Report On

FCC Testing of the
Pace Plc PX001BNT
In accordance with FCC CFR 47 Part 15C

COMMERCIAL-IN-CONFIDENCE

FCC ID: NQ8PX001BNT

Document 75921218 Report 01 Issue 3 April 2013

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REPORT ON

FCC Testing of the
Pace Plc PX001BNT
In accordance with FCC CFR 47 Part 15C

Document 75921218 Report 01 Issue 3

April 2013

PREPARED FOR

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PREPARED BY

Natalie Bennett
Senior Administrator (Technical)

APPROVED BY

Mark Jenkins
Authorised Signatory

DATED 03 April 2013

This report has been up-issued to Issue 3 to correct the FCC ID.

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);

G Lawler S Milliken

Product Service

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Product Service

SECTION 1

REPORT SUMMARY

FCC Testing of the
Pace Plc PX001BNT
In accordance with FCC CFR 47 Part 15C

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the Pace Plc PX001BNT 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)	PX001BNT
Serial Number(s)	PB20121200866 PB2012120025
Number of Samples Tested	2
Test Specification/Issue/Date	FCC CFR 47 Part 15C (2012)
Incoming Release Date	Application Form 04 March 2013
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	PO_171_5158263_0_US 07 January 2013
Start of Test	4 February 2013
Finish of Test	9 February 2013
Name of Engineer(s)	G Lawler S Milliken
Related Document(s)	ANSI C63.10: 2009

Product Service

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
Transmit - Set Top Box 1 – Antenna 0				
2.1	15.207	AC Line Conducted Emissions	Pass	
2.2	15.247 (b)(3)	Maximum Peak Conducted Output 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	
Transmit - Set Top Box 1 – Antenna 1				
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	

Product Service

1.3 APPLICATION FORM

EQUIPMENT DESCRIPTION		
Model Name/Number	PX001BNT	
Part Number	D6671001900	
FCC ID (if applicable)	NQ8PX001BNT	
Industry Canada ID (if applicable)		
Technical Description (Please provide a brief description of the intended use of the equipment)	HD PVR with MOCA.	

EXTREME TEMPERATURE RANGE over which the equipment is to be type tested
☐ -20°C to +55°C
☐ Other (2)
☒ Not applicable (no extreme temperature testing required)
Extreme temperature range for the host(s):

(2) The equipment shall be tested over the following temperature ranges :

a) 0°C to +35°C for equipment for indoor use only, or intended for used in areas where the temperature is controlled within this range.

b) Over the extremes of the temperature range(s) of the declared host equipment(s) in case of plug-in radio devices.

TYPE OF ANTENNA
☒ Integral
Temporary RF connector provided: ☒ Yes ☐ No
☐ Antenna connector
☐ Number of antenna assembly(ies) submitted
Gain of the antenna intended for normal use:
dBi for assembly identified as
dBi for assembly identified as
dBi for assembly identified as
dBi for assembly identified as
dBi for assembly identified as

TRANSMITTER TECHNICAL CHARACTERISTICS		
TRANSMITTER OPERATING FREQUENCY RANGE(S)		
	FCC and/or Industry Canada	**EU**
Bluetooth	to MHz	to MHz
WLAN	2400 to 2485 MHz	to MHz
FCC and/or Industry Canada (only)		
Highest Internally Generated Frequency 1000 MHz		

Product Service

SPREAD SPECTRUM PARAMETERS	
☐ **Bluetooth**	Version:
FHSS: Channel ☐ 79 Other	EDR ☐ Yes ☐ No
Medium Access Protocol (Customer Declaration)	
.	

☐ **WLAN**			
IEEE 802.11(b) – DSSS ☐			
IEEE 802.11(g) – OFDM ☐			
IEEE 802.11(n) – OFDM ☐			
Supported Spatial Streams		2.4 GHz	5GHz
	Transmitter (Tx)		N/A
	Receiver (Rx)		N/A
GI (Guard Interval)	☐ 800 ns	☐ 400 ns	
Band Width	☐ 20 MHz	☐ 40 MHz	
Medium Access Protocol (Customer Declaration)			

☐ **Other Technology**			
☐ Direct Sequence	☐ Frequency Hopping	☐ Combined	☐ Other
DSSS	Chip Sequence Length		bit
	Spectrum Width		MHz
FHSS	Total Number of Hops		
	Dwell Time		ms
	Bandwidth Per Hop		MHz
	Maximum Separation of Hops		MHz for ETSI EN 300 328
Other			
Medium Access Protocol (Customer Declaration)			

Product Service

TRANSMITTER POWER CHARACTERSITICS								
Bluetooth								
Maximum Rated Transmitter Output								
Effective radiated power (for equipment with antenna connector)					W			
Effective radiated power (for equipment with integral antenna)					W			
Minimum Rated Transmitter Output								
Effective radiated power (for equipment with antenna connector)					W			
Effective radiated power (for equipment with integral antenna)					W			
Is transmitter intended for :								
Continuous duty						☐	Yes	☐ No
Intermittent duty						☐	Yes	☐ No
If intermittent state DUTY CYCLE								
Transmitter ON	seconds		Transmitter OFF		minutes			
Is continuous operation possible for testing purposes?						☐	Yes	☐ No
Is transmitter output power variable:						☐	Yes	☐ No
State during the test:								
Transmitter duty cycle	Tx on		Seconds	Tx Off		Seconds		
Duty cycle (Tx on /(Tx on +Tx off))			%					
☐ Continuously variable			☐ Stepped					
dB per step								
WLAN								
Maximum Rated Transmitter Output								
Effective radiated power (for equipment with antenna connector)					W			
Effective radiated power (for equipment with integral antenna)				0.002	W			
Minimum Rated Transmitter Output								
Effective radiated power (for equipment with antenna connector)					W			
Effective radiated power (for equipment with integral antenna)				0.000063	W			
Is transmitter intended for :								
Continuous duty						☐	Yes	☐ No
Intermittent duty						☒	Yes	☐ No
If intermittent state DUTY CYCLE								
Transmitter ON	seconds		Transmitter OFF		minutes			
Is continuous operation possible for testing purposes?						☒	Yes	☐ No
Is transmitter output power variable:						☐	Yes	☐ No
State during the test:								
Transmitter duty cycle	Tx on		Seconds	Tx Off		Seconds		
Duty cycle (Tx on /(Tx on +Tx off))		0.1	%					
☐ Continuously variable			☐ Stepped					
dB per step								

Product Service

TRANSMITTER POWER SOURCE (3)					
☒ Common power source for transmitter and receiver					
☐ AC mains		State voltage			
AC supply frequency	(Hz)	VAC	Max Current		Hz
☐ Single phase		☐ Three phase			
And / Or					
☒ External DC supply					
Nominal voltage	5	Max Current	1.2	A	
Extreme upper voltage		Extreme lower voltage			
Battery					
☐ Nickel Cadmium					
☐ Lead acid (Vehicle regulated)					
☐ Alkaline					
☐ Lithium					
☐ Other Details :					
Volts nominal.					
End point voltage as quoted by equipment manufacturer		V			

(3) If a transmitter and receiver use the same power source, this should be declared. In such cases only the box for the transmitter power source should be filled in.

AUTOMATIC EQUIPMENT SWITCH OFF
If the equipment is designed to automatically switch off at a predetermined voltage level which is higher or lower in value than the battery minimum and minimum calculated values this shall be clearly stated.
☐ Applies V cut-off voltage
☐ Does not apply

Product Service

RECEIVER POWER SOURCE (4)					
☐ AC mains		State voltage			
AC supply frequency	(Hz)	VAC	Max Current		Hz
☐ Single phase		☐ Three phase			
And / Or					
☐ External DC supply					
Nominal voltage		Max Current		A	
Extreme upper voltage		Extreme lower voltage			
Battery					
☐ Nickel Cadmium					
☐ Lead acid (Vehicle regulated)					
☐ Alkaline					
☐ Lithium					
☐ Other Details :					
Volts nominal.					
End point voltage as quoted by equipment manufacturer			V		

(4) If a transmitter and receiver use the same power source, this should be declared. In such cases only the box for the transmitter power source should be filled in.

AUTOMATIC EQUIPMENT SWITCH OFF	
If the equipment is designed to automatically switch off at a predetermined voltage level which is higher or lower in value than the battery minimum and minimum calculated values this shall be clearly stated.	
☐ Applies	V cut-off voltage
☒ Does not apply	

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

Signature: J. Ryan Name: Joseph Ryan

Position held: Approvals Manager Date: 29th March 2013

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Pace Plc PX001BNT. 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 Accreditation
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
Pace Plc PX001BNT
In accordance with FCC CFR 47 Part 15C

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

PX001BNT S/N: PB20121200866 - Modification State 0

2.1.3 Date of Test

9 February 2013

2.1.4 Test Equipment Used

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

2.1.5 Test Procedure

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

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

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

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

2.1.6 Environmental Conditions

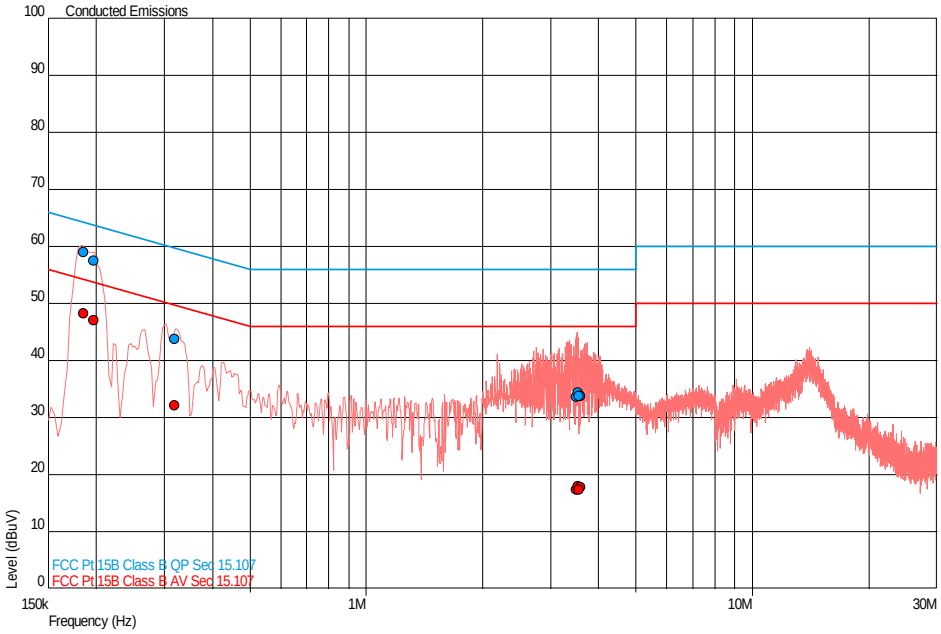
Ambient Temperature	17.4°C
Relative Humidity	31.0%

Product Service

2.1.7 Test Results

Transmit - Set Top Box 1 – Antenna 0

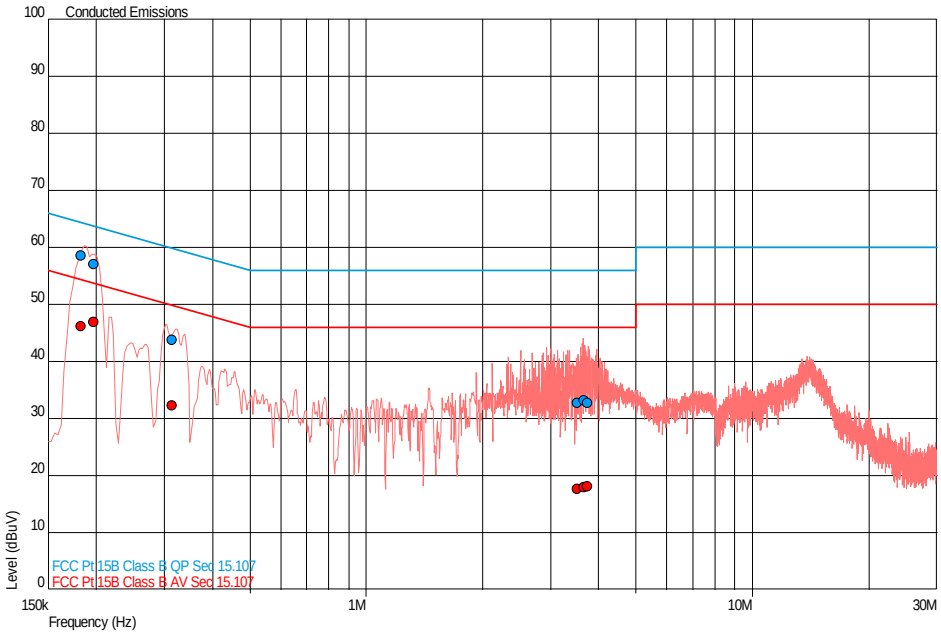
Live Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.185	59.0	64.2	-5.3	48.3	54.2	-6.0
0.197	57.5	63.7	-6.3	47.1	53.7	-6.7
0.319	43.8	59.7	-15.9	32.2	49.7	-17.5
3.491	33.6	56.0	-22.4	17.4	46.0	-28.6
3.524	34.3	56.0	-21.7	18.0	46.0	-28.0
3.545	33.9	56.0	-22.1	17.5	46.0	-28.5
3.595	33.9	56.0	-22.1	17.9	46.0	-28.1

Product Service

Neutral Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.183	58.5	64.4	-5.8	46.2	54.4	-8.1
0.197	57.1	63.7	-6.7	46.9	53.7	-6.9
0.313	43.8	59.9	-16.1	32.4	49.9	-17.5
3.519	32.7	56.0	-23.3	17.7	46.0	-28.3
3.657	33.2	56.0	-22.8	18.0	46.0	-28.0
3.738	32.8	56.0	-23.2	18.1	46.0	-27.9

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

PX001BNT S/N: PB2012120025 - Modification State 0

2.2.3 Date of Test

6 February 2013

2.2.4 Test Equipment Used

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

2.2.5 Test Procedure

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	22.7°C
Relative Humidity	22.6%

Product Service

2.2.7 Test Results

Transmit - Set Top Box 1 – Antenna 0

110 V AC Supply

Modulation Data Rate (Mbps)	Maximum Peak Conducted Output Power					
	dBm			mW		
	2425 MHz	2450 MHz	2475 MHz	2425 MHz	2450 MHz	2475 MHz
1	1.09	1.29	1.26	1.285	1.346	1.337

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.

Transmit - Set Top Box 1 – Antenna 1

110 V AC Supply

Modulation Data Rate (Mbps)	Maximum Peak Conducted Output Power					
	dBm			mW		
	2425 MHz	2450 MHz	2475 MHz	2425 MHz	2450 MHz	2475 MHz
1	1.22	1.45	1.54	1.324	1.396	1.426

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

PX001BNT S/N: PB20121200866 - Modification State 0

2.3.3 Date of Test

4 February 2013

2.3.4 Test Equipment Used

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

2.3.5 Test Procedure

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 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. If applicable, a peak power analyser was also used to obtain a correction factor for wideband signals such as WLAN.

A calculation was then performed to obtain the final figure.

