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Report On

FCC Testing of the
Pace Plc PX013ANM
In accordance with FCC CFR 47 Part 15C

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FCC ID: NQ8PX013ANM

Document 75926325 Report 02 Issue 1

April 2014



Product Service

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COMMERCIAL-IN-CONFIDENCE

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Pace Plc PX013ANM
In accordance with FCC CFR 47 Part 15C

Document 75926325 Report 02 Issue 1

April 2014

PREPARED FOR

Pace Plc
Victoria Road
Saltaire
Shipley
West Yorkshire
BD18 3LF

PREPARED BY

Natalie Bennett
Senior Administrator, Technical Solutions

APPROVED BY

Simon Bennett
Authorised Signatory

DATED

22 April 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 15C. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

T Guy

A Galpin



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SECTION 1

REPORT SUMMARY

FCC Testing of the
Pace Plc PX013ANM
In accordance with FCC CFR 47 Part 15C



Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC Testing of the Pace Plc PX013ANM to the requirements of FCC CFR 47 Part 15C.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Pace Plc
Model Number(s)	Comcast XG1v3
Serial Number(s)	D22014030001 D22014030007
Number of Samples Tested	2
Test Specification/Issue/Date	FCC CFR 47 Part 15C (2013)
Incoming Release Date	Application Form 27 March 2014
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	5169222 28 March 2014
Start of Test	1 April 2014
Finish of Test	5 April 2014
Name of Engineer(s)	T Guy A Galpin
Related Document(s)	ANSI C63.10: 2009



1.2 BRIEF SUMMARY OF RESULTS

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

Section	Spec Clause	Test Description	Result	Comments/Base Standard
Zigbee - Antenna 0				
2.2	15.247 (b)(3)	Maximum Peak Conducted Output Power	Pass	
2.4	15.247 (d)	Spurious and Band Edge Emissions	Pass	
2.5	15.247 (e)	Power Spectral Density	Pass	
2.6	15.247 (a)(2)	6dB Bandwidth	Pass	
Zigbee - Antenna 1				
2.2	15.247 (b)(3)	Maximum Peak Conducted Output Power	Pass	
2.4	15.247 (d)	Spurious and Band Edge Emissions	Pass	
2.5	15.247 (e)	Power Spectral Density	Pass	
2.6	15.247 (a)(2)	6dB Bandwidth	Pass	
Zigbee – Integral Antenna				
2.1	15.207	AC Line Conducted Emissions	Pass	
2.3	15.247 (b)(4)	EIRP Peak Power	Pass	
2.4	15.247 (d)	Spurious and Band Edge Emissions	Pass	



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1.3 APPLICATION FORM

APPLICANT'S DETAILS			
COMPANY NAME :	Pace plc		
ADDRESS :	Salts Mill, Victoria Road, Saltaire, West Yorkshire BD183LF		
NAME FOR CONTACT PURPOSES :	Joe Ryan		
TELEPHONE NO:	01274 537287		
E-MAIL:	joseph.ryan@pace.com		

EQUIPMENT INFORMATION			
Model name/number	PX013ANM	Identification/Part number	XG1 v3
Hardware Version	186-2126102	Software Version	E118 1_40
Manufacturer	Pace plc	Country of Origin	Thailand
FCC ID	NQ8PX013ANM	Industry Canada ID	.....
Technical description (a brief description of the intended use and operation)			
High Definition Set Top Box with MoCA			
<u>Supply Voltage:</u>			
<input type="checkbox"/>	AC mains	State AC voltage	V and AC frequency Hz
<input checked="" type="checkbox"/>	DC (external)	State DC voltage 12 V	and DC current 3 A
<input type="checkbox"/>	DC (internal)	State DC voltage	V and Battery type
<u>Frequency characteristics:</u>			
Transmitter Frequency range	2400 – 2485MHz	Channel spacing	5MHz
		(if channelized)	
Receiver Frequency range	..... MHz to MHz	Channel spacing	.....
(if different)		(if channelized)	
Designated test frequencies:			
Bottom: 2425 MHz	Middle: 2450 MHz	Top: 2475MHz	
Intermediate Frequencies :			
Highest Internally Generated Frequency :	3000MHz		
<u>Power characteristics:</u>			
Maximum transmitter power	0.002W	Minimum transmitter power	0.000063W
		(if variable)	
<input type="checkbox"/>	Continuous transmission		
<input checked="" type="checkbox"/>	Intermittent transmission	State duty cycle 0.1%	
	If intermittent, can transmitter be set to continuous transmit test mode? Y		
<u>Antenna characteristics:</u>			
<input type="checkbox"/>	Antenna connector	State impedance	ohm
<input type="checkbox"/>	Temporary antenna connector	State impedance	ohm
<input type="checkbox"/>	Integral antenna	State gain	dBi
<u>Modulation characteristics:</u>			
<input type="checkbox"/>	Amplitude	<input checked="" type="checkbox"/>	Other
<input type="checkbox"/>	Frequency	Details: OQPSK	
<input type="checkbox"/>	Phase	(GMSK, QSPK etc)	
Can the transmitter operate un-modulated?			
Y/N			
ITU Class of emission:			
<u>Battery/Power Supply</u>			
Model name/number	ADA017	Identification/Part number	ADA017
Manufacturer	ACBEL	Country of Origin	China
<u>Ancillaries (if applicable)</u>			
Model name/number	.....	Identification/Part number	.....
Manufacturer	.....	Country of Origin	.....
<u>Extreme conditions:</u>			
Maximum temperature	..... °C	Minimum temperature	..... °C
Maximum supply voltage	..... V	Minimum supply voltage	..... V

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

Signature :

Name : Joseph Ryan

Position held : Corporate Approvals Manager

Date : 27th March 2014



Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Pace Plc PX013ANM. 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 110 V AC 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.



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SECTION 2

TEST DETAILS

FCC Testing of the
Pace Plc PX013ANM
In accordance with FCC CFR 47 Part 15C



Product Service

2.1 AC LINE CONDUCTED EMISSIONS

2.1.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.207

2.1.2 Equipment Under Test and Modification State

Comcast XG1v3 S/N: D22014030001 - Modification State 0

2.1.3 Date of Test

5 April 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

A test environment and testing arrangement meeting the specification of ANSI C63.4 was used during all testing. The Equipment Under Test (EUT) was set upon a non-conducting platform at an elevation of 80 cm above a horizontal reference ground plane. A vertical reference ground plane was situated 40 cm from the EUT and bonded to the horizontal reference ground plane.

The EUT was powered by a Line Impedance Stabilization Network (LISN), whereby emissions measurements of the current-carrying conductors were made through this LISN. The LISN was bonded to the horizontal reference ground plane with a separation distance greater than 80 cm from the EUT. A mains supply cable of 1 m length was used to supply mains power to the EUT from the LISN.

A preliminary emissions scan was conducted for each current-carrying conductor of the EUT, using a peak detector over a frequency range of 150 kHz to 30 MHz. At least six of the greatest peak emissions, frequency positions were selected from each preliminary emissions scan for further evaluation as final measuring points.

Final measurement points were measured using quasi-peak and average detectors. All final measurements were assessed against the emission limits in Clause 15.207 of FCC CFR 47 FCC Part 15.

2.1.6 Environmental Conditions

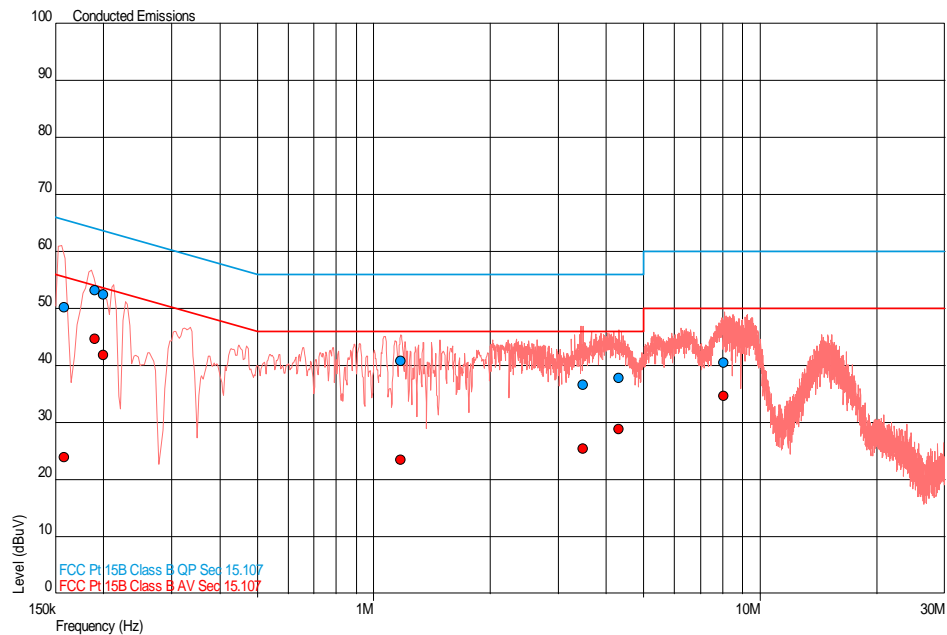
Ambient Temperature	20.5°C
Relative Humidity	52.3%



2.1.7 Test Results

Zigbee - Integral Antenna

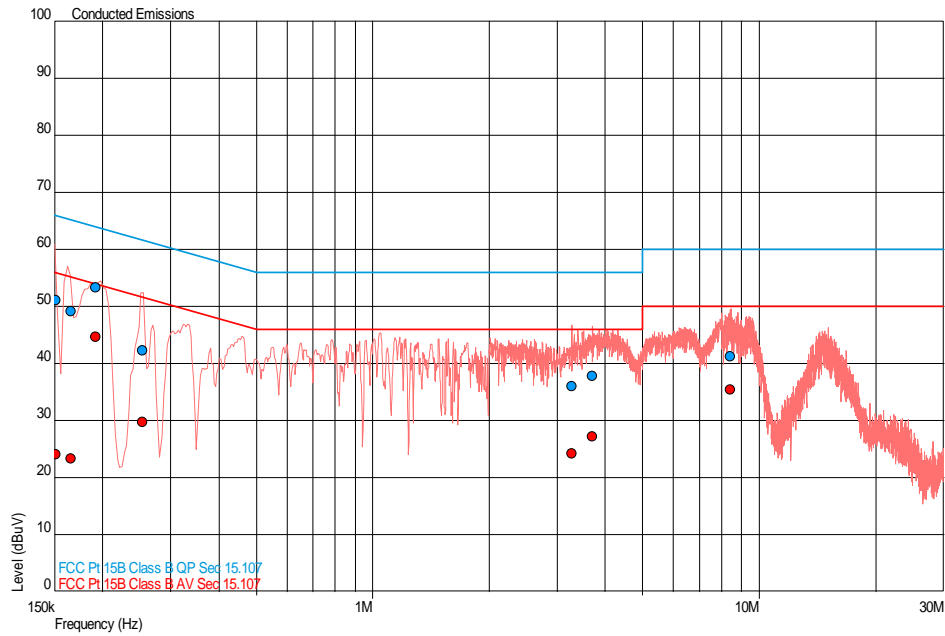
Live Line



Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.158	50.3	65.6	-15.3	24.0	55.6	-31.6
0.190	53.2	64.0	-10.8	44.8	54.0	-9.3
0.200	52.4	63.6	-11.2	41.9	53.6	-11.7
1.174	40.8	56.0	-15.2	23.5	46.0	-22.5
3.481	36.6	56.0	-19.4	25.4	46.0	-20.6
4.307	37.9	56.0	-18.1	28.8	46.0	-17.2
8.031	40.5	60.0	-19.5	34.7	50.0	-15.3



Neutral Line



Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.151	51.2	65.9	-14.8	24.1	55.9	-31.8
0.165	49.2	65.2	-16.0	23.4	55.2	-31.8
0.192	53.3	64.0	-10.6	44.6	54.0	-9.3
0.254	42.3	61.6	-19.3	29.8	51.6	-21.8
3.270	36.1	56.0	-19.9	24.3	46.0	-21.7
3.704	37.8	56.0	-18.2	27.3	46.0	-18.7
8.396	41.3	60.0	-18.7	35.5	50.0	-14.5



Product Service

2.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER

2.2.1 Specification Reference

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

2.2.2 Equipment Under Test and Modification State

Comcast XG1v3 S/N: D22014030007 - Modification State 0

2.2.3 Date of Test

1 April 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

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 (b) and KDB 558074.

The EUT was connected to a broadband peak RF power meter via a cable and attenuator. The EUT was transmitting at maximum power with modulation on the bottom, middle and top channels. The path loss between the EUT and sensor was measured and entered as a reference level offset. The peak power was recorded for measurements on the bottom, middle and top channels.

2.2.6 Environmental Conditions

Ambient Temperature	23.9 - 33.4°C
Relative Humidity	26.0 - 40.2%



Product Service

2.2.7 Test Results

Zigbee - Antenna 0

110 V AC Supply

Modulation Data Rate (kbps)	Maximum Peak Conducted Output Power					
	dBm			mW		
	2425 MHz	2450 MHz	2475 MHz	2425 MHz	2450 MHz	2475 MHz
250	2.94	3.05	3.14	1.97	2.02	2.06

Limit Clause

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

Zigbee - Antenna 1

110 V AC Supply

Modulation Data Rate (kbps)	Maximum Peak Conducted Output Power					
	dBm			mW		
	2425 MHz	2450 MHz	2475 MHz	2425 MHz	2450 MHz	2475 MHz
250	2.10	2.36	2.30	1.62	1.72	1.70

Limit Clause

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.



Product Service

2.3 EIRP PEAK POWER

2.3.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.247 (b)(4)

2.3.2 Equipment Under Test and Modification State

Comcast XG1v3 S/N: D22014030001 - Modification State 0

2.3.3 Date of Test

3 April 2014 & 4 April 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

The EUT was transmitted at maximum power with modulation via a cable to the Spectrum Analyser. The Analyser settings were adjusted to display the resultant trace on screen and a resolution bandwidth and video bandwidth of 1 MHz were used to perform the measurement. The level on the spectrum analyser was maximised by rotating the EUT through 360° and a height search of the measuring antenna. A substitution was then performed using a suitable calibrated 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.

2.3.6 Environmental Conditions

Ambient Temperature	20.6 - 21.5°C
Relative Humidity	42.0 - 44.9%



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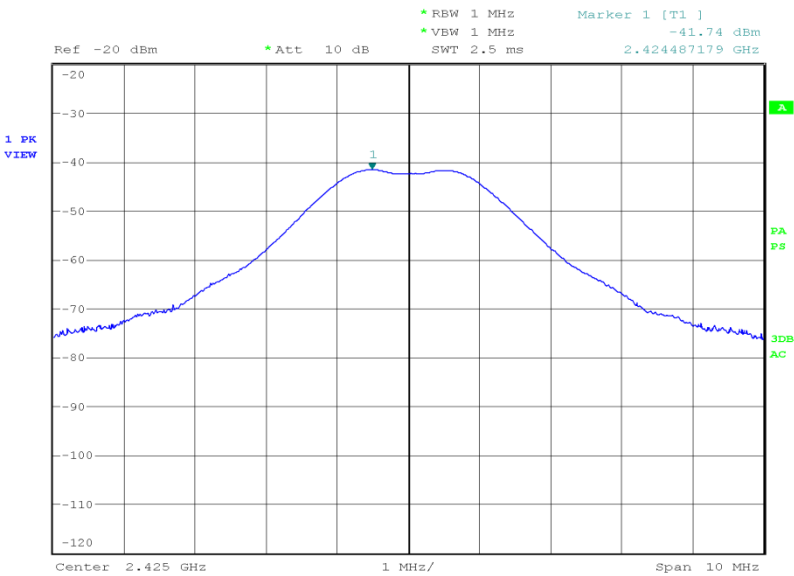
2.3.7 Test Results

Zigbee - Integral Antenna

110 V AC Supply

2425 MHz

EIRP (dBm)	EIRP (mW)
4.59	2.877



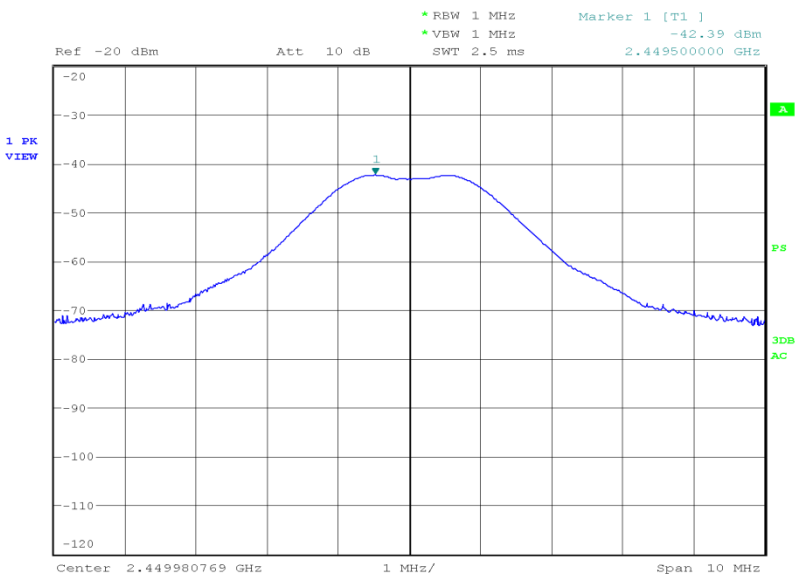
Date: 4.APR.2014 02:07:23



Product Service

2450 MHz

EIRP (dBm)	EIRP (mW)
3.47	2.223



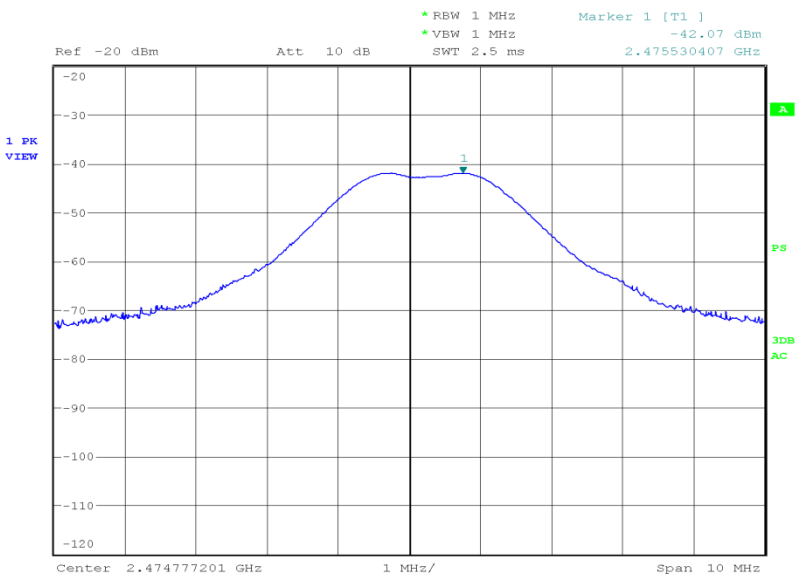
Date: 4.APR.2014 00:22:57



Product Service

2475 MHz

EIRP (dBm)	EIRP (mW)
3.61	2.296



Date: 4.APR.2014 00:03:44

Limit

EIRP (dBm)	EIRP (W)
36.0	4



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2.4 SPURIOUS AND BAND EDGE EMISSIONS

2.4.1 Specification Reference

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

2.4.2 Equipment Under Test and Modification State

Comcast XG1v3 S/N: D22014030001 - Modification State 0

Comcast XG1v3 S/N: D22014030007 - Modification State 0

2.4.3 Date of Test

2 April 2014, 3 April 2014, 4 April 2014 & 5 April 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 test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 (d) and KDB 558074.

