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Report On

Limited FCC and Industry Canada Testing of the
Sorensen Communications Inc ASD041517
In accordance with FCC 47 CFR Part 15C
and Industry Canada RSS-247

COMMERCIAL-IN-CONFIDENCE

FCC ID: XHUASD041517
IC: 8439A- ASD041517

Document 75930506 Report 02 Issue 1 August 2015

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REPORT ON

Limited FCC and Industry Canada Testing of the
Sorensen Communications Inc ASD041517
In accordance with FCC 47 CFR Part 15C
and Industry Canada RSS-247

Document 75930506 Report 02 Issue 1

August 2015

PREPARED FOR

1066 Labs Ltd
Innovation Centre
Highfield Drive
St Leonards-on-Sea
East Sussex
TN38 9UH

PREPARED BY

Natalie Bennett
Senior Administrator, Project Support

APPROVED BY

Ryan Henley
Authorised Signatory

DATED 06 August 2015

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15C and Industry Canada RSS-247. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler M Russell

UKAS TESTING 0141

Product Service

CONTENTS

Product Service

SECTION 1

REPORT SUMMARY

Limited FCC and Industry Canada Testing of the
Sorensen Communications Inc ASD041517
In accordance with FCC 47 CFR Part 15C and Industry Canada RSS-247

1.1 INTRODUCTION

The information contained in this report is intended to show the verification of Limited FCC and Industry Canada Testing of the Sorensen Communications Inc ASD041517 to the requirements of FCC 47 CFR Part 15C and Industry Canada RSS-247.

Objective	To perform Industry Canada Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	1066 Labs Limited
Model Number(s)	ASD041517
Serial Number(s)	EMC #1 EMC #3
Number of Samples Tested	2
Test Specification/Issue/Date	FCC 47 CFR Part 15C (2014) Industry Canada RSS-247 (Issue 1, 2015)
Incoming Release Date	Application Form 26 May 2015
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	101298 13 July 2015
Start of Test	2 July 2015
Finish of Test	2 August 2015
Name of Engineer(s)	G Lawler M Russell
Related Document(s)	ANSI C63.10: 2009

Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C and Industry Canada RSS-247 is shown below.

Section	Specification Clause		Test Description	Result	Comments/Base Standard
	Part 15	RSS-247			
802.11b					
2.4	15.247 (b)(4)	5.4(4)	Peak EIRP	Pass	
2.5	15.247 (d) and 15.205	5.5	Spurious Radiated Emissions	Pass	
2.6	15.205	8.10	Restricted Band Edges	Pass	
2.7	15.247 (d)	5.5	Authorised Band Edges	Pass	
802.11g					
2.4	15.247 (b)(4) and	5.4(4)	Peak EIRP	Pass	
2.5	15.247 (d) and 15.205	5.5	Spurious Radiated Emissions	Pass	
2.6	15.205	8.10	Restricted Band Edges	Pass	
2.7	15.247 (d)	5.5	Authorised Band Edges	Pass	
802.11n - 20 MHz Bandwidth					
2.4	15.247 (b)(4)	5.4(4)	Peak EIRP	Pass	
2.5	15.247 (d) and 15.205	5.5	Spurious Radiated Emissions	Pass	
2.6	15.205	8.10	Restricted Band Edges	Pass	
2.7	15.247 (d)	5.5	Authorised Band Edges	Pass	

Product Service

Section	Specification Clause		Test Description	Result	Comments/Base Standard
	Part 15	RSS-247			
Bluetooth Low Energy					
2.1	15.247 (e)	5.2 (2)	Power Spectral Density	Pass	
2.2	15.247 (a)(2)	5.2(1)	6 dB Bandwidth	Pass	
2.3	15.247 (b)(3)	5.4(4)	Maximum Conducted Output Power	Pass	
2.4	15.247 (b)(4)	5.4(4)	Peak EIRP	Pass	
2.5	15.247 (d) and 15.205	5.5	Spurious Radiated Emissions	Pass	
2.6	15.205	8.10	Restricted Band Edges	Pass	
2.7	15.247 (d)	5.5	Authorised Band Edges	Pass	
802.11n - 40 MHz Bandwidth					
2.4	15.247 (b)(4)	5.4(4)	Peak EIRP	Pass	
2.6	15.205	8.10	Restricted Band Edges	Pass	
2.7	15.247 (d)	5.5	Authorised Band Edges	Pass	

Product Service

1.3 APPLICATION FORM

EQUIPMENT DESCRIPTION		
Model Name/Number	ASD041517	
Part Number		
Hardware Version	DVT3	
Software Version	Build 3.1.0	
FCC ID (if applicable)		XHUASD041517
Industry Canada ID (if applicable)		8439A- ASD041517
Technical Description (Please provide a brief description of the intended use of the equipment)		Set-Top-Box (STB) Videophone

POWER SOURCE				
☒	AC mains	State voltage 110		
AC supply frequency	60 (Hz)			
	VAC			
	Max Current			
	Hz			
☒	Single phase	☐	Three phase	
And / Or				
☐	External DC supply			
	Nominal voltage	18 V	Max Current	A
	Extreme upper voltage	19 V		
	Extreme lower voltage	14 V		
Battery				
☐	Nickel Cadmium	☐	Lead acid (Vehicle regulated)	
☐	Alkaline	☐	Leclanche	
☐	Lithium	☐	Other Details :	
	Volts nominal.			
End point voltage as quoted by equipment manufacturer		V		

Product Service

FREQUENCY INFORMATION				
Frequency Range	2412 to2462	MHz		
Channel Spacing (where applicable)				
Receiver Frequency Range (if different)	2412 to2462	MHz		
Channel Spacing (if different)				
Test Frequencies*	Bottom	2412	MHz	Channel Number (if applicable)
	Middle	2442	MHz	Channel Number (if applicable)
	Top	2462	MHz	Channel Number (if applicable)
Intermediate Frequencies			MHz	
Highest Internally Generated Frequency :			MHz	

POWER CHARACTERISTICS				
Maximum TX power		W		
Minimum TX power		W (if variable)		
Is transmitter intended for :				
Continuous duty			☐ Yes	☐ No
Intermittent duty			☐ Yes	☐ No
If intermittent state DUTY CYCLE				
Transmitter ON	seconds			
Transmitter OFF	seconds			

ANTENNA CHARACTERISTICS						
☐	Antenna connector			State impedance		Ohm
☐	Temporary antenna connector			State impedance		Ohm
☒	Integral antenna	Type	CHIP	State impedance	1.8	dBi
☐	External antenna	Type		State impedance		dBi

MODULATION CHARACTERISTICS			
☐	Amplitude	☐	Frequency
☐	Phase	☐	Other (please provide details):
Can the transmitter operate un-modulated?			☐ Yes ☐ No

CLASS OF EMISSION USED
ITU designation or Class of Emission:
1
(if applicable) 2
(if applicable) 3
If more than three classes of emission, list separately:

BATTERY POWER SUPPLY	
Model name/number	Identification/Part number
Manufacturer	Country of Origin

ANCILLARIES (If applicable)	
Model name/number	Identification/Part number
Manufacturer	Country of Origin

EXTREME CONDITIONS			
Extreme test voltages (Max)	V	Extreme test voltages (Mix)	V
Nominal DC Voltage	V	DC Maximum Current	A
Maximum temperature	°C	Minimum temperature	°C

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Authorised Representative: Dave Williams

Position held: Certification Engineer

Date: 26th May 2015

Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sorensen Communications Inc ASD041517. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from an 18 V DC supply.

FCC Measurement Facility Registration Number
90987 Octagon House, Fareham Test Laboratory

Industry Canada Company Address Code
IC2932B-1 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standard were made during testing.

1.7 MODIFICATION RECORD

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Serial Number: EMC #1			
0	As supplied by manufacturer.	N/A	N/A
1	Board affected is 58-R41832-5551 Modification affects U2_SER and turns off the pre-emphasis. R18_SER pull-up to VIN_3V3 is depopulated and is now DNP R20_SER is now populated with 10K and pulled down to GND Ferrite added to camera cable nearest to camera.	Dave Williams	15/07/2015

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test are recorded on the appropriate test pages.

SECTION 2

TEST DETAILS

Limited FCC and Industry Canada Testing of the
Sorensen Communications Inc ASD041517
In accordance with FCC 47 CFR Part 15C and Industry Canada RSS-247

Product Service

2.1 POWER SPECTRAL DENSITY

2.1.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (e)
Industry Canada RSS-247, Clause 5.2 (2)

2.1.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #3 - Modification State 0

2.1.3 Date of Test

3 July 2015

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Procedure

The test was performed in accordance with KDB 558074 D01 V03r02, clause 10.2.

Remarks

For Industry Canada, RSS-247 clause 5.2(2) references the method in RSS-247, clause 5.4(4) which is the same method as specified for conducted output power. As the conducted output power results are below 8 dBm, compliance with the power spectral density requirements has already been demonstrated.

2.1.6 Environmental Conditions

Ambient Temperature	23.0°C
Relative Humidity	46.0%

Product Service

2.1.7 Test Results

110 V AC Supply

Bluetooth Low Energy, GFSK, Power Spectral Density Results

2402 MHz	2440 MHz	2480 MHz
dBm	dBm	dBm
4.39	6.52	4.70

Bluetooth Low Energy, 2402 MHz, GFSK, Power Spectral Density Plot

Product Service

Bluetooth Low Energy, 2440 MHz, GFSK, Power Spectral Density Plot

Bluetooth Low Energy, 2480 MHz, GFSK, Power Spectral Density Plot

FCC 47 CFR Part 15, Limit Clause 15.247 (e)

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.

Industry Canada RSS-247, Limit Clause, 5.2 (2)

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

2.2 6 dB BANDWIDTH

2.2.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (a)(2)
Industry Canada RSS-247, Clause 5.2(1)

2.2.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #3 - Modification State 0

2.2.3 Date of Test

2 July 2015

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Procedure

The test was performed in accordance with KDB 558074 D01 v03r02, clause 8.2 and Industry Canada RSS-GEN, clause 6.6.

2.2.6 Environmental Conditions

Ambient Temperature	22.9°C
Relative Humidity	68.1%

Product Service

2.2.7 Test Results

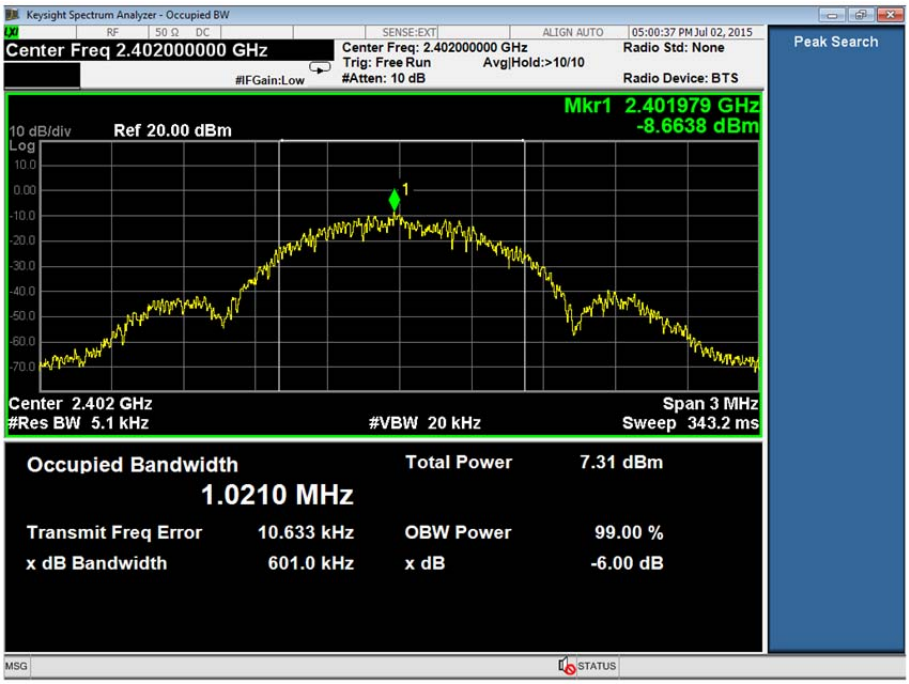
110 V AC Supply

Bluetooth Low Energy, GFSK, 6 dB Bandwidth Results

2402 MHz		2440 MHz		2480 MHz	
kHz		kHz		kHz	
FCC	IC	FCC	IC	FCC	IC
665.9	601.0	661.0	623.7	663.5	622.8

Bluetooth Low Energy, 2402 MHz, GFSK, FCC, 6 dB Bandwidth Plot

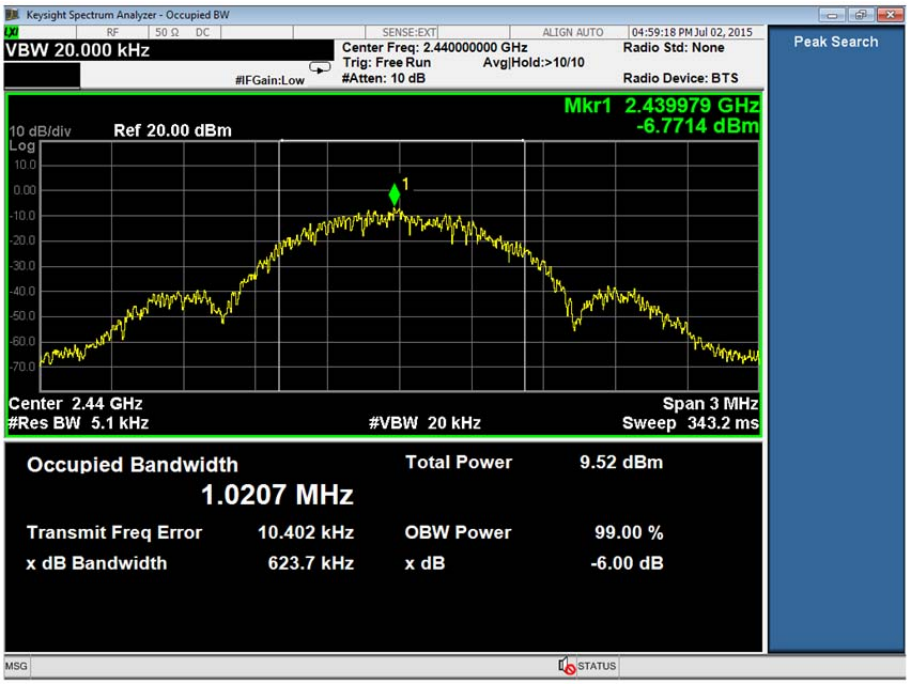
Bluetooth Low Energy, 2402 MHz, GFSK, IC, 6 dB Bandwidth Plot



Bluetooth Low Energy, 2440 MHz, GFSK, FCC, 6 dB Bandwidth Plot

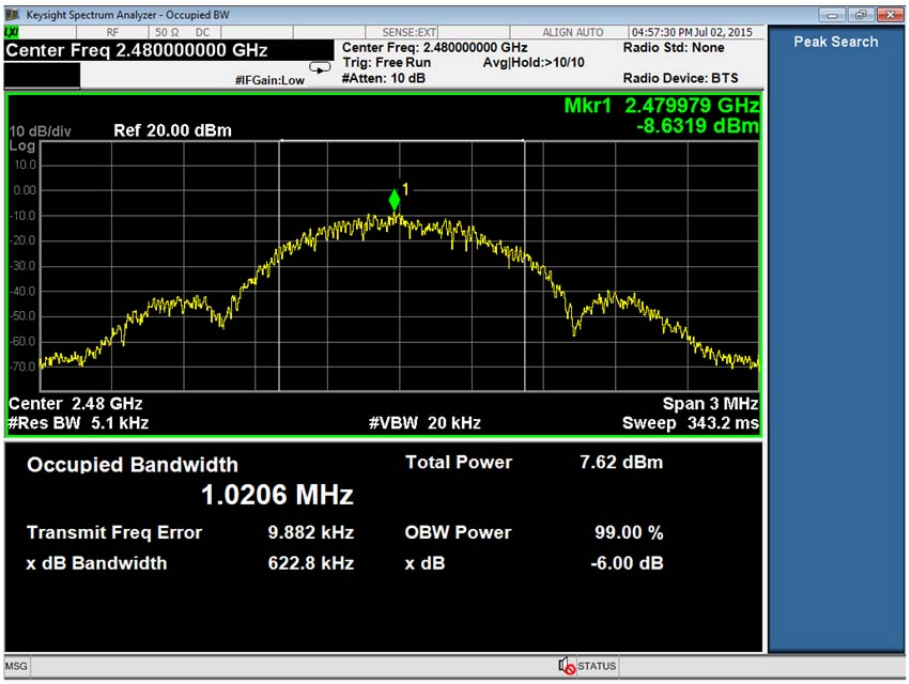
Product Service

Bluetooth Low Energy, 2440 MHz, GFSK, IC, 6 dB Bandwidth Plot



Bluetooth Low Energy, 2480 MHz, GFSK, FCC, 6 dB Bandwidth Plot

Bluetooth Low Energy, 2480 MHz, GFSK, IC, 6 dB Bandwidth Plot



FCC 47 CFR Part 15, Limit Clause 15.247 (a)(2)

The minimum 6 dB Bandwidth shall be at least 500 kHz.

Industry Canada RSS-247, Limit Clause, 5.2(1)

The minimum 6 dB bandwidth shall be 500 kHz.

2.3 MAXIMUM CONDUCTED OUTPUT POWER

2.3.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (b)(3)
Industry Canada RSS-247, Clause 5.2 (4)

2.3.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #3 - Modification State 0

2.3.3 Date of Test

3 July 2015

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.5 Test Procedure

The test was performed in accordance with KDB 558074 D01 v03r02, clause 9.1.1 and Industry Canada RSS-Gen, clause 6.12.

2.3.6 Environmental Conditions

Ambient Temperature	23.1°C
Relative Humidity	50.5%

Product Service

2.3.7 Test Results

110 V AC Supply

Bluetooth Low Energy, Maximum Conducted Output Power Results

2402 MHz		2440 MHz		2480 MHz	
dBm	mW	dBm	mW	dBm	mW
4.48	2.81	6.64	4.61	6.75	4.73

FCC 47 CFR Part 15, Limit Clause 15.247 (b)

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

Industry Canada RSS-247, Limit Clause, 5.4(4)

For DTSs 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.

Product Service

2.4 PEAK EIRP

2.4.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (b)(4)
Industry Canada RSS-247, Clause 5.4 (4)

2.4.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #1 - Modification State 1

2.4.3 Date of Test

29 July 2015 & 2 August 2015

2.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.5 Test Procedure

The test was performed in accordance with KDB 558074 D01 V03r02, clause 9.1.1 and Industry Canada RSS-GEN, clause 6.12.

Remarks

The spectrum analyser did not support an RBW greater than the OBW of the signal under test therefore an RBW of 1 MHz and VBW of 3 MHz were used. A wideband correction factor was then applied by taking the difference in the power measured using a wideband power meter and the spectrum analyser using a conducted sample. This figure was then added on to the measured radiated result.

2.4.6 Environmental Conditions

Ambient Temperature	19.1 - 21.1°C
Relative Humidity	40.0 - 52.0%

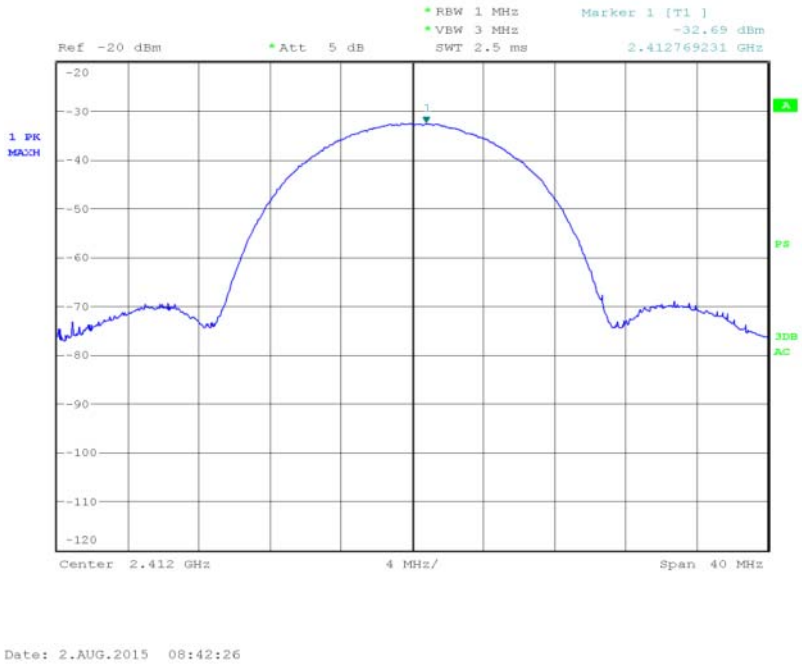
2.4.7 Test Results

110 V AC Supply

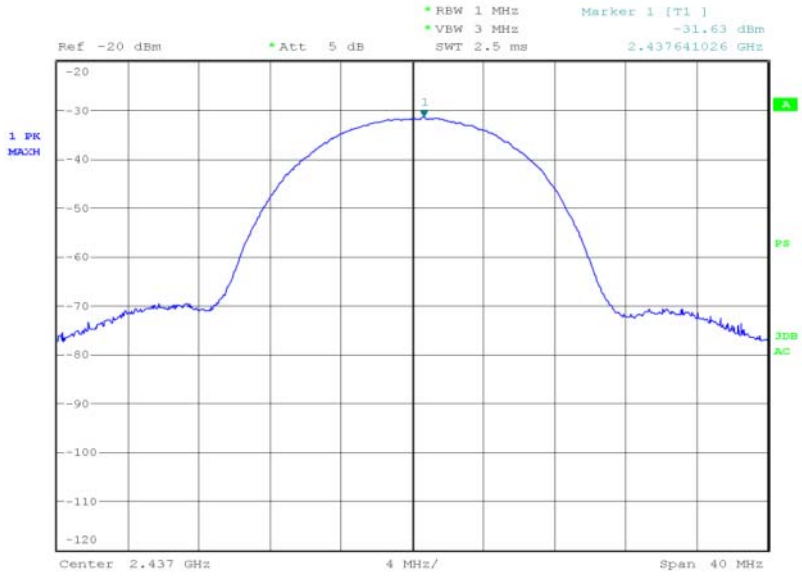
802.11b, EIRP Peak Power Results

2412 MHz		2437 MHz		2462 MHz	
dBm	mW	dBm	mW	dBm	mW
10.83	12.11	11.78	15.07	10.54	11.32

802.11b, 2412 MHz, EIRP Peak Power Plot



802.11b, 2437 MHz, EIRP Peak Power Plot



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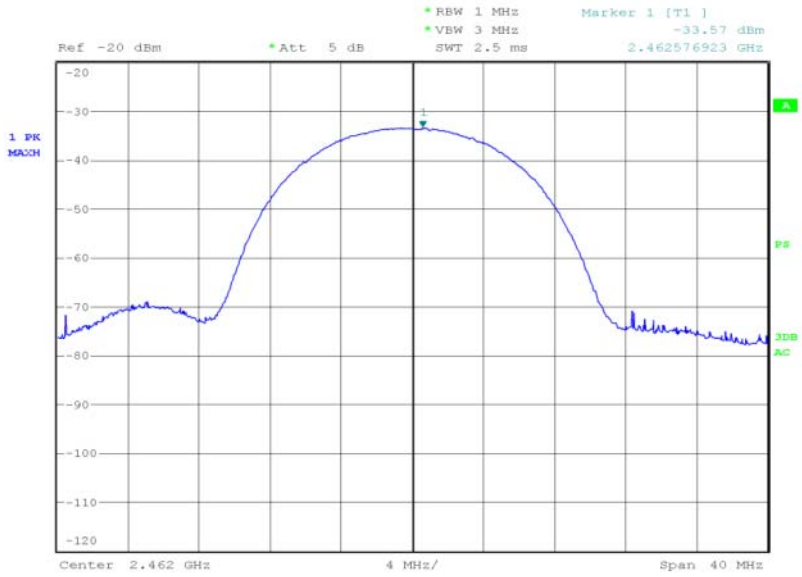
802.11b, 2462 MHz, EIRP Peak Power Plot



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Product Service

FCC 47 CFR Part 15, Limit Clause 15.247 (b)(4)

36.0 dBm or 4000 mW

Industry Canada RSS-247, Limit Clause, 5.4(4)

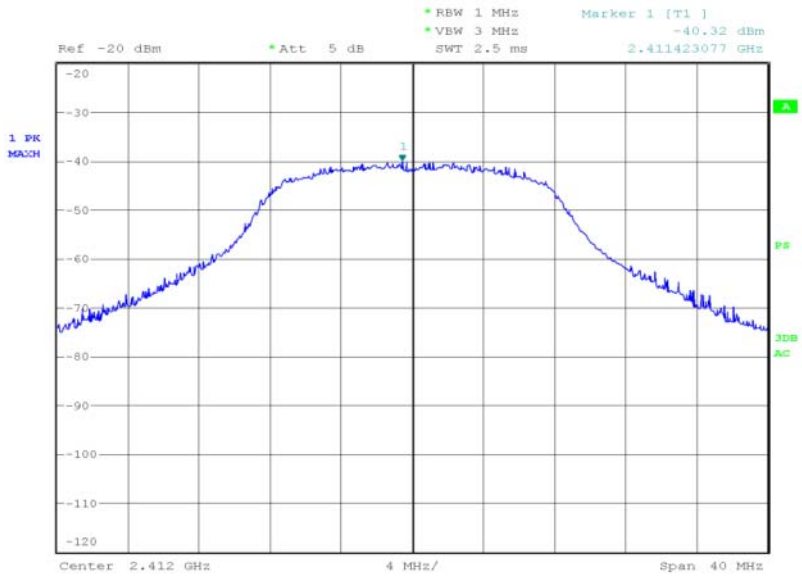
For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. Except as provided in Section 5.4(5), the e.i.r.p. shall not exceed 4 W.

110 V AC Supply

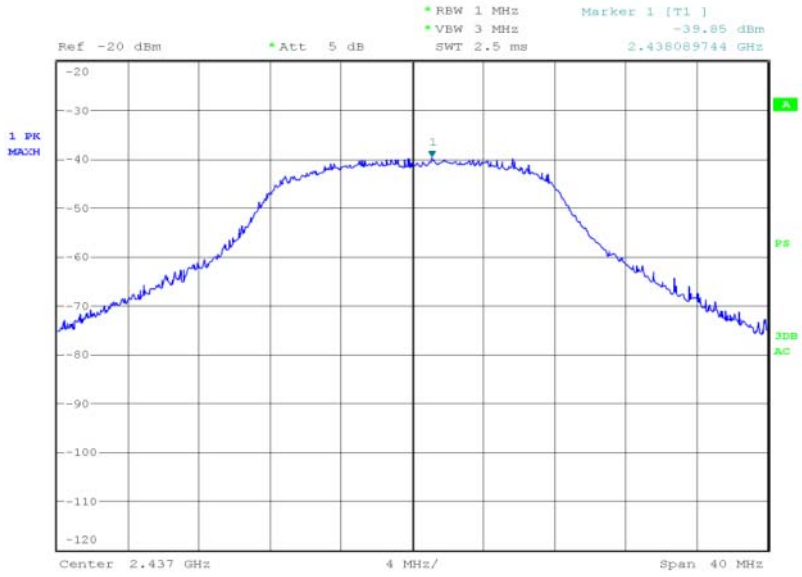
802.11g, EIRP Peak Power Results

2412 MHz		2437 MHz		2462 MHz	
dBm	mW	dBm	mW	dBm	mW
8.43	6.97	8.79	7.57	8.75	7.50

802.11g, 2412 MHz, EIRP Peak Power Plot



802.11g, 2437 MHz, EIRP Peak Power Plot



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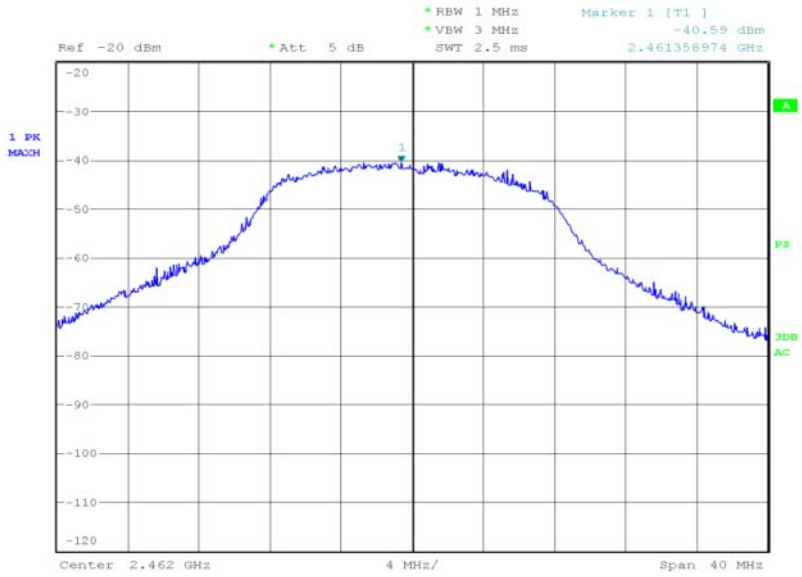
802.11g, 2462 MHz, EIRP Peak Power Plot



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FCC 47 CFR Part 15, Limit Clause 15.247 (b)(4)

36.0 dBm or 4000 mW

Industry Canada RSS-247, Limit Clause, 5.4(4)

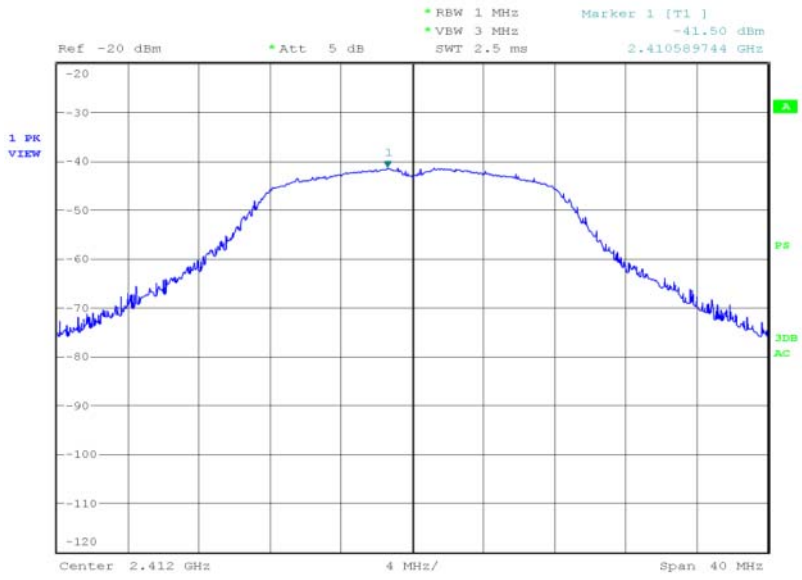
For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. Except as provided in Section 5.4(5), the e.i.r.p. shall not exceed 4 W.