2.3.6 Environmental Conditions

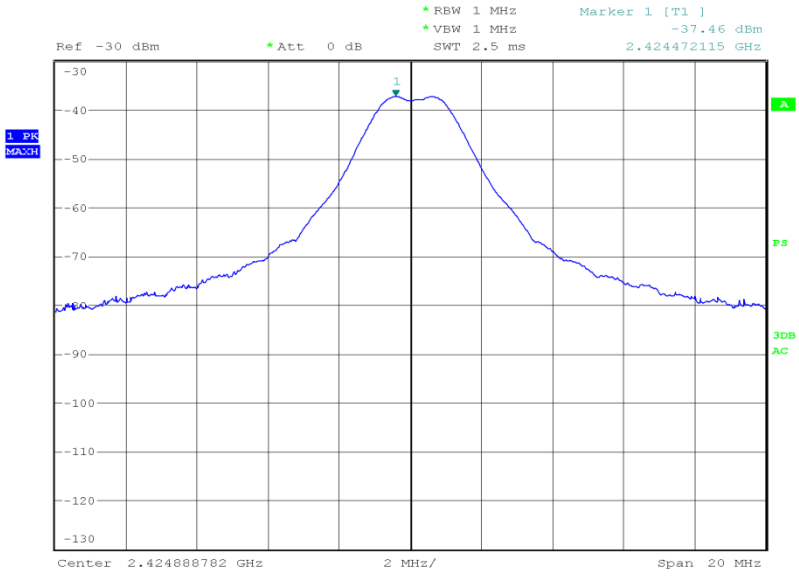
Ambient Temperature	19.7°C
Relative Humidity	31.0%

2.3.7 Test Results

Transmit - Set Top Box 1 – Antenna 1

2425 MHz

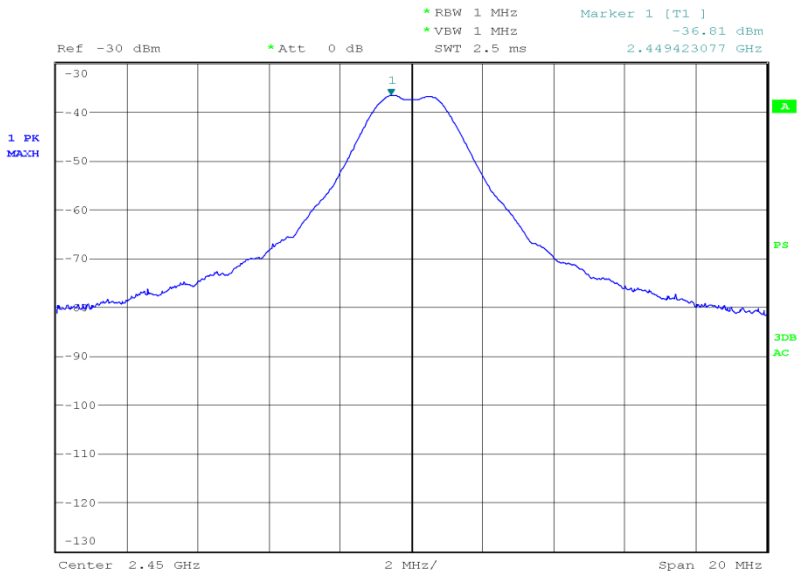
EIRP (dBm)	EIRP (mW)
5.09	3.23



Date: 4.FEB.2013 19:40:34

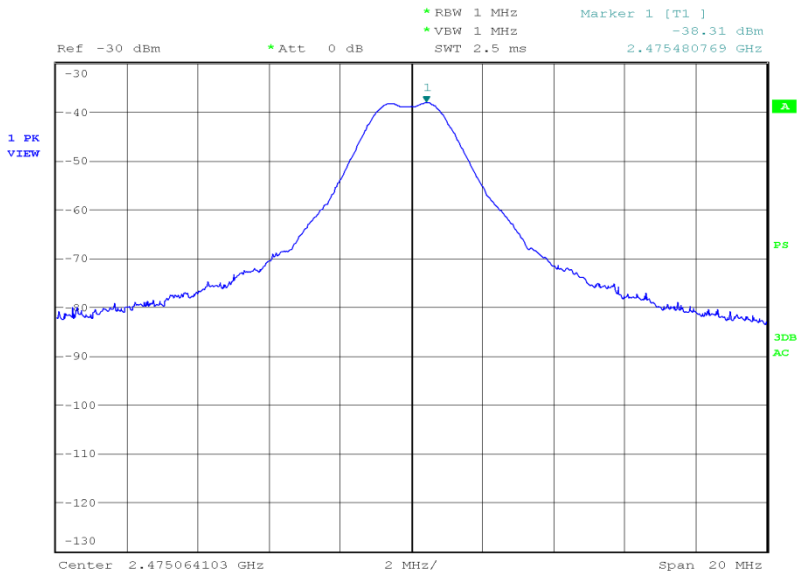
2450 MHz

EIRP (dBm)	EIRP (mW)
5.90	3.89



2475 MHz

EIRP (dBm)	EIRP (mW)
3.80	2.40



Date: 4.FEB.2013 21:00:09

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

PX001BNT S/N: PB2012120025 - Modification State 0

2.4.3 Date of Test

6 February 2013

2.4.4 Test Equipment Used

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

2.4.5 Test Procedure

The EUT was 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	22.7°C
Relative Humidity	22.6%

Product Service

2.4.7 Test Results

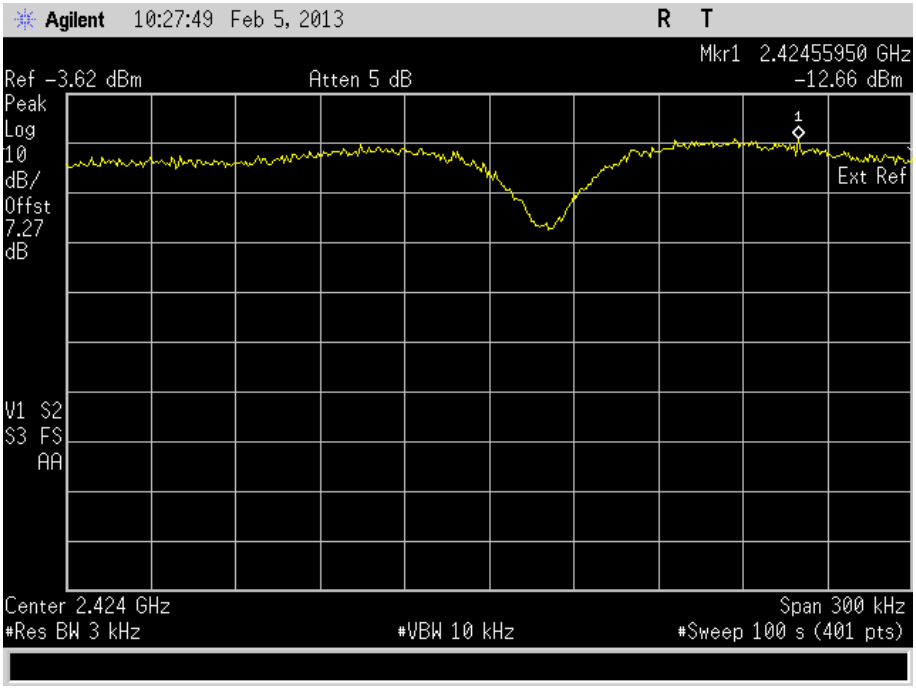
Transmit - Set Top Box 1 – Antenna 0

110 V AC Supply

Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2425 MHz	1	-12.66
2450 MHz	1	-11.93
2475 MHz	1	-13.1

2425 MHz

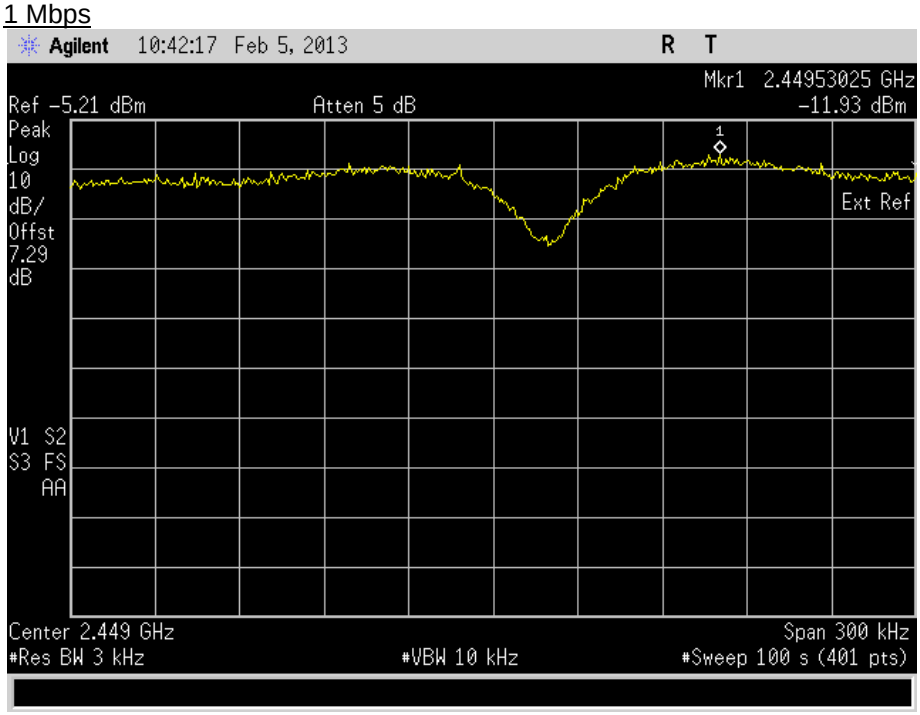
1 Mbps



Product Service

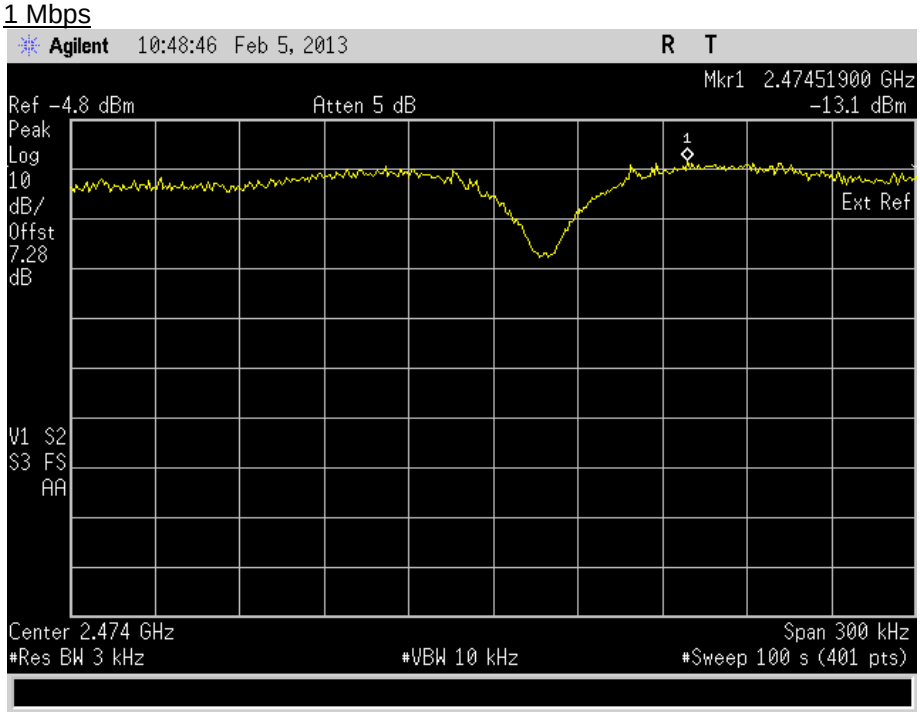
2450 MHz

1 Mbps



2475 MHz

1 Mbps



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.

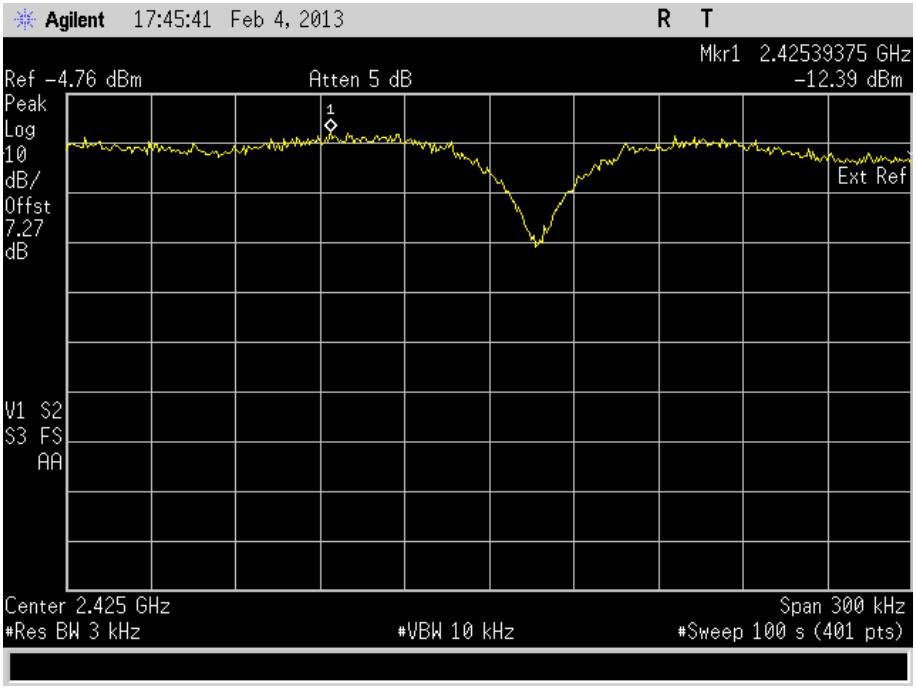
Transmit - Set Top Box 1 – Antenna 1

110 V AC Supply

Frequency	Data Rate (Mbps)	Power Spectral Density in 3 kHz Bands (dBm)
2425 MHz	1	-12.39
2450 MHz	1	-12.94
2475 MHz	1	-12.52

2425 MHz

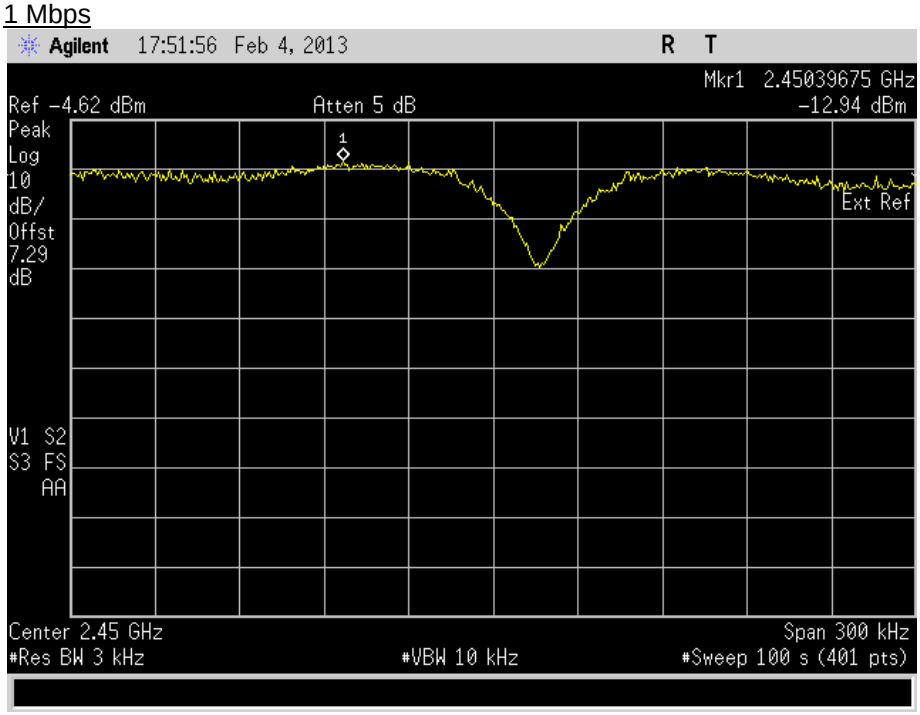
1 Mbps



Product Service

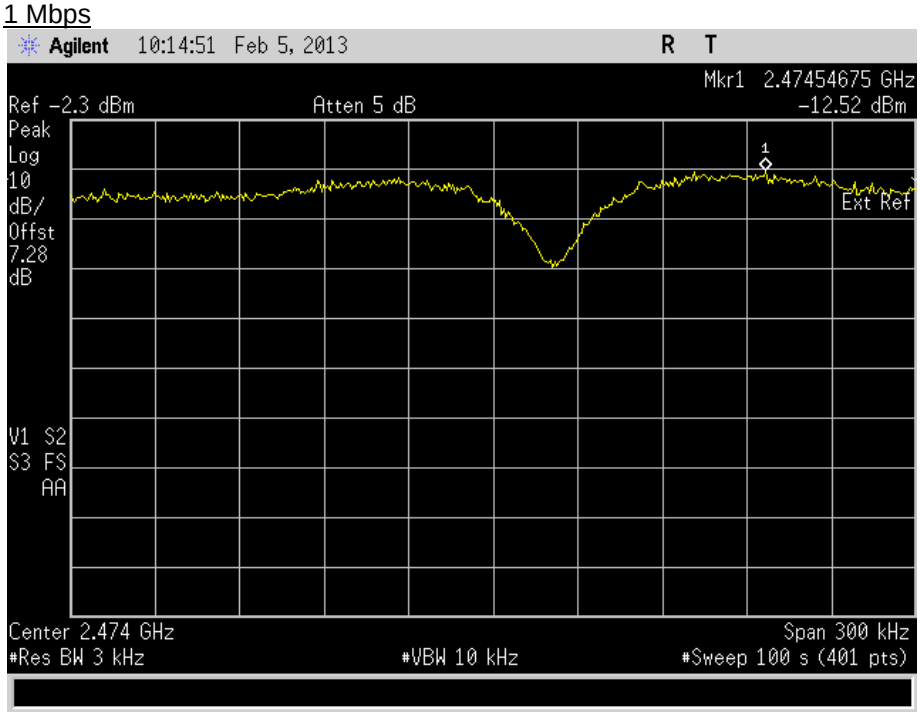
2450 MHz

1 Mbps



2475 MHz

1 Mbps



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.