For conducted emissions, the EUT was set to operate at maximum power on the bottom, middle and top channels with modulation. The power of each fundamental frequency was measured in 100 kHz RBW, the resultant limit line on the trace was set at -20 dBc of this value. The measurement path loss in each relevant frequency band was measured and entered as a reference level offset. The test was performed from 9 kHz to 25 GHz.

For radiated emissions, the test method described above was also used in addition to the guidelines specified for measurements in restricted bands as specified in KDB 558074. Measurements were performed from 30 MHz to 25 GHz and the path loss was incorporated as a transducer factor and entered into the spectrum analyser.

Band edge measurements were performed in accordance with ANSI C63.10, Clause 6.9.2. The results were analysed to ensure compliance with restricted bands. The EUT was set transmit on the lowest and highest operating frequencies.

2.4.6 Environmental Conditions

Ambient Temperature	20.7 - 33.4°C
Relative Humidity	26.0 - 56.4%



Product Service

2.4.7 Test Results

Zigbee - Antenna 0

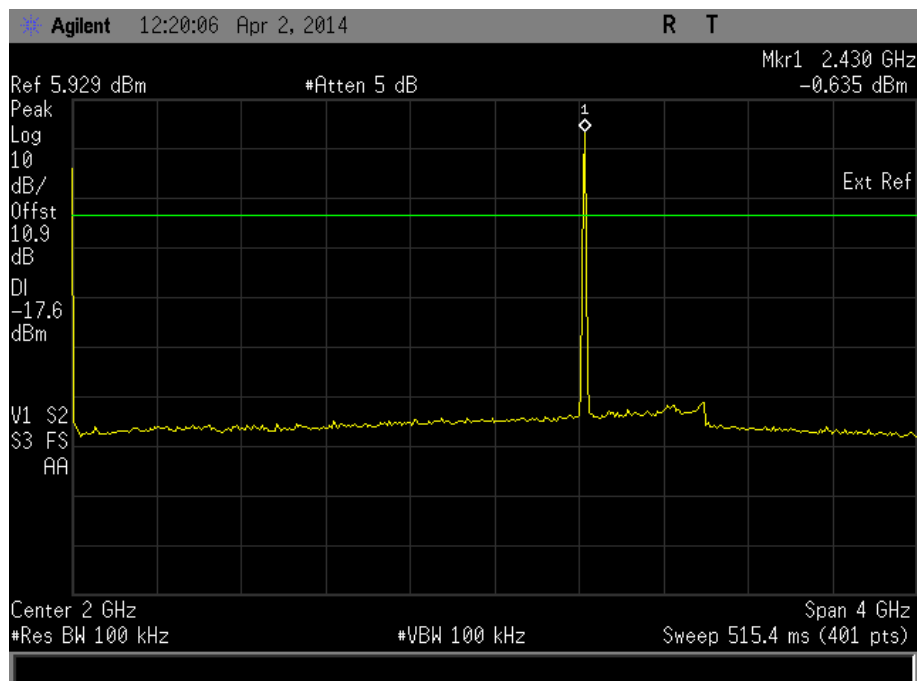
110 V AC Supply

Spurious Conducted Emissions

Zigbee

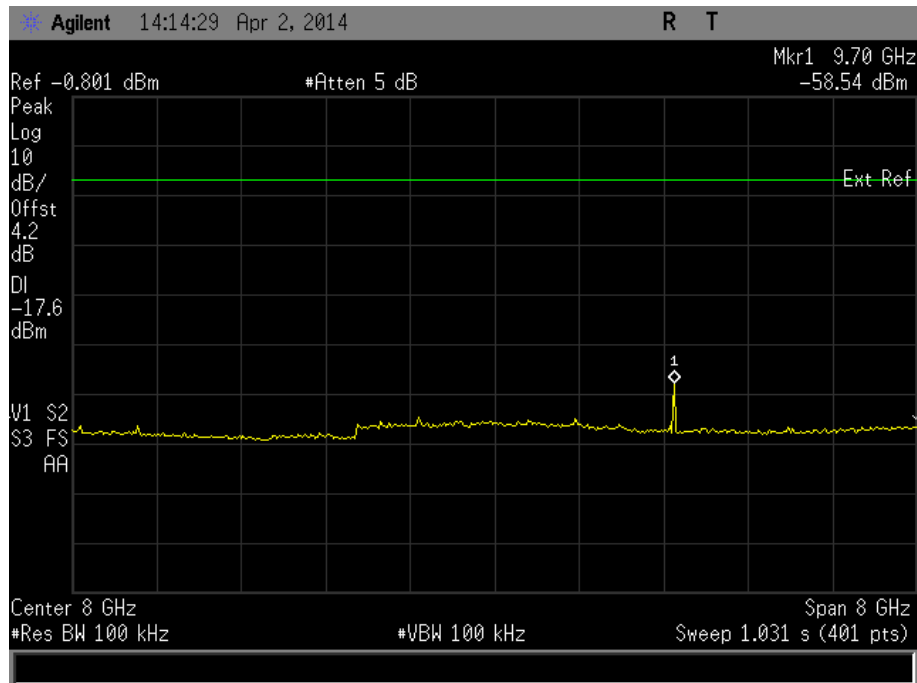
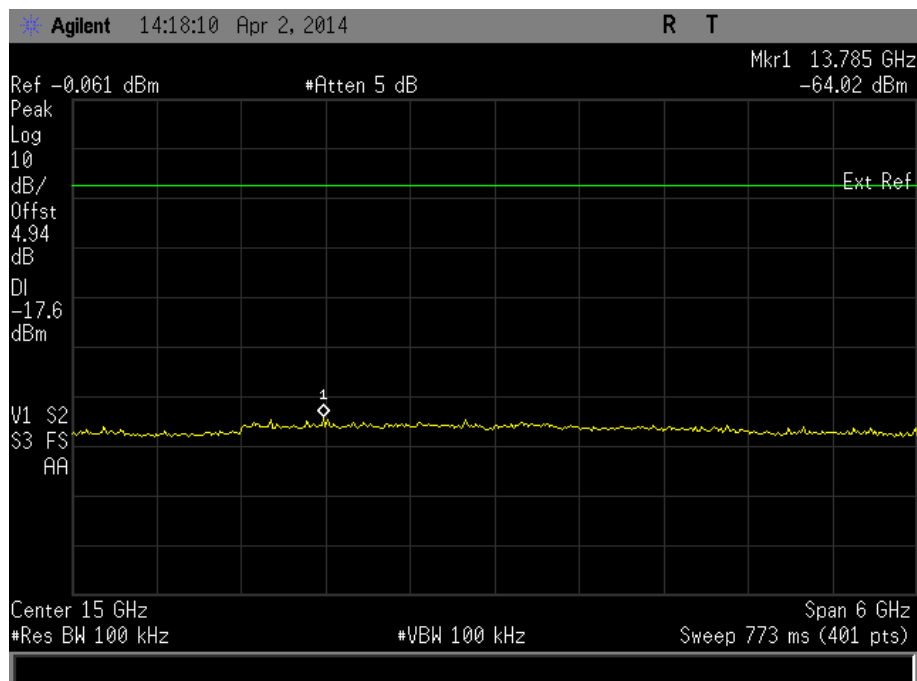
2425 MHz

9 kHz to 4 GHz



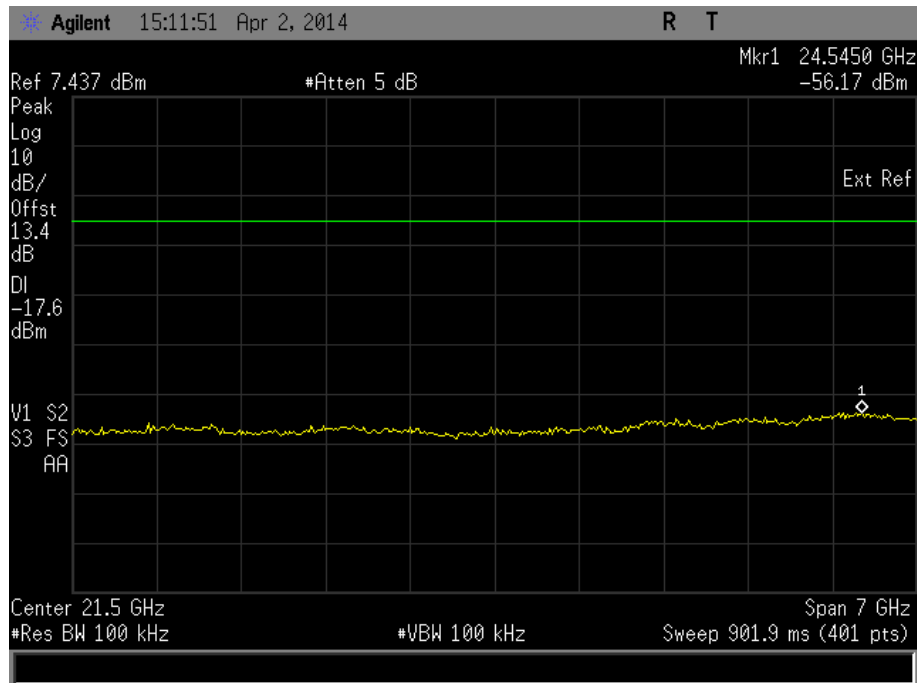
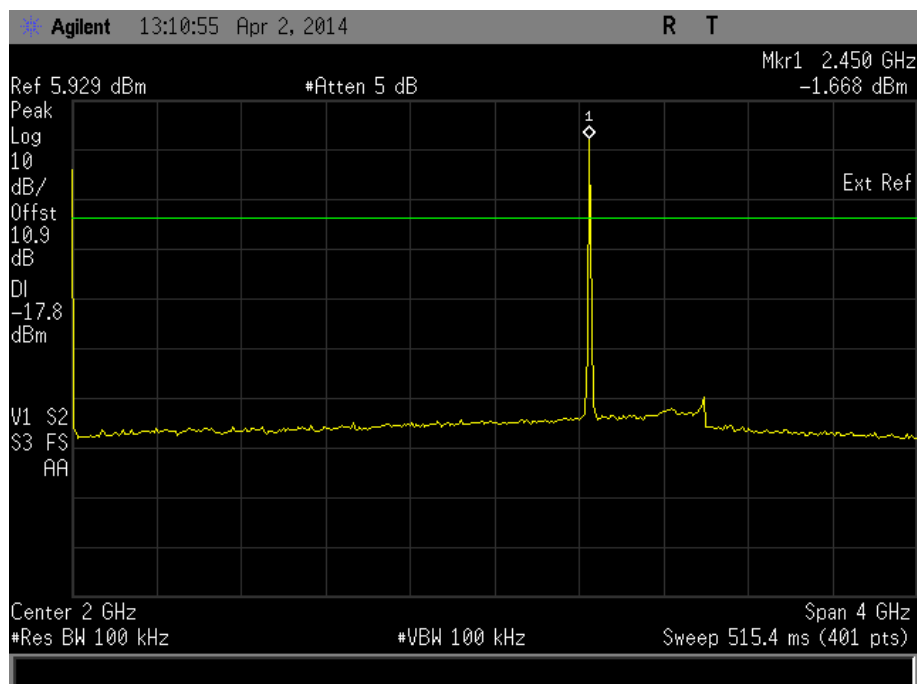


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

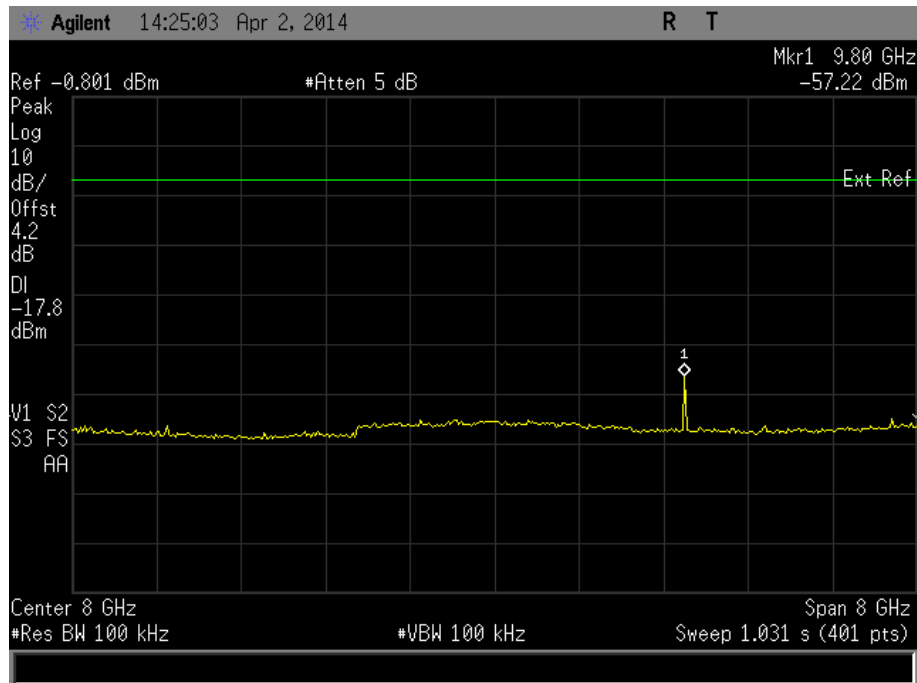
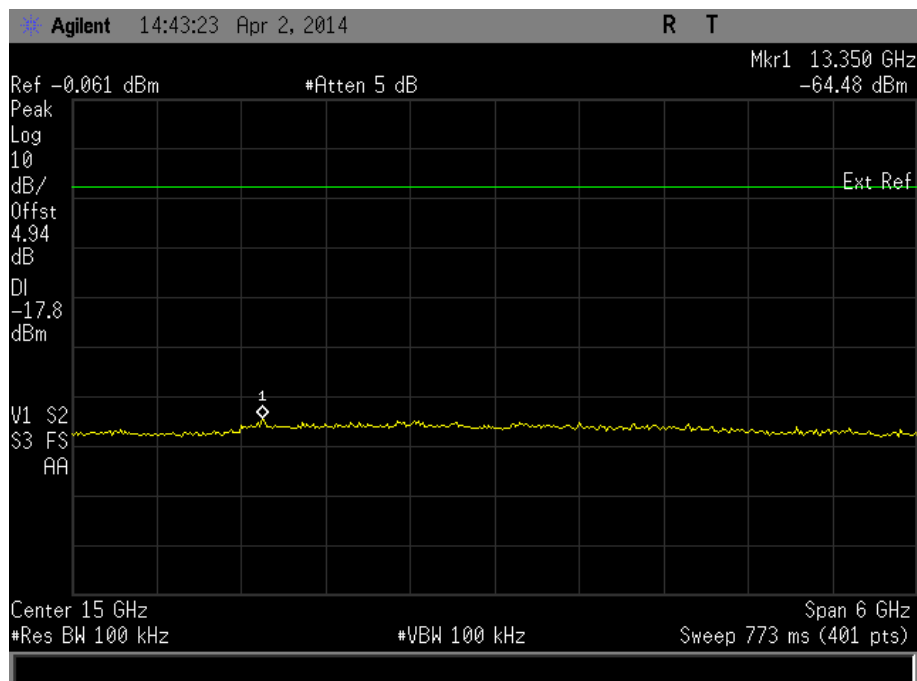


