

# 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-2340-0911-16

**PRODUCT MODEL NO.:** RCS71CW  
**TYPE NAME:** BlackBerry® smartphone  
**FCC ID:** L6ARCS70CW  
**IC:** 2503A-RCS70CW

**DATE:** 20 November, 2009

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**Statement of Performance:**

The BlackBerry® smartphone, model RCS71CW , part number CER-27172-001 Rev. 5 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:



Kevin Rose  
Regulatory Compliance Specialist  
Date: 19 November, 2009

Reviewed by:




Michael Cino  
Regulatory Compliance Associate  
Date: 20 November, 2009

Reviewed by:




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Manager, Regulatory Compliance  
Date: 30 November, 2009

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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, 2008
- 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) HW\_Declaration\_CER-27172-001\_Rev3

## 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 October 30 to November 20 2009

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The sample EUT included:

SAMPLE	MODEL	CER NUMBER	PIN
1	RCS71CW	CER-27172-001 Rev 1	30F4F746
2	RCS71CW	CER-27172-001 Rev 1	30F4F739
3	RCS71CW	CER-27172-001 Rev 1	30FD0798
4	RCS71CW	CER-27172-001 Rev 3	310F4B7E

Samples 1, 2, and 4 were used for Radiated Emissions testing.  
Sample 2 was also used for AC Line Conducted Emissions.  
Sample 3 was used for Conducted Emissions testing.


To view the differences between CER-27172-001 Rev 1 and CER-27172-001 Rev 3, see document number HW\_Declaration\_CER-27172-001\_Rev3. Only the characteristics that may have been impacted by the changes were re-measured.

#### BlackBerry® smartphone Accessories Tested

- 1) 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.
- 2) Stereo Headset, part number HDW-14322-003 with a lead length of 1.3 metres.
- 3) Premium Stereo Headset, part number HDW-15766-005, 1.3 metres long.
- 4) Charging POD, part number HDW-22385-001.


#### **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 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, 6 dB Bandwidth	Pass	4
Part 15.247(b)	RSS-210	802.11b/g, Maximum Conducted Output Power	Pass	4
Part 15.247(b)	RSS-210	802.11b/g, Band-Edge	Pass	4
Part 15.247(b)	RSS-210	802.11b/g, Peak Power Spectral Density	Pass	4
Part 15.247(b)	RSS-210	802.11b/g, 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 BlackBerry® smartphone was tested in the following test configurations:

- 1) The BlackBerry® smartphone, PIN 30F4F739 in 802.11b Tx mode with Stereo Headset attached, was connected to the Folding Blade Charger.
- 2) The BlackBerry® smartphone, PIN 30F4F739 in Bluetooth Tx mode, and MP3 Audio playback mode with the Premium Single Button Stereo Headset attached, was positioned in the Charging Pod which was connected to the Folding Blade Charger.

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 7.00 dB below the QP limit at 2.33 MHz using the quasi-peak detector in Test Configuration 2.

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 PIN 310F4B7E 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 PIN 310F4B7E was measured in standalone configuration transmitting at channels 1, 6 & 11 at 1 Mbps, and channel 6 at 6 Mbps for 802.11b/g 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. The worst case test margin was greater than 25 dB below the limit.

The 802.11b/g harmonics were investigated up to the 10th harmonic. The sample EUT emissions were in the noise floor (NF).

See APPENDIX 2 for the test data


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

The BlackBerry® smartphone PIN 310F4B7E met the requirements for band-edge compliance of RF radiated emissions for Bluetooth and 802.11b/g as per the requirements of 15.247, 15.209, and RSS-210/RSS-GEN.

### Measurement Uncertainty $\pm 4.6$ 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 PIN 30FD0798 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.

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.


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 RF CONDUCTED EMISSIONS

The 802.11b/g conducted RF emissions from the BlackBerry® smartphone PIN 30FD0798 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. 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. 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	09-12-03	Conducted/Radiated Emissions
EMI Test Receiver	Rohde & Schwarz	ESU 40	100162	10-04-22	Conducted/Radiated Emissions
Hybrid Log Antenna	EMC Automation	HLP-3003C	017401	10-09-26	Radiated Emissions
Horn Antenna	CMT	LHA 0180	R52734-001	09-12-17	Radiated Emissions
Horn Antenna	ETS-Lindgren	3117	47563	11-07-15	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA4-SP	001	10-05-08	Radiated Emissions
Preamplifier	Sonoma	310N/11909A	185831	10-11-06	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA-SP	001	10-03-31	Radiated Emissions
L.I.S.N.	Rohde & Schwarz	ENV216	100060	10-04-21	Conducted Emissions
Environment Monitor	Control Company	1870	230355190	10-01-30	Radiated Emissions
EMC Analyzer	Agilent	E7405A	US40240226	09-11-17*	Radiated Emissions
Environment Monitor	Control Company	1870	80117164	10-01-08	RF Conducted Emissions
Temperature Probe	Control Company	15-077-21	51129471	10-05-01	Frequency Stability
Environmental Chamber	ESPEC Corp.	SH-240S1	91005607	N/R	Frequency Stability
Bluetooth Tester	Rohde & Schwarz	CBT	100034	09-12-09	RF Conducted Emissions
Bluetooth Tester	Rohde & Schwarz	CBT35	100368	09-12-09	Radiated Emissions
Bluetooth Tester	Rohde & Schwarz	CBT35	100370	09-12-09	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
Environment Monitor	Control Company	1870	230355159	10-01-30	Radiated Emissions

\*All tests performed with the Spectrum Analyzer E7405A were performed before 09-11-17.

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

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### AC Conducted Emission Test Results

The measurements were performed by Steven Wang.

#### Test Configuration 1

The BlackBerry® smartphone PIN 30F4F739 was tested on October 29, 2009.

The environmental test conditions were: Temperature: 24 °C  
Pressure: 1021 mb  
Relative Humidity: 29 %

Frequency (MHz)	Line	Reading (QP) (dBμV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBμV)	Limit (AV) (dBμV)	Margin (QP) Limits (dB)
0.173	N	34.25	10.04	44.30	64.84	54.84	-20.54
0.182	L1	32.64	9.78	42.42	64.42	54.42	-22.00
0.218	L1	31.66	9.89	41.55	62.91	52.91	-21.37
0.272	L1	27.67	9.84	37.52	61.07	51.07	-23.56
0.317	L1	28.73	9.80	38.53	59.80	49.80	-21.26
0.461	L1	29.03	9.71	38.74	56.68	46.68	-17.94
0.461	N	29.57	9.89	39.46	56.68	46.68	-17.22
1.145	N	25.62	9.63	35.25	56.00	46.00	-20.75
2.018	N	28.62	9.61	38.24	56.00	46.00	-17.77
2.378	L1	34.33	9.55	43.88	56.00	46.00	-12.12
2.432	N	31.43	9.60	41.03	56.00	46.00	-14.97
3.656	L1	24.62	9.62	34.24	56.00	46.00	-21.76
4.484	N	21.67	9.58	31.25	56.00	46.00	-24.75
8.808	L1	25.30	9.79	35.10	60.00	50.00	-24.90

All other emission levels had a test margin of 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 1

Figure 1-1: L1 lines

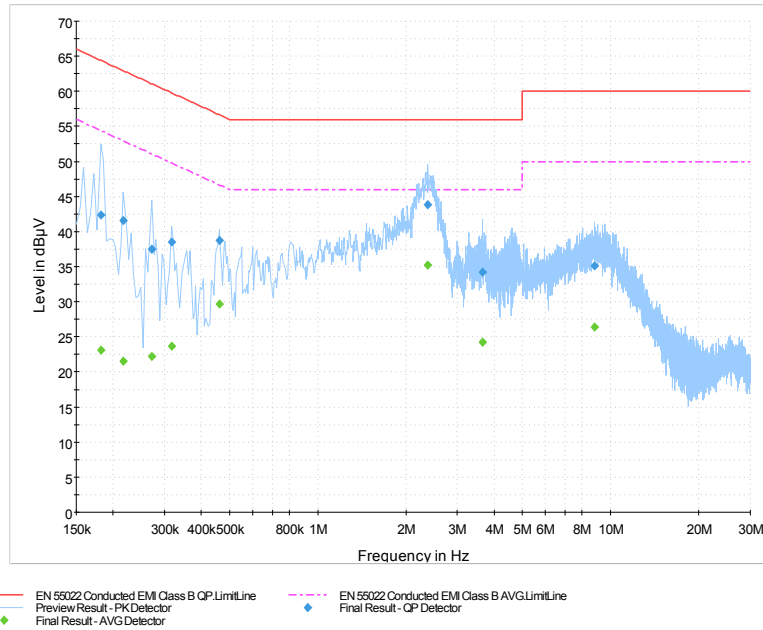
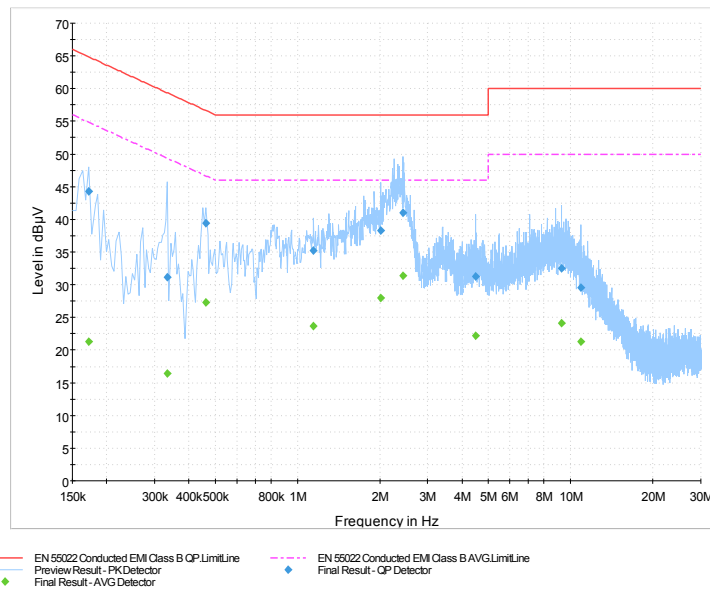



Figure 1-2: N Lines



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### AC Conducted Emission Test Results

The measurements were performed by Steven Wang.

#### Test Configuration 2

The BlackBerry® smartphone PIN 30F4F739 was tested on October 26, 2009.

The environmental test conditions were: Temperature: 24 °C  
Pressure: 1019 mb  
Relative Humidity: 22 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.159	L1	38.17	10.03	48.20	65.52	55.52	-17.32
0.159	N	36.51	9.96	46.47	65.52	55.52	-19.04
0.168	L1	36.38	9.94	46.32	65.06	55.06	-18.74
0.236	N	29.89	9.81	39.70	62.25	52.25	-22.55
0.245	L1	29.85	9.87	39.73	61.94	51.94	-22.21
0.254	L1	27.64	9.86	37.50	61.64	51.64	-24.14
0.267	L1	29.20	9.85	39.05	61.21	51.21	-22.16
0.339	L1	24.85	9.81	34.65	59.23	49.23	-24.57
0.452	N	30.79	9.88	40.67	56.85	46.85	-16.18
0.506	L1	25.85	9.66	35.51	56.00	46.00	-20.49
1.068	N	29.19	9.64	38.82	56.00	46.00	-17.18
1.230	L1	29.82	9.50	39.32	56.00	46.00	-16.68
2.076	N	33.06	9.62	42.68	56.00	46.00	-13.32
2.117	L1	35.82	9.56	45.38	56.00	46.00	-10.62
2.315	N	37.76	9.61	47.38	56.00	46.00	-8.62
2.333	L1	39.45	9.55	49.00	56.00	46.00	<b>-7.00</b>
3.633	N	27.31	9.61	36.92	56.00	46.00	-19.08
3.944	L1	29.56	9.64	39.20	56.00	46.00	-16.80
4.587	L1	29.32	9.65	38.97	56.00	46.00	-17.03
4.853	N	25.98	9.60	35.57	56.00	46.00	-20.43

All other emission levels had a test margin of greater than 25 dB.

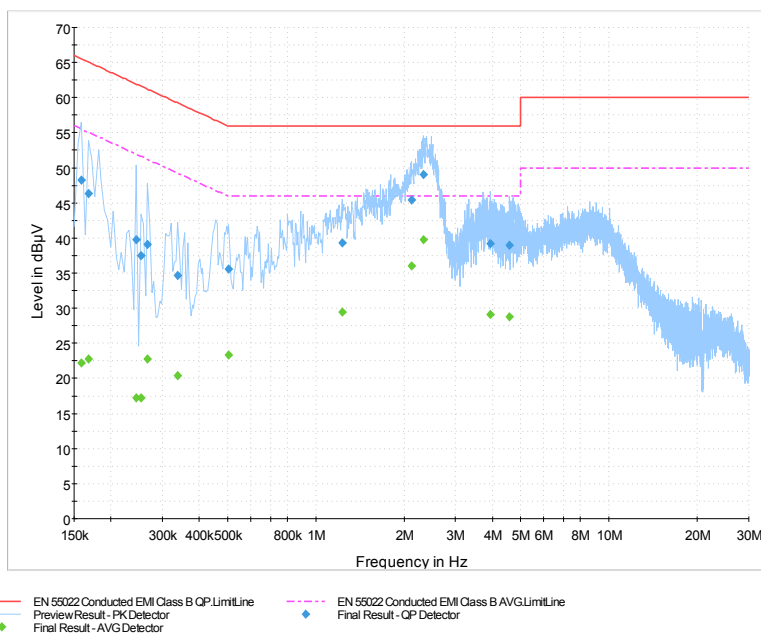
Measurements were done with the quasi-peak detector.

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

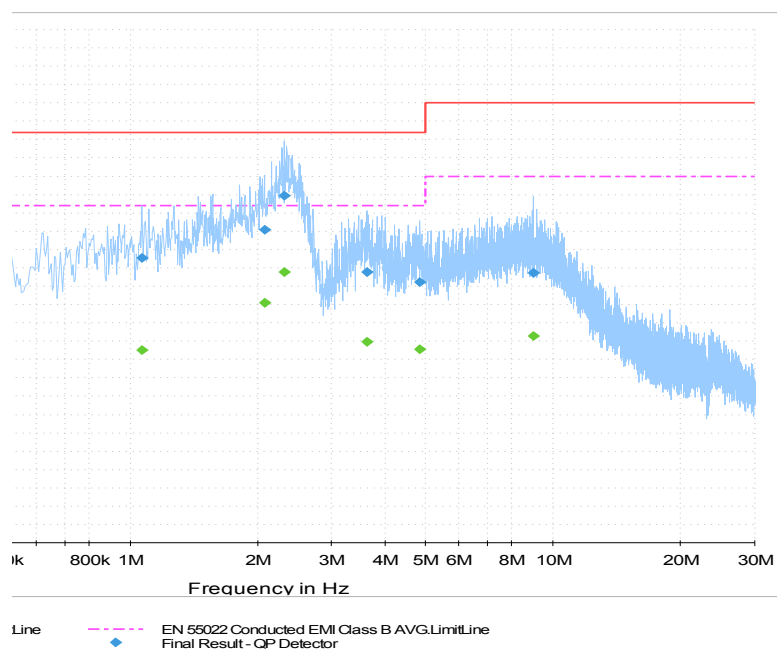
AC Conducted Emissions Test Graphs

Test Configuration 2


**Figure 1-3: L1 lines**




**Figure 1-4: N Lines**





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

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Radiated Emissions Test Results  
Bluetooth Band

Date of Test: October 30 to November 09, 2009  
Measurements were performed by Kevin Rose.

The environmental test conditions were: Temperature: 23 – 29 °C  
Pressure: 1003 – 1021 mb  
Relative Humidity: 22 – 34 %

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 PIN 310F4B7E in Bluetooth Tx mode was in standalone, vertical position.

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: October 30 to November 09, 2009  
Measurements were performed by Heng Lin.

The environmental test conditions were: Temperature: 23 – 29 °C  
Pressure: 1003 – 1021 mb  
Relative Humidity: 22 – 34 %

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 PIN 30F4F739 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: November 09, 2009  
Measurements were performed by Kevin Rose.

The environmental test conditions were: Temperature: 24 °C  
Pressure: 1016 mb  
Relative Humidity: 30 %

BlackBerry® smartphone PIN 310F4B7E was in standalone, vertical, Pattern type “Static PBRs” in “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	104.89	56.12	48.77	74	-25.23
0	2402	Horn	H	PK	1 MHz	100.33	51.99	48.34	74	-25.66
0	2402	Horn	V	AVE.	10 Hz	87.13	56.12	31.01	54	-22.99
0	2402	Horn	H	AVE.	10 Hz	84.15	51.99	32.16	54	-21.84
High Channel, Packet Type DH5										
78	2480	Horn	V	PK	1 MHz	105.77	57.3	48.47	74	-25.53
78	2480	Horn	H	PK	1 MHz	100.36	53.48	46.88	74	-27.12
78	2480	Horn	V	AVE.	10 Hz	87.48	57.3	30.18	54	-23.82
78	2480	Horn	H	AVE.	10 Hz	83.89	53.48	30.41	54	-23.59
Low Channel, Packet Type 2-DH5										
0	2402	Horn	V	PK	1 MHz	102.78	54.43	48.35	74	-25.65
0	2402	Horn	H	PK	1 MHz	98.23	49.04	49.19	74	-24.81
0	2402	Horn	V	AVE.	10 Hz	84.21	54.43	29.78	54	-24.22
0	2402	Horn	H	AVE.	10 Hz	81.09	49.04	32.05	54	-21.95
High Channel, Packet Type 2-DH5										
78	2480	Horn	V	PK	1 MHz	101.87	55.6	46.27	74	-27.73
78	2480	Horn	H	PK	1 MHz	96.47	51.16	45.31	74	-28.69
78	2480	Horn	V	AVE.	10 Hz	83.06	55.6	27.46	54	-26.54
78	2480	Horn	H	AVE.	10 Hz	79.35	51.16	28.19	54	-25.81

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

Low Channel, Packet Type 3-DH5										
0	2402	Horn	V	PK	1 MHz	102.76	54.06	48.70	74	-25.30
0	2402	Horn	H	PK	1 MHz	98.22	49.56	48.66	74	-25.34
0	2402	Horn	V	AVE.	10 Hz	84.12	54.06	30.06	54	-23.94
0	2402	Horn	H	AVE.	10 Hz	80.94	49.56	31.38	54	-22.62
High Channel, Packet Type 3-DH5										
78	2480	Horn	V	PK	1 MHz	101.98	53.01	48.97	74	-25.03
78	2480	Horn	H	PK	1 MHz	96.57	51.98	44.59	74	-29.41
78	2480	Horn	V	AVE.	10 Hz	82.97	53.01	29.96	54	-24.04
78	2480	Horn	H	AVE.	10 Hz	79.21	51.98	27.23	54	-26.77

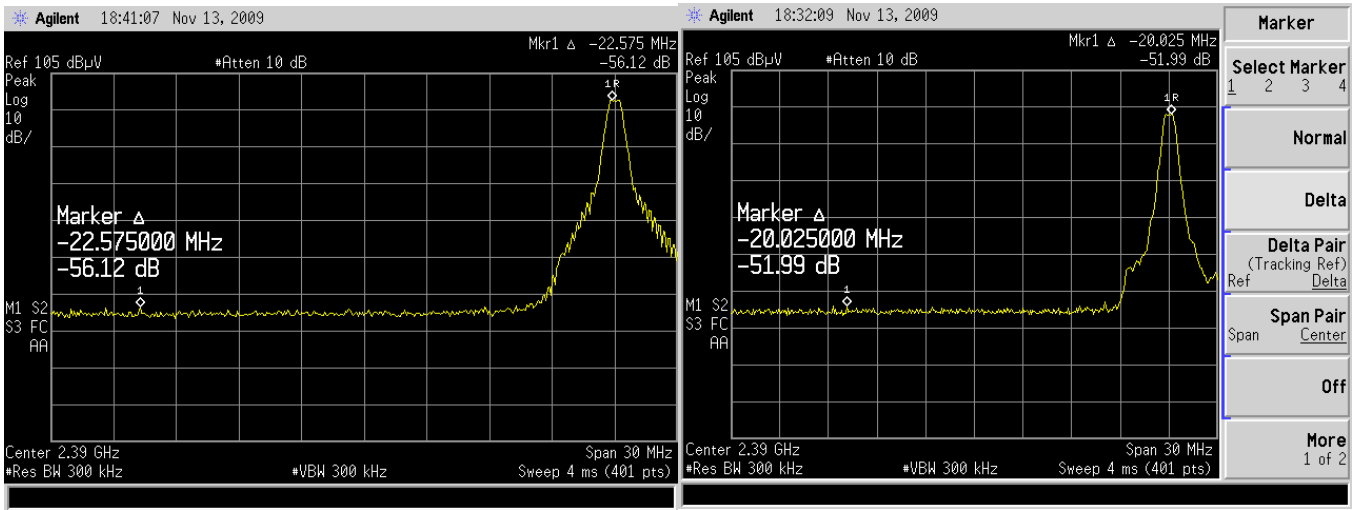
See figures 2-1 to 2-12 for the plots of the Bluetooth band-edge compliance.

