EMC Test Report

Tested in accordance with
Federal Communications Commission (FCC)
Personal Communications Services
CFR 47, Part 15 Subpart C and E
&
Industry Canada (IC) RSS-210, RSS-247, RSS-GEN

REPORT NO.: RTS-6066-1509-01A

PRODUCT MODEL NO.: RHK211LW (STV100-1), RHL211LW (STV100-3)
TYPE NAME: BlackBerry® smartphone
FCC ID: L6ARHK210LW, L6ARHLK210LW
IC: 2503A-RHK210LW, 2503A-RHL210LW

DATE: September 28, 2015

RTS is accredited
according to
EN ISO/IEC 17025 by:

592

Statement of Performance:

The BlackBerry® smartphone, model RHK211LW (STV100-1), part number CER-62541-001 Rev4-x06-01 and its accessories perform within the requirements of the test standards when configured and operated under BlackBerry's operation instructions.

The BlackBerry® smartphone, model RHL211LW (STV100-3), part number CER-62542-001 Rev2-x06-01 and accessories when configured and operated per BlackBerry'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.

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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 47 Part 15, Subpart C Intentional Radiators, October 2014
- FCC CFR 47 Part 15, Subpart E Unlicensed National Information Infrastructure Devices, October 2014
- Industry Canada, RSS-210, Issue 8, December 2010, and Amendment1, February 2015, License-Exempt, Low Power Radio Apparatus operating in the Television Bands
- Industry Canada, RSS-247, issue 1, May 2015, Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Davices
- Industry Canada, RSS-GEN, Issue 04, November 2014, General Requirements for Compliance of Radio Apparatus
- 789033 D02 General UNII Test Procedures v01
- 905462 D06 802.11 Channel Plans v01
- 662911 D01 Multiple Transmitter Output v02r01
- ANSI C63.10–2013, American National Standard Procedures for Compliance Testing of Unlicensed Wireless Devices
- ANSI C63.4-2009, American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electric Equipment in the Range of 9 kHz to 40 GHz

B. Associated Documents

1. RHK211LW-R149-HW_CER-62541-001-Rev2-x06-01
2. RHK211LW-R149-HW_CER-62541-001 - Rev3-x06-02
3. RHK211LW-R149-HW_CER-62541-001 - Rev4-x06-01
4. MultiSourceDeclaration_R149_AAC056_upto_AAC273
5. MultiSourceDeclaration_R149_AAC273_upto_AAC380
6. MultiSourceDeclaration_R149_AAC380_upto_AAC396
7. Test Report RTS-6066-1509-01
8. BlackBerrySystemSimilarity_RHK211LW_RHL211LW

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C. Product Identification

Manufactured by BlackBerry Limited whose headquarters is located at:

2200 University Ave. East
Waterloo, Ontario
Canada, N2K 0A7
Phone: 519 888 7465
Fax: 519 888 6906

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

BlackBerry RTS EMC 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 July 22 – September 8, and September 28, 2015.

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SAMPLE	MODEL	CER NUMBER	IMEI	SOFTWARE
1	RHK211LW (STV100-1)	CER-62541-001 Rev4-x06-01	004402243079534	Software Build: AAC273
2	RHK211LW (STV100-1)	CER-62541-001 Rev3-x06-00	004402243071358	Software Build: AAC056
3	RHK211LW (STV100-1)	CER-62541-001 Rev4-x06-00	004402243079500	Software Build: AAC396
4	RHK211LW (STV100-1)	CER-62541-001 Rev3-x06-00	004402243071390	Software Build: AAC056
5	RHK211LW (STV100-1)	CER-62541-001 Rev4-x06-01	004402243079567	Software Build: AAC273
6	RHK211LW (STV100-1)	CER-62541-001 Rev3-x06-01	004402243071143	Software Build: AAC056
7a	RHK211LW (STV100-1)	CER-62541-001 Rev4-x06-01	004402243079518	Software Build: AAC346
7b	RHK211LW (STV100-1)	CER-62541-001 Rev4-x06-01	004402243079518	Software Build: AAC396
8	RHK211LW (STV100-1)	CER-62541-001 Rev3-x06-01	004402243070640	Software Build: AAC056
9a	RHK211LW (STV100-1)	CER-62541-001 Rev2-x06-01	004402243067414	Software Build: AAC056
9b	RHK211LW (STV100-1)	CER-62541-001 Rev2-x06-01	004402243067414	Software Build: AAC346
9c	RHK211LW (STV100-1)	CER-62541-001 Rev2-x06-01	004402243067414	Software Build: AAC396
10a	RHK211LW (STV100-1)	CER-62541-001 Rev2-x06-01	004402243068065	Software Build: AAC346
10b	RHK211LW (STV100-1)	CER-62541-001 Rev2-x06-01	004402243068065	Software Build: AAC396
11	RHK211LW (STV100-1)	CER-62541-001 Rev2-x06-01	004402243067414	Software Build: AAC396

AC Line Conducted Emissions testing was performed on sample 1.
Conducted Emissions testing was performed on sample 9a, 9b, 9c, 10a, and 10b.
Radiated Emissions testing was performed on sample 2, 3, 4, 5, 6, 7a, 7b, and 8.
Near Field Communications testing was performed on sample 3, and 11.

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The characteristics that may have been affected by the changes from Rev2-x06-01 to Rev4-x06-01 for RHK211LW were verified/re-tested when necessary.
For more details, refer to
RHK211LW- HW_CER-62541-001-Rev2-x06-01,
RHL211LW -HW_CER-62542-001 – Rev3-x06-02,
RHL211LW -HW_CER-62542-001 – Rev4-x06-01,
RHL211LW -HW_CER-62542-001 – Rev5-x08-00, and
RHL211LW -HW_CER-62542-001 – Rev6-x08-00.

To view the differences between software builds AAC056 to AAC396 for RHK211LW, see documents MultiSourceDeclaration_AAC056_upto_AAC273, MultiSourceDeclaration _AAC273_upto_AAC380, and MultiSourceDeclaration _AAC380_upto_AAC396.

The characteristics that may have been affected by the changes from RHK211LW to RHL211LW were verified/re-tested.
For more details, refer to BlackBerrySystemSimilarity_RHK211LW_RHL211LW

BlackBerry® smartphone Accessories Tested

1) Fixed Blade Charger, part number HDW-58920-001 with an output voltage of 5.0 volts dc, 1300mA
2) Headset, part number HDW-49299-001, with a lead length of 1.1 metres
3) Alt.1 Headset, part number HDW-61938-001, with a lead length of 1.1 metres
4) Alt.2 Headset, part number 1060399, with a lead length of 1.1 metres
5) Alt.3 Headset, part number 1014826, with a lead length of 1.1 metres
6) USB Data Cable, part number HDW-50071-001, 0.9 metres long
7) Alt.1 USB Data Cable, part number HDW-51800-001, 0.9 metres long
8) Alt.2 USB Data Cable, part number HDW-50071-002, 1.2 metres long
9) Alt.3 USB Data Cable, part number HDW-51800-002, 1.2 metres long

D. Support Equipment Used for the Testing of the EUT

1) Lenovo Thinkpad laptop, type 4236-D84, S/N PB-HX502 12/02, product ID 4236D84

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E. Test Results Chart

SPECIFICATION		TEST TYPE	Meets Requirements	TEST DATA
FCC CFR 47	IC			APPENDIX
Part 15.207	RSS-247 RSS-GEN	AC Powerline Conducted Emission	Pass	1
Part 15.209 Part 15.247	RSS-247 RSS-GEN	BT/BLE Radiated Spurious Emissions	Pass	2
Part 15.209 Part 15.247	RSS-247 RSS-GEN	BT/BLE Radiated Band Edge Compliance	Pass	2
Part 15.209 Part 15.247	RSS-247 RSS-GEN	802.11b/g/n Radiated Spurious Emissions	Pass	2
Part 15.209 Part 15.247	RSS-247 RSS-GEN	802.11b/g/n Radiated Band Edge Compliance	Pass	2
Part 15.209 Part 15.407	RSS-247 RSS-GEN	802.11a/n Radiated Spurious Emissions	Pass	3
Part 15.209 Part 15.407	RSS-247 RSS-GEN	802.11a/n Radiated Band Edge Compliance	Pass	3
Part 15.209 Part 15.407	RSS-247 RSS-GEN	802.11ac Radiated Spurious Emissions	Pass	4
Part 15.209 Part 15.407	RSS-247 RSS-GEN	802.11ac Radiated Band Edge Compliance	Pass	4
Part 15.247(a)	RSS-247	BT, 20 dB Bandwidth	Pass	5
Part 15.247(a)	RSS-247	BT, Carrier Frequency Separation	Pass	5
Part 15.247(a)	RSS-247	BT, Number of Hopping Frequencies	Pass	5
Part 15.247(a)	RSS-247	BT, Time of Occupancy (Dwell Time)	Pass	5
Part 15.247(b)	RSS-247	BT, Maximum Peak Conducted Output Power	Pass	5
Part 15.247(c)	RSS-247	BT, Band-Edge Compliance of RF Conducted Emissions	Pass	5
Part 15.247(c)	RSS-247	BT, Spurious RF Conducted Emissions	Pass	5
Part 15.247(a)	RSS-247	BLE, 6 dB Bandwidth	Pass	5
Part 15.247(b)	RSS-247	BLE, Maximum Conducted Output Power	Pass	5
Part 15.247(c)	RSS-247	BLE, Band-Edge	Pass	5
Part 15.247(d)	RSS-247	BLE, Peak Power Spectral Density	Pass	5
Part 15.247(c)	RSS-247	BLE, Spurious RF Conducted Emissions	Pass	5

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Test Results Chart cont'd

SPECIFICATION		TEST TYPE	Meets Requirements	TEST DATA
FCC CFR 47	IC			APPENDIX
Part 15.247(a)	RSS-247	802.11b/g/n, 6 dB Bandwidth	Pass	6
Part 15.247(b)	RSS-247	802.11b/g/n, Maximum Conducted Output Power	Pass	6
Part 15.247(c)	RSS-247	802.11b/g/n, Band-Edge	Pass	6
Part 15.247(d)	RSS-247	802.11b/g/n, Peak Power Spectral Density	Pass	6
Part 15.247(c)	RSS-247	802.11b/g/n, Spurious RF Conducted Emissions	Pass	6
Part 15.407	RSS-247	802.11a/n, 6 dB Bandwidth	Pass	7
Part 15.407	RSS-247	802.11a/n, Maximum Conducted Output Power	Pass	7
Part 15.407	RSS-247	802.11a/n, Band-Edge	Pass	7
Part 15.407	RSS-247	802.11a/n, Peak Power Spectral Density	Pass	7
Part 15.407	RSS-247	802.11a/n, Spurious RF Conducted Emissions	Pass	7
Part 15.407	RSS-247	802.11ac, 6 dB Bandwidth	Pass	8
Part 15.407	RSS-247	802.11ac, Maximum Conducted Output Power	Pass	8
Part 15.407	RSS-247	802.11ac, Band-Edge	Pass	8
Part 15.407	RSS-247	802.11ac, Peak Power Spectral Density	Pass	8
Part 15.407	RSS-247	802.11ac, Spurious RF Conducted Emissions	Pass	8
Part 15.209 Part 15.225(a)	RSS-210 RSS-GEN	Near Field Communications, Radiated Emissions	Pass	9
Part 15.225(e)	RSS-210	Near Field Communications, Occupied Bandwidth	Pass	9
Part 15.225(e)	RSS-210	Near Field Communications, Frequency Stability	Pass	9

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F. Summary of Results

1) AC POWER LINE CONDUCTED EMISSIONS

The AC Powerline conducted emissions were measured using the test procedure outlined in CISPR Recommendation 32 through a 50 Ohm Line Impedance Stabilization Network (LISN), which was inserted in the power line to the equipment to provide the specified impedance for measurements. The EUT was placed on a nonconductive wooden table, 80 cm high that was positioned 40 cm from a vertical ground plane. The RF output of the network was connected to an EMI receiver system with characteristics that duplicate those of the receiver specified in CISPR Publication 16.
BlackBerry® smartphone was in battery charging mode. The input voltage was 120 V, 60 Hz.

The following test configurations were measured on model RHK211LW (STV100-1):

Test Configuration	Operating Mode(s)	Charger + Accessories
1	NFC TX	NA Fixed Blade Charger + Headset + Alt 2 USB Cable 0.9m
2	Bluetooth TX	Fixed Blade Charger + Alt Headset + Alt 3 USB Cable 1.20m
3	802.11b TX	Fixed Blade Charger + Headset + Alt 1 USB Cable 0.9m
4	802.11ac TX	Fixed Blade Charger + Alt Headset + Alt 3 USB Cable 1.20m

The sample EUT's conducted emissions were compared with respect to the FCC CFR 47 Part 15, Subpart C and E as well as IC RSS-210 (for NFC only) and RSS-247 limits. The sample EUT had a worst case test margin of 6.89 dB below the QP limit at 0.159 MHz and a worst case test margin of 16.20 below the AV limit at 0.420 MHz with the NA Fixed Blade Charger in Test Configuration 1.

See APPENDIX 1 for the test data.

Measurement Uncertainty ±3.2 dB

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2) BLUETOOTH, BLUETOOTH LOW ENERGY AND 802.11b/g/n RADIATED EMISSIONS

a) Radiated Spurious Emissions and Harmonics

The EUT was placed on a nonconductive styrofoam table, 1.5 metres 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 CISPR compliant modified semi-anechoic chamber (modified SAC) with floor absorbers above 1 GHz. The SAC's FCC registration number is **778487** and the Industry Canada (IC) file number is **2503B-1**. The modified SAC'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 BlackBerry's specifications.

The following test configurations were measured on model RHK211LW (STV100-1):

The BlackBerry® smartphone was measured in standalone configuration with Bluetooth transmitting in single frequency mode at low channel (0), middle channel (39) and high channel (78) for packet type "DH5", "2-DH5" and "3-DH5". The system's radiated emission levels were compared with respect to the FCC CFR 47 Part 15, Subpart C, 15.247 and RSS-247.

The BlackBerry® smartphone was measured in standalone configuration with Bluetooth Low Energy transmitting in single frequency mode at low channel (0), middle channel (20) and high channel (39). The system's radiated emission levels were compared with respect to the FCC CFR 47 Part 15, Subpart C, 15.247 and RSS-247.

The BlackBerry® smartphone was measured in standalone configuration transmitting on channels 1, 6 & 11 at 1 Mbps for 802.11b mode, at 6 Mbps for 802.11g mode, and at MCS 0 for 802.11n mode. The system's radiated emission levels were compared with respect to the FCC CFR 47 Part 15 Subpart C, 15.247 and RSS-247.

The Bluetooth harmonics were investigated up to the 10th harmonic. All emissions had a test margin of greater than 25 dB.

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The Bluetooth Low Energy harmonics were investigated up to the 10th harmonic. The sample EUT emissions were in the noise floor (NF).

The 802.11b/g/n harmonics were investigated up to the 10th harmonic. All emissions had a test margin of greater than 25 dB.

See APPENDIX 2 for the test data.

b) Band-Edge Compliance of RF Radiated Emissions
The BlackBerry® smartphone met the requirements for band-edge compliance of RF radiated emissions for Bluetooth, Bluetooth Low Energy and 802.11b/g/n as per the requirements of 15.247, 15.209, and RSS-247/RSS-GEN.

See APPENDIX 2 for the test data

Measurement Uncertainty ±4.2 dB

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3) 802.11a/n RADIATED EMISSIONS

a) Radiated Spurious and Harmonic Emissions

The EUT was placed on a nonconductive styrofoam table, 1.5 metres 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 40.0 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 CISPR compliant modified semi-anechoic chamber (modified SAC) with floor absorbers above 1 GHz. The SAC's FCC registration number is **778487** and the Industry Canada (IC) file number is **2503B-1**. The modified SAC'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 BlackBerry's specifications.

The following test configurations were measured on model RHK211LW (STV100-1):

The BlackBerry® smartphone was measured in standalone configuration transmitting on channels 36, 48, 64, 100, 140 and 165 at 6 Mbps for 802.11a mode and at MCS 0 for 802.11n. The system's radiated emission levels were compared with respect to the FCC CFR 47 Part 15 Subpart E, 15.407 and RSS-247/RSS-GEN.

The 802.11a/n harmonics were investigated up to the 10th harmonic. All emissions had a test margin of greater than 25 dB.

See APPENDIX 3 for the test data.

b) Band-Edge Compliance of RF Radiated Emissions

The BlackBerry® smartphone met the requirements for band-edge compliance of RF radiated emissions for 802.11a/n as per the requirements of 15.407, 15.209 and RSS-247/ RSS-GEN.

See APPENDIX 3 for the test data

Measurement Uncertainty ±4.2 dB

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4) 802.11ac RADIATED EMISSIONS

a) Radiated Spurious and Harmonic Emissions

The EUT was placed on a nonconductive styrofoam table, 1.5 metres 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 40.0 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 CISPR compliant modified semi-anechoic chamber (modified SAC) with floor absorbers above 1 GHz. The SAC's FCC registration number is **778487** and the Industry Canada (IC) file number is **2503B-1**. The modified SAC'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 BlackBerry's specifications.

The following test configurations were measured on model RHK211LW (STV100-1):

The BlackBerry® smartphone was measured in standalone configuration transmitting on channels 36 and 38 for 802.11ac mode 20MHz bandwidth; on channels 38 and 151 for 802.11ac mode 40MHz bandwidth and on channel 138 for 802.11ac mode 80MHz bandwidth. The system's radiated emission levels were compared with respect to the FCC CFR 47 Part 15 Subpart E, 15.407 and RSS-247/RSS-GEN.

The 802.11ac harmonics were investigated up to the 10th harmonic. All emissions had a test margin of greater than 25 dB.

See APPENDIX 4 for the test data.

b) Band-Edge Compliance of RF Radiated Emissions

The BlackBerry® smartphone met the requirements for band-edge compliance of RF radiated emissions for 802.11ac as per the requirements of 15.407, 15.209 and RSS-247/ RSS-GEN.

See APPENDIX 4 for the test data

Measurement Uncertainty ±4.2 dB

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5) i) BLUETOOTH RF CONDUCTED EMISSIONS

The following test configurations were measured on model RHK211LW (STV100-1):

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

a) 20 dB Bandwidth
The BlackBerry® smartphone met the requirements of the 20 dB bandwidth as per 47 CFR 15.247(a) and RSS-247. Low channel (0), middle channel (39) and high channel (78) were measured. The result includes both normal data rate and EDR. The worst case 20 dB Bandwidth was 0.929 MHz for both channel 39 and channel 78 in normal data rate mode and 1.340 MHz for channel 78 in EDR mode.
See APPENDIX 5 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-247. Channel 38 to 39 was measured. The result includes both normal data rate and EDR.
See APPENDIX 5 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-247. The number of hopping channels measured was 79.
See APPENDIX 5 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-247. 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 5 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-247. Low channel (0), middle channel (39) and high channel (78) were measured. The result includes both normal data rate and EDR. The worst case Conducted Output Power level was 8.10 dBm (0.00646 W) for Channel 39 in normal data rate mode and 7.60 dBm (0.00575 W) for channel 39 in EDR mode.
See APPENDIX 5 for the test data.

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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-247. 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 5 for the test data.

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-247. 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 5 for the test data.

ii) BLUETOOTH LOW ENERGY RF CONDUCTED EMISSIONS

The following test configurations were measured on model RHK211LW (STV100-1):

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

a) 6dB Bandwidth
The EUT met the requirements of the 6 dB bandwidth as per 47 CFR 15.247(b) and RSS-247. Low channel (0), middle channel (20) and high channel (39) were measured. The worst case 6 dB Bandwidth was 0.705 MHz for channel 0.
See APPENDIX 5 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-247. Low channel (0), middle channel (20) and high channel (39) were measured. The worst case Conducted Output Power level was 5.81 dBm (0.0038 W) for channel 20.
See APPENDIX 5 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-247. Low channel (0) and high channel (39) were measured.
See APPENDIX 5 for the test data.

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d) Peak Power Spectral Density
The EUT met the requirements of peak power spectral density as per 47 CFR 15.247(b) and RSS-247. Low channel (0), middle channel (20) and high channel (39) were measured.
See APPENDIX 5 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-247. The frequency range measured was 30 MHz to 26 GHz. Low channel (0), middle channel (20) and high channel (39) were measured.
See APPENDIX 5 for the test data.

6) 802.11b/g/n RF CONDUCTED EMISSIONS

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

The following test configurations were measured on model RHK211LW (STV100-1):

a) 6dB Bandwidth
The EUT met the requirements of the 6 dB bandwidth as per 47 CFR 15.247(b) and RSS-247. Low channel (1), middle channel (6) and high channel (11) were measured. The worst case 6 dB Bandwidth was 9.02 MHz for channel 11 on the secondary antenna in 802.11b mode, 16.36 MHz for channel 6 on the secondary antenna in 802.11g mode, and 17.62 MHz for channel 6 on the primary antenna in 802.11n mode.
See APPENDIX 6 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-247. Low channel (1), middle channel (6) and high channel (11) were measured. The worst case Conducted Output Power level was 20.09 dBm (0.1021 W) for channel 6 in 802.11b, 19.64 dBm (0.0920 W) for channel 6 in 802.11g mode, and 19.56 dBm (0.0903 W) for channel 6 in 802.11n mode, all for MIMO Sum in MIMO mode.
See APPENDIX 6 for the test data

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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-247. Low channel (1) and high channel (11) were measured.
See APPENDIX 6 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-247. Low channel (1), middle channel (6) and high channel (11) were measured.
See APPENDIX 6 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-247. The frequency range measured was 30 MHz to 26 GHz. Low channel (1), middle channel (6) and high channel (11) were measured.
See APPENDIX 6 for the test data.

7) 802.11a/n RF CONDUCTED EMISSIONS

The following test configurations were measured on model RHK211LW (STV100-1):

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

a) 6 dB Bandwidth
The EUT met the requirements of the 6 dB bandwidth as per 47 CFR 15.407 and RSS-247. Channels 36, 48, 64, 100, 140 and 165 were measured. The worst case 6 dB Bandwidth was 16.42 MHz for channel 36 in 802.11a mode on SISO secondary antenna. The worst case 6 dB Bandwidth was 17.62 MHz for channels 36, 64, and 165 on SISO secondary antenna and channel 100 on SISO primary antenna for 20 MHz bandwidth; 36.40 MHz for channel 36 in 40 MHz bandwidth for 802.11n mode on both SISO primary and secondary antennas.
See APPENDIX 7 for the test data.

b) Maximum Conducted Output Power
The EUT met the requirements of the maximum conducted output power as per 47 CFR 15.407 and RSS-247. Channels 36, 64, 100, 140 and 165 were measured. The worst case Conducted Output Power level was 18.34 dBm (0.0682 W) for channel 48 in 802.11a MIMO mode. The worst case Conducted Output Power level was 18.49 dBm (0.0706 W) for channel 36 in 20 MHz

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bandwidth MIMO mode and 18.14 dBm (0.0652 W) in 40 MHz bandwidth for channel 165 MIMO mode in 802.11n mode.
See APPENDIX 7 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 15.407 and RSS-247. Channels 36, 64, 100, 140, 149 and 165 were measured.
See APPENDIX 7 for the test data.

d) Peak Power Spectral Density
The EUT met the requirements of peak power spectral density as per 47 CFR 15.407 and RSS-247. Channels 36, 48, 64, 100, 140 and 165 were measured for 802.11a and channels 36, 64, 100 and 140 were measured for 802.11n with 20 MHz and 40 MHz bandwidth.
See APPENDIX 7 for the test data.

e) Spurious RF Conducted Emissions
The EUT met the requirements of the spurious RF conducted emissions as per 47 CFR 15.407 and RSS-247. The frequency range measured was 30 MHz to 40 GHz. Channels 36, 64, 100 and 140 were measured for both 802.11a and 802.11n.
See APPENDIX 7 for the test data.

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8) 802.11ac RF CONDUCTED EMISSIONS

The 802.11ac conducted RF emissions from the BlackBerry® smartphone were measured using the methods outlined in FCC CFR 47 Part 15, Subpart E.

The following test configurations were measured on model RHK211LW (STV100-1):

a) 6 dB Bandwidth
The EUT met the requirements of the 6 dB bandwidth as per 47 CFR 15.407 and RSS-247. Channels 36, 64, 100, 140 and 149 were measured for 20MHz bandwidth, channels 36, 64, 100, 140 and 149 were measured for 40MHz bandwidth, channels 36, 64, 100, 140 and 149 were measured for 80MHz bandwidth. The worst case 6 dB Bandwidth was 17.62 MHz for channels 36 and 64 on both SISO primary and secondary antennas for 802.11ac mode, 20MHz bandwidth; the worst case 6 dB Bandwidth was 36.40 MHz for channels 100, 140, and 149 for both SISO primary and secondary antennas for 802.11ac mode, 40MHz bandwidth; the worst case 6 dB Bandwidth was 76.40 MHz for channels 140 SISO secondary antenna and 149 SISO primary antenna for 802.11ac mode, 80MHz bandwidth.
See APPENDIX 7 for the test data.

b) Maximum Conducted Output Power
The EUT met the requirements of the maximum conducted output power as per 47 CFR 15.407 and RSS-247. Channels 36, 64, 100, 140 and 149 were measured for 20MHz bandwidth, channels 38, 62, 102, 142 and 151 were measured for 40MHz bandwidth, and channels 42, 58, 105, 138 and 151 were measured for 80MHz bandwidth. The worst case Conducted Output Power level was 18.43 dBm (0.0697 W) for channel 149 MIMO sum for 802.11ac mode, 20MHz bandwidth; the worst case Conducted Output Power level was 17.75 dBm (0.0600 W) for channel 140 for MIMO sum for 802.11ac mode, 40MHz bandwidth; the worst case Conducted Output Power level was 16.92 dBm (0.0492 W) for channel 140 for MIMO sum 802.11ac mode, 80MHz bandwidth.
See APPENDIX 7 for the test data.

b) Band-Edge Compliance of RF Conducted Emissions
The EUT met the requirements of band-edge compliance of RF conducted emissions as per 47 CFR 15.407 and RSS-247. Channels 36, 64, 100, 140, 149 and 165 were measured for 20MHz bandwidth, channels 36, 64, 100, 140, and 149 were measured for 40MHz bandwidth, and channels 36, 64, 100, 140, and 149 were measured for 80MHz bandwidth.
See APPENDIX 7 for the test data.

d) Peak Power Spectral Density
The EUT met the requirements of peak power spectral density as per 47 CFR 15.407 and RSS-247. Channels 36, 64, 140 and 149 were measured for 20MHz

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bandwidth, channels 38, 62, 142 and 151 were measured for 40MHz bandwidth, and channels 42, 58, 106, 138 and 155 were measured for 80MHz bandwidth.
See APPENDIX 7 for the test data.

e) Spurious RF Conducted Emissions
The EUT met the requirements of the spurious RF conducted emissions as per 47 CFR 15.407 and RSS-247. The frequency range measured was 30 MHz to 40 GHz. Channels 36, 64, 140 and 149 were measured for 20MHz bandwidth, channels 38, 62, 142 and 151 were measured for 40MHz bandwidth, and channels 42, 58, 106, 138 and 155 were measured for 80MHz bandwidth.
See APPENDIX 7 for the test data.

9) Near Field Communications (NFC)

The following test configurations were measured on model RHK211LW (STV100-1):

The Near Field Communications emissions from the BlackBerry® smartphone were measured using the methods outlined in FCC CFR 47 Part 15, Subpart C.

a) Radiated Emissions
The BlackBerry® smartphone was measured in standalone configuration transmitting at 13.57 MHz. The system's radiated emission levels were compared with respect to the FCC CFR 47 Part 15 Subpart C, 15.209, 15.225(a) and RSS-210/RSS-GEN.
See APPENDIX 9 for the test data.

b) Occupied Bandwidth
The EUT met the requirements of the Occupied bandwidth as per 47 CFR 15 C and RSS-210. The EUT was measured in test mode with modulation on and transmitting at 13.56 MHz.
See APPENDIX 9 for the test data.

c) Frequency Stability
The EUT met the requirements of the Frequency Stability as per 47 CFR 15.225(e) and RSS-210. The EUT was measured in test mode with modulation on and transmitting at 13.56 MHz.
See APPENDIX 9 for the test data.

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G. Compliance Test Equipment Used

UNIT	MANUFACTURER	MODEL	SERIAL NUMBER	CAL DUE DATE (YY MM DD)	USE
EMI Test Receiver	Rohde & Schwarz	ESIB 40	100255	15-12-04	Conducted/Radiated Emissions
EMI Test Receiver	Rohde & Schwarz	ESU 40	100162	15-12-02	Conducted/Radiated Emissions
Hybrid Log Antenna	EMC Automation	HLP-3003C	017401	16-02-03	Radiated Emissions
Horn Antenna	CMT	LHA0180	R52734-001	16-03-31	Radiated Emissions
Horn Antenna	ETS-Lindgren	3117	2538	17-07-07	Radiated Emissions
Active Loop Antenna	EMCO	6507	00032	17-02-10	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA4-SP	001	16-09-10	Radiated Emissions
Preamplifier	Sonoma	310N/11909A	185831	16-09-10	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA-SP	001	15-10-23	Radiated Emissions
L.I.S.N.	Rohde & Schwarz	ENV216	100060	15-10-08	Conducted Emissions
Environment Monitor	Omega	iTHX-SD	0380561	16-11-15	Radiated Emissions
EMC Analyzer	Agilent	E7405A	US40240226	16-01-23	Radiated Emissions
DC Power Supply	HP	6632B	US37472178	15-10-20	RF Conducted Emissions
Environment Monitor	Omega	iTHX-SD	0340060	16-09-11	RF Conducted Emissions
Environmental Chamber	Test Equity	107	0900246	N/R	Frequency Stability
Bluetooth Tester	Rohde & Schwarz	CBT	119549	15-12-04	RF Conducted Emissions
Bluetooth Tester	Rohde & Schwarz	CBT35	100368	15-11-25	Radiated Emissions
Bluetooth Tester	Rohde & Schwarz	CBT35	100370	15-12-04	Radiated Emissions
Power Meter	Agilent	N1911A	MY45100951	17-06-09	RF Conducted / Frequency Stability
Power Sensor	Agilent	N1921A	MY45241383	16-02-04	RF Conducted / Frequency Stability
Environment Monitor	Omega	iTHX-SD	0380567	16-11-15	Radiated Emissions

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H. Test Software Used

SOFTWARE	COMPANY	VERSION	USE
EMC32	Rohde & Schwarz	8.53.0	Radiated Emissions
TDK Standard Emission Test	TDK RF Solutions	8.53.1.62	Radiated Emissions

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APPENDIX 1 – AC POWER CONDUCTED EMISSIONS TEST DATA/PLOTS

AC Powerline Conducted Emission Test Results

The following test configurations were measured on model RHK211LW (STV100-1):

The following tests were performed by Kevin Guo and Xing Fang.

Test Configuration 1

The BlackBerry® smartphone was tested on September 2, 2015

The environmental test conditions were: Temperature: 25.4 ºC
Relative Humidity: 43.4 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Margin (QP) Limits (dB)
0.159	L1	47.47	11.14	58.61	65.50	**-6.89**
0.168	N	43.11	11.11	54.22	65.10	-10.88
0.213	L1	43.62	10.77	54.38	63.10	-8.72
0.420	L1	32.09	9.98	42.07	57.40	-15.33
0.429	N	28.79	9.98	38.76	57.30	-18.54
1.086	N	27.52	9.81	37.33	56.00	-18.67
1.181	L1	28.46	9.80	38.26	56.00	-17.74
1.640	N	23.44	9.82	33.26	56.00	-22.74
2.720	L1	23.97	9.86	33.83	56.00	-22.17

Frequency (MHz)	Line	Reading (AV) (dBµV)	Correction Factor (dB)	Corrected Reading (AV) (dB)	Limit (AV) (dBµV)	Margin (AV) Limits (dB)
0.159	L1	21.67	11.14	32.81	55.50	-22.69
0.213	L1	20.58	10.77	31.35	53.10	-21.75
0.420	L1	21.22	9.98	31.21	47.40	**-16.20**
0.429	N	14.70	9.98	24.68	47.30	-22.63
1.086	N	14.48	9.81	24.28	46.00	-21.72
1.181	L1	17.38	9.80	27.18	46.00	-18.82
2.720	L1	13.77	9.86	23.63	46.00	-22.37

All other emission levels were at least 25 dB below the limit.
Measurements were done with the quasi-peak and average detectors.

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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 Powerline Conducted Emissions Test Graphs

Test Configuration 1

Figure 1-1: L1 lines

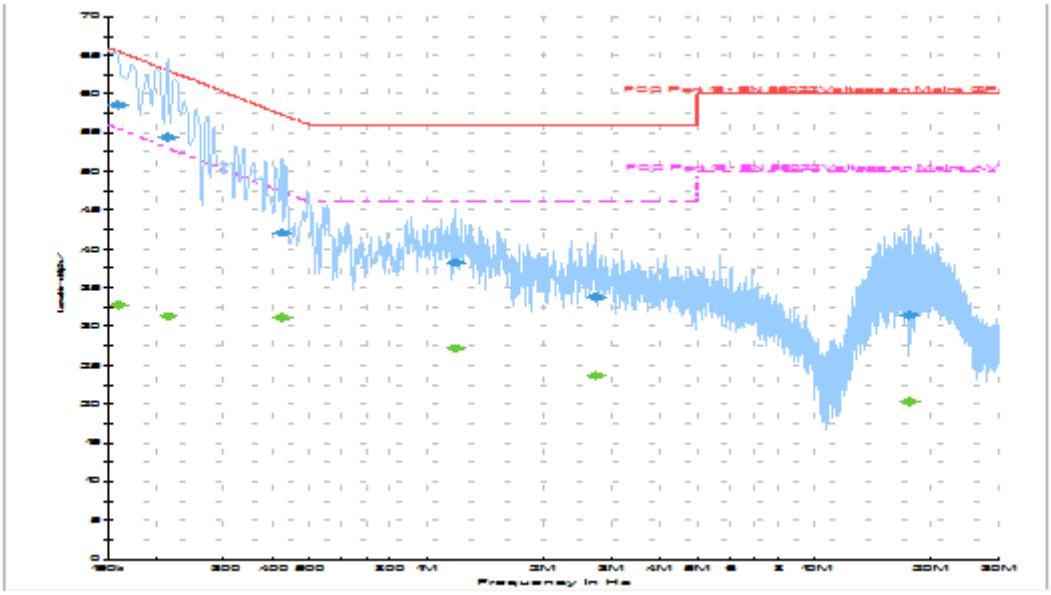
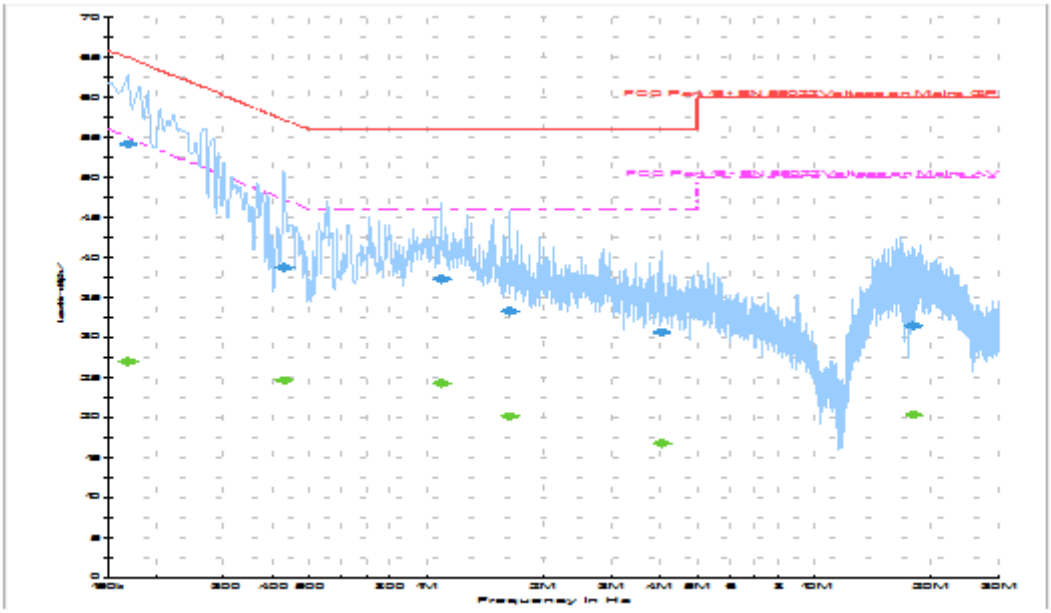


Figure 1-2: N Lines



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AC Powerline Conducted Emission Test Results cont'd

Test Configuration 2

The BlackBerry® smartphone was tested on August 14, 2015

The environmental test conditions were: Temperature: 25.4 ºC
Relative Humidity: 43.4 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.479	N	34.51	9.93	44.44	56.40	46.40	-11.96
0.492	L1	32.75	9.91	42.66	56.10	46.10	-13.44
1.014	N	28.35	9.81	38.16	56.00	46.00	-17.84
1.086	L1	29.23	9.80	39.04	56.00	46.00	-16.96
1.797	N	21.95	9.82	31.77	56.00	46.00	-24.23
2.661	L1	25.26	9.86	35.12	56.00	46.00	-20.89
3.125	N	22.40	9.88	32.28	56.00	46.00	-23.72
4.254	L1	26.21	9.90	36.11	56.00	46.00	-19.89
14.519	L1	28.65	10.07	38.72	60.00	50.00	-21.28
16.296	N	25.47	10.15	35.61	60.00	50.00	-24.39

All other emission levels were at least 25 dB below the limit.
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.

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Figure 1-3: L1 lines

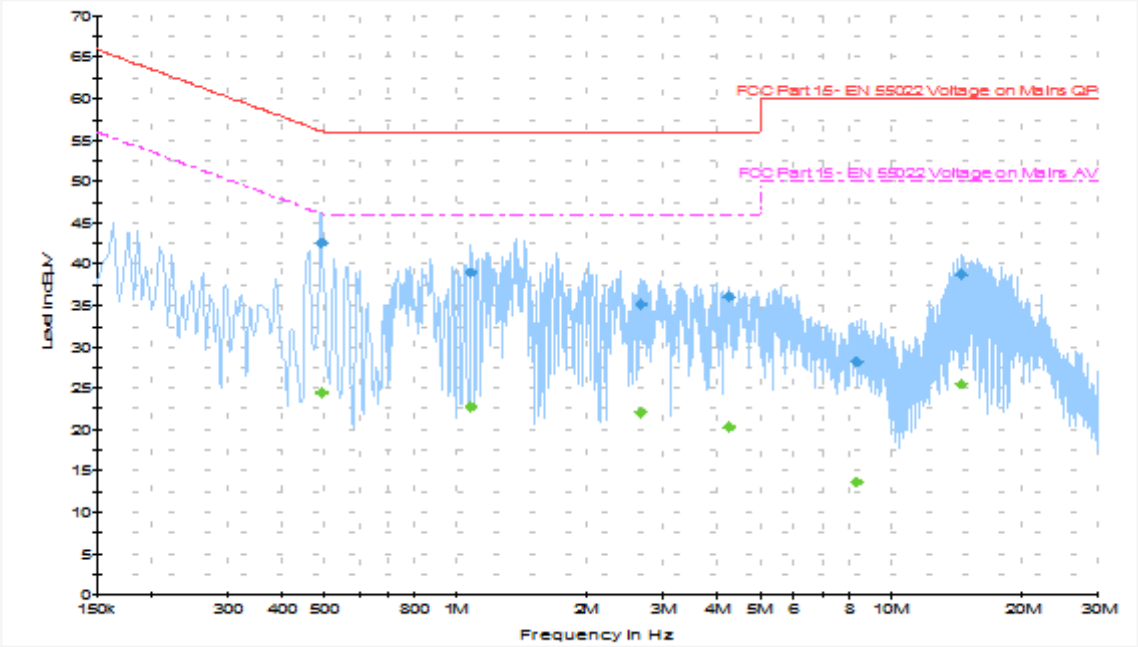
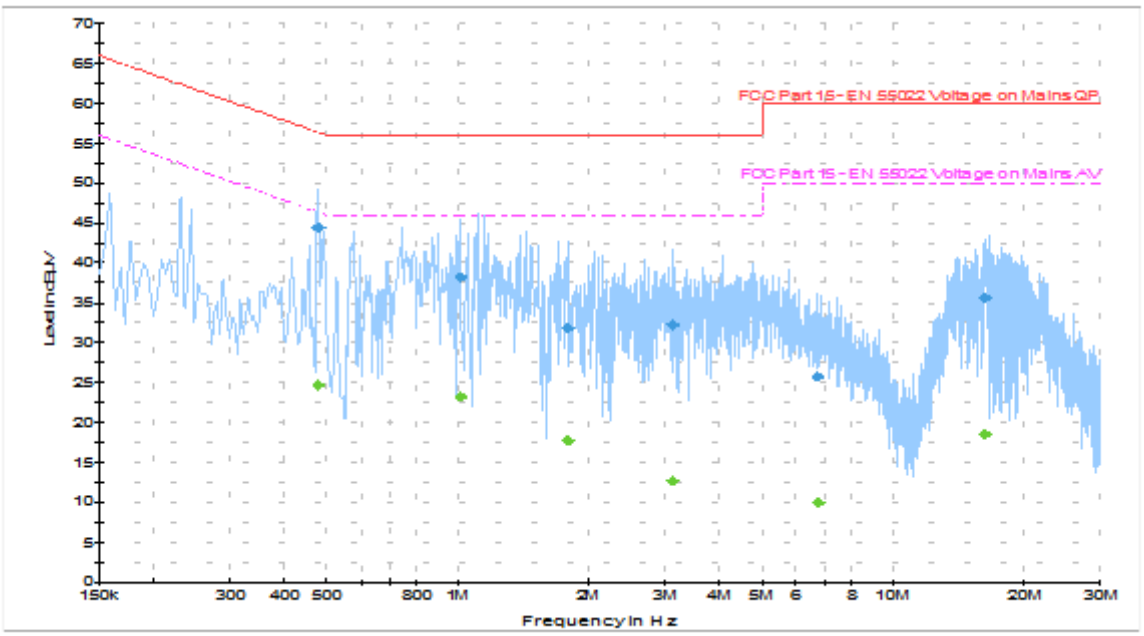


Figure 1-4: N Lines



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AC Powerline Conducted Emissions Test Results cont'd

Test Configuration 3

The BlackBerry® smartphone was tested on August 18, 2015

The environmental test conditions were: Temperature: 23.9 ºC
Relative Humidity: 45.6 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.182	N	42.52	11.01	53.53	64.40	54.40	-10.87
0.191	L1	42.08	10.92	53.00	64.00	54.00	-11.00
0.312	L1	32.18	10.14	42.32	59.90	49.90	-17.58
0.353	N	30.13	10.10	40.23	58.90	48.90	-18.67
0.722	N	26.98	9.83	36.82	56.00	46.00	-19.18
0.758	L1	25.01	9.82	34.84	56.00	46.00	-21.16
1.712	N	24.19	9.82	34.01	56.00	46.00	-22.00
2.112	L1	24.53	9.83	34.36	56.00	46.00	-21.64
4.281	N	21.59	9.91	31.50	56.00	46.00	-24.51
4.650	L1	22.60	9.90	32.50	56.00	46.00	-23.50
14.730	N	25.28	10.08	35.37	60.00	50.00	-24.64
17.111	L1	27.82	10.18	37.99	60.00	50.00	-22.01

All other emission levels were at least 25 dB below the limit.
Measurements were done with the quasi-peak detectors.
See figure 1-5 and 1-6 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

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AC Powerline Conducted Emissions Test Graphs

Test Configuration 3

Figure 1-5: L1 Lines

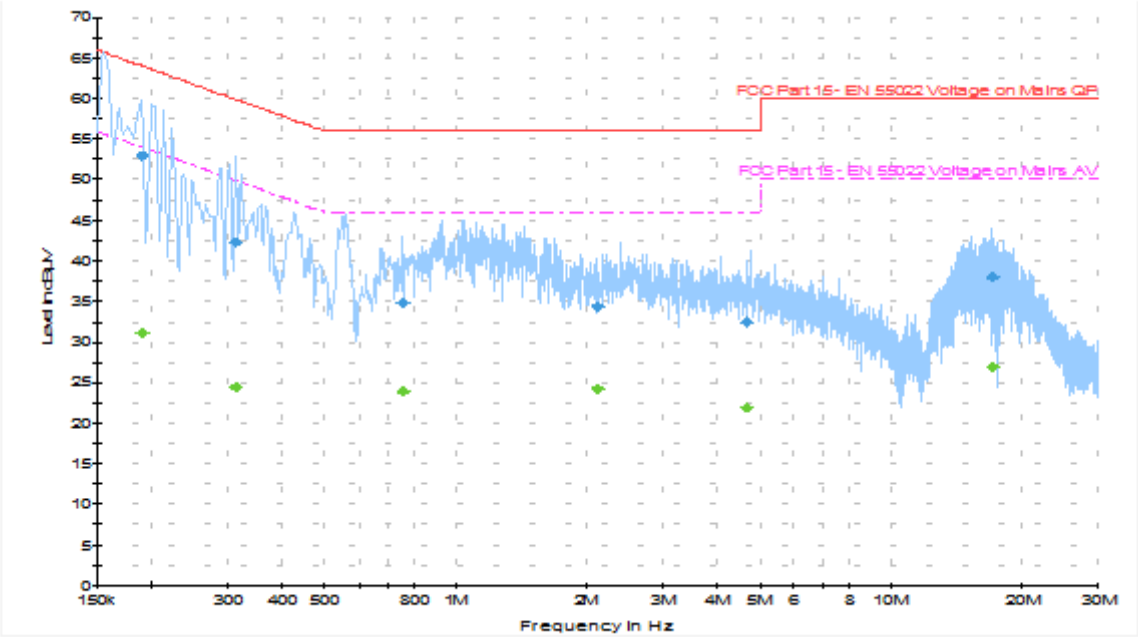
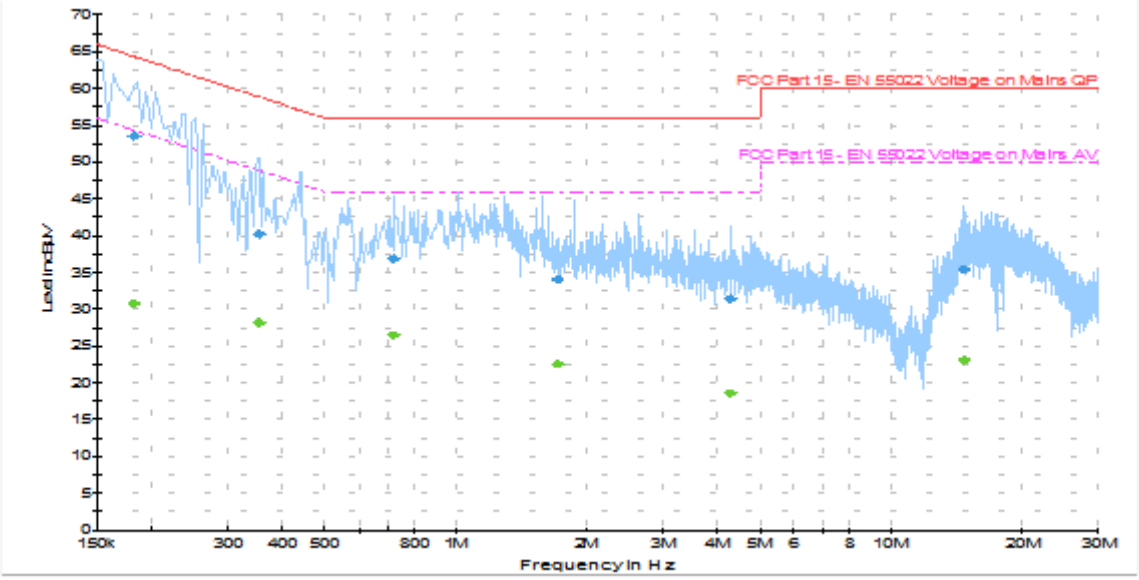


Figure 1-6: N Lines



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AC Powerline Conducted Emission Test Results cont'd

Test Configuration 4

The BlackBerry® smartphone was tested on August 18, 2015

The environmental test conditions were: Temperature: 23.9 ºC
Relative Humidity: 45.6 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.249	N	40.29	10.54	50.83	61.80	51.80	-10.97
0.267	L1	40.05	10.39	50.43	61.20	51.20	-10.77
0.402	N	32.16	10.02	42.18	57.80	47.80	-15.63
0.411	L1	32.12	9.99	42.11	57.60	47.60	-15.49
0.852	L1	28.56	9.81	38.37	56.00	46.00	-17.63
0.947	N	29.54	9.81	39.35	56.00	46.00	-16.65
1.887	L1	24.91	9.82	34.73	56.00	46.00	-21.27
1.896	N	24.88	9.83	34.71	56.00	46.00	-21.29
4.835	L1	22.69	9.90	32.59	56.00	46.00	-23.41
16.548	L1	26.62	10.15	36.77	60.00	50.00	-23.23

All other emission levels were at least 25 dB below the limit.
Measurements were done with the quasi-peak detectors.
See figure 1-7 and figure 1-8 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

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AC Powerline Conducted Emissions Test Graphs

Test Configuration 4

Figure 1-7: L1 lines

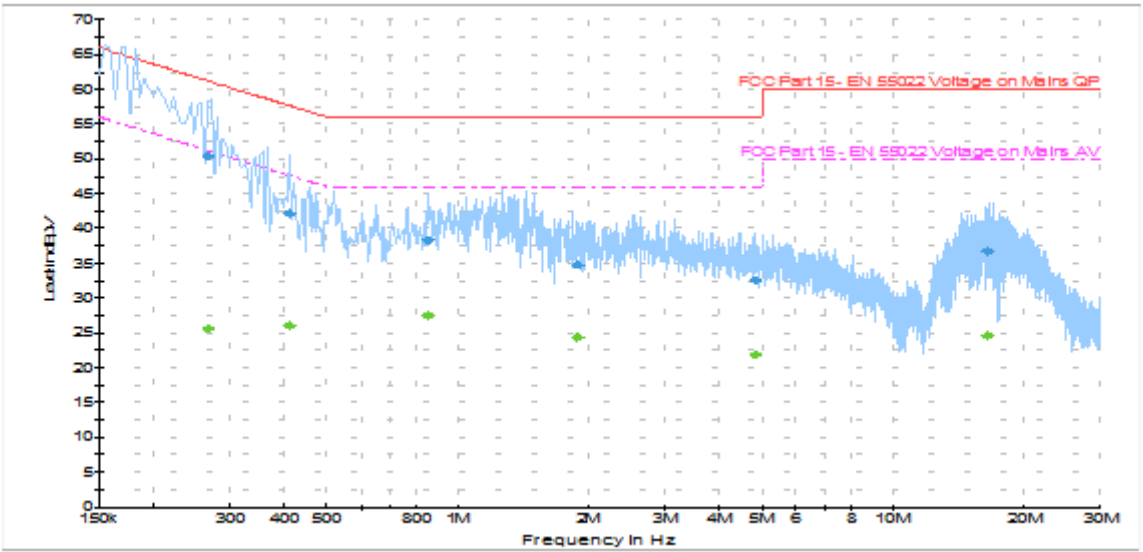
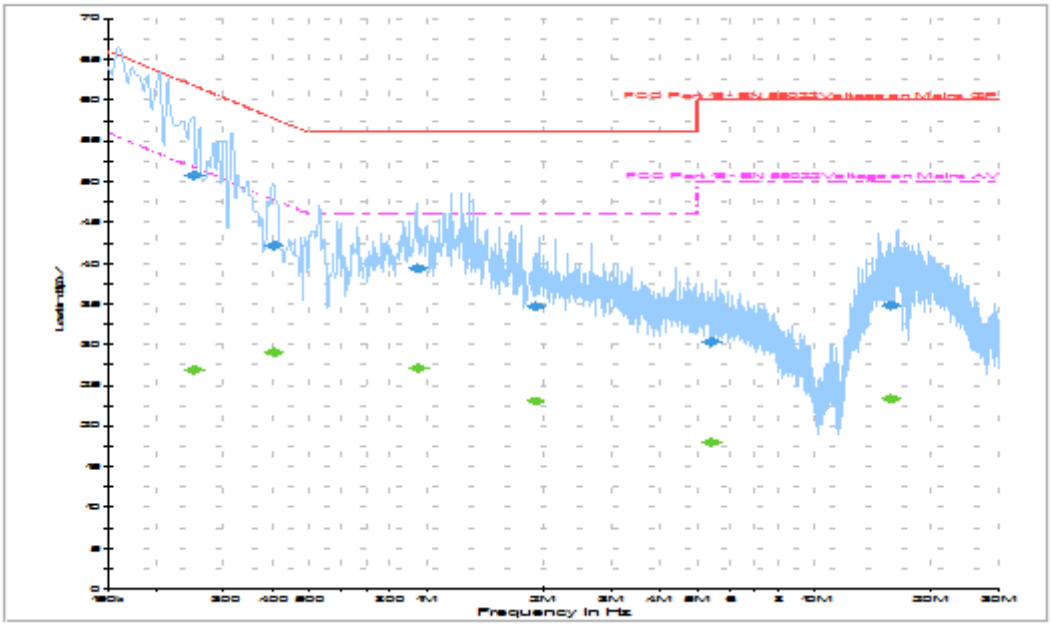


Figure 1-8: N Lines



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APPENDIX 2 – BLUETOOTH, BLUETOOTH LOW ENERGY AND 802.11b/g/n RADIATED EMISSIONS TEST DATA

The following test configurations were measured on model RHK211LW (STV100-1):

Radiated Emissions Test Results
Bluetooth Band

Date of Test: July 22 and 23, 2015
Measurements were performed by Imran Kanji and Shiva Kumbham.

The environmental test conditions were: Temperature: 25.0ºC
Relative Humidity: 32.6 %

The test distance was 3.0 meters with a EUT height of 1.5 meters, and sweep frequency of 30 MHz to 1 GHz.

The BlackBerry® smartphone in Bluetooth TX mode was in volume key up slider open 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 the emission had a test margin of 25 dB.

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Radiated Emissions Test Results cont'd
Bluetooth Band cont'd

Date of Test: July 21, 23 and 24, 2015 and August 1, 2015.
Measurements were performed by Kevin Guo and Xing Fang

The environmental test conditions were: Temperature: 25.5ºC
Relative Humidity: 36.4%

The test distance was 3.0 meters with a EUT height of 1.5 meters, and sweep frequency of 1GHz to 25GHz.

The BlackBerry® smartphone in Bluetooth TX mode was in volume key down slider open 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 the emission had a test margin of greater than 25 dB.

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

Date of test: July 23, 2015
Measurements were performed by Shiva Kumbham.

The environmental test conditions were: Temperature: 24.7 ºC
Relative Humidity: 32.3 %

The BlackBerry® smartphone was in standalone, volume key down position and pattern type "Static PBRS" in "DH5", "2-DH5" and "3-DH5" modulation during the measurements.

The test distance was 3.0 meters.

