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Report On

FCC Testing of the Sharp SHL24 Dual-band CDMA (BC0, BC6), Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900), Dual-band UMTS (FDDI, FDDV), Quad-band LTE (B1, B3, B11, B18), Multi mode cellular phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS
In accordance with FCC CFR 47 Part 15E

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00201

Document 75924750 Report 13 Issue 1

February 2014



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COMMERCIAL-IN-CONFIDENCE

REPORT ON

FCC Testing of the
Sharp SHL24 Dual-band CDMA (BC0, BC6), Quad-band GSM
(GSM850/GSM900/DCS1800/PCS1900), Dual-band UMTS (FDDI,
FDDV), Quad-band LTE (B1, B3, B11, B18), Multi mode cellular
phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS
In accordance with FCC CFR 47 Part 15E

Document 75924750 Report 13 Issue 1

February 2014

PREPARED FOR

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DATED

03 February 2014

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);

N Rousell

G Lawler

T Guy



A Galpin

S Milliken



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SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp SHL24 Dual-band CDMA (BC0, BC6), Quad-band GSM
(GSM850/GSM900/DCS1800/PCS1900), Dual-band UMTS (FDDI, FDDV), Quad-band LTE
(B1, B3, B11, B18), Multi mode cellular phone with Bluetooth, WLAN, SRD(NFC, FeliCa) and
GPS

In accordance with FCC CFR 47 Part 15E



Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the Sharp SHL24 Dual-band CDMA (BC0, BC6), Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900), Dual-band UMTS (FDDI, FDDV), Quad-band LTE (B1, B3, B11, B18), Multi mode cellular phone with Bluetooth, WLAN, SRD(NFC, 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 Communication Compliance Ltd
Model Number(s)	SHL24
Serial Number(s)	IMEI 004401115003432 IMEI 004401115003408
Number of Samples Tested	2
Test Specification/Issue/Date	FCC CFR 47 Part 15E (2012)
Incoming Release Date	Application Form 09 December 2013
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	9952 25 November 2013
Start of Test	23 December 2013
Finish of Test	16 January 2014
Name of Engineer(s)	N Rousell G Lawler T Guy A Galpin S Milliken
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)				
2.1	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	
2.4	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) - 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	
2.4	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	



Product Service

Section	Spec Clause	Test Description	Result	Comments/Base Standard
802.11(n) - 5 GHz 40 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	
2.4	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(ac) - 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	
2.4	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(ac) - 5 GHz 40 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	
2.4	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	



Product Service

Section	Spec Clause	Test Description	Result	Comments/Base Standard
802.11(ac) - 5 GHz 80 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	
2.4	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	



Product Service

1.3 APPLICATION FORM

EQUIPMENT DESCRIPTION	
Model Name/Number	SHL24
Part Number	CA265
Hardware Version	Please refer to handset
Software Version	Please refer to handset
FCC ID	APYHRO00200
Technical Description (Please provide a brief description of the intended use of the equipment)	Quad-band LTE(B1/B3/B11/B18), Dual-band WCDMA (FDDI/V), Quad-band GSM(850/900/1800/1900), Dual-band CDMA(BC0/BC6) Cellular Phone with Bluetooth, WLAN, NFC 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	14.0 dBm
Maximum Antenna Gain	0 dBi
EIRP	14.0 dBm
Minimum rated transmitter output power as stated by manufacturer (if applicable)	
Conducted Power	dBm
Maximum Antenna Gain	dBi
EIRP	dBm
Is TPC supported?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If Yes, provide a description of operation.	
N/A - less than 500mW	

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

SYSTEM ARCHITECTURE			
<input checked="" 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/ 40 MHz
<input checked="" type="checkbox"/>	802.11(n) – 40 MHz	Receiver Bandwidth:	20/ 40 MHz
<input checked="" type="checkbox"/>	802.11(ac) – 20 MHz	Receiver Bandwidth:	20/ 40/ 80 MHz
<input checked="" type="checkbox"/>	802.11(ac) – 40 MHz	Receiver Bandwidth:	20/ 40/ 80 MHz
<input checked="" type="checkbox"/>	802.11(ac) – 80 MHz	Receiver Bandwidth:	20/ 40/ 80 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
* Time from switching on the UUT to the point at which Channel Availability Check (CAC) commences	



Product Service

UNIFORM SPREADING	
Describe how the meter provides, on aggregate, uniform channel loading of the spectrum across all channels.	
N/A	

ANTENNA OPTIONS	
Antenna 1	
Antenna Description:	Integral BT / WLAN strip line antenna
Antenna Model:	GCABBA484AFZZ
Antenna Maximum Gain:	0 dBi
Antenna Frequency Range:	Dual band: 2400MHz -2500MHz, 5100MHz- 5750MHz
Antenna 2	
Antenna Description:	
Antenna Model:	
Antenna Maximum Gain:	
Antenna Frequency Range:	
Antenna 3	
Antenna Description:	
Antenna Model:	
Antenna Maximum Gain:	
Antenna Frequency Range:	
Antenna 4	
Antenna Description:	
Antenna Model:	
Antenna Maximum Gain:	
Antenna Frequency Range:	
Antenna 5	
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: Supervisor

Name: Hiroyuki Murakami
 Date: 9th December, 2013



Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp SHL24 Dual-band CDMA (BC0, BC6), Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900), Dual-band UMTS (FDDI, FDDV), Quad-band LTE (B1, B3, B11, B18), Multi mode cellular phone with Bluetooth, WLAN, SRD(NFC, FeliCa) and GPS. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

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

The EUT was powered from a 4.0 V DC supply.

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

1.6 DEVIATIONS FROM THE STANDARD

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

1.7 MODIFICATION RECORD

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



Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
Sharp SHL24 Dual-band CDMA (BC0, BC6), Quad-band GSM
(GSM850/GSM900/DCS1800/PCS1900), Dual-band UMTS (FDDI, FDDV), Quad-band LTE
(B1, B3, B11, B18), Multi mode cellular phone with Bluetooth, WLAN, SRD(NFC, FeliCa) and
GPS
In accordance with FCC CFR 47 Part 15E



Product Service

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

SHL24 S/N: IMEI 004401115003432 - Modification State 0

2.1.3 Date of Test

12 January 2014

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 was 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.

The EUT was powered through a Line Impedance Stabilisation Network (LISN) which is bonded to the ground plane. The EUT was located so that the distance between the EUT and the LISN was 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 was tuned to the emission of interest where Quasi – Peak and Average measurements were performed in a 9kHz Video and Resolution Bandwidth.

2.1.6 Environmental Conditions

Ambient Temperature	22.6°C
Relative Humidity	24.0%

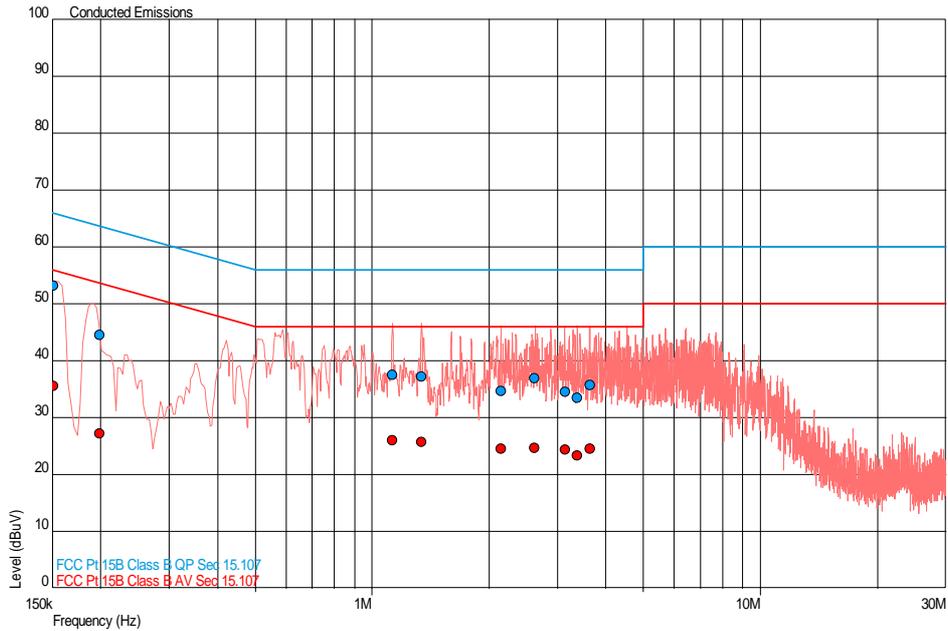


Product Service

2.1.7 Test Results

802.11(a)

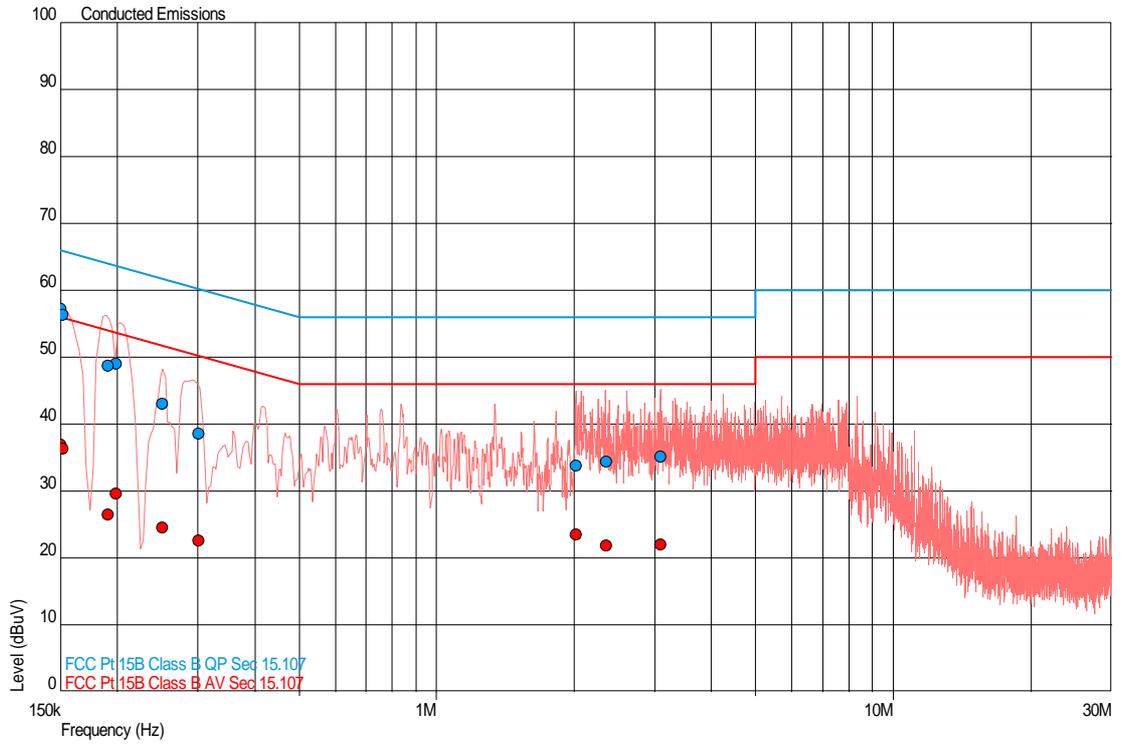
Live Line



Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.151	53.2	65.9	-12.7	35.6	55.9	-20.3
0.199	44.5	63.7	-19.2	27.3	53.7	-26.4
1.129	37.5	56.0	-18.5	26.1	46.0	-19.9
1.342	37.2	56.0	-18.8	25.8	46.0	-20.2
2.150	34.8	56.0	-21.2	24.6	46.0	-21.4
2.613	36.9	56.0	-19.1	24.7	46.0	-21.3
3.143	34.6	56.0	-21.4	24.5	46.0	-21.5
3.372	33.4	56.0	-22.6	23.3	46.0	-22.7
3.639	35.8	56.0	-20.2	24.6	46.0	-21.4



Neutral Line



Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.150	57.3	66.0	-8.7	37.0	56.0	-19.0
0.152	56.3	65.9	-9.6	36.3	55.9	-19.6
0.191	48.8	64.0	-15.2	26.5	54.0	-27.5
0.199	49.0	63.7	-14.6	29.6	53.7	-24.1
0.251	43.0	61.7	-18.7	24.6	51.7	-27.1
0.301	38.6	60.2	-21.6	22.7	50.2	-27.6
2.023	33.8	56.0	-22.2	23.5	46.0	-22.5
2.350	34.4	56.0	-21.6	21.9	46.0	-24.1
3.099	35.2	56.0	-20.8	22.1	46.0	-23.9



Product Service

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

SHL24 S/N: IMEI 004401115003432 - Modification State 0

2.2.3 Date of Test

23 December 2013, 5 January 2014 & 6 January 2014

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 a wideband power meter. The average power was then recorded.

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.

A wideband power meter was 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	21.0 - 22.2°C
Relative Humidity	31.0%



Product Service

2.2.7 Test Results

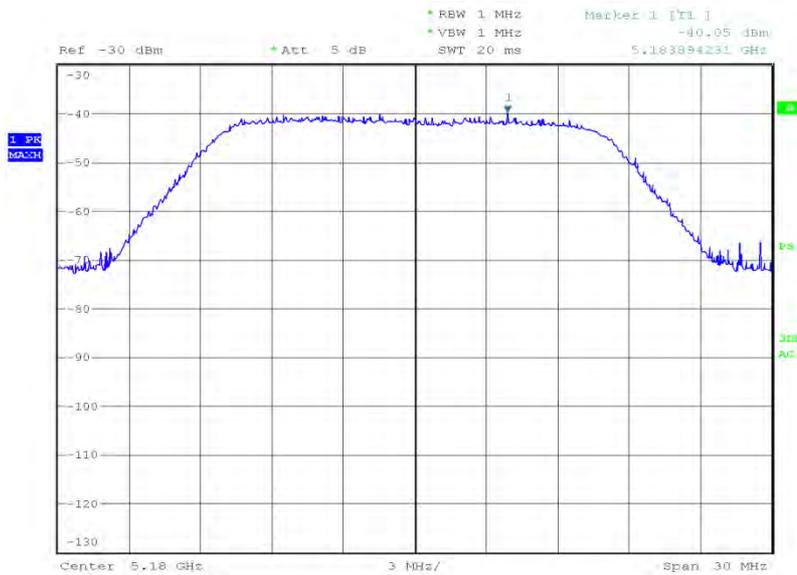
802.11(a)

Radiated

Frequency Band 1

5180 MHz

EIRP (dBm)	EIRP (mW)
11.22	13.24

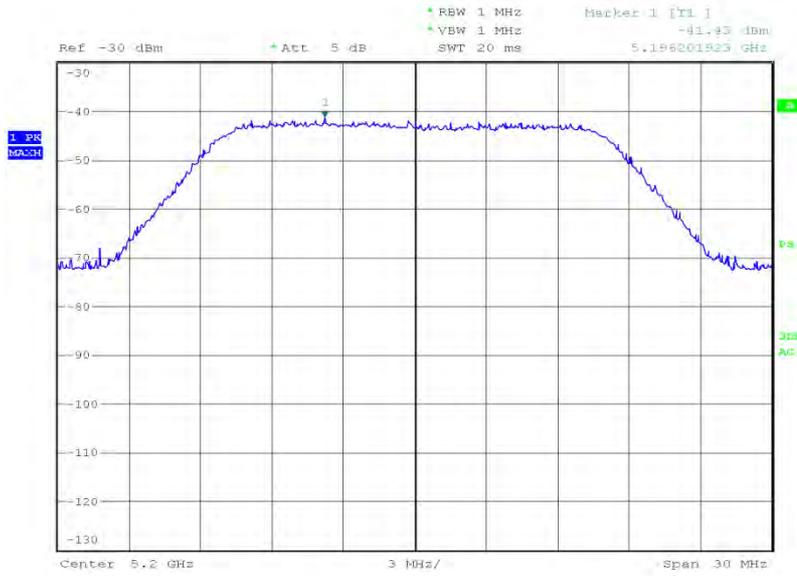


Date: 21.DEC.2013 19:16:50



5200 MHz

EIRP (dBm)	EIRP (mW)
11.16	13.06

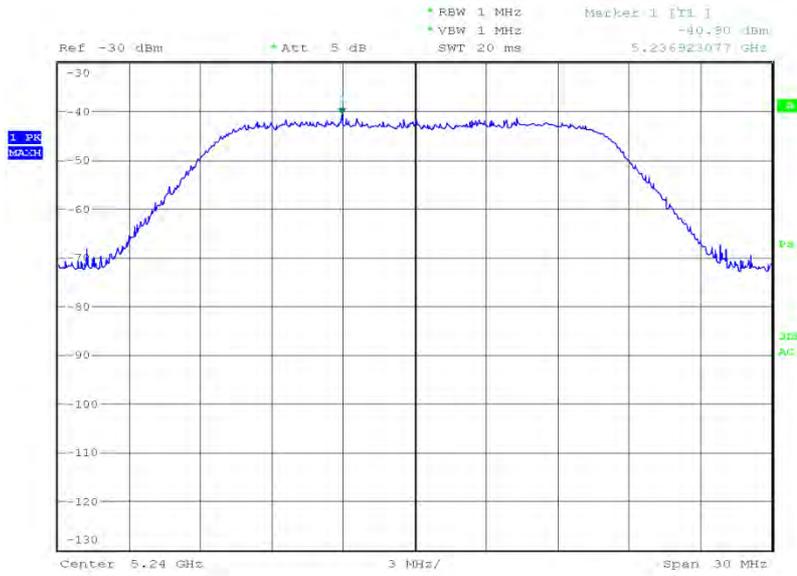


Date: 21.DEC.2013 19:41:03



5240 MHz

EIRP (dBm)	EIRP (mW)
11.10	12.88



Date: 21.DEC.2013 19:52:10



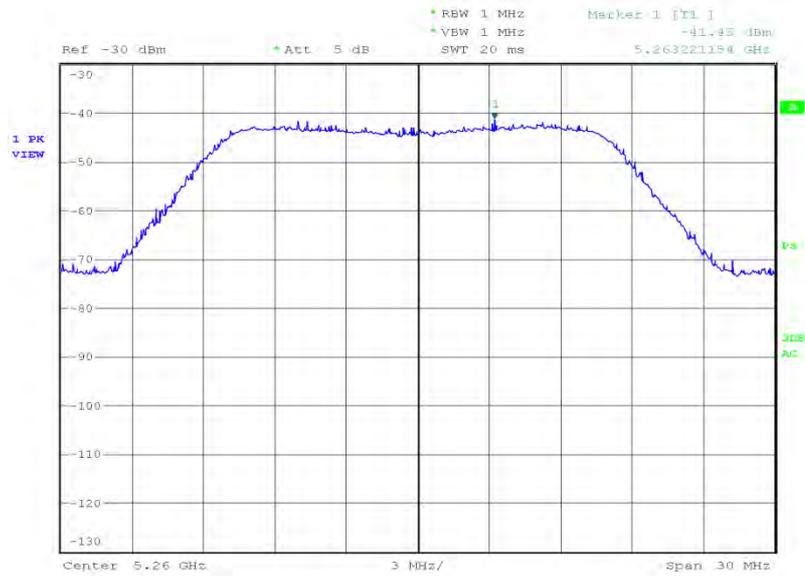
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Radiated

Frequency Band 2

5260 MHz

EIRP (dBm)	EIRP (mW)
10.49	11.19

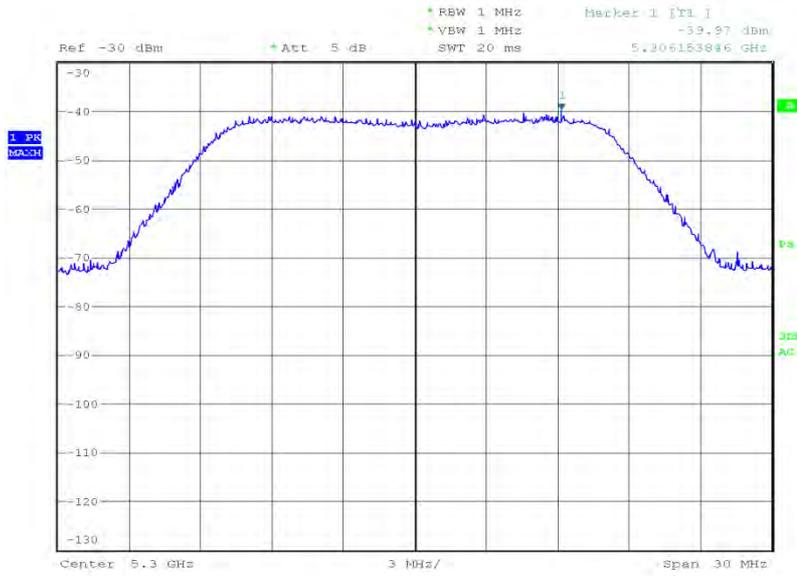


Date: 21.DEC.2013 20:08:59



5300 MHz

EIRP (dBm)	EIRP (mW)
11.50	14.12

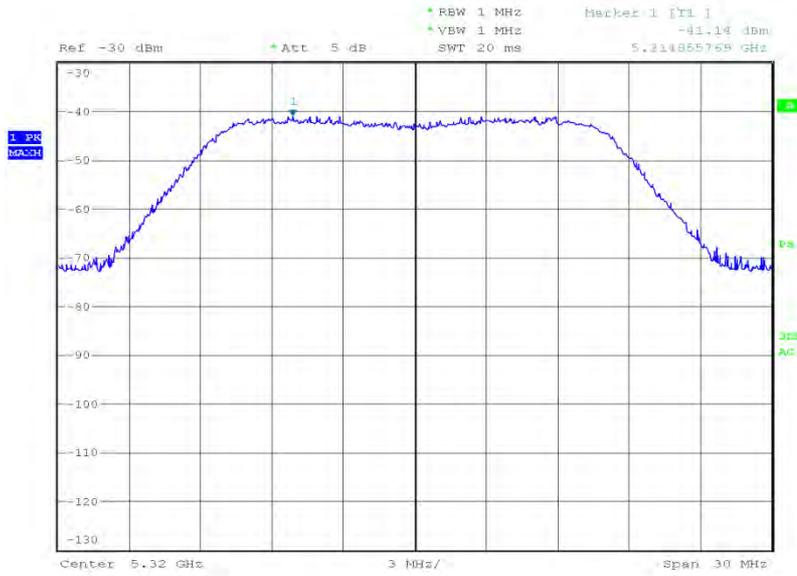


Date: 21.DEC.2013 20:14:33



5320 MHz

EIRP (dBm)	EIRP (mW)
10.41	10.99



Date: 21.DEC.2013 20:19:16



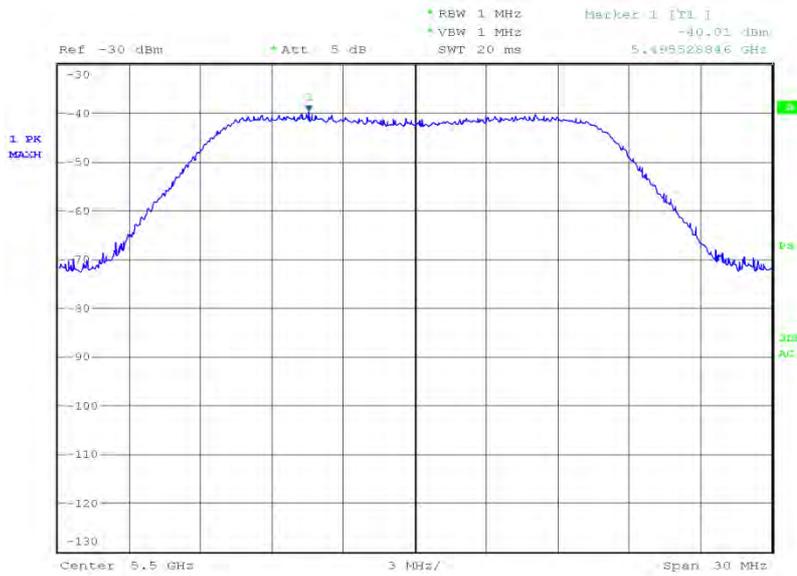
Product Service

Radiated

Frequency Band 3

5500 MHz

EIRP (dBm)	EIRP (mW)
12.28	16.90

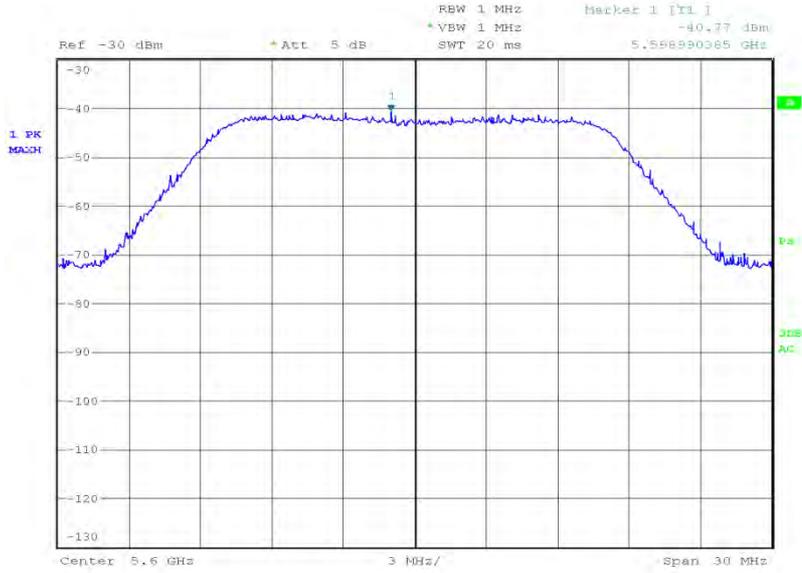


Date: 21.DEC.2013 20:26:44



5600 MHz

EIRP (dBm)	EIRP (mW)
10.62	11.53

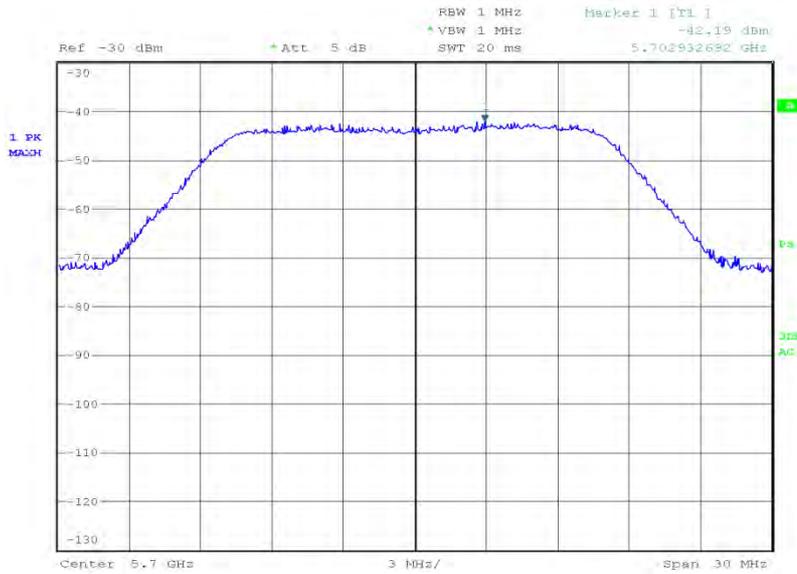


Date: 21.DEC.2013 20:46:58



5700 MHz

EIRP (dBm)	EIRP (mW)
8.15	6.53



Date: 21.DEC.2013 20:56:02

Limit for Radiated

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

Note: "B" = 26 dB Bandwidth.

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)
13.54	22.594

5200 MHz

EIRP (dBm)	EIRP (mW)
13.47	22.233

5240 MHz

EIRP (dBm)	EIRP (mW)
13.75	23.714

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 6 Mbps.

Conducted

Frequency Band 2

5260 MHz

EIRP (dBm)	EIRP (mW)
13.69	23.388

5300 MHz

EIRP (dBm)	EIRP (mW)
13.15	20.654

5320 MHz

EIRP (dBm)	EIRP (mW)
13.25	21.135

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 6 Mbps.



Product Service

Conducted

Frequency Band 3

5500 MHz

EIRP (dBm)	EIRP (mW)
12.54	17.947

5600 MHz

EIRP (dBm)	EIRP (mW)
12.45	17.579

5700 MHz

EIRP (dBm)	EIRP (mW)
12.36	17.219

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 6 Mbps.

Limit for Conducted

Frequency Band (MHz)	FCC 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
5470 to 5725	Lesser of 250 mW or 11 dBm + 10 log B
5725 to 5825	Lesser of 1 W or 17 dBm + 10 log B

Note: "B" = 26 dB Bandwidth.



Product Service

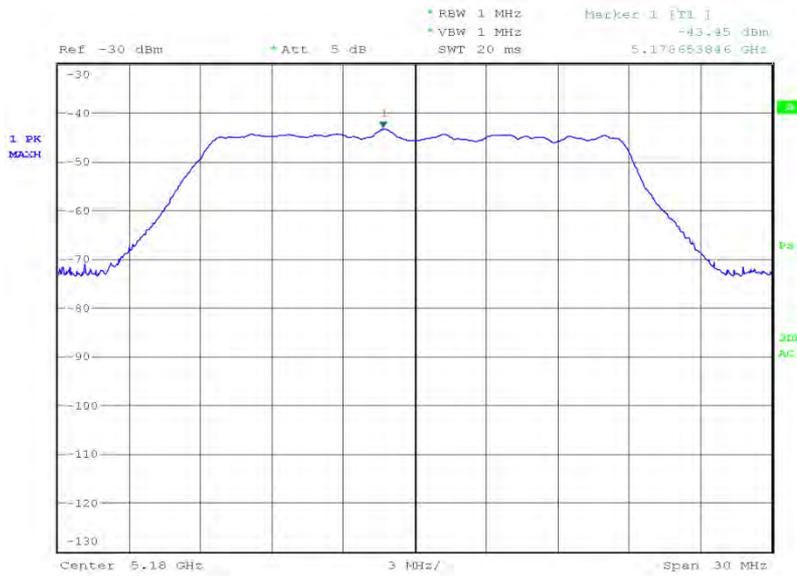
802.11(ac) - 5 GHz 20 MHz BW

Radiated

Frequency Band 1

5180 MHz

EIRP (dBm)	EIRP (mW)
12.13	16.33

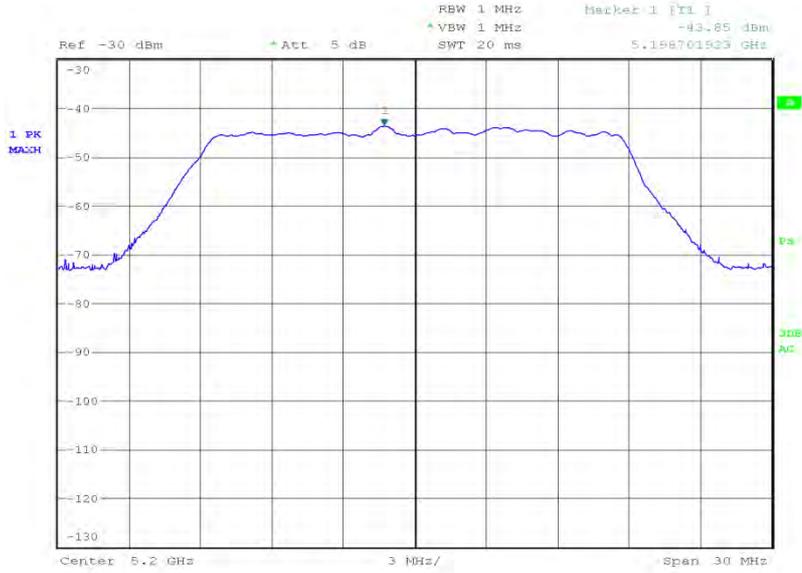


Date: 5.JAN.2014 10:23:39



5200 MHz

EIRP (dBm)	EIRP (mW)
12.24	16.75

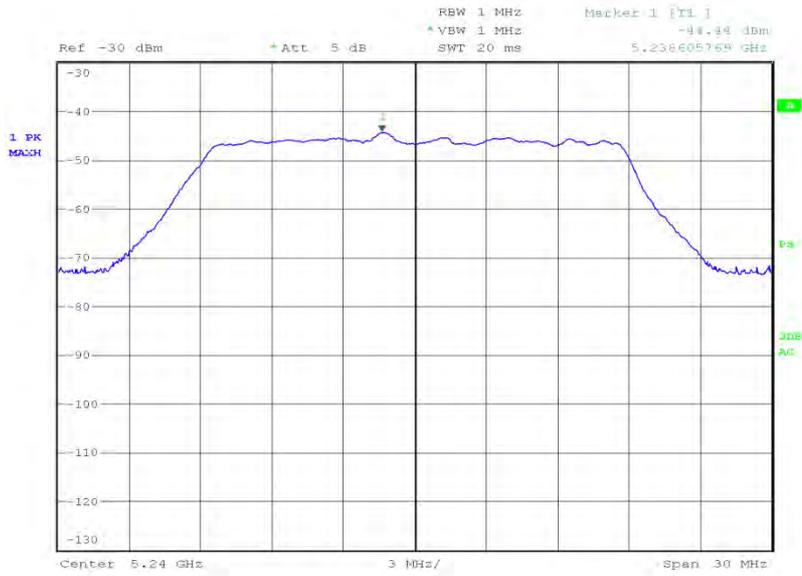


Date: 5.JAN.2014 10:48:05



5240 MHz

EIRP (dBm)	EIRP (mW)
11.14	13.00



Date: 5.JAN.2014 10:52:02



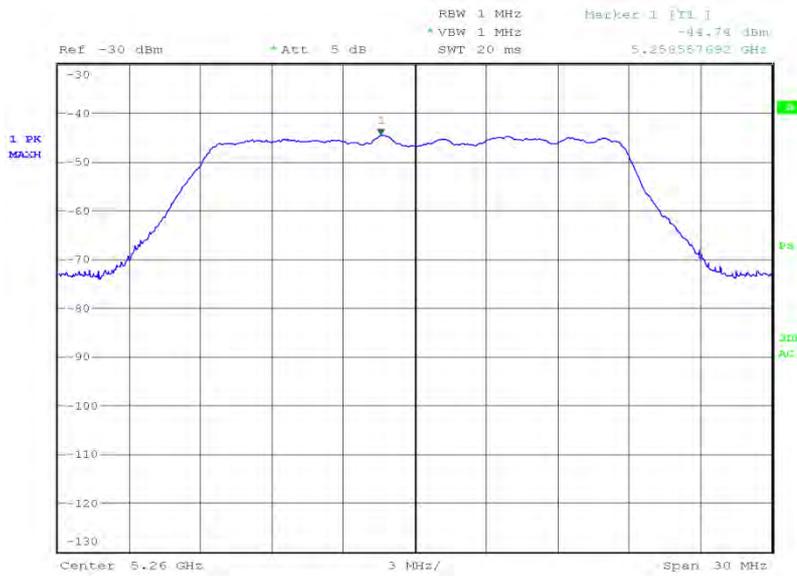
Product Service

Radiated

Frequency Band 2

5260 MHz

EIRP (dBm)	EIRP (mW)
10.43	11.04



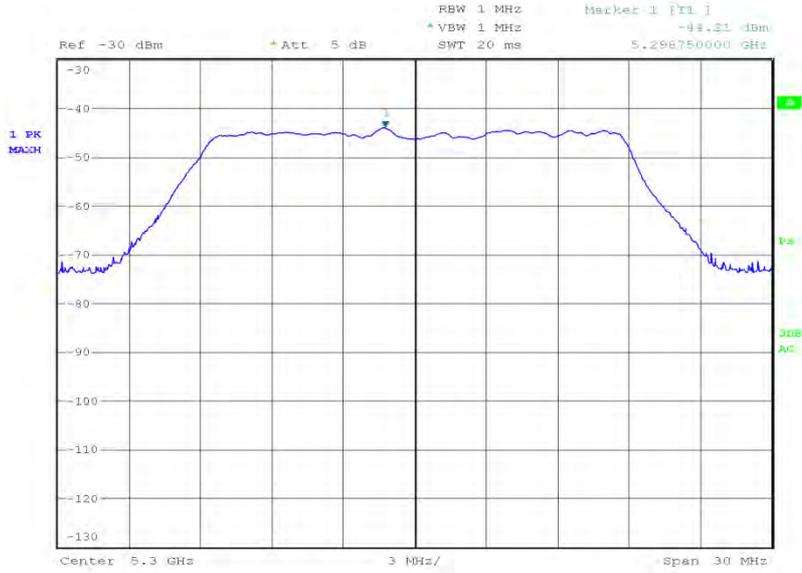
Date: 5.JAN.2014 10:56:21



Product Service

5300 MHz

EIRP (dBm)	EIRP (mW)
10.72	11.80



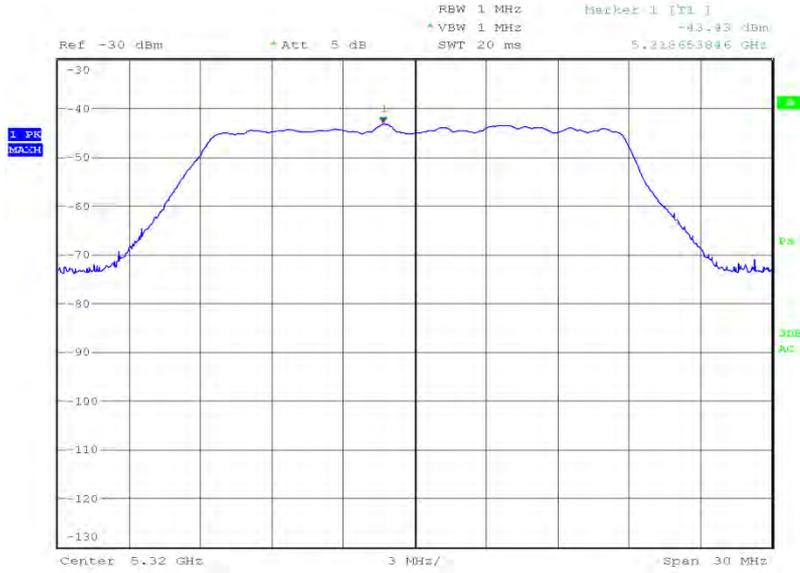
Date: 5.JAN.2014 11:00:45



Product Service

5320 MHz

EIRP (dBm)	EIRP (mW)
11.88	15.42



Date: 5.JAN.2014 11:10:18



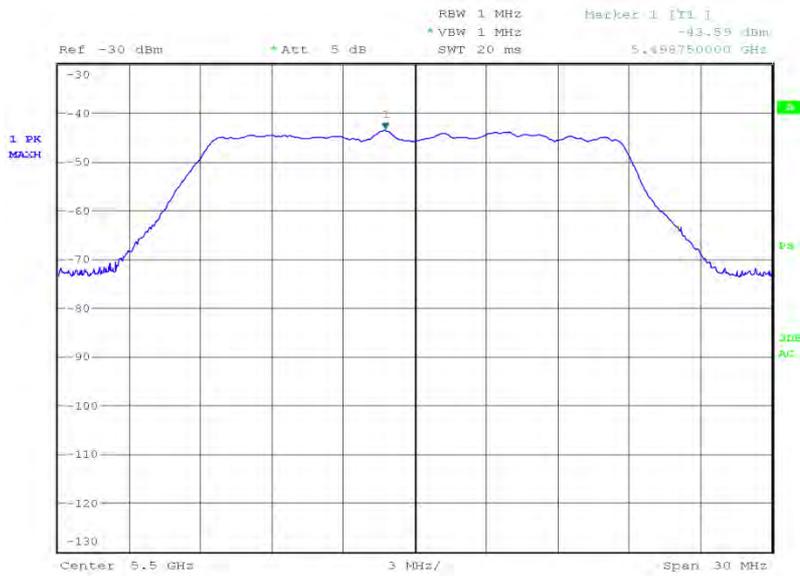
Product Service

Radiated

Frequency Band 3

5500 MHz

EIRP (dBm)	EIRP (mW)
12.09	16.18



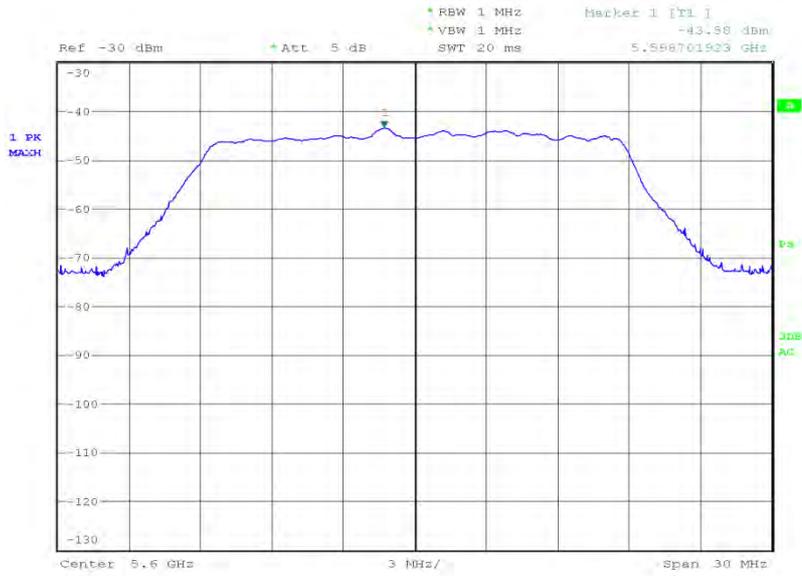
Date: 5.JAN.2014 11:17:56



Product Service

5600 MHz

EIRP (dBm)	EIRP (mW)
11.98	15.78



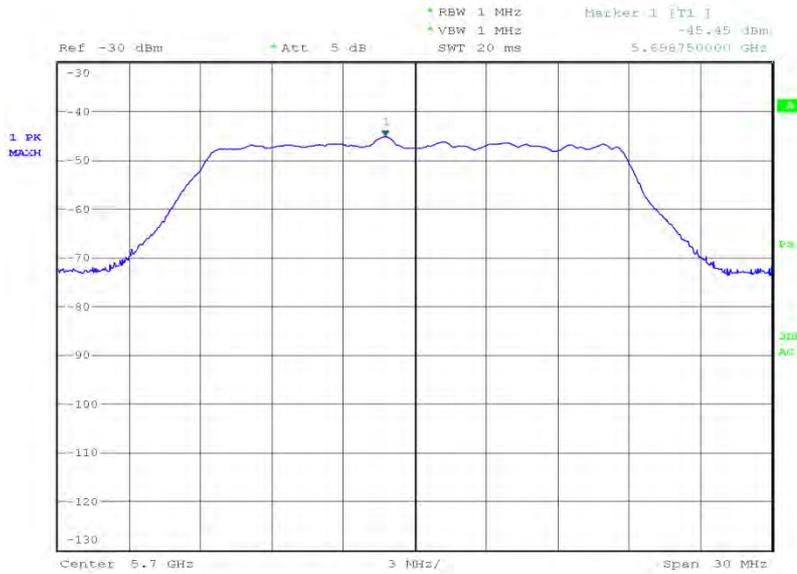
Date: 5.JAN.2014 11:31:34



Product Service

5700 MHz

EIRP (dBm)	EIRP (mW)
9.50	8.91



Date: 5.JAN.2014 11:30:30

Limit for Radiated

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

Note: "B" = 26 dB Bandwidth.
 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)
11.83	15.241

5200 MHz

EIRP (dBm)	EIRP (mW)
12.31	17.022

5240 MHz

EIRP (dBm)	EIRP (mW)
12.21	16.634

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS2.

Conducted

Frequency Band 2

5260 MHz

EIRP (dBm)	EIRP (mW)
12.06	16.069

5300 MHz

EIRP (dBm)	EIRP (mW)
12.61	18.239

5320 MHz

EIRP (dBm)	EIRP (mW)
12.29	16.943

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS2.



Product Service

Conducted

Frequency Band 3

5500 MHz

EIRP (dBm)	EIRP (mW)
11.34	13.614

5600 MHz

EIRP (dBm)	EIRP (mW)
11.47	14.028

5700 MHz

EIRP (dBm)	EIRP (mW)
11.30	13.490

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS2.

Limit for Conducted

Frequency Band (MHz)	FCC 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
5470 to 5725	Lesser of 250 mW or 11 dBm + 10 log B
5725 to 5825	Lesser of 1 W or 17 dBm + 10 log B

Note: "B" = 26 dB Bandwidth.



Product Service

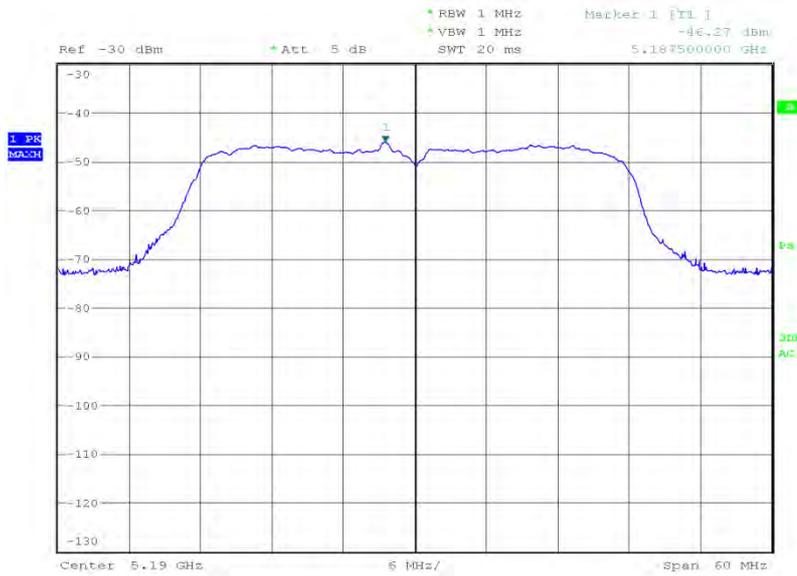
802.11(ac) - 5 GHz 40 MHz BW

Radiated

Frequency Band 1

5190 MHz

EIRP (dBm)	EIRP (mW)
10.14	10.33



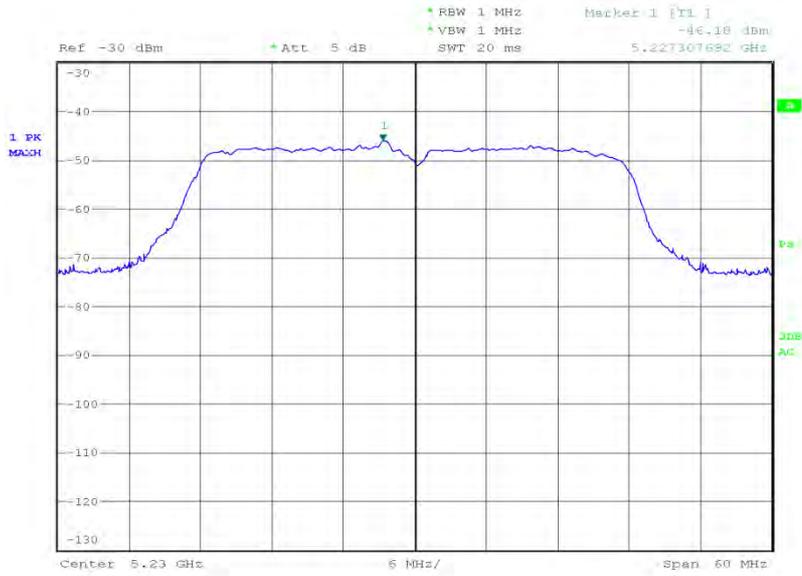
Date: 5.JAN.2014 12:12:17



Product Service

5230 MHz

EIRP (dBm)	EIRP (mW)
10.40	10.96



Date: 5.JAN.2014 12:33:33



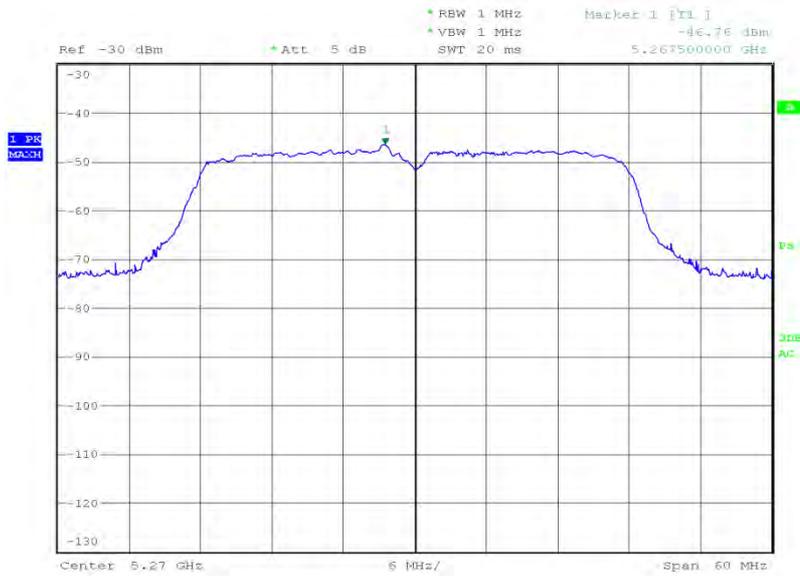
Product Service

Radiated

Frequency Band 2

5270 MHz

EIRP (dBm)	EIRP (mW)
9.66	9.25



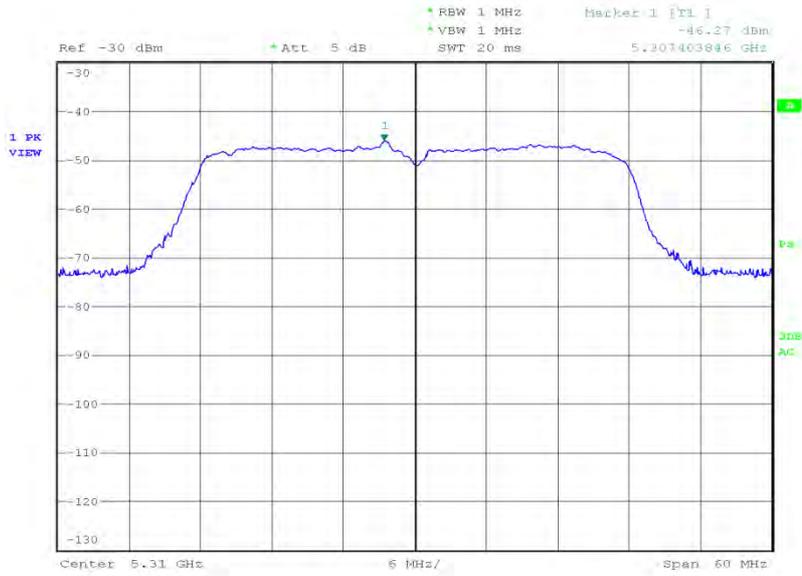
Date: 5.JAN.2014 12:36:32



Product Service

5310 MHz

EIRP (dBm)	EIRP (mW)
9.83	9.62



Date: 5.JAN.2014 12:38:58



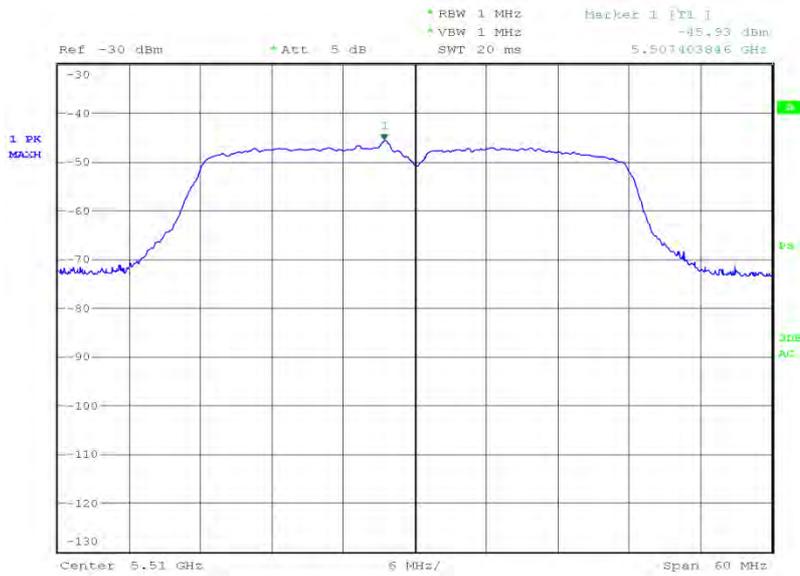
Product Service

Radiated

Frequency Band 3

5510 MHz

EIRP (dBm)	EIRP (mW)
11.13	12.97



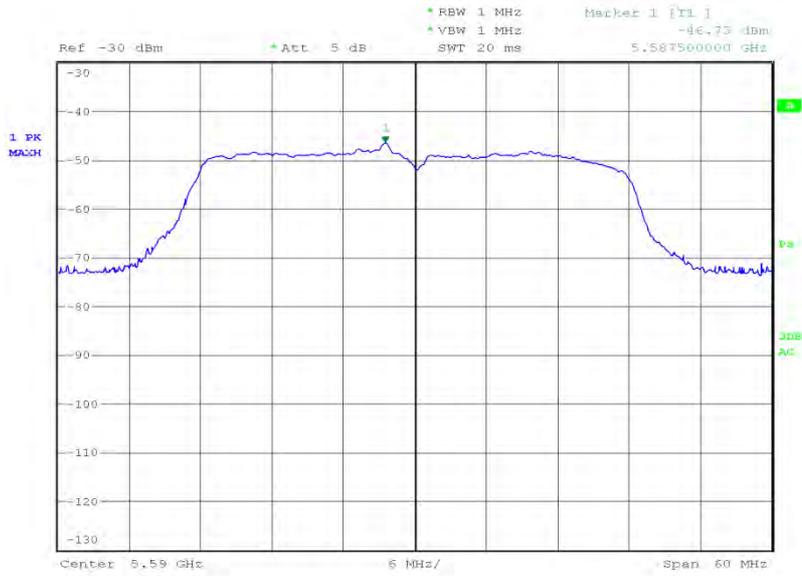
Date: 5.JAN.2014 12:51:41



Product Service

5590 MHz

EIRP (dBm)	EIRP (mW)
9.46	8.83



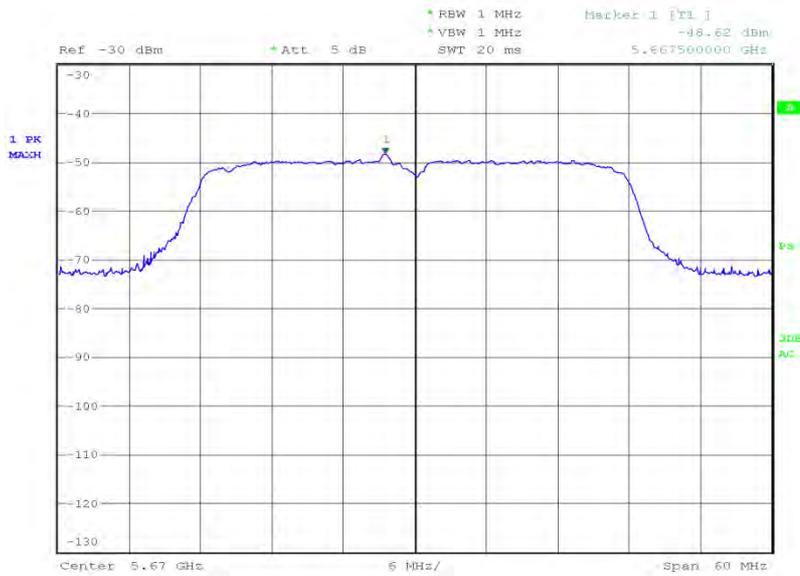
Date: 5.JAN.2014 13:02:03



Product Service

5670 MHz

EIRP (dBm)	EIRP (mW)
7.10	5.13



Date: 5.JAN.2014 13:11:21

Limit for Radiated

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

Note: "B" = 26 dB Bandwidth.

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)
12.01	15.885

5230 MHz

EIRP (dBm)	EIRP (mW)
12.32	17.061

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS0.

Conducted

Frequency Band 2

5270 MHz

EIRP (dBm)	EIRP (mW)
12.25	16.788

5310 MHz

EIRP (dBm)	EIRP (mW)
12.01	15.885

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS0.



Product Service

Conducted

Frequency Band 3

5510 MHz

EIRP (dBm)	EIRP (mW)
11.48	14.060

5590 MHz

EIRP (dBm)	EIRP (mW)
11.70	14.791

5670 MHz

EIRP (dBm)	EIRP (mW)
11.86	15.346

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS0.

Limit for Conducted

Frequency Band (MHz)	FCC 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
5470 to 5725	Lesser of 250 mW or 11 dBm + 10 log B
5725 to 5825	Lesser of 1 W or 17 dBm + 10 log B

Note: "B" = 26 dB Bandwidth.



Product Service

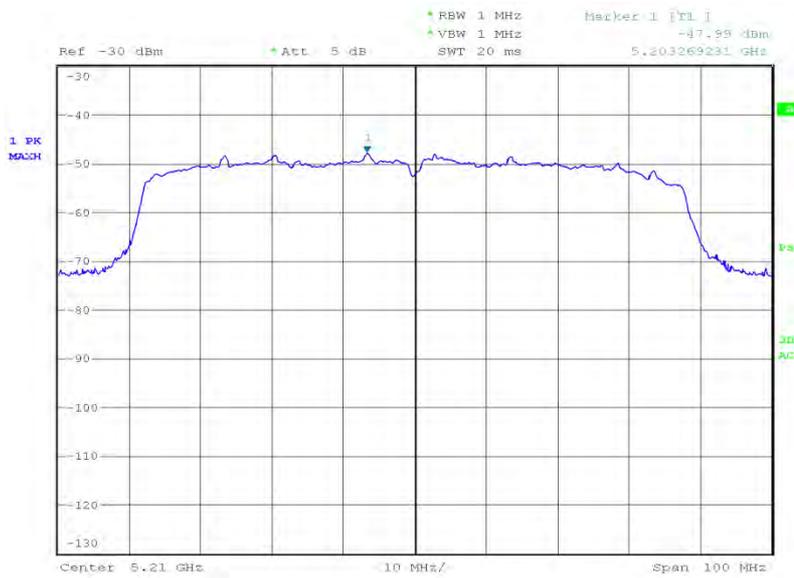
802.11(ac) - 5 GHz 80 MHz BW

Radiated

Frequency Band 1

5210 MHz

EIRP (dBm)	EIRP (mW)
11.50	14.12



Date: 5.JAN.2014 13:45:51



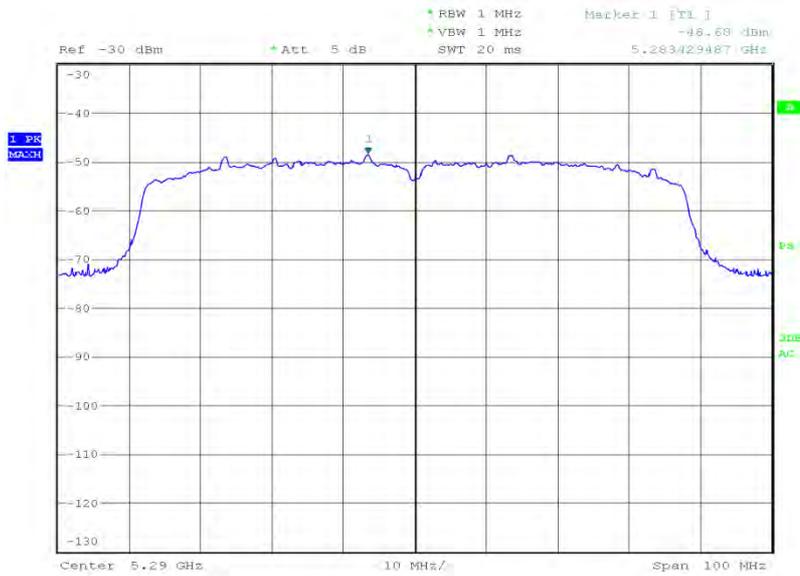
Product Service

Radiated

Frequency Band 2

5290 MHz

EIRP (dBm)	EIRP (mW)
10.47	11.14



Date: 5.JAN.2014 14:20:54



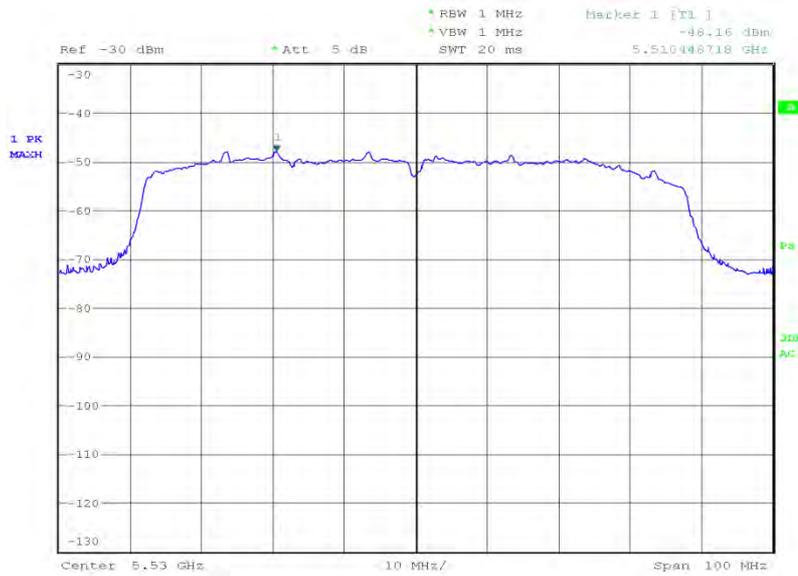
Product Service

Radiated

Frequency Band 3

5530 MHz

EIRP (dBm)	EIRP (mW)
11.49	14.09



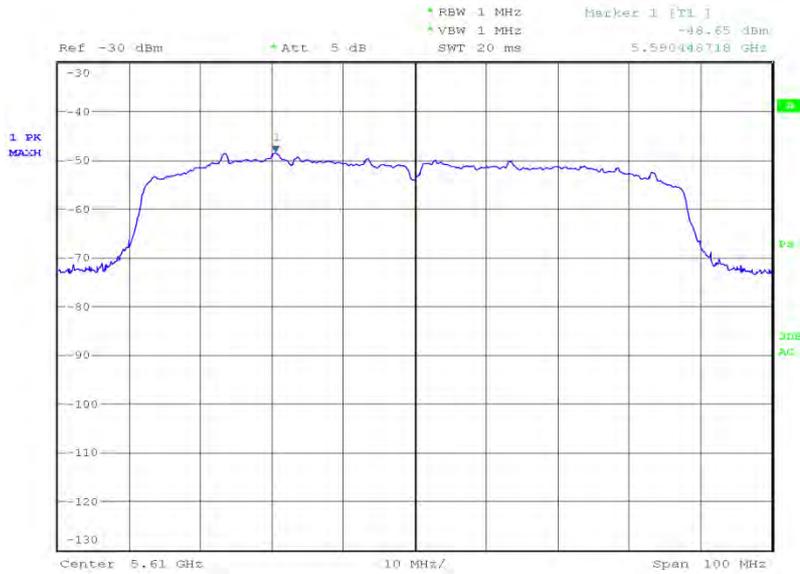
Date: 5.JAN.2014 14:30:05



Product Service

5610 MHz

EIRP (dBm)	EIRP (mW)
10.43	11.04



Date: 5.JAN.2014 14:36:58

Limit for Radiated

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

Note: "B" = 26 dB Bandwidth.
 It is acceptable to have an antenna with up to 6 dBi gain, without reducing the conducted output power.



Product Service

ConductedFrequency Band 15210 MHz

EIRP (dBm)	EIRP (mW)
12.15	16.406

The test was performed on the worst case data rate for 802.11(ac) - 80 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 MCS0.

ConductedFrequency Band 25290 MHz

EIRP (dBm)	EIRP (mW)
12.23	16.711

The test was performed on the worst case data rate for 802.11(ac) - 80 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 MCS0.

ConductedFrequency Band 35530 MHz

EIRP (dBm)	EIRP (mW)
11.86	15.346

5610 MHz

EIRP (dBm)	EIRP (mW)
11.64	14.588

The test was performed on the worst case data rate for 802.11(ac) - 80 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 MCS0.



Product Service

Limit for Conducted

Frequency Band (MHz)	FCC 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
5470 to 5725	Lesser of 250 mW or 11 dBm + 10 log B
5725 to 5825	Lesser of 1 W or 17 dBm + 10 log B

Note: "B" = 26 dB Bandwidth.



