	-58.43	-20
	MCS 7	11.95	-44.17	-56.12	-20

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802.11b/g/n RF Conducted Emission Test Results cont'd

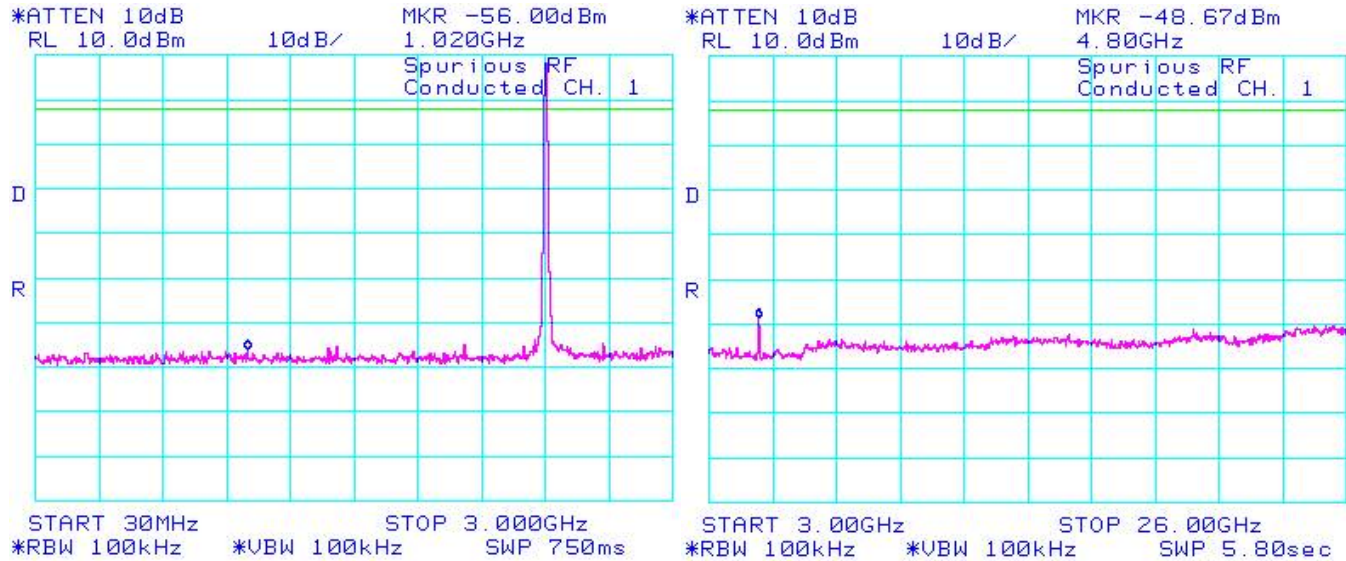
Channel	Data Rate	Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from Carrier (dBc)	Limit (dBc)
11	1 Mbps	17.96	-45.17	-63.13	-20
	5.5 Mbps	17.84	-42.83	-60.67	-20
	11 Mbps	17.91	-39.17	-57.08	-20
	6 Mbps	13.92	-49.83	-63.75	-20
	24 Mbps	13.80	-44.17	-57.97	-20
	54 Mbps	12.90	-44.50	-57.40	-20
	MCS 0	13.81	-44.33	-58.14	-20
	MCS 4	13.75	-43.83	-57.58	-20
	MCS 7	10.72	-44.17	-54.89	-20

The emissions were in the NF.

