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Report On

FCC and Industry Canada Testing of the
Sorensen Communications Inc ASD041517
In accordance with FCC 47 CFR Part 15C,
Industry Canada RSS-247 and Industry Canada RSS-GEN

COMMERCIAL-IN-CONFIDENCE

FCC ID: XHUASD041517
IC: 8439A- ASD041517

Document 75930506 Report 03 Issue 1

August 2015



Product Service

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COMMERCIAL-IN-CONFIDENCE

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Document 75930506 Report 03 Issue 1

August 2015

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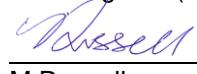
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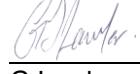
12 August 2015

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 47 CFR Part 15C, Industry Canada RSS-247 and Industry Canada RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);


M Russell


G Lawler





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SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
Sorensen Communications Inc ASD041517
In accordance with FCC 47 CFR Part 15C, Industry Canada RSS-247
and Industry Canada RSS-GEN



1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC and Industry Canada Testing of the Sorensen Communications Inc ASD041517 to the requirements of FCC 47 CFR Part 15C, Industry Canada RSS-247 and Industry Canada RSS-GEN.

Objective	To perform Industry Canada Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	1066 Labs Limited
Model Number(s)	ASD041517
Serial Number(s)	EMC #3 EMC #1
Number of Samples Tested	2
Test Specification/Issue/Date	FCC 47 CFR Part 15C (2014) Industry Canada RSS-247 (Issue 1, 2015) Industry Canada RSS-GEN (Issue 4, 2014)
Incoming Release Date	Application Form 26 May 2015
Disposal	Held Pending Disposal
Reference Number	Not Applicable
Date	Not Applicable
Order Number	101298
Date	13 July 2015
Start of Test	2 July 2015
Finish of Test	29 July 2015
Name of Engineer(s)	M Russell G Lawler
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 47 CFR Part 15, Industry Canada RSS-247 and Industry Canada RSS-GEN is shown below.

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	Part 15	RSS-247	RSS-GEN			
Bluetooth						
2.1	15.247 (a)(1)(iii)	5.1(4)	-	Frequency Hopping Systems - Number of Hopping Channels	Pass	
2.2	15.247 (a)(1)	5.1(1)	-	Frequency Hopping Systems - 20 dB Bandwidth	Pass	
2.3	15.247 (a)(1)	5.1(2)	-	Frequency Hopping Systems - Channel Separation	Pass	
2.4	15.247 (a)(1)(iii)	5.1(4)	-	Frequency Hopping Systems - Average Time of Occupancy	Pass	
2.5	15.247 (b)(1)	5.4(2)	-	Maximum Conducted Output Power	Pass	
2.6	15.247 (b)(4)	5.4(2)	-	Peak EIRP	Pass	
2.7	15.247 (d) and 15.205	5.5	-	Spurious Radiated Emissions	Pass	
2.8	15.205	-	8.10	Restricted Band Edges	Pass	
2.9	15.247 (d)	5.5	-	Authorised Band Edges	Pass	



Product Service

1.3 APPLICATION FORM

EQUIPMENT DESCRIPTION	
Model Name/Number	ASD041517
Part Number	
Hardware Version	DVT3
Software Version	Build 3.1.0
FCC ID (if applicable)	XHUASD041517
Industry Canada ID (if applicable)	8439A- ASD041517
Technical Description (Please provide a brief description of the intended use of the equipment)	Set-Top-Box (STB) Videophone

POWER SOURCE			
<input checked="" type="checkbox"/> AC mains	State voltage 110		
AC supply frequency	60	(Hz)	
VAC			
Max Current			
Hz			
<input checked="" type="checkbox"/> Single phase	<input type="checkbox"/> Three phase		
And / Or			
<input type="checkbox"/> External DC supply			
Nominal voltage	18 V	Max Current	A
Extreme upper voltage	19 V		
Extreme lower voltage	14 V		
Battery			
<input type="checkbox"/> Nickel Cadmium	<input type="checkbox"/> Lead acid (Vehicle regulated)		
<input type="checkbox"/> Alkaline	<input type="checkbox"/> Leclanche		
<input type="checkbox"/> Lithium	<input type="checkbox"/> Other Details :		
Volts nominal.			
End point voltage as quoted by equipment manufacturer	V		



Product Service

FREQUENCY INFORMATION				
Frequency Range	2412 to 2462		MHz	
Channel Spacing (where applicable)				
Receiver Frequency Range (if different)	2412 to 2462		MHz	
Channel Spacing (if different)				
Test Frequencies*	Bottom	2412	MHz	Channel Number (if applicable)
	Middle	2442	MHz	Channel Number (if applicable)
	Top	2462	MHz	Channel Number (if applicable)
Intermediate Frequencies			MHz	
Highest Internally Generated Frequency :			MHz	

POWER CHARACTERISTICS				
Maximum TX power	W			
Minimum TX power	W (if variable)			
Is transmitter intended for :				
Continuous duty	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
Intermittent duty	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
If intermittent state DUTY CYCLE				
Transmitter ON	seconds			
Transmitter OFF	seconds			

ANTENNA CHARACTERISTICS				
<input type="checkbox"/>	Antenna connector		State impedance	Ohm
<input type="checkbox"/>	Temporary antenna connector		State impedance	Ohm
<input checked="" type="checkbox"/>	Integral antenna	Type CHIP	State impedance	1.8 dBi
<input type="checkbox"/>	External antenna	Type	State impedance	dB

MODULATION CHARACTERISTICS				
<input type="checkbox"/>	Amplitude	<input type="checkbox"/>	Frequency	
<input type="checkbox"/>	Phase	<input type="checkbox"/>	Other (please provide details):	
Can the transmitter operate un-modulated?				<input type="checkbox"/> Yes <input type="checkbox"/> No

CLASS OF EMISSION USED				
ITU designation or Class of Emission:				
1				
	(if applicable) 2			
	(if applicable) 3			
If more than three classes of emission, list separately:				



Product Service

BATTERY POWER SUPPLY

Model name/number	Identification/Part number
Manufacturer	Country of Origin

ANCILLARIES (If applicable)

Model name/number	Identification/Part number
Manufacturer	Country of Origin

EXTREME CONDITIONS

Extreme test voltages (Max)	V	Extreme test voltages (Mix)	V
Nominal DC Voltage	V	DC Maximum Current	A
Maximum temperature	°C	Minimum temperature	°C

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

Authorised Representative: Dave Williams

Position held: Certification Engineer Date: 26th May 2015



Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sorensen Communications Inc ASD041517. 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 60 Hz supply.

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

Industry Canada Company Address Code
IC2932B-1 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 State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Serial Number: EMC #1			
0	As supplied by manufacturer.	N/A	N/A
1	Board affected is 58-R41832-5551 Modification affects U2_SER and turns off the pre-emphasis. R18_SER pull-up to VIN_3V3 is depopulated and is now DNP R20_SER is now populated with 10K and pulled down to GND Ferrite added to camera cable nearest to camera.	Dave Williams	15/07/2015

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test are recorded on the appropriate test pages.



Product Service

SECTION 2

TEST DETAILS

FCC and Industry Canada Testing of the
Sorensen Communications Inc ASD041517
In accordance with FCC 47 CFR Part 15C, Industry Canada RSS-247
and Industry Canada RSS-GEN



Product Service

2.1 FREQUENCY HOPPING SYSTEMS - NUMBER OF HOPPING CHANNELS

2.1.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (a)(1)(iii)
Industry Canada RSS-247, Clause 5.1(4)

2.1.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #3 - Modification State 0

2.1.3 Date of Test

2 July 2015

2.1.4 Test Equipment Used

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

2.1.5 Test Procedure

The EUT was connected to a spectrum analyser via an attenuator. The span was set to show the entire band of operation and with a peak detector and max hold using 100 kHz RBW and 300 kHz VBW the EUT was configured in its hopping mod and the number of channels was verified.

2.1.6 Environmental Conditions

Ambient Temperature	23.0°C
Relative Humidity	69.1%



Product Service

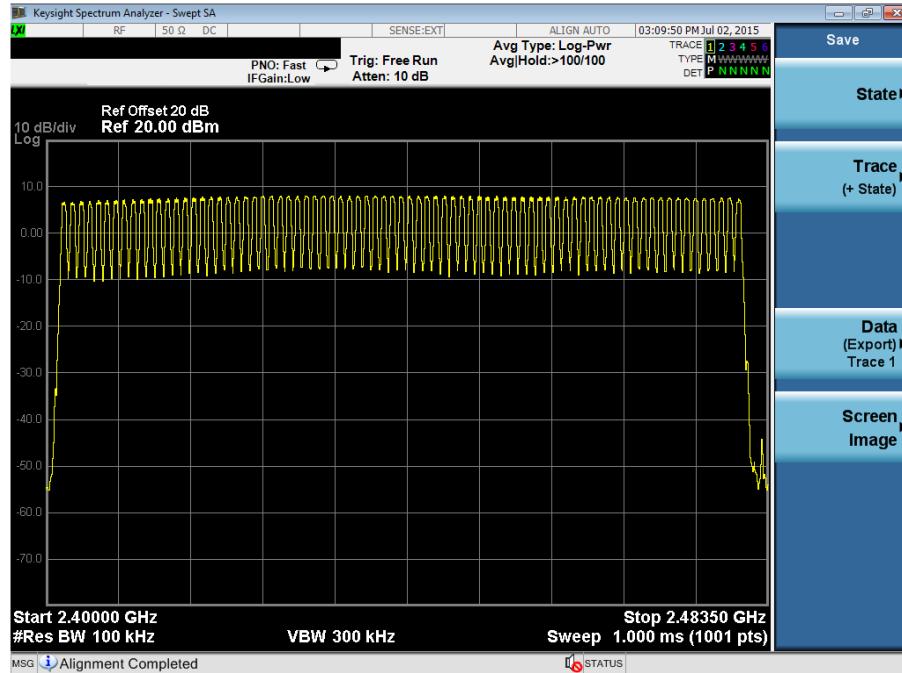
2.1.7 Test Results

110 V AC Supply

Bluetooth, Number of Hopping Channels Results

Number of Hopping Channels: 79

Bluetooth, Segment 1, Number of Hopping Channels Plot



FCC 47 CFR Part 15, Limit Clause 15.247 (a)(1)(iii)

≥ 15 channels

Industry Canada RSS-247, Limit Clause, 5.1(4)

≥ 15 hopping channels



Product Service

2.2 FREQUENCY HOPPING SYSTEMS - 20 dB BANDWIDTH

2.2.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (a)(1)
Industry Canada RSS-247, Clause 5.1(1)

2.2.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #3 - Modification State 0

2.2.3 Date of Test

2 July 2015

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 performed in accordance with ANSI C63.10, clause 6.9.1 and Industry Canada RSS-GEN, clause 6.6.

2.2.6 Environmental Conditions

Ambient Temperature	23.4°C
Relative Humidity	65.6%



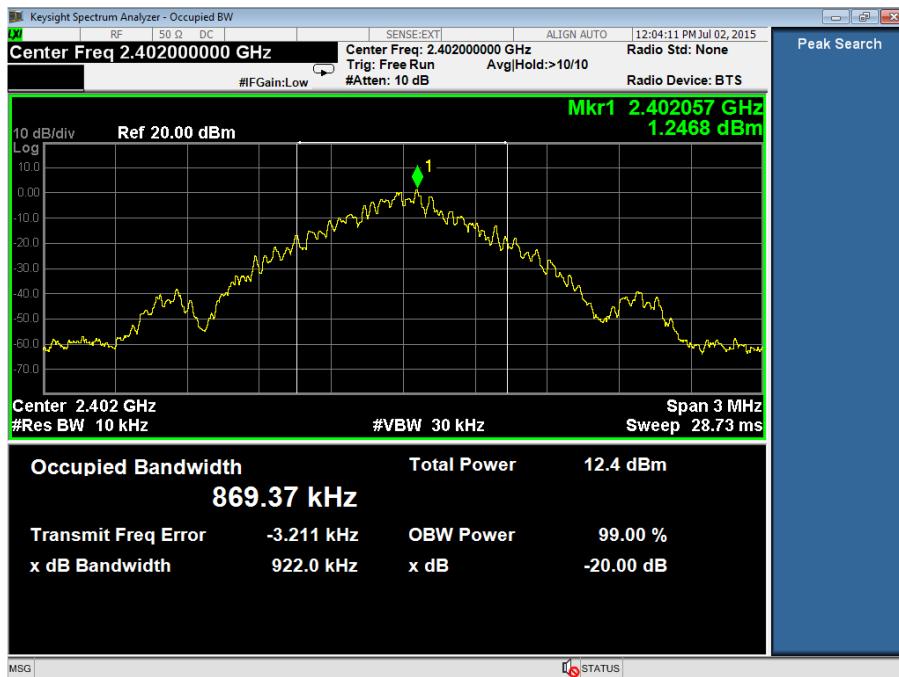
2.2.7 Test Results

110 V AC Supply

Bluetooth, 20 dB Bandwidth Results

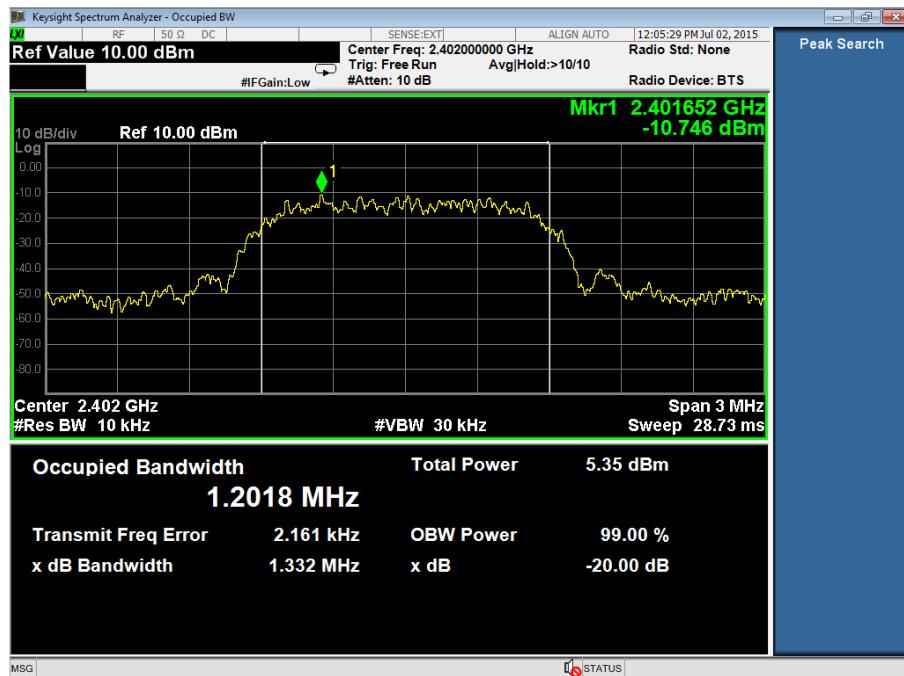
Modulation	2402 MHz	2441 MHz	2480 MHz
	KHz	KHz	KHz
GFSK	922.0	921.3	919.3
pi/4 DQPSK	1332.0	1337.0	1335.0
8-DPSK	1345.0	1347.0	1346.0

Bluetooth, 2402 MHz, GFSK, 20 dB Bandwidth Plot





Product Service

Bluetooth, 2402 MHz, pi/4 DQPSK, 20 dB Bandwidth PlotBluetooth, 2402 MHz, 8-DPSK, 20 dB Bandwidth Plot



Product Service

Bluetooth, 2441 MHz, GFSK, 20 dB Bandwidth PlotBluetooth, 2441 MHz, pi/4 DQPSK, 20 dB Bandwidth Plot

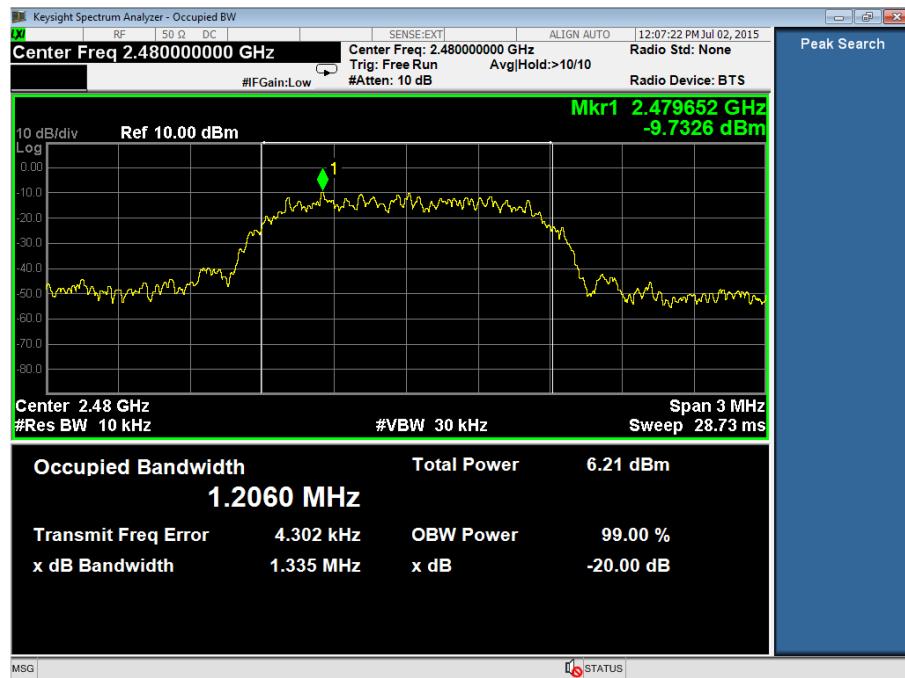
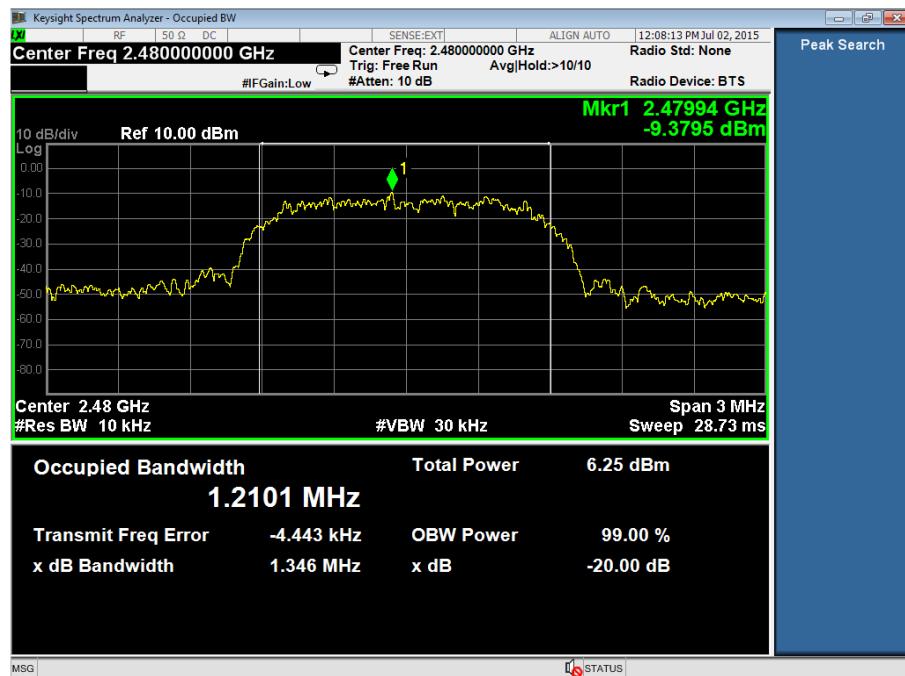


Product Service

Bluetooth, 2441 MHz, 8-DPSK, 20 dB Bandwidth PlotBluetooth, 2480 MHz, GFSK, 20 dB Bandwidth Plot



Product Service

Bluetooth, 2480 MHz, pi/4 DQPSK, 20 dB Bandwidth PlotBluetooth, 2480 MHz, 8-DPSK, 20 dB Bandwidth Plot



Product Service

FCC 47 CFR Part 15, Limit Clause

None specified.