Product Service

18 GHz to 25 GHz2450 MHz9 kHz to 4 GHz

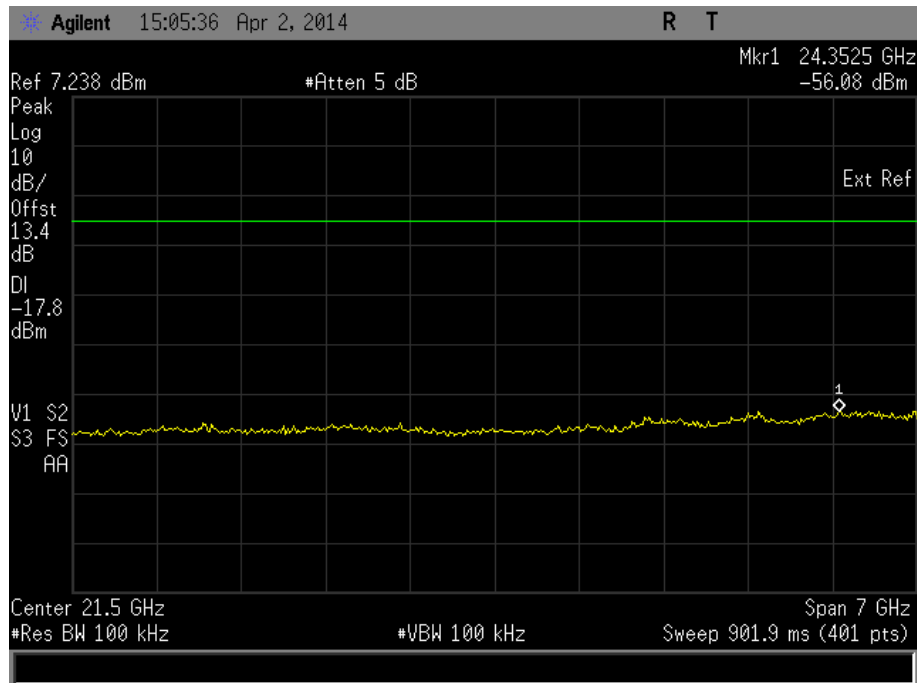
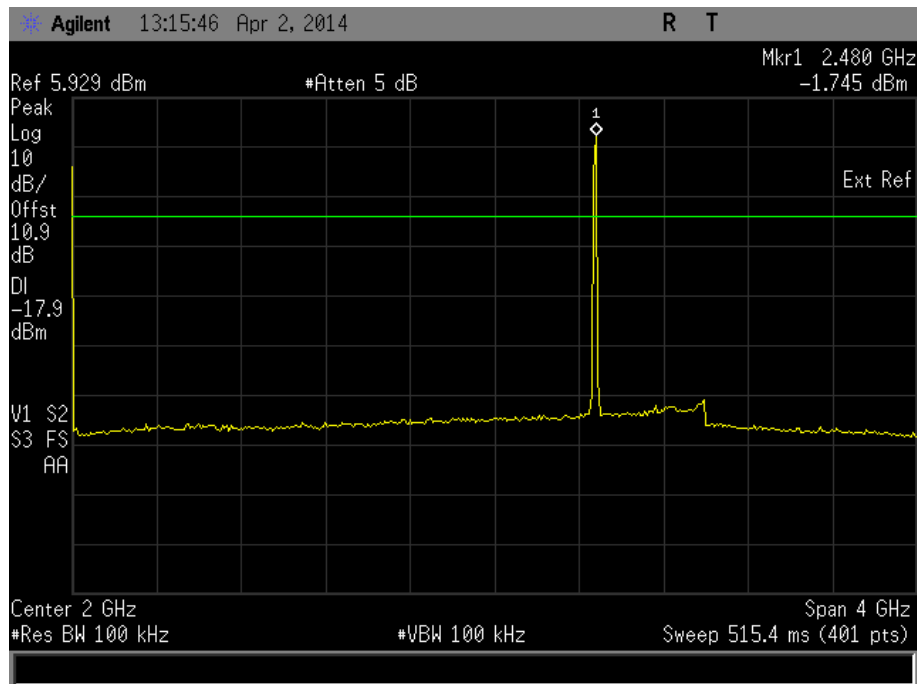


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

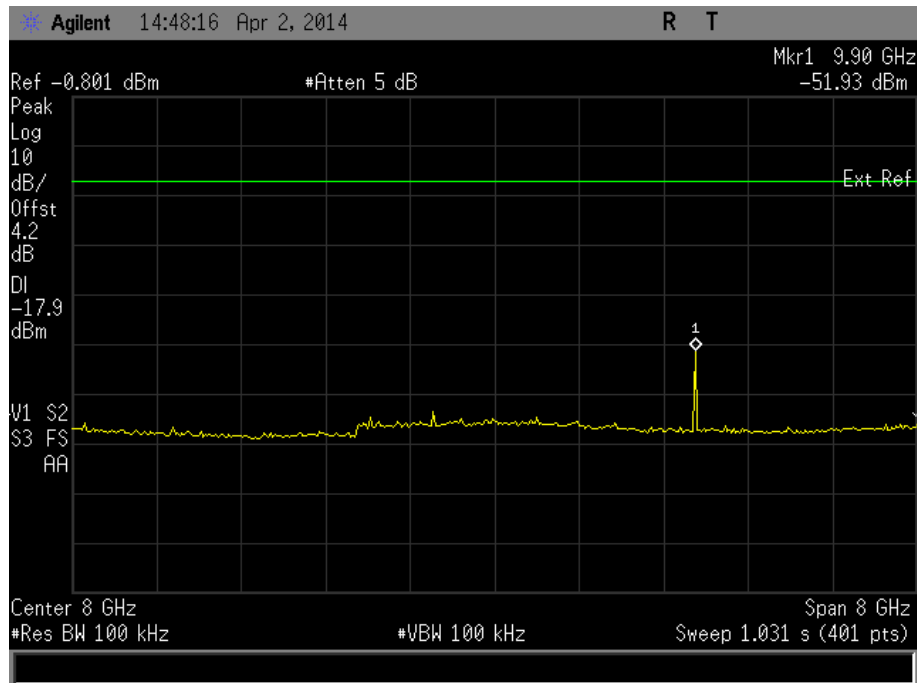
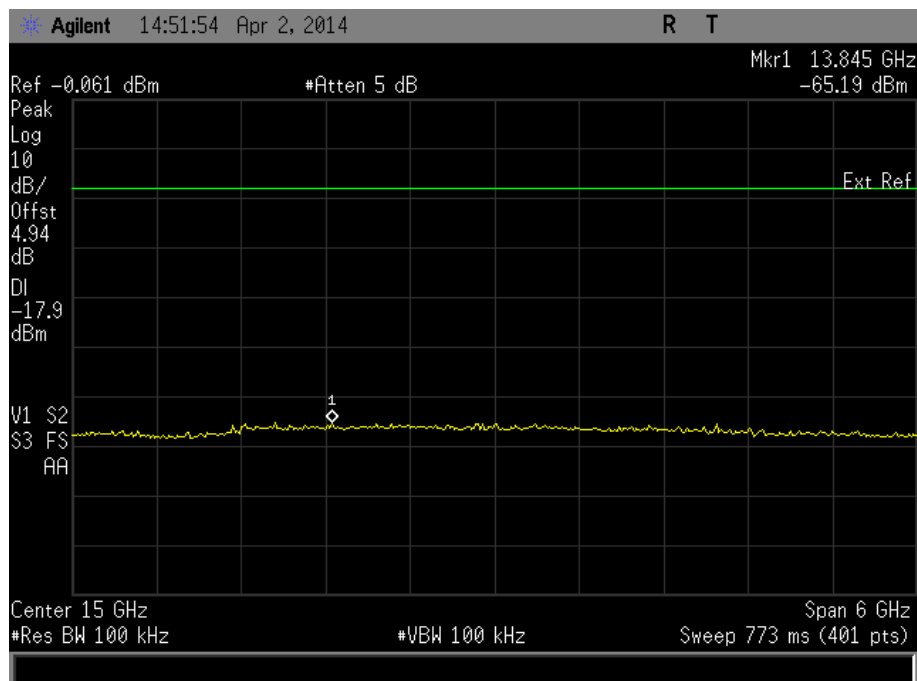


Product Service

18 GHz to 25 GHz2475 MHz9 kHz to 4 GHz

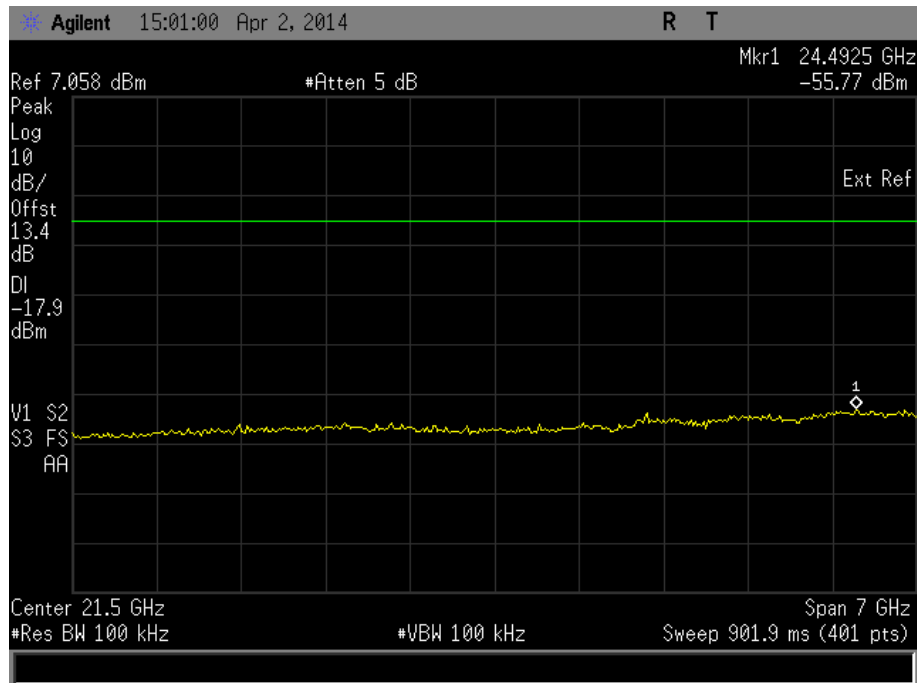


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz



Product Service

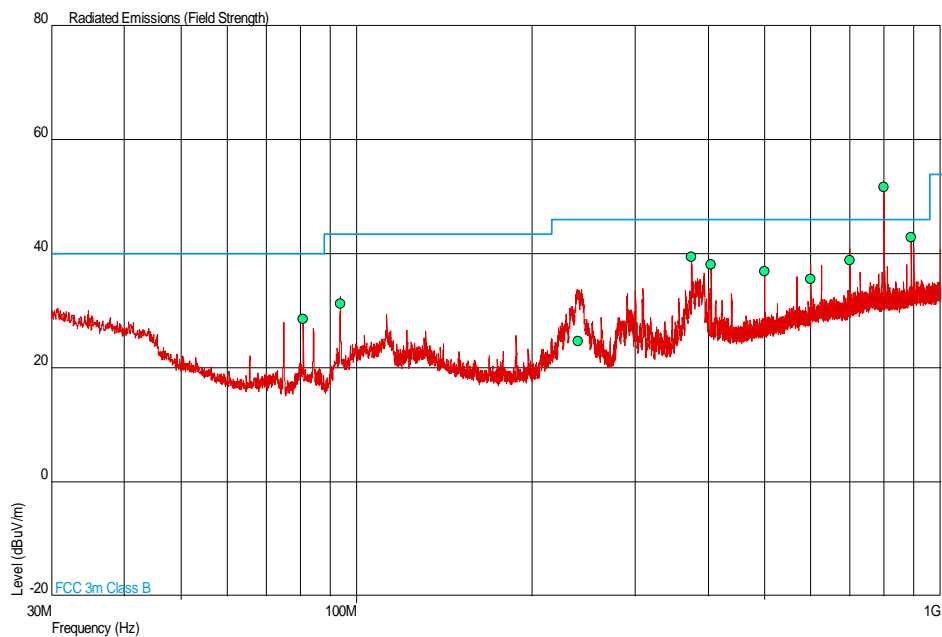
18 GHz to 25 GHzLimit Clause

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

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

Zigbee - Integral Antenna

110 V AC Supply

Spurious Radiated Emissions2425 MHz30 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
80.997	28.6	26.9	40.0	100	-11.4	73.1	360	1.00	Vertical
93.741	31.2	36.3	43.5	150	-12.3	113.7	340	1.00	Vertical
239.739	24.7	17.2	46.0	200	-21.3	182.8	222	1.00	Horizontal
374.993	39.4	93.3	46.0	200	-6.6	106.7	107	1.03	Horizontal
404.986	38.1	80.4	46.0	200	-7.9	119.6	195	1.00	Horizontal
499.997	37.0	70.8	46.0	200	-9.0	129.2	130	1.00	Horizontal
600.001	35.7	61.0	46.0	200	-10.3	139.0	234	1.00	Vertical
699.989	38.9	88.1	46.0	200	-7.1	111.9	72	1.00	Vertical
*799.996	51.7	384.6	46.0	200	5.7	-184.6	54	1.02	Horizontal
891.001	42.9	139.6	46.0	200	-3.1	60.4	163	1.06	Horizontal

*The emission at 799.996 MHz does not fall within a restricted band. The limit is -20 dBc in 100 kHz bandwidth. This limit would never be less than 74.0 dBuV/m and the plot clearly shows a margin exceeding 20 dBc at this frequency.

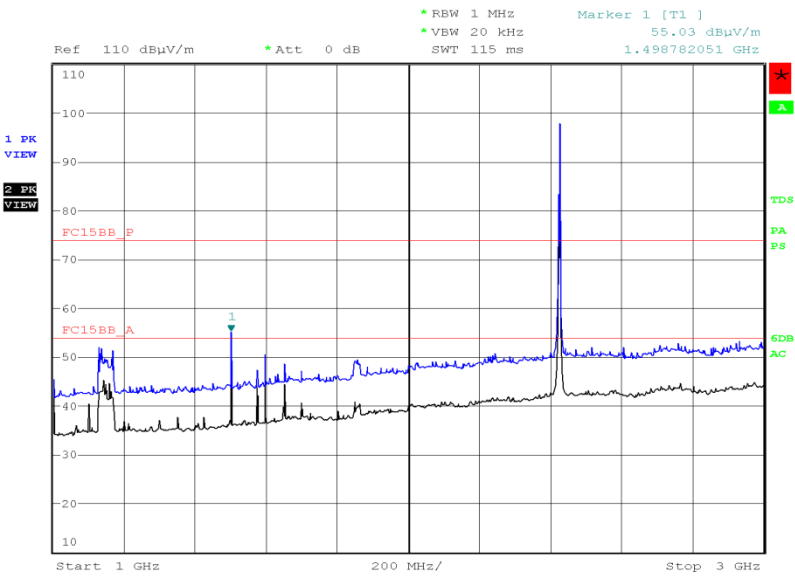


Product Service

1 GHz to 25 GHz

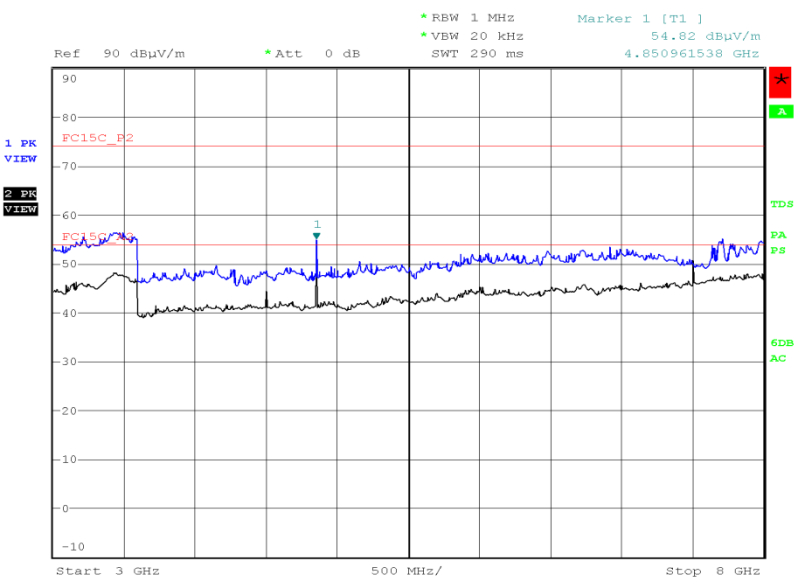
Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
1.500	Horizontal	105	272	56.59	52.37
4.850	Vertical	105	139	51.53	48.63