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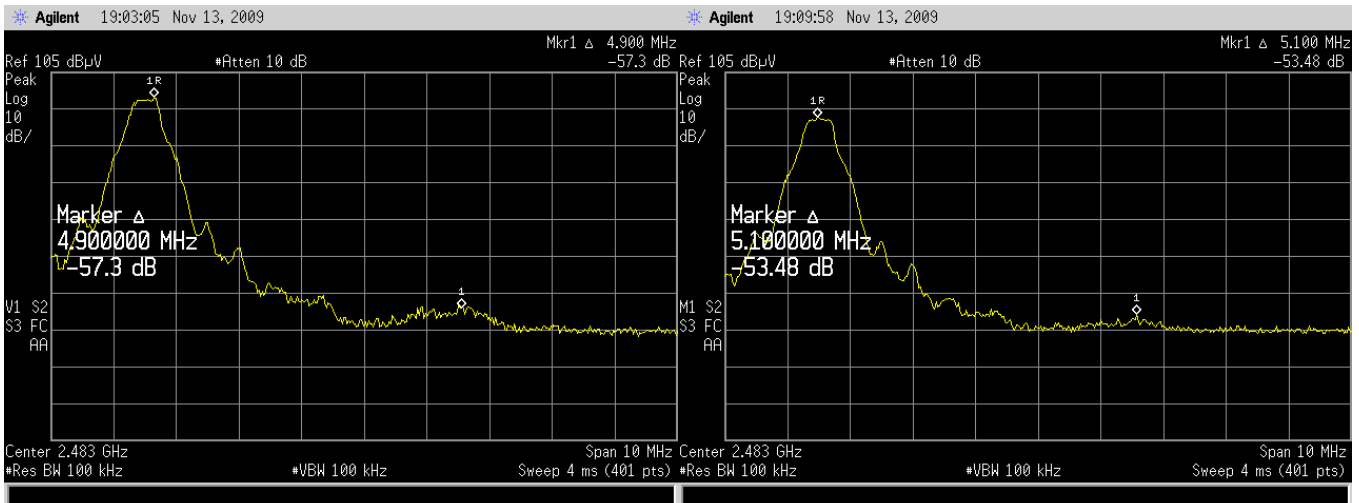
**Figure 2-1:** Band-Edge Compliance of RF Rad. Emissions.  
Bluetooth, Single freq., Static PBRs,  
DH5, Channel 0, Pol: V, Detector: PK


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



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

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

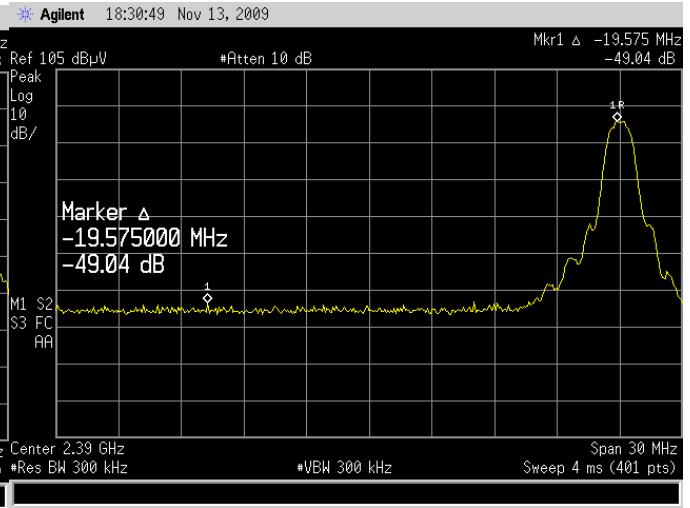
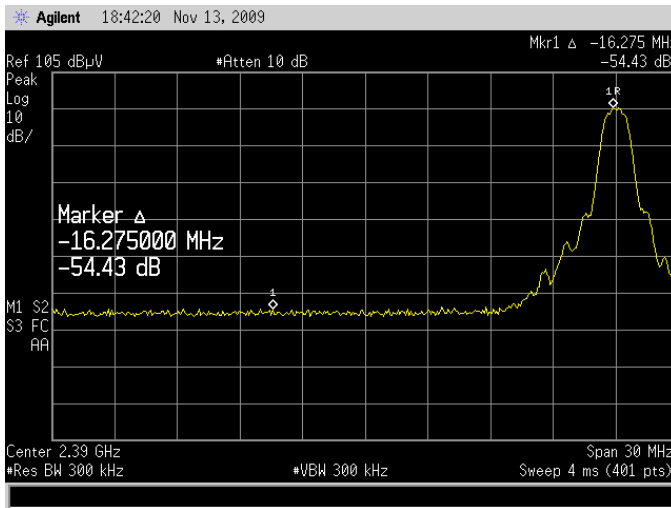


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Bluetooth Band-Edge Compliance of RF Radiated Emissions cont'd

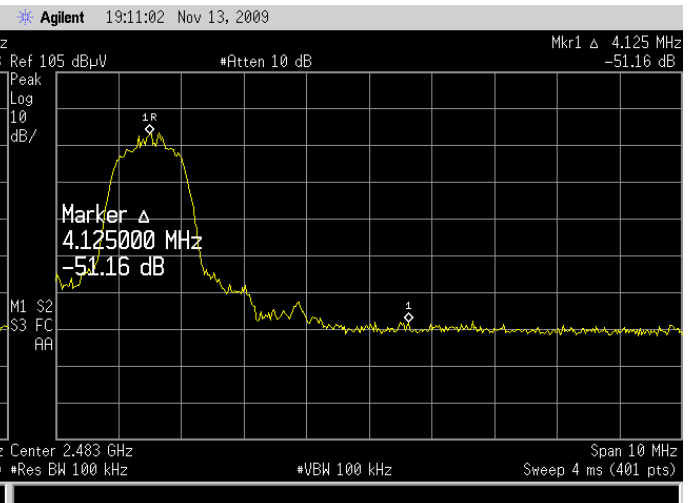
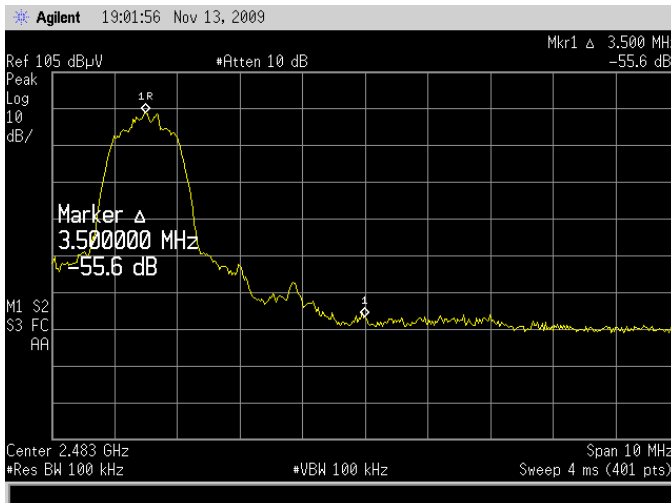
**Figure 2-5:** Band-Edge Compliance of RF Rad. Emissions.  
Bluetooth, Single freq., Static PBRs,  
2-DH5, Channel 0, Pol: V, Detector: PK


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



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

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

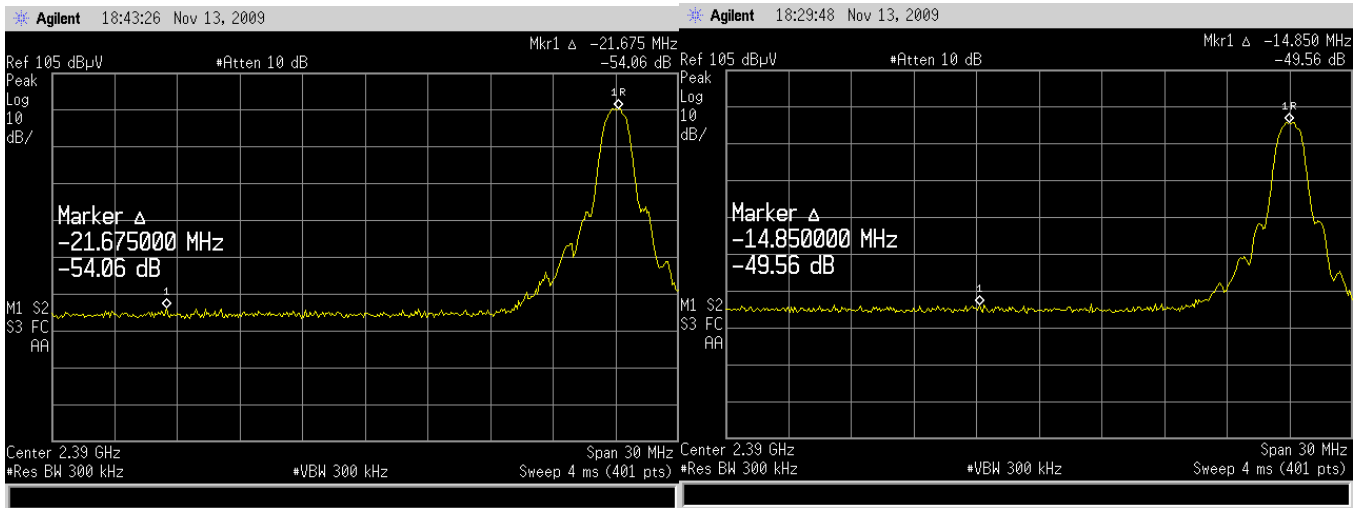


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Radiated Emissions Test Results cont'd  
802.11b/g Band

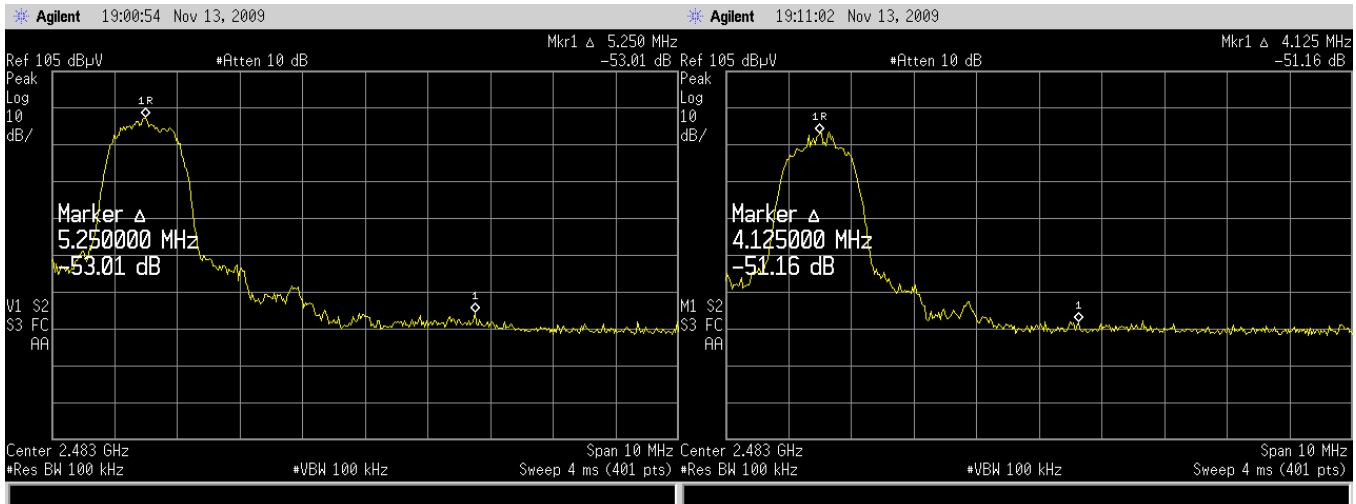
**Figure 2-9:** Band-Edge Compliance of RF Rad. Emissions.  
Bluetooth, Single freq., Static PBRs,  
3-DH5, Channel 0, Pol: V, Detector: PK


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



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

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



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Date of Test: October 22, 2009  
 Measurements were performed by Kevin Rose.

The environmental test conditions were: Temperature: 23 – 26 °C  
 Pressure: 1015 – 1021 mb  
 Relative Humidity: 25 – 29 %

The test distance was 3.0 metres with a height of 0.8 metres, 30 MHz to 1000 MHz.  
 The BlackBerry® smartphone PIN 30F4F746 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, and in 802.11g Tx mode at 6 Mbps on channel 6.

All emissions had a test margin greater than 25.0 dB.

Date of Test: October 28, 2009  
 Measurements were performed by Heng Lin.


The environmental test conditions were: Temperature: 23 – 26 °C  
 Pressure: 1015 – 1021 mb  
 Relative Humidity: 25 – 29 %

The test distance was 3.0 metres with a height of 0.8 metres, 1GHz to 25GHz.  
 The BlackBerry® smartphone PIN 30F4F739 was in standalone, vertical down position.

The frequency sweep measurements were performed in 802.11b Tx mode at 1 Mbps on channels 1, 6 and 11, and in 802.11g Tx mode at 6 Mbps on channel 6.

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



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802.11b/g Band-Edge Compliance of RF Radiated Emissions

Date of Tests: November 20, 2009  
Measurements performed by Kevin Rose.

The environmental test conditions were: Temperature: 25 °C  
Pressure: 1012 mb  
Relative Humidity: 31 %


802.11b Band

The measurements were performed on BlackBerry® smartphone PIN 30F4F746, standalone in 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)	Delta Marker (dB)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
		Type	POL.							
1.0	2412.00	Horn	V	PK	1 MHz	102.86	55.57	47.29	74.00	-26.71
1.0	2412.00	Horn	H	PK	1 MHz	102.99	55.11	47.88	74.00	-26.12
1.0	2412.00	Horn	V	AV	10 Hz	98.47	55.57	42.90	54.00	-11.10
1.0	2412.00	Horn	H	AV	10 Hz	98.68	55.11	43.57	54.00	-10.43

Channel	Freq. (MHz)	Rx Antenna		Detector (MHz)	VBW For Peak (dBuV/m)	Peak Corrected Reading (dBuV/m)	Delta Marker (dB)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
		Type	POL.							
11.0	2480.00	Horn	V	PK	1 MHz	103.68	56.53	47.15	74.00	-26.85
11.0	2480.00	Horn	H	PK	1 MHz	104.77	54.96	49.81	74.00	-24.19
11.0	2480.00	Horn	V	AV	10 Hz	99.24	56.53	42.71	54.00	-11.29
11.0	2480.00	Horn	H	AV	10 Hz	100.36	54.96	45.40	54.00	-8.60

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### 802.11g Band

The measurements were performed on BlackBerry® smartphone PIN 30F4F746, standalone in vertical configuration on channels 1 and 11 for 802.11g mode at 6 Mbps.

The test distance was 3 metres.

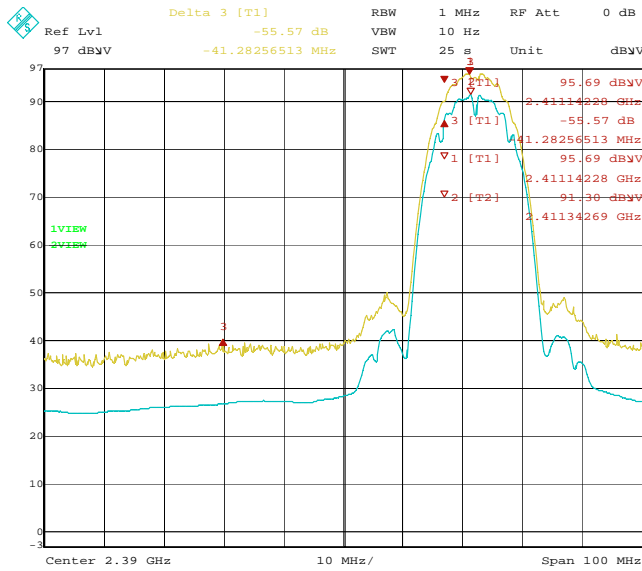
Channel	Freq. (MHz)	Rx Antenna		Detector (MHz)	VBW For Peak (dBuV/m)	Peak Corrected Reading (dBuV/m)	Delta Marker (dB)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
		Type	POL.							
1.0	2412.00	Horn	V	PK	1 MHz	101.99	41.89	60.10	74.00	-13.90
1.0	2412.00	Horn	H	PK	1 MHz	103.07	42.81	60.26	74.00	-13.74
1.0	2412.00	Horn	V	AV	10 Hz	87.32	41.89	45.43	54.00	-8.57
1.0	2412.00	Horn	H	AV	10 Hz	88.53	42.81	45.72	54.00	-8.28

Channel	Freq. (MHz)	Rx Antenna		Detector (MHz)	VBW For Peak (dBuV/m)	Peak Corrected Reading (dBuV/m)	Delta Marker (dB)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
		Type	POL.							
11.0	2480.00	Horn	V	PK	1 MHz	104.32	40.12	64.20	74.00	-9.80
11.0	2480.00	Horn	H	PK	1 MHz	102.26	41.29	60.97	74.00	-13.03
11.0	2480.00	Horn	V	AV	10 Hz	89.32	40.12	49.20	54.00	-4.80
11.0	2480.00	Horn	H	AV	10 Hz	87.57	41.29	46.28	54.00	-7.72

See figures 2-13 to 2-10 for the plots of the 802.11b band-edge compliance.  
See figures 2-11 to 2-14 for the plots of the 802.11b band-edge compliance.