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

PX001BNT S/N: PB2012120025 - Modification State 0
PX001BNT S/N: PB20121200866 - Modification State 0

2.5.3 Date of Test

4 February 2013, 6 February 2013 & 9 February 2013

2.5.4 Test Equipment Used

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

2.5.5 Test Procedure

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 a s 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	17.4 - 22.7°C
Relative Humidity	22.6 - 31.0%

Product Service

2.5.7 Test Results

Transmit - Set Top Box 1 – Antenna 0

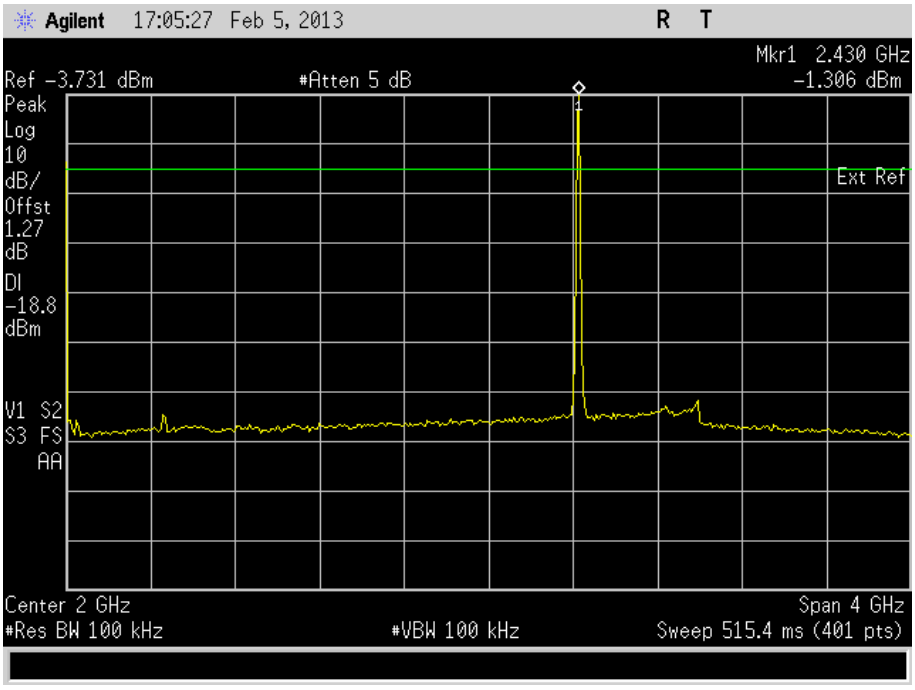
110 V AC Supply

Spurious Conducted Emissions

1 Mbps

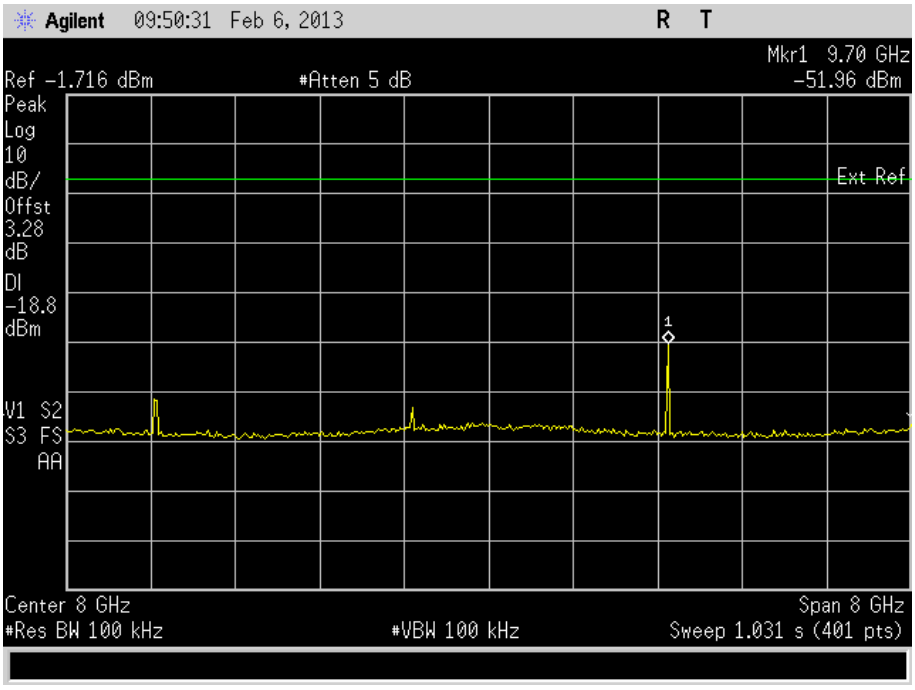
2425 MHz

9 kHz to 4 GHz