1 GHz to 3 GHz



Date: 4.APR.2014 01:41:36

3 GHz to 8 GHz

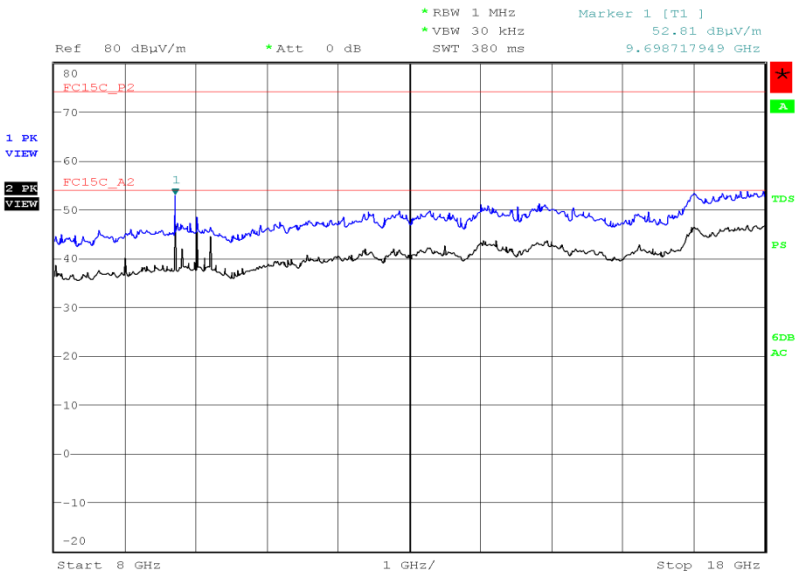


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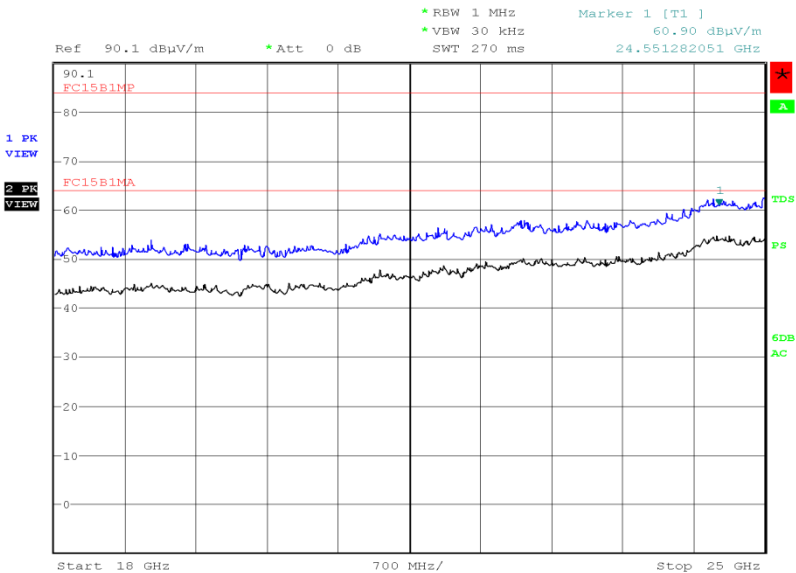
Product Service

8 GHz to 18 GHz



Date: 5.APR.2014 12:50:02

18 GHz to 25 GHz

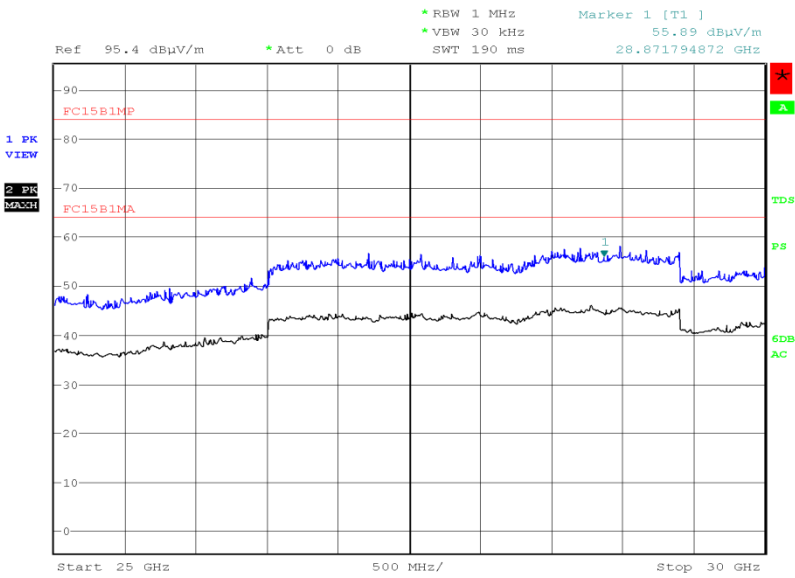


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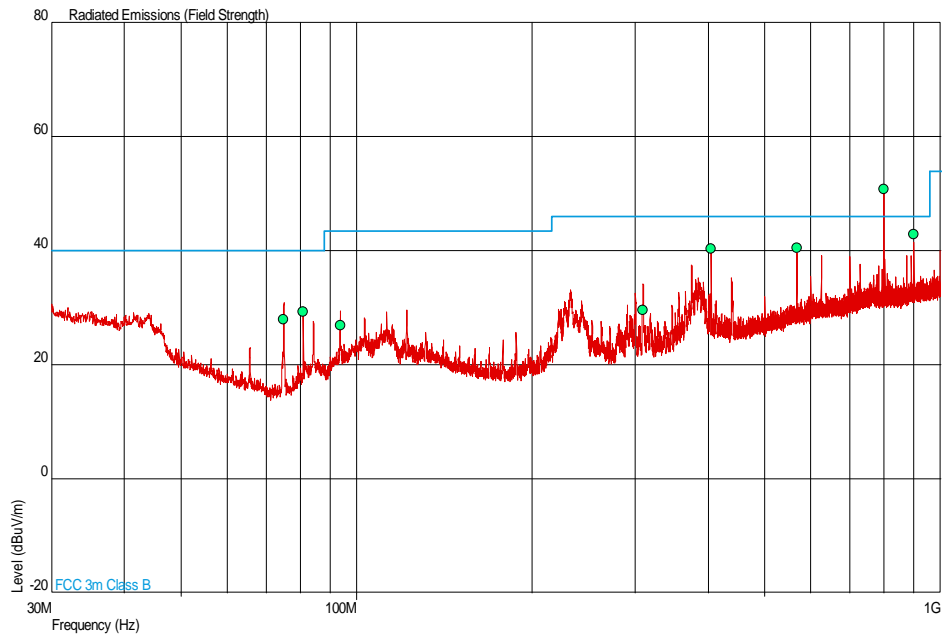


Product Service

25 GHz to 30 GHz



Date: 5.APR.2014 14:00:02

2450 MHz30 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
75.024	28.0	25.1	40.0	100	-12.0	74.9	360	1.00	Vertical
80.998	29.3	29.2	40.0	100	-10.7	70.8	336	1.00	Vertical
93.791	26.9	22.1	43.5	150	-16.6	127.9	31	1.00	Vertical
309.397	29.6	30.2	46.0	200	-16.4	169.8	247	1.09	Horizontal
404.998	40.4	104.7	46.0	200	-5.6	95.3	95	1.00	Horizontal
566.993	40.6	107.2	46.0	200	-5.4	92.8	80	1.12	Vertical
800.000	50.8	346.7	46.0	200	4.8	-146.7	133	1.00	Horizontal
899.998	43.0	141.3	46.0	200	-3.0	58.7	163	1.64	Horizontal

*The emission at 800.000 MHz does not fall within a restricted band. The limit is -20 dBc in 100 kHz bandwidth. This limit would never be less than 74.0 dBuV/m and the plot clearly shows a margin exceeding 20 dBc at this frequency.

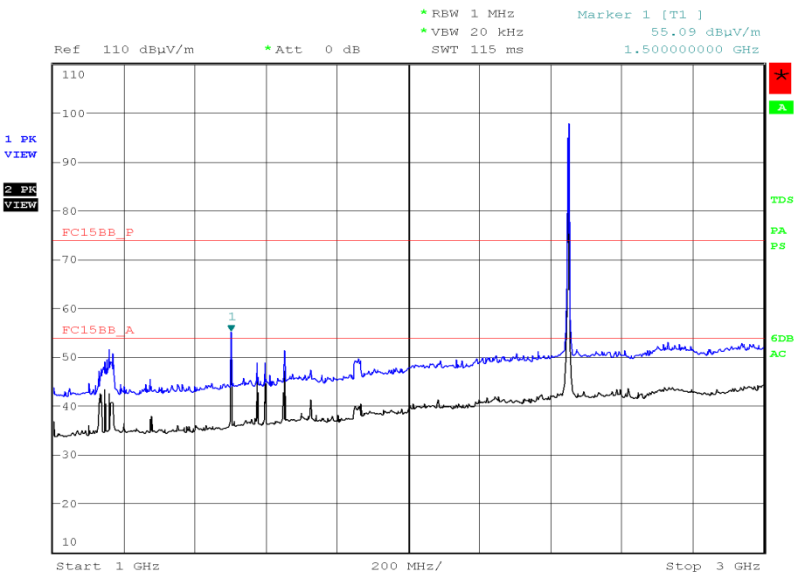


Product Service

1 GHz to 25 GHz

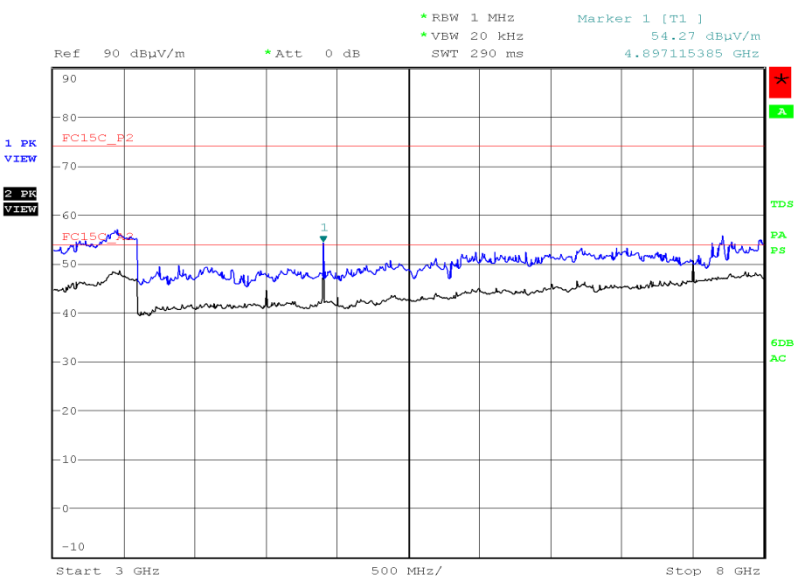
Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
1.500	Horizontal	105	241	56.07	52.68
4.900	Vertical	100	128	57.32	49.44

1 GHz to 3 GHz



Date: 4.APR.2014 00:31:32

3 GHz to 8 GHz

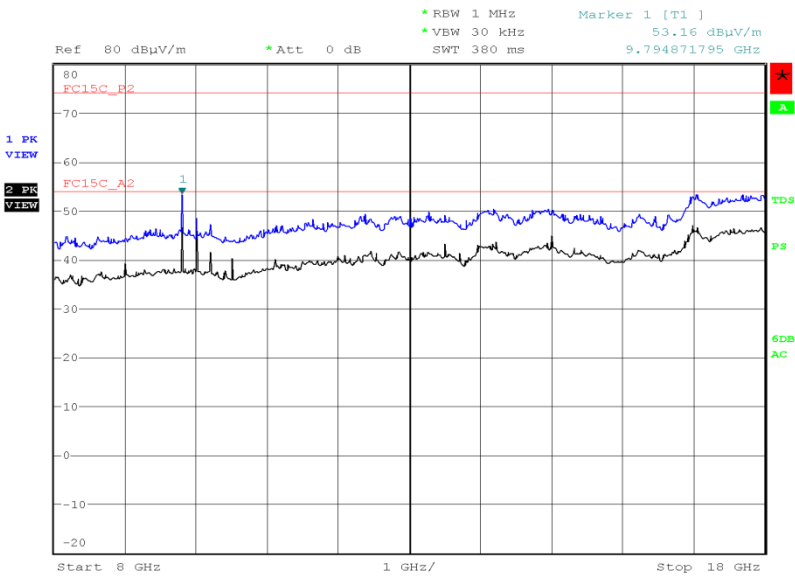


Date: 4.APR.2014 03:25:46



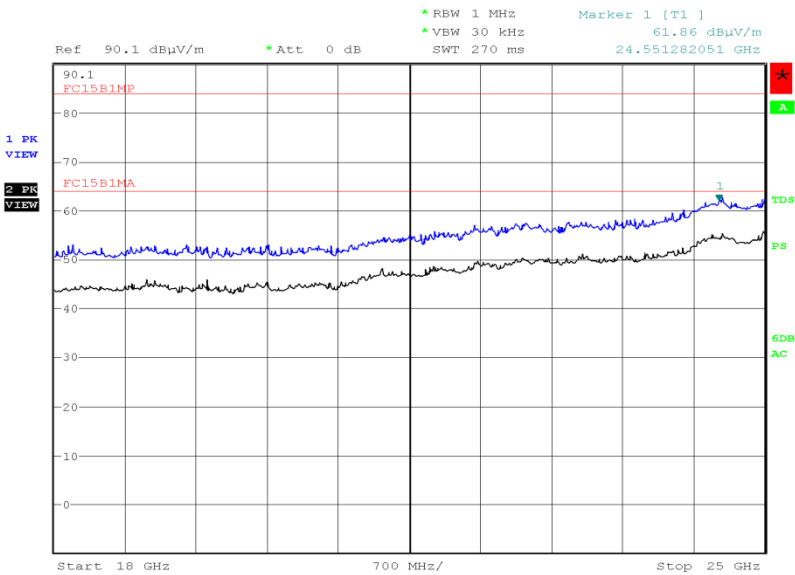
Product Service

8 GHz to 18 GHz



Date: 5.APR.2014 12:28:11

18 GHz to 25 GHz

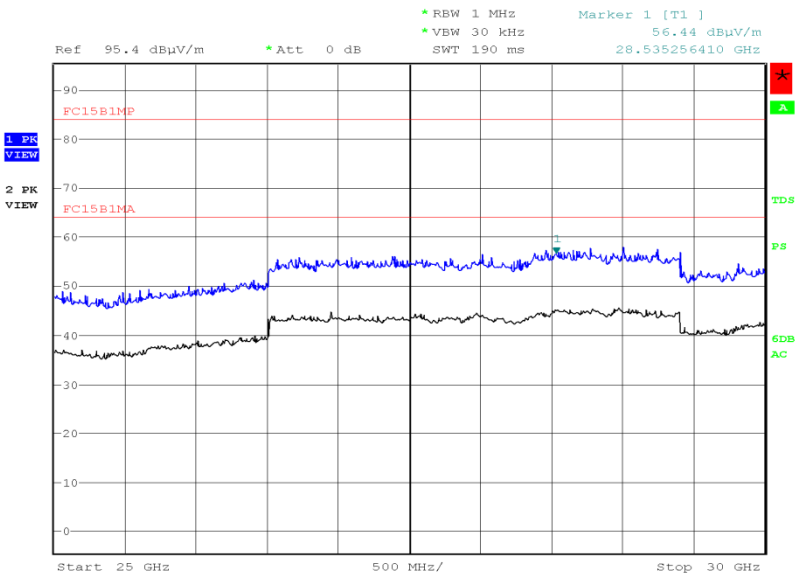


Date: 5.APR.2014 13:40:24

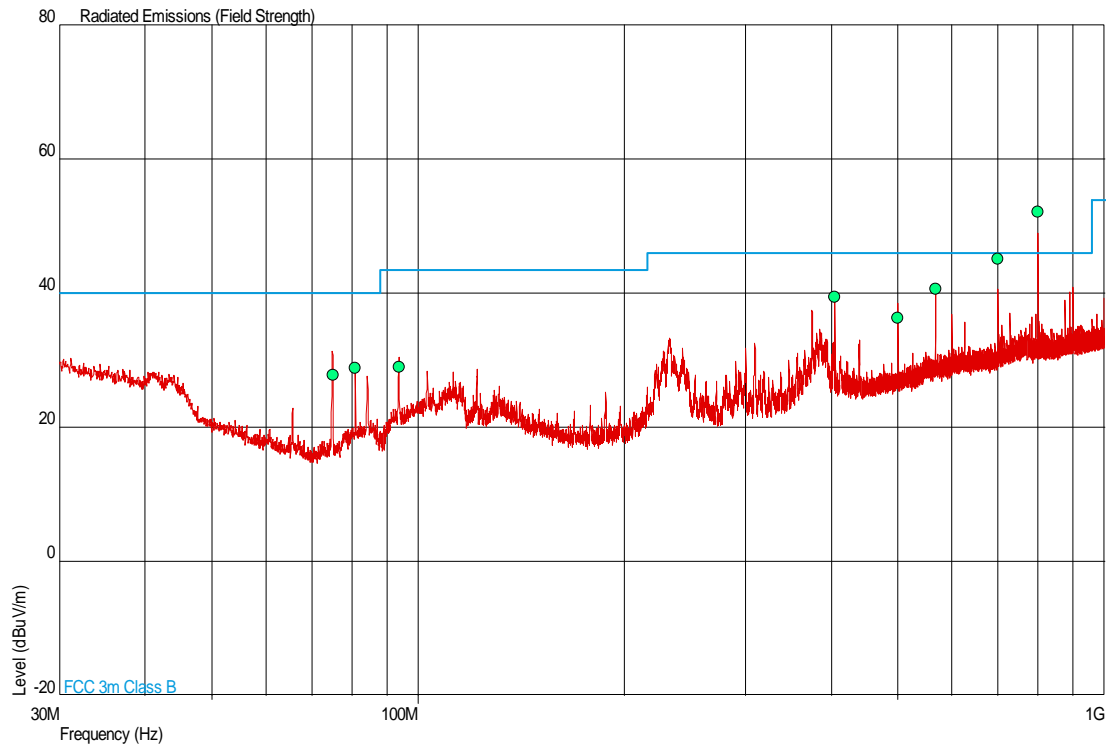


Product Service

25 GHz to 30 GHz



Date: 5.APR.2014 14:10:07

2475 MHz30 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
75.067	27.8	24.5	40.0	100	-12.2	75.5	358	1.00	Vertical
80.997	28.8	27.5	40.0	100	-11.2	72.5	269	1.00	Vertical
93.807	29.0	28.2	43.5	150	-14.5	121.8	102	1.15	Vertical
404.994	39.5	94.4	46.0	200	-6.5	105.6	115	1.00	Horizontal
500.002	36.3	65.3	46.0	200	-9.7	134.7	243	1.00	Vertical
566.989	40.7	108.4	46.0	200	-5.3	91.6	76	1.02	Vertical
699.995	45.2	182.0	46.0	200	-0.8	18.0	155	1.16	Horizontal
799.997	52.2	407.4	46.0	200	6.2	-207.4	127	1.08	Horizontal

*The emission at 799.997 MHz does not fall within a restricted band. The limit is -20 dBc in 100 kHz bandwidth. This limit would never be less than 74.0 dBuV/m and the plot clearly shows a margin exceeding 20 dBc at this frequency.

