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# Report On

FCC Testing of the  
Sharp 205SH AXGP & Quad-band WCDMA (FDD I/FDD V/FDD  
VIII/FDD XI) Dual-mode Cellular Phone with Bluetooth, WLAN, Felica  
and GPS

In accordance with FCC CFR 47 Part 15E

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00193

Document 75921996 Report 11 Issue 2

May 2013



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](http://www.tuv-sud.co.uk)

COMMERCIAL-IN-CONFIDENCE

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and GPS

In accordance with FCC CFR 47 Part 15E

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May 2013

**PREPARED FOR**

Sharp Communication Compliance Ltd  
Azure House  
Bagshot Road  
Bracknell  
Berkshire  
RG12 7QY

**PREPARED BY**

**Natalie Bennett**  
Senior Administrator (Technical)

**APPROVED BY**

**Simon Bennett**  
Authorised Signatory

**DATED**

20 May 2013

**This report has been up-issued to Issue 2 to include the updated application form.**

**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 CFR 47 Part 15E. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

M Russell

R Henley

S Milliken



S Hartley

G Lawler



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## **SECTION 1**

### **REPORT SUMMARY**

FCC Testing of the  
Sharp 205SH AXGP & Quad-band WCDMA (FDD I/FDD V/FDD VIII/FDD XI) Dual-mode  
Cellular Phone with Bluetooth, WLAN, Felica and GPS  
In accordance with FCC CFR 47 Part 15E



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## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the Sharp 205SH AXGP & Quad-band WCDMA (FDD I/FDD V/FDD VIII/FDD XI) Dual-mode Cellular Phone with Bluetooth, WLAN, Felica and GPS to the requirements of FCC CFR 47 Part 15E.

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)	205SH
Serial Number(s)	IMEI 004401114779164 IMEI 004401114778885 IMEI 004401114778737 IMEI 004401114778828 IMEI 004401114778877
Number of Samples Tested	5
Test Specification/Issue/Date	FCC CFR 47 Part 15E (2012)
Incoming Release Date	Application Form 14 May 2013
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	9669 22 April 2013
Start of Test	14 April 2013
Finish of Test	1 May 2013
Name of Engineer(s)	M Russell R Henley S Milliken S Hartley G Lawler
Related Document(s)	FCC 06-96: 2006; FCC Public Notice DA 02-2138: 2002; UKAS M3003: Edition 2: 2007; ETSI TR 100 028: 2001



## 1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 15E is shown below.

Section	Spec Clause	Test Description	Result	Comments/Base Standard
802.11(a)				
2.2	15.407 (a)(1)(2)(3)	Power Limits	Pass	
2.3	15.407 (b)(1)(2)(3)(4)(6)(7)	Undesirable Emission Limits	Pass	
2.4	2.1055 and 15.407 (g)	Frequency Stability	Pass	
2.5	15.407 (a)	26 dB Bandwidth	Pass	
2.6	15.407 (a)(5)	Peak Power Spectral Density	Pass	
2.7	15.407 (a)(6)	Ratio of the Peak Excursion of the Modulation Envelope	Pass	
802.11(n) FCC - 5 GHz 20 MHz BW				
2.2	15.407 (a)(1)(2)(3)	Power Limits	Pass	
2.3	15.407 (b)(1)(2)(3)(4)(6)(7)	Undesirable Emission Limits	Pass	
2.5	15.407 (a)	26 dB Bandwidth	Pass	
2.6	15.407 (a)(5)	Peak Power Spectral Density	Pass	
2.7	15.407 (a)(6)	Ratio of the Peak Excursion of the Modulation Envelope	Pass	



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Section	Spec Clause	Test Description	Result	Comments/Base Standard
802.11(n) FCC - 5 GHz 40 MHz BW				
2.1	15.207	AC Line Conducted Emissions	Pass	
2.2	15.407 (a)(1)(2)(3)	Power Limits	Pass	
2.3	15.407 (b)(1)(2)(3)(4)(6)(7)	Undesirable Emission Limits	Pass	
2.5	15.407 (a)	26 dB Bandwidth	Pass	
2.6	15.407 (a)(5)	Peak Power Spectral Density	Pass	
2.7	15.407 (a)(6)	Ratio of the Peak Excursion of the Modulation Envelope	Pass	



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**1.3 APPLICATION FORM**

EQUIPMENT DESCRIPTION	
Model Name/Number	205SH
Part Number	
Hardware Version	PP1
Software Version	A4040 for DFS Testing F3282 for all other testing
FCC ID	APYHRO00193
Technical Description (Please provide a brief description of the intended use of the equipment)	AXGP and Quad-band (FDD I / V / VIII / XI) Dual-mode Cellular Phone with Bluetooth, WLAN, FeliCa and GPS

TYPE OF EQUIPMENT	
<input type="checkbox"/>	Master
<input type="checkbox"/>	Client with Radar Detection
<input checked="" type="checkbox"/>	Client without Radar Detection
<input type="checkbox"/>	Wi-Fi Direct Support

TRANSMITTER TECHNICAL CHARACTERISTICS	
FREQUENCY CHARACTERISTICS	
<input checked="" type="checkbox"/>	5.150 GHz to 5.250 GHz
<input checked="" type="checkbox"/>	5.250 GHz to 5.350 GHz
<input checked="" type="checkbox"/>	5.470 GHz to 5.725 GHz
<input type="checkbox"/>	5.725 GHz to 5.825 GHz
<input type="checkbox"/>	EUT operates in the frequency band 5600 – 5650 MHz?
<input type="checkbox"/>	Off Channel CAC Implemented
	Off Channel CAC within 5600 – 5650 MHz band                      hours, (1 – 24)
	Off Channel CAC outside 5600 – 5650 MHz band                    minutes, (6 – 240)
Note: DFS is not required in the ranges 5.15 – 5.25 GHz and 5.725 – 5.825 GHz	

TRANSMITTER RF POWER CHARACTERISTICS	
Maximum rated transmitter output power as stated by manufacturer (if applicable)	
Conducted Power	14.5 dBm
Maximum Antenna Gain	0 dBi
EIRP	14.5 dBm
Minimum rated transmitter output power as stated by manufacturer (if applicable)	
Conducted Power	6.0 dBm
Maximum Antenna Gain	0 dBi
EIRP	6.0 dBm
Is TPC supported?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
If Yes, provide a description of operation.	



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This equipment implements TPC accordance with IEEE802.11a/n and IEEE802.11h



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POWER SOURCE	
<input type="checkbox"/> AC mains supply	State voltage
AC supply frequency	(Hz) VAC
<input checked="" type="checkbox"/> DC supply	
Nominal voltage	4.0V

SYSTEM ARCHITECTURE			
<input type="checkbox"/>	Frame Based		
<input type="checkbox"/>	IP Based		
<input type="checkbox"/>	Other	If other please state	
<input checked="" type="checkbox"/>	802.11(a)	Receiver Bandwidth:	20 MHz
<input checked="" type="checkbox"/>	802.11(n) – 20 MHz	Receiver Bandwidth:	20 MHz
<input checked="" type="checkbox"/>	802.11(n) – 40 MHz	Receiver Bandwidth:	20/40 MHz
<input type="checkbox"/>	802.11(ac) – 20 MHz	Receiver Bandwidth:	MHz
<input type="checkbox"/>	802.11(ac) – 40 MHz	Receiver Bandwidth:	MHz
<input type="checkbox"/>	802.11(ac) – 80 MHz	Receiver Bandwidth:	MHz

DECLARATION	
No parameter or information relating to the detected radar waveforms is available or accessible to the end user.	
<input checked="" type="checkbox"/> True	<input type="checkbox"/> False

MISCELLANEOUS	
Power-on cycle time*	N/A – only applicable for Master device
* Time from switching on the UUT to the point at which Channel Availability Check (CAC) commences	

UNIFORM SPREADING	
Describe how the meter provides, on aggregate, uniform channel loading of the spectrum across all channels.	
N/A – only applicable for Master device	



ANTENNA OPTIONS	
<b>Antenna 1</b>	
Antenna Description:	Bluetooth / WLAN antenna
Antenna Model:	GCABBA472AFS* : *= Colour Code
Antenna Maximum Gain:	0dBi
Antenna Frequency Range:	2.400 - 5.725MHz
<b>Antenna 2</b>	
Antenna Description:	
Antenna Model:	
Antenna Maximum Gain:	
Antenna Frequency Range:	
<b>Antenna 3</b>	
Antenna Description:	
Antenna Model:	
Antenna Maximum Gain:	
Antenna Frequency Range:	
<b>Antenna 4</b>	
Antenna Description:	
Antenna Model:	
Antenna Maximum Gain:	
Antenna Frequency Range:	
<b>Antenna 5</b>	
Antenna Description:	
Antenna Model:	
Antenna Maximum Gain:	
Antenna Frequency Range:	

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

Signature:   
 Position held: Junior Manager

Name: Hiroyuki Uwatoko  
 Date: 20<sup>th</sup> May, 2013



Product Service

## **1.4 PRODUCT INFORMATION**

### **1.4.1 Technical Description**

The Equipment Under Test (EUT) was a Sharp 205SH AXGP & Quad-band WCDMA (FDD I/FDD V/FDD VIII/FDD XI) Dual-mode Cellular Phone with Bluetooth, WLAN, 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 Accreditation  
90987 Octagon House, Fareham Test Laboratory

## **1.6 DEVIATIONS FROM THE STANDARD**

No deviations from the applicable test standard during testing.

## **1.7 MODIFICATION RECORD**

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



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## **SECTION 2**

### **TEST DETAILS**

FCC Testing of the  
Sharp 205SH AXGP & Quad-band WCDMA (FDD I/FDD V/FDD VIII/FDD XI) Dual-mode  
Cellular Phone with Bluetooth, WLAN, Felica and GPS  
In accordance with FCC CFR 47 Part 15E



## **2.1 AC LINE CONDUCTED EMISSIONS**

### **2.1.1 Specification Reference**

FCC CFR 47 Part 15E, Clause 15.207

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

205SH S/N: IMEI 004401114778885 - Modification State 0

### **2.1.3 Date of Test**

24 April 2013

### **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 EUT is set up on a test table 800mm above a horizontal ground plane. A vertical ground plane is also required and is placed 400mm from the EUT. Where a EUT is floor standing it will be stood on but insulated from the ground plane by up to 12mm.

The EUT is powered through a Line Impedance Stabilisation Network (LISN) which is bonded to the ground plane. The EUT is located so that the distance between the EUT and the LISN is no less than 800mm. Where possible the cable between the mains input of the EUT and the LISN is 1m. Where this is not possible the cable is non inductively bundled with the bundle not exceeding 400mm in length.

A preliminary profile of the Conducted Emissions is obtained over the frequency range 150kHz to 30MHz. Any points of interest are noted for formal measurements.

During formal measurements, the measuring receiver is tuned to the emission of interest where Quasi – Peak and Average measurements are performed in a 9kHz Video and Resolution Bandwidth.

### **2.1.6 Environmental Conditions**

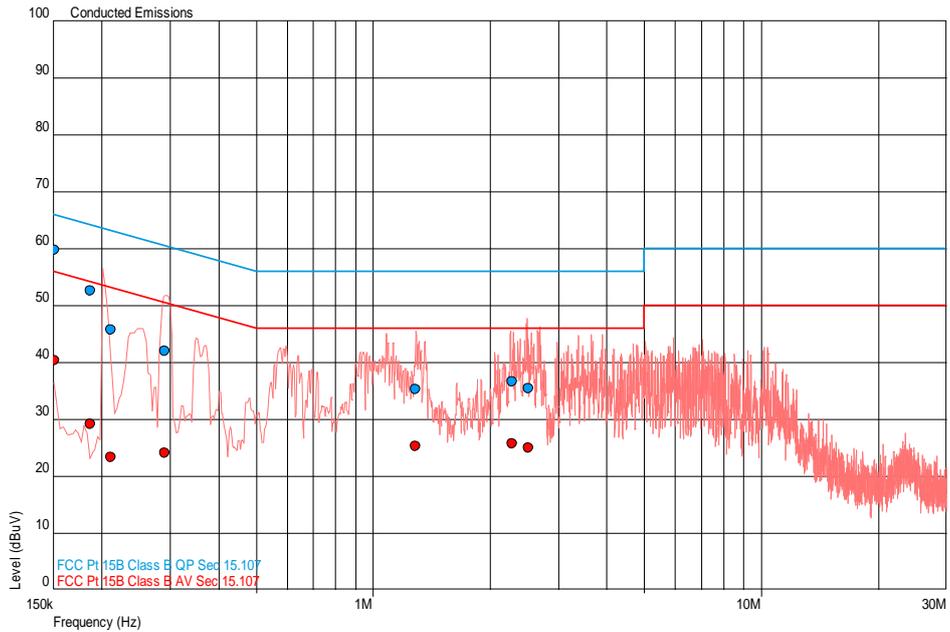
Ambient Temperature	21.0°C
Relative Humidity	36.0%



**2.1.7 Test Results**

802.11(n) FCC - 5 GHz 40 MHz BW

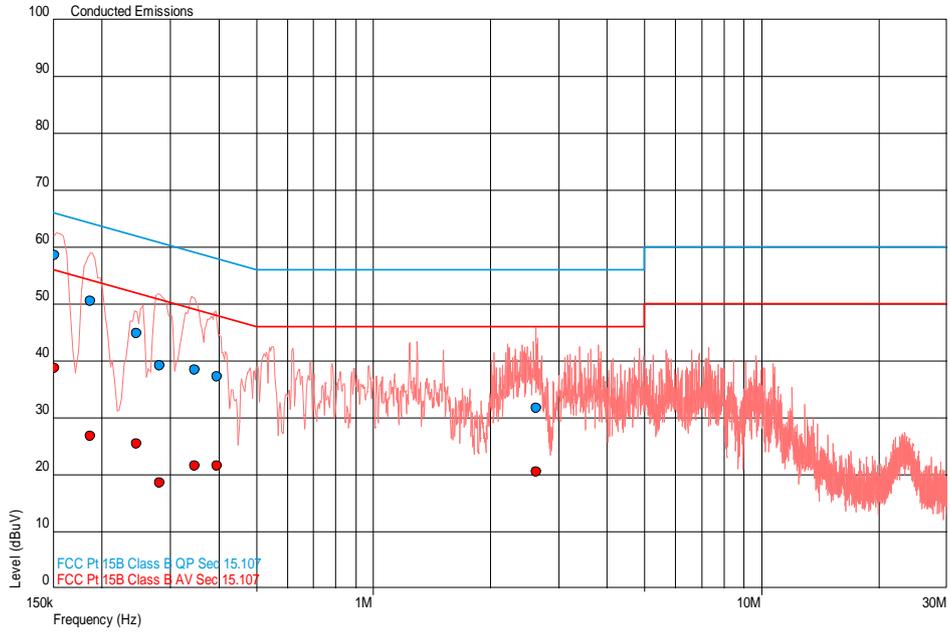
Live Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.151	59.8	65.9	-6.1	40.4	55.9	-15.5
0.187	52.7	64.2	-11.5	29.2	54.2	-24.9
0.211	45.8	63.2	-17.4	23.3	53.2	-29.8
0.291	42.1	60.5	-18.4	24.2	50.5	-26.3
1.286	35.2	56.0	-20.8	25.2	46.0	-20.8
2.288	36.6	56.0	-19.4	25.7	46.0	-20.3
2.510	35.5	56.0	-20.5	25.0	46.0	-21.0



Neutral Line



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.151	58.6	65.9	-7.4	38.7	55.9	-17.2
0.187	50.5	64.2	-13.6	26.7	54.2	-27.4
0.247	44.9	61.9	-17.0	25.5	51.9	-26.4
0.283	39.2	60.7	-21.5	18.6	50.7	-32.2
0.347	38.5	59.0	-20.6	21.6	49.0	-27.5
0.395	37.3	57.9	-20.6	21.5	47.9	-26.4
2.628	31.7	56.0	-24.3	20.5	46.0	-25.5



## **2.2 POWER LIMITS**

### **2.2.1 Specification Reference**

FCC CFR 47 Part 15E, Clause 15.407 (a)(1)(2)(3)

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

205SH S/N: IMEI 004401114778877 - Modification State 0

### **2.2.3 Date of Test**

14 April 2013, 22 April 2013 & 30 April 2013

### **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**

For conducted power, the EUT was transmitted at maximum power via a cable and attenuator to the Spectrum Analyser. The Analyser settings were adjusted to display the resultant trace on screen and a resolution bandwidth and video bandwidth of 1 MHz were used to perform the measurement.

For radiated power, the EUT was transmitted at maximum power level. The signal was observed on the Spectrum Analyser using a Double Ridge Guide antenna at 3 metres from the EUT. The signal was maximised by rotating the EUT 360° and a height search of the measuring antenna. A substitution was then performed using a substitution antenna and signal generator.

This level was maximised by adjusting the height of the measuring antenna once more. The level from the signal generator was then adjusted to achieve the same raw result as with the EUT. This level was then corrected to account for cable loss and antenna factor. A calculation was then performed to obtain the final figure.

In both cases a Peak Power Analyser was then used to obtain a correction factor for the wideband signal and in terms of an rms-equivalent voltage.

### **2.2.6 Environmental Conditions**

Ambient Temperature	20.1 - 25.5°C
Relative Humidity	18.3 - 40.0%



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**2.2.7 Test Results**

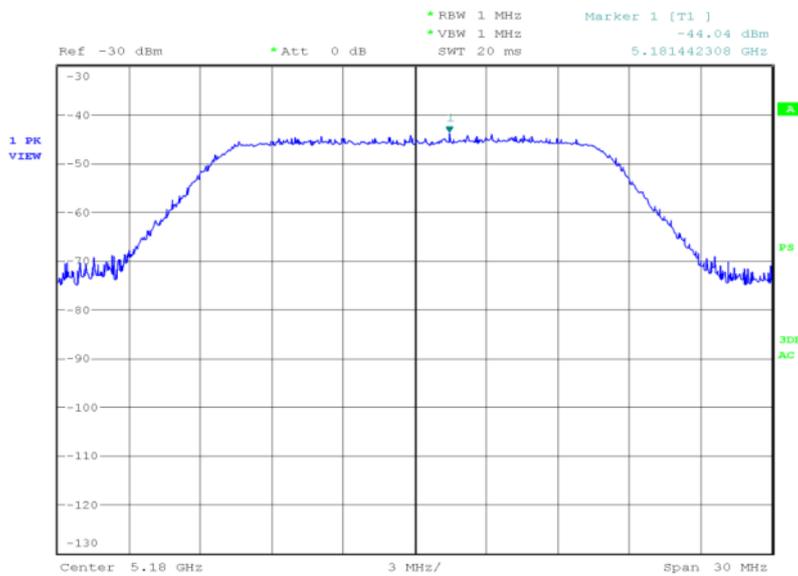
802.11(a)

Radiated

Frequency Band 1

5180 MHz

EIRP (dBm)	EIRP (mW)
7.11	5.14



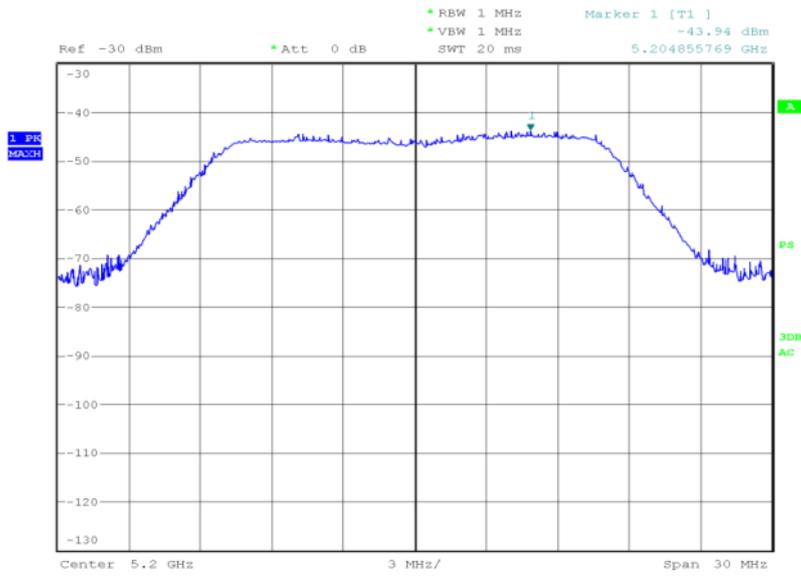
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Product Service

5200 MHz

EIRP (dBm)	EIRP (mW)
7.42	5.52



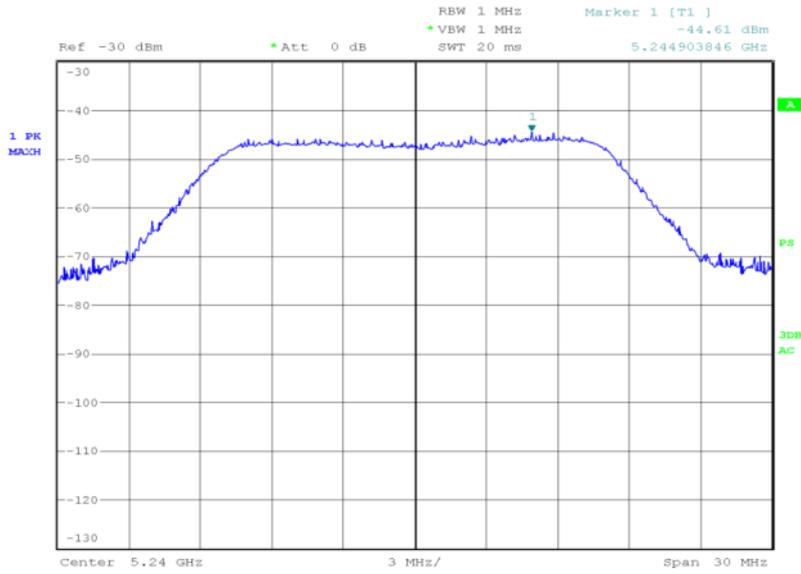
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Product Service

5240 MHz

EIRP (dBm)	EIRP (mW)
6.67	4.65



Date: 12.APR.2013 21:14:15



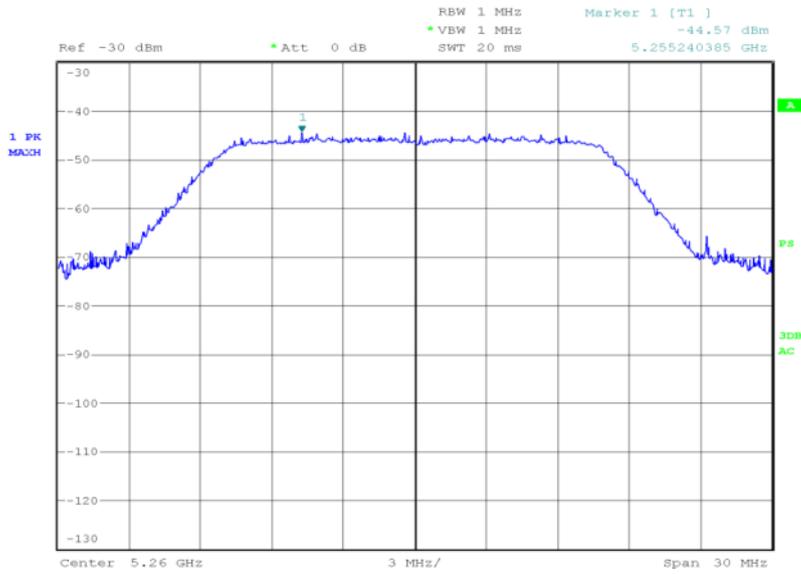
Product Service

Radiated

Frequency Band 2

5260 MHz

EIRP (dBm)	EIRP (mW)
8.71	7.43



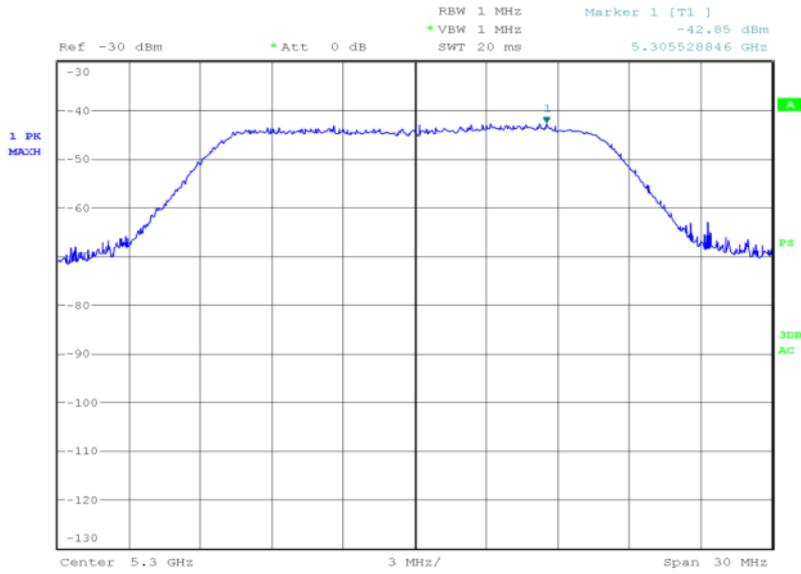
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Product Service

5300 MHz

EIRP (dBm)	EIRP (mW)
8.21	6.62



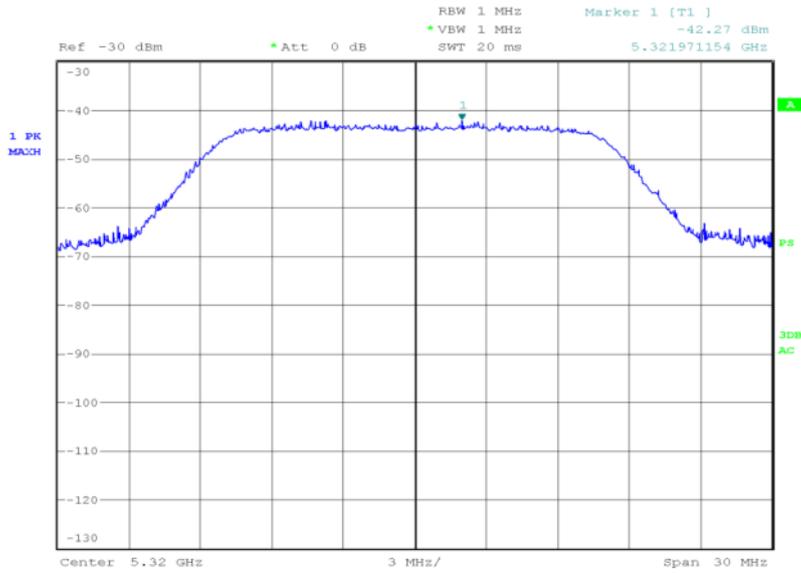
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Product Service

5320 MHz

EIRP (dBm)	EIRP (mW)
8.22	6.64



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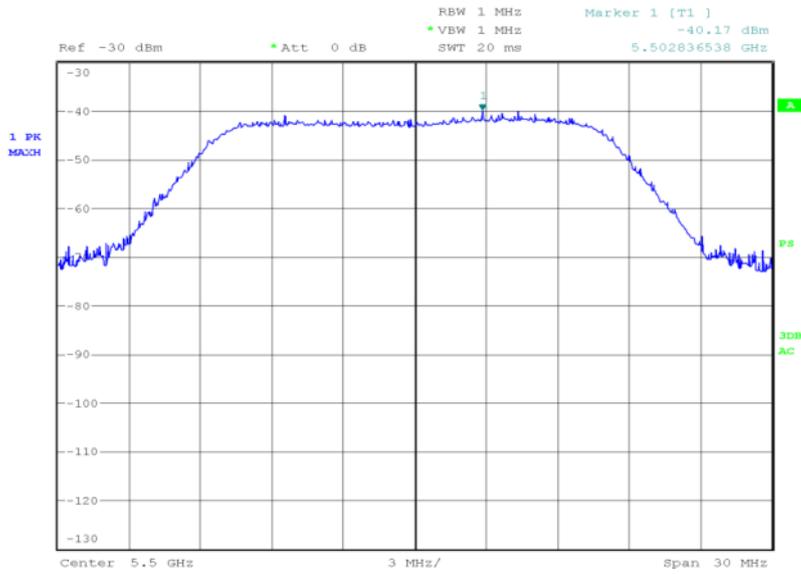
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Radiated

Frequency Band 3

5500 MHz

EIRP (dBm)	EIRP (mW)
13.77	23.82



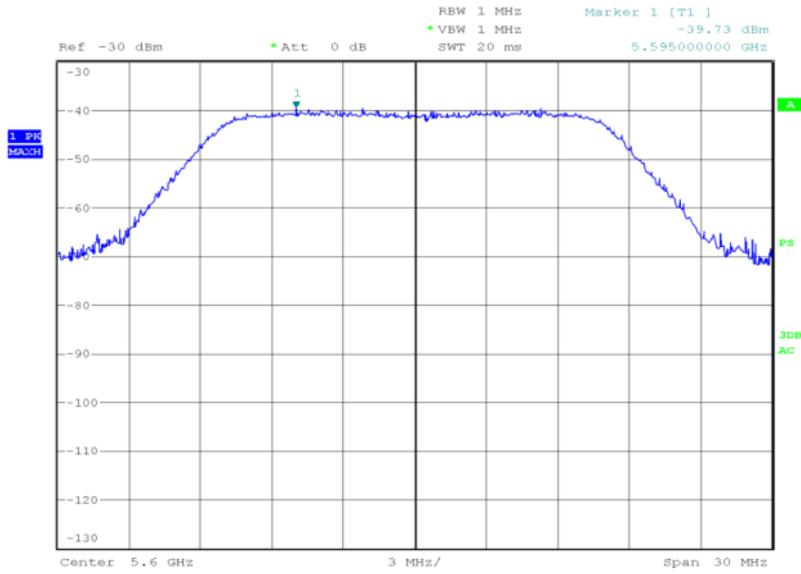
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Product Service

5600 MHz

EIRP (dBm)	EIRP (mW)
13.33	21.53

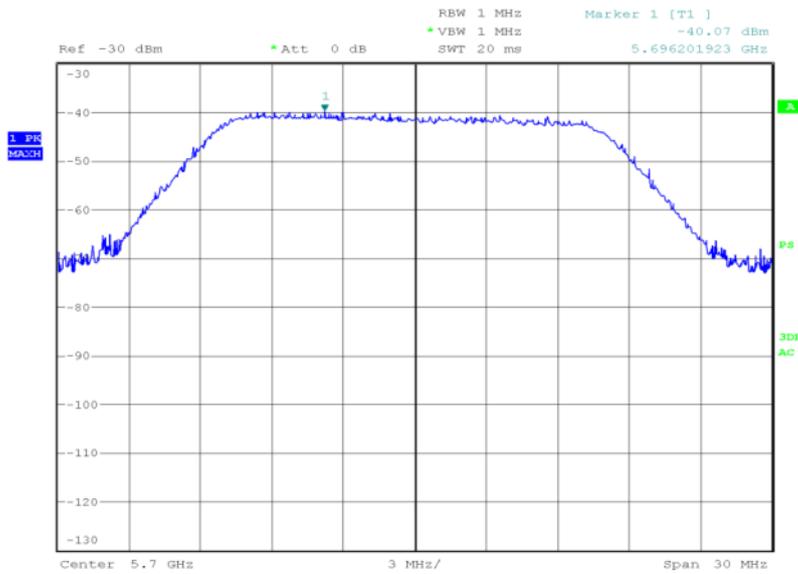


Date: 14.APR.2013 08:53:50



5700 MHz

EIRP (dBm)	EIRP (mW)
13.56	22.70



Date: 14.APR.2013 08:44:19

Limit for Radiated

Frequency Band (MHz)	FCC Limit	IC Limit
5150 to 5250	Lesser of 200 mW or 10 dBm + 10 log B	Lesser of 200 mW or 10 dBm + 10 log B
5250 to 5350	Lesser of 1 W or 17 dBm + 10 log B	Lesser of 1 W or 17 dBm + 10 log B
5470 to 5725	Lesser of 1 W or 17 dBm + 10 log B	Lesser of 1 W or 17 dBm + 10 log B
5725 to 5825	Lesser of 4 W or 23 dBm + 10 log B	Lesser of 4 W or 23 dBm + 10 log B

Note: For FCC limit, "B" = 26 dB Bandwidth. For IC limit "B" = 99% Occupied Bandwidth.  
 For FCC only – It is acceptable to have an antenna with up to 6 dBi gain, without reducing the conducted output power.



Product Service

Conducted

Frequency Band 1

5180 MHz

EIRP (dBm)	EIRP (mW)
13.43	22.01

5200 MHz

EIRP (dBm)	EIRP (mW)
12.81	19.09

5240 MHz

EIRP (dBm)	EIRP (mW)
13.44	22.07

The test was performed on the worst case data rate for 802.11(a) modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 9 Mbps.

Conducted

Frequency Band 2

5260 MHz

EIRP (dBm)	EIRP (mW)
13.27	21.24

5300 MHz

EIRP (dBm)	EIRP (mW)
13.47	22.22

5320 MHz

EIRP (dBm)	EIRP (mW)
12.65	18.43

The test was performed on the worst case data rate for 802.11(a) modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 9 Mbps.



Product Service

Conducted

Frequency Band 3

5500 MHz

EIRP (dBm)	EIRP (mW)
13.54	22.60

5600 MHz

EIRP (dBm)	EIRP (mW)
13.75	23.70

5700 MHz

EIRP (dBm)	EIRP (mW)
14.28	26.76

The test was performed on the worst case data rate for 802.11(a) modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 9 Mbps.

Limit for Conducted

Frequency Band (MHz)	FCC Limit	IC Limit
5150 to 5250	Lesser of 50 mW or 4 dBm + 10 log B	-
5250 to 5350	Lesser of 250 mW or 11 dBm + 10 log B	Lesser of 250 mW or 11 dBm + 10 log B
5470 to 5725	Lesser of 250 mW or 11 dBm + 10 log B	Lesser of 250 mW or 11 dBm + 10 log B
5725 to 5825	Lesser of 1 W or 17 dBm + 10 log B	Lesser of 1 W or 17 dBm + 10 log B

Note: For FCC limit, "B" = 26 dB Bandwidth. For IC limit "B" = 99% Occupied Bandwidth.



Product Service

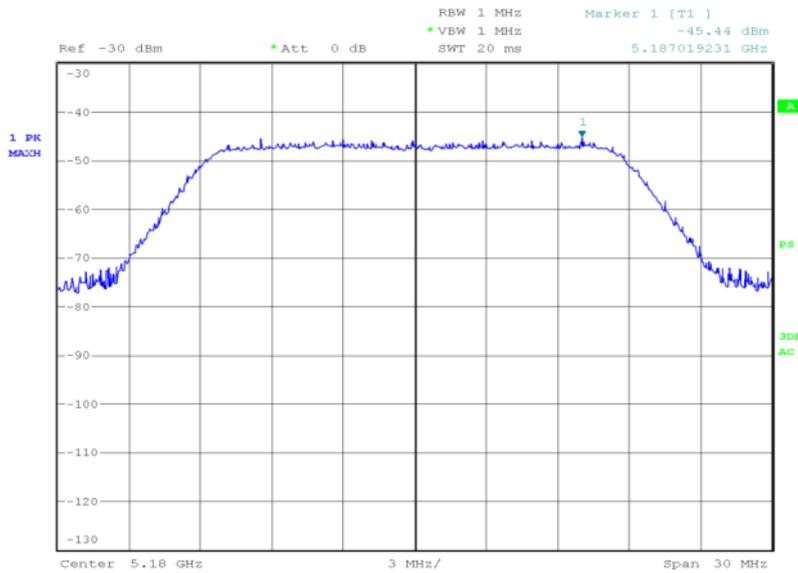
802.11(n) FCC - 5 GHz 20 MHz BW

Radiated

Frequency Band 1

5180 MHz

EIRP (dBm)	EIRP (mW)
5.94	3.93



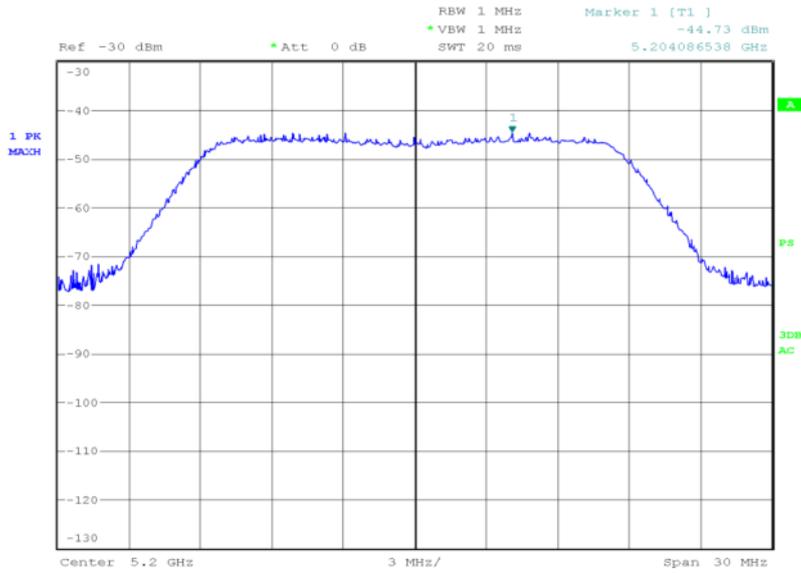
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Product Service

5200 MHz

EIRP (dBm)	EIRP (mW)
6.08	4.06



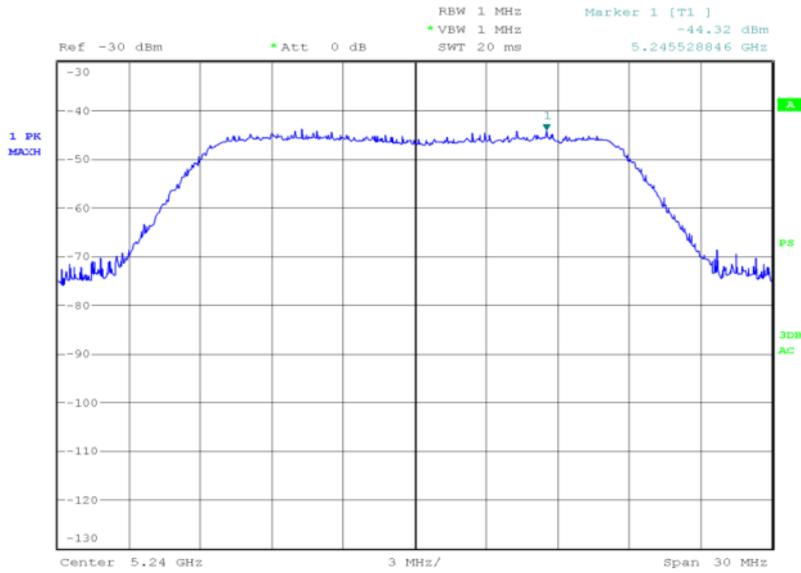
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Product Service

5240 MHz

EIRP (dBm)	EIRP (mW)
5.99	3.97



Date: 14.APR.2013 10:07:37



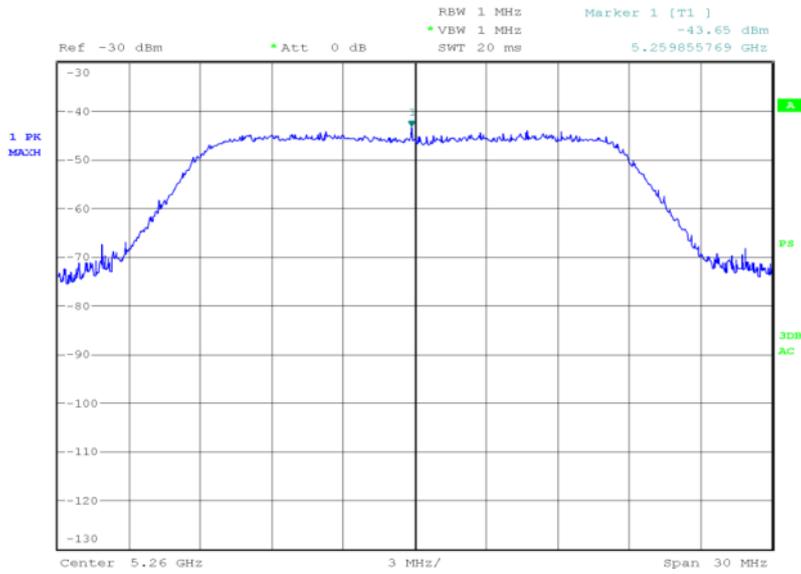
Product Service

Radiated

Frequency Band 2

5260 MHz

EIRP (dBm)	EIRP (mW)
7.82	6.05



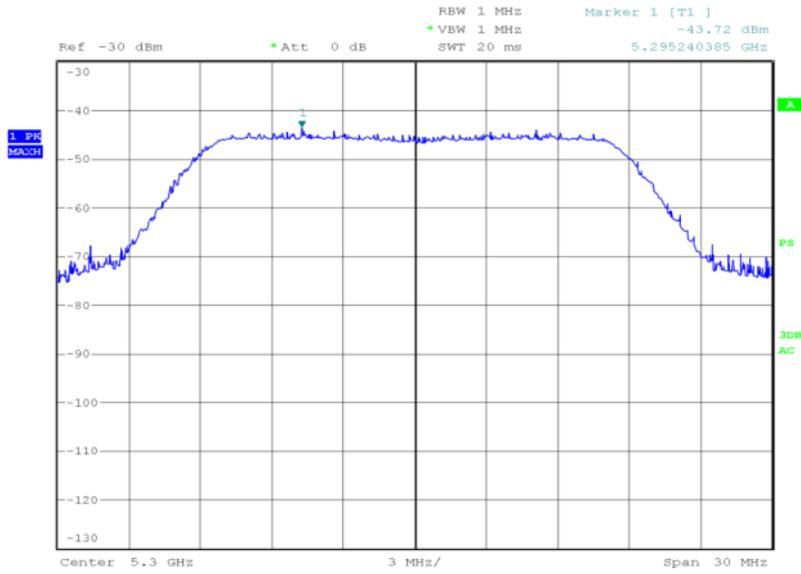
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Product Service

5300 MHz

EIRP (dBm)	EIRP (mW)
7.43	5.53



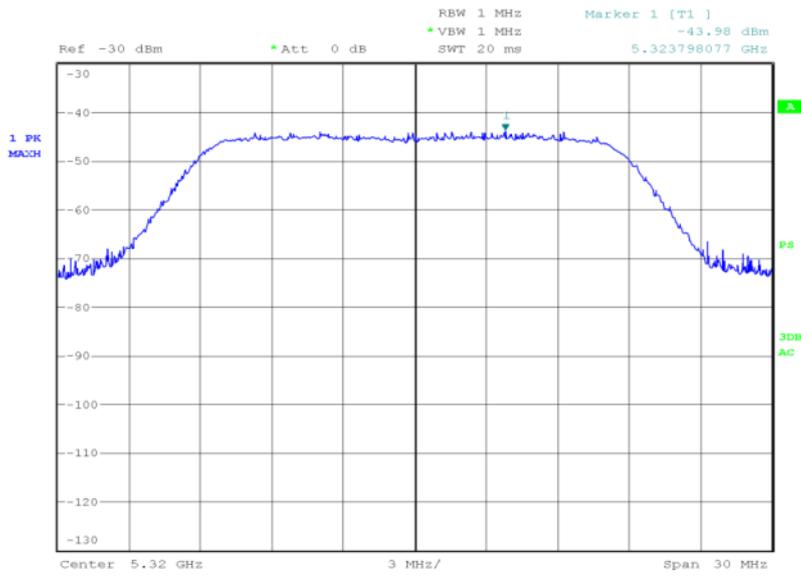
Date: 14.APR.2013 10:25:52



Product Service

5320 MHz

EIRP (dBm)	EIRP (mW)
6.88	4.88



Date: 14.APR.2013 10:30:04



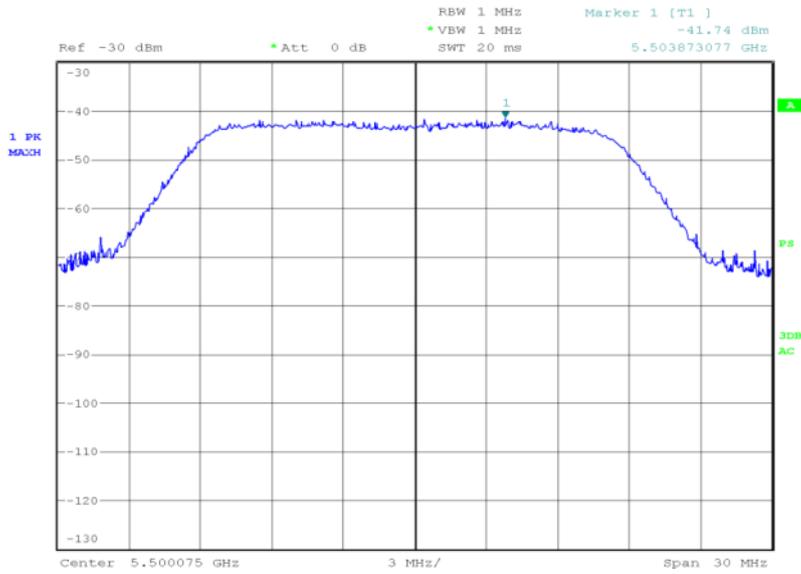
Product Service

Radiated

Frequency Band 3

5500 MHz

EIRP (dBm)	EIRP (mW)
12.51	17.82



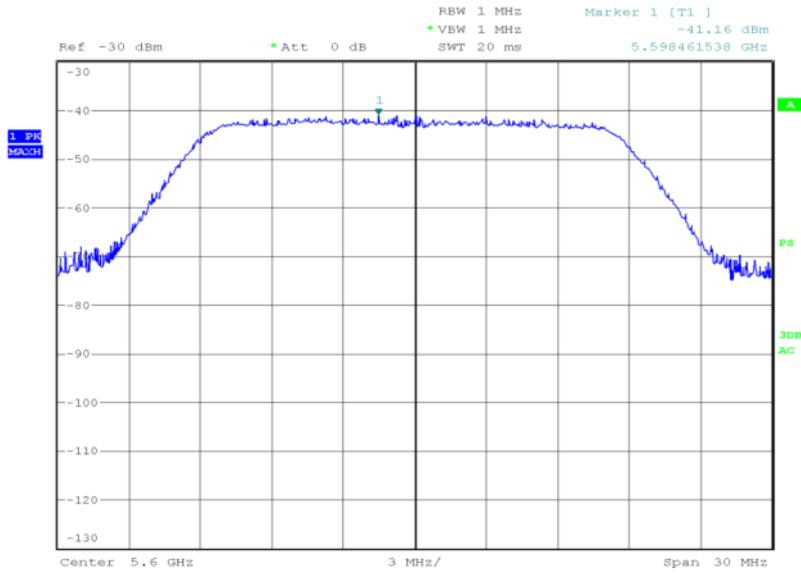
Date: 14.APR.2013 11:05:19



Product Service

5600 MHz

EIRP (dBm)	EIRP (mW)
12.44	17.54

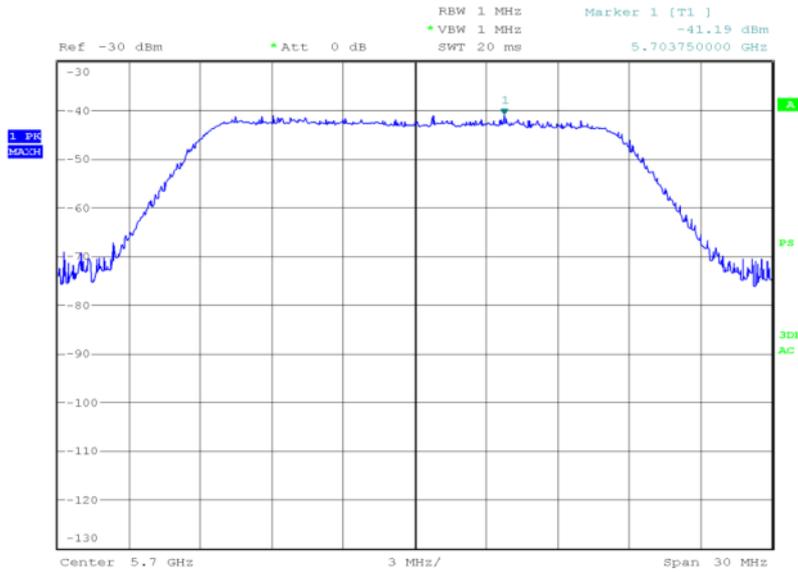


Date: 14.APR.2013 11:20:13



5700 MHz

EIRP (dBm)	EIRP (mW)
12.76	18.88



Date: 14.APR.2013 11:16:24

Limit for Radiated

Frequency Band (MHz)	FCC Limit	IC Limit
5150 to 5250	Lesser of 200 mW or 10 dBm + 10 log B	Lesser of 200 mW or 10 dBm + 10 log B
5250 to 5350	Lesser of 1 W or 17 dBm + 10 log B	Lesser of 1 W or 17 dBm + 10 log B
5470 to 5725	Lesser of 1 W or 17 dBm + 10 log B	Lesser of 1 W or 17 dBm + 10 log B
5725 to 5825	Lesser of 4 W or 23 dBm + 10 log B	Lesser of 4 W or 23 dBm + 10 log B

Note: For FCC limit, "B" = 26 dB Bandwidth. For IC limit "B" = 99% Occupied Bandwidth.  
 For FCC only – It is acceptable to have an antenna with up to 6 dBi gain, without reducing the conducted output power.



