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Report On

FCC Testing of the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), 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)

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00234

Document 75933606 Report 22 Issue 1 **May 2016**

Product Service

TÜV SÜD Product Service, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuv-sud.co.uk

COMMERCIAL-IN-CONFIDENCE

REPORT ON

FCC Testing of the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), 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)

Document 75933606 Report 22 Issue 1

May 2016

PREPARED FOR

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DATED

05 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);

G Lawler T Guy N Rousell M Russell

UKAS TESTING 0141

COMMERCIAL-IN-CONFIDENCE

Product Service

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Product Service

SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), 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)

1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC Testing of the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), 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 004401115723948 IMEI 004401115723419 IMEI 004401115723443
Number of Samples Tested	3
Test Specification/Issue/Date	FCC 47 CFR Part 15C (2015)
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	10749 15 February 2016
Start of Test	4 April 2016
Finish of Test	19 April 2016
Name of Engineer(s)	G Lawler T Guy N Rousell M Russell
Related Document(s)	ANSI C63.10: 2013

Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C 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	

Product Service

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	

1.3 PRODUCT TECHNICAL DESCRIPTION

Refer to Model Description APYHRO00234 Rev 4.0 document.

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), 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 Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), 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)

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 004401115723948 - Modification State 0

2.1.3 Date of Test

18 April 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 Clause 15.207 of FCC 47 CFR Part 15.

2.1.6 Environmental Conditions

Ambient Temperature	18.6°C
Relative Humidity	30.0%

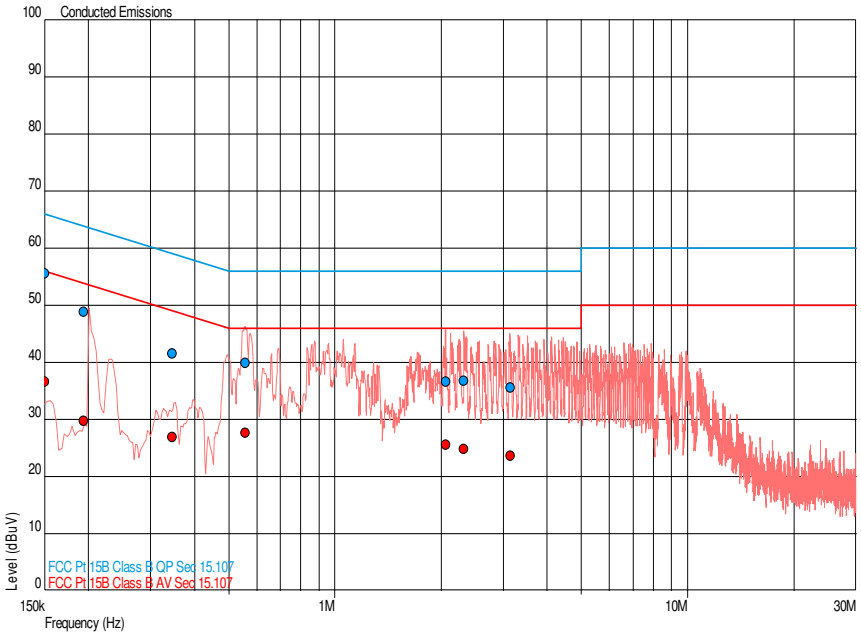
Product Service

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	55.5	66.0	-10.5	36.7	56.0	-19.3
0.194	48.8	63.9	-15.0	29.8	53.9	-24.0
0.345	41.6	59.1	-17.5	26.9	49.1	-22.2
0.558	39.9	56.0	-16.1	27.6	46.0	-18.4
2.060	36.6	56.0	-19.4	25.5	46.0	-20.5
2.319	36.8	56.0	-19.2	24.8	46.0	-21.2
3.140	35.6	56.0	-20.4	23.7	46.0	-22.3

802.11b, Live Line, AC Line Conducted Emissions Plot

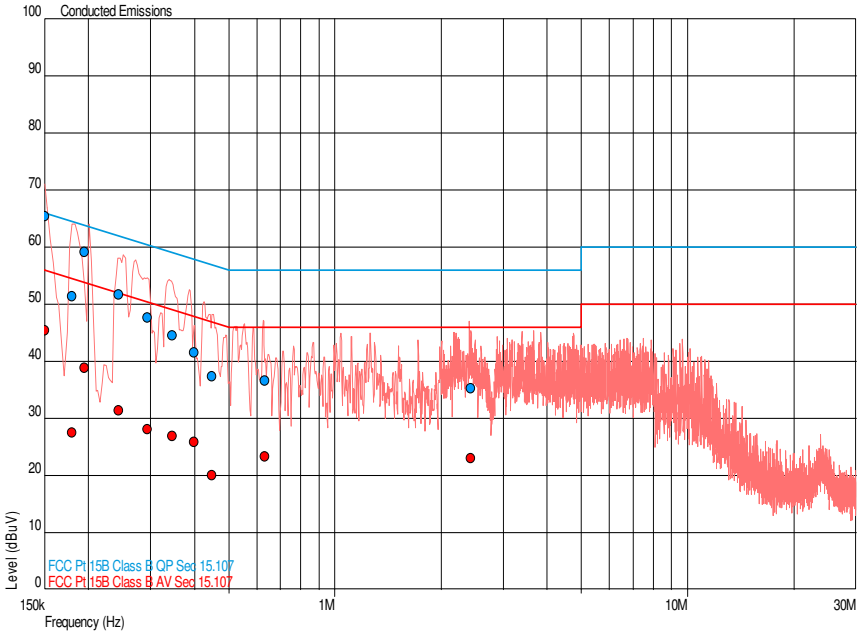


Product Service

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	65.5	66.0	-0.5	45.5	56.0	-10.5
0.180	51.4	64.5	-13.1	27.5	54.5	-27.0
0.195	59.2	63.8	-4.7	38.9	53.8	-14.9
0.244	51.7	62.0	-10.3	31.5	52.0	-20.5
0.294	47.7	60.4	-12.7	28.2	50.4	-22.3
0.345	44.5	59.1	-14.6	26.9	49.1	-22.2
0.399	41.6	57.9	-16.3	25.9	47.9	-22.0
0.449	37.3	56.9	-19.6	20.1	46.9	-26.8
0.631	36.6	56.0	-19.4	23.4	46.0	-22.6
2.426	35.3	56.0	-20.7	23.1	46.0	-22.9

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.

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 004401115723419 - Modification State 0

2.2.3 Date of Test

7 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	22.1°C
Relative Humidity	28.2%

Product Service

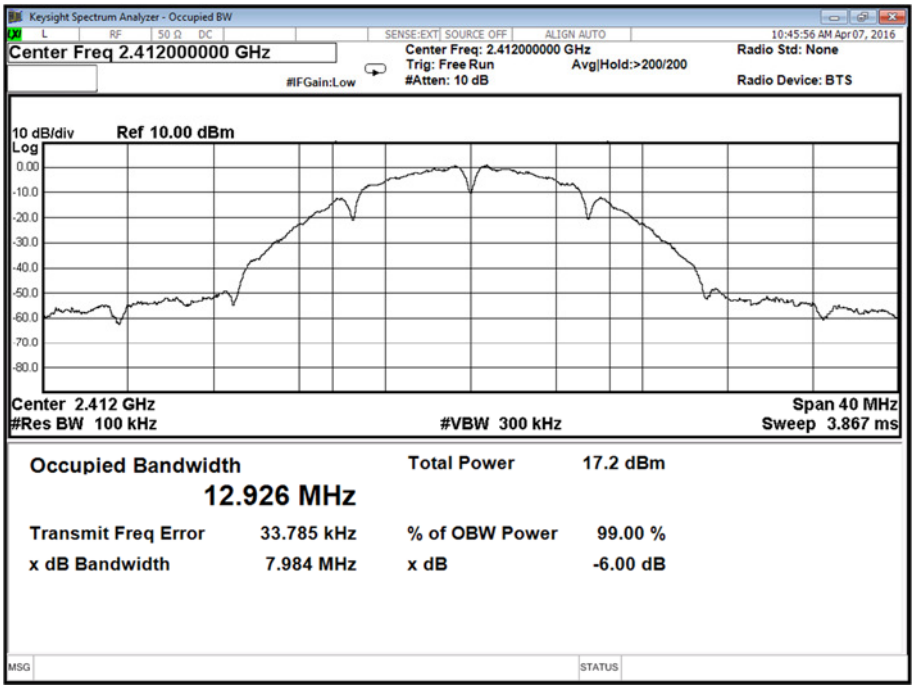
2.2.7 Test Results

4.0 V DC Supply

802.11b, DSSS, 11 Mbps, 6 dB Bandwidth Results

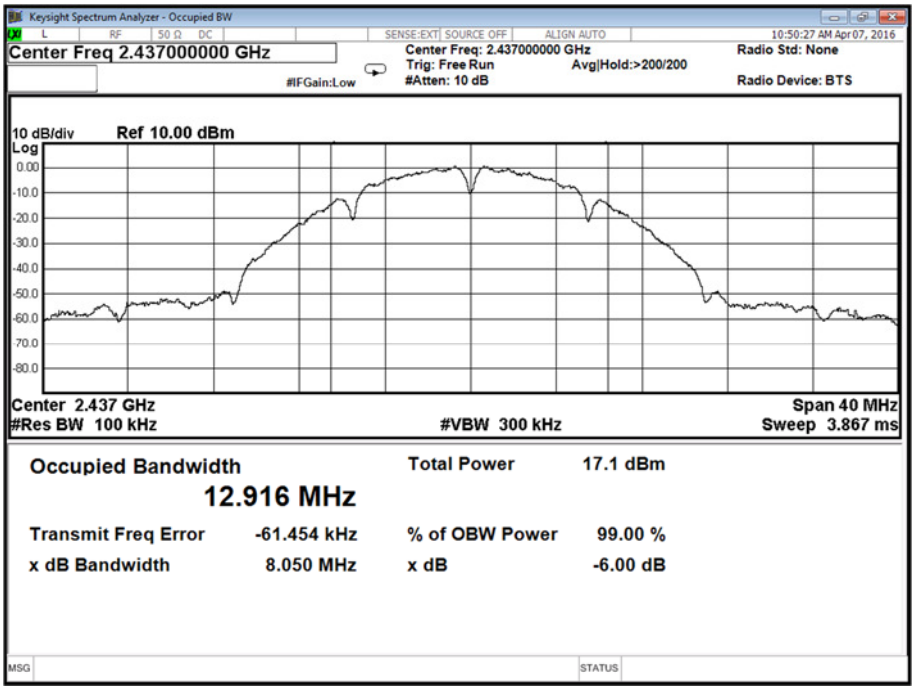
2412 MHz	2437 MHz	2462 MHz
kHz	kHz	kHz
7984	8050	8028

802.11b, 2412 MHz, DSSS, 11 Mbps, 6 dB Bandwidth Plot

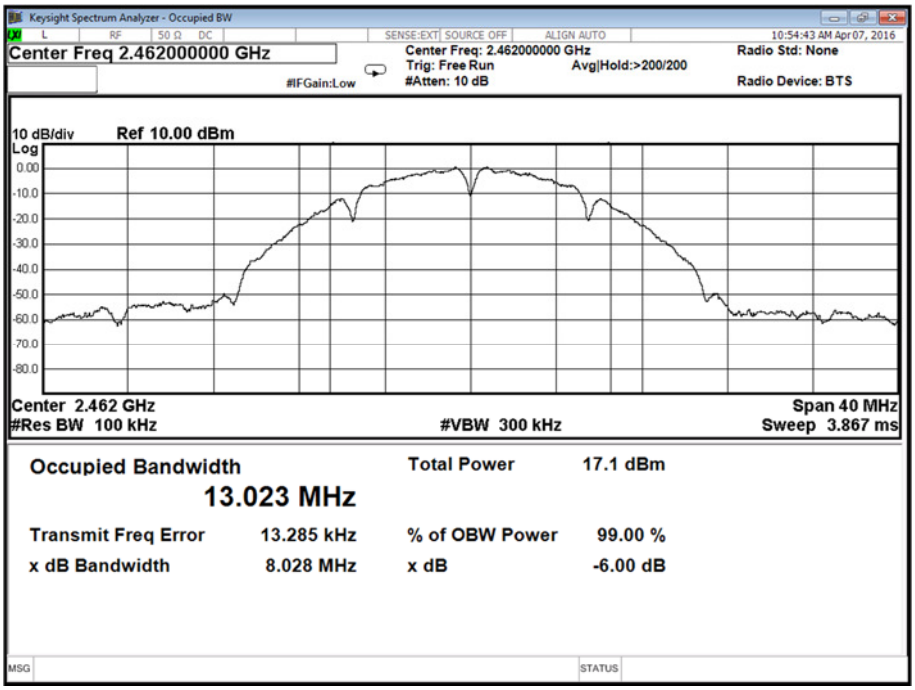


Product Service

802.11b, 2437 MHz, DSSS, 11 Mbps, 6 dB Bandwidth Plot



802.11b, 2462 MHz, DSSS, 11 Mbps, 6 dB Bandwidth Plot, 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.

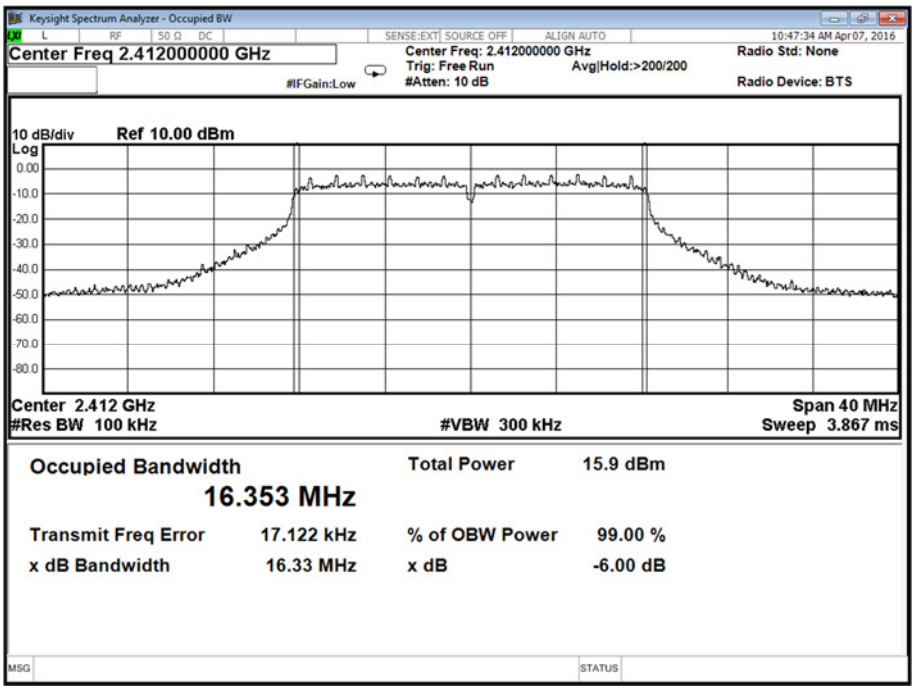
Product Service

4.0 V DC Supply

802.11g, OFDM, 48 Mbps, 6 dB Bandwidth Results

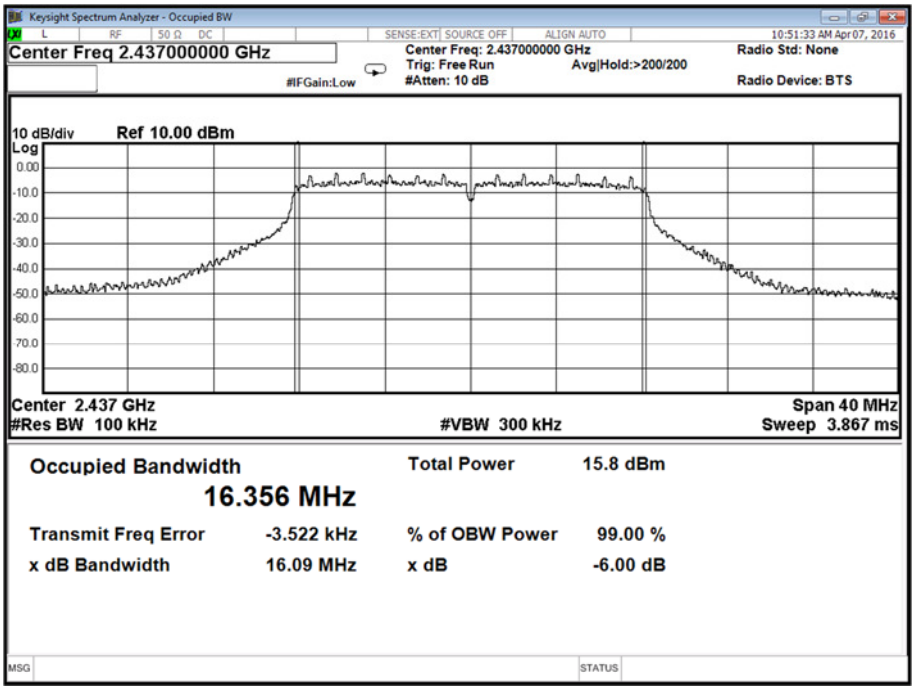
2412 MHz	2437 MHz	2462 MHz
kHz	kHz	kHz
16330	16090	16320