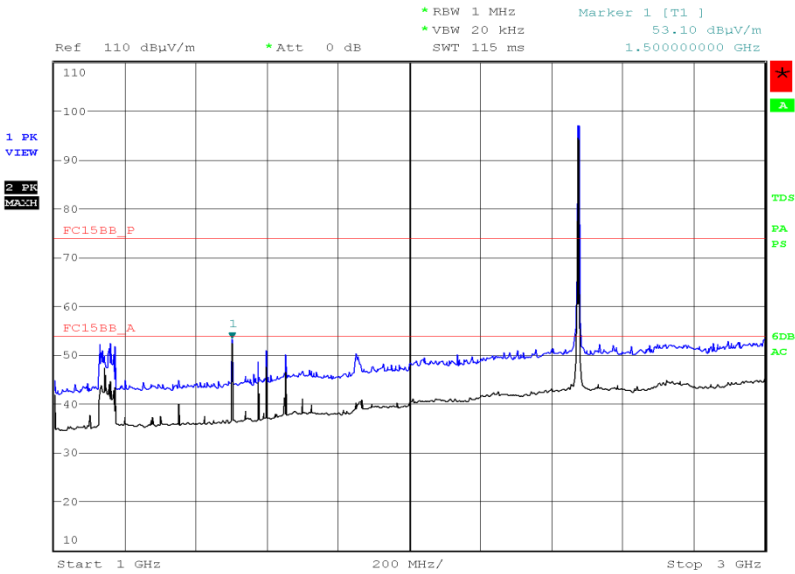


Product Service

1 GHz to 25 GHz

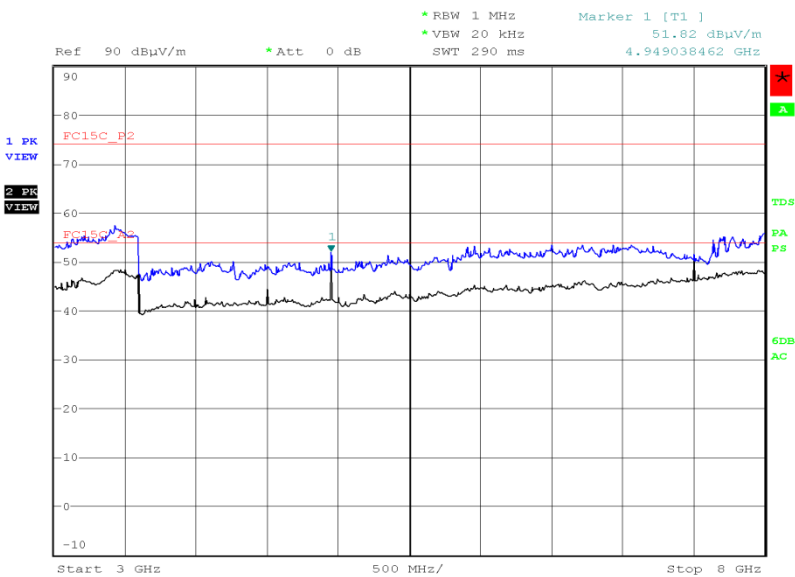
Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
1.500	Vertical	115	163	56.17	53.38
4.950	Vertical	105	107	49.32	45.72

1 GHz to 3 GHz



Date: 4.APR.2014 01:22:13

3 GHz to 8 GHz

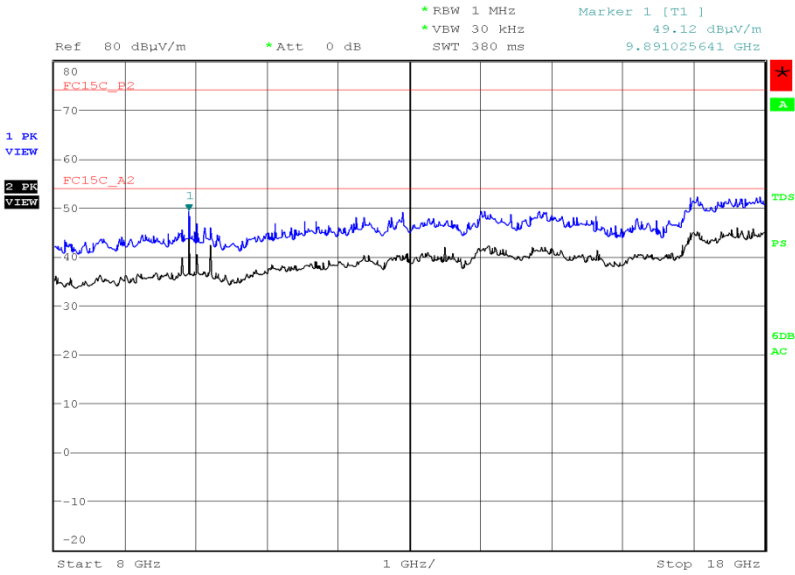


Date: 4.APR.2014 04:01:32



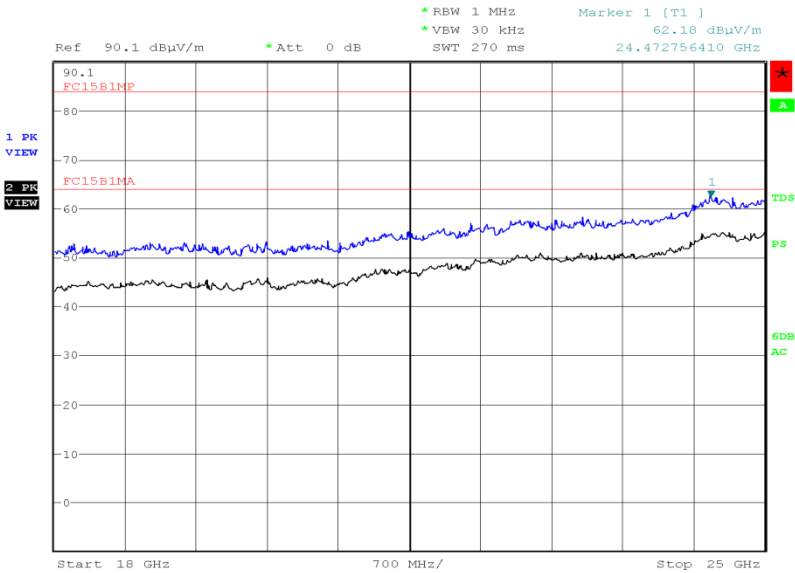
Product Service

8 GHz to 18 GHz



Date: 5.APR.2014 12:17:45

18 GHz to 25 GHz

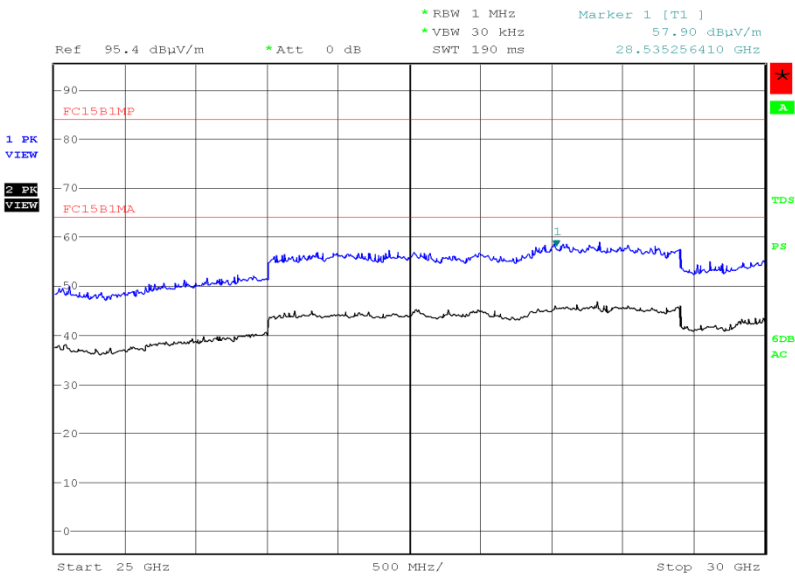


Date: 5.APR.2014 13:49:07



Product Service

25 GHz to 30 GHz



Date: 5.APR.2014 14:38:41

Limit

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

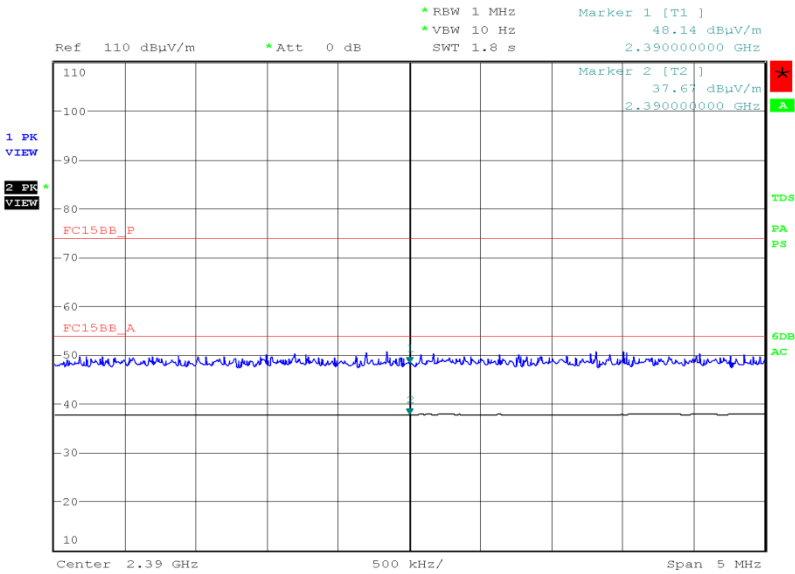


Product Service

Band Edge Emissions

2425 MHz

Polarisation	Final Peak (dBμV/m)	Final Average (dBμV/m)
Vertical	48.14	37.67



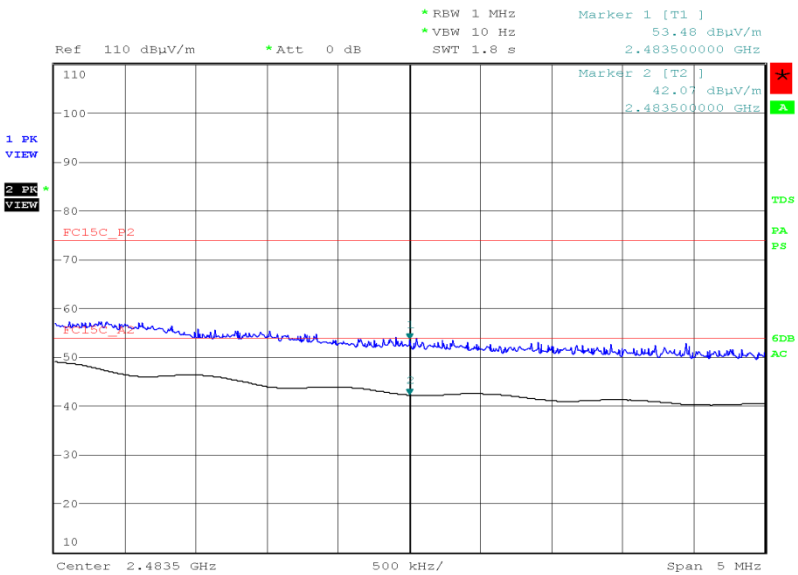
Date: 4.APR.2014 01:51:42



Product Service

2475 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	53.48	42.07



Date: 3.APR.2014 23:50:44

Limit

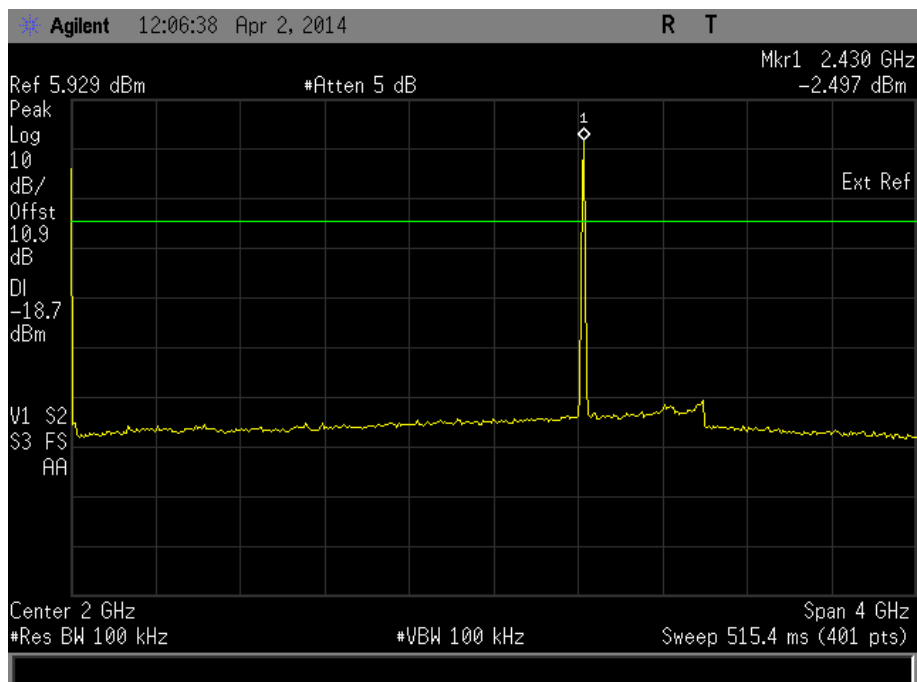
Peak (dBµV/m)	Average (dBµV/m)
74.0	54.0