Product Service

Conducted

Frequency Band 1

5180 MHz

EIRP (dBm)	EIRP (mW)
12.25	16.79

5200 MHz

EIRP (dBm)	EIRP (mW)
11.77	15.04

5240 MHz

EIRP (dBm)	EIRP (mW)
11.80	15.13

The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 6.5 Mbps.

Conducted

Frequency Band 2

5260 MHz

EIRP (dBm)	EIRP (mW)
12.13	16.35

5300 MHz

EIRP (dBm)	EIRP (mW)
12.44	17.55

5320 MHz

EIRP (dBm)	EIRP (mW)
11.66	14.67

The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 27 Mbps.



Product Service

Conducted

Frequency Band 3

5500 MHz

EIRP (dBm)	EIRP (mW)
12.76	18.88

5600 MHz

EIRP (dBm)	EIRP (mW)
12.79	19.02

5700 MHz

EIRP (dBm)	EIRP (mW)
13.24	21.10

The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 6.5 Mbps.

Limit for Conducted

Frequency Band (MHz)	FCC Limit	IC Limit
5150 to 5250	Lesser of 50 mW or 4 dBm + 10 log B	-
5250 to 5350	Lesser of 250 mW or 11 dBm + 10 log B	Lesser of 250 mW or 11 dBm + 10 log B
5470 to 5725	Lesser of 250 mW or 11 dBm + 10 log B	Lesser of 250 mW or 11 dBm + 10 log B
5725 to 5825	Lesser of 1 W or 17 dBm + 10 log B	Lesser of 1 W or 17 dBm + 10 log B

Note: For FCC limit, "B" = 26 dB Bandwidth. For IC limit "B" = 99% Occupied Bandwidth.



Product Service

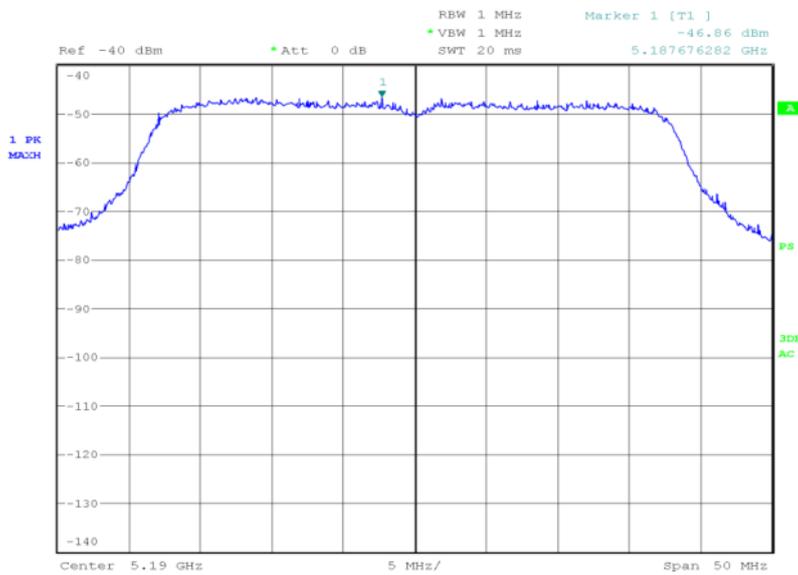
802.11(n) FCC - 5 GHz 40 MHz BW

Radiated

Frequency Band 1

5190 MHz

EIRP (dBm)	EIRP (mW)
6.47	4.44



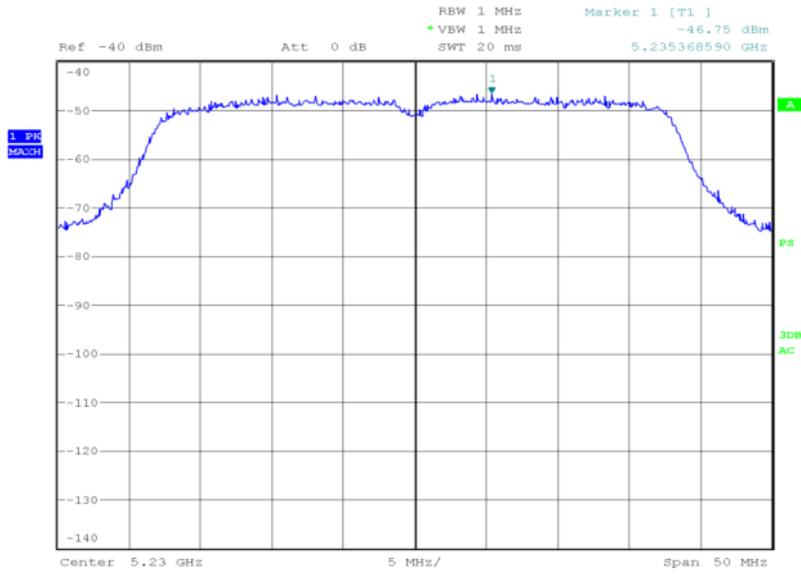
Date: 14.APR.2013 12:51:00



Product Service

5230 MHz

EIRP (dBm)	EIRP (mW)
6.32	4.29



Date: 14.APR.2013 13:25:29



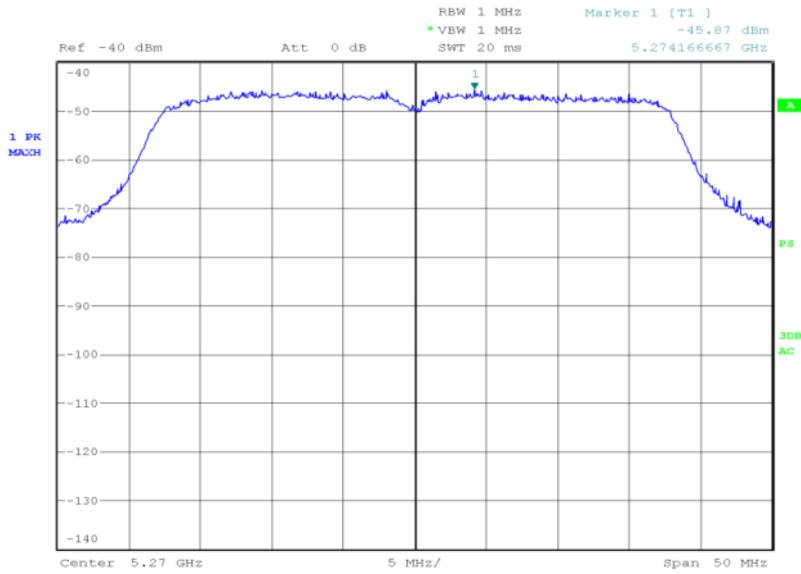
Product Service

Radiated

Frequency Band 2

5270 MHz

EIRP (dBm)	EIRP (mW)
7.97	6.27

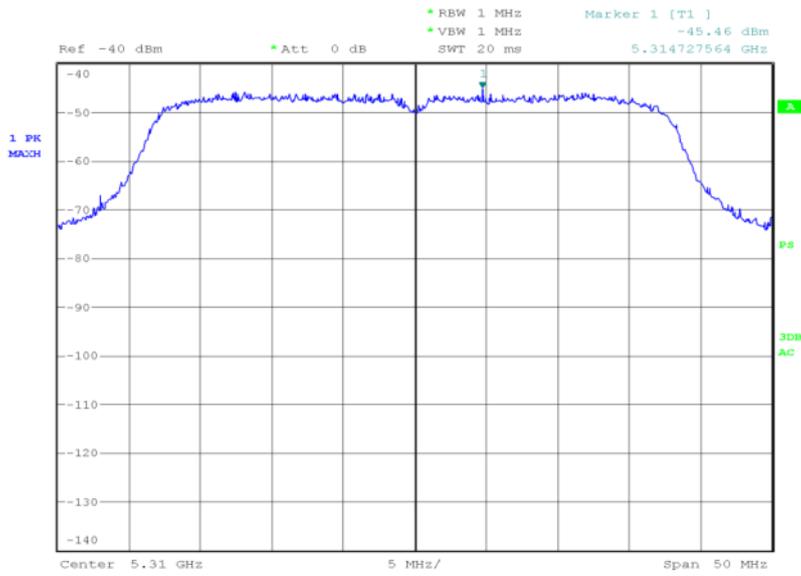


Date: 14.APR.2013 13:29:58



5310 MHz

EIRP (dBm)	EIRP (mW)
8.28	6.73



Date: 14.APR.2013 14:18:09



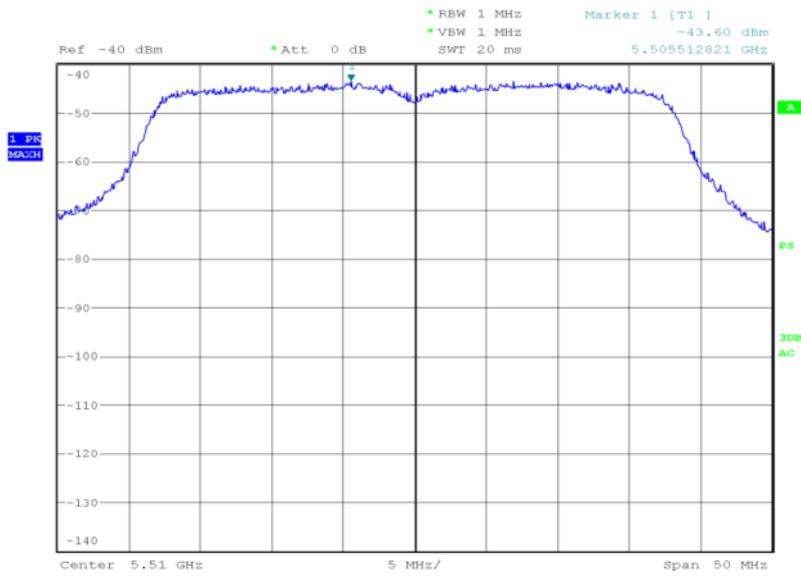
Product Service

Radiated

Frequency Band 3

5510 MHz

EIRP (dBm)	EIRP (mW)
10.85	12.16



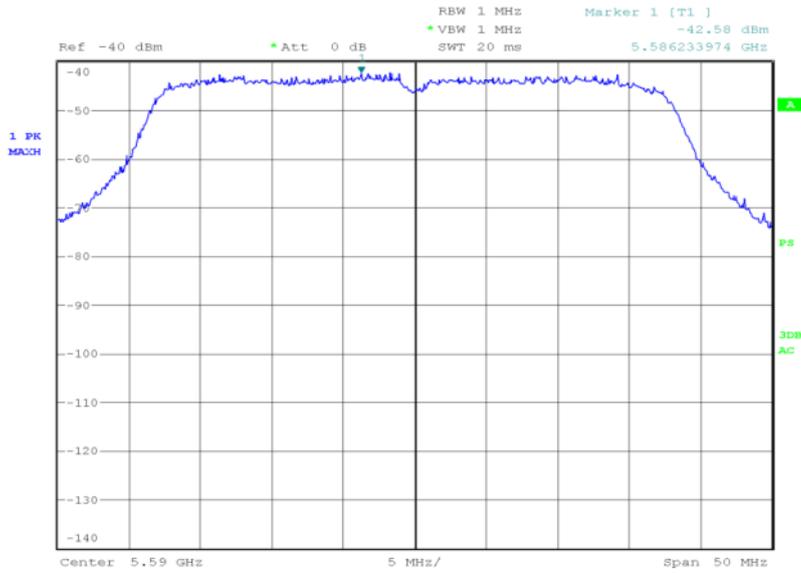
Date: 14.APR.2013 15:48:26



Product Service

5590 MHz

EIRP (dBm)	EIRP (mW)
10.39	10.94



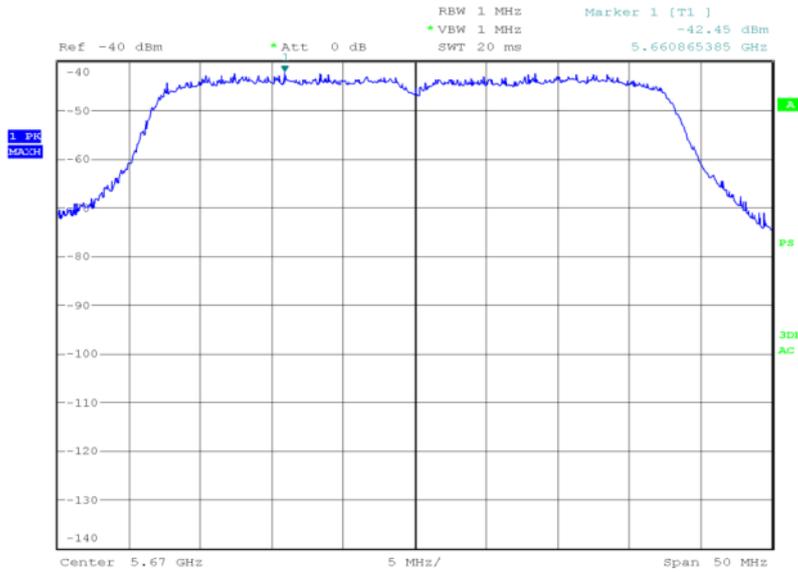
Date: 14.APR.2013 16:42:29



Product Service

5670 MHz

EIRP (dBm)	EIRP (mW)
10.27	10.64



Date: 14.APR.2013 16:45:09

Limit for Radiated

Frequency Band (MHz)	FCC Limit	IC Limit
5150 to 5250	Lesser of 200 mW or 10 dBm + 10 log B	Lesser of 200 mW or 10 dBm + 10 log B
5250 to 5350	Lesser of 1 W or 17 dBm + 10 log B	Lesser of 1 W or 17 dBm + 10 log B
5470 to 5725	Lesser of 1 W or 17 dBm + 10 log B	Lesser of 1 W or 17 dBm + 10 log B
5725 to 5825	Lesser of 4 W or 23 dBm + 10 log B	Lesser of 4 W or 23 dBm + 10 log B

Note: For FCC limit, "B" = 26 dB Bandwidth. For IC limit "B" = 99% Occupied Bandwidth.  
 For FCC only – It is acceptable to have an antenna with up to 6 dBi gain, without reducing the conducted output power.



Product Service

Conducted

Frequency Band 1

5190 MHz

EIRP (dBm)	EIRP (mW)
12.93	19.63

5230 MHz

EIRP (dBm)	EIRP (mW)
13.38	21.79

The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 27 Mbps.

Conducted

Frequency Band 2

5270 MHz

EIRP (dBm)	EIRP (mW)
12.86	19.34

5310 MHz

EIRP (dBm)	EIRP (mW)
12.06	16.06

The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 27 Mbps.



Product Service

Conducted

Frequency Band 3

5510 MHz

EIRP (dBm)	EIRP (mW)
12.70	18.63

5590 MHz

EIRP (dBm)	EIRP (mW)
13.24	21.09

5670 MHz

EIRP (dBm)	EIRP (mW)
12.55	17.97

The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 27 Mbps.

Limit for Conducted

Frequency Band (MHz)	FCC Limit	IC Limit
5150 to 5250	Lesser of 50 mW or 4 dBm + 10 log B	-
5250 to 5350	Lesser of 250 mW or 11 dBm + 10 log B	Lesser of 250 mW or 11 dBm + 10 log B
5470 to 5725	Lesser of 250 mW or 11 dBm + 10 log B	Lesser of 250 mW or 11 dBm + 10 log B
5725 to 5825	Lesser of 1 W or 17 dBm + 10 log B	Lesser of 1 W or 17 dBm + 10 log B

Note: For FCC limit, "B" = 26 dB Bandwidth. For IC limit "B" = 99% Occupied Bandwidth.



## **2.3 UNDESIRABLE EMISSION LIMITS**

### **2.3.1 Specification Reference**

FCC CFR 47 Part 15E, Clause 15.407 (b)(1)(2)(3)(4)(6)(7)

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

205SH S/N: IMEI 004401114778885 - Modification State 0  
205SH S/N: IMEI 004401114778877 - Modification State 0

### **2.3.3 Date of Test**

14 April 2013, 15 April 2013, 16 April 2013, 24 April 2013 & 30 April 2013

### **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**

For conducted emissions, the EUT was set to operate at maximum power on the worst case data rate. The test was performed on the bottom, middle and top channels. The test was performed from 9 kHz to 40 GHz.

The measurement path loss in each relevant frequency band was measured and entered as a reference level offset.

For radiated emissions, the test method described above was also used. However, the measurement was performed from 30 MHz to 40 GHz and the path loss is incorporated as a transducer factor and entered into the spectrum analyser. In each frequency span the level was maximised by rotating the EUT 360° and a height search of the measuring antenna.

The band edge measurements were performed in accordance with ANSI C63.10, Clause 6.9.3. The results were analysed to ensure compliance with restricted bands. The EUT was set to the lowest and highest operating frequencies.

### **2.3.6 Environmental Conditions**

Ambient Temperature	19.3 - 22.8°C
Relative Humidity	28.0 - 46.0%



Product Service

**2.3.7 Test Results**

802.11(a)

4.0 V DC Supply

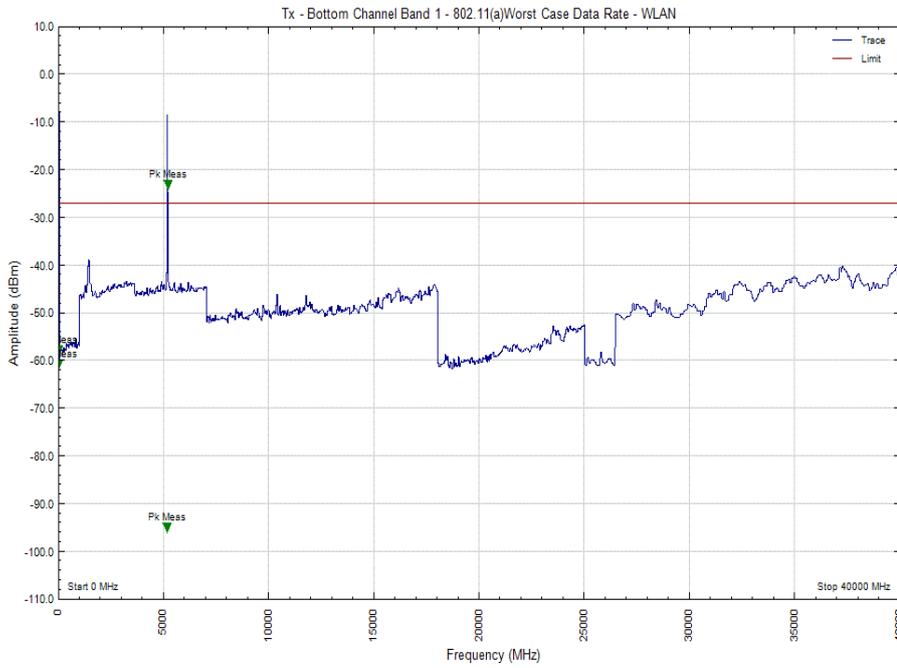
Spurious Conducted Emissions

9 Mbps

Frequency Band 1

5180 MHz

9 kHz to 40 GHz

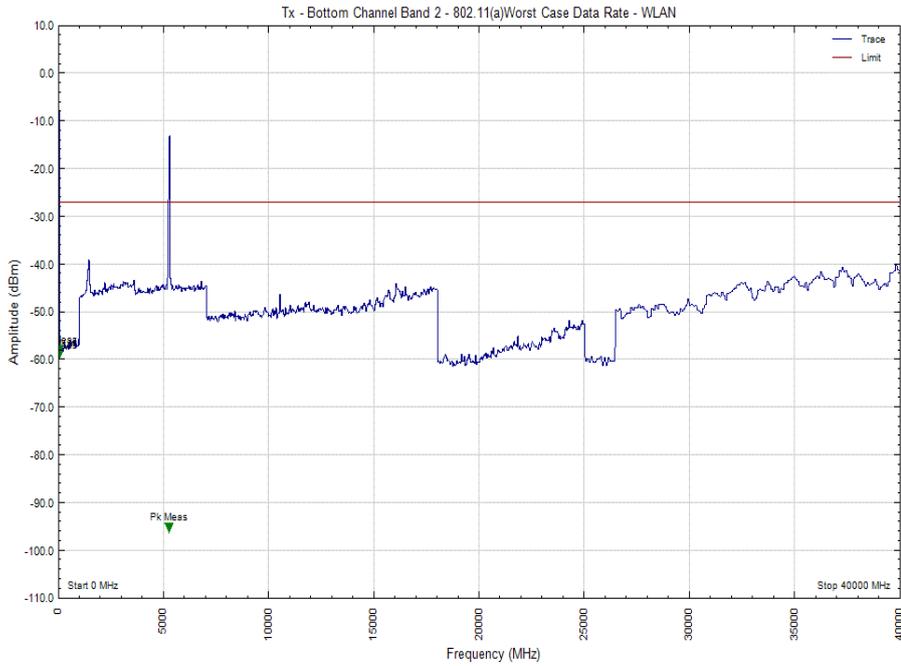




Frequency Band 2

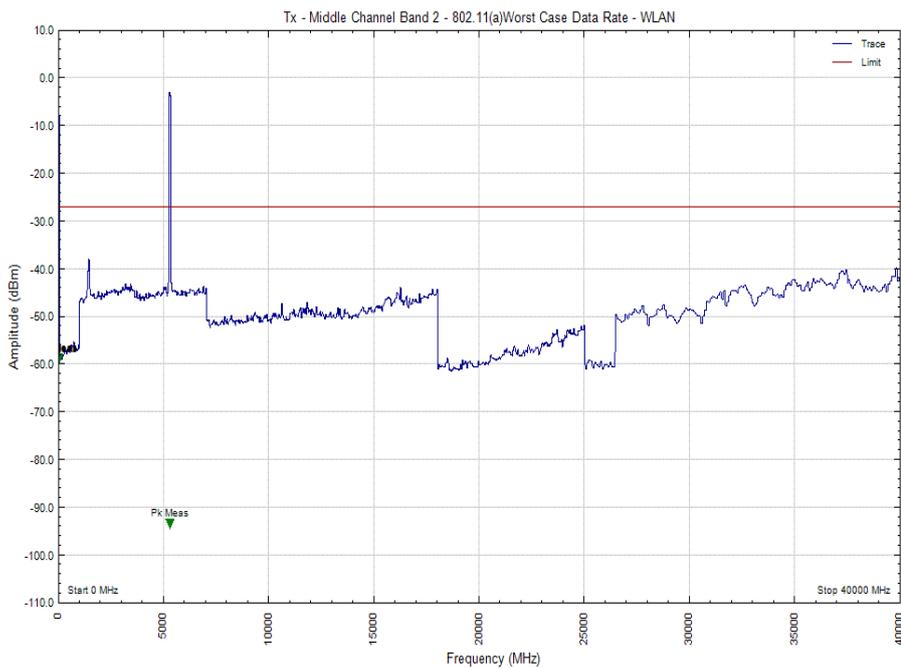
5260 MHz

9 kHz to 40 GHz



5300 MHz

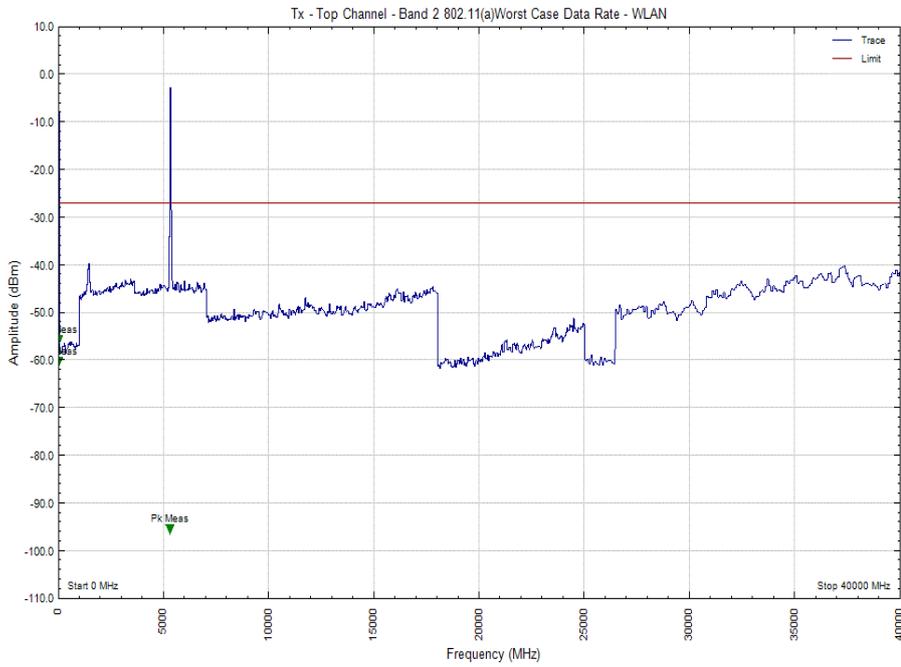
9 kHz to 40 GHz





5320 MHz

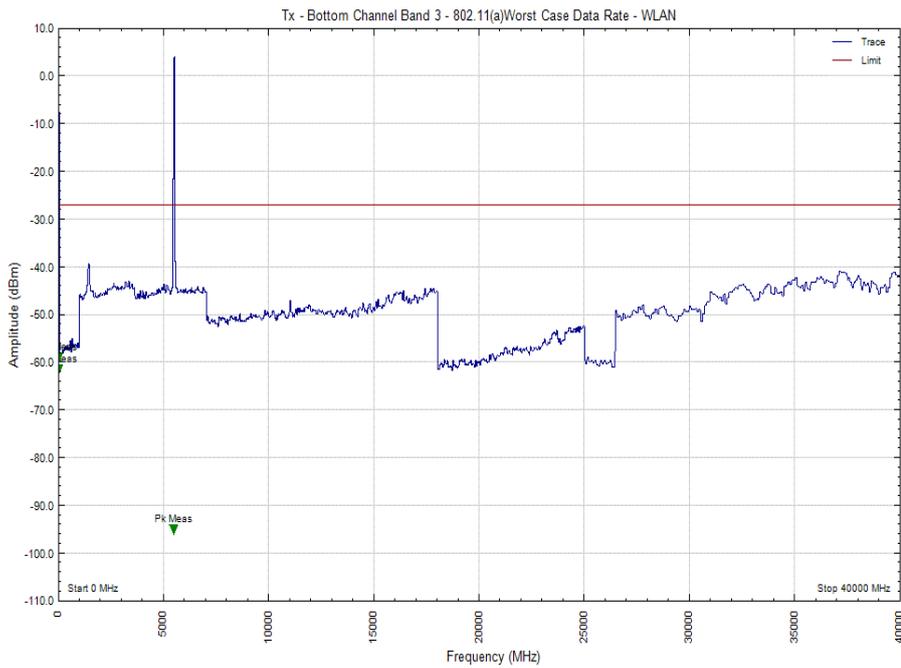
9 kHz to 40 GHz



Frequency Band 3

5500 MHz

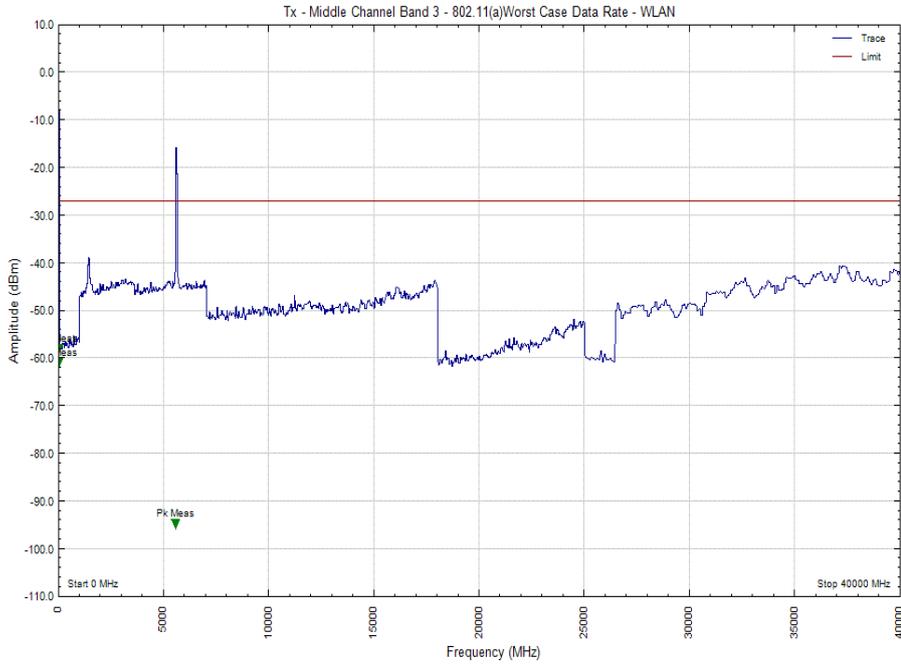
9 kHz to 40 GHz





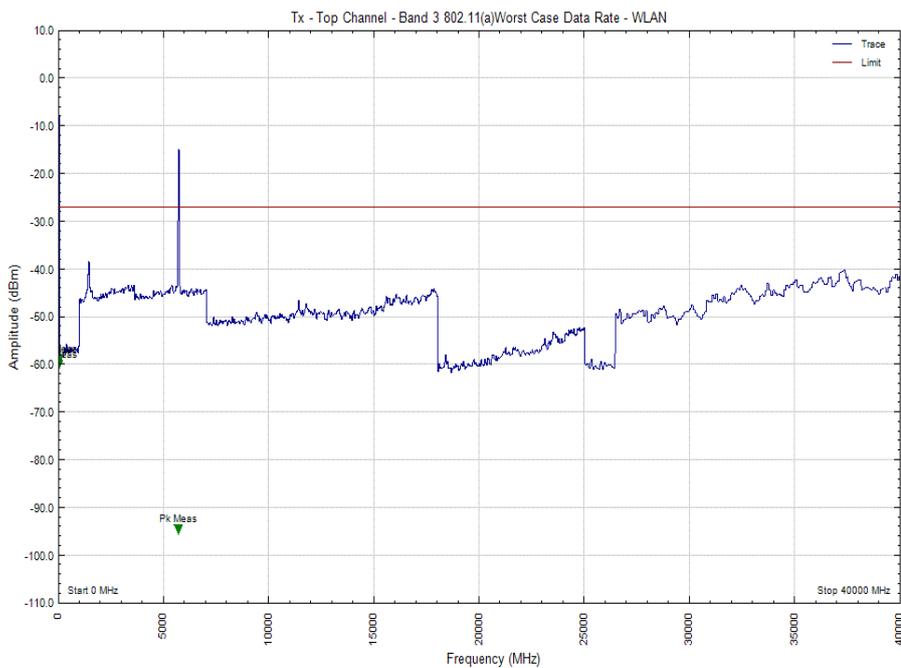
5600 MHz

9 kHz to 40 GHz



5700 MHz

9 kHz to 40 GHz





Product Service

### Limit Clause

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB.



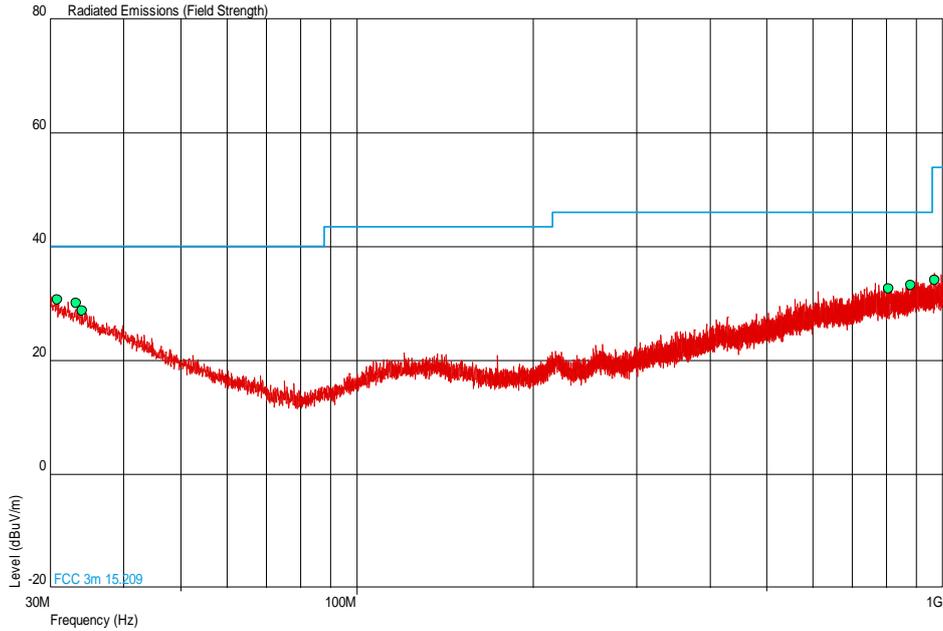
Product Service

Spurious Radiated Emissions

Frequency Band 1

5180 MHz

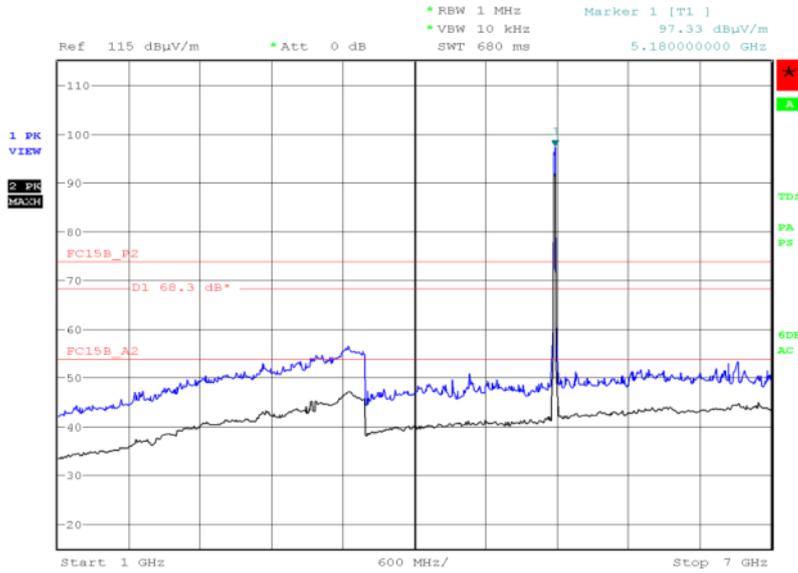
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
30.873	30.7	34.3	40.0	100	-9.3	65.7	0	1.00	Horizontal
33.250	30.1	32.0	40.0	100	-9.9	68.0	0	1.00	Vertical
33.977	28.8	27.5	40.0	100	-11.2	72.5	0	1.00	Vertical
808.425	32.6	42.7	46.0	200	-13.4	157.3	0	1.00	Horizontal
881.563	33.2	45.7	46.0	200	-12.8	154.3	0	1.00	Vertical
966.972	34.1	50.7	54.0	500	-19.9	449.3	0	1.00	Horizontal

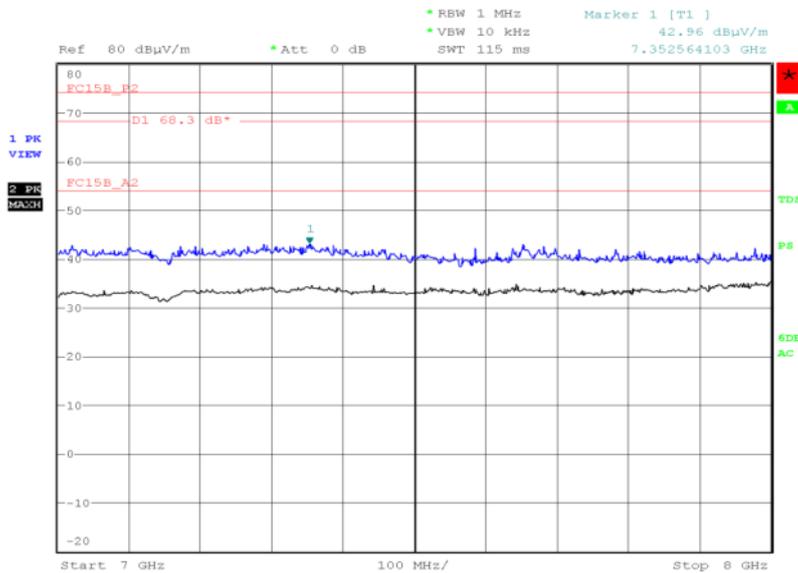


1 GHz to 7 GHz



Date: 12.APR.2013 19:40:58

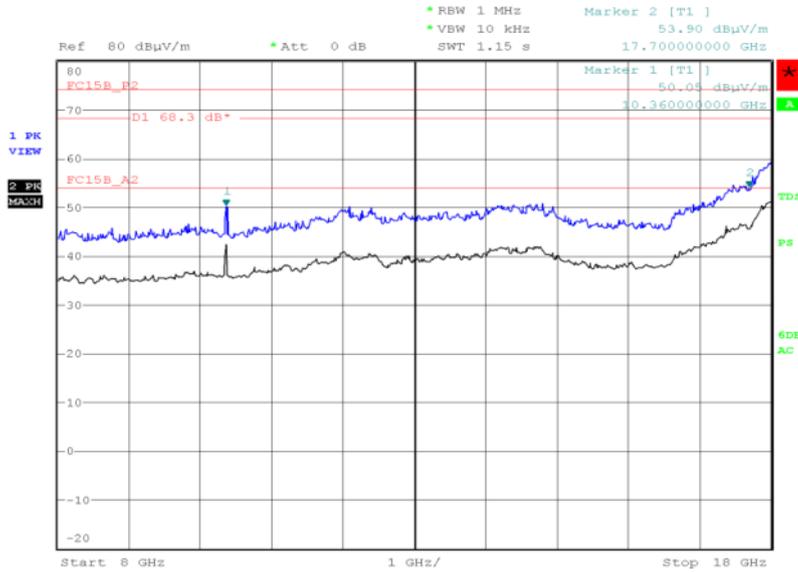
7 GHz to 8 GHz



Date: 15.APR.2013 22:03:31

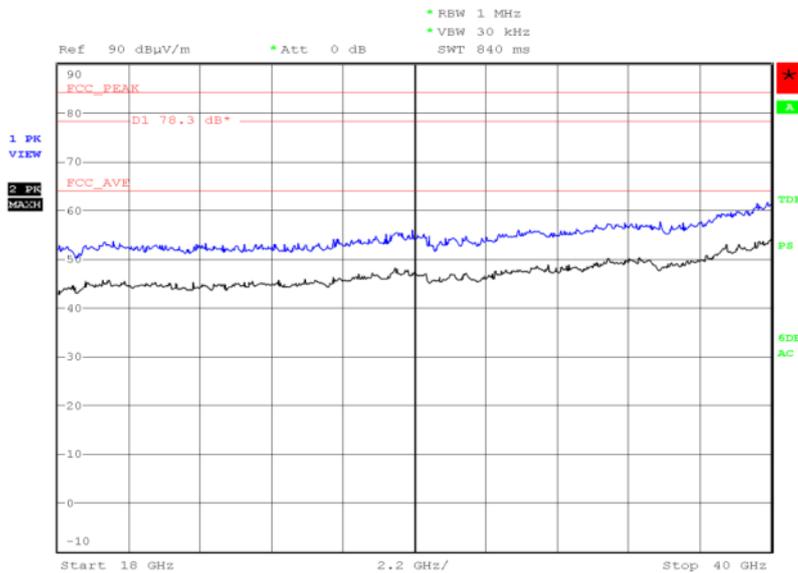


8 GHz to 18 GHz



Date: 16.APR.2013 16:51:32

18 GHz to 40 GHz

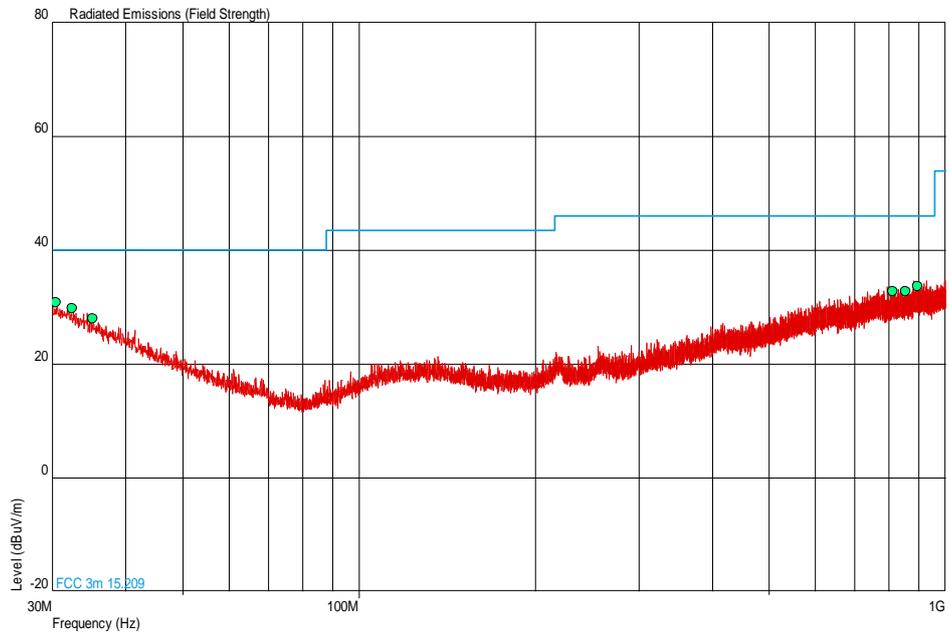


Date: 30.APR.2013 18:50:54



5200 MHz

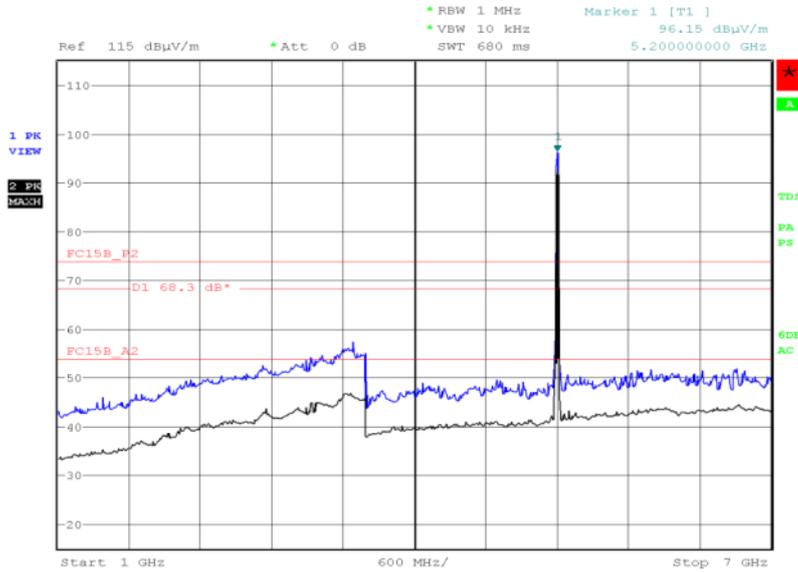
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.485	30.9	35.1	40.0	100	-9.1	64.9	0	1.00	Horizontal
32.425	29.8	30.9	40.0	100	-10.2	69.1	0	1.00	Horizontal
35.190	27.9	24.8	40.0	100	-12.1	75.2	0	1.00	Vertical
813.178	32.7	43.2	46.0	200	-13.3	156.8	0	1.00	Horizontal
855.325	32.7	43.2	46.0	200	-13.3	156.8	0	1.00	Horizontal
897.374	33.6	47.9	46.0	200	-12.4	452.1	0	1.00	Horizontal

