Report On

FCC Testing of the
Pace Plc DC60Xu
In accordance with FCC CFR 47 Part 15C

COMMERCIAL-IN-CONFIDENCE

FCC ID: NQ80DC60XU

Document 75916038 Report 02 Issue 3 December 2011

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COMMERCIAL-IN-CONFIDENCE

REPORT ON

FCC Testing of the
Pace Plc DC60Xu
In accordance with FCC CFR 47 Part 15C

Document 75916038 Report 02 Issue 3

December 2011

PREPARED FOR

Pace Plc
Victoria Road
Saltaire
Shipley
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BD18 3LF

PREPARED BY

Natalie Bennett
Senior Administrator

APPROVED BY

Mark Jenkins
Authorised Signatory

DATED 08 December 2011

This report has been up-issued to Issue 3 to include test results for clause 15.207.

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);

R Bennett R Henley

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SECTION 1

REPORT SUMMARY

FCC Testing of the
Pace Plc DC60Xu
In accordance with FCC CFR 47 Part 15C

Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the Pace Plc DC60Xu 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)	DC60Xu
Serial Number(s)	PAPW00001245 PAPW00001171
Number of Samples Tested	2
Test Specification/Issue/Date	FCC CFR 47 Part 15C (2010)
Incoming Release Date	Application Form 12 November 2011
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	5138396 10 November 2011
Start of Test	15 November 2011
Finish of Test	08 December 2011
Name of Engineer(s)	R Bennett R Henley S Milliken
Related Document(s)	ANSI C63.10: 2009

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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				
2.1	15.207 (a)	AC Line Conducted Emissions	Pass	
2.2	15.247 (b)(3)	Maximum Peak Conducted Output Power	Pass	
2.3	15.247 (b)(4)	EIRP Peak Power	Pass	
2.4	15.247 (e)	Power Spectral Density	Pass	
2.5	15.247 (d)	Spurious and Band Edge Emissions	Pass	
2.6	15.247 (2)	6dB Bandwidth	Pass	
Zigbee – Alternative Antenna				
2.1	15.247 (b)(3)	Maximum Peak Conducted Output Power	Pass	
2.3	15.247 (e)	Power Spectral Density	Pass	
2.4	15.247 (d)	Spurious and Band Edge Emissions	Pass	
2.5	15.247 (2)	6dB Bandwidth	Pass	

Product Service

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	DC60Xu	Identification/Part number	C1383378100
Hardware Version	7	Software Version 1.128.6.317	
Manufacturer	Pace plc	Country of Origin	Thailand
FCC ID	NQ80DC60XU	Industry Canada ID	…….……

Technical description (a brief description of the intended use and operation)

High Definition Digital Transport Adaptor. A cable TV interface device for digital to analogue conversion.

Supply Voltage:

[ ]	AC mains	State AC voltage …… V	and AC frequency …… Hz
[X]	DC (external)	State DC voltage 5 V	and DC current 1.2 A
[ ]	DC (internal)	State DC voltage …… V	and Battery type ……

Frequency characteristics:

Transmitter Frequency range	2400 – 2485MHz	Channel spacing 5MHz (if channelized)
Receiver Frequency range (if different)	…… MHz to …… MHz	Channel spacing …… (if channelized)

Designated test frequencies:

Bottom: 2412 MHz Middle: 2437 MHz Top: 2462MHz

Intermediate Frequencies :

Highest Internally Generated Frequency : 1000MHz

Power characteristics:

Maximum transmitter power 0.002W Minimum transmitter power (if variable) 0.000063W

[ ] Continuous transmission

[X] Intermittent transmission State duty cycle 0.1%

If intermittent, can transmitter be set to continuous transmit test mode? Y

Antenna characteristics:

[ ]	Antenna connector	State impedance …… ohm
[ ]	Temporary antenna connector	State impedance …… ohm
[ ]	Integral antenna	State gain …… dBi

Modulation characteristics:

[ ]	Amplitude	[X]	Other
[ ]	Frequency	Details: OQPSK (GMSK, QSPK etc)	
[ ]	Phase		

Can the transmitter operate un-modulated? Y/N

ITU Class of emission: ……

Battery/Power Supply

Model name/number	WAA016	Identification/Part number	WAA016
Manufacturer	ACBEL	Country of Origin	China

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Ancillaries (if applicable)			
Model name/number	…….……	Identification/Part number	…….……
Manufacturer	…….……	Country of Origin	…….……
Extreme conditions:			
Maximum temperature	……. ºC	Minimum temperature	……. ºC
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 : Global Approvals Manager

Date : 12th November 2011

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Pace Plc DC60Xu. 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 5 V DC Supply.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

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

1.7 MODIFICATION RECORD

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

Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
Pace Plc DC60Xu
In accordance with FCC CFR 47 Part 15C

2.1 AC LINE CONDUCTED EMISSIONS

2.1.1 Specification Reference

FCC CFR 47 Part 15B, Clause 15.207 (a)

2.1.2 Equipment Under Test and Modification State

DC60Xu S/N: PAPW00001245 - Modification State 0

2.1.3 Date of Test

08 December 2011

2.1.4 Test Equipment Used

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

2.1.5 Test Procedure

The EUT is set up on a test table inside a screened room. The EUT is positioned 800mm above the screened room floor and 400mm from a vertical wall of the screened room.
The EUT is powered through a Line Impedance Stabilisation Network (LISN) which is bonded to the screened room floor. The EUT is located so that the distance between the EUT and the LISN is no less than 800mm. Where possible the cable between the mains input of the EUT and the LISN is 1m. Where this is not possible the cable is non inductively bundled with the bundle not exceeding 400mm in length.

A preliminary profile of the Conducted Emissions is obtained over the frequency range 150kHz to 30MHz using Compliance 5 software. Any points within 10dB of the limits is selected for formal measurements.

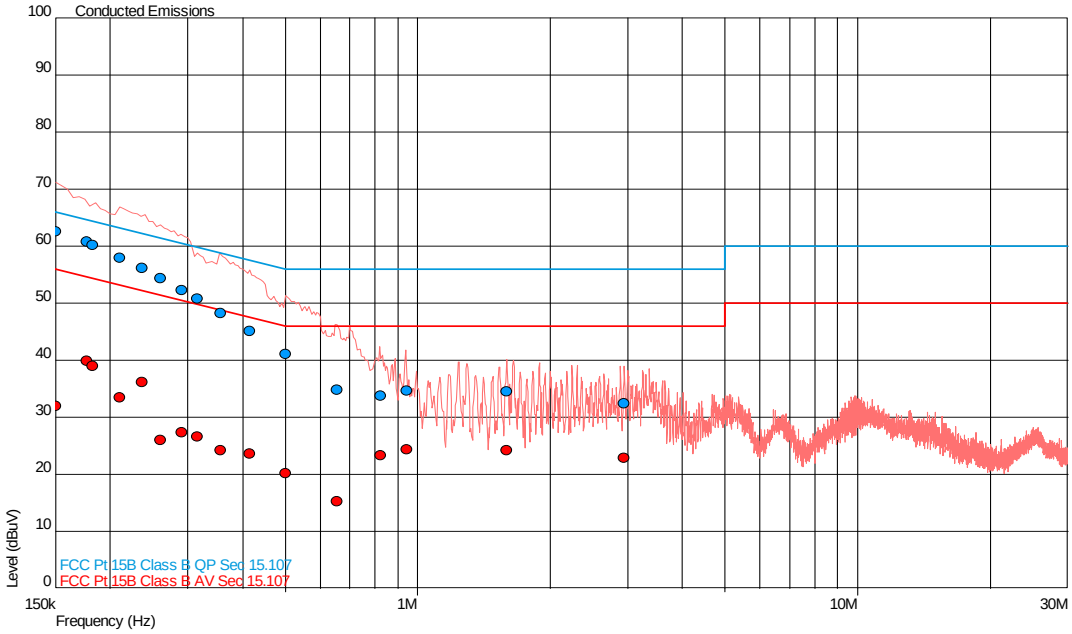
During formal measurements, the measuring receiver is tuned to the emission of interest where Quasi – Peak and Average measurements are performed in a 9kHz measurement Bandwidth.

2.1.6 Environmental Conditions

Ambient Temperature	20.0°C
Relative Humidity	36.0%

2.1.7 Test Results

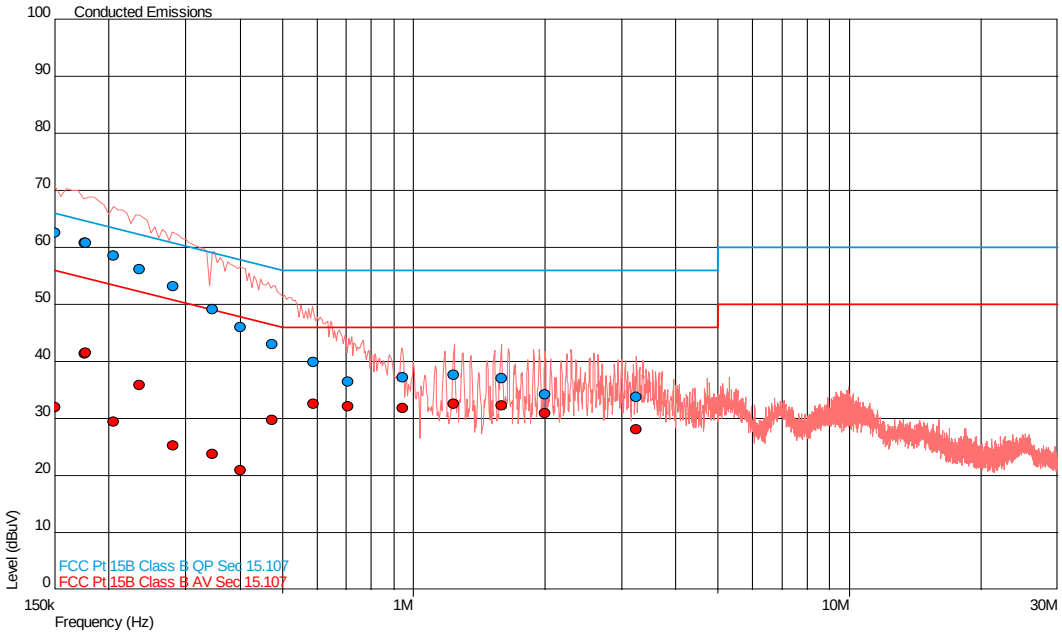
Live Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.151	62.6	66.0	-3.3	32.1	56.0	-23.9
0.177	60.8	64.6	-3.9	40.0	54.6	-14.7
0.182	60.2	64.4	-4.2	39.1	54.4	-15.3
0.211	57.9	63.2	-5.3	33.4	53.2	-19.7
0.236	56.1	62.2	-6.1	36.2	52.2	-16.0
0.261	54.4	61.4	-7.0	26.0	51.4	-25.4
0.291	52.3	60.5	-8.2	27.5	50.5	-23.0
0.315	50.8	59.8	-9.0	26.6	49.8	-23.2
0.356	48.4	58.8	-10.5	24.3	48.8	-24.6
0.416	45.1	57.5	-12.4	23.7	47.5	-23.8
0.501	41.1	56.0	-14.9	20.2	46.0	-25.8
0.655	34.9	56.0	-21.1	15.3	46.0	-30.7
0.823	33.7	56.0	-22.3	23.4	46.0	-22.6
0.942	34.7	56.0	-21.3	24.5	46.0	-21.5
1.591	34.6	56.0	-21.4	24.3	46.0	-21.7
2.950	32.5	56.0	-23.5	22.9	46.0	-23.1

Product Service

Neutral Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.150	62.6	66.0	-3.3	32.0	56.0	-23.9
0.176	60.8	64.7	-3.9	41.5	54.7	-13.2
0.177	60.8	64.6	-3.8	41.5	54.6	-13.1
0.205	58.5	63.4	-4.9	29.5	53.4	-23.9
0.236	56.2	62.2	-6.0	35.8	52.2	-16.4
0.281	53.2	60.8	-7.6	25.3	50.8	-25.4
0.345	49.2	59.1	-9.8	23.8	49.1	-25.3
0.401	46.1	57.8	-11.8	21.0	47.8	-26.8
0.472	43.1	56.5	-13.4	29.8	46.5	-16.7
0.590	39.9	56.0	-16.1	32.6	46.0	-13.4
0.707	36.5	56.0	-19.5	32.2	46.0	-13.8
0.943	37.2	56.0	-18.8	31.9	46.0	-14.1
1.238	37.7	56.0	-18.3	32.6	46.0	-13.4
1.590	37.1	56.0	-18.9	32.3	46.0	-13.7
2.005	34.3	56.0	-21.7	31.0	46.0	-15.0
3.240	33.8	56.0	-22.2	28.2	46.0	-17.8

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

DC60Xu S/N: PAPW00001171 - Modification State 0

2.2.3 Date of Test

21 November 2011, 22 November 2011 & 24 November 2011

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 EUT was transmitted at maximum power via a cable to the Peak Power Analyser. The Analyser settings were adjusted to display the resultant trace on screen and a reference level offset was entered to account for the measurement path loss. The measurement bandwidth was set according to the signal being measured and the peak and average levels were recorded.

2.2.6 Environmental Conditions

Ambient Temperature	24.6°C
Relative Humidity	33.3%

Product Service

2.2.7 Test Results

Zigbee

5 V DC Supply

Maximum Peak Conducted Output Power					
dBm			mW		
2425 MHz	2450 MHz	2475 MHz	2425 MHz	2450 MHz	2475 MHz
2.44	2.44	1.83	1.754	1.754	1.524

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 - Alternative Antenna

5 V DC Supply

Maximum Peak Conducted Output Power					
dBm			mW		
2425 MHz	2450 MHz	2475 MHz	2425 MHz	2450 MHz	2475 MHz
+0.58	+0.22	+0.04	1.143	1.052	1.009

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.

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

DC60Xu S/N: PAPW00001245 - Modification State 0

2.3.3 Date of Test

16 November 2011

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 via its internal antenna to the Spectrum Analyser and DRG antenna. 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 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.

2.3.6 Environmental Conditions

Ambient Temperature	19.5°C
Relative Humidity	58.0%

Product Service

2.3.7 Test Results

Zigbee

5 V DC Supply

2425 MHz

EIRP (dBm)	EIRP (mW)
-4.80	0.331

2450 MHz

EIRP (dBm)	EIRP (mW)
-5.70	0.269

2475 MHz

EIRP (dBm)	EIRP (mW)
-2.40	0.575

Limit

EIRP (dBm)	EIRP (mW)
36.0	4000

2.4 POWER SPECTRAL DENSITY

2.4.1 Specification Reference

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

2.4.2 Equipment Under Test and Modification State

DC60Xu S/N: PAPW00001171 - Modification State 0

2.4.3 Date of Test

21 November 2011, 22 November 2011 & 24 November 2011

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 connected to a spectrum analyser via a 10 dB attenuator. 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.

