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## Report On

FCC Testing of the Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & AXGP (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: APYHRO00218

Document 75929719 Report 13 Issue 1

May 2015



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REPORT ON

FCC Testing of the Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & AXGP (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD (NFC,FeliCa) and GPS  
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Document 75929719 Report 13 Issue 1

May 2015

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DATED

19 May 2015

ENGINEERING STATEMENT

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

Test Engineer(s);

T Guy

M Russell

M Toubella



G Lawler

J Tuckwell



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## SECTION 1

### REPORT SUMMARY

FCC Testing of the  
Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V),  
Quad-band GSM (850/900/1800/1900) & AXGP (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 SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & AXGP (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
Model Number(s)	SHV32
Serial Number(s)	IMEI 004401115406791 IMEI 004401115406510 IMEI 004401115406536
Number of Samples Tested	3
Test Specification/Issue/Date	FCC 47 CFR Part 15C (2014)
Disposal	Held Pending Disposal
Reference Number	Not Applicable
Date	Not Applicable
Order Number	10477
Date	02 March 2015
Start of Test	17 April 2015
Finish of Test	6 May 2015
Name of Engineer(s)	T Guy M Russell M Toubella G Lawler J Tuckwell
Related Document(s)	ANSI C63.10: 2009 FCC KDB 558074 D01 v03r02



## 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) and 15.205	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) and 15.205	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) and 15.205	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) and 15.205	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**

Please refer to the SHV32 Model Description Form.

### **1.4 PRODUCT INFORMATION**

#### **1.4.1 Technical Description**

The Equipment Under Test (EUT) was a Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & AXGP (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 SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V),  
Quad-band GSM (850/900/1800/1900) & AXGP (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**

SHV32 S/N: IMEI 004401115406791 - Modification State 0

### **2.1.3 Date of Test**

6 May 2015

### **2.1.4 Test Equipment Used**

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

### **2.1.5 Test Procedure**

The test was performed in accordance with KDB 174176 D01 v01 and 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	22.2°C
Relative Humidity	32.5%



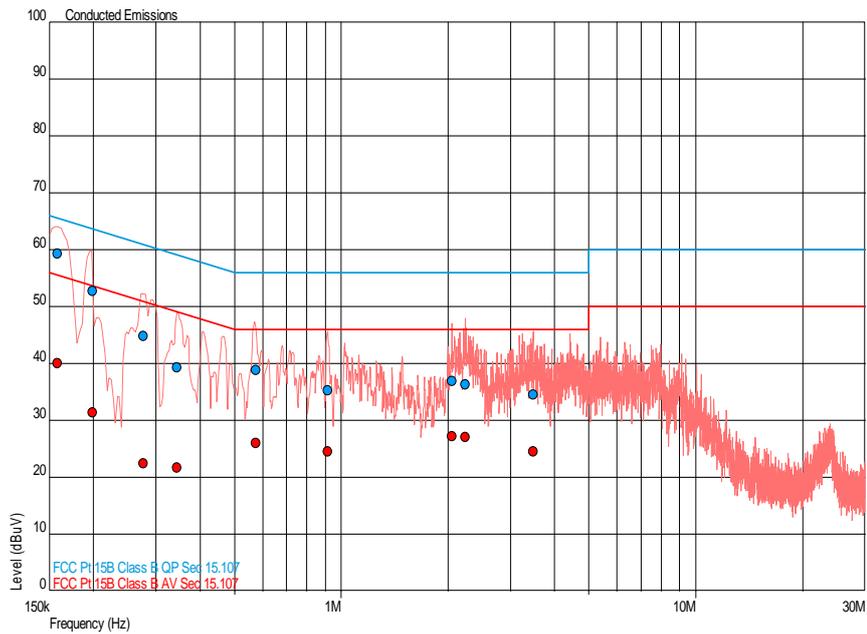
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2.1.7 Test Results

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)
0.158	59.4	65.6	-6.2	40.1	55.6	-15.5
0.199	52.7	63.6	-10.9	31.4	53.6	-22.3
0.276	44.8	60.9	-16.1	22.5	50.9	-28.4
0.344	39.3	59.1	-19.8	21.7	49.1	-27.4
0.573	38.8	56.0	-17.2	26.0	46.0	-20.0
0.915	35.2	56.0	-20.8	24.5	46.0	-21.5
2.057	37.0	56.0	-19.0	27.2	46.0	-18.8
2.238	36.3	56.0	-19.7	27.1	46.0	-18.9
3.472	34.5	56.0	-21.5	24.5	46.0	-21.5

802.11b, Live Line, AC Line Conducted Emissions Plot

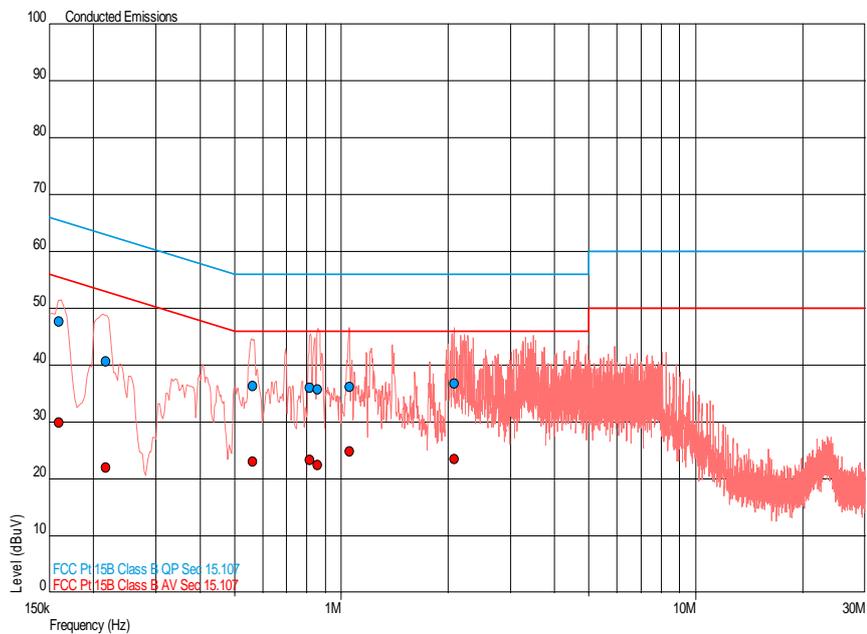




**802.11b, Neutral Line, AC Line Conducted Emissions Result**

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.160	47.7	65.5	-17.7	30.0	55.5	-25.5
0.217	40.7	62.9	-22.3	22.0	52.9	-31.0
0.561	36.4	56.0	-19.6	23.1	46.0	-22.9
0.817	36.0	56.0	-20.0	23.4	46.0	-22.6
0.858	35.7	56.0	-20.3	22.5	46.0	-23.5
1.053	36.2	56.0	-19.8	24.9	46.0	-21.1
2.082	36.8	56.0	-19.2	23.5	46.0	-22.5

**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

SHV32 S/N: IMEI 004401115406510 - Modification State 0  
SHV32 S/N: IMEI 004401115406536 - Modification State 0

### 2.2.3 Date of Test

17 April 2015 & 27 April 2015

### 2.2.4 Test Equipment Used

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

### 2.2.5 Test Procedure

This test was performed in accordance with KDB 558074 D01 v03r02, clause 8.2.

#### Remarks

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

### 2.2.6 Environmental Conditions

Ambient Temperature	23.5 - 25.5°C
Relative Humidity	22.0 - 25.0%



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
8691	8258	8687

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





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



802.11b, 2462 MHz, DSSS, 11 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.



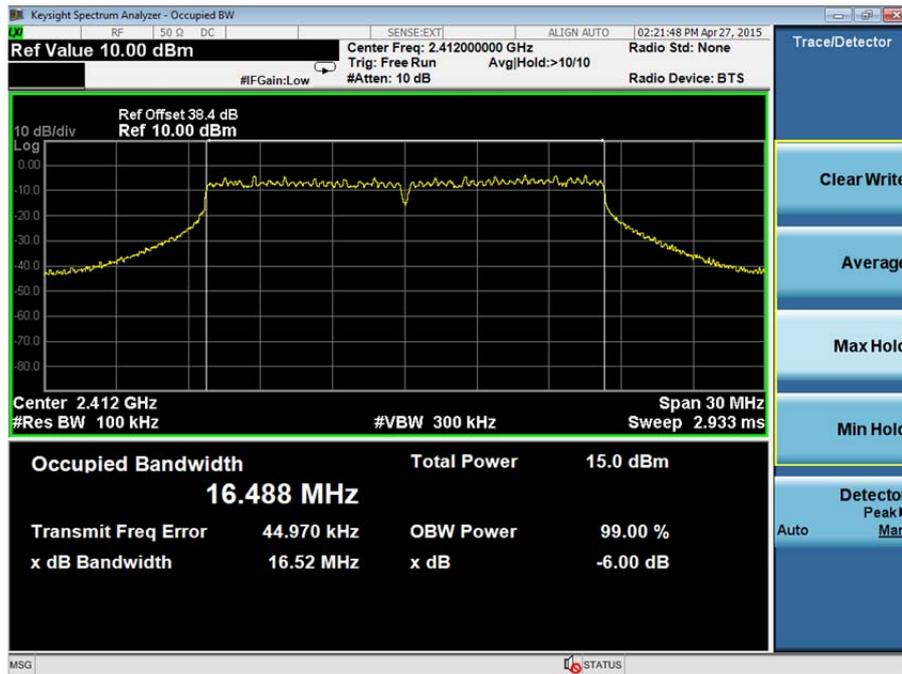
Product Service

4.0 V DC Supply

802.11g, OFDM, 54, 6 dB Bandwidth Results

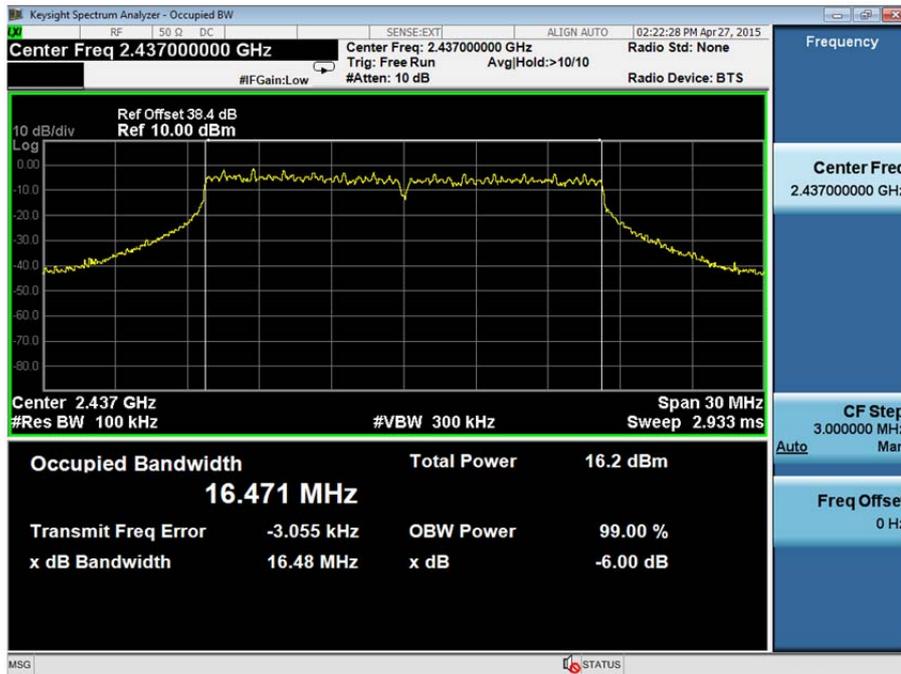
2412 MHz	2437 MHz	2462 MHz
kHz	kHz	kHz
16520	16480	16490

802.11g, 2412 MHz, OFDM, 54 Mbps, 6 dB Bandwidth Plot

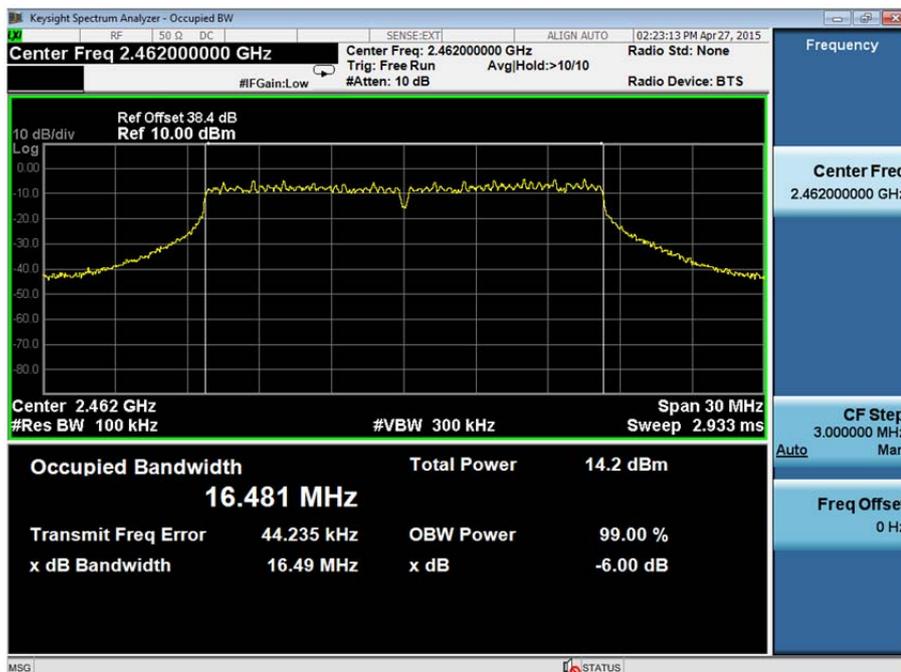




802.11g, 2437 MHz, OFDM, 54 Mbps, 6 dB Bandwidth Plot



802.11g, 2462 MHz, OFDM, 54 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
17740	17720	17720

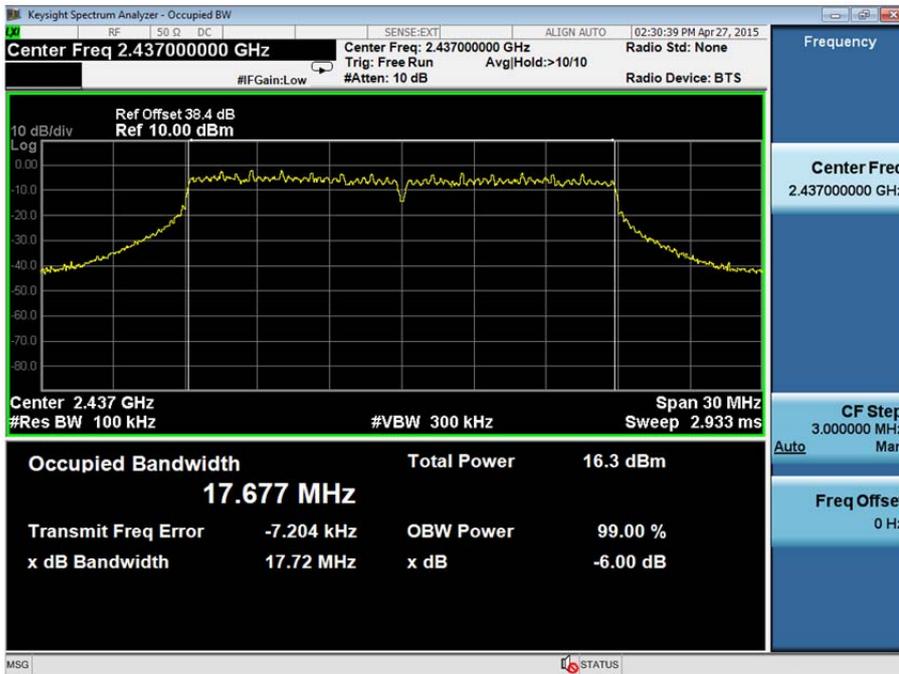
802.11n, 2412 MHz, OFDM, 65 Mbps, 6 dB Bandwidth Plot





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
691.6	696.5	692.3

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

SHV32 S/N: IMEI 004401115406510 - Modification State 0

SHV32 S/N: IMEI 004401115406536 - Modification State 0

### 2.3.3 Date of Test

17 April 2015 & 24 April 2015

### 2.3.4 Test Equipment Used

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

### 2.3.5 Test Procedure

The test was performed in accordance with KDB 558074 D01 v03r02, clause 9.2.1 and 9.2.3.2.

