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Report On

FCC Testing of the Sharp Quad-band LTE (B1/ B3/ B17/ B26), Dual-band WCDMA (FDD I / V) , Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS in accordance with FCC 47 CFR Part 15C (WLAN and Bluetooth Low Energy)

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FCC ID: APYHRO00235

Document 75933620 Report 15 Issue 1

May 2016



Product Service

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COMMERCIAL-IN-CONFIDENCE

REPORT ON

FCC Testing of the Sharp Quad-band LTE (B1/ B3/ B17/ B26), Dual-band WCDMA (FDD I / V) , Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS in accordance with FCC 47 CFR Part 15C (WLAN and Bluetooth Low Energy)

Document 75933620 Report 15 Issue 1

May 2016

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DATED

16 May 2016

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. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

M Choudhury

M Toubella



G Lawler

T Guy

M Russell



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SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp Quad-band LTE (B1/ B3/ B17/ B26), Dual-band WCDMA (FDD I / V) , Quad-band GSM
(850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN,
SRD(NFC,FeliCa) and GPS
In accordance with FCC 47 CFR Part 15C (WLAN and Bluetooth Low Energy)



Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC Testing of the Sharp Quad-band LTE (B1/ B3/ B17/ B26), Dual-band WCDMA (FDD I / V) , Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS to the requirements of FCC 47 CFR Part 15C.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Sharp Corporation
Serial Number(s)	IMEI 004401115744522 IMEI 004401115744035
Number of Samples Tested	2
Test Specification/Issue/Date	FCC 47 CFR Part 15C (2015)
Disposal Reference Number	Held Pending Disposal
Date	Not Applicable
Order Number	10792
Date	16 March 2016
Start of Test	18 April 2016
Finish of Test	3 May 2016
Name of Engineer(s)	M Choudhury M Toubella G Lawler T Guy M Russell
Related Document(s)	ANSI C63.10: 2013



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C (WLAN and Bluetooth Low Energy) is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
802.11b				
2.1	15.207	AC Line Conducted Emissions	Pass	
2.2	15.247 (a)(2)	6 dB Bandwidth	Pass	
2.3	15.247 (b)(3)	Maximum Conducted Output Power	Pass	
2.4	15.247 (d), 15.205 and 15.209	Spurious Radiated Emissions	Pass	
2.5	15.205	Restricted Band Edges	Pass	
2.6	15.247 (d)	Authorised Band Edges	Pass	
2.7	15.247 (e)	Power Spectral Density	Pass	
802.11g				
2.2	15.247 (a)(2)	6 dB Bandwidth	Pass	
2.3	15.247 (b)(3)	Maximum Conducted Output Power	Pass	
2.4	15.247 (d), 15.205 and 15.209	Spurious Radiated Emissions	Pass	
2.5	15.205	Restricted Band Edges	Pass	
2.6	15.247 (d)	Authorised Band Edges	Pass	
2.7	15.247 (e)	Power Spectral Density	Pass	



Section	Specification Clause	Test Description	Result	Comments/Base Standard
802.11n				
2.2	15.247 (a)(2)	6 dB Bandwidth	Pass	
2.3	15.247 (b)(3)	Maximum Conducted Output Power	Pass	
2.4	15.247 (d), 15.205 and 15.209	Spurious Radiated Emissions	Pass	
2.5	15.205	Restricted Band Edges	Pass	
2.6	15.247 (d)	Authorised Band Edges	Pass	
2.7	15.247 (e)	Power Spectral Density	Pass	
Bluetooth Low Energy				
2.2	15.247 (a)(2)	6 dB Bandwidth	Pass	
2.3	15.247 (b)(3)	Maximum Conducted Output Power	Pass	
2.4	15.247 (d), 15.205 and 15.209	Spurious Radiated Emissions	Pass	
2.5	15.205	Restricted Band Edges	Pass	
2.6	15.247 (d)	Authorised Band Edges	Pass	
2.7	15.247 (e)	Power Spectral Density	Pass	



Product Service

1.3 PRODUCT TECHNICAL DESCRIPTION

Refer to Model Description APYHRO00235 Rev 4.0 document.

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp Quad-band LTE (B1/ B3/ B17/ B26), Dual-band WCDMA (FDD I / V) , Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS. 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 a 4.0 V DC supply.

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

1.6 DEVIATIONS FROM THE STANDARD

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

1.7 MODIFICATION RECORD

Modification 0 - No modifications were made to the test sample during testing.



Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
Sharp Quad-band LTE (B1/ B3/ B17/ B26), Dual-band WCDMA (FDD I / V) , Quad-band GSM
(850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN,
SRD(NFC,FeliCa) and GPS
In accordance with FCC 47 CFR Part 15C (WLAN and Bluetooth Low Energy)



Product Service

2.1 AC LINE CONDUCTED EMISSIONS

2.1.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.207

2.1.2 Equipment Under Test and Modification State

S/N: IMEI 004401115744035 - Modification State 0

2.1.3 Date of Test

3 May 2016

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 ANSI C63.10, Clause 6.2.

Remarks

A mains supply cable of 1 m length was used to supply mains power to the EUT from the LISN.

All final measurements were assessed against the Class B emission limits in FCC 47 CFR Part 15, Clause 15.107.

2.1.6 Environmental Conditions

Ambient Temperature	18.2°C
Relative Humidity	33.0%



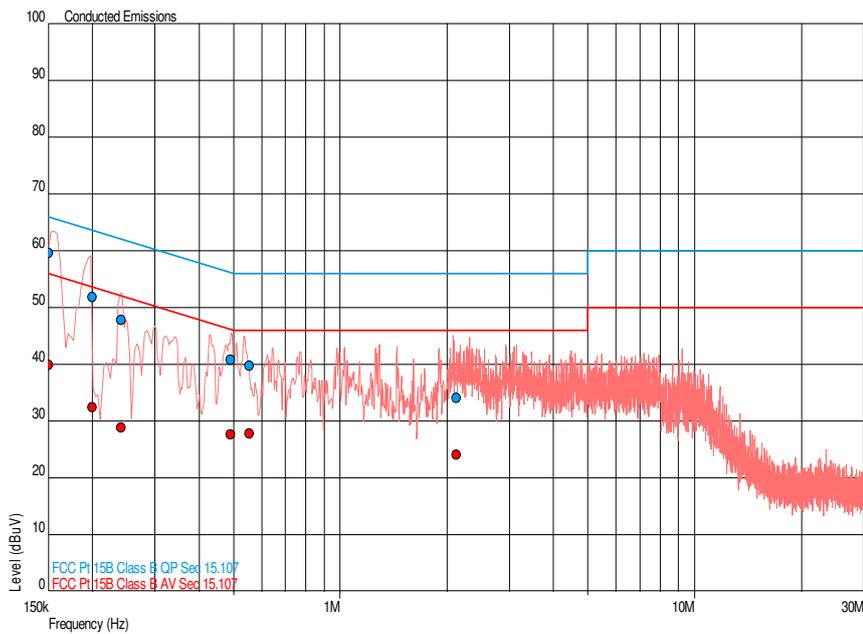
Product Service

2.1.7 Test Results

802.11b, Live Line, AC Line Conducted Emissions Result

Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.150	59.6	66.0	-6.4	39.9	56.0	-16.1
0.200	51.9	63.6	-11.8	32.5	53.6	-21.1
0.242	47.9	62.0	-14.2	29.0	52.0	-23.1
0.490	40.9	56.2	-15.3	27.6	46.2	-18.6
0.553	39.8	56.0	-16.2	27.8	46.0	-18.2
2.125	34.2	56.0	-21.8	24.1	46.0	-21.9

802.11b, Live Line, AC Line Conducted Emissions Plot

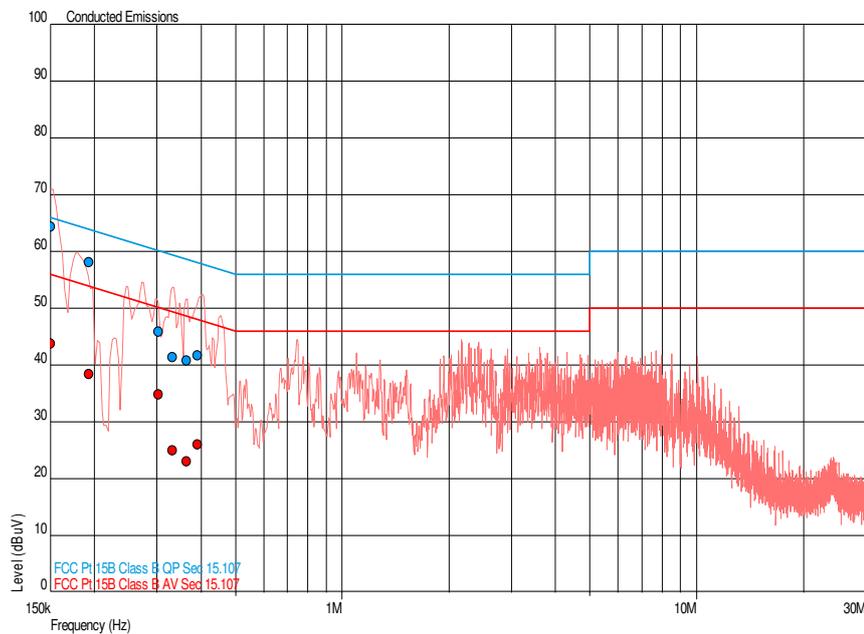




802.11b, Neutral Line, AC Line Conducted Emissions Result

Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.150	64.3	66.0	-1.7	43.8	56.0	-12.2
0.193	58.2	63.9	-5.7	38.4	53.9	-15.5
0.302	45.9	60.2	-14.3	34.9	50.2	-15.3
0.332	41.5	59.4	-18.0	25.0	49.4	-24.4
0.364	40.7	58.6	-17.9	23.0	48.6	-25.6
0.391	41.7	58.0	-16.4	26.0	48.0	-22.0

802.11b, Neutral Line, AC Line Conducted Emissions Plot



FCC 47 CFR Part 15, Limit Clause 15.207

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

*Decreases with the logarithm of the frequency.



Product Service

2.2 6 dB BANDWIDTH

2.2.1 Specification Reference

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

2.2.2 Equipment Under Test and Modification State

S/N: IMEI 004401115744522 - Modification State 0

2.2.3 Date of Test

26 April 2016 & 27 April 2016

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 8.1.

Remarks

Preliminary checks were performed to determine the data rate with the widest bandwidth.

2.2.6 Environmental Conditions

Ambient Temperature	21.9 - 23.6°C
Relative Humidity	19.4 - 25.0%



Product Service

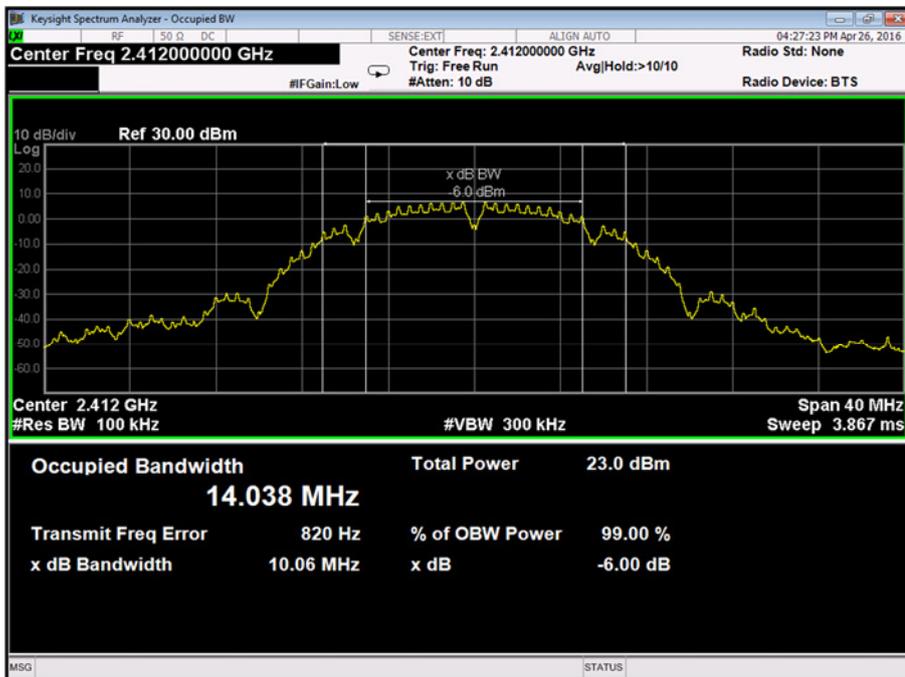
2.2.7 Test Results

4.0 V DC Supply

802.11b, DSSS, 1 Mbps, 6 dB Bandwidth Results

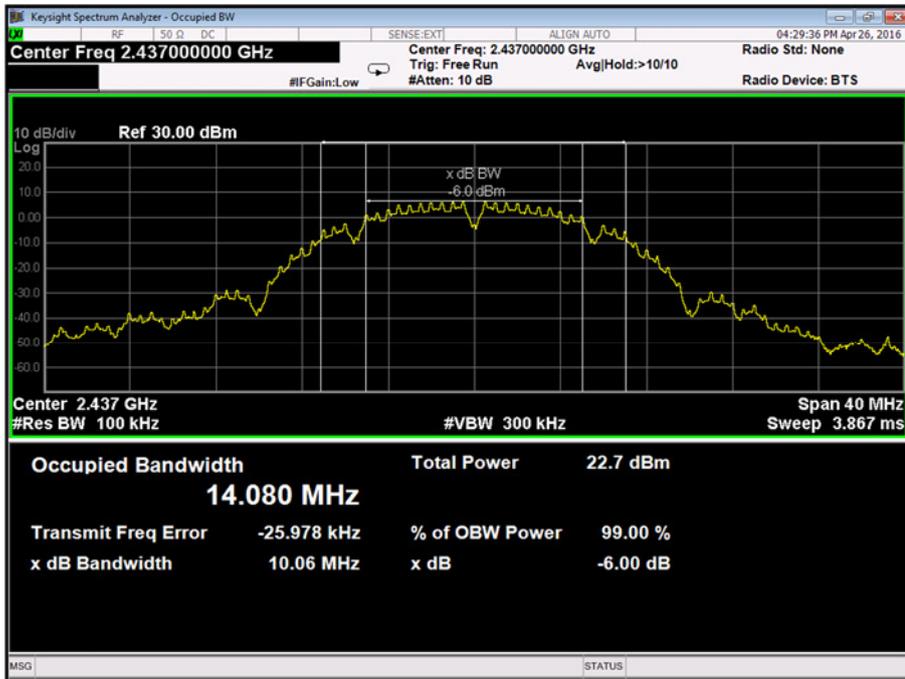
2412 MHz	2437 MHz	2462 MHz
kHz	kHz	kHz
10060	10060	10060

802.11b, 2412 MHz, DSSS, 1 Mbps, 6 dB Bandwidth Plot

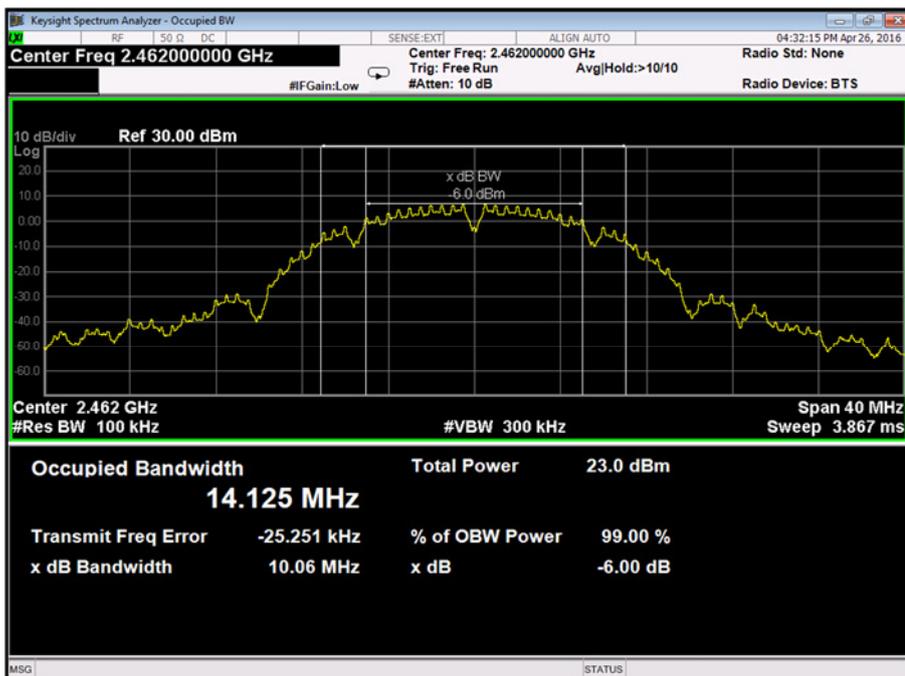




802.11b, 2437 MHz, DSSS, 1 Mbps, 6 dB Bandwidth Plot



802.11b, 2462 MHz, DSSS, 1 Mbps, 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.