Industry Canada RSS-247, Limit Clause 5.1(1)

None specified.



Product Service

2.3 FREQUENCY HOPPING SYSTEMS - CHANNEL SEPARATION

2.3.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (a)(1)
Industry Canada RSS-247, Clause 5.1(2)

2.3.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #3 - Modification State 0

2.3.3 Date of Test

3 July 2015

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 test was performed in accordance with ANSI C63.10, clause 7.7.2.

Remarks

In order to distinguish between the peaks of two adjacent hopping frequencies the hopping function had to be disabled. The spectrum analyser was first configured to identify the peak of one channel and using a second trace to identify the peak of the channel adjacent to the first.

2.3.6 Environmental Conditions

Ambient Temperature	22.7°C
Relative Humidity	42.7%



Product Service

2.3.7 Test Results

110 V AC Supply

Bluetooth, Channel Separation Results

Modulation	Frequency Hopping
	MHz
GFSK	1.000
pi/4 DQPSK	0.996
8-DPSK	0.999

Bluetooth, GFSK, Channel Separation Plot





Product Service

Bluetooth, pi/4 DQPSK, Channel Separation PlotBluetooth, 8-DPSK, Channel Separation Plot



Product Service

FCC 47 CFR Part 15, Limit Clause 15.247 (a)(1)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively, frequency hopping systems operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 0.125 W.

Industry Canada RSS-247, Limit Clause, 5.1(2)

FHSs shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the -20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively, FHSs operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two thirds of the -20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W.



Product Service

2.4 FREQUENCY HOPPING SYSTEMS - AVERAGE TIME OF OCCUPANCY

2.4.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (a)(1)(iii)
Industry Canada RSS-247, Clause 5.1(4)

2.4.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #3 - Modification State 0

2.4.3 Date of Test

2 July 2015

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 performed in accordance with ANSI C63.10, clause 7.7.4.

2.4.6 Environmental Conditions

Ambient Temperature	22.7°C
Relative Humidity	55.6%



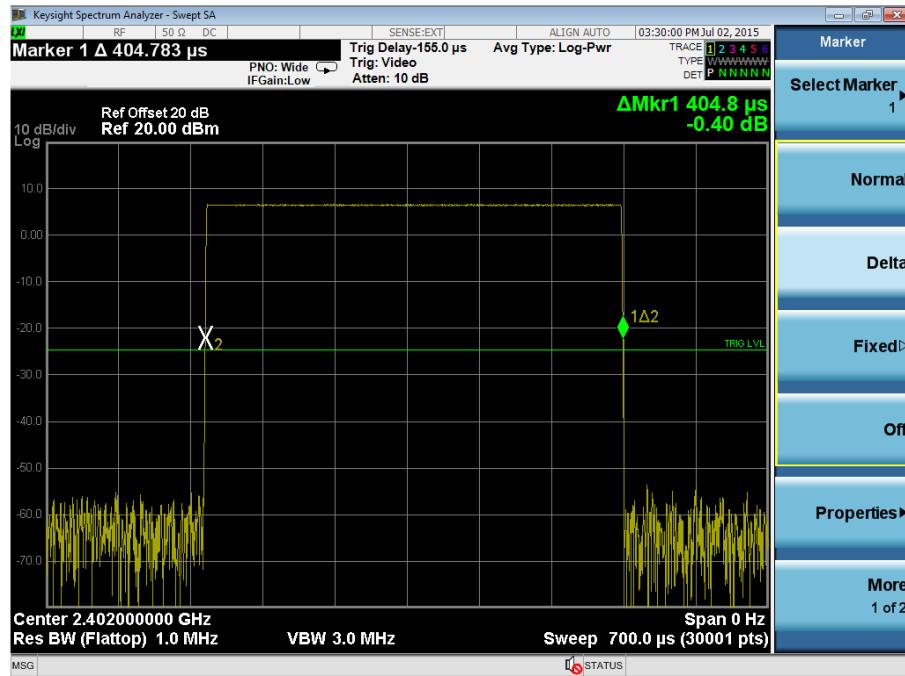
Product Service

2.4.7 Test Results

Bluetooth, Average Time of Occupancy Results

Packet Type	Dwell Time (ms)	Number of Transmissions	Average Occupancy Time (ms)
DH1	0.4048	319	129.1312
DH3	1.661	156	259.116
DH5	2.909	102	296.718

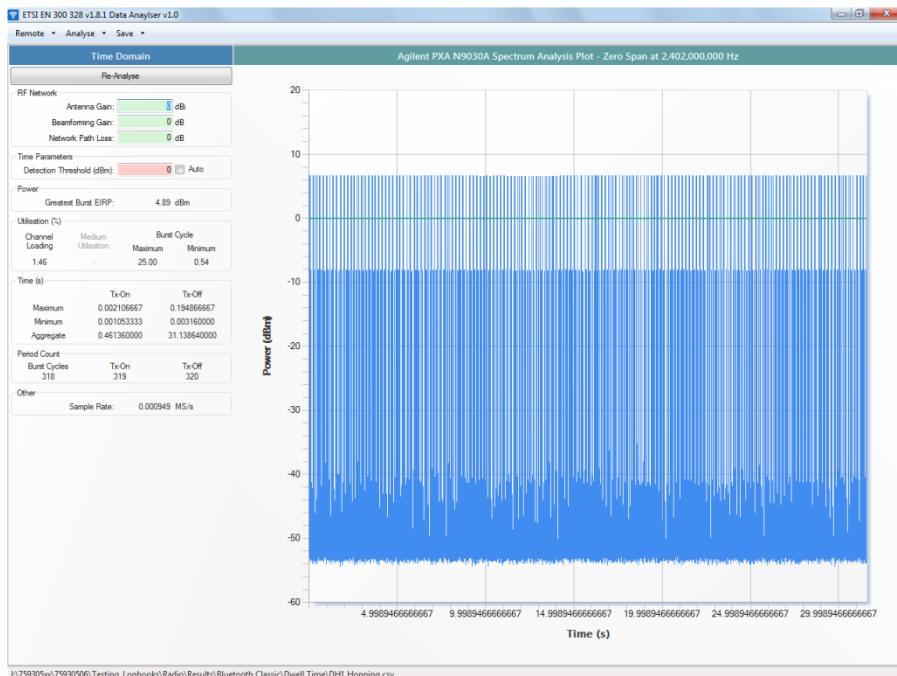
Bluetooth, DH1, Average Time of Occupancy Plot



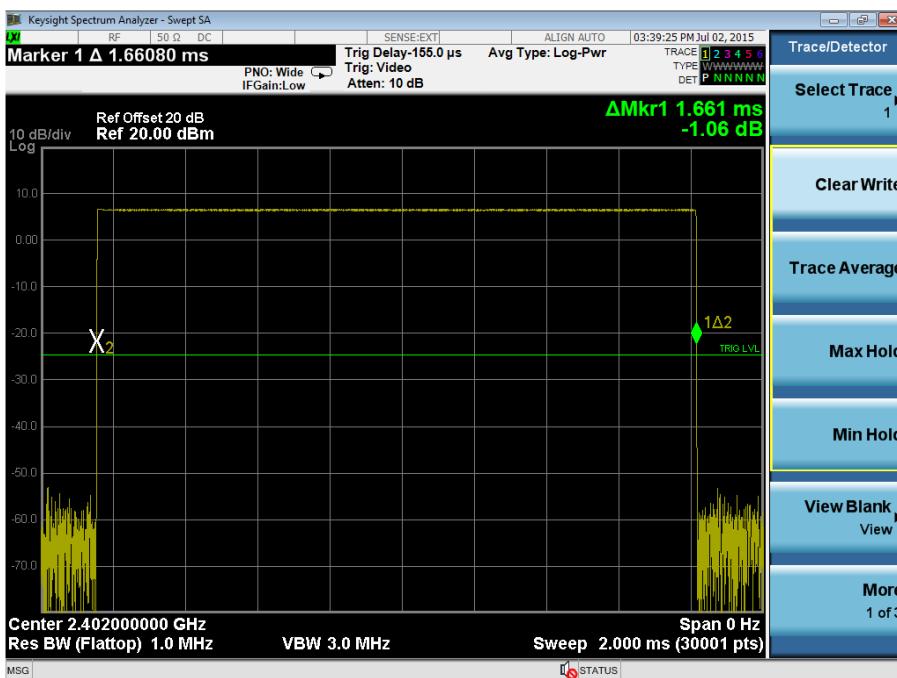


Product Service

Bluetooth, DH1, Total Average Time of Occupancy Plot



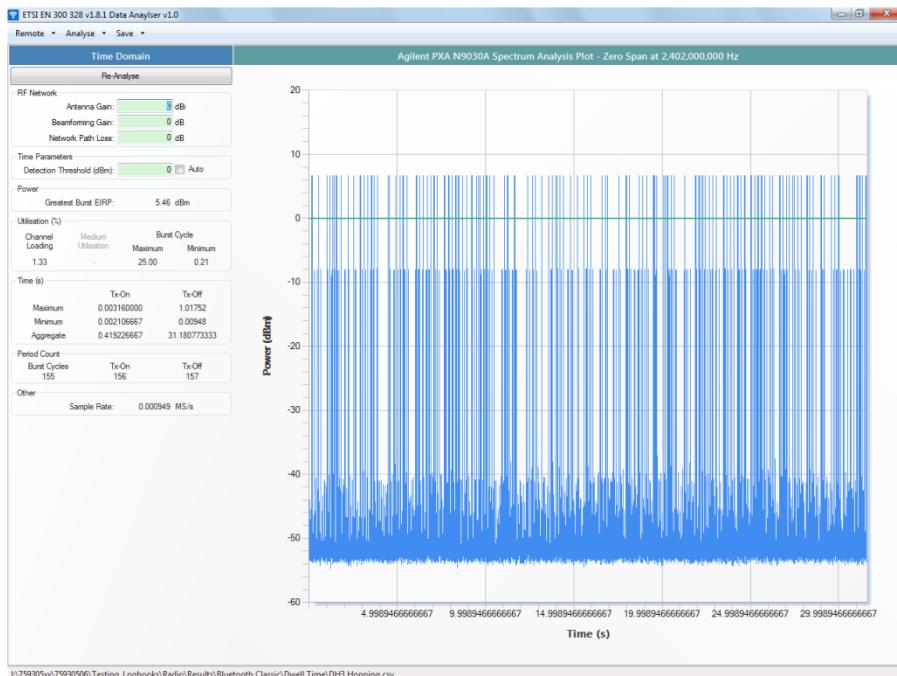
Bluetooth, DH3, Average Time of Occupancy Plot



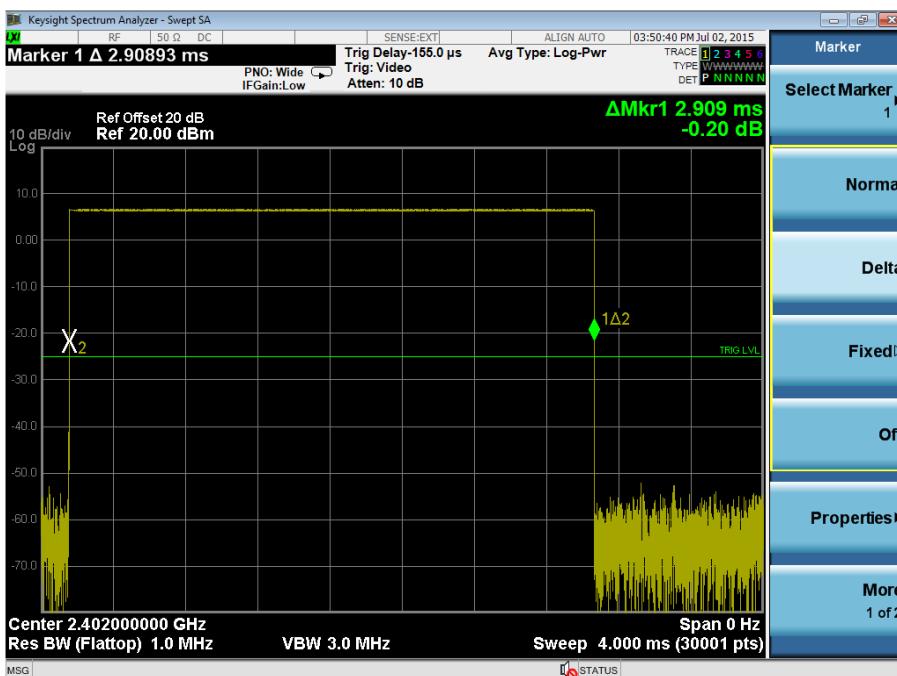


Product Service

Bluetooth, DH3, Total Average Time of Occupancy Plot

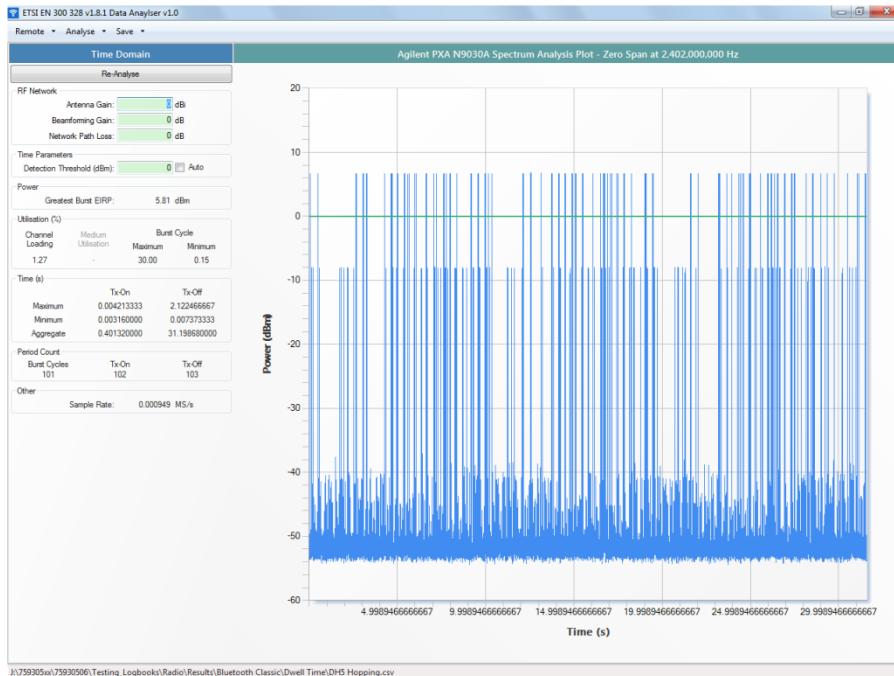


Bluetooth, DH5, Average Time of Occupancy Plot





Product Service

Bluetooth, DH5, Total Average Time of Occupancy PlotFCC 47 CFR Part 15, Limit Clause 15.247 (a)(1)(iii)

Frequency hopping systems operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

Industry Canada RSS-247, Limit Clause, 5.1(4)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that at least 15 hopping channels are used.



