EMI Test Report

Tested in accordance with
Federal Communications Commission (FCC)
Personal Communications Services
CFR 47, Part 15 Subpart C

RIM Testing Services (RTS)

A division of Research In Motion Limited

REPORT NO.: RTS-0428-0606-08

PRODUCT MODEL NO.: RBE41GW
TYPE NAME: BlackBerry
FCC ID: L6ARBE40GW
IC: 2503A-RBE40GW

DATE: 25 July 2006

Statement of Performance:

The BlackBerry Wireless Handheld, model RBA41GW, ASY-11454-xyz Rev P_ASY-11509-001 Rev L, and accessories when configured and operated per RIM's operation instructions, performs within the requirements of the test standards.

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.

Tested by:

Edward A. Davidian
Compliance Specialist
Date: 25 July 2006

Maurice Battler
Compliance Specialist
Date: 25 July 2006

Masud S. Attayi, P.Eng.
Senior Compliance Engineer,
Date: July 25, 2006

Approved by:

Paul G. Cardinal, Ph.D.
Manager
Date: 26 July 2006

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A. Scope

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

- FCC CFR 15 Subpart C, Dec. 8, 2003
- Industry Canada, RSS-210, Issue 6, September 2005, Low Power Licence-Exempt Radiocommunication Devices

B. Associated Documents

Test report number RTS-0428-0606-07.

C. Product Identification

The equipment under test (EUT) was tested at the RIM Testing Services (RTS) EMI test facility, located at:

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

The testing was performed on June 23-26, and July 10-18, 2006. The sample EUT included:

1a. BlackBerry model RBE41GW, part number ASY-11454-xyz Rev K_ASY-11509-001 Rev K, PIN 204803C1.

1b. BlackBerry model RBE41GW, part number ASY-11454-xyz Rev P_ASY-11509-001 Rev L, PIN 2048D170, LCD part number LCD-10294-003/004.

1c. BlackBerry model RBE41GW, part number ASY-11454-xyz Rev P_ASY-11509-001 Rev L, PIN 2048F610, LCD part number LCD-10294-002/004

2. BlackBerry model RBE41GW, part number ASY-11454-xyz Rev H_ASY-11509-001 Rev H, PIN 204426B4.

Sample numbers 1a, 1b, and 1c were used for radiated emission and radiated band edge testing. Sample 2 was used for conducted tests.

Only the differences that maybe impacted by the changes from ASY-11454-xyz Rev H_ASY-11509-001 Rev H and ASY-11454-xyz Rev P_ASY-11509-001 Rev L were re-measured.

The transmit frequency bands operating in North America for the Handheld are: GSM 824 to 849 MHz, PCS 1850 to 1910 MHz and Bluetooth 2402 to 2480 MHz.

D. Support Equipment Used for the Testing of the EUT

1) Communication Tester, Rohde & Schwarz, model CMU 200, serial number 837493/073
2) DC Power Supply, H/P, model 6632B, serial number US37472178
3) Bluetooth Tester, Rohde & Schwarz, model CBT, serial number 100133

E. Test Voltage

The ac input voltage was 120 volts, 60 Hz where applicable. This configuration was per RIM's specifications.

F. Test Results Chart

SPECIFICATION	TEST TYPE	MEETS REQUIREMENTS	PERFORMED BY
FCC CFR 47 Part 15.207 IC RSS-210	AC Line Conducted Emissions	See test report RTS-0428-0606-07	-
FCC CFR 47 Part 15.209, 15.247 IC RSS-210	Radiated Emissions Radiated Band Edge Compliance	Yes	Masud Attayi and Edward Davidian
FCC CFR 47 Part 15.247(a), (b), and (c) IC RSS-210	20 dB Bandwidth Carrier Freq. Separation Number of Hopping freq. Dwell Time Max. Peak Output Power Band Edge Compliance Spurious RF Conducted Emissions	Yes	Maurice Battler

G. Modifications to EUT

No modifications were required on the EUT.

H. Summary of Results

1) AC LINE CONDUCTED EMISSIONS

To view the test results, see test report number RTS-0428-0606-07.

2) RADIATED EMISSIONS

a) Radiated Spurious and Harmonic Emissions

The radiated emissions from the EUT were measured as per FCC Part 15.247 and IC RSS-210. The EUT was placed on a nonconductive styrofoam table, 100 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 polarisations of the emissions were measured.

The measurements were performed in a semi-anechoic chamber. The semi-anechoic chamber's FCC registration number is **778487** and the Industry Canada file number is **IC4240**.

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

The Handheld was measured in standalone configuration with Bluetooth transmitting in single frequency mode at low channel (0), middle channel (39) and high channel (78) and frequency hopping mode.

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 sample EUT had a worse case test margin of 10.5 dB using the peak detector and a worse case test margin of 1.6 dB at 4960.0 MHz using the average detector.

b) Band-Edge Compliance of RF Radiated Emissions

The Band-Edge Compliance of RF Radiated Emissions met the requirements as per 15.209.

See APPENDIX 1 for the test data. The results include both normal data rate and EDR.

Sample Calculation:

Field Strength (dBµV/M) is calculated as follows:
FS = Measured Level (dBµV) + A.F. (dB/m) + Cable Loss (dB) - Preamp (dB) + Filter Loss (dB)

Measurement Uncertainty ±4.0 dB

3) BLUETOOTH RF CONDUCTED EMISSIONS

a) 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. The result includes both normal data rate and EDR.
See APPENDIX 2 for the test data.

b) 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. The result includes both normal data rate and EDR.
See APPENDIX 2 for the test data.

c) 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. The number of hopping channels measured was 79.
See APPENDIX 2 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 2 for the test data.

e) Maximum Peak Conducted Output Power
The EUT 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 2 for the test data.

f) Band-Edge Compliance of RF Conducted Emissions
The EUT 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.
See APPENDIX 2 for the test data. The result includes both normal data rate and EDR.

g) 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 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 2 for the test data.

I. Compliance Test Equipment Used

UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
Preamplifier	Sonoma	310N/11909A	185831	06-11-27	Radiated Emissions
Preamplifier system	TDK RF Solutions	PA-02	080010	06-11-25	Radiated Emissions
Hybrid Log Antenna	TDK	HLP-3003C	017401	06-07-21	Radiated Emissions
Horn Antenna	TDK	HRN-0118	130092	06-09-24	Radiated Emissions
Horn Antenna	TDK	HRN-0118	30101	06-07-21	Radiated Emissions
Horn Antenna	Emco	3116	2538	06-09-27	Radiated Emissions
Preamplifier	TDK	18-26	3002	06-11-28	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	973	06-12-13	Radiated Emissions
Dipole Antenna	Schwarzbeck	UHAP	974	06-09-21	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	837493/073	07-03-20	Radiated Emissions
EMI Receiver	Rohde & Schwarz	ESIB-40	100255	07-05-11	Radiated Emissions
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	100251	07-04-23	Conducted Emissions
Spectrum Analyzer	HP	8563E	3745A08112	06-09-10	RF Conducted Emissions
DC Power Supply	HP	6632B	US37472178	07-09-14	RF Conducted Emissions
Environment Monitor	Control Company	1870	230355190	06-12-23	Radiated Emissions
Environment Monitor	Control Company	1870	230355189	06-12-23	RF Conducted Emissions
Temperature Probe	Hart Scientific	61161-302	21352860	06-09-28	Frequency Stability
Environmental Chamber	ESPEC Corp.	SH-240S1	91005607	N/R	Frequency Stability
Bluetooth Tester	Rohde & Schwarz	CBT	100133	07-04-11	Radiated Emissions

APPENDIX 1 – RADIATED EMISSIONS TEST DATA

Radiated Emissions Test Results

Test Distance was 3.0 metres. Bluetooth Band

The measurements were performed in single frequency and hopping mode (channels 0 to 78) at maximum output power.
Using Pattern type "Static PRBS" and packet type "DH5" during the measurements.

Type	Channel	Frequency	Antenna		Reading (Peak)	Corrected Reading	Detector	Peak Limit	Diff. To Limit
		(MHz)	Type	Pol	(dBuV)	(dBuV)	AVE/PK	(dBuV/m)	(dB)
Handheld Standalone, USB side down Single frequency mode Low Channel									
2nd	0	4804.0	Horn	V	40.6	60.2	PK.	74	-13.8
2nd	0	4804.0	Horn	H	NF				
2nd	0	4804.0	Horn	V	28.5	48.1	AVE.	54	-5.9
2nd	0	4804.0	Horn	H	NF				
The harmonics were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the noise floor (NF)									
Single frequency mode Middle Channel									
2nd	39	4882.0	Horn	V	43.3	62.9	PK.	74	-11.1
2nd	39	4882.0	Horn	H	NF				
2nd	39	4882.0	Horn	V	32.4	52.0	AVE.	54	-2.0
2nd	39	4882.0	Horn	H	NF				
The harmonics were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF									
Single frequency mode High Channel									
2nd	78	4960.0	Horn	V	43.9	63.5	PK.	74	**-10.5**
2nd	78	4960.0	Horn	H	NF				
2nd	78	4960.0	Horn	V	32.8	52.4	AVE.	54	**-1.6**
2nd	78	4960.0	Horn	H	NF				
The harmonics were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the NF									

Radiated Emissions Test Results con't

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

Bluetooth Band

Type	Channel	Frequency	Antenna		Reading (Peak)	Corrected Reading	Detector	Peak Limit	Diff. To Limit
		(MHz)	Type	Pol	(dBuV)	(dBuV)	AVE/PK	(dBuV/m)	(dB)
Handheld Standalone, USB side down Hopping mode.									
2nd	0-78	4960.0	Horn	V	43.3	62.9	PK.	74	-11.1
2nd	0-78	4960.0	Horn	H	NF				
2nd	0-78	4960.0	Horn	V	29.6	49.2	AVE.	54	-4.8
2nd	0-78	4960.0	Horn	H	NF				
The harmonics were investigated up to the 10th harmonic. Emissions above the 2nd harmonic were in the noise floor (NF)									

Bluetooth Band-Edge Compliance of RF Radiated Emissions

Handheld standalone, vertical, Bluetooth in single frequency mode, channel 78.
Using Pattern type "Static PRBS" and packet type "3-DH5" during the measurements.

The test distance was 3 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)
78	2480.00	Horn	V	PK	1.0 MHz	88.05	36.7	51.35	74	-22.65
78	2480.00	Horn	H	PK	1.0 MHz	89.35	35.2	54.15	74	-19.85
78	2480.00	Horn	V	AVE.	10 Hz	78.35	36.7	41.65	54	-12.35
78	2480.00	Horn	H	AVE.	10 Hz	79.45	35.2	44.25	54	-9.75

The environmental test conditions were: Temperature 22ºC
Pressure 1013 mb
Relative Humidity 36%

APPENDIX 2 – BLUETOOTH CONDUCTED EMISSIONS TEST DATA/PLOTS

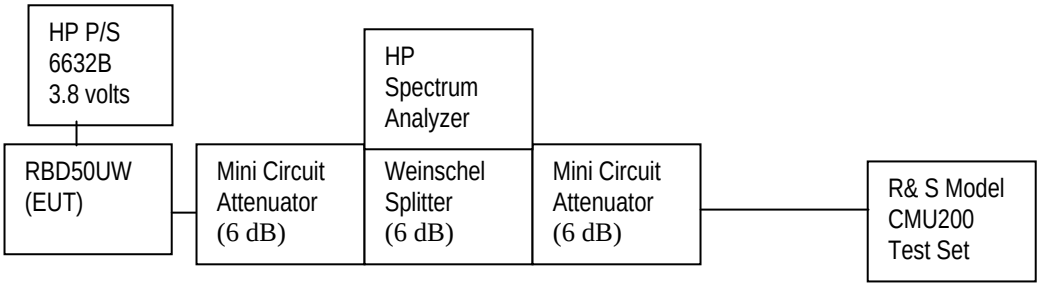
Bluetooth RF Conducted Emission Test Results

Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer	HP	8563E	3745A08112	30 Hz – 26.5 GHz
Splitter	Weinschel	1515	ME092	DC – 18 GHz
Attenuator	Mini Circuit	MCL BW-S20W2	-	DC – 18 GHz
Attenuator	Mini Circuit	MCL BW-S6W2	-	DC – 18 GHz
Attenuator	Mini Circuit	MCL BW-S6W2	-	DC – 18 GHz
DC Power Supply	HP	6632B	US37472178	-
Bluetooth Tester	Rohde & Schwarz	CBT	100133	-

Bluetooth power output was at maximum for all the recorded measurements shown below.

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.

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 mod.

