EMC Test Report

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

REPORT NO.: RTS-6057-1411-10

PRODUCT MODEL NO.: RGV161LW (SQW100-3)
TYPE NAME: BlackBerry® smartphone
FCC ID: L6ARGV160LW

DATE: November 25, 2014

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

592

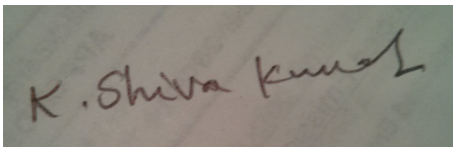
Statement of Performance:

The BlackBerry® smartphone, model RGV161LW (SQW100-3), part number CER-59664-001 Rev1-x07-001, and its accessories perform within the requirements of the test standards when configured and operated under BlackBerry's operation instructions.

Declaration:

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

Documented by:



Shiva Kumbham
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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, October, 2013
- FCC CFR 47 Part 15, Subpart E, October, 2013
- KDB 789033 D02 General UNII Test Procedures
- KDB 905462 D06 802.11 Channel Plans

B. Associated Documents

MultiSourceDeclaration_R132_10.3.1.1106_10.3.1.1817.docx

C. Product Identification

Manufactured by BlackBerry Limited whose headquarters is located at:
2200 University Ave. E
Waterloo, Ontario
Canada, N2K 0A7
Phone: 519 888 7465
Fax: 519 888 7884

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

BlackBerry RTS EMC test facilities

305 Phillip Street	440 Phillip Street
Waterloo, Ontario	Waterloo, Ontario
Canada, N2L 3W8	Canada, N2L 5R9
Phone: 519 888 7465	Phone: 519 888 7465
Fax: 519 888 6906	Fax: 519 888 6906

The testing was performed from November 4- November 28, 2014.

SAMPLE	MODEL	CER NUMBER	PIN	SOFTWARE
1	RGV161LW (SQW100-3)	CER-59664-001 Rev1-x07-001	2FFEDD08	OS Version: 10.3.1.887 Bundle: 887
2	RGV161LW (SQW100-3)	CER-59664-001 Rev1-x07-001	2FFEDD00	OS Version: 10.3.1.887 Bundle: 887
2a	RGV161LW (SQW100-3)	CER-59664-001 Rev1-x07-001	2FFEDD00	OS Version: 10.3.1.1817 Bundle: 1817
3	RGV161LW (SQW100-3)	CER-59664-001 Rev1-x07-001	2FFEDD01	OS Version: 10.3.1.887 Bundle: 887
4	RGV161LW (SQW100-3)	CER-59664-001 Rev1-x07-001	2FFEDD02	OS Version: 10.3.1.887 Bundle: 887
5	RGV161LW (SQW100-3)	CER-59664-001 Rev1-x07-001	2FFEDCF8	OS Version: 10.3.1.887 Bundle: 887

AC Line Conducted Emissions testing was performed on sample 4.
Conducted Emissions testing was performed on sample 5.
Radiated Emissions testing was performed on samples 1, 2, 2a and 3.
Near Field Communications testing was performed on sample 1.

BlackBerry® smartphone Accessories Tested

1) Scarlet North America Fixed Blade Charger, part number HDW-58920-001, with an output voltage 5 volts dc, 1300mA
2) Wired Headset, part number HDW-49299-002, with a lead length of 1.1 meters
3) Alt. Wired Headset, part number HDW-55351-002, with a lead length of 1.1 meters
4) USB Cable, part number HDW-50071-001, with a lead length of 1.2 meters
5) Alt. USB Cable, part number HDW-51800-001, with a lead length of 1.2 meters

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

E. Test Results Chart

SPECIFICATION	TEST TYPE	Meets Requirements	TEST DATA
FCC CFR 47			APPENDIX
Part 15.207	AC Power line Conducted Emission	Pass	1
Part 15.209 Part 15.247	BT/BLE Radiated Spurious Emissions	Pass	2
Part 15.209 Part 15.247	BT/BLE Radiated Band Edge Compliance	Pass	2
Part 15.209 Part 15.247	802.11b/g/n Radiated Spurious Emissions	Pass	2
Part 15.209 Part 15.247	802.11b/g/n Radiated Band Edge Compliance	Pass	2
Part 15.209 Part 15.407	802.11a/n Radiated Spurious Emissions	Pass	3
Part 15.209 Part 15.407	802.11a/n Radiated Band Edge Compliance	Pass	3
Part 15.209 Part 15.407	802.11ac Radiated Spurious Emissions	Pass	4
Part 15.209 Part 15.407	802.11ac Radiated Band Edge Compliance	Pass	4
Part 15.247(a)	BT, 20 dB Bandwidth	Pass	See Test Report RTS-6057-1406-11_rev1
Part 15.247(a)	BT, Carrier Frequency Separation	Pass	See Test Report RTS-6057-1406-11_rev1
Part 15.247(a)	BT, Number of Hopping Frequencies	Pass	See Test Report RTS-6057-1406-11_rev1
Part 15.247(a)	BT, Time of Occupancy (Dwell Time)	Pass	See Test Report RTS-6057-1406-11_rev1
Part 15.247(b)	BT, Maximum Peak Conducted Output Power	Pass	See Test Report RTS-6057-1406-11_rev1
Part 15.247(c)	BT, Band-Edge Compliance of RF Conducted Emissions	Pass	See Test Report RTS-6057-1406-11_rev1
Part 15.247(c)	BT, Spurious RF Conducted Emissions	Pass	See Test Report RTS-6057-1406-11_rev1

SPECIFICATION	TEST TYPE	Meets Requirements	TEST DATA
FCC CFR 47			APPENDIX
Part 15.247(a)	BLE, 6 dB Bandwidth	Pass	See Test Report RTS-6057-1406-11_rev1
Part 15.247(b)	BLE, Maximum Conducted Output Power	Pass	See Test Report RTS-6057-1406-11_rev1
Part 15.247(c)	BLE, Band-Edge	Pass	See Test Report RTS-6057-1406-11_rev1
Part 15.247(d)	BLE, Peak Power Spectral Density	Pass	See Test Report RTS-6057-1406-11_rev1
Part 15.247(c)	BLE, Spurious RF Conducted Emissions	Pass	See Test Report RTS-6057-1406-11_rev1
Part 15.247(a)	802.11b/g/n, 6 dB Bandwidth	Pass	5
Part 15.247(b)	802.11b/g/n, Maximum Conducted Output Power	Pass	5
Part 15.247(c)	802.11b/g/n, Band-Edge	Pass	5
Part 15.247(d)	802.11b/g/n, Peak Power Spectral Density	Pass	5
Part 15.247(c)	802.11b/g/n, Spurious RF Conducted Emissions	Pass	5
Part 15.407	802.11a/n, 6 dB Bandwidth	Pass	6
Part 15.407	802.11a/n, Maximum Conducted Output Power	Pass	6
Part 15.407	802.11a/n, Band-Edge	Pass	6
Part 15.407	802.11a/n, Peak Power Spectral Density	Pass	6
Part 15.407	802.11a/n, Spurious RF Conducted Emissions	Pass	6

Test Results Chart cont'd

SPECIFICATION	TEST TYPE	Meets Requirements	TEST DATA
FCC CFR 47			APPENDIX
Part 15.407	802.11ac, 6 dB Bandwidth	Pass	7
Part 15.407	802.11ac, Maximum Conducted Output Power	Pass	7
Part 15.407	802.11ac, Band-Edge	Pass	7
Part 15.407	802.11ac, Peak Power Spectral Density	Pass	7
Part 15.407	802.11ac, Spurious RF Conducted Emissions	Pass	7
Part 15.209 Part 15.225(a)	Near Field Communications, Radiated Emissions	Pass	8
Part 15.225(e)	Near Field Communications, Occupied Bandwidth	Pass	8
Part 15.225(e)	Near Field Communications, Frequency Stability	Pass	8

F. Summary of Results

1) AC POWER LINE CONDUCTED EMISSIONS

The AC Power line conducted emissions were measured using the test procedure outlined in CISPR Recommendation 22 through a 50 Ohm Line Impedance Stabilization Network (LISN), which was inserted in the power line to the equipment to provide the specified impedance for measurements. The EUT was placed on a nonconductive wooden table, 80 cm high that was positioned 40 cm from a vertical ground plane. The RF output of the network was connected to an EMI receiver system with characteristics that duplicate those of the receiver specified in CISPR Publication 16.
BlackBerry® smartphone was in battery charging mode. The input voltage was 120 V, 60 Hz.

The following test configurations were measured:

Test Configuration	Operating Mode(s)	Charger + Accessories
1	NFC TX	Fixed Blade Charger + Wired Headset + USB Cable 1.20m
2	Bluetooth TX	Fixed Blade Charger + Alt Wired Headset + USB Cable 1.20m
3	802.11b TX	Fixed Blade Charger + Alt. Wired Headset + USB Cable 2.20m
4	802.11ac TX	Fixed Blade Charger + Wired Headset + USB Cable 2.20m

The sample EUT's conducted emissions were compared with respect to the FCC CFR 47 Part 15, Subpart C. The sample EUT had a worst case test margin of 10.47 dB below the QP limit at 0.402MHz with the Fixed Blade Charger in Test Configuration 3.

See APPENDIX 1 for the test data.

Measurement Uncertainty ±3.2 dB

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

a) Radiated Spurious and Harmonic Emissions

The EUT was placed on a nonconductive styrofoam table, 80 cm high that was positioned on a remotely controlled turntable. The test distance used between the EUT and the receiving antenna was three meters. 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 meters. 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 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 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.

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.

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.

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

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. The sample EUT emissions were in the noise floor (NF).

See APPENDIX 2 for the test data.

b) Band-Edge Compliance of RF Radiated Emissions
The BlackBerry® smartphone 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.

Measurement Uncertainty ±4.2 dB
See APPENDIX 2 for the test data

3) 802.11a/n RADIATED EMISSIONS

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

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

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.

See APPENDIX 3 for the test data

Measurement Uncertainty ±4.2 dB

4) 802.11ac RADIATED EMISSIONS

a) Radiated Spurious and Harmonic Emissions
The EUT was placed on a nonconductive styrofoam table, 80 cm high that was positioned on a remotely controlled turntable. The test distance used between the EUT and the receiving antenna was three meters. 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 meters. 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 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 BlackBerry® smartphone was measured in standalone configuration transmitting on channel 36 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.

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

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 802.11a/n as per the requirements of 15.407, 15.209.

See APPENDIX 4 for the test data

Measurement Uncertainty ±4.2 dB

5) 802.11b/g/n RF CONDUCTED EMISSIONS

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

a) 6dB Bandwidth
The EUT met the requirements of the 6 dB bandwidth as per 47 CFR 15.247(b). Low channel (1), middle channel (6) and high channel (11) were measured. The worst case 6 dB Bandwidth was 9.06 MHz for channel 11 in 802.11b mode, 16.54 MHz for channels 6 and 11 in 802.11g mode, and 17.80 MHz for channel 11 in 802.11n mode.
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). Low channel (1), middle channel (6) and high channel (11) were measured. The worst case Conducted Output Power level was 18.33 dBm (68.1 mW) for channel 6 in 802.11b mode, 18.73 dBm (74.7 mW) for channel 6 in 802.11g mode, and 16.78 dBm (47.6 mW) for channel 6 in 802.11n mode.
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). Low channel (1) and high channel (11) were measured.
See APPENDIX 5 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)
. Low channel (1), middle channel (6) and high channel (11) 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). The frequency range measured was 30 MHz to 26 GHz. Low channel (1), middle channel (6) and high channel (11) were measured.
See APPENDIX 5 for the test data.

6) 802.11a/n RF CONDUCTED EMISSIONS

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. Channels 36, 64, 100, 140 and 165 were measured. The worst case 6 dB Bandwidth was 16.56 MHz for channels 48, 64, 100, 140 and 165 in 802.11a mode. The worst case 6 dB Bandwidth was 16.51 MHz for channel 36 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 15.407. Channels 36, 64, 100, 140 and 165 were measured. The worst case Conducted Output Power level was 17.52 dBm (56.53 mW) for channel 165 in 802.11a mode. The worst case Conducted Output Power level was was 16.40 dBm (43.65 mW) for channel 100 in 802.11n mode.
See APPENDIX 6 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. Channels 36, 64, 100, 140, 149 and 165 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 15.407. Channels 36, 64, 100, 140 and 165 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 15.407. The frequency range measured was 30 MHz to 40 GHz. Channels 36, 64, 100 and 140 were measured.
See APPENDIX 6 for the test data.

7) 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.

a) 6 dB Bandwidth

The EUT met the requirements of the 6 dB bandwidth as per 47 CFR 15.407. 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, 138 and 155 were measured for 80MHz bandwidth. The worst case 6 dB Bandwidth was 17.82 MHz for channel 64 for 802.11ac mode, 20MHz bandwidth; the worst case 6 dB Bandwidth was 36.56 MHz for channels 38, 62, 142, and 151 for 802.11ac mode, 40MHz bandwidth; the worst case 6 dB Bandwidth was 76.56 MHz for channels 42, 58, 138 and 155 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. 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, 138 and 155 were measured for 80MHz bandwidth. The worst case Conducted Output Power level was 16.51 dBm(44.75 mW) for channel 100 for 802.11ac mode, 20MHz bandwidth; the worst case Conducted Output Power level was 16.60 dBm (45.70 mW) for channel 142 for 802.11ac mode, 40MHz bandwidth; the worst case Conducted Output Power level was 14.50 dBm (28.20 mW) for channel 138 for 802.11ac mode, 80MHz bandwidth.
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. Channels 36, 64, 100,140, 149 and 165 were measured for 20MHz bandwidth, channels 38, 62, 102, 142, 1510and 159 were measured for 40MHz bandwidth, channels 42, 58, 105 138 and 155 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. 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, 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. 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, 138 and 155 were measured for 80MHz bandwidth.

See APPENDIX 7 for the test data.

8) Near Field Communications (NFC)

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).
See APPENDIX 8 for the test data.

b) Occupied Bandwidth
The EUT met the requirements of the occupied bandwidth as per 47 CFR 15 C. The EUT was measured in test mode with modulation on and transmitting at 13.56 MHz.
See APPENDIX 8 for the test data.

c) Frequency Stability
The EUT met the requirements of the Frequency Stability as per 47 CFR 15.225(e). The EUT was measured in test mode with modulation on and transmitting at 13.56 MHz.
See APPENDIX 8 for the test data.

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	14-12-11	Conducted/Radiated Emissions
EMI Test Receiver	Rohde & Schwarz	ESU 40	100162	14-12-08	Conducted/Radiated Emissions
Hybrid Log Antenna	EMC Automation	HLP-3003C	017301	16-03-02	Radiated Emissions
Horn Antenna	CMT	3116	R52734-001	16-03-31	Radiated Emissions
Horn Antenna	ETS-Lindgren	3117	2538	15-08-07	Radiated Emissions
Active Loop Antenna	EMCO	6507	00032	15-08-21	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA4-SP	001	15-09-10	Radiated Emissions
Preamplifier	Sonoma	310N/11909A	185831	15-10-22	Radiated Emissions
Preamplifier	Rohde & Schwarz	TS-ANA-SP	001	15-09-10	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	15-01-23	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	14-11-28	RF Conducted Emissions
Bluetooth Tester	Rohde & Schwarz	CBT35	100368	14-11-28	Radiated Emissions
Bluetooth Tester	Rohde & Schwarz	CBT35	100370	14-11-28	Radiated Emissions
Power Meter	Agilent	N1911A	MY45100951	15-09-10	RF Conducted / Frequency Stability
Power Sensor	Agilent	N1921A	MY45241383	15-09-11	RF Conducted / Frequency Stability
Environment Monitor	Omega	iTHX-SD	0380567	16-11-15	Radiated Emissions

APPENDIX 1 – AC POWER CONDUCTED EMISSIONS TEST DATA/PLOTS

AC Powerline Conducted Emission Test Results

The following tests were performed by Kevin Guo

Test Configuration 1

The BlackBerry® smartphone was tested on November 25, 2014

The environmental test conditions were: Temperature: 26.0 ºC
Relative Humidity: 23.9 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.191	L1	35.30	10.92	46.22	64.00	54.00	-17.78
0.213	L1	32.37	10.77	43.14	63.10	53.10	-19.97
0.357	L1	26.84	10.08	36.92	58.80	48.80	-21.88
0.389	N	29.39	10.04	39.43	58.10	48.10	-18.67
0.528	N	31.43	9.90	41.34	56.00	46.00	-14.67
1.064	N	29.43	9.81	39.24	56.00	46.00	-16.77
1.271	L1	27.87	9.80	37.67	56.00	46.00	-18.33
1.599	L1	26.07	9.81	35.88	56.00	46.00	-20.12
1.856	N	25.61	9.82	35.43	56.00	46.00	-20.57
16.220	N	25.03	10.14	35.17	60.00	50.00	-24.83

All other emission levels were at least 25 dB below the limit.
Measurements were done with the quasi-peak detector.
See figure 1-1 and figure 1-2 for the measurement plot of the L1 and N lines of AC power line conducted emissions.

AC Power line Conducted Emissions Test Graphs

Test Configuration 1

Figure 1-1: L1 lines

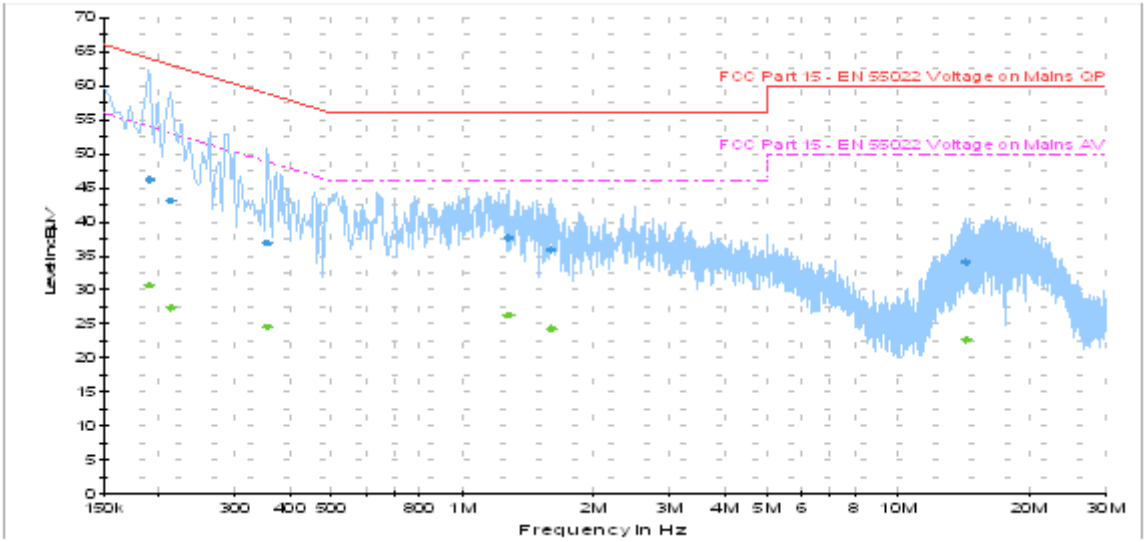
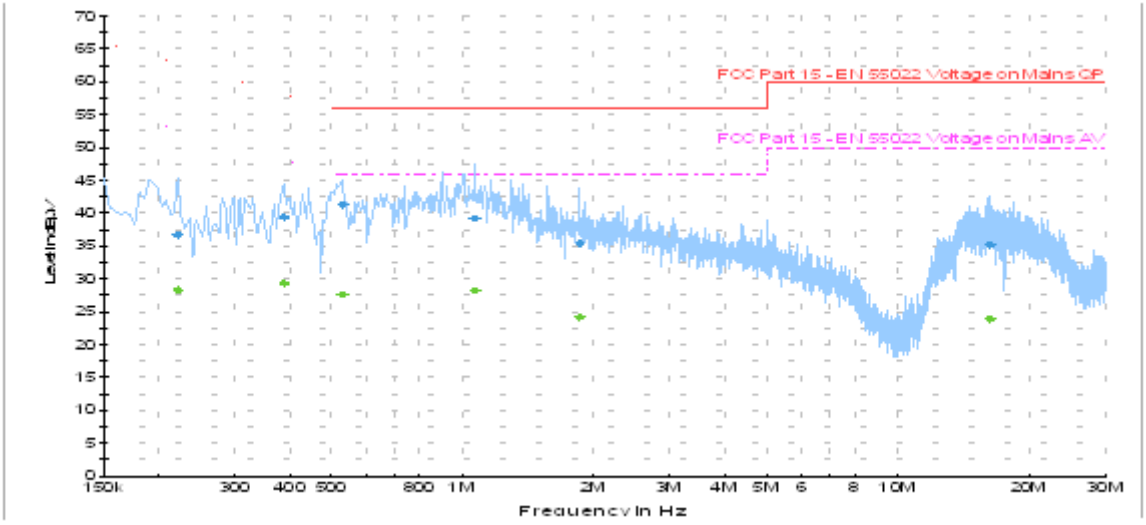


Figure 1-2: N Lines



AC Power line Conducted Emission Test Results cont'd

Test Configuration 2

The BlackBerry® smartphone was tested on November 25, 2014

The environmental test conditions were: Temperature: 26.0 ºC
Relative Humidity: 23.9 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.191	L1	34.90	10.92	45.82	64.00	54.00	-18.18
0.384	L1	30.17	10.04	40.21	58.20	48.20	-18.00
0.384	N	35.57	10.05	45.62	58.20	48.20	-12.58
0.411	N	33.76	10.01	43.76	57.60	47.60	-13.84
0.924	N	21.97	9.81	31.79	56.00	46.00	-24.22
1.437	L1	26.39	9.80	36.19	56.00	46.00	-19.81

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.

Figure 1-3: L1 lines

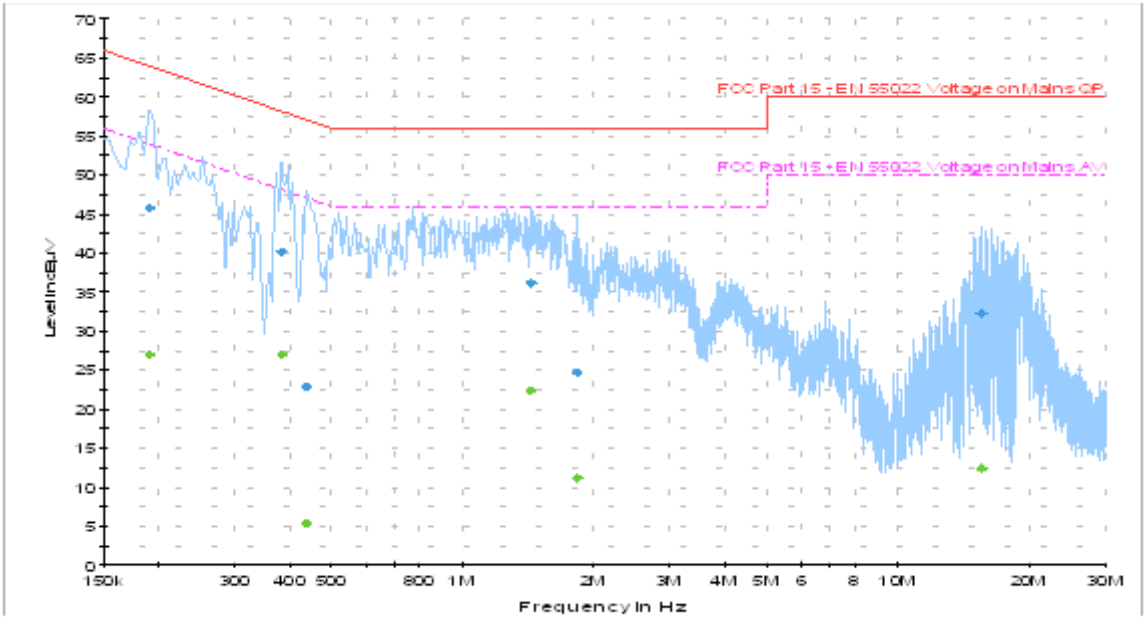
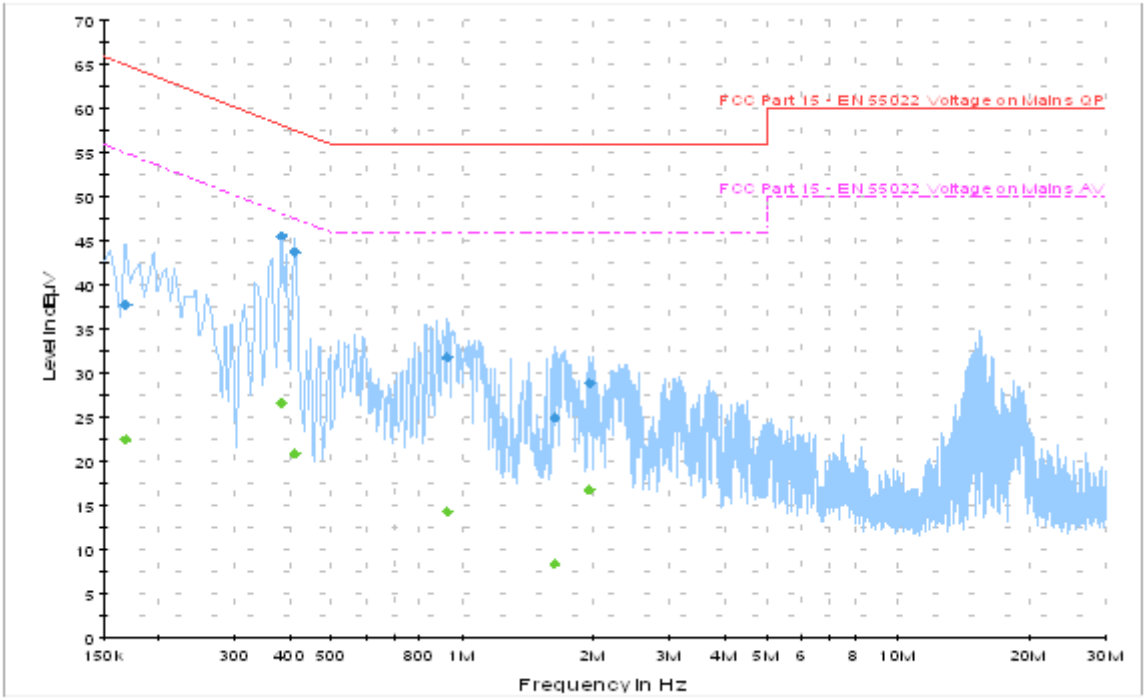


Figure 1-4: N Lines



AC Powerline Conducted Emissions Test Results cont'd

Test Configuration 3

The BlackBerry® smartphone was tested on November 25, 2014

The environmental test conditions were: Temperature: 26.0 ºC
Relative Humidity: 23.9 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.236	L1	27.16	10.61	37.77	62.30	52.30	-24.53
0.384	L1	30.68	10.04	40.72	58.20	48.20	-17.48
0.384	N	31.82	10.05	41.87	58.20	48.20	-16.33
0.402	L1	37.24	10.01	47.25	57.80	47.80	-10.55
0.402	N	37.32	10.02	47.34	57.80	47.80	**-10.47**
0.416	L1	28.55	9.99	38.54	57.50	47.50	-18.96
0.425	N	30.75	9.98	40.73	57.40	47.40	-16.67

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.

AC Powerline Conducted Emissions Test Graphs

Test Configuration 3

Figure 1-5: L1 Lines

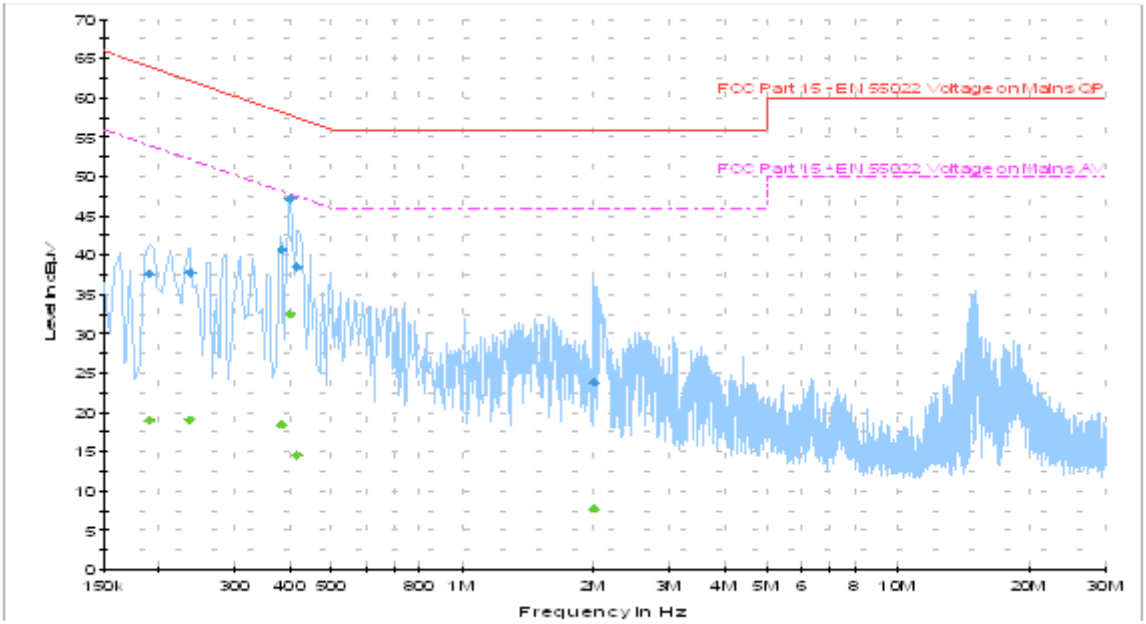
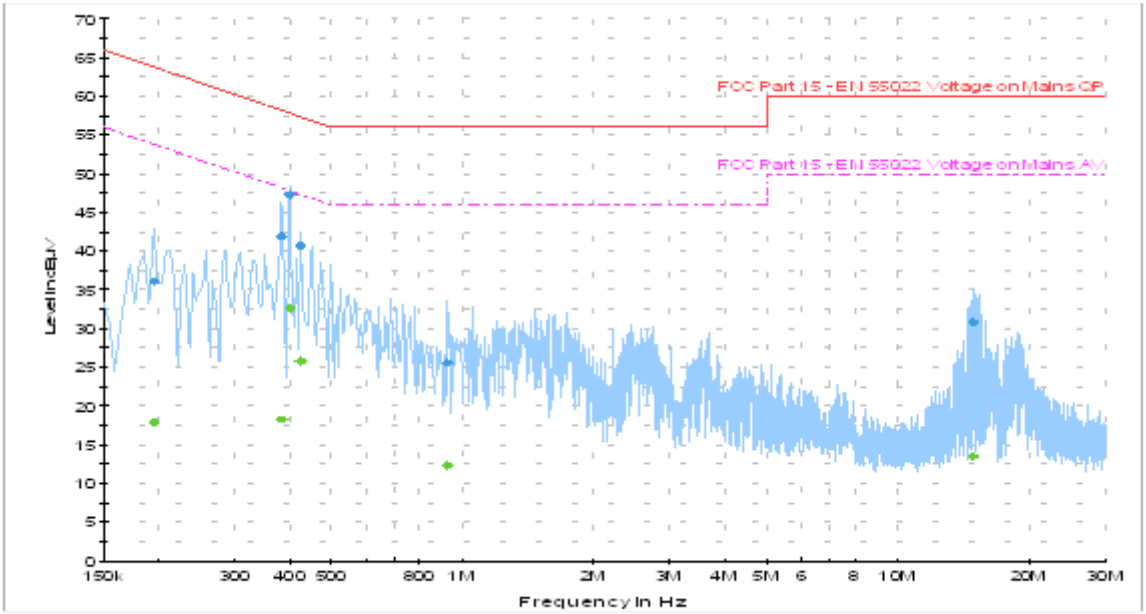


Figure 1-6: N Lines



AC Powerline Conducted Emission Test Results cont'd

Test Configuration 4

The BlackBerry® smartphone was tested on November 25, 2014

The environmental test conditions were: Temperature: 26.0 ºC
Relative Humidity: 23.9 %

Frequency (MHz)	Line	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dB)	Limit (QP) (dBµV)	Limit (AV) (dBµV)	Margin (QP) Limits (dB)
0.380	L1	26.60	10.04	36.64	58.30	48.30	-21.66
0.398	N	32.65	10.03	42.68	57.90	47.90	-15.23
0.402	L1	37.26	10.01	47.26	57.80	47.80	-10.54
0.411	L1	27.50	9.99	37.49	57.60	47.60	-20.11
0.425	N	30.63	9.98	40.61	57.40	47.40	-16.79

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.

AC Powerline Conducted Emissions Test Graphs

Test Configuration 4

Figure 1-7: L1 lines

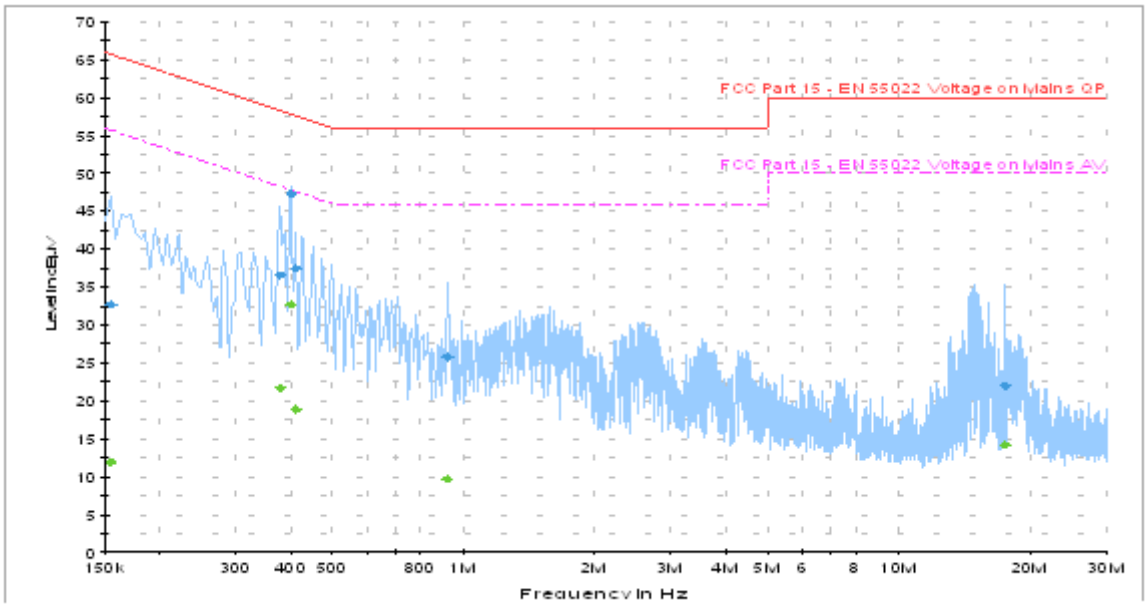
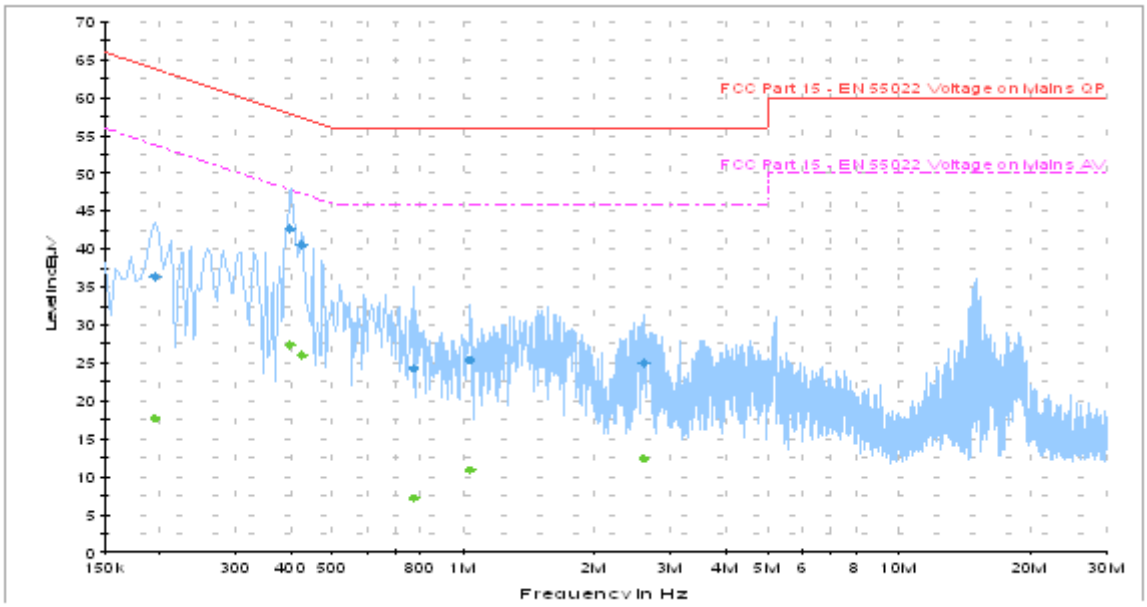


Figure 1-8: N Lines



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

Radiated Emissions Test Results
Bluetooth Band

Date of Test: November 07, 2014 to November 10, 2014
Measurements were performed by Shiva Kumbham.

The environmental test conditions were: Temperature: 23.6ºC
Relative Humidity: 14.8 %

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

The BlackBerry® smartphone in Bluetooth TX mode was volume key down 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 emission levels were at least 25 dB below the limit.

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

Date of Test: November 12, 2014 to November 25, 2014
Measurements were performed by Steven Liu

The environmental test conditions were: Temperature: 23.3ºC - 24.7ºC
Relative Humidity: 38% - 44%

The test distance was 3.0 meters with a EUT height of 0.8 meters, and sweep frequency of 1GHz to 25GHz.

The BlackBerry® smartphone in Bluetooth TX mode was in horizontal down 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 emission levels were at least 25 dB below the limit.

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

Date of test: November 10, 2014
Measurements were performed by Shiva Kumbham.

The environmental test conditions were: Temperature: 23.2 º C
Relative Humidity: 25.2 %

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	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	91.72	49.64	42.08	74.00	-31.92
0	2402	Horn	H	PK	1 MHz	96.16	53.98	42.18	74.00	-31.82
0	2402	Horn	V	AVE.	10 Hz	89.06	49.64	39.42	54.00	-14.58
0	2402	Horn	H	AVE.	10 Hz	93.47	53.98	39.49	54.00	-14.51
High Channel, Packet Type DH5										
78	2480	Horn	V	PK	1 MHz	96.69	54.36	42.33	74.00	-31.67
78	2480	Horn	H	PK	1 MHz	101.15	57.73	43.42	74.00	-30.58
78	2480	Horn	V	AVE.	10 Hz	94.00	54.36	39.64	54.00	-14.36
78	2480	Horn	H	AVE.	10 Hz	98.44	57.73	40.71	54.00	-13.29
Low Channel, Packet Type 2-DH5										
0	2402	Horn	V	PK	1 MHz	91.12	47.58	43.54	74.00	-30.46
0	2402	Horn	H	PK	1 MHz	94.73	49.76	44.97	74.00	-29.03
0	2402	Horn	V	AVE.	10 Hz	85.98	47.58	38.40	54.00	-15.60
0	2402	Horn	H	AVE.	10 Hz	89.49	49.76	39.73	54.00	-14.27
High Channel, Packet Type 2-DH5										
78	2480	Horn	V	PK	1 MHz	95.99	50.62	45.37	74.00	-28.63
78	2480	Horn	H	PK	1 MHz	99.79	55.99	43.80	74.00	-30.20
78	2480	Horn	V	AVE.	10 Hz	90.80	50.62	40.18	54.00	-13.82
78	2480	Horn	H	AVE.	10 Hz	94.62	55.99	38.63	54.00	-15.37

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

Channel	Freq.	Rx Antenna		Detector	VBW	Corrected Reading	Delta Marker	Corrected Band edge	Limit	Diff. To Limit
	(MHz)	Type	POL.			(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
Low Channel, Packet Type 3-DH5										
0	2402	Horn	V	PK	1 MHz	91.57	46.95	44.62	74.00	-29.38
0	2402	Horn	H	PK	1 MHz	95.91	51.90	44.01	74.00	-29.99
0	2402	Horn	V	AVE.	10 Hz	86.17	46.95	39.22	54.00	-14.78
0	2402	Horn	H	AVE.	10 Hz	90.39	51.90	38.49	54.00	-15.51
High Channel, Packet Type 3-DH5										
78	2480	Horn	V	PK	1 MHz	96.34	51.19	45.15	74.00	-28.85
78	2480	Horn	H	PK	1 MHz	100.06	55.68	44.38	74.00	-29.62
78	2480	Horn	V	AVE.	10 Hz	90.92	51.19	39.73	54.00	-14.27
78	2480	Horn	H	AVE.	10 Hz	94.60	55.68	38.92	54.00	-15.08

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

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

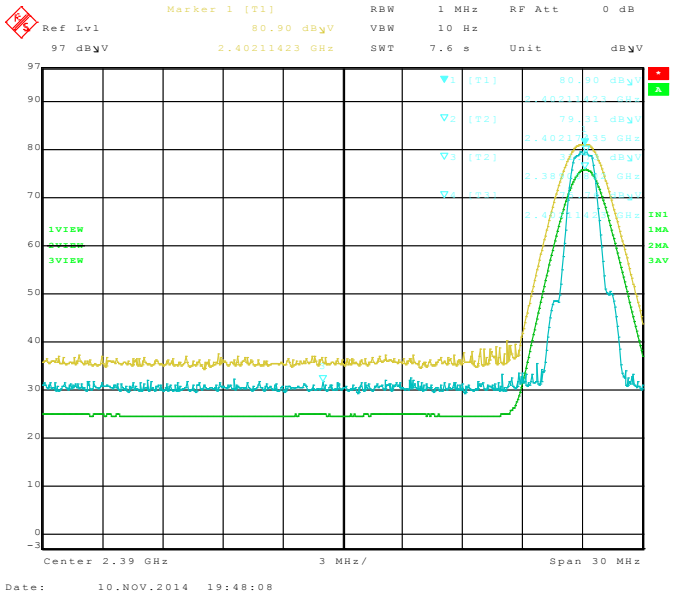


Figure 2-2: Band-Edge Compliance of RF Rad. Emissions.
Bluetooth, Single freq., Static PBRS,
DH5, Channel 0, Pol: H, Detector: PK

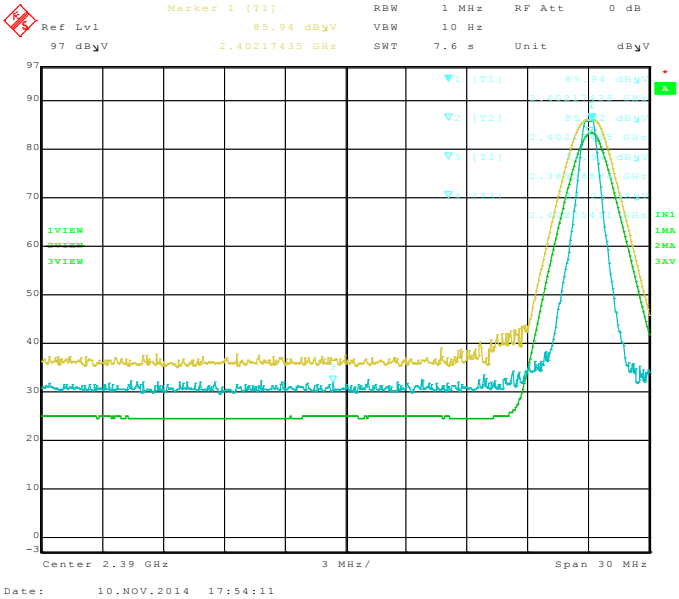


Figure 2-3: Band-Edge Compliance of RF Rad. Emissions.
Bluetooth, Single freq., Static PBRS,
DH5, Channel 78, Pol: V, Detector: PK

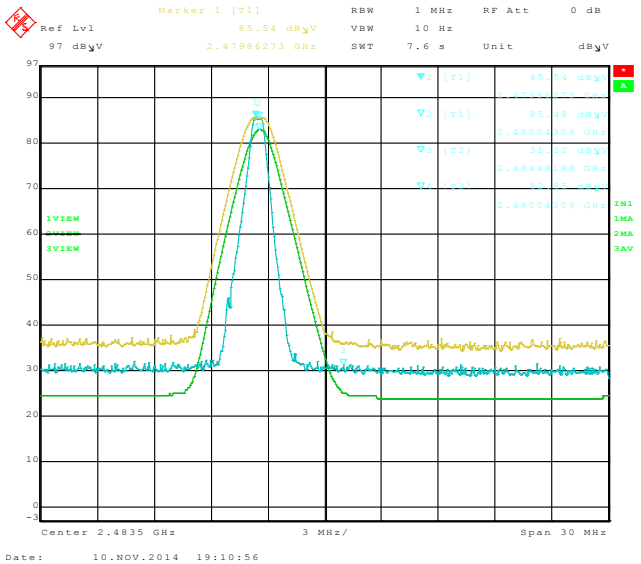
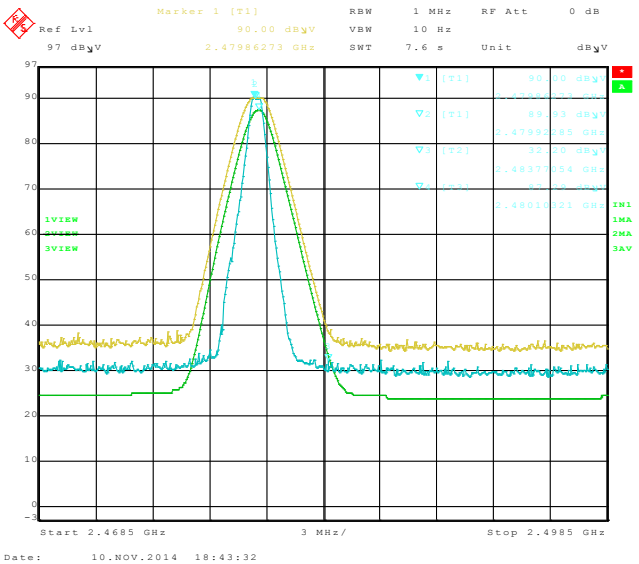