Product Service

2.5 MAXIMUM CONDUCTED OUTPUT POWER

2.5.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (b)(1)
Industry Canada RSS-247, Clause 5.4(2)

2.5.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #3 - Modification State 0

2.5.3 Date of Test

3 July 2015

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 performed in accordance with ANSI C63.10, clause 6.10.1 and Industry Canada RSS-GEN, clause 6.12.

Remarks

Measurements were performed on all supported modulations and it was determined that the worst case with respect to power was GFSK, therefore only results for GFSK are reported below.

2.5.6 Environmental Conditions

Ambient Temperature	22.9°C
Relative Humidity	51.1%



Product Service

2.5.7 Test Results

110 V AC Supply

Bluetooth, Maximum Conducted Output Power Results

2402 MHz		2441 MHz		2480 MHz	
dBm	mW	dBm	mW	dBm	mW
7.91	6.18	8.91	7.78	8.08	6.43

Bluetooth, 2402 MHz, Maximum Conducted Output Power Plot





Product Service

Bluetooth, 2441 MHz, Maximum Conducted Output Power PlotBluetooth, 2480 MHz, Maximum Conducted Output Power PlotRemarks

Testing was performed on a static channel where the packet type was non-configurable, however GFSK modulation was used as a test mode.



Product Service

FCC 47 CFR Part 15, Limit Clause 15.247 (b)

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.

Industry Canada RSS-247, Limit Clause, 5.4(2)

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W and the e.i.r.p. shall not exceed 4 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W and the e.i.r.p. shall not exceed 0.5 W if the hopset uses less than 75 hopping channels.



Product Service

2.6 PEAK EIRP

2.6.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (b)(4)
Industry Canada RSS-247, Clause 5.4(2)

2.6.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #1 - Modification State 1

2.6.3 Date of Test

29 July 2015

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 performed in accordance with ANSI C63.10 clause 6.10.

Remarks

The plots on the following pages show the raw test result before substitution. The final measured result is obtained after a substitution procedure.

2.6.6 Environmental Conditions

Ambient Temperature	21.1°C
Relative Humidity	40.0%



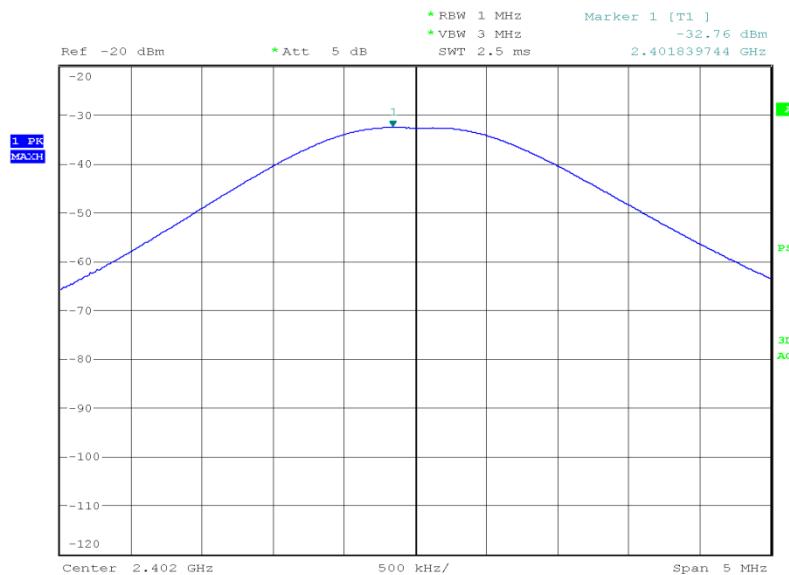
Product Service

2.6.7 Test Results

Bluetooth, EIRP Peak Power Results

2402 MHz		2441 MHz		2480 MHz	
dBm	mW	dBm	mW	dBm	mW
8.97	7.89	8.49	7.06	6.33	4.30

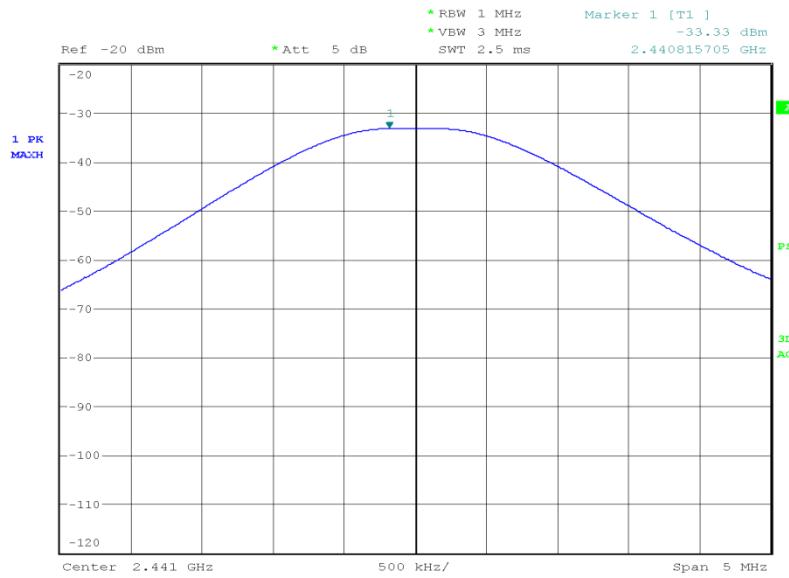
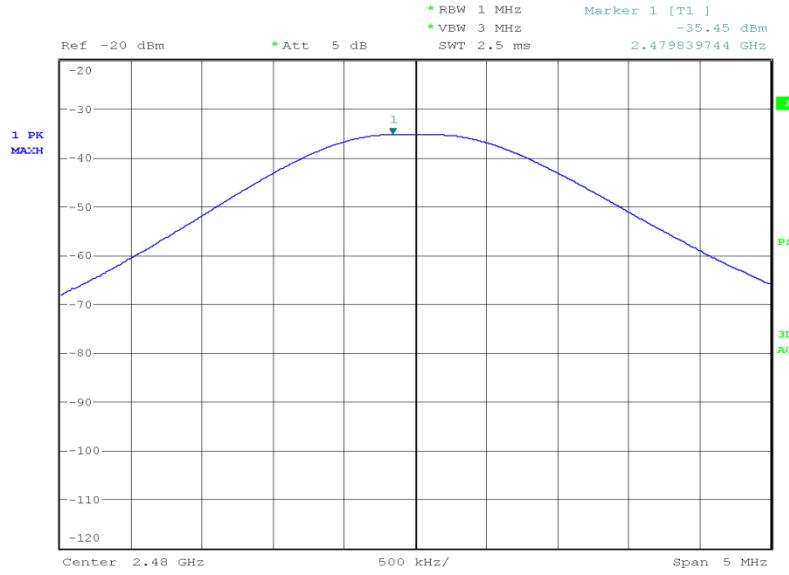
Bluetooth, 2402 MHz, EIRP Peak Power Plot



Date: 29.JUL.2015 22:39:37



Product Service

Bluetooth, 2441 MHz, EIRP Peak Power PlotBluetooth, 2480 MHz, EIRP Peak Power PlotRemarks

Testing was performed on a static channel where the packet type was non-configurable, however GFSK modulation was used as a test mode.



Product Service

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

36.0 dBm or 4000 mW

Industry Canada RSS-247, Limit Clause, 5.4(2)

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W and the e.i.r.p. shall not exceed 4 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W and the e.i.r.p. shall not exceed 0.5 W if the hopset uses less than 75 hopping channels.



Product Service

2.7 SPURIOUS RADIATED EMISSIONS

2.7.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d) and 15.205
Industry Canada RSS-247, Clause 5.5

2.7.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #1 - Modification State 1

2.7.3 Date of Test

20 July 2015, 21 July 2015, 27 July 2015 & 29 July 2015

2.7.4 Test Equipment Used

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

2.7.5 Test Procedure

The test was performed in accordance with ANSI C63.10, clause 6.3, 6.5 and 6.6.

2.7.6 Environmental Conditions

Ambient Temperature	19.1 - 21.6°C
Relative Humidity	40.0 - 63.0%



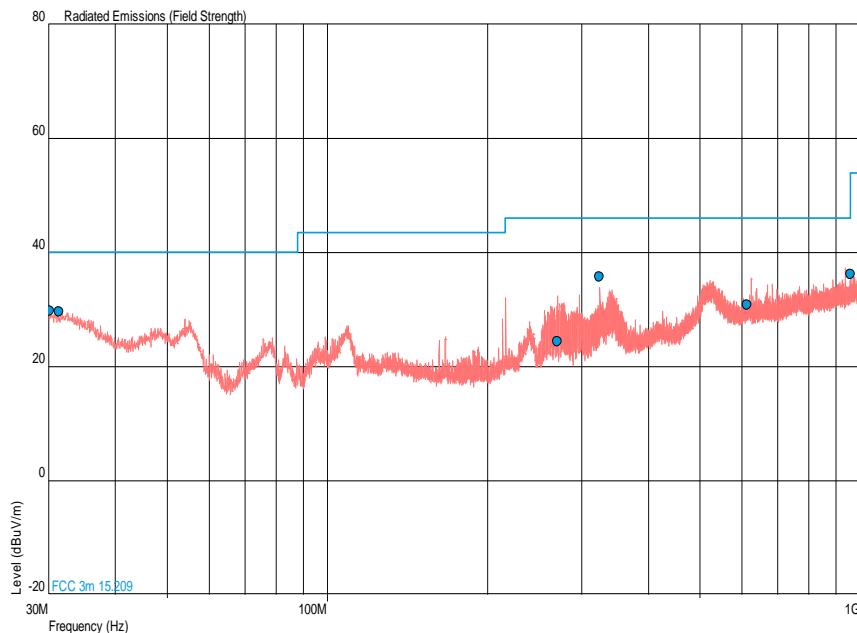
2.7.7 Test Results

110 V AC Supply

Bluetooth, 2402 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dB μ V/m)	QP Margin (dB μ V/m)	QP Level (μ V/m)	QP Margin (μ V/m)	Angle (°)	Height (m)	Polarisation
30.117	29.8	-10.2	30.9	-69.1	37	1.00	Vertical
31.413	29.6	-10.4	30.2	-69.8	347	1.00	Horizontal
270.004	24.5	-21.5	16.8	-183.2	219	1.00	Horizontal
323.998	35.7	-10.3	61.0	-139.0	128	1.00	Horizontal
614.000	30.8	-15.2	34.7	-165.3	323	1.00	Horizontal
960.000	36.1	-9.9	63.8	-136.2	152	1.00	Horizontal

Bluetooth, 2402 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot



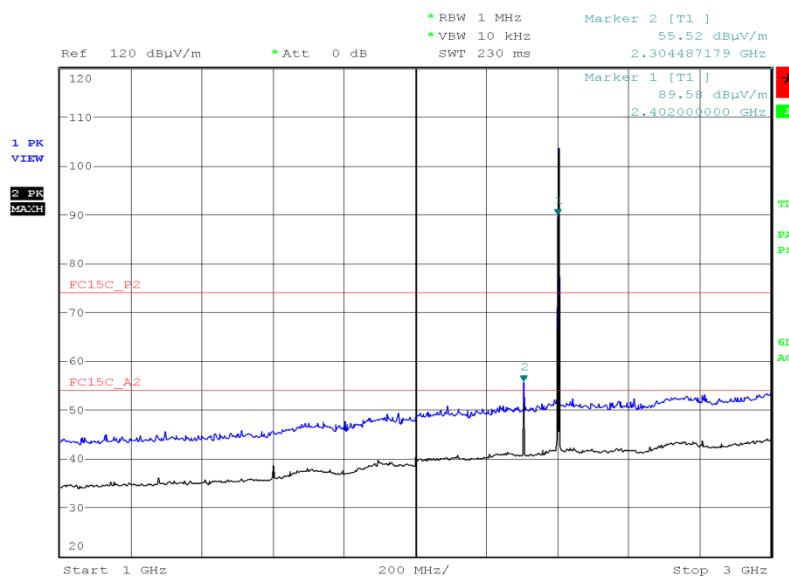


Product Service

Bluetooth, 2402 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dB μ V/m)	Final Average (dB μ V/m)	Final Peak (μ V/m)	Final Average (μ V/m)	Angle (°)	Height (m)	Polarisation
4608.069	47.85	44.74	246.89	172.58	327	1.00	Vertical

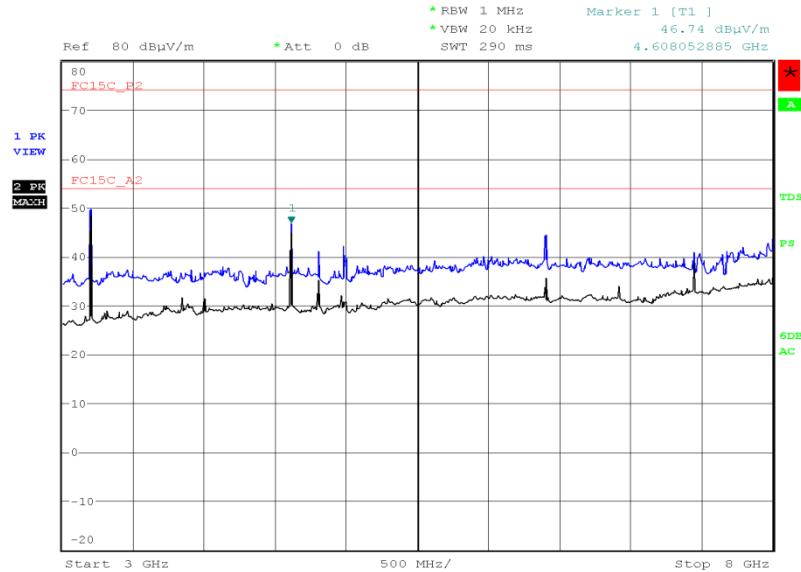
No other emissions were detected within 10 dB of the limit.

Bluetooth, 2402 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

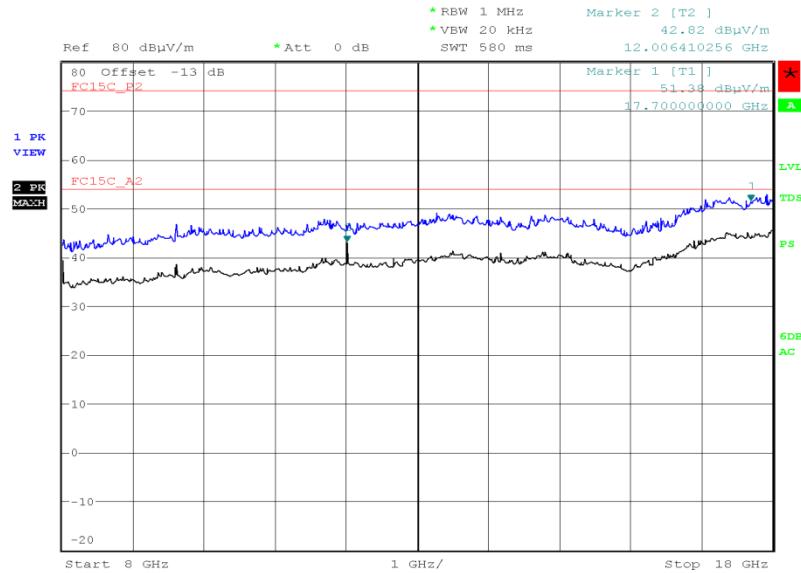
Date: 20.JUL.2015 19:57:54



Product Service

Bluetooth, 2402 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot

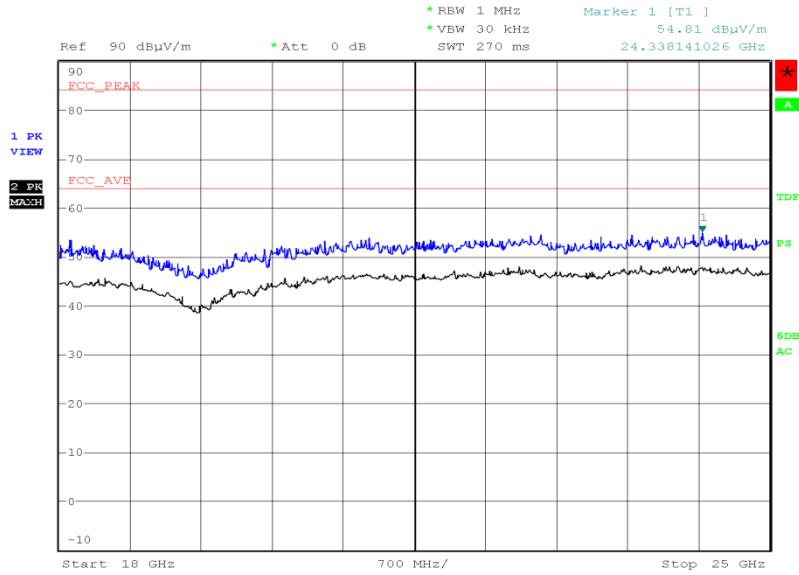
Date: 21.JUL.2015 22:11:04

Bluetooth, 2402 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot

Date: 27.JUL.2015 18:39:48



Product Service

Bluetooth, 2402 MHz, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot

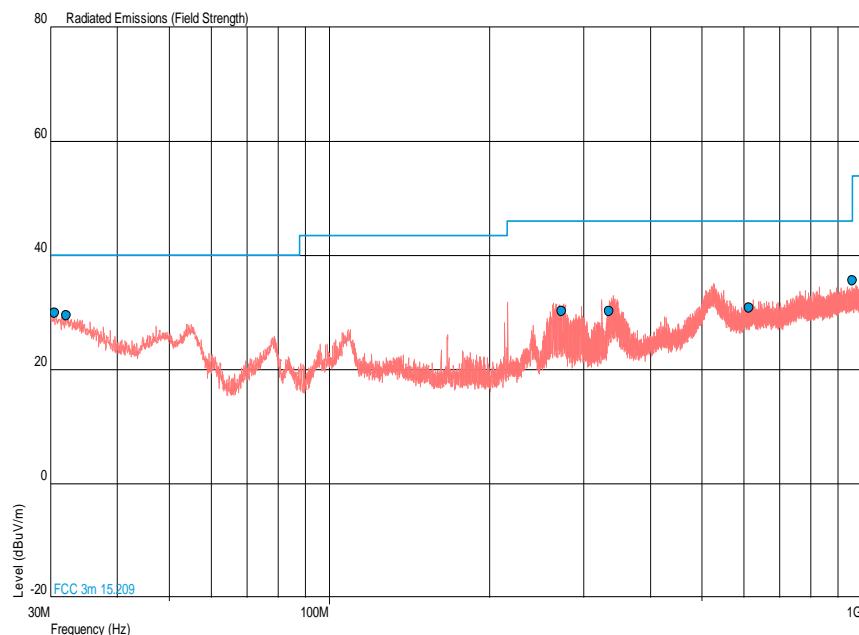
Date: 27.JUL.2015 23:25:45



Product Service

Bluetooth, 2441 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dB μ V/m)	QP Margin (dB μ V/m)	QP Level (μ V/m)	QP Margin (μ V/m)	Angle (°)	Height (m)	Polarisation
30.533	29.9	-10.1	31.3	-68.7	229	1.00	Vertical
32.096	29.5	-10.5	29.9	-70.1	0	1.00	Vertical
273.238	30.3	-15.7	32.7	-167.3	42	1.00	Vertical
334.959	30.2	-15.8	32.4	-167.6	86	1.00	Vertical
614.000	30.8	-15.2	34.7	-165.3	300	1.00	Vertical
960.000	35.6	-10.4	60.3	-139.7	245	1.00	Vertical