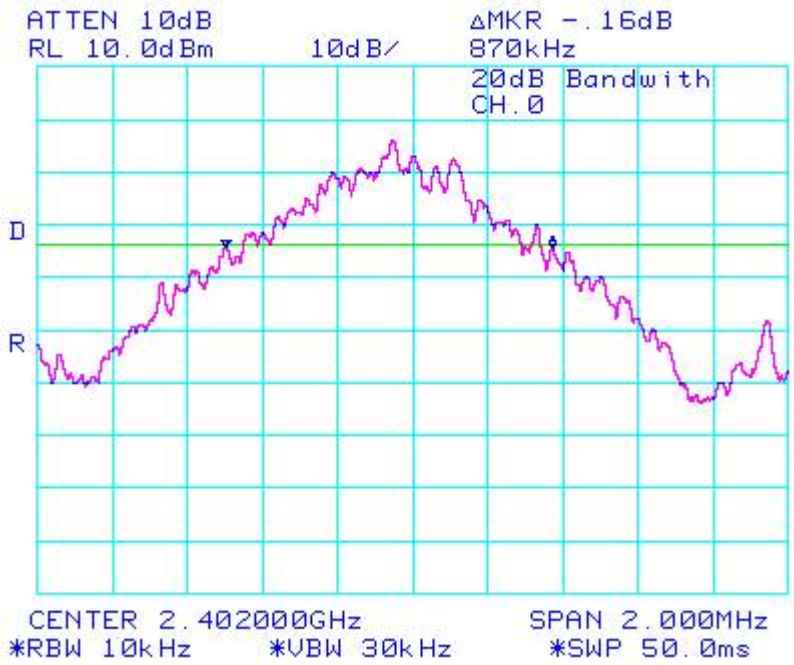
Using pattern type Static PRBS and packet type DH5 during the measurements.

Bluetooth Channel	Limit (MHz)	Measured Level (MHz)
0	<=1.0	0.870
39	<=1.0	0.870
78	<=1.0	0.870

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

The environmental test conditions were: Temperature 23ºC
Pressure 1014 mb
Relative Humidity 41%

Figure 1: 20 dB Bandwidth, channel 0



Bluetooth RF Conducted Emission Test Results cont'd

Figure 2: 20 dB Bandwidth, channel 39

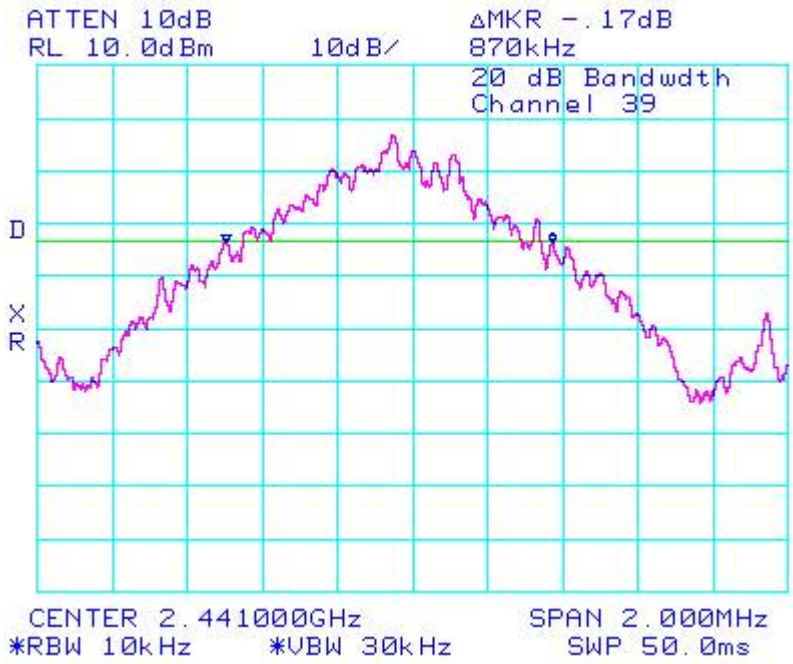
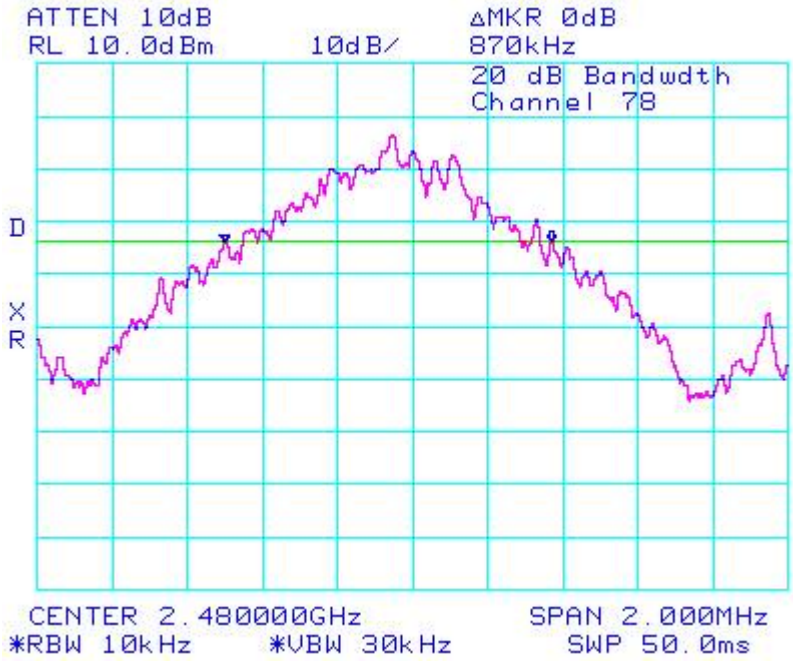


Figure 3: 20 dB Bandwidth, channel 78



Bluetooth RF Conducted Emission Test Results cont'd

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

Bluetooth Channel	Limit (MHz)	Measured Level (MHz)
0	<=1.5	1.247
39	<=1.5	1.247
78	<=1.5	1.233

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

The environmental test conditions were: Temperature 23ºC
Pressure 1014 mb
Relative Humidity 41%

Figure 4: 20 dB Bandwidth, channel 0

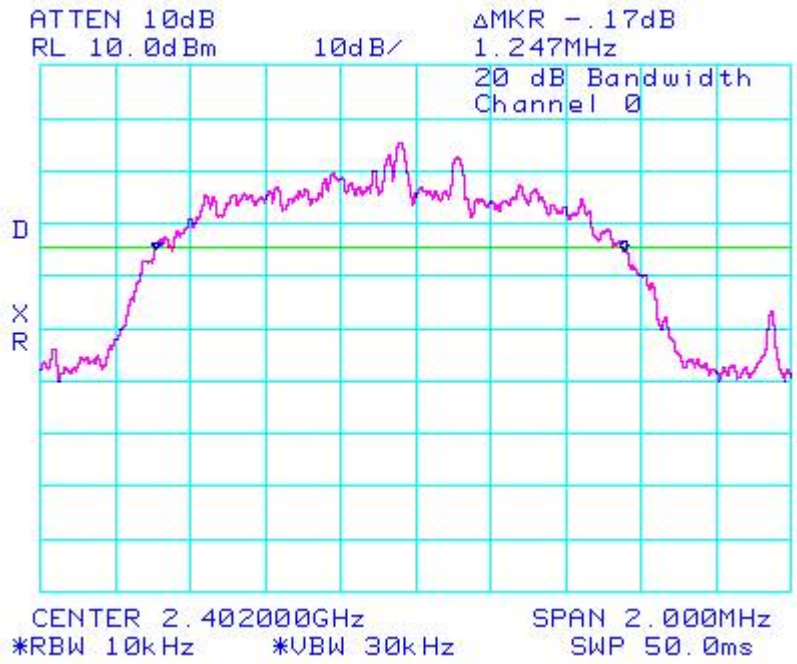


Figure 5: 20 dB Bandwidth, channel 39

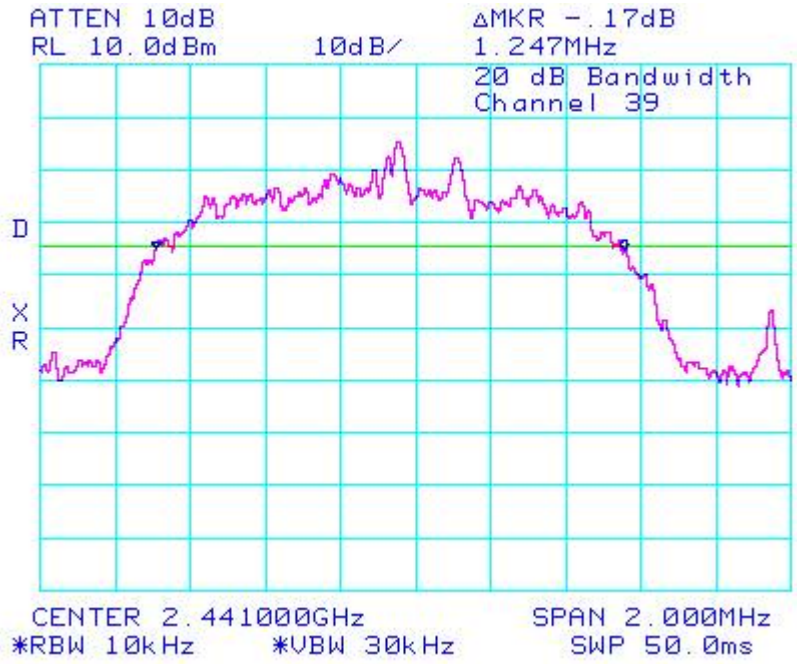
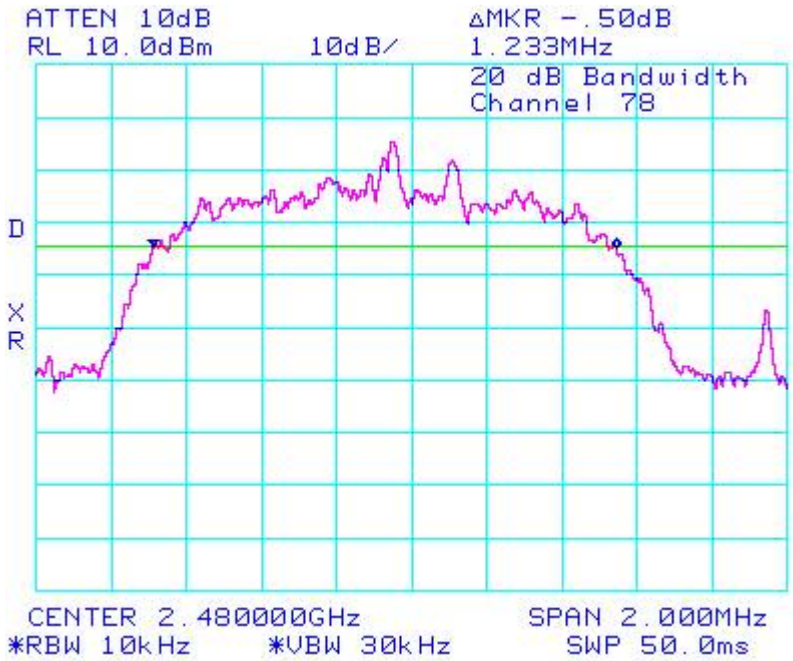


Figure 6: 20 dB Bandwidth, channel 78



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.

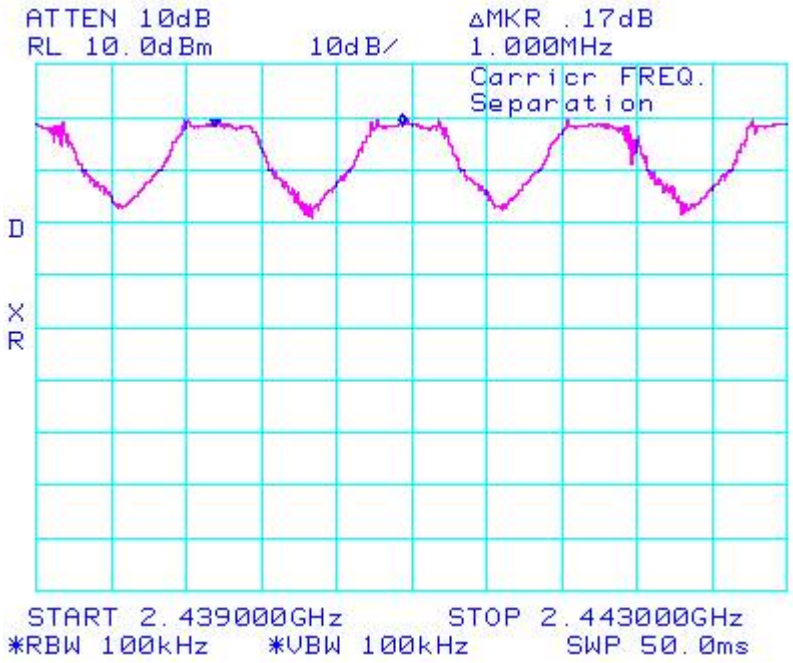
Using pattern type Static PRBS and packet type DH5 during the measurements.