#### Remarks

The EUT supports antenna diversity for 802.11b and 802.11g therefore both antenna ports have been measured individually, the antenna terminal with the highest output power has been included below.

802.11n can also operate simultaneously (MiMo) therefore both antenna ports were individually measured and the procedure described in KDB 662911 V02r01, clause D has been used to determine the sum of the spectral maxima across both antenna terminals.

### 2.3.6 Environmental Conditions

Ambient Temperature 23.8 - 25.2°C

Relative Humidity 25.0 - 28.4%



Product Service

**2.3.7 Test Results**

4.0 V DC Supply

802.11b, 1 Mbps, Maximum Peak Conducted Output Power Results

2412 MHz		2437 MHz		2462 MHz	
dBm	mW	dBm	mW	dBm	mW
12.11	16.26	12.78	18.97	12.30	16.98

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.

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
8.18	6.58	9.33	8.57	6.64	4.61

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

802.11n, 6.5 Mbps, Maximum Conducted Output Power Results

2412 MHz		2437 MHz		2462 MHz	
dBm	mW	dBm	mW	dBm	mW
10.56	11.38	12.45	17.58	10.09	10.21

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
3.50	2.24	3.87	2.44	3.74	2.37

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) and 15.205

### **2.4.2 Equipment Under Test and Modification State**

SHV32 S/N: IMEI 004401115406791 - Modification State 0

### **2.4.3 Date of Test**

18 April 2015, 19 April 2015, 23 April 2015, 3 May 2015, 4 May 2015, 5 May 2015 & 6 May 2015

### **2.4.4 Test Equipment Used**

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

### **2.4.5 Test Procedure**

The test was performed in accordance with KDB 558074 D01 v03r02, clause 11.0 and 12.0 and ANSI C63.10, clause 6.3, 6.5 and 6.6.

### **2.4.6 Environmental Conditions**

Ambient Temperature	20.1 - 21.9°C
Relative Humidity	30.2 - 43.0%



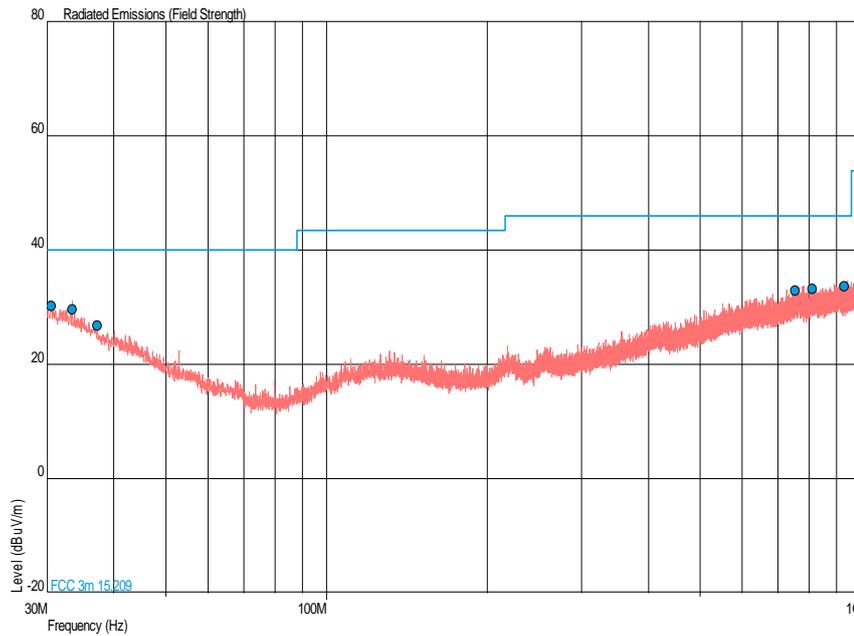
**2.4.7 Test Results**

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
30.582	30.2	-9.8	32.4	-67.6	0	1.00	Vertical
33.444	29.7	-10.3	30.5	-69.5	180	1.00	Vertical
37.227	26.8	-13.2	21.9	-78.1	0	1.00	Vertical
753.087	33.0	-13.0	44.7	-155.3	0	1.00	Vertical
811.335	33.3	-12.7	46.2	-153.8	180	1.00	Vertical
929.190	33.7	-12.3	48.4	-151.6	0	1.00	Vertical

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



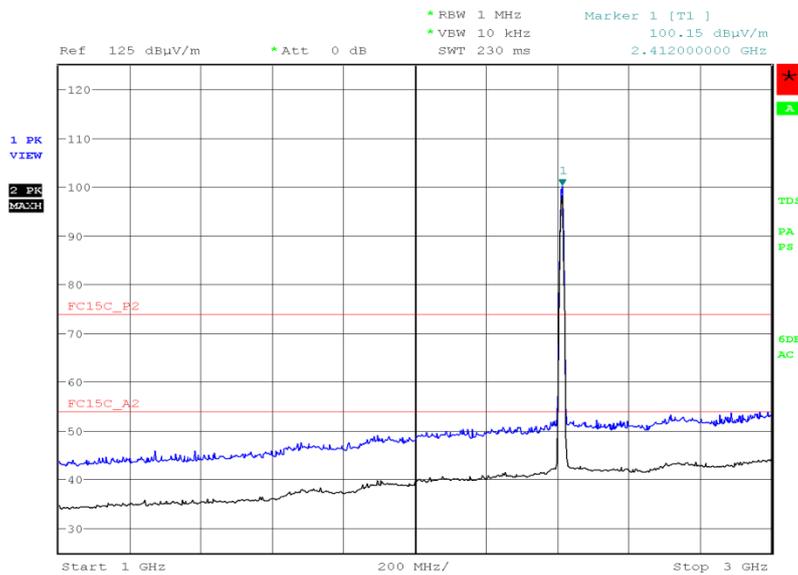


802.11b, 2412 MHz, 1 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

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.

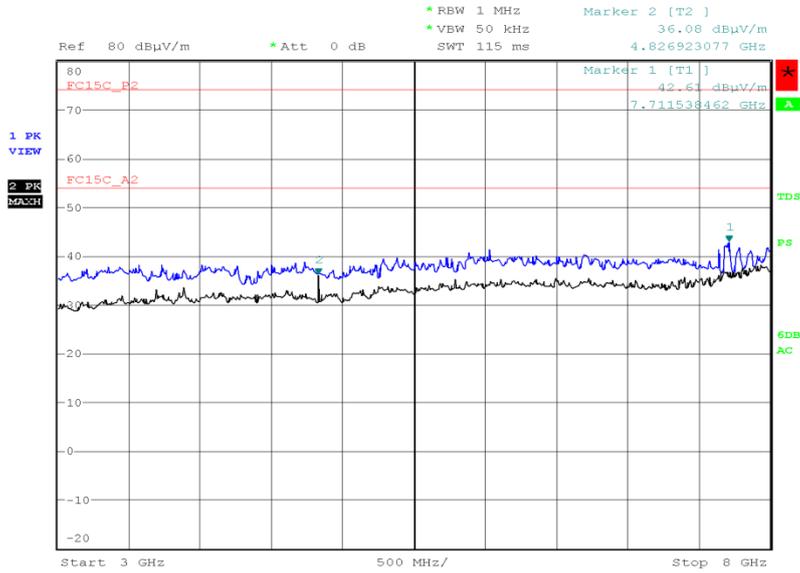
802.11b, 2412 MHz, 1 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



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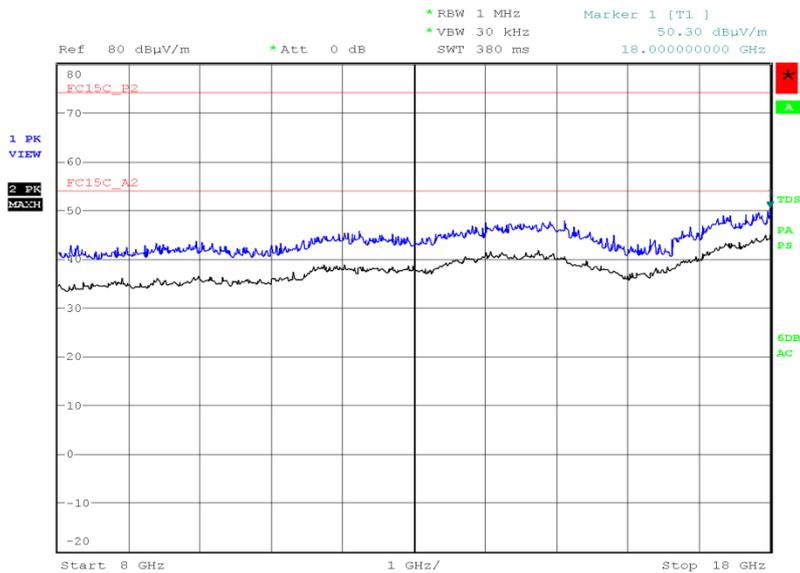


802.11b, 2412 MHz, 1 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



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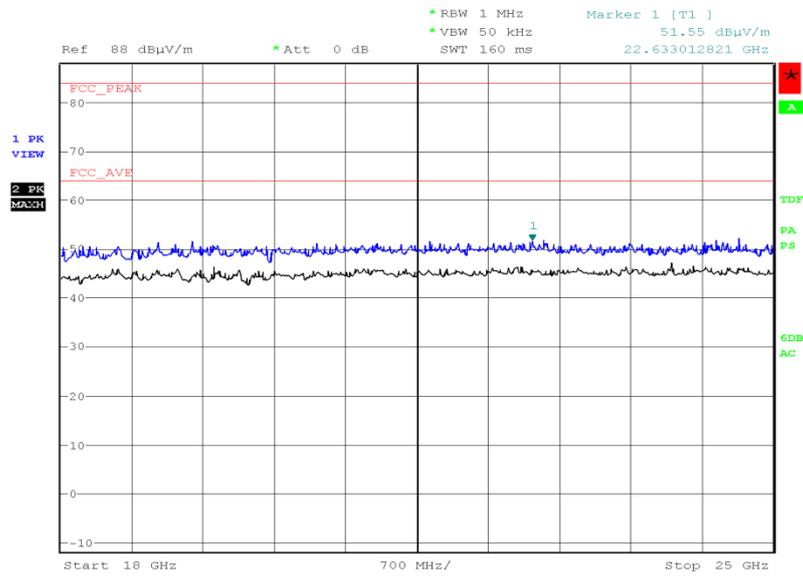
802.11b, 2412 MHz, 1 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 4.MAY.2015 10:50:43



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



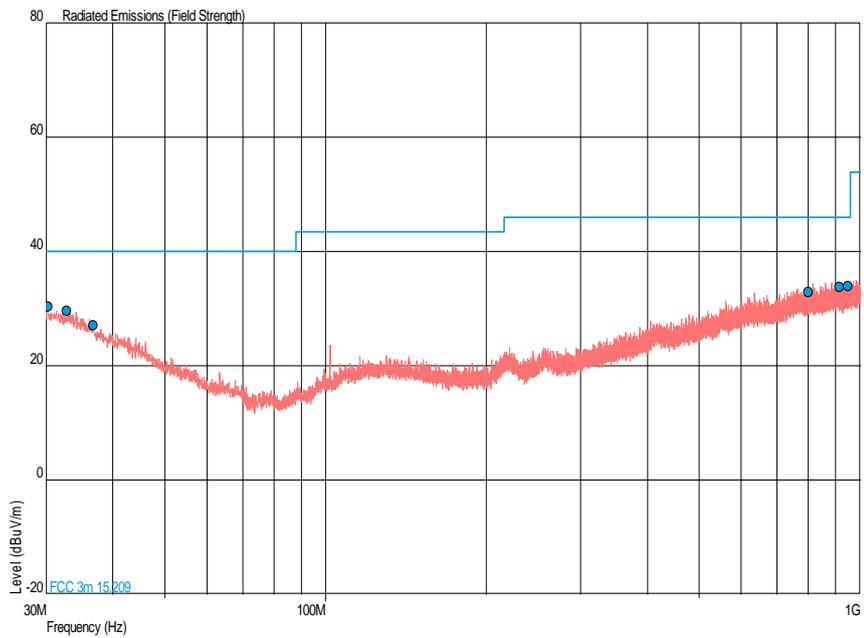
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**802.11b, 2437 MHz, 1 Mbps, 30 MHz to 1 GHz, Spurious Radiated Emissions Results**

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.243	30.3	-9.7	32.7	-67.3	0	1.00	Horizontal
32.813	29.6	-10.4	30.2	-69.8	180	1.00	Horizontal
36.790	27.1	-12.9	22.6	-77.4	0	1.00	Vertical
800.471	32.9	-13.1	44.2	-155.8	0	1.00	Vertical
914.640	33.8	-12.2	49.0	-151.0	0	1.00	Horizontal
947.814	33.9	-12.1	49.5	-150.5	180	1.00	Horizontal

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



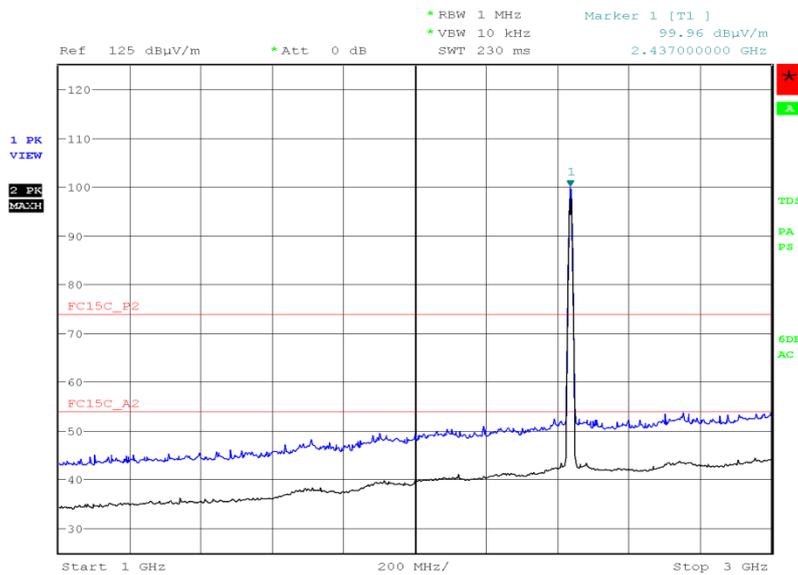


802.11b, 2437 MHz, 1 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

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.