2.4.6 Environmental Conditions

Ambient Temperature	24.6°C
Relative Humidity	33.3%

Product Service

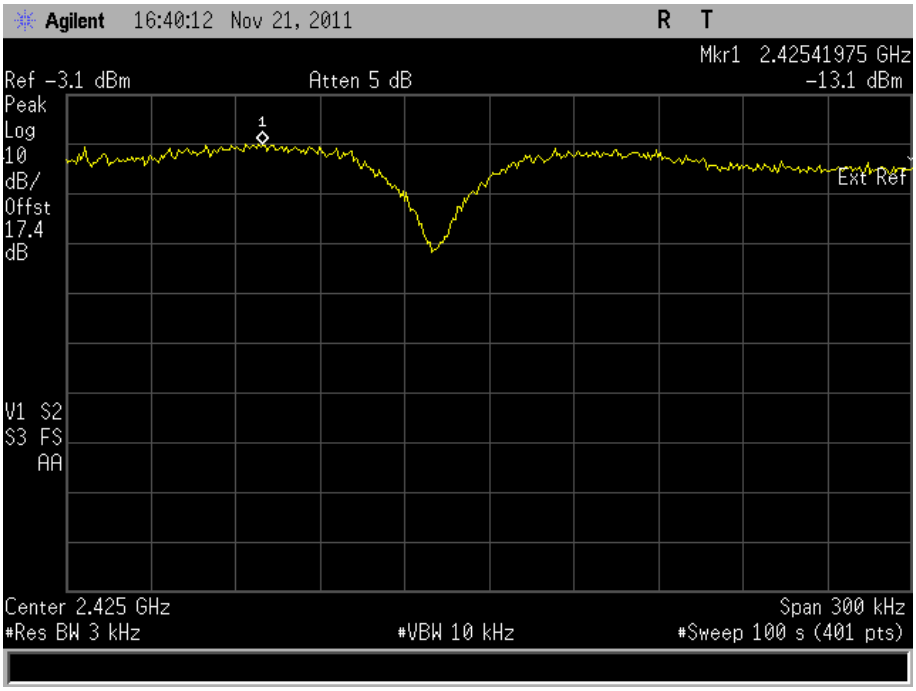
2.4.7 Test Results

Zigbee

5 V DC Supply

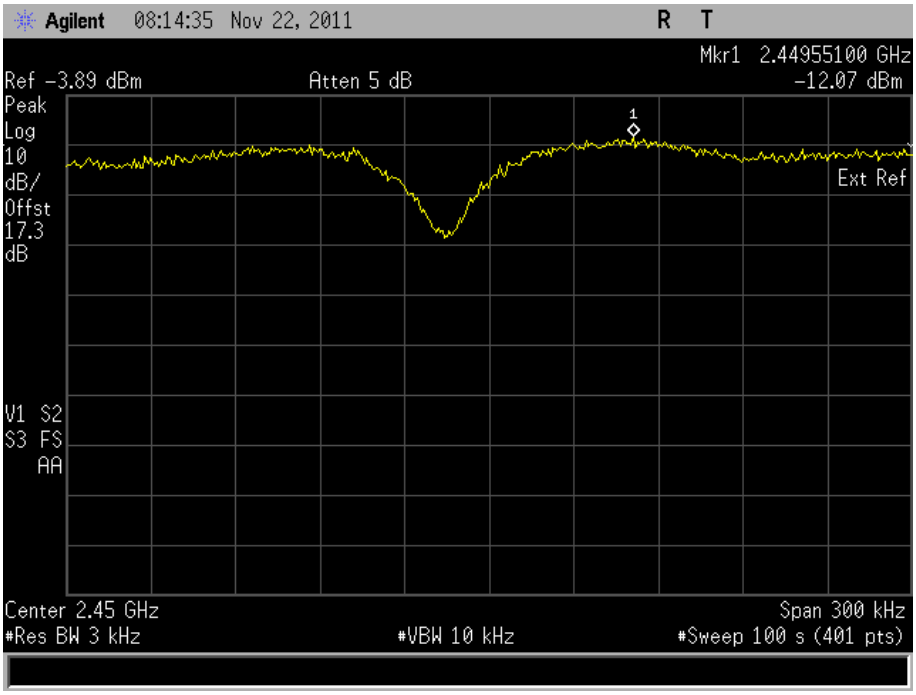
Frequency (MHz)	Power Spectral Density in 3 kHz Bands (dBm)
2425 MHz	-13.10
2450 MHz	-12.07
2475 MHz	-13.23

2425 MHz

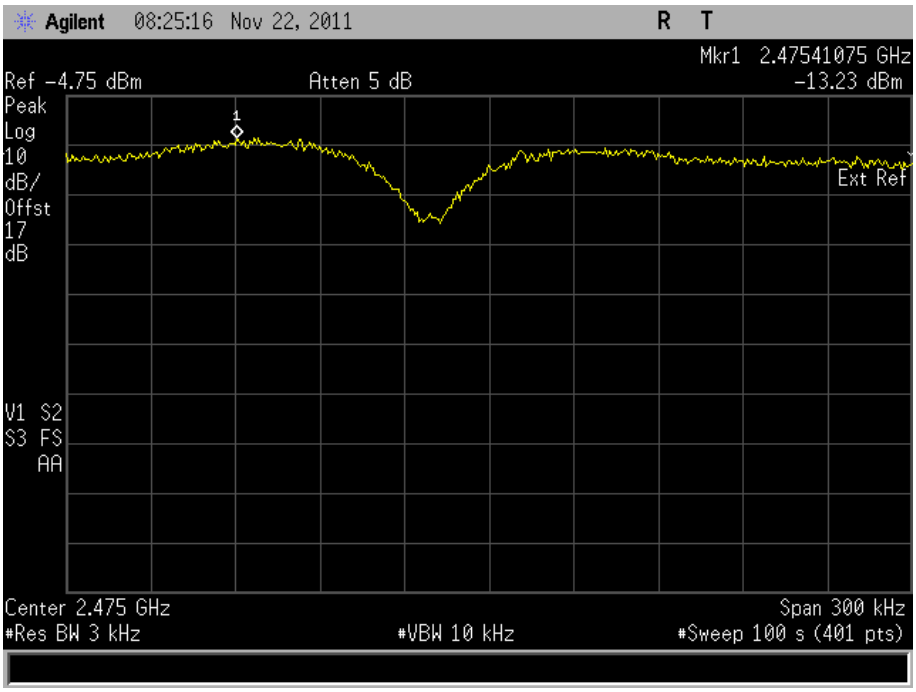


Product Service

2450 MHz



2475 MHz



Limit Clause

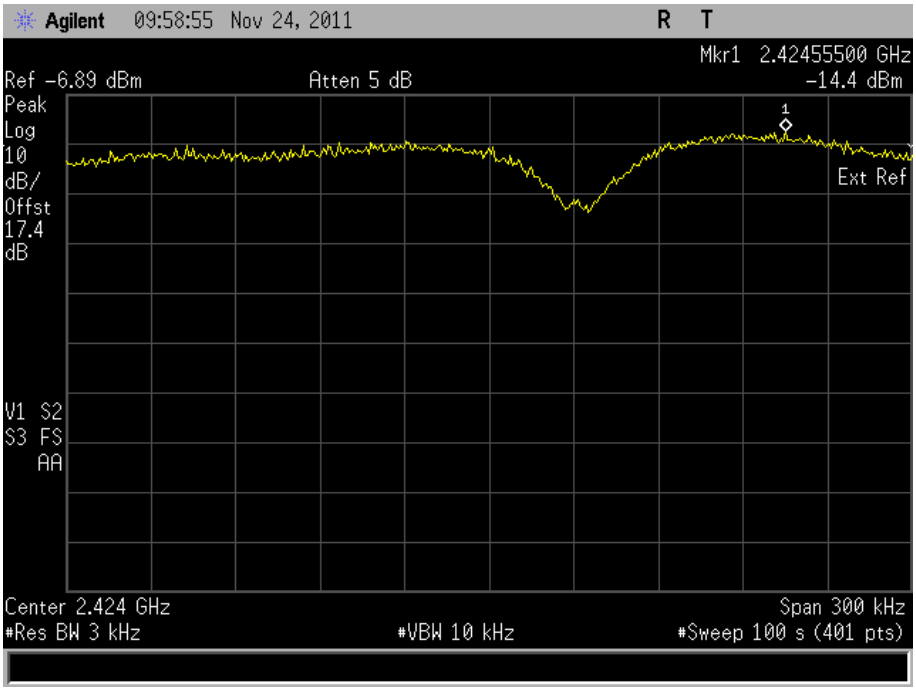
The minimum 6 dB Bandwidth shall be at least 500 kHz.

Zigbee - Alternative Antenna

5 V DC Supply

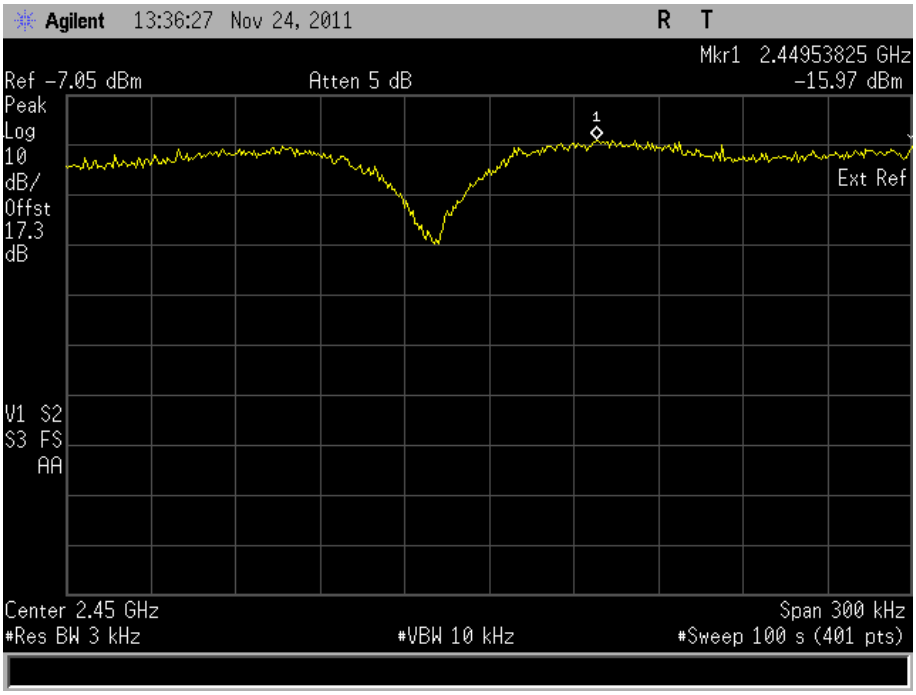
Frequency (MHz)	Power Spectral Density in 3 kHz Bands (dBm)
2425 MHz	-14.40
2450 MHz	-15.97
2475 MHz	-16.47

2425 MHz

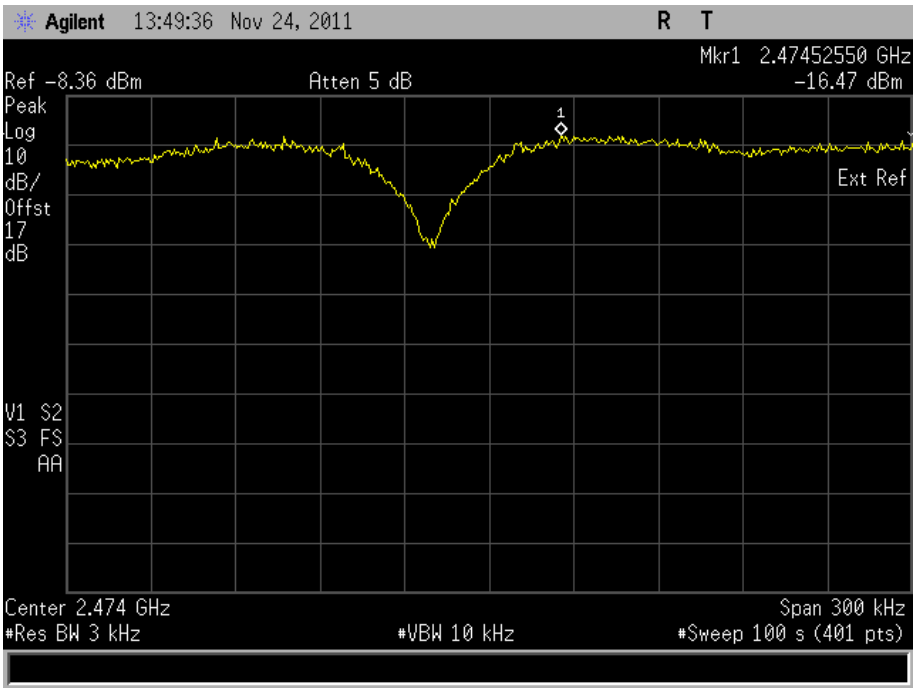


Product Service

2450 MHz



2475 MHz



Limit Clause

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

2.5 SPURIOUS AND BAND EDGE EMISSIONS

2.5.1 Specification Reference

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

2.5.2 Equipment Under Test and Modification State

DC60Xu S/N: PAPW00001245 - Modification State 0
DC60Xu S/N: PAPW00001171 - Modification State 0

2.5.3 Date of Test

16 November 2011, 21 November 2011 & 25 November 2011

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

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 25 GHz. Firstly, the power of each fundamental frequency was measured in 100 kHz bandwidth and this was used to shown a -20 dBc limit line on the trace. 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 25 GHz and the path loss is incorporated as a transducer factor and entered into the spectrum analyser.

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.