110 V AC Supply

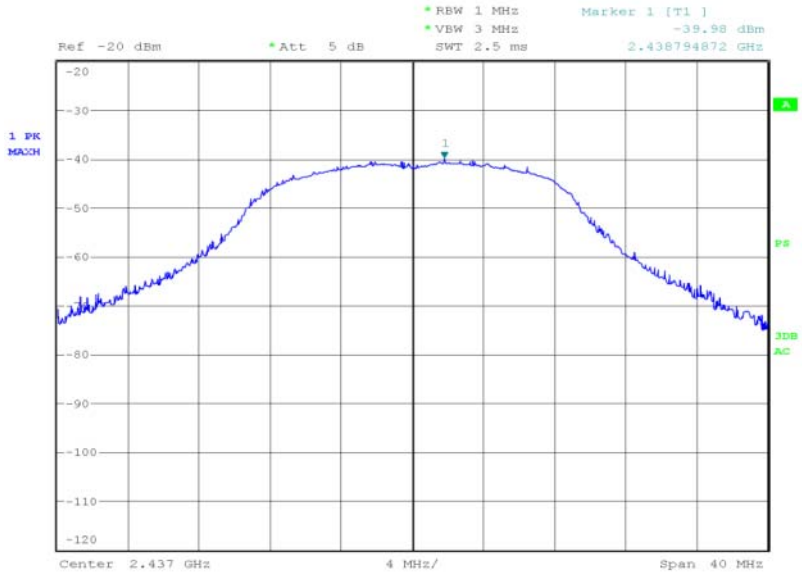
802.11n - 20 MHz Bandwidth, EIRP Peak Power Results

2412 MHz		2437 MHz		2462 MHz	
dBm	mW	dBm	mW	dBm	mW
8.14	6.52	9.55	9.02	9.06	8.05

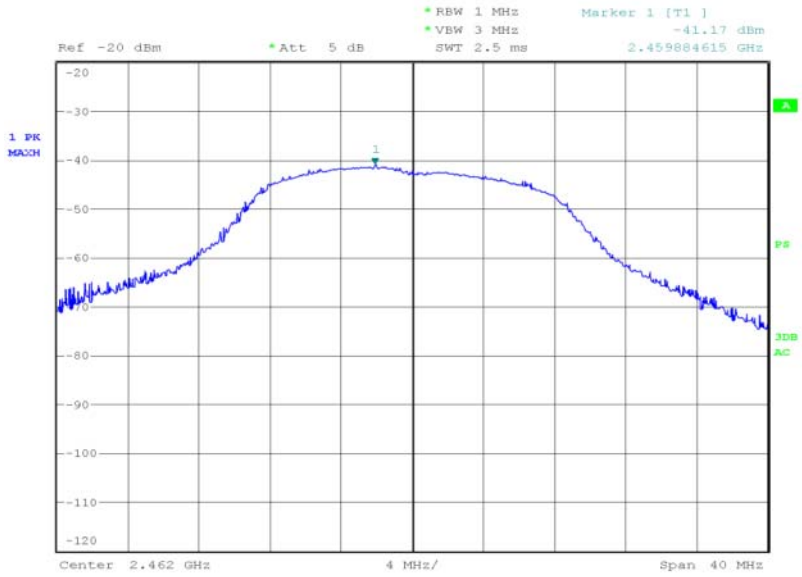
802.11n - 20 MHz Bandwidth, 2412 MHz, EIRP Peak Power Plot



802.11n - 20 MHz Bandwidth, 2437 MHz, EIRP Peak Power Plot



802.11n - 20 MHz Bandwidth, 2462 MHz, EIRP Peak Power Plot



Product Service

FCC 47 CFR Part 15, Limit Clause 15.247 (b)(4)

36.0 dBm or 4000 mW

Industry Canada RSS-247, Limit Clause, 5.4(4)

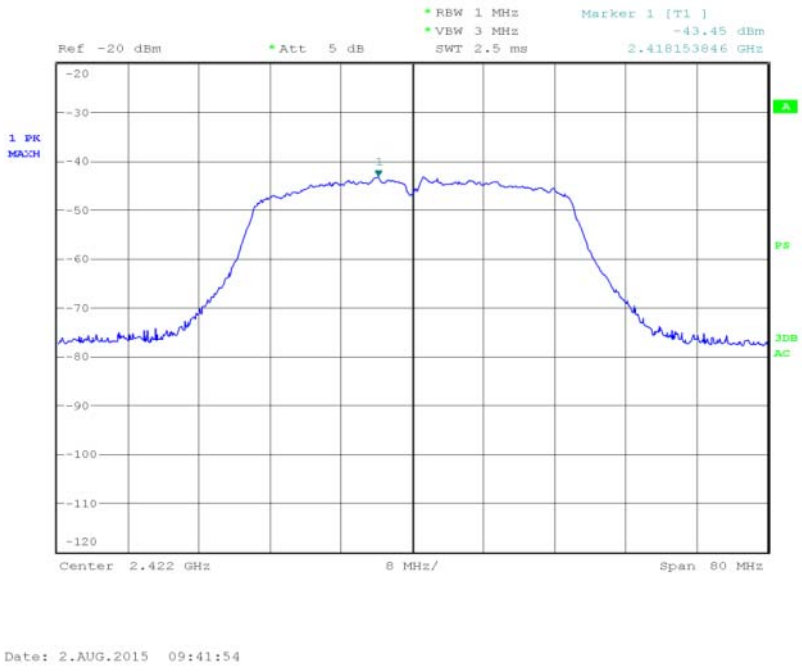
For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. Except as provided in Section 5.4(5), the e.i.r.p. shall not exceed 4 W.

110 V AC Supply

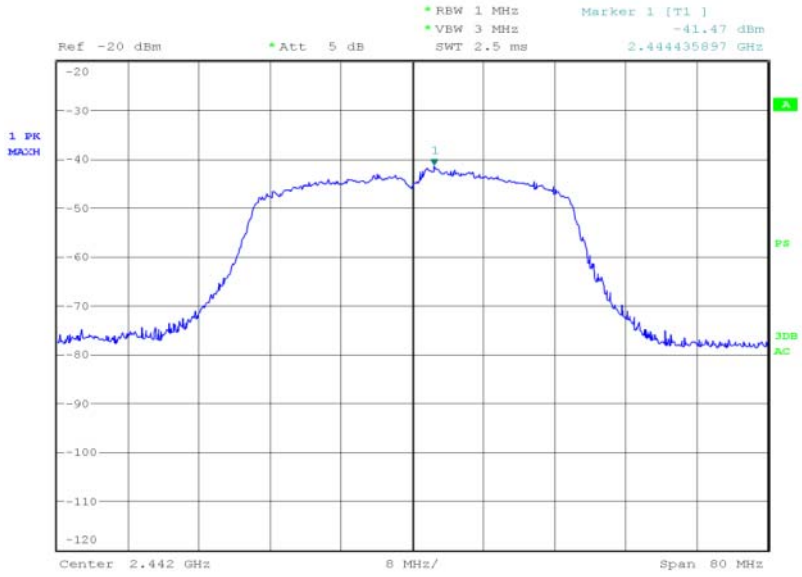
802.11n - 40 MHz Bandwidth, EIRP Peak Power Results

2422 MHz		2442 MHz		2462 MHz	
dBm	mW	dBm	mW	dBm	mW
10.61	11.51	12.22	16.67	11.68	14.72

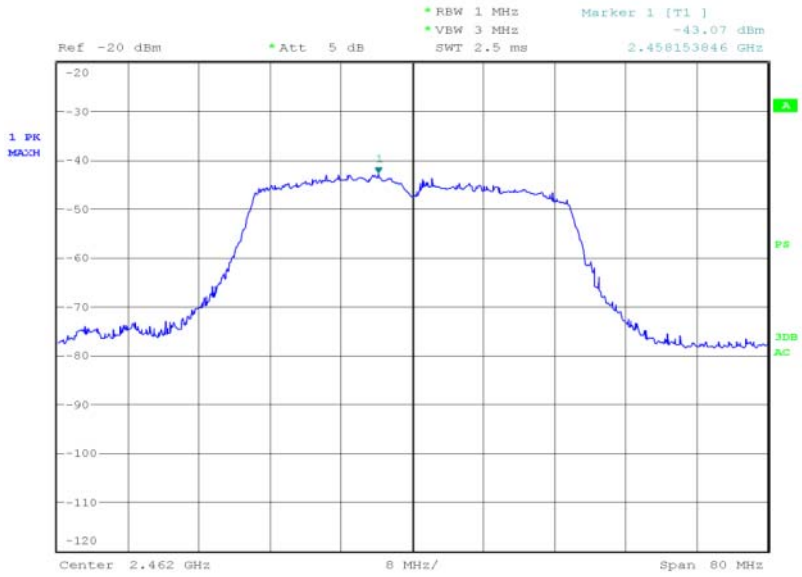
802.11n - 40 MHz Bandwidth, 2422 MHz, EIRP Peak Power Plot



802.11n - 40 MHz Bandwidth, 2442 MHz, EIRP Peak Power Plot



802.11n - 40 MHz Bandwidth, 2462 MHz, EIRP Peak Power Plot



Product Service

FCC 47 CFR Part 15, Limit Clause 15.247 (b)(4)

36.0 dBm or 4000 mW

Industry Canada RSS-247, Limit Clause, 5.4(4)

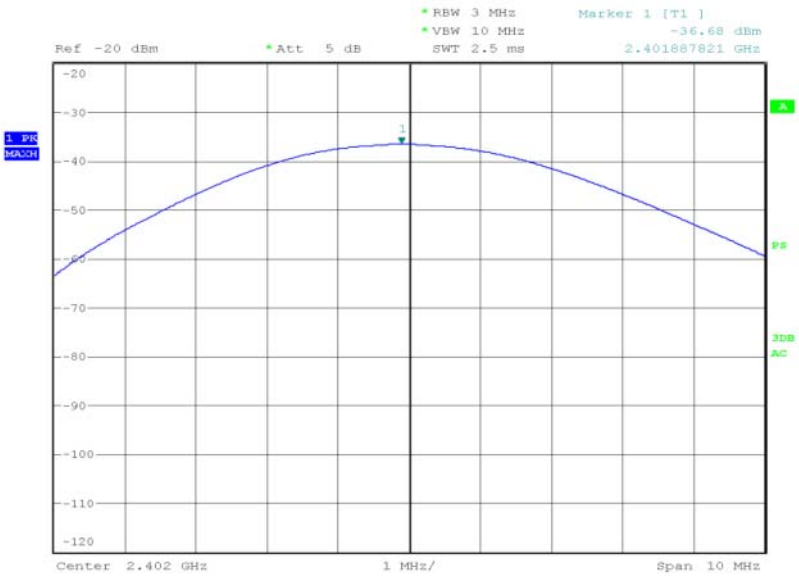
For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. Except as provided in Section 5.4(5), the e.i.r.p. shall not exceed 4 W.

110 V AC Supply

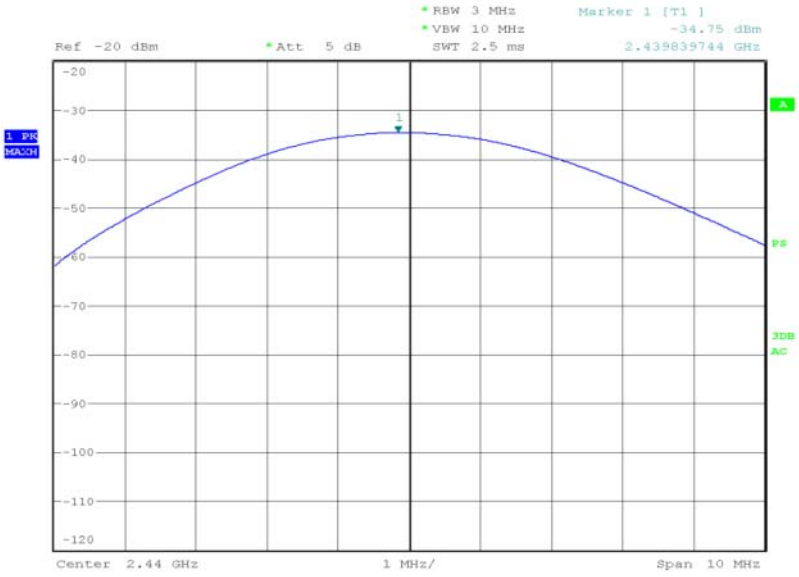
Bluetooth Low Energy, EIRP Peak Power Results

2402 MHz		2440 MHz		2480 MHz	
dBm	mW	dBm	mW	dBm	mW
5.05	3.20	7.07	5.09	3.41	2.19

Bluetooth Low Energy, 2402 MHz, EIRP Peak Power Plot

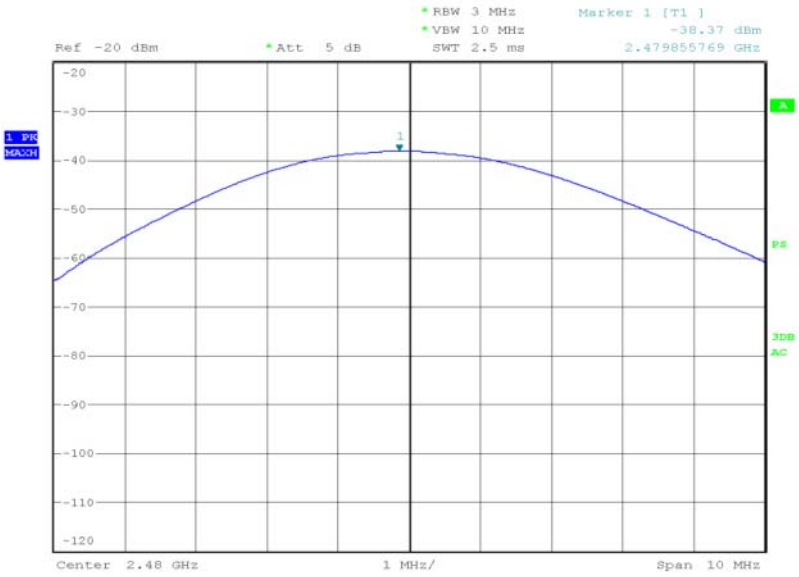


Bluetooth Low Energy, 2440 MHz, EIRP Peak Power Plot



Date: 29.JUL.2015 23:00:30

Bluetooth Low Energy, 2480 MHz, EIRP Peak Power Plot



Date: 29.JUL.2015 22:59:57

FCC 47 CFR Part 15, Limit Clause 15.247 (b)(4)

36.0 dBm or 4000 mW

Industry Canada RSS-247, Limit Clause, 5.4(4)

For DTSs 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.

2.5 SPURIOUS RADIATED EMISSIONS

2.5.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d) and 15.205
Industry Canada RSS-247, Clause 5.5

2.5.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #1 - Modification State 1

2.5.3 Date of Test

15 July 2015, 18 July 2015, 20 July 2015, 21 July 2015, 26 July 2015, 27 July 2015, 28 July 2015 & 29 July 2015

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.5 Test Procedure

The test was performed in accordance with KDB 558074 D01 v03r02, clause 11.0 and 12.1 and ANSI C63.10, clause 6.3, 6.5 and 6.6.

2.5.6 Environmental Conditions

Ambient Temperature	19.1 - 21.6°C
Relative Humidity	40.0 - 65.0%

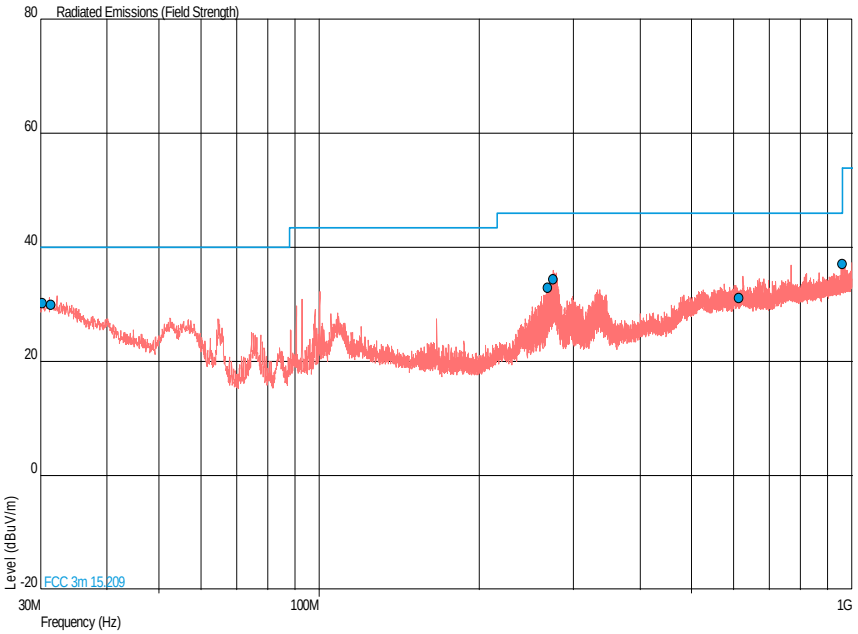
2.5.7 Test Results

110 V AC Supply

802.11b, 2412 MHz, 11 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.245	30.2	-9.8	32.4	-67.6	149	1.00	Vertical
31.435	29.9	-10.1	31.3	-68.7	360	1.00	Vertical
268.479	32.9	-13.1	44.2	-155.8	311	1.00	Vertical
274.674	34.3	-11.7	51.9	-148.1	277	1.00	Vertical
614.000	31.2	-14.8	36.3	-163.7	234	1.00	Vertical
960.000	37.1	-8.9	71.6	-128.4	14	1.00	Vertical

802.11b, 2412 MHz, 11 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

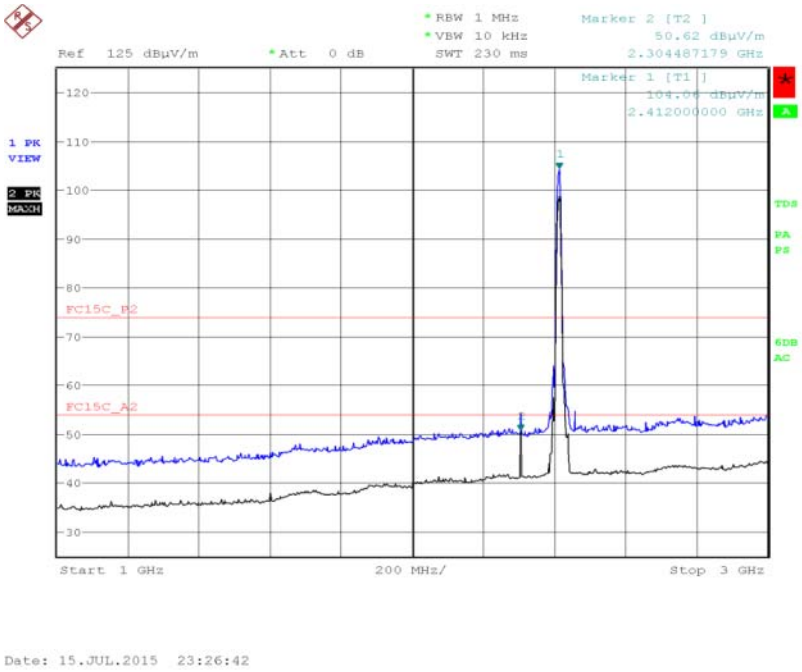


802.11b, 2412 MHz, 11 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

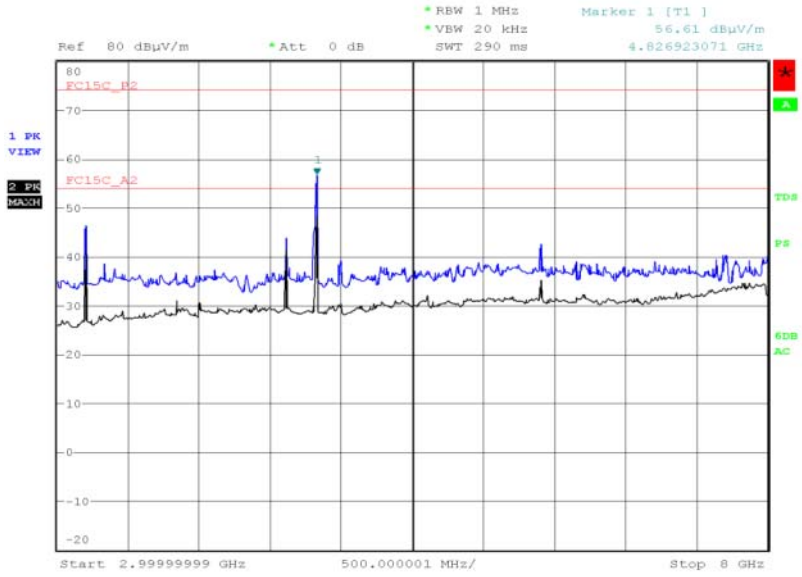
Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
4824.000	62.82	52.23	1383.57	408.79	197	160	Horizontal

No other emissions were detected within 10 dB of the limit.

802.11b, 2412 MHz, 11 Mbps, 1 GHz to 3 GHz , Spurious Radiated Emissions Plot

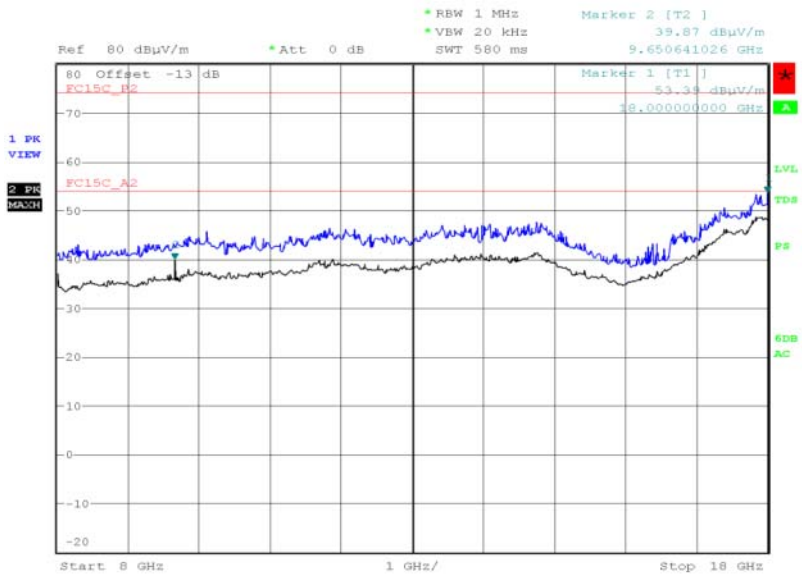


802.11b, 2412 MHz,11 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



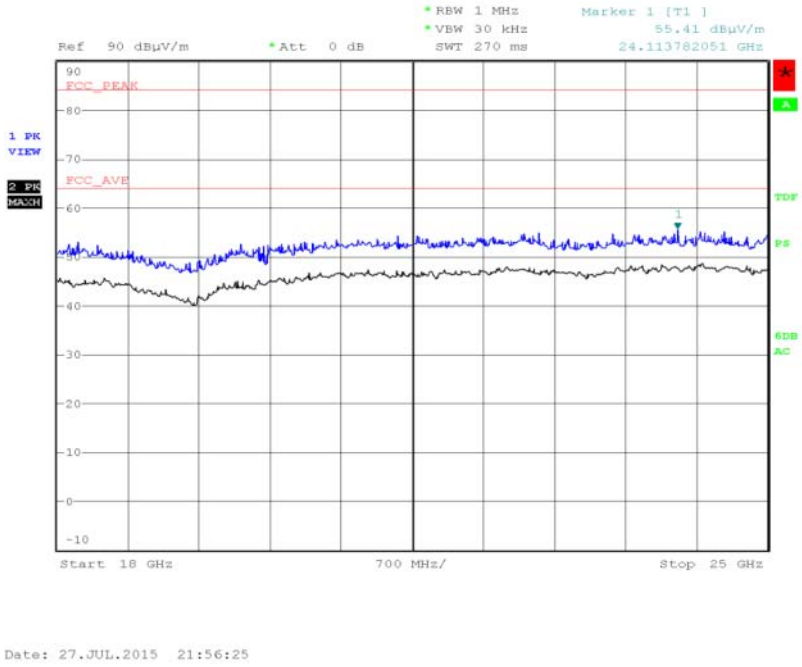
Date: 26.JUL.2015 10:08:57

802.11b, 2412 MHz,11 Mbps, 8 GHz to 18 GHz , Spurious Radiated Emissions Plot



Date: 26.JUL.2015 14:52:35

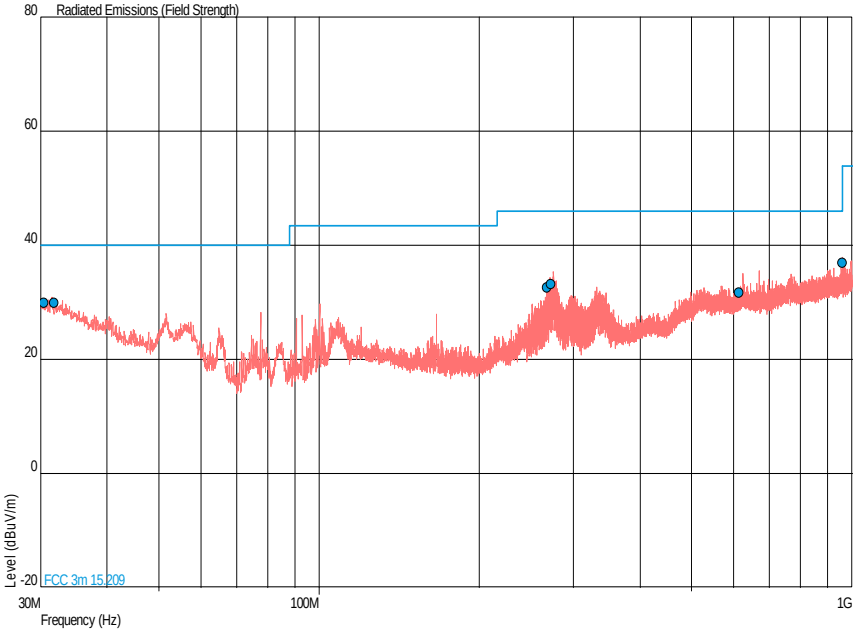
802.11b, 2412 MHz, 11 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



802.11b, 2437 MHz, 11 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.502	30.0	-10.0	31.6	-68.4	346	1.00	Horizontal
31.803	29.9	-10.1	31.3	-68.7	37	1.00	Vertical
267.981	32.7	-13.3	43.2	-156.8	348	1.00	Vertical
272.225	33.2	-12.8	45.7	-154.3	300	1.00	Vertical
614.000	31.8	-14.2	38.9	-161.1	37	1.00	Vertical
960.000	36.9	-9.1	70.0	-130.0	26	1.00	Vertical

802.11b, 2437 MHz, 11 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

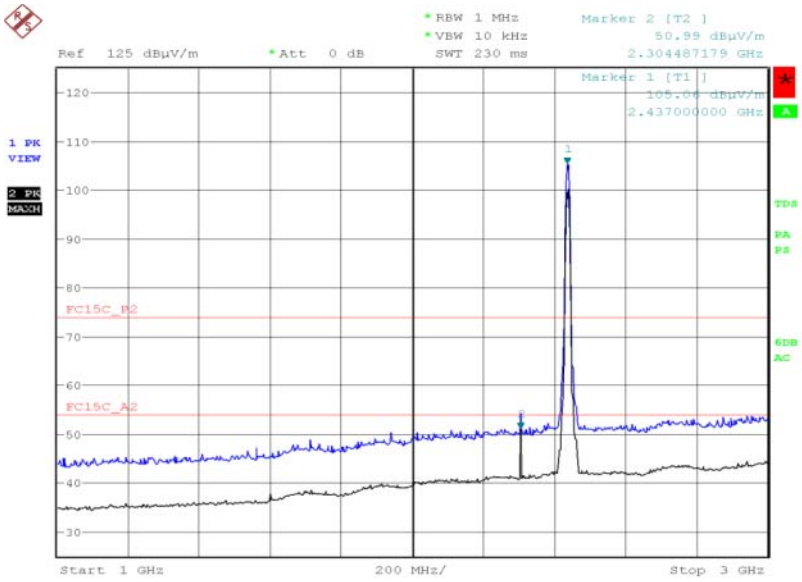


802.11b, 2437 MHz, 11 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
4874.990	59.61	49.50	956.09	298.54	106	196	Horizontal

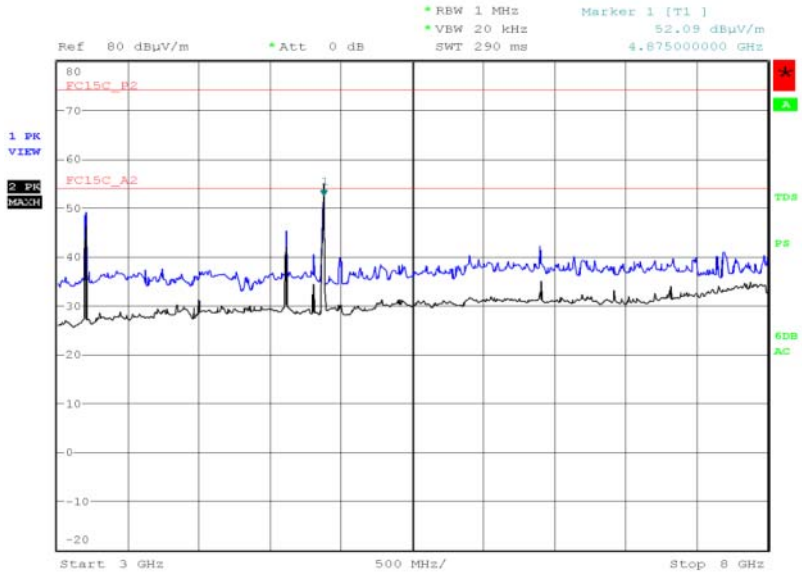
No other emissions were detected within 10 dB of the limit.