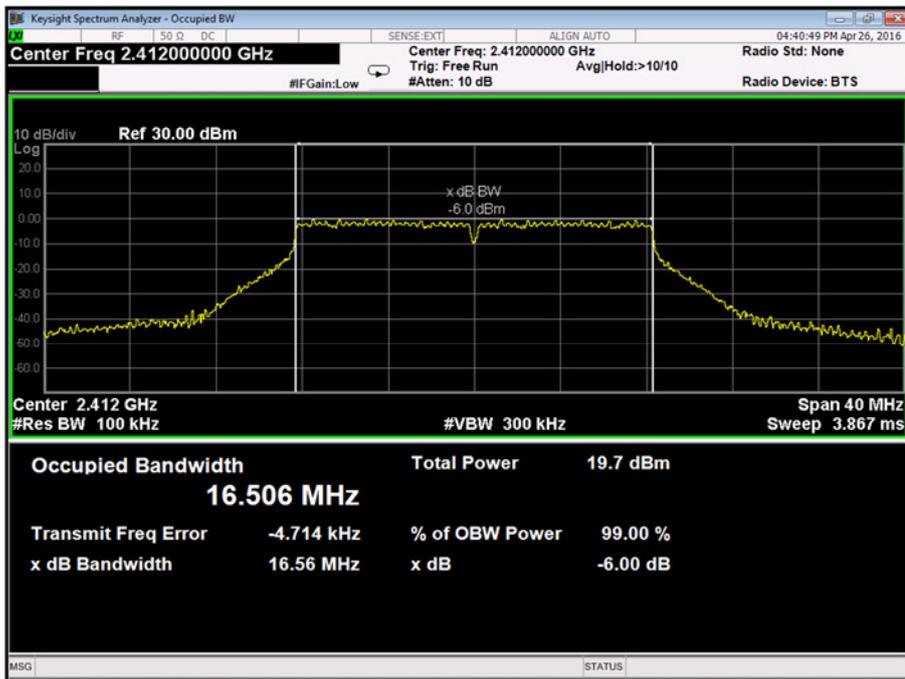
Product Service

4.0 V DC Supply

802.11g, OFDM, 36 Mbps, 6 dB Bandwidth Results

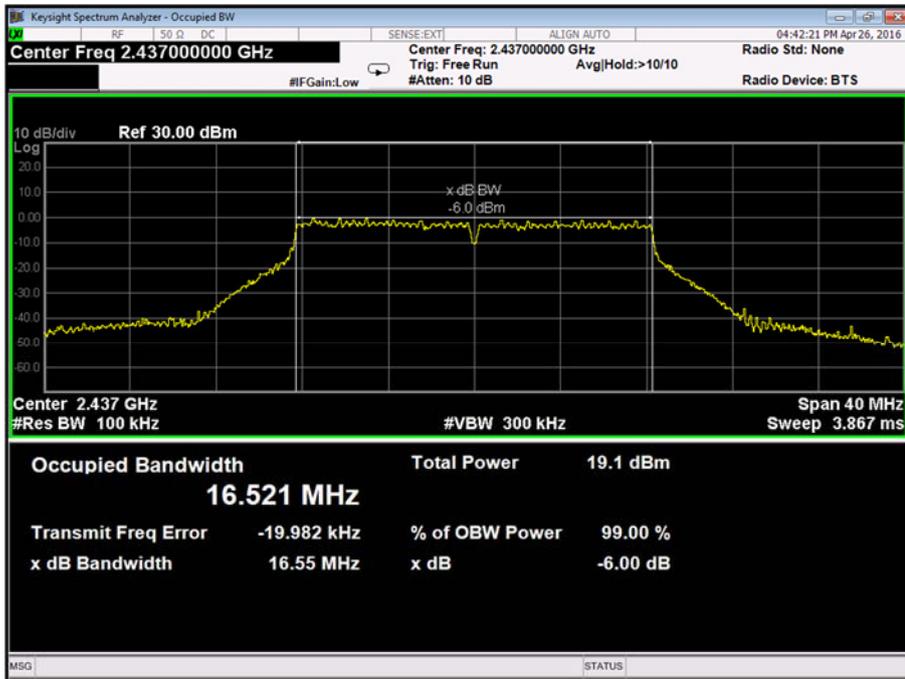
2412 MHz	2437 MHz	2462 MHz
kHz	kHz	kHz
16560	16550	16540

802.11g, 2412 MHz, OFDM, 36 Mbps, 6 dB Bandwidth Plot

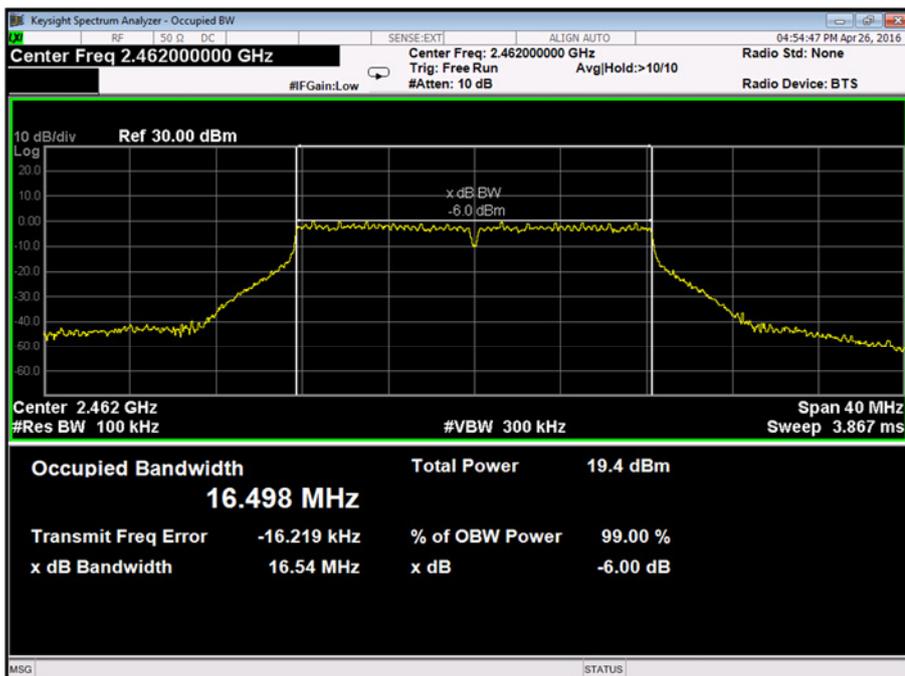




802.11g, 2437 MHz, OFDM, 36 Mbps, 6 dB Bandwidth Plot



802.11g, 2462 MHz, OFDM, 36 Mbps, 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.



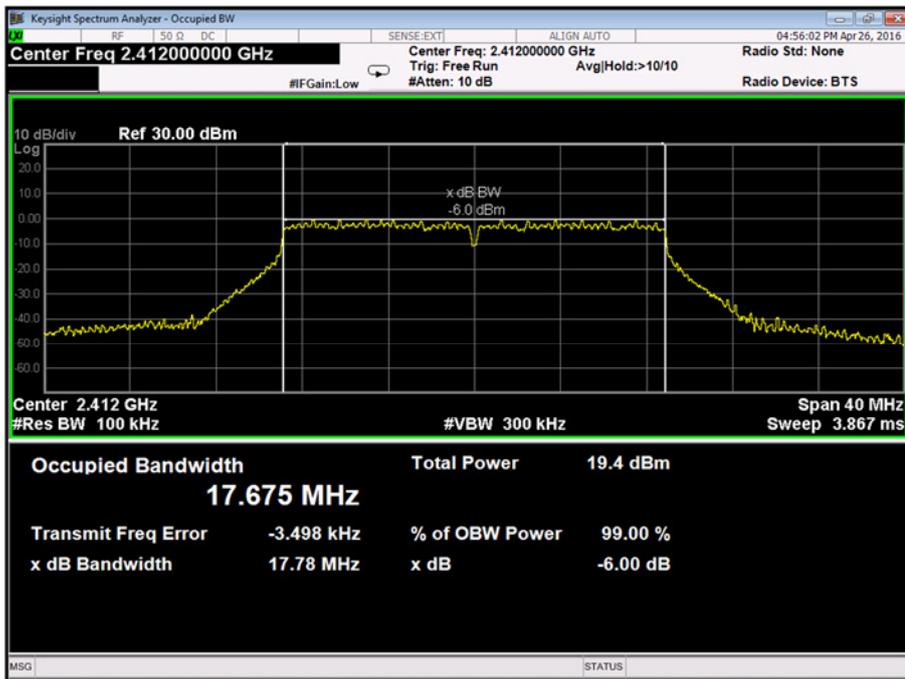
Product Service

4.0 V DC Supply

802.11n, OFDM, 52 Mbps, 6 dB Bandwidth Results

2412 MHz	2437 MHz	2462 MHz
kHz	kHz	kHz
17780	17780	17770

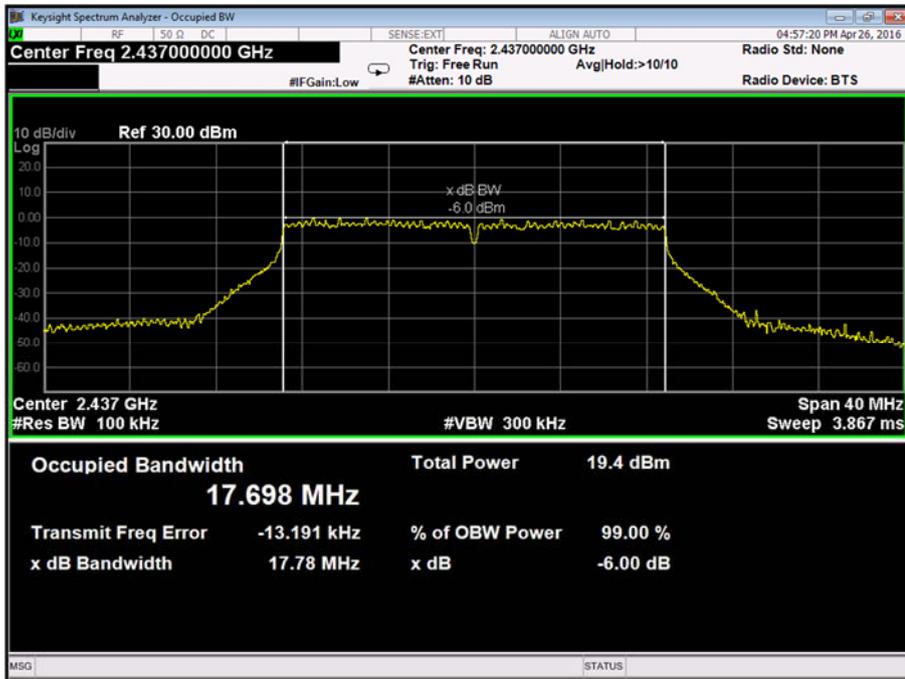
802.11n, 2412 MHz, OFDM, 52 Mbps, 6 dB Bandwidth Plot



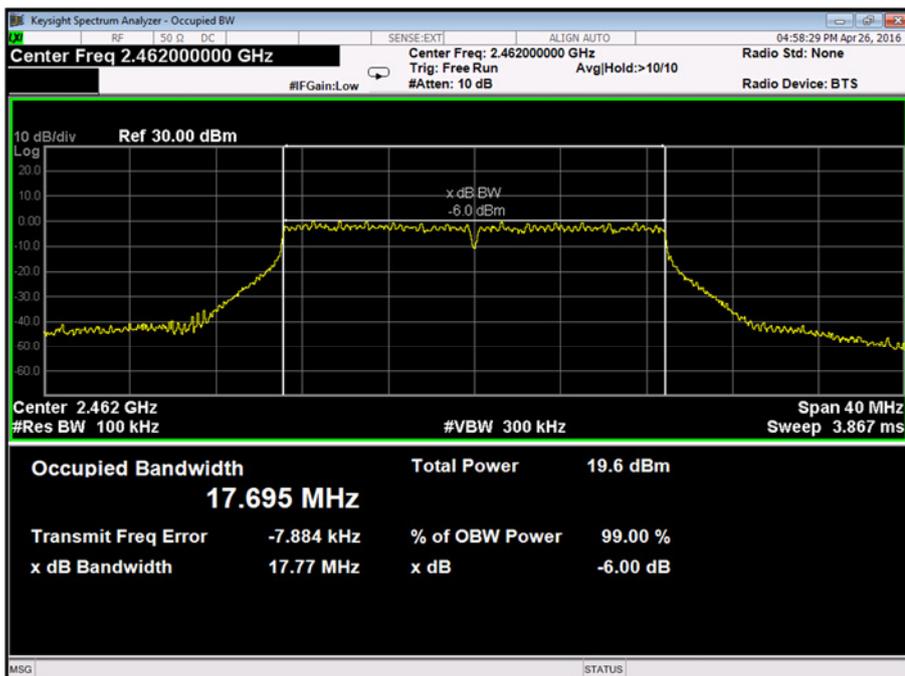


Product Service

802.11n, 2437 MHz, OFDM, 52 Mbps, 6 dB Bandwidth Plot



802.11n, 2462 MHz, OFDM, 52 Mbps, 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.