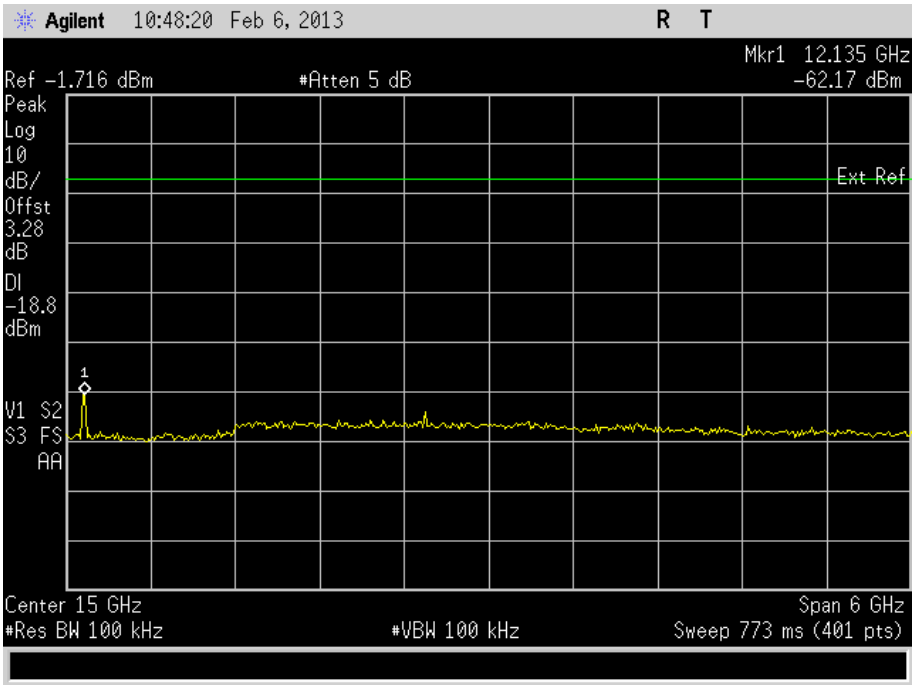


Product Service

4 GHz to 12 GHz

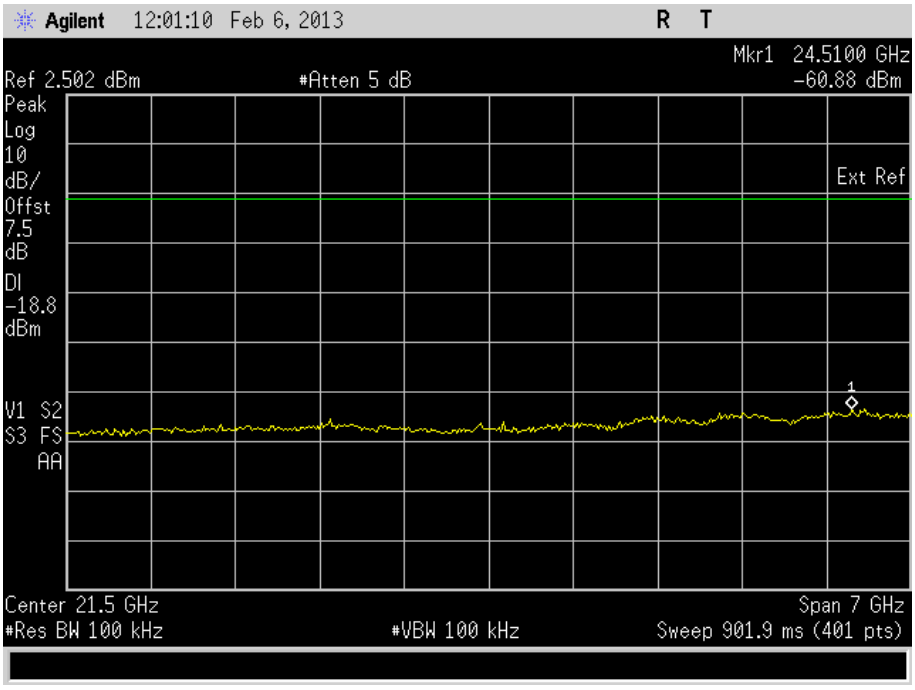


12 GHz to 18 GHz



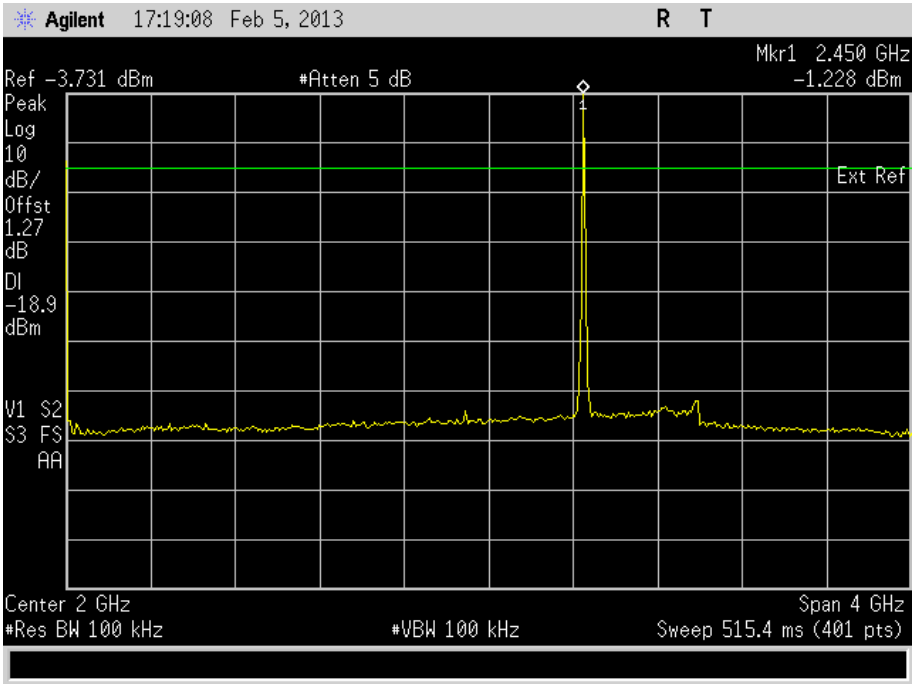
Product Service

18 GHz to 25 GHz



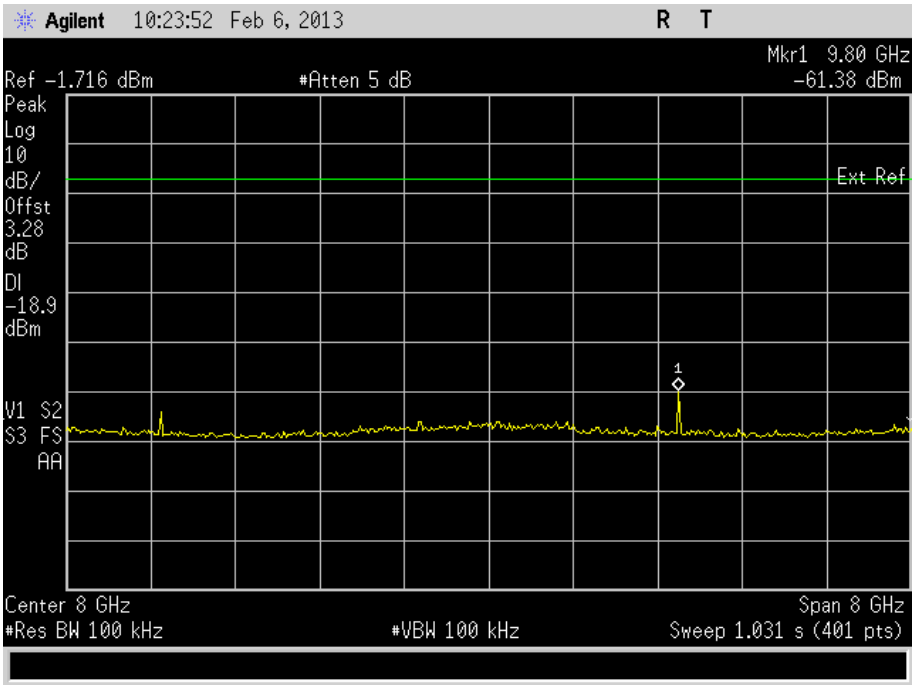
2450 MHz

9 kHz to 4 GHz

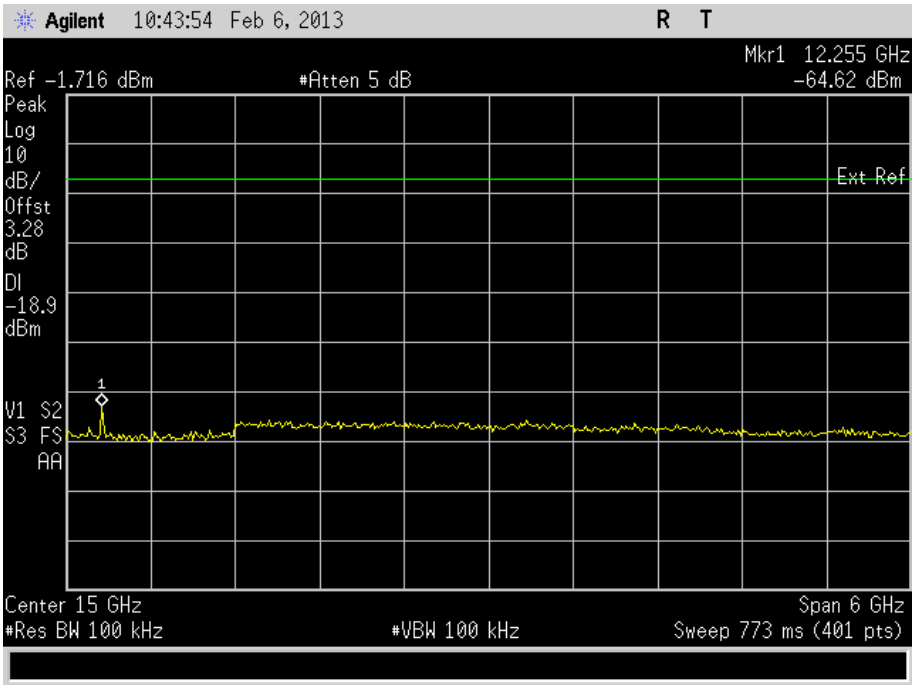


Product Service

4 GHz to 12 GHz

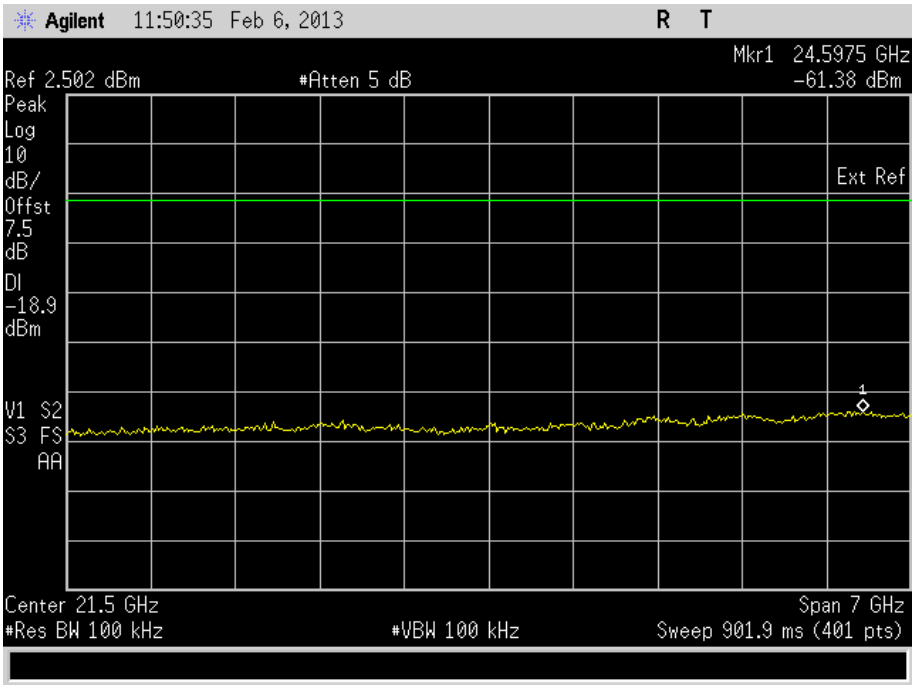


12 GHz to 18 GHz



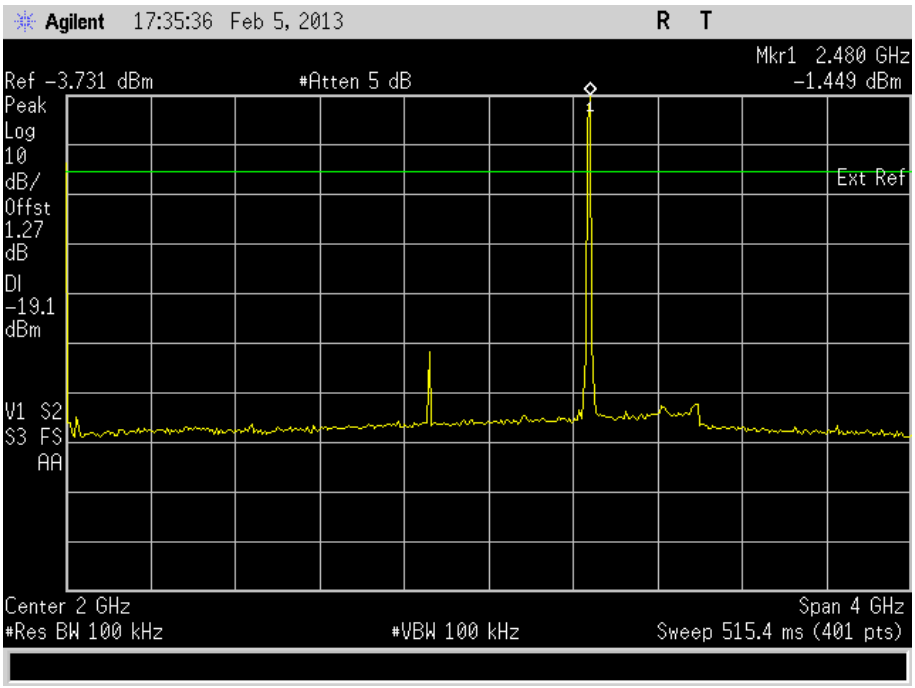
Product Service

18 GHz to 25 GHz



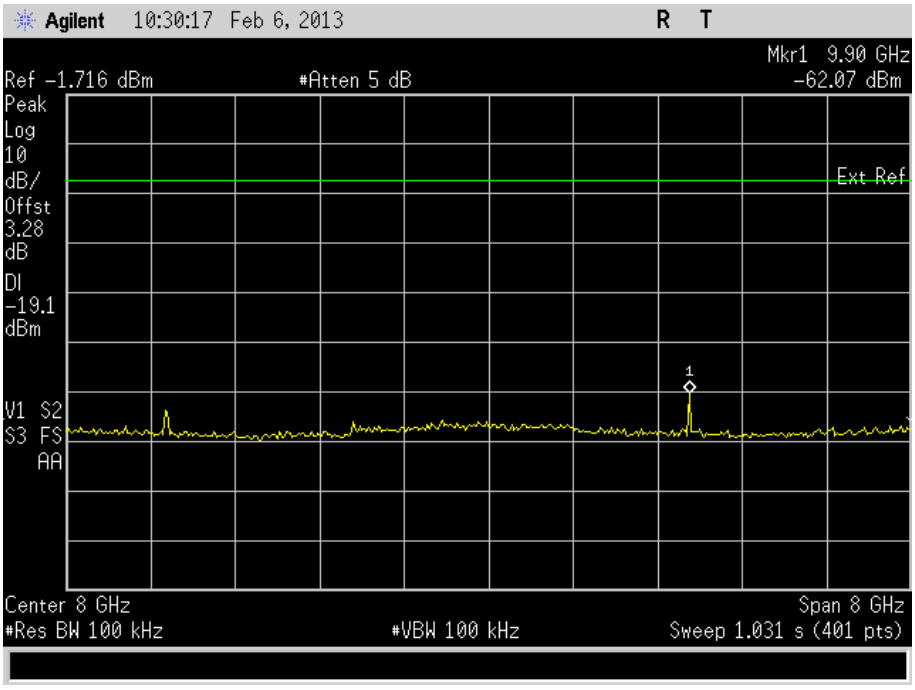
2475 MHz

9 kHz to 4 GHz

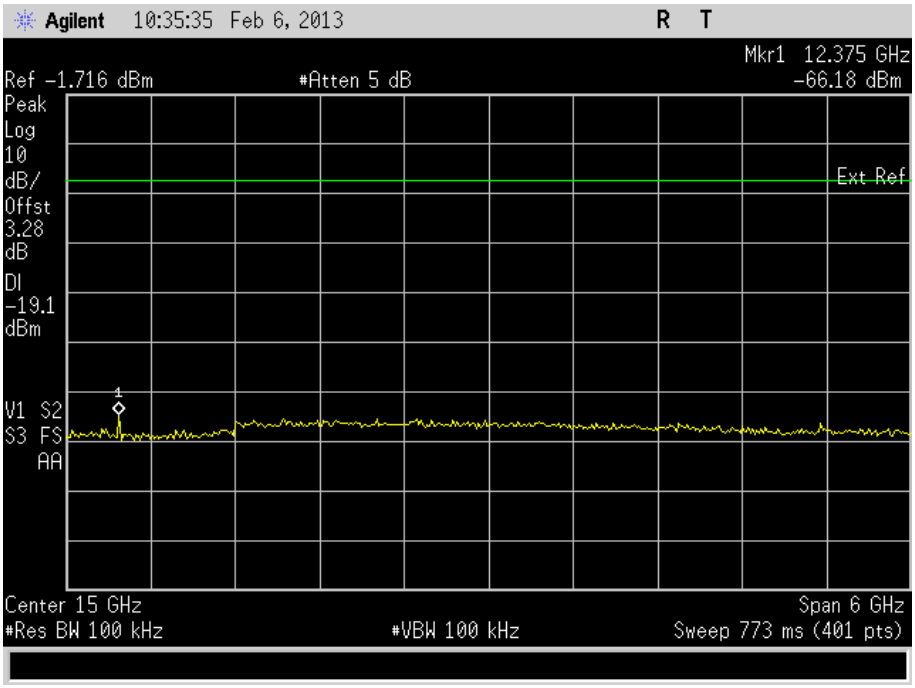


Product Service

4 GHz to 12 GHz

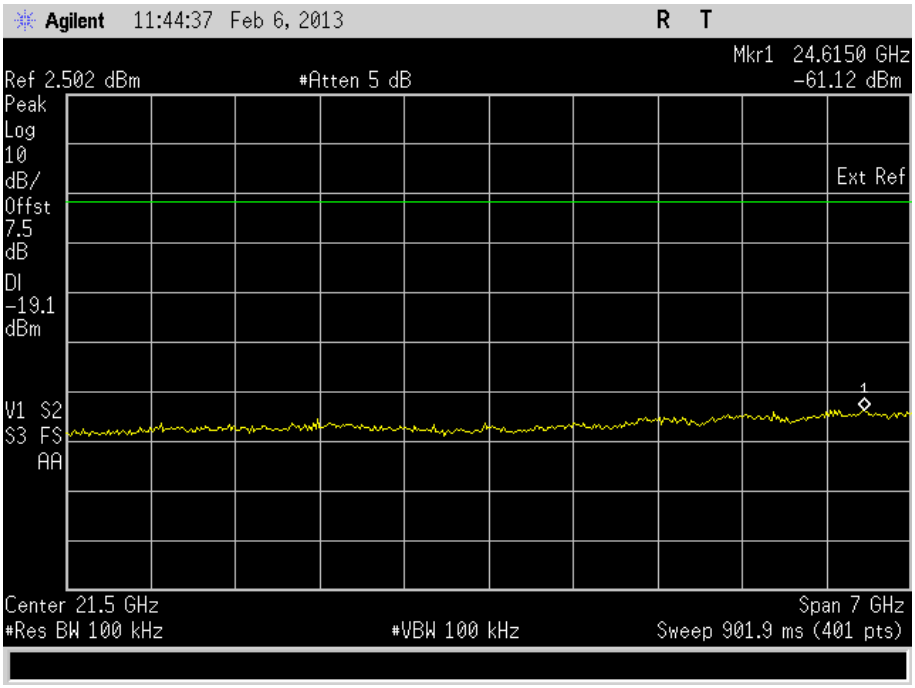


12 GHz to 18 GHz



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.