Figure 2-4: Band-Edge Compliance of RF Rad. Emissions
Bluetooth, Single freq., Static PBRS,
DH5, Channel 78, Pol: H, Detector: PK



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

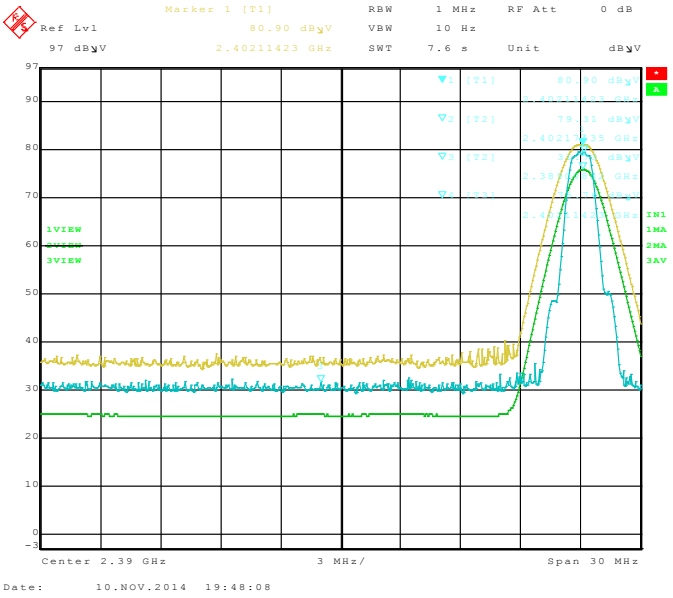


Figure 2-6: Band-Edge Compliance of RF Rad. Emissions. Bluetooth, Single freq., Static PBRS, 2-DH5, Channel 0, Pol: H, Detector: PK

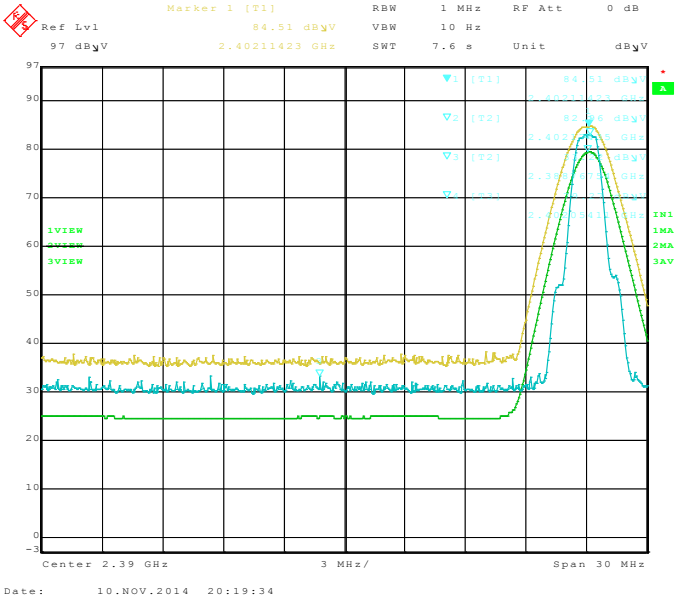


Figure 2-7: Band-Edge Compliance of RF Rad. Emissions. Bluetooth, Single freq., Static PBRS, 2-DH5, Channel 78, Pol: V, Detector: PK

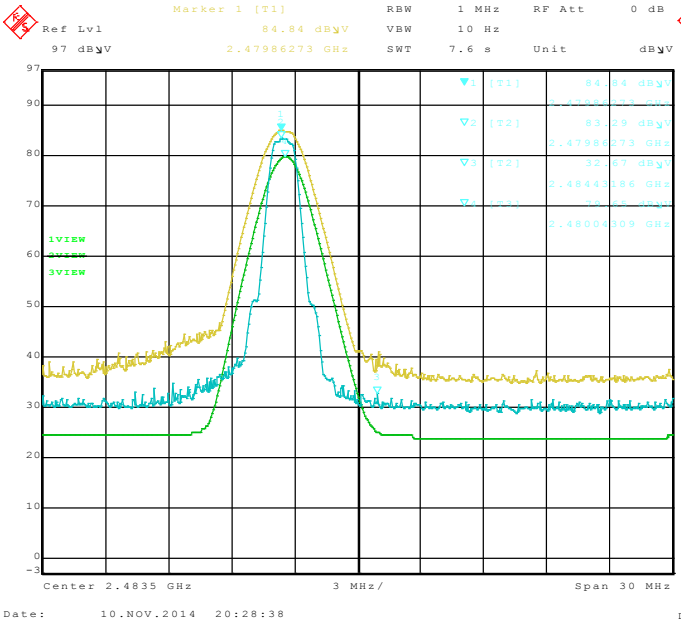
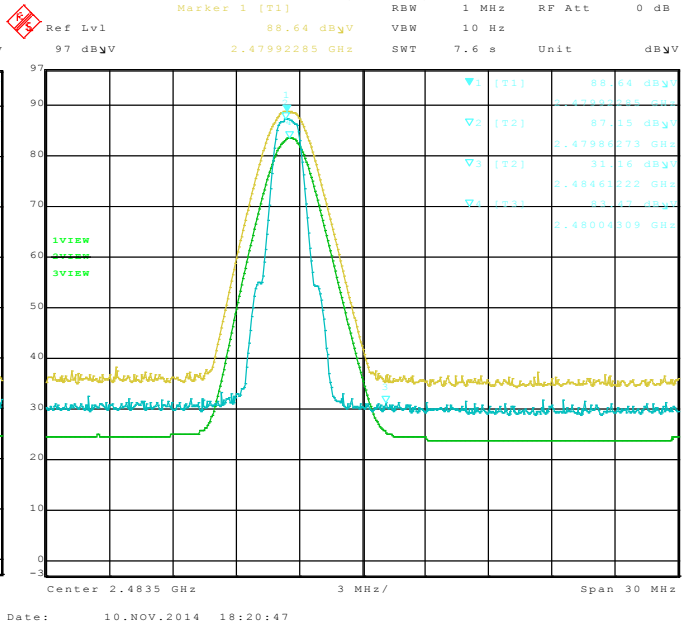


Figure 2-8: Band-Edge Compliance of RF Rad. Emissions. Bluetooth, Single freq., Static PBRS, 2-DH5, Channel 78, Pol: H, Detector: PK



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

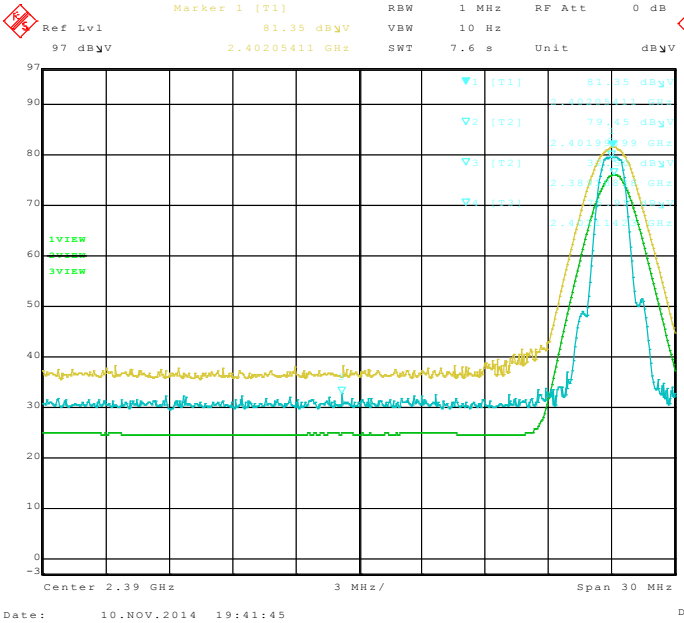


Figure 2-10: Band-Edge Compliance of RF Rad. Emissions. Bluetooth, Single freq., Static PBRS, 3-DH5, Channel 0, Pol: H, Detector: PK

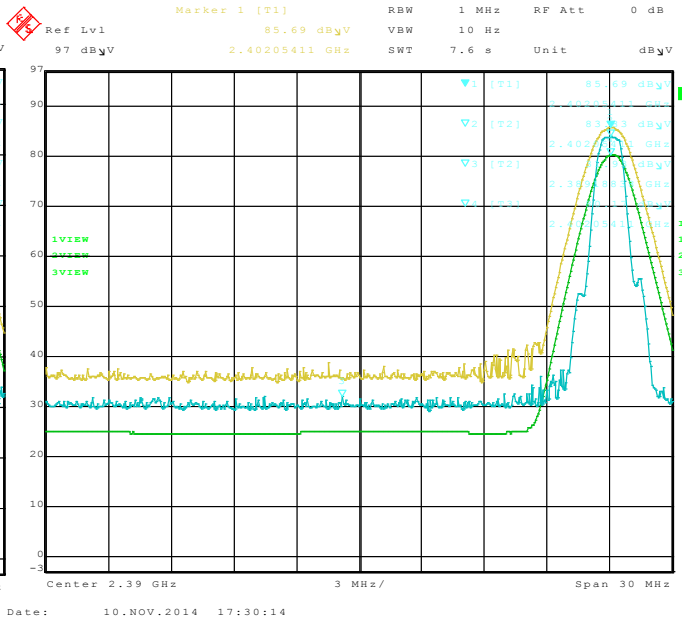


Figure 2-11: Band-Edge Compliance of RF Rad. Emissions. Bluetooth, Single freq., Static PBRS, 3-DH5, Channel 78, Pol: V, Detector: PK

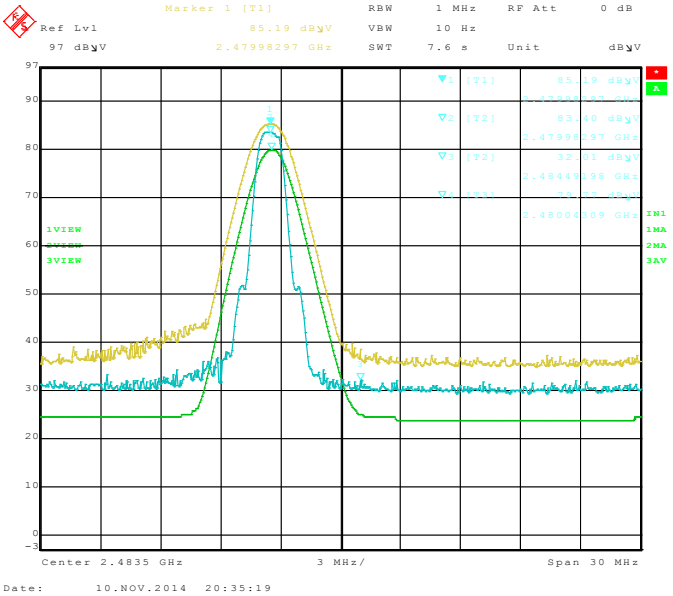
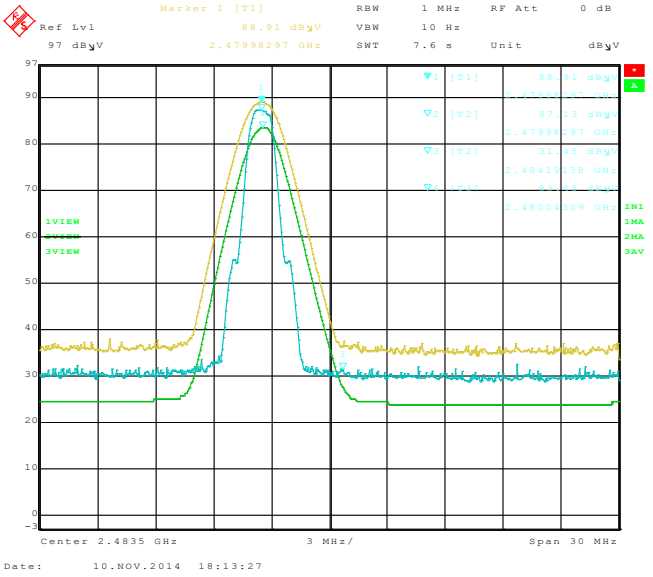


Figure 2-12: Band-Edge Compliance of RF Rad. Emissions. Bluetooth, Single freq., Static PBRS, 3-DH5, Channel 78, Pol: H, Detector: PK



Radiated Emissions Test Results cont'd
Bluetooth Low Energy Band

Date of Test: November 10, 2014
Measurements were performed by Savtej Sandhu.

The environmental test conditions were: Temperature: 24.3 ºC
Relative Humidity: 22.8 %

The test distance was 3.0 meters with a EUT height of 0.8 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: November 12, 2014 to November 25, 2014
Measurements were performed by Steven Liu

The environmental test conditions were: Temperature: 23.3ºC - 24.7ºC
Relative Humidity: 38% - 44%

The test distance was 3.0 meters with a EUT height of 0.8 meters, and sweep frequency of 1GHz to 25GHz.

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

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

Date of test: November 10, 2014
Measurements were performed by Shiva Kumbham.

The environmental test conditions were: Temperature: 23.2º C
Relative Humidity: 25.2 %

The BlackBerry® smartphone was in Vertical Up position.

The test distance was 3.0 meters.

Channel	Freq.	Rx Antenna		Detector	VBW	Corrected Reading	Delta Marker	Corrected Band edge	Limit	Diff. To Limit
	(MHz)	Type	POL.			(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
Low Channel, LE										
0	2402	Horn	V	PK	1 MHz	89.63	47.38	42.25	74.00	-31.75
0	2402	Horn	H	PK	1 MHz	94.93	52.78	42.15	74.00	-31.85
0	2402	Horn	V	AVE.	10 Hz	84.85	47.38	37.47	54.00	-16.53
0	2402	Horn	H	AVE.	10 Hz	90.07	52.78	37.29	54.00	-16.71
High Channel, LE										
39	2480	Horn	V	PK	1 MHz	94.95	52.11	42.84	74.00	-31.16
39	2480	Horn	H	PK	1 MHz	99.52	56.13	43.39	74.00	-30.61
39	2480	Horn	V	AVE.	10 Hz	90.03	52.11	37.92	54.00	-16.08
39	2480	Horn	H	AVE.	10 Hz	94.64	56.13	38.51	54.00	-15.49

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

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

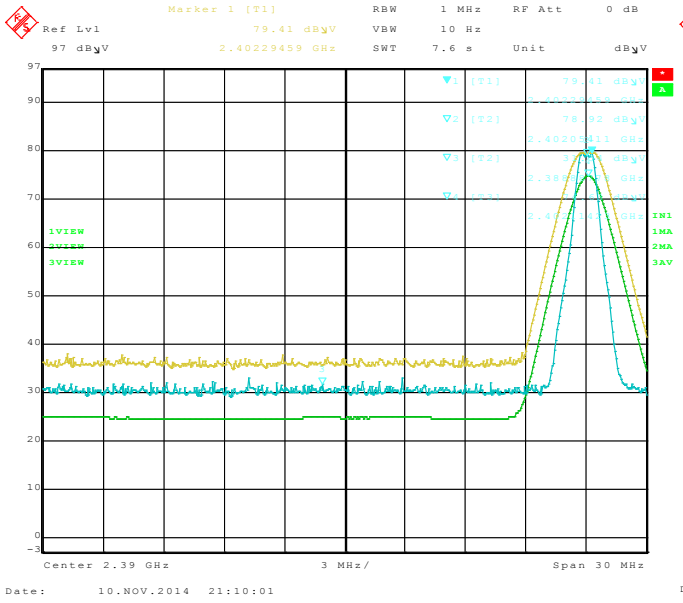


Figure 2-14: Band-Edge Compliance of RF Rad. Emissions. Bluetooth Low Energy, Single freq., LE, Channel 0, Pol: H, Detector: PK

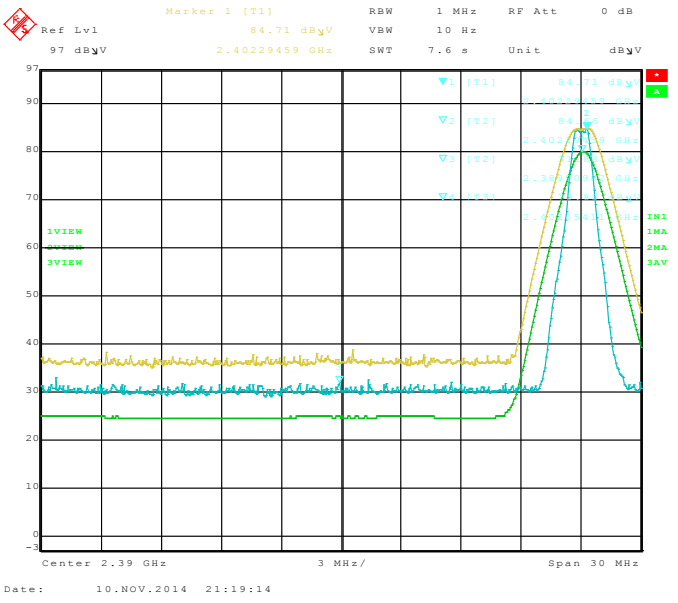


Figure 2-15: Band-Edge Compliance of RF Rad. Emissions. Bluetooth Low Energy, Single freq., LE, Channel 39, Pol: V, Detector: PK

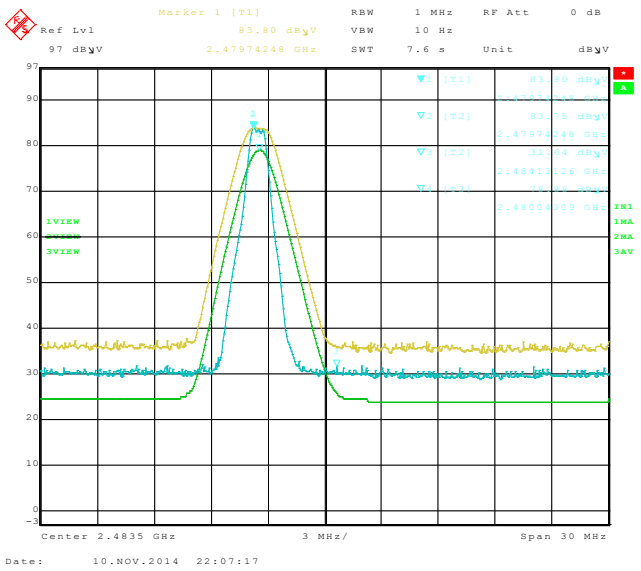
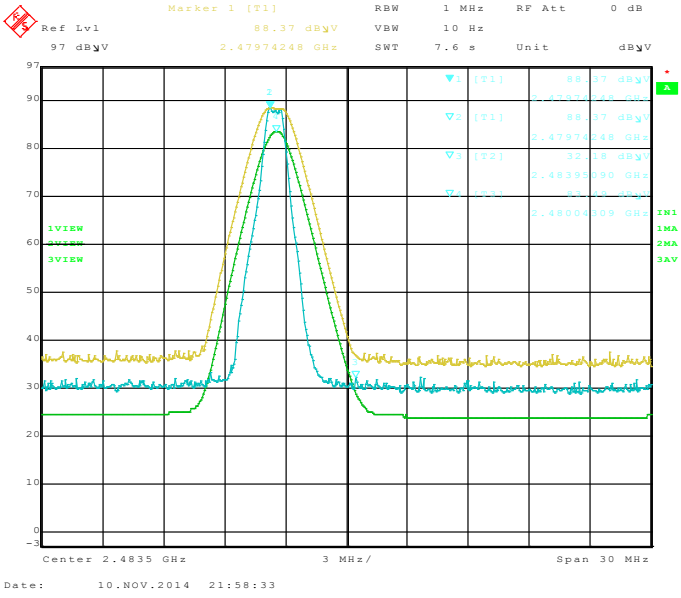


Figure 2-16: Band-Edge Compliance of RF Rad. Emissions Bluetooth Low Energy, Single freq., LE, Channel 39, Pol: H, Detector: PK



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

Date of Test: November 25, 2014
Measurements performed by Savtej Sandhu.

The environmental test conditions were: Temperature: 23.5 ºC
Relative Humidity: 16.9%

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

The BlackBerry® smartphone was in Vertical Up 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 other emission levels were at least 25 dB below the limit.

Date of Test: November 21 and November 25, 2014
Measurements performed by Kevin Guo.

The environmental test conditions were: Temperature: 23.3ºC - 24.7ºC
Relative Humidity: 38% - 44%

The test distance was 3.0 meters with a EUT height of 0.8 meters, and sweep frequency of 1GHz to 25GHz.

The BlackBerry® smartphone was in Vertical Up.

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.

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

Date of Tests: November 25, 2014
Measurements performed by Shiva Kumbham.

The environmental test conditions were: Temperature: 23.1 ºC
Relative Humidity: 16.7 %

802.11b Band

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

Channel	Freq.	Rx Antenna		Detector	VBW for peak (dBuV/m)	Corrected Band edge	Limit	Diff. To Limit
	(MHz)	Type	POL.	(MHz)		(dBuV/m)	(dBuV/m)	(dB)
Low Channel 802.11b								
1.0	2412.00	Horn	V	PK	1 MHz	49.67	74.00	-24.33
1.0	2412.00	Horn	H	PK	1 MHz	51.93	74.00	-22.07
1.0	2412.00	Horn	V	AV	10 Hz	37.22	54.00	-16.78
1.0	2412.00	Horn	H	AV	10 Hz	38.56	54.00	-15.44
High Channel 802.11b								
11.0	2462.00	Horn	V	PK	1 MHz	51.71	74.00	-22.29
11.0	2462.00	Horn	H	PK	1 MHz	53.68	74.00	-20.32
11.0	2462.00	Horn	V	AV	10 Hz	41.67	54.00	-12.33
11.0	2462.00	Horn	H	AV	10 Hz	44.17	54.00	-9.83

802.11g Band

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

The test distance was 3 meters.

Channel	Freq.	Rx Antenna		Detector	VBW for peak (dBuV/m)	Corrected Band edge	Limit	Diff. To Limit
	(MHz)	Type	POL.	(MHz)		(dBuV/m)	(dBuV/m)	(dB)
Low Channel 802.11g								
1.0	2412.00	Horn	V	PK	1 MHz	51.38	74.00	-22.62
1.0	2412.00	Horn	H	PK	1 MHz	56.60	74.00	-17.40
1.0	2412.00	Horn	V	AV	10 Hz	38.56	54.00	-15.44
1.0	2412.00	Horn	H	AV	10 Hz	41.65	54.00	-12.35
High Channel 802.11g								
11.0	2462.00	Horn	V	PK	1 MHz	62.31	74.00	-11.69
11.0	2462.00	Horn	H	PK	1 MHz	65.82	74.00	-8.18
11.0	2462.00	Horn	V	AV	10 Hz	47.19	54.00	-6.81
11.0	2462.00	Horn	H	AV	10 Hz	51.21	54.00	-2.79

802.11n Band

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

The test distance was 3 meters.

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW for peak (dBuV/m)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Low Channel 802.11n								
1.0	2412.00	Horn	V	PK	1 MHz	54.86	74.00	-19.14
1.0	2412.00	Horn	H	PK	1 MHz	57.34	74.00	-16.66
1.0	2412.00	Horn	V	AV	10 Hz	38.56	54.00	-15.44
1.0	2412.00	Horn	H	AV	10 Hz	41.65	54.00	-12.35
High Channel 802. 11n								
11.0	2462.00	Horn	V	PK	1 MHz	64.80	74.00	-9.20
11.0	2462.00	Horn	H	PK	1 MHz	67.96	74.00	-6.04
11.0	2462.00	Horn	V	AV	10 Hz	49.43	54.00	-4.57
11.0	2462.00	Horn	H	AV	10 Hz	50.28	54.00	-3.72

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 2-28 for the plots of the 802.11n band-edge compliance.

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

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

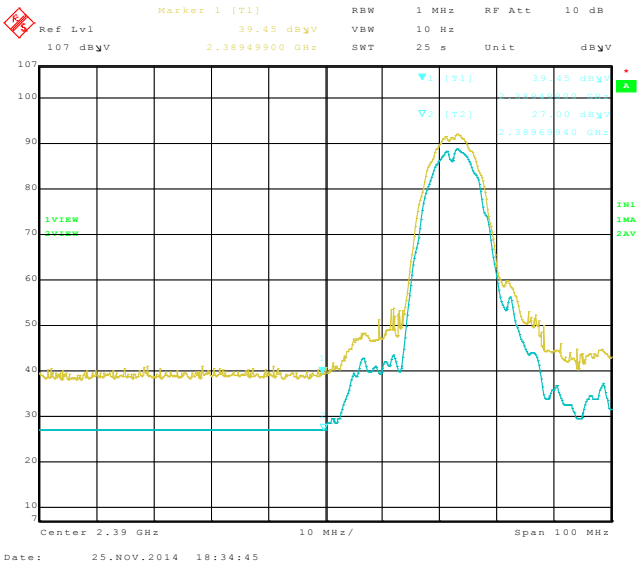


Figure 2-18: Band-Edge Compliance of RF Radiated Emission 802.11b, Channel 1, 2412 MHz, Max Pol: H, Detector: PK

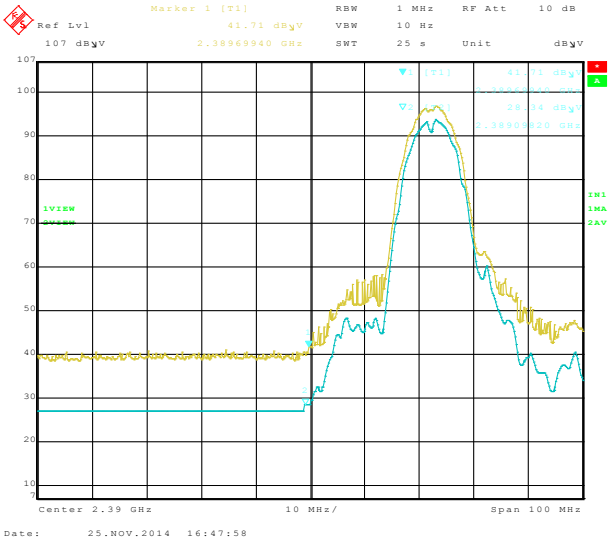


Figure 2-19: Band-Edge Compliance of RF Radiated Emission 802.11b, Channel 11, 2462 MHz, Max Pol: V, Detector: PK

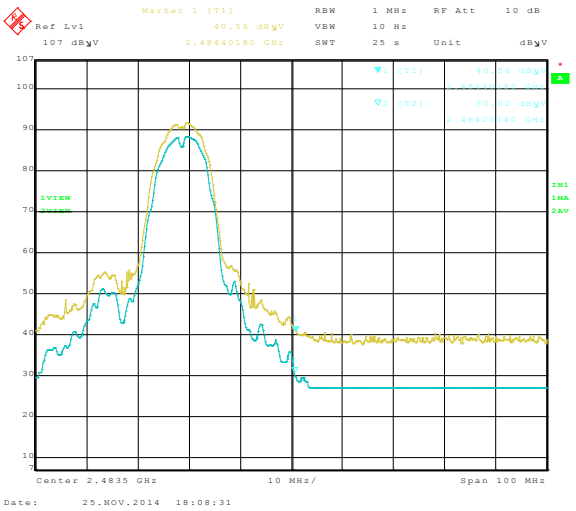


Figure 2-20: Band-Edge Compliance of RF Radiated Emission 802.11b, Channel 11, 2462 MHz, Max Pol: H, Detector: PK

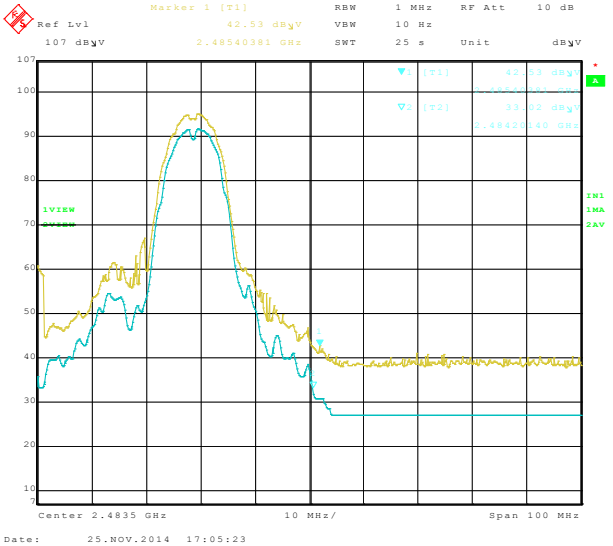


Figure 2-21: Band-Edge Compliance of RF Radiated Emission 802.11g, Channel 1, 2412 MHz, Max Pol: V, Detector: PK

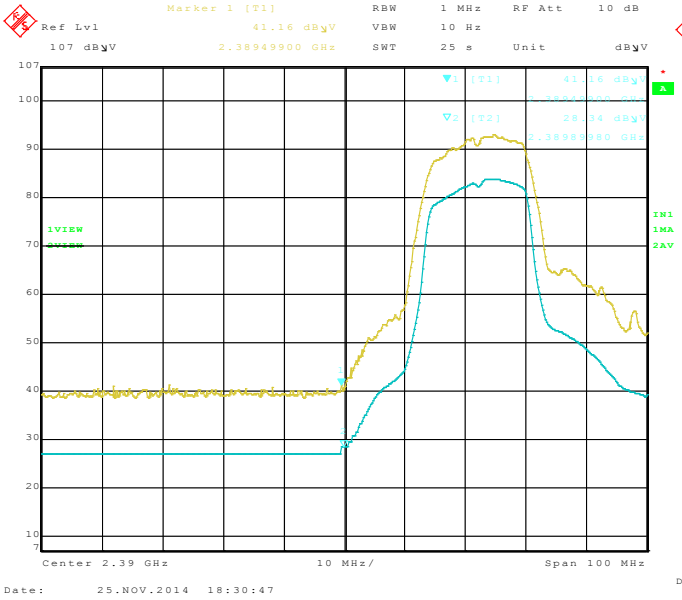


Figure 2-22: Band-Edge Compliance of RF Radiated Emission 802.11g, Channel 1, 2412 MHz, Max Pol: H, Detector: PK

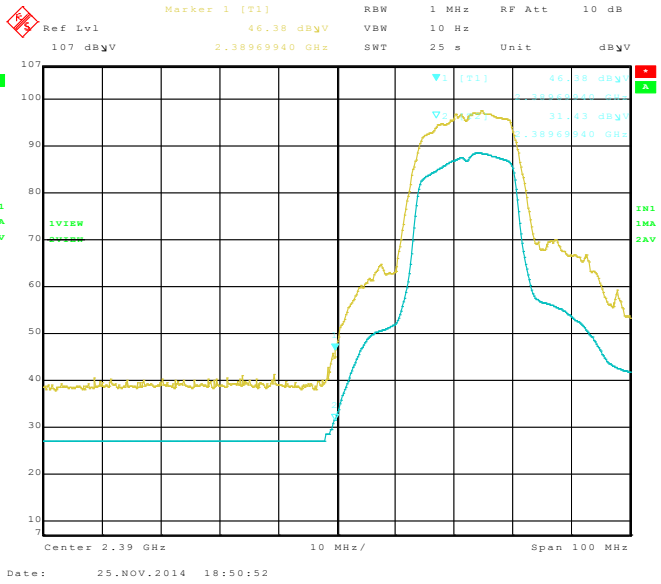


Figure 2-23: Band-Edge Compliance of RF Radiated Emission 802.11g, Channel 11, 2462 MHz, Max Pol: V, Detector: PK

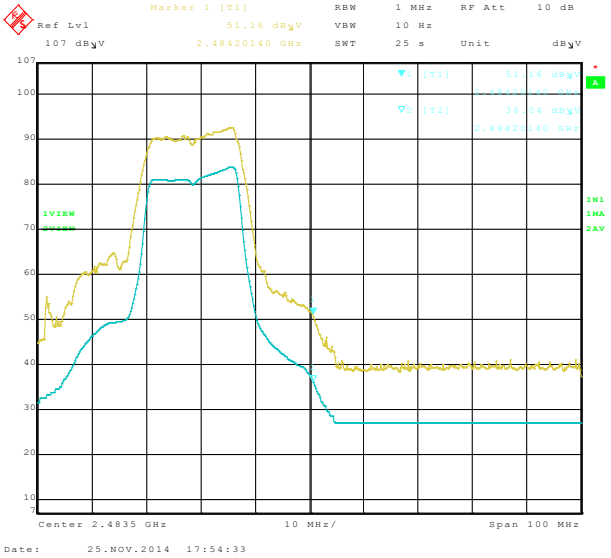


Figure 2-24: Band-Edge Compliance of RF Radiated Emission 802.11g, Channel 11, 2462 MHz, Max Pol: H, Detector: PK

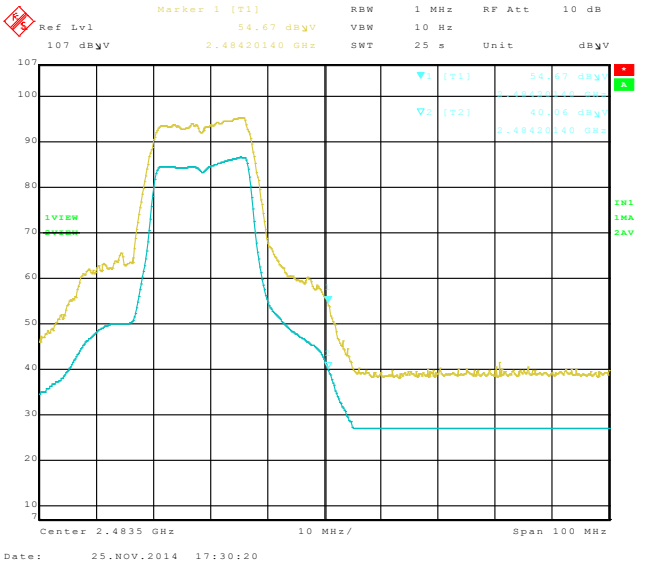


Figure 2-25: Band-Edge Compliance of RF Radiated Emission 802.11n, Channel 1, 2412 MHz, Max Pol: V, Detector: PK

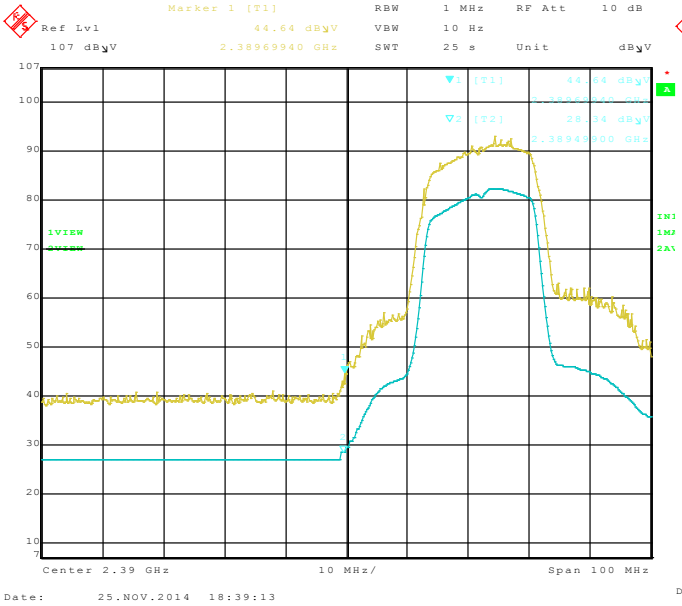


Figure 2-26: Band-Edge Compliance of RF Radiated Emission 802.11n, Channel 1, 2412 MHz, Max Pol: H, Detector: PK

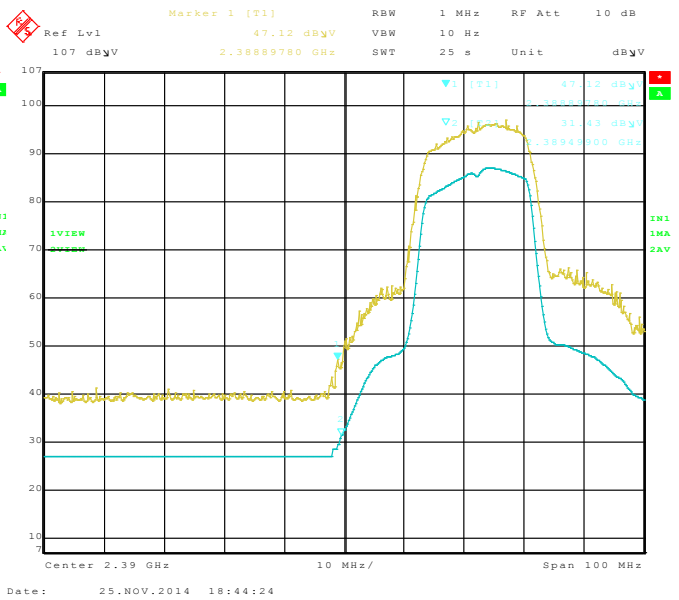


Figure 2-27: Band-Edge Compliance of RF Radiated Emission 802.11n, Channel 11, 2462 MHz, Max Pol: V, Detector: PK

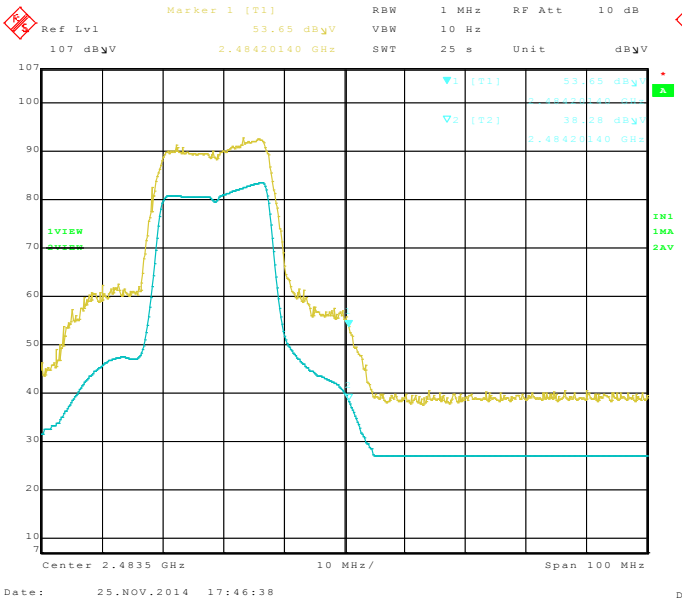
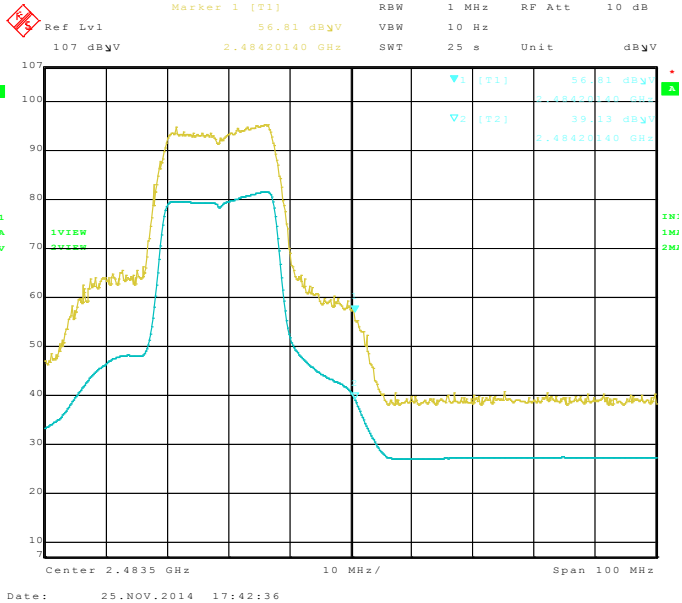


Figure 2-28: Band-Edge Compliance of RF Radiated Emission 802.11n, Channel 11, 2462 MHz, Max Pol: H, Detector: PK



APPENDIX 3 – 802.11a/n RADIATED EMISSIONS TEST DATA

Radiated Emissions Test Results
802.11a Band

Date of Test: November 19, 2014
Measurements were performed by Shiva Kumbham

The environmental test conditions were: Temperature: 22.8 ºC
Relative Humidity: 13.0 %

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

The BlackBerry® smartphone was in Volume key up 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 levels were at least 25 dB below the limit.

Radiated Emissions Test Results
802.11a Band

Date of Test: November 18, 2014 to November 25, 2014
Measurements were performed by Kevin Guo.

The environmental test conditions were: Temperature: 23.3ºC - 24.7ºC
Relative Humidity: 38% - 44%

The test distance was 3.0 meters with a EUT height of 0.8 meters, and sweep frequency of 1GHz to 40GHz.

The BlackBerry® smartphone was in Volume Key Up 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 other emission levels were at least 25 dB below the limit.

Radiated Emissions Test Results cont'd
802.11n Band

Date of Test: November 20, 2014
Measurements were performed by Shiva kumbham

The environmental test conditions were: Temperature: 22.6 ºC
Relative Humidity: 12.1 %

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

The BlackBerry® smartphone was in Volume key up position.

The frequency sweep measurements were performed in 802.11n TX mode at MCS 0 on channels 36, 38 and 151.

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

Radiated Emissions Test Results cont'd
802.11n Band

Date of Test: November 18, 2014 to November 25, 2014
Measurements were performed by Kevin Guo.

The environmental test conditions were: Temperature: 23.3ºC - 24.7ºC
Relative Humidity: 38% - 44%

The test distance was 3.0 meters with a EUT height of 0.8 meters, and sweep frequency of 1GHz to 40GHz.

The BlackBerry® smartphone was in Volume Key Up.

The frequency sweep measurements were performed in 802.11n TX mode at MCS 0 on channels 36, 48, 64, 100, 140 and 165.
All emission levels were at least 25 dB below the limit.

802.11a Band-Edge Compliance of RF Radiated Emissions

Date of Tests: November 18, 2014
Measurements performed by Shiva Kumbham.

The environmental test conditions were: Temperature: 22.4 ºC
Relative Humidity: 12.1 %
The measurements were performed on BlackBerry® smartphone in standalone, Volume key up 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 for peak (dBuV/m)	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	59.38	74.00	-14.62
36.0	5180.00	Horn	H	PK	1 MHz	66.59	74.00	-7.41
36.0	5180.00	Horn	V	AV	10 Hz	47.58	54.00	-6.42
36.0	5180.00	Horn	H	AV	10 Hz	49.26	54.00	-4.74
Centre at Band-Edge: 5350 MHz, 802.11a								
64.0	5320.00	Horn	V	PK	1 MHz	63.41	74.00	-10.59
64.0	5320.00	Horn	H	PK	1 MHz	69.79	74.00	-4.21
64.0	5320.00	Horn	V	AV	10 Hz	49.48	54.00	-4.52
64.0	5320.00	Horn	H	AV	10 Hz	52.24	54.00	-1.76

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

Channel	Freq.	Rx Antenna		Detector	VBW for peak (dBuV/m)	Corrected Band edge	Limit	Diff. To Limit
	(MHz)	Type	POL.	(MHz)		(dBuV/m)	(dBuV/m)	(dB)
Centre at Band-Edge: 5470 MHz, 802.11a								
100.0	5500.00	Horn	V	PK	1 MHz	64.65	74.00	-9.35
100.0	5500.00	Horn	H	PK	1 MHz	63.59	74.00	-10.41
100.0	5500.00	Horn	V	AV	10 Hz	49.19	54.00	-4.81
100.0	5500.00	Horn	H	AV	10 Hz	50.35	54.00	-3.65
Centre at Band-Edge: 5725 MHz, 802.11a								
140.0	5700.00	Horn	V	PK	1 MHz	62.81	68.20	-5.39
140.0	5700.00	Horn	H	PK	1 MHz	62.57	68.20	-5.63

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

802.11n Band-Edge Compliance of RF Radiated Emissions

Date of Tests: November 18, 2014
Measurements performed by Shiva Kumbham.

The environmental test conditions were: Temperature: 22.4 ºC
Relative Humidity: 12.1 %

The measurements were performed on BlackBerry® smartphone in standalone, volume key up 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.

Bandwidth 20MHz

Channel	Freq.	Rx Antenna		Detector	VBW for peak (dBuV/m)	Corrected Band edge	Limit	Diff. To Limit
	(MHz)	Type	POL.	(MHz)		(dBuV/m)	(dBuV/m)	(dB)
Centre at Band-Edge: 5150 MHz, 802.11n								
36.0	5180.00	Horn	V	PK	1 MHz	62.50	74.00	-11.50
36.0	5180.00	Horn	H	PK	1 MHz	70.88	74.00	-3.12
36.0	5180.00	Horn	V	AV	10 Hz	47.58	54.00	-6.42
36.0	5180.00	Horn	H	AV	10 Hz	49.26	54.00	-4.74
Centre at Band-Edge: 5350 MHz, 802.11n								
64.0	5320.00	Horn	V	PK	1 MHz	61.92	74.00	-12.08
64.0	5320.00	Horn	H	PK	1 MHz	67.18	74.00	-6.82
64.0	5320.00	Horn	V	AV	10 Hz	48.32	54.00	-5.68
64.0	5320.00	Horn	H	AV	10 Hz	50.00	54.00	-4.00

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

Bandwidth 20MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW for peak (dBuV/m)	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	65.88	74.00	-8.12
100.0	5500.00	Horn	H	PK	1 MHz	68.97	74.00	-5.03
100.0	5500.00	Horn	V	AV	10 Hz	49.79	54.00	-4.21
100.0	5500.00	Horn	H	AV	10 Hz	50.35	54.00	-3.65
Centre at Band-Edge: 5725 MHz, 802.11n								
140.0	5700.00	Horn	V	PK	1 MHz	63.96	68.20	-4.24
140.0	5700.00	Horn	H	PK	1 MHz	63.49	68.20	-4.71

Bandwidth 40MHz

Channel	Freq. (MHz)	Rx Antenna Type	Rx Antenna POL.	Detector (MHz)	VBW for peak (dBuV/m)	Corrected Band edge (dBuV/m)	Limit (dBuV/m)	Diff. To Limit (dB)
Centre at Band-Edge: 5150 MHz, 802.11n								
38.0	5180.00	Horn	V	PK	1 MHz	60.78	74.00	-13.22
38.0	5180.00	Horn	H	PK	1 MHz	68.04	74.00	-5.96
38.0	5180.00	Horn	V	AV	10 Hz	47.58	54.00	-6.42
38.0	5180.00	Horn	H	AV	10 Hz	50.23	54.00	-3.77
Centre at Band-Edge: 5350 MHz, 802.11n								
62.0	5320.00	Horn	V	PK	1 MHz	62.81	74.00	-11.19
62.0	5320.00	Horn	H	PK	1 MHz	69.41	74.00	-4.59
62.0	5320.00	Horn	V	AV	10 Hz	48.92	54.00	-5.08
62.0	5320.00	Horn	H	AV	10 Hz	51.42	54.00	-2.58
Centre at Band-Edge: 5470 MHz, 802.11n								
102.00	5510.0	Horn	V	PK	1MHZ	66.78	74.00	-7.22
102.00	5510.0	Horn	H	PK	1 MHz	69.75	74.00	-4.25
102.00	5510.0	Horn	V	AV	10 Hz	50.87	54.00	-3.13
102.00	5510.0	Horn	H	AV	10 Hz	53.11	54.00	-0.89

See figures 3-9 to 3-22 for the plots of the 802.11n band-edge compliance.

