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Test report

FCC-15.247 and RSS-247 WIFI 2016_315051

Date of issue: February 15, 2017

Applicant: MyGnar, Inc.

Product: Pocket-sized device to backup, organize, edit & share HD videos and photos, laptop free.
(2400–2483.5 MHz, Wi-Fi)

Model: Gnarbox128V1

Model variant: N/A

FCC ID: 2AJLW – GBX128V1

IC Registration number: 21193-GBX128V1

Specifications:

◆ FCC 47 CFR Part 15 Subpart C, §15.247

Operation in the 902–928 MHz, 2400–2483.5 MHz, 5725–5850 MHz

◆ RSS-247, Issue 1, May 2015

Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

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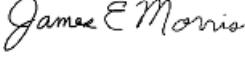
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FCC-15.247 and RSS-247 WIFI 2016_315051

NVLAP
NVLAP Code
200116-0

Test location

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Province	California
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Country	USA
Telephone	+1 760 444 3500
Website	www.nemko.com
Site number	FCC: US5058; IC: 2040B

Tested by	Feng You, Sr. Wireless Engineer
Reviewed by	James Morris, EMC and Wireless Divisions Manager
Review date	February 21, 2017
Reviewer signature	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contained in this report are within Nemko USA's ISO/IEC 17025 accreditation.

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Section 1. Report summary

1.1 Applicant and manufacturer

Company name	MyGnar, Inc.
Address	2640 Lincoln Blvd, Suite 2A
City	Santa Monica
Province/State	CA
Postal/Zip code	90405
Country	U.S.A.

1.2 Test specifications

FCC 47 CFR Part 15, Subpart C, Clause 15.247	Operation in the 902–928 MHz, 2400–2483.5 MHz, 5725–5850 MHz
RSS-247, Issue 1	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

1.3 Test methods

ANSI C64.3-2014	American National Standard for Methods of Measurement of Radio- Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was completed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

1.5 Exclusions

None

1.6 Test report revision history

Revision #	Details of changes made to test report
1	Original report issued
2	Updated according to customer comment
3	Updated according to review comment

Section 2. Summary of test results

2.1 FCC Part 15 Subpart C, general requirements test results

Part	Test description	Verdict
§15.207(a)	Conducted limits	Pass
§15.31(e)	Variation of power source	Pass ¹
§15.203	Antenna requirement	Pass ²
§15.205	Restricted bands of operation	Pass

Notes: ¹ Test performed with extreme of rated voltage 100-240V AC.

² The EUT uses PCB antennas internally.

2.2 FCC Part 15 Subpart C, intentional radiators test results

Part	Test description	Verdict
§15.247(a)(1)	20 dB bandwidth of the hopping channel	Not applicable
§15.247(a)(1)(i)	Frequency hopping systems operating in the 902–928 MHz band	Not applicable
§15.247(a)(1)(ii)	Frequency hopping systems operating in the 5725–5850 MHz band	Not applicable
§15.247(a)(1)(iii)	Frequency hopping systems operating in the 2400–2483.5 MHz band	Not applicable
§15.247(a)(2)	Minimum 6 dB bandwidth for systems using digital modulation techniques	Pass
§15.247(b)(1)	Maximum peak output power of frequency hopping systems operating in the 2400–2483.5 MHz band and 5725–5850 MHz band	Not applicable
§15.247(b)(2)	Maximum peak output power of Frequency hopping systems operating in the 902–928 MHz band	Not applicable
§15.247(b)(3)	Maximum peak output power of systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands	Pass
§15.247(c)(1)	Fixed point-to-point operation with directional antenna gains greater than 6 dBi	Not applicable
§15.247(c)(2)	Transmitters operating in the 2400–2483.5 MHz band that emit multiple directional beams	Pass
§15.247(d)	Spurious emissions	Pass
§15.247(e)	Power spectral density for digitally modulated devices	Pass
§15.247(f)	Time of occupancy for hybrid systems	Not applicable

2.3 IC RSS-GEN, Issue 4, test results

Part	Test description	Verdict
7.1.2	Receiver radiated emission limits	Not applicable
7.1.3	Receiver conducted emission limits	Not applicable
8.8	Power Line Conducted Emissions Limits for Licence-Exempt Radio Apparatus	Pass
8.10	Restricted Frequency Bands	Pass

Notes: ¹ According to sections 5.2 and 5.3 of RSS-Gen, Issue 4 the EUT does not have a stand-alone receiver neither scanner receiver, therefore exempt from receiver requirements.

2.4 IC RSS-247, Issue 1, test results

Part	Test description	Verdict
5.1	Frequency hopping systems (FHSs)	
5.1 (1)	Bandwidth of a frequency hopping channel	Not applicable
5.1 (2)	Minimum channel spacing for frequency hopping systems	Not applicable
5.1 (3)	Frequency hopping systems operating in the 902–928 MHz band	Not applicable
5.1 (4)	Frequency hopping systems operating in the 2400–2483.5 MHz band	Not applicable
5.1 (5)	Frequency hopping systems operating in the 5725–5850 MHz band	Not applicable
5.2	Digital modulation systems	
5.2 (1)	Minimum 6 dB bandwidth	Pass
5.2 (2)	Maximum power spectral density	Pass
5.3	Hybrid systems	
5.3 (1)	Digital modulation turned off	Not applicable
5.3 (2)	Frequency hopping turned off	Not applicable
5.4	Transmitter output power and e.i.r.p. requirements	
5.4 (1)	Frequency hopping systems operating in the 902–928 MHz band	Not applicable
5.4 (2)	Frequency hopping systems operating in the 2400–2483.5 MHz band	Not applicable
5.4 (3)	Frequency hopping systems operating in the 5725–5850 MHz	Not applicable
5.4 (4)	Systems employing digital modulation techniques	Pass
5.4 (5)	Point-to-point systems in 2400–2483.5 MHz and 5725–5850 MHz band	Not applicable
5.4 (6)	Transmitters which operate in the 2400–2483.5 MHz band with multiple directional beams	Pass
5.5	Unwanted Emissions	Pass

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	November 3, 2016
Nemko sample ID number	315051#1, 315051#2

3.2 EUT information

Product name	Pocket-sized device to backup, organize, edit & share HD videos and photos, laptop free. (2400-2483.5 MHz, Wi-Fi)
Model	Gnarbox128V1
Model variant	N/A
Serial number	P1-01-003, P1-01-007

3.3 Technical information

Applicant IC company number	21193
IC UPN number	GBX128V1
All used IC test site(s) Reg. number	2040B
RSS number and Issue number	RSS-247, Issue 1, May 2015
Frequency band	2400-2483.5 MHz
Frequency Min (MHz)	2412 (20MHz BW) / 2422 (40MHz BW)
Frequency Max (MHz)	2462 (20MHz BW) / 2452 (40MHz BW)
RF power Min (W), Conducted/ERP/EIRP	N/A
RF power Max (W), Conducted/ERP/EIRP	0.0443 (Conducted)
Field strength, Units @ distance	N/A
Measured BW (kHz) (6 dB)	16980 (20MHz Mode) / 36180 (40MHz Mode)
Calculated BW (kHz), as per TRC-43	N/A
Type of modulation	DSSS/(BPSK, QPSK, CCK), OFDM/(BPSK, QPSK, QAM16, QAM64)
Emission classification (F1D, G1D, D1D)	G1D, W7D
Transmitter spurious, Units @ distance	51.67 dB μ V/m @ 3m AVG, 64.95 dB μ V/m @ 3m Peak
Power requirements	3.7V Li-Polymer Rechargeable Battery, AC charger 100-240V AC
Antenna information	0 dBi PCB antennas for both output. The EUT uses a unique antenna coupling/ non-detachable antenna to the intentional radiator.

3.4 Product description and theory of operation

EUT is pocket-sized device to backup, organize, edit & share HD videos and photos, laptop free. 2400-2483.5 MHz, Wi-Fi b/g/n 20/40MHz.

3.5 EUT exercise details

EUT frequencies, modulation, bandwidth are set using client provided computer with test software.

EUT is set to output maximum power.

3.6 EUT setup diagram

Please see separate photo exhibit

Figure 3.6-1: Radiated Emissions Test Setup – below 1GHz

Please see separate photo exhibit

Figure 3.6-2: Radiated Emissions Test Setup – above 1GHz

Please see separate photo exhibit

Figure 3.6-3: AC Conducted Emissions Test Setup

3.7 EUT sub assemblies

Table 3.7-1: EUT sub assemblies

Description	Brand name	Model/Part number	Serial number
EUT (RF connector)	MYGNAR	Gnarbox128V1	P1-01-003
EUT	MYGNAR	Gnarbox128V1	P1-01-007
Power Supply 5V DC	Apple	12W USA Power Adapter A1402	N/A
USB Cable	KAIBAO	3ft USB to Micro USB Cable	N/A

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

Test channels and test modes (modulation and bandwidth) were optimized according to ANSI 63.10-2013 sec.5.6.2.

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

Temperature	15–30 °C
Relative humidity	20–75 %
Air pressure	860–1060 mbar

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages $\pm 5\%$, for which the equipment was designed.

3.7V Li-Polymer Rechargeable Battery, AC charger 100-240V AC 50-60Hz

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of K = 2 with 95% certainty.

Test name	Measurement uncertainty, dB
All antenna port measurements	0.55
Conducted spurious emissions	1.13
Radiated spurious emissions	3.78
AC power line conducted emissions	3.55

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: Equipment list

Asset Tag	Description	Manufacturer	Model	Serial #	Next Cal
529	Antenna, DRWG	EMCO	3115	2505	01-Feb-2017
811	Multimeter	Fluke	111	78130057	08-Jul-2017
E1013	DRG Horn (Small)	EMCO	3116	00119488	18-Nov-2016
E1019	Two Line V-Network	Rohde & Schwarz	ENV216	101045	15-Jun-2017
E1026	EMI Test Receiver 9kHz to 7GHz	Rohde & Schwarz	ESCI 7	100800	17-Mar-2017
S1043	Variac (Variable Transformer) 3kVA, Input 110/220VAC @ 4.8/12A	Shanghai China	TDGC	N/A	VOU
1480	Antenna, Bilog	Schaffner-Chase	CBL6111C	2572	21-Jul-2017
E1120	Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	101395	25-May-2017
E1121	EMI Test Receiver	Rohde & Schwarz	ESU 40	100064	28-Apr-2017

Note: NCR - no calibration required, VOU - verify on use

Section 8. Test Data

8.1 FCC 15.247(a) (2) and RSS-247 5.2(1) Minimum 6 dB bandwidth

8.1.1 Definitions and limits

FCC 15.247:

- (a) (2) Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

IC RSS-247

- 5.2 (1) The minimum 6 dB bandwidth shall be 500 kHz.

8.1.2 Test summary

Test date	November 3, 2016	Temperature	23 °C
Test engineer	Feng You	Air pressure	1005 mbar
Verdict	Pass	Relative humidity	37 %

8.1.3 Observations, settings and special notes

Spectrum analyzer settings:

Resolution bandwidth	100 kHz
Video bandwidth	$\geq 3 \times$ RBW
Frequency span	1.5 x OBW
Detector mode	Peak
Trace mode	Max Hold

Per ANSI 63.10-2013 5.6.2.1

- a) For each operating mode, if the measured channel bandwidth on the middle channel is at least 150% of the minimum permitted bandwidth, then it is not necessary to measure the bandwidth on the high and low channels.

OBW from RF output 2 as worst case.

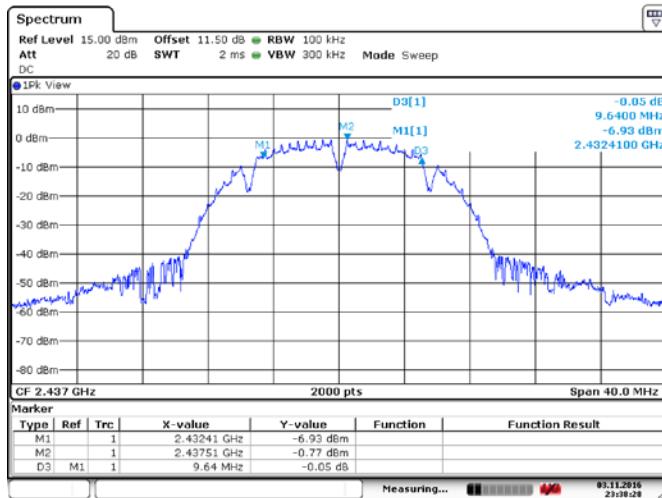
8.1.4 Test data

Table 8.1-1: 6 dB bandwidth results with middle channel 2437MHz

Channel BW, MHz	Modulation	Data Rate	6dB bandwidth, kHz	Limit, kHz	Margin, kHz
20	DSSS/BPSK	1	9640	500	9140
20	DSSS/QPSK	2	10120	500	9620
20	DSSS/CCK	5.5	9000	500	8500
20	DSS/CCK	11	7240	500	6740
20	OFDM/BPSK	6	16380	500	15880
20	OFDM/BPSK	9	16380	500	15880
20	OFDM/QPSK	12	16440	500	15940
20	OFDM/QPSK	18	16440	500	15940
20	OFDM/QAM16	24	16500	500	16000
20	OFDM/QAM16	36	16440	500	15940
20	OFDM/QAM64	48	16480	500	15980
20	OFDM/QAM64	54	16460	500	15960
20	OFDM/BPSK	MCS0	16980	500	16480
20	OFDM/QPSK	MCS1	16960	500	16460
20	OFDM/QPSK	MCS2	16960	500	16460
20	OFDM/QAM16	MCS3	16980	500	16480
20	OFDM/QAM16	MCS4	16980	500	16480
20	OFDM/QAM64	MCS5	16980	500	16480
20	OFDM/QAM64	MCS6	16980	500	16480
20	OFDM/QAM64	MCS7	16980	500	16480
40	OFDM/BPSK	MCS0	36030	500	35530
40	OFDM/QPSK	MCS1	35430	500	34930
40	OFDM/QPSK	MCS2	35940	500	35440
40	OFDM/QAM16	MCS3	35910	500	35410
40	OFDM/QAM16	MCS4	35940	500	35440
40	OFDM/QAM64	MCS5	35820	500	35320
40	OFDM/QAM64	MCS6	35820	500	35320
40	OFDM/QAM64	MCS7	36180	500	35680

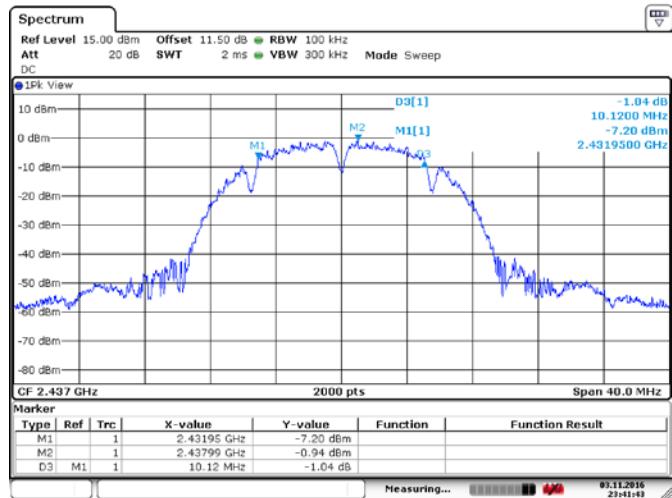
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Testing data
FCC 15.247(a) (2) and RSS-247 5.2(1) Minimum 6 dB bandwidth
FCC 15 Subpart C and RSS-247, Issue 1



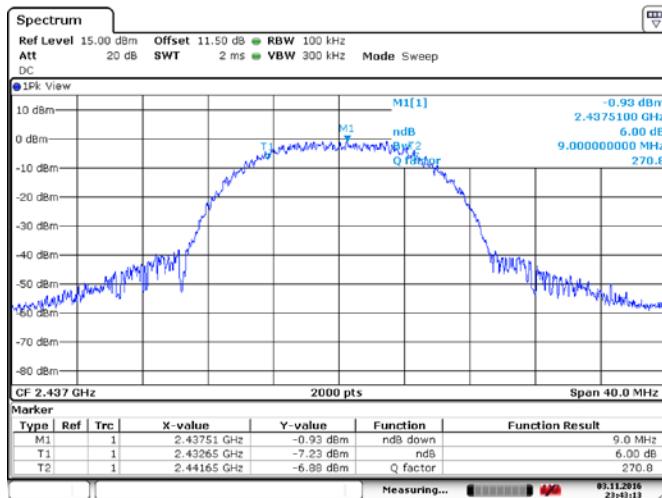
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Figure 8.1-1: 6 dB bandwidth, 20MHz BW DSSS/BPSK 1 Mbps



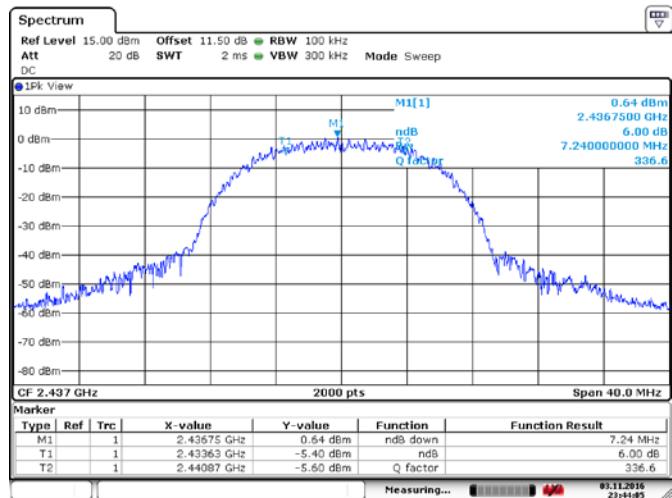
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Figure 8.1-2: 6 dB bandwidth, 20MHz BW DSSS/QPSK 2 Mbps



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Figure 8.1-3: 6 dB bandwidth, 20MHz BW DSSS/CCK 5.5 Mbps



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Figure 8.1-4: 6 dB bandwidth, 20MHz BW DSSS/CCK 11 Mbps

Section 8
Test name
Specification

Testing data
FCC 15.247(a) (2) and RSS-247 5.2(1) Minimum 6 dB bandwidth
FCC 15 Subpart C and RSS-247, Issue 1

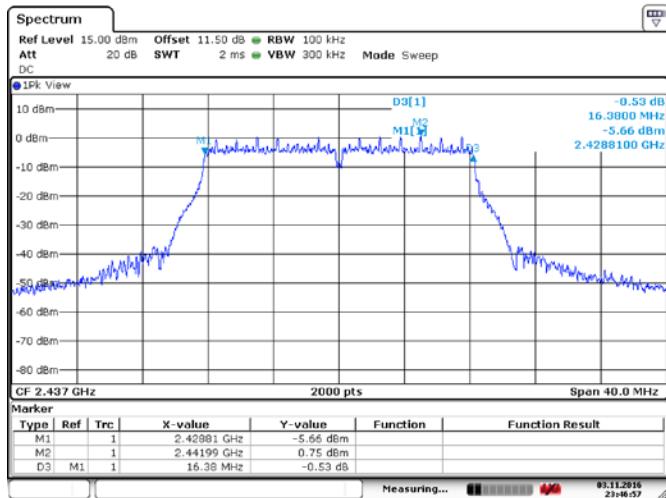


Figure 8.1-5: 6 dB bandwidth, 20MHz BW OFDM/BPSK 6 Mbps

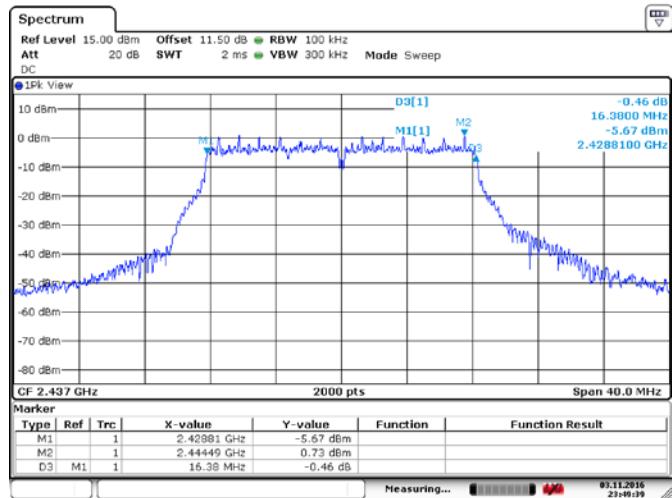


Figure 8.1-6: 6 dB bandwidth, 20MHz BW OFDM/BPSK 9 Mbps

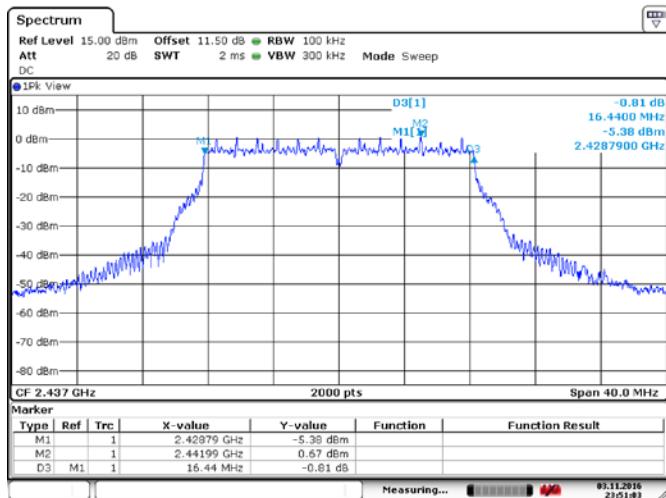


Figure 8.1-7: 6 dB bandwidth, 20MHz BW OFDM/QPSK 12 Mbps

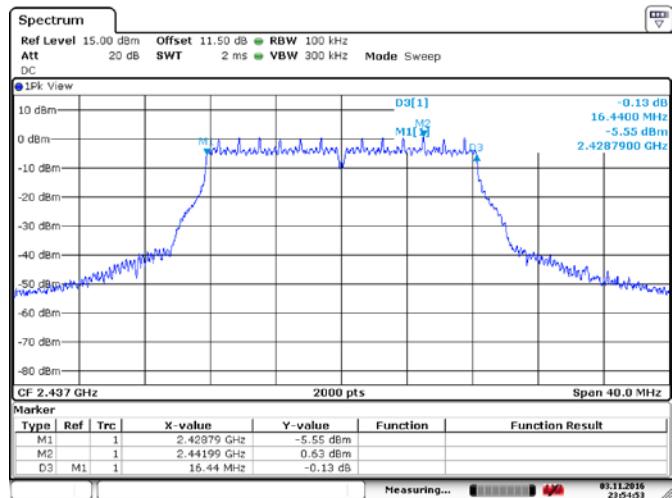
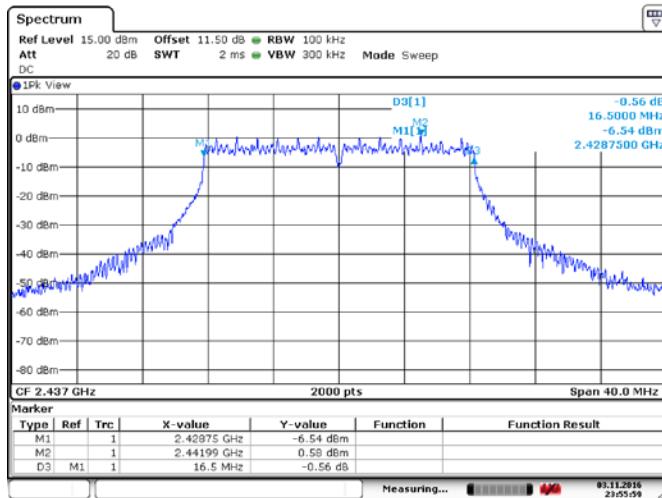