802.11b, 2437 MHz, 11 Mbps, 1 GHz to 3 GHz , Spurious Radiated Emissions Plot



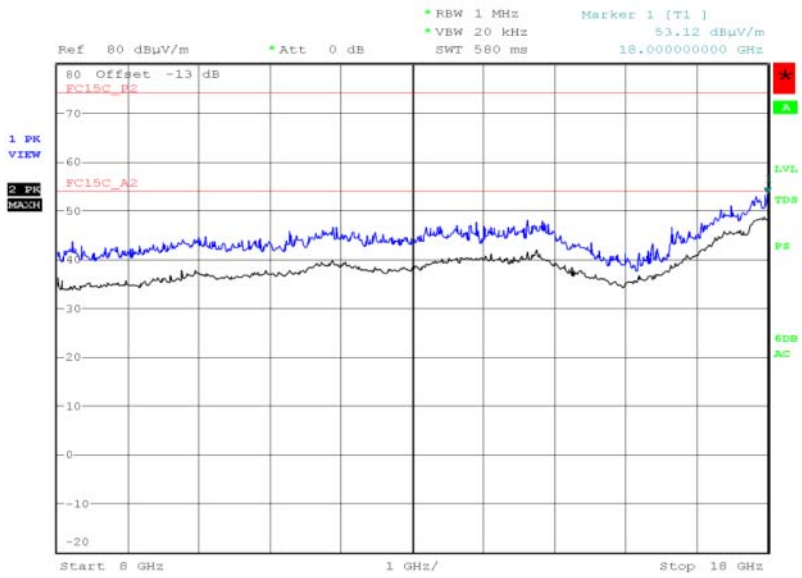
Date: 15.JUL.2015 23:30:20

802.11b, 2437 MHz, 11 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



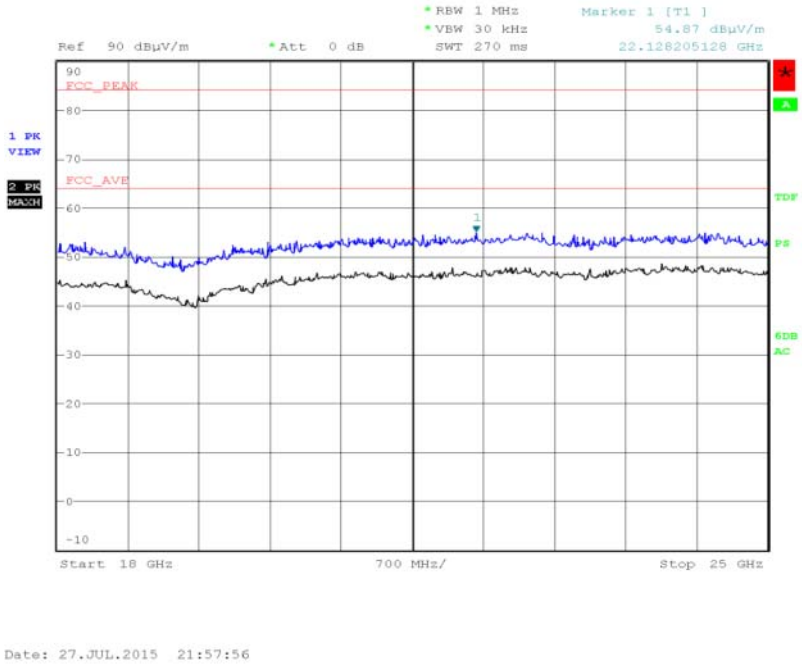
Date: 26.JUL.2015 10:44:16

802.11b, 2437 MHz, 11 Mbps, 8 GHz to 18 GHz , Spurious Radiated Emissions Plot



Date: 26.JUL.2015 15:04:07

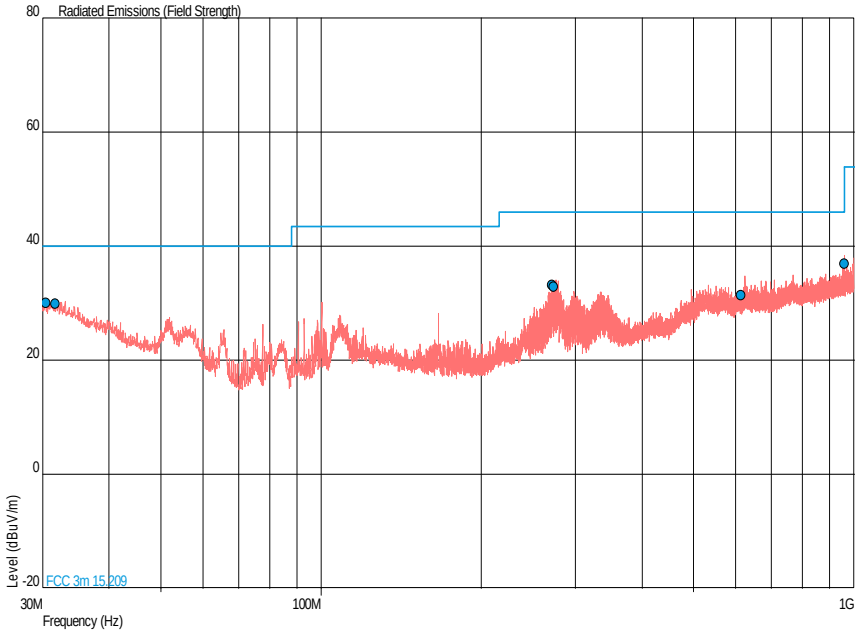
802.11b, 2437 MHz, 11 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



802.11b, 2462 MHz, 11 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.503	30.1	-9.9	32.0	-68.0	161	1.00	Vertical
31.674	29.9	-10.1	31.3	-68.7	229	1.00	Vertical
271.641	33.2	-12.8	45.7	-154.3	289	1.00	Vertical
273.460	32.9	-13.1	44.2	-155.8	307	1.00	Vertical
614.000	31.4	-14.6	37.2	-162.8	0	1.00	Vertical
960.000	37.0	-9.0	70.8	-129.2	249	1.00	Vertical

802.11b, 2462 MHz, 11 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

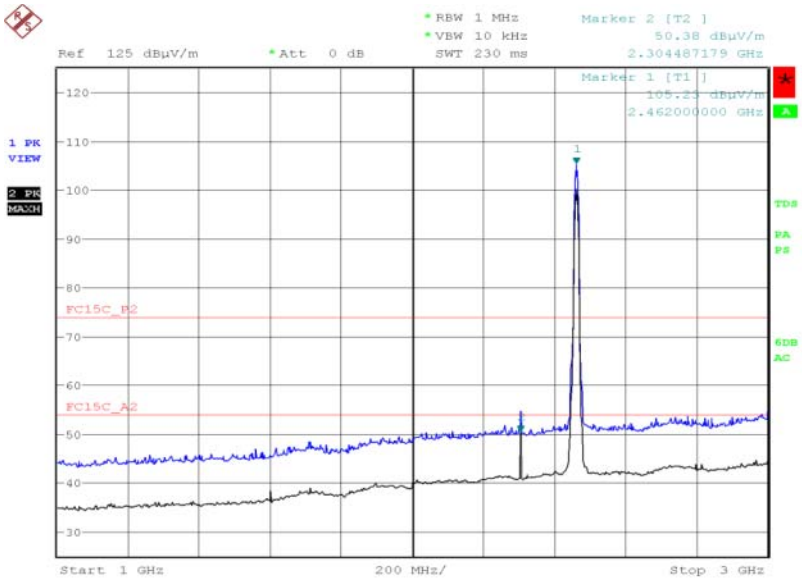


802.11b, 2462 MHz, 11 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
4923.057	64.41	53.09	1661.50	451.34	144	1.50	Horizontal

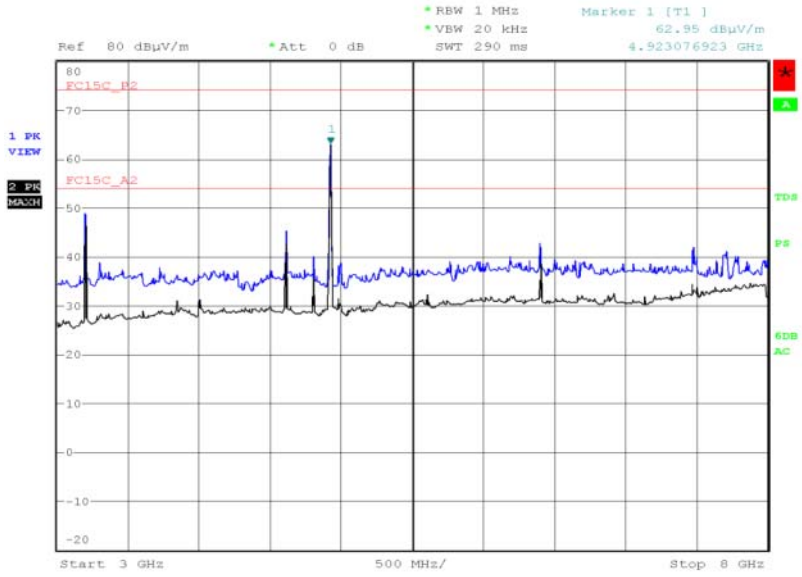
No other emissions were detected within 10 dB of the limit.

802.11b, 2462 MHz, 11 Mbps, 1 GHz to 3 GHz , Spurious Radiated Emissions Plot



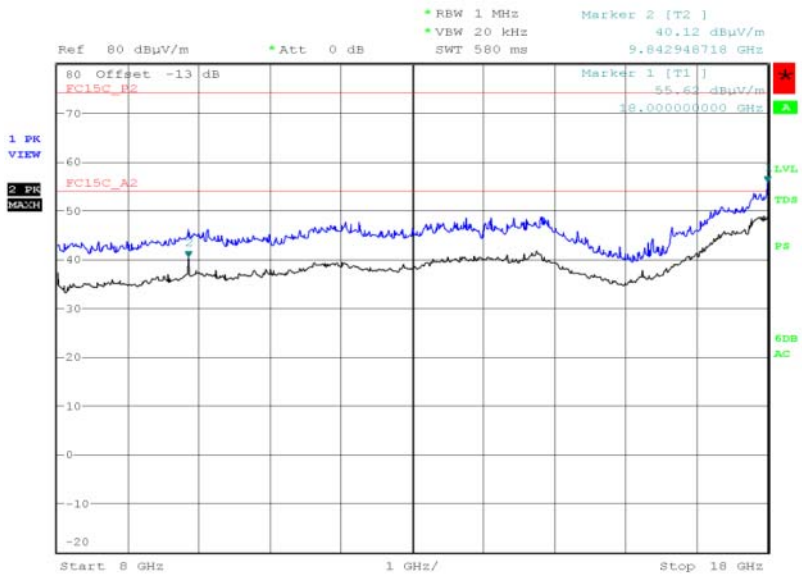
Date: 15.JUL.2015 23:33:49

802.11b, 2462 MHz, 11 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



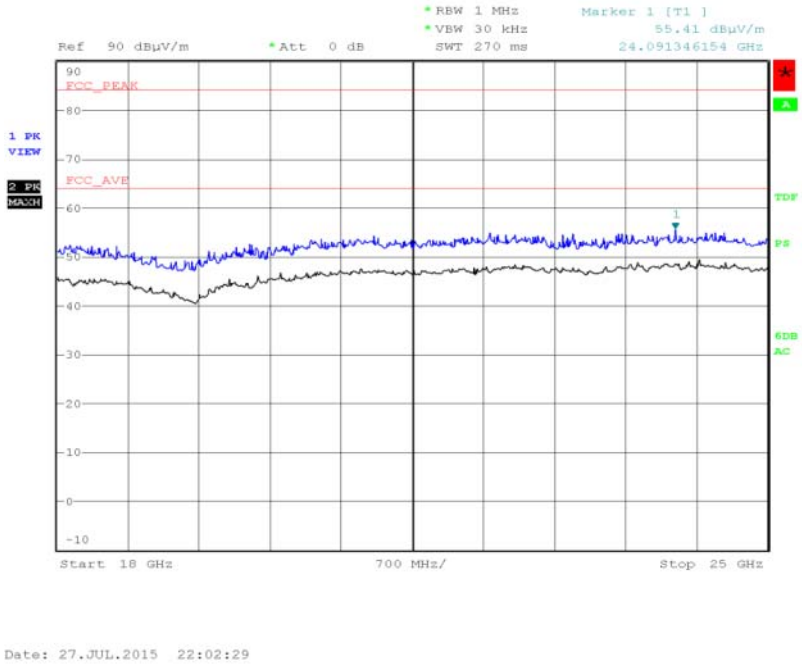
Date: 26.JUL.2015 11:22:38

802.11b, 2462 MHz, 11 Mbps, 8 GHz to 18 GHz , Spurious Radiated Emissions Plot



Date: 26.JUL.2015 15:13:33

802.11b, 2462 MHz, 11 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



FCC 47 CFR Part 15, Limit Clause 15.247 (d)

Emissions outside the restricted bands shall be at least 20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength			Measurement Distance (m)
	(µV/m)	Average (dBµV/m)	Peak (dBµV/m)	
30-88	100	40.0	60.0	3
88-216	150	43.5	63.5	3
216-960	200	46.0	66.0	3
Above 960	500	54.0	74.0	3

Industry Canada RSS-247, Limit Clause, 5.5

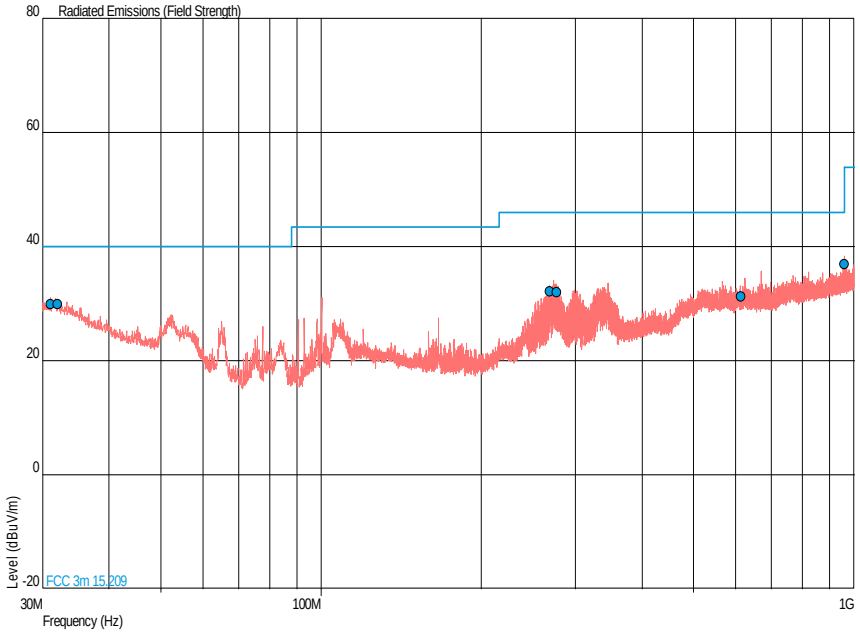
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either 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.

110 V AC Supply

802.11g, 2412 MHz, 12 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
31.096	29.9	-10.1	31.3	-68.7	354	1.00	Horizontal
32.018	29.9	-10.1	31.3	-68.7	269	1.00	Vertical
268.582	32.1	-13.9	40.3	-159.7	304	1.00	Vertical
277.154	32.0	-14.0	39.8	-160.2	281	1.00	Vertical
614.000	31.3	-14.7	36.7	-163.3	0	1.00	Vertical
960.000	37.0	-9.0	70.8	-129.2	248	1.00	Vertical

802.11g, 2412 MHz, 12 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

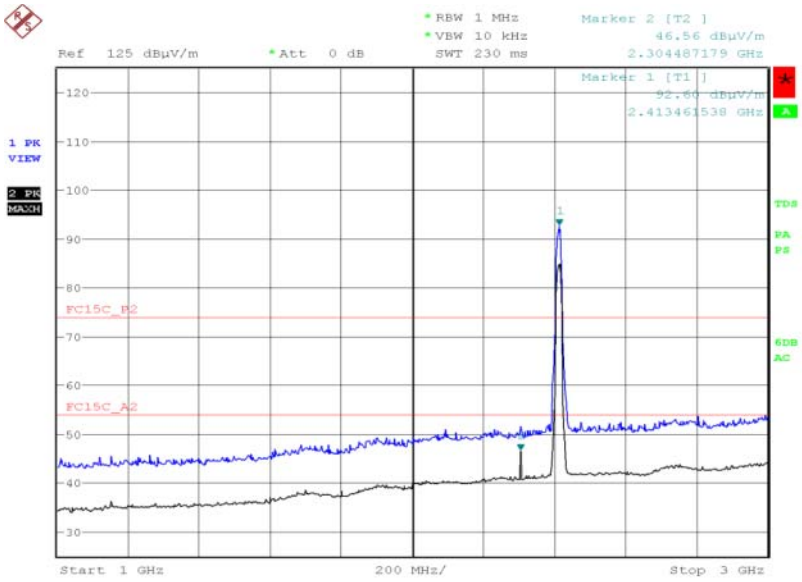


802.11g, 2412 MHz, 12 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

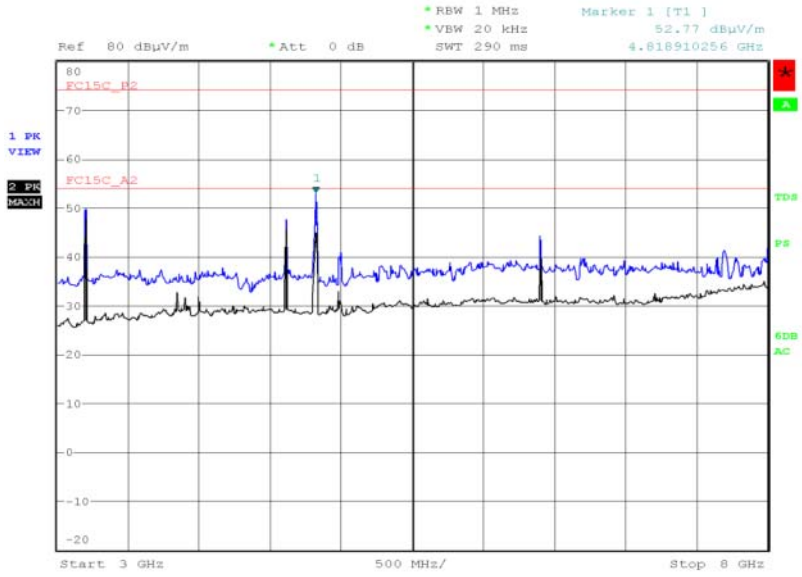
*No emissions were detected within 10 dB of the limit.

802.11g, 2412 MHz, 12 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



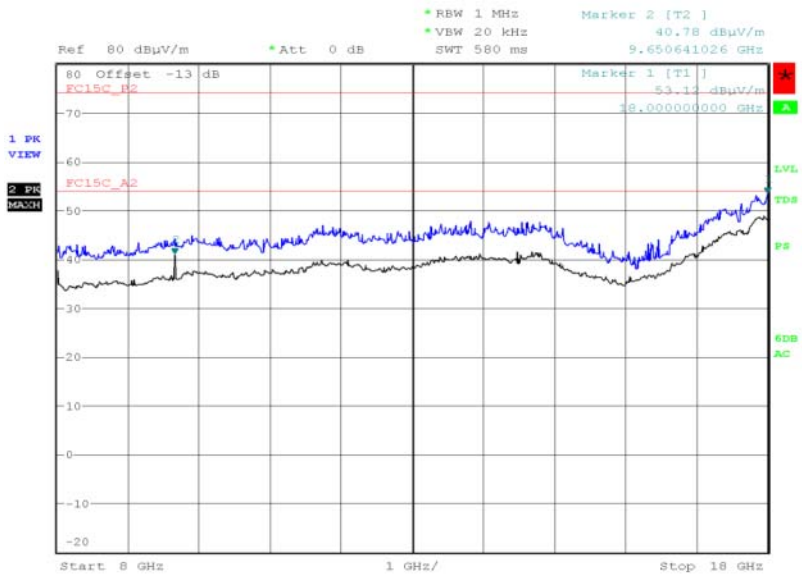
Date: 18.JUL.2015 16:32:38

802.11g, 2412 MHz,12 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



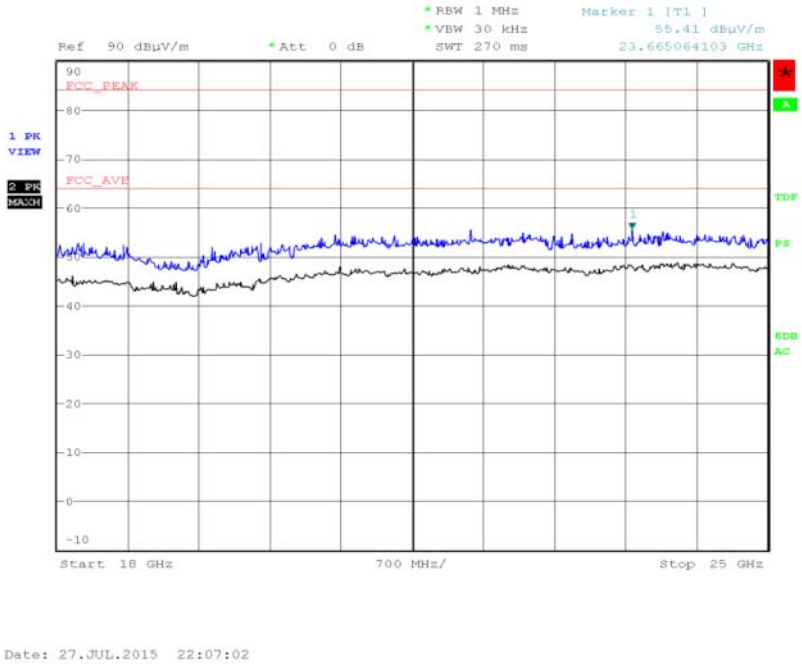
Date: 26.JUL.2015 11:45:26

802.11g, 2412 MHz,12 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.JUL.2015 14:36:48

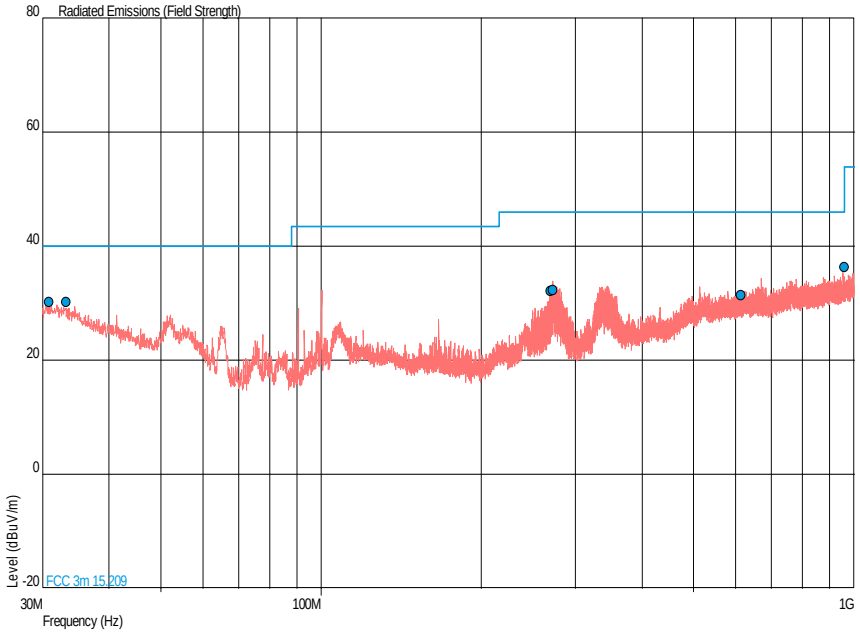
802.11g, 2412 MHz, 12 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



802.11g, 2437 MHz, 12 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.892	30.2	-9.8	32.4	-67.6	170	1.00	Vertical
33.240	30.2	-9.8	32.4	-67.6	67	1.00	Vertical
269.183	32.2	-13.8	40.7	-159.3	329	1.00	Vertical
272.209	32.3	-13.7	41.2	-158.8	280	1.00	Vertical
614.000	31.4	-14.6	37.2	-162.8	42	1.00	Vertical
960.000	36.3	-9.7	65.3	-134.7	18	1.00	Vertical

802.11g, 2437 MHz, 12 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

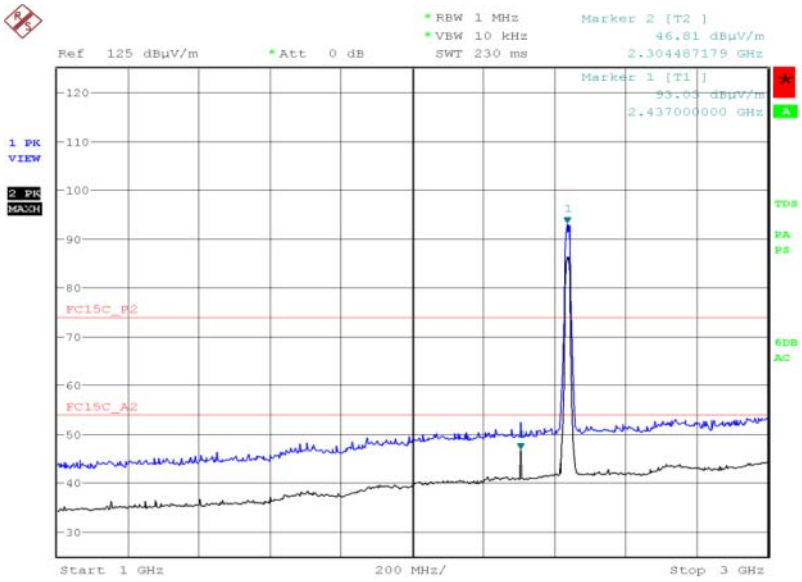


802.11g, 2437 MHz, 12 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

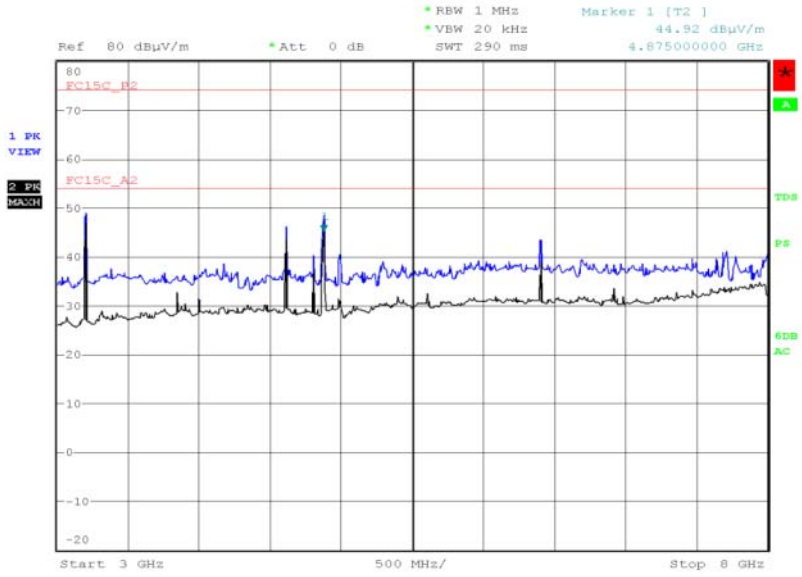
*No emissions were detected within 10 dB of the limit.

802.11g, 2437 MHz, 12 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



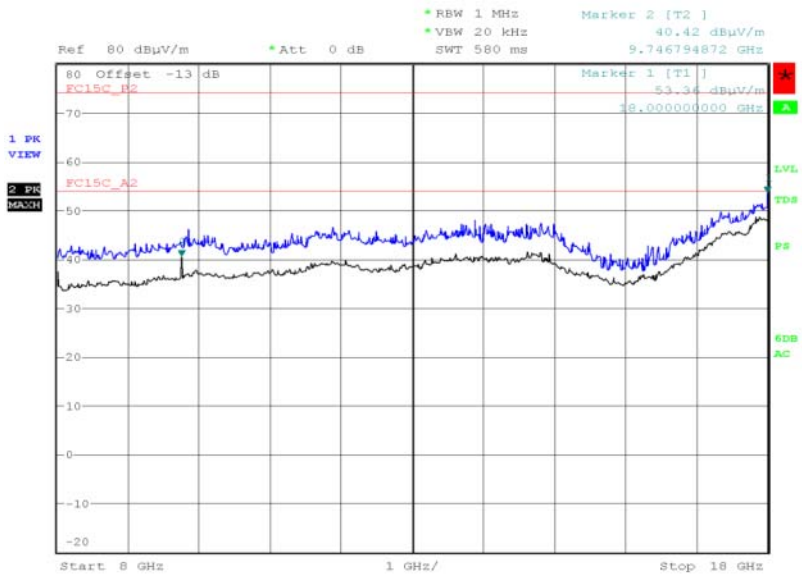
Date: 18.JUL.2015 16:38:03

802.11g, 2437 MHz, 12 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



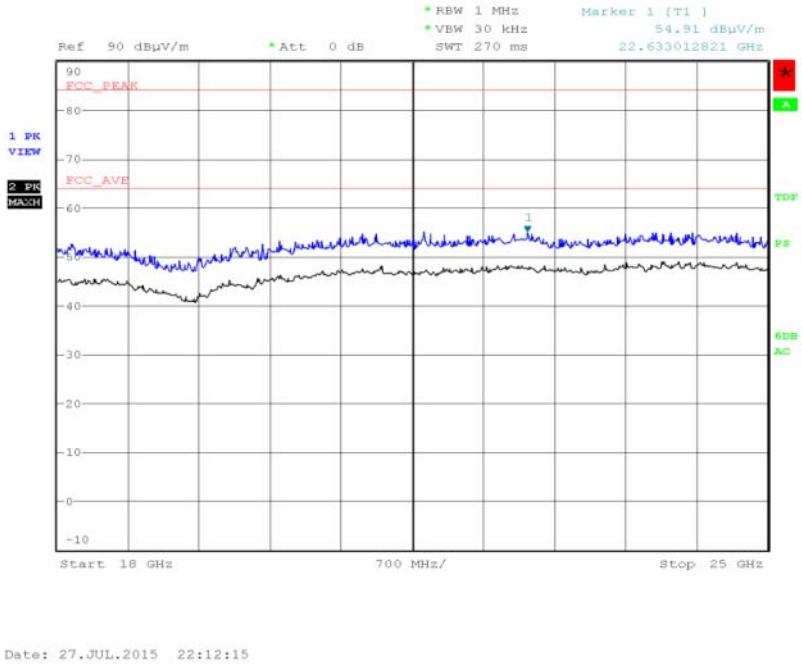
Date: 26.JUL.2015 12:16:12

802.11g, 2437 MHz, 12 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.JUL.2015 14:43:16

802.11g, 2437 MHz, 12 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot

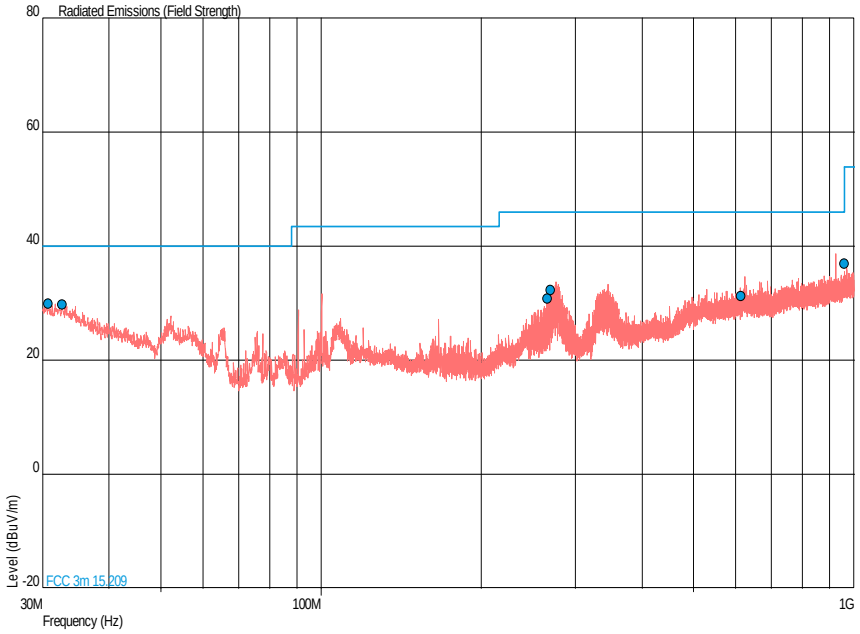


Date: 27.JUL.2015 22:12:15

802.11g, 2462 MHz, 12 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.787	30.0	-10.0	31.6	-68.4	183	1.00	Vertical
32.639	29.7	-10.3	30.5	-69.5	10	1.00	Vertical
265.529	30.9	-15.1	35.1	-164.9	299	1.00	Vertical
269.165	32.4	-13.6	41.7	-158.3	331	1.00	Vertical
614.000	31.3	-14.7	36.7	-163.3	147	1.00	Vertical
960.000	37.0	-9.0	70.8	-129.2	360	1.00	Vertical

802.11g, 2462 MHz, 12 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

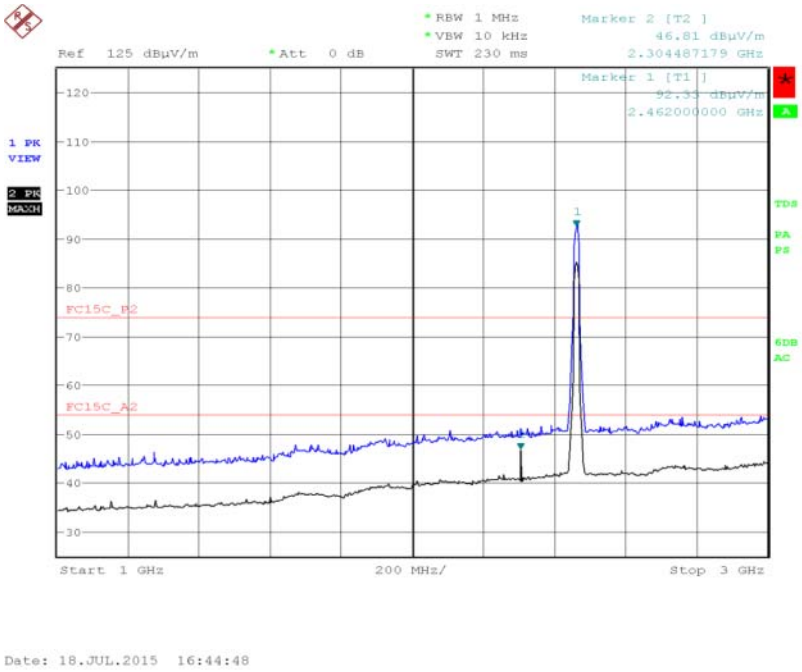


802.11g, 2462 MHz, 12 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

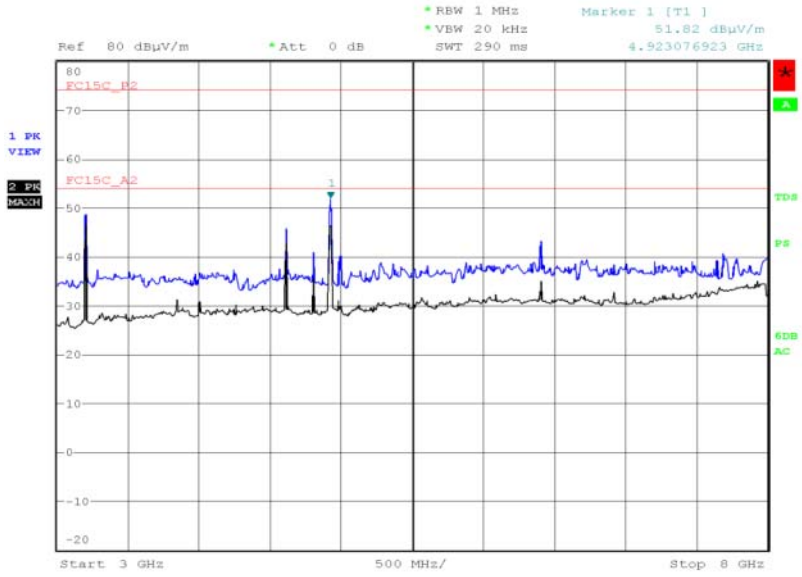
Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
4924.038	59.62	47.18	957.19	228.56	197	1.40	Horiztonal

No other emissions were detected within 10 dB of the limit.