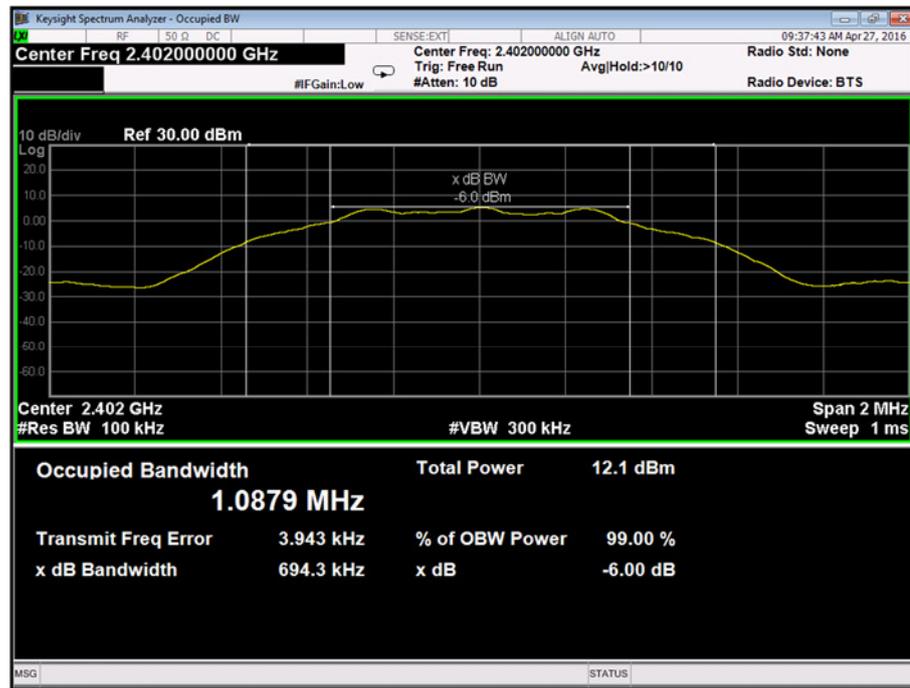
Product Service

4.0 V DC Supply

Bluetooth Low Energy, GFSK, 6 dB Bandwidth Results

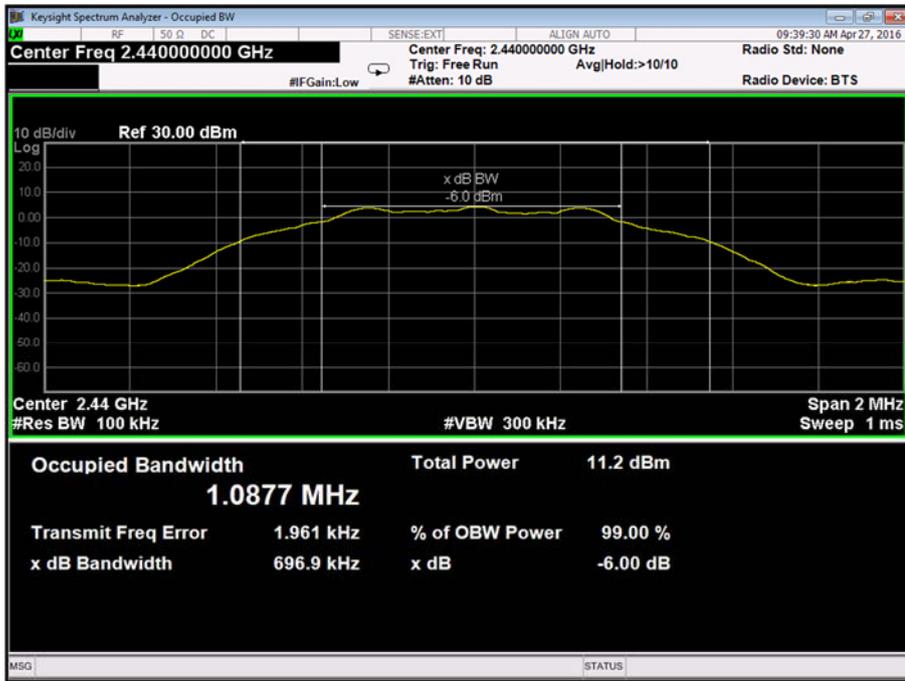
2402 MHz	2441 MHz	2480 MHz
kHz	kHz	kHz
694.30	696.90	697.70

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

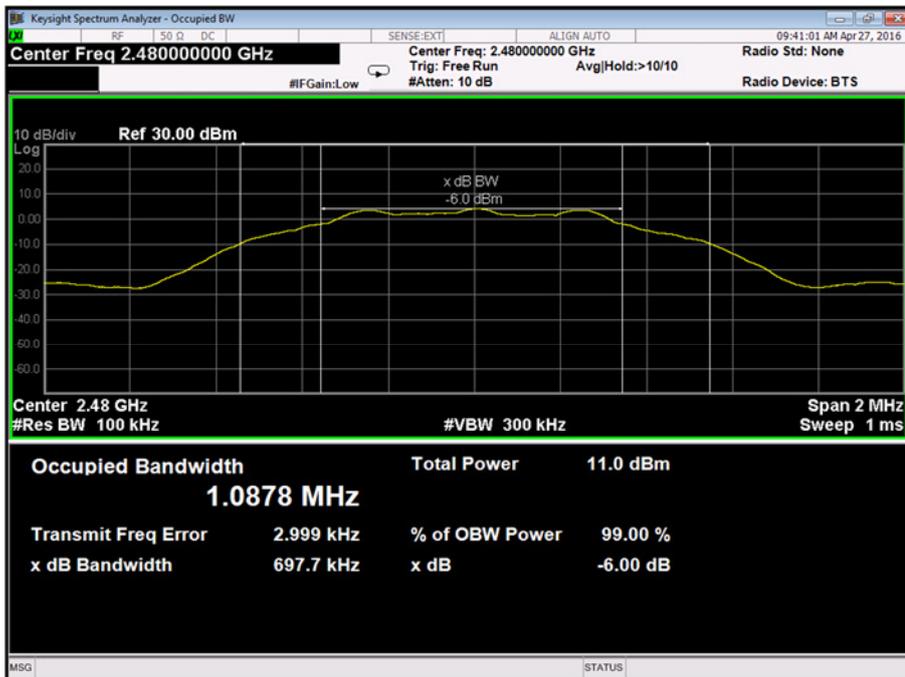




Bluetooth Low Energy, 2441 MHz, GFSK, 6 dB Bandwidth Plot



Bluetooth Low Energy, 2480 MHz, GFSK, 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.



Product Service

2.3 MAXIMUM CONDUCTED OUTPUT POWER

2.3.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (b)(3)

2.3.2 Equipment Under Test and Modification State

S/N: IMEI 004401115744522 - Modification State 0

2.3.3 Date of Test

23 April 2016 & 28 April 2016

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 9.1.2.

2.3.6 Environmental Conditions

Ambient Temperature 24.1 - 25.4°C
 Relative Humidity 19.0 - 20.4%

2.3.7 Test Results

4.0 V DC Supply

802.11b, 2 Mbps, Maximum Conducted Output Power Results

2412 MHz		2437 MHz		2462 MHz	
dBm	mW	dBm	mW	dBm	mW
18.34	68.23	18.06	63.97	18.45	69.98

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.



Product Service

4.0 V DC Supply

802.11g, 6 Mbps, Maximum Conducted Output Power Results

2412 MHz		2437 MHz		2462 MHz	
dBm	mW	dBm	mW	dBm	mW
21.72	148.59	21.50	141.25	22.19	165.58

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.

4.0 V DC Supply

802.11n, 6.5 Mbps, Maximum Conducted Output Power Results

2412 MHz		2437 MHz		2462 MHz	
dBm	mW	dBm	mW	dBm	mW
22.04	159.96	21.27	133.97	21.77	150.31

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.



Product Service

4.0 V DC Supply

Bluetooth Low Energy, Maximum Conducted Output Power Results

2402 MHz		2441 MHz		2480 MHz	
dBm	mW	dBm	mW	dBm	mW
5.529	3.57	4.728	2.97	4.448	2.78

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.



Product Service

2.4 SPURIOUS RADIATED EMISSIONS

2.4.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d), 15.205 and 15.209

2.4.2 Equipment Under Test and Modification State

S/N: IMEI 004401115744035 - Modification State 0

2.4.3 Date of Test

30 April 2016, 1 May 2016, 2 May 2016 & 3 May 2016

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

Testing was performed in accordance with ANSI C63.10, clause 11.11, 11.12.1 and 11.12.2.7.

Remarks

Plots for average measurements were taken in accordance with ANSI C63.10, clause 4.1.4.2.3. Final average measurements were taken using a CISPR average detector as required by ANSI C63.10, clause 4.1.2.

2.4.6 Environmental Conditions

Ambient Temperature	18.2 - 20.5°C
Relative Humidity	29.0 - 43.0%



Product Service

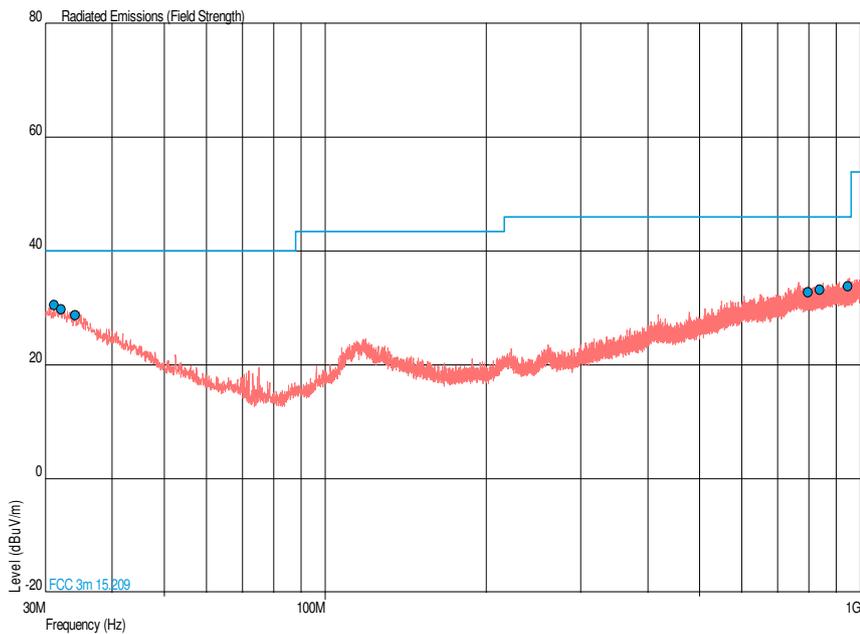
2.4.7 Test Results

4.0 V DC Supply

802.11b, 2412 MHz, 2 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dB μ V/m)	QP Margin (dB μ V/m)	QP Level (μ V/m)	QP Margin (μ V/m)	Angle (°)	Height (m)	Polarisation
31.213	30.5	-9.5	33.5	-66.5	90	1.00	Horizontal
32.183	29.7	-10.3	30.5	-69.5	180	1.00	Horizontal
34.123	28.8	-11.2	27.5	-72.5	0	1.00	Horizontal
797.076	32.8	-13.2	43.7	-156.3	180	1.00	Horizontal
837.428	33.2	-12.8	45.7	-154.3	270	1.00	Vertical
946.456	33.8	-12.2	49.0	-151.0	0	1.00	Horizontal

802.11b, 2412 MHz, 2 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot





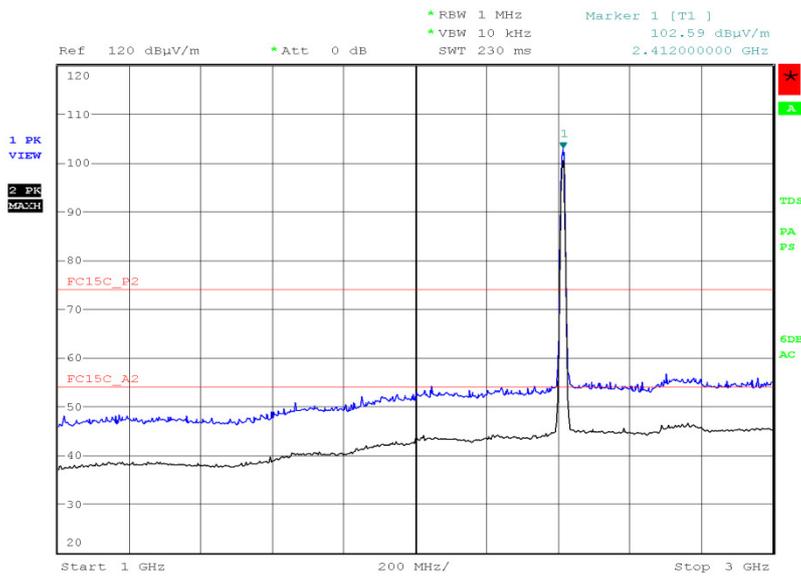
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802.11b, 2412 MHz, 2 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

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.

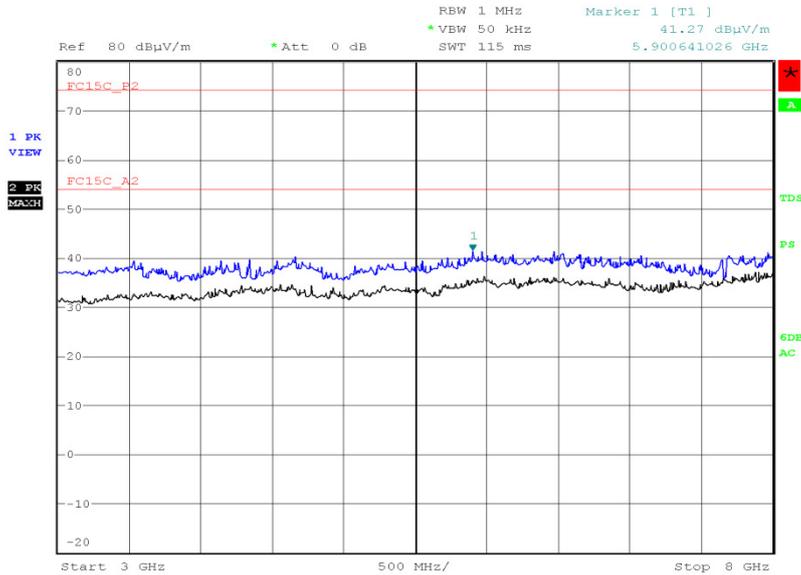
802.11b, 2412 MHz, 2 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



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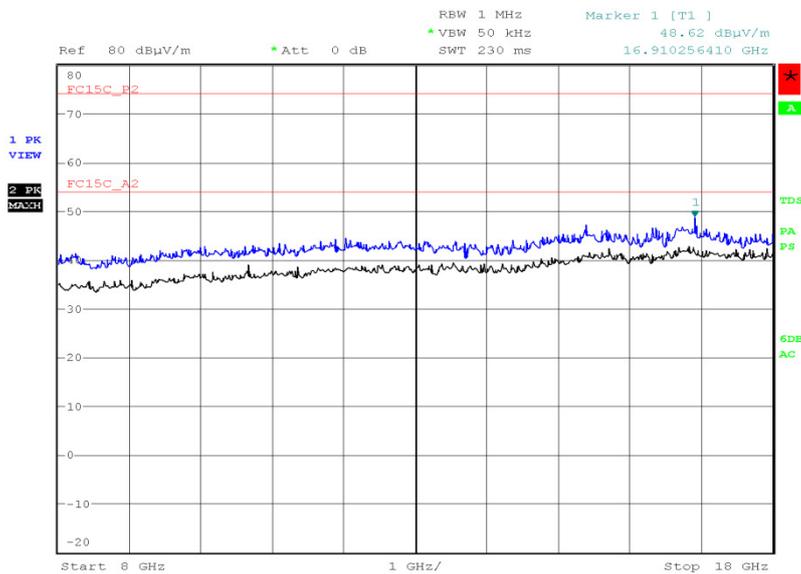