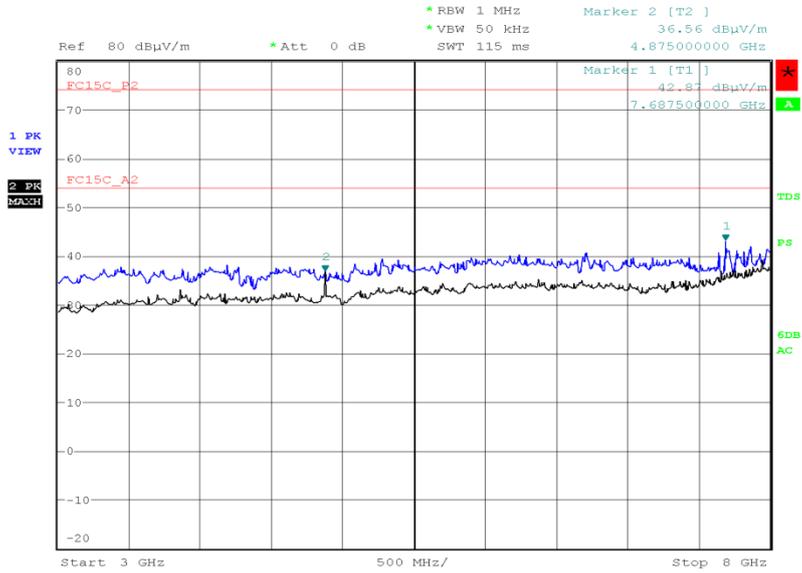
802.11b, 2437 MHz, 1 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 5.MAY.2015 19:53:25

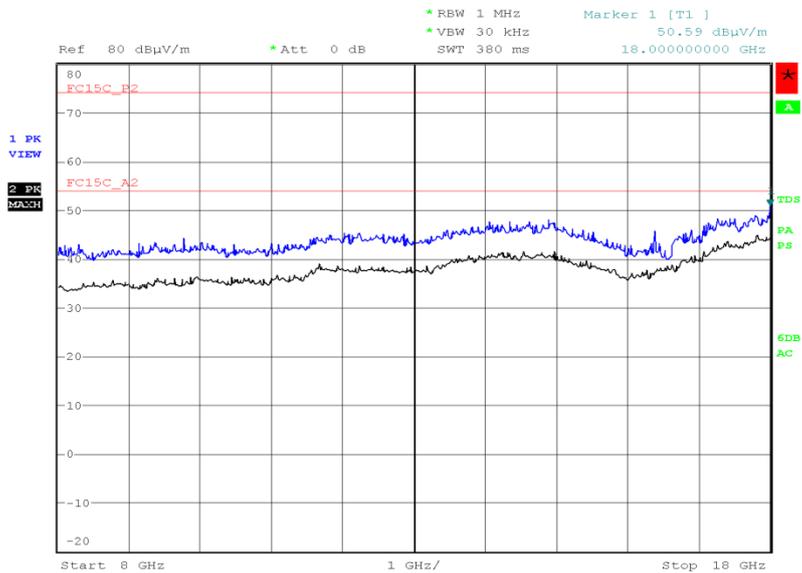


802.11b, 2437 MHz, 1 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 4.MAY.2015 12:47:58

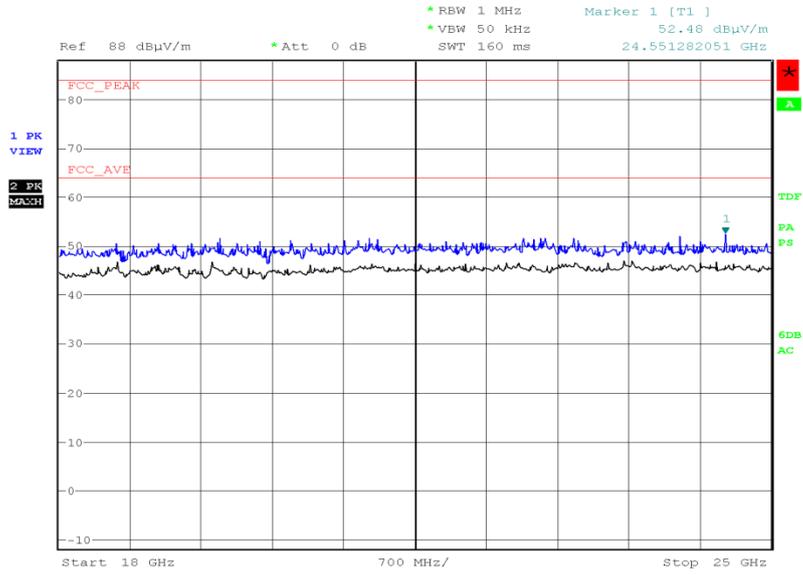
802.11b, 2437 MHz, 1 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 4.MAY.2015 11:04:07



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



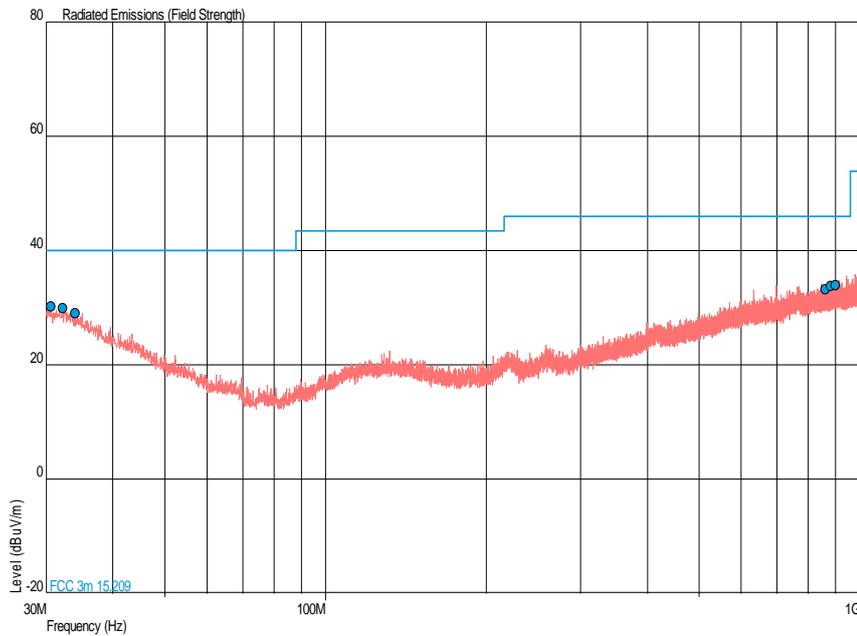
Date: 3.MAY.2015 13:28:45



**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
30.631	30.2	-9.8	32.4	-67.6	180	1.00	Vertical
32.231	29.9	-10.1	31.3	-68.7	180	1.00	Horizontal
34.074	29.0	-11.0	28.2	-71.8	180	1.00	Horizontal
861.005	33.3	-12.7	46.2	-153.8	180	1.00	Horizontal
881.854	33.8	-12.2	49.0	-151.0	180	1.00	Horizontal
901.012	33.9	-12.1	49.5	-150.5	0	1.00	Horizontal

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



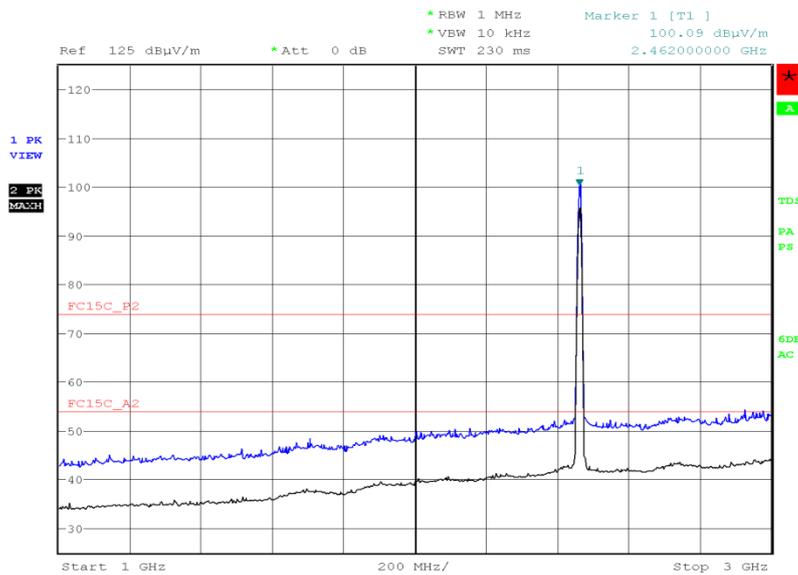


802.11b, 2462 MHz, 1 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

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.

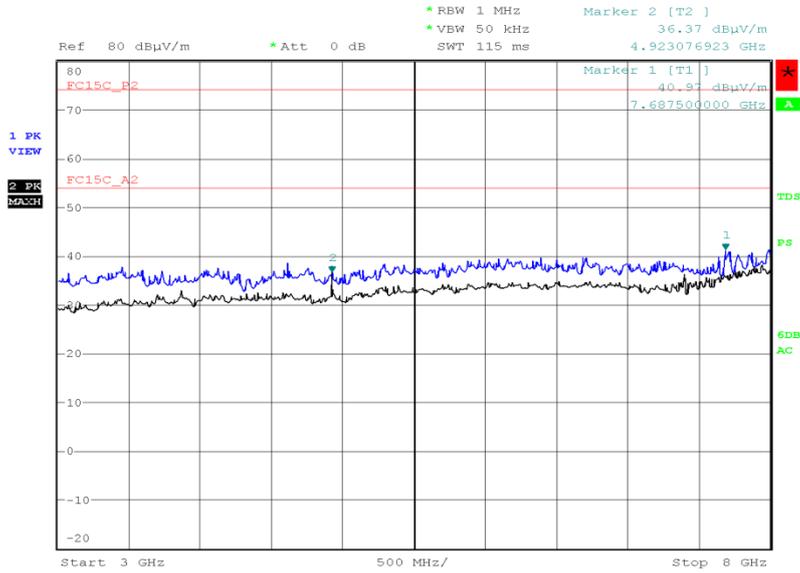
802.11b, 2462 MHz, 1 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 5.MAY.2015 19:56:09

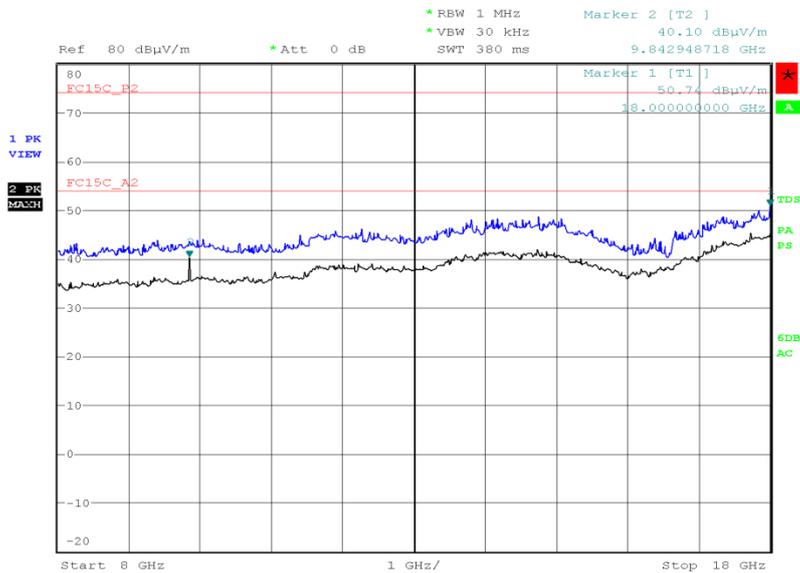


802.11b, 2462 MHz, 1 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 4.MAY.2015 12:51:21

