



Product Service

**Choose certainty.
Add value.**

Report On

FCC Testing of the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC, FeliCa) and GPS
In accordance with FCC 47 CFR Part 15C (Bluetooth)

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00234

Document 75933606 Report 21 Issue 1

May 2016



Product Service

TÜV SÜD Product Service, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuv-sud.co.uk

COMMERCIAL-IN-CONFIDENCE

REPORT ON

FCC Testing of the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC, FeliCa) and GPS
In accordance with FCC 47 CFR Part 15C (Bluetooth)

Document 75933606 Report 21 Issue 1

May 2016

PREPARED FOR

Sharp Telecommunications of Europe Ltd
Inspired
Easthampstead Road
Bracknell
Berkshire
RG12 1NS

PREPARED BY

Natalie Bennett
Senior Administrator, Project Support

APPROVED BY

Matthew Russell
Authorised Signatory

DATED

05 May 2016

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. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler

M Toubella





CONTENTS

Section	Page No
1	REPORT SUMMARY 3
1.1	Introduction 4
1.2	Brief Summary of Results 5
1.3	Product Technical Description 6
1.4	Product Information 6
1.5	Test Conditions 6
1.6	Deviations from the Standard 6
1.7	Modification Record 6
2	TEST DETAILS 7
2.1	AC Line Conducted Emissions 8
2.2	Frequency Hopping Systems - Number of Hopping Channels 11
2.3	Frequency Hopping Systems - 20 dB Bandwidth 13
2.4	Frequency Hopping Systems - Channel Separation 19
2.5	Frequency Hopping Systems - Average Time of Occupancy 23
2.6	Maximum Conducted Output Power 28
2.7	Spurious Radiated Emissions 32
2.8	Restricted Band Edges 45
2.9	Authorised Band Edges 64
3	TEST EQUIPMENT USED 77
3.1	Test Equipment Used 78
3.2	Measurement Uncertainty 81
4	ACCREDITATION, DISCLAIMERS AND COPYRIGHT 82
4.1	Accreditation, Disclaimers and Copyright 83



Product Service

SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V),
Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with
Bluetooth, WLAN, SRD(NFC, FeliCa) and GPS
In accordance with FCC 47 CFR Part 15C (Bluetooth)



Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC Testing of the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC, FeliCa) and GPS to the requirements of FCC 47 CFR 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	Sharp Corporation
Serial Number(s)	IMEI 004401115723948 IMEI 004401115723419
Number of Samples Tested	2
Test Specification/Issue/Date	FCC 47 CFR Part 15C (2015)
Disposal	Held Pending Disposal
Reference Number	Not Applicable
Date	Not Applicable
Order Number	10749
Date	15 February 2016
Start of Test	31 March 2016
Finish of Test	20 April 2016
Name of Engineer(s)	G Lawler M Toubella
Related Document(s)	ANSI C63.10: 2013



1.2 BRIEF SUMMARY OF RESULTS

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

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Bluetooth				
2.1	15.207	AC Line Conducted Emissions	Pass	
2.2	15.247 (a)(1)(iii)	Frequency Hopping Systems - Number of Hopping Channels	Pass	
2.3	15.247 (a)(1)	Frequency Hopping Systems - 20 dB Bandwidth	Pass	
2.4	15.247 (a)(1)	Frequency Hopping Systems - Channel Separation	Pass	
2.5	15.247 (a)(1)(iii)	Frequency Hopping Systems - Average Time of Occupancy	Pass	
2.6	15.247 (b)(3)	Maximum Conducted Output Power	Pass	
2.7	15.247 (d), 15.205 and 15.209	Spurious Radiated Emissions	Pass	
2.8	15.205	Restricted Band Edges	Pass	
2.9	15.247 (d)	Authorised Band Edges	Pass	



1.3 PRODUCT TECHNICAL DESCRIPTION

Refer to Model Description APYHRO00234 Rev 4.0 document.

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC, FeliCa) and GPS. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

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

The EUT was powered from a 4.0 V DC supply.

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

1.6 DEVIATIONS FROM THE STANDARD

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

1.7 MODIFICATION RECORD

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



Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V),
Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with
Bluetooth, WLAN, SRD(NFC, FeliCa) and GPS
In accordance with FCC 47 CFR Part 15C (Bluetooth)



Product Service

2.1 AC LINE CONDUCTED EMISSIONS**2.1.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.207

2.1.2 Equipment Under Test and Modification State

S/N: IMEI 004401115723948 - Modification State 0

2.1.3 Date of Test

28 April 2016

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 test was performed in accordance with ANSI C63.10, clause 6.2.

Remarks

A mains supply cable of 1 m length was used to supply mains power to the EUT from the LISN.

All final measurements were assessed against the Class B emission limits in Clause 15.207 of FCC 47 CFR Part 15.

2.1.6 Environmental Conditions

Ambient Temperature	18.6°C
Relative Humidity	30.0%

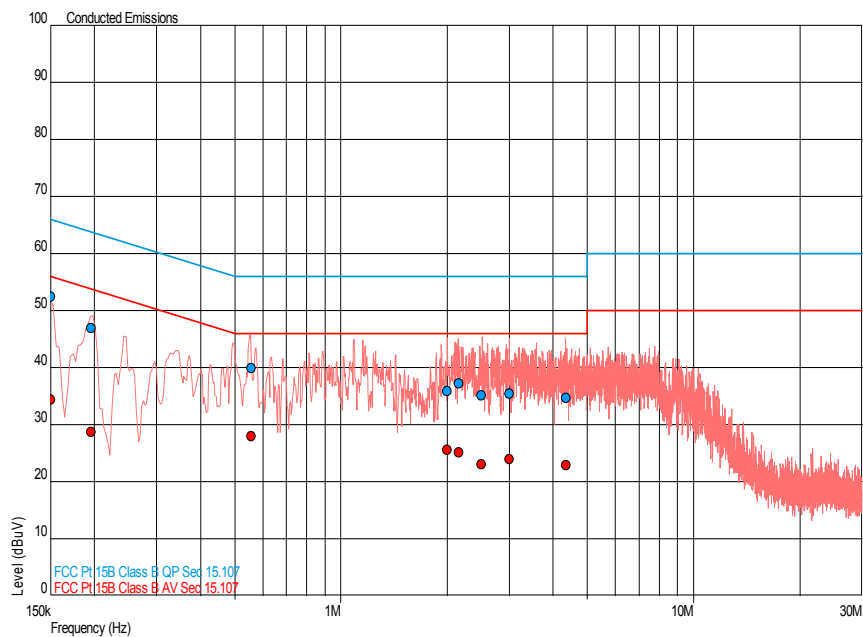


2.1.7 Test Results

Bluetooth, Live Line, AC Line Conducted Emissions Result

Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.150	52.5	66.0	-13.5	34.4	56.0	-21.6
0.196	46.9	63.8	-16.8	28.7	53.8	-25.1
0.556	39.9	56.0	-16.1	28.0	46.0	-18.0
2.005	35.9	56.0	-20.1	25.6	46.0	-20.4
2.163	37.3	56.0	-18.7	25.2	46.0	-20.8
2.507	35.2	56.0	-20.8	23.0	46.0	-23.0
3.003	35.5	56.0	-20.5	24.0	46.0	-22.0
4.358	34.7	56.0	-21.3	22.9	46.0	-23.1