802.11g, 2412 MHz, OFDM, 48 Mbps, 6 dB Bandwidth Plot

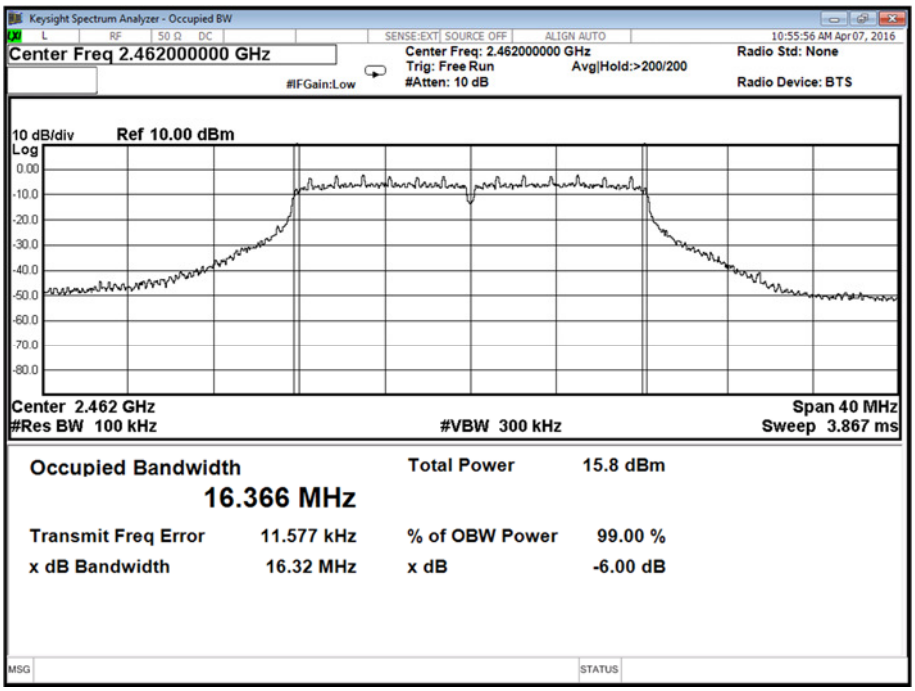


Product Service

802.11g, 2437 MHz, OFDM, 48 Mbps, 6 dB Bandwidth Plot



802.11g, 2462 MHz, OFDM, 48 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.

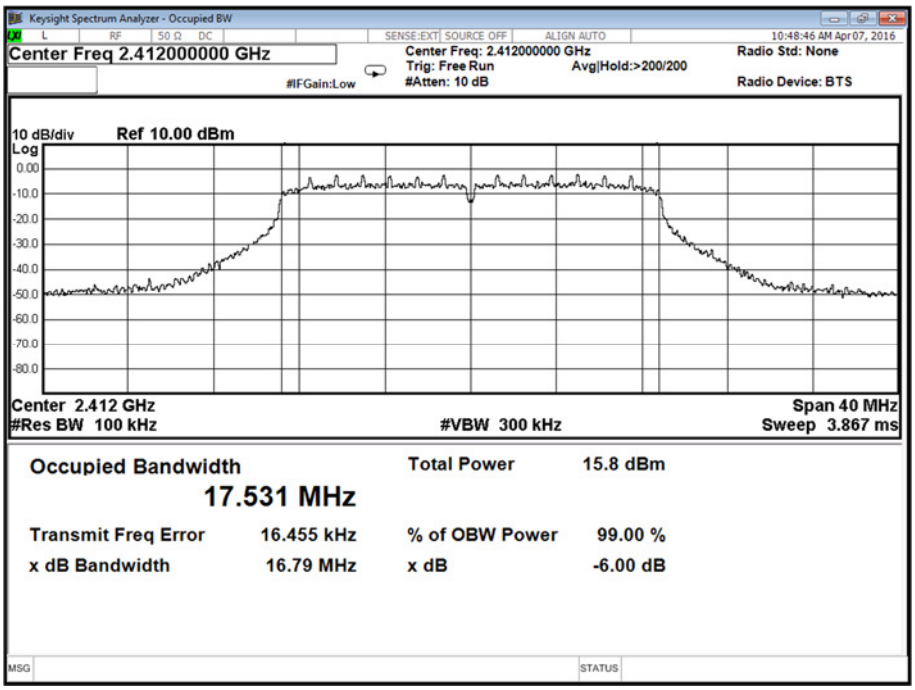
Product Service

4.0 V DC Supply

802.11n, OFDM, 65 Mbps, 6 dB Bandwidth Results

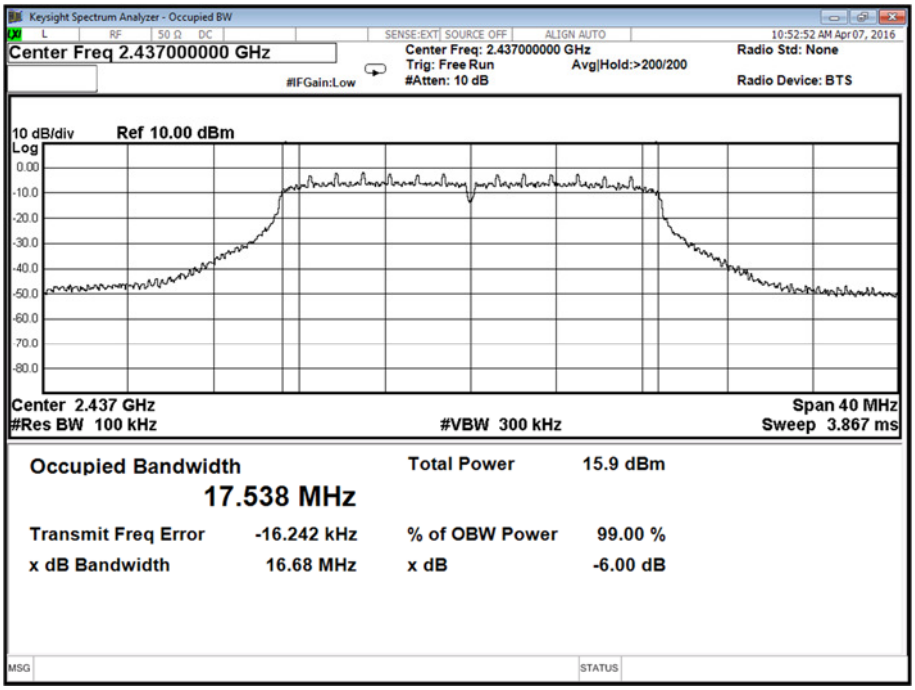
2412 MHz	2437 MHz	2462 MHz
kHz	kHz	kHz
16790	16680	16920

802.11n, 2412 MHz, OFDM, 65 Mbps, 6 dB Bandwidth Plot

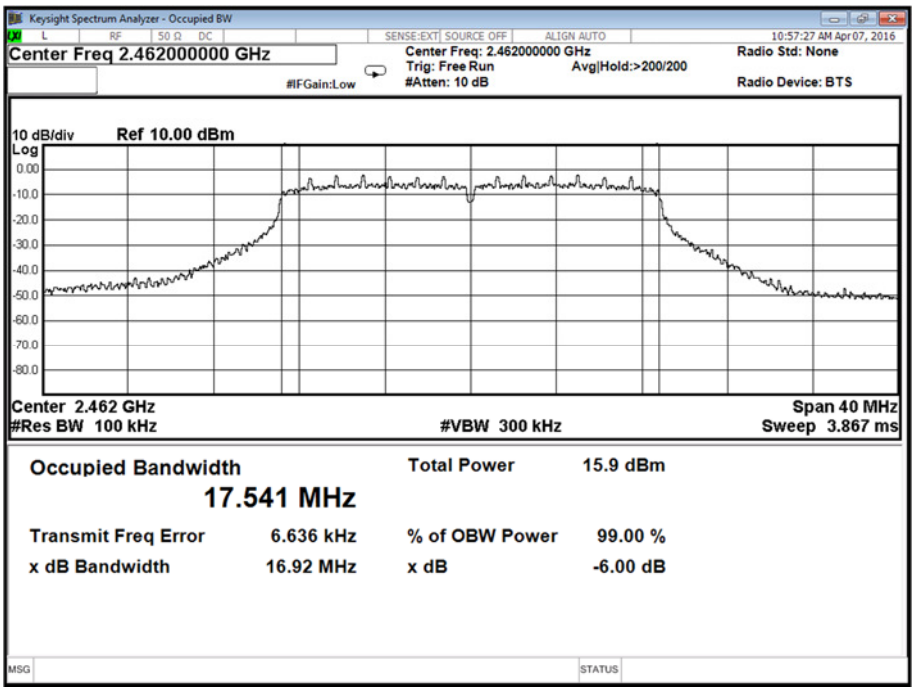


Product Service

802.11n, 2437 MHz, OFDM, 65 Mbps, 6 dB Bandwidth Plot



802.11n, 2462 MHz, OFDM, 65 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.

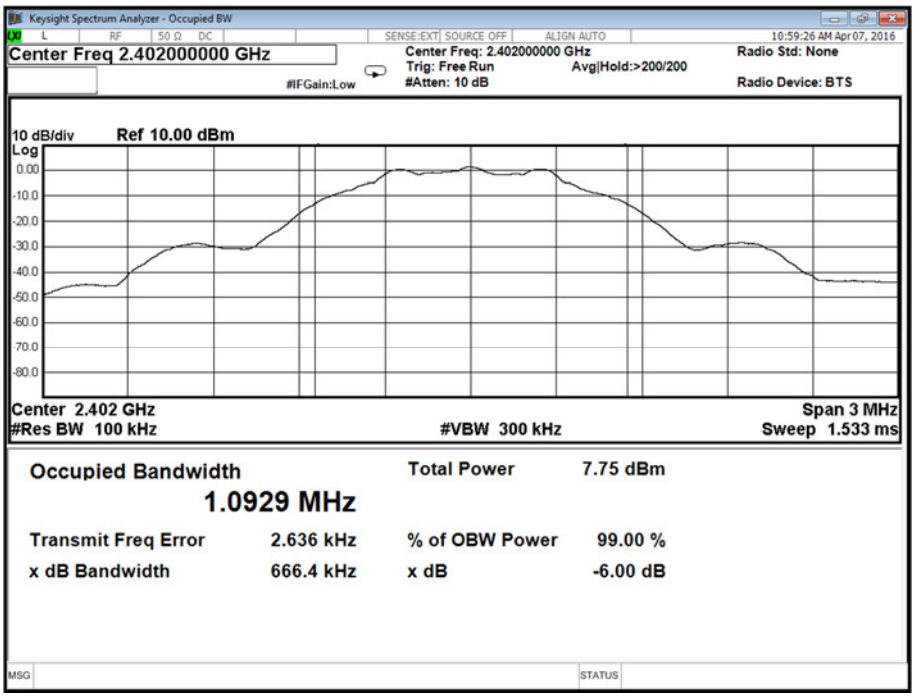
Product Service

4.0 V DC Supply

Bluetooth Low Energy, GFSK, 6 dB Bandwidth Results

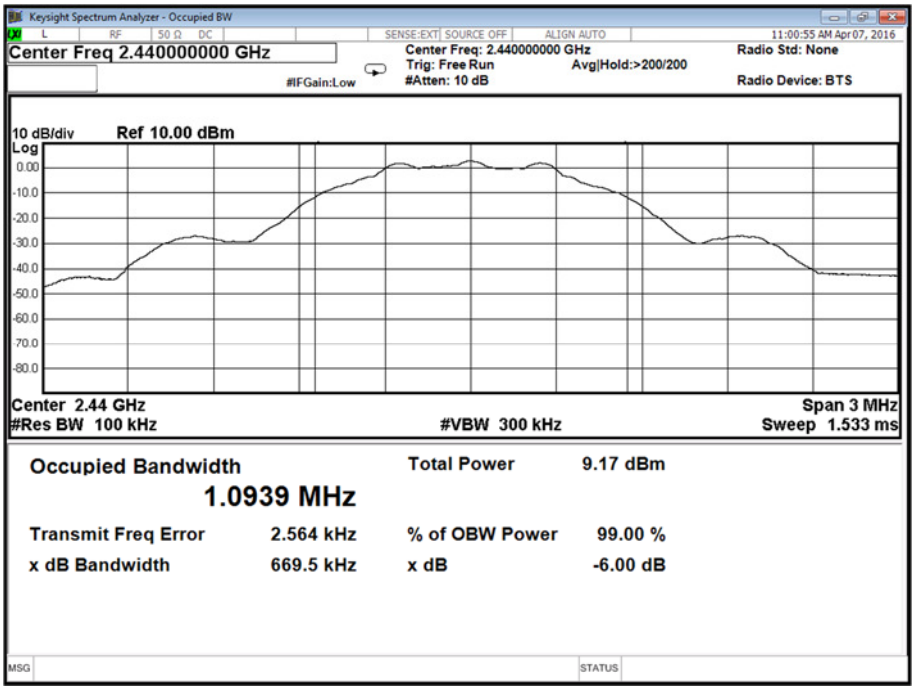
2402 MHz	2441 MHz	2480 MHz
kHz	kHz	kHz
666.4	669.5	671.8

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

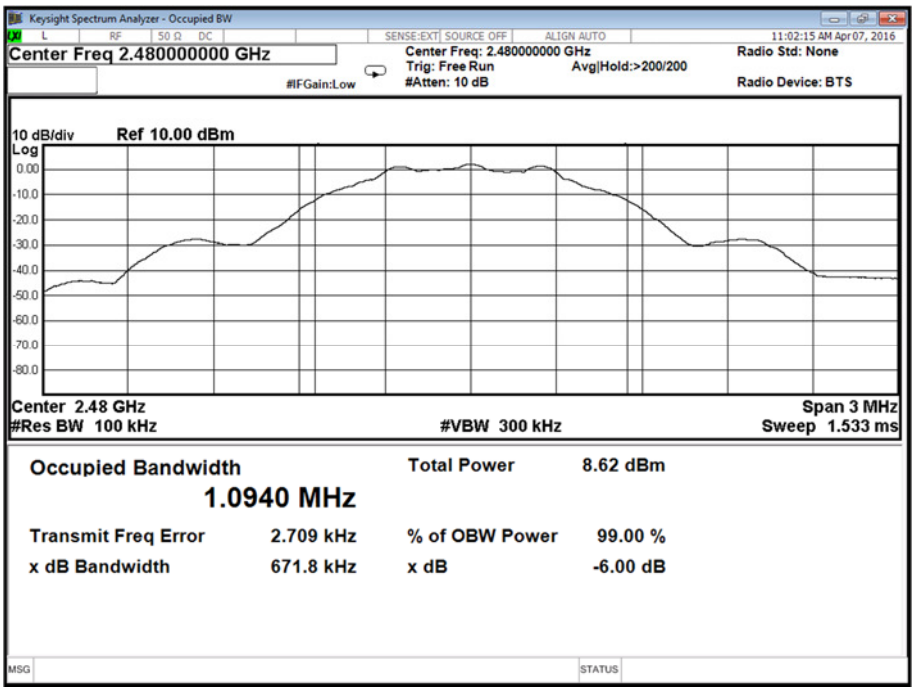


Product Service

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.

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 004401115723443 - Modification State 0
S/N: IMEI 004401115723419 - Modification State 0

2.3.3 Date of Test

4 April 2016 & 7 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.

Remarks

The power was measured individually for both antenna ports and summed as per the procedure in KDB 662911 D01 v02r01.