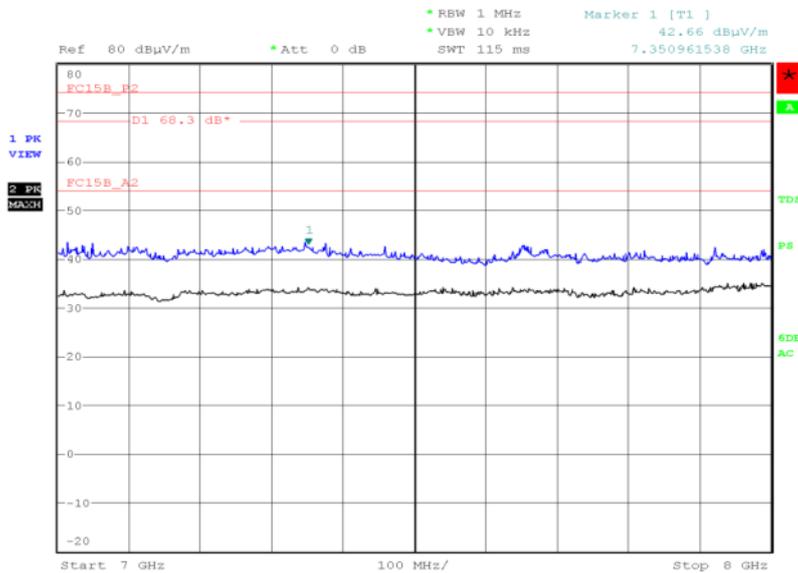


1 GHz to 7 GHz



Date: 12.APR.2013 20:17:17

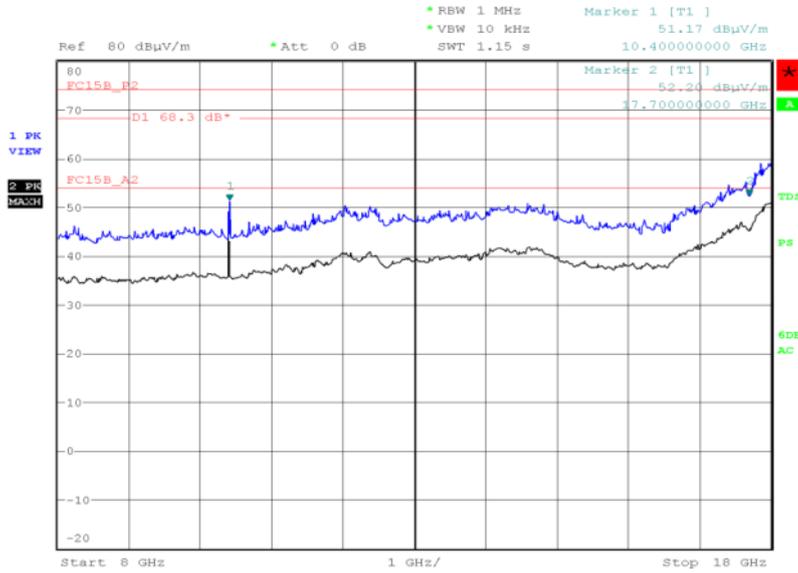
7 GHz to 8 GHz



Date: 15.APR.2013 22:08:11

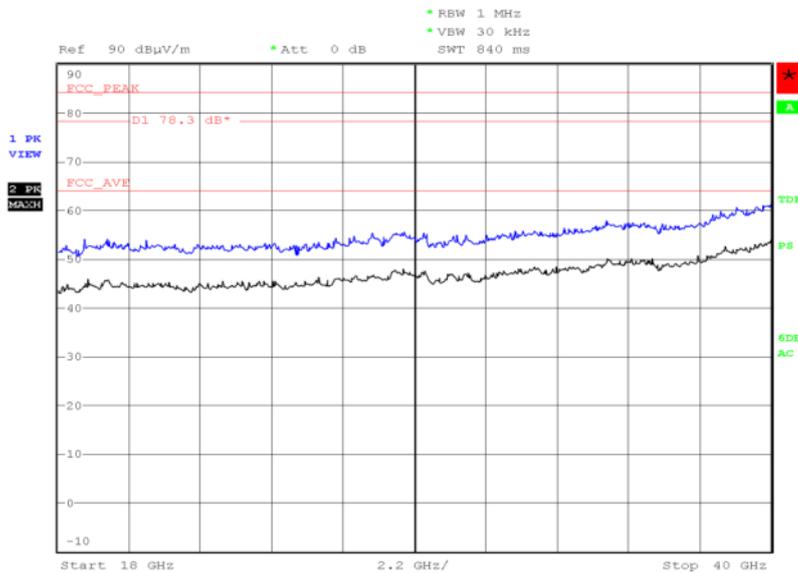


8 GHz to 18 GHz



Date: 16.APR.2013 17:11:04

18 GHz to 40 GHz

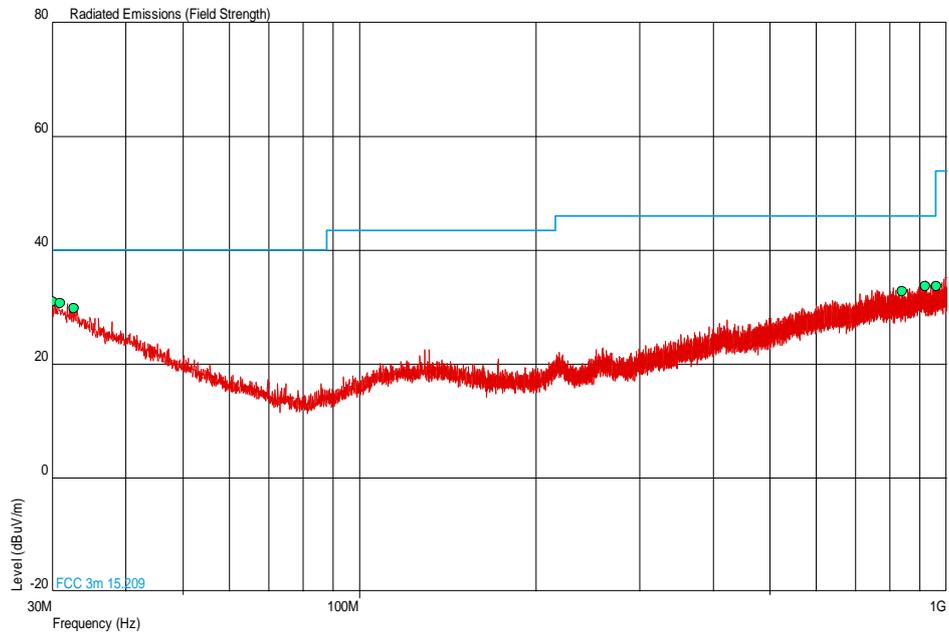


Date: 30.APR.2013 19:08:12



5240 MHz

30 MHz to 1 GHz

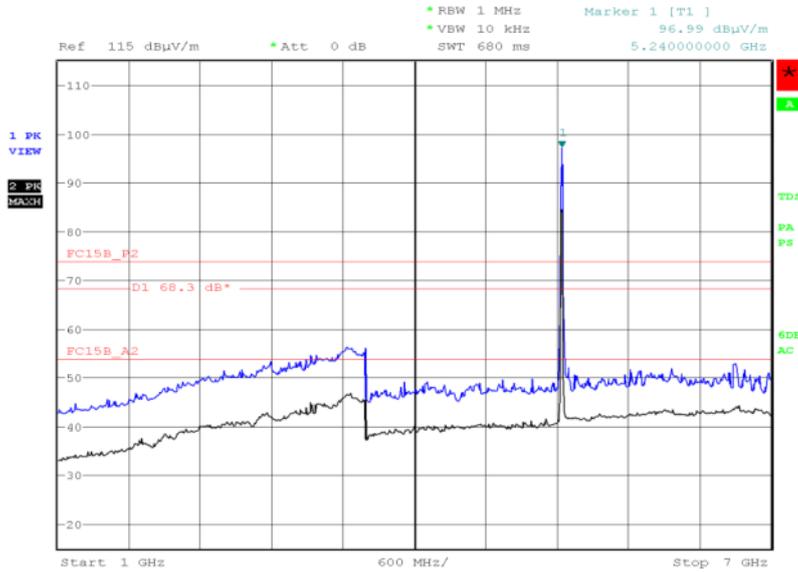


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.097	31.0	35.5	40.0	100	-9.0	64.5	0	1.00	Horizontal
31.019	30.7	34.3	40.0	100	-9.3	65.7	0	1.00	Horizontal
32.716	29.8	30.9	40.0	100	-10.2	69.1	0	1.00	Vertical
842.084	32.8	43.7	46.0	200	-13.2	156.3	0	1.00	Horizontal
920.606	33.6	47.9	46.0	200	-12.4	152.1	0	1.00	Horizontal
962.607	33.7	48.4	54.0	500	-20.3	451.6	0	1.00	Vertical



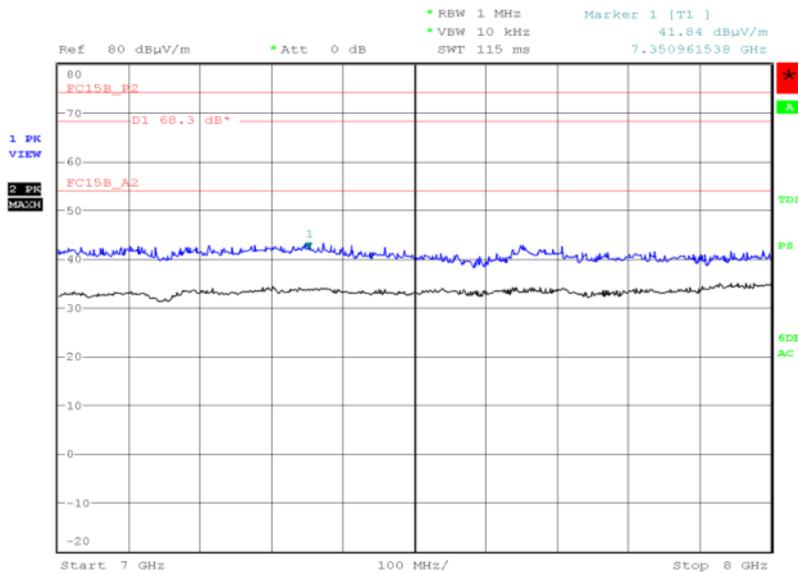
Product Service

1 GHz to 7 GHz



Date: 12.APR.2013 21:04:42

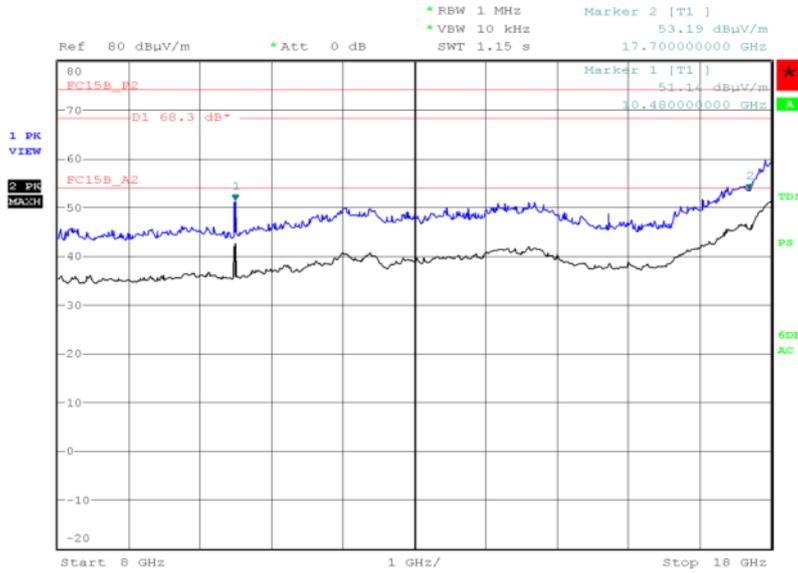
7 GHz to 8 GHz



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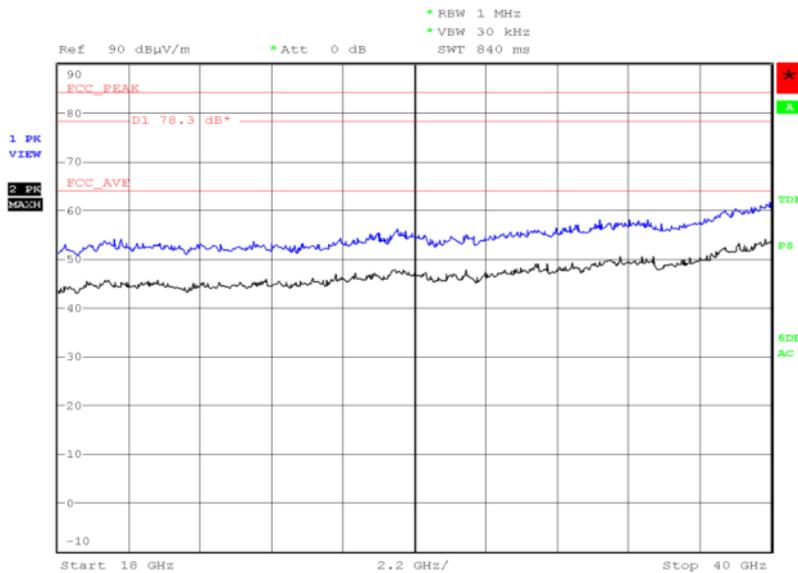


8 GHz to 18 GHz



Date: 16.APR.2013 17:25:39

18 GHz to 40 GHz



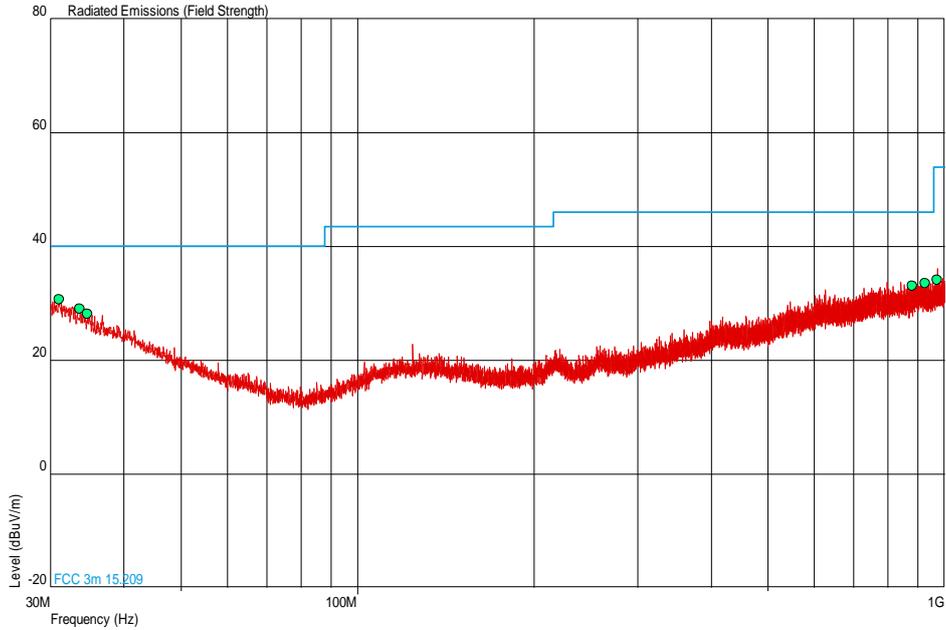
Date: 30.APR.2013 19:19:24



Frequency Band 2

5260 MHz

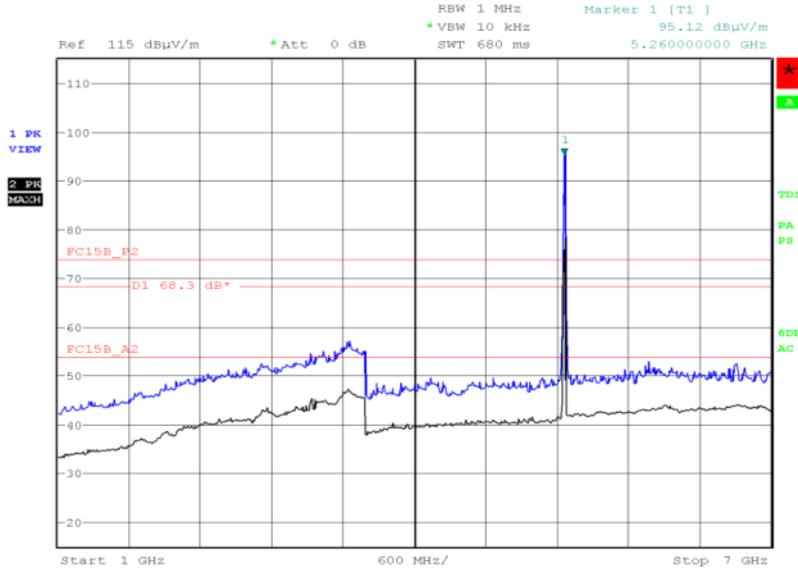
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
31.116	30.6	33.9	40.0	100	-9.4	66.1	0	1.00	Vertical
33.735	29.0	28.2	40.0	100	-11.0	71.8	0	1.00	Horizontal
34.753	28.2	25.7	40.0	100	-11.8	74.3	0	1.00	Horizontal
880.448	33.1	45.2	46.0	200	-12.9	154.8	0	1.00	Horizontal
927.735	33.4	46.8	46.0	200	-12.6	153.2	0	1.00	Vertical
971.434	34.1	50.7	54.0	500	-19.9	149.3	0	1.00	Horizontal

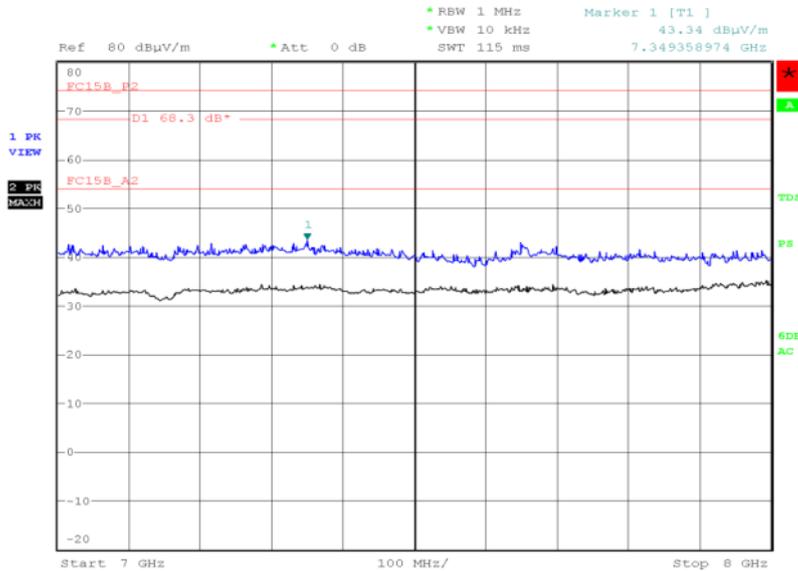


1 GHz to 7 GHz



Date: 12.APR.2013 21:52:19

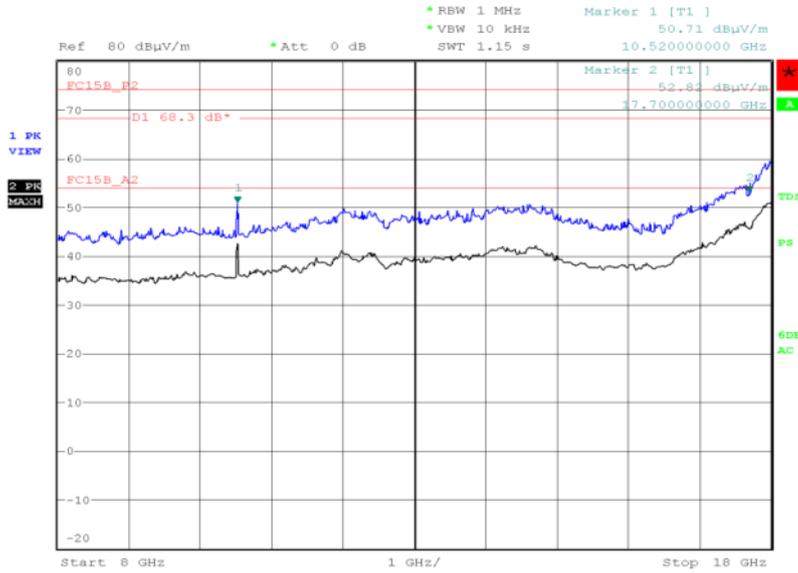
7 GHz to 8 GHz



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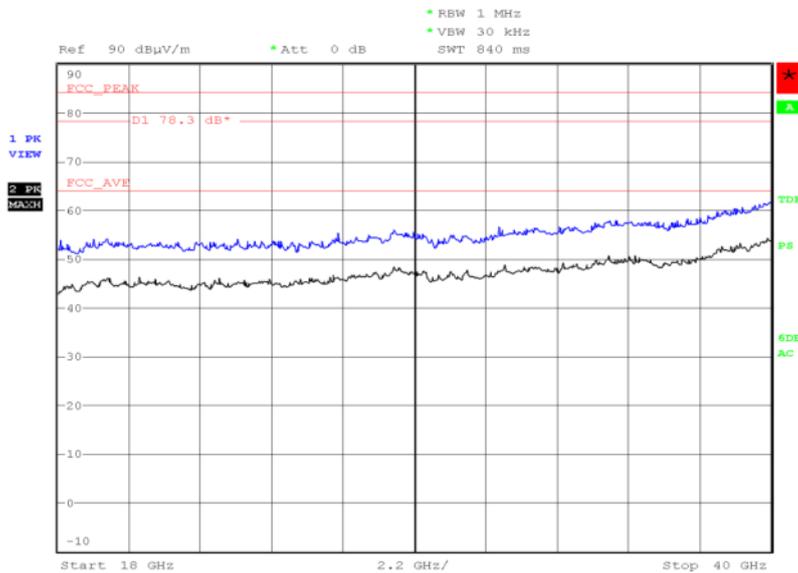


8 GHz to 18 GHz



Date: 16.APR.2013 17:45:42

18 GHz to 40 GHz

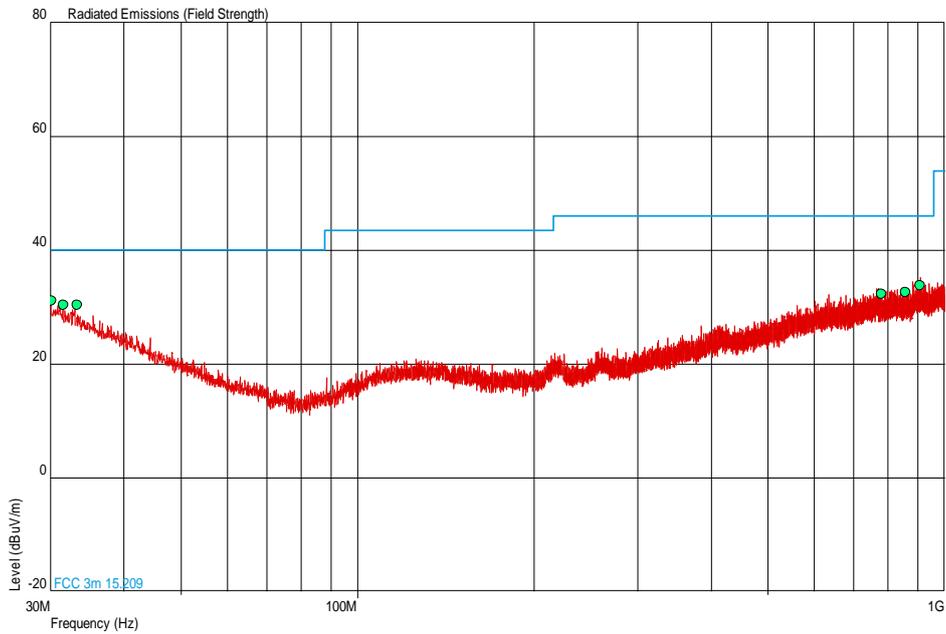


Date: 30.APR.2013 19:43:55



5300 MHz

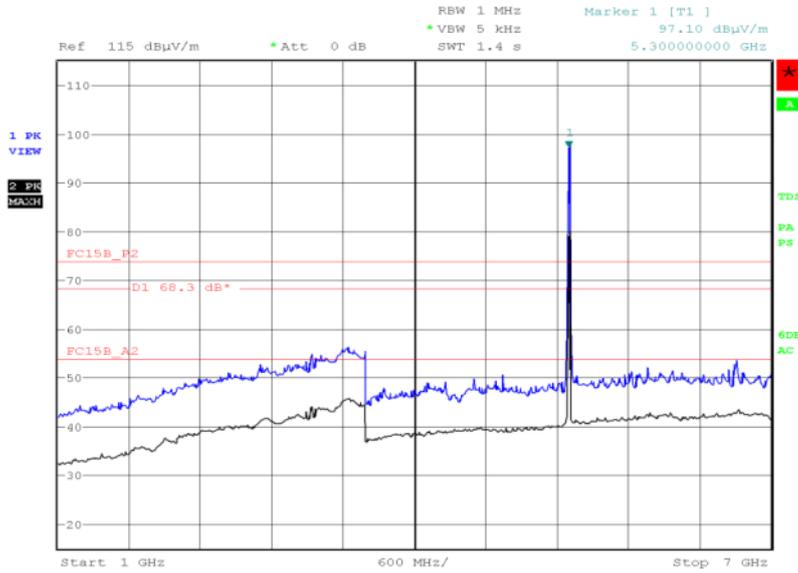
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.192	31.1	35.9	40.0	100	-8.9	64.1	0	1.00	Horizontal
31.552	30.3	32.7	40.0	100	-9.7	67.3	0	1.00	Horizontal
33.298	30.4	33.1	40.0	100	-9.6	66.9	0	1.00	Vertical
781.750	32.3	41.2	46.0	200	-13.7	158.8	0	1.00	Vertical
857.313	32.7	43.2	46.0	200	-13.3	156.8	0	1.00	Horizontal
909.063	33.8	49.0	46.0	200	-12.2	151.0	0	1.00	Vertical

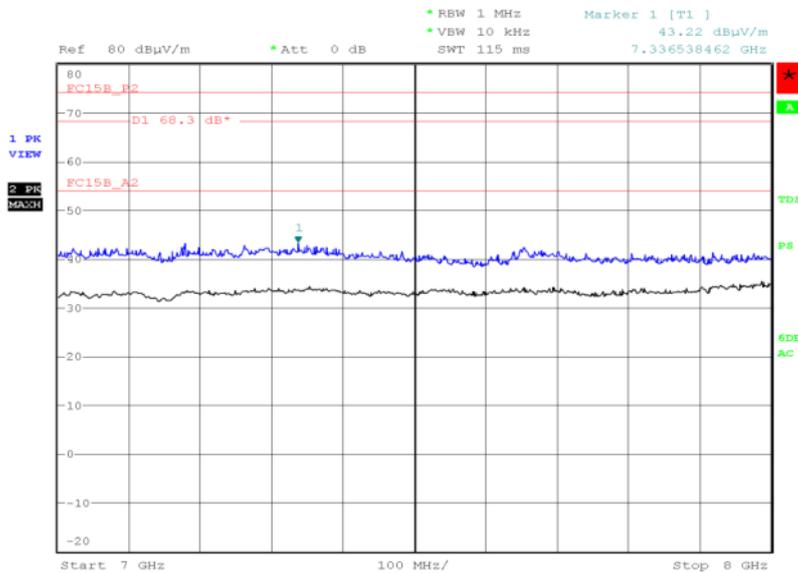


1 GHz to 7 GHz



Date: 12.APR.2013 22:13:08

7 GHz to 8 GHz

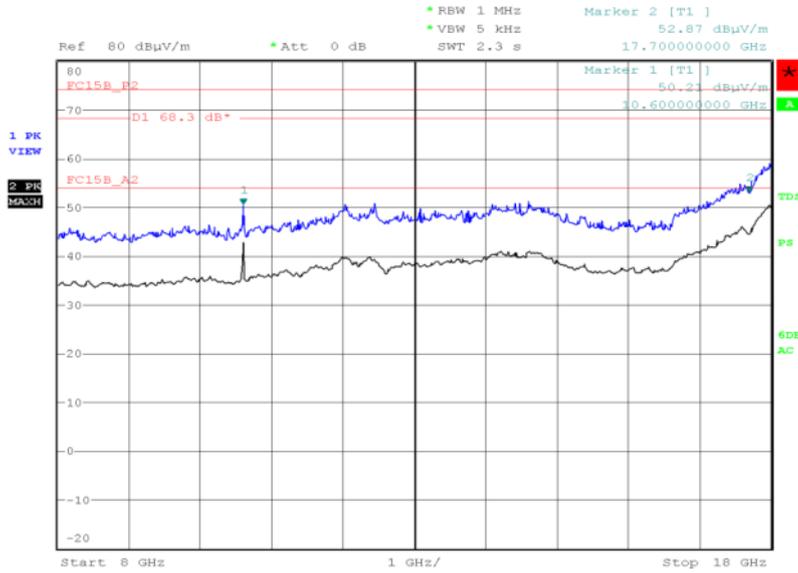


Date: 15.APR.2013 22:22:28



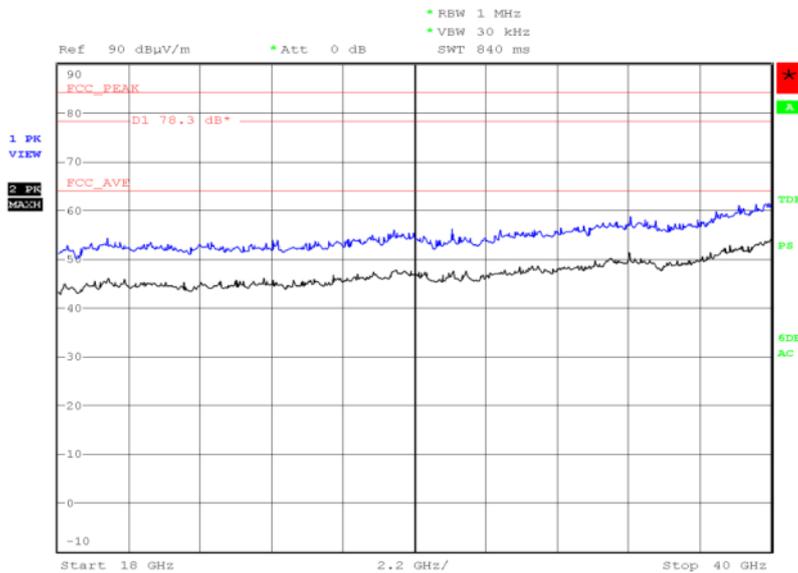
Product Service

8 GHz to 18 GHz



Date: 16.APR.2013 18:00:16

18 GHz to 40 GHz

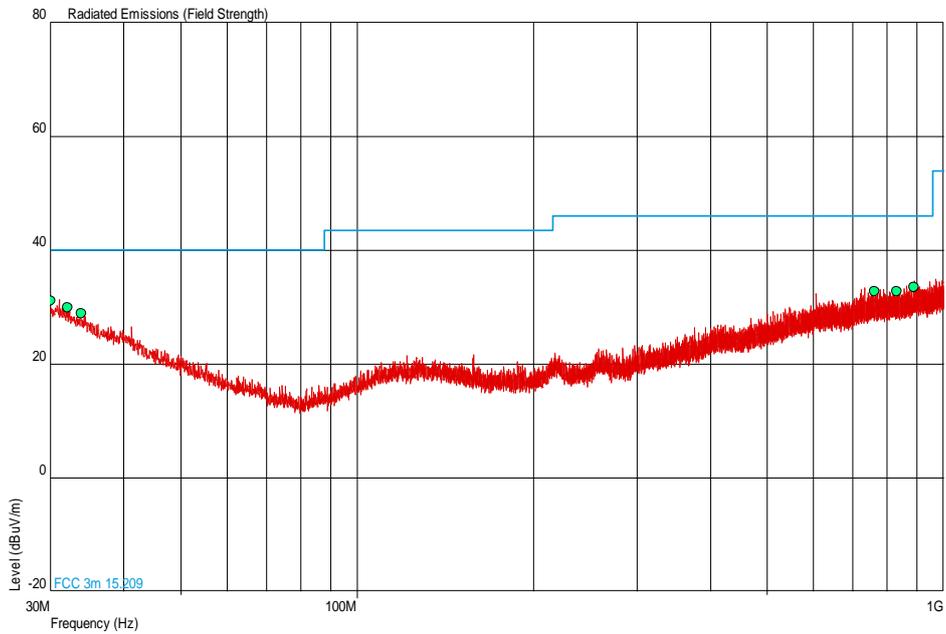


Date: 30.APR.2013 19:52:45



5320 MHz

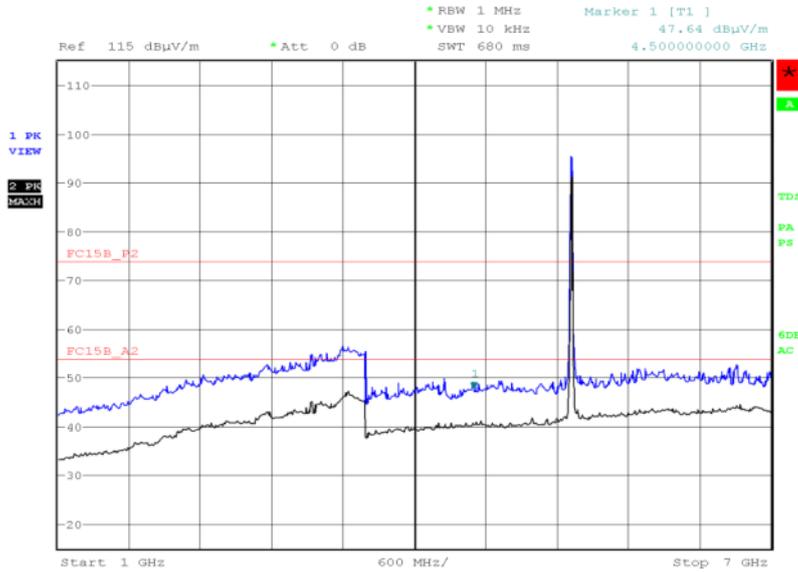
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.049	31.0	35.5	40.0	100	-9.0	64.5	0	1.00	Horizontal
32.183	30.0	31.6	40.0	100	-10.0	68.4	0	1.00	Horizontal
33.880	28.9	27.9	40.0	100	-11.1	72.1	0	1.00	Vertical
762.641	32.8	43.7	46.0	200	-13.2	156.3	0	1.00	Vertical
833.112	32.8	43.7	46.0	200	-13.2	156.3	0	1.00	Vertical
890.778	33.5	47.3	46.0	200	-12.5	152.7	0	1.00	Horizontal

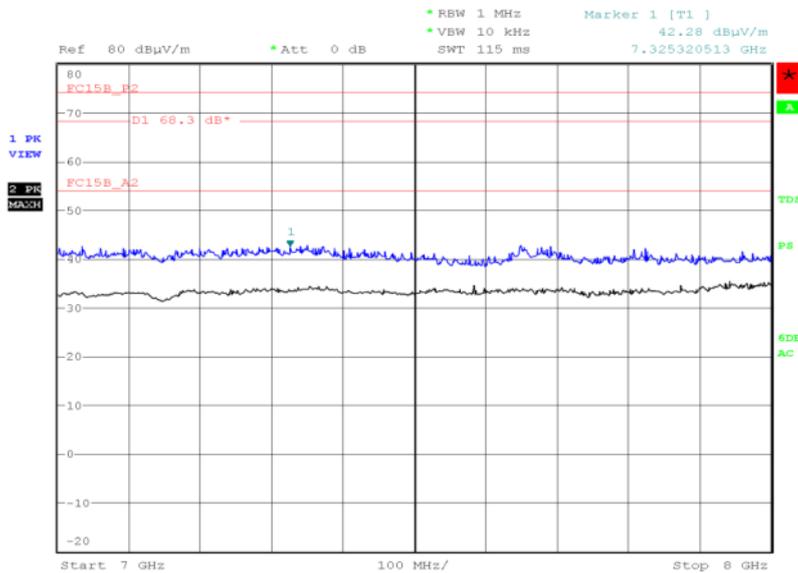


1 GHz to 7 GHz



Date: 12.APR.2013 23:26:51

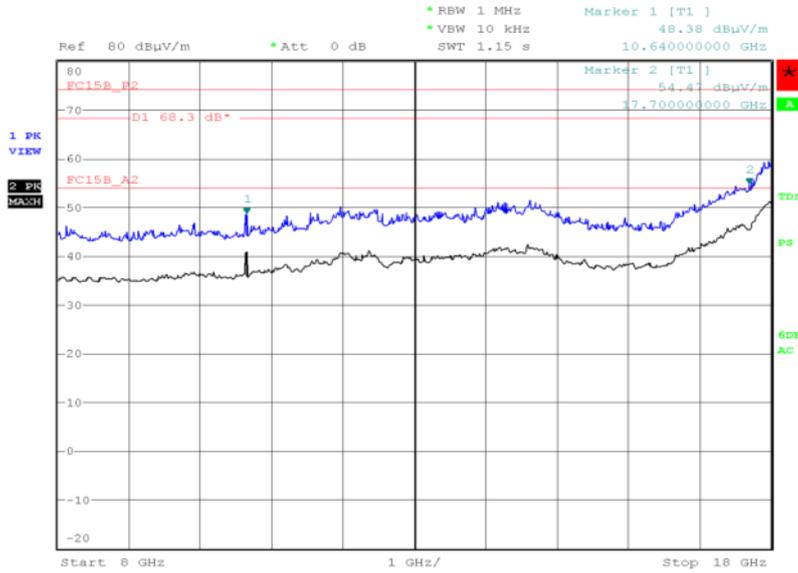
7 GHz to 8 GHz



Date: 15.APR.2013 22:27:38

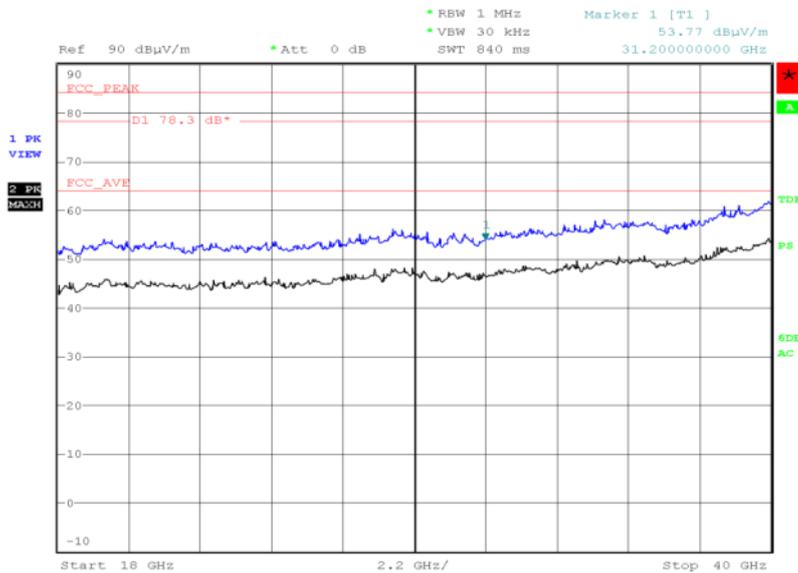


8 GHz to 18 GHz



Date: 16.APR.2013 19:22:20

18 GHz to 40 GHz



Date: 30.APR.2013 19:59:55

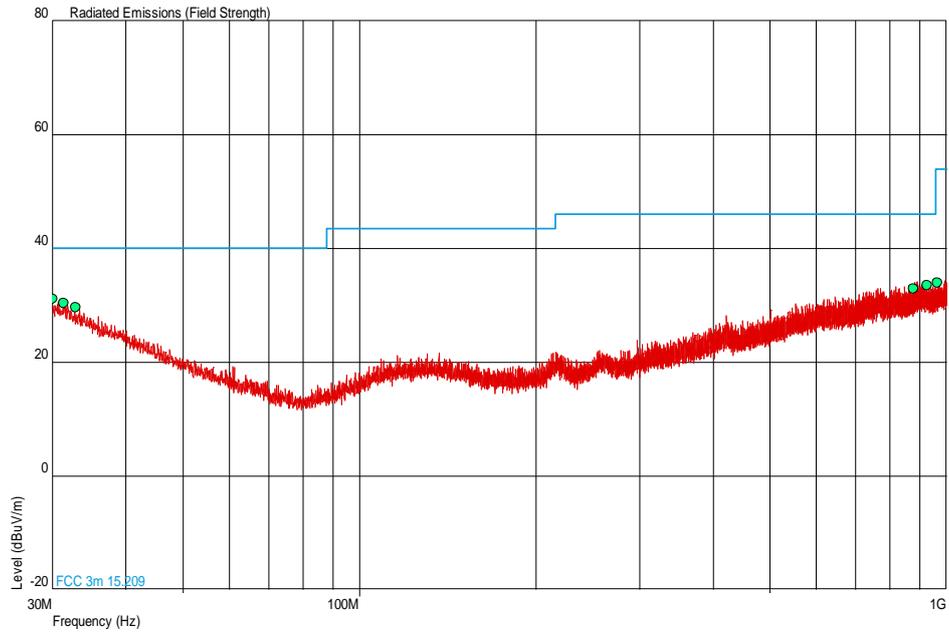


Product Service

Frequency Band 3

5500 MHz

30 MHz to 1 GHz

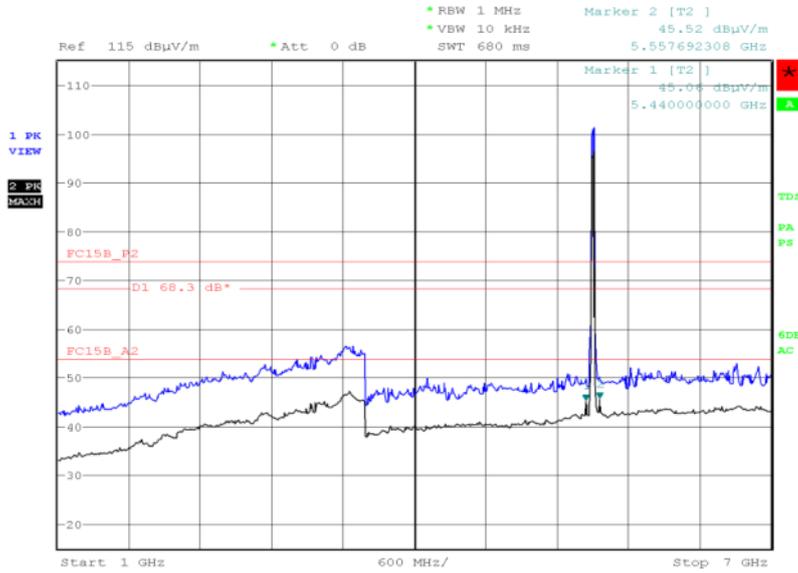


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.049	31.1	35.9	40.0	100	-8.9	64.1	0	1.00	Horizontal
31.407	30.4	33.1	40.0	100	-9.6	66.9	0	1.00	Vertical
32.862	29.7	30.5	40.0	100	-10.3	69.5	0	1.00	Vertical
878.265	32.9	44.2	46.0	200	-13.1	155.8	0	1.00	Horizontal
927.153	33.5	47.3	46.0	200	-12.5	152.7	0	1.00	Vertical
965.711	33.9	49.5	54.0	500	-20.1	450.5	0	1.00	Vertical