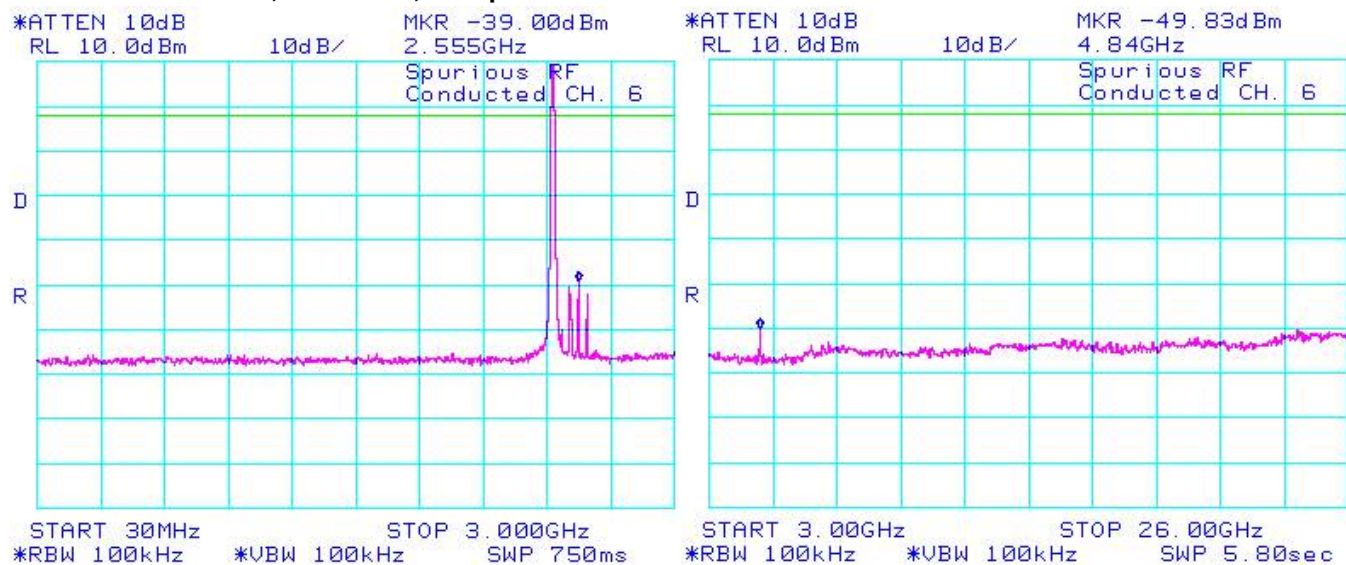
See figures 4-25 to 4-33 for the plots of the spurious RF conducted emissions for Channels 1, 6 and 11, at 1 Mbps each for 802.11b mode, 6 Mbps each for 802.11g mode, and MCS 0 each for 802.11n mode.