2.5.6 Environmental Conditions

Ambient Temperature	19.5 - 24.6°C
Relative Humidity	33.3 - 58.0%

Product Service

2.5.7 Test Results

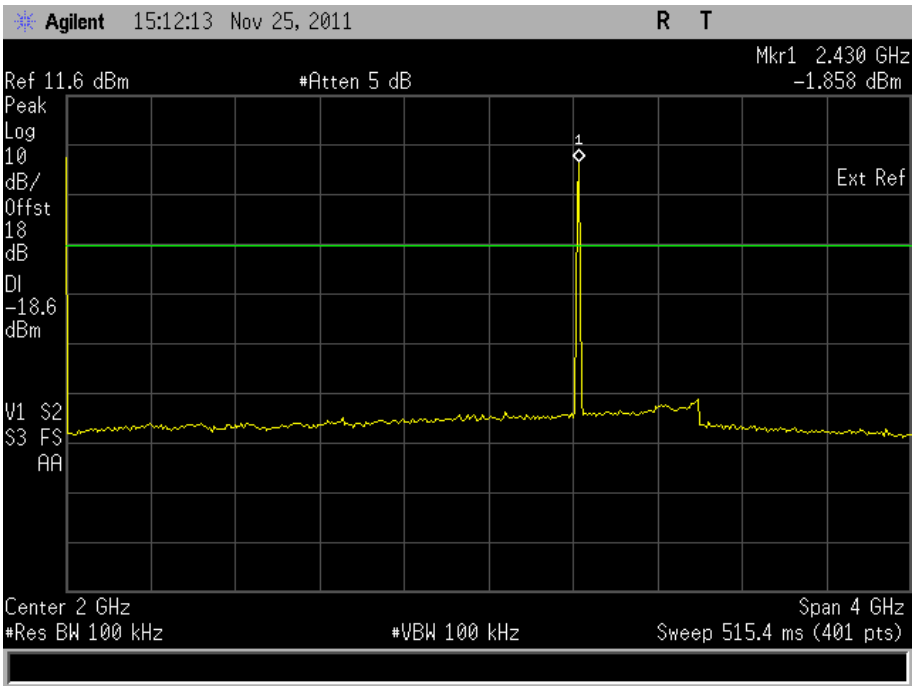
Zigbee

5 V DC Supply

Spurious Conducted Emissions

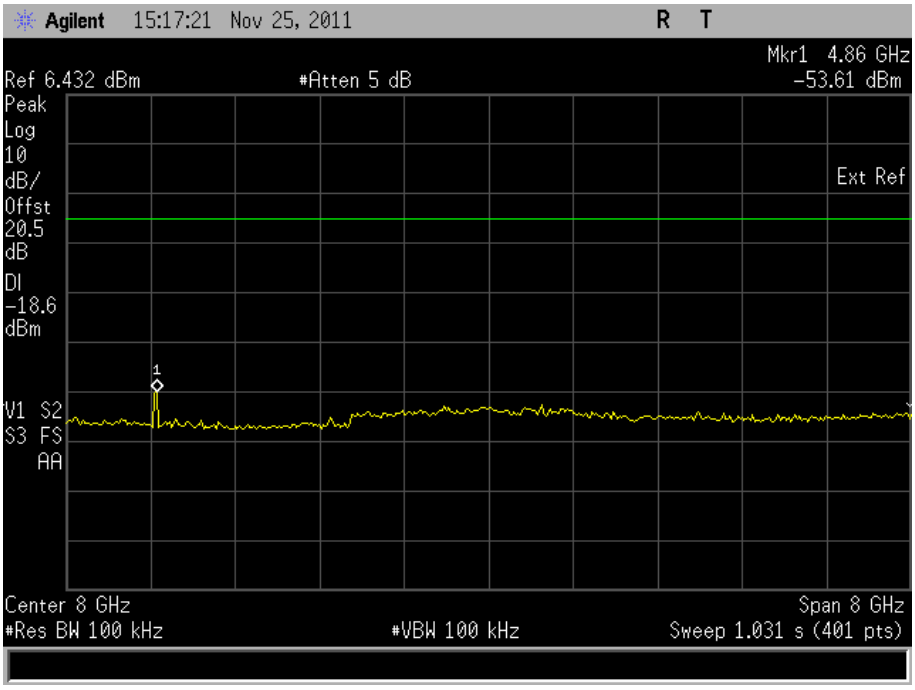
2425 MHz

9 kHz to 4 GHz

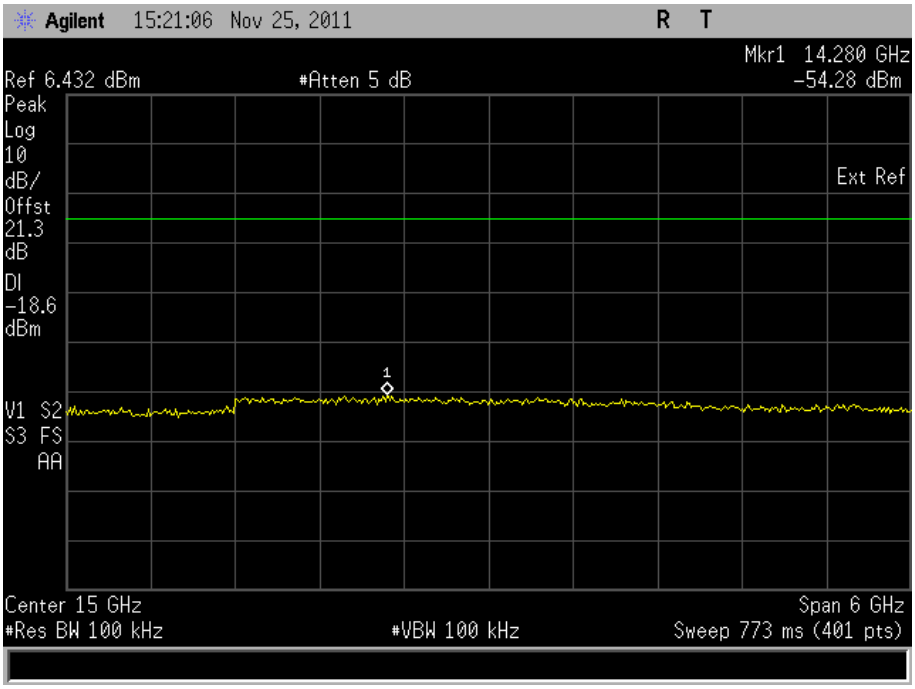


Product Service

4 GHz to 12 GHz



12 GHz to 18 GHz



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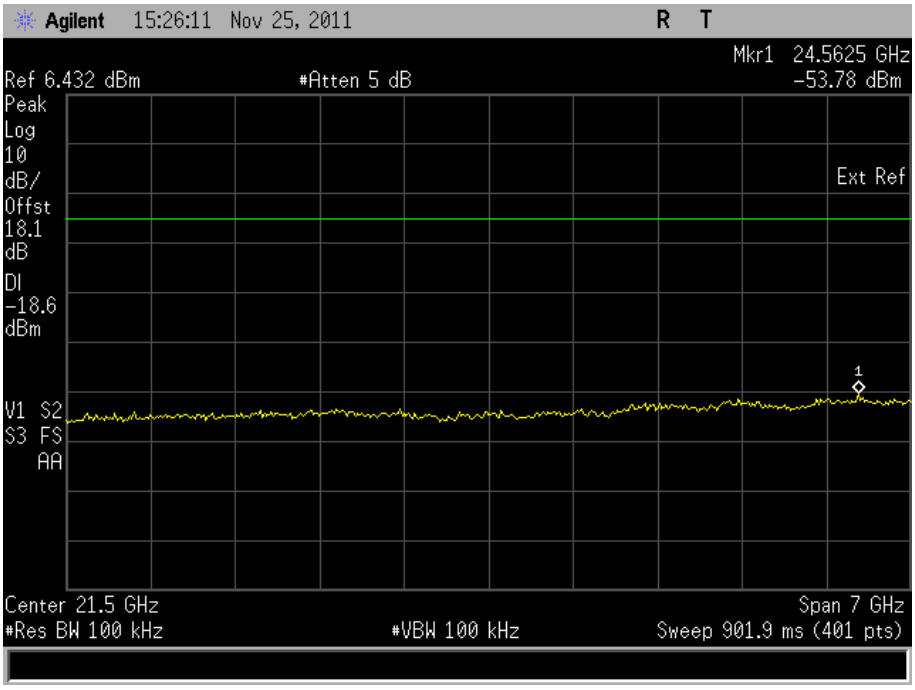
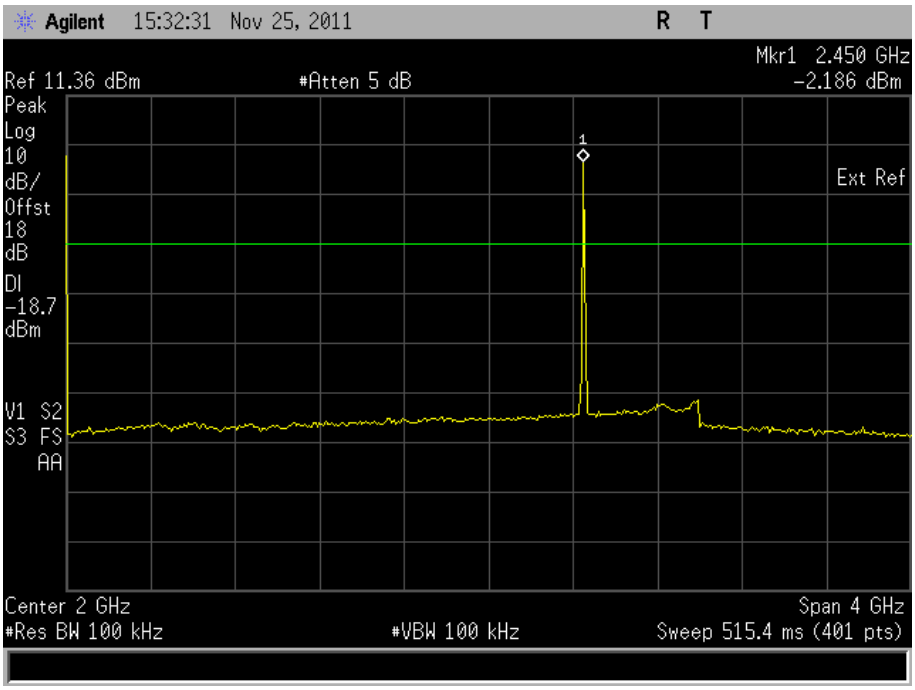
18 GHz to 25 GHz



2450 MHz

9 kHz to 4 GHz



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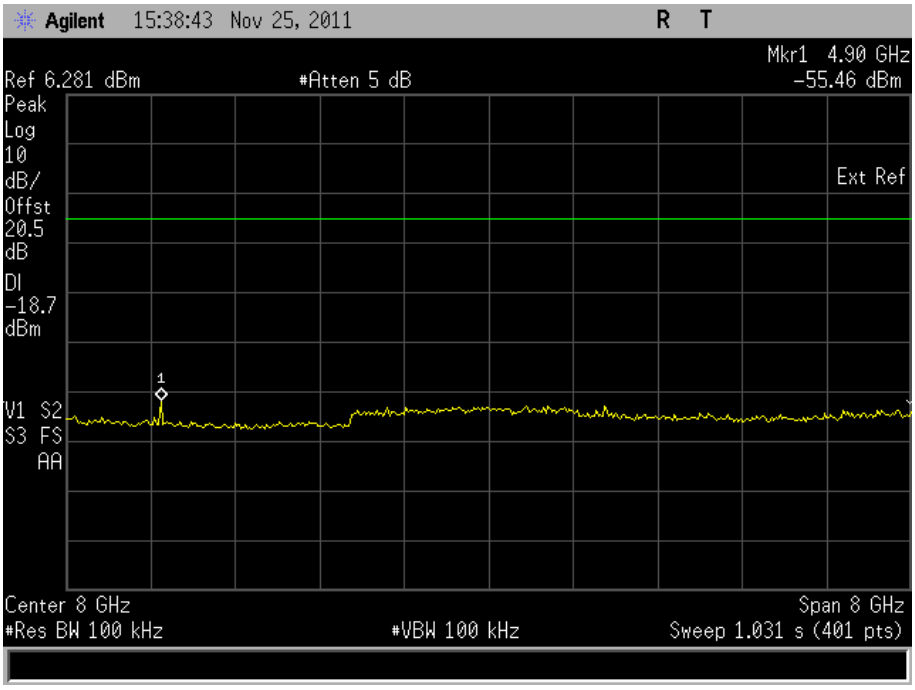
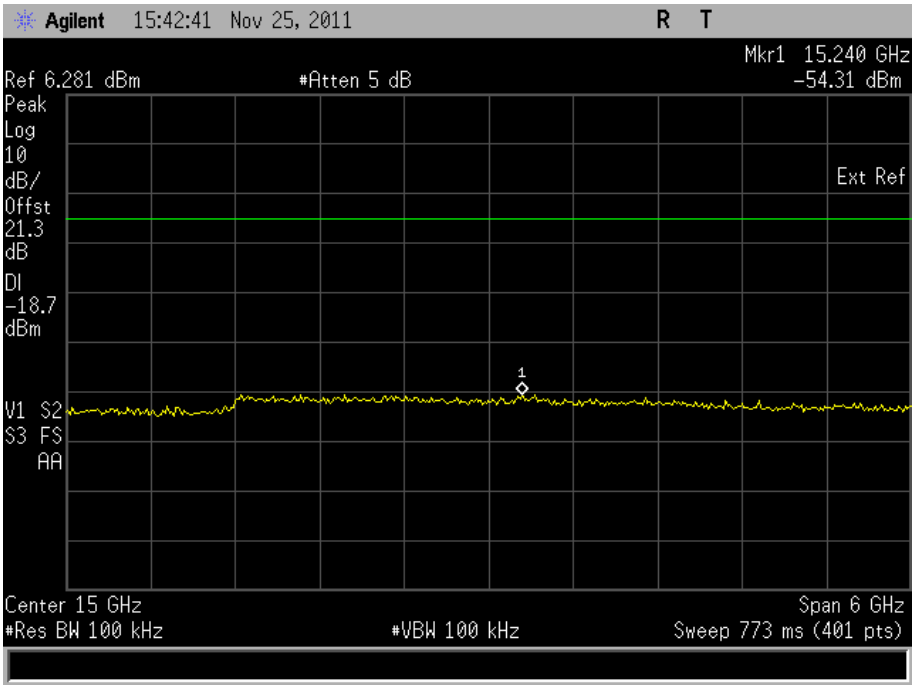
4 GHz to 12 GHz