Figure 8.1-8: 6 dB bandwidth, 20MHz BW OFDM/QPSK 18 Mbps

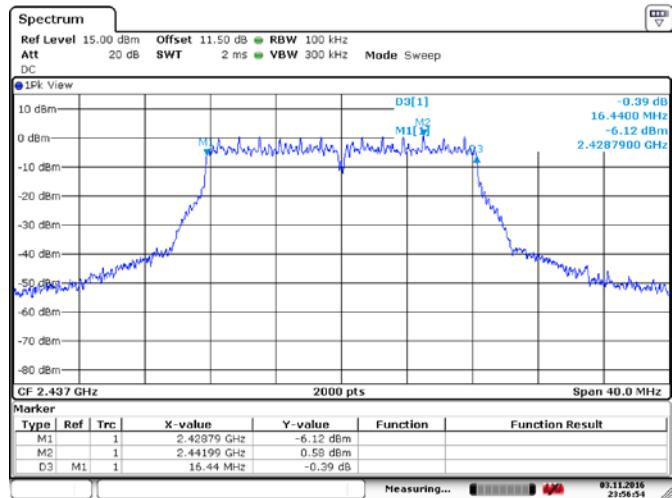
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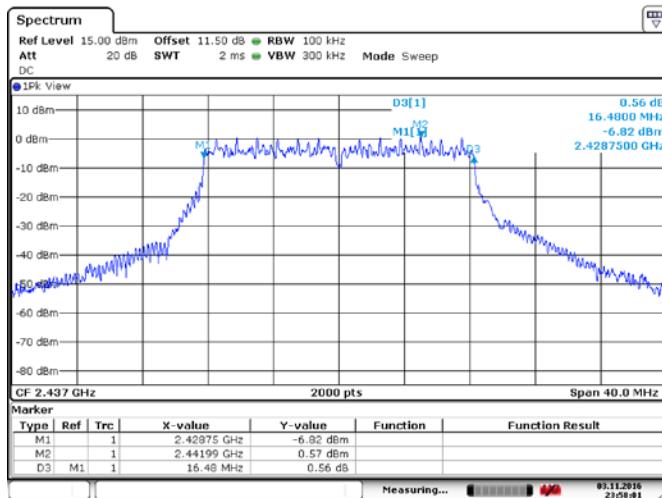
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Figure 8.1-9: 6 dB bandwidth, 20MHz BW OFDM/QAM16 24 Mbps



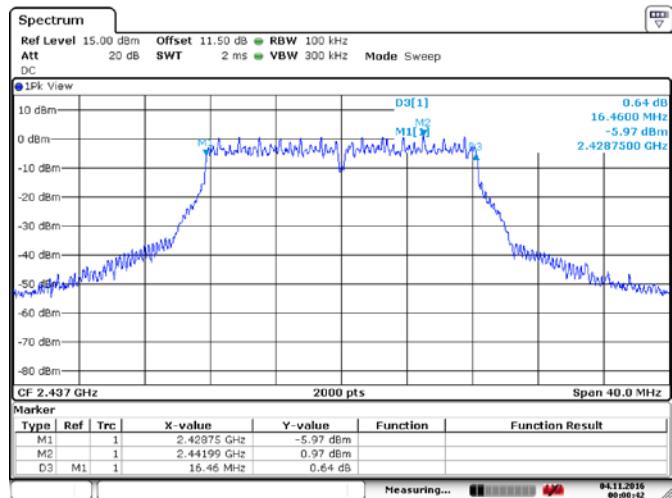
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Figure 8.1-10: 6 dB bandwidth, 20MHz BW OFDM/QAM16 36 Mbps



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Figure 8.1-11: 6 dB bandwidth, 20MHz BW OFDM/QAM64 48 Mbps

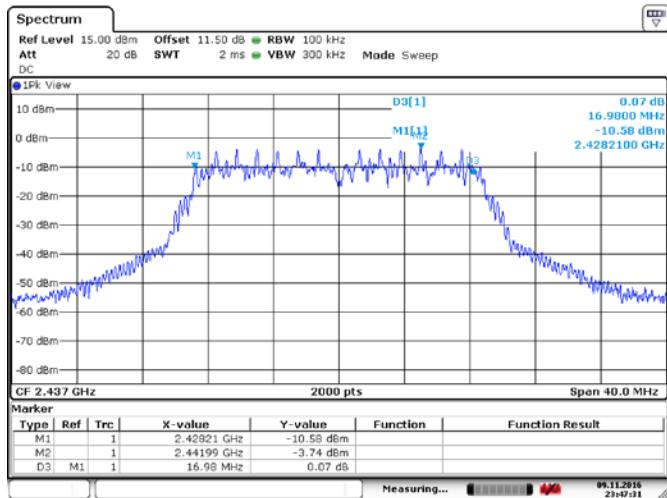


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Figure 8.1-12: 6 dB bandwidth, 20MHz BW OFDM/QAM64 54 Mbps

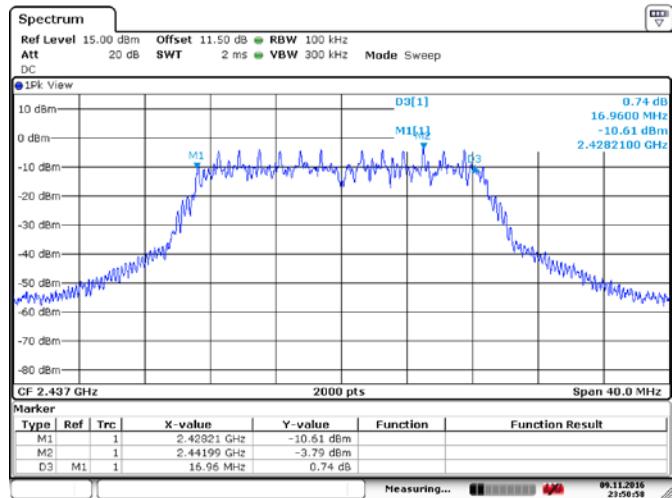
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FCC 15 Subpart C and RSS-247, Issue 1



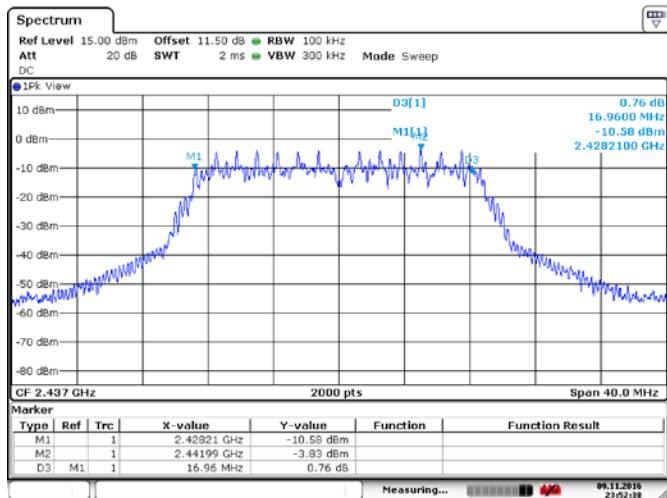
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Figure 8.1-13: 6 dB bandwidth, 20MHz BW OFDM/BPSK MCS0



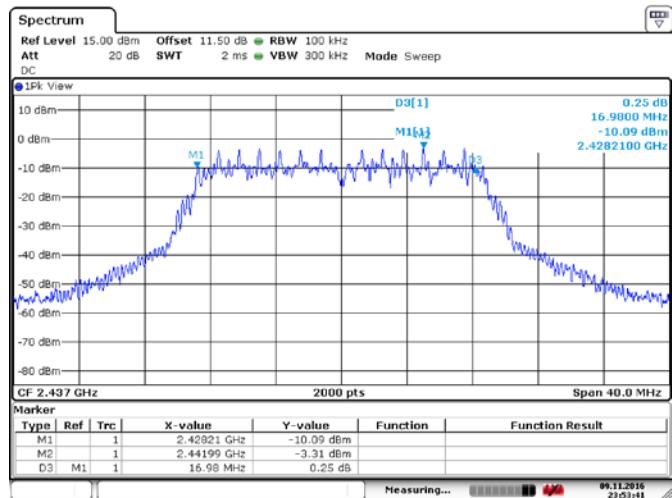
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Figure 8.1-14: 6 dB bandwidth, 20MHz BW OFDM/QPSK MCS1



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Figure 8.1-15: 6 dB bandwidth, 20MHz BW OFDM/QPSK MCS2



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Figure 8.1-16: 6 dB bandwidth, 20MHz BW OFDM/QAM16 MCS3

Section 8
Test name
Specification

Testing data
FCC 15.247(a) (2) and RSS-247 5.2(1) Minimum 6 dB bandwidth
FCC 15 Subpart C and RSS-247, Issue 1

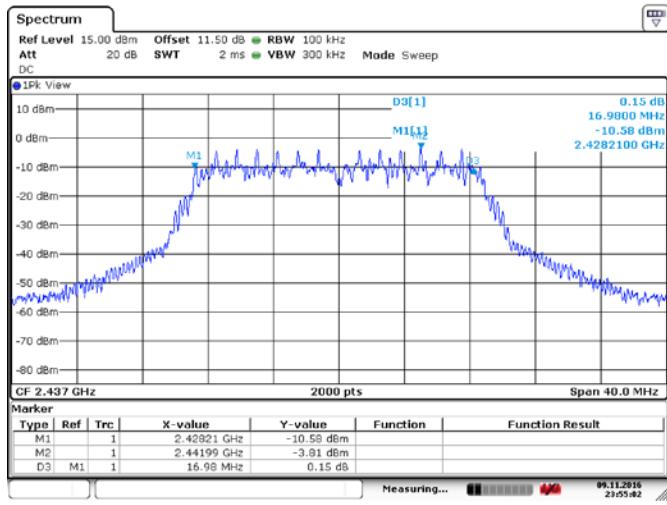


Figure 8.1-17: 6 dB bandwidth, 20MHz BW OFDM/QAM16 MCS4

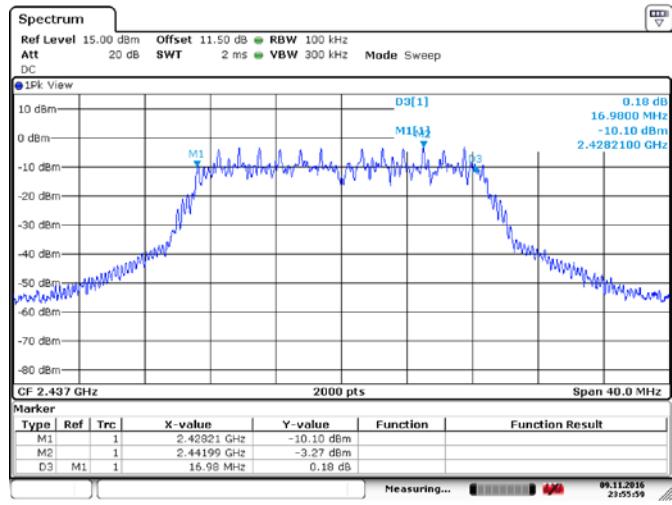


Figure 8.1-18: 6 dB bandwidth, 20MHz BW OFDM/QAM64 MCS5

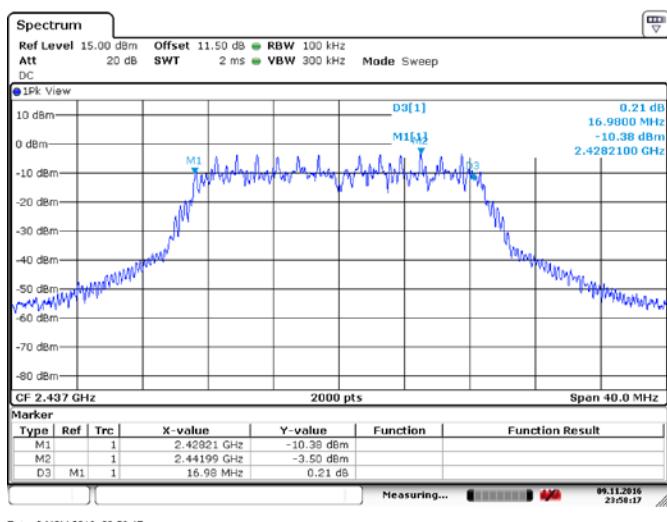


Figure 8.1-19: 6 dB bandwidth, 20MHz BW OFDM/QAM64 MCS6

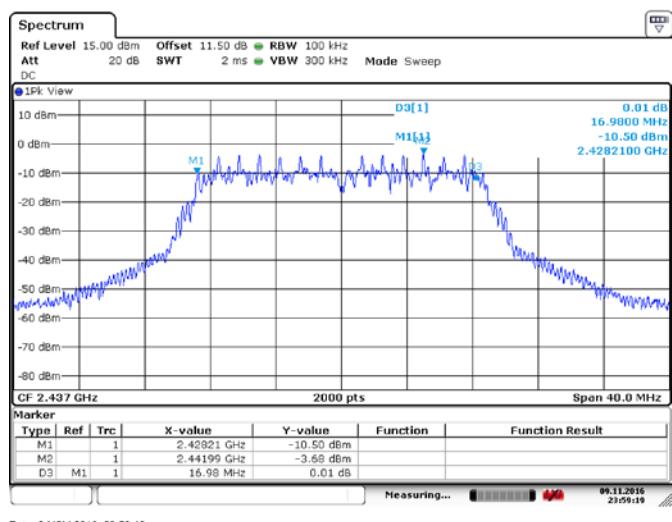


Figure 8.1-20: 6 dB bandwidth, 20MHz BW OFDM/QAM64 MCS7

Section 8
Test name
Specification

Testing data
FCC 15.247(a) (2) and RSS-247 5.2(1) Minimum 6 dB bandwidth
FCC 15 Subpart C and RSS-247, Issue 1

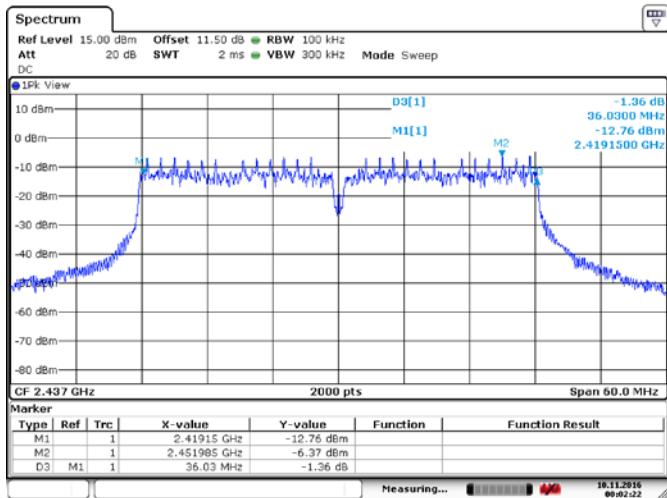


Figure 8.1-21: 6 dB bandwidth, 40MHz BW OFDM/BPSK MCS0

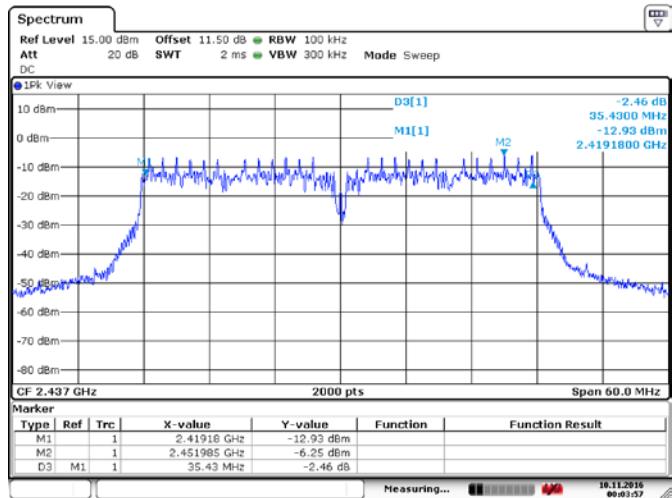


Figure 8.1-22: 6 dB bandwidth, 40MHz BW OFDM/QPSK MCS1

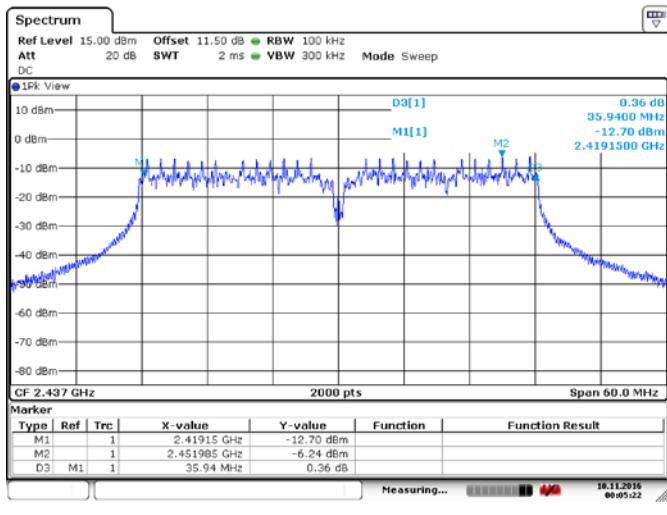


Figure 8.1-23: 6 dB bandwidth, 40MHz BW OFDM/QPSK MCS2

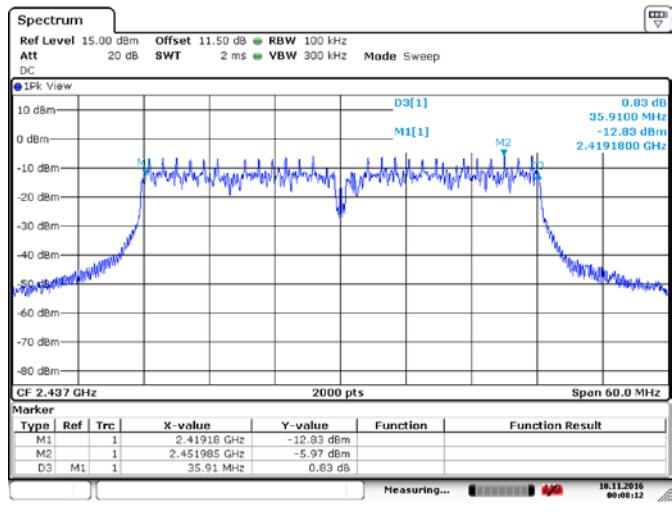
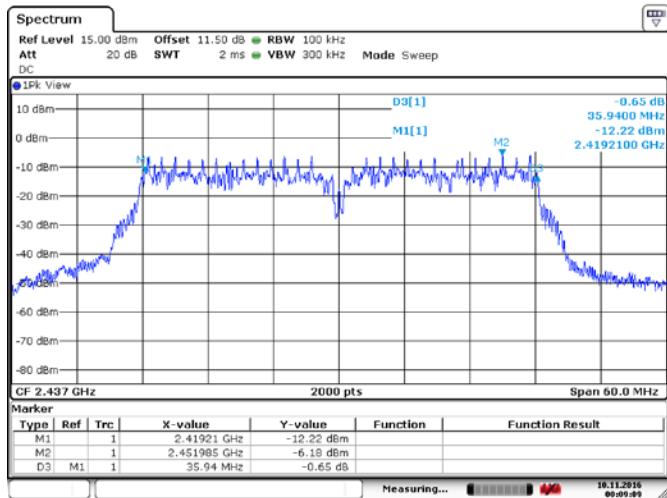


Figure 8.1-24: 6 dB bandwidth, 40MHz BW OFDM/QAM16 MCS3

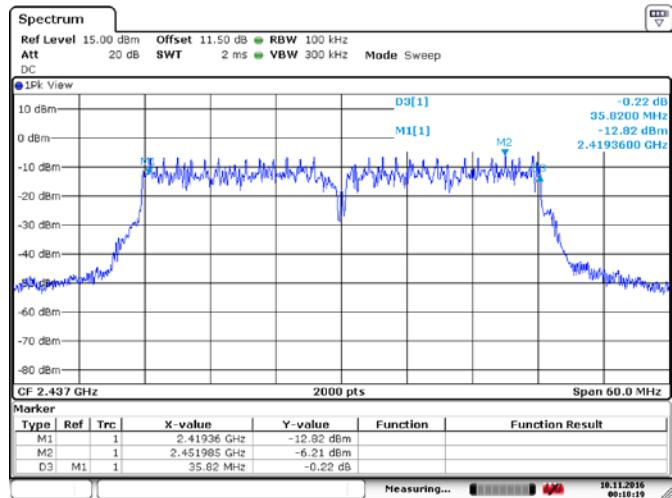
Section 8
Test name
Specification

Testing data
FCC 15.247(a) (2) and RSS-247 5.2(1) Minimum 6 dB bandwidth
FCC 15 Subpart C and RSS-247, Issue 1



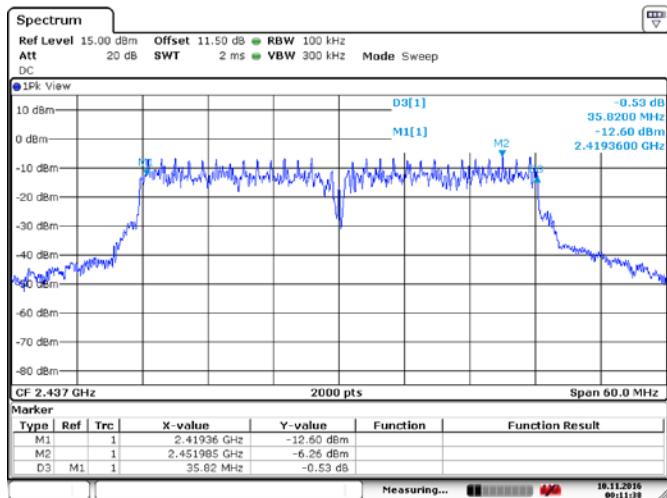
Date: 10.NOV.2016 00:09:09

Figure 8.1-25: 6 dB bandwidth, 40MHz BW OFDM/QAM16 MCS4



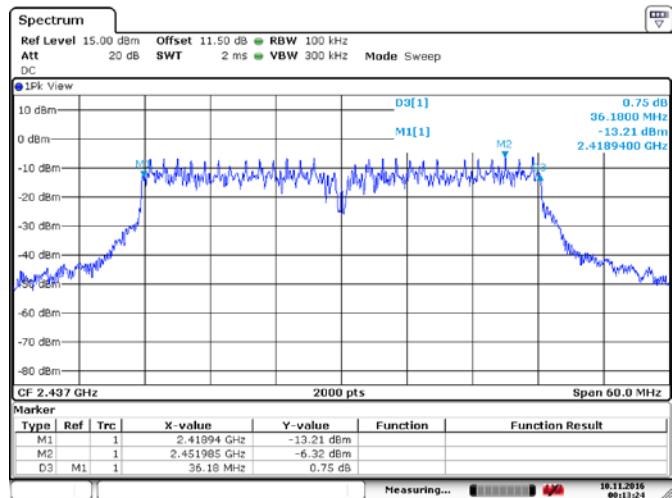
Date: 10.NOV.2016 00:10:19

Figure 8.1-26: 6 dB bandwidth, 40MHz BW OFDM/QAM64 MCS5



Date: 10.NOV.2016 00:11:38

Figure 8.1-27: 6 dB bandwidth, 40MHz BW OFDM/QAM64 MCS6



Date: 10.NOV.2016 00:13:25

Figure 8.1-28: 6 dB bandwidth, 40MHz BW OFDM/QAM64 MCS7

8.2 FCC 15.247(b) and RSS-247 5.4 (4) Transmitter output power and e.i.r.p. requirements

8.2.1 Definitions and limits

FCC:

- (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:
- (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
 - (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC:

5.4 Transmitter Output Power and Equivalent Isotropically Radiated Power (E.I.R.P.) Requirements

- (4) For DTs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. Except as provided in Section 5.4(5), the e.i.r.p. shall not exceed 4 W.