2.3.6 Environmental Conditions

Ambient Temperature	22.1 - 23.8°C
Relative Humidity	28.2 - 37.6%

2.3.7 Test Results

4.0 V DC Supply

802.11b, 1 Mbps, Maximum Conducted Output Power Results

2412 MHz					
Port A		Port B		Total Power	
dBm	mW	dBm	mW	dBm	mW
12.38	17.30	12.03	15.96	15.22	33.26

2437 MHz					
Port A		Port B		Total Power	
dBm	mW	dBm	mW	dBm	mW
12.26	16.83	12.09	16.18	15.19	33.01

2462 MHz					
Port A		Port B		Total Power	
dBm	mW	dBm	mW	dBm	mW
12.15	16.41	12.01	15.89	15.09	32.29

Remarks

Port A = ANT-0 and Port B = ANT-1

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

802.11g, 6 Mbps, Maximum Conducted Output Power Results

2412 MHz					
Port A		Port B		Total Power	
dBm	mW	dBm	mW	dBm	mW
16.24	42.07	16.00	39.81	19.13	81.88

2437 MHz					
Port A		Port B		Total Power	
dBm	mW	dBm	mW	dBm	mW
16.10	40.74	16.01	39.90	19.07	80.64

2462 MHz					
Port A		Port B		Total Power	
dBm	mW	dBm	mW	dBm	mW
15.94	39.26	15.96	39.45	18.96	78.81

Remarks

Port A = ANT-0 and Port B = ANT-1

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					
Port A		Port B		Total Power	
dBm	mW	dBm	mW	dBm	mW
16.12	40.93	16.00	39.81	19.07	80.74

2437 MHz					
Port A		Port B		Total Power	
dBm	mW	dBm	mW	dBm	mW
16.00	39.81	15.95	39.36	18.99	79.17

2462 MHz					
Port A		Port B		Total Power	
dBm	mW	dBm	mW	dBm	mW
16.03	40.09	15.84	38.37	18.95	78.46

Remarks

Port A = ANT-0 and Port B = ANT-1

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

Bluetooth Low Energy, Maximum Conducted Output Power Results

2402 MHz		2441 MHz		2480 MHz	
dBm	mW	dBm	mW	dBm	mW
1.200	1.318	2.600	1.819	2.100	1.622

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.

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 004401115723948 - Modification State 0

2.4.3 Date of Test

11 April 2016, 12 April 2016, 17 April 2016, 18 April 2016 & 19 April 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 in accordance with ANSI C63.10, Clause 4.1.4.2.2

2.4.6 Environmental Conditions

Ambient Temperature	18.6 - 20.3°C
Relative Humidity	25.0 - 36.0%

Product Service

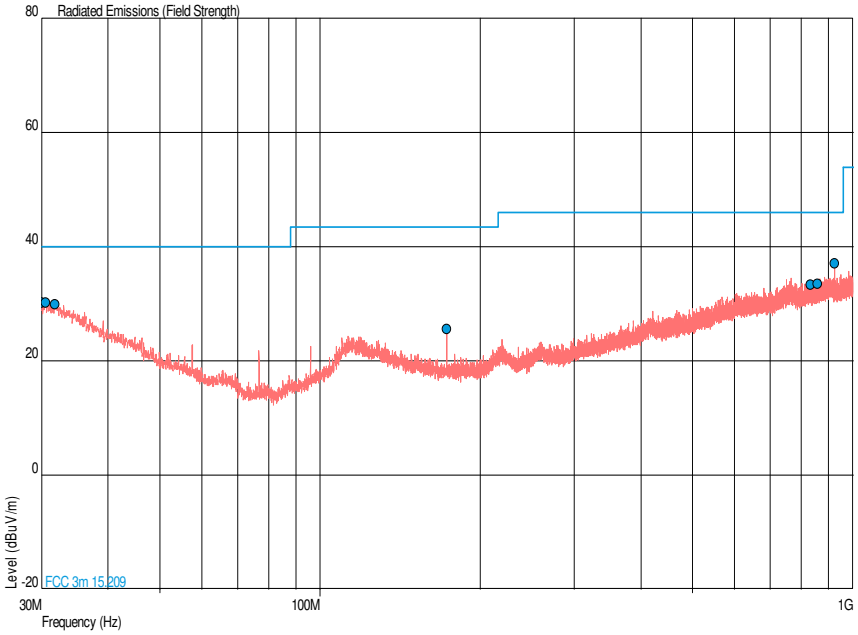
2.4.7 Test Results

4.0 V DC Supply

802.11b, 2412 MHz, 1 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
30.036	30.3	-9.7	32.7	-67.3	190	1.00	Vertical
30.523	30.2	-9.8	32.4	-67.6	85	2.31	Horizontal
31.856	29.9	-10.1	31.3	-68.7	297	1.00	Horizontal
172.796	25.5	-18.0	18.8	-131.2	1	1.00	Vertical
831.915	33.4	-12.6	46.8	-153.2	124	1.68	Horizontal
858.425	33.4	-12.6	46.8	-153.2	119	1.00	Horizontal
923.444	37.0	-9.0	70.8	-129.2	360	1.00	Horizontal

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



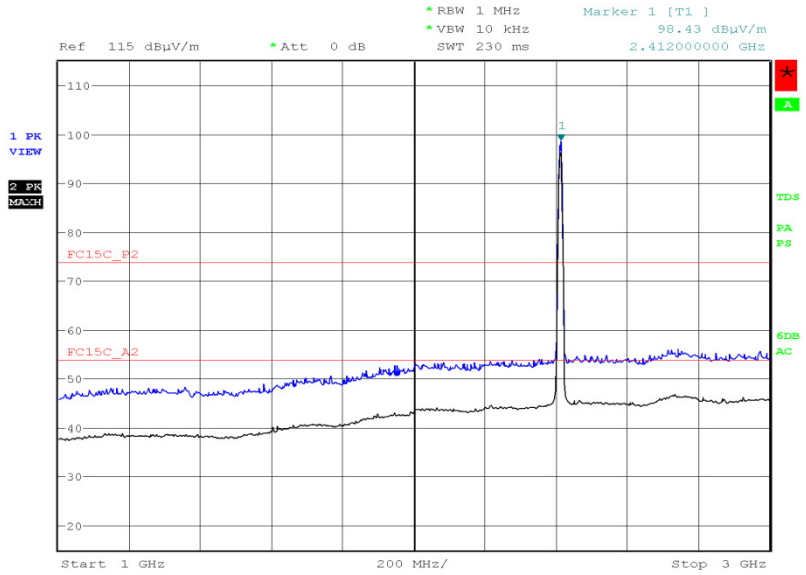
Product Service

802.11b, 2412 MHz, 1 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
*							

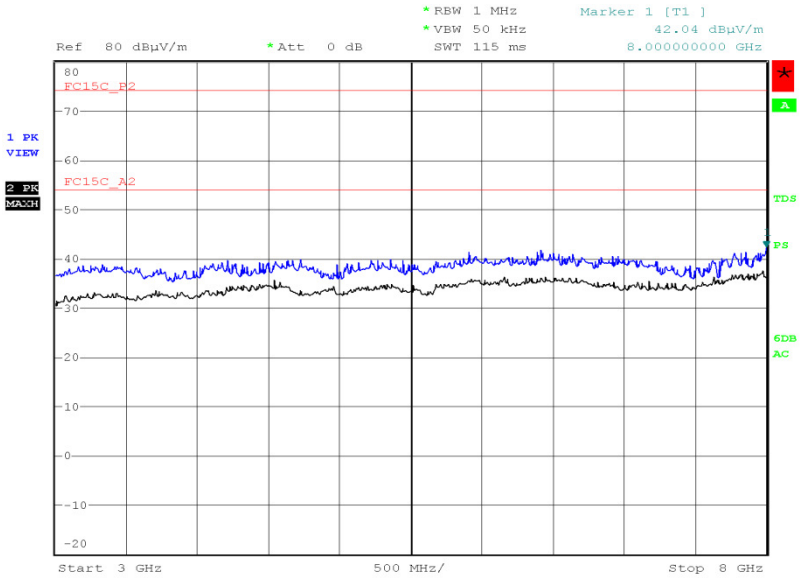
*No emissions were detected within 10 dB of the limit.

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



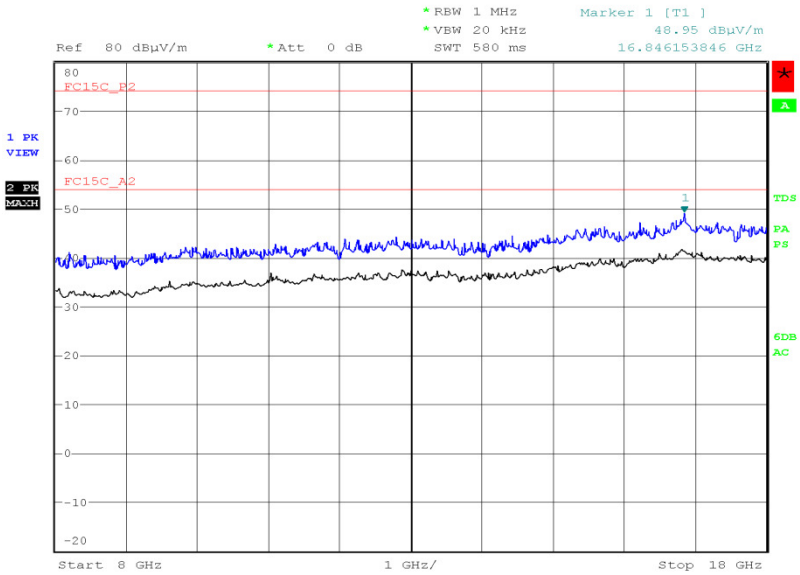
Product Service

802.11b, 2412 MHz,1 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 08:01:10

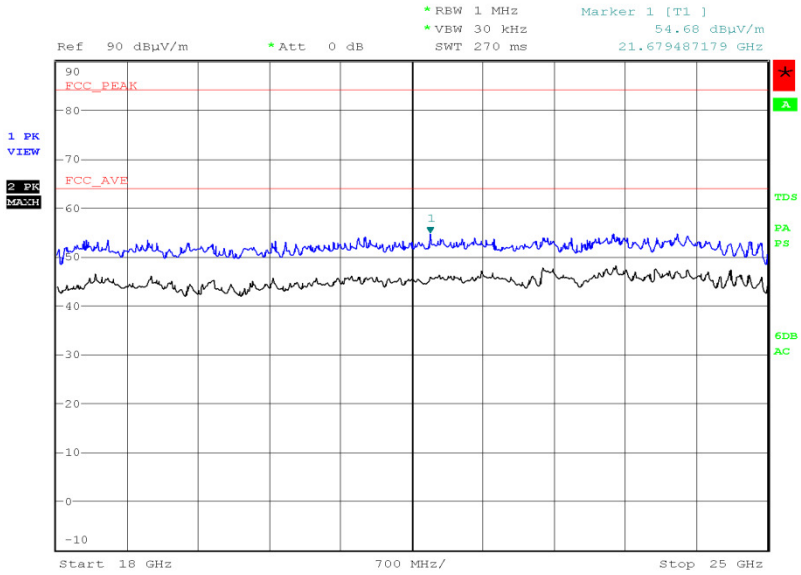
802.11b, 2412 MHz,1 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 13:08:05

Product Service

802.11b, 2412 MHz, 1 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



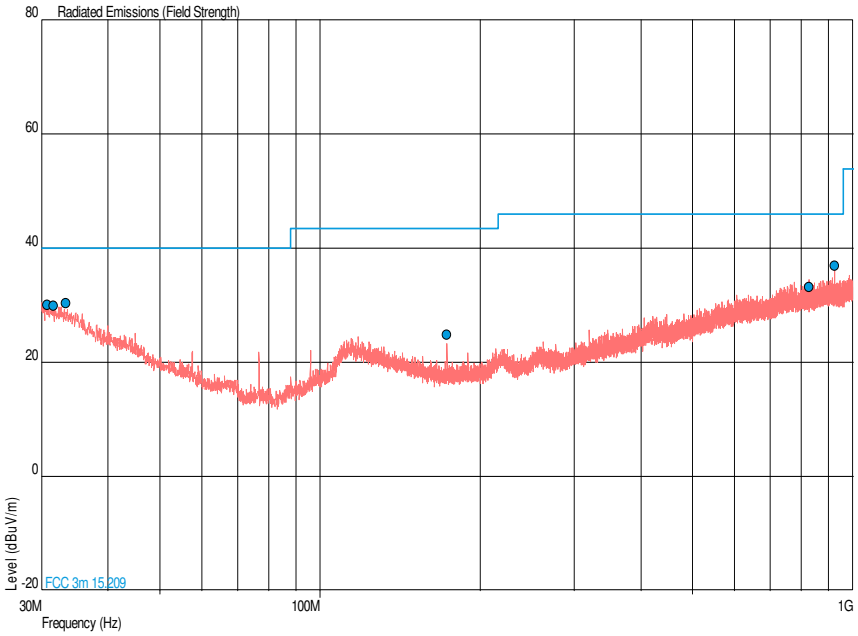
Date: 17.APR.2016 15:29:47

Product Service

802.11b, 2437 MHz, 1 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
30.776	30.1	-9.9	32.0	-68.0	180	1.00	Horizontal
31.601	29.9	-10.1	31.3	-68.7	180	1.00	Vertical
33.347	30.4	-9.6	33.1	-66.9	180	1.00	Horizontal
172.784	24.8	-18.7	17.4	-132.6	180	1.00	Vertical
826.128	33.2	-12.8	45.7	-154.3	0	1.00	Horizontal
923.370	36.9	-9.1	70.0	-130.0	0	1.00	Horizontal

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



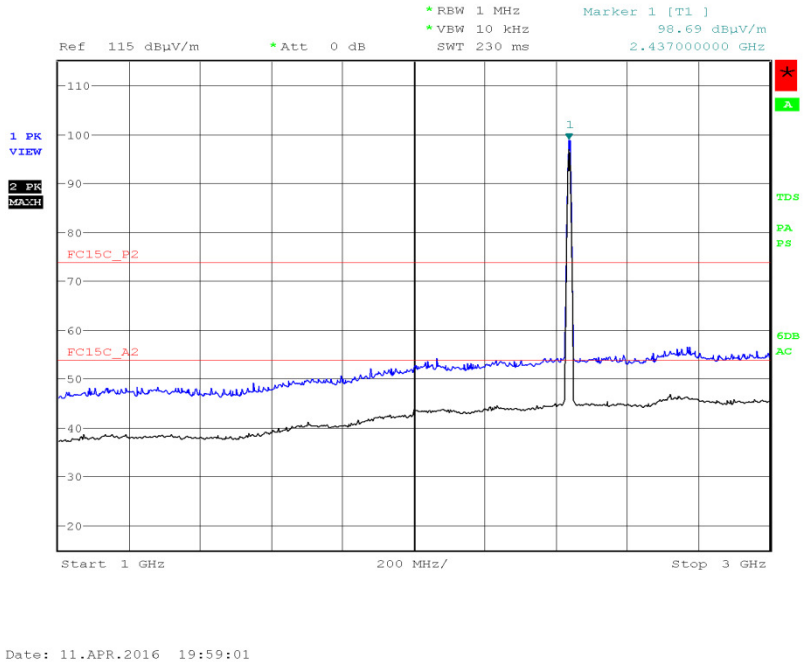
Product Service

802.11b, 2437 MHz, 1 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
*							

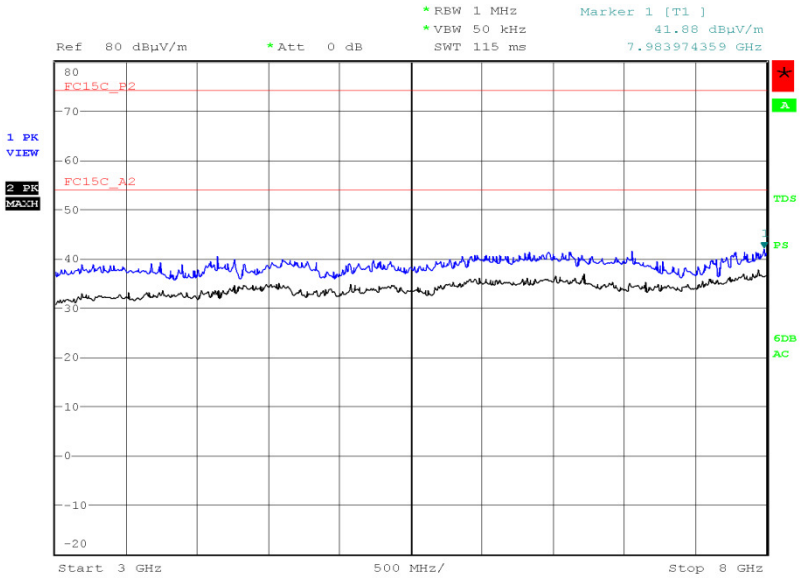
*No emissions were detected within 10 dB of the limit.