Product Service

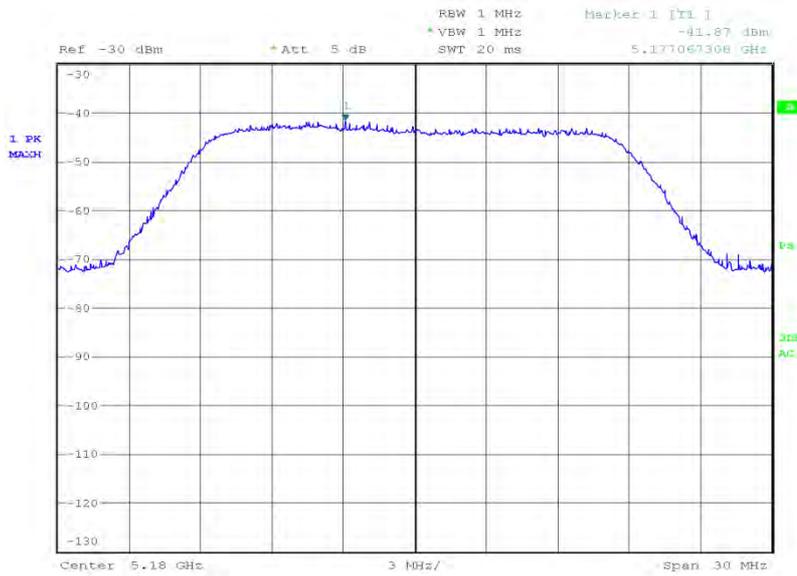
802.11(n) - 5 GHz 20 MHz BW

Radiated

Frequency Band 1

5180 MHz

EIRP (dBm)	EIRP (mW)
10.78	11.97

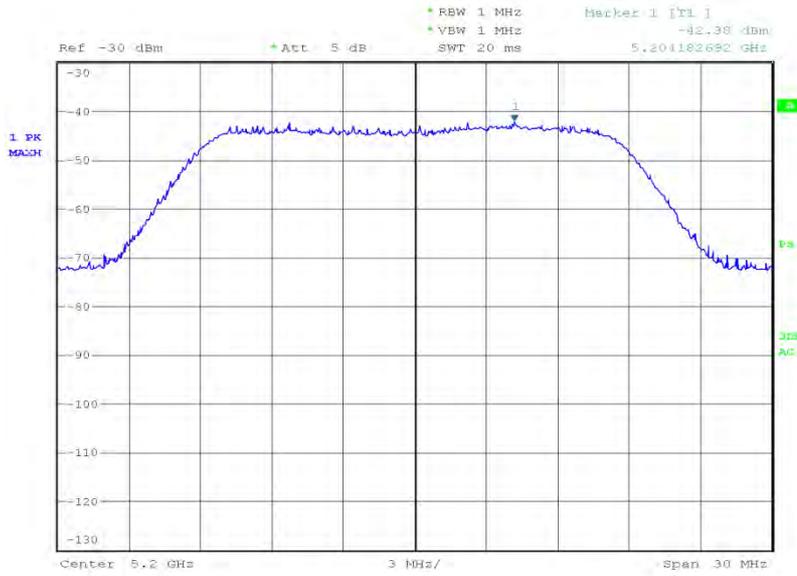


Date: 21.DEC.2013 21:08:44



5200 MHz

EIRP (dBm)	EIRP (mW)
11.29	13.46

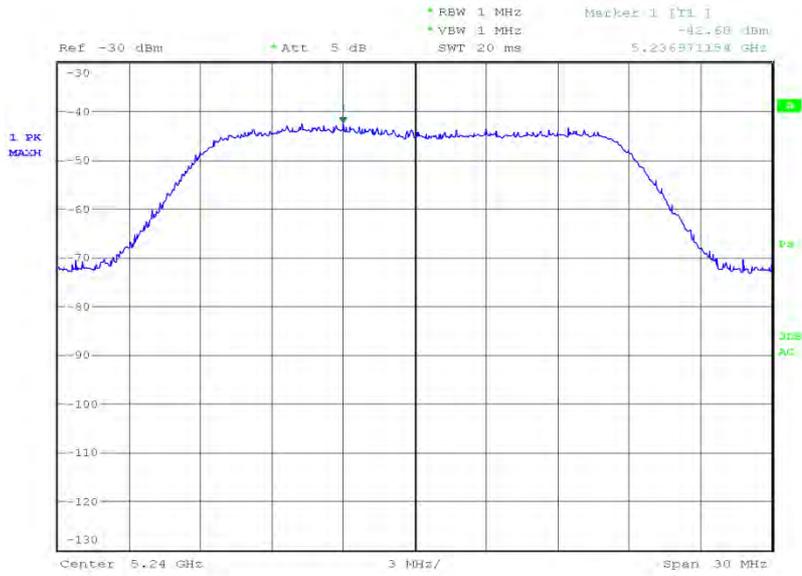


Date: 21.DEC.2013 21:36:22



5240 MHz

EIRP (dBm)	EIRP (mW)
10.70	11.75



Date: 21.DEC.2013 21:42:39



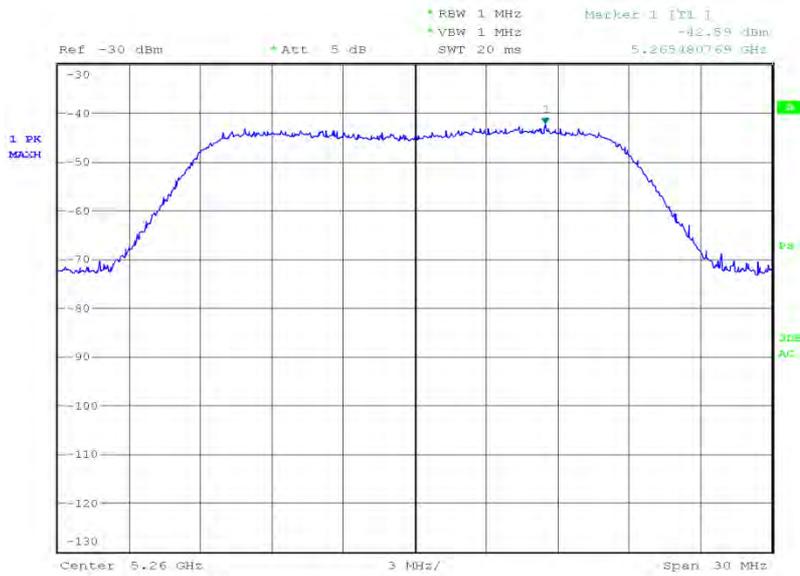
Product Service

Radiated

Frequency Band 2

5260 MHz

EIRP (dBm)	EIRP (mW)
10.71	11.78



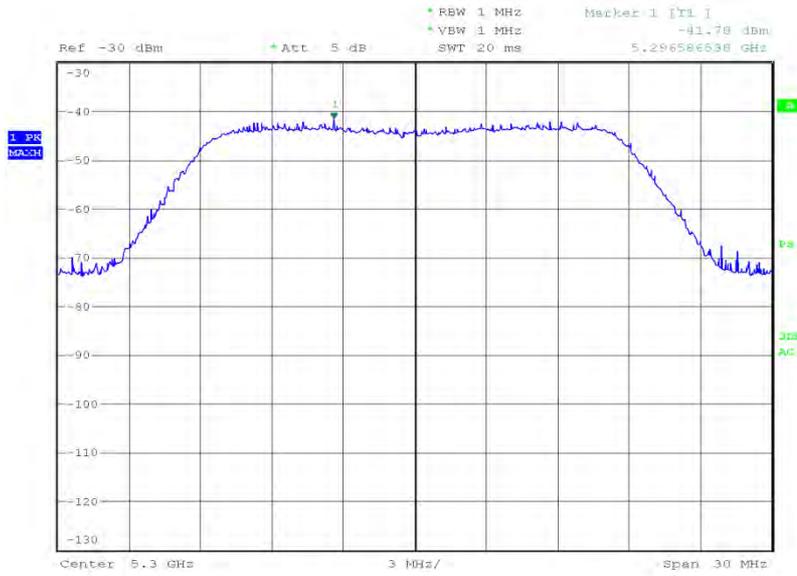
Date: 21.DEC.2013 21:46:35



Product Service

5300 MHz

EIRP (dBm)	EIRP (mW)
11.07	12.79



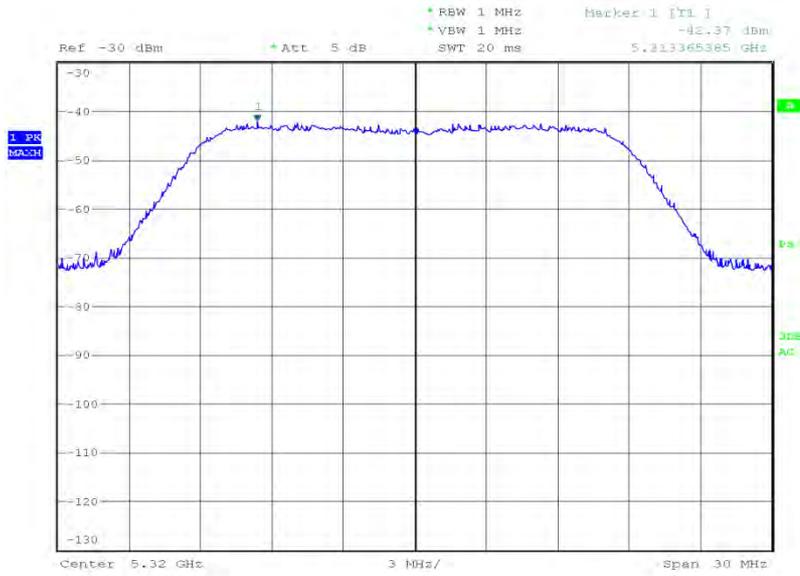
Date: 21.DEC.2013 21:50:08



Product Service

5320 MHz

EIRP (dBm)	EIRP (mW)
10.56	11.38



Date: 21.DEC.2013 21:55:29



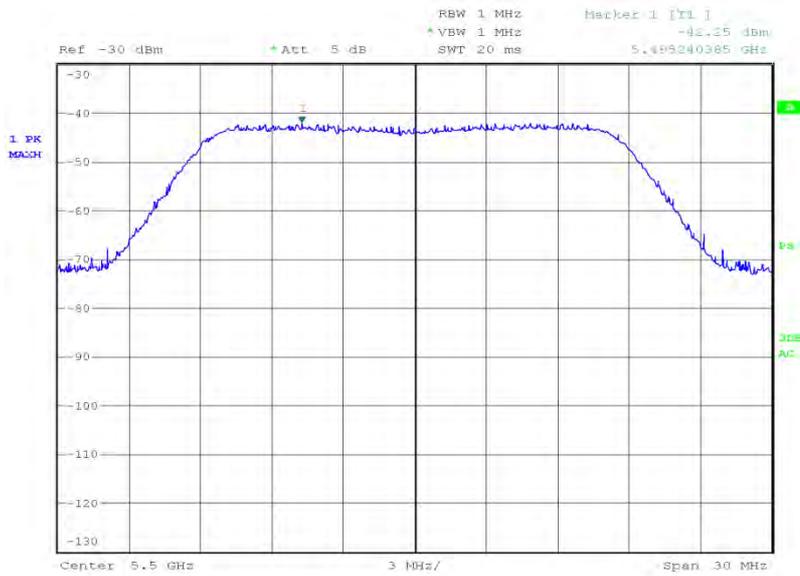
Product Service

Radiated

Frequency Band 3

5500 MHz

EIRP (dBm)	EIRP (mW)
11.41	13.84

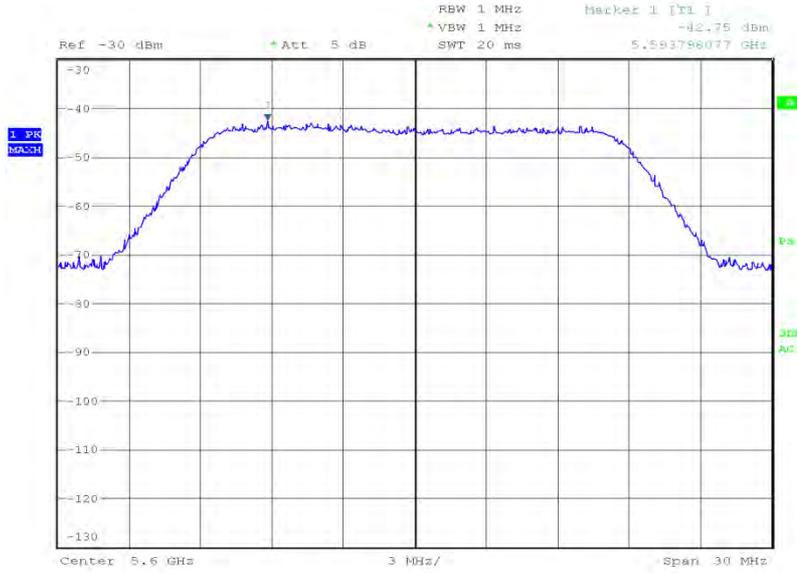


Date: 21.DEC.2013 22:03:26



5600 MHz

EIRP (dBm)	EIRP (mW)
10.02	10.05



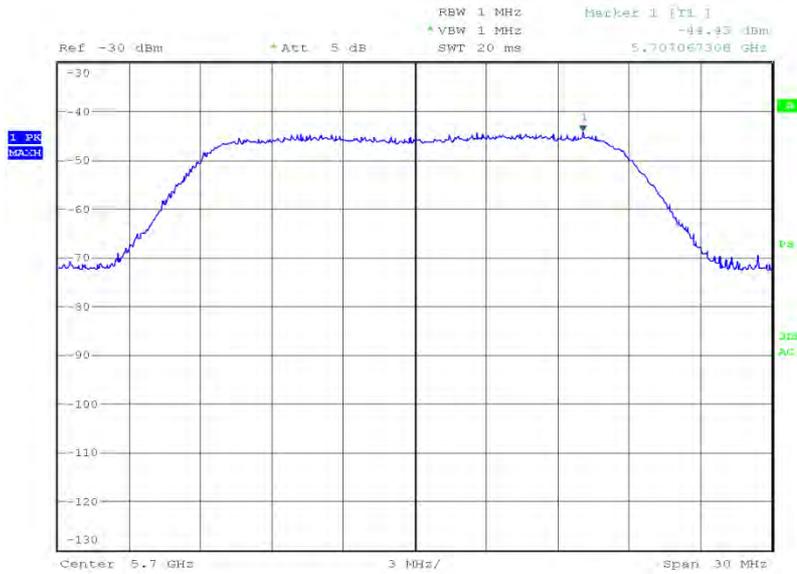
Date: 21.DEC.2013 22:12:12



Product Service

5700 MHz

EIRP (dBm)	EIRP (mW)
7.29	5.36



Date: 21.DEC.2013 22:18:18

Limit for Radiated

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

Note: "B" = 26 dB Bandwidth.

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)
12.45	17.579

5200 MHz

EIRP (dBm)	EIRP (mW)
12.47	17.660

5240 MHz

EIRP (dBm)	EIRP (mW)
12.43	17.498

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 MCS0.

Conducted

Frequency Band 2

5260 MHz

EIRP (dBm)	EIRP (mW)
12.19	16.558

5300 MHz

EIRP (dBm)	EIRP (mW)
12.21	16.634

5320 MHz

EIRP (dBm)	EIRP (mW)
12.19	16.558

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 MCS0.



Product Service

Conducted

Frequency Band 3

5500 MHz

EIRP (dBm)	EIRP (mW)
11.44	13.932

5600 MHz

EIRP (dBm)	EIRP (mW)
11.56	14.322

5700 MHz

EIRP (dBm)	EIRP (mW)
11.43	13.900

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 MCS0.

Limit for Conducted

Frequency Band (MHz)	FCC 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
5470 to 5725	Lesser of 250 mW or 11 dBm + 10 log B
5725 to 5825	Lesser of 1 W or 17 dBm + 10 log B

Note: "B" = 26 dB Bandwidth.



Product Service

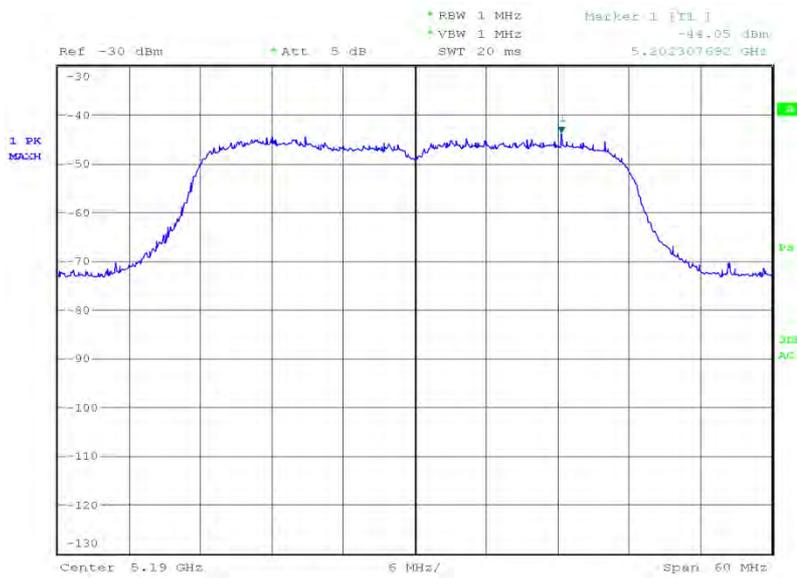
802.11(n) - 5 GHz 40 MHz BW

Radiated

Frequency Band 1

5190 MHz

EIRP (dBm)	EIRP (mW)
10.84	12.13

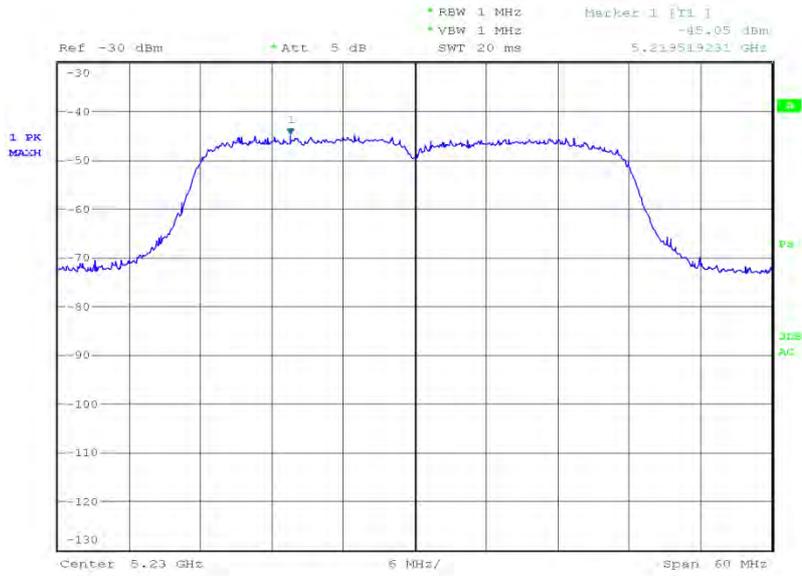


Date: 5.JAN.2014 08:19:58



5230 MHz

EIRP (dBm)	EIRP (mW)
9.99	9.98



Date: 5.JAN.2014 06:32:21



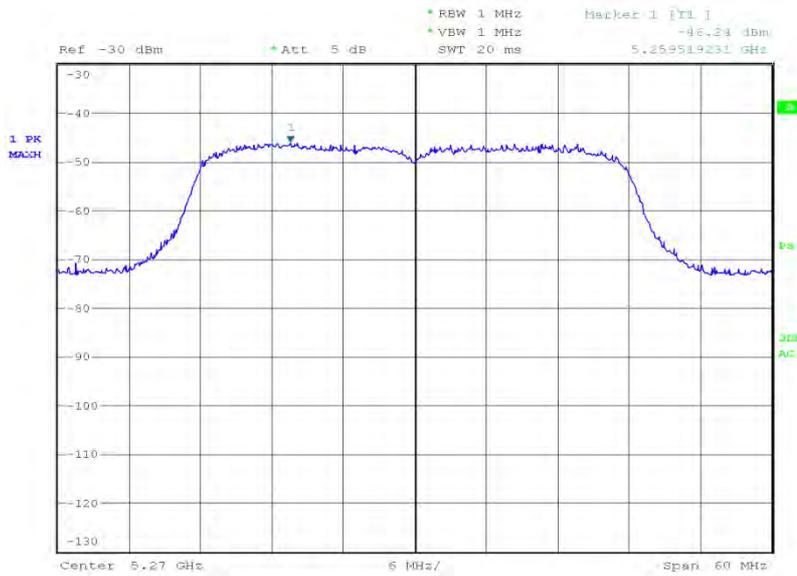
Product Service

Radiated

Frequency Band 2

5270 MHz

EIRP (dBm)	EIRP (mW)
8.66	7.35



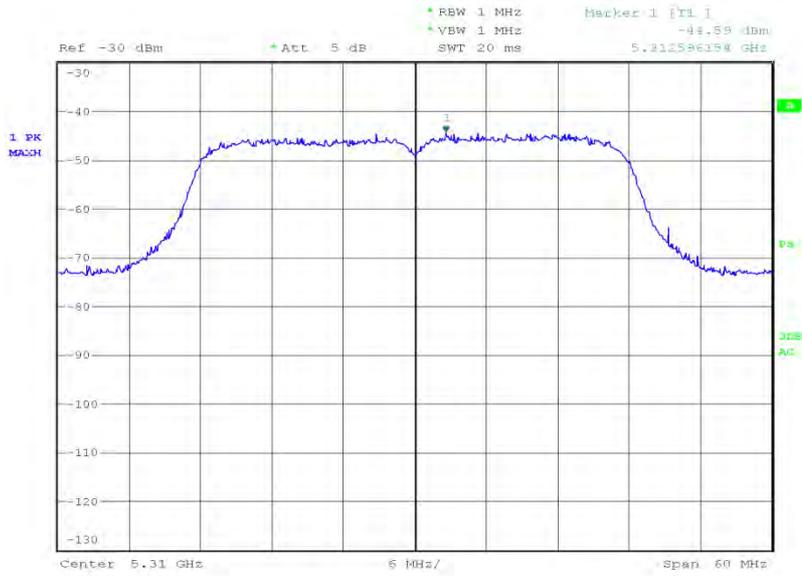
Date: 5.JAN.2014 08:40:32



Product Service

5310 MHz

EIRP (dBm)	EIRP (mW)
9.99	9.98



Date: 5.JAN.2014 06:44:57



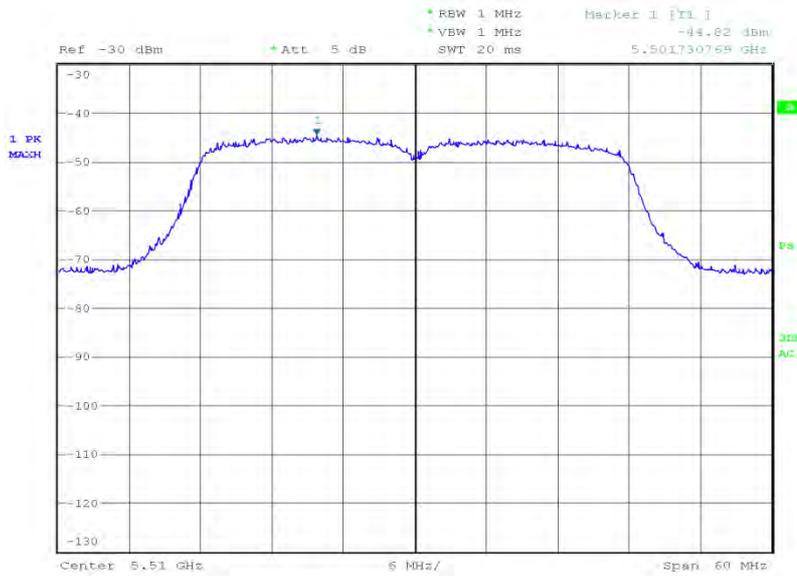
Product Service

Radiated

Frequency Band 3

5510 MHz

EIRP (dBm)	EIRP (mW)
10.72	11.80

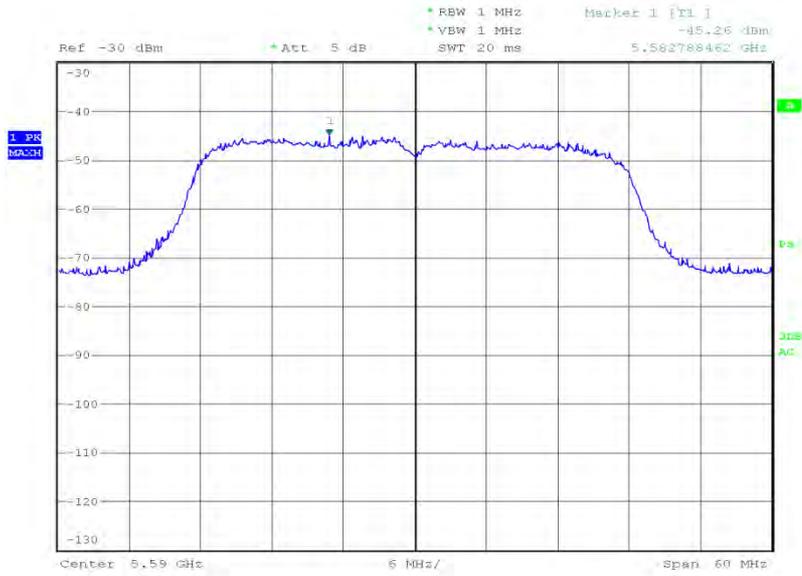


Date: 5.JAN.2014 08:55:35



5590 MHz

EIRP (dBm)	EIRP (mW)
9.54	8.99



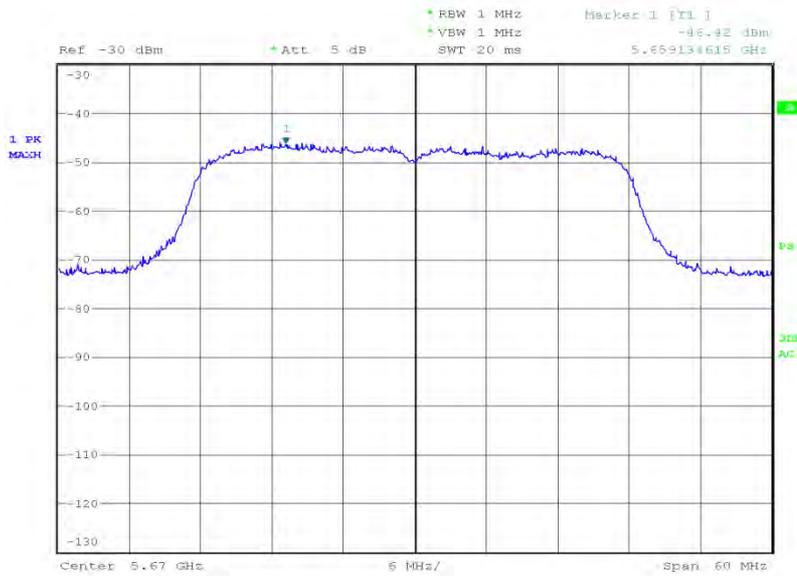
Date: 5.JAN.2014 09:08:30



Product Service

5670 MHz

EIRP (dBm)	EIRP (mW)
7.78	6.00



Date: 5.JAN.2014 09:14:18

Limit for Radiated

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

Note: "B" = 26 dB Bandwidth.
 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)
12.16	16.444

5230 MHz

EIRP (dBm)	EIRP (mW)
12.42	17.458

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 MCS1.

Conducted

Frequency Band 2

5270 MHz

EIRP (dBm)	EIRP (mW)
12.19	16.558

5310 MHz

EIRP (dBm)	EIRP (mW)
12.06	16.069

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 MCS1.



Product Service

Conducted

Frequency Band 3

5510 MHz

EIRP (dBm)	EIRP (mW)
11.67	14.689

5590 MHz

EIRP (dBm)	EIRP (mW)
11.68	14.723

5670 MHz

EIRP (dBm)	EIRP (mW)
11.77	15.031

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 MCS1.

Limit for Conducted

Frequency Band (MHz)	FCC 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
5470 to 5725	Lesser of 250 mW or 11 dBm + 10 log B
5725 to 5825	Lesser of 1 W or 17 dBm + 10 log B

Note: "B" = 26 dB Bandwidth.



Product Service

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

SHL24 S/N: IMEI 004401115003432 - Modification State 0

2.3.3 Date of Test

5 January 2014, 6 January 2014, 7 January 2014, 8 January 2014 & 11 January 2014

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	21.5 - 25.0°C
Relative Humidity	29.0 - 36.0%



Product Service

2.3.7 Test Results

802.11(a)

4.0 V DC Supply

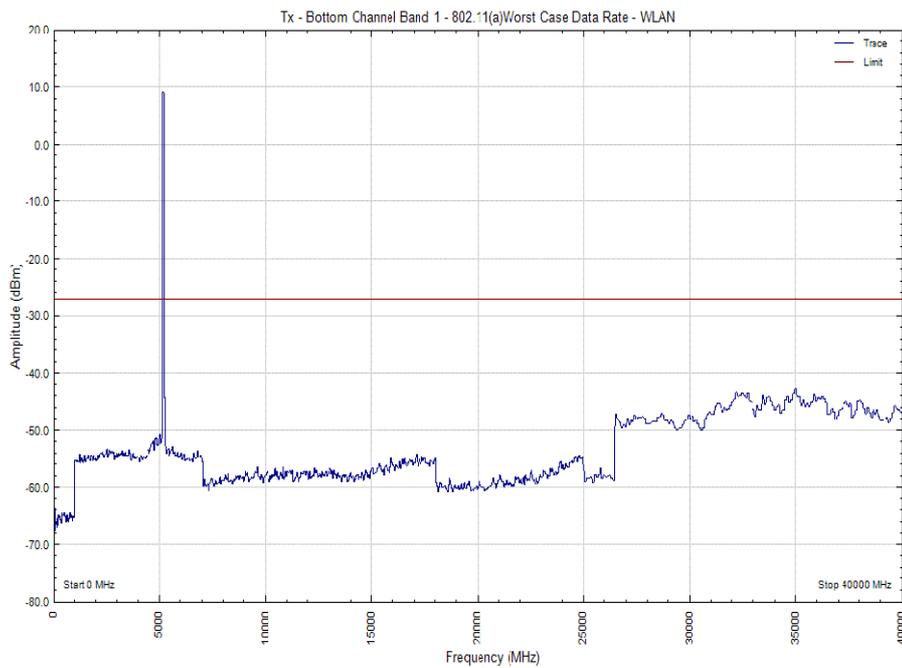
Spurious Conducted Emissions

6 Mbps

Frequency Band 1

5180 MHz

9 kHz to 40 GHz

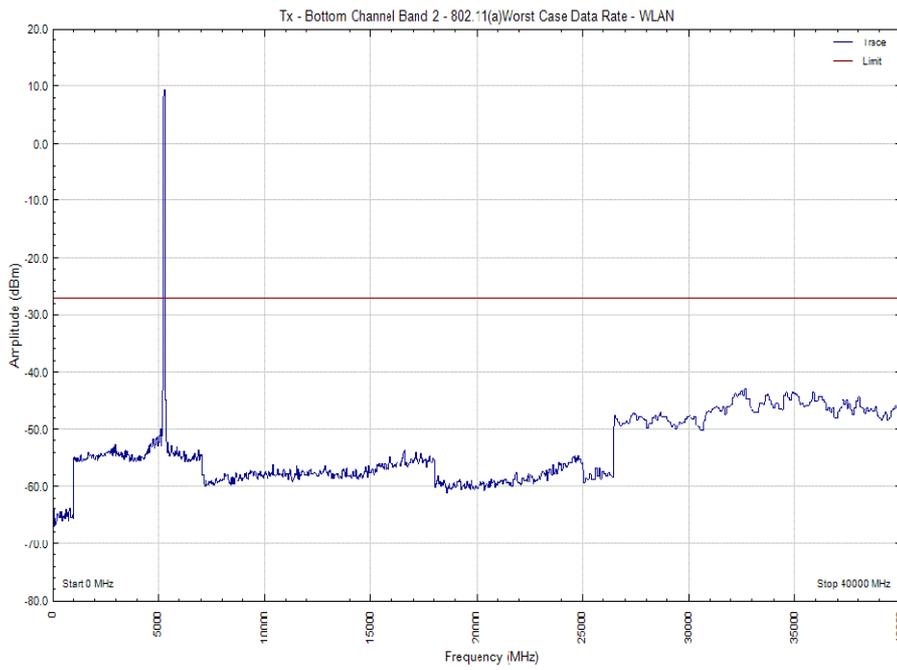




Frequency Band 2

5260 MHz

9 kHz to 40 GHz

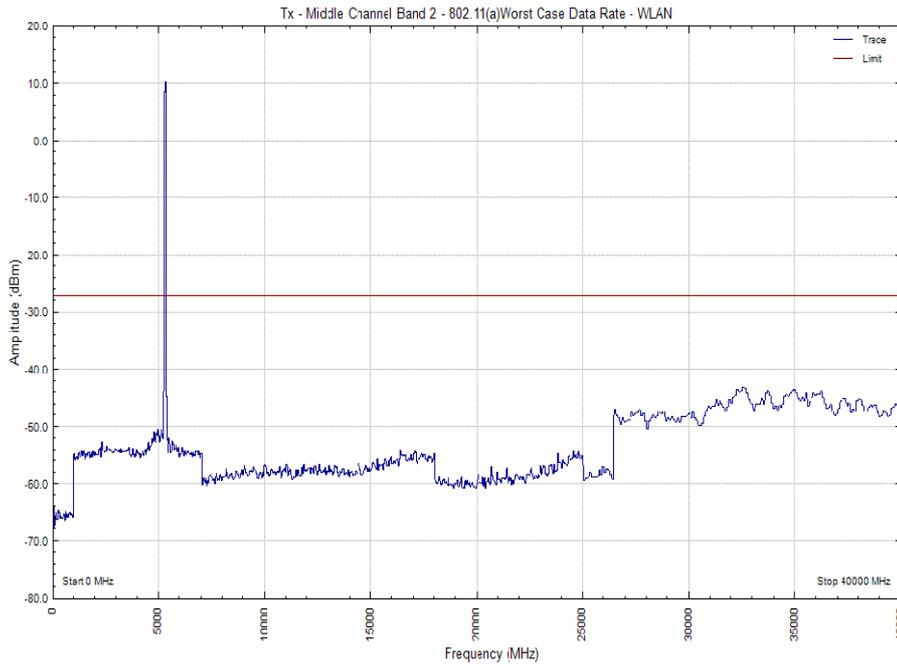


5300 MHz

9 kHz to 40 GHz



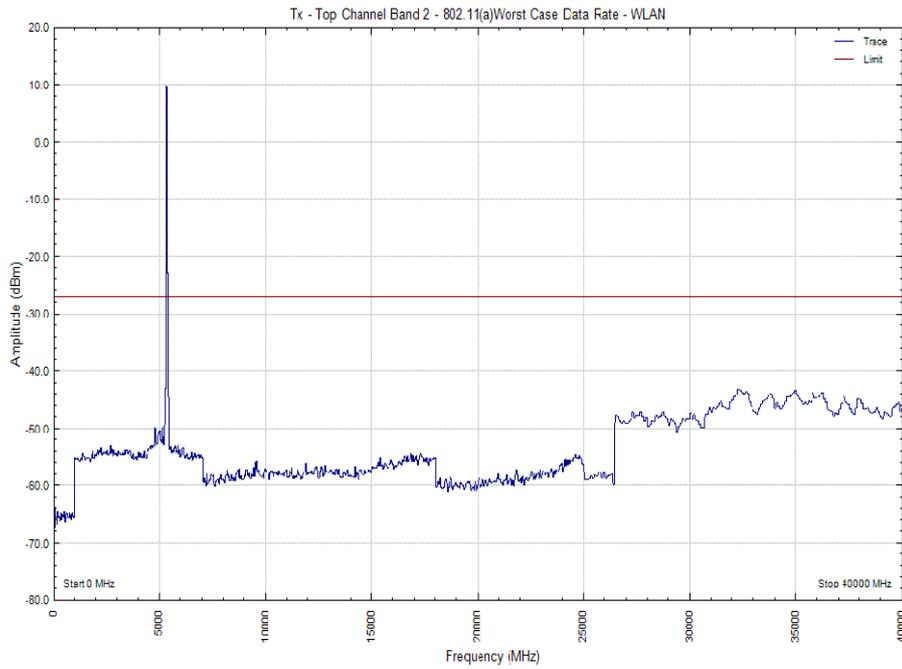
Product Service





5320 MHz

9 kHz to 40 GHz



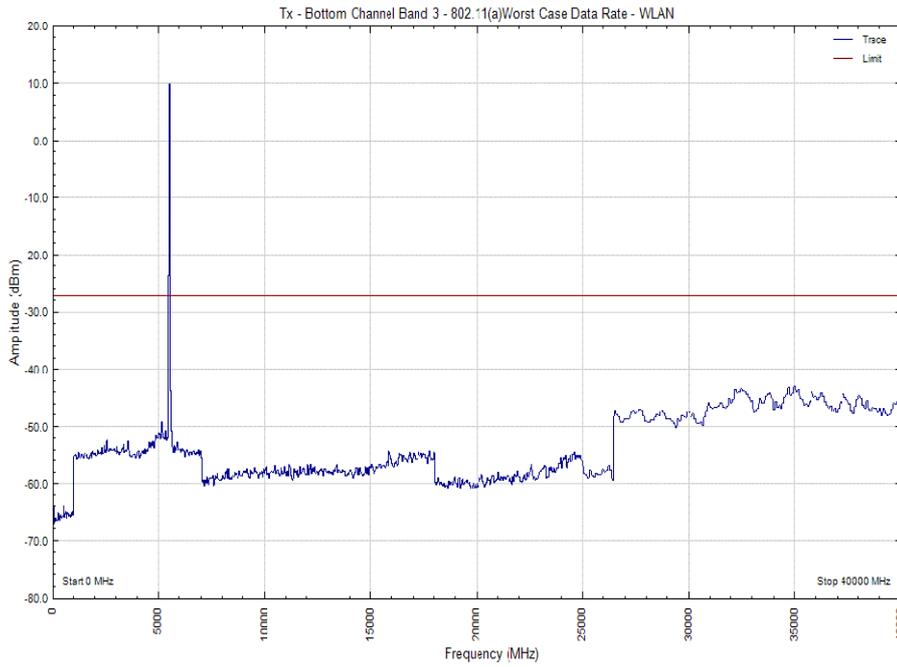
Frequency Band 3

5500 MHz

9 kHz to 40 GHz



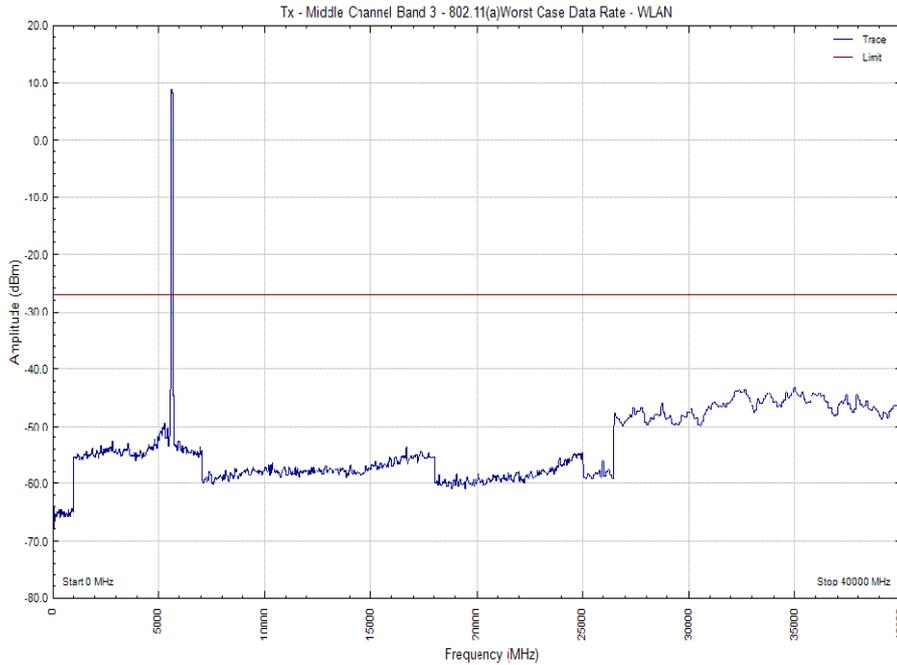
Product Service





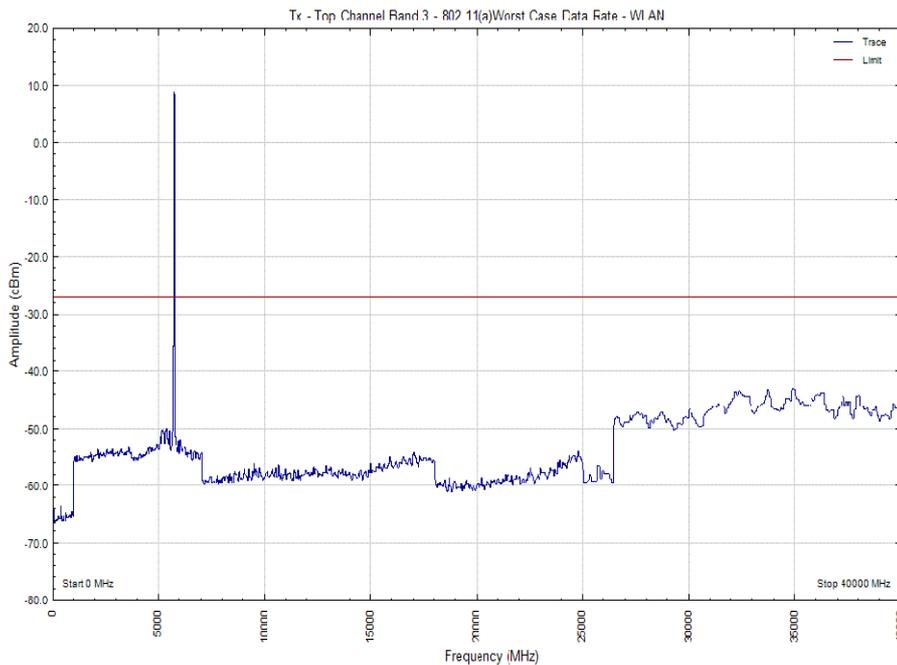
5600 MHz

9 kHz to 40 GHz



5700 MHz

9 kHz to 40 GHz





Product Service

Limit Clause

Band of Operation (MHz)	Limit
5150 to 5250	-27 dBm/MHz
5250 to 5350	-27 dBm/MHz
5470 to 5725	-27 dBm/MHz
5725 to 5825	(5715 to 5725) -17 dBm/MHz (5825 to 5835) -17 dBm/MHz (<5715 to >5835) -27 dBm/MHz



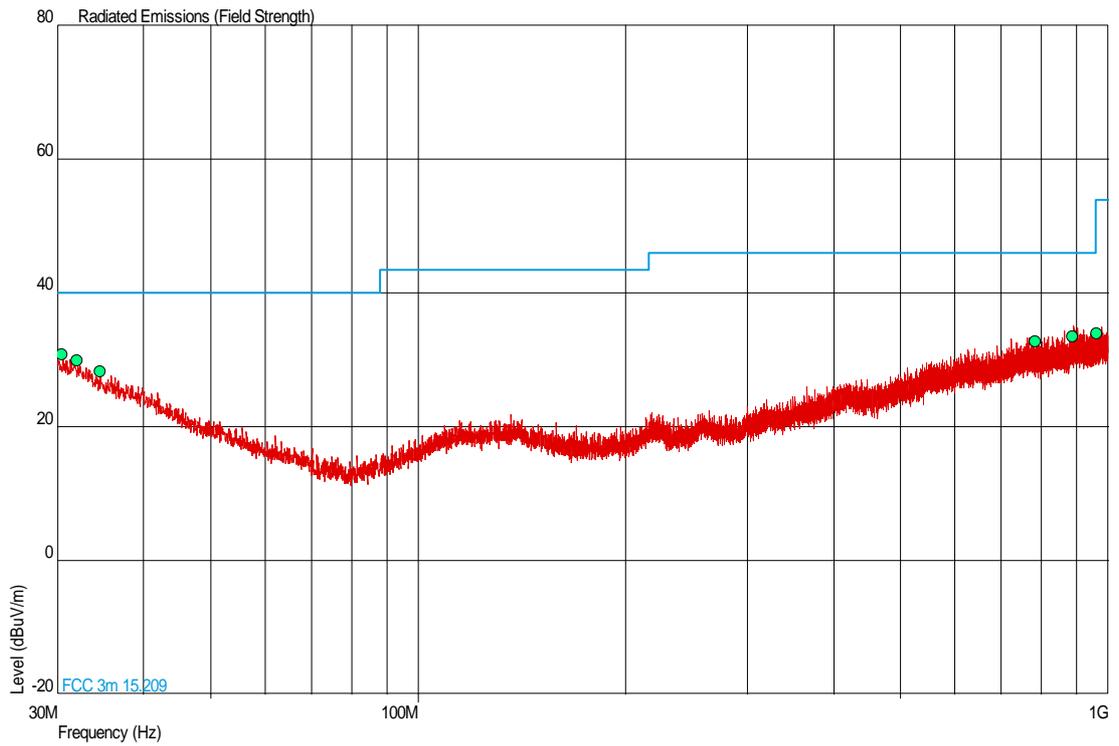
Product Service

Spurious Radiated Emissions

Frequency Band 1

5180 MHz

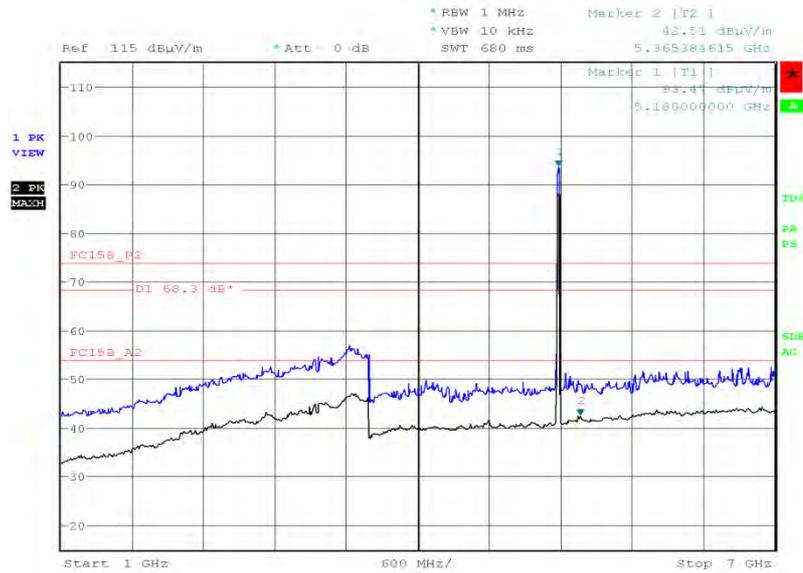
30 MHz to 1 GHz



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	30.8	34.7	40.0	100	-9.2	65.3	0	1.00	Vertical
32.037	29.9	31.3	40.0	100	-10.1	68.7	0	1.00	Vertical
34.559	28.3	26.0	40.0	100	-11.7	74.0	0	1.00	Horizontal
784.854	32.7	43.2	46.0	200	-13.3	156.8	0	1.00	Vertical
886.219	33.6	47.9	46.0	200	-12.4	152.1	0	1.00	Horizontal
962.607	34.0	50.1	54.0	501	-20.0	450.9	0	1.00	Vertical

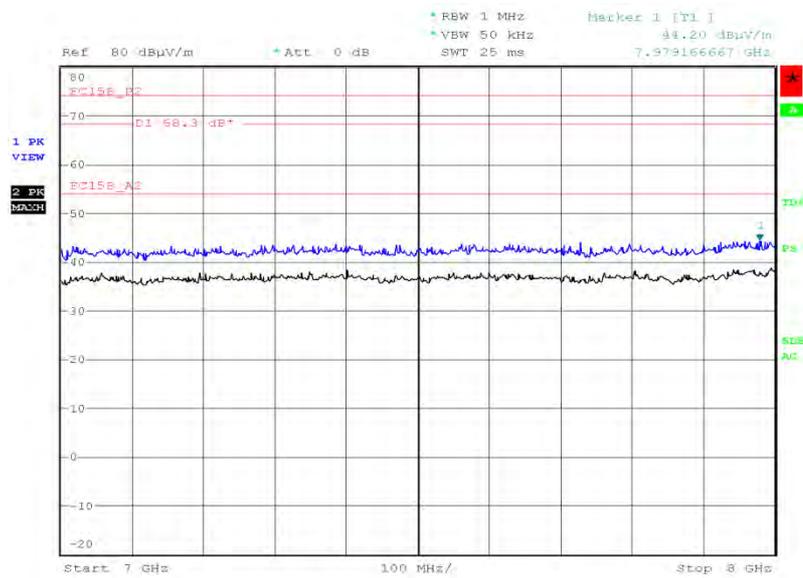


1 GHz to 7 GHz



Date: 7.JAN.2014 18:27:18

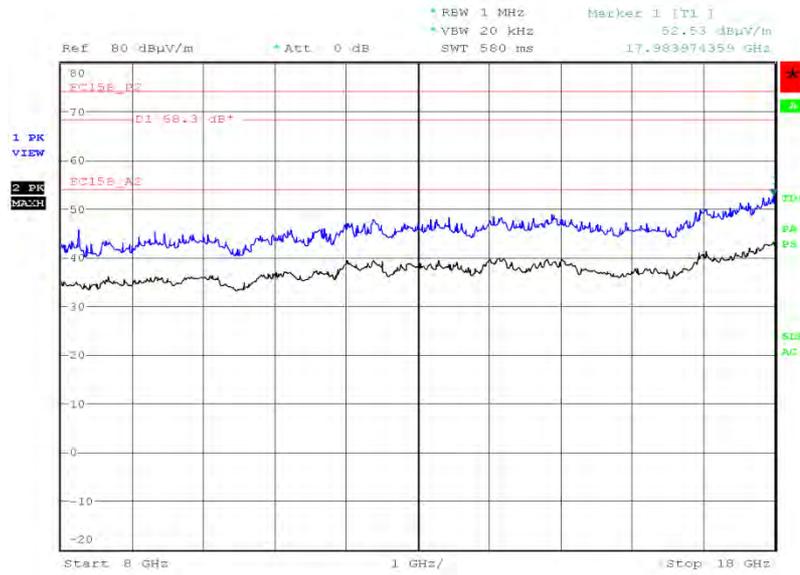
7 GHz to 8 GHz



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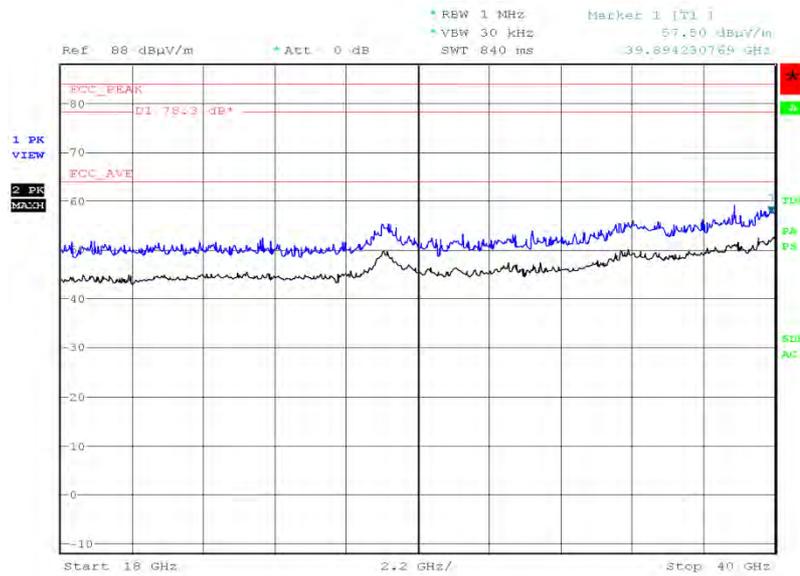


8 GHz to 18 GHz



Date: 8.JAN.2014 17:33:03

18 GHz to 40 GHz

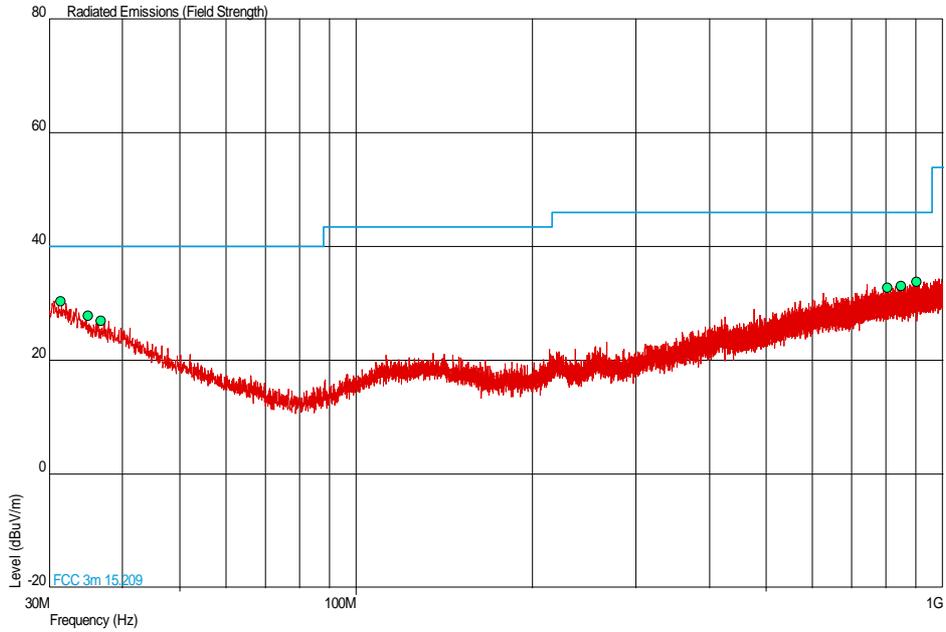


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5200 MHz

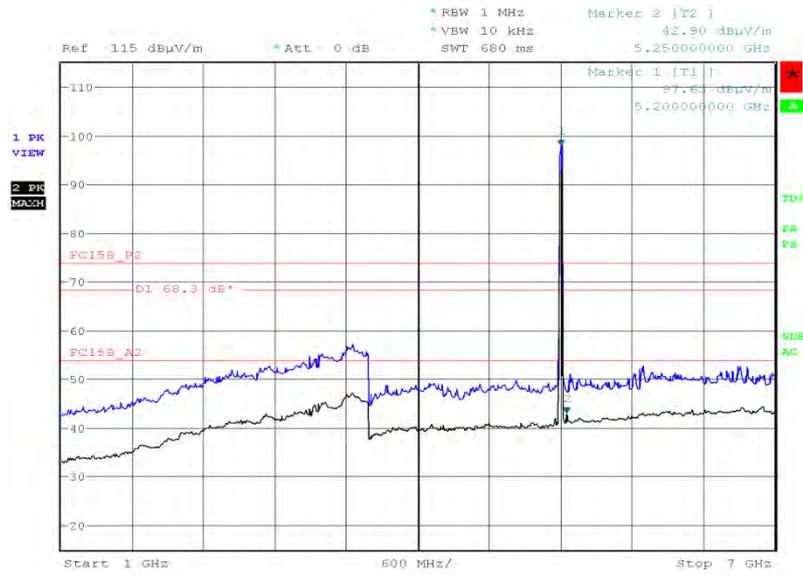
30 MHz to 1 GHz



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
31.407	30.4	33.1	40.0	100	-9.6	66.9	0	1.00	Vertical
34.996	27.9	24.8	40.0	100	-12.1	75.2	0	1.00	Vertical
36.790	26.9	22.1	40.0	100	-13.1	77.9	0	1.00	Vertical
804.836	32.8	43.7	46.0	200	-13.2	156.3	0	1.00	Vertical
849.893	33.0	44.7	46.0	200	-13.0	155.3	0	1.00	Vertical
903.049	33.8	49.0	46.0	200	-12.2	151.0	0	1.00	Vertical

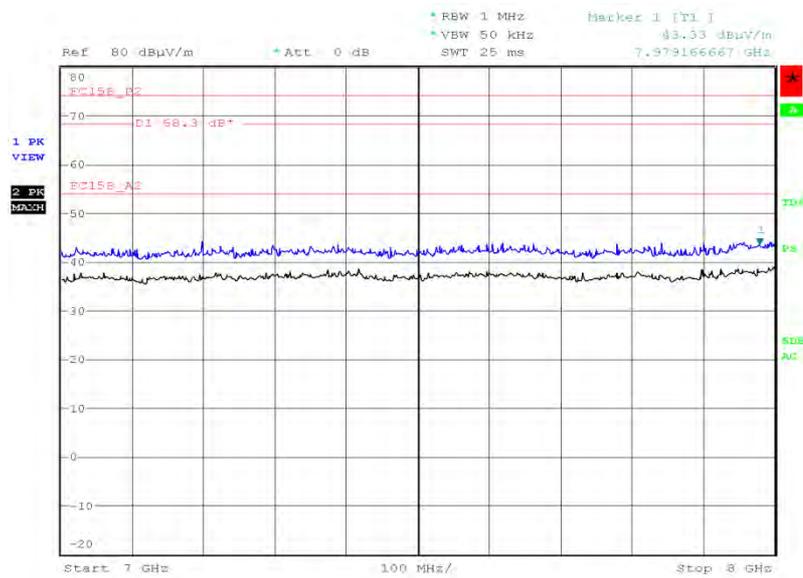


1 GHz to 7 GHz



Date: 7.JAN.2014 18:44:54

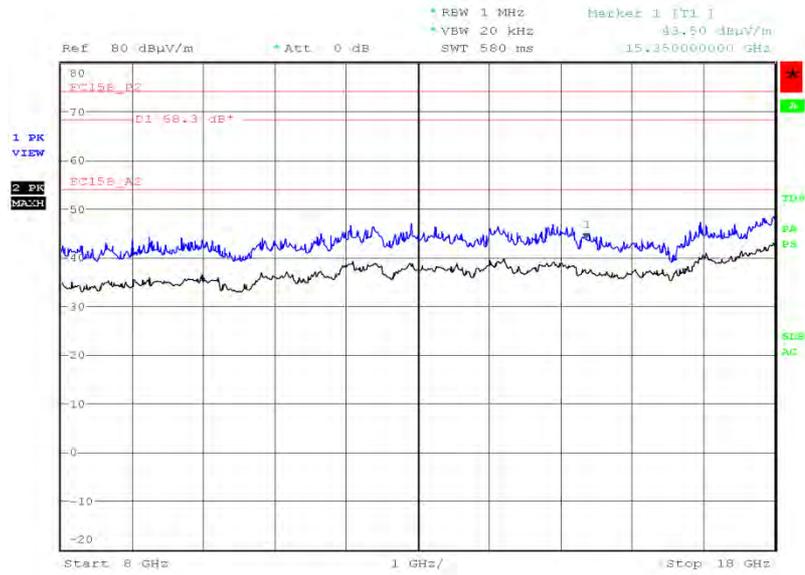
7 GHz to 8 GHz



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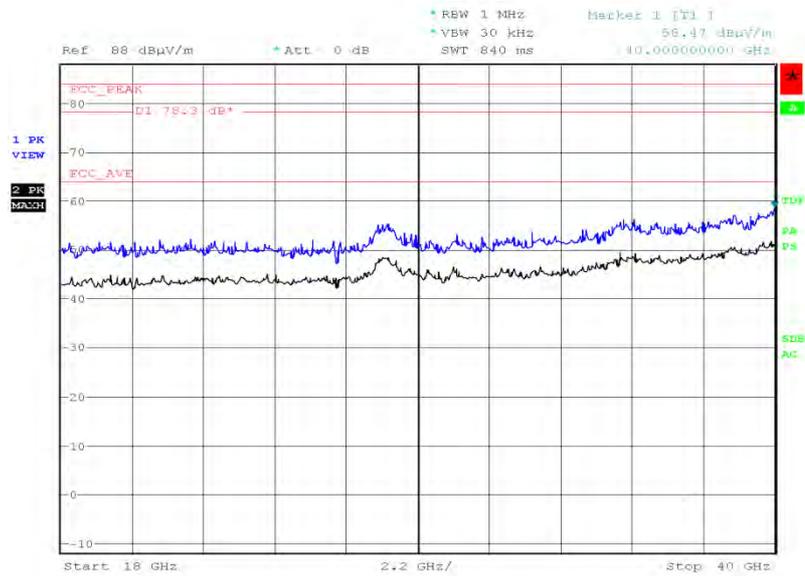


8 GHz to 18 GHz



Date: 8.JAN.2014 17:47:37

18 GHz to 40 GHz

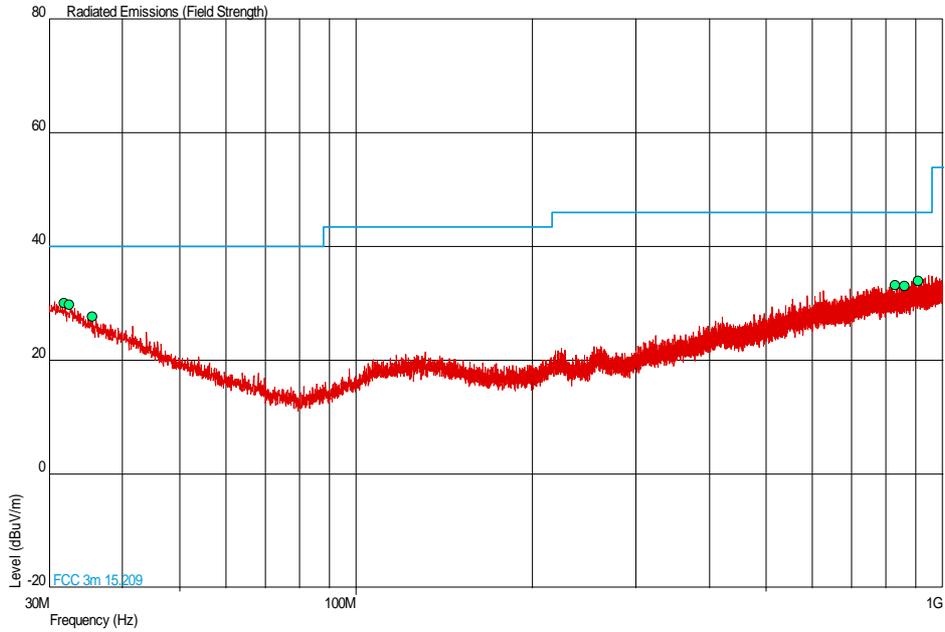


Date: 11.JAN.2014 15:16:50



5240 MHz

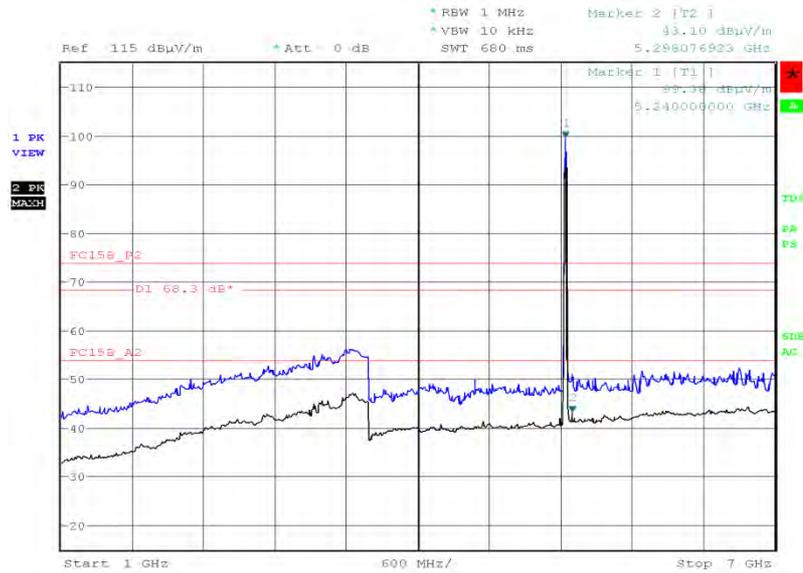
30 MHz to 1 GHz



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
31.772	30.1	32.0	40.0	100	-9.9	68.0	0	0.00	Horizontal
32.425	29.7	30.5	40.0	100	-10.3	69.5	0	1.00	Horizontal
35.529	27.7	24.3	40.0	100	-12.3	75.7	0	1.00	Horizontal
831.220	33.2	45.7	46.0	200	-12.8	154.3	0	1.00	Vertical
860.175	33.1	45.2	46.0	200	-12.9	154.8	0	1.00	Vertical
908.869	34.0	50.1	46.0	200	-12.0	149.9	0	1.00	Vertical