802.11b, 2412 MHz, 2 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 06:48:32

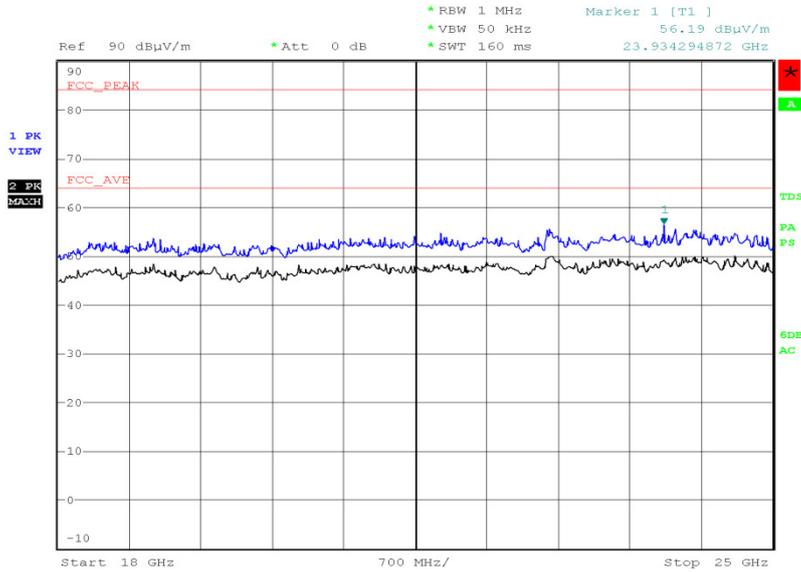
802.11b, 2412 MHz, 2 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 10:52:48



802.11b, 2412 MHz, 2 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



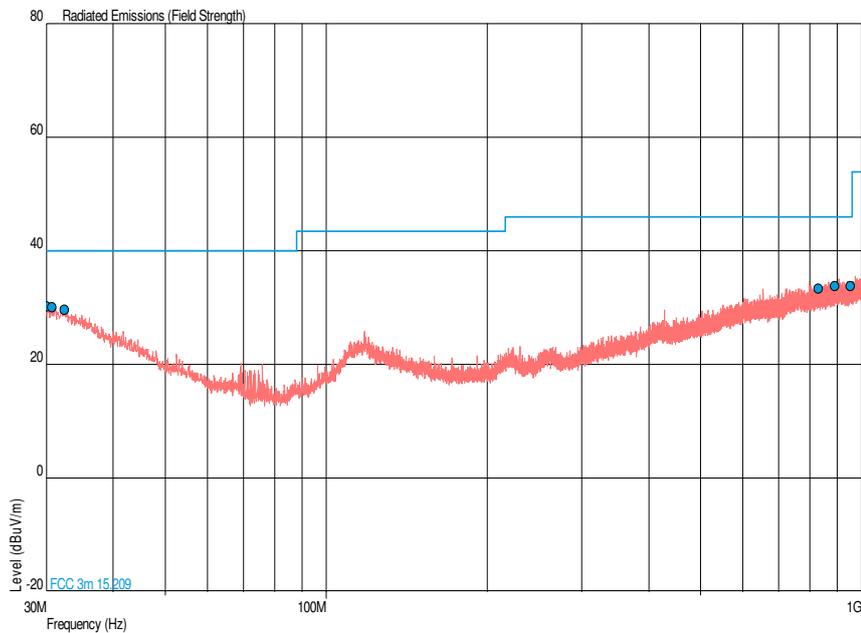
Date: 3.MAY.2016 17:30:15



802.11b, 2437 MHz, 2 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
30.097	30.2	-9.8	32.4	-67.6	180	1.00	Vertical
30.776	30.0	-10.0	31.6	-68.4	90	1.00	Vertical
32.425	29.6	-10.4	30.2	-69.8	0	1.00	Horizontal
831.317	33.4	-12.6	46.8	-153.2	270	1.00	Vertical
891.942	33.8	-12.2	49.0	-151.0	0	1.00	Horizontal
953.101	33.8	-12.2	49.0	-151.0	90	1.00	Vertical

802.11b, 2437 MHz, 2 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot





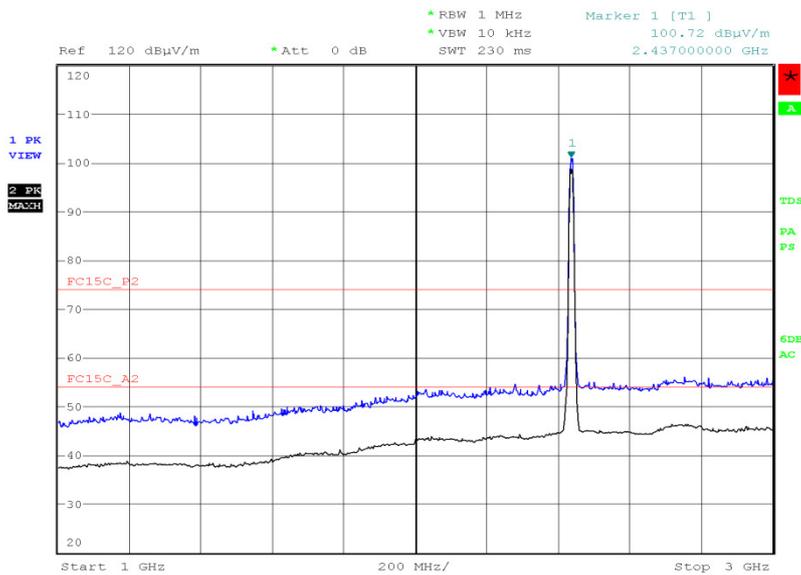
Product Service

802.11b, 2437 MHz, 2 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.

802.11b, 2437 MHz, 2 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

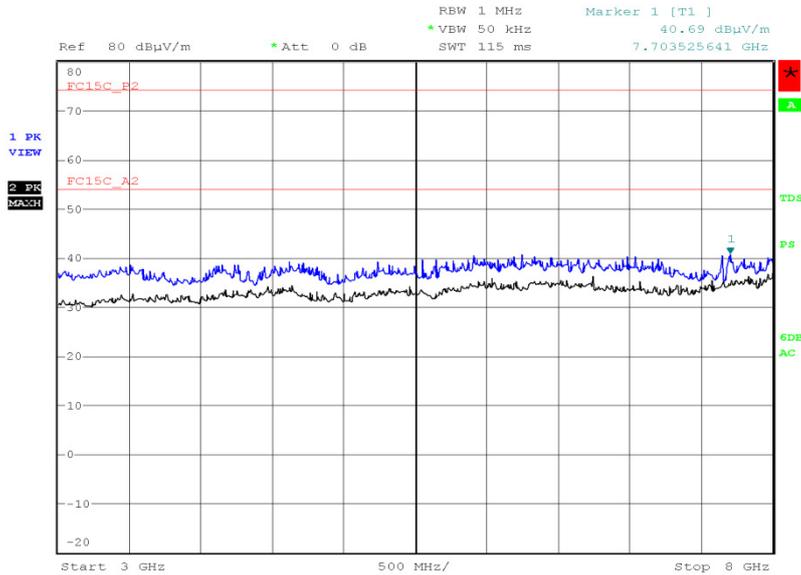


Date: 1.MAY.2016 13:46:19



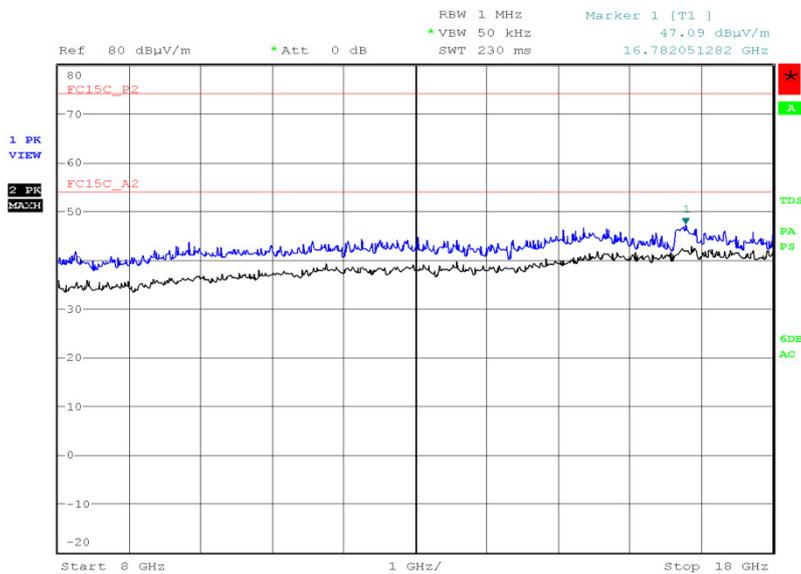
Product Service

802.11b, 2437 MHz, 2 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 06:56:01

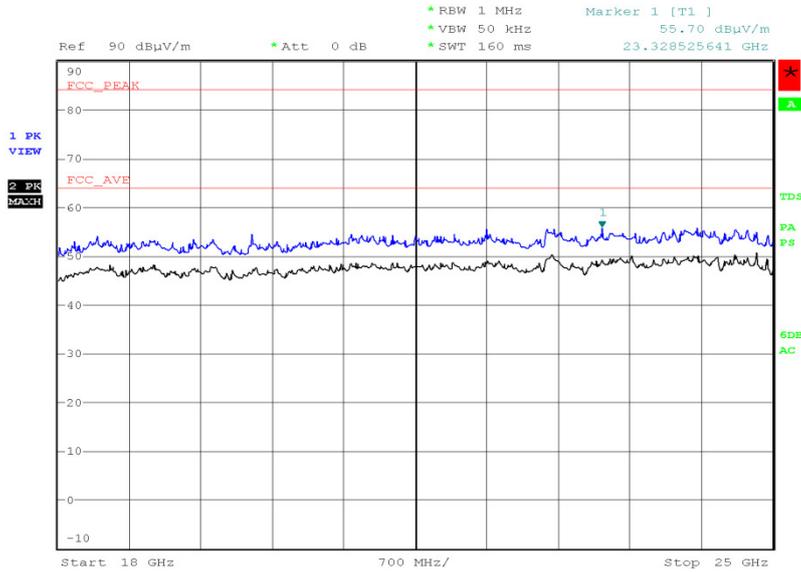
802.11b, 2437 MHz, 2 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 11:03:04



802.11b, 2437 MHz, 2 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



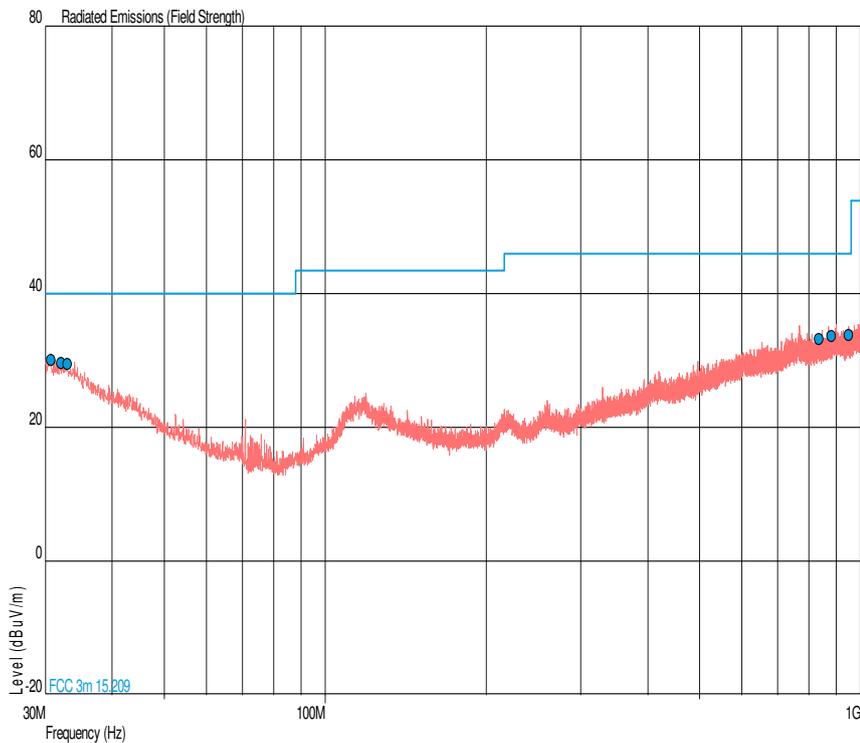
Date: 3.MAY.2016 17:33:49



802.11b, 2462 MHz, 2 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dB μ V/m)	QP Margin (dB μ V/m)	QP Level (μ V/m)	QP Margin (μ V/m)	Angle (°)	Height (m)	Polarisation
30.775	30.0	-10.0	31.6	-68.4	0	0.00	Horizontal
32.179	29.6	-10.4	30.2	-69.8	0	0.00	Horizontal
33.011	29.5	-10.5	29.9	-70.1	0	0.00	Horizontal
836.511	33.1	-12.9	45.2	-154.8	0	0.00	Horizontal
880.284	33.7	-12.3	48.4	-151.6	0	0.00	Horizontal
950.274	33.9	-12.1	49.5	-150.5	0	0.00	Horizontal

802.11b, 2462 MHz, 2 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot





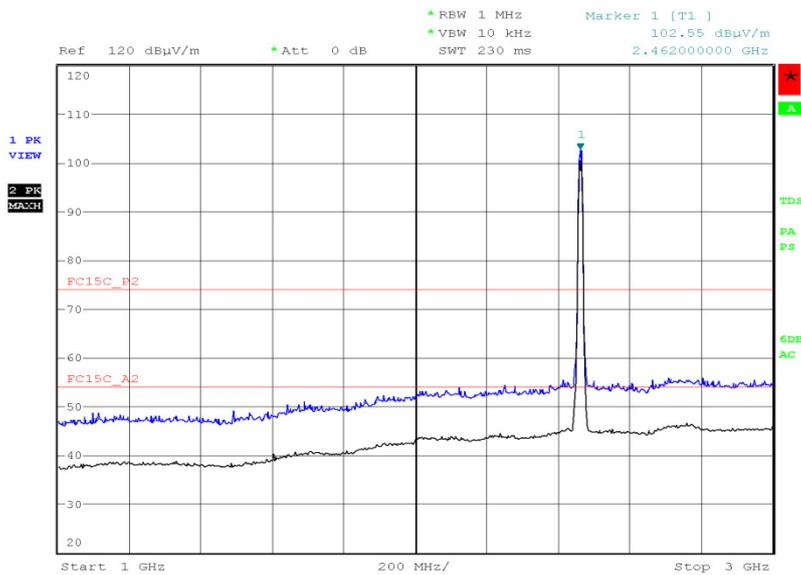
Product Service

802.11b, 2462 MHz, 2 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.