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



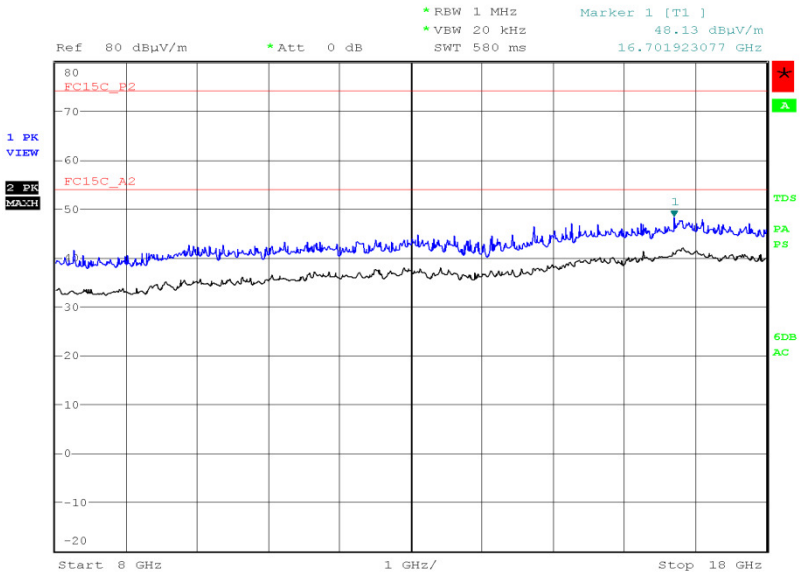
Product Service

802.11b, 2437 MHz, 1 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 08:07:34

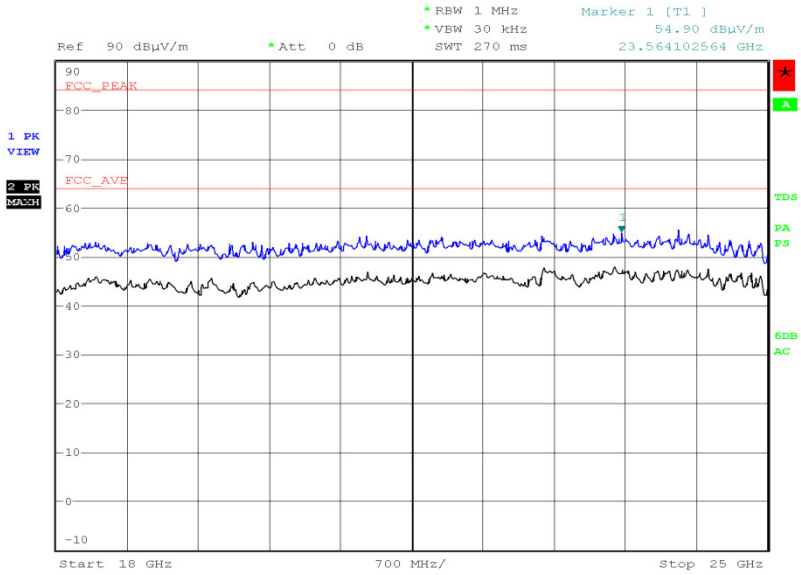
802.11b, 2437 MHz, 1 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 13:17:48

Product Service

802.11b, 2437 MHz, 1 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



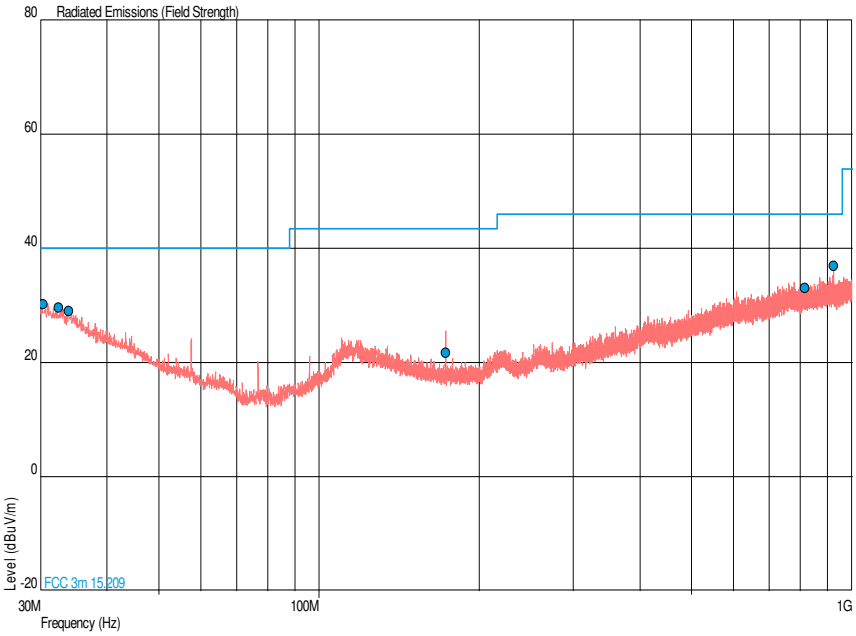
Date: 17.APR.2016 15:31:33

Product Service

802.11b, 2462 MHz, 1 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
30.388	30.2	-9.8	32.4	-67.6	0	1.00	Horizontal
32.425	29.7	-10.3	30.5	-69.5	180	1.00	Horizontal
33.880	29.0	-11.0	28.2	-71.8	0	1.00	Horizontal
172.736	21.8	-21.7	12.3	-137.7	0	1.00	Vertical
815.448	33.1	-12.9	45.2	-154.8	0	1.00	Vertical
923.370	36.9	-9.1	70.0	-130.0	0	1.00	Horizontal

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



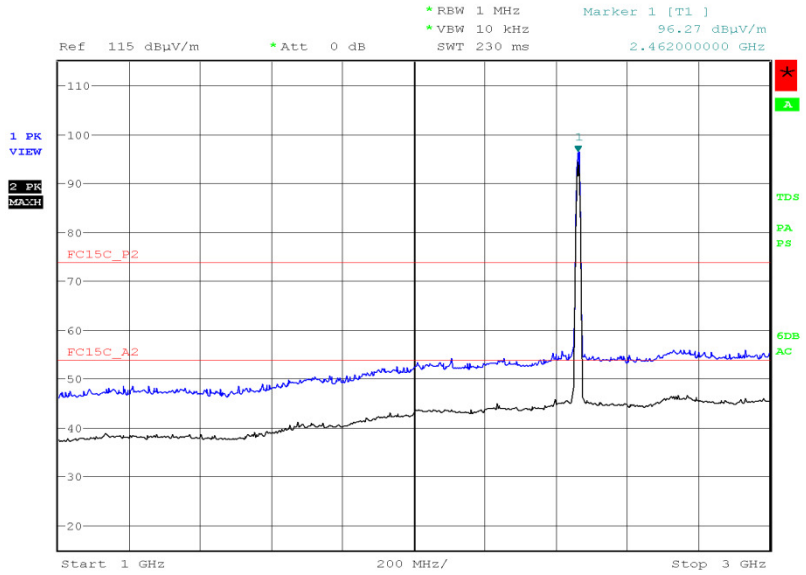
Product Service

802.11b, 2462 MHz, 1 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.

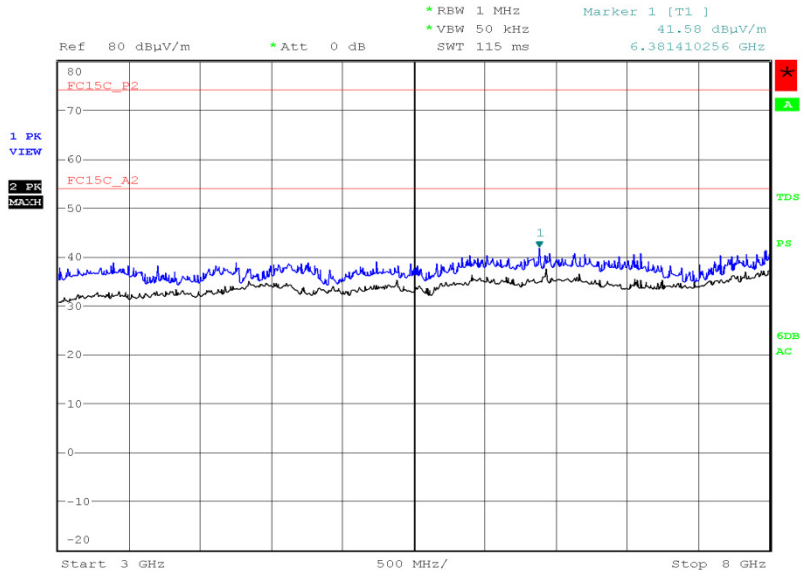
802.11b, 2462 MHz, 1 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 11.APR.2016 20:02:49

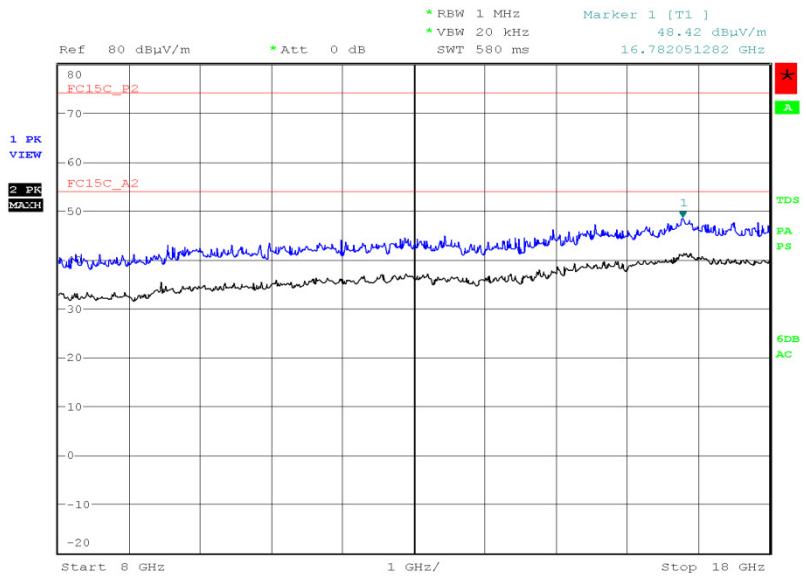
Product Service

802.11b, 2462 MHz, 1 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 08:11:57

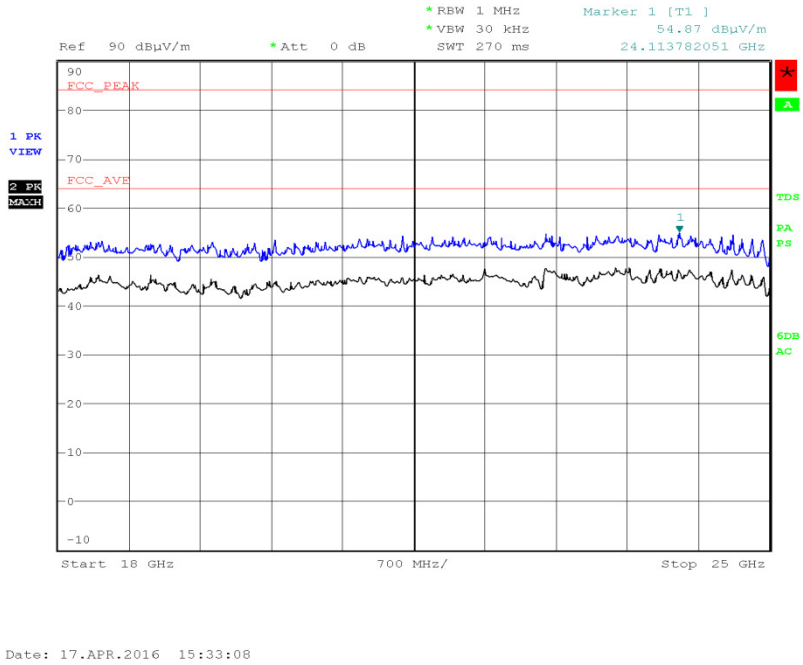
802.11b, 2462 MHz, 1 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 13:27:57

Product Service

802.11b, 2462 MHz, 1 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

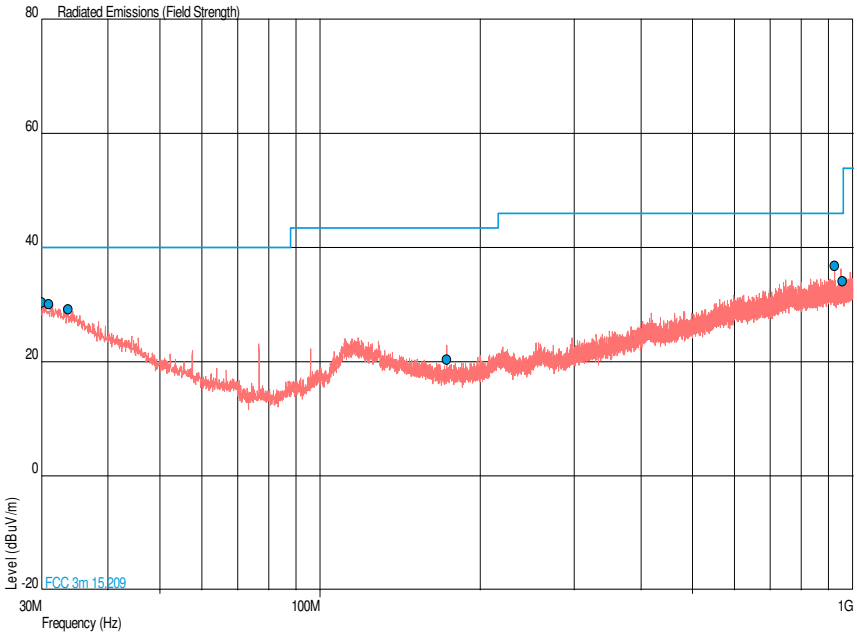
Product Service

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
30.049	30.3	-9.7	32.7	-67.3	0	1.00	Vertical
31.019	30.1	-9.9	32.0	-68.0	0	1.00	Horizontal
33.686	29.2	-10.8	28.8	-71.2	180	1.00	Vertical
172.736	20.4	-23.1	10.5	-139.5	180	1.00	Vertical
923.419	36.8	-9.2	69.2	-130.8	0	1.00	Horizontal
956.352	34.1	-11.9	50.7	-149.3	0	1.00	Horizontal

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



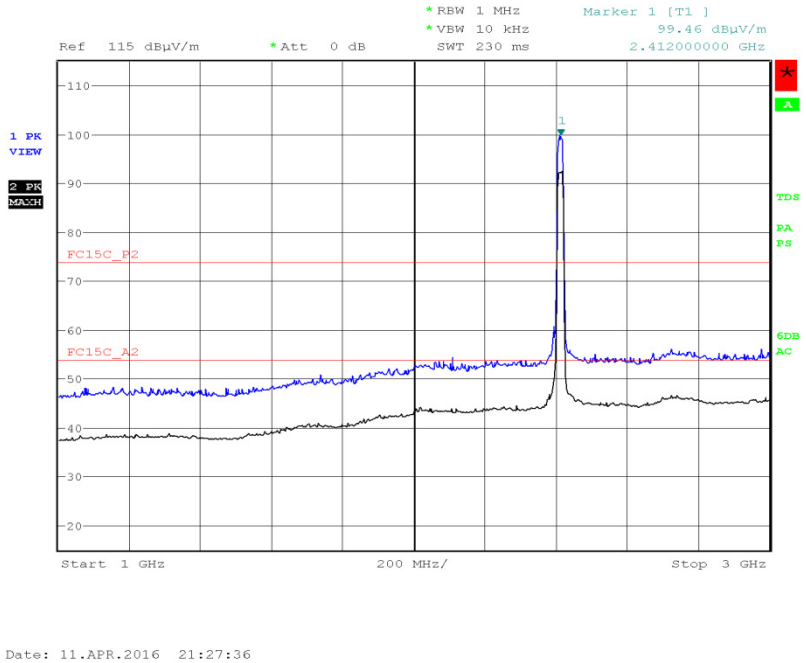
Product Service

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
*							

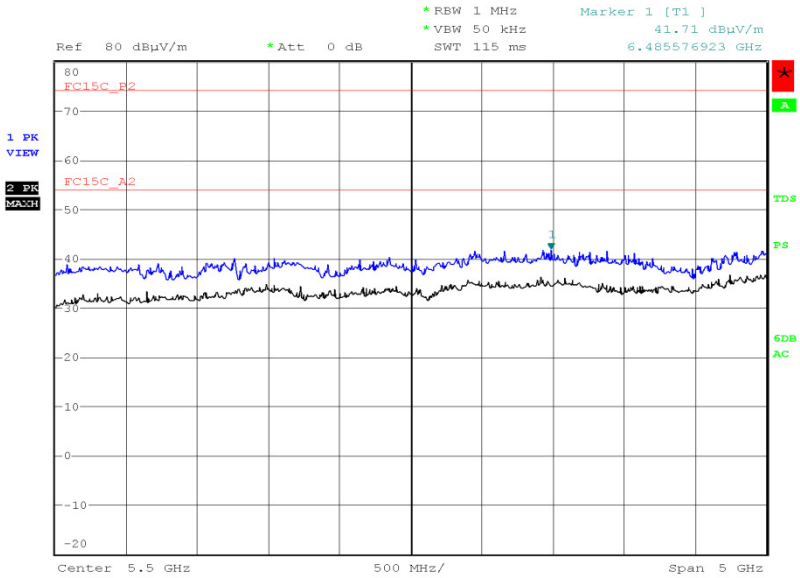
*No emissions were detected within 10 dB of the limit.