Product Service

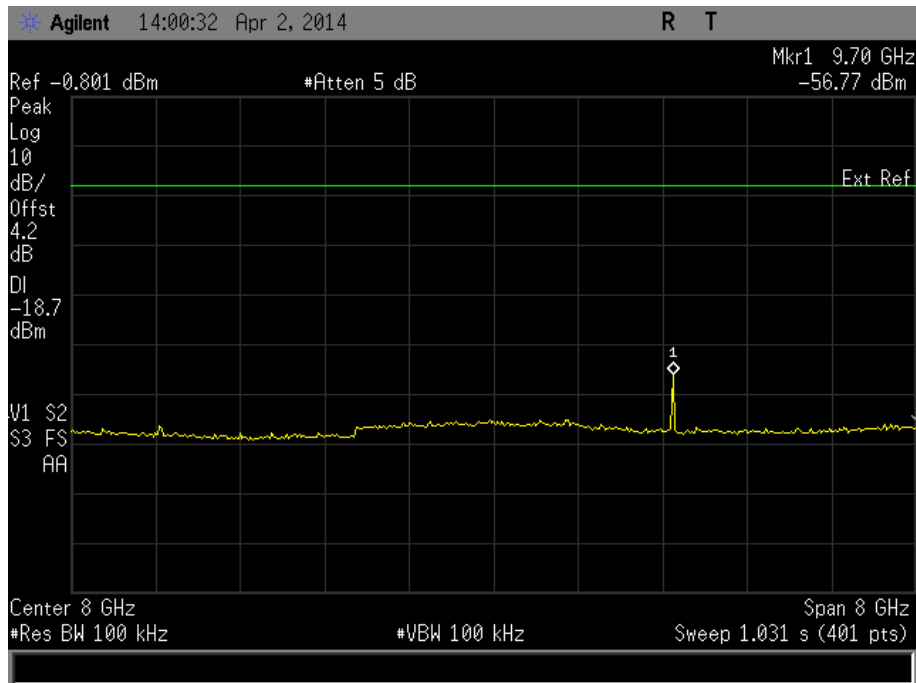
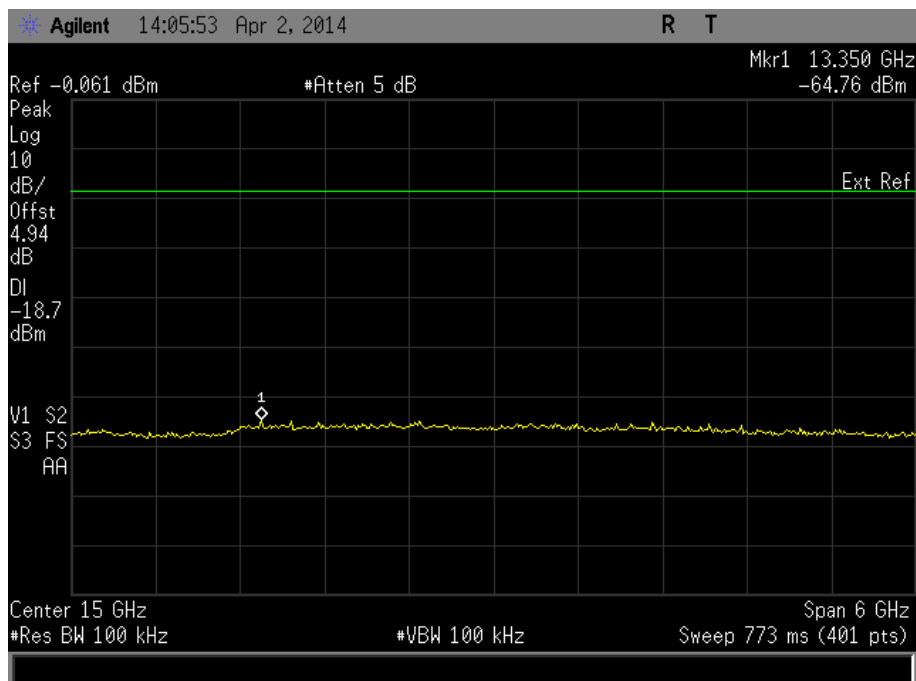
Zigbee - Antenna 1

110 V AC Supply

Spurious Conducted EmissionsZigbee2425 MHz9 kHz to 4 GHz

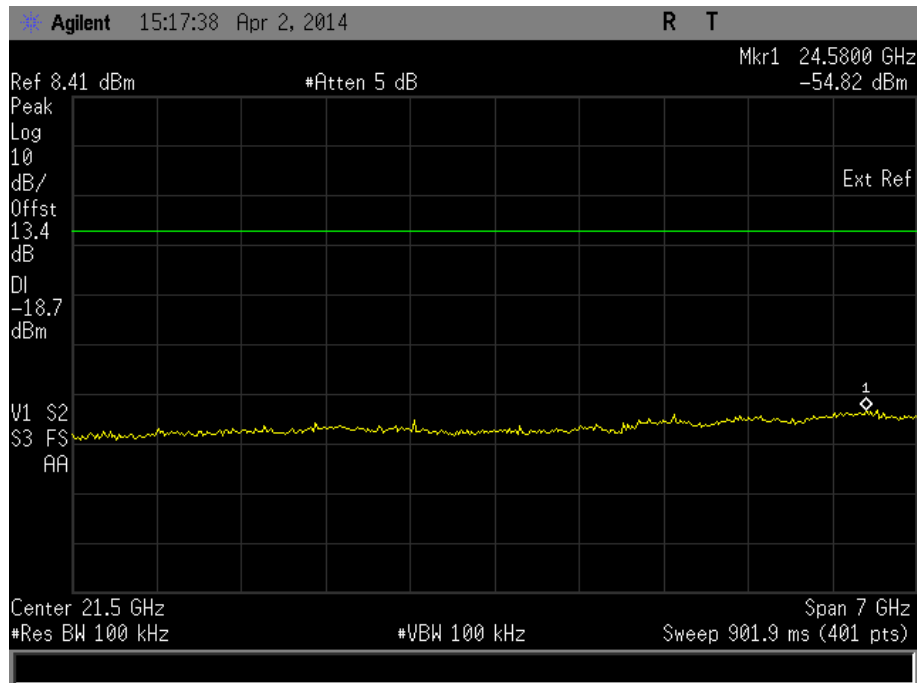
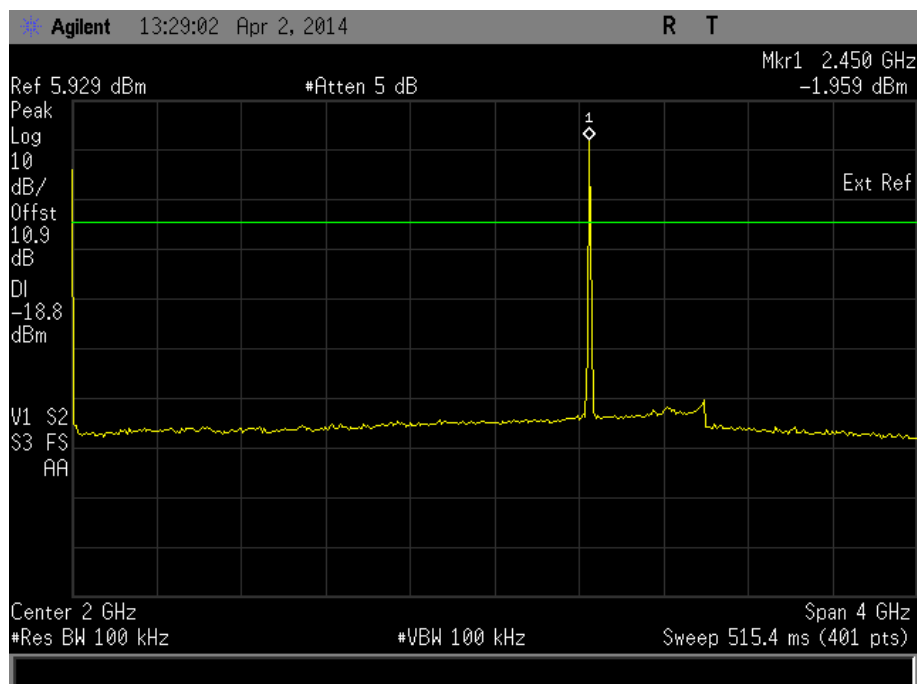


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

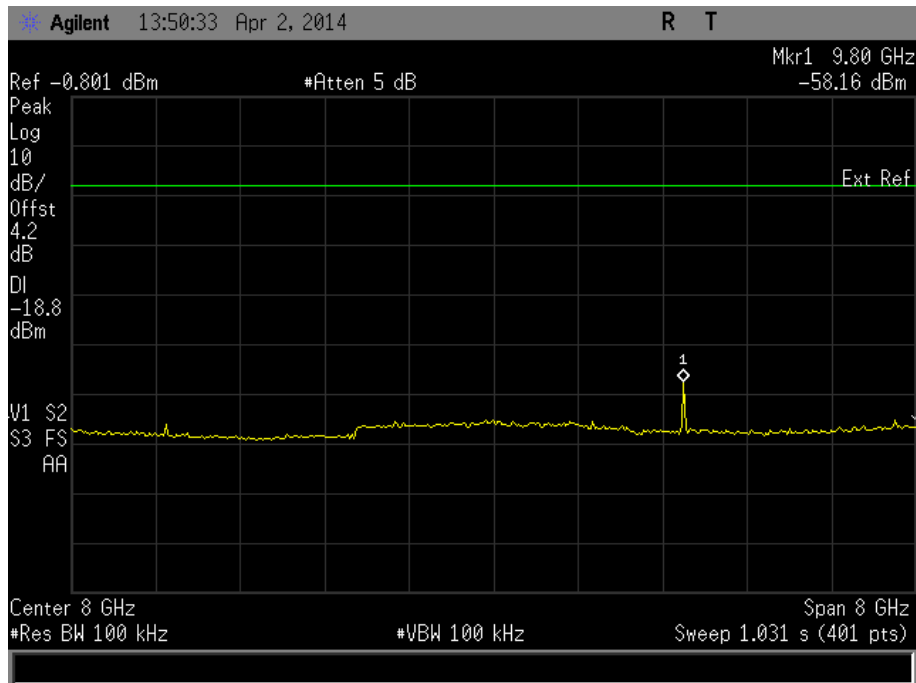
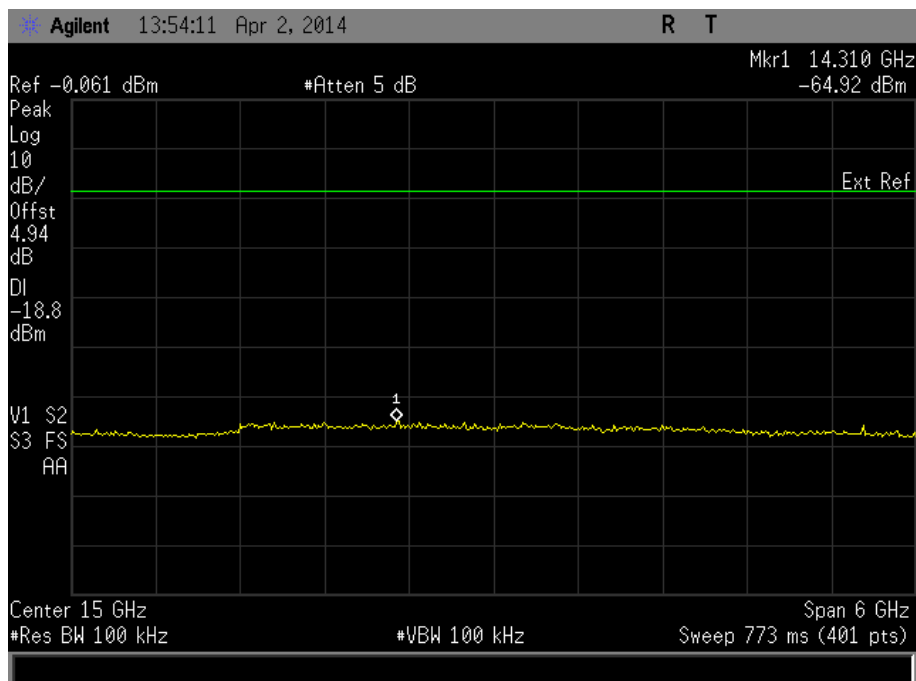


Product Service

18 GHz to 25 GHz2450 MHz9 kHz to 4 GHz

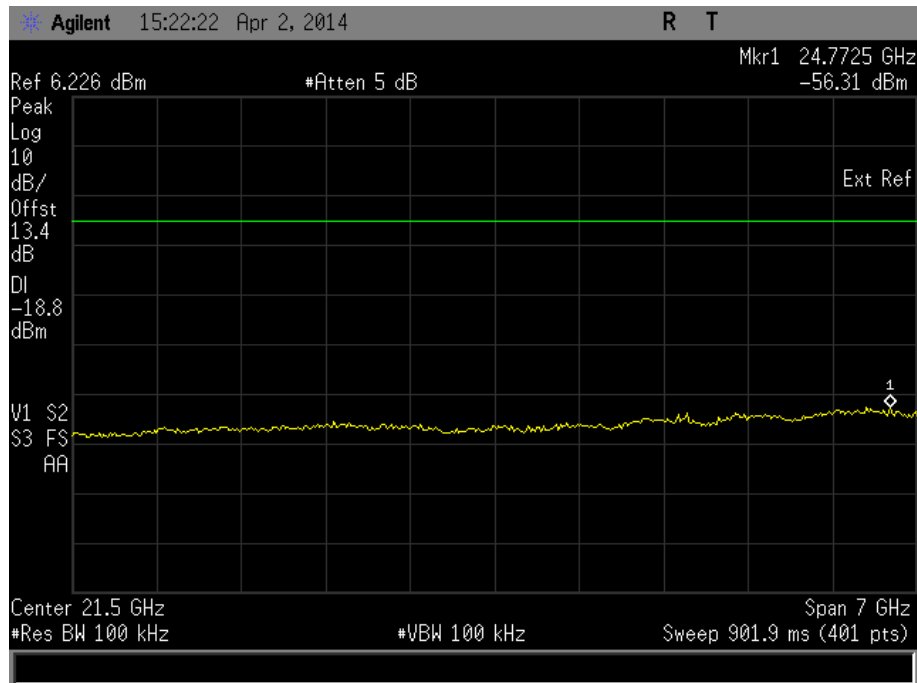
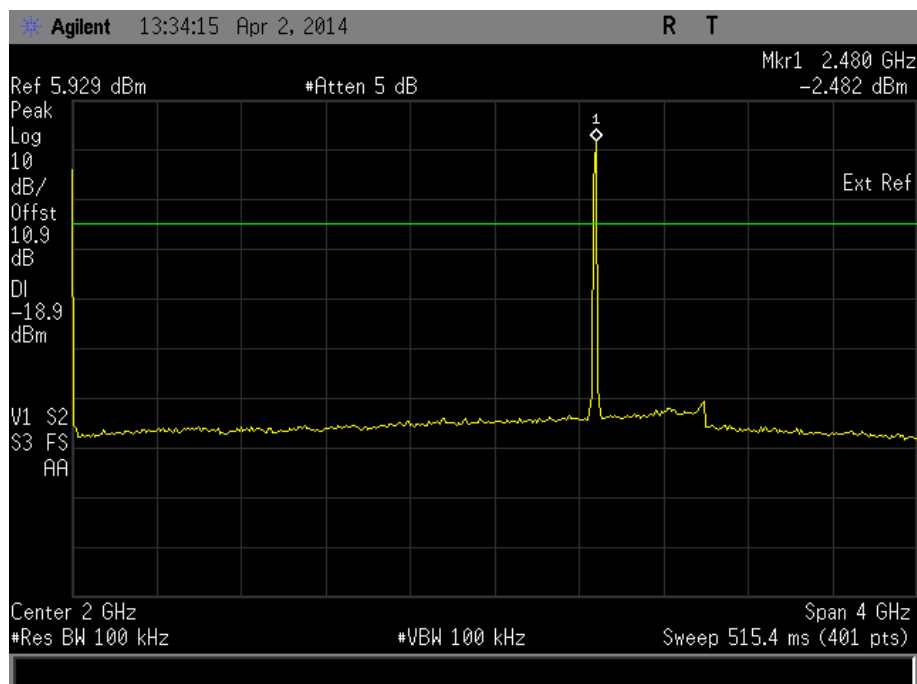


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz

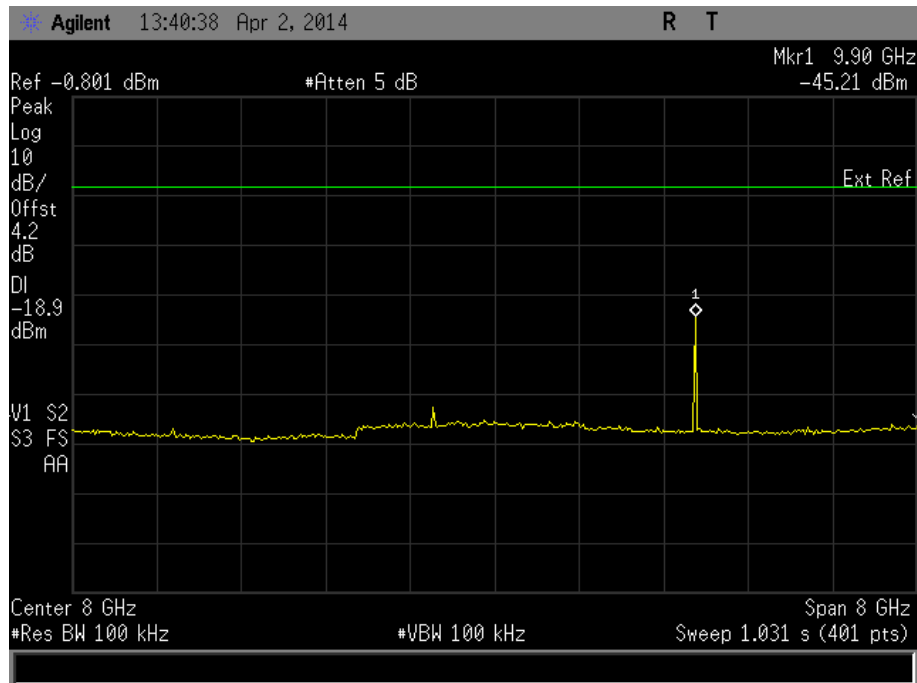
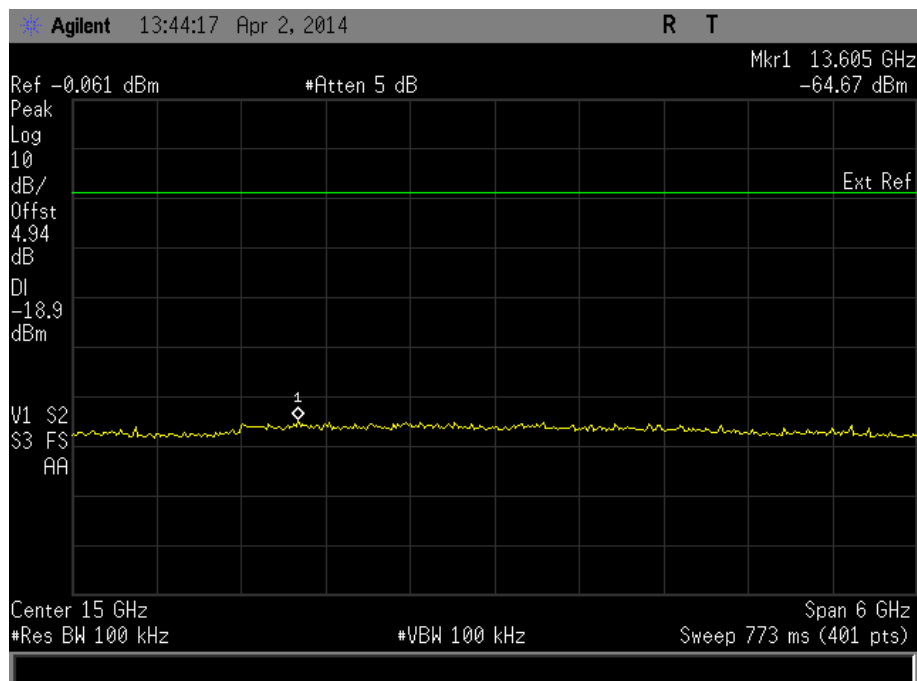