802.11g, 2462 MHz, 12 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

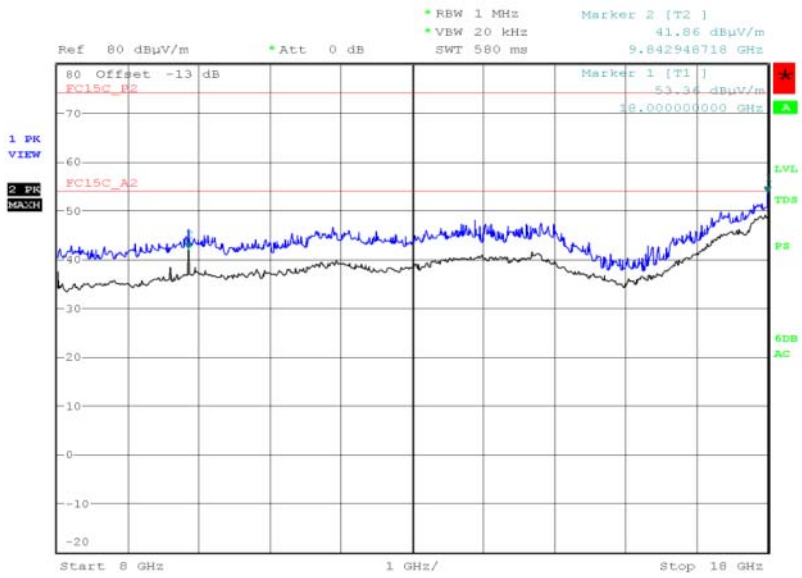


802.11g, 2462 MHz, 12 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



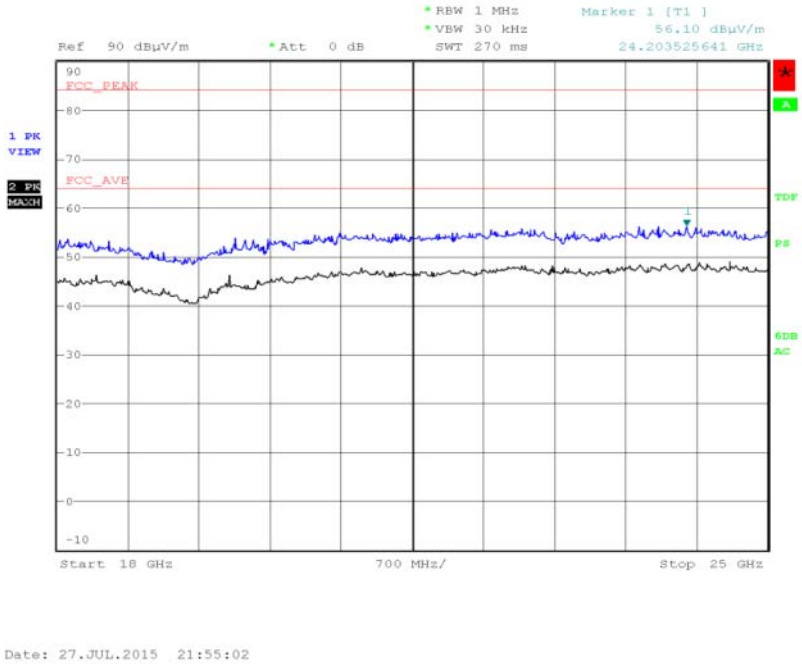
Date: 26.JUL.2015 12:18:39

802.11g, 2462 MHz, 12 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.JUL.2015 14:45:00

802.11g, 2462 MHz, 12 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



FCC 47 CFR Part 15, Limit Clause 15.247 (d)

Emissions outside the restricted bands shall be at least 20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength			Measurement Distance (m)
	(µV/m)	Average (dBµV/m)	Peak (dBµV/m)	
30-88	100	40.0	60.0	3
88-216	150	43.5	63.5	3
216-960	200	46.0	66.0	3
Above 960	500	54.0	74.0	3

Industry Canada RSS-247, Limit Clause, 5.5

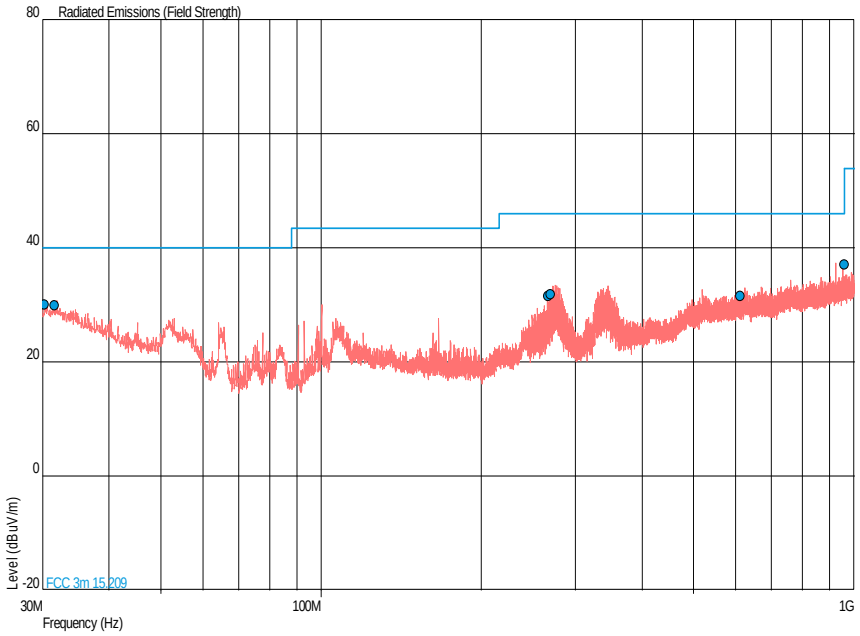
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either 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.

110 V AC Supply

802.11n - 20 MHz Bandwidth, 2412 MHz, 6.5 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.297	30.0	-10.0	31.6	-68.4	360	1.00	Vertical
31.568	29.9	-10.1	31.3	-68.7	219	1.00	Vertical
266.726	31.6	-14.4	38.0	-162.0	317	1.00	Vertical
269.185	31.8	-14.2	38.9	-161.1	288	1.00	Vertical
610.691	31.6	-14.4	38.0	-162.0	25	1.00	Vertical
960.000	37.1	-8.9	71.6	-128.4	246	1.00	Vertical

802.11n - 20 MHz Bandwidth, 2412 MHz, 6.5 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

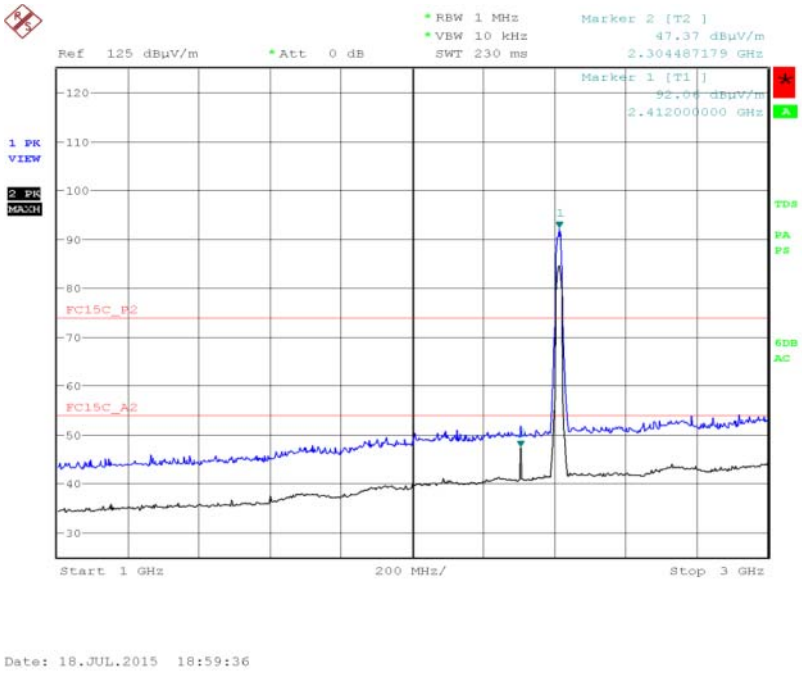


802.11n - 20 MHz Bandwidth, 2412 MHz, 6.5 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

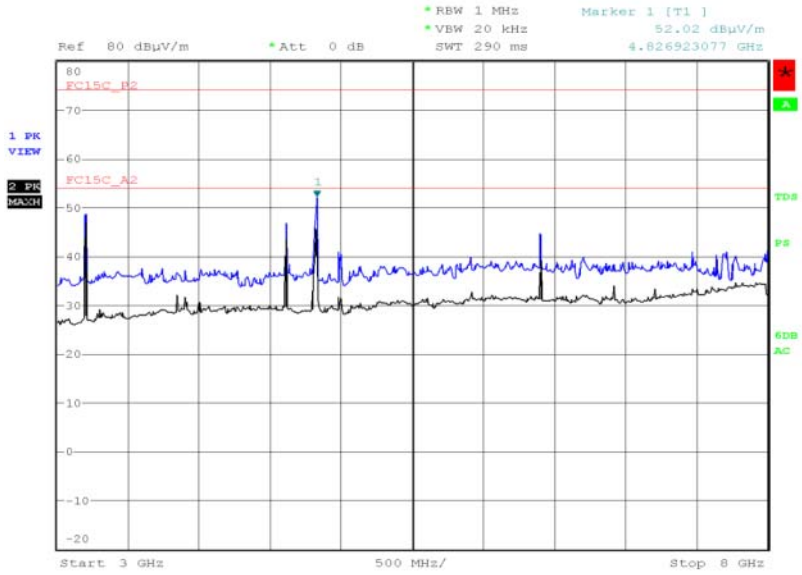
Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

*No emissions were detected within 10 dB of the limit.

802.11n - 20 MHz Bandwidth, 2412 MHz, 6.5 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

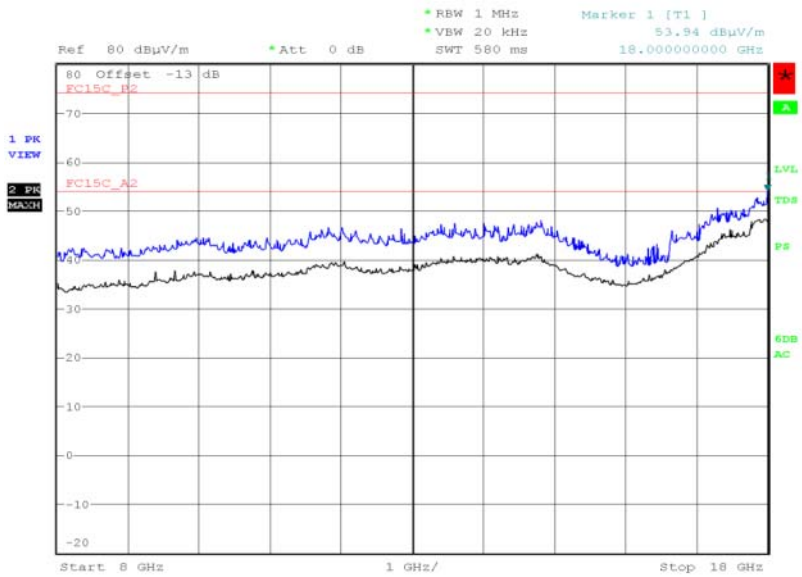


802.11n - 20 MHz Bandwidth, 2412 MHz,6.5 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



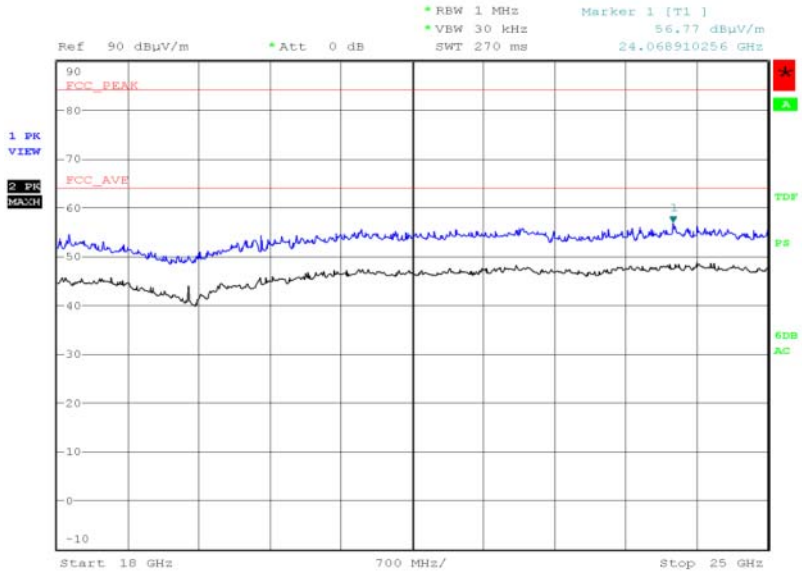
Date: 26.JUL.2015 12:41:59

802.11n - 20 MHz Bandwidth, 2412 MHz,6.5 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.JUL.2015 14:25:59

802.11n - 20 MHz Bandwidth, 2412 MHz, 6.5 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot

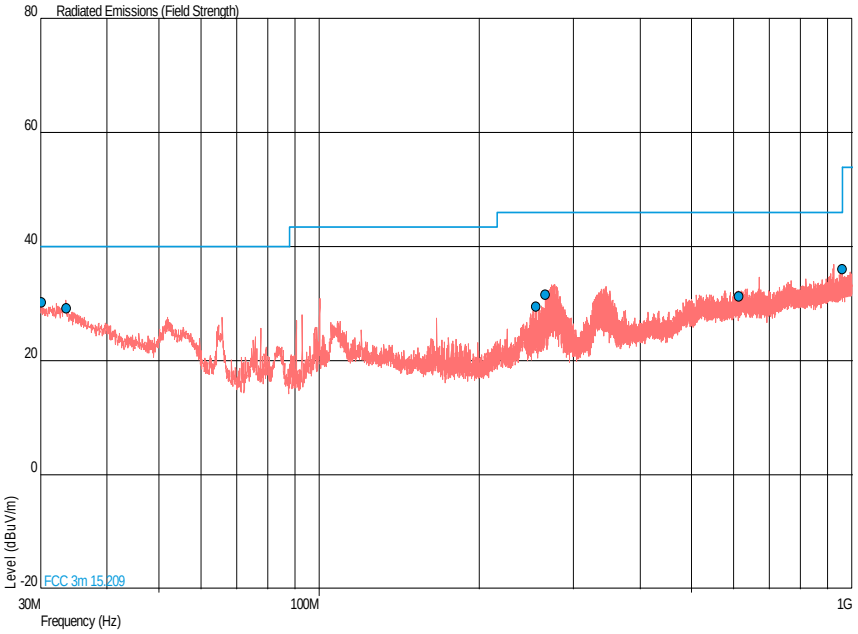


Date: 27.JUL.2015 22:17:22

802.11n - 20 MHz Bandwidth, 2437 MHz, 6.5 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.174	30.2	-9.8	32.4	-67.6	348	1.00	Vertical
33.627	29.2	-10.8	28.8	-71.2	0	1.00	Vertical
255.024	29.5	-16.5	29.9	-170.1	313	1.00	Vertical
266.039	31.5	-14.5	37.6	-162.4	319	1.00	Vertical
614.000	31.3	-14.7	36.7	-163.3	273	1.00	Vertical
960.000	36.1	-9.9	63.8	-136.2	117	1.00	Vertical

802.11n - 20 MHz Bandwidth, 2437 MHz, 6.5 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

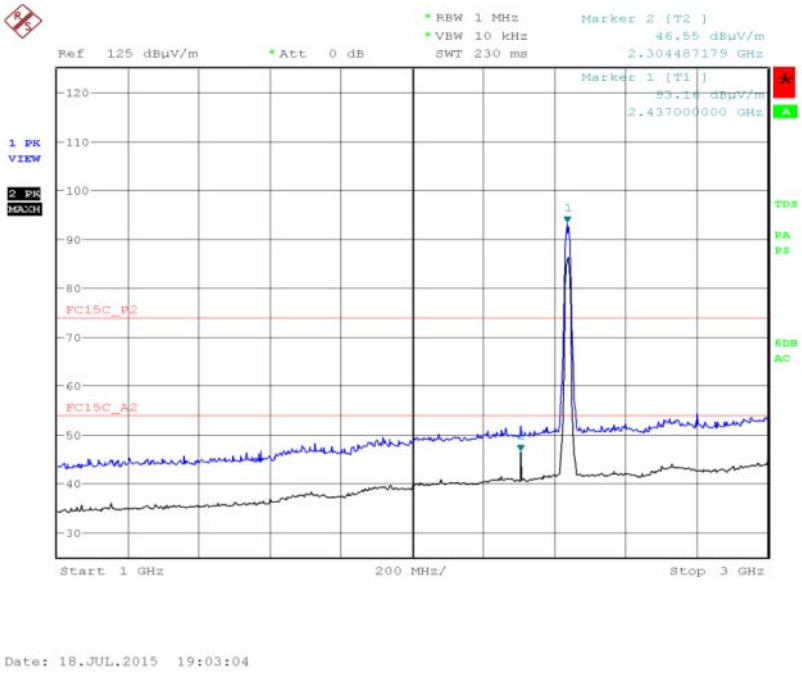


802.11n - 20 MHz Bandwidth, 2437 MHz, 6.5 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

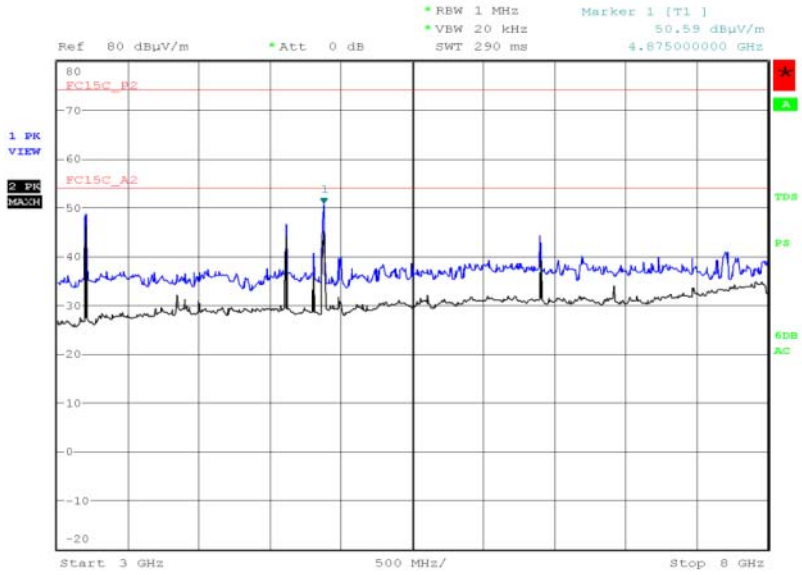
Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

*No emissions were detected within 10 dB of the limit.

802.11n - 20 MHz Bandwidth, 2437 MHz, 6.5 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

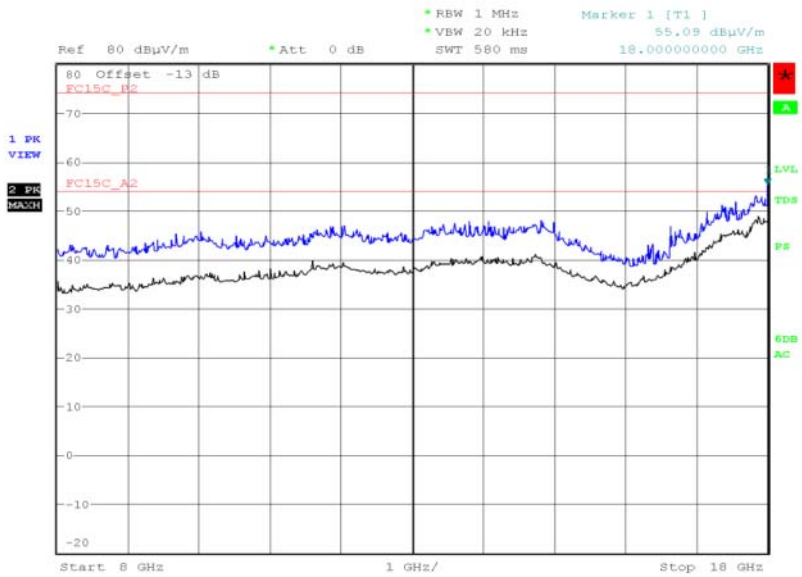


802.11n - 20 MHz Bandwidth, 2437 MHz, 6.5 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



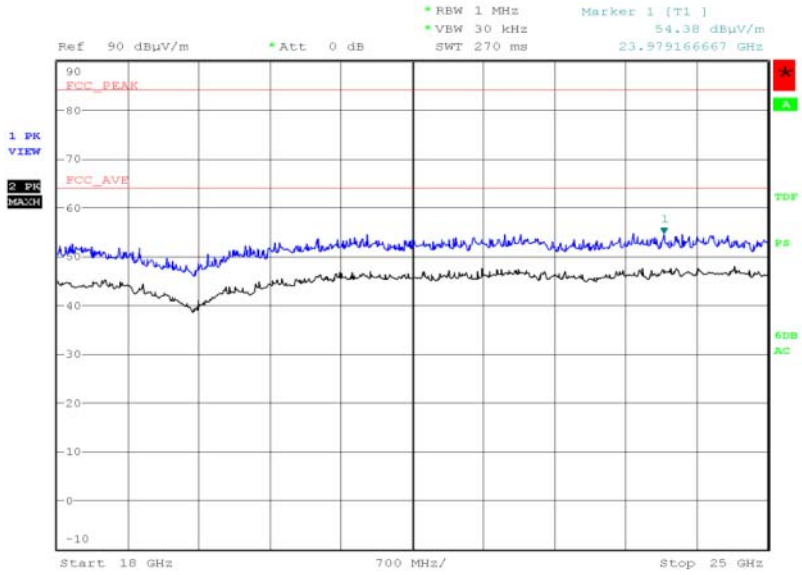
Date: 26.JUL.2015 13:25:53

802.11n - 20 MHz Bandwidth, 2437 MHz, 6.5 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.JUL.2015 14:15:03

802.11n - 20 MHz Bandwidth, 2437 MHz, 6.5 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot

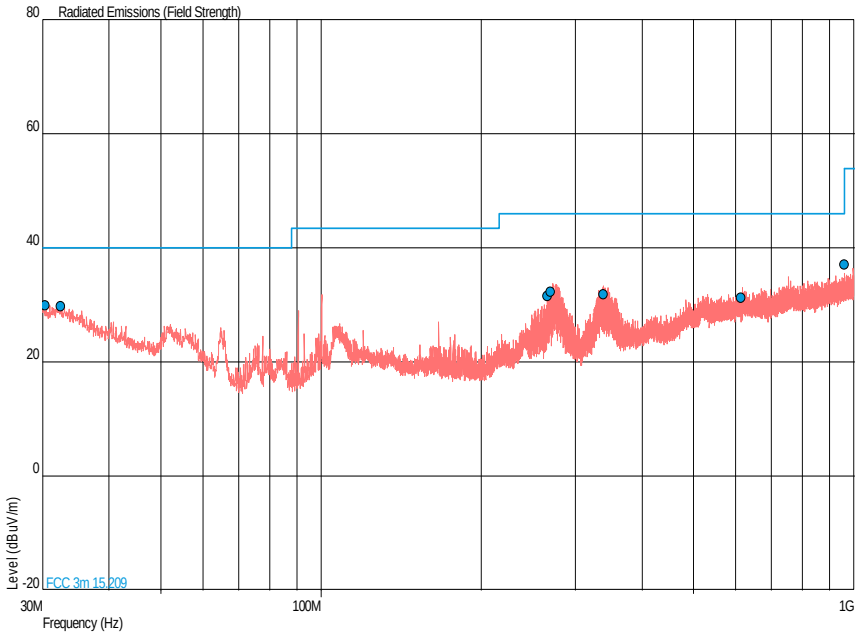


Date: 27.JUL.2015 22:25:27

802.11n - 20 MHz Bandwidth, 2462 MHz, 6.5 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.394	30.0	-10.0	31.6	-68.4	360	1.00	Vertical
32.502	29.7	-10.3	30.5	-69.5	65	1.00	Vertical
265.440	31.6	-14.4	38.0	-162.0	321	1.00	Vertical
269.084	32.4	-13.6	41.7	-158.3	305	1.00	Vertical
338.333	31.8	-14.2	38.9	-161.1	245	1.00	Vertical
614.000	31.3	-14.7	36.7	-163.3	289	1.00	Vertical
960.000	37.0	-9.0	70.8	-129.2	7	1.00	Vertical

802.11n - 20 MHz Bandwidth, 2462 MHz, 6.5 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

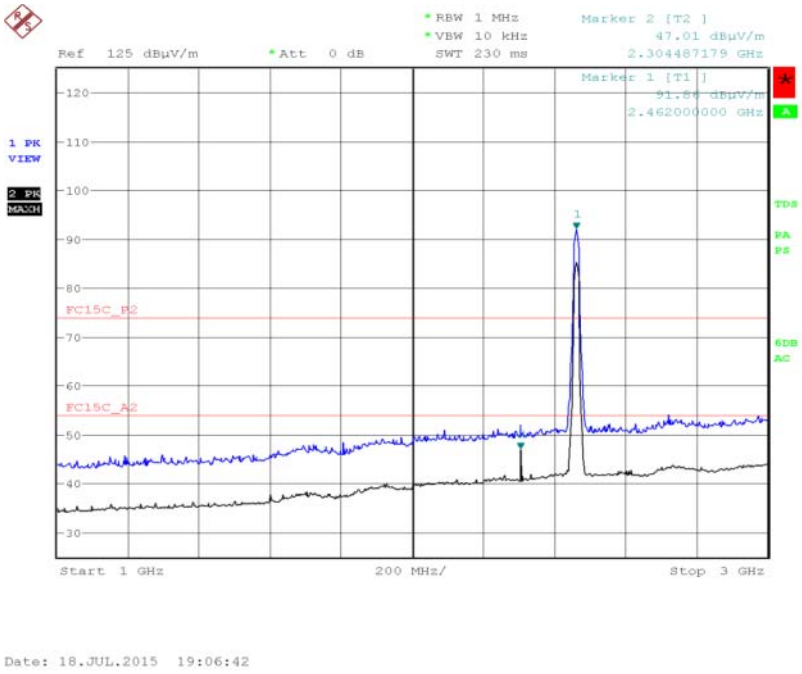


802.11n - 20 MHz Bandwidth, 2462 MHz, 6.5 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

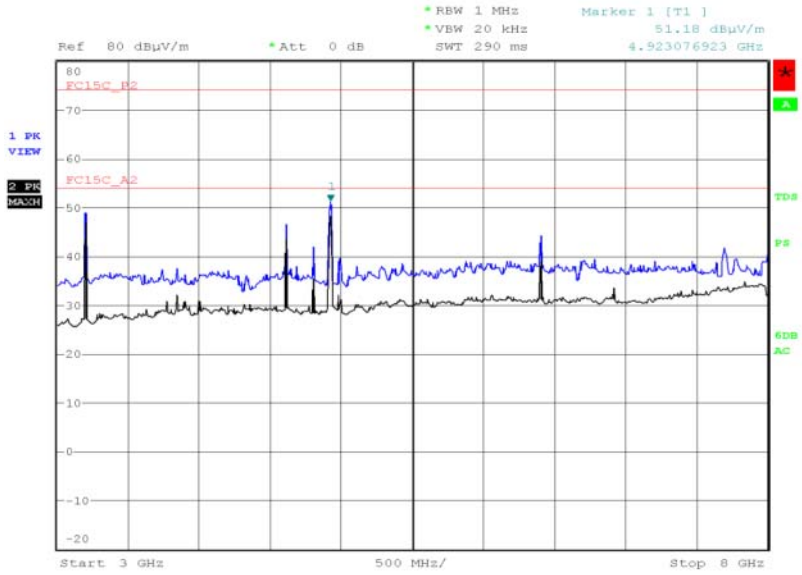
Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
4924.014	60.84	47.46	1101.54	236.05	198	1.40	Horizontal

No other emissions were detected within 10 dB of the limit.