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

The environmental test conditions were: Temperature 23ºC
Pressure 1014 mb
Relative Humidity 41%

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

Figure 7: Carrier Frequency Separation, channel 38 to 39



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

The environmental test conditions were: Temperature 23ºC
Pressure 1014 mb
Relative Humidity 41%

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

Figure 8: Carrier Frequency Separation, channel 38 to 39

Bluetooth RF Conducted Emission Test Results cont'd

Number of Hopping Frequencies

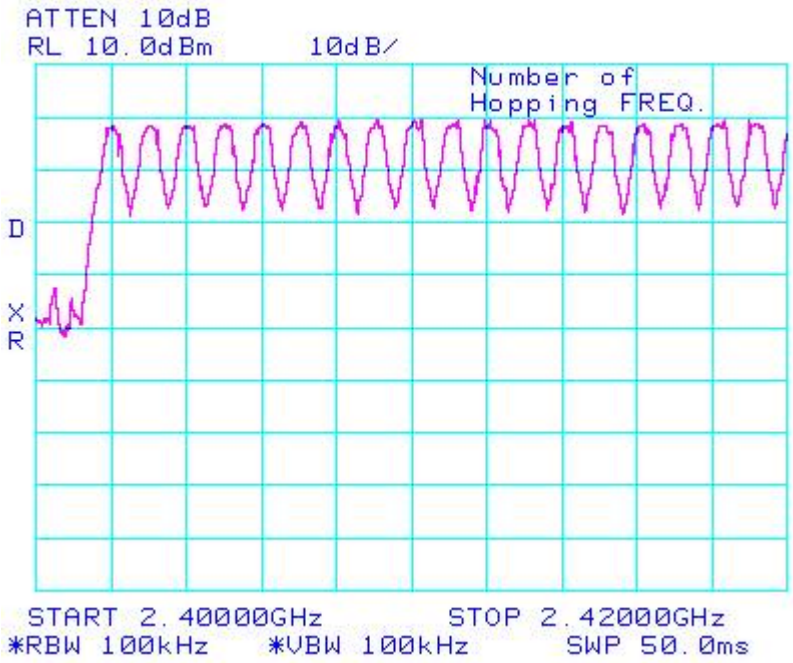
The EUT met the requirements of the number of hopping frequencies as per 47 CFR 15.247(a) and RSS-210.
Bluetooth was operating in frequency hopping (Euro/US) mode.

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

Limit (CH)	Number of Hopping Frequencies (CH)
>= 75	79

The environmental test conditions were: Temperature 23ºC
Pressure 1014 mb
Relative Humidity 36%
See figures 9 to 12 for the plots of the number of hopping frequencies.

Figure 9: Number of Hopping Frequencies



Bluetooth RF Conducted Emission Test Results cont'd

Figure 10: Number of Hopping Frequencies

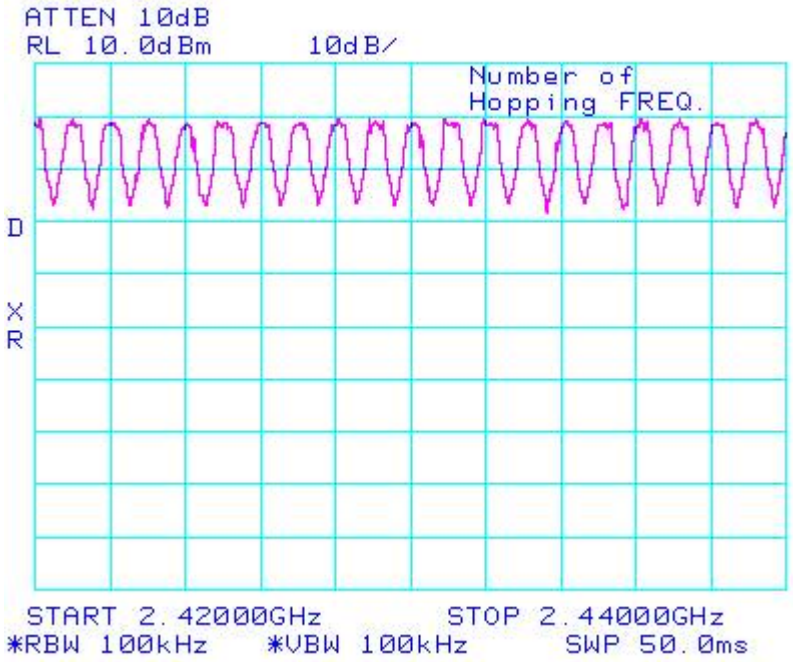
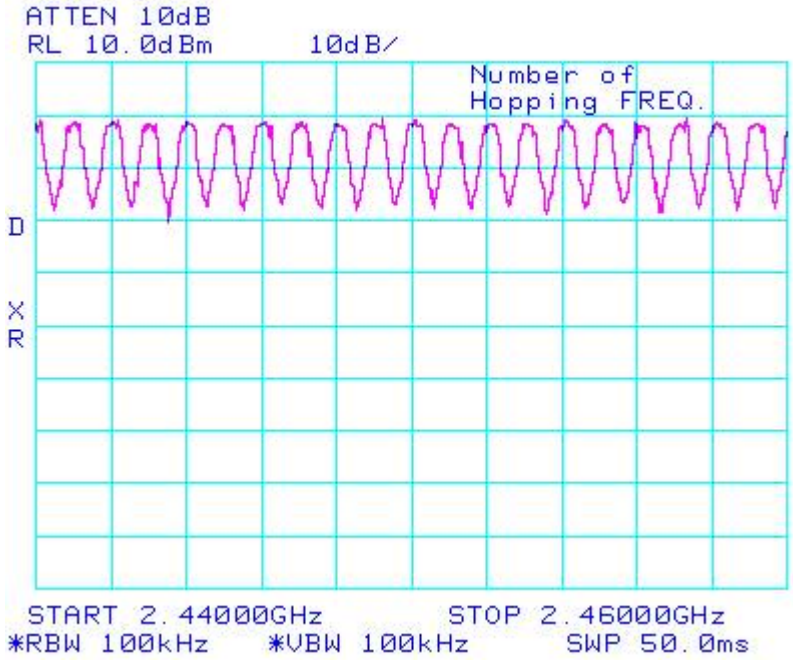
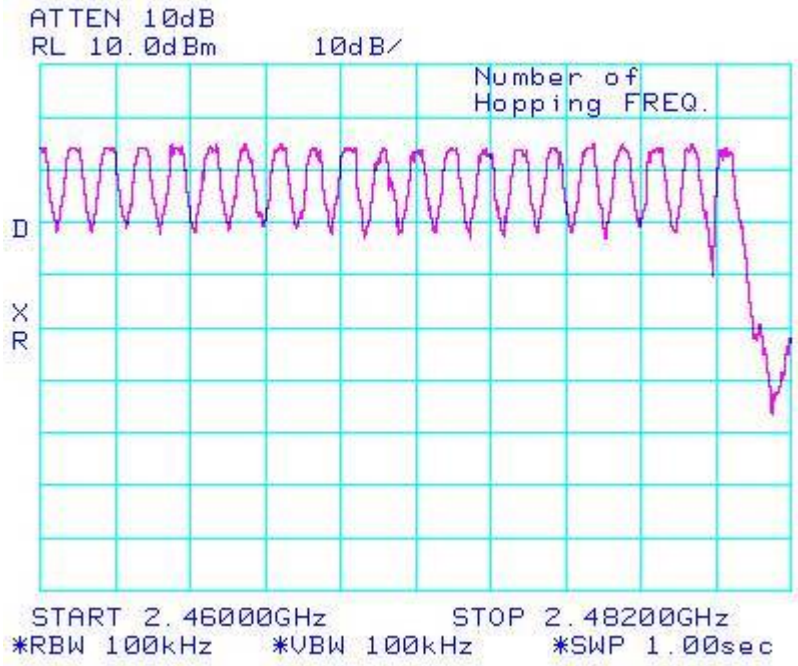


Figure 11: Number of Hopping Frequencies



Bluetooth RF Conducted Emission Test Results cont'd

Figure 12: **Number of Hopping Frequencies**



Bluetooth RF Conducted Emission Test Results cont'd

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.

Bluetooth Channel	Mode	Tx Time (ms)	Dwell Time/31.6 sec. (msec.)	Limit (msec.)	Margin (msec.)
0	DH1	0.529	. 529 x 320.0 = 169.28	400	230.72
39	DH1	0.537	. 537 x 320.0 = 171.84	400	228.16
78	DH1	0.520	. 520 x 320.0 = 166.40	400	233.60
0	DH3	1.768	1.768 x 159.9 = 282.70	400	117.30
39	DH3	1.785	1.785 x 159.9 = 285.42	400	114.58
78	DH3	1.785	1.785 x 159.9 = 285.42	400	114.58
0	DH5	3.007	3.007 x 106.8 = 321.15	400	78.85
39	DH5	3.007	3.007 x 106.8 = 321.15	400	78.85
78	DH5	3.007	3.007 x 106.8 = 321.15	400	78.85

The environmental test conditions were: Temperature 23ºC
Pressure 1014 mb
Relative Humidity 41%

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

Bluetooth RF Conducted Emission Test Results cont'd

Figure 13: Dwell Time, Low Channel, Packet Type DH1

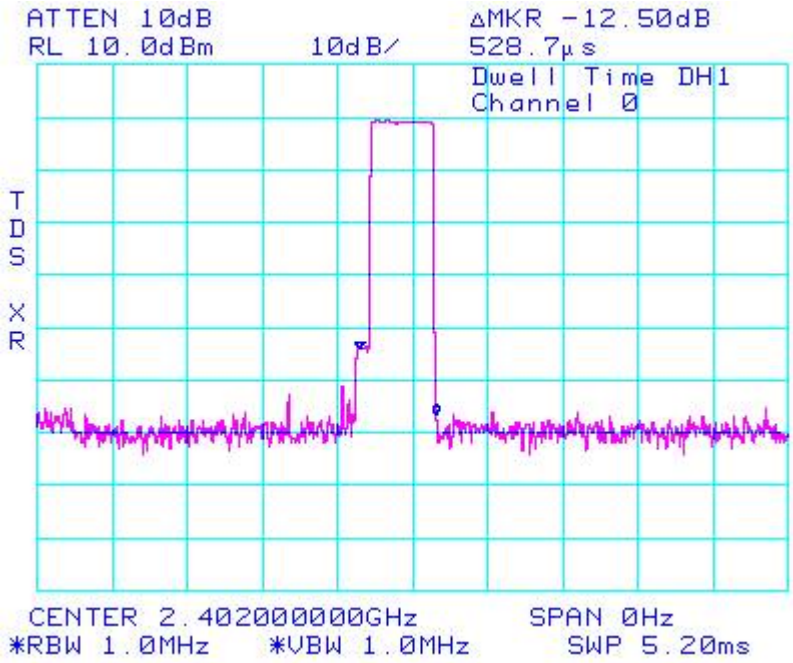
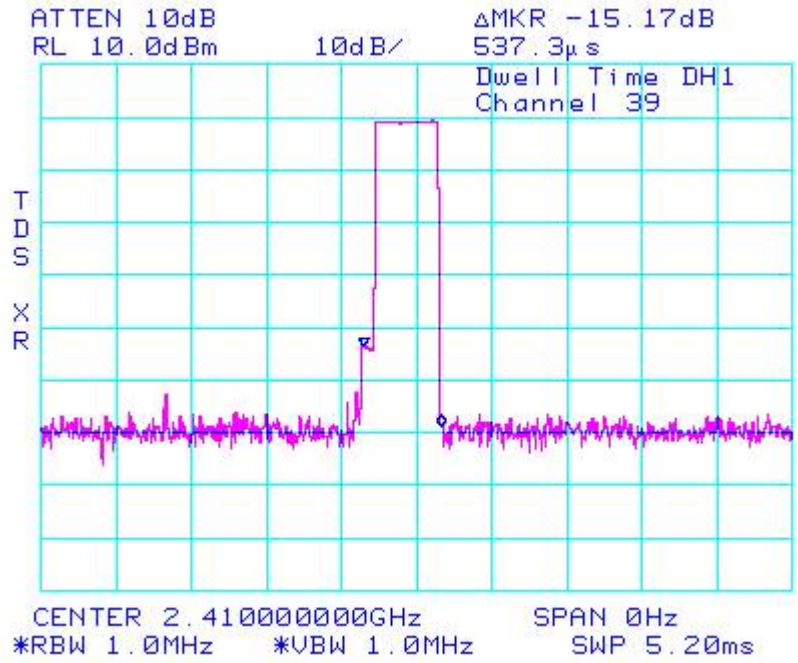