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

8.2.2 Test summary

Test date	November 3, 2016	Temperature	23 °C
Test engineer	Feng You	Air pressure	1005 mbar
Verdict	Pass	Relative humidity	37 %

8.2.3 Observations, settings and special notes

Peak Conducted Power Measured

Spectrum analyzer settings:

Resolution bandwidth	1MHz
Video bandwidth	3MHz
Channel Power bandwidth	20MHz / 40MHz
Frequency span	30MHz / 60MHz
Detector mode	Peak
Trace mode	Max Hold

The measure-and-sum method is used to combine RF output 1 & 2.

8.2.4 Test data

Table 8.2-1: Output power measurements results – Low Channel (2412MHz @20MHz BW, 2422MHz @ 40MHz BW)

Channel BW MHz	Modulation	Data Rate	RF 1 dBm	RF 2 dBm	Total Power dBm	Power Limit dBm	Margin dB	Ant gain dBi	ERIP dBm	EIRP Limit dBm	EIRP margin dB
20	DSSS/BPSK	1	9.9	10.1	13.0	30	17.0	0	13.0	36	23.0
20	DSSS/QPSK	2	10.0	10.1	13.0	30	17.0	0	13.0	36	23.0
20	DSSS/CCK	5.5	10.0	10.2	13.1	30	16.9	0	13.1	36	22.9
20	DSS/CCK	11	10.0	10.1	13.0	30	17.0	0	13.0	36	23.0
20	OFDM/BPSK	6	12.3	12.2	15.3	30	14.7	0	15.3	36	20.7
20	OFDM/BPSK	9	12.4	12.4	15.4	30	14.6	0	15.4	36	20.6
20	OFDM/QPSK	12	12.4	12.1	15.3	30	14.7	0	15.3	36	20.7
20	OFDM/QPSK	18	12.4	12.3	15.3	30	14.7	0	15.3	36	20.7
20	OFDM/QAM16	24	12.2	12.1	15.2	30	14.8	0	15.2	36	20.8
20	OFDM/QAM16	36	12.4	12.1	15.2	30	14.8	0	15.2	36	20.8
20	OFDM/QAM64	48	12.6	12.8	15.7	30	14.3	0	15.7	36	20.3
20	OFDM/QAM64	54	12.2	12.2	15.2	30	14.8	0	15.2	36	20.8
20	OFDM/BPSK	MCS0	8.3	8.6	11.5	30	18.5	0	11.5	36	24.5
20	OFDM/QPSK	MCS1	8.2	8.6	11.4	30	18.6	0	11.4	36	24.6
20	OFDM/QPSK	MCS2	8.2	8.5	11.4	30	18.6	0	11.4	36	24.6
20	OFDM/QAM16	MCS3	8.2	8.5	11.4	30	18.6	0	11.4	36	24.6
20	OFDM/QAM16	MCS4	8.2	8.5	11.4	30	18.6	0	11.4	36	24.6
20	OFDM/QAM64	MCS5	8.5	8.4	11.5	30	18.5	0	11.5	36	24.5
20	OFDM/QAM64	MCS6	8.4	8.6	11.5	30	18.5	0	11.5	36	24.5
20	OFDM/QAM64	MCS7	8.3	8.5	11.4	30	18.6	0	11.4	36	24.6
40	OFDM/BPSK	MCS0	8.8	8.7	11.8	30	18.2	0	11.8	36	24.2
40	OFDM/QPSK	MCS1	8.7	8.6	11.7	30	18.3	0	11.7	36	24.3
40	OFDM/QPSK	MCS2	8.6	8.7	11.6	30	18.4	0	11.6	36	24.4
40	OFDM/QAM16	MCS3	8.7	8.8	11.8	30	18.2	0	11.8	36	24.2
40	OFDM/QAM16	MCS4	9.0	9.3	12.2	30	17.8	0	12.2	36	23.8
40	OFDM/QAM64	MCS5	9.9	10.0	13.0	30	17.0	0	13.0	36	23.0
40	OFDM/QAM64	MCS6	9.8	10.2	13.0	30	17.0	0	13.0	36	23.0
40	OFDM/QAM64	MCS7	9.6	10.1	12.8	30	17.2	0	12.8	36	23.2

Table 8.2-2: Output power measurements results – Mid Channel (2437MHz)

Channel BW MHz	Modulation	Data Rate	RF 1 dBm	RF 2 dBm	Total Power dBm	Power Limit dBm	Margin dB	Ant gain dBi	ERIP dBm	EIRP Limit dBm	EIRP margin dB
20	DSSS/BPSK	1	10.4	10.3	13.3	30	16.7	0	13.3	36	22.7
20	DSSS/QPSK	2	10.4	10.3	13.3	30	16.7	0	13.3	36	22.7
20	DSSS/CCK	5.5	10.5	10.7	13.6	30	16.4	0	13.6	36	22.4
20	DSS/CCK	11	10.5	10.4	13.5	30	16.5	0	13.5	36	22.5
20	OFDM/BPSK	6	12.6	12.5	15.6	30	14.4	0	15.6	36	20.4
20	OFDM/BPSK	9	12.5	12.6	15.6	30	14.4	0	15.6	36	20.4
20	OFDM/QPSK	12	12.5	12.4	15.5	30	14.5	0	15.5	36	20.5
20	OFDM/QPSK	18	12.4	12.4	15.4	30	14.6	0	15.4	36	20.6
20	OFDM/QAM16	24	12.3	12.3	15.3	30	14.7	0	15.3	36	20.7
20	OFDM/QAM16	36	12.4	12.3	15.4	30	14.6	0	15.4	36	20.6
20	OFDM/QAM64	48	12.9	12.8	15.9	30	14.1	0	15.9	36	20.1
20	OFDM/QAM64	54	12.4	12.5	15.5	30	14.5	0	15.5	36	20.5
20	OFDM/BPSK	MCS0	8.5	8.9	11.7	30	18.3	0	11.7	36	24.3
20	OFDM/QPSK	MCS1	9.0	8.9	11.9	30	18.1	0	11.9	36	24.1
20	OFDM/QPSK	MCS2	9.0	8.8	11.9	30	18.1	0	11.9	36	24.1
20	OFDM/QAM16	MCS3	8.8	8.9	11.9	30	18.1	0	11.9	36	24.1
20	OFDM/QAM16	MCS4	8.7	9.0	11.9	30	18.1	0	11.9	36	24.1
20	OFDM/QAM64	MCS5	8.7	8.9	11.8	30	18.2	0	11.8	36	24.2
20	OFDM/QAM64	MCS6	8.6	8.9	11.8	30	18.2	0	11.8	36	24.2
20	OFDM/QAM64	MCS7	8.6	8.9	11.8	30	18.2	0	11.8	36	24.2
40	OFDM/BPSK	MCS0	8.7	9.0	11.9	30	18.1	0	11.9	36	24.1
40	OFDM/QPSK	MCS1	8.8	8.9	11.9	30	18.1	0	11.9	36	24.1
40	OFDM/QPSK	MCS2	9.0	8.9	12.0	30	18.0	0	12.0	36	24.0
40	OFDM/QAM16	MCS3	9.3	9.2	12.3	30	17.7	0	12.3	36	23.7
40	OFDM/QAM16	MCS4	9.3	9.7	12.5	30	17.5	0	12.5	36	23.5
40	OFDM/QAM64	MCS5	10.0	10.4	13.2	30	16.8	0	13.2	36	22.8
40	OFDM/QAM64	MCS6	9.9	10.2	13.1	30	16.9	0	13.1	36	22.9
40	OFDM/QAM64	MCS7	9.7	10.1	12.9	30	17.1	0	12.9	36	23.1

Table 8.2-3: Output power measurements results – High Channel (2462MHz @20MHz BW, 2452MHz @ 40MHz BW)

Channel BW MHz	Modulation	Data Rate	RF 1 dBm	RF 2 dBm	Total Power dBm	Power Limit dBm	Margin dB	Ant gain dBi	ERIP dBm	EIRP Limit dBm	EIRP margin dB
20	DSSS/BPSK	1	10.8	10.8	13.8	30	16.2	0	13.8	36	22.2
20	DSSS/QPSK	2	11.0	10.9	14.0	30	16.0	0	14.0	36	22.0
20	DSSS/CCK	5.5	11.2	10.9	14.1	30	15.9	0	14.1	36	21.9
20	DSS/CCK	11	11.6	11.1	14.3	30	15.7	0	14.3	36	21.7
20	OFDM/BPSK	6	13.0	12.8	15.9	30	14.1	0	15.9	36	20.1
20	OFDM/BPSK	9	12.9	12.9	15.9	30	14.1	0	15.9	36	20.1
20	OFDM/QPSK	12	13.1	12.7	15.9	30	14.1	0	15.9	36	20.1
20	OFDM/QPSK	18	13.0	12.8	15.9	30	14.1	0	15.9	36	20.1
20	OFDM/QAM16	24	12.9	12.8	15.9	30	14.1	0	15.9	36	20.1
20	OFDM/QAM16	36	13.0	12.8	15.9	30	14.1	0	15.9	36	20.1
20	OFDM/QAM64	48	13.4	13.7	16.6	30	13.4	0	16.6	36	19.4
20	OFDM/QAM64	54	13.0	12.9	15.9	30	14.1	0	15.9	36	20.1
20	OFDM/BPSK	MCS0	9.2	9.4	12.3	30	17.7	0	12.3	36	23.7
20	OFDM/QPSK	MCS1	9.5	9.3	12.4	30	17.6	0	12.4	36	23.6
20	OFDM/QPSK	MCS2	9.4	9.5	12.5	30	17.5	0	12.5	36	23.5
20	OFDM/QAM16	MCS3	9.3	9.4	12.4	30	17.6	0	12.4	36	23.6
20	OFDM/QAM16	MCS4	9.3	9.4	12.3	30	17.7	0	12.3	36	23.7
20	OFDM/QAM64	MCS5	9.3	9.4	12.3	30	17.7	0	12.3	36	23.7
20	OFDM/QAM64	MCS6	9.2	9.3	12.3	30	17.7	0	12.3	36	23.7
20	OFDM/QAM64	MCS7	9.5	9.3	12.4	30	17.6	0	12.4	36	23.6
40	OFDM/BPSK	MCS0	9.1	9.1	12.1	30	17.9	0	12.1	36	23.9
40	OFDM/QPSK	MCS1	9.0	9.0	12.0	30	18.0	0	12.0	36	24.0
40	OFDM/QPSK	MCS2	9.0	9.0	12.0	30	18.0	0	12.0	36	24.0
40	OFDM/QAM16	MCS3	9.2	9.3	12.2	30	17.8	0	12.2	36	23.8
40	OFDM/QAM16	MCS4	9.2	9.8	12.5	30	17.5	0	12.5	36	23.5
40	OFDM/QAM64	MCS5	9.7	10.3	13.0	30	17.0	0	13.0	36	23.0
40	OFDM/QAM64	MCS6	10.2	10.3	13.2	30	16.8	0	13.2	36	22.8
40	OFDM/QAM64	MCS7	9.9	10.2	13.1	30	16.9	0	13.1	36	22.9

Table 8.2-4: Output power measurements results – over voltage change (Worst case 11g OFDM/QAM64, 20MHz BW, 54Mbps)

Voltage	Channel	RF1	RF2	Total Power	Power Limit	Margin	Ant gain	ERIP	EIRP Limit	EIRP margin
		dBm	dBm	dBm	dBm	dB	dBi	dBm	dBm	dB
120V	Low	12.3	12.4	15.3	30	14.7	0	15.3	36	20.7
120V	Mid	12.8	12.6	15.7	30	14.3	0	15.7	36	20.3
120V	Hi	13.6	13.0	16.3	30	13.7	0	16.3	36	19.7
85V	Low	12.1	12.4	15.2	30	14.8	0	15.2	36	20.8
85V	Mid	13.0	12.6	15.8	30	14.2	0	15.8	36	20.2
85V	Hi	13.6	13.1	16.4	30	13.6	0	16.4	36	19.6
230V	Low	12.2	12.4	15.3	30	14.7	0	15.3	36	20.7
230V	Mid	12.7	12.8	15.7	30	14.3	0	15.7	36	20.3
230V	Hi	13.6	12.9	16.3	30	13.7	0	16.3	36	19.7
276V	Low	12.2	12.3	15.3	30	14.7	0	15.3	36	20.7
276V	Mid	12.7	12.9	15.8	30	14.2	0	15.8	36	20.2
276V	Hi	13.9	13.0	16.5	30	13.5	0	16.5	36	19.5

8.3 FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) emissions

8.3.1 Definitions and limits

FCC:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

IC:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

- (a) Fundamental components of modulation of licence-exempt radio apparatus shall not fall within the restricted bands of Table 8.4-1 except for apparatus complying under RSS-287;
- (b) Unwanted emissions that fall into restricted bands of Table 6 shall comply with the limits specified in RSS-Gen; and
- (c) Unwanted emissions that do not fall within the restricted frequency bands of Table 8.4-1 shall comply either with the limits specified in the applicable RSS or with those specified in this RSS-Gen.

Table 8.3-1: FCC §15.209 and RSS-Gen – Radiated emission limits

Frequency, MHz	Field strength of emissions		Measurement distance, m
	µV/m	dBµV/m	
0.009–0.490	2400/F	67.6 – 20 × log ₁₀ (F)	300
0.490–1.705	24000/F	87.6 – 20 × log ₁₀ (F)	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes: In the emission table above, the tighter limit applies at the band edges.

For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test

Table 8.3-2: IC restricted frequency bands

MHz	MHz	MHz	GHz
0.090–0.110	12.51975–12.52025	399.9–410	5.35–5.46
2.1735–2.1905	12.57675–12.57725	608–614	7.25–7.75
3.020–3.026	13.36–13.41	960–1427	8.025–8.5
4.125–4.128	16.42–16.423	1435–1626.5	9.0–9.2
4.17725–4.17775	16.69475–16.69525	1645.5–1646.5	9.3–9.5
4.20725–4.20775	16.80425–16.80475	1660–1710	10.6–12.7
5.677–5.683	25.5–25.67	1718.8–1722.2	13.25–13.4
6.215–6.218	37.5–38.25	2200–2300	14.47–14.5
6.26775–6.26825	73–74.6	2310–2390	15.35–16.2
6.31175–6.31225	74.8–75.2	2655–2900	17.7–21.4
8.291–8.294	108–138	3260–3267	22.01–23.12
8.362–8.366	156.52475–156.52525	3332–3339	23.6–24.0
8.37625–8.38675	156.7–156.9	3345.8–3358	31.2–31.8
8.41425–8.41475	240–285	3500–4400	36.43–36.5
12.29–12.293	322–335.4	4500–5150	Above 38.6

Note: Certain frequency bands listed in Table 8.3-2 and above 38.6 GHz are designated for low-power licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in this Standard

Table 8.3-3: FCC restricted frequency bands

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			

8.3.2 Test summary

Test date	November 11, 2016	Temperature	22 °C
Test engineer	Feng You	Air pressure	1006 mbar
Verdict	Pass	Relative humidity	30 %

8.3.3 Observations, settings and special notes

The spectrum was searched from 30 MHz to the 10th harmonic.
EUT was set to transmit with 100 % duty cycle.
Worst case radiated test cases were checked in 3 orthogonal positions.

Spectrum analyzer settings for conducted spurious emissions measurements:

Resolution bandwidth:	100 kHz
Video bandwidth:	300 kHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyzer settings for radiated measurements within restricted bands below 1 GHz:

Resolution bandwidth:	100 kHz
Video bandwidth:	300 kHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyzer settings for peak radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyzer settings for average radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	Avg
Trace mode:	Max Hold

Per ANSI 63.10-2013 5.6.2.2

- a) Band edge requirements—Measurements on the mode with the widest bandwidth can be used to cover the same channel (center frequency) on modes with narrower bandwidth that have the same or lower output power for each modulation family (e.g., OFDM and direct sequence spread spectrum).
- b) Spurious emissions—Measure the mode with the highest output power and the mode with the highest output power spectral density for each modulation family (e.g., OFDM and direct sequence spread spectrum).

For radiated test, both antenna output were enabled. For RF conducted test, RF2 was selected as worst case.

8.3.4 Test data

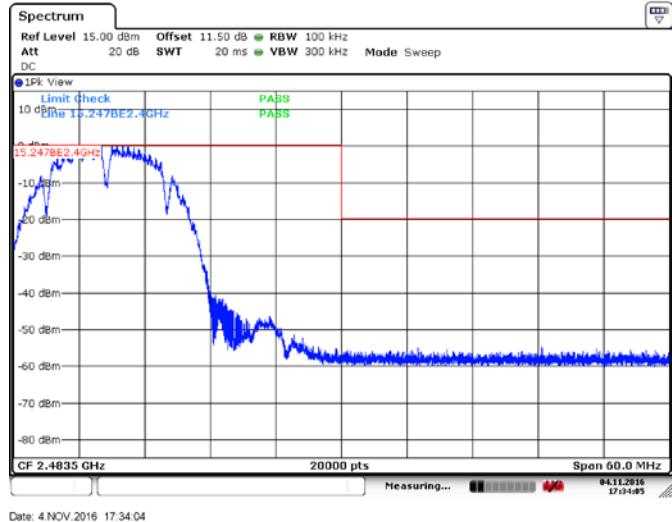
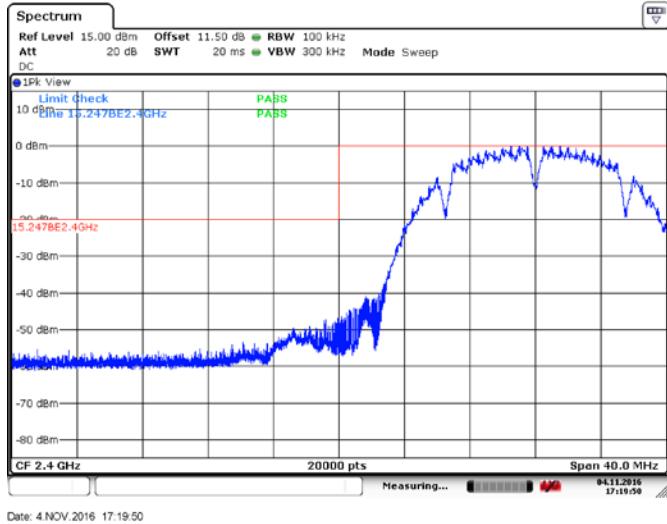
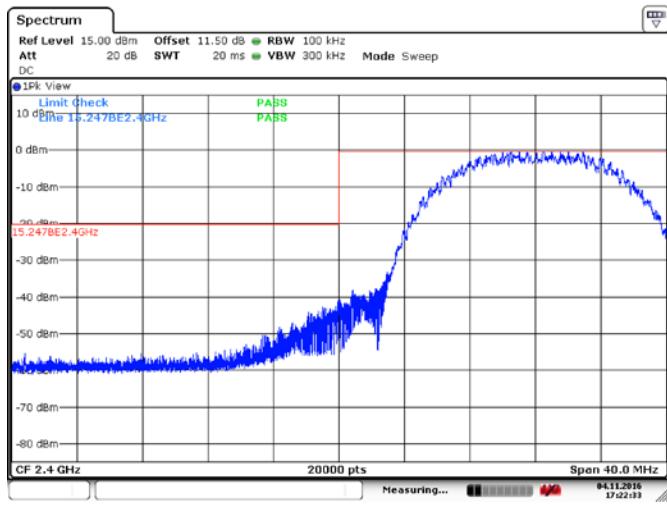


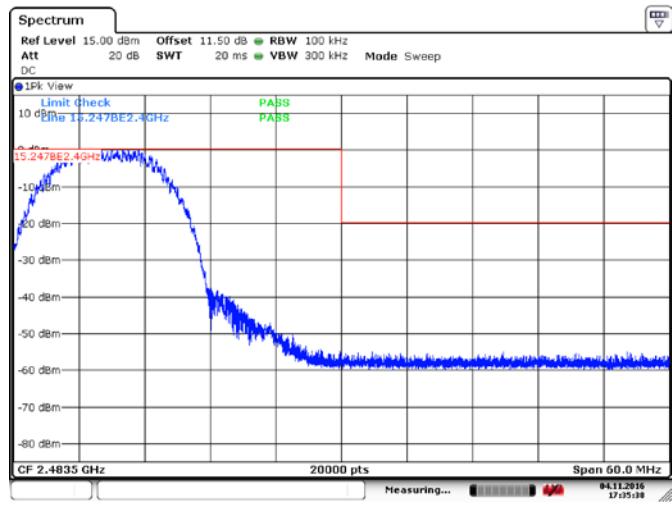
Figure 8.3.1: Bandedge Measurement, 2412MHz, 20MHz BW, DSSS/Mbps2