Transmit - Set Top Box 1 – Antenna 1

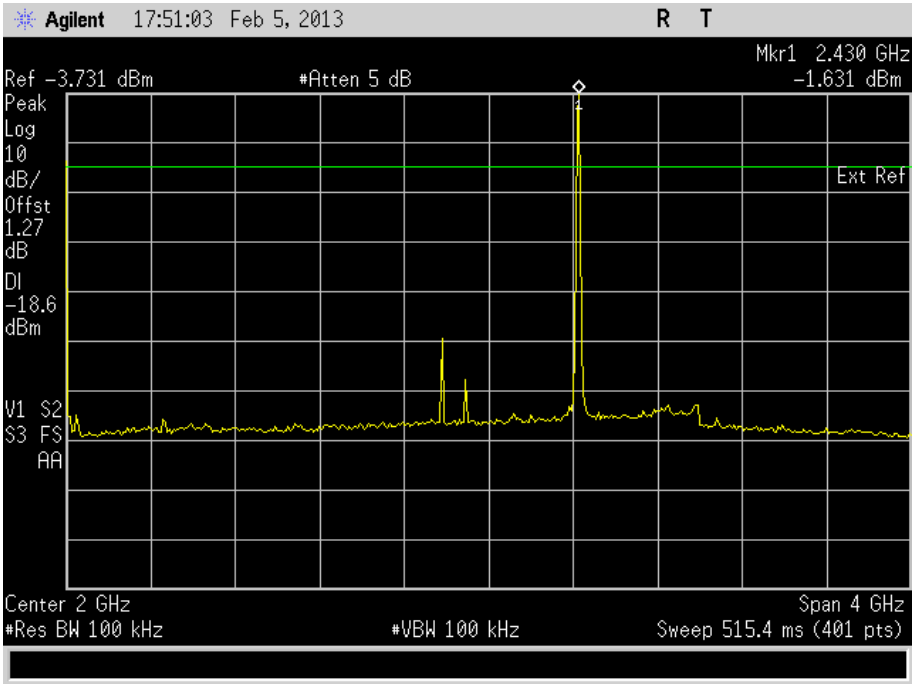
110 V AC Supply

Spurious Conducted Emissions

1 Mbps

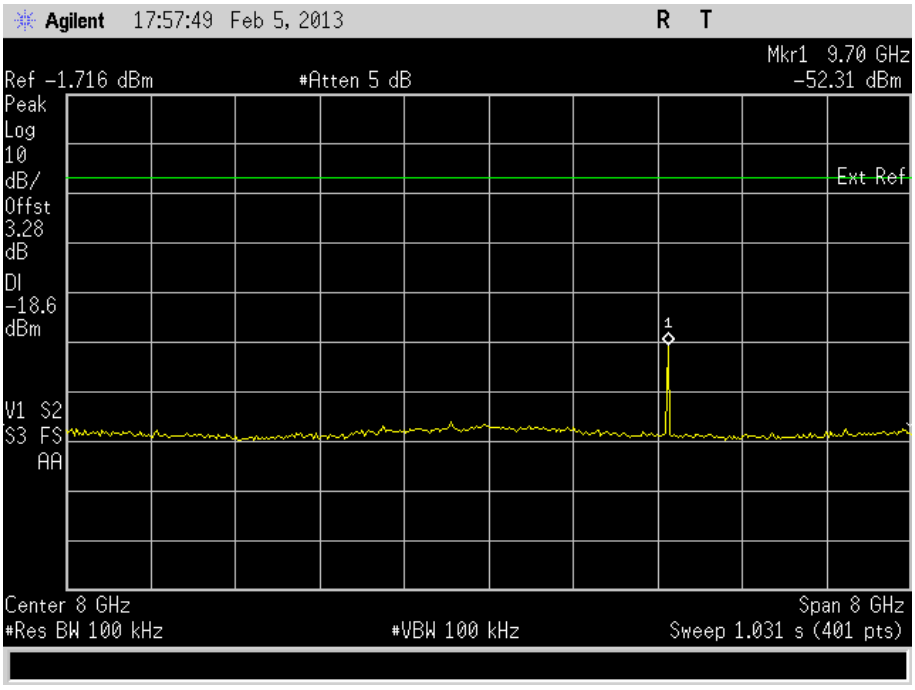
2425 MHz

9 kHz to 4 GHz

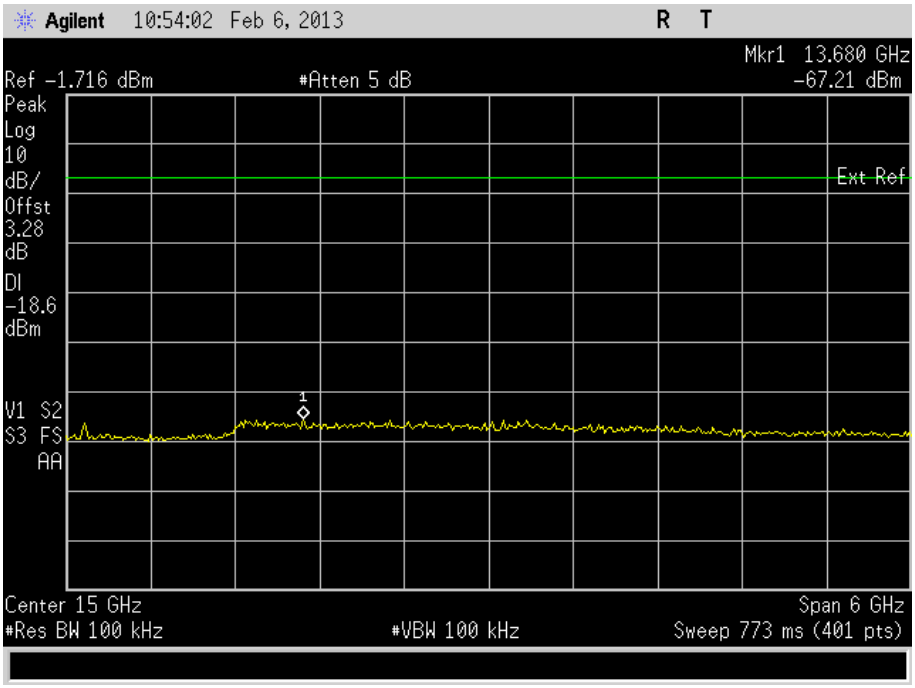


Product Service

4 GHz to 12 GHz

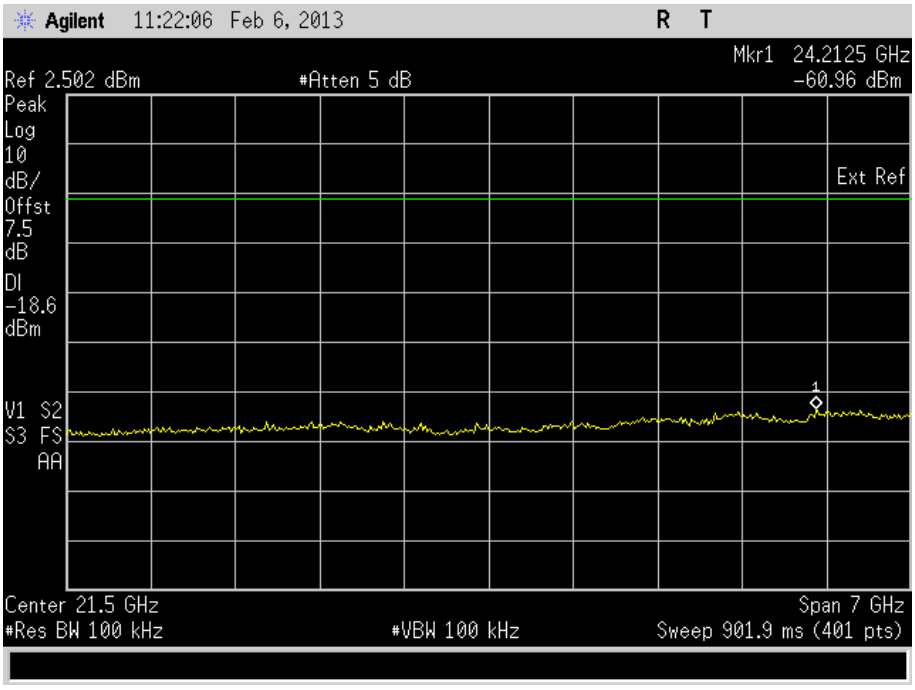


12 GHz to 18 GHz



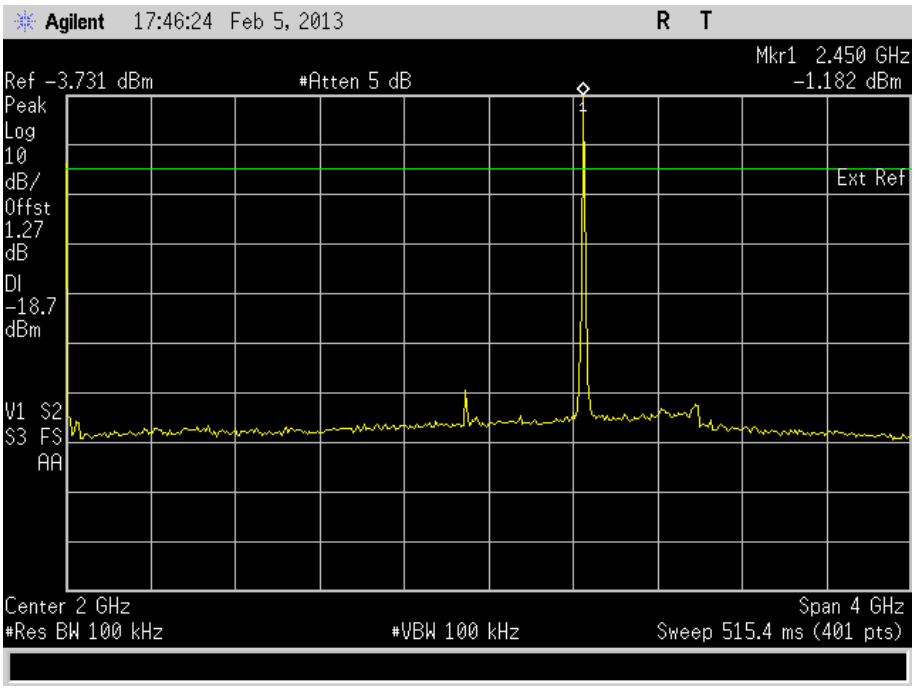
Product Service

18 GHz to 25 GHz



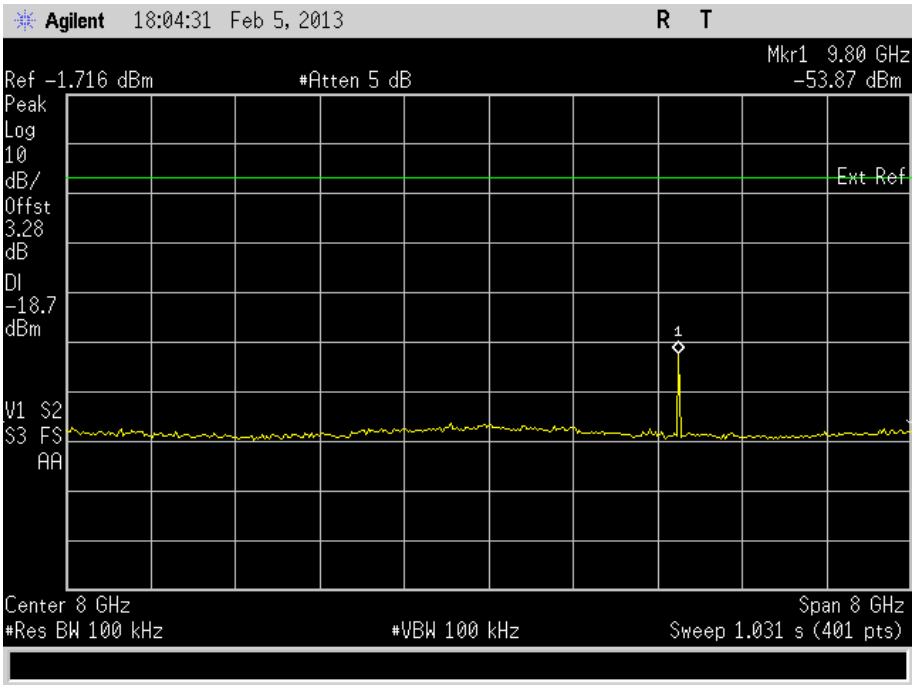
2450 MHz

9 kHz to 4 GHz

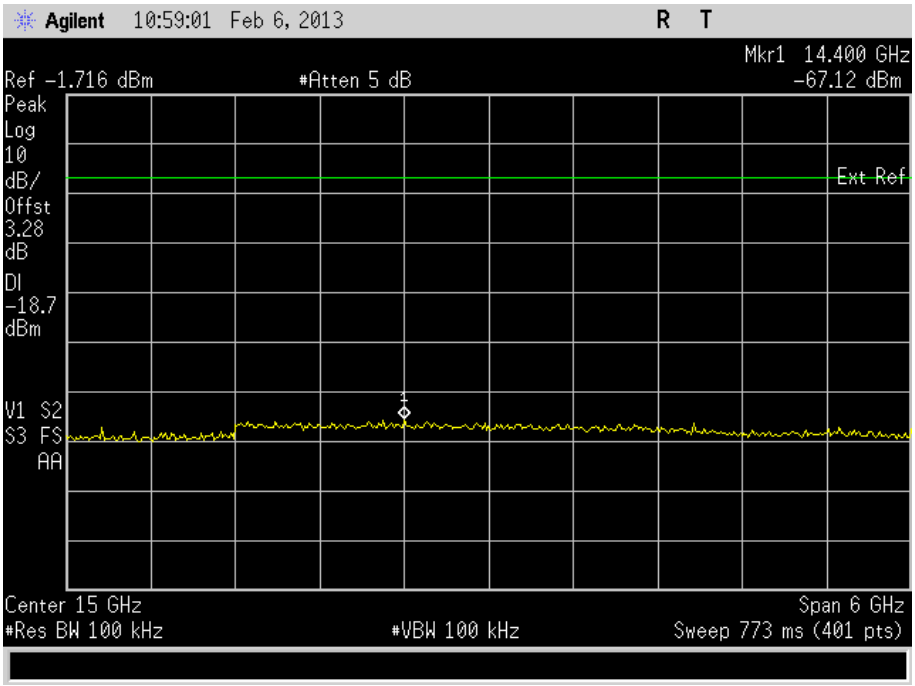


Product Service

4 GHz to 12 GHz

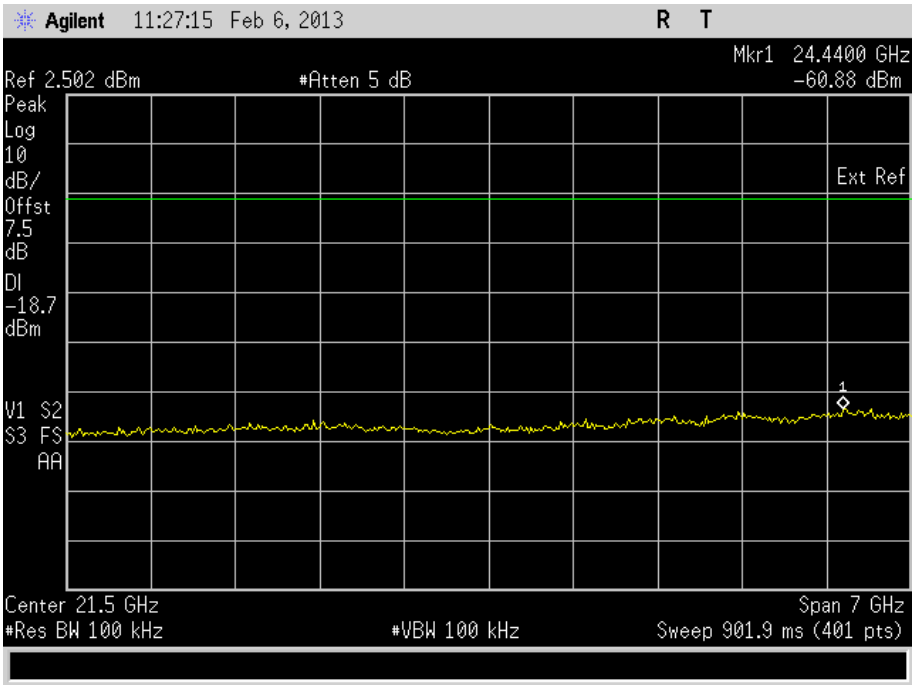


12 GHz to 18 GHz



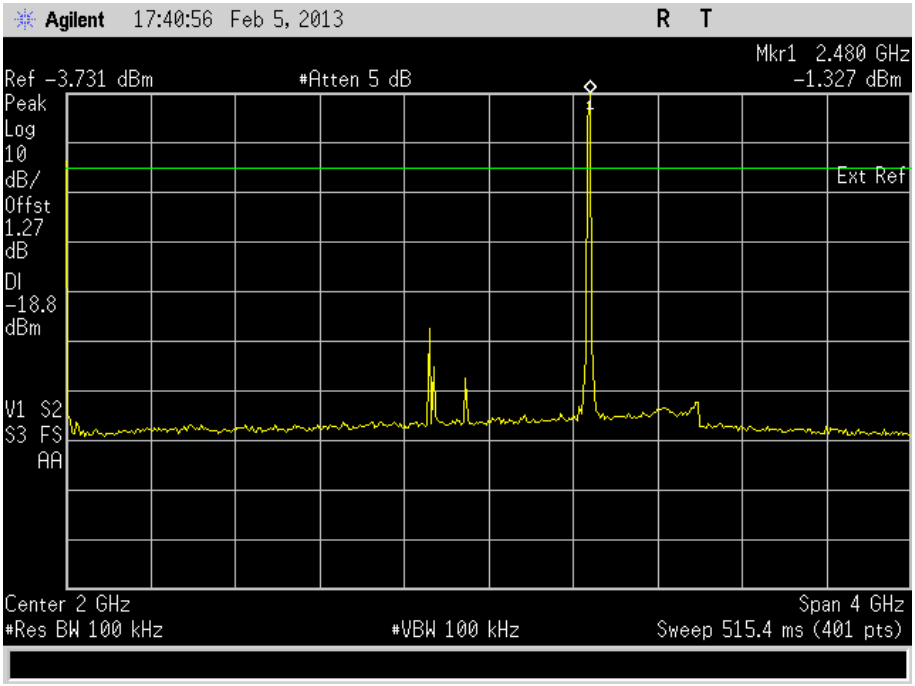
Product Service

18 GHz to 25 GHz



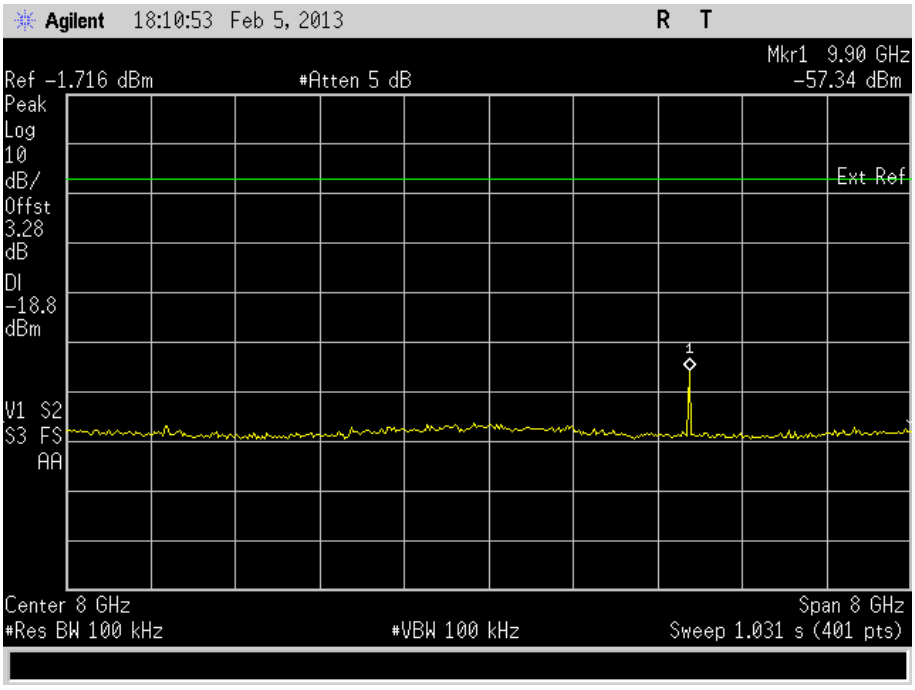
2475 MHz

9 kHz to 4 GHz

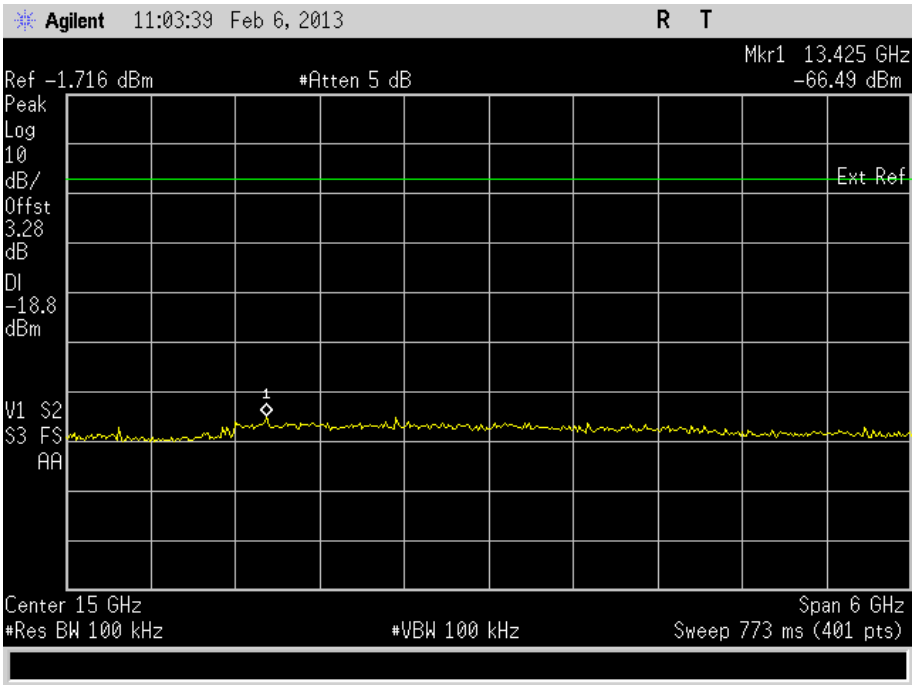


Product Service

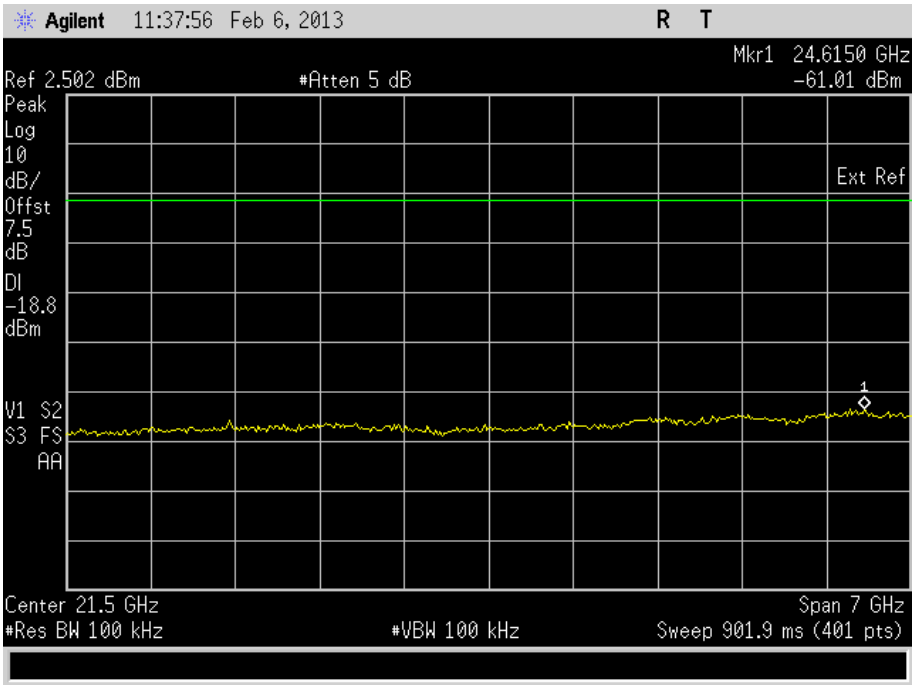
4 GHz to 12 GHz



12 GHz to 18 GHz



18 GHz to 25 GHz



Limit Clause

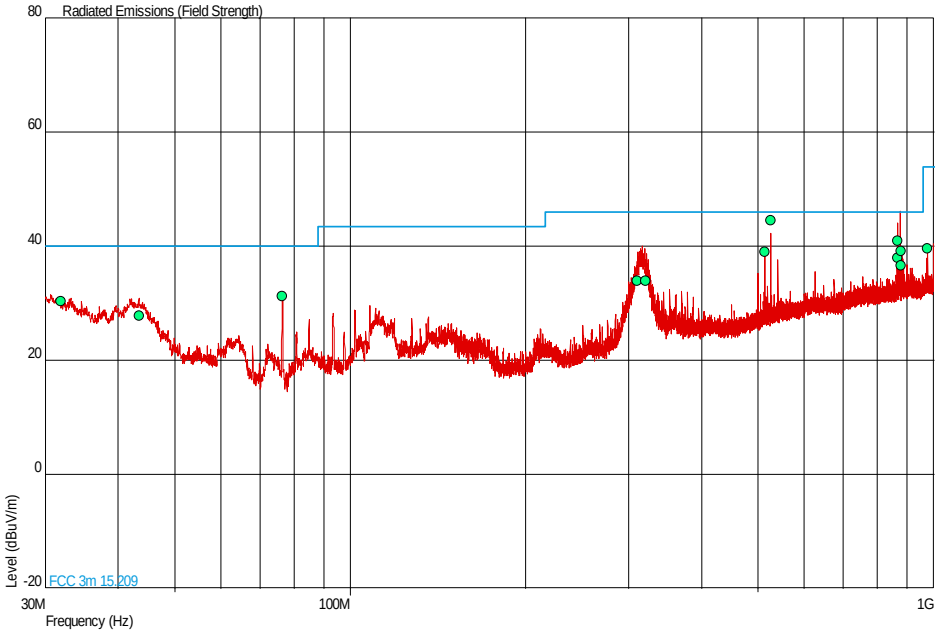
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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

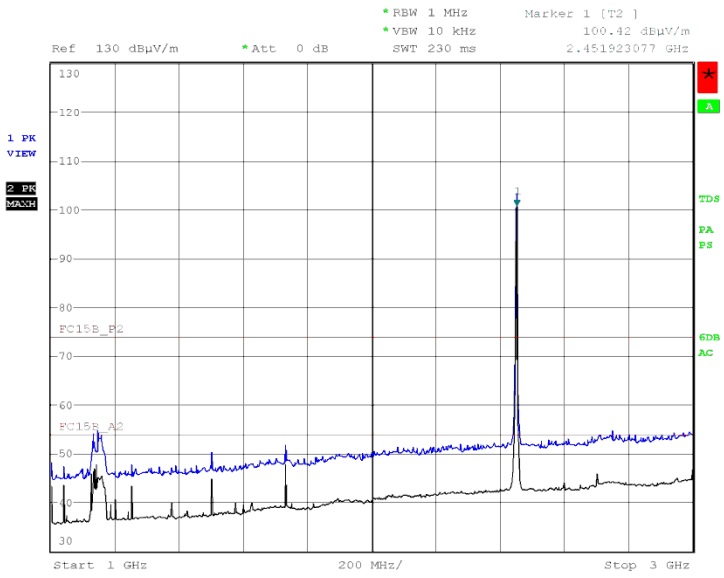