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

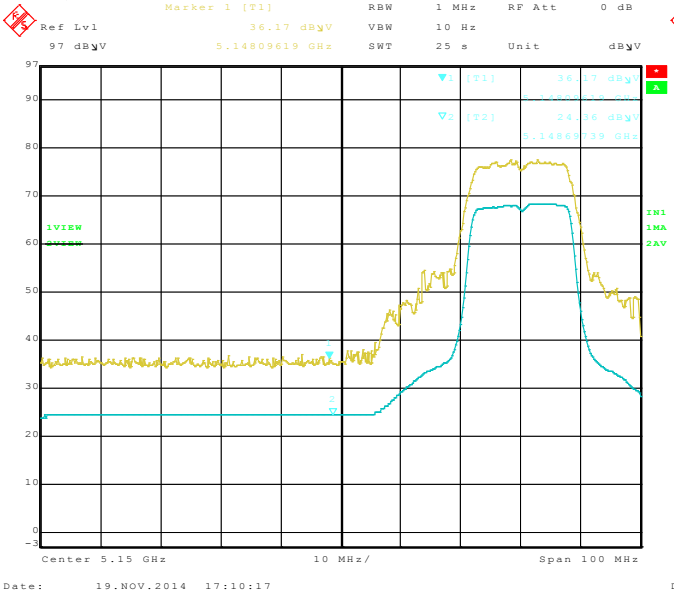


Figure 3-2: Band-Edge Compliance of RF Radiated Emission 802.11a, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz Pol: H, Detector: PK

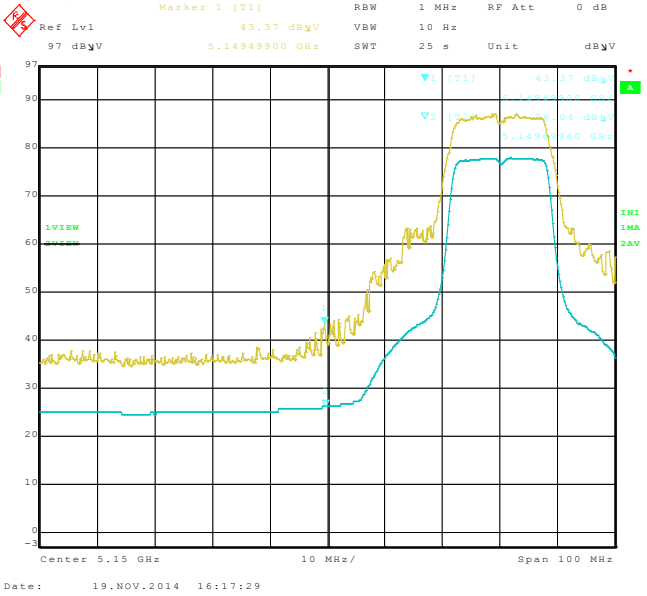


Figure 3-3: Band-Edge Compliance of RF Radiated Emission 802.11a, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz Pol: V, Detector: PK

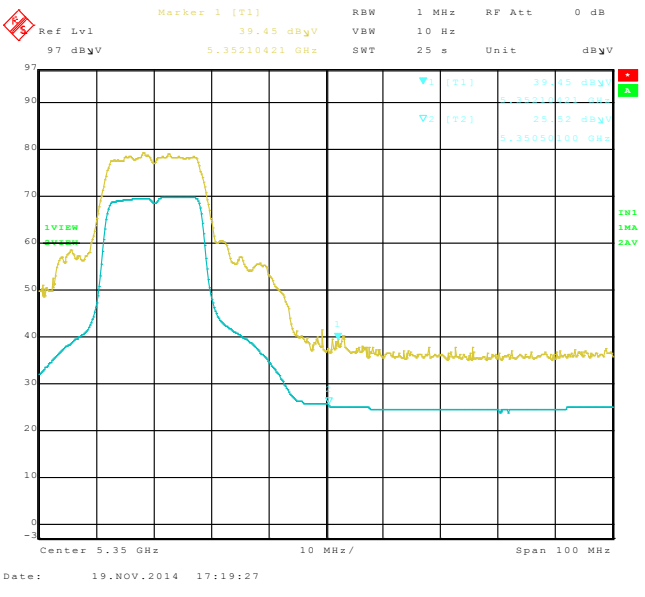
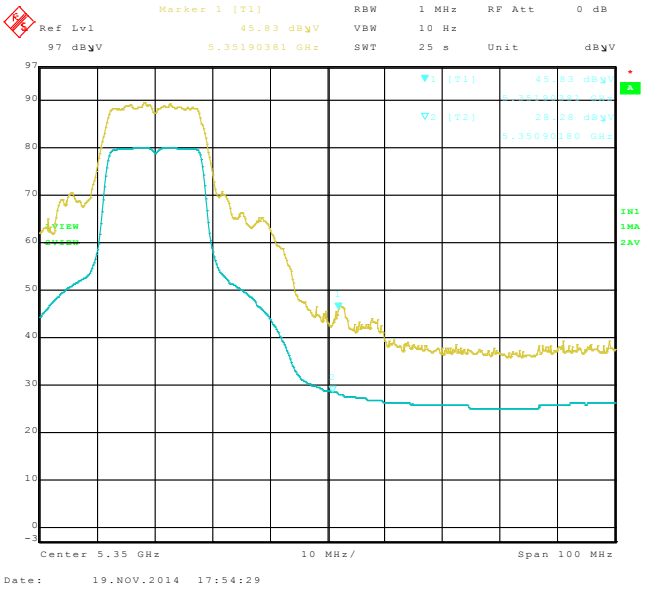


Figure 3-4: Band-Edge Compliance of RF Radiated Emission 802.11a, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz Pol: H, Detector: PK



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

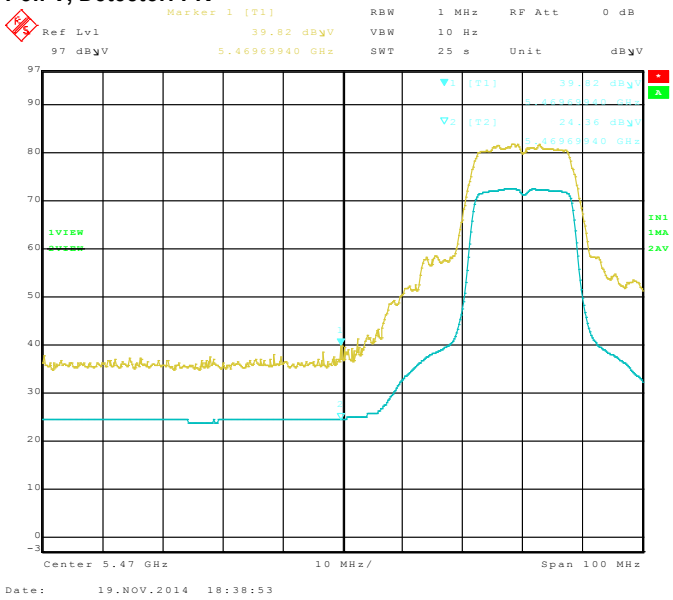


Figure 3-6: Band-Edge Compliance of RF Radiated Emission. 802.11a, Ch. 100, 5500 MHz, Centre of Band-Edge: 5460 MHz Pol: H, Detector: PK

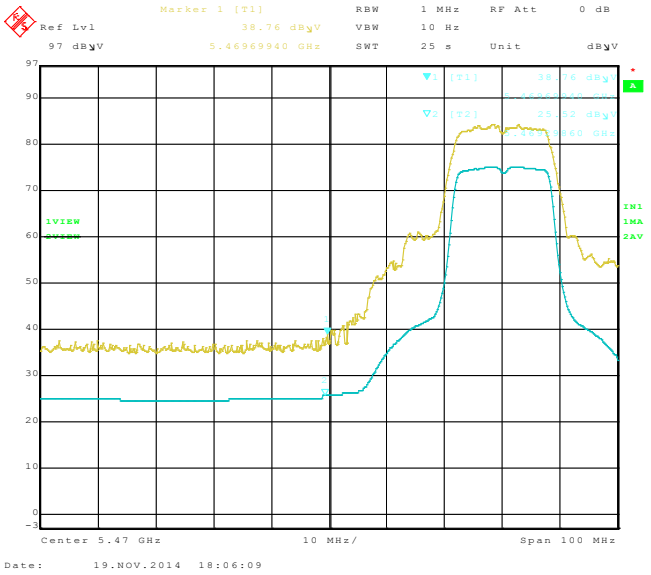


Figure 3-7: Band-Edge Compliance of RF Radiated Emission. 802.11a, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz Pol: V, Detector: PK

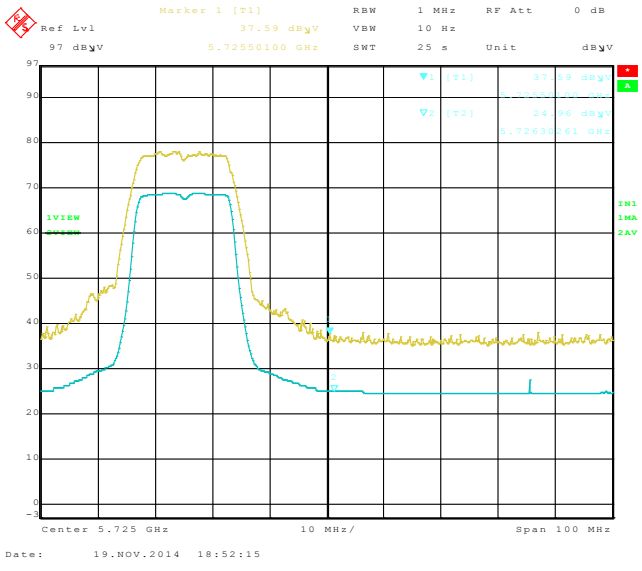
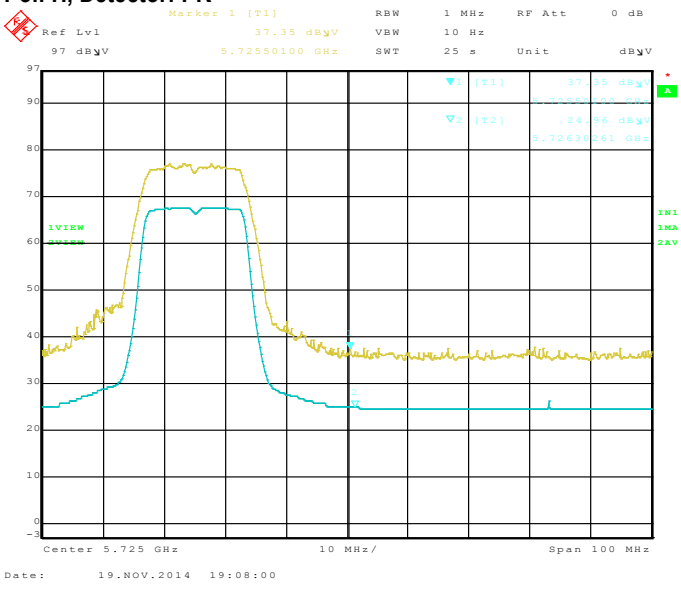


Figure 3-8: Band-Edge Compliance of RF Radiated Emission. 802.11a, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz Pol: H, Detector: PK



802.11n Band-Edge Compliance of RF Radiated Emissions

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

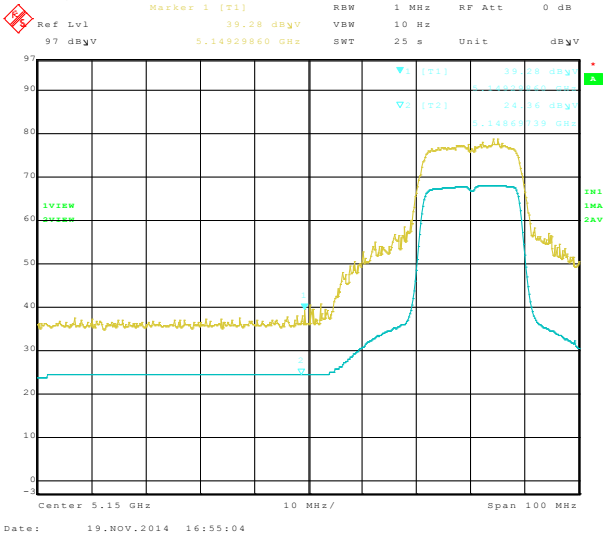


Figure 3-10: Band-Edge Compliance of RF Radiated Emission 802.11n, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz Pol: H, Detector: PK

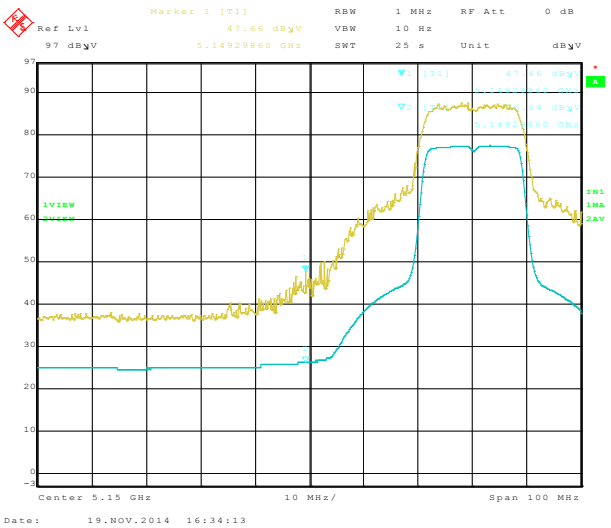


Figure 3-11: Band-Edge Compliance of RF Radiated Emission 802.11n, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz Pol: V, Detector: PK

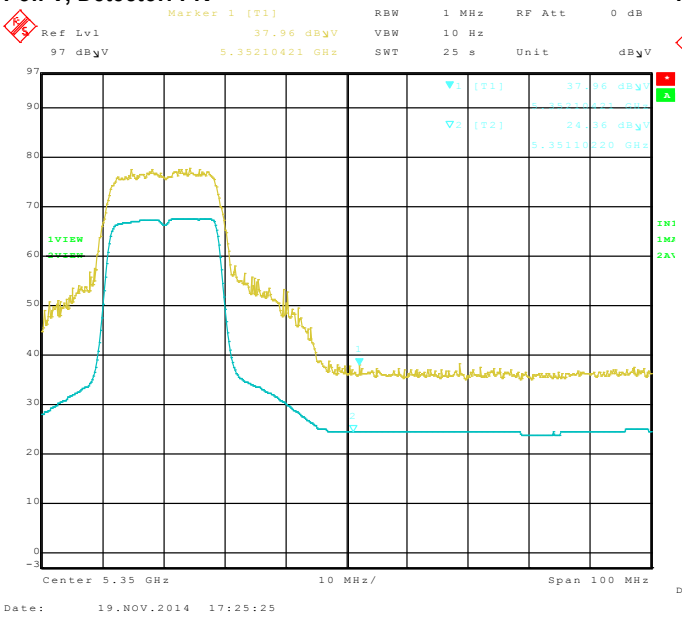
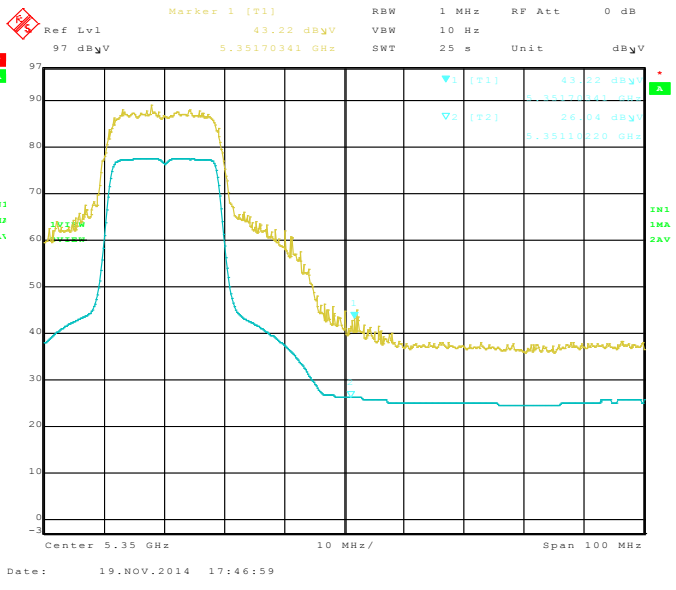


Figure 3-12: Band-Edge Compliance of RF Radiated Emission 802.11n Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz Pol: H, Detector: PK



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

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

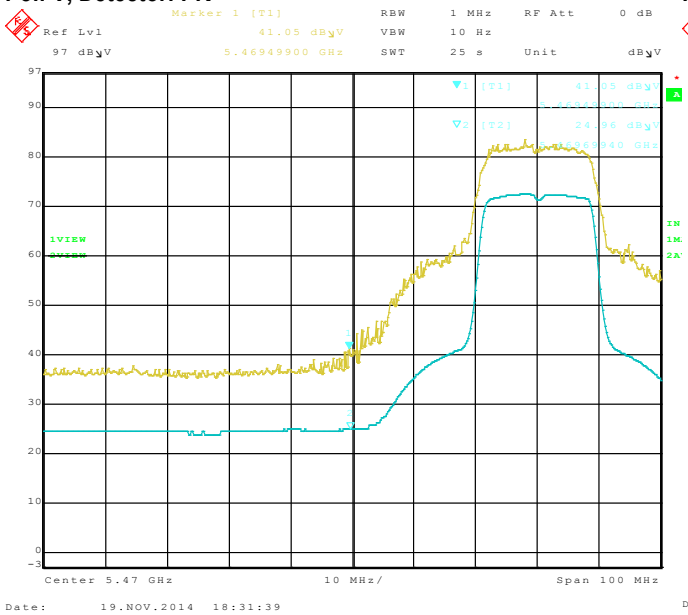


Figure 3-14: Band-Edge Compliance of RF Radiated Emission. 802.11n, Ch. 100, 5500 MHz, Centre of Band-Edge: 5460 MHz Pol: H, Detector: PK

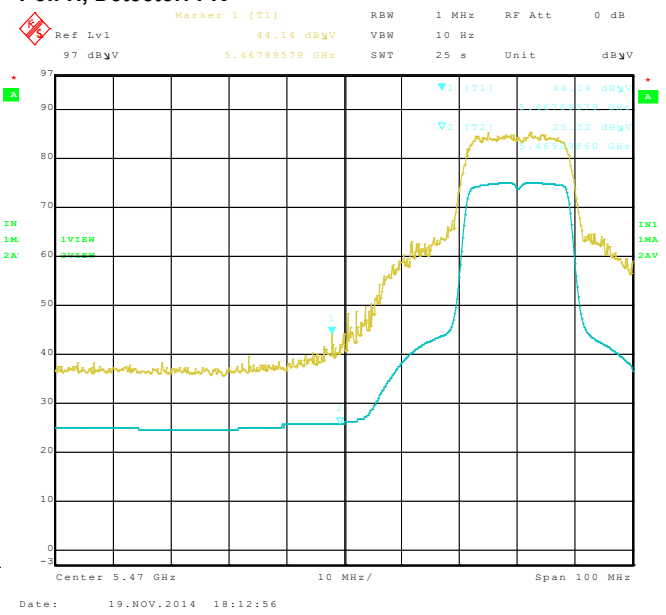


Figure 3-15: Band-Edge Compliance of RF Radiated Emission. 802.11n, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz Pol: V, Detector: PK

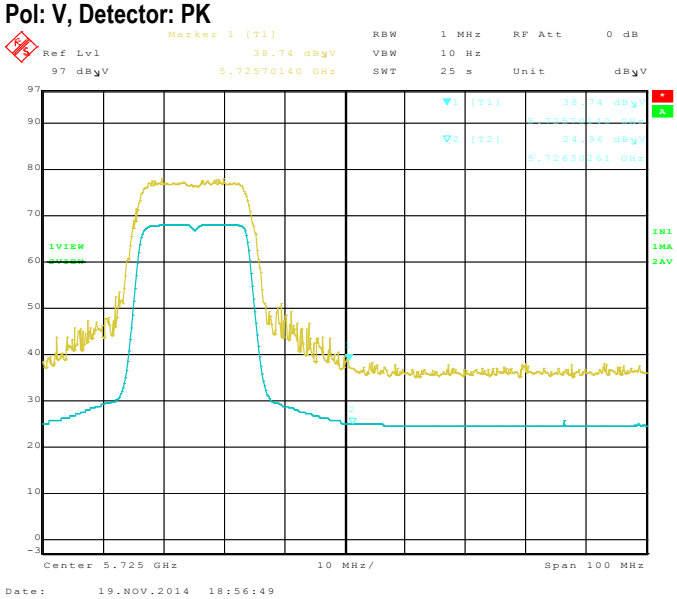
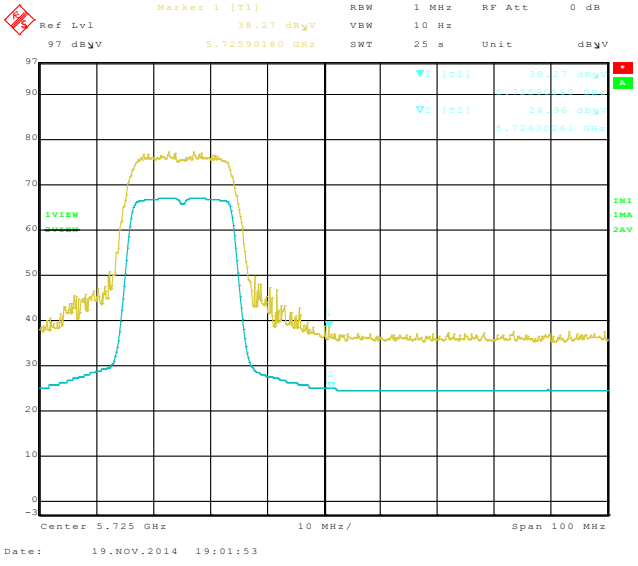


Figure 3-16: Band-Edge Compliance of RF Radiated Emission. 802.11n, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz Pol: H, Detector: PK



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

40 MHz BW

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

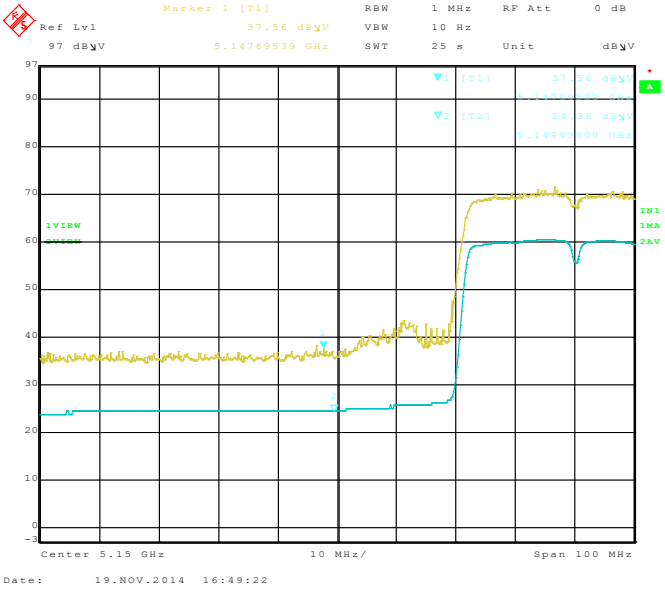


Figure 3-18: Band-Edge Compliance of RF Radiated Emission. 802.11n, Ch. 38, 5190 MHz, Centre of Band-Edge: 5150 MHz Pol: H, Detector: PK

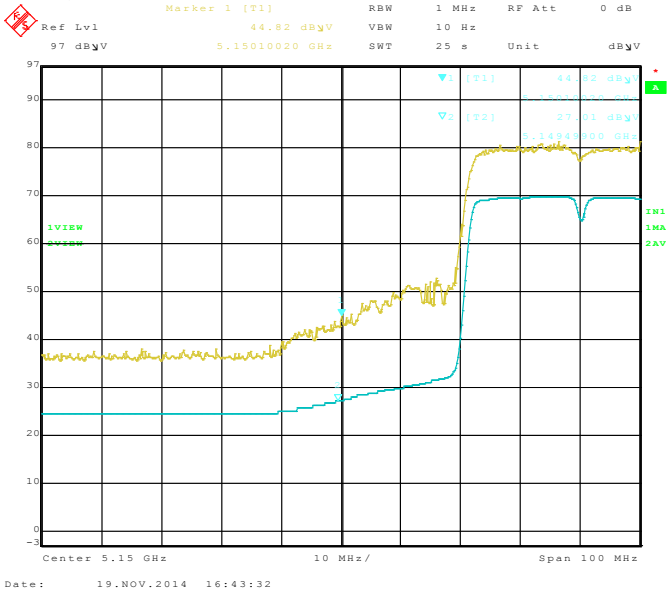


Figure 3-19: Band-Edge Compliance of RF Radiated Emission. 802.11n, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz Pol: V, Detector: PK

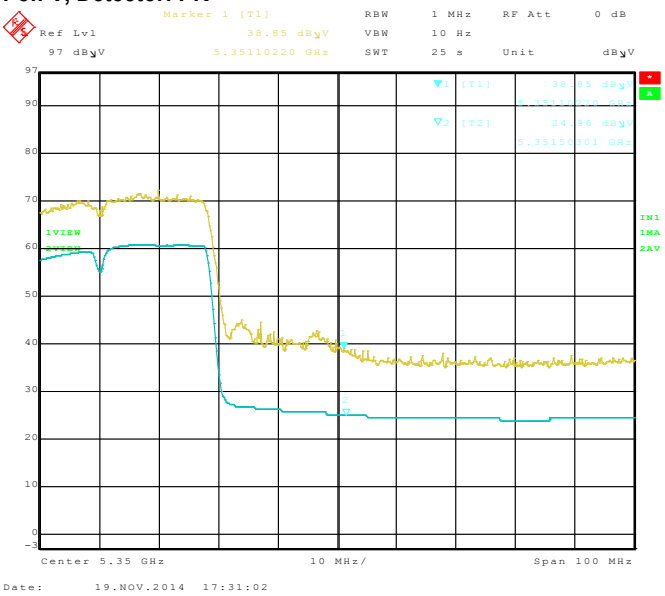


Figure 3-20: Band-Edge Compliance of RF Radiated Emission. 802.11n, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz Pol: H, Detector: PK

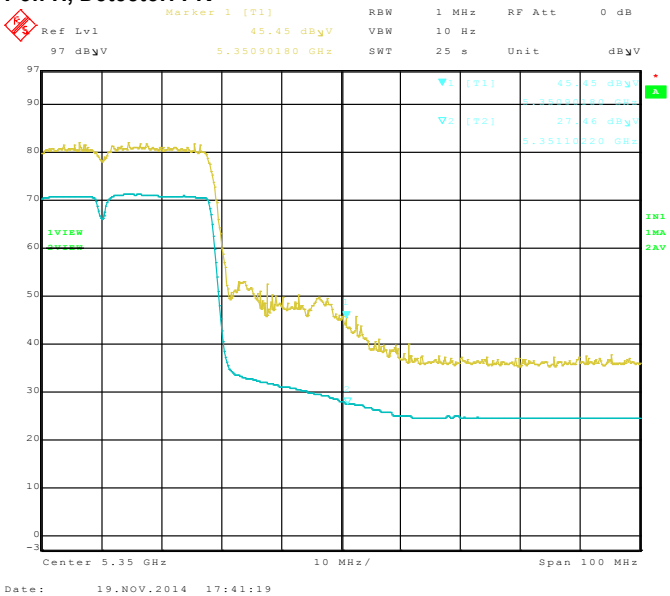


Figure 3-21: Band-Edge Compliance of RF Radiated Emission 802.11n, Ch. 102, 5510 MHz, Centre of Band-Edge: 5470 MHz Pol: V, Detector: PK

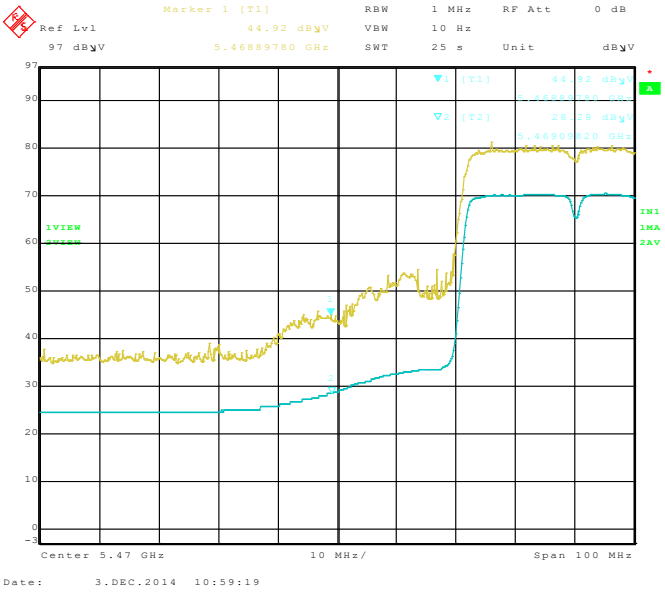
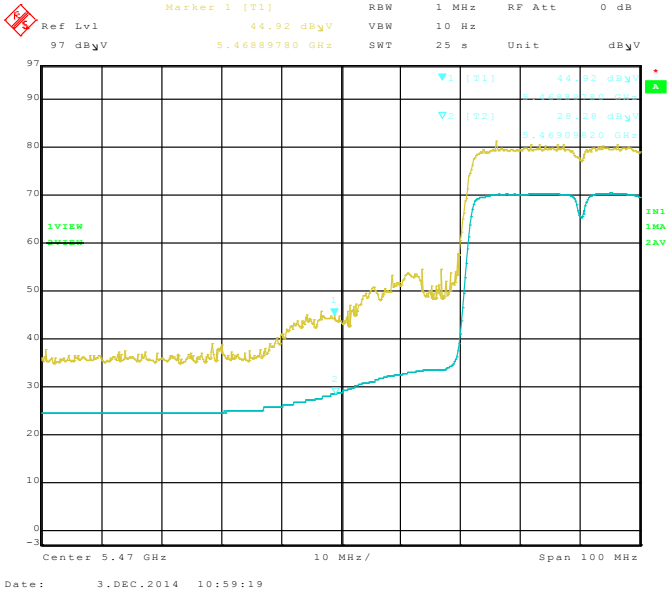


Figure 3-22: Band-Edge Compliance of RF Radiated Emission. 802.11n, Ch. 102, 5510 MHz, Centre of Band-Edge: 5470 MHz Pol: H, Detector: PK



APPENDIX 4 – 802.11ac RADIATED EMISSIONS TEST DATA

Radiated Emissions Test Results
802.11ac Band

Date of Test: November 21, 2014
Measurements were performed by Shiva Kumbham

The environmental test conditions were: Temperature: 22.6 ºC
Relative Humidity: 9.6 %

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

The BlackBerry® smartphone was in volume key up position.

The frequency sweep measurements were performed in 802.11ac TX mode at 6 Mbps on channel 36, bandwidth 20MHz; channel 38 and 151, bandwidth 40MHz; and channel 138, bandwidth 80MHz.

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

Radiated Emissions Test Results
802.11ac Band

Date of Test: November 18, 2014 to November 25, 2014
Measurements were performed by Kevin Guo.

The environmental test conditions were: Temperature: 23.3ºC - 24.7ºC
Relative Humidity: 38% - 44%

The test distance was 3.0 meters with a EUT height of 0.8 meters, and sweep frequency of 1GHz to 40GHz.

The BlackBerry® smartphone was volume key up position.

The frequency sweep measurements were performed in 802.11ac TX mode at 6 Mbps on channel 36, bandwidth 20MHz; channel 38 and 151, bandwidth 40MHz; and channel 138, bandwidth 80MHz.

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

802.11ac Band-Edge Compliance of RF Radiated Emissions

Date of Tests: November 18, 2014
Measurements performed by Savtej Sandhu.

The environmental test conditions were: Temperature: 23.3 ºC
Relative Humidity: 10 %

The measurements were performed on BlackBerry® smartphone in standalone, Vertical Down 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.

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	37.43	60.65	74.00	-13.35
36.0	5180.00	Horn	H	PK	1 MHz	41.62	64.84	74.00	-9.16
36.0	5180.00	Horn	V	AV	10 Hz	24.36	47.58	54.00	-6.42
36.0	5180.00	Horn	H	AV	10 Hz	26.04	49.26	54.00	-4.74
Centre at Band-Edge: 5350 MHz, 802.11ac									
64.0	5320.00	Horn	V	PK	1 MHz	38.36	62.32	74.00	-11.68
64.0	5320.00	Horn	H	PK	1 MHz	41.46	65.42	74.00	-8.58
64.0	5320.00	Horn	V	AV	10 Hz	24.96	48.92	54.00	-5.08
64.0	5320.00	Horn	H	AV	10 Hz	25.52	49.48	54.00	-4.52

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

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: 5470 MHz, 802.11ac									
100	5500	Horn	V	PK	1 MHz	38.33	63.16	74.00	-10.84
100	5500	Horn	H	PK	1 MHz	37.70	62.53	74.00	-11.47
100	5500	Horn	V	AV	10 Hz	24.36	49.19	54.00	-4.81
100	5500	Horn	H	AV	10 Hz	24.36	49.19	54.00	-4.81
Centre at Band-Edge: 5725 MHz, 802.11ac									
140	5700	Horn	V	PK	1 MHz	38.05	63.27	68.20	-4.93
140	5700	Horn	H	PK	1 MHz	37.02	62.24	68.20	-5.96

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

Bandwidth 40MHz

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									
38.0	5190.00	Horn	V	PK	1 MHz	37.59	60.81	74.00	-13.19
38.0	5190.00	Horn	H	PK	1 MHz	41.74	64.96	74.00	-9.04
38.0	5190.00	Horn	V	AV	10 Hz	24.96	48.18	54.00	-5.82
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	37.44	61.40	74.00	-12.60
62.0	5310.00	Horn	H	PK	1 MHz	41.27	65.23	74.00	-8.77
62.0	5310.00	Horn	V	AV	10 Hz	25.52	49.48	54.00	-4.52
62.0	5310.00	Horn	H	AV	10 Hz	26.54	50.50	54.00	-3.50
Centre at Band-Edge: 5470 MHz, 802.11ac									
102.0	5510.0	Horn	V	PK	1 MHz	40.27	65.10	74.00	-8.90
102.0	5510.0	Horn	H	PK	1 MHz	40.38	65.21	74.00	-8.79
102.0	5510.0	Horn	V	AV	10 Hz	26.04	50.87	54.00	-3.13
102.0	5510.0	Horn	H	AV	10 Hz	26.04	50.87	54.00	-3.13

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

Bandwidth 80MHz

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									
42.0	5210.00	Horn	V	PK	1 MHz	38.00	61.22	74.00	-12.78
42.0	5210.00	Horn	H	PK	1 MHz	41.96	65.18	74.00	-8.82
42.0	5210.00	Horn	V	AV	10 Hz	24.36	47.58	54.00	-6.42
42.0	5210.00	Horn	H	AV	10 Hz	26.54	49.76	54.00	-4.24
Centre at Band-Edge: 5350 MHz, 802.11ac									
58.0	5290.00	Horn	V	PK	1 MHz	37.79	61.75	74.00	-12.25
58.0	5290.00	Horn	H	PK	1 MHz	41.74	65.70	74.00	-8.30
58.0	5290.00	Horn	V	AV	10 Hz	26.04	50.00	54.00	-4.00
58.0	5290.00	Horn	H	AV	10 Hz	27.88	51.84	54.00	-2.16
Centre at Band-Edge: 5470 MHz, 802.11ac									
106.0	5530.0	Horn	V	PK	1 MHz	42.44	67.27	74.00	-6.73
106.0	5530.0	Horn	H	PK	1 MHz	44.88	69.71	74.00	-4.29
106.0	5530.0	Horn	V	AV	10 Hz	26.54	51.37	54.00	-2.63
106.0	5530.0	Horn	H	AV	10 Hz	28.28	53.11	54.00	-0.89

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

Bandwidth 20MHz

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

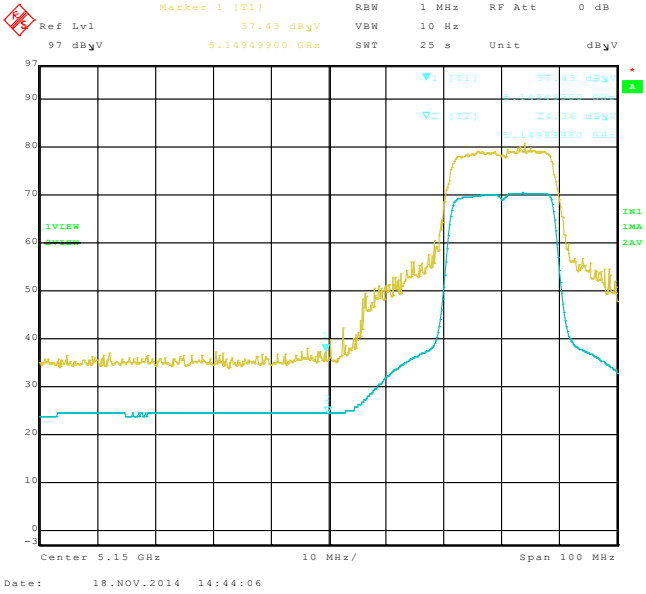


Figure 4-2: Band-Edge Compliance of RF Radiated Emission 802.11ac, Ch. 36, 5180 MHz, Centre of Band-Edge: 5150 MHz Pol: H, Detector: PK

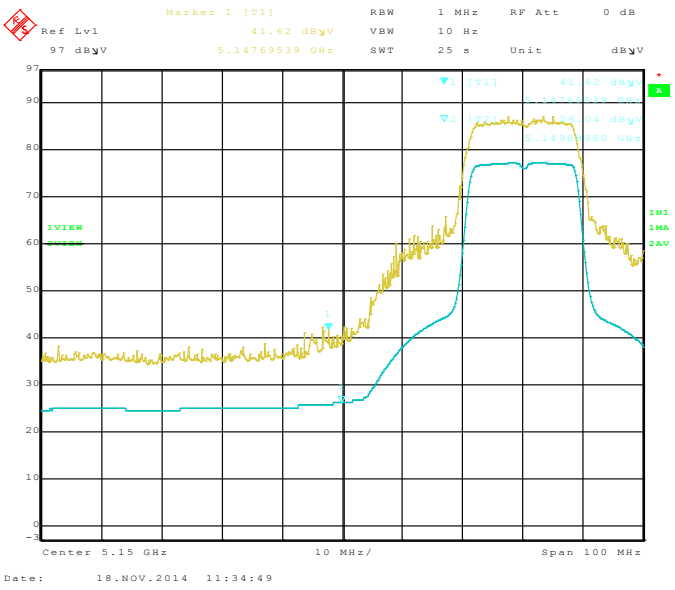


Figure 4-3: Band-Edge Compliance of RF Radiated Emission 802.11ac, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz Pol: V, Detector: PK

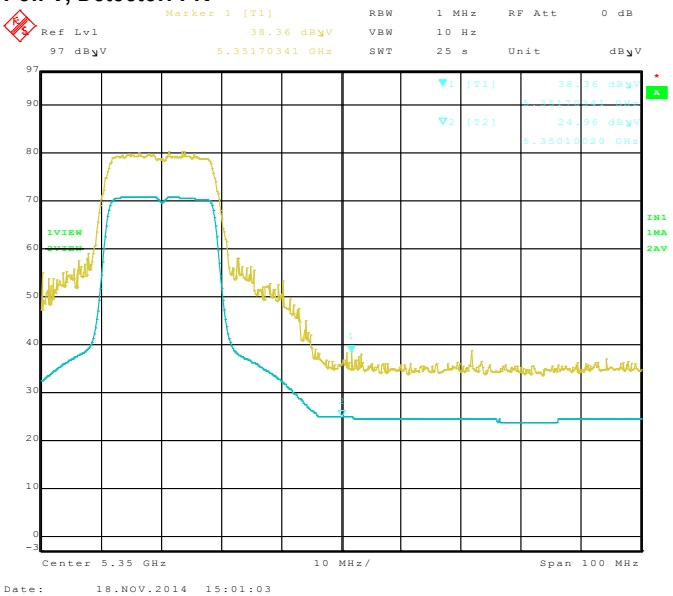
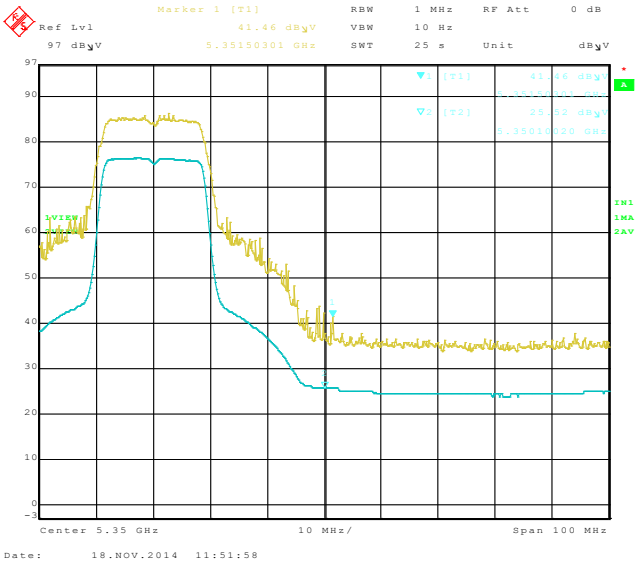


Figure 4-4: Band-Edge Compliance of RF Radiated Emission 802.11ac, Ch. 64, 5320 MHz, Centre of Band-Edge: 5350 MHz Pol: H, Detector: PK



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

Bandwidth 20MHz

Figure 4-5: Band-Edge Compliance of RF Radiated Emission 802.11ac, Ch. 100, 5500 MHz, Centre of Band-Edge: 5460 MHz Pol: V, Detector: PK

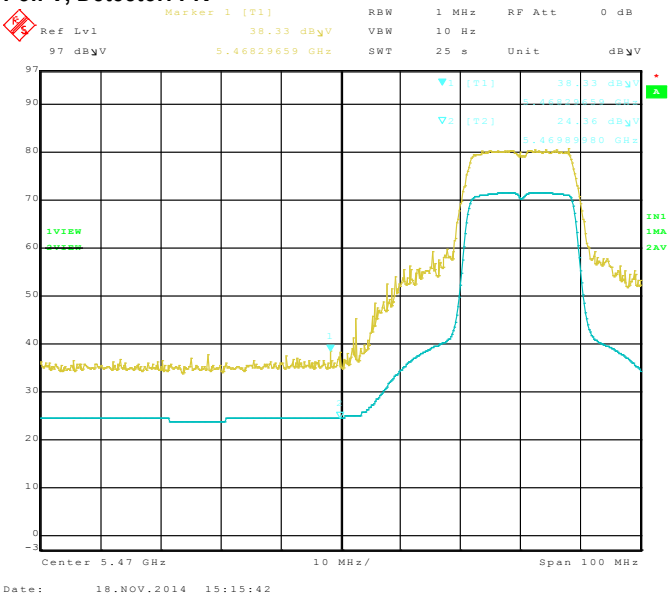


Figure 4-6: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Ch. 100, 5500 MHz, Centre of Band-Edge: 5460 MHz Pol: H, Detector: PK

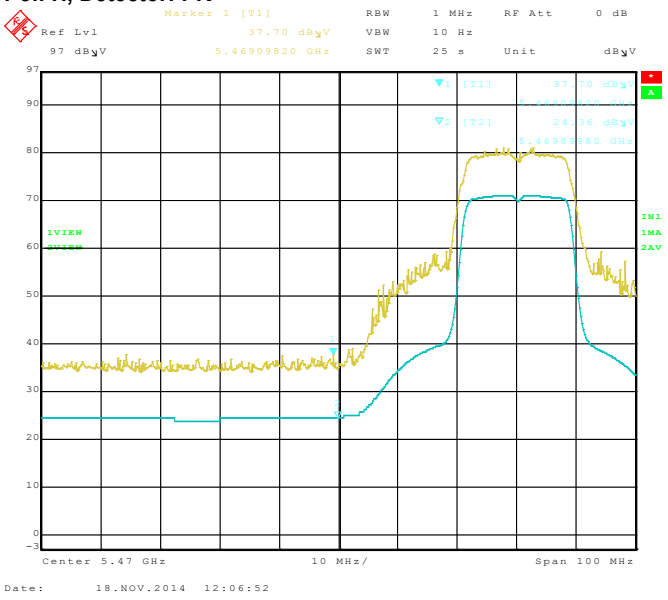


Figure 4-7: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz Pol: V, Detector: PK