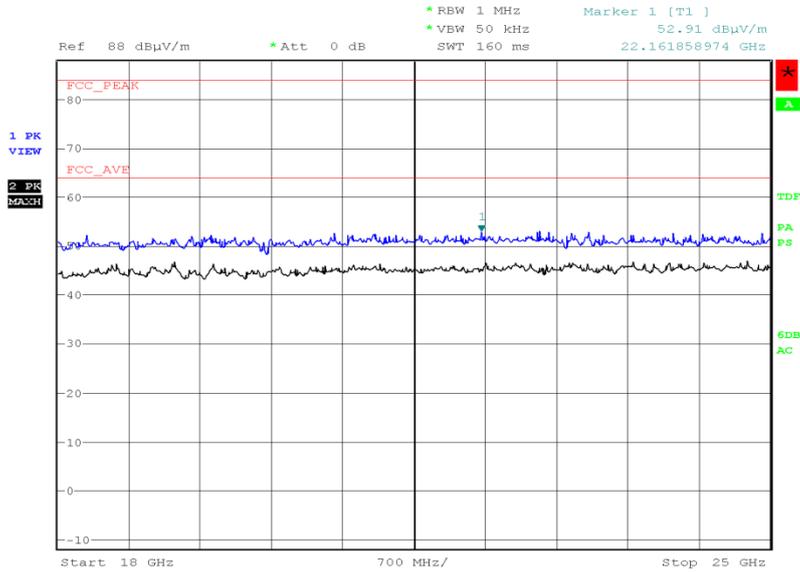
802.11b, 2462 MHz, 1 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 4.MAY.2015 11:18:47



802.11b, 2462 MHz, 1 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



Date: 3.MAY.2015 13:31:59

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 (dBuV/m)	Average (dBuV/m)
Restricted Bands of Operation	74	54

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength			Measurement Distance (m)
	(uV/m)	Average (dBuV/m)	Peak (dBuV/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



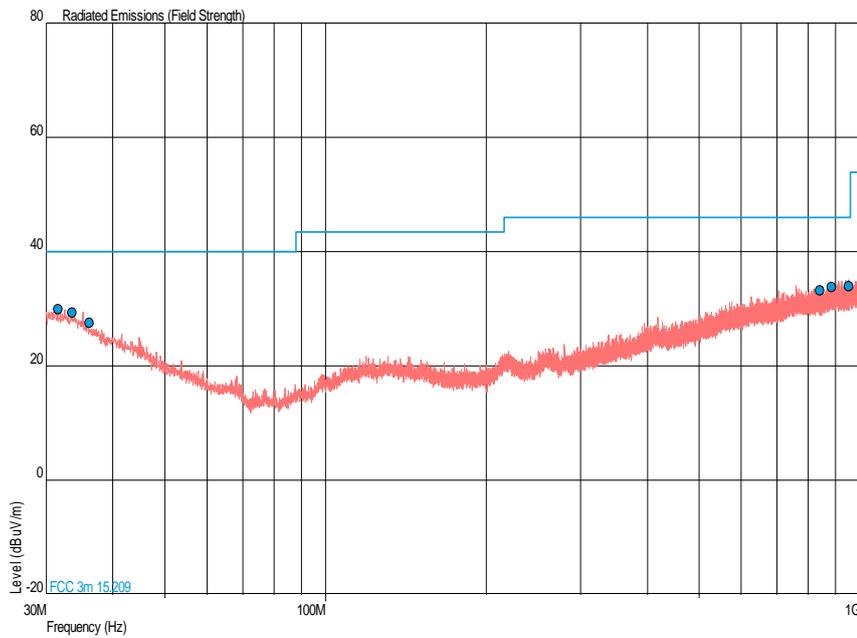
Product Service

4.0 V DC Supply

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

Frequency (MHz)	QP Level (dB $\mu$ V/m)	QP Margin (dB $\mu$ V/m)	QP Level ( $\mu$ V/m)	QP Margin ( $\mu$ V/m)	Angle (°)	Height (m)	Polarisation
31.552	30.0	-10.0	31.6	-68.4	0	1.00	Horizontal
33.541	29.3	-10.7	29.2	-70.8	180	1.00	Vertical
36.160	27.6	-12.4	24.0	-76.0	180	1.00	Horizontal
840.920	33.1	-12.9	45.2	-154.8	180	1.00	Horizontal
883.600	33.8	-12.2	49.0	-151.0	180	1.00	Horizontal
954.022	33.9	-12.1	49.5	-150.5	0	1.00	Horizontal

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



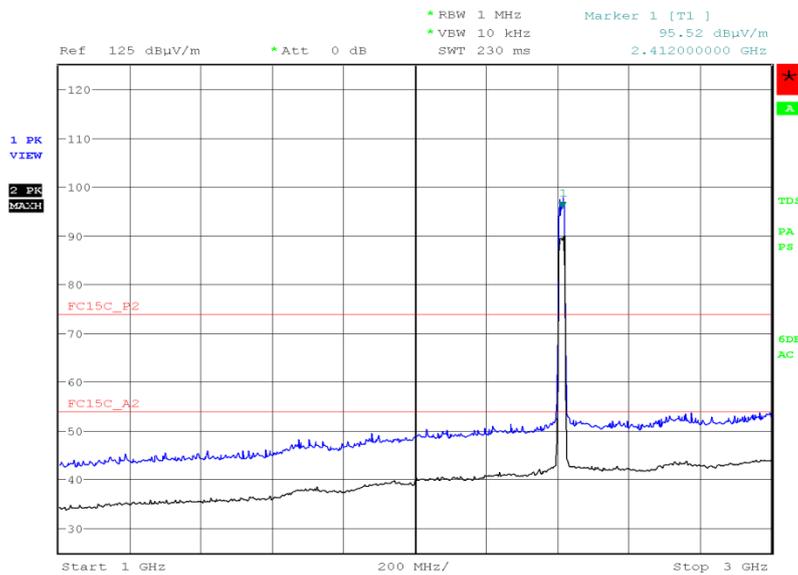


802.11g, 2412 MHz, 6 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

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 dBof the limit.

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

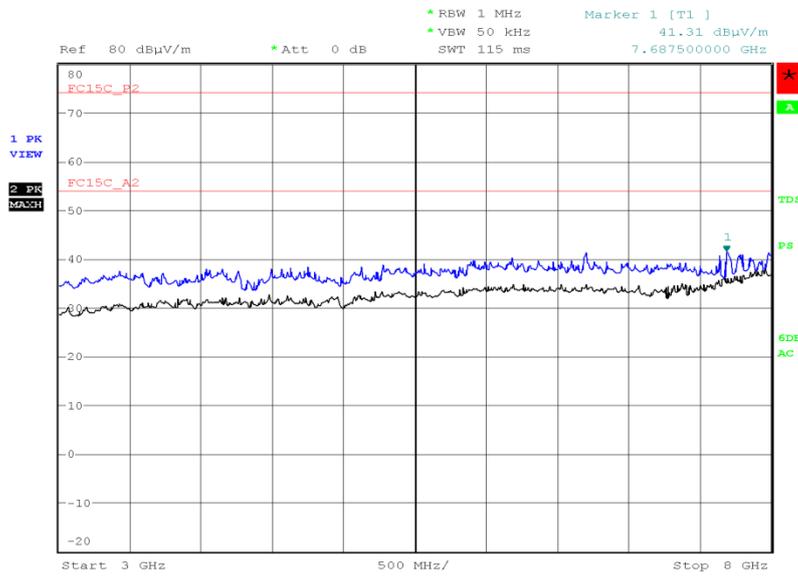


Date: 5.MAY.2015 20:33:37



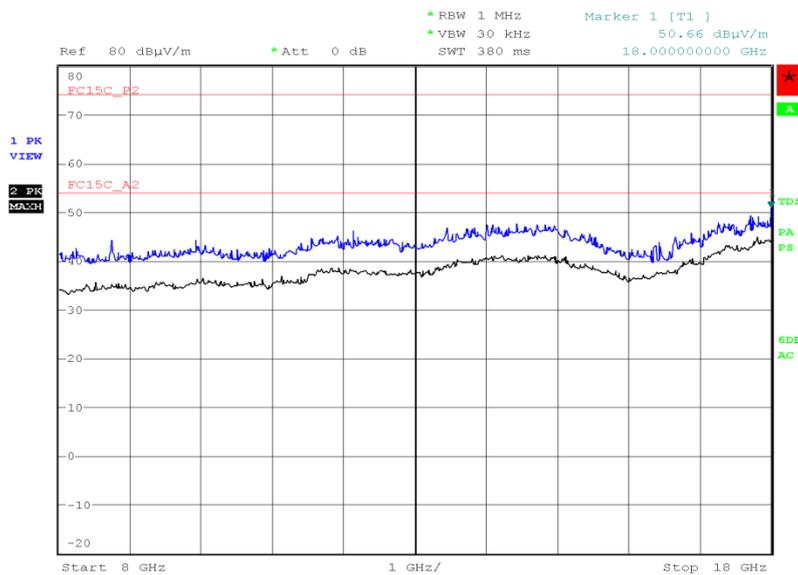
Product Service

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



Date: 4.MAY.2015 12:55:42

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

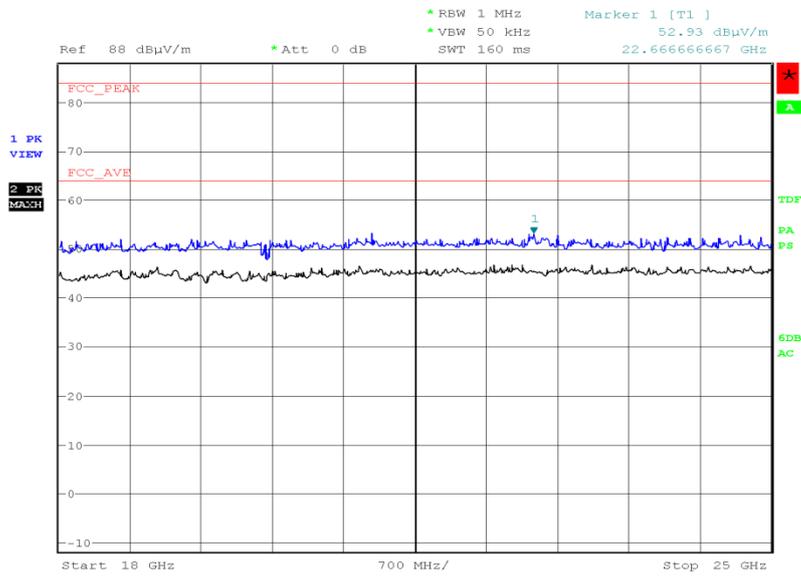


Date: 4.MAY.2015 11:34:11



Product Service

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



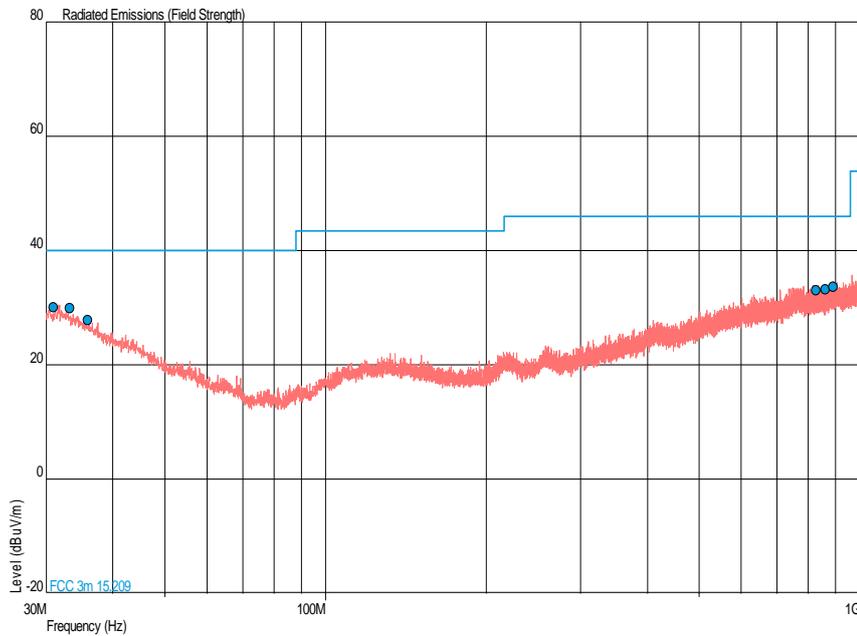
Date: 3.MAY.2015 13:35:21



**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
31.019	30.1	-9.9	32.0	-68.0	180	1.00	Horizontal
33.250	29.9	-10.1	31.3	-68.7	180	1.00	Horizontal
35.869	27.8	-12.2	24.5	-75.5	180	1.00	Horizontal
825.912	33.0	-13.0	44.7	-155.3	180	1.00	Horizontal
860.272	33.3	-12.7	46.2	-153.8	0	1.00	Vertical
891.748	33.7	-12.3	48.4	-151.6	180	1.00	Horizontal

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



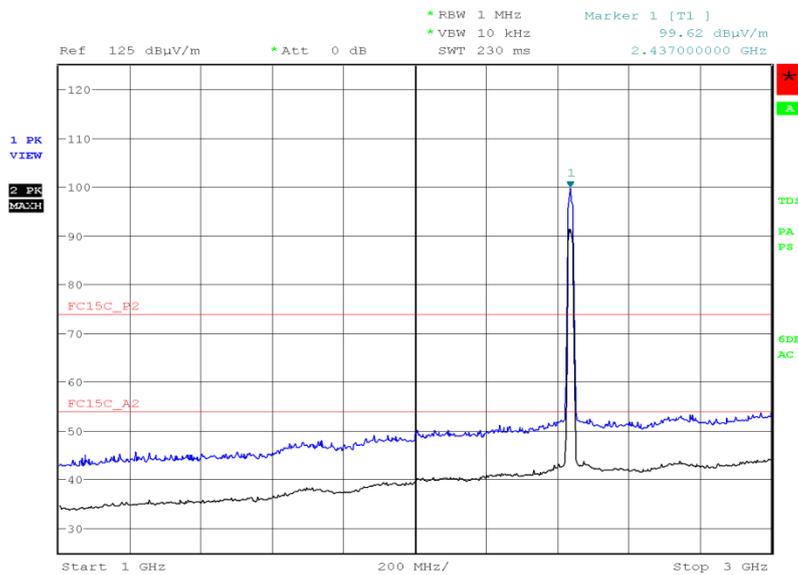


802.11g, 2437 MHz, 6 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

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.