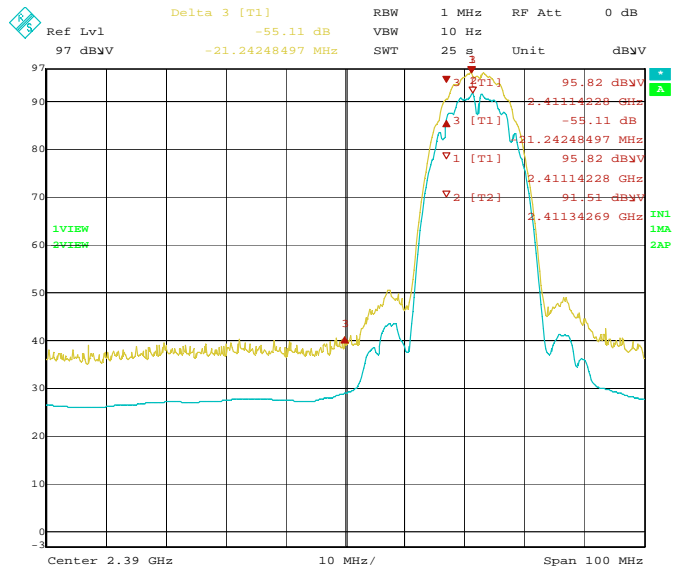
**802.11b/g Band-Edge Compliance of RF Radiated Emissions cont'd**

Figure 2-7: Band-Edge Compliance of RF Radiated Emission  
 802.11b, Channel 1, 2412 MHz, Max Pol: V,  
 Detector: PK



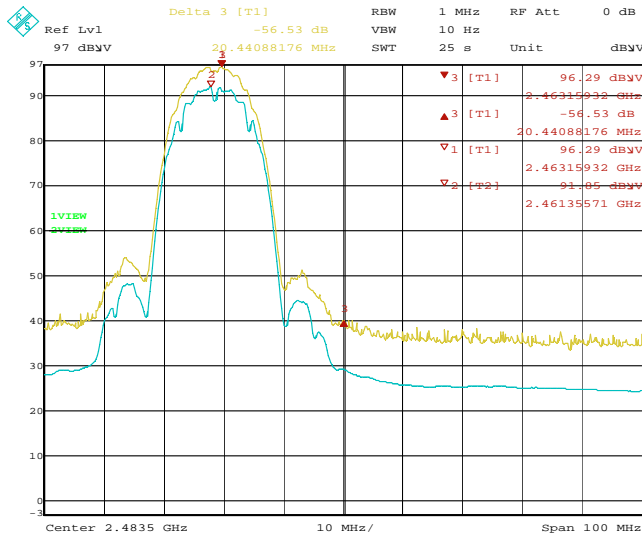
Title: 2505..3..5  
 Comment A: .2.E  
 Date: 20.NOV.2009 10:18:11

Figure 2-8: Band-Edge Compliance of RF Radiated Emission  
 802.11b, Channel 1, 2412 MHz, Max Pol: H,  
 Detector: PK



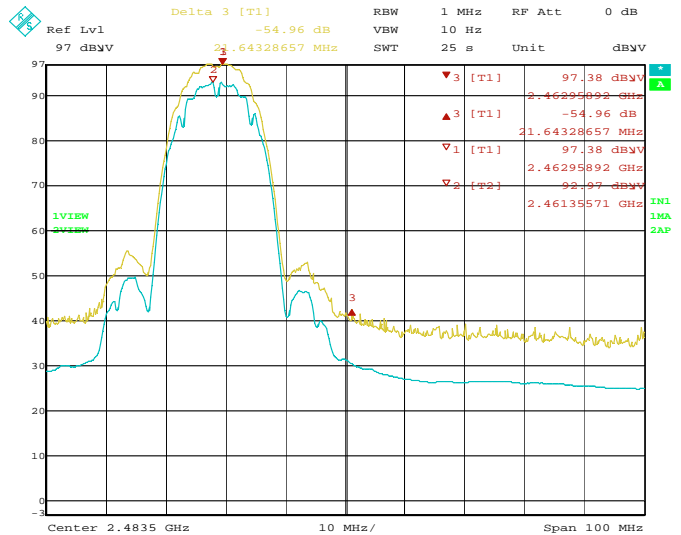
Title: 2505..3..5  
 Comment A: .2.E  
 Date: 20.NOV.2009 11:19:06

Figure 2-9: Band-Edge Compliance of RF Radiated Emission  
 802.11b, Channel 11, 2462 MHz, Max Pol: V,  
 Detector: PK



Title: 2505..3..5  
 Comment A: .2.E  
 Date: 20.NOV.2009 10:58:20

Figure 2-10: Band-Edge Compliance of RF Radiated Emission  
 802.11b, Channel 11, 2462 MHz, Max Pol: H,  
 Detector: PK



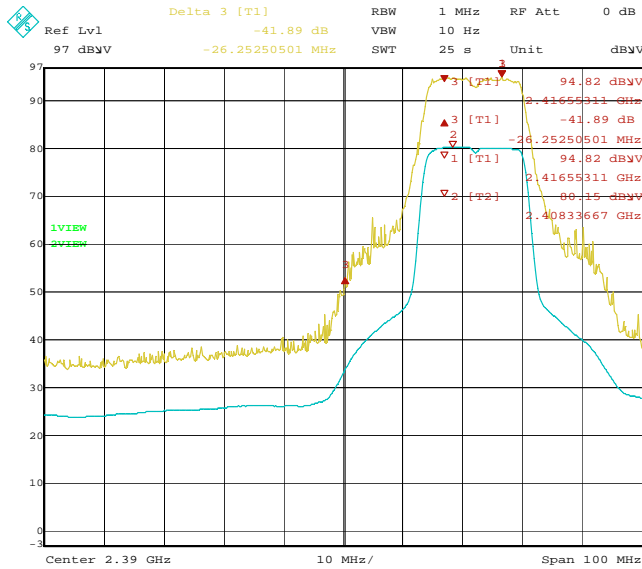
Title: 2505..3..5  
 Comment A: .2.E  
 Date: 20.NOV.2009 10:53:17

Test Report No.  
 RTS-2340-0911-16

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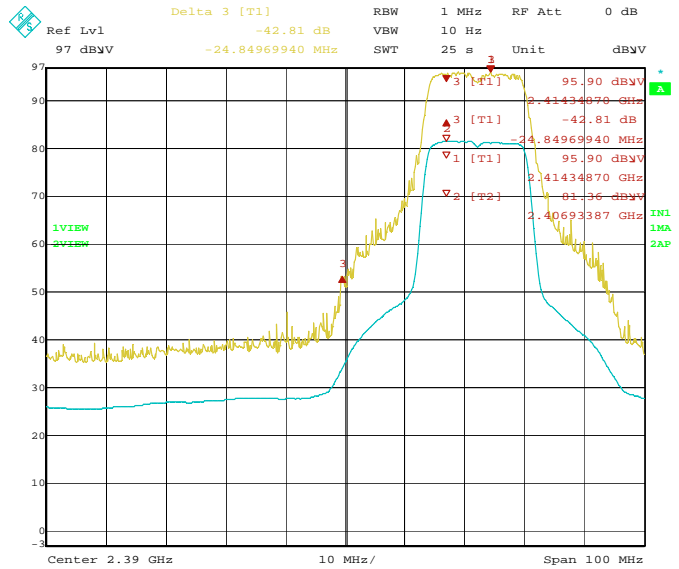
Author Data  
 Kevin Rose

Figure 2-11: Band-Edge Compliance of RF Radiated Emission  
 802.11g, Channel 1, 2412 MHz, Max Pol: V,  
 Detector: PK



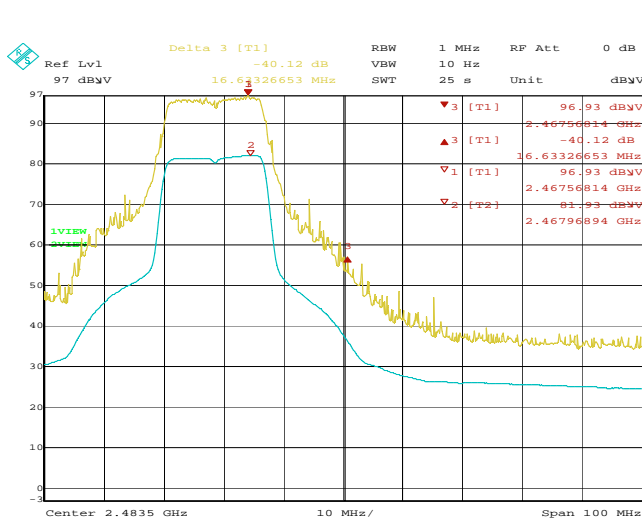
Title: 2505...3..5  
 Comment A: .2.E  
 Date: 20.NOV.2009 10:32:24

Figure 2-12: Band-Edge Compliance of RF Radiated Emission  
 802.11g, Channel 1, 2412 MHz, Max Pol: H,  
 Detector: PK



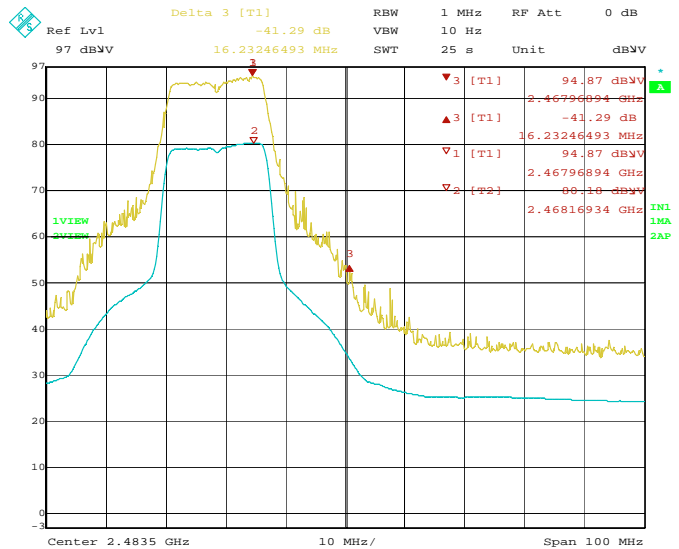
Title: 2505...3..5  
 Comment A: .2.E  
 Date: 20.NOV.2009 10:38:38

Figure 2-13: Band-Edge Compliance of RF Radiated Emission  
 802.11g, Channel 11, 2462 MHz, Max Pol: V,  
 Detector: PK




Title: 2505...3..5  
 Comment A: .2.E  
 Date: 20.NOV.2009 11:05:52


Figure 2-14: Band-Edge Compliance of RF Radiated Emission  
 802.11g, Channel 11, 2462 MHz, Max Pol: H,  
 Detector: PK



Title: 2505...3..5  
 Comment A: .2.E  
 Date: 20.NOV.2009 11:11:38

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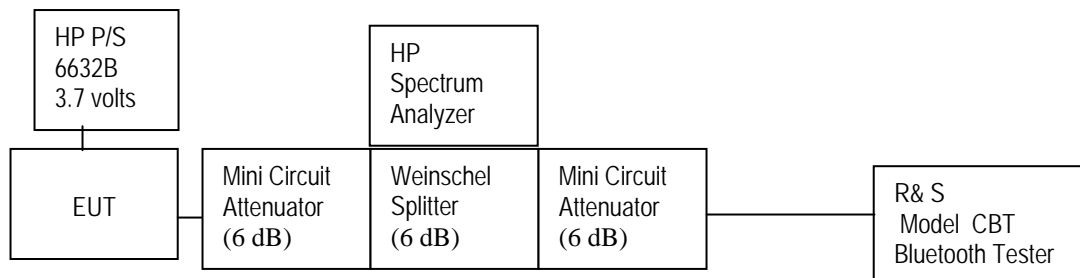
## APPENDIX 3 – BLUETOOTH CONDUCTED EMISSIONS TEST DATA/PLOTS

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Bluetooth RF Conducted Emission Test Results

Bluetooth power output from BlackBerry® smartphone PIN 30FD0798 was at maximum for all the recorded measurements shown below.  
The measurements were performed by Maurice Battler.


**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.

Date of test: October 30, 2009

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

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Bluetooth RF Conducted Emission Test Results cont'd

**20 dB Bandwidth**

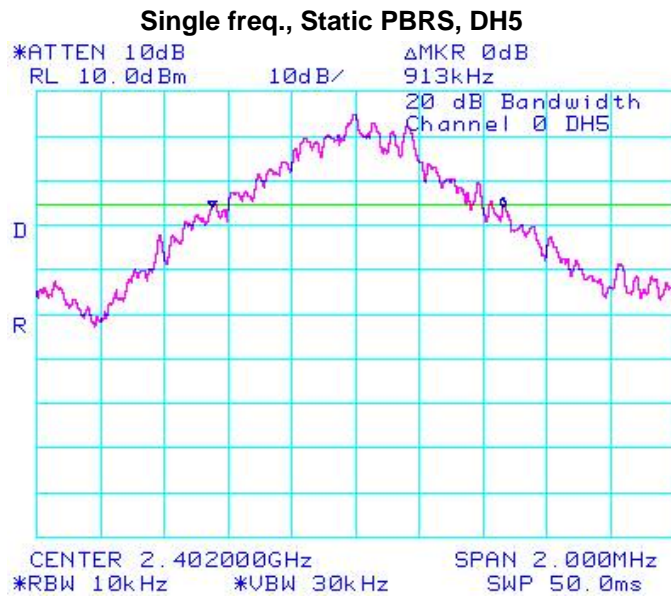
The EUT met the requirements of the 20 dB bandwidth as per 47 CFR 15.247(a) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured. Bluetooth was operating in single frequency mode.

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

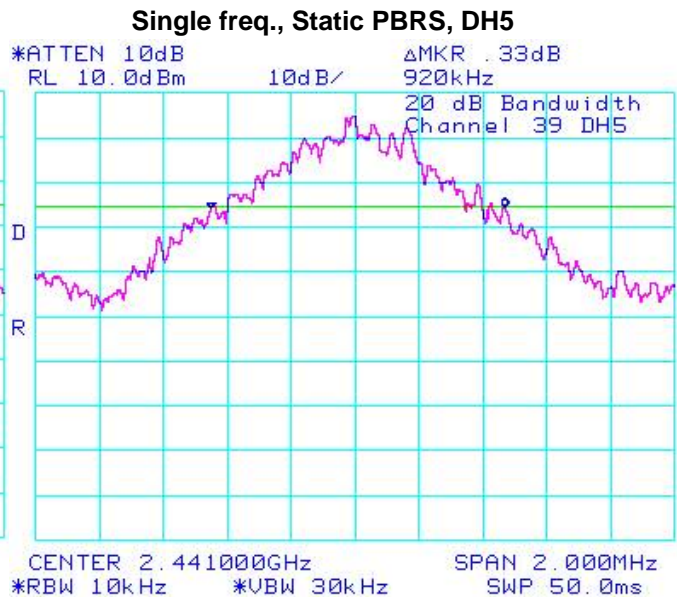
Bluetooth Channel	Limit (MHz)	Measured Level (MHz)
0	≤1.0	0.913
39	≤1.0	0.920
78	≤1.0	0.907


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

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



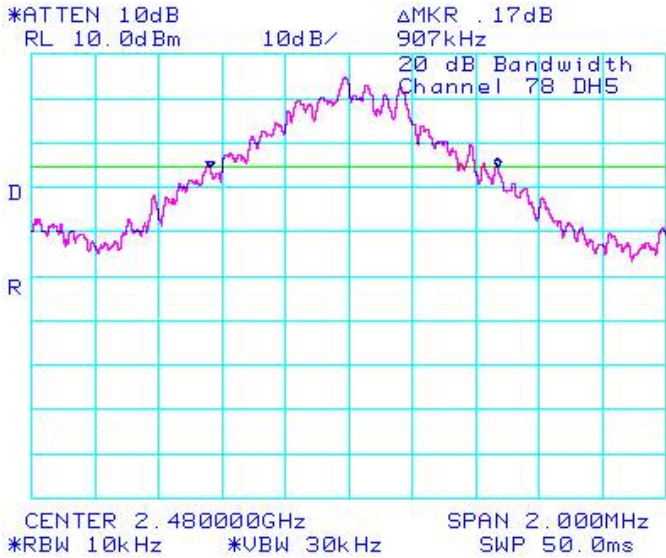
**Figure 3-2: 20 dB Bandwidth**



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Bluetooth RF Conducted Emission Test Results cont'd

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



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

Bluetooth Channel	Limit (MHz)	Measured Level (MHz)
0	≤1.5	1.237
39	≤1.5	1.240
78	≤1.5	1.243

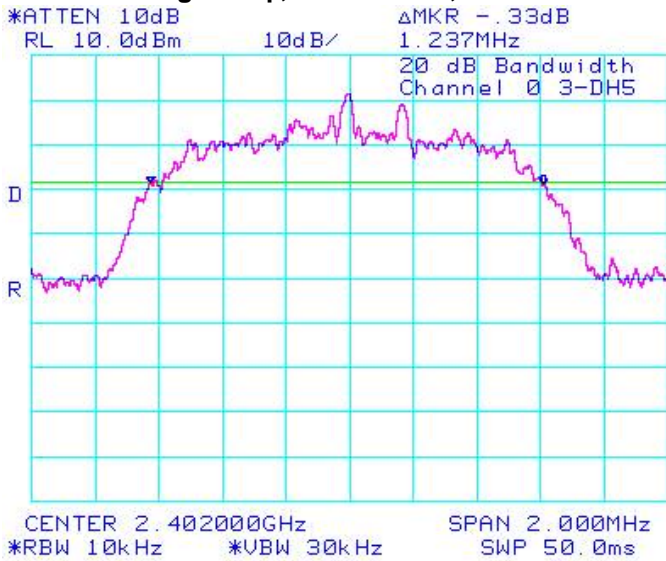
See figures 3-4 to 3-6 for the plots of the 20 dB bandwidth measurements.



Bluetooth RF Conducted Emission Test Results cont'd

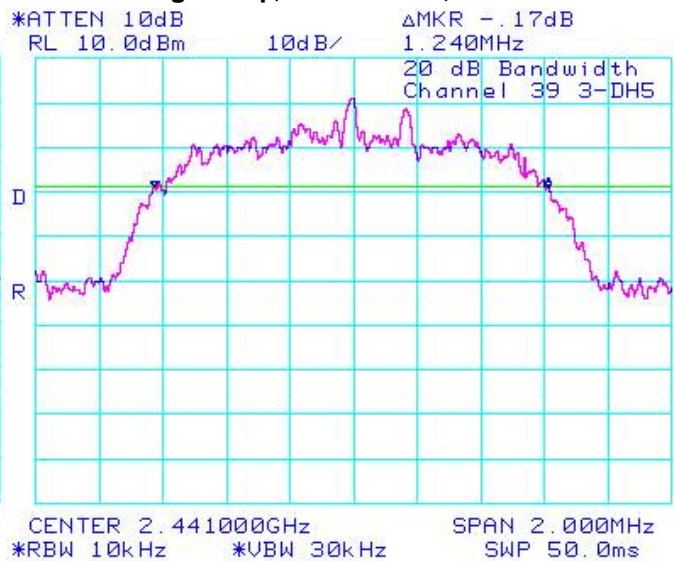
**Figure 3-4: 20 dB Bandwidth**

Single freq., Static PBRs, 3-DH5



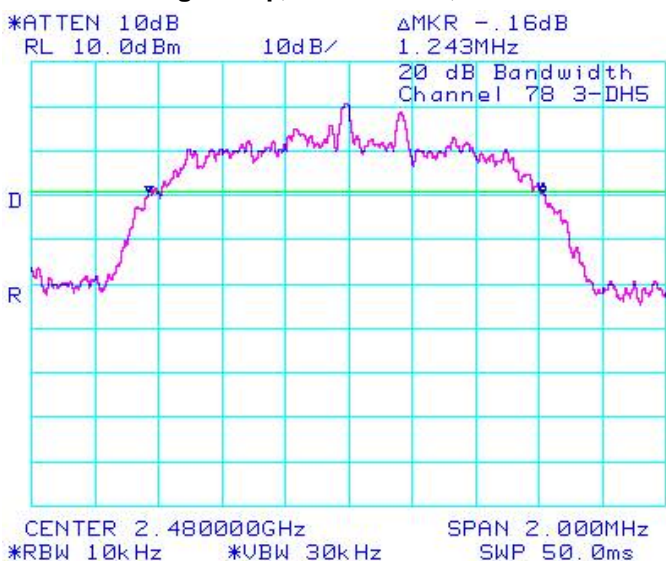
**Figure 3-5: 20 dB Bandwidth**


Single freq., Static PBRs, 3-DH5



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

Single freq., Static PBRs, 3-DH5



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Bluetooth RF Conducted Emission Test Results cont'd

**Carrier Frequency Separation**

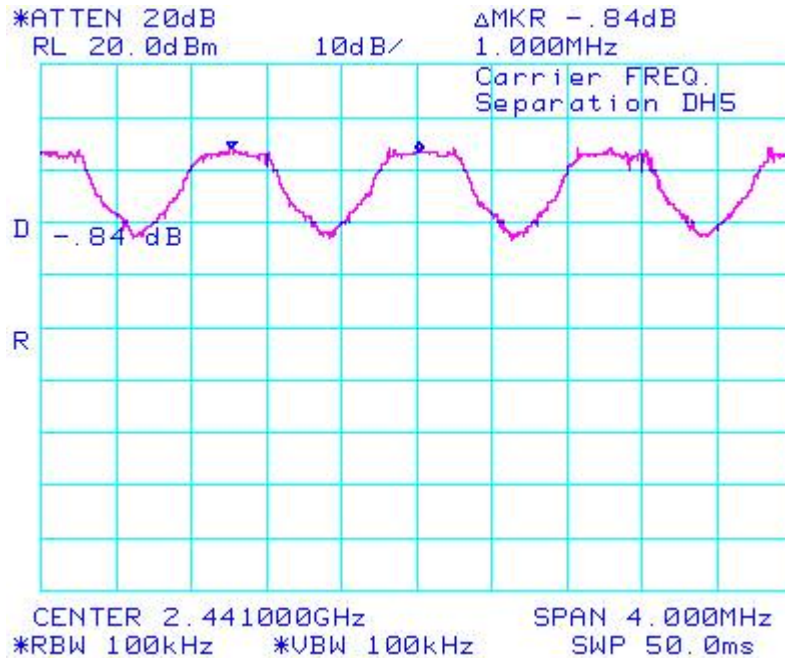
The EUT met the requirements of the Carrier Frequency Separation as per 47 CFR 15.247(a) and RSS-210. Channel 38 to 39 was measured. Bluetooth was operating in frequency hopping (Euro/US) mode.