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector	VBW	Reading (dBuV)	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	89.42	99.64	57.89	41.75	74.00	-32.25
0	2402	Horn	H	PK	1 MHz	86.75	96.97	55.11	41.86	74.00	-32.14
0	2402	Horn	V	AV	10 Hz	82.45	92.67	57.89	34.78	54.00	-19.22
0	2402	Horn	H	AV	10 Hz	79.84	90.06	55.11	34.95	54.00	-19.05
High Channel, Packet Type DH5											
78	2480	Horn	V	PK	1 MHz	89.47	100.62	59.01	41.61	74.00	-32.39
78	2480	Horn	H	PK	1 MHz	89.82	100.97	58.80	42.17	74.00	-31.83
78	2480	Horn	V	AV	10 Hz	82.43	93.58	59.01	34.57	54.00	-19.43
78	2480	Horn	H	AV	10 Hz	82.83	93.98	58.80	35.18	54.00	-18.82
Low Channel, Packet Type 2-DH5											
0	2402	Horn	V	PK	1 MHz	88.49	98.71	56.71	42.00	74.00	-32.00
0	2402	Horn	H	PK	1 MHz	86.02	96.24	53.25	42.99	74.00	-31.01
0	2402	Horn	V	AV	10 Hz	79.41	89.63	56.71	32.92	54.00	-21.08
0	2402	Horn	H	AV	10 Hz	76.46	86.68	53.25	33.43	54.00	-20.57
High Channel, Packet Type 2-DH5											
78	2480	Horn	V	PK	1 MHz	87.69	98.84	54.31	44.53	74.00	-29.47
78	2480	Horn	H	PK	1 MHz	87.85	99.00	55.32	43.68	74.00	-30.32
78	2480	Horn	V	AV	10 Hz	78.38	89.53	54.31	35.22	54.00	-18.78
78	2480	Horn	H	AV	10 Hz	78.48	89.63	55.32	34.31	54.00	-19.69

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

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Bluetooth Band

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector	VBW	Reading (dBuV)	Corrected Reading (dBuV/m)	Delta Marker (dB)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Low Channel, Packet Type 3-DH5											
0	2402	Horn	V	PK	1 MHz	90.03	100.25	57.16	43.09	74.00	-30.91
0	2402	Horn	H	PK	1 MHz	89.95	100.17	58.52	41.65	74.00	-32.35
0	2402	Horn	V	AV	10 Hz	78.04	88.26	57.16	31.10	54.00	-22.90
0	2402	Horn	H	AV	10 Hz	80.52	90.74	58.52	32.22	54.00	-21.78
High Channel, Packet Type 3-DH5											
78	2480	Horn	V	PK	1 MHz	85.30	96.45	52.50	43.95	74.00	-30.05
78	2480	Horn	H	PK	1 MHz	87.72	98.87	55.46	43.41	74.00	-30.59
78	2480	Horn	V	AV	10 Hz	76.42	87.57	52.50	35.07	54.00	-18.93
78	2480	Horn	H	AV	10 Hz	78.25	89.40	55.46	33.94	54.00	-20.06

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

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

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

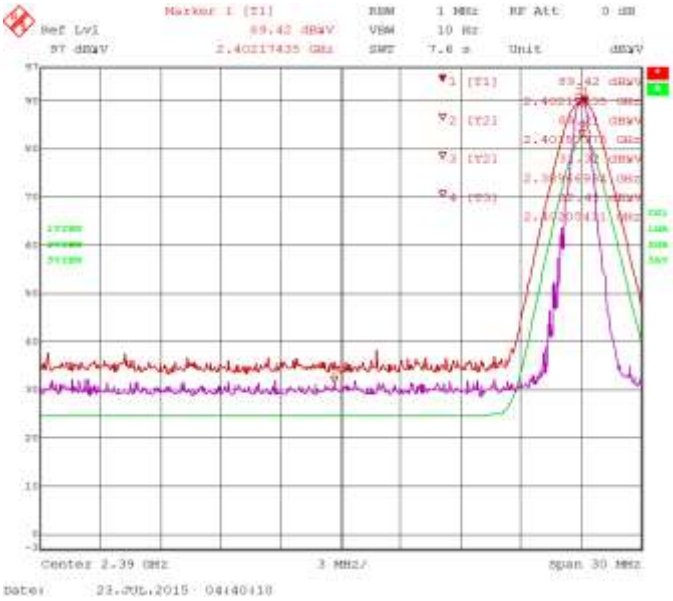


Figure 2-2: Band-Edge Compliance of RF Rad. Emissions. Bluetooth, Single freq., Static PBRS, DH5, Channel 0, Pol: H, Detector: PK

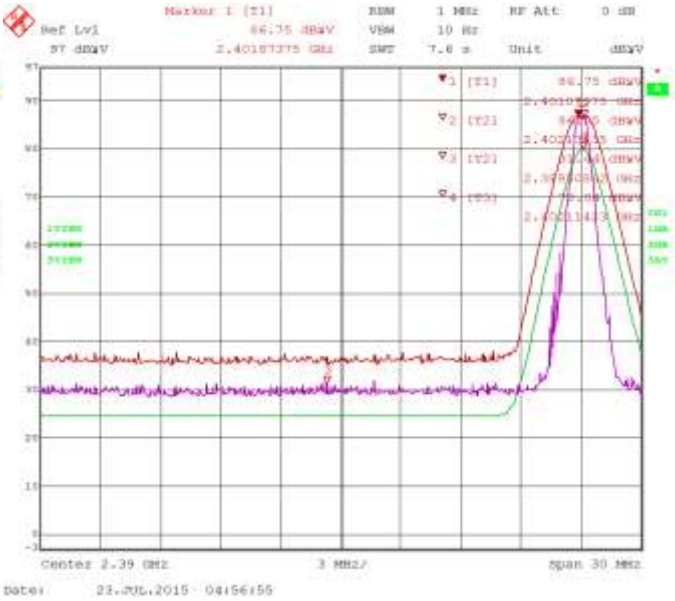


Figure 2-3: Band-Edge Compliance of RF Rad. Emissions. Bluetooth, Single freq., Static PBRS, DH5, Channel 78, Pol: V, Detector: PK

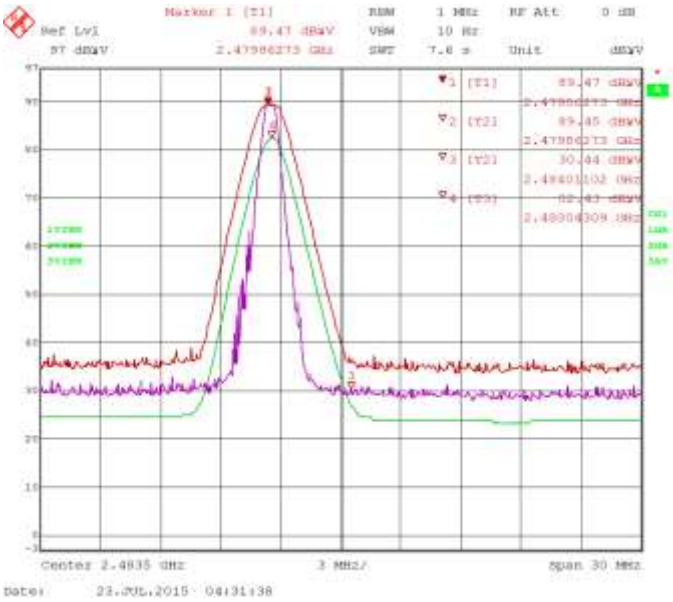
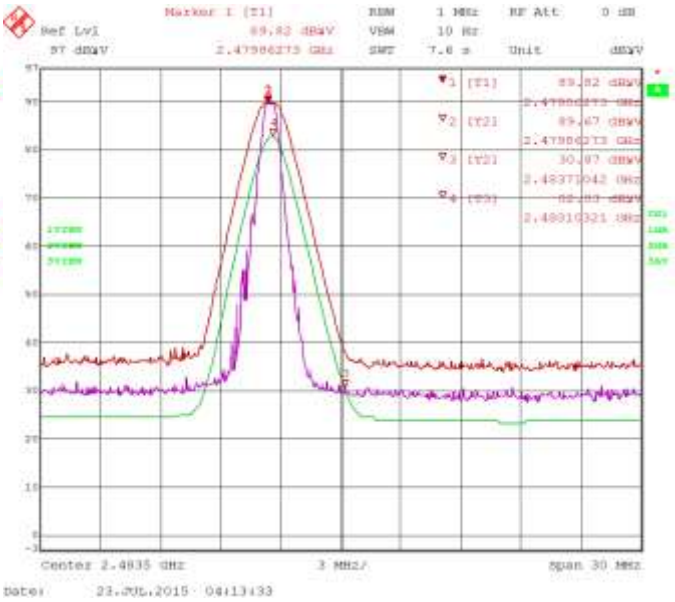


Figure 2-4: Band-Edge Compliance of RF Rad. Emissions Bluetooth, Single freq., Static PBRS, DH5, Channel 78, Pol: H, Detector: PK



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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

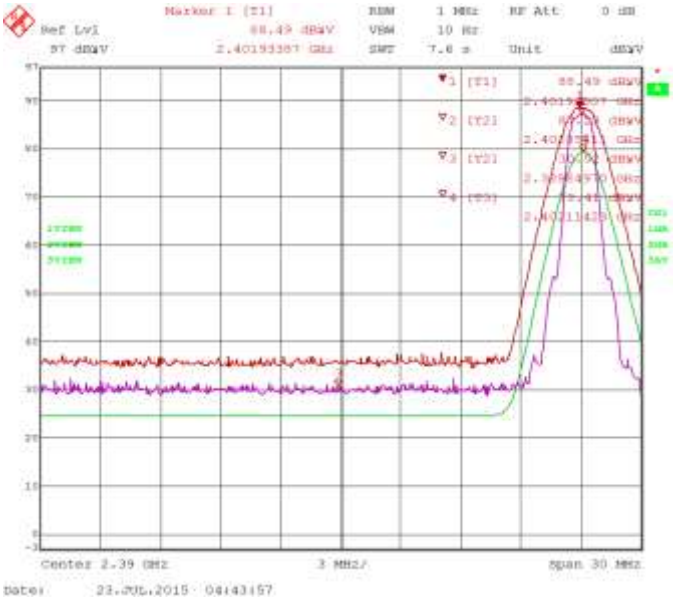


Figure 2-6: Band-Edge Compliance of RF Rad. Emissions. Bluetooth, Single freq., Static PBRS, 2-DH5, Channel 0, Pol: H, Detector: PK

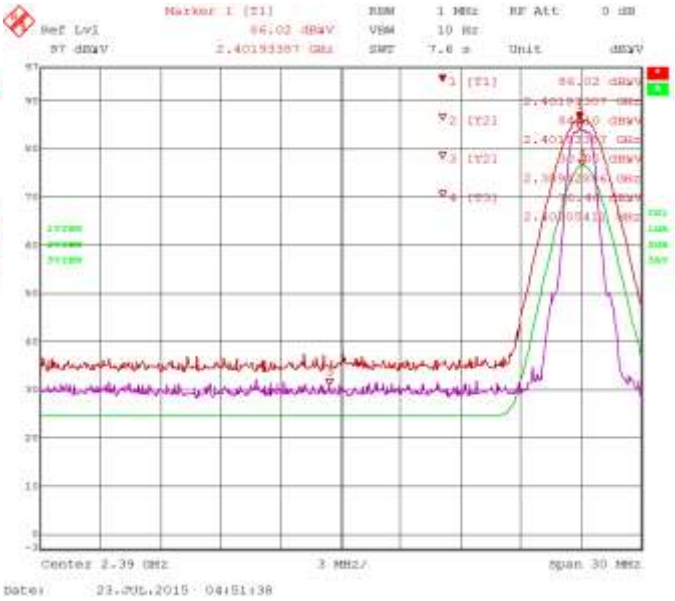


Figure 2-7: Band-Edge Compliance of RF Rad. Emissions. Bluetooth, Single freq., Static PBRS, 2-DH5, Channel 78, Pol: V, Detector: PK

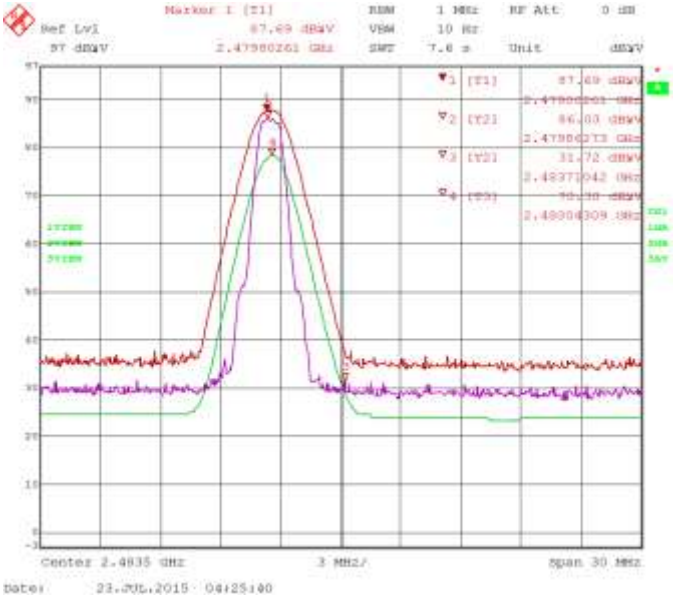
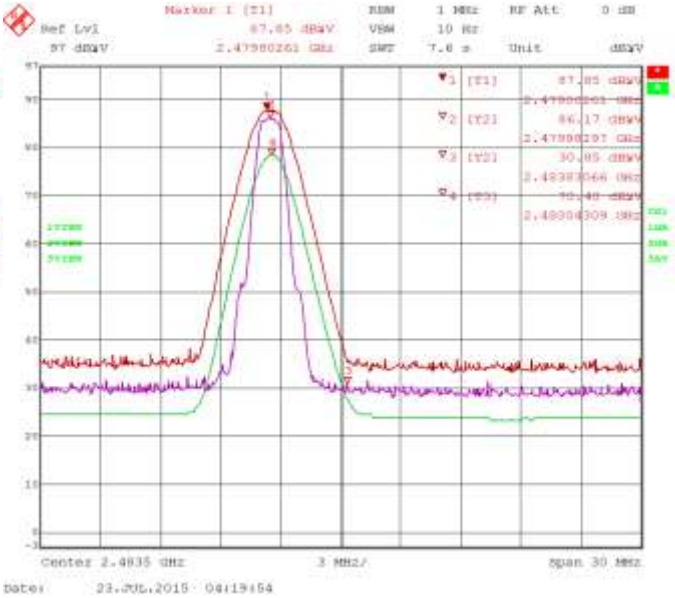


Figure 2-8: Band-Edge Compliance of RF Rad. Emissions. Bluetooth, Single freq., Static PBRS, 2-DH5, Channel 78, Pol: H, Detector: PK



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

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

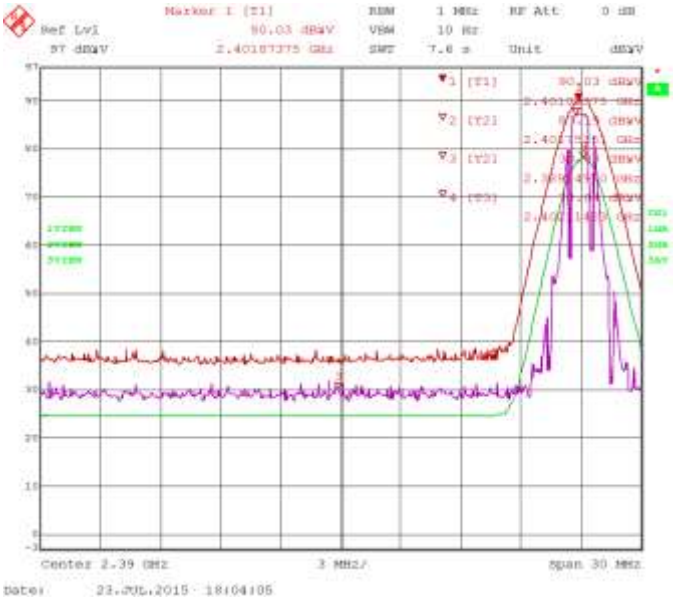


Figure 2-10: Band-Edge Compliance of RF Rad. Emissions. Bluetooth, Single freq., Static PBRS, 3-DH5, Channel 0, Pol: H, Detector: PK

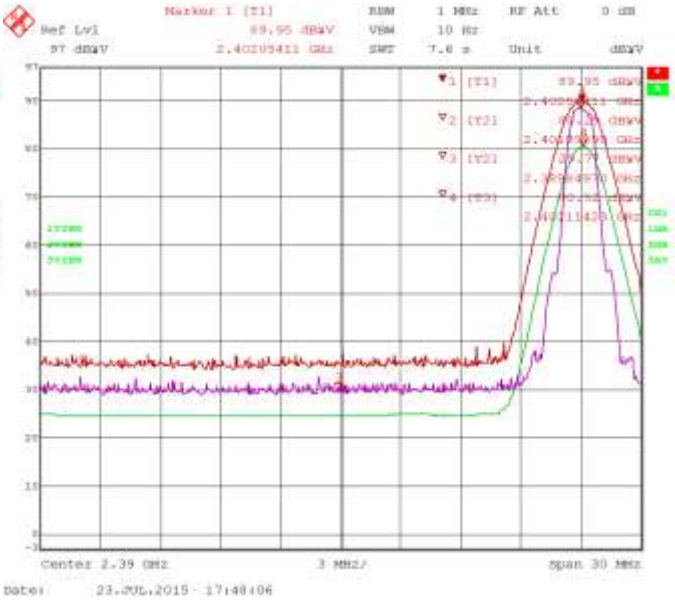


Figure 2-11: Band-Edge Compliance of RF Rad. Emissions. Bluetooth, Single freq., Static PBRS, 3-DH5, Channel 78, Pol: V, Detector: PK

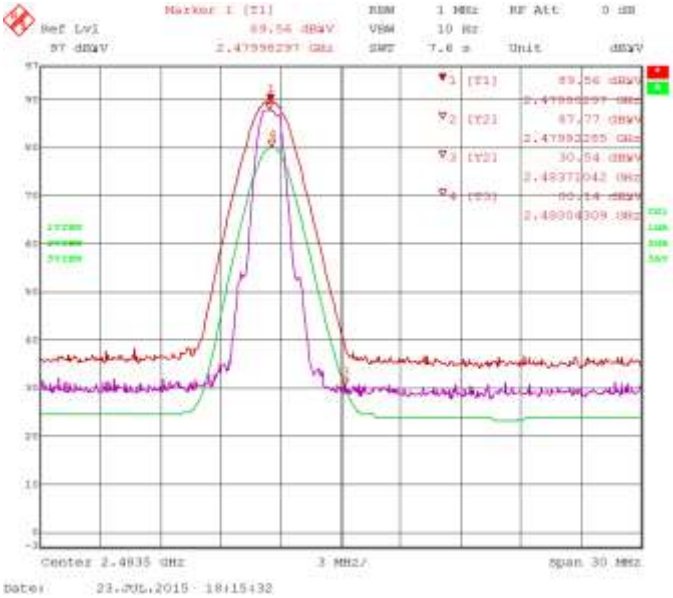
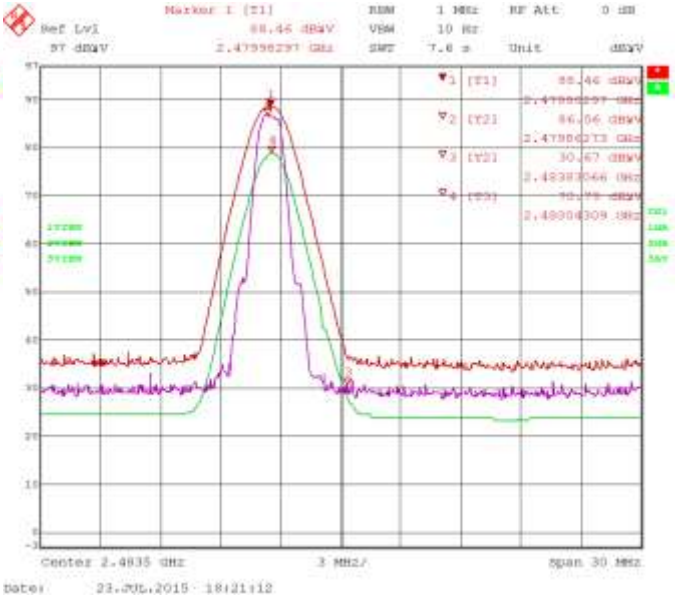


Figure 2-12: Band-Edge Compliance of RF Rad. Emissions. Bluetooth, Single freq., Static PBRS, 3-DH5, Channel 78, Pol: H, Detector: PK



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Radiated Emissions Test Results cont'd
Bluetooth Low Energy Band

Date of Test: July 23, 2015
Measurements were performed by Shiva Kumbham.

The environmental test conditions were: Temperature: 24.6 ºC
Relative Humidity: 32.2 %

The test distance was 3.0 meters with a EUT height of 1.5 meters, and sweep frequency of 30 MHz to 1 GHz.

The BlackBerry® smartphone in Bluetooth Low Energy TX mode was in volume key down position.

The frequency sweep measurements were performed in single frequency mode on channels 0, 20 and 39.

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

Date of Test: July 24 and August 1, 2015
Measurements were performed by Xing Fang.

The environmental test conditions were: Temperature: 24.3 ºC
Relative Humidity: 40.8%

The test distance was 3.0 meters with a EUT height of 1.5 meters, and sweep frequency of 1GHz to 25GHz.

The BlackBerry® smartphone in Bluetooth Low Energy TX mode was in volume key up position.

The frequency sweep measurements were performed in single frequency mode on channels 0, 20 and 39.

All other emission levels were at least 25 dB below the limit.

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

Date of test: July 23, 2015
Measurements were performed by Shiva Kumbham.

The environmental test conditions were: Temperature: 24.7 ºC
Relative Humidity: 32.3 %

The BlackBerry® smartphone was in volume key down position.

The test distance was 3.0 meters.

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector	VBW	Reading (dBuV)	Corrected Reading (dBuV/m)	Delta Marker (dB)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Low Channel, LE											
0	2402	Horn	V	PK	1 MHz	86.59	96.81	55.14	41.67	74.00	-32.33
0	2402	Horn	H	PK	1 MHz	86.60	96.82	55.57	41.25	74.00	-32.75
0	2402	Horn	V	AV	10 Hz	81.79	92.01	55.14	36.87	54.00	-17.13
0	2402	Horn	H	AV	10 Hz	81.64	91.86	55.57	36.29	54.00	-17.71
High Channel, LE											
39	2480	Horn	V	PK	1 MHz	87.36	98.51	57.01	41.50	74.00	-32.50
39	2480	Horn	H	PK	1 MHz	88.29	99.44	56.97	42.47	74.00	-31.53
39	2480	Horn	V	AV	10 Hz	82.50	93.65	57.01	36.64	54.00	-17.36
39	2480	Horn	H	AV	10 Hz	83.28	94.43	56.97	37.46	54.00	-16.54

See figures 2-13 to 2-16 for the plots of the Bluetooth Low Energy band-edge compliance.

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

Figure 2-13: Band-Edge Compliance of RF Rad. Emissions. Bluetooth Low Energy, Single freq., LE, Channel 0, Pol: V, Detector: PK

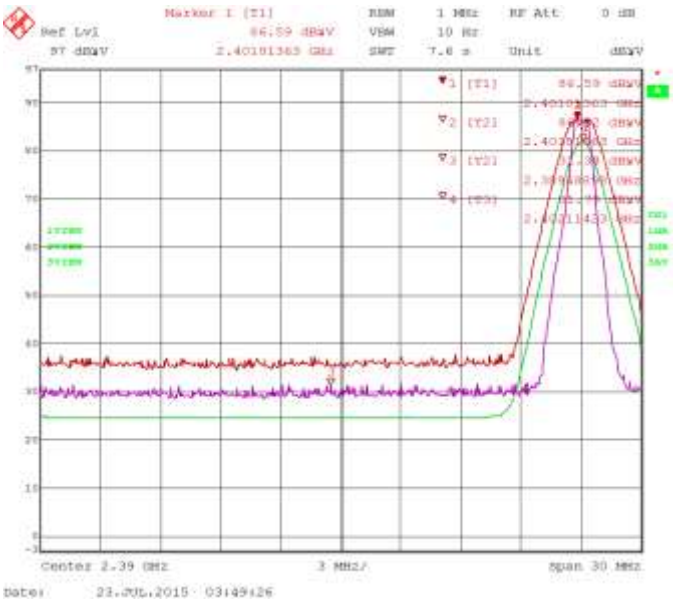


Figure 2-14: Band-Edge Compliance of RF Rad. Emissions. Bluetooth Low Energy, Single freq., LE, Channel 0, Pol: H, Detector: PK

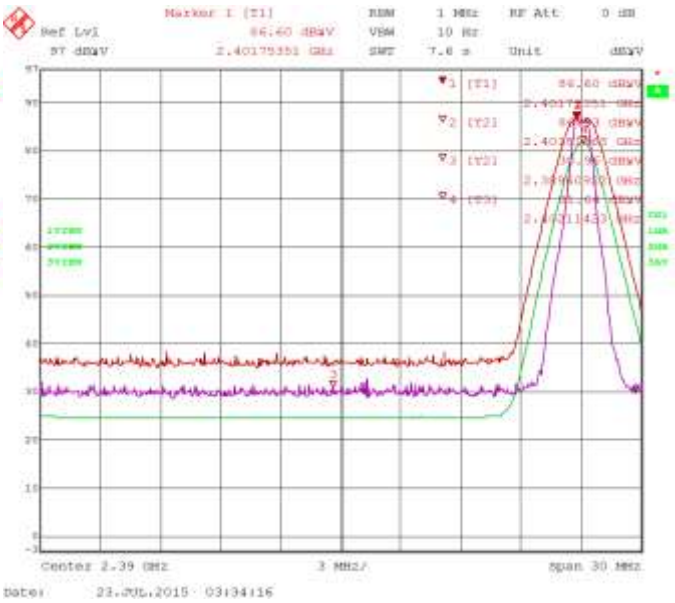


Figure 2-15: Band-Edge Compliance of RF Rad. Emissions. Bluetooth Low Energy, Single freq., LE, Channel 39, Pol: V, Detector: PK

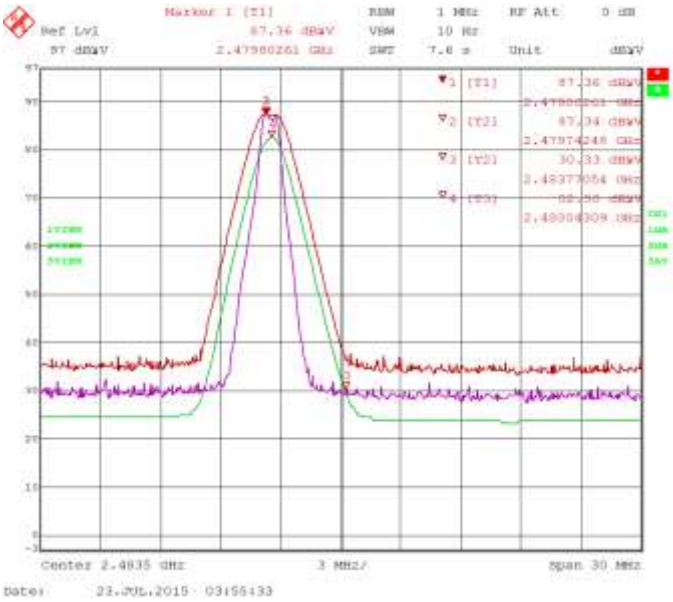
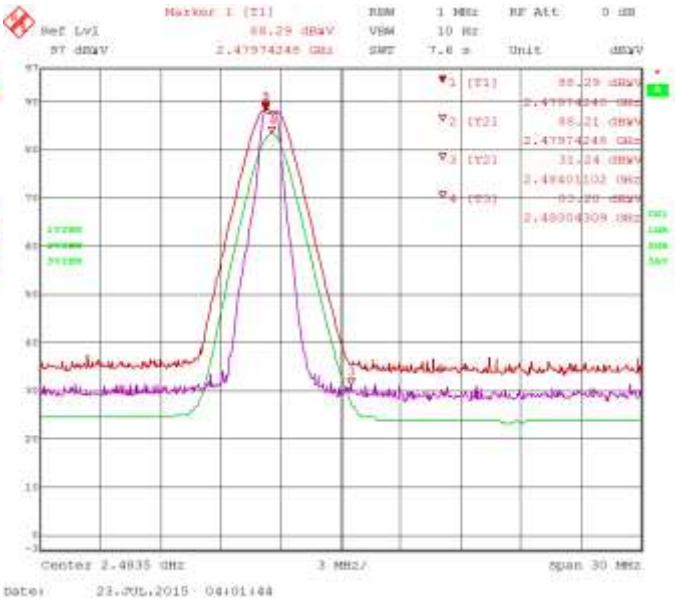


Figure 2-16: Band-Edge Compliance of RF Rad. Emissions Bluetooth Low Energy, Single freq., LE, Channel 39, Pol: H, Detector: PK



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

Date of Test: July 29, 30, 31, and August 27, 2015
Measurements performed by Shiva Kumbham and Imran Kanji.

The environmental test conditions were: Temperature: 26.6 ºC
Relative Humidity: 40.5 %

The test distance was 3.0 meters with a EUT height of 1.5 meters, and sweep frequency of 30 MHz to 1 GHz.

The BlackBerry® smartphone was in volume key up slider open position.

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

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

Date of Test: July 29, 30 and 31, and August 1, and 4, 2015
Measurements performed by Xing Fang and Kevin Guo.

The environmental test conditions were: Temperature: 24.8 ºC
Relative Humidity: 52.9 %

The test distance was 3.0 meters with a EUT height of 1.5 meters, and sweep frequency of 1GHz to 25GHz.

The BlackBerry® smartphone was in volume key down slider open position.

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

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

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

Date of Tests: July 29, and 30, 2015
Measurements performed by Imran Kanji and Savtej Sandhu.

The environmental test conditions were: Temperature: 26.3 ºC
Relative Humidity: 41.2 %

802.11b Band

The measurements were performed on BlackBerry® smartphone in standalone, volume key up slider open configuration on channels 1 and 11 for 802.11b mode at 1 Mbps.

The test distance was 3 meters.

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Low channel 802.11b,1Mbps									
1.0	2412.00	Horn	V	PK	1 MHz	46.39	56.61	74.00	-17.39
1.0	2412.00	Horn	H	PK	1 MHz	45.04	55.26	74.00	-18.74
1.0	2412.00	Horn	V	AV	10 Hz	38.67	48.89	54.00	-5.11
1.0	2412.00	Horn	H	AV	10 Hz	35.52	45.74	54.00	-8.26
High channel 802.11b,1Mbps									
11.0	2462.00	Horn	V	PK	1 MHz	39.72	50.87	74.00	-23.13
11.0	2462.00	Horn	H	PK	1 MHz	39.71	50.86	74.00	-23.14
11.0	2462.00	Horn	V	AV	10 Hz	29.50	40.65	54.00	-13.35
11.0	2462.00	Horn	H	AV	10 Hz	27.00	38.15	54.00	-15.85

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

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

The test distance was 3 meters.

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Low channel 802.11g,6Mbps									
1.0	2412.00	Horn	V	PK	1 MHz	50.06	60.28	74.00	-13.72
1.0	2412.00	Horn	H	PK	1 MHz	45.04	55.26	74.00	-18.74
1.0	2412.00	Horn	V	AV	10 Hz	34.30	44.52	54.00	-9.48
1.0	2412.00	Horn	H	AV	10 Hz	35.52	45.74	54.00	-8.26
High channel 802.11g,6Mbps									
11.0	2462.00	Horn	V	PK	1 MHz	49.53	60.68	74.00	-13.32
11.0	2462.00	Horn	H	PK	1 MHz	50.23	61.38	74.00	-12.62
11.0	2462.00	Horn	V	AV	10 Hz	33.71	44.86	54.00	-9.14
11.0	2462.00	Horn	H	AV	10 Hz	34.36	45.51	54.00	-8.49

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

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

The test distance was 3 meters.

SISO Primary Antenna

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Low channel 802.11n, MCS0									
1.0	2412.00	Horn	V	PK	1 MHz	55.27	65.49	74.00	-8.51
1.0	2412.00	Horn	H	PK	1 MHz	56.85	67.07	74.00	-6.93
1.0	2412.00	Horn	V	AV	10 Hz	37.69	47.91	54.00	-6.09
1.0	2412.00	Horn	H	AV	10 Hz	38.46	48.68	54.00	-5.32
High channel 802.11n, MCS0									
11.0	2462.00	Horn	V	PK	1 MHz	52.92	64.07	74.00	-9.93
11.0	2462.00	Horn	H	PK	1 MHz	52.04	63.19	74.00	-10.81
11.0	2462.00	Horn	V	AV	10 Hz	35.06	46.21	54.00	-7.79
11.0	2462.00	Horn	H	AV	10 Hz	35.06	46.21	54.00	-7.79

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

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Low channel 802.11n, MCS0									
1.0	2412.00	Horn	V	PK	1 MHz	45.59	55.81	74.00	-18.19
1.0	2412.00	Horn	H	PK	1 MHz	54.04	64.26	74.00	-9.74
1.0	2412.00	Horn	V	AV	10 Hz	32.32	42.54	54.00	-11.46
1.0	2412.00	Horn	H	AV	10 Hz	40.71	50.93	54.00	-3.07
High channel 802.11n, MCS0									
11.0	2462.00	Horn	V	PK	1 MHz	46.64	57.79	74.00	-16.21
11.0	2462.00	Horn	H	PK	1 MHz	50.44	61.59	74.00	-12.41
11.0	2462.00	Horn	V	AV	10 Hz	33.90	45.05	54.00	-8.95
11.0	2462.00	Horn	H	AV	10 Hz	36.40	47.55	54.00	-6.45

MIMO Antenna Configuration

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Low channel 802.11n, MCS0									
1.0	2412.00	Horn	V	PK	1 MHz	54.31	64.53	74.00	-9.47
1.0	2412.00	Horn	H	PK	1 MHz	53.39	63.61	74.00	-10.39
1.0	2412.00	Horn	V	AV	10 Hz	38.46	48.68	54.00	-5.32
1.0	2412.00	Horn	H	AV	10 Hz	37.83	48.05	54.00	-5.95
High channel 802.11n, MCS0									
11.0	2462.00	Horn	V	PK	1 MHz	52.24	63.39	74.00	-10.61
11.0	2462.00	Horn	H	PK	1 MHz	50.82	61.97	74.00	-12.03
11.0	2462.00	Horn	V	AV	10 Hz	35.92	47.07	54.00	-6.93
11.0	2462.00	Horn	H	AV	10 Hz	32.32	43.47	54.00	-10.53

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

See figures 2-17 to 2-20 for the plots of the 802.11b band-edge compliance.
See figures 2-21 to 2-24 for the plots of the 802.11g band-edge compliance.
See figures 2-25 to 2-36 for the plots of the 802.11n band-edge compliance.

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

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

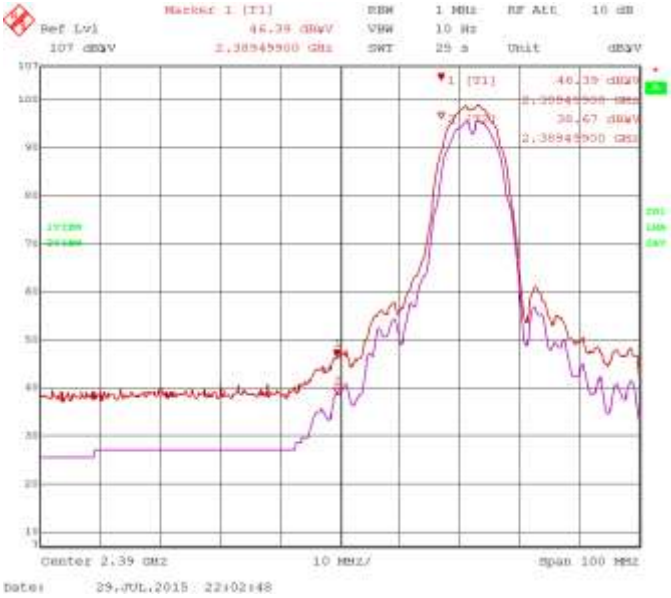


Figure 2-18: Band-Edge Compliance of RF Radiated Emission 802.11b, Channel 1, 2412 MHz, Max Pol: H, Detector: PK

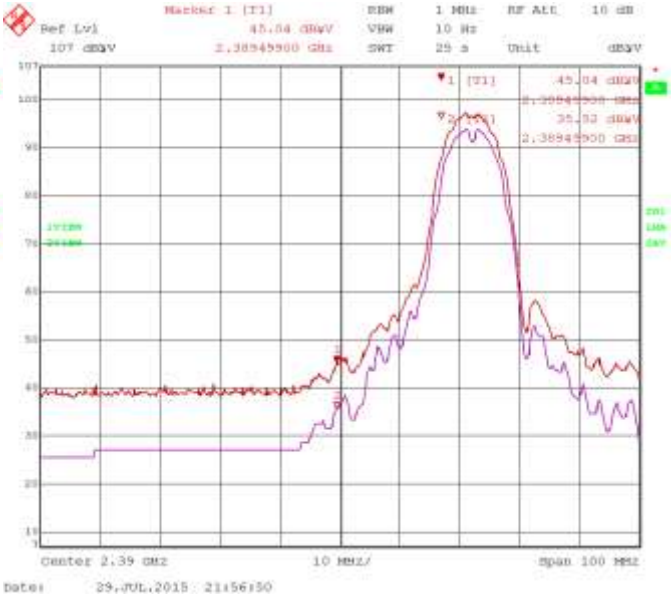


Figure 2-19: Band-Edge Compliance of RF Radiated Emission 802.11b, Channel 11, 2462 MHz, Max Pol: V, Detector: PK

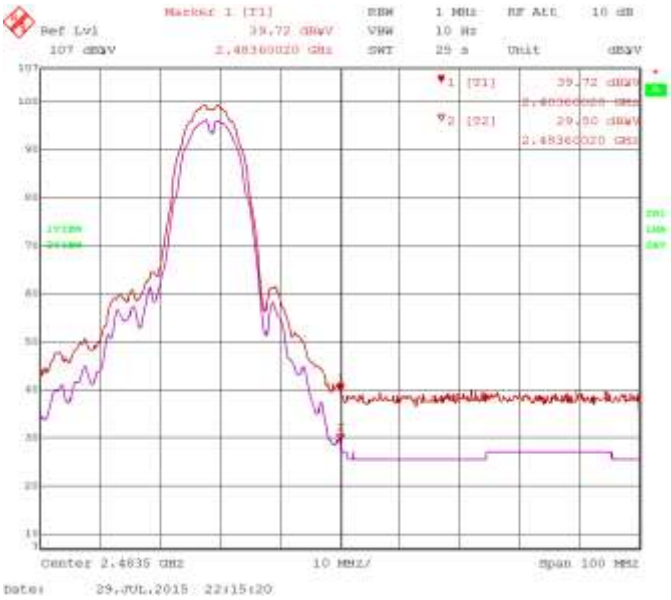
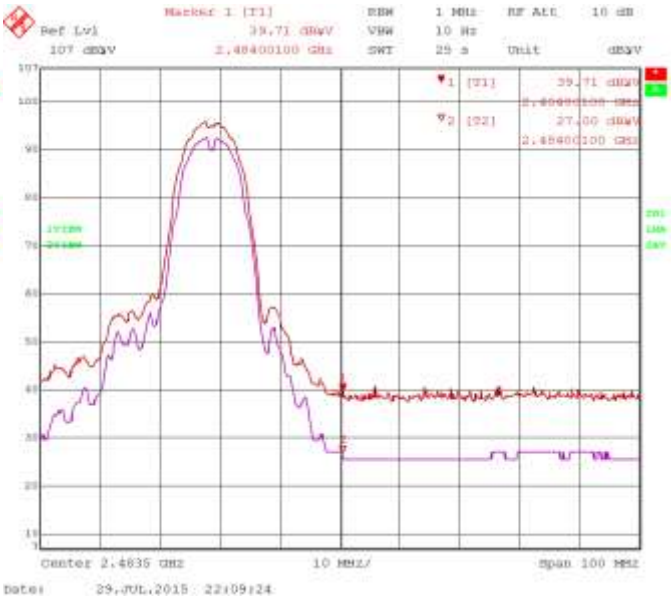


Figure 2-20: Band-Edge Compliance of RF Radiated Emission 802.11b, Channel 11, 2462 MHz, Max Pol: H, Detector: PK



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

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

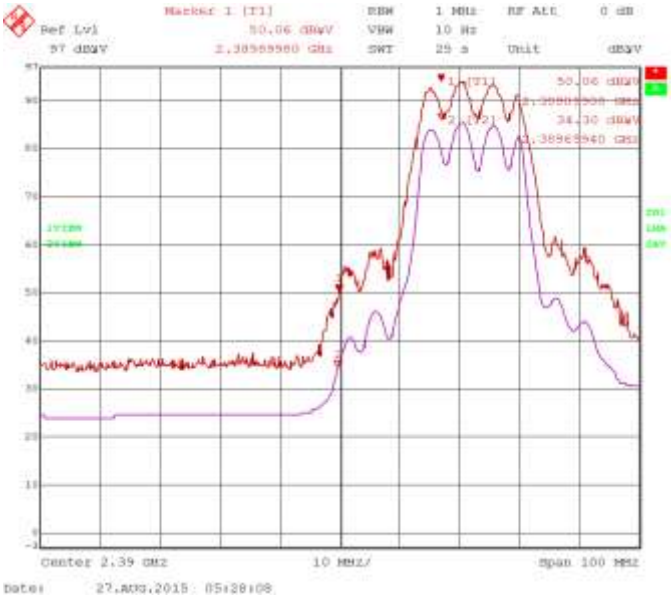


Figure 2-22: Band-Edge Compliance of RF Radiated Emission 802.11g, Channel 1, 2412 MHz, Max Pol: H, Detector: PK

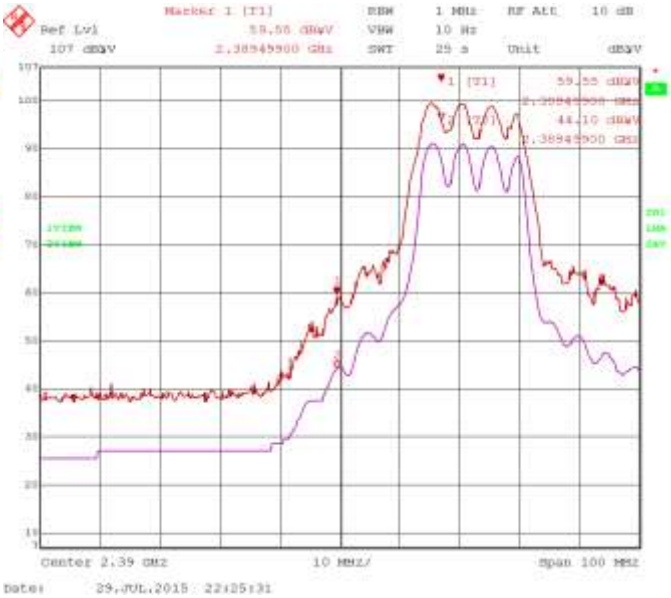


Figure 2-23: Band-Edge Compliance of RF Radiated Emission 802.11g, Channel 11, 2462 MHz, Max Pol: V, Detector: PK

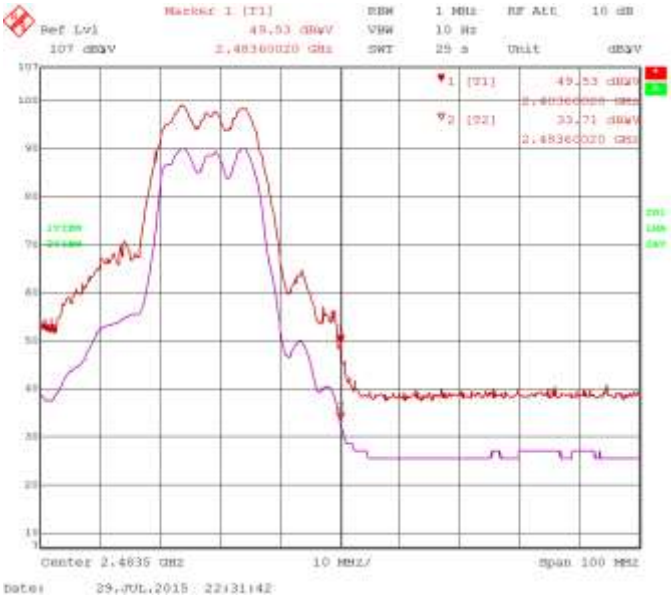
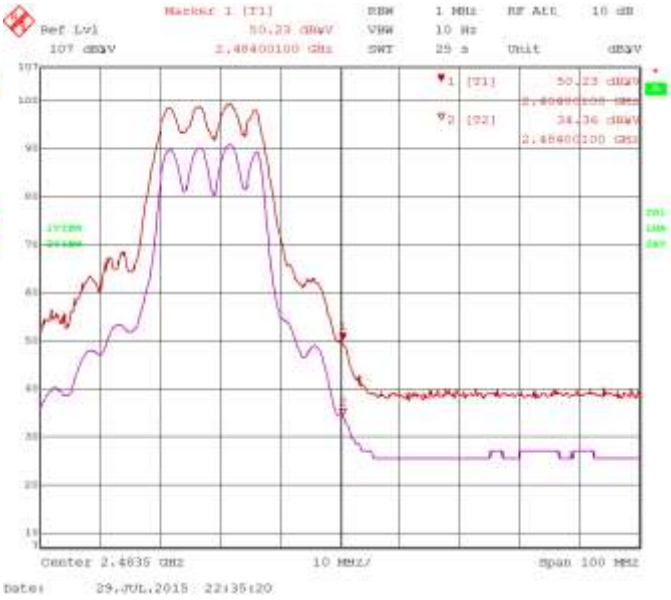


Figure 2-24: Band-Edge Compliance of RF Radiated Emission 802.11g, Channel 11, 2462 MHz, Max Pol: H, Detector: PK



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

Figure 2-25: Band-Edge Compliance of RF Radiated Emission Primary, 802.11n, Channel 1, 2412 MHz, Max Pol: V, Detector: PK

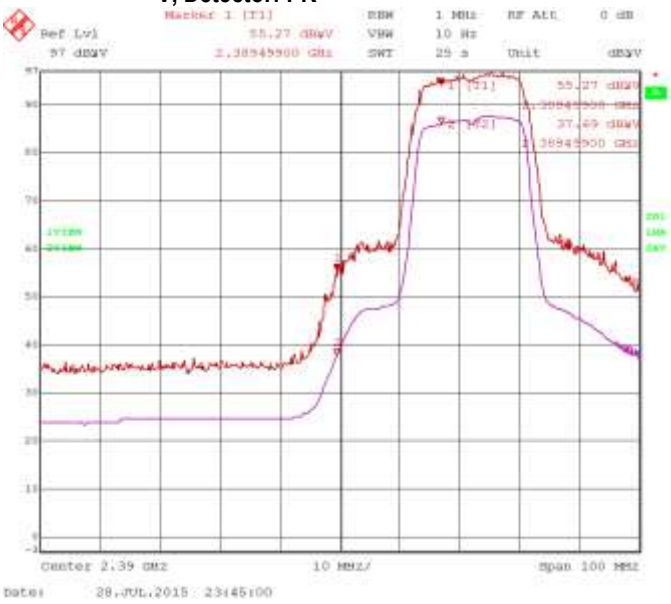


Figure 2-26: Band-Edge Compliance of RF Radiated Emission Primary, 802.11n, Channel 1, 2412 MHz, Max Pol: H, Detector: PK

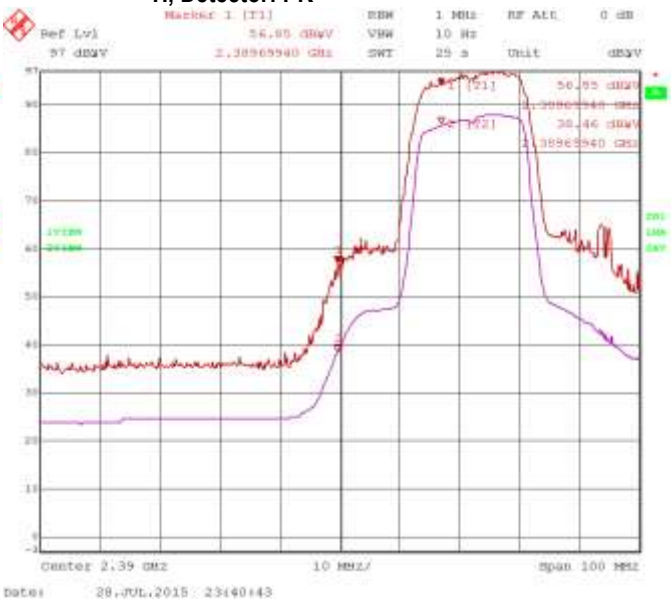


Figure 2-27: Band-Edge Compliance of RF Radiated Emission Primary, 802.11n, Channel 11, 2462 MHz, Max Pol: V, Detector: PK

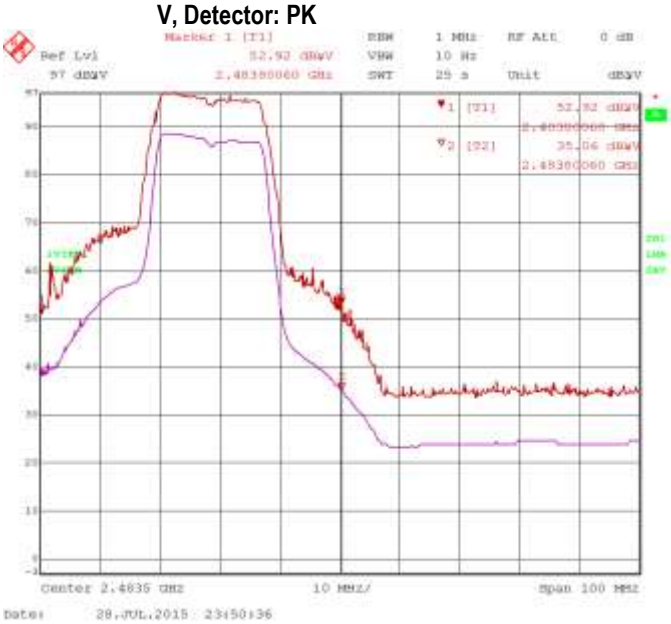
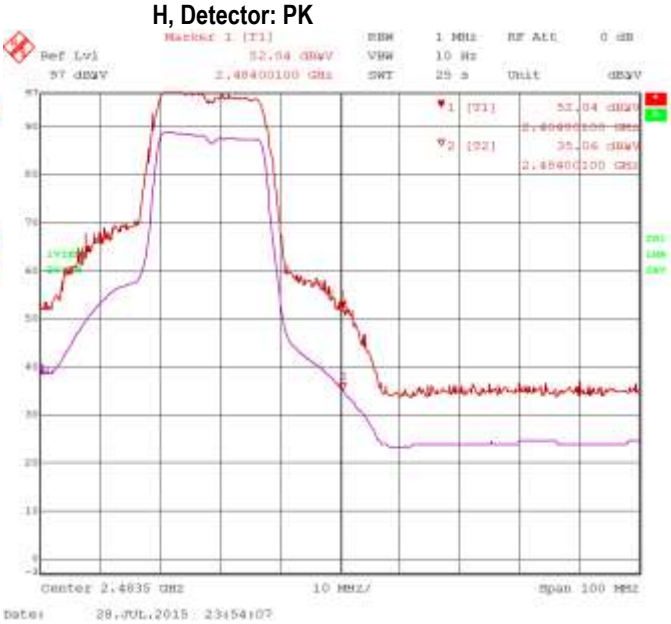


Figure 2-28: Band-Edge Compliance of RF Radiated Emission Primary, 802.11n, Channel 11, 2462 MHz, Max Pol: H, Detector: PK



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

Figure 2-29: Band-Edge Compliance of RF Radiated Emission Secondary, 802.11n, Channel 1, 2412 MHz, Max Pol: V, Detector: PK

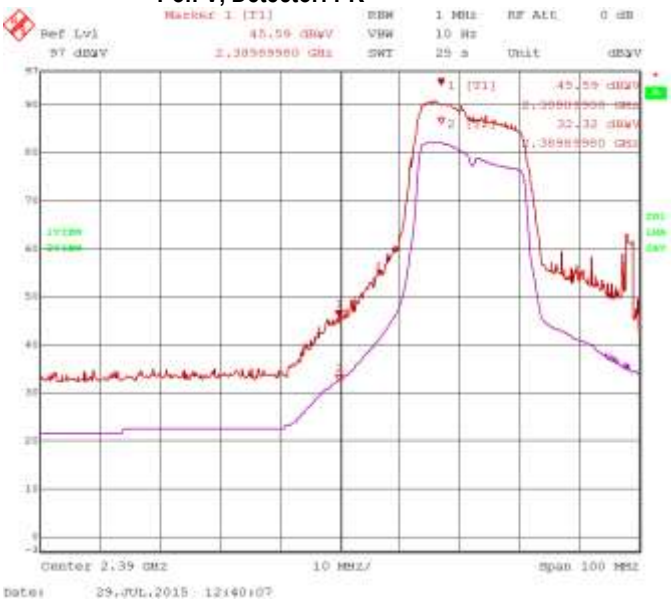


Figure 2-30: Band-Edge Compliance of RF Radiated Emission Secondary, 802.11n, Channel 1, 2412 MHz, Max Pol: H, Detector: PK

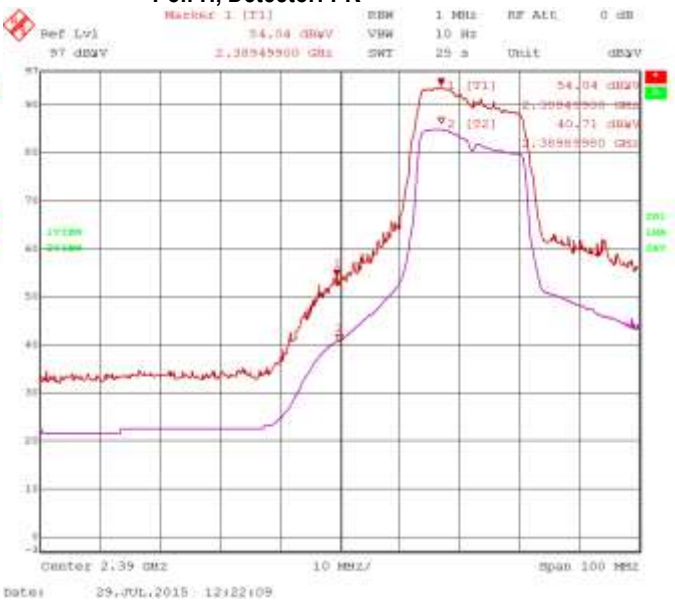


Figure 2-31: Band-Edge Compliance of RF Radiated Emission Secondary, 802.11n, Channel 11, 2462 MHz, Max Pol: V, Detector: PK

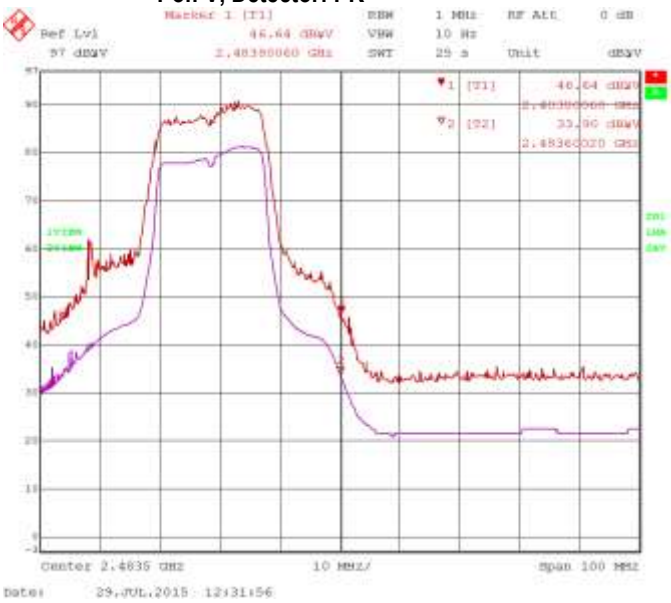
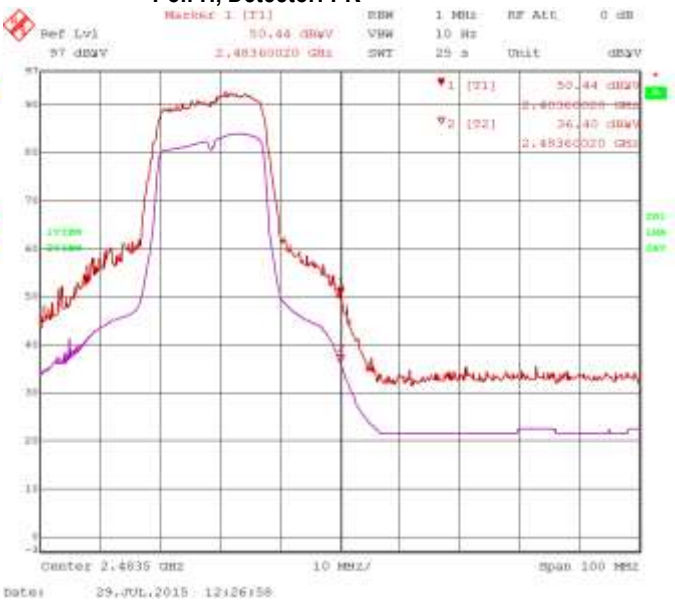


Figure 2-32: Band-Edge Compliance of RF Radiated Emission Secondary, 802.11n, Channel 11, 2462 MHz, Max Pol: H, Detector: PK



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

Figure 2-33: Band-Edge Compliance of RF Radiated Emission MIMO, 802.11n, Channel 1, 2412 MHz, Max Pol: V, Detector: PK

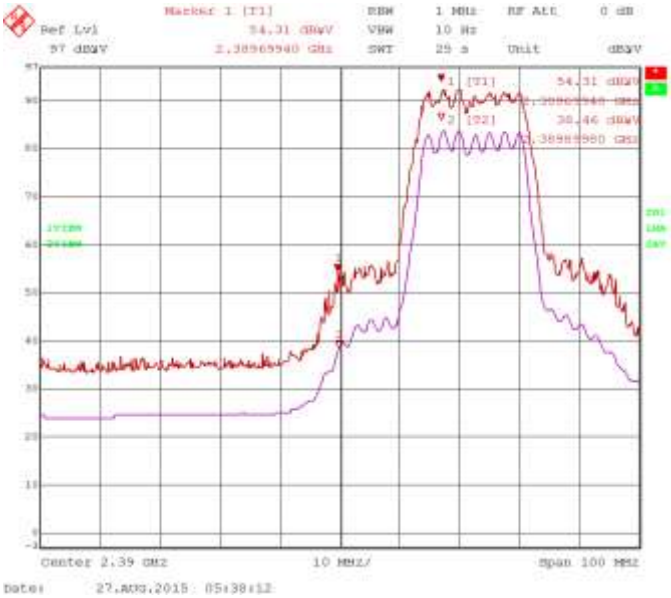


Figure 2-34: Band-Edge Compliance of RF Radiated Emission MIMO, 802.11n, Channel 1, 2412 MHz, Max Pol: H, Detector: PK

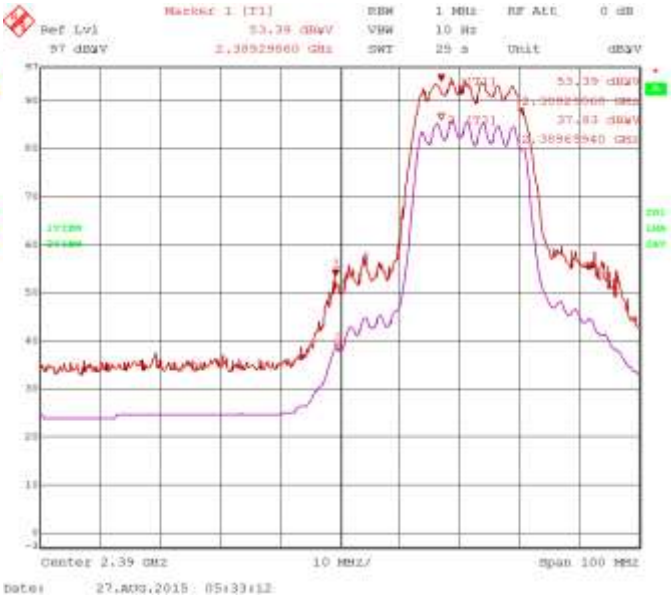


Figure 2-35: Band-Edge Compliance of RF Radiated Emission MIMO, 802.11n, Channel 11, 2462 MHz, Max Pol: V, Detector: PK

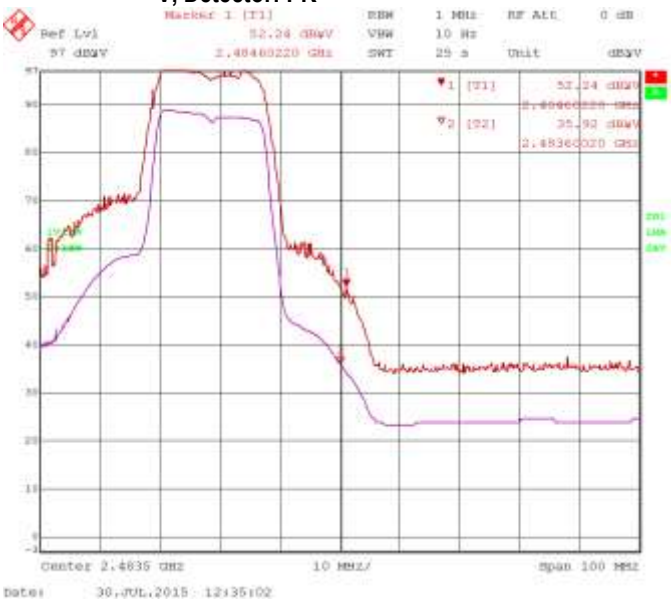
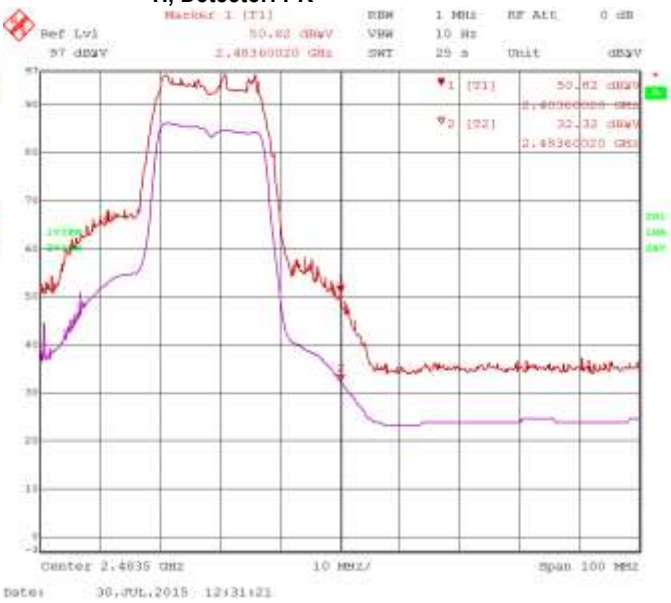


Figure 2-36: Band-Edge Compliance of RF Radiated Emission MIMO, 802.11n, Channel 11, 2462 MHz, Max Pol: H, Detector: PK



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APPENDIX 3 – 802.11a/n RADIATED EMISSIONS TEST DATA

The following test configurations were measured on model RHK211LW (STV100-1):

Radiated Emissions Test Results
802.11a Band

Date of Test: July 31, 2015 and September 8, 2015.
Measurements were performed by Shiva Kumbham and Savtej Sandhu.