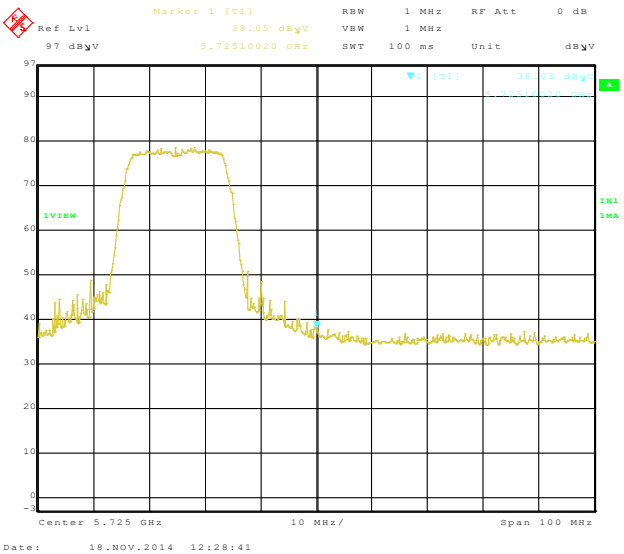
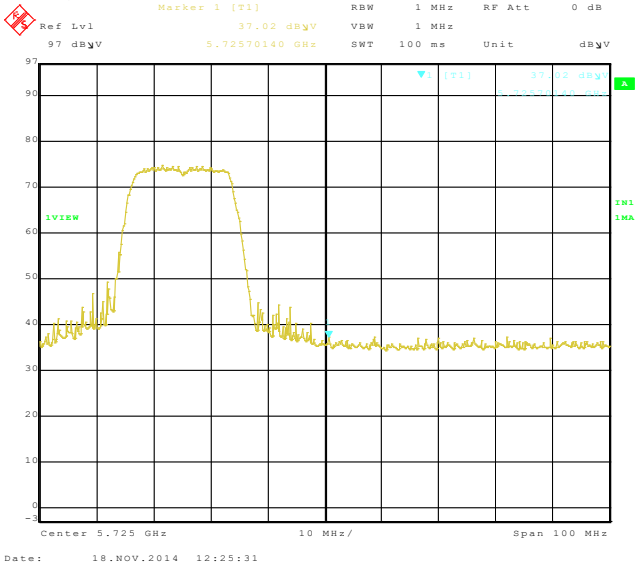


Figure 4-8: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Ch. 140, 5700 MHz, Centre of Band-Edge: 5725 MHz Pol: H, Detector: PK



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

Bandwidth 40MHz

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

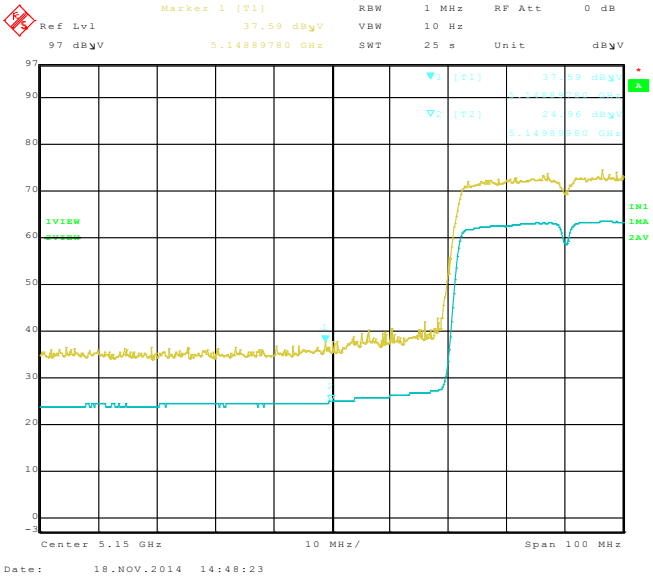


Figure 4-10: Band-Edge Compliance of RF Radiated Emission 802.11ac, Ch. 38, 5190 MHz, Centre of Band-Edge: 5150 MHz Pol: H, Detector: PK

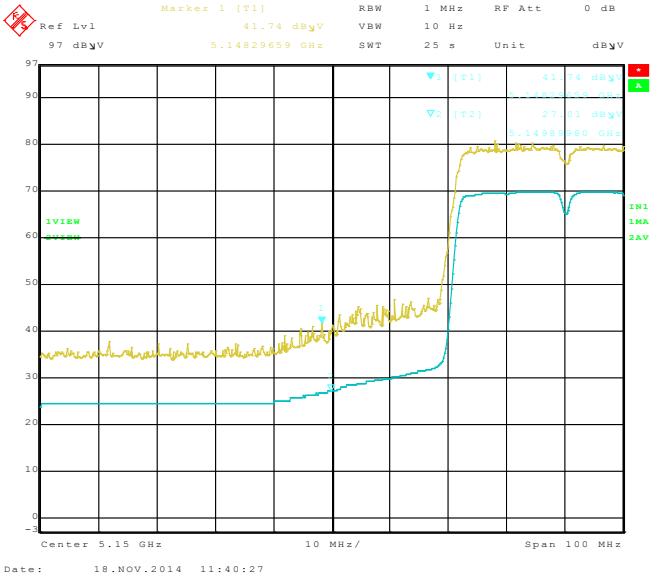


Figure 4-11: Band-Edge Compliance of RF Radiated Emission 802.11ac, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz Pol: V, Detector: PK

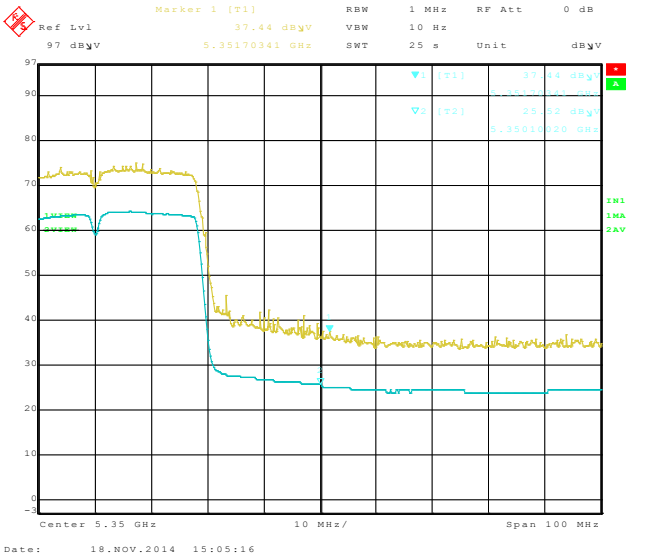
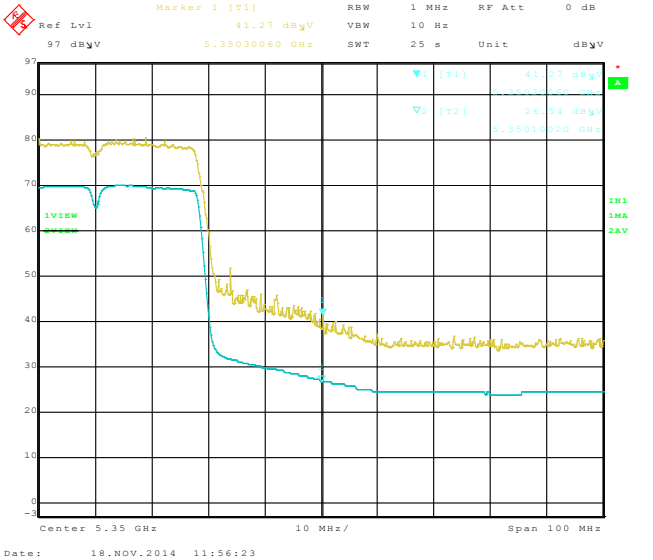


Figure 4-12: Band-Edge Compliance of RF Radiated Emission 802.11ac, Ch. 62, 5310 MHz, Centre of Band-Edge: 5350 MHz Pol: H, Detector: PK



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

Bandwidth 40MHz

Figure 4-13: Band-Edge Compliance of RF Radiated Emission 802.11ac, Ch. 102, 5510 MHz, Centre of Band-Edge: 5460 MHz Pol: V, Detector: PK

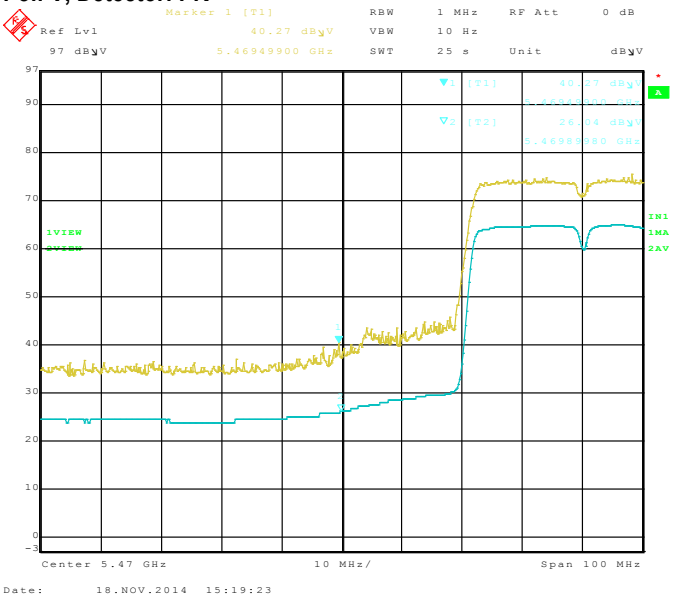
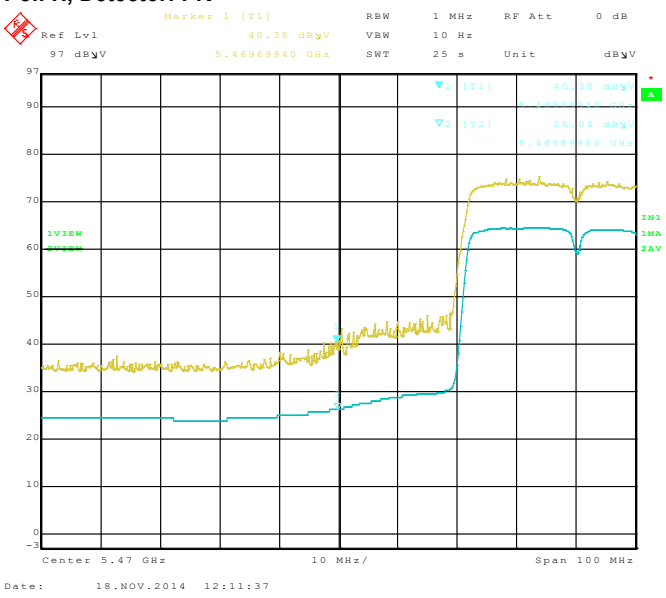


Figure 4-14: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Ch. 102, 5510 MHz, Centre of Band-Edge: 5460 MHz Pol: H, Detector: PK



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

Bandwidth 80MHz

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

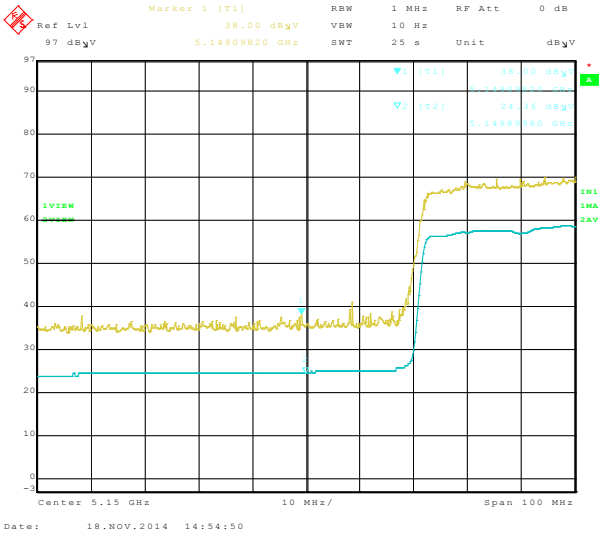


Figure 4-16: Band-Edge Compliance of RF Radiated Emission 802.11ac, Ch. 42, 5210 MHz, Centre of Band-Edge: 5150 MHz Pol: H, Detector: PK

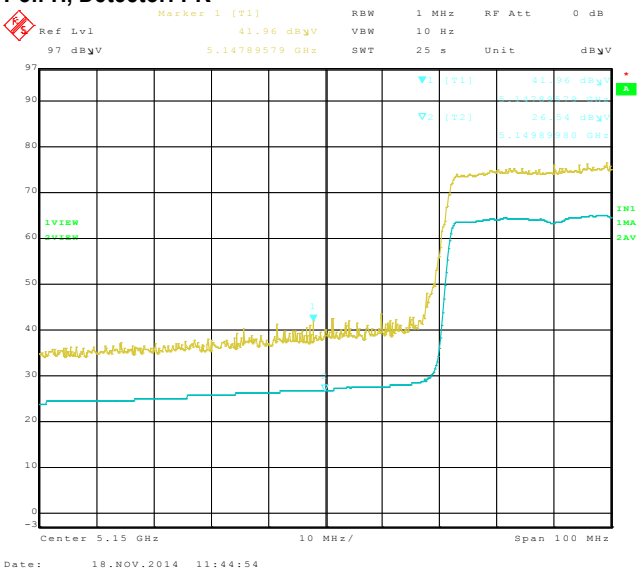


Figure 4-17: Band-Edge Compliance of RF Radiated Emission 802.11ac, Ch. 58, 5290 MHz, Centre of Band-Edge: 5350 MHz Pol: V, Detector: PK

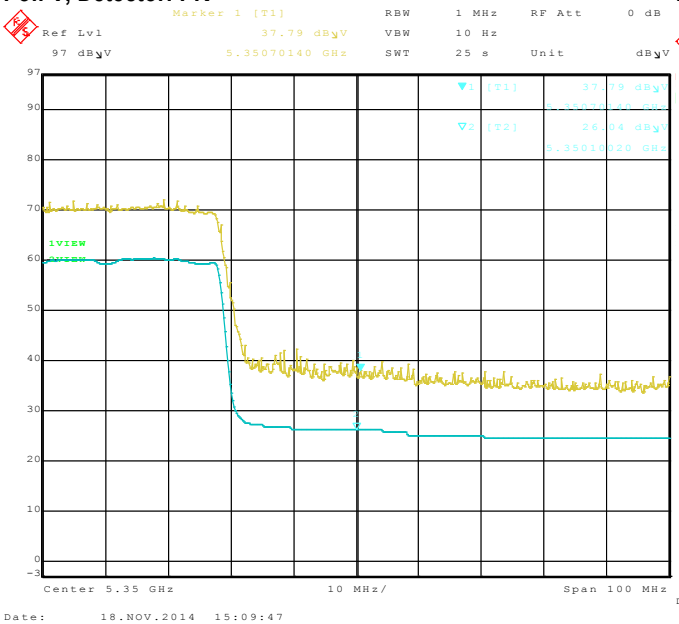
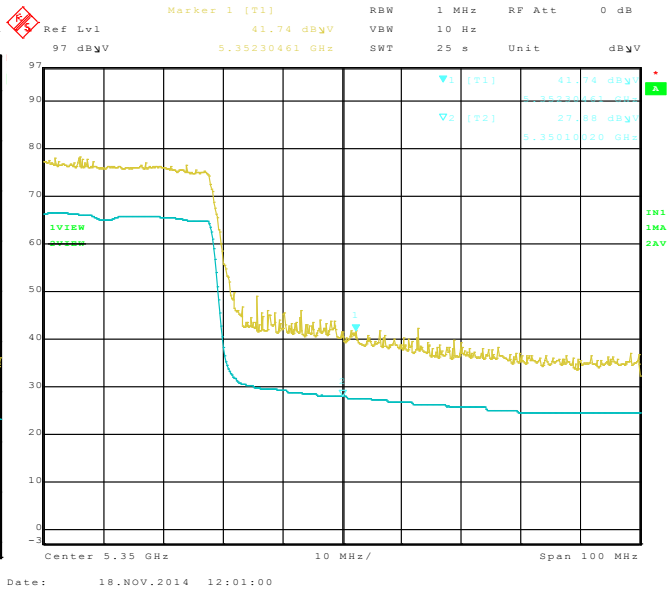


Figure 4-18: Band-Edge Compliance of RF Radiated Emission 802.11ac, Ch. 58, 5290 MHz, Centre of Band-Edge: 5350 MHz Pol: H, Detector: PK



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

Bandwidth 80MHz

Figure 4-19: Band-Edge Compliance of RF Radiated Emission 802.11ac, Ch. 106, 5530 MHz, Centre of Band-Edge: 5460 MHz Pol: V, Detector: PK

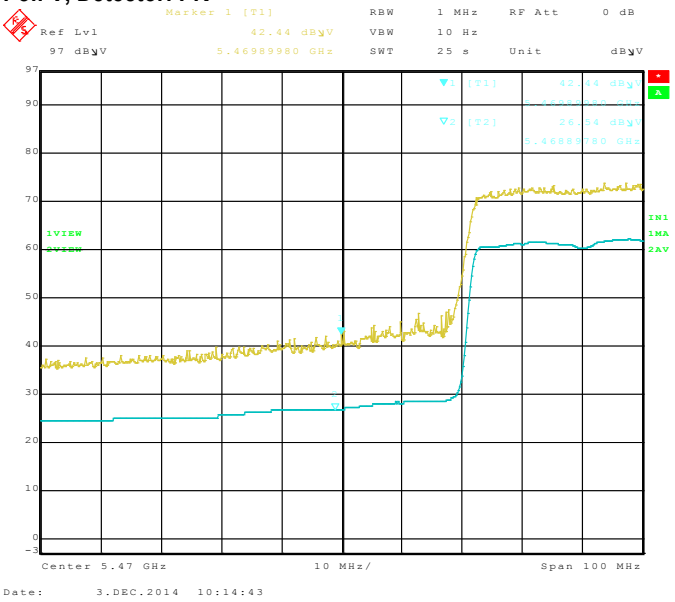
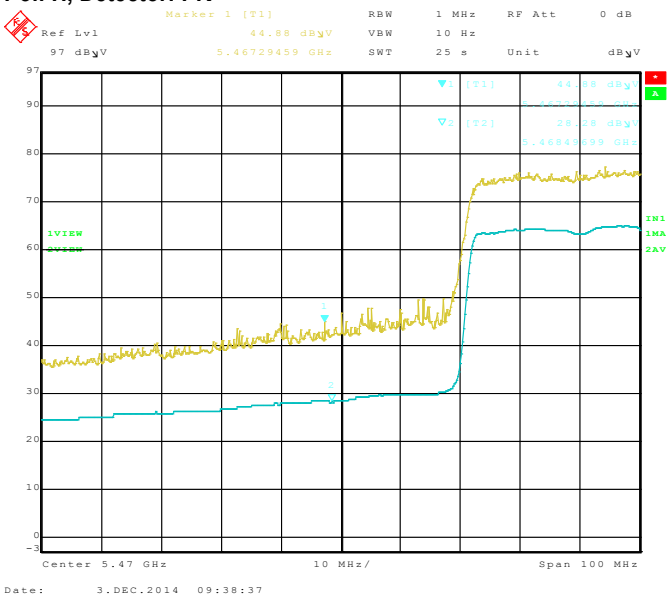


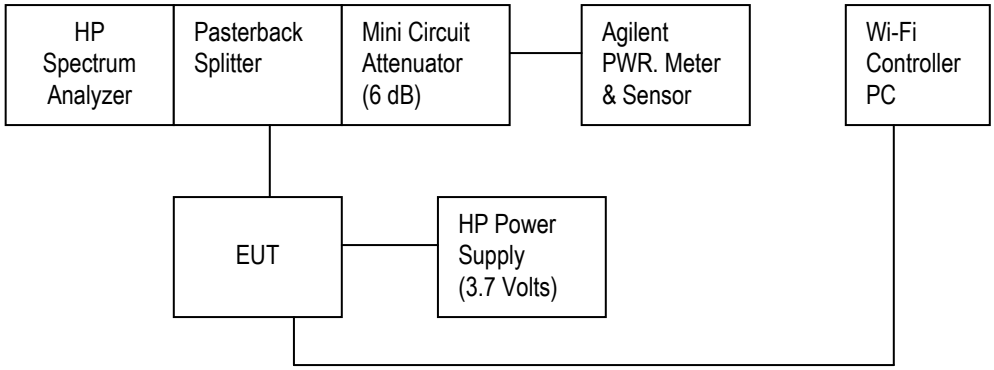
Figure 4-20: Band-Edge Compliance of RF Radiated Emission. 802.11ac, Ch. 106, 5530 MHz, Centre of Band-Edge: 5460 MHz Pol: H, Detector: PK



APPENDIX 5 – 802.11b/g/n CONDUCTED EMISSIONS TEST DATA/PLOTS

802.11b/g/n RF Conducted Emission Test Results

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: November 5 – November 28, 2014
The measurements on the BlackBerry® smartphone were performed by Sijia Li.

The environmental test conditions were: Temperature: 24.5 ºC
Relative Humidity: 35.5 %

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

Following tests were performed on the model RGY181LW.

6 dB Bandwidth

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

Channel	Data Rate	Limit (kHz)	Measured Level (MHz)
1	1 Mbps	≥ 500	8.04
	5.5 Mbps	≥ 500	8.80
	11 Mbps	≥ 500	8.34
	6 Mbps	≥ 500	16.44
	24 Mbps	≥ 500	16.46
	54 Mbps	≥ 500	16.10
	MCS 0	≥ 500	17.68
	MCS 4	≥ 500	17.66
	MCS 7	≥ 500	17.72
6	1 Mbps	≥ 500	8.52
	5.5 Mbps	≥ 500	8.80
	11 Mbps	≥ 500	8.66
	6 Mbps	≥ 500	**16.54**
	24 Mbps	≥ 500	16.50
	54 Mbps	≥ 500	16.50
	MCS 0	≥ 500	17.72
	MCS 4	≥ 500	17.76
	MCS 7	≥ 500	17.76
11	1 Mbps	≥ 500	**9.06**
	5.5 Mbps	≥ 500	9.04
	11 Mbps	≥ 500	9.04
	6 Mbps	≥ 500	16.52
	24 Mbps	≥ 500	16.54
	54 Mbps	≥ 500	16.50
	MCS 0	≥ 500	**17.80**
	MCS 4	≥ 500	17.78
	MCS 7	≥ 500	17.76

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

See figures 5-1 to 5-9 for the plots of the 6 dB bandwidth measurements for Channels 1, 6, and 11, at 1 Mbps each for 802.11b mode, 6 Mbps each for 802.11g mode, and MCS 0 each for 802.11n mode.

Figure 5-1: 6 dB Bandwidth
802.11b, Channel 1, 1 Mbps

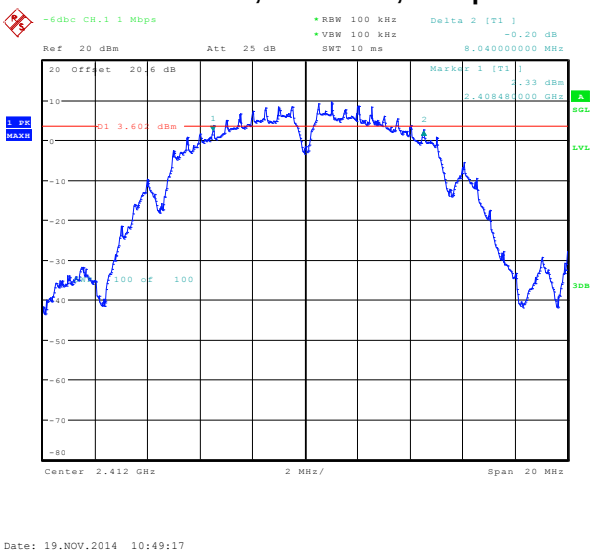


Figure 5-2: 6 dB Bandwidth
802.11b, Channel 6, 1 Mbps

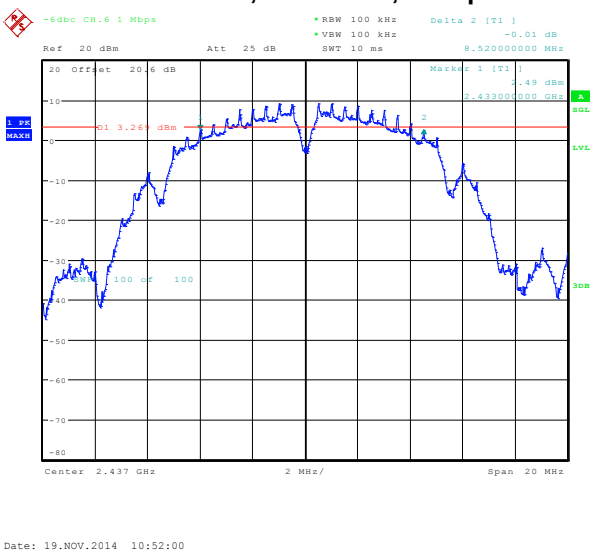


Figure 5-3: 6 dB Bandwidth
802.11b, Channel 11, 1 Mbps

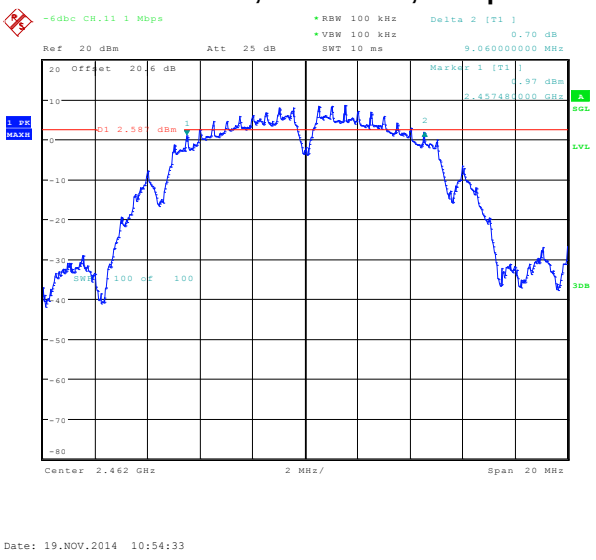
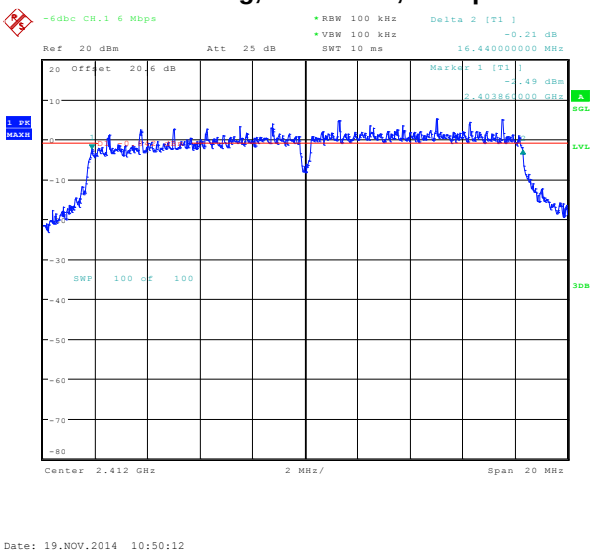


Figure 5-4: 6 dB Bandwidth
802.11g, Channel 1, 6 Mbps



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

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

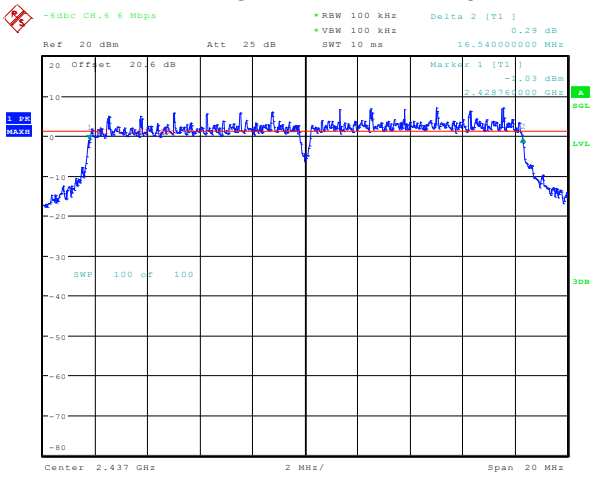


Figure 5-6: 6 dB Bandwidth
802.11g, Channel 11, 6 Mbps

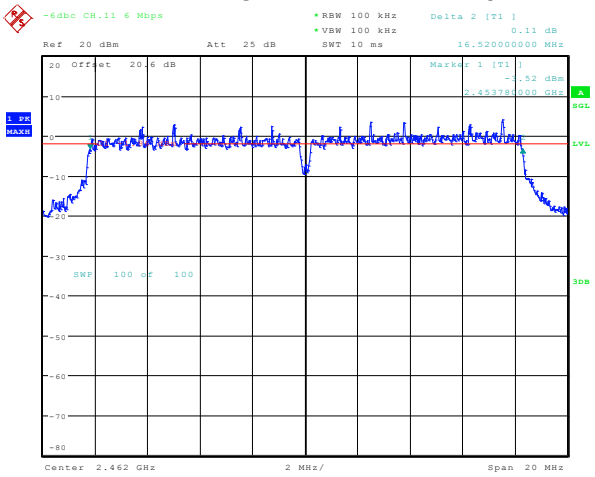


Figure 5-7: 6 dB Bandwidth
802.11n, Channel 1, MCS 0

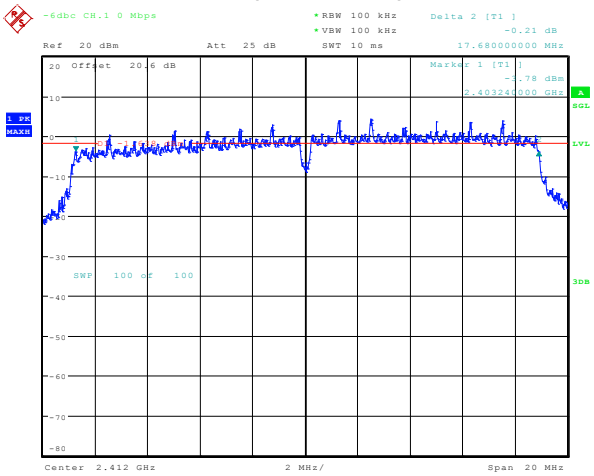


Figure 5-8: 6 dB Bandwidth
802.11n, Channel 6, MCS 0

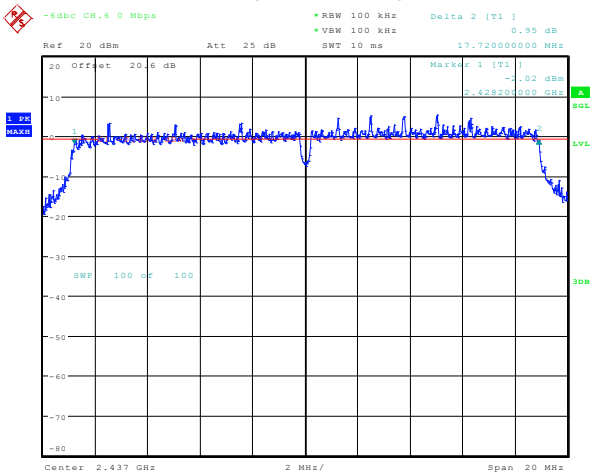
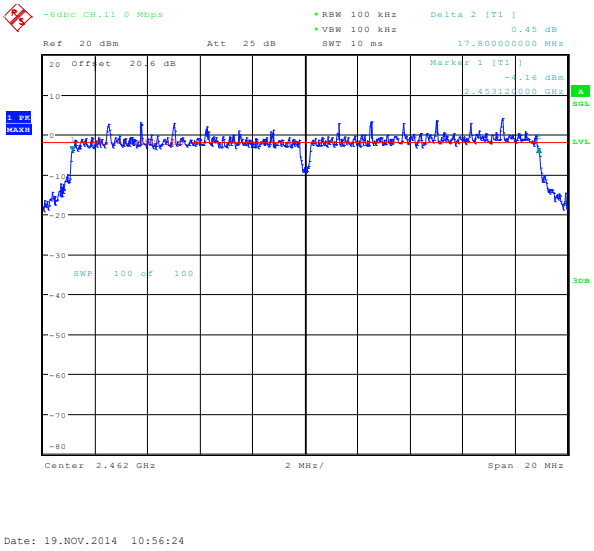


Figure 5-9: 6 dB Bandwidth

802.11n, Channel 11, MCS 0



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). Channels 1, 6 and 11 were measured at 1 Mbps, 5.5 Mbps, and 11 Mbps each for 802.11b mode, 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11g mode, and MCS 0, 4 and 7 for 802.11n mode using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 18.4 dB was applied to the power meter reference level for the coaxial cable loss and attenuators in the test circuit.

Channel	Data Rate	Class 2 Limit (W)	Measured Level (dBm)	Measured Level (W)
1	1 Mbps	< 1.00	17.86	0.0611
	5.5 Mbps	< 1.00	17.80	0.0602
	11 Mbps	< 1.00	17.61	0.0577
	6 Mbps	< 1.00	16.32	0.0429
	24 Mbps	< 1.00	14.72	0.0297
	54 Mbps	< 1.00	13.84	0.0242
	MCS 0	< 1.00	15.26	0.0336
	MCS 4	< 1.00	13.42	0.0220
	MCS 7	< 1.00	11.78	0.0151
6	1 Mbps	< 1.00	18.05	0.0639
	5.5 Mbps	**< 1.00**	**18.33**	**0.0681**
	11 Mbps	< 1.00	17.88	0.0614
	6 Mbps	**< 1.00**	**18.73**	**0.0747**
	24 Mbps	< 1.00	15.27	0.0336
	54 Mbps	< 1.00	14.45	0.0279
	MCS 0	**< 1.00**	**16.78**	**0.0476**
	MCS 4	< 1.00	14.03	0.0253
	MCS 7	< 1.00	12.51	0.0178

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

Channel	Data Rate	Class 2 Limit (W)	Measured Level (dBm)	Measured Level (W)
11	1 Mbps	< 1.00	17.23	0.0528
	5.5 Mbps	< 1.00	17.18	0.0522
	11 Mbps	< 1.00	17.10	0.0512
	6 Mbps	< 1.00	15.26	0.0336
	24 Mbps	< 1.00	14.76	0.0299
	54 Mbps	< 1.00	13.77	0.0238
	MCS 0	< 1.00	15.21	0.0332
	MCS 4	< 1.00	13.43	0.0220
	MCS 7	< 1.00	11.84	0.0153

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). Channels 1 and 11 were measured at 1 Mbps, 5.5 Mbps, and 11 Mbps each for 802.11b mode, 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11g mode, and MCS 0, 4 and 7 for 802.11n mode.

Channel	Data Rate	Limit (dBc)	Measured Level (dBc)	Margin (dBc)
1	1 Mbps	< -20	-41.9	-21.90
	5.5 Mbps	< -20	-42.77	-22.77
	11 Mbps	< -20	-42.68	-22.68
	6 Mbps	< -20	-34.45	-14.45
	24 Mbps	< -20	-37.30	-17.30
	54 Mbps	< -20	-36.97	-16.97
	MCS 0	< -20	-36.63	-16.63
	MCS 4	< -20	-35.55	-15.55
	MCS 7	< -20	-35.78	-15.78
11	1 Mbps	< -20	-40.43	-20.43
	5.5 Mbps	< -20	-39.77	-19.77
	11 Mbps	< -20	-40.80	-20.80
	6 Mbps	< -20	-37.65	-17.65
	24 Mbps	< -20	-36.76	-16.76
	54 Mbps	< -20	-36.68	-16.68
	MCS 0	< -20	-38.38	-18.38
	MCS 4	< -20	-36.94	-16.94
	MCS 7	< -20	-38.74	-18.74

See figures 5-10 to 5-15 for the plots of the band edge compliance measurements for Channels 1 and 11, at 1 Mbps each for 802.11b mode, 6 Mbps each for 802.11g mode, and MCS 0 each for 802.11n mode.

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

Figure 5-10: Band Edge Compliance
802.11b, Channel 1, 1 Mbps

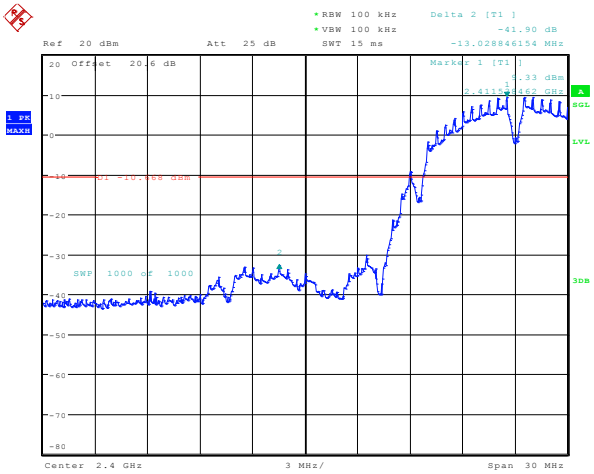


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Figure 5-11: Band Edge Compliance
802.11b, Channel 11, 1 Mbps

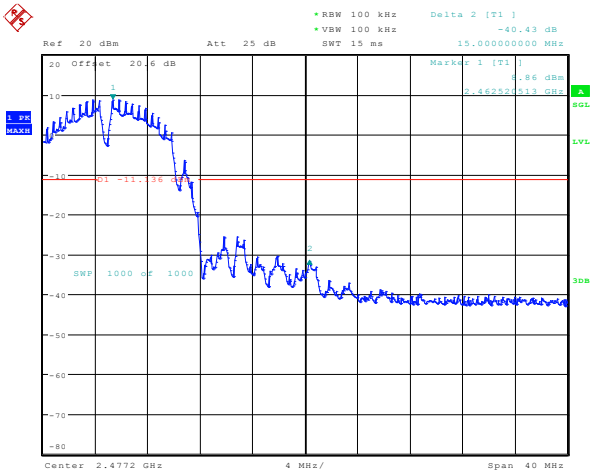

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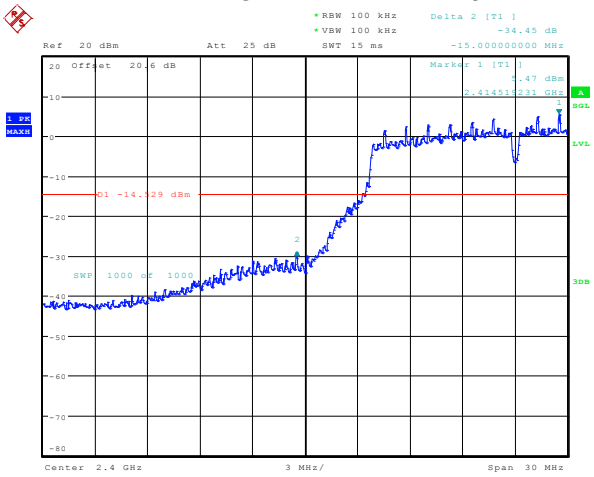
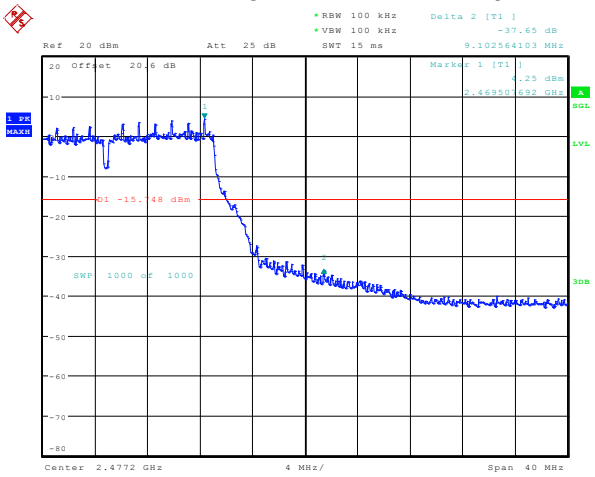
Figure 5-12: Band Edge Compliance
802.11g, Channel 1, 6 Mbps



Date: 20.NOV.2014 11:29:54

Figure 5-13: Band Edge Compliance
802.11g, Channel 11, 6 Mbps



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

Figure 5-14: Band Edge Compliance
802.11n, Channel 1, MCS 0

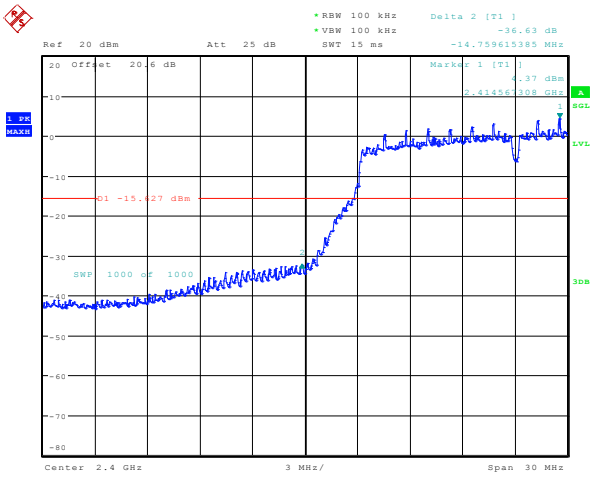
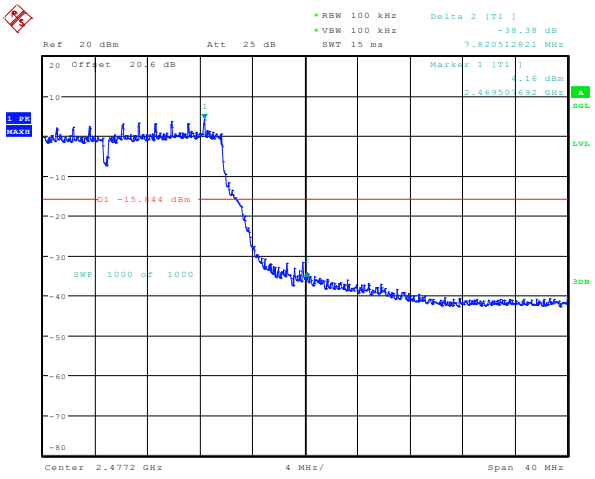


Figure 5-15: Band Edge Compliance
802.11n, Channel 11, MCS 0



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). Channels 1, 6 and 11 were measured at 1 Mbps, 5.5 Mbps, and 11 Mbps each for 802.11b mode, 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11g mode, and MCS 0, 4, and 7 for 802.11n mode.

Channel	Data Rate	Limit (dBm)	Measured Level (dBm)	Margin (dBm)
1	1 Mbps	< 8.00	-3.46	-11.46
	5.5 Mbps	< 8.00	-4.21	-12.21
	11 Mbps	< 8.00	-3.67	-11.67
	6 Mbps	< 8.00	-9.67	-17.67
	24 Mbps	< 8.00	-9.08	-17.08
	54 Mbps	< 8.00	-12.01	-20.01
	MCS 0	< 8.00	-8.99	-16.99
	MCS 4	< 8.00	-10.33	-18.33
	MCS 7	< 8.00	-10.67	-18.67
6	1 Mbps	< 8.00	-3.23	-11.23
	5.5 Mbps	< 8.00	-4.51	-12.51
	11 Mbps	< 8.00	-4.06	-12.06
	6 Mbps	< 8.00	-7.17	-15.17
	24 Mbps	< 8.00	-8.66	-16.66
	54 Mbps	< 8.00	-11.00	-19.00
	MCS 0	< 8.00	-7.63	-15.63
	MCS 4	< 8.00	-9.84	-17.84
	MCS 7	< 8.00	-11.76	-19.76
11	1 Mbps	< 8.00	-3.70	-11.70
	5.5 Mbps	< 8.00	-5.53	-13.53
	11 Mbps	< 8.00	-5.47	-13.47
	6 Mbps	< 8.00	-9.97	-17.97
	24 Mbps	< 8.00	-9.42	-17.42
	54 Mbps	< 8.00	-11.68	-19.68
	MCS 0	< 8.00	-9.96	-17.96
	MCS 4	< 8.00	-11.20	-19.20
	MCS 7	< 8.00	-10.84	-18.84

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

See figures 5-16 to 5-24 for the plots of the peak power spectral density for Channels 1, 6 and 11, at 1 Mbps each for 802.11b mode, 6 Mbps each for 802.11g mode, and MCS 0 for 802.11n mode.