Bluetooth, Live Line, AC Line Conducted Emissions Plot

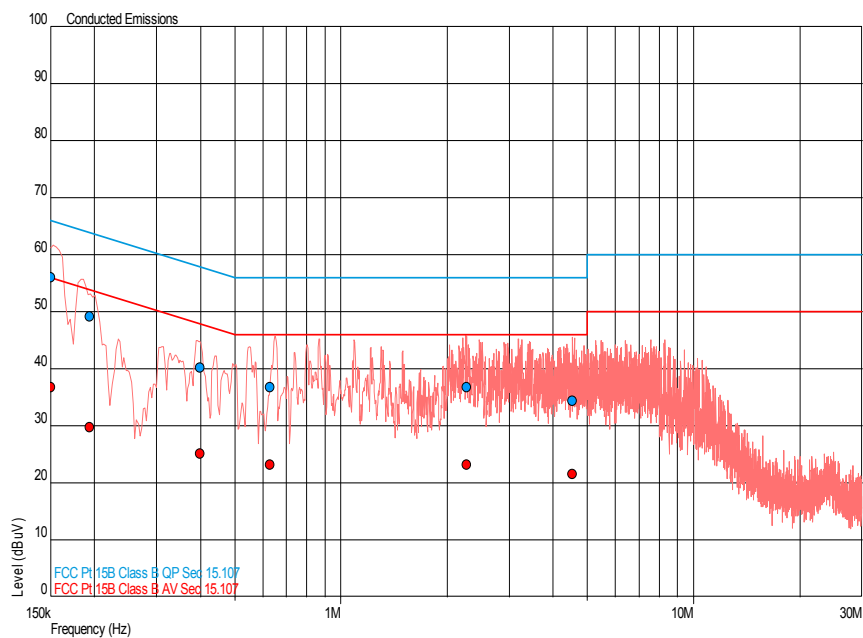




Bluetooth, Neutral Line, AC Line Conducted Emissions Result

Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.150	56.1	66.0	-9.9	36.7	56.0	-19.3
0.194	49.1	63.9	-14.7	29.8	53.9	-24.1
0.398	40.2	57.9	-17.7	25.2	47.9	-22.7
0.630	36.8	56.0	-19.2	23.2	46.0	-22.8
2.273	36.8	56.0	-19.2	23.2	46.0	-22.8
4.527	34.4	56.0	-21.6	21.5	46.0	-24.5

Bluetooth, Neutral Line, AC Line Conducted Emissions Plot



FCC 47 CFR Part 15, Limit Clause 15.207

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

*Decreases with the logarithm of the frequency.



Product Service

2.2 FREQUENCY HOPPING SYSTEMS - NUMBER OF HOPPING CHANNELS

2.2.1 Specification Reference

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

2.2.2 Equipment Under Test and Modification State

S/N: IMEI 004401115723419 - Modification State 0

2.2.3 Date of Test

18 April 2016

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 7.8.3

2.2.6 Environmental Conditions

Ambient Temperature	22.3°C
Relative Humidity	28.9%



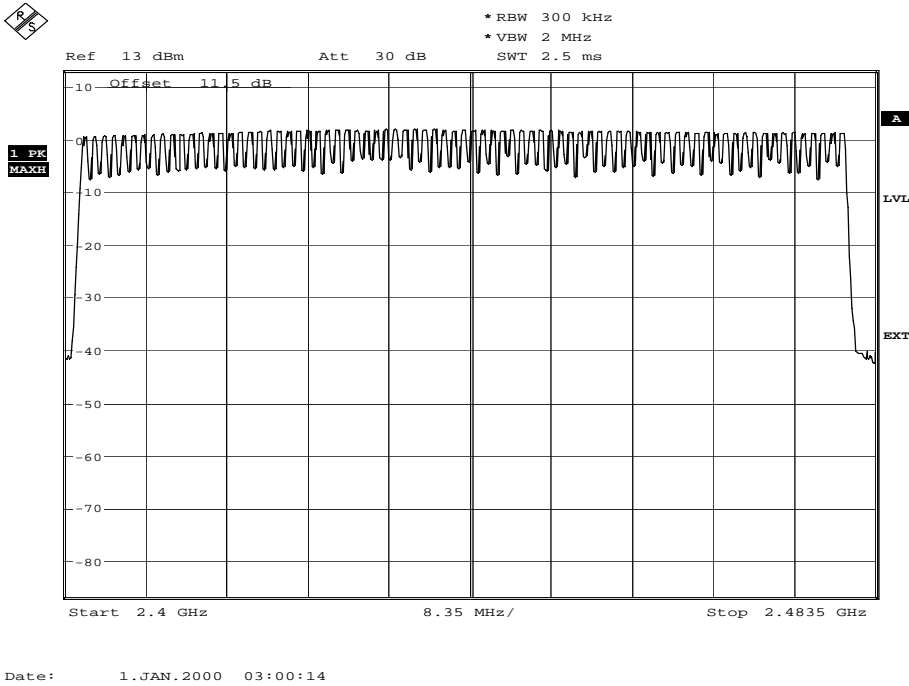
Product Service

2.2.7 Test Results

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



Product Service

2.3 FREQUENCY HOPPING SYSTEMS - 20 dB BANDWIDTH**2.3.1 Specification Reference**

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

2.3.2 Equipment Under Test and Modification State

S/N: IMEI 004401115723419 - Modification State 0

2.3.3 Date of Test

28 April 2016

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 7.8.7.

2.3.6 Environmental Conditions

Ambient Temperature	23.7°C
Relative Humidity	16.3%



Product Service

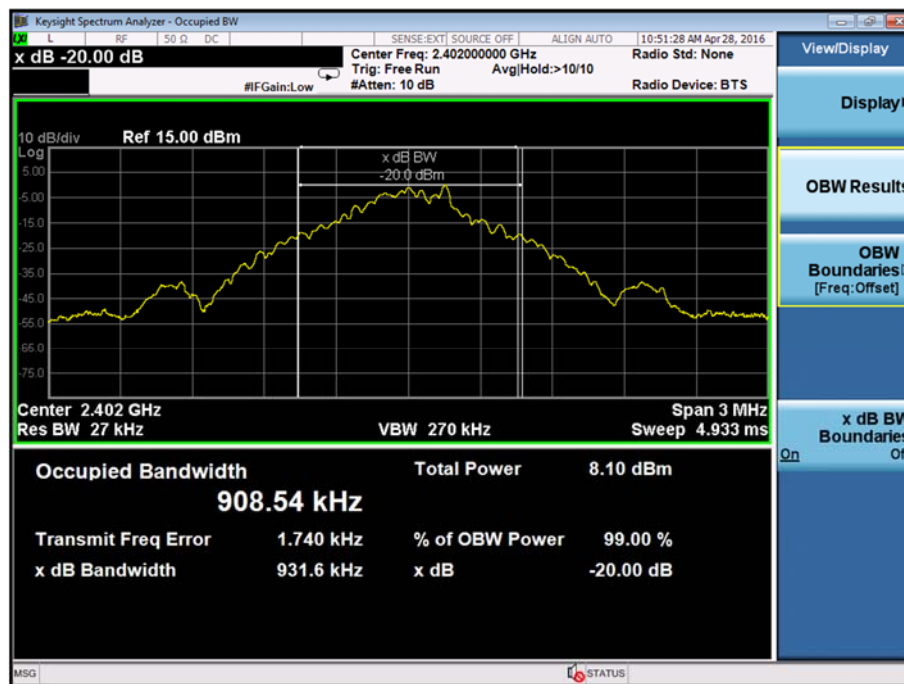
2.3.7 Test Results

4.0 V DC Supply

Bluetooth, 20 dB Bandwidth Results

Modulation	2402 MHz	2441 MHz	2480 MHz
	kHz	kHz	kHz
GFSK	931.6	928.8	930.7
pi/4 DQPSK	1277.0	1277.0	1277.0
8-DPSK	1254.0	1261.0	1255.0