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



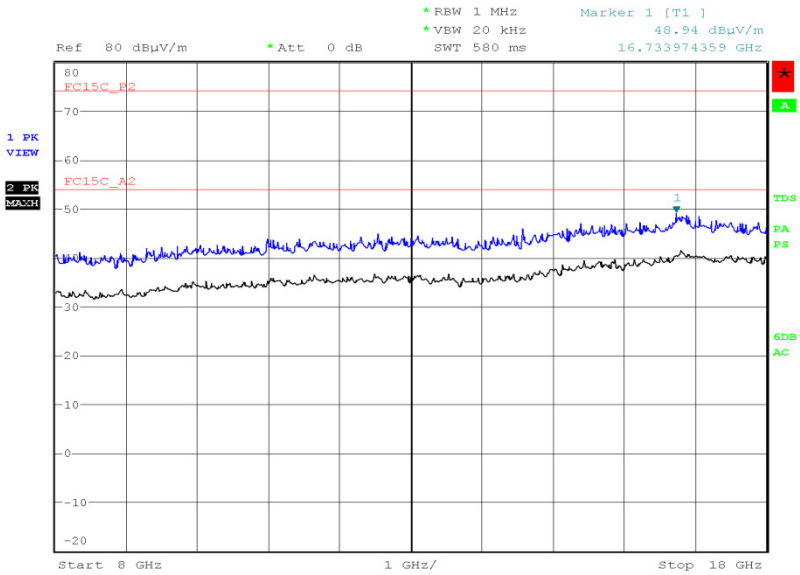
Product Service

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



Date: 17.APR.2016 08:17:07

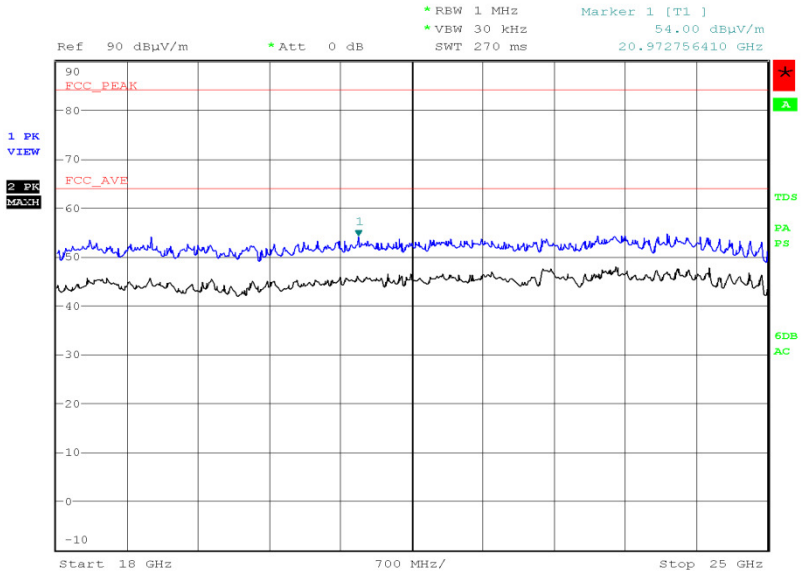
802.11g, 2412 MHz, 6 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 13:35:35

Product Service

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



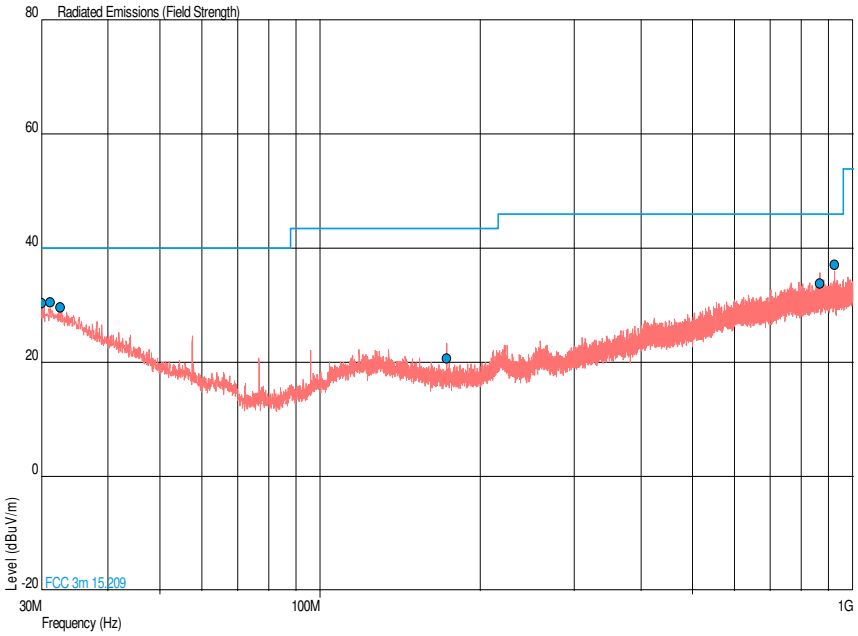
Date: 17.APR.2016 15:34:53

Product Service

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
30.000	30.4	-9.6	33.1	-66.9	180	1.00	Vertical
31.213	30.6	-9.4	33.9	-66.1	0	1.00	Vertical
32.619	29.7	-10.3	30.5	-69.5	180	1.00	Vertical
172.736	20.6	-22.9	10.7	-139.3	0	1.00	Vertical
865.752	33.8	-12.2	49.0	-151.0	180	1.00	Vertical
923.419	37.1	-8.9	71.6	-128.4	0	1.00	Vertical

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



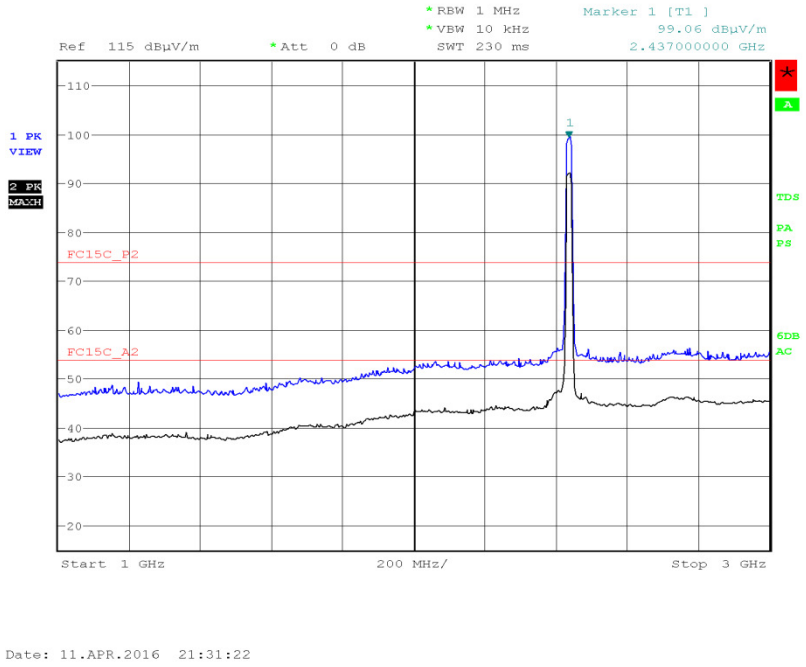
Product Service

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
*							

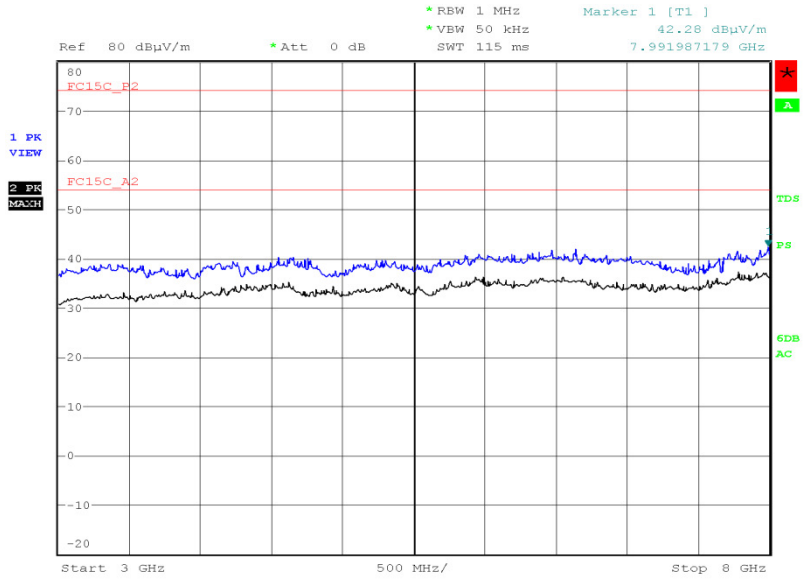
*No emissions were detected within 10 dB of the limit.

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



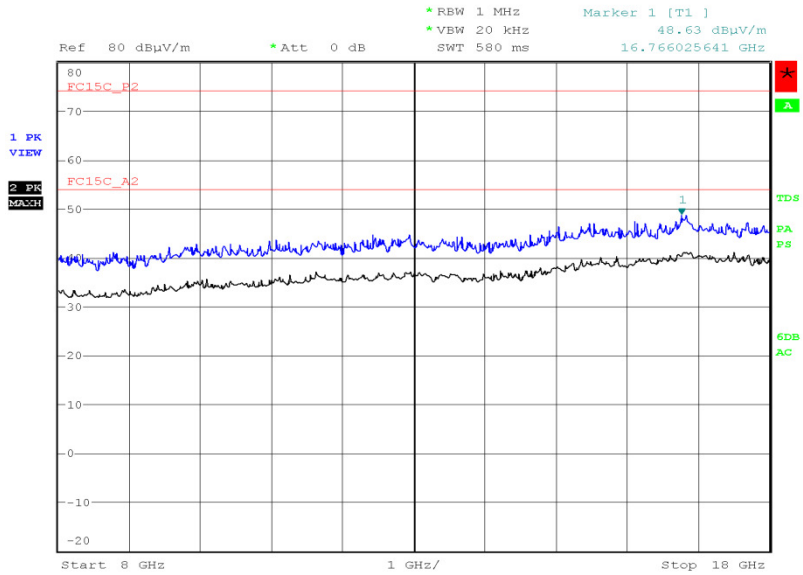
Product Service

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



Date: 17.APR.2016 08:22:53

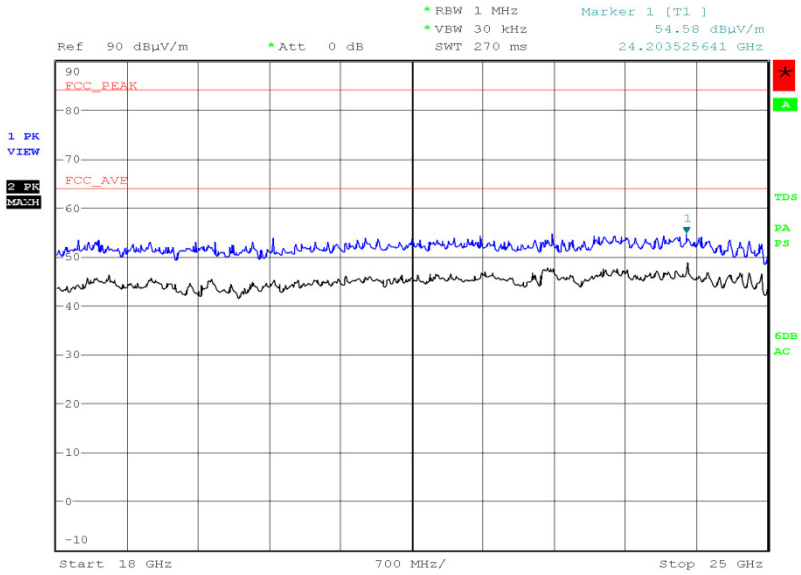
802.11g, 2437 MHz, 6 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 13:49:54

Product Service

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



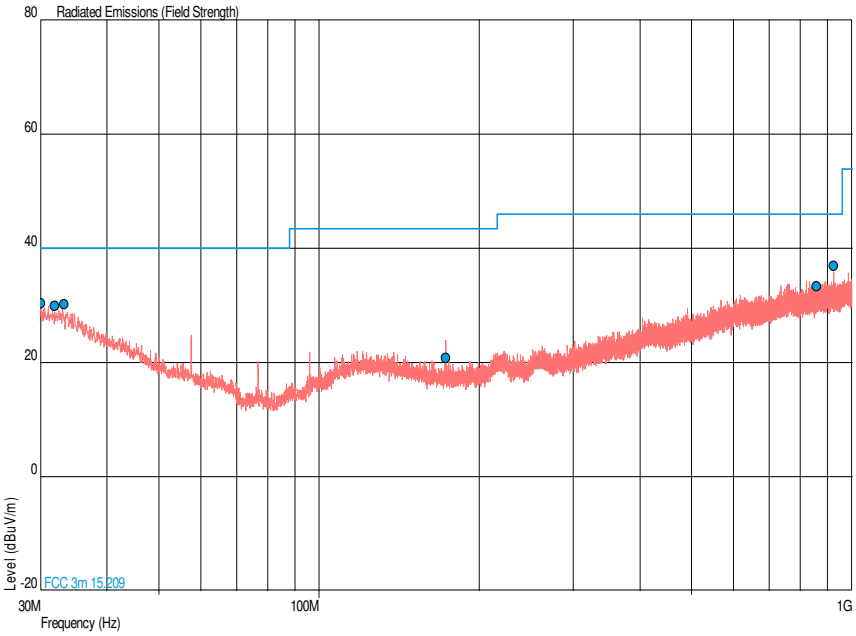
Date: 17.APR.2016 15:36:49

Product Service

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
30.097	30.3	-9.7	32.7	-67.3	0	1.00	Vertical
31.892	29.9	-10.1	31.3	-68.7	180	1.00	Vertical
33.250	30.2	-9.8	32.4	-67.6	180	1.00	Vertical
172.736	20.8	-22.7	11.0	-139.0	0	1.00	Vertical
858.118	33.4	-12.6	46.8	-153.2	0	1.00	Vertical
923.370	36.9	-9.1	70.0	-130.0	0	1.00	Vertical