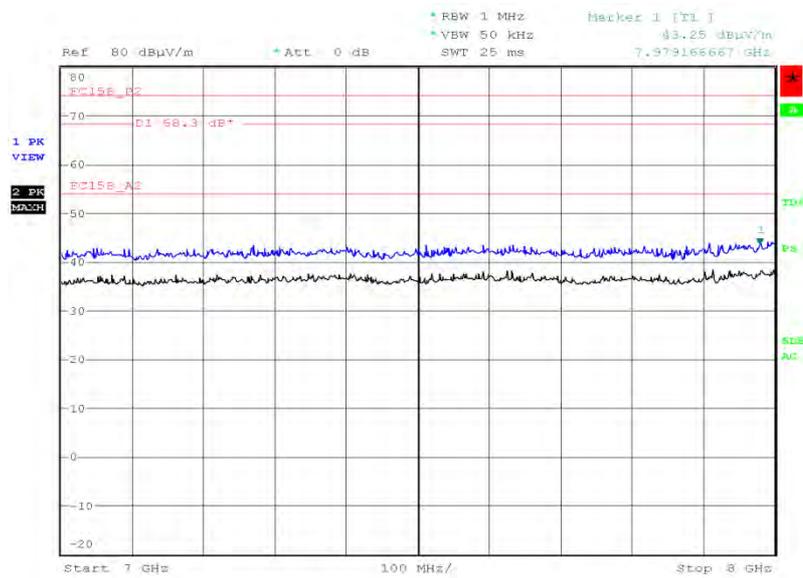


1 GHz to 7 GHz



Date: 7.JAN.2014 18:59:09

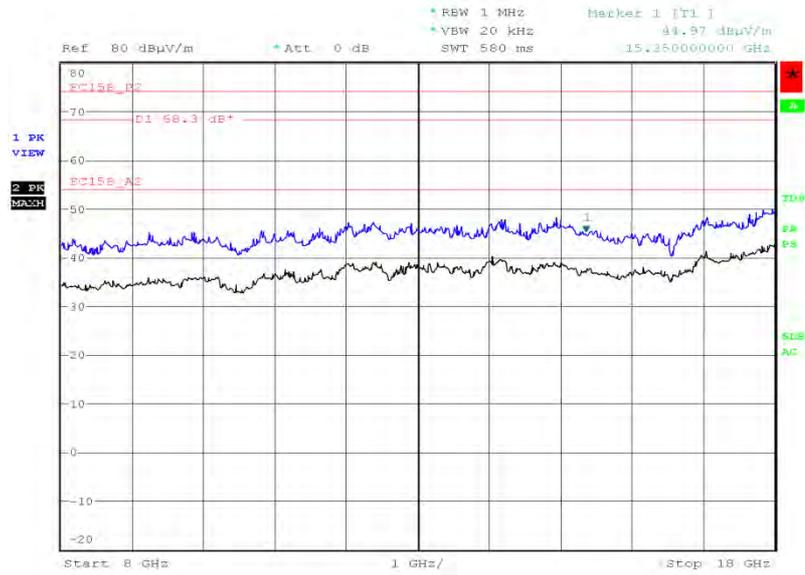
7 GHz to 8 GHz



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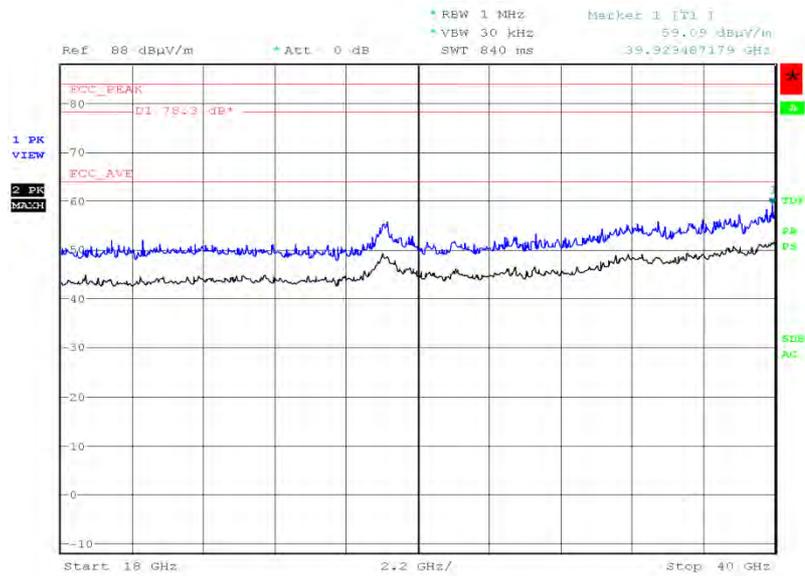


8 GHz to 18 GHz



Date: 8.JAN.2014 18:00:01

18 GHz to 40 GHz



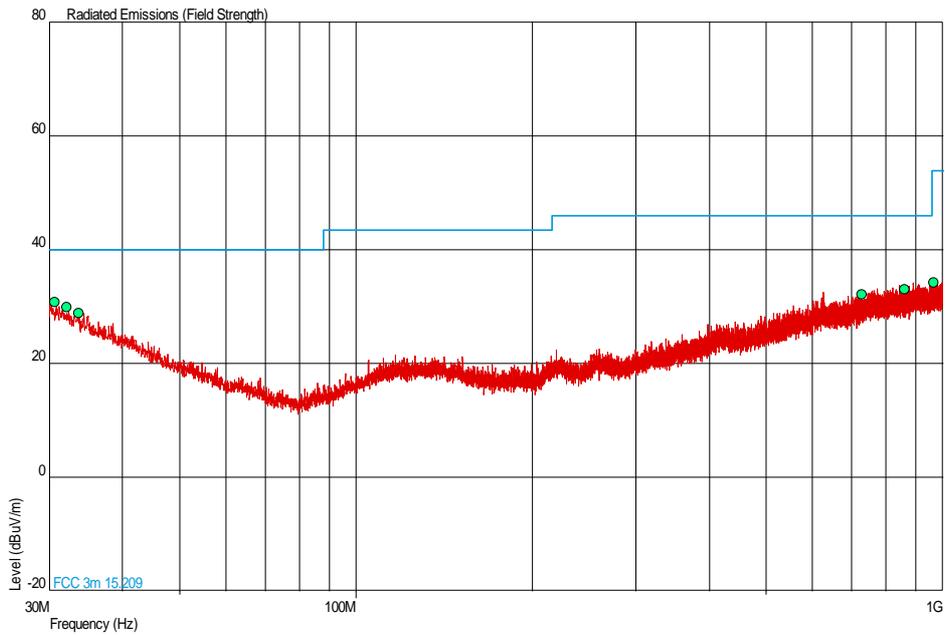
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Frequency Band 2

5260 MHz

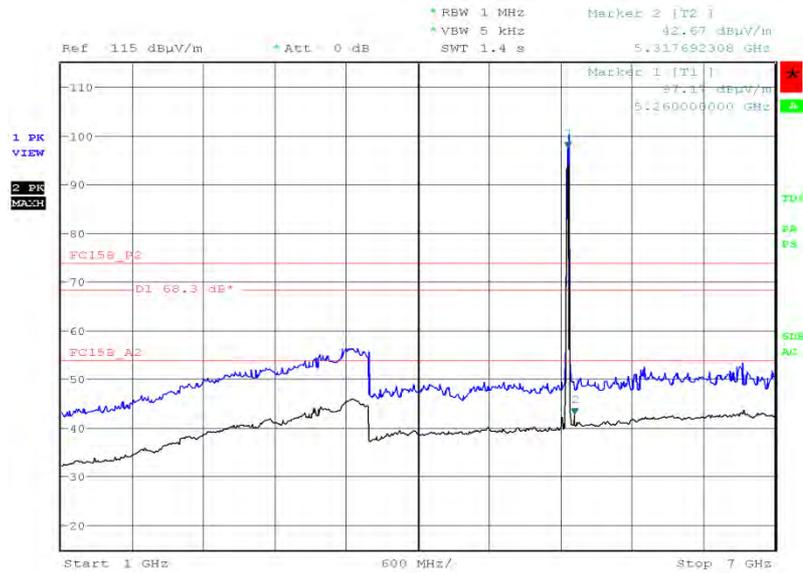
30 MHz to 1 GHz



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
30.679	30.8	34.7	40.0	100	-9.2	65.3	0	1.00	Horizontal
32.086	29.9	31.3	40.0	100	-10.1	68.7	0	1.00	Vertical
33.686	28.9	27.9	40.0	100	-11.1	72.1	0	1.00	Vertical
727.333	32.1	40.3	46.0	200	-13.9	159.7	0	1.00	Vertical
862.406	33.1	45.2	46.0	200	-12.9	154.8	0	1.00	Vertical
966.826	34.3	51.9	54.0	501	-19.7	449.1	0	1.00	Horizontal

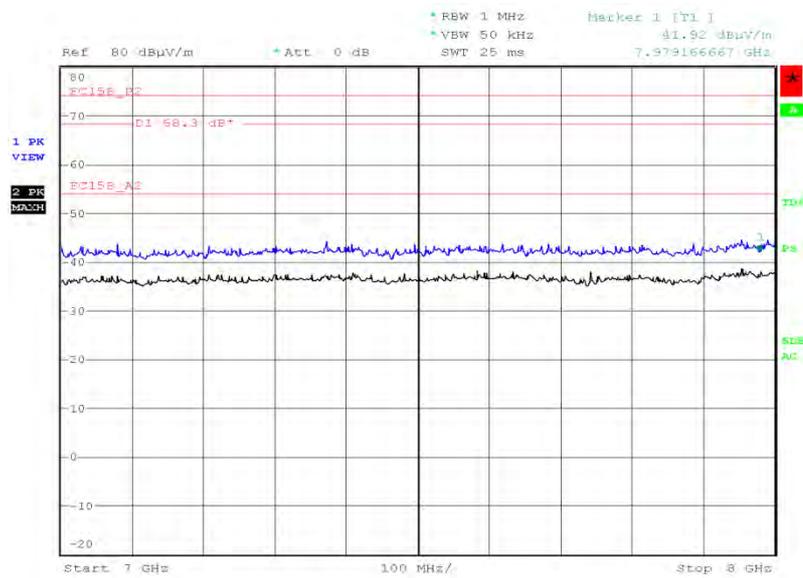


1 GHz to 7 GHz



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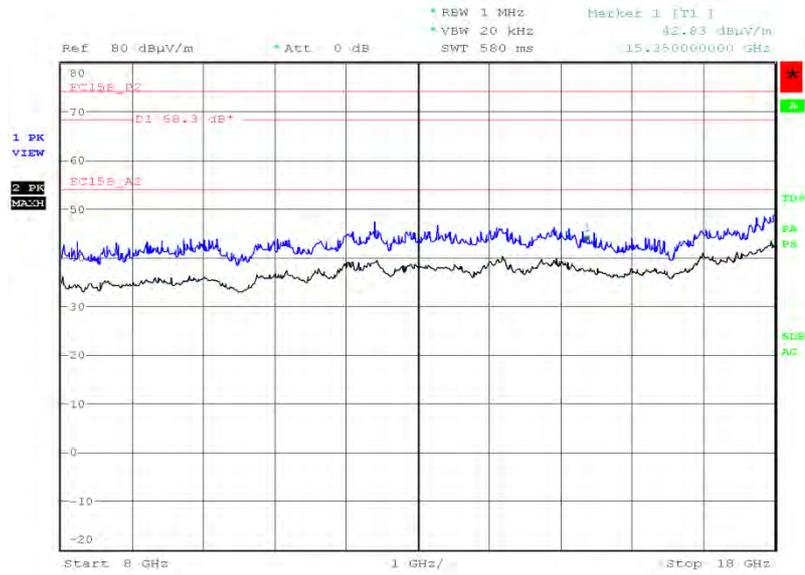
7 GHz to 8 GHz



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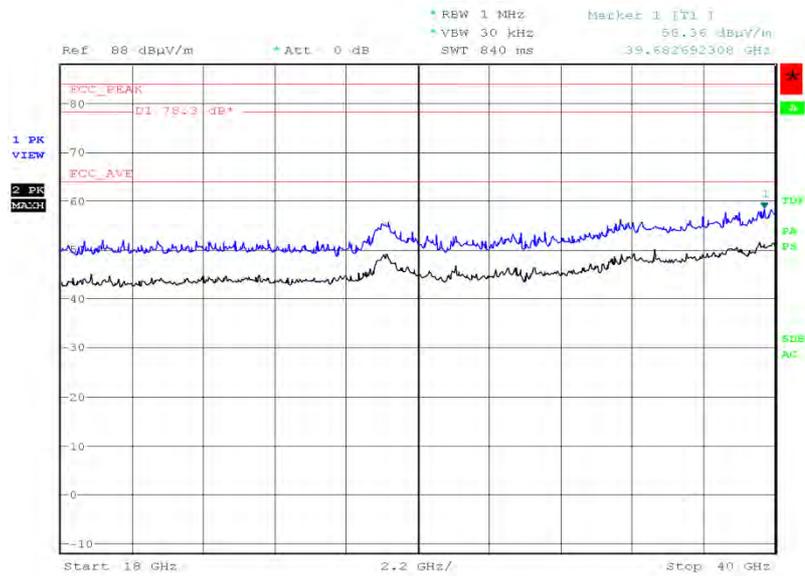


8 GHz to 18 GHz



Date: 8.JAN.2014 18:19:34

18 GHz to 40 GHz

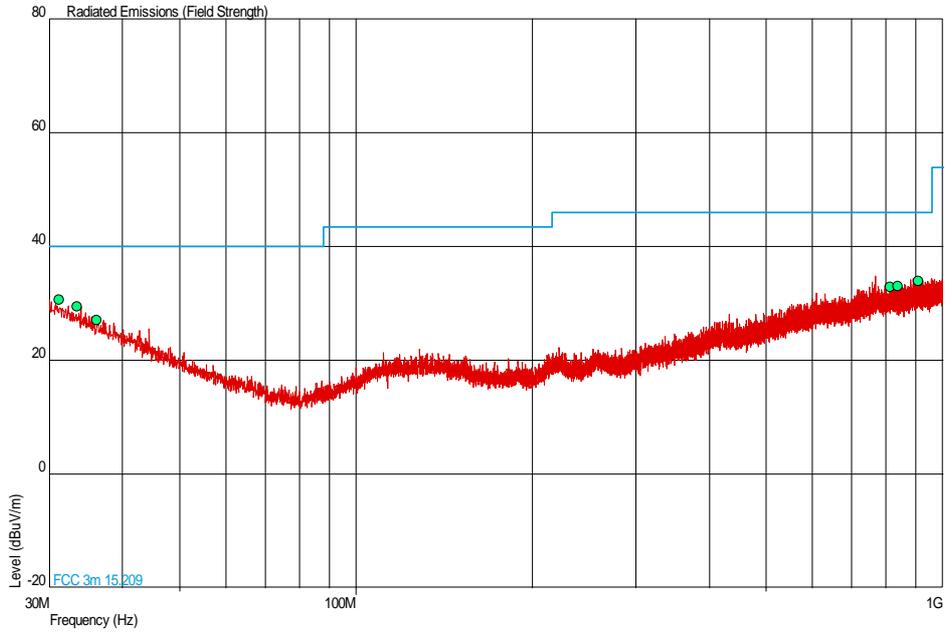


Date: 11.JAN.2014 11:37:48



5300 MHz

30 MHz to 1 GHz



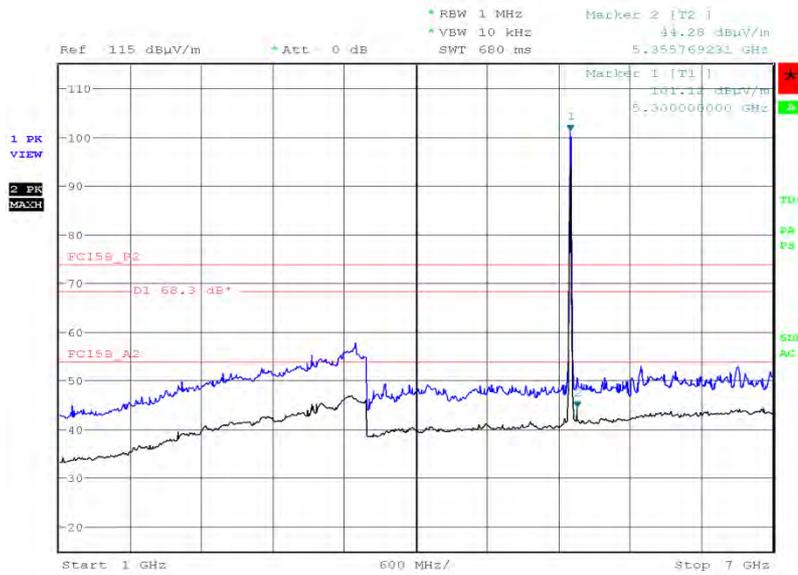
Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
31.164	30.7	34.3	40.0	100	-9.3	65.7	0	1.00	Vertical
33.444	29.5	29.9	40.0	100	-10.5	70.1	0	1.00	Vertical
36.160	27.1	22.6	40.0	100	-12.9	77.4	0	1.00	Horizontal
813.809	33.0	44.7	46.0	200	-13.0	155.3	0	1.00	Horizontal
837.428	33.0	44.7	46.0	200	-13.0	155.3	0	1.00	Vertical
908.432	34.0	50.1	46.0	200	-12.0	149.9	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)
5.352	Vertical	100	161	54.44	42.66

1 GHz to 7 GHz

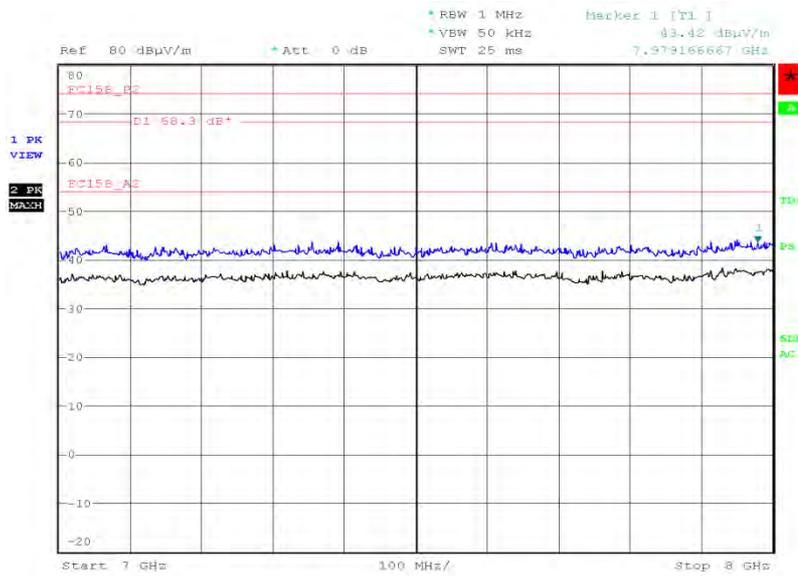


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7 GHz to 8 GHz

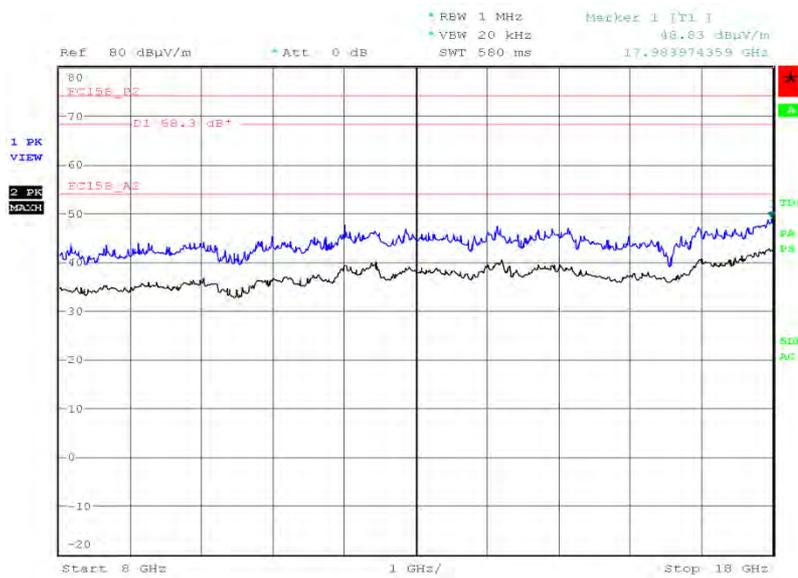


Product Service



Date: 8.JAN.2014 15:03:50

8 GHz to 18 GHz

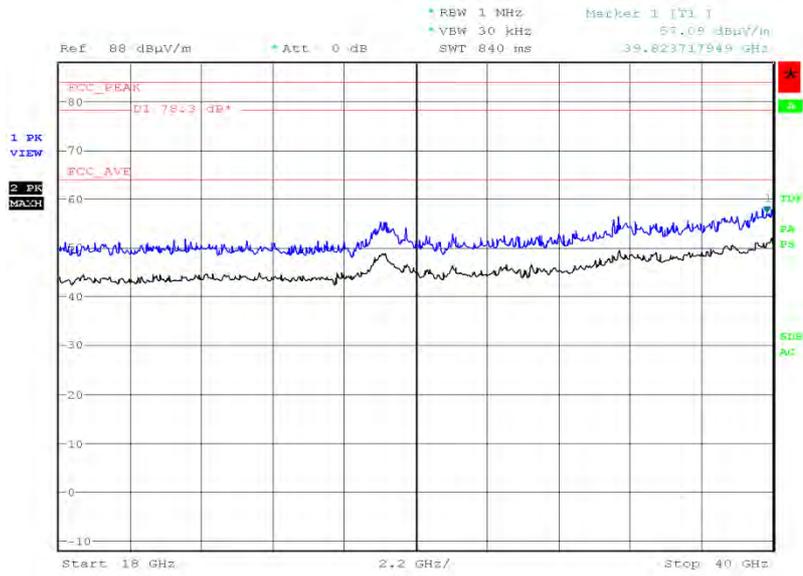


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18 GHz to 40 GHz



Product Service

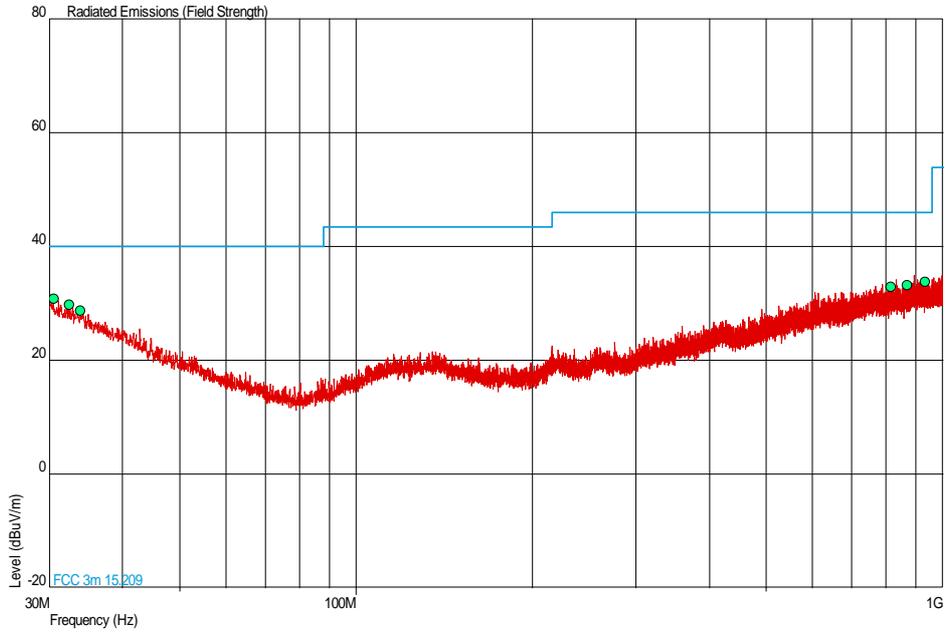


Date: 11.JAN.2014 11:49:42



5320 MHz

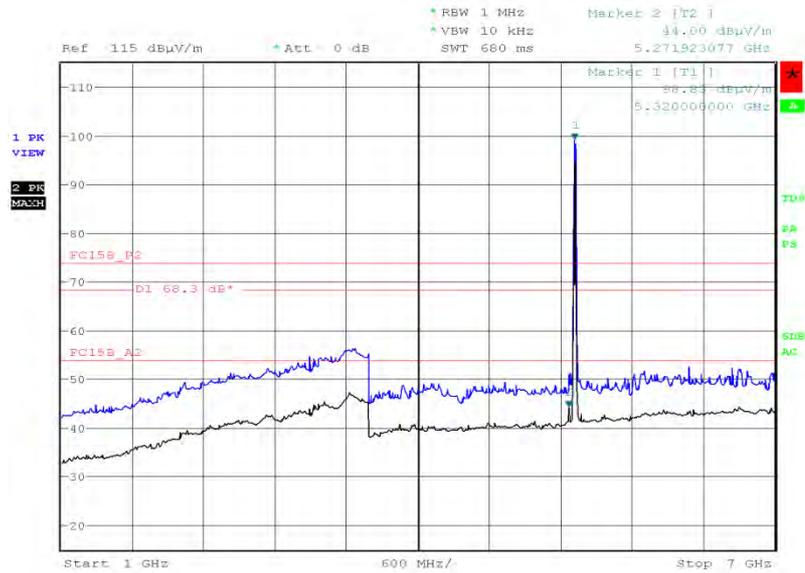
30 MHz to 1 GHz



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
30.582	30.8	34.7	40.0	100	-9.2	65.3	0	1.00	Horizontal
32.425	29.8	30.9	40.0	100	-10.2	69.1	0	1.00	Horizontal
33.929	28.7	27.2	40.0	100	-11.3	72.8	0	1.00	Vertical
815.458	33.0	44.7	46.0	200	-13.0	155.3	0	1.00	Vertical
869.438	33.2	45.7	46.0	200	-12.8	154.3	0	1.00	Vertical
932.391	33.8	49.0	46.0	200	-12.2	151.0	0	1.00	Horizontal

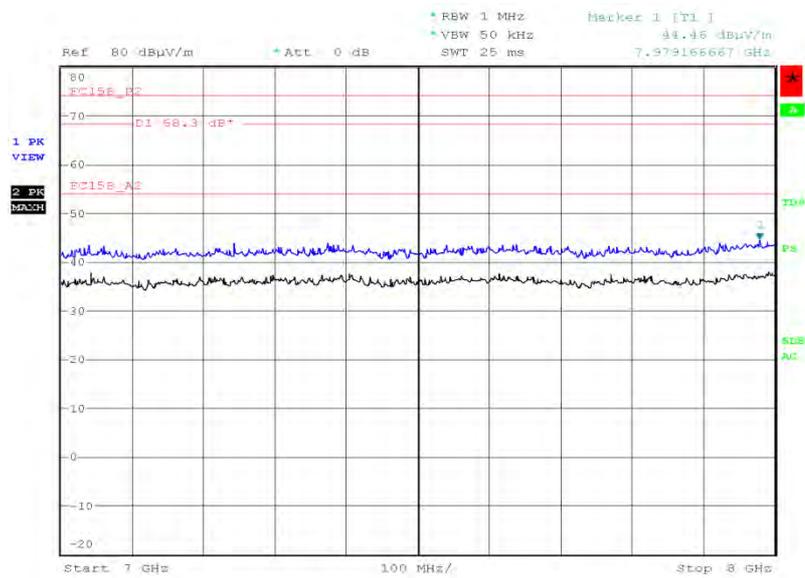


1 GHz to 7 GHz



Date: 7.JAN.2014 19:49:52

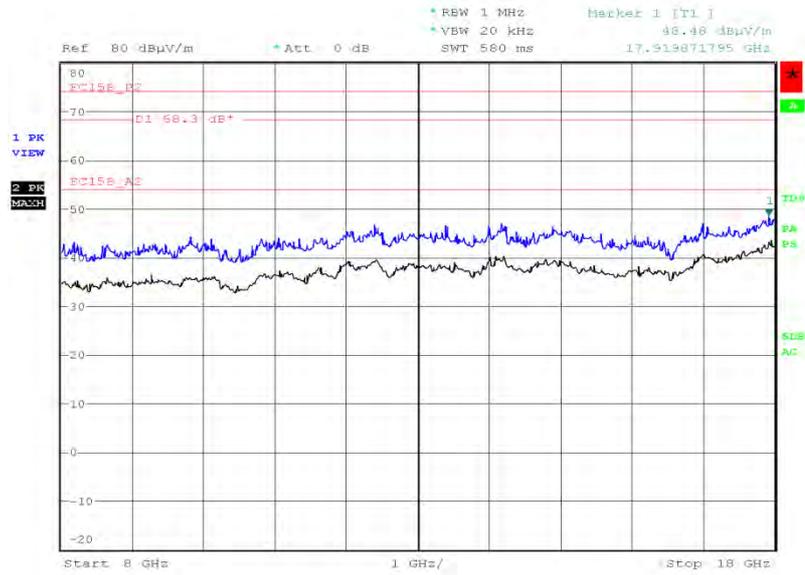
7 GHz to 8 GHz



Date: 8.JAN.2014 15:08:16

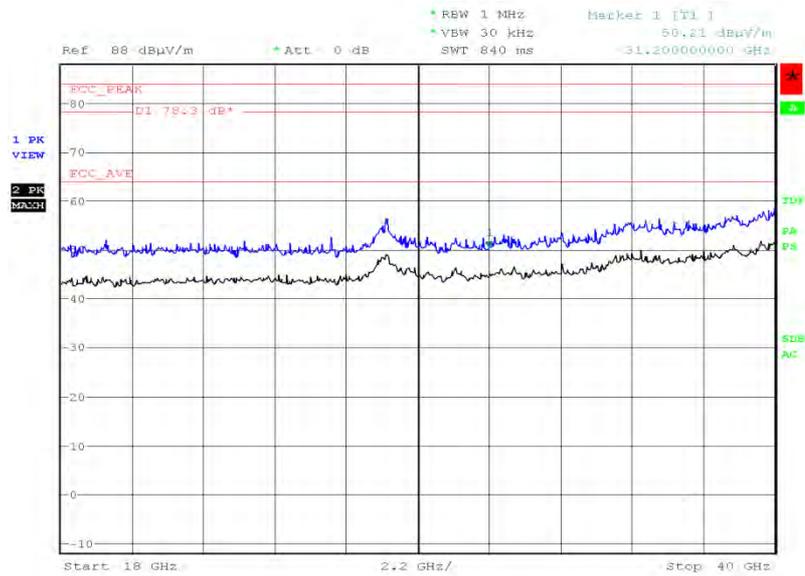


8 GHz to 18 GHz



Date: 8.JAN.2014 18:39:17

18 GHz to 40 GHz



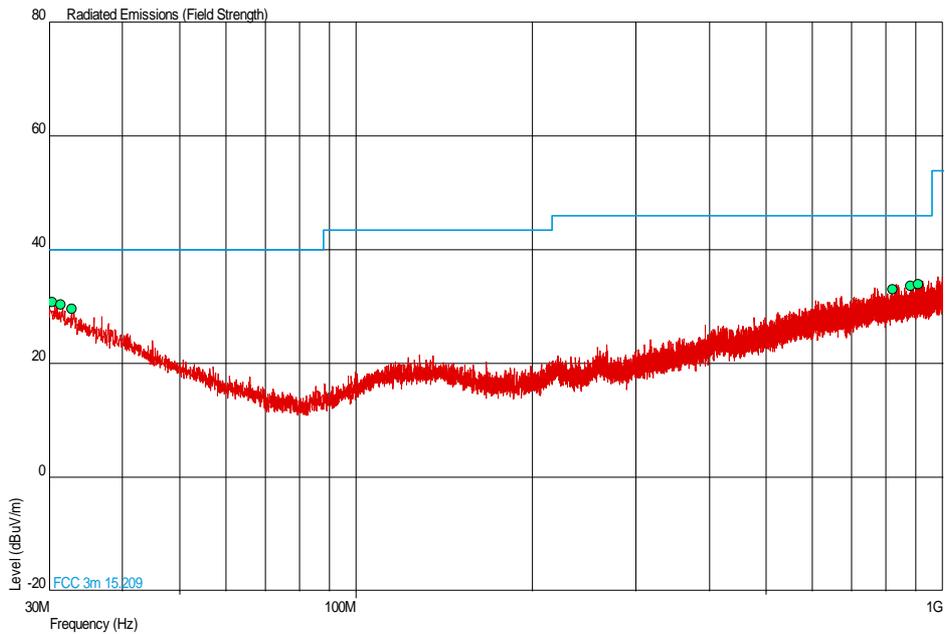
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Frequency Band 3

5500 MHz

30 MHz to 1 GHz



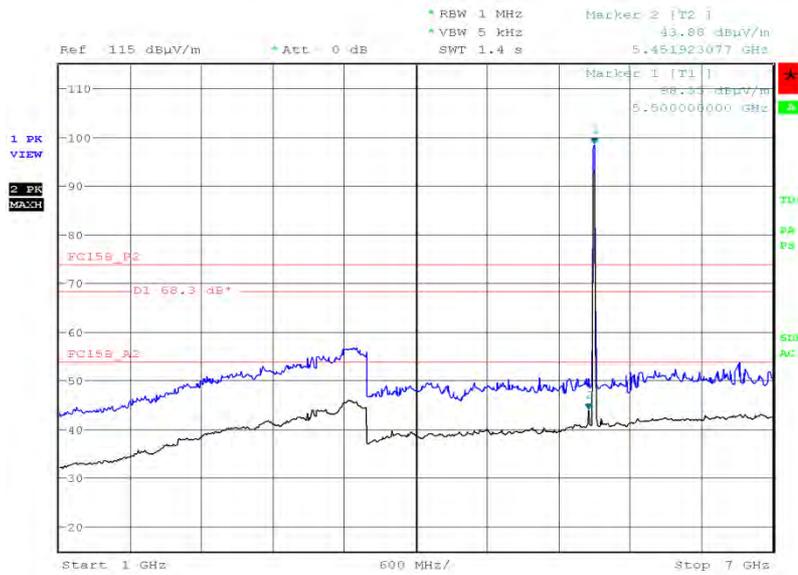
Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
30.388	30.9	35.1	40.0	100	-9.1	64.9	0	1.00	Vertical
31.407	30.3	32.7	40.0	100	-9.7	67.3	0	1.00	Vertical
32.813	29.6	30.2	40.0	100	-10.4	69.8	0	1.00	Vertical
820.841	33.1	45.2	46.0	200	-12.9	154.8	0	1.00	Vertical
882.727	33.6	47.9	46.0	200	-12.4	152.1	0	1.00	Vertical
908.966	34.0	50.1	46.0	200	-12.0	149.9	0	1.00	Vertical



1 GHz to 40 GHz

Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
5.448	Vertical	108	217	54.92	43.52

1 GHz to 7 GHz

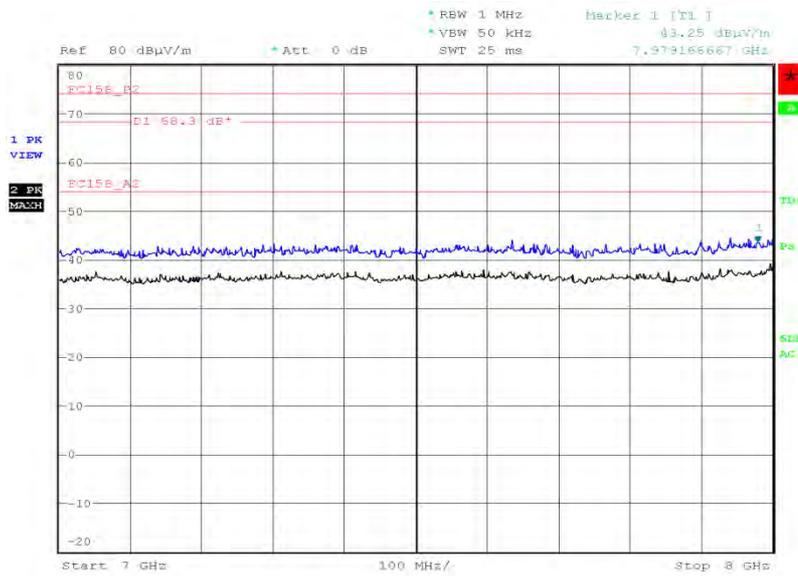


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7 GHz to 8 GHz

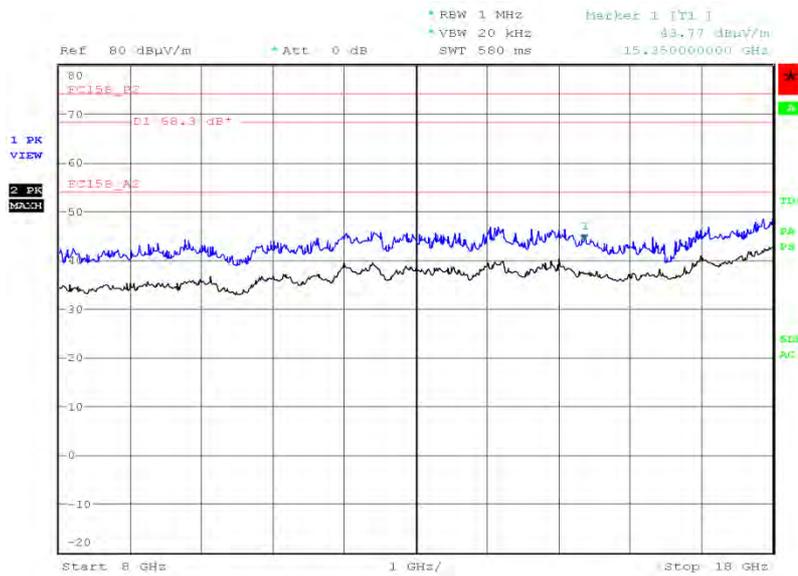


Product Service



Date: 8.JAN.2014 15:11:54

8 GHz to 18 GHz

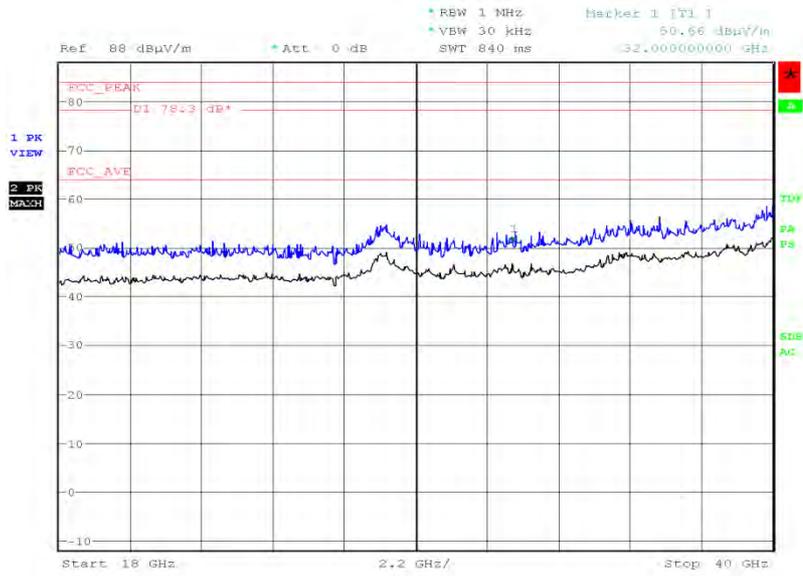


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18 GHz to 40 GHz



Product Service

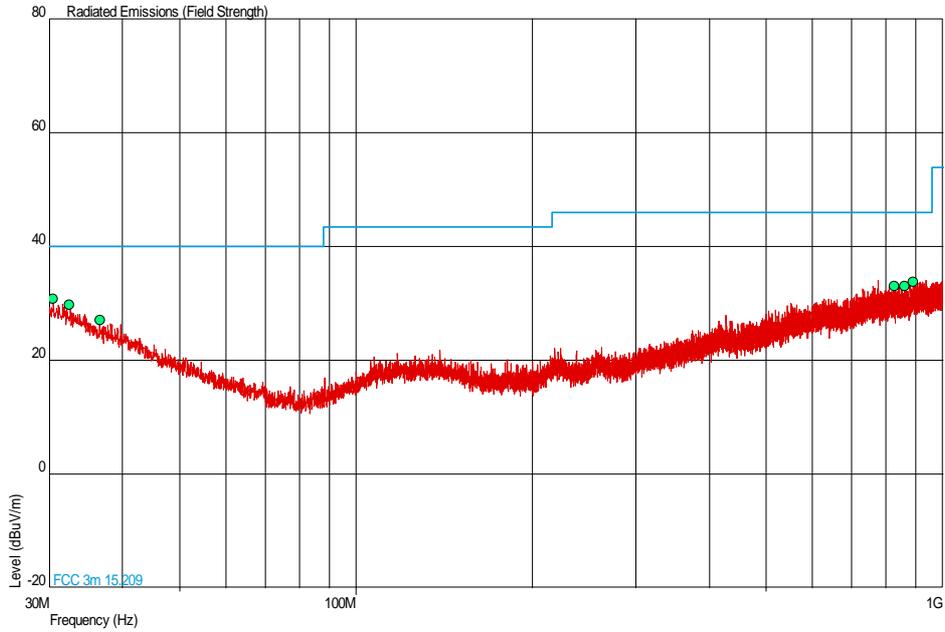


Date: 11.JAN.2014 12:32:42



5600 MHz

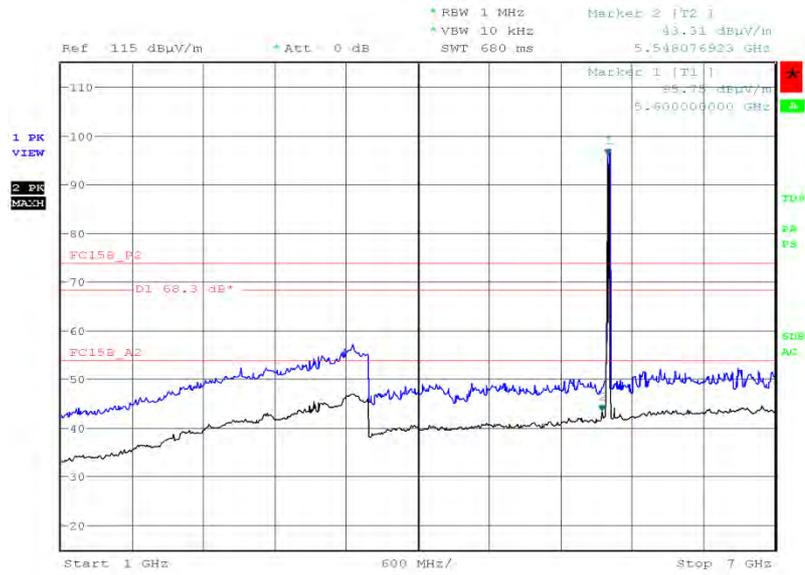
30 MHz to 1 GHz



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
30.485	30.8	34.7	40.0	100	-9.2	65.3	0	1.00	Vertical
32.425	29.7	30.5	40.0	100	-10.3	69.5	0	1.00	Vertical
36.596	27.0	22.4	40.0	100	-13.0	77.6	0	1.00	Vertical
825.912	33.1	45.2	46.0	200	-12.9	154.8	0	1.00	Vertical
861.048	33.1	45.2	46.0	200	-12.9	154.8	0	1.00	Vertical
890.342	33.7	48.4	46.0	200	-12.3	151.6	0	1.00	Vertical

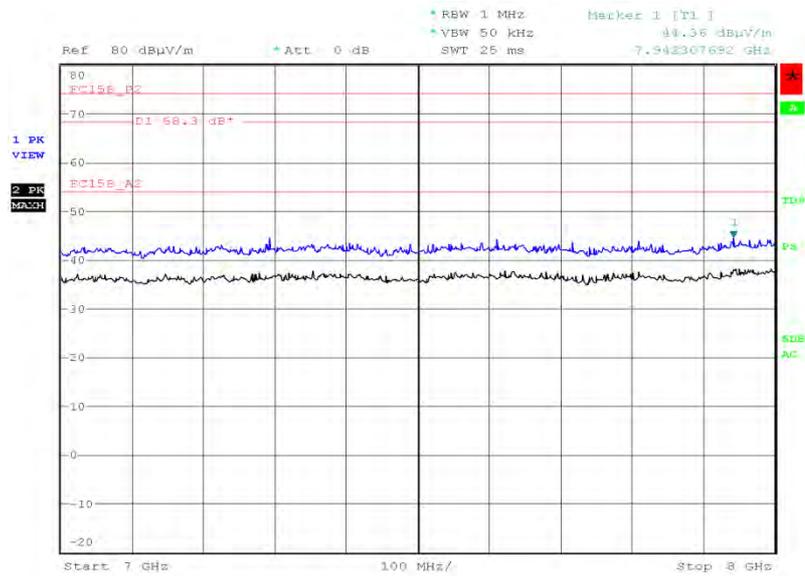


1 GHz to 7 GHz



Date: 7.JAN.2014 20:36:58

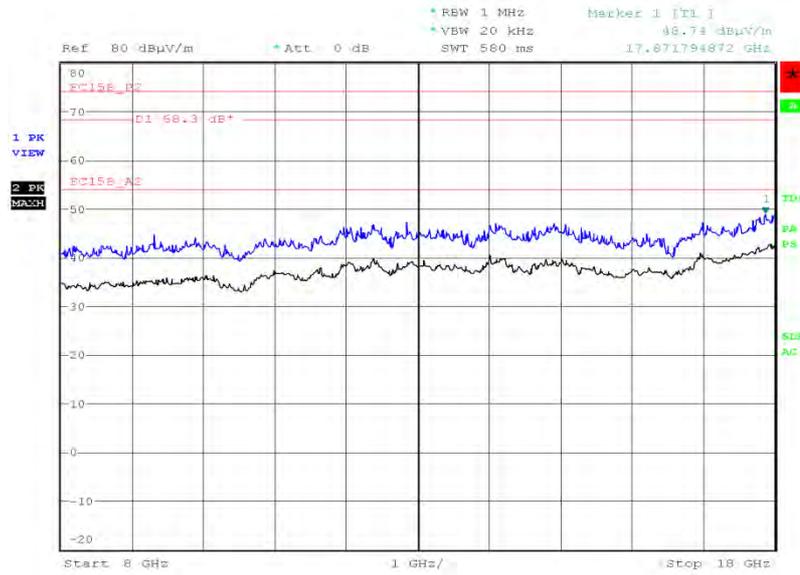
7 GHz to 8 GHz



Date: 8.JAN.2014 15:17:04

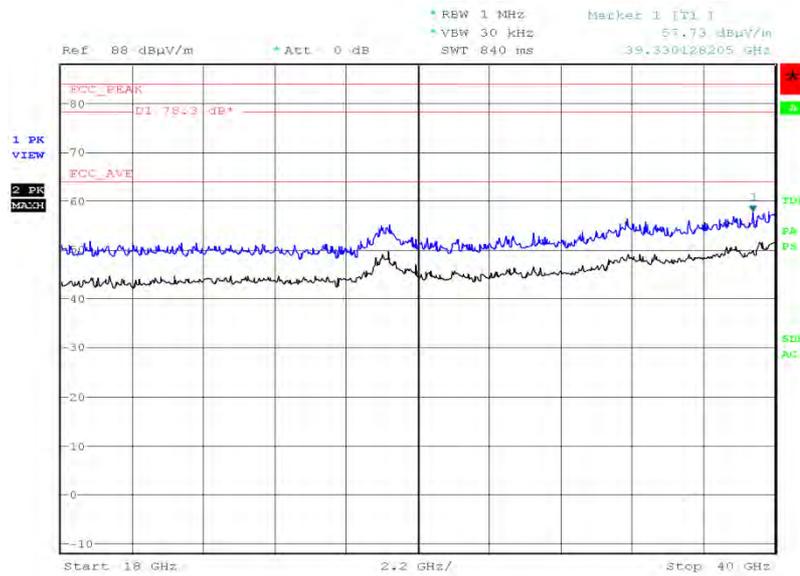


8 GHz to 18 GHz



Date: 8.JAN.2014 19:00:04

18 GHz to 40 GHz

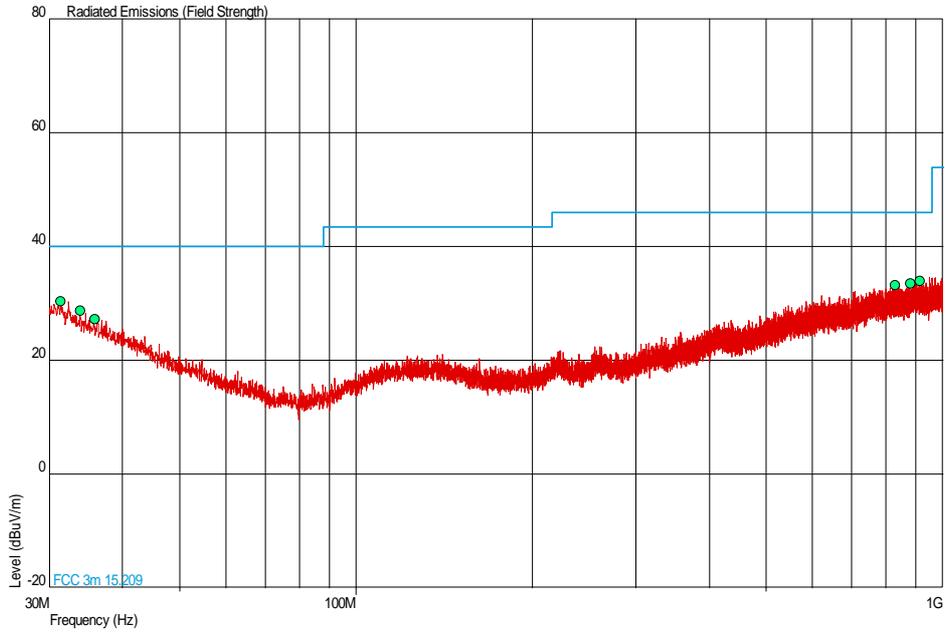


Date: 11.JAN.2014 12:45:29



5700 MHz

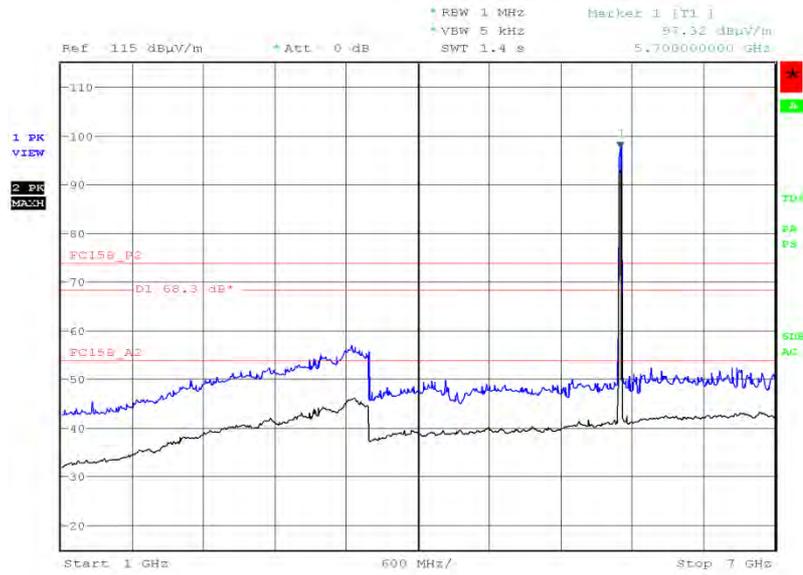
30 MHz to 1 GHz



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
31.407	30.3	32.7	40.0	100	-9.7	67.3	0	1.00	Vertical
33.929	28.7	27.2	40.0	100	-11.3	72.8	0	1.00	Vertical
35.917	27.2	22.9	40.0	100	-12.8	77.1	0	1.00	Vertical
831.220	33.2	45.7	46.0	200	-12.8	154.3	0	1.00	Vertical
881.515	33.5	47.3	46.0	200	-12.5	152.7	0	1.00	Vertical
915.416	34.0	50.1	46.0	200	-12.0	149.9	0	1.00	Vertical