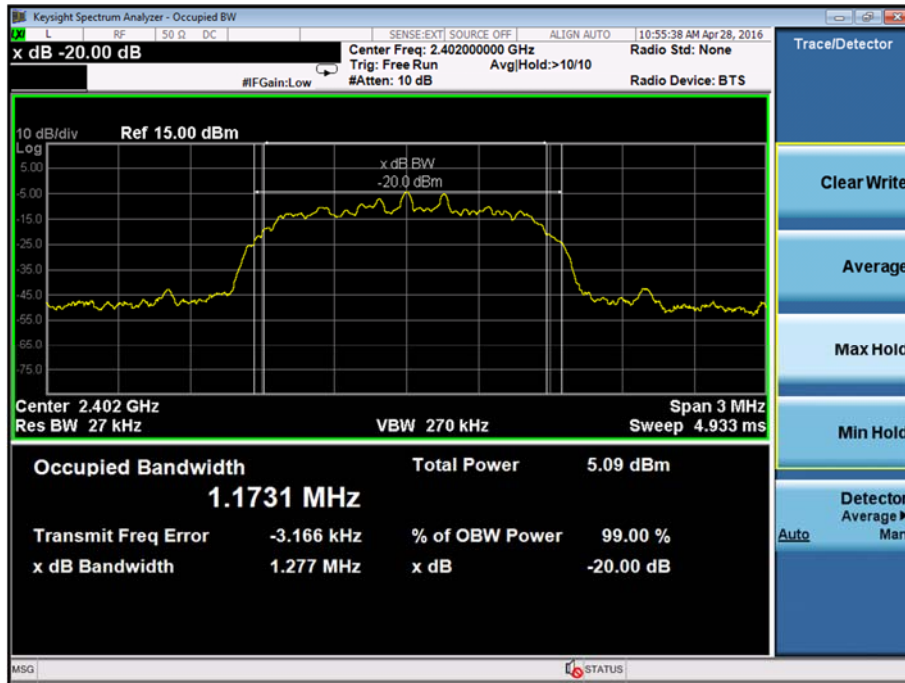
Bluetooth, 2402 MHz, GFSK, 20 dB Bandwidth Plot



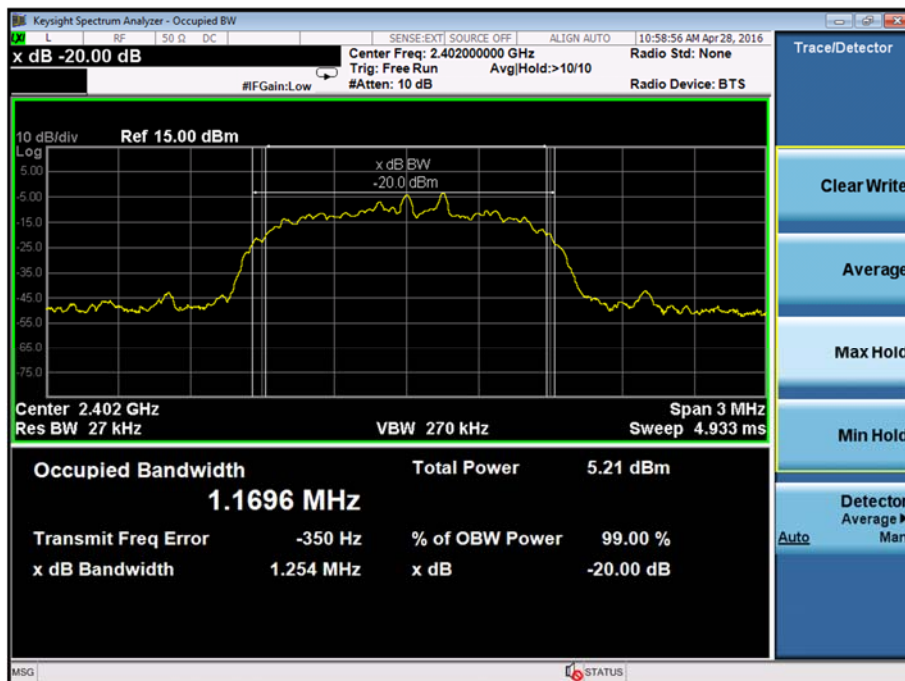


Product Service

Bluetooth, 2402 MHz, pi/4 DQPSK, 20 dB Bandwidth Plot



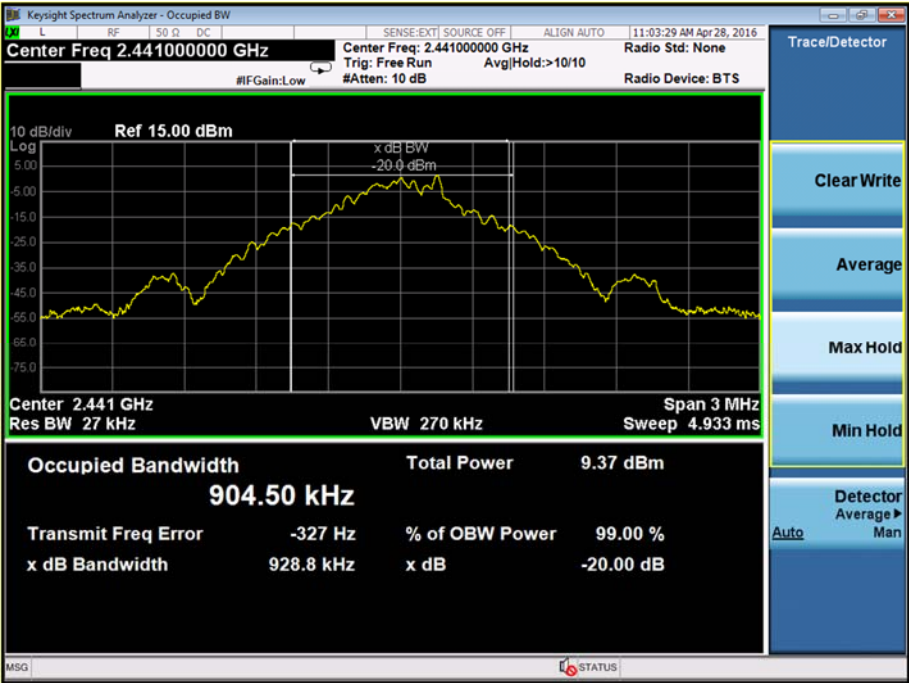
Bluetooth, 2402 MHz, 8-DPSK, 20 dB Bandwidth Plot