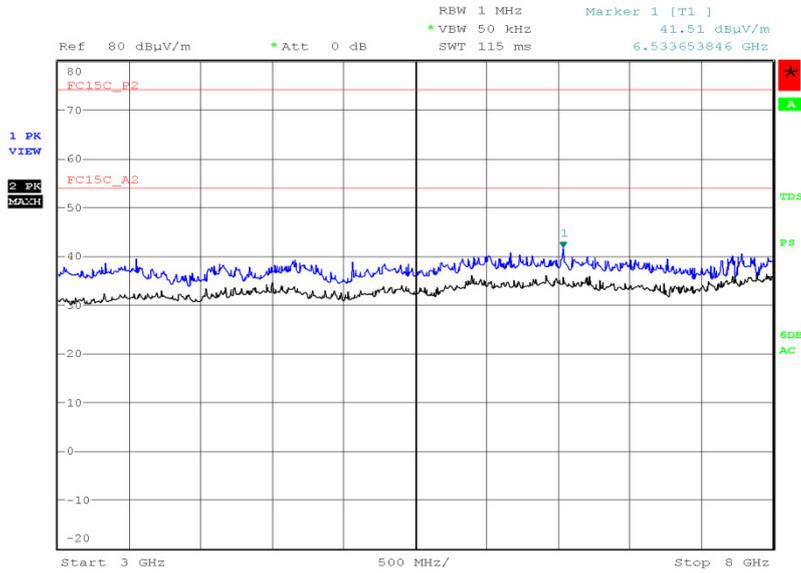
802.11b, 2462 MHz, 2 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 1.MAY.2016 13:43:18

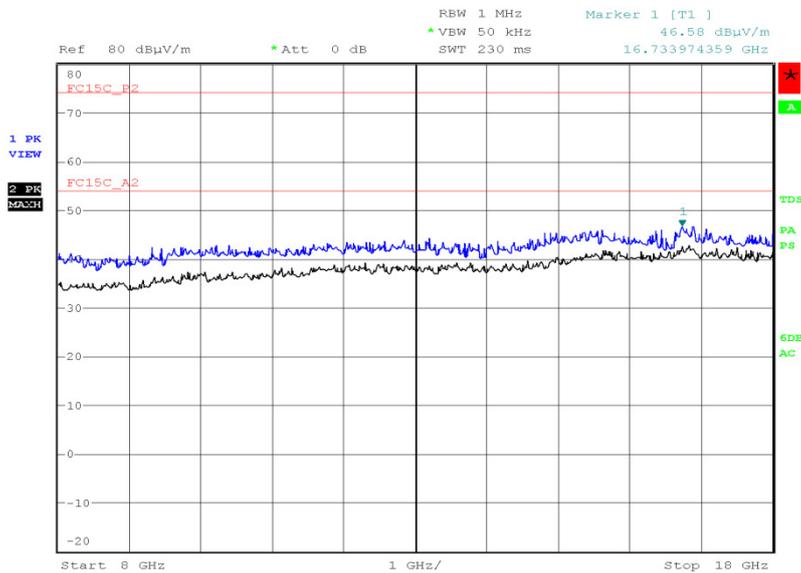


802.11b, 2462 MHz, 2 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 07:02:50

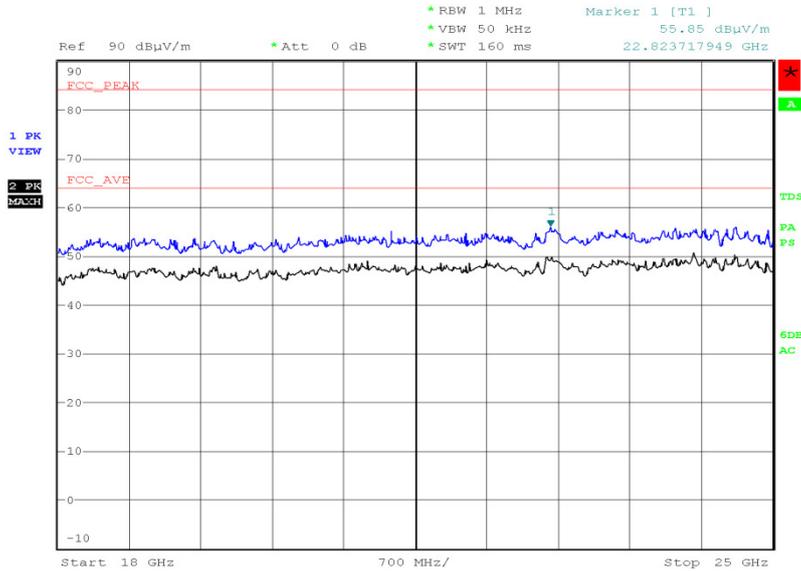
802.11b, 2462 MHz, 2 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 11:11:16



802.11b, 2462 MHz, 2 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



Date: 3.MAY.2016 17:36:09

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



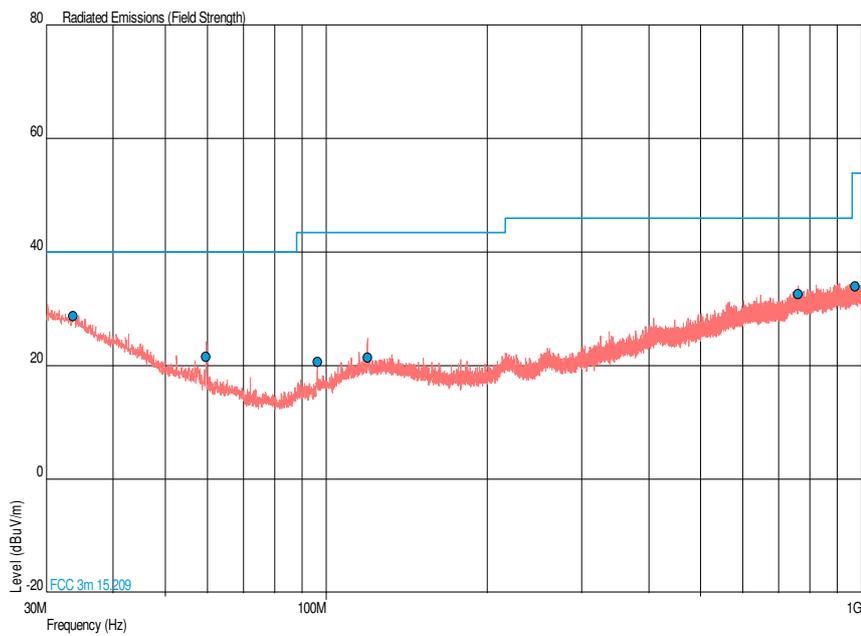
Product Service

4.0 V DC Supply

802.11g, 2412 MHz, 6 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
33.686	28.8	-11.2	27.5	-72.5	360	1.00	Vertical
59.675	21.5	-18.5	11.9	-88.1	236	1.00	Vertical
96.340	20.7	-22.8	10.8	-139.2	107	1.00	Vertical
119.358	21.3	-22.2	11.6	-138.4	278	1.00	Vertical
760.349	32.7	-13.3	43.2	-156.8	133	2.48	Vertical
971.818	33.9	-20.1	49.5	-451.5	242	1.00	Vertical

802.11g, 2412 MHz, 6 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot





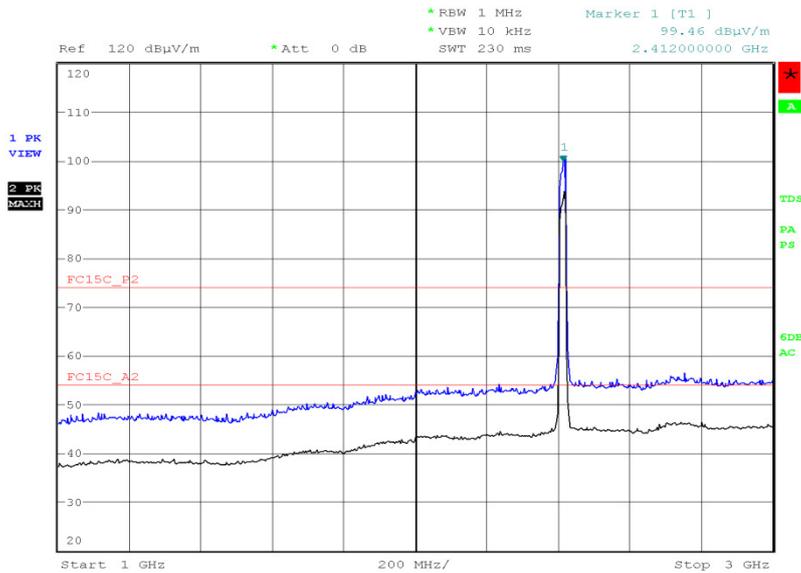
Product Service

802.11g, 2412 MHz, 6 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.

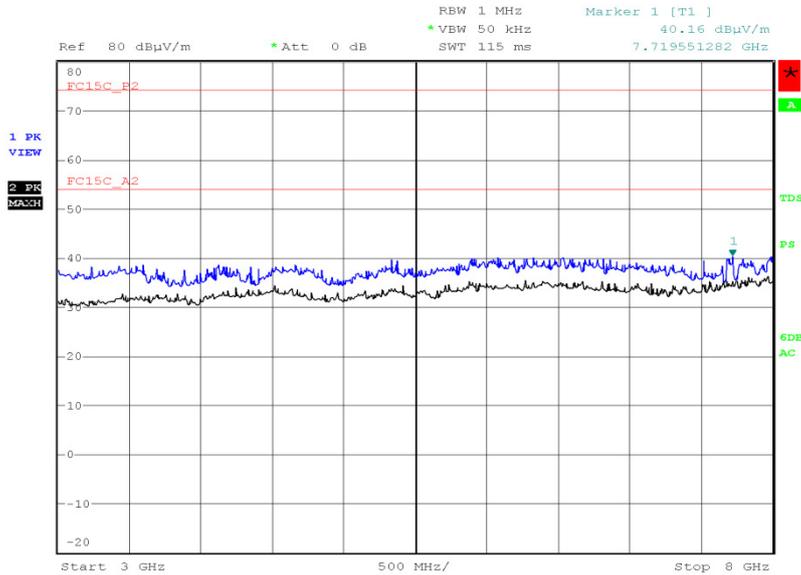
802.11g, 2412 MHz, 6 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 1.MAY.2016 13:52:39

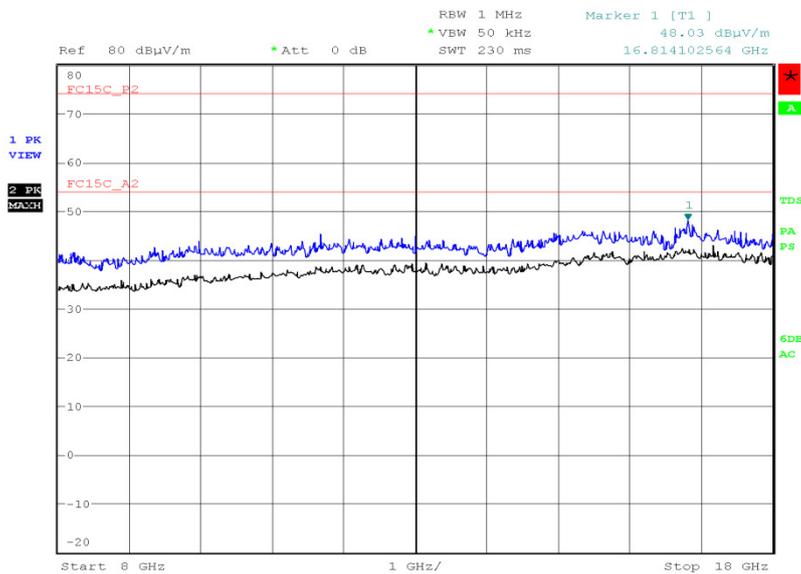


802.11g, 2412 MHz, 6 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 07:10:25

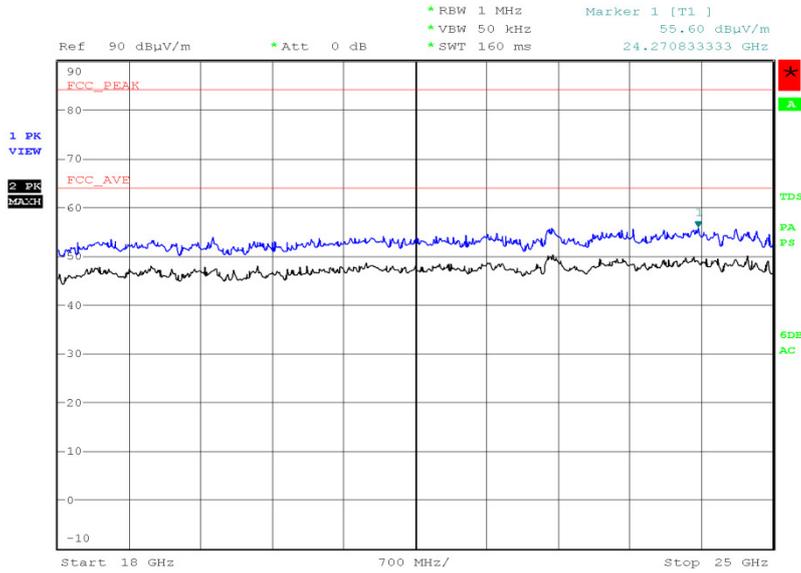
802.11g, 2412 MHz, 6 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 11:19:15



802.11g, 2412 MHz, 6 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



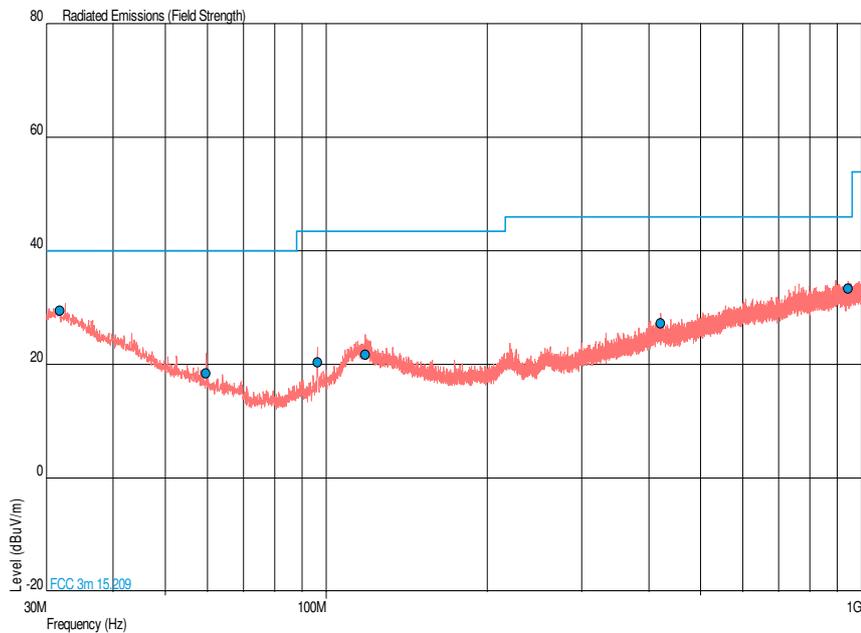
Date: 3.MAY.2016 17:38:59



802.11g, 2437 MHz, 6 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
31.789	29.5	-10.5	29.9	-70.1	354	2.90	Horizontal
59.659	18.5	-21.5	8.4	-91.6	148	1.00	Vertical
96.330	20.4	-23.1	10.5	-139.5	130	1.47	Vertical
118.171	21.7	-21.8	12.2	-137.8	360	1.00	Horizontal
420.577	27.3	-18.7	23.2	-176.8	23	1.37	Vertical
941.930	33.4	-12.6	46.8	-153.2	195	2.04	Vertical