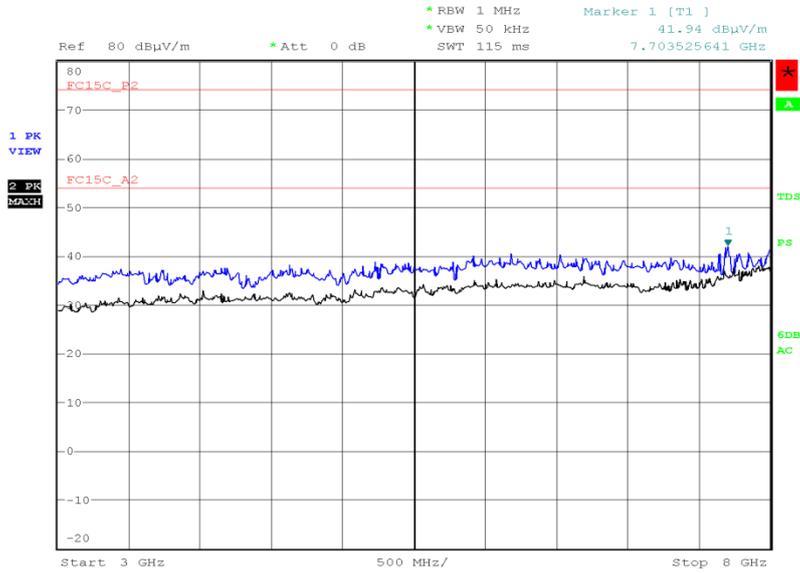
802.11g, 2437 MHz, 6 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 5.MAY.2015 20:38:45

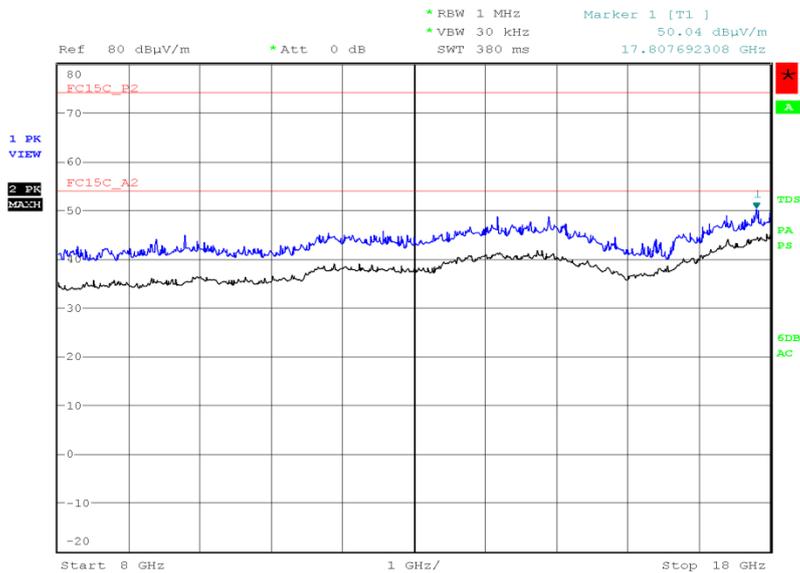


802.11g, 2437 MHz, 6 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 4.MAY.2015 13:00:25

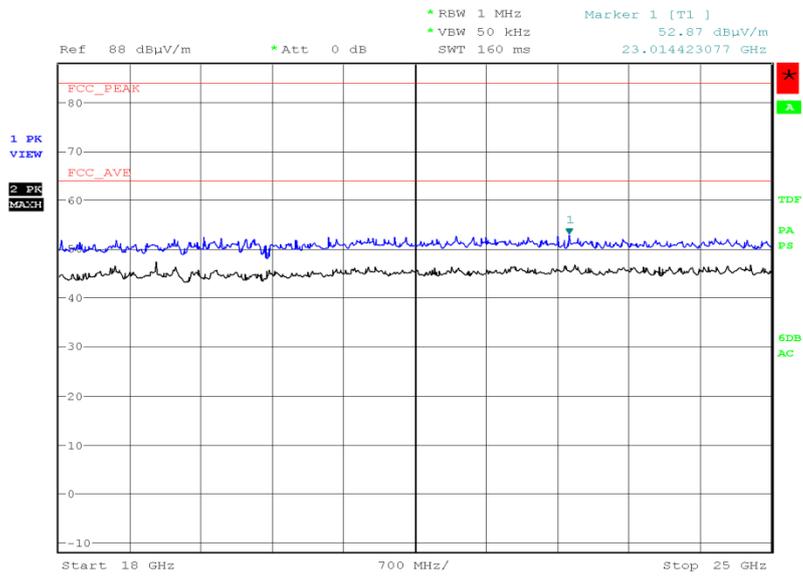
802.11g, 2437 MHz, 6 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 4.MAY.2015 11:45:21



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



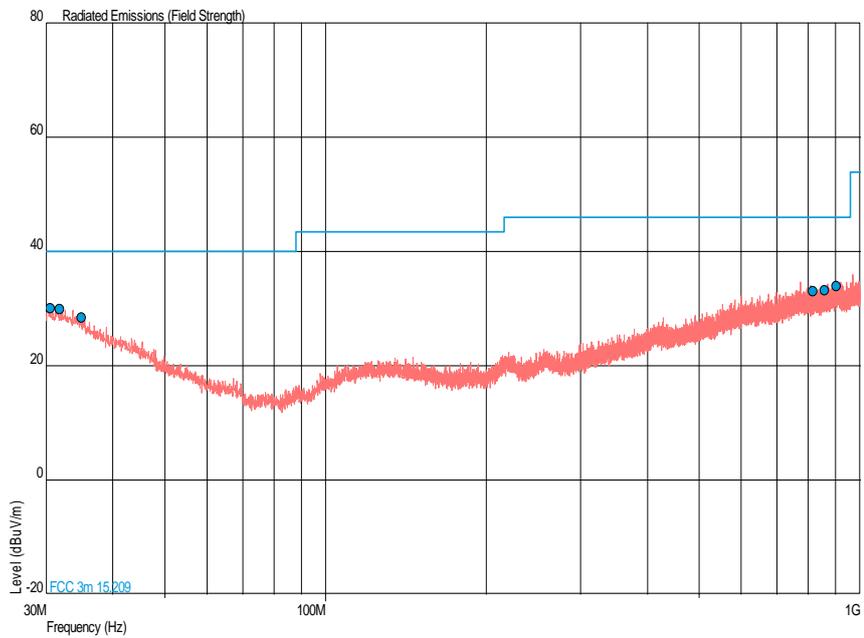
Date: 3.MAY.2015 13:38:51



**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
30.579	30.1	-9.9	32.0	-68.0	0	0.00	Horizontal
31.795	29.9	-10.1	31.3	-68.7	180	1.00	Vertical
34.996	28.4	-11.6	26.3	-73.7	0	1.00	Vertical
815.555	33.0	-13.0	44.7	-155.3	180	1.00	Vertical
858.429	33.3	-12.7	46.2	-153.8	0	1.00	Horizontal
903.485	33.9	-12.1	49.5	-150.5	180	1.00	Horizontal

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



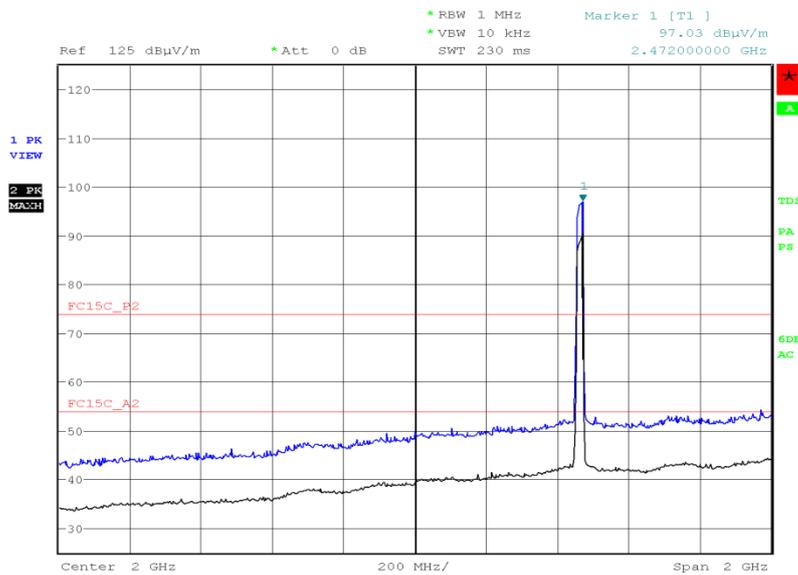


802.11g, 2462 MHz, 6 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

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.

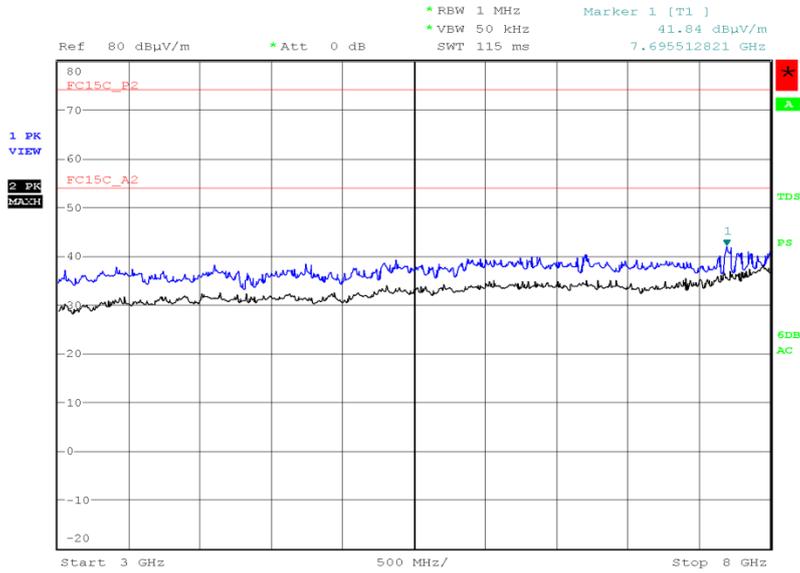
802.11g, 2462 MHz, 6 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 5.MAY.2015 20:42:58

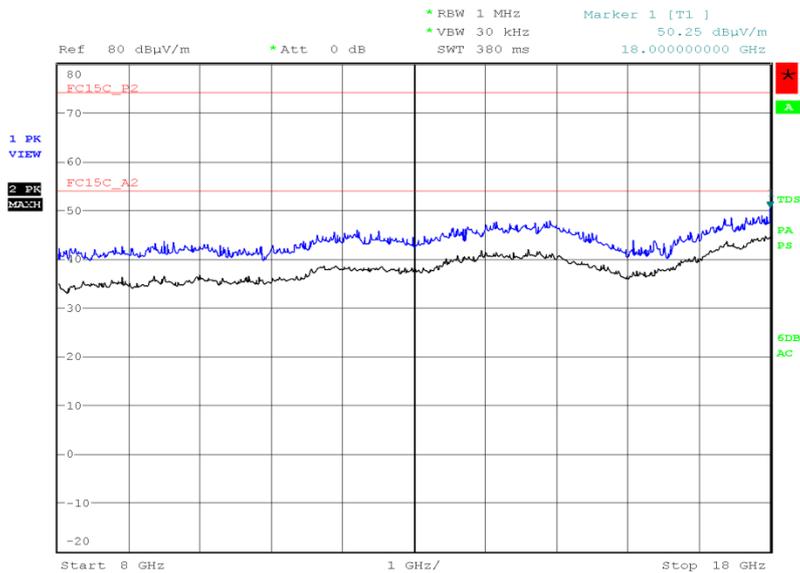


802.11g, 2462 MHz, 6 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 4.MAY.2015 13:04:35

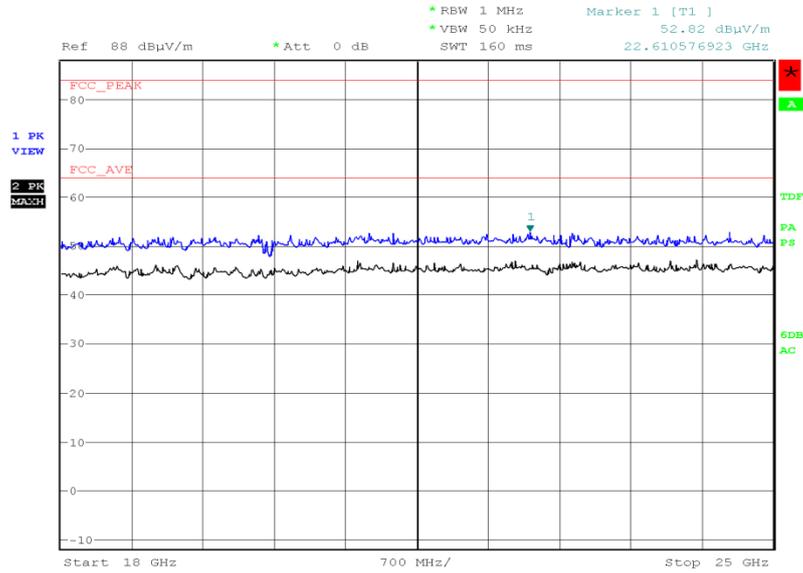
802.11g, 2462 MHz, 6 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 4.MAY.2015 11:55:09



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



Date: 3.MAY.2015 13:42:26

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 (dB $\mu$ V/m)	Average (dB $\mu$ V/m)
Restricted Bands of Operation	74	54

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength			Measurement Distance (m)
	( $\mu$ V/m)	Average (dB $\mu$ V/m)	Peak (dB $\mu$ V/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



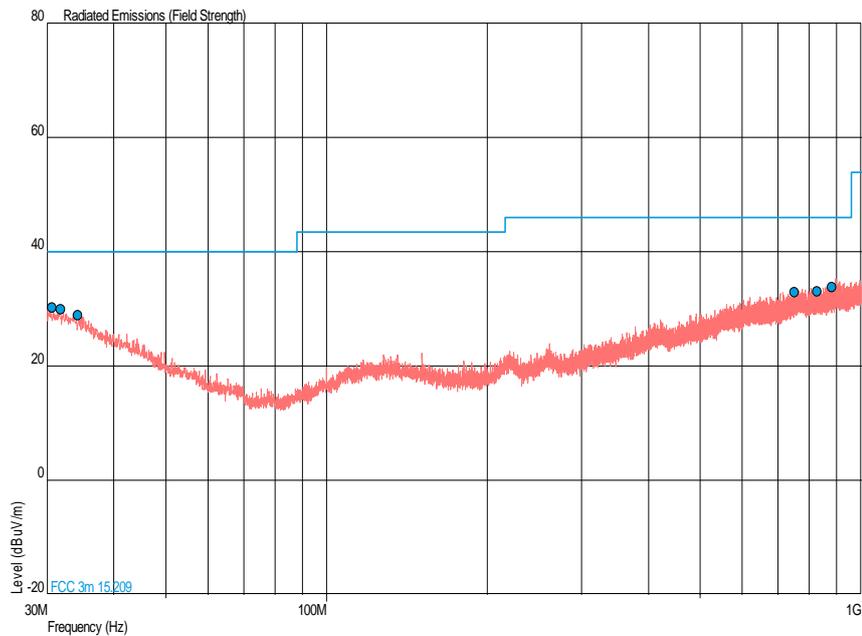
Product Service

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
30.631	30.2	-9.8	32.4	-67.6	180	1.00	Vertical
31.795	29.9	-10.1	31.3	-68.7	180	1.00	Vertical
34.268	28.8	-11.2	27.5	-72.5	180	1.00	Horizontal
750.904	32.8	-13.2	43.7	-156.3	180	1.00	Horizontal
827.292	33.1	-12.9	45.2	-154.8	180	1.00	Horizontal
881.272	33.8	-12.2	49.0	-151.0	0	1.00	Horizontal