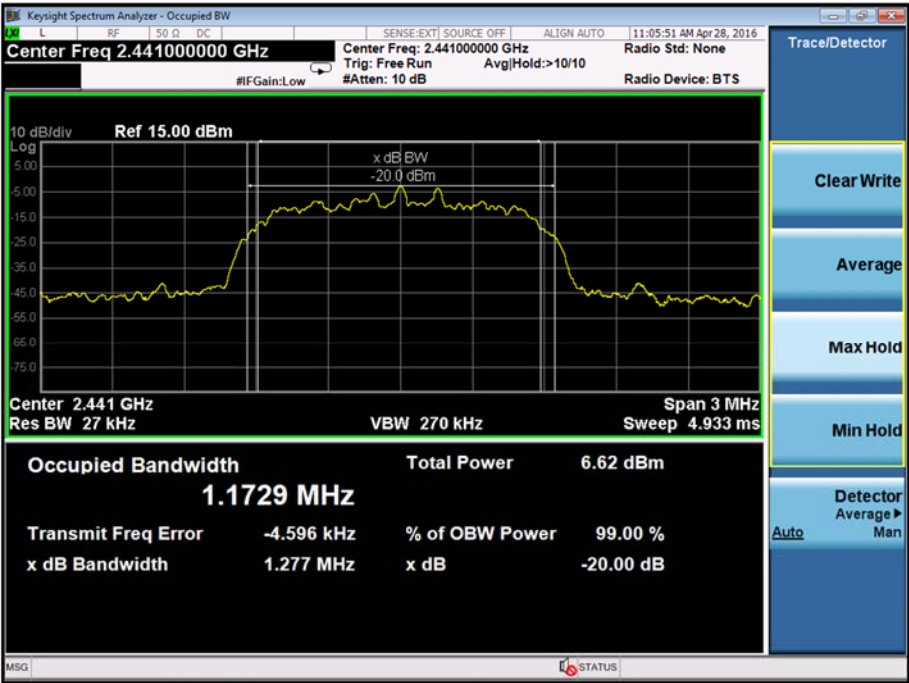


Product Service

Bluetooth, 2441 MHz, GFSK, 20 dB Bandwidth Plot



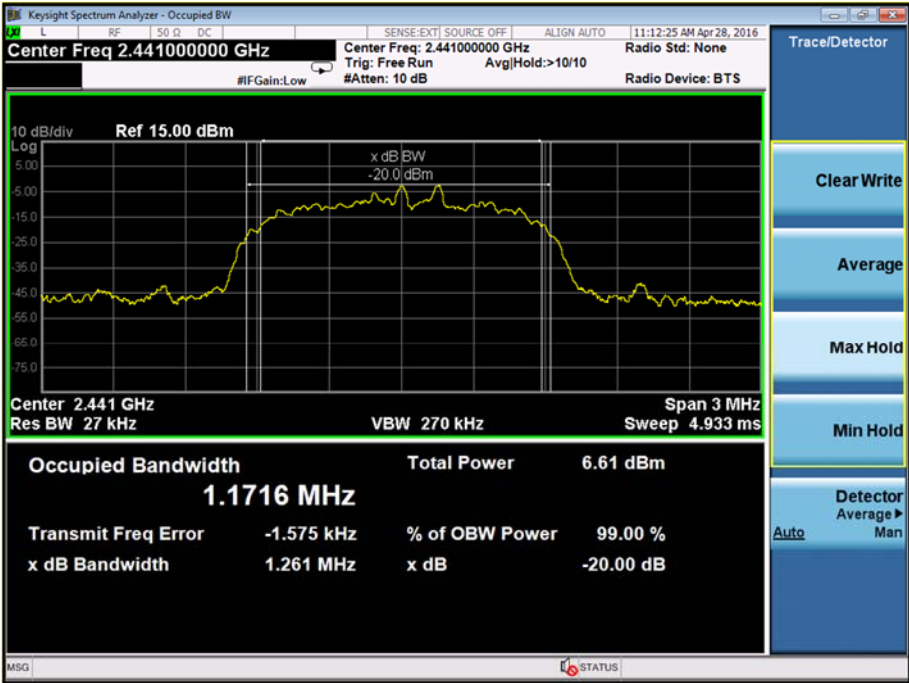
Bluetooth, 2441 MHz, pi/4 DQPSK, 20 dB Bandwidth Plot