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



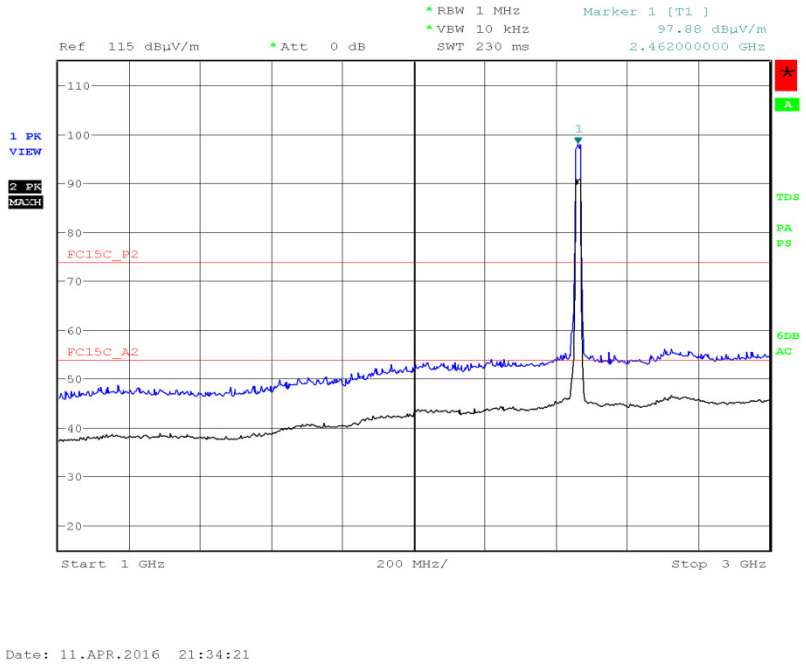
Product Service

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
*							

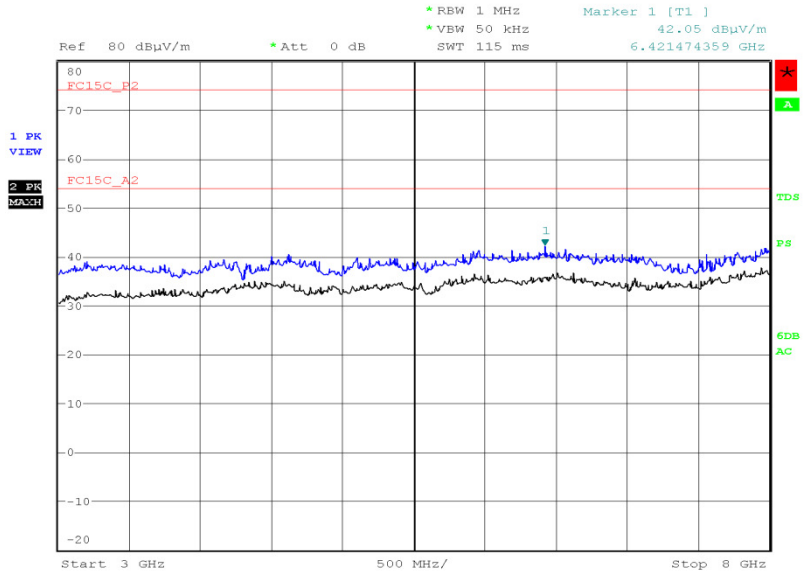
*No emissions were detected within 10 dB of the limit.

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



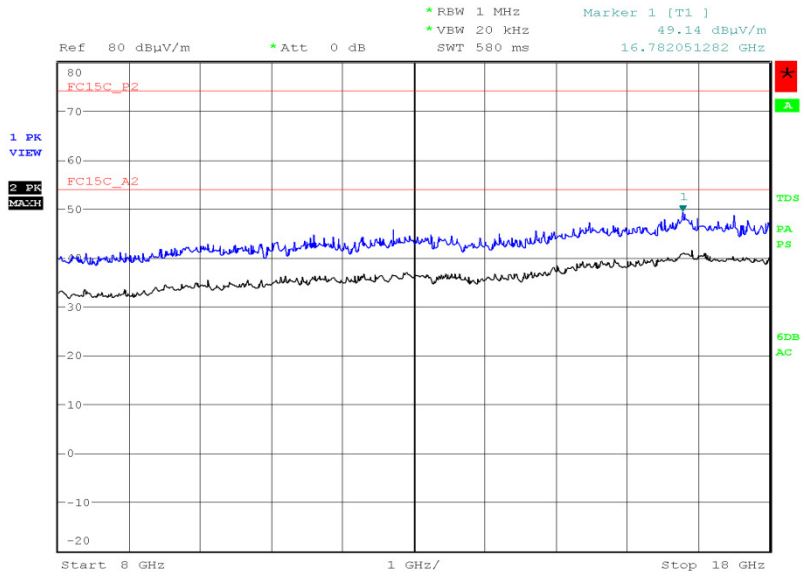
Product Service

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



Date: 17.APR.2016 08:28:18

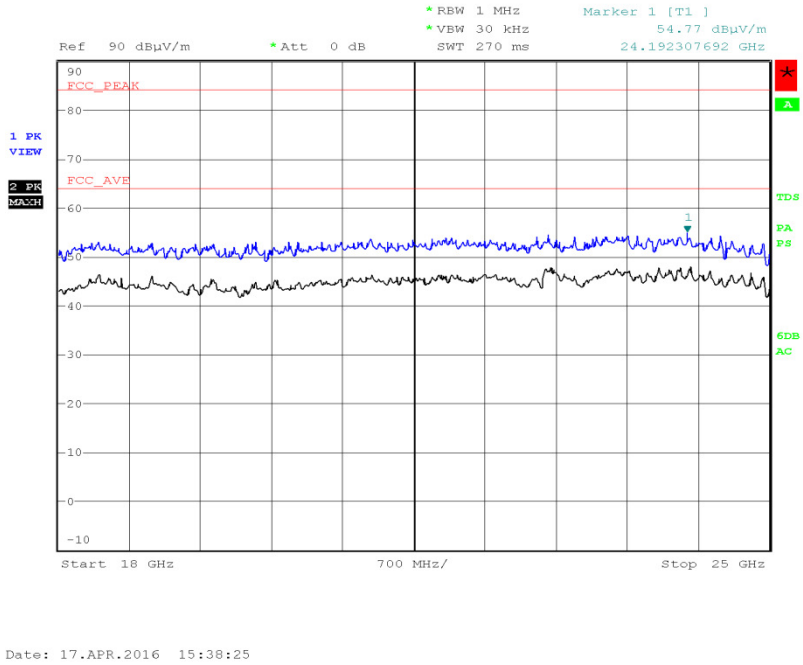
802.11g, 2462 MHz, 6 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 13:57:08

Product Service

802.11g, 2462 MHz, 6 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

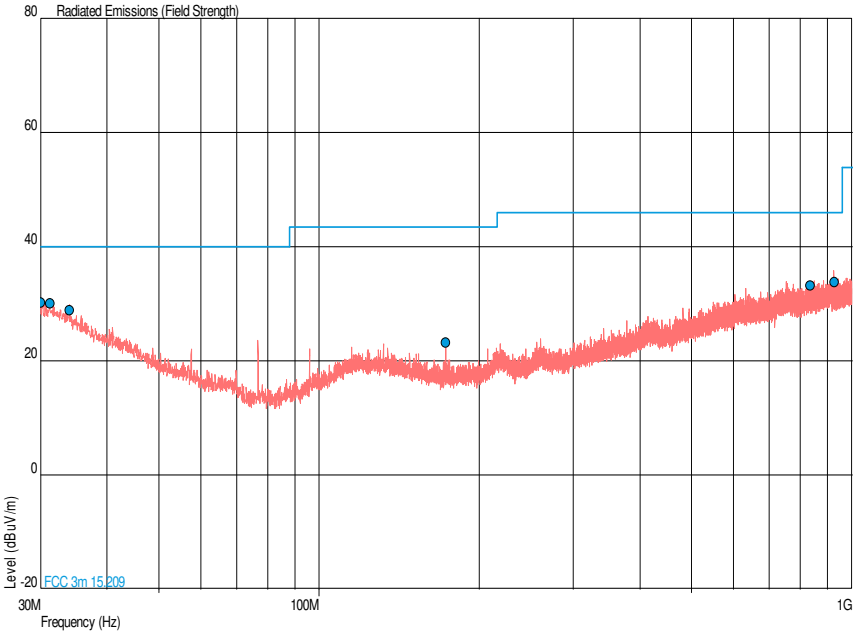
Product Service

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
30.049	30.3	-9.7	32.7	-67.3	180	1.00	Vertical
31.310	30.1	-9.9	32.0	-68.0	0	1.00	Vertical
34.026	28.9	-11.1	27.9	-72.1	0	1.00	Vertical
172.784	23.2	-20.3	14.5	-135.5	0	1.00	Vertical
836.511	33.2	-12.8	45.7	-154.3	0	1.00	Vertical
926.347	33.9	-12.1	49.5	-150.5	0	1.00	Vertical

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



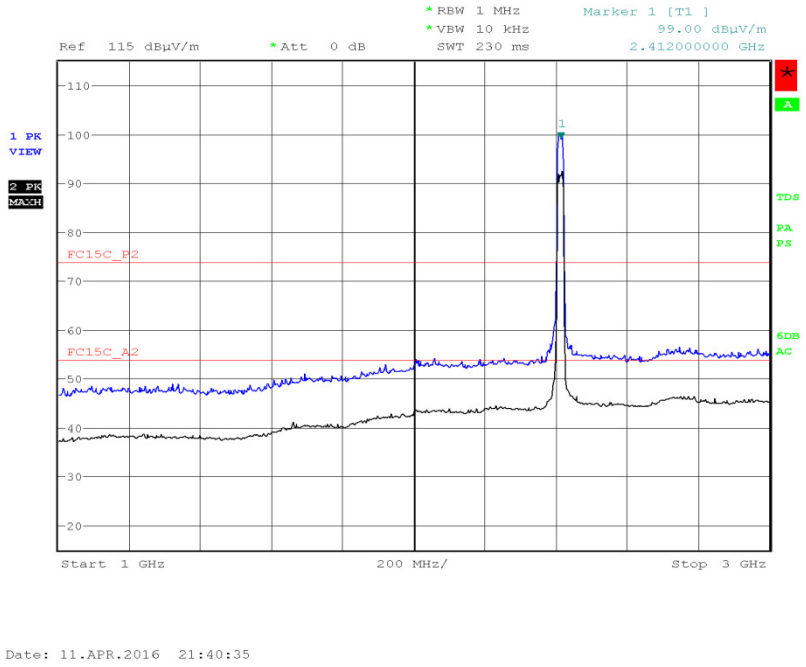
Product Service

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
*							

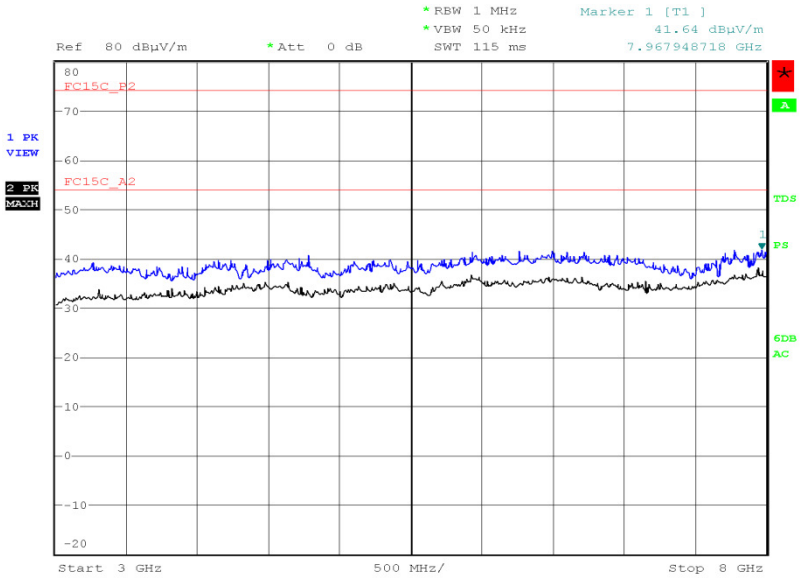
*No emissions were detected within 10 dB of the limit.

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



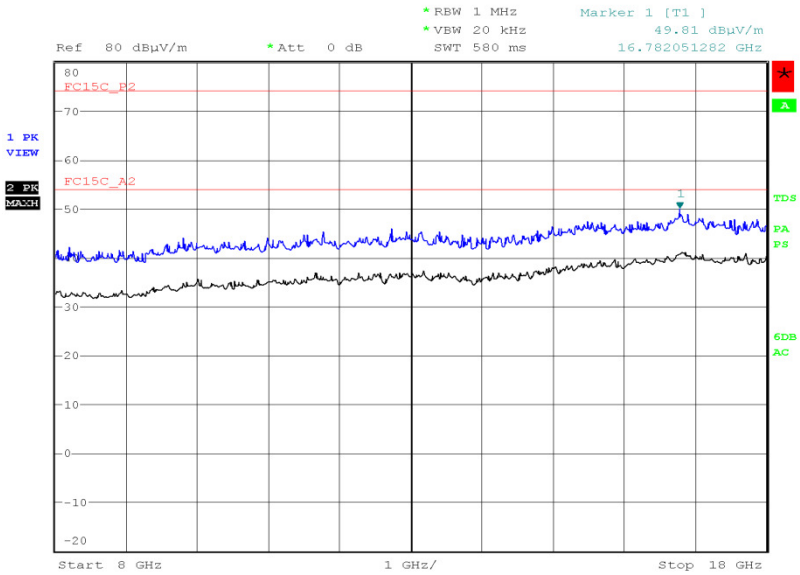
Product Service

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



Date: 17.APR.2016 08:34:28

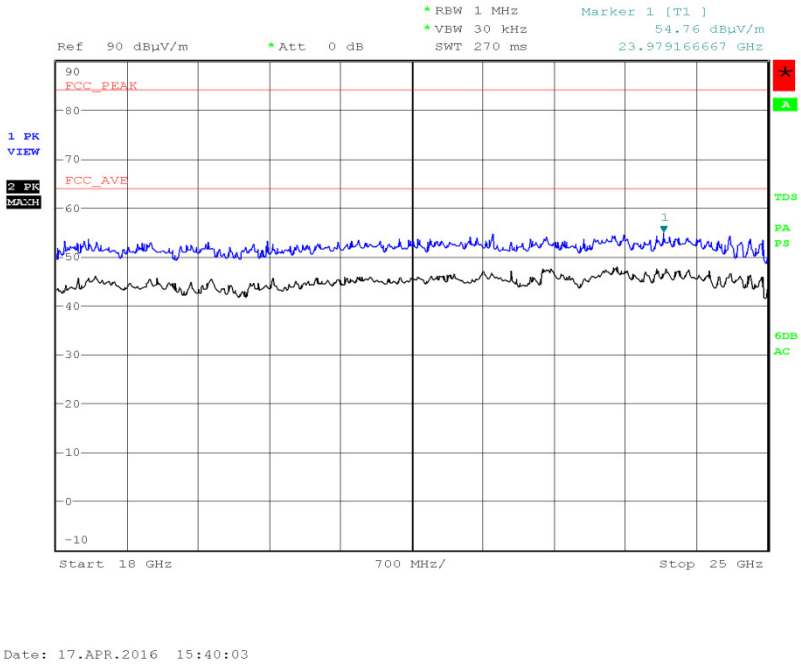
802.11n, 2412 MHz,6.5 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 14:05:26