802.11g, 2437 MHz, 6 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot





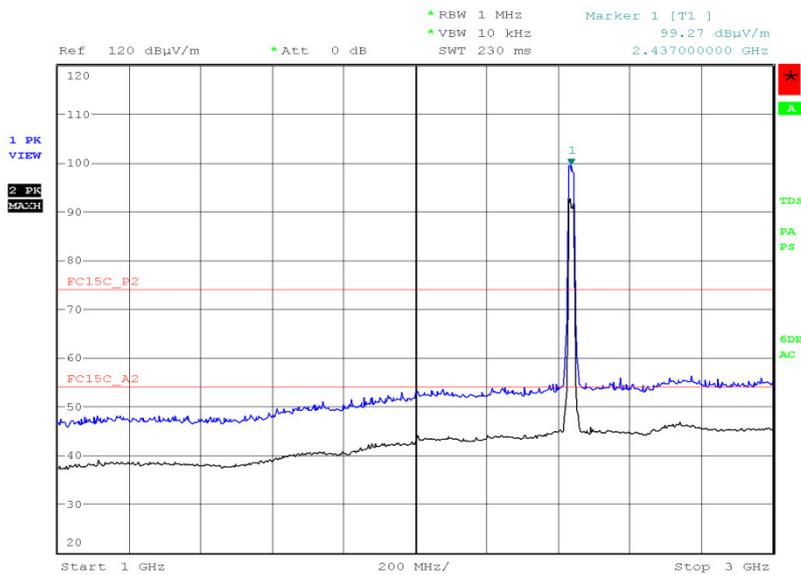
Product Service

802.11g, 2437 MHz, 6 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, 6 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

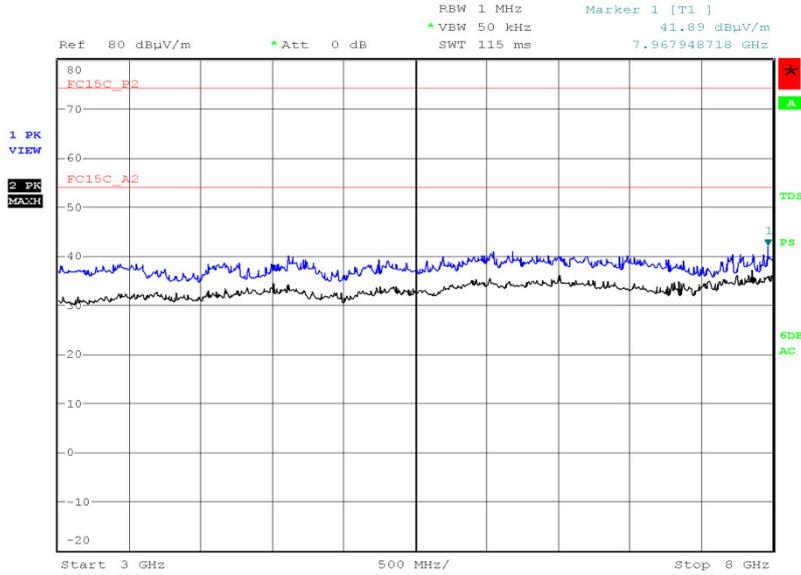


Date: 1.MAY.2016 13:56:05



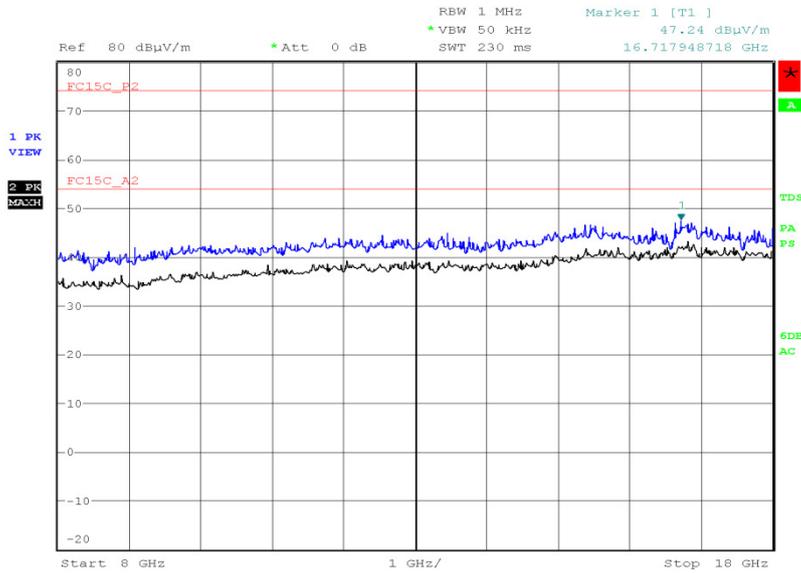
Product Service

802.11g, 2437 MHz, 6 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 07:19:04

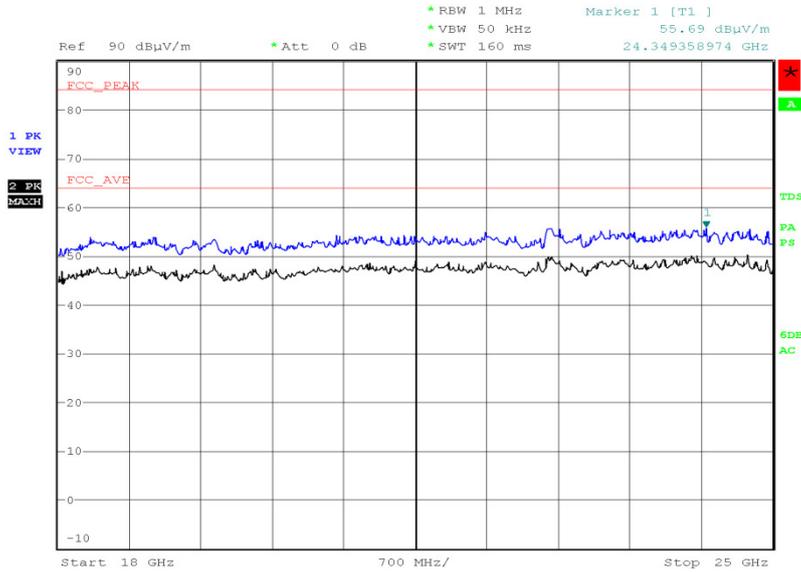
802.11g, 2437 MHz, 6 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 11:27:09



802.11g, 2437 MHz, 6 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



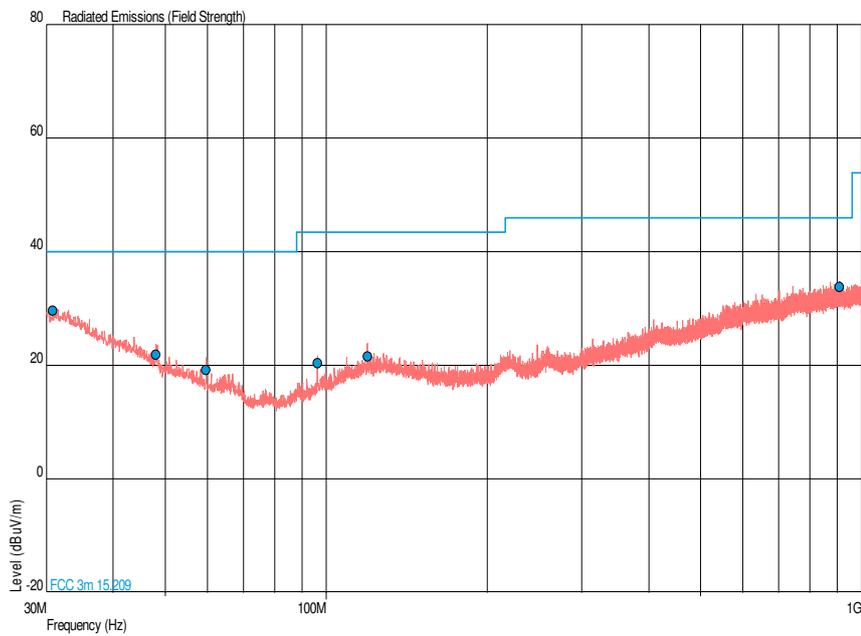
Date: 3.MAY.2016 17:41:04



802.11g, 2462 MHz, 6 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
30.872	29.7	-10.3	29.9	-70.1	360	3.13	Vertical
48.171	21.8	-18.2	8.4	-91.6	289	1.00	Vertical
59.687	19.1	-20.9	10.5	-89.5	104	1.00	Vertical
96.351	20.3	-23.2	12.2	-137.8	35	1.00	Vertical
119.339	21.5	-22.0	23.2	-126.8	311	3.54	Vertical
908.681	33.8	-12.2	46.8	-153.2	336	1.00	Vertical

802.11g, 2462 MHz, 6 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot





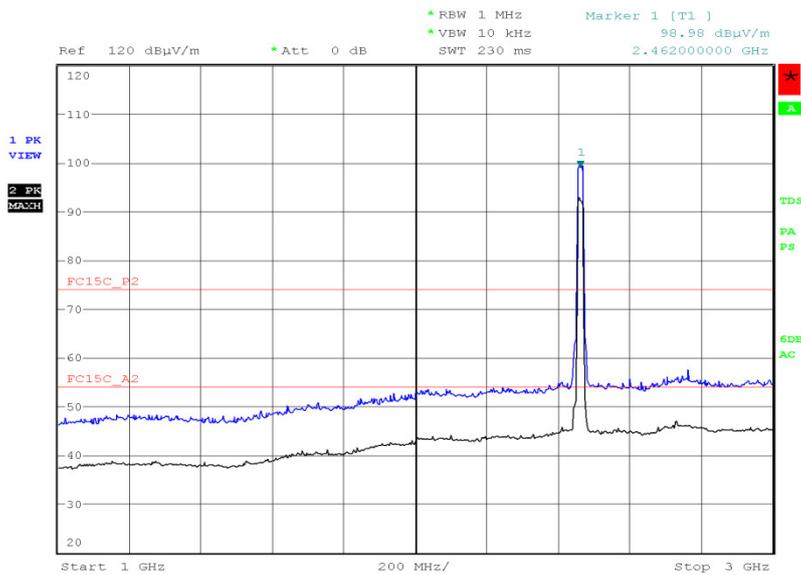
Product Service

802.11g, 2462 MHz, 6 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.

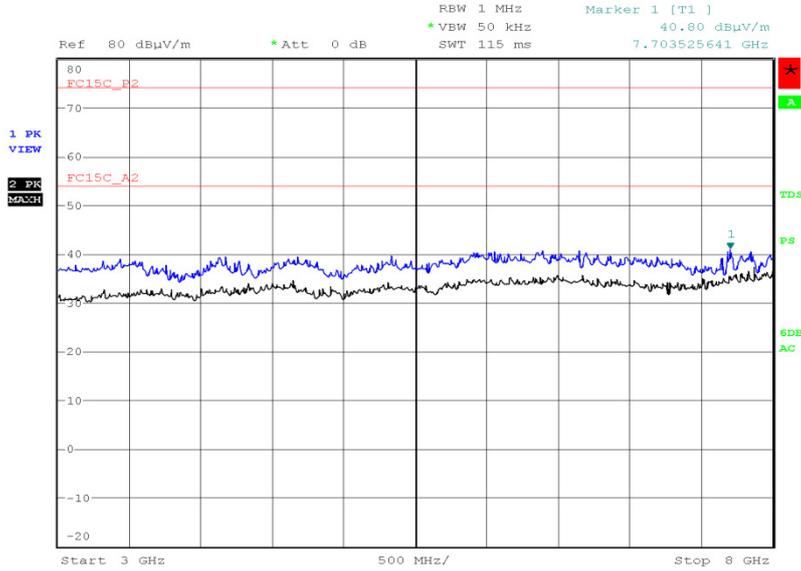
802.11g, 2462 MHz, 6 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 1.MAY.2016 14:00:34

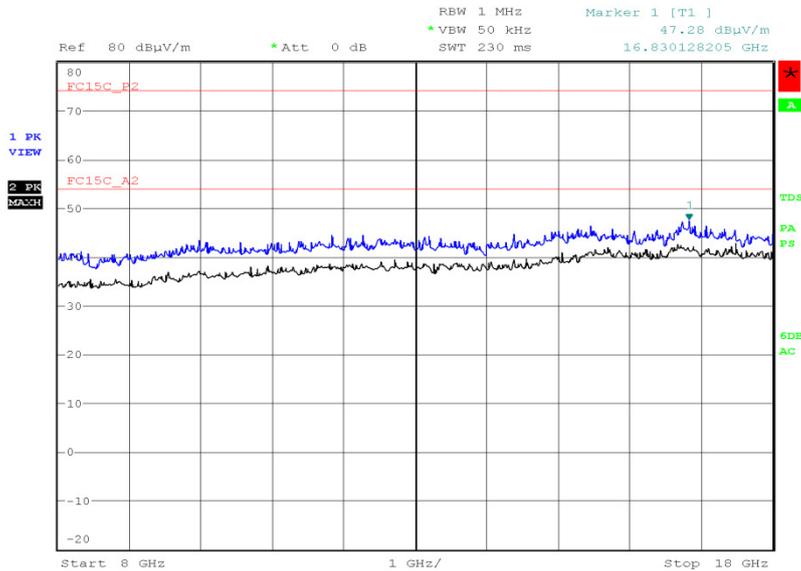


802.11g, 2462 MHz, 6 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 07:29:56

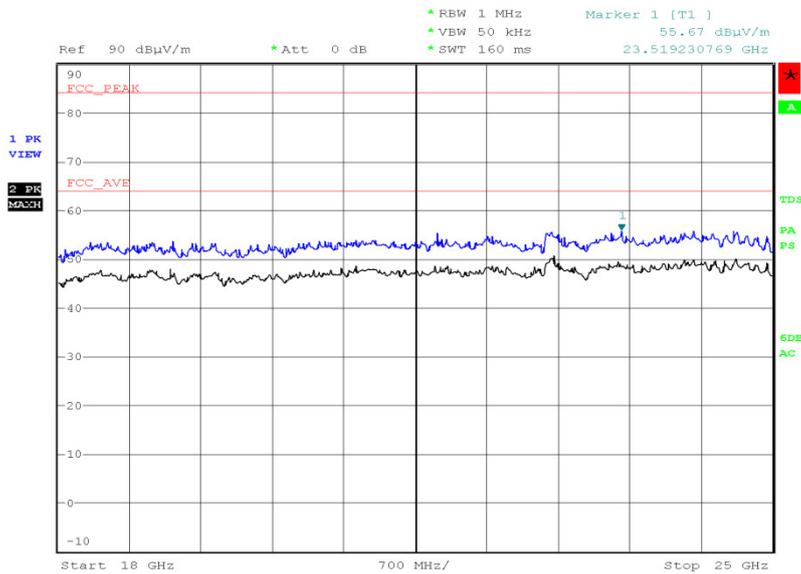
802.11g, 2462 MHz, 6 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 11:36:46