The environmental test conditions were: Temperature: 26.8 ºC
Relative Humidity: 43.0 %

The test distance was 3.0 meters with a EUT height of 1.5 meters, and sweep frequency of 30 MHz to 1 GHz.

The BlackBerry® smartphone was in volume key up slider open position.

The frequency sweep measurements were performed in 802.11a TX mode at 6 Mbps on channels 36, 48, 64, 100, 140 and 165.

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

Radiated Emissions Test Results
802.11a Band

Date of Test: July 30,31, August 4, and September 8, 2015
Measurements were performed by Kevin Guo and Xing Fang.

The environmental test conditions were: Temperature: 27.7 ºC
Relative Humidity: 46.4 %

The test distance was 3.0 meters with a EUT height of 1.5 meters, and sweep frequency of 1GHz to 40GHz.

The BlackBerry® smartphone was in volume key up slider open position.

The frequency sweep measurements were performed in 802.11a TX mode at 6 Mbps on channels 36, 48, 64, 100, 140 and 165.

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

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Radiated Emissions Test Results cont'd
802.11n Band

Date of Test: July 29, 30, August 27, and September 8, 2015

The environmental test conditions were: Temperature: 26.6 ºC
Relative Humidity: 40.5 %

The test distance was 3.0 meters with a EUT height of 1.5 meters, and sweep frequency of 30 MHz to 1 GHz.

The BlackBerry® smartphone was in volume key up slider open position.

The frequency sweep measurements were performed in 802.11n TX mode at MCS 0 on channels 38, 62, 102 and 159.

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

802.11n Band

Date of Test: July 29, 30, 31, August 4, 25, and September 8, 2015

The environmental test conditions were: Temperature: 24.8 ºC
Relative Humidity: 52.9 %

The test distance was 3.0 meters with a EUT height of 1.5 meters, and sweep frequency of 1GHz to 40GHz.

The BlackBerry® smartphone was in volume key up slider open position.

The frequency sweep measurements were performed in 802.11n TX mode at MCS 0 on channels 38, 62, 102, and 159.
All emission had a test margin of greater than 25 dB.

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802.11a Band-Edge Compliance of RF Radiated Emissions

Date of Tests: July 30, and September 8, 2015
Measurements performed by Imran Kanji.

The environmental test conditions were: Temperature: 26.7 ºC
Relative Humidity: 39.5 %
The measurements were performed on BlackBerry® smartphone in standalone, volume key up slider open configuration on channels 36, 64, 100, 140 for 802.11a mode at 6 Mbps.

The test distance was performed at a distance of 3 meters.

Bandwidth 20MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11a									
36.0	5180.00	Horn	V	PK	1 MHz	45.23	68.45	74.00	-5.55
36.0	5180.00	Horn	H	PK	1 MHz	44.25	67.47	74.00	-6.53
36.0	5180.00	Horn	V	AV	10 Hz	29.73	52.95	54.00	-1.05
36.0	5180.00	Horn	H	AV	10 Hz	29.39	52.61	54.00	-1.39
Centre at Band-Edge: 5350 MHz, 802.11a									
64.0	5320.00	Horn	V	PK	1 MHz	36.29	60.25	74.00	-13.75
64.0	5320.00	Horn	H	PK	1 MHz	36.45	60.41	74.00	-13.59
64.0	5320.00	Horn	V	AV	10 Hz	24.36	48.32	54.00	-5.68
64.0	5320.00	Horn	H	AV	10 Hz	24.36	48.32	54.00	-5.68

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802.11a Band-Edge Compliance of RF Radiated Emissions cont'd

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5470 MHz, 802.11a									
100.0	5500.00	Horn	V	PK	1 MHz	35.18	60.01	74.00	-13.99
100.0	5500.00	Horn	H	PK	1 MHz	34.92	59.75	74.00	-14.25
100.0	5500.00	Horn	V	AV	10 Hz	23.71	48.54	54.00	-5.46
100.0	5500.00	Horn	H	AV	10 Hz	23.71	48.54	54.00	-5.46
Centre at Band-Edge: 5725 MHz, 802.11a									
140.0	5700.00	Horn	V	PK	1 MHz	34.43	59.65	68.20	-8.55
140.0	5700.00	Horn	H	PK	1 MHz	36.89	62.11	68.20	-6.09

See figures 3-1 to 3-8 for the plots of the 802.11a band-edge compliance.

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802.11n Band-Edge Compliance of RF Radiated Emissions

Date of Tests: September 8, 2015.
Measurements performed by Imran Kanji and Shiva Kumbham.

The environmental test conditions were: Temperature: 23.9 ºC
Relative Humidity: 22.6 %

The measurements were performed on BlackBerry® smartphone in standalone, Vertical Down configuration on channels 36, 64, 100 and 140 for 802.11n mode at MCS 0.

The test distance was performed at a distance of 3 meters.

SISO Primary Antenna

Bandwidth 20MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11n									
36.0	5180.00	Horn	V	PK	1 MHz	38.18	61.40	74.00	-12.60
36.0	5180.00	Horn	H	PK	1 MHz	41.33	64.55	74.00	-9.45
36.0	5180.00	Horn	V	AV	10 Hz	25.52	48.74	54.00	-5.26
36.0	5180.00	Horn	H	AV	10 Hz	26.54	49.76	54.00	-4.24
Centre at Band-Edge: 5350 MHz, 802.11n									
64.0	5320.00	Horn	V	PK	1 MHz	40.02	63.98	74.00	-10.02
64.0	5320.00	Horn	H	PK	1 MHz	39.40	63.36	74.00	-10.64
64.0	5320.00	Horn	V	AV	10 Hz	26.04	50.00	54.00	-4.00
64.0	5320.00	Horn	H	AV	10 Hz	26.54	50.50	54.00	-3.50

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802.11n Band-Edge Compliance of RF Radiated Emissions cont'd

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5470 MHz, 802.11n									
100.0	5500.00	Horn	V	PK	1 MHz	35.06	59.89	74.00	-14.11
100.0	5500.00	Horn	H	PK	1 MHz	40.54	65.37	74.00	-8.63
100.0	5500.00	Horn	V	AV	10 Hz	23.71	48.54	54.00	-5.46
100.0	5500.00	Horn	H	AV	10 Hz	26.04	50.87	54.00	-3.13
Centre at Band-Edge: 5725 MHz, 802.11n									
140.0	5700.00	Horn	V	PK	1 MHz	36.12	61.34	68.20	-6.86
140.0	5700.00	Horn	H	PK	1 MHz	37.25	62.47	68.20	-5.73

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802.11n Band-Edge Compliance of RF Radiated Emissions cont'd

Bandwidth 40MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11n									
38.00	5190.0	Horn	V	PK	1 MHz	39.17	62.39	74.00	-11.61
38.00	5190.0	Horn	H	PK	1 MHz	42.86	66.08	74.00	-7.92
38.00	5190.0	Horn	V	AV	10 Hz	27.01	50.23	54.00	-3.77
38.00	5190.0	Horn	H	AV	10 Hz	28.28	51.50	54.00	-2.50
Centre at Band-Edge: 5350 MHz, 802.11n									
62.00	5310.0	Horn	V	PK	1 MHz	37.34	61.30	74.00	-12.70
62.00	5310.0	Horn	H	PK	1 MHz	37.93	61.89	74.00	-12.11
62.00	5310.0	Horn	V	AV	10 Hz	24.96	48.92	54.00	-5.08
62.00	5310.0	Horn	H	AV	10 Hz	25.52	49.48	54.00	-4.52
Centre at Band-Edge: 5470 MHz, 802.11n									
102.00	5510.0	Horn	V	PK	1 MHz	36.24	61.07	74.00	-12.93
102.00	5510.0	Horn	H	PK	1 MHz	38.50	63.33	74.00	-10.67
102.00	5510.0	Horn	V	AV	10 Hz	24.36	49.19	54.00	-4.81
102.00	5510.0	Horn	H	AV	10 Hz	26.04	50.87	54.00	-3.13

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802.11n Band-Edge Compliance of RF Radiated Emissions cont'd

SISO Secondary Antenna

Bandwidth 20MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11n									
36.0	5180.00	Horn	V	PK	1 MHz	38.80	62.02	74.00	-11.98
36.0	5180.00	Horn	H	PK	1 MHz	37.88	61.10	74.00	-12.90
36.0	5180.00	Horn	V	AV	10 Hz	25.52	48.74	54.00	-5.26
36.0	5180.00	Horn	H	AV	10 Hz	25.52	48.74	54.00	-5.26
Centre at Band-Edge: 5350 MHz, 802.11n									
64.0	5320.00	Horn	V	PK	1 MHz	36.61	60.57	74.00	-13.43
64.0	5320.00	Horn	H	PK	1 MHz	34.74	58.70	74.00	-15.30
64.0	5320.00	Horn	V	AV	10 Hz	22.26	46.22	54.00	-7.78
64.0	5320.00	Horn	H	AV	10 Hz	22.26	46.22	54.00	-7.78
Centre at Band-Edge: 5470 MHz, 802.11n									
100.0	5500.00	Horn	V	PK	1 MHz	34.76	59.59	74.00	-14.41
100.0	5500.00	Horn	H	PK	1 MHz	33.90	58.73	74.00	-15.27
100.0	5500.00	Horn	V	AV	10 Hz	22.26	47.09	54.00	-6.91
100.0	5500.00	Horn	H	AV	10 Hz	22.26	47.09	54.00	-6.91
Centre at Band-Edge: 5725 MHz, 802.11n									
140.0	5700.00	Horn	V	PK	1 MHz	38.94	64.16	68.20	-4.04
140.0	5700.00	Horn	H	PK	1 MHz	41.35	66.57	68.20	-1.63

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802.11n Band-Edge Compliance of RF Radiated Emissions cont'd

Bandwidth 40MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11n									
38.00	5190.0	Horn	V	PK	1 MHz	37.32	60.54	74.00	-13.46
38.00	5190.0	Horn	H	PK	1 MHz	37.13	60.35	74.00	-13.65
38.00	5190.0	Horn	V	AV	10 Hz	24.96	48.18	54.00	-5.82
38.00	5190.0	Horn	H	AV	10 Hz	24.36	47.58	54.00	-6.42
Centre at Band-Edge: 5350 MHz, 802.11n									
62.00	5310.0	Horn	V	PK	1 MHz	35.60	59.56	74.00	-14.44
62.00	5310.0	Horn	H	PK	1 MHz	36.35	60.31	74.00	-13.69
62.00	5310.0	Horn	V	AV	10 Hz	24.36	48.32	54.00	-5.68
62.00	5310.0	Horn	H	AV	10 Hz	24.36	48.32	54.00	-5.68
Centre at Band-Edge: 5470 MHz, 802.11n									
102.00	5510.0	Horn	V	PK	1 MHz	35.07	59.90	74.00	-14.10
102.00	5510.0	Horn	H	PK	1 MHz	35.64	60.47	74.00	-13.53
102.00	5510.0	Horn	V	AV	10 Hz	23.71	48.54	54.00	-5.46
102.00	5510.0	Horn	H	AV	10 Hz	23.71	48.54	54.00	-5.46

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802.11n Band-Edge Compliance of RF Radiated Emissions cont'd

MIMO Antenna Configuration

Bandwidth 20MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11n									
36.0	5180.00	Horn	V	PK	1 MHz	42.24	65.46	74.00	-8.54
36.0	5180.00	Horn	H	PK	1 MHz	40.76	63.98	74.00	-10.02
36.0	5180.00	Horn	V	AV	10 Hz	27.46	50.68	54.00	-3.32
36.0	5180.00	Horn	H	AV	10 Hz	27.46	50.68	54.00	-3.32
Centre at Band-Edge: 5350 MHz, 802.11n									
64.0	5320.00	Horn	V	PK	1 MHz	39.78	63.74	74.00	-10.26
64.0	5320.00	Horn	H	PK	1 MHz	43.03	66.99	74.00	-7.01
64.0	5320.00	Horn	V	AV	10 Hz	27.01	50.97	54.00	-3.03
64.0	5320.00	Horn	H	AV	10 Hz	27.88	51.84	54.00	-2.16
Centre at Band-Edge: 5470 MHz, 802.11n									
100.0	5500.00	Horn	V	PK	1 MHz	36.03	60.86	74.00	-13.14
100.0	5500.00	Horn	H	PK	1 MHz	40.02	64.85	74.00	-9.15
100.0	5500.00	Horn	V	AV	10 Hz	23.71	48.54	54.00	-5.46
100.0	5500.00	Horn	H	AV	10 Hz	27.88	52.71	54.00	-1.29
Centre at Band-Edge: 5725 MHz, 802.11n									
140.0	5700.00	Horn	V	PK	1 MHz	41.81	67.03	68.20	-1.17
140.0	5700.00	Horn	H	PK	1 MHz	35.46	60.68	68.20	-7.52

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802.11n Band-Edge Compliance of RF Radiated Emissions cont'd

Bandwidth 40MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11n									
38.00	5190.0	Horn	V	PK	1 MHz	35.93	59.15	74.00	-14.85
38.00	5190.0	Horn	H	PK	1 MHz	43.32	66.54	74.00	-7.46
38.00	5190.0	Horn	V	AV	10 Hz	24.36	47.58	54.00	-6.42
38.00	5190.0	Horn	H	AV	10 Hz	29.04	52.26	54.00	-1.74
Centre at Band-Edge: 5350 MHz, 802.11n									
62.00	5310.0	Horn	V	PK	1 MHz	35.02	58.98	74.00	-15.02
62.00	5310.0	Horn	H	PK	1 MHz	36.78	60.74	74.00	-13.26
62.00	5310.0	Horn	V	AV	10 Hz	24.36	48.32	54.00	-5.68
62.00	5310.0	Horn	H	AV	10 Hz	24.36	48.32	54.00	-5.68
Centre at Band-Edge: 5470 MHz, 802.11n									
102.00	5510.0	Horn	V	PK	1 MHz	37.86	62.69	74.00	-11.31
102.00	5510.0	Horn	H	PK	1 MHz	40.08	64.91	74.00	-9.09
102.00	5510.0	Horn	V	AV	10 Hz	26.04	50.87	54.00	-3.13
102.00	5510.0	Horn	H	AV	10 Hz	27.88	52.71	54.00	-1.29

See figures 3-9 to 3-50 for the plots of the 802.11n band-edge compliance.

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802.11a Band-Edge Compliance of RF Radiated Emissions cont'd

Figure 3-1: Band-Edge Compliance of RF Radiated Emission 802.11a, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz Pol: V, Detector: PK

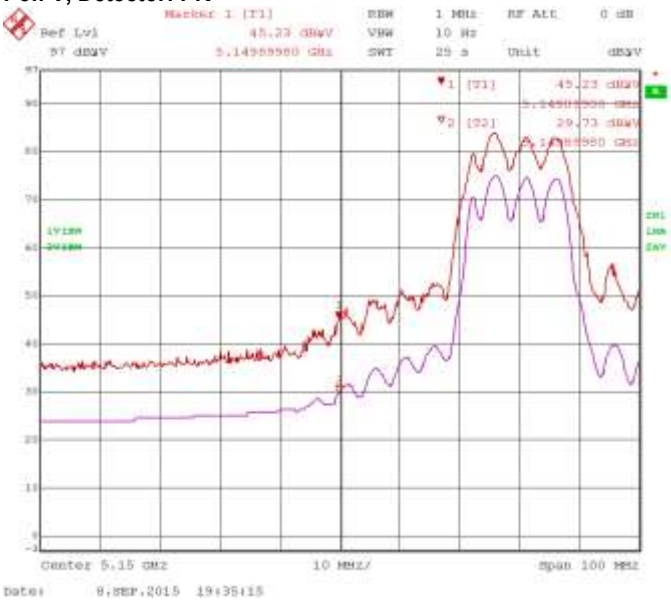


Figure 3-2: Band-Edge Compliance of RF Radiated Emission 802.11a, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz Pol: H, Detector: PK

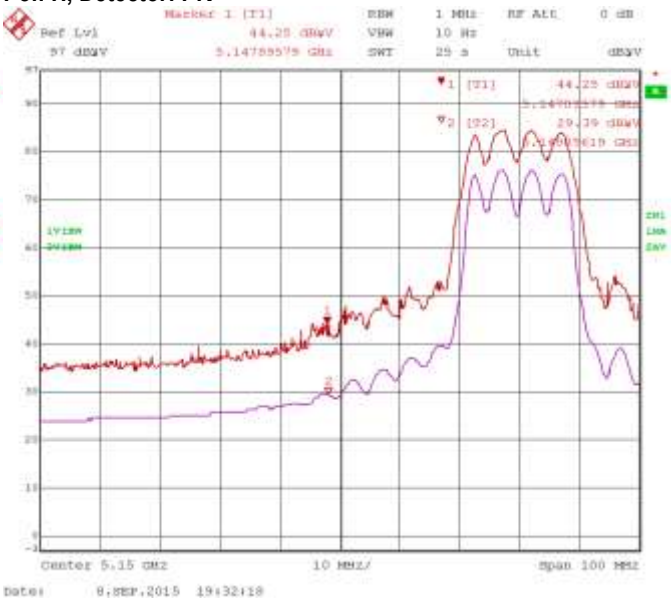


Figure 3-3: Band-Edge Compliance of RF Radiated Emission 802.11a, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz Pol: V, Detector: PK

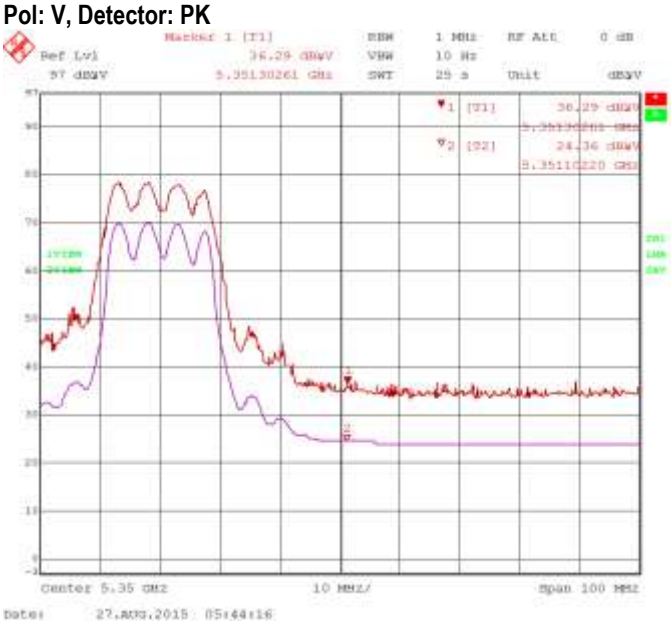
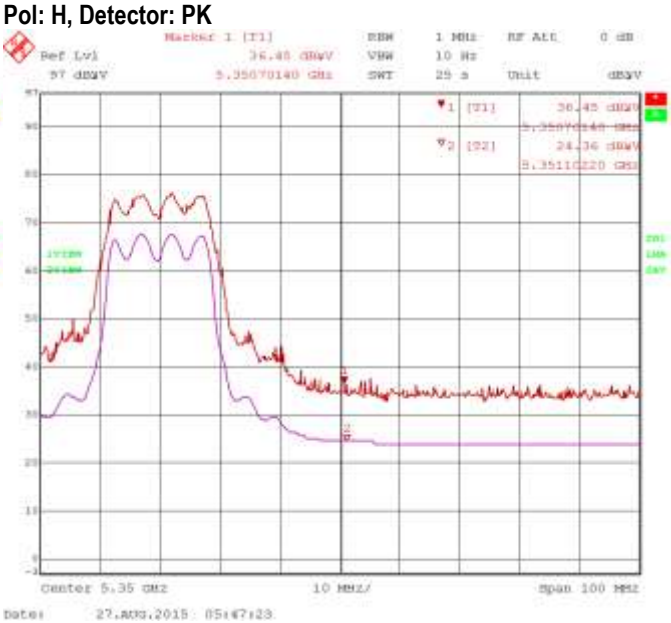


Figure 3-4: Band-Edge Compliance of RF Radiated Emission 802.11a, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz Pol: H, Detector: PK



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802.11a Band-Edge Compliance of RF Radiated Emissions cont'd

Figure 3-5: Band-Edge Compliance of RF Radiated Emission 802.11a, Ch. 100, 5500 MHz, Centre of Band-Edge: 5460 MHz Pol: V, Detector: PK

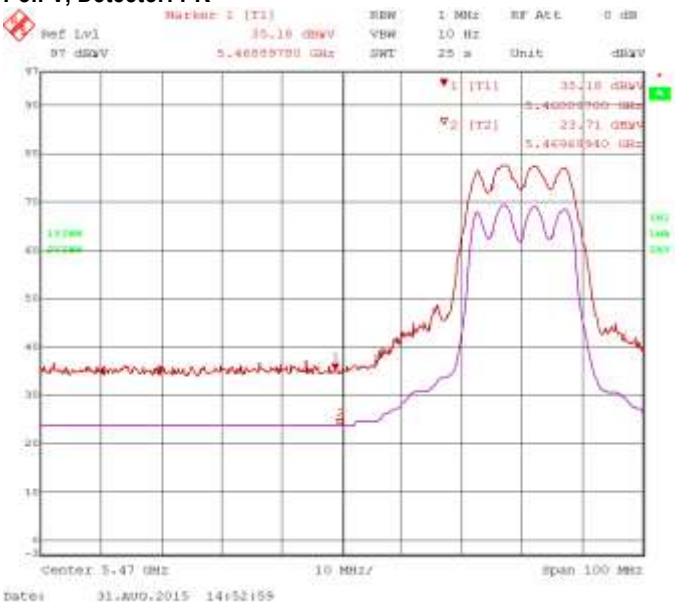


Figure 3-6: Band-Edge Compliance of RF Radiated Emission. 802.11a, Ch. 100, 5500 MHz, Centre of Band-Edge: 5460 MHz Pol: H, Detector: PK

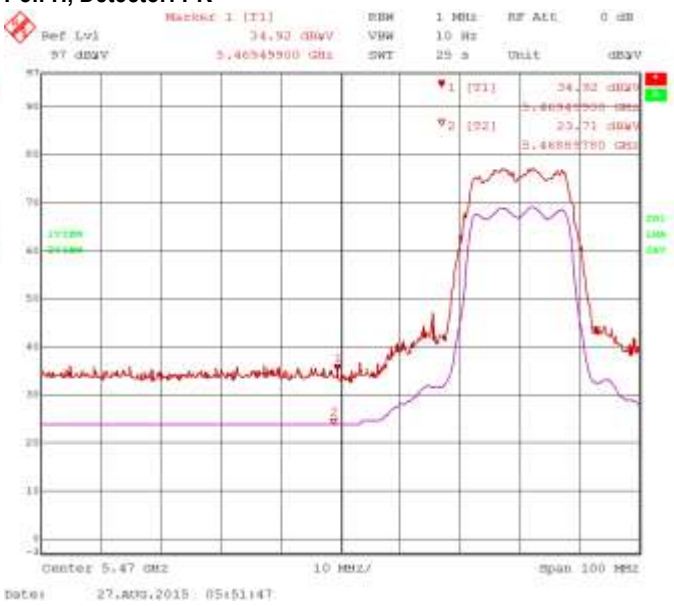


Figure 3-7: Band-Edge Compliance of RF Radiated Emission. 802.11a, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz Pol: V, Detector: PK

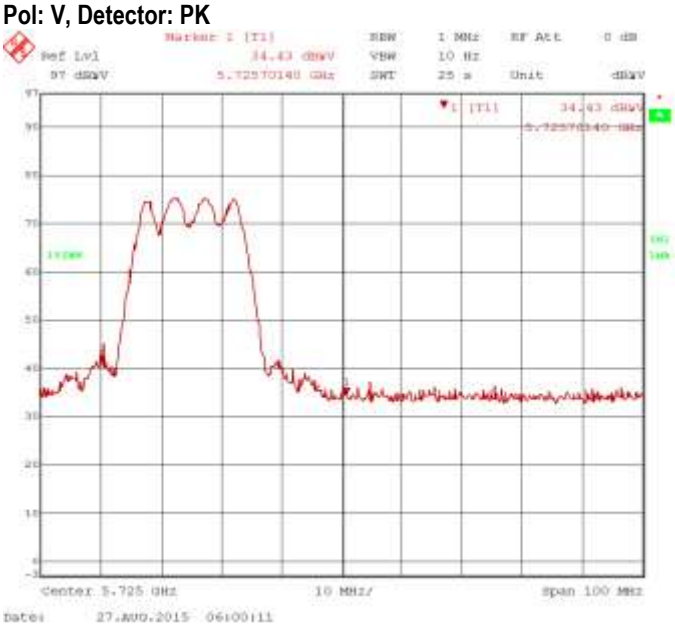
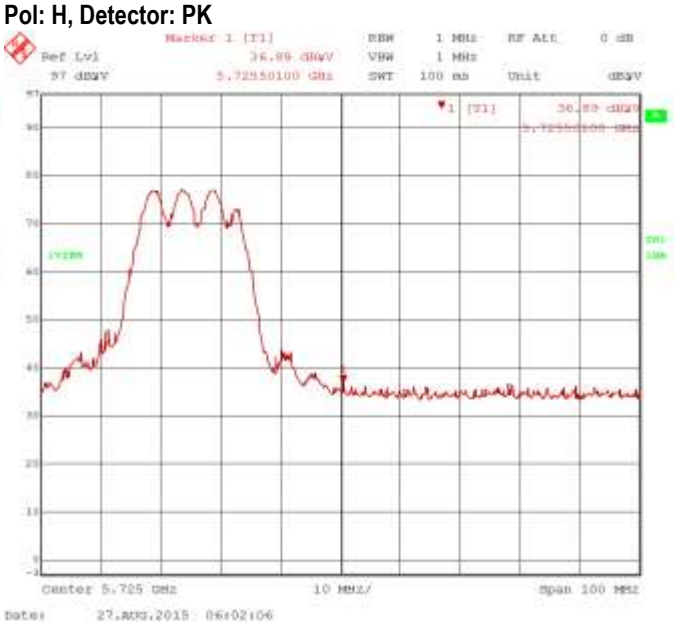


Figure 3-8: Band-Edge Compliance of RF Radiated Emission. 802.11a, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz Pol: H, Detector: PK



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802.11n Band-Edge Compliance of RF Radiated Emissions
Primary - 20 MHz Bandwidth

Figure 3-9: Band-Edge Compliance of RF Radiated Emission 802.11n, Primary, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

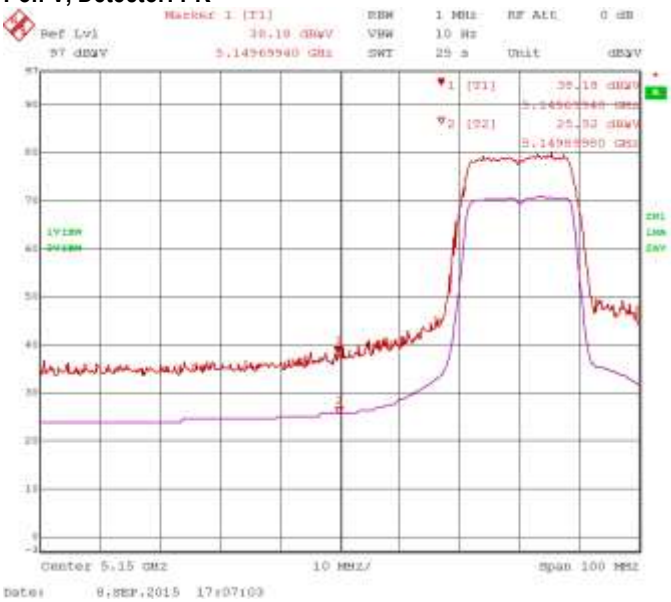


Figure 3-10: Band-Edge Compliance of RF Radiated Emission 802.11n, Primary, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK

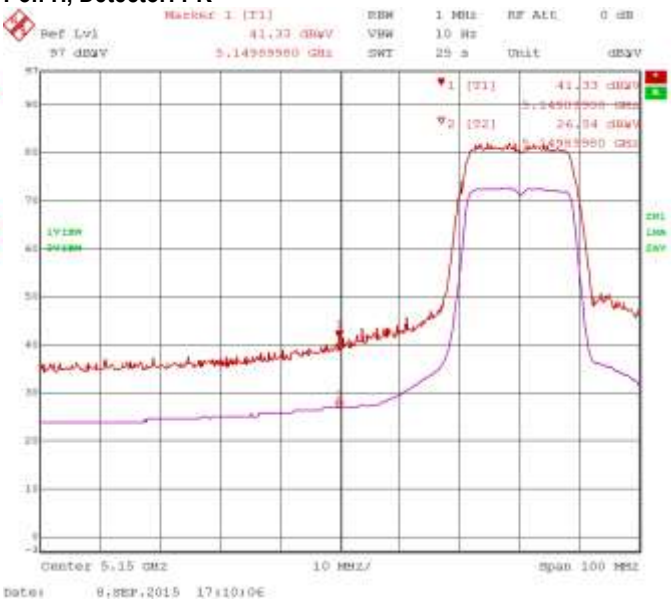


Figure 3-11: Band-Edge Compliance of RF Radiated Emission 802.11n, Primary, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

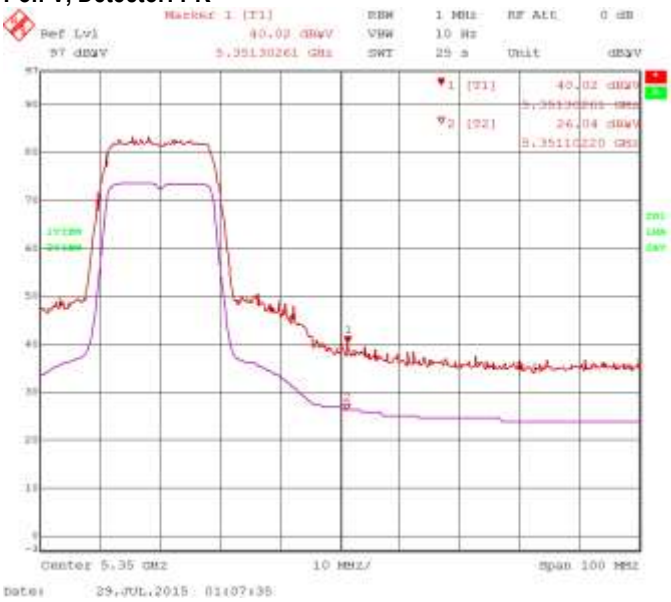
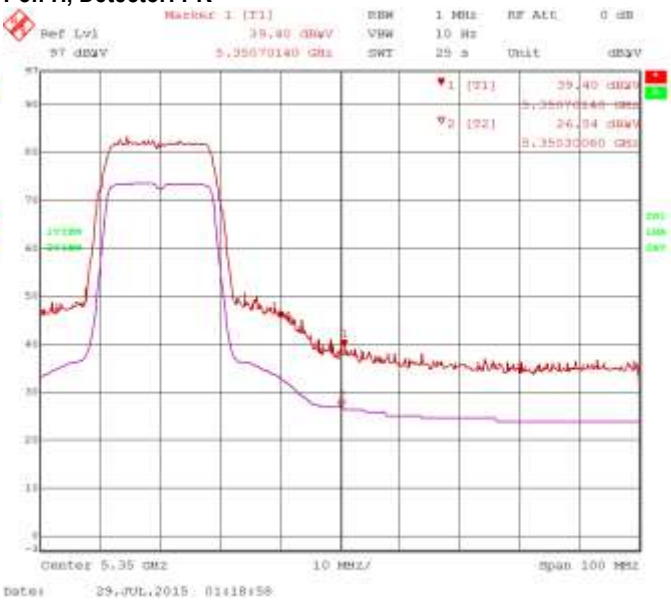


Figure 3-12: Band-Edge Compliance of RF Radiated Emission 802.11n, Primary, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK



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802.11n Band-Edge Compliance of RF Radiated Emissions cont'd

Figure 3-13: Band-Edge Compliance of RF Radiated Emission 802.11n, Primary, Ch. 100, 5500 MHz, Centre of Band-Edge: 5460 MHz
Pol: V, Detector: PK

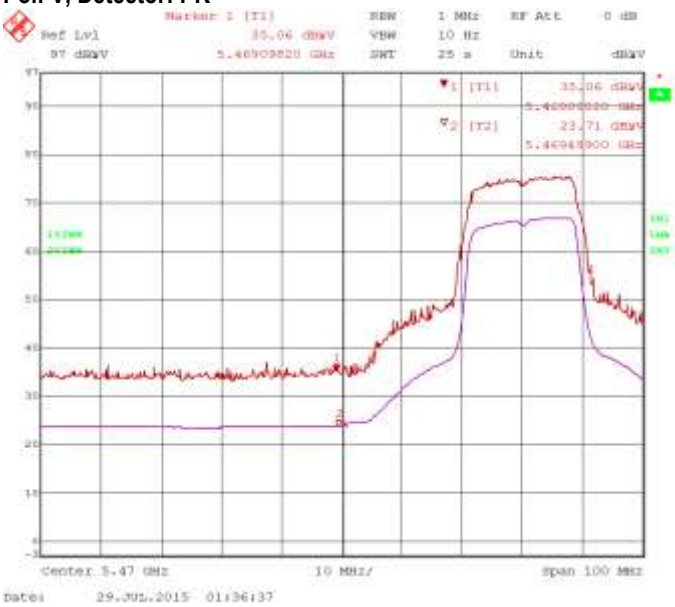


Figure 3-14: Band-Edge Compliance of RF Radiated Emission. 802.11n, Primary, Ch. 100, 5500 MHz, Centre of Band-Edge: 5460 MHz
Pol: H, Detector: PK

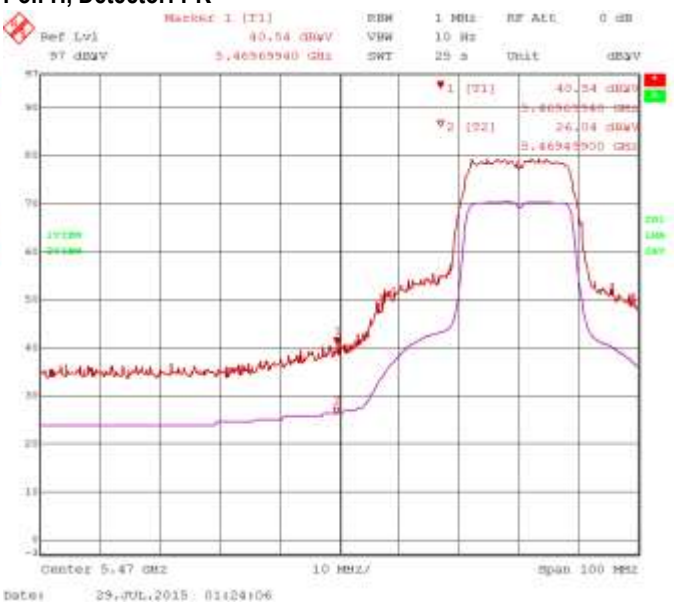


Figure 3-15: Band-Edge Compliance of RF Radiated Emission. 802.11n, Primary, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz
Pol: V, Detector: PK

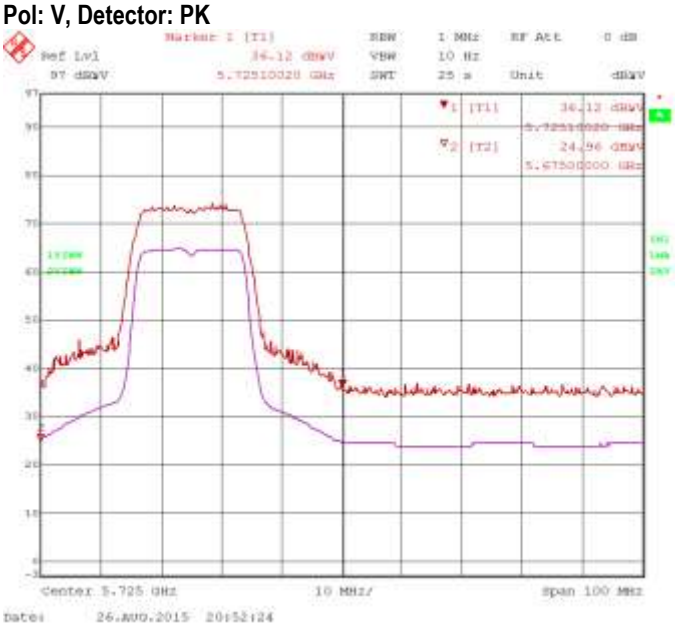
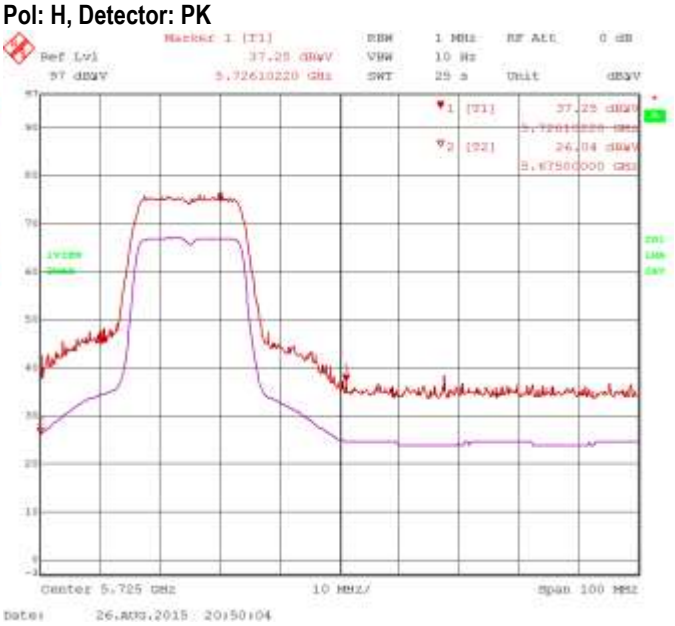


Figure 3-16: Band-Edge Compliance of RF Radiated Emission. 802.11n, Primary, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz
Pol: H, Detector: PK



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802.11n Band-Edge Compliance of RF Radiated Emissions
Primary - 40 MHz Bandwidth

Figure 3-17: Band-Edge Compliance of RF Radiated Emission 802.11n, Primary, Ch. 38, 5190 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

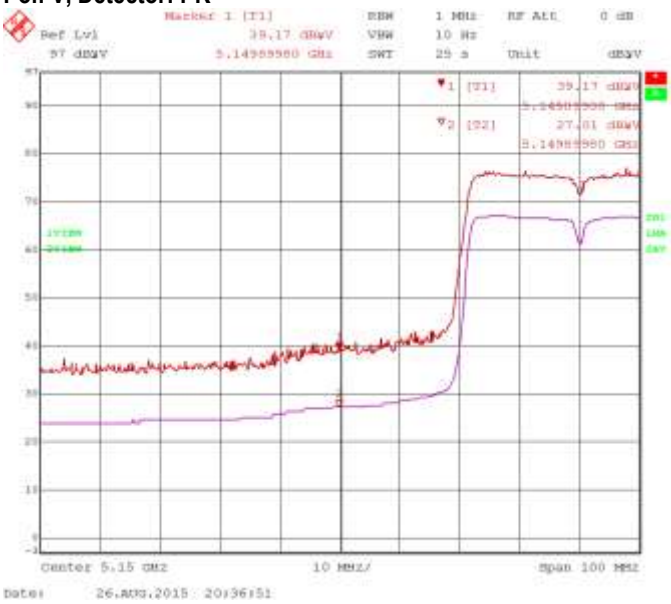


Figure 3-18: Band-Edge Compliance of RF Radiated Emission 802.11n, Primary, Ch. 38, 5190 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK

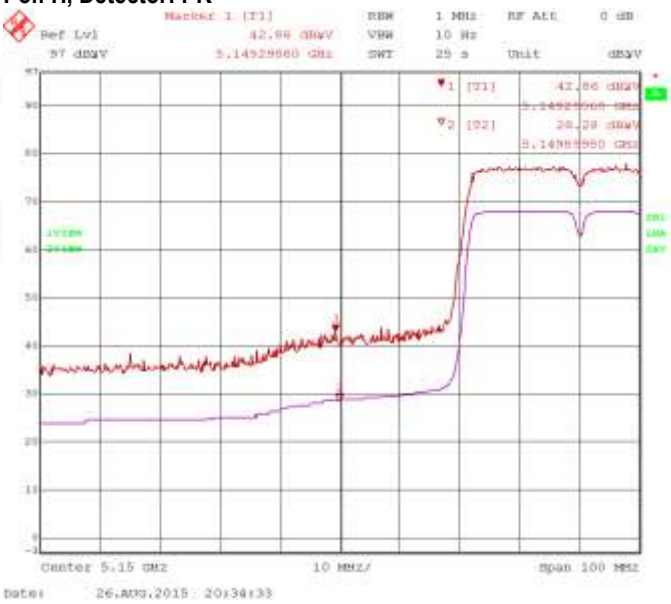


Figure 3-19 Band-Edge Compliance of RF Radiated Emission 802.11n, Primary, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

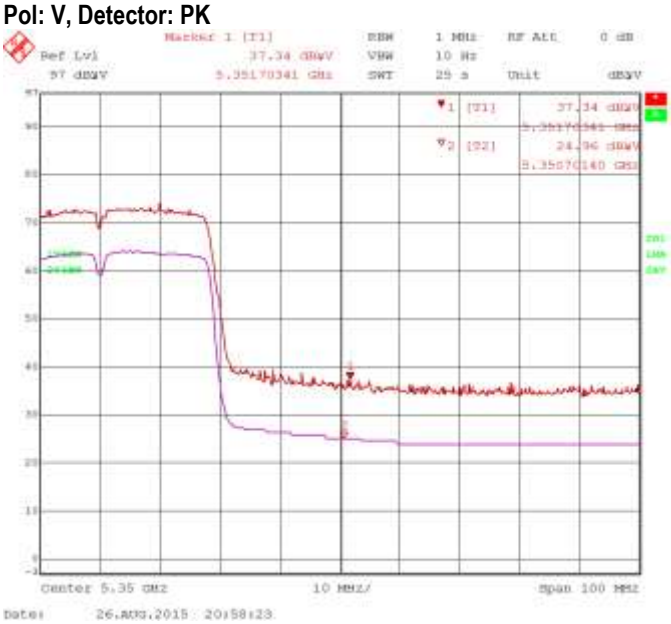
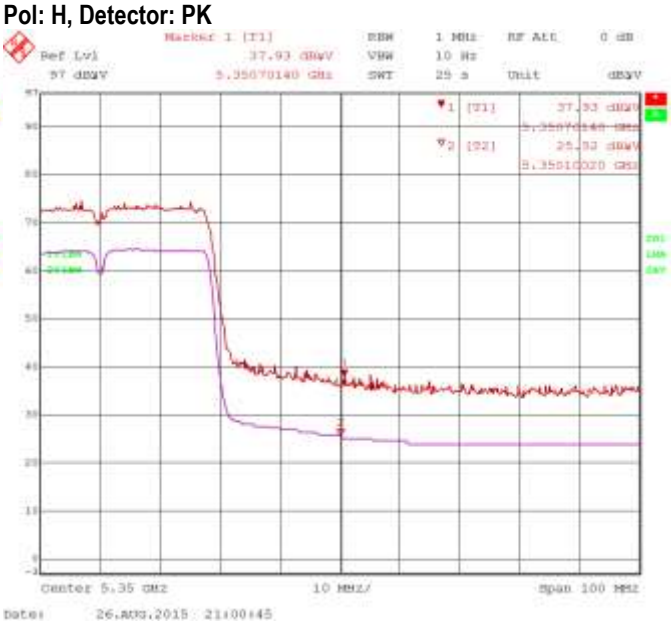


Figure 3-20: Band-Edge Compliance of RF Radiated Emission 802.11n, Primary, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK



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802.11n Band-Edge Compliance of RF Radiated Emissions cont'd

Figure 3-21: Band-Edge Compliance of RF Radiated Emission 802.11n, Primary, Ch. 102, 55100 MHz, Centre of Band-Edge: 5470 MHz
Pol: V, Detector: PK

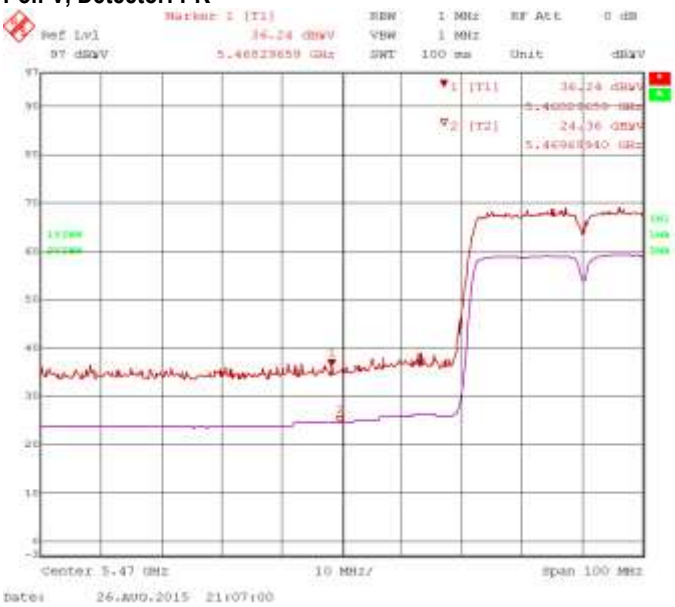
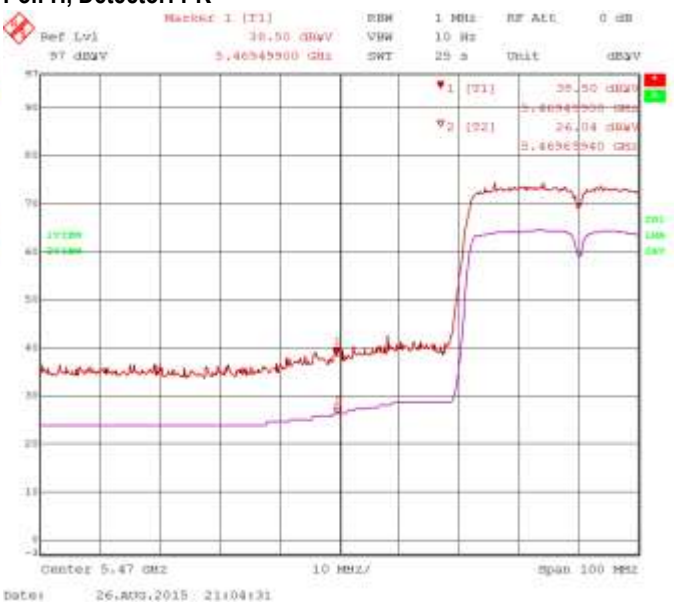


Figure 3-22: Band-Edge Compliance of RF Radiated Emission. 802.11n, Primary, Ch. 102, 5510 MHz, Centre of Band-Edge: 5470 MHz
Pol: H, Detector: PK



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802.11n Band-Edge Compliance of RF Radiated Emissions
Secondary - 20 MHz Bandwidth

Figure 3-23: Band-Edge Compliance of RF Radiated Emission 802.11n, Secondary, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

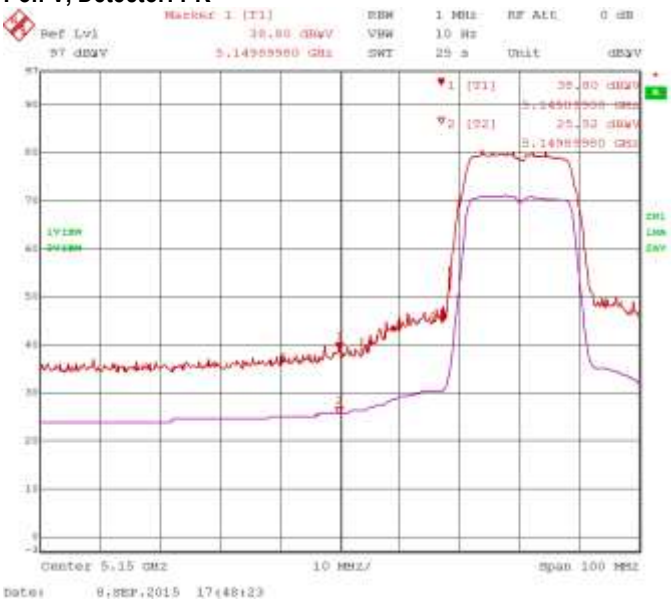


Figure 3-24: Band-Edge Compliance of RF Radiated Emission 802.11n, Secondary, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK

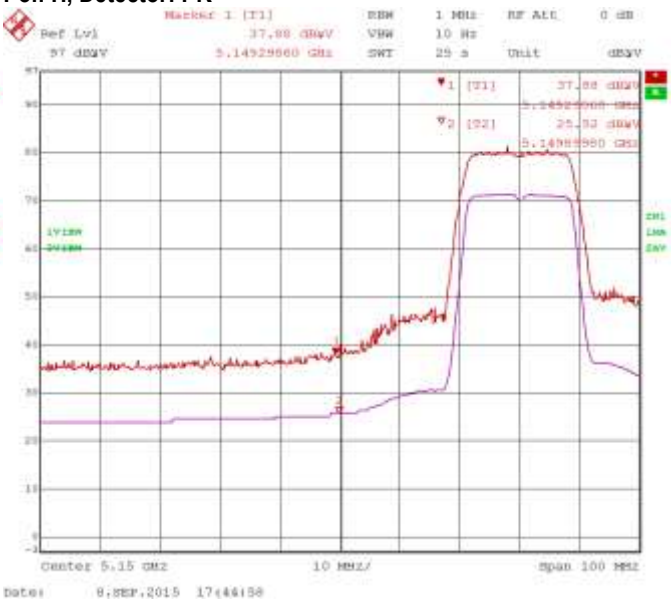


Figure 3-25: Band-Edge Compliance of RF Radiated Emission 802.11n, Secondary, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