Frequency (MHz)	QP Level (dBµV/m)	QP Limit (dBµV/m)	QP Margin (dBµV/m)	Angle(Deg)	Height(m)	Polarity
31.962	30.4	40.0	-9.6	315	1.00	Vertical
43.509	27.9	40.0	-12.1	18	1.00	Vertical
76.505	31.3	40.0	-8.7	79	1.00	Vertical
975.040	39.7	54.0	-14.3	357	3.20	Vertical

1GHz to 25GHz

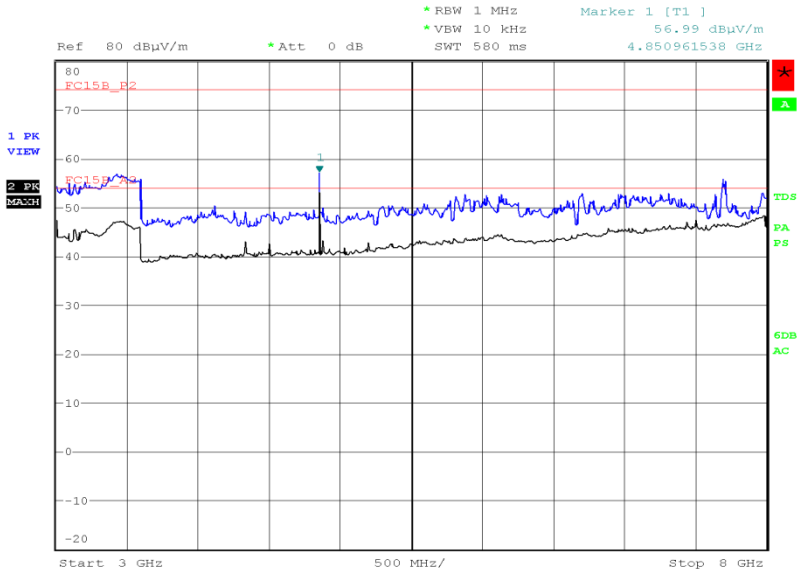
Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
1.500	Vertical	110	203	52.25	45.58
2.701	Vertical	112	153	53.16	44.22
4.851	Vertical	100	326	59.54	51.67

1 GHz to 3 GHz



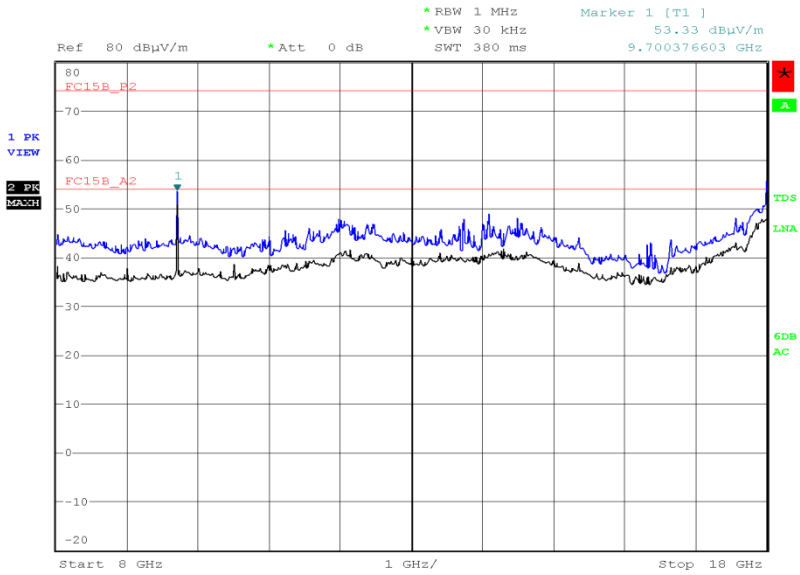
Product Service

3 GHz to 8 GHz



Date: 9.FEB.2013 22:55:50

8 GHz to 18 GHz



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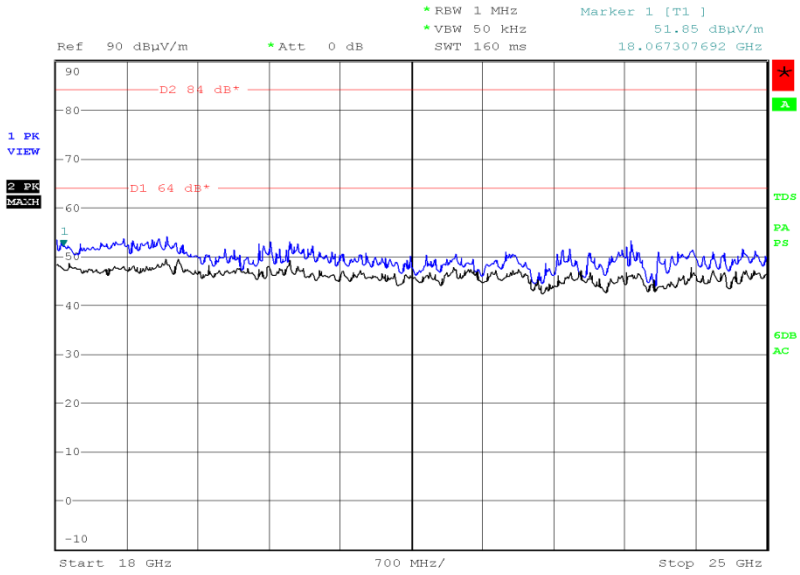
Product Service

18 GHz to 25 GHz



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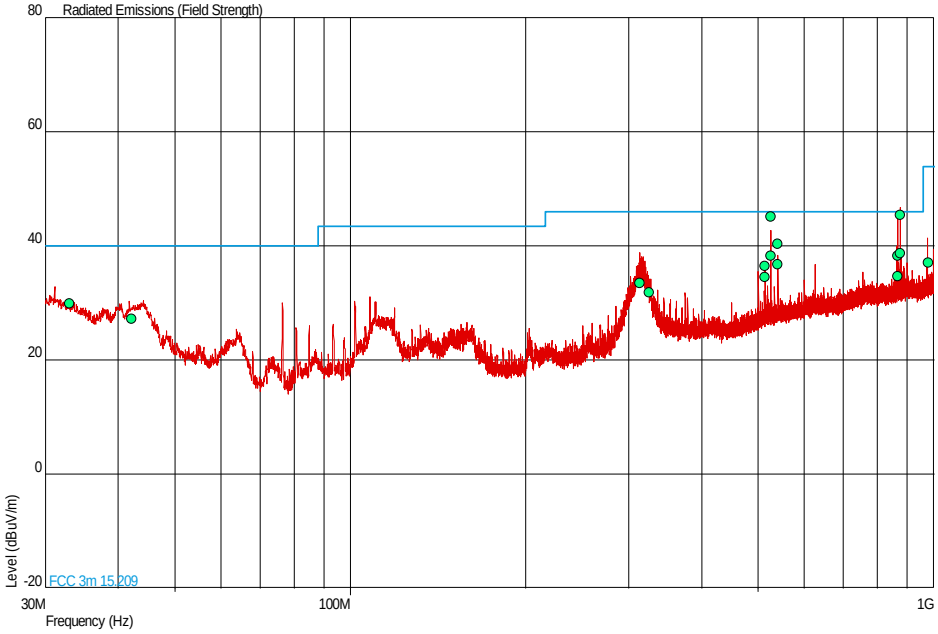
2450 MHz

30 MHz to 1 GHz



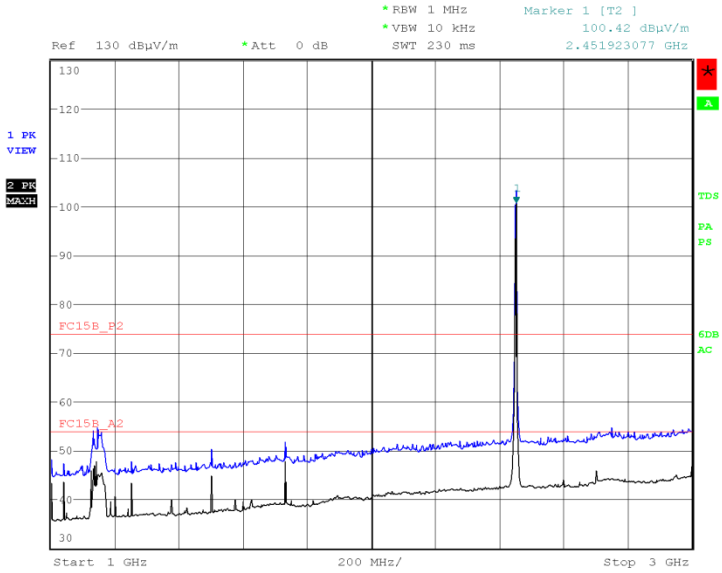
Frequency (MHz)	QP Level (dBµV/m)	QP Limit (dBµV/m)	QP Margin (dBµV/m)	Angle(Deg)	Height(m)	Polarity
33.047	29.9	40.0	-10.1	66	1.00	Vertical
42.239	27.2	40.0	-12.8	360	1.00	Vertical
979.997	37.0	54.0	-17.0	194	1.00	Vertical