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



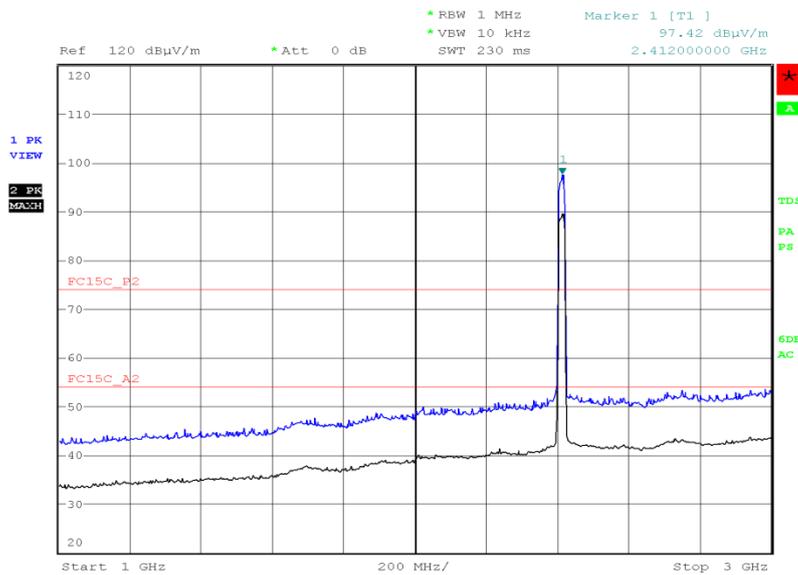


802.11n, 2412 MHz, 6.5 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

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.

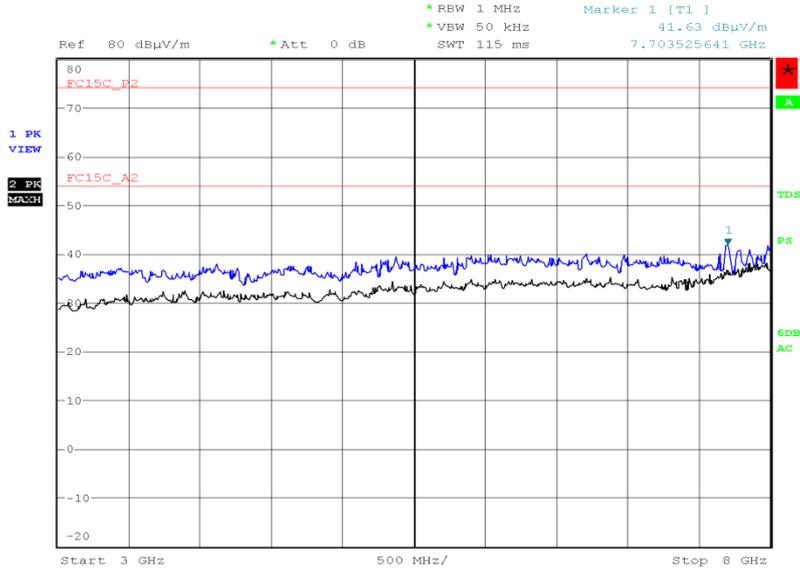
802.11n, 2412 MHz, 6.5 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 5.MAY.2015 22:20:18

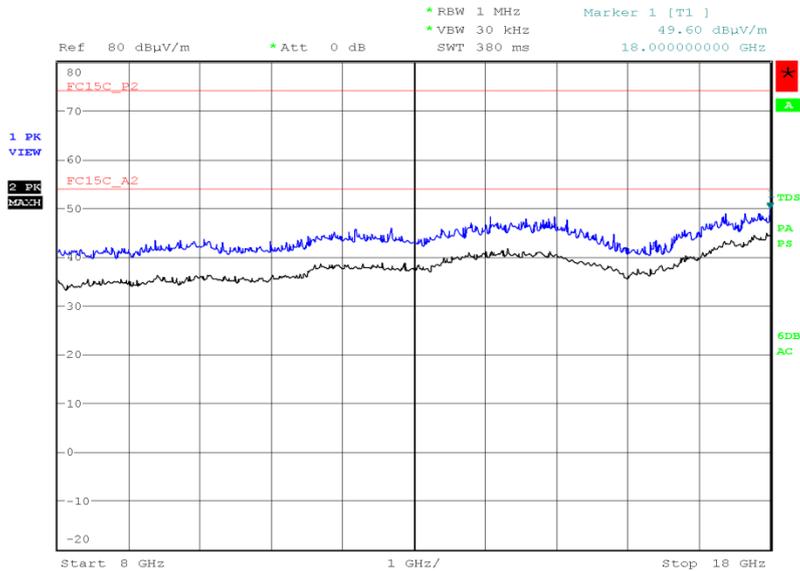


802.11n, 2412 MHz, 6.5 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 4.MAY.2015 13:10:36

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

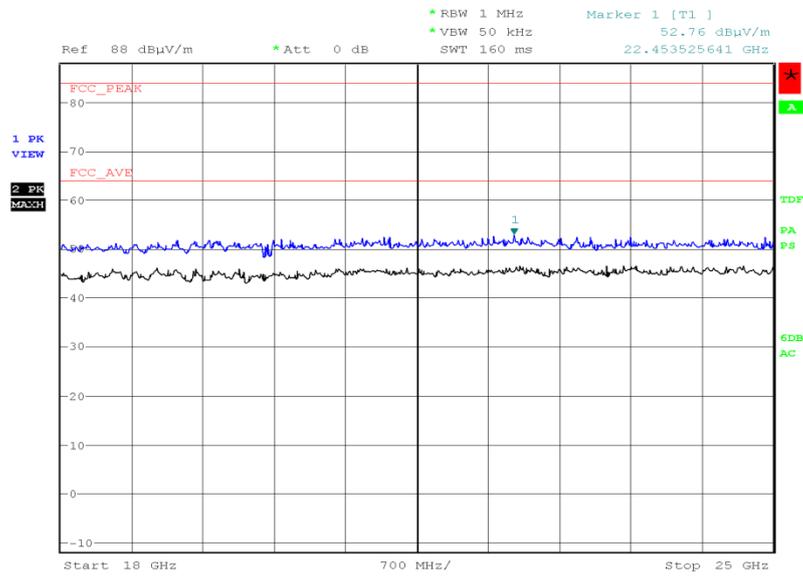


Date: 4.MAY.2015 12:04:49



Product Service

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



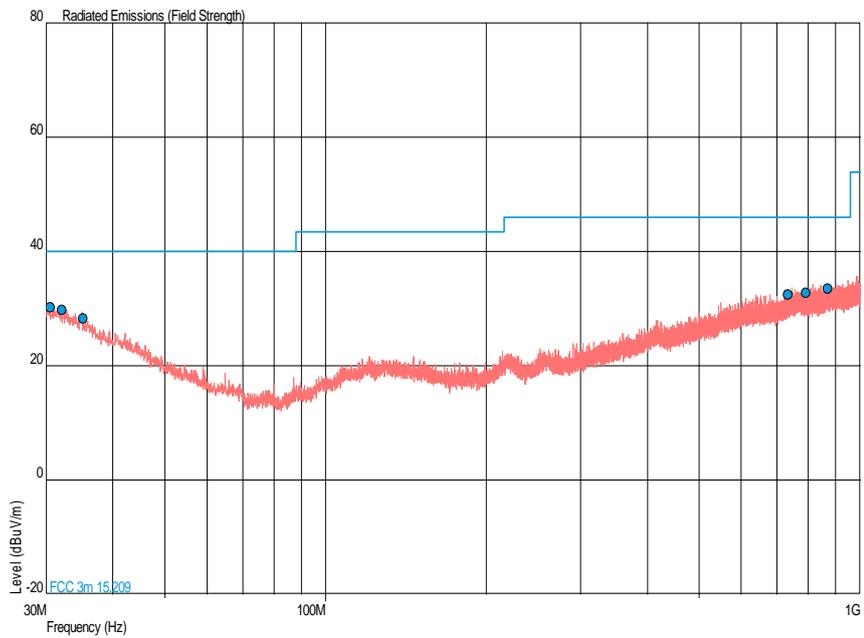
Date: 3.MAY.2015 13:45:51



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

Frequency (MHz)	QP Level (dB $\mu$ V/m)	QP Margin (dB $\mu$ V/m)	QP Level ( $\mu$ V/m)	QP Margin ( $\mu$ V/m)	Angle (°)	Height (m)	Polarisation
30.582	30.2	-9.8	32.4	-67.6	0	1.00	Horizontal
32.183	29.8	-10.2	30.9	-69.1	180	1.00	Horizontal
35.141	28.3	-11.7	26.0	-74.0	0	1.00	Horizontal
733.929	32.5	-13.5	42.2	-157.8	180	1.00	Vertical
790.723	32.7	-13.3	43.2	-156.8	180	1.00	Vertical
869.487	33.5	-12.5	47.3	-152.7	0	1.00	Horizontal

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





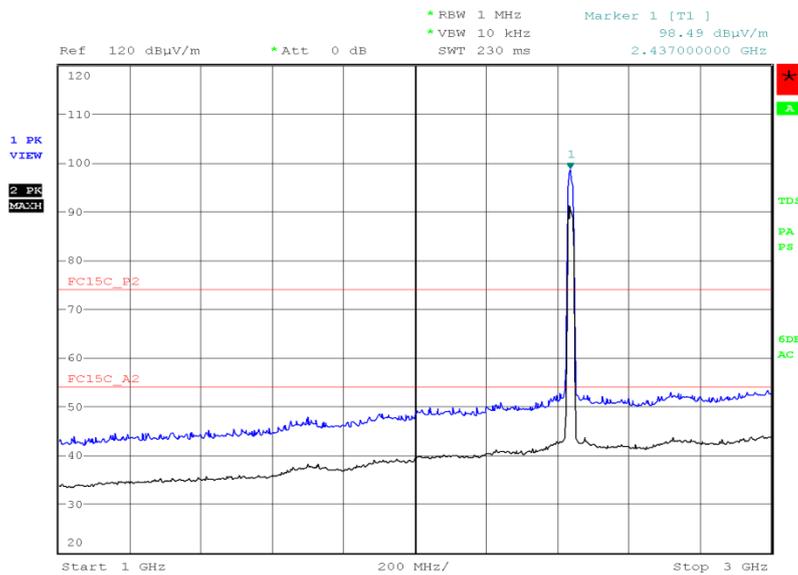
Product Service

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 emissions were detected within 10 dB of the limit.

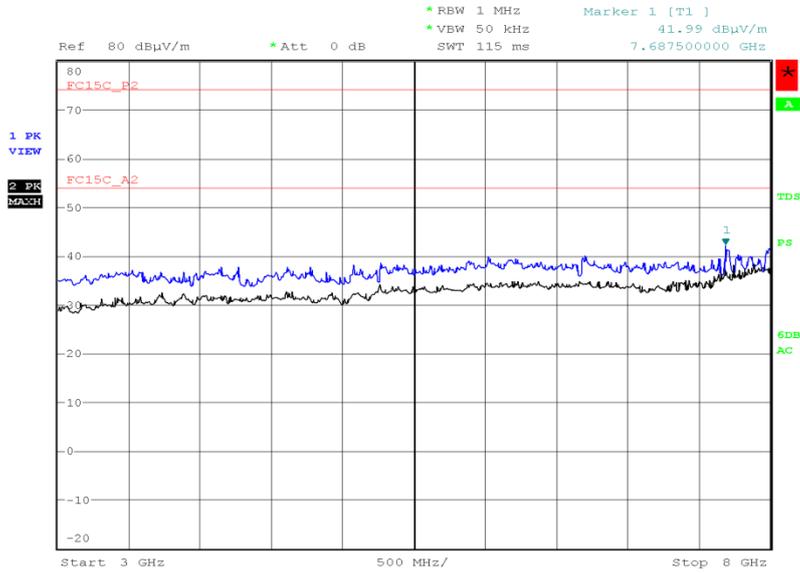
802.11n, 2437 MHz, 6.5 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 5.MAY.2015 22:28:06

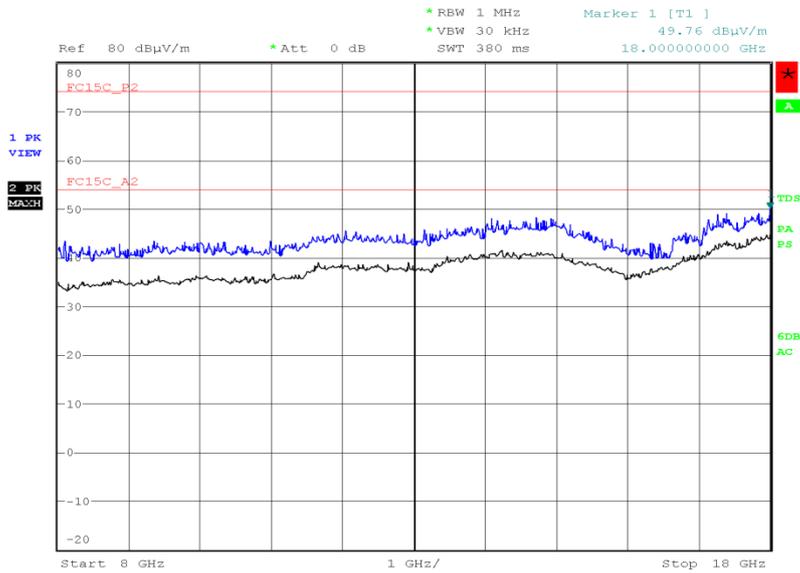


802.11n, 2437 MHz, 6.5 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 4.MAY.2015 13:16:05