Figure 14: Dwell Time, Middle Channel, Packet Type DH1



Bluetooth RF Conducted Emission Test Results cont'd

Figure 15: Dwell Time, High Channel, Packet Type DH1

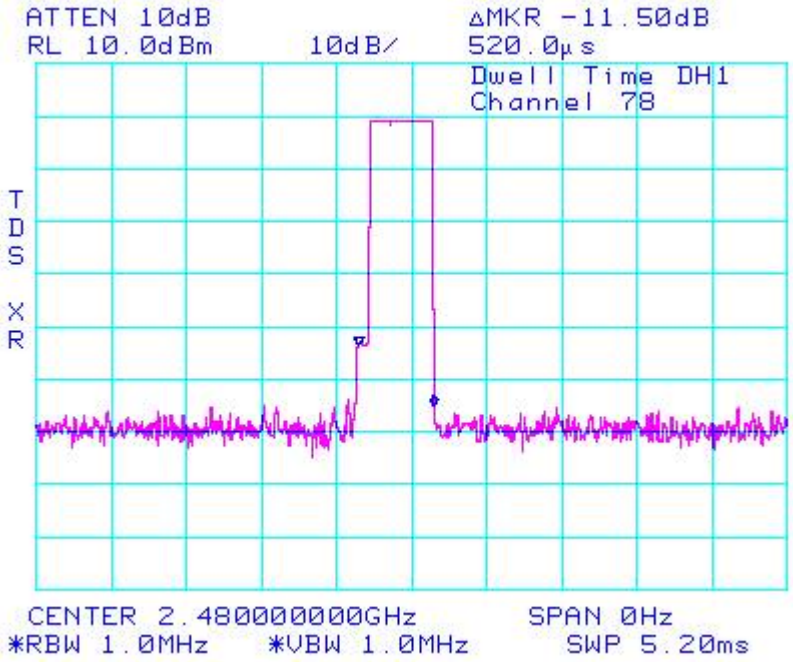
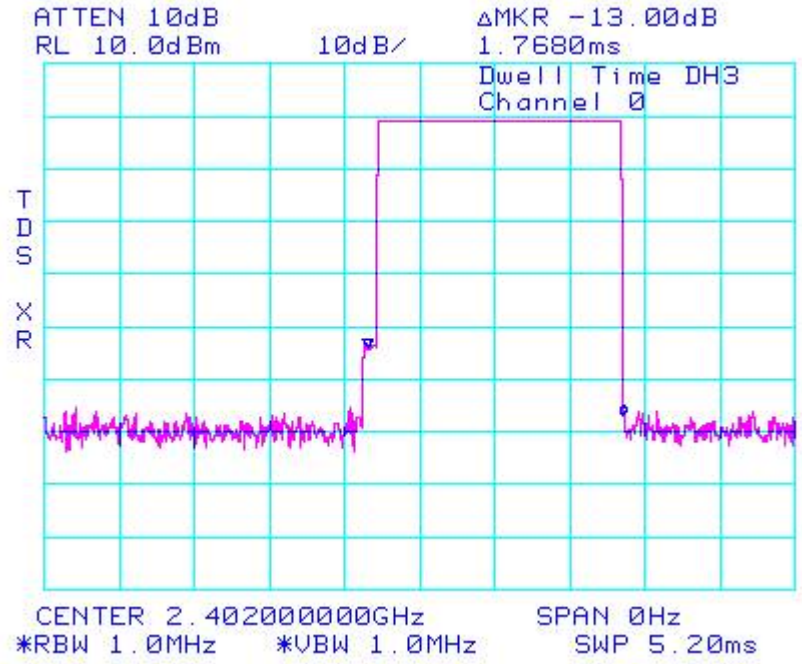


Figure 16: Dwell Time, Low Channel, Packet Type DH3



Bluetooth RF Conducted Emission Test Results cont'd

Figure 17: Dwell Time, Middle Channel, Packet Type DH3

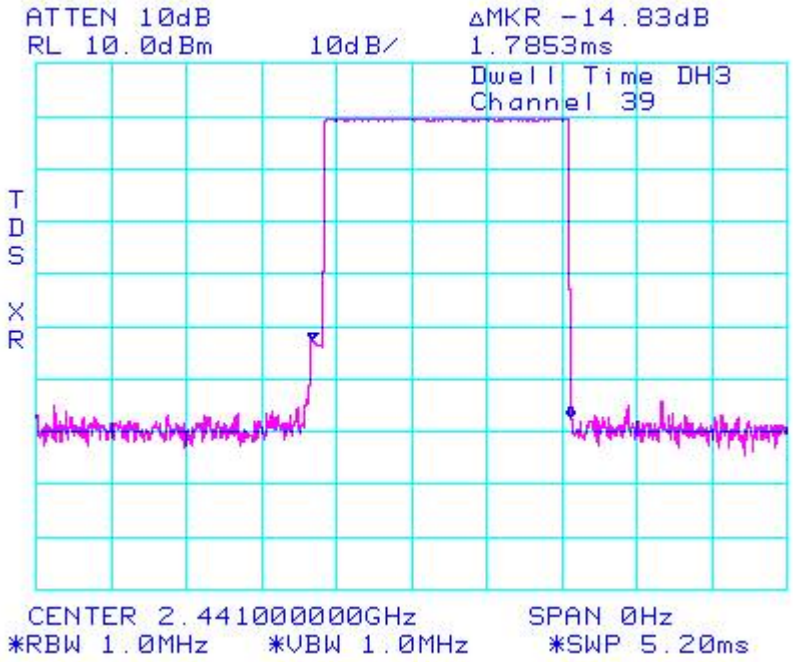
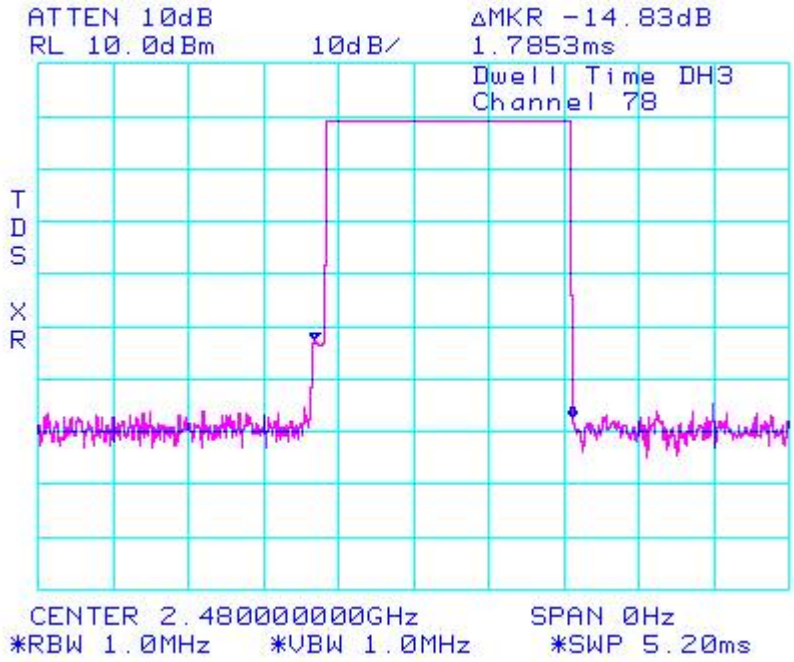


Figure 18: Dwell Time, High Channel, Packet Type DH3



Bluetooth RF Conducted Emission Test Results cont'd

Figure 19: Dwell Time, Low Channel, Packet Type DH5

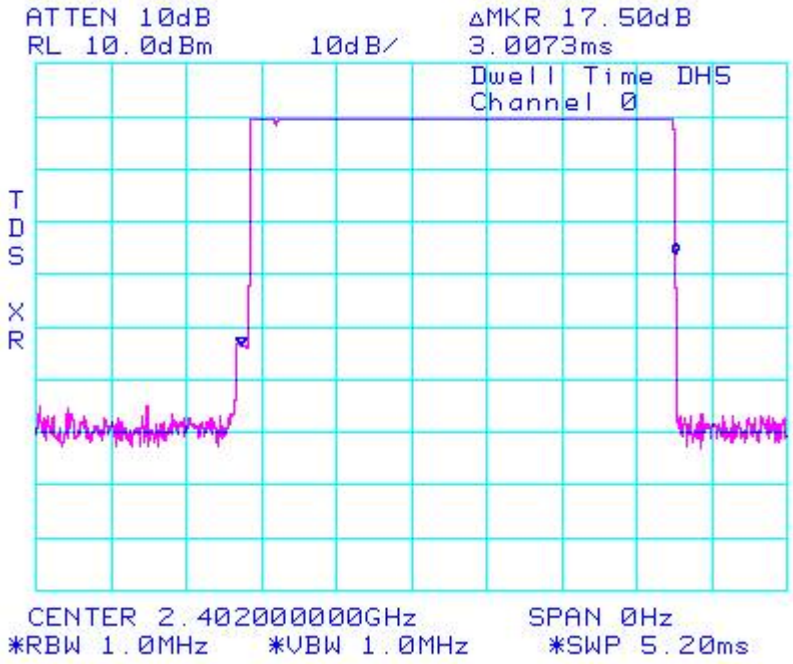
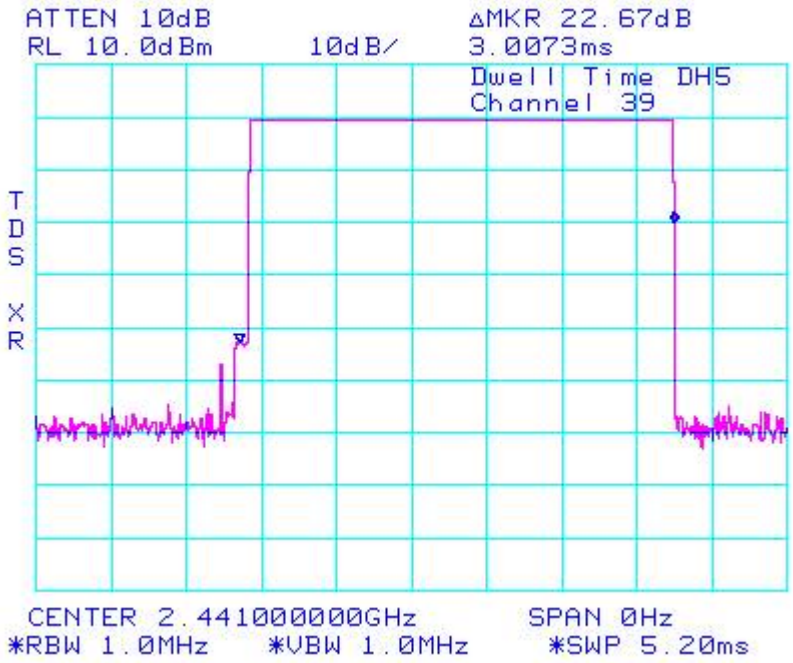
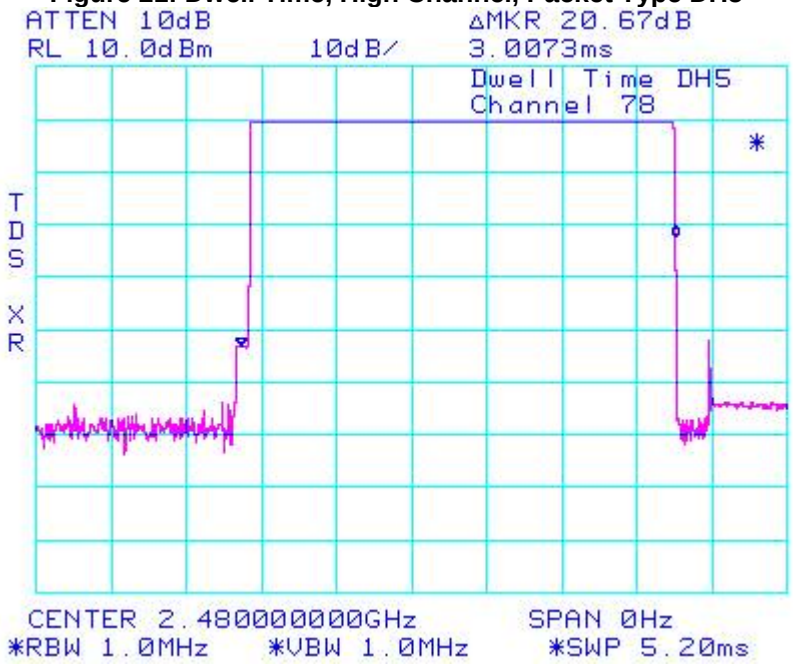


Figure 20: Dwell Time, Middle Channel, Packet Type DH5



Bluetooth RF Conducted Emission Test Results cont'd

Figure 21: Dwell Time, High Channel, Packet Type DH5



Bluetooth RF Conducted Emission Test Results cont'd

Maximum Peak Conducted Output Power

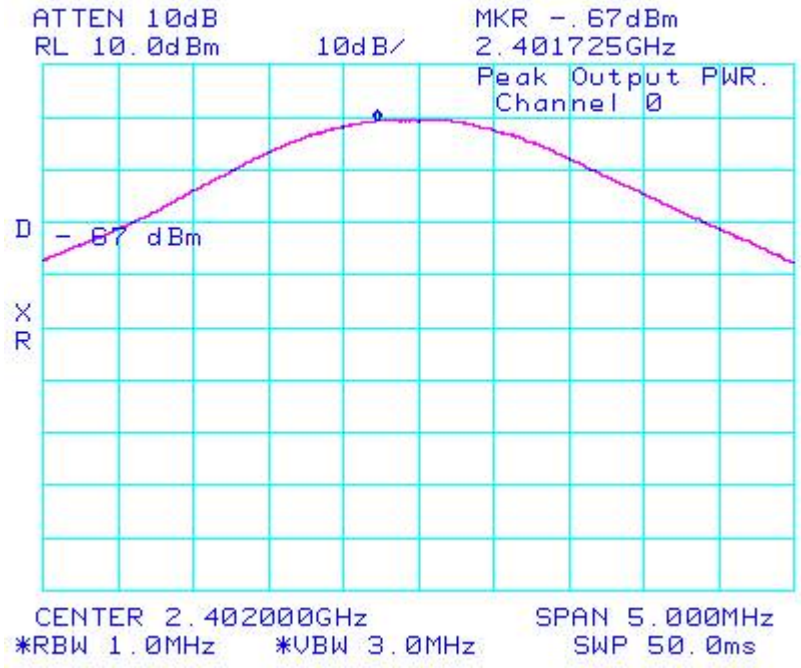
The EUT met the requirements of the maximum peak conducted output power of class 2 as per 47 CFR 15.247(b) and RSS-210. Low channel (0), middle channel (39) and high channel (78) were measured. Bluetooth was operating in single frequency mode during the measurements. A reference offset of 12.4 dB was 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)	Class 2 Limit (dBm)
0	-0.67	-6.0 to 4.0
39	-0.50	-6.0 to 4.0
78	-0.67	-6.0 to 4.0