Figure 8.3.2: Bandedge Measurement, 2462MHz, 20MHz BW, DSSS/Mbps2



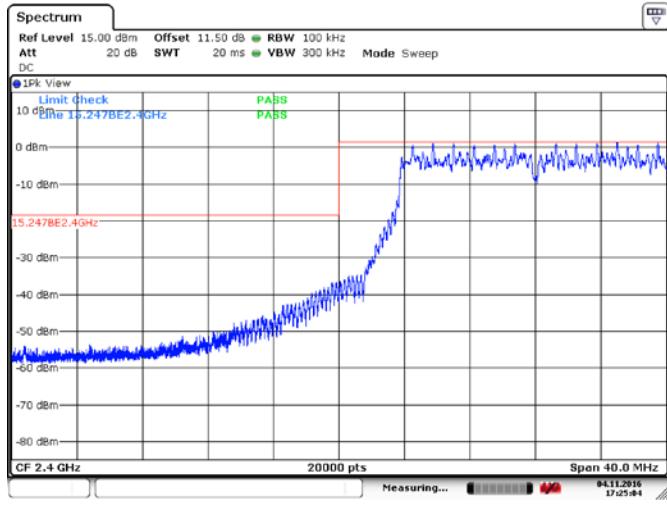
Date: 4.NOV.2016 17:22:33

Figure 8.3.3: Bandedge Measurement, 2412MHz, 20MHz BW, DSSS/Mbps5.5



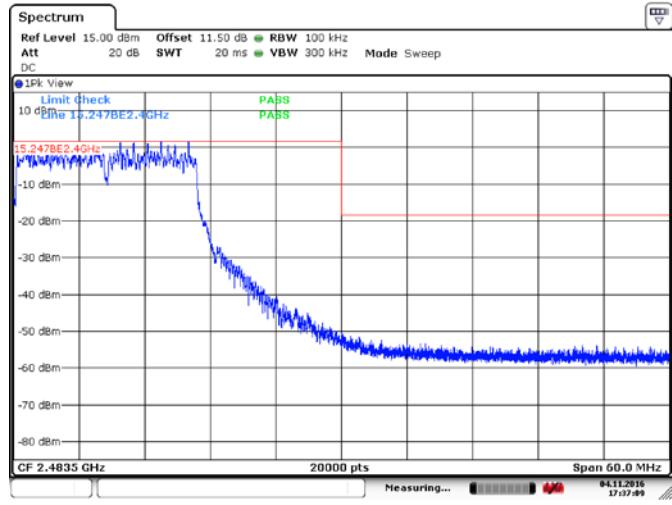
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Figure 8.3.4: Bandedge Measurement, 2462MHz, 20MHz BW, DSSS/Mbps5.5



Date: 4.NOV.2016 17:25:04

Figure 8.3.5: Bandedge Measurement, 2412MHz, 20MHz BW, OFDM/Mbps48

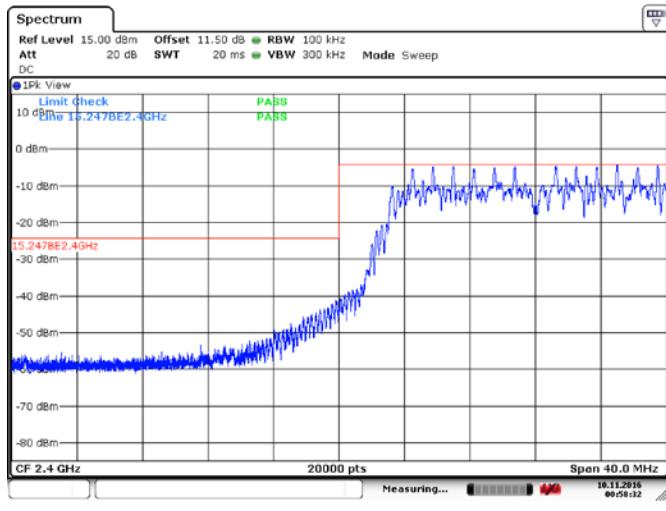


Date: 4.NOV.2016 17:37:10

Figure 8.3.6: Bandedge Measurement, 2462MHz, 20MHz BW, OFDM/Mbps48

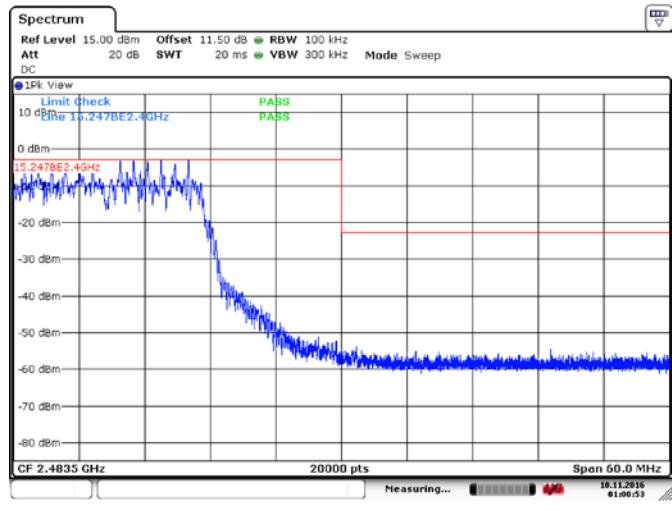
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Test name
Specification

Testing data
FCC 15.247(e) and RSS-247 5.2(2) Power Spectrum Density
FCC Part 15 Subpart C and RSS-247, Issue 1



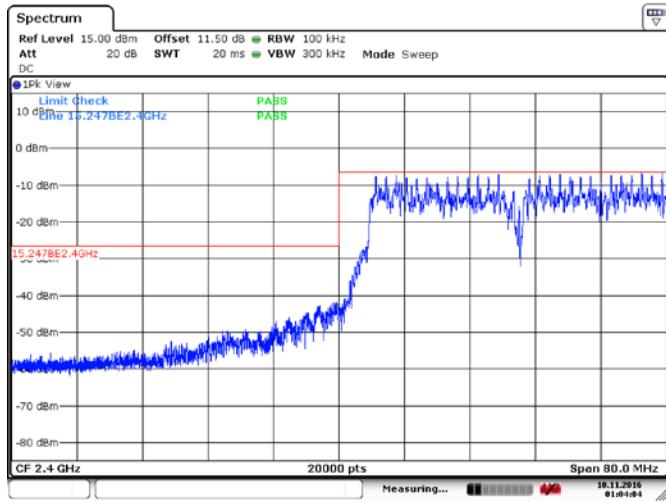
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Figure 8.3.7: Bandedge Measurement, 2412MHz, 20MHz BW, OFDM/MCS6



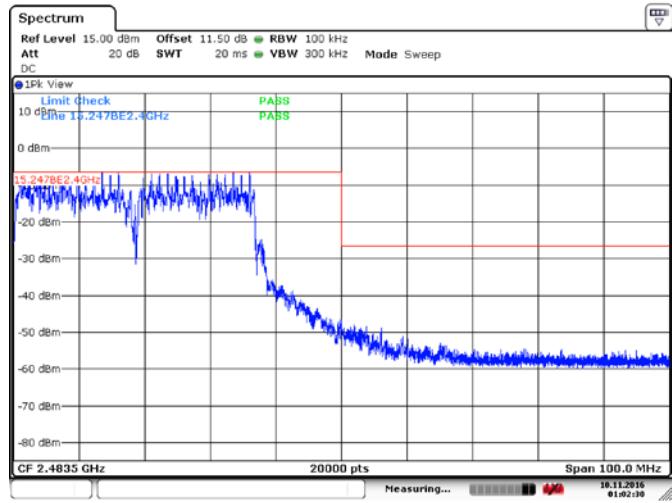
Date: 10.NOV.2016 01:00:53

Figure 8.3.8: Bandedge Measurement, 2462MHz, 20MHz BW, OFDM/MCS2



Date: 10.NOV.2016 01:04:04

Figure 8.3.9: Bandedge Measurement, 2422MHz, 40MHz BW, OFDM/MCS6



Date: 10.NOV.2016 01:02:31

Figure 8.3.10: Bandedge Measurement, 2452MHz, 40MHz BW, OFDM/MCS6

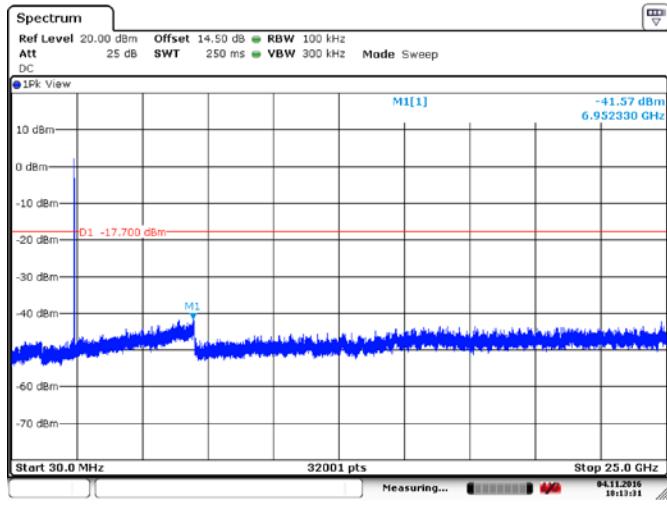


Figure 8.3.11: Conducted spurious emissions, 2412MHz, 20MHz BW, DSSS/Mbps5.5

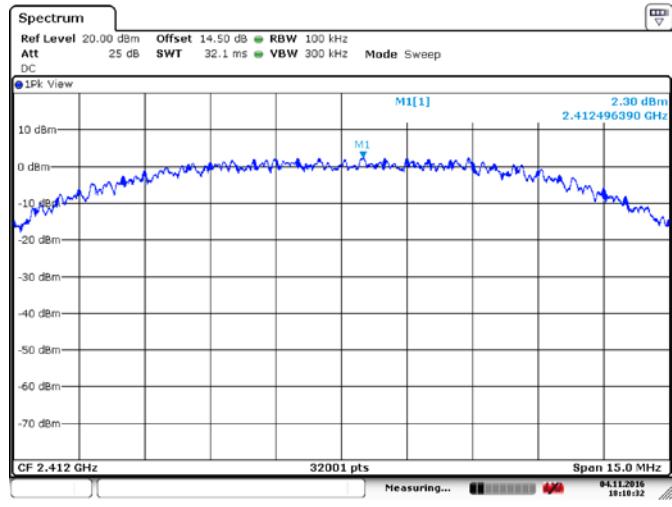


Figure 8.3.12: Conducted spurious emissions, 2412MHz, 20MHz BW, DSSS/Mbps5.5, Reference Measured (dBm/100kHz): 2.3

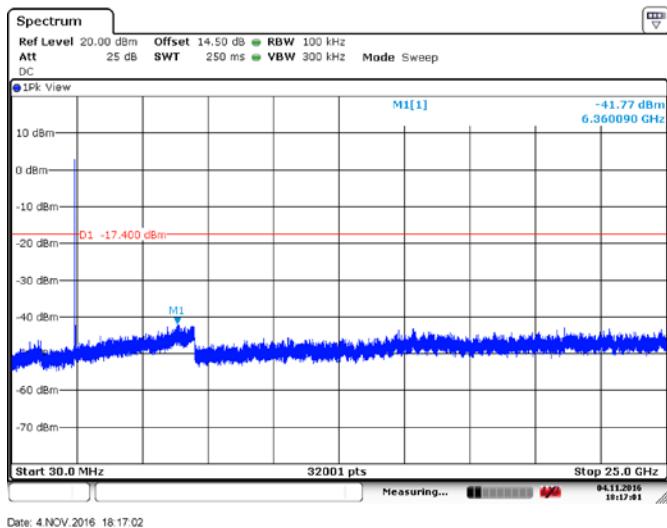


Figure 8.3.13: Conducted spurious emissions, 2437MHz, 20MHz BW, DSSS/Mbps5.5

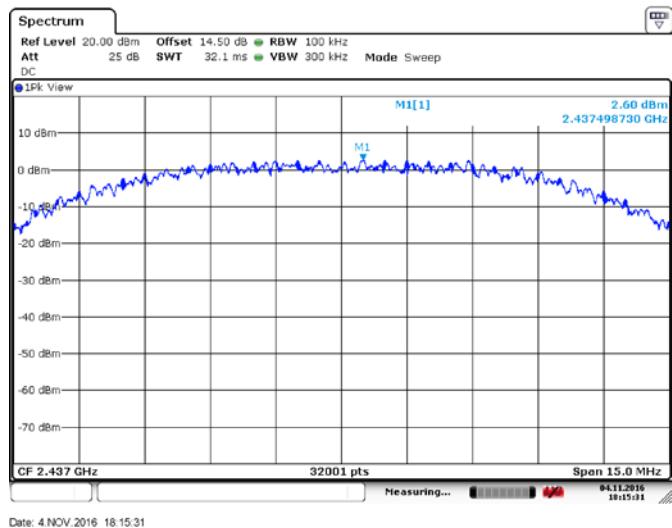
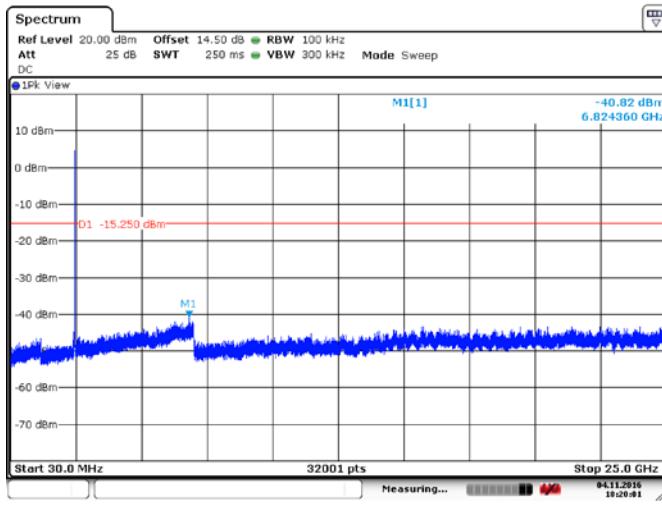


Figure 8.3.14: Conducted spurious emissions, 2437MHz, 20MHz BW, DSSS/Mbps5.5, Reference Measured (dBm/100kHz): 2.6

Peaks within 2400-2483.5MHz are transmitter fundamentals.

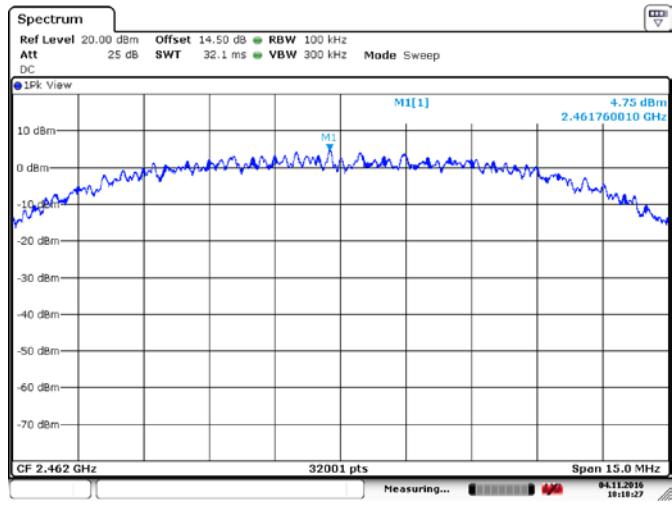
Section 8
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Testing data
FCC 15.247(e) and RSS-247 5.2(2) Power Spectrum Density
FCC Part 15 Subpart C and RSS-247, Issue 1



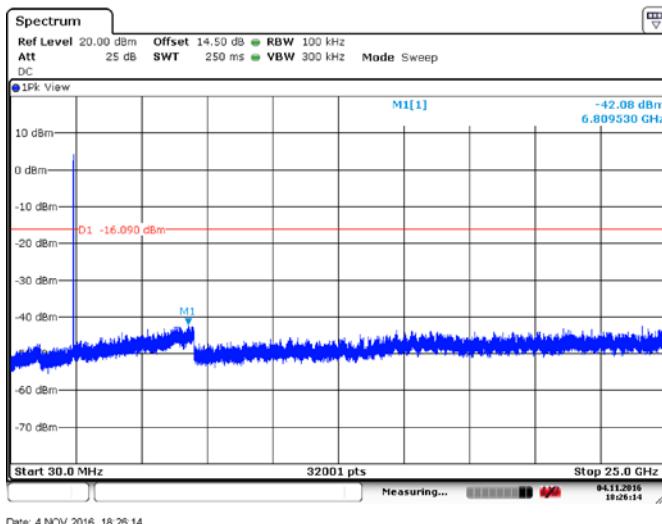
Date: 4 NOV. 2016 18:20:00

Figure 8.3.15: Conducted spurious emissions, 2462MHz, 20MHz BW, DSSS/Mbps11



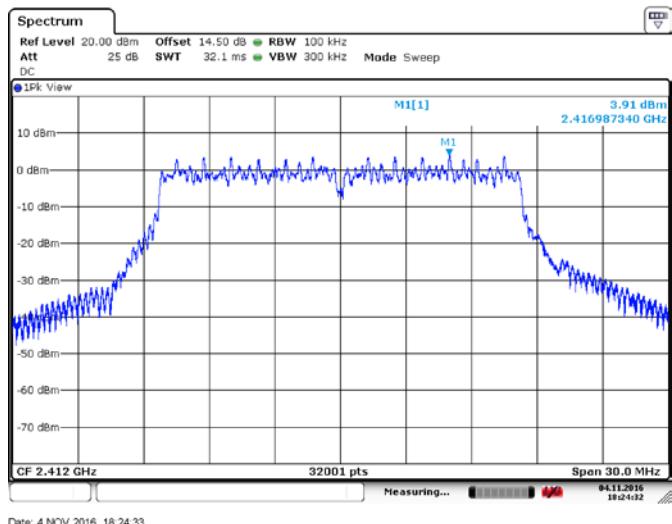
Date: 4 NOV. 2016 18:18:28

Figure 8.3.16: Conducted spurious emissions, 2462MHz, 20MHz BW, DSSS/Mbps11, Reference Measured (dBm/100kHz): 4.75



Date: 4 NOV. 2016 18:26:14

Figure 8.3.17: Conducted spurious emissions, 2412MHz, 20MHz BW, OFDM/Mbps48



Date: 4 NOV. 2016 18:24:33

Figure 8.3.18: Conducted spurious emissions, 2412MHz, 20MHz BW, OFDM/Mbps48, Reference Measured (dBm/100kHz): 3.91

Peaks within 2400-2483.5MHz are transmitter fundamentals.

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Test name
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FCC Part 15 Subpart C and RSS-247, Issue 1

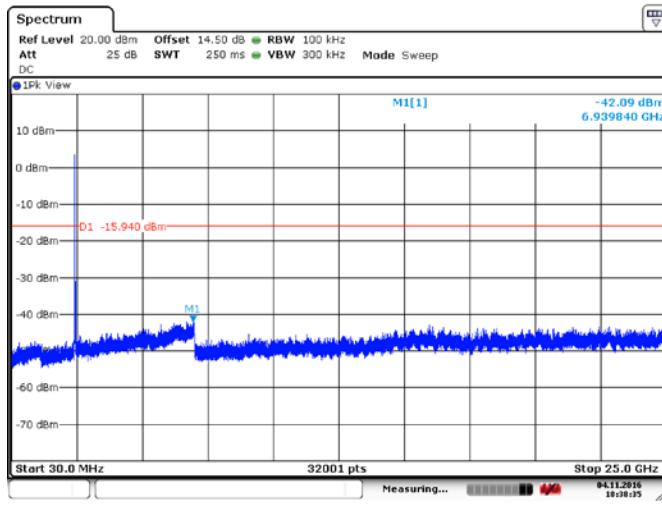


Figure 8.3.19: Conducted spurious emissions, 2437MHz, 20MHz BW, OFDM/Mbps48

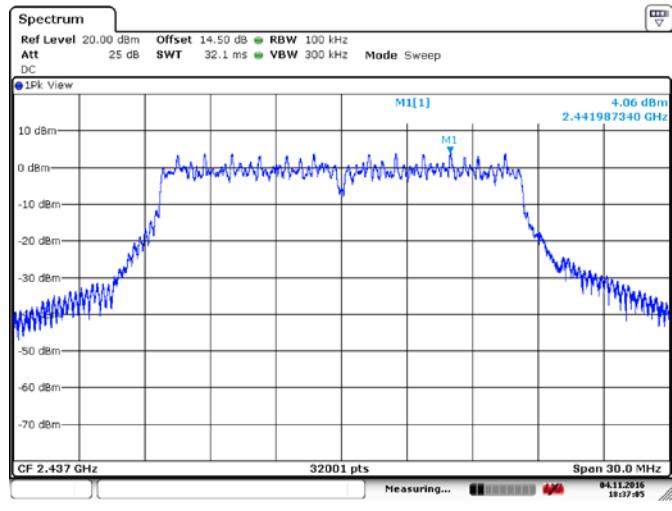


Figure 8.3.20: Conducted spurious emissions, 2437MHz, 20MHz BW, OFDM/Mbps48, Reference Measured (dBm/100kHz): 4.06

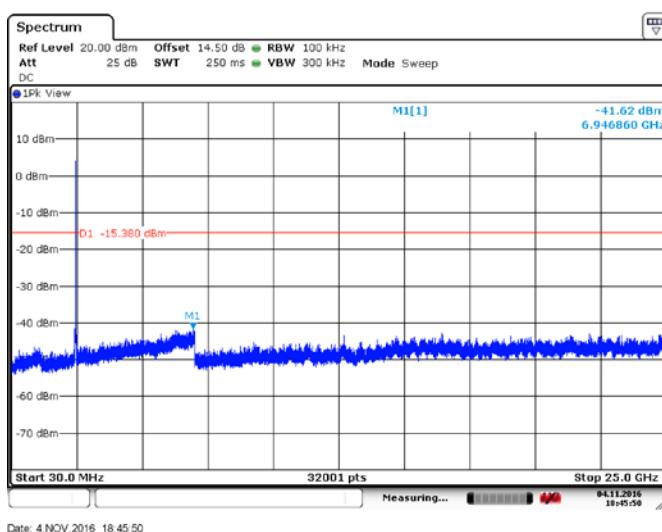


Figure 8.3.21: Conducted spurious emissions, 2462MHz, 20MHz BW, OFDM/Mbps48

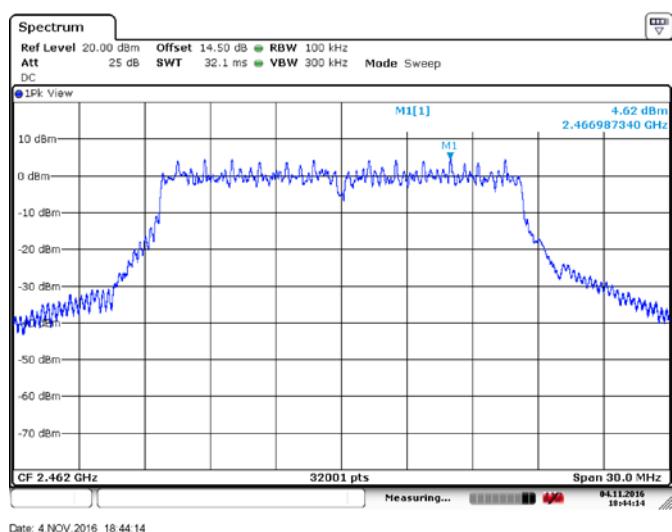
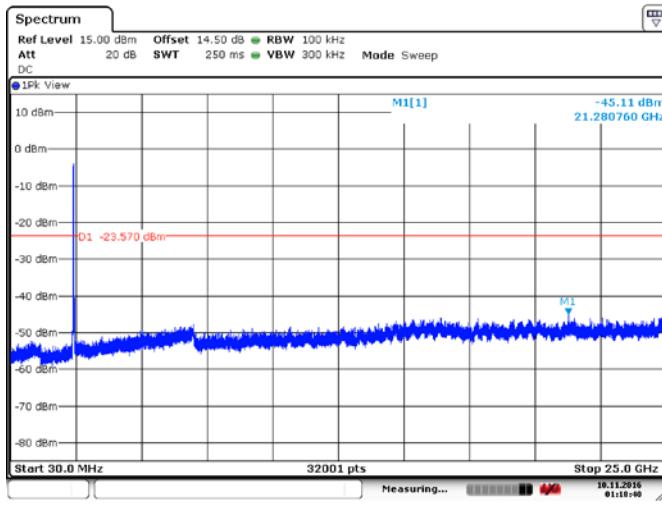


Figure 8.3.22: Conducted spurious emissions, 2462MHz, 20MHz BW, OFDM/Mbps48, Reference Measured (dBm/100kHz): 4.62

Peaks within 2400-2483.5MHz are transmitter fundamentals.