802.11g, 2462 MHz, 6 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



Date: 3.MAY.2016 17:42:52

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



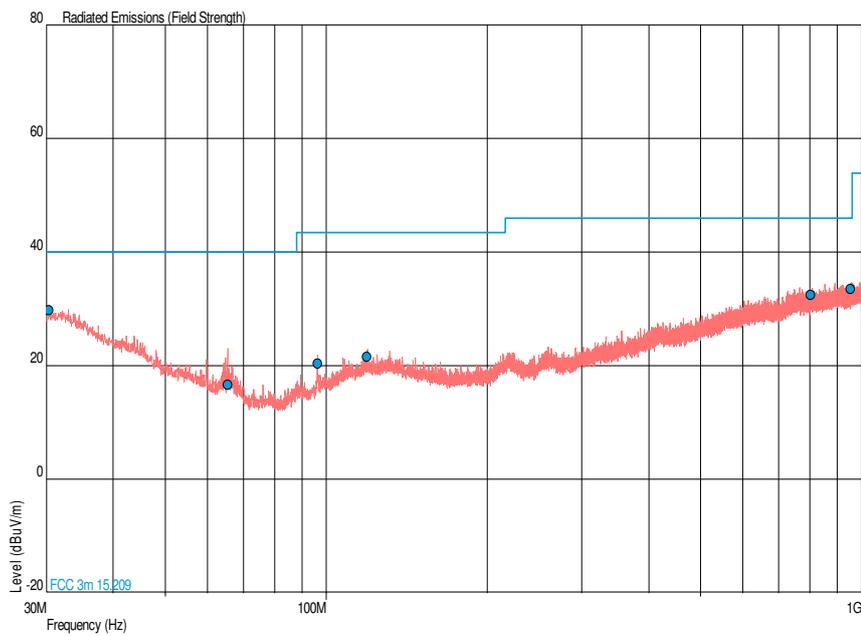
Product Service

4.0 V DC Supply

802.11n, 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
30.387	29.7	-10.3	30.5	-69.5	231	1.00	Vertical
65.405	16.7	-23.3	6.8	-93.2	102	1.00	Vertical
96.353	20.4	-23.1	10.5	-139.5	260	1.00	Vertical
119.230	21.5	-22.0	11.9	-138.1	0	3.79	Vertical
801.645	32.5	-13.5	42.2	-157.8	295	1.00	Vertical
951.909	33.4	-12.6	46.8	-153.2	291	3.13	Vertical

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





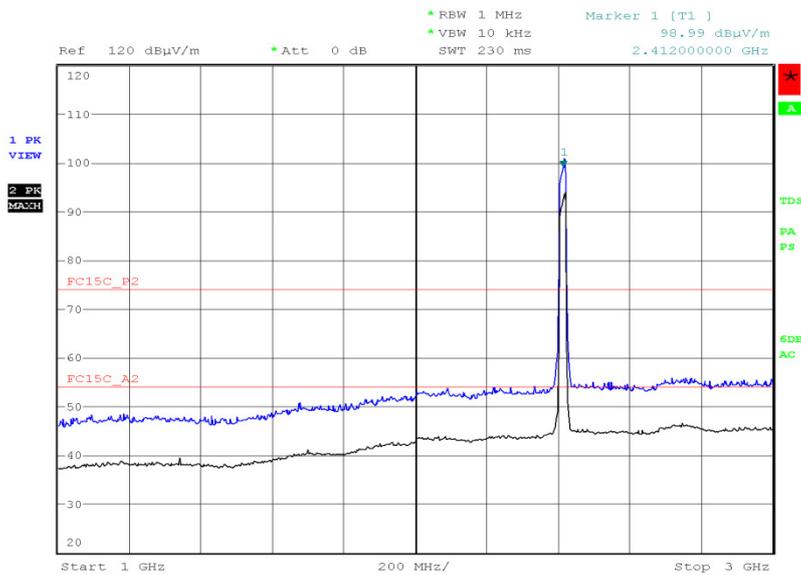
Product Service

802.11n, 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.

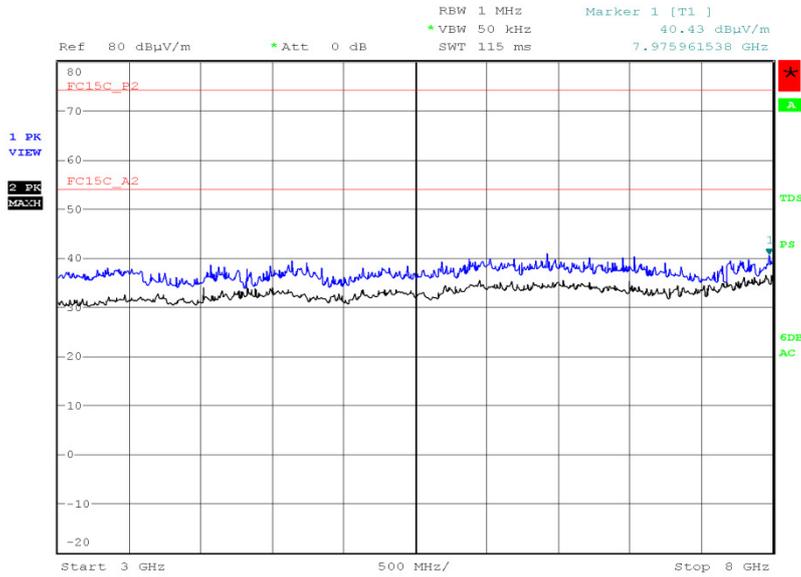
802.11n, 2412 MHz, 6.5 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 1.MAY.2016 14:04:01

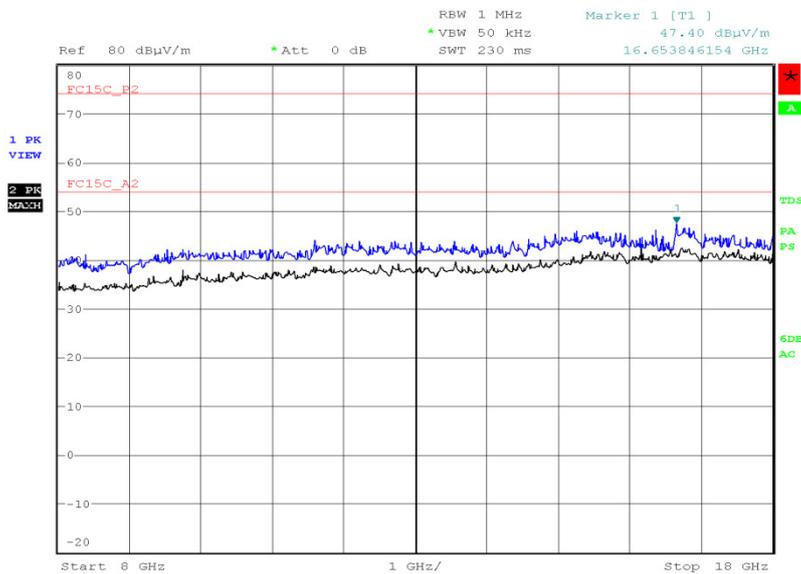


802.11n, 2412 MHz, 6.5 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 08:08:53

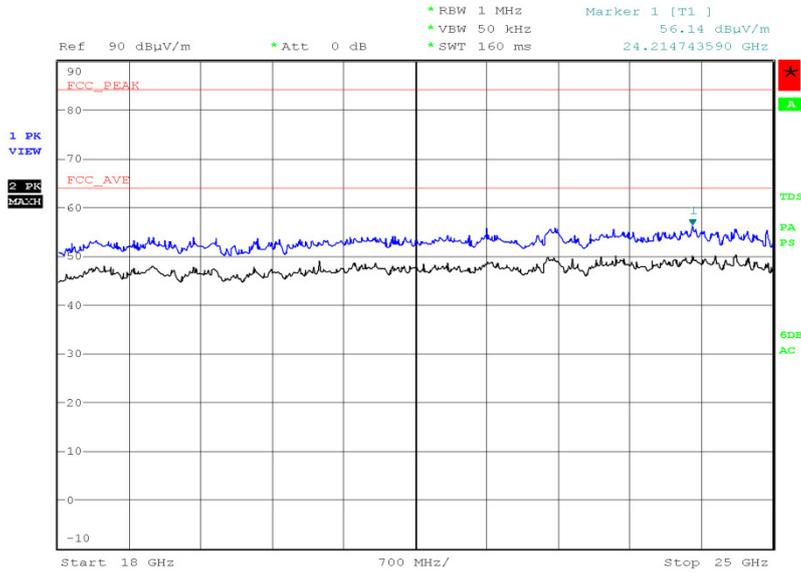
802.11n, 2412 MHz, 6.5 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 11:44:47



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



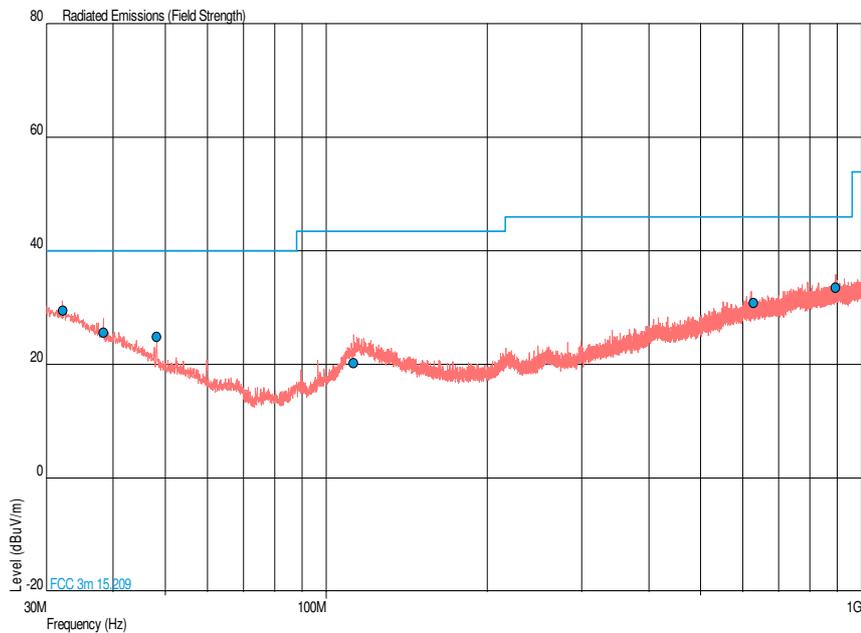
Date: 3.MAY.2016 17:45:03



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

Frequency (MHz)	QP Level (dB μ V/m)	QP Margin (dB μ V/m)	QP Level (μ V/m)	QP Margin (μ V/m)	Angle (°)	Height (m)	Polarisation
32.259	29.5	-10.5	29.9	-70.1	214	1.00	Horizontal
38.340	25.5	-14.5	18.8	-81.2	136	1.00	Horizontal
48.234	24.8	-15.2	17.4	-82.6	59	1.00	Vertical
112.644	20.2	-23.3	10.2	-139.8	65	1.58	Horizontal
627.783	30.8	-15.2	34.7	-165.3	155	1.00	Horizontal
892.650	33.5	-12.5	47.3	-152.7	177	1.00	Vertical

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



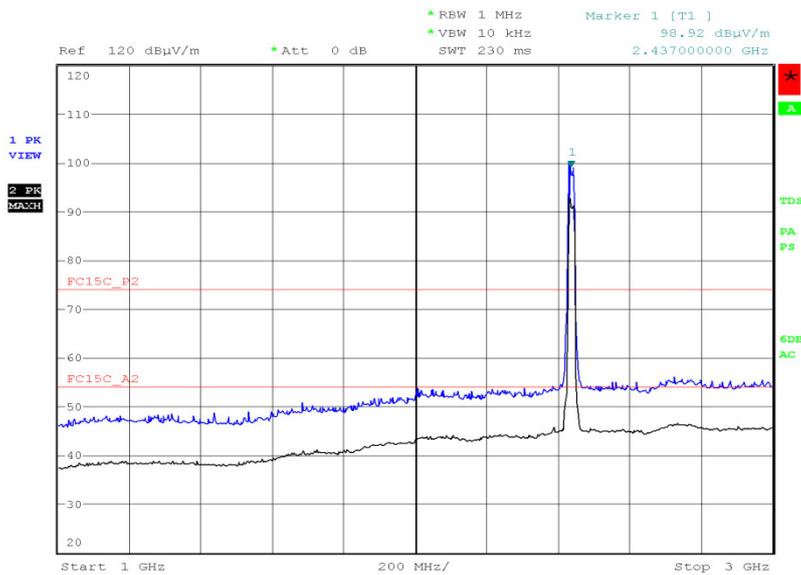


802.11n, 2437 MHz, 6.5 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

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, 2437 MHz, 6.5 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