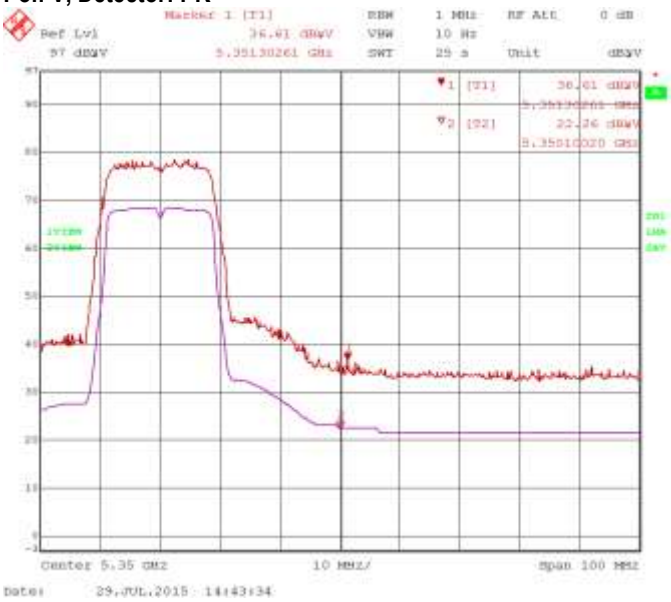
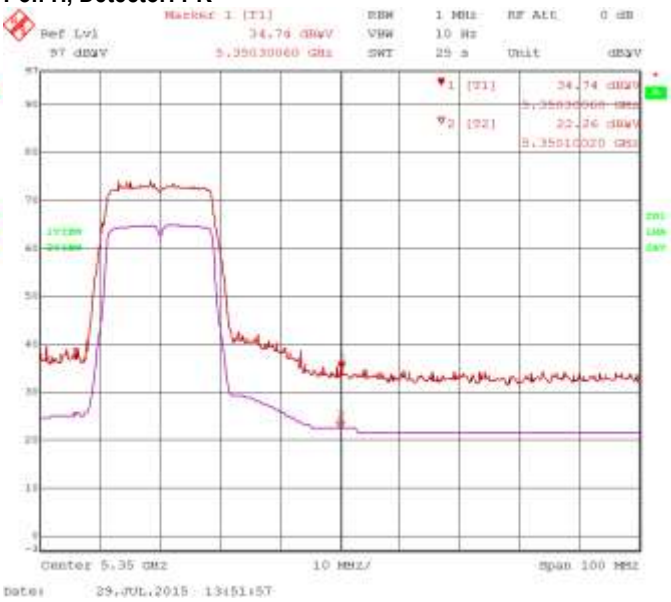


Figure 3-26: Band-Edge Compliance of RF Radiated Emission 802.11n, Secondary, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK



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802.11n Band-Edge Compliance of RF Radiated Emissions cont'd

Figure 3-27: Band-Edge Compliance of RF Radiated Emission 802.11n, Secondary, Ch. 100, 5500 MHz, Centre of Band-Edge: 5460 MHz
Pol: V, Detector: PK

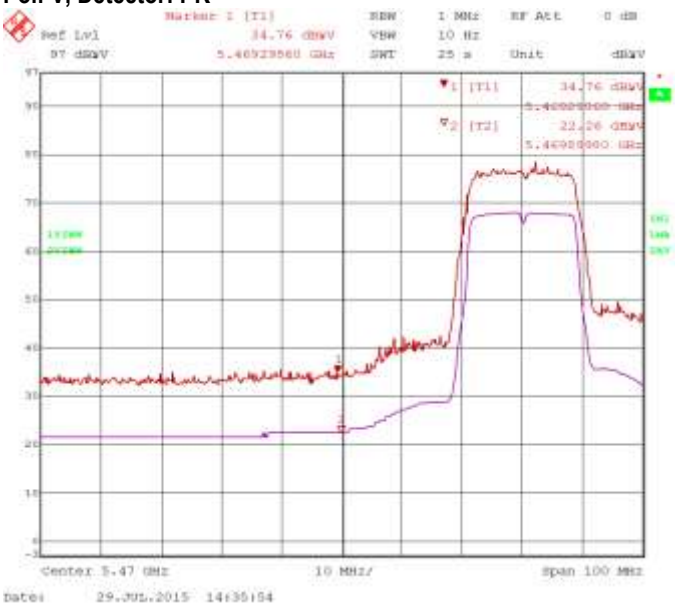


Figure 3-28: Band-Edge Compliance of RF Radiated Emission. 802.11n, Secondary, Ch. 100, 5500 MHz, Centre of Band-Edge: 5460 MHz
Pol: H, Detector: PK

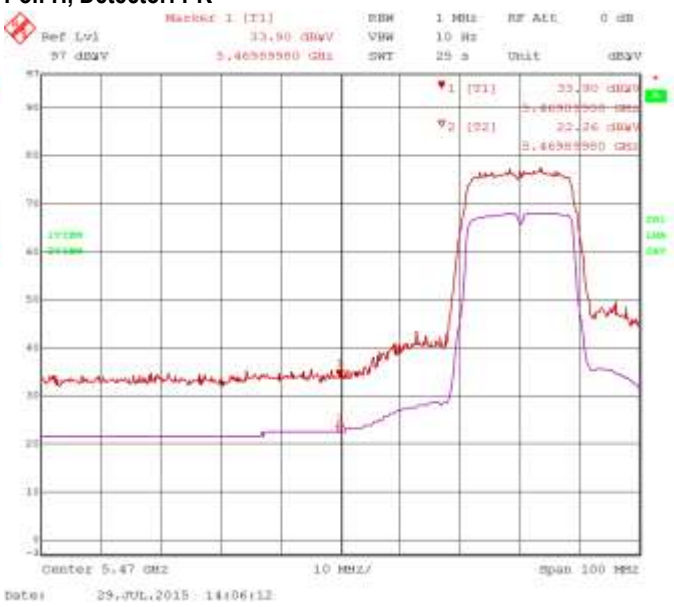


Figure 3-29: Band-Edge Compliance of RF Radiated Emission. 802.11n, Secondary, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz
Pol: V, Detector: PK

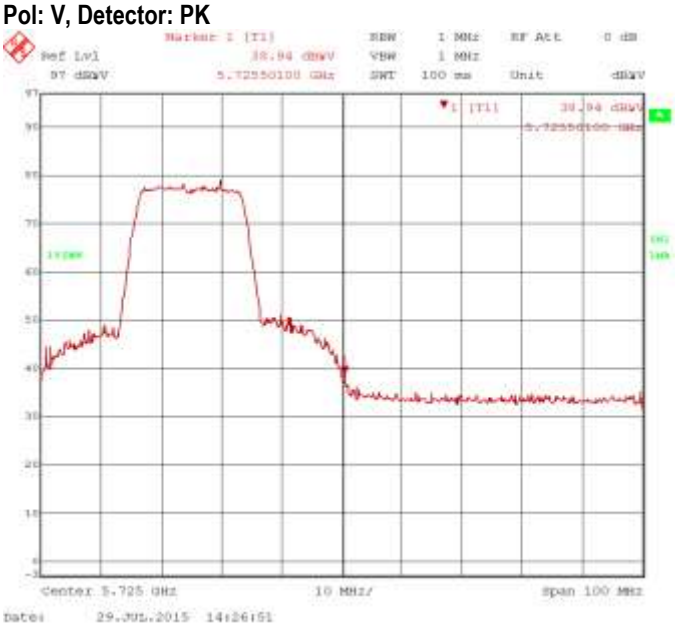
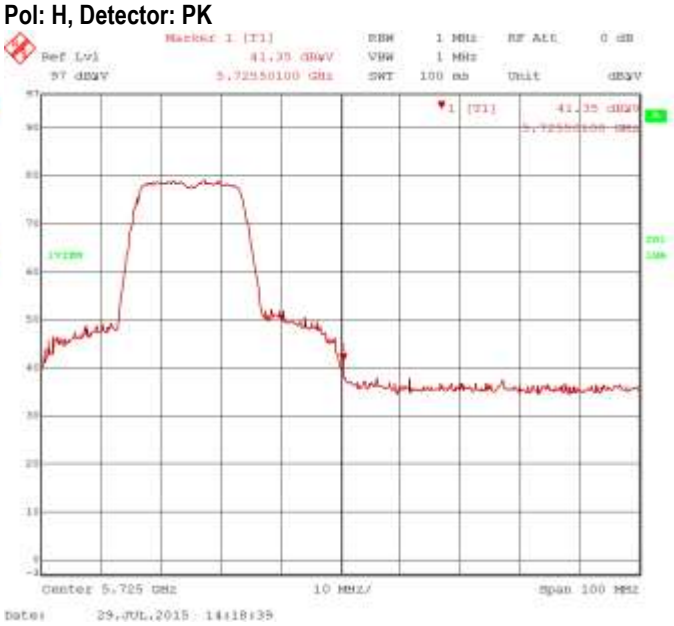


Figure 3-30: Band-Edge Compliance of RF Radiated Emission. 802.11n, Secondary, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz
Pol: H, Detector: PK



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802.11n Band-Edge Compliance of RF Radiated Emissions
Secondary - 40 MHz Bandwidth

Figure 3-31: Band-Edge Compliance of RF Radiated Emission 802.11n, Secondary, Ch. 38, 5190 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

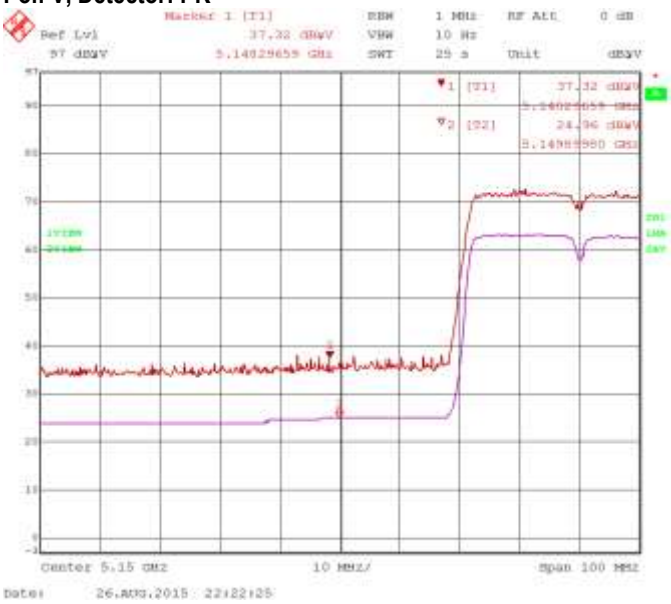


Figure 3-32: Band-Edge Compliance of RF Radiated Emission 802.11n, Secondary, Ch. 38, 5190 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK

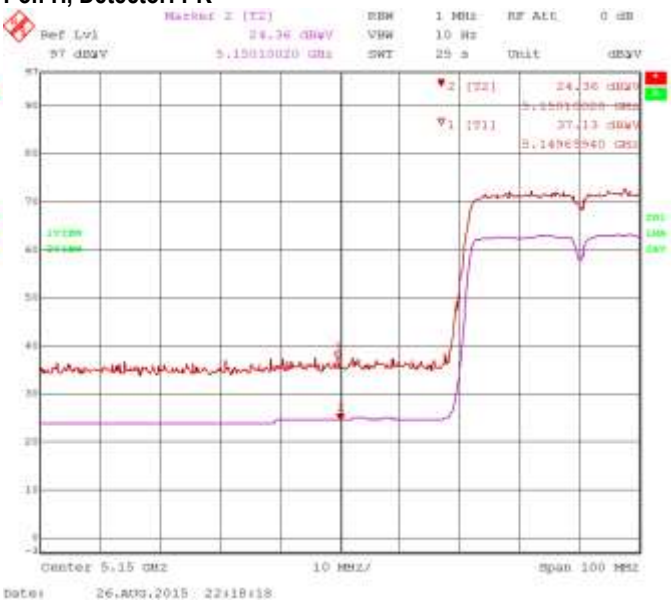


Figure 3-33: Band-Edge Compliance of RF Radiated Emission 802.11n, Secondary, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

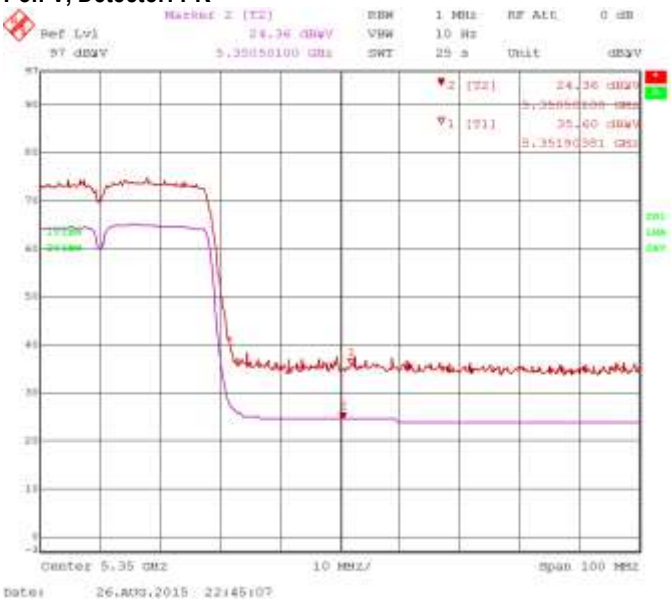
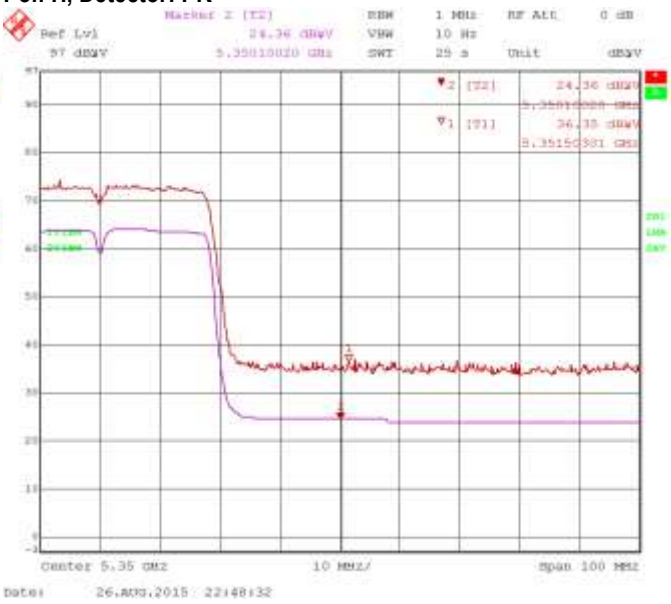


Figure 3-34: Band-Edge Compliance of RF Radiated Emission 802.11n Secondary, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK



802.11n Band-Edge Compliance of RF Radiated Emissions cont'd

Figure 3-35: Band-Edge Compliance of RF Radiated Emission 802.11n, Secondary, Ch. 102, 55100 MHz, Centre of Band-Edge: 5470 MHz
Pol: V, Detector: PK

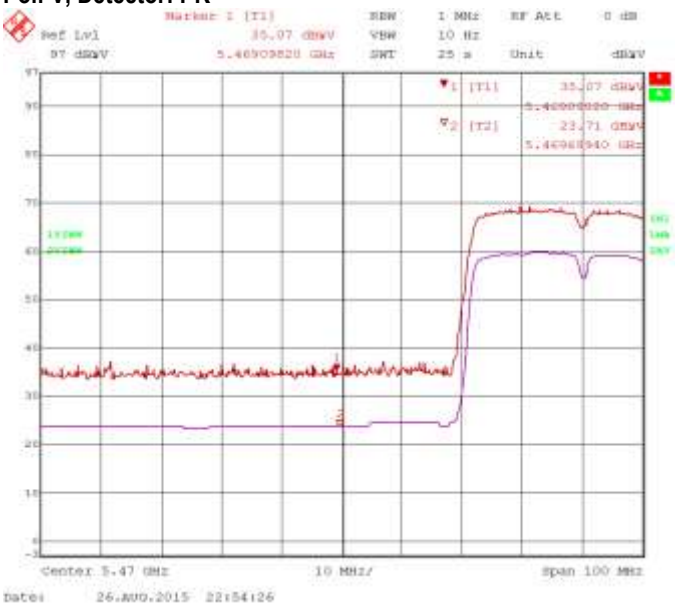
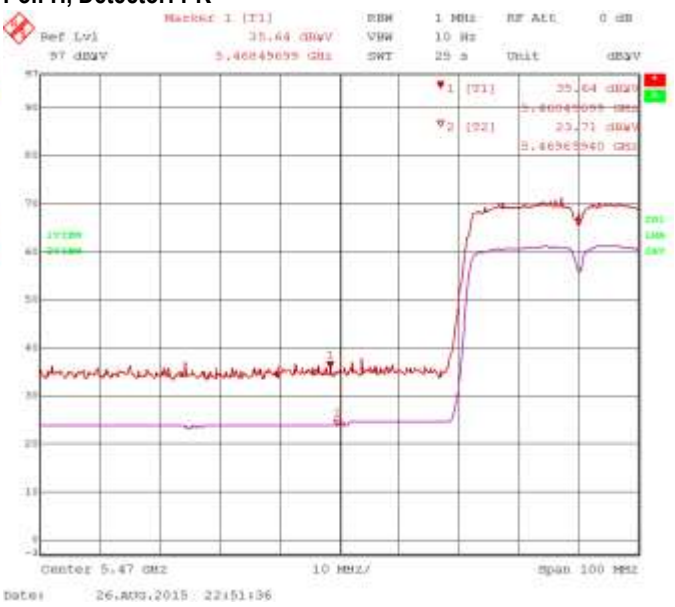


Figure 3-36: Band-Edge Compliance of RF Radiated Emission. 802.11n, Secondary, Ch. 102, 5510 MHz, Centre of Band-Edge: 5470 MHz
Pol: H, Detector: PK



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802.11n Band-Edge Compliance of RF Radiated Emissions
MIMO - 20 MHz Bandwidth

Figure 3-37: Band-Edge Compliance of RF Radiated Emission 802.11n, MIMO, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

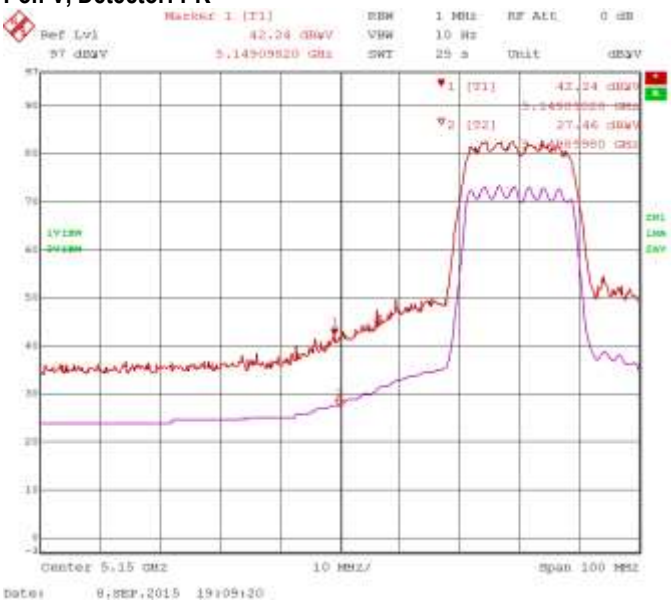


Figure 3-38: Band-Edge Compliance of RF Radiated Emission 802.11n, MIMO, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK

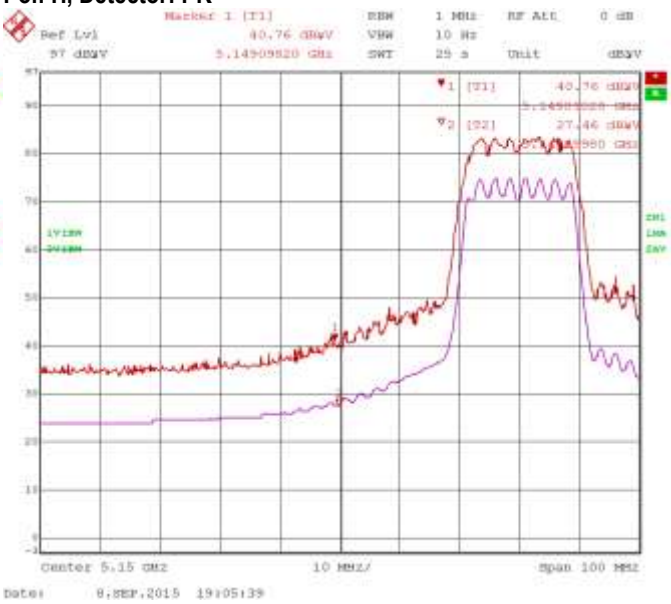


Figure 3-39: Band-Edge Compliance of RF Radiated Emission 802.11n, MIMO, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

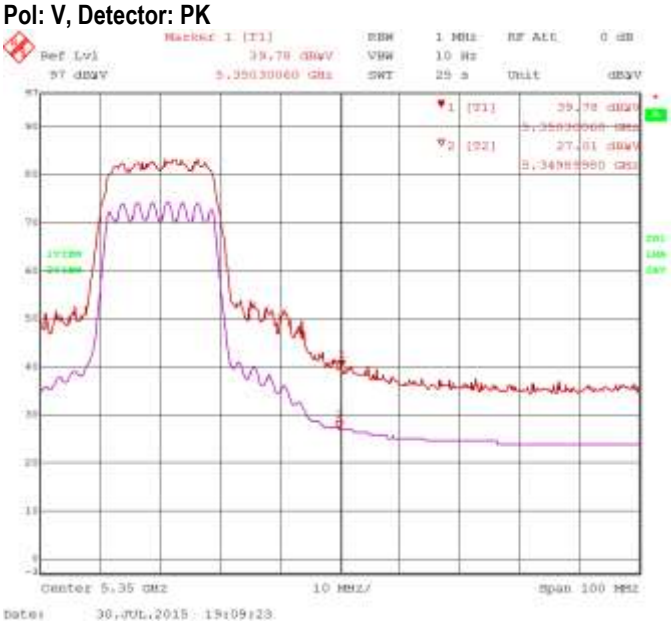
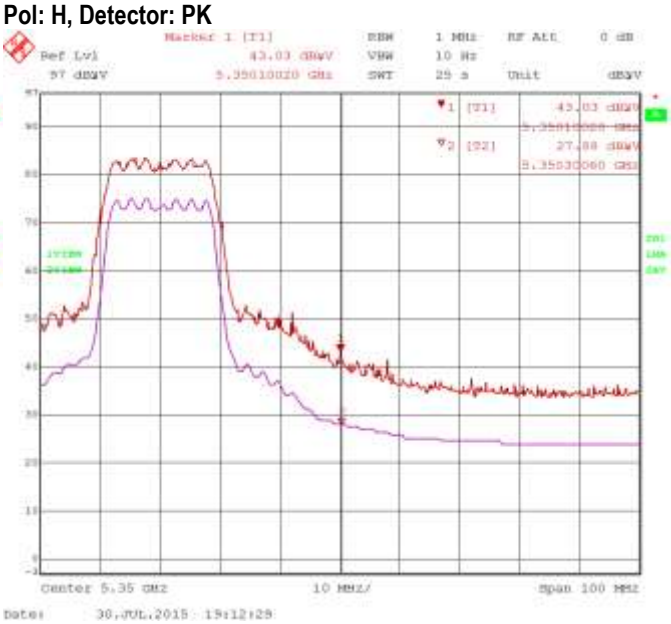


Figure 3-40: Band-Edge Compliance of RF Radiated Emission 802.11n, MIMO, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK



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802.11n Band-Edge Compliance of RF Radiated Emissions cont'd

Figure 3-41: Band-Edge Compliance of RF Radiated Emission 802.11n, MIMO, Ch. 100, 5500 MHz, Centre of Band-Edge: 5460 MHz
Pol: V, Detector: PK

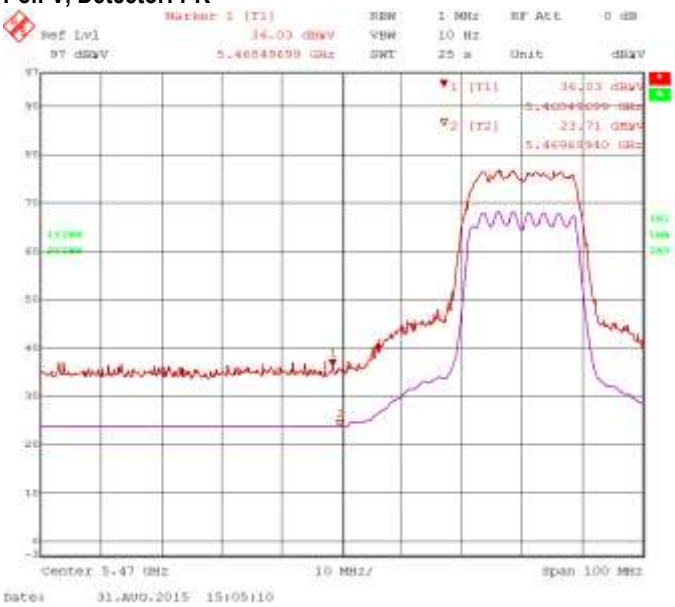


Figure 3-42: Band-Edge Compliance of RF Radiated Emission. 802.11n, MIMO, Ch. 100, 5500 MHz, Centre of Band-Edge: 5460 MHz
Pol: H, Detector: PK

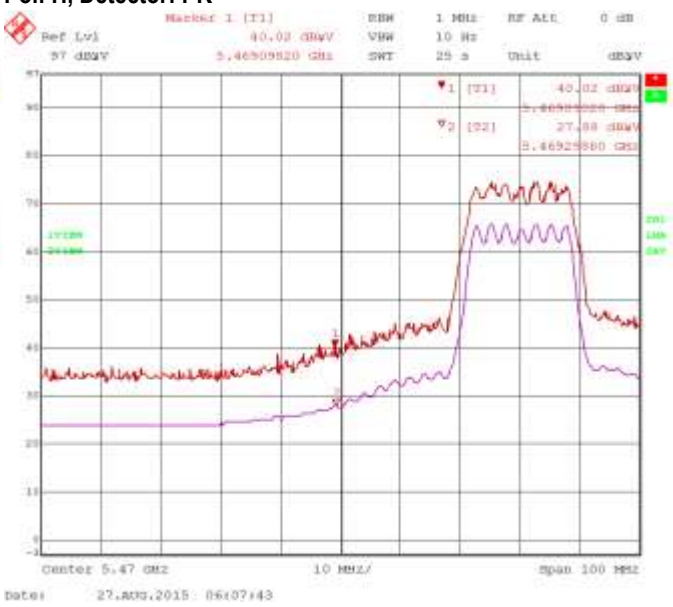


Figure 3-43: Band-Edge Compliance of RF Radiated Emission. 802.11n, MIMO, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz
Pol: V, Detector: PK

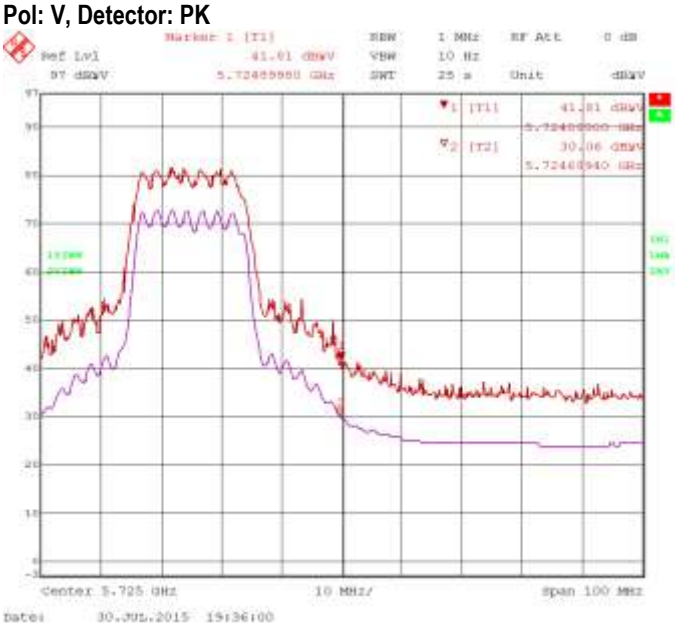
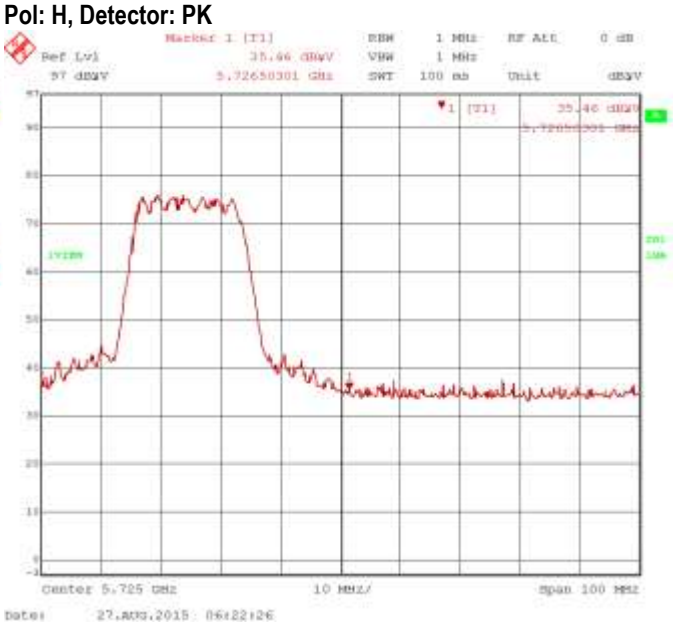


Figure 3-44: Band-Edge Compliance of RF Radiated Emission. 802.11n, MIMO, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz
Pol: H, Detector: PK



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802.11n Band-Edge Compliance of RF Radiated Emissions
MIMO - 40 MHz Bandwidth

Figure 3-45: Band-Edge Compliance of RF Radiated Emission 802.11n, MIMO, Ch. 38, 5190 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

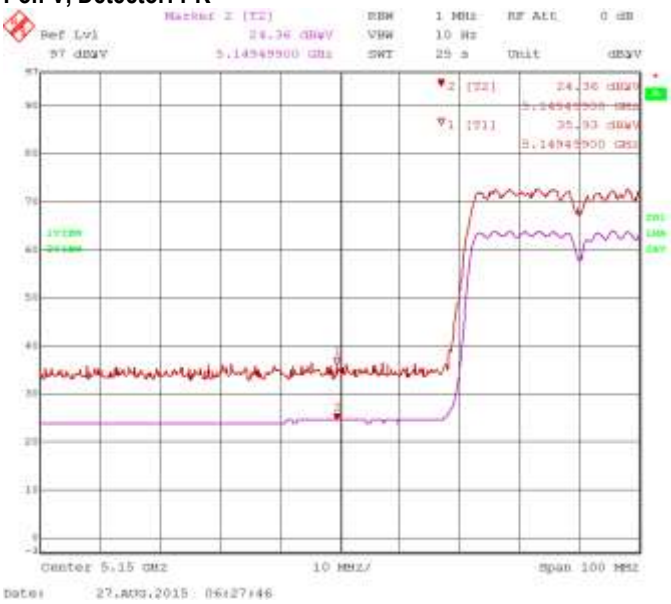


Figure 3-46: Band-Edge Compliance of RF Radiated Emission 802.11n, MIMO, Ch. 38, 5190 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK

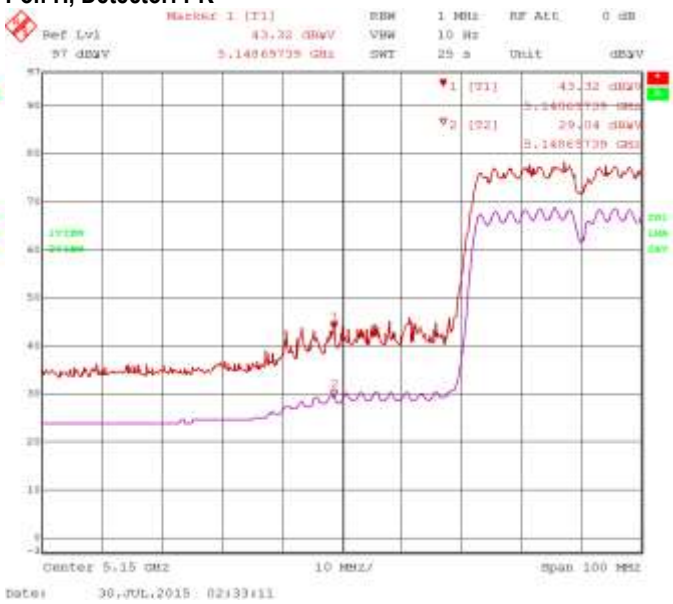


Figure 3-47: Band-Edge Compliance of RF Radiated Emission 802.11n, MIMO, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

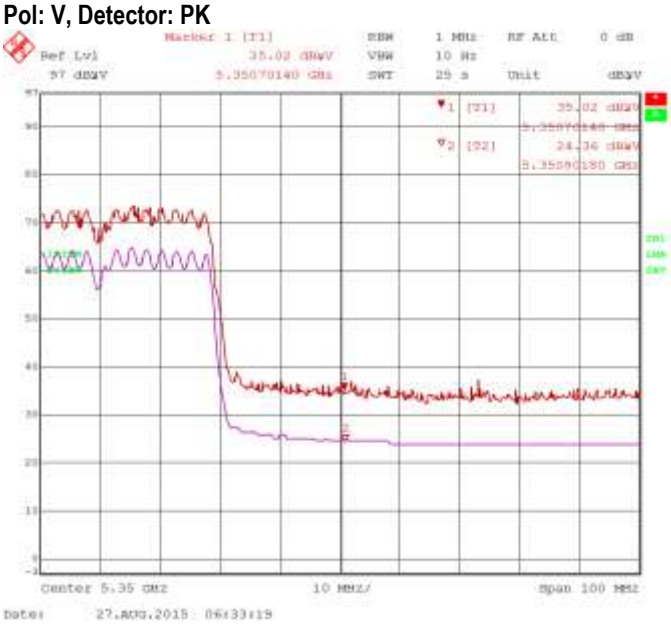
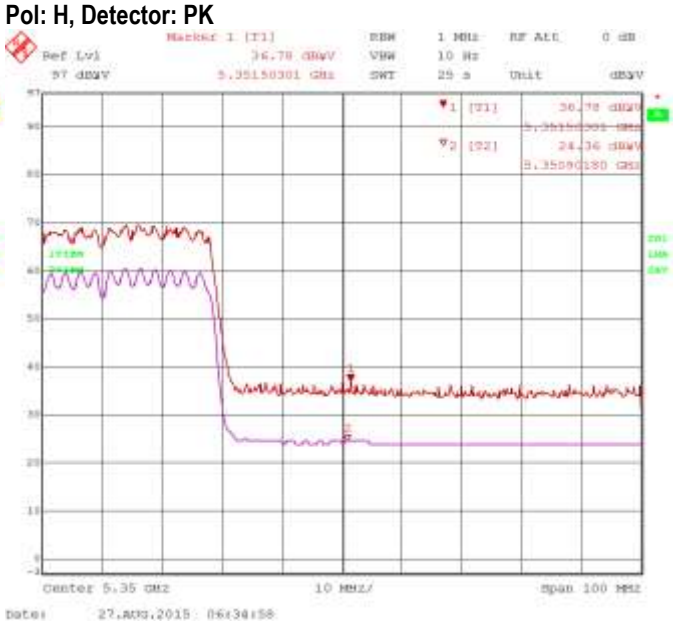


Figure 3-48: Band-Edge Compliance of RF Radiated Emission 802.11n, MIMO, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK



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802.11n Band-Edge Compliance of RF Radiated Emissions cont'd

Figure 3-49: Band-Edge Compliance of RF Radiated Emission 802.11n, MIMO, Ch. 102, 55100 MHz, Centre of Band-Edge: 5470 MHz
Pol: V, Detector: PK

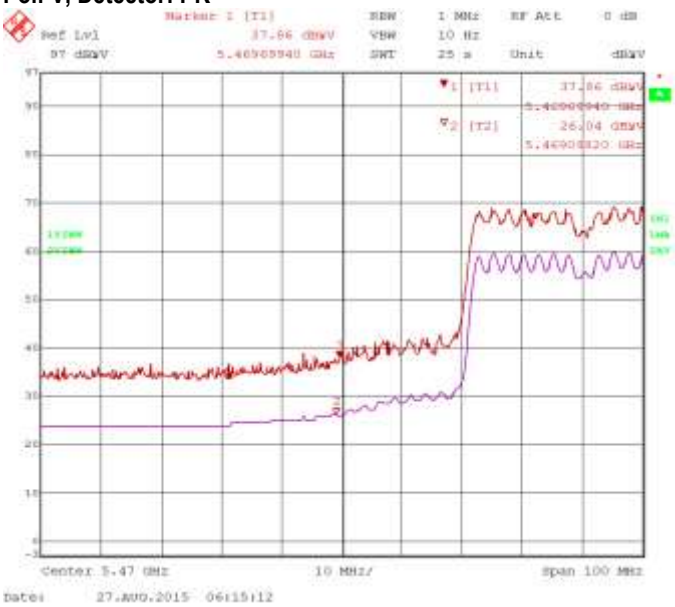
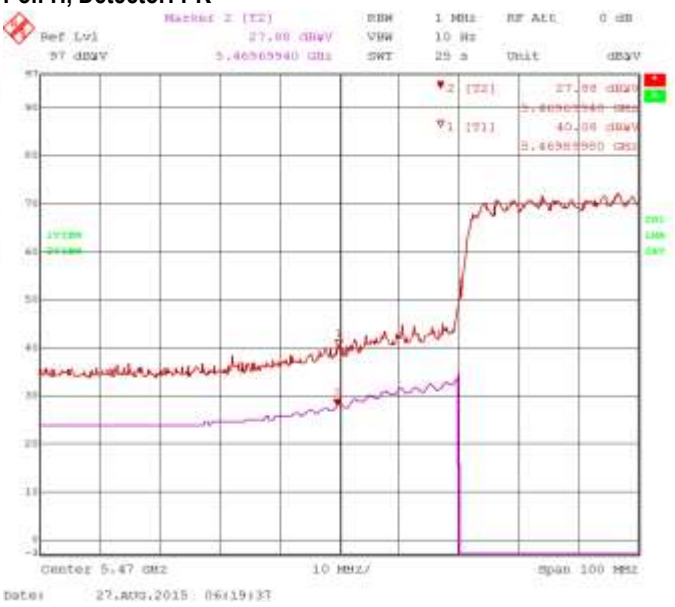


Figure 3-50: Band-Edge Compliance of RF Radiated Emission. 802.11n, MIMO, Ch. 102, 5510 MHz, Centre of Band-Edge: 5470 MHz
Pol: H, Detector: PK



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APPENDIX 4 – 802.11ac RADIATED EMISSIONS TEST DATA

The following test configurations were measured on model RHK211LW (STV100-1):

Radiated Emissions Test Results
802.11ac Band

Date of Test: July 29, and 31, and August, 27, 29, and September 8, 2015
Measurements were performed by Savtej Sandhu and Imran Kanji.

The environmental test conditions were: Temperature: 26.8 ºC
Relative Humidity: 43.0 %

The test distance was 3.0 meters with a EUT height of 1.5 meters, and sweep frequency of 30 MHz to 1 GHz.

The BlackBerry® smartphone was in volume key up slider open position.

The frequency sweep measurements were performed in 802.11ac TX mode at 6 Mbps on channels 42, 58,106, and 155 bandwidth 80MHz.

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

Radiated Emissions Test Results
802.11ac Band

Date of Test: July 29, 30, and 31, and August 4, 19, 25, and September 8, 2015
Measurements were performed by Kevin Guo, Winston Vernon, and Xing Fang.

The environmental test conditions were: Temperature: 24.8 ºC
Relative Humidity: 52.9 %

The test distance was 3.0 meters with a EUT height of 1.5 meters, and sweep frequency of 1GHz to 40GHz.

The BlackBerry® smartphone was in horizontal position.

The frequency sweep measurements were performed in 802.11ac TX mode at 6 Mbps on channel 36, 38, 42, 58, 62, 64, 100, 102, 106, 155, 159, and 165 bandwidth 20 MHz, 40 MHz, and 80MHz.

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

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802.11ac Band-Edge Compliance of RF Radiated Emissions

Date of Tests: July 28, 29, 30, and September 8, 2015
Measurements performed by Imran Kanji and Shiva Kumbham.

The environmental test conditions were: Temperature: 26.6 ºC
Relative Humidity: 40.2 %

The measurements were performed on BlackBerry® smartphone in standalone, volume key up slider open configuration on Bandwidth 20MHz, channel 36, 64,100, 140; Bandwidth 40MHz, channels 38, 62 and 102; Bandwidth 80 MHz, channels 42, 58 and 106 for 802.11ac mode at MCS0 data rate.

The test distance was performed at a distance of 3 meters.

SISO Primary - Bandwidth 20MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW for peak (dBuV/m)	Carrier Freq (dBuV/m)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11ac									
36.0	5180.00	Horn	V	PK	1 MHz	37.62	60.84	74.00	-13.16
36.0	5180.00	Horn	H	PK	1 MHz	39.97	63.19	74.00	-10.81
36.0	5180.00	Horn	V	AV	10 Hz	25.52	48.74	54.00	-5.26
36.0	5180.00	Horn	H	AV	10 Hz	26.54	49.76	54.00	-4.24
Centre at Band-Edge: 5350 MHz, 802.11ac									
64.0	5320.00	Horn	V	PK	1 MHz	40.59	64.55	74.00	-9.45
64.0	5320.00	Horn	H	PK	1 MHz	37.45	61.41	74.00	-12.59
64.0	5320.00	Horn	V	AV	10 Hz	26.54	50.50	54.00	-3.50
64.0	5320.00	Horn	H	AV	10 Hz	24.96	48.92	54.00	-5.08

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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd

SISO Primary - Bandwidth 20MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5470 MHz, 802.11ac									
100	5500	Horn	V	PK	1 MHz	35.44	60.27	74.00	-13.73
100	5500	Horn	H	PK	1 MHz	39.44	64.27	74.00	-9.73
100	5500	Horn	V	AV	10 Hz	23.71	48.54	54.00	-5.46
100	5500	Horn	H	AV	10 Hz	25.52	50.35	54.00	-3.65
Centre at Band-Edge: 5725 MHz, 802.11ac									
140	5700	Horn	V	PK	1 MHz	36.94	62.16	68.20	-6.04
140	5700	Horn	H	PK	1 MHz	36.69	61.91	68.20	-6.29

SISO Primary - Bandwidth 40MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11ac									
38.0	5190.00	Horn	V	PK	1 MHz	40.14	63.36	74.00	-10.64
38.0	5190.00	Horn	H	PK	1 MHz	41.27	64.49	74.00	-9.51
38.0	5190.00	Horn	V	AV	10 Hz	26.04	49.26	54.00	-4.74
38.0	5190.00	Horn	H	AV	10 Hz	27.01	50.23	54.00	-3.77
Centre at Band-Edge: 5350 MHz, 802.11ac									
62.0	5310.00	Horn	V	PK	1 MHz	37.31	61.27	74.00	-12.73
62.0	5310.00	Horn	H	PK	1 MHz	35.43	59.39	74.00	-14.61
62.0	5310.00	Horn	V	AV	10 Hz	24.96	48.92	54.00	-5.08
62.0	5310.00	Horn	H	AV	10 Hz	24.36	48.32	54.00	-5.68

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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd

SISO Primary - Bandwidth 40MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5470 MHz, 802.11ac									
102.0	5510.0	Horn	V	PK	1 MHz	36.11	60.94	74.00	-13.06
102.0	5510.0	Horn	H	PK	1 MHz	39.11	63.94	74.00	-10.06
102.0	5510.0	Horn	V	AV	10 Hz	24.36	49.19	54.00	-4.81
102.0	5510.0	Horn	H	AV	10 Hz	26.04	50.87	54.00	-3.13

SISO Primary - Bandwidth 80MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11ac									
42.0	5210.00	Horn	V	PK	1 MHz	39.08	62.30	74.00	-11.70
42.0	5210.00	Horn	H	PK	1 MHz	39.65	62.87	74.00	-11.13
42.0	5210.00	Horn	V	AV	10 Hz	25.52	48.74	54.00	-5.26
42.0	5210.00	Horn	H	AV	10 Hz	27.01	50.23	54.00	-3.77
Centre at Band-Edge: 5350 MHz, 802.11ac									
58.0	5290.00	Horn	V	PK	1 MHz	45.02	68.98	74.00	-5.02
58.0	5290.00	Horn	H	PK	1 MHz	41.98	65.94	74.00	-8.06
58.0	5290.00	Horn	V	AV	10 Hz	28.67	52.63	54.00	-1.37
58.0	5290.00	Horn	H	AV	10 Hz	29.04	53.00	54.00	-1.00
Centre at Band-Edge: 5470 MHz, 802.11ac									
106.0	5530.0	Horn	V	PK	1 MHz	39.07	63.90	74.00	-10.10
106.0	5530.0	Horn	H	PK	1 MHz	36.36	61.19	74.00	-12.81
106.0	5530.0	Horn	V	AV	10 Hz	27.01	51.84	54.00	-2.16
106.0	5530.0	Horn	H	AV	10 Hz	24.96	49.79	54.00	-4.21

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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd

SISO Secondary - Bandwidth 20MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW for peak (dBuV/m)	Carrier Freq (dBuV/m)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11ac									
36.0	5180.00	Horn	V	PK	1 MHz	39.37	62.59	74.00	-11.41
36.0	5180.00	Horn	H	PK	1 MHz	39.24	62.46	74.00	-11.54
36.0	5180.00	Horn	V	AV	10 Hz	25.52	48.74	54.00	-5.26
36.0	5180.00	Horn	H	AV	10 Hz	25.52	48.74	54.00	-5.26
Centre at Band-Edge: 5350 MHz, 802.11ac									
64.0	5320.00	Horn	V	PK	1 MHz	34.78	58.74	74.00	-15.26
64.0	5320.00	Horn	H	PK	1 MHz	33.60	57.56	74.00	-16.44
64.0	5320.00	Horn	V	AV	10 Hz	22.26	46.22	54.00	-7.78
64.0	5320.00	Horn	H	AV	10 Hz	22.26	46.22	54.00	-7.78
Centre at Band-Edge: 5470 MHz, 802.11ac									
100	5500	Horn	V	PK	1 MHz	34.78	59.61	74.00	-14.39
100	5500	Horn	H	PK	1 MHz	34.75	59.58	74.00	-14.42
100	5500	Horn	V	AV	10 Hz	22.26	47.09	54.00	-6.91
100	5500	Horn	H	AV	10 Hz	22.26	47.09	54.00	-6.91
Centre at Band-Edge: 5725 MHz, 802.11ac									
140	5700	Horn	V	PK	1 MHz	36.43	61.65	68.20	-6.55
140	5700	Horn	H	PK	1 MHz	38.37	63.59	68.20	-4.61

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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd

SISO Secondary - Bandwidth 40MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11ac									
38.0	5190.00	Horn	V	PK	1 MHz	36.75	59.97	74.00	-14.03
38.0	5190.00	Horn	H	PK	1 MHz	35.37	58.59	74.00	-15.41
38.0	5190.00	Horn	V	AV	10 Hz	24.36	47.58	54.00	-6.42
38.0	5190.00	Horn	H	AV	10 Hz	24.36	47.58	54.00	-6.42
Centre at Band-Edge: 5350 MHz, 802.11ac									
62.0	5310.00	Horn	V	PK	1 MHz	44.12	68.08	74.00	-5.92
62.0	5310.00	Horn	H	PK	1 MHz	41.09	65.05	74.00	-8.95
62.0	5310.00	Horn	V	AV	10 Hz	29.04	53.00	54.00	-1.00
62.0	5310.00	Horn	H	AV	10 Hz	27.01	50.97	54.00	-3.03
Centre at Band-Edge: 5470 MHz, 802.11ac									
102.0	5510.0	Horn	V	PK	1 MHz	37.08	61.91	74.00	-12.09
102.0	5510.0	Horn	H	PK	1 MHz	36.70	61.53	74.00	-12.47
102.0	5510.0	Horn	V	AV	10 Hz	24.96	49.79	54.00	-4.21
102.0	5510.0	Horn	H	AV	10 Hz	24.36	49.19	54.00	-4.81

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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd

SISO Secondary - Bandwidth 80MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11ac									
42.0	5210.00	Horn	V	PK	1 MHz	42.16	65.38	74.00	-8.62
42.0	5210.00	Horn	H	PK	1 MHz	43.27	66.49	74.00	-7.51
42.0	5210.00	Horn	V	AV	10 Hz	29.39	52.61	54.00	-1.39
42.0	5210.00	Horn	H	AV	10 Hz	29.73	52.95	54.00	-1.05
Centre at Band-Edge: 5350 MHz, 802.11ac									
58.0	5290.00	Horn	V	PK	1 MHz	39.48	63.44	74.00	-10.56
58.0	5290.00	Horn	H	PK	1 MHz	38.93	62.89	74.00	-11.11
58.0	5290.00	Horn	V	AV	10 Hz	26.54	50.50	54.00	-3.50
58.0	5290.00	Horn	H	AV	10 Hz	24.96	48.92	54.00	-5.08
Centre at Band-Edge: 5470 MHz, 802.11ac									
106.0	5530.0	Horn	V	PK	1 MHz	36.35	61.18	74.00	-12.82
106.0	5530.0	Horn	H	PK	1 MHz	37.00	61.83	74.00	-12.17
106.0	5530.0	Horn	V	AV	10 Hz	24.36	49.19	54.00	-4.81
106.0	5530.0	Horn	H	AV	10 Hz	24.36	49.19	54.00	-4.81

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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd

MIMO - Bandwidth 20MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW for peak (dBuV/m)	Carrier Freq (dBuV/m)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11ac									
36.0	5180.00	Horn	V	PK	1 MHz	40.38	63.60	74.00	-10.40
36.0	5180.00	Horn	H	PK	1 MHz	42.35	65.57	74.00	-8.43
36.0	5180.00	Horn	V	AV	10 Hz	27.01	50.23	54.00	-3.77
36.0	5180.00	Horn	H	AV	10 Hz	27.46	50.68	54.00	-3.32
Centre at Band-Edge: 5350 MHz, 802.11ac									
64.0	5320.00	Horn	V	PK	1 MHz	39.51	63.47	74.00	-10.53
64.0	5320.00	Horn	H	PK	1 MHz	40.74	64.70	74.00	-9.30
64.0	5320.00	Horn	V	AV	10 Hz	26.54	50.50	54.00	-3.50
64.0	5320.00	Horn	H	AV	10 Hz	26.54	50.50	54.00	-3.50
Centre at Band-Edge: 5470 MHz, 802.11ac									
100	5500	Horn	V	PK	1 MHz	42.22	67.05	74.00	-6.95
100	5500	Horn	H	PK	1 MHz	43.10	67.93	74.00	-6.07
100	5500	Horn	V	AV	10 Hz	27.01	51.84	54.00	-2.16
100	5500	Horn	H	AV	10 Hz	26.54	51.37	54.00	-2.63
Centre at Band-Edge: 5725 MHz, 802.11ac									
140	5700	Horn	V	PK	1 MHz	39.63	64.85	68.20	-3.35
140	5700	Horn	H	PK	1 MHz	40.44	65.66	68.20	-2.54

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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd

MIMO - Bandwidth 40MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11ac									
38.0	5190.00	Horn	V	PK	1 MHz	43.94	67.16	74.00	-6.84
38.0	5190.00	Horn	H	PK	1 MHz	38.95	62.17	74.00	-11.83
38.0	5190.00	Horn	V	AV	10 Hz	29.73	52.95	54.00	-1.05
38.0	5190.00	Horn	H	AV	10 Hz	25.52	48.74	54.00	-5.26
Centre at Band-Edge: 5350 MHz, 802.11ac									
62.0	5310.00	Horn	V	PK	1 MHz	35.07	59.03	74.00	-14.97
62.0	5310.00	Horn	H	PK	1 MHz	36.75	60.71	74.00	-13.29
62.0	5310.00	Horn	V	AV	10 Hz	24.36	48.32	54.00	-5.68
62.0	5310.00	Horn	H	AV	10 Hz	24.36	48.32	54.00	-5.68
Centre at Band-Edge: 5470 MHz, 802.11ac									
102.0	5510.0	Horn	V	PK	1 MHz	36.22	61.05	74.00	-12.95
102.0	5510.0	Horn	H	PK	1 MHz	36.92	61.75	74.00	-12.25
102.0	5510.0	Horn	V	AV	10 Hz	23.71	48.54	54.00	-5.46
102.0	5510.0	Horn	H	AV	10 Hz	24.96	49.79	54.00	-4.21

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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd

MIMO - Bandwidth 80MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW	Reading (dBuV)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11ac									
42.0	5210.00	Horn	V	PK	1 MHz	40.97	64.19	74.00	-9.81
42.0	5210.00	Horn	H	PK	1 MHz	42.64	65.86	74.00	-8.14
42.0	5210.00	Horn	V	AV	10 Hz	27.46	50.68	54.00	-3.32
42.0	5210.00	Horn	H	AV	10 Hz	29.73	52.95	54.00	-1.05
Centre at Band-Edge: 5350 MHz, 802.11ac									
58.0	5290.00	Horn	V	PK	1 MHz	36.57	60.53	74.00	-13.47
58.0	5290.00	Horn	H	PK	1 MHz	36.01	59.97	74.00	-14.03
58.0	5290.00	Horn	V	AV	10 Hz	23.71	47.67	54.00	-6.33
58.0	5290.00	Horn	H	AV	10 Hz	23.71	47.67	54.00	-6.33
Centre at Band-Edge: 5470 MHz, 802.11ac									
106.0	5530.0	Horn	V	PK	1 MHz	35.00	59.83	74.00	-14.17
106.0	5530.0	Horn	H	PK	1 MHz	35.52	60.35	74.00	-13.65
106.0	5530.0	Horn	V	AV	10 Hz	23.71	48.54	54.00	-5.46
106.0	5530.0	Horn	H	AV	10 Hz	23.71	48.54	54.00	-5.46

See figures 4-1 to 4-60 for the plots of the 802.11ac band-edge compliance.