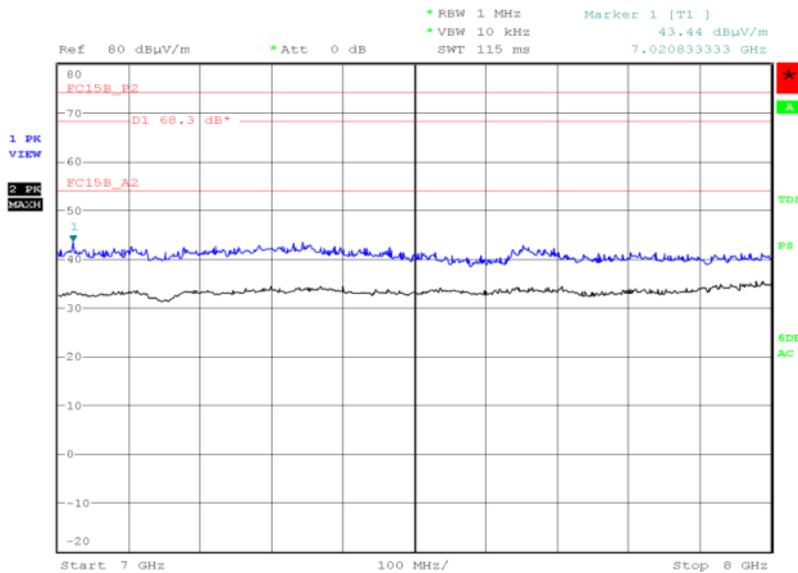
Product Service

1 GHz to 7 GHz



Date: 14.APR.2013 07:52:39

7 GHz to 8 GHz

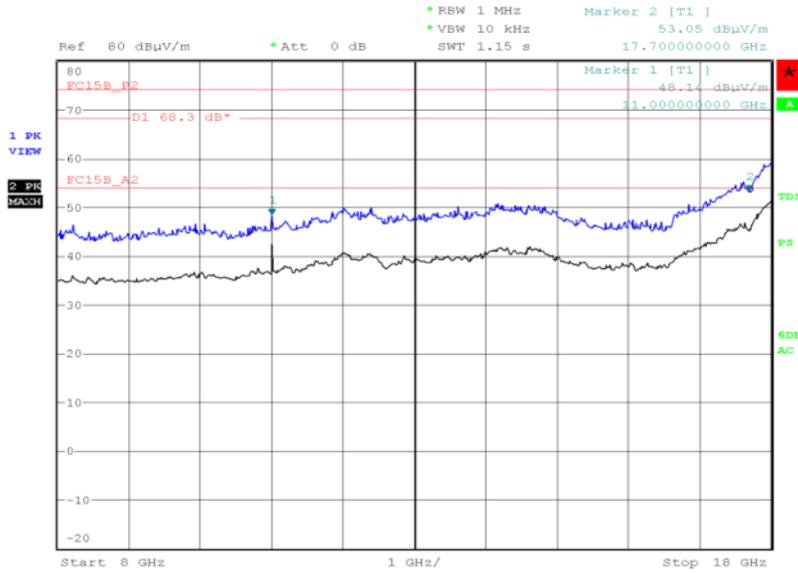


Date: 15.APR.2013 22:33:39



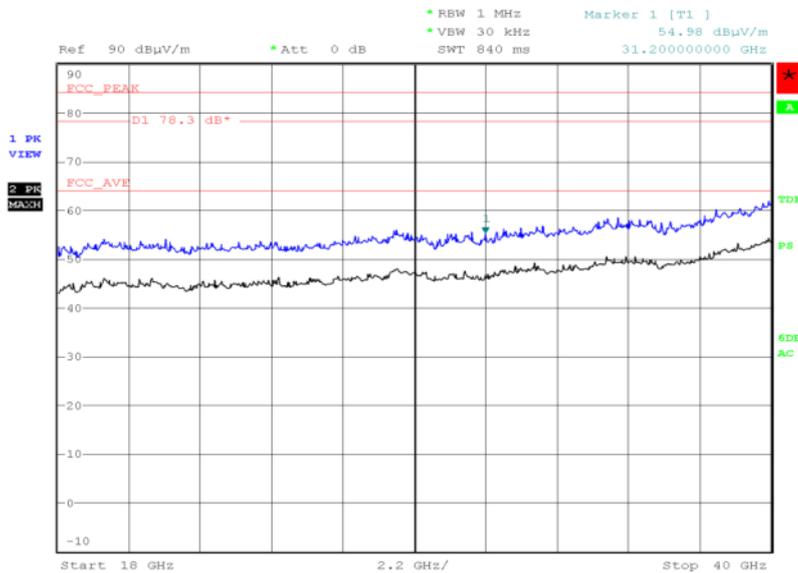
Product Service

8 GHz to 18 GHz



Date: 16.APR.2013 19:30:13

18 GHz to 40 GHz

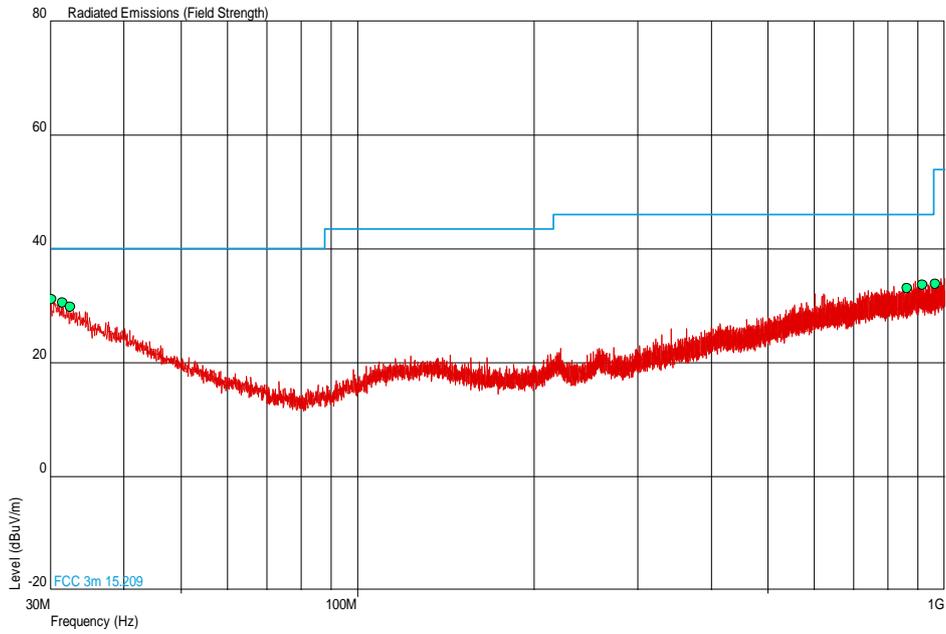


Date: 30.APR.2013 20:06:30



5600 MHz

30 MHz to 1 GHz

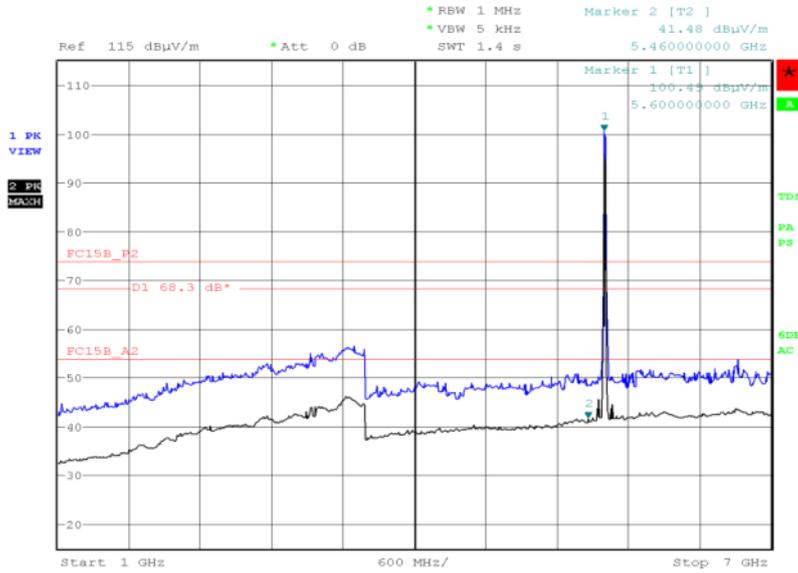


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.194	31.2	36.3	40.0	100	-8.8	63.7	0	1.00	Horizontal
31.455	30.4	33.1	40.0	100	-9.6	66.9	0	1.00	Vertical
32.425	29.8	30.9	40.0	100	-10.2	69.1	0	1.00	Vertical
864.055	33.0	44.7	46.0	200	-13.0	155.3	0	1.00	Horizontal
918.472	33.6	47.9	46.0	200	-12.4	152.1	0	1.00	Vertical
964.062	33.8	49.0	54.0	500	-20.2	451.0	0	1.00	Horizontal



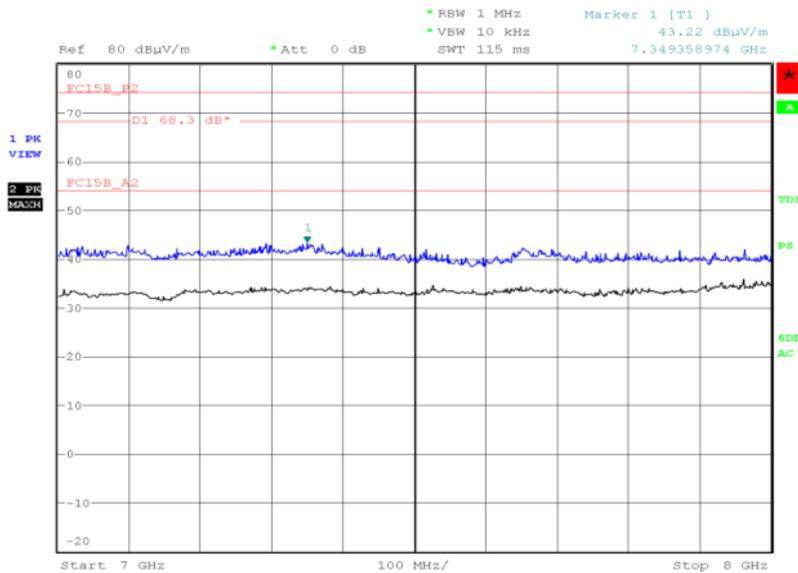
Product Service

1 GHz to 7 GHz



Date: 14.APR.2013 08:08:42

7 GHz to 8 GHz

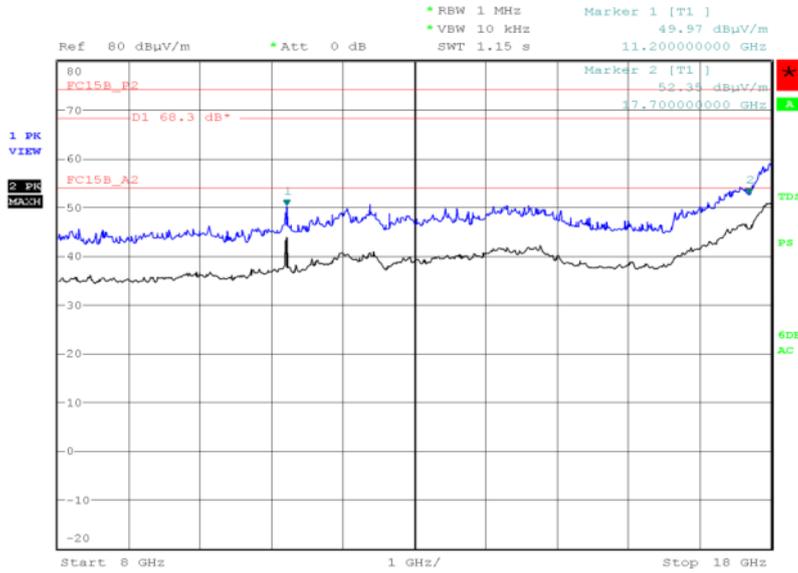


Date: 15.APR.2013 22:38:53



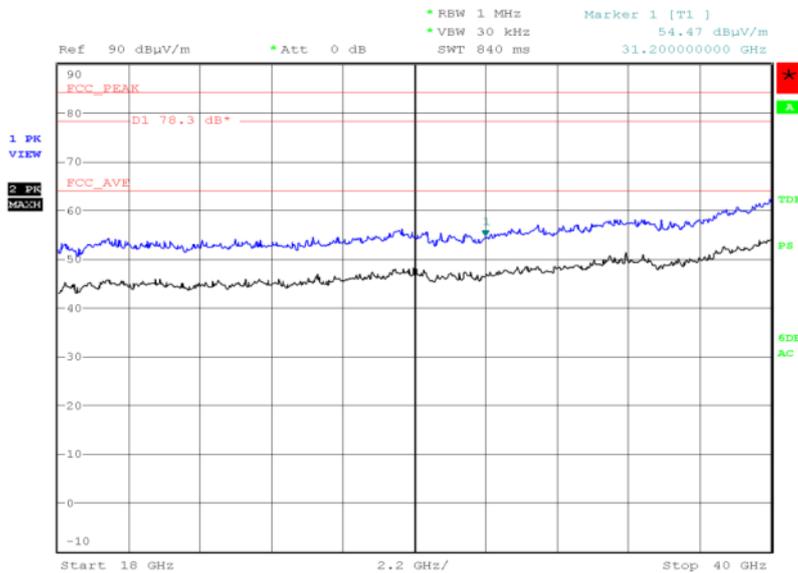
Product Service

8 GHz to 18 GHz



Date: 16.APR.2013 19:39:46

18 GHz to 40 GHz

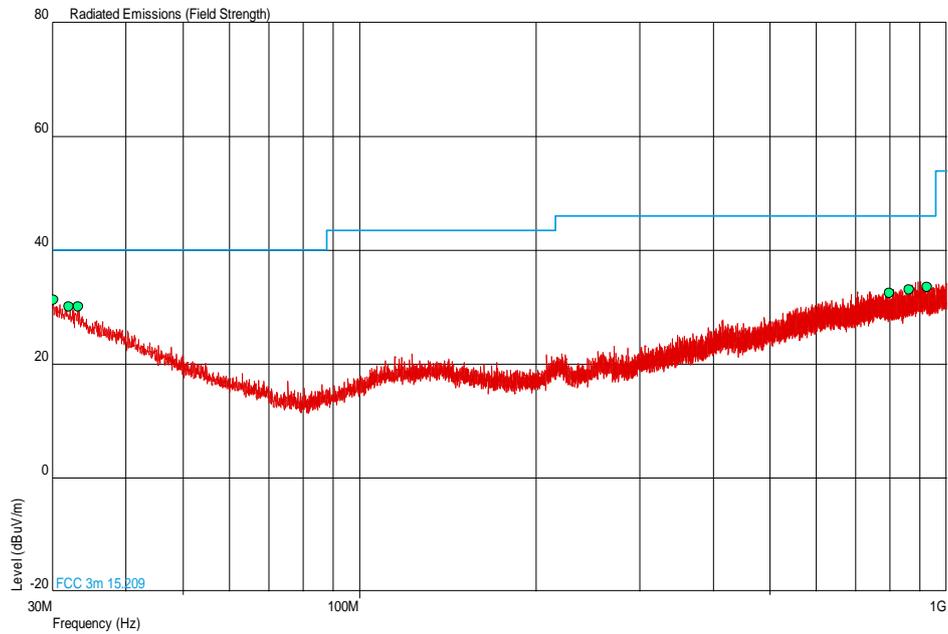


Date: 30.APR.2013 20:16:11



5700 MHz

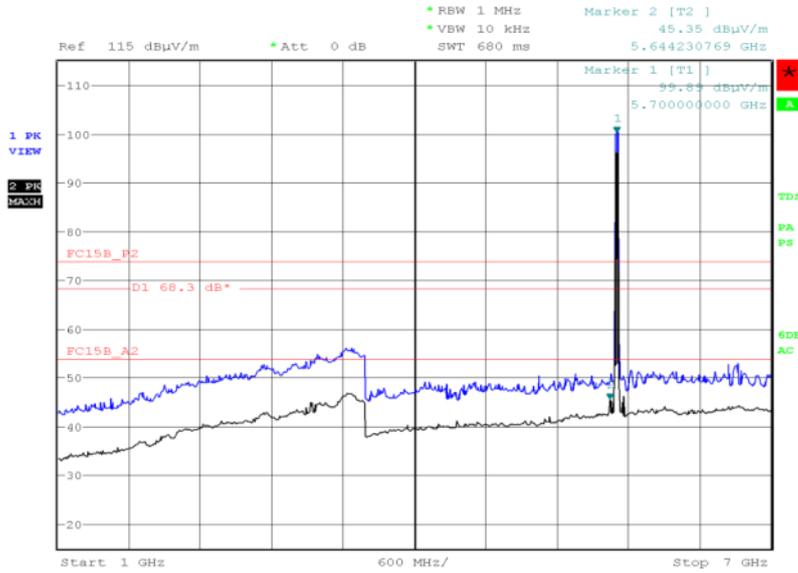
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.146	31.2	36.3	40.0	100	-8.8	63.7	0	1.00	Vertical
32.037	30.0	31.6	40.0	100	-10.0	68.4	0	1.00	Horizontal
33.250	30.1	32.0	40.0	100	-9.9	68.0	0	1.00	Vertical
800.423	32.4	41.7	46.0	200	-13.6	158.3	0	1.00	Vertical
863.764	33.0	44.7	46.0	200	-13.0	155.3	0	1.00	Horizontal
925.989	33.5	47.3	46.0	200	-12.5	152.7	0	1.00	Horizontal

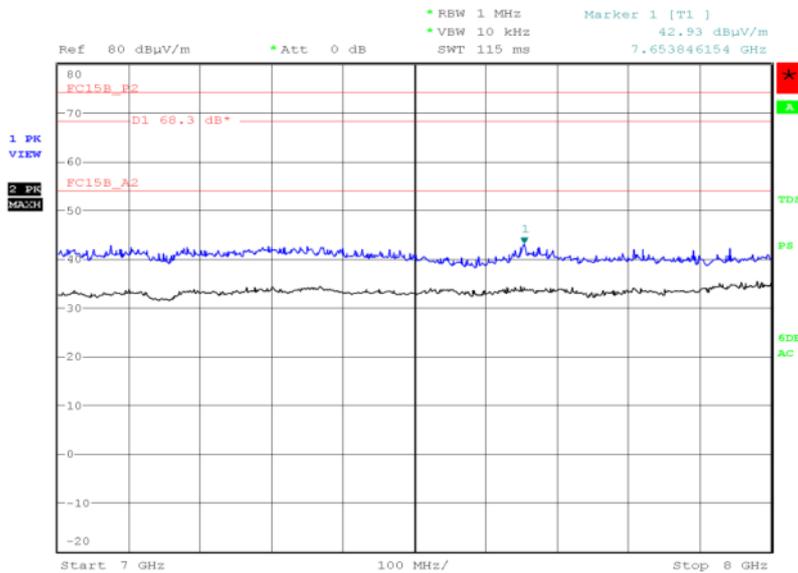


1 GHz to 7 GHz



Date: 14.APR.2013 08:40:42

7 GHz to 8 GHz

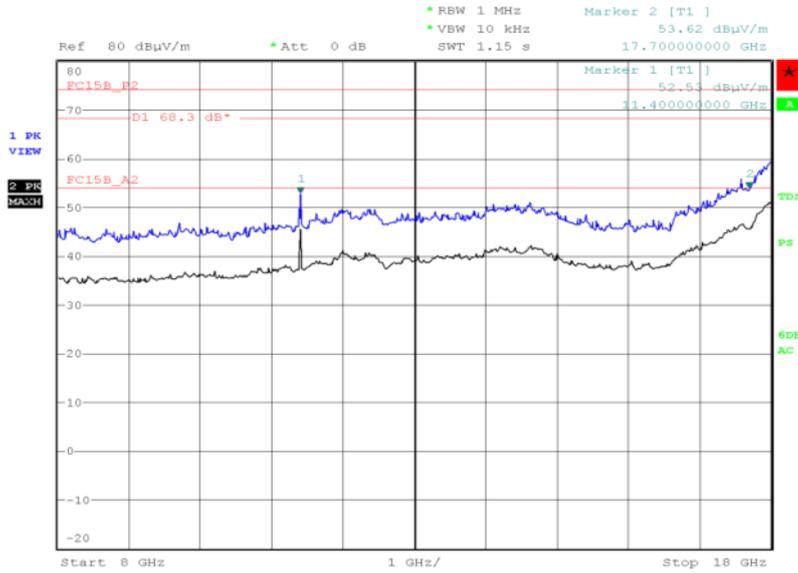


Date: 15.APR.2013 22:43:53



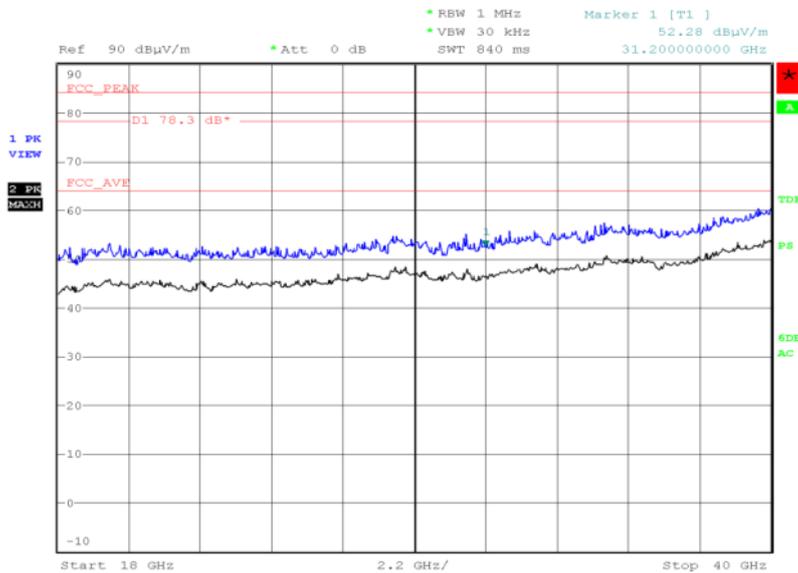
Product Service

8 GHz to 18 GHz



Date: 16.APR.2013 19:48:41

18 GHz to 40 GHz



Date: 30.APR.2013 20:22:47

Limit

Peak (dBμV/m)	Average (dBμV/m)
74.0	54.0

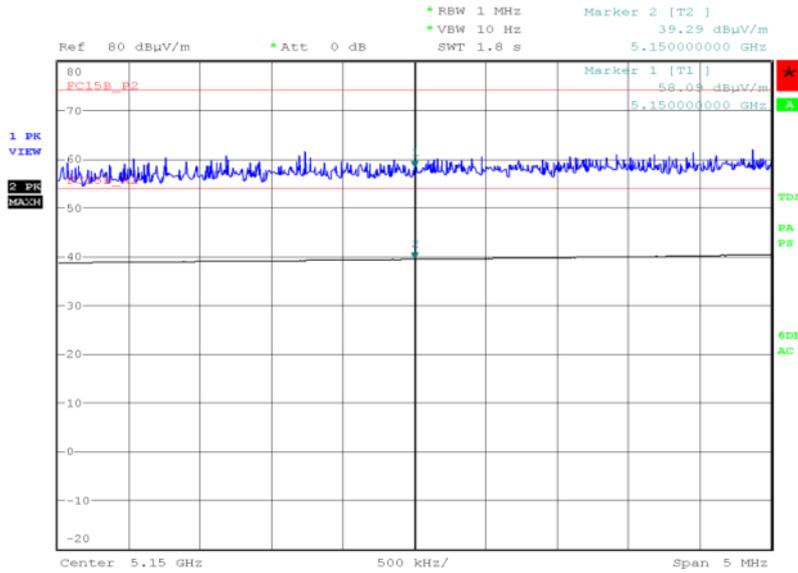


Product Service

Band Edge Emissions

5180 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	58.09	39.29

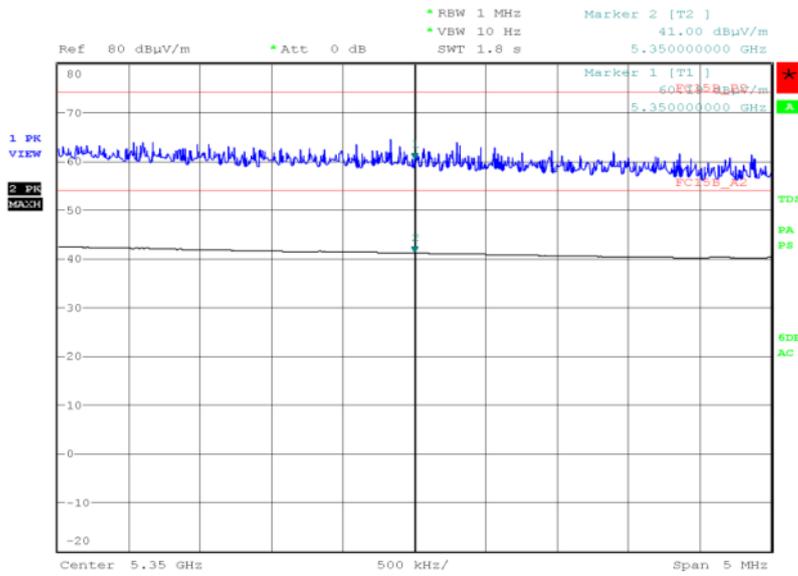


Date: 12.APR.2013 19:12:56



5320 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	60.19	41.00

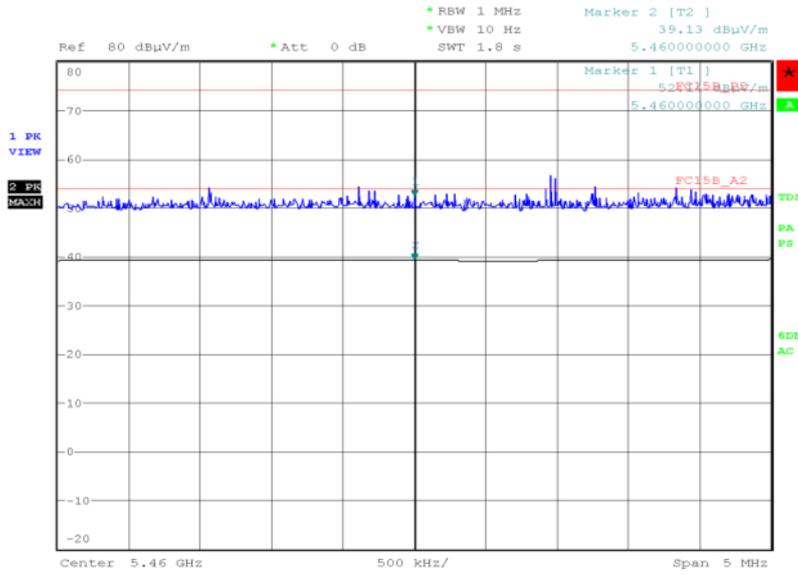


Date: 12.APR.2013 23:13:47



5500 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	52.14	39.13



Date: 14.APR.2013 07:26:23

Limit

Peak (dBµV/m)	Average (dBµV/m)
74.0	54.0

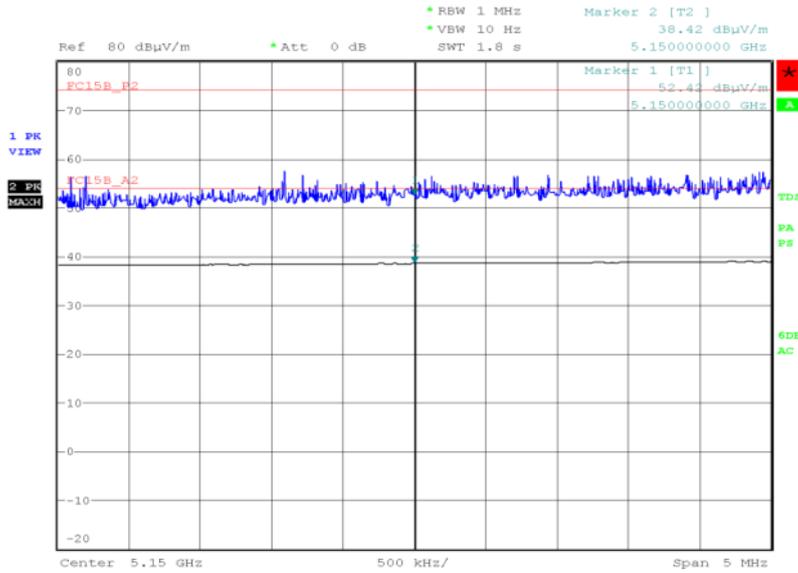


Product Service

Band Edge Emissions

5180 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	52.42	38.42

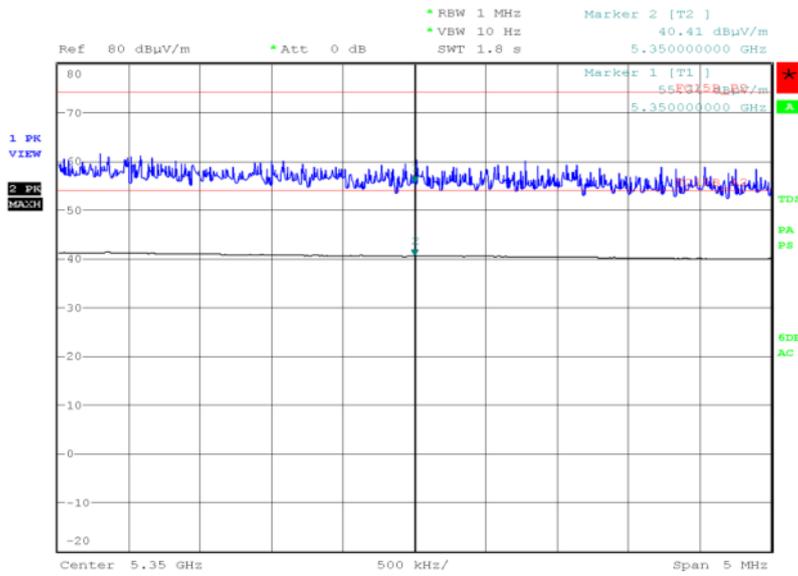


Date: 14.APR.2013 09:59:49



5320 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	55.34	40.41

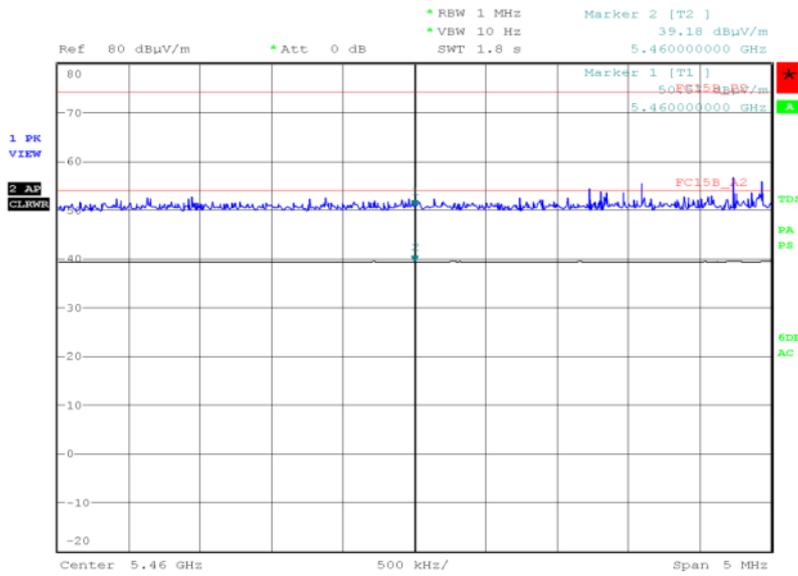


Date: 14.APR.2013 10:32:55



5500 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	50.57	39.18



Date: 14.APR.2013 11:07:17

Limit

Peak (dBµV/m)	Average (dBµV/m)
74.0	54.0



Product Service

802.11(n) FCC - 5 GHz 40 MHz BW

4.0 V DC Supply

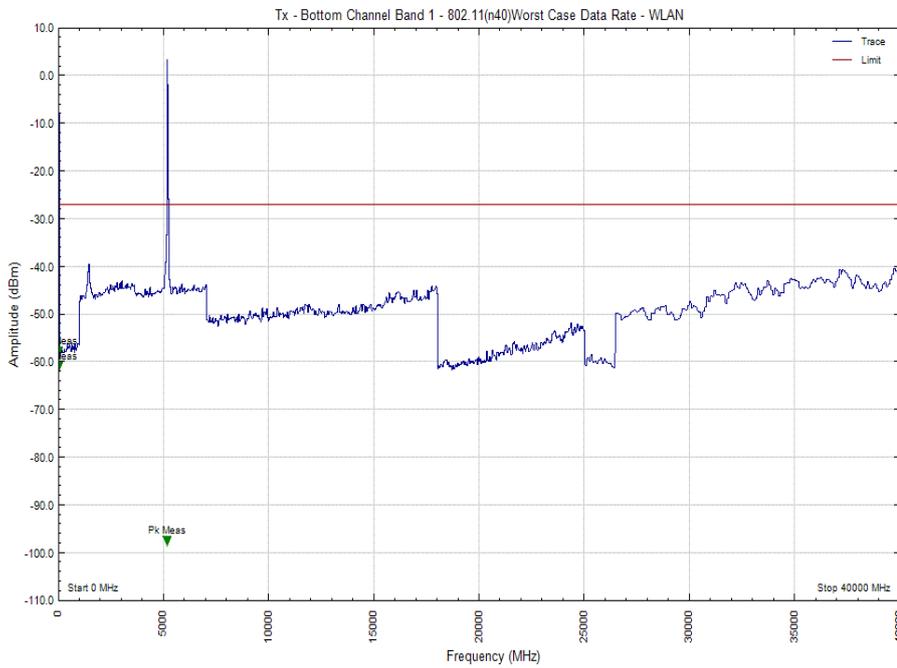
Spurious Conducted Emissions

27 Mbps

Frequency Band 1

5190 MHz

9 kHz to 40 GHz

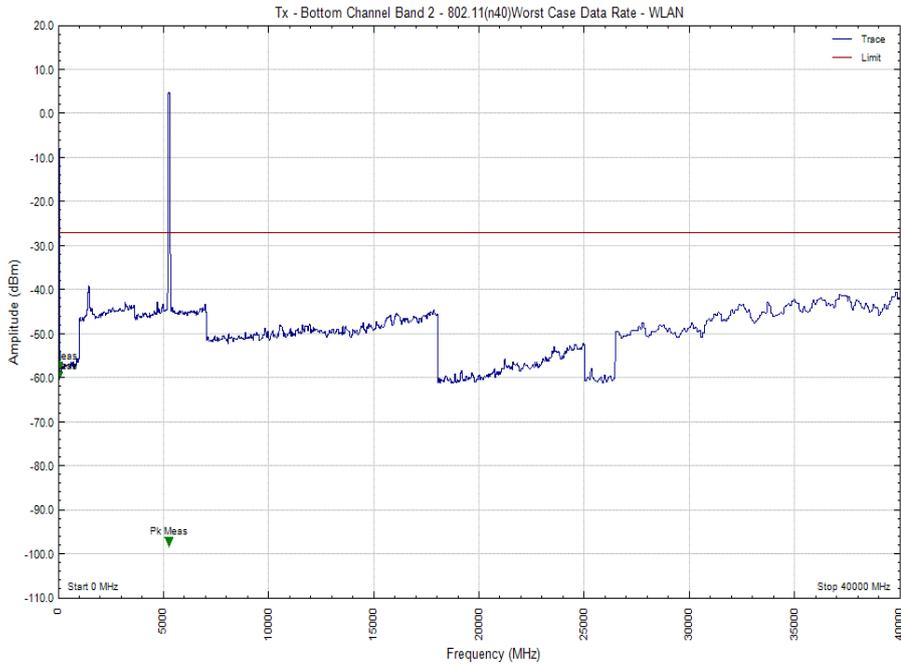




Frequency Band 2

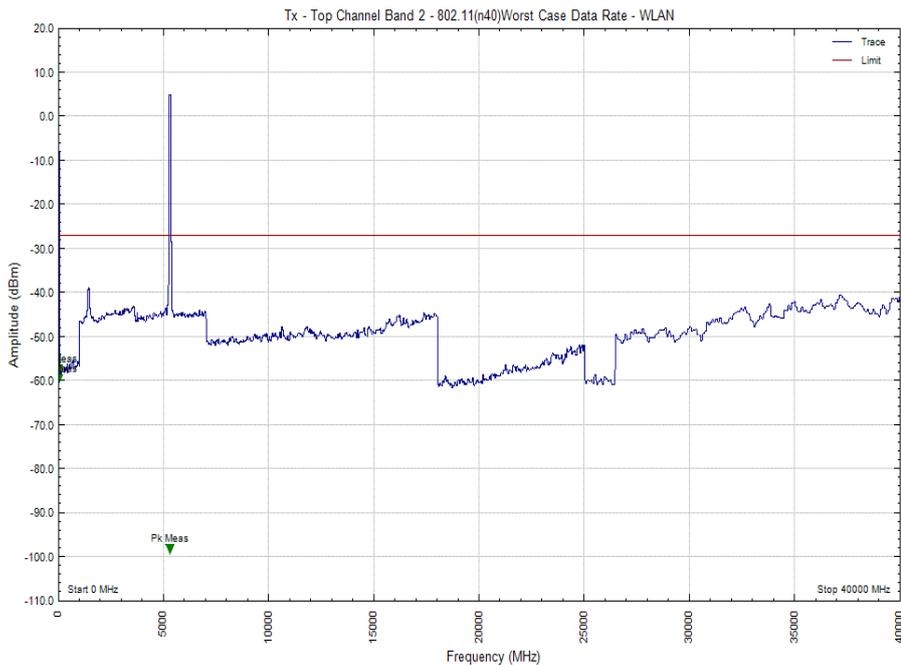
5270 MHz

9 kHz to 40 GHz



5310 MHz

9 kHz to 40 GHz

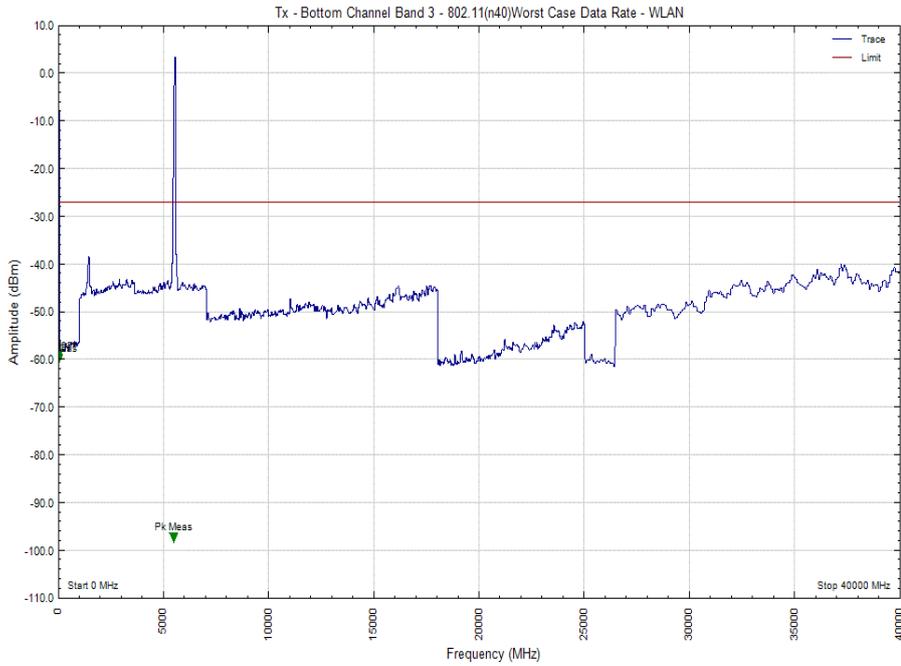




Frequency Band 3

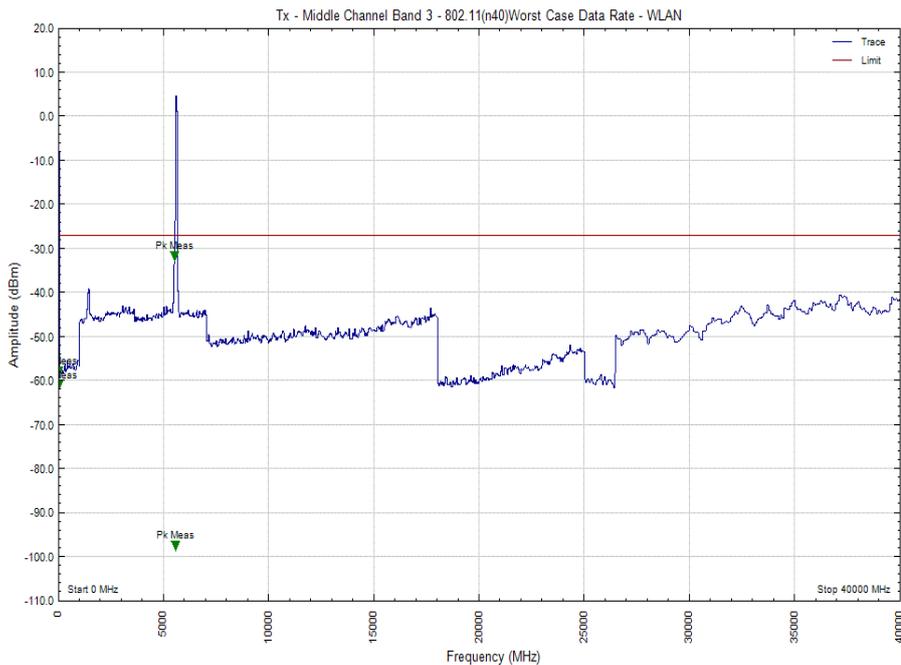
5510 MHz

9 kHz to 40 GHz



5590 MHz

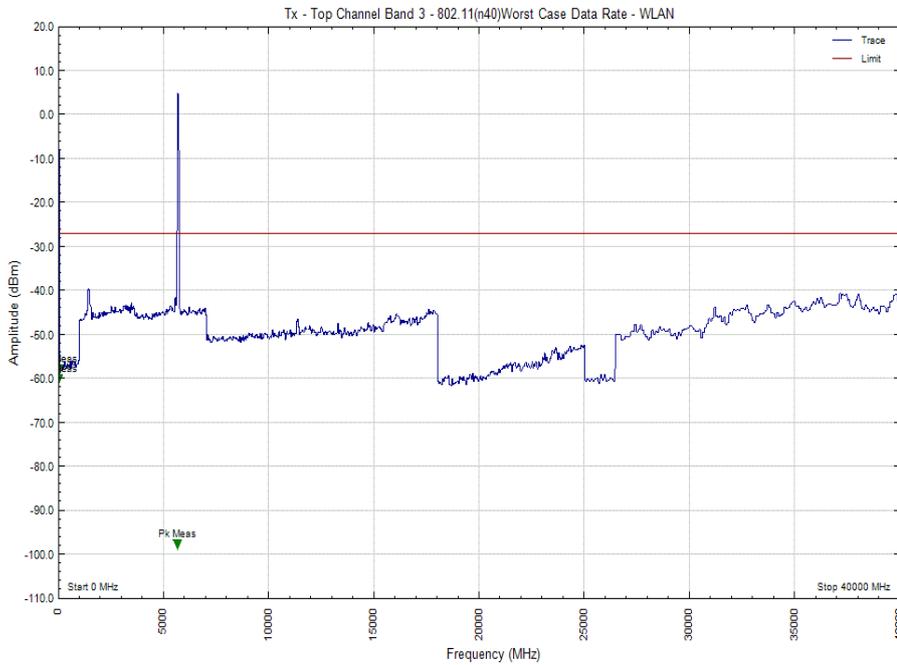
9 kHz to 40 GHz





5670 MHz

9 kHz to 40 GHz



Limit Clause

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB.