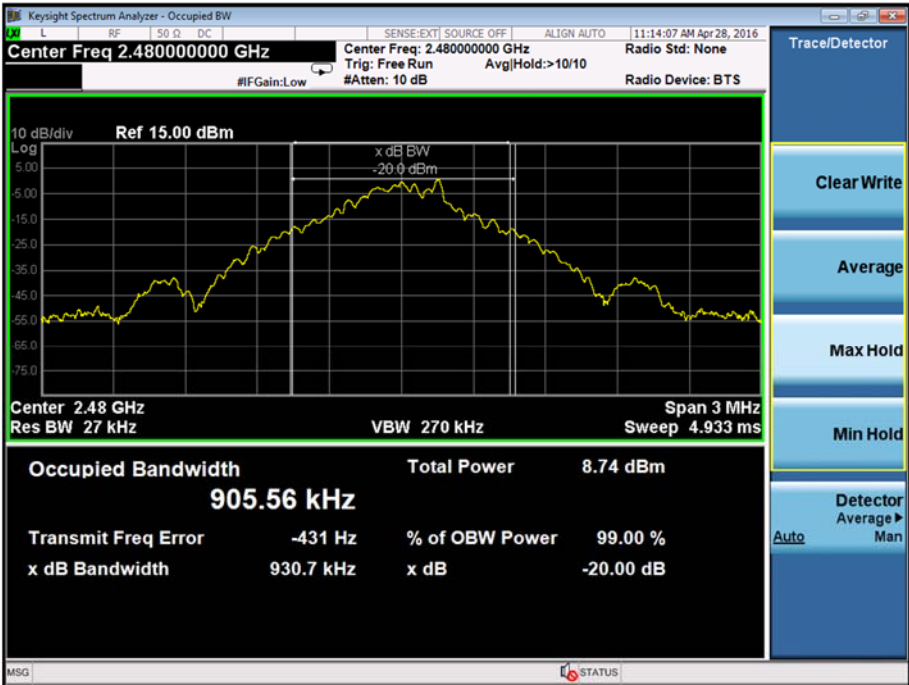


Product Service

Bluetooth, 2441 MHz, 8-DPSK, 20 dB Bandwidth Plot



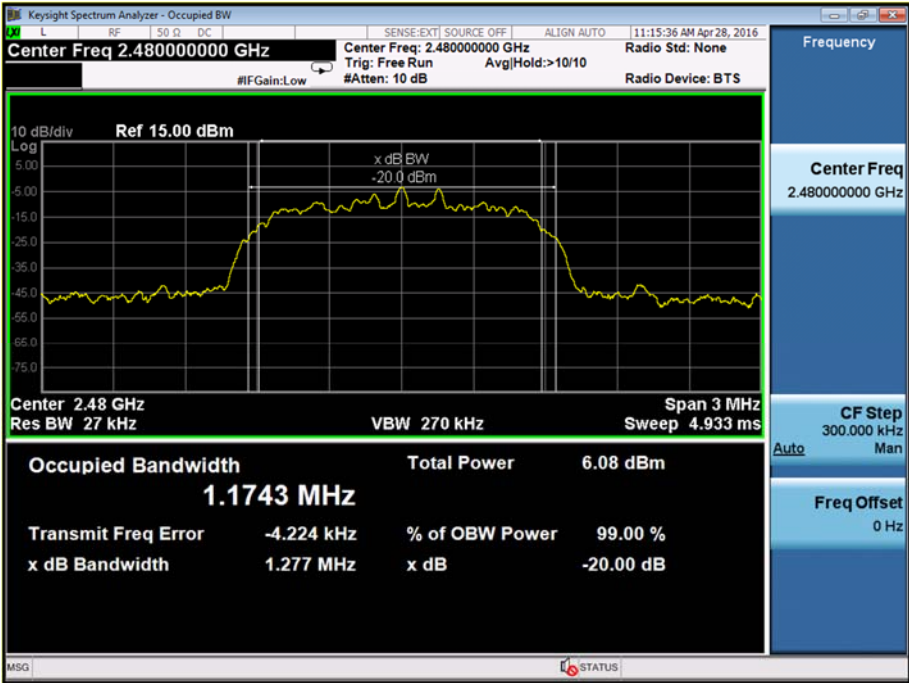
Bluetooth, 2480 MHz, GFSK, 20 dB Bandwidth Plot



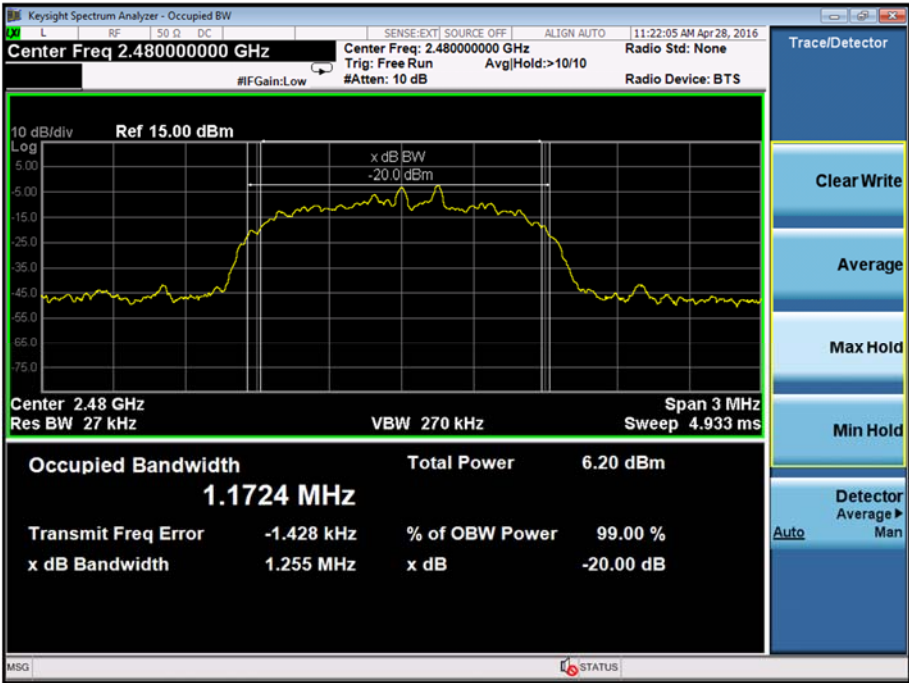


Product Service

Bluetooth, 2480 MHz, pi/4 DQPSK, 20 dB Bandwidth Plot



Bluetooth, 2480 MHz, 8-DPSK, 20 dB Bandwidth Plot



FCC 47 CFR Part 15, Limit Clause

None specified.



Product Service

2.4 FREQUENCY HOPPING SYSTEMS - CHANNEL SEPARATION

2.4.1 Specification Reference

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

2.4.2 Equipment Under Test and Modification State

S/N: IMEI 004401115723419 - Modification State 0

2.4.3 Date of Test

18 April 2016

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

This test was performed in accordance with ANSI C63.10, clause 7.8.2.

Remarks

For $\pi/4$ DQPSK & 8-DPSK modulations it was not possible to make this measurement with frequency hopping enabled as the spectral shape means the peaks from each hopping frequency cannot be differentiated with a single max hold trace. Instead two traces were used, the first on one hopping frequency and another on an adjacent hopping frequency.