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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
SISO Primary - Bandwidth 20MHz

Figure 4-1: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

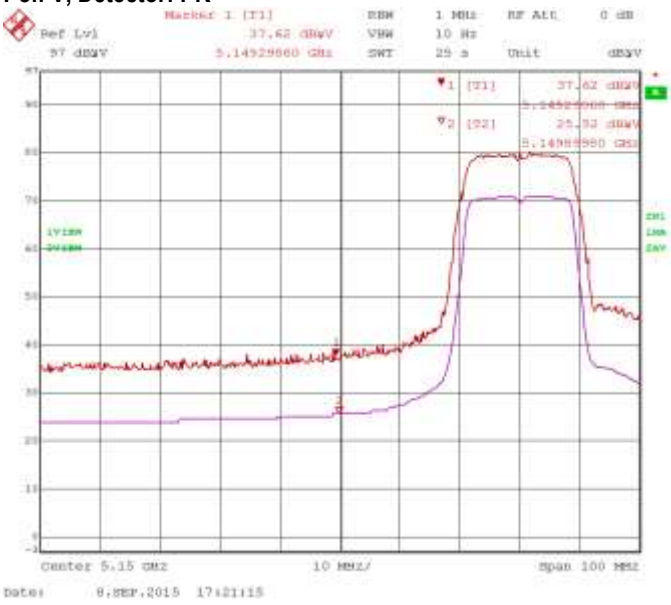


Figure 4-2: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK

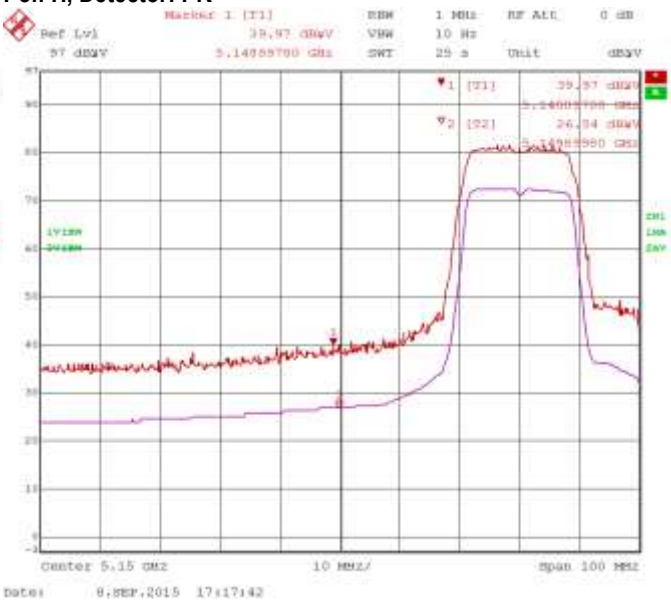


Figure 4-3: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

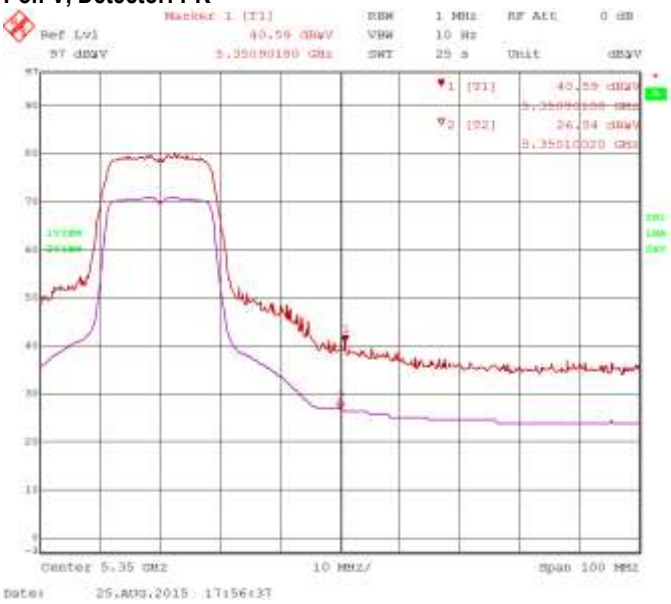
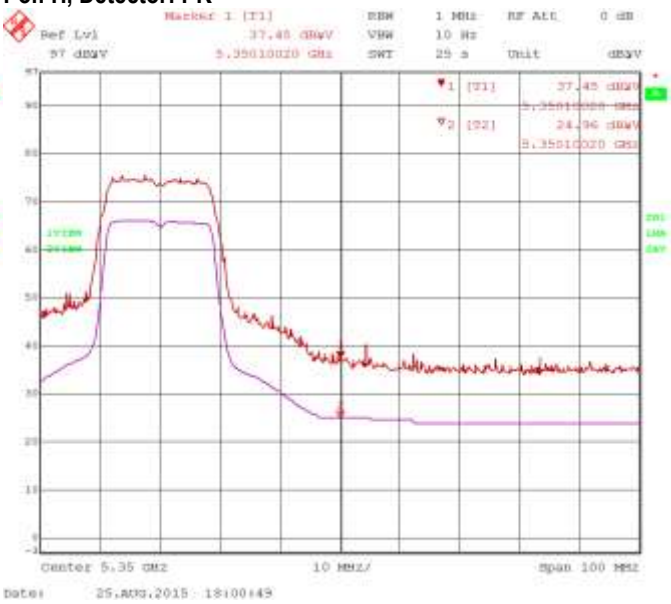


Figure 4-4: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK



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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
SISO Primary - Bandwidth 20MHz

Figure 4-5: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 100, 5500 MHz, Centre of Band-Edge: 5470 MHz
Pol: V, Detector: PK

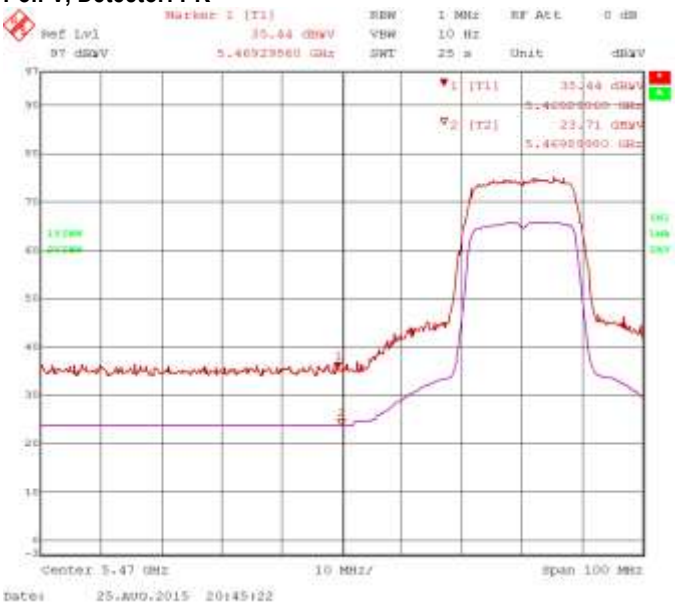


Figure 4-6: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Primary, Ch. 100, 5500 MHz, Centre of Band-Edge: 5470 MHz
Pol: H, Detector: PK

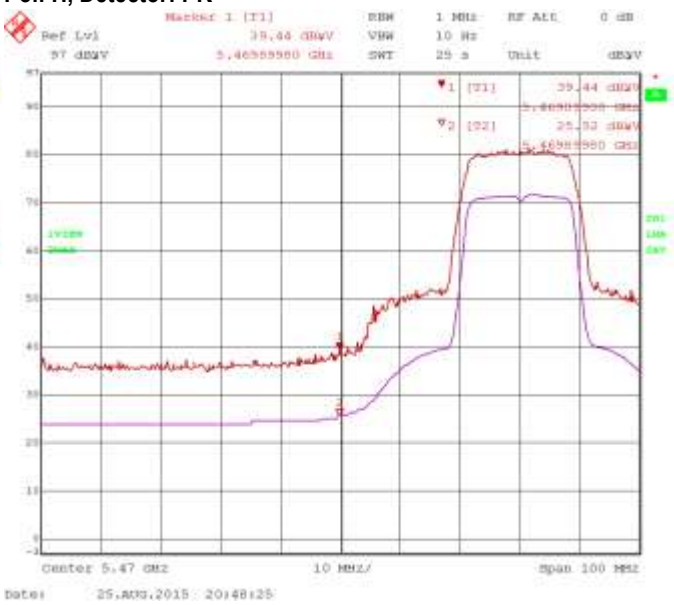


Figure 4-7: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Primary, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz
Pol: V, Detector: PK

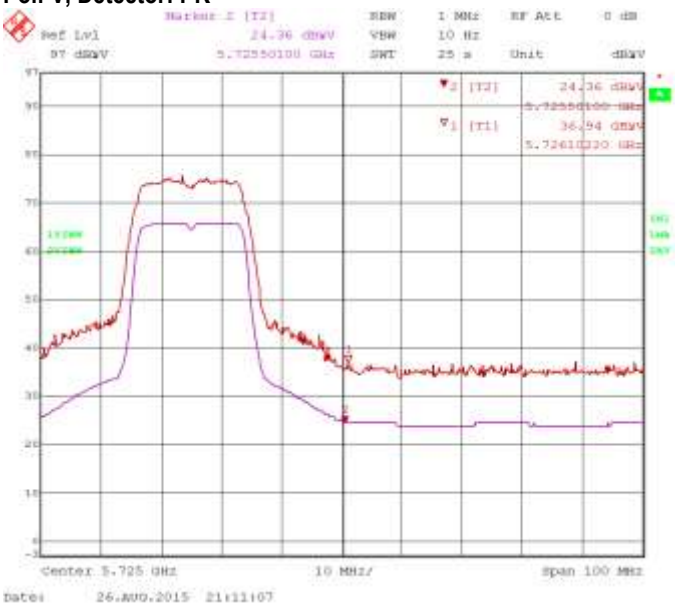
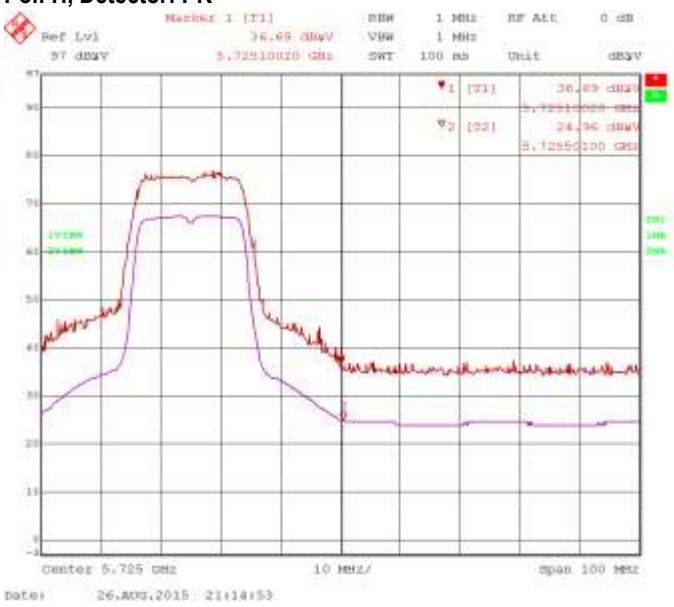


Figure 4-8: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Primary, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz
Pol: H, Detector: PK



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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
SISO Primary - Bandwidth 40MHz

Figure 4-9: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 38, 5190 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

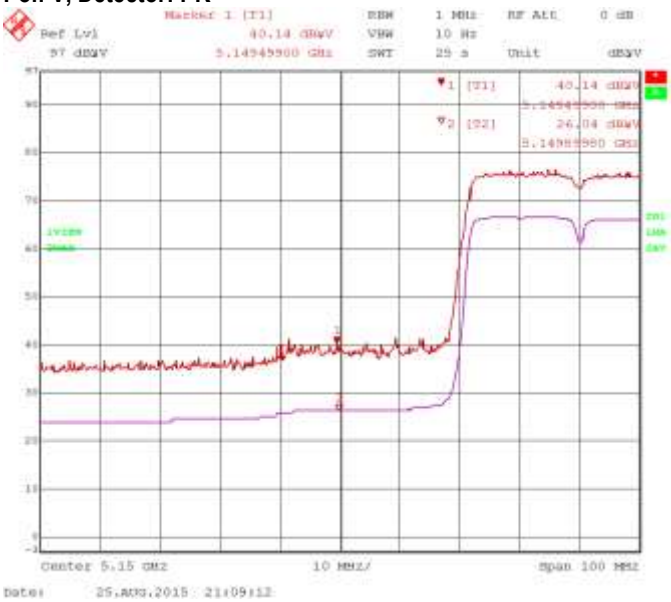


Figure 4-10: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 38, 5190 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK

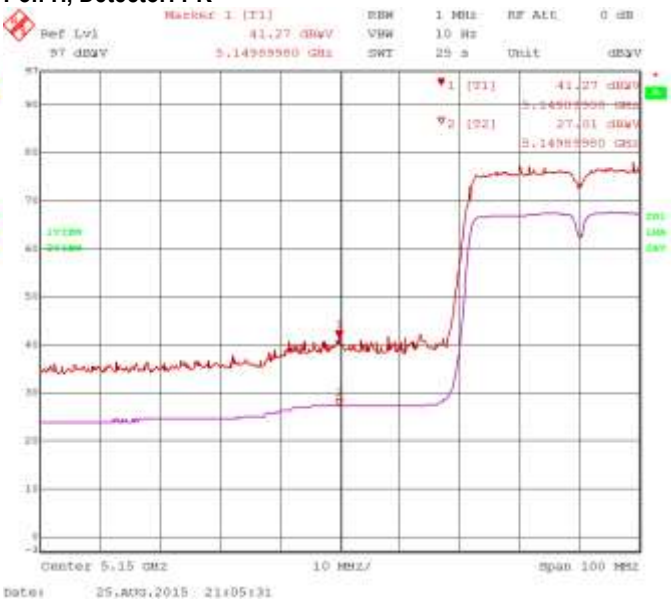


Figure 4-11: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

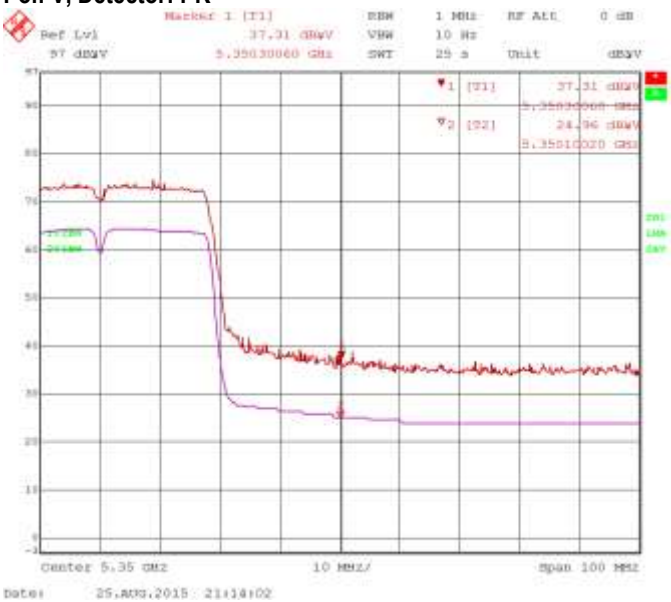
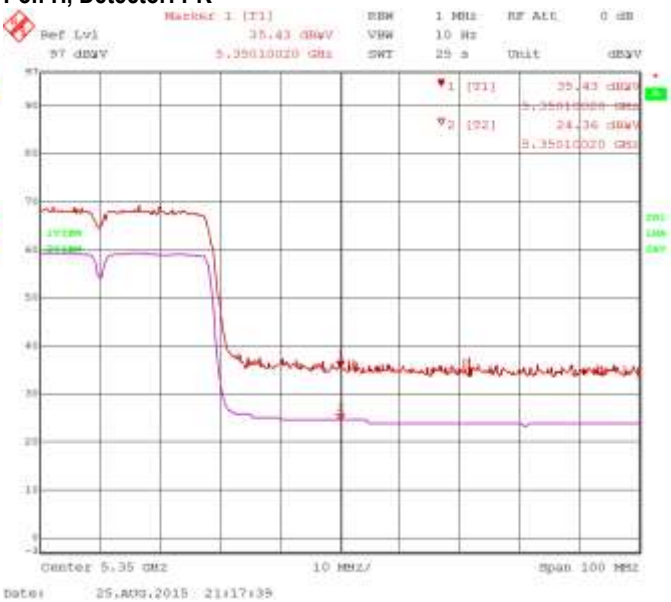


Figure 4-12: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK



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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
SISO Primary - Bandwidth 40MHz

Figure 4-13: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 102, 5510 MHz, Centre of Band-Edge: 5470 MHz
Pol: V, Detector: PK

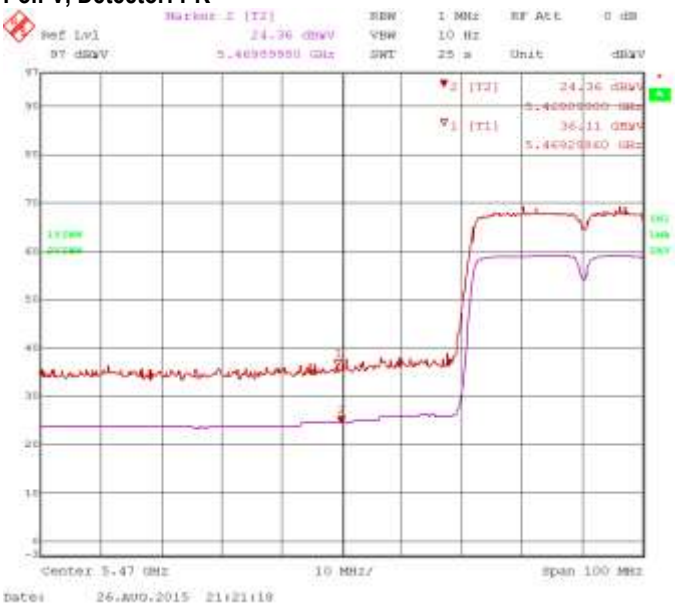
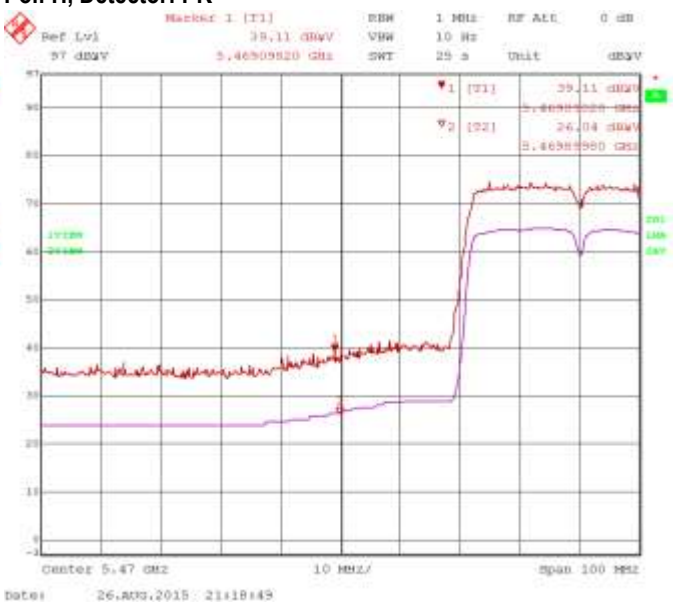


Figure 4-14: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Primary, Ch. 102, 5510 MHz, Centre of Band-Edge: 5470 MHz
Pol: H, Detector: PK



SISO Primary - Bandwidth 80MHz

Figure 4-15: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 42, 5210 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

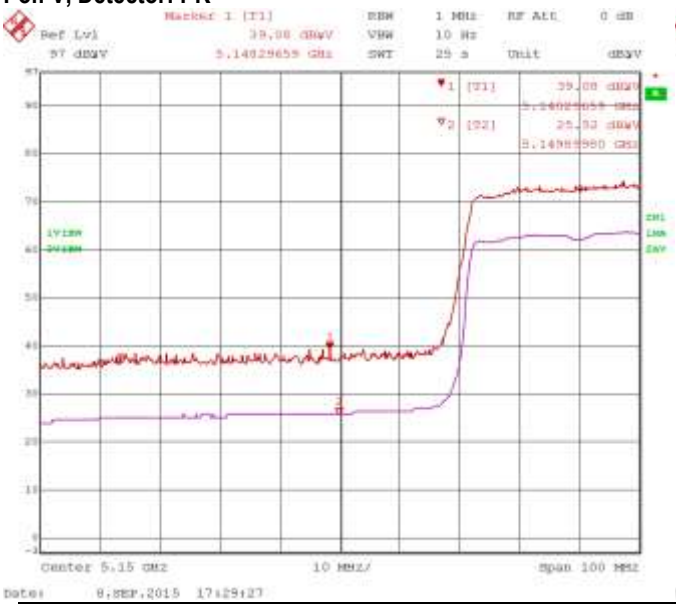
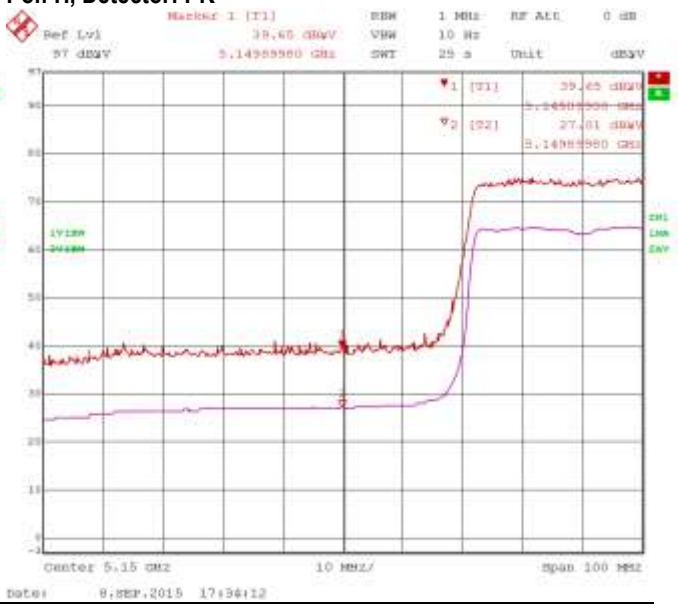


Figure 4-16: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 42, 5210 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK



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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
SISO Primary - Bandwidth 80MHz

Figure 4-17: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 58, 5290 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

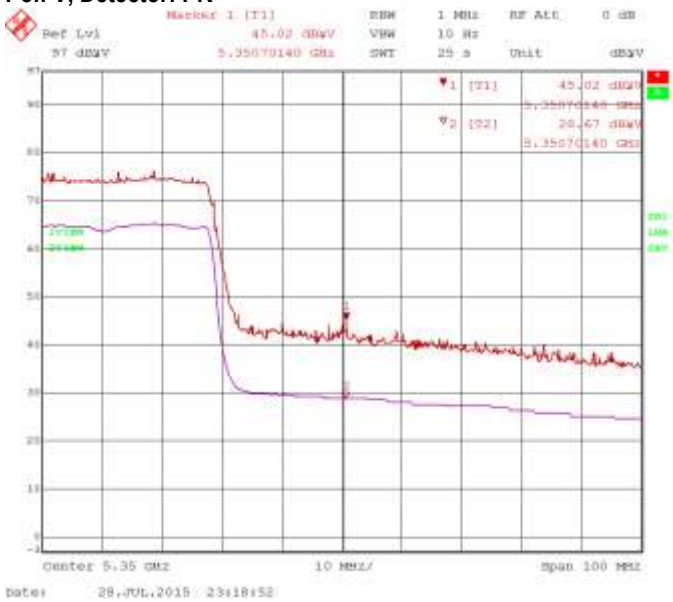


Figure 4-18: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 58, 5290 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK

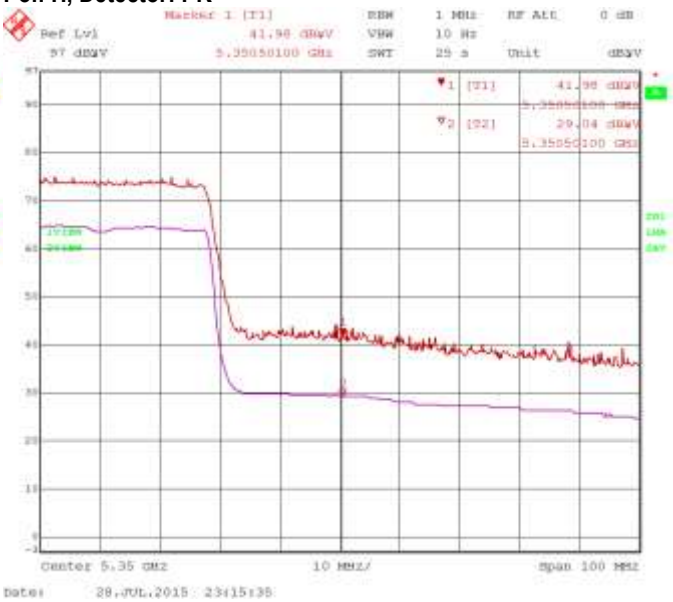


Figure 4-19: Band-Edge Compliance of RF Radiated Emission 802.11ac, Primary, Ch. 106, 5530 MHz, Centre of Band-Edge: 5470 MHz
Pol: V, Detector: PK

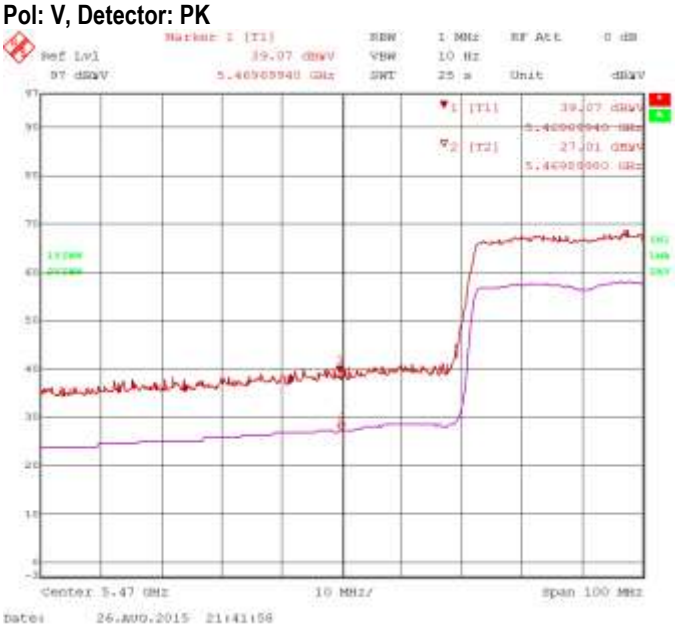
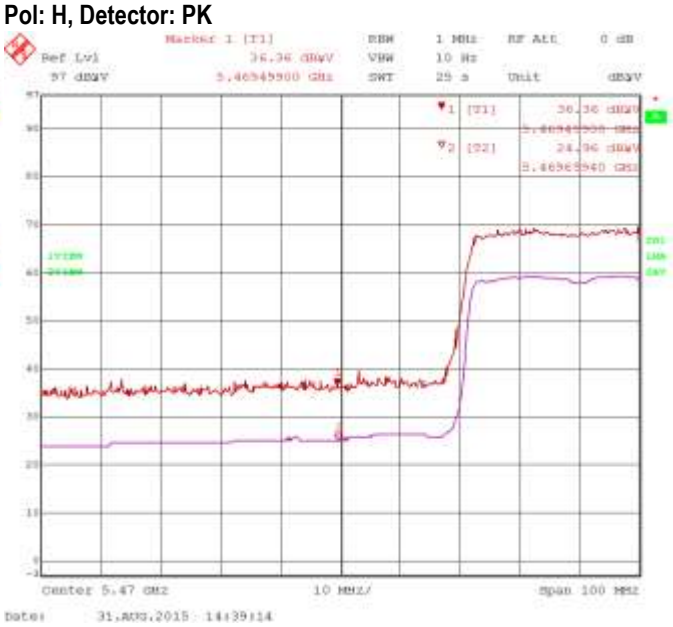


Figure 4-20: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Primary, Ch. 106, 5530 MHz, Centre of Band-Edge: 5470 MHz
Pol: H, Detector: PK



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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
SISO Secondary - Bandwidth 20MHz

Figure 4-21: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

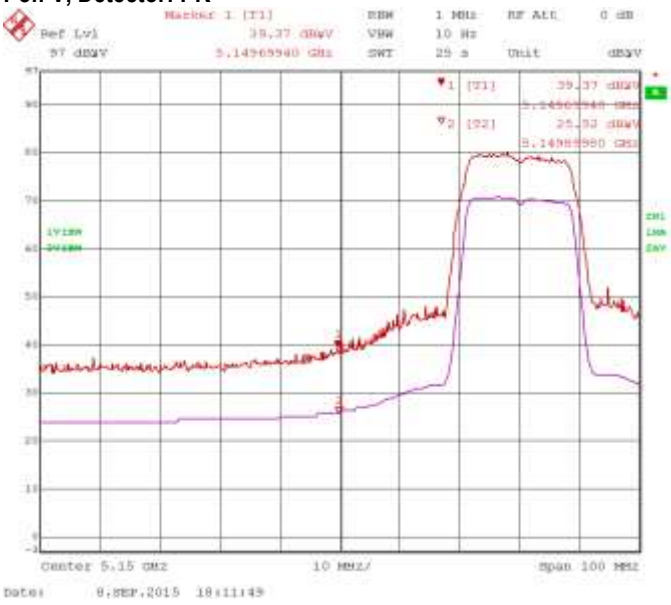


Figure 4-22: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK

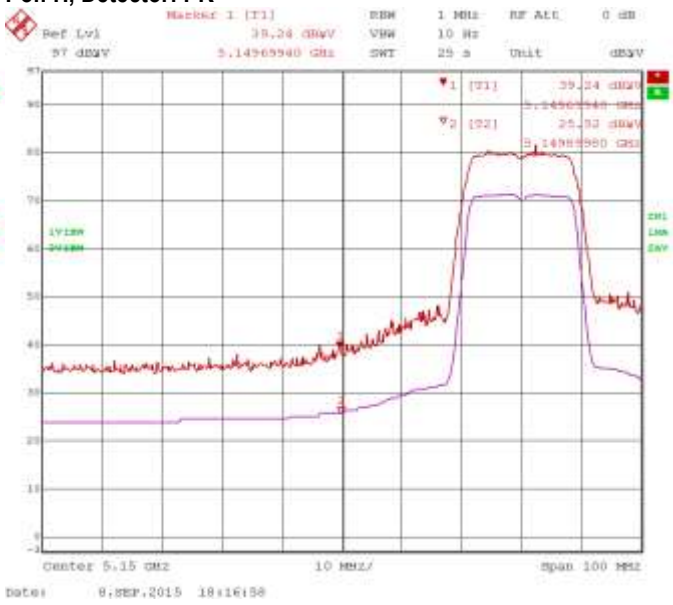


Figure 4-23: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

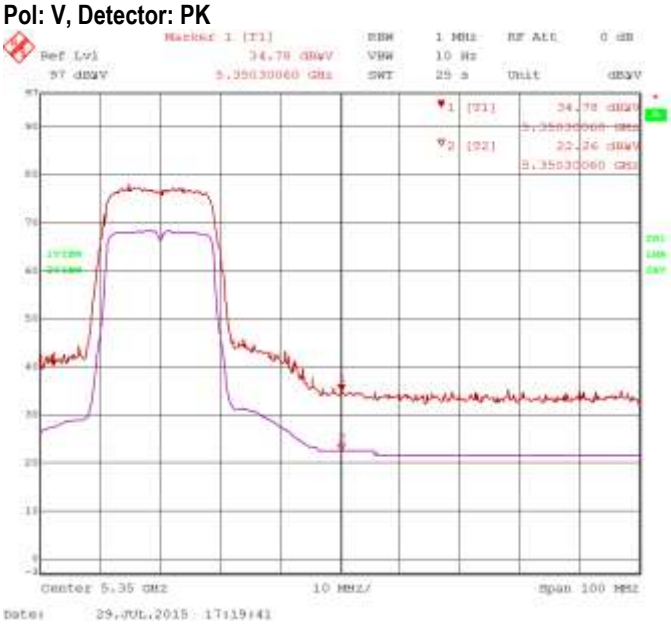
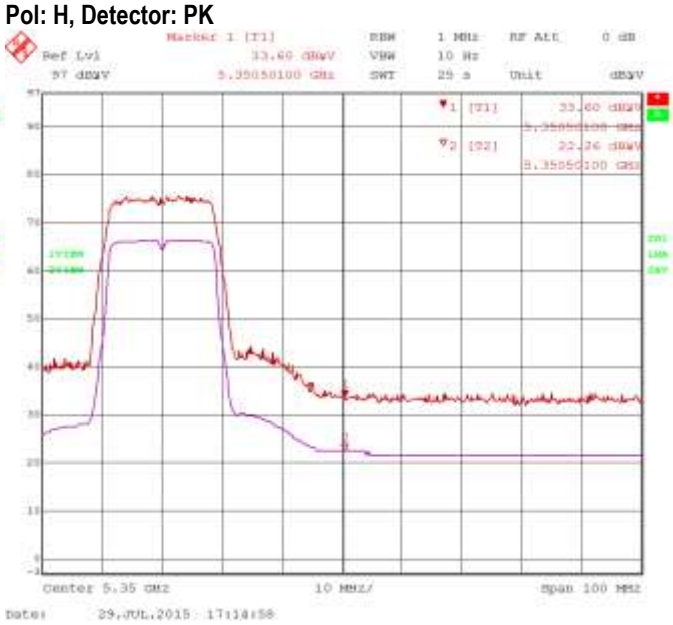


Figure 4-24: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK



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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
SISO Secondary - Bandwidth 20MHz

Figure 4-25: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 100, 5500 MHz, Centre of Band-Edge: 5470 MHz
Pol: V, Detector: PK

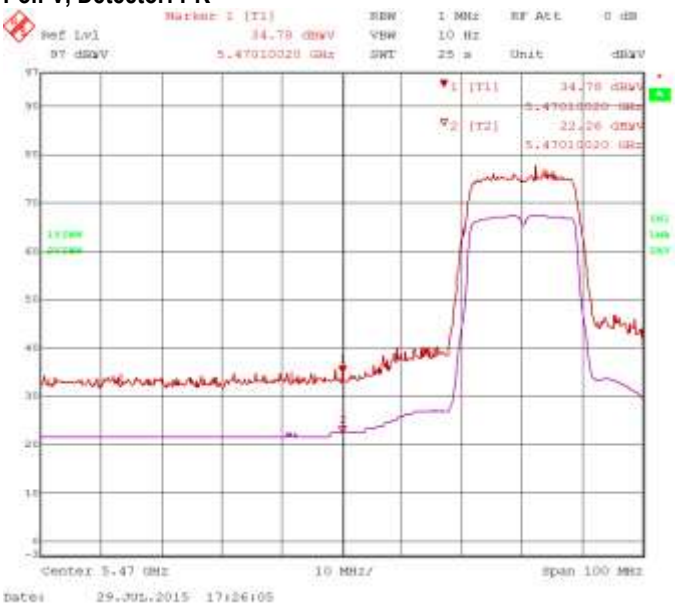


Figure 4-26: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Secondary, Ch. 100, 5500 MHz, Centre of Band-Edge: 5470 MHz
Pol: H, Detector: PK

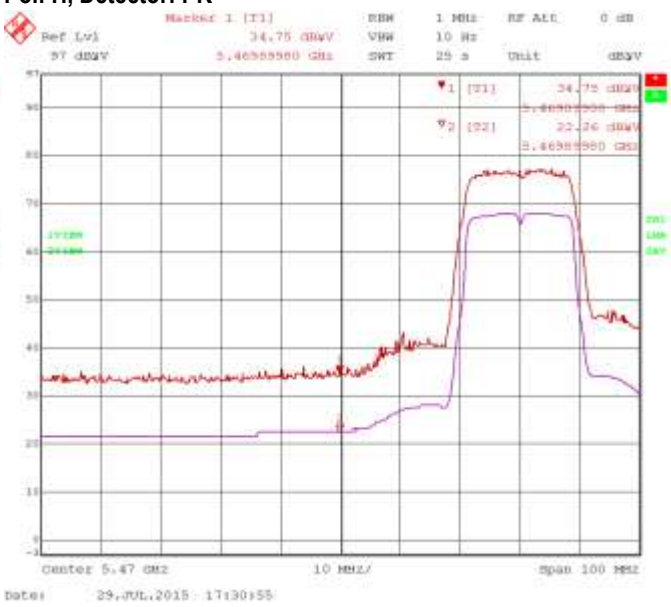


Figure 4-27: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Secondary, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz
Pol: V, Detector: PK

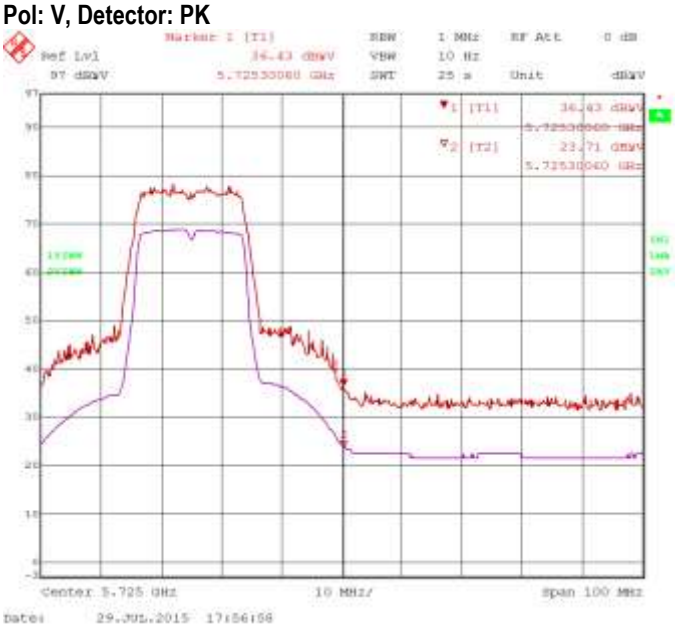
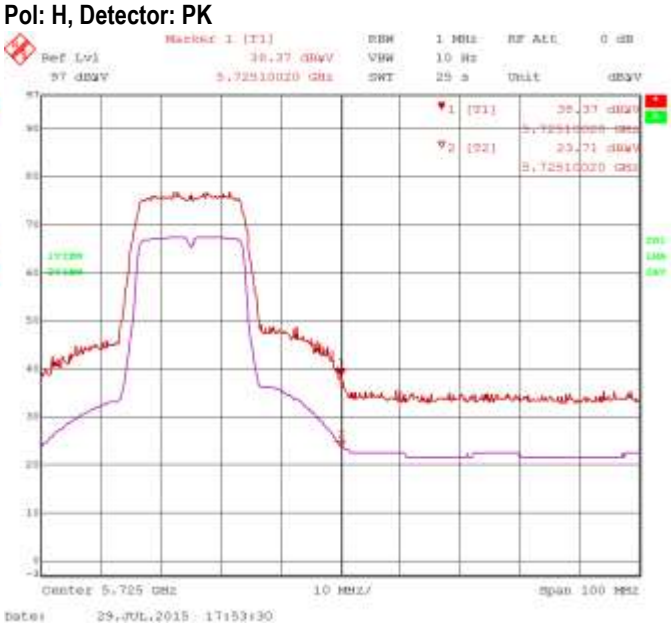


Figure 4-28: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Secondary, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz
Pol: H, Detector: PK



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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
SISO Secondary - Bandwidth 40MHz

Figure 4-29: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 38, 5190 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

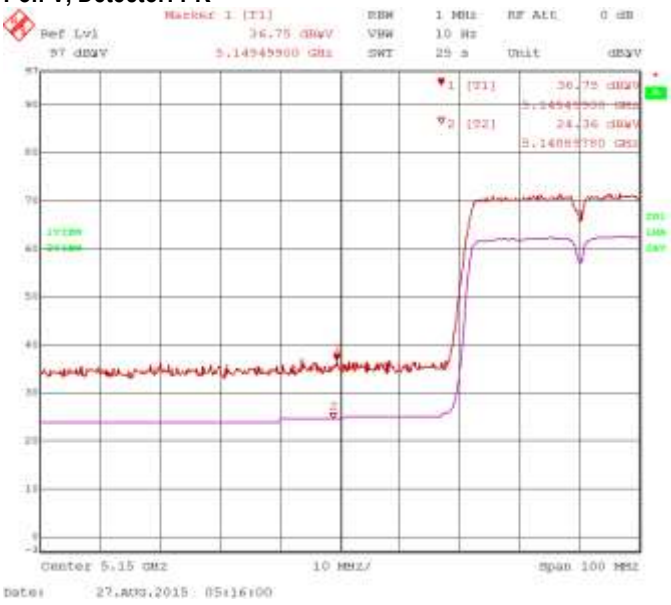


Figure 4-30: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 38, 5190 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK

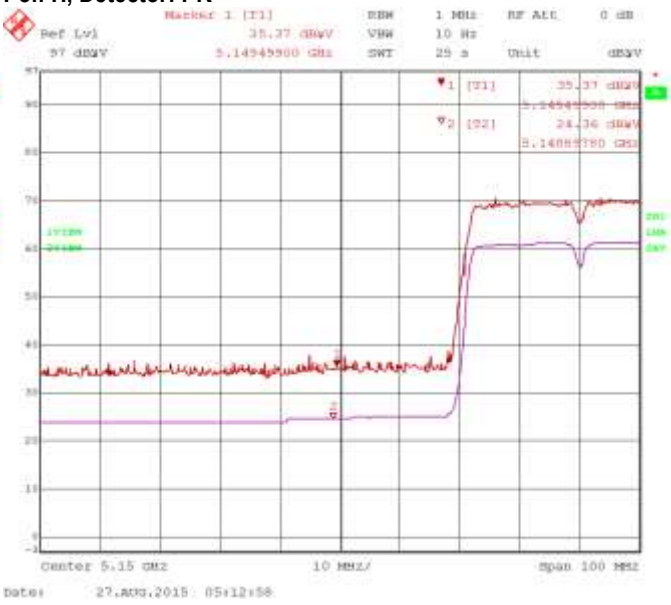


Figure 4-31: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

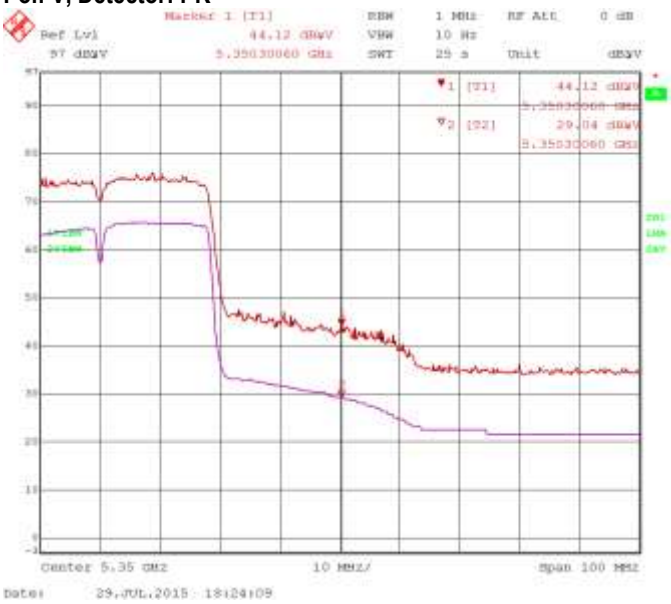
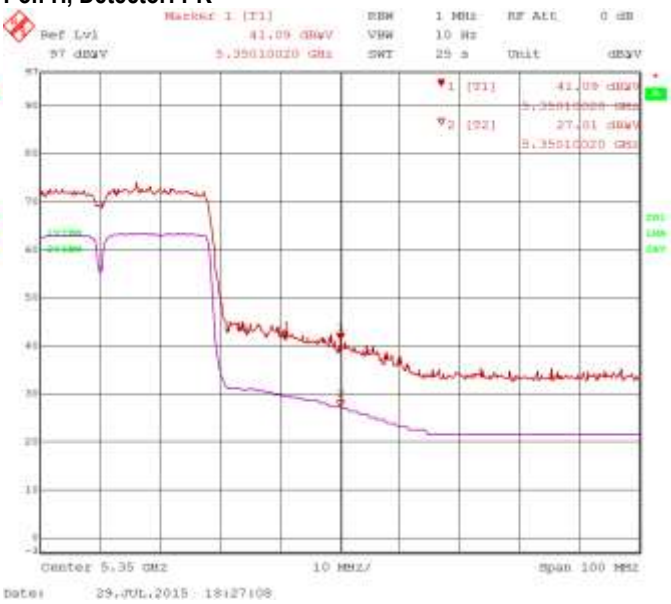


Figure 4-32: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK



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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
SISO Secondary - Bandwidth 40MHz

Figure 4-33: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 102, 5510 MHz, Centre of Band-Edge: 5470 MHz
Pol: V, Detector: PK

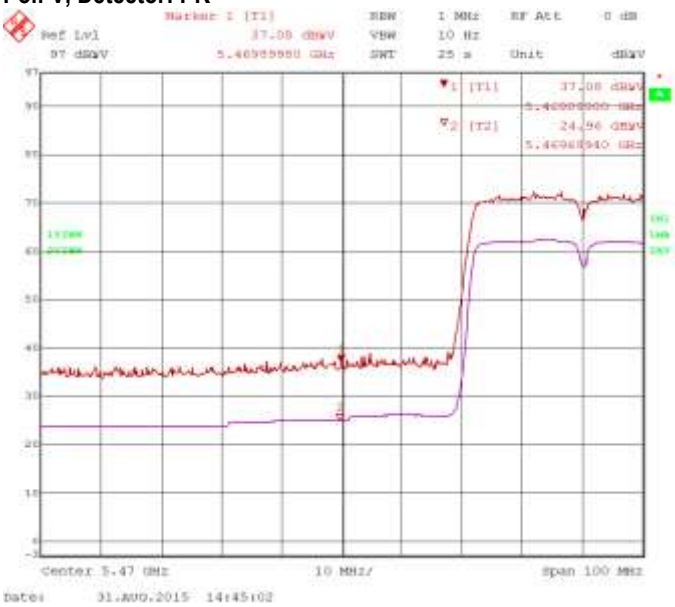
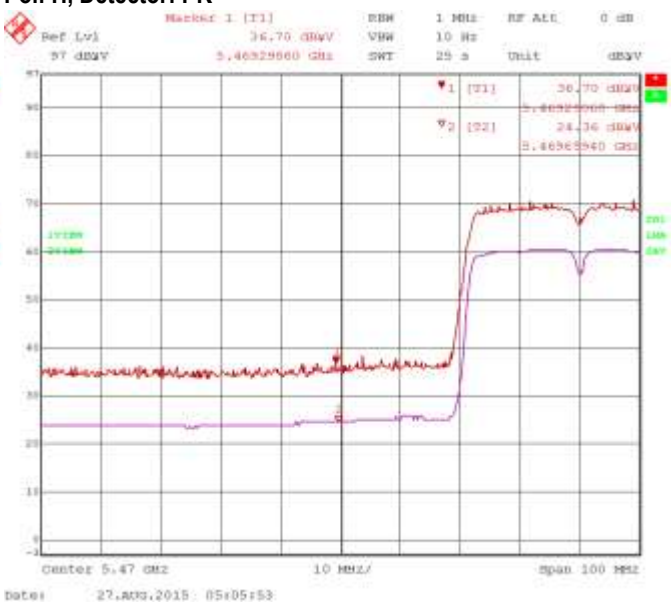


Figure 4-34: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Secondary, Ch. 102, 5510 MHz, Centre of Band-Edge: 5470 MHz
Pol: H, Detector: PK



Secondary - Bandwidth 80MHz

Figure 4-35: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 42, 5210 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

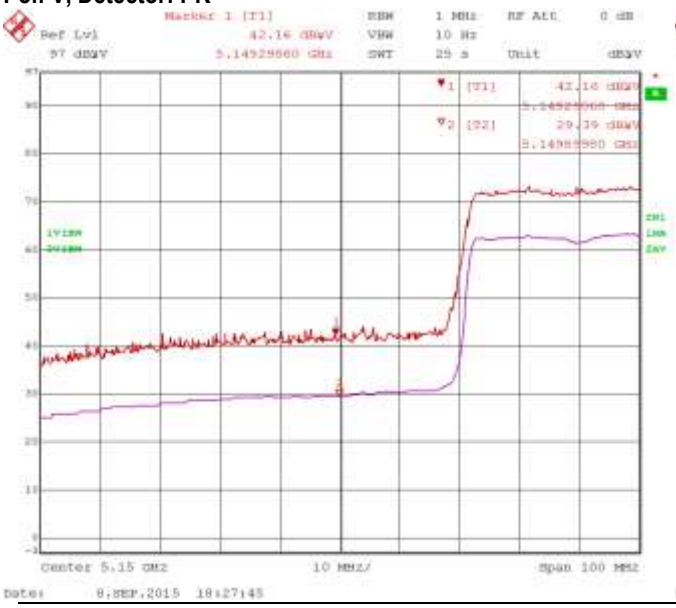
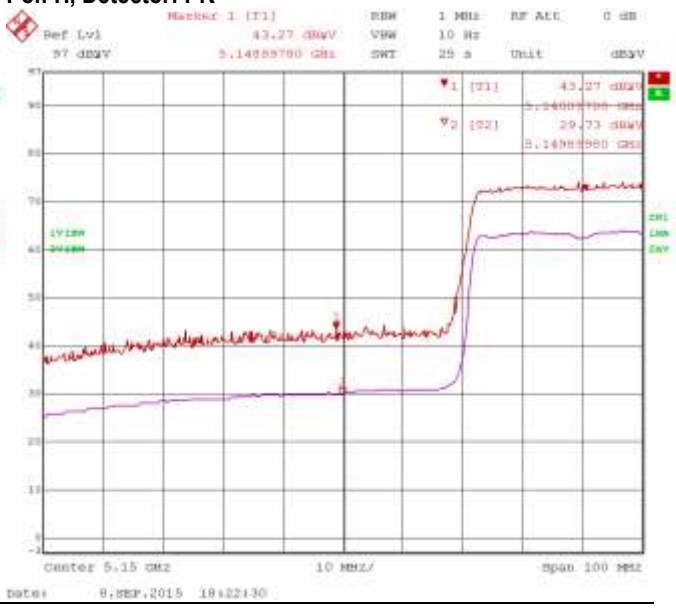


Figure 4-36: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 42, 5210 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK



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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
SISO Secondary - Bandwidth 80MHz

Figure 4-37: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 58, 5290 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

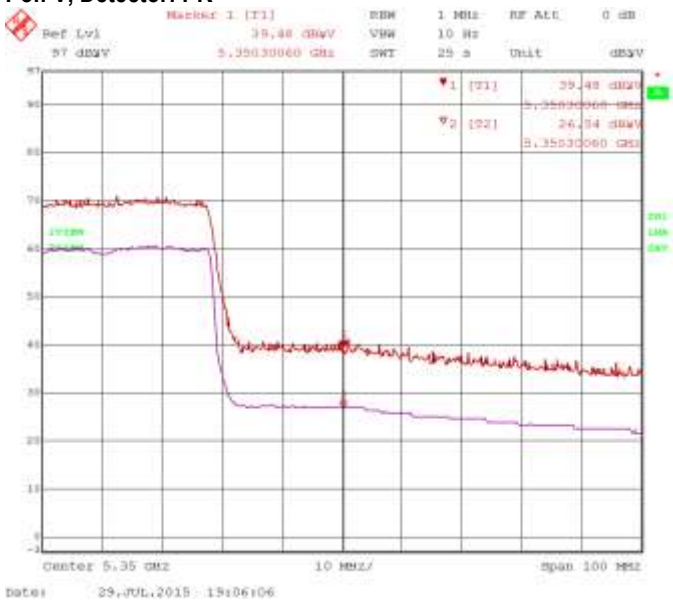


Figure 4-38: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 58, 5290 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK

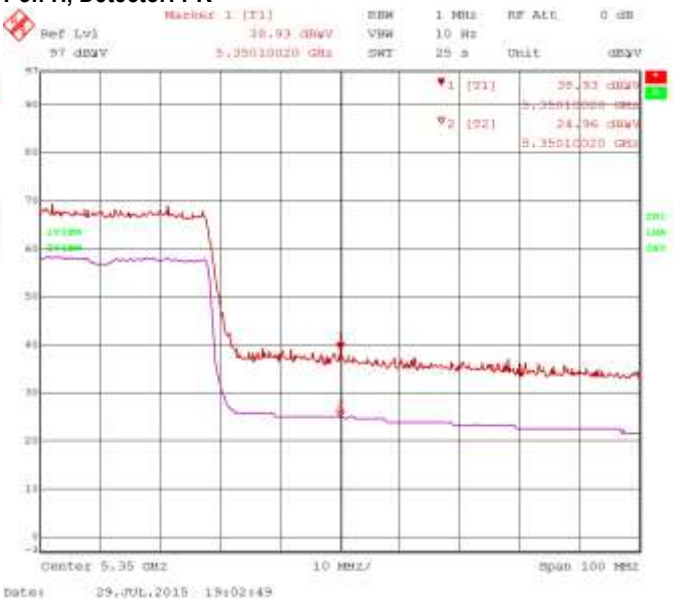


Figure 4-39: Band-Edge Compliance of RF Radiated Emission 802.11ac, Secondary, Ch. 106, 5530 MHz, Centre of Band-Edge: 5470 MHz
Pol: V, Detector: PK

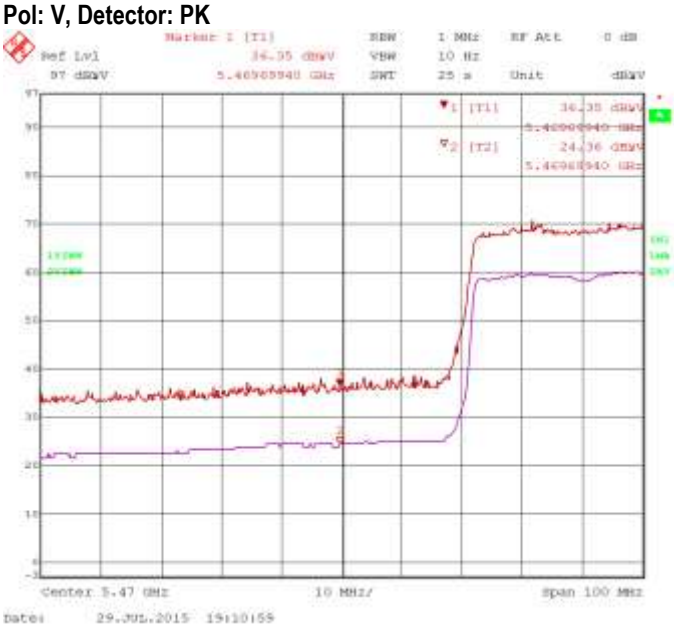
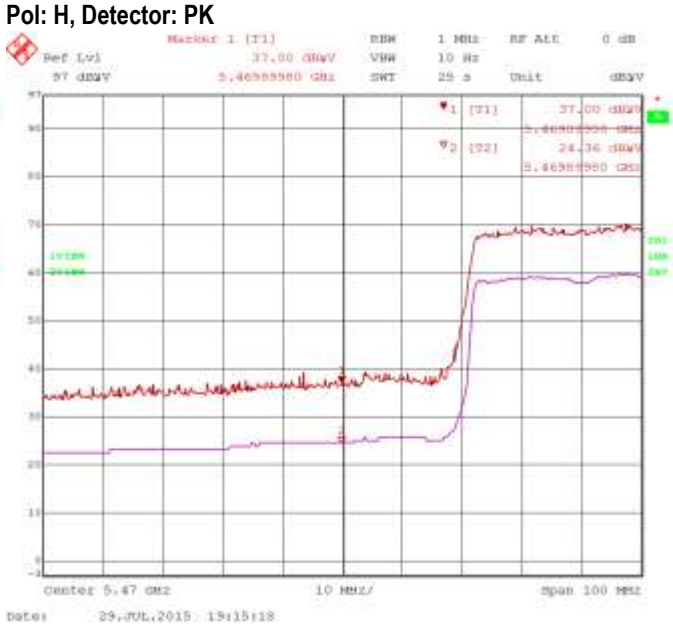


Figure 4-40: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Secondary, Ch. 106, 5530 MHz, Centre of Band-Edge: 5470 MHz
Pol: H, Detector: PK



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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
MIMO - Bandwidth 20MHz