802.11n - 20 MHz Bandwidth, 2462 MHz, 6.5 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

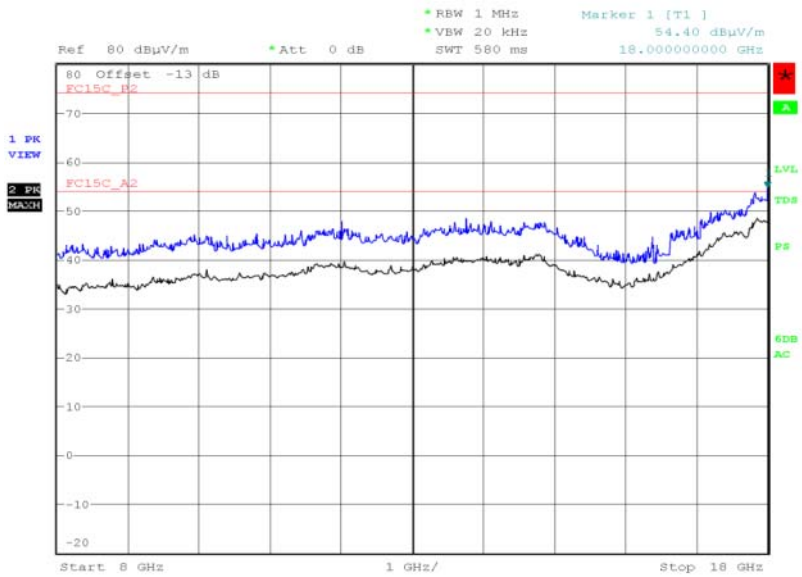


802.11n - 20 MHz Bandwidth, 2462 MHz, 6.5 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



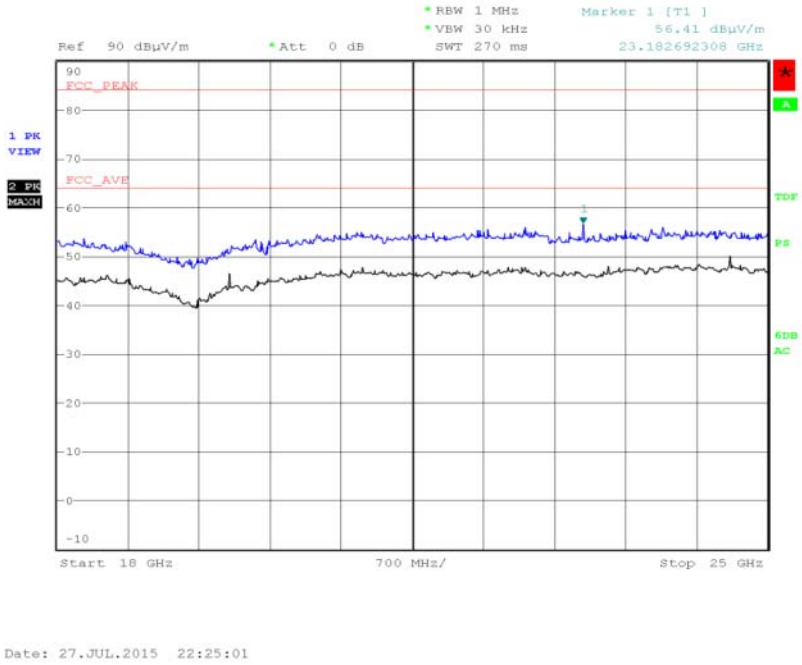
Date: 26.JUL.2015 13:30:04

802.11n - 20 MHz Bandwidth, 2462 MHz, 6.5 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.JUL.2015 14:02:30

802.11n - 20 MHz Bandwidth, 2462 MHz, 6.5 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



FCC 47 CFR Part 15, Limit Clause 15.247 (d)

Emissions outside the restricted bands shall be at least 20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength			Measurement Distance (m)
	(µV/m)	Average (dBµV/m)	Peak (dBµV/m)	
30-88	100	40.0	60.0	3
88-216	150	43.5	63.5	3
216-960	200	46.0	66.0	3
Above 960	500	54.0	74.0	3

Industry Canada RSS-247, Limit Clause, 5.5

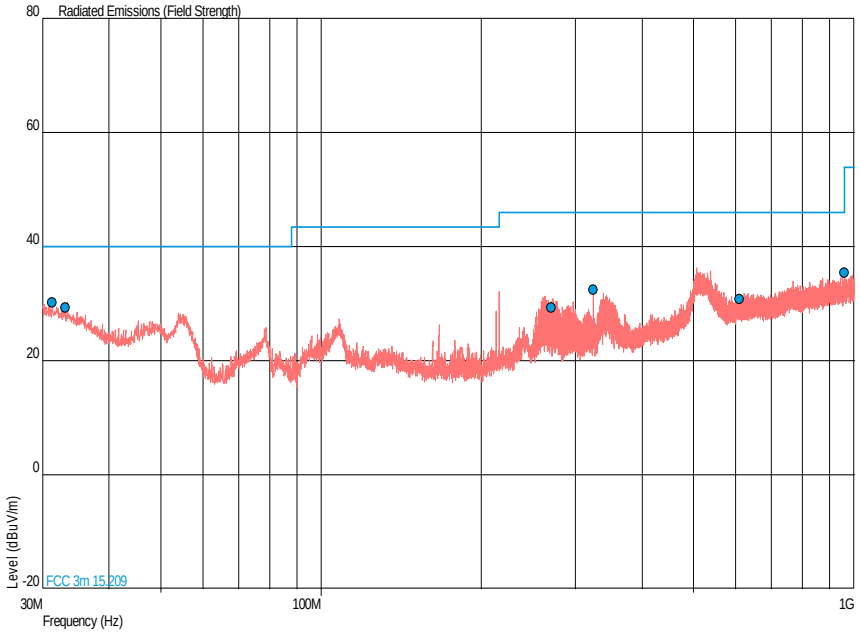
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either 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.

110 V AC Supply

Bluetooth Low Energy, 2402 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
31.280	30.3	-9.7	32.7	-67.3	333	1.00	Vertical
33.138	29.3	-10.7	29.2	-70.8	238	1.00	Vertical
270.022	29.3	-16.7	29.2	-170.8	12	1.00	Vertical
323.997	32.5	-13.5	42.2	-157.8	353	1.00	Vertical
608.457	30.9	-15.1	35.1	-164.9	179	1.00	Vertical
960.000	35.4	-10.6	58.9	-141.1	54	1.00	Vertical

Bluetooth Low Energy, 2402 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

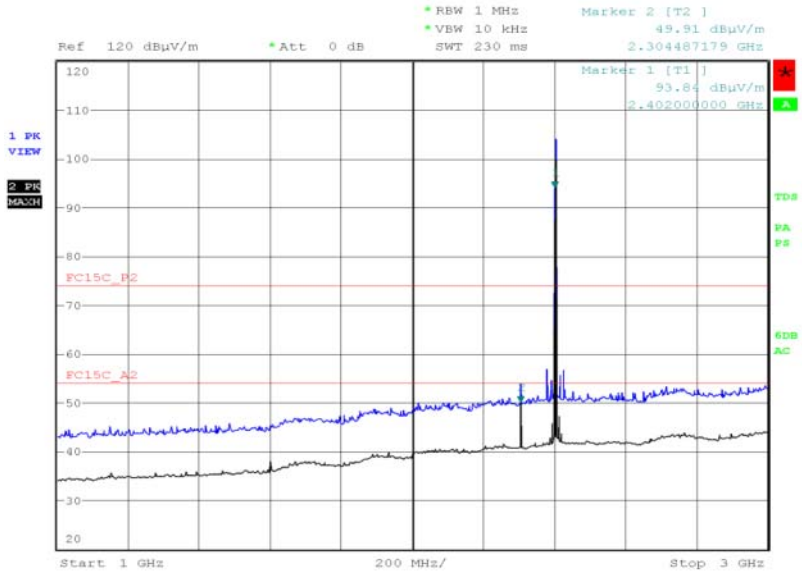


Bluetooth Low Energy, 2402 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
4607.925	49.53	45.20	299.57	181.97	326	100	Vertical

No other emissions were detected within 10 dB of the limit.

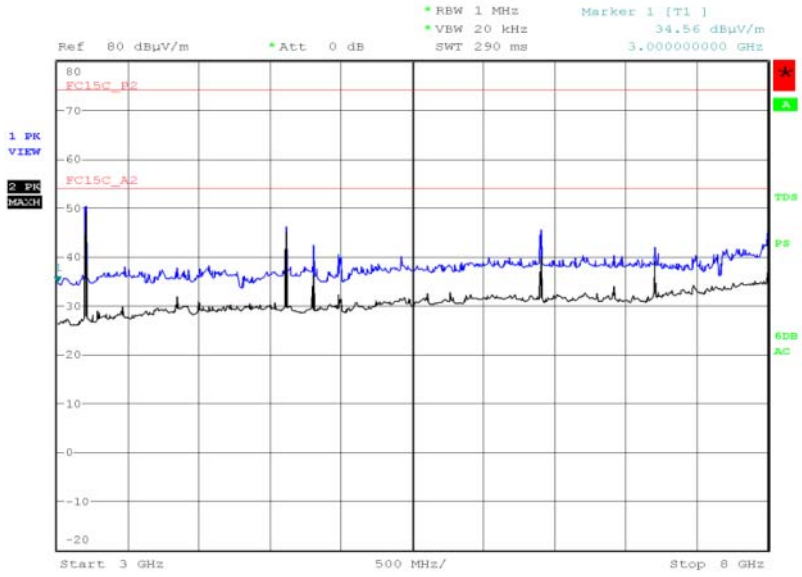
Bluetooth Low Energy, 2402 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 20.JUL.2015 23:43:27

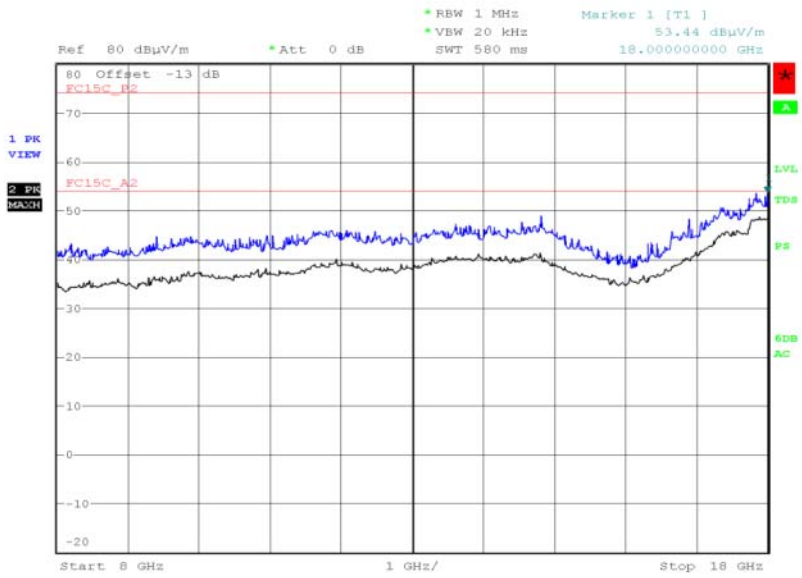
Product Service

Bluetooth Low Energy, 2402 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 21.JUL.2015 20:06:48

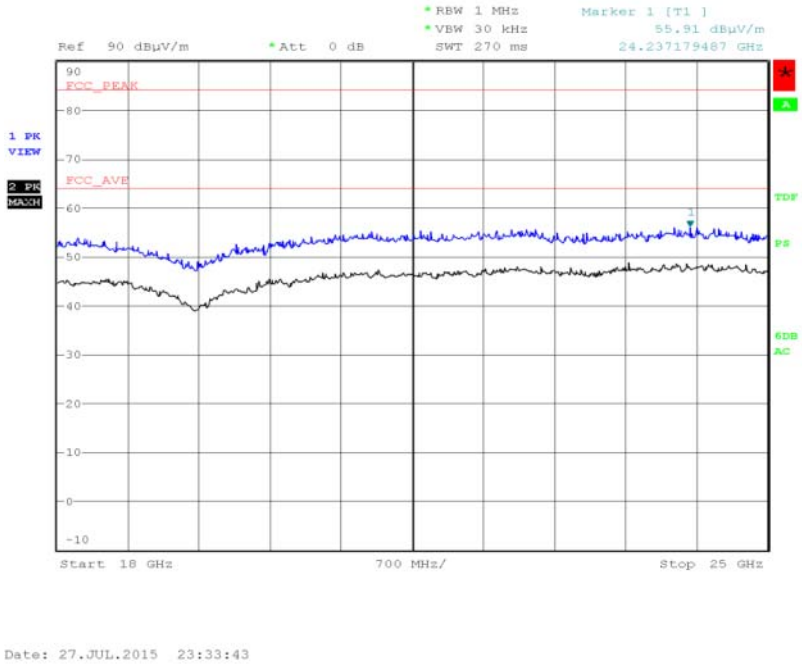
Bluetooth Low Energy, 2402 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.JUL.2015 15:39:58

Product Service

Bluetooth Low Energy, 2402 MHz, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot

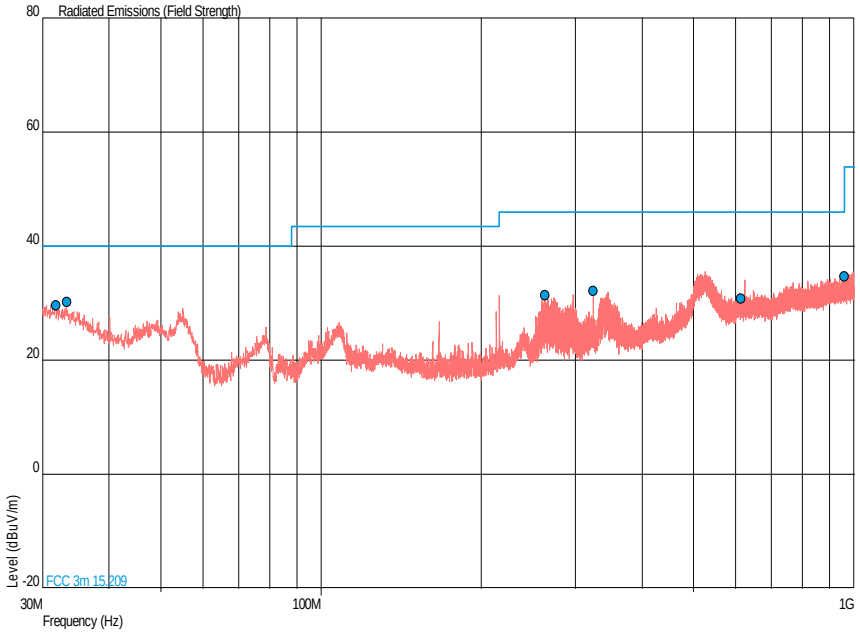


Date: 27.JUL.2015 23:33:43

Bluetooth Low Energy, 2440 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
31.868	29.6	-10.4	30.2	-69.8	8	1.00	Vertical
33.308	30.3	-9.7	32.7	-67.3	49	1.00	Vertical
262.851	31.4	-14.6	37.2	-162.8	25	1.00	Vertical
323.998	32.2	-13.8	40.7	-159.3	360	1.00	Vertical
614.000	30.8	-15.2	34.7	-165.3	333	1.00	Vertical
960.000	34.7	-11.3	54.3	-145.7	63	1.00	Vertical

Bluetooth Low Energy, 2440 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

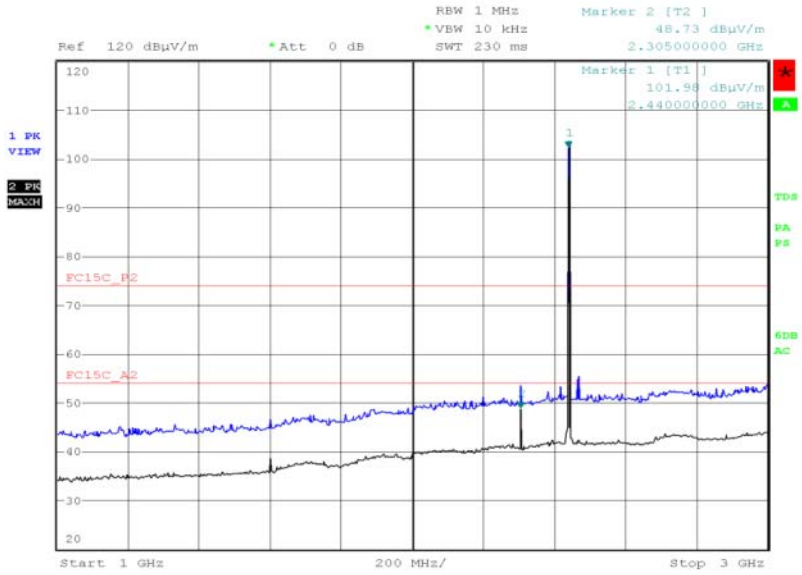


Bluetooth Low Energy, 2440 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
4607.981	49.57	42.28	300.95	183.65	327	100	Horizontal

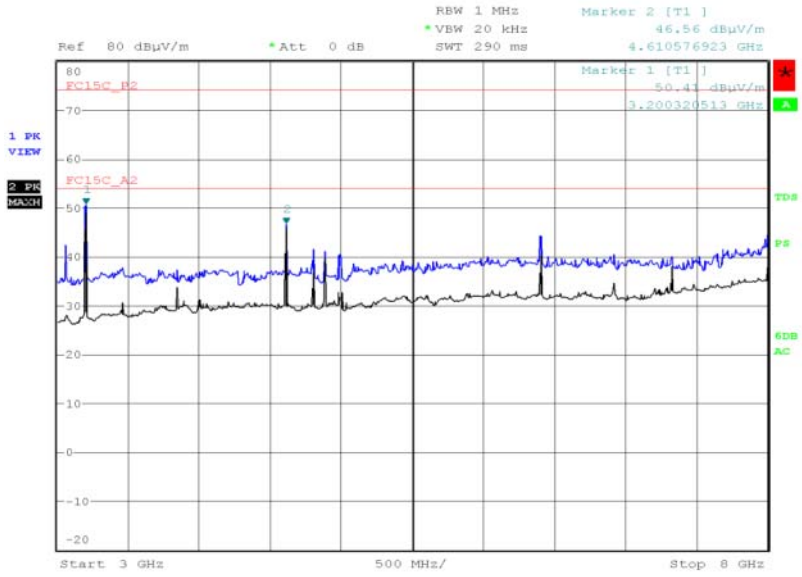
No other emissions were detected within 10 dB of the limit.

Bluetooth Low Energy, 2440 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



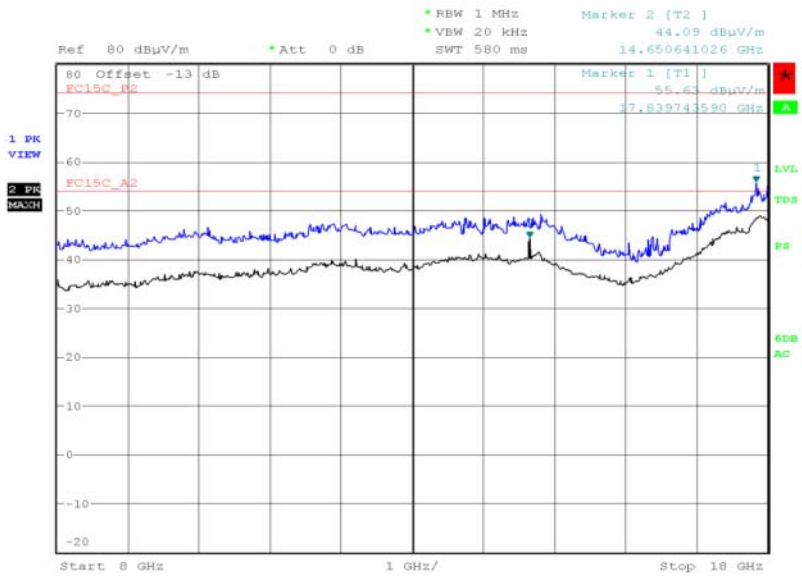
Product Service

Bluetooth Low Energy, 2440 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 21.JUL.2015 19:53:17

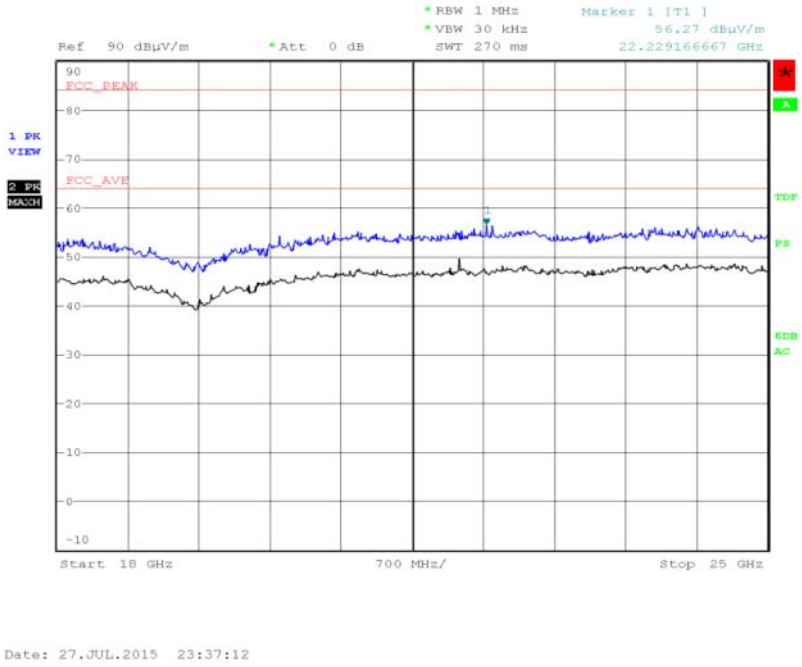
Bluetooth Low Energy, 2440 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.JUL.2015 15:45:14

Product Service

Bluetooth Low Energy, 2440 MHz, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot

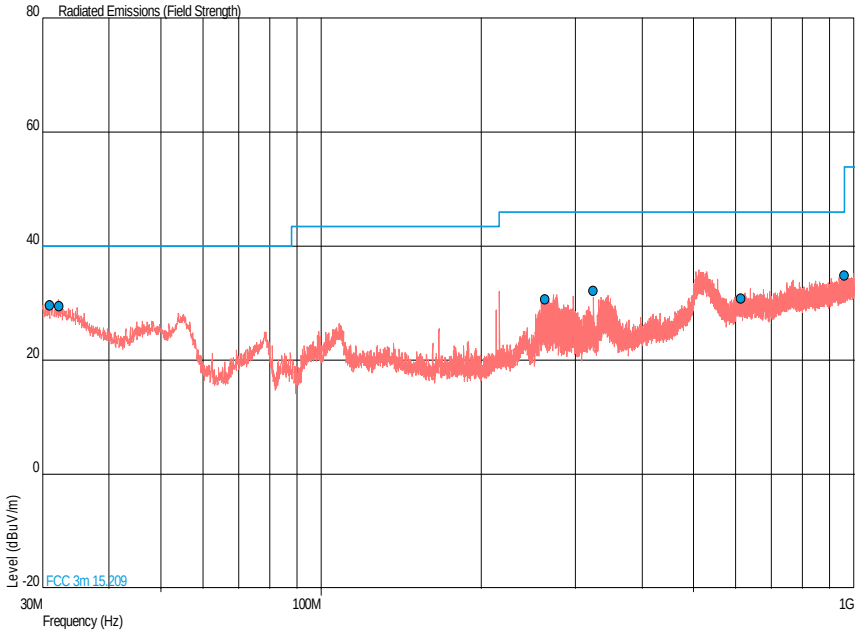


Date: 27.JUL.2015 23:37:12

Bluetooth Low Energy, 2480 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
31.017	29.7	-10.3	30.5	-69.5	119	1.00	Vertical
32.280	29.5	-10.5	29.9	-70.1	24	1.00	Vertical
262.861	30.7	-15.3	34.3	-165.7	12	1.00	Vertical
324.000	32.2	-13.8	40.7	-159.3	338	1.00	Vertical
614.000	30.8	-15.2	34.7	-165.3	243	1.00	Vertical
960.000	34.8	-11.2	55.0	-145.0	52	1.00	Vertical

Bluetooth Low Energy, 2480 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

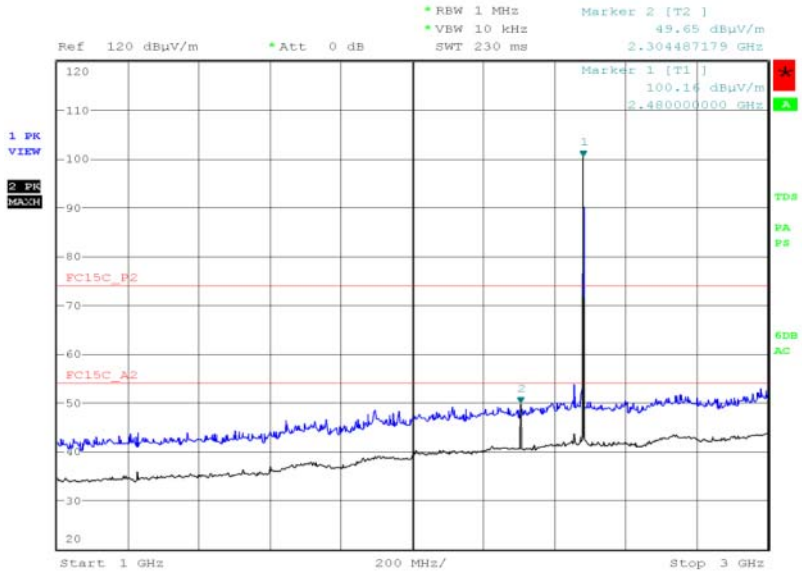


Bluetooth Low Energy, 2480 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
4608.058	49.07	44.85	248.12	174.78	314	100	Horizontal

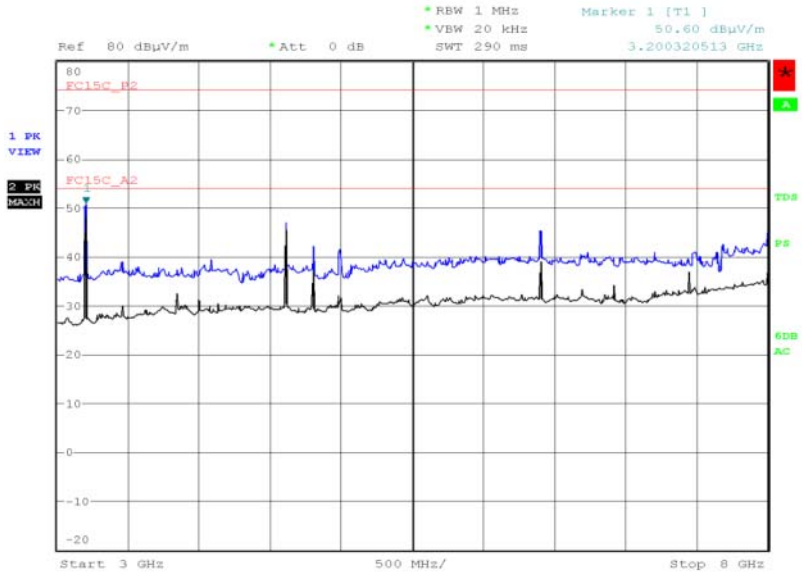
No other emissions were detected within 10 dB of the limit.

Bluetooth Low Energy, 2480 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



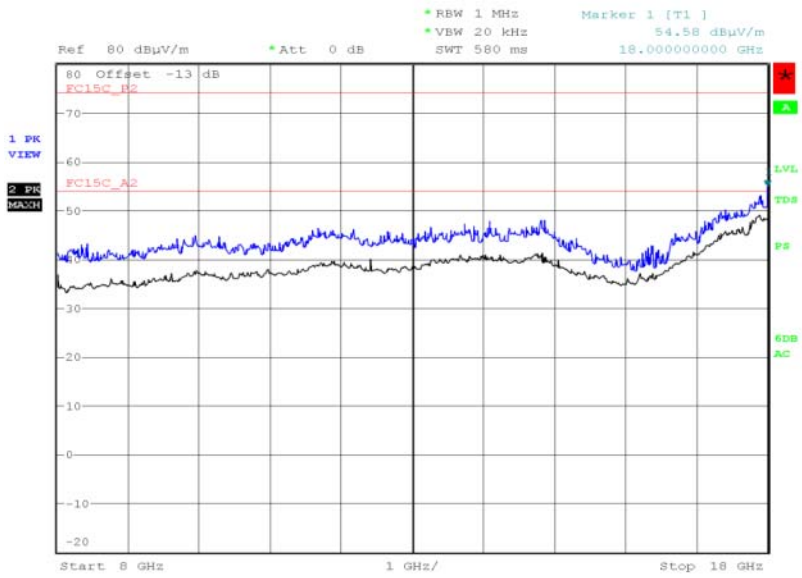
Product Service

Bluetooth Low Energy, 2480 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



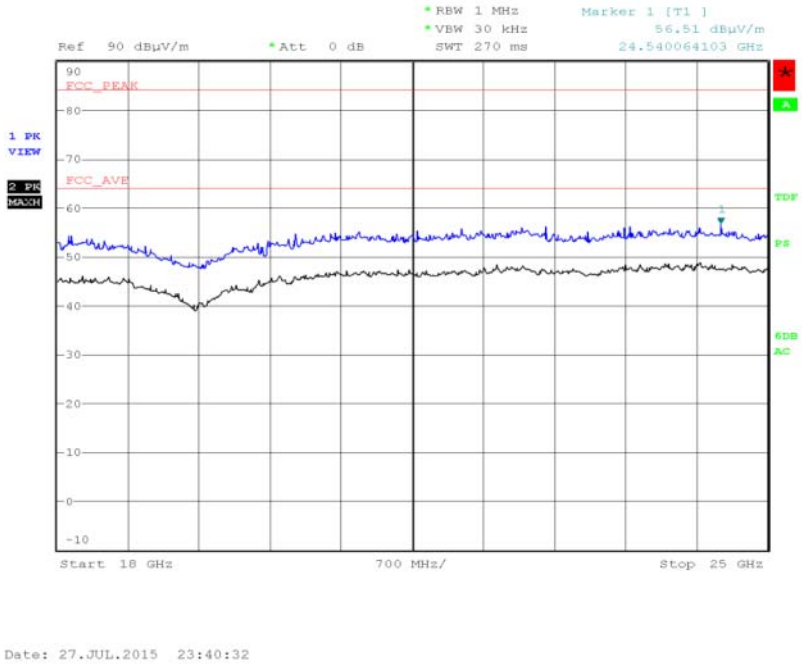
Date: 21.JUL.2015 20:26:59

Bluetooth Low Energy, 2480 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.JUL.2015 15:47:13

Bluetooth Low Energy, 2480 MHz, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



FCC 47 CFR Part 15, Limit Clause 15.247 (d)

Emissions outside the restricted bands shall be at least 20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength			Measurement Distance (m)
	(µV/m)	Average (dBµV/m)	Peak (dBµV/m)	
30-88	100	40.0	60.0	3
88-216	150	43.5	63.5	3
216-960	200	46.0	66.0	3
Above 960	500	54.0	74.0	3

Industry Canada RSS-247, Limit Clause, 5.5

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.