802.11b/g/n RF Conducted Emission Test Results cont'd


**Figure 4-25: Spurious Conducted RF Emissions**  
 802.11b, Channel 1, 1 Mbps



**Figure 4-26 : Spurious Conducted RF Emissions**  
 802.11b, Channel 6, 1 Mbps

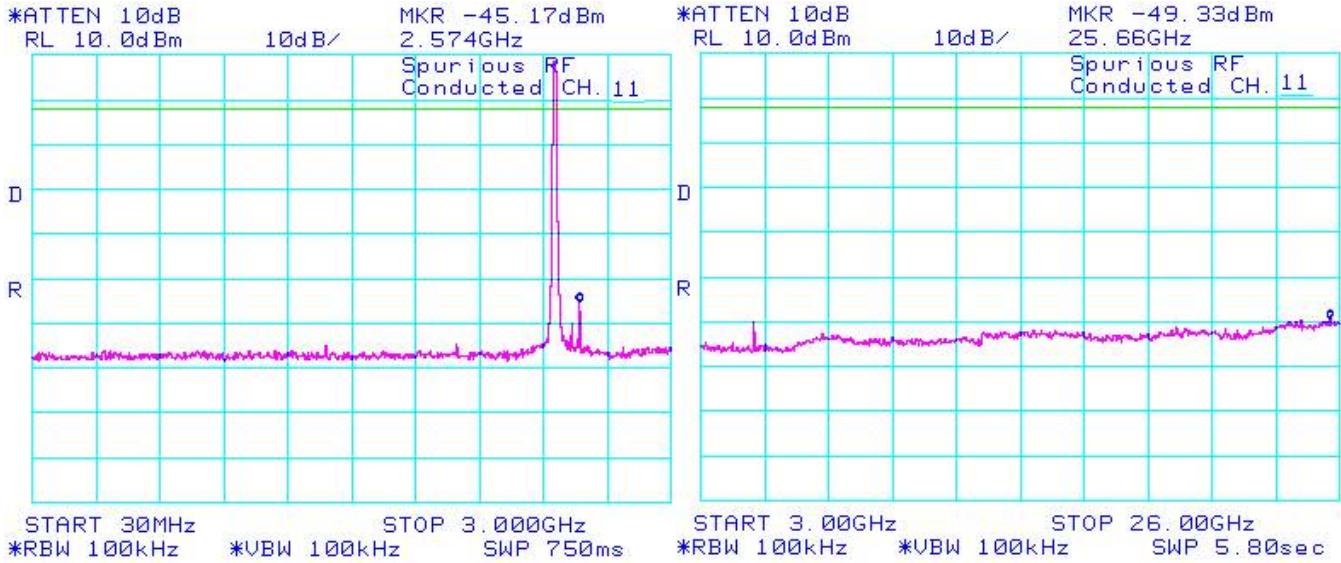




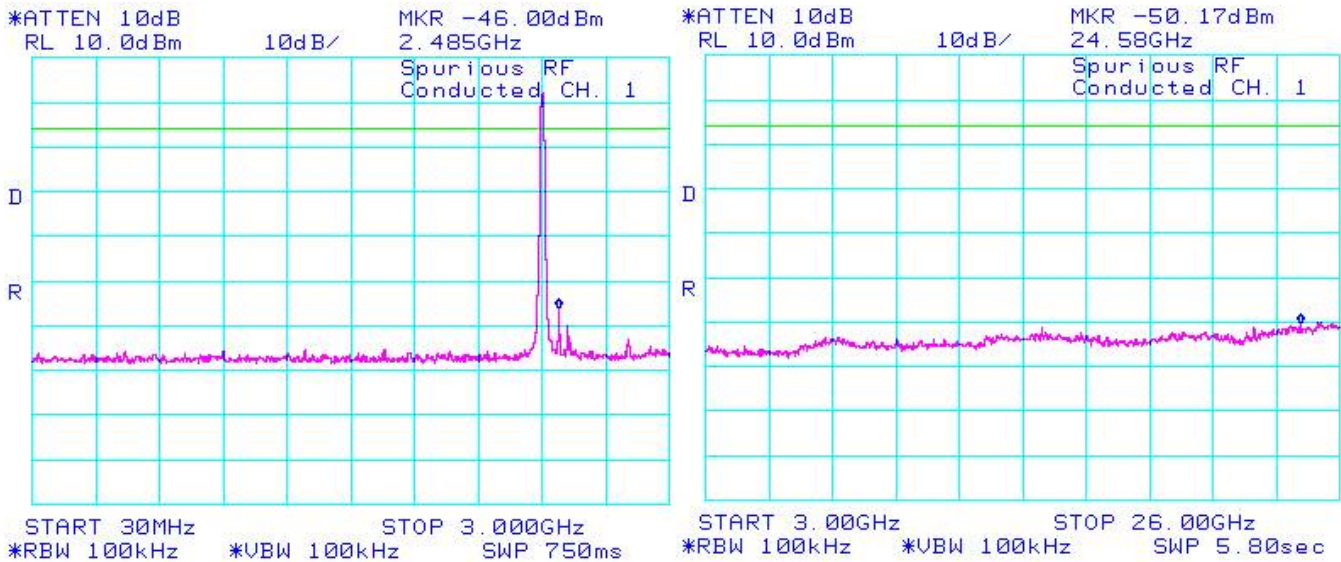
	EMI Test Report for the BlackBerry® smartphone Model RDA71UW	
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802.11b/g/n RF Conducted Emission Test Results cont'd