Figure 4-41: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

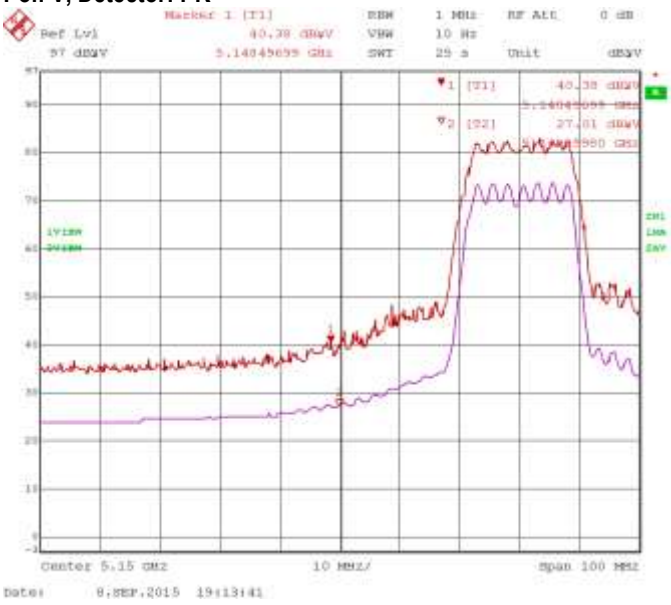


Figure 4-42: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK

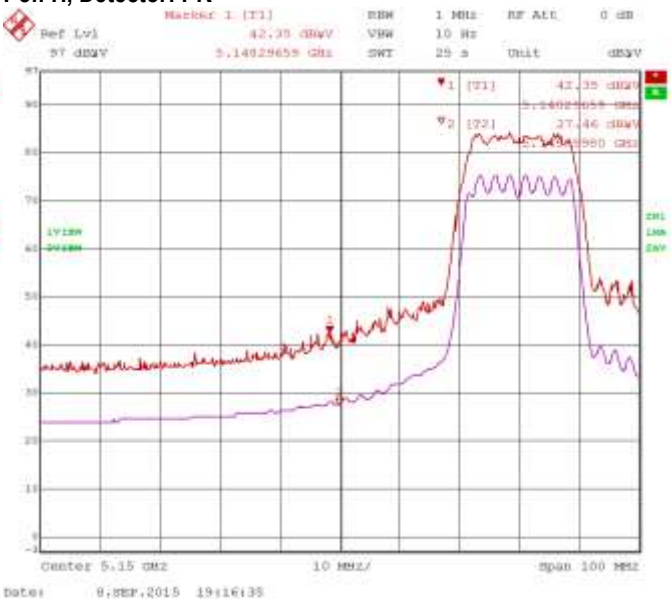


Figure 4-43: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

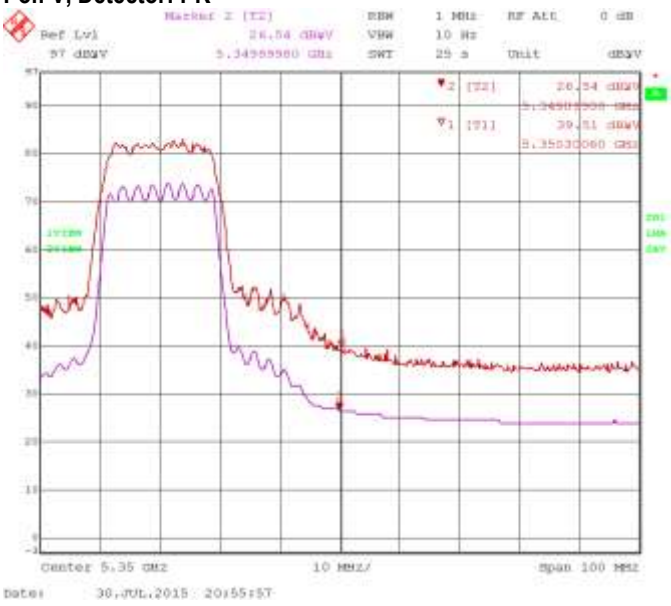
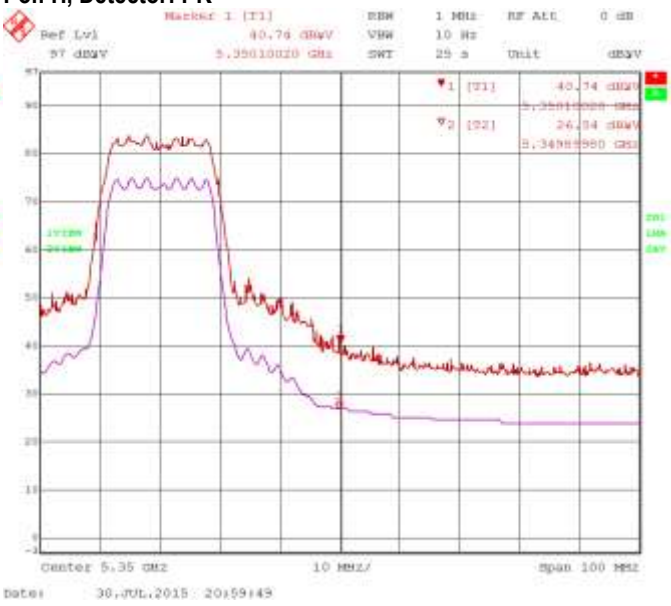


Figure 4-44: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK



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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
MIMO - Bandwidth 20MHz

Figure 4-45: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 100, 5500 MHz, Centre of Band-Edge: 5470 MHz
Pol: V, Detector: PK

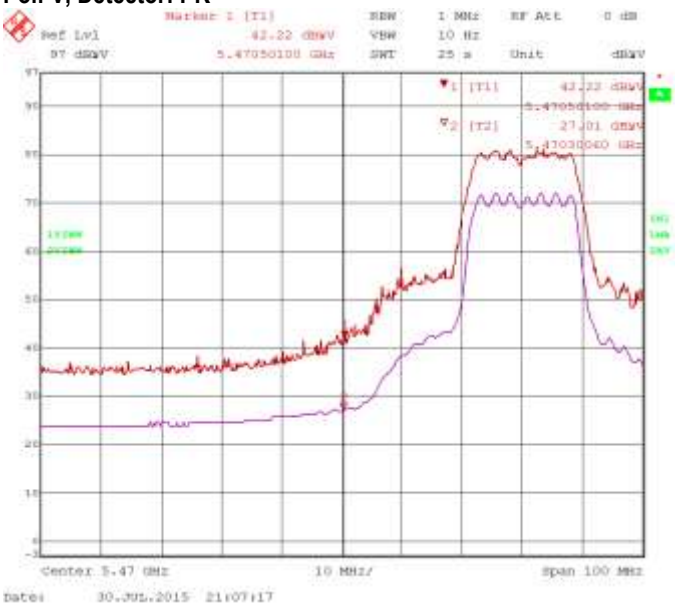


Figure 4-46: Band-Edge Compliance of RF Radiated Emission. 802.11ac, MIMO, Ch. 100, 5500 MHz, Centre of Band-Edge: 5470 MHz
Pol: H, Detector: PK

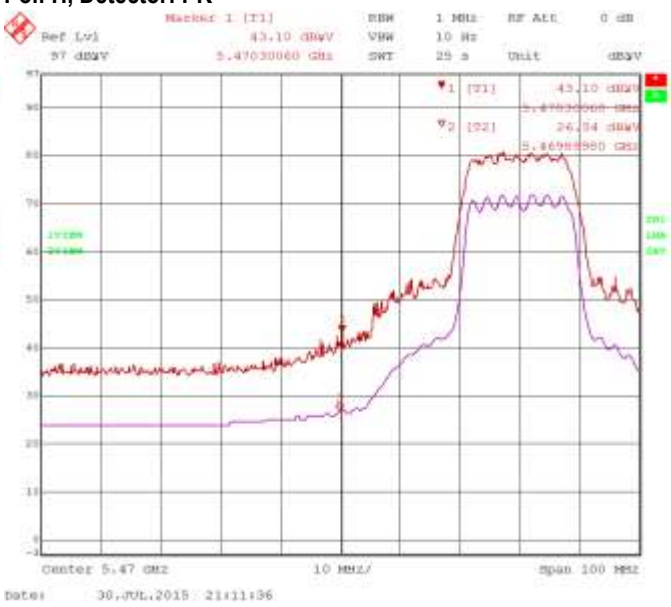


Figure 4-47: Band-Edge Compliance of RF Radiated Emission. 802.11ac, MIMO, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz
Pol: V, Detector: PK

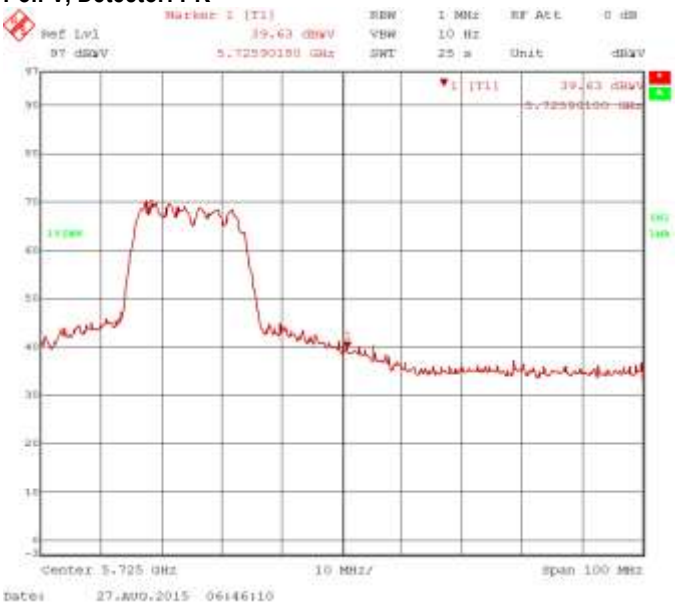
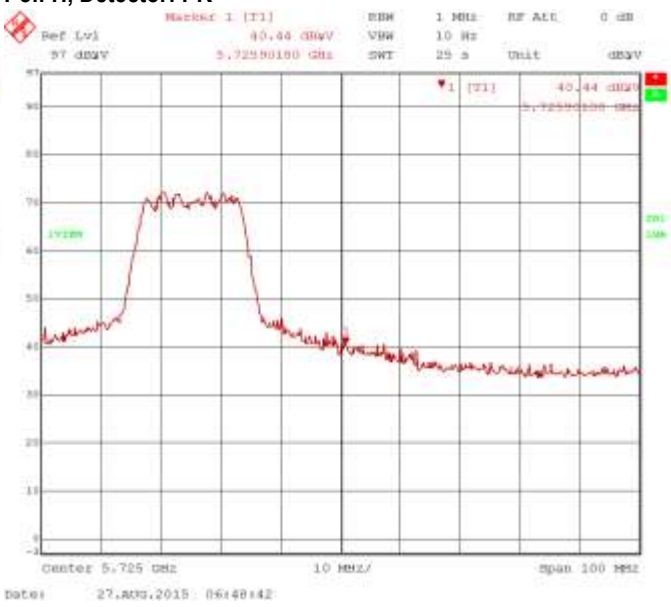


Figure 4-48: Band-Edge Compliance of RF Radiated Emission. 802.11ac, MIMO, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz
Pol: H, Detector: PK



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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
MIMO - Bandwidth 40MHz

Figure 4-49: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 38, 5190 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

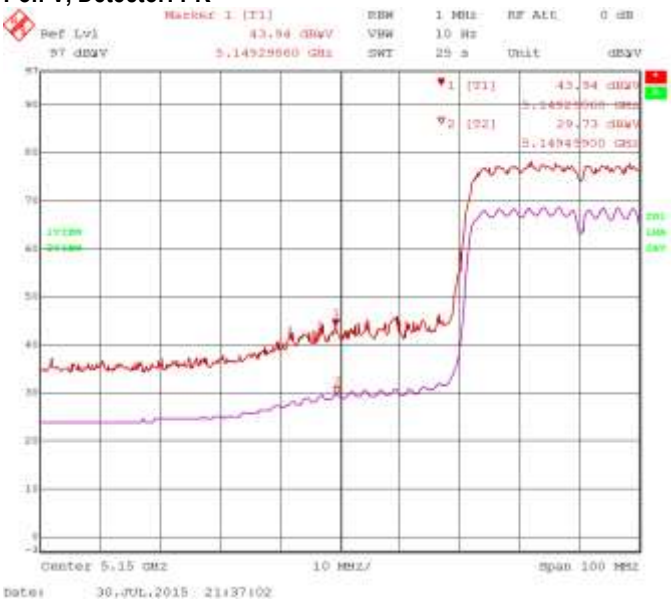


Figure 4-50: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 38, 5190 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK

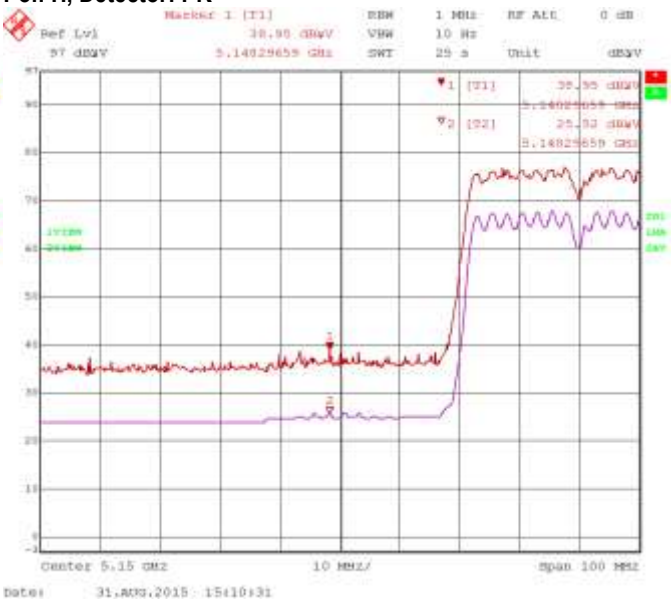


Figure 4-51: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

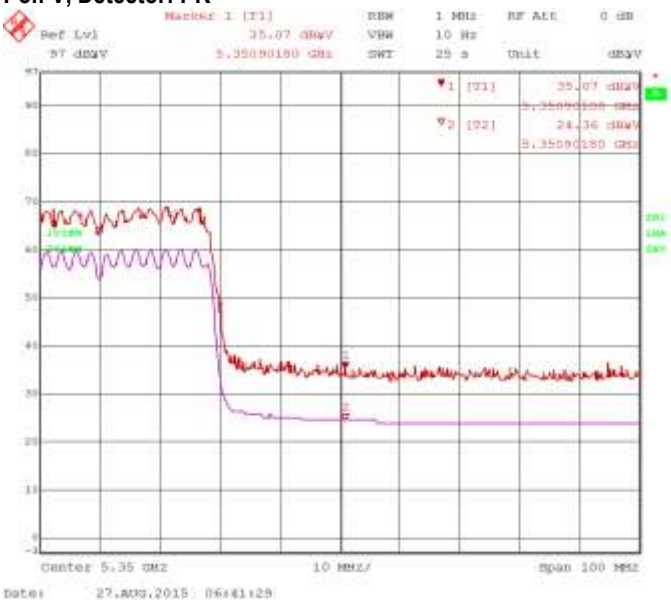
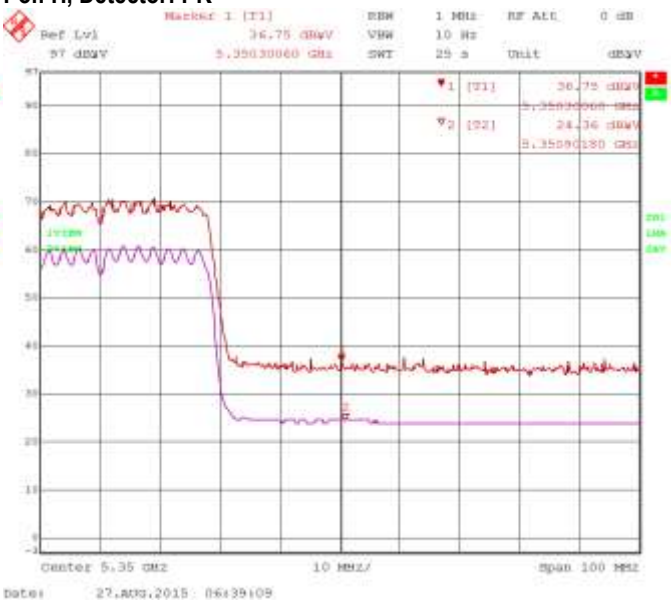


Figure 4-52: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK



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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
MIMO - Bandwidth 40MHz

Figure 4-53: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 102, 5510 MHz, Centre of Band-Edge: 5470 MHz
Pol: V, Detector: PK

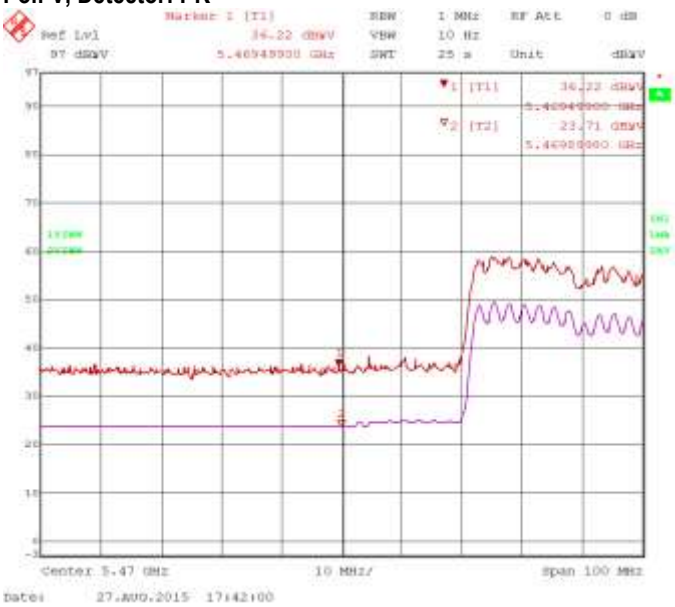
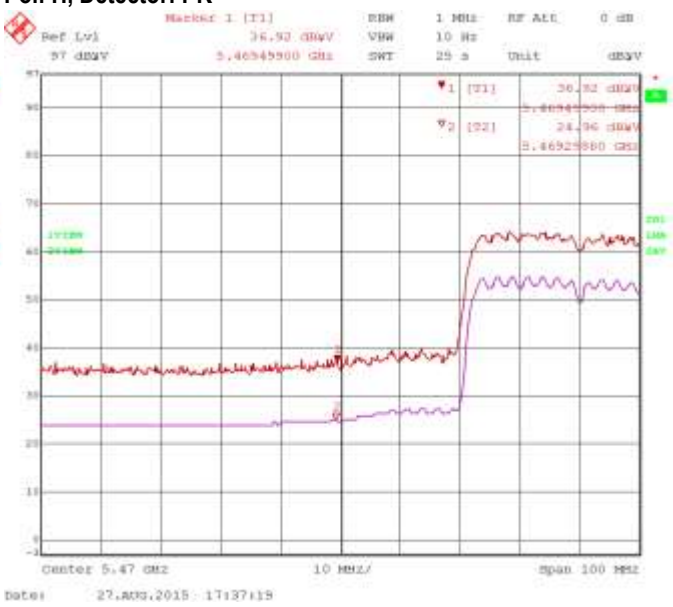


Figure 4-54: Band-Edge Compliance of RF Radiated Emission. 802.11ac, MIMO, Ch. 102, 5510 MHz, Centre of Band-Edge: 5470 MHz
Pol: H, Detector: PK



MIMO - Bandwidth 80MHz

Figure 4-55: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 42, 5210 MHz, Centre of Band-Edge: 5150 MHz
Pol: V, Detector: PK

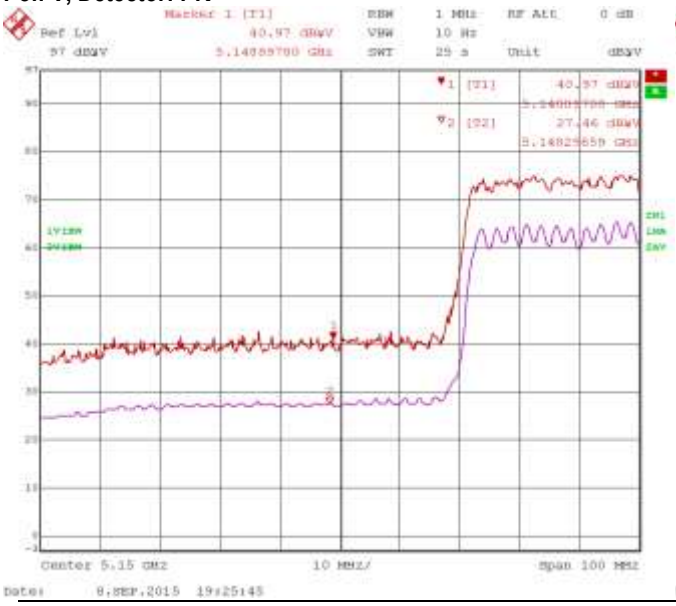
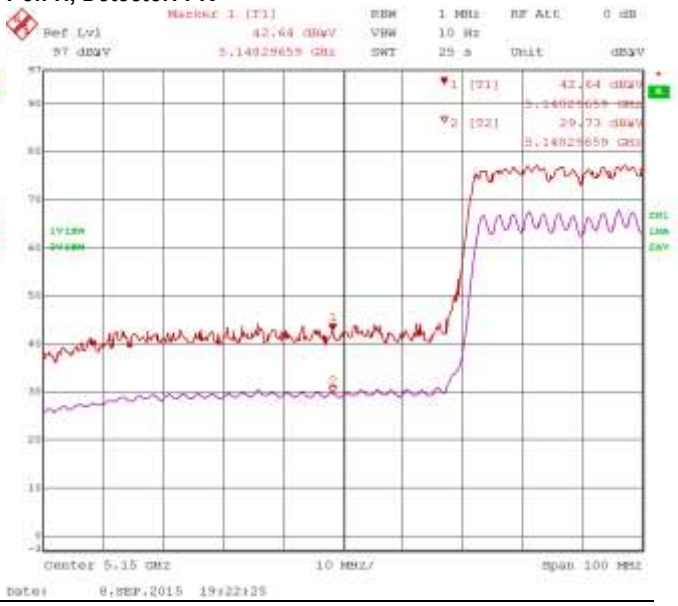


Figure 4-56: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 42, 5210 MHz, Centre of Band-Edge: 5150 MHz
Pol: H, Detector: PK



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802.11ac Band-Edge Compliance of RF Radiated Emissions cont'd
MIMO - Bandwidth 80MHz

Figure 4-57: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 58, 5290 MHz, Centre of Band-Edge: 5350 MHz
Pol: V, Detector: PK

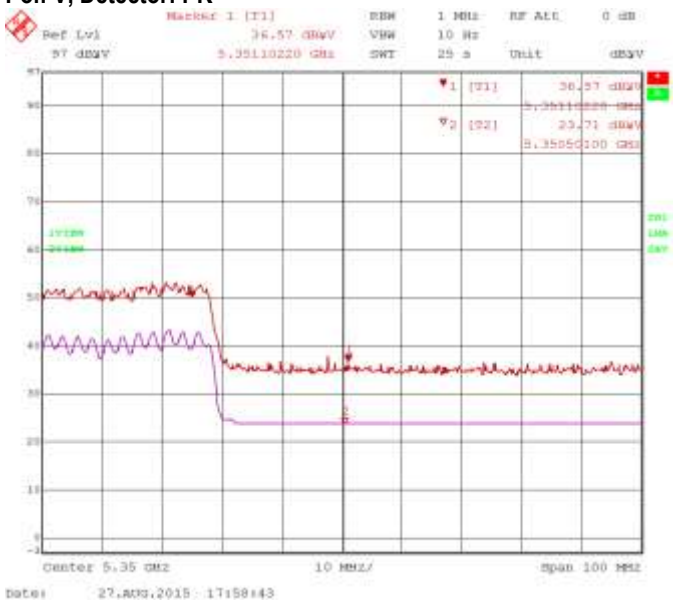


Figure 4-58: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 58, 5290 MHz, Centre of Band-Edge: 5350 MHz
Pol: H, Detector: PK

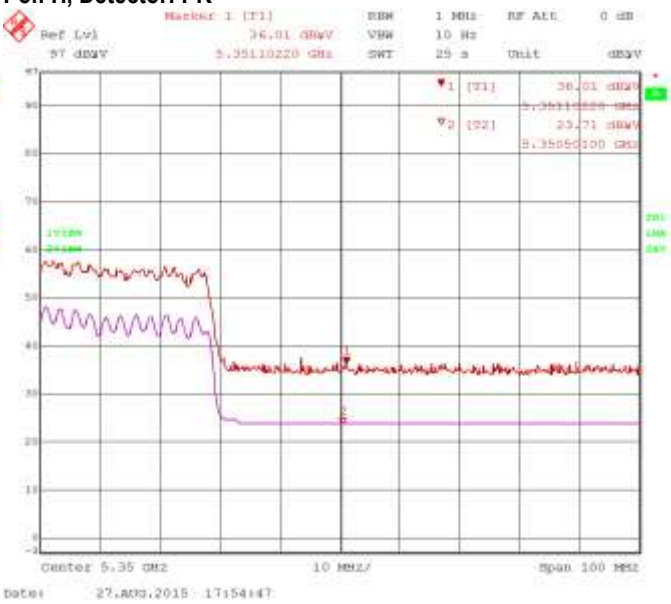


Figure 4-59: Band-Edge Compliance of RF Radiated Emission 802.11ac, MIMO, Ch. 106, 5530 MHz, Centre of Band-Edge: 5470 MHz
Pol: V, Detector: PK

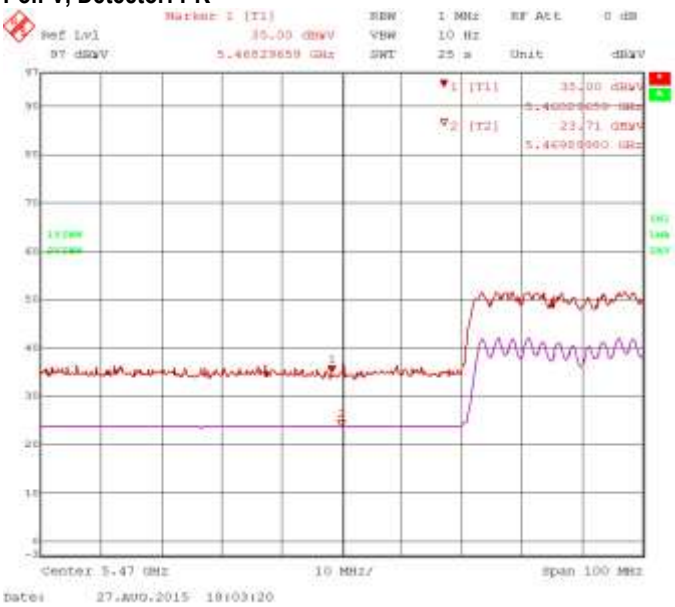
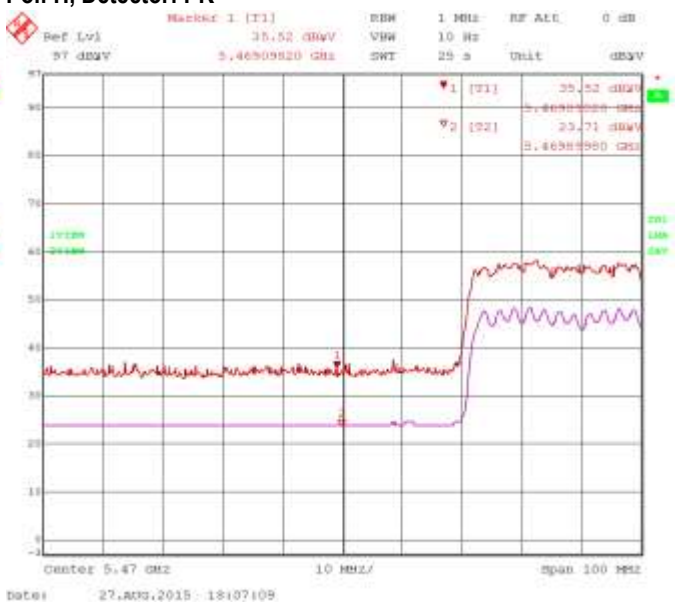


Figure 4-60: Band-Edge Compliance of RF Radiated Emission. 802.11ac, MIMO, Ch. 106, 5530 MHz, Centre of Band-Edge: 5470 MHz
Pol: H, Detector: PK



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APPENDIX 5 – BLUETOOTH AND BLUETOOTH LOW ENERGY CONDUCTED EMISSIONS TEST DATA/PLOTS

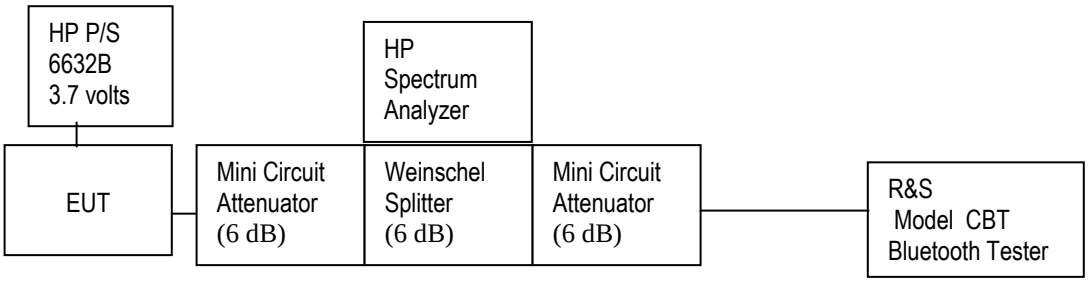
Bluetooth RF Conducted Emission Test Results

The following test configurations were measured on model RHK211LW (STV100-1):

Bluetooth power output from BlackBerry® smartphone was at maximum for all the recorded measurements shown below.
The measurements were performed by Sijia Li.

Date of test: August 12, 2015

Test Setup Diagram



UNIT	MANUFACTURER	MODEL	SERIAL NUMBER
Attenuator 1	Mini-Circuits	BW-S6W2+	0647
Attenuator 2	Mini-Circuits	BW-S6W2+	0648
Attenuator 3	Mini-Circuits	BW-S20-2W263+	1234
Splitter 1	Weinschel	1515	MES 92

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

The environmental test conditions were: Temperature: 23.2 ºC
Relative Humidity: 38.7 %

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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-247. Low channel (0), middle channel (39) and high channel (78) were measured. Bluetooth was operating in single frequency mode.

Using pattern type "Static PBRS" and packet type "DH5" during the measurements.

Bluetooth Channel	Limit (MHz)	Measured Level (MHz)
0	≤1.0	0.926
39	≤1.0	**0.929**
78	≤1.0	**0.929**

See figures 5-1 to 5-3 for the plots of the 20 dB bandwidth measurements.

Figure 5-1: 20 dB Bandwidth
Single freq. CH 0 Static PBRS, DH5

Figure 5-2: 20 dB Bandwidth
Single freq. CH 39 Static PBRS, DH5

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Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-3: 20 dB Bandwidth
Single freq. CH 78 Static PBRS, DH5

Using Pattern type "Static PBRS" and packet type "2-DH5" during the measurements.

Bluetooth Channel	Limit (MHz)	Measured Level (MHz)
0	≤1.5	1.330
39	≤1.5	1.317
78	≤1.5	1.321

See figures 5-4 to 5-6 for the plots of the 20 dB bandwidth measurements.

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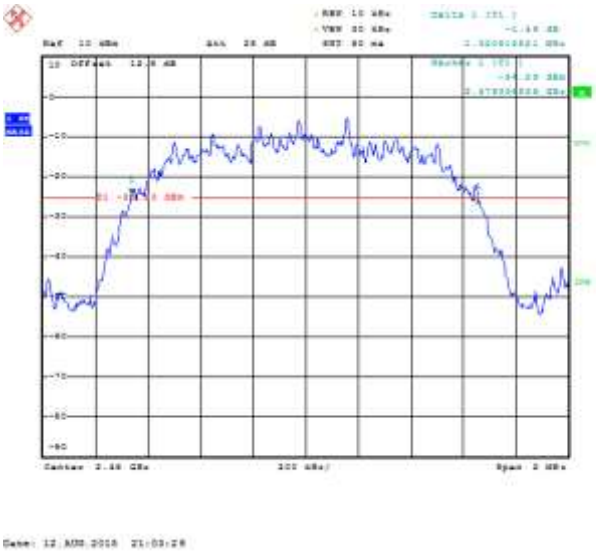
Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-4: 20 dB Bandwidth
Single freq. CH 0 Static PBRS, 2-DH5

Figure 5-5: 20 dB Bandwidth
Single freq. CH 39 Static PBRS, 2-DH5

Figure 5-6: 20 dB Bandwidth
Single freq. CH 78 Static PBRS, 2-DH5



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

Bluetooth Channel	Limit (MHz)	Measured Level (MHz)
0	≤1.5	1.337
39	≤1.5	1.337
78	≤1.5	**1.340**

See figures 5-7 to 5-9 for the plots of the 20 dB bandwidth measurements.

Figure 5-7: 20 dB Bandwidth
Single freq. CH 0 Static PBRS, 3-DH5

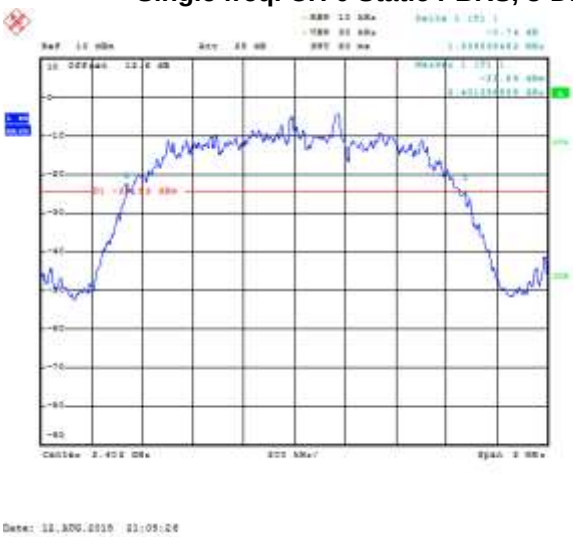

Figure 5-8: 20 dB Bandwidth
Single freq. CH 39 Static PBRS, 3-DH5

Figure 5-9: 20 dB Bandwidth
Single freq. CH 78 Static PBRS, 3-DH5

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Bluetooth RF Conducted Emission Test Results cont'd

Carrier Frequency Separation

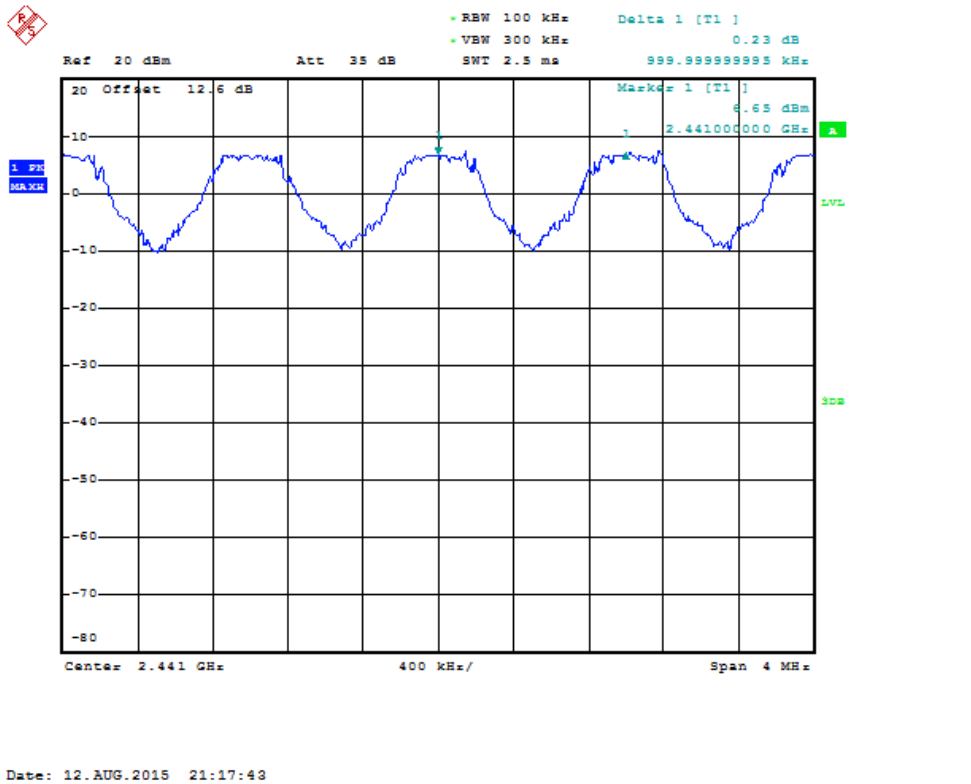
The EUT met the requirements of the Carrier Frequency Separation as per 47 CFR 15.247(a) and RSS-247. Channel 38 to 39 was measured. Bluetooth was operating in frequency hopping (Euro/US) mode.

Using pattern type "Static PBRS" 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 5-10 for the plot of the Carrier Frequency Separation measurement.

Figure 5-10: Carrier Frequency Separation, Freq. Hopping, Static PBRS, DH5, Channels 38 to 39



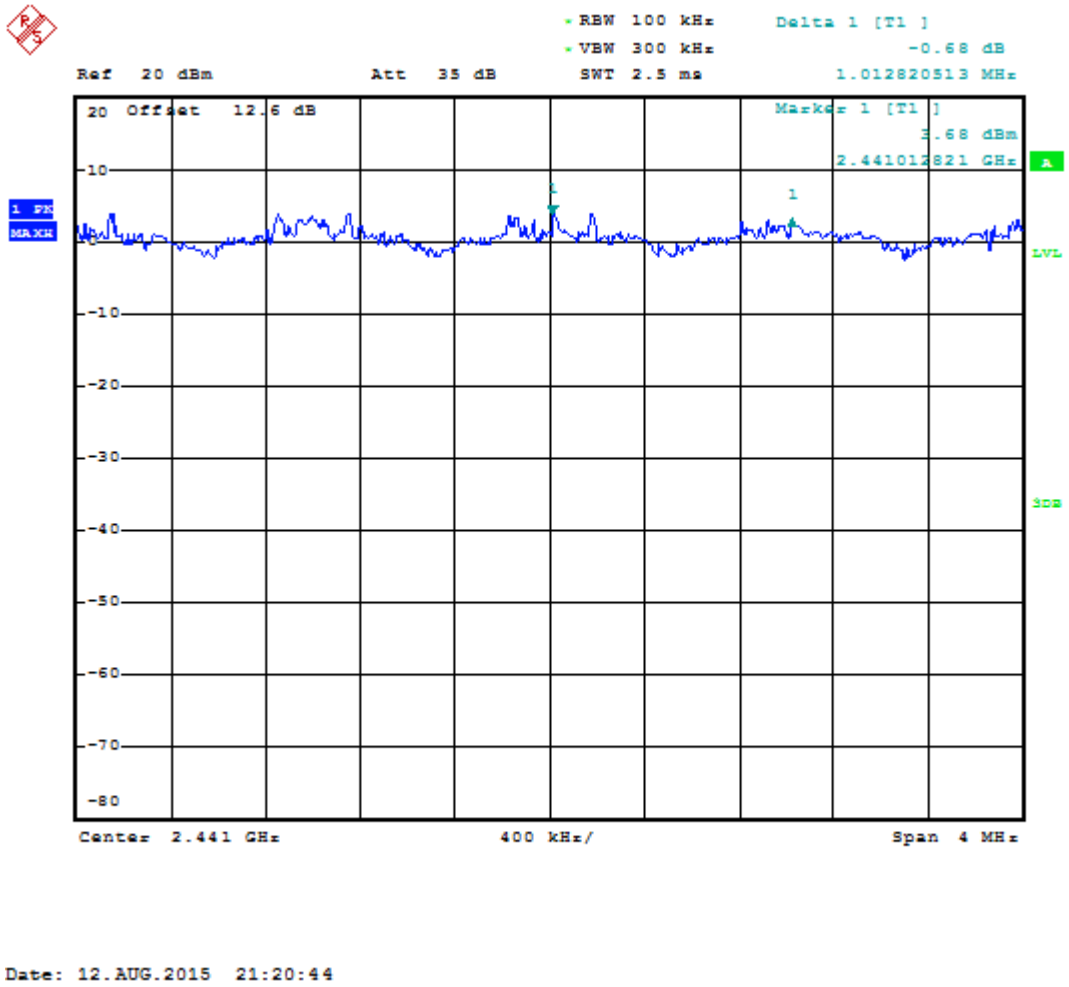
Bluetooth RF Conducted Emission Test Results cont'd

Using Pattern type "Static PBRS" and packet type "2-DH5" during the measurements.

Bluetooth Channels	Limit (MHz)	Measured Level (MHz)
38 to 39	≥ 0.025 or 20 dB bandwidth	1.013

See figure 5-11 for the plot of the Carrier Frequency Separation measurement.

Figure 5-11: Carrier Frequency Separation, Freq. Hopping, Static PBRS, 2-DH5, Channels 38 to 39



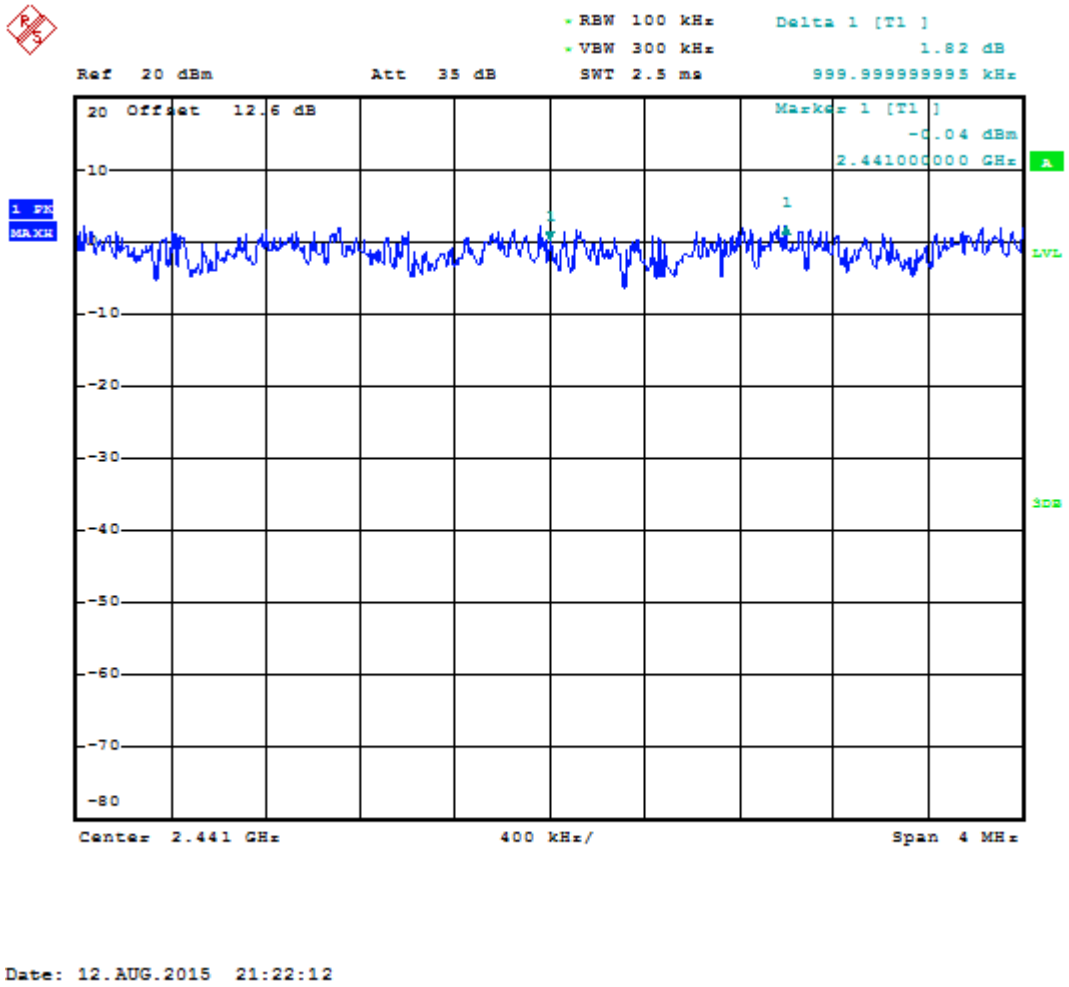
Bluetooth RF Conducted Emission Test Results cont'd

Using Pattern type "Static PBRS" 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 5-12 for the plot of the Carrier Frequency Separation measurement.

Figure 5-12: Carrier Frequency Separation, Freq. Hopping, Static PBRS, 3-DH5, Channels 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-247. Bluetooth was operating in frequency hopping (Euro/US) mode.

Using pattern type "Static PBRS" and packet type "DH5" during the measurements.

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

See figures 5-13 to 5-16 for the plots of the number of hopping frequencies.

Figure 5-13: Number of Hopping Frequencies Static PBRS, DH5

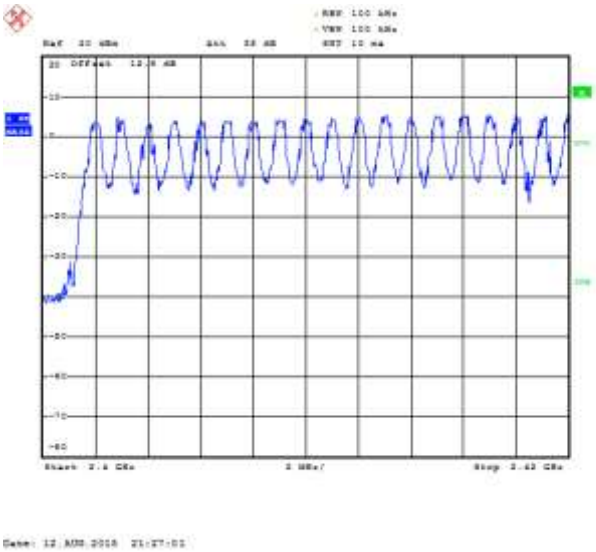
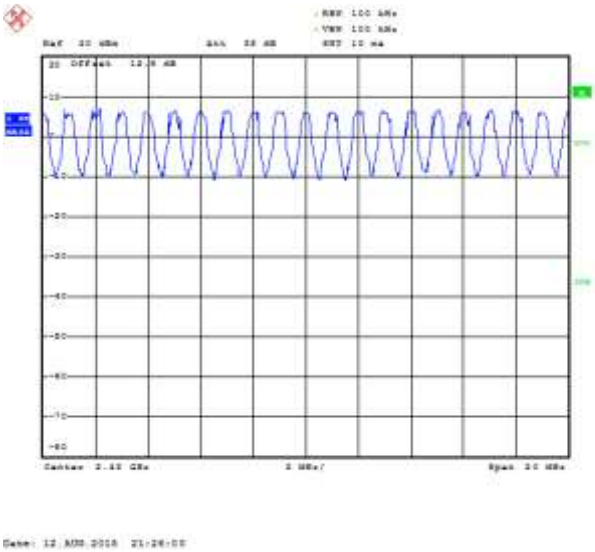


Figure 5-14: Number of Hopping Frequencies Static PBRS, DH5



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Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-15: Number of Hopping Frequencies Static PBRS, DH5

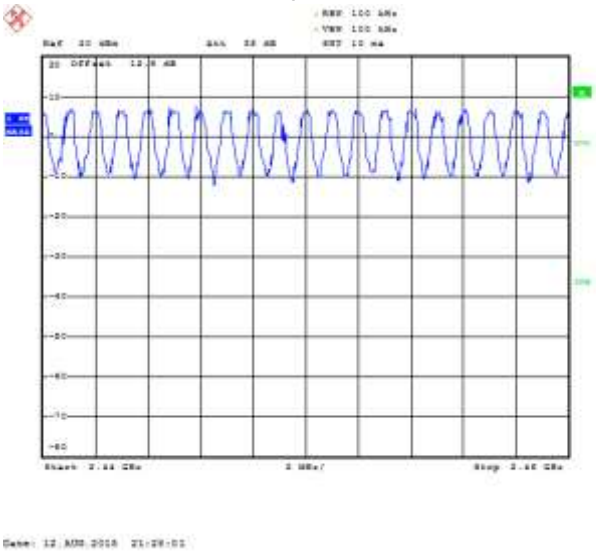
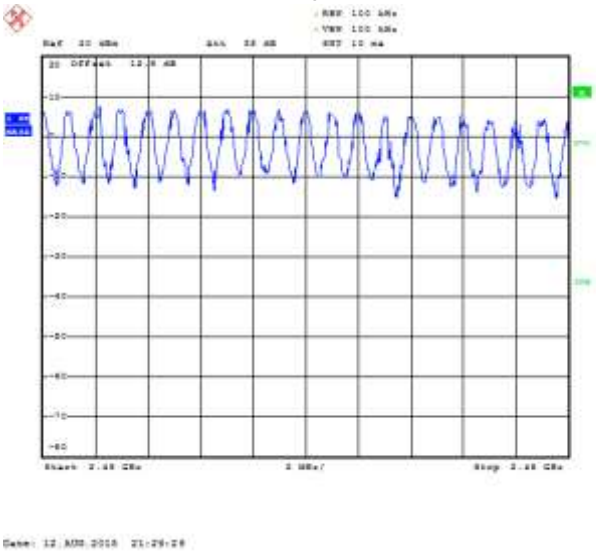


Figure 5-16: Number of Hopping Frequencies Static PBRS, DH5



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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-247. 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	0.4260	0.426 x 320.0 = 136.32	400	263.68
39	DH1	0.4250	0.425 x 320.0 = 136	400	264.00
78	DH1	0.4210	0.421 x 320.0 = 134.72	400	265.28
0	DH3	1.6940	1.694 x 159.9 = 270.87	400	129.13
39	DH3	1.6940	1.694 x 159.9 = 270.87	400	129.13
78	DH3	1.7020	1.702 x 159.9 = 272.15	400	127.85
0	DH5	2.9600	2.96 x 106.8 = 316.13	400	83.87
39	DH5	2.9440	2.944 x 106.8 = 314.42	400	85.58
78	DH5	2.9570	2.957 x 106.8 = 315.81	400	84.19

See figures 5-17 to 5-25 for the plots of the dwell time.

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Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-17: Time of Occupancy (Dwell Time) Freq. Hopping, Static PBRS, DH1

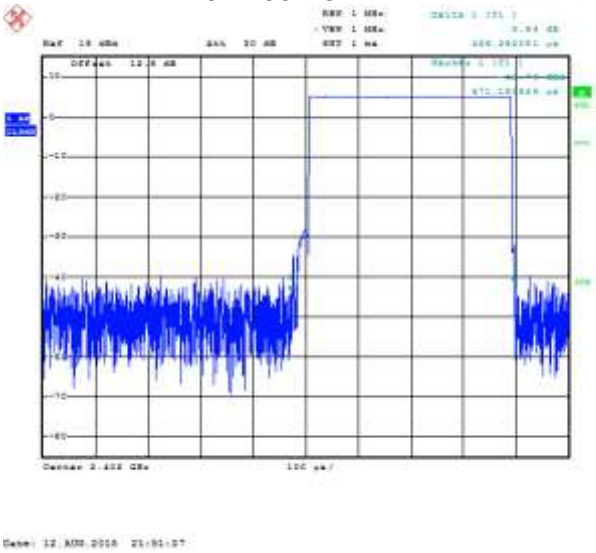


Figure 5-18: Time of Occupancy (Dwell Time) Freq. Hopping, Static PBRS, DH1

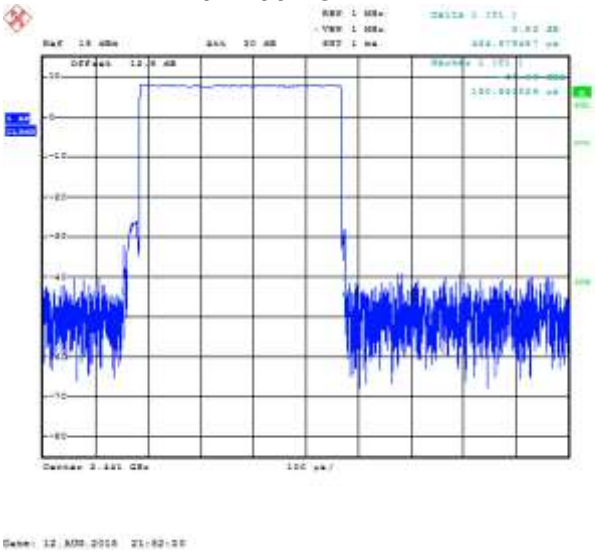


Figure 5-19: Time of Occupancy (Dwell Time) Freq. Hopping, Static PBRS, DH1

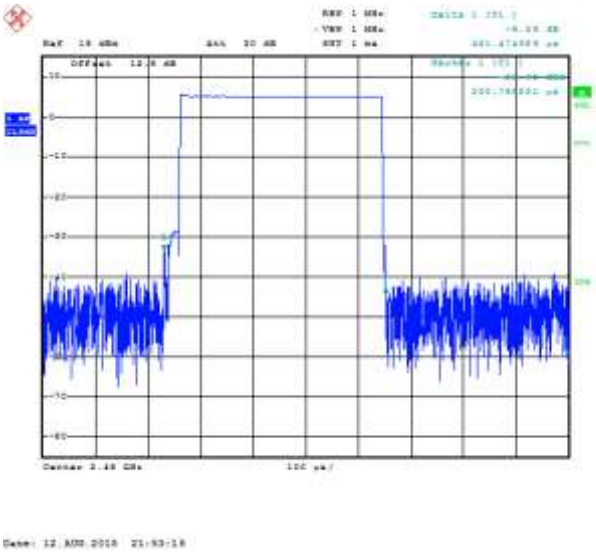
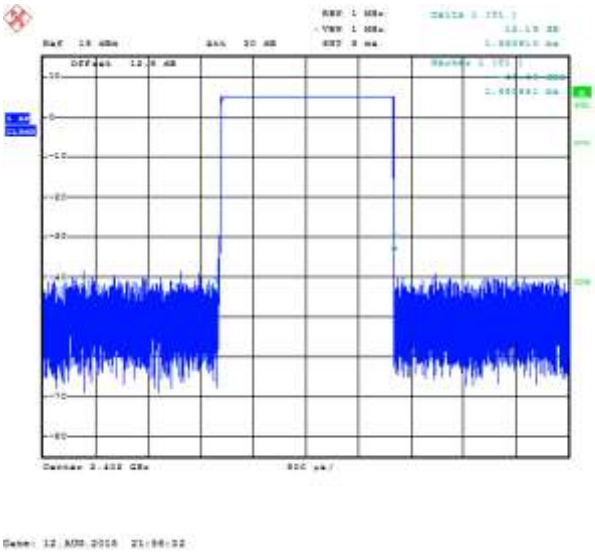


Figure 5-20: Time of Occupancy (Dwell Time) Freq. Hopping, Static PBRS, DH3



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Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-21: Time of Occupancy (Dwell Time) Freq. Hopping, Static PBRS, DH3

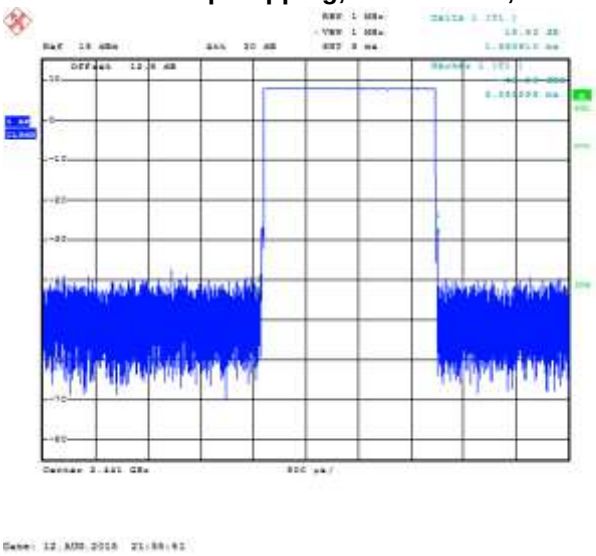


Figure 5-22: Time of Occupancy (Dwell Time) Freq. Hopping, Static PBRS, DH3

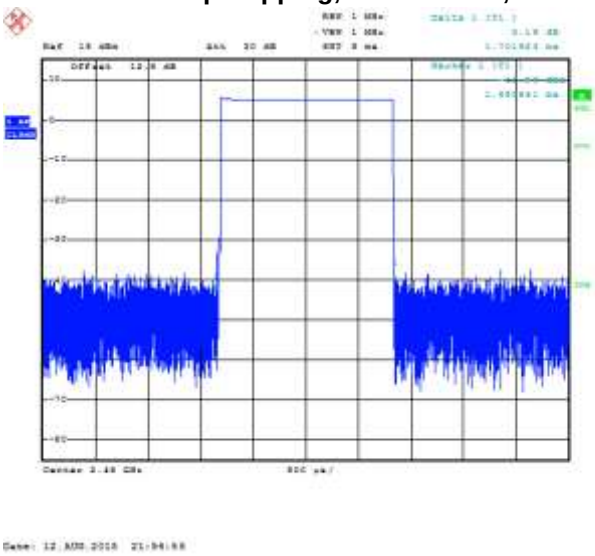


Figure 5-23: Time of Occupancy (Dwell Time) Freq. Hopping, Static PBRS, DH5

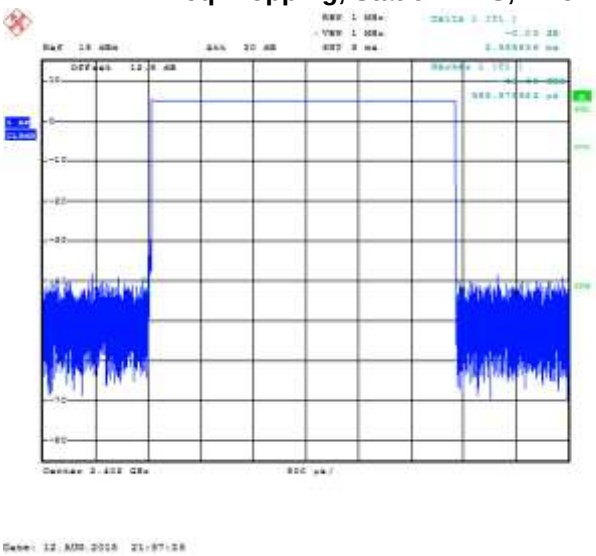
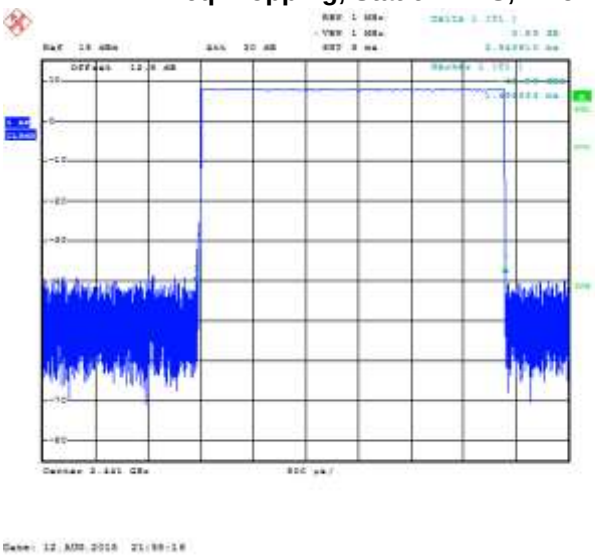


Figure 5-24: Time of Occupancy (Dwell Time) Freq. Hopping, Static PBRS, DH5



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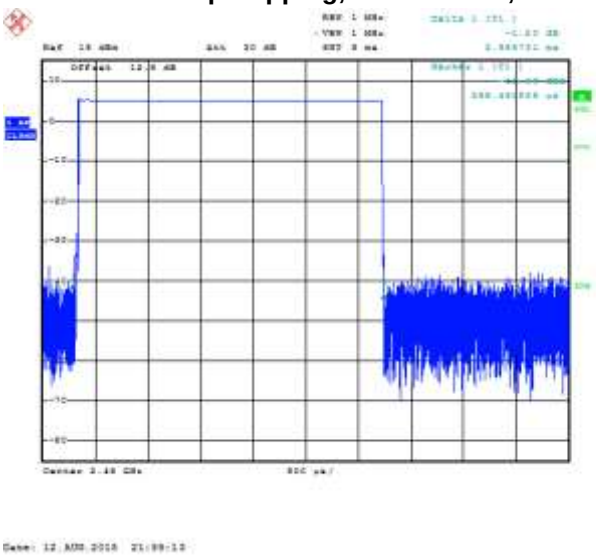
Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-25: Time of Occupancy (Dwell Time)
Freq. Hopping, Static PBRS, 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 1 as per 47 CFR 15.247(b) and RSS-247. 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 PBRS" and packet type "DH5" during the measurements.