2.6 RESTRICTED BAND EDGES

2.6.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.205
Industry Canada RSS-247, Clause 8.10

2.6.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #1 - Modification State 1

2.6.3 Date of Test

15 July 2015, 18 July 2015, 20 July 2015, 26 July 2015 & 2 August 2015

2.6.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.5 Test Procedure

The test was performed in accordance with KDB 558074 D01 V03r02, clause 12.1 and ANSI C63.10, clause 6.5 and 6.6.

2.6.6 Environmental Conditions

Ambient Temperature	19.1 - 21.6°C
Relative Humidity	45.0 - 65.0%

Product Service

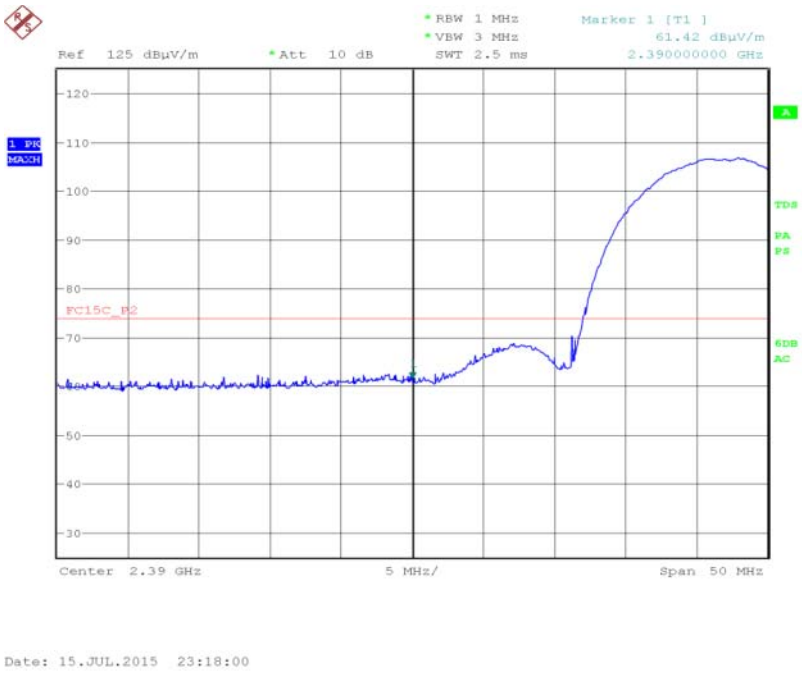
2.6.7 Test Results

110 V AC Supply

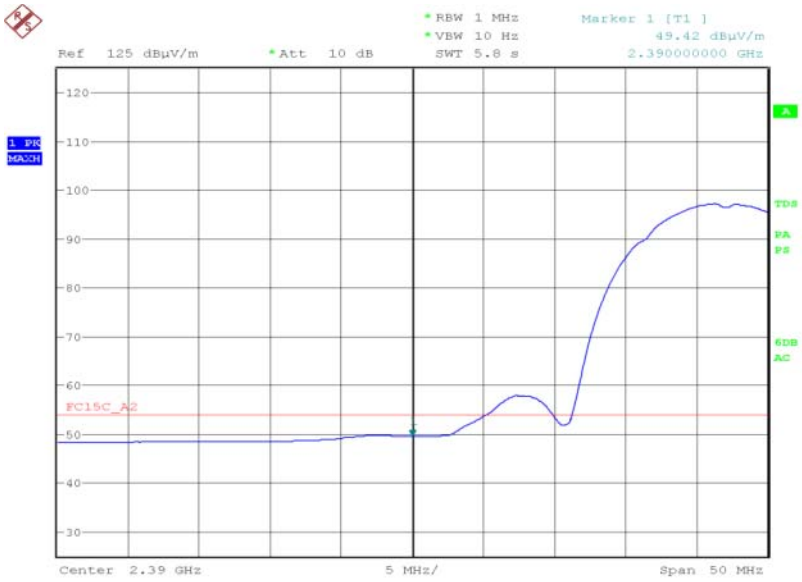
802.11b, 11 Mbps, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
61.42	49.42	59.67	48.43

802.11b, 2412 MHz, Measured Frequency 2390 MHz, 11 Mbps, Final Peak, Restricted Band Edges Plot

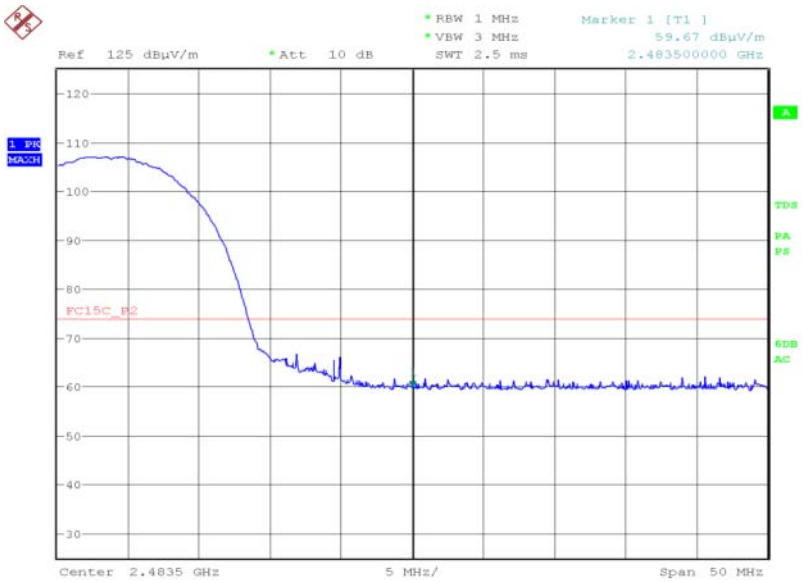


802.11b, 2412 MHz, Measured Frequency 2390 MHz, 11 Mbps, Final Average, Restricted Band Edges Plot



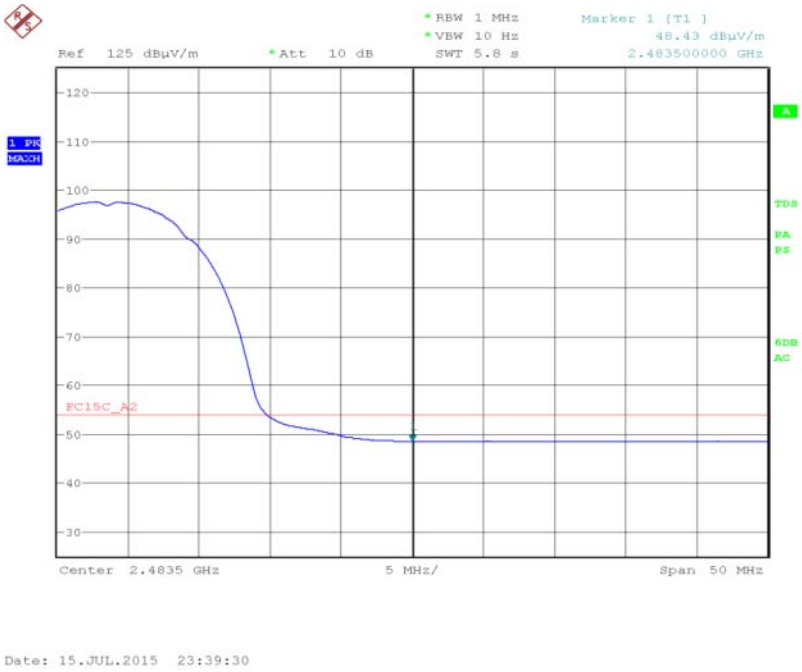
Date: 15.JUL.2015 23:19:22

802.11b, 2462 MHz, Measured Frequency 2483.5 MHz, 11 Mbps, Final Peak, Restricted Band Edges Plot



Date: 15.JUL.2015 23:38:14

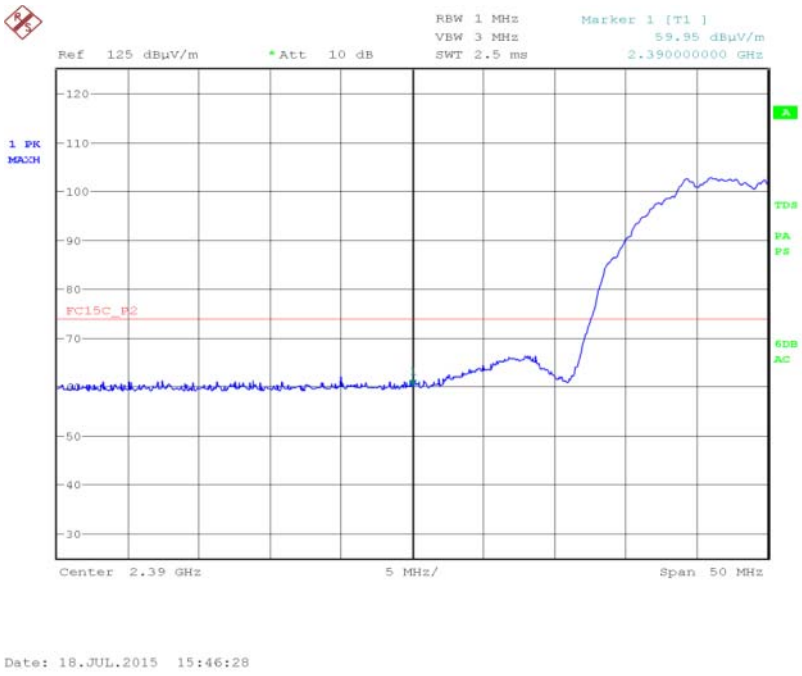
802.11b, 2462 MHz, Measured Frequency 2483.5 MHz, 11 Mbps, Final Average, Restricted Band Edges Plot



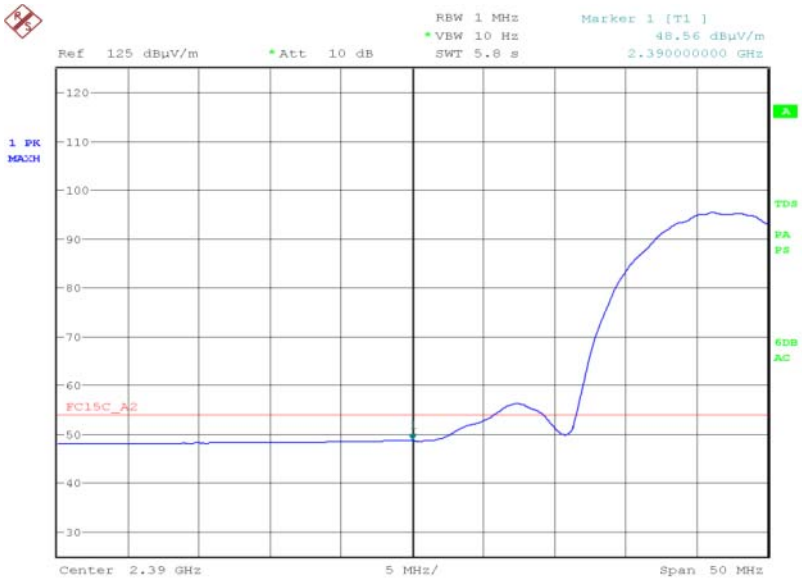
802.11b, 5.5 Mbps, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
59.95	48.56	60.67	48.33

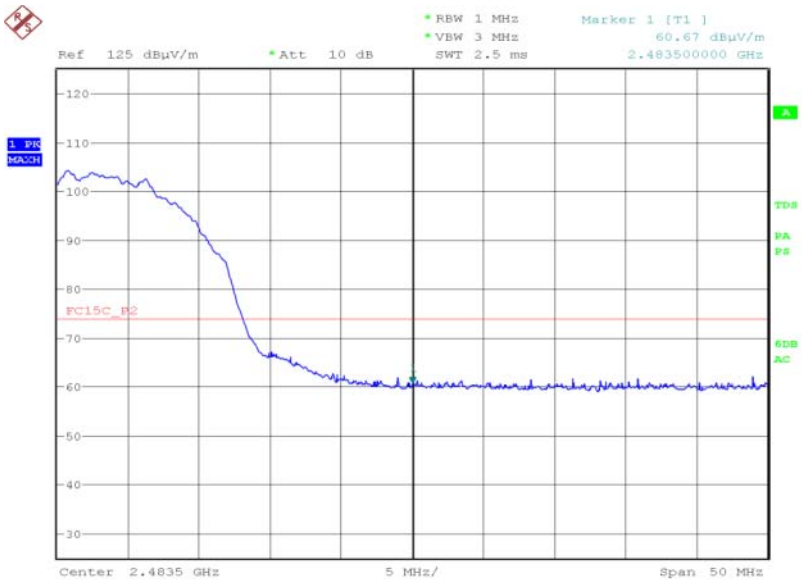
802.11b, 2412 MHz, Measured Frequency 2390 MHz, 5.5 Mbps, Final Peak, Restricted Band Edges Plot



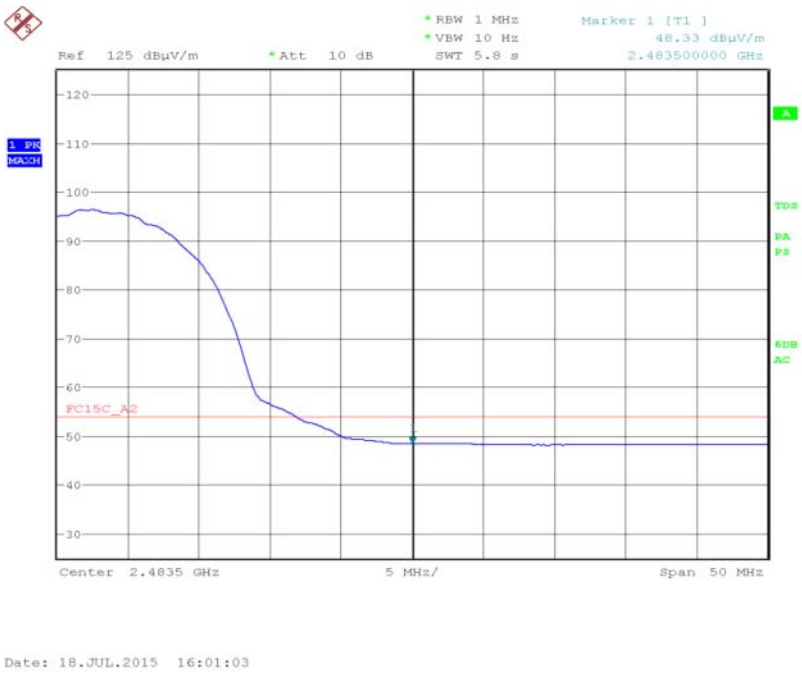
802.11b, 2412 MHz, Measured Frequency 2390 MHz, 5.5 Mbps, Final Average, Restricted Band Edges Plot



802.11b, 2462 MHz, Measured Frequency 2483.5 MHz, 5.5 Mbps, Final Peak, Restricted Band Edges Plot



802.11b, 2462 MHz, Measured Frequency 2483.5 MHz, 5.5 Mbps, Final Average, Restricted Band Edges Plot



Remark

The test was performed on 11 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 5.5 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

Industry Canada RSS-GEN, Limit Clause 8.10

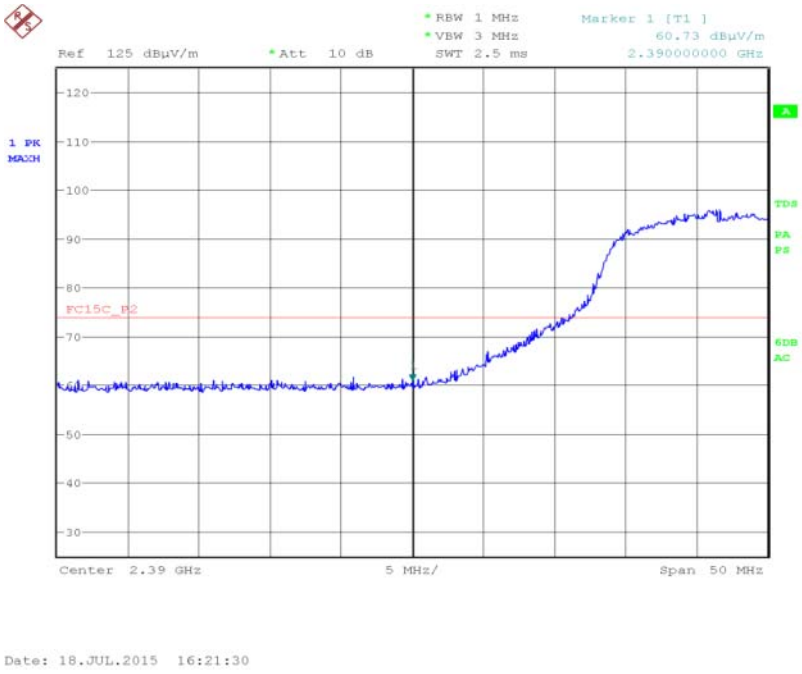
	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

110 V AC Supply

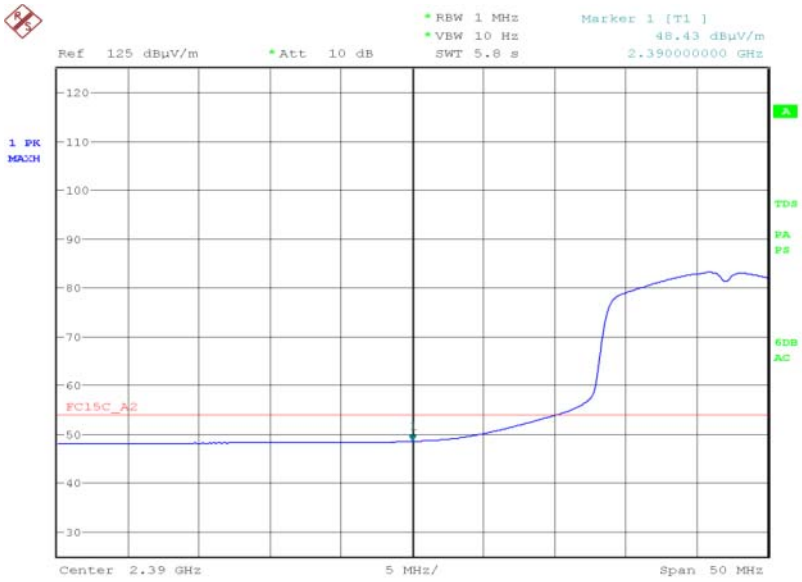
802.11g, 12 Mbps, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
60.73	48.43	59.92	48.25

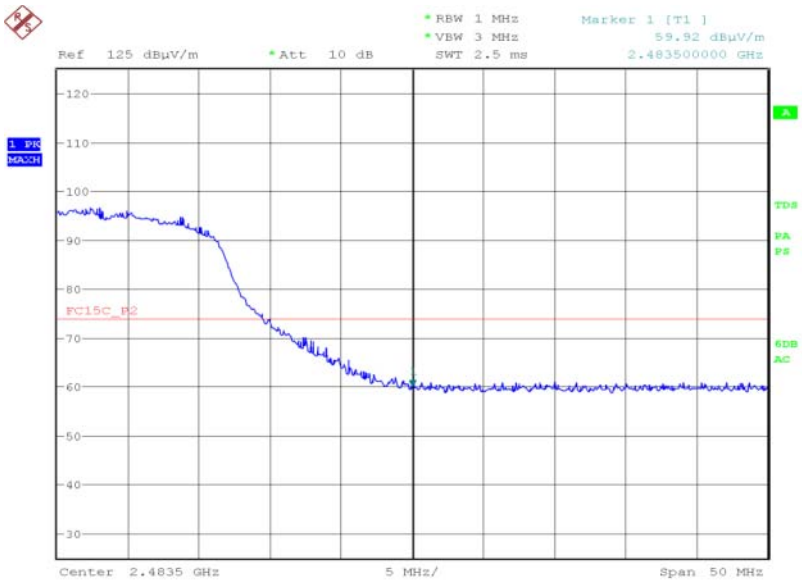
802.11g, 2412 MHz, Measured Frequency 2390 MHz, 12 Mbps, Final Peak, Restricted Band Edges Plot



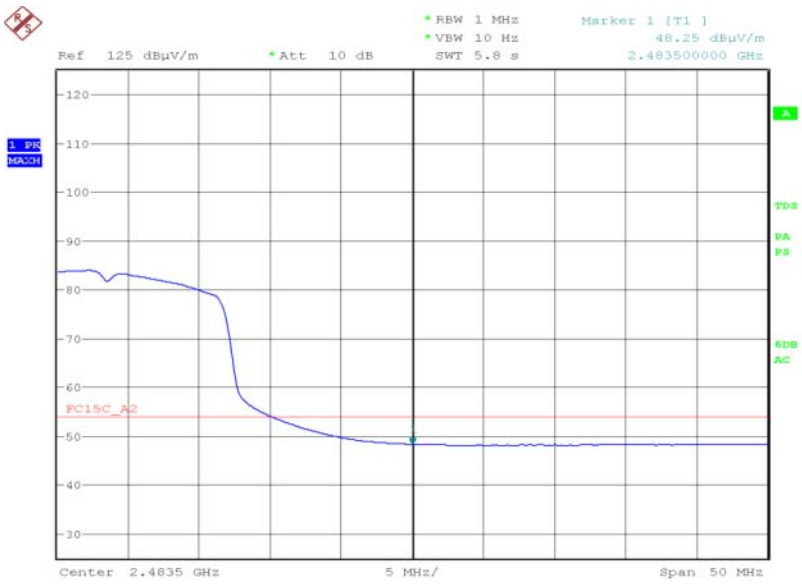
802.11g, 2412 MHz, Measured Frequency 2390 MHz, 12 Mbps, Final Average, Restricted Band Edges Plot



802.11g, 2462 MHz, Measured Frequency 2483.5 MHz, 12 Mbps, Final Peak, Restricted Band Edges Plot



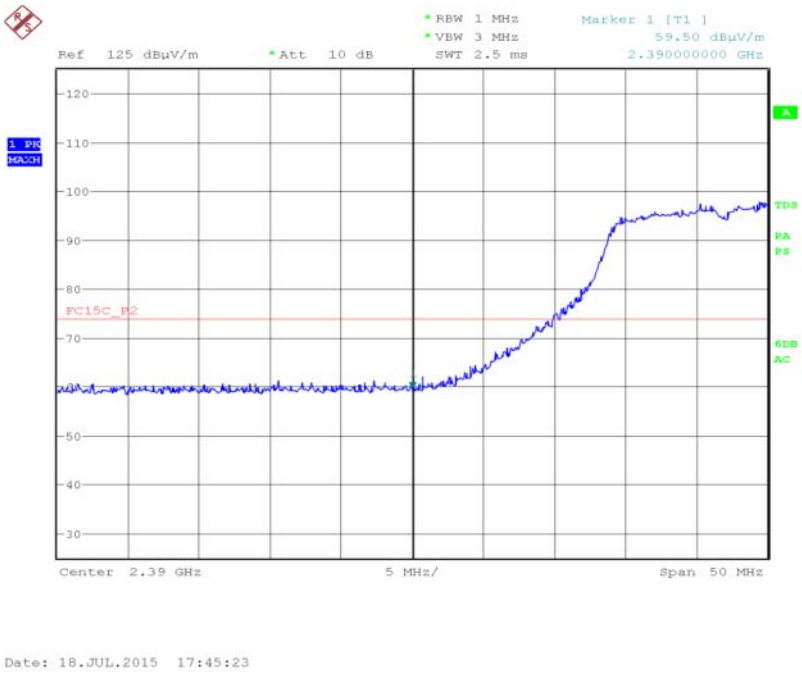
802.11g, 2462 MHz, Measured Frequency 2483.5 MHz, 12 Mbps, Final Average, Restricted Band Edges Plot



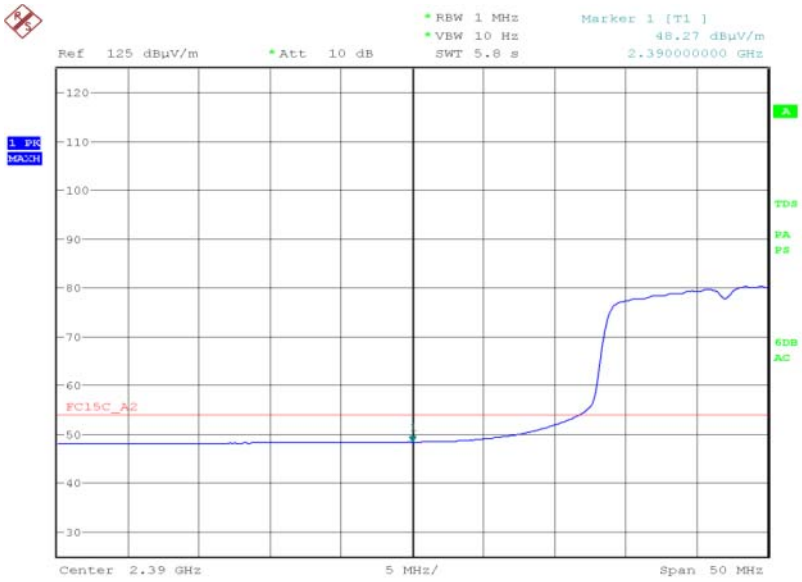
802.11g, 48 Mbps, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
59.50	48.27	59.81	48.10

802.11g, 2412 MHz, Measured Frequency 2390 MHz, 48 Mbps, Final Peak, Restricted Band Edges Plot

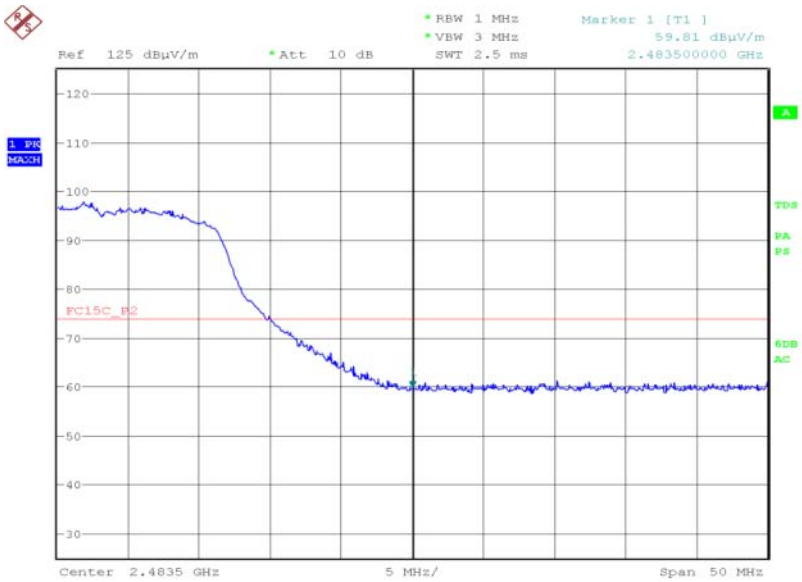


802.11g, 2412 MHz, Measured Frequency 2390 MHz, 48 Mbps, Final Average, Restricted Band Edges Plot



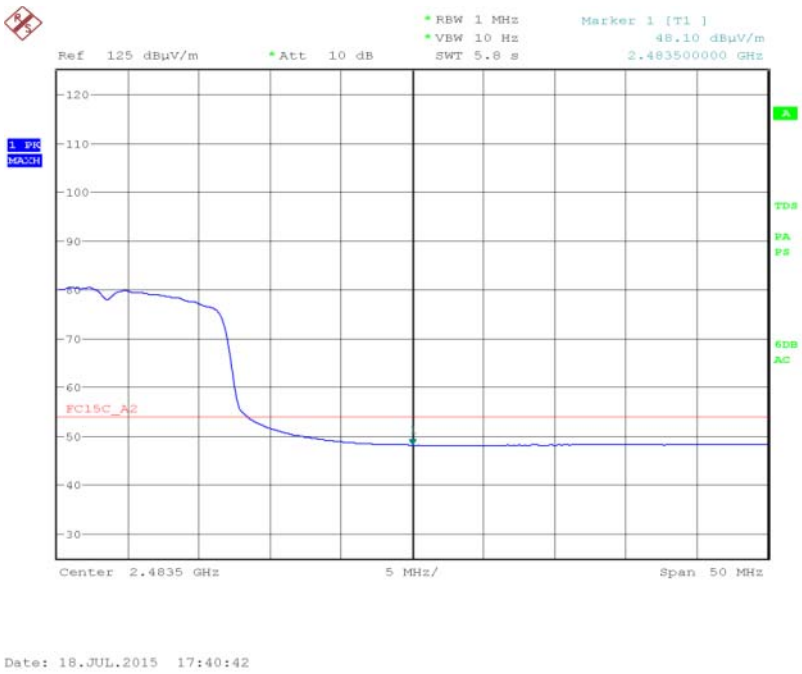
Date: 18.JUL.2015 17:33:31

802.11g, 2462 MHz, Measured Frequency 2483.5 MHz, 48 Mbps, Final Peak, Restricted Band Edges Plot



Date: 18.JUL.2015 17:39:33

802.11g, 2462 MHz, Measured Frequency 2483.5 MHz, 48 Mbps, Final Average, Restricted Band Edges Plot



Remark

The test was performed on 12 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 48 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

Industry Canada RSS-GEN, Limit Clause 8.10

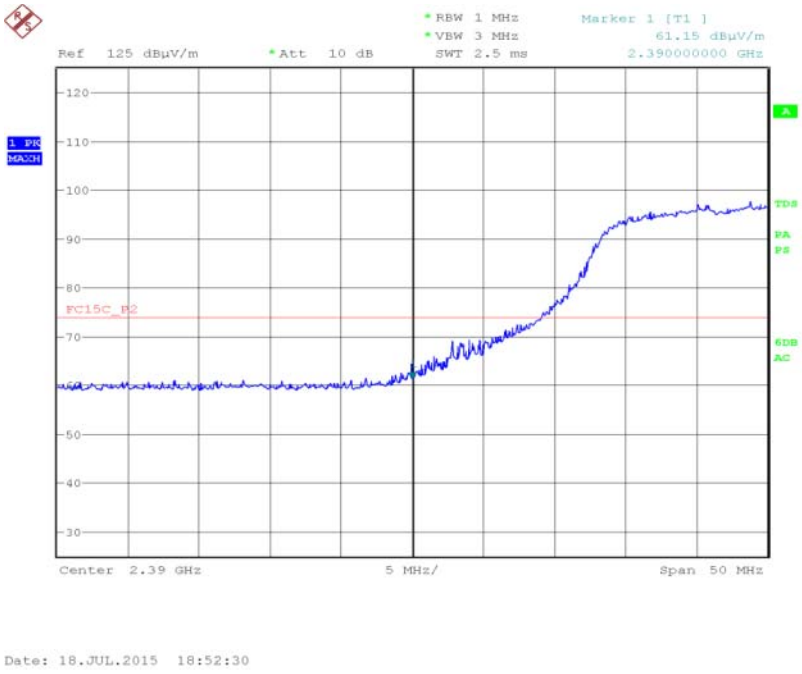
	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