Bluetooth, 2441 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

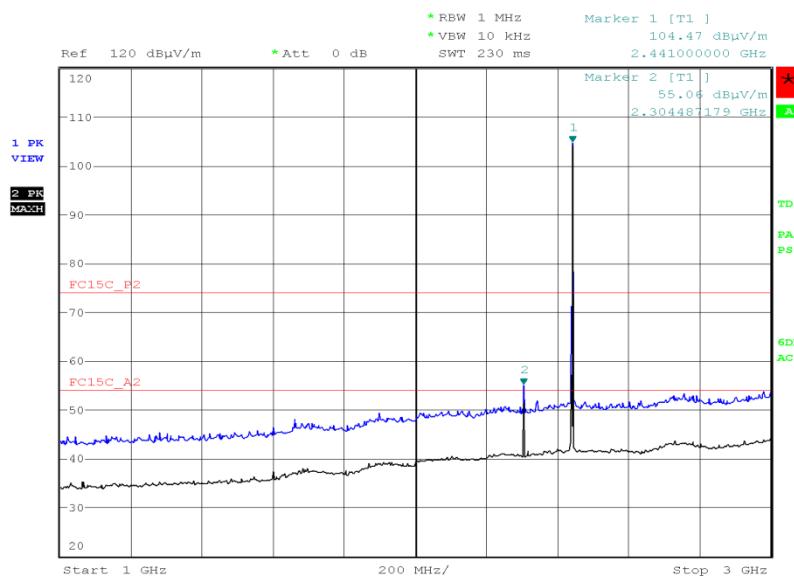


Product Service

Bluetooth, 2441 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dB μ V/m)	Final Average (dB μ V/m)	Final Peak (μ V/m)	Final Average (μ V/m)	Angle (°)	Height (m)	Polarisation
4608.048	49.57	45.22	300.95	182.39	314	100	Horizontal

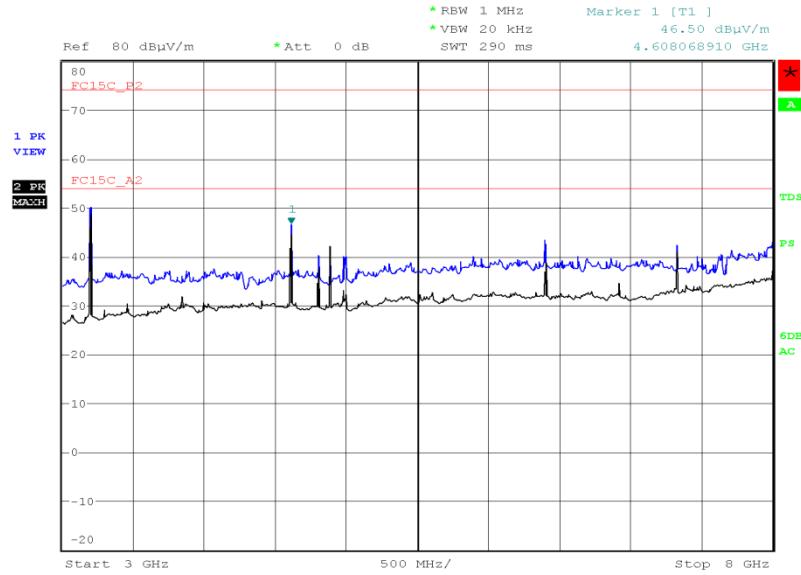
No other emissions were detected within 10 dB of the limit.

Bluetooth, 2441 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

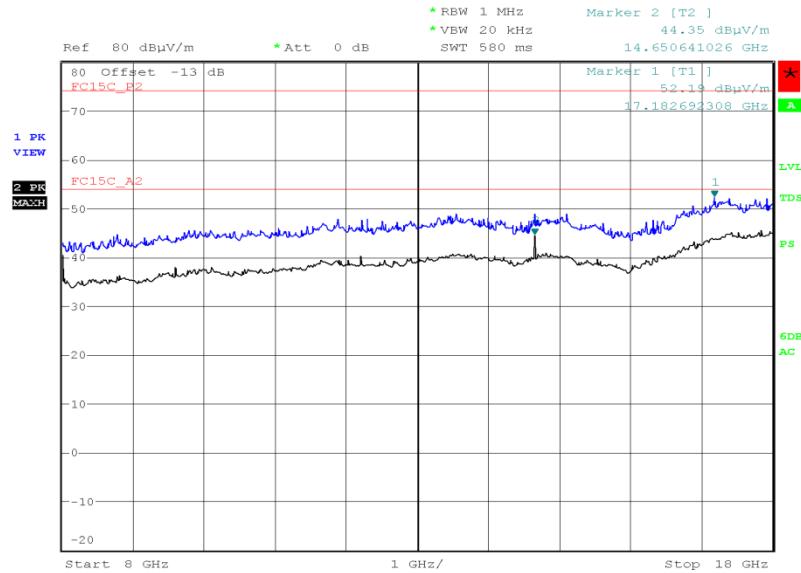
Date: 20.JUL.2015 20:00:31



Product Service

Bluetooth, 2441 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot

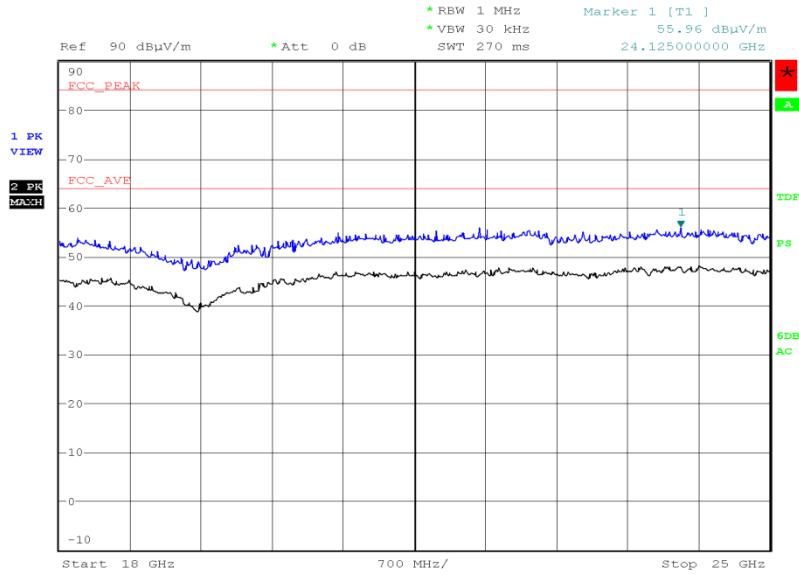
Date: 21.JUL.2015 21:06:39

Bluetooth, 2441 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot

Date: 27.JUL.2015 18:51:03



Product Service

Bluetooth, 2441 MHz, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot

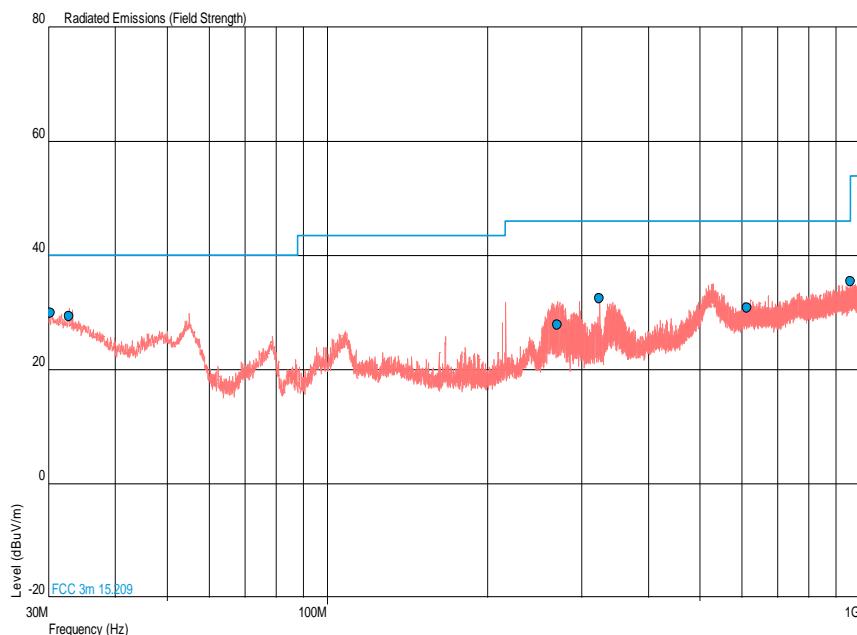
Date: 27.JUL.2015 23:28:40



Product Service

Bluetooth, 2480 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dB μ V/m)	QP Margin (dB μ V/m)	QP Level (μ V/m)	QP Margin (μ V/m)	Angle (°)	Height (m)	Polarisation
30.262	29.9	-10.1	31.3	-68.7	360	1.00	Vertical
32.803	29.3	-10.7	29.2	-70.8	275	1.00	Vertical
270.058	27.9	-18.1	24.8	-175.2	1	1.00	Vertical
323.990	32.4	-13.6	41.7	-158.3	360	1.00	Vertical
614.000	30.8	-15.2	34.7	-165.3	19	1.00	Vertical
960.000	35.4	-10.6	58.9	-141.1	246	1.00	Vertical

Bluetooth, 2480 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

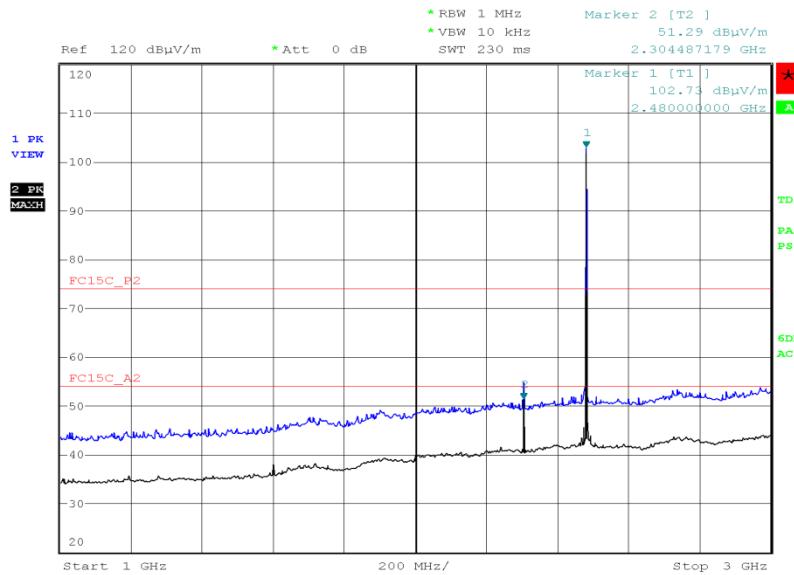


Product Service

Bluetooth, 2480 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dB μ V/m)	Final Average (dB μ V/m)	Final Peak (μ V/m)	Final Average (μ V/m)	Angle (°)	Height (m)	Polarisation
4608.053	49.43	45.31	306.55	184.29	313	1.00	Horizontal

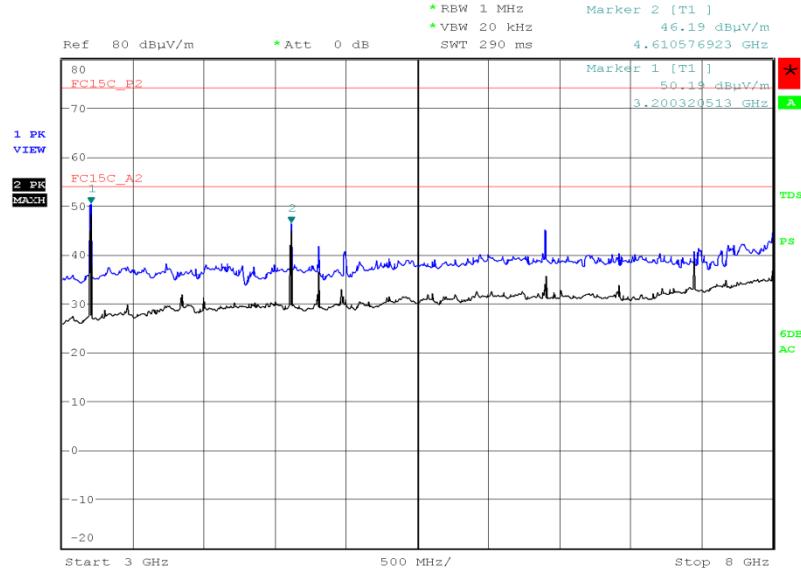
No other emissions were detected within 10 dB of the limit.

Bluetooth, 2480 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

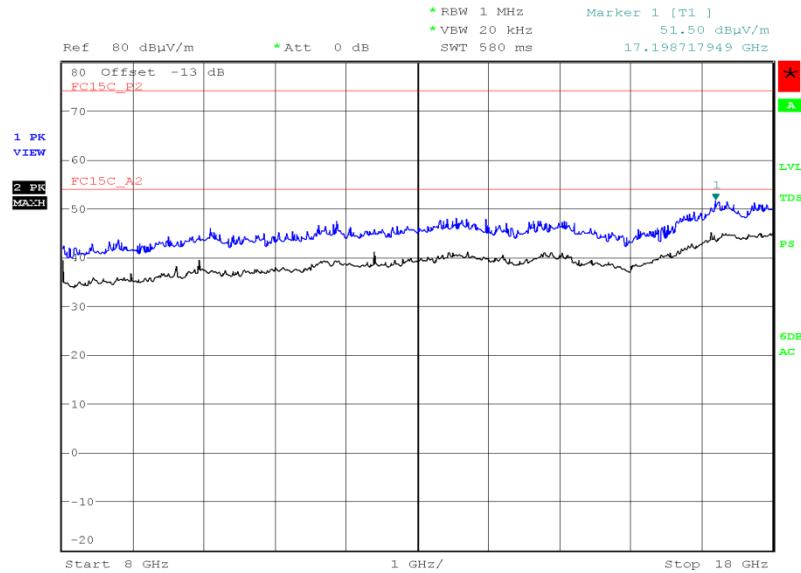
Date: 20.JUL.2015 20:03:44



Product Service

Bluetooth, 2480 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot

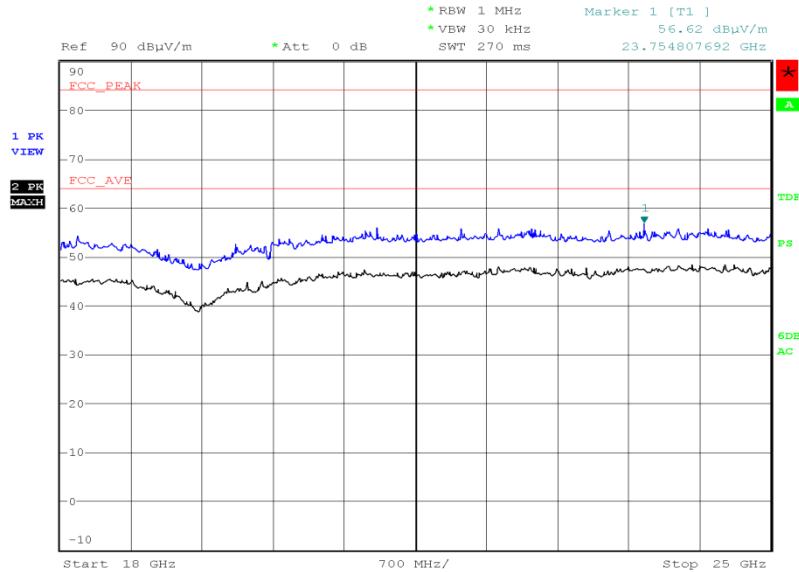
Date: 21.JUL.2015 21:59:37

Bluetooth, 2480 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot

Date: 27.JUL.2015 19:07:47



Product Service

Bluetooth, 2480 MHz, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot

Date: 27.JUL.2015 23:31:19

Remarks

Testing was performed on a static channel where the packet type was non-configurable, however GFSK modulation was used as a test mode.