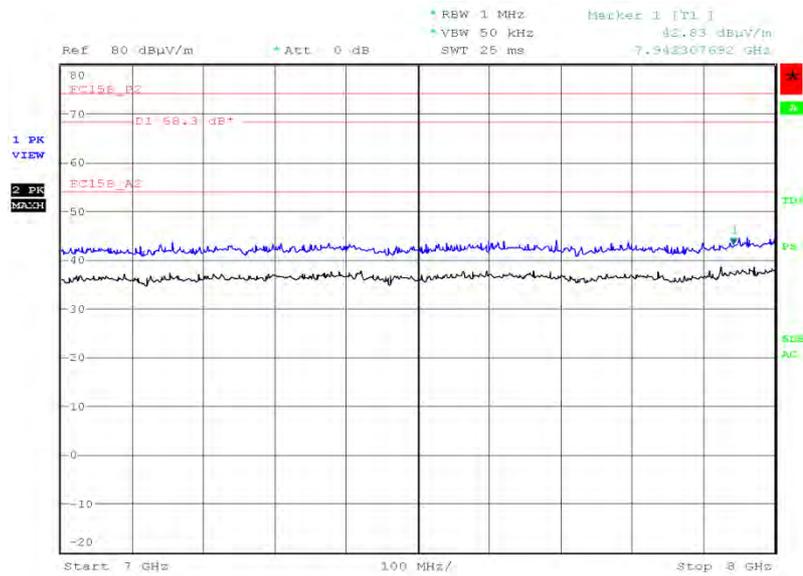


1 GHz to 7 GHz



Date: 7.JAN.2014 21:05:07

7 GHz to 8 GHz

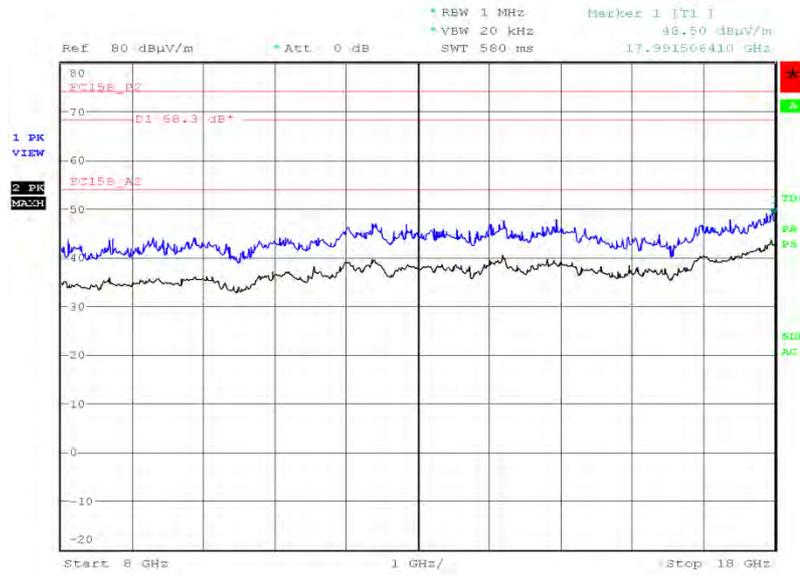


Date: 8.JAN.2014 15:24:12



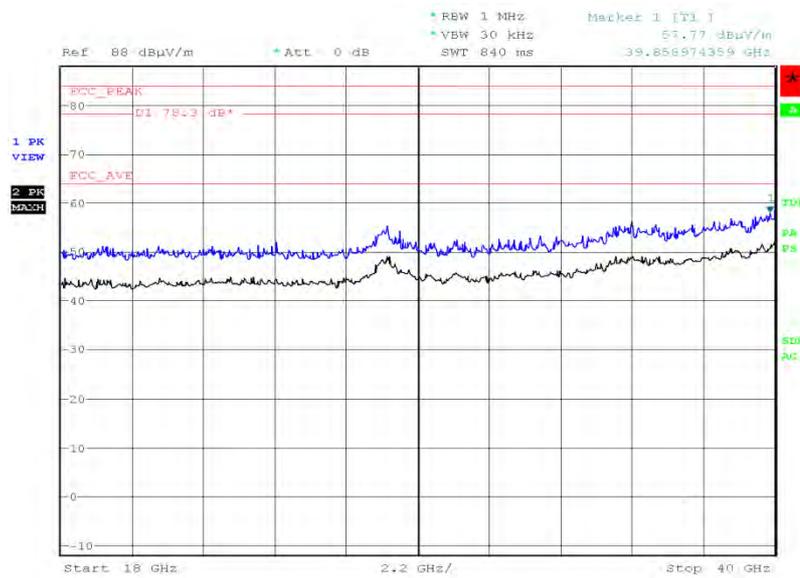
Product Service

8 GHz to 18 GHz



Date: 8.JAN.2014 19:13:11

18 GHz to 40 GHz



Date: 11.JAN.2014 13:07:33

Limit

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



Product Service

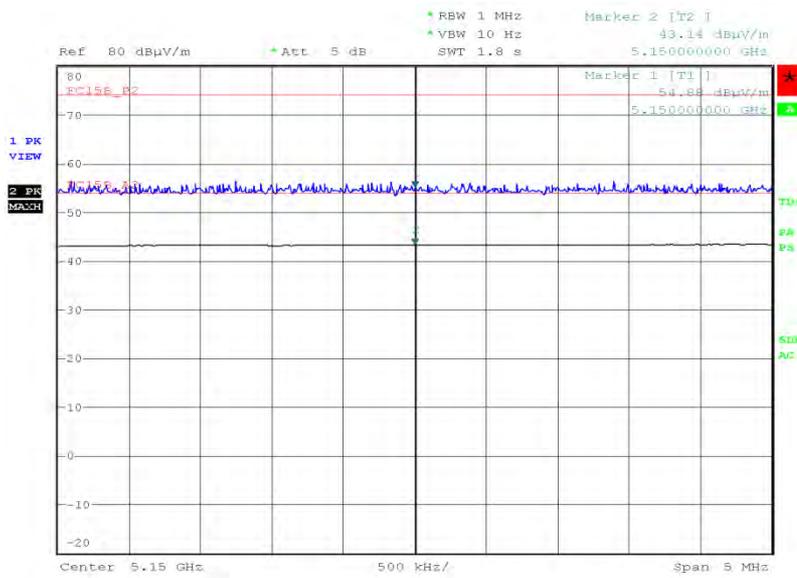


Product Service

Band Edge Emissions

5180 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	54.88	43.14

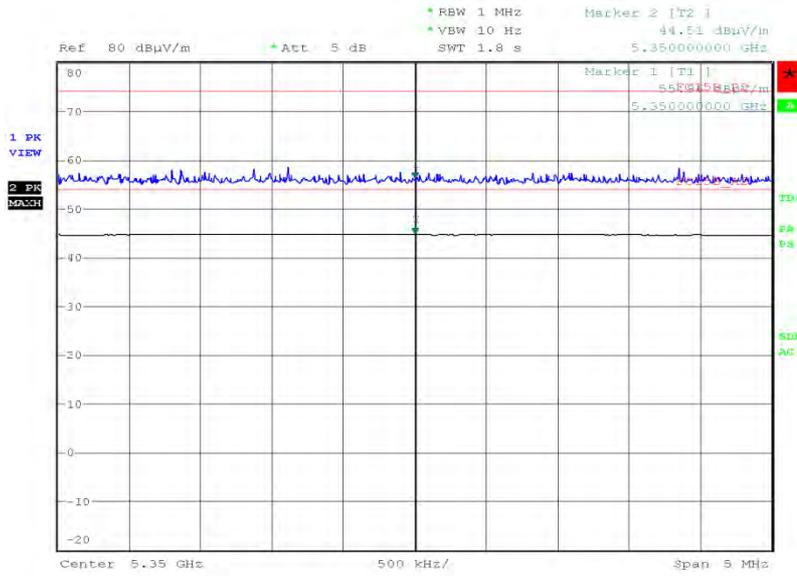


Date: 21.DEC.2013 19:34:21



5320 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	55.96	44.51

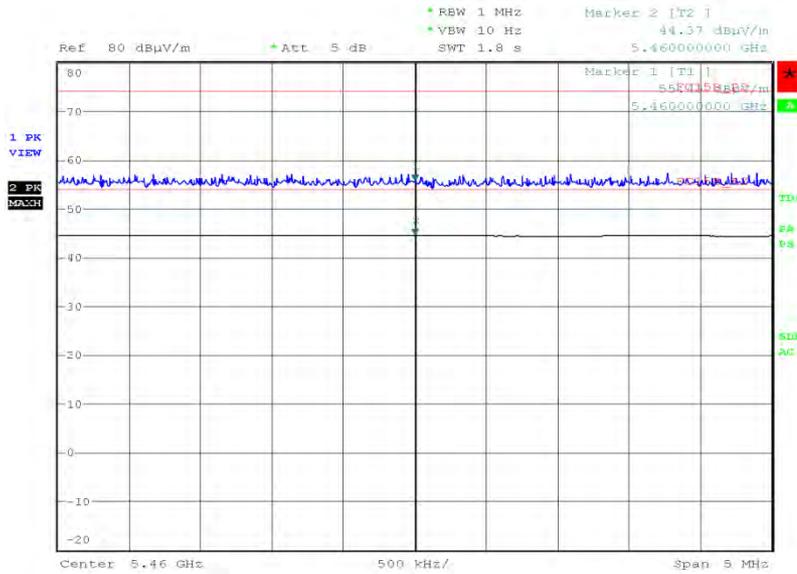


Date: 21.DEC.2013 20:21:46



5500 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	55.43	44.37



Date: 21.DEC.2013 20:30:44

Limit

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

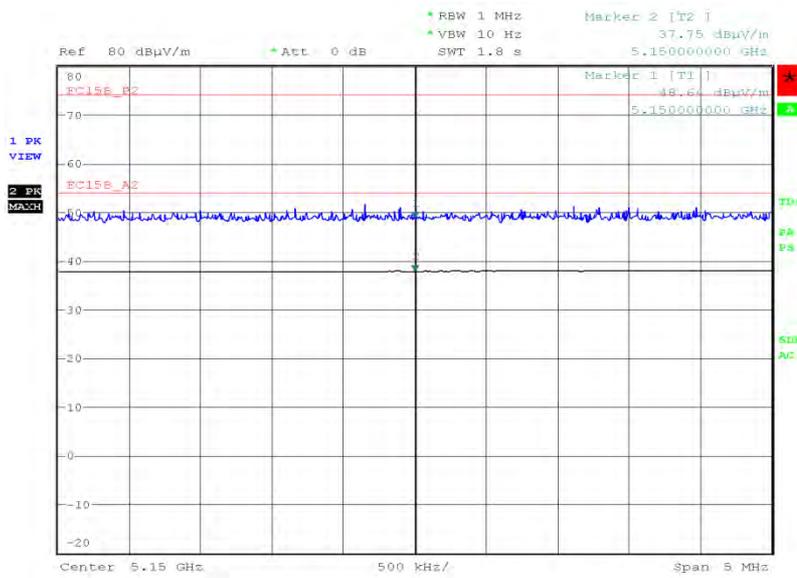


Product Service

Band Edge Emissions

5180 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	48.64	37.75



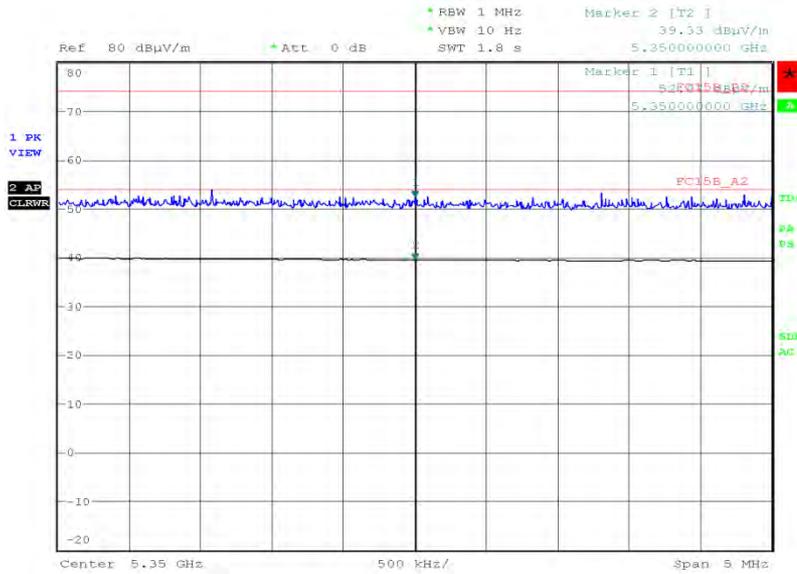
Date: 5.JAN.2014 10:25:15



Product Service

5320 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	52.07	39.33

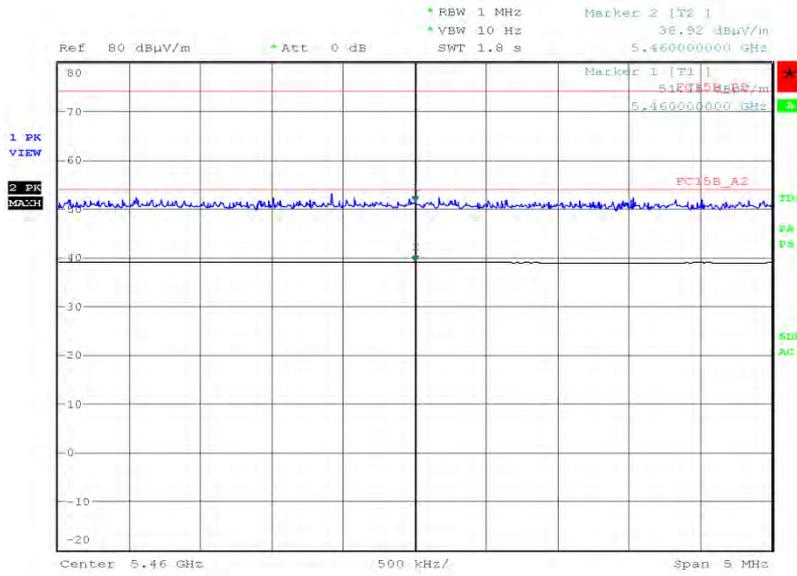


Date: 5.JAN.2014 11:12:07



5500 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	51.15	38.92



Date: 5.JAN.2014 11:20:53

Limit

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

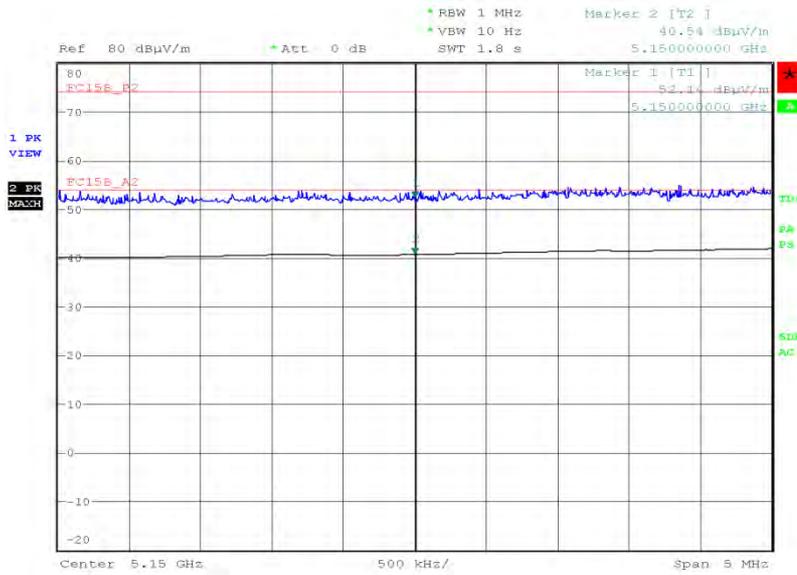


Product Service

Band Edge Emissions

5190 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	52.14	40.54

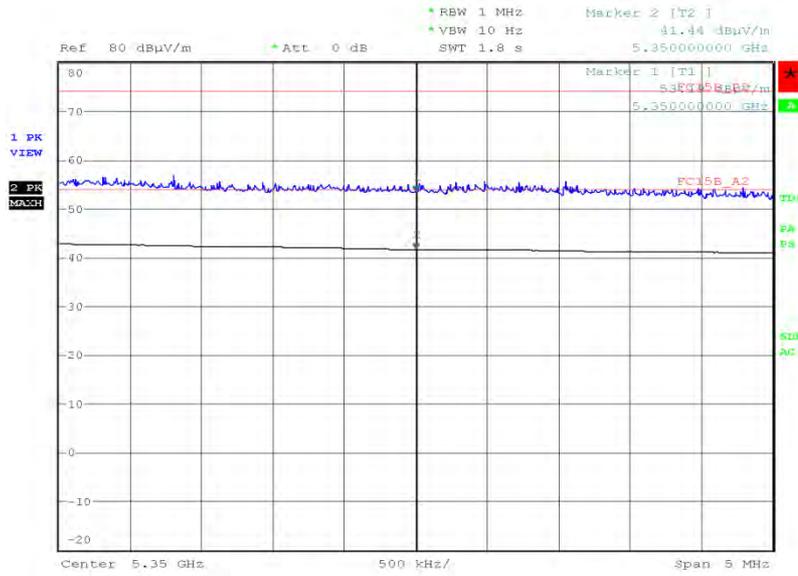


Date: 5.JAN.2014 12:14:50



5310 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	53.19	41.44



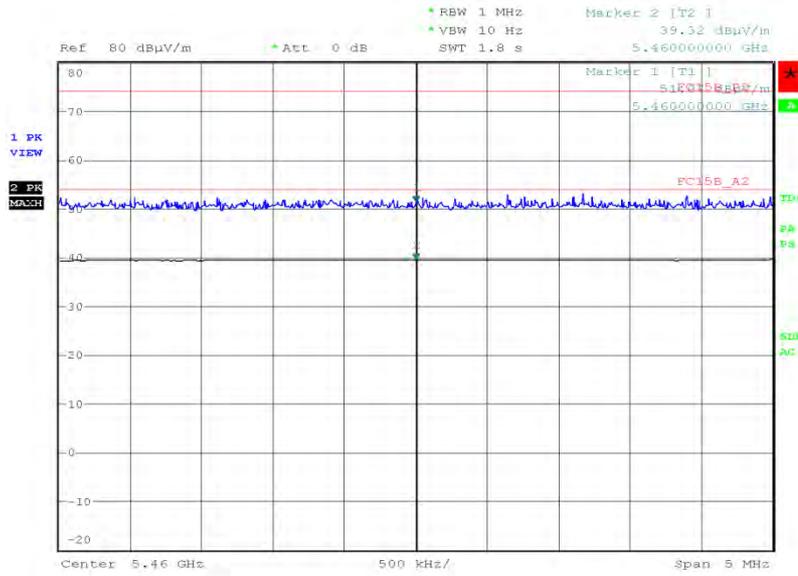
Date: 5.JAN.2014 12:43:51



Product Service

5510 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	51.07	39.32



Date: 5.JAN.2014 12:55:15

Limit

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



Product Service

802.11(ac) - 5 GHz 80 MHz BW

4.0 V DC Supply

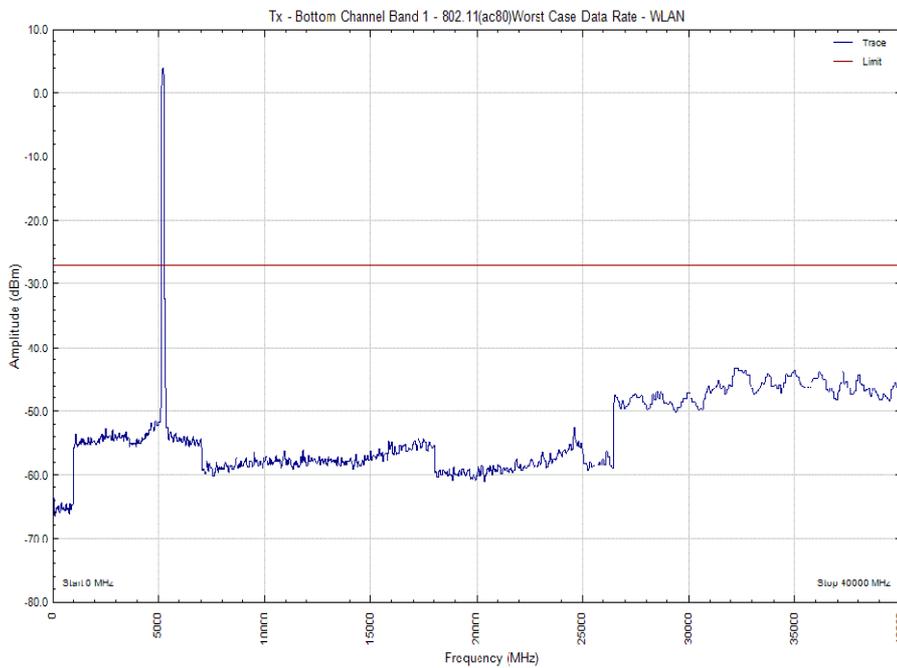
Spurious Conducted Emissions

MCS0

Frequency Band 1

5210 MHz

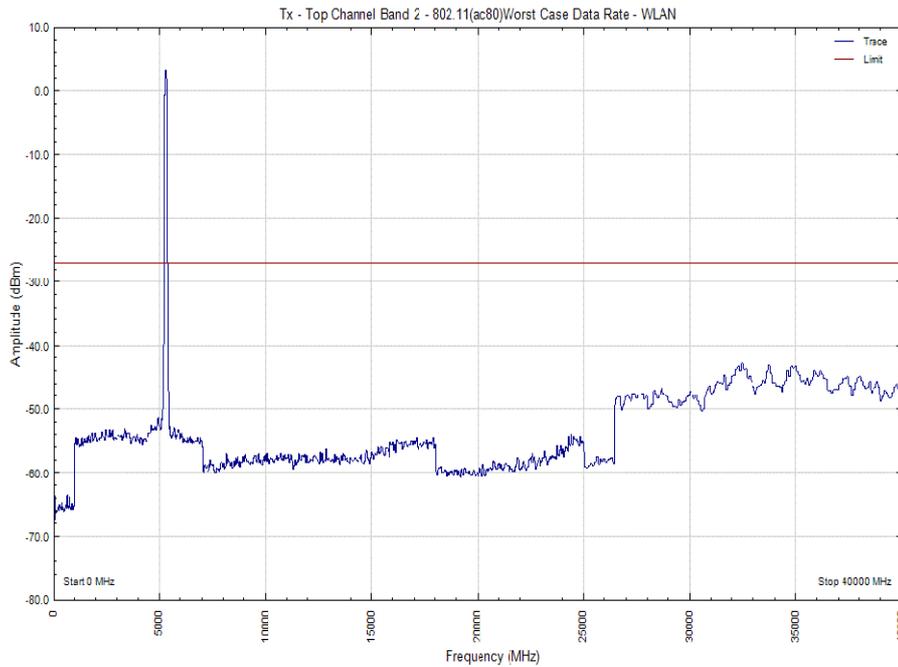
9 kHz to 40 GHz





5290 MHz

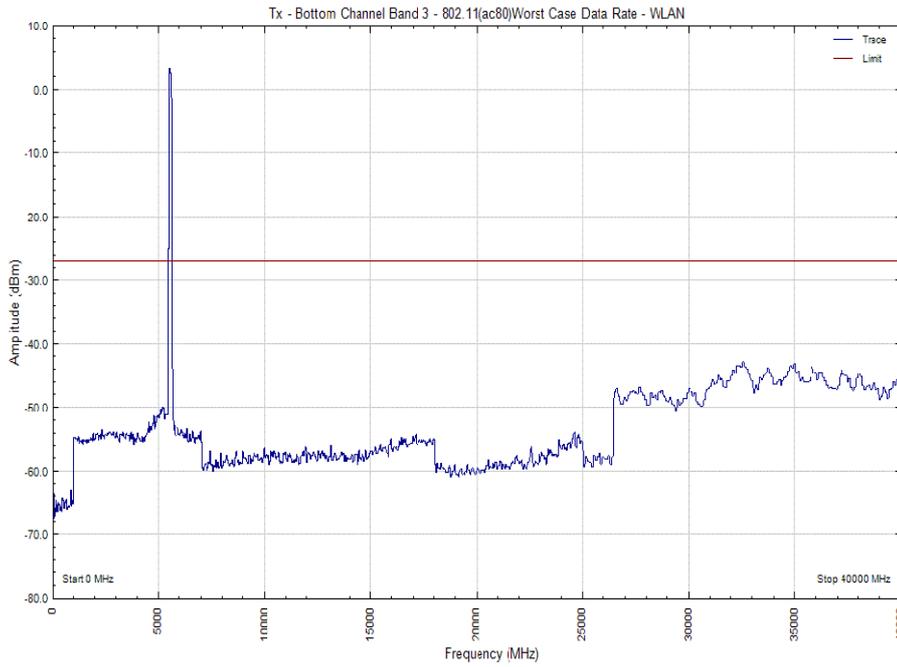
9 kHz to 40 GHz



Frequency Band 3

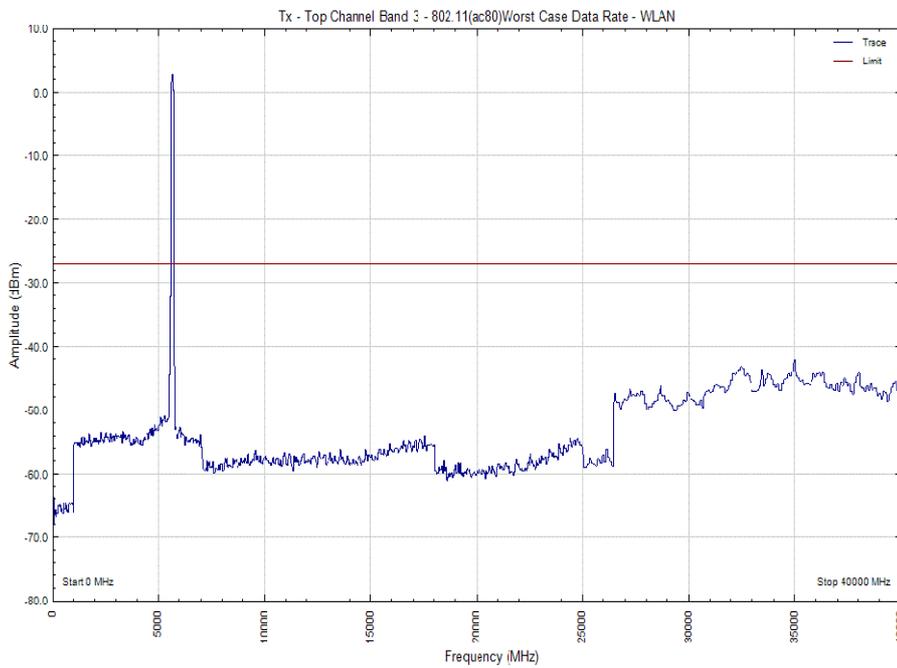
5530 MHz

9 kHz to 40 GHz



5610 MHz

9 kHz to 40 GHz





Product Service

Limit Clause

Band of Operation (MHz)	Limit
5150 to 5250	-27 dBm/MHz
5250 to 5350	-27 dBm/MHz
5470 to 5725	-27 dBm/MHz
5725 to 5825	(5715 to 5725) -17 dBm/MHz (5825 to 5835) -17 dBm/MHz (<5715 to >5835) -27 dBm/MHz

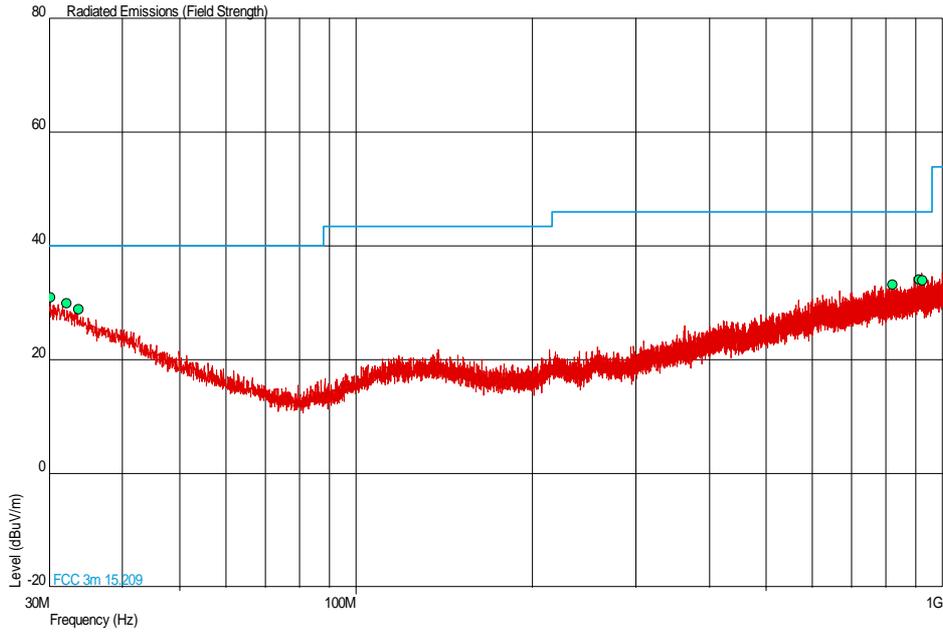


Spurious Radiated Emissions

Frequency Band 1

5210 MHz

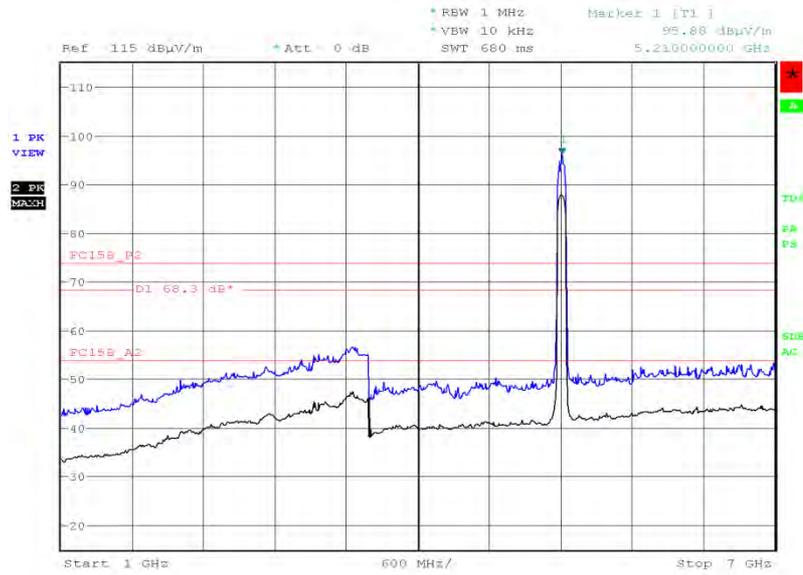
30 MHz to 1 GHz



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	30.9	35.1	40.0	100	-9.1	64.9	0	1.00	Vertical
32.183	29.9	31.3	40.0	100	-10.1	68.7	0	1.00	Vertical
33.686	29.0	28.2	40.0	100	-11.0	71.8	0	1.00	Vertical
821.229	33.1	45.2	46.0	200	-12.9	154.8	0	1.00	Vertical
910.469	34.1	50.7	46.0	200	-11.9	149.3	0	1.00	Vertical
923.273	34.0	50.1	46.0	200	-12.0	149.9	0	1.00	Vertical

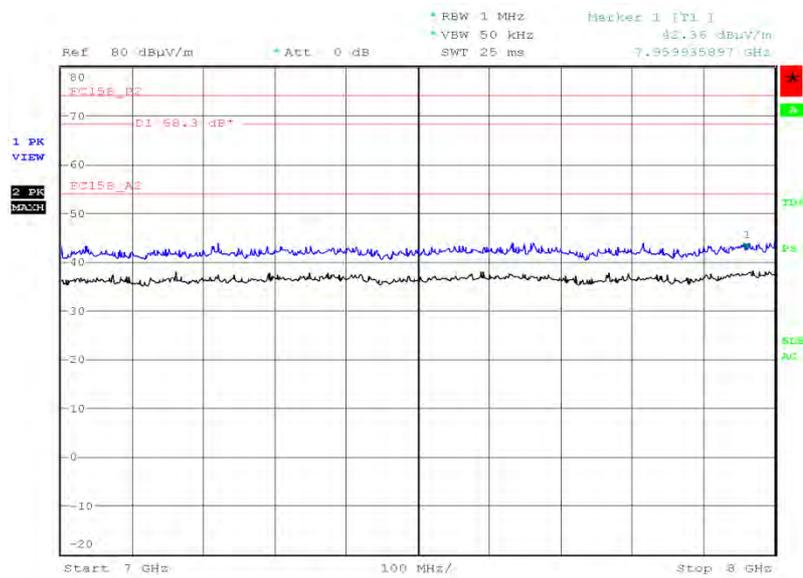


1 GHz to 7 GHz



Date: 8.JAN.2014 13:17:24

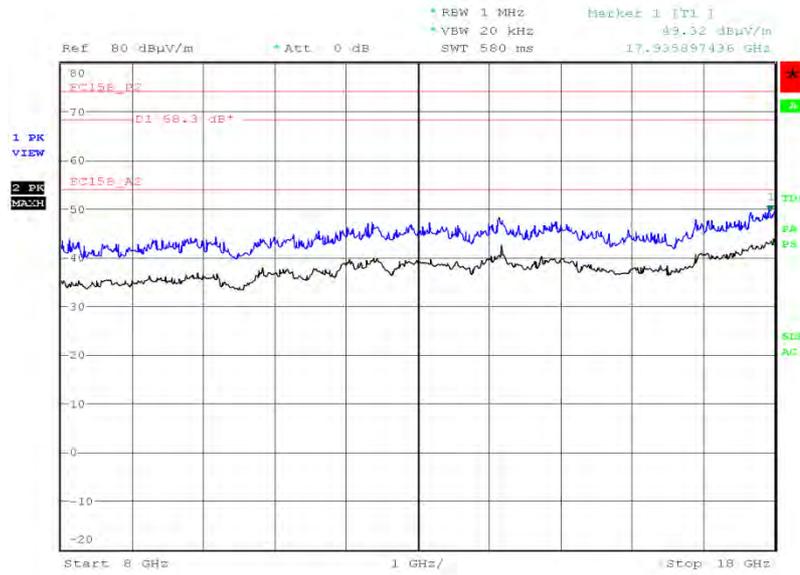
7 GHz to 8 GHz



Date: 8.JAN.2014 16:09:07

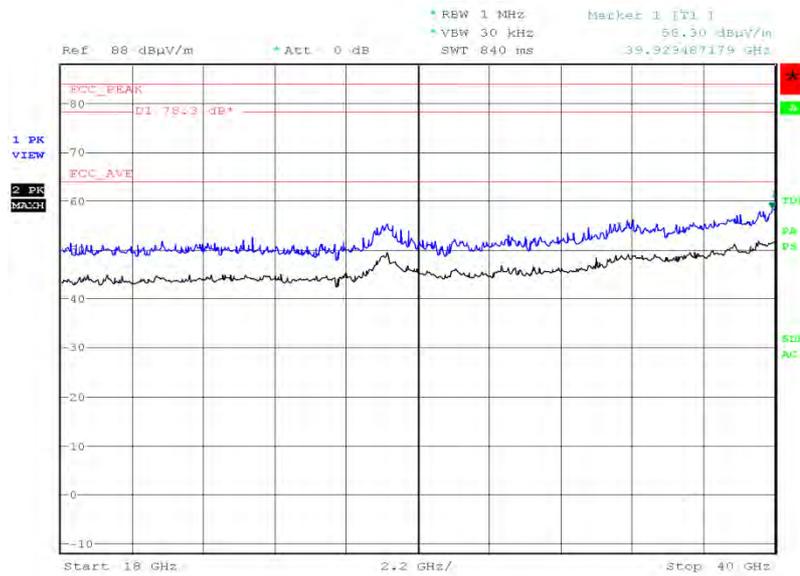


8 GHz to 18 GHz



Date: 11.JAN.2014 08:37:37

18 GHz to 40 GHz

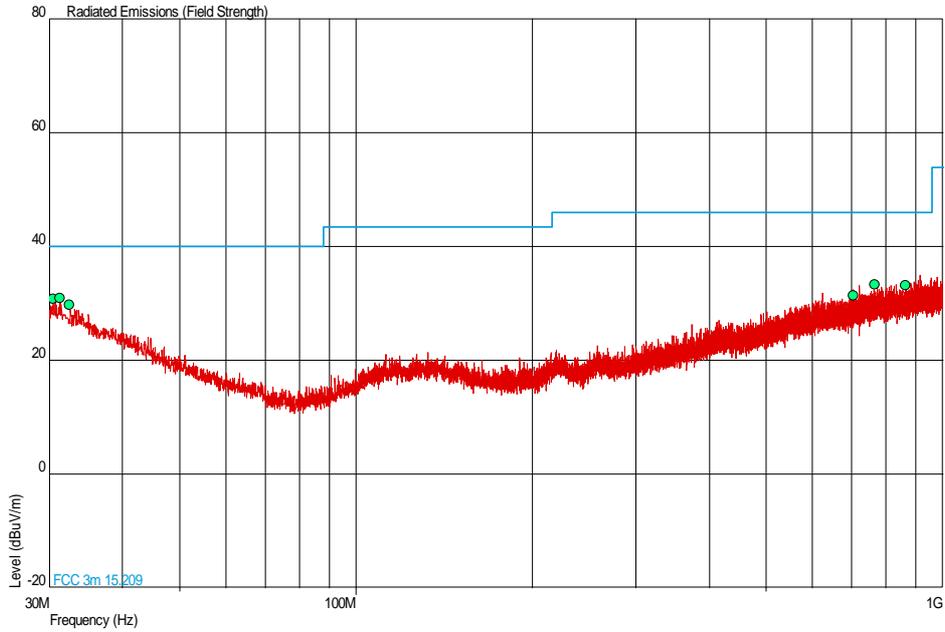


Date: 11.JAN.2014 15:24:52



5290 MHz

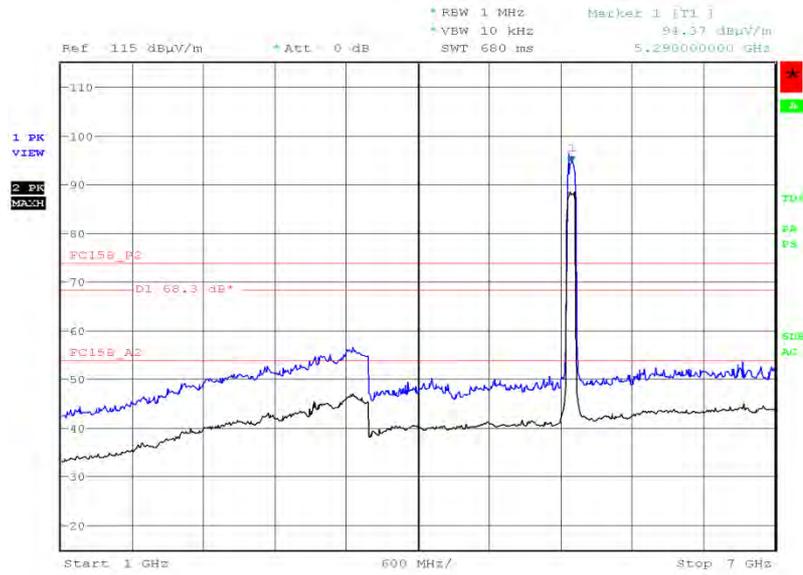
30 MHz to 1 GHz



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
30.437	30.8	34.7	40.0	100	-9.2	65.3	0	1.00	Vertical
31.310	30.9	35.1	40.0	100	-9.1	64.9	0	1.00	Vertical
32.425	29.7	30.5	40.0	100	-10.3	69.5	0	1.00	Vertical
704.296	31.5	37.6	46.0	200	-14.5	162.4	0	1.00	Vertical
765.163	33.3	46.2	46.0	200	-12.7	153.8	0	1.00	Vertical
863.667	33.2	45.7	46.0	200	-12.8	154.3	0	1.00	Vertical

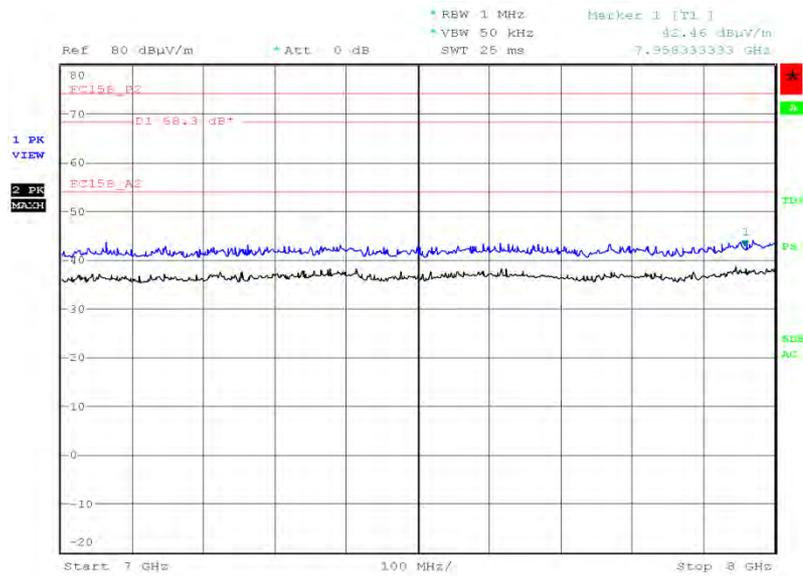


1 GHz to 7 GHz



Date: 8.JAN.2014 13:31:25

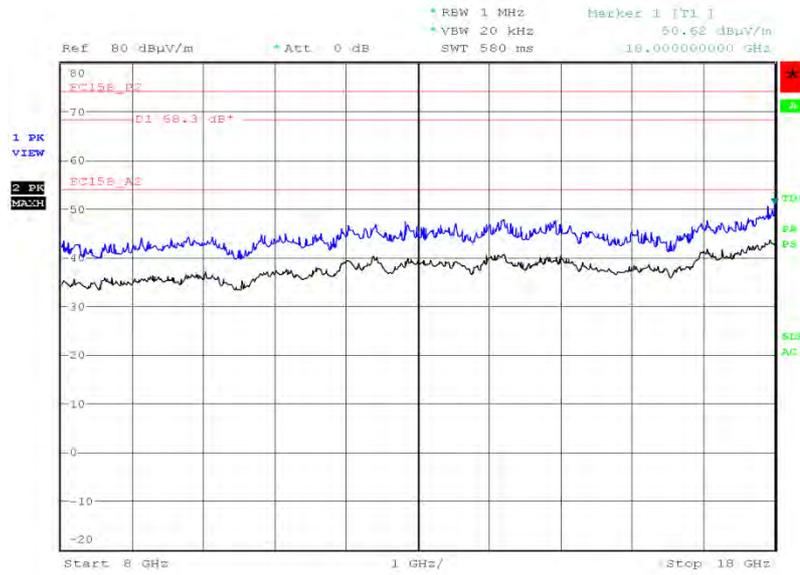
7 GHz to 8 GHz



Date: 8.JAN.2014 16:14:32

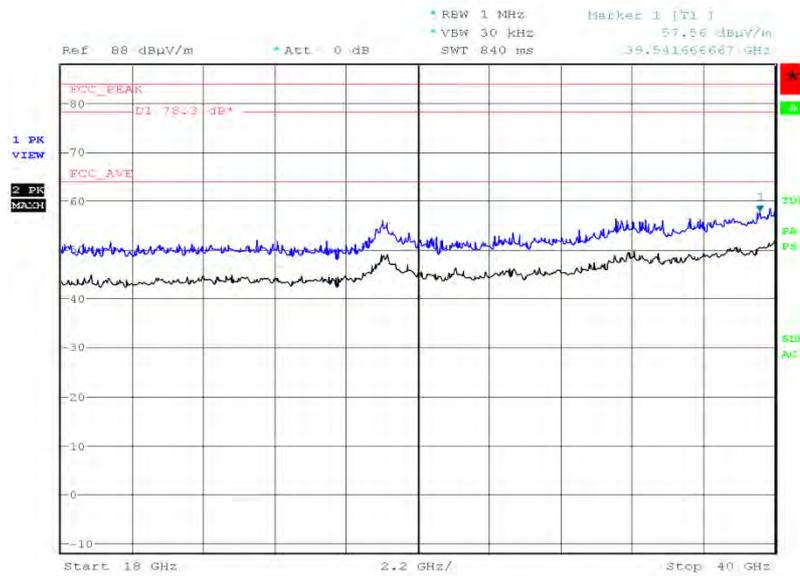


8 GHz to 18 GHz



Date: 11.JAN.2014 08:35:41

18 GHz to 40 GHz



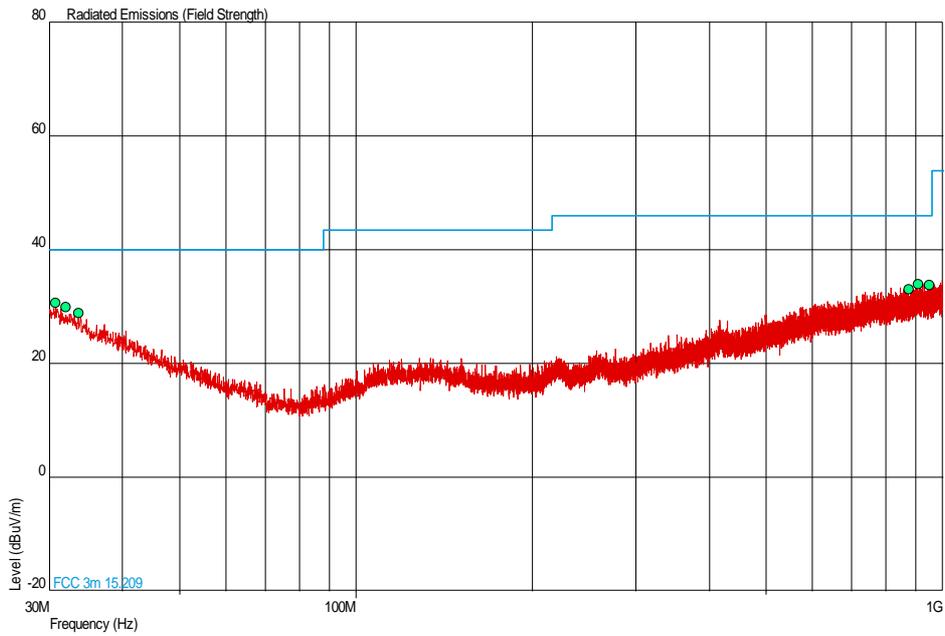
Date: 11.JAN.2014 15:27:44



Frequency Band 3

5530 MHz

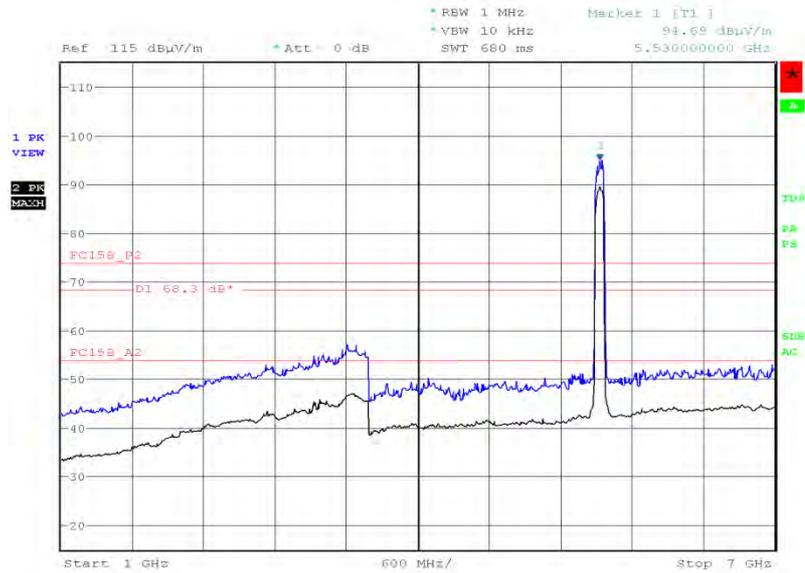
30 MHz to 1 GHz



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
30.776	30.7	34.3	40.0	100	-9.3	65.7	0	1.00	Vertical
31.989	29.9	31.3	40.0	100	-10.1	68.7	0	1.00	Vertical
33.735	28.9	27.9	40.0	100	-11.1	72.1	0	1.00	Vertical
874.725	33.1	45.2	46.0	200	-12.9	154.8	0	1.00	Vertical
908.820	34.0	50.1	46.0	200	-12.0	149.9	0	1.00	Vertical
950.433	33.7	48.4	46.0	200	-12.3	151.6	0	1.00	Vertical

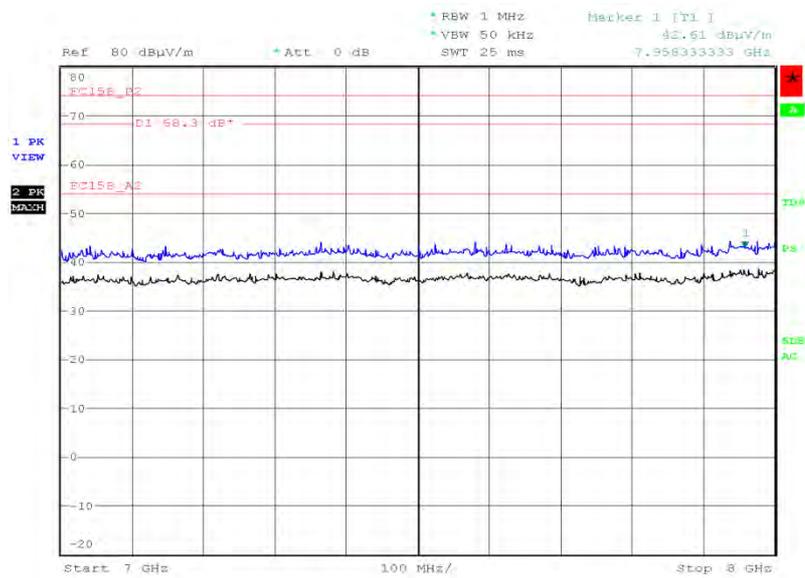


1 GHz to 7 GHz



Date: 8.JAN.2014 14:06:51

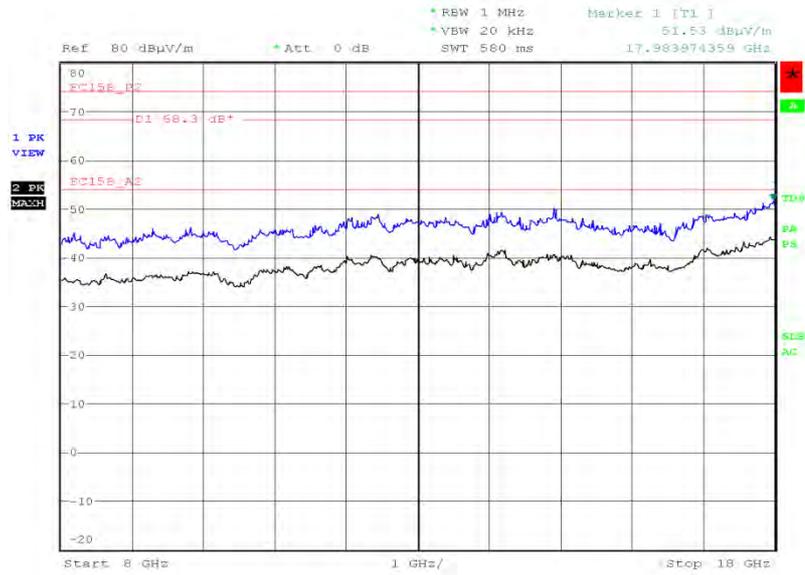
7 GHz to 8 GHz



Date: 8.JAN.2014 16:19:42

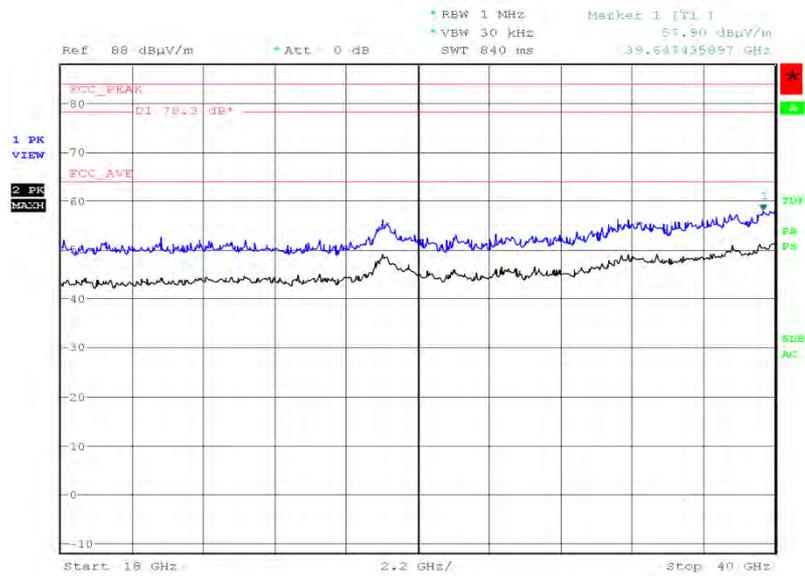


8 GHz to 18 GHz



Date: 11.JAN.2014 08:13:57

18 GHz to 40 GHz

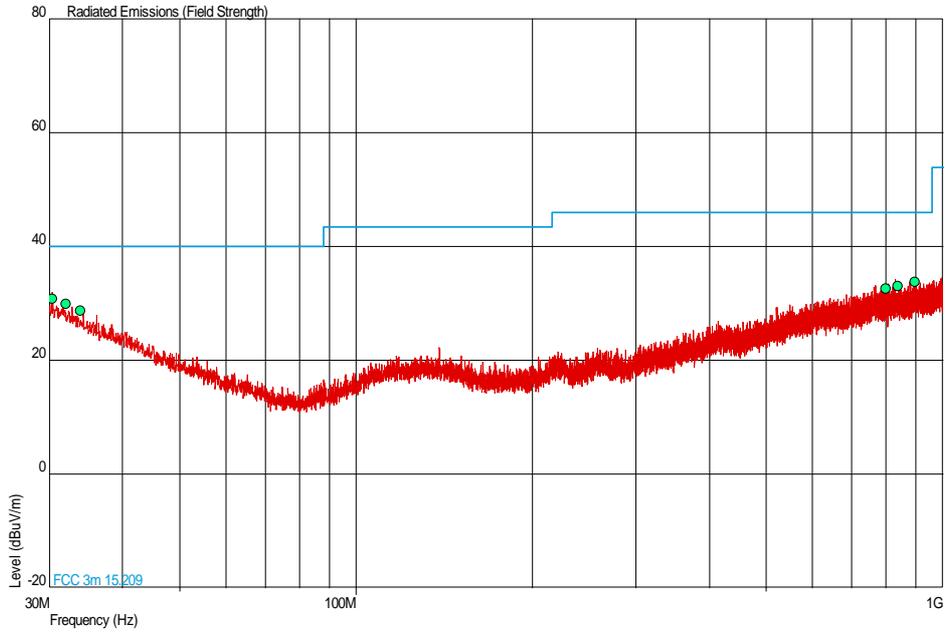


Date: 11.JAN.2014 15:36:25



5610 MHz

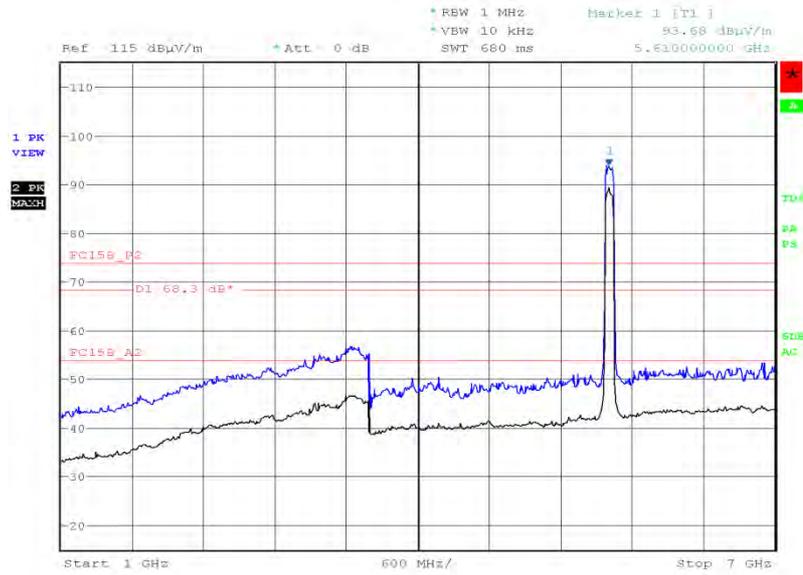
30 MHz to 1 GHz



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
30.388	30.8	34.7	40.0	100	-9.2	65.3	0	1.00	Vertical
32.037	29.9	31.3	40.0	100	-10.1	68.7	0	1.00	Vertical
33.880	28.7	27.2	40.0	100	-11.3	72.8	0	1.00	Vertical
800.762	32.6	42.7	46.0	200	-13.4	157.3	0	1.00	Vertical
837.380	33.0	44.7	46.0	200	-13.0	155.3	0	1.00	Vertical
898.053	33.8	49.0	46.0	200	-12.2	151.0	0	1.00	Vertical

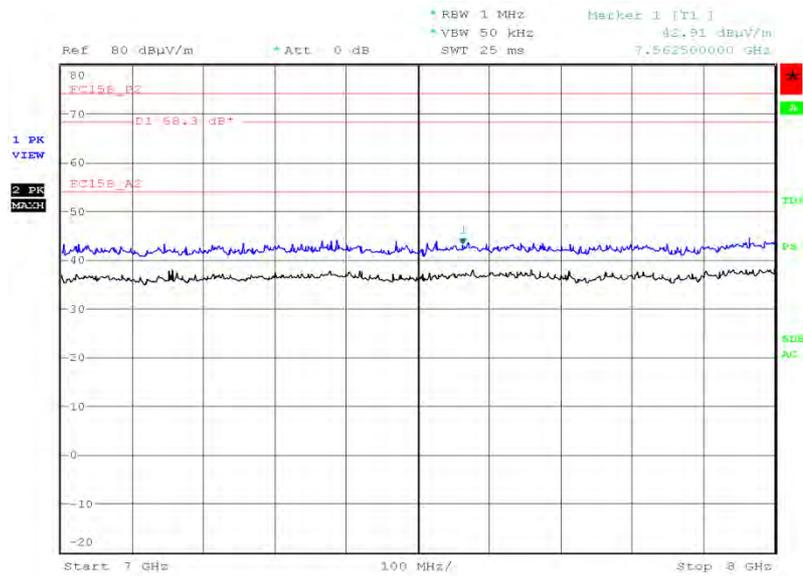


1 GHz to 7 GHz



Date: 8.JAN.2014 13:46:46

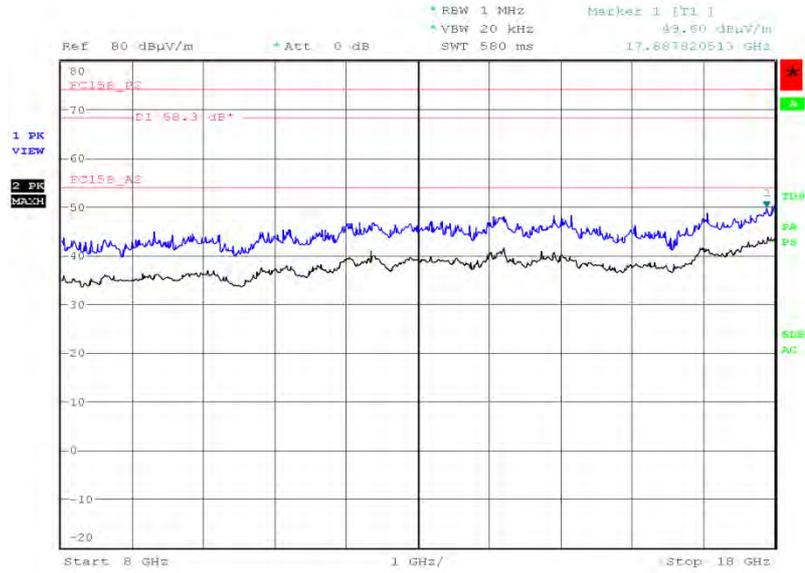
7 GHz to 8 GHz



Date: 8.JAN.2014 16:26:34

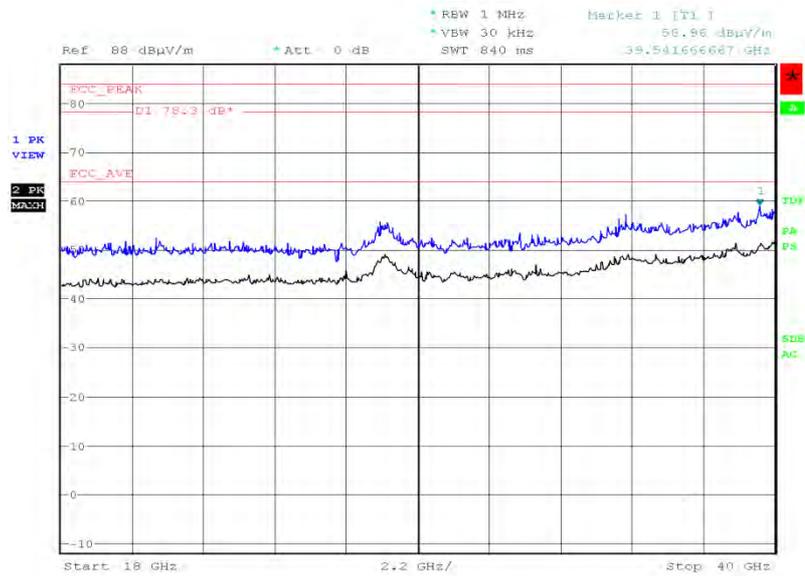


8 GHz to 18 GHz



Date: 11.JAN.2014 08:22:16

18 GHz to 40 GHz



Date: 11.JAN.2014 15:42:02

Limit

Peak (dBμV/m)	Average (dBμV/m)
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Product Service

74.0	54.0
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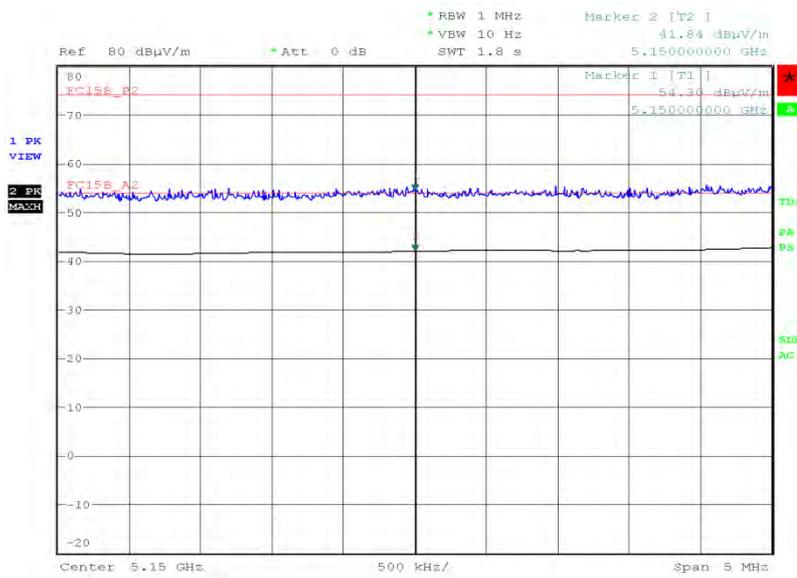


Product Service

Band Edge Emissions

5210 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	54.30	41.84



Date: 5.JAN.2014 13:57:22



5290 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	53.43	41.29

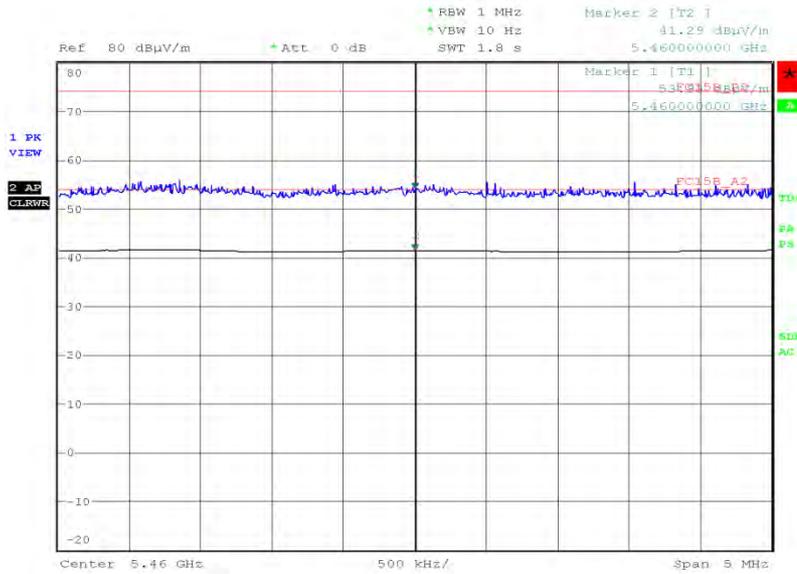


Date: 5.JAN.2014 14:22:26



5530 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	53.93	41.29



Date: 5.JAN.2014 14:31:58

Limit

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

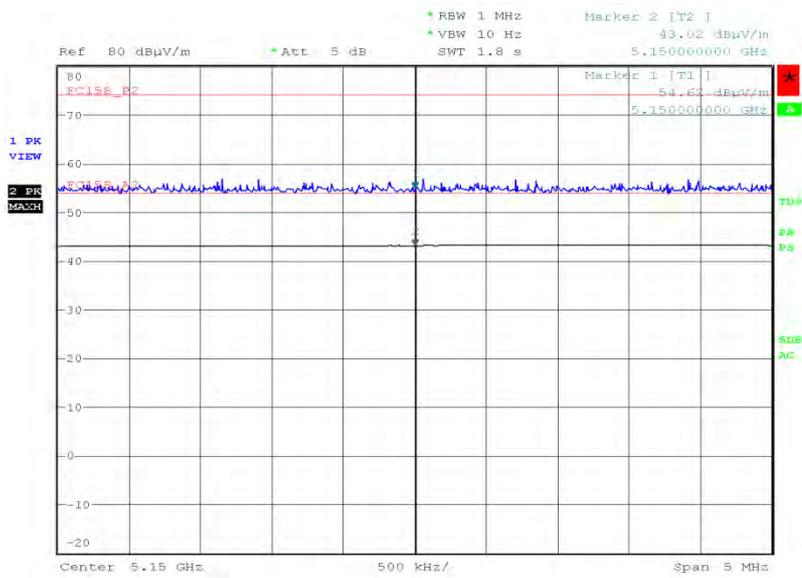


Product Service

Band Edge Emissions

5180 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	54.62	43.02



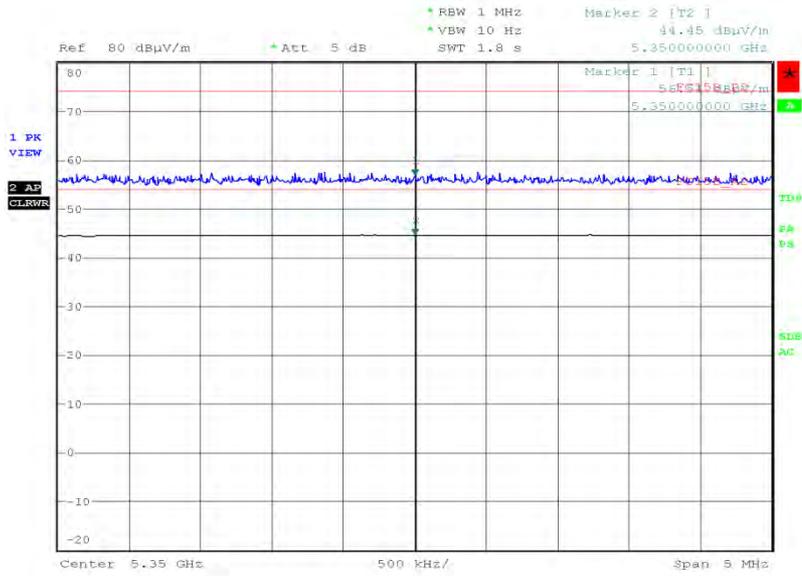
Date: 21.DEC.2013 21:30:23



Product Service

5320 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	56.51	44.45

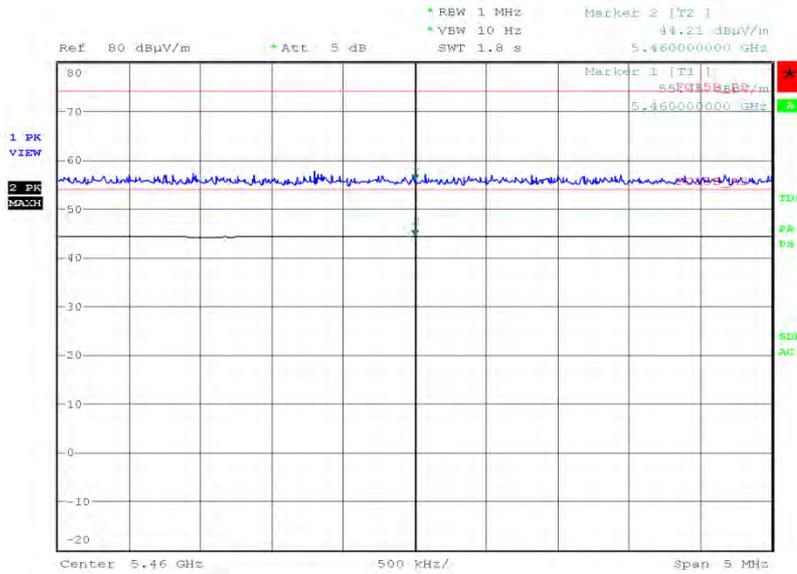


Date: 21.DEC.2013 21:57:30



5500 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	55.45	44.21



Date: 21.DEC.2013 22:05:19

Limit

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



Product Service

802.11(n) - 5 GHz 40 MHz BW

4.0 V DC Supply

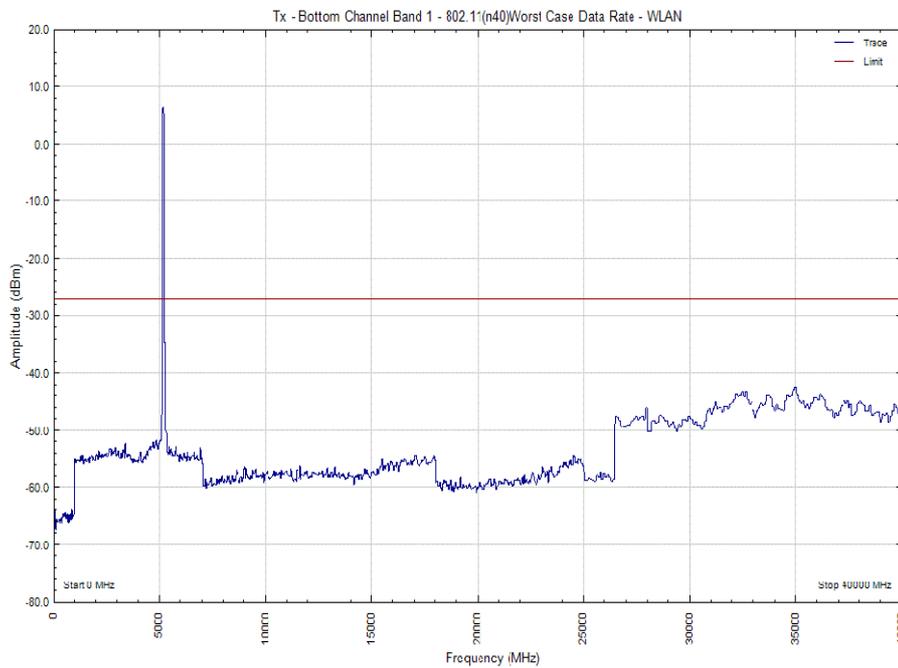
Spurious Conducted Emissions

MCS1

Frequency Band 1

5190 MHz

9 kHz to 40 GHz

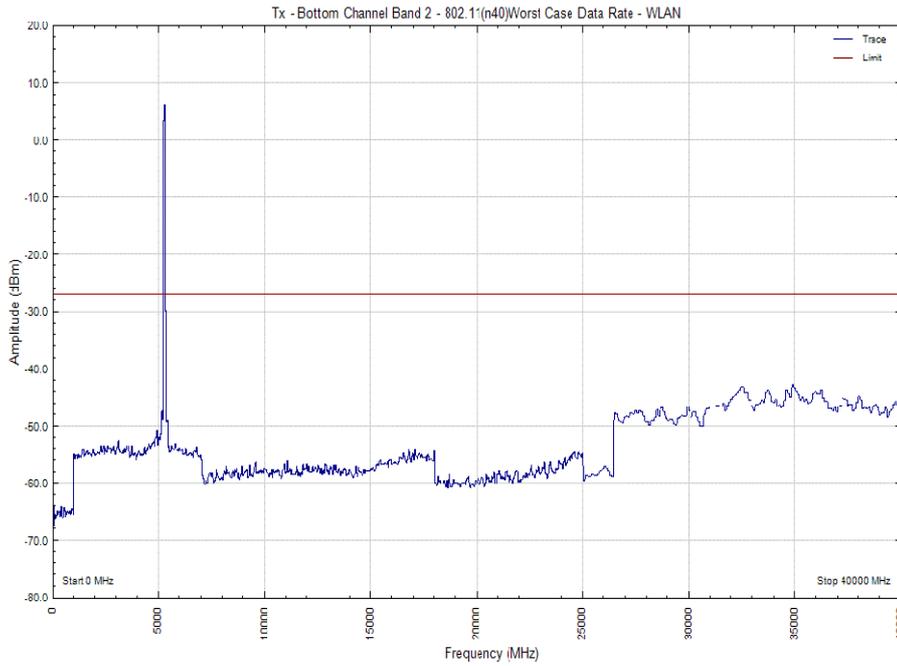




Frequency Band 2

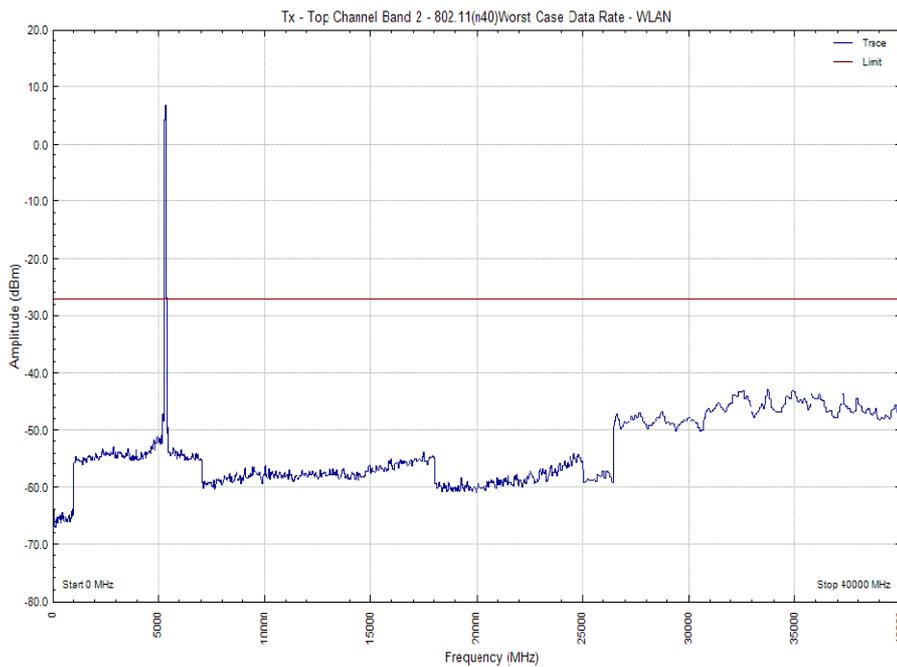
5270 MHz

9 kHz to 40 GHz



5310 MHz

9 kHz to 40 GHz

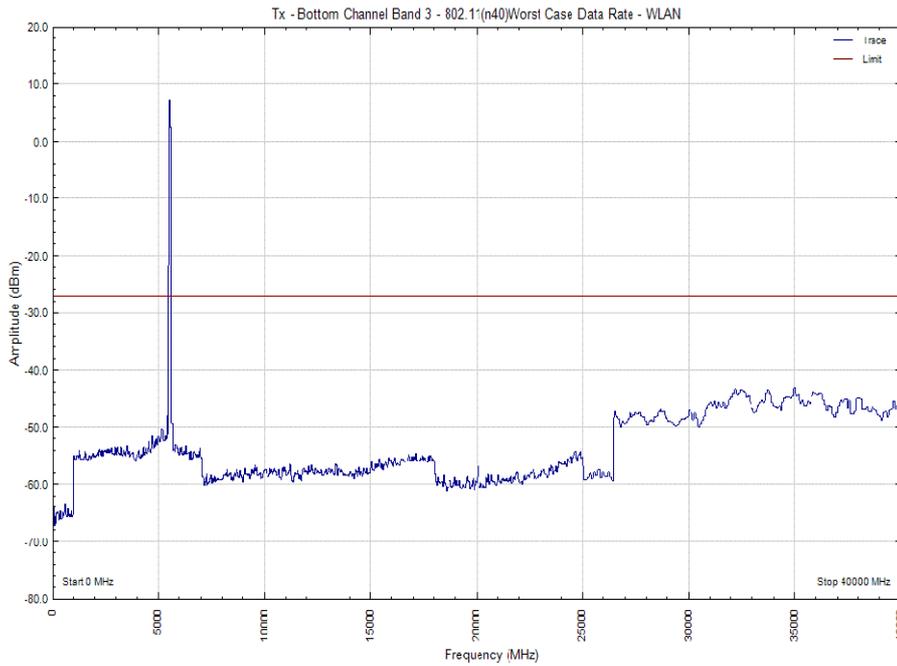




Frequency Band 3

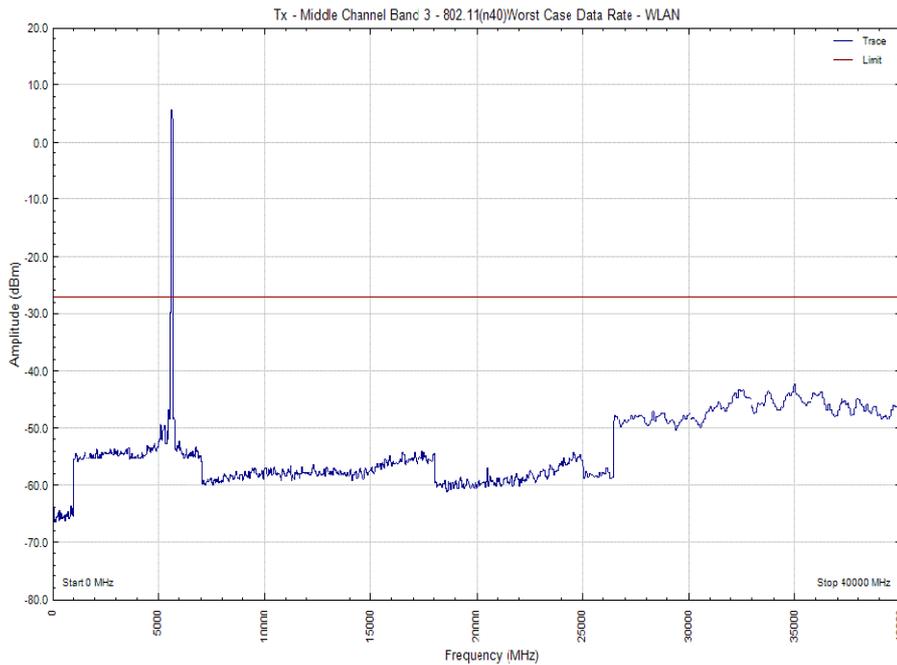
5510 MHz

9 kHz to 40 GHz



5590 MHz

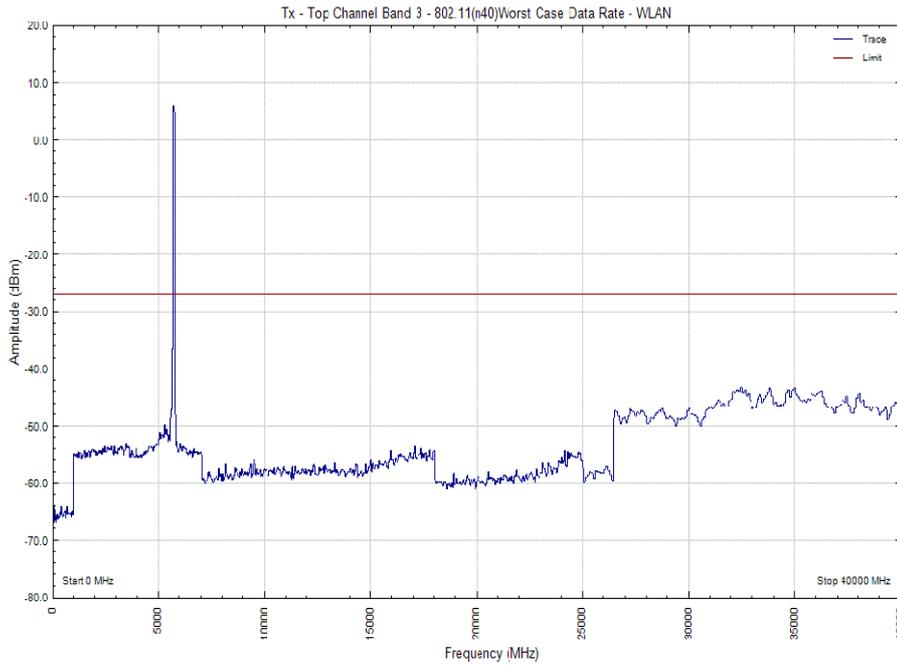
9 kHz to 40 GHz





5670 MHz

9 kHz to 40 GHz



Limit Clause

Band of Operation (MHz)	Limit
5150 to 5250	-27 dBm/MHz
5250 to 5350	-27 dBm/MHz
5470 to 5725	-27 dBm/MHz
5725 to 5825	(5715 to 5725) -17 dBm/MHz (5825 to 5835) -17 dBm/MHz (<5715 to >5835) -27 dBm/MHz