Product Service

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

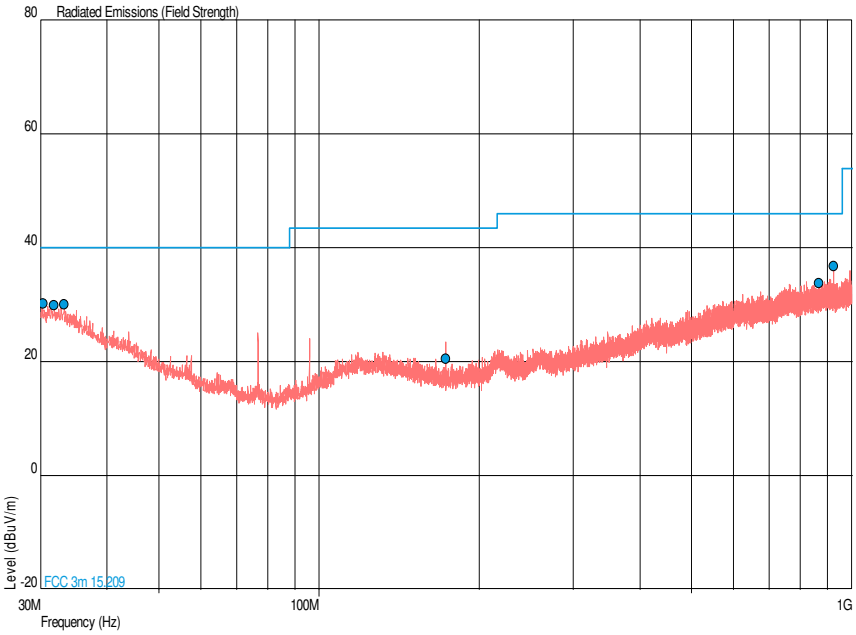


Product Service

802.11n, 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
30.388	30.2	-9.8	32.4	-67.6	180	1.00	Vertical
31.795	29.9	-10.1	31.3	-68.7	0	1.00	Vertical
33.250	30.1	-9.9	32.0	-68.0	180	1.00	Vertical
172.736	20.5	-23.0	10.6	-139.4	180	1.00	Vertical
866.237	33.8	-12.2	49.0	-151.0	180	1.00	Vertical
923.467	36.8	-9.2	69.2	-130.8	180	1.00	Vertical

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



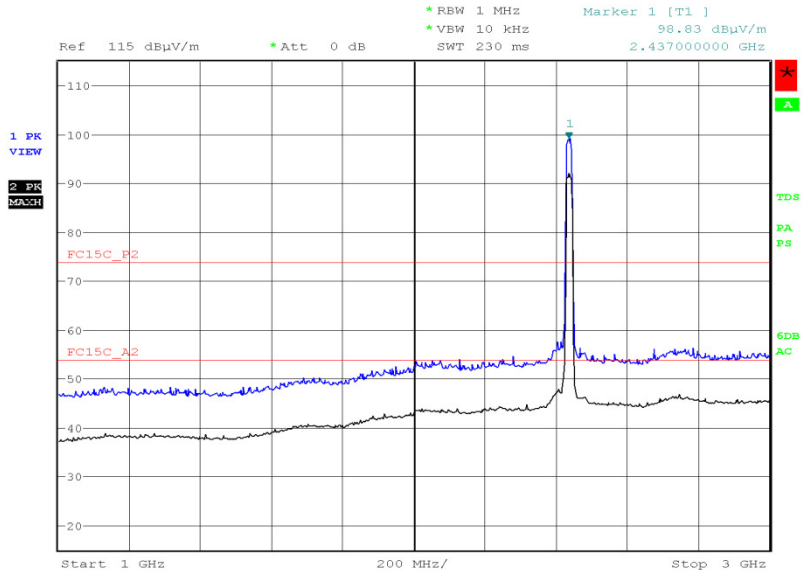
Product Service

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 emissionswere detected within 10 dB of the limit.

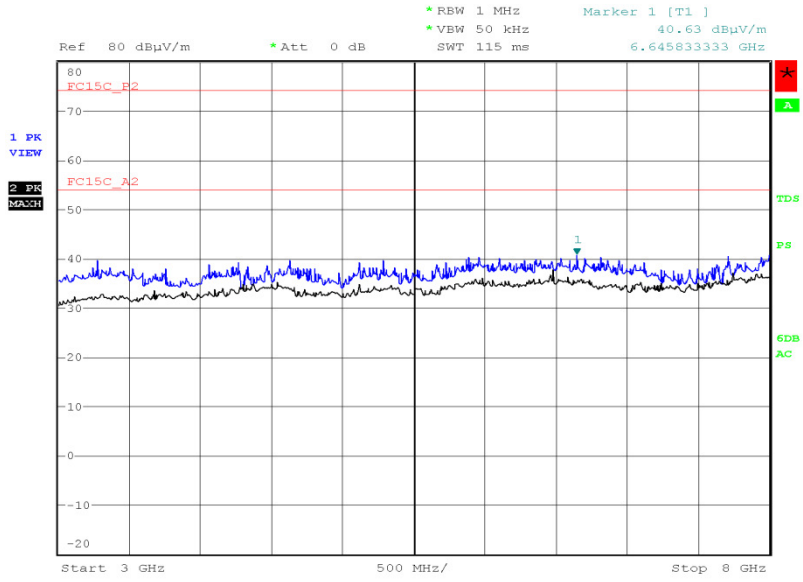
802.11n, 2437 MHz, 6.5 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 11.APR.2016 21:43:40

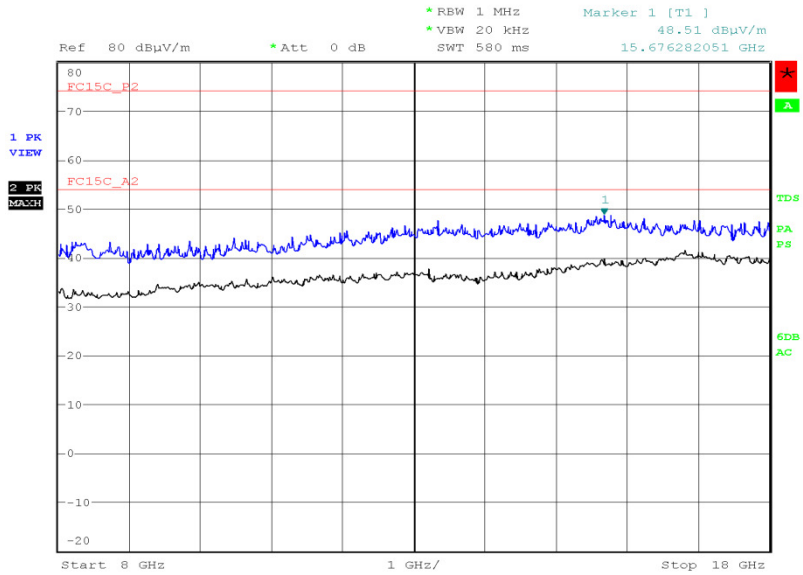
Product Service

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



Date: 17.APR.2016 08:43:14

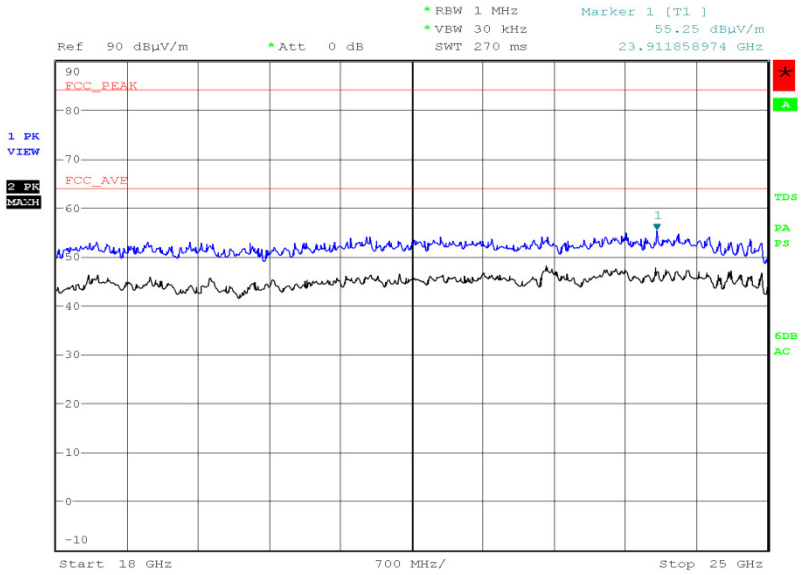
802.11n, 2437 MHz, 6.5 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 14:13:28

Product Service

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



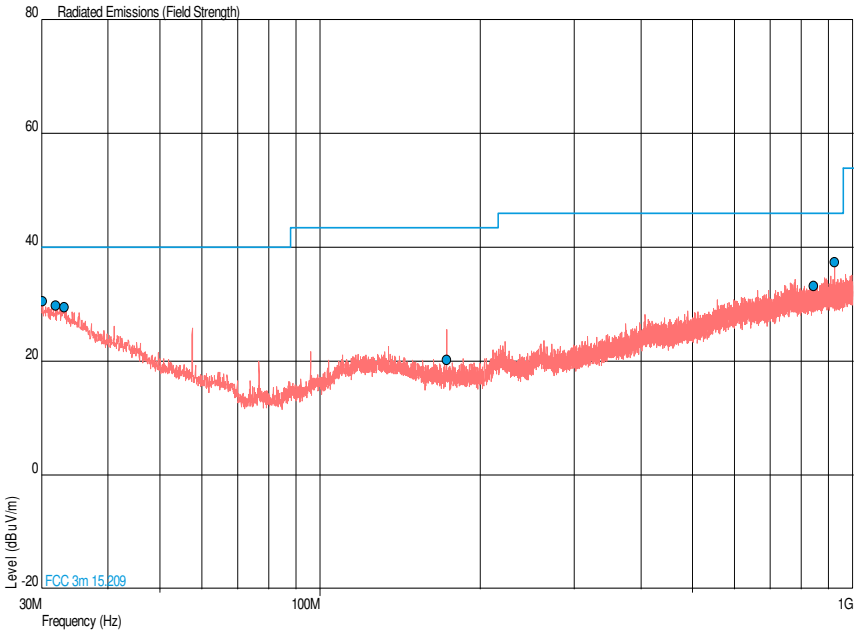
Date: 17.APR.2016 15:41:39

Product Service

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
30.194	30.5	-9.5	33.5	-66.5	0	1.00	Vertical
31.940	29.8	-10.2	30.9	-69.1	180	1.00	Vertical
33.104	29.5	-10.5	29.9	-70.1	180	1.00	Vertical
172.881	20.2	-23.3	10.2	-139.8	0	1.00	Vertical
843.442	33.2	-12.8	45.7	-154.3	180	1.00	Vertical
923.419	37.4	-8.6	74.1	-125.9	0	1.00	Vertical

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



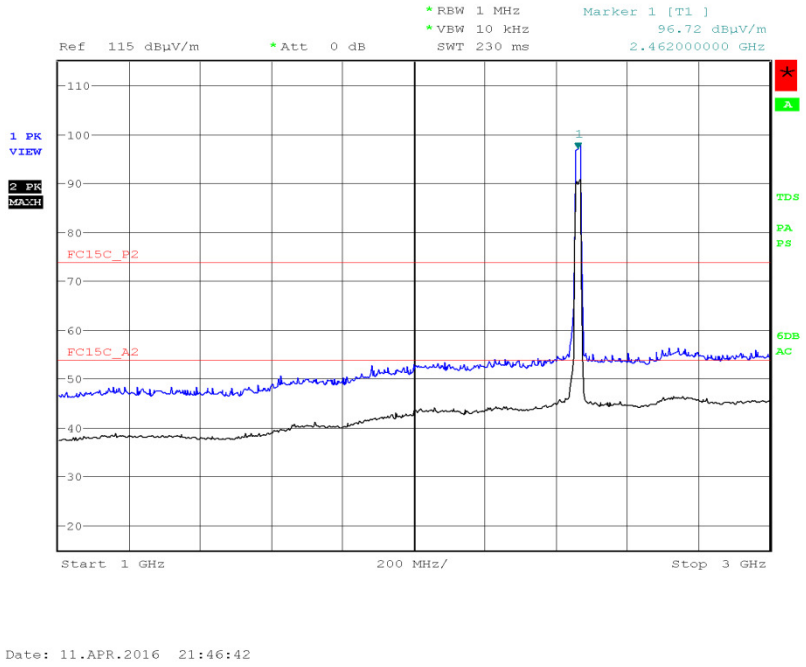
Product Service

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
*							

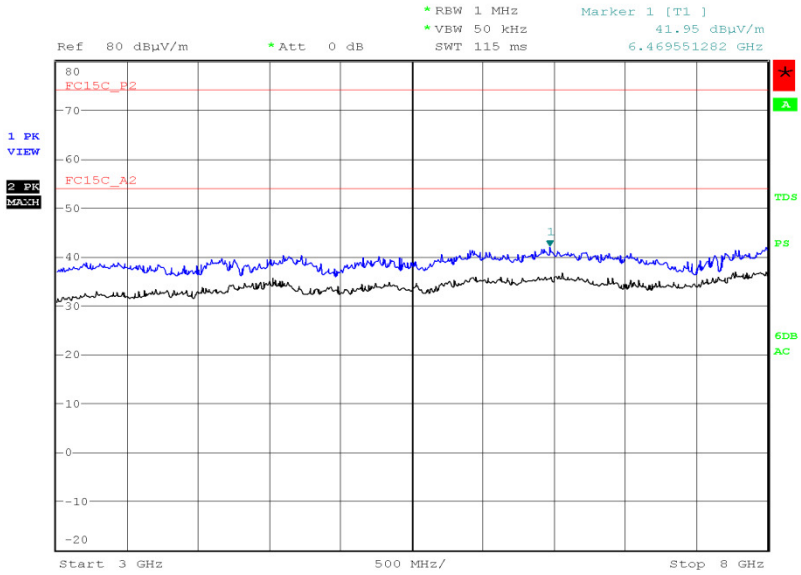
*No emissions were detected within 10 dB of the limit.

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



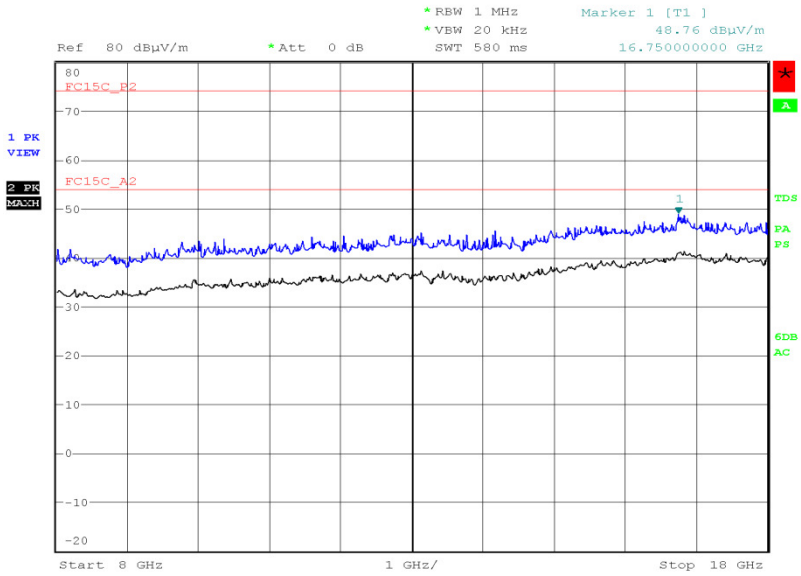
Product Service

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



Date: 17.APR.2016 08:46:34

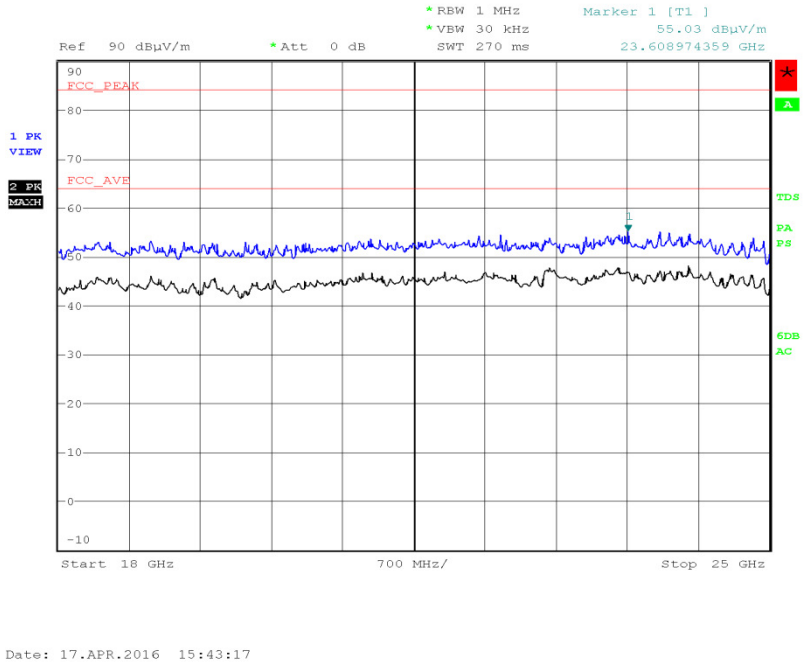
802.11n, 2462 MHz, 6.5 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 14:21:30