Product Service

18 GHz to 25 GHz2475 MHz9 kHz to 4 GHz

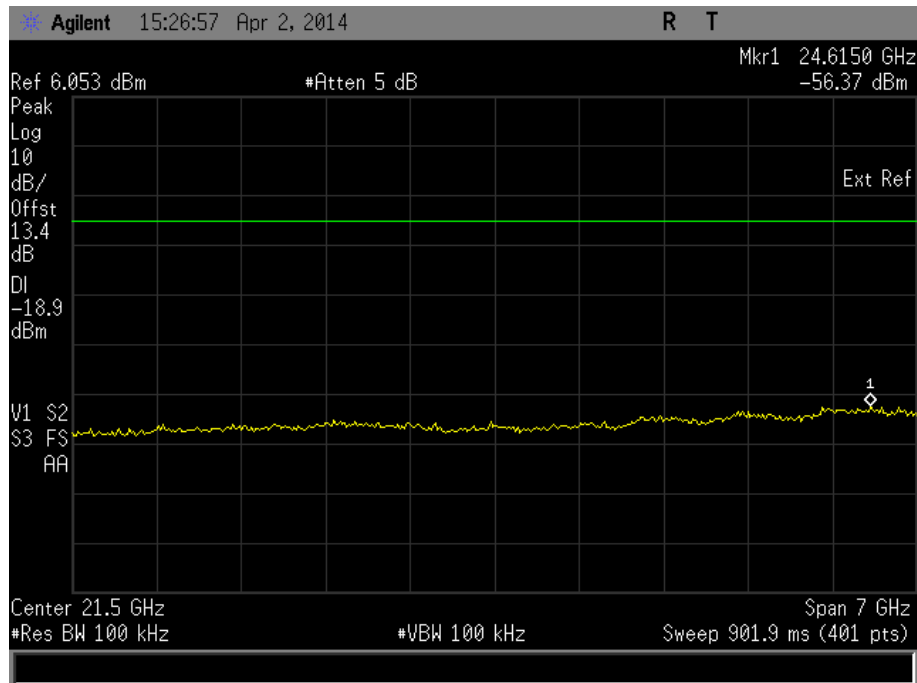


Product Service

4 GHz to 12 GHz12 GHz to 18 GHz



Product Service

18 GHz to 25 GHzLimit Clause

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

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



Product Service

2.5 POWER SPECTRAL DENSITY

2.5.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.247 (e)

2.5.2 Equipment Under Test and Modification State

Comcast XG1v3 S/N: D22014030007 - Modification State 0

2.5.3 Date of Test

1 April 2014 & 2 April 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 test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 (e) and KDB 558074.

The EUT was connected to a spectrum analyser via a cable and attenuator. The EUT was transmitting at maximum power, for bottom, middle and top channels. The path loss was measured between the EUT and the spectrum analyser and entered as a reference level offset. The trace was set to max hold and using a peak detector the maximum response was established with the spectrum analyser RBW at 3 kHz and VBW at 10 kHz, the power spectral density in a 3 kHz bandwidth was measured.

2.5.6 Environmental Conditions

Ambient Temperature	23.9 - 26.0°C
Relative Humidity	33.4 - 40.2%



Product Service

2.5.7 Test Results

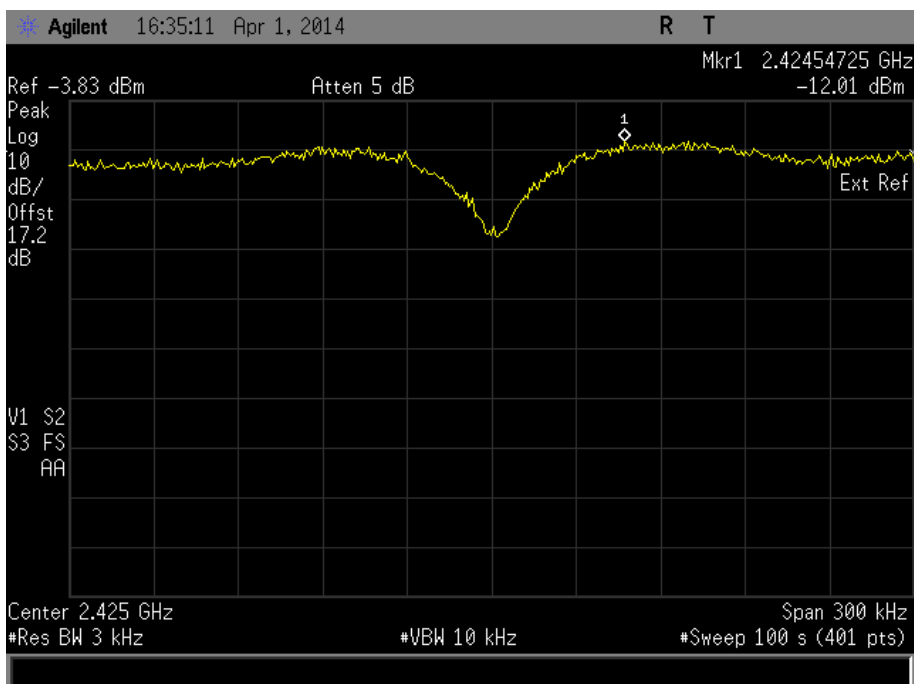
Zigbee - Antenna 0

110 V AC Supply

Frequency	Data Rate (kbps)	Power Spectral Density in 3 kHz Band (dBm)
2425 MHz	250	-12.01
2450 MHz	250	-12.42
2475 MHz	250	-12.38

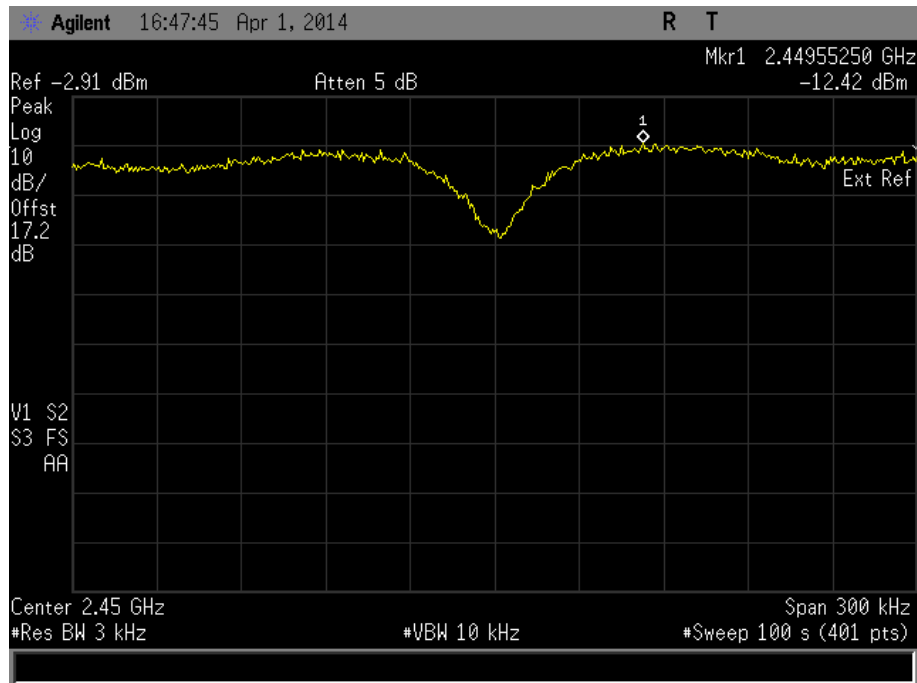
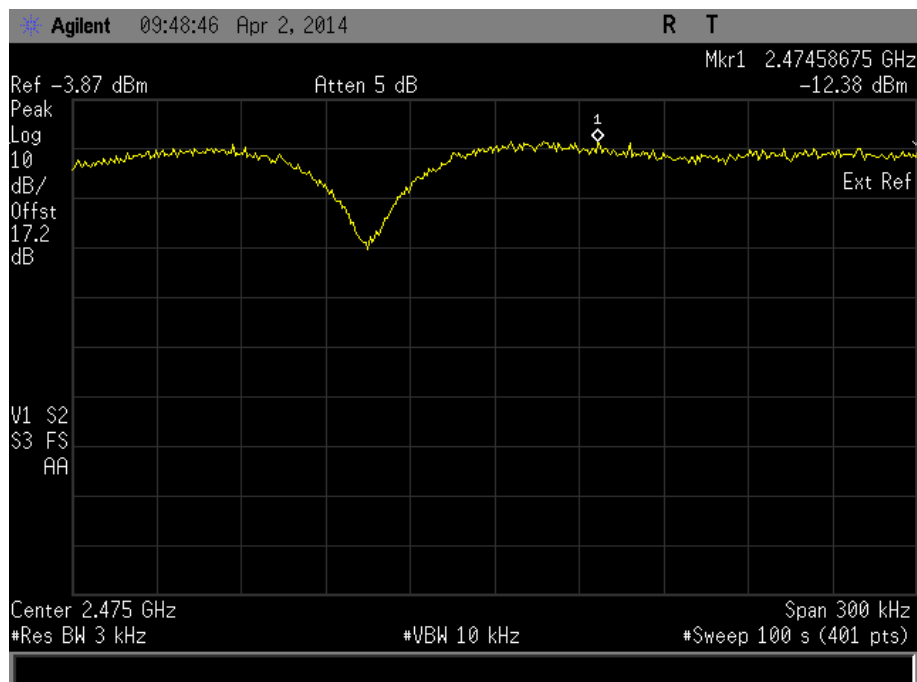
2425 MHz

250 kbps





Product Service

2450 MHz250 kbps2475 MHz250 kbps



Product Service

Limit Clause

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

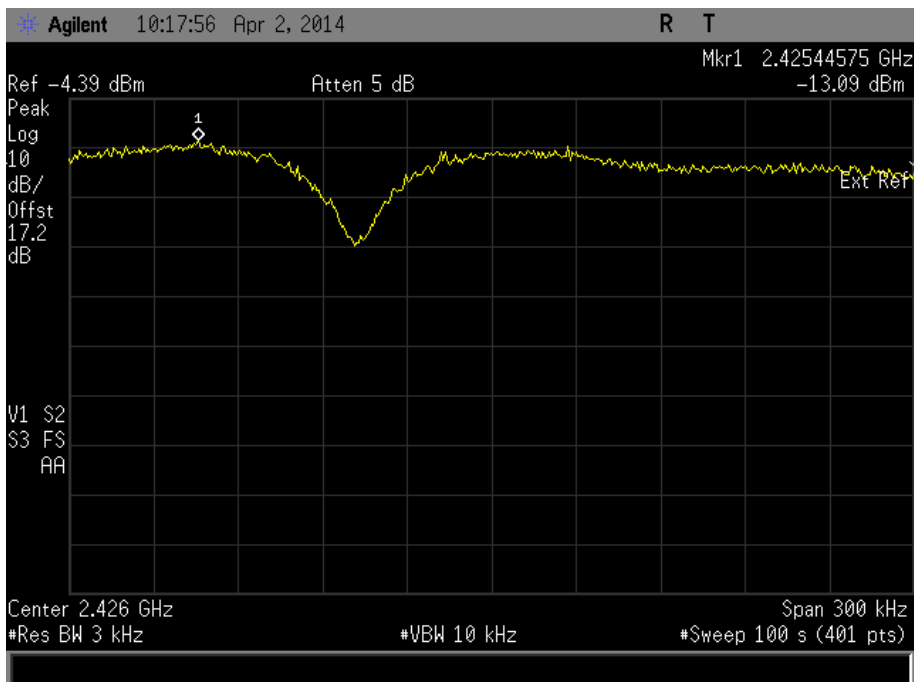
Zigbee - Antenna 1

110 V AC Supply

Frequency	Data Rate (kbps)	Power Spectral Density in 3 kHz Band (dBm)
2425 MHz	250	-13.09
2450 MHz	250	-13.58
2475 MHz	250	-13.25

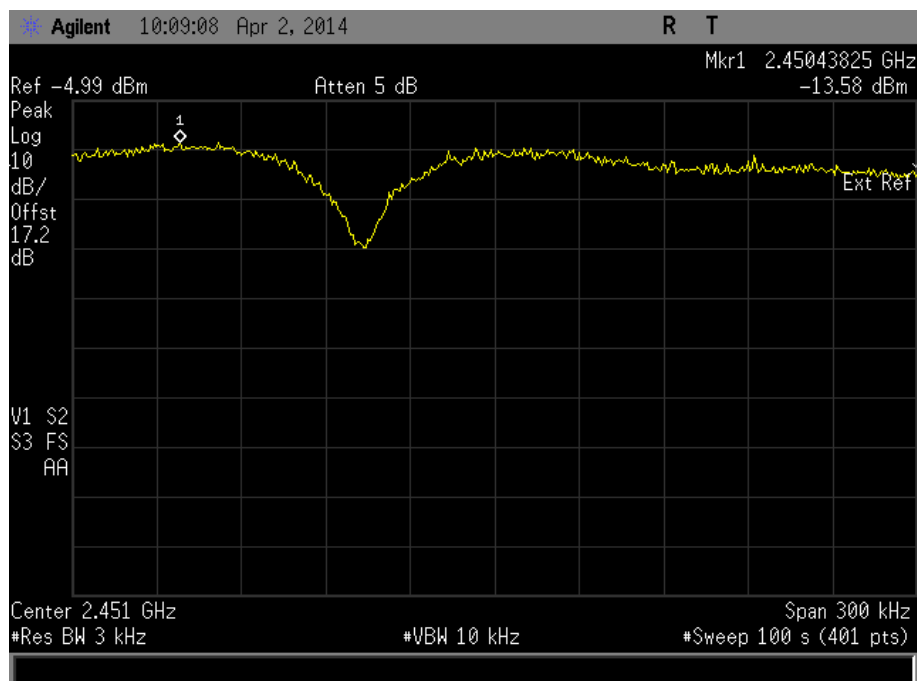
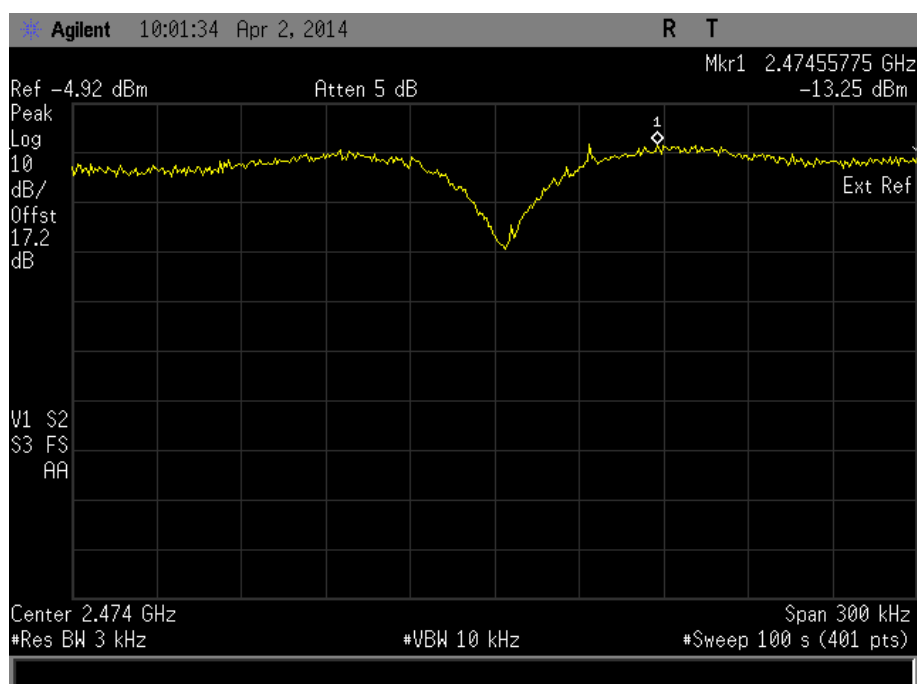
2425 MHz

250 kbps





Product Service

2450 MHz250 kbps2475 MHz250 kbpsLimit Clause

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.