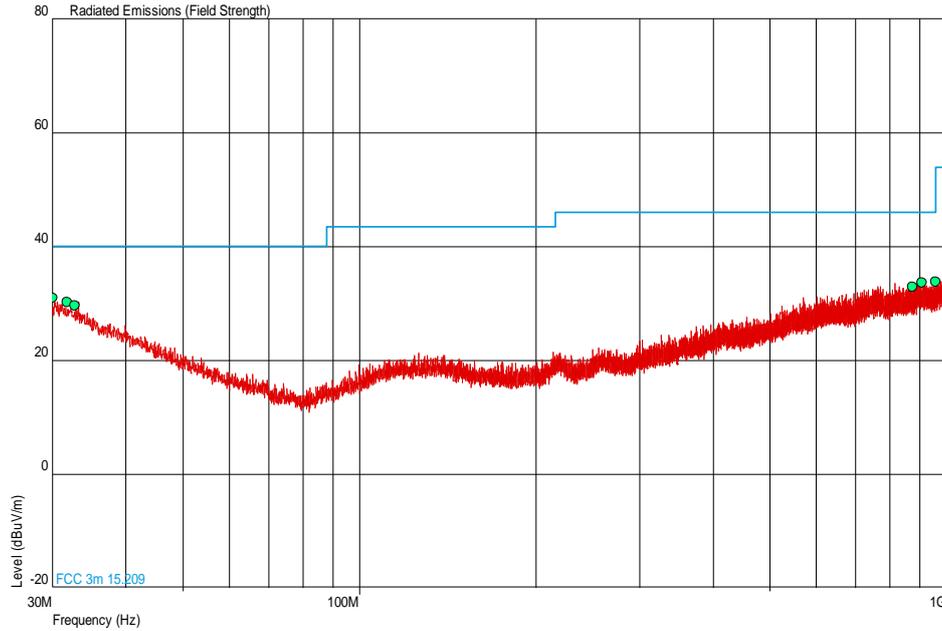
Product Service

Spurious Radiated Emissions

Frequency Band 1

5190 MHz

30 MHz to 1 GHz

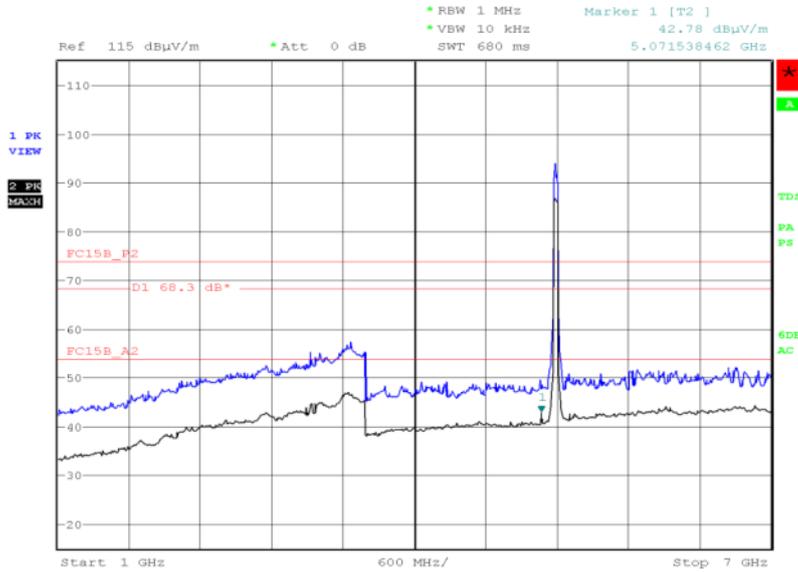


Frequency (MHz)	QP Level (dB $\mu$ V/m)	QP Level ( $\mu$ V/m)	QP Limit (dB $\mu$ V/m)	QP Limit ( $\mu$ V/m)	QP Margin (dB $\mu$ V/m)	QP Margin ( $\mu$ V/m)	Angle (Deg)	Height (m)	Polarity
30.097	31.0	35.5	40.0	100	-9.0	64.5	0	1.00	Horizontal
31.795	30.2	32.4	40.0	100	-9.8	67.6	0	1.00	Horizontal
32.813	29.7	30.5	40.0	100	-10.3	69.5	0	1.00	Horizontal
875.016	32.9	44.2	46.0	200	-13.1	155.8	0	1.00	Horizontal
907.220	33.7	48.4	46.0	200	-12.3	151.6	0	1.00	Vertical
960.085	33.8	49.0	54.0	500	-20.2	451.0	0	1.00	Vertical



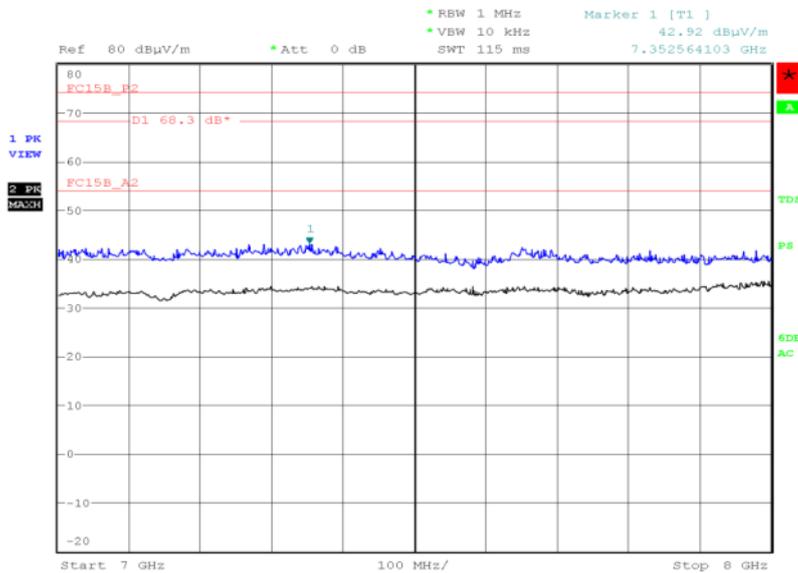
Product Service

1 GHz to 7 GHz



Date: 14.APR.2013 13:06:14

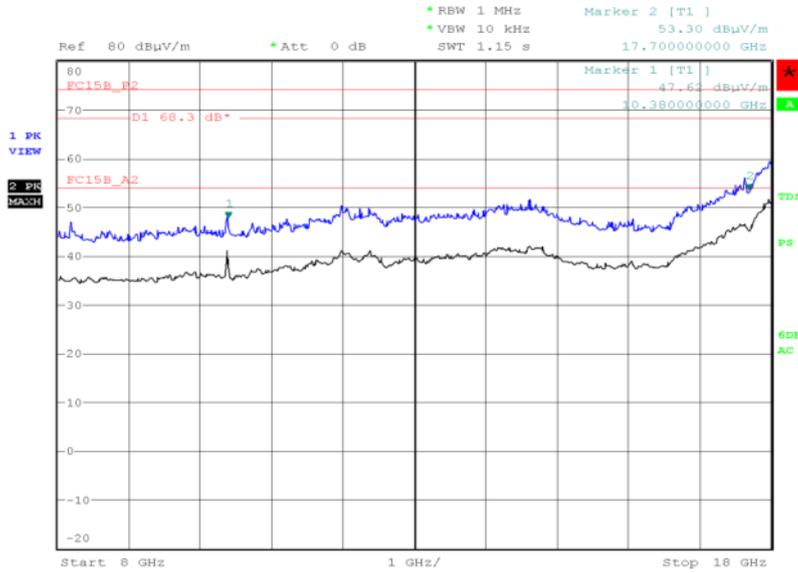
7 GHz to 8 GHz



Date: 15.APR.2013 21:35:41

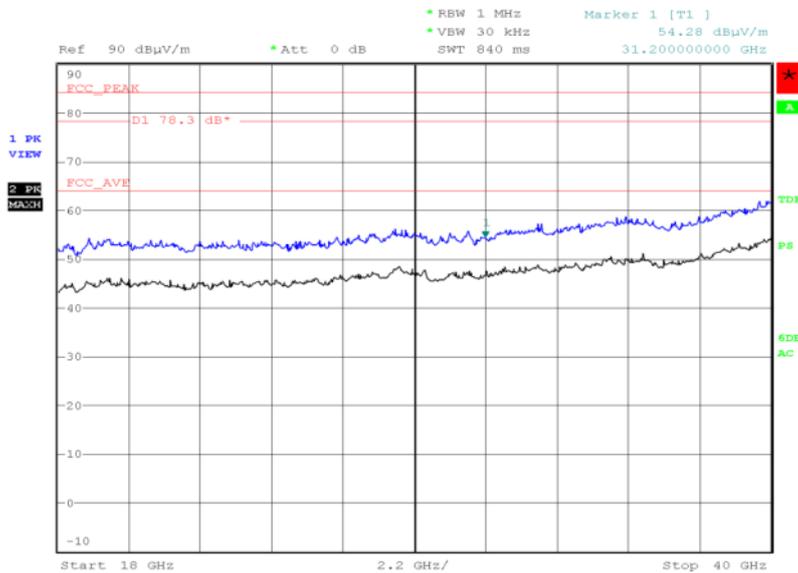


8 GHz to 18 GHz



Date: 16.APR.2013 20:03:35

18 GHz to 40 GHz

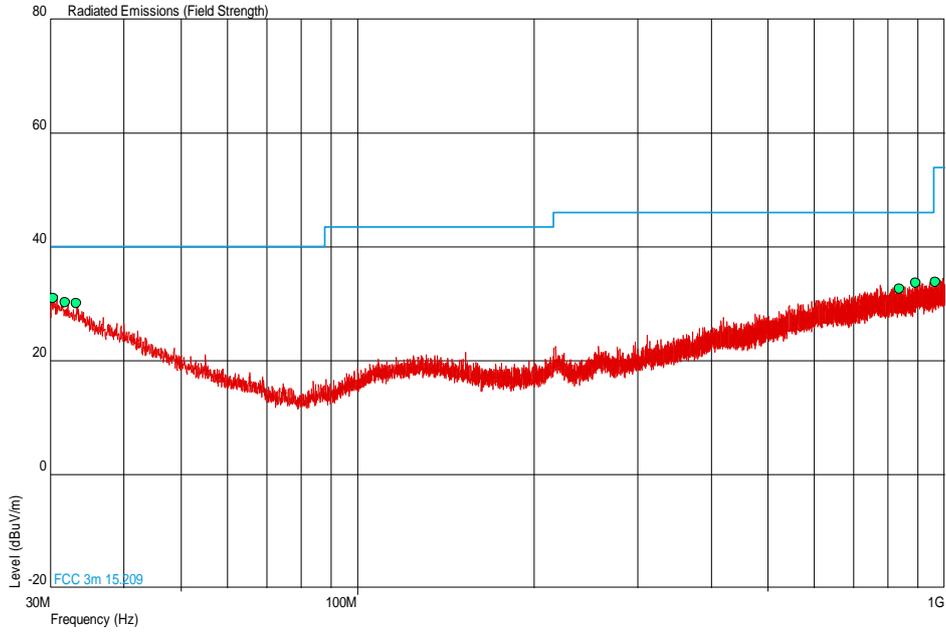


Date: 30.APR.2013 20:32:11



5230 MHz

30 MHz to 1 GHz

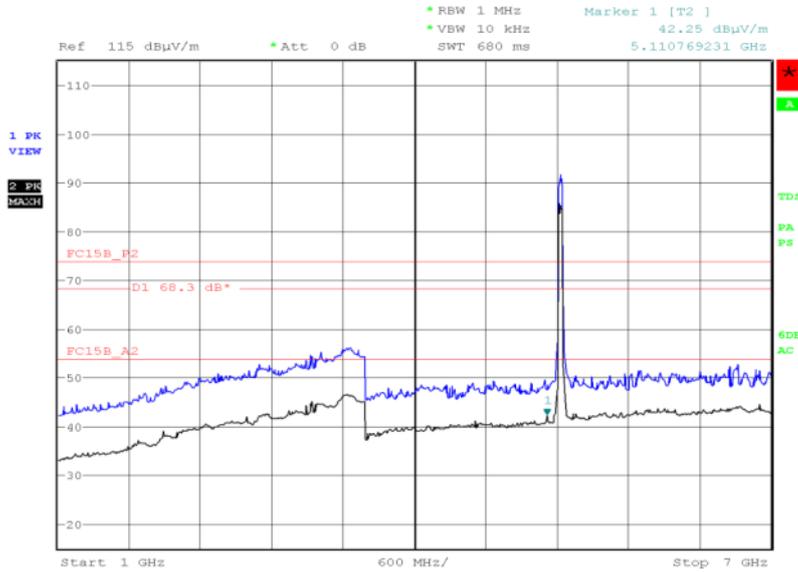


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.388	31.0	35.5	40.0	100	-9.0	64.5	0	1.00	Vertical
31.795	30.2	32.4	40.0	100	-9.8	67.6	0	1.00	Horizontal
33.250	30.0	31.6	40.0	100	-10.0	68.4	0	1.00	Horizontal
838.059	32.7	43.2	46.0	200	-13.3	156.8	0	1.00	Vertical
893.203	33.7	48.4	46.0	200	-12.3	151.6	0	1.00	Horizontal
965.371	33.9	49.5	54.0	500	-20.1	450.5	0	1.00	Vertical



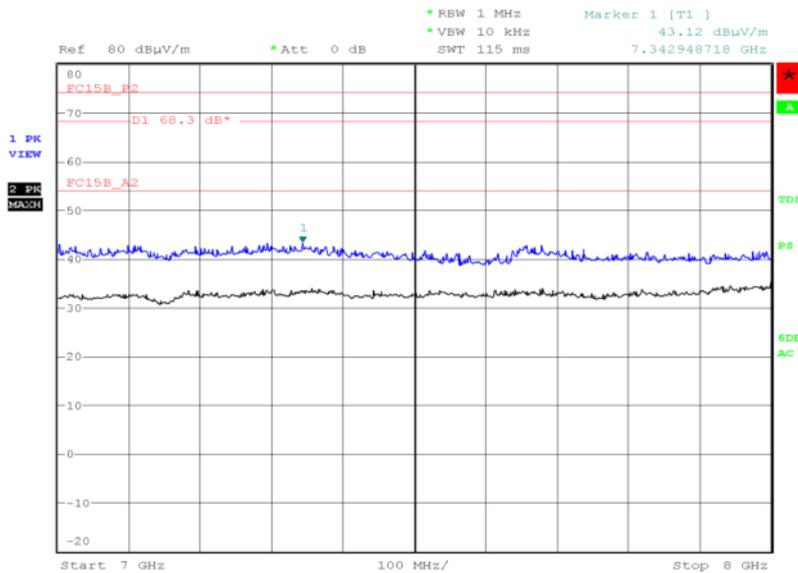
Product Service

1 GHz to 7 GHz



Date: 14.APR.2013 13:19:18

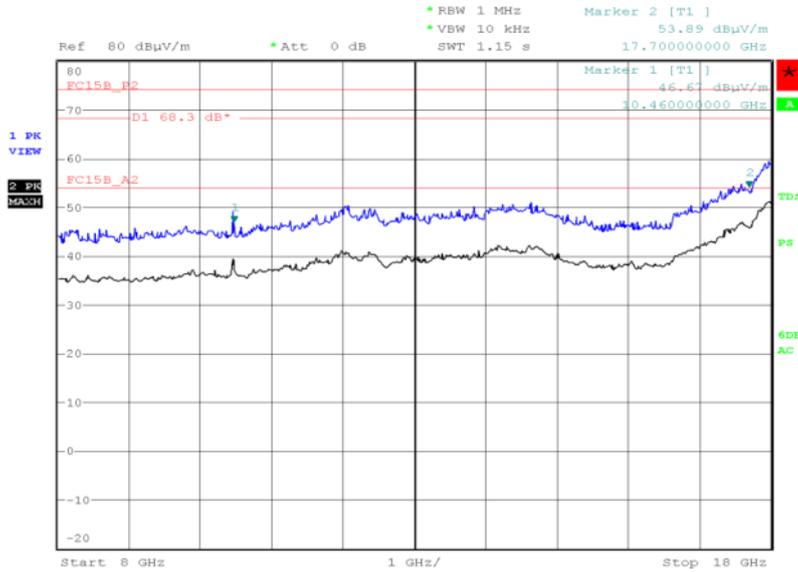
7 GHz to 8 GHz



Date: 15.APR.2013 21:28:45

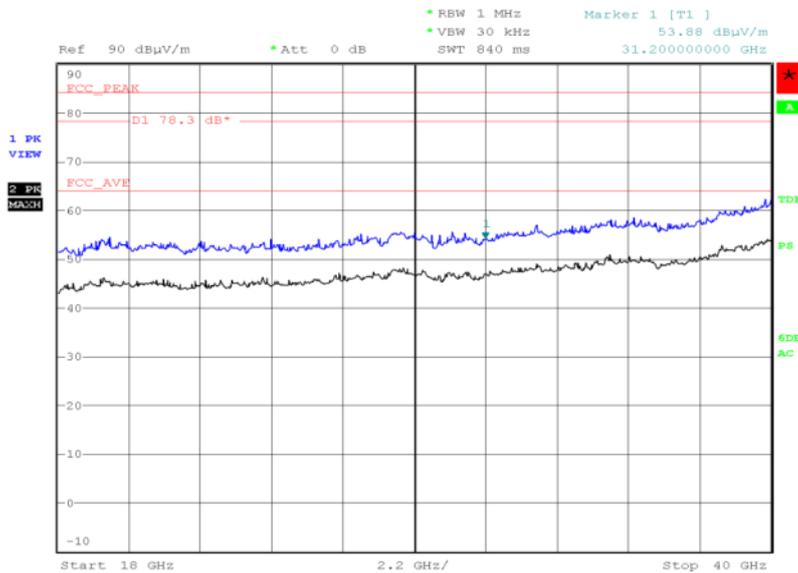


8 GHz to 18 GHz



Date: 16.APR.2013 20:20:55

18 GHz to 40 GHz



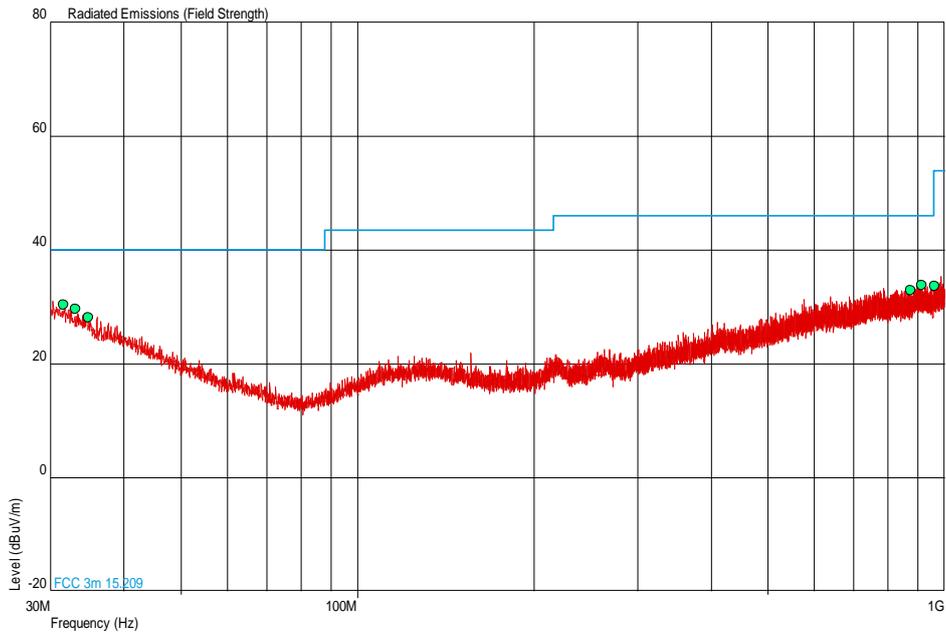
Date: 30.APR.2013 20:37:52



Frequency Band 2

5270 MHz

30 MHz to 1 GHz

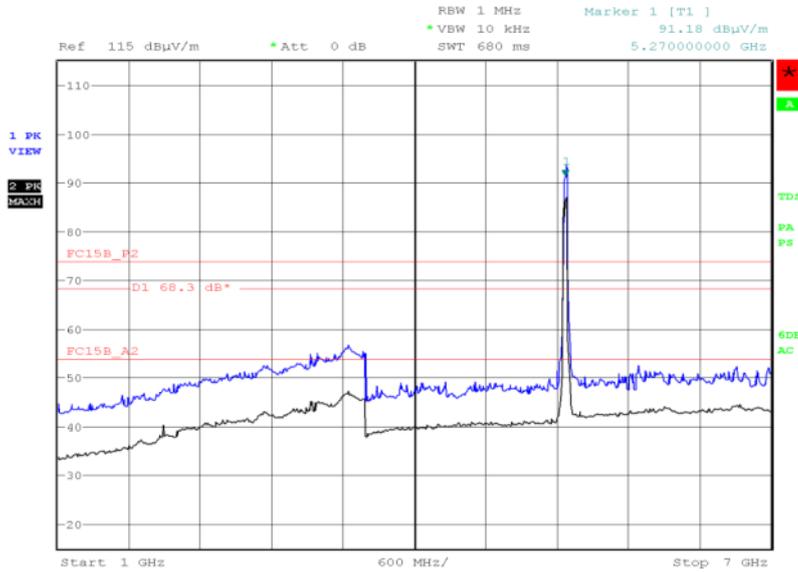


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
31.552	30.3	35.5	40.0	100	-9.7	64.5	0	1.00	Vertical
33.104	29.6	32.4	40.0	100	-10.4	67.6	0	1.00	Vertical
34.850	28.1	31.6	40.0	100	-11.9	68.4	0	1.00	Horizontal
874.919	32.9	43.2	46.0	200	-13.1	156.8	0	1.00	Horizontal
914.883	33.8	48.4	46.0	200	-12.2	151.6	0	1.00	Horizontal
962.558	33.7	49.5	54.0	500	-20.3	450.5	0	1.00	Horizontal



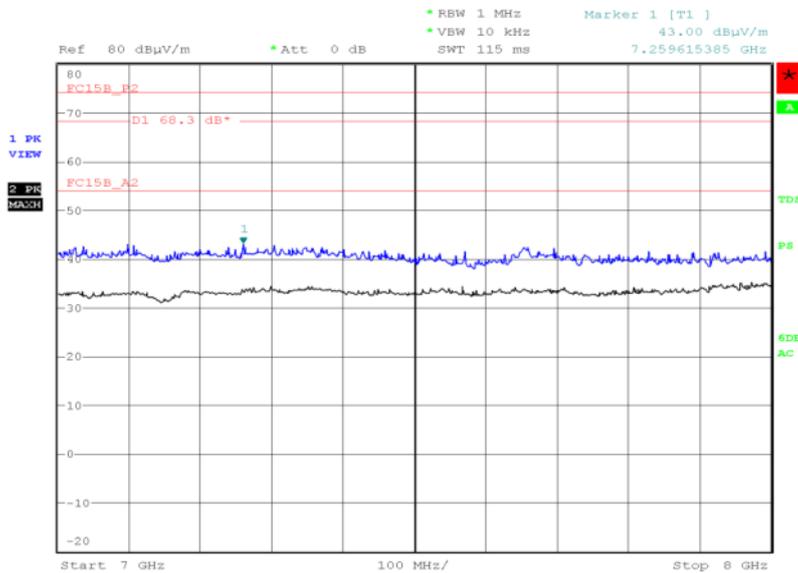
Product Service

1 GHz to 7 GHz



Date: 14.APR.2013 13:56:26

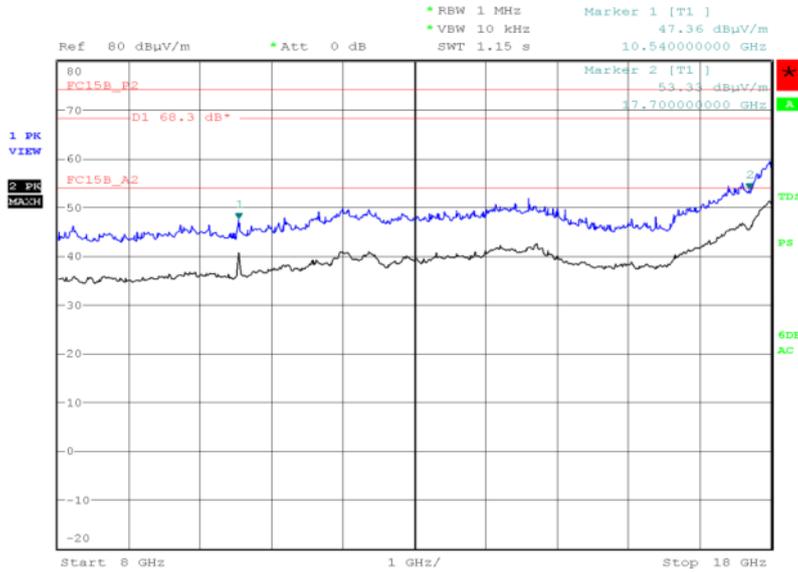
7 GHz to 8 GHz



Date: 15.APR.2013 21:25:30

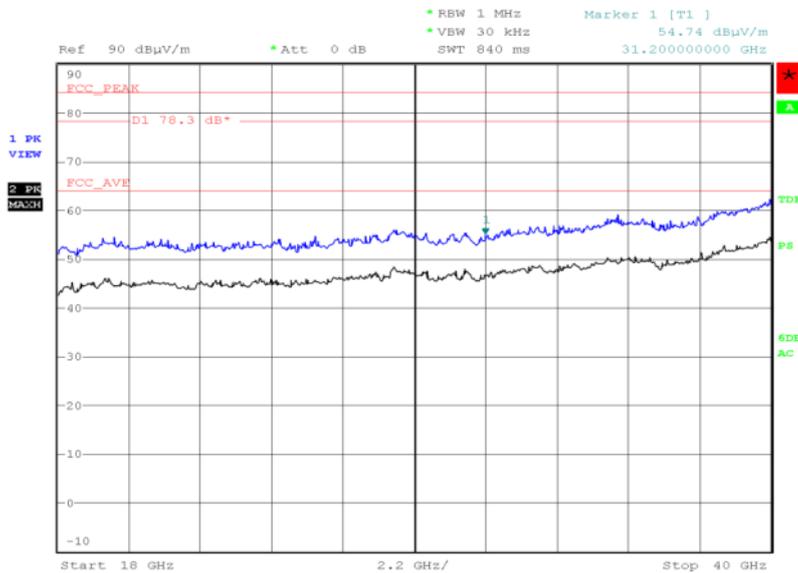


8 GHz to 18 GHz



Date: 16.APR.2013 20:32:49

18 GHz to 40 GHz

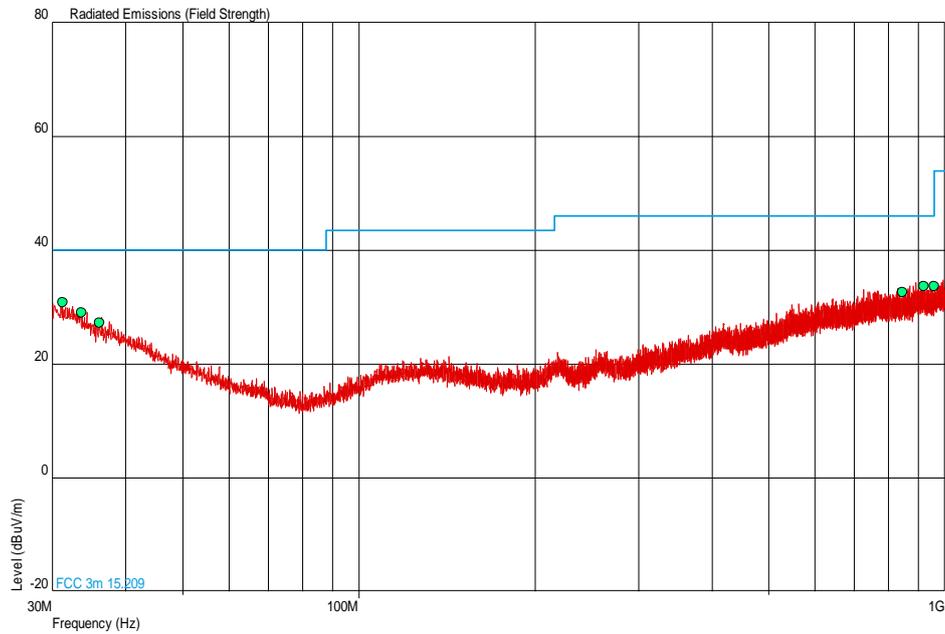


Date: 30.APR.2013 20:55:09



5310 MHz

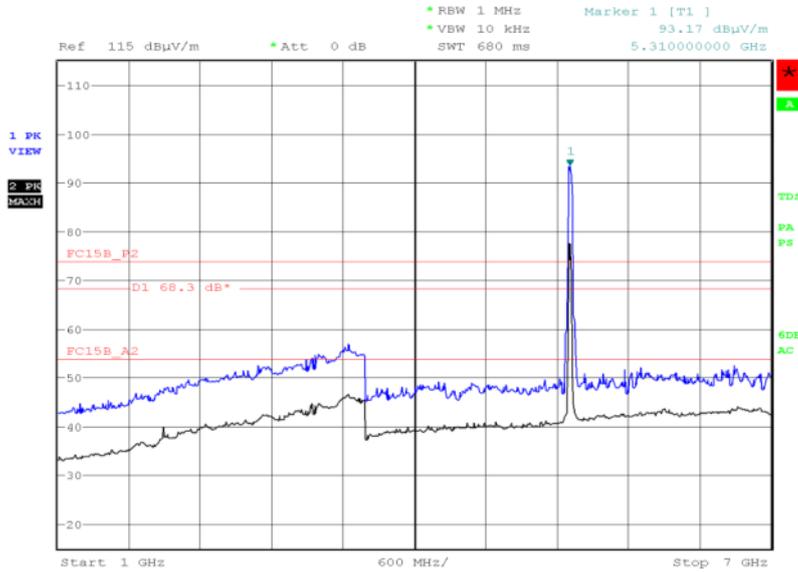
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
31.310	30.8	34.7	40.0	100	-9.2	65.3	0	1.00	Horizontal
33.735	29.0	28.2	40.0	100	-11.0	71.8	0	1.00	Horizontal
36.111	27.3	23.2	40.0	100	-12.7	76.8	0	1.00	Vertical
847.274	32.6	42.7	46.0	200	-13.4	157.3	0	1.00	Vertical
920.557	33.7	48.4	46.0	200	-12.3	151.6	0	1.00	Vertical
957.854	33.7	48.4	54.0	500	-12.3	151.6	0	1.00	Horizontal

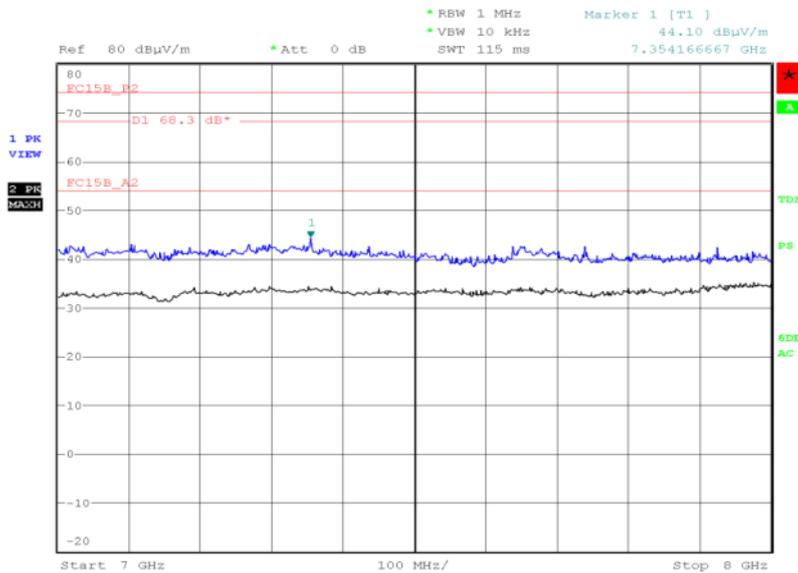


1 GHz to 7 GHz



Date: 14.APR.2013 14:14:17

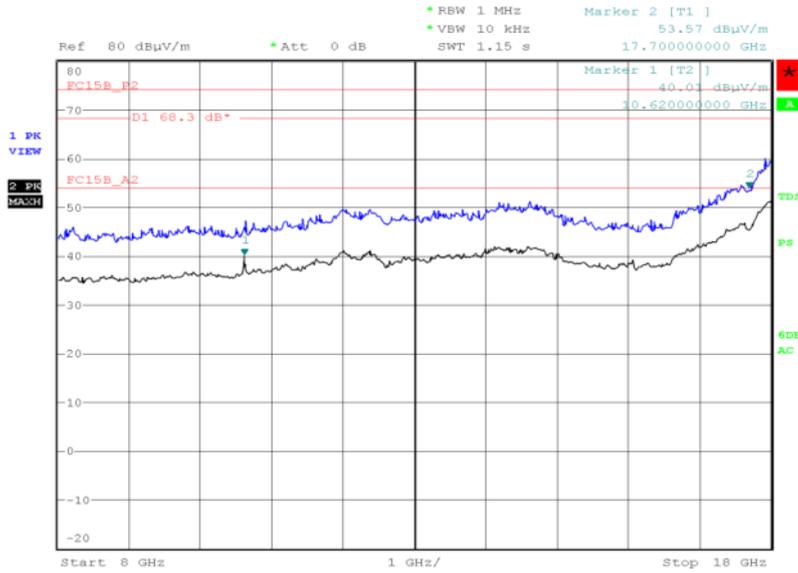
7 GHz to 8 GHz



Date: 15.APR.2013 21:41:30

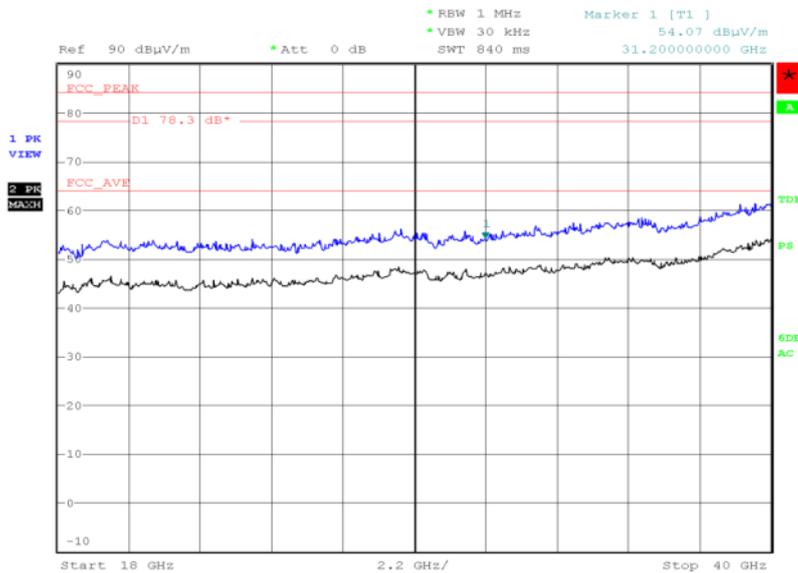


8 GHz to 18 GHz



Date: 16.APR.2013 20:44:51

18 GHz to 40 GHz



Date: 30.APR.2013 21:02:47

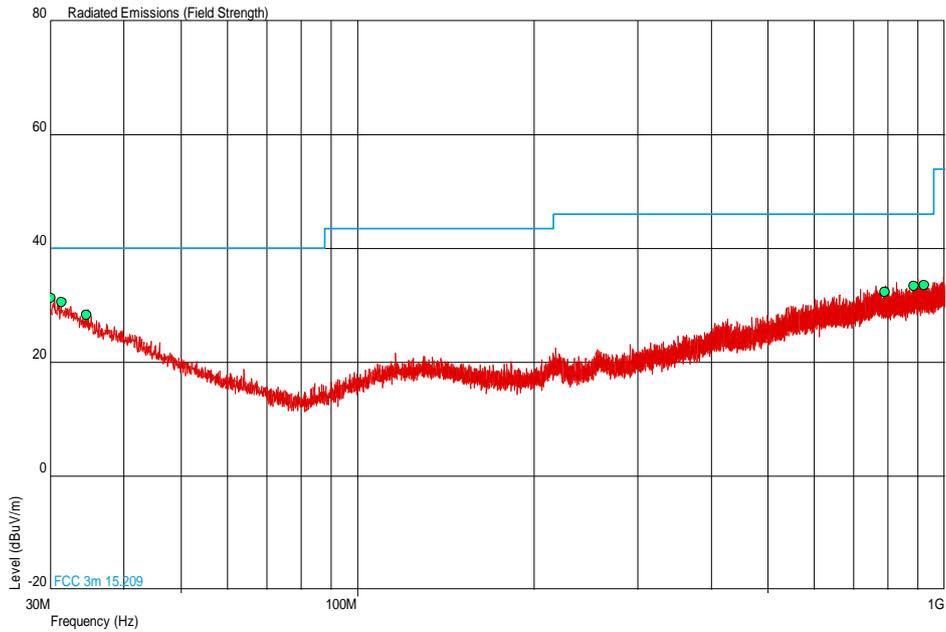


Product Service

Frequency Band 3

5510 MHz

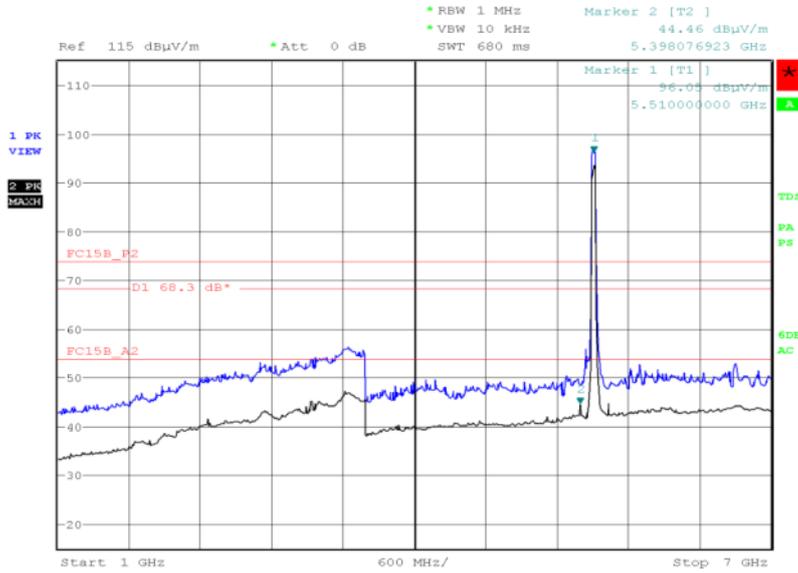
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
30.000	31.2	36.3	40.0	100	-8.8	63.7	0	1.00	Horizontal
31.407	30.5	33.5	40.0	100	-9.5	66.5	0	1.00	Horizontal
34.608	28.3	26.0	40.0	100	-11.7	74.0	0	1.00	Vertical
793.051	32.4	41.7	46.0	200	-13.6	158.3	0	1.00	Vertical
886.122	33.3	46.2	46.0	200	-12.7	153.8	0	1.00	Horizontal
923.225	33.6	47.9	46.0	200	-12.4	152.1	0	1.00	Horizontal

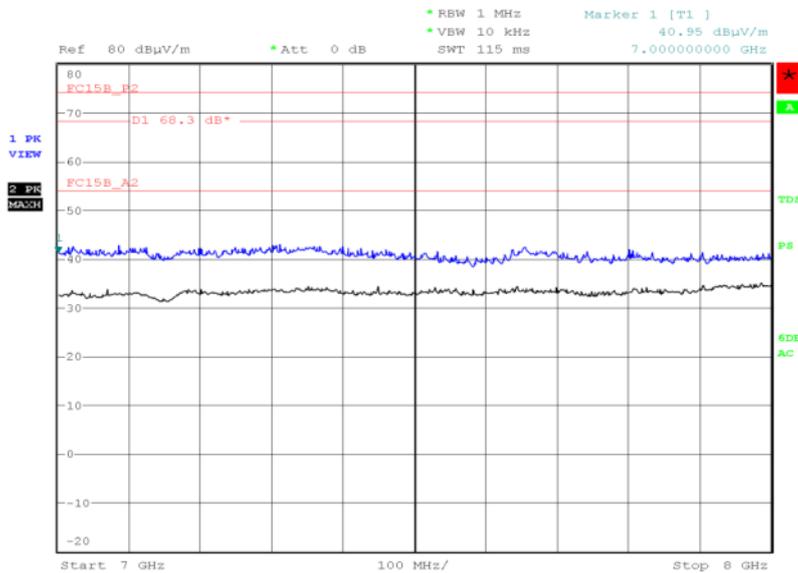


1 GHz to 7 GHz



Date: 14.APR.2013 16:26:17

7 GHz to 8 GHz

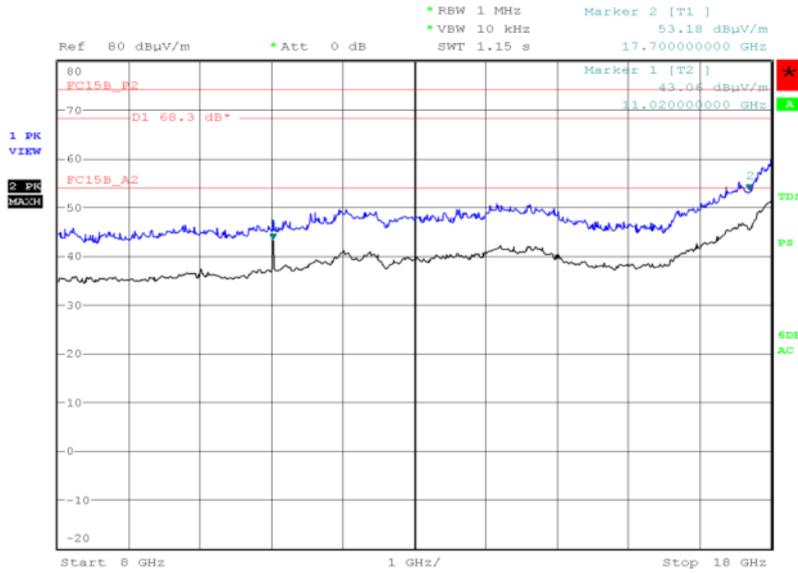


Date: 15.APR.2013 21:47:34



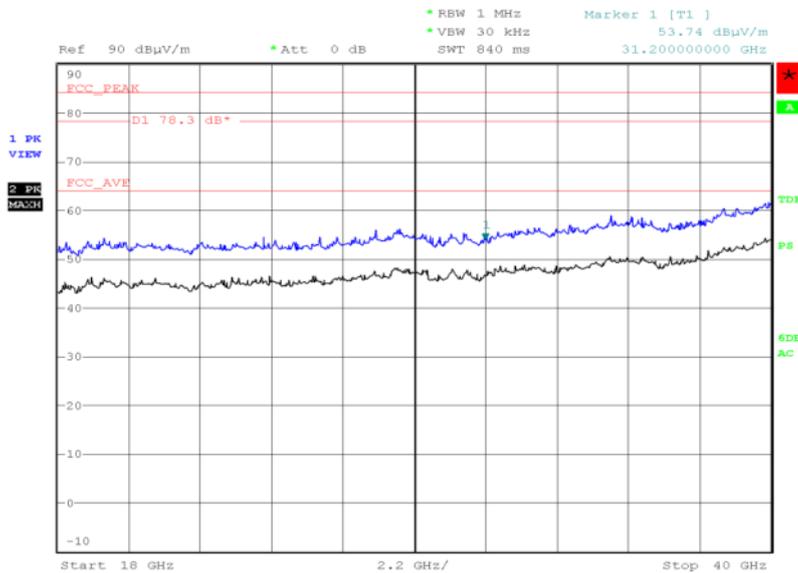
Product Service

8 GHz to 18 GHz



Date: 16.APR.2013 20:55:49

18 GHz to 40 GHz



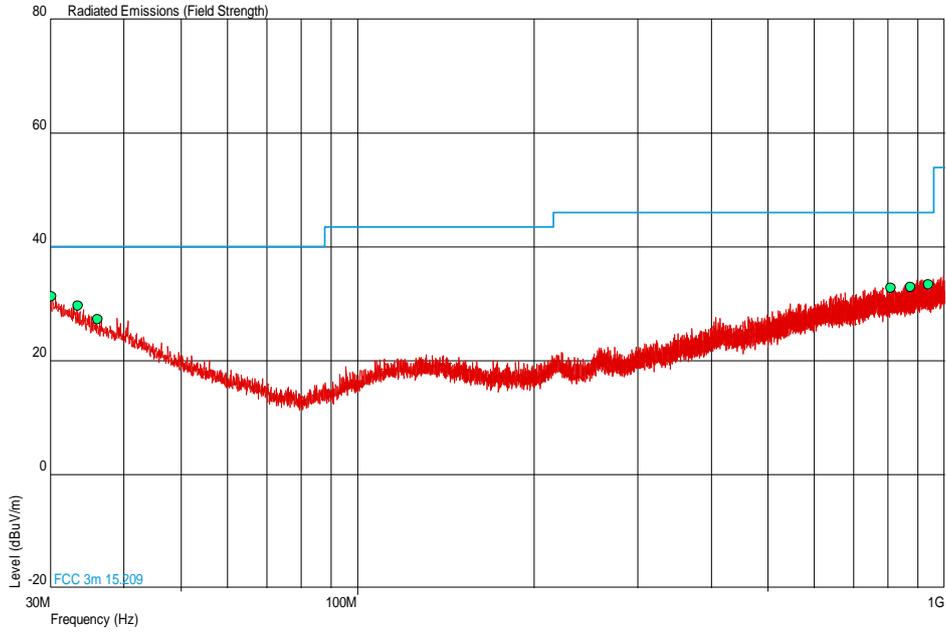
Date: 30.APR.2013 21:11:09



Product Service

5590 MHz

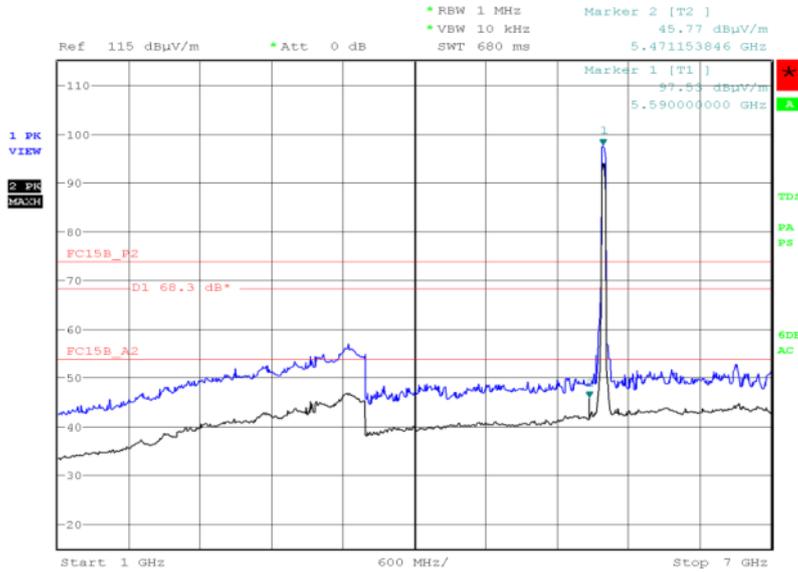
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.146	31.2	36.3	40.0	100	-8.8	63.7	0	1.00	Vertical
33.444	29.6	30.2	40.0	100	-10.4	69.8	0	1.00	Horizontal
36.111	27.3	23.2	40.0	100	-12.7	76.8	0	1.00	Horizontal
810.802	32.7	43.2	46.0	200	-13.3	156.8	0	1.00	Vertical
875.016	32.9	44.2	46.0	200	-13.1	155.8	0	1.00	Vertical
939.278	33.4	46.8	46.0	200	-12.6	153.2	0	1.00	Vertical