The environmental test conditions were: Temperature 23ºC
Pressure 1014 mb
Relative Humidity 41%

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

Figure 22: Maximum Peak Conducted Output Power



Bluetooth RF Conducted Emission Test Results cont'd

Figure 23: Maximum Peak Conducted Output Power

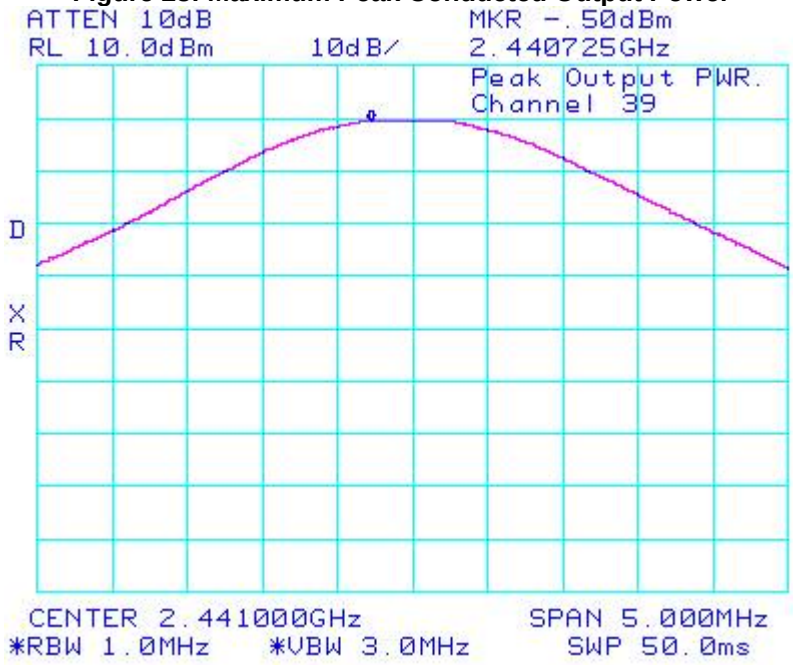
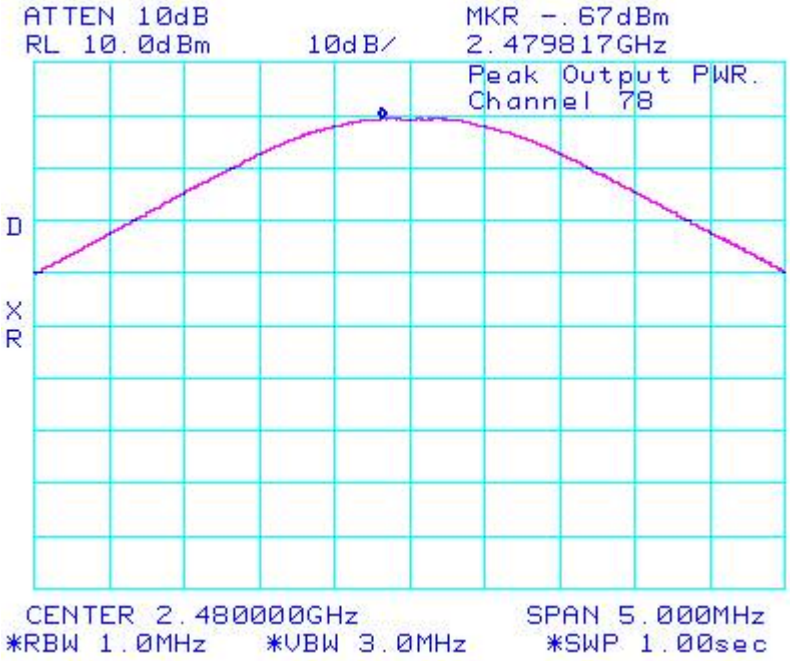


Figure 24: Maximum Peak Conducted Output Power



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

Bluetooth Channel	Measured Level (dBm)	Class 2 Limit (dBm)
0	-0.17	-6.0 to 4.0
39	-0.50	-6.0 to 4.0
78	-1.17	-6.0 to 4.0

The environmental test conditions were: Temperature 23ºC
Pressure 1014 mb
Relative Humidity 41%

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

Figure 25: Maximum Peak Conducted Output Power

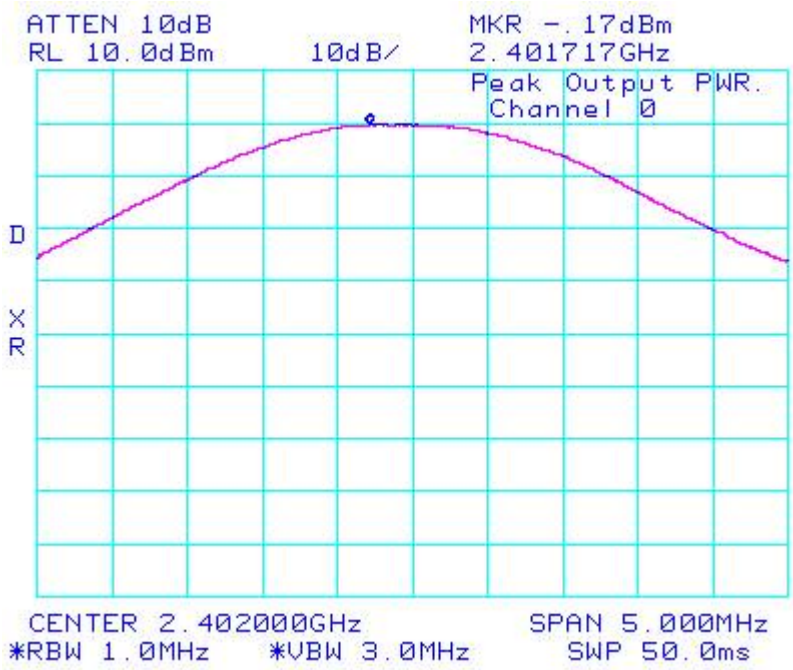


Figure 26: Maximum Peak Conducted Output Power

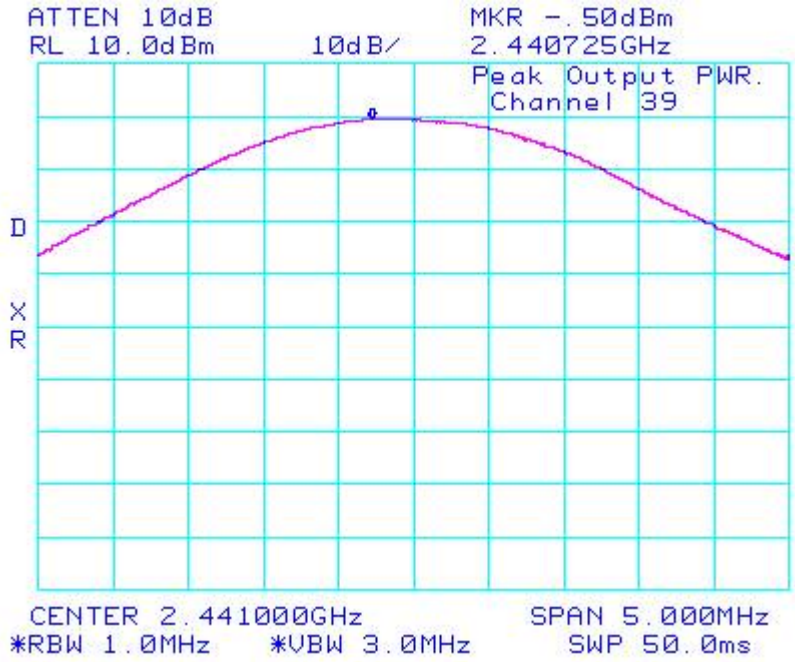
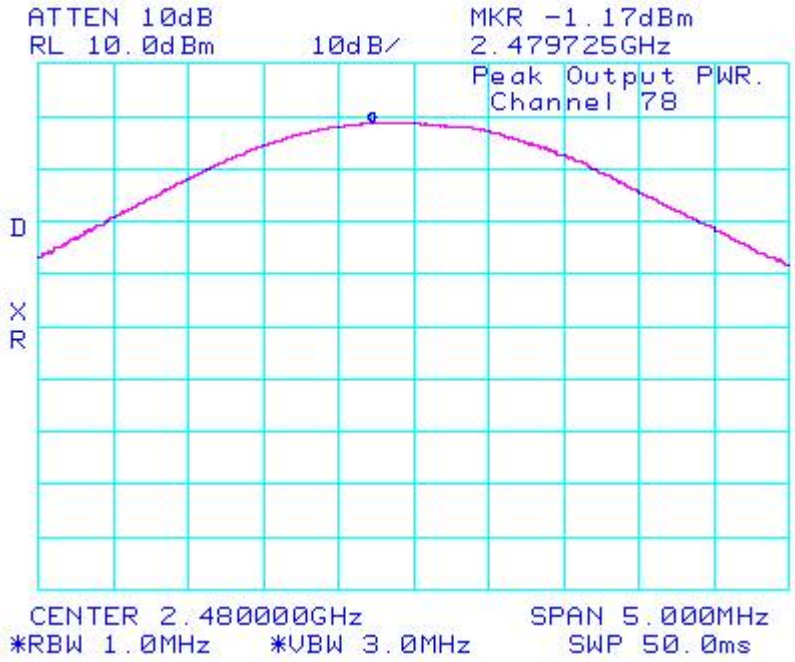


Figure 27: Maximum Peak Conducted Output Power



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.

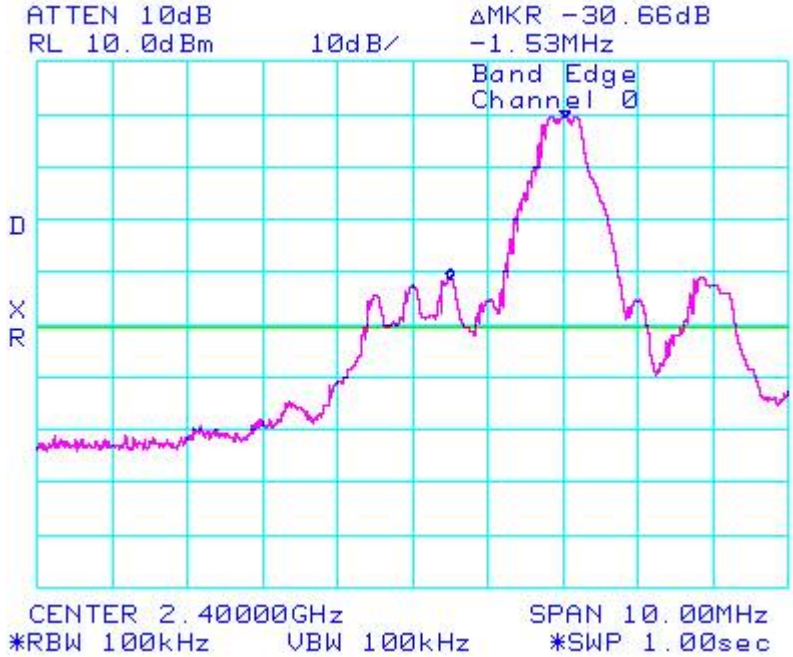
Using pattern type Static PRBS and packet type DH5 during the measurements.

Bluetooth Channel	Operating Mode	Measured Level (dBc)	Limit (dBc)	Margin (dB)
0	Single Frequency	-30.66	-20	-10.66
0 - 78	Hopping	-29.16	-20	- 9.16
78	Single Frequency	-33.30	-20	-13.30
0 - 78	Hopping	-32.50	-20	-12.5

The environmental test conditions were: Temperature 23ºC
Pressure 1014 mb
Relative Humidity 41%