Figure 5-16: Peak Power Spectral Density
802.11b, Channel 1, 1 Mbps

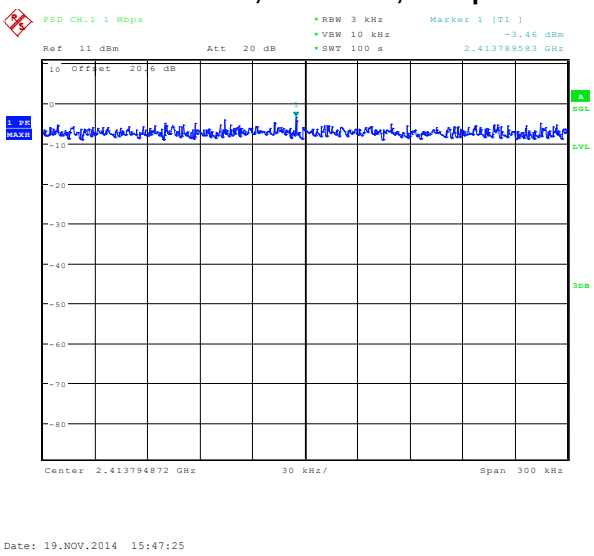


Figure 5-17: Peak Power Spectral Density
802.11b, Channel 6, 1 Mbps

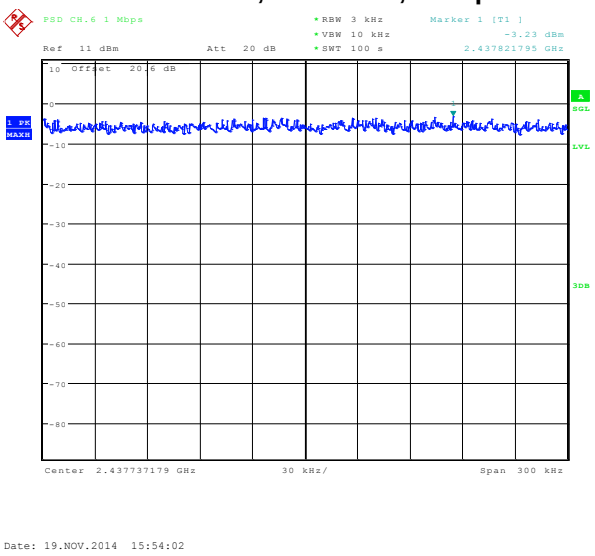
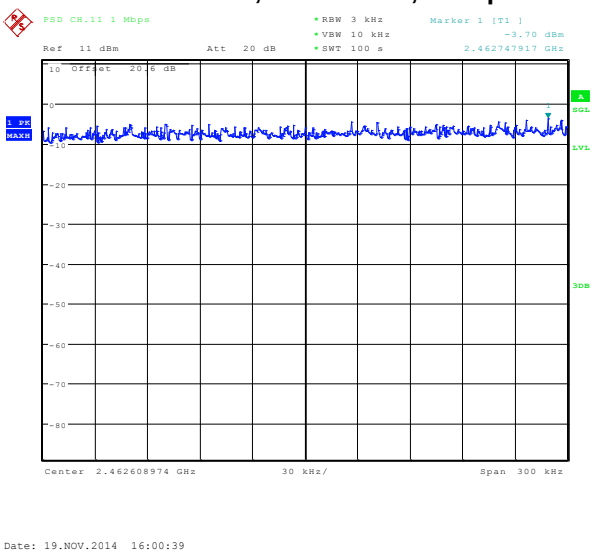
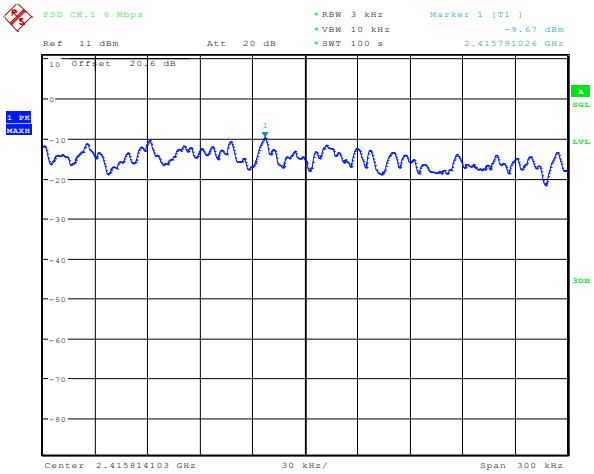


Figure 5-18: Peak Power Spectral Density
802.11b, Channel 11, 1 Mbps



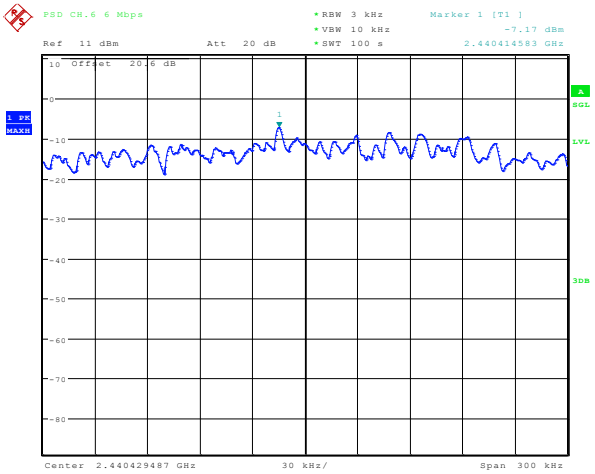
802.11b/g/n RF Conducted Emission Test Results cont'd

Figure 5-19: Peak Power Spectral Density
802.11g, Channel 1, 6 Mbps



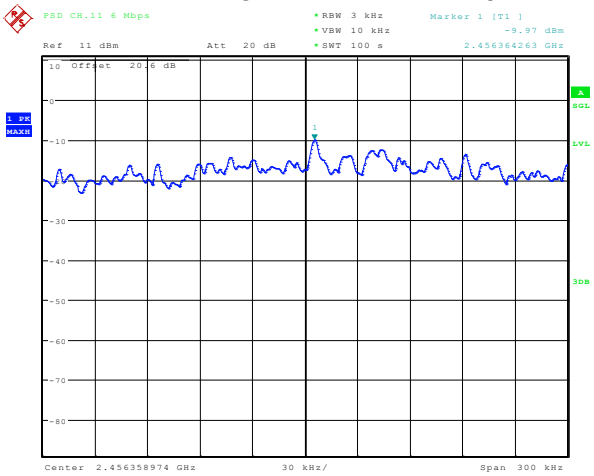
Date: 19.NOV.2014 15:49:37

Figure 5-20: Peak Power Spectral Density
802.11g, Channel 6, 6 Mbps



Date: 19.NOV.2014 15:56:15

Figure 5-21: Peak Power Spectral Density
802.11g, Channel 11, 6 Mbps



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

Figure 5-22: Peak Power Spectral Density
802.11n, Channel 1, MCS 0

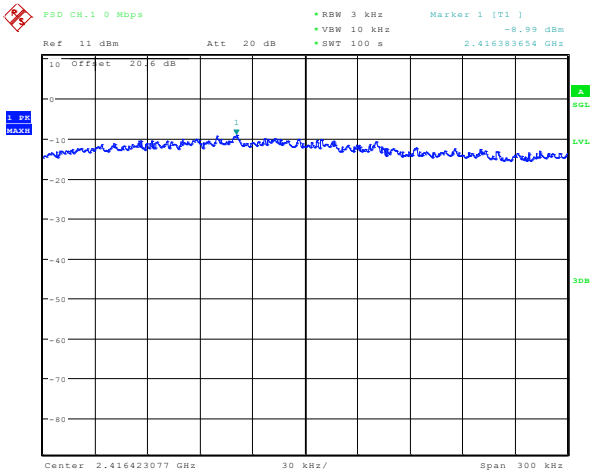

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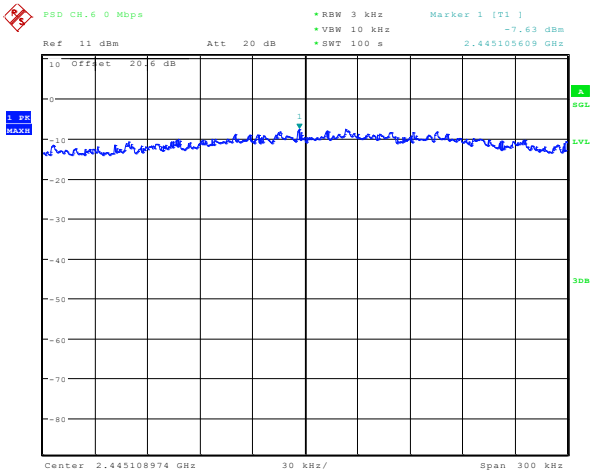
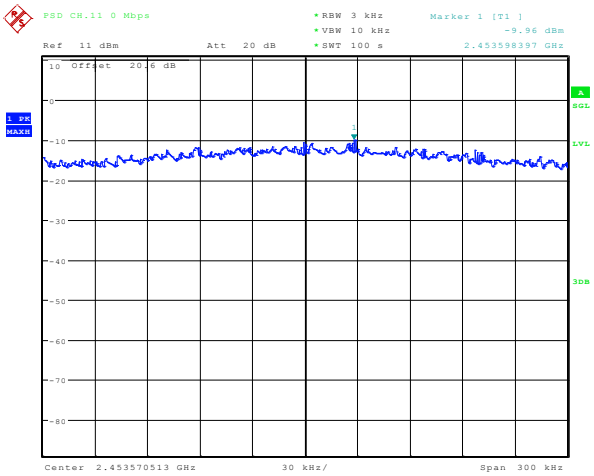
Figure 5-23: Peak Power Spectral Density
802.11n, Channel 6, MCS 0



Date: 19.NOV.2014 15:58:27

Figure 5-24: Peak Power Spectral Density
802.11n, Channel 11, MCS 0



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

Spurious RF Conducted Emissions

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

Channel	Data Rate	Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from Carrier (dBc)	Limit (dBc)
1	1 Mbps	18.08	-29.03	-46.88	-20
	5.5 Mbps	17.97	-26.82	-44.62	-20
	11 Mbps	17.85	-23.54	-41.15	-20
	6 Mbps	17.72	-18.14	-34.46	-20
	24 Mbps	17.18	-28.08	-42.81	-20
	54 Mbps	15.66	-17.96	-31.80	-20
	MCS 0	17.47	-26.01	-41.27	-20
	MCS 4	14.93	-21.16	-34.57	-20
	MCS 7	13.51	-33.44	-45.22	-20
6	1 Mbps	18.47	-25.66	-43.71	-20
	5.5 Mbps	18.45	-25.54	-43.87	-20
	11 Mbps	18.22	-24.63	-42.51	-20
	6 Mbps	18.03	-28.11	-46.84	-20
	24 Mbps	17.60	-32.17	-47.43	-20
	54 Mbps	16.01	-20.93	-35.38	-20
	MCS 0	18.03	-38.24	-55.02	-20
	MCS 4	15.30	-18.13	-32.15	-20
	MCS 7	13.98	-31.01	-43.52	-20

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

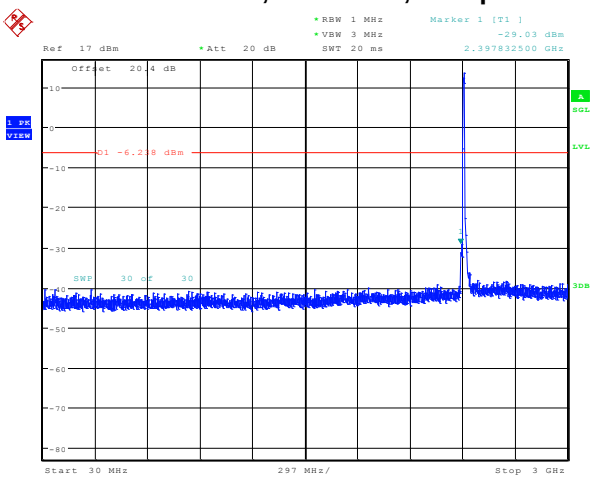
Channel	Data Rate	Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from Carrier (dBc)	Limit (dBc)
11	1 Mbps	16.05	-24.52	-41.75	-20
	5.5 Mbps	15.91	-23.43	-40.61	-20
	11 Mbps	15.78	-22.12	-39.22	-20
	6 Mbps	15.70	-33.77	-49.03	-20
	24 Mbps	15.21	-33.85	-48.61	-20
	54 Mbps	13.03	-24.13	-37.90	-20
	MCS 0	15.44	-24.17	-39.38	-20
	MCS 4	14.82	-22.38	-35.81	-20
	MCS 7	11.53	-34.29	-46.13	-20

The emissions were in the NF.

See figures 5-25 to 5-33 for the plots of the spurious RF conducted emissions for Channels 1, 6 and 11, at 1 Mbps each for 802.11b mode, 6 Mbps each for 802.11g mode, and MCS 0 each for 802.11n mode.

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

Figure 5-25: Spurious Conducted RF Emissions
802.11b, Channel 1, 1 Mbps



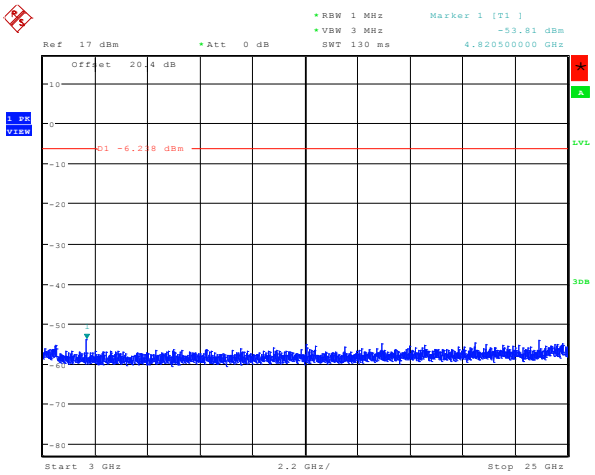
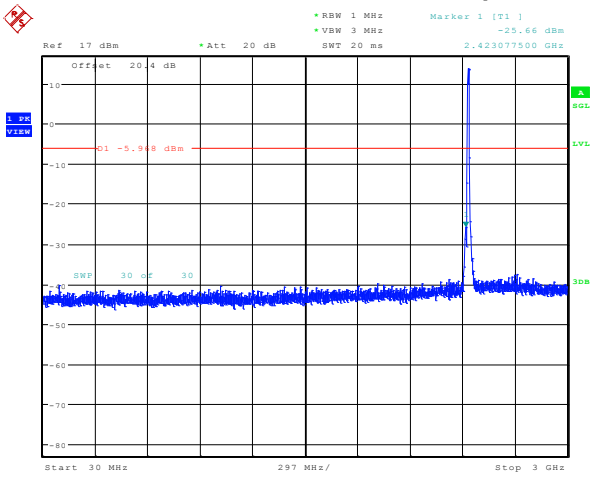
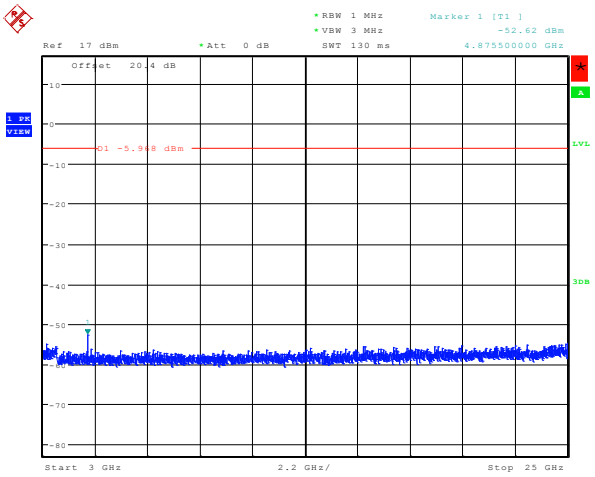


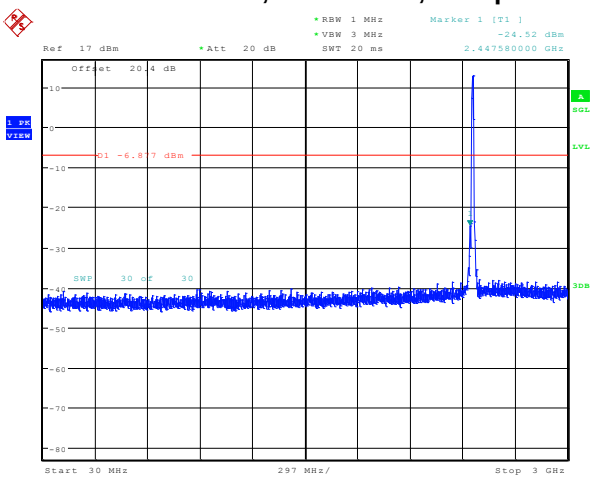
Figure 5-26 : Spurious Conducted RF Emissions
802.11b, Channel 6, 1 Mbps





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

Figure 5-27: Spurious Conducted RF Emissions
802.11b, Channel 11, 1 Mbps



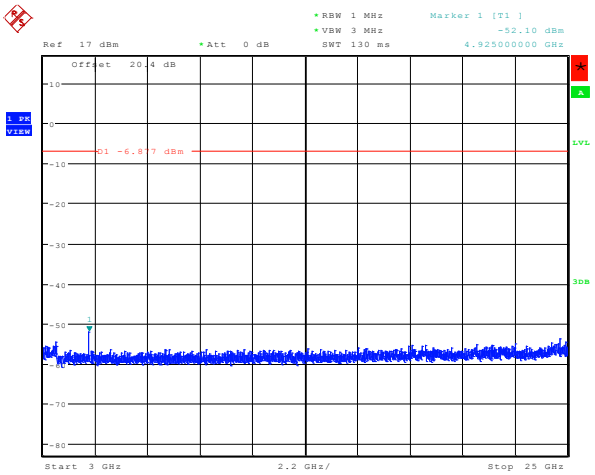
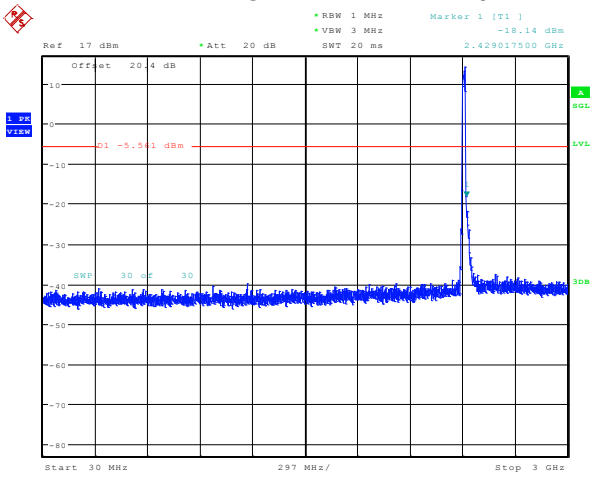
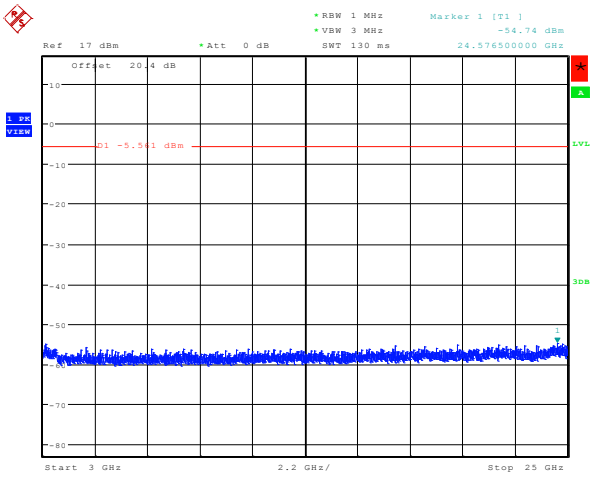


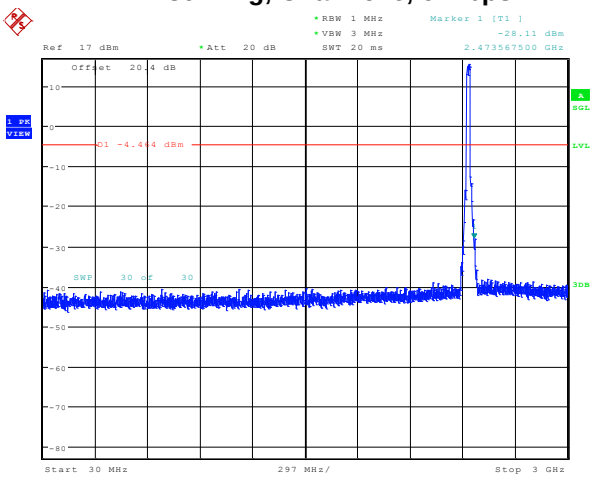
Figure 5-28: Spurious Conducted RF Emissions
802.11g, Channel 1, 6 Mbps





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

Figure 5-29: Spurious Conducted RF Emissions
802.11g, Channel 6, 6 Mbps



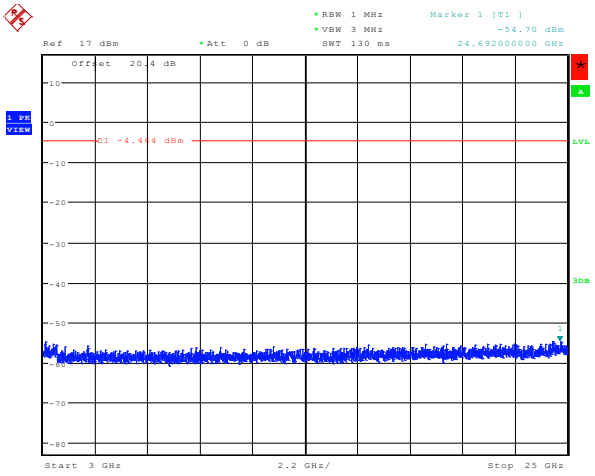
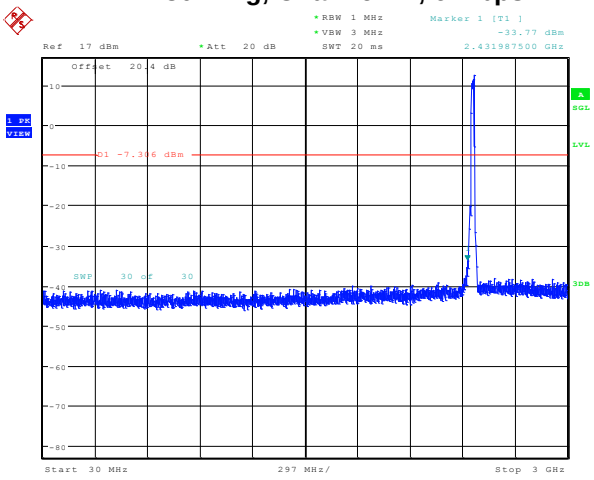
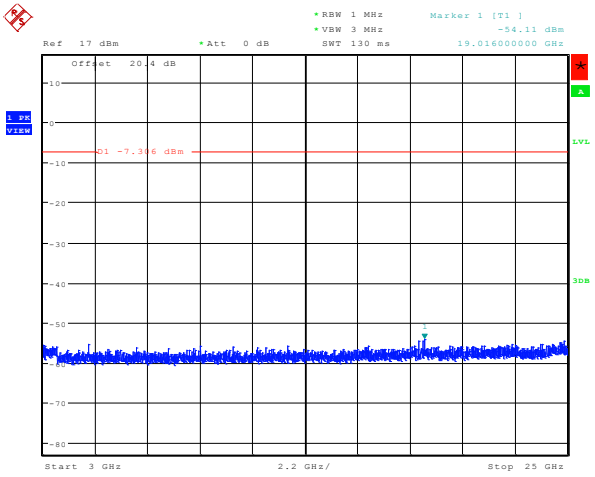


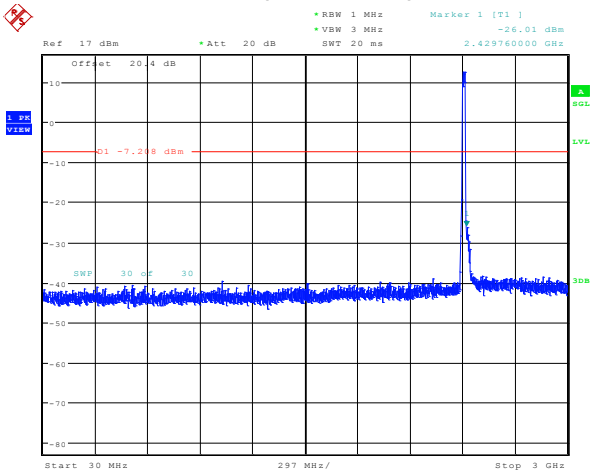
Figure 5-30: Spurious Conducted RF Emissions
802.11g, Channel 11, 6 Mbps





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

Figure 5-31: Spurious Conducted RF Emissions
802.11n, Channel 1, MCS 0



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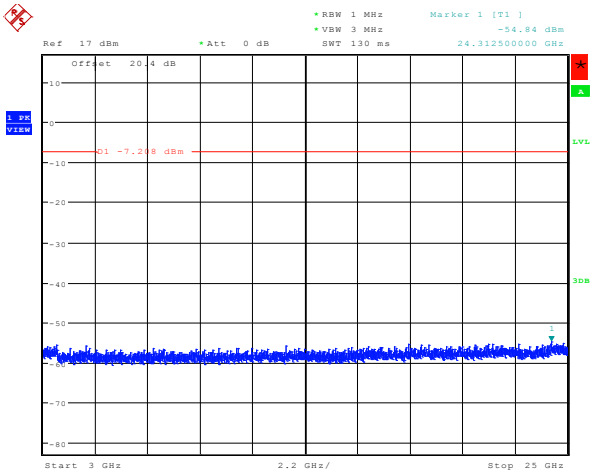

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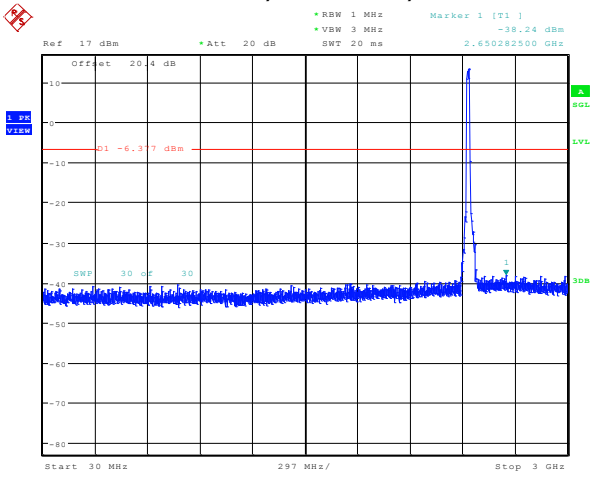
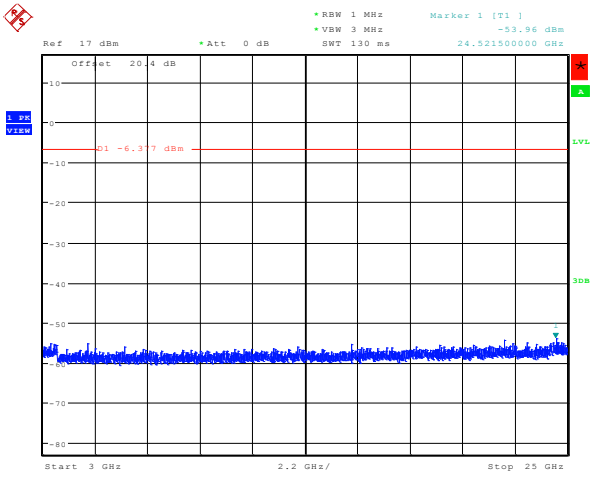
Figure 5-32: Spurious Conducted RF Emissions
802.11n, Channel 6, MCS 0



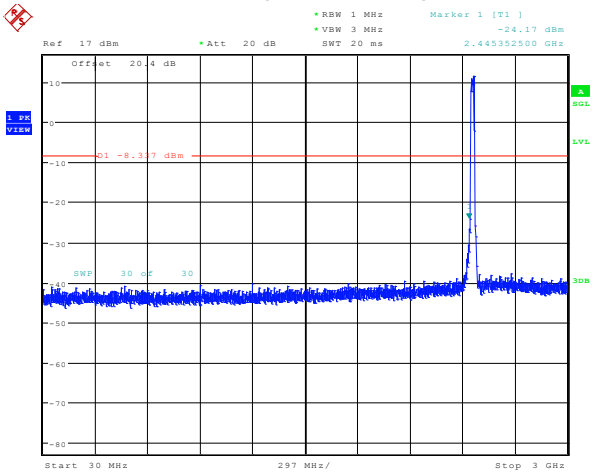
Date: 19.NOV.2014 13:40:05

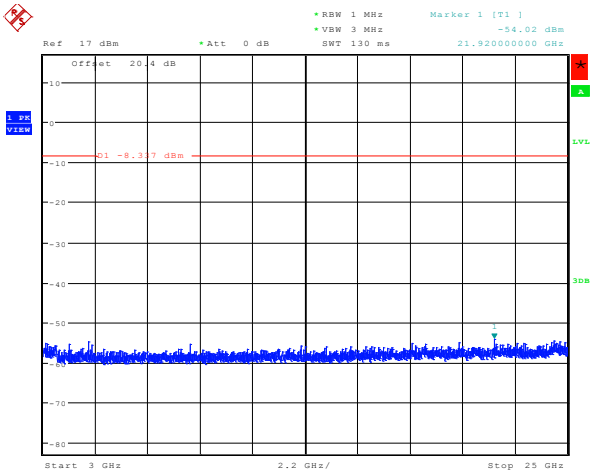


Date: 19.NOV.2014 13:40:09

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

Figure 5-33: Spurious Conducted RF Emissions
802.11n, Channel 11, MCS 0

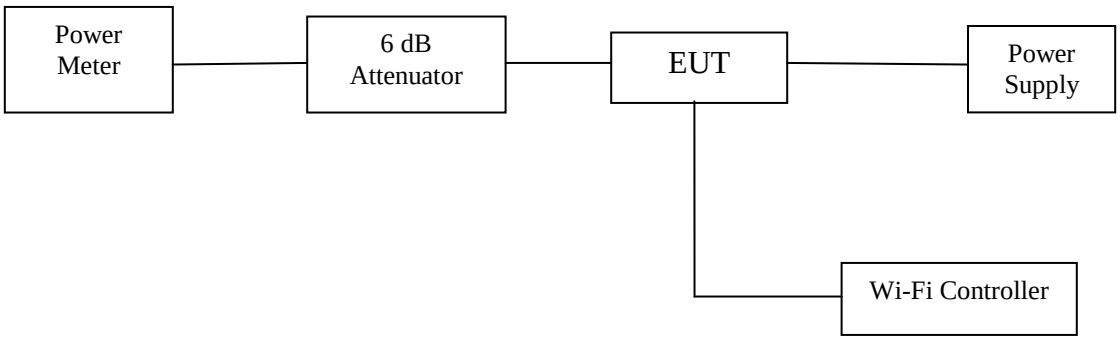


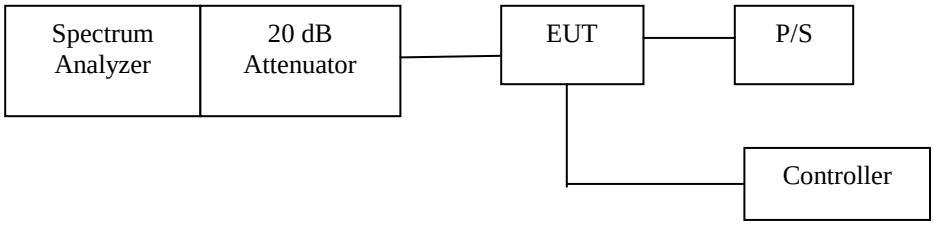


APPENDIX 6 – 802.11a/n CONDUCTED EMISSIONS TEST DATA/PLOTS

802.11a/n RF Conducted Emission Test Results

Test Setup Diagram





A reference offset of 8.9 dB was applied to the spectrum analyzer and 7.4 dB to the Power Meter reference level for the attenuators and coaxial cable loss in the test circuit.

Date of test: November 5 – November 28, 2014
The measurements were performed by Sijia Li.

The environmental test conditions were:	Temperature:	25.8 – 26.3 ºC
	Relative Humidity:	28.2 – 31.2 %

802.11a 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). Channels 36, 48, 64, 100, 140, and 165 were measured at 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11a mode.

Channel	Data Rate	Limit (kHz)	Measured Level (MHz)
36	6 Mbps	≥ 500	16.54
	24 Mbps	≥ 500	16.52
	54 Mbps	≥ 500	16.50
48	**6 Mbps**	**≥ 500**	**16.56**
	24 Mbps	≥ 500	16.54
	54 Mbps	≥ 500	16.54
64	**6 Mbps**	**≥ 500**	**16.56**
	24 Mbps	≥ 500	16.50
	54 Mbps	≥ 500	16.52
100	**6 Mbps**	**≥ 500**	**16.56**
	24 Mbps	≥ 500	16.52
	54 Mbps	≥ 500	16.50
140	**6 Mbps**	**≥ 500**	**16.56**
	24 Mbps	≥ 500	16.52
	54 Mbps	≥ 500	16.50
165	**6 Mbps**	**≥ 500**	**16.56**
	24 Mbps	≥ 500	16.50
	54 Mbps	≥ 500	16.50

See figures 6-1 to 6-6 for the plots of the 6 dB bandwidth measurements for Channel 36, 48, 64, 100, 140, and 165 at 6 Mbps each for 802.11a mode

802.11n 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) Channels 36, 64 and 165 were measured at MCS 0, MCS 4 an MCS 7 each for 802.11n mode.

Channel	Data Rate	Limit (kHz)	Measured Level (MHz)
36	MCS0	≥ 500	**16.51**
	MCS4	≥ 500	16.44
	MCS7	≥ 500	16.44
64	MCS0	≥ 500	16.44
	MCS4	≥ 500	16.44
	MCS7	≥ 500	16.44
165	MCS0	≥ 500	16.44
	MCS4	≥ 500	16.44
	MCS7	≥ 500	16.44

See figures 6-7 to 6-9 for the plots of the 6 dB bandwidth measurements for Channel 36, 64 and 165 at MCS 0 each for 802.11n mode.

802.11a RF Conducted Emission Test Results cont'd

Figure 6-1: 6 dB Bandwidth
802.11a, Channel 36, 6 Mbps

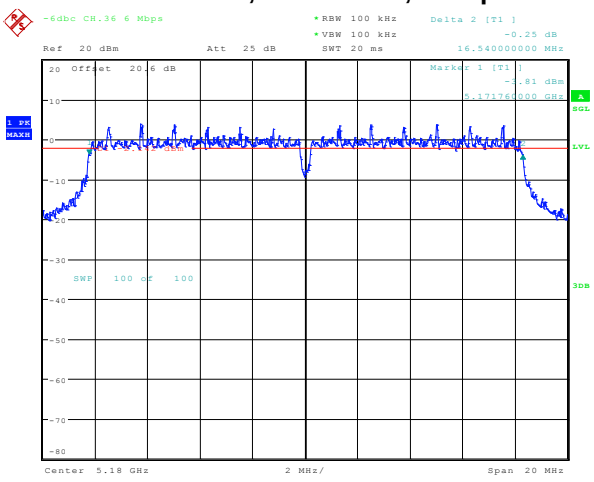


Figure 6-2: 6 dB Bandwidth
802.11a, Channel 48, 6 Mbps

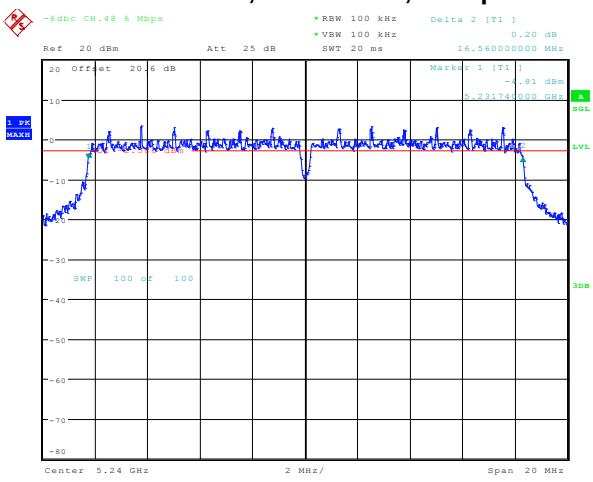


Figure 6-3: 6 dB Bandwidth
802.11a, Channel 64, 6 Mbps

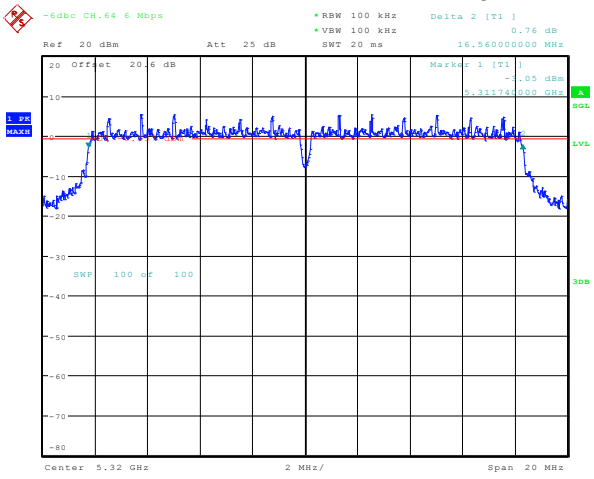
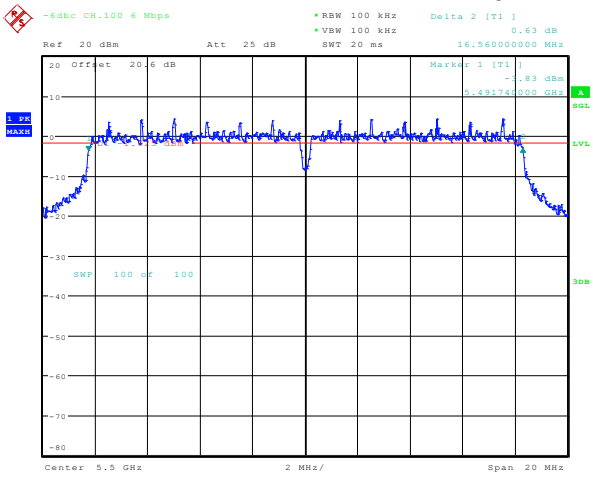


Figure 6-4: 6 dB Bandwidth
802.11a, Channel 100, 6 Mbps



802.11a RF Conducted Emission Test Results cont'd

Figure 6-5: 6 dB Bandwidth
802.11a, Channel 140, 6 Mbps

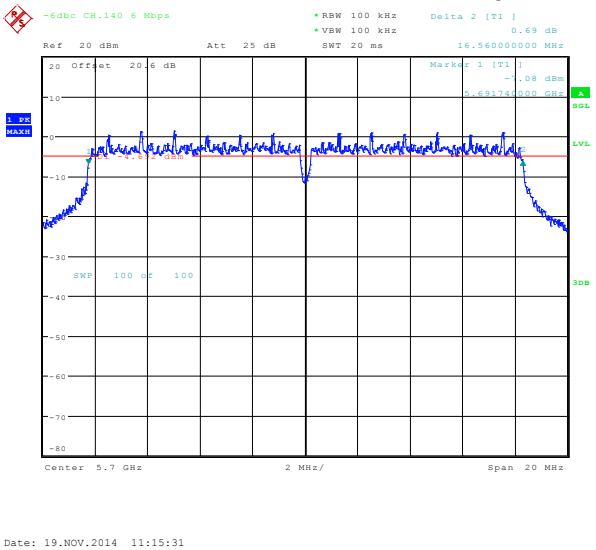
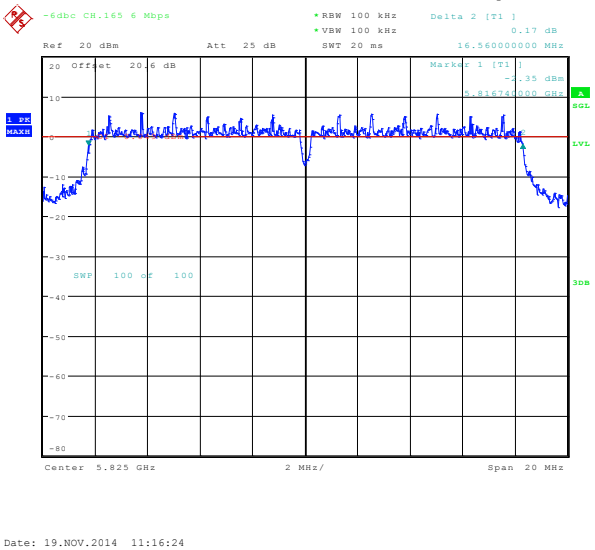


Figure 6-6: 6 dB Bandwidth
802.11a, Channel 165, 6 Mbps



802.11a RF Conducted Emission Test Results cont'd

Figure 6-7: 6 dB Bandwidth
802.11n, Channel 36, MCS 0

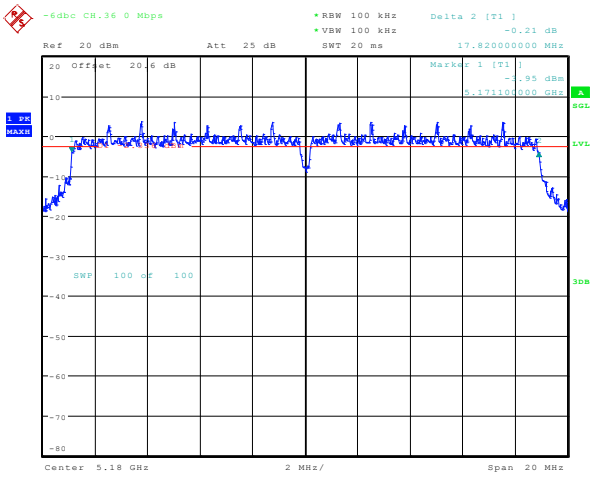


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Figure 6-8: 6 dB Bandwidth
802.11n, Channel 100, MCS 0

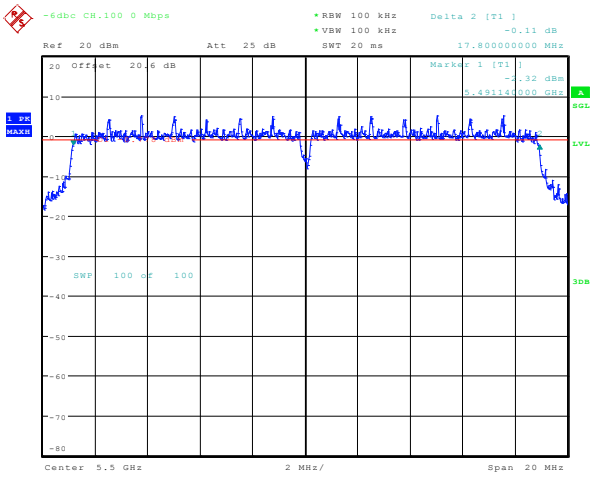

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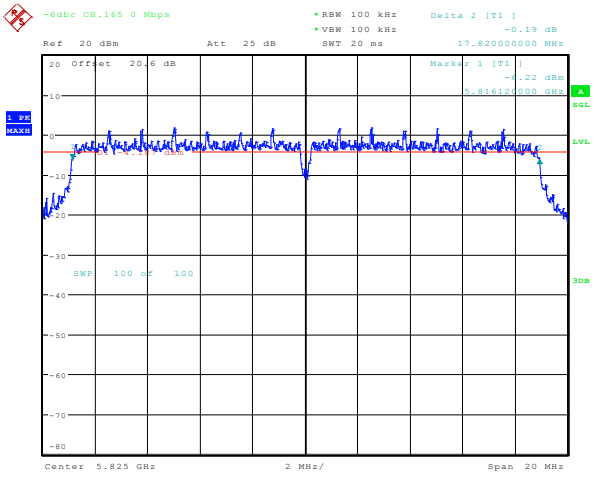
Figure 6-9: 6 dB Bandwidth
802.11n, Channel 165, MCS 0



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802.11a 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 15.407. Channels 36, 48, 64, 100, 140 and 165 were measured for 802.11a mode using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 8.9 dB was applied to the power meter reference level for the coaxial cable loss and attenuators in the test circuit.

Channel	Data Rate	Power Limit (mW)	Measured Level (dBm)	Measured Level (mW)
36	6 Mbps	< 250.0	15.56	36.01
	24 Mbps	< 250.0	14.67	29.30
	54 Mbps	< 250.0	13.84	24.18
48	6 Mbps	< 250.0	15.14	32.63
	24 Mbps	< 250.0	14.34	27.14
	54 Mbps	< 250.0	13.40	21.90
64	6 Mbps	< 250.0	16.87	48.68
	24 Mbps	< 250.0	15.49	35.44
	54 Mbps	< 250.0	13.26	21.17
100	6 Mbps	< 250.0	16.01	39.88
	24 Mbps	< 250.0	15.07	32.12
	54 Mbps	< 250.0	14.15	26.01
140	6 Mbps	< 250.0	13.23	21.06
	24 Mbps	< 250.0	12.40	17.38
	54 Mbps	< 250.0	11.51	14.16
165	**6 Mbps**	**< 1000**	**17.52**	**56.53**
	24 Mbps	< 1000	16.29	42.55
	54 Mbps	< 1000	14.16	26.07

802.11n RF Conducted Emission Test Results

Maximum Conducted Output Power

The EUT met the requirements of the maximum conducted output power of class 2 as per 47 CFR 15.407. Channels 36, 64, 100, 140 and 165 were measured for 802.11n mode using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 8.9 dB was applied to the power meter reference level for the coaxial cable loss and attenuators in the test circuit.

Channel	Data Rate	Class 2 Limit (W)	Measured Level (dBm)	Measured Level (mW)
36	5180	< 250.0	15.40	34.67
	24 Mbps	< 250.0	14.30	26.92
	54 Mbps	< 250.0	12.80	19.05
64	5320	< 250.0	14.90	30.90
	24 Mbps	< 250.0	13.90	24.55
	54 Mbps	< 250.0	12.20	16.60
100	**5500**	**< 250.0**	**16.40**	**43.65**
	24 Mbps	< 250.0	15.40	34.67
	54 Mbps	< 250.0	13.10	20.42
140	5700	< 250.0	12.80	19.05
	24 Mbps	< 250.0	11.70	14.79
	54 Mbps	< 250.0	11.10	12.88
165	5825	< 1000	13.70	23.44
	24 Mbps	< 1000	12.70	18.62
	54 Mbps	< 1000	11.90	15.49

802.11a RF Conducted Emission Test Results cont'd

Band Edge Compliance

The EUT met the requirements of the band edge compliance as per 47 CFR 15.407. Channels 36, 64, 100, 140, 149, and 165 were measured at 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11a mode.

Channel	Data Rate	Limit (dBc)	Measured Level (dBc)	Margin (dBc)
36	6 Mbps	< -20	-45.53	-25.53
	24 Mbps	< -20	-46.21	-26.21
	54 Mbps	< -20	-45.84	-25.84
64	6 Mbps	< -20	-46.23	-26.23
	24 Mbps	< -20	-46.30	-26.30
	54 Mbps	< -20	-44.88	-24.88
100	6 Mbps	< -20	-45.72	-25.72
	24 Mbps	< -20	-46.12	-26.12
	54 Mbps	< -20	-45.78	-25.78
140	6 Mbps	< -20	-42.96	-22.96
	24 Mbps	< -20	-42.24	-22.24
	54 Mbps	< -20	-43.64	-23.64
149	6 Mbps	< -20	-39.85	-19.85
	24 Mbps	< -20	-40.92	-20.92
	54 Mbps	< -20	-41.63	-21.63
165	6 Mbps	< -20	-32.24	-12.24
	24 Mbps	< -20	-36.21	-16.21
	54 Mbps	< -20	-38.16	-18.16

See figures 6-10 to 6-15 for the plots of the band edge compliance measurements for Channel 36, 64, 100,140, 149 and 165 at 6 Mbps each for 802.11a mode.

802.11n RF Conducted Emission Test Results

Band Edge Compliance

The EUT met the requirements of the band edge compliance as per 47 CFR 15.407. Channels 36, 64, 100, 140, 149 and 165 were measured at MCS 0, MCS 4 and MCS 7 each for 802.11n mode.

Channel	Data Rate	Limit (dBc)	Measured Level (dBc)	Margin (dBc)
36	MCS0	< -20	-44.80	-24.80
	MCS4	< -20	-45.36	-25.36
	MCS7	< -20	-45.02	-25.02
64	MCS0	< -20	-44.73	-24.73
	MCS4	< -20	-45.68	-25.68
	MCS7	< -20	-44.27	-24.27
100	MCS0	< -20	-45.70	-25.70
	MCS4	< -20	-44.30	-24.30
	MCS7	< -20	-44.86	-24.86
140	MCS0	< -20	-43.07	-23.07
	MCS4	< -20	-42.39	-22.39
	MCS7	< -20	-42.70	-22.70
149	MCS0	< -20	-36.96	-16.96
	MCS4	< -20	-36.50	-16.50
	MCS7	< -20	-39.14	-19.14
165	MCS0	< -20	-36.94	-16.94
	MCS4	< -20	-38.53	-18.53
	MCS7	< -20	-39.48	-19.48

See figures 6-16 to 6-21 for the plots of the band edge compliance measurements for Channel 36, 64, 100,140, 149 and 165 at MCS 0 each for 802.11n mode.