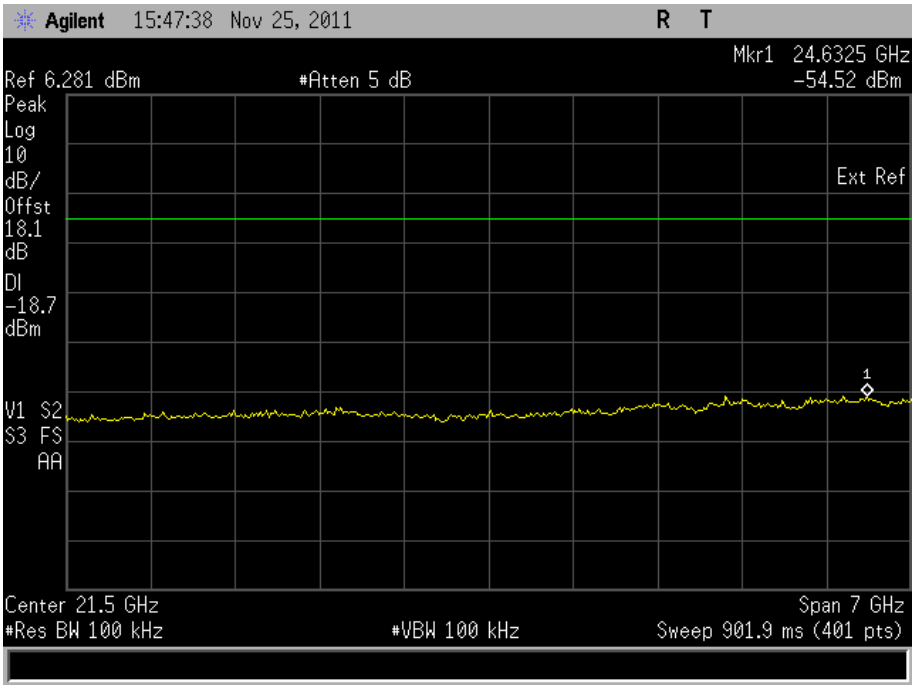


12 GHz to 18 GHz



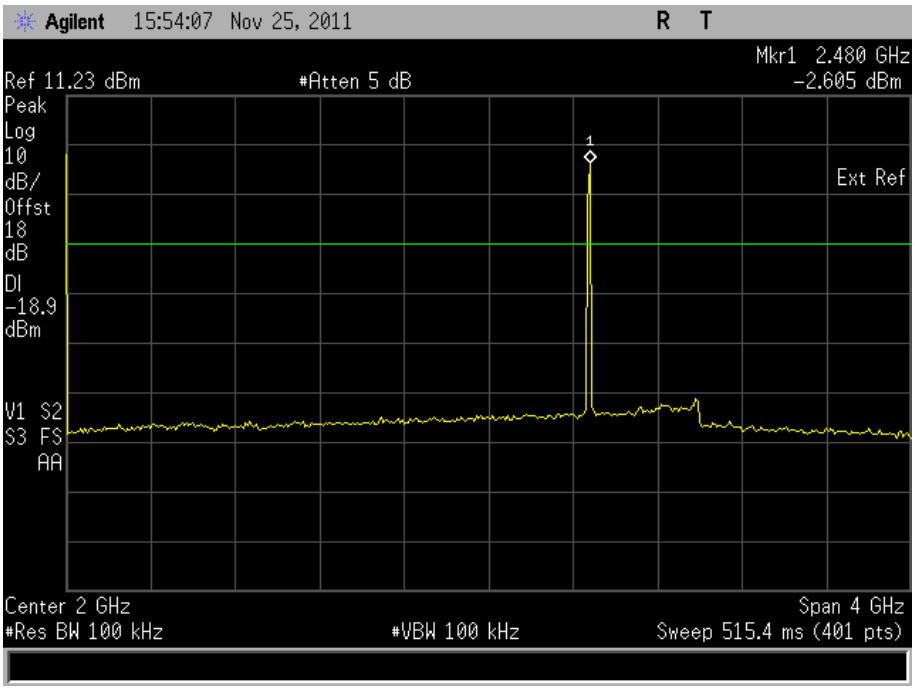
Product Service

18 GHz to 25 GHz



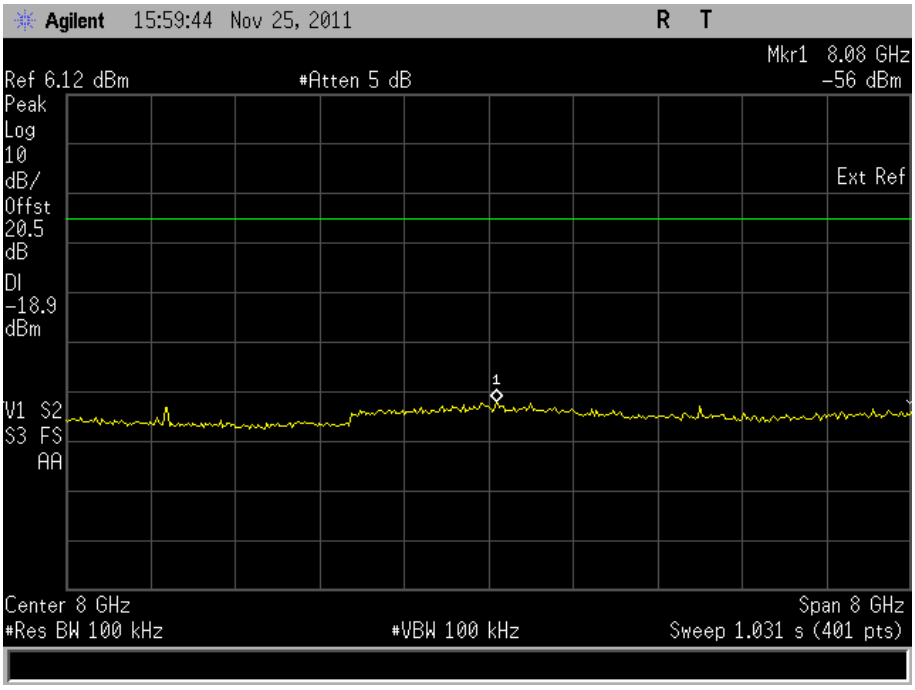
2475 MHz

9 kHz to 4 GHz

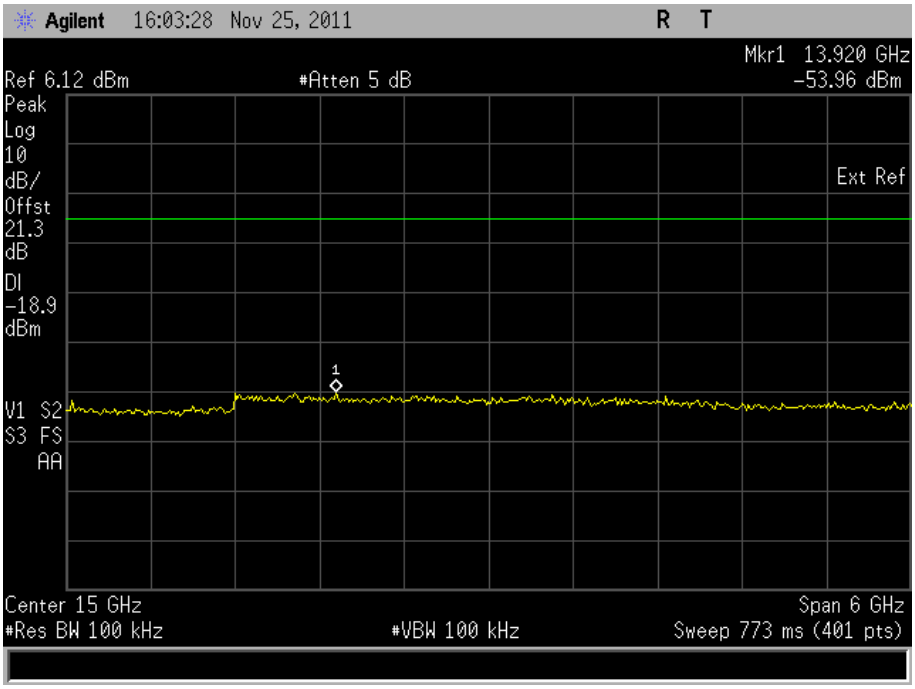


Product Service

4 GHz to 12 GHz

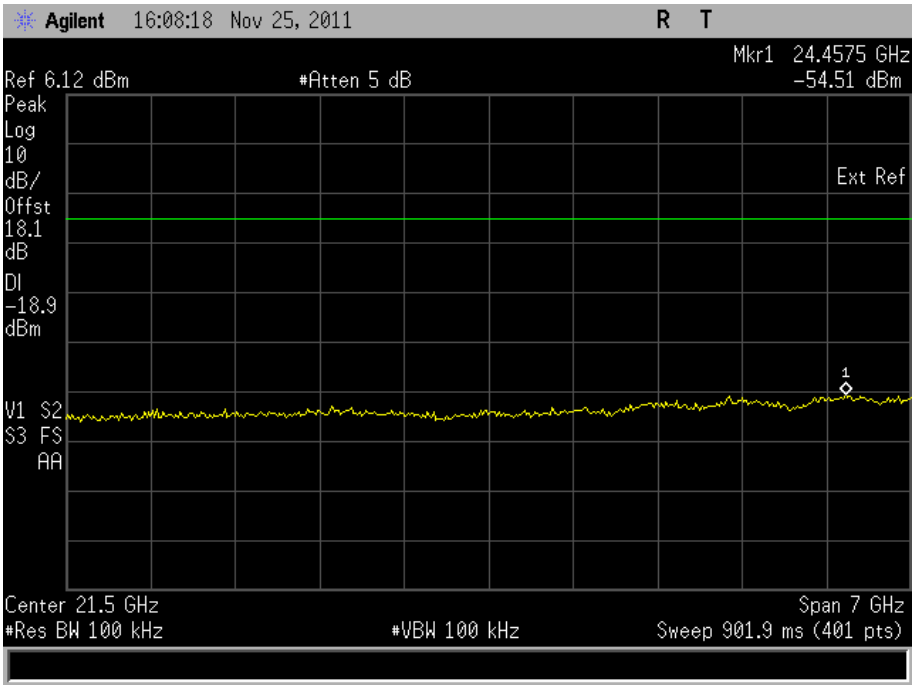


12 GHz to 18 GHz



Product Service

18 GHz to 25 GHz



Limit Clause

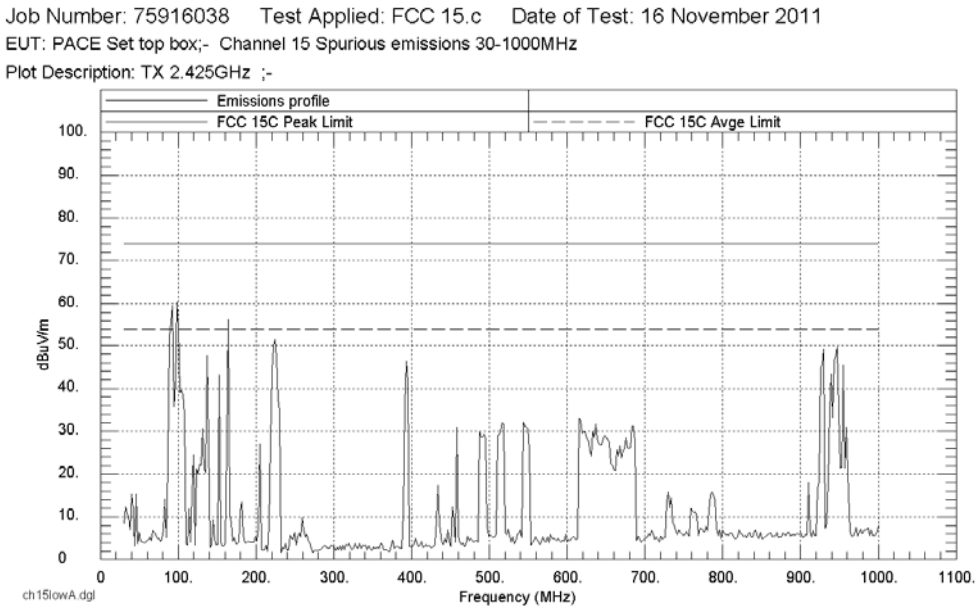
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

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

Spurious Radiated Emissions

2425 MHz

30 MHz to 1 GHz



1GHz to 25GHz

Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
4.850	V	100	20	61.2	49.9

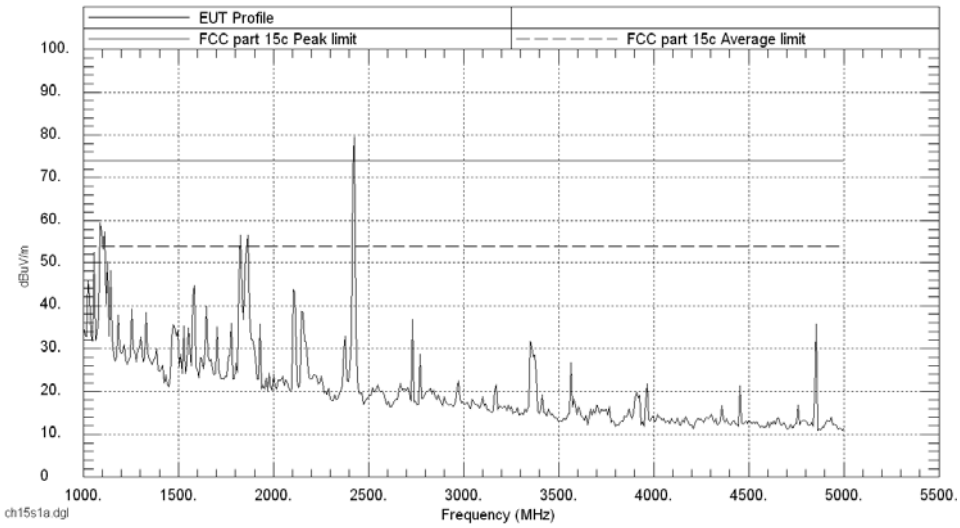
Product Service

1 GHz to 5 GHz

Job Number: 75916038 Test Applied: FCC 15c. Date of Test: 16 November 2011

EUT: PACE Set top box;- Channel 15 Spurious emissions 1-5GHz

Plot Description: TX 2.425GHz ;-

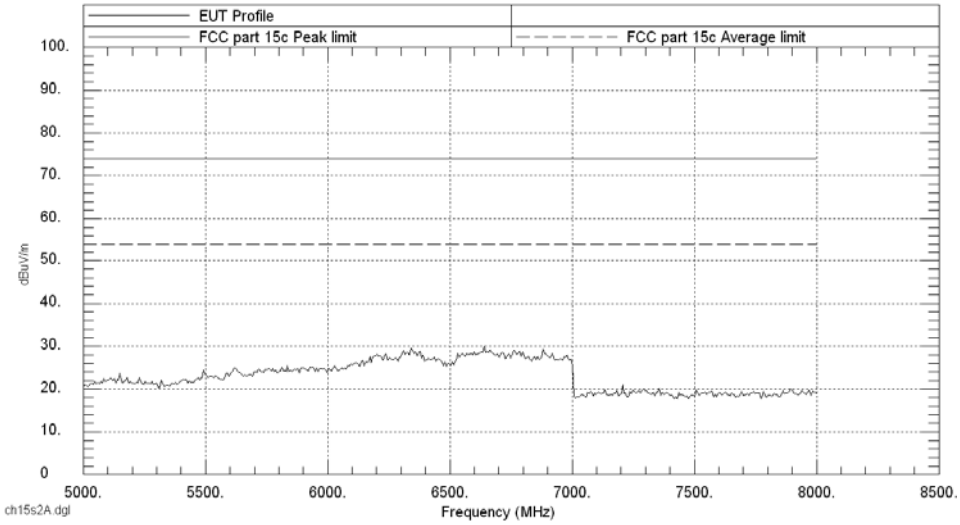


5 GHz to 8 GHz

Job Number: 75916038 Test Applied: FCC 15.c Date of Test: 16 November 2011

EUT: PACE Set top box;- Channel 15 Spurious emissions 5-8GHz

Plot Description: TX 2.425GHz ;-



"The test was performed on an Open Area Test Site and the Emissions shown in the plot above are ambient emissions with the exception on any specified in the table."