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

Emissions outside the restricted bands shall be at least 20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. 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 below the fundamental instead of 20 dB.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength			Measurement Distance (m)
	(µV/m)	Average (dBµV/m)	Peak (dBµV/m)	
30-88	100	40.0	60.0	3
88-216	150	43.5	63.5	3
216-960	200	46.0	66.0	3
Above 960	500	54.0	74.0	3



Product Service

Industry Canada RSS-247, Limit Clause, 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.



Product Service

2.8 RESTRICTED BAND EDGES

2.8.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.205
Industry Canada RSS-GEN, Clause 8.10

2.8.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #1 - Modification State 1

2.8.3 Date of Test

20 July 2015

2.8.4 Test Equipment Used

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

2.8.5 Test Procedure

The test was performed in accordance with ANSI C63.10, clause 6.3, 6.6 and 6.9.

2.8.6 Environmental Conditions

Ambient Temperature	21.1°C
Relative Humidity	63.0%



2.8.7 Test Results

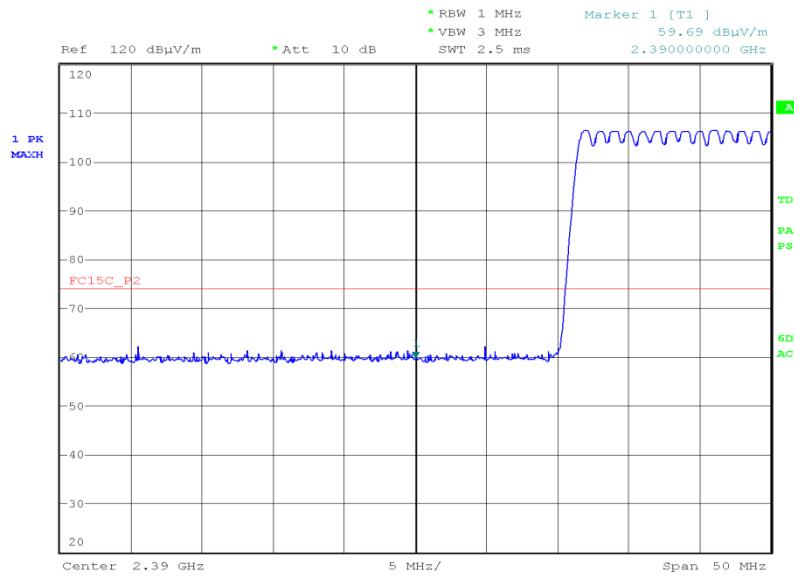
110 V AC Supply

Hopping Mode

Bluetooth, GFSK, Restricted Band Edges Results

2402 MHz		2480 MHz	
Measured Frequency 2390 MHz		Measured Frequency 2483.5 MHz	
dB μ V/m		dB μ V/m	
Final Peak	Final Average	Final Peak	Final Average
59.69	48.38	59.75	48.27

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, GFSK, Final Peak, Restricted Band Edges Plot

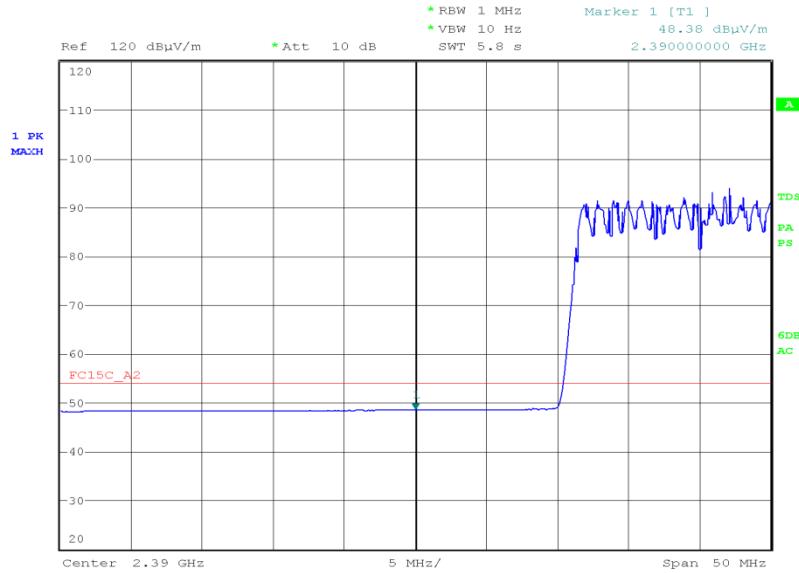


Date: 20.JUL.2015 21:42:32



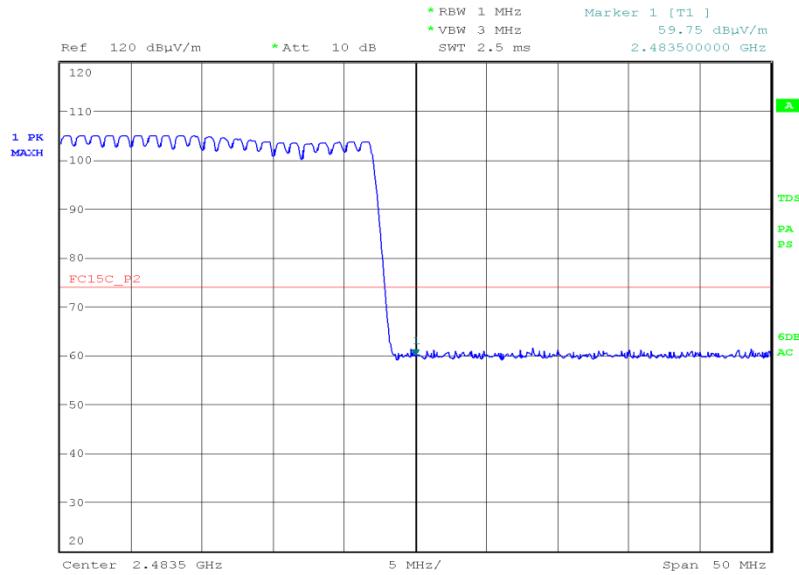
Product Service

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, GFSK, Final Average, Restricted Band Edges Plot



Date: 20.JUL.2015 21:49:46

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, GFSK, Final Peak, Restricted Band Edges Plot

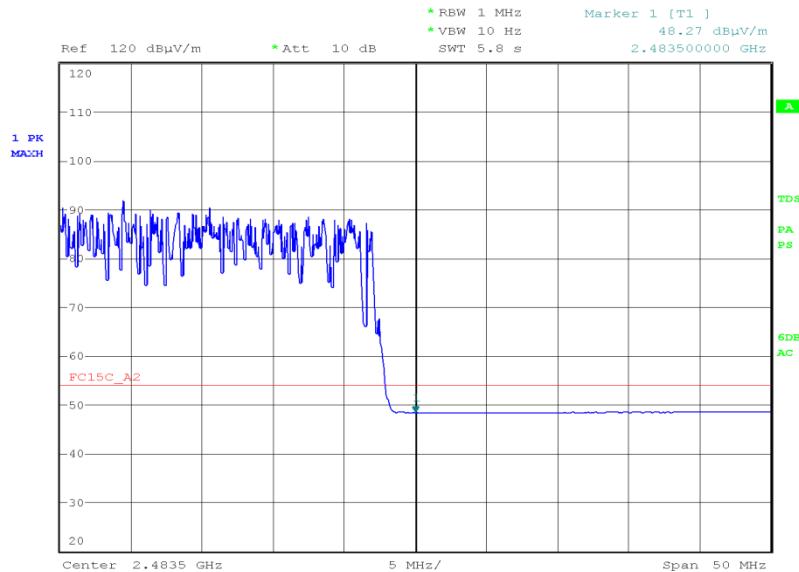


Date: 20.JUL.2015 21:57:10



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, GFSK, Final Average, Restricted Band Edges Plot



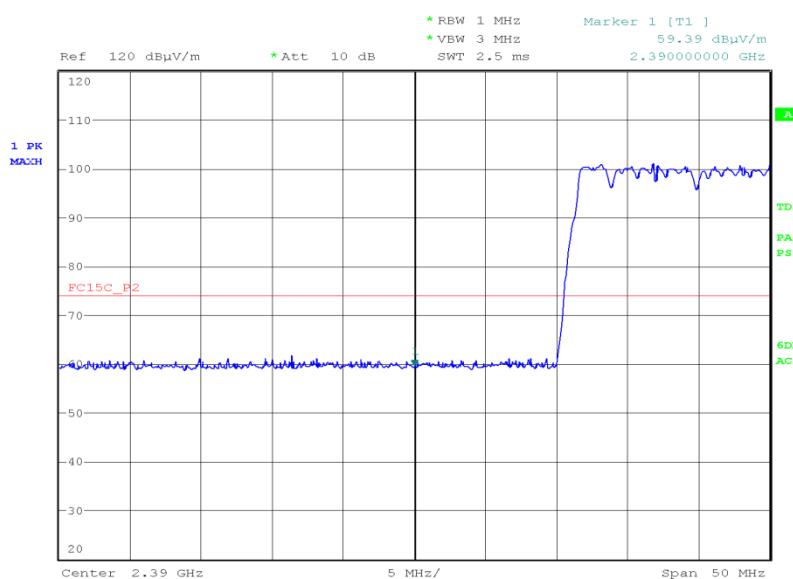
Date: 20.JUL.2015 21:55:45



Product Service

Bluetooth, pi/4 DQPSK, Restricted Band Edges Results

2402 MHz		2480 MHz	
Measured Frequency 2390 MHz		Measured Frequency 2483.5 MHz	
dB μ V/m		dB μ V/m	
Final Peak	Final Average	Final Peak	Final Average
59.39	48.32	60.75	48.26

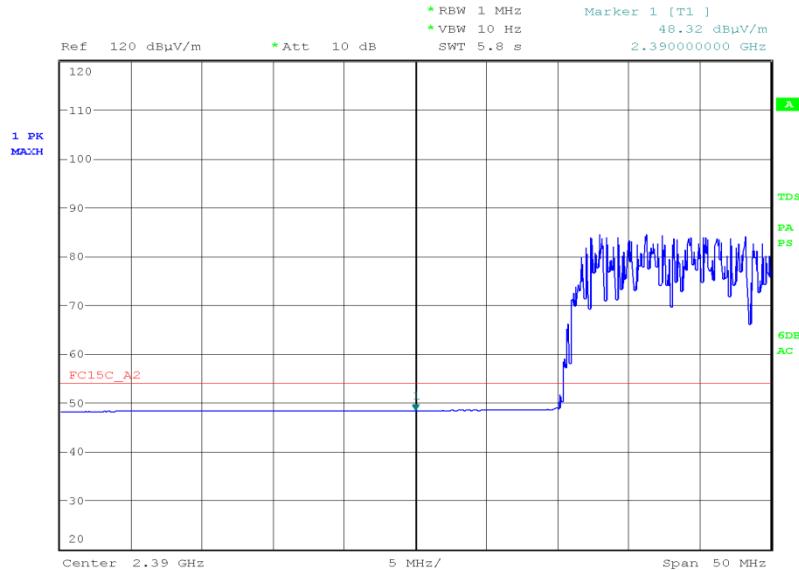
Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, pi/4 DQPSK, Final Peak, Restricted Band Edges Plot

Date: 20.JUL.2015 22:07:44



Product Service

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, pi/4 DQPSK, Final Average, Restricted Band Edges Plot

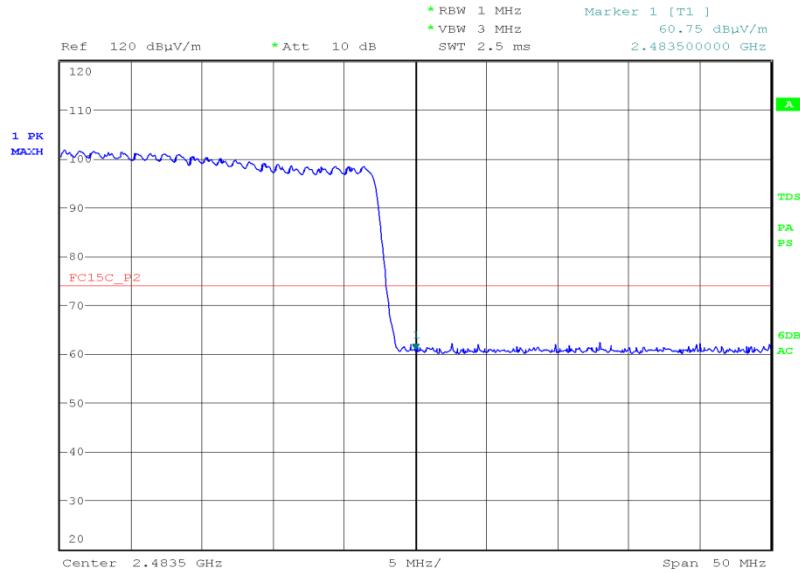


Date: 20.JUL.2015 22:09:23



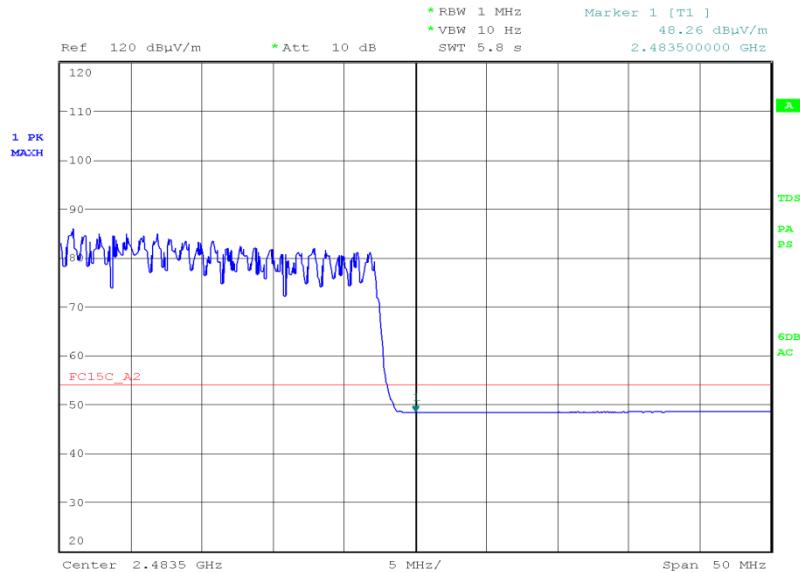
Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, pi/4 DQPSK, Final Peak, Restricted Band Edges Plot



Date: 20.JUL.2015 22:24:23

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, pi/4 DQPSK, Final Average, Restricted Band Edges Plot



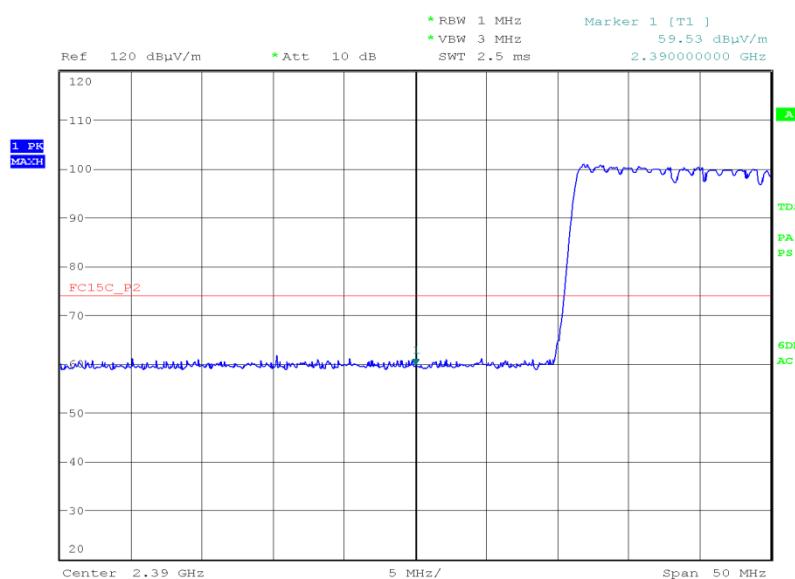
Date: 20.JUL.2015 22:28:52



Product Service

Bluetooth, 8-DPSK, Restricted Band Edges Results

2402 MHz		2480 MHz	
Measured Frequency 2390 MHz		Measured Frequency 2483.5 MHz	
dB μ V/m		dB μ V/m	
Final Peak	Final Average	Final Peak	Final Average
59.53	48.34	60.53	48.22

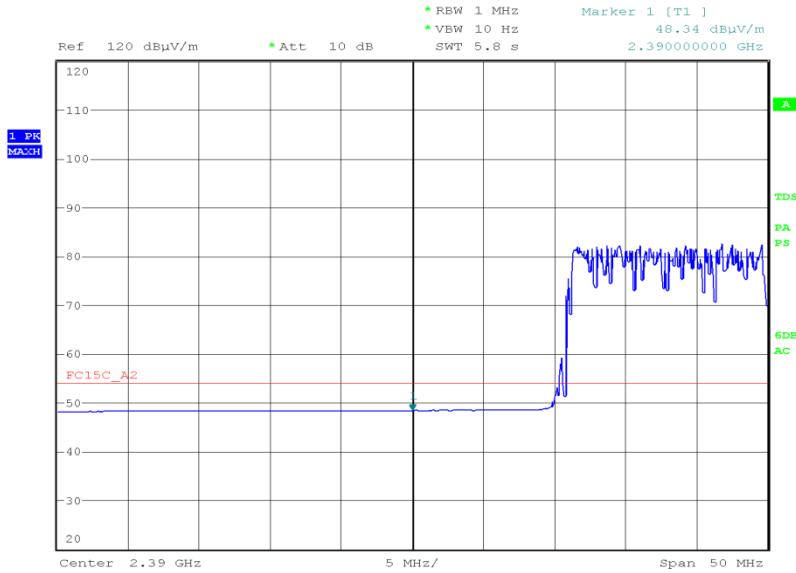
Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, 8-DPSK, Final Peak, Restricted Band Edges Plot