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 PBRs, DH5, Channels 38 to 39**



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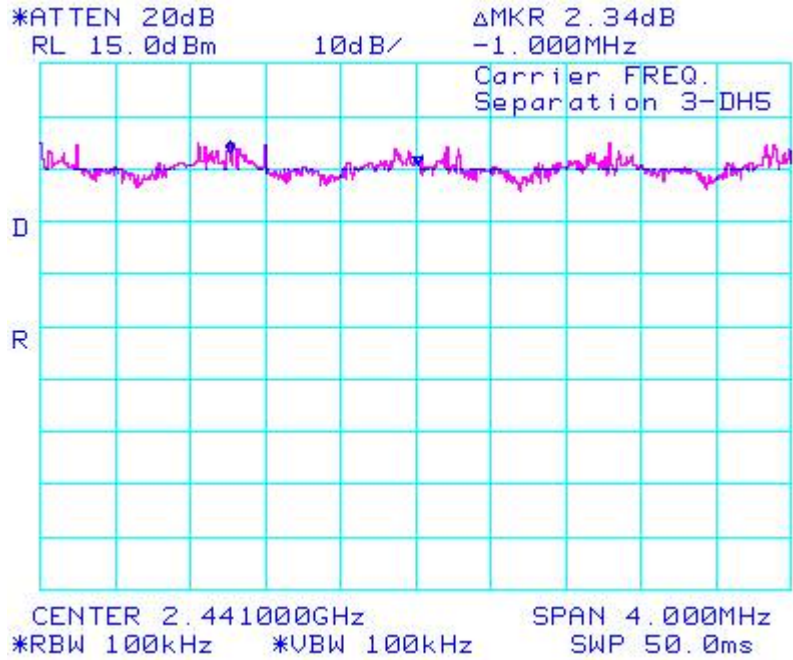
Bluetooth RF Conducted Emission Test Results cont'd


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 PBRS, 3-DH5, Channels 38 to 39**



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Bluetooth RF Conducted Emission Test Results cont'd

**Number of Hopping Frequencies**

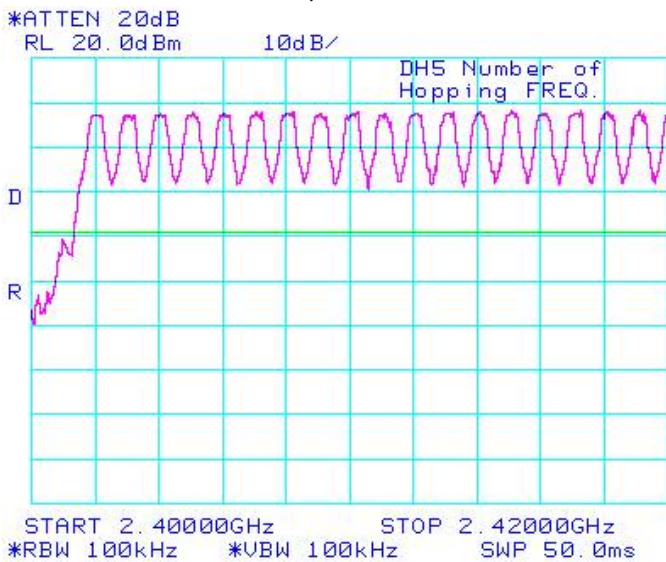
The EUT met the requirements of the number of hopping frequencies as per 47 CFR 15.247(a) and RSS-210. Bluetooth was operating in frequency hopping (Euro/US) mode.

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

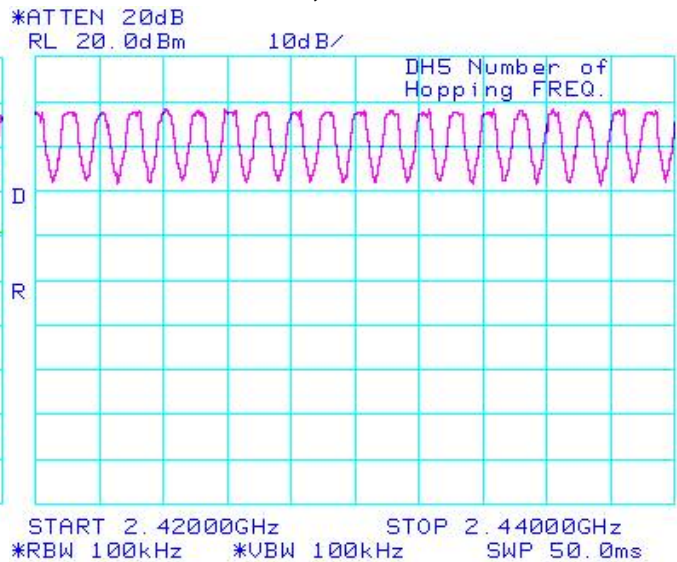
Limit (CH)	Number of Hopping Frequencies (CH)
≥75	79


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**



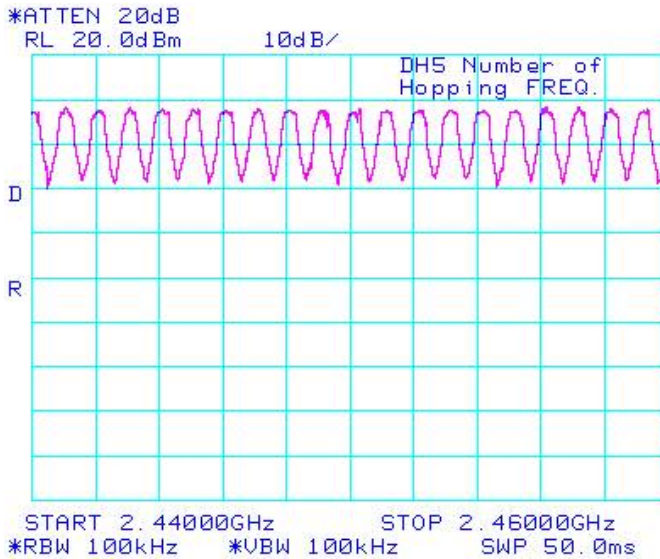
**Figure 3-7: Number of Hopping Frequencies  
Static PRBS, DH5**



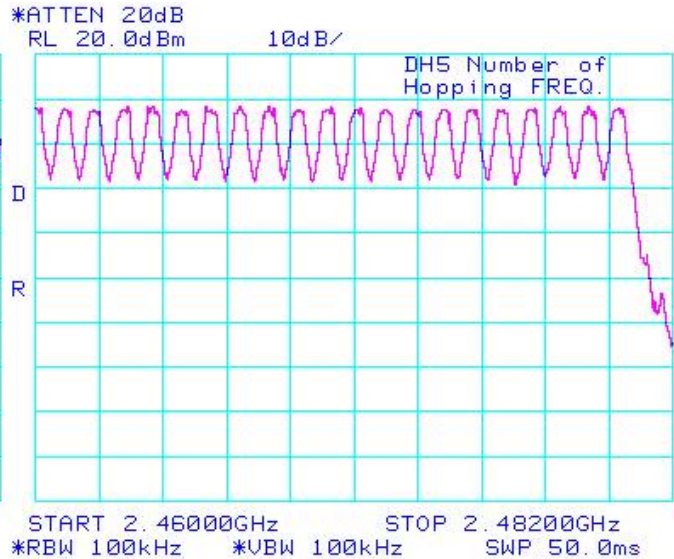
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Bluetooth RF Conducted Emission Test Results cont'd

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



**Figure 3-9: Number of Hopping Frequencies  
Static PBRs, 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 usec 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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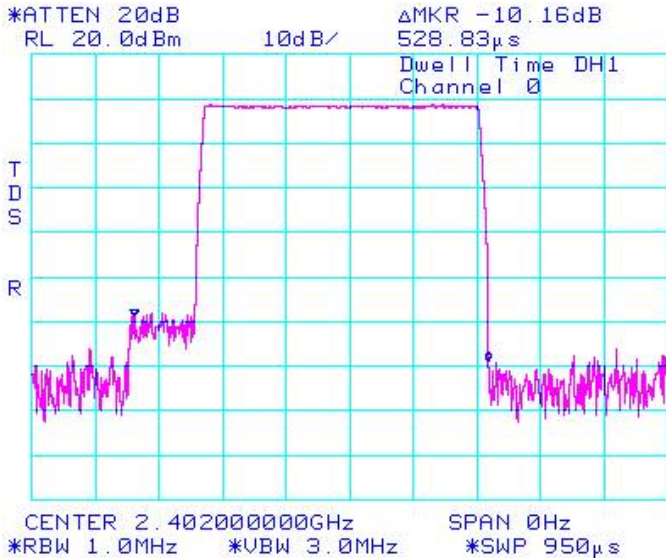
Bluetooth RF Conducted Emission Test Results cont'd

Bluetooth Channel	Mode	Tx Time (ms)	Dwell Time/31.6 sec. (msec.)	Limit (msec.)	Margin (msec.)
0	DH1	0.5288	0.5288 x 320.0 = 169.23	400	230.77
39	DH1	0.5271	0.5271 x 320.0 = 168.67	400	231.33
78	DH1	0.5271	0.5271 x 320.0 = 168.67	400	231.33
0	DH3	1.7733	1.7733 x 159.9 = 283.55	400	116.45
39	DH3	1.7733	1.7733 x 159.9 = 283.55	400	116.45
78	DH3	1.7733	1.7733 x 159.9 = 283.55	400	116.45
0	DH5	3.0417	3.0417 x 106.8 = 324.85	400	75.15
39	DH5	3.0333	3.0333 x 106.8 = 323.96	400	76.04
78	DH5	3.0333	3.0333 x 106.8 = 323.96	400	76.04

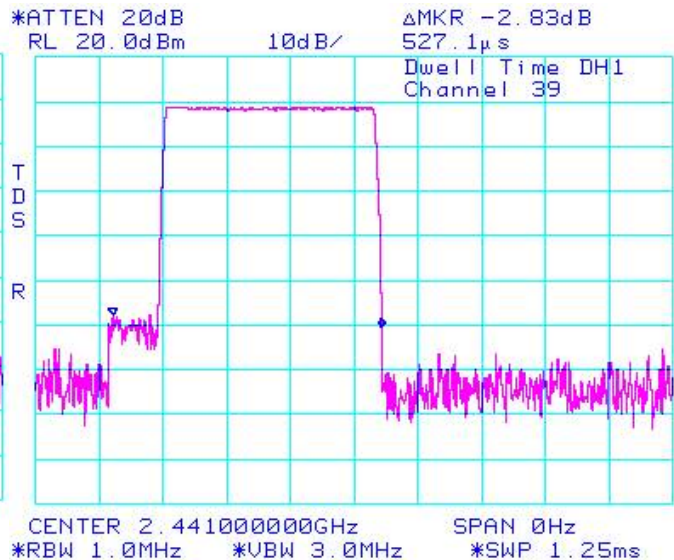
See figures 3-13 to 3-21 for the plots of the dwell time.

Bluetooth RF Conducted Emission Test Results cont'd

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

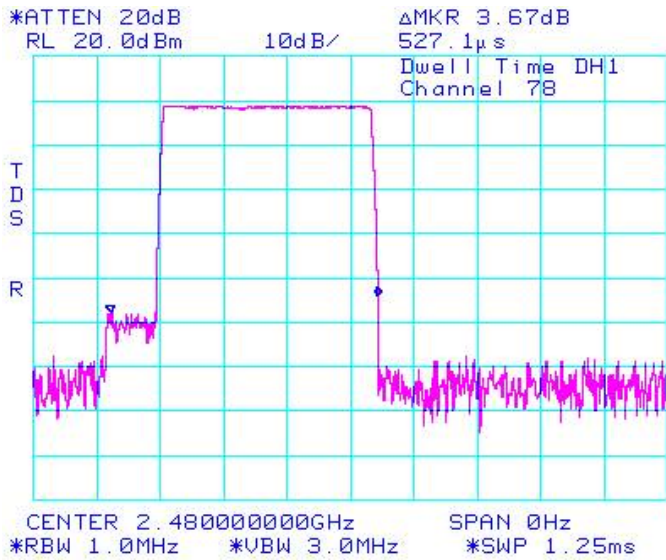


**Figure 3-14: Time of Occupancy (Dwell Time)**  
Freq. Hopping, Static PBRS, DH1

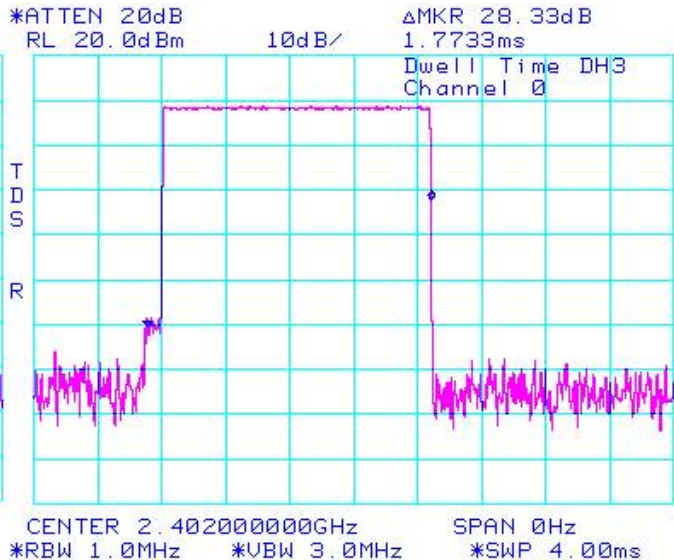


Bluetooth RF Conducted Emission Test Results cont'd

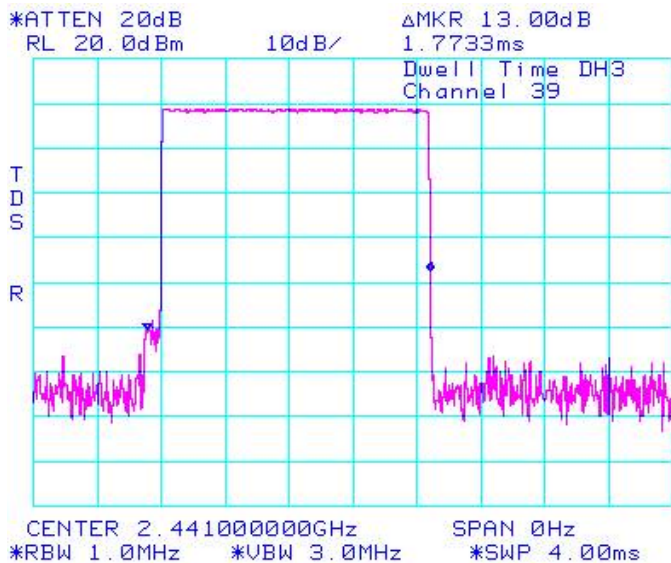
**Figure 3-15: Time of Occupancy (Dwell Time)**  
**Freq. Hopping, Static PBRs, DH1**



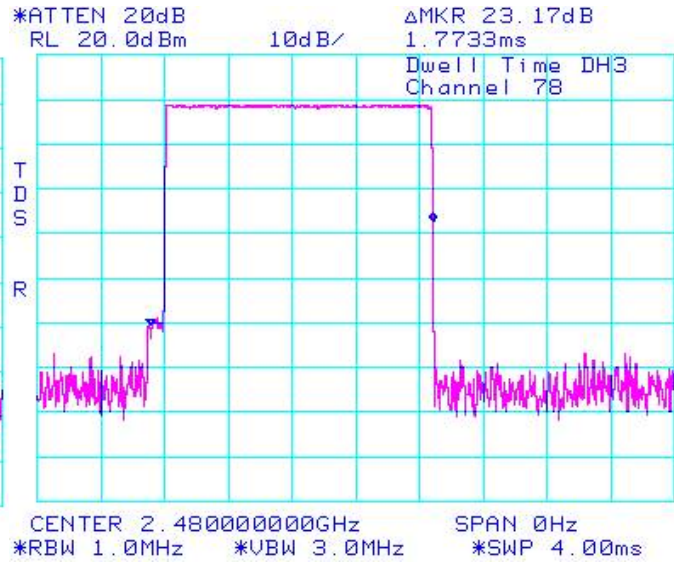
**Figure 3-16: Time of Occupancy (Dwell Time)**  
**Freq. Hopping, Static PBRs, DH3**



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



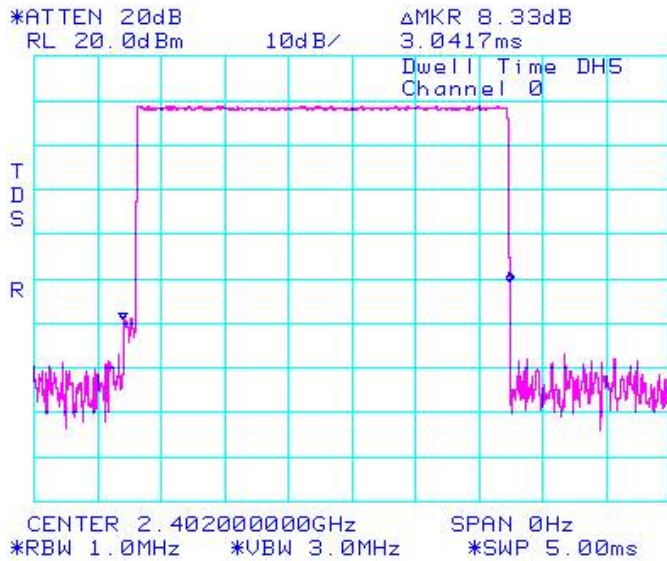
**Figure 3-18 : Time of Occupancy (Dwell Time)**  
**Freq. Hopping, Static PBRs, DH3**



Bluetooth RF Conducted Emission Test Results cont'd

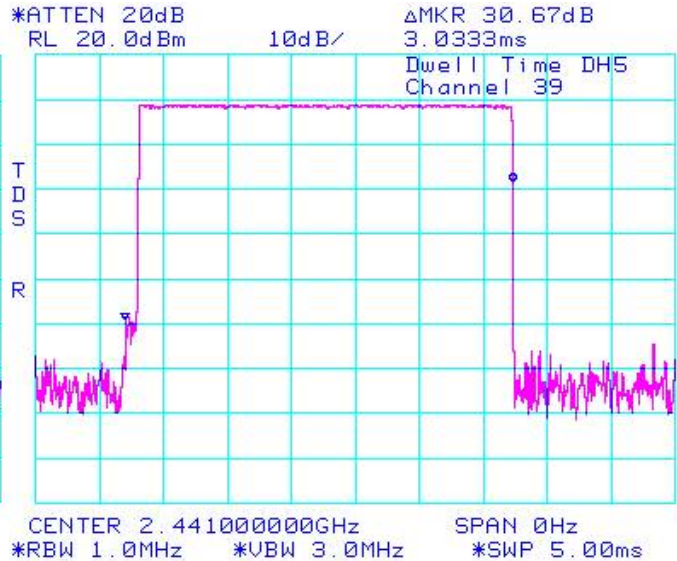
**Figure 3-19: Time of Occupancy (Dwell Time)**

**Freq. Hopping, Static PBRs, DH5**



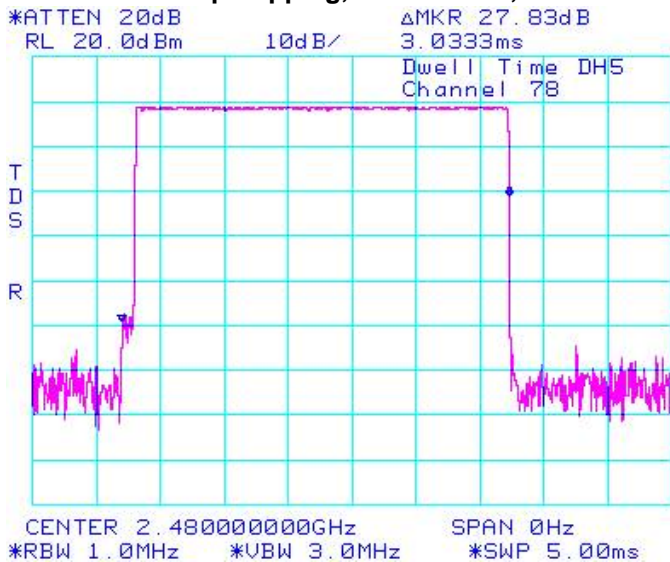
**Figure 3-20: Time of Occupancy (Dwell Time)**