110 V AC Supply

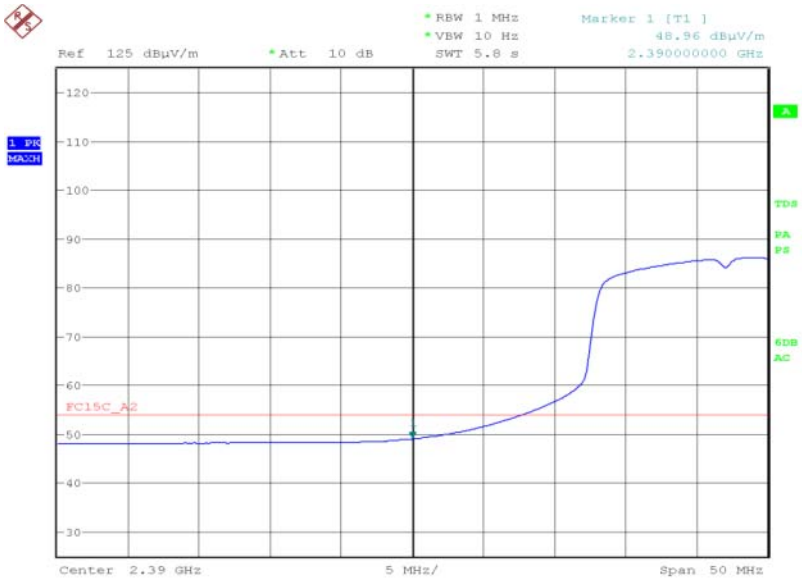
802.11n - 20 MHz Bandwidth, 6.5 Mbps, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
61.15	48.96	60.41	48.49

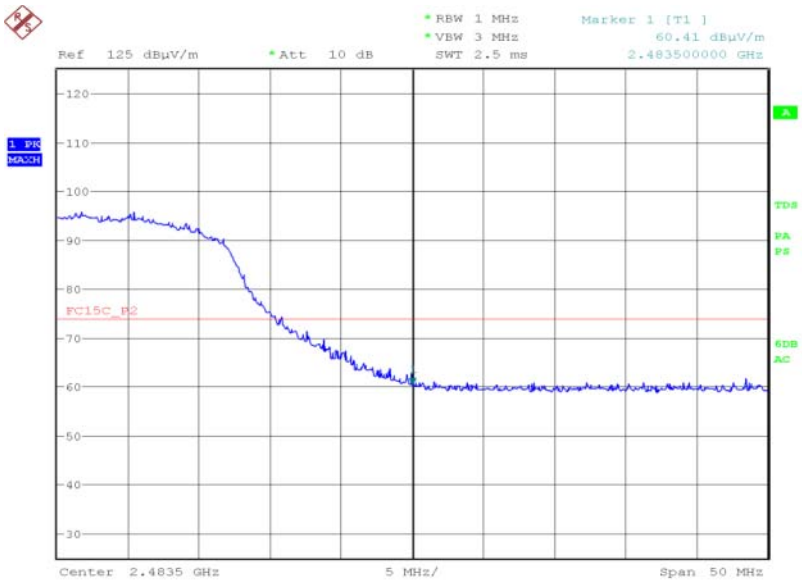
802.11n - 20 MHz Bandwidth, 2412 MHz, Measured Frequency 2390 MHz, 6.5 Mbps, Final Peak, Restricted Band Edges Plot



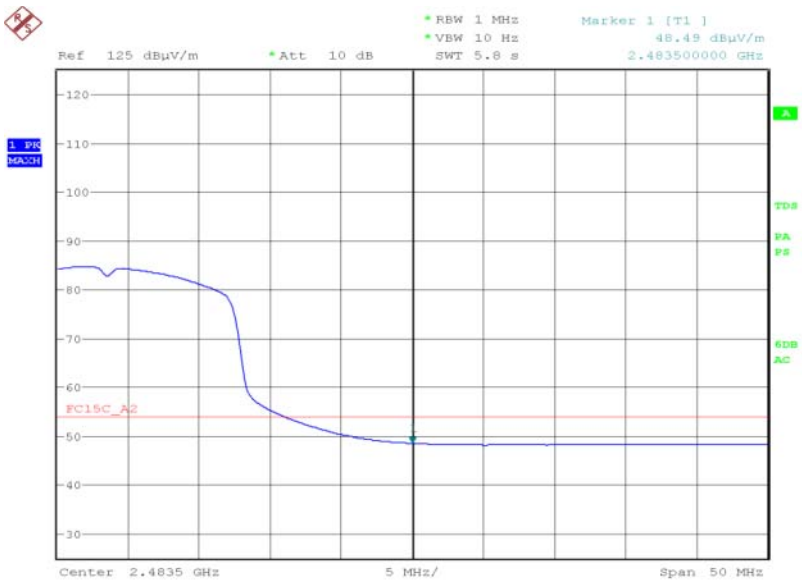
802.11n - 20 MHz Bandwidth, 2412 MHz, Measured Frequency 2390 MHz, 6.5 Mbps, Final Average, Restricted Band Edges Plot



802.11n - 20 MHz Bandwidth, 2462 MHz, Measured Frequency 2483.5 MHz, 6.5 Mbps, Final Peak, Restricted Band Edges Plot



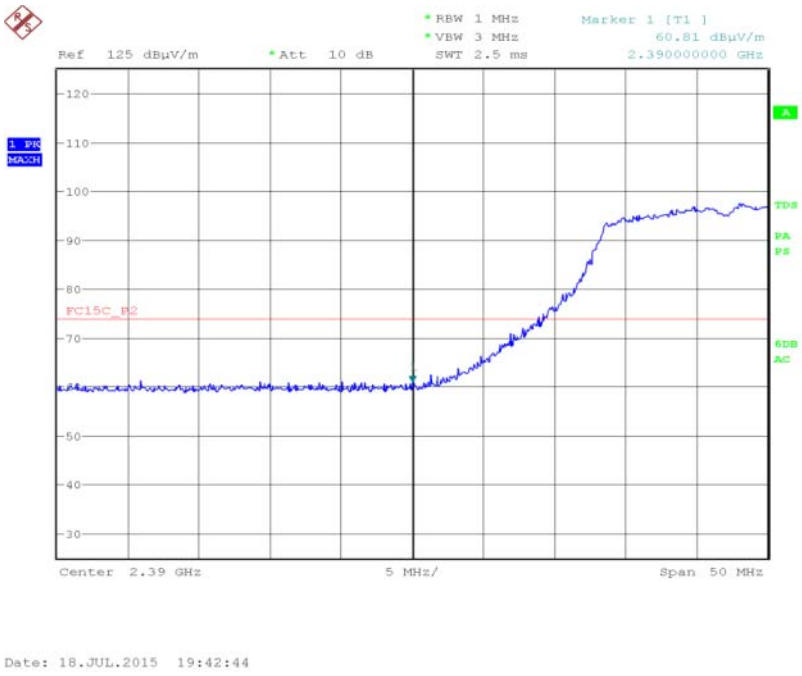
802.11n - 20 MHz Bandwidth, 2462 MHz, Measured Frequency 2483.5 MHz, 6.5 Mbps, Final Average, Restricted Band Edges Plot



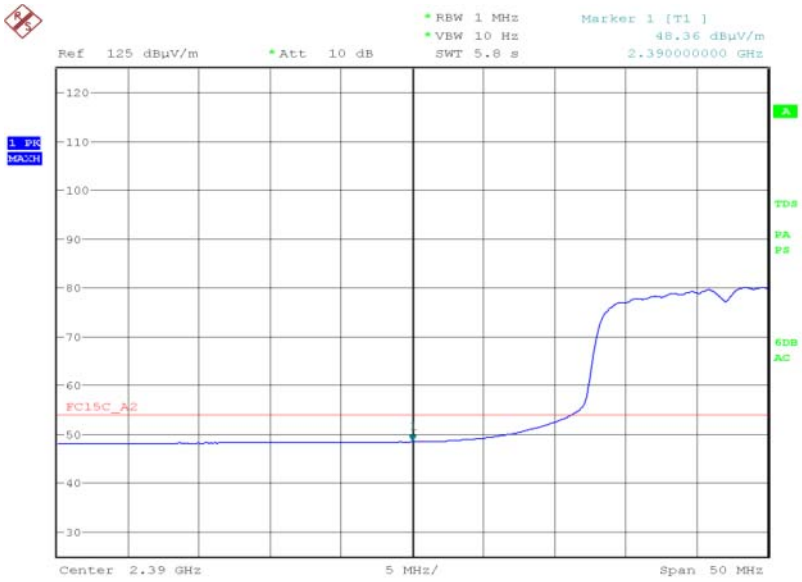
802.11n - 20 MHz Bandwidth, 52 Mbps, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
60.81	48.36	59.61	48.05

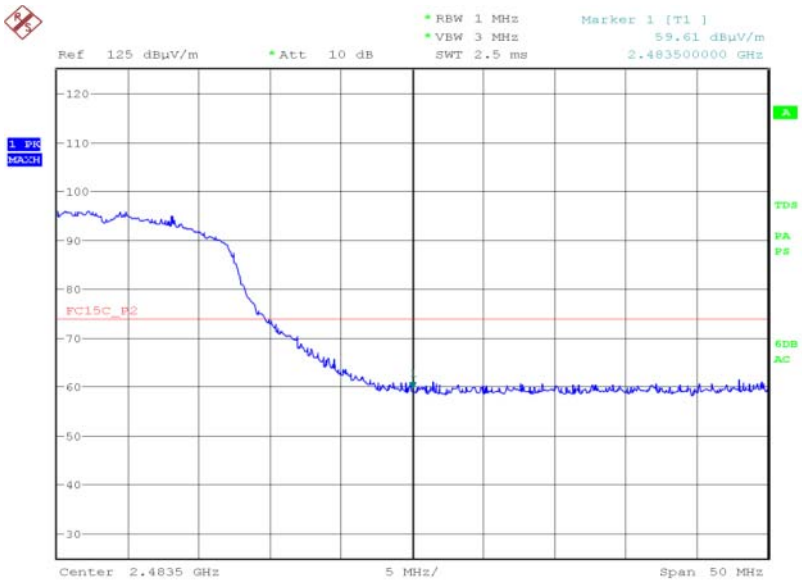
802.11n - 20 MHz Bandwidth, 2412 MHz, Measured Frequency 2390 MHz, 52 Mbps, Final Peak, Restricted Band Edges Plot



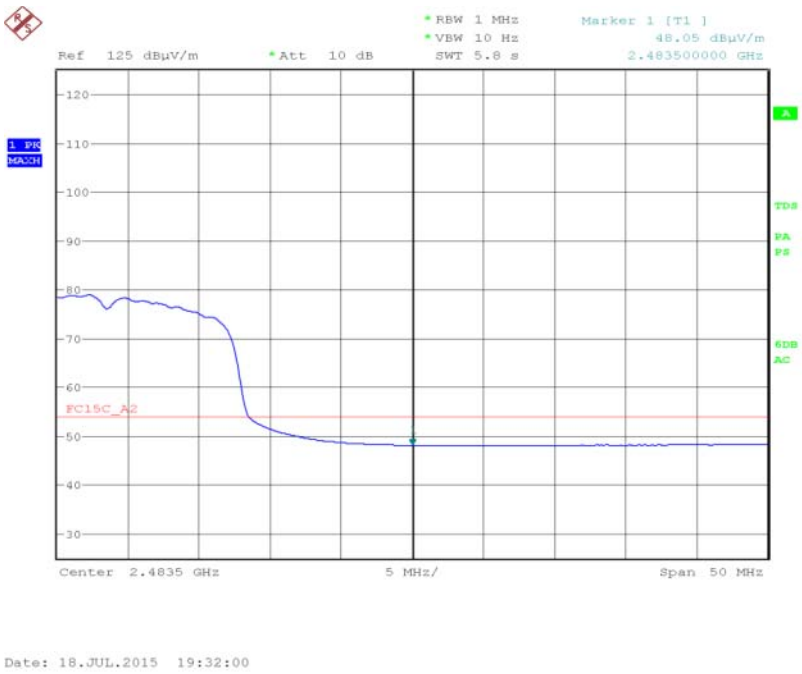
802.11n - 20 MHz Bandwidth, 2412 MHz, Measured Frequency 2390 MHz, 52 Mbps, Final Average, Restricted Band Edges Plot



802.11n - 20 MHz Bandwidth, 2462 MHz, Measured Frequency 2483.5 MHz, 52 Mbps, Final Peak, Restricted Band Edges Plot



802.11n - 20 MHz Bandwidth, 2462 MHz, Measured Frequency 2483.5 MHz, 52 Mbps, Final Average, Restricted Band Edges Plot



Remark

The test was performed on 6.5 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 52 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

Industry Canada RSS-GEN, Limit Clause 8.10

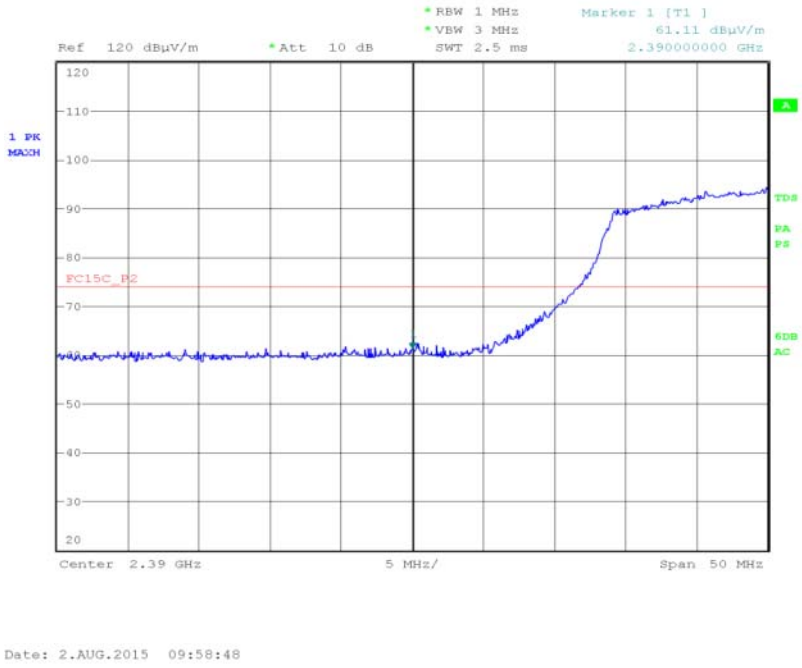
	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

110 V AC Supply

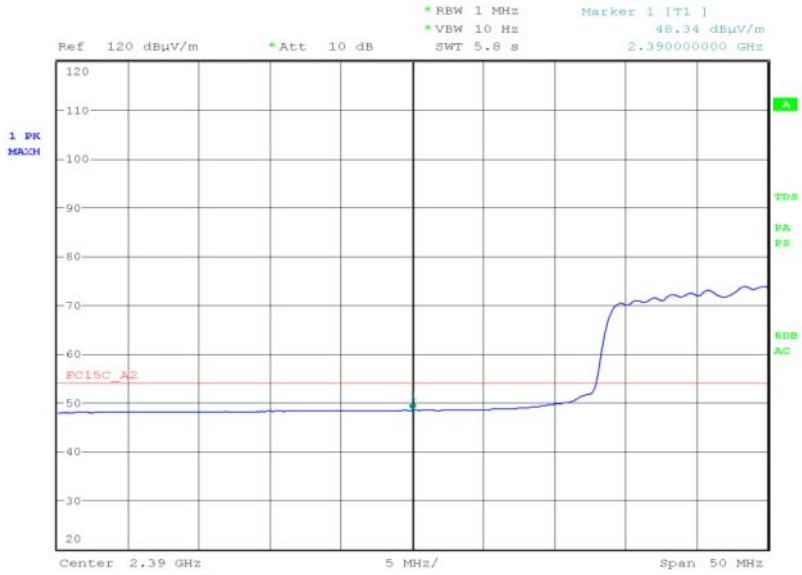
802.11n - 40 MHz Bandwidth, 65 Mbps, Restricted Band Edges Results

2422 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
61.11	48.34	68.89	49.56

802.11n - 40 MHz Bandwidth, 2422 MHz, Measured Frequency 2390 MHz, 65 Mbps, Final Peak, Restricted Band Edges Plot

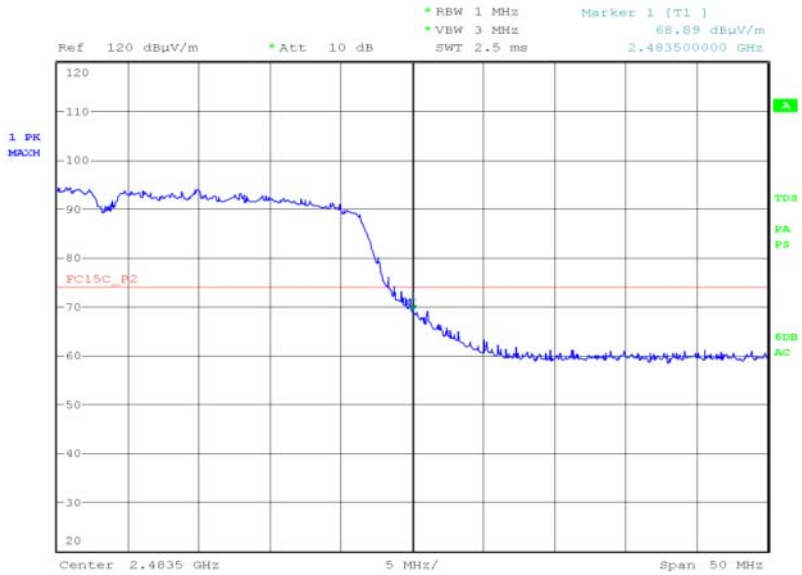


802.11n - 40 MHz Bandwidth, 2422 MHz, Measured Frequency 2390 MHz, 65 Mbps, Final Average, Restricted Band Edges Plot



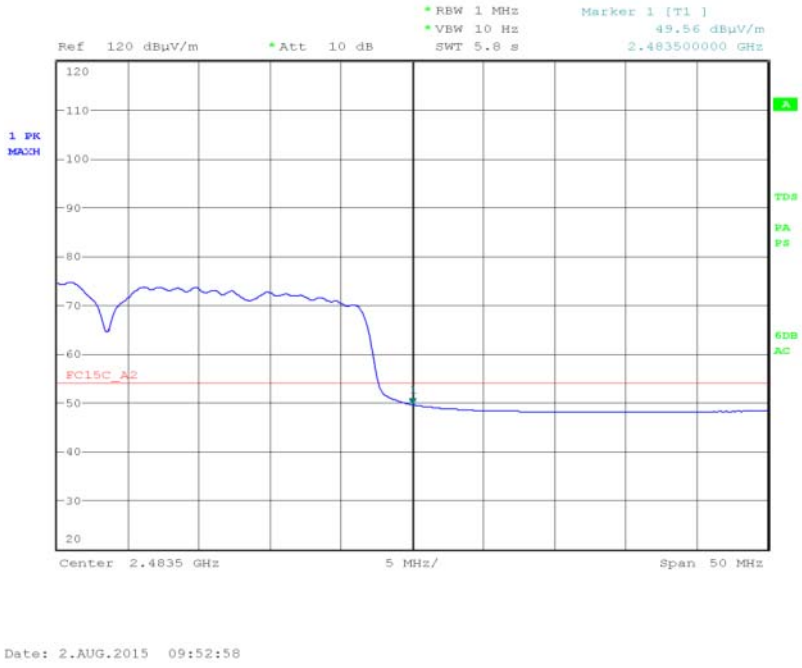
Date: 2.AUG.2015 09:59:50

802.11n - 40 MHz Bandwidth, 2462 MHz, Measured Frequency 2483.5 MHz, 65 Mbps, Final Peak, Restricted Band Edges Plot



Date: 2.AUG.2015 09:53:47

802.11n - 40 MHz Bandwidth, 2462 MHz, Measured Frequency 2483.5 MHz, 65 Mbps, Final Average, Restricted Band Edges Plot



Remark

The test was performed on 65 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 65 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

Industry Canada RSS-GEN, Limit Clause 8.10

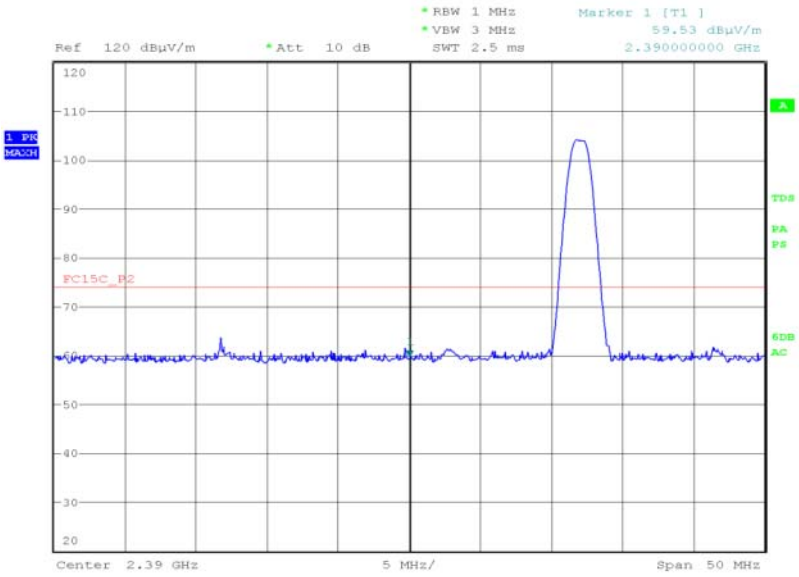
	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

110 V AC Supply

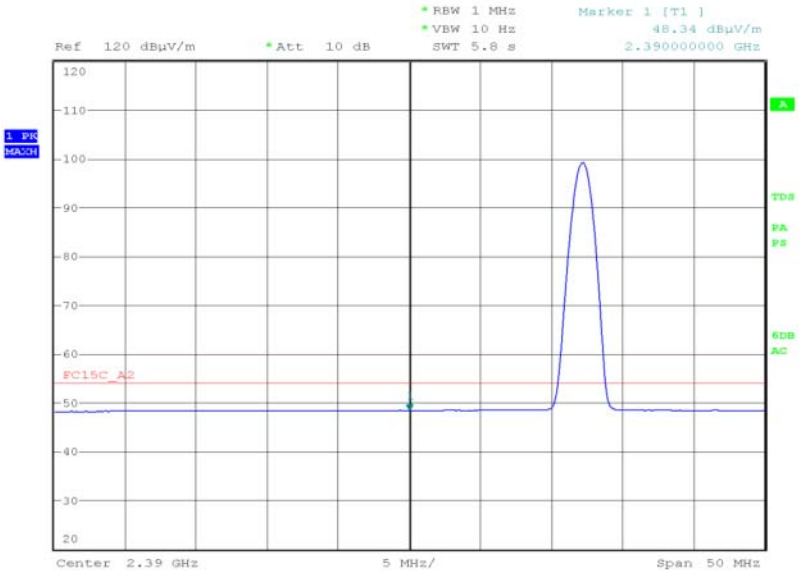
Bluetooth Low Energy, GFSK, Restricted Band Edges Results

2402 MHz		2480 MHz	
Measured Frequency 2390 MHz		Measured Frequency 2483.5 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
59.53	48.34	59.03	48.27

Bluetooth Low Energy, 2402 MHz, Measured Frequency 2390 MHz, GFSK, Final Peak, Restricted Band Edges Plot

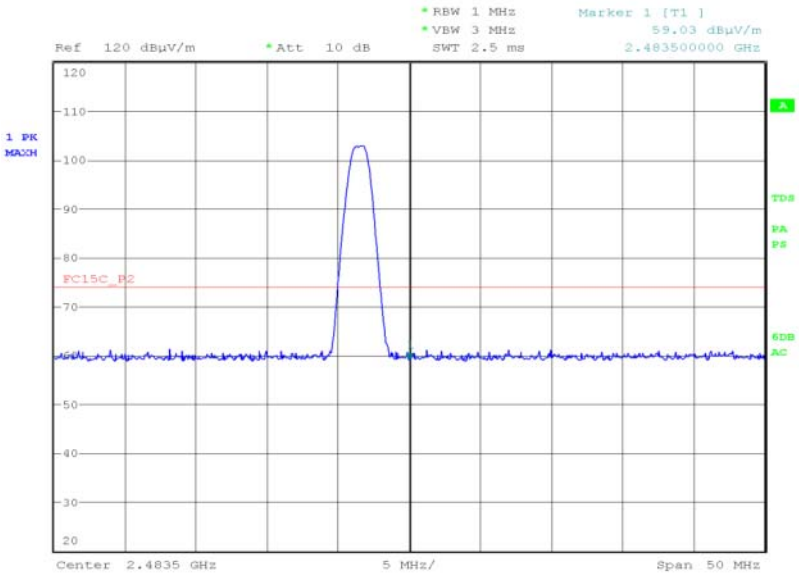


Bluetooth Low Energy, 2402 MHz, Measured Frequency 2390 MHz, GFSK, Final Average, Restricted Band Edges Plot



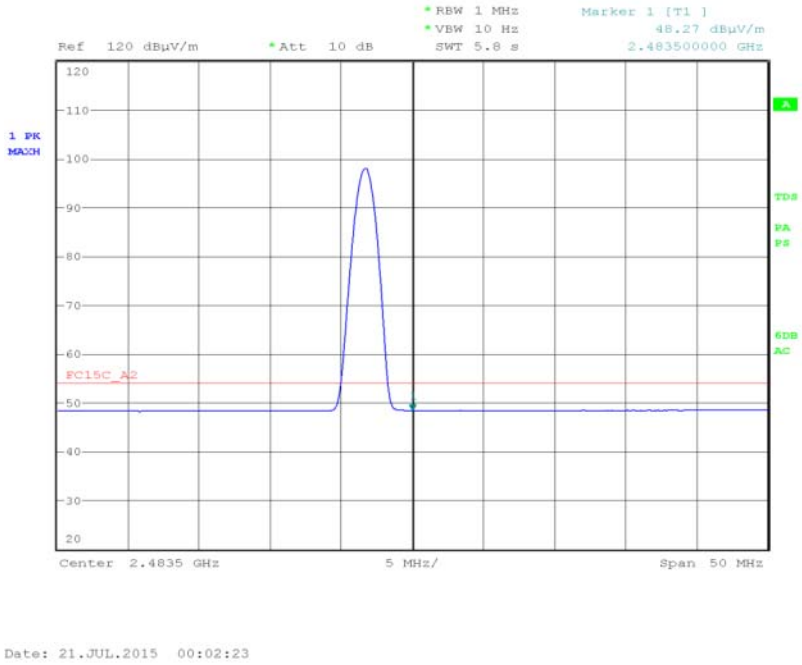
Date: 20.JUL.2015 23:37:24

Bluetooth Low Energy, 2480 MHz, Measured Frequency 2483.5 MHz, GFSK, Final Peak, Restricted Band Edges Plot



Date: 21.JUL.2015 00:01:44

Bluetooth Low Energy, 2480 MHz, Measured Frequency 2483.5 MHz, GFSK, Final Average, Restricted Band Edges Plot



FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

Industry Canada RSS-GEN, Limit Clause 8.10

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

2.7 AUTHORISED BAND EDGES

2.7.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d)
Industry Canada RSS-247, Clause 5.5

2.7.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #1 - Modification State 1

2.7.3 Date of Test

15 July 2015, 18 July 2015, 20 July 2015, 21 July 2015 & 2 August 2015

2.7.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.5 Test Procedure

The test was performed in accordance with KDB 558074 D01 V03r02, clause 11.0 and ANSI C63.10, clause 6.3, 6.5 and 6.6.