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

Figure 28: Band Edge Compliance, Single Frequency Mode, Channel 0



Bluetooth RF Conducted Emission Test Results cont'd

Figure 29: Band Edge Compliance, Hopping Frequency Mode, Channel 0

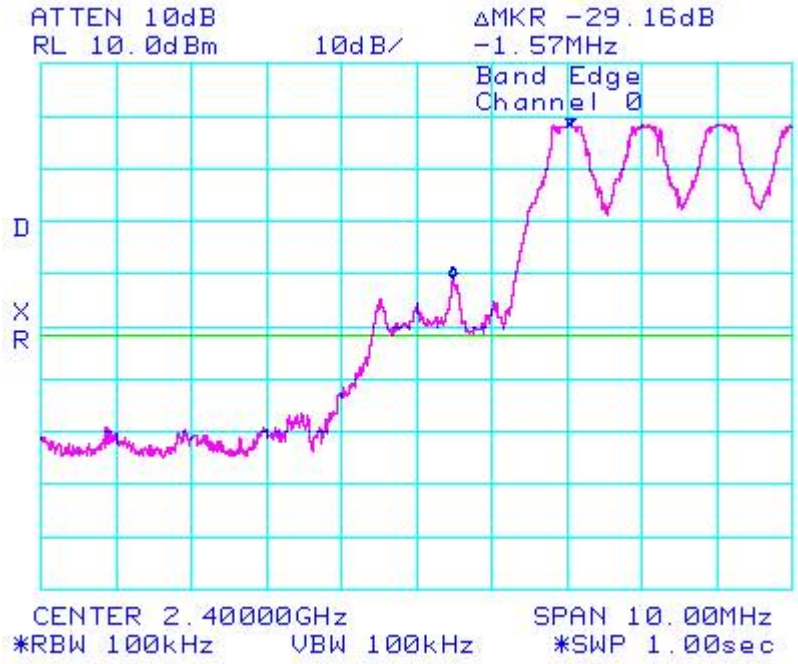
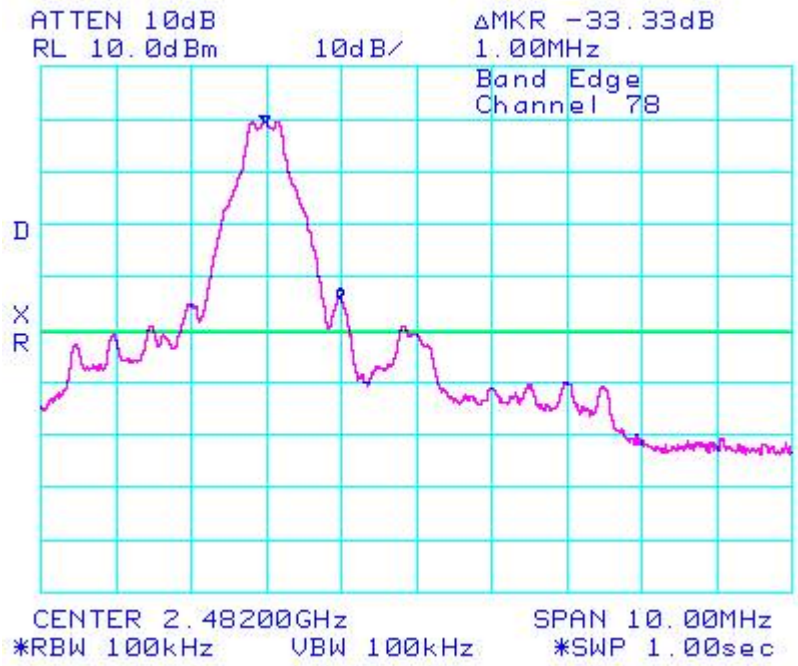
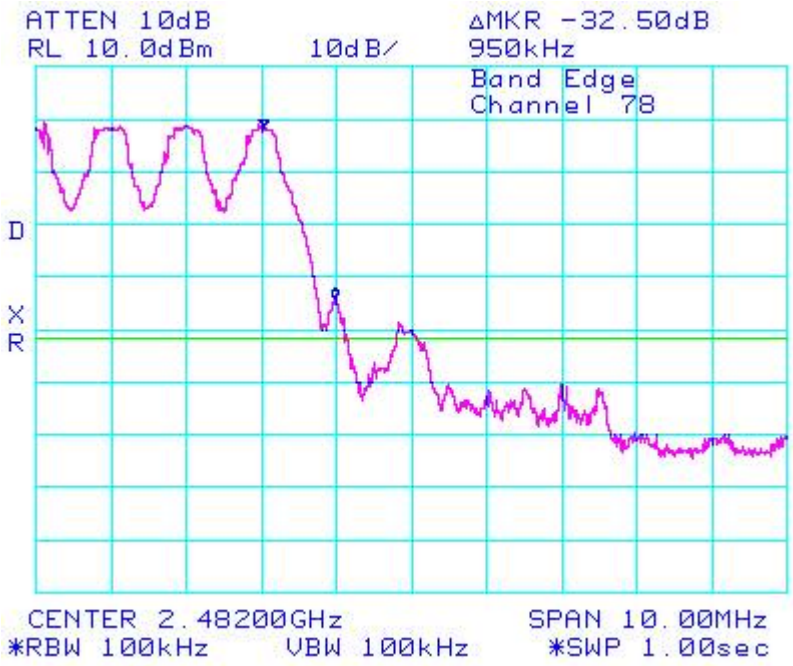


Figure 30: Band Edge Compliance, Single Frequency Mode, Channel 78



Bluetooth RF Conducted Emission Test Results cont'd

Figure 31: Band Edge Compliance, Hopping Frequency Mode, Channel 78



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	-33.00	-20	-13.00
0 - 78	Hopping	-29.84	-20	- 9.84
78	Single Frequency	-32.34	-20	-12.34
0 - 78	Hopping	-28.67	-20	- 8.67

The environmental test conditions were: Temperature 23ºC
Pressure 1014 mb
Relative Humidity 41%

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

Figure 32: Band Edge Compliance, Single Frequency Mode, Channel 0

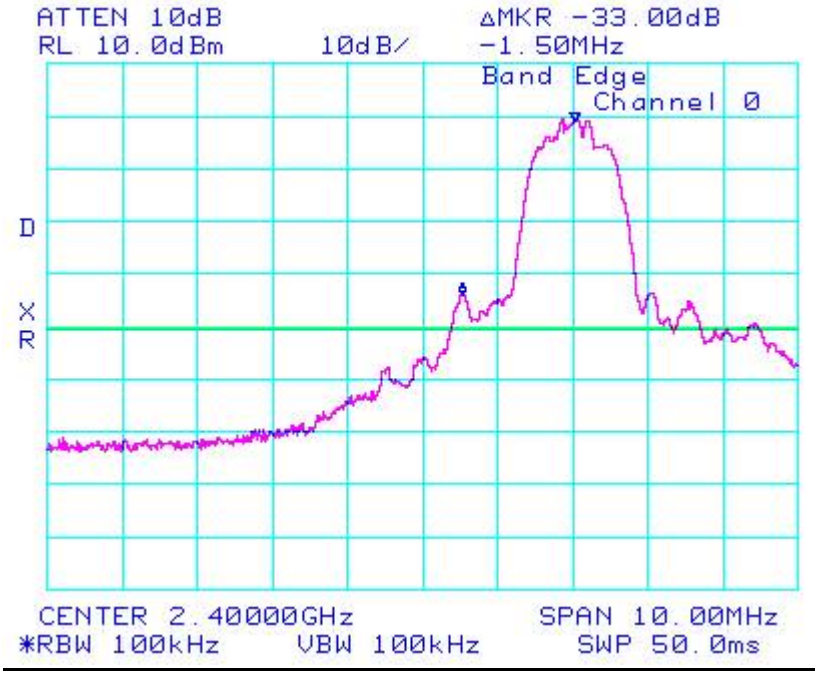


Figure 33: Band Edge Compliance, Hopping Frequency Mode, Channel 0

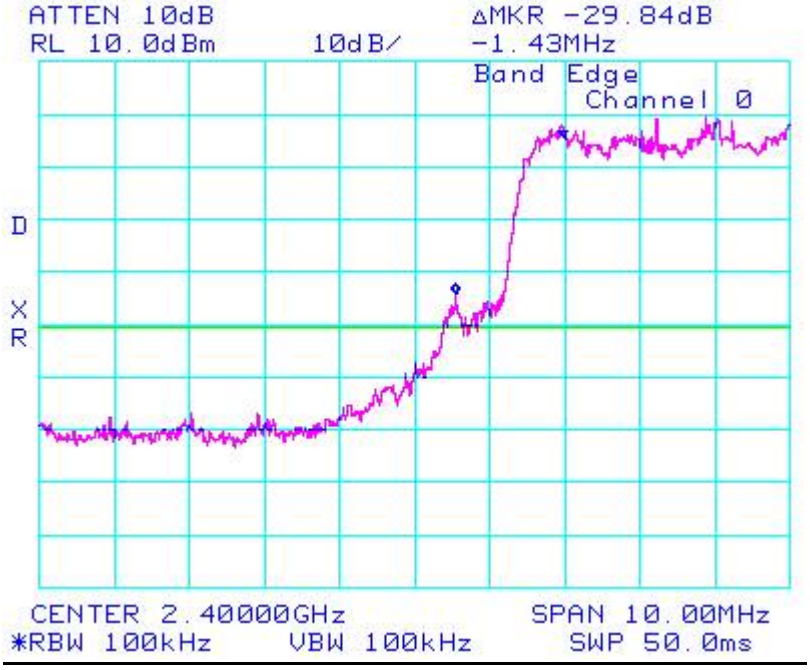


Figure 34: Band Edge Compliance, Single Frequency Mode, Channel 78

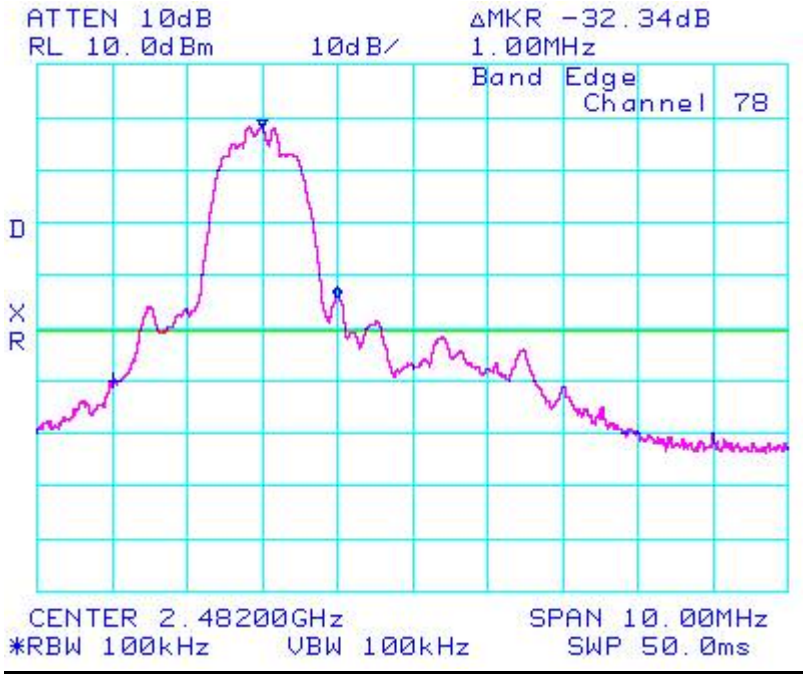
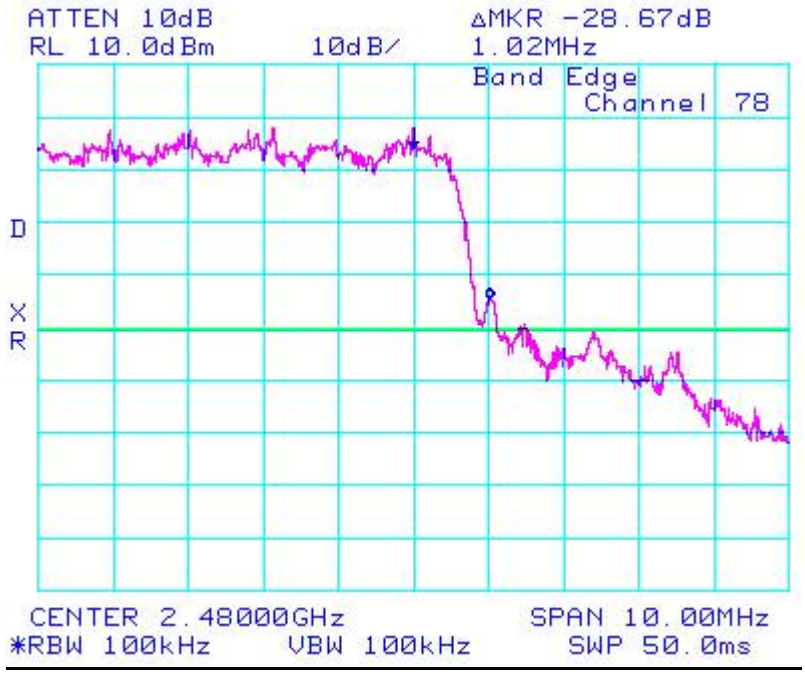


Figure 35: Band Edge Compliance, Hopping Frequency Mode, Channel 78



Spurious RF Conducted Emissions

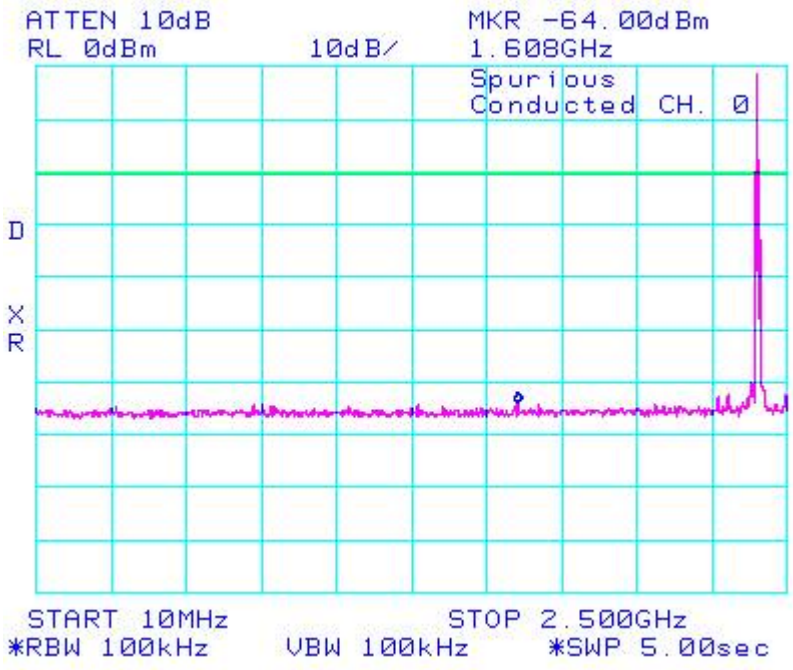
The EUT met the requirements of the spurious RF conducted emissions as per 47 CFR 15.247(c) and RSS-210. Low channel (0) and high channel (78) were measured. Bluetooth was operating in single frequency mode.
Using pattern type Static PRBS and packet type DH5 during the measurements. A reference offset of 12.4 dB was applied to the spectrum analyzer reference level for the attenuators and coaxial cable loss in the test circuit.