**Freq. Hopping, Static PBRs, DH5**




**Figure 3-21: Time of Occupancy (Dwell Time)**

**Freq. Hopping, Static PBRs, DH5**





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**Maximum Peak Conducted Output Power**

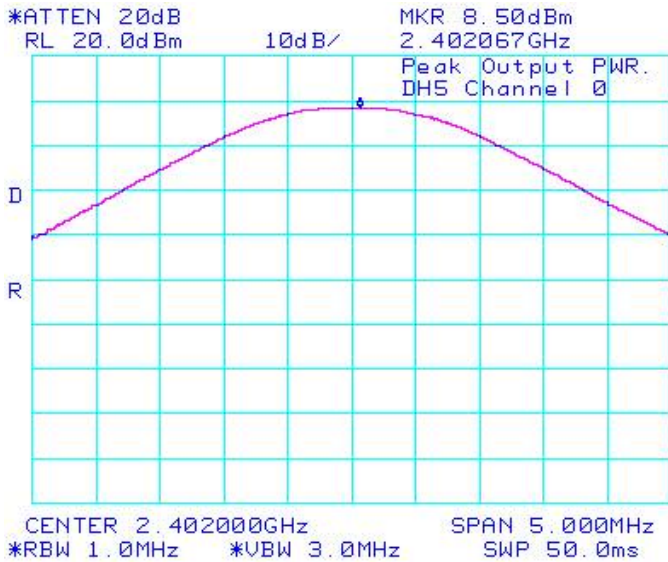
The EUT met the requirements of the maximum peak conducted output power of class 2 as per 47 CFR 15.247(b) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured. Bluetooth was operating in single frequency mode during the measurements. A reference offset of 12.4 dB was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

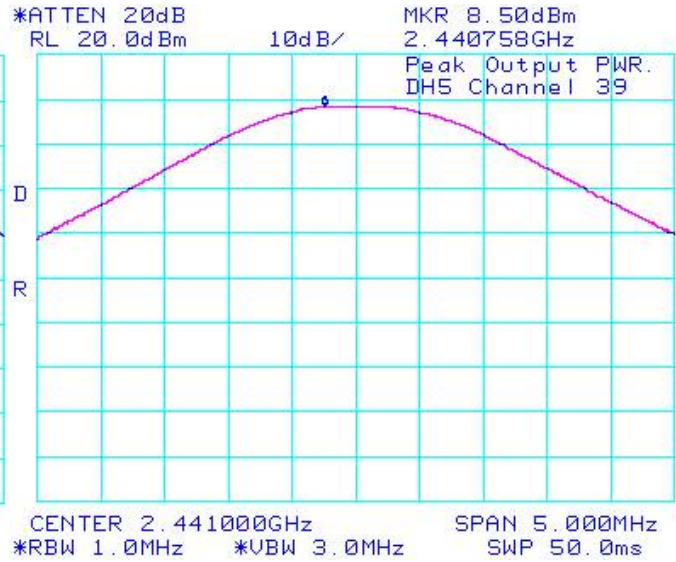
Bluetooth Channel	Measured Level (dBm)	Measured Level (W)	Class 1 Limit (dBm)
0	8.50	0.00708	0.0 to 20.0
39	8.50	0.00708	0.0 to 20.0
78	8.67	0.00736	0.0 to 20.0


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 PBRs, DH5**



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

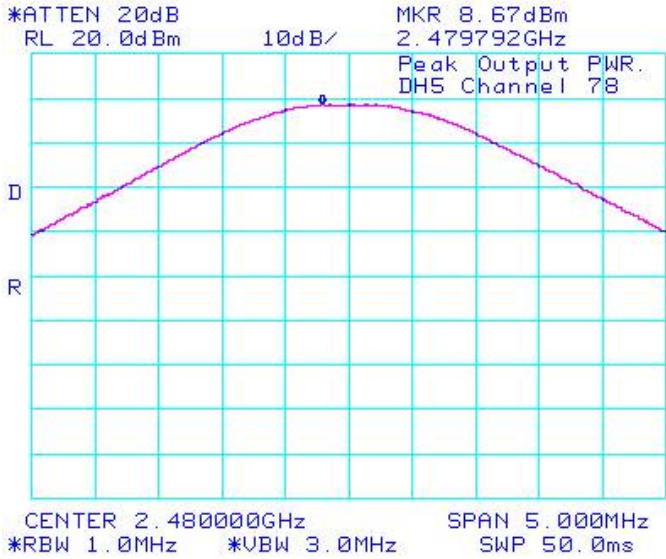


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**Figure 3-24: Max. Peak Conducted Output Power**


**Single Freq., Static PBRs, DH5**



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

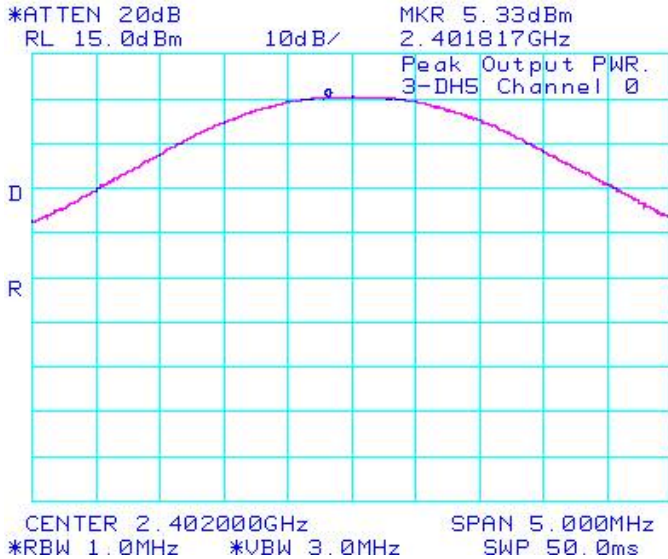
Bluetooth Channel	Measured Level (dBm)	Measured Level (W)	Class 1 Limit (dBm)
0	5.33	0.00341	0.0 to 20.0
39	5.17	0.00329	0.0 to 20.0
78	5.17	0.00329	0.0 to 20.0

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

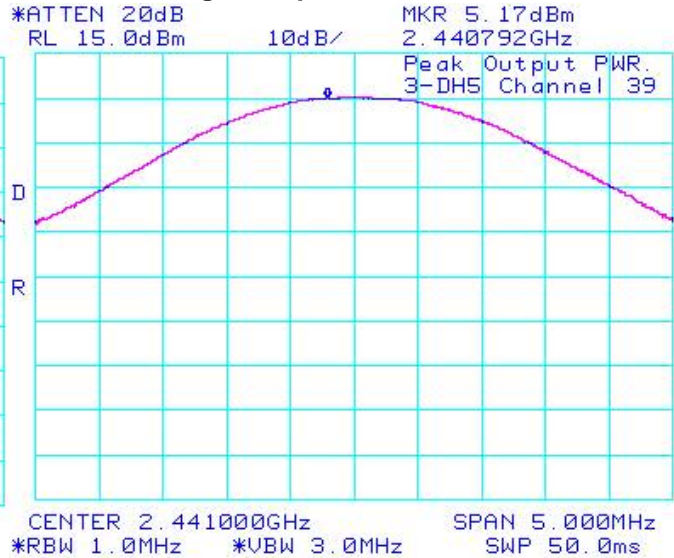
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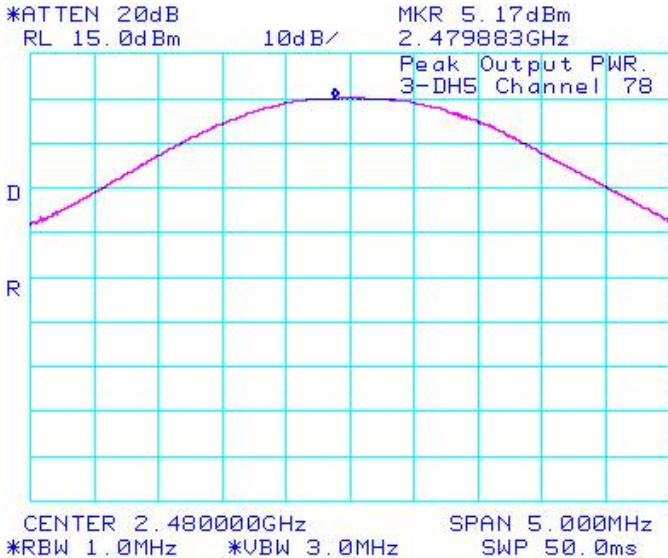
**Figure 3-25: Max. Peak Conducted Output Power  
Single Freq., Static PBRs, 3-DH5**




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



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



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**Band Edge Compliance**

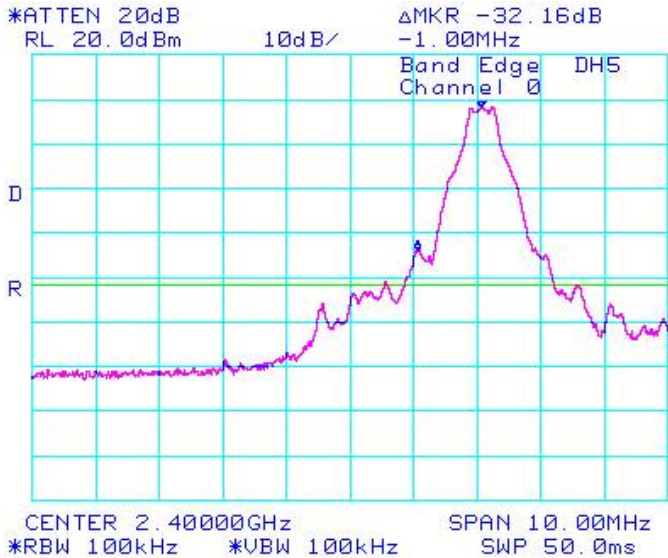
The EUT met the requirements of the band edge compliance as per 47 CFR 15.247(c) and RSS-210. Low channel (0) and high channel (78) were measured. Bluetooth was operating in single frequency and hopping mode.

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

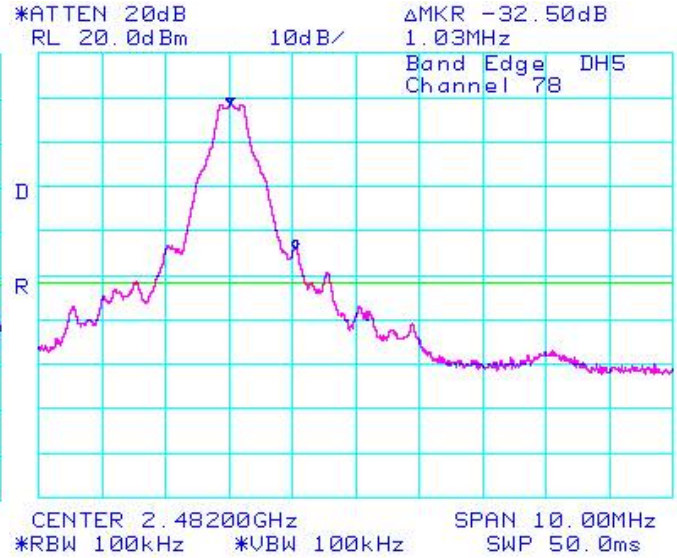
Bluetooth Channel	Operating Mode	Measured Level (dBc)	Limit (dBc)	Margin (dB)
0	Single Frequency	-32.16	-20	-12.16
78	Single Frequency	-32.50	-20	-12.50
0	Hopping	-32.66	-20	-12.66
78	Hopping	-33.00	-20	-13.00


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



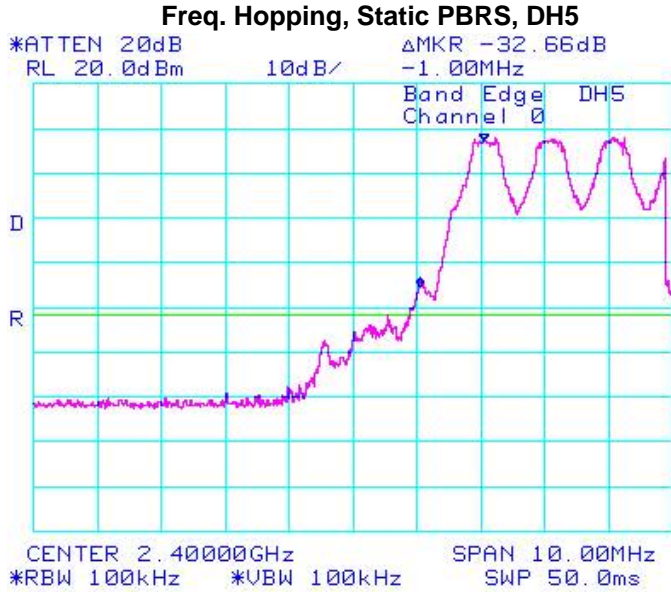
**Figure 3-29: Band Edge Compliance**  
Single Freq., Static PRBS, DH5



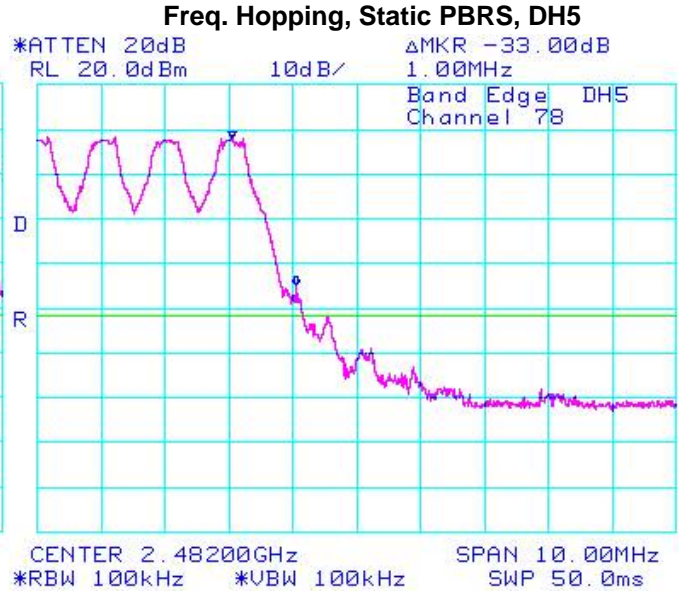
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**Figure 3-30: Band Edge Compliance**



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



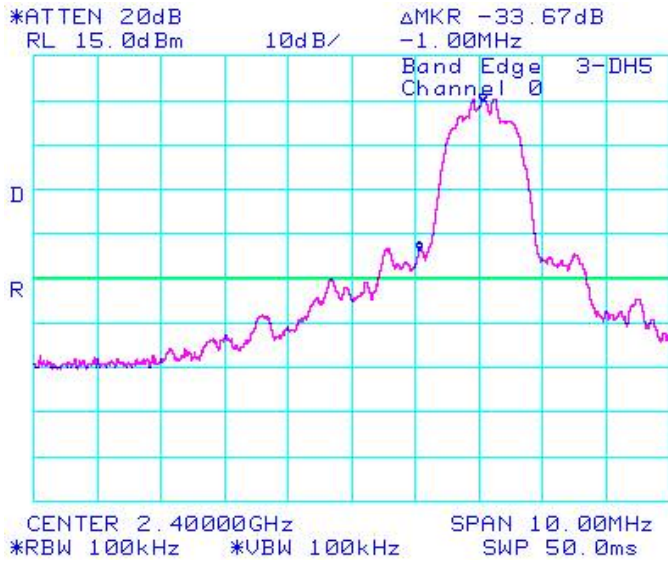
Using pattern type “Static PRBS” and packet type “3-DH5” during the measurements.

Bluetooth Channel	Operating Mode	Measured Level (dBc)	Limit (dBc)	Margin (dB)
0	Single Frequency	-33.67	-20	-13.67
78	Single Frequency	-36.50	-20	-16.50
0	Hopping	-33.50	-20	-13.50
78	Hopping	-34.16	-20	-14.16

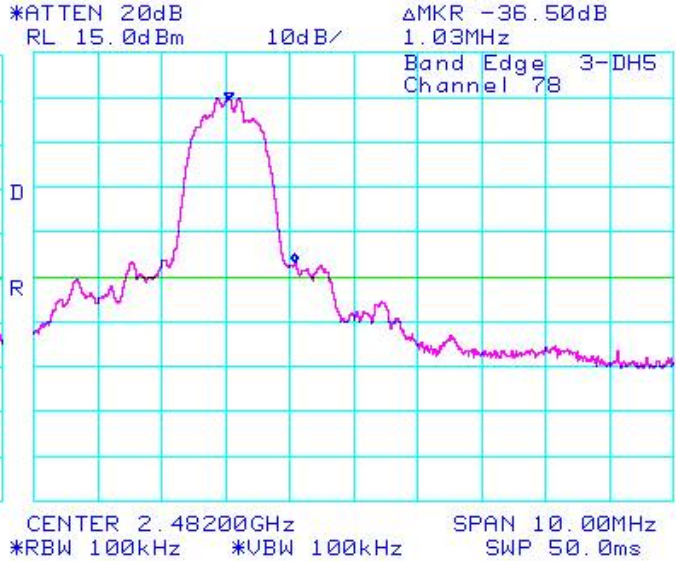
See figures 3-32 to 3-35 for the plots of the band edge compliance measurements.