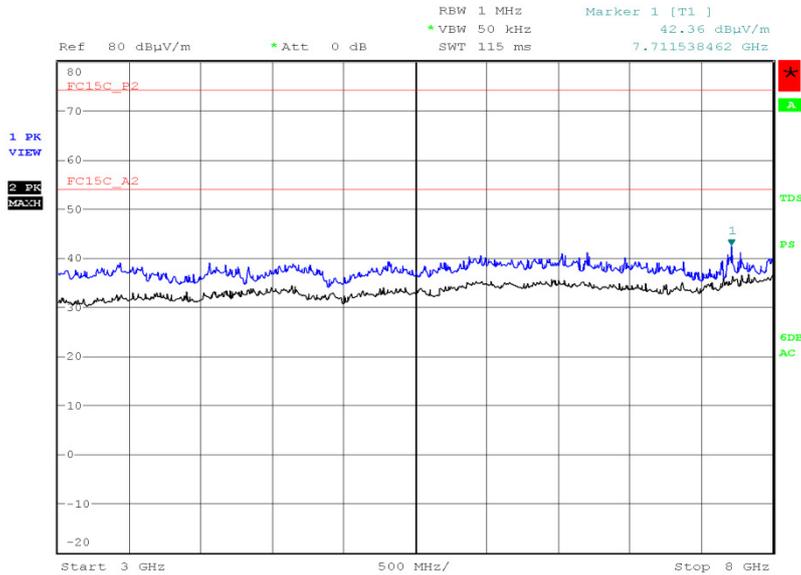


Date: 1.MAY.2016 14:09:28



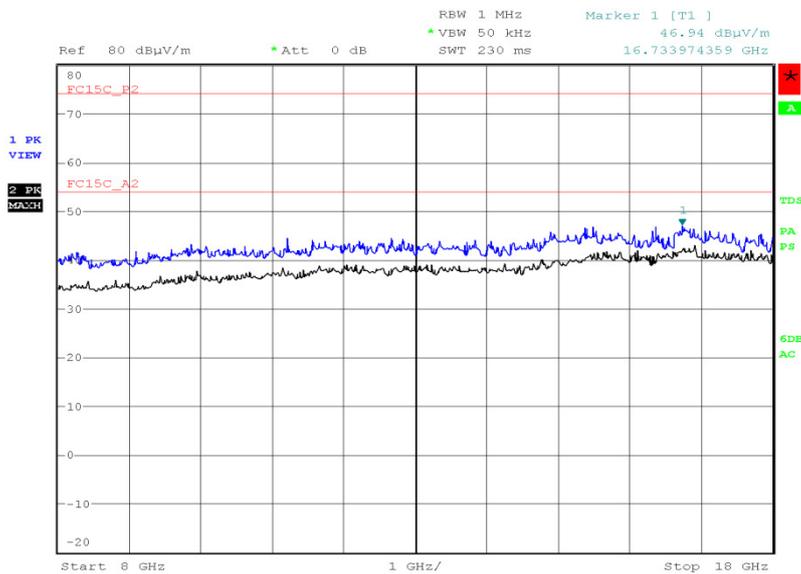
Product Service

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



Date: 2.MAY.2016 08:17:53

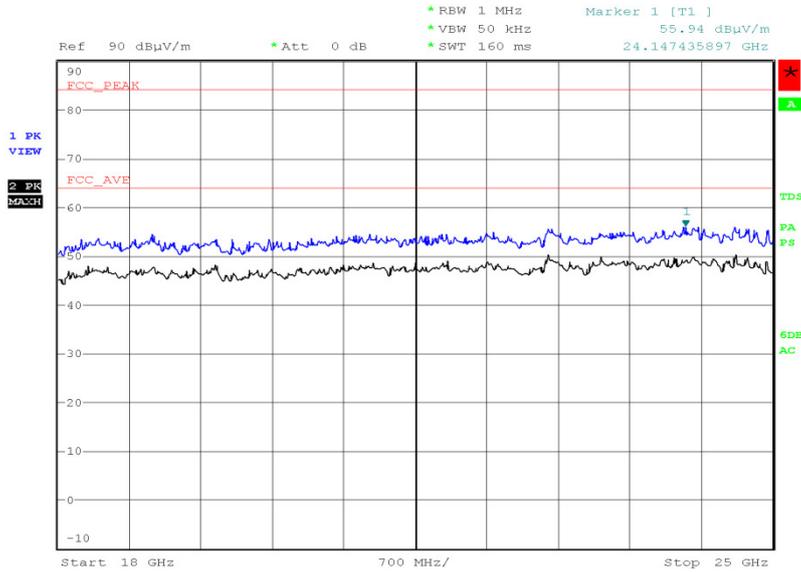
802.11n, 2437 MHz, 6.5 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 11:53:17



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



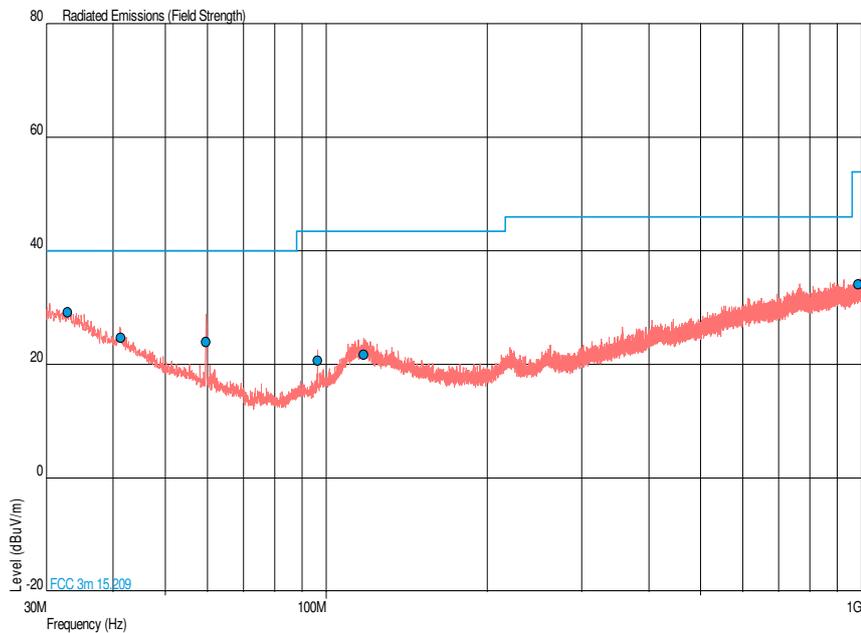
Date: 3.MAY.2016 17:47:22



802.11n, 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
32.905	29.2	-10.8	28.8	-71.2	213	2.11	Horizontal
41.299	24.6	-15.4	17.0	-83.0	205	1.00	Vertical
59.670	24.0	-16.0	15.8	-84.2	0	1.98	Vertical
96.353	20.7	-22.8	10.8	-139.2	90	1.69	Vertical
117.347	21.7	-21.8	12.2	-137.8	360	1.00	Horizontal
983.802	34.0	-20.0	50.1	-450.9	129	3.30	Horizontal

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



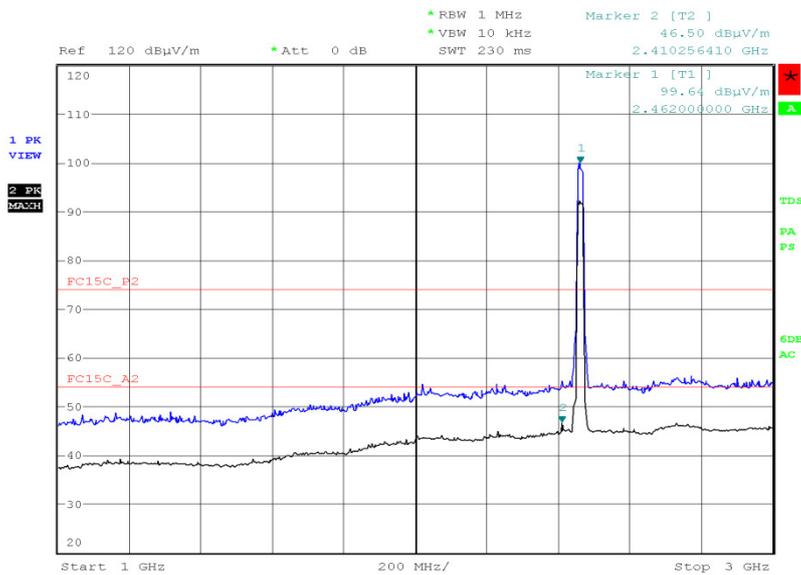


802.11n, 2462 MHz, 6.5 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

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

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

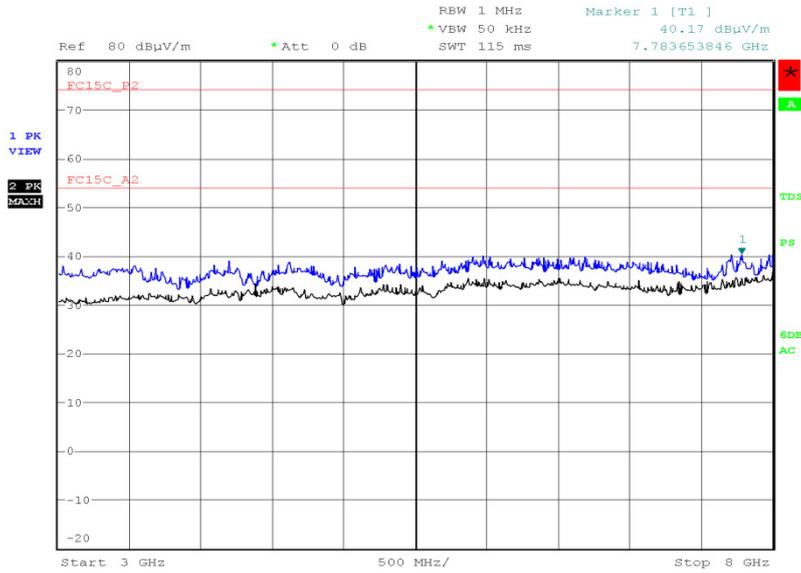
802.11n, 2462 MHz, 6.5 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 1.MAY.2016 14:13:49

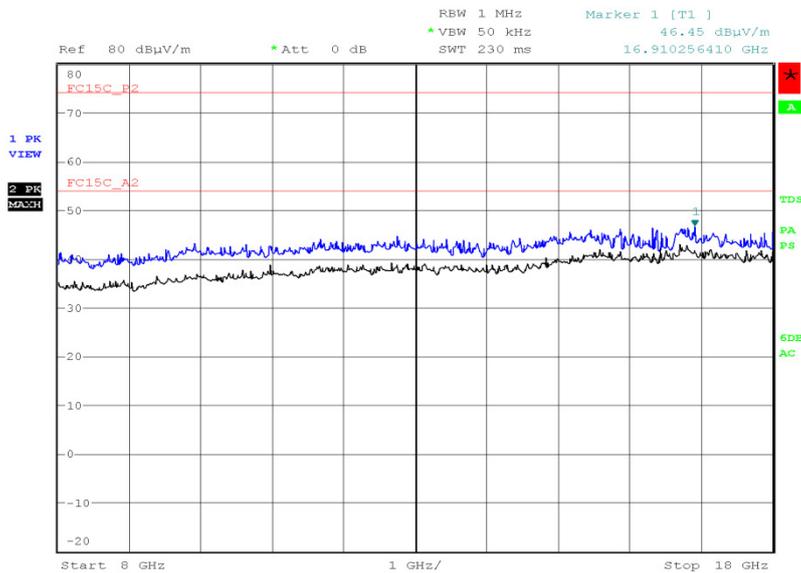


802.11n, 2462 MHz, 6.5 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 08:24:22

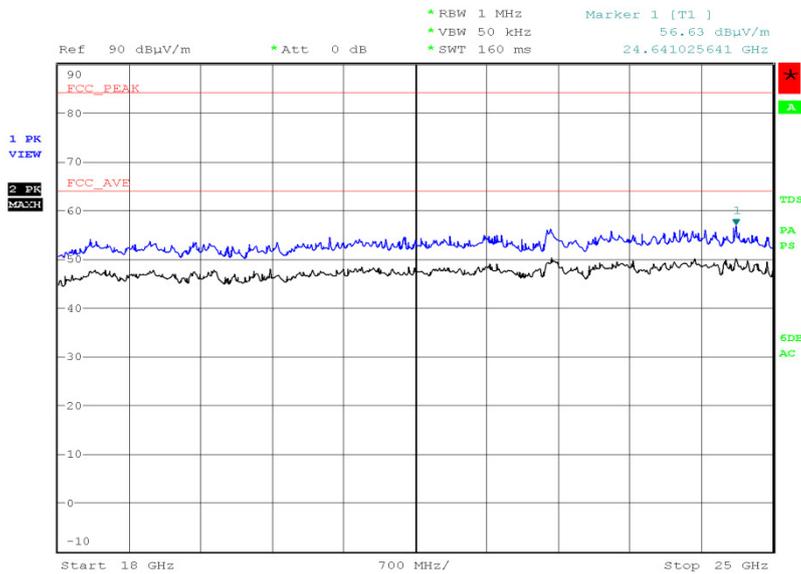
802.11n, 2462 MHz, 6.5 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 2.MAY.2016 12:01:08



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



Date: 3.MAY.2016 17:49:25

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



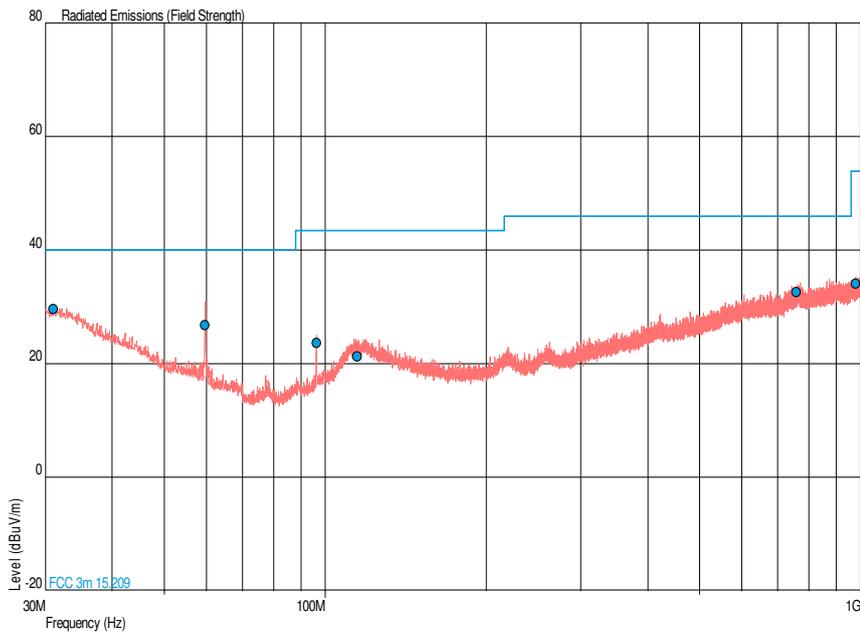
Product Service

4.0 V DC 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
31.116	29.6	-10.4	30.2	-69.8	29	1.00	Horizontal
59.677	26.7	-13.3	21.6	-78.4	303	1.00	Vertical
96.376	23.7	-19.8	15.3	-134.7	134	1.00	Vertical
114.612	21.2	-22.3	11.5	-138.5	73	1.00	Horizontal
757.621	32.5	-13.5	42.2	-157.8	358	1.00	Vertical
979.853	34.1	-19.9	50.7	-450.3	0	1.00	Vertical

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





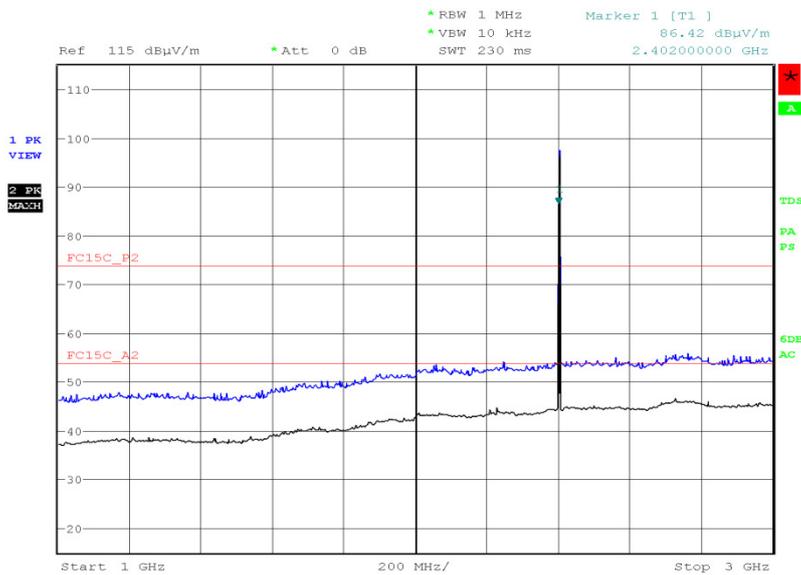
Product Service

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
*							

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

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



Date: 1.MAY.2016 12:10:54