Bluetooth Channel	Channel Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from carrier (dBc)	Limit (dBc)
0	-0.67	-48.00	-47.33	-20
39	-0.50	-50.33	-49.83	-20
78	-0.67	-48.67	-48.00	-20
Hopping mode	-0.50	-49.50	-49.00	-20

The environmental test conditions were: Temperature 23ºC
Pressure 1014 mb
Relative Humidity 41%

See figures 36 to 43 for the plots of the Spurious RF Conducted Emissions.

Figure 36: **Spurious RF Conducted Emissions, Channel 0**



Bluetooth RF Conducted Emission Test Results cont'd

Figure 37: Spurious RF Conducted Emissions, Channel 0

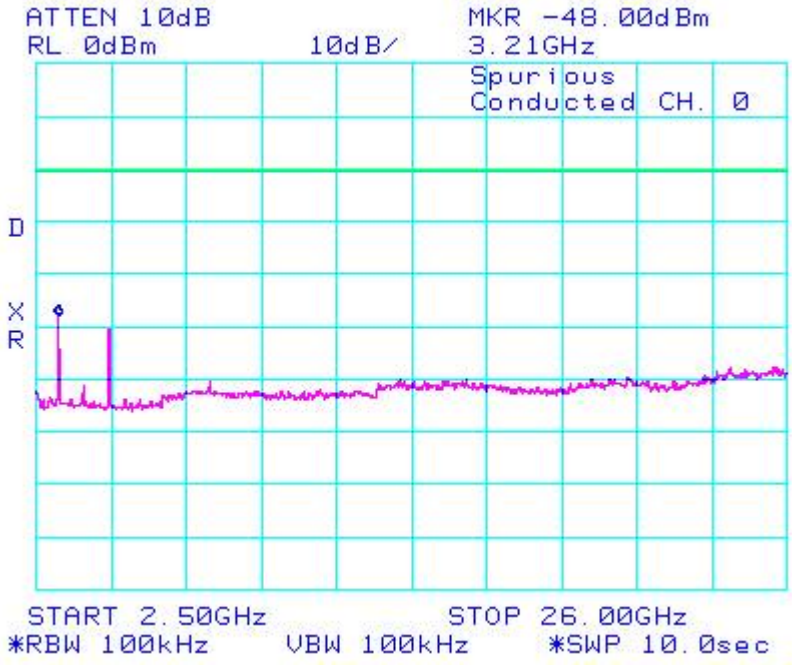
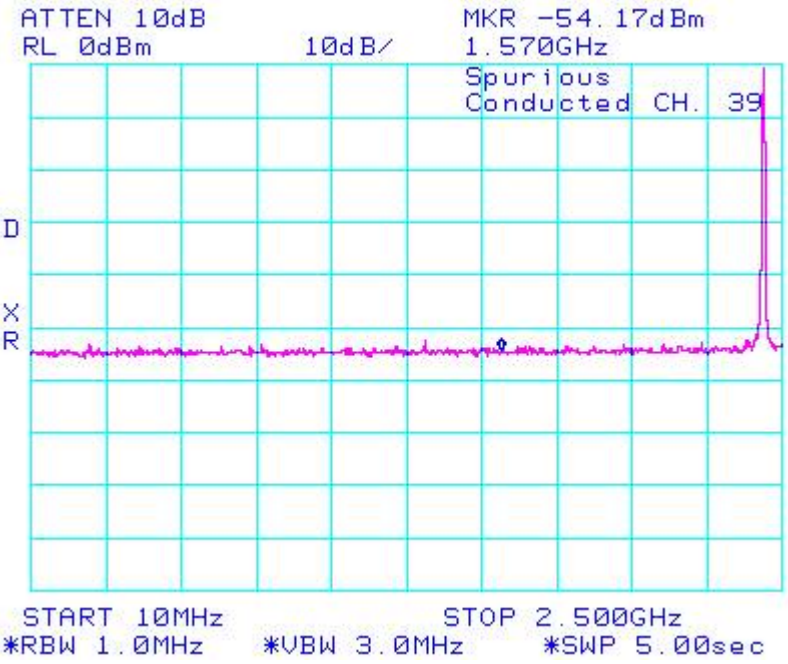


Figure 38: Spurious RF Conducted Emissions, Channel 39



Bluetooth RF Conducted Emission Test Results cont'd

Figure 39: - **Spurious RF Conducted Emissions, Channel 39**

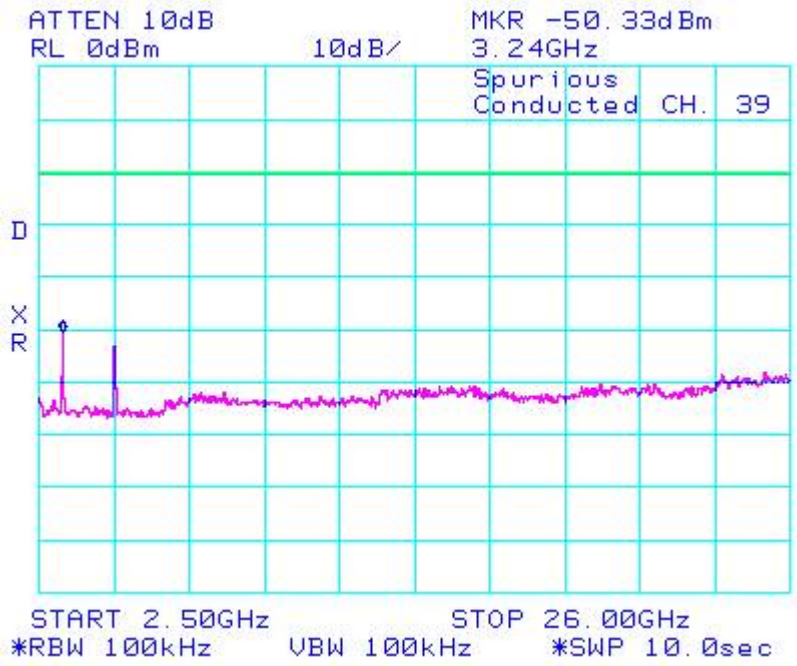
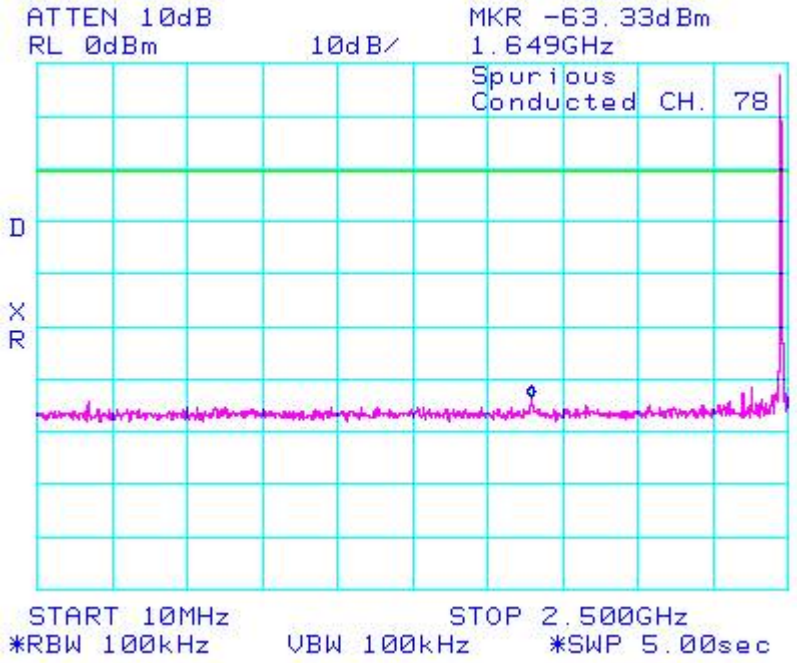


Figure 40: Spurious RF Conducted Emissions, Channel 78



Bluetooth RF Conducted Emission Test Results cont'd

Figure 41: **Spurious RF Conducted Emissions, Channel 78**

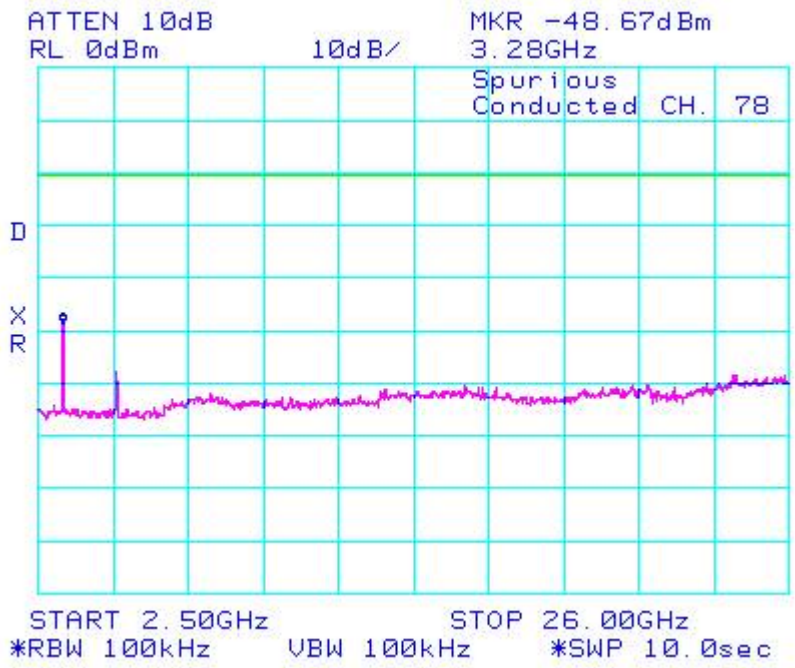
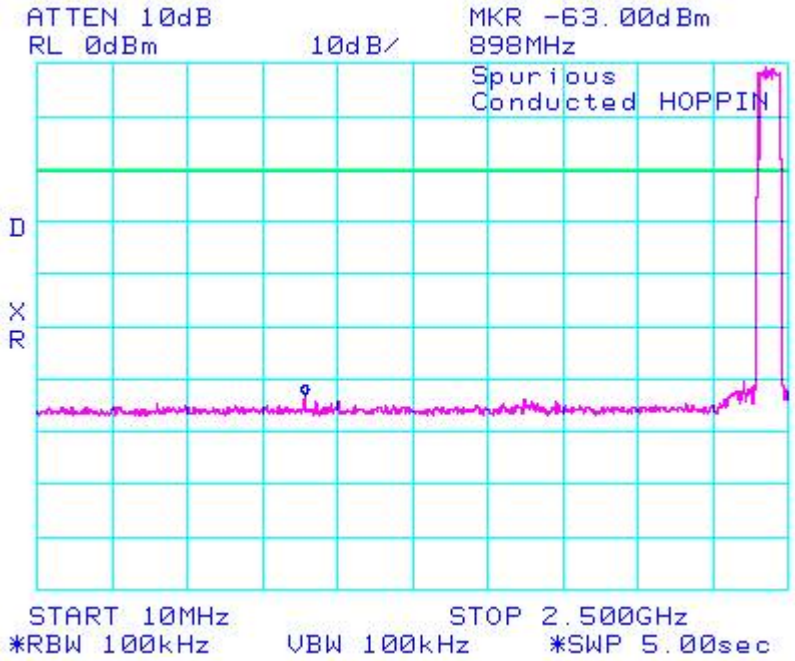
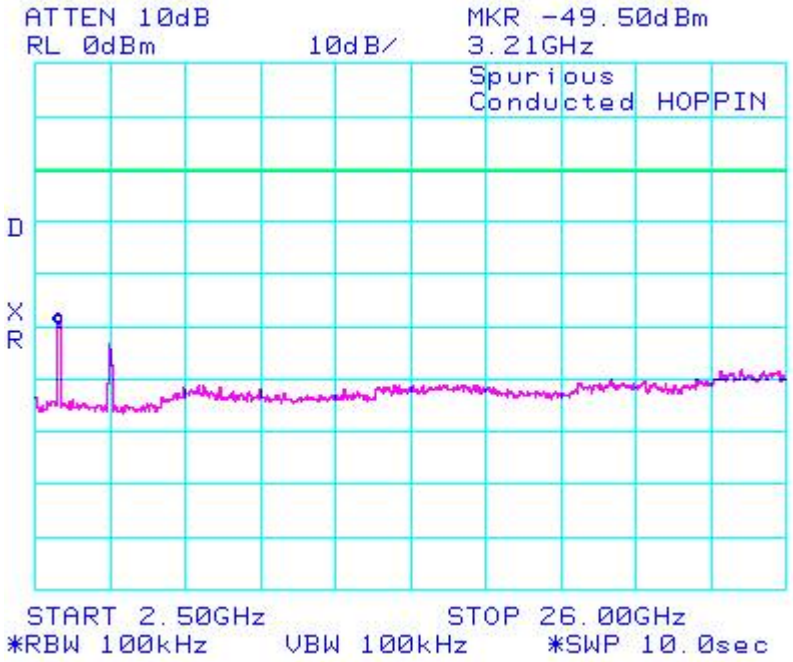


Figure 42: Spurious RF Conducted Emissions, Frequency Hopping Mode



Bluetooth RF Conducted Emission Test Results cont'd

Figure 43: Spurious RF Conducted Emissions, Frequency Hopping Mode



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	-0.17	-53.83	-53.66	-20
39	-0.50	-53.17	-52.67	-20
78	-1.17	-53.17	-52.00	-20
Hopping mode	-0.17	-53.00	-52.83	-20

The environmental test conditions were: Temperature 23ºC
Pressure 1014 mb
elative Humidity 41%

See figures 44 to 51 for the plots of the Spurious RF Conducted Emissions.