Product Service

2.6 6dB BANDWIDTH**2.6.1 Specification Reference**

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

2.6.2 Equipment Under Test and Modification State

Comcast XG1v3 S/N: D22014030007 - Modification State 0

2.6.3 Date of Test

2 April 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 test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 (a) and KDB 558074.

The EUT was transmitting at maximum power, for bottom, middle and top channels. The EUT was connected to a spectrum analyser via a cable and attenuator. The Analyser settings were adjusted to an RBW of 100 kHz, video bandwidth of 3 x RBW with peak detector and trace set to max hold. The peak point of the trace was measured and the markers positioned to give the -6 dBc points of the displayed spectrum.

The plots on the following pages show the resultant display from the Spectrum Analyser.

2.6.6 Environmental Conditions

Ambient Temperature	23.9 - 26.0°C
Relative Humidity	33.4 - 40.2%



Product Service

2.6.7 Test Results

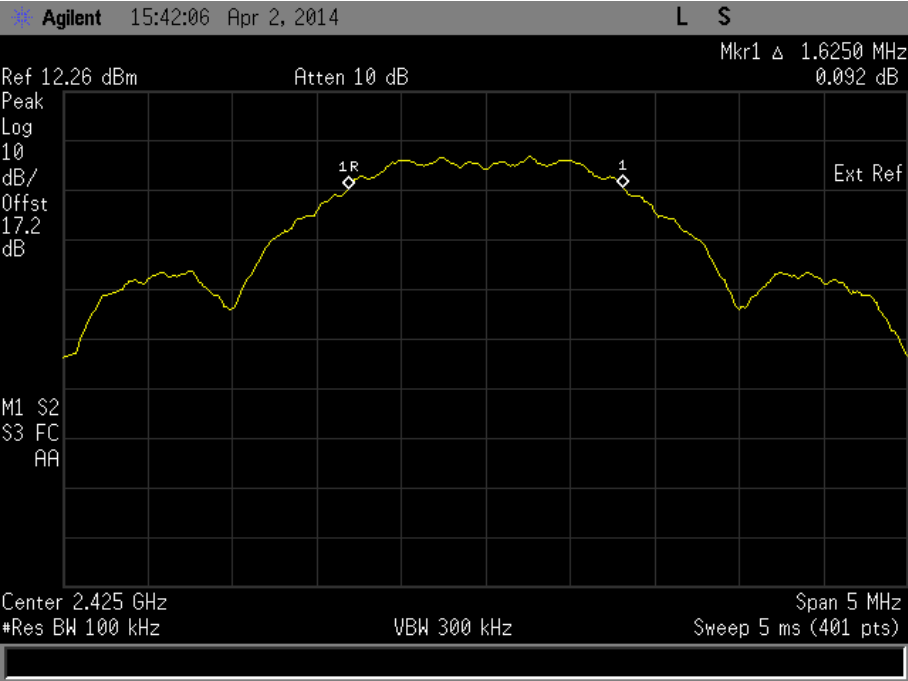
Zigbee - Antenna 0

110 V AC Supply

Frequency (MHz)	Data Rate (kbps)	6dB Bandwidth (kHz)
2425 MHz	250	1625.0
2450 MHz	250	1612.5
2475 MHz	250	1625.0

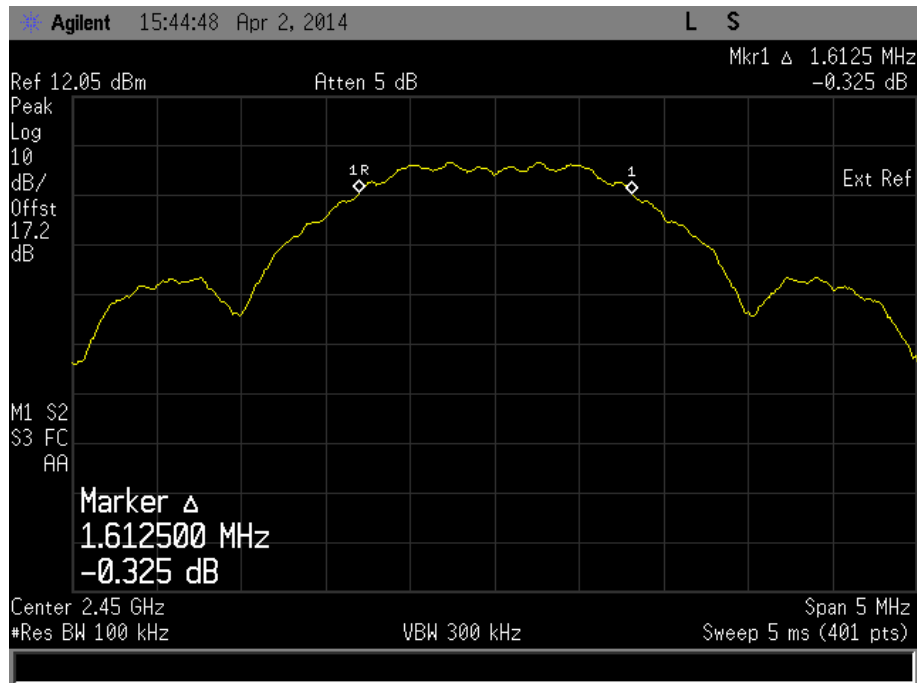
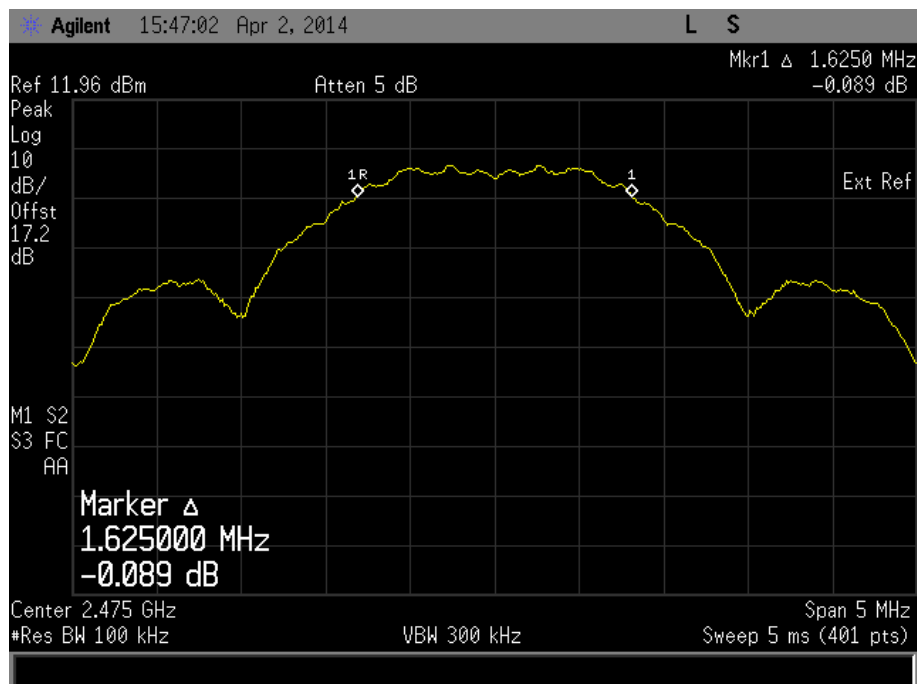
2425 MHz

250 kbps





Product Service

2450 MHz250 kbps2475 MHz250 kbpsLimit Clause

The minimum 6 dB Bandwidth shall be at least 500 kHz.

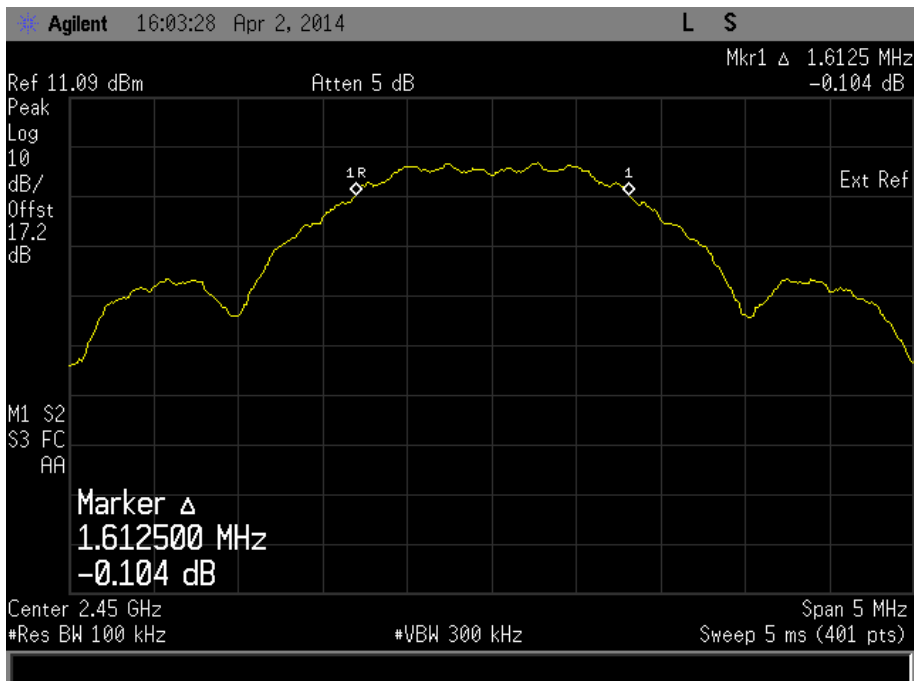


Product Service

Zigbee - Antenna 1

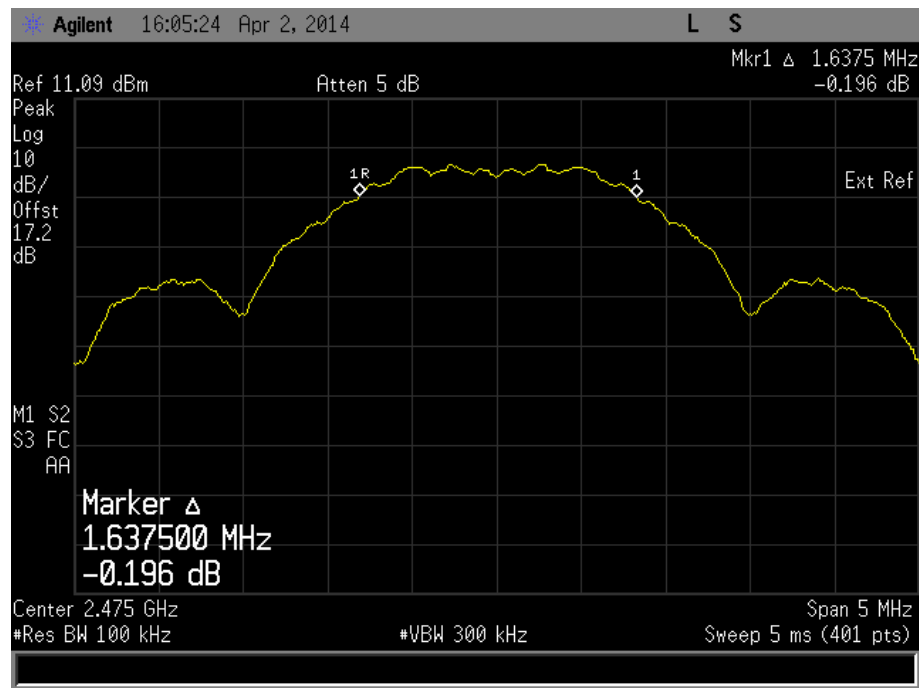
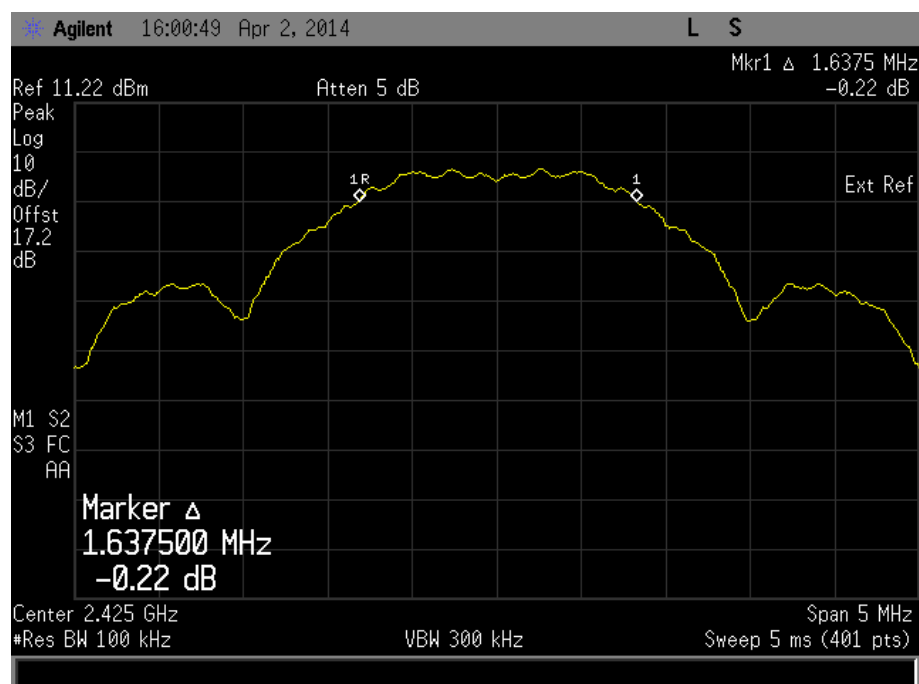
110 V AC Supply

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2425 MHz	1	1612.5
2450 MHz	1	1637.5
2475 MHz	1	1637.5

2425 MHz1 Mbps



Product Service

2450 MHz1 Mbps2475 MHz1 MbpsLimit Clause

The minimum 6 dB Bandwidth shall be at least 500 kHz.



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					
Transient Limiter	Hewlett Packard	11947A	15	12	10-Dec-2014
LISN (1 Phase)	Chase	MN 2050	336	12	28-Mar-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
Section 2.2 - Maximum Peak Conducted Output Power					
Power Splitter	Weinschel	1506A	607	12	21-Mar-2015
Spectrum Analyser	Agilent Technologies	E4407B	1154	12	13-Aug-2014
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Mains Voltage Monitor	TUV SUD Product Service	MVM1	1378	12	6-Sep-2014
Variac Transformer	Zenith	Z-710-R	3169	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	12-Dec-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Sep-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
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	18-Sep-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014
Section 2.3 - EIRP Peak Power					
Antenna (Double Ridge Guide)	EMCO	3115	34	12	8-Nov-2014
Signal Generator	Marconi	2031	53	12	7-Nov-2014
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-May-2014
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
GPS/SBAS Simulator	Spirent	STR4500	3056	-	TU
Tilt Antenna Mast	matur GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matur GmbH	NCD	3917	-	TU
Section 2.4 - Spurious and Band Edge Emissions					
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	26-Nov-2015
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-May-2014
Spectrum Analyser	Agilent Technologies	E4407B	1154	12	13-Aug-2014
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Mains Voltage Monitor	TUV SUD Product Service	MVM1	1378	12	6-Sep-2014
Power Passport: 50, 60 or 400Hz Power Supply	Behlman Hauppauge	P1350-CE	1434	-	TU
Pre-Amplifier	Phase One	PS04-0086	1533	12	19-Dec-2014
Pre-Amplifier	Phase One	PS04-0087	1534	12	30-Sep-2014
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
High Pass Filter (4GHz)	RLC Electronics	F-100-4000-5-R	2773	12	4-Feb-2015
Antenna (Bilog)	Chase	CBL6143	2904	24	10-Jun-2015
Variac Transformer	Zenith	Z-710-R	3169	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	12-Dec-2014
High Pass Filter (3GHz)	RLC Electronics	F-100-3000-5-R	3349	12	30-May-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Sep-2014
Tilt Antenna Mast	matur GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matur GmbH	NCD	3917	-	TU
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	18-Sep-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.5 - Power Spectral Density					
Power Splitter	Weinschel	1506A	607	12	21-Mar-2015
Spectrum Analyser	Agilent Technologies	E4407B	1154	12	13-Aug-2014
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Mains Voltage Monitor	TUV SUD Product Service	MVM1	1378	12	6-Sep-2014
Power Passport: 50, 60 or 400Hz Power Supply	Behlman Hauppauge	P1350-CE	1434	-	TU
Variac Transformer	Zenith	Z-710-R	3169	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	12-Dec-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Sep-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
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	18-Sep-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014
Section 2.6 - 6dB Bandwidth					
Power Splitter	Weinschel	1506A	607	12	21-Mar-2015
Spectrum Analyser	Agilent Technologies	E4407B	1154	12	13-Aug-2014
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Mains Voltage Monitor	TUV SUD Product Service	MVM1	1378	12	6-Sep-2014
Power Passport: 50, 60 or 400Hz Power Supply	Behlman Hauppauge	P1350-CE	1434	-	TU
Variac Transformer	Zenith	Z-710-R	3169	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	12-Dec-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Sep-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
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	18-Sep-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-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
6dB Bandwidth	± 212.114 kHz
EIRP Peak Power	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Maximum Peak Conducted Output Power	± 0.70 dB
Spurious and Band Edge Emissions	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Power Spectral Density	± 3.0 dB
AC Line Conducted Emissions	± 3.2 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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