802.11a RF Conducted Emission Test Results cont'd

Figure 6-10: Band Edge Compliance
802.11a, Channel 36, 6 Mbps

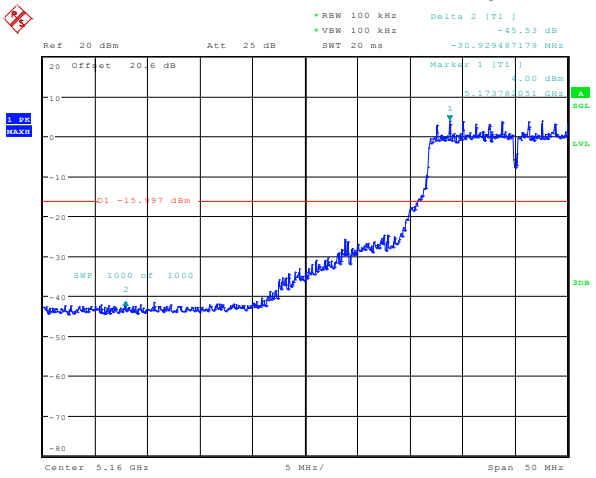

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Figure 6-11: Band Edge Compliance
802.11a, Channel 64, 6 Mbps

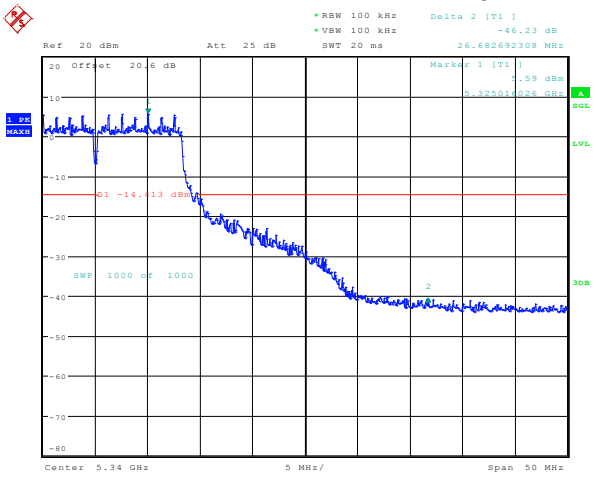

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Figure 6-12: Band Edge Compliance
802.11a, Channel 100, 6 Mbps

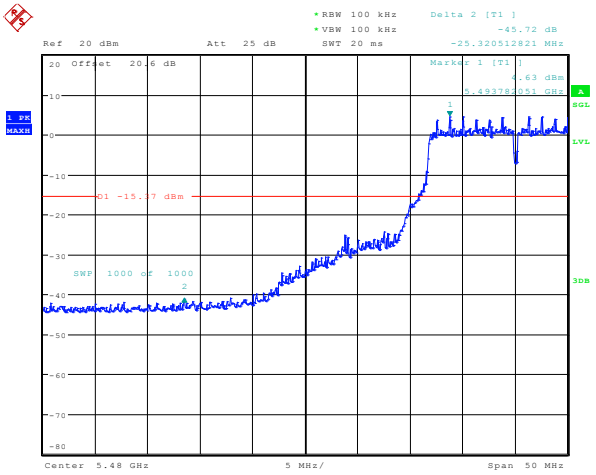

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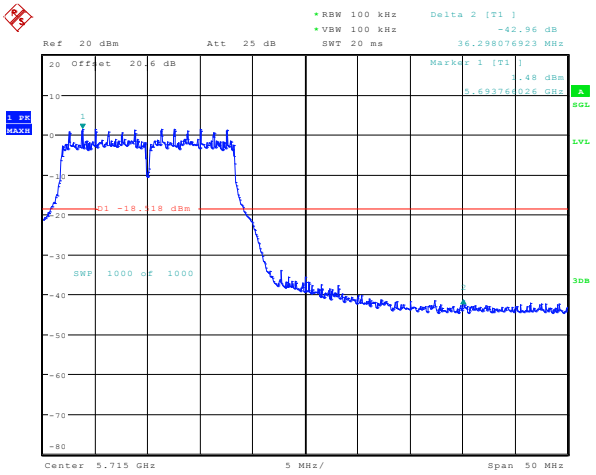
Figure 6-13: Band Edge Compliance
802.11a, Channel 140, 6 Mbps



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802.11a RF Conducted Emission Test Results cont'd

Figure 6-14: Band Edge Compliance
802.11a, Channel 149, 6 Mbps

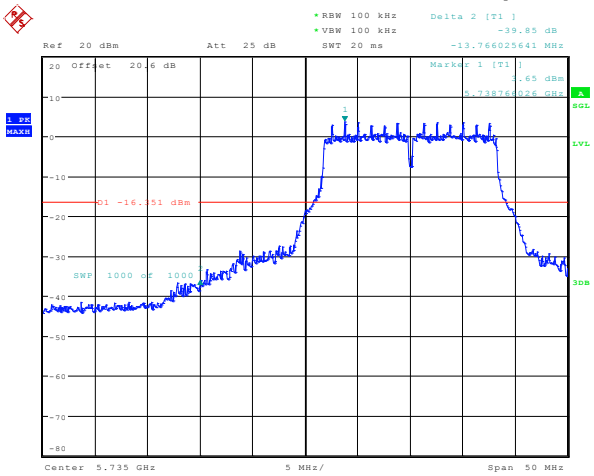

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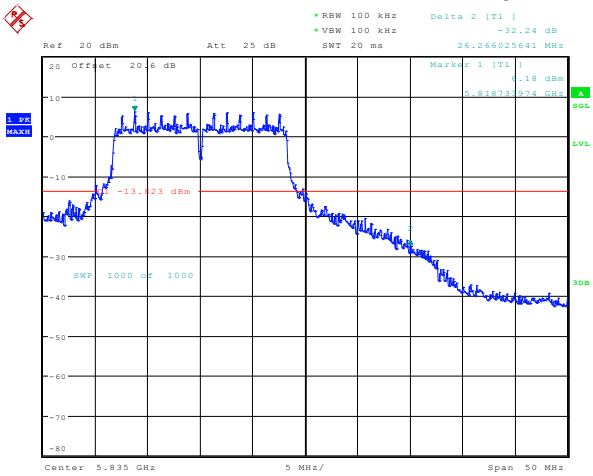
Figure 6-15: Band Edge Compliance
802.11a, Channel 165, 6 Mbps



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802.11n RF Conducted Emission Test Results

Figure 6-16: Band Edge Compliance
802.11n, Channel 36, 6 Mbps

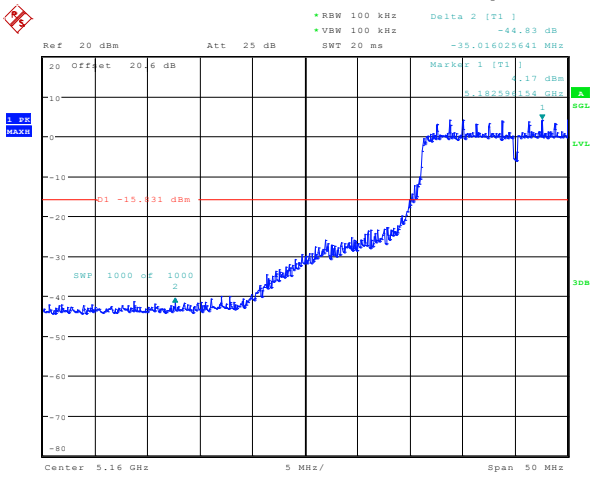


Figure 6-17: Band Edge Compliance
802.11n, Channel 64, 6 Mbps

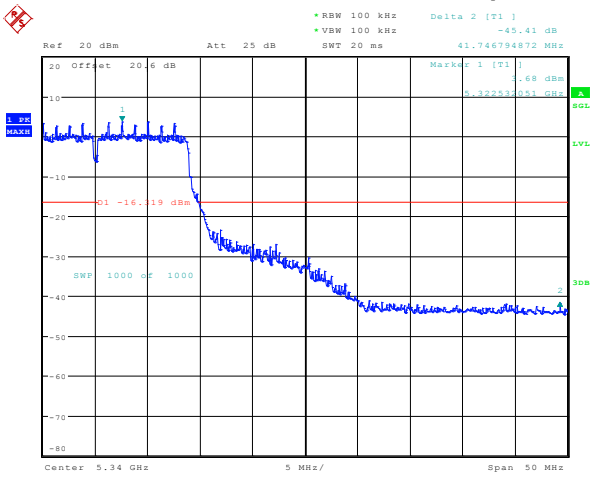


Figure 6-18: Band Edge Compliance
802.11n, Channel 100, 6 Mbps

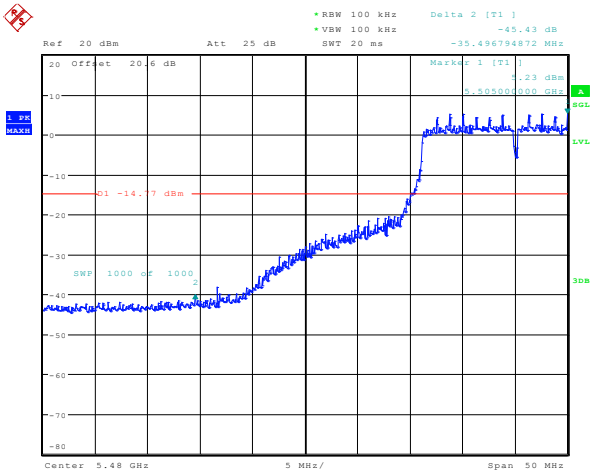
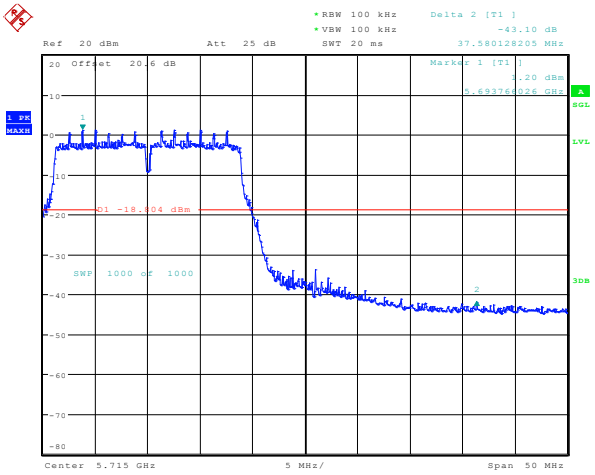


Figure 6-19: Band Edge Compliance
802.11n, Channel 140, 6 Mbps



802.11n RF Conducted Emission Test Results cont'd

Figure 6-20: Band Edge Compliance
802.11n, Channel 149, 6 Mbps

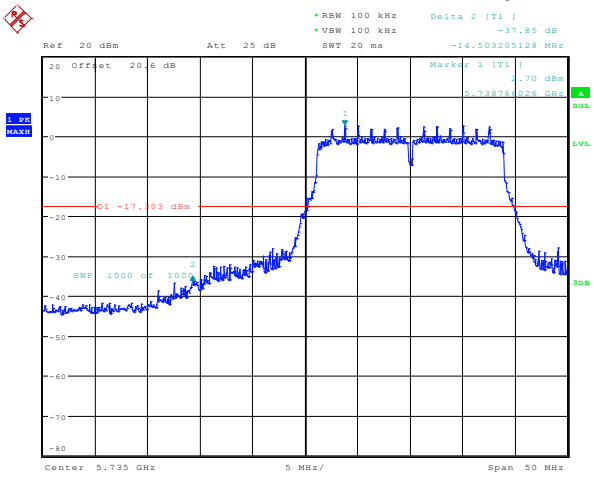
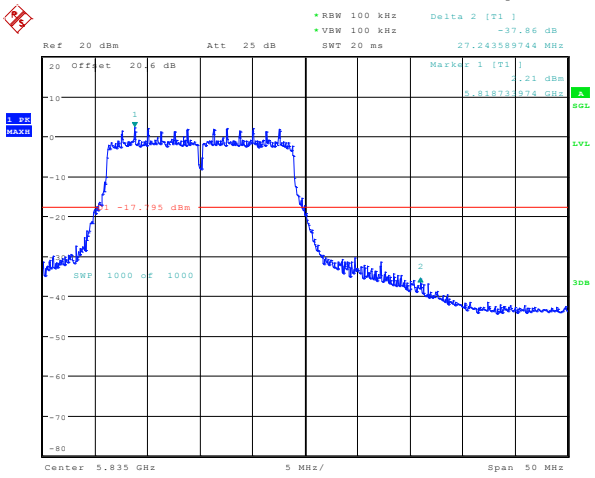


Figure 6-21: Band Edge Compliance
802.11n, Channel 165, 6 Mbps



802.11a 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 15.407. Channels 36, 48, 64, 100, 140 and 165 were measured at 6 Mbps, 24 Mbps, and 54 Mbps each for 802.11a mode.

Channel	Data Rate	Limit (dBm)	Measured Level (dBm)	Margin (dBm)
36	6 Mbps	< 11.00	3.93	-7.07
	24 Mbps	< 11.00	3.16	-7.84
	54 Mbps	< 11.00	2.34	-8.66
48	6 Mbps	< 11.00	3.48	-7.52
	24 Mbps	< 11.00	2.65	-8.35
	54 Mbps	< 11.00	1.91	-9.09
64	6 Mbps	< 11.00	5.36	-5.64
	24 Mbps	< 11.00	4.07	-6.93
	54 Mbps	< 11.00	2.02	-8.98
100	6 Mbps	< 11.00	4.38	-6.62
	24 Mbps	< 11.00	3.79	-7.21
	54 Mbps	< 11.00	2.90	-8.10
140	6 Mbps	< 11.00	1.56	-9.44
	24 Mbps	< 11.00	0.70	-10.30
	54 Mbps	< 11.00	-0.12	-11.12
165	6 Mbps	< 33.00	-9.07	-26.07
	24 Mbps	< 33.00	-9.02	-26.02
	54 Mbps	< 33.00	-12.27	-29.27

See figures 6-22 to 6-27 for the plots of the peak power spectral density for Channel 36, 48, 64, 100, 140, and 165 at 6 Mbps each for 802.11a mode.

802.11n RF Conducted Emission Test Results

Peak Power Spectral Density

The EUT met the requirements of the peak power spectral density as per 47 CFR 15.407. Channels 36, 64 and 165 were measured at MCS 0, MCS 4 and MCS 7 each for 802.11n mode.

Channel	Data Rate	Limit (dBm)	Measured Level (dBm)	Margin (dBm)
36	6 Mbps	< 11.00	2.01	-1.99
	24 Mbps	< 11.00	1.64	-2.36
	54 Mbps	< 11.00	0.34	-3.66
64	6 Mbps	< 11.00	4.02	-6.98
	24 Mbps	< 11.00	3.47	-7.53
	54 Mbps	< 11.00	1.68	-9.32
165	6 Mbps	< 33.00	-9.84	-26.84
	24 Mbps	< 33.00	-9.74	-26.74
	54 Mbps	< 33.00	-9.58	-26.58

See figures 6-28 to 6-30 for the plots of the peak power spectral density for Channel 36, 64 and 165 at MCS 0 each for 802.11n mode.

802.11a RF Conducted Emission Test Results cont'd

Figure 6-22: Peak Power Spectral Density
802.11a, Channel 36, 6 Mbps

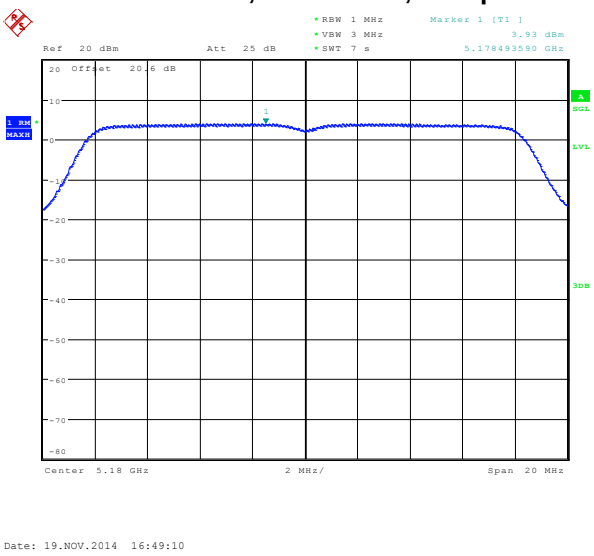


Figure 6-23: Peak Power Spectral Density
802.11a, Channel 48, 6 Mbps

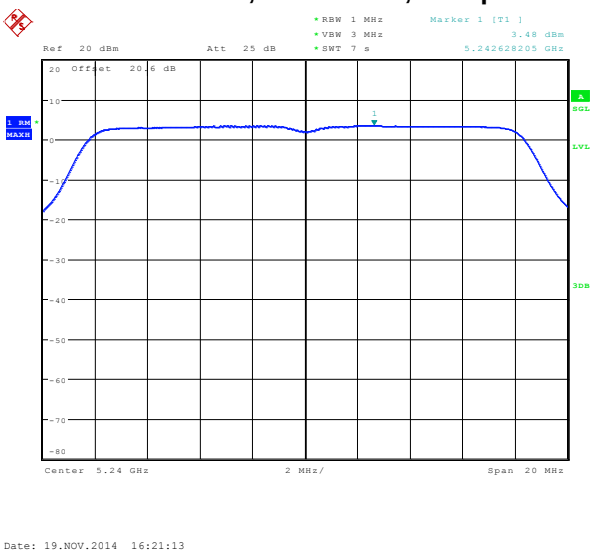


Figure 6-24: Peak Power Spectral Density
802.11a, Channel 64, 6 Mbps

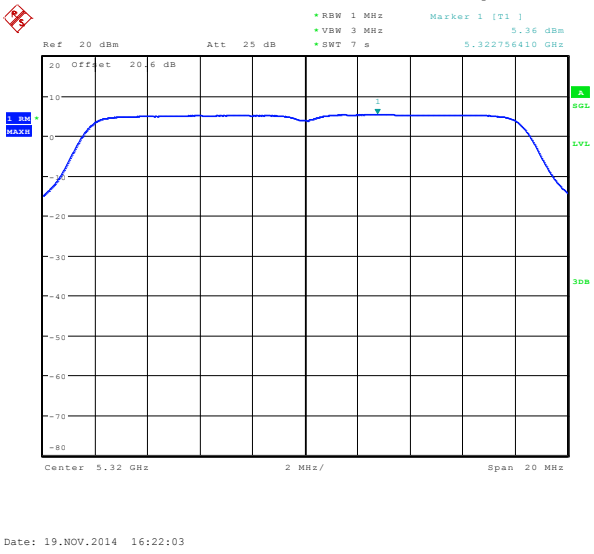
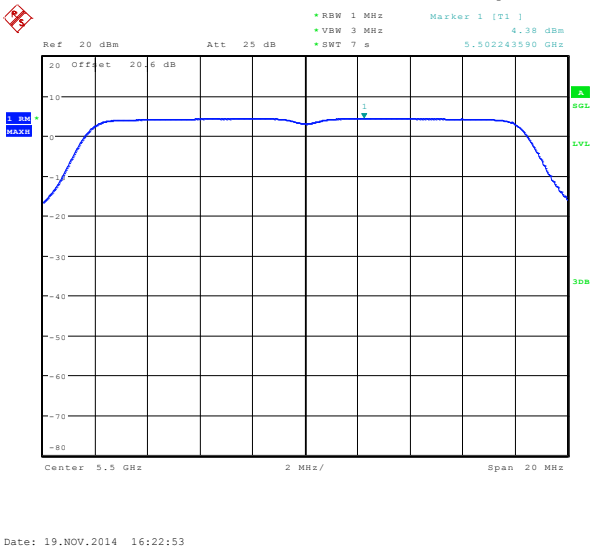


Figure 6-25: Peak Power Spectral Density
802.11a, Channel 100, 6 Mbps



802.11a RF Conducted Emission Test Results cont'd

Figure 6-26: Peak Power Spectral Density
802.11a, Channel 140, 6 Mbps

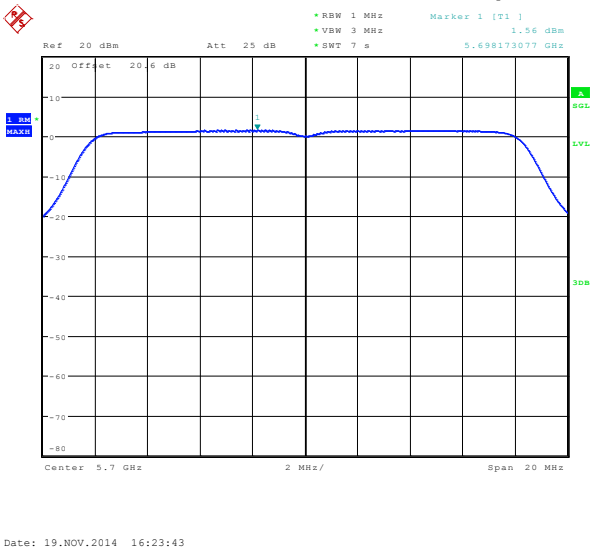
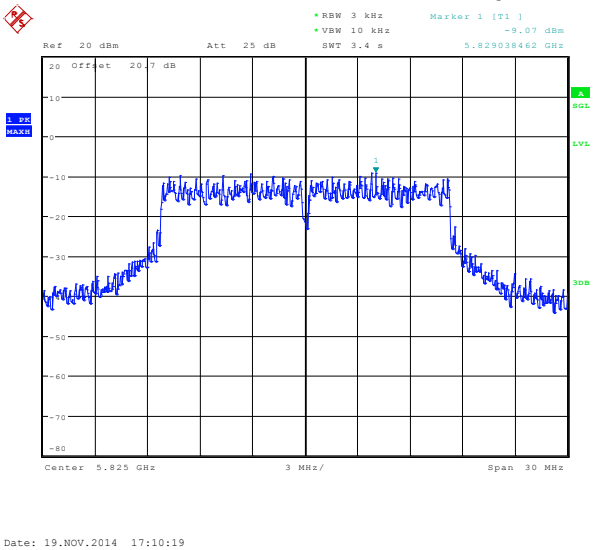


Figure 6-27: Peak Power Spectral Density
802.11a, Channel 165, 6 Mbps



802.11n RF Conducted Emission Test Results

Figure 6-28: Peak Power Spectral Density
802.11n, Channel 36, MCS 0

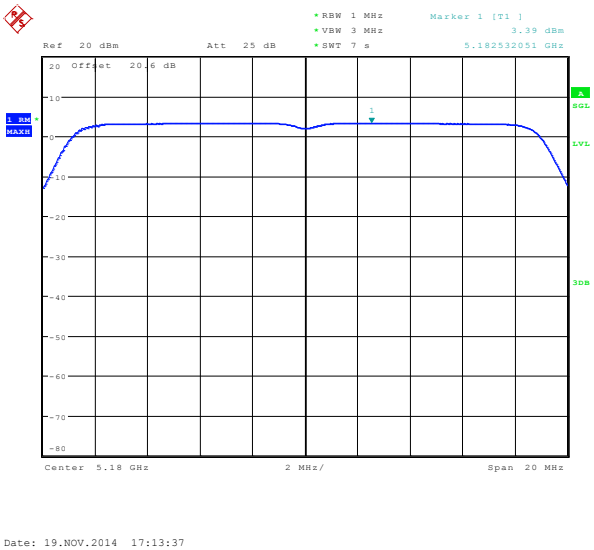


Figure 6-29: Peak Power Spectral Density
802.11n, Channel 64, MCS 0

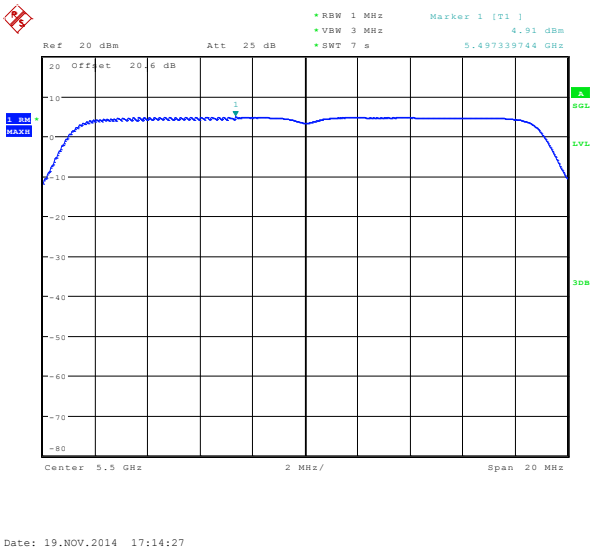
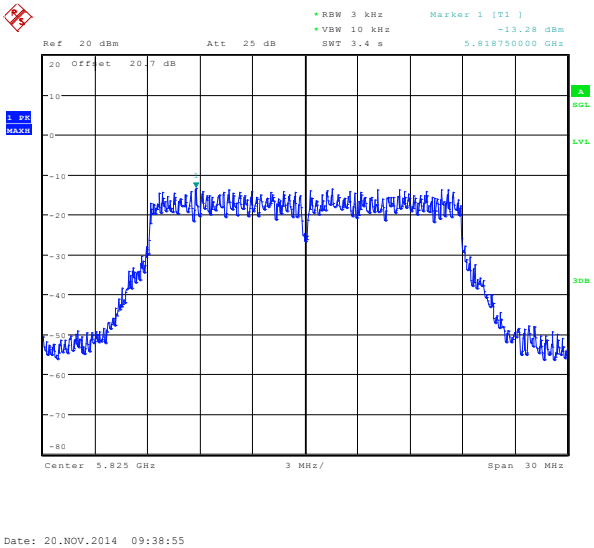


Figure 6-30: Peak Power Spectral Density
802.11n, Channel 165, MCS 0



802.11a RF Conducted Emission Test Results cont'd

Spurious RF Conducted Emissions

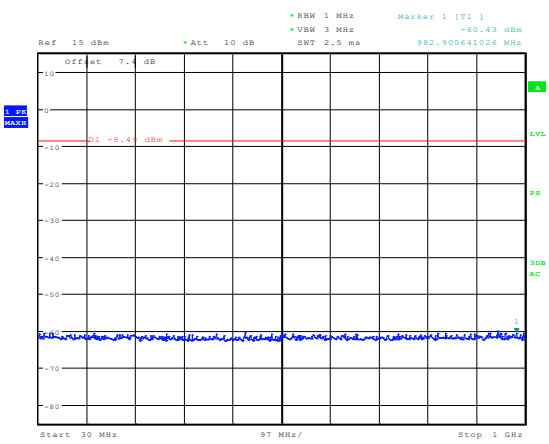
The EUT met the requirements of the spurious RF conducted emissions as per 47 CFR 15.407. Channels 36, 64, 100 and 140 were measured at 6 Mbps, 24Mbps and 54 Mbps each for 802.11a mode. Peak power was measured using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 29.0 dB was applied to the spectrum analyzer reference level for the attenuators and coaxial cable loss in the test circuit.

Channel	Data Rate	Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from Carrier (dBc)	Limit (dBc)
36	6 Mbps	17.91	-49.40	-64.96	-20
	24 Mbps	16.81	-40.62	-55.29	-20
	54 Mbps	14.84	-50.57	-64.41	-20
64	6 Mbps	17.73	-50.90	-67.77	-20
	24 Mbps	16.75	-50.86	-66.35	-20
	54 Mbps	14.81	-50.54	-63.80	-20
100	6 Mbps	18.33	-50.03	-66.04	-20
	24 Mbps	17.42	-51.07	-66.14	-20
	54 Mbps	15.28	-51.11	-65.26	-20
140	6 Mbps	17.98	-50.13	-63.36	-20
	24 Mbps	16.93	-51.22	-63.62	-20
	54 Mbps	14.92	-51.1	-62.61	-20

See figures 6-31 to 6-34 for the plots of the spurious RF conducted emissions for Channel 36, 64, 100 and 140 at 6 Mbps each for 802.11a mode.

802.11a RF Conducted Emission Test Results cont'd

Figure 6-31a: Spurious RF Conducted Emissions, 802.11a Channel 36, 6 Mbps



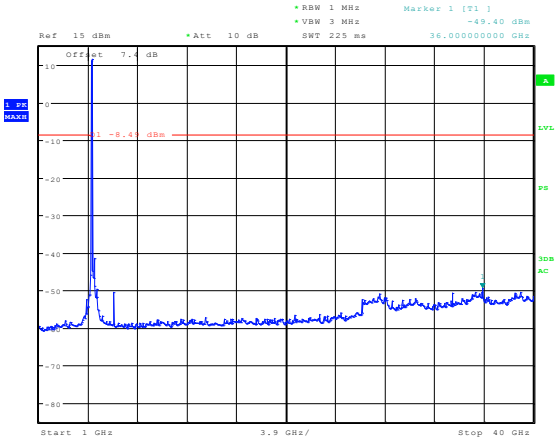
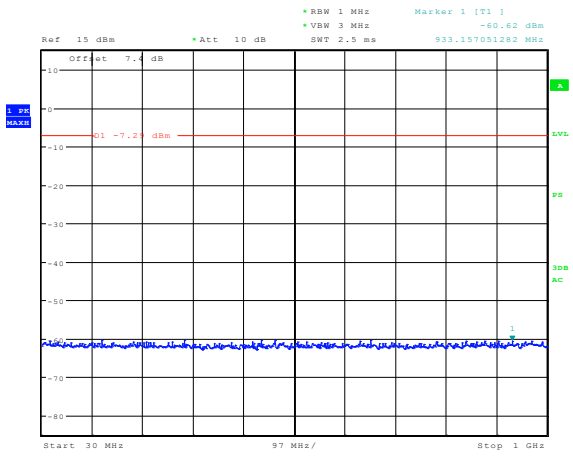
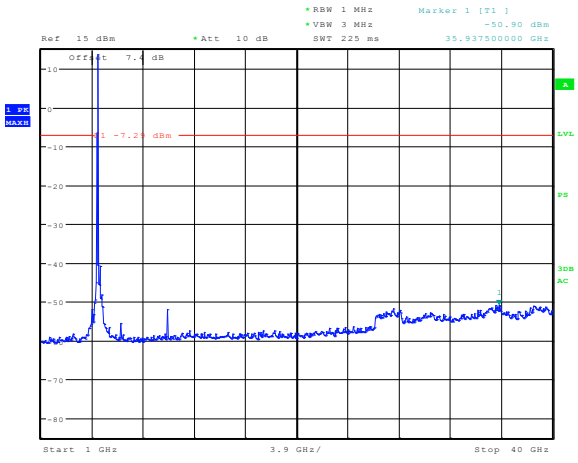


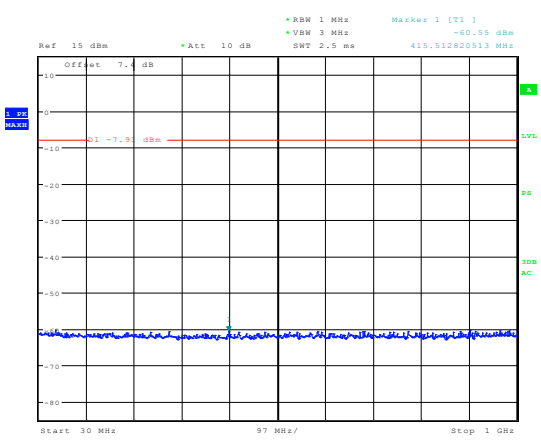
Figure 6-32a: Spurious RF Conducted Emissions, 802.11a Channel 64, 6 Mbps





802.11a RF Conducted Emission Test Results cont'd

Figure 6-33a: Spurious RF Conducted Emissions, 802.11a Channel 100, 6 Mbps



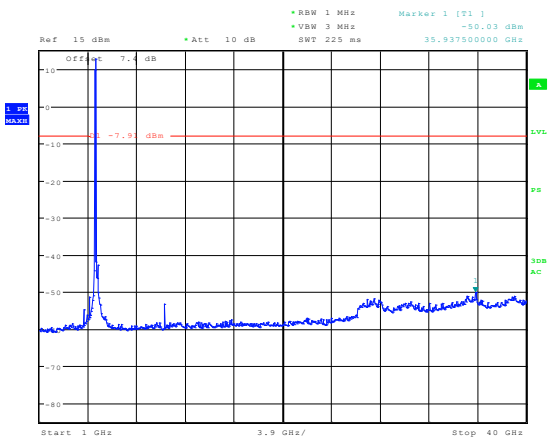
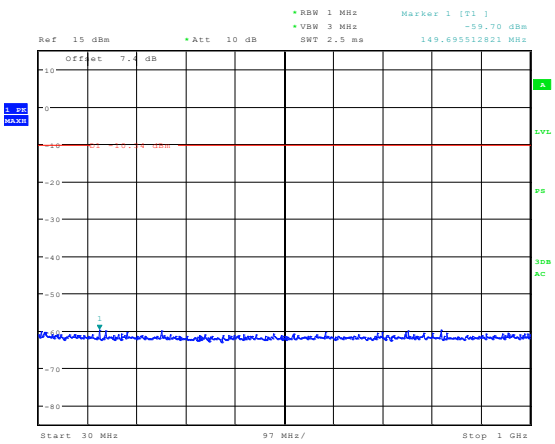
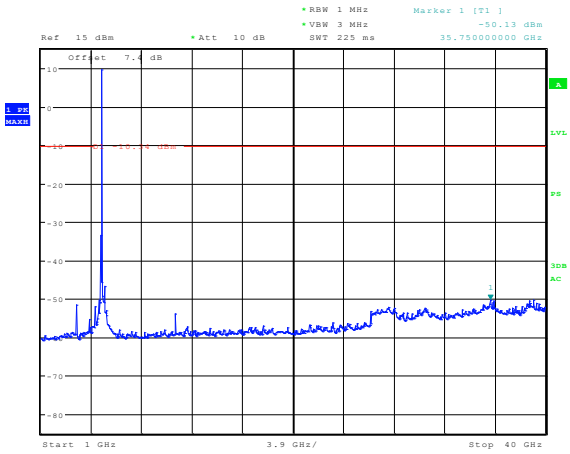


Figure 6-34a: Spurious RF Conducted Emissions, 802.11a Channel 140, 6 Mbps





802.11n RF Conducted Emission Test Results cont'd

Spurious RF Conducted Emissions

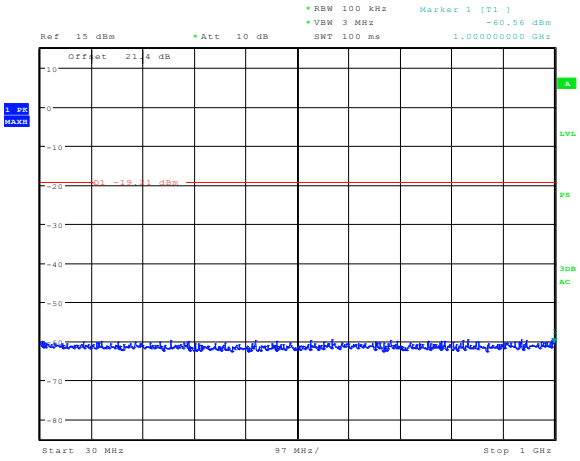
The EUT met the requirements of the spurious RF conducted emissions as per 47 CFR 15.407. Channels 36, 64, 100 and 140 were measured at MCS0 Mbps, MCS4 Mbps and MCS7 Mbps each for 802.11n mode. Peak power was measured using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 29.0 dB was applied to the spectrum analyzer reference level for the attenuators and coaxial cable loss in the test circuit.

Channel	Data Rate	Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from Carrier (dBc)	Limit (dBc)
36	MCS0	17.83	-47.47	-62.87	-20
	MCS4	16.17	-46.89	-61.19	-20
	MCS7	13.71	-47.35	-60.15	-20
64	MCS0	17.58	-48.62	-63.52	-20
	MCS4	16.16	-47.95	-61.85	-20
	MCS7	13.78	-46.53	-58.73	-20
100	MCS0	18.25	-46.81	-63.21	-20
	MCS4	16.76	-47.52	-62.92	-20
	MCS7	14.29	-46.53	-59.63	-20
140	MCS0	17.98	-46.31	-59.11	-20
	MCS4	16.39	-48.11	-59.81	-20
	MCS7	13.93	-48	-59.10	-20

See figures 6-35 to 6-38 for the plots of the spurious RF conducted emissions for Channel 36, 64, 100 and 140 at MCSa0 Mbps each for 802.11n mode.

802.11a RF Conducted Emission Test Results cont'd

Figure 6-35a: Spurious RF Conducted Emissions, 802.11n Channel 36, MCS0 Mbps



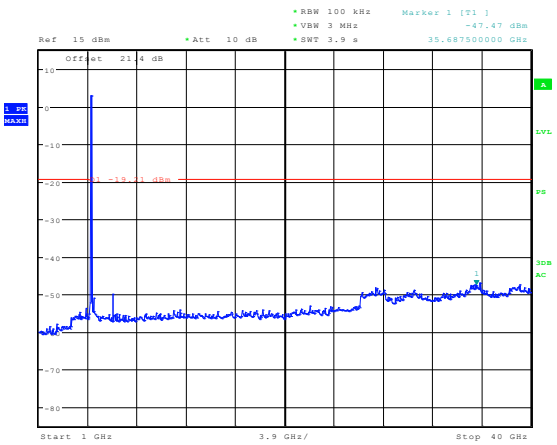
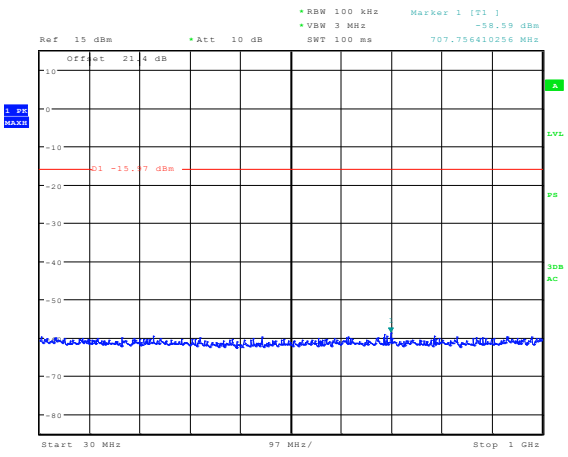
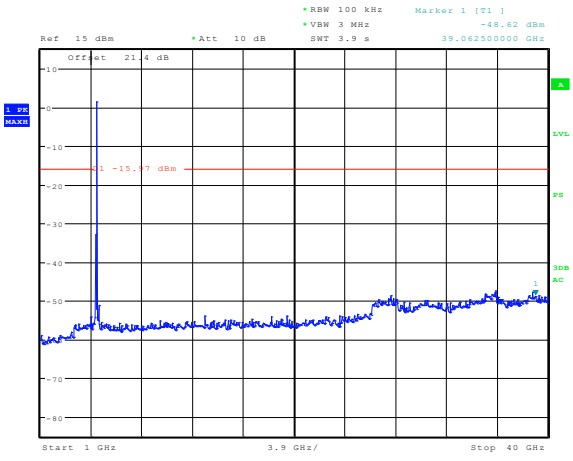


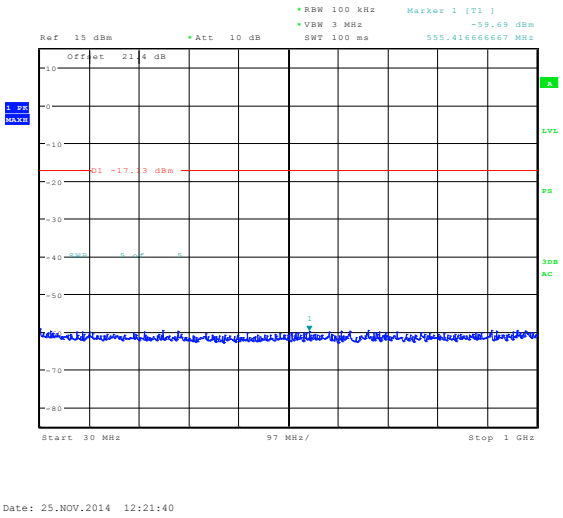
Figure 6-36a: Spurious RF Conducted Emissions, 802.11n Channel 64, MCS0 Mbps





802.11n RF Conducted Emission Test Results cont'd

Figure 6-37a: Spurious RF Conducted Emissions, 802.11n Channel 100, MCS0 Mbps



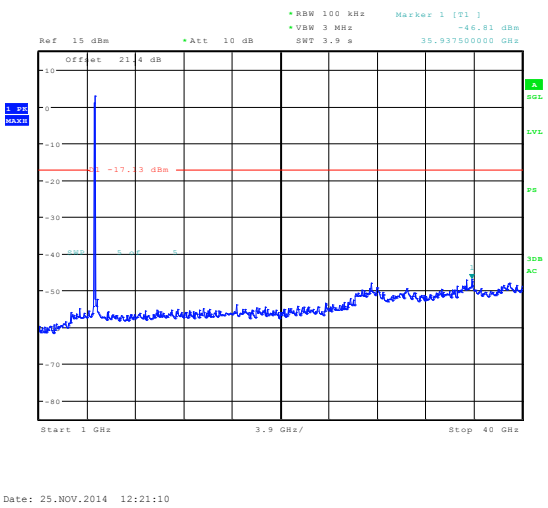
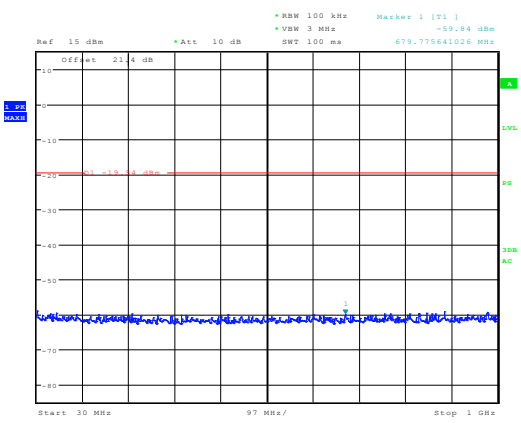
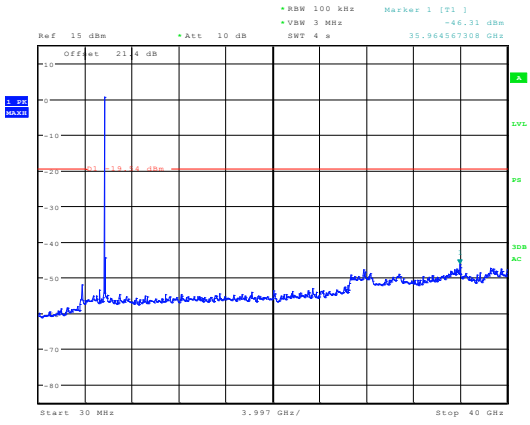


Figure 6-38a: Spurious RF Conducted Emissions, 802.11n Channel 140, MCS0 Mbps

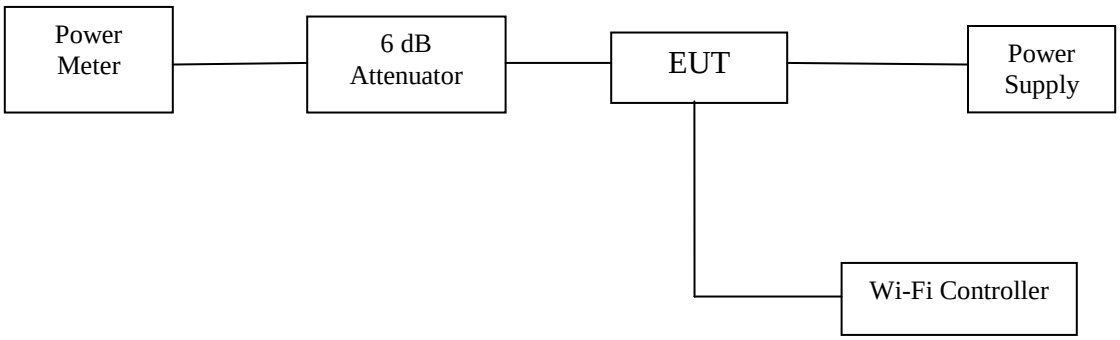


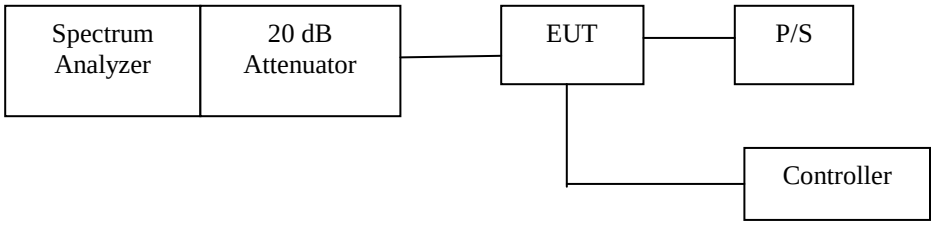


APPENDIX 7 – 802.11ac CONDUCTED EMISSIONS TEST DATA/PLOTS

802.11ac RF Conducted Emission Test Results

Test Setup Diagram





A reference offset of 8.9 dB was applied to the spectrum analyzer and 7.4 dB to the Power Meter reference level for the attenuators and coaxial cable loss in the test circuit.

Date of test: November 5 – November 28, 2014
The measurements were performed by Sijia Li.