2.7.6 Environmental Conditions

Ambient Temperature	19.1 - 21.6°C
Relative Humidity	45.0 - 65.0%

Product Service

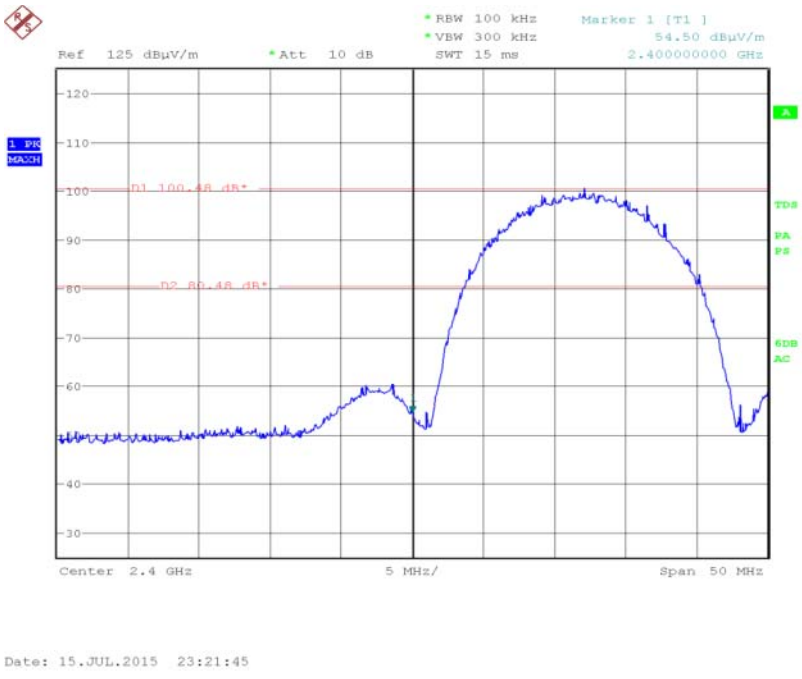
2.7.7 Test Results

110 V AC Supply

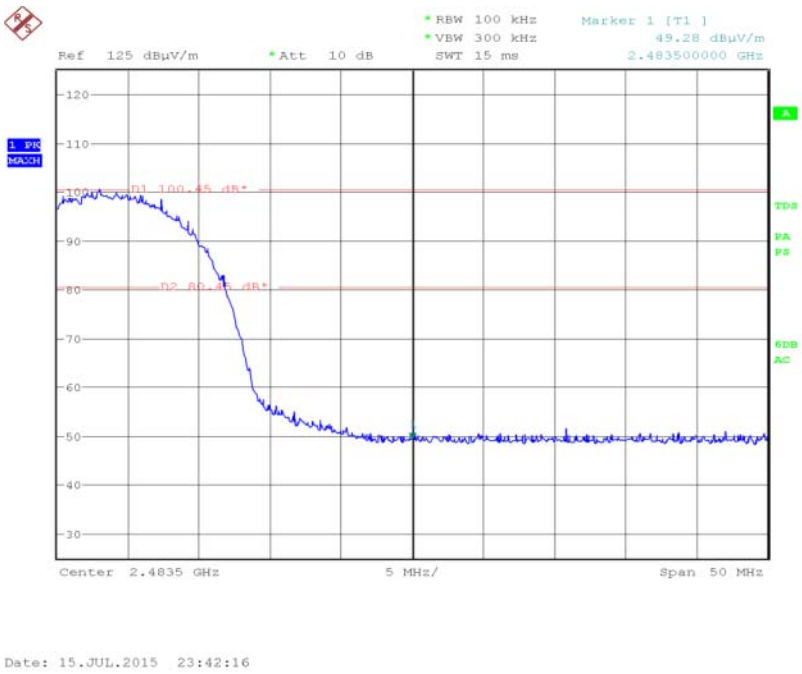
802.11b, 11 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
54.50	49.28

802.11b, 2412 MHz, Measured Frequency 2400.00 MHz, 11 Mbps, Final Peak, Authorised Band Edges Plot



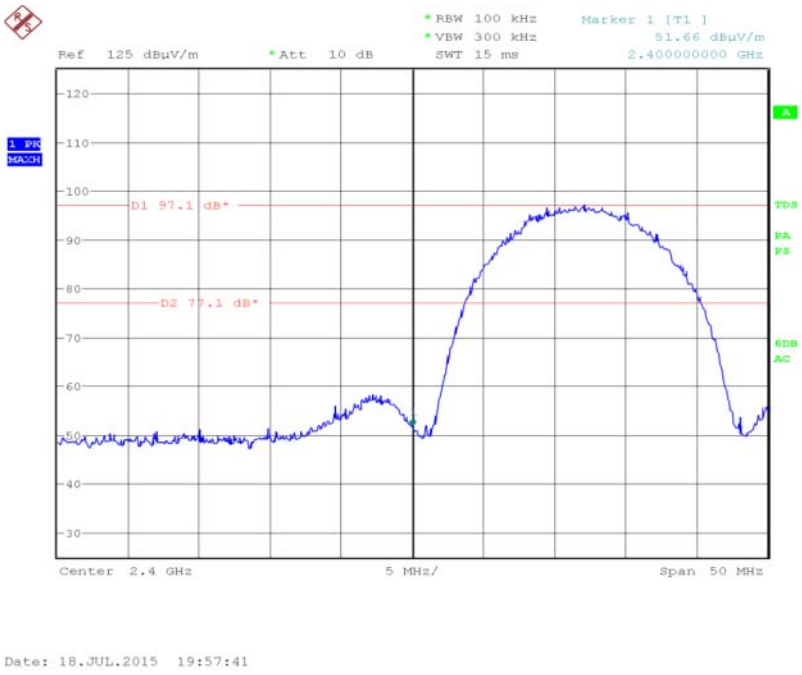
802.11b, 2462 MHz, Measured Frequency 2483.50 MHz, 11 Mbps, Final Peak, Authorised Band Edges Plot



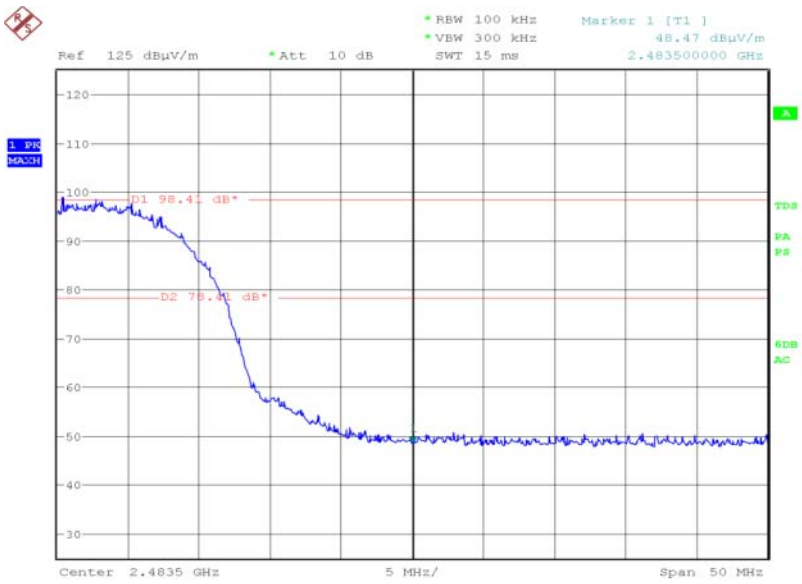
802.11b, 5.5 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
51.66	48.47

802.11b, 2412 MHz, Measured Frequency 2400.00 MHz, 5.5 Mbps, Final Peak, Authorised Band Edges Plot



802.11b, 2462 MHz, Measured Frequency 2483.50 MHz, 5.5 Mbps, Final Peak, Authorised Band Edges Plot



Remark

The test was performed on 11 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 5.5 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

Industry Canada RSS-247, Limit Clause 5.5

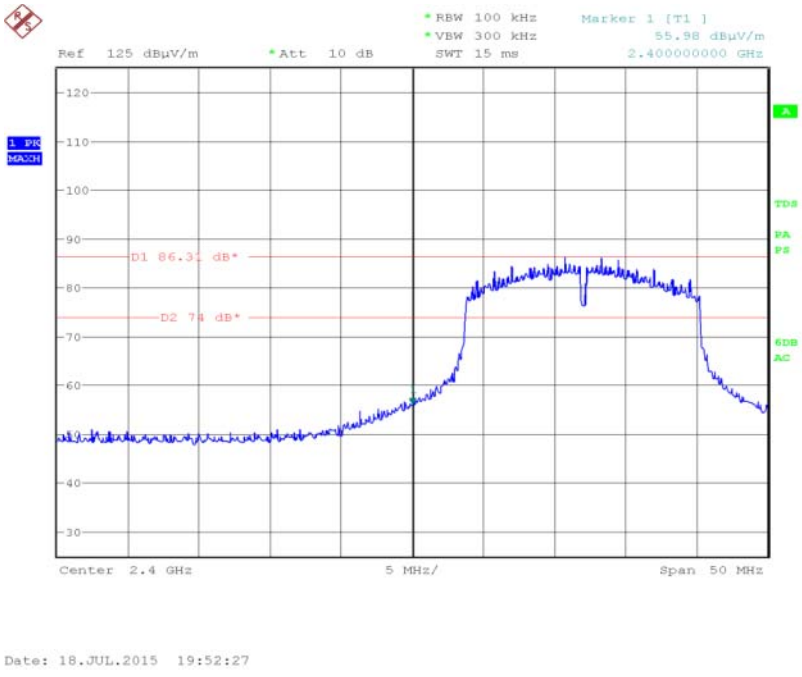
20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

110 V AC Supply

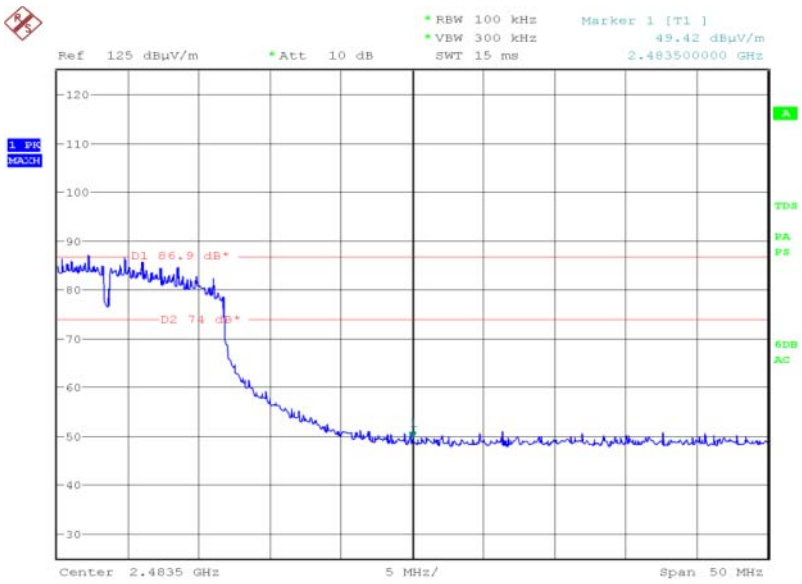
802.11g, 12 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
55.98	49.42

802.11g, 2412 MHz, Measured Frequency 2400.00 MHz, 12 Mbps, Final Peak, Authorised Band Edges Plot



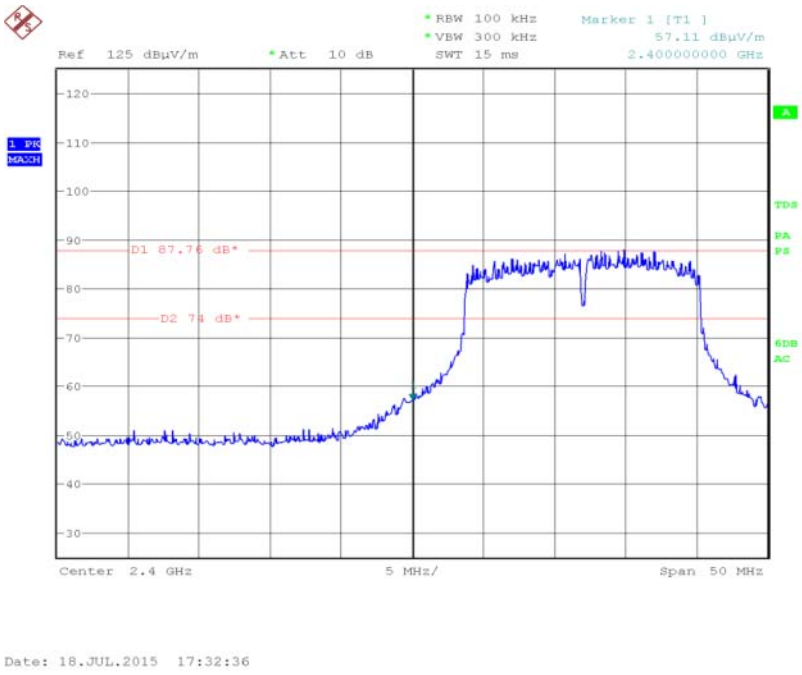
802.11g, 2462 MHz, Measured Frequency 2483.50 MHz, 12 Mbps, Final Peak, Authorised Band Edges Plot



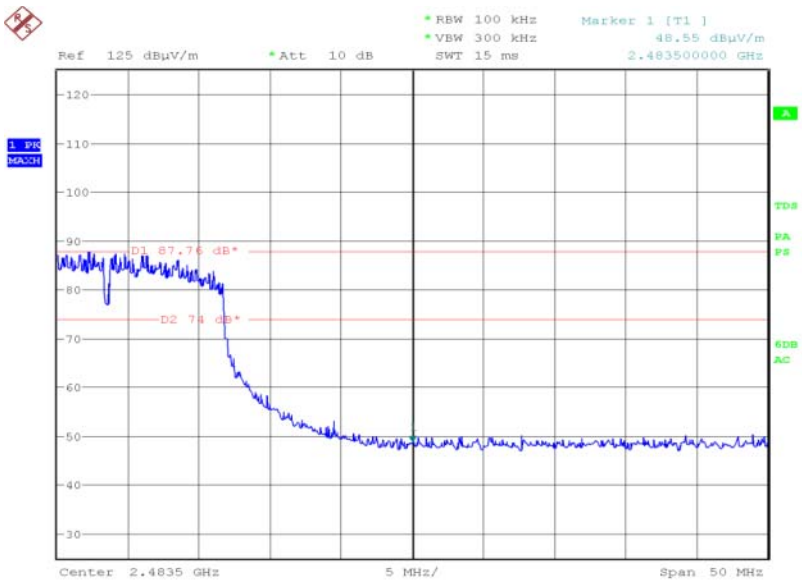
802.11g, 48 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
57.11	48.55

802.11g, 2412 MHz, Measured Frequency 2400.00 MHz, 48 Mbps, Final Peak, Authorised Band Edges Plot



802.11g, 2462 MHz, Measured Frequency 2483.50 MHz, 48 Mbps, Final Peak, Authorised Band Edges Plot



Remark

The test was performed on 12 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 48 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

Industry Canada RSS-247, Limit Clause 5.5

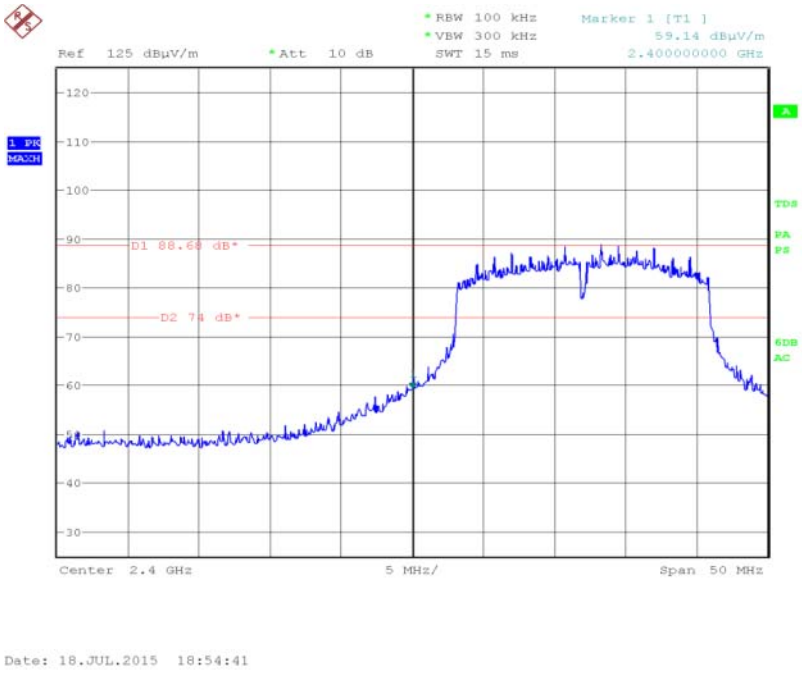
20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

110 V AC Supply

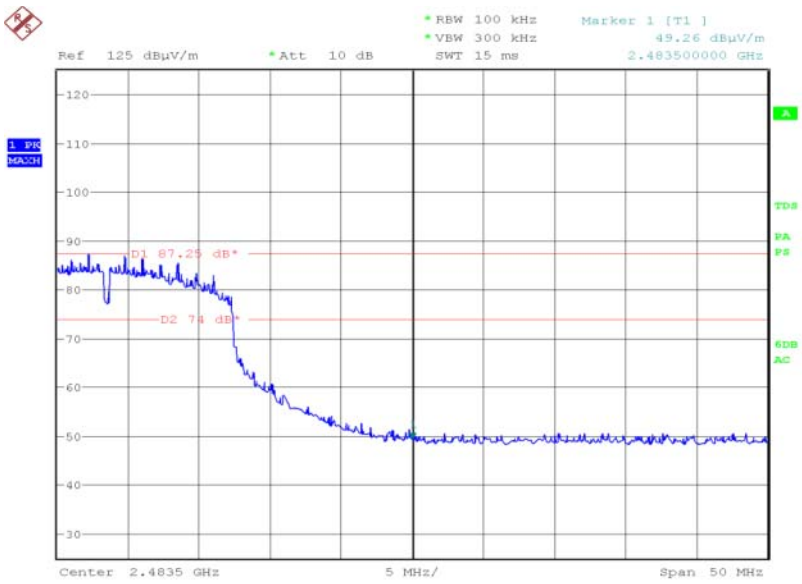
802.11n - 20 MHz Bandwidth, 6.5 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
59.14	49.26

802.11n - 20 MHz Bandwidth, 2412 MHz, Measured Frequency 2400.00 MHz, 6.5 Mbps, Final Peak, Authorised Band Edges Plot



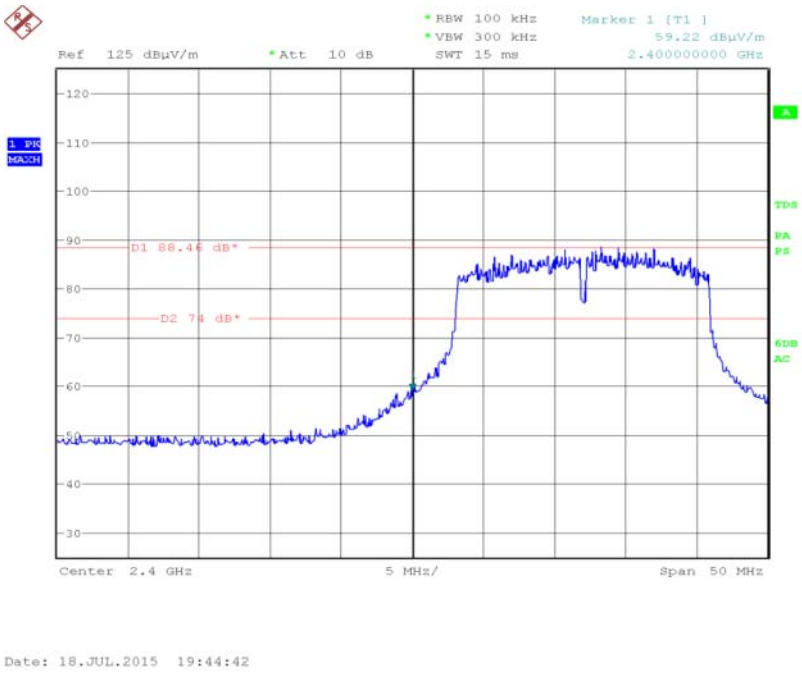
802.11n - 20 MHz Bandwidth, 2462 MHz, Measured Frequency 2483.50 MHz, 6.5 Mbps, Final Peak, Authorised Band Edges Plot



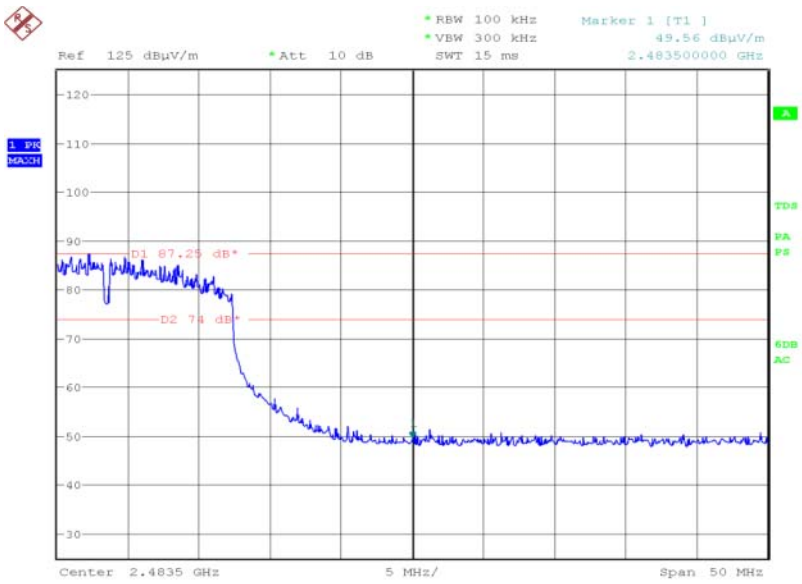
802.11n - 20 MHz Bandwidth, 52 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
59.22	49.56

802.11n - 20 MHz Bandwidth, 2412 MHz, Measured Frequency 2400.00 MHz, 52 Mbps, Final Peak, Authorised Band Edges Plot



802.11n - 20 MHz Bandwidth, 2462 MHz, Measured Frequency 2483.50 MHz, 52 Mbps, Final Peak, Authorised Band Edges Plot



Remark

The test was performed on 6.5 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 52 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

Industry Canada RSS-247, Limit Clause 5.5

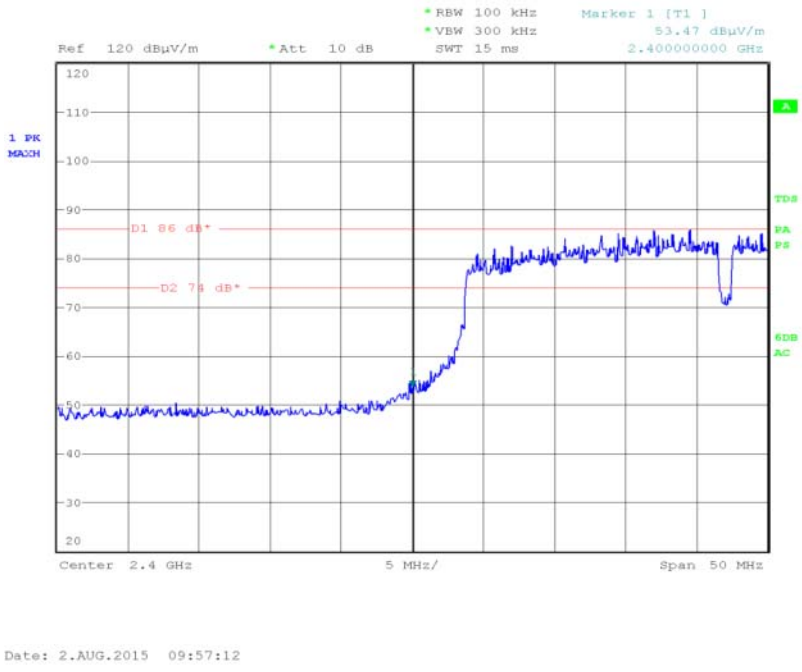
20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

110 V AC Supply

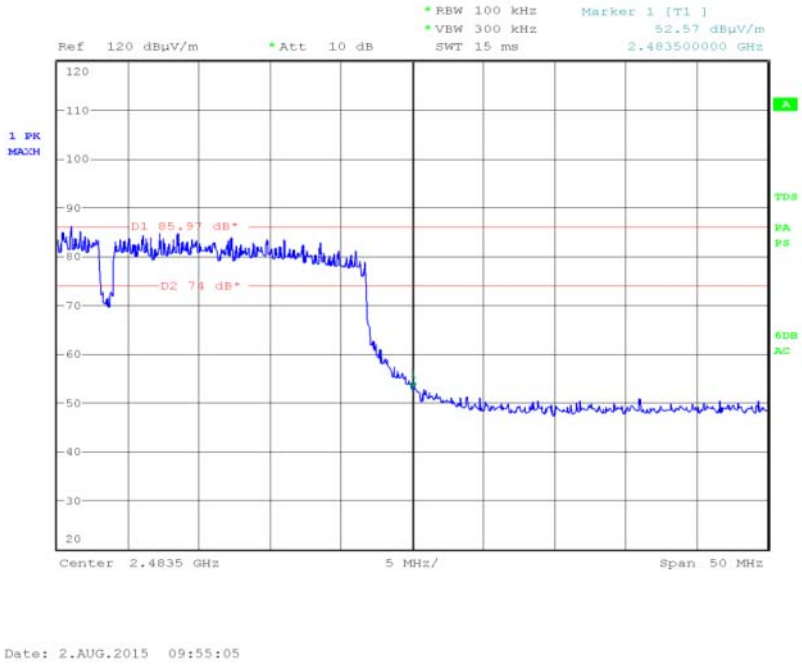
802.11n - 40 MHz Bandwidth, 65 Mbps, Authorised Band Edges Results

2422 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
53.47	52.57

802.11n - 40 MHz Bandwidth, 2422 MHz, Measured Frequency 2400.00 MHz, 65 Mbps, Final Peak, Authorised Band Edges Plot



802.11n - 40 MHz Bandwidth, 2462 MHz, Measured Frequency 2483.50 MHz, 65 Mbps, Final Peak, Authorised Band Edges Plot



Remark

The test was performed on 65 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 65 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

Industry Canada RSS-247, Limit Clause 5.5

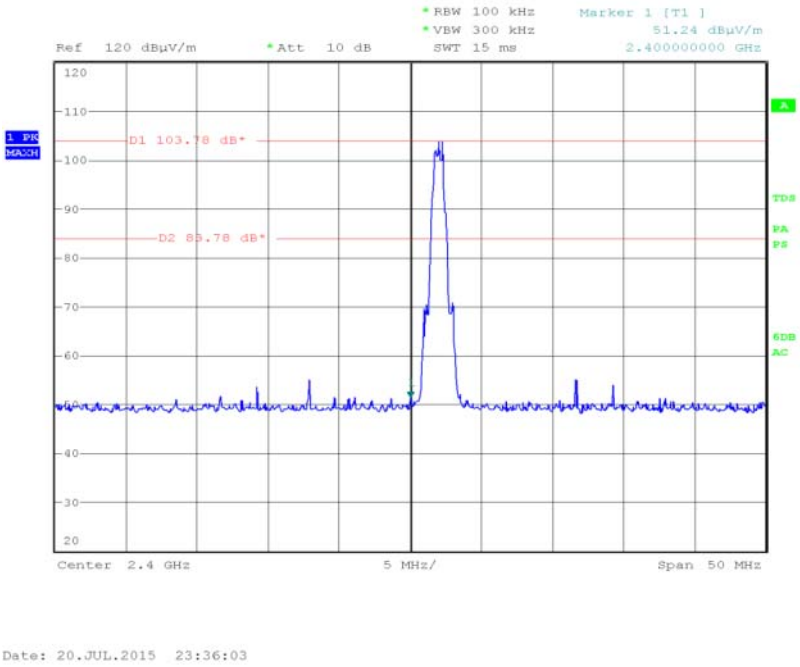
20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

110 V AC Supply

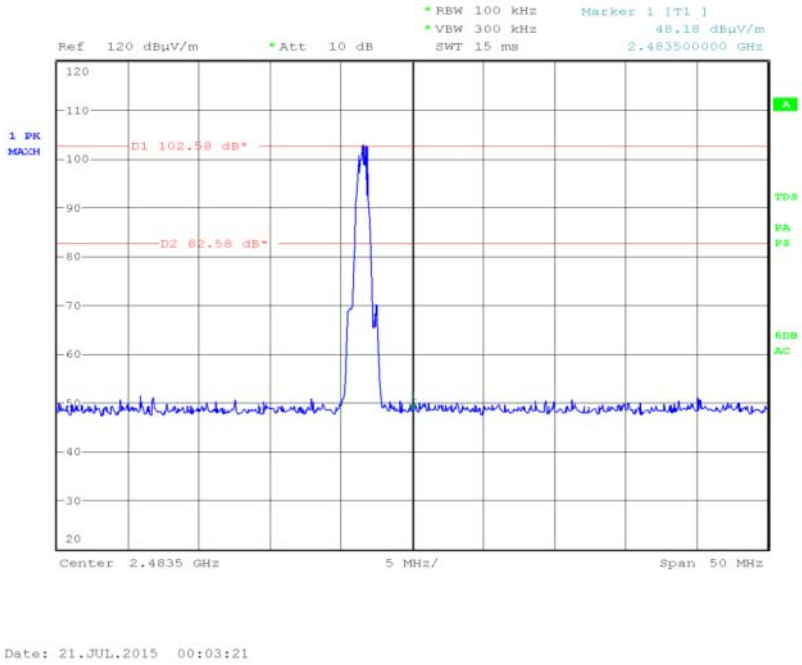
Bluetooth Low Energy, GFSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
51.24	48.18

Bluetooth Low Energy, 2402 MHz, Measured Frequency 2400.00 MHz, GFSK, Final Peak, Authorised Band Edges Plot



Bluetooth Low Energy, 2480 MHz, Measured Frequency 2483.50 MHz, GFSK, Final Peak, Authorised Band Edges Plot



FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

Industry Canada RSS-247, Limit Clause 5.5

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 - Power Spectral Density					
20dB Attenuator	Narda	4772-20	456	-	TU
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	28-Jul-2015
Mains Voltage Monitor	TUV SUD Product Service	MVM1	1378	12	1-Sep-2015
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Hygrometer	Rotronic	I-1000	3220	12	24-Jul-2015
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	3-Sep-2015
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	24-Sep-2015
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	28-Jul-2015
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	16-Feb-2016
2 metre SMA Cable	Florida Labs	SMS-235SP-78.8-SMS	4518	12	29-Jan-2016
Section 2.2 – 6 dB Bandwidth					
20dB Attenuator	Narda	4772-20	456	-	TU
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	28-Jul-2015
Mains Voltage Monitor	TUV SUD Product Service	MVM1	1378	12	1-Sep-2015
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Hygrometer	Rotronic	I-1000	3220	12	24-Jul-2015
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	28-Jul-2015
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	16-Feb-2016
2 metre SMA Cable	Florida Labs	SMS-235SP-78.8-SMS	4518	12	29-Jan-2016
Section 2.3 - Maximum Conducted Output Power					
20dB Attenuator	Narda	4772-20	456	-	TU
Mains Voltage Monitor	TUV SUD Product Service	MVM1	1378	12	1-Sep-2015
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Hygrometer	Rotronic	I-1000	3220	12	24-Jul-2015
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	3-Sep-2015
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	24-Sep-2015
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	16-Feb-2016
2 metre SMA Cable	Florida Labs	SMS-235SP-78.8-SMS	4518	12	29-Jan-2016

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.4 - Peak EIRP					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2016
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	22	28-Nov-2015
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	30-Oct-2015
Screened Room (5)	Rainford	Rainford	1545	0	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM101	2417	12	26-Sep-2015
Hygromer	Rotronic	A1	2677	12	11-Jun-2016
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	18-Sep-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
P-Series Power Meter	Agilent Technologies	N1911A	3980	12	22-Sep-2015
50 MHz-18 GHz Wideband Power Sensor	Agilent Technologies	N1921A	3982	12	22-Sep-2015
2 metre SMA Cable	IW Microwave	3PS-1806LC-788-3PS	4525	12	29-Jan-2016
2m K-Type Cable (Rx)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU
Section 2.5 - Spurious Radiated Emissions					
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	26-Nov-2015
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2016
Antenna (Bilog)	Schaffner	CBL6143	287	24	3-Feb-2016
Pre-Amplifier	Phase One	PSO4-0087	1534	12	23-Dec-2015
Screened Room (5)	Rainford	Rainford	1545	0	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM101	2424	12	26-Sep-2015
Hygromer	Rotronic	A1	2677	12	11-Jun-2016
Filter (Hi Pass)	Lorch	9HP7-7000-SR	2833	12	5-Feb-2016
Comb Generator	Schaffner	RSG1000	3034	-	TU
Amplifier (8 - 18GHz)	Phase One	PS06-0061	3176	12	11-Aug-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4105	12	7-Nov-2015
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4106	12	7-Nov-2015
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	1-Oct-2015
Hygropalm Temperature and Humidity Meter	Rotronic	HP21	4410	12	15-Apr-2016
Suspended Substrate Highpass Filter	Advance Power Components	11SH10-3000/X18000-O/O	4411	12	24-Mar-2016
2m K-Type Cable (Rx)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU
0.5m SMA Cable (Rx)	Scott Cables	SLSLL18-SMSM-00.50M	4528	6	29-Jul-2015

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.6 - Restricted Band Edges					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2016
Screened Room (5)	Rainford	Rainford	1545	0	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM101	2424	12	26-Sep-2015
Hygromer	Rotronic	A1	2677	12	11-Jun-2016
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Hygropalm Temperature and Humidity Meter	Rotronic	HP21	4410	12	15-Apr-2016
2m K-Type Cable (Rx)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU
Section 2.7 - Authorised Band Edges					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2016
Screened Room (5)	Rainford	Rainford	1545	0	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM101	2424	12	26-Sep-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Hygropalm Temperature and Humidity Meter	Rotronic	HP21	4410	12	15-Apr-2016
2m K-Type Cable (Rx)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU

TU – Traceability Unscheduled

Product Service

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	MU
6 dB Bandwidth	± 212.114 kHz
Maximum Conducted Output Power	± 0.70 dB
Power Spectral Density	± 3.0 dB
Peak EIRP	± 6.3 dB
Authorised Band Edges	± 6.3 dB
Restricted Band Edges	± 6.3 dB
Spurious Radiated Emissions	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 40 GHz: ± 6.3 dB

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).