**Figure 4-27: Spurious Conducted RF Emissions**  
802.11b, Channel 11, 1 Mbps



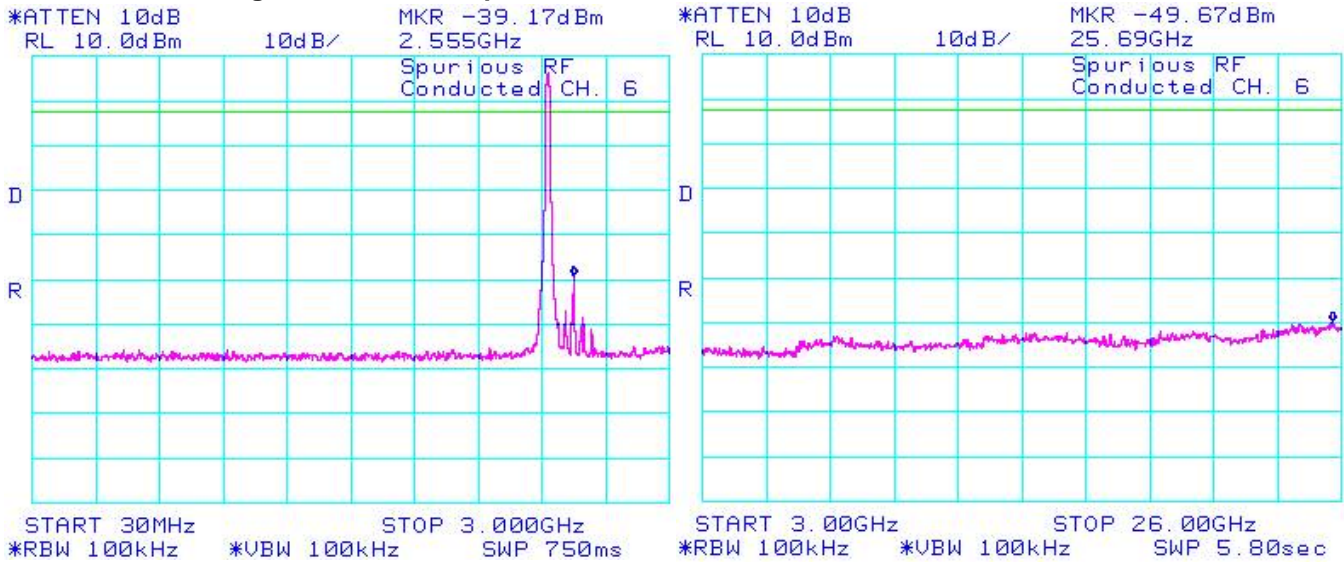
**Figure 4-28: Spurious Conducted RF Emissions**  
802.11g, Channel 1, 6 Mbps