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

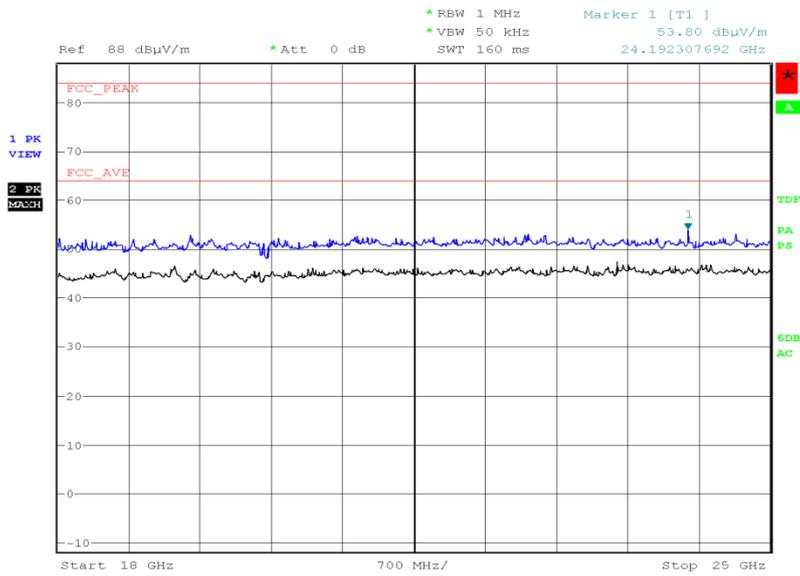


Date: 4.MAY.2015 12:15:02



Product Service

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



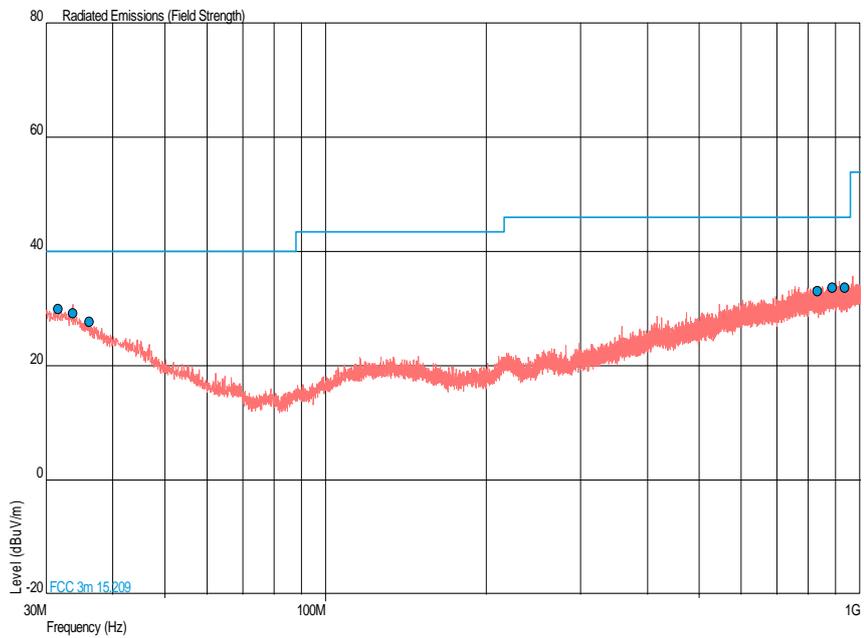
Date: 3.MAY.2015 13:50:50



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

Frequency (MHz)	QP Level (dB $\mu$ V/m)	QP Margin (dB $\mu$ V/m)	QP Level ( $\mu$ V/m)	QP Margin ( $\mu$ V/m)	Angle (°)	Height (m)	Polarisation
31.601	30.0	-10.0	31.6	-68.4	0	1.00	Vertical
33.638	29.2	-10.8	28.8	-71.2	0	1.00	Vertical
36.111	27.7	-12.3	24.3	-75.7	180	1.00	Horizontal
831.948	33.1	-12.9	45.2	-154.8	180	1.00	Horizontal
886.559	33.7	-12.3	48.4	-151.6	0	1.00	Horizontal
936.077	33.6	-12.4	47.9	-152.1	0	1.00	Vertical

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



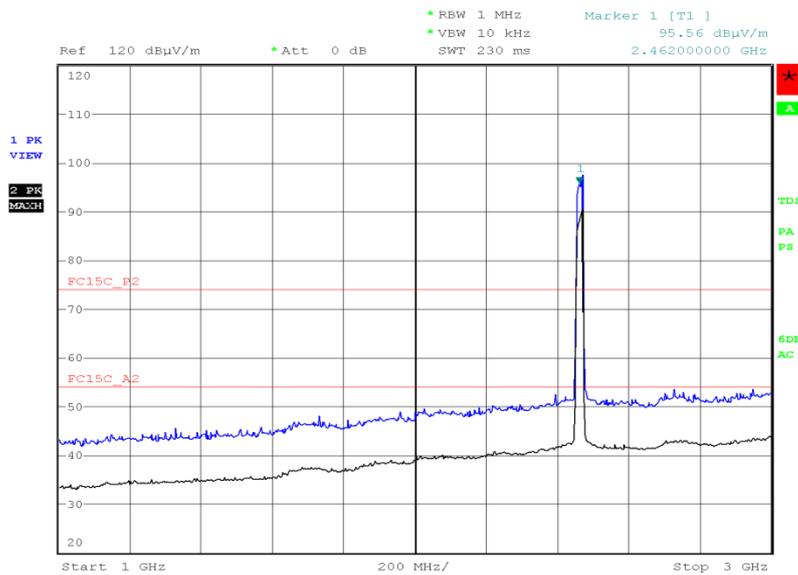


802.11n, 2462 MHz, 6.5 Mbps, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

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.

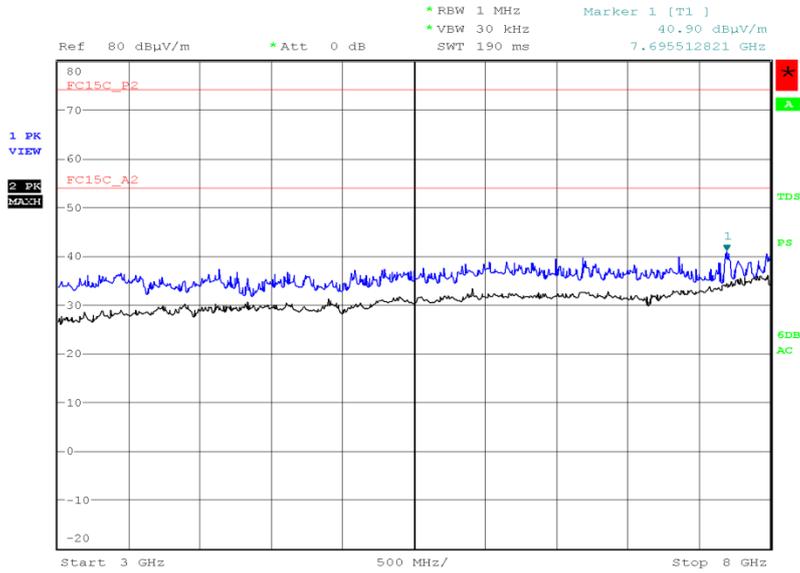
802.11n, 2462 MHz, 6.5 Mbps, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 5.MAY.2015 22:31:24

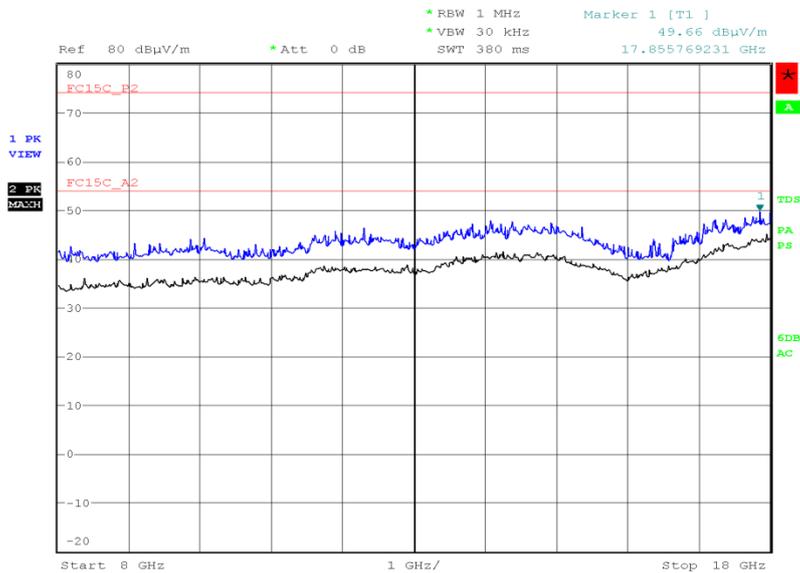


802.11n, 2462 MHz, 6.5 Mbps, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 4.MAY.2015 14:10:09

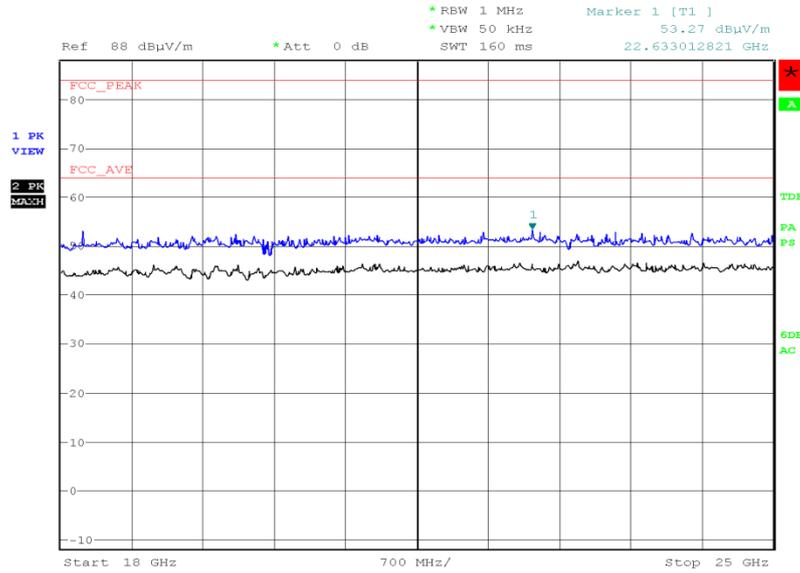
802.11n, 2462 MHz, 6.5 Mbps, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 4.MAY.2015 12:23:55



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



Date: 3.MAY.2015 13:54:48

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

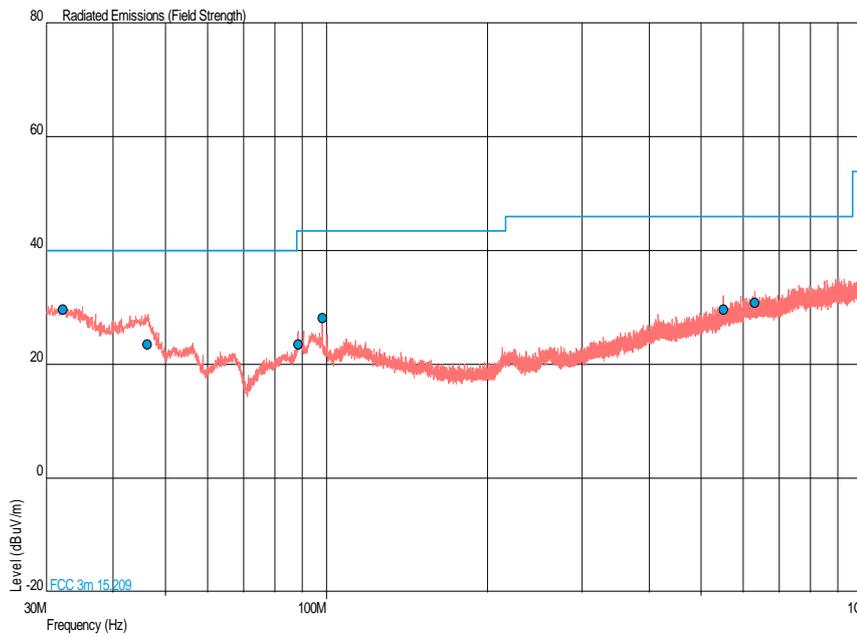


4.0 V DC Supply

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

Frequency (MHz)	QP Level (dB $\mu$ V/m)	QP Margin (dB $\mu$ V/m)	QP Level ( $\mu$ V/m)	QP Margin ( $\mu$ V/m)	Angle (°)	Height (m)	Polarisation
32.230	29.6	-10.4	30.2	-69.8	273	1.00	Vertical
46.279	23.5	-16.5	15.0	-85.0	175	1.00	Vertical
88.503	23.5	-20.0	15.0	-135.0	160	1.00	Vertical
98.199	28.1	-15.4	25.4	-124.6	30	1.12	Vertical
550.004	29.7	-16.3	30.5	-169.5	235	1.00	Vertical
631.012	30.9	-15.1	35.1	-164.9	334	1.00	Vertical

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



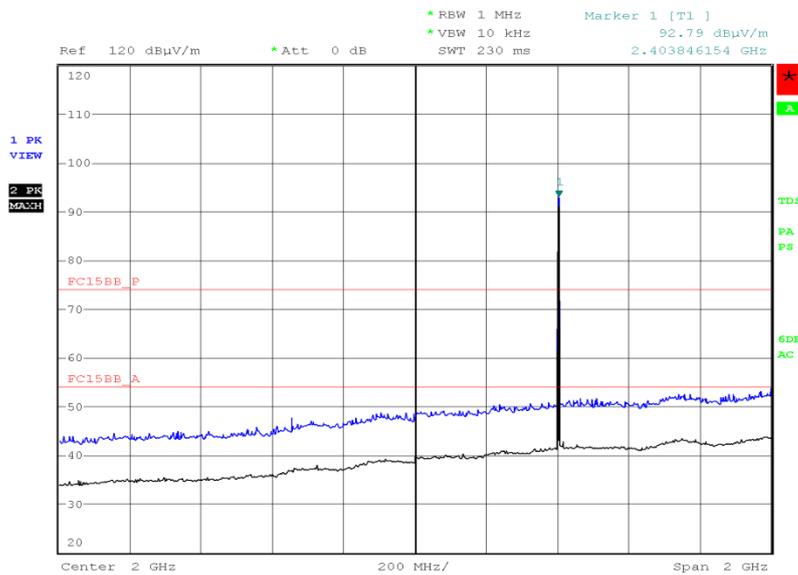


Bluetooth Low Energy, 2402 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

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

\*No emissions were detected within 6 dB of the limit.