Bluetooth RF Conducted Emission Test Results cont'd

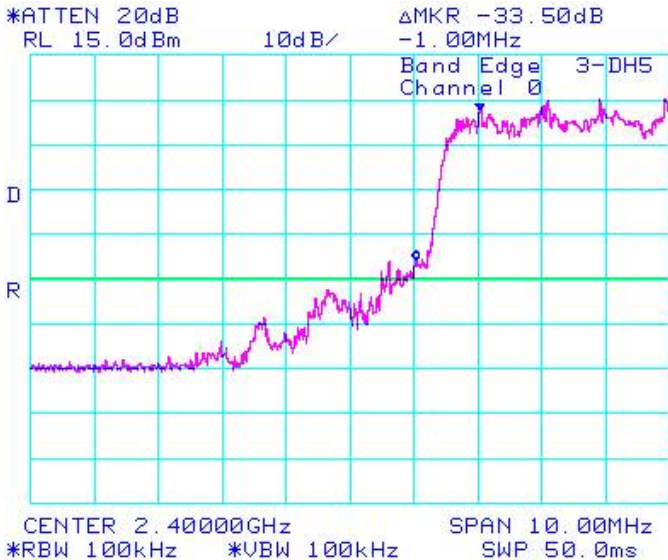
**Figure 3-32: Band Edge Compliance**  
 Single Freq., Static PBRs, 3-DH5



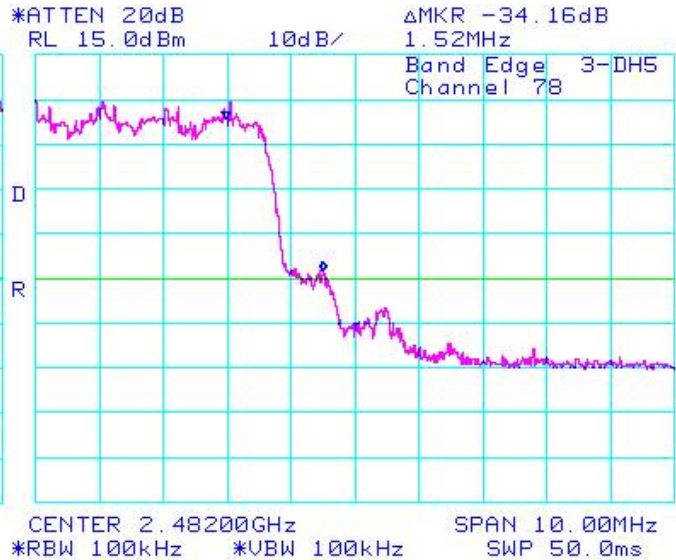
**Figure 3-33: Band Edge Compliance**  
 Single Freq., Static PBRs, 3-DH5




**Figure 3-34: Band Edge Compliance**  
 Freq. Hopping, Static PBRs, 3-DH5



**Figure 3-35: Band Edge Compliance**  
 Freq. Hopping, Static PBRs, 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	8.50	-35.17	-43.67	-20
39	8.50	-40.00	-48.50	-20
78	8.67	-44.83	-53.50	-20
Hopping mode	8.67	-37.50	-46.17	-20

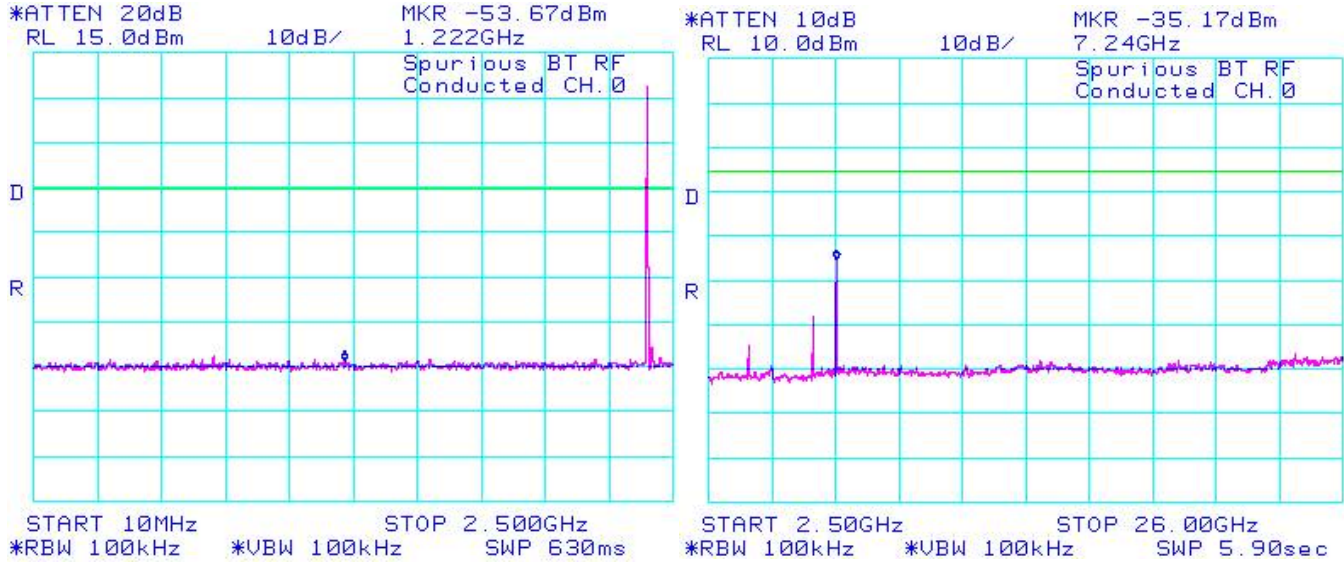
See figures 2-36 to 2-39 for the plots of the spurious RF conducted emissions.

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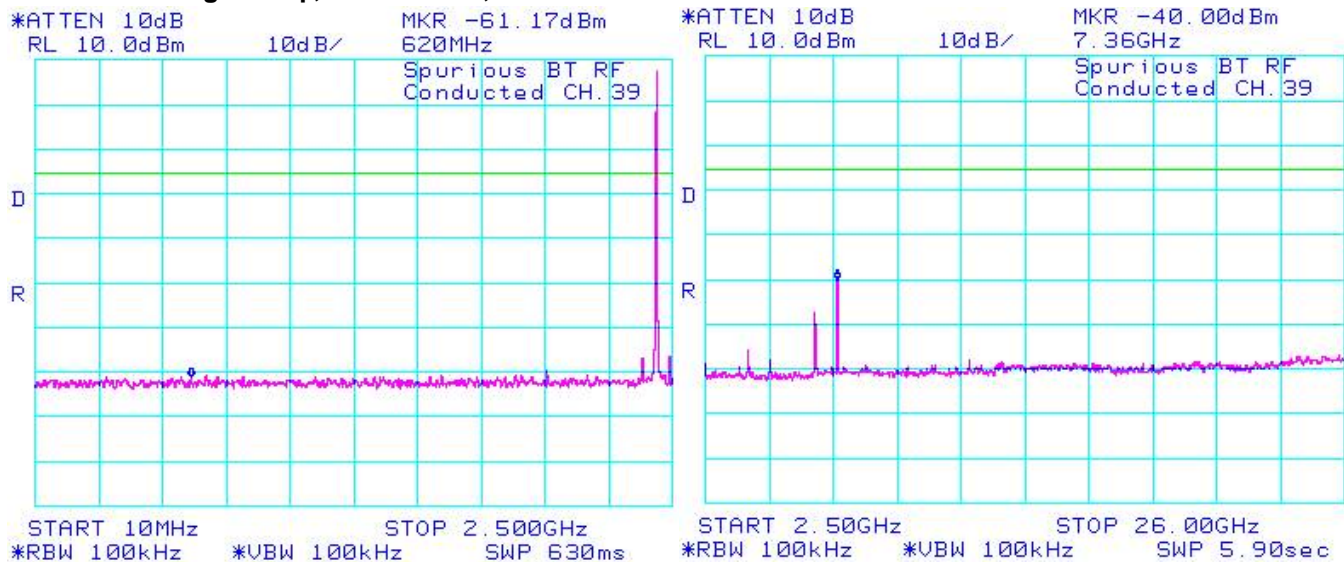
**Figure 2-36: Spurious RF Conducted Emissions**

**Single Freq., Static PBRs, DH5,**



**Figure 2-37: Spurious RF Conducted Emissions**

**Single Freq., Static PBRs, DH5**

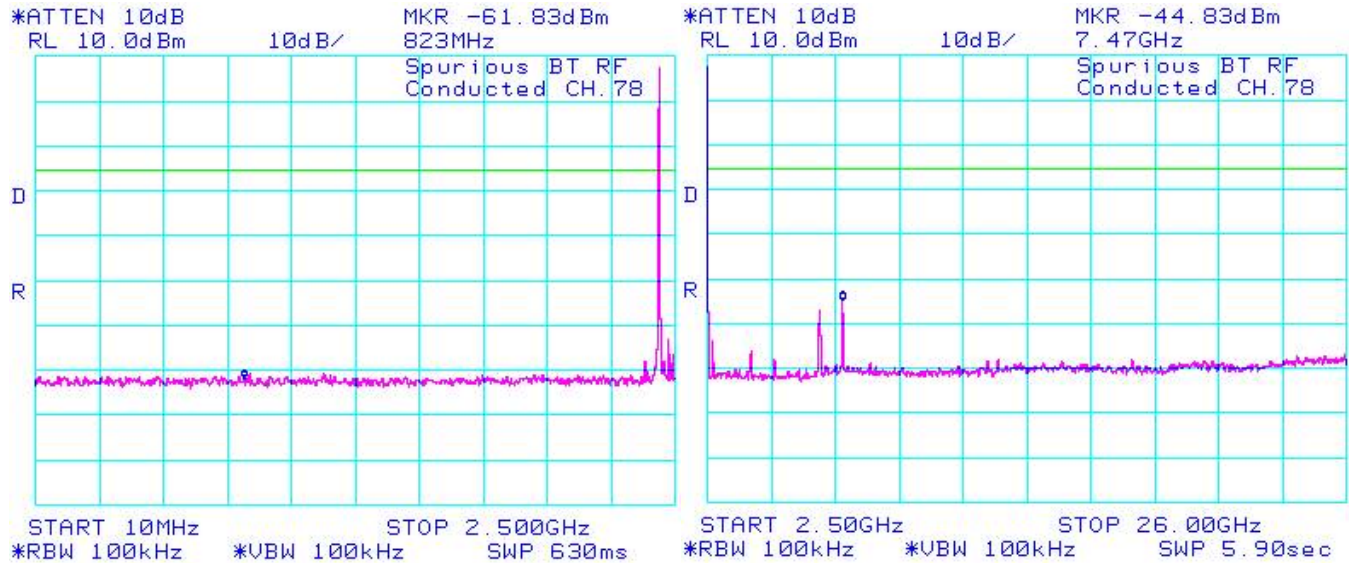




Bluetooth RF Conducted Emission Test Results cont'd

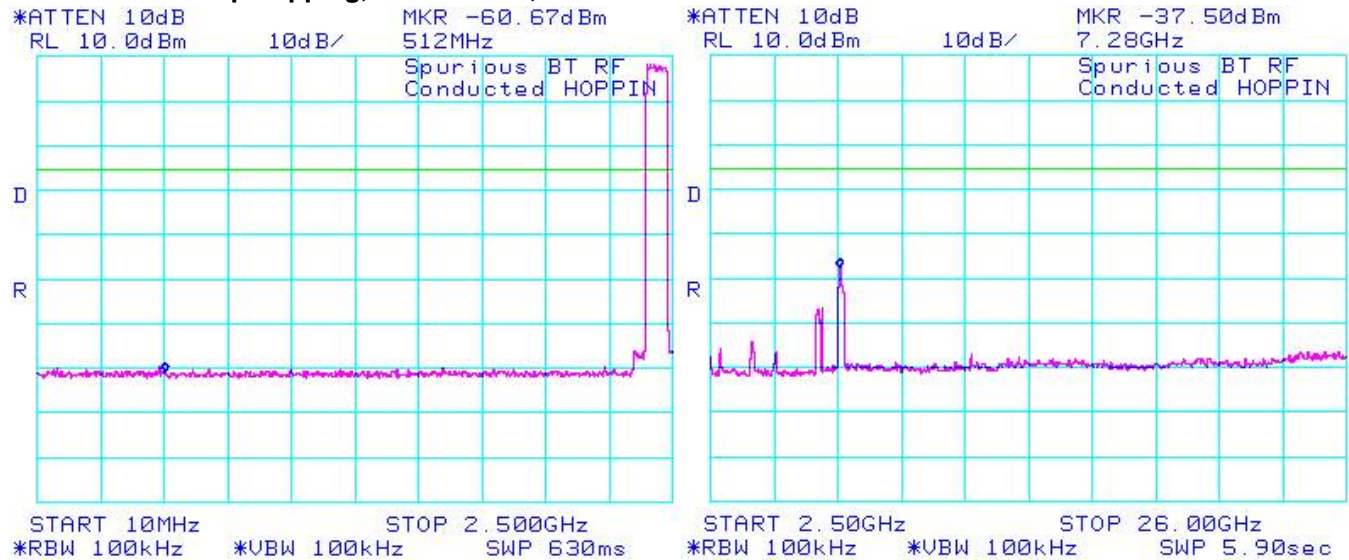
**Figure 2-38: Spurious RF Conducted Emissions**


**Single Freq., Static PBRS, DH5**



**Figure 2-39: Spurious RF Conducted Emissions**

**Freq. Hopping, Static PBRS, DH5**



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

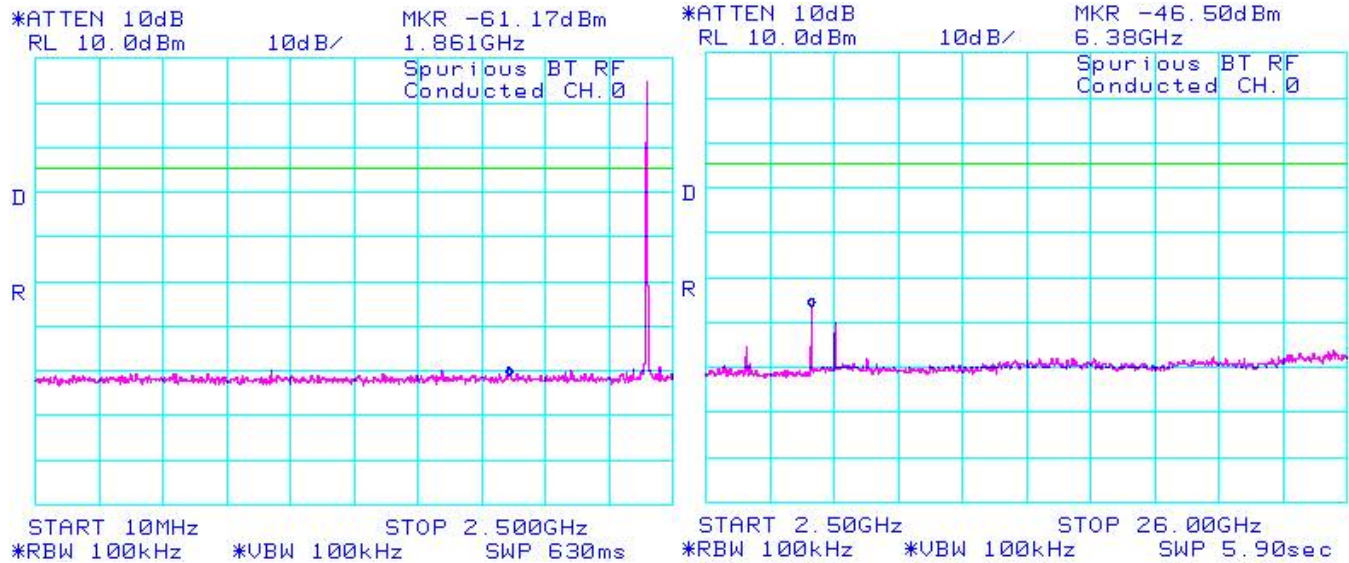
Bluetooth Channel	Channel Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from carrier (dBc)	Limit (dBc)
0	5.33	-46.50	-51.83	-20
39	5.17	-46.17	-51.34	-20
78	5.17	-45.67	-50.84	-20
Hopping mode	5.17	-44.83	-50.00	-20

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

Bluetooth RF Conducted Emission Test Results cont'd

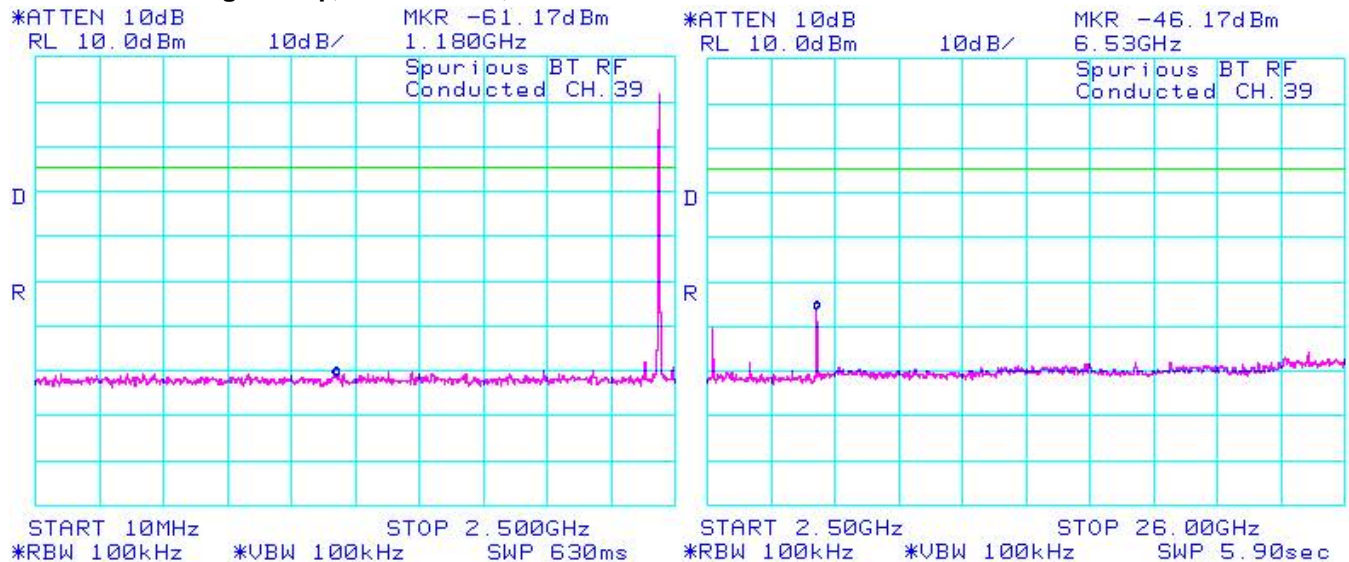
**Figure 3-40 : Spurious RF Conducted Emissions**


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



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

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

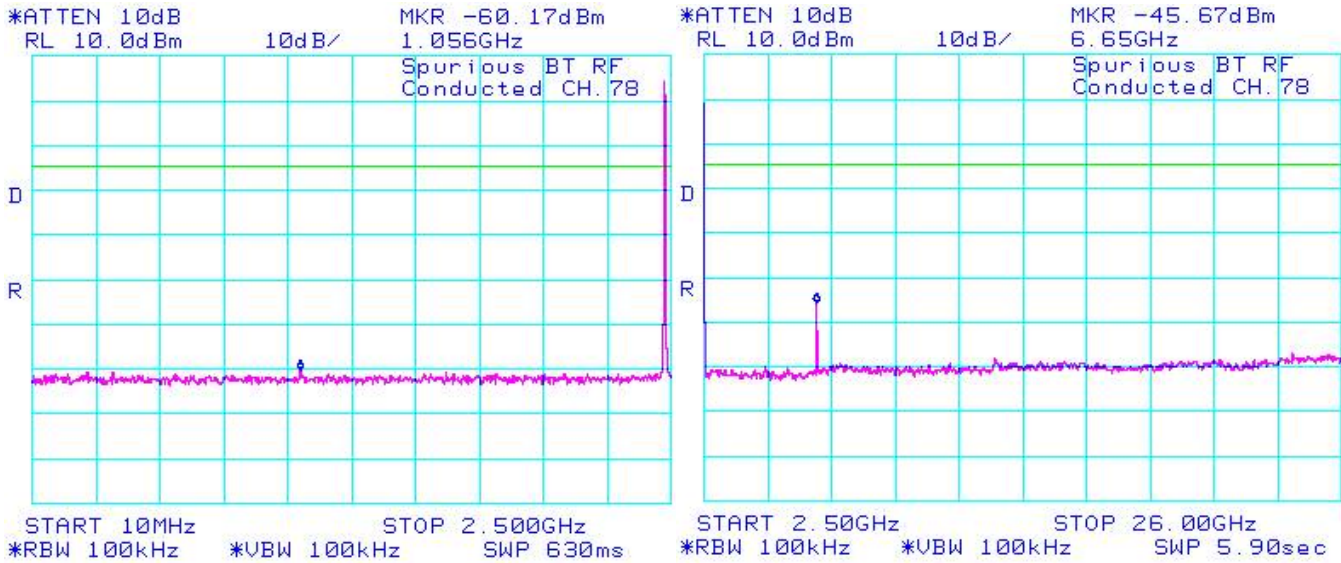


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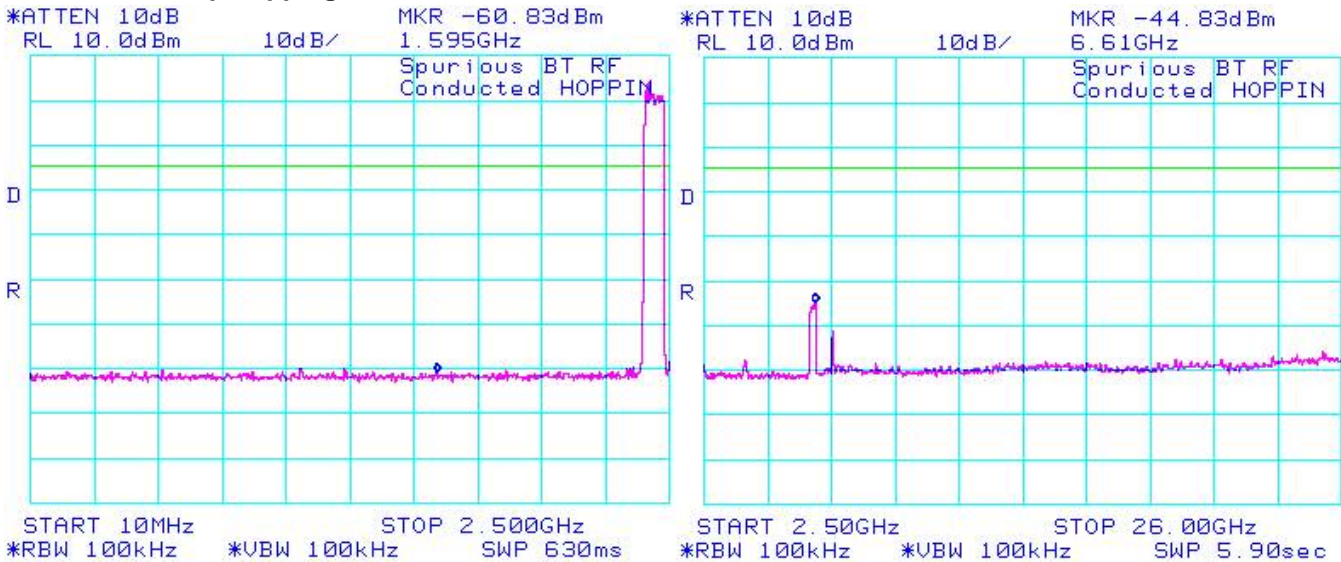
**Figure 3-42: Spurious RF Conducted Emissions**


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



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


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



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



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802.11b/g 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 and 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11g mode.