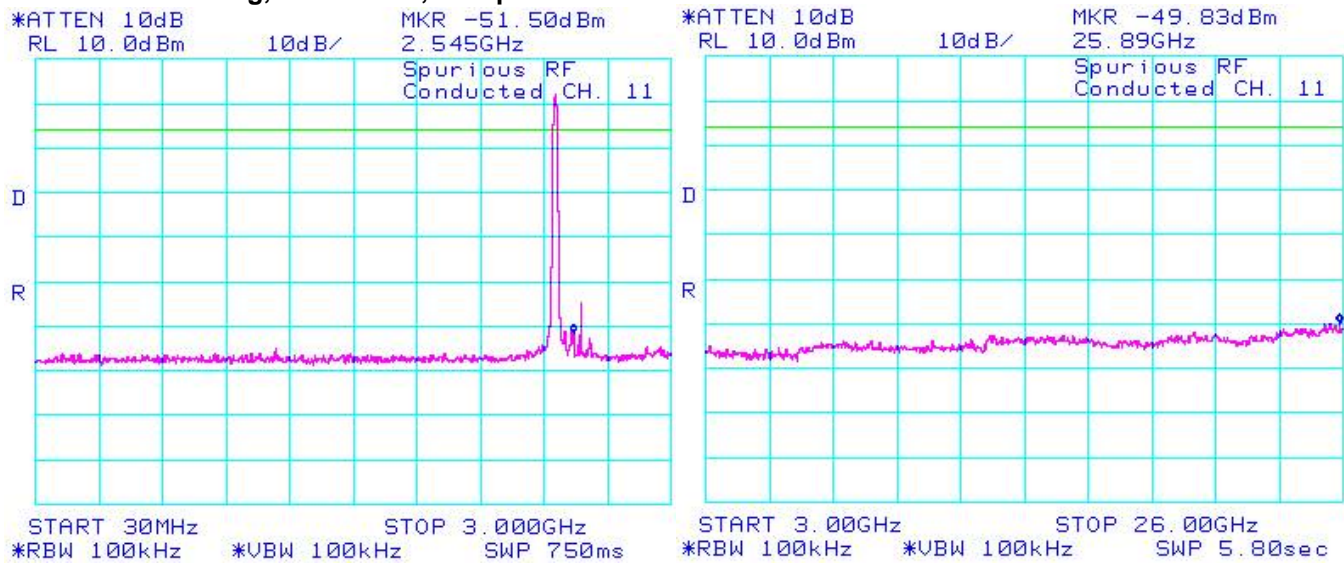
	EMI Test Report for the BlackBerry® smartphone Model RDA71UW	
	<b>APPENDIX 4</b>	
Test Report No. RTS-2671-1004-30	Dates of Test April 07 to May 07, 2010	Author Data Adam Rusinek

802.11b/g/n RF Conducted Emission Test Results cont'd

**Figure 4-29: Spurious Conducted RF Emissions  
802.11g, Channel 6, 6 Mbps**



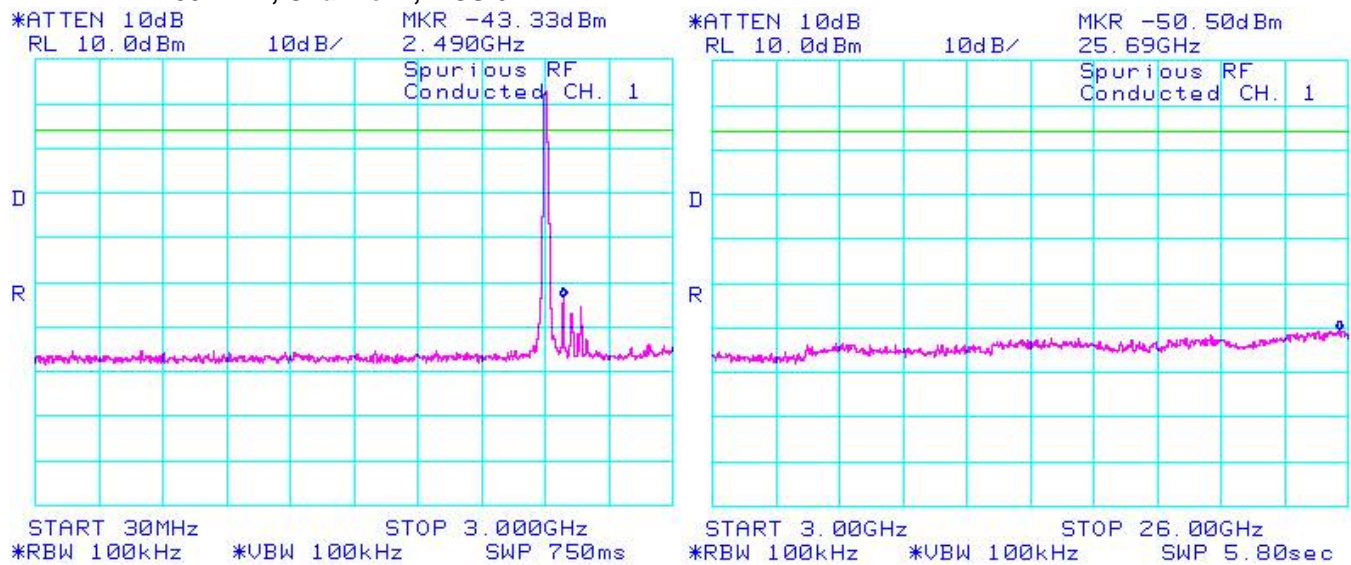
**Figure 4-30: Spurious Conducted RF Emissions  
802.11g, Channel 11, 6 Mbps**