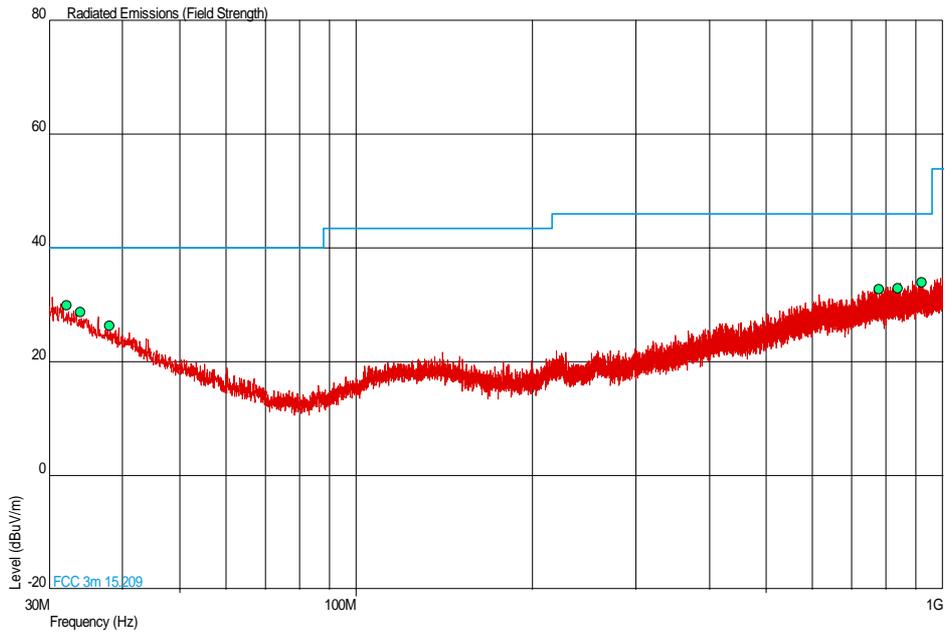


Spurious Radiated Emissions

Frequency Band 1

5190 MHz

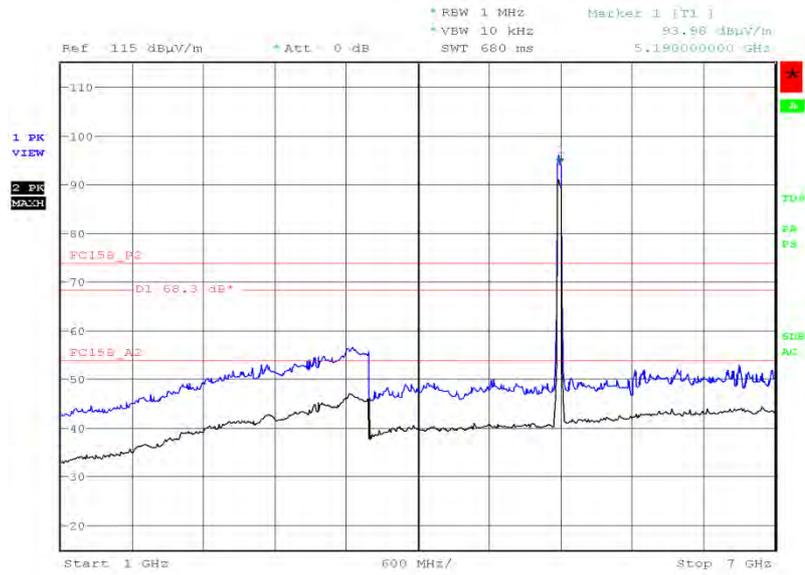
30 MHz to 1 GHz



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
32.086	29.9	31.3	40.0	100	-10.1	68.7	0	1.00	Vertical
33.880	28.7	27.2	40.0	100	-11.3	72.8	0	1.00	Vertical
38.051	26.4	20.9	40.0	100	-13.6	79.1	0	1.00	Vertical
779.907	32.8	43.7	46.0	200	-13.2	156.3	0	1.00	Vertical
838.010	33.0	44.7	46.0	200	-13.0	155.3	0	1.00	Vertical
922.303	34.0	50.1	46.0	200	-12.0	149.9	0	1.00	Vertical

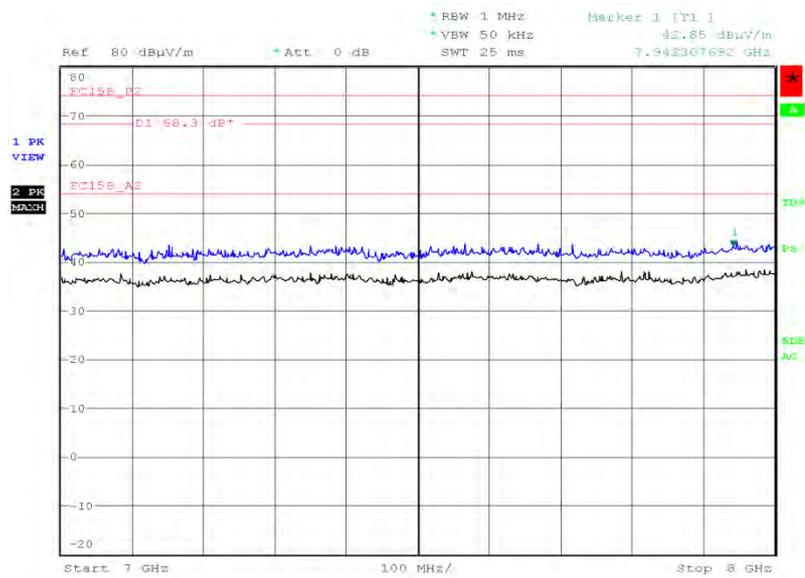


1 GHz to 7 GHz



Date: 7.JAN.2014 21:24:28

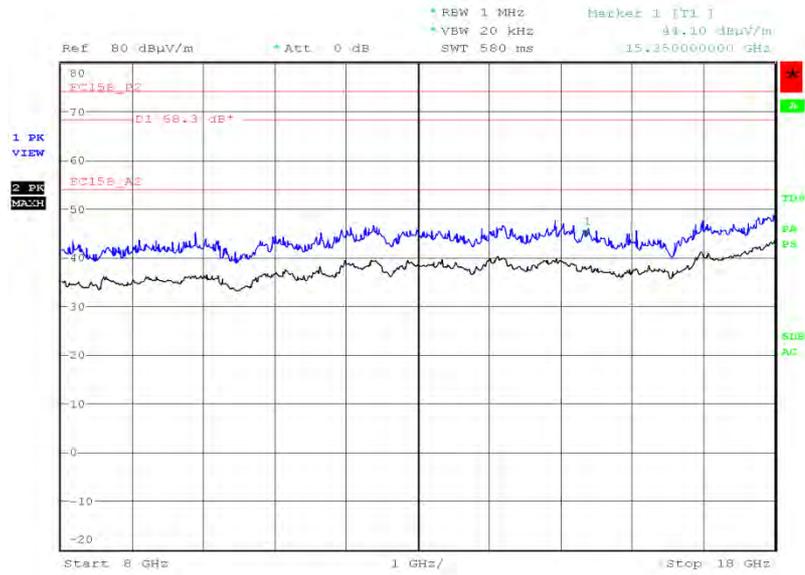
7 GHz to 8 GHz



Date: 8.JAN.2014 15:29:21

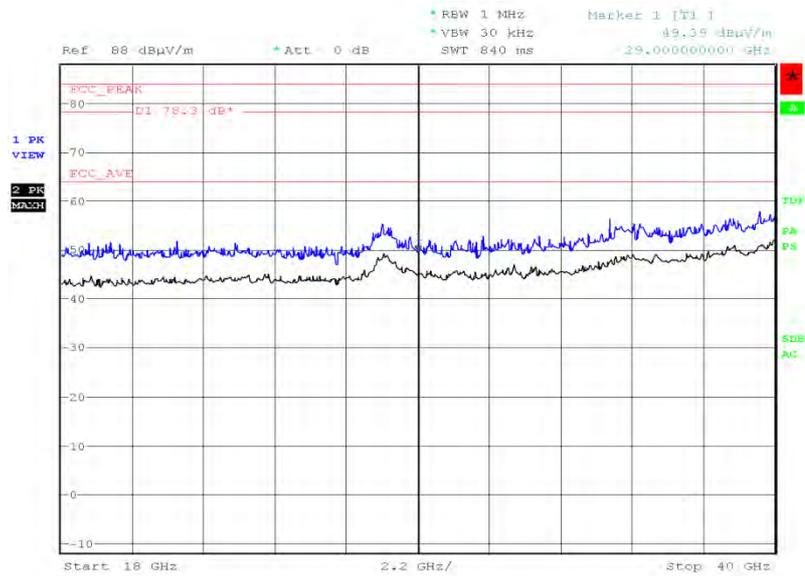


8 GHz to 18 GHz



Date: 8.JAN.2014 19:32:48

18 GHz to 40 GHz



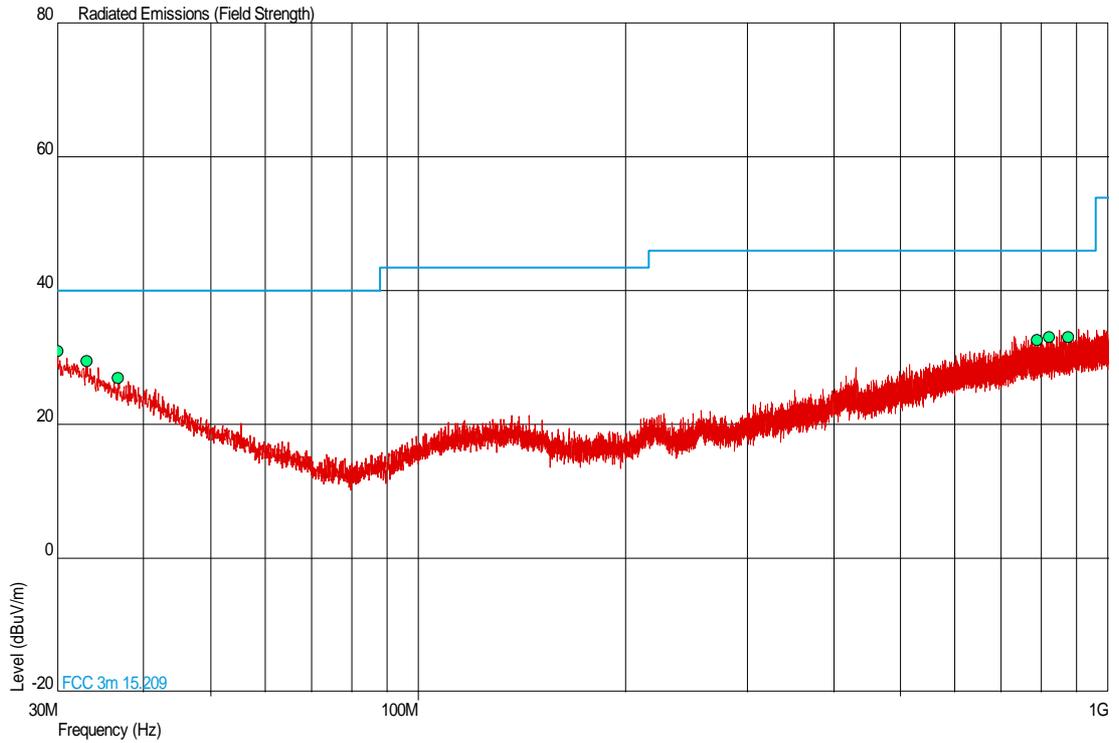
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Product Service

5230 MHz

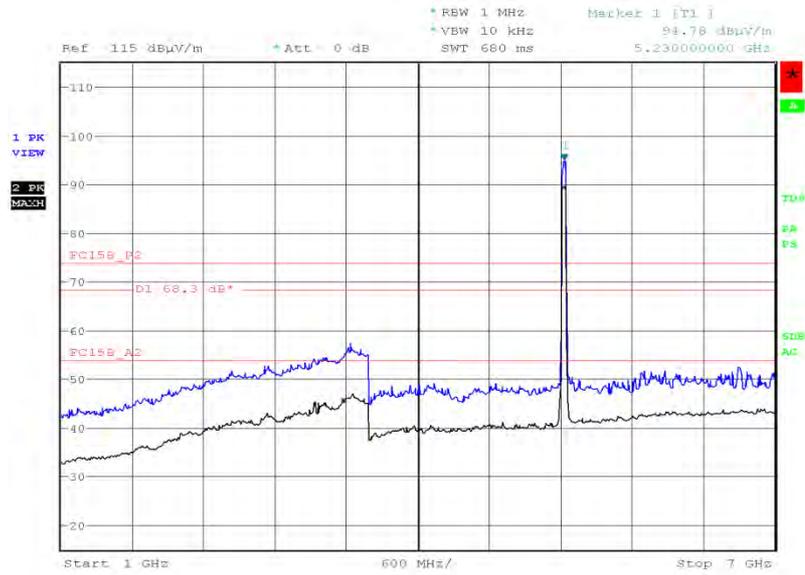
30 MHz to 1 GHz



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
30.097	31.0	35.5	40.0	100	-9.0	64.5	0	1.00	Vertical
33.104	29.4	29.5	40.0	100	-10.6	70.5	0	1.00	Vertical
36.742	26.9	22.1	40.0	100	-13.1	77.9	0	1.00	Vertical
790.141	32.6	42.7	46.0	200	-13.4	157.3	0	1.00	Vertical
821.132	33.1	45.2	46.0	200	-12.9	154.8	0	1.00	Vertical
875.452	33.0	44.7	46.0	200	-13.0	155.3	0	1.00	Vertical

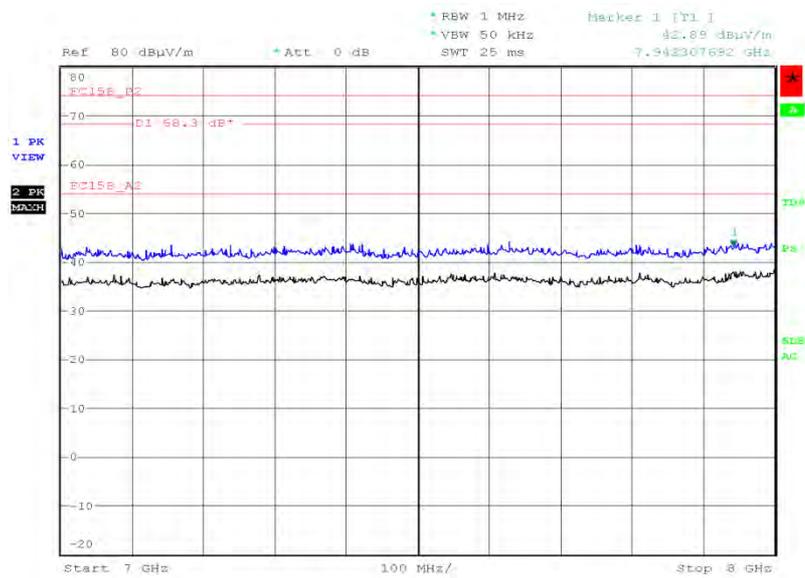


1 GHz to 7 GHz



Date: 7.JAN.2014 21:39:50

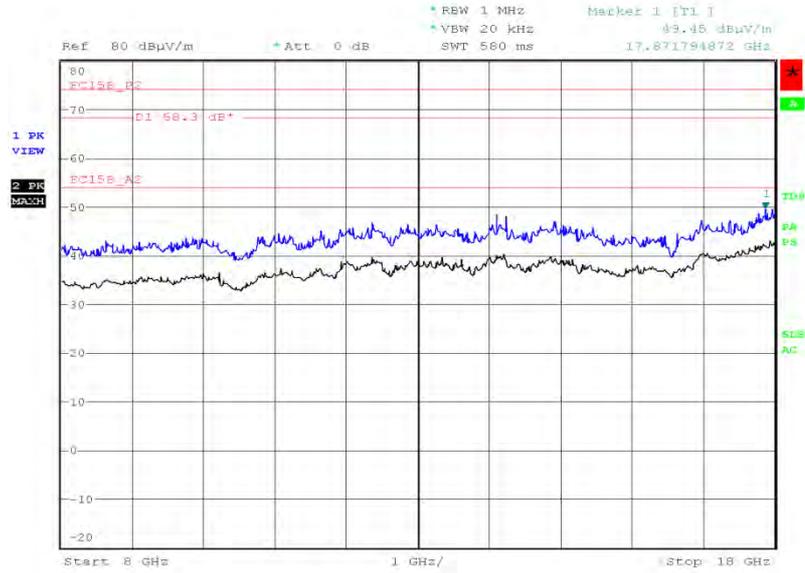
7 GHz to 8 GHz



Date: 8.JAN.2014 15:36:03

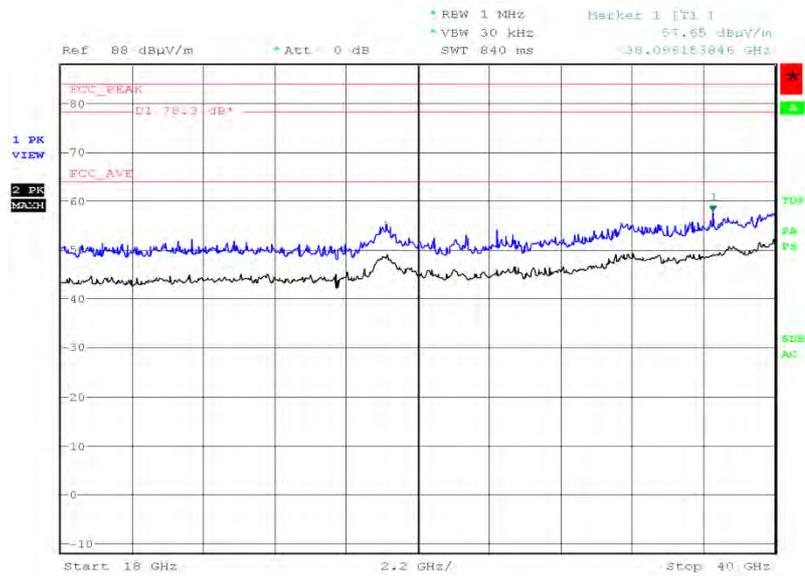


8 GHz to 18 GHz



Date: 8.JAN.2014 19:44:28

18 GHz to 40 GHz



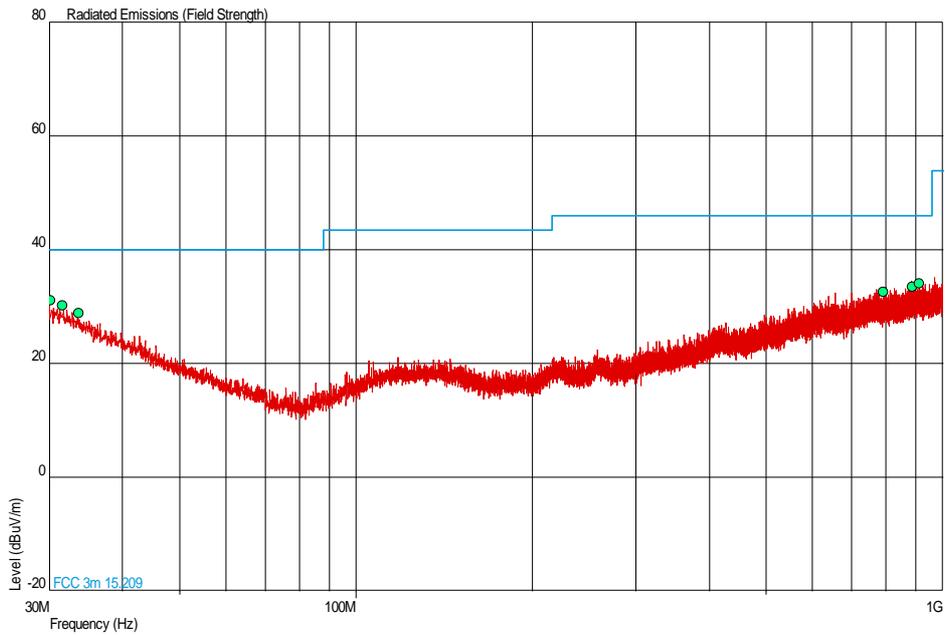
Date: 11.JAN.2014 15:45:52



Frequency Band 2

5270 MHz

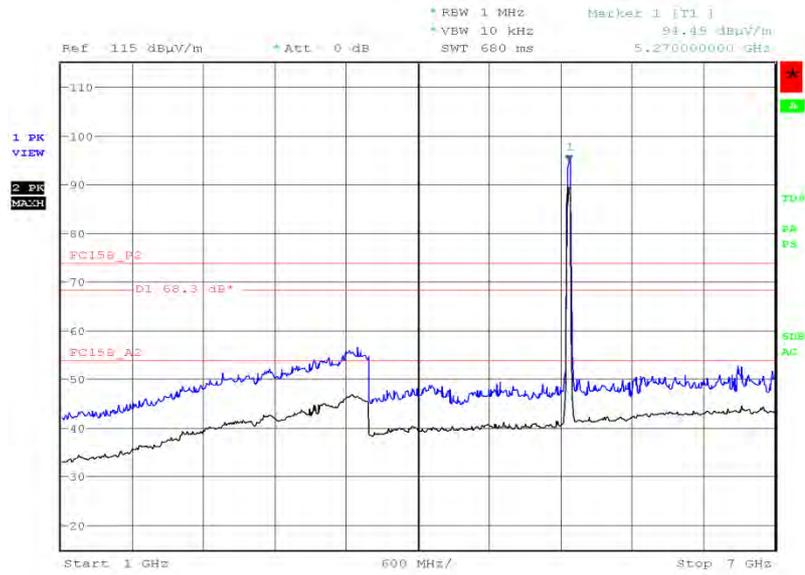
30 MHz to 1 GHz



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
30.146	31.2	36.3	40.0	100	-8.8	63.7	0	1.00	Vertical
31.601	30.2	32.4	40.0	100	-9.8	67.6	0	1.00	Vertical
33.686	28.9	27.9	40.0	100	-11.1	72.1	0	1.00	Vertical
790.965	32.6	42.7	46.0	200	-13.4	157.3	0	1.00	Vertical
886.365	33.6	47.9	46.0	200	-12.4	152.1	0	1.00	Vertical
911.633	34.1	50.7	46.0	200	-11.9	149.3	0	1.00	Vertical

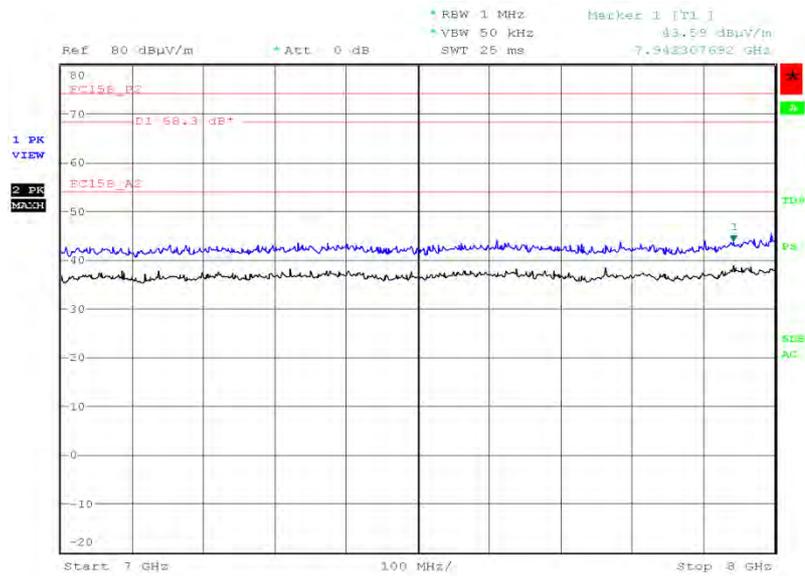


1 GHz to 7 GHz



Date: 7.JAN.2014 21:58:15

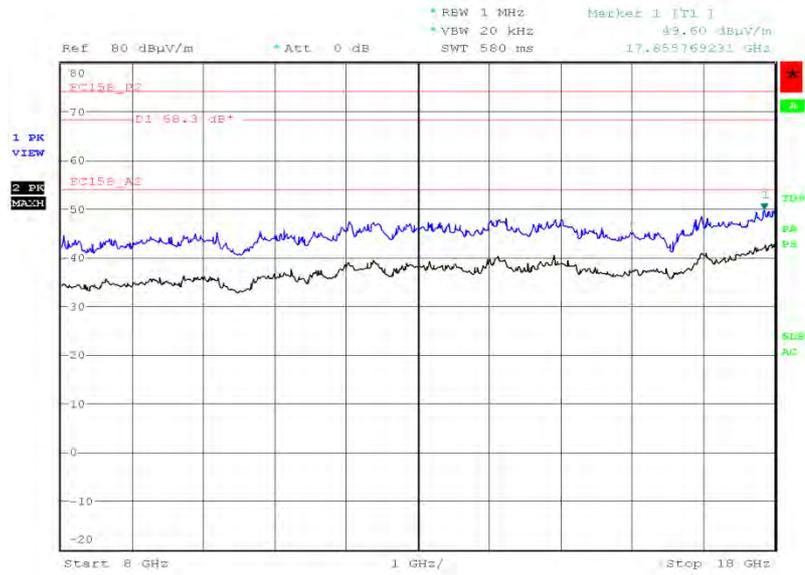
7 GHz to 8 GHz



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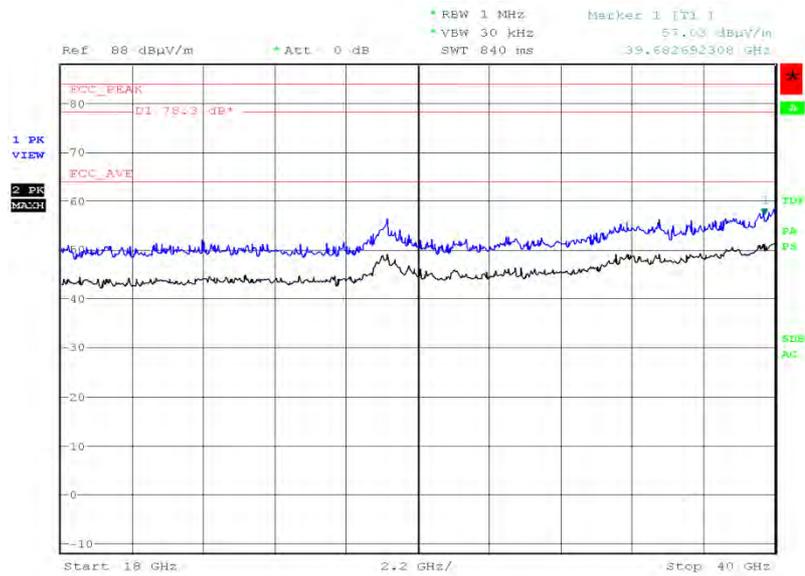


8 GHz to 18 GHz



Date: 8.JAN.2014 19:55:48

18 GHz to 40 GHz

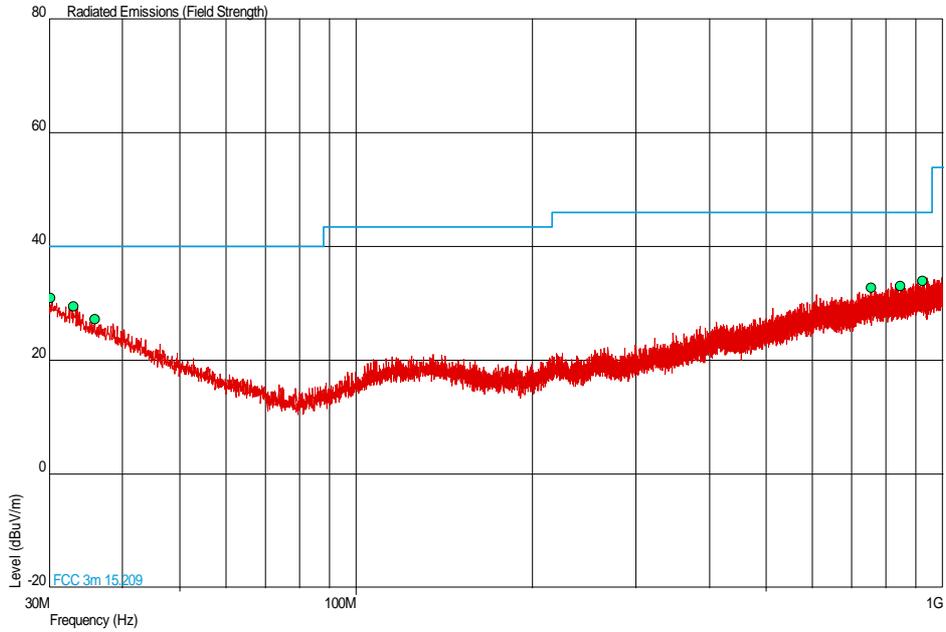


Date: 11.JAN.2014 15:53:03



5310 MHz

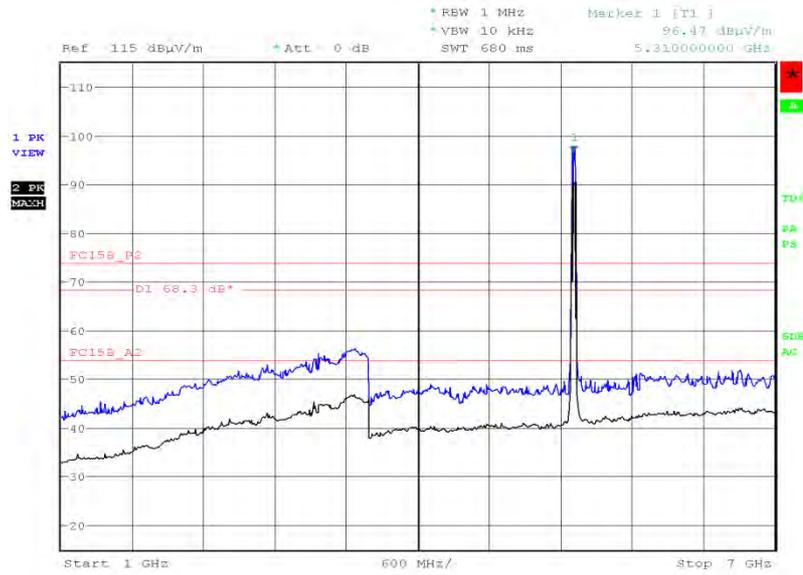
30 MHz to 1 GHz



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
30.194	31.0	35.5	40.0	100	-9.0	64.5	0	1.00	Vertical
33.056	29.4	29.5	40.0	100	-10.6	70.5	0	1.00	Vertical
35.966	27.2	22.9	40.0	100	-12.8	77.1	0	1.00	Vertical
755.075	32.7	43.2	46.0	200	-13.3	156.8	0	1.00	Vertical
846.449	33.0	44.7	46.0	200	-13.0	155.3	0	1.00	Vertical
924.292	34.0	50.1	46.0	200	-12.0	149.9	0	1.00	Vertical

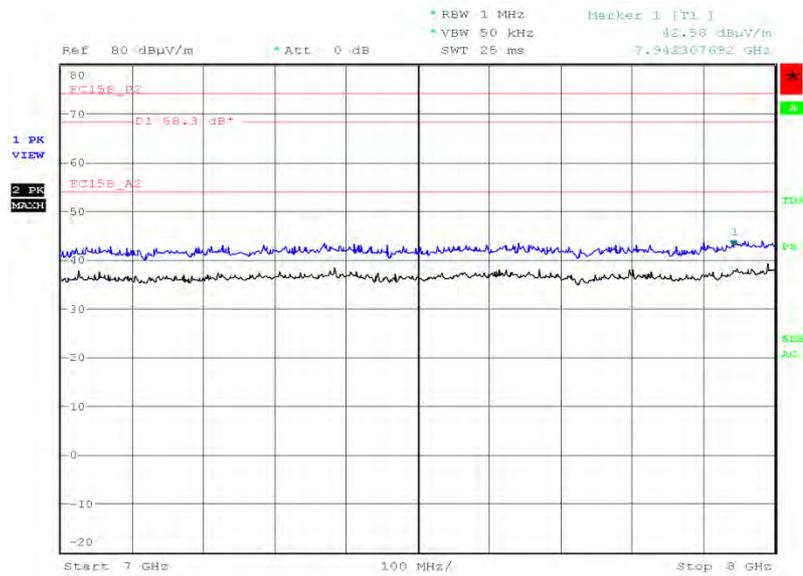


1 GHz to 7 GHz



Date: 7.JAN.2014 22:12:01

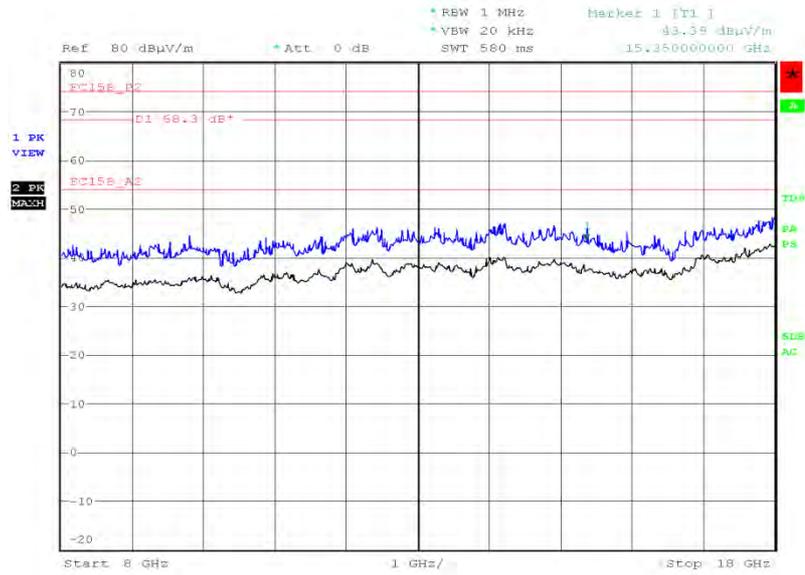
7 GHz to 8 GHz



Date: 8.JAN.2014 15:50:28

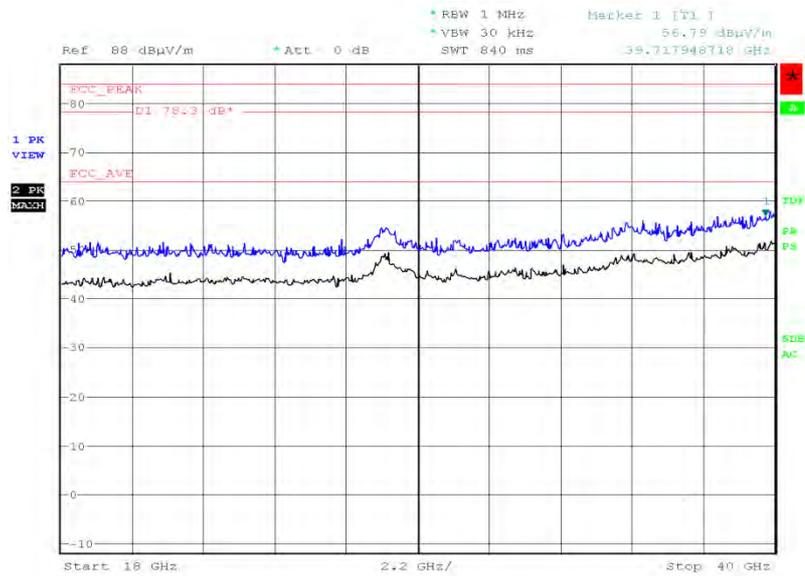


8 GHz to 18 GHz



Date: 8.JAN.2014 20:04:59

18 GHz to 40 GHz



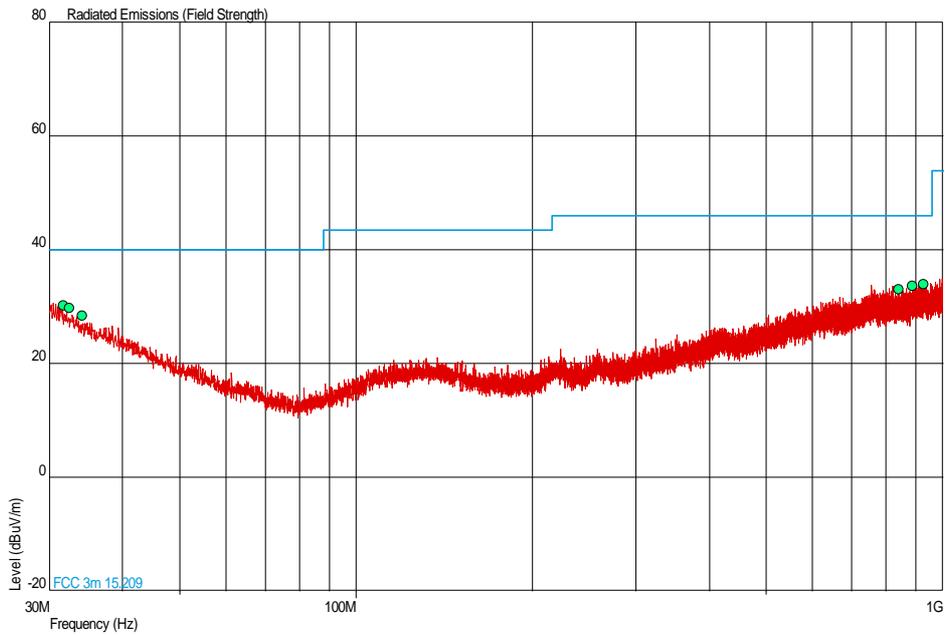
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Frequency Band 3

5510 MHz

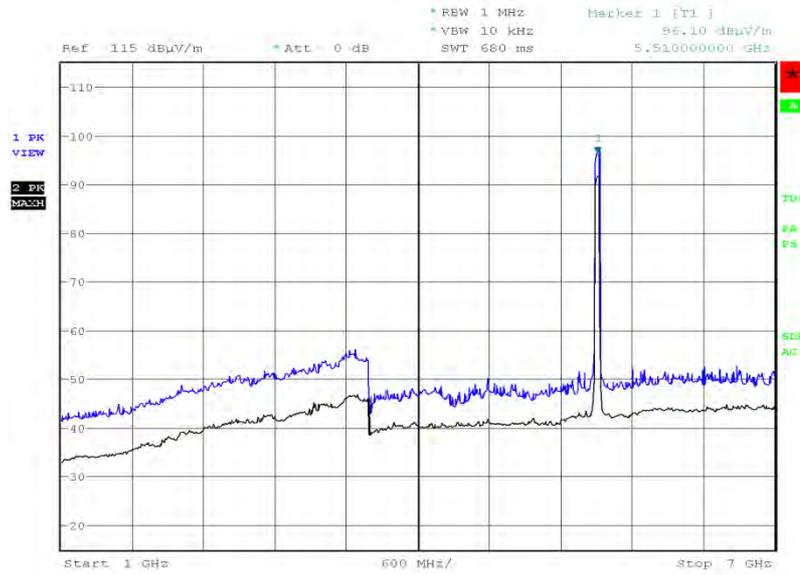
30 MHz to 1 GHz



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
31.698	30.2	35.5	40.0	100	-9.8	64.5	0	1.00	Vertical
32.425	29.8	32.4	40.0	100	-10.2	67.6	0	1.00	Vertical
34.171	28.5	30.9	40.0	100	-11.5	69.1	0	1.00	Vertical
841.017	33.1	26.6	46.0	200	-12.9	173.4	0	1.00	Vertical
888.062	33.6	45.2	46.0	200	-12.4	154.8	0	1.00	Vertical
927.638	33.9	47.9	46.0	200	-12.1	152.1	0	1.00	Vertical

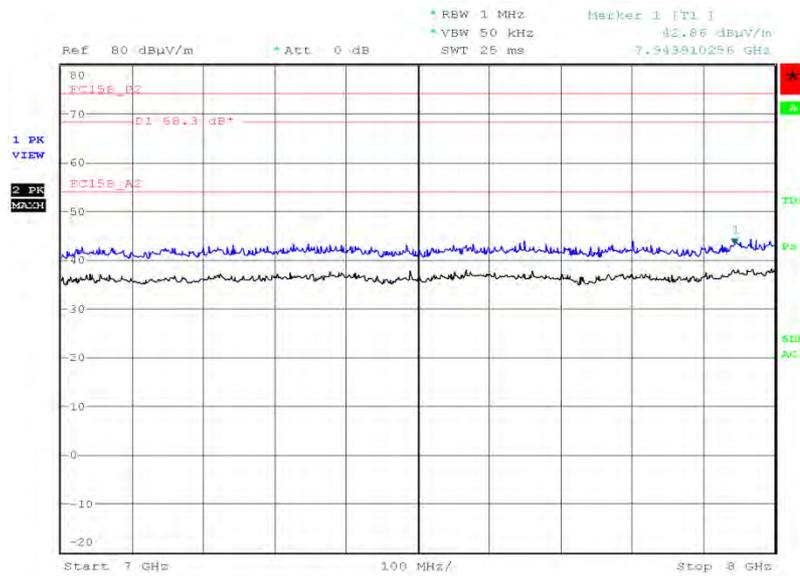


1 GHz to 7 GHz



Date: 12.JAN.2014 12:41:22

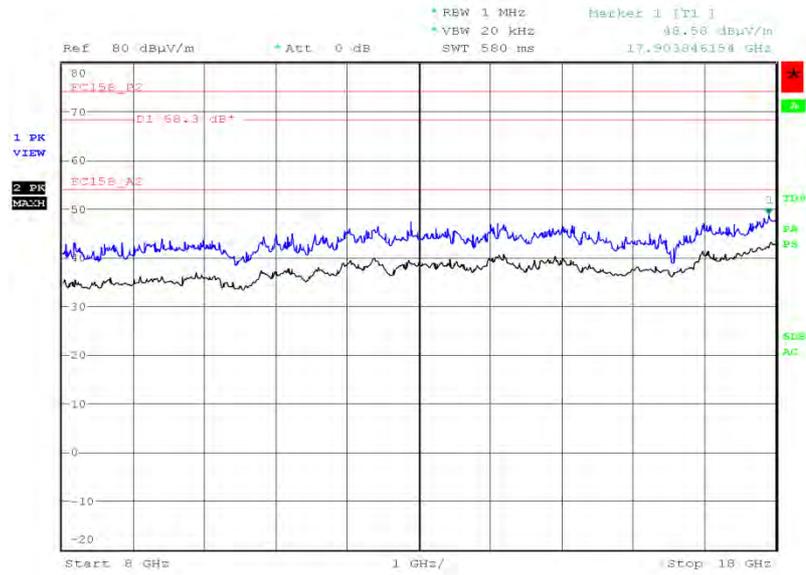
7 GHz to 8 GHz



Date: 8.JAN.2014 15:54:36

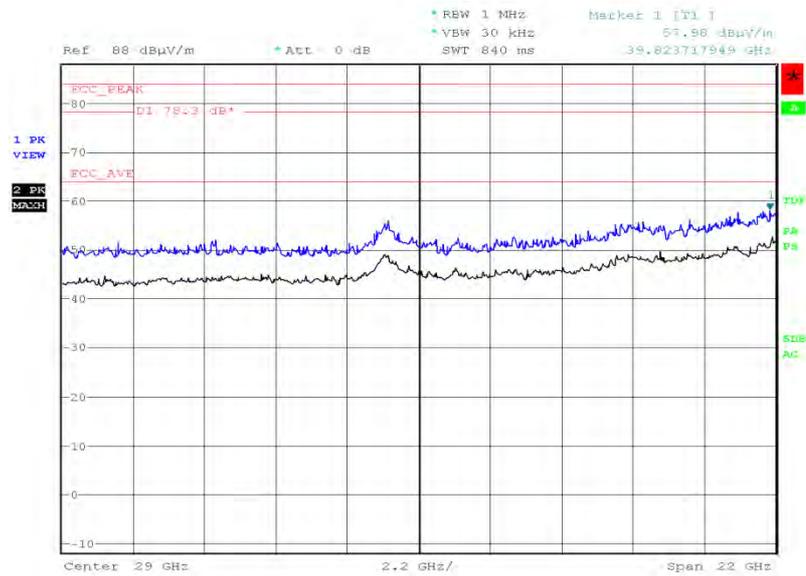


8 GHz to 18 GHz



Date: 8.JAN.2014 20:15:32

18 GHz to 40 GHz

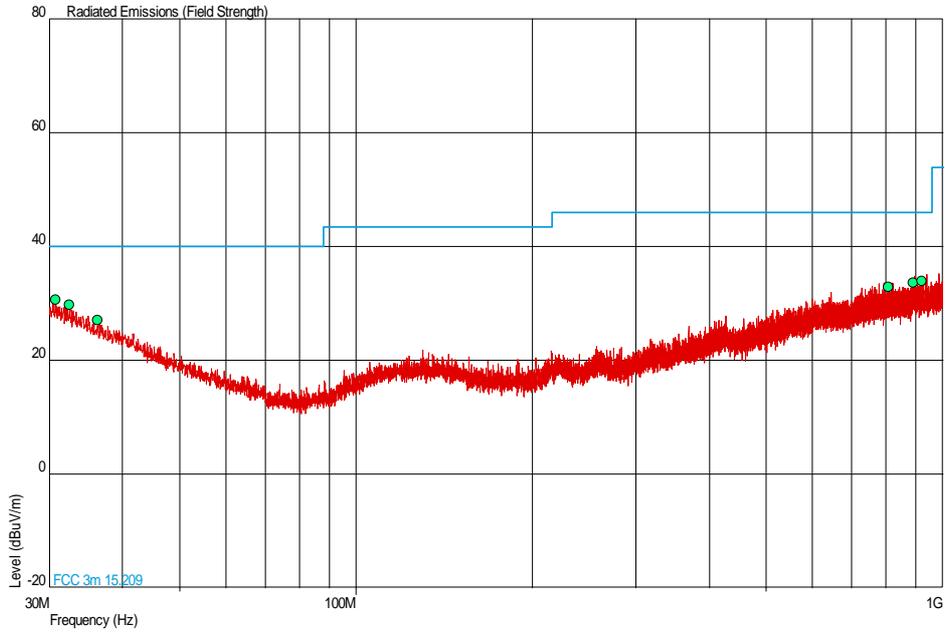


Date: 11.JAN.2014 16:05:40



5590 MHz

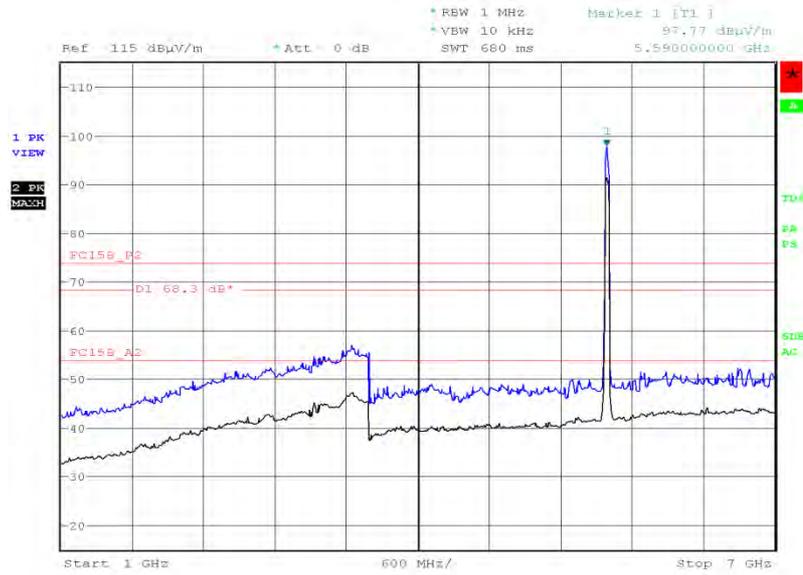
30 MHz to 1 GHz



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
30.776	30.7	34.3	40.0	100	-9.3	65.7	0	1.00	Vertical
32.425	29.7	30.5	40.0	100	-10.3	69.5	0	1.00	Vertical
36.257	27.1	22.6	40.0	100	-12.9	77.4	0	1.00	Vertical
808.862	32.9	44.2	46.0	200	-13.1	155.8	0	1.00	Vertical
889.275	33.6	47.9	46.0	200	-12.4	152.1	0	1.00	Vertical
921.527	34.0	50.1	46.0	200	-12.0	149.9	0	1.00	Vertical

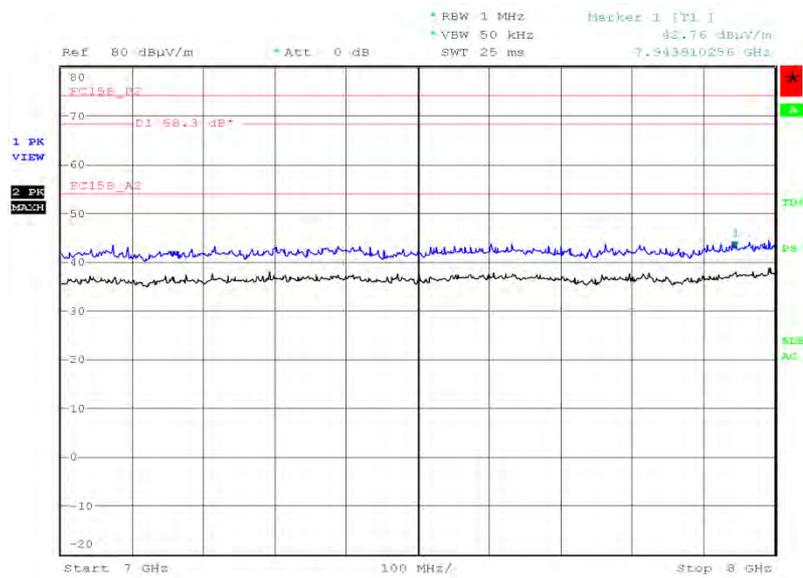


1 GHz to 7 GHz



Date: 7.JAN.2014 22:40:11

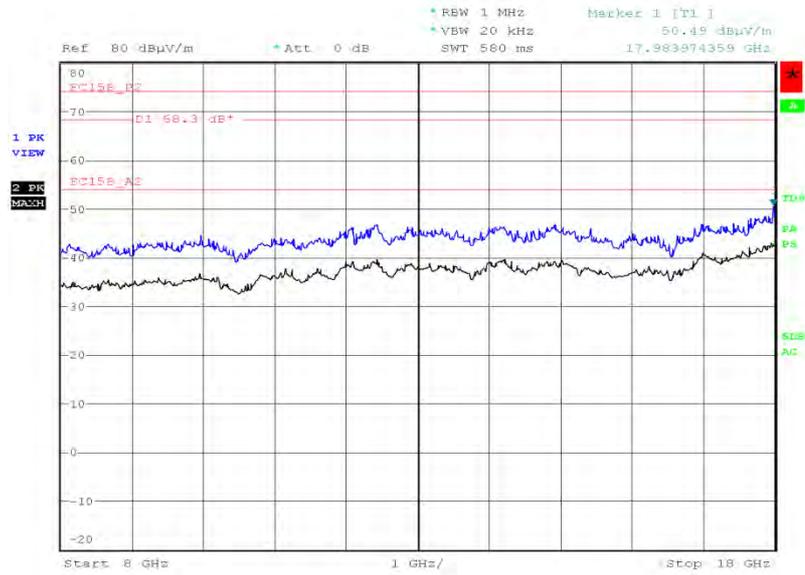
7 GHz to 8 GHz



Date: 8.JAN.2014 16:00:07

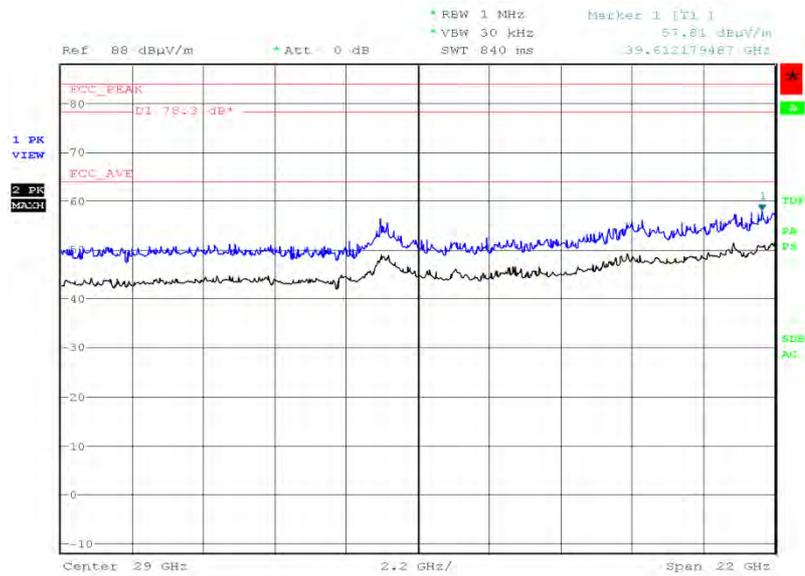


8 GHz to 18 GHz



Date: 8.JAN.2014 20:25:28

18 GHz to 40 GHz



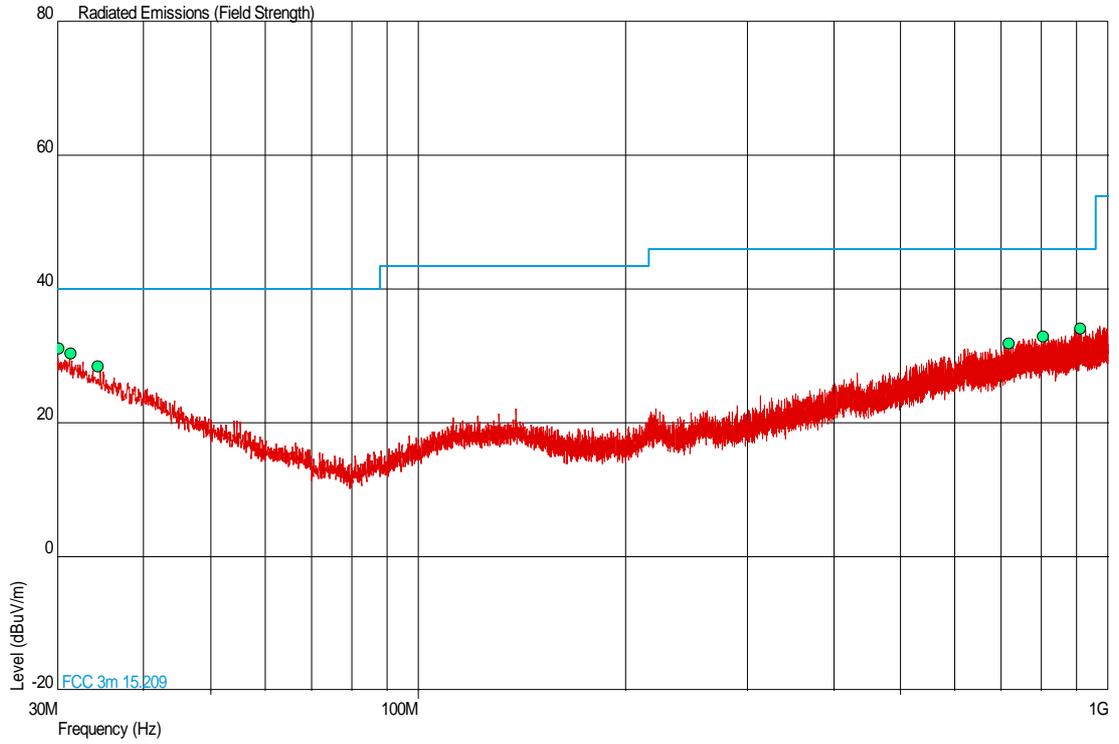
Date: 11.JAN.2014 16:11:55



Product Service

5670 MHz

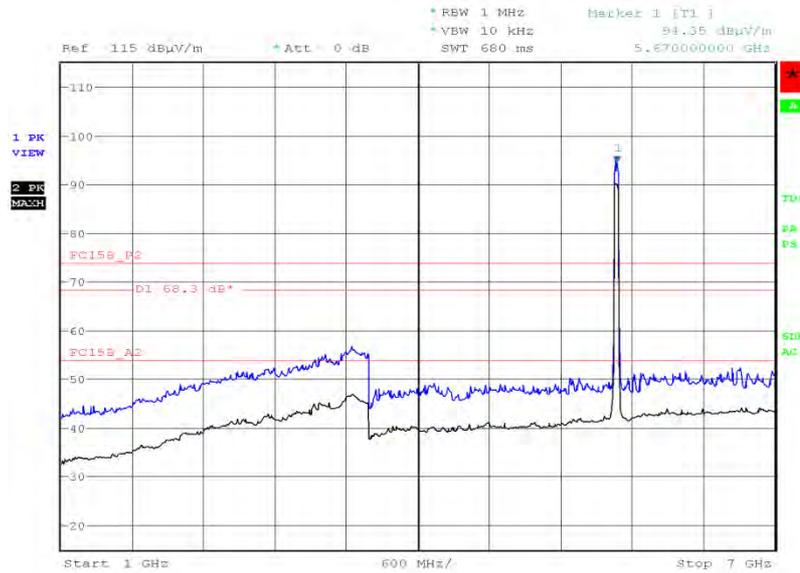
30 MHz to 1 GHz



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
30.194	31.1	35.9	40.0	100	-8.9	64.1	0	1.00	Vertical
31.407	30.3	32.7	40.0	100	-9.7	67.3	0	1.00	Vertical
34.317	28.5	26.6	40.0	100	-11.5	73.4	0	1.00	Vertical
718.894	31.8	38.9	46.0	200	-14.2	161.1	0	1.00	Vertical
805.370	32.8	43.7	46.0	200	-13.2	156.3	0	1.00	Vertical
910.518	34.1	50.7	46.0	200	-11.9	149.3	0	1.00	Vertical

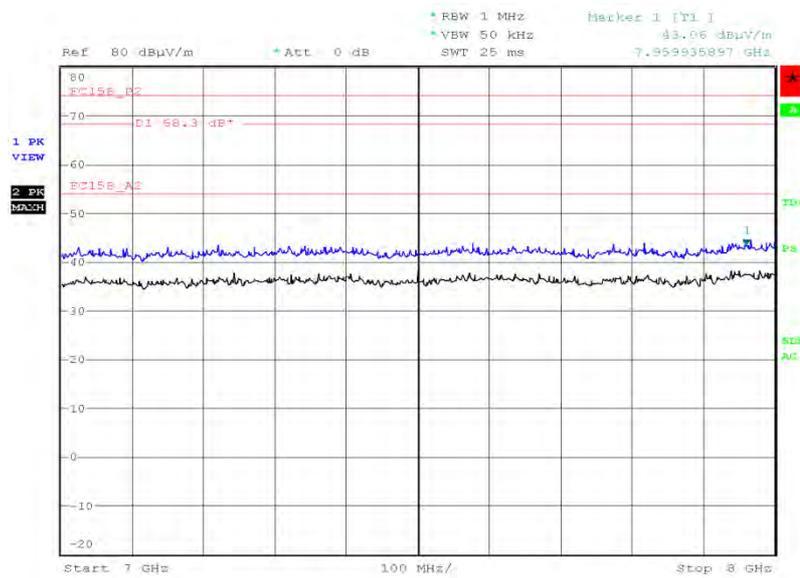


1 GHz to 7 GHz



Date: 7.JAN.2014 22:50:52

7 GHz to 8 GHz

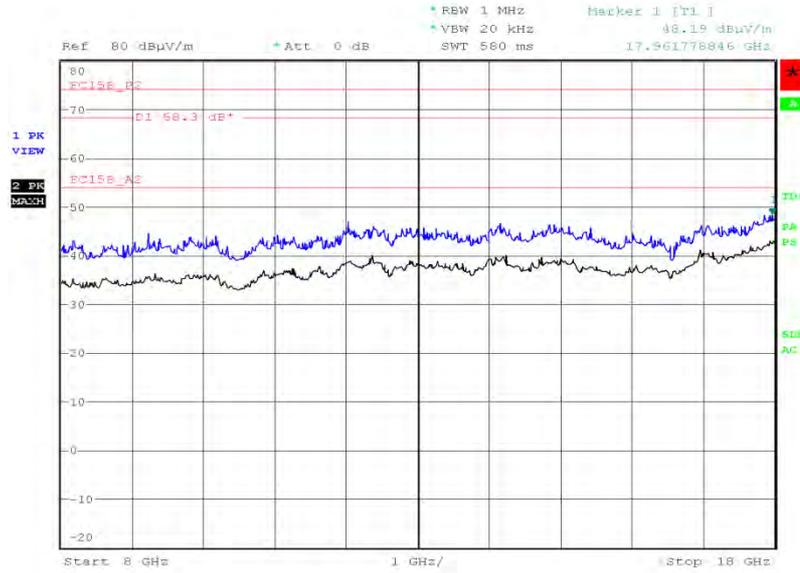


Date: 8.JAN.2014 16:03:27



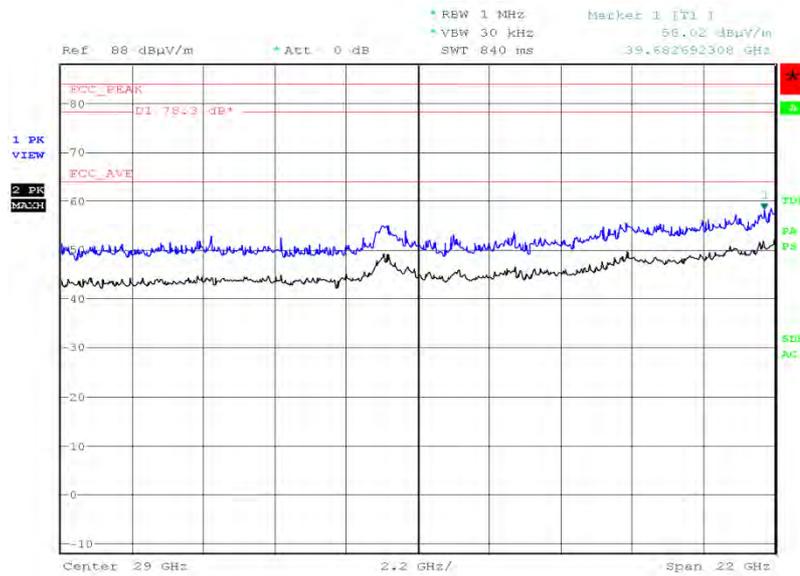
Product Service

8 GHz to 18 GHz



Date: 8.JAN.2014 20:34:10

18 GHz to 40 GHz



Date: 11.JAN.2014 16:17:35

Limit

Peak (dBμV/m)	Average (dBμV/m)
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Product Service

74.0	54.0
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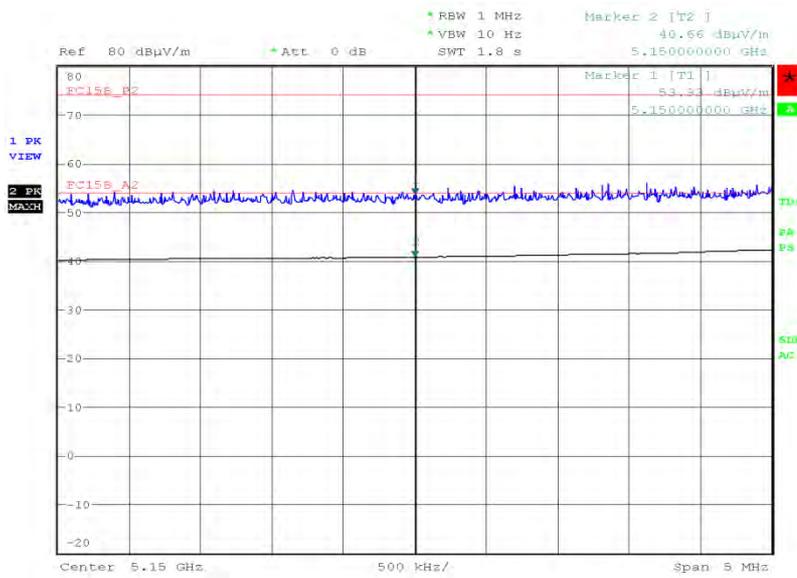


Product Service

Band Edge Emissions

5190 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	53.33	40.66



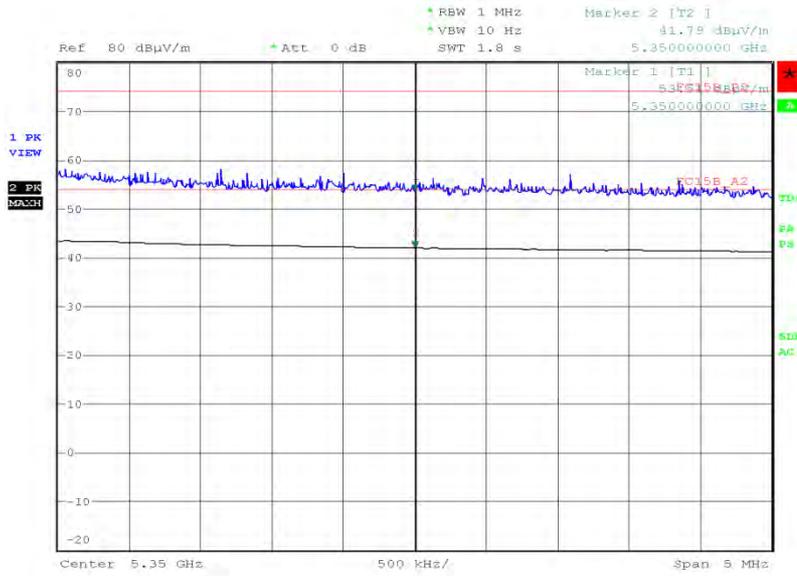
Date: 5.JAN.2014 12:02:41



Product Service

5310 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	53.51	41.79



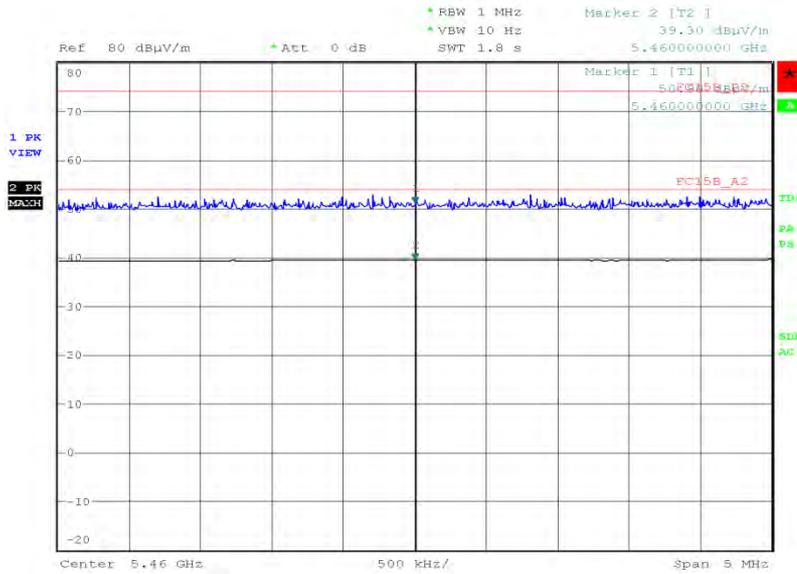
Date: 5.JAN.2014 08:47:48



Product Service

5510 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	50.90	39.30



Date: 5.JAN.2014 08:58:04

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

SHL24 S/N: IMEI 004401115003408 - Modification State 0

2.4.3 Date of Test

10 January 2014

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 and a spectrum analyser was used to measure emissions at the operating band edges with an emission limit of -27 dBm/MHz.