Product Service

802.11n, 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

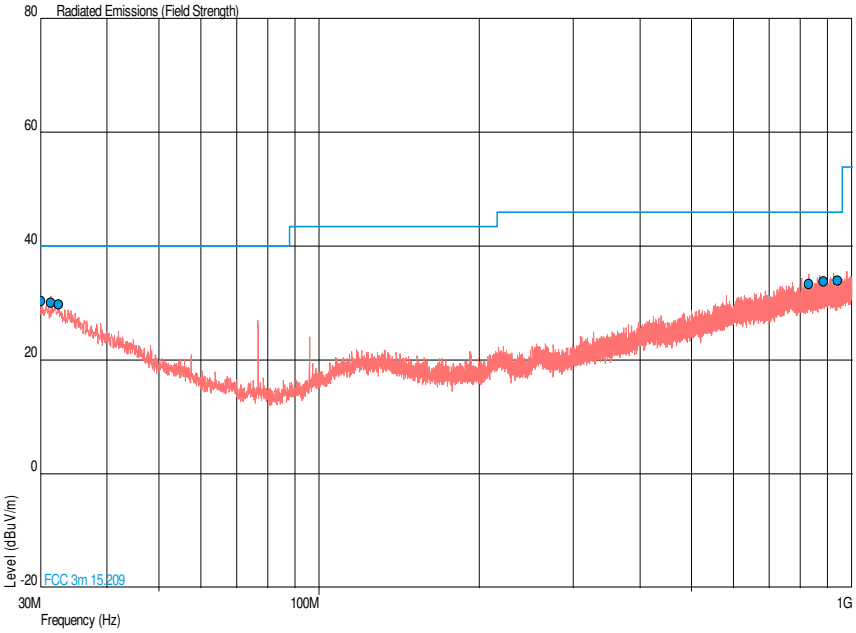
Product Service

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
30.000	30.3	-9.7	32.7	-67.3	180	1.00	Vertical
31.407	30.0	-10.0	31.6	-68.4	180	1.00	Vertical
32.474	29.7	-10.3	30.5	-69.5	0	1.00	Vertical
829.959	33.4	-12.6	46.8	-153.2	0	1.00	Vertical
883.843	33.9	-12.1	49.5	-150.5	180	1.00	Vertical
939.715	33.9	-12.1	49.5	-150.5	180	1.00	Vertical

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



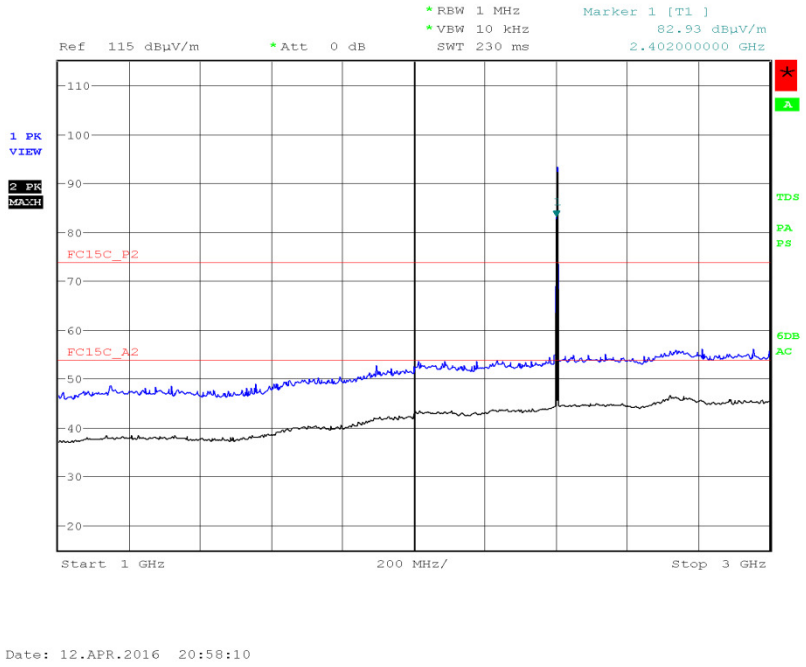
Product Service

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
*							

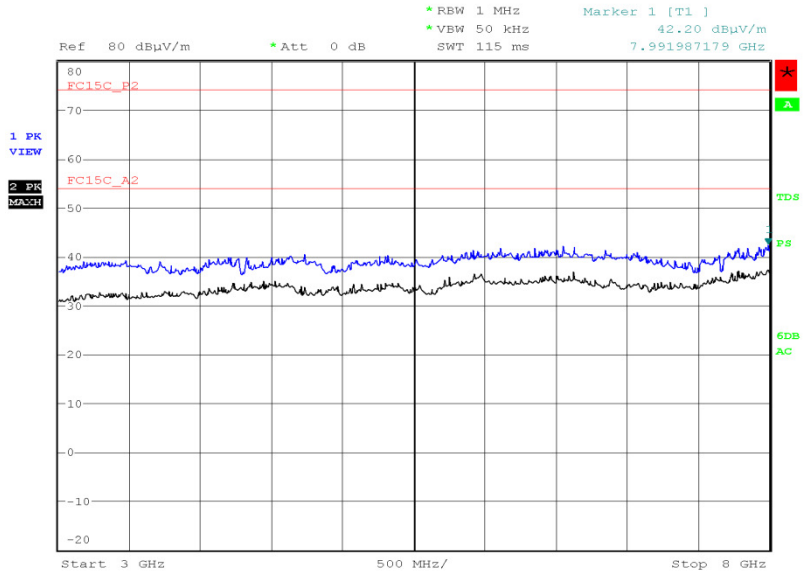
*No emissions were detected within 10 dB of the limit.

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



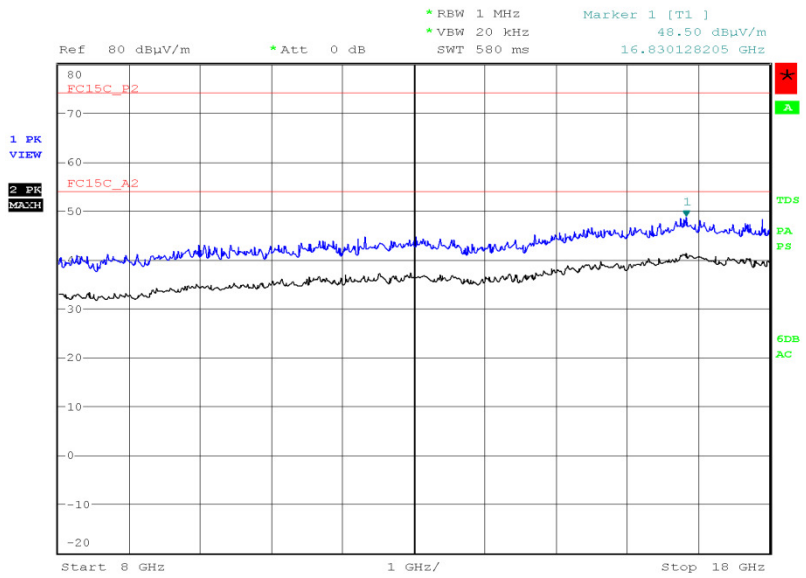
Product Service

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



Date: 17.APR.2016 08:56:16

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



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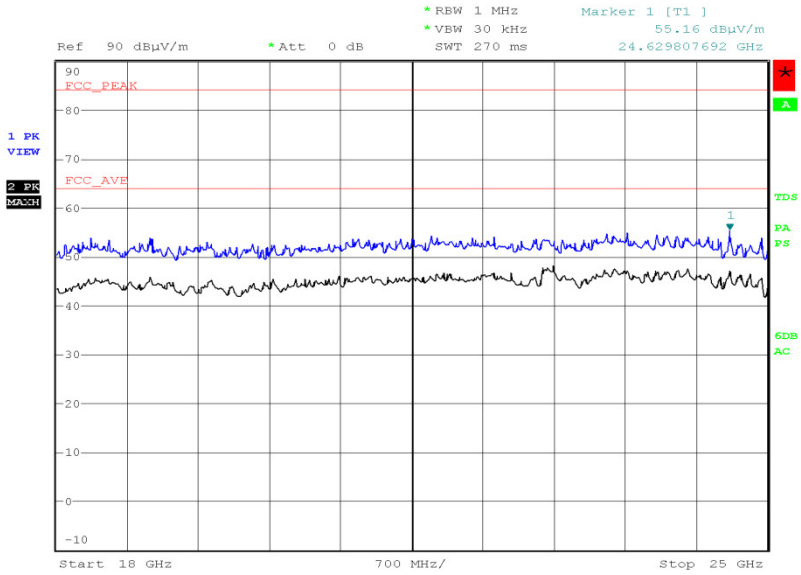
Product Service

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



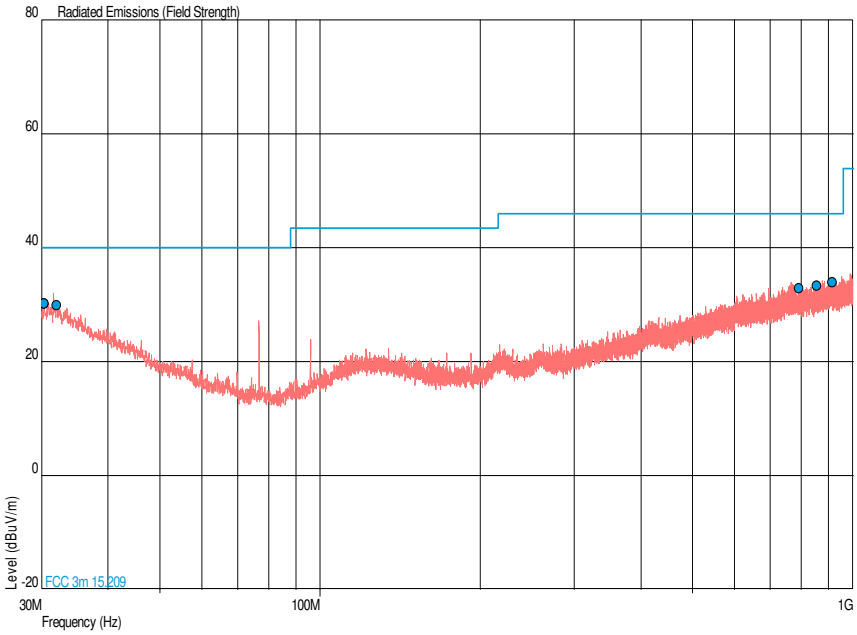
Date: 17.APR.2016 15:22:05

Product Service

Bluetooth Low Energy, 2441 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
30.340	30.2	-9.8	32.4	-67.6	0	1.00	Vertical
30.388	30.2	-9.8	32.4	-67.6	180	1.00	Vertical
32.037	29.9	-10.1	31.3	-68.7	180	1.00	Vertical
791.935	32.8	-13.2	43.7	-156.3	180	1.00	Vertical
854.985	33.3	-12.7	46.2	-153.8	180	1.00	Vertical
914.010	34.0	-12.0	50.1	-149.9	0	1.00	Vertical

Bluetooth Low Energy, 2441 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot



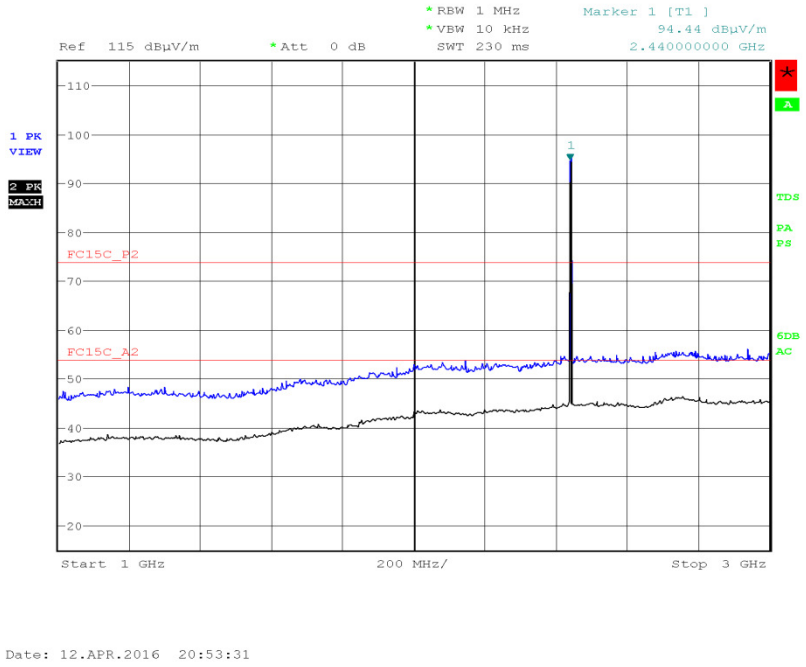
Product Service

Bluetooth Low Energy, 2441 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
*							

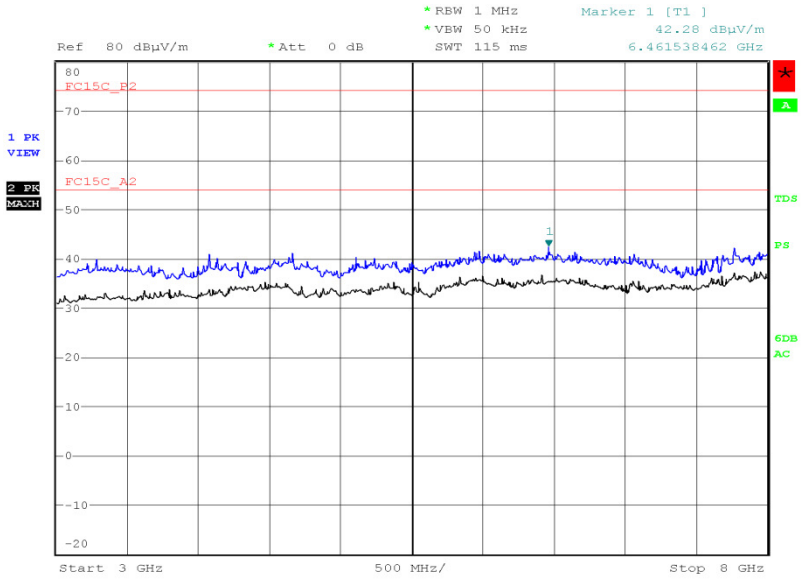
*No emissions were detected within 10 dB of the limit.

Bluetooth Low Energy, 2441 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



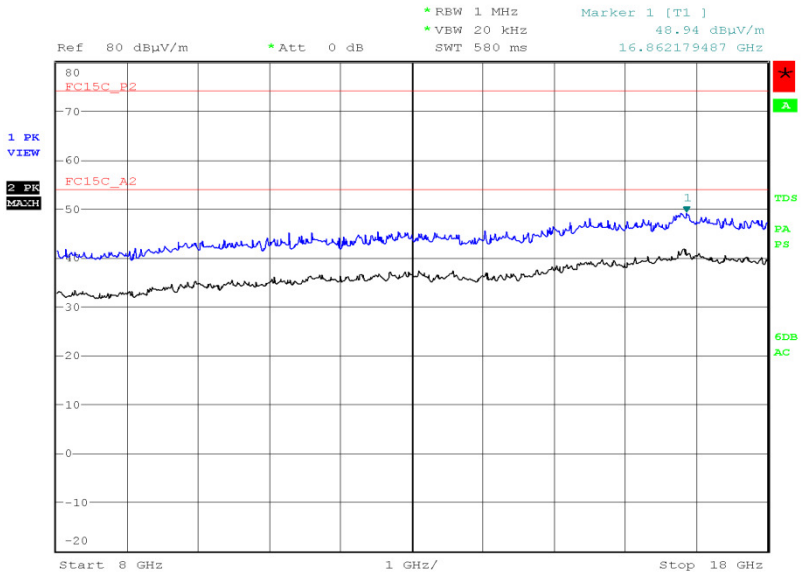
Product Service

Bluetooth Low Energy, 2441 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 09:02:13

Bluetooth Low Energy, 2441 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 12:45:23