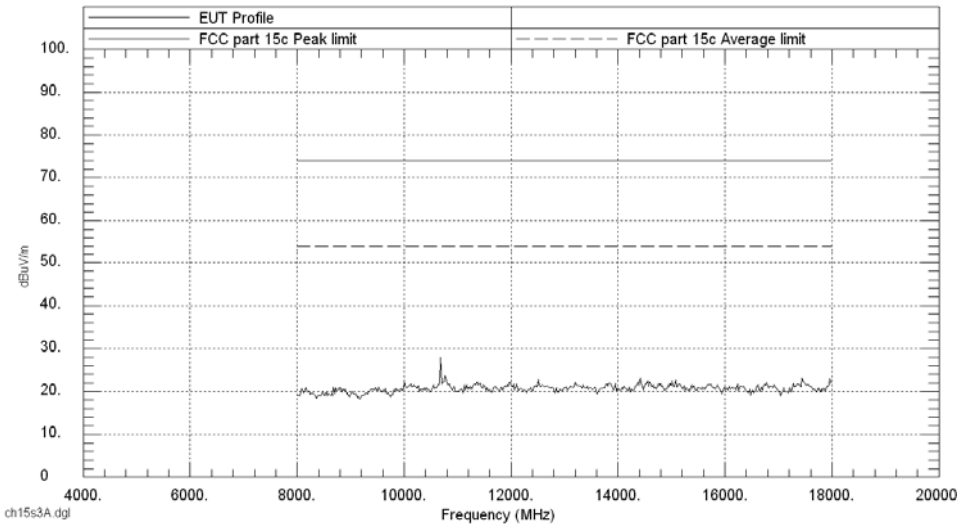
Product Service

8 GHz to 18 GHz

Job Number: 75916038 Test Applied: FCC 15.c Date of Test: 16 November 2011

EUT: PACE Set top box;- Channel 15 Spurious emissions 8-18GHz

Plot Description: TX 2.425GHz ;-

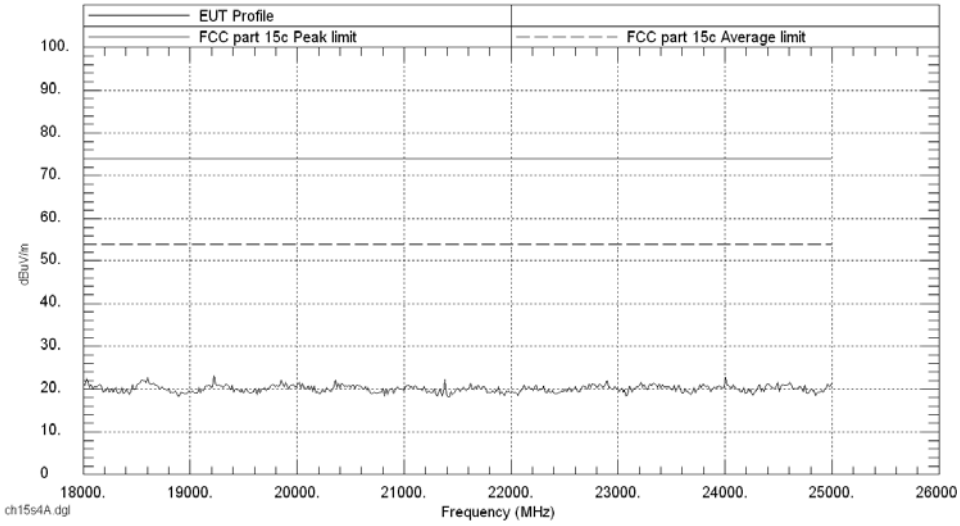


18 GHz to 25 GHz

Job Number: 75916038 Test Applied: FCC 15.c Date of Test: 16 November 2011

EUT: PACE Set top box;- Channel 15 Spurious emissions 18-25GHz

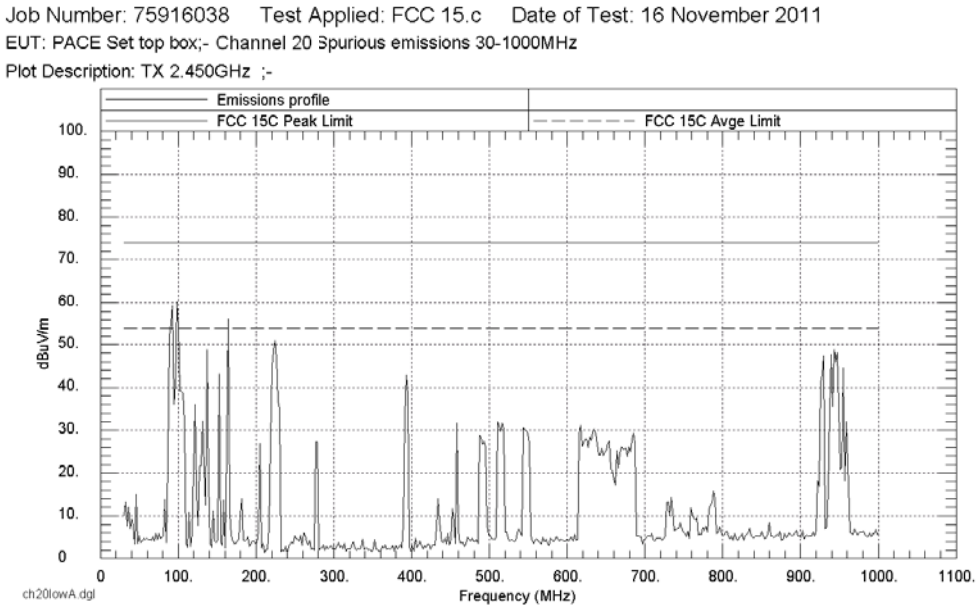
Plot Description: TX 2.425GHz ;-



Product Service

2450 MHz

30 MHz to 1 GHz



1GHz to 25GHz

Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
4.900	V	100	20	63.3	51.2

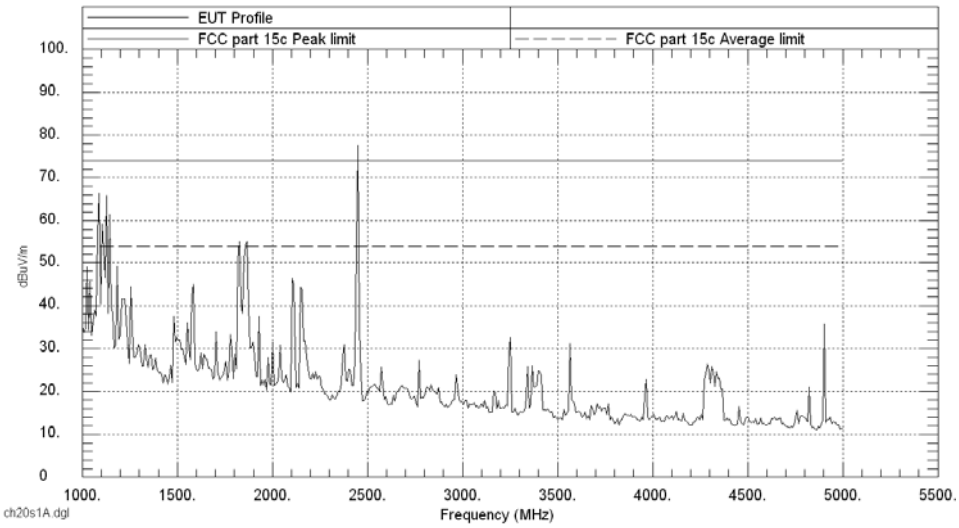
Product Service

1 GHz to 5 GHz

Job Number: 75916038 Test Applied: FCC 15.c Date of Test: 16 November 2011

EUT: PACE Set top box;- Channel 20 Spurious emissions 1-5GHz

Plot Description: TX 2.450GHz ;-

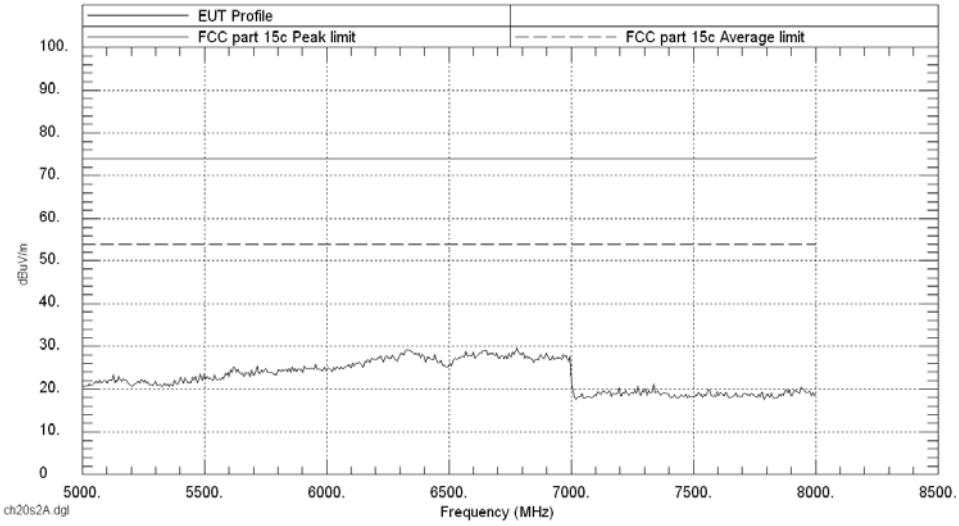


5 GHz to 8 GHz

Job Number: 75916038 Test Applied: FCC 15.c Date of Test: 16 November 2011

EUT: PACE Set top box;- Channel 20 Spurious emissions 5-8GHz

Plot Description: TX 2.450GHz ;-



"The test was performed on an Open Area Test Site and the Emissions shown in the plot above are ambient emissions with the exception on any specified in the table."

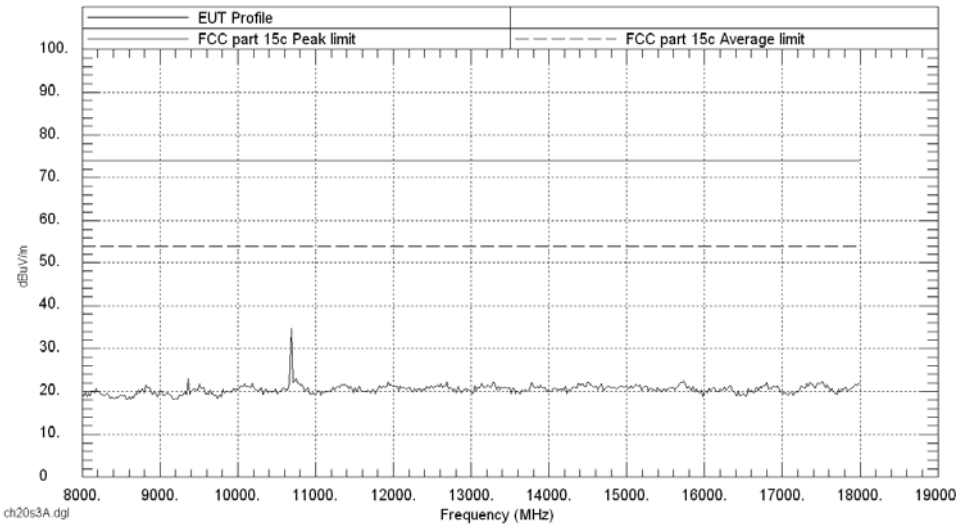
Product Service

8 GHz to 18 GHz

Job Number: 75916038 Test Applied: FCC 15.c Date of Test: 16 November 2011

EUT: PACE Set top box;- Channel 20 Spurious emissions 8-18GHz

Plot Description: TX 2.450GHz ;-

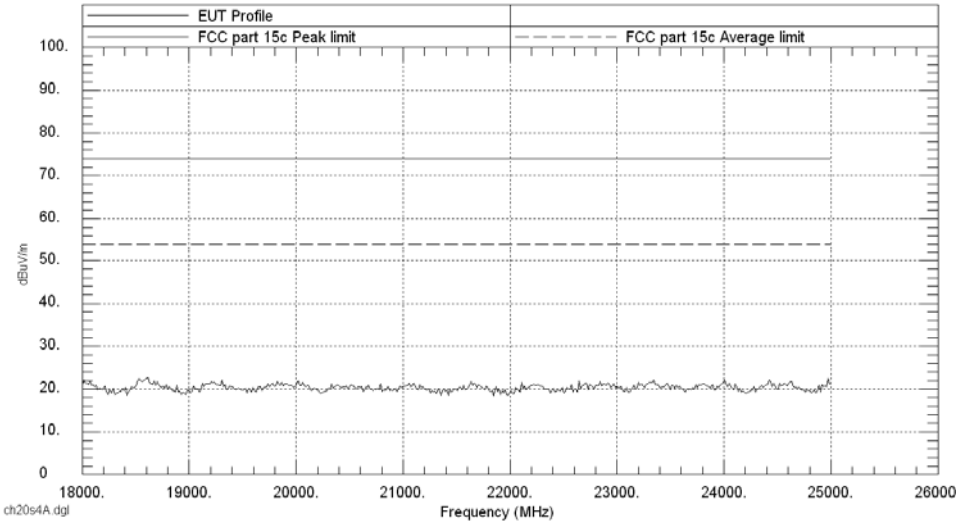


18 GHz to 25 GHz

Job Number: 75916038 Test Applied: FCC 15.c Date of Test: 16 November 2011

EUT: PACE Set top box;- Channel 20 Spurious emissions 18-25GHz

Plot Description: TX 2.450GHz ;-

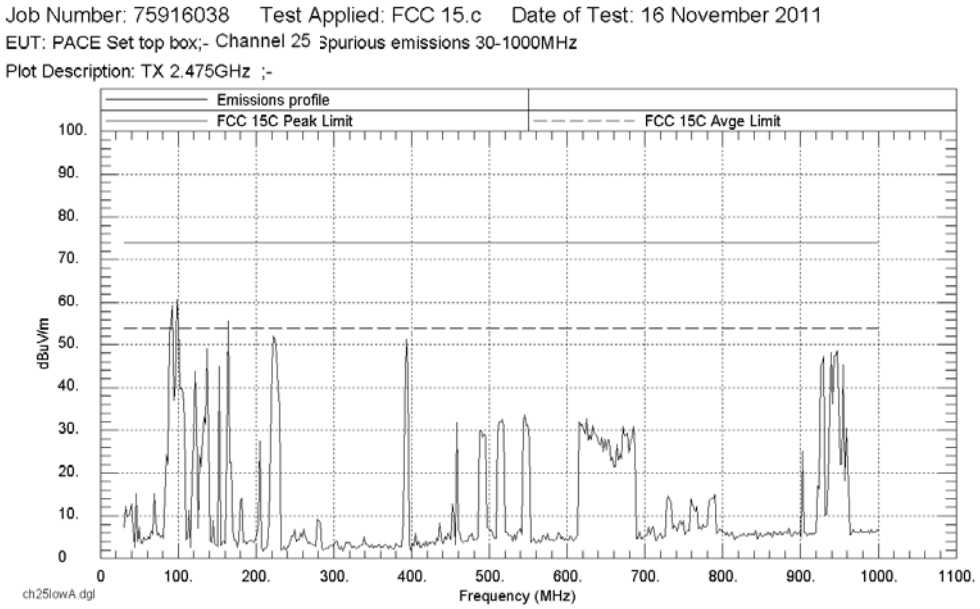


Limit

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

2475 MHz

30 MHz to 1 GHz



1GHz to 25GHz

Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
4.950	V	100	350	60.27	49.0

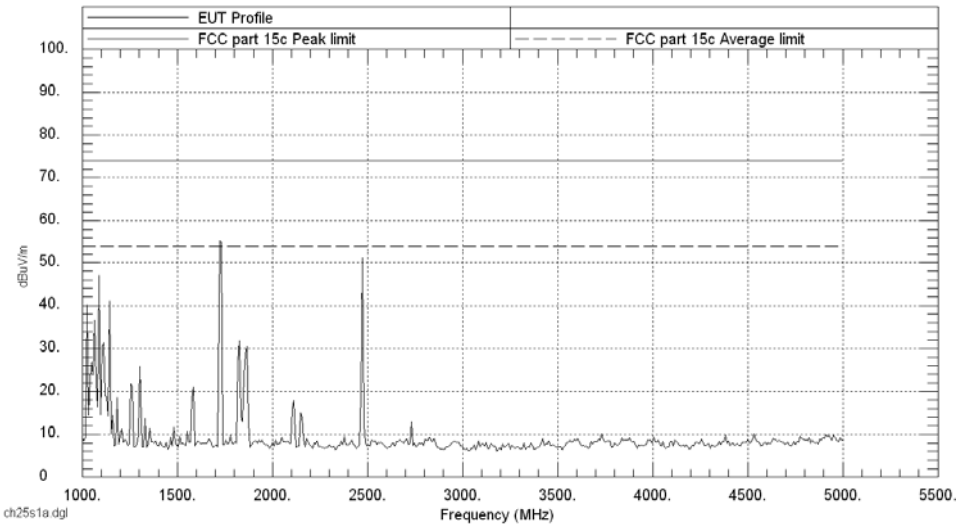
Product Service

1 GHz to 5 GHz

Job Number: 75916038 Test Applied: FCC 15.c Date of Test: 16 November 2011

EUT: PACE Set top box;- Channel 25 Spurious emissions 1-5GHz

Plot Description: TX 2.475GHz ;-

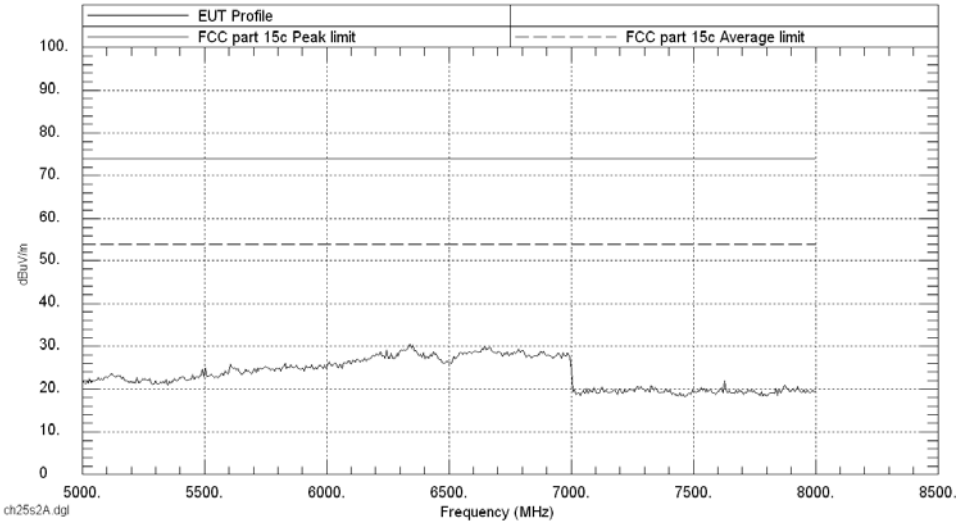


5 GHz to 8 GHz

Job Number: 75916038 Test Applied: FCC 15.c Date of Test: 16 November 2011

EUT: PACE Set top box;- Channel 25 Spurious emissions 5-8GHz

Plot Description: TX 2.475GHz ;-



"The test was performed on an Open Area Test Site and the Emissions shown in the plot above are ambient emissions with the exception on any specified in the table."