Measurements were made at extremes of the manufacturer's declared temperature range and at intervals not more than 10°C throughout the range. The EUT was stabilised at each temperature variations prior to measurements being made. For each temperature variation, measurements were made at the maximum and minimum end point battery supply voltages declared by the manufacturer.

2.4.6 Environmental Conditions

Ambient Temperature	25.0°C
Relative Humidity	35.0%



Product Service

2.4.7 Test Results

802.11(a)

Frequency Band 1

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)
		5180 MHz
-10°C	4.0 V DC	Pass
	3.7 V DC	Pass
0°C	4.0 V DC	Pass
	3.7 V DC	Pass
+10°C	4.0 V DC	Pass
	3.7 V DC	Pass
+20°C	4.0 V DC	Pass
	3.7 V DC	Pass
-30°C	4.0 V DC	Pass
	3.7 V DC	Pass
+40°C	4.0 V DC	Pass
	3.7 V DC	Pass
+50°C	4.0 V DC	Pass
	3.7 V DC	Pass
+55°C	4.0 V DC	Pass
	3.7 V DC	Pass



Product Service

Frequency Band 2

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)
		5320 MHz
-10°C	4.0 V DC	Pass
	3.7 V DC	Pass
0°C	4.0 V DC	Pass
	3.7 V DC	Pass
+10°C	4.0 V DC	Pass
	3.7 V DC	Pass
+20°C	4.0 V DC	Pass
	3.7 V DC	Pass
-30°C	4.0 V DC	Pass
	3.7 V DC	Pass
+40°C	4.0 V DC	Pass
	3.7 V DC	Pass
+50°C	4.0 V DC	Pass
	3.7 V DC	Pass
+55°C	4.0 V DC	Pass
	3.7 V DC	Pass



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	Pass	Pass
	3.7 V DC	Pass	Pass
0°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+10°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+20°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
-30°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+40°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+50°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+55°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass

Limit

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

802.11(ac) - 5 GHz 20 MHz BW

4.0 V DC Supply

Frequency Band 1

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)
		5180 MHz
-10°C	4.0 V DC	Pass
	3.7 V DC	Pass
0°C	4.0 V DC	Pass
	3.7 V DC	Pass
+10°C	4.0 V DC	Pass
	3.7 V DC	Pass
+20°C	4.0 V DC	Pass
	3.7 V DC	Pass
-30°C	4.0 V DC	Pass
	3.7 V DC	Pass
+40°C	4.0 V DC	Pass
	3.7 V DC	Pass
+50°C	4.0 V DC	Pass
	3.7 V DC	Pass
+55°C	4.0 V DC	Pass
	3.7 V DC	Pass



Product Service

Frequency Band 2

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)
		5320 MHz
-10°C	4.0 V DC	Pass
	3.7 V DC	Pass
0°C	4.0 V DC	Pass
	3.7 V DC	Pass
+10°C	4.0 V DC	Pass
	3.7 V DC	Pass
+20°C	4.0 V DC	Pass
	3.7 V DC	Pass
-30°C	4.0 V DC	Pass
	3.7 V DC	Pass
+40°C	4.0 V DC	Pass
	3.7 V DC	Pass
+50°C	4.0 V DC	Pass
	3.7 V DC	Pass
+55°C	4.0 V DC	Pass
	3.7 V DC	Pass



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	Pass	Pass
	3.7 V DC	Pass	Pass
0°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+10°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+20°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
-30°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+40°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+50°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+55°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass

Limit

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



Product Service

802.11(ac) - 5 GHz 40 MHz BW

4.0 V DC Supply

Frequency Band 1

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)
		5190 MHz
-10°C	4.0 V DC	Pass
	3.7 V DC	Pass
0°C	4.0 V DC	Pass
	3.7 V DC	Pass
+10°C	4.0 V DC	Pass
	3.7 V DC	Pass
+20°C	4.0 V DC	Pass
	3.7 V DC	Pass
-30°C	4.0 V DC	Pass
	3.7 V DC	Pass
+40°C	4.0 V DC	Pass
	3.7 V DC	Pass
+50°C	4.0 V DC	Pass
	3.7 V DC	Pass
+55°C	4.0 V DC	Pass
	3.7 V DC	Pass



Product Service

Frequency Band 2

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)
		5310 MHz
-10°C	4.0 V DC	Pass
	3.7 V DC	Pass
0°C	4.0 V DC	Pass
	3.7 V DC	Pass
+10°C	4.0 V DC	Pass
	3.7 V DC	Pass
+20°C	4.0 V DC	Pass
	3.7 V DC	Pass
-30°C	4.0 V DC	Pass
	3.7 V DC	Pass
+40°C	4.0 V DC	Pass
	3.7 V DC	Pass
+50°C	4.0 V DC	Pass
	3.7 V DC	Pass
+55°C	4.0 V DC	Pass
	3.7 V DC	Pass



Product Service

Frequency Band 3

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)	
		5510 MHz	5670 MHz
-10°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
0°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+10°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+20°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
-30°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+40°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+50°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+55°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass

Limit

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



Product Service

802.11(ac) - 5 GHz 80 MHz BW

4.0 V DC Supply

Frequency Band 1

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)
		5210 MHz
-10°C	4.0 V DC	Pass
	3.7 V DC	Pass
0°C	4.0 V DC	Pass
	3.7 V DC	Pass
+10°C	4.0 V DC	Pass
	3.7 V DC	Pass
+20°C	4.0 V DC	Pass
	3.7 V DC	Pass
-30°C	4.0 V DC	Pass
	3.7 V DC	Pass
+40°C	4.0 V DC	Pass
	3.7 V DC	Pass
+50°C	4.0 V DC	Pass
	3.7 V DC	Pass
+55°C	4.0 V DC	Pass
	3.7 V DC	Pass



Product Service

Frequency Band 2

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)
		5290 MHz
-10°C	4.0 V DC	Pass
	3.7 V DC	Pass
0°C	4.0 V DC	Pass
	3.7 V DC	Pass
+10°C	4.0 V DC	Pass
	3.7 V DC	Pass
+20°C	4.0 V DC	Pass
	3.7 V DC	Pass
-30°C	4.0 V DC	Pass
	3.7 V DC	Pass
+40°C	4.0 V DC	Pass
	3.7 V DC	Pass
+50°C	4.0 V DC	Pass
	3.7 V DC	Pass
+55°C	4.0 V DC	Pass
	3.7 V DC	Pass



Product Service

Frequency Band 3

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)	
		5530 MHz	5610 MHz
-10°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
0°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+10°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+20°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
-30°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+40°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+50°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+55°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass

Limit

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



Product Service

802.11(n) - 5 GHz 20 MHz BW

4.0 V DC Supply

Frequency Band 1

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)
		5180 MHz
-10°C	4.0 V DC	Pass
	3.7 V DC	Pass
0°C	4.0 V DC	Pass
	3.7 V DC	Pass
+10°C	4.0 V DC	Pass
	3.7 V DC	Pass
+20°C	4.0 V DC	Pass
	3.7 V DC	Pass
-30°C	4.0 V DC	Pass
	3.7 V DC	Pass
+40°C	4.0 V DC	Pass
	3.7 V DC	Pass
+50°C	4.0 V DC	Pass
	3.7 V DC	Pass
+55°C	4.0 V DC	Pass
	3.7 V DC	Pass



Product Service

Frequency Band 2

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)
		5320 MHz
-10°C	4.0 V DC	Pass
	3.7 V DC	Pass
0°C	4.0 V DC	Pass
	3.7 V DC	Pass
+10°C	4.0 V DC	Pass
	3.7 V DC	Pass
+20°C	4.0 V DC	Pass
	3.7 V DC	Pass
-30°C	4.0 V DC	Pass
	3.7 V DC	Pass
+40°C	4.0 V DC	Pass
	3.7 V DC	Pass
+50°C	4.0 V DC	Pass
	3.7 V DC	Pass
+55°C	4.0 V DC	Pass
	3.7 V DC	Pass



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	Pass	Pass
	3.7 V DC	Pass	Pass
0°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+10°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+20°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
-30°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+40°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+50°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+55°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass

Limit

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



Product Service

802.11(n) - 5 GHz 40 MHz BW

4.0 V DC Supply

Frequency Band 1

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)
		5190 MHz
-10°C	4.0 V DC	Pass
	3.7 V DC	Pass
0°C	4.0 V DC	Pass
	3.7 V DC	Pass
+10°C	4.0 V DC	Pass
	3.7 V DC	Pass
+20°C	4.0 V DC	Pass
	3.7 V DC	Pass
-30°C	4.0 V DC	Pass
	3.7 V DC	Pass
+40°C	4.0 V DC	Pass
	3.7 V DC	Pass
+50°C	4.0 V DC	Pass
	3.7 V DC	Pass
+55°C	4.0 V DC	Pass
	3.7 V DC	Pass



Product Service

Frequency Band 2

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)
		5310 MHz
-10°C	4.0 V DC	Pass
	3.7 V DC	Pass
0°C	4.0 V DC	Pass
	3.7 V DC	Pass
+10°C	4.0 V DC	Pass
	3.7 V DC	Pass
+20°C	4.0 V DC	Pass
	3.7 V DC	Pass
-30°C	4.0 V DC	Pass
	3.7 V DC	Pass
+40°C	4.0 V DC	Pass
	3.7 V DC	Pass
+50°C	4.0 V DC	Pass
	3.7 V DC	Pass
+55°C	4.0 V DC	Pass
	3.7 V DC	Pass



Product Service

Frequency Band 3

Hand Carrier Battery Powered

Temperature Interval	Supply Voltage	Frequency Error (ppm)	
		5510 MHz	5670 MHz
-10°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
0°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+10°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+20°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
-30°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+40°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+50°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass
+55°C	4.0 V DC	Pass	Pass
	3.7 V DC	Pass	Pass

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

SHL24 S/N: IMEI 004401115003408 - Modification State 0

2.5.3 Date of Test

16 January 2014

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	21.4°C
Relative Humidity	40.7%



Product Service

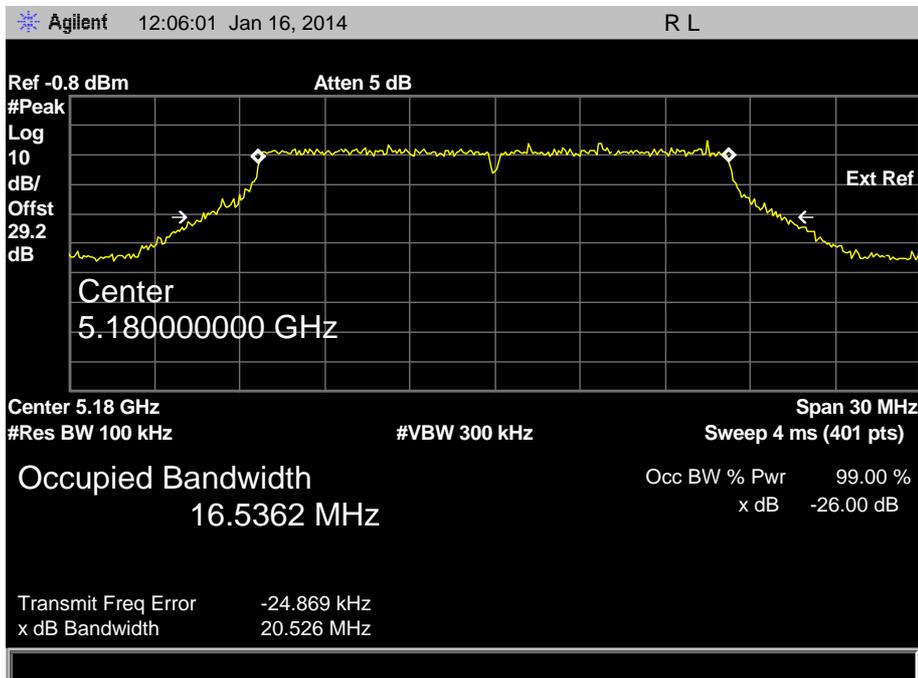
2.5.7 Test Results

802.11(a)

Frequency Band 1

5180 MHz

26 dB Bandwidth (MHz)	20.526
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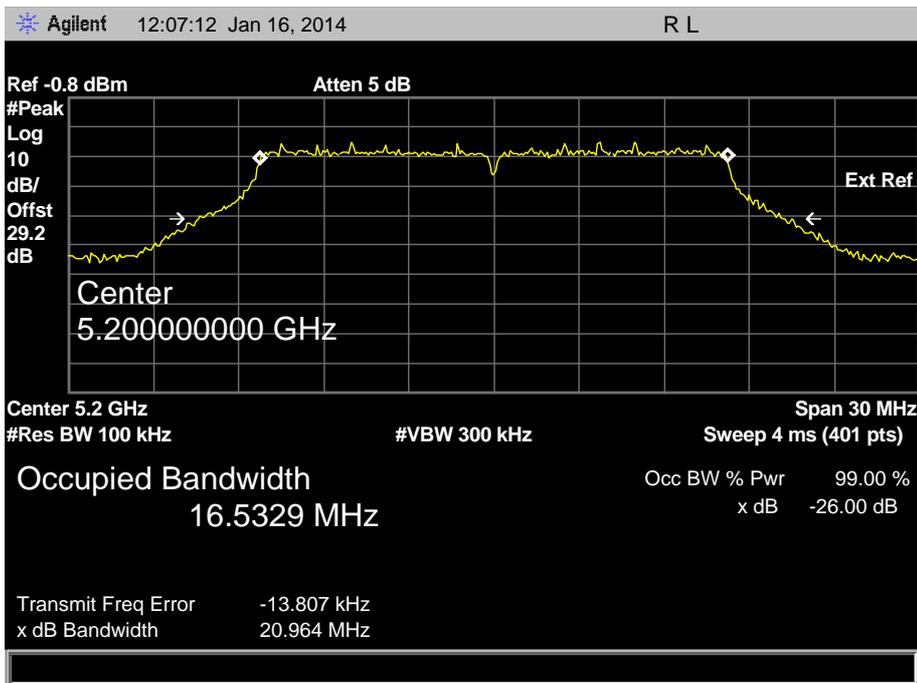




Product Service

5200 MHz

26 dB Bandwidth (MHz)	20.964
-----------------------	--------

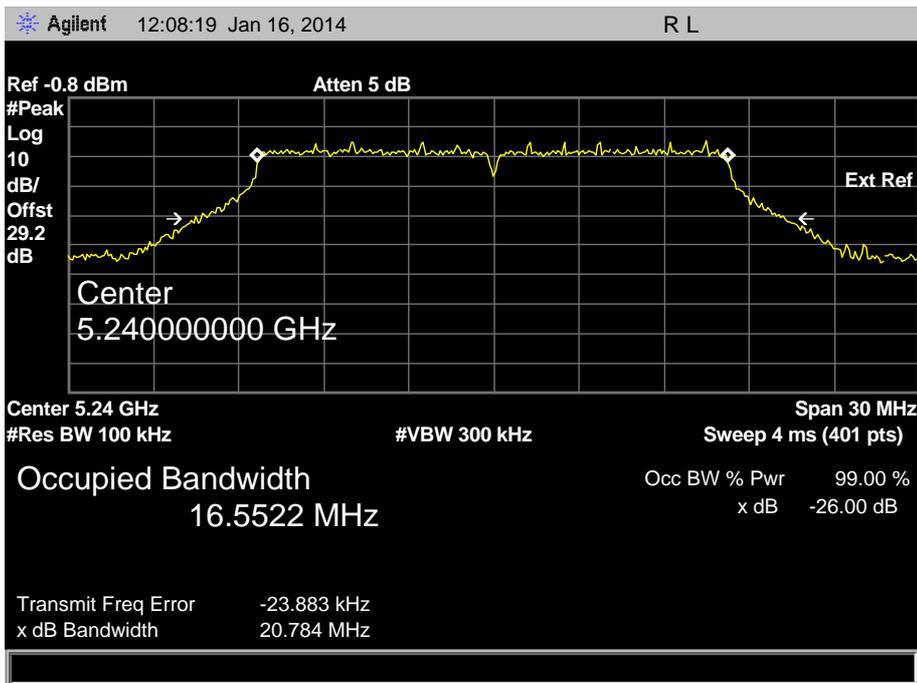




Product Service

5240 MHz

26 dB Bandwidth (MHz)	20.784
-----------------------	--------



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 6 Mbps.

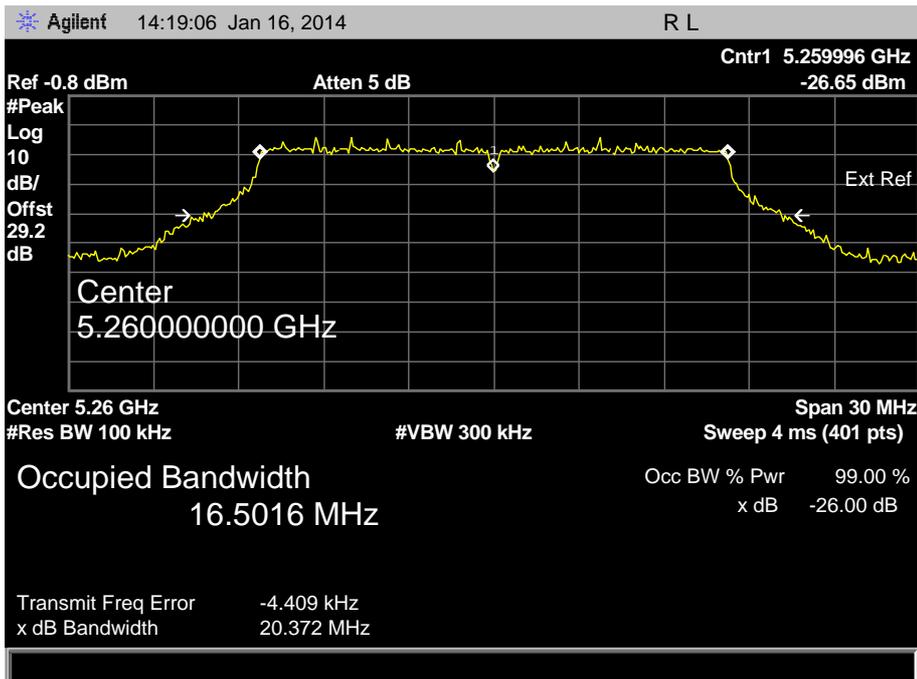


Product Service

Frequency Band 2

5260 MHz

26 dB Bandwidth (MHz)	20.372
-----------------------	--------

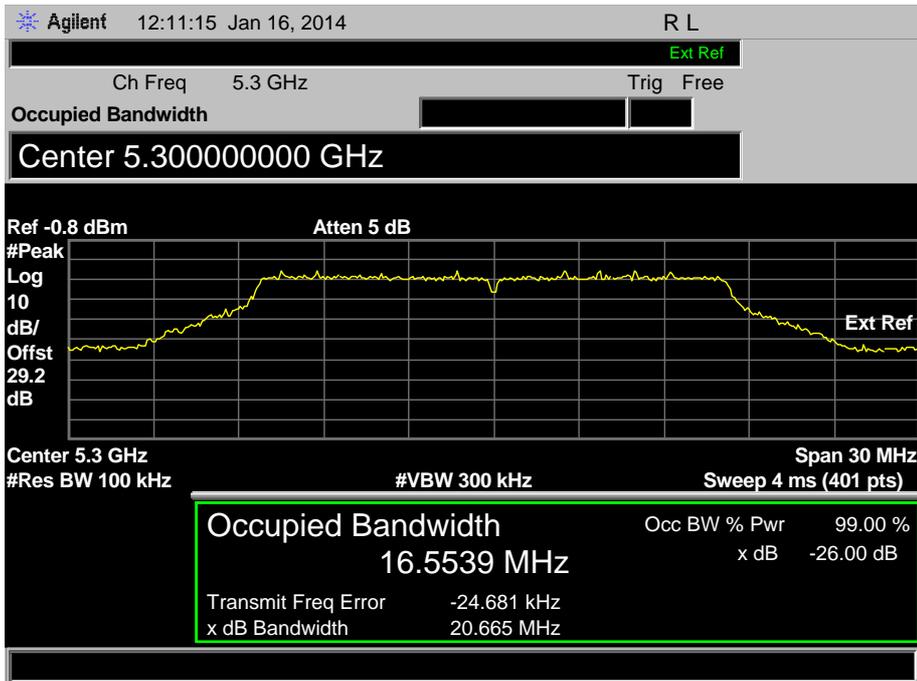




Product Service

5300 MHz

26 dB Bandwidth (MHz)	20.665
-----------------------	--------

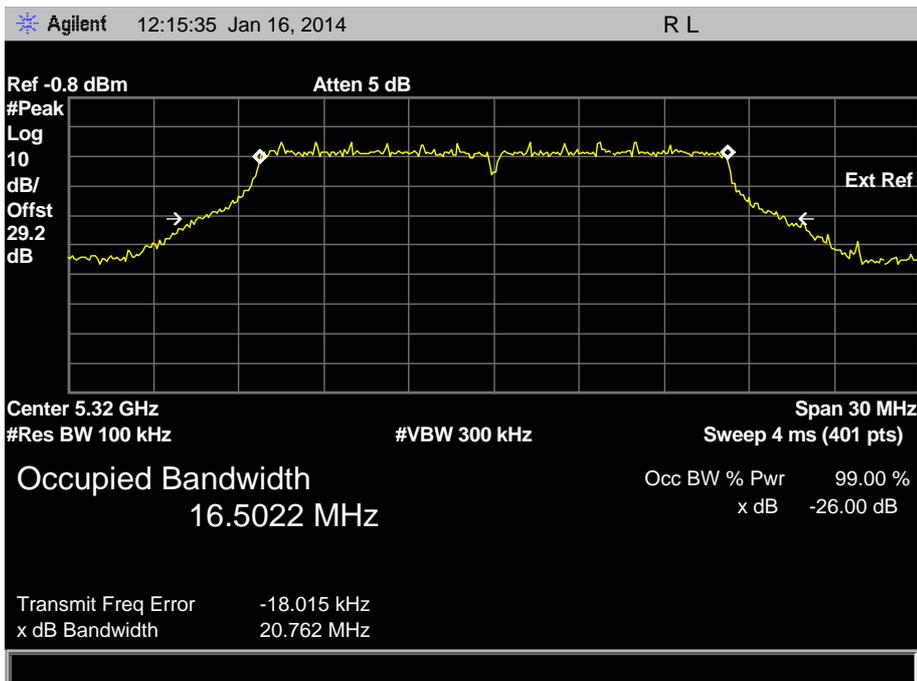




Product Service

5320 MHz

26 dB Bandwidth (MHz)	20.762
-----------------------	--------



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 6 Mbps.

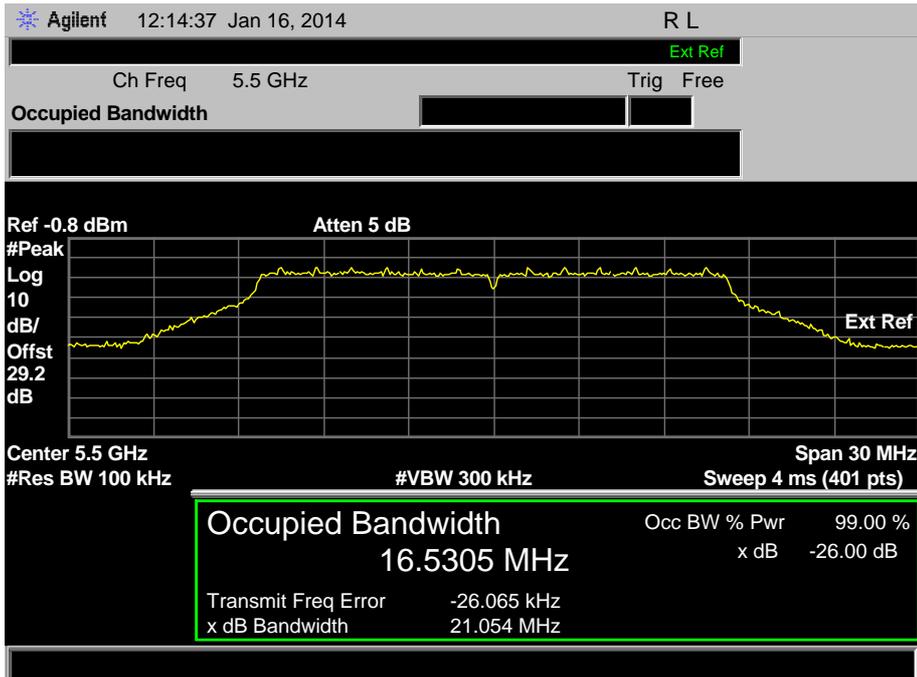


Product Service

Frequency Band 3

5500 MHz

26 dB Bandwidth (MHz)	21.054
-----------------------	--------

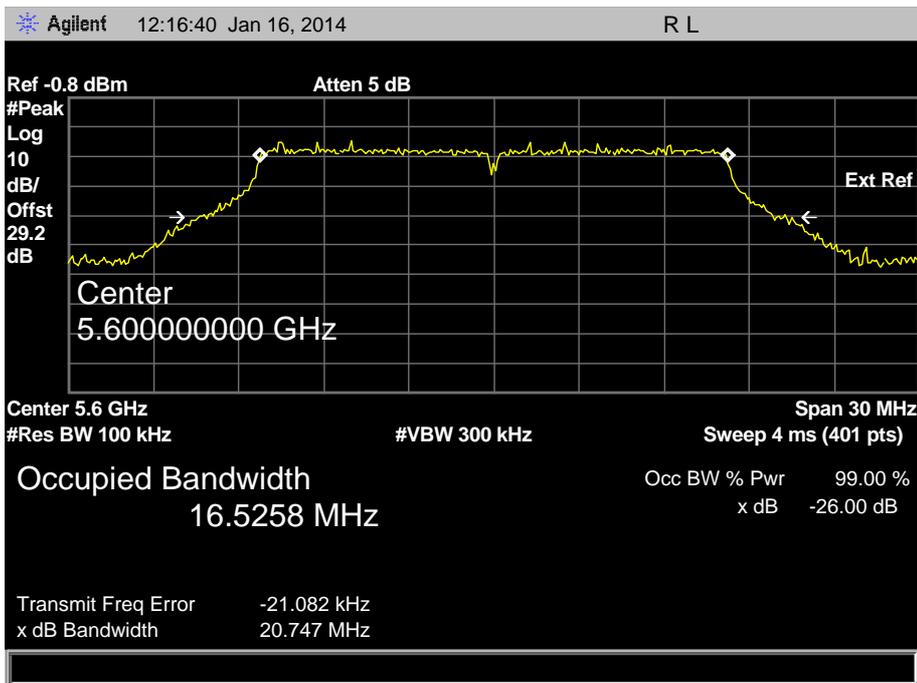




Product Service

5600 MHz

26 dB Bandwidth (MHz)	20.747
-----------------------	--------

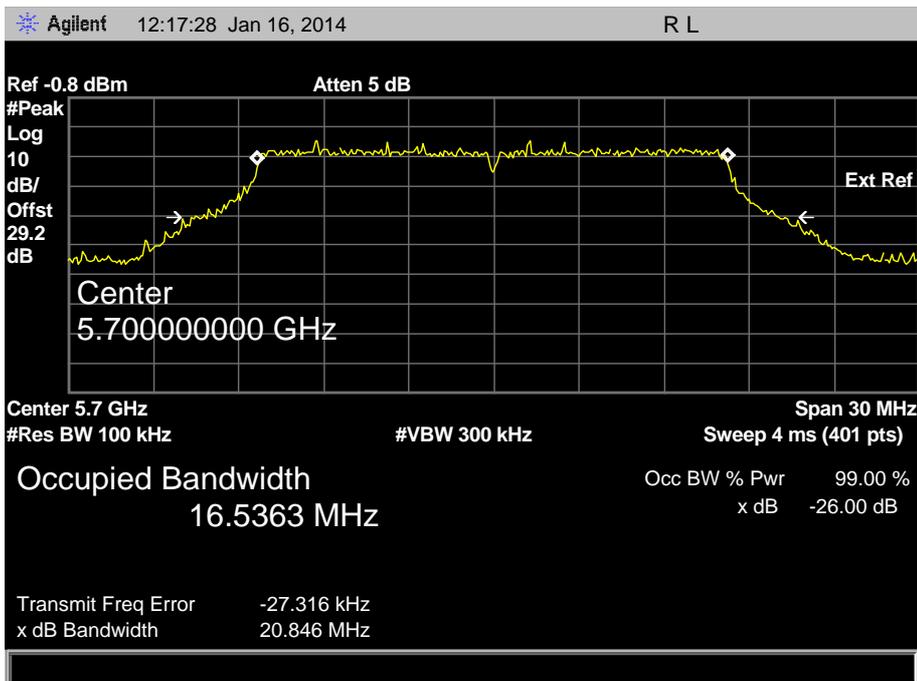




Product Service

5700 MHz

26 dB Bandwidth (MHz)	20.846
-----------------------	--------



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 6 Mbps.

Limit

Not specified.



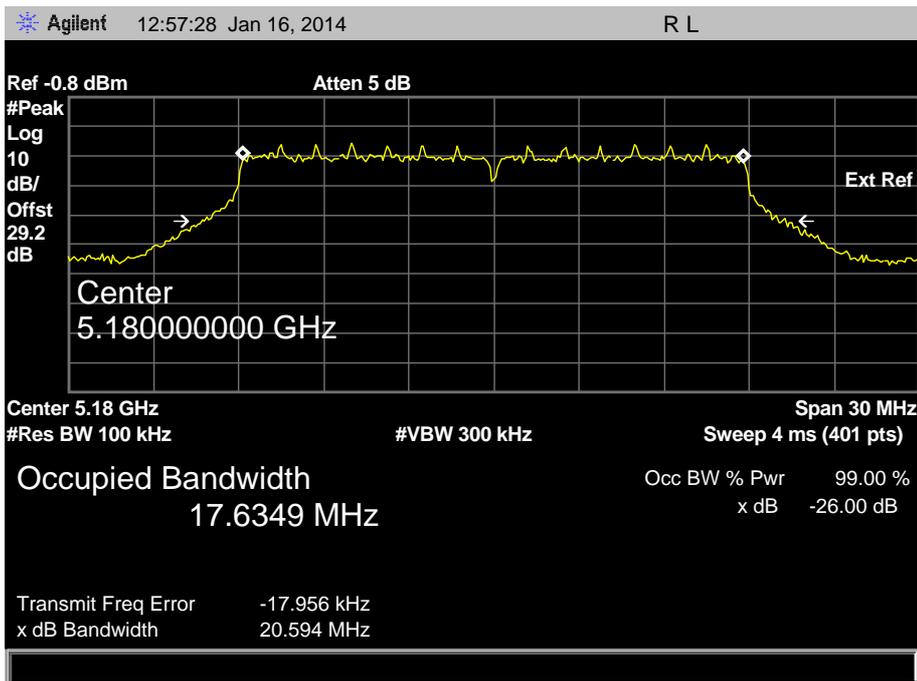
Product Service

802.11(ac) - 5 GHz 20 MHz BW

Frequency Band 1

5180 MHz

26 dB Bandwidth (MHz)	20.594
-----------------------	--------

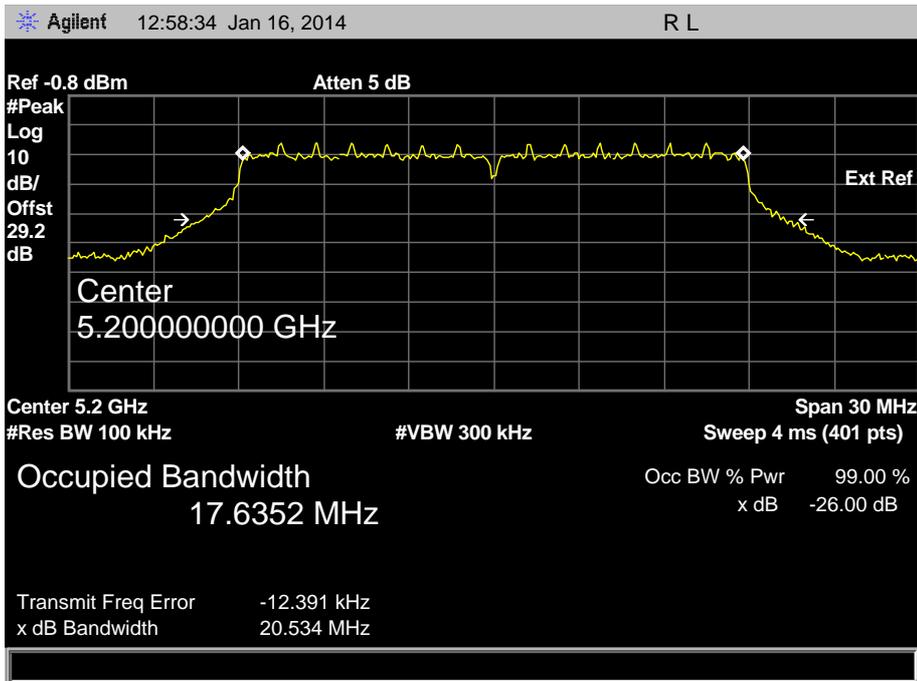




Product Service

5200 MHz

26 dB Bandwidth (MHz)	20.534
-----------------------	--------

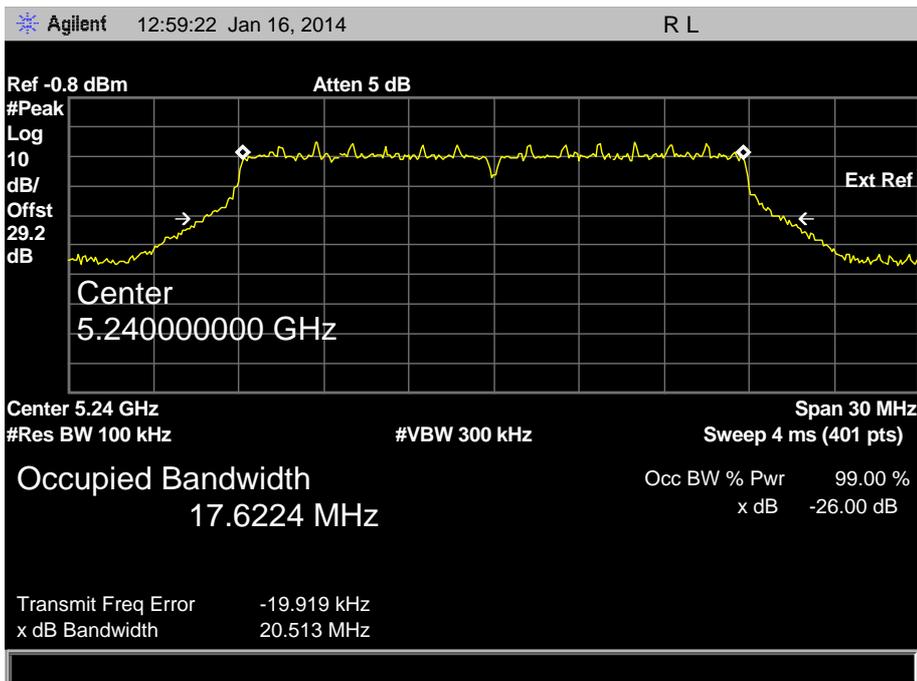




Product Service

5240 MHz

26 dB Bandwidth (MHz)	20.513
-----------------------	--------



The test was performed on the worst case data rate for 802.11(ac) - 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 MCS2.

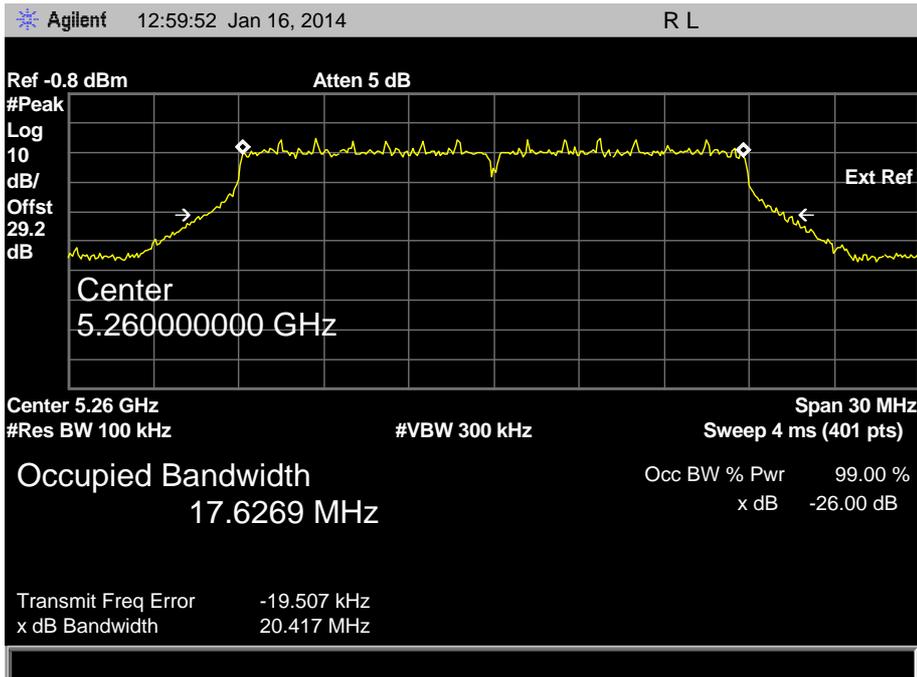


Product Service

Frequency Band 2

5260 MHz

26 dB Bandwidth (MHz)	20.417
-----------------------	--------

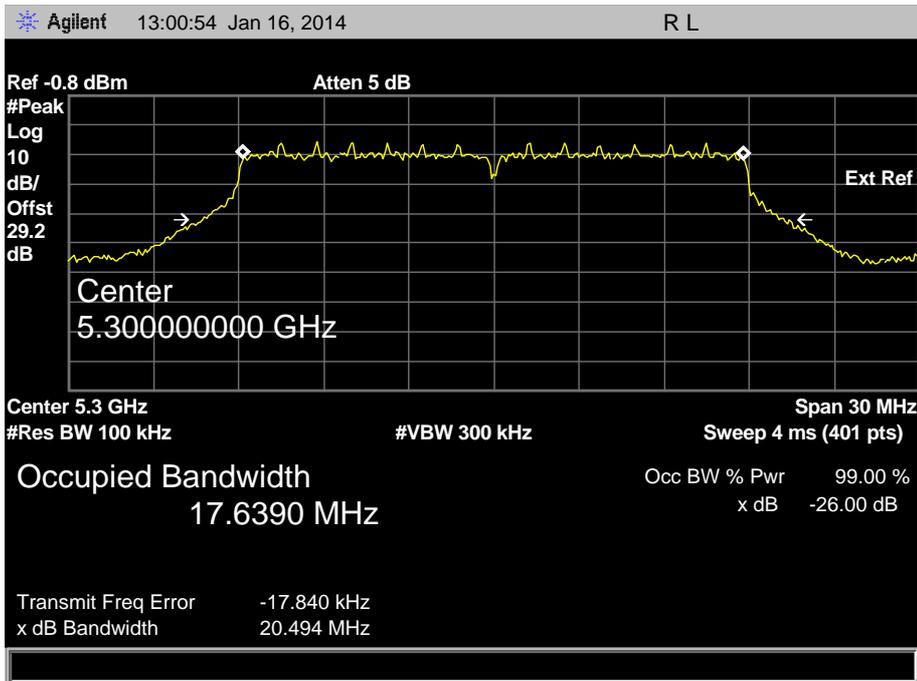




Product Service

5300 MHz

26 dB Bandwidth (MHz)	20.494
-----------------------	--------

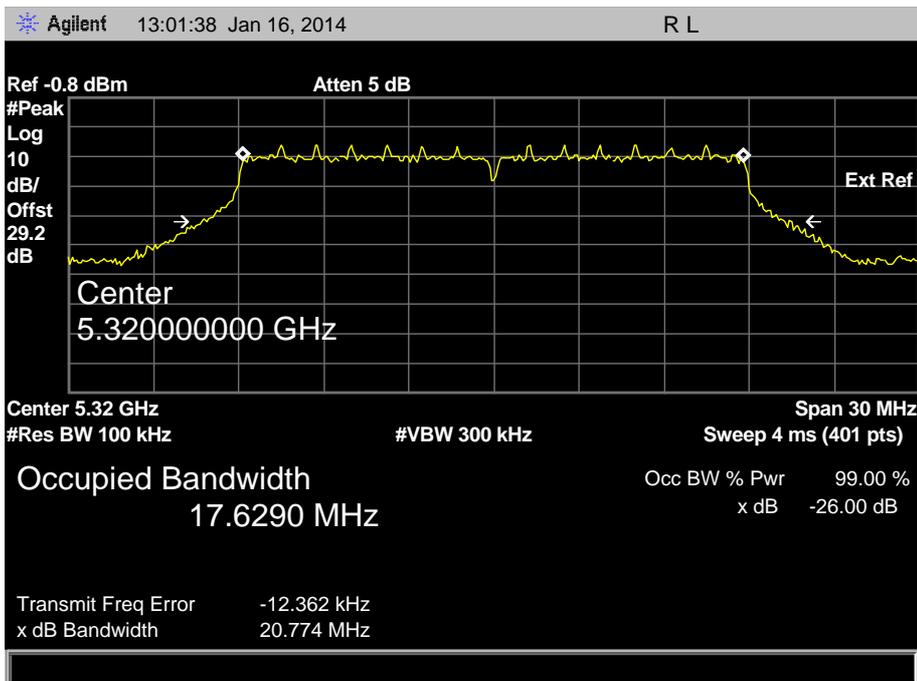




Product Service

5320 MHz

26 dB Bandwidth (MHz)	20.774
-----------------------	--------



The test was performed on the worst case data rate for 802.11(ac) - 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 MCS2.

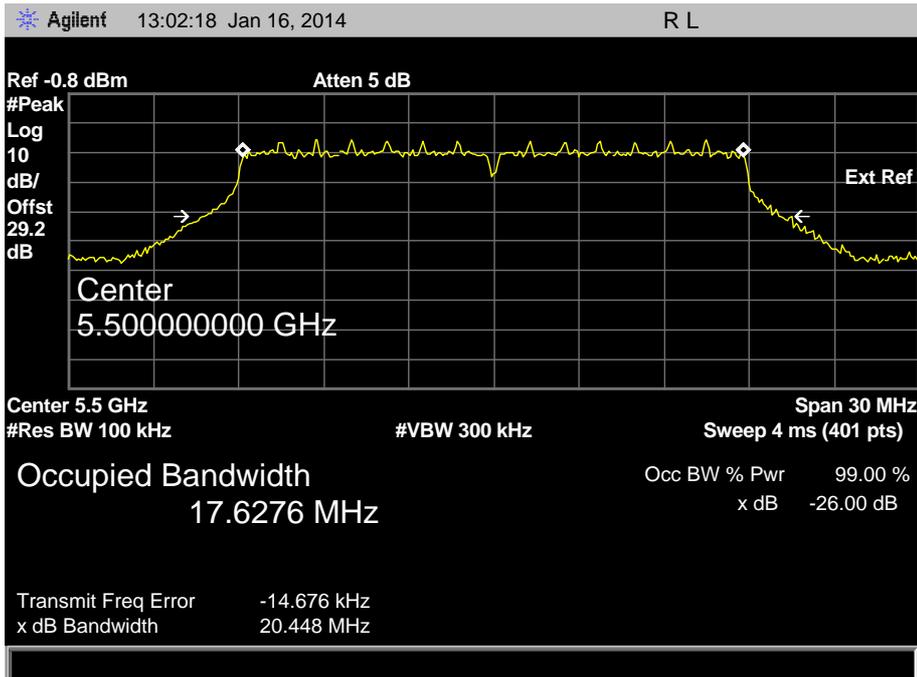


Product Service

Frequency Band 3

5500 MHz

26 dB Bandwidth (MHz)	20.448
-----------------------	--------

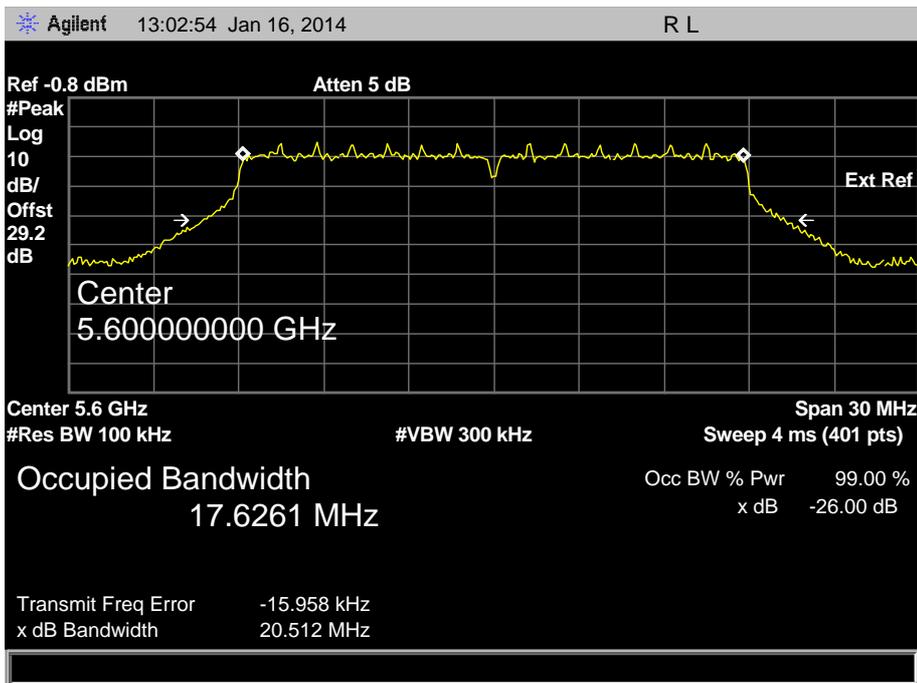




Product Service

5600 MHz

26 dB Bandwidth (MHz)	20.512
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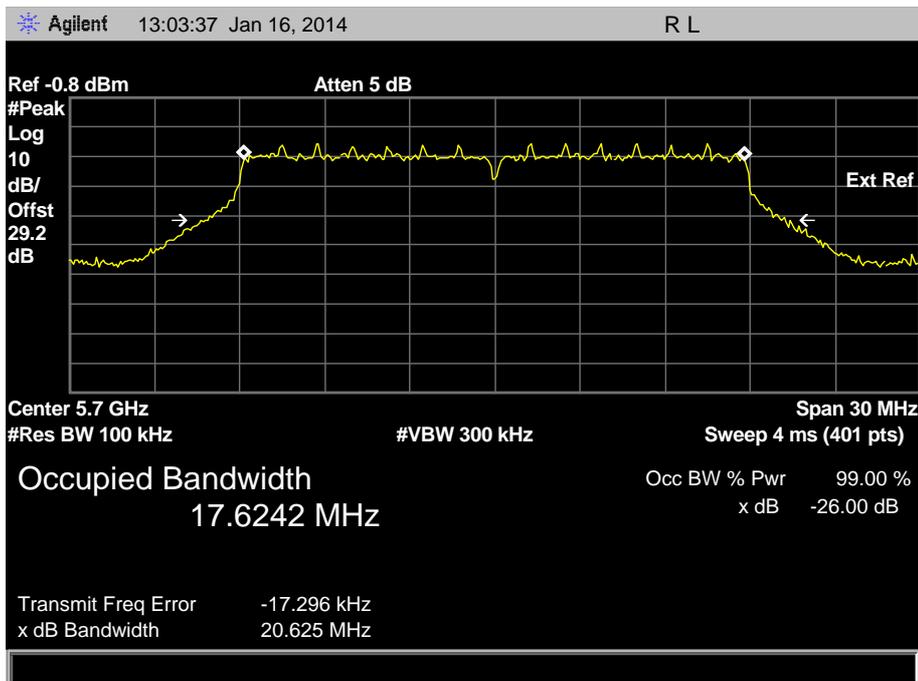




Product Service

5700 MHz

26 dB Bandwidth (MHz)	20.625
-----------------------	--------



The test was performed on the worst case data rate for 802.11(ac) - 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 MCS2.

Limit

Not specified.



Product Service

802.11(ac) - 5 GHz 40 MHz BW

Frequency Band 1

5190 MHz

26 dB Bandwidth (MHz)	42.990
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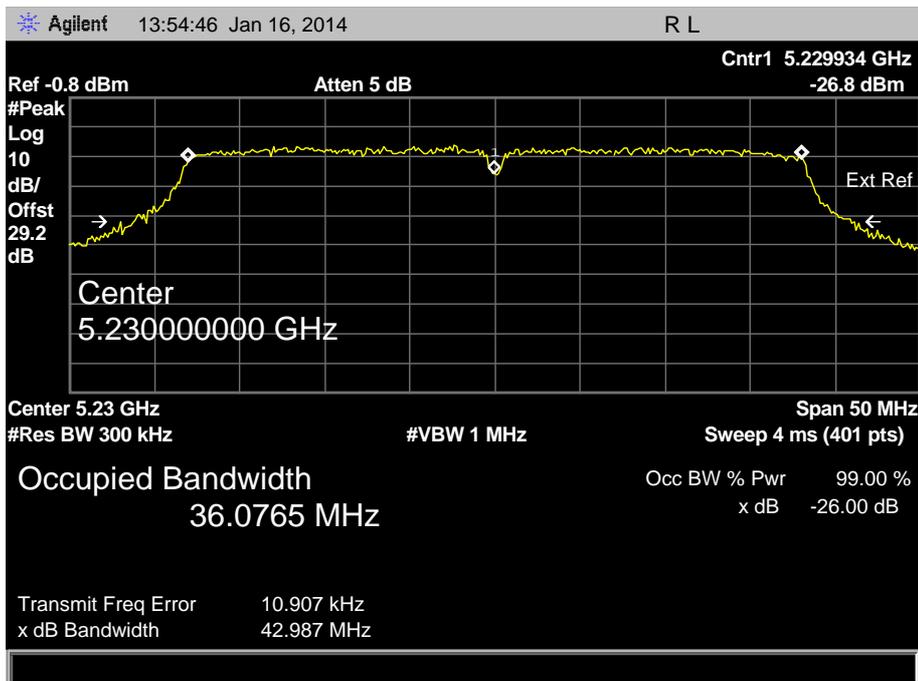




Product Service

5230 MHz

26 dB Bandwidth (MHz)	42.987
-----------------------	--------



The test was performed on the worst case data rate for 802.11(ac) - 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 MCS0.

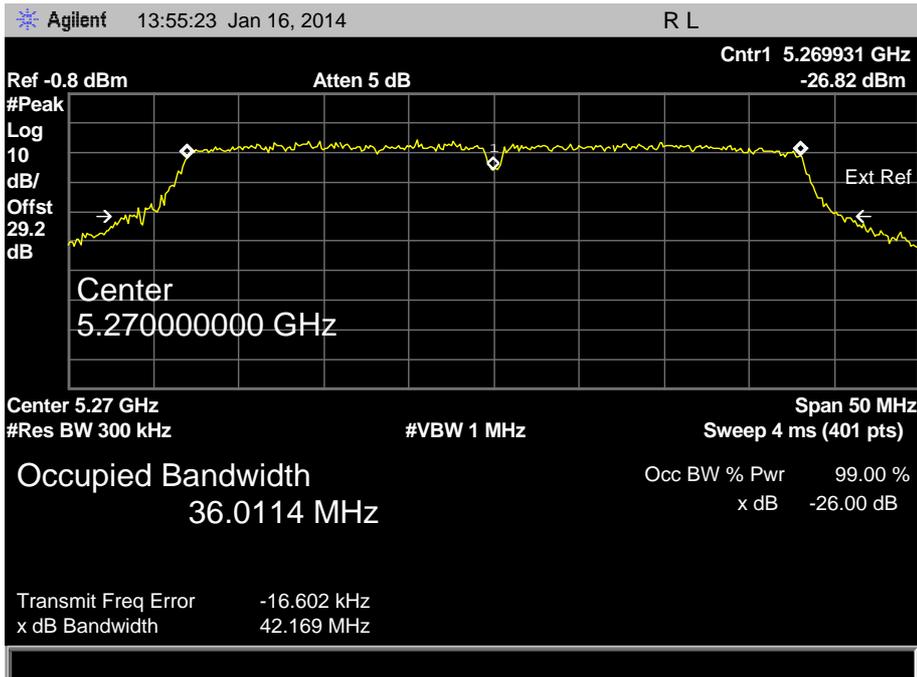


Product Service

Frequency Band 2

5270 MHz

26 dB Bandwidth (MHz)	42.169
-----------------------	--------

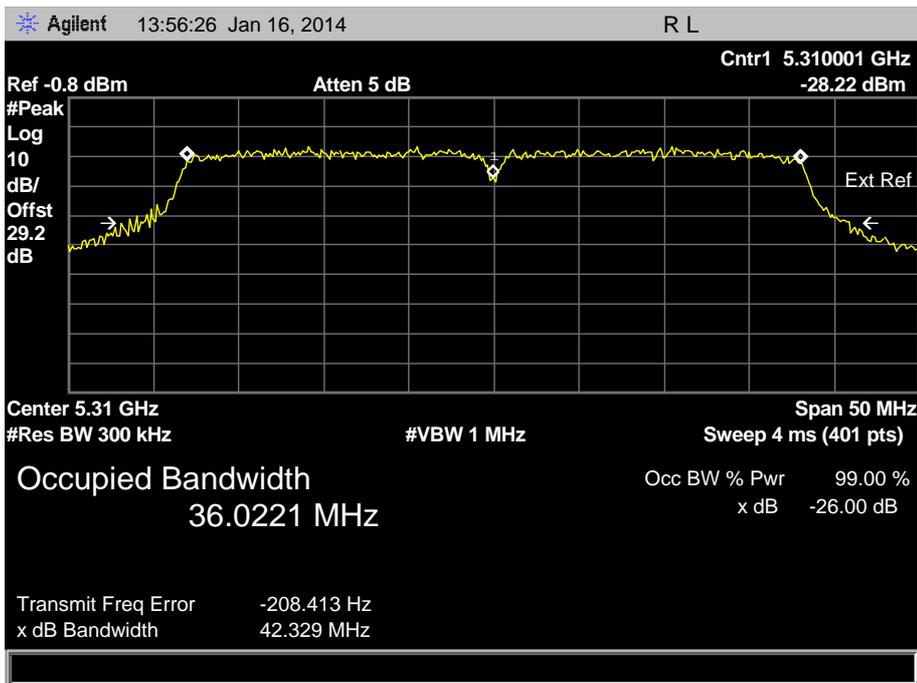




Product Service

5310 MHz

26 dB Bandwidth (MHz)	42.329
-----------------------	--------



The test was performed on the worst case data rate for 802.11(ac) - 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 MCS0.