2.4.6 Environmental Conditions

Ambient Temperature	22.2°C
Relative Humidity	25.6%



Product Service

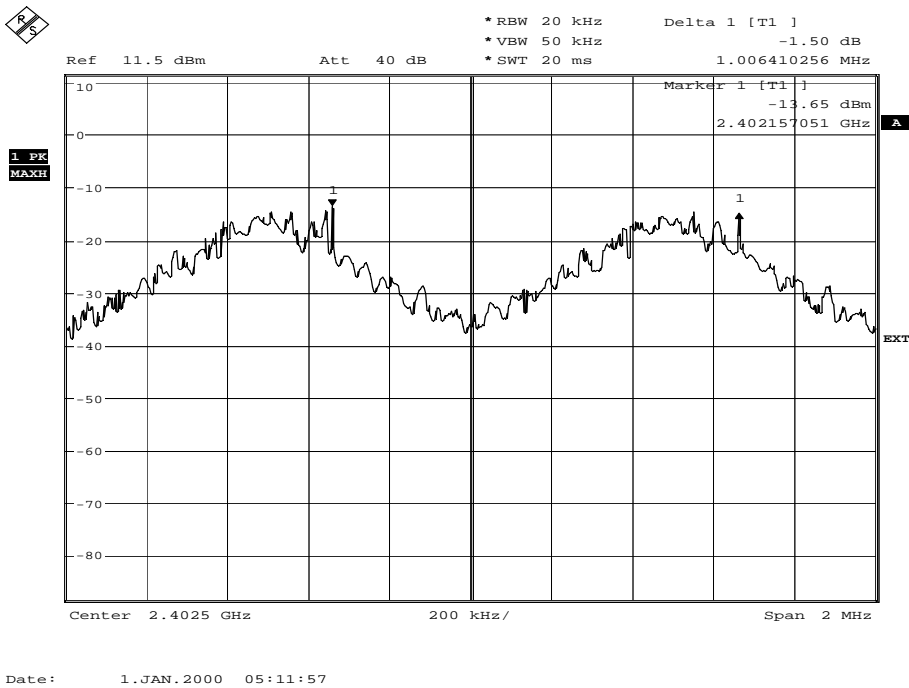
2.4.7 Test Results

4.0 V DC Supply

Bluetooth, Channel Separation Results

Modulation	Frequency Hopping
	MHz
GFSK	1.0064
pi/4 DQPSK	1.0000
8-DPSK	1.0048

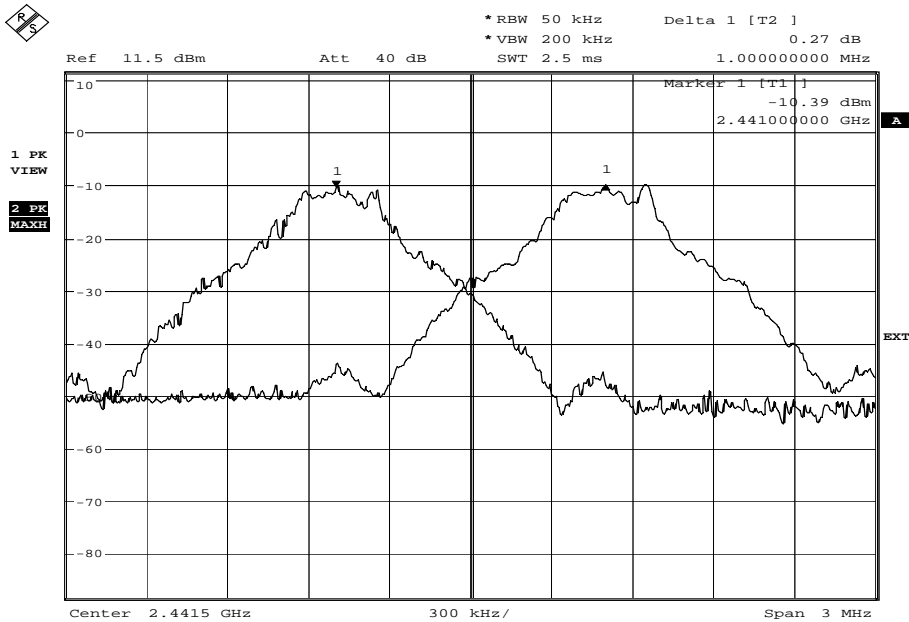
Bluetooth, GFSK, Channel Separation Plot





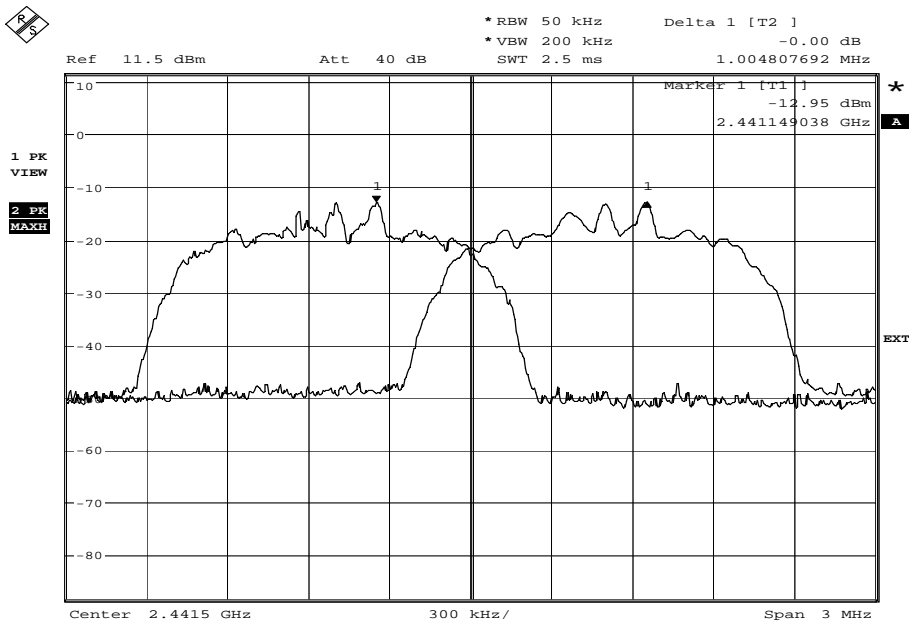
Product Service

Bluetooth, pi/4 DQPSK, Channel Separation Plot



Date: 1.JAN.2000 05:35:27

Bluetooth, 8-DPSK, Channel Separation Plot



Date: 1.JAN.2000 06:24:05



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.



Product Service

2.5 FREQUENCY HOPPING SYSTEMS - AVERAGE TIME OF OCCUPANCY**2.5.1 Specification Reference**

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

2.5.2 Equipment Under Test and Modification State

S/N: IMEI 004401115723419 - Modification State 0

2.5.3 Date of Test

19 April 2016

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 7.8.4.