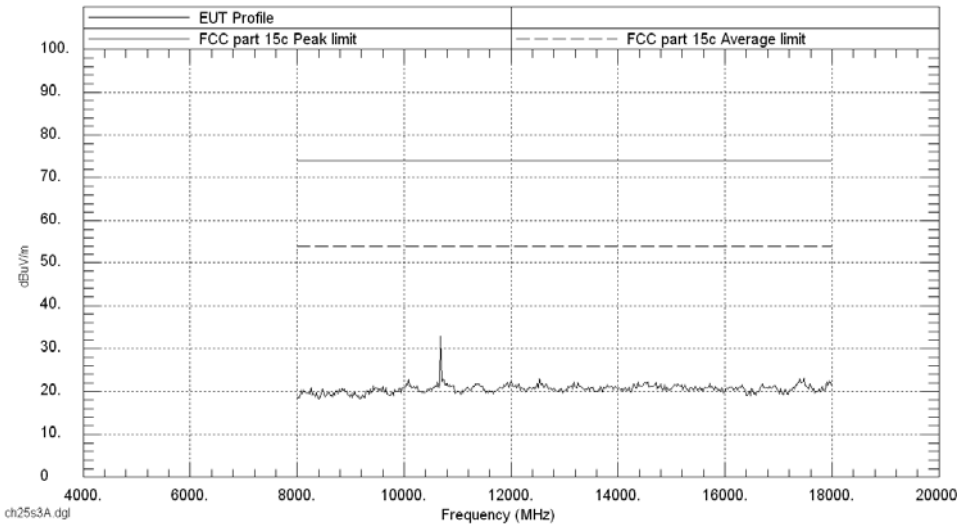
Product Service

8 GHz to 18 GHz

Job Number: 75916038 Test Applied: FCC 15.c Date of Test: 16 November 2011

EUT: PACE Set top box;- Channel 25 Spurious emissions 8-18GHz

Plot Description: TX 2.475GHz ;-

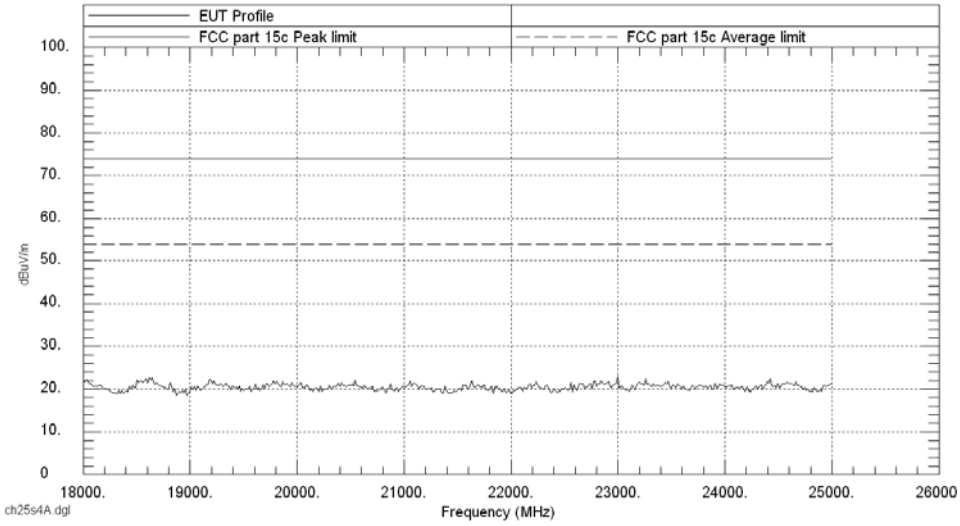


18 GHz to 25 GHz

Job Number: 75916038 Test Applied: FCC 15.c Date of Test: 16 November 2011

EUT: PACE Set top box;- Channel 25 Spurious emissions 18-25GHz

Plot Description: TX 2.4750GHz ;-



Band Edge Emissions

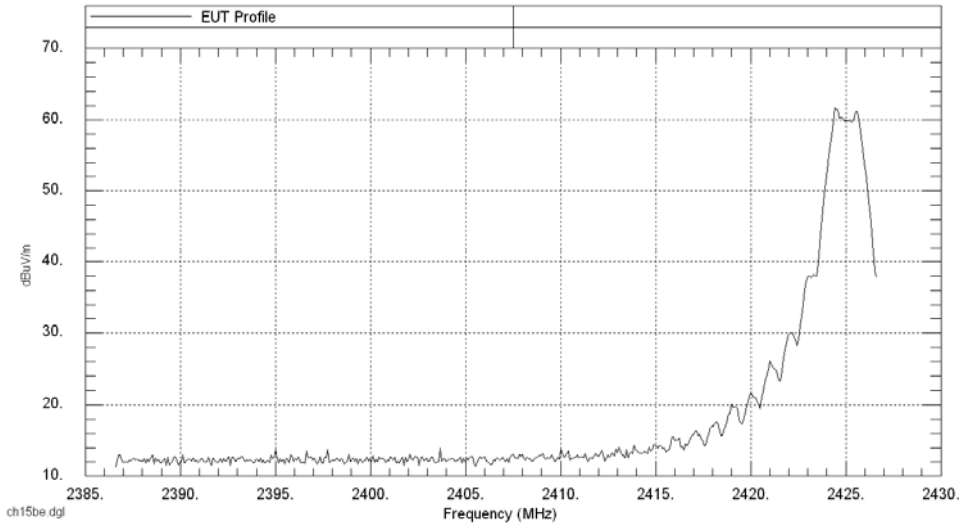
2425 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	11.29	4.10

Job Number: 75916038 Test Applied: FCC 15.c Date of Test: 16 November 2011

EUT: PACE Set top box;- Channel 15 band edge

Plot Description: TX 2.425GHz Band edge 2.390GHz;-



Product Service

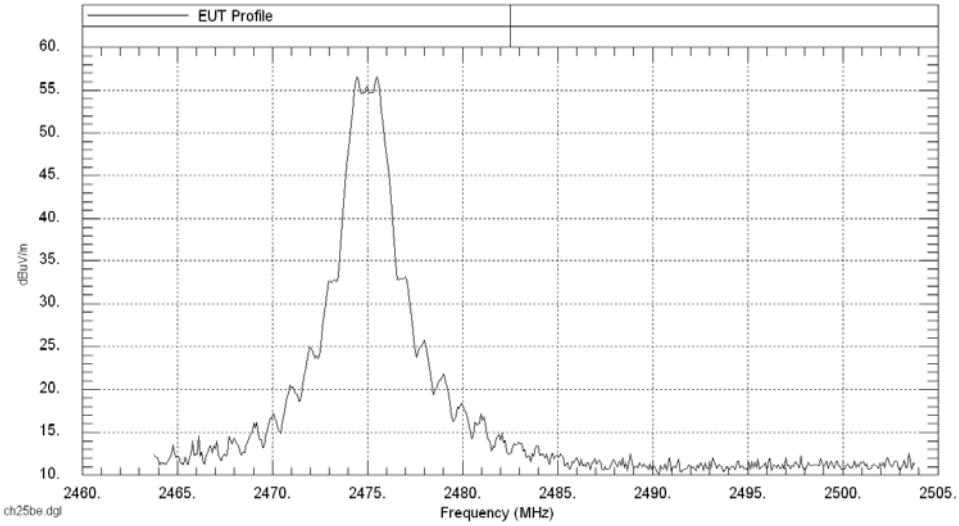
2475 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	12.33	4.50