Bluetooth Channel	Measured Level (dBm)	Measured Level (W)	Class 1 Limit (dBm)
0	5.70	0.00372	0.0 to 20.0
39	**8.10**	**0.00646**	0.0 to 20.0
78	5.50	0.00355	0.0 to 20.0

Using Pattern type "Static PBRS" and packet type "2-DH5" during the measurements.

Bluetooth Channel	Measured Level (dBm)	Measured Level (W)	Class 1 Limit (dBm)
0	5.50	0.00355	0.0 to 20.0
39	7.40	0.00550	0.0 to 20.0
78	4.30	0.00269	0.0 to 20.0

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

Bluetooth Channel	Measured Level (dBm)	Measured Level (W)	Class 1 Limit (dBm)
0	5.90	0.00389	0.0 to 20.0
39	**7.60**	**0.00575**	0.0 to 20.0
78	4.60	0.00288	0.0 to 20.0

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Bluetooth RF Conducted Emission Test Results cont'd

Band Edge Compliance

The EUT met the requirements of the band edge compliance as per 47 CFR 15.247(c) and RSS-247. Low channel (0) and high channel (78) were measured. Bluetooth was operating in single frequency and hopping mode.

Using pattern type "Static PBRS" and packet type "DH5" during the measurements.

Bluetooth Channel	Operating Mode	Measured Level (dBc)	Limit (dBc)	Margin (dB)
0	Single Frequency	-47.14	-20	-27.14
78	Single Frequency	-47.07	-20	-27.07
0	Hopping	-50.5	-20	-30.50
78	Hopping	-47.52	-20	-27.52

See figures 5-26 to 5-29 for the plots of the band edge compliance measurements.

Figure 5-26: Band Edge Compliance
Single Freq., Static PBRS, DH5

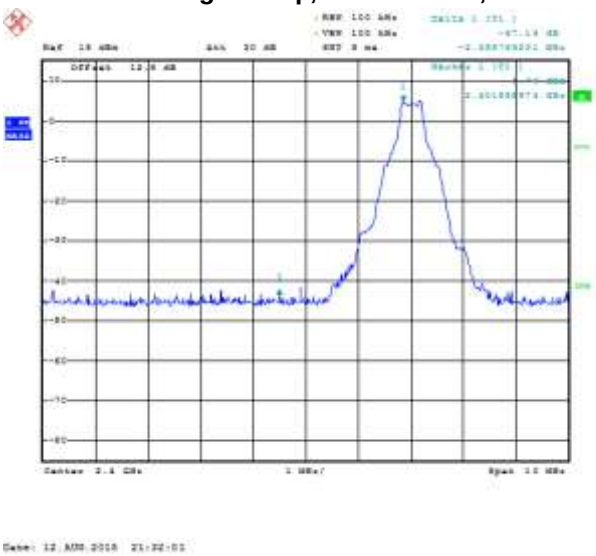
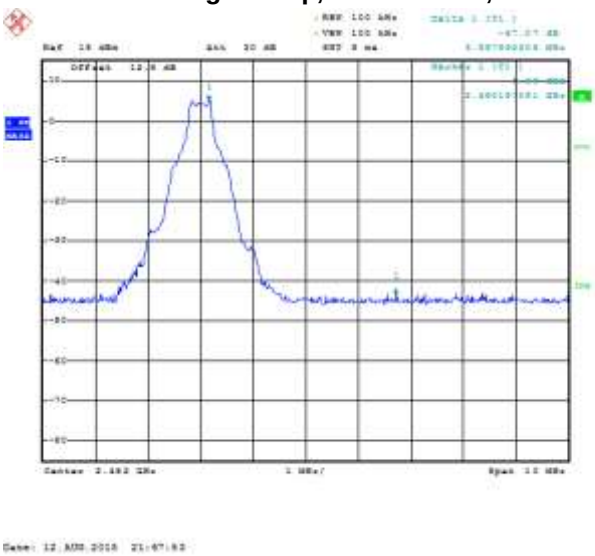


Figure 5-27: Band Edge Compliance
Single Freq., Static PBRS, DH5



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Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-28: Band Edge Compliance
Freq. Hopping, Static PBRS, DH5

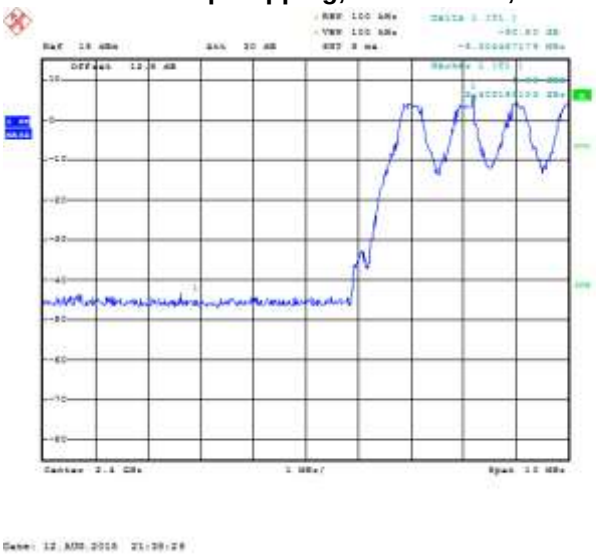
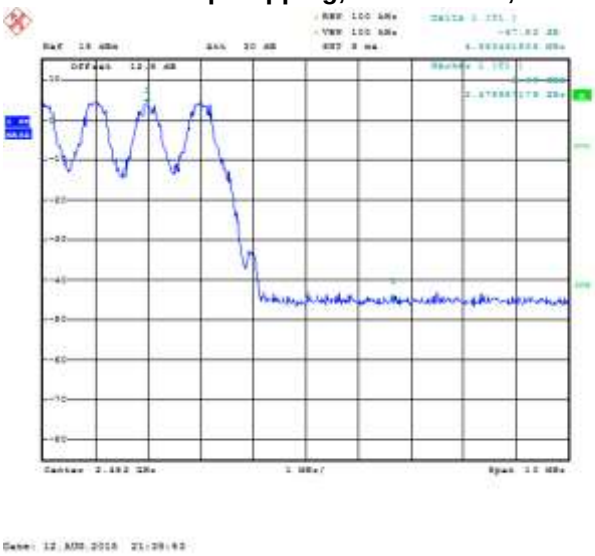


Figure 5-29: Band Edge Compliance
Freq. Hopping, Static PBRS, DH5



Using pattern type "Static PBRS" and packet type "2-DH5" during the measurements.

Bluetooth Channel	Operating Mode	Measured Level (dBc)	Limit (dBc)	Margin (dB)
0	Single Frequency	-45.76	-20	-25.76
78	Single Frequency	-44.49	-20	-24.49
0	Hopping	-45.72	-20	-25.72
78	Hopping	-43.8	-20	-23.80

See figures 5-30 to 5-33 for the plots of the band edge compliance measurements.

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Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-30: Band Edge Compliance
Single Freq., Static PBRS, 2-DH5

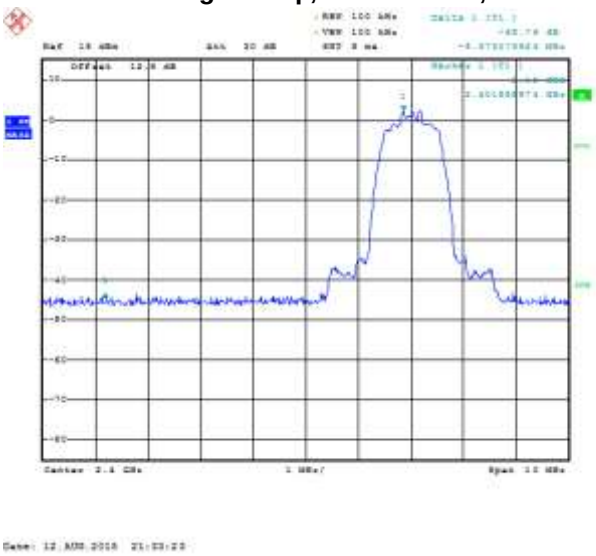

Figure 5-31: Band Edge Compliance
Single Freq., Static PBRS, 2-DH5

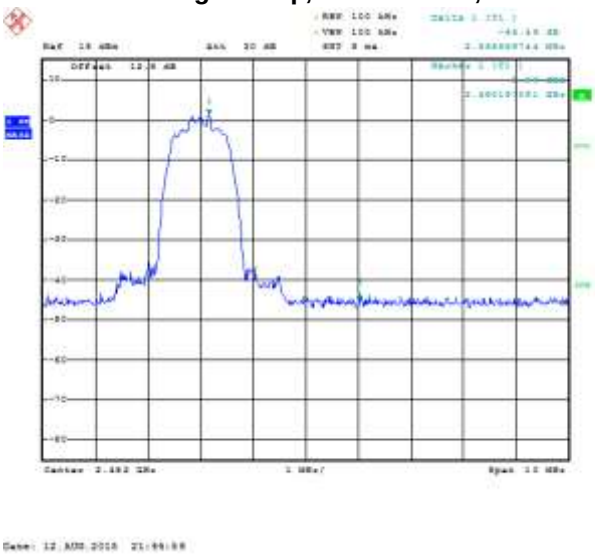

Figure 5-32: Band Edge Compliance
Freq. Hopping, Static PBRS, 2-DH5

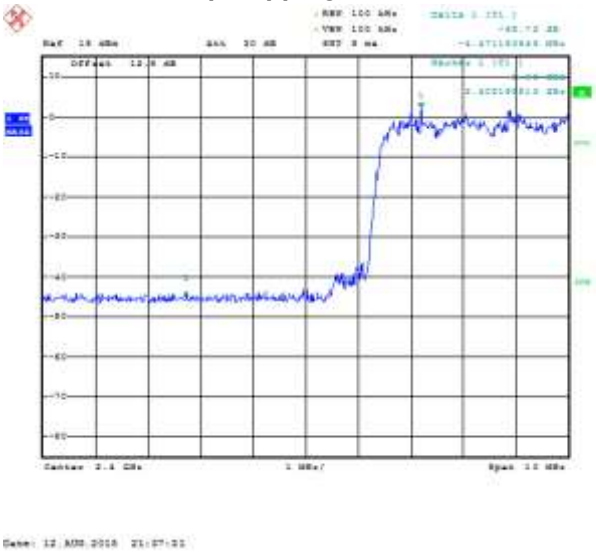

Figure 5-33: Band Edge Compliance
Freq. Hopping, Static PBRS, 2-DH5

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Bluetooth RF Conducted Emission Test Results cont'd

Using pattern type "Static PBRS" and packet type "3-DH5" during the measurements.

Bluetooth Channel	Operating Mode	Measured Level (dBc)	Limit (dBc)	Margin (dB)
0	Single Frequency	-45.95	-20	-25.95
78	Single Frequency	-43.99	-20	-23.99
0	Hopping	-45.30	-20	-25.30
78	Hopping	-43.78	-20	-23.78

See figures 5-34 to 5-37 for the plots of the band edge compliance measurements.

Figure 5-34: Band Edge Compliance
Single Freq., Static PBRS, 3-DH5

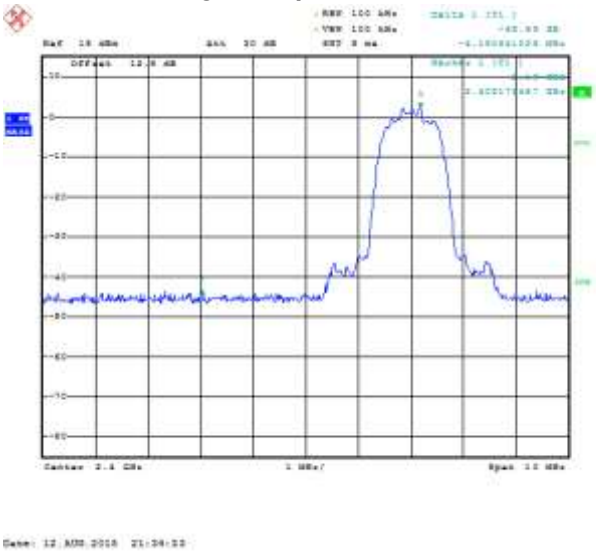
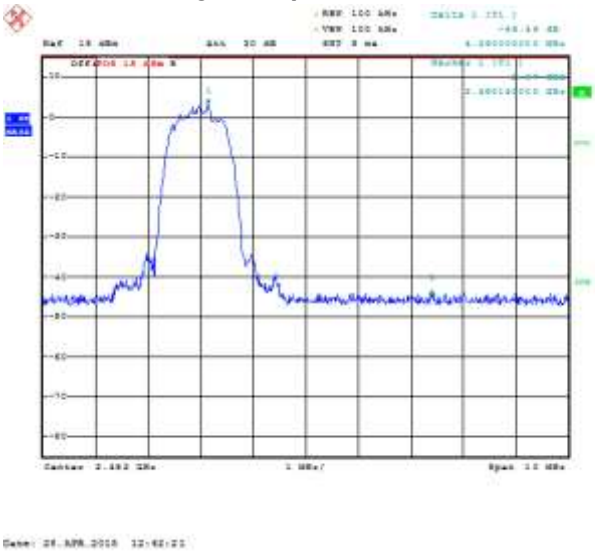


Figure 5-35: Band Edge Compliance
Single Freq., Static PBRS, 3-DH5



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Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-36: Band Edge Compliance
Freq. Hopping, Static PBRS, 3-DH5

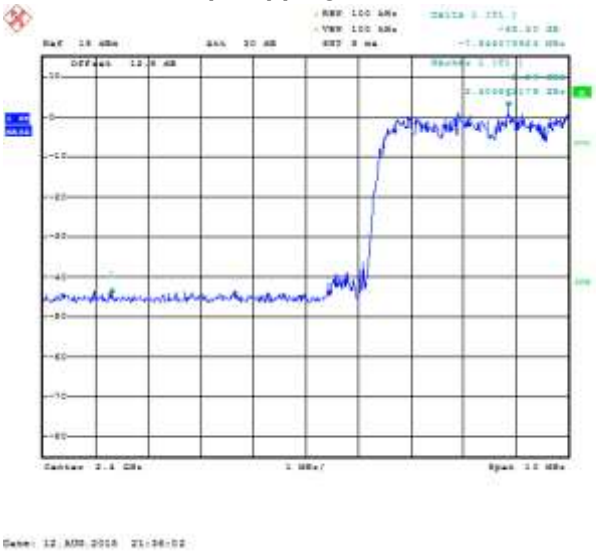
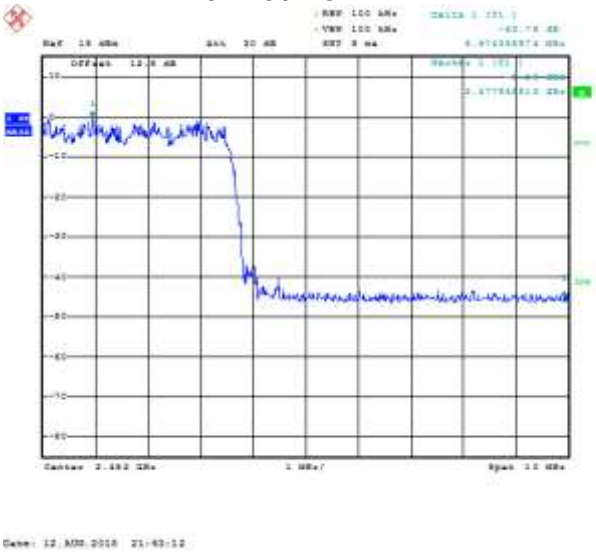


Figure 5-37: Band Edge Compliance
Freq. Hopping, Static PBRS, 3-DH5



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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-247. 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 PBRS" and packet type "DH5" during the measurements.

Bluetooth Channel	Channel Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from carrier (dBc)	Limit (dBc)
0.00	7.70	-37.84	-43.54	-20.00
39.00	9.60	-37.46	-45.56	-20.00
78.00	8.80	-36.79	-42.29	-20.00
Hopping mode	7.70	-38.09	-43.59	-20.00

See figures 5-38 to 5-41 for the plots of the spurious RF conducted emissions.

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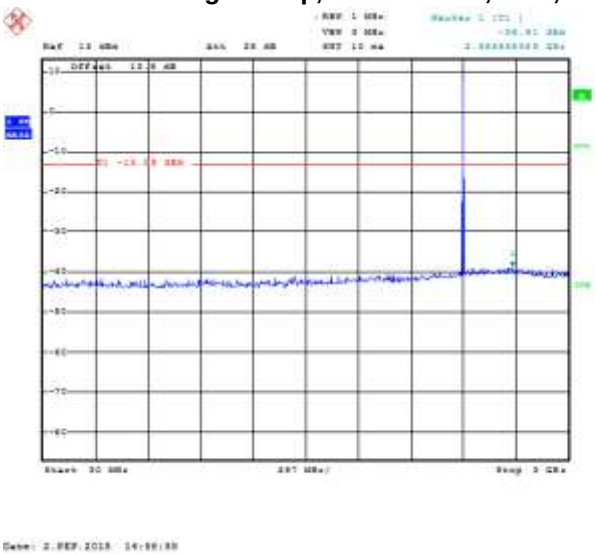
Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-38: Spurious RF Conducted Emissions Single Freq., Static PBRS, DH5,



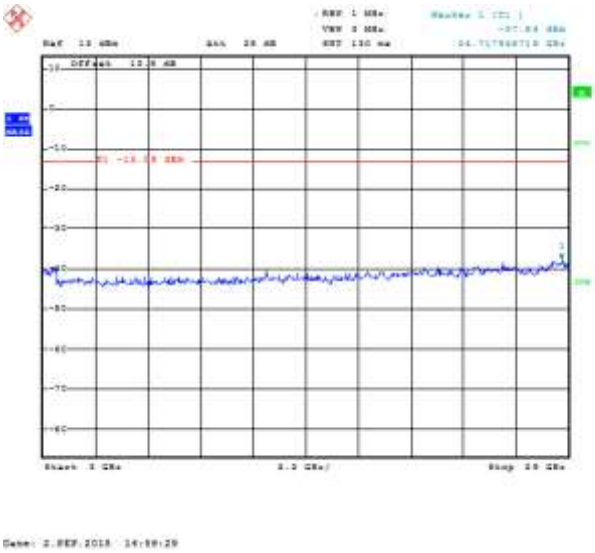
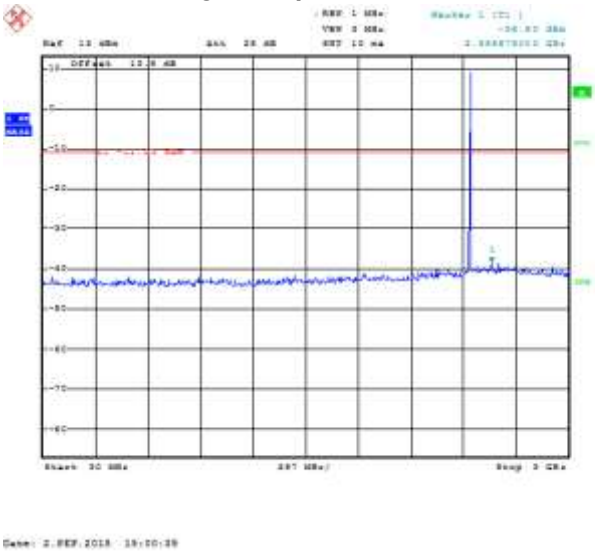
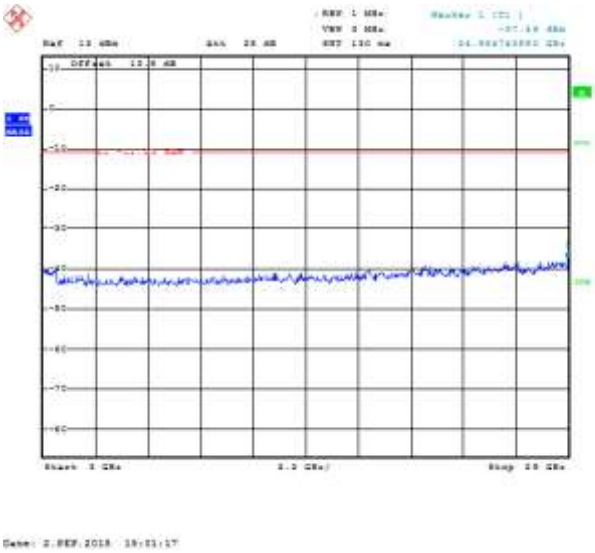


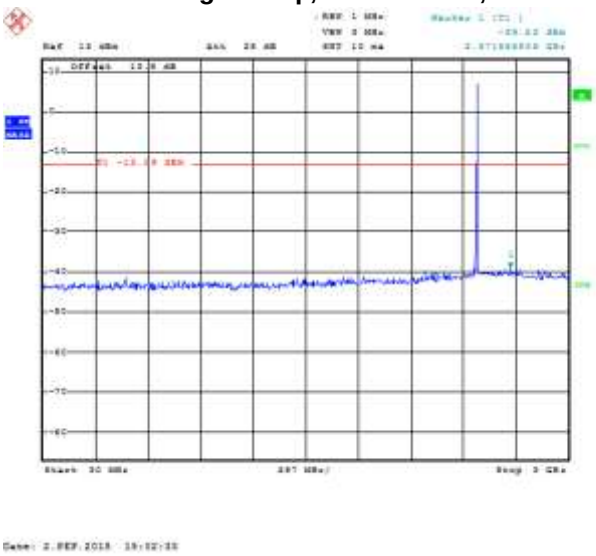
Figure 5-39: Spurious RF Conducted Emissions Single Freq., Static PBRS, DH5





Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-40: Spurious RF Conducted Emissions
Single Freq., Static PBRS, DH5



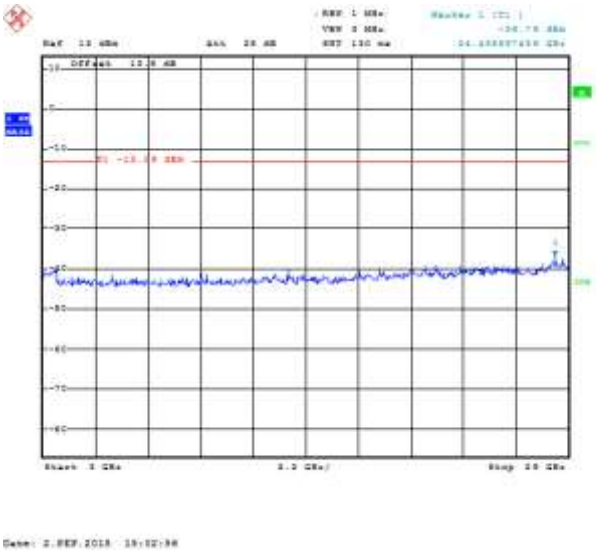
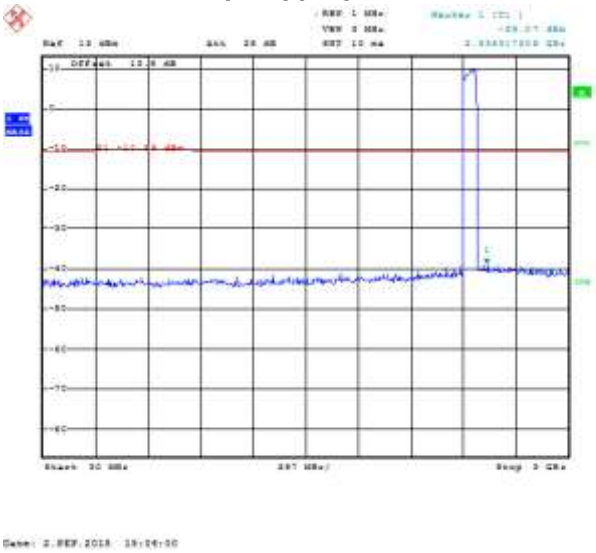
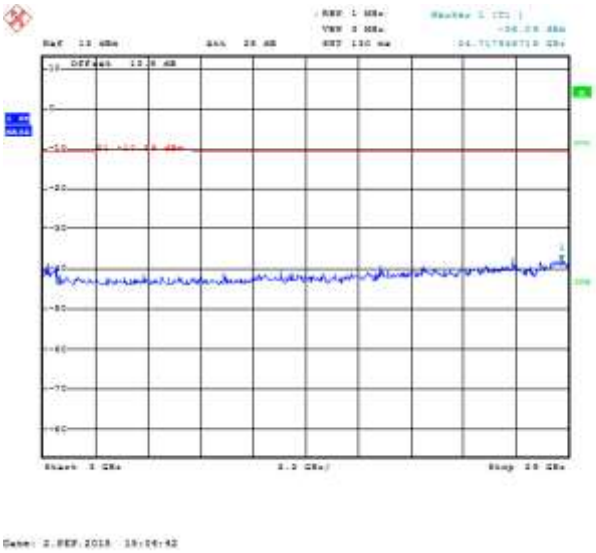


Figure 5-41: Spurious RF Conducted Emissions
Freq. Hopping, Static PBRS, DH5





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Bluetooth RF Conducted Emission Test Results cont'd

Using pattern type "Static PBRS" and packet type "2-DH5" during the measurements.

Bluetooth Channel	Channel Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from carrier (dBc)	Limit (dBc)
0.00	5.10	-37.90	-43.80	-20.00
39.00	7.50	-37.47	-45.07	-20.00
78.00	5.80	-37.92	-42.52	-20.00
Hopping mode	5.10	-38.04	-42.64	-20.00

See figures 5-42 to 5-45 for the plots of the spurious RF conducted emissions.

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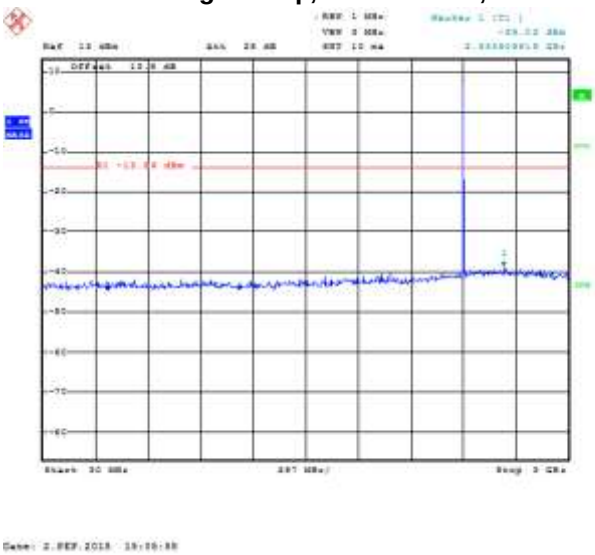
Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-42: Spurious RF Conducted Emissions
Single Freq., Static PBRS, 2-DH5



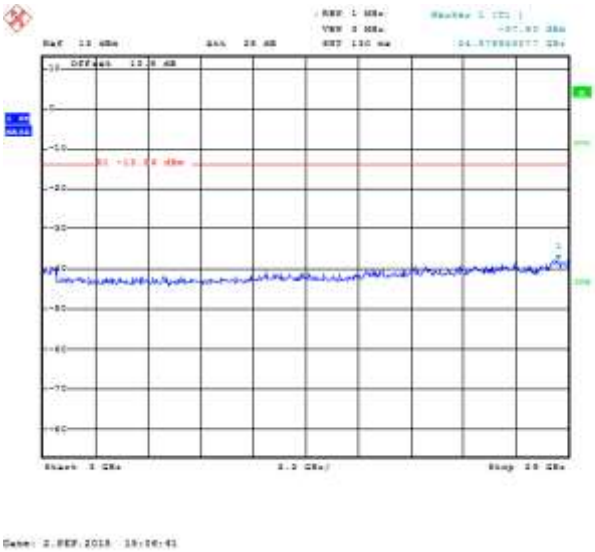
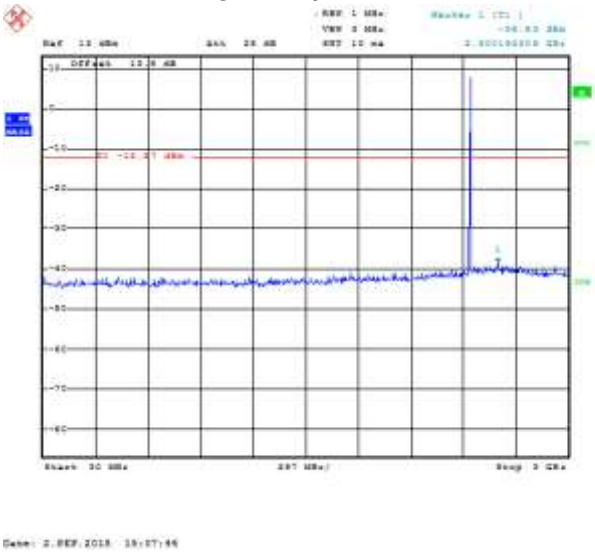
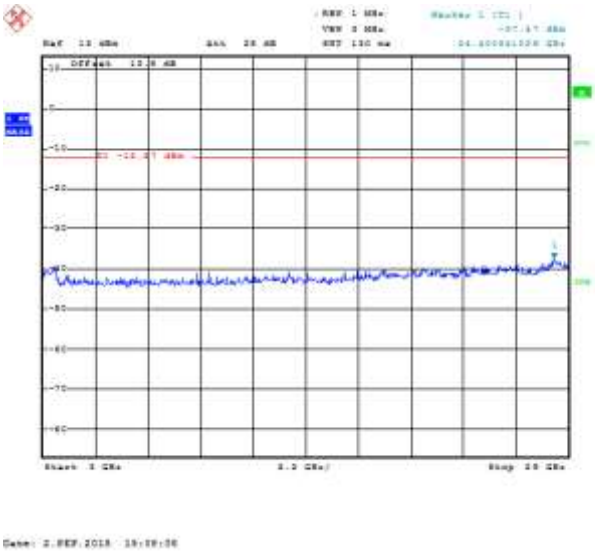


Figure 5-43: Spurious RF Conducted Emissions
Single Freq., Static PBRS, 2-DH5





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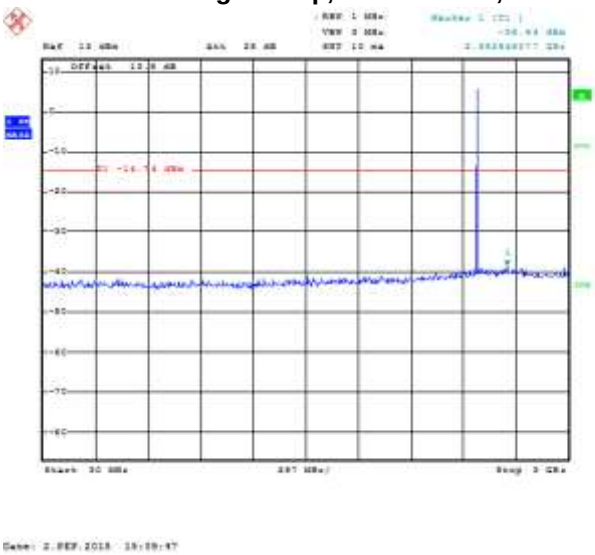
Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-44: Spurious RF Conducted Emissions
Single Freq., Static PBRS, 2-DH5



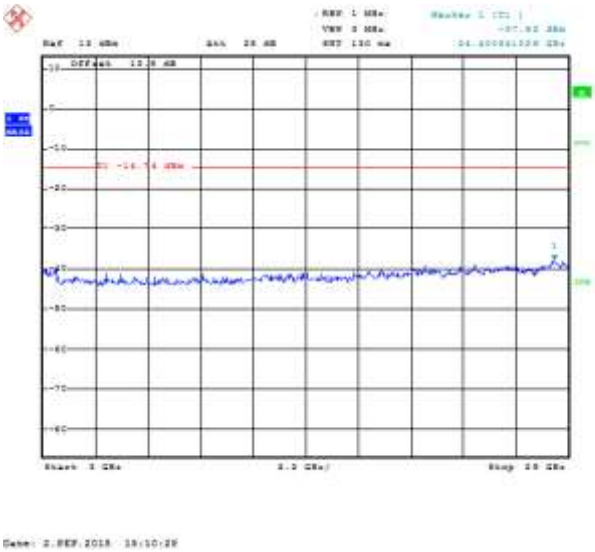
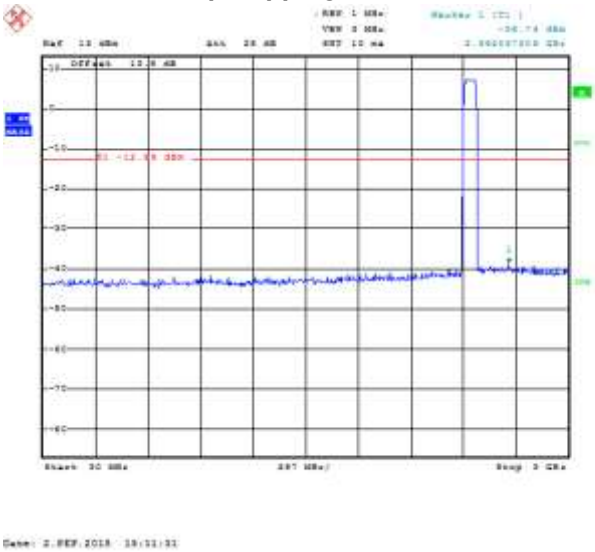
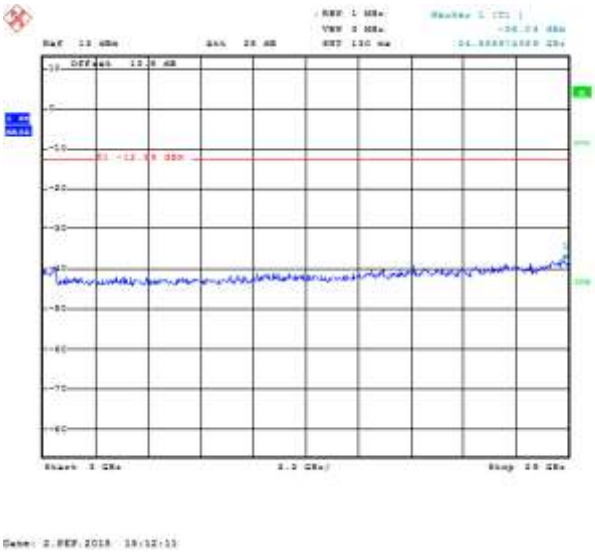


Figure 5-45: Spurious RF Conducted Emissions
Freq. Hopping, Static PBRS, 2-DH5





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Bluetooth RF Conducted Emission Test Results cont'd

Using pattern type "Static PBRS" 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)
0.00	6.90	-38.06	-43.56	-20.00
39.00	8.90	-37.72	-45.12	-20.00
78.00	4.90	-37.63	-41.93	-20.00
Hopping mode	4.90	-37.93	-42.23	-20.00

See figures 5-46 to 5-49 for the plots of the spurious RF conducted emissions.

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Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-46: Spurious RF Conducted Emissions Single Freq., Static PBRS, 3-DH5

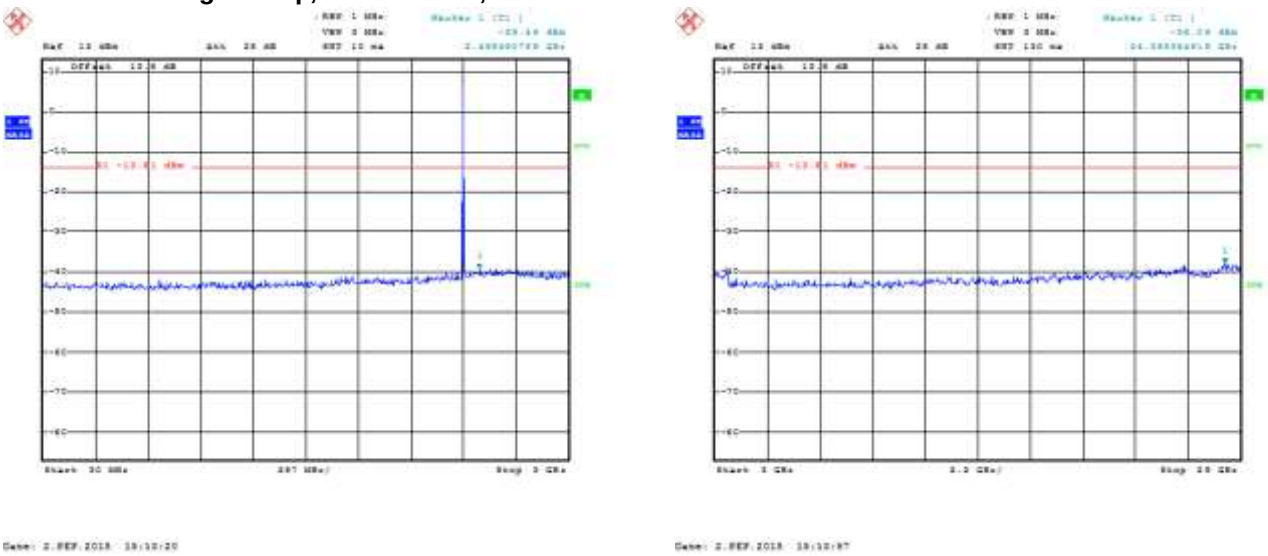
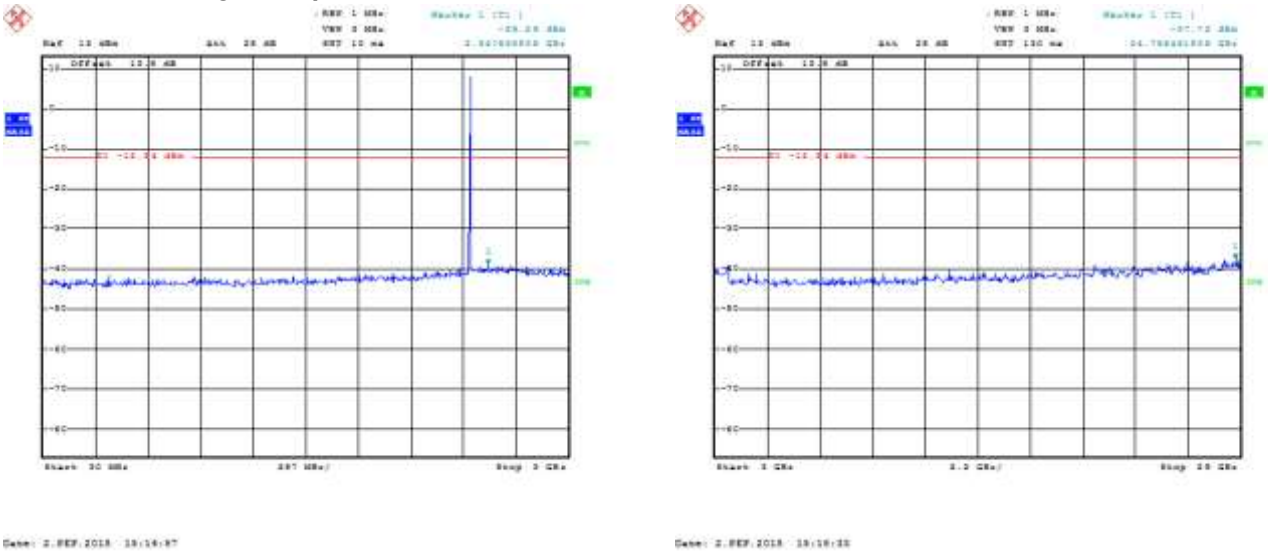


Figure 5-47: Spurious RF Conducted Emissions Single Freq., Static PBRS, 3-DH5



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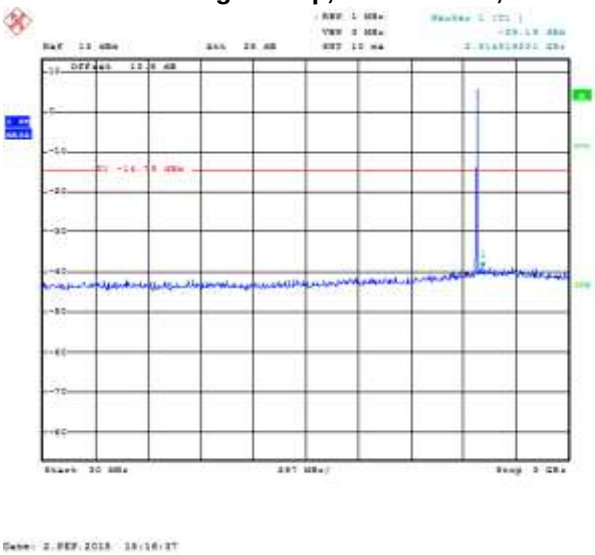
Bluetooth RF Conducted Emission Test Results cont'd

Figure 5-48: Spurious RF Conducted Emissions Single Freq., Static PBRS, 3-DH5



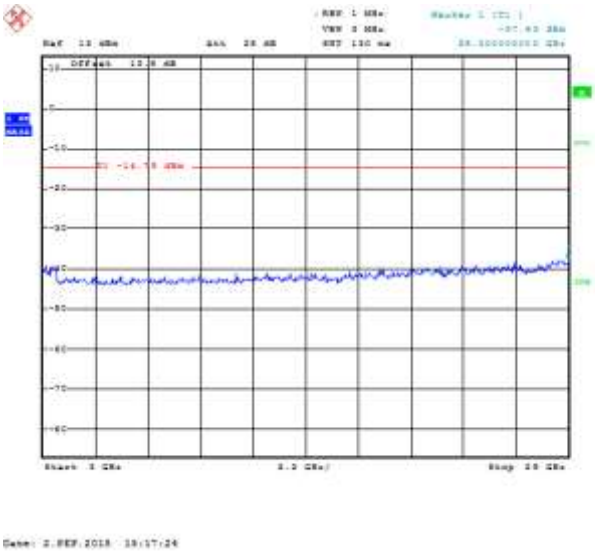
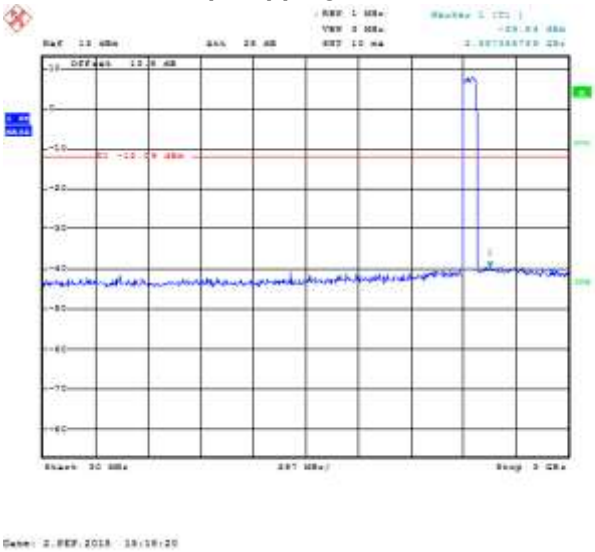
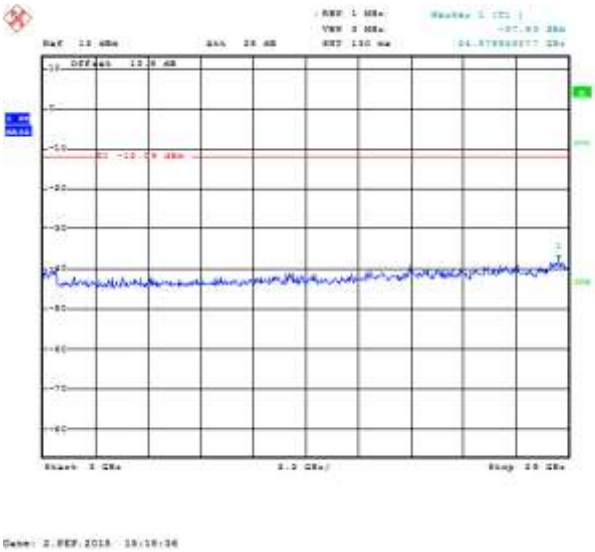


Figure 5-49: Spurious RF Conducted Emissions Freq. Hopping, Static PBRS, 3-DH5





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Bluetooth Low Energy RF Conducted Emission Test Results

6 dB Bandwidth

The EUT met the requirements of the 6 dB bandwidth as per 47 CFR 15.247(a)(2) and RSS-247.

Channels 0, 20 and 39 were measured.

Channel	Limit (kHz)	Measured Level (kHz)
0	≥ 500	**705.13**
20	≥ 500	713.14
39	≥ 500	713.14

See figures 5-50 to 5-52 for the plots of the 6 dB bandwidth measurements for Channels 0, 20, and 39.

Figure 5-50: 6 dB Bandwidth
LE, Channel 0

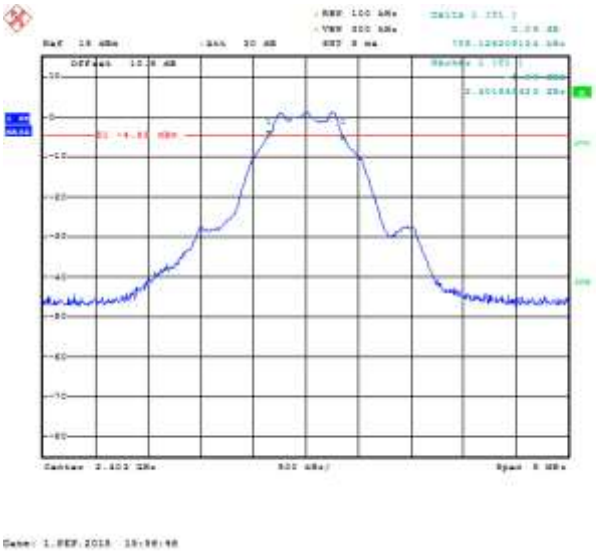
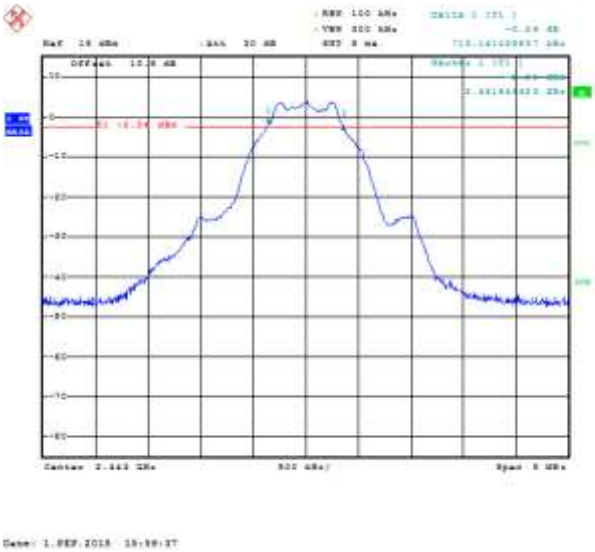


Figure 5-51: 6 dB Bandwidth
LE, Channel 20



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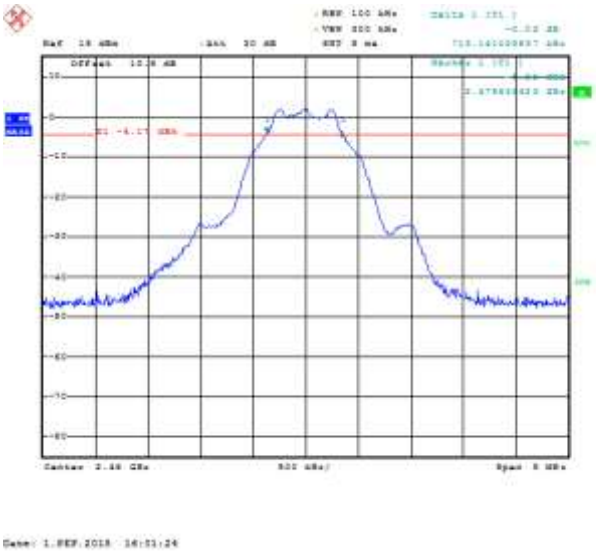
Bluetooth Low Energy RF Conducted Emission Test Results cont'd

Figure 5-52: 6 dB Bandwidth
LE, Channel 39



Bluetooth Low Energy 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-247. Channels 0, 20 and 39 were measured using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 6.4 dB was applied to the power meter reference level for the coaxial cable loss and attenuators in the test circuit.

Channel	Class 2 Limit (W)	Measured Level (dBm)	Measured Level (mW)
0	< 1.00	5.42	3.48337
20	< 1.00	**5.81**	**3.81066**
39	< 1.00	5.34	3.41979

Band Edge Compliance

The EUT met the requirements of the band edge compliance as per 47 CFR 15.247(c) and RSS-247. Channels 0 and 39 were measured.

Channel	Limit (dBc)	Measured Level (dBc)	Margin (dB)
0	< -20	-46.52	-26.52
39	< -20	-48.90	-28.90

See figures 5-53 to 5-54 for the plots of the band edge compliance measurements for Channels 0 and 39.

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Bluetooth Low Energy RF Conducted Emission Test Results cont'd

Figure 5-53: Band Edge Compliance LE, Channel 0

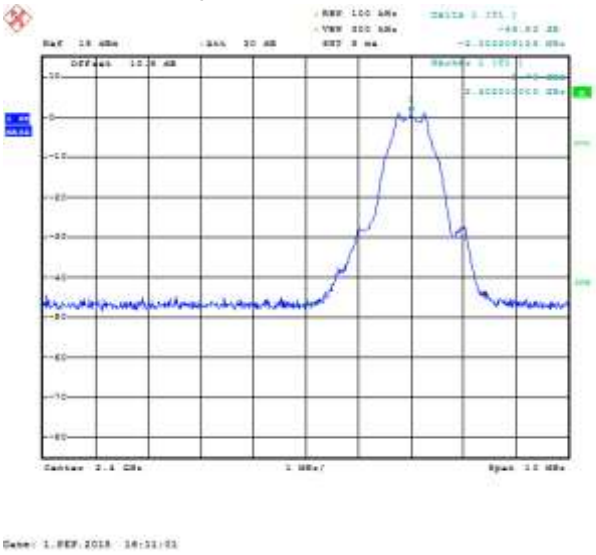
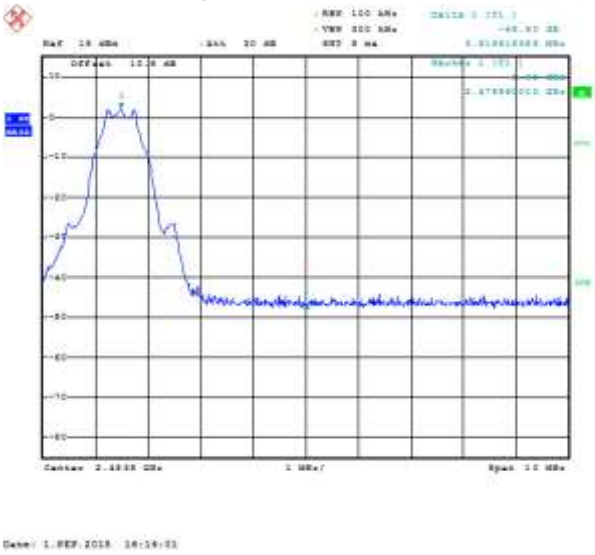


Figure 5-54: Band Edge Compliance LE, Channel 39



Peak Power Spectral Density

The EUT met the requirements of the peak power spectral density as per 47 CFR 15.247(d) and RSS-247. Channels 0, 20 and 39 were measured.

Channel	Limit (dBm)	Measured Level (dBm)	Margin (dB)
0	< 8.00	-12.70	-20.70
20	< 8.00	-9.79	-17.79
39	< 8.00	-11.70	-19.70

See figures 5-55 to 5-57 for the plots of the peak power spectral density for Channels 0, 20 and 39.