Figure 44: **Spurious RF Conducted Emissions, Channel 0**

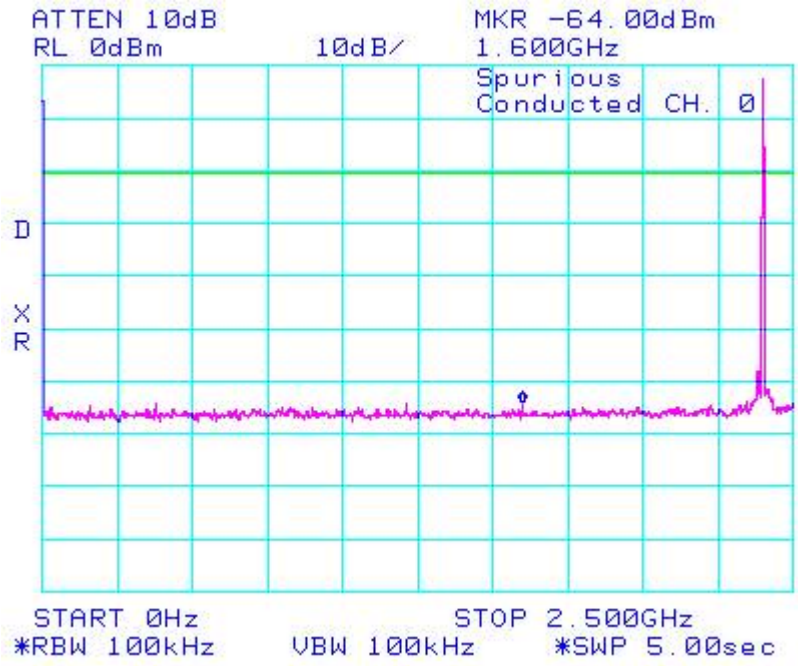


Figure 45: Spurious RF Conducted Emissions, Channel 0

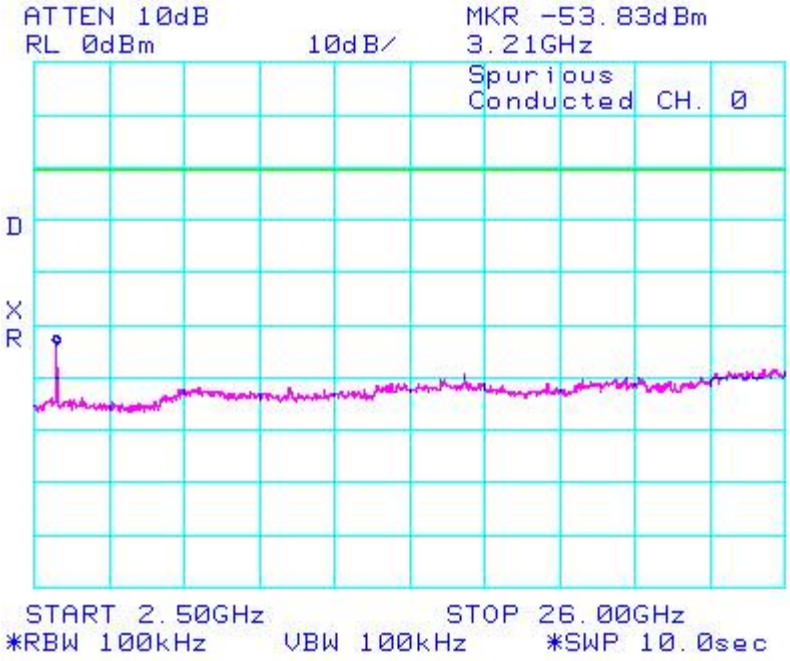


Figure 46: Spurious RF Conducted Emissions, Channel 39

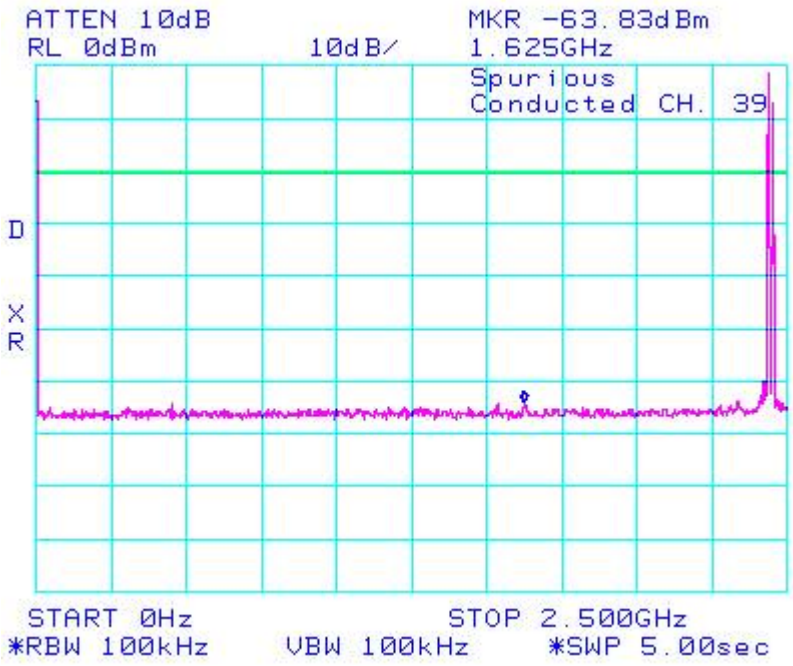


Figure 47: - **Spurious RF Conducted Emissions, Channel 39**

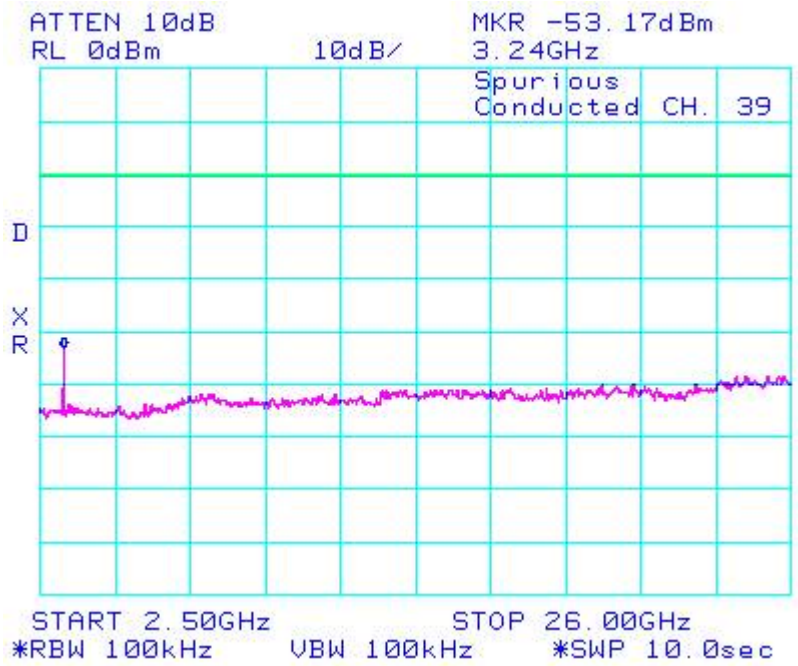


Figure 48: Spurious RF Conducted Emissions, Channel 78

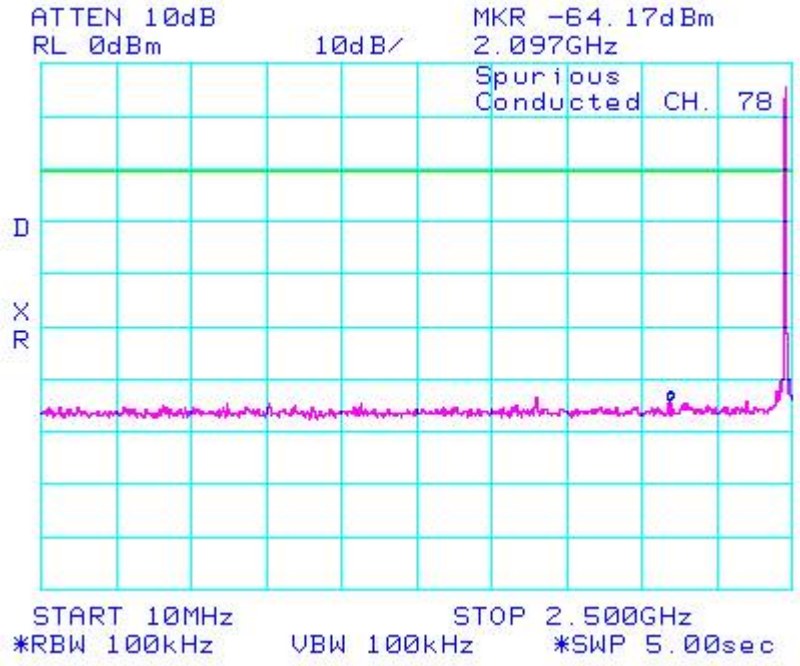


Figure 49: **Spurious RF Conducted Emissions, Channel 78**

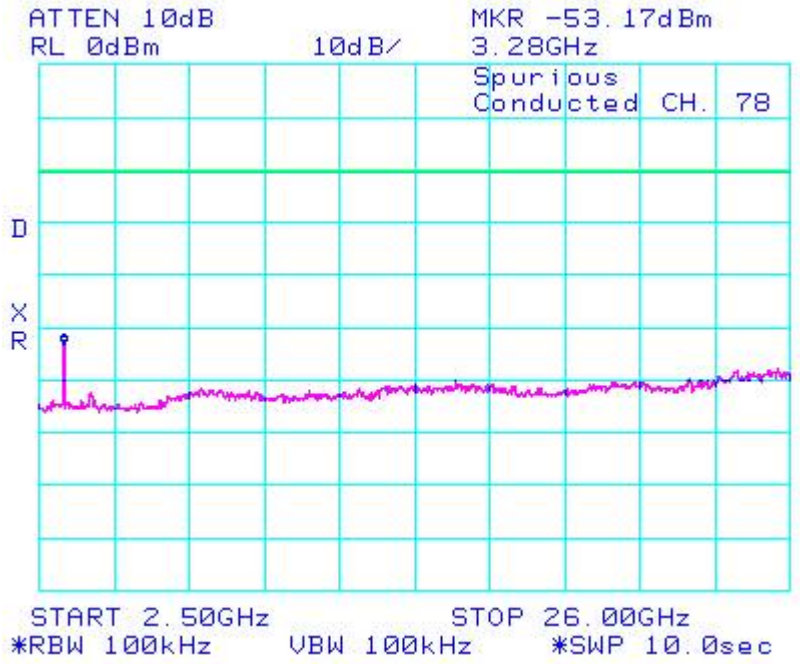


Figure 50: Spurious RF Conducted Emissions, Frequency Hopping Mode

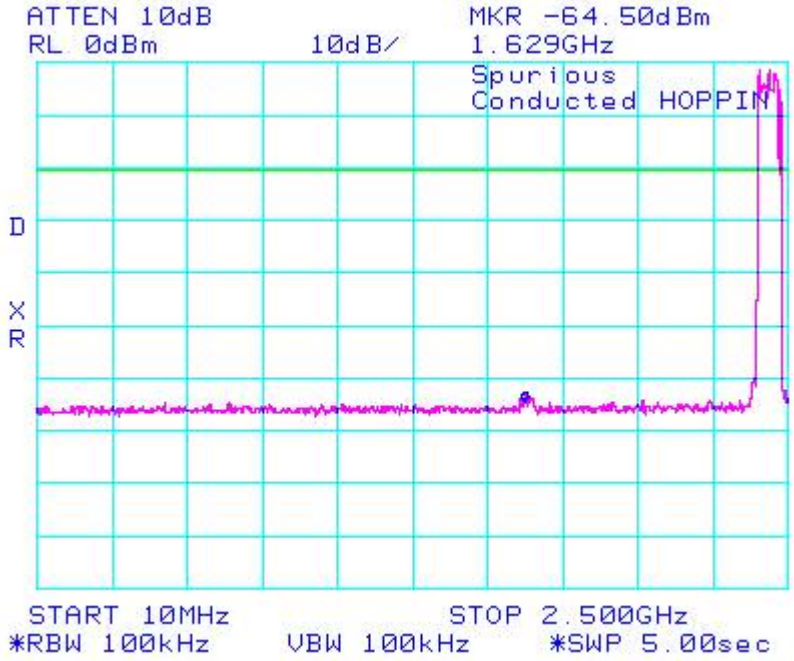


Figure 51: Spurious RF Conducted Emissions, Frequency Hopping Mode