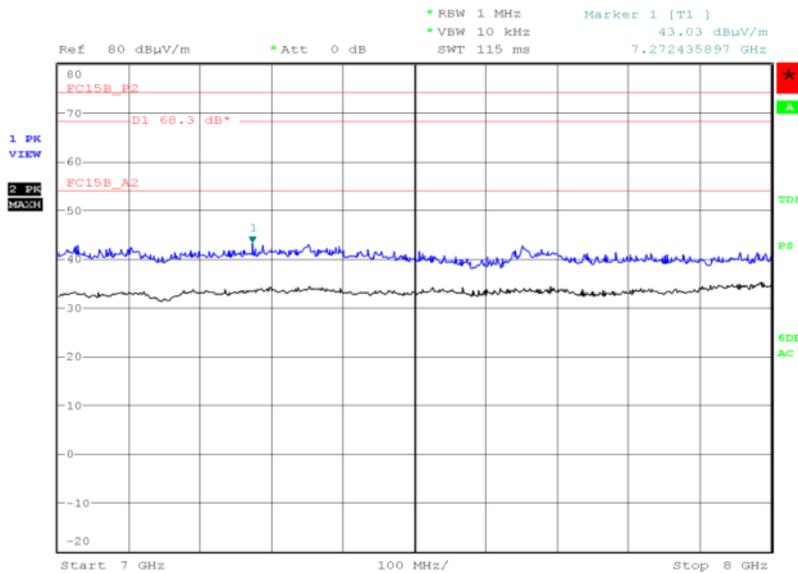


1 GHz to 7 GHz



Date: 14.APR.2013 16:18:00

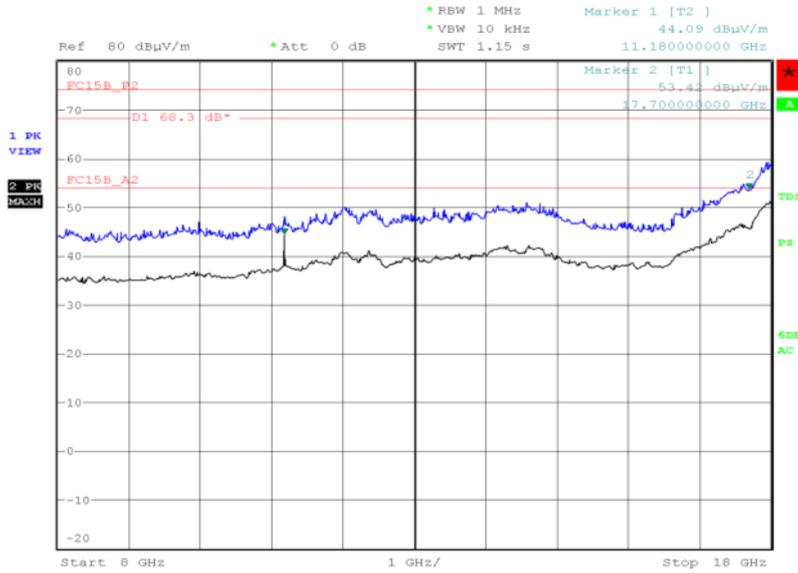
7 GHz to 8 GHz



Date: 15.APR.2013 21:51:49

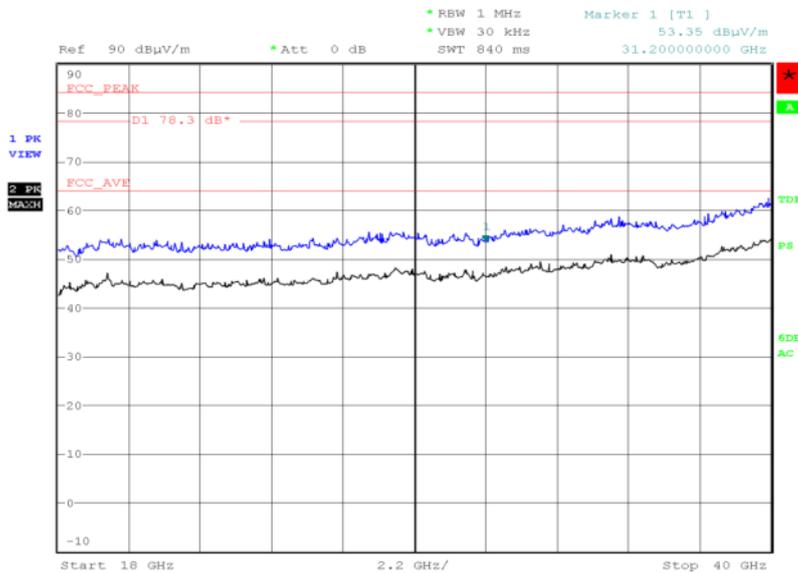


8 GHz to 18 GHz



Date: 16.APR.2013 21:04:42

18 GHz to 40 GHz

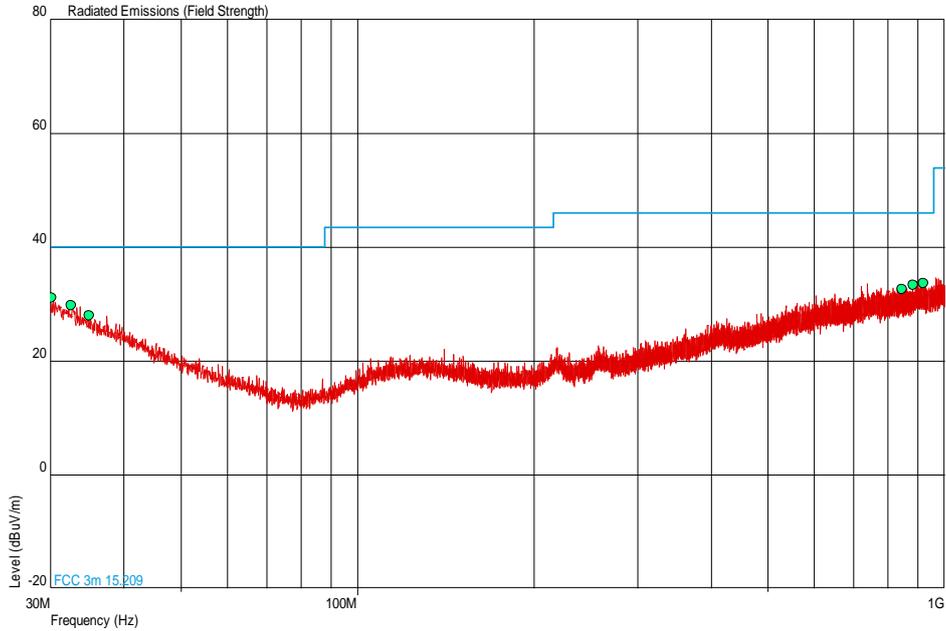


Date: 30.APR.2013 21:17:10



5670 MHz

30 MHz to 1 GHz



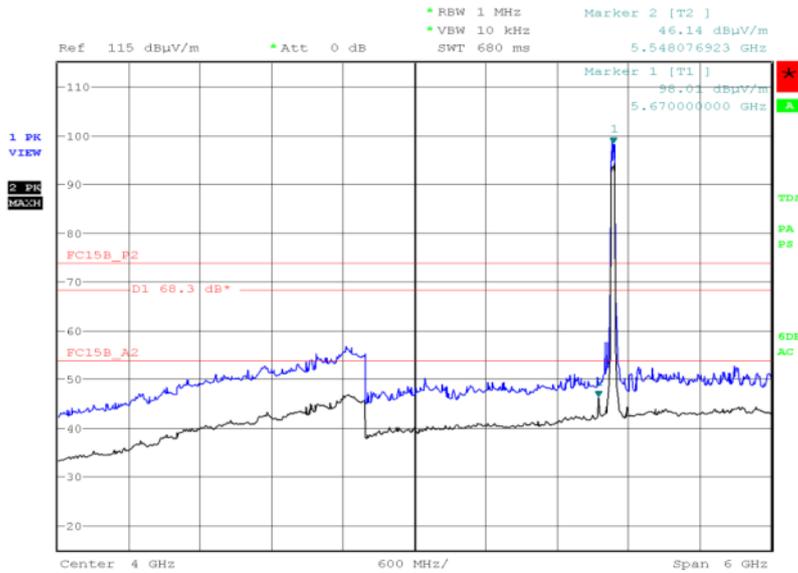
Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.194	31.2	36.3	40.0	100	-8.8	63.7	0	1.00	Vertical
32.619	29.8	30.9	40.0	100	-10.2	69.1	0	1.00	Horizontal
34.996	28.1	25.4	40.0	100	-11.9	74.6	0	1.00	Vertical
847.274	32.7	43.2	46.0	200	-13.3	156.8	0	1.00	Horizontal
885.928	33.3	46.2	46.0	200	-12.7	153.8	0	1.00	Horizontal
920.606	33.7	48.4	46.0	200	-12.3	151.6	0	1.00	Horizontal



1 GHz to 40 GHz

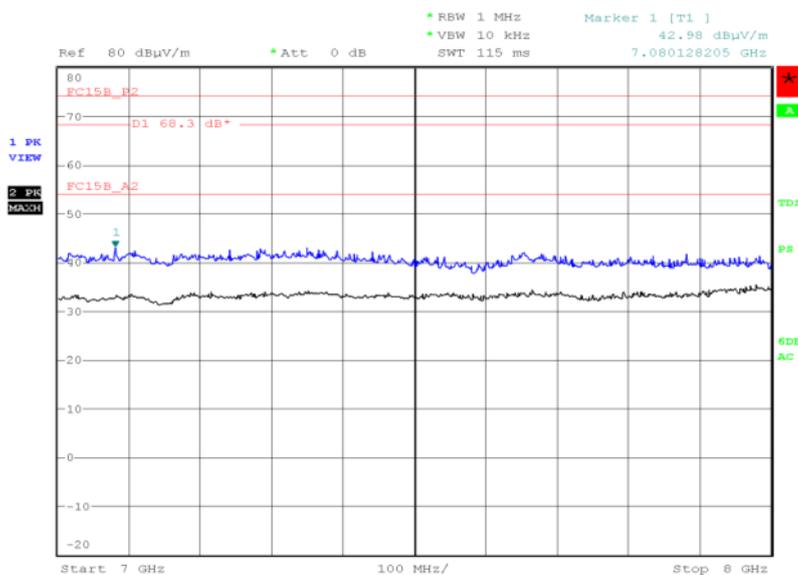
Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
11.340	Vertical	108	200	55.01	45.37

1 GHz to 7 GHz



Date: 14.APR.2013 17:03:27

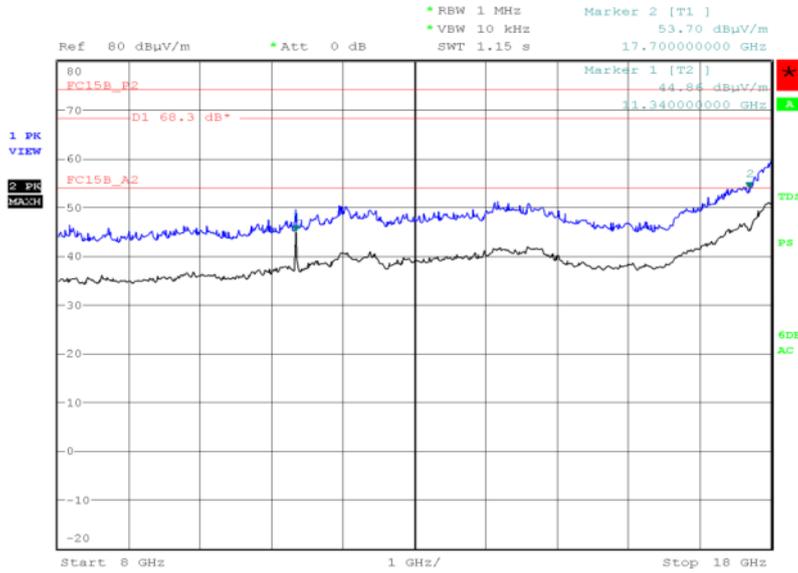
7 GHz to 8 GHz



Date: 15.APR.2013 21:55:13

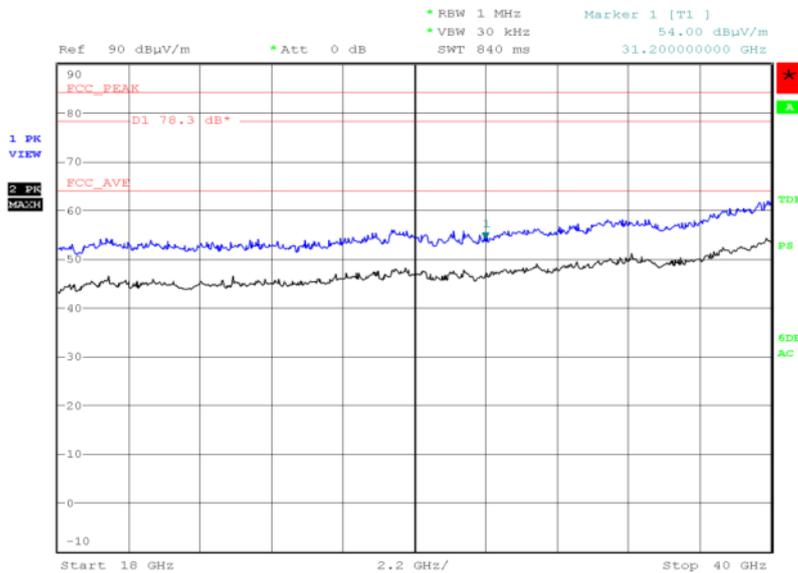


8 GHz to 18 GHz



Date: 16.APR.2013 21:16:59

18 GHz to 40 GHz



Date: 30.APR.2013 21:25:05

Limit

Peak (dBμV/m)	Average (dBμV/m)
74.0	54.0

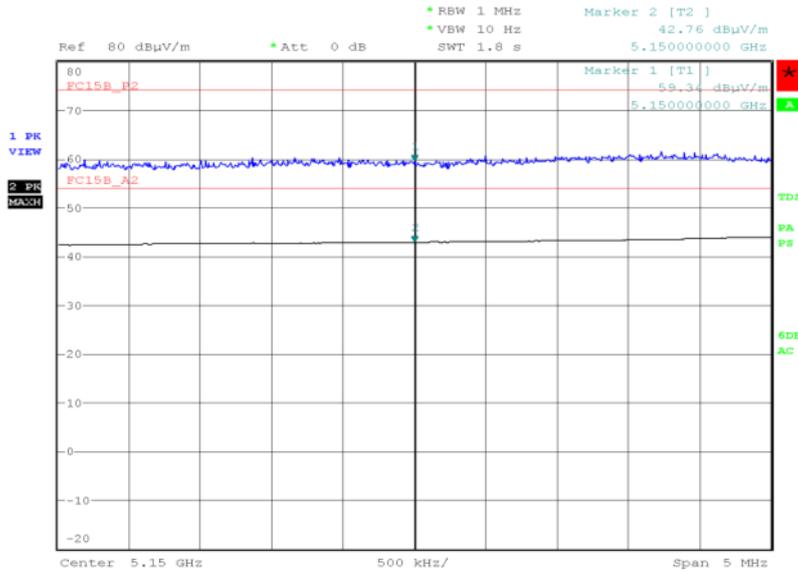


Product Service

Band Edge Emissions

5190 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	59.34	42.76

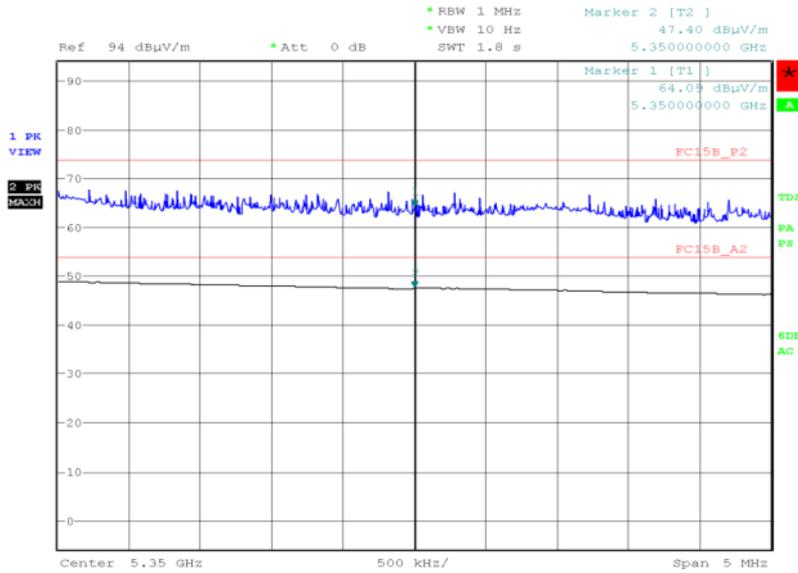


Date: 14.APR.2013 12:53:46



5310 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	64.09	47.40

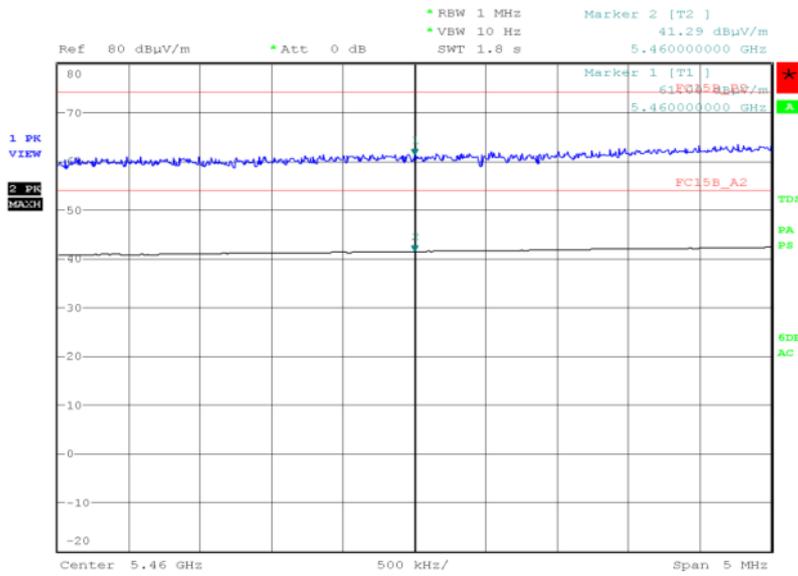


Date: 14.APR.2013 14:22:50



5510 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	61.00	41.29



Date: 14.APR.2013 15:50:26

Limit

Peak (dBµV/m)	Average (dBµV/m)
74.0	54.0



Product Service

## **2.4 FREQUENCY STABILITY**

### **2.4.1 Specification Reference**

FCC CFR 47 Part 15E, Clause 2.1055 and 15.407 (g)

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

205SH S/N: IMEI 004401114779164 - Modification State 0

### **2.4.3 Date of Test**

29 April 2013

### **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 EUT was set to transmit on maximum power with test model 1. In accordance with 2.1055, the temperature was varied from -30°C to +50° in 10° steps. Testing was performed on the middle channel only 2132.4MHz, Channel 1637.

### **2.4.6 Environmental Conditions**

Ambient Temperature	23.4°C
Relative Humidity	24.6%



Product Service

**2.4.7 Test Results**

802.11(a)

4.0 V DC Supply

Frequency Band 1

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)	
		5180 MHz	5240 MHz
-10°C	4.0 V DC	-0.278	-0.184
	3.7 V DC	-0.186	-0.092
0°C	4.0 V DC	-4.455	-4.312
	3.7 V DC	-4.362	-4.312
+10°C	4.0 V DC	-3.733	-6.881
	3.7 V DC	-5.847	-6.789
+20°C	4.0 V DC	-10.117	-10.459
	3.7 V DC	-10.302	-10.328
	4.0 V DC	-10.117	-10.328
-30°C	4.0 V DC	-11.849	-6.110
	3.7 V DC	-11.879	-11.835
+40°C	4.0 V DC	-11.694	-11.652
	3.7 V DC	-11.879	-11.652
+50°C	4.0 V DC	-10.488	-10.367
	3.7 V DC	-10.859	-10.367
+60°C	4.0 V DC	-7.982	-7.431
	3.7 V DC	-8.353	-7.707
Maximum Frequency Error (Hz)		-11.879	-11.835



Product Service

Frequency Band 2

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)	
		5260 MHz	5320 MHz
-10°C	4.0 V DC	-0.274	-0.180
	3.7 V DC	-0.274	-0.271
0°C	4.0 V DC	-4.204	-4.157
	3.7 V DC	-4.387	-4.247
+10°C	4.0 V DC	-6.855	-7.048
	3.7 V DC	-6.855	-7.048
+20°C	4.0 V DC	-10.419	-10.392
	3.7 V DC	-10.328	-10.302
	4.0 V DC	-10.419	-10.392
-30°C	4.0 V DC	-11.882	-11.838
	3.7 V DC	-11.882	-11.838
+40°C	4.0 V DC	-11.516	-11.477
	3.7 V DC	-11.608	-11.567
+50°C	4.0 V DC	-9.963	-9.669
	3.7 V DC	-10.154	-9.759
+60°C	4.0 V DC	-7.769	-7.951
	3.7 V DC	-7.769	-7.772
Maximum Frequency Error (Hz)		-11.882	-11.838



Product Service

Frequency Band 3

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)	
		5500 MHz	5700 MHz
-10°C	4.0 V DC	-0.349	-0.253
	3.7 V DC	-0.349	-0.253
0°C	4.0 V DC	-4.201	-3.964
	3.7 V DC	-4.159	-4.048
+10°C	4.0 V DC	-6.447	-7.001
	3.7 V DC	-6.906	-7.001
+20°C	4.0 V DC	-10.402	-10.290
	3.7 V DC	-10.314	-10.205
	4.0 V DC	-10.402	-10.290
-30°C	4.0 V DC	-11.888	-11.808
	3.7 V DC	-11.801	-11.808
+40°C	4.0 V DC	-11.720	-11.555
	3.7 V DC	-11.538	-11.555
+50°C	4.0 V DC	-9.790	-9.699
	3.7 V DC	-9.965	-9.790
+60°C	4.0 V DC	-7.779	-7.591
	3.7 V DC	-7.954	-7.844
Maximum Frequency Error (Hz)		-11.888	-11.808

Limit

Maintained within the band of operation under all conditions of normal operations as specified in the user's manual.
--



Product Service

**2.5 26 dB BANDWIDTH****2.5.1 Specification Reference**

FCC CFR 47 Part 15E, Clause 15.407 (a)

**2.5.2 Equipment Under Test and Modification State**

205SH S/N: IMEI 004401114779164 - Modification State 0

**2.5.3 Date of Test**

22 April 2013

**2.5.4 Test Equipment Used**

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

**2.5.5 Test Procedure**

The EUT was transmitted at maximum power via an attenuator and cable to the Spectrum Analyser. The Analyser settings were adjusted to display the resultant trace on screen and a resolution bandwidth and video bandwidth were set appropriately to perform the measurement correctly.

**2.5.6 Environmental Conditions**

Ambient Temperature	22.7 - 25.1°C
Relative Humidity	30.4 - 36.2%



Product Service

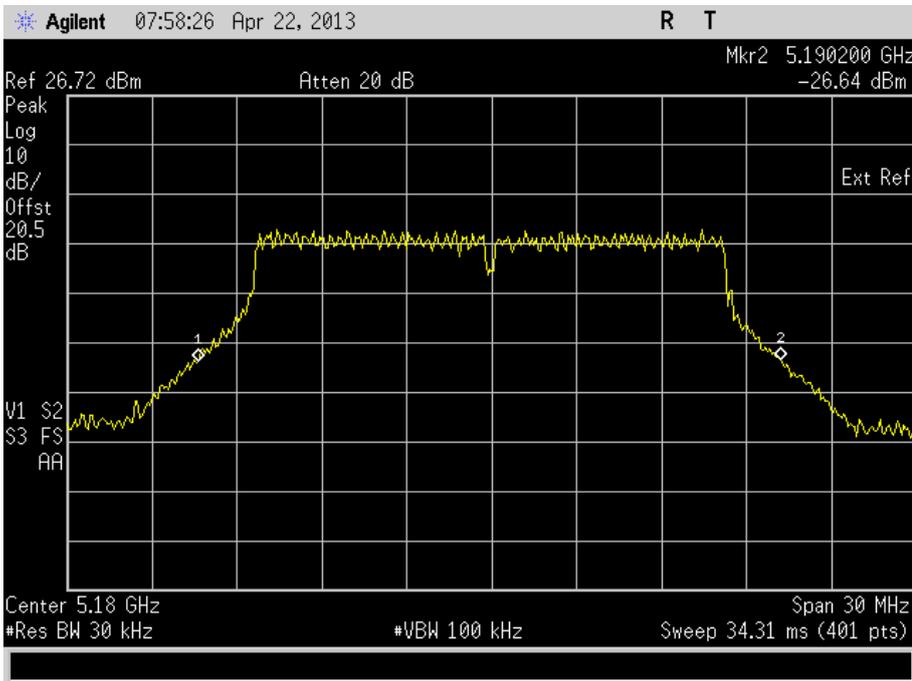
2.5.7 Test Results

802.11(a)

Frequency Band 1

5180 MHz

26 dB Bandwidth (MHz)	20550
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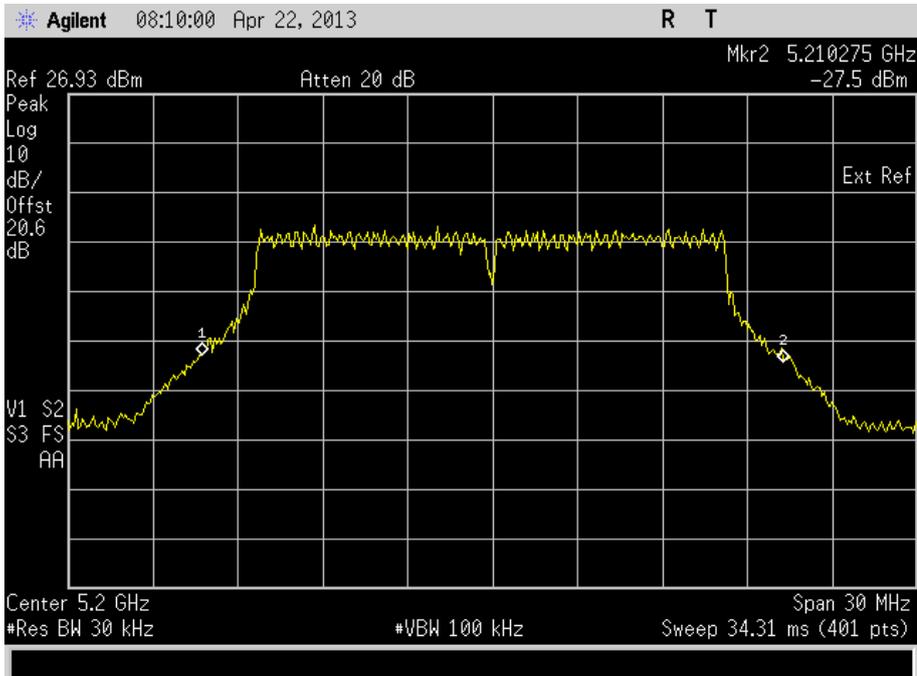




Product Service

5200 MHz

26 dB Bandwidth (MHz)	20550
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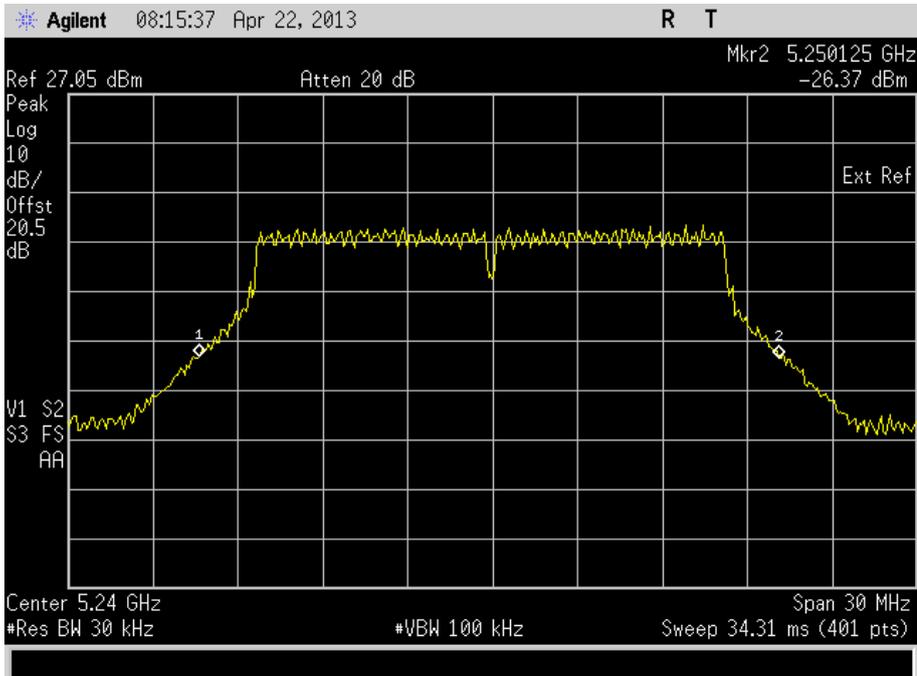




Product Service

5240 MHz

26 dB Bandwidth (MHz)	20475
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The test was performed on the worst case data rate for 802.11(a) modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 9 Mbps.

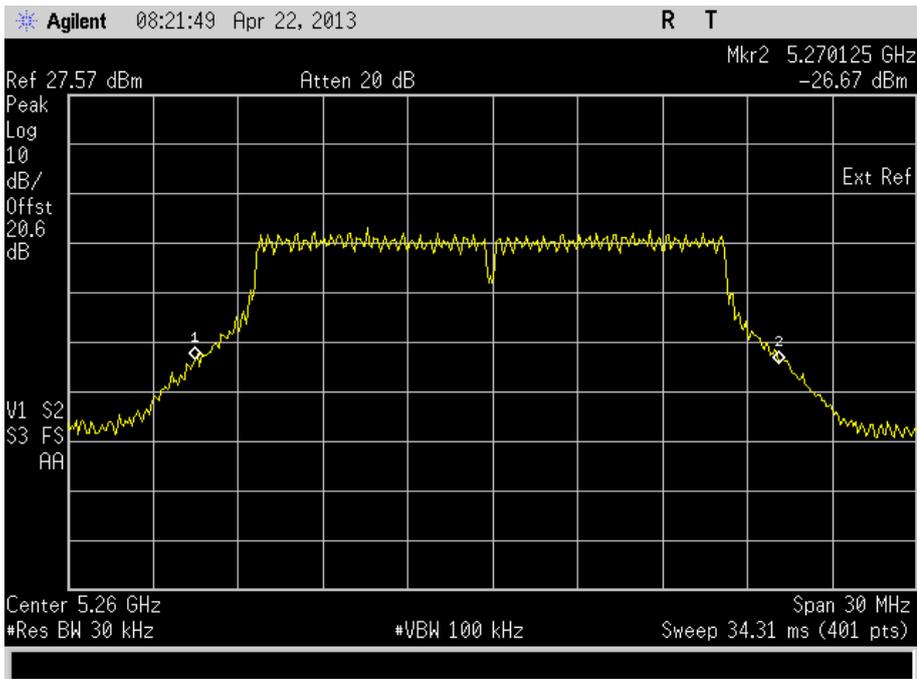


Product Service

Frequency Band 2

5260 MHz

26 dB Bandwidth (MHz)	20625
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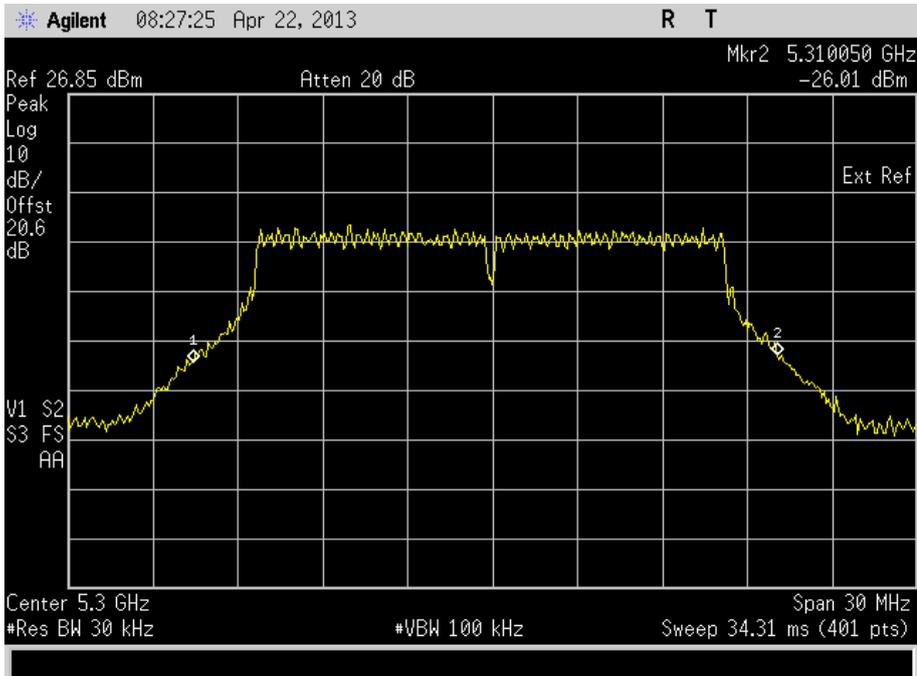




Product Service

5300 MHz

26 dB Bandwidth (MHz)	20625
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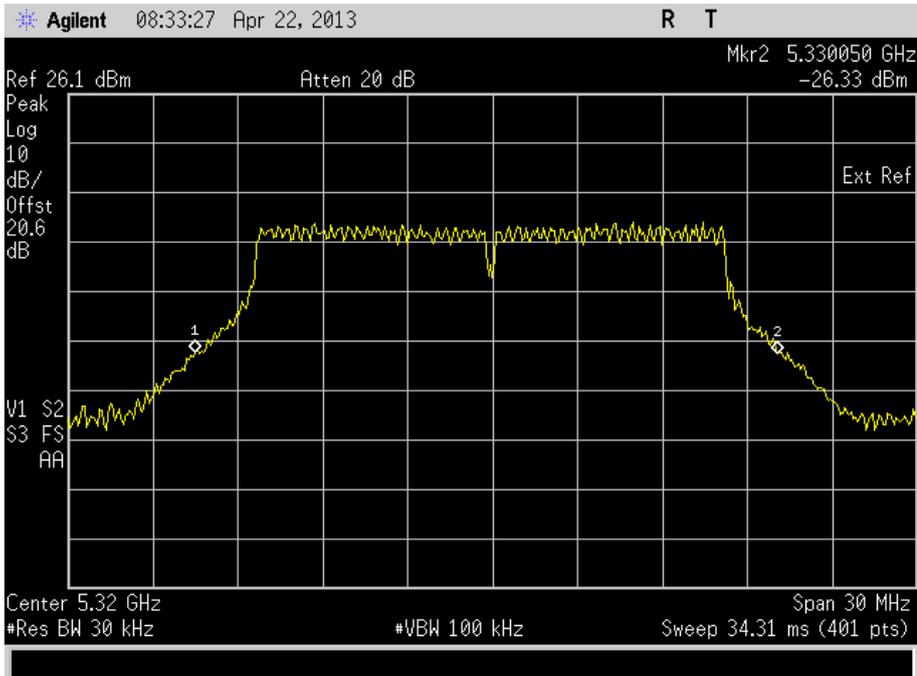




Product Service

5320 MHz

26 dB Bandwidth (MHz)	20550
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The test was performed on the worst case data rate for 802.11(a) modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 9 Mbps.

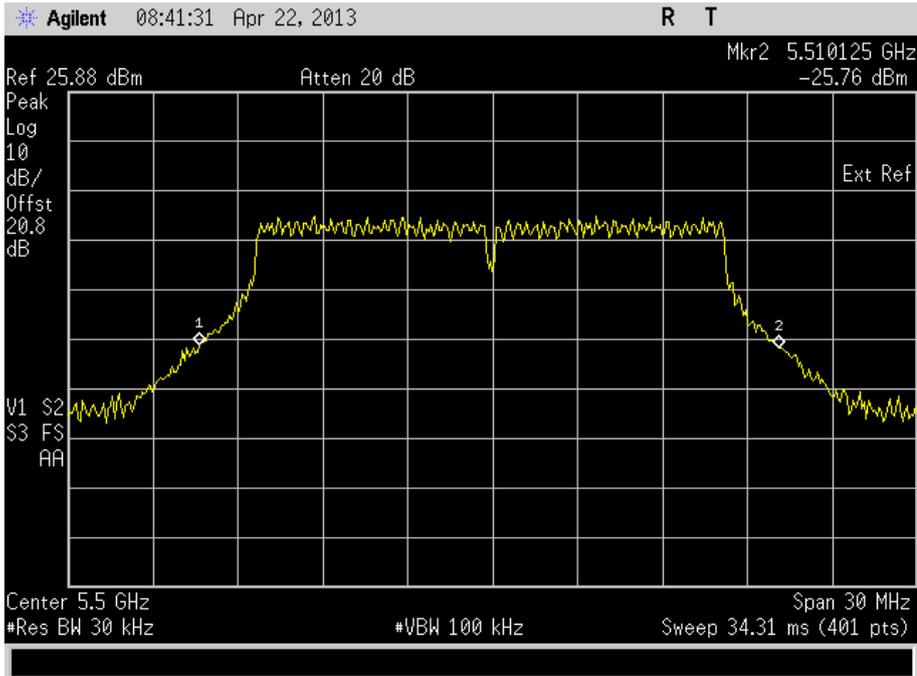


Product Service

Frequency Band 3

5500 MHz

26 dB Bandwidth (MHz)	20475
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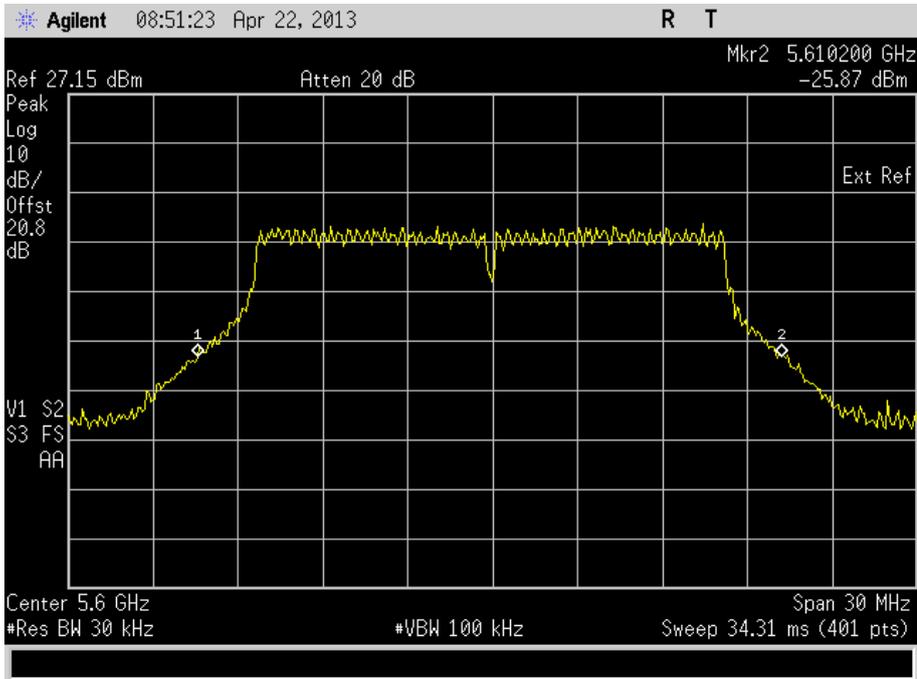




Product Service

5600 MHz

26 dB Bandwidth (MHz)	20625
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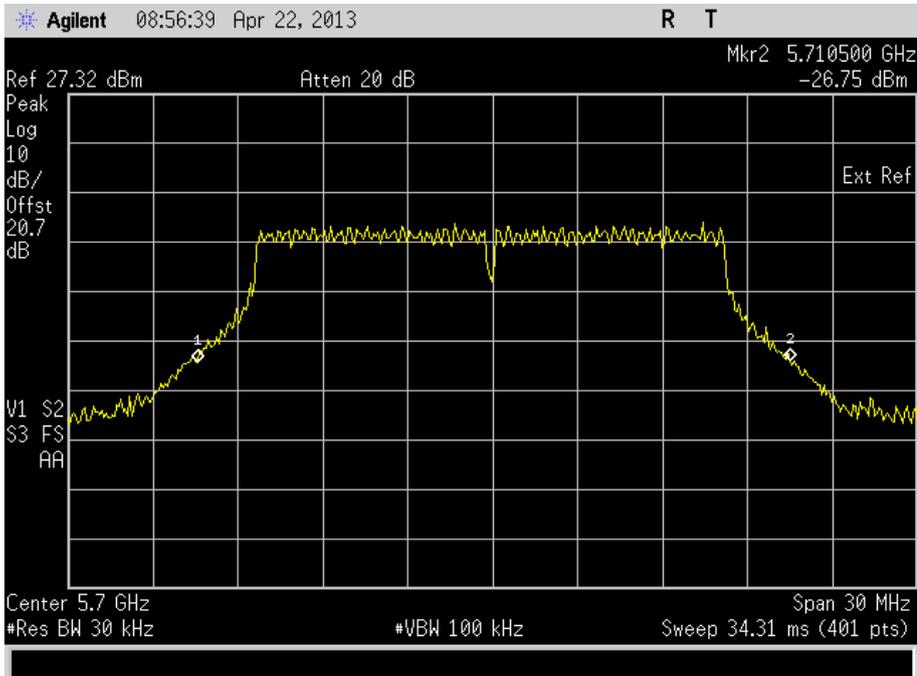




Product Service

5700 MHz

26 dB Bandwidth (MHz)	20925
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The test was performed on the worst case data rate for 802.11(a) modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 9 Mbps.

Limit

Not specified.



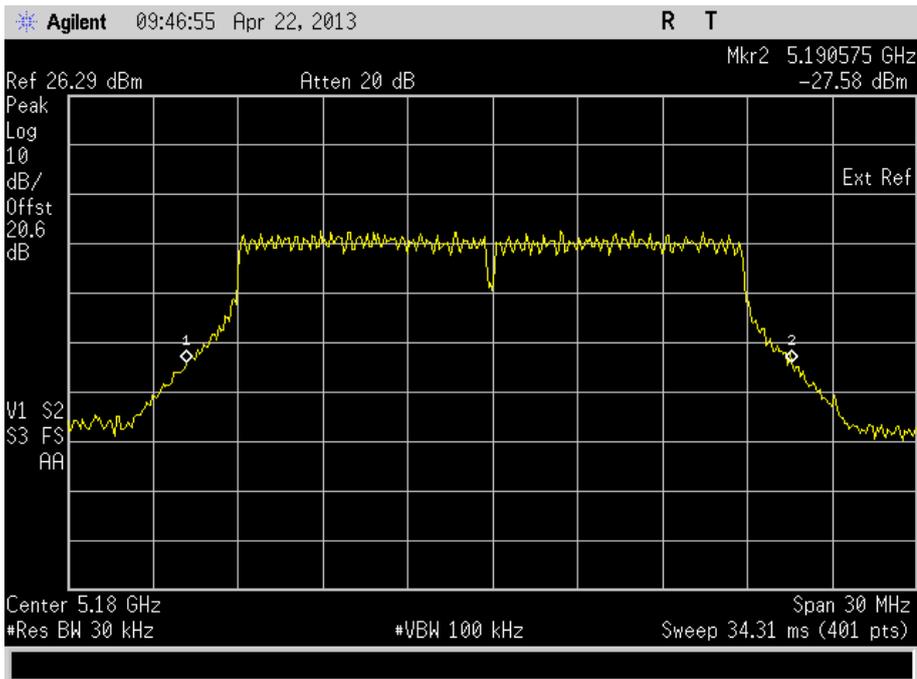
Product Service

802.11(n) FCC - 5 GHz 20 MHz BW

Frequency Band 1

5180 MHz

26 dB Bandwidth (MHz)	21375
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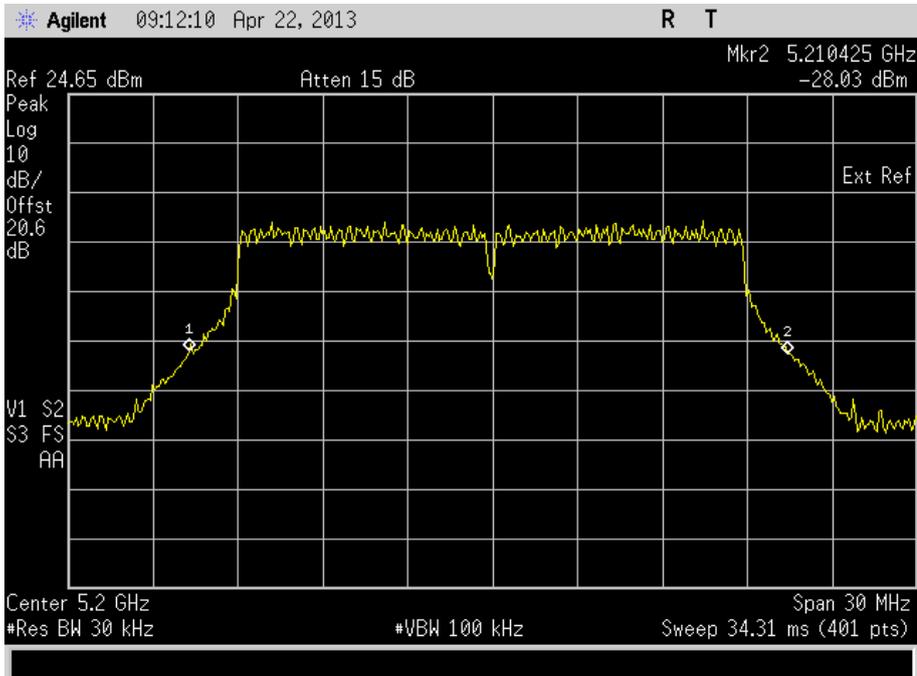




Product Service

5200 MHz

26 dB Bandwidth (MHz)	21150
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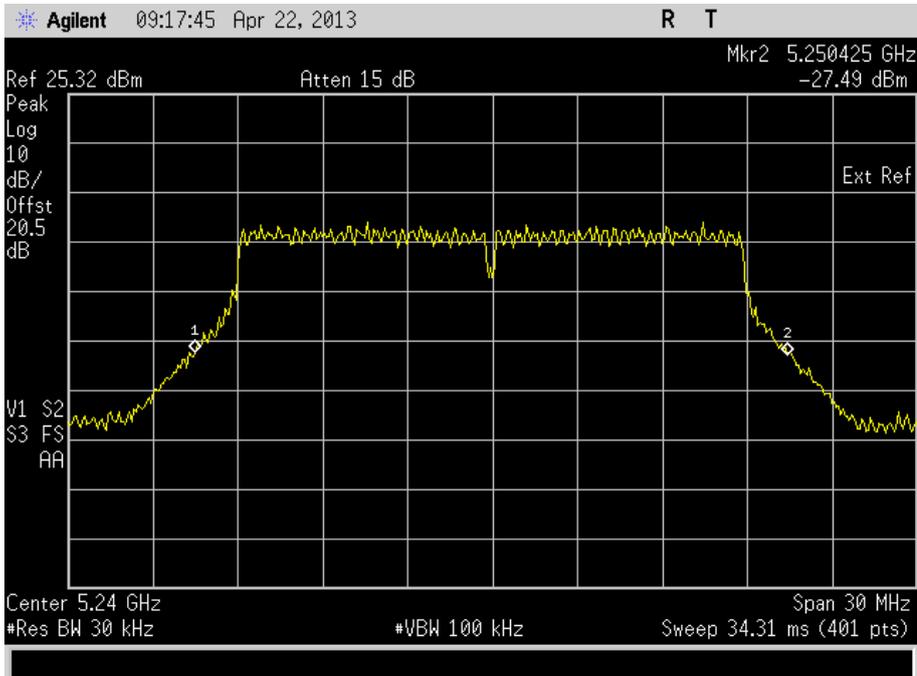




Product Service

5240 MHz

26 dB Bandwidth (MHz)	20925
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The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 6.5 Mbps.