Product Service

1 GHz to 25 GHz

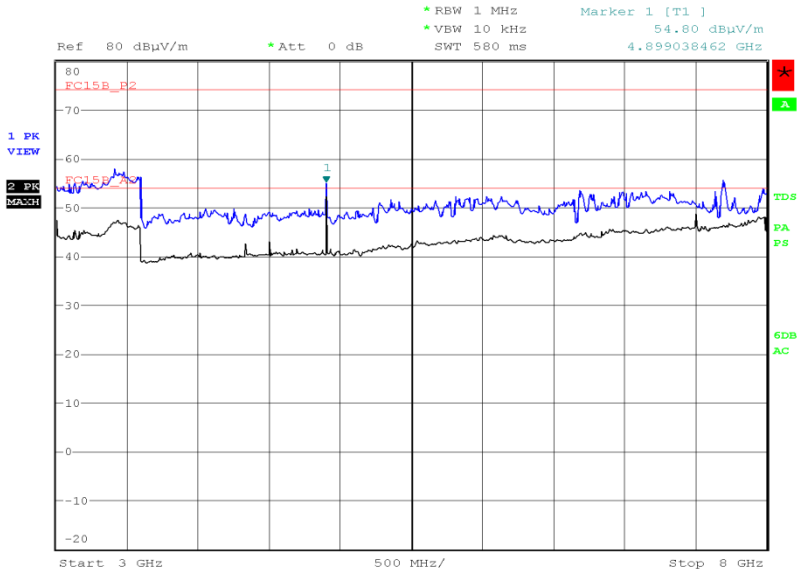
Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
1.500	Vertical	112	205	51.38	45.31
4.899	Vertical	100	060	59.33	51.77
7.500	Vertical	100	255	58.86	49.76

1 GHz to 3 GHz



Product Service

3 GHz to 8 GHz



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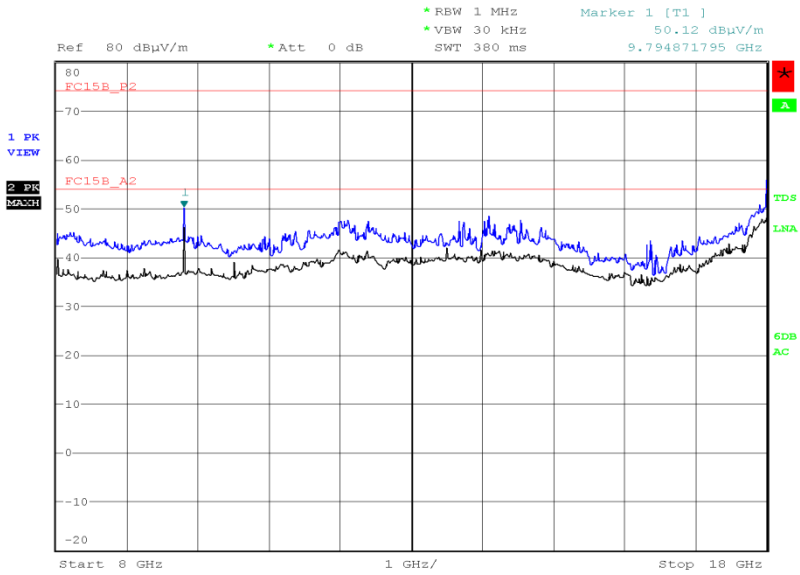
8 GHz to 18 GHz



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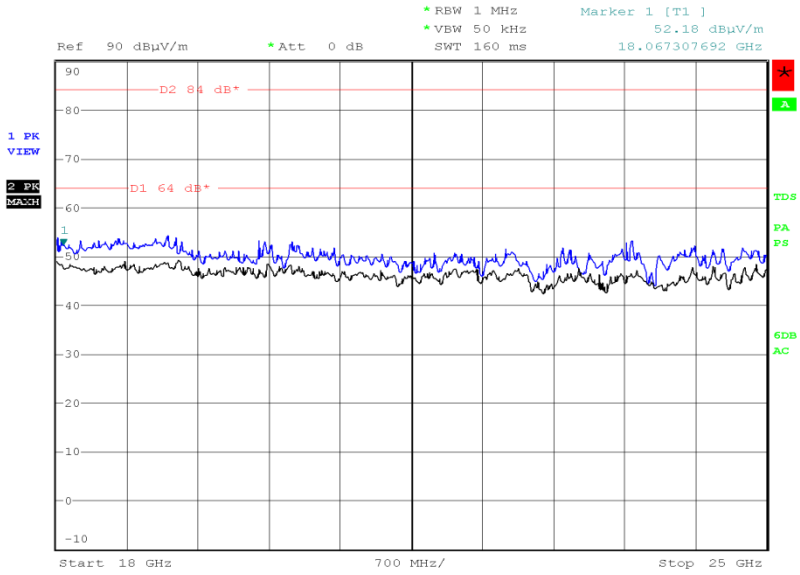
Product Service

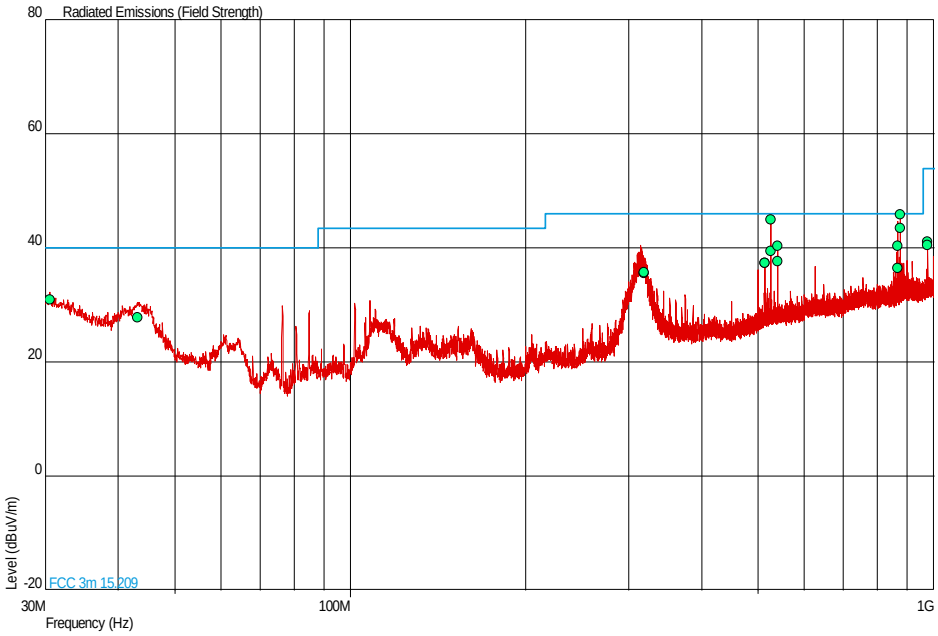
18 GHz to 25 GHz



Date: 9.FEB.2013 23:51:26

2475 MHz

30 MHz to 1 GHz

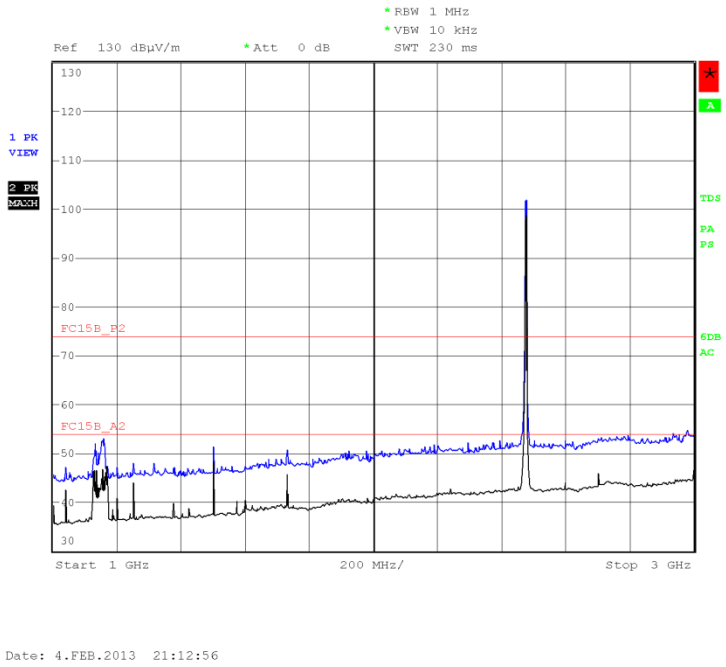


Frequency (MHz)	QP Level (dBµV/m)	QP Limit (dBµV/m)	QP Margin (dBµV/m)	Angle(Deg)	Height(m)	Polarity
30.518	31.0	40.0	-9.0	95	1.00	Vertical
43.240	27.8	40.0	-12.2	37	1.00	Vertical
975.036	41.2	54.0	-12.8	84	1.03	Horizontal
975.036	40.6	54.0	-13.4	128	2.09	Vertical

1 GHz to 25 GHz

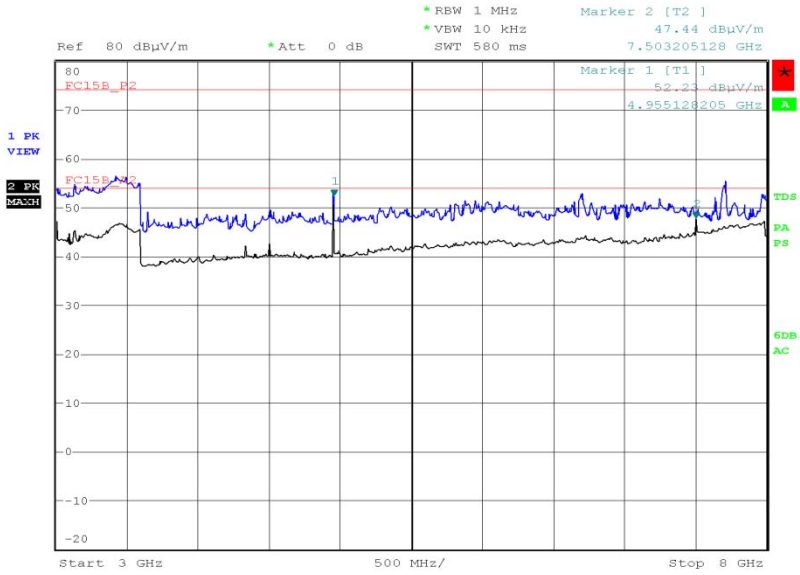
Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
1.125	Vertical	100	173	53.76	45.60
1.500	Vertical	115	209	53.61	46.88
2.701	Horizontal	100	238	53.26	45.06
4.951	Vertical	100	065	58.45	50.40
7.500	Vertical	100	255	58.30	49.78

1 GHz to 3 GHz



Product Service

3 GHz to 8 GHz



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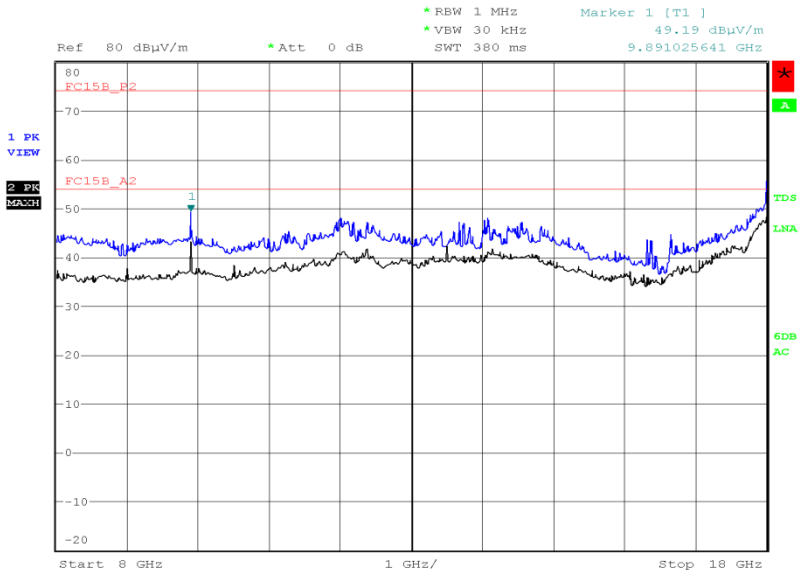
8 GHz to 18 GHz



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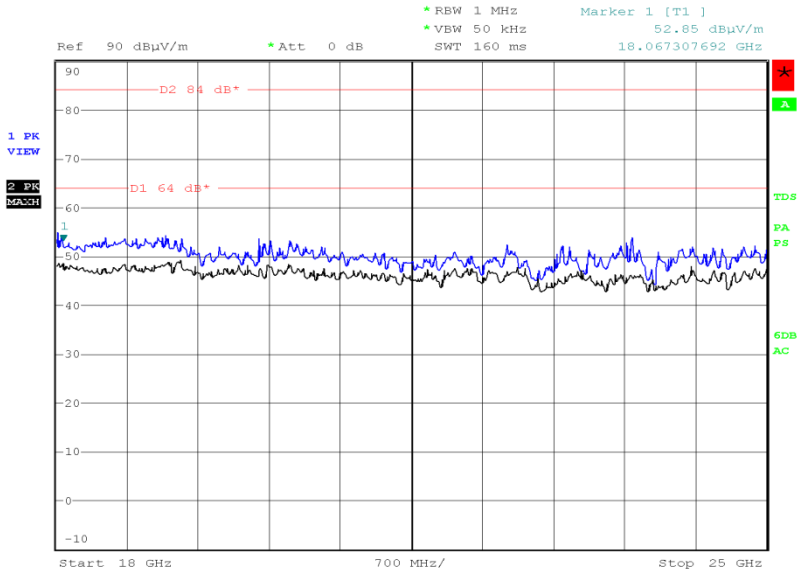
Product Service

18 GHz to 25 GHz



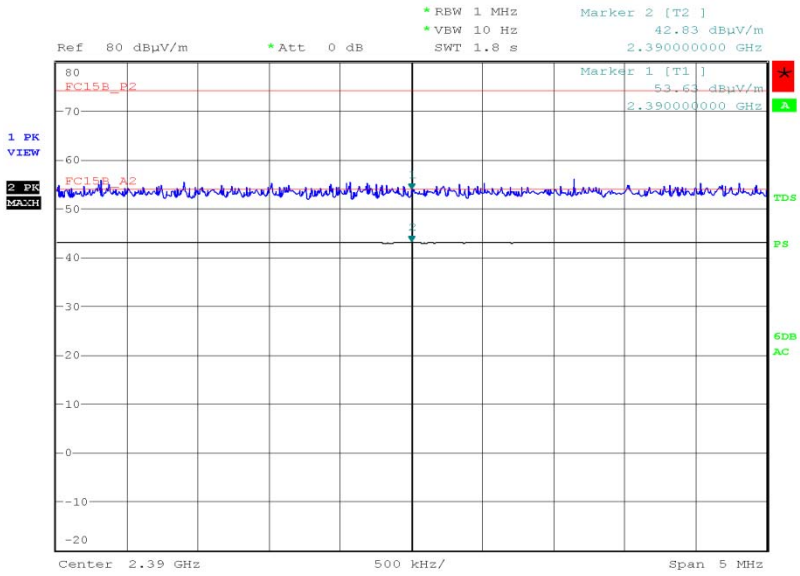
Limit

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

Band Edge Emissions

2425 MHz

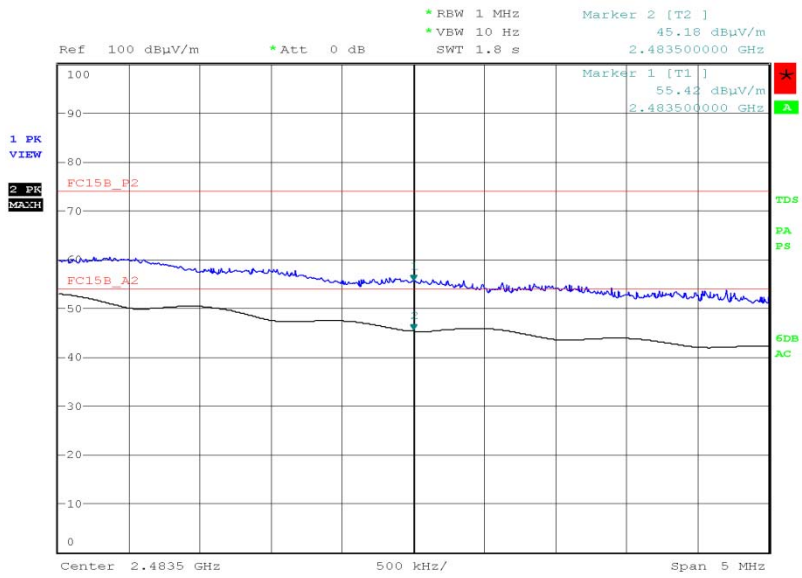
Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	53.63	42.83