Date: 20.JUL.2015 23:02:31



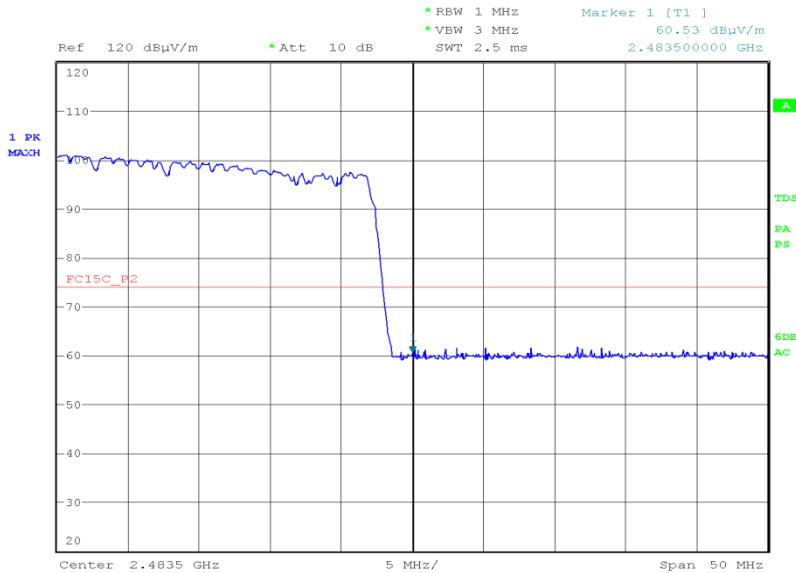
Product Service

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, 8-DPSK, Final Average, Restricted Band Edges Plot



Date: 20.JUL.2015 23:05:35

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, 8-DPSK, Final Peak, Restricted Band Edges Plot

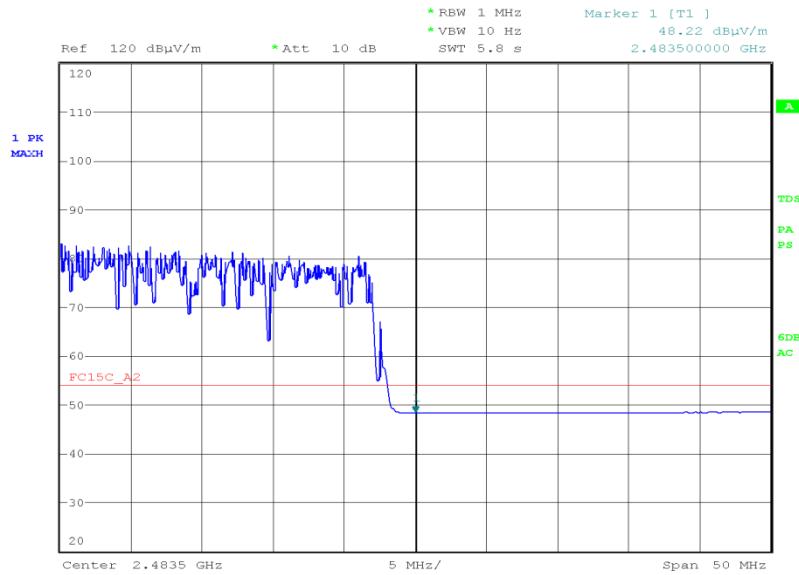


Date: 20.JUL.2015 22:47:22



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, 8-DPSK, Final Average, Restricted Band Edges Plot



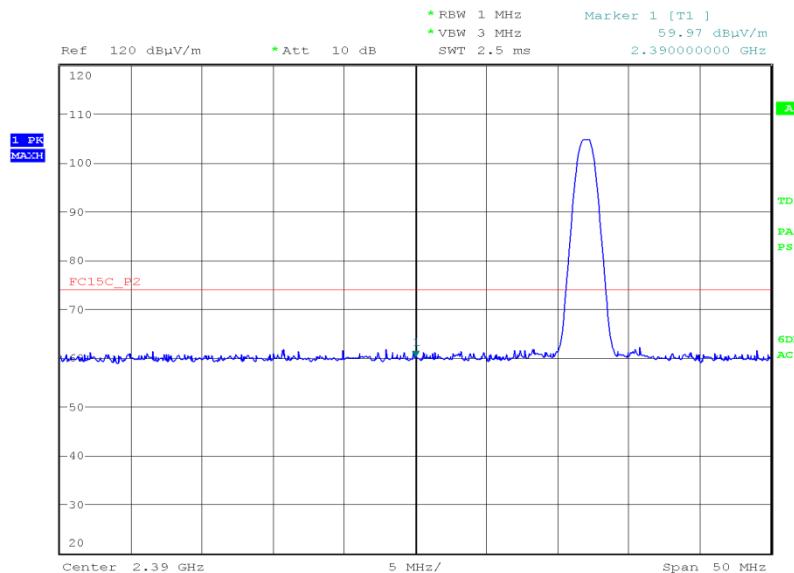
Date: 20.JUL.2015 22:49:20



Product Service

Static ModeBluetooth, GFSK, Restricted Band Edges Results

2402 MHz		2480 MHz,	
Measured Frequency 2390 MHz		Measured Frequency 2483.5 MHz	
dB μ V/m		dB μ V/m	
Final Peak	Final Average	Final Peak	Final Average
59.97	48.36	59.64	48.68

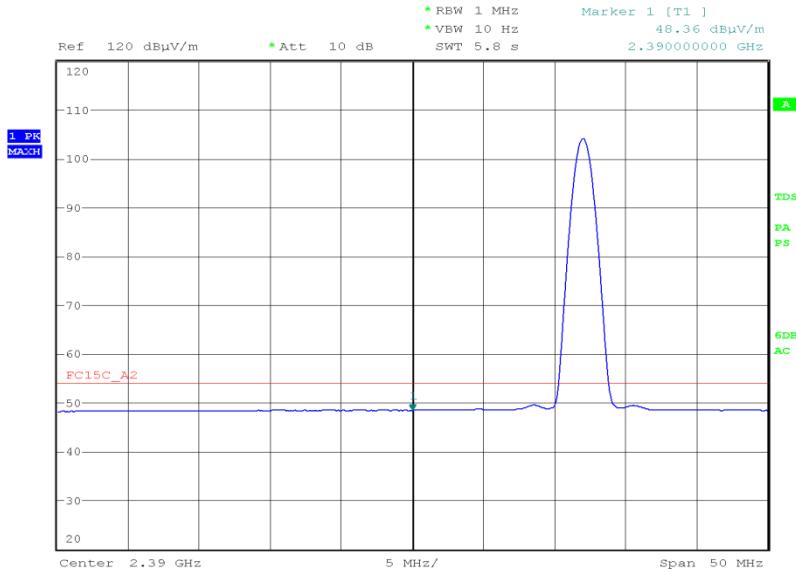
Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, GFSK, Final Peak, Restricted Band Edges Plot

Date: 20.JUL.2015 19:51:39



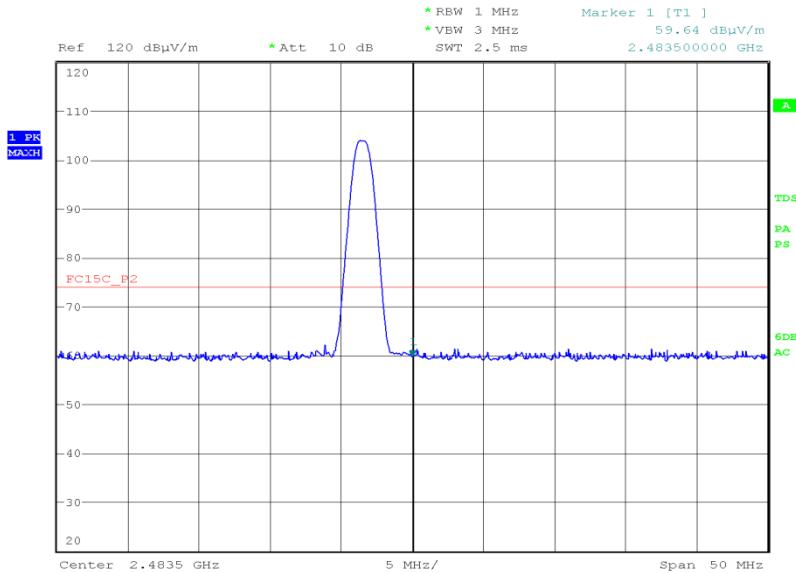
Product Service

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, GFSK, Final Average, Restricted Band Edges Plot



Date: 20.JUL.2015 19:52:20

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, GFSK, Final Peak, Restricted Band Edges Plot

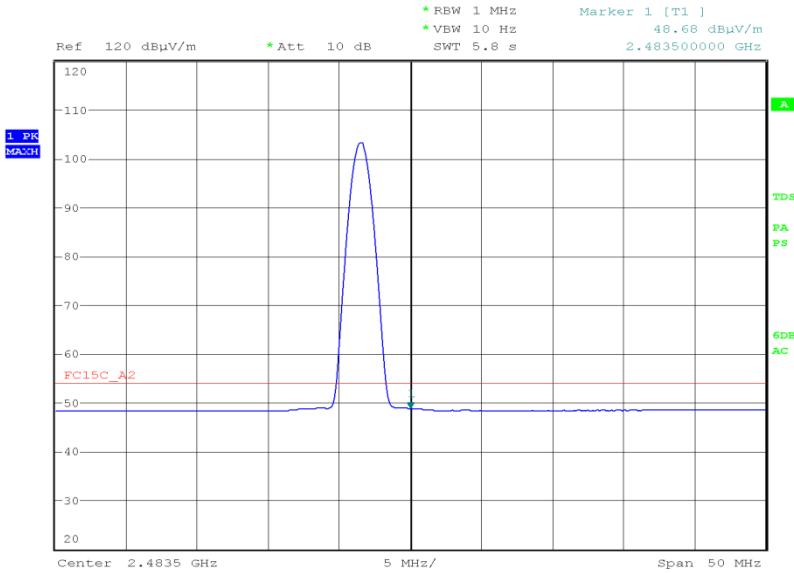


Date: 20.JUL.2015 20:10:09



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, GFSK, Final Average, Restricted Band Edges Plot



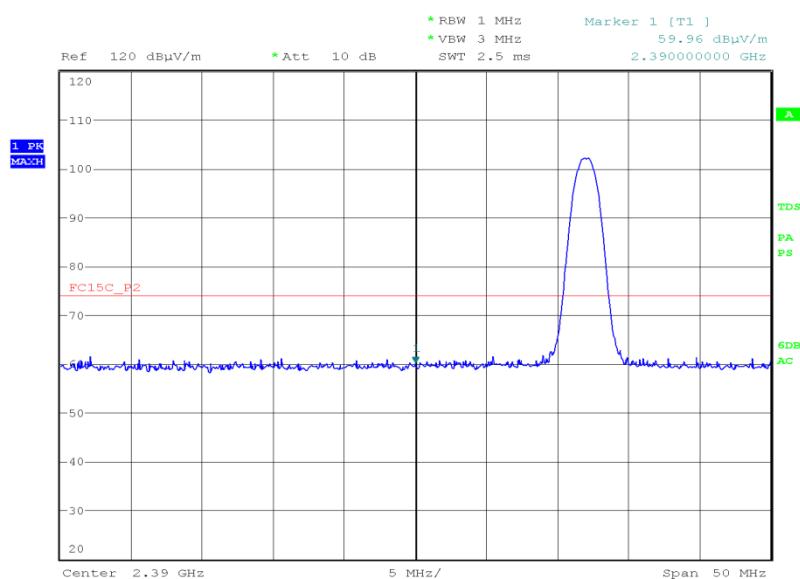
Date: 20.JUL.2015 20:10:52



Product Service

Bluetooth, pi/4 DQPSK, Restricted Band Edges Results

2402 MHz		2480 MHz,	
Measured Frequency 2390 MHz		Measured Frequency 2483.5 MHz	
dB μ V/m		dB μ V/m	
Final Peak	Final Average	Final Peak	Final Average
59.96	48.39	59.77	48.56

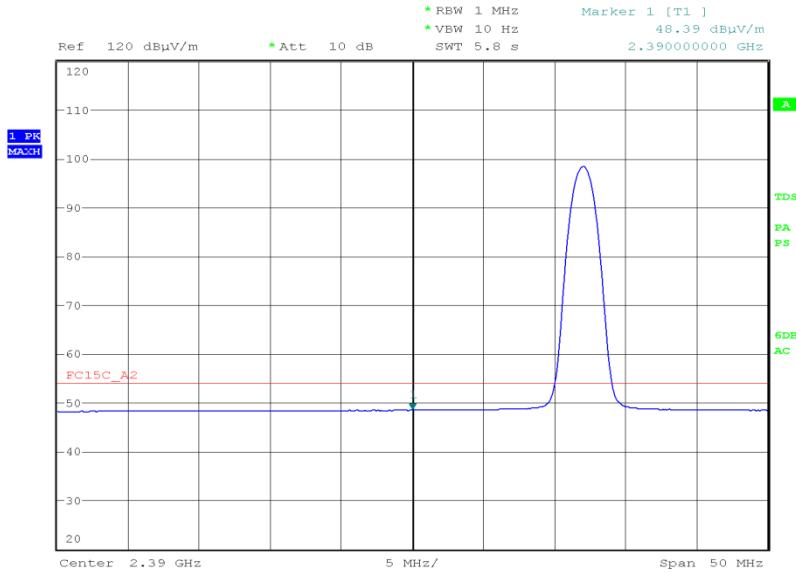
Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, pi/4 DQPSK, Final Peak, Restricted Band Edges Plot

Date: 20.JUL.2015 20:29:07



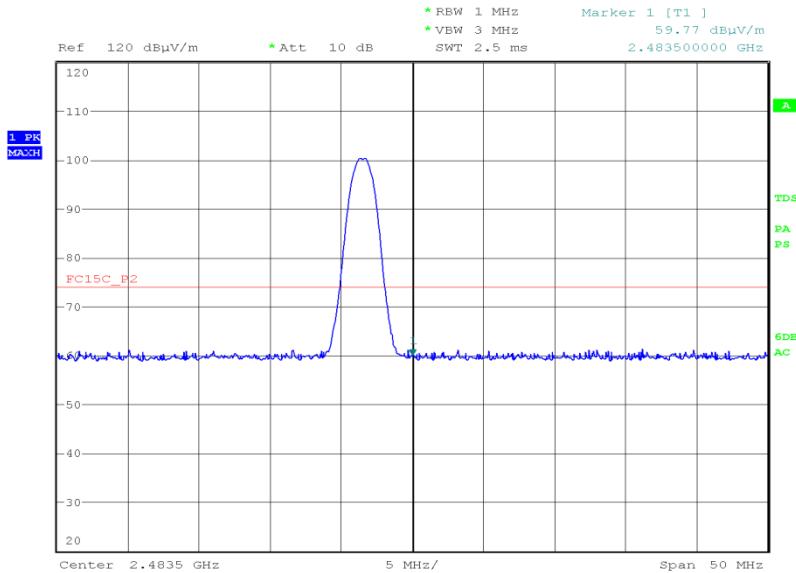
Product Service

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, pi/4 DQPSK, Final Average, Restricted Band Edges Plot



Date: 20.JUL.2015 20:29:44

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, pi/4 DQPSK, Final Peak, Restricted Band Edges Plot

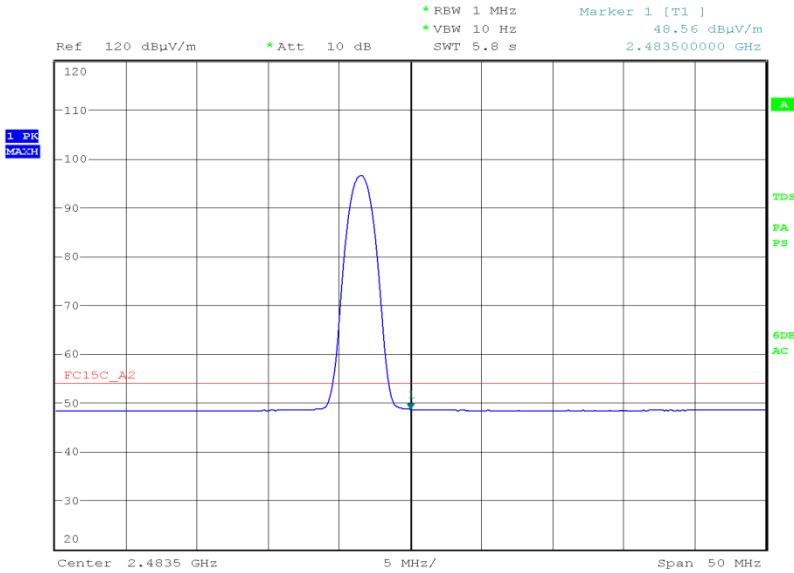


Date: 20.JUL.2015 20:39:15



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, pi/4 DQPSK, Final Average,
Restricted Band Edges Plot