Channel	Data Rate	Limit (kHz)	Measured Level (MHz)
1	1 Mbps	≥ 500	10.23
	5.5 Mbps	≥ 500	10.23
	11 Mbps	≥ 500	10.87
	6 Mbps	≥ 500	16.63
	24 Mbps	≥ 500	16.67
	54 Mbps	≥ 500	16.70
6	1 Mbps	≥ 500	10.23
	5.5 Mbps	≥ 500	10.93
	11 Mbps	≥ 500	11.37
	6 Mbps	≥ 500	16.53
	24 Mbps	≥ 500	16.67
	54 Mbps	≥ 500	16.67
11	1 Mbps	≥ 500	10.23
	5.5 Mbps	≥ 500	10.53
	11 Mbps	≥ 500	11.13
	6 Mbps	≥ 500	16.53
	24 Mbps	≥ 500	16.67
	54 Mbps	≥ 500	16.67

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

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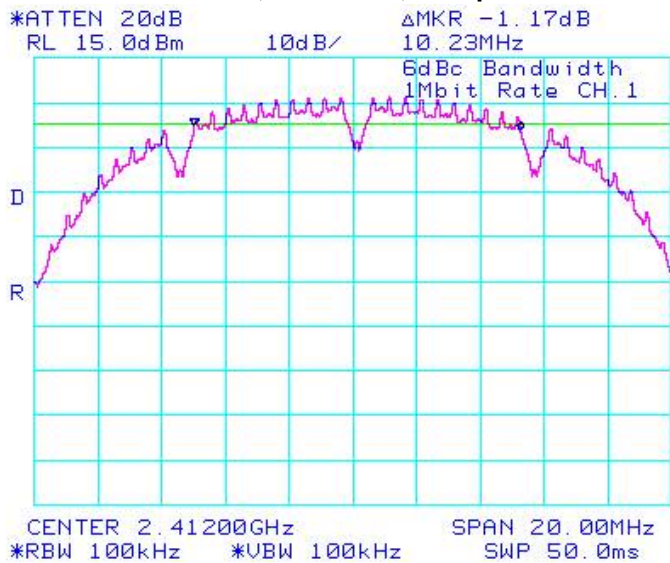
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Author Data  
 Kevin Rose

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

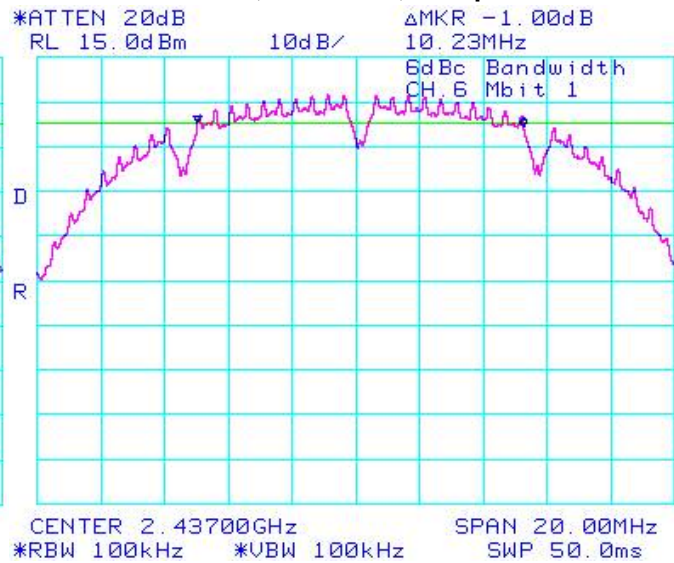
**Figure 4-1: 6 dB Bandwidth**

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



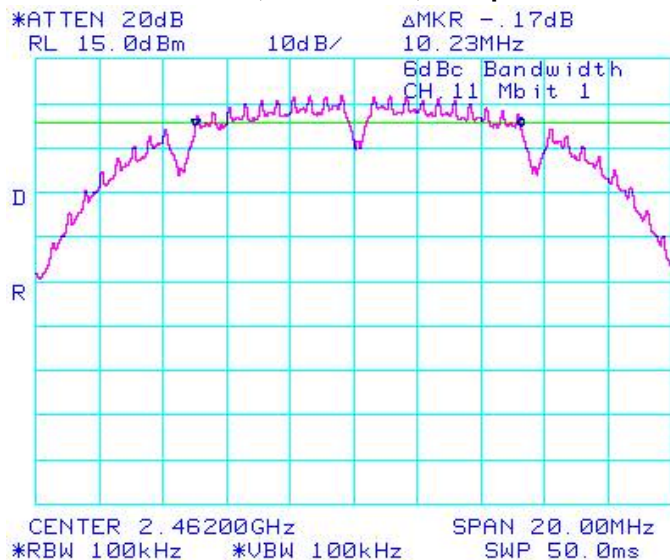
**Figure 4-2: 6 dB Bandwidth**

**802.11b, Channel 6, 1 Mbps**




**Figure 4-3: 6 dB Bandwidth**

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



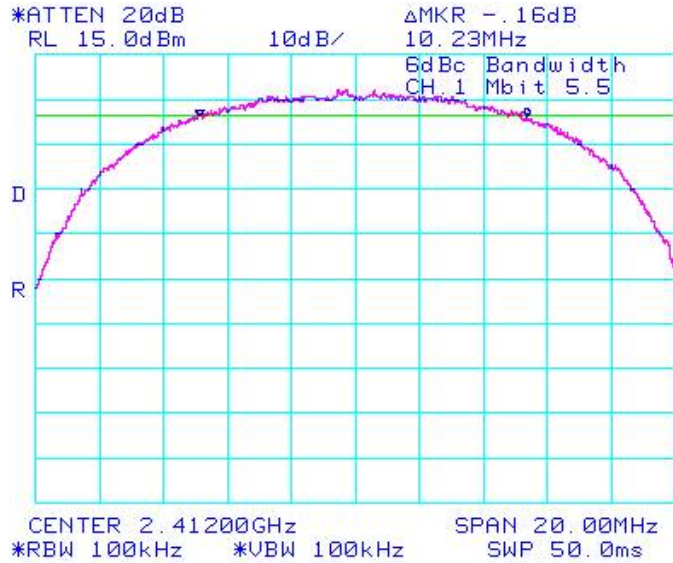


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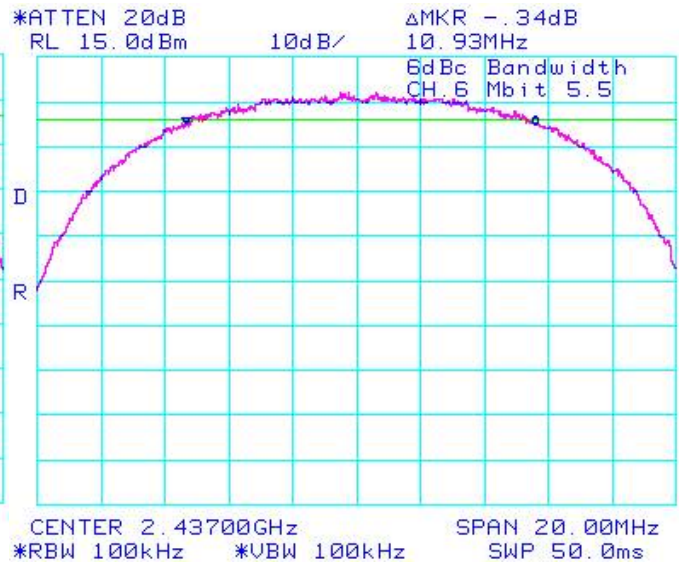
**Figure 4-4: 6 dB Bandwidth**

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



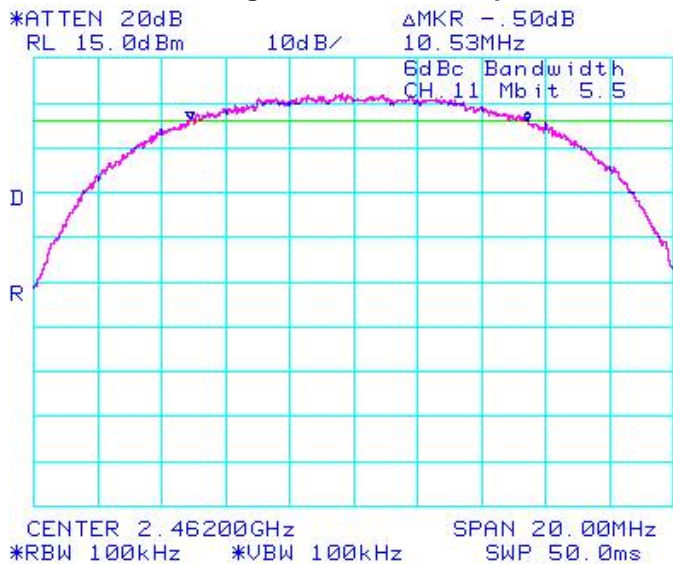
**Figure 4-5: 6 dB Bandwidth**


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



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

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




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802.11b/g 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 and 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11g 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 (W)
1	1 Mbps	< 1.00	15.20	0.03311
	5.5 Mbps	< 1.00	15.90	0.03890
	11 Mbps	< 1.00	15.26	0.03357
	6 Mbps	< 1.00	13.33	0.02153
	24 Mbps	< 1.00	13.35	0.02163
	54 Mbps	< 1.00	12.47	0.01766
6	1 Mbps	< 1.00	15.39	0.03459
	5.5 Mbps	< 1.00	15.45	0.03508
	11 Mbps	< 1.00	16.24	0.04207
	6 Mbps	< 1.00	15.49	0.03540
	24 Mbps	< 1.00	14.05	0.02541
	54 Mbps	< 1.00	12.50	0.01778
11	1 Mbps	< 1.00	15.83	0.03828
	5.5 Mbps	< 1.00	15.86	0.03855
	11 Mbps	< 1.00	15.85	0.03846
	6 Mbps	< 1.00	13.95	0.02483
	24 Mbps	< 1.00	14.00	0.02512
	54 Mbps	< 1.00	12.89	0.01945

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#### **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 and 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11g mode.

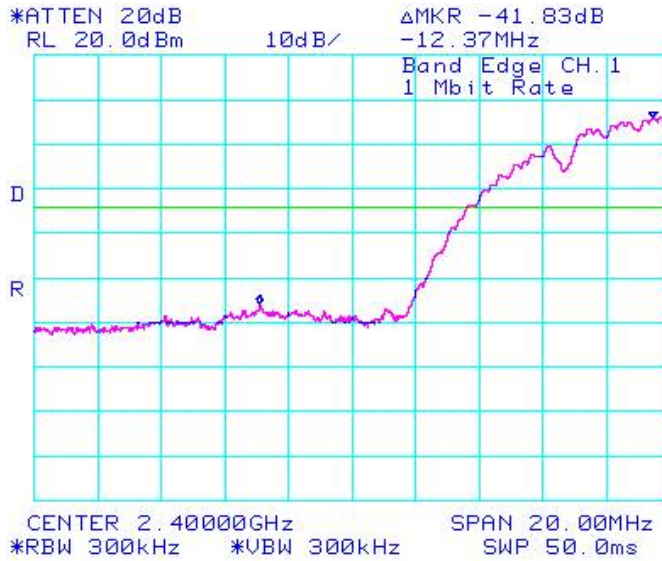
Channel	Data Rate	Limit (dBc)	Measured Level (dBc)	Margin (dBc)
1	1 Mbps	< -20	-41.83	-21.83
	5.5 Mbps	< -20	-46.34	-26.34
	11 Mbps	< -20	-46.00	-26.00
	6 Mbps	< -20	-29.50	-9.50
	24 Mbps	< -20	-28.67	-8.67
	54 Mbps	< -20	-31.84	-11.84
11	1 Mbps	< -20	-39.66	-19.66
	5.5 Mbps	< -20	-44.10	-24.10
	11 Mbps	< -20	-44.50	-24.50
	6 Mbps	< -20	-34.67	-14.67
	24 Mbps	< -20	-35.67	-15.67
	54 Mbps	< -20	-40.33	-20.33

See figures 4-7 to 4-10 for the plots of the band edge compliance measurements for Channels 1, and 11, at 1 Mbps each for 802.11b mode and at 6 Mbps each for 802.11g mode.

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

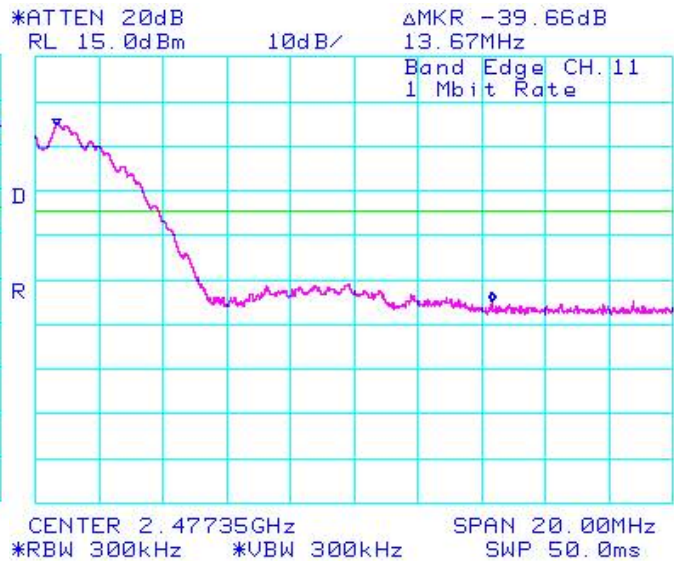
**Figure 4-7: Band Edge Compliance**

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



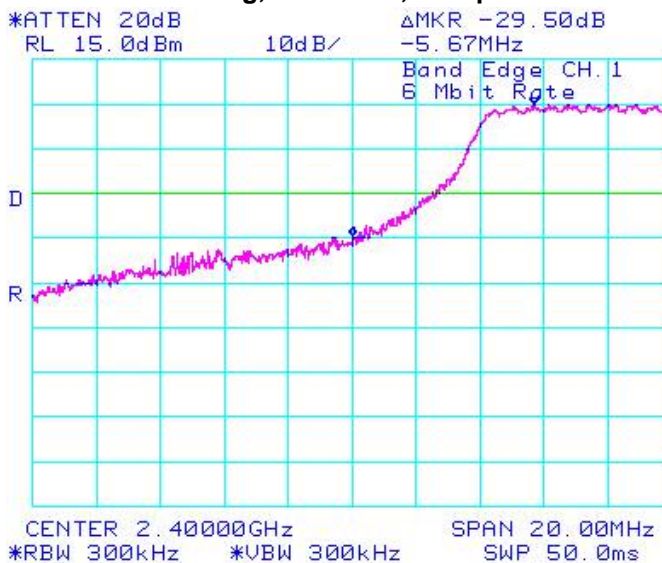
**Figure 4-8: Band Edge Compliance**

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



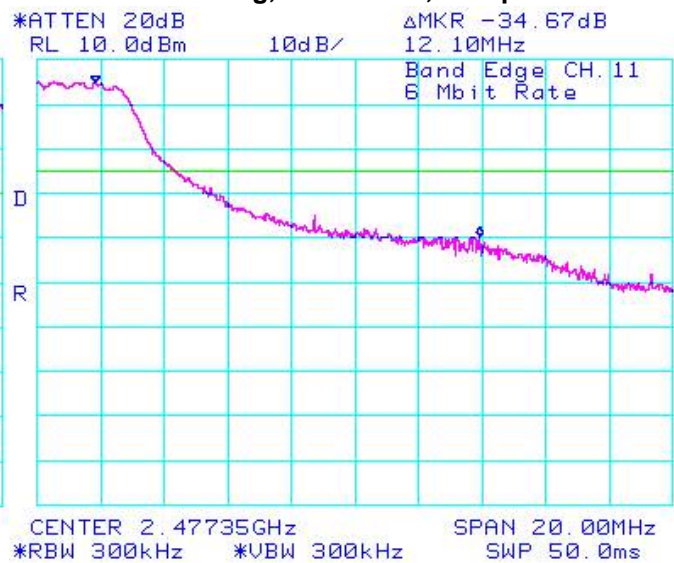
**Figure 4-9: Band Edge Compliance**


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



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

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



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**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 and 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11g mode.

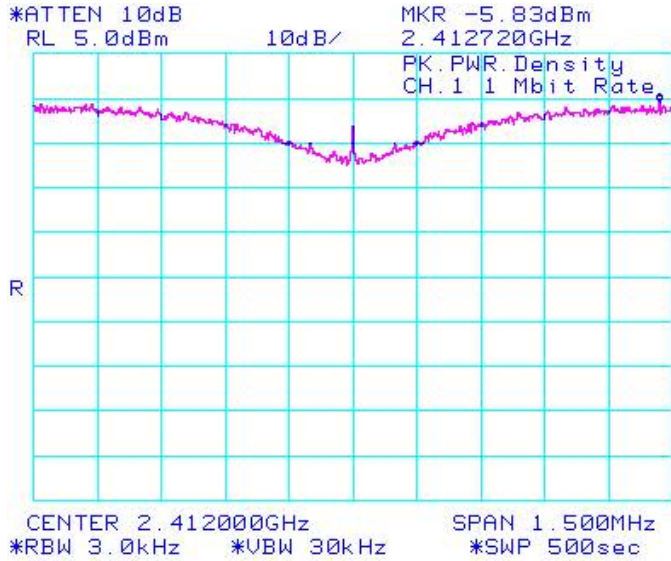
Channel	Data Rate	Limit (dBm)	Measured Level (dBm)	Margin (dBm)
1	1 Mbps	< 8.00	-5.83	-13.83
	5.5 Mbps	< 8.00	-6.67	-14.67
	11 Mbps	< 8.00	-6.67	-14.67
	6 Mbps	< 8.00	-10.33	-18.33
	24 Mbps	< 8.00	-11.33	-19.33
	54 Mbps	< 8.00	-13.83	-21.83
6	1 Mbps	< 8.00	-5.67	-13.67
	5.5 Mbps	< 8.00	-6.33	-14.33
	11 Mbps	< 8.00	-6.50	-14.50
	6 Mbps	< 8.00	-8.17	-16.17
	24 Mbps	< 8.00	-10.83	-18.83
	54 Mbps	< 8.00	-13.33	-21.33
11	1 Mbps	< 8.00	-5.50	-13.50
	5.5 Mbps	< 8.00	-6.33	-14.33
	11 Mbps	< 8.00	-6.17	-14.17
	6 Mbps	< 8.00	-9.83	-17.83
	24 Mbps	< 8.00	-11.50	-19.50
	54 Mbps	< 8.00	-13.00	-21.00