Date: 4.FEB.2013 18:55:49

2475 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	55.42	45.18



Limit

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

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

PX001BNT S/N: PB2012120025 - Modification State 0

2.6.3 Date of Test

6 February 2013

2.6.4 Test Equipment Used

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

2.6.5 Test Procedure

The EUT was transmitted at maximum power via 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	22.7°C
Relative Humidity	22.6%

Product Service

2.6.7 Test Results

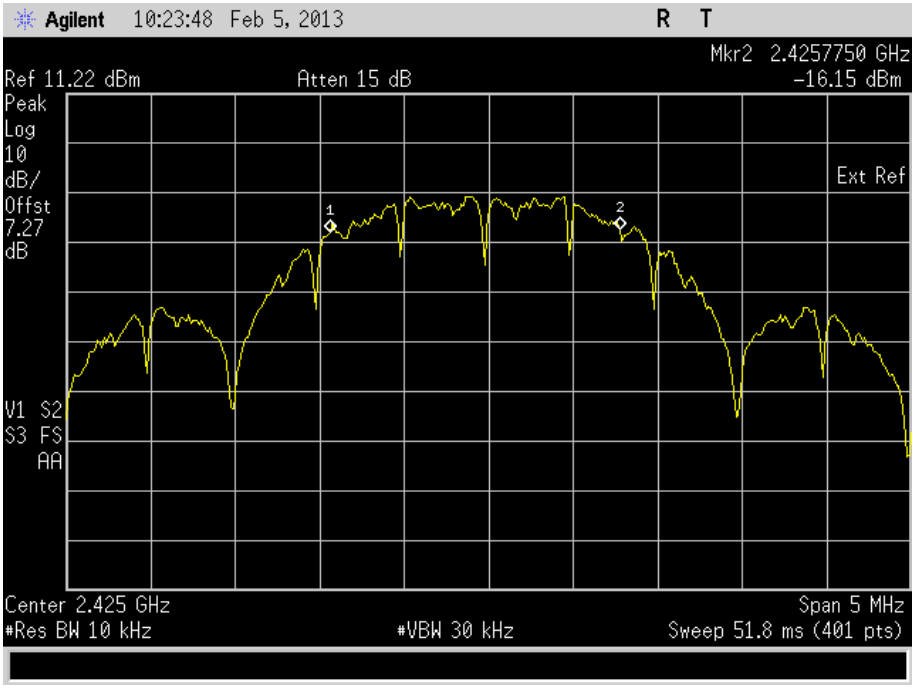
Transmit - Set Top Box 1 – Antenna 0

110 V AC Supply

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2425 MHz	1	1712.5
2450 MHz	1	1562.5
2475 MHz	1	1512.5

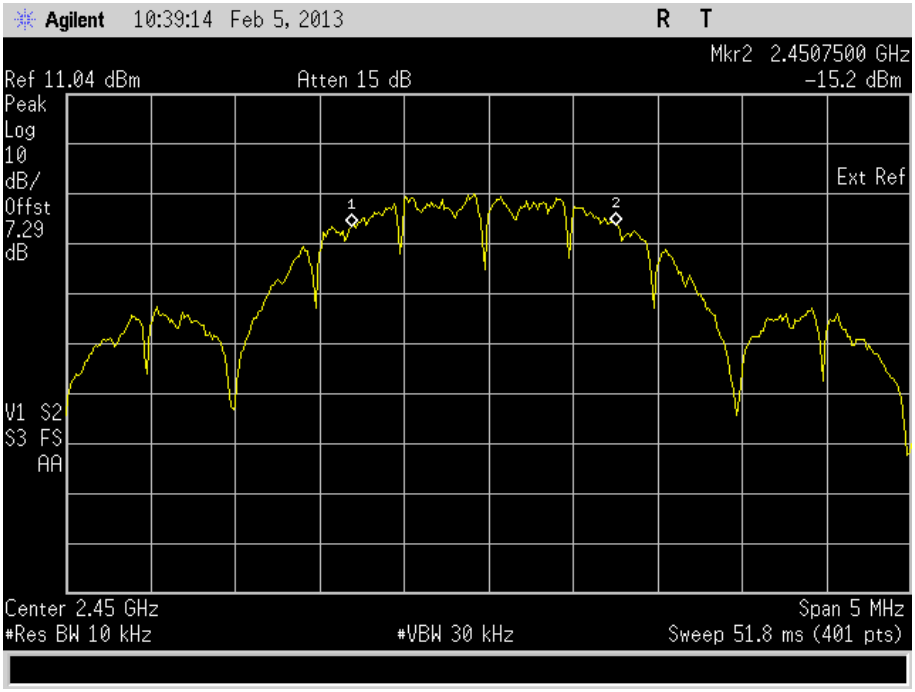
2425 MHz

1 Mbps



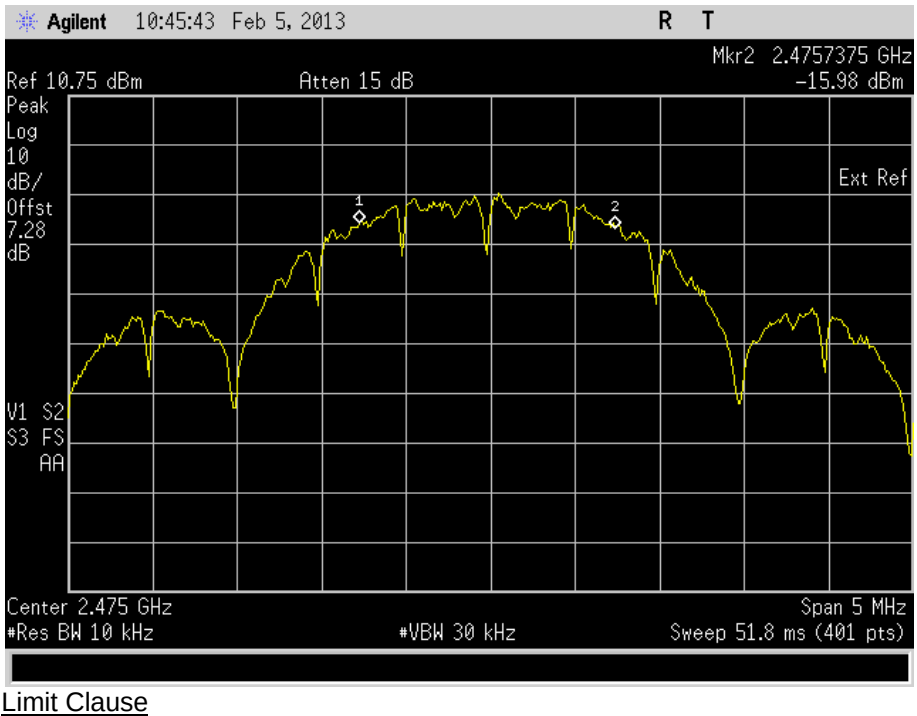
2450 MHz

1 Mbps



2475 MHz

1 Mbps



Limit Clause

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

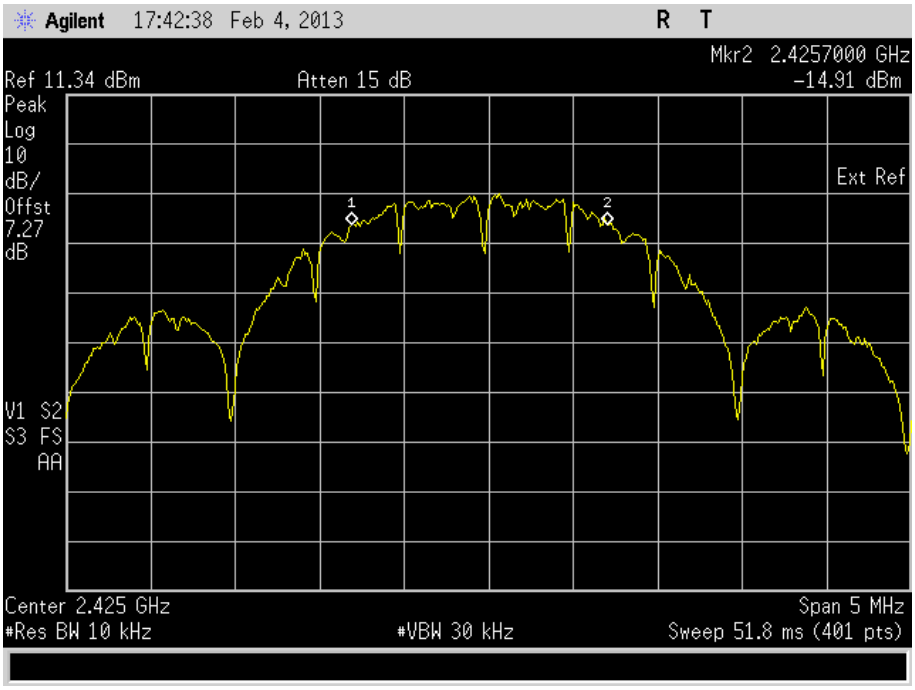
Transmit - Set Top Box 1 – Antenna 1

110 V AC Supply

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)
2425 MHz	1	1512.5
2450 MHz	1	1500
2475 MHz	1	1587.5

2425 MHz

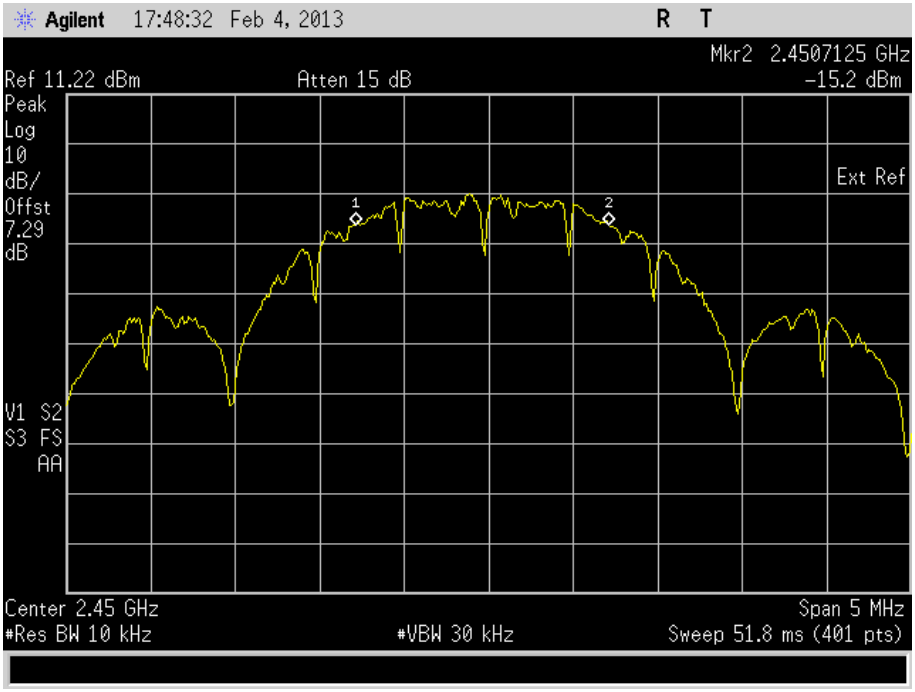
1 Mbps



Product Service

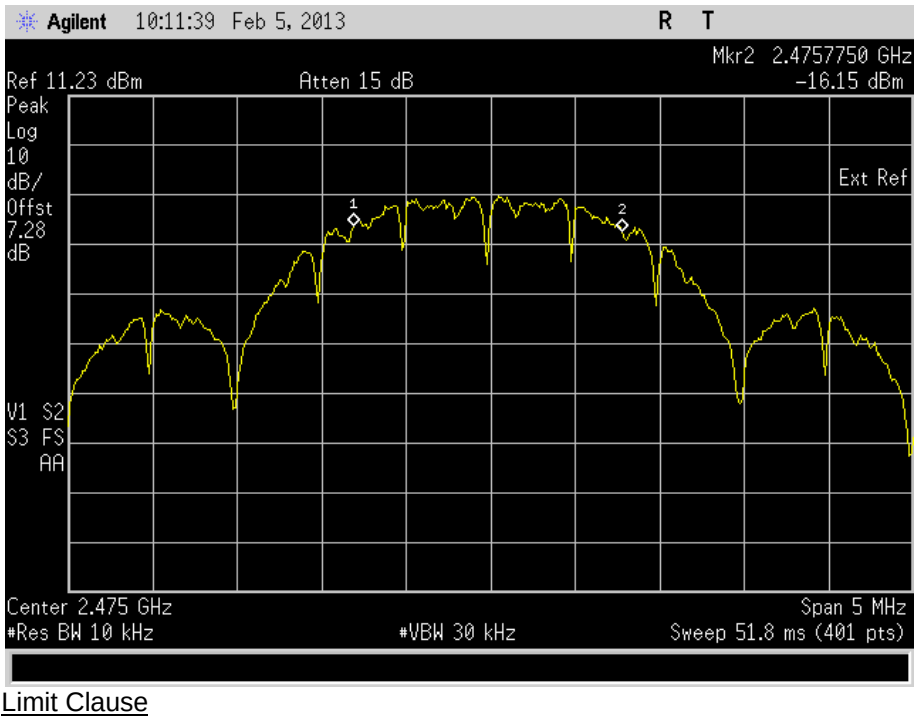
2450 MHz

1 Mbps



2475 MHz

1 Mbps



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					
LISN (1 Phase)	Chase	MN 2050	336	12	23-Mar-2013
Transient Limiter	Hewlett Packard	11947A	1032	12	28-Jun-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
Section 2.2 - Maximum Peak Conducted Output Power					
Multimeter	White Gold	WG022	190	12	30-Oct-2013
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013
Combiner/Splitter	Weinschel	1506A	3877	12	19-Mar-2013
P-Series Power Meter	Agilent	N1911A	3980	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	17-Sep-2013
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4106	12	25-Oct-2013
2 Metre N Type Cable	Rhophase	NPS-1601A-2000-NPS	4108	12	1-Jun-2013
Section 2.3- EIRP Peak Power					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	9-Nov-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (DRG Horn)	ETS-LINDGREN	3115	3125	12	24-May-2013
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	30-Aug-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Section 2.4 - Peak Spectral Density					
Multimeter	White Gold	WG022	190	12	30-Oct-2013
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013
Combiner/Splitter	Weinschel	1506A	3877	12	19-Mar-2013
P-Series Power Meter	Agilent	N1911A	3980	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	17-Sep-2013
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4106	12	25-Oct-2013
2 Metre N Type Cable	Rhophase	NPS-1601A-2000-NPS	4108	12	1-Jun-2013

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.5 - Spurious and Band Edge Emissions					
Multimeter	White Gold	WG022	190	12	30-Oct-2013
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Programmable Power Supply	California Inst	2001RP	1898	-	TU
4GHz HPF	Sematron	F-100-4000-5-R	2245	-	TU
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3695	12	15-Oct-2013
Combiner/Splitter	Weinschel	1506A	3877	12	19-Mar-2013
P-Series Power Meter	Agilent	N1911A	3980	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	17-Sep-2013
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4106	12	25-Oct-2013
2 Metre N Type Cable	Rhophase	NPS-1601A-2000-NPS	4108	12	1-Jun-2013
Section 2.6 - Occupied Bandwidth					
Multimeter	White Gold	WG022	190	12	30-Oct-2013
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013
Combiner/Splitter	Weinschel	1506A	3877	12	19-Mar-2013
P-Series Power Meter	Agilent	N1911A	3980	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	17-Sep-2013
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4106	12	25-Oct-2013
2 Metre N Type Cable	Rhophase	NPS-1601A-2000-NPS	4108	12	1-Jun-2013

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
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

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).