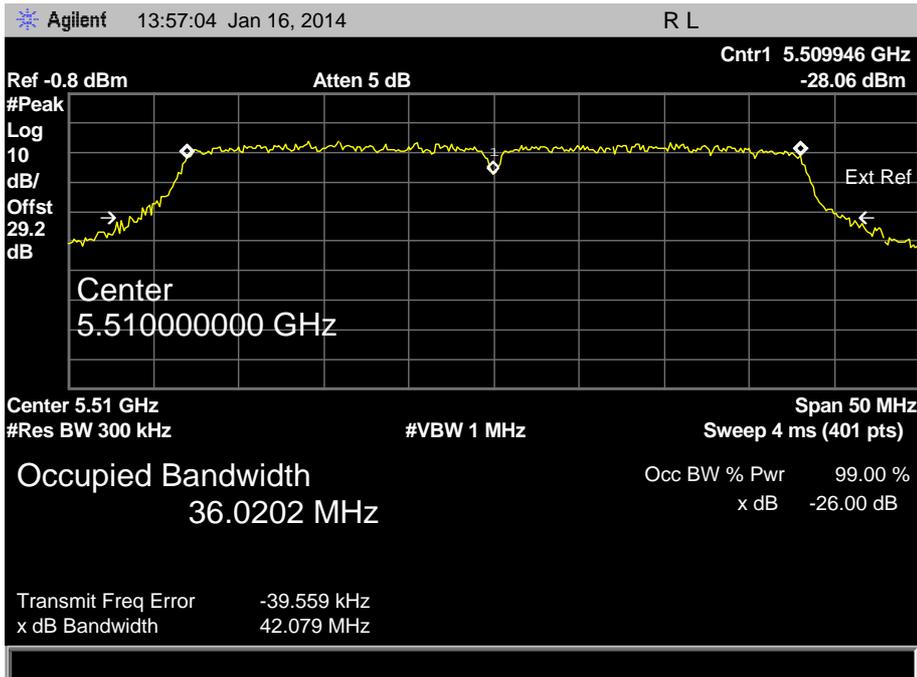


Product Service

Frequency Band 3

5510 MHz

26 dB Bandwidth (MHz)	42.079
-----------------------	--------

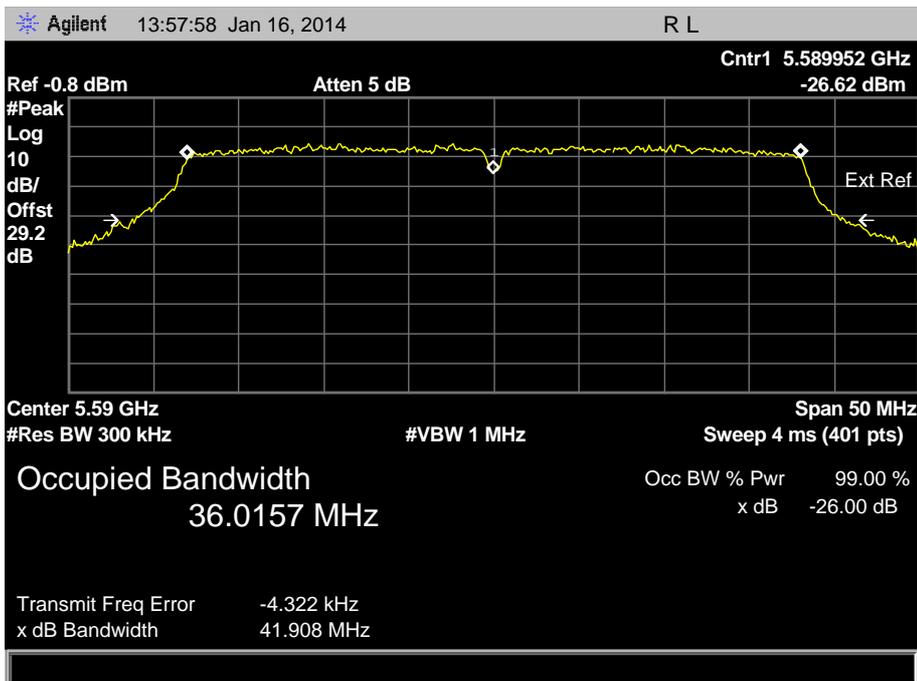




Product Service

5590 MHz

26 dB Bandwidth (MHz)	41.908
-----------------------	--------

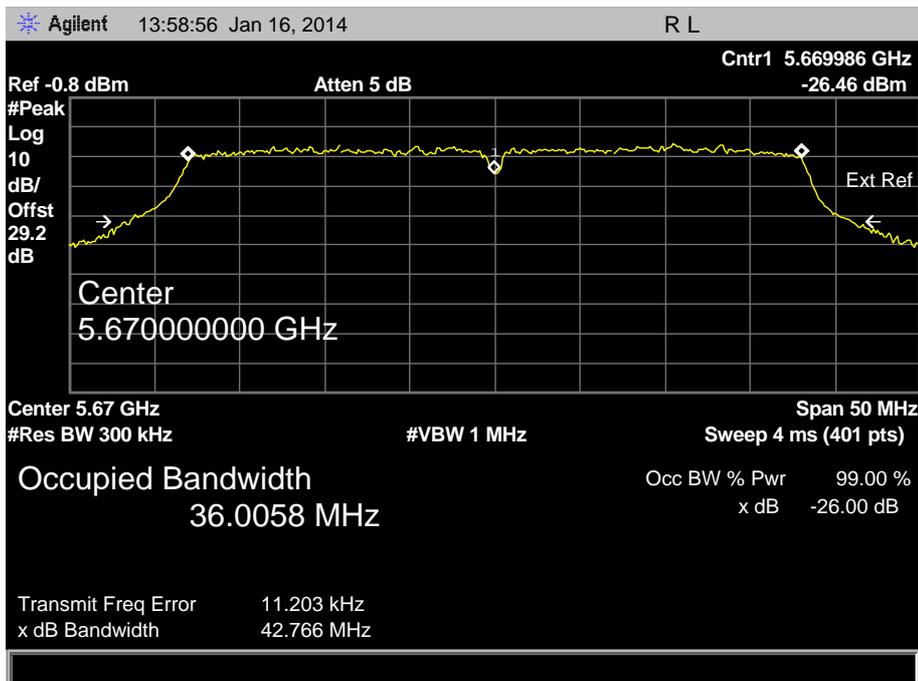




Product Service

5670 MHz

26 dB Bandwidth (MHz)	42.766
-----------------------	--------



The test was performed on the worst case data rate for 802.11(ac) - 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 MCS0.

Limit

Not specified.



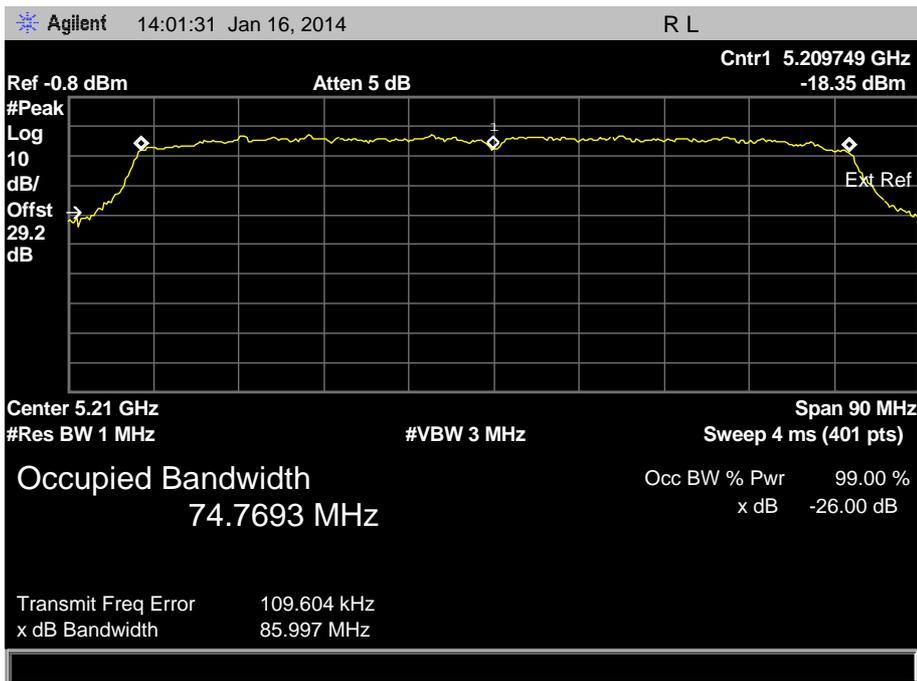
Product Service

802.11(ac) - 5 GHz 80 MHz BW

Frequency Band 1

5210 MHz

26 dB Bandwidth (MHz)	85.997
-----------------------	--------



The test was performed on the worst case data rate for 802.11(ac) - 80 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 MCS0.

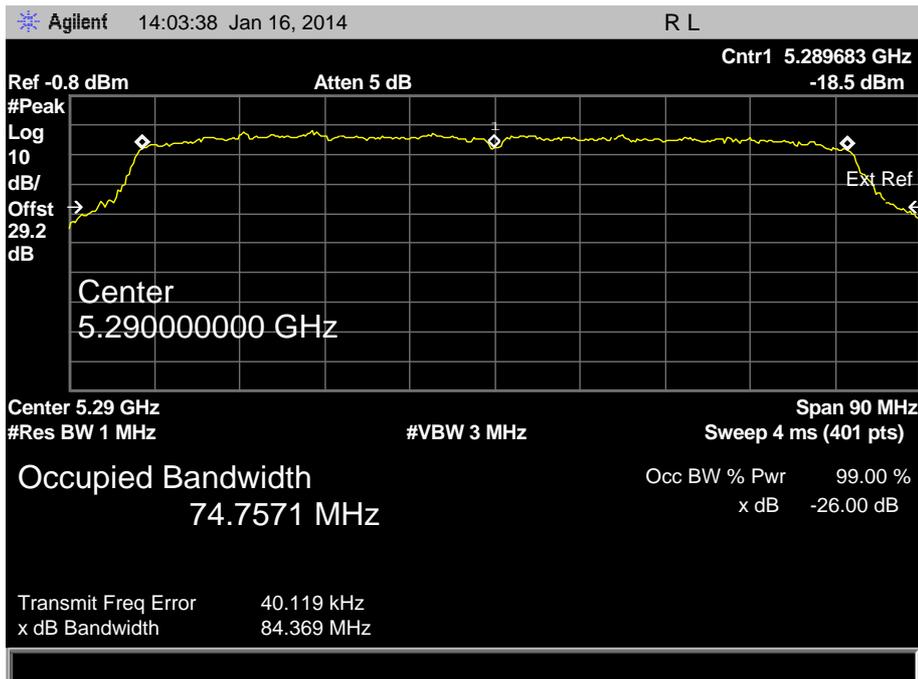


Product Service

Frequency Band 2

5290 MHz

26 dB Bandwidth (MHz)	84.369
-----------------------	--------



The test was performed on the worst case data rate for 802.11(ac) - 80 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 MCS0.

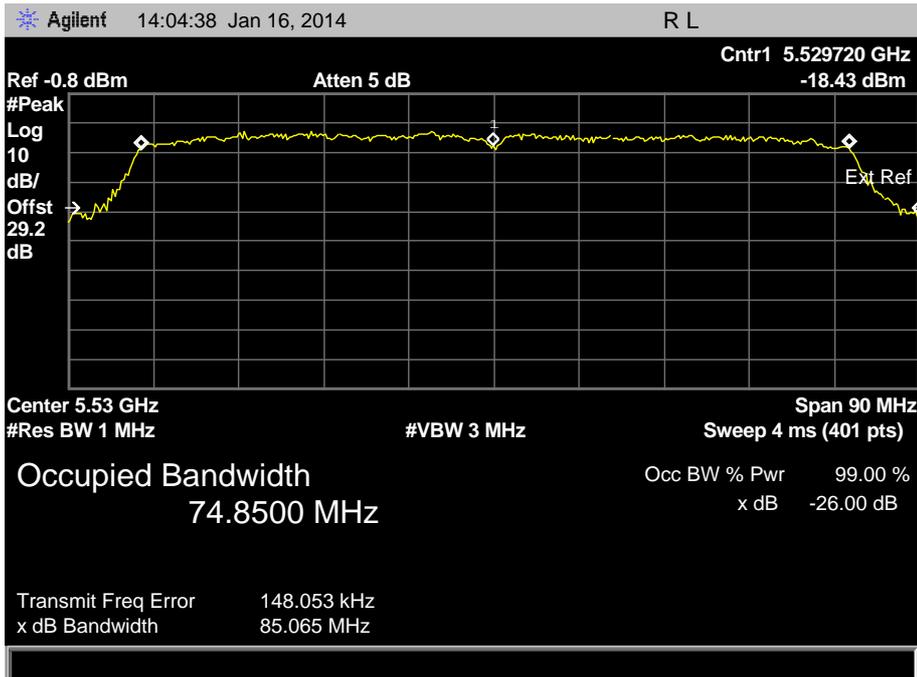


Product Service

Frequency Band 3

5530 MHz

26 dB Bandwidth (MHz)	85.065
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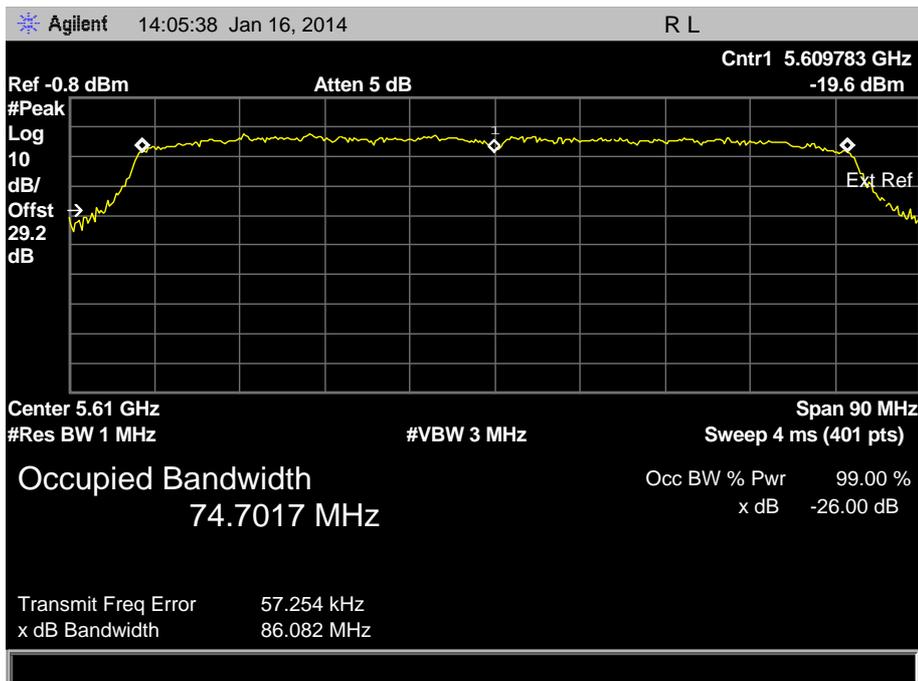




Product Service

5610 MHz

26 dB Bandwidth (MHz)	86.082
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The test was performed on the worst case data rate for 802.11(ac) - 80 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 MCS0.

Limit

Not specified.



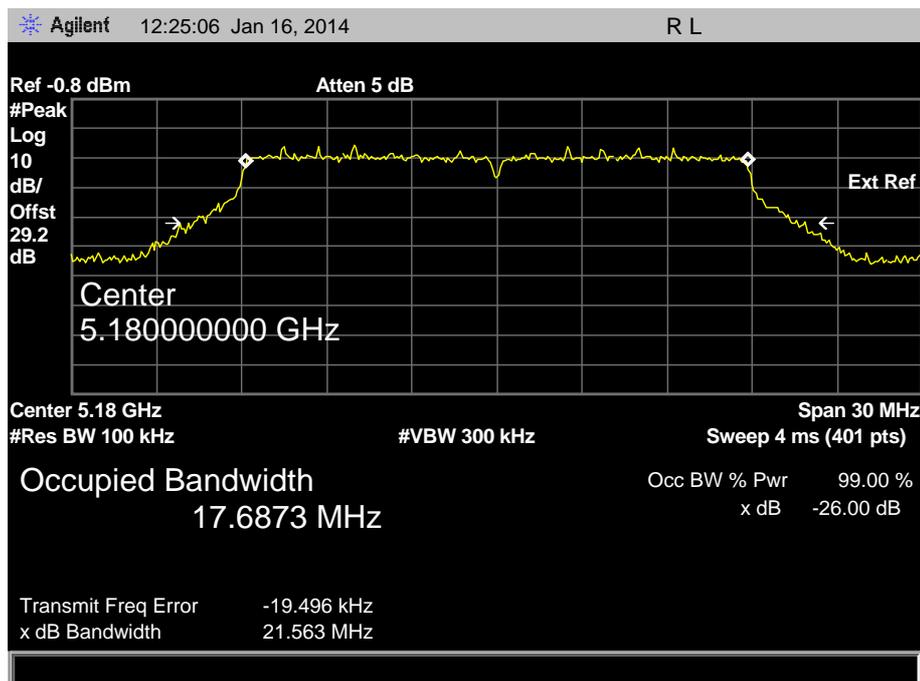
Product Service

802.11(n) - 5 GHz 20 MHz BW

Frequency Band 1

5180 MHz

26 dB Bandwidth (MHz)	21.563
-----------------------	--------

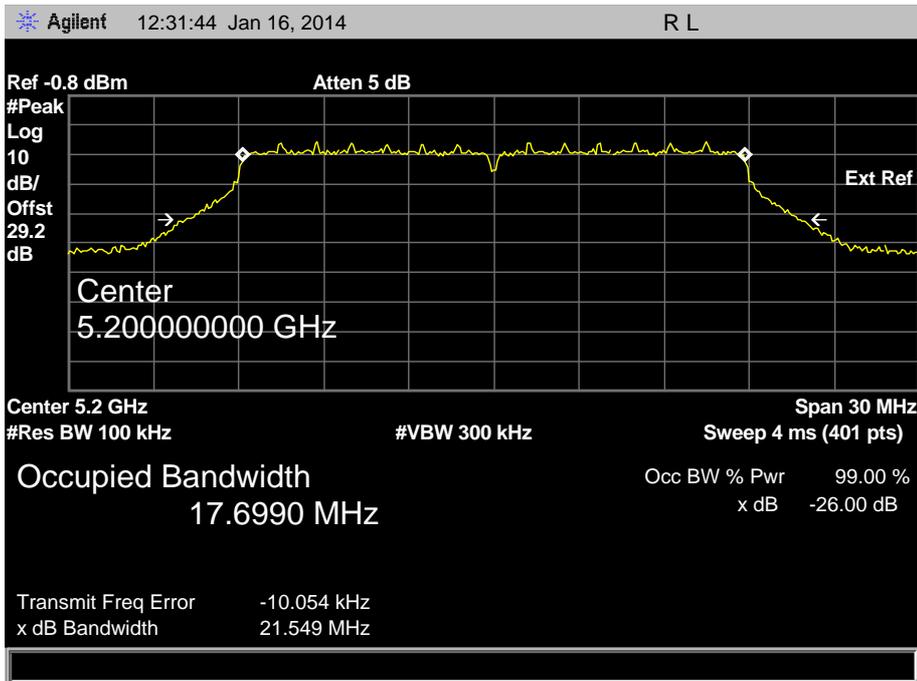




Product Service

5200 MHz

26 dB Bandwidth (MHz)	21.549
-----------------------	--------

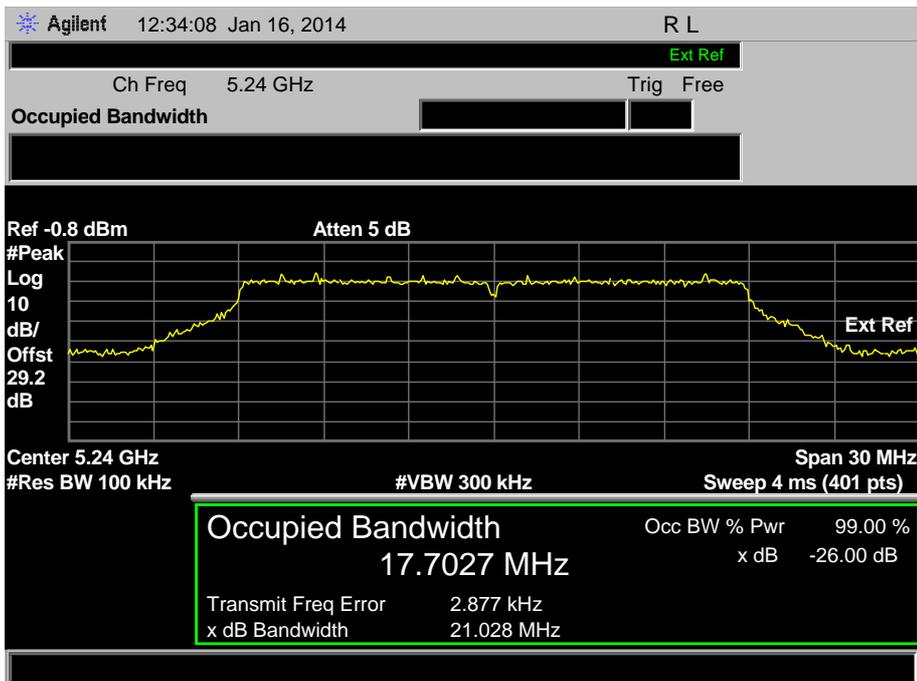




Product Service

5240 MHz

26 dB Bandwidth (MHz)	21.028
-----------------------	--------



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 MCS0.

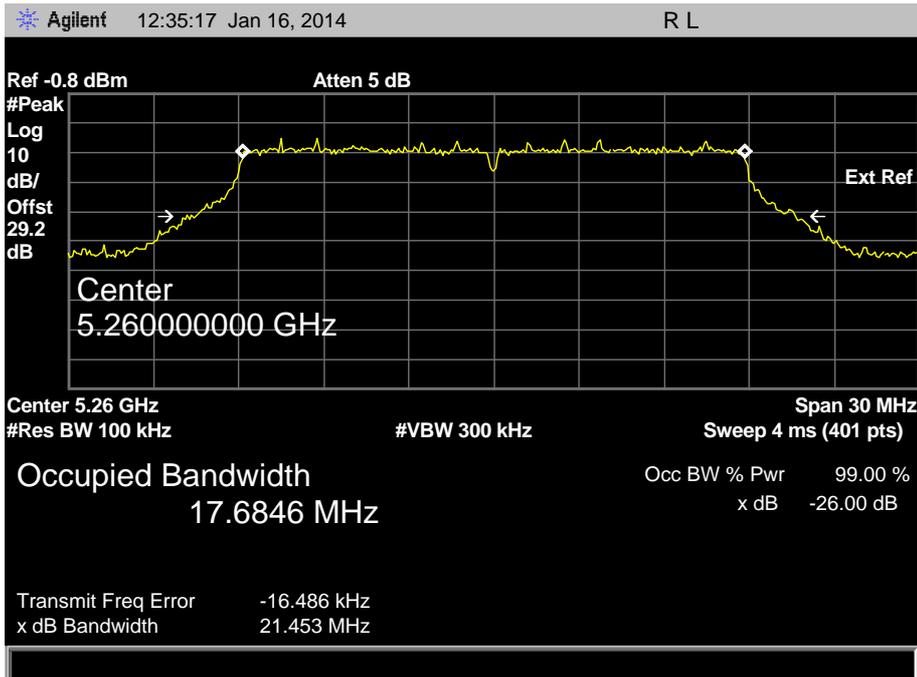


Product Service

Frequency Band 2

5260 MHz

26 dB Bandwidth (MHz)	21.453
-----------------------	--------

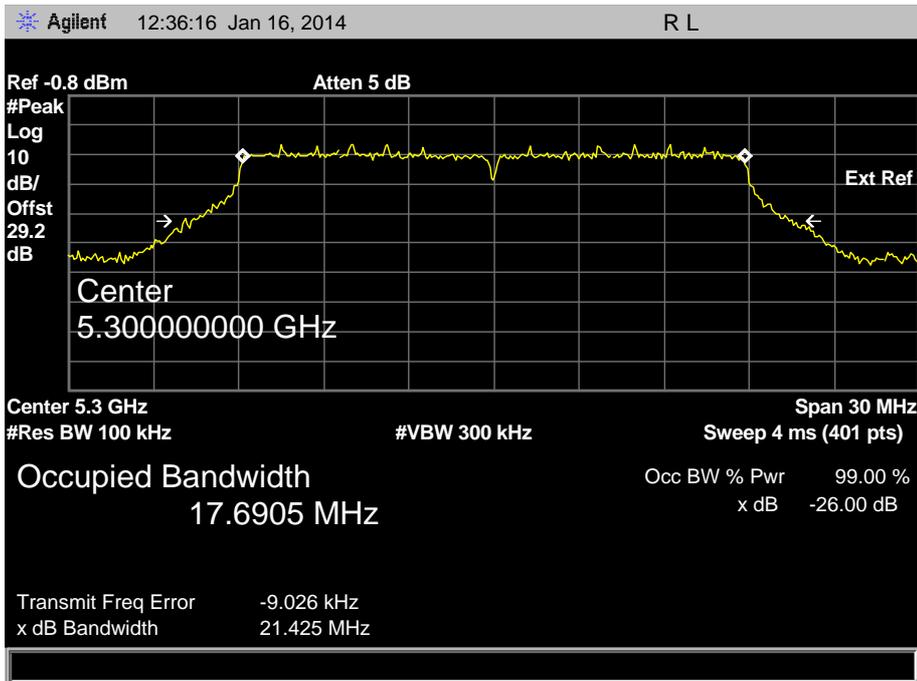




Product Service

5300 MHz

26 dB Bandwidth (MHz)	21.425
-----------------------	--------

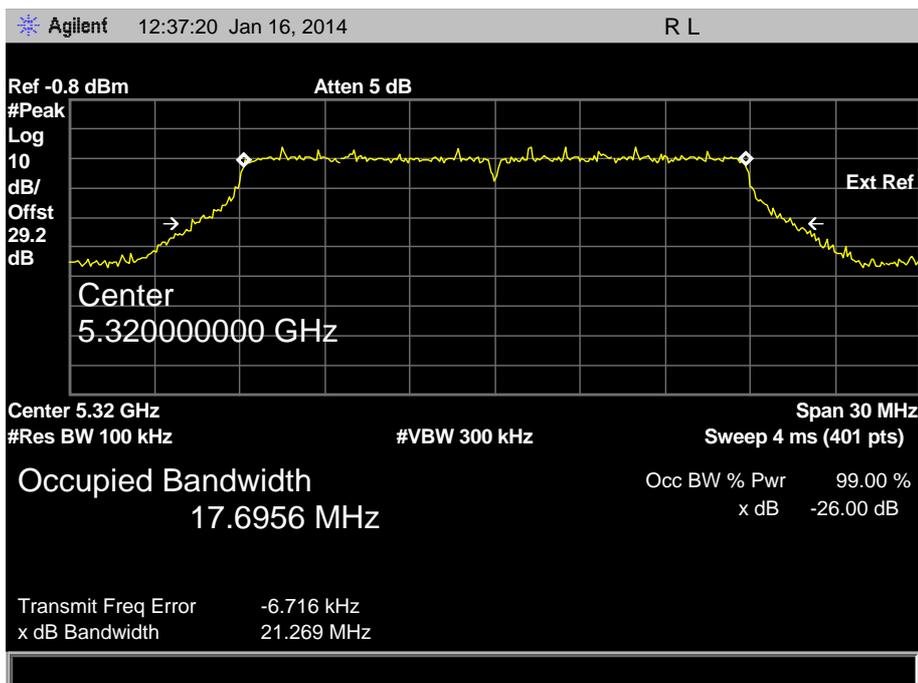




Product Service

5320 MHz

26 dB Bandwidth (MHz)	21.269
-----------------------	--------



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 MCS0.

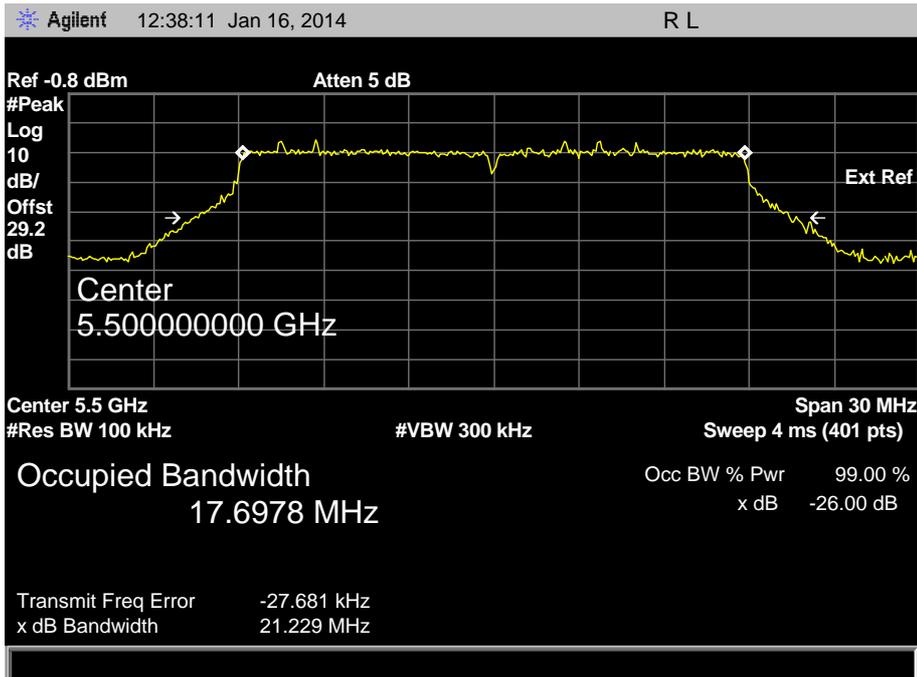


Product Service

Frequency Band 3

5500 MHz

26 dB Bandwidth (MHz)	21.229
-----------------------	--------

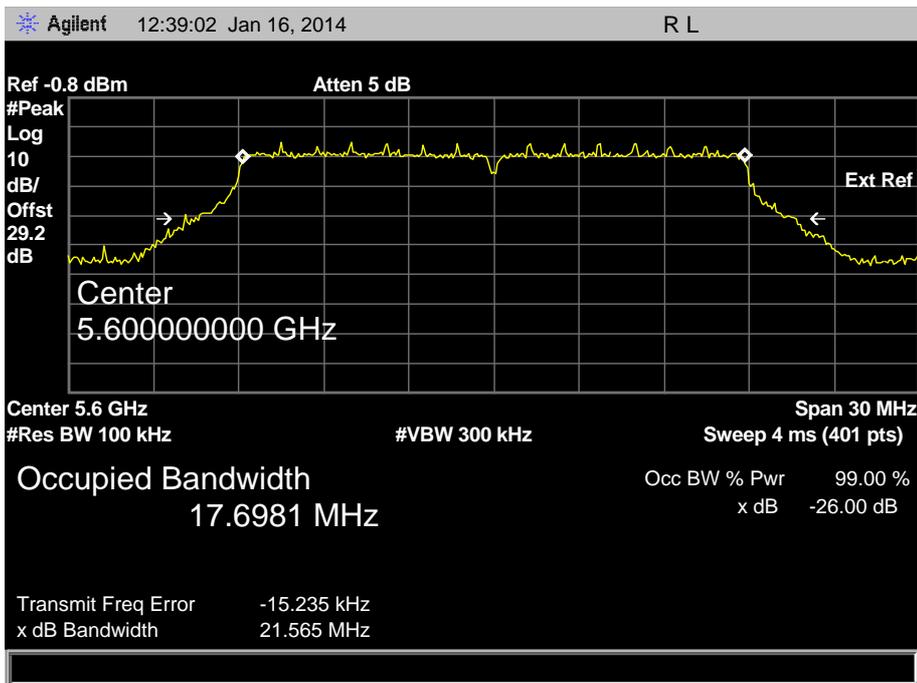




Product Service

5600 MHz

26 dB Bandwidth (MHz)	21.565
-----------------------	--------

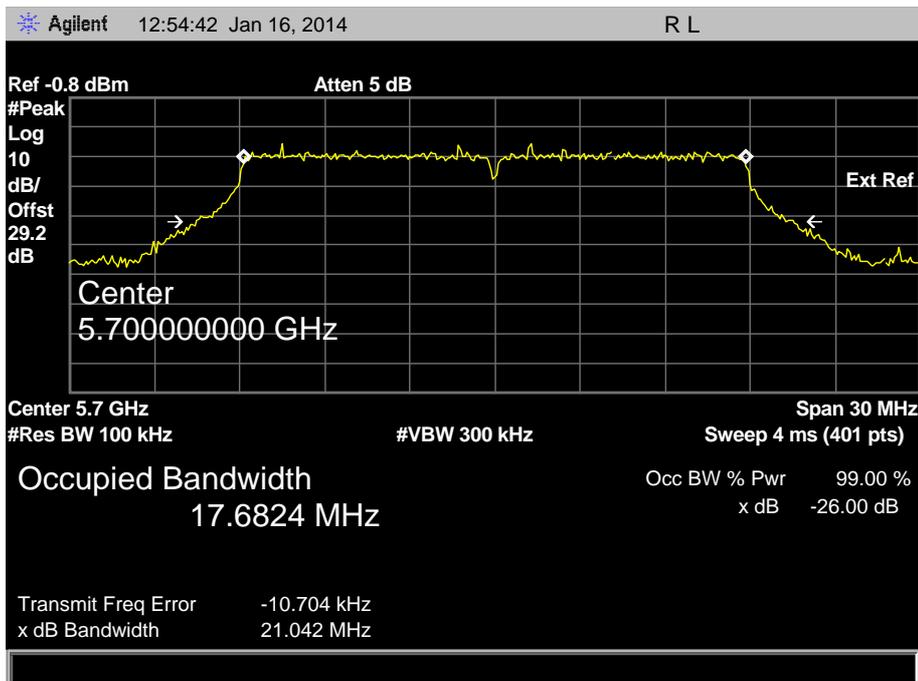




Product Service

5700 MHz

26 dB Bandwidth (MHz)	21.042
-----------------------	--------



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 MCS0.

Limit

Not specified.



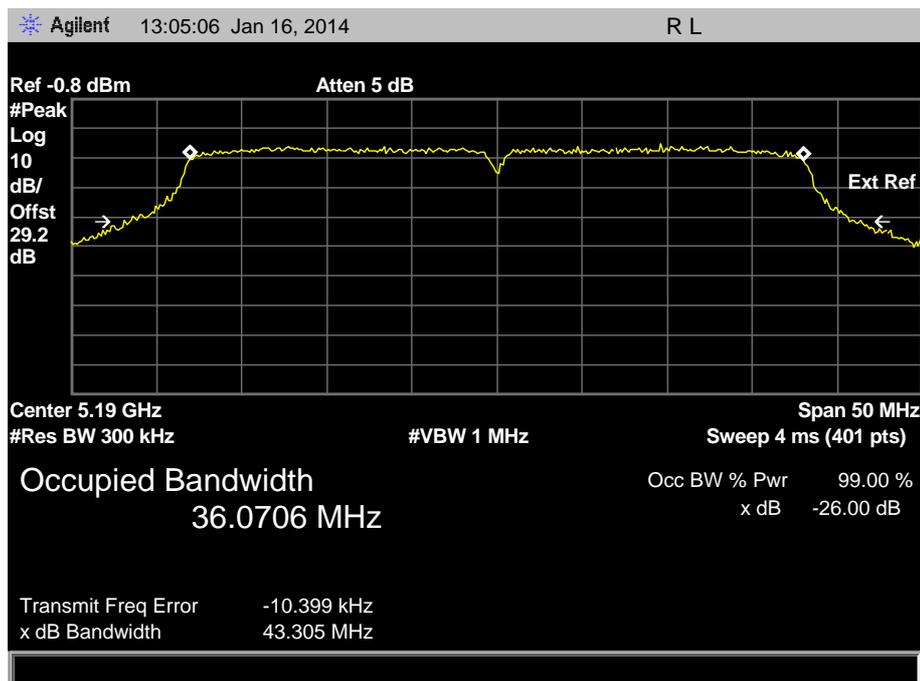
Product Service

802.11(n) - 5 GHz 40 MHz BW

Frequency Band 1

5190 MHz

26 dB Bandwidth (MHz)	43.305
-----------------------	--------

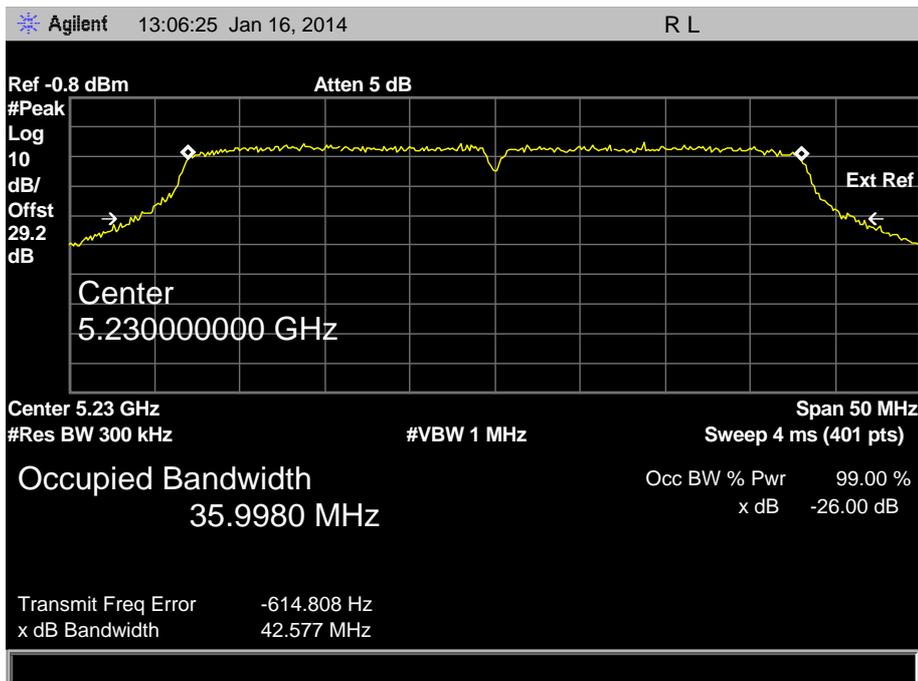




Product Service

5230 MHz

26 dB Bandwidth (MHz)	42.577
-----------------------	--------



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 MCS1.

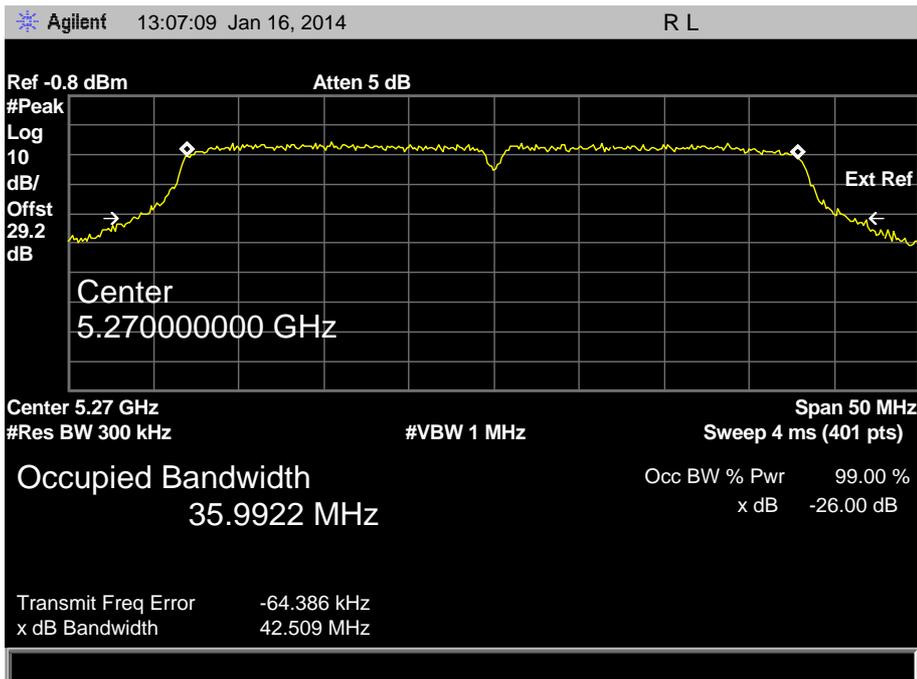


Product Service

Frequency Band 2

5270 MHz

26 dB Bandwidth (MHz)	42.509
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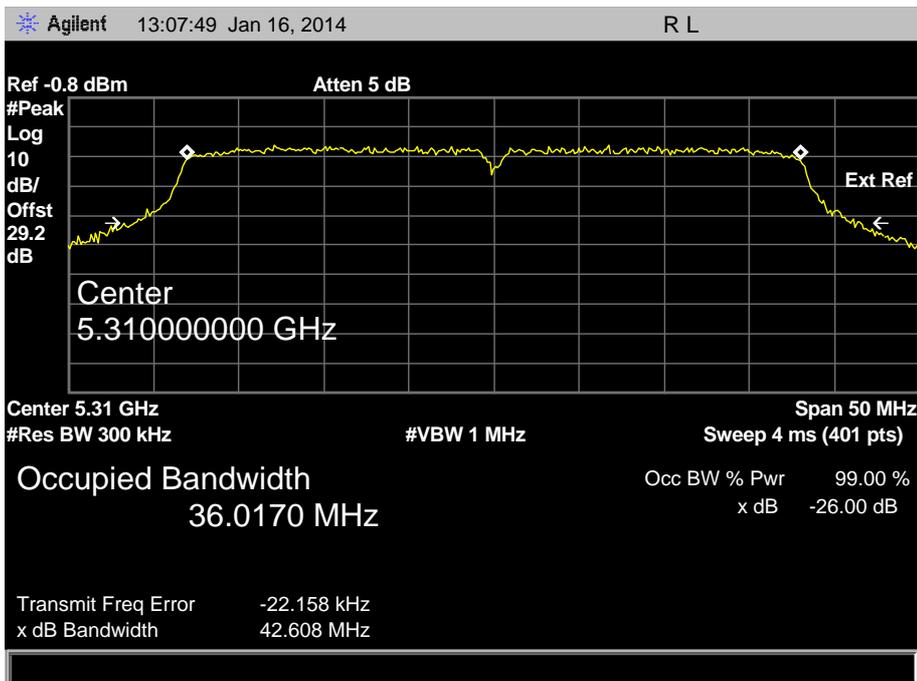




Product Service

5310 MHz

26 dB Bandwidth (MHz)	42.608
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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 MCS1.

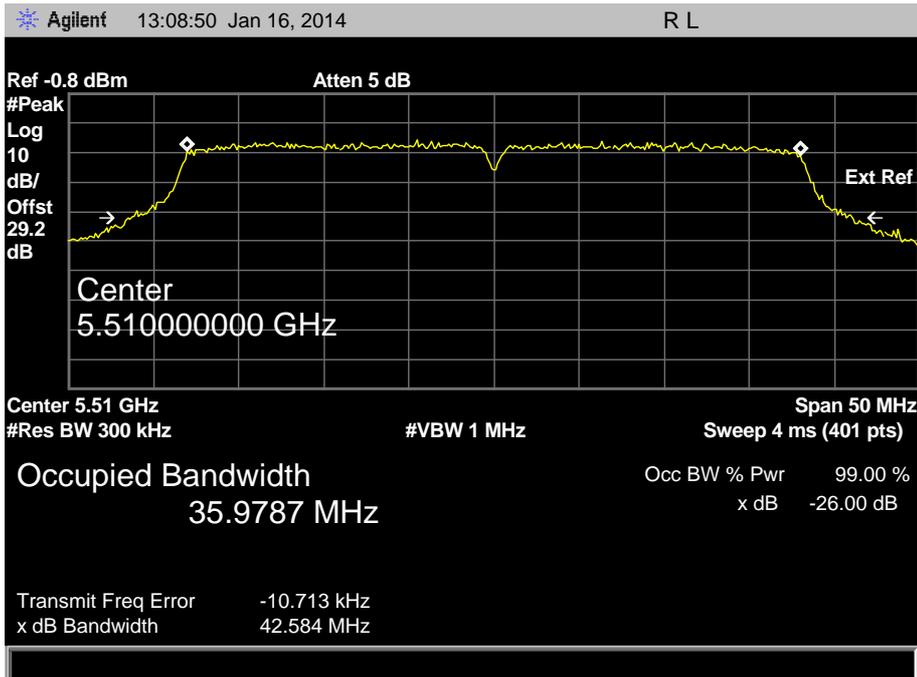


Product Service

Frequency Band 3

5510 MHz

26 dB Bandwidth (MHz)	42.584
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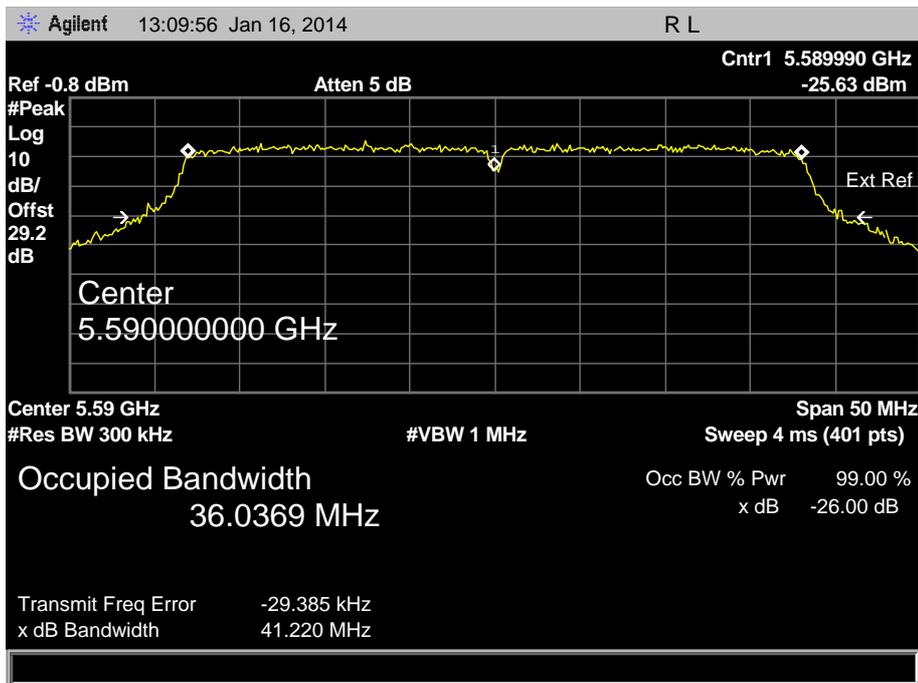




Product Service

5590 MHz

26 dB Bandwidth (MHz)	41.220
-----------------------	--------

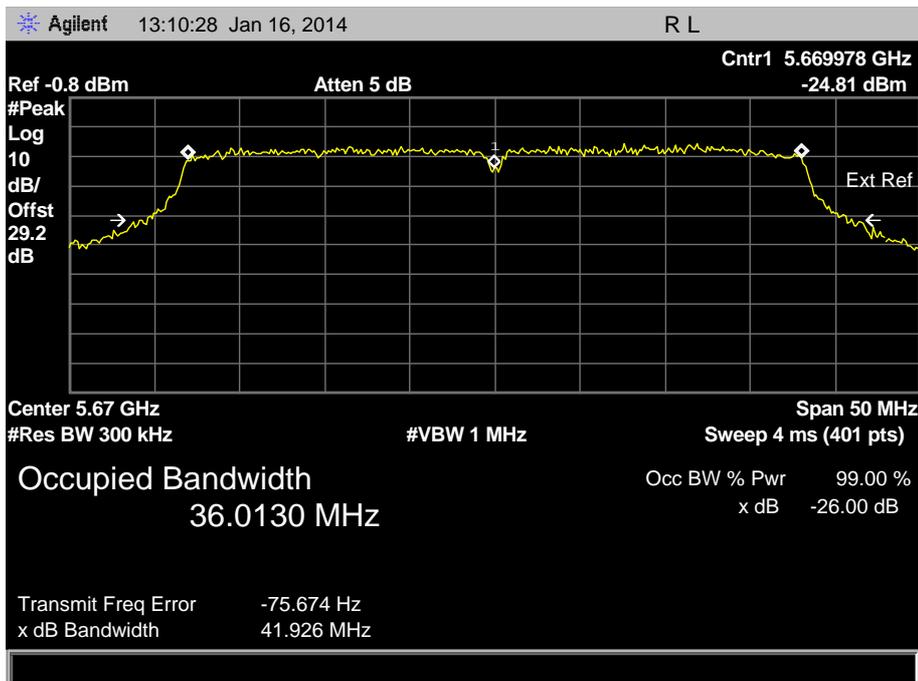




Product Service

5670 MHz

26 dB Bandwidth (MHz)	41.926
-----------------------	--------



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 MCS1.

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

SHL24 S/N: IMEI 004401115003408 - Modification State 0

2.6.3 Date of Test

8 January 2014

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 1 MHz and 3 MHz respectively. The detector was set to rms and 200 trace averages. The marker was set to the peak value of the resultant trace.

2.6.6 Environmental Conditions

Ambient Temperature	25.0°C
Relative Humidity	35.0%



Product Service

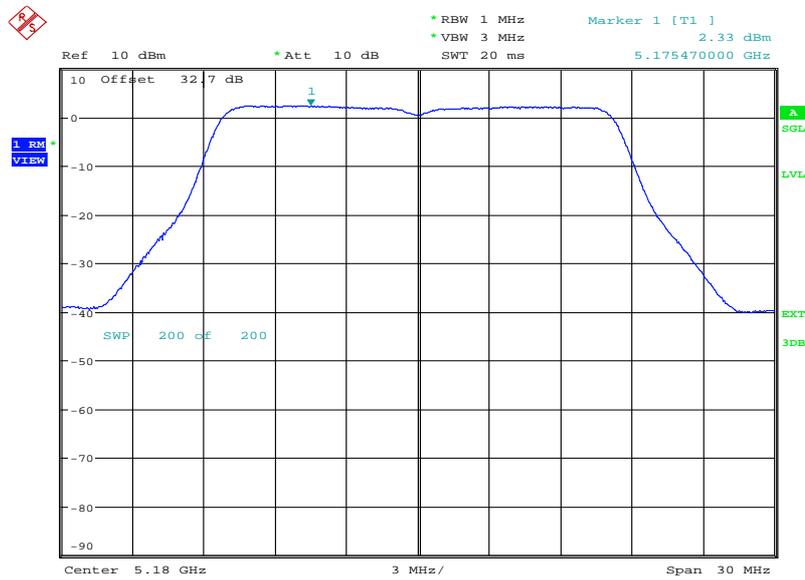
2.6.7 Test Results

802.11(a)

Frequency Band 1

5180 MHz

Peak Power Spectral Density (dBm)	2.33
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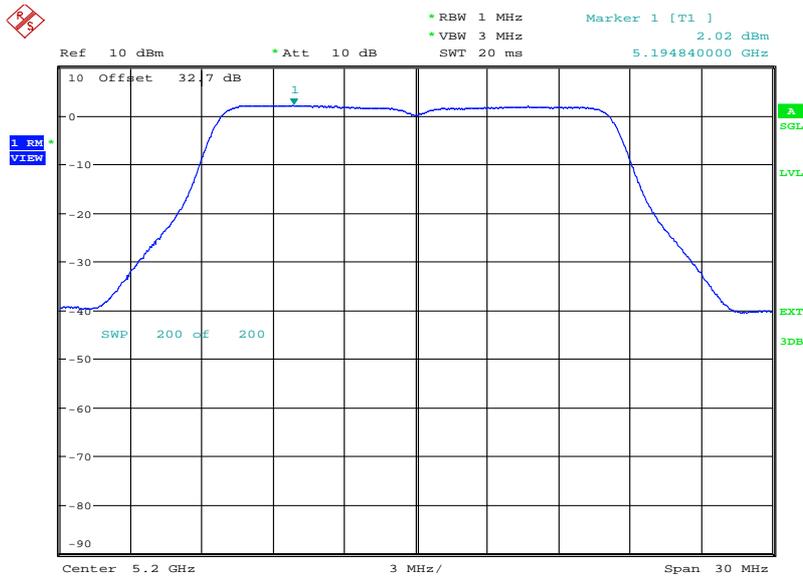
Date: 8.JAN.2014 12:03:56



Product Service

5200 MHz

Peak Power Spectral Density (dBm)	2.02
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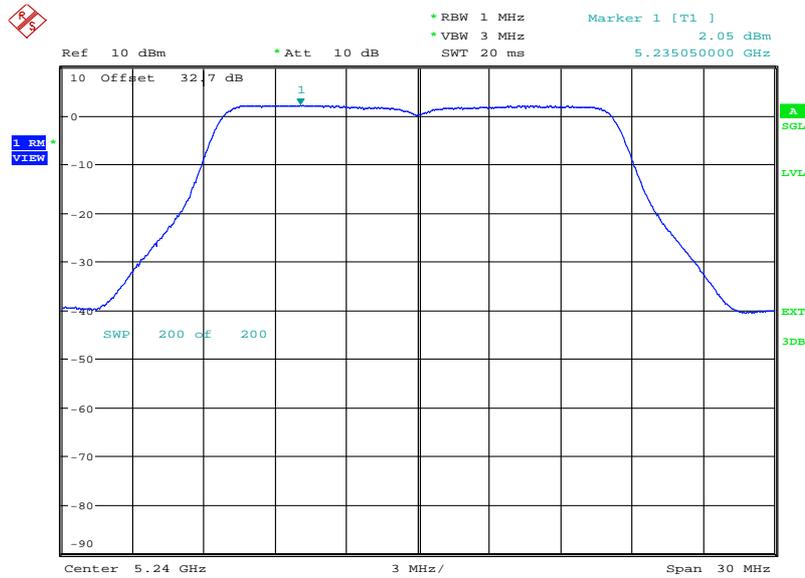
Date: 8.JAN.2014 12:05:49



Product Service

5240 MHz

Peak Power Spectral Density (dBm)	2.05
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Date: 8.JAN.2014 12:06:49

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 6 Mbps.

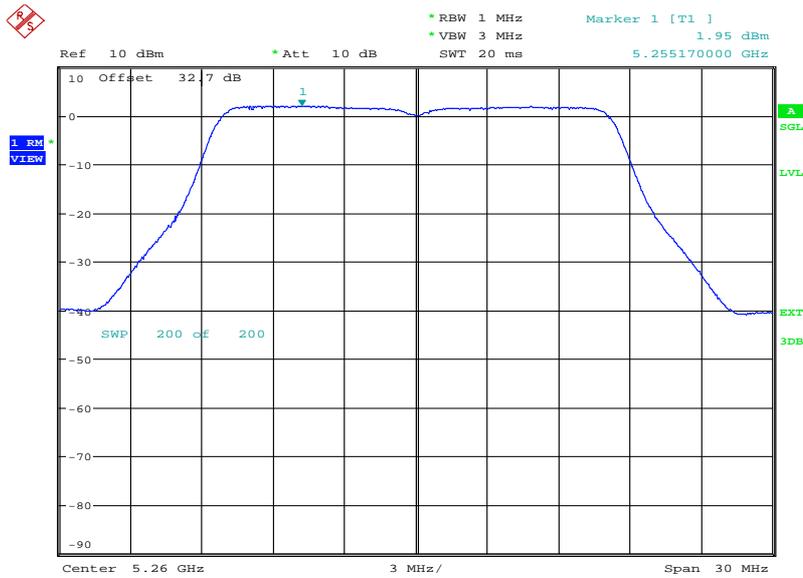


Product Service

Frequency Band 2

5260 MHz

Peak Power Spectral Density (dBm)	1.95
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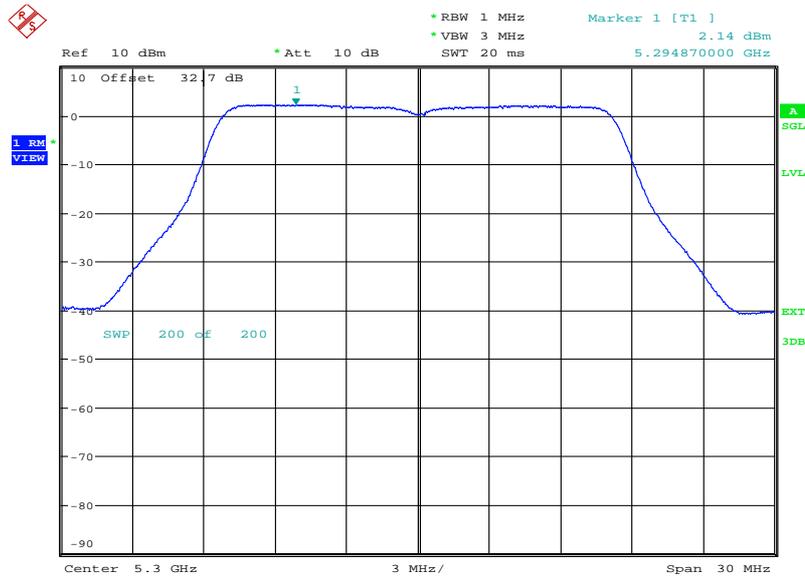
Date: 8.JAN.2014 12:08:06



Product Service

5300 MHz

Peak Power Spectral Density (dBm)	2.14
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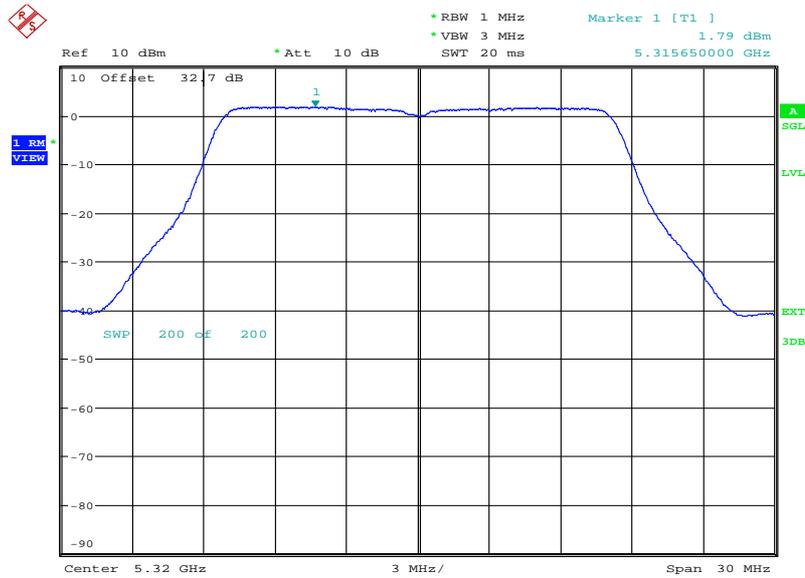
Date: 8.JAN.2014 12:30:23



Product Service

5320 MHz

Peak Power Spectral Density (dBm)	1.79
-----------------------------------	------



Date: 8.JAN.2014 12:31:21

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 6 Mbps.

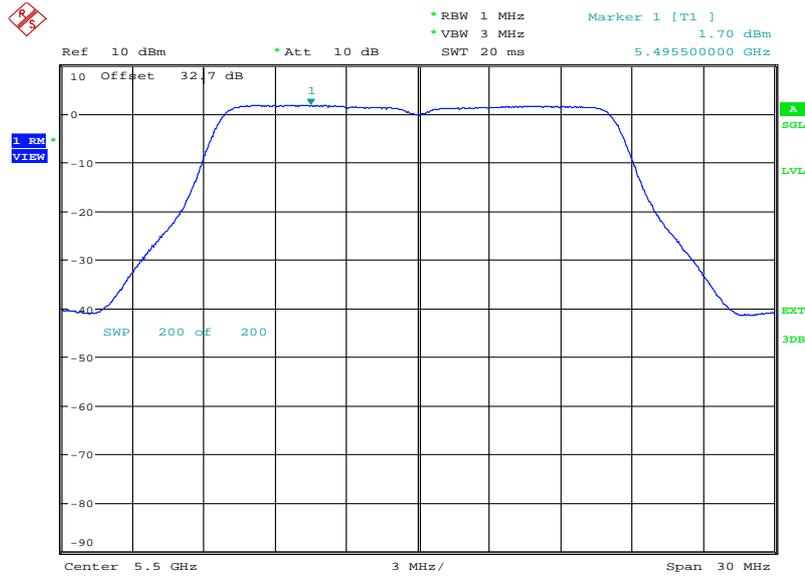


Product Service

Frequency Band 3

5500 MHz

Peak Power Spectral Density (dBm)	1.70
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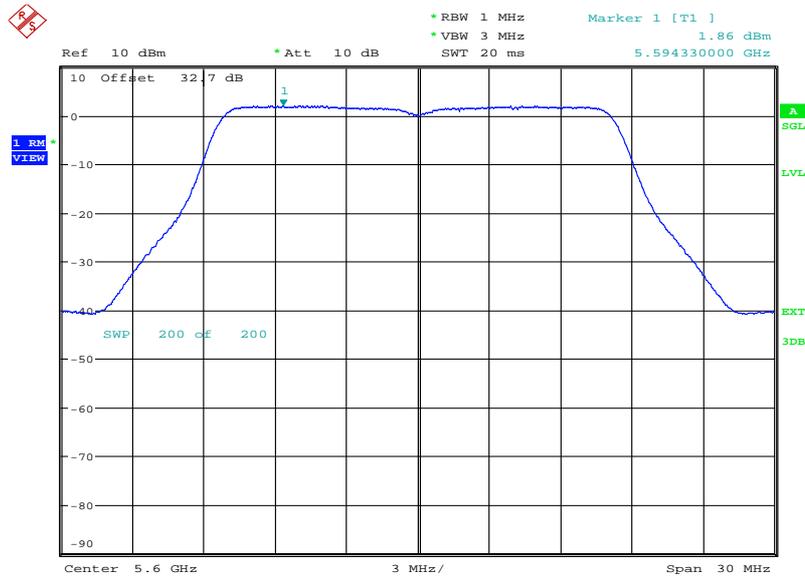
Date: 8.JAN.2014 12:32:56



Product Service

5600 MHz

Peak Power Spectral Density (dBm)	1.86
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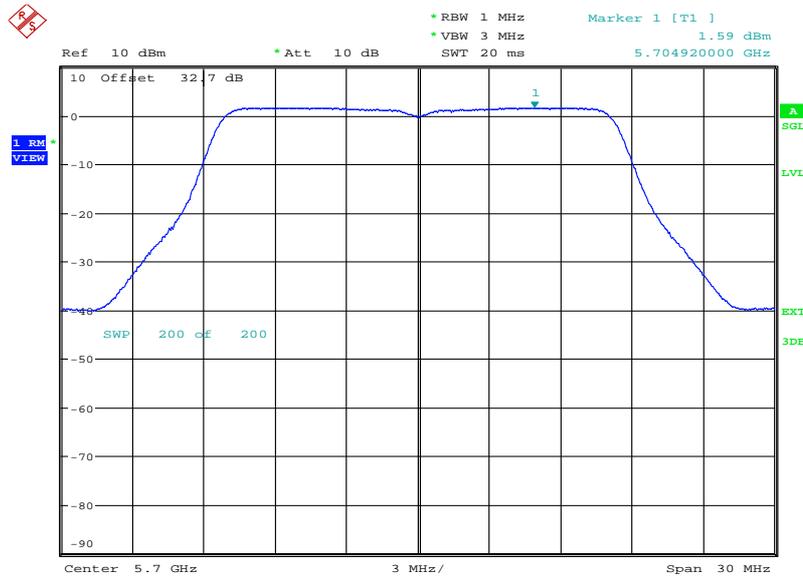
Date: 8.JAN.2014 12:35:15



Product Service

5700 MHz

Peak Power Spectral Density (dBm)	1.59
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Date: 8.JAN.2014 12:36:01

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 6 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



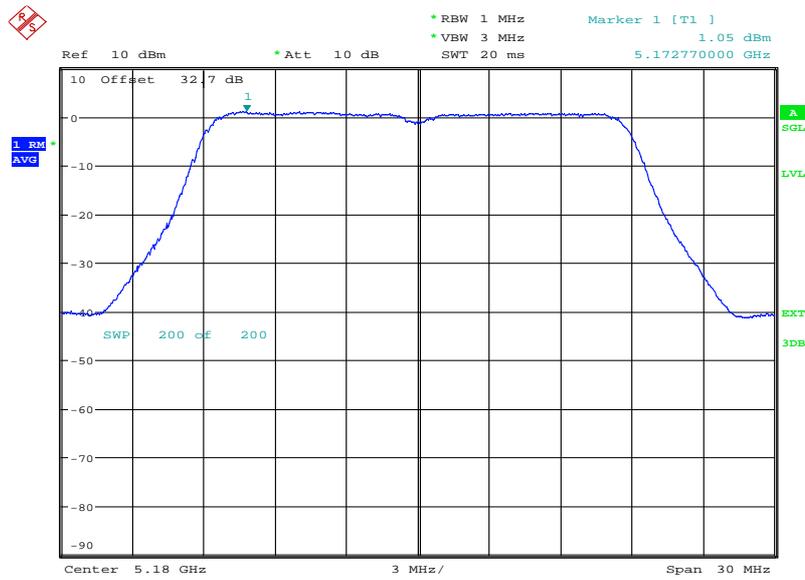
Product Service

802.11(ac) - 5 GHz 20 MHz BW

Frequency Band 1

5180 MHz

Peak Power Spectral Density (dBm)	1.05
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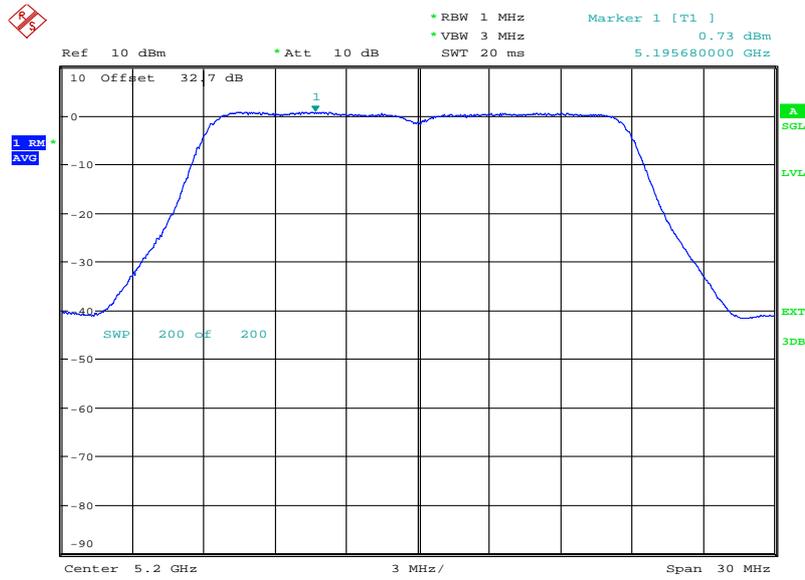
Date: 8.JAN.2014 12:38:22



Product Service

5200 MHz

Peak Power Spectral Density (dBm)	0.72
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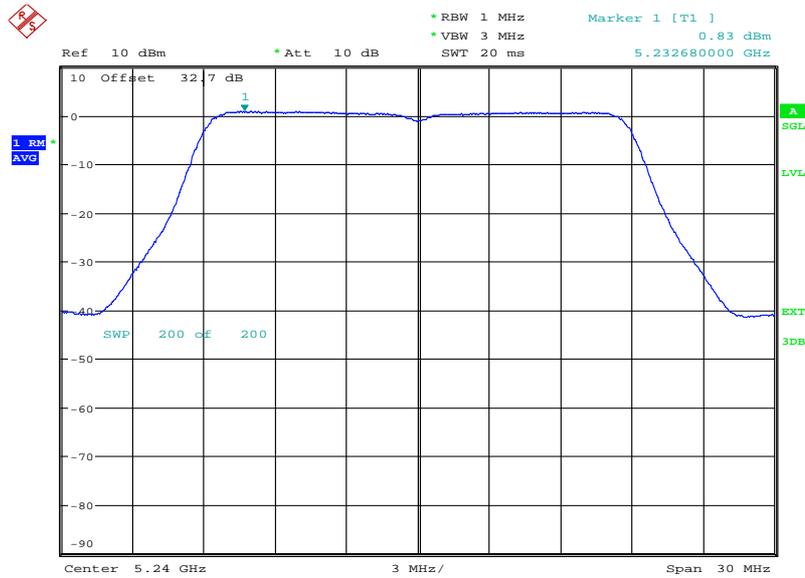
Date: 8.JAN.2014 12:39:29



Product Service

5240 MHz

Peak Power Spectral Density (dBm)	0.83
-----------------------------------	------



Date: 8.JAN.2014 12:41:06

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS2.