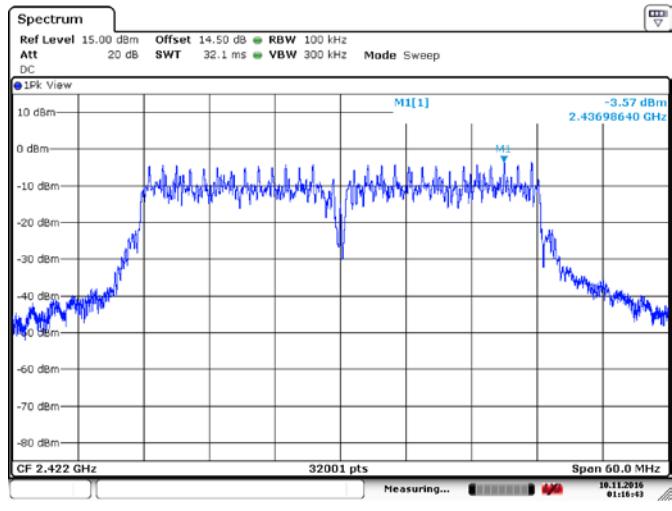
Section 8
Test name
Specification

Testing data
FCC 15.247(e) and RSS-247 5.2(2) Power Spectrum Density
FCC Part 15 Subpart C and RSS-247, Issue 1



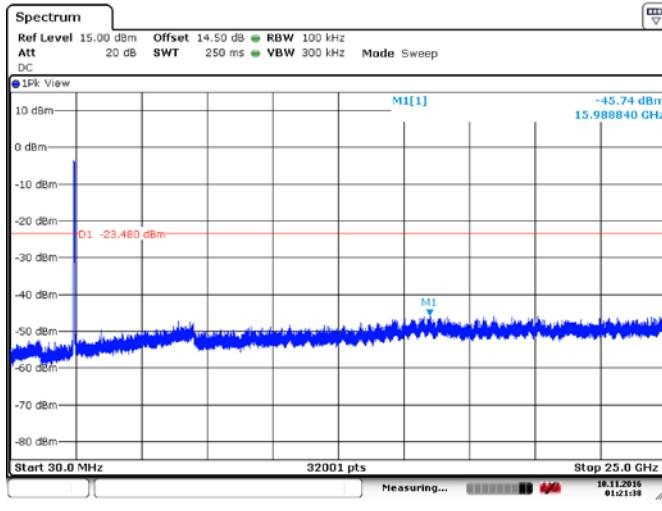
Date: 10.NOV.2016 01:18:40

Figure 8.3.23: Conducted spurious emissions, 2422MHz, 40MHz BW, OFDM/MCS6



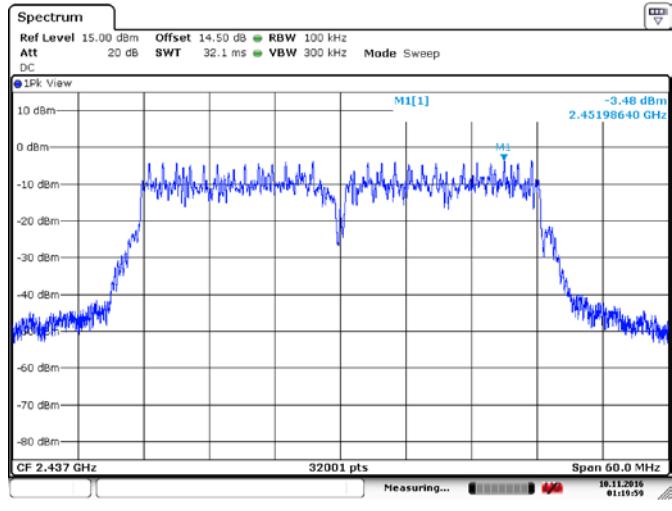
Date: 10.NOV.2016 01:16:43

Figure 8.3.24: Conducted spurious emissions, 2422MHz, 40MHz BW, OFDM/MCS6, Reference Measured (dBm/100kHz): -3.57



Date: 10.NOV.2016 01:21:38

Figure 8.3.25: Conducted spurious emissions, 2437MHz, 40MHz BW, OFDM/MCS5



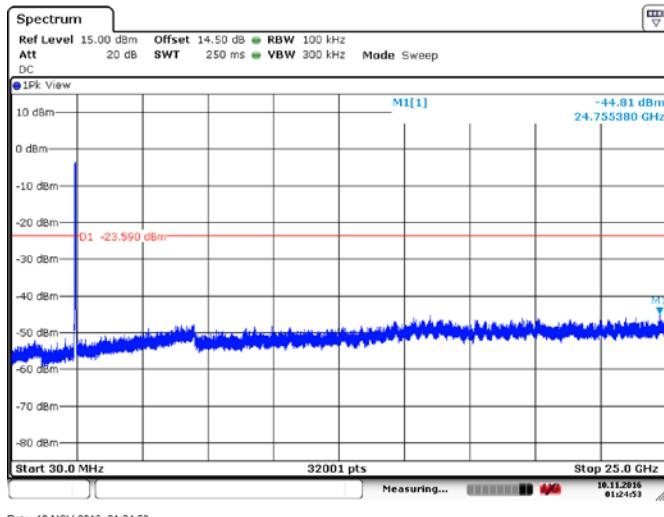
Date: 10.NOV.2016 01:19:59

Figure 8.3.26: Conducted spurious emissions, 2437MHz, 40MHz BW, OFDM/MCS5, Reference Measured (dBm/100kHz): -3.48

Peaks within 2400-2483.5MHz are transmitter fundamentals.

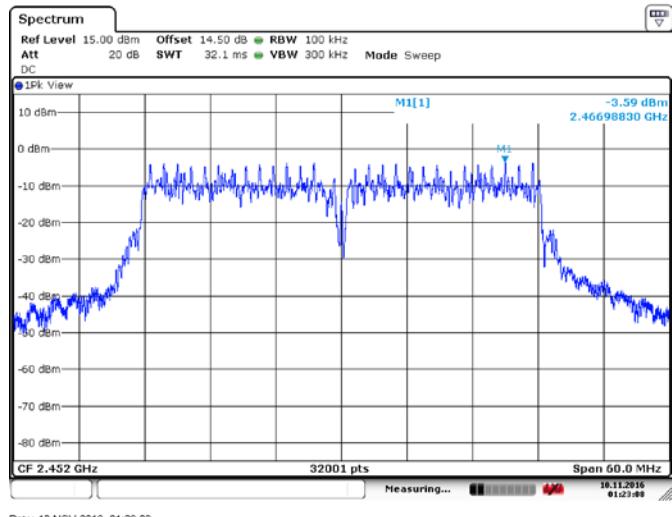
Section 8
Test name
Specification

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FCC 15.247(e) and RSS-247 5.2(2) Power Spectrum Density
FCC Part 15 Subpart C and RSS-247, Issue 1



Date: 10.NOV.2016 01:24:53

Figure 8.3.27: Conducted spurious emissions, 2452MHz, 40MHz BW, OFDM/MCS6



Date: 10.NOV.2016 01:23:09

Figure 8.3.28: Conducted spurious emissions, 2452MHz, 40MHz BW, OFDM/MCS6, Reference Measured (dBm/100kHz): -3.59

Peaks within 2400-2483.5MHz are transmitter fundamentals.

8.3.5 Test data – Radiated Spurious Emissions

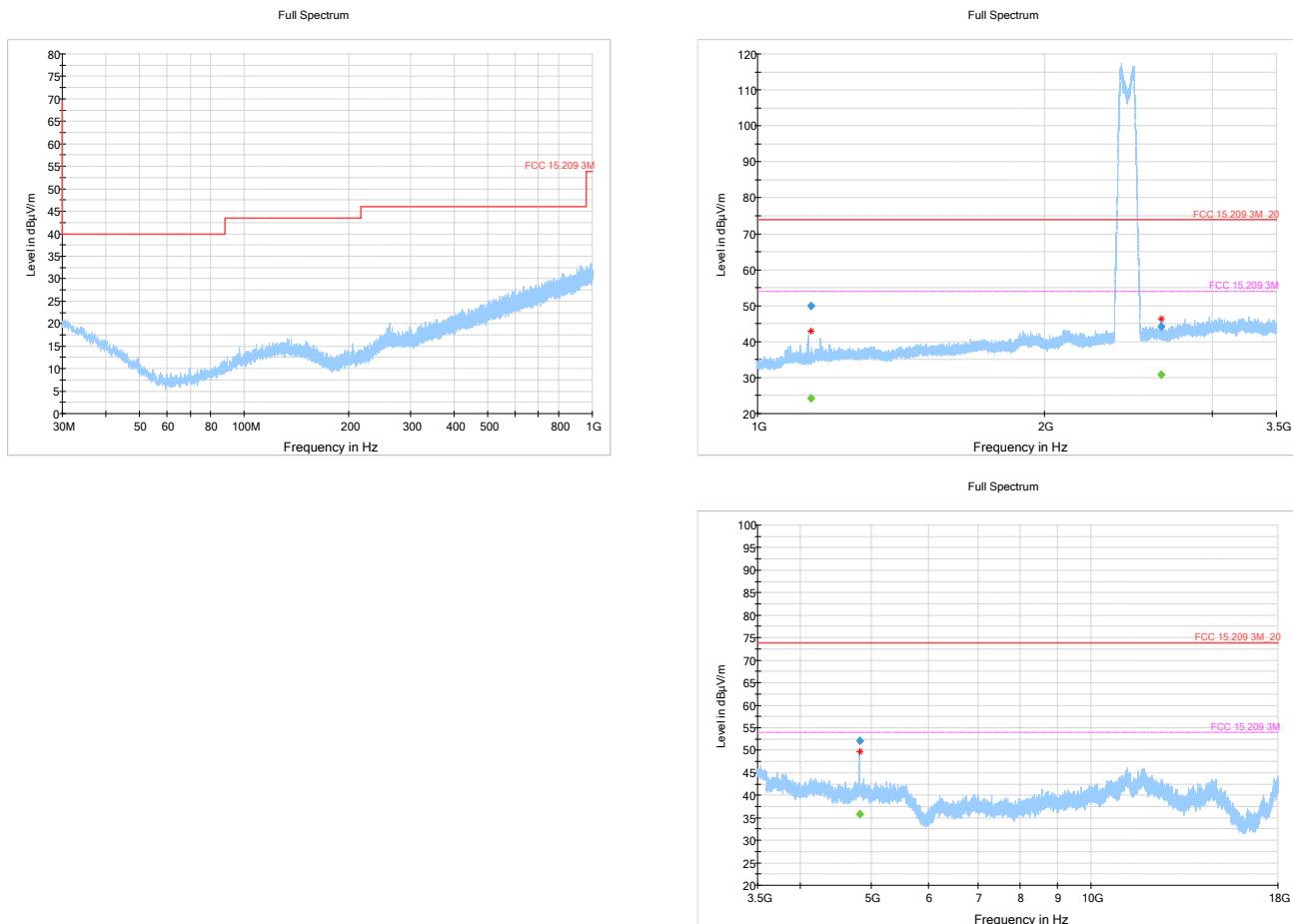


Figure 8.3.29: Radiated spurious emissions, 2412MHz, 20MHz BW,
DSSS/Mbps5.5, 30-1000MHz

Figure 8.3.30: Radiated spurious emissions, 2412MHz, 20MHz BW,
DSSS/Mbps5.5, 1-18GHz

Peaks within 2400-2483.5MHz are transmitter fundamentals.

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1136.600000	49.87	---	73.90	24.03	1000.0	1000.000	294.5	H	152.0
1136.600000	---	24.27	53.90	29.63	1000.0	1000.000	294.5	H	152.0
2648.150000	44.16	---	73.90	29.74	1000.0	1000.000	255.4	H	0.0
2648.150000	---	30.86	53.90	23.04	1000.0	1000.000	255.4	H	0.0
4824.050000	---	35.81	53.90	18.09	1000.0	1000.000	101.6	V	63.0
4824.050000	52.03	---	73.90	21.87	1000.0	1000.000	101.6	V	63.0

Section 8
Test name
Specification

Testing data
FCC 15.247(e) and RSS-247 5.2(2) Power Spectrum Density
FCC Part 15 Subpart C and RSS-247, Issue 1

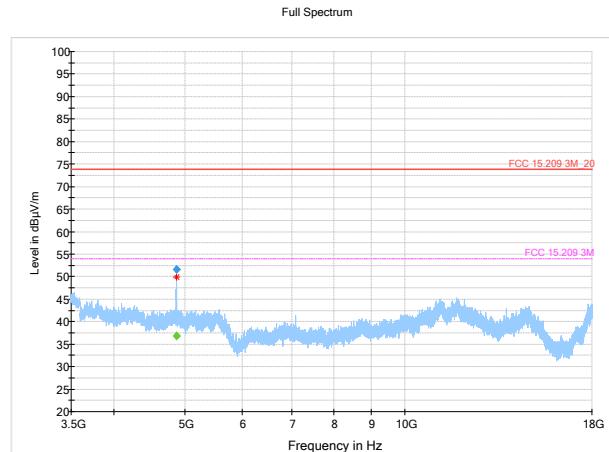
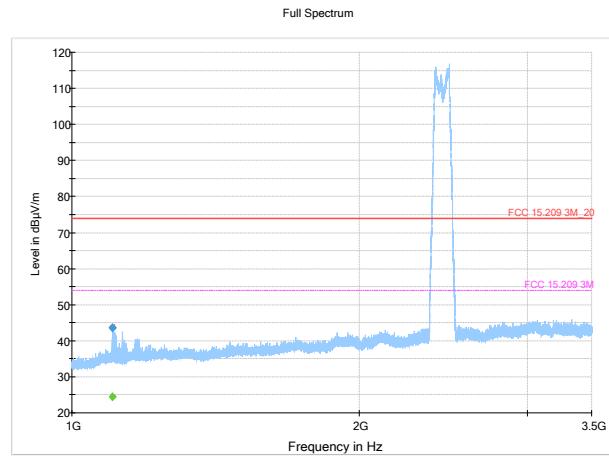
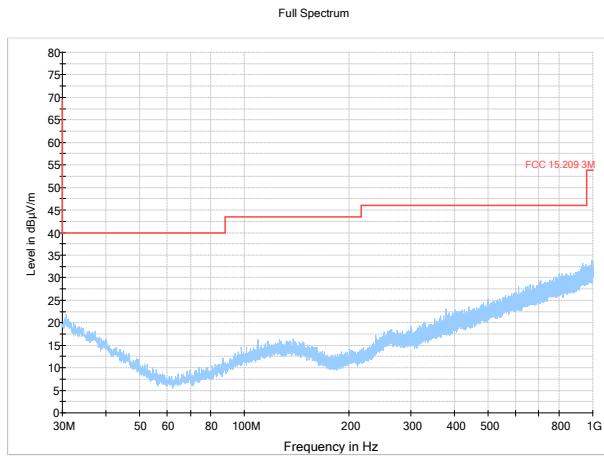


Figure 8.3.31: Radiated spurious emissions, 2437MHz, 20MHz BW,
DSSS/Mbps5.5, 30-1000MHz

Figure 8.3.32: Radiated spurious emissions, 2437MHz, 20MHz BW,
DSSS/Mbps5.5, 1-18GHz

Peaks within 2400-2483.5MHz are transmitter fundamentals.

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1103.366667	---	24.47	53.90	29.43	1000.0	1000.000	303.7	H	197.0
1103.366667	43.59	---	73.90	30.31	1000.0	1000.000	303.7	H	197.0
4874.433333	---	36.87	53.90	17.03	1000.0	1000.000	124.9	H	60.0
4874.433333	51.59	---	73.90	22.31	1000.0	1000.000	124.9	H	60.0

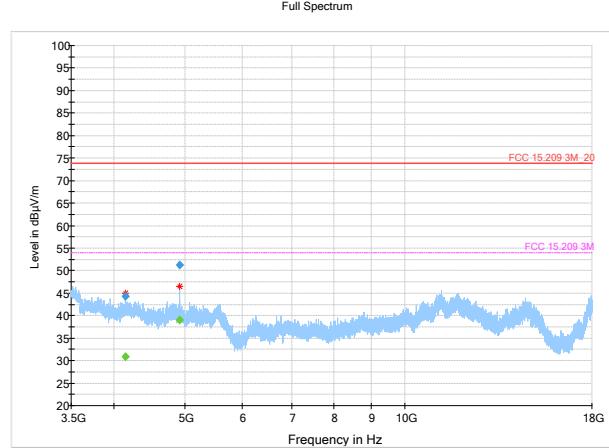
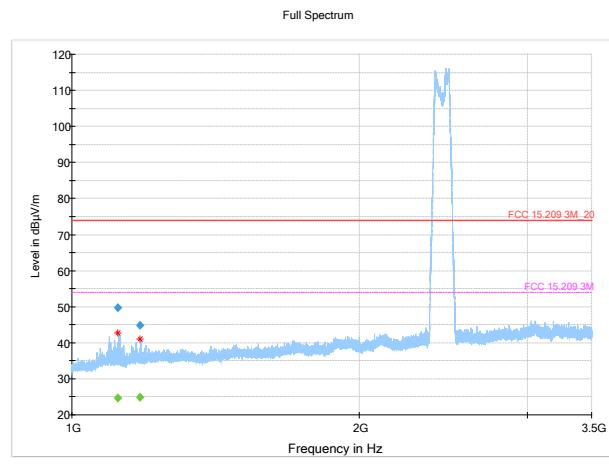
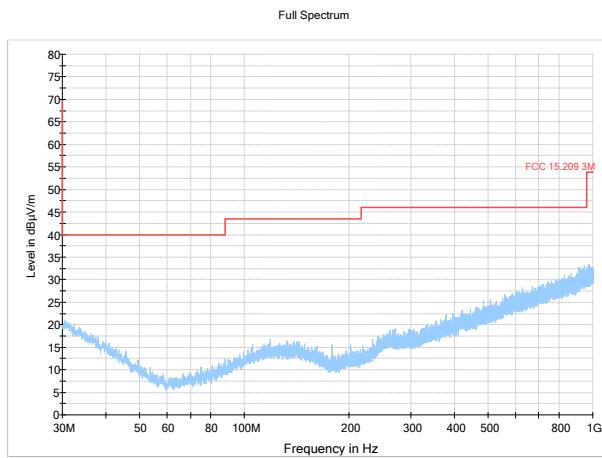


Figure 8.3.33: Radiated spurious emissions, 2462MHz, 20MHz BW,
DSSS/Mbps11, 30-1000MHz

Figure 8.3.34: Radiated spurious emissions, 2462MHz, 20MHz BW,
DSSS/Mbps11, 1-18GHz

Peaks within 2400-2483.5MHz are transmitter fundamentals.

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1116.433333	49.78	---	73.90	24.12	1000.0	1000.000	401.0	H	139.0
1116.433333	---	24.65	53.90	29.25	1000.0	1000.000	401.0	H	139.0
1178.100000	44.80	---	73.90	29.10	1000.0	1000.000	138.6	H	312.0
1178.100000	---	24.94	53.90	28.96	1000.0	1000.000	138.6	H	312.0
4149.233333	---	30.92	53.90	22.98	1000.0	1000.000	113.3	H	309.0
4149.233333	44.29	---	73.90	29.61	1000.0	1000.000	113.3	H	309.0
4924.100000	---	39.01	53.90	14.89	1000.0	1000.000	139.2	H	268.0
4924.100000	51.17	---	73.90	22.73	1000.0	1000.000	139.2	H	268.0

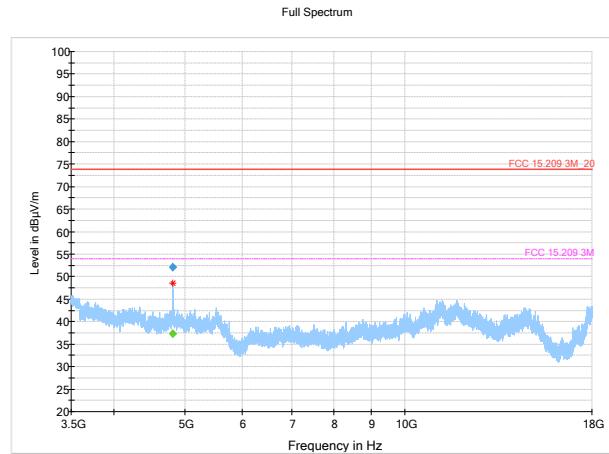
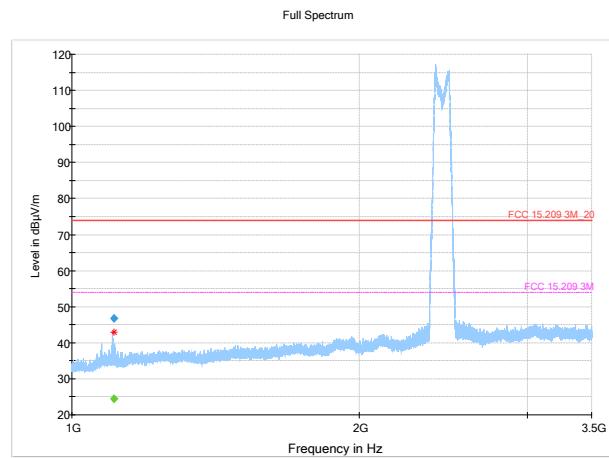
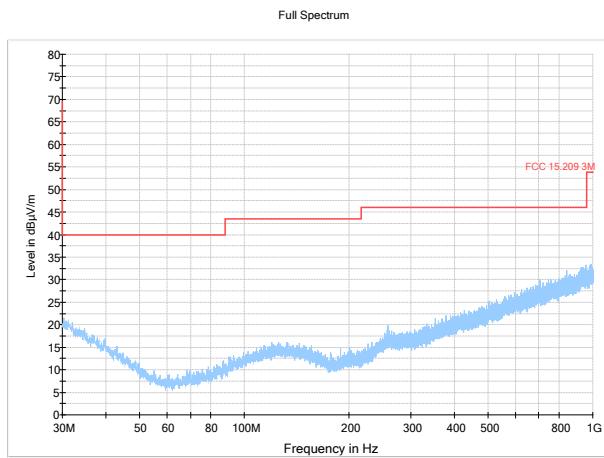


Figure 8.3.35: Radiated spurious emissions, 2412MHz, 20MHz BW,
OFDM/Mbps48, 30-1000MHz

Figure 8.3.36: Radiated spurious emissions, 2412MHz, 20MHz BW,
OFDM/Mbps48, 1-18GHz

Peaks within 2400-2483.5MHz are transmitter fundamentals.