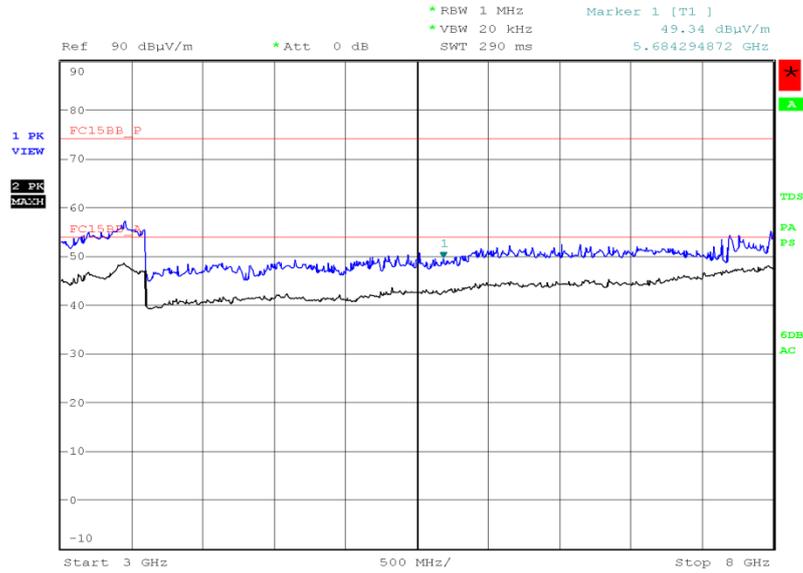
Bluetooth Low Energy, 2402 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 18.APR.2015 02:34:46

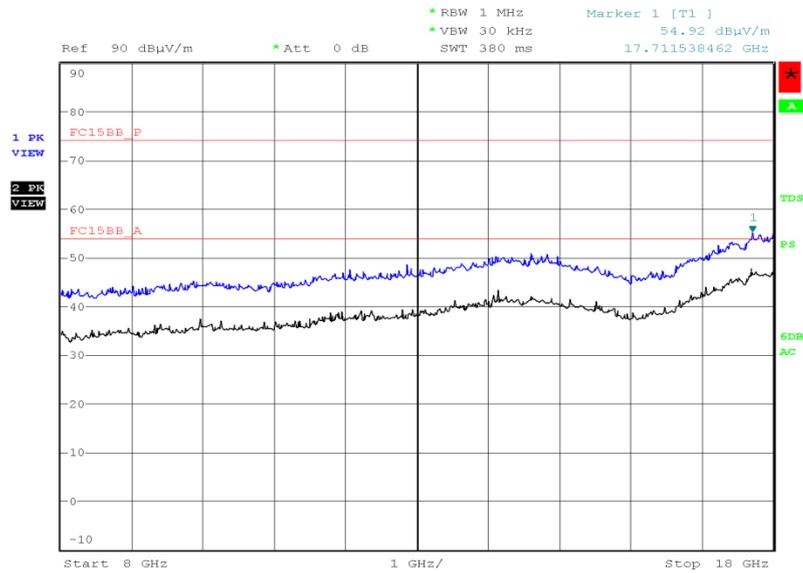


Bluetooth Low Energy, 2402 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 18.APR.2015 03:23:07

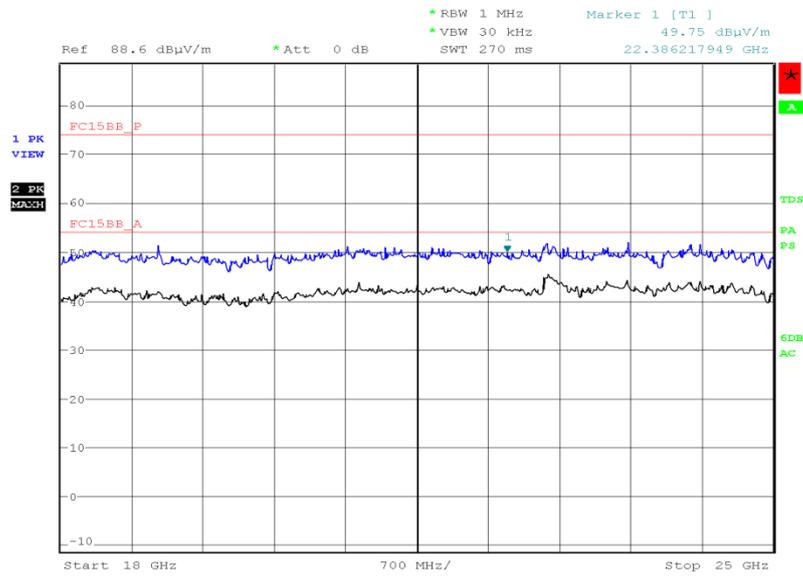
Bluetooth Low Energy, 2402 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 19.APR.2015 02:35:35



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



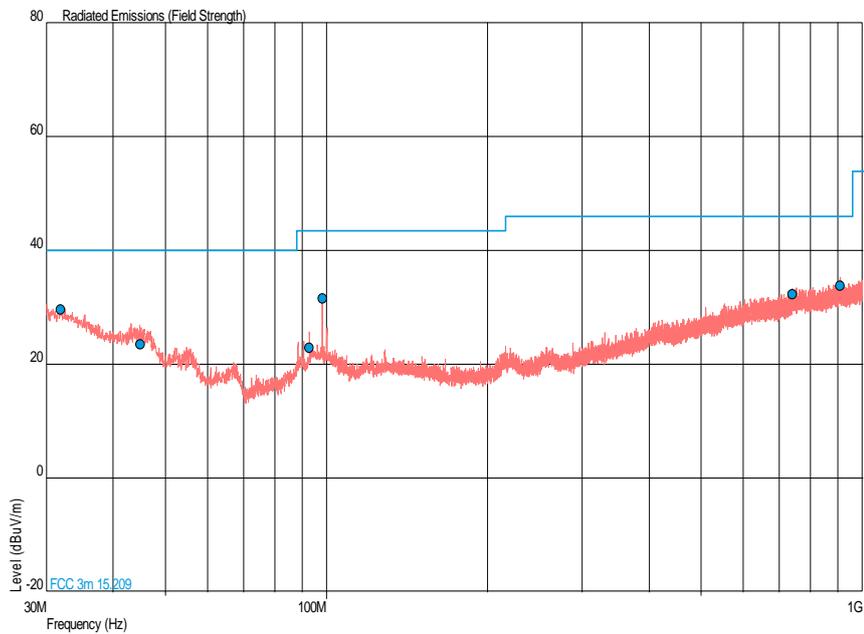
Date: 19.APR.2015 04:55:33



**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
31.890	29.6	-10.4	30.2	-69.8	345	1.43	Vertical
44.895	23.6	-16.4	15.1	-84.9	127	1.42	Vertical
92.890	22.9	-20.6	14.0	-136.0	264	1.00	Vertical
98.201	31.6	-11.9	38.0	-112.0	0	1.00	Vertical
741.082	32.3	-13.7	41.2	-158.8	55	1.00	Horizontal
907.452	33.8	-12.2	49.0	-151.0	212	1.00	Vertical

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



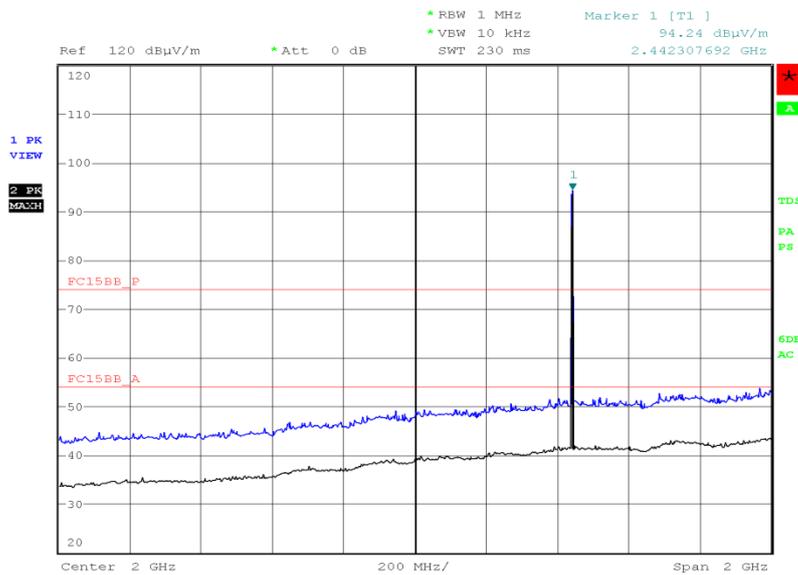


Bluetooth Low Energy, 2441 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

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 6 dB of the limit.

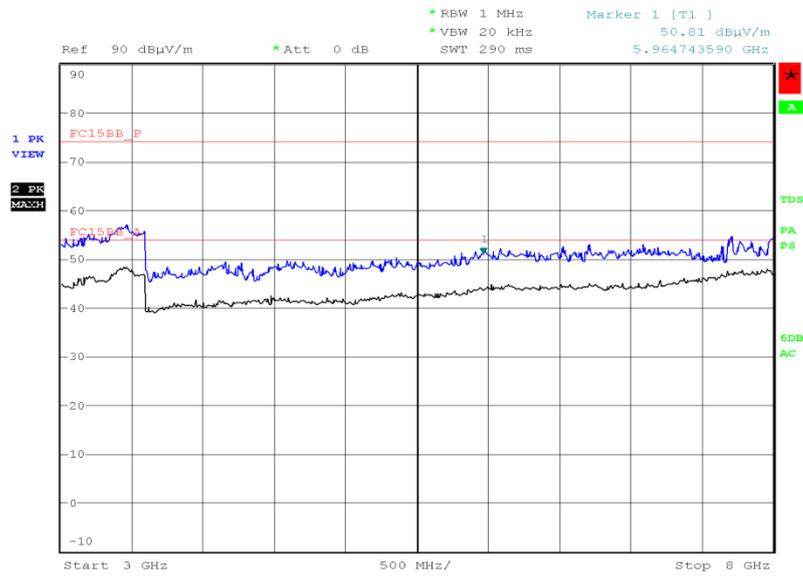
Bluetooth Low Energy, 2441 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



Date: 18.APR.2015 02:26:16

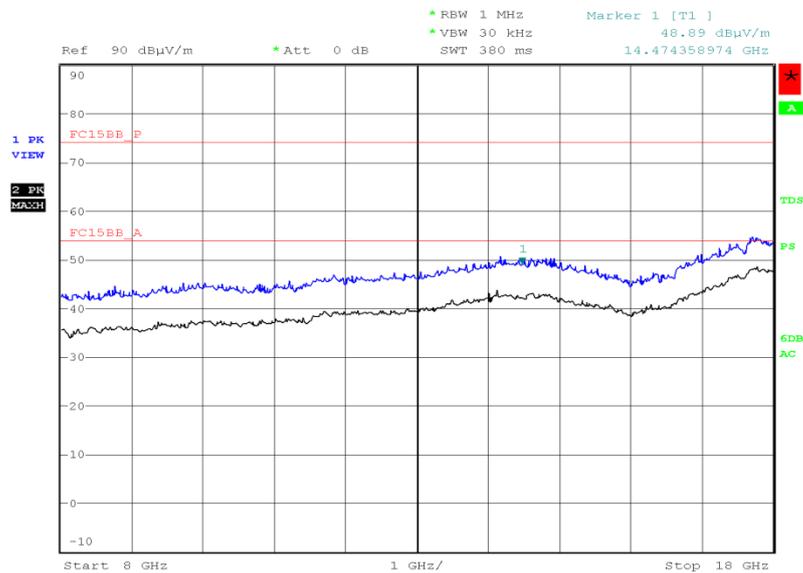


Bluetooth Low Energy, 2441 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 18.APR.2015 03:28:15

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

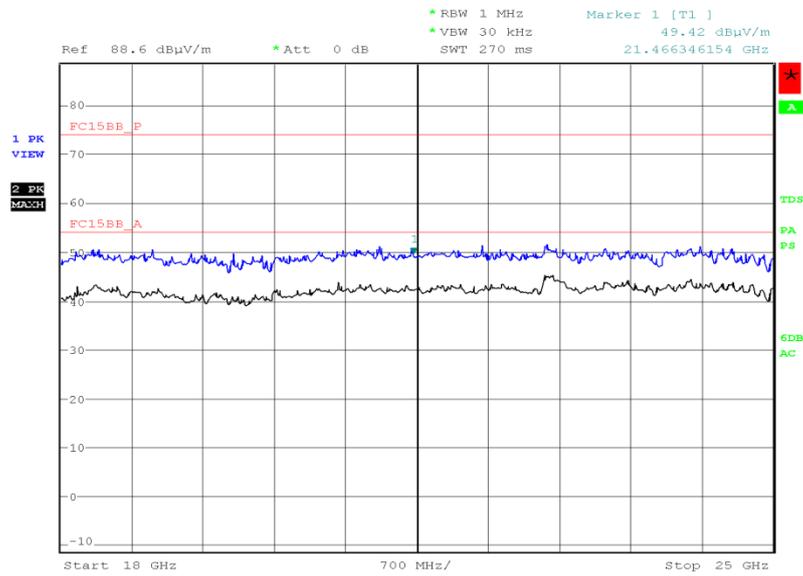


Date: 19.APR.2015 02:47:51



Product Service

Bluetooth Low Energy, 2441 MHz, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



Date: 19.APR.2015 05:08:19



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

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
33.219	29.6	-10.4	30.2	-69.8	154	1.00	Horizontal
46.103	23.4	-16.6	14.8	-85.2	26	1.00	Vertical
92.871	23.7	-19.8	15.3	-134.7	143	1.00	Vertical
98.201	29.4	-14.1	29.5	-120.5	234	1.11	Vertical
620.811	30.9	-15.1	35.1	-164.9	183	1.00	Vertical
895.619	33.4	-12.6	46.8	-153.2	213	3.58	Horizontal

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