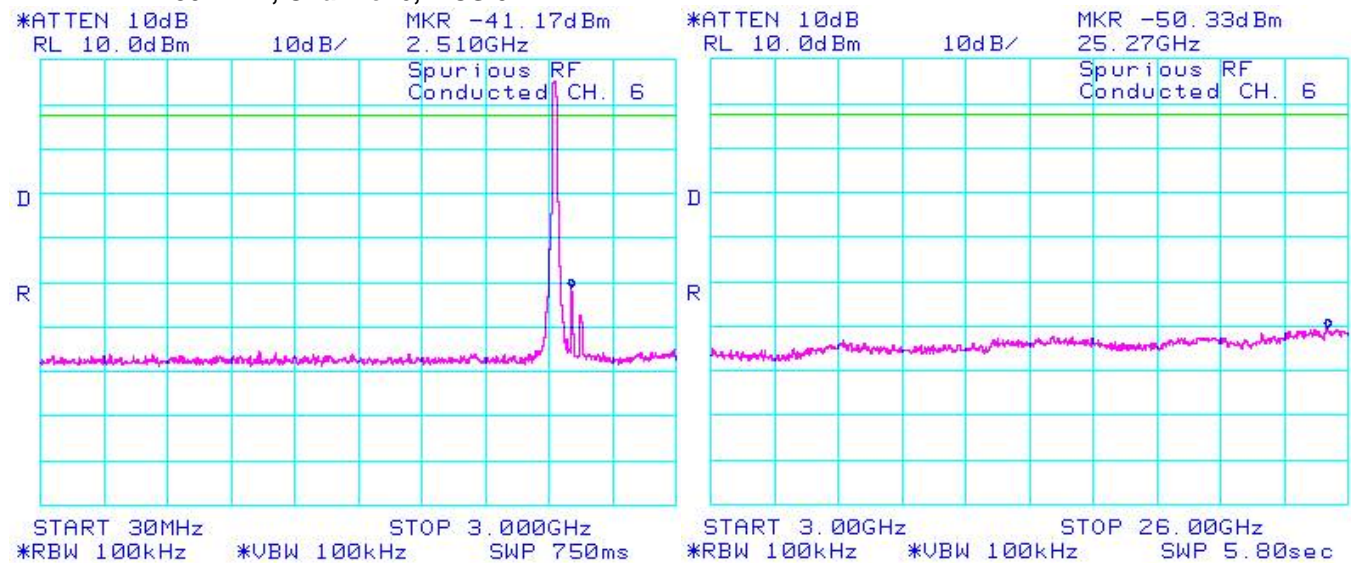
Test Report No. RTS-2671-1004-30	Dates of Test April 07 to May 07, 2010	Author Data Adam Rusinek
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802.11b/g/n RF Conducted Emission Test Results cont'd

**Figure 4-31: Spurious Conducted RF Emissions  
 802.11n, Channel 1, MCS 0**



**Figure 4-32: Spurious Conducted RF Emissions  
 802.11n, Channel 6, MCS 0**



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802.11b/g/n RF Conducted Emission Test Results cont'd

**Figure 4-33: Spurious Conducted RF Emissions  
802.11n, Channel 11, MCS 0**