2.5.6 Environmental Conditions

Ambient Temperature	22.5 - 25.2°C
Relative Humidity	22.5 - 25.2%



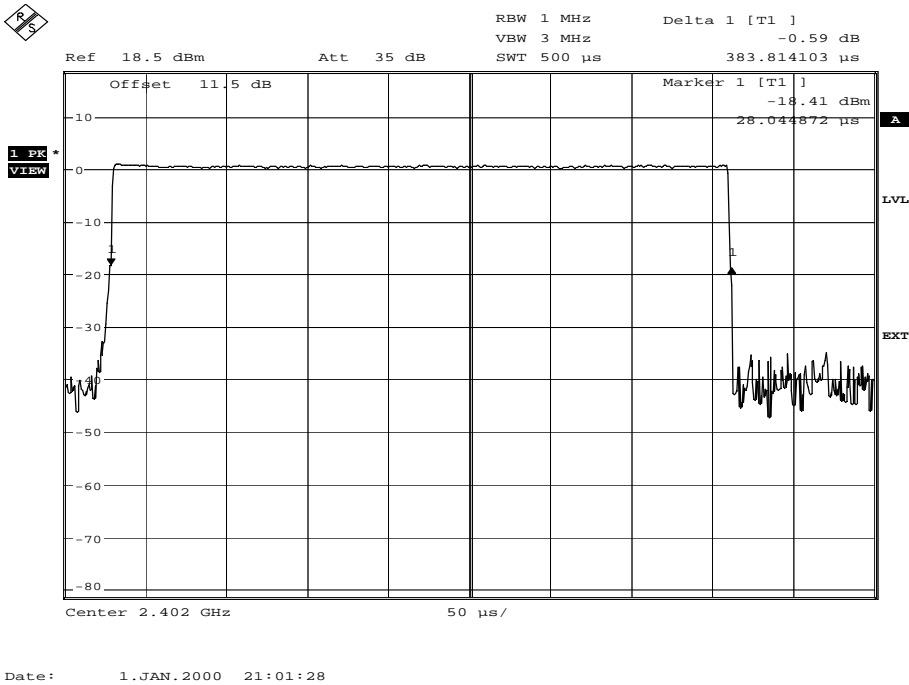
Product Service

2.5.7 Test Results

Bluetooth, Average Time of Occupancy Results

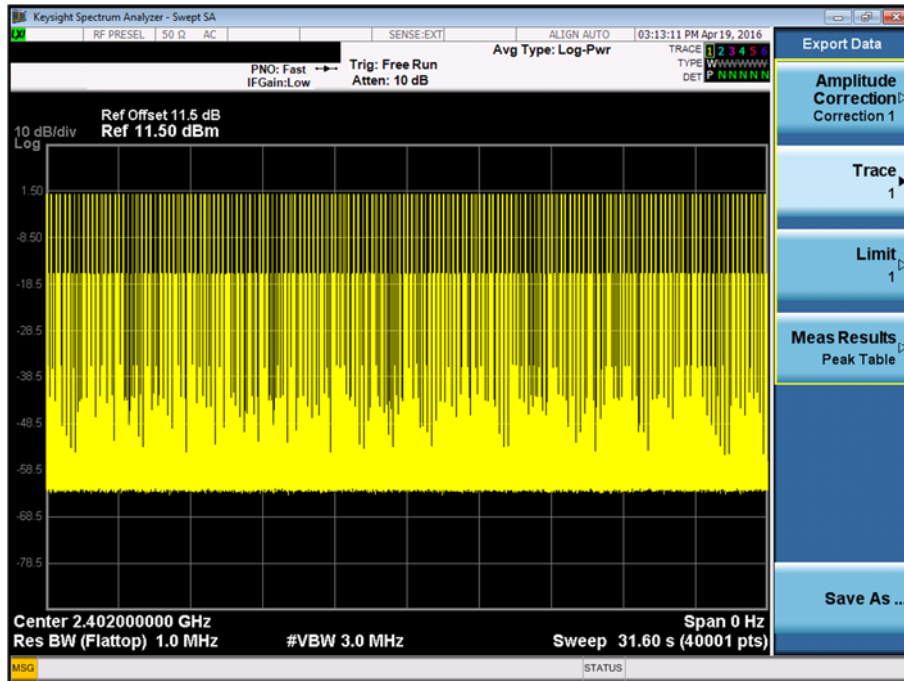
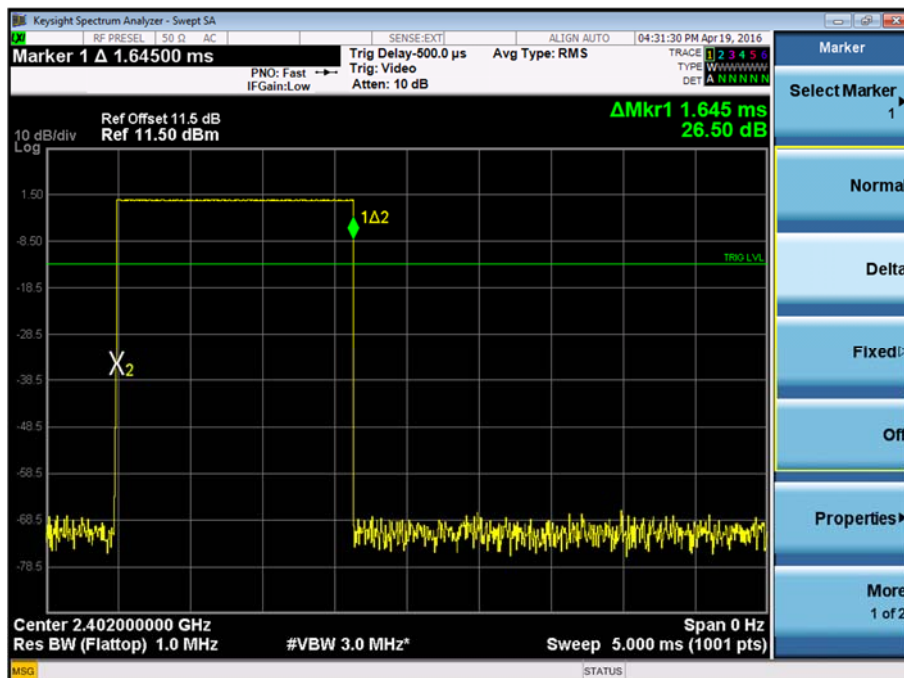
Packet Type	Dwell Time (ms)	Number of Transmissions	Average Occupancy Time (ms)
DH1	0.38	320	122.56
DH3	1.65	168	277.20
DH5	2.90	107	310.30

Bluetooth, DH1, Average Time of Occupancy Plot



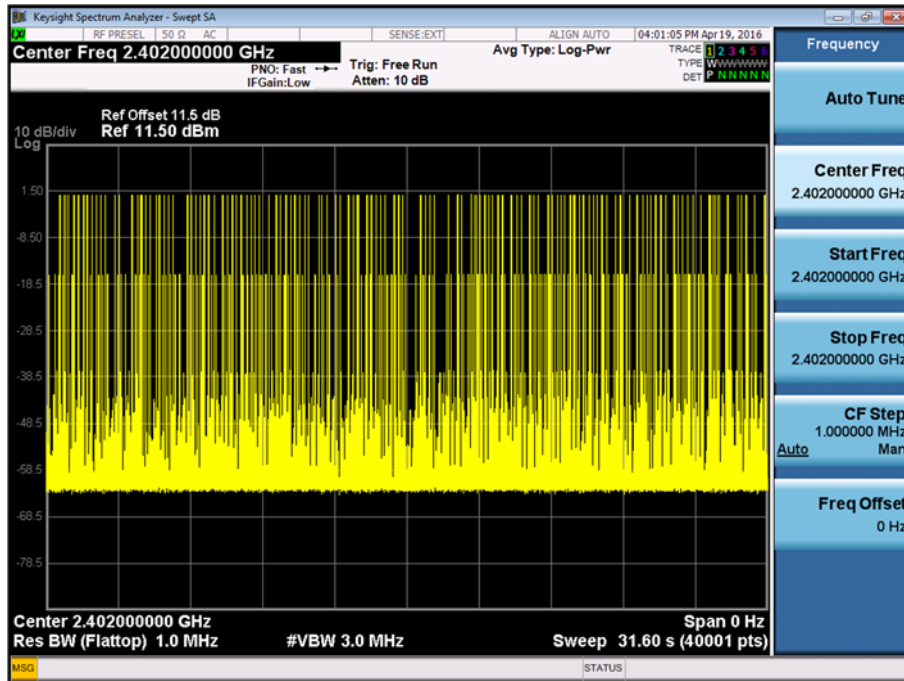
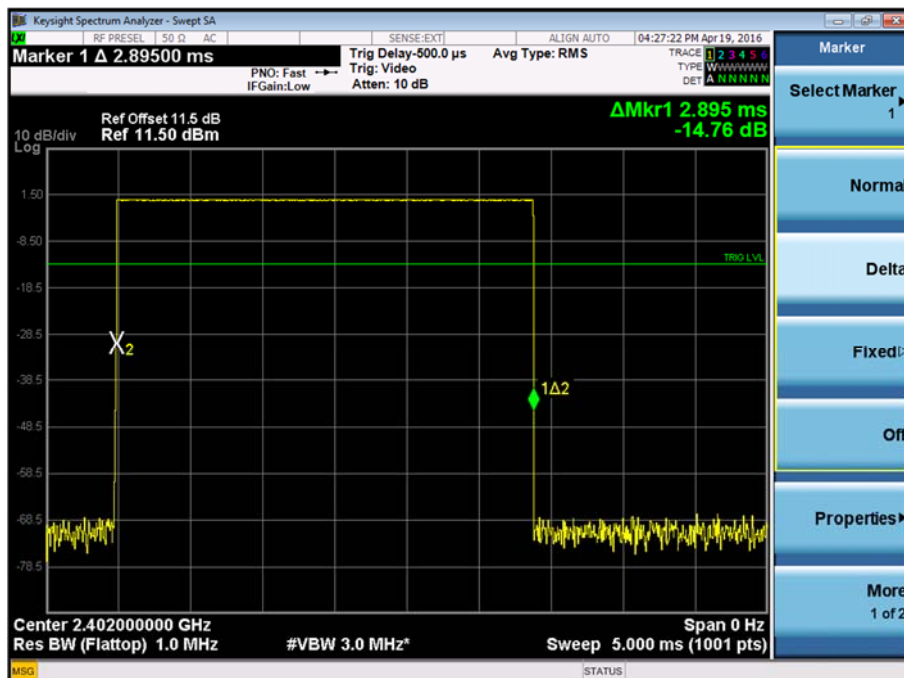