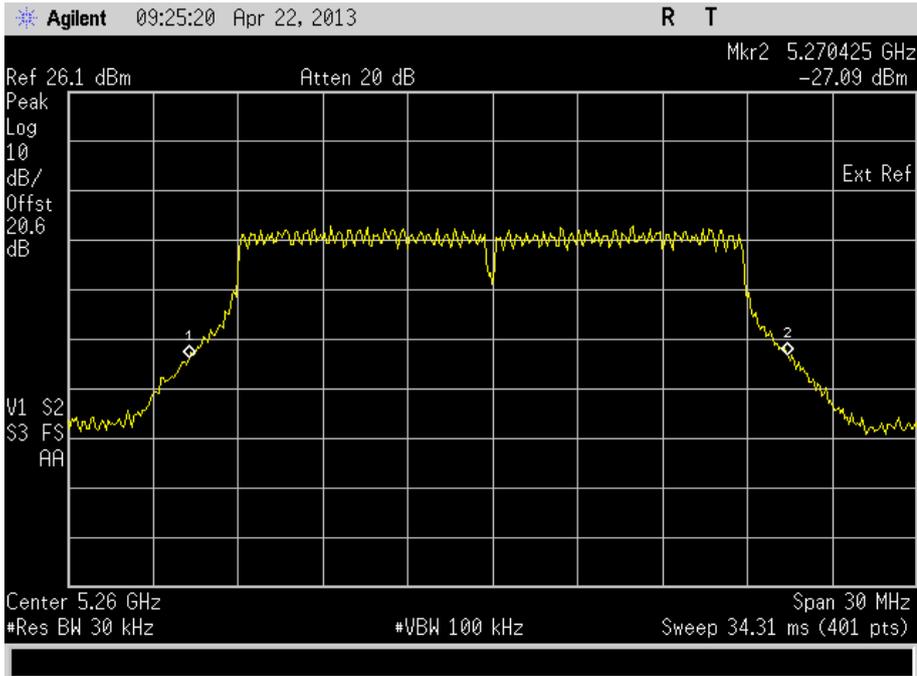


Product Service

Frequency Band 2

5260 MHz

26 dB Bandwidth (MHz)	21150
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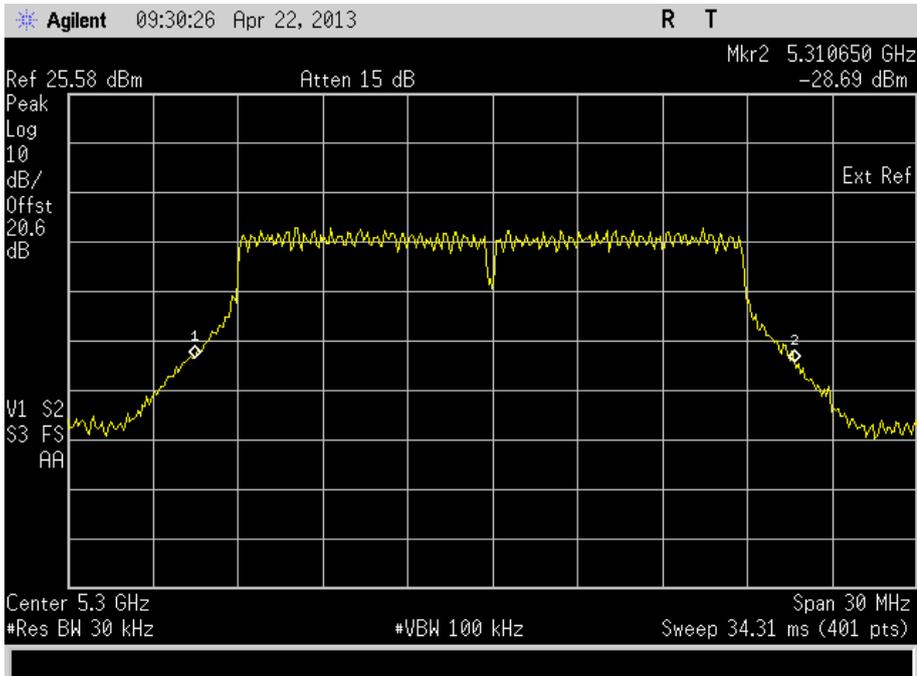




Product Service

5300 MHz

26 dB Bandwidth (MHz)	21150
-----------------------	-------

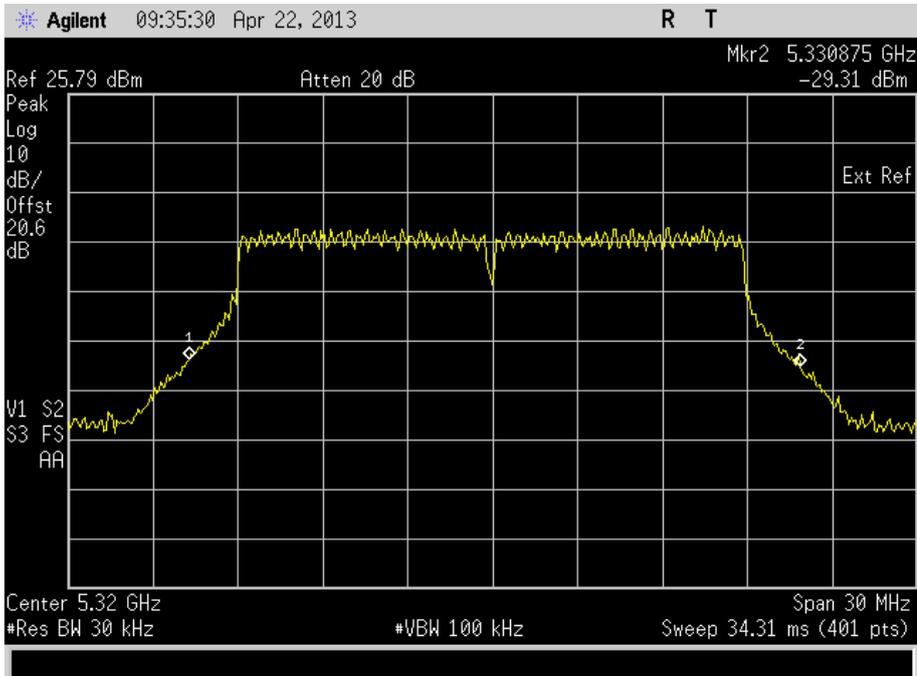




Product Service

5320 MHz

26 dB Bandwidth (MHz)	21600
-----------------------	-------



The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 6.5 Mbps.

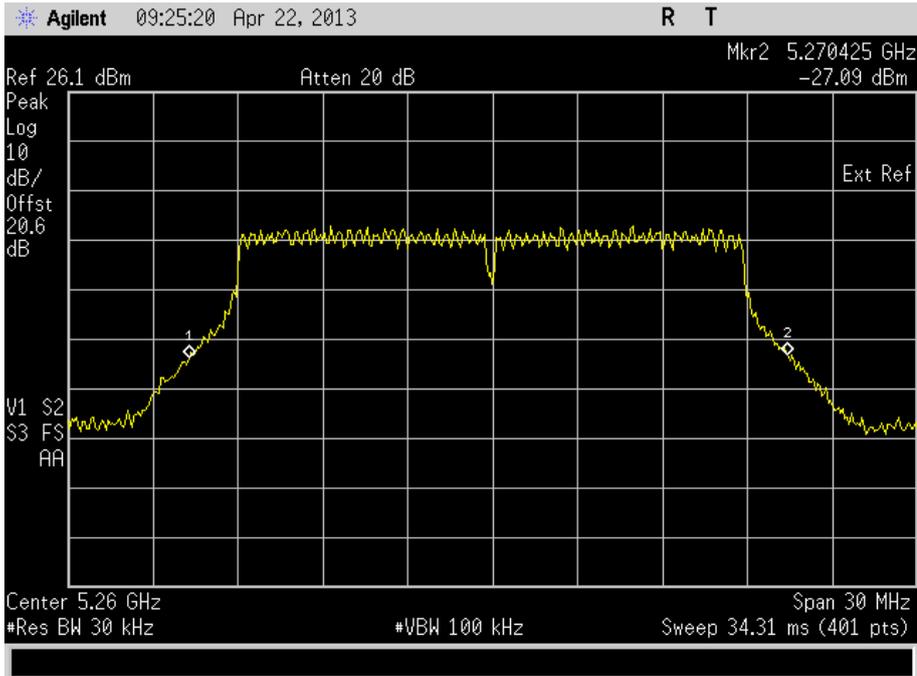


Product Service

Frequency Band 3

5500 MHz

26 dB Bandwidth (MHz)	21300
-----------------------	-------

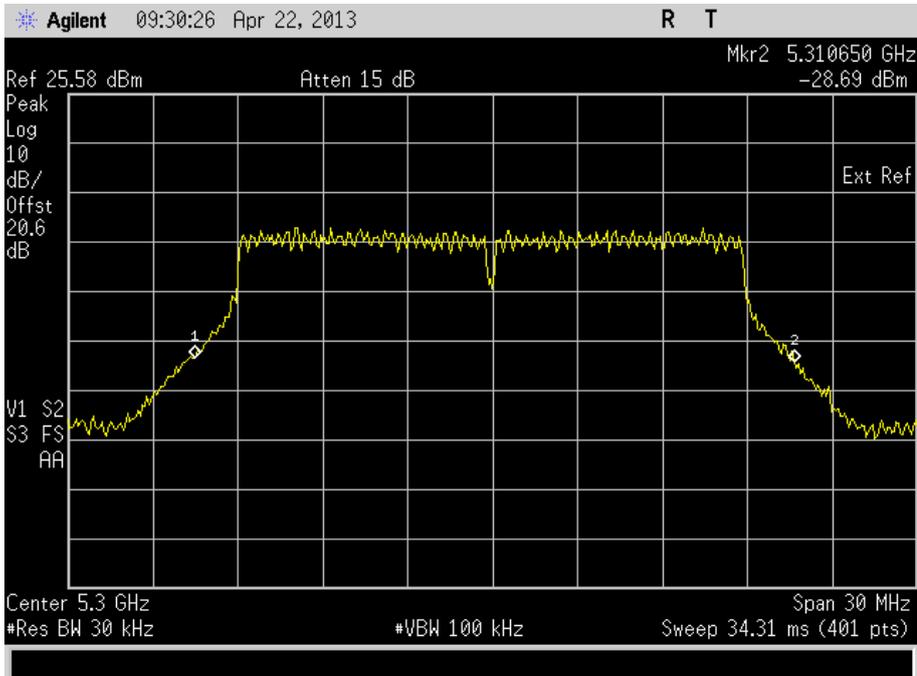




Product Service

5600 MHz

26 dB Bandwidth (MHz)	21525
-----------------------	-------

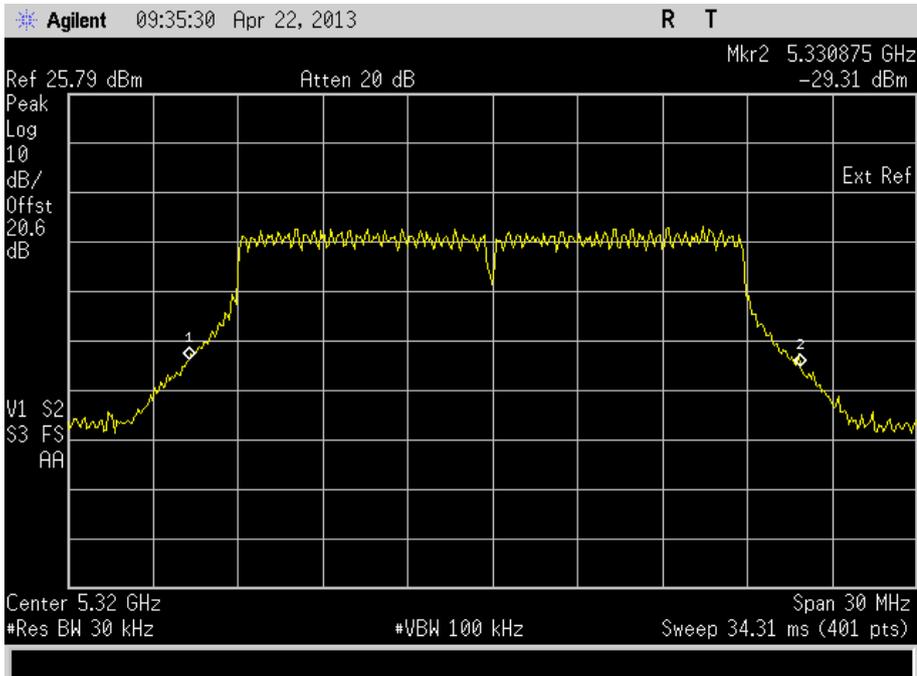




Product Service

5700 MHz

26 dB Bandwidth (MHz)	21150
-----------------------	-------



The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 6.5 Mbps.

Limit

Not specified.



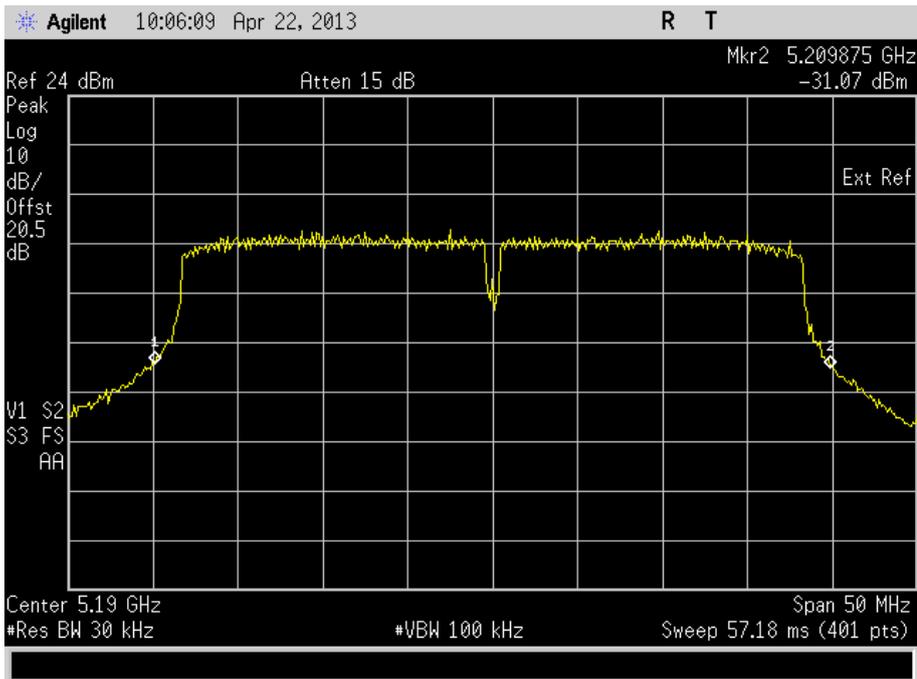
Product Service

802.11(n) FCC - 5 GHz 40 MHz BW

Frequency Band 1

5190 MHz

26 dB Bandwidth (MHz)	39750
-----------------------	-------

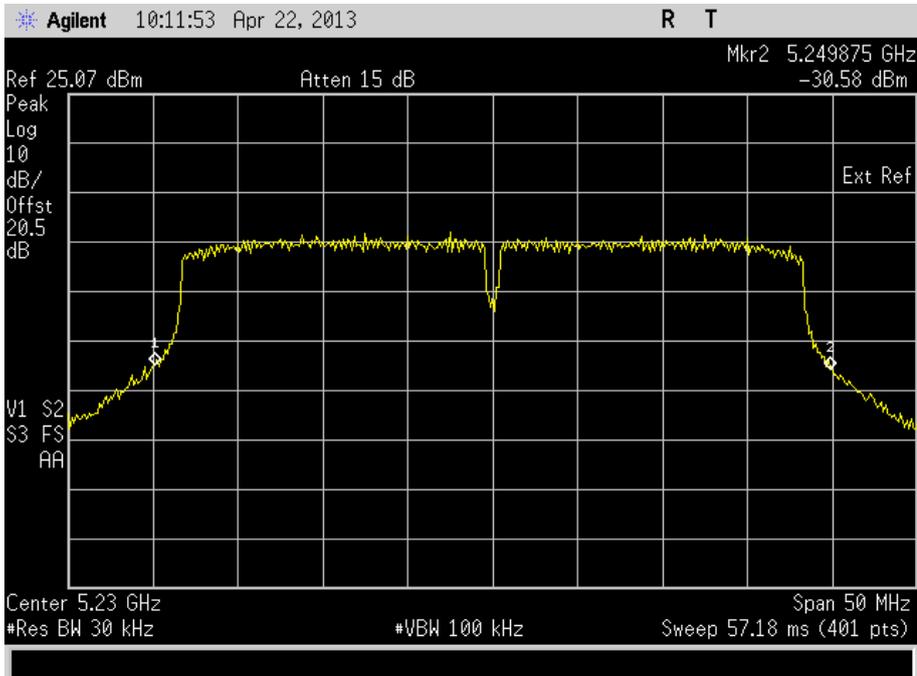




Product Service

5230 MHz

26 dB Bandwidth (MHz)	39750
-----------------------	-------



The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 27 Mbps.

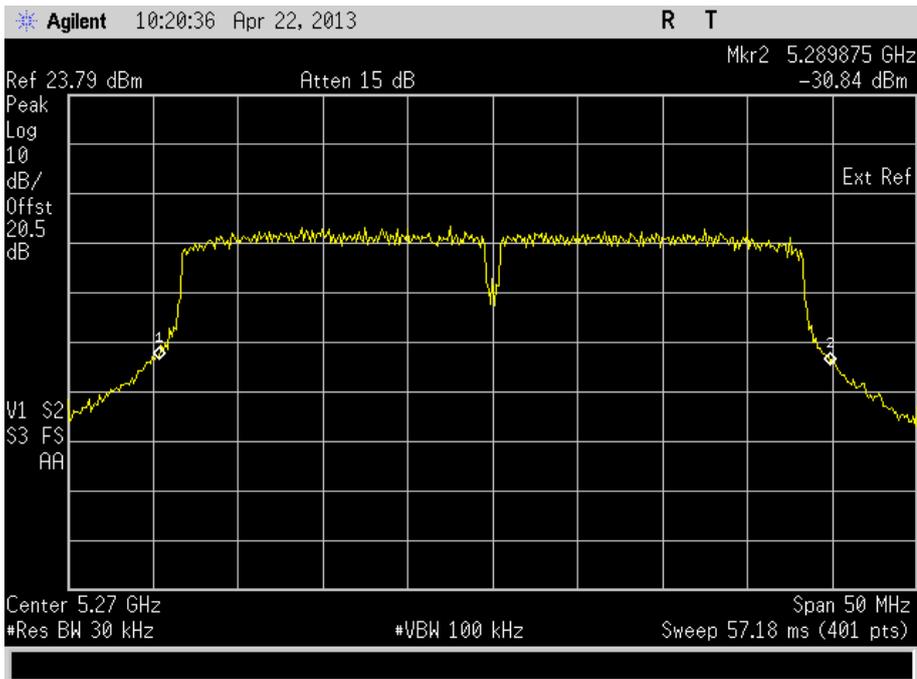


Product Service

Frequency Band 2

5270 MHz

26 dB Bandwidth (MHz)	39500
-----------------------	-------

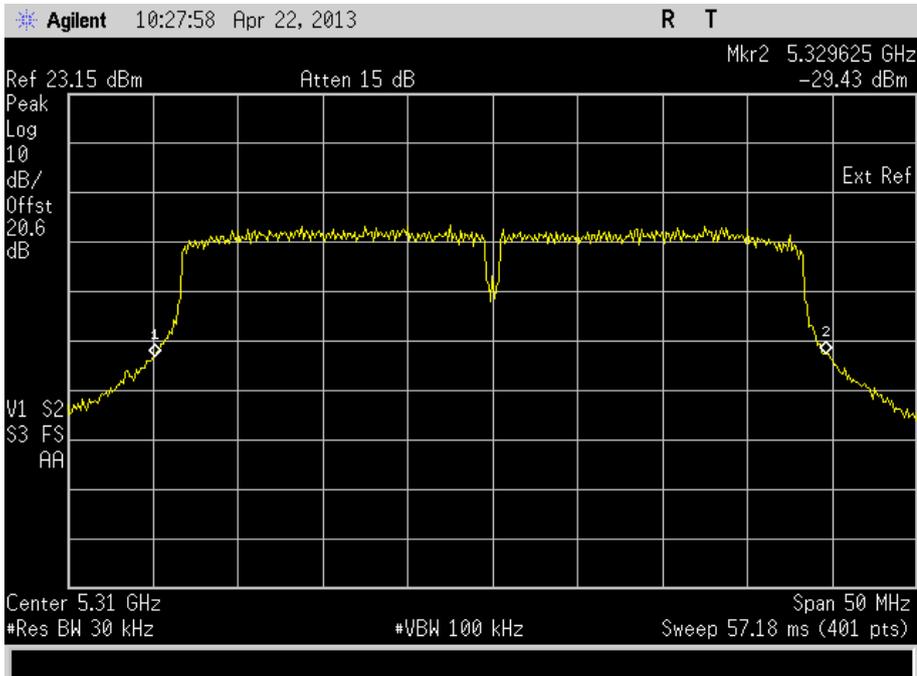




Product Service

5310 MHz

26 dB Bandwidth (MHz)	39500
-----------------------	-------



The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 27 Mbps.

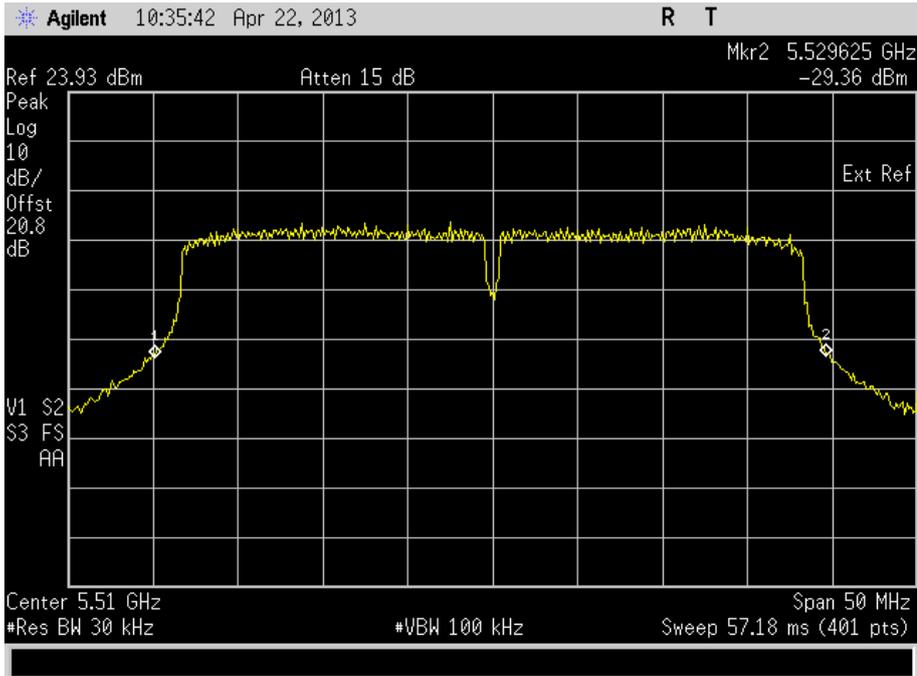


Product Service

Frequency Band 3

5510 MHz

26 dB Bandwidth (MHz)	39500
-----------------------	-------

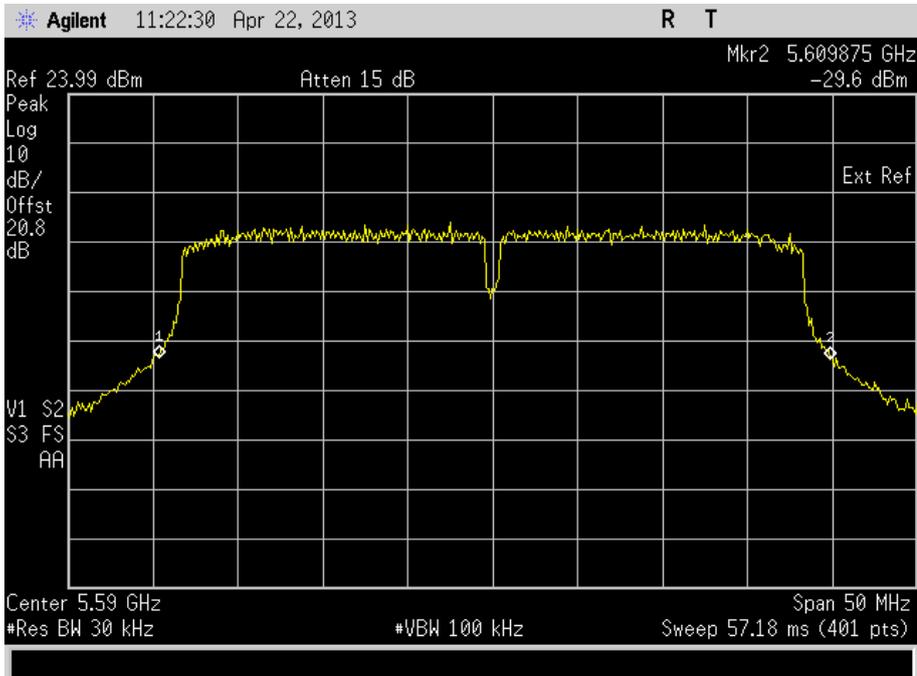




Product Service

5590 MHz

26 dB Bandwidth (MHz)	39500
-----------------------	-------

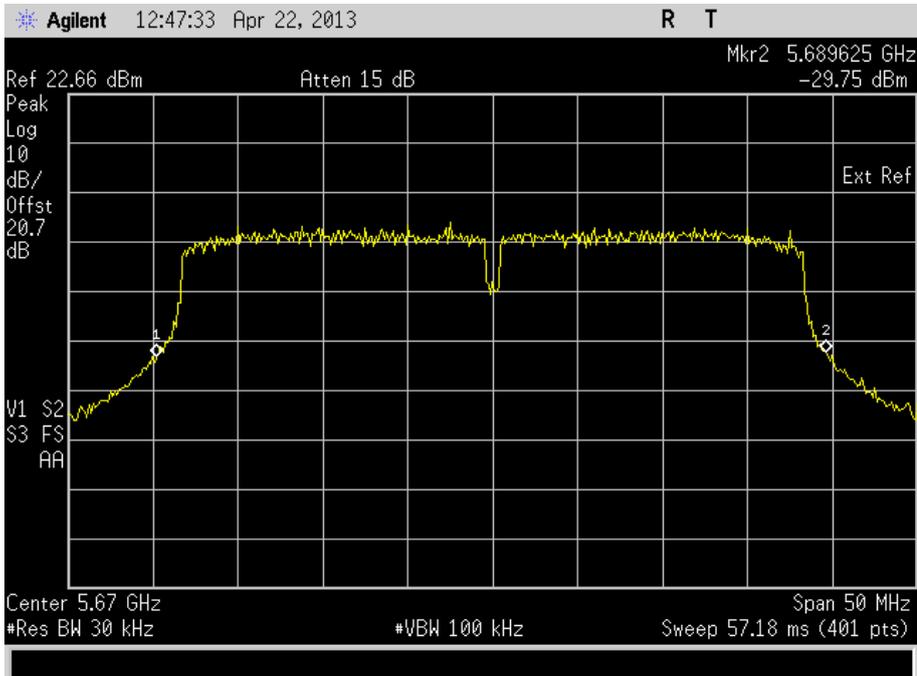




Product Service

5670 MHz

26 dB Bandwidth (MHz)	39375
-----------------------	-------



The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 27 Mbps.

Limit

Not specified.



Product Service

## **2.6 PEAK POWER SPECTRAL DENSITY**

### **2.6.1 Specification Reference**

FCC CFR 47 Part 15E, Clause 15.407 (a)(5)

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

205SH S/N: IMEI 004401114779164 - Modification State 0

### **2.6.3 Date of Test**

22 April 2013 & 23 April 2013

### **2.6.4 Test Equipment Used**

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

### **2.6.5 Test Procedure**

The EUT was transmitted at maximum power via an attenuator and cable to the Spectrum Analyser. The Analyser settings were adjusted to display the resultant trace on screen. The resolution bandwidth and video bandwidth were set to 3 kHz and 10 kHz respectively. The trace was set to Max Hold and the peak of the level was measured.

### **2.6.6 Environmental Conditions**

Ambient Temperature	22.6 - 25.4°C
Relative Humidity	30.4 - 37.8%



Product Service

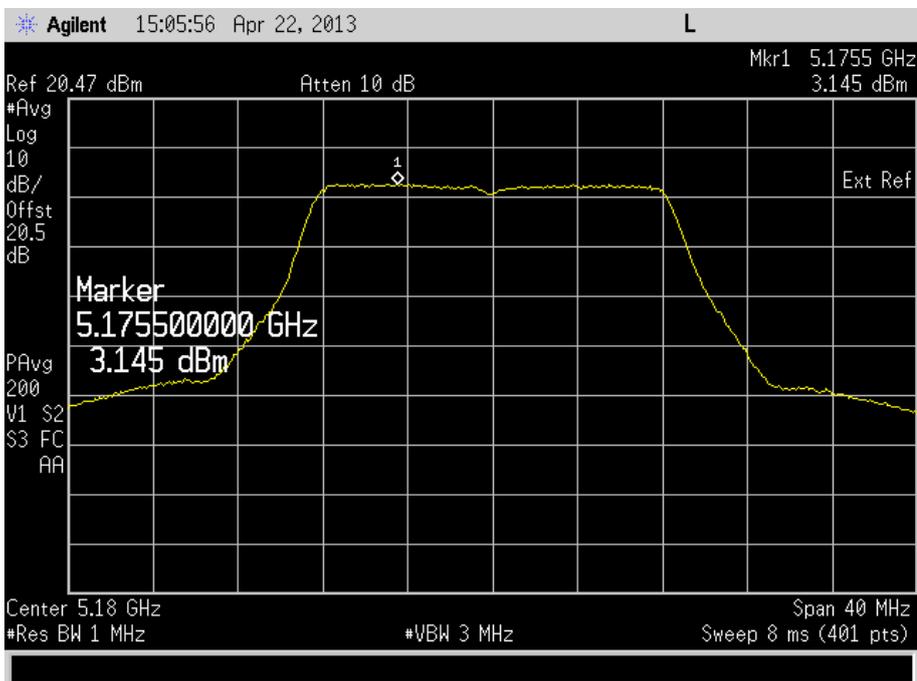
2.6.7 Test Results

802.11(a)

Frequency Band 1

5180 MHz

Peak Power Spectral Density (dBm)	3.145
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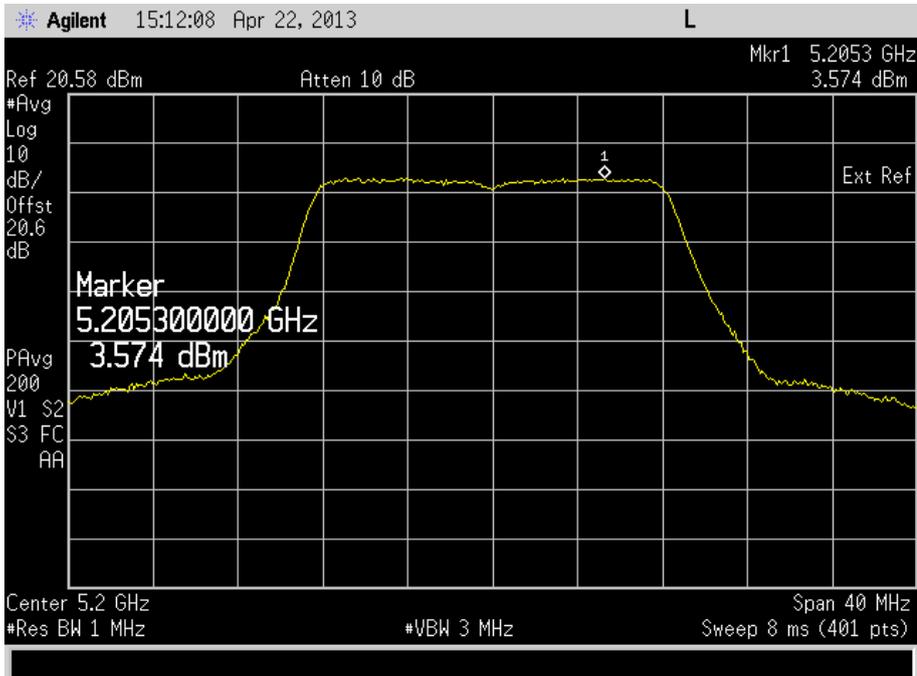




Product Service

5200 MHz

Peak Power Spectral Density (dBm)	3.574
-----------------------------------	-------

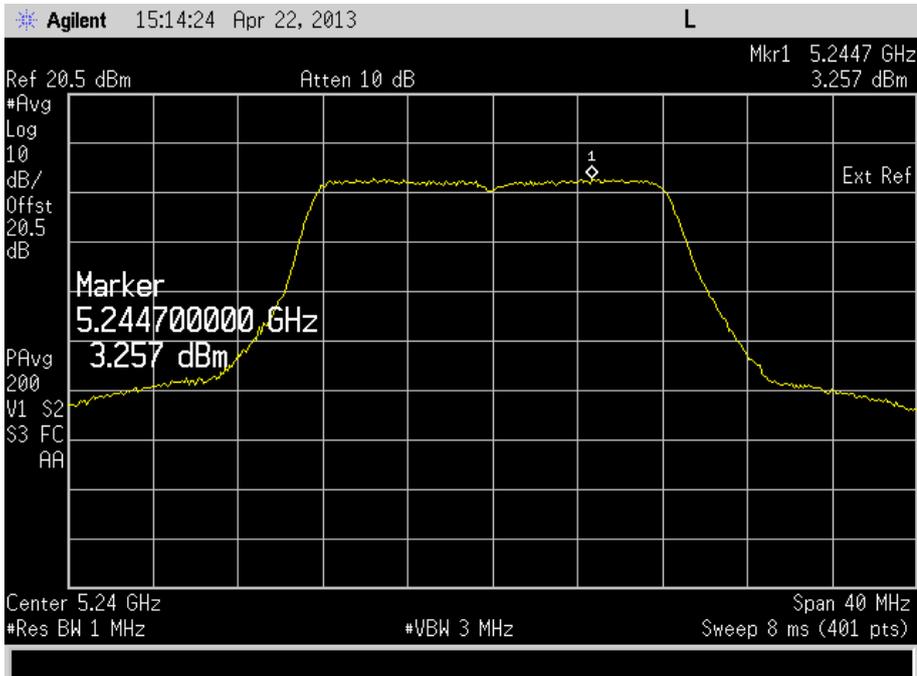




Product Service

5240 MHz

Peak Power Spectral Density (dBm)	3.257
-----------------------------------	-------



The test was performed on the worst case data rate for 802.11(a) modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 9 Mbps.

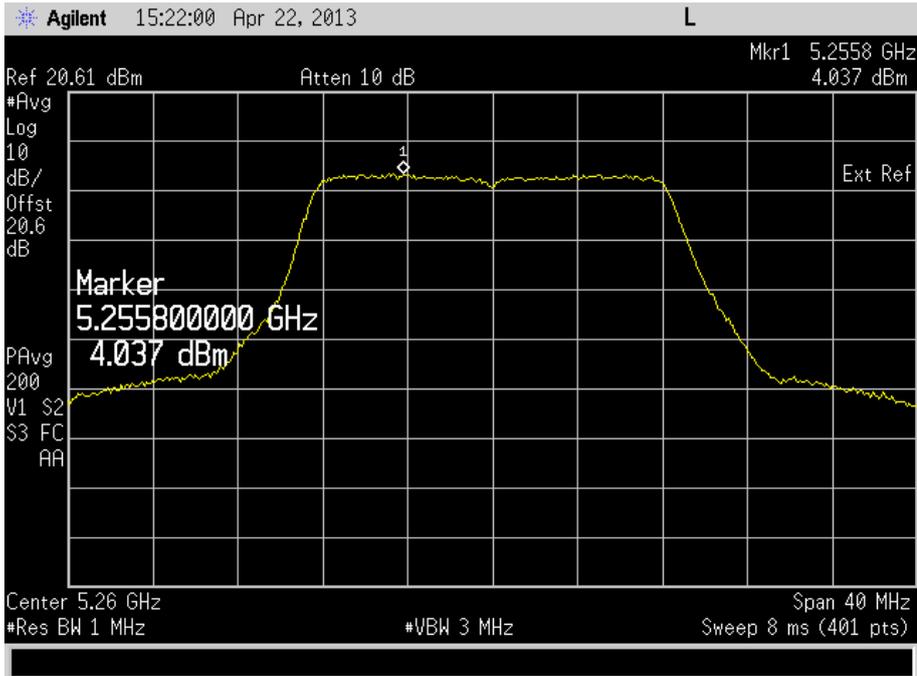


Product Service

Frequency Band 2

5260 MHz

Peak Power Spectral Density (dBm)	4.037
-----------------------------------	-------

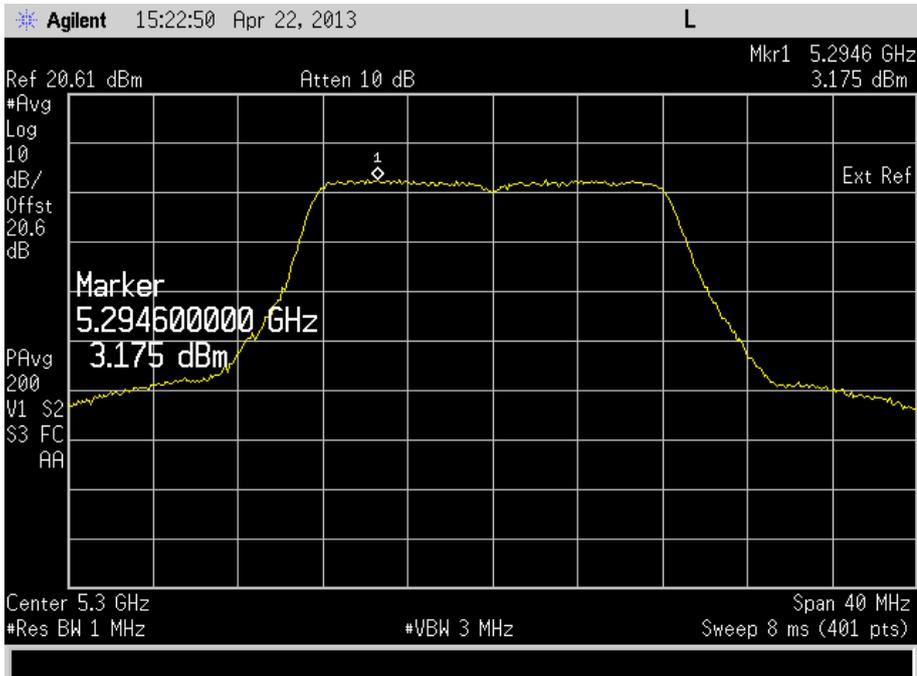




Product Service

5300 MHz

Peak Power Spectral Density (dBm)	3.175
-----------------------------------	-------

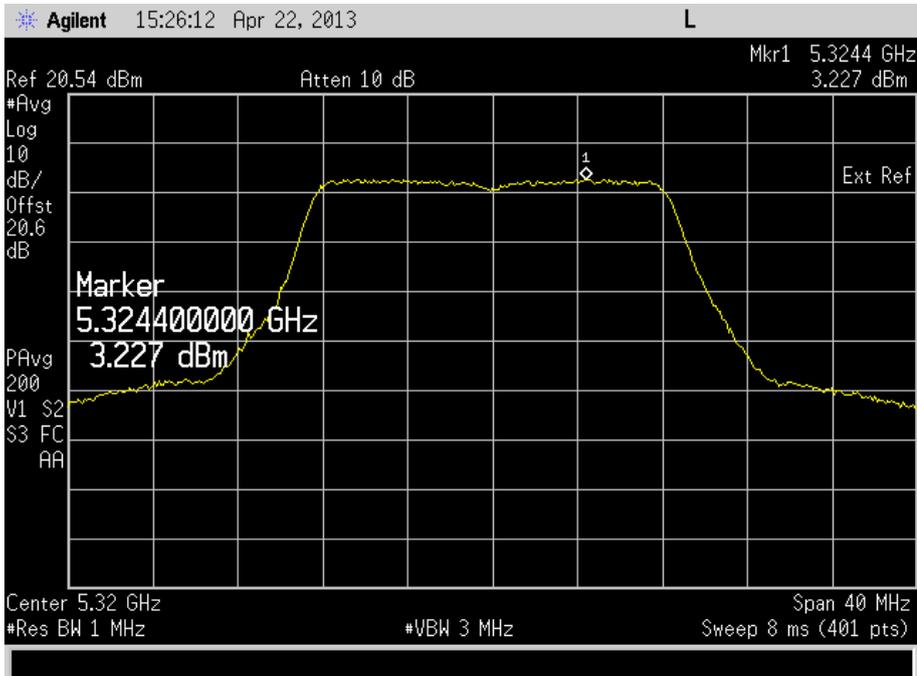




Product Service

5320 MHz

Peak Power Spectral Density (dBm)	3.227
-----------------------------------	-------



The test was performed on the worst case data rate for 802.11(a) modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 9 Mbps.

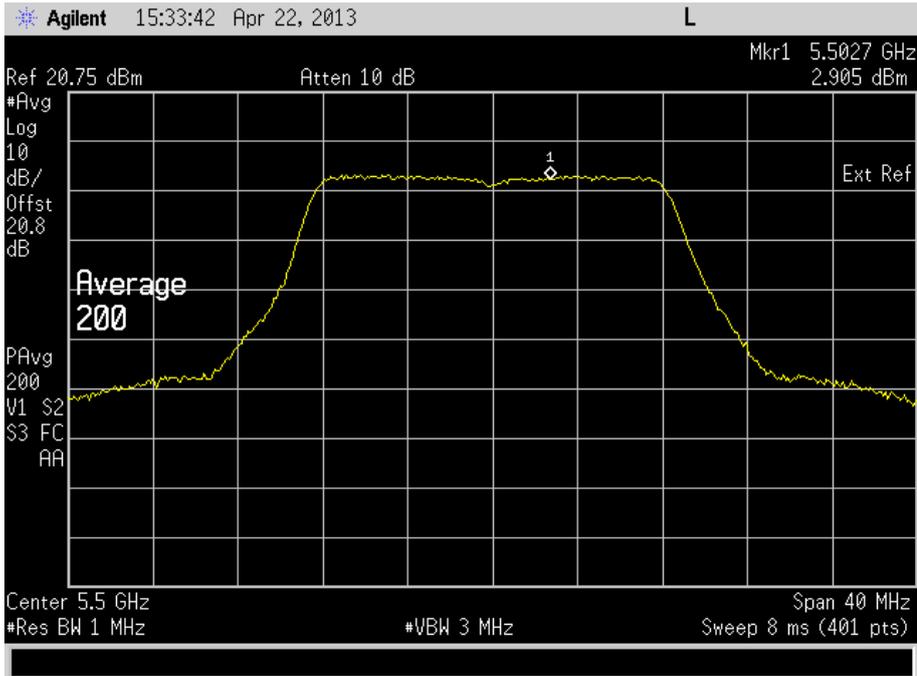


Product Service

Frequency Band 3

5500 MHz

Peak Power Spectral Density (dBm)	2.905
-----------------------------------	-------

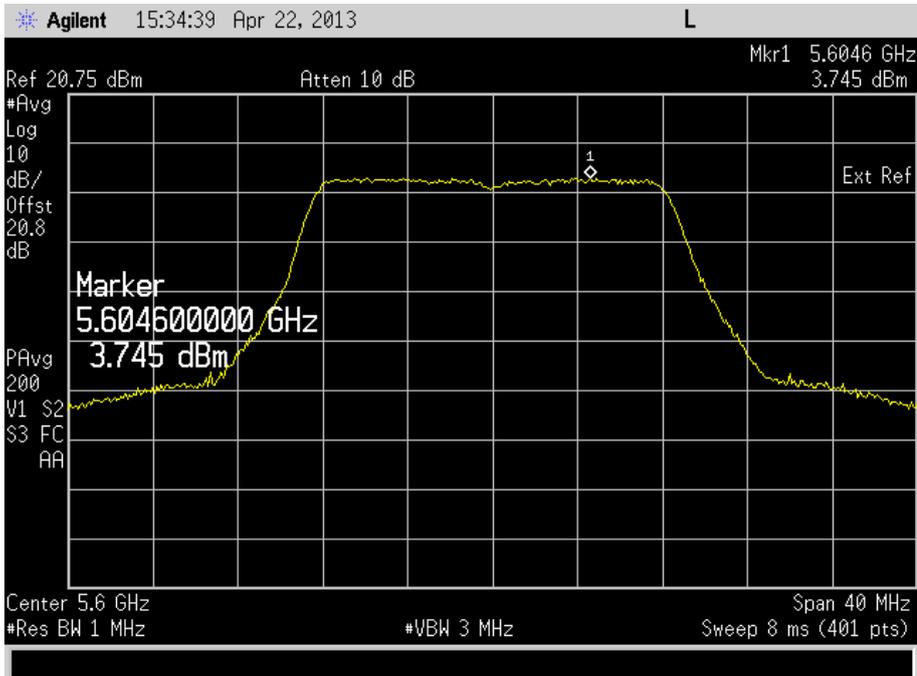




Product Service

5600 MHz

Peak Power Spectral Density (dBm)	3.745
-----------------------------------	-------

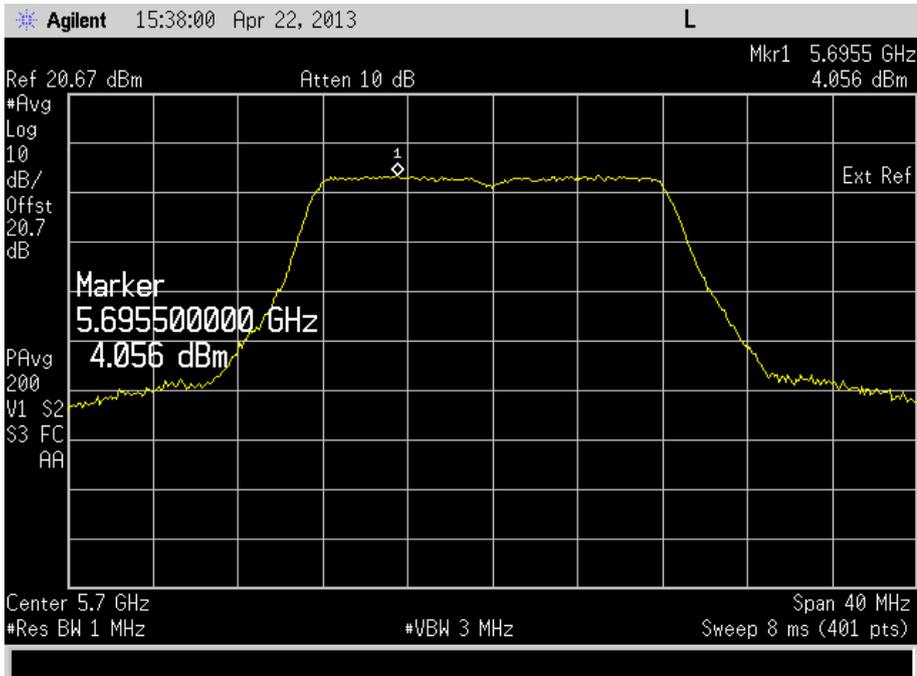




Product Service

5700 MHz

Peak Power Spectral Density (dBm)	4.056
-----------------------------------	-------



The test was performed on the worst case data rate for 802.11(a) modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 9 Mbps.