The environmental test conditions were:	Temperature:	23.5 ºC
	Relative Humidity:	30.4 %

802.11ac 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). For bandwidth 20 MHz, channels 36, 64, 140 and 149 were measured at 0 Mbps, 4 Mbps, and 9 Mbps each; for bandwidth 40 MHz, channels 38, 62, 142 and 151 were measured at 0 Mbps, 4 Mbps, and 9 Mbps each; for bandwidth 80 MHz, channels 42, 58, 138 and 155 were measured at 0 Mbps, 4 Mbps, and 9 Mbps each

20MHz Bandwidth

Channel	Data Rate	Limit (kHz)	Measured Level (MHz)
36	MCS0	≥ 500	17.78
	MCS4	≥ 500	17.76
	MCS9	≥ 500	15.24
64	MCS0	≥ 500	17.80
	MCS4	**≥ 500**	**17.82**
	MCS9	≥ 500	15.24
140	MCS0	≥ 500	17.80
	MCS4	≥ 500	17.80
	MCS9	≥ 500	15.24
149	MCS0	≥ 500	17.80
	MCS4	≥ 500	17.76
	MCS9	≥ 500	15.26

See figures 7-1 to 7-4 for the plots of the 6 dB bandwidth measurements for Channel 36, 64, 140 and 149 at MCS0 Mbps each for 802.11ac mode

802.11ac RF Conducted Emission Test Results cont'd

40MHz Bandwidth

Channel	Data Rate	Limit (kHz)	Measured Level (MHz)
38	**MCS0**	**≥ 500**	**36.56**
	MCS4	≥ 500	36.52
	MCS9	**≥ 500**	**36.56**
62	**MCS0**	**≥ 500**	**36.56**
	MCS4	**≥ 500**	**36.56**
	MCS9	**≥ 500**	**36.56**
142	MCS0	≥ 500	36.52
	MCS4	**≥ 500**	**36.56**
	MCS9	**≥ 500**	**36.56**
151	**MCS0**	**≥ 500**	**36.56**
	MCS4	≥ 500	36.52
	MCS9	**≥ 500**	**36.56**

See figures 7-5 to 7-8 for the plots of the 6 dB bandwidth measurements for Channel 38, 62, 142 and 151 at MCS 0 each for 802.11ac mode.

80MHz Bandwidth

Channel	Data Rate	Limit (kHz)	Measured Level (MHz)
42	**MCS0**	**≥ 500**	**76.56**
	MCS4	**≥ 500**	**76.56**
	MCS9	**≥ 500**	**76.56**
58	**MCS0**	**≥ 500**	**76.56**
	MCS4	**≥ 500**	**76.56**
	MCS9	**≥ 500**	**76.56**
138	**MCS0**	**≥ 500**	**76.56**
	MCS4	**≥ 500**	**76.56**
	MCS9	**≥ 500**	**76.56**
155	MCS0	≥ 500	76.48
	MCS4	≥ 500	76.48
	MCS9	**≥ 500**	**76.56**

See figures 7-9 to 7-12 for the plots of the 6 dB bandwidth measurements for Channel 42, 58, 138 and 155 at MCS 0 each for 802.11n mode.

802.11ac RF Conducted Emission Test Results cont'd

Figure 7-1: 6 dB Bandwidth
802.11ac, BW20, Channel 36, MCS0 Mbps

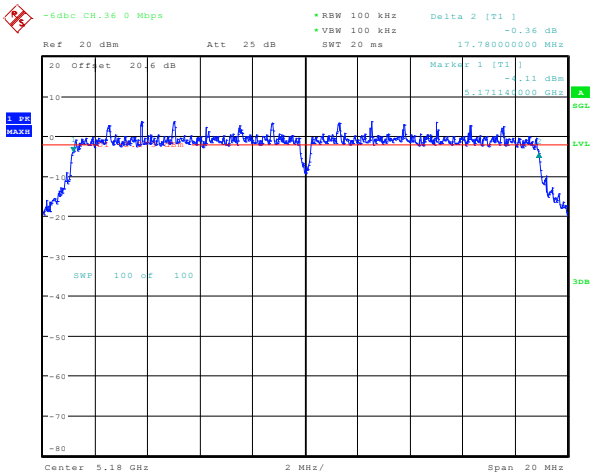


Figure 7-2: 6 dB Bandwidth
802.11ac, BW20 Channel 48, MCS0 Mbps

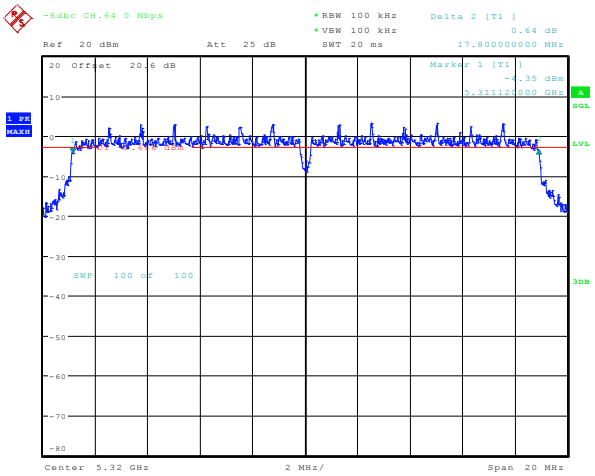


Figure 7-3: 6 dB Bandwidth
802.11ac, BW20, Channel 64, 6 Mbps

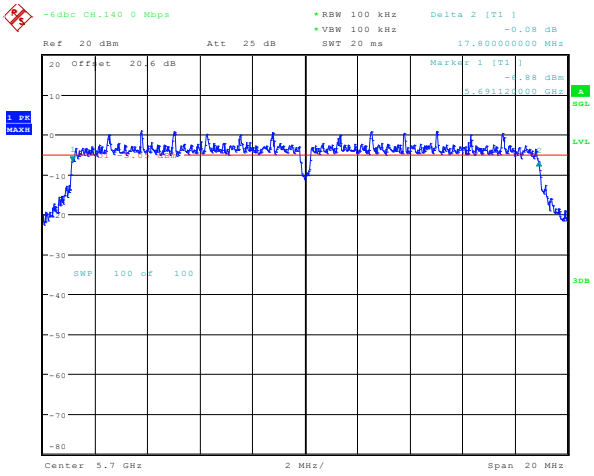
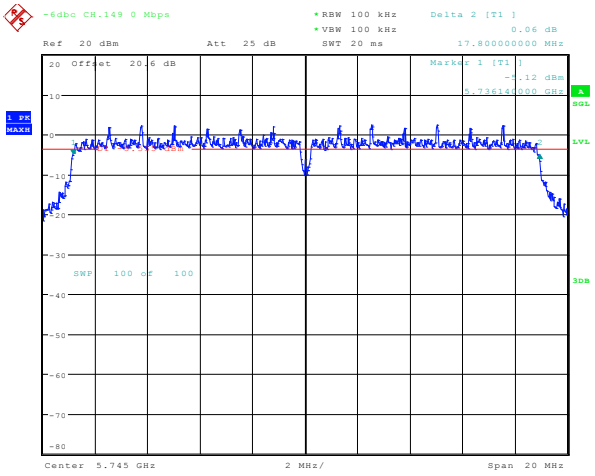


Figure 7-4: 6 dB Bandwidth
802.11ac, BW20, Channel 100, 6 Mbps



802.11ac RF Conducted Emission Test Results cont'd

Figure 7-5: 6 dB Bandwidth
802.11ac, BW40, Channel 38, MCS0 Mbps

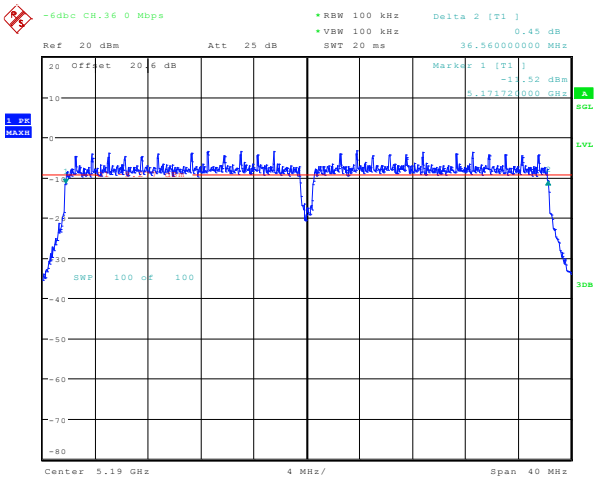


Figure 7-6: 6 dB Bandwidth
802.11ac, BW40, Channel 62, MCS0 Mbps

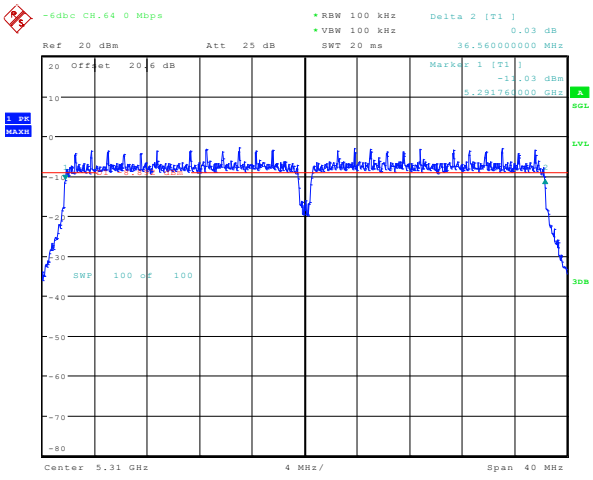


Figure 7-7: 6 dB Bandwidth
802.11ac, BW40, Channel 142, MCS0 Mbps

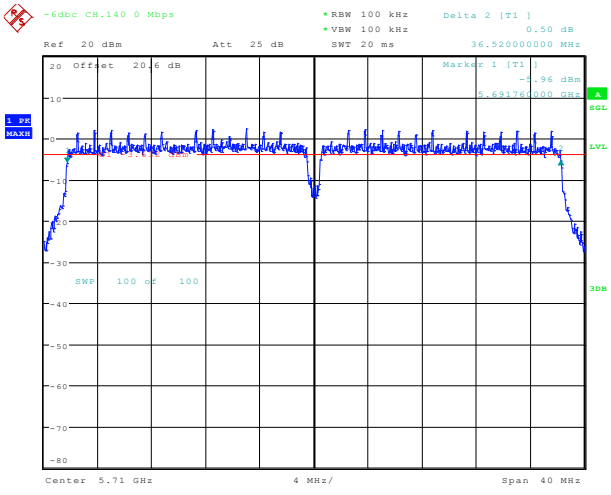
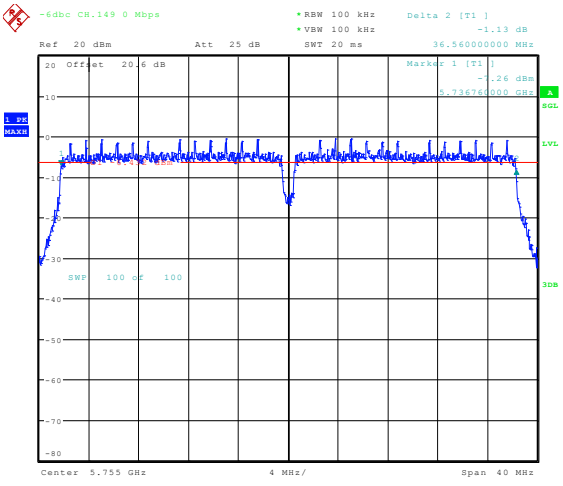


Figure 7-8: 6 dB Bandwidth
802.11ac, BW40, Channel 151, MCS0 Mbps



802.11ac RF Conducted Emission Test Results cont'd

Figure 7-9: 6 dB Bandwidth
802.11ac, BW80, Channel 42, MCS0 Mbps

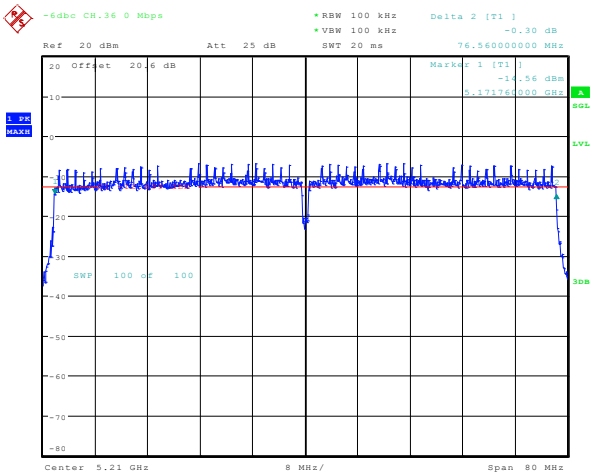


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Figure 7-10: 6 dB Bandwidth
802.11ac, BW80, Channel 58, MCS0 Mbps

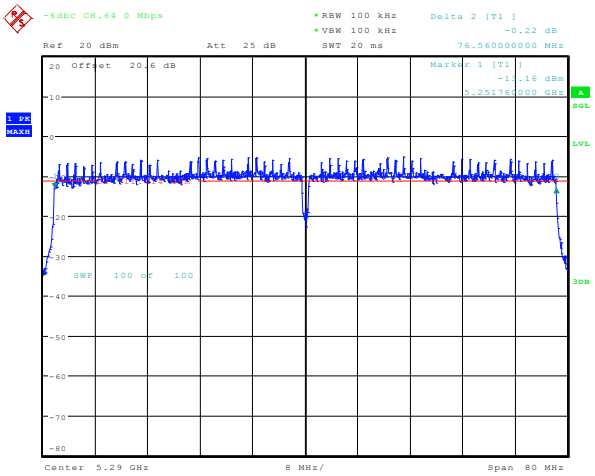

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Figure 7-11: 6 dB Bandwidth
802.11ac, BW80, Channel 138, MCS0 Mbps

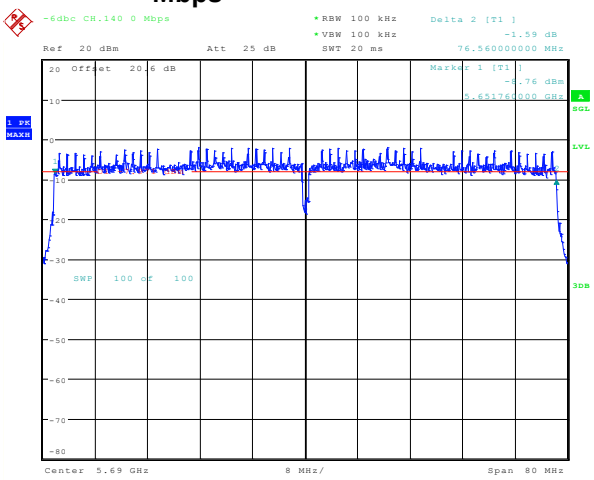

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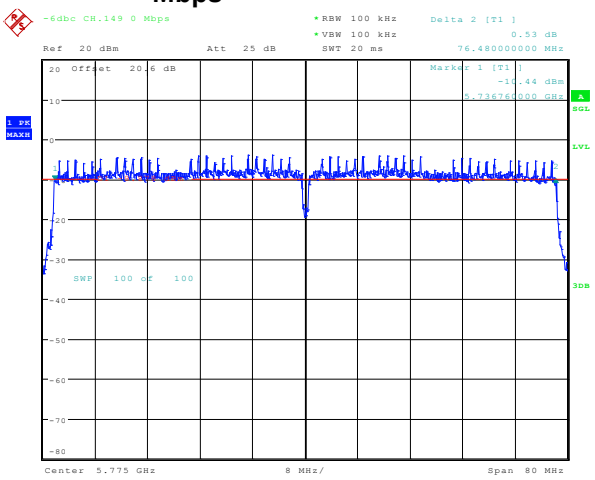
Figure 7-12: 6 dB Bandwidth
802.11ac, BW80, Channel 155, MCS0 Mbps



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802.11ac 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 15.407. Channels 36, 64, 100, 140 and 149 were measured for 802.11ac mode, bandwidth 20MHz, using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 8.9 dB was applied to the power meter reference level for the coaxial cable loss and attenuators in the test circuit.

20 MHz Bandwidth

Channel	BW(MHz)	Data Rate	Power Limit (mW)	Measured Level (dBm)	Measured Level (mW)
36	20	MCS0	< 250.0	15.54	35.79
		MCS4	< 250.0	14.39	27.49
		MCS9	< 250.0	5.02	3.18
64	20	MCS0	< 250.0	14.99	31.57
		MCS4	< 250.0	13.89	24.49
		MCS9	< 250.0	4.38	2.74
100	20	**MCS0**	**< 250.0**	**16.51**	**44.75**
		MCS4	< 250.0	15.33	34.08
		MCS9	< 250.0	5.18	3.30
140	20	MCS0	< 250.0	12.93	19.63
		MCS4	< 250.0	11.74	14.93
		MCS9	< 250.0	4.94	3.12
149	20	MCS0	< 1000	14.43	27.72
		MCS4	< 1000	13.43	22.03
		MCS9	< 1000	5.44	3.50

802.11ac RF Conducted Emission Test Results

Channels 38, 62, 102, 142 and 151 were measured for 802.11ac mode, bandwidth 40MHz, using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 8.9 dB was applied to the power meter reference level for the coaxial cable loss and attenuators in the test circuit.

40 MHz Bandwidth

Channel	BW(MHz)	Data Rate	Power Limit (mW)	Measured Level (dBm)	Measured Level (mW)
38	40	MCS0	< 250.0	11.28	13.42
		MCS4	< 250.0	9.57	9.06
		MCS9	< 250.0	8.39	6.91
62	40	MCS0	< 250.0	11.57	14.34
		MCS4	< 250.0	9.79	9.53
		MCS9	< 250.0	8.07	6.41
102	40	MCS0	< 250.0	13.08	20.30
		MCS4	< 250.0	11.30	13.49
		MCS9	< 250.0	8.86	7.70
142	40	**MCS0**	**< 250.0**	**16.60**	**45.70**
		MCS4	< 250.0	13.73	23.60
		MCS9	< 250.0	8.83	7.64
151	40	MCS0	< 1000	14.22	26.42
		MCS4	< 1000	12.49	17.72
		MCS9	< 1000	9.37	8.65

802.11ac RF Conducted Emission Test Results

Channels 42, 58, 105, 138 and 151 were measured for 802.11ac mode, bandwidth 80MHz, using an Agilent power meter; model N1911A with model N1921A power sensor. A reference offset of 8.9 dB was applied to the power meter reference level for the coaxial cable loss and attenuators in the test circuit.

80 MHz Bandwidth

Channel	BW(MHz)	Data Rate	Power Limit (mW)	Measured Level (dBm)	Measured Level (mW)
42	80	MCS0	< 250.0	9.86	9.69
		MCS4	< 250.0	7.64	5.81
		MCS9	< 250.0	6.81	4.79
58	80	MCS0	< 250.0	11.25	13.34
		MCS4	< 250.0	9.28	8.47
		MCS9	< 250.0	6.63	4.61
105	80	MCS0	< 250.0	12.46	17.60
		MCS4	< 250.0	10.53	11.29
		MCS9	< 250.0	7.15	5.19
138	80	**MCS0**	**< 250.0**	**14.50**	**28.20**
		MCS4	< 250.0	11.63	14.56
		MCS9	< 250.0	7.15	5.19
151	80	MCS0	< 1000	12.58	18.10
		MCS4	< 1000	10.66	11.64
		MCS9	< 1000	7.38	5.47

802.11ac RF Conducted Emission Test Results cont'd

Band Edge Compliance

The EUT met the requirements of the band edge compliance as per 47 CFR 15.407. Channels 36, 64, 100, 140, 149, and 165 were measured at MCS0 Mbps, MCS4 Mbps, and MCS9 Mbps each for bandwidth 20MHz, 802.11ac mode.

20MHz Bandwidth

Channel	Bandwidt(MHz)	Data Rate	Limit (dBc)	Measured Level (dBc)	Margin (dBc)
36	20	MCS0	< -20	-45.57	-25.57
		MCS4	< -20	-45.25	-25.25
		MCS9	< -20	-41.38	-21.38
64	20	MCS0	< -20	-45.23	-25.23
		MCS4	< -20	-45.51	-25.51
		MCS9	< -20	-41.16	-21.16
100	20	MCS0	< -20	-46.41	-26.41
		MCS4	< -20	-46.79	-26.79
		MCS9	< -20	-42.64	-22.64
140	20	MCS0	< -20	-42.85	-22.85
		MCS4	< -20	-42.30	-22.30
		MCS9	< -20	-41.57	-21.57
149	20	MCS0	< -20	-37.38	-17.38
		MCS4	< -20	-40.21	-20.21
		MCS9	< -20	-41.89	-21.89
165	20	MCS0	< -20	-38.56	-18.56
		MCS4	< -20	-39.78	-19.78
		MCS9	< -20	-40.37	-20.37

See figures 7-13 to 7-18 for the plots of the band edge compliance measurements for Channel 36, 64, 100, 140, 149 and 165 at MCS0 Mbps each for 802.11ac mode.

802.11ac RF Conducted Emission Test Results cont'd

Figure 7-13: Band Edge Compliance
802.11ac, Channel 36, MCS0 Mbps

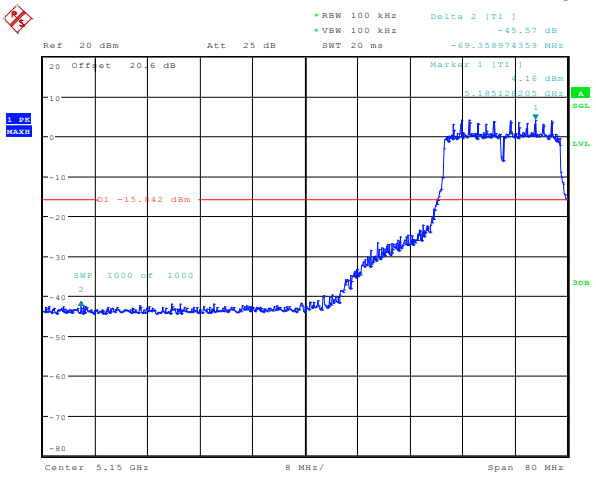

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Figure 7-14: Band Edge Compliance
802.11ac, Channel 64, MCS0 Mbps

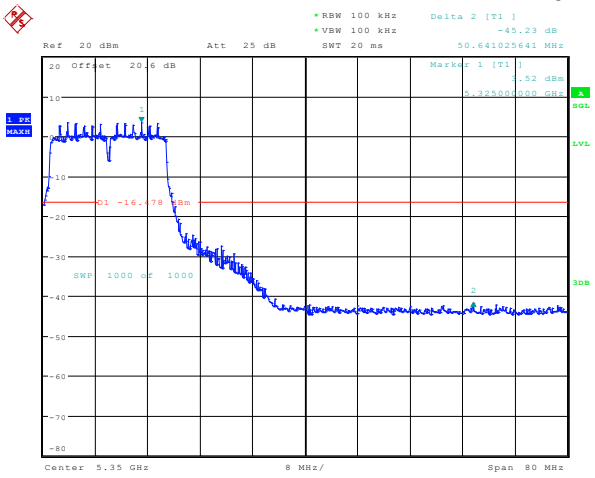

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Figure 7-15: Band Edge Compliance
802.11ac, Channel 100, MCS0 Mbps

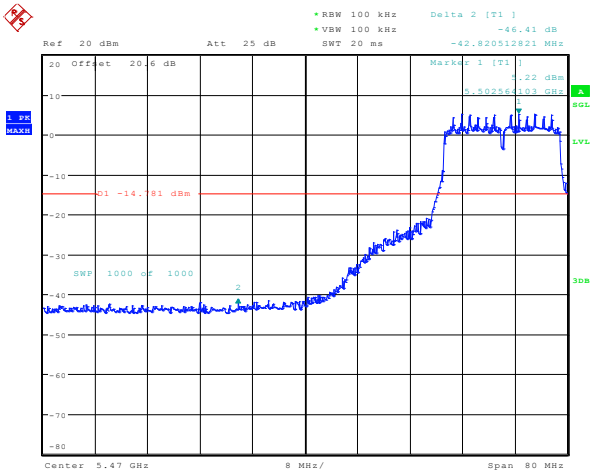

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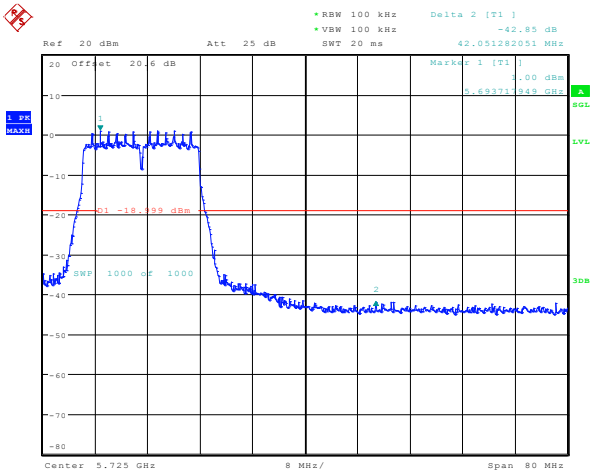
Figure 7-16: Band Edge Compliance
802.11ac, Channel 140, MCS0 Mbps



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802.11ac RF Conducted Emission Test Results cont'd

Figure 7-17: Band Edge Compliance
802.11ac, Channel 149, MCS0 Mbps

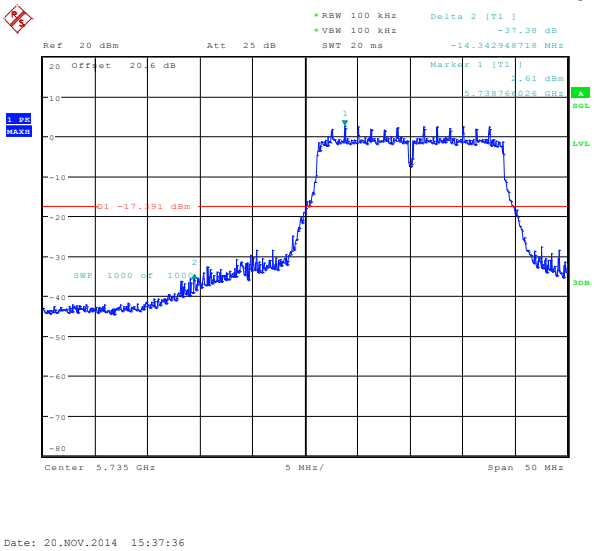
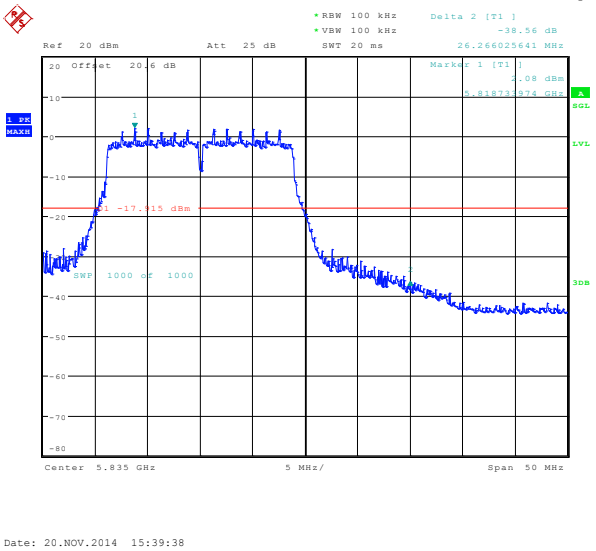


Figure 7-18: Band Edge Compliance
802.11ac, Channel 165, MCS0 Mbps



802.11ac RF Conducted Emission Test Results cont'd

Channels 38, 62, 102, 142, 151, and 159 were measured at MCS0 Mbps, MCS4 Mbps, and MCS9 Mbps each for bandwidth 40MHz, 802.11ac mode.

40MHz Bandwidth

Channel	Bandwidt(MHz)	Data Rate	Limit (dBc)	Measured Level (dBc)	Margin (dBc)
38	40	MCS0	< -20	-37.33	-17.33
		MCS4	< -20	-37.97	-17.97
		MCS9	< -20	-38.34	-18.34
62	40	MCS0	< -20	-38.72	-18.72
		MCS4	< -20	-39.03	-19.03
		MCS9	< -20	-38.76	-18.76
102	40	MCS0	< -20	-39.17	-19.17
		MCS4	< -20	-39.77	-19.77
		MCS9	< -20	-38.89	-18.89
142	40	MCS0	< -20	-25.62	-5.62
		MCS4	< -20	-29.42	-9.42
		MCS9	< -20	-31.11	-11.11
151	40	MCS0	< -20	-37.27	-48.27
		MCS4	< -20	-38.78	-49.78
		MCS9	< -20	-39.22	-50.22
159	40	MCS0	< -20	-36.58	-47.58
		MCS4	< -20	-37.65	-48.65
		MCS9	< -20	-38.79	-49.79

See figures 7-19 to 7-24 for the plots of the band edge compliance measurements for Channel 38, 62, 102, 142, 151, and 159 at MCS0 Mbps each for 802.11ac mode.

802.11ac RF Conducted Emission Test Results cont'd

Figure 7-19: Band Edge Compliance
802.11ac, Channel 38, MCS0 Mbps

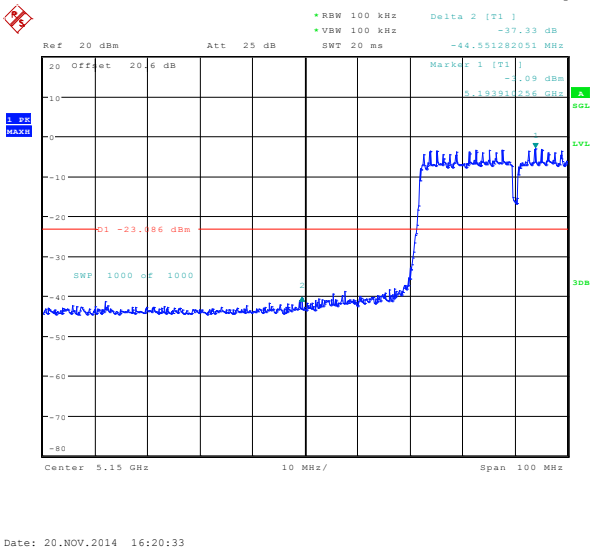


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Figure 7-20: Band Edge Compliance
802.11ac, Channel 62, MCS0 Mbps

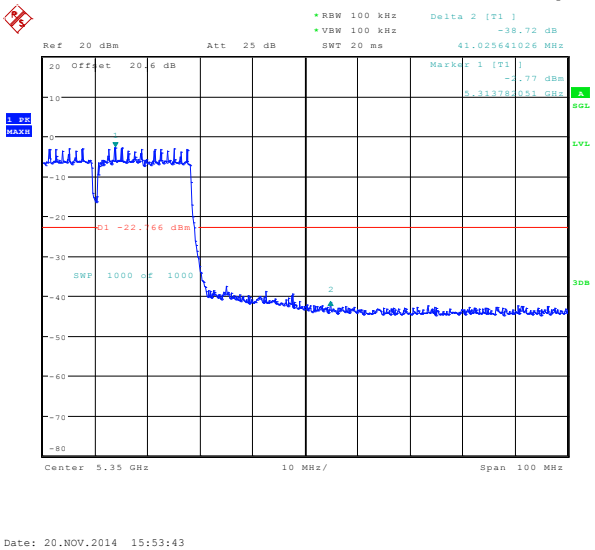

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Figure 7-21: Band Edge Compliance
802.11ac, Channel 102, MCS0 Mbps

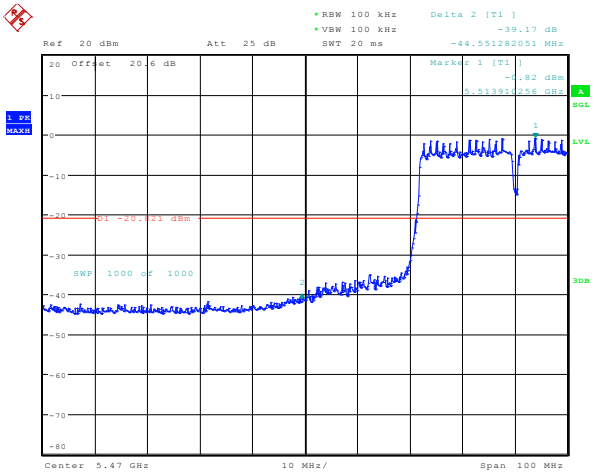

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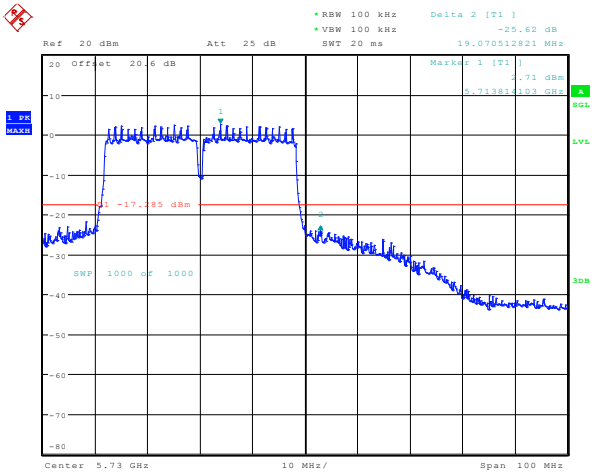
Figure 7-22: Band Edge Compliance
802.11ac, Channel 142, MCS0 Mbps



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802.11a RF Conducted Emission Test Results cont'd

Figure 7-23: Band Edge Compliance
802.11ac, Channel 151, MCS0 Mbps

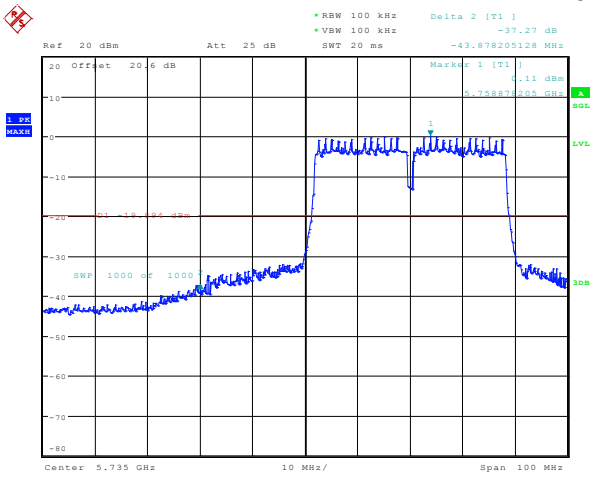
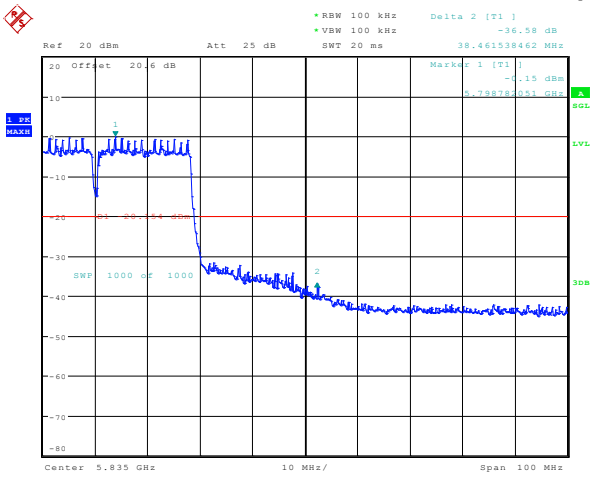


Figure 7-24: Band Edge Compliance
802.11ac, Channel 159, MCS0 Mbps



802.11ac RF Conducted Emission Test Results cont'd

Channels 42, 58, 105, 138, 155(Low edge) , and 155 (High edge) were measured at MCS0 Mbps, MCS4 Mbps, and MCS9 Mbps each for bandwidth 80MHz, 802.11ac mode.

80MHz Bandwidth

Channel	Bandwidt(MHz)	Data Rate	Limit (dBc)	Measured Level (dBc)	Margin (dBc)
42	80	MCS0	< -20	-34.63	-14.63
		MCS4	< -20	-34.49	-14.49
		MCS9	< -20	-34.34	-14.34
58	80	MCS0	< -20	-35.73	-15.73
		MCS4	< -20	-36.03	-16.03
		MCS9	< -20	-35.48	-15.48
105	80	MCS0	< -20	-34.80	-14.80
		MCS4	< -20	-35.23	-15.23
		MCS9	< -20	-34.73	-14.73
138	80	MCS0	< -20	-27.53	-7.53
		MCS4	< -20	-29.04	-9.04
		MCS9	< -20	-28.45	-8.45
155 (Low Edge)	80	MCS0	< -20	-33.04	-13.04
		MCS4	< -20	-33.59	-13.59
		MCS9	< -20	-33.36	-13.36
155 (High Edge)	80	MCS0	< -20	-34.95	-14.95
		MCS4	< -20	-35.24	-15.24
		MCS9	< -20	-35.15	-15.15

See figures 7-25 to 7-30 for the plots of the band edge compliance measurements for Channel 42, 58, 105, 138 and 155 at MCS0 Mbps each for 802.11ac mode.

802.11ac RF Conducted Emission Test Results cont'd

Figure 7-25: Band Edge Compliance
802.11ac, Channel 42, MCS0 Mbps

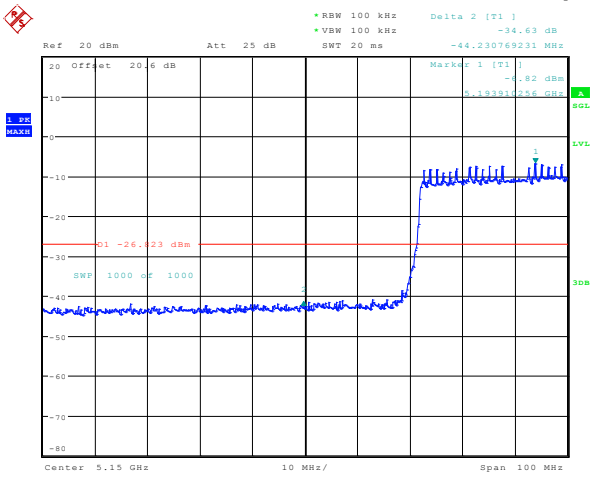


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Figure 7-26: Band Edge Compliance
802.11ac, Channel 58, MCS0 Mbps

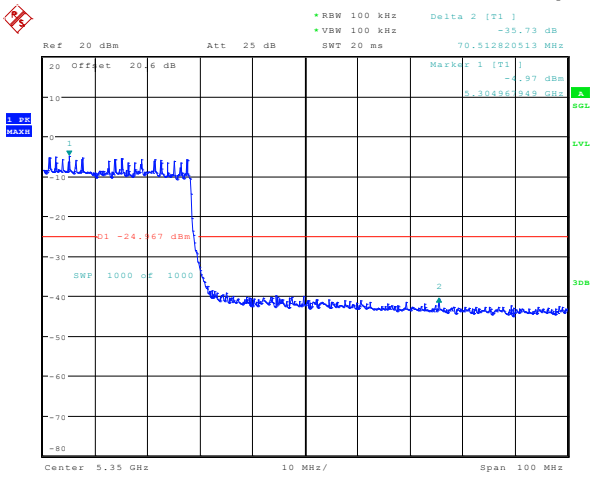

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Figure 7-27: Band Edge Compliance
802.11ac, Channel 105, MCS0 Mbps

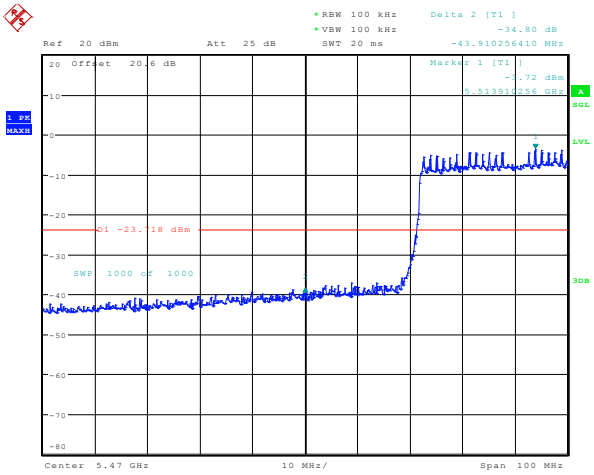

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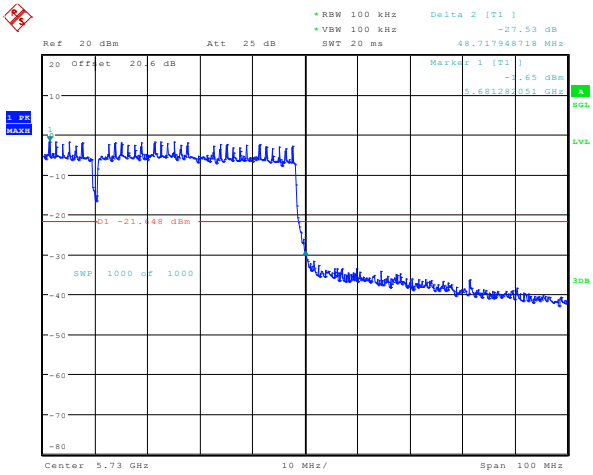
Figure 7-28: Band Edge Compliance
802.11ac, Channel 138, MCS0 Mbps



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802.11ac RF Conducted Emission Test Results cont'd

Figure 7-29: Band Edge Compliance 802.11ac, Channel 155 (Low edge), MCS0 Mbps

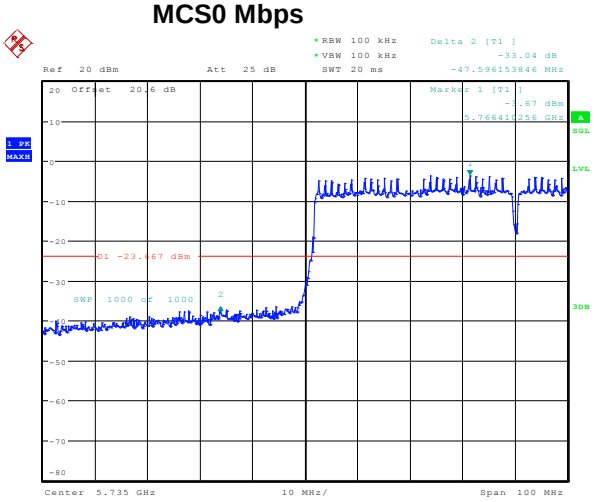
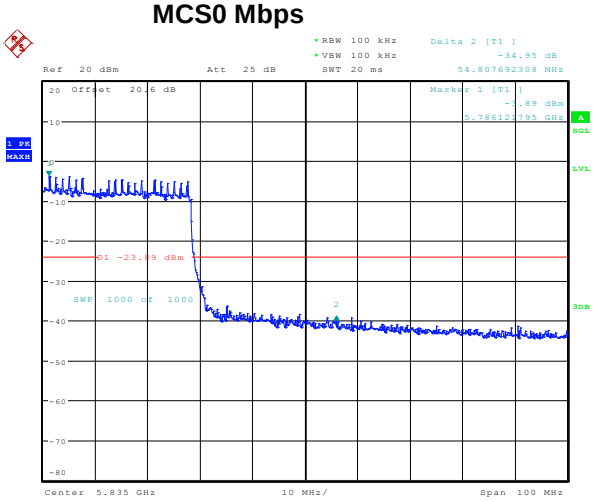


Figure 7-30: Band Edge Compliance 802.11ac, Channel 155 (high edge), MCS0 Mbps



802.11ac 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 15.407. Channels 36, 64, 140 and 149 were measured at MCS0 Mbps, MCS4 Mbps, and MCS9 Mbps each for 802.11ac mode, bandwidth 20MHz.

Bandwidth 20MHz

Channel	Data Rate	Limit (dBm)	Measured Level (dBm)	Margin (dBm)
36	MCS0	< 11.00	3.50	-7.50
	MCS4	< 11.00	2.44	-8.56
	MCS9	< 11.00	-5.59	-16.59
64	MCS0	**< 11.00**	3.12	-7.88
	MCS4	< 11.00	2.13	-8.87
	MCS9	< 11.00	-6.05	-17.05
140	MCS0	< 11.00	0.82	-10.18
	MCS4	< 11.00	-0.34	-11.34
	MCS9	< 11.00	-5.44	-16.44
149	MCS0	< 11.00	-12.28	-23.28
	MCS4	< 11.00	-13.35	-24.35
	MCS9	< 11.00	-13.45	-24.45

See figures 7-31 to 7-34 for the plots of the peak power spectral density for Channel 36, 64, 140 and 149 at MCS0 Mbps each for 802.11ac mode, 20MHz bandwidth.

802.11ac RF Conducted Emission Test Results cont'd

Figure 7-31: Peak Power Spectral Density
802.11ac, Channel 36, MCS0 Mbps

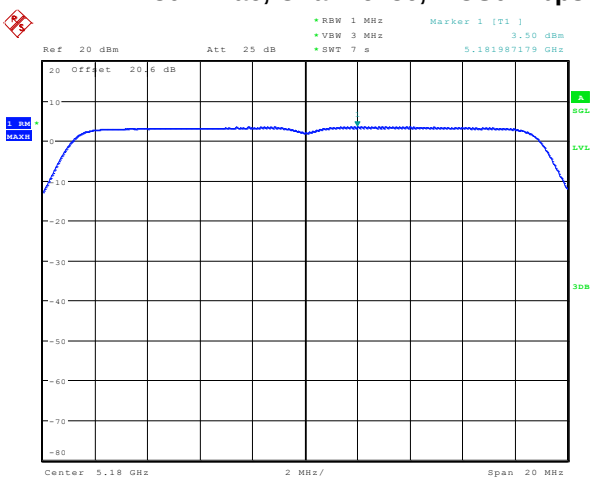


Figure 7-32: Peak Power Spectral Density
802.11ac, Channel 64, MCS0 Mbps

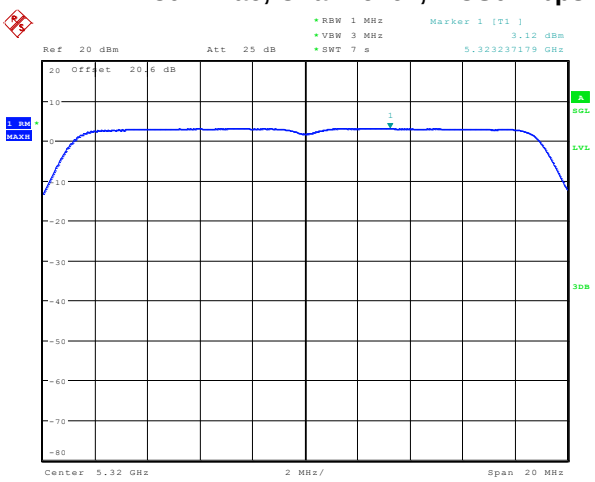


Figure 7-33: Peak Power Spectral Density
802.11ac, Channel 140, MCS0 Mbps

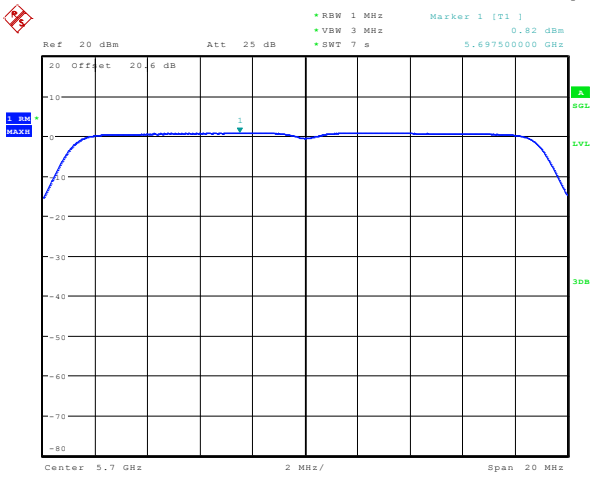
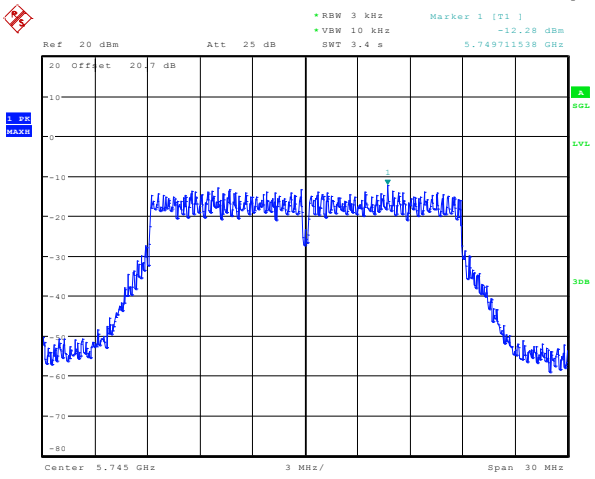


Figure 7-34: Peak Power Spectral Density
802.11ac, Channel 149, MCS0 Mbps



802.11ac RF Conducted Emission Test Results cont'd

Channels 38, 62, 142 and 151 were measured at MCS0 Mbps, MCS4 Mbps, and MCS9 Mbps each for 802.11ac mode, bandwidth 40MHz.