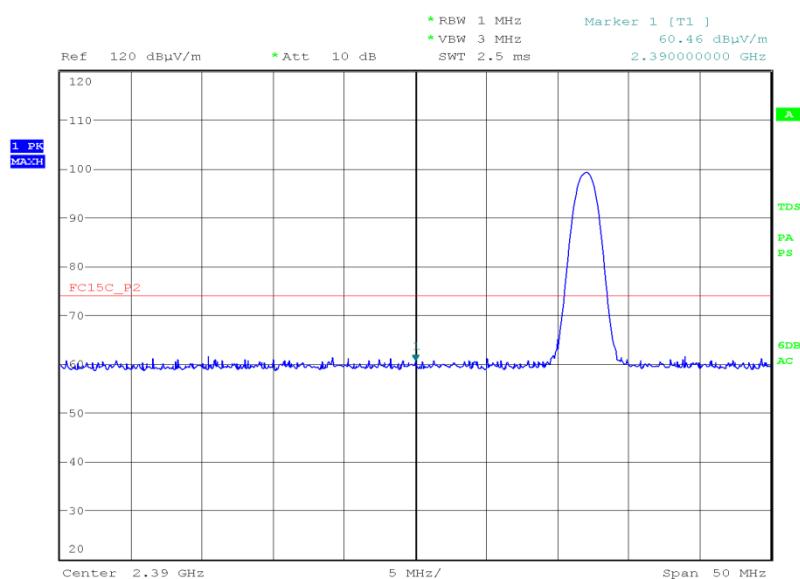
Date: 20.JUL.2015 20:38:31



Product Service

Bluetooth, 8-DPSK, Restricted Band Edges Results

2402 MHz		2480 MHz	
Measured Frequency 2390 MHz		Measured Frequency 2483.5 MHz	
dB μ V/m		dB μ V/m	
Final Peak	Final Average	Final Peak	Final Average
60.46	48.37	60.78	48.59

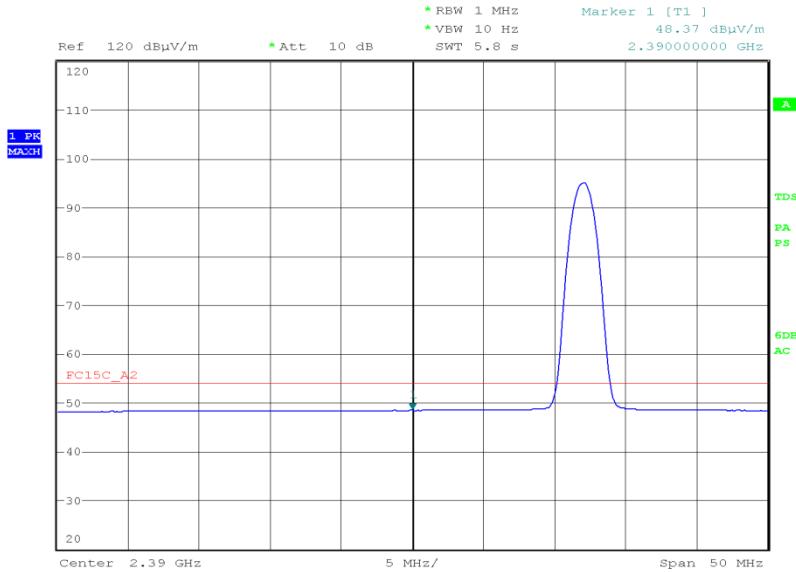
Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, 8-DPSK, Final Peak, Restricted Band Edges Plot

Date: 20.JUL.2015 20:54:37



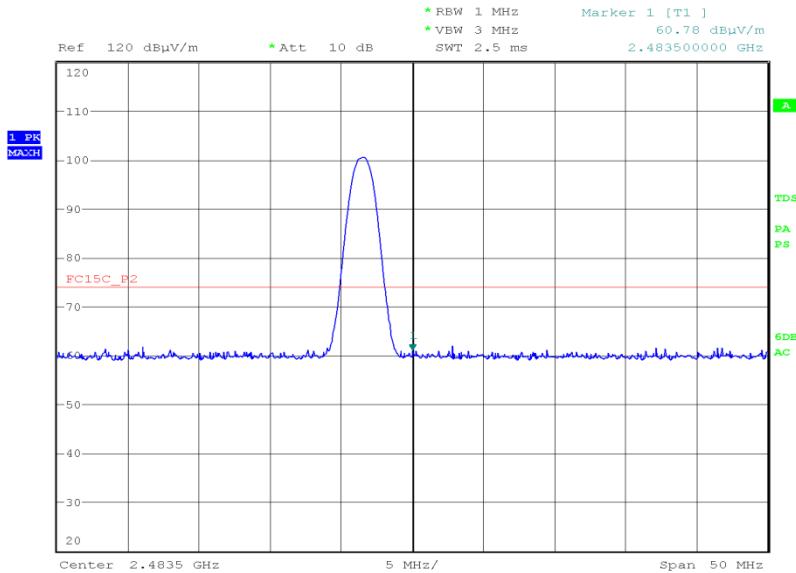
Product Service

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, 8-DPSK, Final Average, Restricted Band Edges Plot



Date: 20.JUL.2015 20:55:17

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, 8-DPSK, Final Peak, Restricted Band Edges Plot

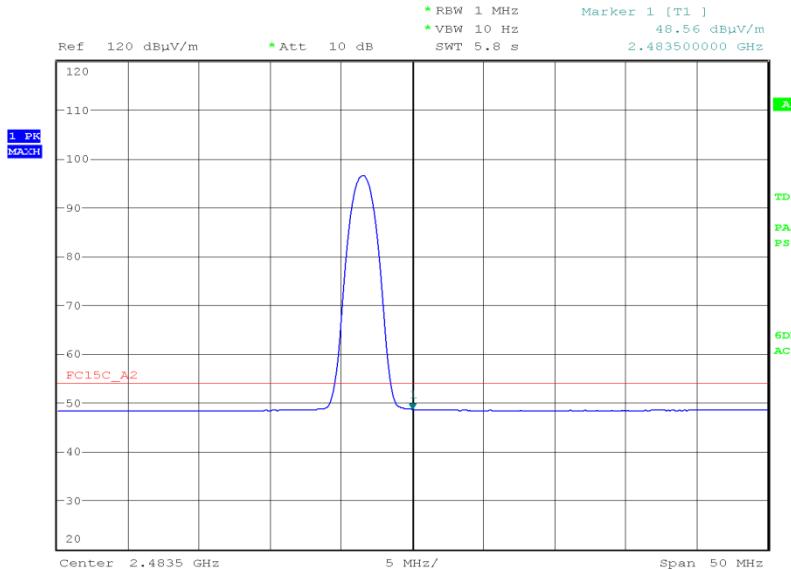


Date: 20.JUL.2015 21:02:26



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, 8-DPSK, Final Average, Restricted Band Edges Plot



Date: 20.JUL.2015 20:38:31

Remark

Testing was performed on the bottom and top channels using GFSK modulation because this was the modulation which produced the highest level of conducted average power.

Testing was performed on a static channel where the packet type was non-configurable, however GFSK modulation was used as a test mode.

Testing was performed on the bottom channel using pi/4 DQPSK modulation because this was the modulation which produced the widest value of 20 dB bandwidth.

Testing was performed on the top channel using 8-DPSK modulation because this was the modulation which produced the widest value of 20 dB bandwidth.

Testing was performed on a static channel where the packet type was non-configurable, however GFSK modulation was used as a test mode.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBμV/m)	Average (dBμV/m)
Restricted Bands of Operation	74	54

Industry Canada RSS-GEN, Limit Clause 8.10

	Peak (dBμV/m)	Average (dBμV/m)
Restricted Bands of Operation	74	54



Product Service

2.9 AUTHORISED BAND EDGES

2.9.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d)
Industry Canada RSS-247, Clause 5.5

2.9.2 Equipment Under Test and Modification State

ASD041517 S/N: EMC #1 - Modification State 1

2.9.3 Date of Test

20 July 2015

2.9.4 Test Equipment Used

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

2.9.5 Test Procedure

The test was performed in accordance with ANSI C63.10, clause 6.3, 6.6 and 7.7.9.

Remarks

The RBW was set at 100 kHz as per 15.247(d).

2.9.6 Environmental Conditions

Ambient Temperature	21.1°C
Relative Humidity	63.0%



Product Service

2.9.7 Test Results

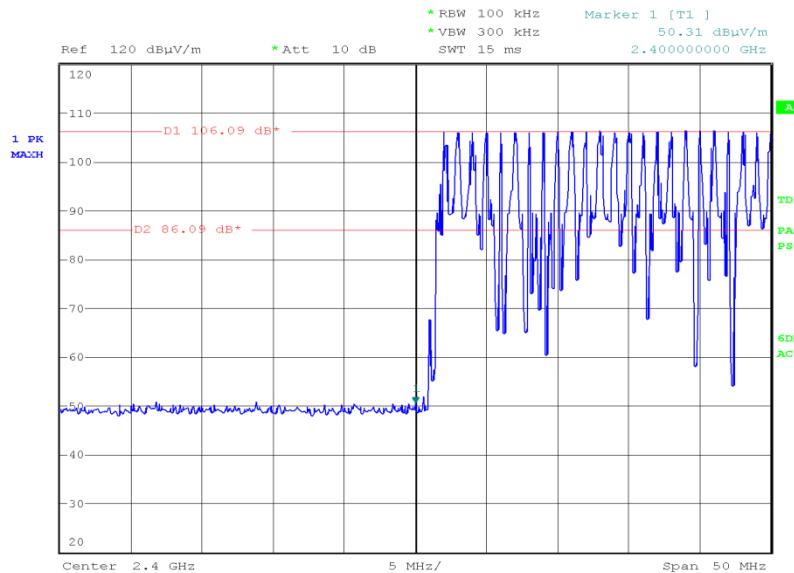
110 V AC Supply

Hopping Mode

Bluetooth, GFSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dB μ V/m	dB μ V/m
Final Peak	Final Peak
50.31	48.21

Bluetooth, 2402 MHz, Measured Frequency 2400.00 MHz, GFSK, Final Peak, Authorised Band Edges Plot

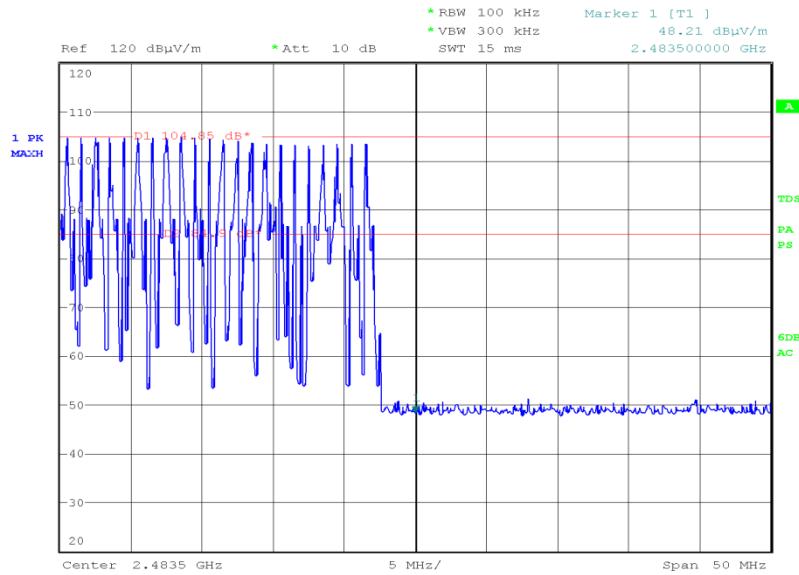


Date: 20.JUL.2015 21:41:37



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.50 MHz, GFSK, Final Peak, Authorised Band Edges Plot



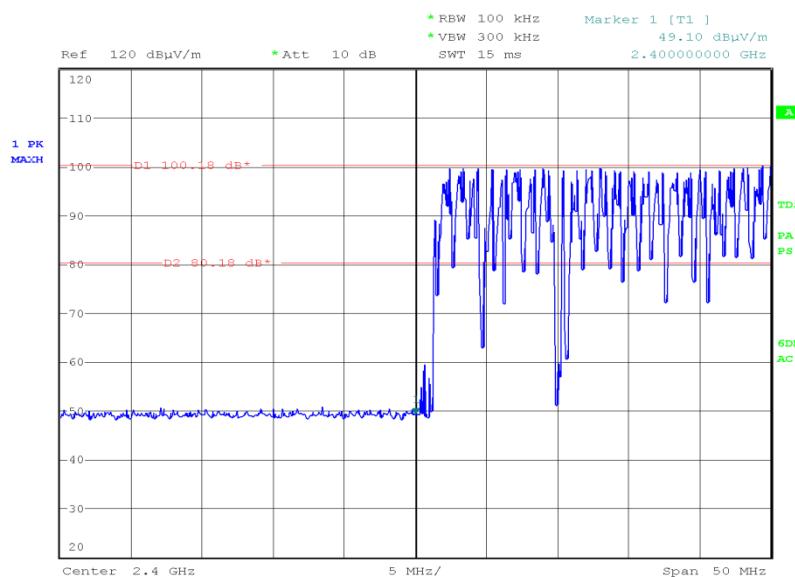
Date: 20.JUL.2015 21:58:38



Product Service

Bluetooth, pi/4 DQPSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dB μ V/m	dB μ V/m
Final Peak	Final Peak
49.10	49.84

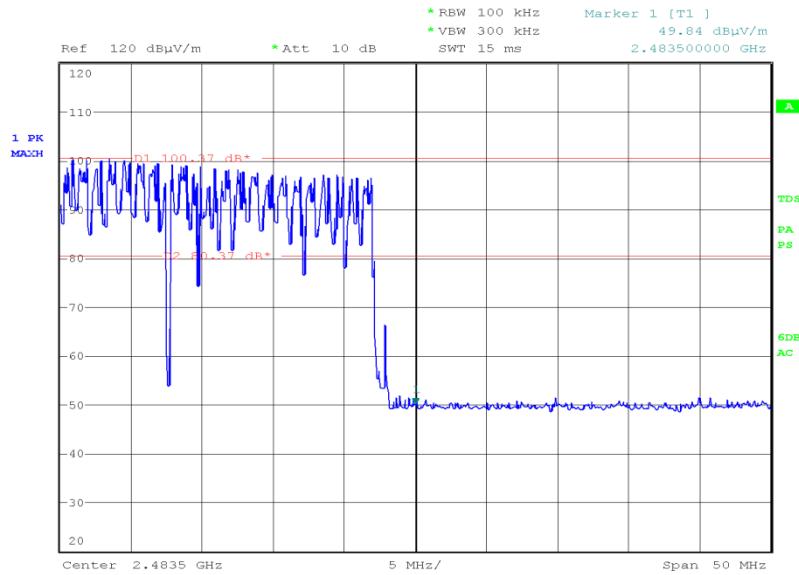
Bluetooth, 2402 MHz, Measured Frequency 2400.00 MHz, pi/4 DQPSK, Final Peak, Authorised Band Edges Plot

Date: 20.JUL.2015 22:06:50



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.50 MHz, pi/4 DQPSK, Final Peak, Authorised Band Edges Plot



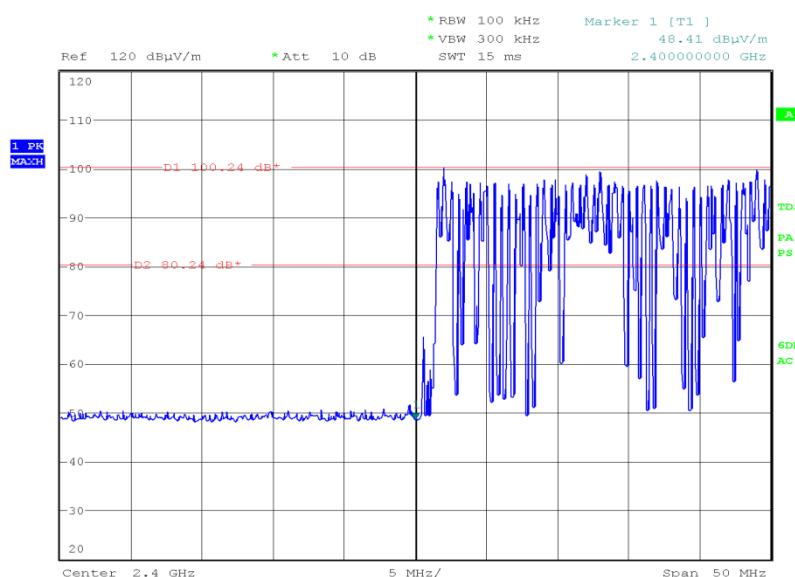
Date: 20.JUL.2015 22:36:28



Product Service

Bluetooth, 8-DPSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dB μ V/m	dB μ V/m
Final Peak	Final Peak
48.41	49.11

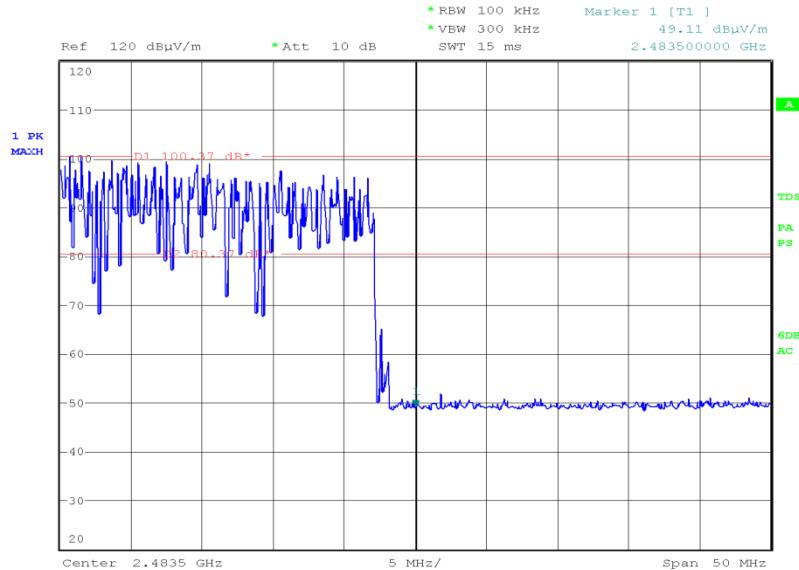
Bluetooth, 2402 MHz, Measured Frequency 2400.00 MHz, 8-DPSK, Final Peak, Authorised Band Edges Plot