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

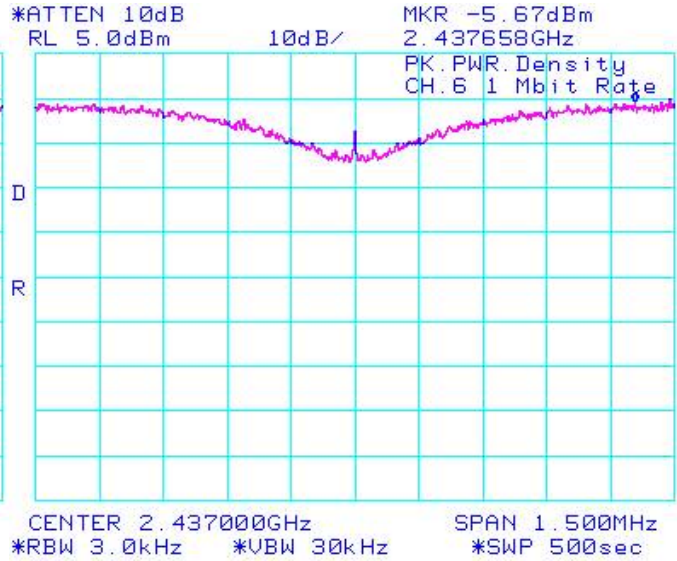
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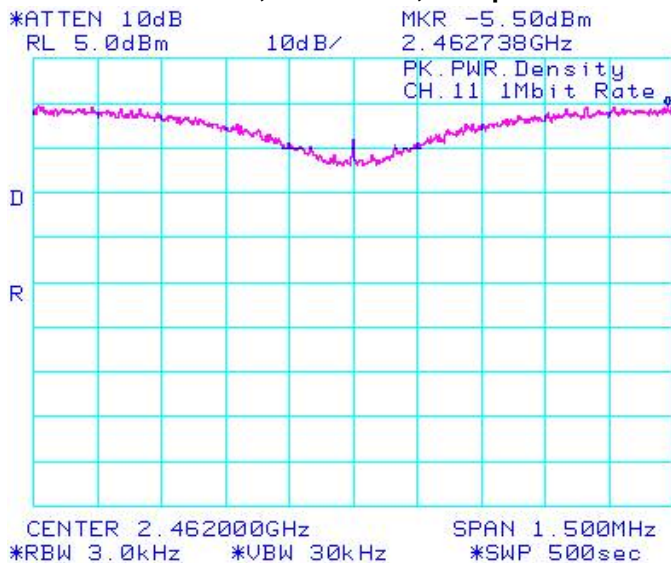
**Figure 4-11: Peak Power Spectral Density**  
802.11b, Channel 1, 1 Mbps




**Figure 4-12: Peak Power Spectral Density**  
802.11b, Channel 6, 1 Mbps



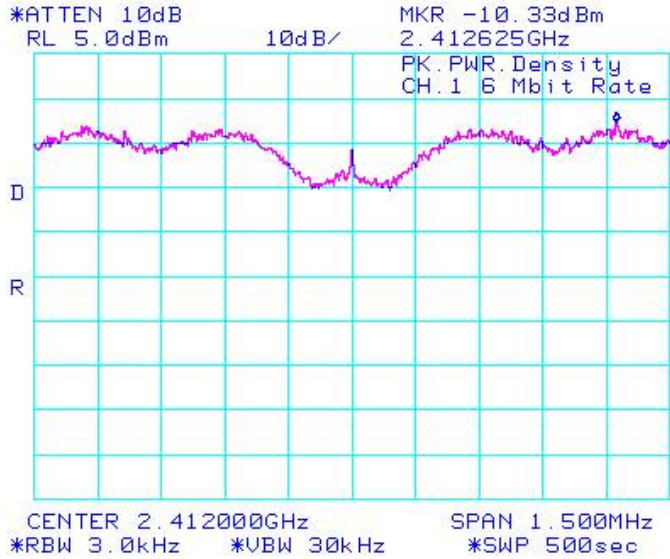
**Figure 4-13: Peak Power Spectral Density**  
802.11b, Channel 11, 1 Mbps



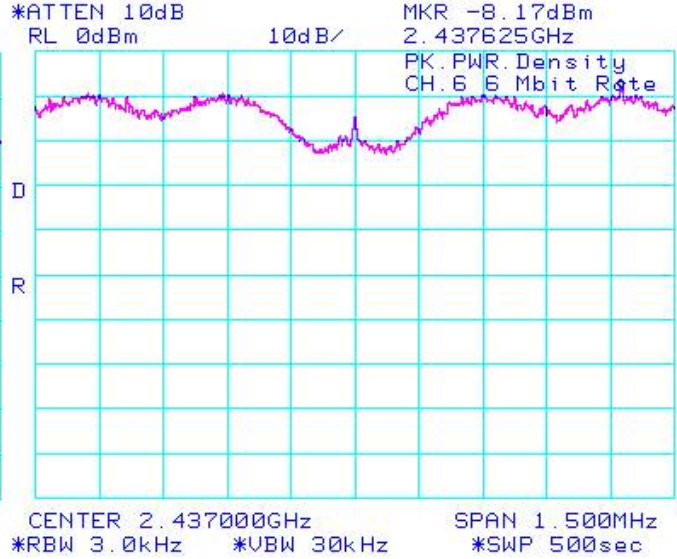
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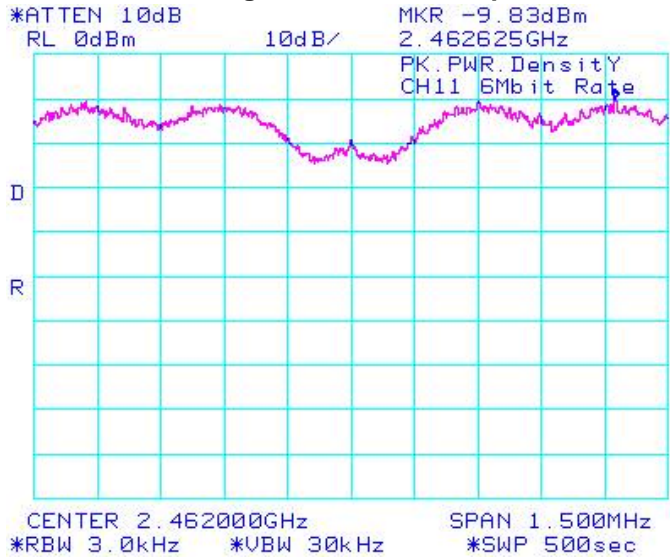
**Figure 4-14: Peak Power Spectral Density  
802.11g, Channel 1, 6 Mbps**




**Figure 4-15: Peak Power Spectral Density  
802.11g, Channel 6, 6 Mbps**



**Figure 4-16: Peak Power Spectral Density  
802.11g, Channel 11, 6 Mbps**



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**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 and 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11g 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	17.02	-50.50	-65.70	-20
	5.5 Mbps	17.03	-49.67	-65.57	-20
	11 Mbps	17.07	-50.00	-65.26	-20
	6 Mbps	13.02	-50.00	-63.33	-20
	24 Mbps	12.15	-50.17	-63.52	-20
	54 Mbps	10.85	-49.83	-62.30	-20
6	1 Mbps	17.42	-49.67	-65.06	-20
	5.5 Mbps	17.50	-50.00	-65.45	-20
	11 Mbps	17.45	-49.67	-65.91	-20
	6 Mbps	16.83	-49.17	-64.66	-20
	24 Mbps	13.05	-49.67	-63.72	-20
	54 Mbps	11.05	-50.00	-62.50	-20
11	1 Mbps	11.28	-50.33	-66.16	-20
	5.5 Mbps	17.41	-50.00	-65.86	-20
	11 Mbps	17.32	-50.00	-65.85	-20
	6 Mbps	13.40	-49.50	-63.45	-20
	24 Mbps	12.45	-49.67	-63.67	-20
	54 Mbps	11.05	-50.00	-62.89	-20

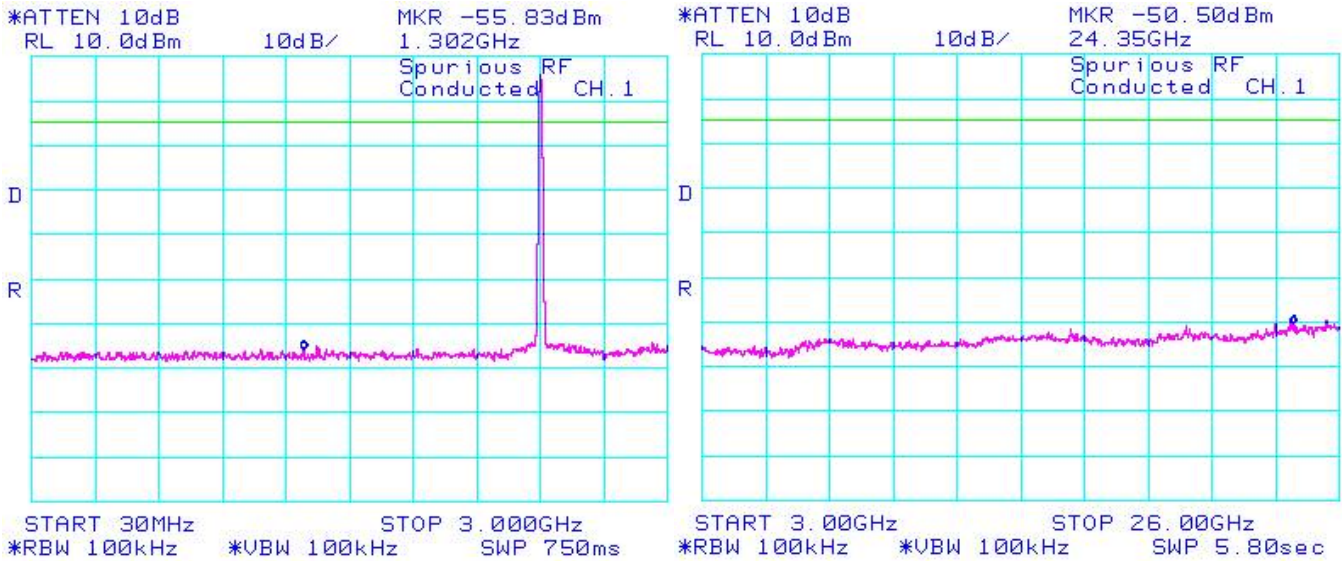
The emissions were in the NF.

See figures 4-17 to 4-22 for the plots of the spurious RF conducted emissions for Channels 1, 6 and 11, at 1 Mbps each for 802.11b mode and at 6 Mbps each for 802.11g mode.

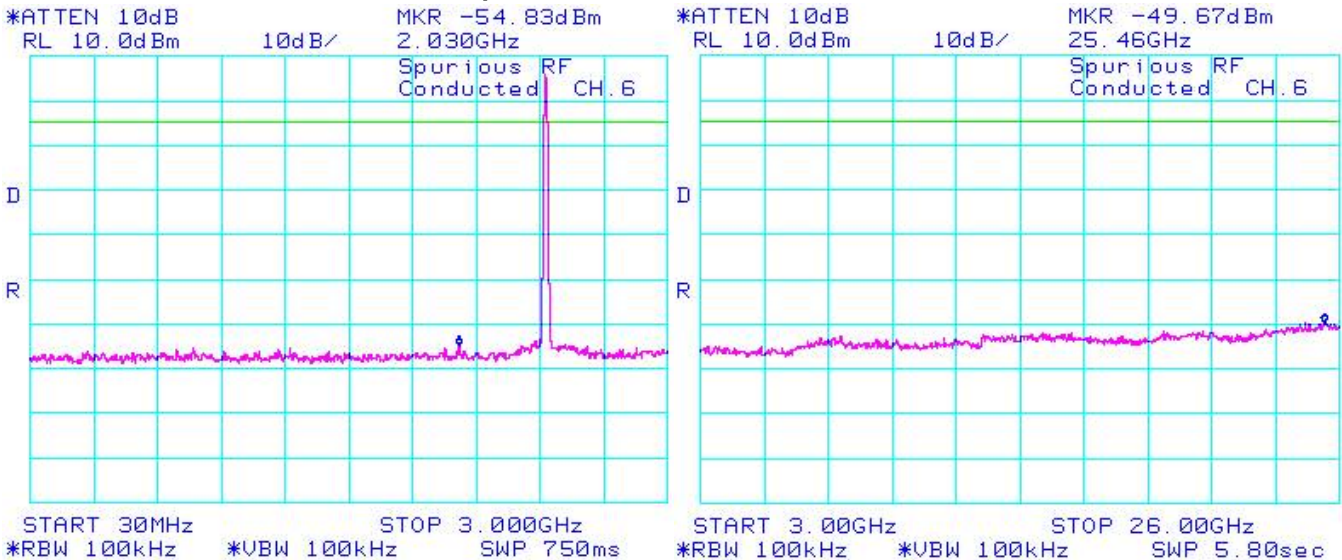


802.11b/g RF Conducted Emission Test Results cont'd

**Figure 4-17: Spurious Conducted RF Emissions**  
 802.11b, Channel 1, 1 Mbps

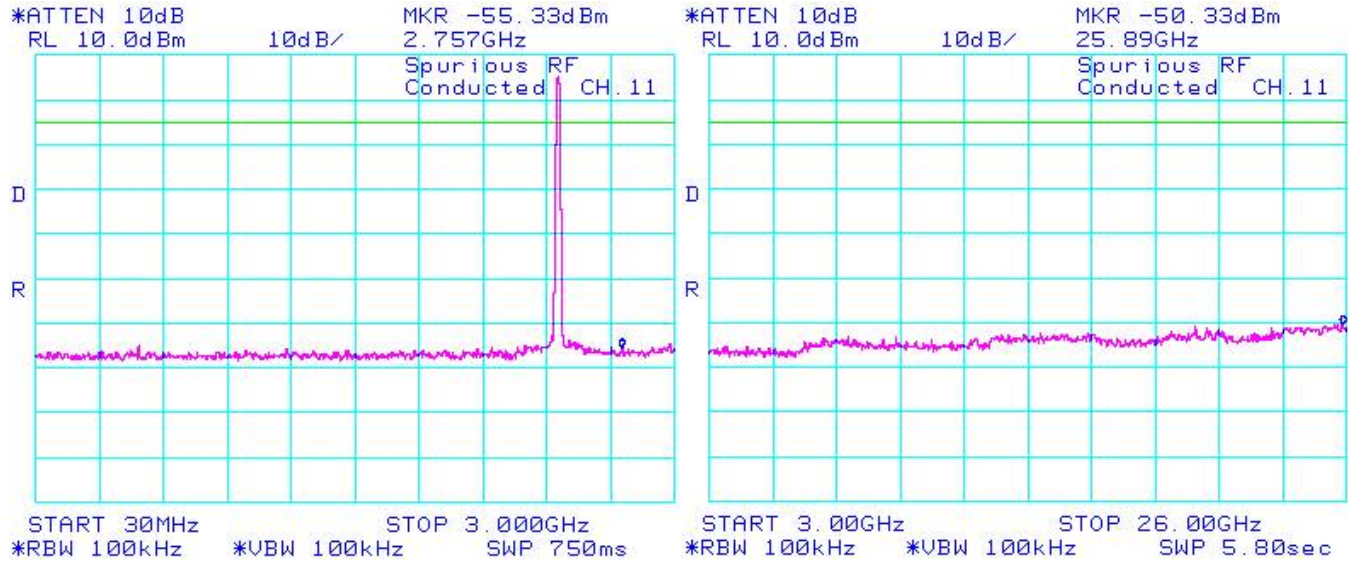


**Figure 4-18 : Spurious Conducted RF Emissions**  
 802.11b, Channel 6, 1 Mbps

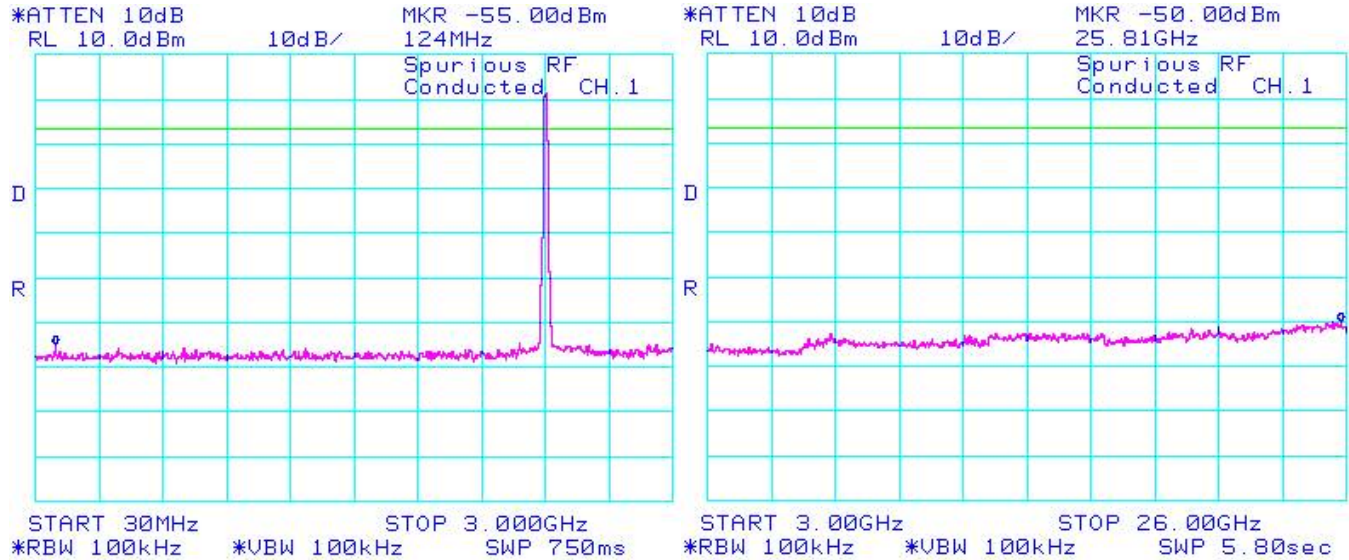



802.11b/g RF Conducted Emission Test Results cont'd

**Figure 4-19: Spurious Conducted RF Emissions**  
 802.11b, Channel 11, 1 Mbps



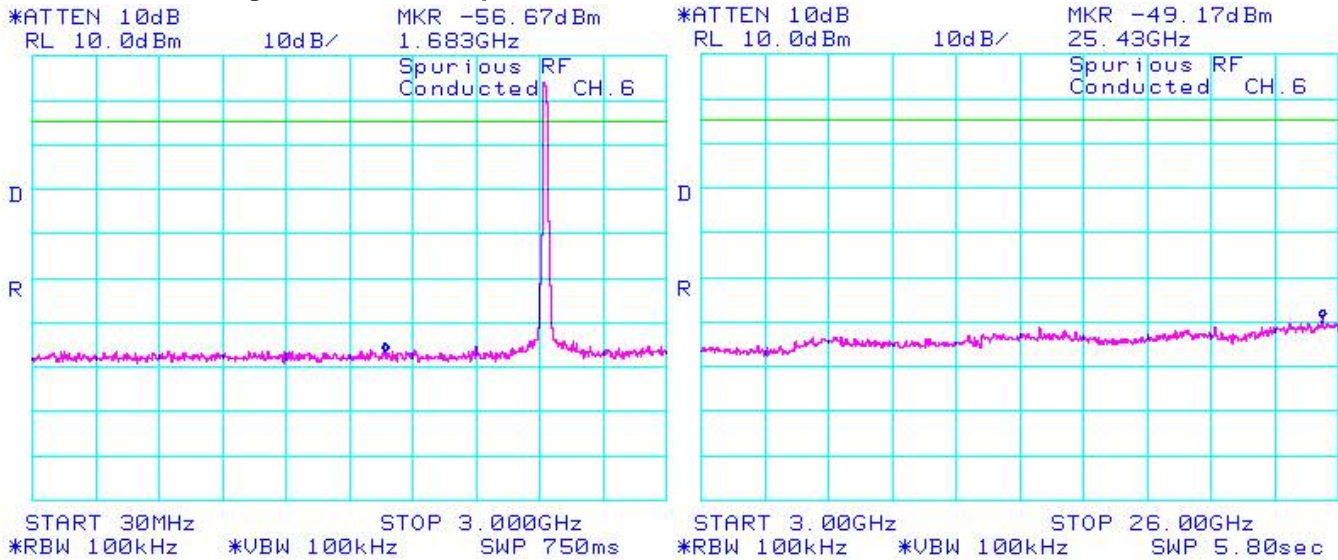
**Figure 4-20: Spurious Conducted RF Emissions**  
 802.11g, Channel 1, 6 Mbps



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**Figure 4-21: Spurious Conducted RF Emissions  
802.11g, Channel 6, 6 Mbps**



**Figure 4-22: Spurious Conducted RF Emissions  
802.11g, Channel 11, 6 Mbps**