Bandwidth 40MHz

Channel	Data Rate	Limit (dBm)	Measured Level (dBm)	Margin (dBm)
38	MCS0	< 11.00	-3.76	-14.76
	MCS4	< 11.00	-5.34	-16.34
	MCS9	< 11.00	-6.16	-17.16
62	MCS0	**< 11.00**	-3.26	-14.26
	MCS4	< 11.00	-4.87	-15.87
	MCS9	< 11.00	-6.27	-17.27
142	MCS0	< 11.00	1.93	-9.07
	MCS4	< 11.00	-1.03	-12.03
	MCS9	< 11.00	-5.84	-16.84
151	MCS0	< 11.00	-15.23	-26.23
	MCS4	< 11.00	-15.39	-26.39
	MCS9	< 11.00	-18.50	-29.50

See figures 7-35 to 7-38 for the plots of the peak power spectral density for channel 38, 62, 142 and 151 at MCS0 Mbps each for 802.11ac mode, 40MHz bandwidth.

802.11ac RF Conducted Emission Test Results cont'd

Figure 7-35: Peak Power Spectral Density
802.11ac, Channel 38, MCS0 Mbps

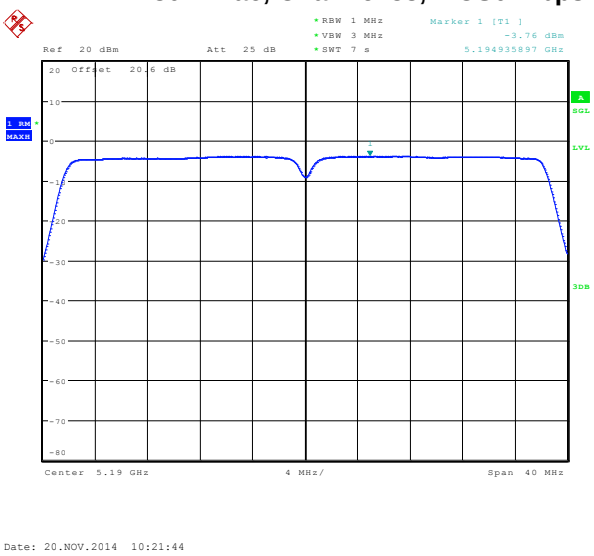


Figure 7-36: Peak Power Spectral Density
802.11ac, Channel 62, MCS0 Mbps

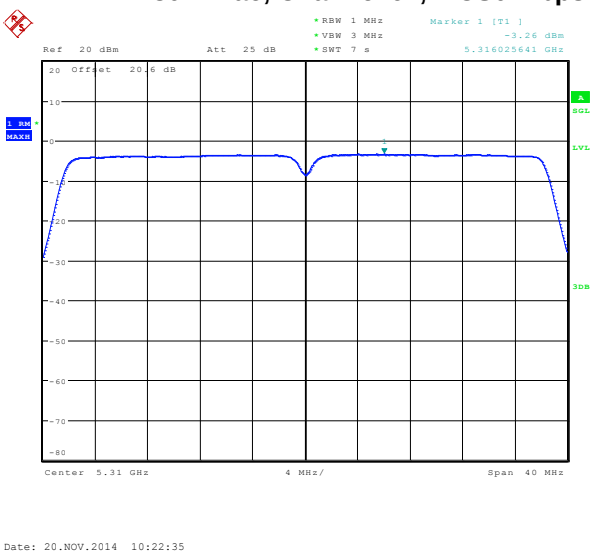


Figure 7-37: Peak Power Spectral Density
802.11ac, Channel 142, MCS0 Mbps

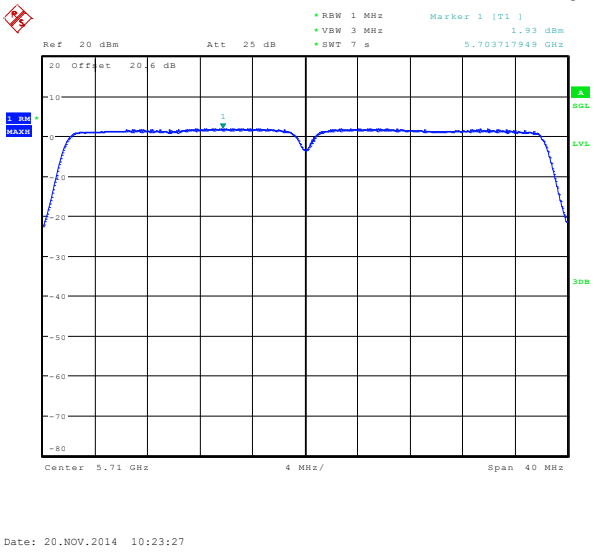
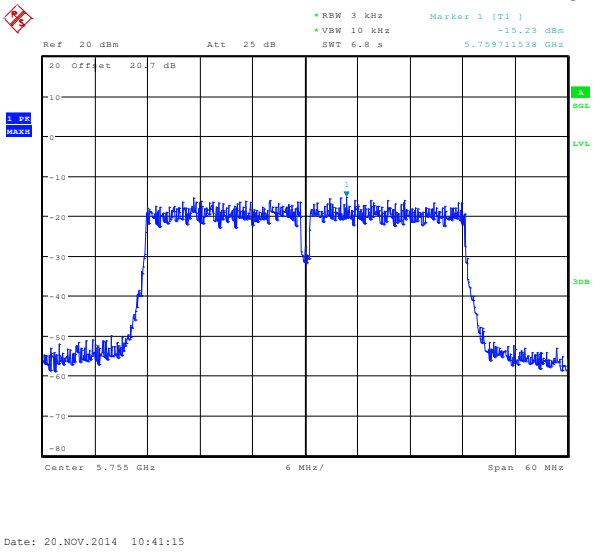


Figure 7-38: Peak Power Spectral Density
802.11ac, Channel 151, MCS0 Mbps



802.11ac RF Conducted Emission Test Results cont'd

Channels 42, 58, 138 and 155 were measured at MCS0 Mbps, MCS4 Mbps, and MCS9 Mbps each for 802.11ac mode, bandwidth 80MHz.

Bandwidth 80MHz

Channel	Data Rate	Limit (dBm)	Measured Level (dBm)	Margin (dBm)
42	MCS0	< 11.00	-7.67	-18.67
	MCS4	< 11.00	-9.45	-20.45
	MCS9	< 11.00	-10.02	-21.02
58	MCS0	**< 11.00**	-6.19	-17.19
	MCS4	< 11.00	-8.05	-19.05
	MCS9	< 11.00	-10.31	-21.31
138	MCS0	< 11.00	-2.97	-13.97
	MCS4	< 11.00	-5.33	-16.33
	MCS9	< 11.00	-10.01	-21.01
155	MCS0	< 11.00	-19.10	-30.10
	MCS4	< 11.00	-18.94	-29.94
	MCS9	< 11.00	-21.60	-32.60

See figures 7-39 to 7-42 for the plots of the peak power spectral density for channel 42, 58, 138 and 155 at MCS0 Mbps each for 802.11ac mode, 80MHz bandwidth.

802.11ac RF Conducted Emission Test Results cont'd

Figure 7-39: Peak Power Spectral Density
802.11ac, Channel 42, MCS0 Mbps

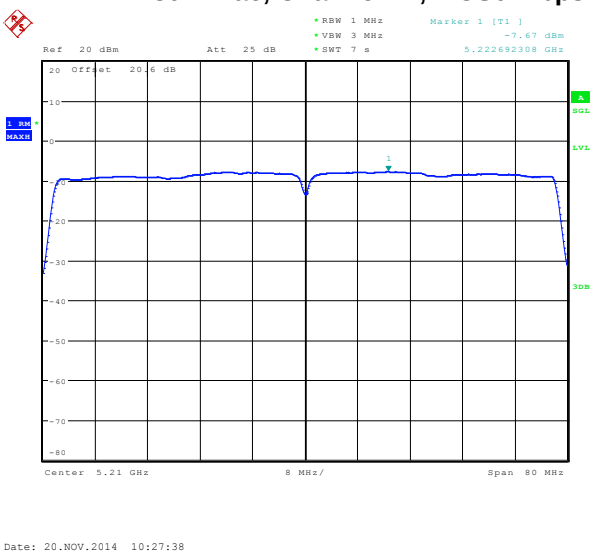


Figure 7-40: Peak Power Spectral Density
802.11ac, Channel 58, MCS0 Mbps

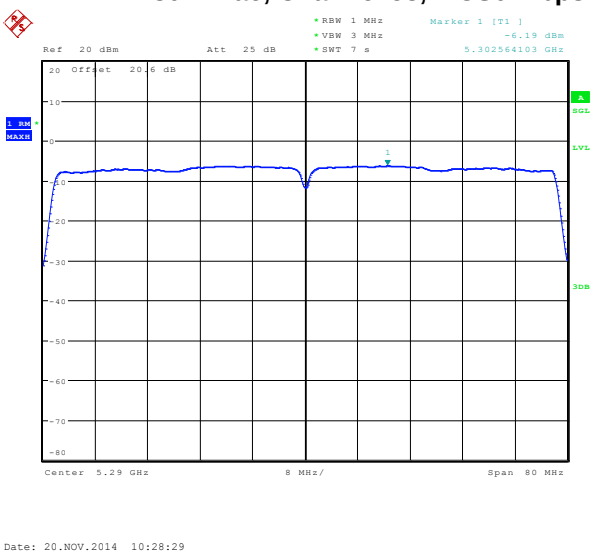


Figure 7-41: Peak Power Spectral Density
802.11ac, Channel 138, MCS0 Mbps

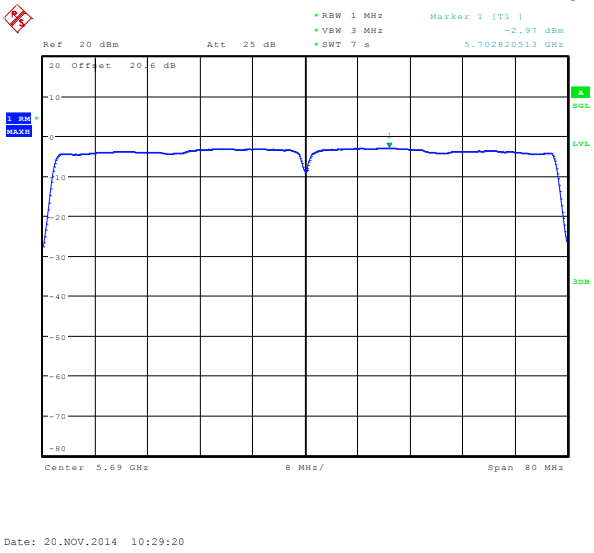
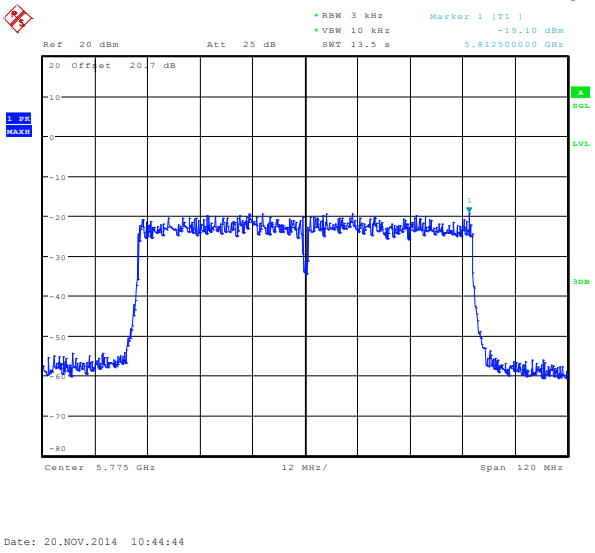


Figure 7-42: Peak Power Spectral Density
802.11ac, Channel 155, MCS0 Mbps



802.11ac 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 15.407. Channels 36, 64, 140 and 149 were measured at MCS0 Mbps, MCS4 Mbps and MCS9 Mbps each for 802.11ac mode, 20MHz bandwidth. Peak power was measured using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 29.0 dB was applied to the spectrum analyzer reference level for the attenuators and coaxial cable loss in the test circuit.

20MHZ Bandwidth

Channel	Data Rate	Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from Carrier (dBc)	Limit (dBc)
36	MCS0	16.26	-40.36	-55.90	-20
	MCS4	15.99	-49.3	-63.69	-20
	MCS9	**6.40**	-49.66	-54.68	-20
64	MCS0	17.34	-49.84	-64.83	-20
	MCS4	16.90	-50.76	-64.65	-20
	MCS9	6.12	-51.8	-56.18	-20
140	MCS0	13.23	-50.59	-63.52	-20
	MCS4	13.28	-50.88	-62.62	-20
	MCS9	6.21	-50.69	-55.63	-20
149	MCS0	14.92	-49.60	-64.03	-20
	MCS4	14.87	-50.74	-64.17	-20
	MCS9	6.93	-50.45	-55.89	-20

See figures 7-43 to 7-46 for the plots of the spurious RF conducted emissions for Channel 36, 64, 140 and 149 at MCS0 Mbps each for 802.11ac mode.

802.11ac RF Conducted Emission Test Results cont'd

Figure 7-43a: Spurious RF Conducted Emissions, 802.11ac Channel 36, MCS0 Mbps

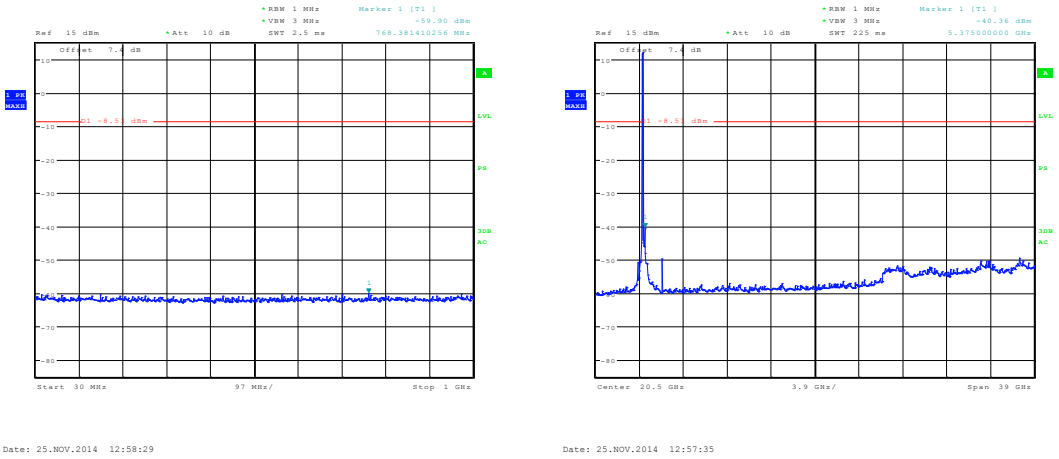
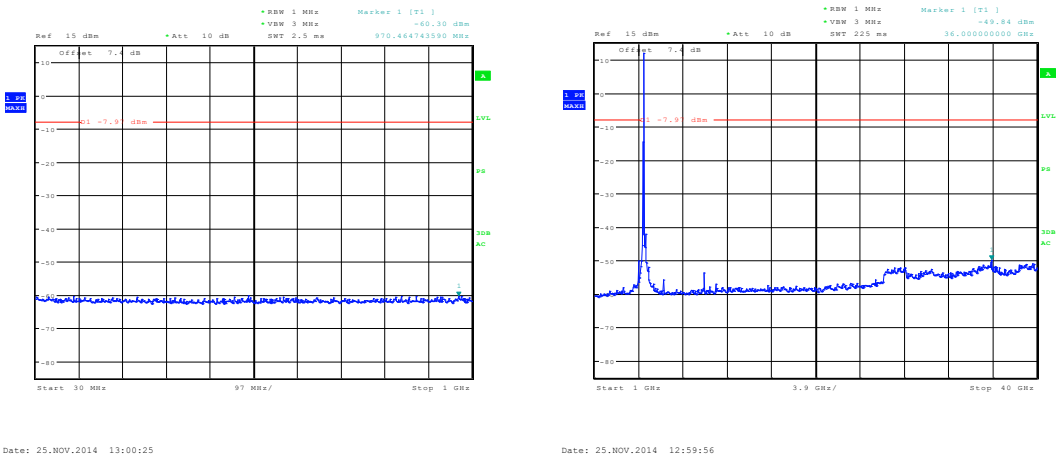
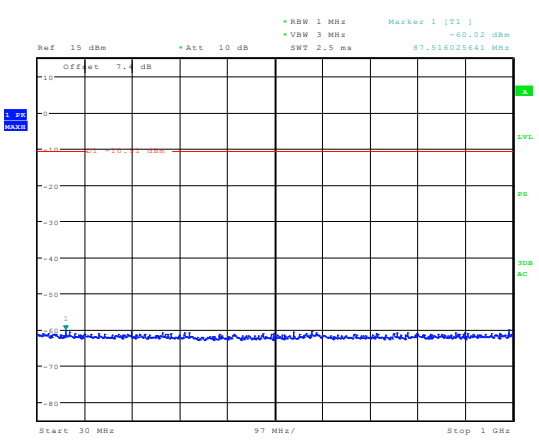


Figure 7-44a: Spurious RF Conducted Emissions, 802.11ac Channel 64, MCS0



802.11ac RF Conducted Emission Test Results cont'd

Figure 7-45a: Spurious RF Conducted Emissions, 802.11ac Channel 140, MCS0



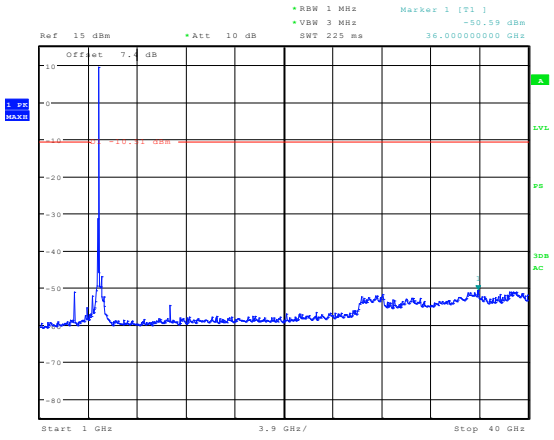
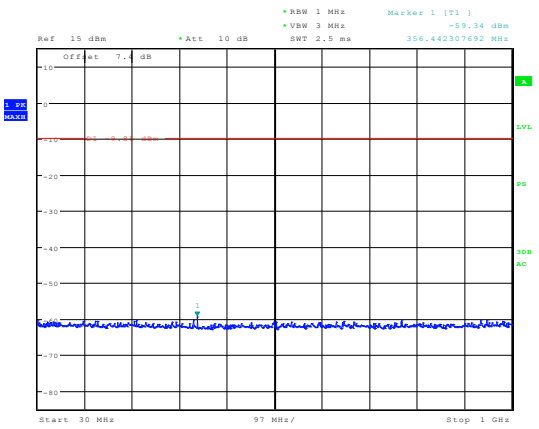
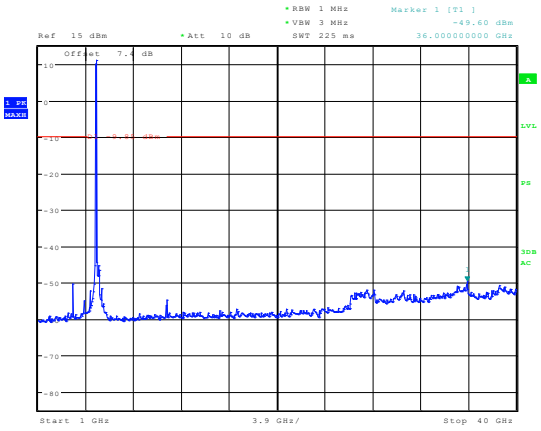


Figure 7-46a: Spurious RF Conducted Emissions, 802.11ac Channel 149, MCS0





802.11ac RF Conducted Emission Test Results cont'd

Channels 38, 62, 142 and 151 were measured at MCS0 Mbps, MCS4 Mbps and MCS9 Mbps each for 802.11ac mode, 40MHz bandwidth. Peak power was measured using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 29.0 dB was applied to the spectrum analyzer reference level for the attenuators and coaxial cable loss in the test circuit.

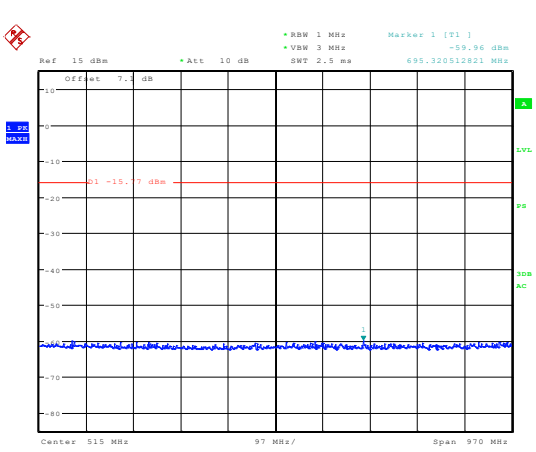
40MHZ Bandwidth

Channel	Data Rate	Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from Carrier (dBc)	Limit (dBc)
38	MCS0	16.26	-49.41	-60.69	-20
	MCS4	16.16	-40.7	-50.27	-20
	MCS9	10.79	-50.06	-58.45	-20
62	MCS0	17.25	-50.44	-62.01	-20
	MCS4	15.94	-51.56	-61.35	-20
	MCS9	10.56	-50.5	-58.57	-20
142	MCS0	17.42	-49.54	-66.14	-20
	MCS4	16.24	-50.21	-63.94	-20
	MCS9	10.56	-52.14	-60.97	-20
151	MCS0	15.13	-50.78	-65.00	-20
	MCS4	14.96	-50.59	-63.08	-20
	MCS9	11.25	-51.57	-60.94	-20

See figures 7-47 to 7-50 for the plots of the spurious RF conducted emissions for Channel 38, 62, 142 and 151 at MCS0 Mbps each for 802.11ac mode, bandwidth 40MHz.

802.11ac RF Conducted Emission Test Results cont'd

Figure 7-47a: Spurious RF Conducted Emissions, 802.11ac Channel 38, MCS0



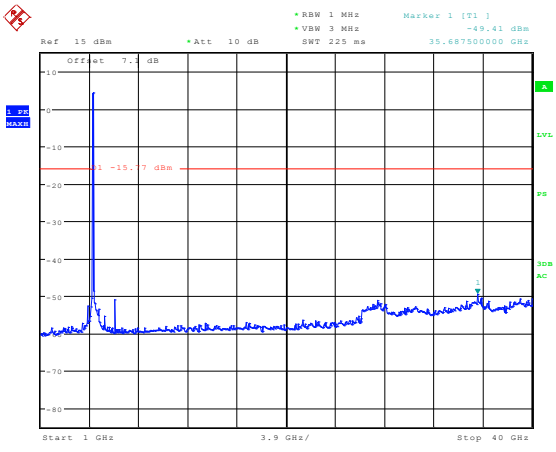
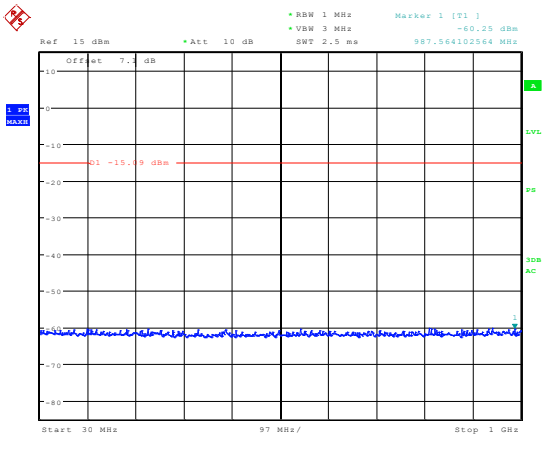
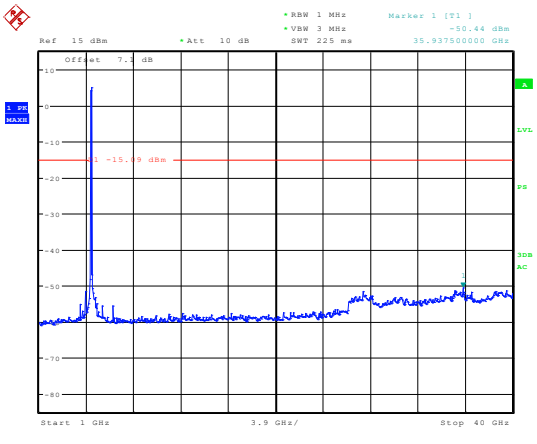


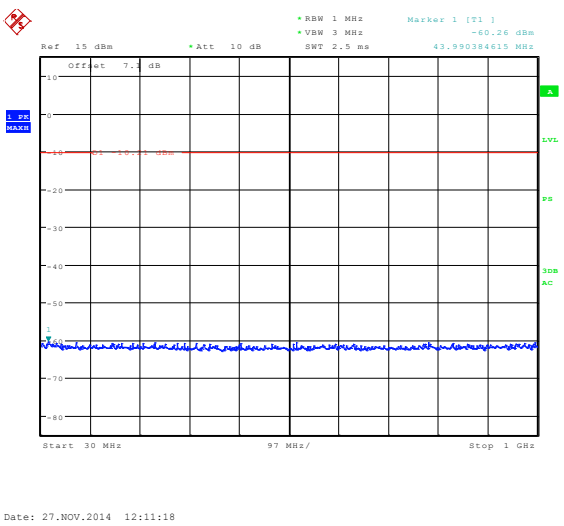
Figure 7-48a: Spurious RF Conducted Emissions, 802.11ac Channel 62, MCS0





802.11ac RF Conducted Emission Test Results cont'd

Figure 7-49a: Spurious RF Conducted Emissions, 802.11ac Channel 142, MCS0



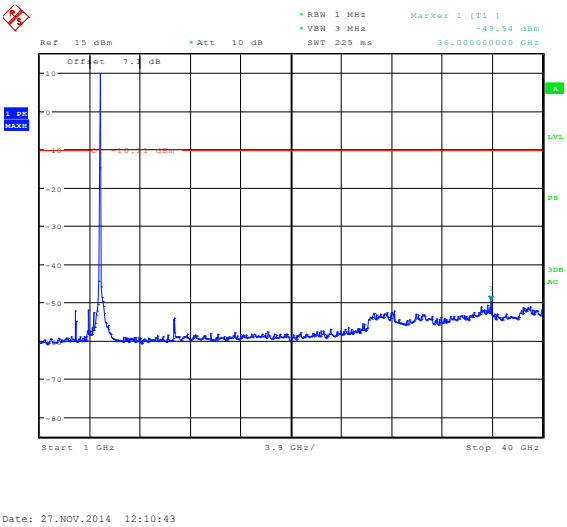
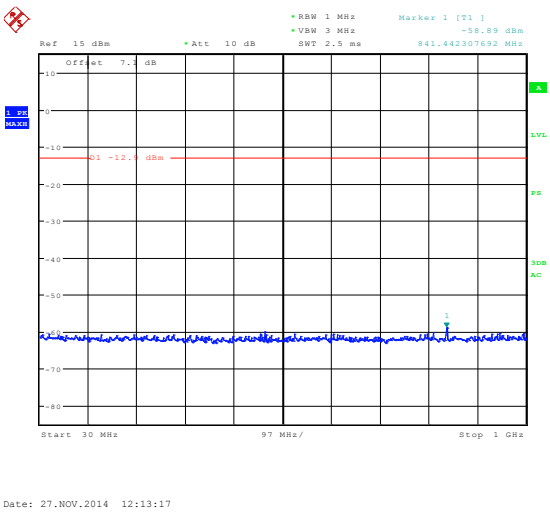
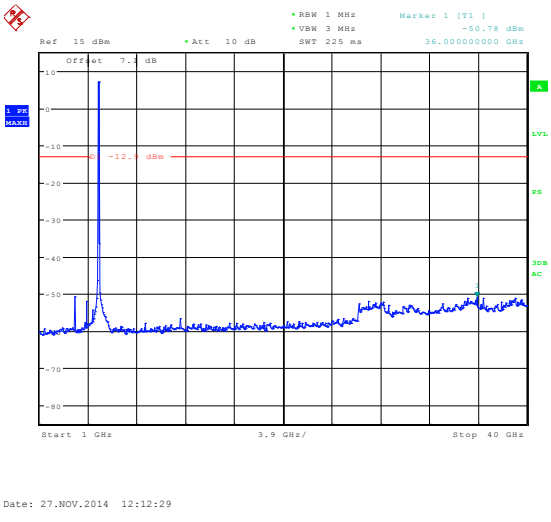


Figure 7-50a: Spurious RF Conducted Emissions, 802.11ac Channel 151, MCS0





802.11ac RF Conducted Emission Test Results cont'd

Channels 42, 58, 138 and 155 were measured at MCS0 Mbps, MCS4 Mbps and MCS9 Mbps each for 802.11ac mode, 80MHz bandwidth. Peak power was measured using an Agilent power meter, model N1911A with model N1921A power sensor. A reference offset of 29.0 dB was applied to the spectrum analyzer reference level for the attenuators and coaxial cable loss in the test circuit.

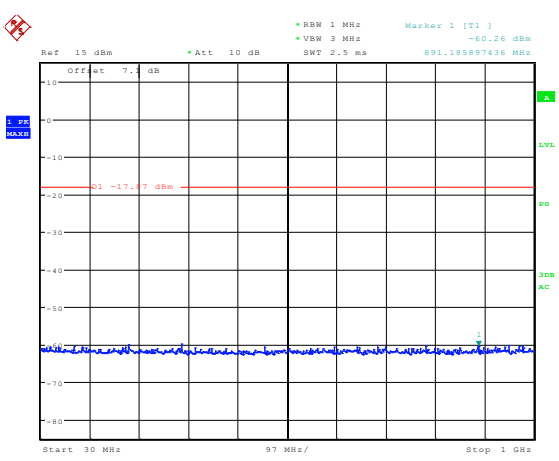
80MHZ Bandwidth

Channel	Data Rate	Power (dBm)	Max. Measured Level (dBm)	Max. Measured Level from Carrier (dBc)	Limit (dBc)
42	MCS0	13.66	-48.89	-60.17	-20
	MCS4	12.51	-47.33	-56.90	-20
	MCS9	8.09	-51.35	-59.74	-20
58	MCS0	13.95	-49.33	-60.90	-20
	MCS4	12.89	-49.2	-58.99	-20
	MCS9	8.13	-50.11	-58.18	-20
138	MCS0	16.05	-51.15	-67.75	-20
	MCS4	14.07	-50.38	-64.11	-20
	MCS9	8.02	-51.18	-60.01	-20
155	MCS0	14.11	-44.45	-58.67	-20
	MCS4	12.81	-50.04	-62.53	-20
	MCS9	8.35	-50.63	-60.00	-20

See figures 7-51 to 7-54 for the plots of the spurious RF conducted emissions for Channel 42, 58, 138 and 155 at MCS0 Mbps each for 802.11ac mode, bandwidth 80MHz.

802.11ac RF Conducted Emission Test Results cont'd

Figure 7-51a: Spurious RF Conducted Emissions, 802.11ac Channel 42, MCS0



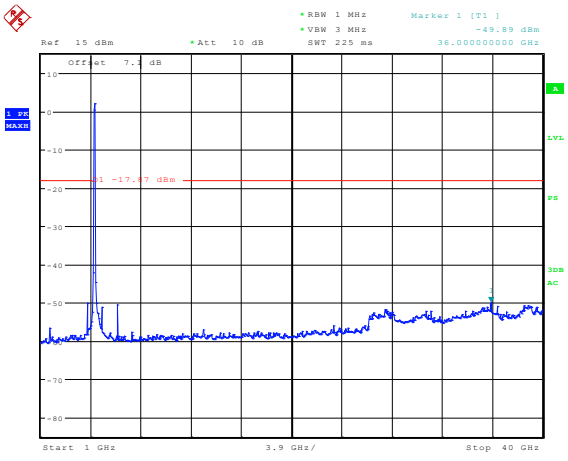
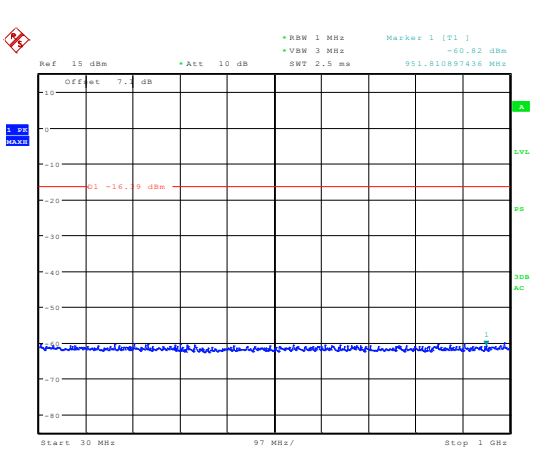
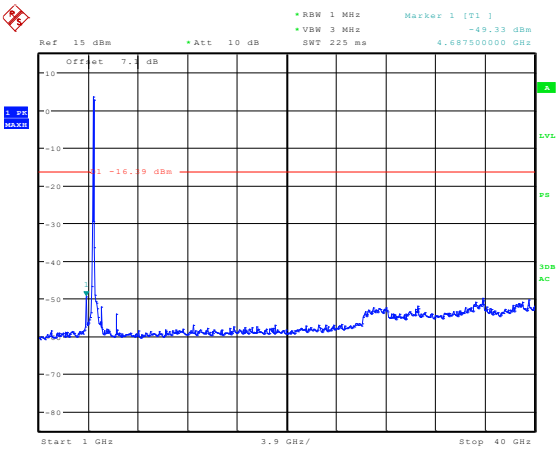


Figure 7-52a: Spurious RF Conducted Emissions, 802.11ac Channel 58, MCS0





802.11ac RF Conducted Emission Test Results cont'd

Figure 7-53a: Spurious RF Conducted Emissions, 802.11ac Channel 138, MCS0

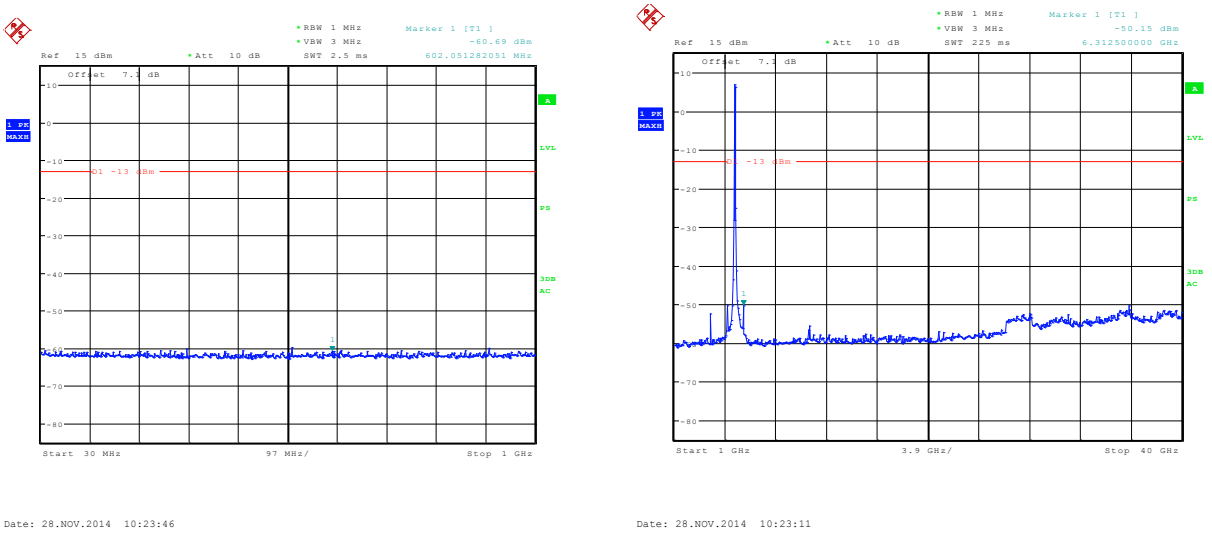
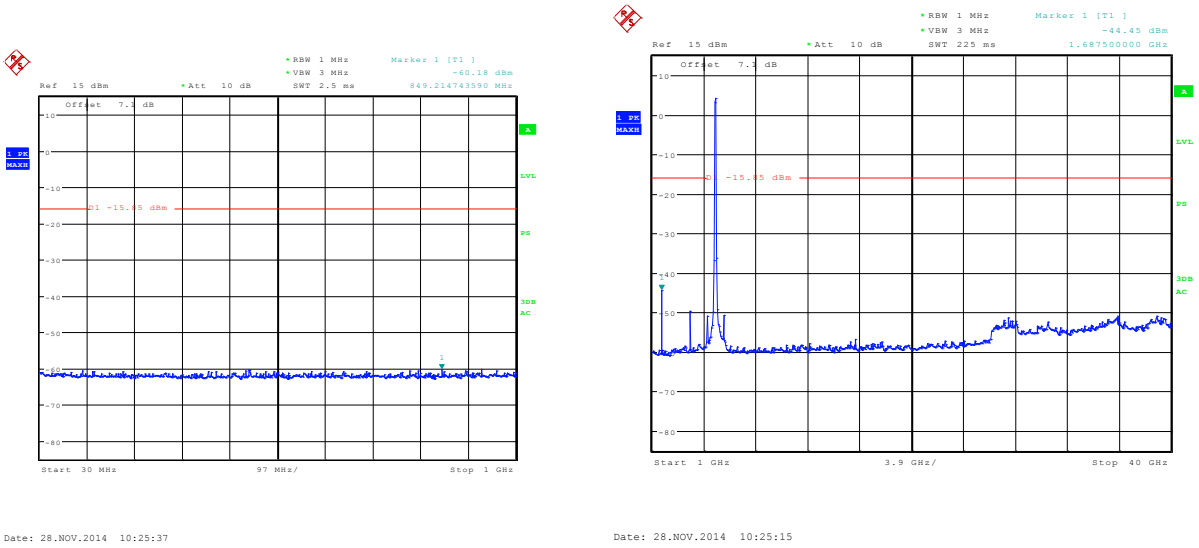


Figure 7-54a: Spurious RF Conducted Emissions, 802.11ac Channel 155, MCS0



APPENDIX 8 – NEAR FIELD COMMUNICATIONS TEST DATA/PLOTS

Near Field Communications (NFC) Test Results

Radiated Emissions

Date of Test: November 10, 2014

Measurements were performed by Savtej Sandhu.

The environmental test conditions were: Temperature: 24.5 ºC
Relative Humidity: 34.6 %

The test distance was 3.0 meters with a EUT height of 0.8 meters, and sweep frequency of 9 kHz to 1 GHz.

The BlackBerry® smartphone was in vertical position.

The frequency sweep measurements were performed in Near Field Communications Tx mode at 13.56 MHz

Frequency (MHz)	Reading (QP) (dBµV)	Correction Factor (dB)	Corrected Reading (QP) (dBµV/m)	Limit (dBµV/m)	Test Margin (dB)
13.57	35.2	16.67	52.42	124.00	-71.58

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

Near Field Communications (NFC) Test Results

Following tests were performed on the model RGV161LW.

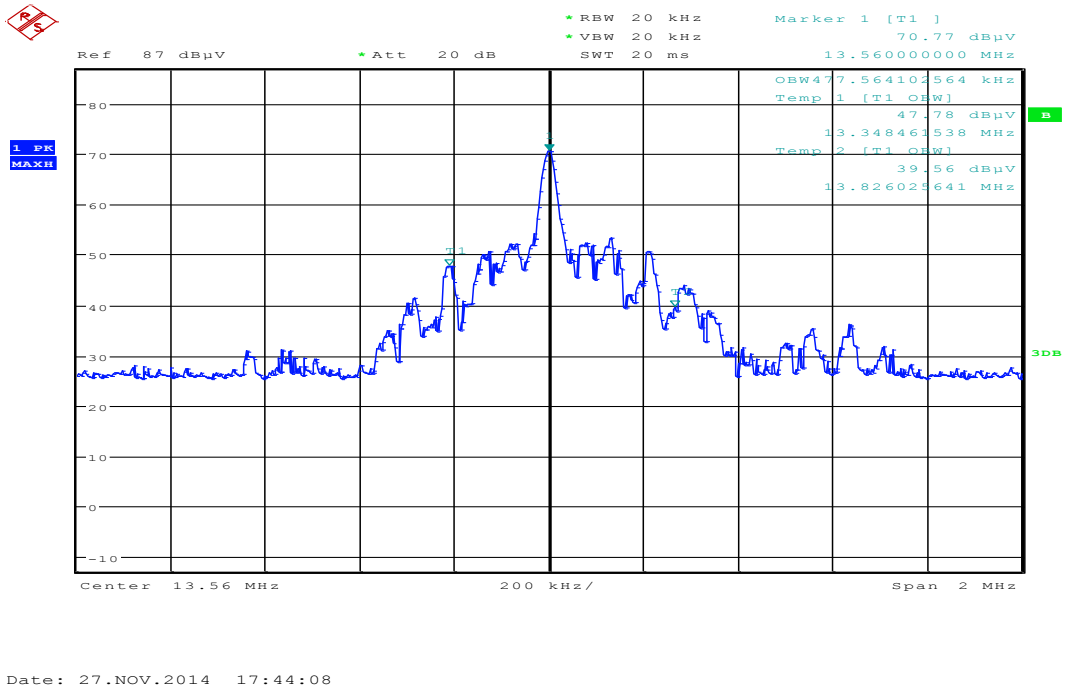
Occupied Bandwidth

Date of test: November 5, 2014
The measurements were performed by Sijia Li.

The environmental test conditions were: Temperature: 24.2 ºC
Relative Humidity: 36.5 %

Operation mode (TX ON)	Occupied Bandwidth (kHz)
NFC, modulated	477.56

Figure 8-1: Occupied Bandwidth, NFC TX Frequency = 13.56 MHz



Near Field Communications (NFC) Test Results cont'd

Frequency Stability

The measurements were performed by Sijia Li.

The environmental test conditions were: Temperature: 25.2 ºC
Relative Humidity: 41.5 %

Test Temperature (Celsius)	Nominal Freq. (MHz)	Measured Freq. (MHz)	Input Voltage (Volts)	Max Freq Error (Hz)	% Deviation (Limit .01%)	PPM
-20	13.56	13.560022	3.6	-1308	-0.00964	-96.4375
-20	13.56	13.560003	3.8	77	0.00057	5.6728
-20	13.56	13.560013	4.35	199	0.00147	14.6547
-10	13.56	13.559511	3.6	-474	-0.00350	-34.9822
-10	13.56	13.559745	3.8	-1356	-0.01000	-99.9830
-10	13.56	13.559579	4.35	167	0.00123	12.2911
0	13.56	13.559611	3.6	-34	-0.00025	-2.4818
0	13.56	13.559599	3.8	301	0.00222	22.2184
0	13.56	13.560040	4.35	-1247	-0.00919	-91.9465
10	13.56	13.559753	3.6	234	0.00173	17.2547
10	13.56	13.559779	3.8	2018	0.01488	148.7926
10	13.56	13.559736	4.35	42	0.00031	3.0728
20	13.56	13.560032	3.6	71	0.00052	5.2001
20	13.56	13.560032	3.8	123	0.00091	9.1001
20	13.56	13.560018	4.35	208	0.00154	15.3638

Near Field Communications (NFC) Test Results cont'd

Frequency Stability cont'd

Test Temperature (Celsius)	Nominal Freq. (MHz)	Measured Freq. (MHz)	Input Voltage (Volts)	Max Freq Error (Hz)	% Deviation (Limit .01%)	PPM
30	13.56	13.560010	3.6	0.000010	10	0.00007
30	13.56	13.560024	3.8	0.000024	24	0.00018
30	13.56	13.559500	4.35	-0.000500	-500	-0.00369
40	13.56	13.559643	3.6	-0.000357	-357	-0.00264
40	13.56	13.556503	3.8	-0.003497	-3497	-0.02579
40	13.56	13.559931	4.35	-0.000069	-69	-0.00051
50	13.56	13.559532	3.6	-0.000468	-468	-0.00345
50	13.56	13.559537	3.8	-0.000463	-463	-0.00342
50	13.56	13.559684	4.35	-0.000316	-316	-0.00233
60	13.56	13.559545	3.6	-0.000455	-455	-0.00336
60	13.56	13.559606	3.8	-0.000394	-394	-0.00291
60	13.56	13.559639	4.35	-0.000361	-361	-0.00266