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Bluetooth Low Energy RF Conducted Emission Test Results cont'd

Figure 5-55: Peak Power Spectral Density LE, Channel 0

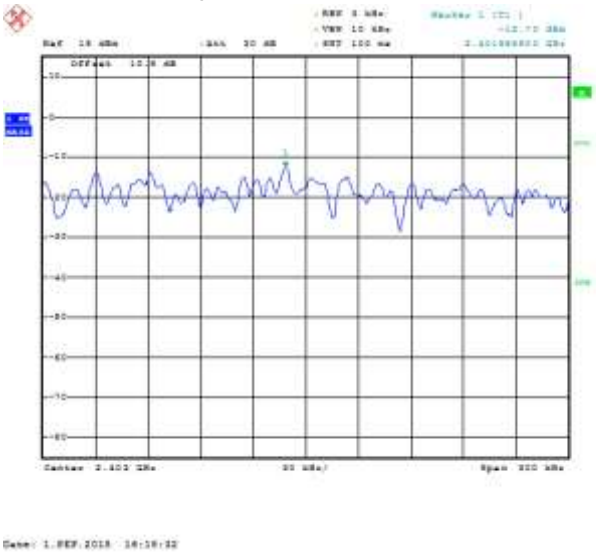


Figure 5-56: Peak Power Spectral Density LE, Channel 20

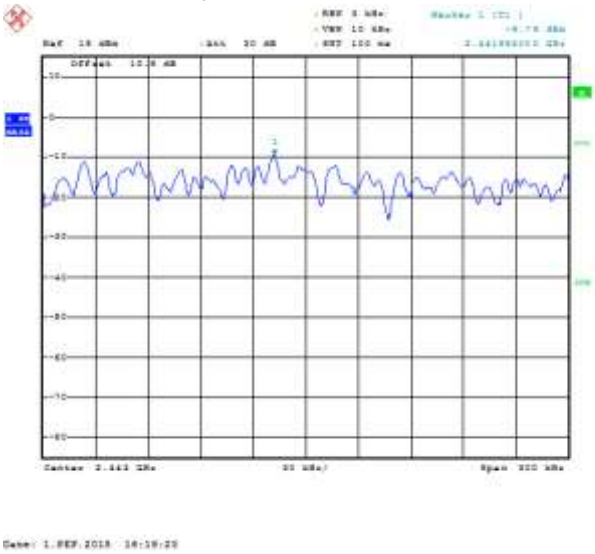
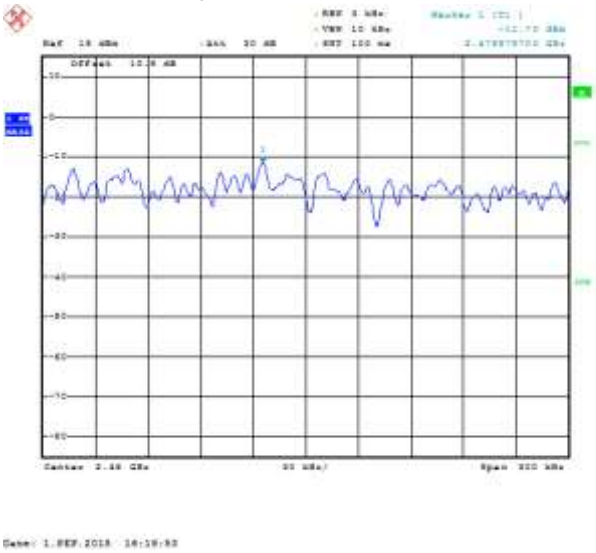


Figure 5-57: Peak Power Spectral Density LE, Channel 39



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Bluetooth Low Energy RF Conducted Emission Test Results cont'd

Spurious RF Conducted Emissions

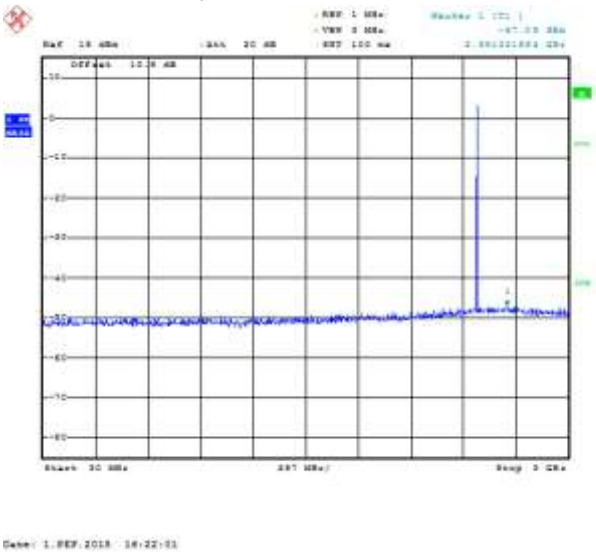
The EUT met the requirements of the spurious RF conducted emissions as per 47 CFR 15.247(c) and RSS-247. Channels 0, 20 and 39 were measured. Peak power was measured using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 6.4 dB was applied to the power meter reference level for the coaxial cable loss and attenuators in the test circuit.

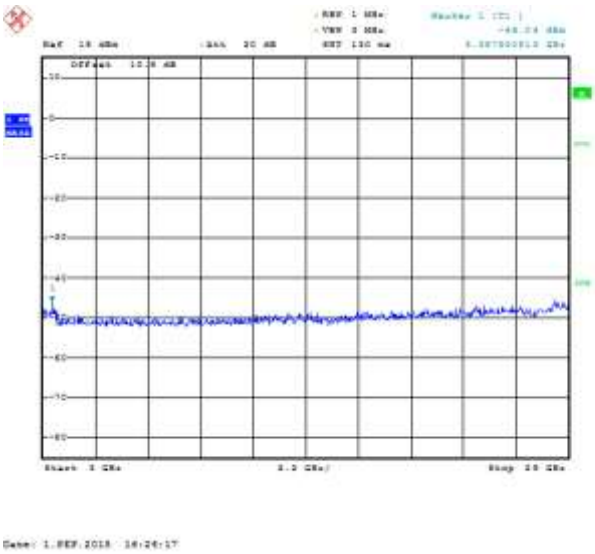
Channel	Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from Carrier (dBc)	Limit (dBc)
0	5.4	-47.1	-52.5	-20.0
20	5.8	-47.3	-53.1	-20.0
39	5.3	-37.2	-42.6	-20.0

The emissions were in the NF.

See figures 5-58 to 5-60 for the plots of the spurious RF conducted emissions for Channels 0, 20 and 39.

Figure 5-58: Spurious Conducted RF Emissions LE, Channel 0





Bluetooth Low Energy RF Conducted Emission Test Results cont'd

Figure 5-59 : Spurious Conducted RF Emissions LE, Channel 20

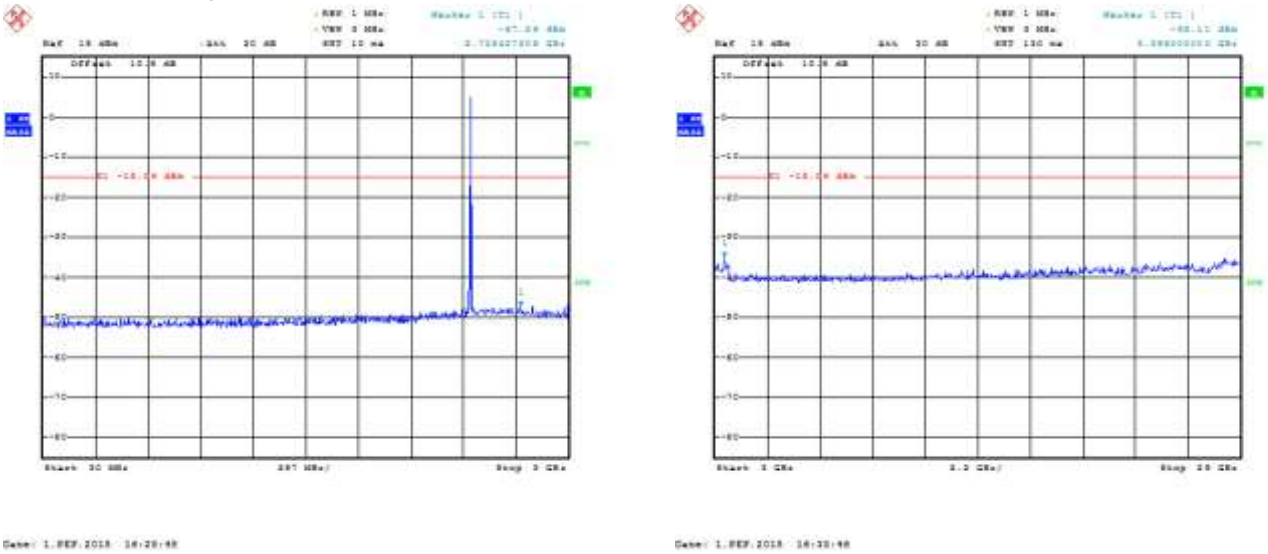
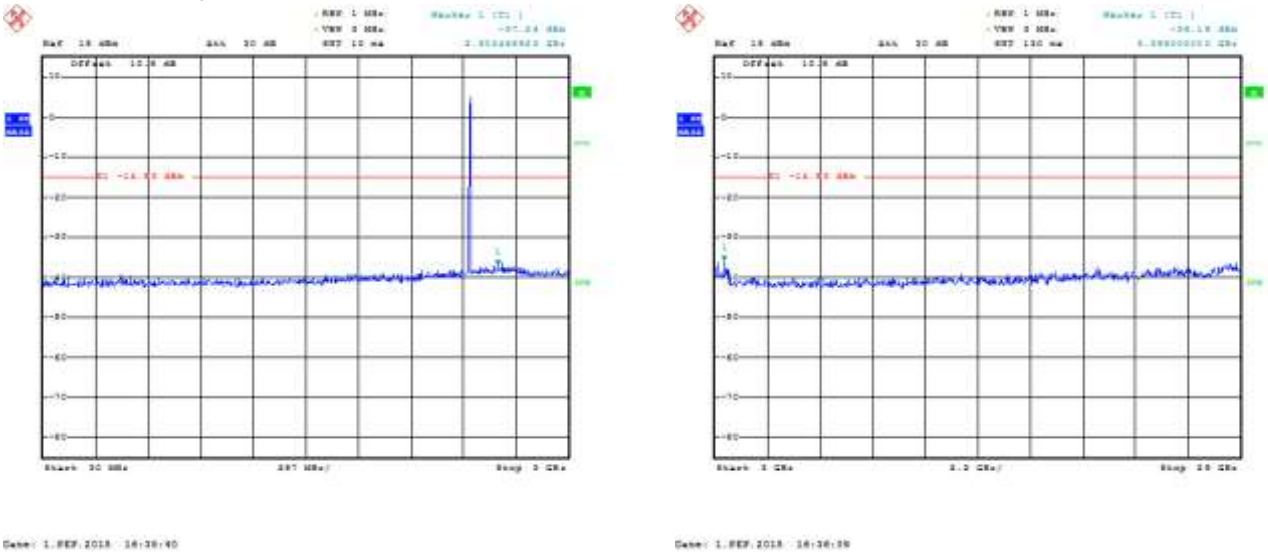


Figure 5-60: Spurious Conducted RF Emissions LE, Channel 39



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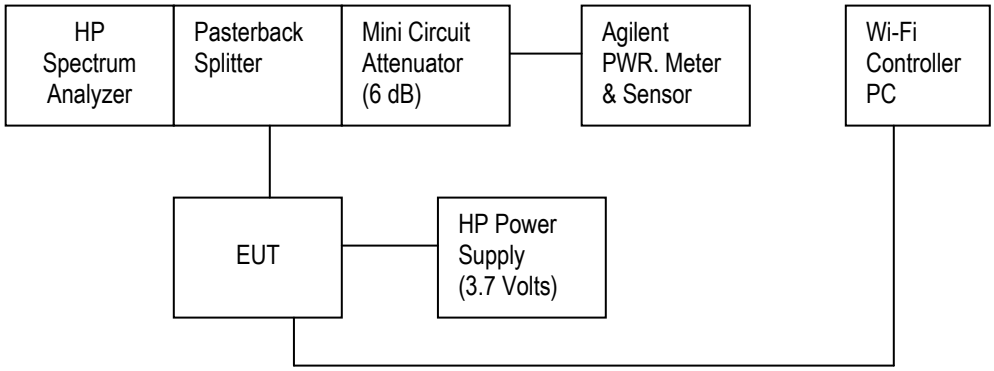
APPENDIX 6 – 802.11b/g/n CONDUCTED EMISSIONS TEST DATA/PLOTS

802.11b/g/n RF Conducted Emission Test Results

The following test configurations were measured on model RHK211LW (STV100-1):

Test Setup Diagram



UNIT	MANUFACTURER	MODEL	SERIAL NUMBER
Attenuator 1	Mini-Circuits	BW-S6W2+	0647
Attenuator 2	Mini-Circuits	BW-S6W2+	0648
Attenuator 3	Mini-Circuits	BW-S20-2W263+	1234
Splitter 1	Weinschel	1515	MES 92

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

Date of test: July 22, August 20, 24, and September 1, 2015
The measurements on the BlackBerry® smartphone were performed by Landon Martin.

The environmental test conditions were: Temperature: 26.2 ºC
Relative Humidity: 45.20 %

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

6 dB Bandwidth

The EUT met the requirements of the 6 dB bandwidth as per 47 CFR 15.247(a)(2) and RSS-247. Channels 1, 6 and 11 were measured at 1 Mbps each for 802.11b mode, 6 Mbps each for 802.11g mode, and MCS 0 for 802.11n mode.

Primary Antenna

Channel	Data Rate	Limit (kHz)	Measured Level (MHz)
1	1 Mbps	≥ 500	8.06
	6 Mbps	≥ 500	16.32
	MCS 0	≥ 500	17.60
6	1 Mbps	≥ 500	8.06
	6 Mbps	≥ 500	16.28
	MCS 0	≥ 500	**17.62**
11	1 Mbps	≥ 500	8.04
	6 Mbps	≥ 500	16.24
	MCS 0	≥ 500	17.20

Secondary Antenna

Channel	Data Rate	Limit (kHz)	Measured Level (MHz)
1	1 Mbps	≥ 500	7.60
	6 Mbps	≥ 500	16.34
	MCS 0	≥ 500	17.58
6	1 Mbps	≥ 500	8.56
	6 Mbps	≥ 500	**16.36**
	MCS 0	≥ 500	17.20
11	1 Mbps	≥ 500	**9.02**
	6 Mbps	≥ 500	16.22
	MCS 0	≥ 500	17.54

See figures 6-1 to 6-18 for the plots of the 6 dB bandwidth measurements for Channels 1, 6, and 11, at 1 Mbps each for 802.11b mode, 6 Mbps each for 802.11g mode, and MCS 0 each for 802.11n mode.

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

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

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

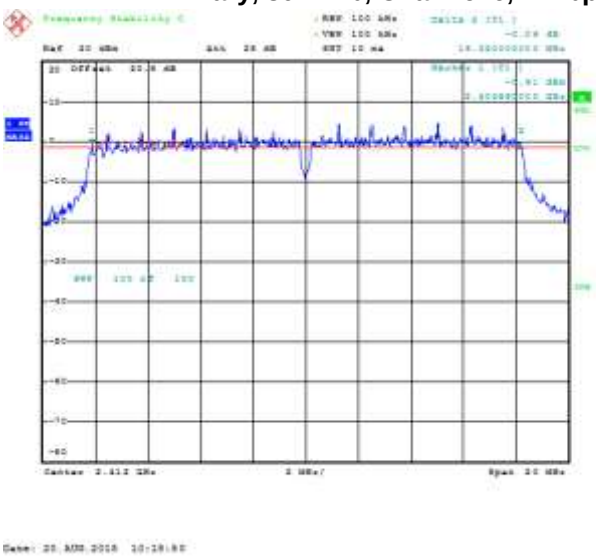

Figure 6-3: 6 dB Bandwidth
Primary, 802.11b, Channel 11, 1 Mbps

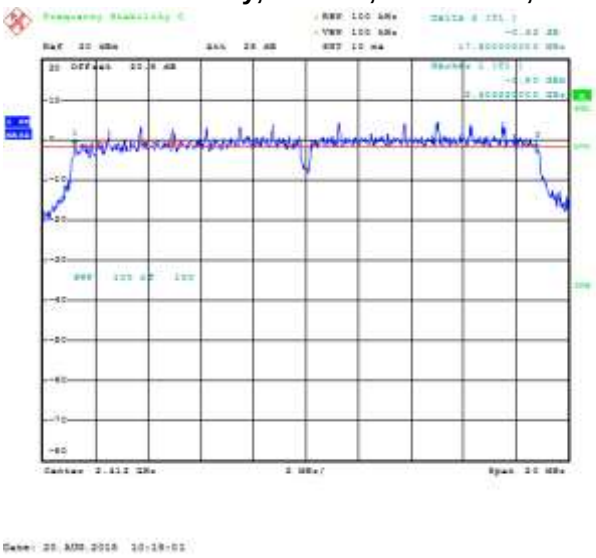

Figure 6-4: 6 dB Bandwidth
Primary, 802.11g, Channel 1, 6 Mbps

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Figure 6-5: 6 dB Bandwidth
Primary, 802.11g, Channel 6, 6 Mbps

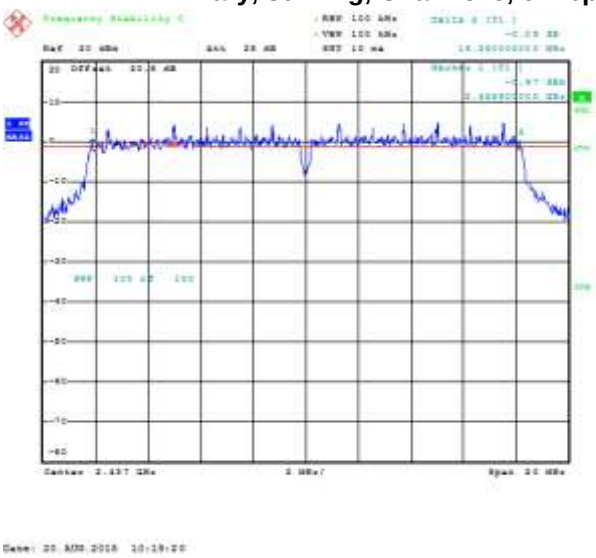

Figure 6-6: 6 dB Bandwidth
Primary, 802.11g, Channel 11, 6 Mbps

Figure 6-7: 6 dB Bandwidth
Primary, 802.11n, Channel 1, MCS 0

Figure 6-8: 6 dB Bandwidth
Primary, 802.11n, Channel 6, MCS 0

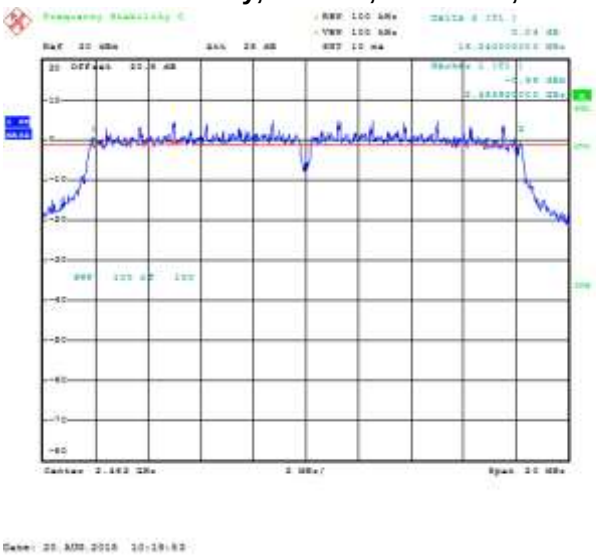

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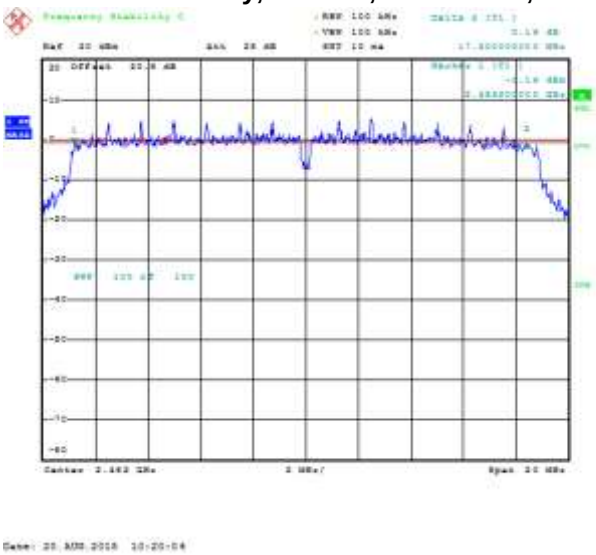
Figure 6-9: 6 dB Bandwidth
Primary, 802.11n, Channel 11, MCS 0



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

Figure 6-10: 6 dB Bandwidth
Secondary, 802.11b, Channel 1, 1 Mbps

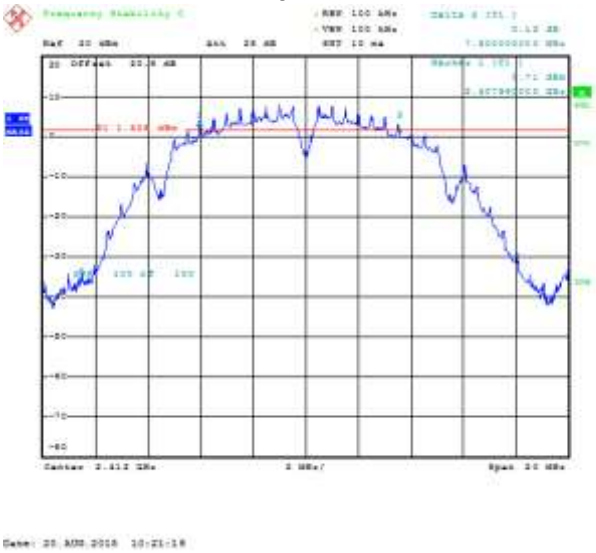


Figure 6-11: 6 dB Bandwidth
Secondary, 802.11b, Channel 6, 1 Mbps

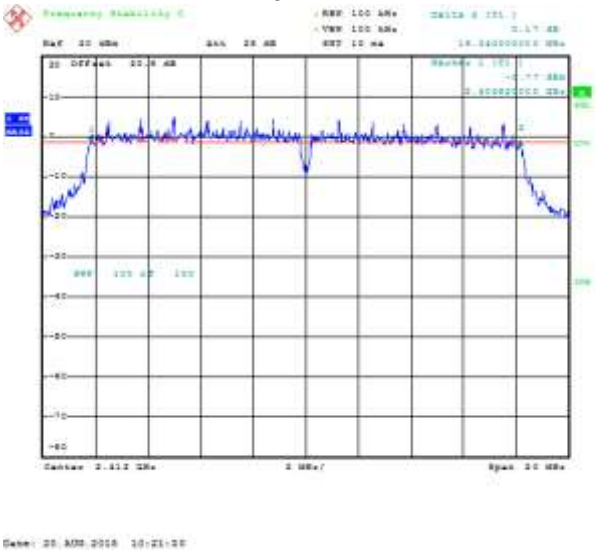


Figure 6-12: 6 dB Bandwidth
Secondary, 802.11b, Channel 11, 1 Mbps

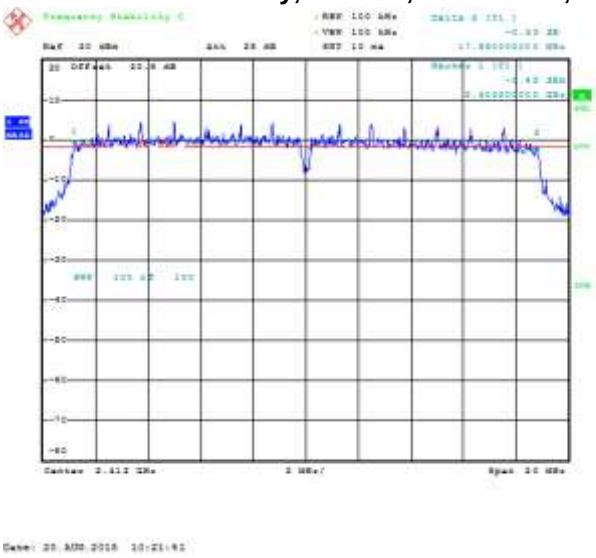


Figure 6-13: 6 dB Bandwidth
Secondary, 802.11g, Channel 1, 6 Mbps

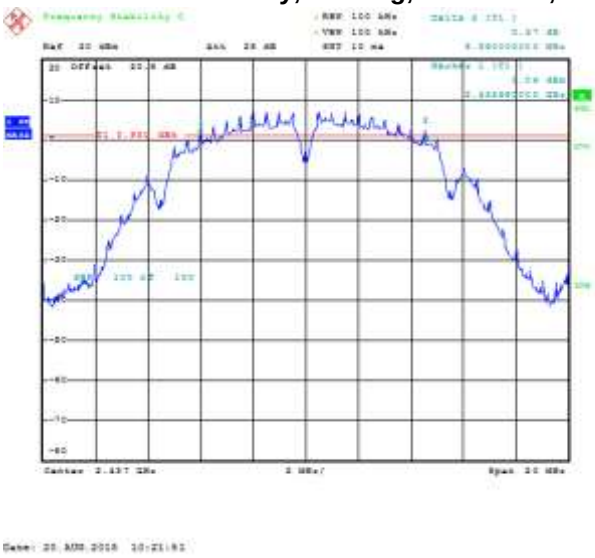


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Figure 6-14: 6 dB Bandwidth
Secondary, 802.11g, Channel 6, 6 Mbps

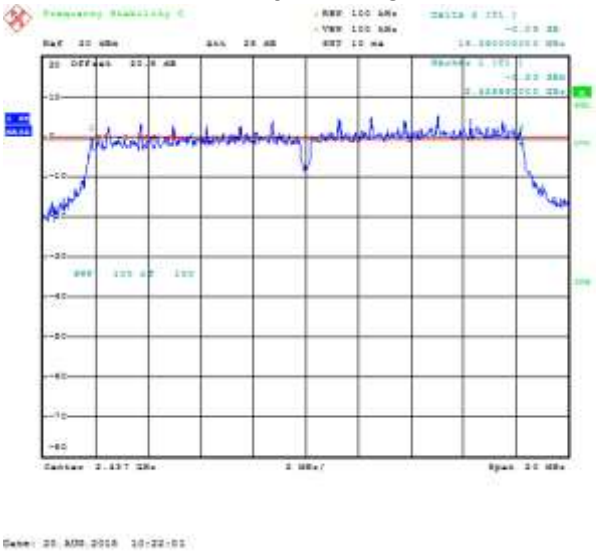

Figure 6-15: 6 dB Bandwidth
Secondary, 802.11g, Channel 11, 6 Mbps

Figure 6-16: 6 dB Bandwidth
Secondary, 802.11n, Channel 1, MCS 0

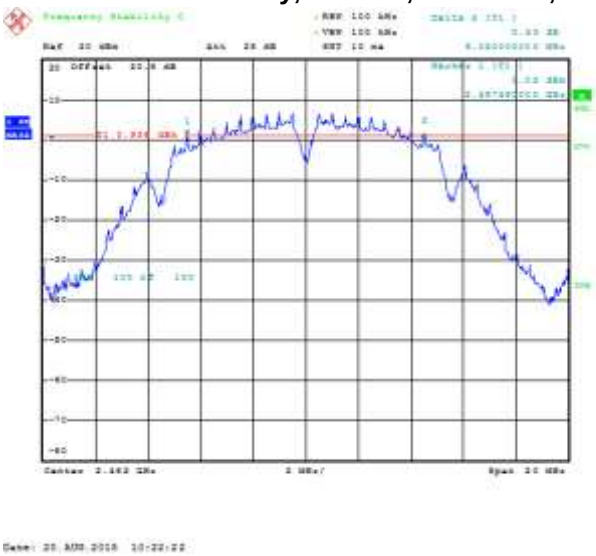

Figure 6-17: 6 dB Bandwidth
Secondary, 802.11n, Channel 6, MCS 0

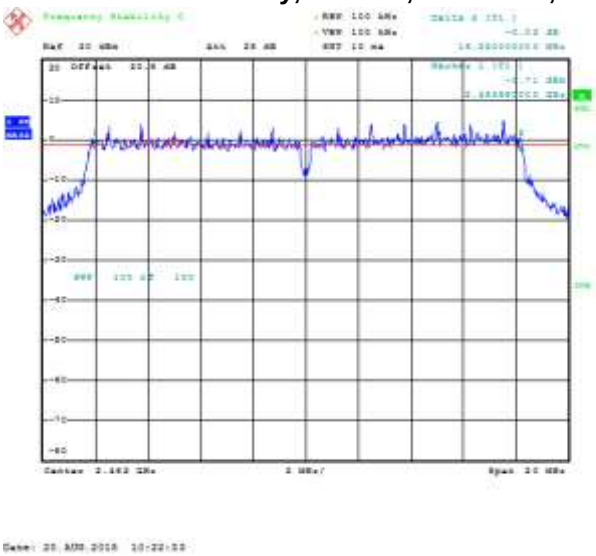

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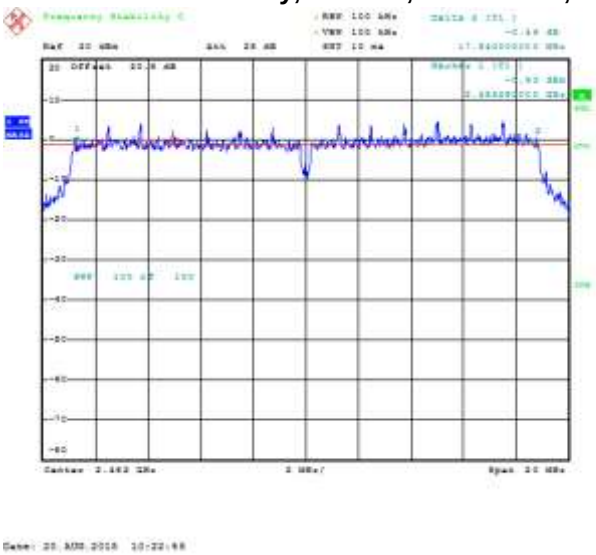
Figure 6-18: 6 dB Bandwidth

Secondary, 802.11n, Channel 11, MCS 0



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

Maximum Conducted Output Power

The EUT met the requirements of the maximum conducted output power of class 2 as per 47 CFR 15.247(b)(3) and RSS-247. Channels 1, 6 and 11 were measured at 1 Mbps each for 802.11b mode, 6 Mbps for 802.11g mode, and MCS 0 for 802.11n mode using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 18.4 dB was applied to the power meter reference level for the coaxial cable loss and attenuators in the test circuit.

Primary Antenna

Channel	Data Rate	Class 2 Limit (W)	Measured Level (dBm)	Measured Level (W)
1	1 Mbps	< 1.00	16.33	0.0430
	6 Mbps	< 1.00	16.20	0.0417
	MCS 0	< 1.00	15.99	0.0397
6	1 Mbps	< 1.00	16.85	0.0484
	6 Mbps	< 1.00	16.66	0.0463
	MCS 0	< 1.00	16.56	0.0453
11	1 Mbps	< 1.00	17.08	0.0511
	6 Mbps	< 1.00	16.74	0.0472
	MCS 0	< 1.00	16.70	0.0468

Secondary Antenna

Channel	Data Rate	Class 2 Limit (W)	Measured Level (dBm)	Measured Level (W)
1	1 Mbps	< 1.00	17.01	0.0502
	6 Mbps	< 1.00	16.41	0.0438
	MCS 0	< 1.00	16.18	0.0415
6	1 Mbps	< 1.00	17.04	0.0506
	6 Mbps	< 1.00	16.55	0.0452
	MCS 0	< 1.00	16.30	0.0427
11	1 Mbps	< 1.00	16.79	0.0478
	6 Mbps	< 1.00	16.14	0.0411
	MCS 0	< 1.00	16.08	0.0406

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

2TX/CDD/MIMO Primary Antenna

Channel	Data Rate	Class 2 Limit (W)	Measured Level (dBm)	Measured Level (W)
1	1 Mbps	< 1.00	17.20	0.0525
	6 Mbps	< 1.00	13.65	0.0232
	MCS 0	< 1.00	13.78	0.0239
6	1 Mbps	< 1.00	17.13	0.0516
	6 Mbps	< 1.00	16.49	0.0446
	MCS 0	< 1.00	16.47	0.0444
11	1 Mbps	< 1.00	16.84	0.0483
	6 Mbps	< 1.00	15.36	0.0344
	MCS 0	< 1.00	15.20	0.0331

2TX/CDD/MIMO Secondary Antenna

Channel	Data Rate	Class 2 Limit (W)	Measured Level (dBm)	Measured Level (W)
1	1 Mbps	< 1.00	16.48	0.0445
	6 Mbps	< 1.00	13.66	0.0232
	MCS 0	< 1.00	13.58	0.0228
6	1 Mbps	< 1.00	17.03	0.0505
	6 Mbps	< 1.00	16.76	0.0474
	MCS 0	< 1.00	16.62	0.0459
11	1 Mbps	< 1.00	17.24	0.0530
	6 Mbps	< 1.00	15.98	0.0340
	MCS 0	< 1.00	15.70	0.0372

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

2TX/CDD/MIMO Sum

Channel	Data Rate	Class 2 Limit (W)	Measured Level (dBm)	Measured Level (W)
1	1 Mbps	< 1.00	19.87	0.0969
	6 Mbps	< 1.00	16.67	0.0464
	MCS 0	< 1.00	16.69	0.0467
6	1 Mbps	< 1.00	**20.09**	**0.1021**
	6 Mbps	< 1.00	**19.64**	**0.0920**
	MCS 0	< 1.00	**19.56**	**0.0903**
11	1 Mbps	< 1.00	20.05	0.1013
	6 Mbps	< 1.00	18.69	0.0740
	MCS 0	< 1.00	18.47	0.0703

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

Band Edge Compliance

The EUT met the requirements of the band edge compliance as per 47 CFR 15.247(c) and RSS-247. Channels 1 and 11 were measured at 1 Mbps, 6 Mbps, and MCS 0 each for 802.11b mode, 802.11g mode, and 802.11n mode.

Primary Antenna

Channel	Data Rate	Limit (dBc)	Measured Level (dBc)	Margin (dB)
1	1 Mbps	< -20	-45.06	-25.06
	6 Mbps	< -20	-38.57	-18.57
	MCS 0	< -20	-38.97	-18.97
11	1 Mbps	< -20	-45.06	-28.09
	6 Mbps	< -20	-38.57	-18.49
	MCS 0	< -20	-38.97	-18.78

Secondary Antenna

Channel	Data Rate	Limit (dBc)	Measured Level (dBc)	Margin (dB)
1	1 Mbps	< -20	-45.28	-25.28
	6 Mbps	< -20	-37.09	-17.09
	MCS 0	< -20	-37.40	-17.40
11	1 Mbps	< -20	-45.34	-25.34
	6 Mbps	< -20	-36.50	-16.50
	MCS 0	< -20	-34.64	-14.64

See figures 6-19 to 6-24 for the plots of the band edge compliance measurements for Channels 1 and 11, at 1 Mbps each for 802.11b mode, 6 Mbps each for 802.11g mode, and MCS 0 each for 802.11n mode.

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

Figure 6-19: Band Edge Compliance
Primary, 802.11b, Channel 1, 1 Mbps

Figure 6-20: Band Edge Compliance
Primary, 802.11b, Channel 11, 1 Mbps

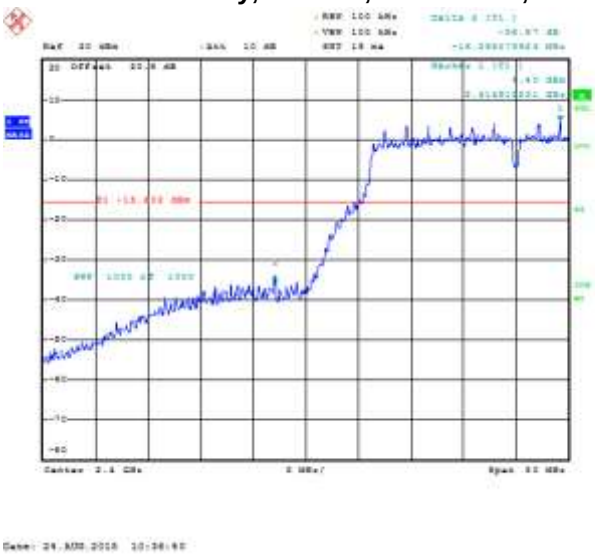

Figure 6-21: Band Edge Compliance
Primary, 802.11g, Channel 1, 6 Mbps

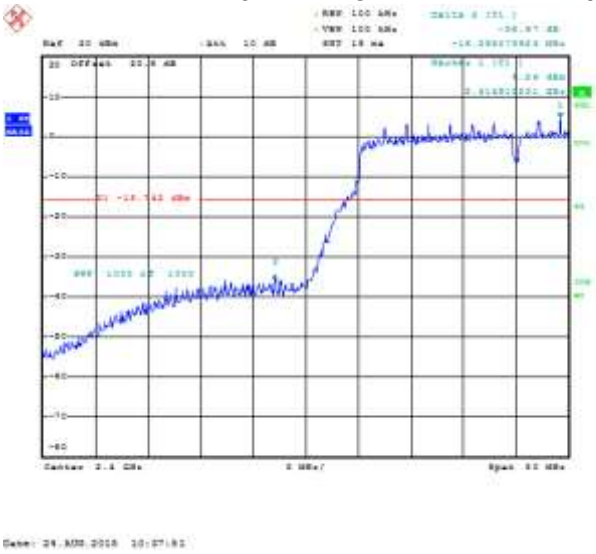

Figure 6-22: Band Edge Compliance
Primary, 802.11g, Channel 11, 6 Mbps

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

Figure 6-23: Band Edge Compliance
Primary, 802.11n, Channel 1, MCS 0

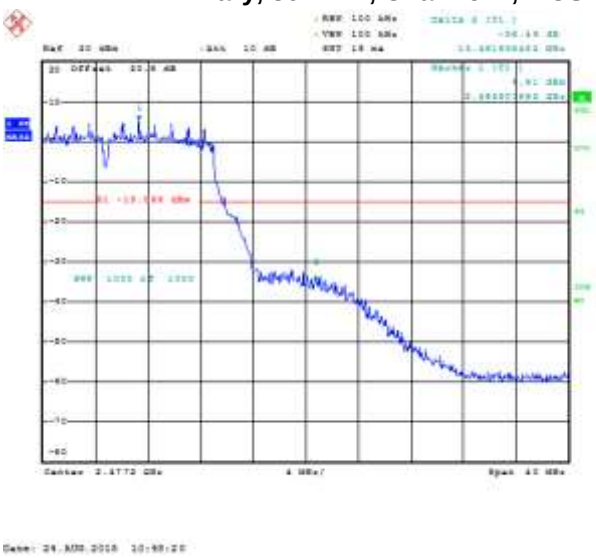

Figure 6-24: Band Edge Compliance
Primary, 802.11n, Channel 11, MCS 0

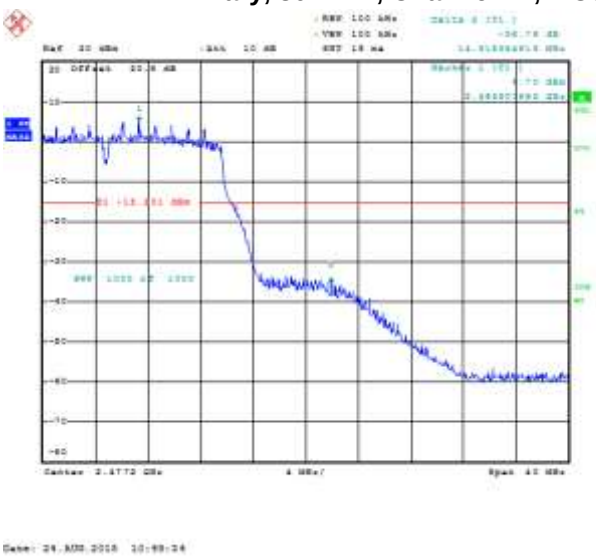

Figure 6-19: Band Edge Compliance
Secondary, 802.11b, Channel 1, 1 Mbps

Figure 6-20: Band Edge Compliance
Secondary, 802.11b, Channel 11, 1 Mbps

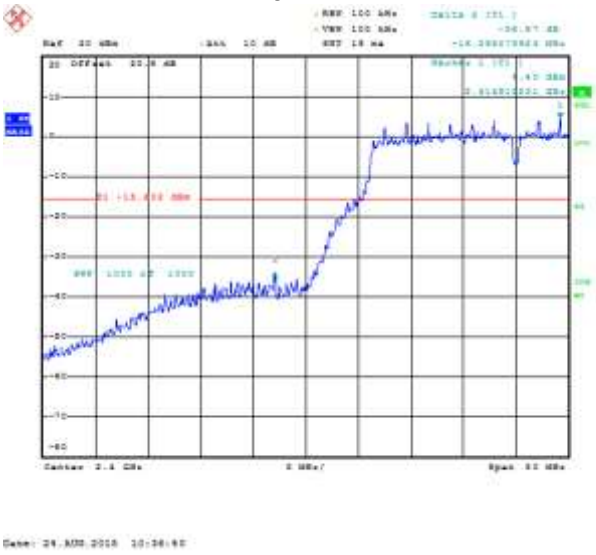

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Figure 6-21: Band Edge Compliance
Secondary, 802.11g, Channel 1, 6 Mbps

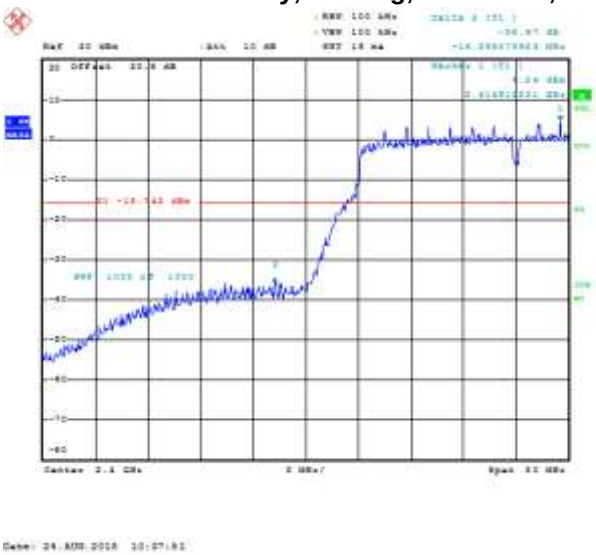


Figure 6-22: Band Edge Compliance
Secondary, 802.11g, Channel 11, 6 Mbps

Figure 6-23: Band Edge Compliance
Secondary, 802.11n, Channel 1, MCS 0

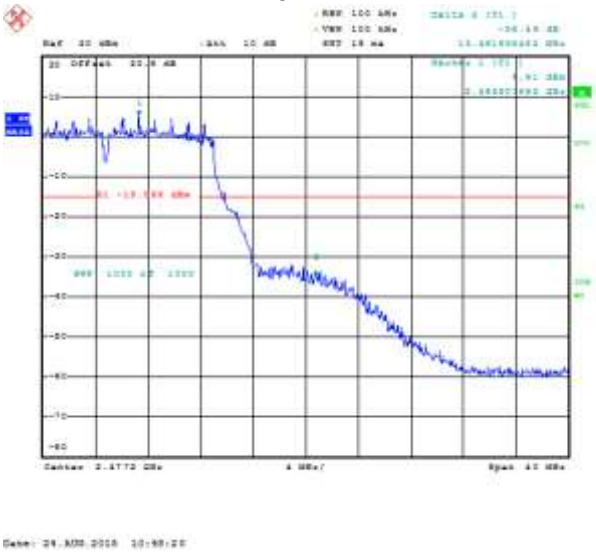
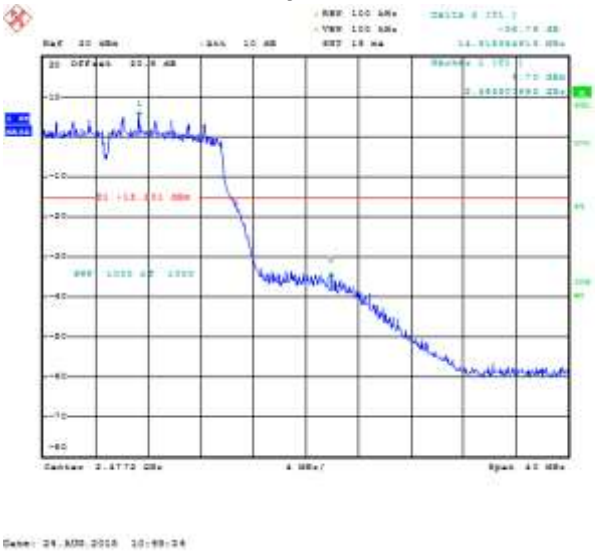


Figure 6-24: Band Edge Compliance
Secondary, 802.11n, Channel 11, MCS 0



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

Peak Power Spectral Density

The EUT met the requirements of the peak power spectral density as per 47 CFR 15.247(d) and RSS-247. Channels 1, 6 and 11 were measured at 1 Mbps, 6 Mbps, and MCS 0 each for 802.11b mode, 802.11g mode, and 802.11n mode, respectively.

SISO

Channel	Data Rate	Limit (dBm/MHz)	Measured Level Primary Antenna (dBm/MHz)	Measured Level Secondary Antenna (dBm/MHz)	Margin (Primary) (dB)	Margin (Secondary) (dB)
1	1 Mbps	< 11.00	-3.68	-4.68	-14.68	-15.68
	6 Mbps	< 11.00	-9.51	-8.02	-20.51	-19.02
	MCS 0	< 11.00	-6.15	-8.56	-17.15	-19.56
6	1 Mbps	< 11.00	-5.40	-3.82	-16.4	-14.82
	6 Mbps	< 11.00	-8.96	-9.24	-19.96	-20.24
	MCS 0	< 11.00	-8.50	-5.76	-19.5	-16.76
11	1 Mbps	< 11.00	-4.68	-3.90	-15.68	-14.9
	6 Mbps	< 11.00	-8.38	-9.17	-19.38	-20.17
	MCS 0	< 11.00	-8.43	-8.84	-19.43	-19.84

2TX/CDD/MIMO

Channel	Data Rate	Limit (dBm/MHz)	Measured Level Primary Antenna (dBm/MHz)	Measured Level Secondary Antenna (dBm/MHz)	Combined Peak 2TX/CDD/ MMO (dBm/MHz)	Margin (dB)
1	1 Mbps	< 11.00	-3.62	-3.20	-3.52	-14.52
	6 Mbps	< 11.00	-11.96	-10.89	-8.81	-19.81
	MCS 0	< 11.00	-11.63	-11.60	-10.02	-21.02
6	1 Mbps	< 11.00	-3.76	-5.09	-3.52	-14.52
	6 Mbps	< 11.00	-8.60	-8.93	-5.94	-16.94
	MCS 0	< 11.00	-7.87	-8.20	-7.71	-18.71
11	1 Mbps	< 11.00	-4.08	-3.93	-3.99	-14.99
	6 Mbps	< 11.00	-8.83	-11.21	-7.08	-18.08
	MCS 0	< 11.00	-9.03	-8.12	-7.58	-18.58

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

See figures 6-25 to 6-60 for the plots of the peak power spectral density for Channels 1, 6 and 11, at 1 Mbps each for 802.11b mode, 6 Mbps each for 802.11g mode, and MCS 0 for 802.11n mode.

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

Figure 6-25: Peak Power Spectral Density SISO Primary, 802.11b, Channel 1, 1 Mbps

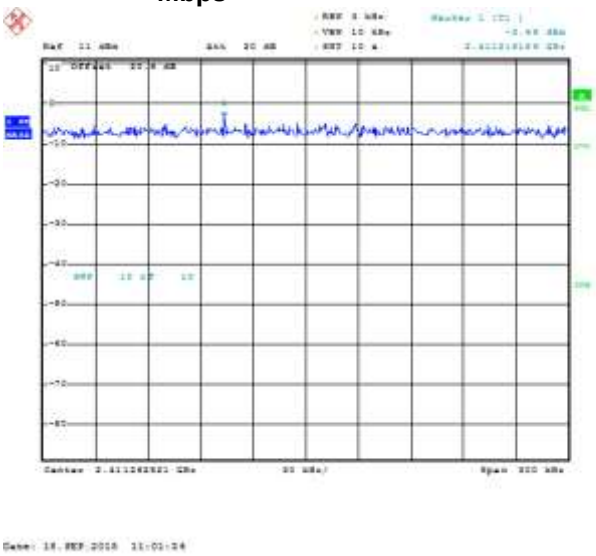


Figure 6-26: Peak Power Spectral Density SISO Primary, 802.11b, Channel 6, 1 Mbps

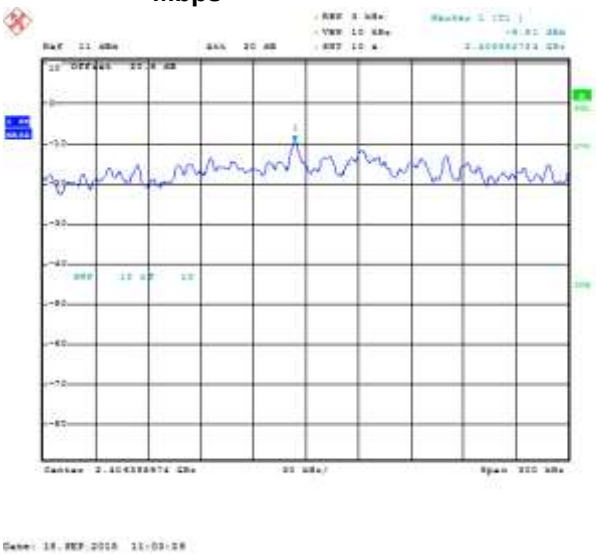
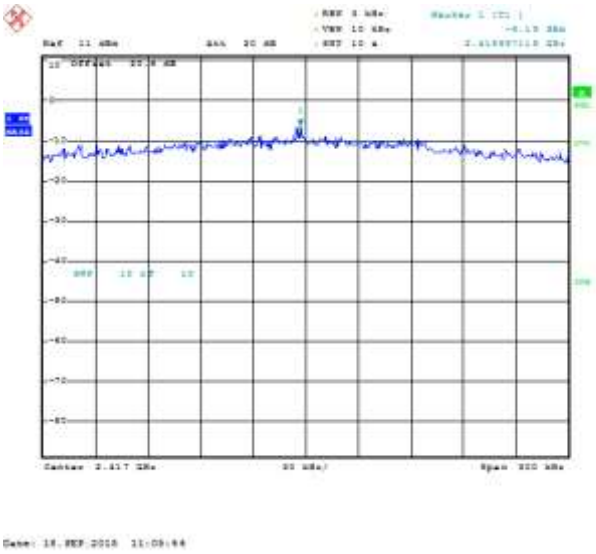


Figure 6-27: Peak Power Spectral Density SISO Primary, 802.11b, Channel 11, 1 Mbps



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

Figure 6-28: Peak Power Spectral Density SISO Primary, 802.11g, Channel 1, 6 Mbps

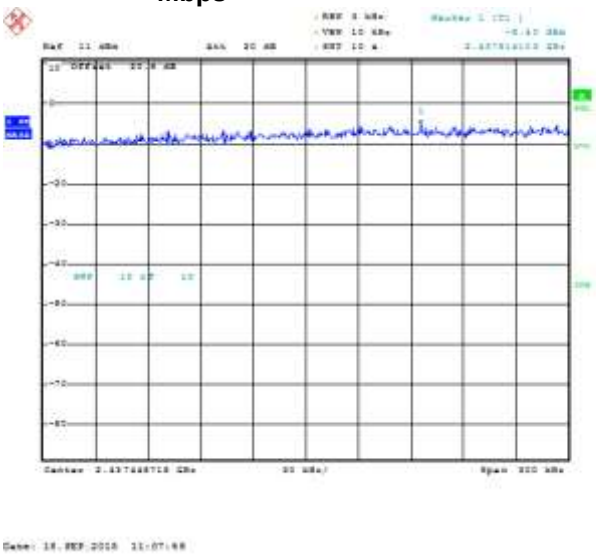


Figure 6-29: Peak Power Spectral Density SISO Primary, 802.11g, Channel 6, 6 Mbps

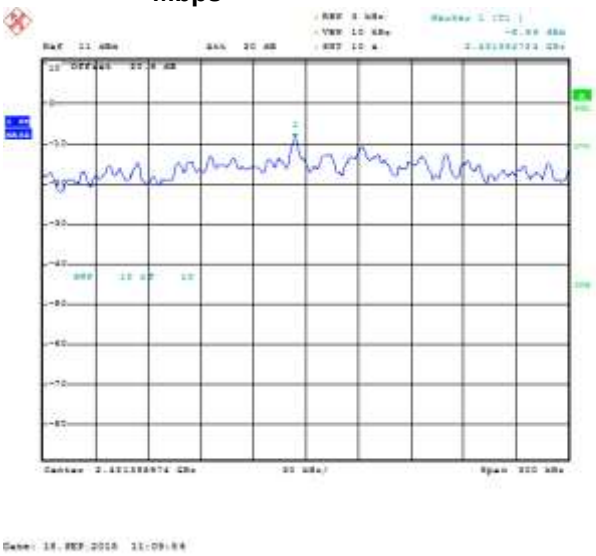
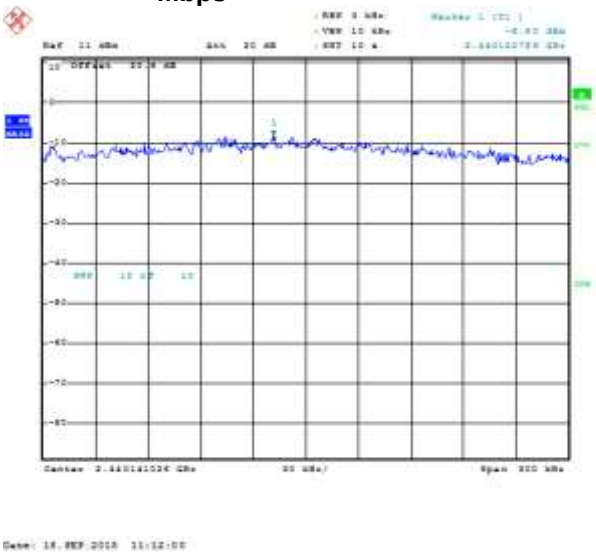


Figure 6-30: Peak Power Spectral Density SISO Primary, 802.11g, Channel 11, 6 Mbps



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

Figure 6-31: Peak Power Spectral Density SISO Primary, 802.11n, Channel 1, MCS 0

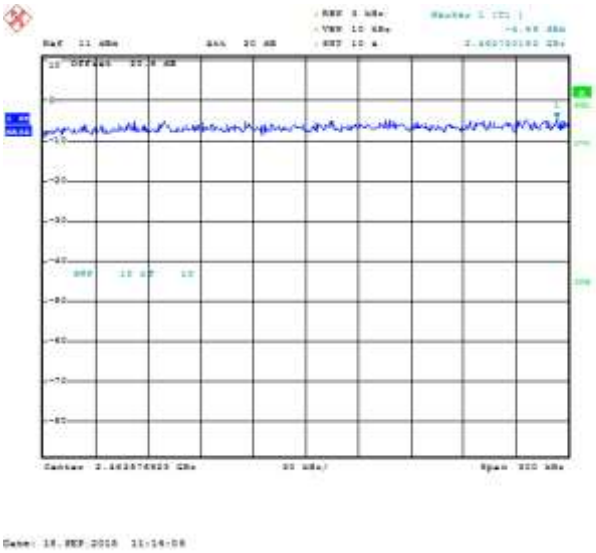


Figure 6-32: Peak Power Spectral Density SISO Primary, 802.11n, Channel 6, MCS 0

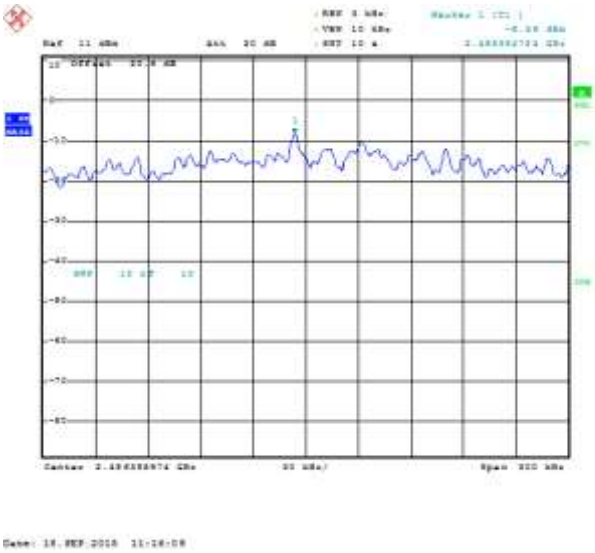
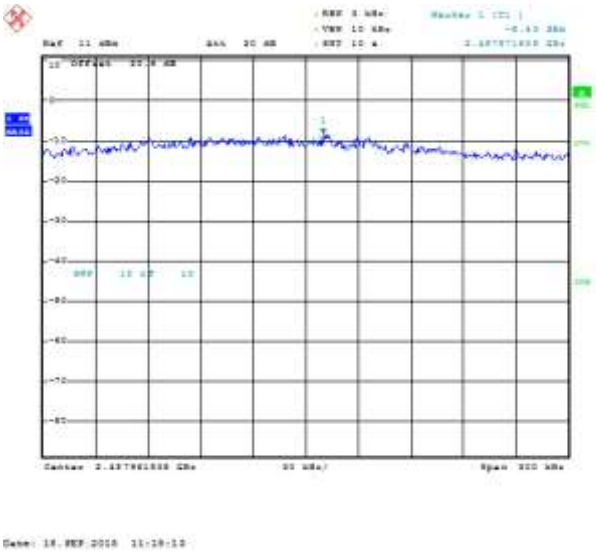



Figure 6-33: Peak Power Spectral Density SISO Primary, 802.11n, Channel 11, MCS 0