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1105.933333	---	24.39	53.90	29.51	1000.0	1000.000	307.3	H	0.0
1105.933333	46.67	---	73.90	27.23	1000.0	1000.000	307.3	H	0.0
4818.200000	---	37.34	53.90	16.56	1000.0	1000.000	119.9	H	86.0
4818.200000	52.11	---	73.90	21.79	1000.0	1000.000	119.9	H	86.0

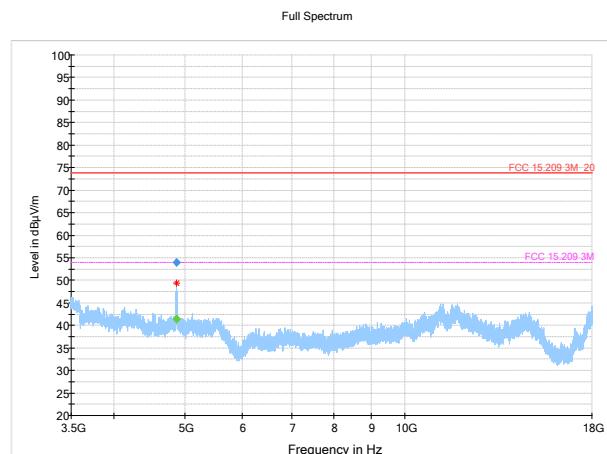
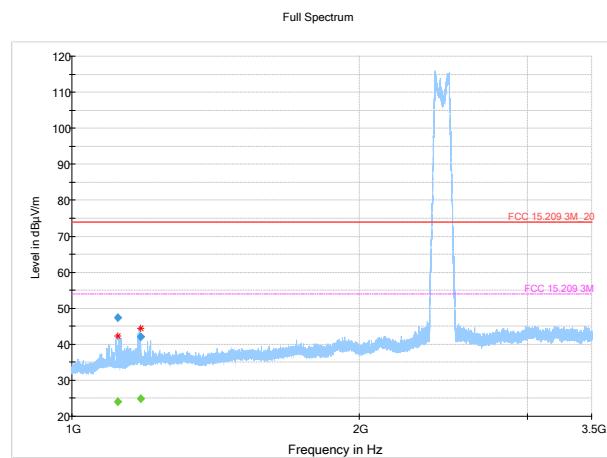
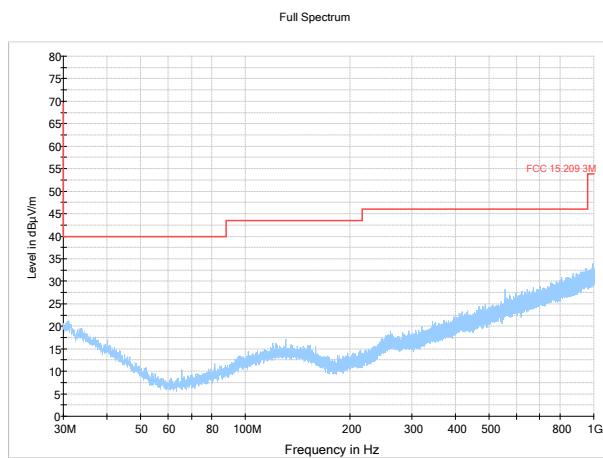


Figure 8.3.37: Radiated spurious emissions, 2437MHz, 20MHz BW,
OFDM/Mbps48, 30-1000MHz

Figure 8.3.38: Radiated spurious emissions, 2437MHz, 20MHz BW,
OFDM/Mbps48, 1-18GHz

Peaks within 2400-2483.5MHz are transmitter fundamentals.

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1117.666667	47.48	---	73.90	26.42	1000.0	1000.000	329.6	H	153.0
1117.666667	---	24.13	53.90	29.77	1000.0	1000.000	329.6	H	153.0
1179.350000	42.08	---	73.90	31.82	1000.0	1000.000	195.8	H	352.0
1179.350000	---	24.80	53.90	29.10	1000.0	1000.000	195.8	H	352.0
4873.433333	---	41.41	53.90	12.49	1000.0	1000.000	107.2	H	84.0
4873.433333	53.96	---	73.90	19.94	1000.0	1000.000	107.2	H	84.0

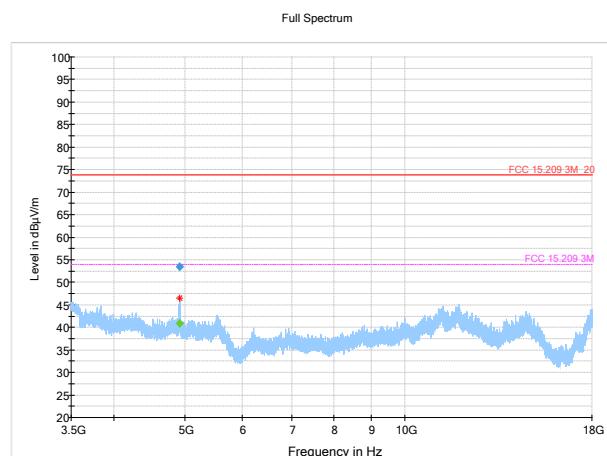
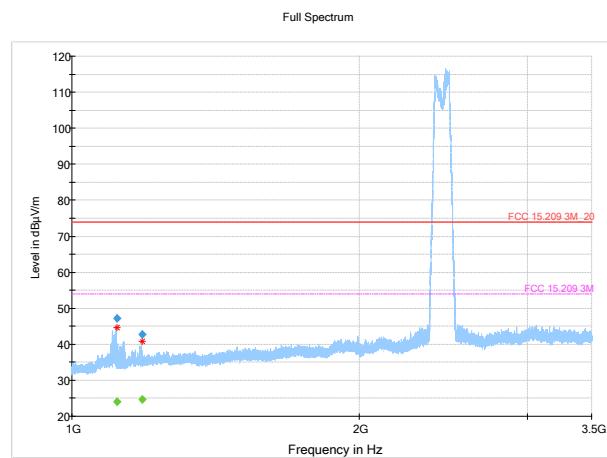
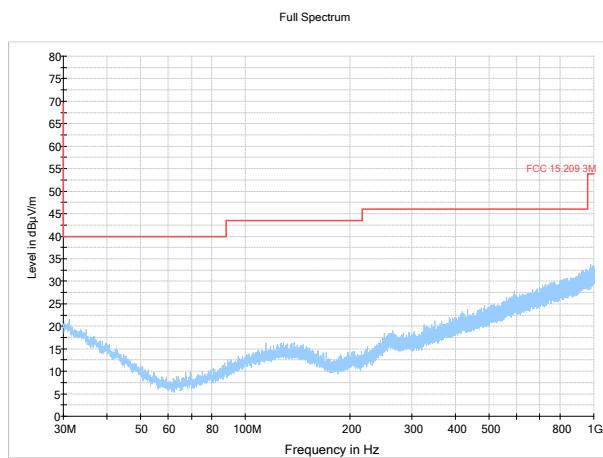


Figure 8.3.39: Radiated spurious emissions, 2462MHz, 20MHz BW,
OFDM/Mbps48, 30-1000MHz

Figure 8.3.40: Radiated spurious emissions, 2462MHz, 20MHz BW,
OFDM/Mbps48, 1-18GHz

Peaks within 2400-2483.5MHz are transmitter fundamentals.

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1115.616667	47.21	---	73.90	26.69	1000.0	1000.000	195.7	H	161.0
1115.616667	---	24.05	53.90	29.85	1000.0	1000.000	195.7	H	161.0
1185.683333	42.63	---	73.90	31.27	1000.0	1000.000	110.7	H	345.0
1185.683333	---	24.76	53.90	29.14	1000.0	1000.000	110.7	H	345.0
4923.616667	---	40.93	53.90	12.97	1000.0	1000.000	102.3	V	341.0
4923.616667	53.41	---	73.90	20.49	1000.0	1000.000	102.3	V	341.0

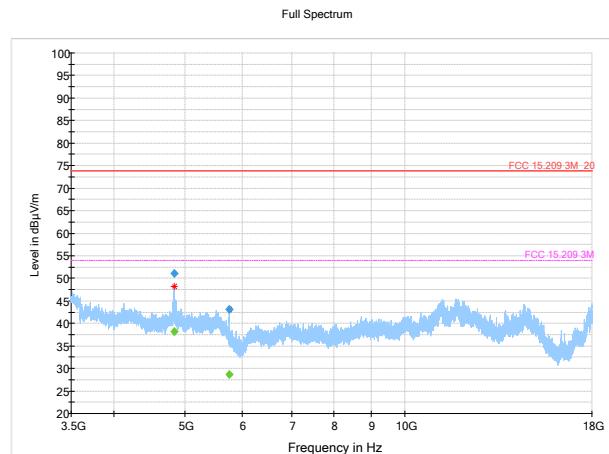
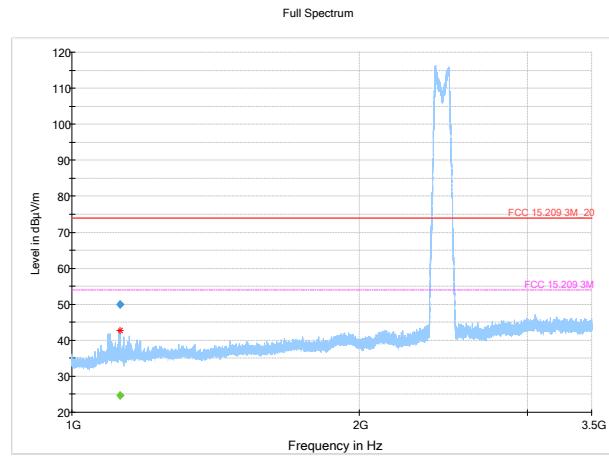
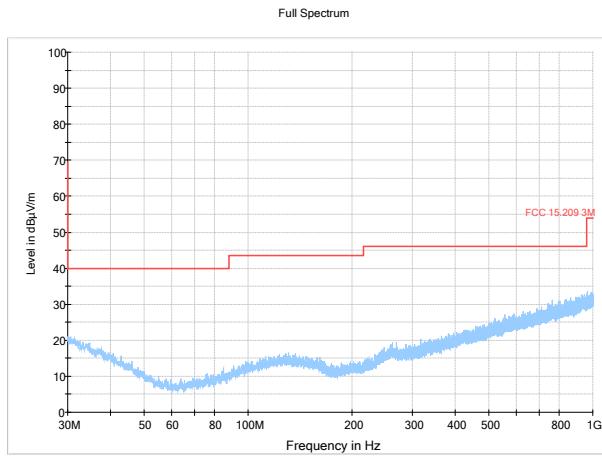


Figure 8.3.41: Radiated spurious emissions, 2422MHz, 40MHz BW,
OFDM/MCS6, 30-1000MHz

Figure 8.3.42: Radiated spurious emissions, 2422MHz, 40MHz BW,
OFDM/MCS6, 1-18GHz

Peaks within 2400-2483.5MHz are transmitter fundamentals.

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1122.250000	---	24.74	53.90	29.16	1000.0	1000.000	306.1	H	147.0
1122.250000	49.93	---	73.90	23.97	1000.0	1000.000	306.1	H	147.0
4843.533333	---	38.14	53.90	15.76	1000.0	1000.000	126.7	H	30.0
4843.533333	51.12	---	73.90	22.78	1000.0	1000.000	126.7	H	30.0
5752.750000	---	28.74	53.90	25.16	1000.0	1000.000	390.8	V	104.0
5752.750000	43.18	---	73.90	30.72	1000.0	1000.000	390.8	V	104.0

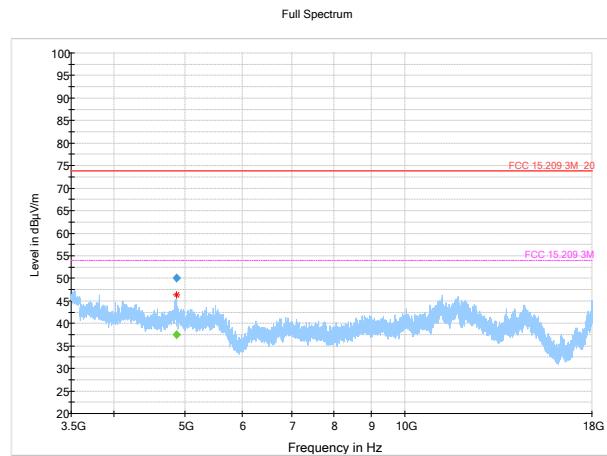
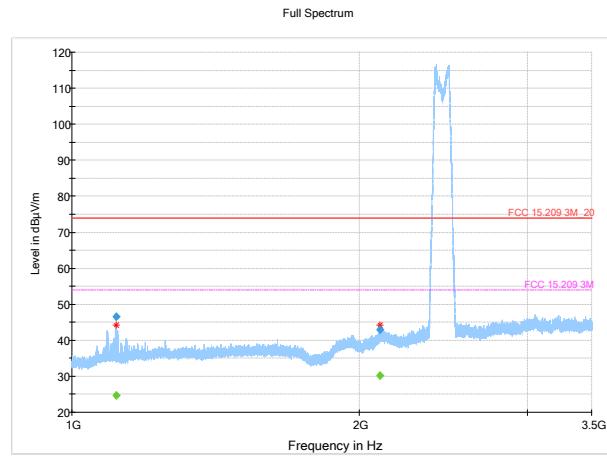
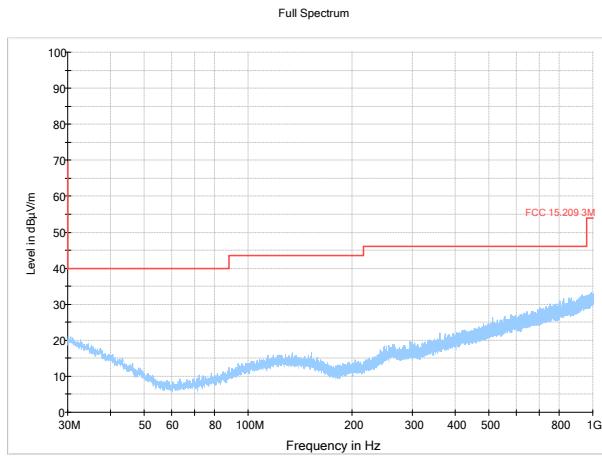


Figure 8.3.43: Radiated spurious emissions, 2437MHz, 40MHz BW,
OFDM/MCS5, 30-1000MHz

Figure 8.3.44: Radiated spurious emissions, 2437MHz, 40MHz BW,
OFDM/MCS5, 1-18GHz

Peaks within 2400-2483.5MHz are transmitter fundamentals.

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1113.383333	---	24.66	53.90	29.24	1000.0	1000.000	246.0	H	150.0
1113.383333	46.52	---	73.90	27.38	1000.0	1000.000	246.0	H	150.0
2100.500000	---	30.10	53.90	23.80	1000.0	1000.000	259.9	V	194.0
2100.500000	42.88	---	73.90	31.02	1000.0	1000.000	259.9	V	194.0
4872.383333	---	37.55	53.90	16.35	1000.0	1000.000	102.6	V	310.0
4872.383333	49.99	---	73.90	23.91	1000.0	1000.000	102.6	V	310.0

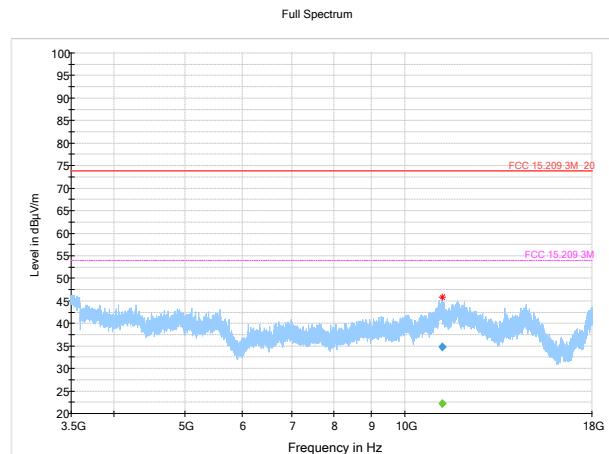
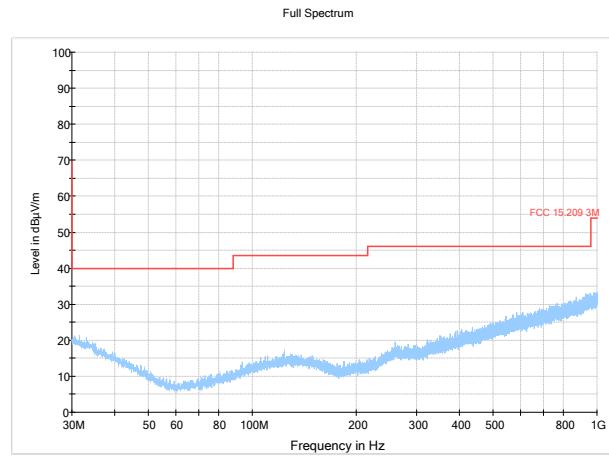
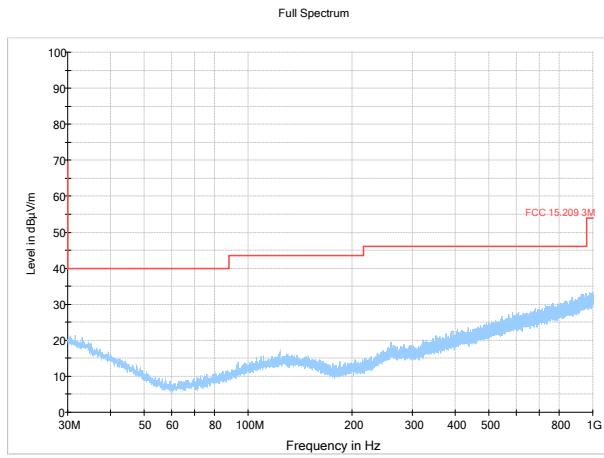


Figure 8.3.45: Radiated spurious emissions, 2452MHz, 40MHz BW,
OFDM/MCS6, 30-1000MHz

Figure 8.3.46: Radiated spurious emissions, 2452MHz, 40MHz BW,
OFDM/MCS6, 1-18GHz

Peaks within 2400-2483.5MHz are transmitter fundamentals.

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1101.250000	---	25.12	53.90	28.78	1000.0	1000.000	353.7	H	135.0
1101.250000	50.88	---	73.90	23.02	1000.0	1000.000	353.7	H	135.0
11240.550000	---	22.23	53.90	31.67	1000.0	1000.000	319.7	H	94.0
11240.550000	34.75	---	73.90	39.15	1000.0	1000.000	319.7	H	94.0

8.3.6 Test data – Radiated Spurious Emissions at Band Edge in Restricted Band

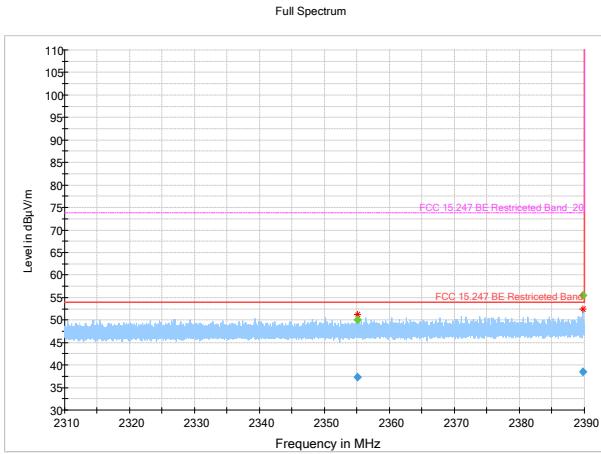


Figure 8.3.47: Radiated Band Edge, 2412MHz, 20MHz BW, DSSS/Mbps5.5

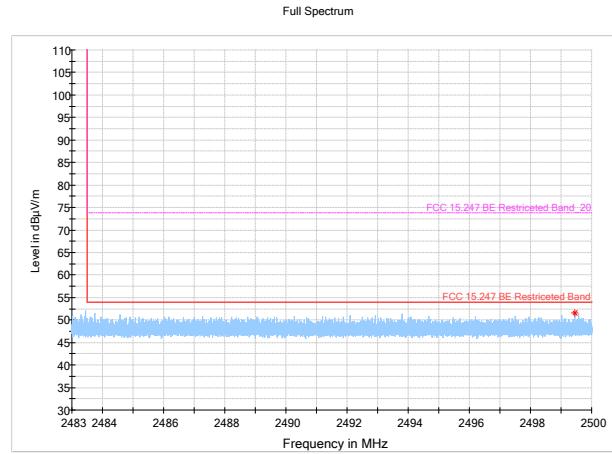


Figure 8.3.48: Radiated Band Edge, 2462MHz, 20MHz BW, DSSS/Mbps11

Frequency (MHz)	Average (dB μ V/m)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2355.032000	---	49.99	73.90	23.91	1000.0	1000.000	116.3	H	6.0
2355.032000	37.22	---	53.90	16.68	1000.0	1000.000	116.3	H	6.0
2389.720000	---	55.40	73.90	18.50	1000.0	1000.000	135.8	H	252.0
2389.720000	38.52	---	53.90	15.38	1000.0	1000.000	135.8	H	252.0