Job Number: 75916038 Test Applied: FCC 15.c Date of Test: 16 November 2011

EUT: PACE Set top box;- Channel 25 band edge

Plot Description: TX 2.475GHz Band edge 2.4835GHz;-



Limit

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

Product Service

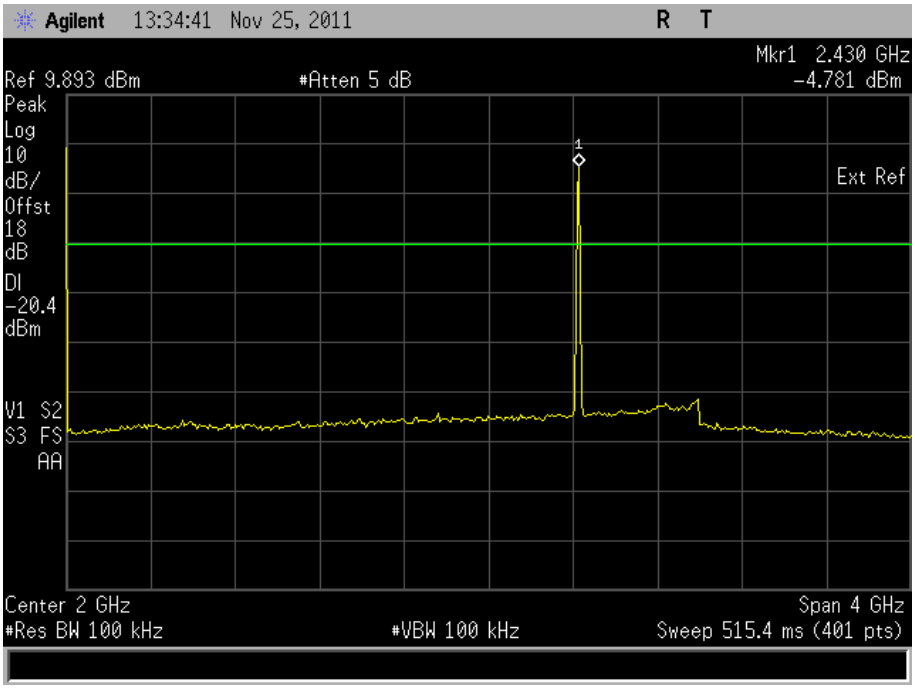
Zigbee - Alternative Antenna

5 V DC Supply

Spurious Conducted Emissions

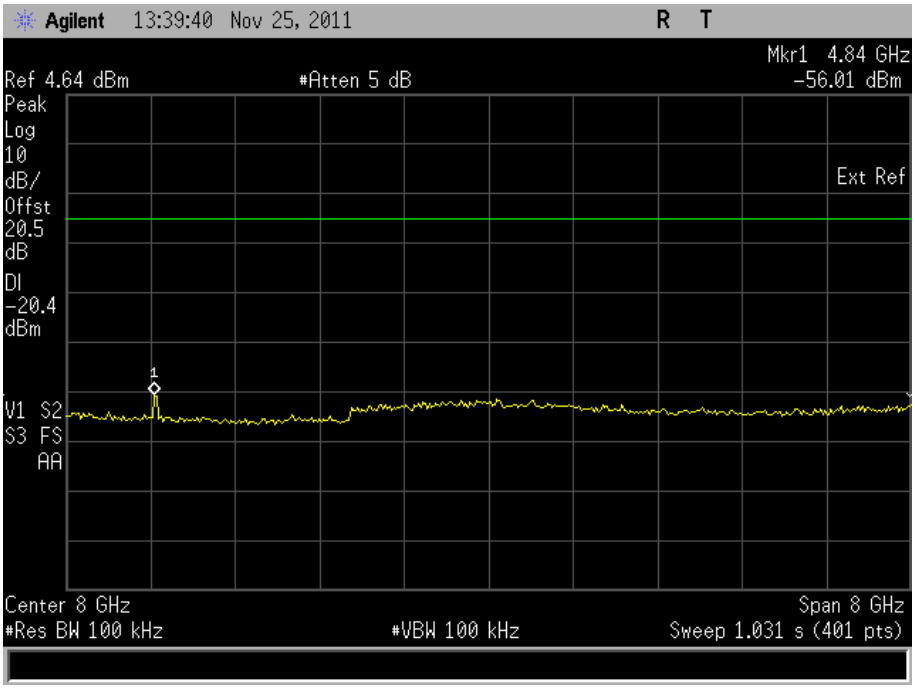
2425 MHz

9 kHz to 4 GHz

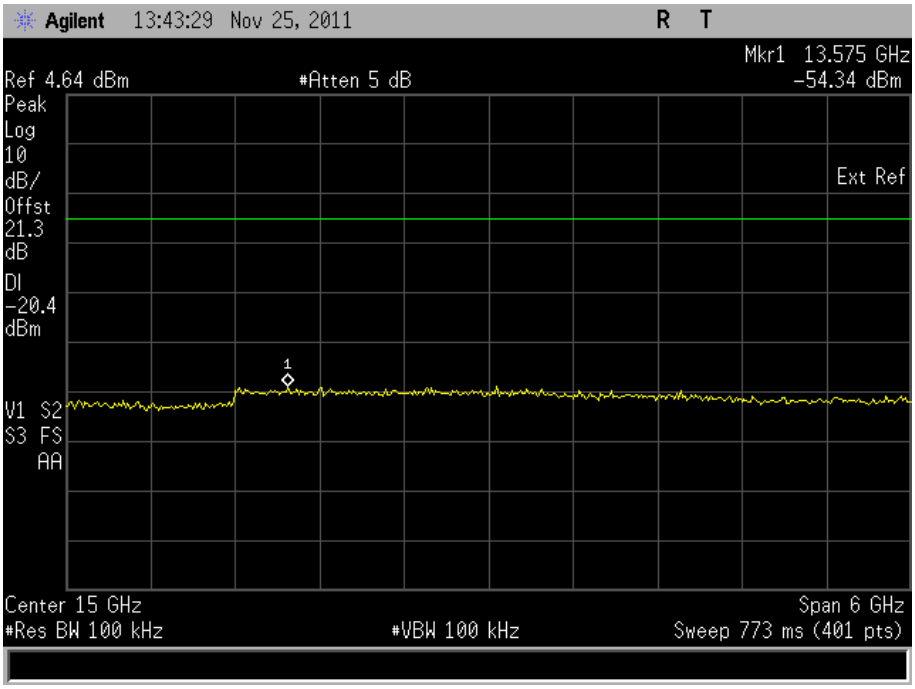


Product Service

4 GHz to 12 GHz

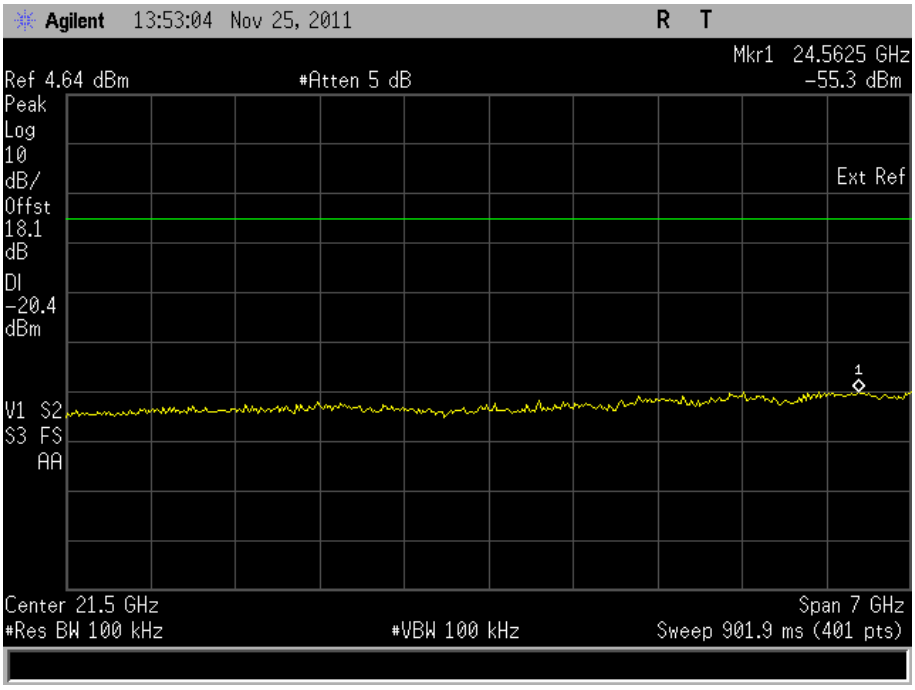


12 GHz to 18 GHz



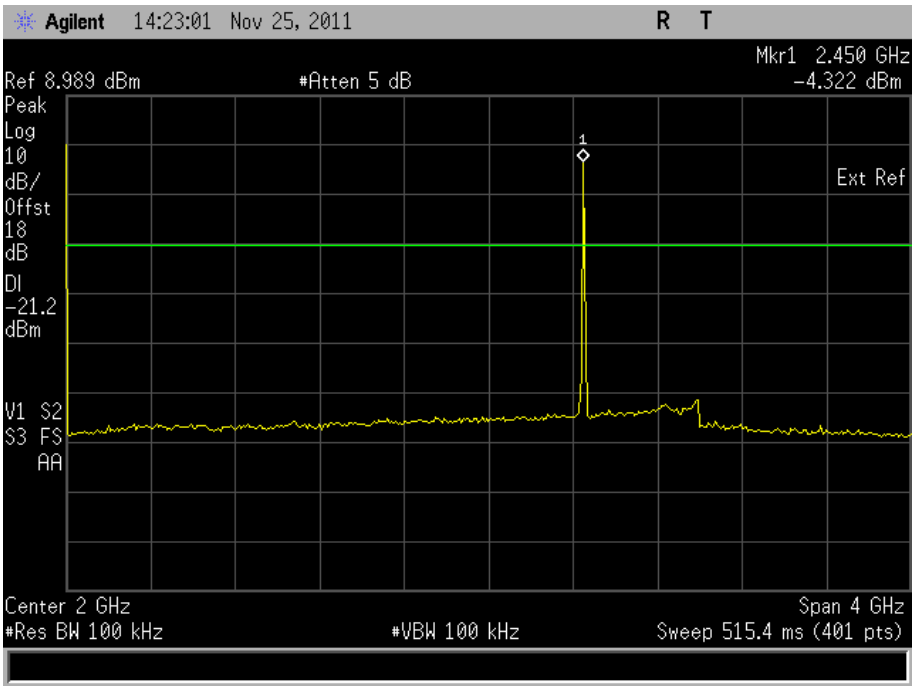
Product Service

18 GHz to 25 GHz



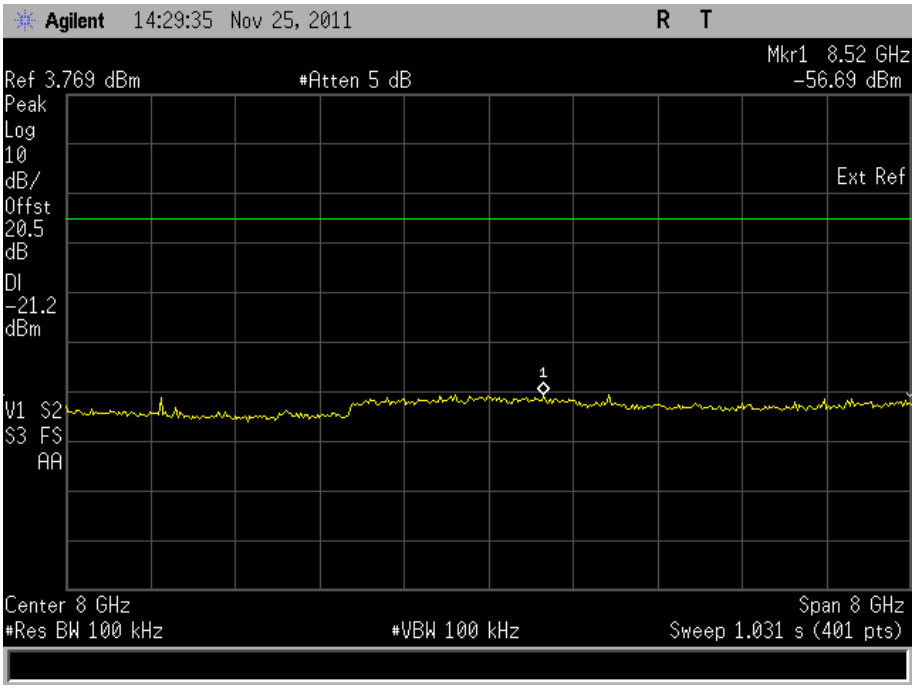
2450 MHz

9 kHz to 4 GHz

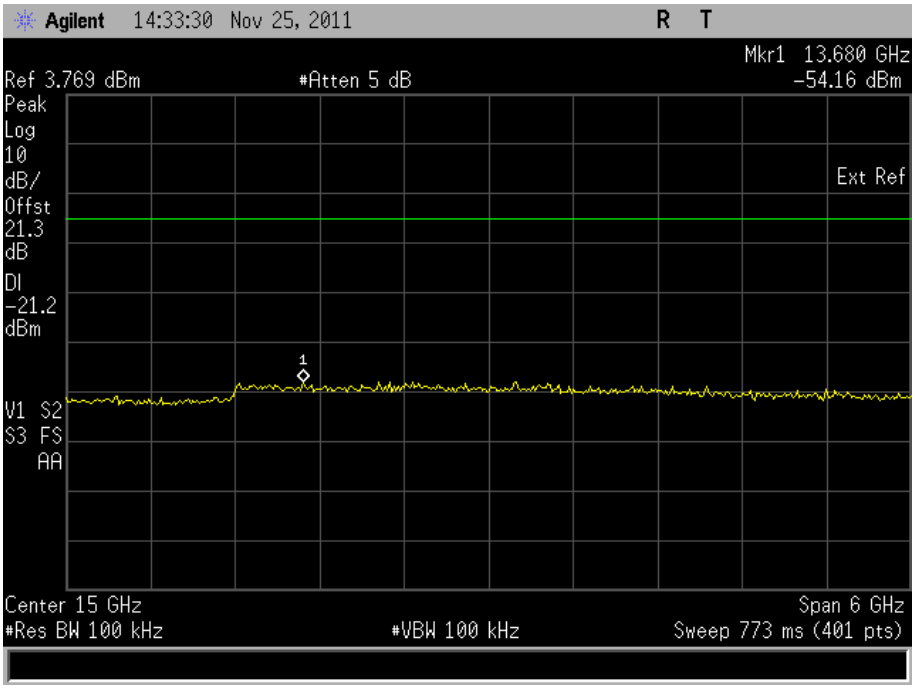


Product Service

4 GHz to 12 GHz

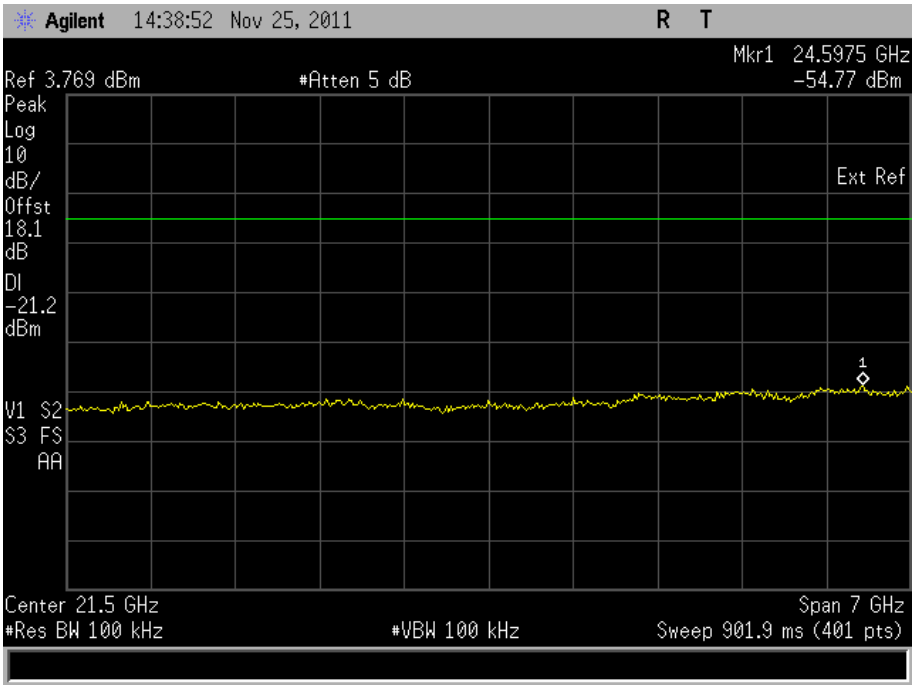


12 GHz to 18 GHz



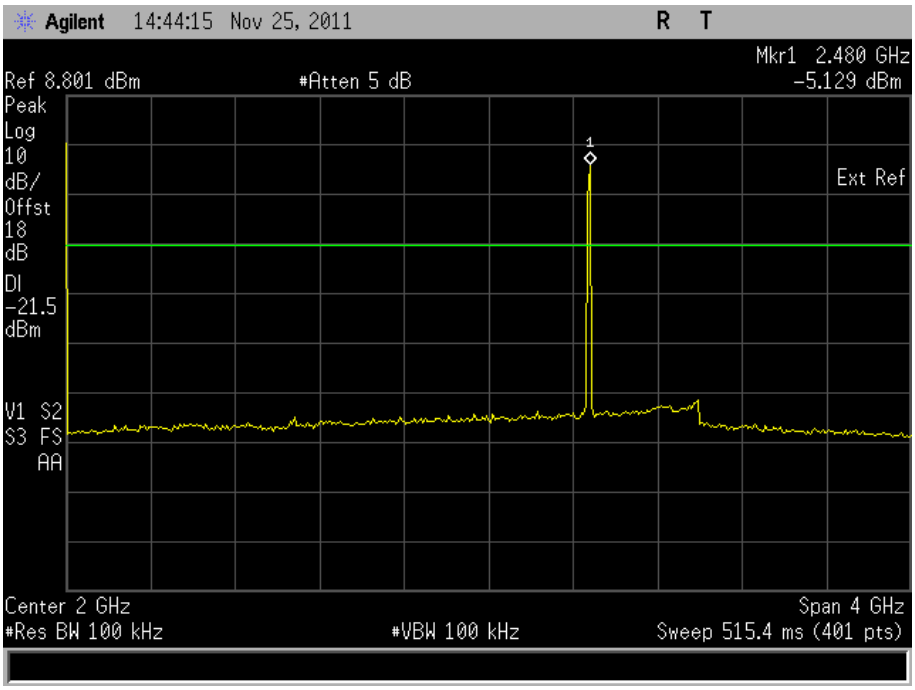
Product Service

18 GHz to 25 GHz



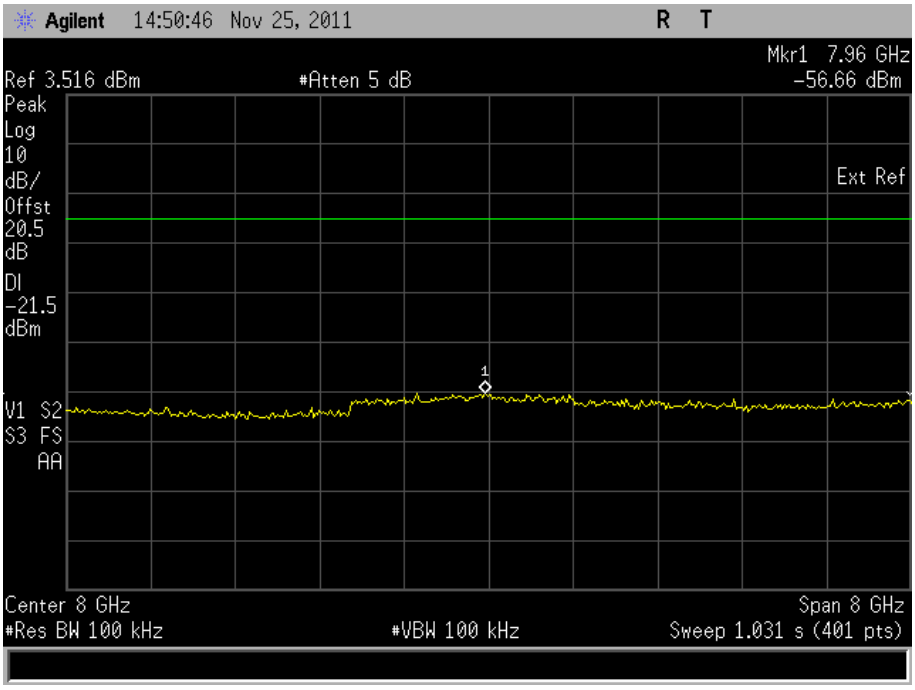
2475 MHz

9 kHz to 4 GHz

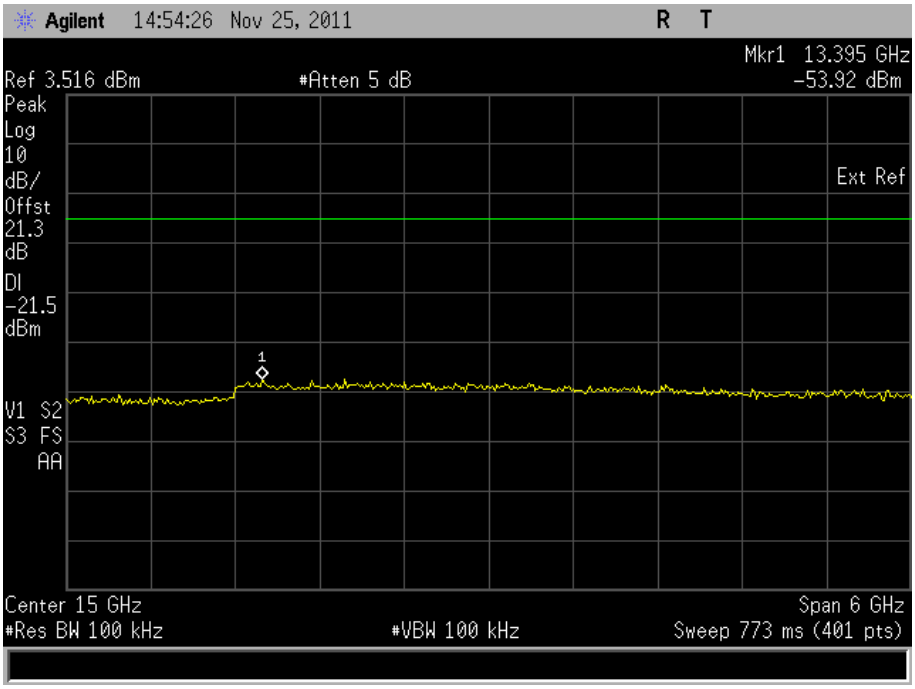


Product Service

4 GHz to 12 GHz

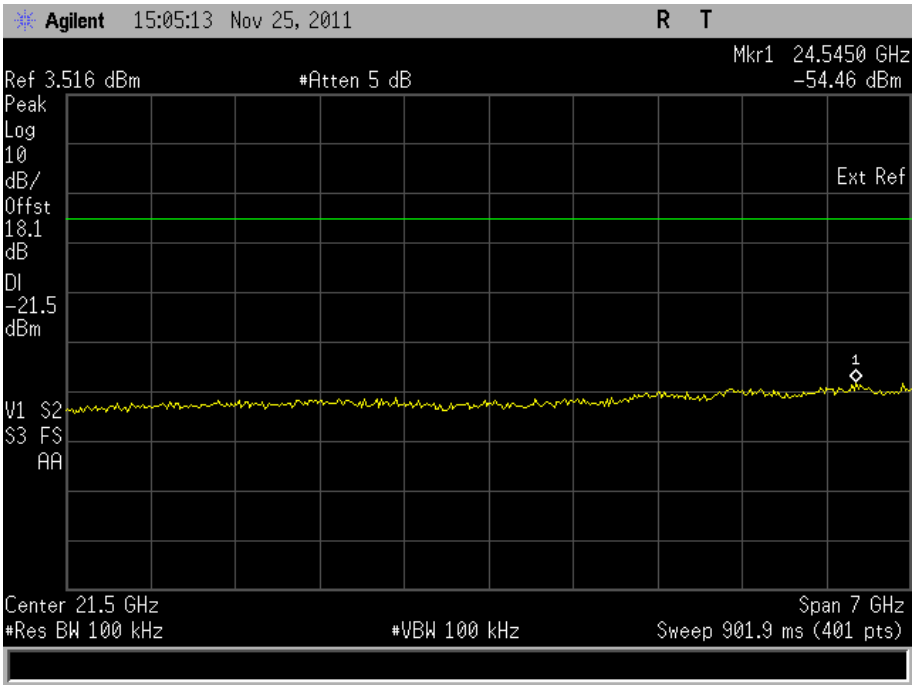


12 GHz to 18 GHz



Product Service

18 GHz to 25 GHz



Limit Clause

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

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

2.6 6DB BANDWIDTH

2.6.1 Specification Reference

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

2.6.2 Equipment Under Test and Modification State

DC60Xu S/N: PAPW00001171 - Modification State 0

2.6.3 Date of Test

21 November 2011, 22 November 2011 & 24 November 2011

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 a cable to the Spectrum Analyser. The Analyser settings were adjusted to display the resultant trace on screen. The peak point of the trace was measured and the markers positioned to give the -6dBc points of the displayed spectrum.