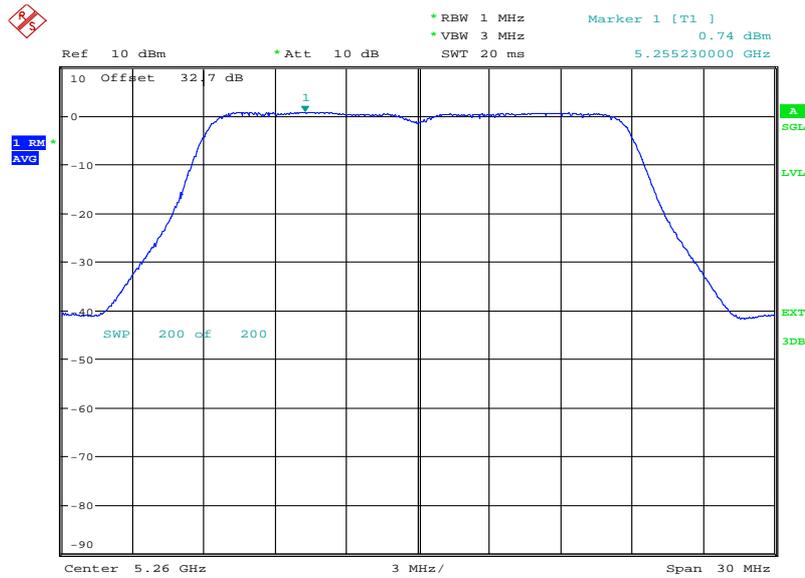


Product Service

Frequency Band 2

5260 MHz

Peak Power Spectral Density (dBm)	0.74
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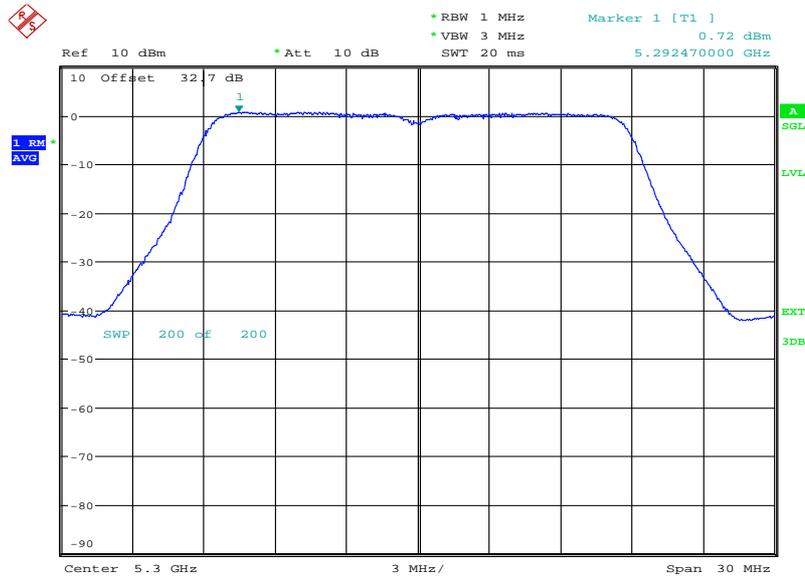
Date: 8.JAN.2014 12:42:46



Product Service

5300 MHz

Peak Power Spectral Density (dBm)	0.72
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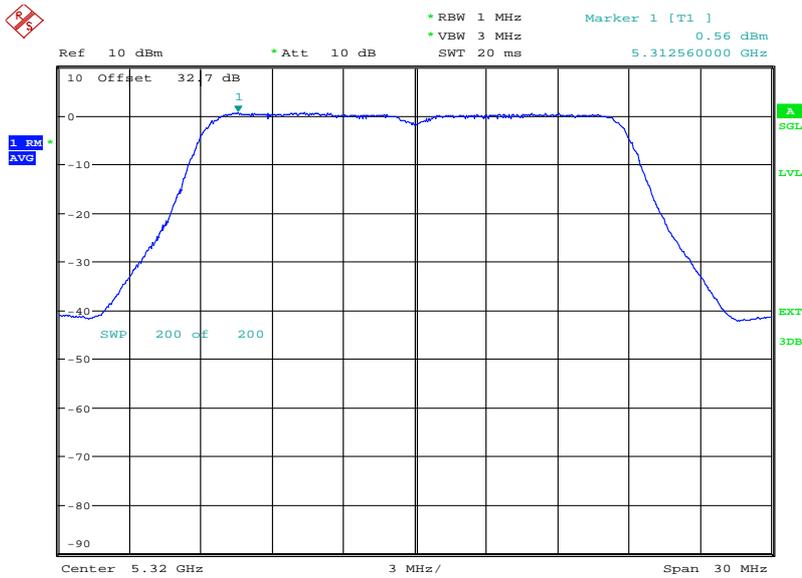
Date: 8.JAN.2014 12:45:13



Product Service

5320 MHz

Peak Power Spectral Density (dBm)	0.56
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Date: 8.JAN.2014 12:45:57

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS2.

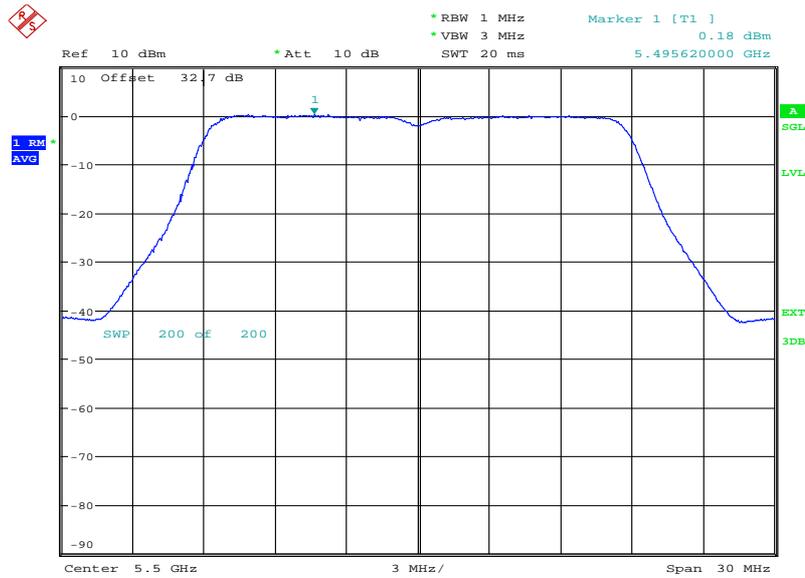


Product Service

Frequency Band 3

5500 MHz

Peak Power Spectral Density (dBm)	0.18
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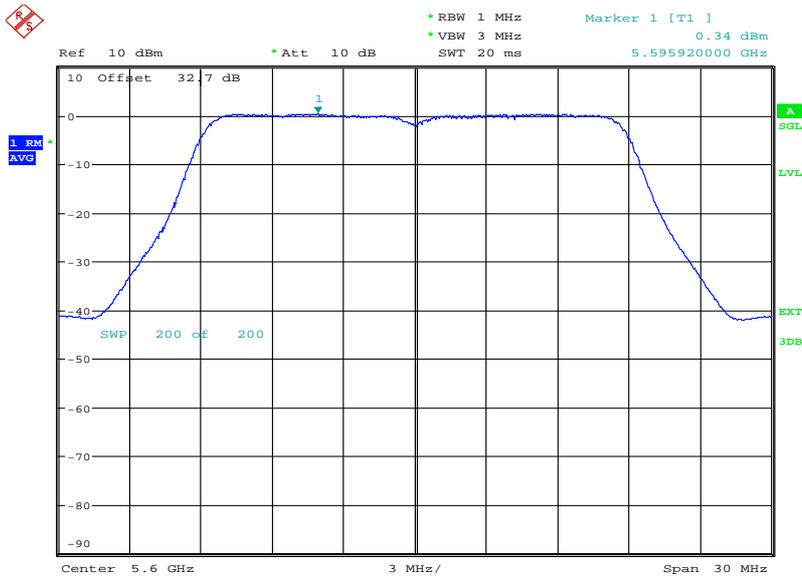
Date: 8.JAN.2014 12:49:57



Product Service

5600 MHz

Peak Power Spectral Density (dBm)	0.34
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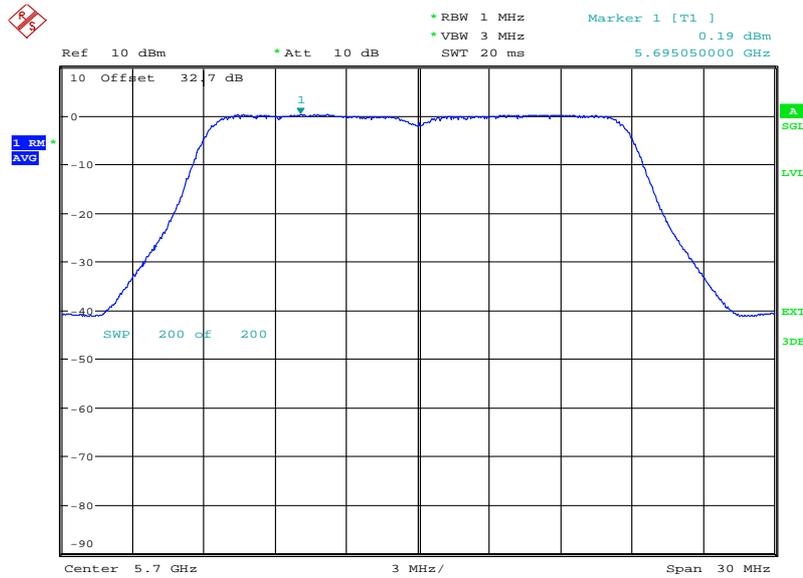


Date: 8.JAN.2014 12:51:40



5700 MHz

Peak Power Spectral Density (dBm)	0.19
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Date: 8.JAN.2014 12:54:03

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS2.

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



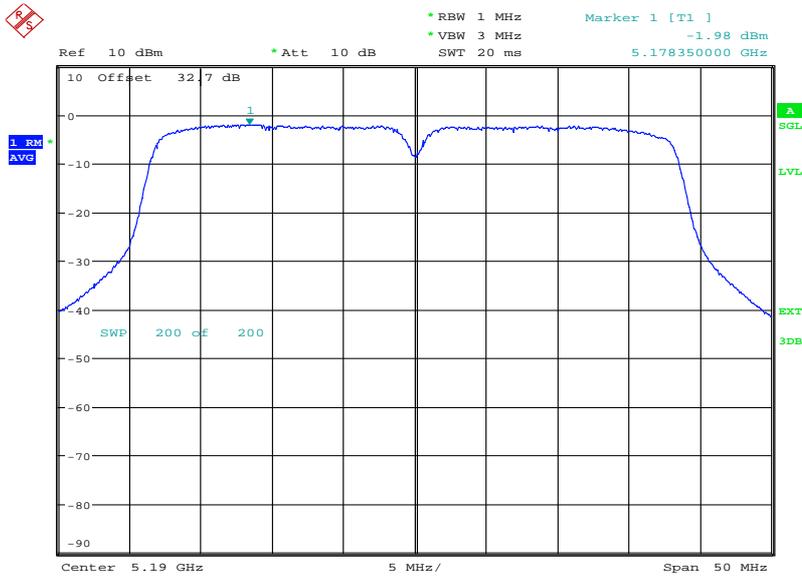
Product Service

802.11(ac) - 5 GHz 40 MHz BW

Frequency Band 1

5190 MHz

Peak Power Spectral Density (dBm)	-1.98
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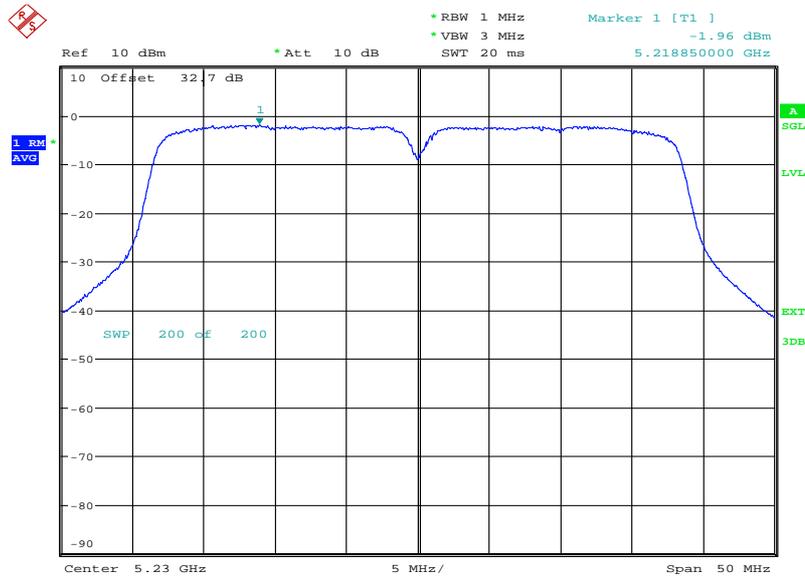
Date: 8.JAN.2014 12:56:42



Product Service

5230 MHz

Peak Power Spectral Density (dBm)	-1.96
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Date: 8.JAN.2014 12:58:18

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS0.

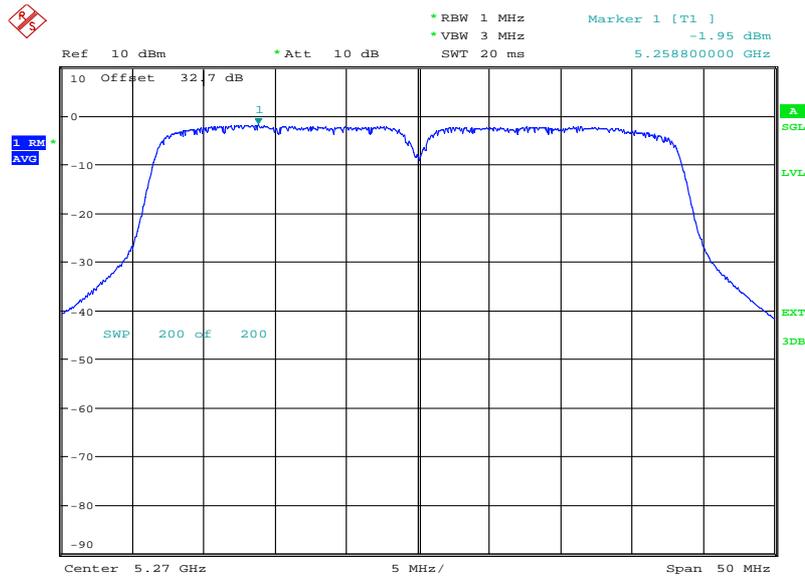


Product Service

Frequency Band 2

5270 MHz

Peak Power Spectral Density (dBm)	-1.95
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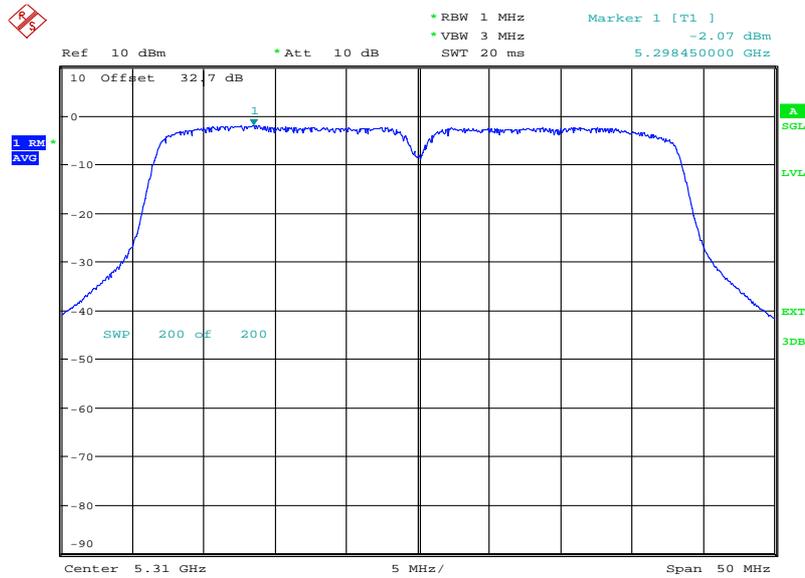
Date: 8.JAN.2014 13:01:14



Product Service

5310 MHz

Peak Power Spectral Density (dBm)	-2.07
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Date: 8.JAN.2014 13:01:51

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS0.

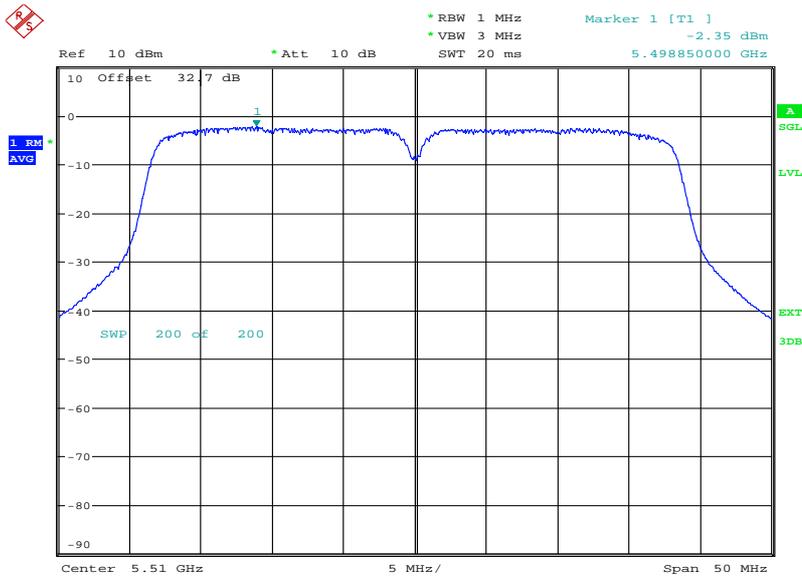


Product Service

Frequency Band 3

5510 MHz

Peak Power Spectral Density (dBm)	-2.35
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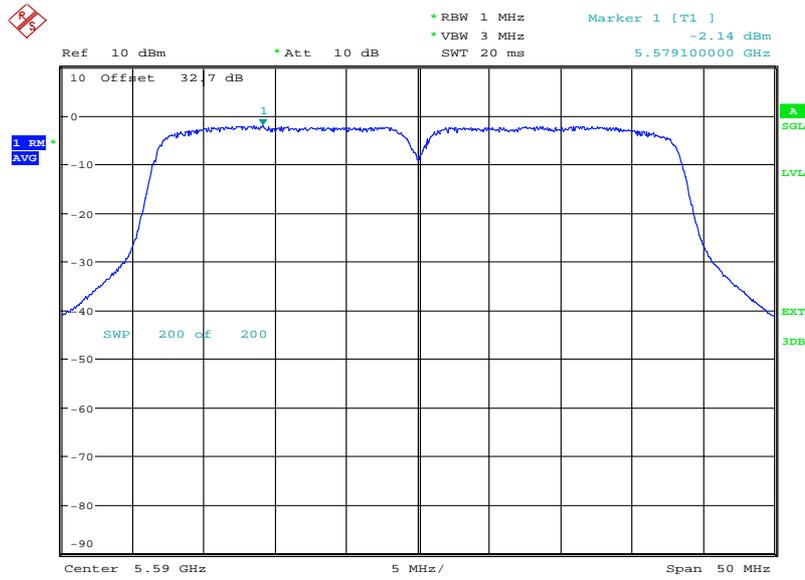
Date: 8.JAN.2014 13:05:08



Product Service

5590 MHz

Peak Power Spectral Density (dBm)	-2.14
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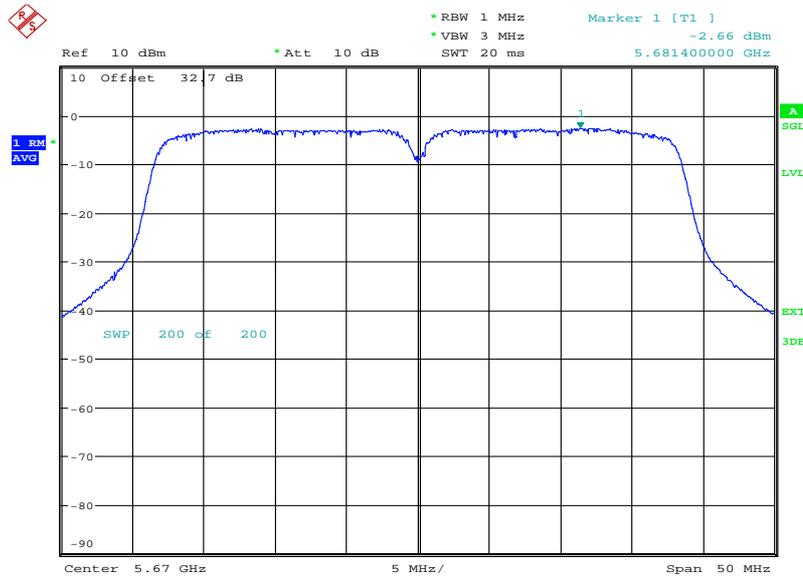
Date: 8.JAN.2014 13:08:04



Product Service

5670 MHz

Peak Power Spectral Density (dBm)	-2.66
-----------------------------------	-------



Date: 8.JAN.2014 13:10:28

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS0.

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



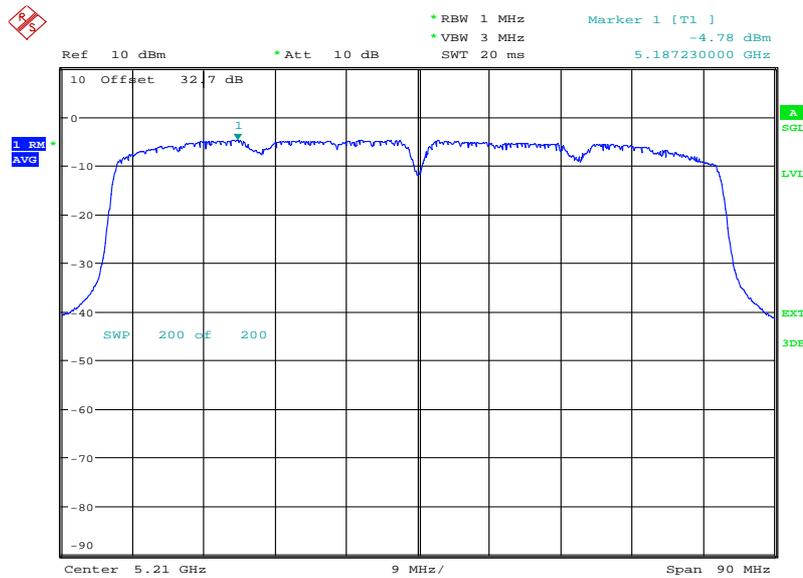
Product Service

802.11(ac) - 5 GHz 80 MHz BW

Frequency Band 1

5210 MHz

Peak Power Spectral Density (dBm)	-4.78
-----------------------------------	-------



Date: 8.JAN.2014 13:11:22

The test was performed on the worst case data rate for 802.11(ac) - 80 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 MCS0.

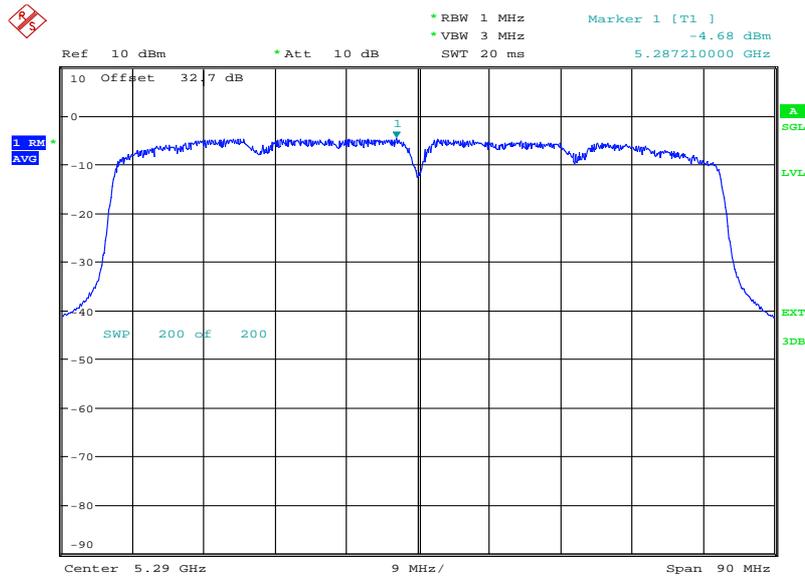


Product Service

Frequency Band 2

5290 MHz

Peak Power Spectral Density (dBm)	-4.68
-----------------------------------	-------



Date: 8.JAN.2014 13:12:18

The test was performed on the worst case data rate for 802.11(ac) - 80 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 MCS0.

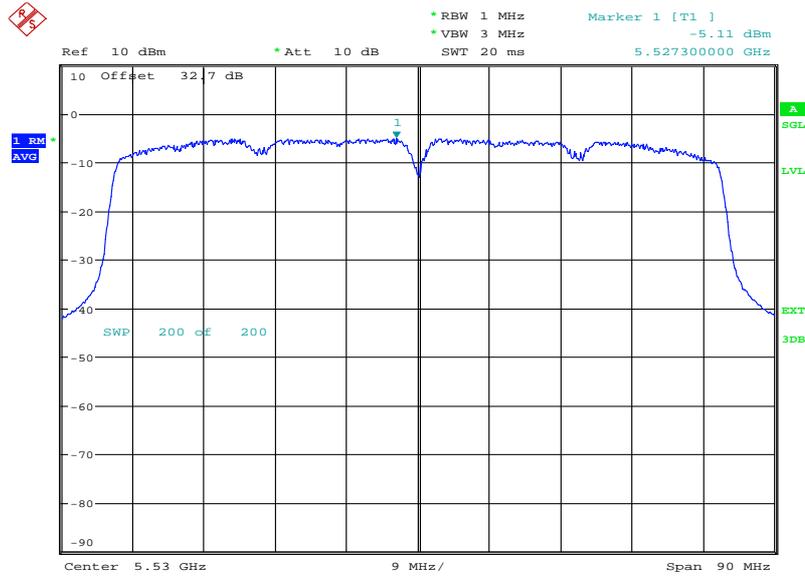


Product Service

Frequency Band 3

5530 MHz

Peak Power Spectral Density (dBm)	-5.11
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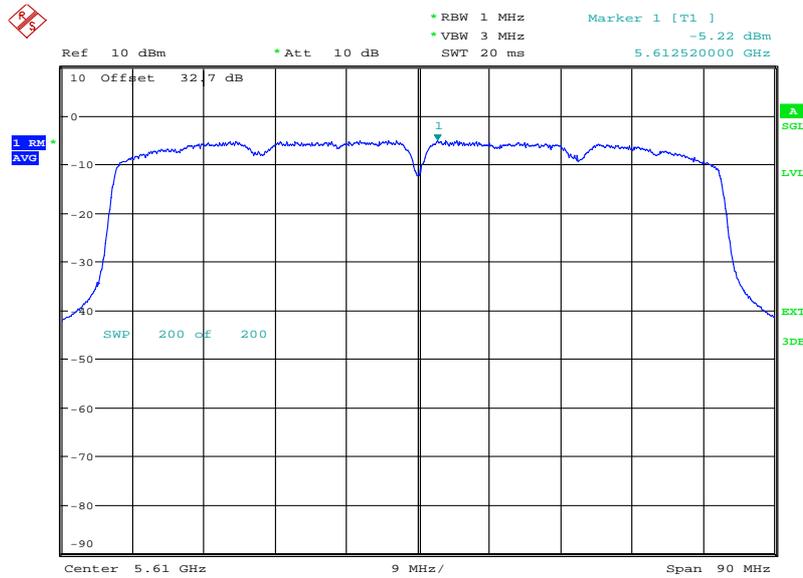
Date: 8.JAN.2014 13:13:16



Product Service

5610 MHz

Peak Power Spectral Density (dBm)	-5.22
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Date: 8.JAN.2014 13:13:57

The test was performed on the worst case data rate for 802.11(ac) - 80 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 MCS0.

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



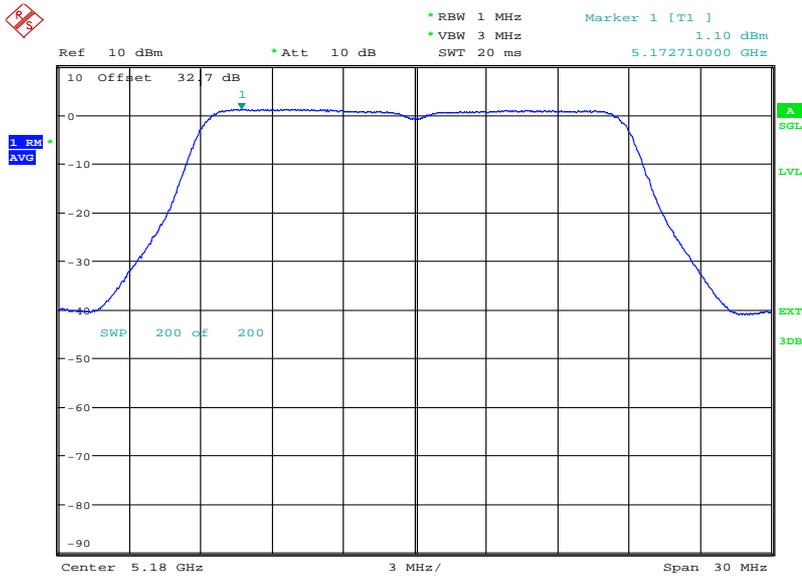
Product Service

802.11(n) - 5 GHz 20 MHz BW

Frequency Band 1

5180 MHz

Peak Power Spectral Density (dBm)	1.10
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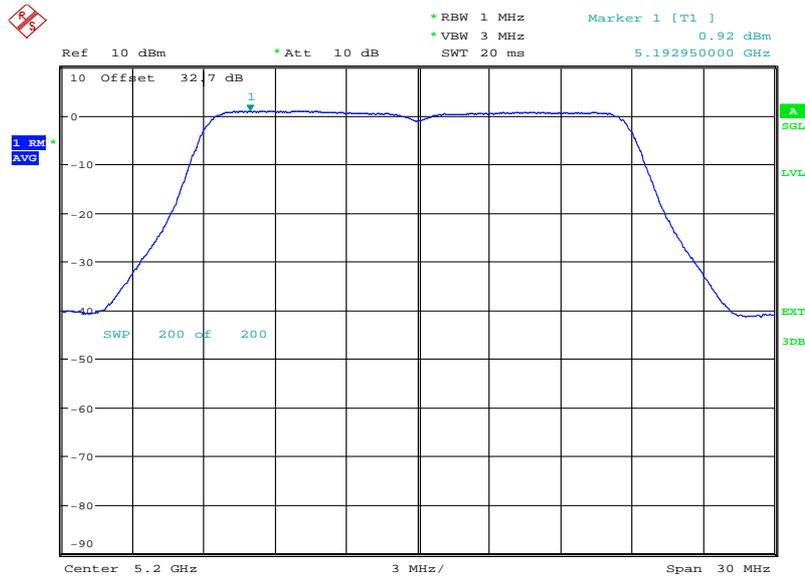
Date: 8.JAN.2014 12:36:58



Product Service

5200 MHz

Peak Power Spectral Density (dBm)	0.92
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Date: 8.JAN.2014 12:40:19

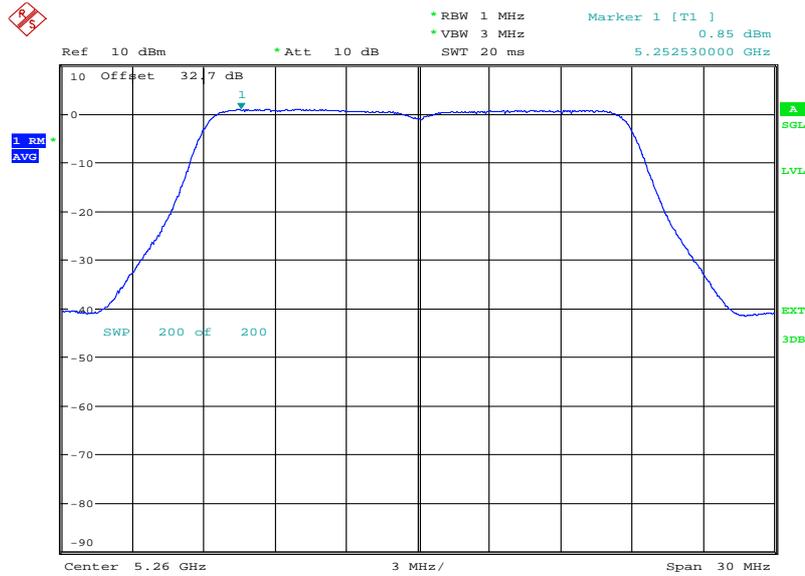


Product Service

Frequency Band 2

5260 MHz

Peak Power Spectral Density (dBm)	0.85
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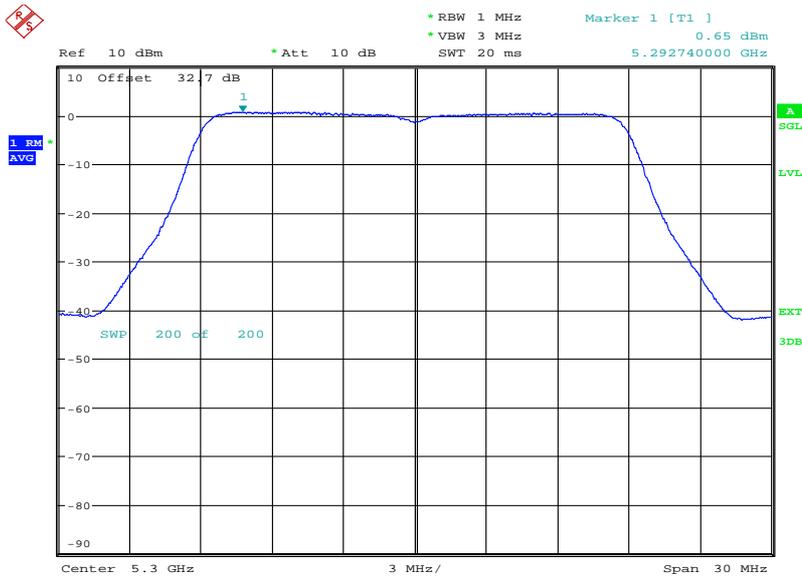
Date: 8.JAN.2014 12:43:37



Product Service

5300 MHz

Peak Power Spectral Density (dBm)	0.65
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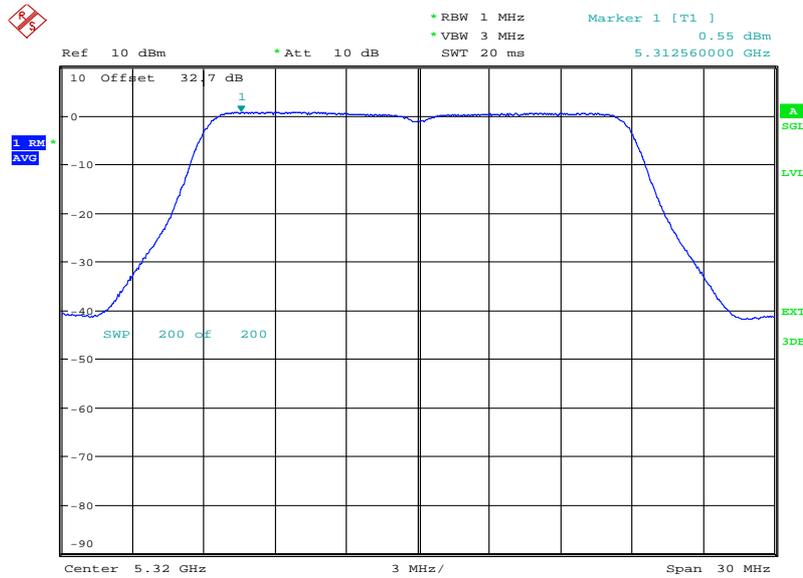
Date: 8.JAN.2014 12:44:22



Product Service

5320 MHz

Peak Power Spectral Density (dBm)	0.55
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Date: 8.JAN.2014 12:48:06

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 MCS0.

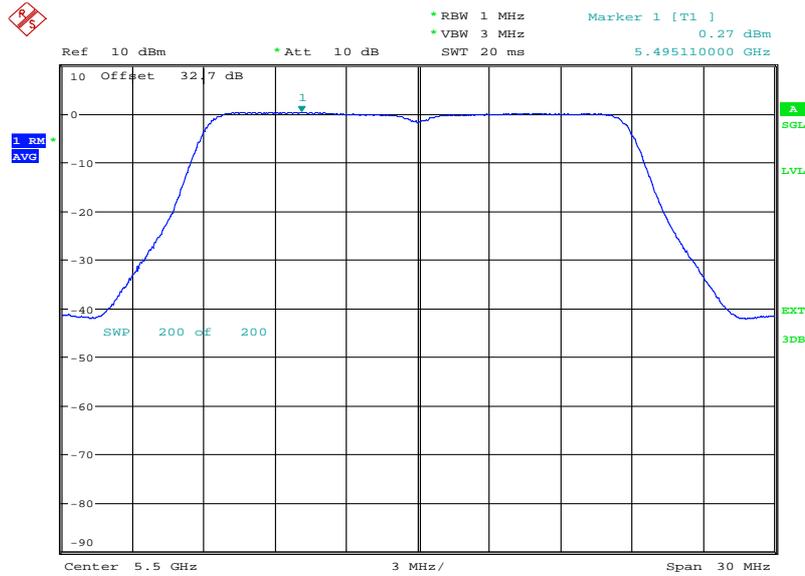


Product Service

Frequency Band 3

5500 MHz

Peak Power Spectral Density (dBm)	0.27
-----------------------------------	------



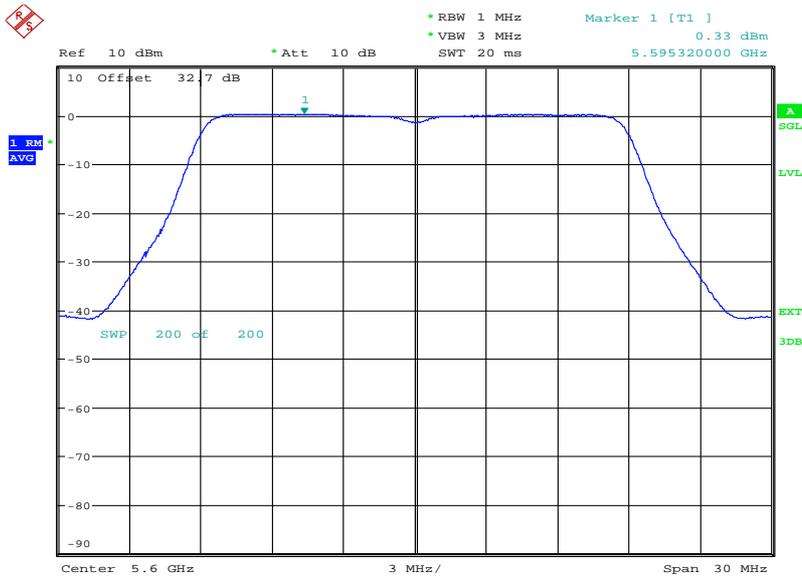
Date: 8.JAN.2014 12:49:05



Product Service

5600 MHz

Peak Power Spectral Density (dBm)	0.33
-----------------------------------	------



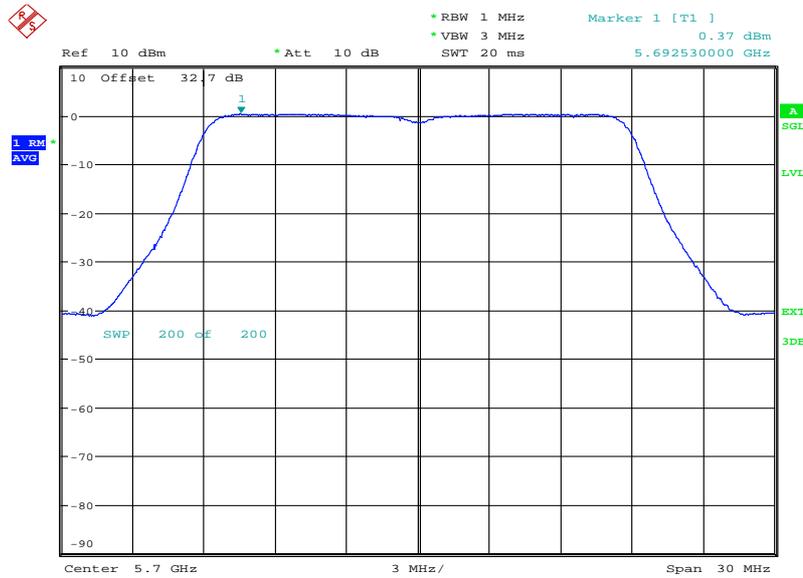
Date: 8.JAN.2014 12:50:46



Product Service

5700 MHz

Peak Power Spectral Density (dBm)	0.37
-----------------------------------	------



Date: 8.JAN.2014 12:52:46

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 MCS0.

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



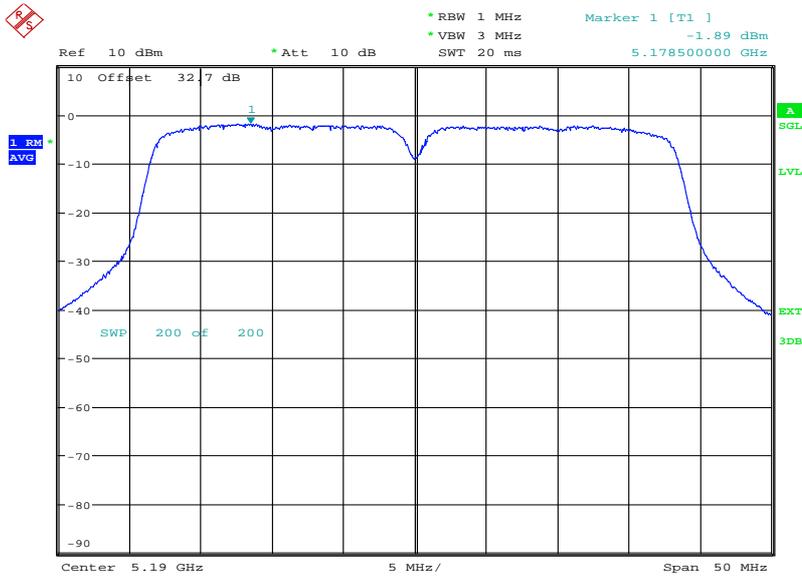
Product Service

802.11(n) - 5 GHz 40 MHz BW

Frequency Band 1

5190 MHz

Peak Power Spectral Density (dBm)	-1.89
-----------------------------------	-------



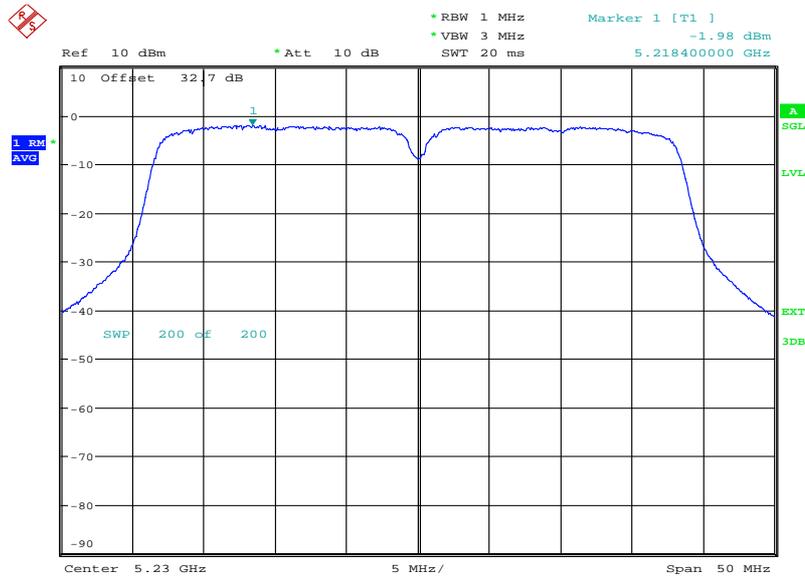
Date: 8.JAN.2014 12:55:31



Product Service

5230 MHz

Peak Power Spectral Density (dBm)	-1.98
-----------------------------------	-------



Date: 8.JAN.2014 12:58:59

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 MCS1.

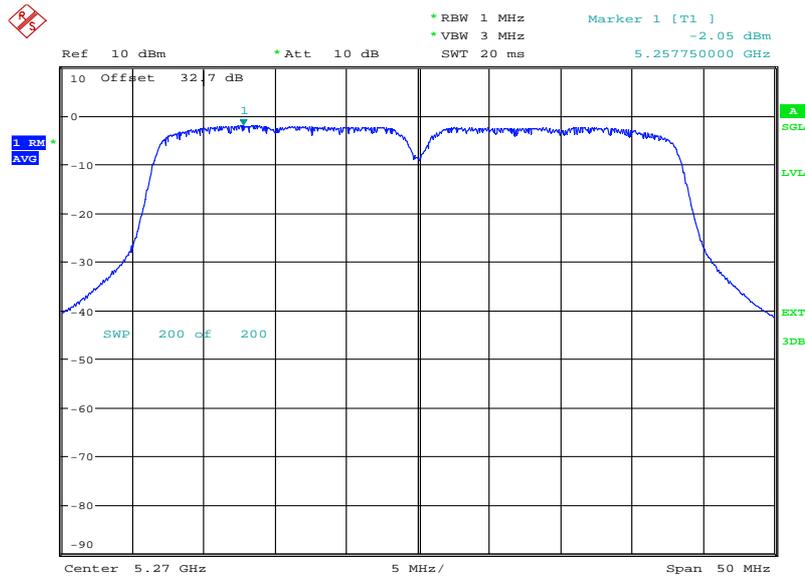


Product Service

Frequency Band 2

5270 MHz

Peak Power Spectral Density (dBm)	-2.05
-----------------------------------	-------



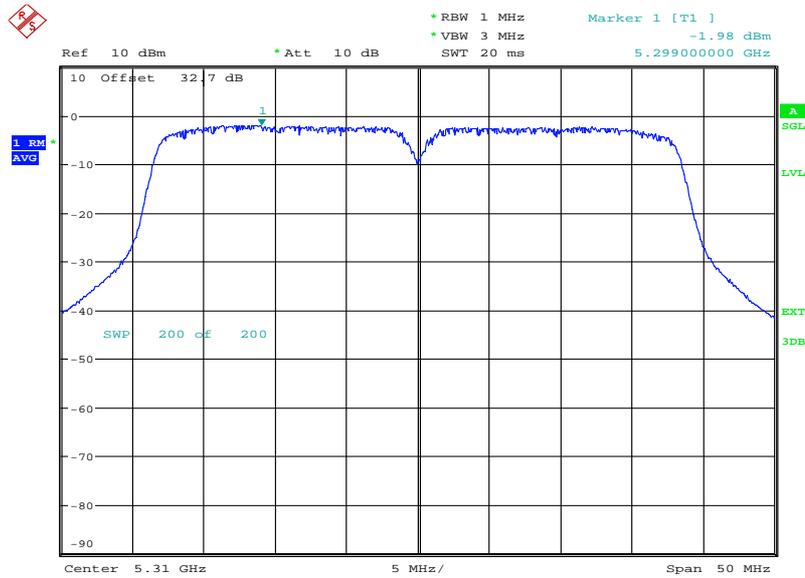
Date: 8.JAN.2014 13:00:06



Product Service

5310 MHz

Peak Power Spectral Density (dBm)	-1.98
-----------------------------------	-------



Date: 8.JAN.2014 13:03:23

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 MCS1.

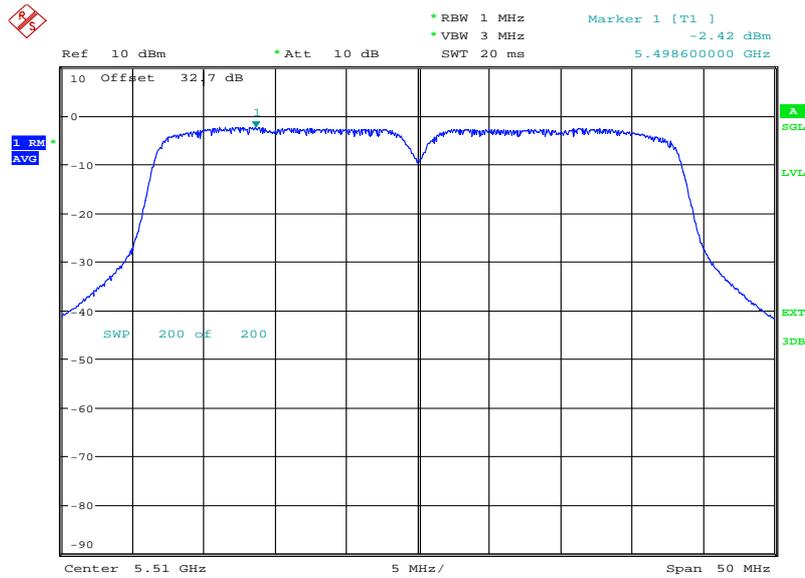


Product Service

Frequency Band 3

5510 MHz

Peak Power Spectral Density (dBm)	-2.42
-----------------------------------	-------



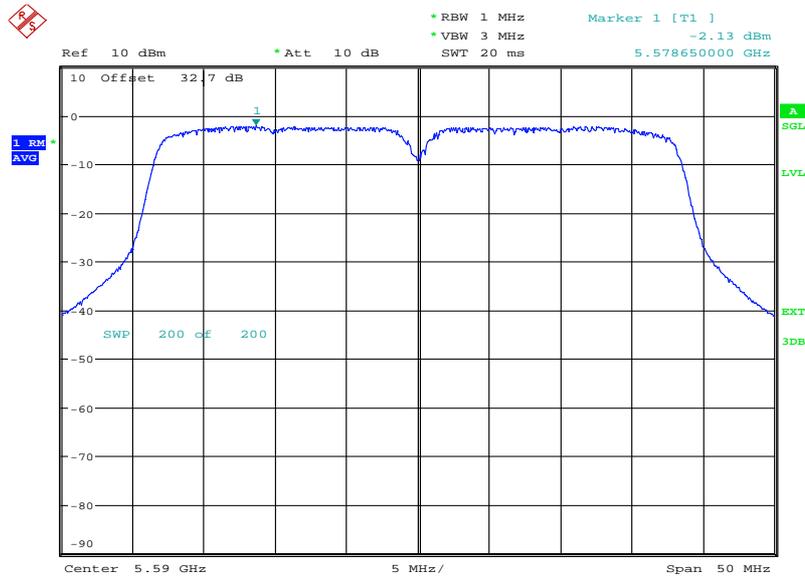
Date: 8.JAN.2014 13:04:05



Product Service

5590 MHz

Peak Power Spectral Density (dBm)	-2.12
-----------------------------------	-------



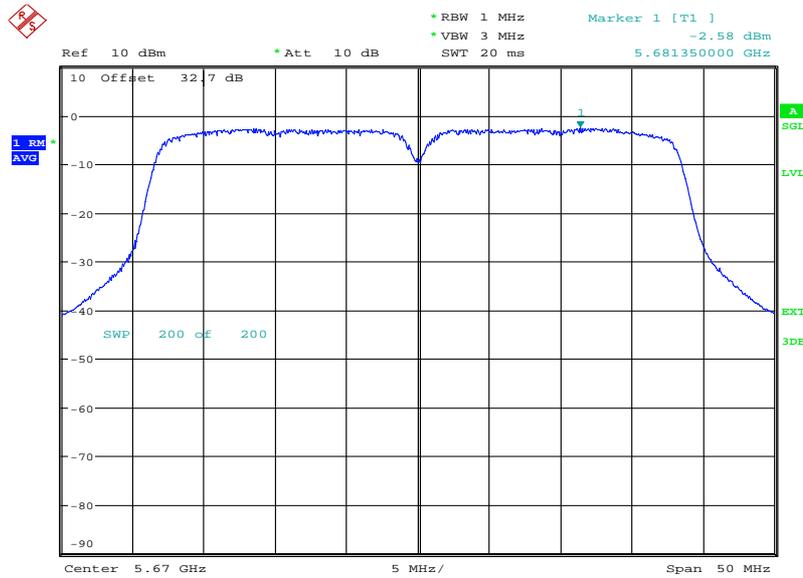
Date: 8.JAN.2014 13:08:49



Product Service

5670 MHz

Peak Power Spectral Density (dBm)	-2.58
-----------------------------------	-------



Date: 8.JAN.2014 13:09:50

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 MCS1.

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

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

SHL24 S/N: IMEI 004401115003408 - Modification State 0

2.7.3 Date of Test

8 January 2014

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

This measurement was conducted in accordance to FCC 789033D01 General UNII guidelines.

THE EUT was set to transmit at maximum power to a Spectrum Analyser via attenuator and cable. The Spectrum Analyser span was set to view the entire emission bandwidth with a Peak Detector and max hold trace settings, using a resolution bandwidth of 1 MHz and a video bandwidth of 3 MHz.

The trace was swept until it stabilised before using a peak search function to find the peak of the spectrum. The ratio of the maximum of the peak max hold spectrum to the peak power spectral density was computed using the previous peak search measurement and the respective peak power spectral density from section 2.6 of this report.

2.7.6 Environmental Conditions

Ambient Temperature	25.0°C
Relative Humidity	35.0%



Product Service

2.7.7 Test Results

802.11(a)

Frequency Band 1

5180 MHz

Ratio (dB)	9.96
------------	------

5200 MHz

Ratio (dB)	9.90
------------	------

5240 MHz

Ratio (dB)	9.35
------------	------

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 6 Mbps.

Frequency Band 2

5260 MHz

Ratio (dB)	10.13
------------	-------

5300 MHz

Ratio (dB)	9.65
------------	------

5320 MHz

Ratio (dB)	9.78
------------	------

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 6 Mbps.



Product Service

Frequency Band 3

5500 MHz

Ratio (dB)	10.11
------------	-------

5600 MHz

Ratio (dB)	9.78
------------	------

5700 MHz

Ratio (dB)	9.91
------------	------

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 6 Mbps.

Limit

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

802.11(ac) - 5 GHz 20 MHz BW

Frequency Band 1

5180 MHz

Ratio (dB)	8.83
------------	------

5200 MHz

Ratio (dB)	8.89
------------	------

5240 MHz

Ratio (dB)	8.78
------------	------

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS2.



Product Service

Frequency Band 2

5260 MHz

Ratio (dB)	8.78
------------	------

5300 MHz

Ratio (dB)	8.48
------------	------

5320 MHz

Ratio (dB)	8.84
------------	------

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS2.

Frequency Band 3

5500 MHz

Ratio (dB)	8.86
------------	------

5600 MHz

Ratio (dB)	8.82
------------	------

5700 MHz

Ratio (dB)	9.00
------------	------

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS2.

Limit

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.



Product Service

802.11(ac) - 5 GHz 40 MHz BW

Frequency Band 1

5190 MHz

Ratio (dB)	9.65
------------	------

5230 MHz

Ratio (dB)	9.22
------------	------

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS0.

Frequency Band 2

5270 MHz

Ratio (dB)	9.06
------------	------

5310 MHz

Ratio (dB)	9.21
------------	------

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS0.



Product Service

Frequency Band 3

5510 MHz

Ratio (dB)	9.08
------------	------

5590 MHz

Ratio (dB)	9.13
------------	------

5670 MHz

Ratio (dB)	9.23
------------	------

The test was performed on the worst case data rate for 802.11(ac) - 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 MCS0.

Limit

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.



Product Service

802.11(ac) - 5 GHz 80 MHz BW

Frequency Band 1

5210 MHz

Ratio (dB)	10.46
------------	-------

The test was performed on the worst case data rate for 802.11(ac) - 80 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 MCS0.

Frequency Band 2

5290 MHz

Ratio (dB)	10.15
------------	-------

The test was performed on the worst case data rate for 802.11(ac) - 80 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 MCS0.

Frequency Band 3

5530 MHz

Ratio (dB)	9.49
------------	------

5610 MHz

Ratio (dB)	9.67
------------	------

The test was performed on the worst case data rate for 802.11(ac) - 80 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 MCS0.

Limit

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.



Product Service

802.11(n) - 5 GHz 20 MHz BW

Frequency Band 1

5180 MHz

Ratio (dB)	9.66
------------	------

5200 MHz

Ratio (dB)	9.63
------------	------

5240 MHz

Ratio (dB)	10.26
------------	-------

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 MCS0.

Frequency Band 2

5260 MHz

Ratio (dB)	10.23
------------	-------

5300 MHz

Ratio (dB)	9.95
------------	------

5320 MHz

Ratio (dB)	9.68
------------	------

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 MCS0.



Product Service

Frequency Band 35500 MHz

Ratio (dB)	9.98
------------	------

5600 MHz

Ratio (dB)	10.14
------------	-------

5700 MHz

Ratio (dB)	9.71
------------	------

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 MCS0.

Limit

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

802.11(n) - 5 GHz 40 MHz BWFrequency Band 15190 MHz

Ratio (dB)	11.14
------------	-------

5230 MHz

Ratio (dB)	10.37
------------	-------

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 MCS1.

Frequency Band 25270 MHz5310 MHz

Ratio (dB)	10.08
------------	-------

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 MCS1.



Product Service

Frequency Band 3

5510 MHz

Ratio (dB)	10.28
------------	-------

5590 MHz

Ratio (dB)	10.23
------------	-------

5670 MHz

Ratio (dB)	10.86
------------	-------

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 MCS1.

Limit

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.



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
Section 2.1 – AC Line Conducted Emissions					
Amplifier (18GHz-26.5GHz)	Avantek	AMT-26177-33	236	12	TU
LISN (1 Phase)	Chase	MN 2050	336	12	28-Mar-2014
Screened Room (5)	Rainford	Rainford	1545	36	25-Jan-2014
Transient Limiter	Hewlett Packard	11947A	2377	12	13-Feb-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
Section 2.2- Power Limits					
Antenna (Double Ridge Guide)	EMCO	3115	34	12	8-Nov-2014
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-Apr-2014
Power Supply Unit	Hewlett Packard	6253A	441	-	O/P Mon
Attenuator (10dB, 10W)	Texscan	HFP-50N	468	12	27-Jun-2014
Screened Room (5)	Rainford	Rainford	1545	36	25-Jan-2014
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM101	2419	12	9-Oct-2014
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	10-Sep-2014
Power Divider	Weinschel	1506A	3345	12	23-May-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
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
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	17-Oct-2014
P-Series Power Meter	Agilent Technologies	N1911A	3981	12	18-Sep-2014
50 MHz-18 GHz Wideband Power Sensor	Agilent Technologies	N1921A	3983	12	18-Sep-2014



Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.3 - Undesirable Emission Limits					
Multimeter	White Gold	WG022	190	12	28-Oct-2014
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-Apr-2014
Antenna (Bilog)	Schaffner	CBL6143	287	24	18-Jan-2014
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	24-Jan-2014
Pre-Amplifier	Phase One	PS04-0086	1533	12	19-Dec-2014
Pre-Amplifier	Phase One	PS04-0087	1534	12	30-Sep-2014
Screened Room (5)	Rainford	Rainford	1545	36	25-Jan-2014
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Power Supply	Hewlett Packard	6104A	1948	-	TU
High Pass Filter (7GHz)	Lorch	9HP7-7000-SR	2246	-	O/P Mon
Filter (Hi Pass)	Lorch	9HP7-7000-SR	2833	12	1-Feb-2014
Test Receiver	Rohde & Schwarz	ESIB40	2941	12	4-Nov-2014
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	12-Sep-2014
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	10-Sep-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	4-Jul-2014
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3694	12	5-Nov-2014
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3695	12	16-Oct-2014
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	mature GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	mature GmbH	NCD	3917	-	TU
Cable 1503 2M 2.92(P)m 2.92(P)m	Rhophase	KPS-1503A-2000-KPS	4293	12	20-Apr-2014
1503 2M 2.92(P)m 2.92(P)m	Rhophase	KPS-1503A-2000-KPS	4358	12	5-Sep-2014
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	1-Oct-2014
Section 2.4 - Frequency Stability					
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Multimeter	White Gold	WG022	190	12	28-Oct-2014
Power Supply Unit	Hewlett Packard	6253A	441	-	O/P Mon
Temperature Chamber	Montford	2F3	467	-	O/P Mon
Attenuator (10dB, 10W)	Texscan	HFP-50N	468	12	27-Jun-2014
Attenuator (10dB)	Weinschel	47-10-34	481	12	27-Mar-2014
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	24-Jan-2014
Digital Temperature Indicator	Fluke	51	2267	12	11-Sep-2014
Multimeter	Iso-tech	IDM101	2424	12	12-Sep-2014
Attenuator (30dB, 25W)	Weinschel	46-30-34	2776	12	6-Feb-2014
Thermocouple Thermometer	Fluke	51	3174	12	3-Dec-2014
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	4-Jul-2014
DC - 8 GHz Attenuator	Lucas Weinschel	24-30-33	3963	12	27-Jun-2014
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	5-Nov-2014
1 Metre N Type Cable	Rhophase	NPS-1601A-1000-NPS	4102	12	11-Jun-2014
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	4143	12	22-Jul-2014
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	4144	12	17-Jul-2014



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.5 - 26 dB Bandwidth					
Multimeter	White Gold	WG022	190	12	28-Oct-2014
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	24-Jan-2014
Power Supply	Hewlett Packard	6104A	1948	-	TU
Attenuator (30dB, 25W)	Weinschel	46-30-34	2776	12	6-Feb-2014
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	4-Jul-2014
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	5-Nov-2014
1 Metre N Type Cable	Rhophase	NPS-1601A-1000-NPS	4102	12	11-Jun-2014
Section 2.6 - Peak Power Spectral Density					
Multimeter	White Gold	WG022	190	12	28-Oct-2014
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	24-Jan-2014
Power Supply	Hewlett Packard	6104A	1948	-	TU
Attenuator (30dB, 25W)	Weinschel	46-30-34	2776	12	6-Feb-2014
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	4-Jul-2014
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	5-Nov-2014
1 Metre N Type Cable	Rhophase	NPS-1601A-1000-NPS	4102	12	11-Jun-2014
Section 2.7 - Ratio of the Peak Excursion of the Modulation Envelope					
Multimeter	White Gold	WG022	190	12	28-Oct-2014
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	24-Jan-2014
Power Supply	Hewlett Packard	6104A	1948	-	TU
Attenuator (30dB, 25W)	Weinschel	46-30-34	2776	12	6-Feb-2014
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	4-Jul-2014
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	5-Nov-2014
1 Metre N Type Cable	Rhophase	NPS-1601A-1000-NPS	4102	12	11-Jun-2014

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



Product Service

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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