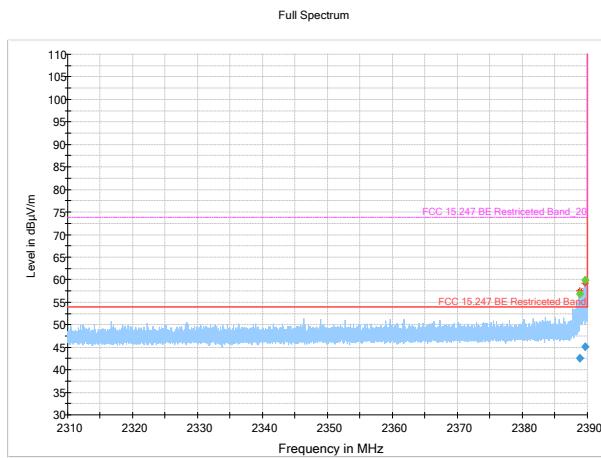


Figure 8.3.49: Radiated Band Edge, 2412MHz, 20MHz BW, OFDM/Mbps48

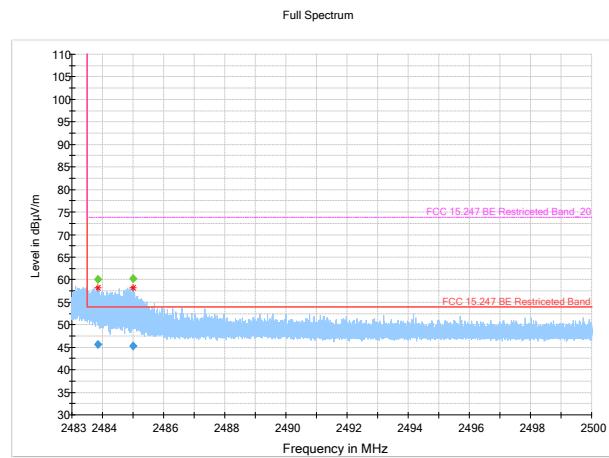


Figure 8.3.50: Radiated Band Edge, 2462MHz, 20MHz BW, OFDM/Mbps48

Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2388.773333	---	56.87	73.90	17.03	1000.0	1000.000	103.7	H	258.0
2388.773333	42.62	---	53.90	11.28	1000.0	1000.000	103.7	H	258.0
2389.682667	---	59.90	73.90	14.00	1000.0	1000.000	135.9	H	254.0
2389.682667	45.09	---	53.90	8.81	1000.0	1000.000	135.9	H	254.0

Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2483.838667	---	60.01	73.90	13.89	1000.0	1000.000	114.5	H	262.0
2483.838667	45.67	---	53.90	8.23	1000.0	1000.000	114.5	H	262.0
2484.993533	---	60.22	73.90	13.68	1000.0	1000.000	120.6	H	259.0
2484.993533	45.26	---	53.90	8.64	1000.0	1000.000	120.6	H	259.0

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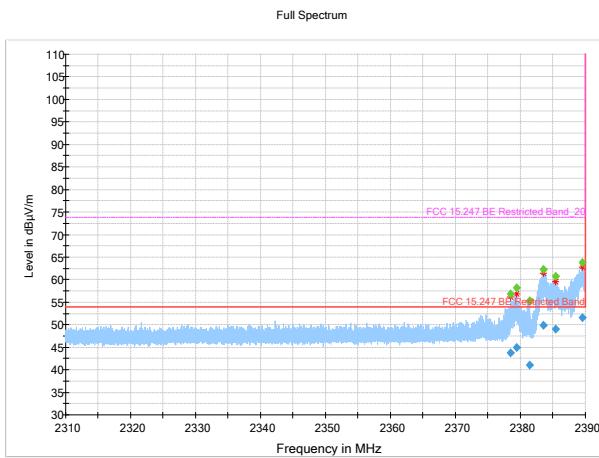


Figure 8.3.51: Radiated Band Edge, 2422MHz, 40MHz BW, OFDM/MCS6

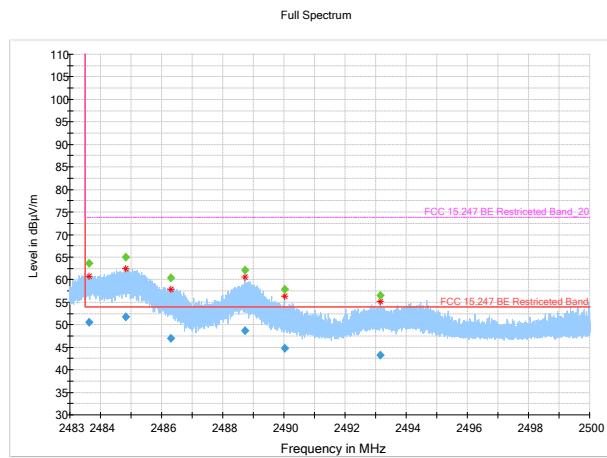


Figure 8.3.52: Radiated Band Edge, 2452MHz, 40MHz BW, OFDM/MCS6

Frequency (MHz)	Average (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2378.424000	---	56.91	73.90	16.99	1000.0	1000.000	121.6	H	236.0
2378.424000	43.77	---	53.90	10.13	1000.0	1000.000	121.6	H	236.0
2379.386667	---	58.24	73.90	15.66	1000.0	1000.000	139.5	H	237.0
2379.386667	44.88	---	53.90	9.02	1000.0	1000.000	139.5	H	237.0
2381.392000	---	55.28	73.90	18.62	1000.0	1000.000	107.0	H	233.0
2381.392000	41.02	---	53.90	12.88	1000.0	1000.000	107.0	H	233.0
2383.573333	---	62.31	73.90	11.59	1000.0	1000.000	123.4	H	237.0
2383.573333	49.79	---	53.90	4.11	1000.0	1000.000	123.4	H	237.0
2385.402667	---	60.77	73.90	13.13	1000.0	1000.000	115.7	H	234.0
2385.402667	48.98	---	53.90	4.92	1000.0	1000.000	115.7	H	234.0
2389.570667	---	63.79	73.90	10.11	1000.0	1000.000	140.4	H	238.0
2389.570667	51.54	---	53.90	2.36	1000.0	1000.000	140.4	H	238.0

Frequency (MHz)	Average (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2483.615967	---	63.68	73.90	10.22	1000.0	1000.000	121.1	H	233.0
2483.615967	50.58	---	53.90	3.32	1000.0	1000.000	121.1	H	233.0
2484.834300	51.67	---	53.90	2.23	1000.0	1000.000	116.7	H	230.0
2484.834300	---	64.95	73.90	8.95	1000.0	1000.000	116.7	H	230.0
2486.304800	---	60.42	73.90	13.48	1000.0	1000.000	113.7	H	224.0
2486.304800	46.94	---	53.90	6.96	1000.0	1000.000	113.7	H	224.0
2488.732400	---	62.16	73.90	11.74	1000.0	1000.000	123.1	H	233.0
2488.732400	48.64	---	53.90	5.26	1000.0	1000.000	123.1	H	233.0
2490.031200	44.82	---	53.90	9.08	1000.0	1000.000	121.3	H	227.0
2490.031200	---	57.94	73.90	15.96	1000.0	1000.000	121.3	H	227.0
2493.141067	---	56.43	73.90	17.47	1000.0	1000.000	122.3	H	235.0
2493.141067	43.24	---	53.90	10.66	1000.0	1000.000	122.3	H	235.0

8.4 FCC 15.247(e) and RSS-247 5.2(2) Power Spectrum Density

8.4.1 Definitions and limits

FCC and IC:

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

8.4.2 Test summary

Test date	November 3, 2016	Temperature	23 °C
Test engineer	Feng You	Air pressure	1005 mbar
Verdict	Pass	Relative humidity	37 %

8.4.3 Observations, settings and special notes

3kHz RBW

Per ANSI 63.10-2013 5.6.2.2

- c) In-band PSD—Measurements on the mode with the narrowest bandwidth can be used to cover all modes within the same modulation family of an equal or lower output power provided the result is less than 50% of the limit.

Measure and add (10 log(2)) dB method is used – 2 antennas = 3dB. RF output 2 is used as worst case.

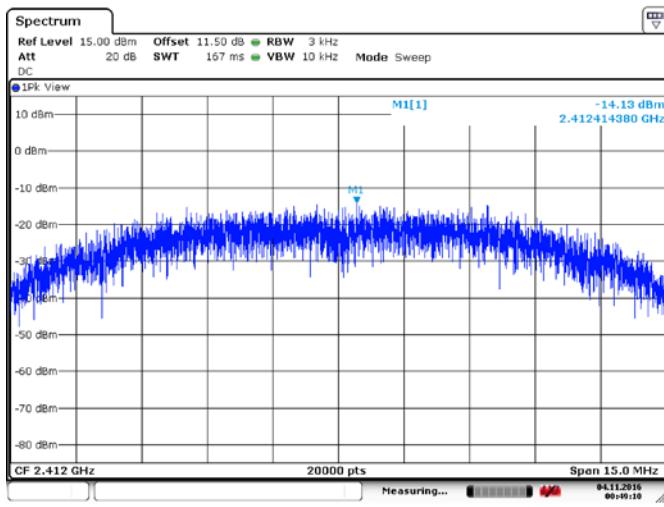
8.4.4 Test data

Table 8.4-1: Power Spectrum Density

Frequency, MHz	Channel Bandwidth, MHz	Modulation	Data Rate, Mbps	RF2 Measured PSD@3kHz	Total	Limit	Margin	Antenna gain	EIRP, dBm	EIRP limit, dBm	EIRP margin
			dBm	dBm	dBm	dB	dB	dBi	dBm	dBm	dB
2412	20	DSSS	5.5	-14.13	-11.13	8	19.13	0	-11.13	36	47.13
2437	20	DSSS	5.5	-13.92	-10.92	8	18.92	0	-10.92	36	46.92
2462	20	DSSS	11	-12.59	-9.59	8	17.59	0	-9.59	36	45.59
2412	20	OFDM	48	-2.54	0.46	8	7.54	0	0.46	36	35.54
2437	20	OFDM	48	-2.2	0.8	8	7.2	0	0.8	36	35.2
2462	20	OFDM	48	-2.08	0.92	8	7.08	0	0.92	36	35.08
2422	40	OFDM	MCS6	-10.11	-7.11	8	15.11	0	-7.11	36	43.11
2437	40	OFDM	MCS5	-9.01	-6.01	8	14.01	0	-6.01	36	42.01
2452	40	OFDM	MCS6	-9.43	-6.43	8	14.43	0	-6.43	36	42.43

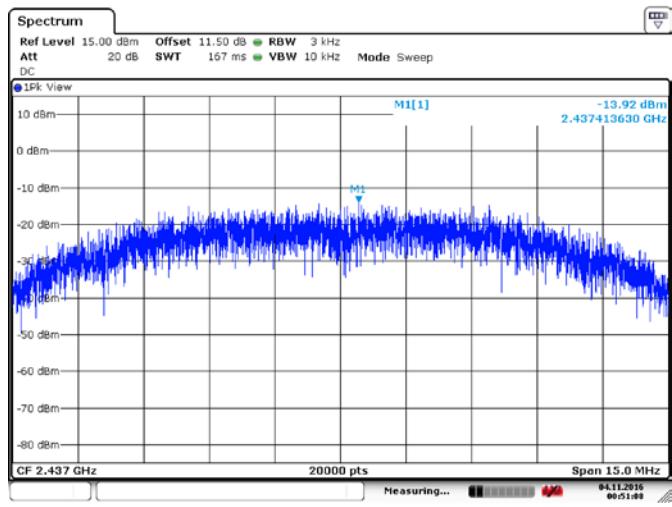
Section 8
Test name
Specification

Testing data
FCC 15.247(e) and RSS-247 5.2(2) Power Spectrum Density
FCC Part 15 Subpart C and RSS-247, Issue 1



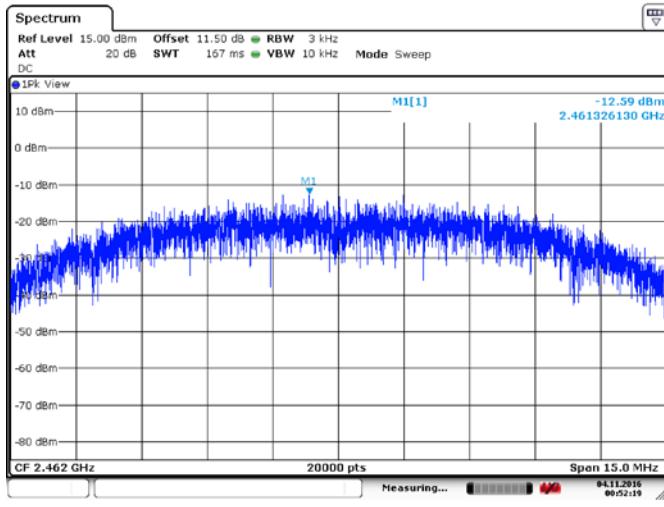
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Figure 8.4.1: Power Spectrum Density, 2412MHz, 20MHz BW, DSSS/Mbps5.5



Date: 4 NOV. 2016 00:51:08

Figure 8.4.2: Power Spectrum Density, 2437MHz, 20MHz BW, DSSS/Mbps5.5



Date: 4 NOV. 2016 00:52:20

Figure 8.4.3: Power Spectrum Density, 2462MHz, 20MHz BW, DSSS/Mbps11

Section 8
Test name
Specification

Testing data
FCC 15.247(e) and RSS-247 5.2(2) Power Spectrum Density
FCC Part 15 Subpart C and RSS-247, Issue 1

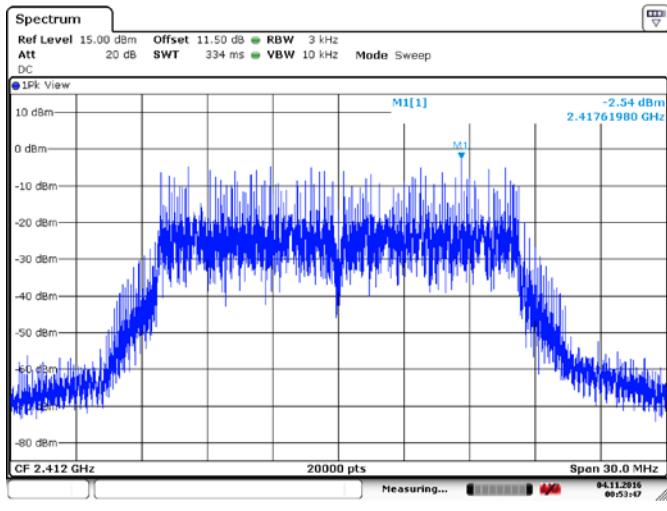


Figure 8.4.4: Power Spectrum Density, 2412MHz, 20MHz BW,
OFDM/Mbps48

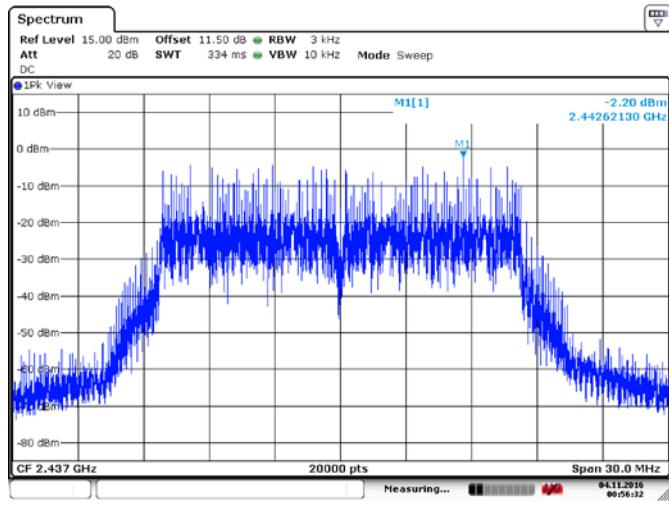


Figure 8.4.5: Conducted spurious emissions, 2437MHz, 20MHz BW,
OFDM/Mbps48

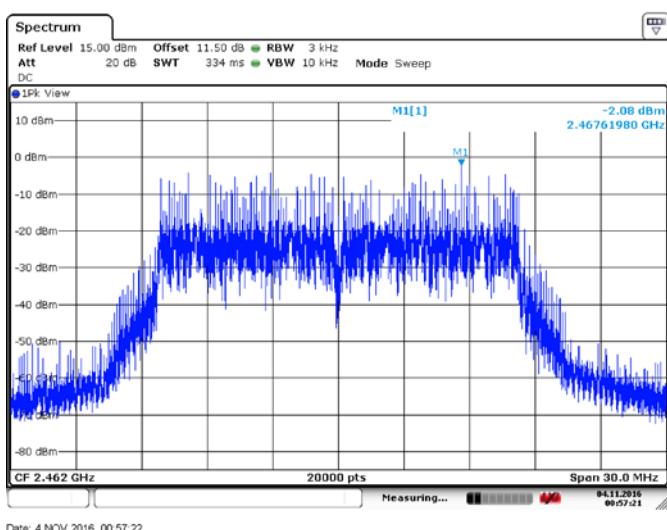
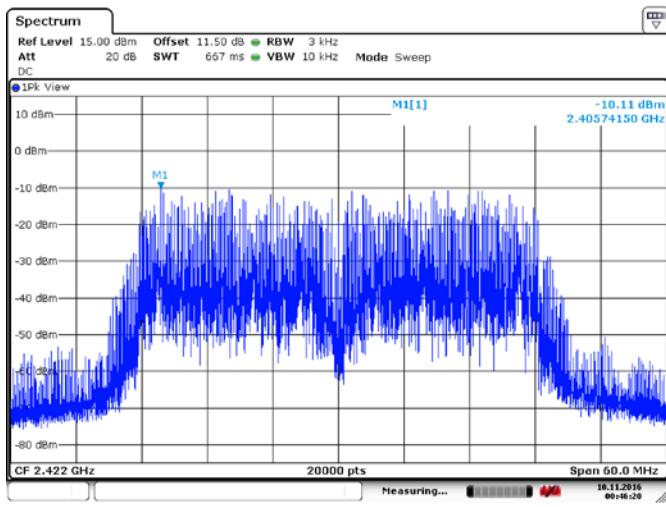


Figure 8.4.6: Power Spectrum Density, 2462MHz, 20MHz BW,
OFDM/Mbps48

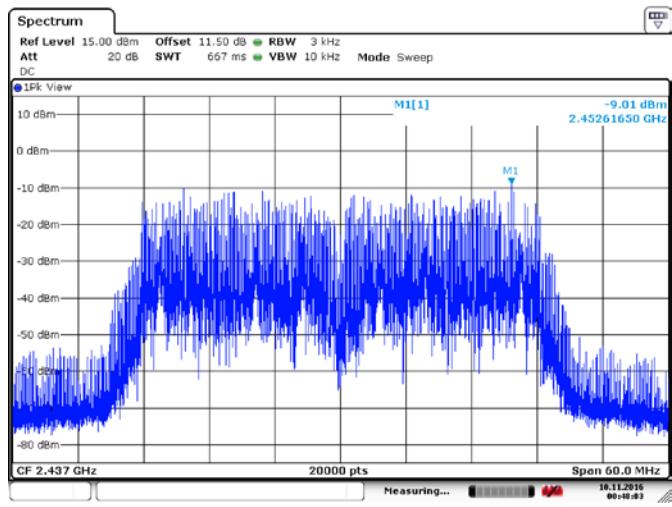
Section 8
Test name
Specification

Testing data
FCC 15.247(e) and RSS-247 5.2(2) Power Spectrum Density
FCC Part 15 Subpart C and RSS-247, Issue 1



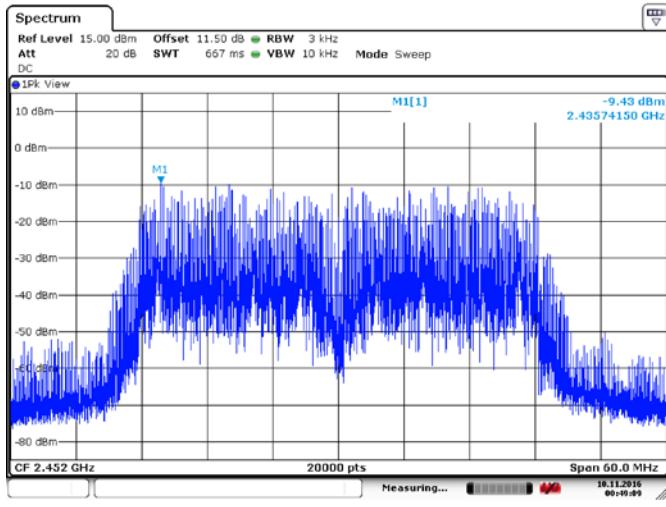
Date: 10.NOV.2016 00:46:20

Figure 8.4.7: Power Spectrum Density, 2422MHz, 40MHz BW, OFDM/MCS6



Date: 10.NOV.2016 00:48:03

Figure 8.4.8: Power Spectrum Density, 2437MHz, 40MHz BW, OFDM/MCS5



Date: 10.NOV.2016 00:49:10

Figure 8.4.9: Power Spectrum Density, 2452MHz, 40MHz BW, OFDM/MCS6

8.5 FCC 15.207(a) AC power line conducted emissions limits

8.5.1 Definitions and limits

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

The conducted emissions shall be measured with a 50 Ω /50 μ H line impedance stabilization network (LISN).

Table 8.5-1: Conducted emissions limit

Frequency of emission (MHz)	Quasi-peak	Conducted limit (dB μ V)	Average
0.15–0.5	66 to 56*	56 to 46*	
0.5–5	56	46	
5–30	60	50	

Note: * - Decreases with the logarithm of the frequency.

8.5.2 Test summary

Test date	November 3, 2016	Temperature	23 °C
Test engineer	Feng You	Air pressure	1005 mbar
Verdict	Pass	Relative humidity	37 %

8.5.3 Observations, settings and special notes

The spectral scan has been corrected with transducer factors (i.e. cable loss, LISN factors, and attenuators) for determination of compliance.

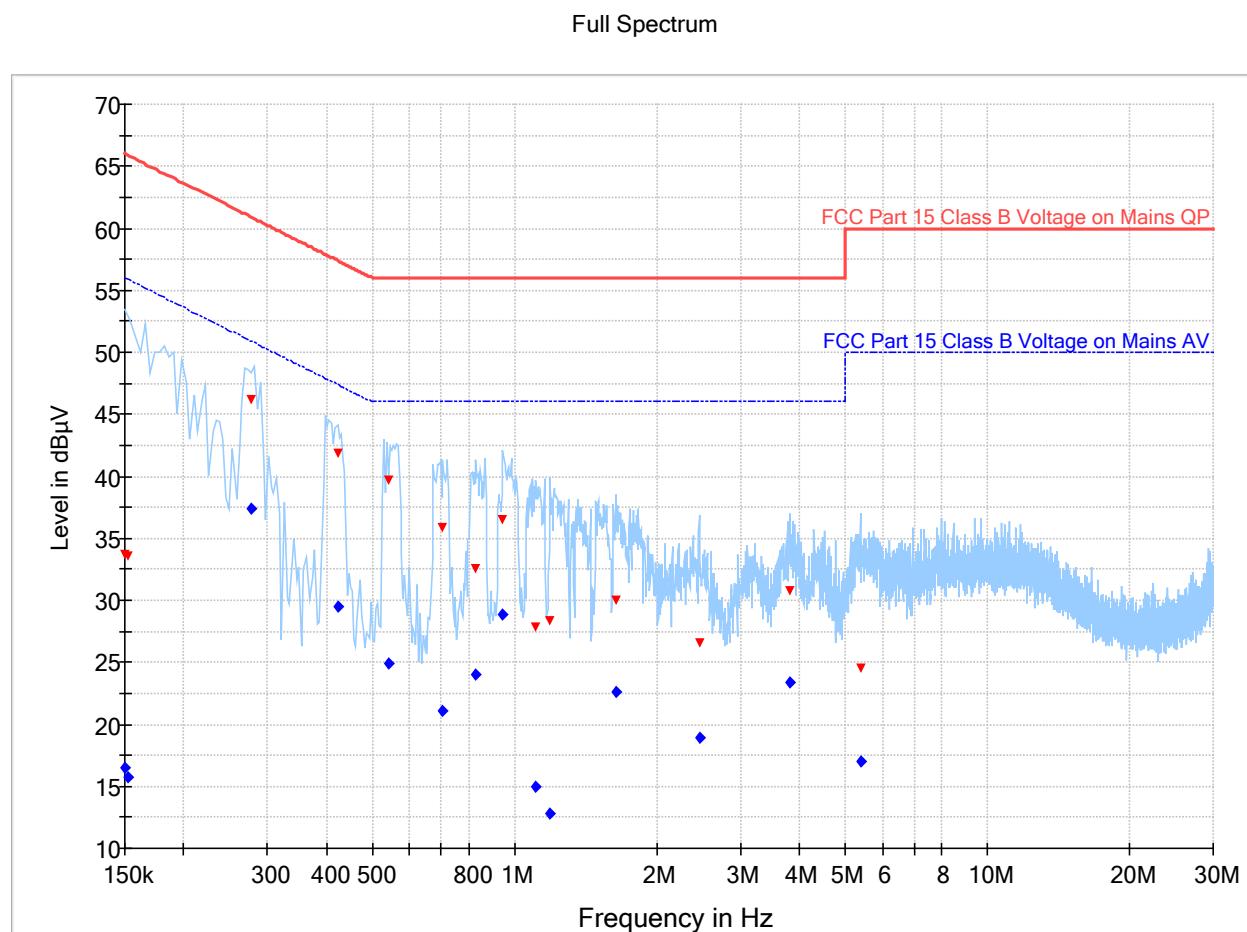
A preview measurement was generated with the receiver in continuous scan mode. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

Highest output power modes were selected, both antenna output enabled.