2.6.6 Environmental Conditions

Ambient Temperature	24.6°C
Relative Humidity	33.3%

Product Service

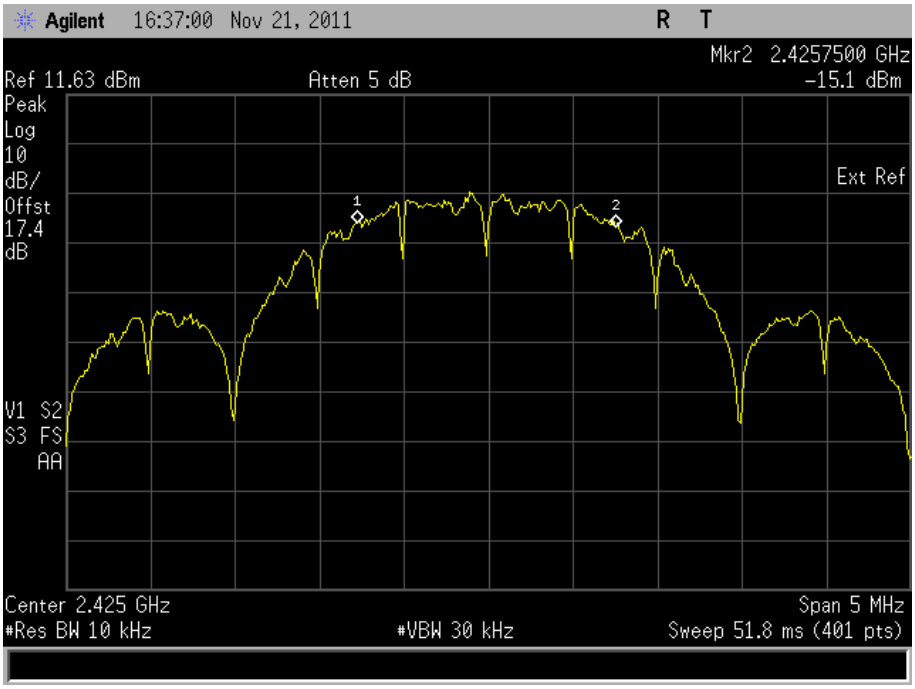
2.6.7 Test Results

Zigbee

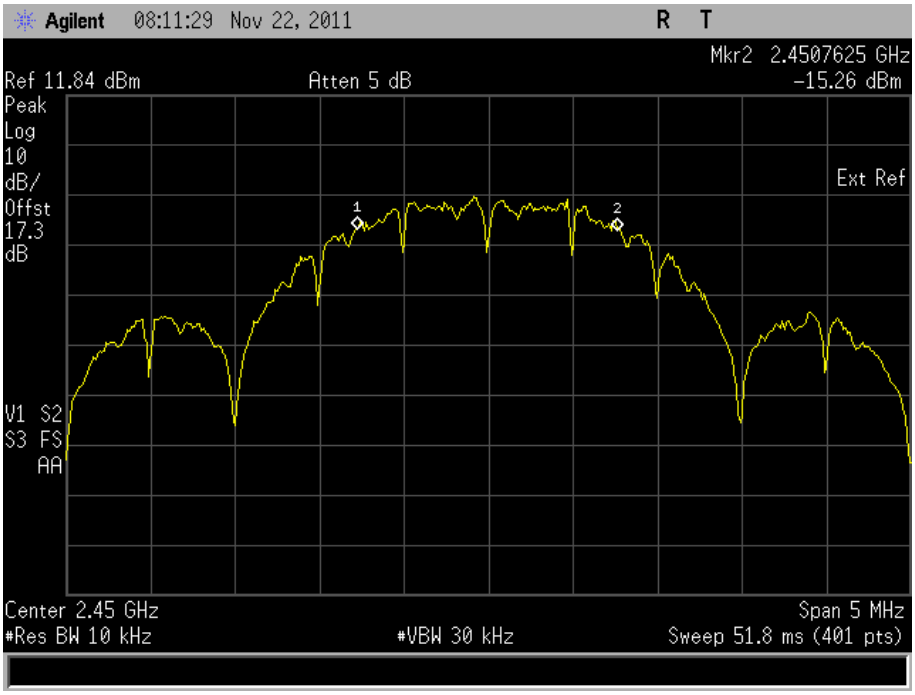
5 V DC Supply

Frequency (MHz)	6dB Bandwidth (kHz)
2425 MHz	1525.0
2450 MHz	1537.5
2475 MHz	1575.0

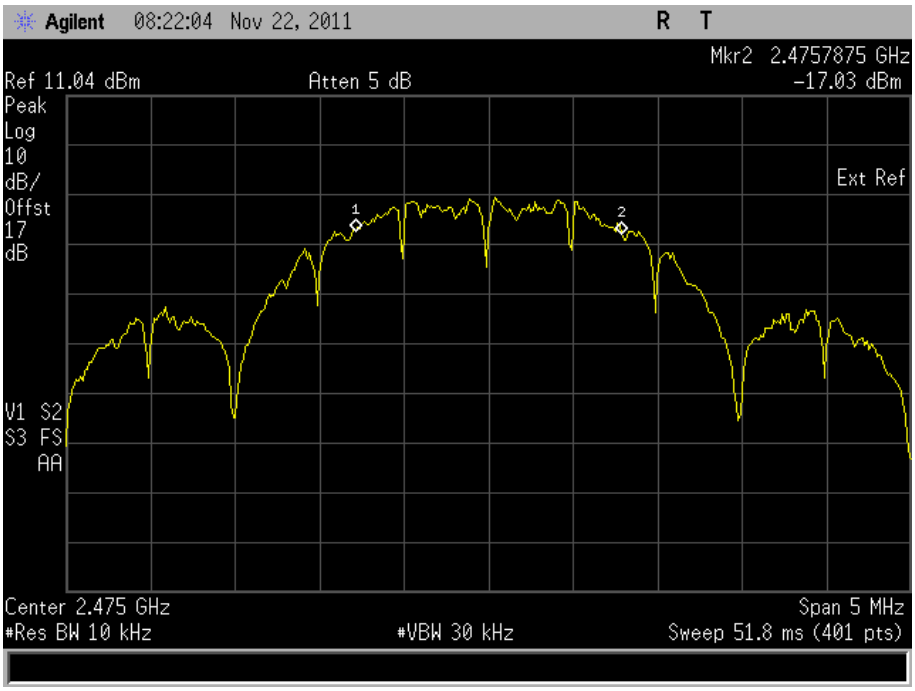
2425 MHz



2450 MHz



2475 MHz



Limit Clause

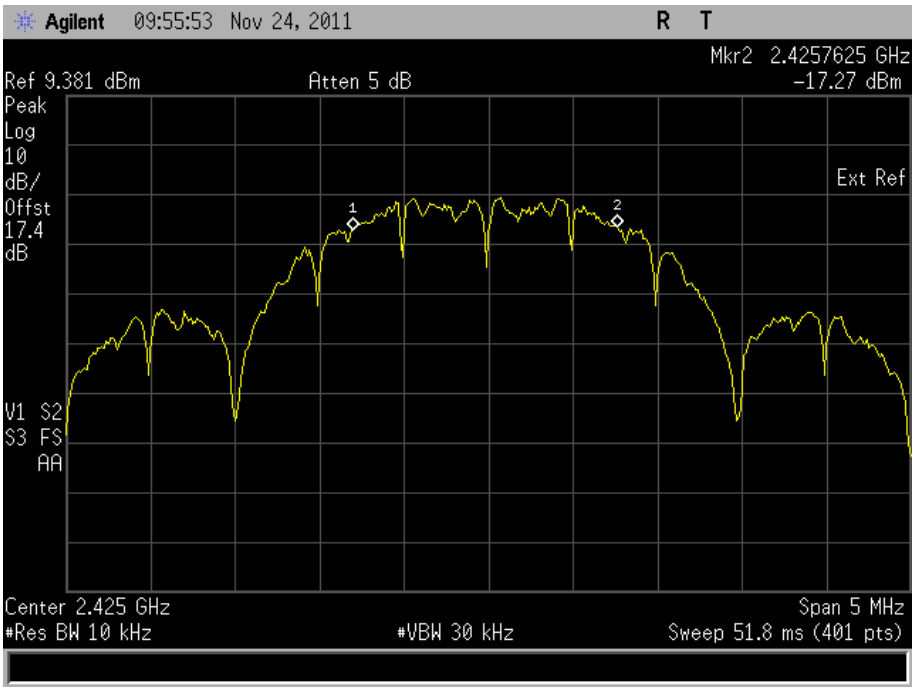
The minimum 6 dB Bandwidth shall be at least 500 kHz.

Zigbee - Alternative Antenna

5 V DC Supply

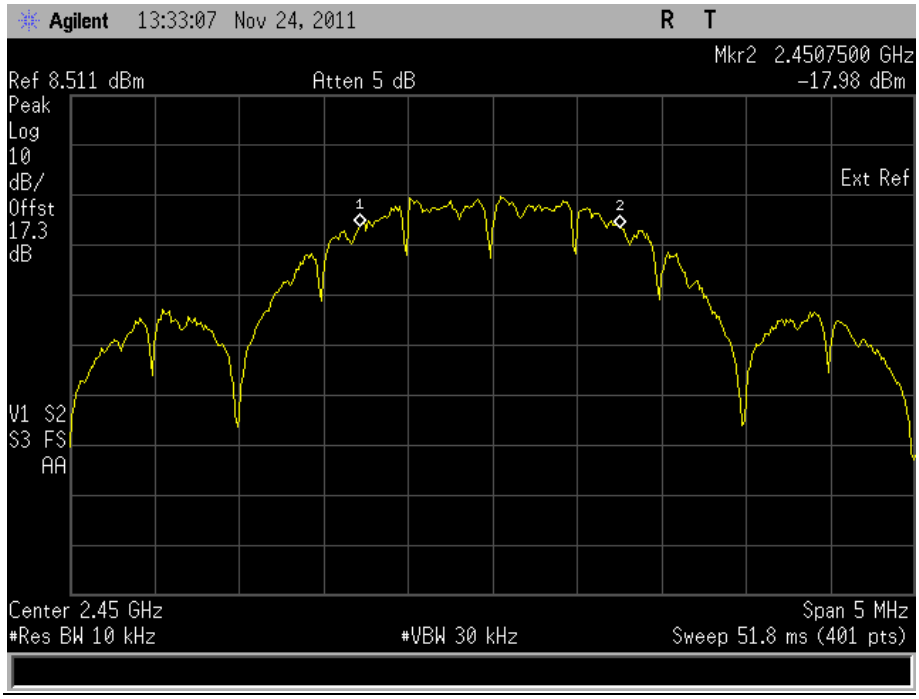
Frequency (MHz)	6dB Bandwidth (kHz)
2425 MHz	1562.5
2450 MHz	1537.5
2475 MHz	1450

2425 MHz

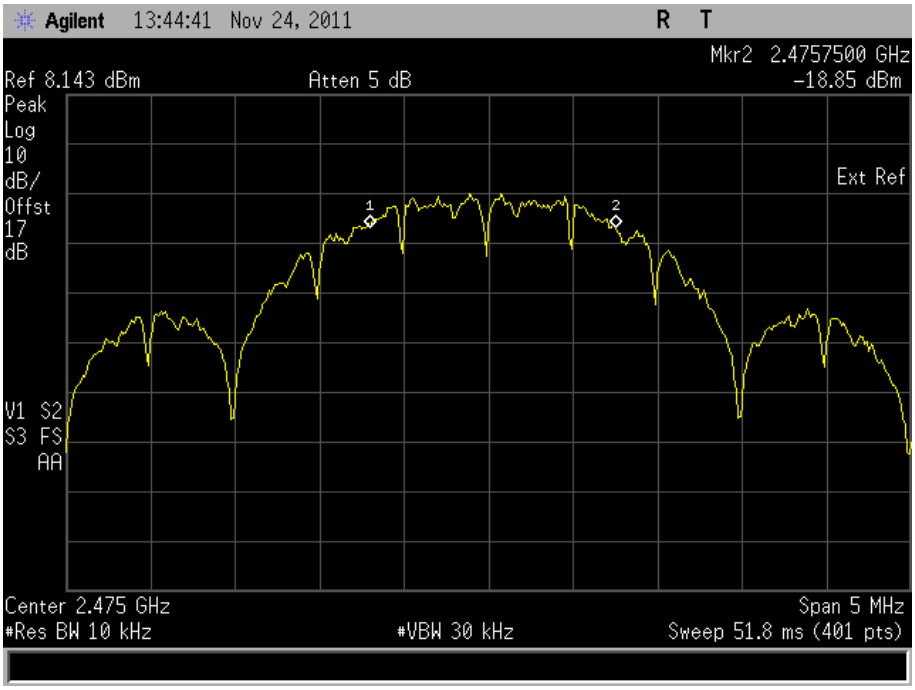


Product Service

2450 MHz



2475 MHz



Limit Clause

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

Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

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					
3 phase LISN	Rohde & Schwarz	ESH2-Z5	323	12	10-Jan-2012
Screened Room (5)	Rainford	Rainford	1545	36	3-Feb-2014
Transient Limiter	Hewlett Packard	11947A	2377	12	17-Dec-2011
Test Receiver	Rohde & Schwarz	ESIB40	2941	12	12-May-2012
Section 2.2 - Maximum Peak Conducted Output Power					
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	28-Jun-2012
Mains Voltage Monitor	TUV	MVM1	1378	12	19-Aug-2012
Multimeter	Iso-tech	IDM101	2424	12	5-Sep-2012
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	10-Jun-2012
Variac Transformer	Zenith	Z-710-R	3169	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	3-May-2012
Power Divider	Weinschel	1506A	3345	12	4-May-2012
Vector Signal Generator	Rohde & Schwarz	SMU 200A	3493	12	20-Sep-2012
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3700	12	11-Jan-2012
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3701	12	11-Jan-2012
P-Series Power Meter	Agilent	N1911A	3980	12	12-Sep-2012
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	12-Sep-2012
Section 2.3 –EIRP Peak Power					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	TU
Antenna Mast	EMCO	1050	1707	-	TU
Turntable Controller	Various	RH253	1708	-	TU
Bilog Antenna	Schaffner	CBL6143	1858	24	9-Aug-2012
Power Supply	Farnell	LT30-2	2279	-	TU
Insulation Resistance Meter	Megger	MIT 40X	3601	12	10-Dec-2011
EMI Test Receiver	Rohde & Schwarz	ESIB26	3763	12	11-Jan-2012
Section 2.4 - Power Spectral Density					
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	28-Jun-2012
Mains Voltage Monitor	TUV	MVM1	1378	12	19-Aug-2012
Multimeter	Iso-tech	IDM101	2424	12	5-Sep-2012
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	10-Jun-2012
Variac Transformer	Zenith	Z-710-R	3169	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	3-May-2012
Power Divider	Weinschel	1506A	3345	12	4-May-2012
Vector Signal Generator	Rohde & Schwarz	SMU 200A	3493	12	20-Sep-2012
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3700	12	11-Jan-2012
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3701	12	11-Jan-2012
P-Series Power Meter	Agilent	N1911A	3980	12	12-Sep-2012
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	12-Sep-2012

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.5 – Spurious and Band Edge Emissions					
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	28-Jun-2012
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	1777	12	19-Nov-2011
LISN	Rohde & Schwarz	ESH3-Z5	1820	12	5-May-2012
4GHz HPF	Sematron	F-100-4000-5-R	2245	-	TU
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	10-Jun-2012
Hygrometer	Rotronic	I-1000	3220	12	3-May-2012
Power Divider	Weinschel	1506A	3345	12	4-May-2012
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	8-Feb-2012
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3700	12	11-Jan-2012
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3701	12	11-Jan-2012
EMI Test Receiver	Rohde & Schwarz	ESIB26	3763	12	11-Jan-2012
P-Series Power Meter	Agilent	N1911A	3980	12	12-Sep-2012
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	12-Sep-2012
Section 2.6 - 6dB Bandwidth					
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	28-Jun-2012
Mains Voltage Monitor	TUV	MVM1	1378	12	19-Aug-2012
Multimeter	Iso-tech	IDM101	2424	12	5-Sep-2012
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	10-Jun-2012
Variac Transformer	Zenith	Z-710-R	3169	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	3-May-2012
Power Divider	Weinschel	1506A	3345	12	4-May-2012
Vector Signal Generator	Rohde & Schwarz	SMU 200A	3493	12	20-Sep-2012
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3700	12	11-Jan-2012
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3701	12	11-Jan-2012
P-Series Power Meter	Agilent	N1911A	3980	12	12-Sep-2012
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	12-Sep-2012

TU – Traceability Unscheduled
O/P MON – Output Monitored with Calibrated Equipment

Product Service

3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
AC Line Conducted Emissions	± 3.2 dB
Maximum Peak Conducted Output Power	± 0.70 dB
EIRP Peak Power	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Power Spectral Density	± 3.0 dB
Spurious and Band Edge Emissions	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
6dB Bandwidth	± 212.114 kHz

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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

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

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

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