Date: 20.JUL.2015 23:01:22



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.50 MHz, 8-DPSK, Final Peak, Authorised Band Edges Plot



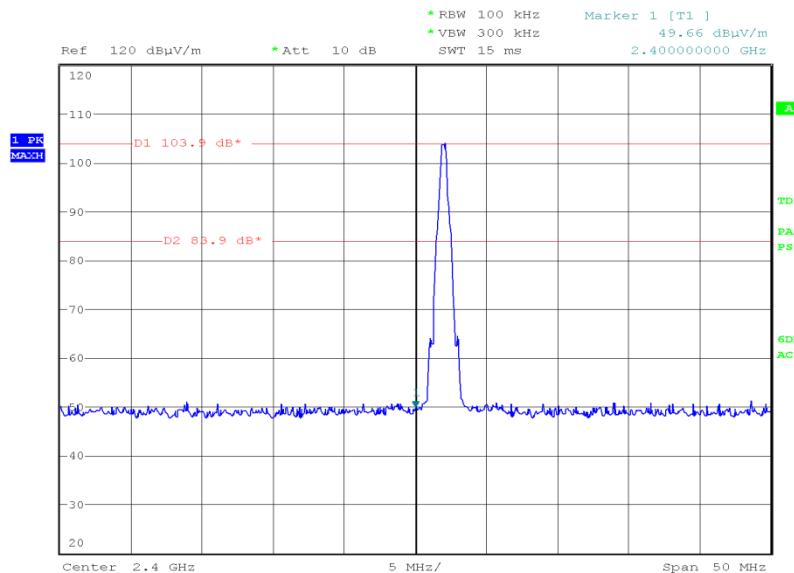
Date: 20.JUL.2015 22:46:06



Product Service

Static ModeBluetooth, GFSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dB μ V/m	dB μ V/m
Final Peak	Final Peak
49.66	49.54

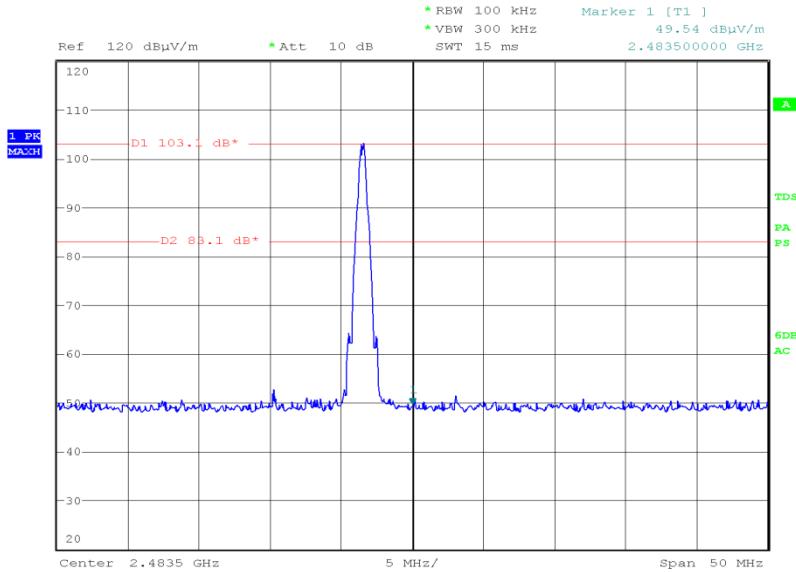
Bluetooth, 2402 MHz, Measured Frequency 2400.00 MHz, GFSK, Final Peak, Authorised Band Edges Plot

Date: 20.JUL.2015 19:53:41



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.50 MHz, GFSK, Final Peak, Authorised Band Edges Plot



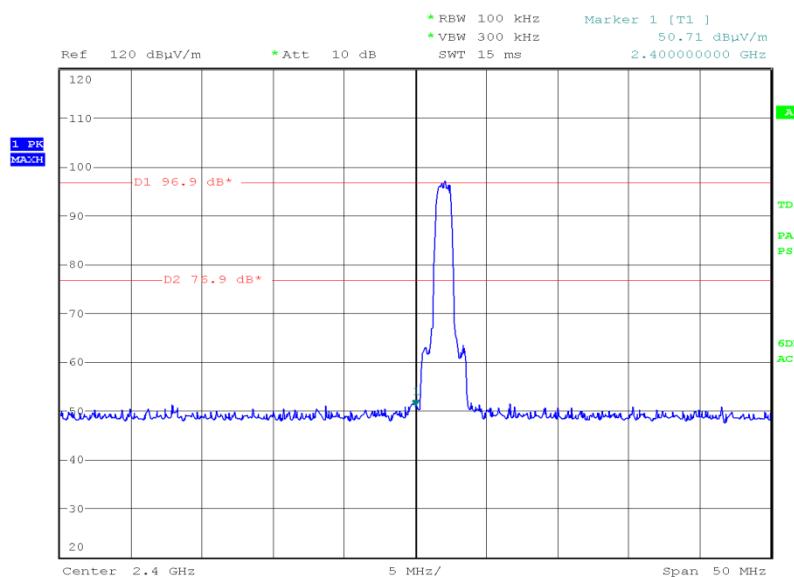
Date: 20.JUL.2015 20:12:53



Product Service

Bluetooth, pi/4 DQPSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dB μ V/m	dB μ V/m
Final Peak	Final Peak
50.71	49.51

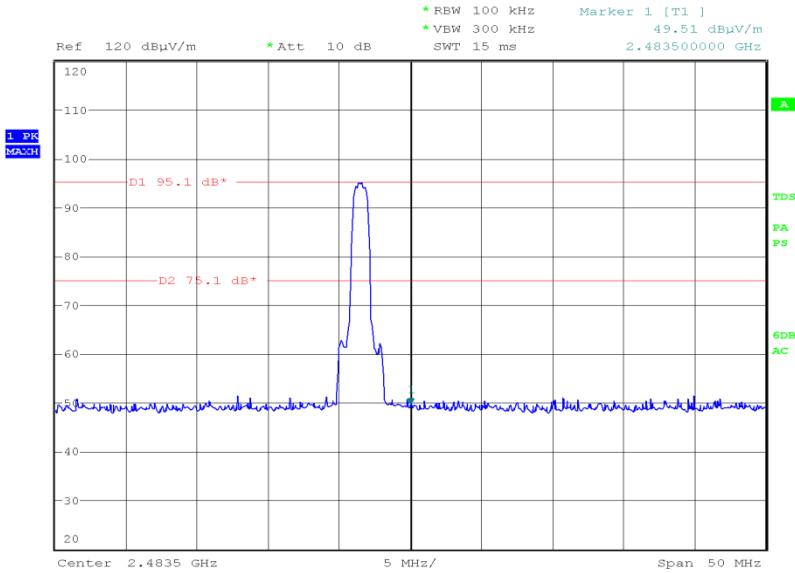
Bluetooth, 2402 MHz, Measured Frequency 2400.00 MHz, pi/4 DQPSK, Final Peak, Authorised Band Edges Plot

Date: 20.JUL.2015 20:28:22



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.50 MHz, pi/4 DQPSK, Final Peak, Authorised Band Edges Plot



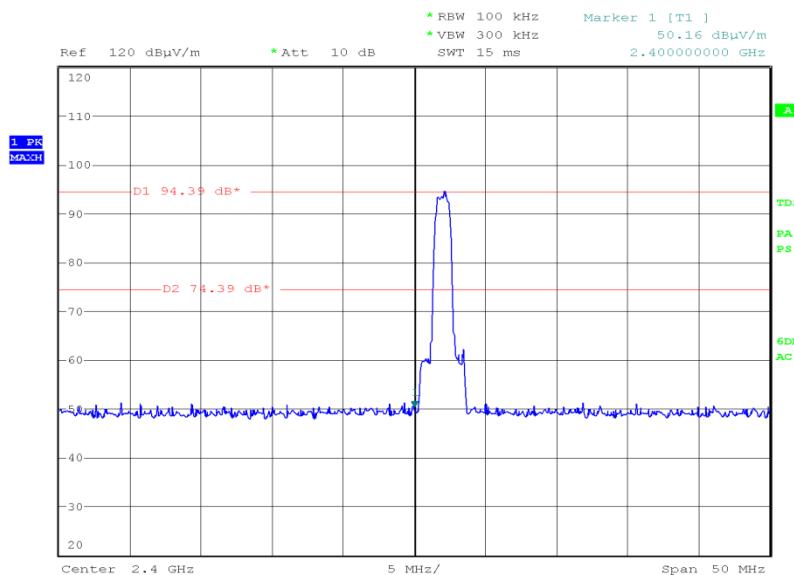
Date: 20.JUL.2015 20:41:07



Product Service

Bluetooth, 8-DPSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dB μ V/m	dB μ V/m
Final Peak	Final Peak
50.16	48.53

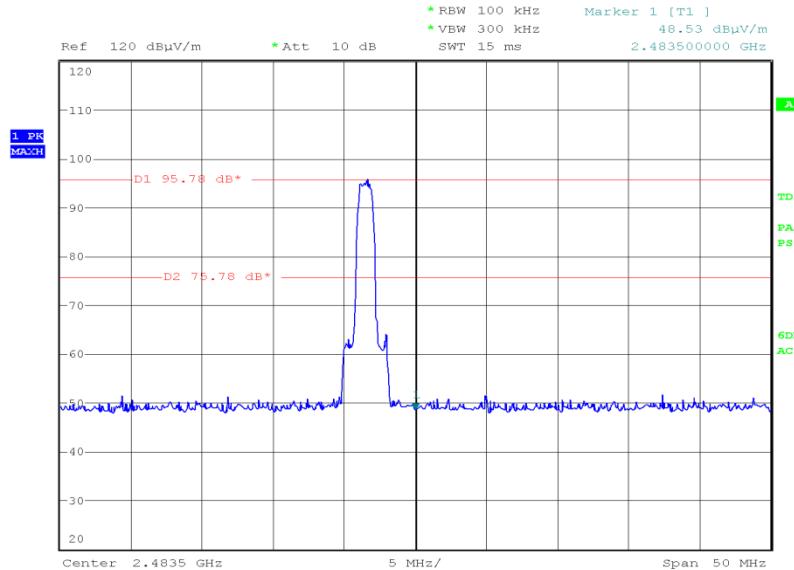
Bluetooth, 2402 MHz, Measured Frequency 2400.00 MHz, 8-DPSK, Final Peak, Authorised Band Edges Plot

Date: 20.JUL.2015 20:53:37



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.50 MHz, 8-DPSK, Final Peak, Authorised Band Edges Plot



Date: 20.JUL.2015 21:04:30

Remark

Testing was performed on the bottom and top channels using GFSK modulation because this was the modulation which produced the highest level of conducted average power.

Testing was performed on a static channel where the packet type was non-configurable, however GFSK modulation was used as a test mode.

Testing was performed on the bottom channel using pi/4 DQPSK modulation because this was the modulation which produced the widest value of 20 dB bandwidth.

Testing was performed on the top channel using 8-DPSK modulation because this was the modulation which produced the widest value of 20 dB bandwidth.

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

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. 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 below the fundamental instead of 20 dB.

Industry Canada RSS-247, Limit Clause 5.5

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. 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 below the fundamental instead of 20 dB.



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 - Frequency Hopping Systems - Number of Hopping Channels					
20dB Attenuator	Narda	4772-20	456	-	TU
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	28-Jul-2015
Mains Voltage Monitor	TUV SUD Product Service	MVM1	1378	12	1-Sep-2015
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Hygrometer	Rotronic	I-1000	3220	12	24-Jul-2015
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	28-Jul-2015
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	16-Feb-2016
2 metre SMA Cable	Florida Labs	SMS-235SP-78.8-SMS	4518	12	29-Jan-2016
Section 2.2 - Frequency Hopping Systems - 20 dB Bandwidth					
20dB Attenuator	Narda	4772-20	456	-	TU
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	28-Jul-2015
Mains Voltage Monitor	TUV SUD Product Service	MVM1	1378	12	1-Sep-2015
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Hygrometer	Rotronic	I-1000	3220	12	24-Jul-2015
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	28-Jul-2015
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	16-Feb-2016
2 metre SMA Cable	Florida Labs	SMS-235SP-78.8-SMS	4518	12	29-Jan-2016
Section 2.3 - Frequency Hopping Systems - Channel Separation					
20dB Attenuator	Narda	4772-20	456	-	TU
Mains Voltage Monitor	TUV SUD Product Service	MVM1	1378	12	1-Sep-2015
Programmable Power Supply	California Inst	2001RP	1898	-	TU
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	16-Feb-2016
2 metre SMA Cable	Florida Labs	SMS-235SP-78.8-SMS	4518	12	29-Jan-2016
Section 2.4 - Frequency Hopping Systems - Average Time of Occupancy					
20dB Attenuator	Narda	4772-20	456	-	TU
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	28-Jul-2015
Mains Voltage Monitor	TUV SUD Product Service	MVM1	1378	12	1-Sep-2015
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Hygrometer	Rotronic	I-1000	3220	12	24-Jul-2015
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	28-Jul-2015
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	16-Feb-2016
2 metre SMA Cable	Florida Labs	SMS-235SP-78.8-SMS	4518	12	29-Jan-2016
Section 2.5 - Maximum Conducted Output Power					
20dB Attenuator	Narda	4772-20	456	-	TU
Mains Voltage Monitor	TUV SUD Product Service	MVM1	1378	12	1-Sep-2015
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Hygrometer	Rotronic	I-1000	3220	12	24-Jul-2015
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	3-Sep-2015
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	24-Sep-2015
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	16-Feb-2016
2 metre SMA Cable	Florida Labs	SMS-235SP-78.8-SMS	4518	12	29-Jan-2016



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.6 – Peak EIRP					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2016
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	22	28-Nov-2015
Screened Room (5)	Rainford	Rainford	1545	0	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	A1	2677	12	11-Jun-2016
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	18-Sep-2015
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	matureo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matureo GmbH	NCD	3917	-	TU
2m K-Type Cable (Rx)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU
Section 2.7 - Spurious Radiated 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	29-Apr-2016
Antenna (Bilog)	Schaffner	CBL6143	287	24	3-Feb-2016
Pre-Amplifier	Phase One	PSO4-0087	1534	12	23-Dec-2015
Screened Room (5)	Rainford	Rainford	1545	0	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM101	2424	12	26-Sep-2015
Hygrometer	Rotronic	A1	2677	12	11-Jun-2016
Filter (Hi Pass)	Lorch	9HP7-7000-SR	2833	12	5-Feb-2016
Comb Generator	Schaffner	RSG1000	3034	-	TU
Amplifier (8 - 18GHz)	Phase One	PS06-0061	3176	12	11-Aug-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	matureo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matureo GmbH	NCD	3917	-	TU
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4105	12	7-Nov-2015
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4106	12	7-Nov-2015
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	1-Oct-2015
Hygropalm Temperature and Humidity Meter	Rotronic	HP21	4410	12	15-Apr-2016
Suspended Substrate Highpass Filter	Advance Power Components	11SH10-3000/X18000-O/O	4411	12	24-Mar-2016
2m K-Type Cable (Rx)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU
0.5m SMA Cable (Rx)	Scott Cables	SLSLL18-SMSM-00.50M	4528	6	29-Jul-2015



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.8 - Restricted Band Edges					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2016
Screened Room (5)	Rainford	Rainford	1545	0	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM101	2424	12	26-Sep-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	matureo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matureo GmbH	NCD	3917	-	TU
Hygropalm Temperature and Humidity Meter	Rotronic	HP21	4410	12	15-Apr-2016
2m K-Type Cable (Rx)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU
Section 2.9 - Authorised Band Edges					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2016
Screened Room (5)	Rainford	Rainford	1545	0	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM101	2424	12	26-Sep-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	matureo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matureo GmbH	NCD	3917	-	TU
Hygropalm Temperature and Humidity Meter	Rotronic	HP21	4410	12	15-Apr-2016
2m K-Type Cable (Rx)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU

TU – Traceability Unscheduled



Product Service

3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Frequency Hopping Systems - 20 dB Bandwidth	$\pm 16.74 \text{ kHz}$
Frequency Hopping Systems - Number of Hopping Channels	-
Frequency Hopping Systems - Average Time of Occupancy	-
Maximum Conducted Output Power	$\pm 0.70 \text{ dB}$
Peak EIRP	30 MHz to 1 GHz: $\pm 5.1 \text{ dB}$ 1 GHz to 40 GHz: $\pm 6.3 \text{ dB}$
Authorised Band Edges	Conducted: $\pm 3.08 \text{ dB}$ Radiated: 30 MHz to 1 GHz: $\pm 5.1 \text{ dB}$ Radiated: 1 GHz to 40 GHz: $\pm 6.3 \text{ dB}$
Restricted Band Edges	30 MHz to 1 GHz: $\pm 5.1 \text{ dB}$ 1 GHz to 40 GHz: $\pm 6.3 \text{ dB}$
Spurious Radiated Emissions	30 MHz to 1 GHz: $\pm 5.1 \text{ dB}$ 1 GHz to 40 GHz: $\pm 6.3 \text{ dB}$
Frequency Hopping Systems - Channel Separation	$\pm 16.74 \text{ kHz}$



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
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