Limit

Frequency Band (MHz)	FCC Limit	IC Limit
5150 to 5250	<4 dBm / 1 MHz	<10 dBm / 1 MHz
5250 to 5350	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5470 to 5725	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5725 to 5825	<17 dBm / 1 MHz	<17 dBm / 1 MHz



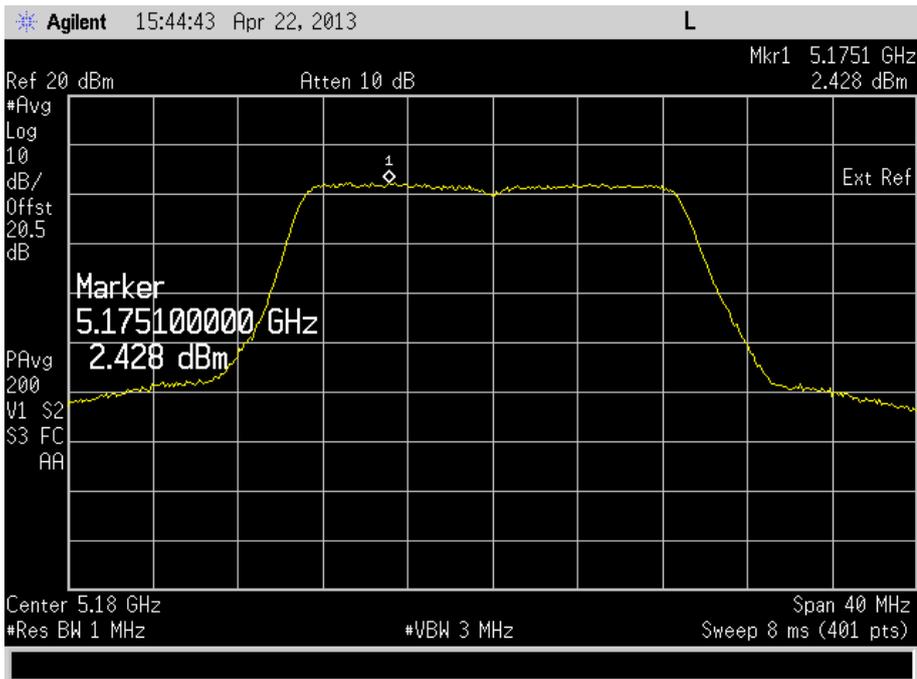
Product Service

802.11(n) FCC - 5 GHz 20 MHz BW

Frequency Band 1

5180 MHz

Peak Power Spectral Density (dBm)	2.428
-----------------------------------	-------

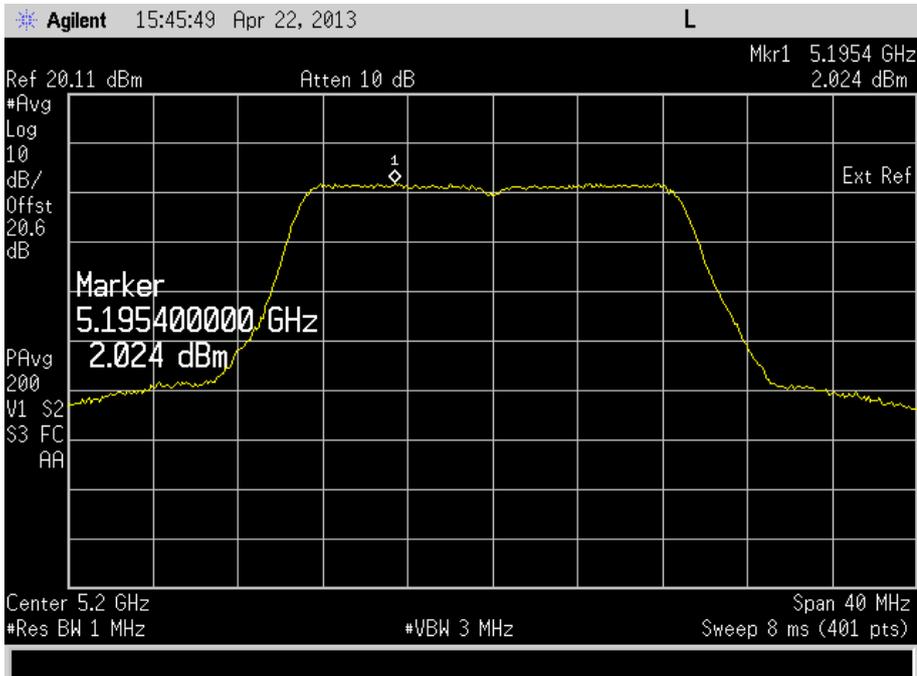




Product Service

5200 MHz

Peak Power Spectral Density (dBm)	2.024
-----------------------------------	-------

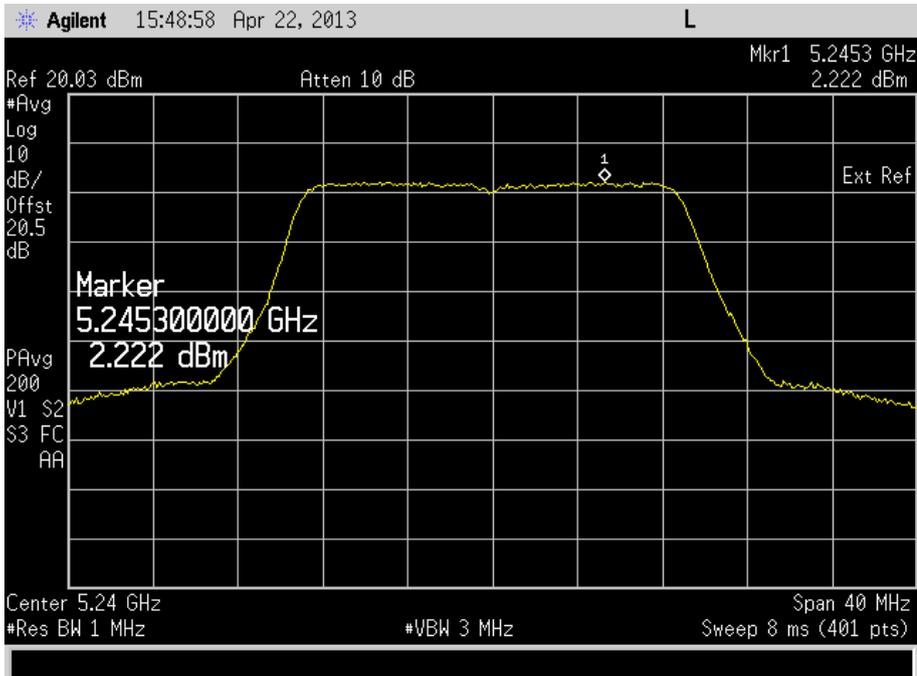




Product Service

5240 MHz

Peak Power Spectral Density (dBm)	2.222
-----------------------------------	-------



The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 6.5 Mbps.

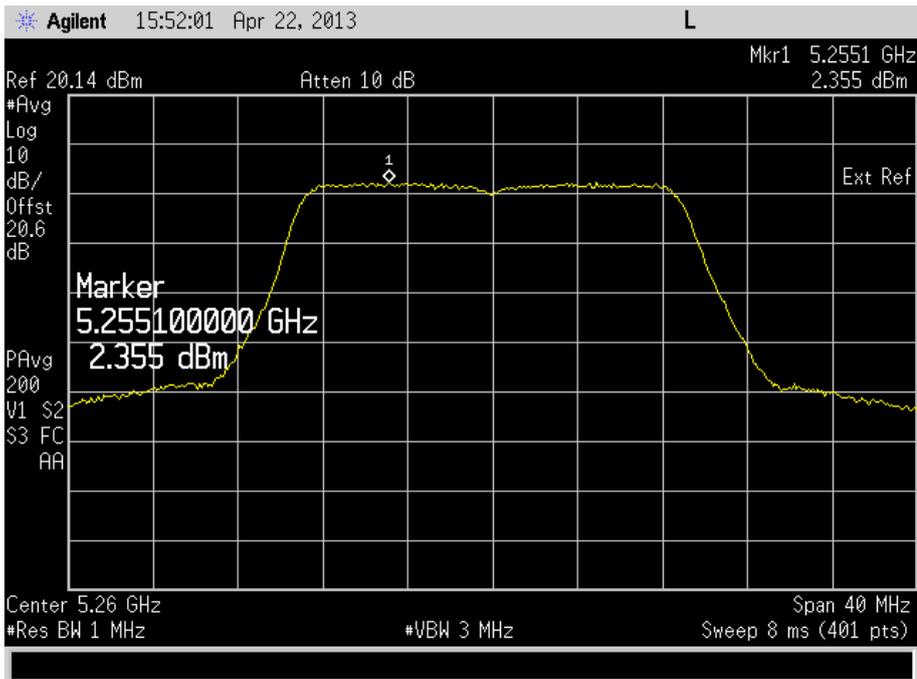


Product Service

Frequency Band 2

5260 MHz

Peak Power Spectral Density (dBm)	2.355
-----------------------------------	-------

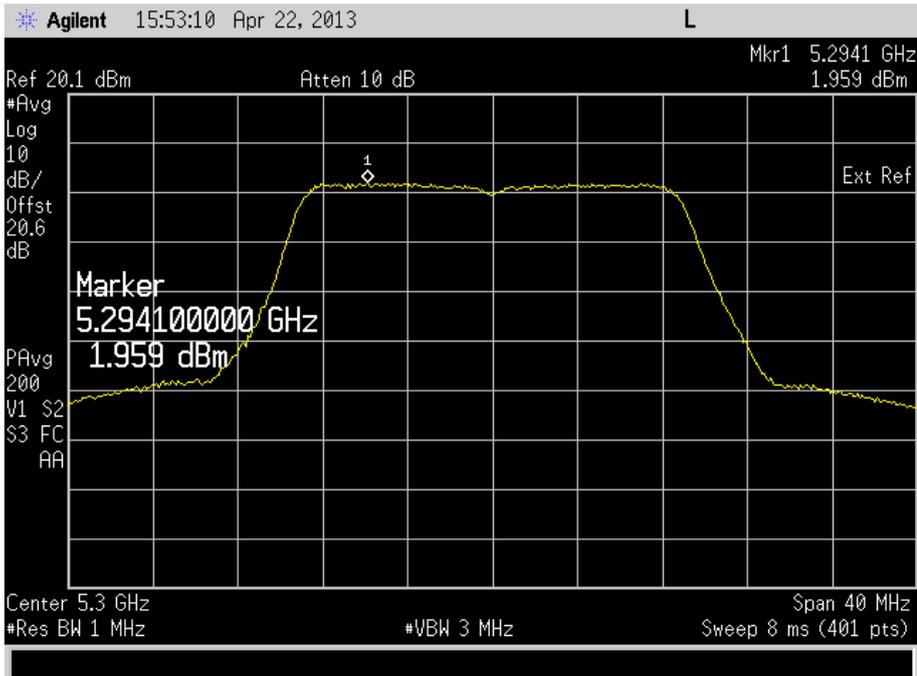




Product Service

5300 MHz

Peak Power Spectral Density (dBm)	1.959
-----------------------------------	-------

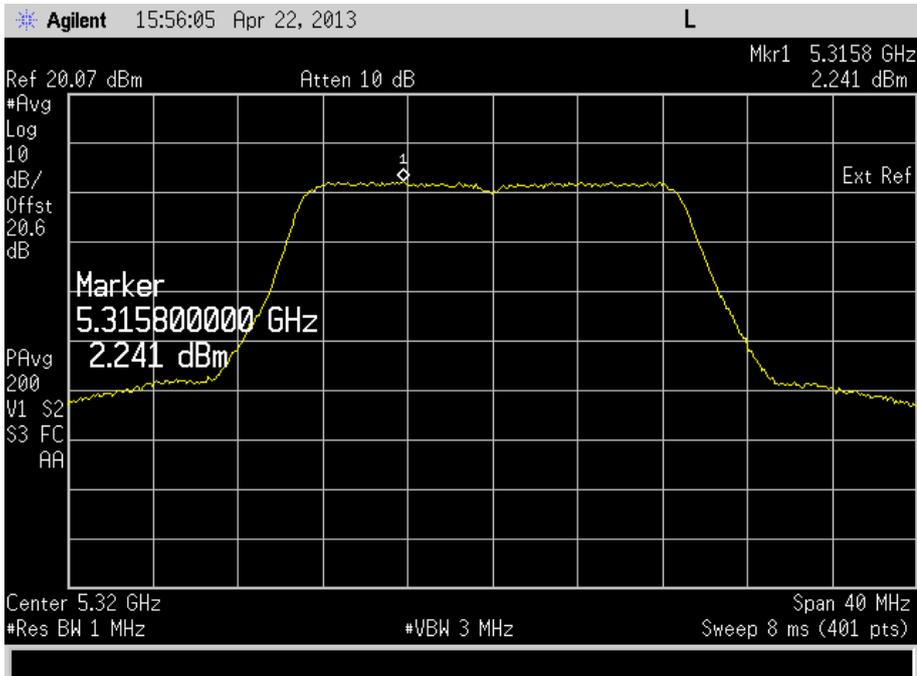




Product Service

5320 MHz

Peak Power Spectral Density (dBm)	2.241
-----------------------------------	-------



The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 6.5 Mbps.

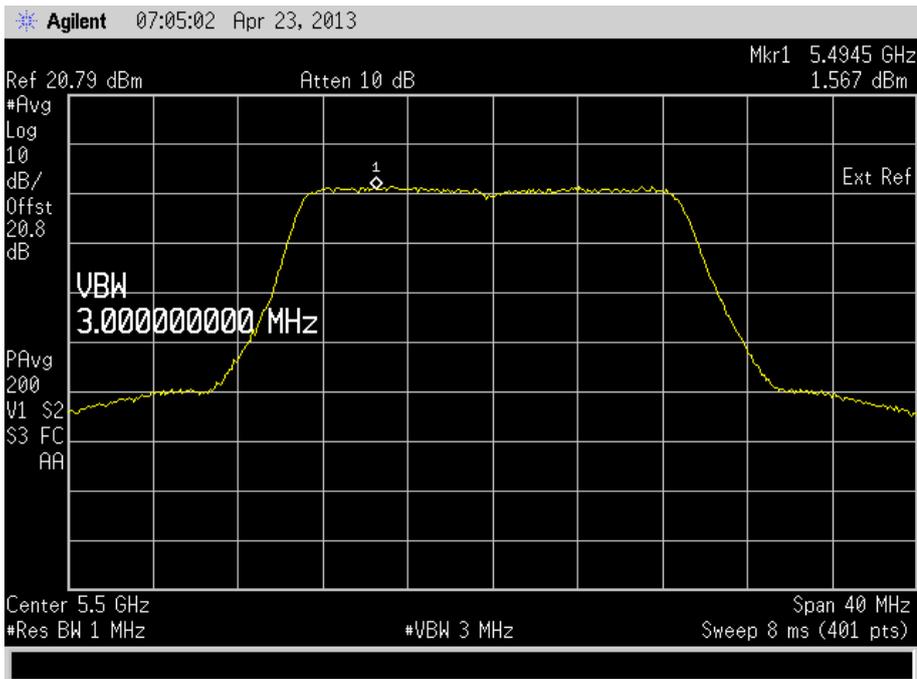


Product Service

Frequency Band 3

5500 MHz

Peak Power Spectral Density (dBm)	1.567
-----------------------------------	-------

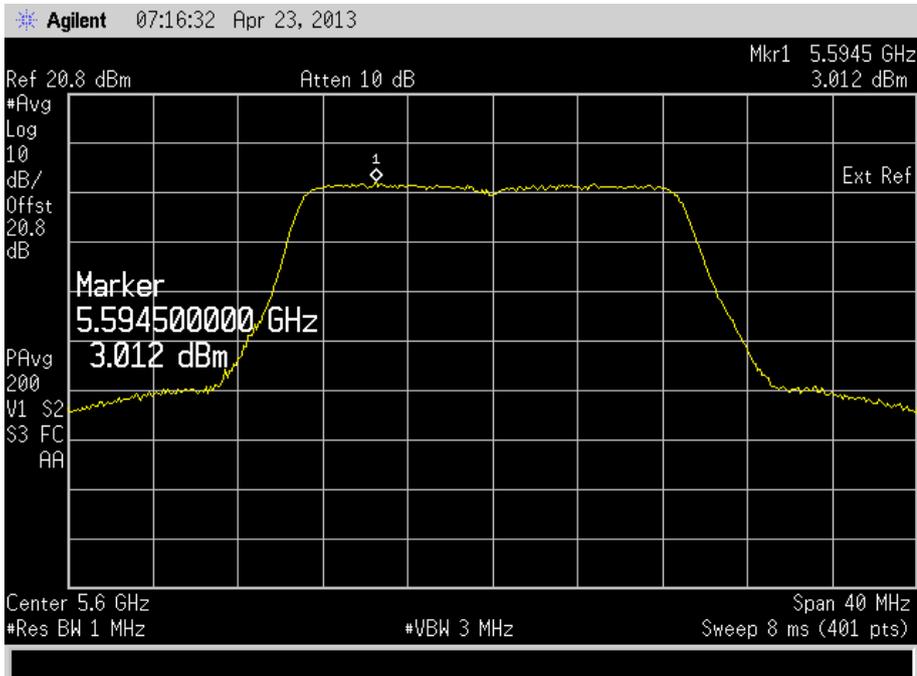




Product Service

5600 MHz

Peak Power Spectral Density (dBm)	3.012
-----------------------------------	-------

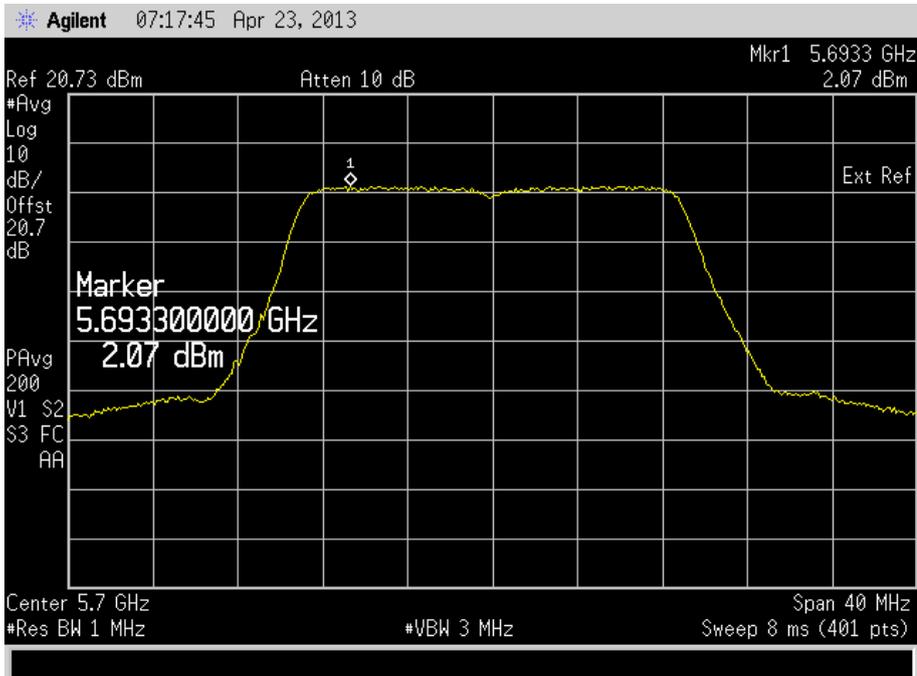




Product Service

5700 MHz

Peak Power Spectral Density (dBm)	2.070
-----------------------------------	-------



The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 6.5 Mbps.

Limit

Frequency Band (MHz)	FCC Limit	IC Limit
5150 to 5250	<4 dBm / 1 MHz	<10 dBm / 1 MHz
5250 to 5350	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5470 to 5725	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5725 to 5825	<17 dBm / 1 MHz	<17 dBm / 1 MHz



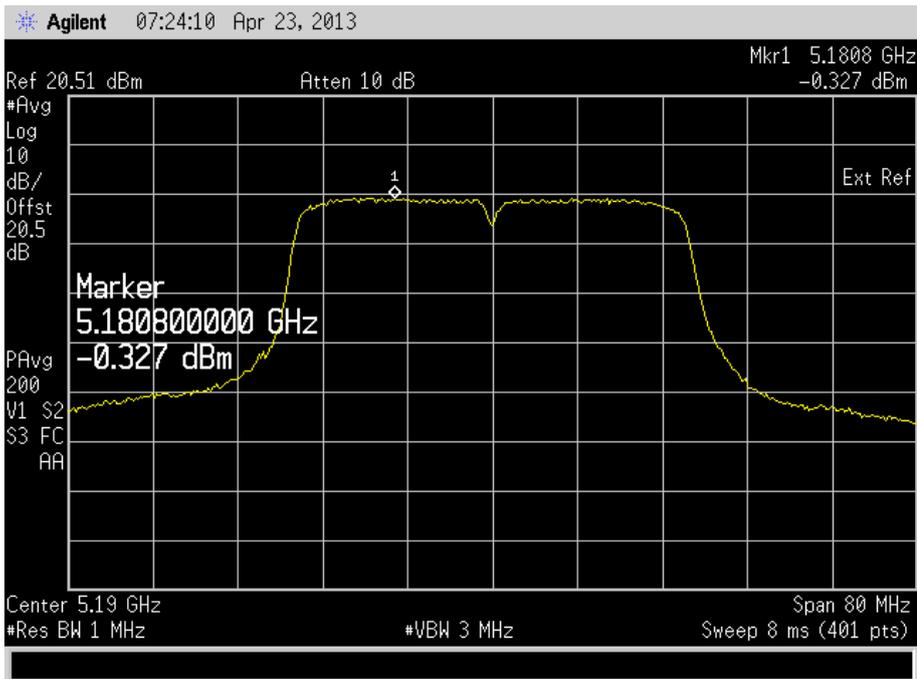
Product Service

802.11(n) FCC - 5 GHz 40 MHz BW

Frequency Band 1

5190 MHz

Peak Power Spectral Density (dBm)	-0.327
-----------------------------------	--------

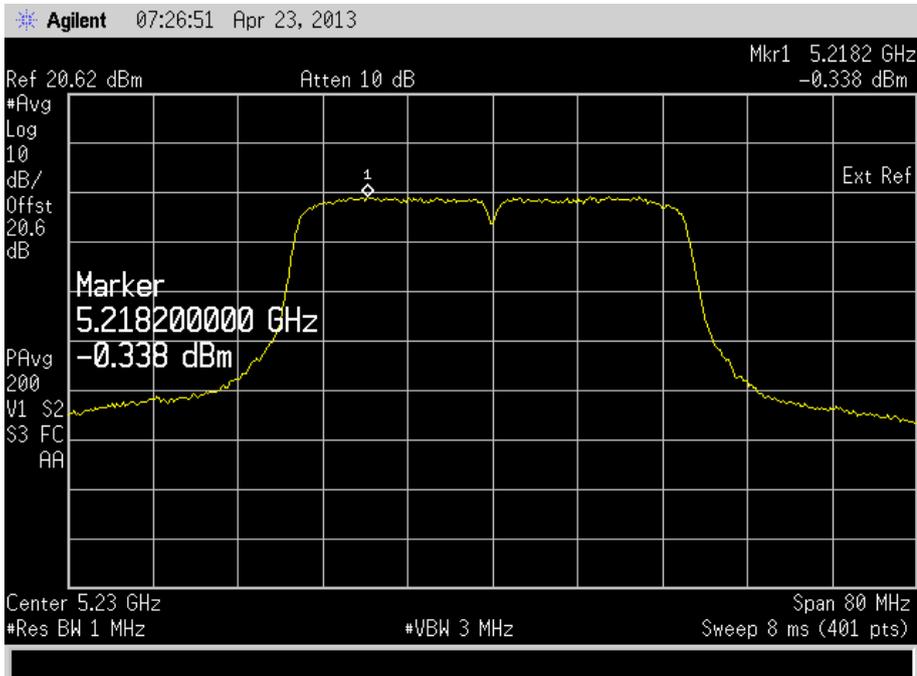




Product Service

5230 MHz

Peak Power Spectral Density (dBm)	-0.338
-----------------------------------	--------



The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 27 Mbps.

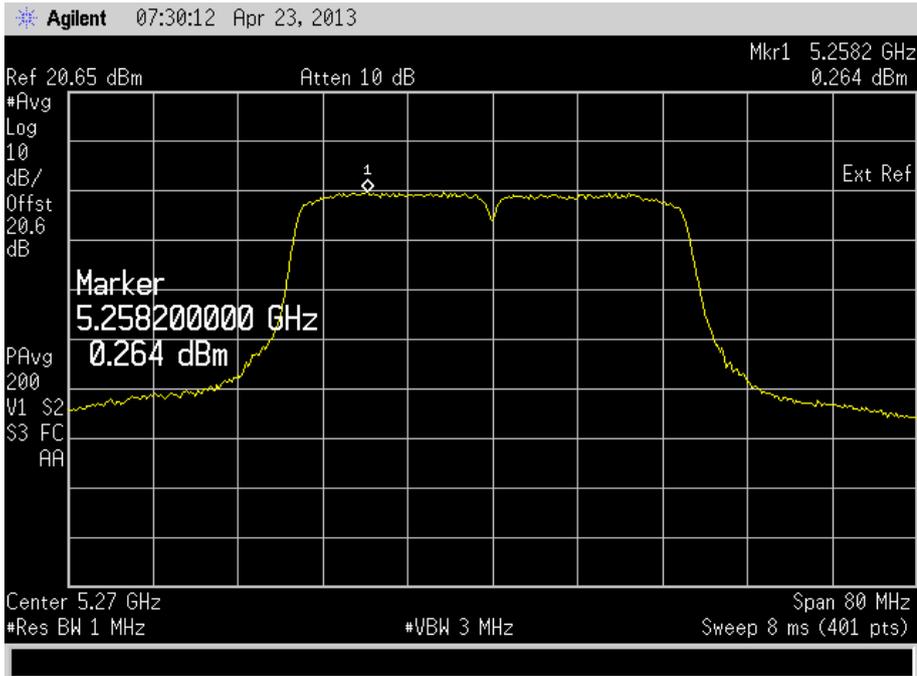


Product Service

Frequency Band 2

5270 MHz

Peak Power Spectral Density (dBm)	0.264
-----------------------------------	-------

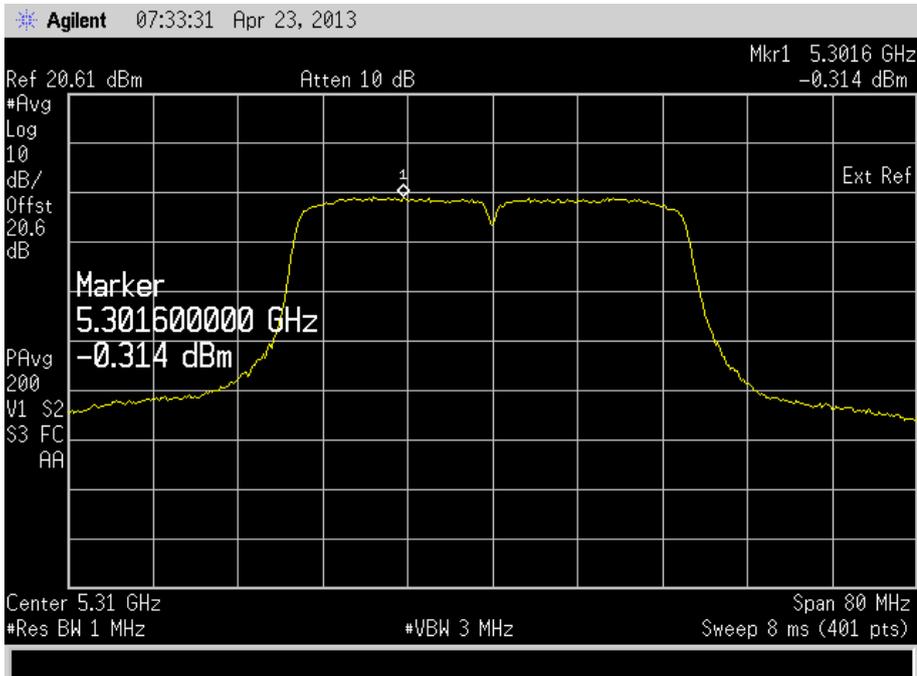




Product Service

5310 MHz

Peak Power Spectral Density (dBm)	-0.314
-----------------------------------	--------



The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 27 Mbps.

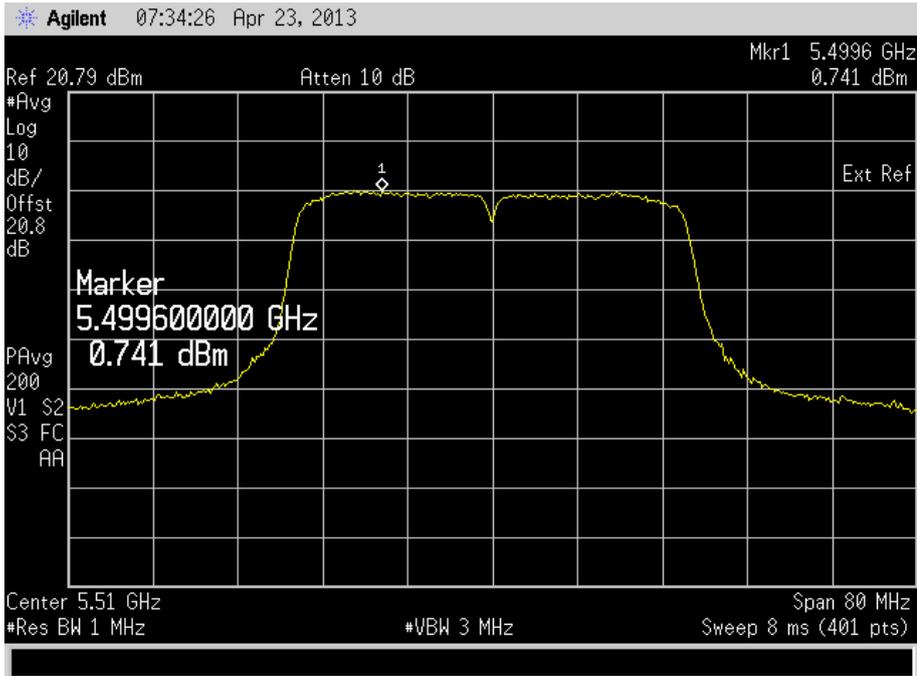


Product Service

Frequency Band 3

5510 MHz

Peak Power Spectral Density (dBm)	0.741
-----------------------------------	-------

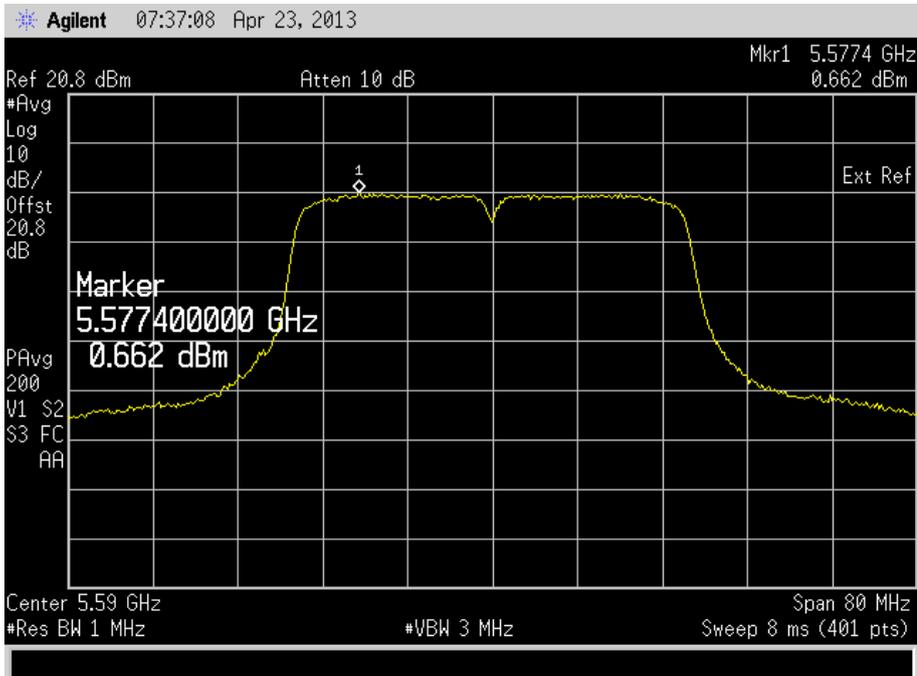




Product Service

5590 MHz

Peak Power Spectral Density (dBm)	0.662
-----------------------------------	-------

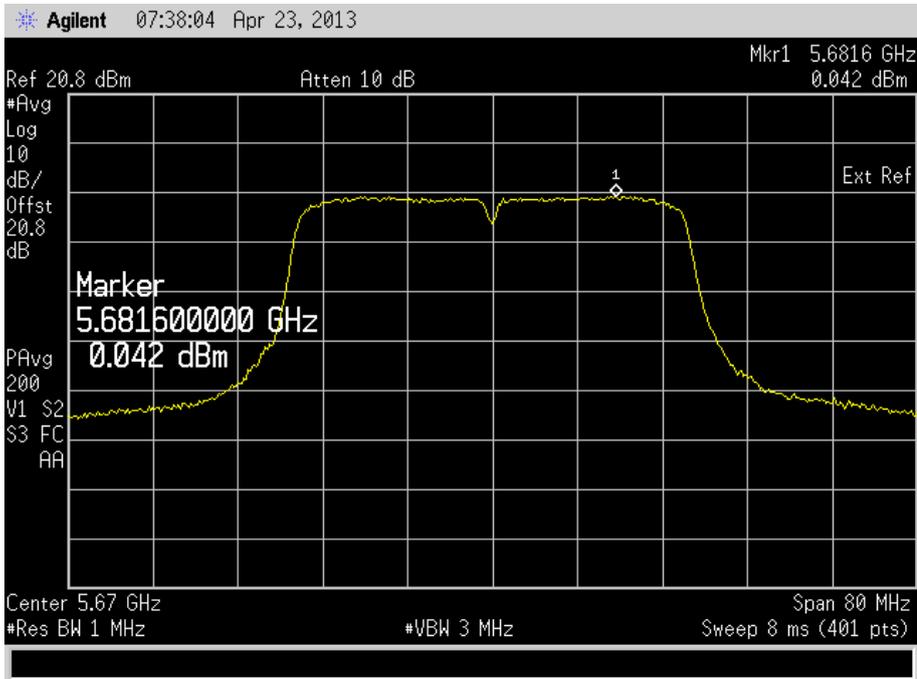




Product Service

5670 MHz

Peak Power Spectral Density (dBm)	0.042
-----------------------------------	-------



The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 27 Mbps.

Limit

Frequency Band (MHz)	FCC Limit	IC Limit
5150 to 5250	<4 dBm / 1 MHz	<10 dBm / 1 MHz
5250 to 5350	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5470 to 5725	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5725 to 5825	<17 dBm / 1 MHz	<17 dBm / 1 MHz



## **2.7 RATIO OF THE PEAK EXCURSION OF THE MODULATION ENVELOPE**

### **2.7.1 Specification Reference**

FCC CFR 47 Part 15E, Clause 15.407 (a)(6)

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

205SH S/N: IMEI 004401114779164 - Modification State 0

### **2.7.3 Date of Test**

23 April 2013

### **2.7.4 Test Equipment Used**

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

### **2.7.5 Test Procedure**

The EUT was transmitted at maximum power via an attenuator and cable to the Spectrum Analyser. The Analyser settings were adjusted to display the resultant trace on screen. The resolution bandwidth and video bandwidth were set to 1 MHz and 1 MHz respectively. The trace was set to Max Hold and the peak exclusion of the modulation envelope was measured. The ratio of this measurement to the maximum conducted output power was measured.

### **2.7.6 Environmental Conditions**

Ambient Temperature	22.7 - 25.4°C
Relative Humidity	32.7 - 37.8%



Product Service

**2.7.7 Test Results**

802.11(a)

Frequency Band 1

5180 MHz

Ratio (dB)	10.305
------------	--------

5200 MHz

Ratio (dB)	9.616
------------	-------

5240 MHz

Ratio (dB)	10.383
------------	--------

The test was performed on the worst case data rate for 802.11(a) modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 9 Mbps.

Frequency Band 2

5260 MHz

Ratio (dB)	10.313
------------	--------

5300 MHz

Ratio (dB)	9.515
------------	-------

5320 MHz

Ratio (dB)	9.533
------------	-------

The test was performed on the worst case data rate for 802.11(a) modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 9 Mbps.



Product Service

Frequency Band 3

5500 MHz

Ratio (dB)	11.105
------------	--------

5600 MHz

Ratio (dB)	10.575
------------	--------

5700 MHz

Ratio (dB)	9.784
------------	-------

The test was performed on the worst case data rate for 802.11(a) modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 9 Mbps.

Limit

Not specified.

802.11(n) FCC - 5 GHz 20 MHz BW

Frequency Band 1

5180 MHz

Ratio (dB)	9.582
------------	-------

5200 MHz

Ratio (dB)	9.106
------------	-------

5240 MHz

Ratio (dB)	9.818
------------	-------

The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 6.5 Mbps.



Product Service

Frequency Band 2

5260 MHz

Ratio (dB)	10.585
------------	--------

5300 MHz

Ratio (dB)	9.911
------------	-------

5320 MHz

Ratio (dB)	9.649
------------	-------

The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 6.5 Mbps.



Product Service

Frequency Band 3

5500 MHz

Ratio (dB)	10.093
------------	--------

5600 MHz

Ratio (dB)	9.338
------------	-------

5700 MHz

Ratio (dB)	9.590
------------	-------

The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 6.5 Mbps.

Limit

Not specified.

802.11(n) FCC - 5 GHz 40 MHz BW

Frequency Band 1

5190 MHz

Ratio (dB)	11.557
------------	--------

5230 MHz

Ratio (dB)	10.788
------------	--------

The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 27 Mbps.

Frequency Band 2

5270 MHz

Ratio (dB)	10.256
------------	--------

5310 MHz

Ratio (dB)	12.114
------------	--------

The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 27 Mbps.



Product Service

Frequency Band 3

5510 MHz

Ratio (dB)	10.189
------------	--------

5590 MHz

Ratio (dB)	10.468
------------	--------

5670 MHz

Ratio (dB)	10.688
------------	--------

The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 27 Mbps.

Limit

Not specified.



Product Service

### **SECTION 3**

#### **TEST EQUIPMENT USED**



### 3.1 TEST EQUIPMENT USED

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

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
<b>Section 2.1- AC Line Conducted Emissions</b>					
LISN	Rohde & Schwarz	ESH2-Z5	17	12	31-Jul-2013
Transient Limiter	Hewlett Packard	11947A	1032	12	28-Jun-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
<b>Section 2.2 – Power Limits</b>					
Peak Power Analyser	Hewlett Packard	8990A	107	12	14-Feb-2014
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-Apr-2014
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	9-Nov-2013
Attenuator 20dB 5W	Marconi	56534-904H	377	12	8-May-2013
Signal Generator	Marconi	2031	762	12	4-Apr-2014
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
Antenna (DRG Horn)	ETS-LINDGREN	3115	3125	12	24-May-2013
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	30-Aug-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000- NPS	3791	-	TU
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU



Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
<b>Section 2.3 - Undesirable Emission Limits</b>					
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	13-Sep-2013
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-Apr-2014
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	9-Nov-2013
Dual Power Supply Unit	Thurlby	PL320	288	-	TU
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	18-Oct-2013
Filter (High Pass)	Lorch	SHP7-7000-SR	566	12	20-Feb-2014
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Antenna (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	7-Nov-2014
Pre-Amplifier	Phase One	PS04-0086	1533	12	27-Sep-2013
Pre-Amplifier	Phase One	PSO4-0087	1534	12	28-Sep-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
4GHz HPF	Sematron	F-100-4000-5-R	2245	-	TU
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	30-Nov-2013
Filter	Daden Anthony Ass	MH-1500-7SS	2778	12	31-Jan-2014
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
Test Receiver	Rohde & Schwarz	ESIB40	2941	12	23-Oct-2013
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	30-Aug-2013
Amplifier (1 - 8GHz)	Phase One	PS06-0060	3175	12	10-Jul-2013
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	31-Aug-2013
3 GHz High Pass Filter	K&L Microwave	11SH10-3000/X18000-O/O	3552	12	1-Feb-2014
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3694	12	25-Oct-2013
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3695	12	15-Oct-2013
500N compact force gauge	Mecmesin	Mecmesin 500N	3717	12	4-Oct-2013
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU
1 metre, SMA to SMA	Suhner	Sucoflex armoured cable	4048	-	O/P Mon
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4101	12	25-Oct-2013
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	4144	12	10-May-2013
<b>Section 2.4 - Frequency Stability</b>					
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
RF Coupler	TUV SUD Product Service	RFC1	414	-	TU
Power Supply Unit	Farnell	H60-25	1092	-	O/P Mon
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Multimeter	Iso-tech	IDM101	2424	12	10-Sep-2013
Thermocouple Thermometer	Fluke	51	3172	12	30-Jul-2013
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	4144	12	10-May-2013



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
<b>Section 2.5 - 26 dB Bandwidth</b>					
Power Supply Unit	Farnell	H60-25	1092	-	O/P Mon
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Multimeter	Iso-tech	IDM101	2424	12	10-Sep-2013
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	9-May-2013
Combiner/Splitter	Weinschel	1506A	3878	12	19-Mar-2014
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	27-Jun-2013
P-Series Power Meter	Agilent	N1911A	3981	12	17-Sep-2013
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	4144	12	10-May-2013
<b>Section 2.6 - Peak Power Spectral Density</b>					
Power Supply Unit	Farnell	H60-25	1092	-	O/P Mon
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Multimeter	Iso-tech	IDM101	2424	12	10-Sep-2013
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	31-Aug-2013
Combiner/Splitter	Weinschel	1506A	3878	12	19-Mar-2014
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	27-Jun-2013
P-Series Power Meter	Agilent	N1911A	3981	12	17-Sep-2013
<b>Section 2.7 - Ratio of the Peak Excursion of the Modulation Envelope</b>					
Power Supply Unit	Farnell	H60-25	1092	-	O/P Mon
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Multimeter	Iso-tech	IDM101	2424	12	10-Sep-2013
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013
Combiner/Splitter	Weinschel	1506A	3878	12	19-Mar-2014
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	27-Jun-2013
P-Series Power Meter	Agilent	N1911A	3981	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3983	12	17-Sep-2013
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	26-Oct-2013
2 Metre SMA Type Cable	Rhophase	3PS-1801A-2000-3PS	4111	12	25-Oct-2013

TU – Traceability Unscheduled

O/P MON – Output Monitored with Calibrated Equipment



### 3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Frequency Stability	± 90.32 Hz
Power Limits	Conducted: ± 0.70 dB Radiated: 30MHz to 1GHz: ± 5.1 dB Radiated: 1GHz to 40GHz: ± 6.3 dB
26 dB Bandwidth	± 5.72 kHz
Undesirable Emission Limits	Conducted: ± 3.454 dB Radiated: ± 3.08 dB
Ratio of the Peak Excursion of the Modulation Envelope	± 0.70 dB
AC Line Conducted Emissions	± 3.2 dB
Peak Power Spectral Density	± 3.0 dB



Product Service

## **SECTION 4**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



#### 4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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

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

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

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