Test receiver settings:

Frequency span	150 kHz to 30 MHz
Detector mode	Peak and Average (preview mode); Quasi-Peak (final measurements)
Resolution bandwidth	9 kHz
Video bandwidth	30 kHz
Trace mode	Max Hold
Measurement time	1000 ms

8.5.4 Test data – 2462MHz TX, 20MHz BW, DSSS/Mbps11

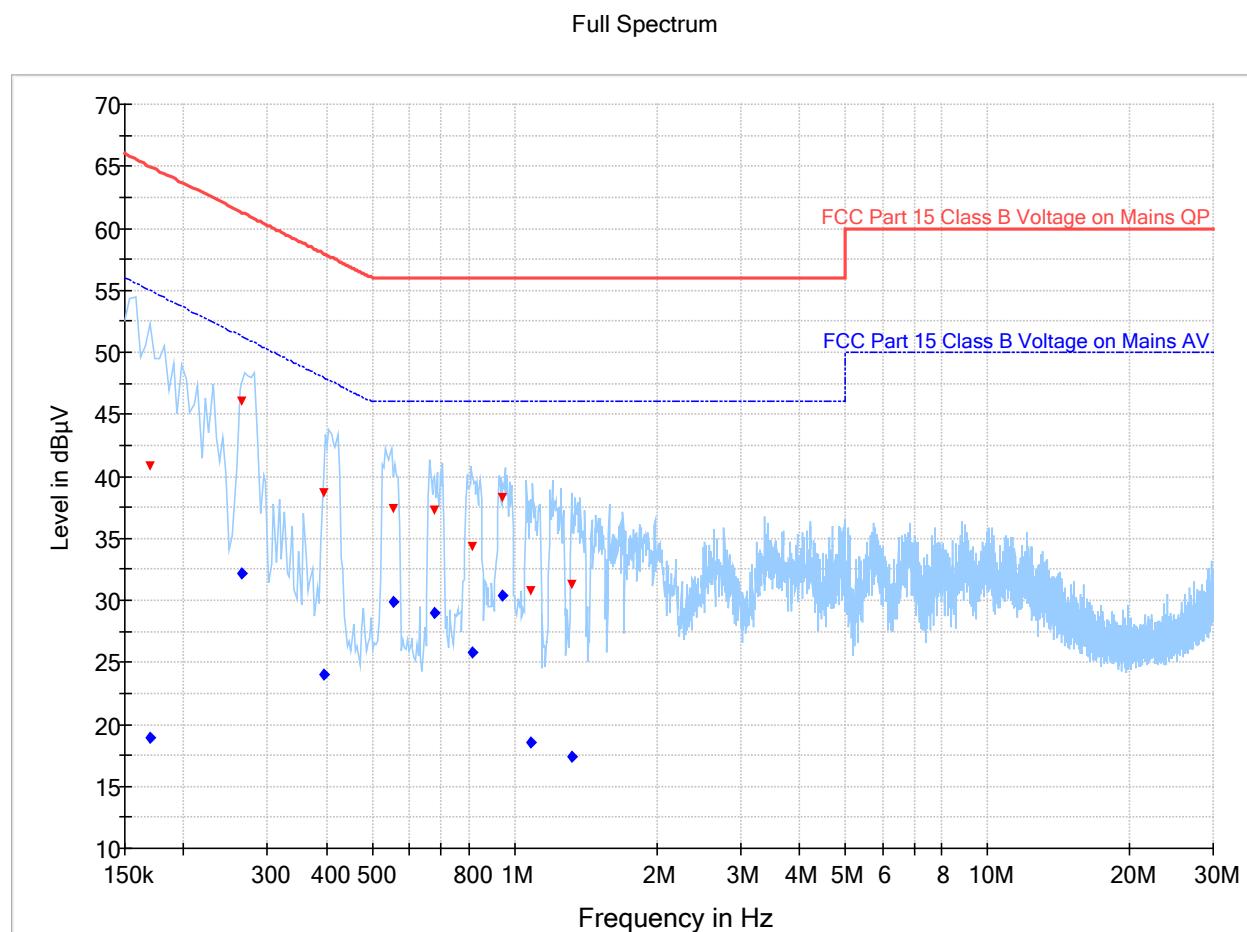


Plot 8.5-1: Conducted emissions scan

Table 8.5-2: Quasi-Peak and Average conducted emissions results

Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter
0.150000	33.72	---	66.00	32.28	5000.0	9.000	N	ON
0.150000	---	16.44	56.00	39.56	5000.0	9.000	N	ON
0.152500	33.55	---	65.86	32.32	5000.0	9.000	N	ON
0.152500	---	15.75	55.86	40.11	5000.0	9.000	N	ON
0.276500	46.19	---	60.92	14.73	5000.0	9.000	L1	ON
0.276500	---	37.45	50.92	13.47	5000.0	9.000	L1	ON
0.423500	41.86	---	57.38	15.52	5000.0	9.000	L1	ON
0.423500	---	29.43	47.38	17.95	5000.0	9.000	L1	ON
0.540500	---	24.96	46.00	21.04	5000.0	9.000	L1	ON
0.540500	39.66	---	56.00	16.34	5000.0	9.000	L1	ON
0.704500	---	21.13	46.00	24.87	5000.0	9.000	L1	ON
0.704500	35.81	---	56.00	20.19	5000.0	9.000	L1	ON
0.828500	---	23.97	46.00	22.03	5000.0	9.000	L1	ON
0.828500	32.61	---	56.00	23.39	5000.0	9.000	L1	ON
0.944500	36.52	---	56.00	19.48	5000.0	9.000	L1	ON
0.944500	---	28.91	46.00	17.09	5000.0	9.000	L1	ON
1.107500	---	14.99	46.00	31.01	5000.0	9.000	N	ON
1.107500	27.78	---	56.00	28.22	5000.0	9.000	N	ON
1.188500	28.31	---	56.00	27.69	5000.0	9.000	L1	ON
1.188500	---	12.83	46.00	33.17	5000.0	9.000	L1	ON
1.644500	---	22.55	46.00	23.45	5000.0	9.000	N	ON
1.644500	29.96	---	56.00	26.04	5000.0	9.000	N	ON
2.471500	---	18.87	46.00	27.13	5000.0	9.000	N	ON
2.471500	26.55	---	56.00	29.45	5000.0	9.000	N	ON
3.812500	---	23.33	46.00	22.67	5000.0	9.000	N	ON
3.812500	30.73	---	56.00	25.27	5000.0	9.000	N	ON
5.395500	---	17.04	50.00	32.96	5000.0	9.000	N	ON
5.395500	24.48	---	60.00	35.52	5000.0	9.000	N	ON

8.5.5 Test data – 2437MHz TX, 20MHz BW, OFDM/Mbps48

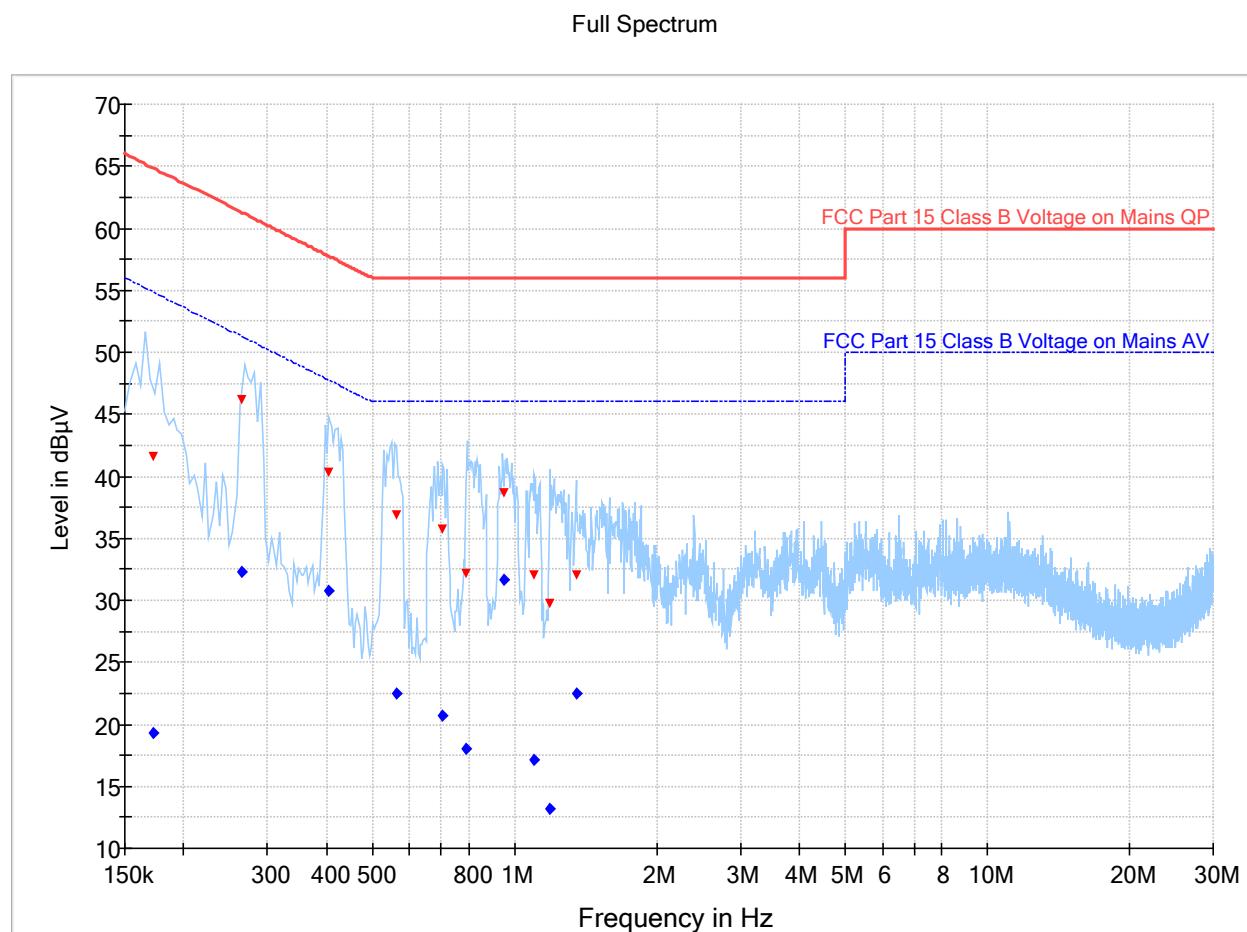


Plot 8.5-2: Conducted emissions scan

Table 8.5-3: Quasi-Peak and Average conducted emissions results

Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter
0.170000	---	18.93	54.96	36.03	5000.0	9.000	N	ON
0.170000	40.80	---	64.96	24.16	5000.0	9.000	N	ON
0.264500	46.06	---	61.29	15.23	5000.0	9.000	L1	ON
0.264500	---	32.21	51.29	19.08	5000.0	9.000	L1	ON
0.396500	38.66	---	57.93	19.27	5000.0	9.000	L1	ON
0.396500	---	23.95	47.93	23.98	5000.0	9.000	L1	ON
0.552500	---	29.90	46.00	16.10	5000.0	9.000	L1	ON
0.552500	37.36	---	56.00	18.64	5000.0	9.000	L1	ON
0.675500	37.23	---	56.00	18.77	5000.0	9.000	L1	ON
0.675500	---	28.98	46.00	17.02	5000.0	9.000	L1	ON
0.812500	---	25.78	46.00	20.22	5000.0	9.000	L1	ON
0.812500	34.36	---	56.00	21.64	5000.0	9.000	L1	ON
0.944500	38.27	---	56.00	17.73	5000.0	9.000	N	ON
0.944500	---	30.42	46.00	15.58	5000.0	9.000	N	ON
1.080500	---	18.59	46.00	27.41	5000.0	9.000	L1	ON
1.080500	30.80	---	56.00	25.20	5000.0	9.000	L1	ON
1.320500	---	17.34	46.00	28.66	5000.0	9.000	N	ON
1.320500	31.33	---	56.00	24.67	5000.0	9.000	N	ON

8.5.6 Test data – 2452MHz TX, 40MHz BW, OFDM/MCS5



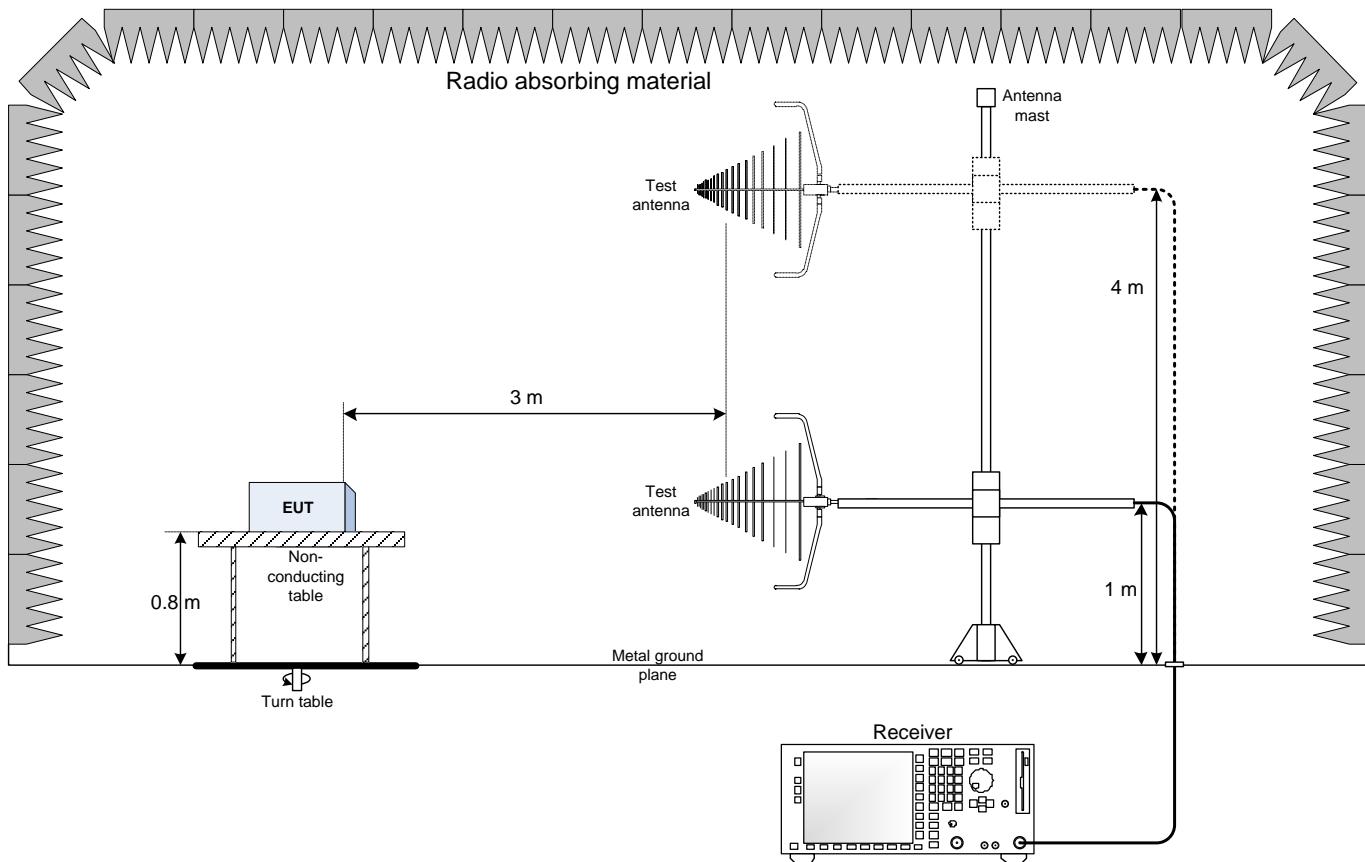
Plot 8.5-3: Conducted emissions scan

Table 8.5-4: Quasi-Peak and Average conducted emissions results

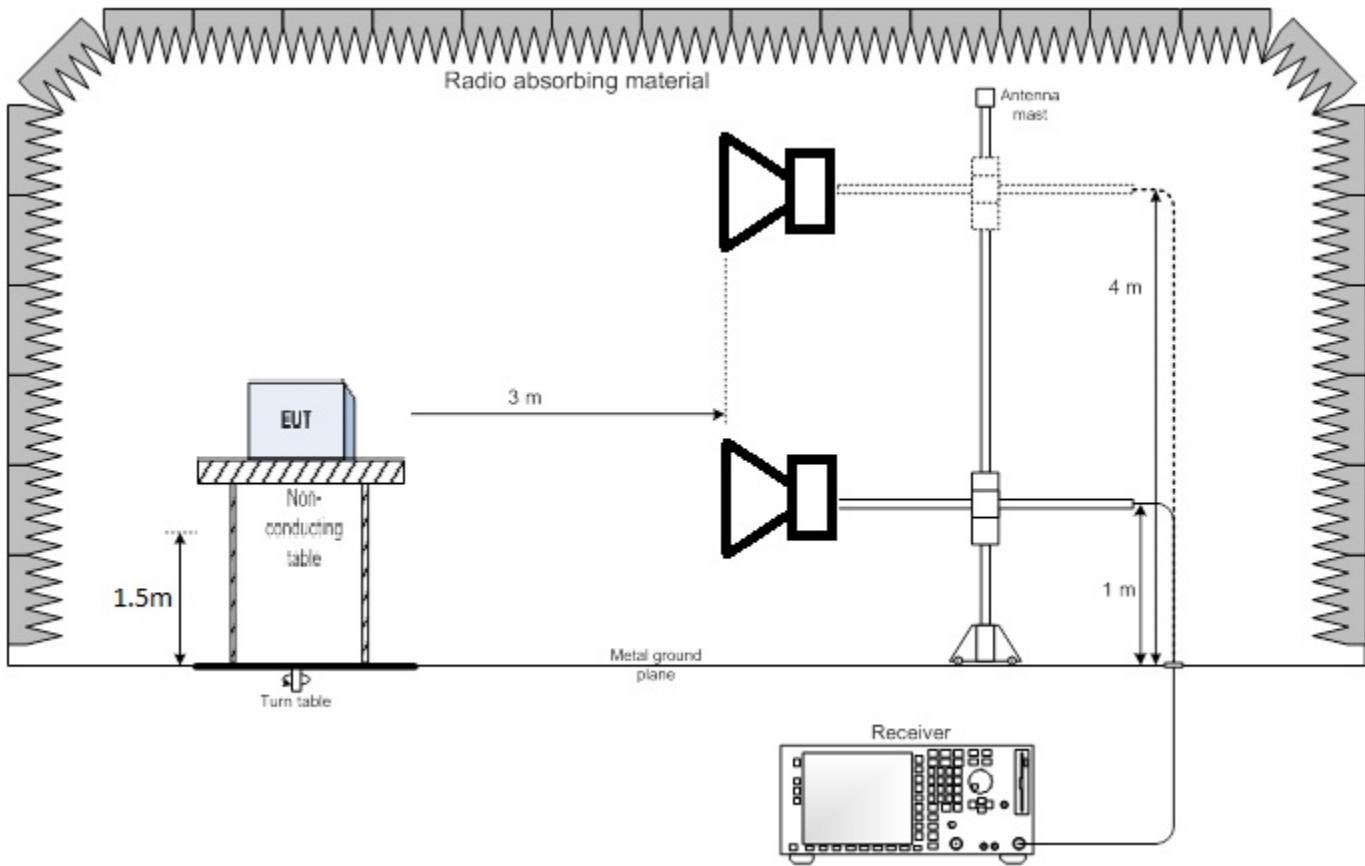
Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter
0.172500	---	19.27	54.84	35.57	5000.0	9.000	L1	ON
0.172500	41.63	---	64.84	23.21	5000.0	9.000	L1	ON
0.264500	---	32.29	51.29	18.99	5000.0	9.000	L1	ON
0.264500	46.12	---	61.29	15.17	5000.0	9.000	L1	ON
0.404500	---	30.81	47.76	16.95	5000.0	9.000	L1	ON
0.404500	40.26	---	57.76	17.50	5000.0	9.000	L1	ON
0.563500	---	22.47	46.00	23.53	5000.0	9.000	L1	ON
0.563500	36.86	---	56.00	19.14	5000.0	9.000	L1	ON
0.704500	---	20.75	46.00	25.25	5000.0	9.000	L1	ON
0.704500	35.70	---	56.00	20.30	5000.0	9.000	L1	ON
0.792500	---	18.06	46.00	27.94	5000.0	9.000	L1	ON
0.792500	32.18	---	56.00	23.82	5000.0	9.000	L1	ON
0.948500	---	31.59	46.00	14.41	5000.0	9.000	N	ON
0.948500	38.72	---	56.00	17.28	5000.0	9.000	N	ON
1.100500	32.03	---	56.00	23.97	5000.0	9.000	L1	ON
1.100500	---	17.18	46.00	28.82	5000.0	9.000	L1	ON
1.188500	---	13.21	46.00	32.79	5000.0	9.000	L1	ON
1.188500	29.69	---	56.00	26.31	5000.0	9.000	L1	ON
1.352500	32.02	---	56.00	23.98	5000.0	9.000	L1	ON
1.352500	---	22.43	46.00	23.57	5000.0	9.000	L1	ON

Section 9. Block diagrams of test set-ups

9.1 Radiated emissions set-up – Below 1GHz



9.2 Radiated emissions set-up – Above 1GHz



9.3 Conducted emissions set-up