Product Service

Bluetooth, DH1, Total Average Time of Occupancy PlotBluetooth, DH3, Average Time of Occupancy Plot



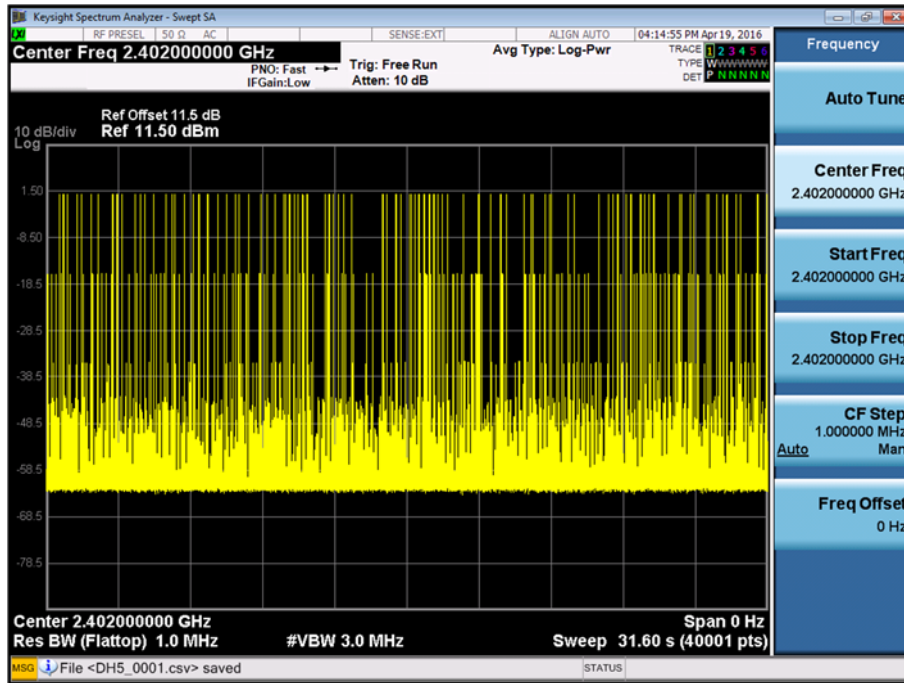
Product Service

Bluetooth, DH3, Total Average Time of Occupancy PlotBluetooth, DH5, Average Time of Occupancy Plot



Product Service

Bluetooth, DH5, Total Average Time of Occupancy Plot



FCC 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.



Product Service

2.6 MAXIMUM CONDUCTED OUTPUT POWER**2.6.1 Specification Reference**

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

2.6.2 Equipment Under Test and Modification State

S/N: IMEI 004401115723419 - Modification State 0

2.6.3 Date of Test

18 April 2016

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 7.8.5.

2.6.6 Environmental Conditions

Ambient Temperature	22.8°C
Relative Humidity	29.0%



Product Service

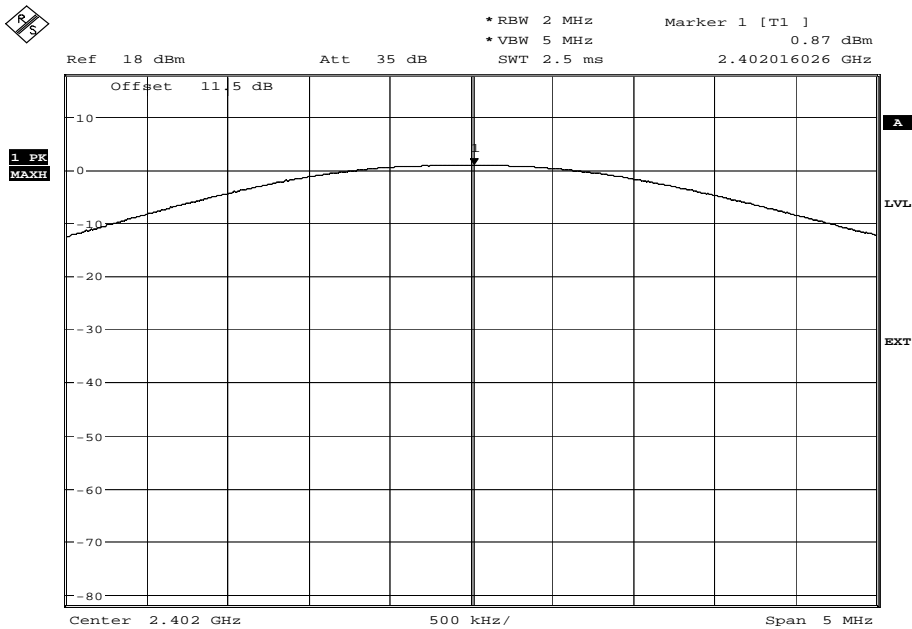
2.6.7 Test Results

4.0 V DC Supply

Bluetooth, DH5, Maximum Conducted Output Power Results

2402 MHz		2441 MHz		2480 MHz	
dBm	mW	dBm	mW	dBm	mW
0.87	1.22	1.92	1.56	1.56	1.43

Bluetooth, 2402 MHz, DH5, Maximum Conducted Output Power Plot

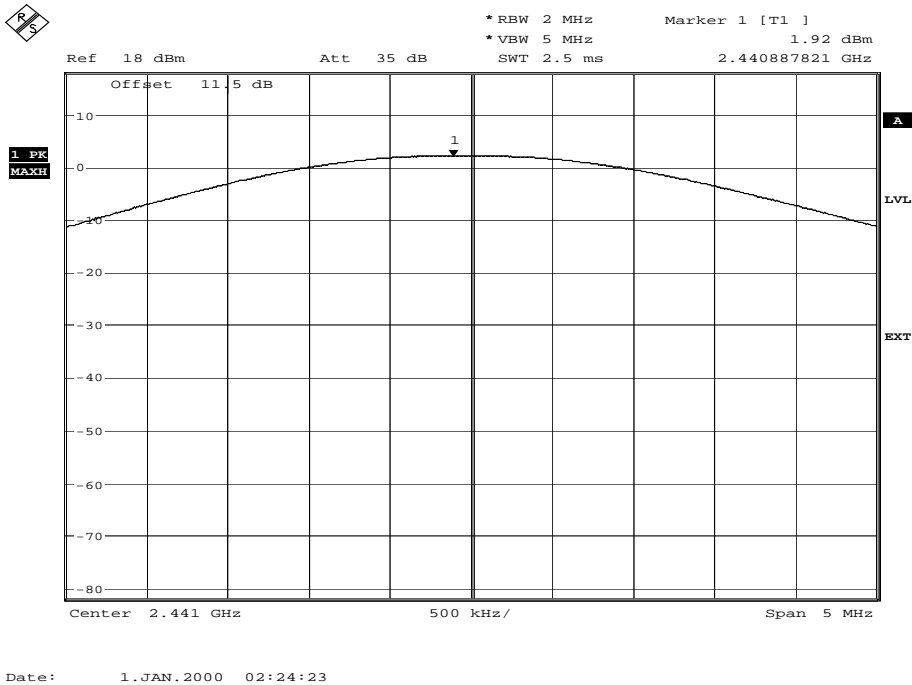


Date: 1.JAN.2000 02:16:11

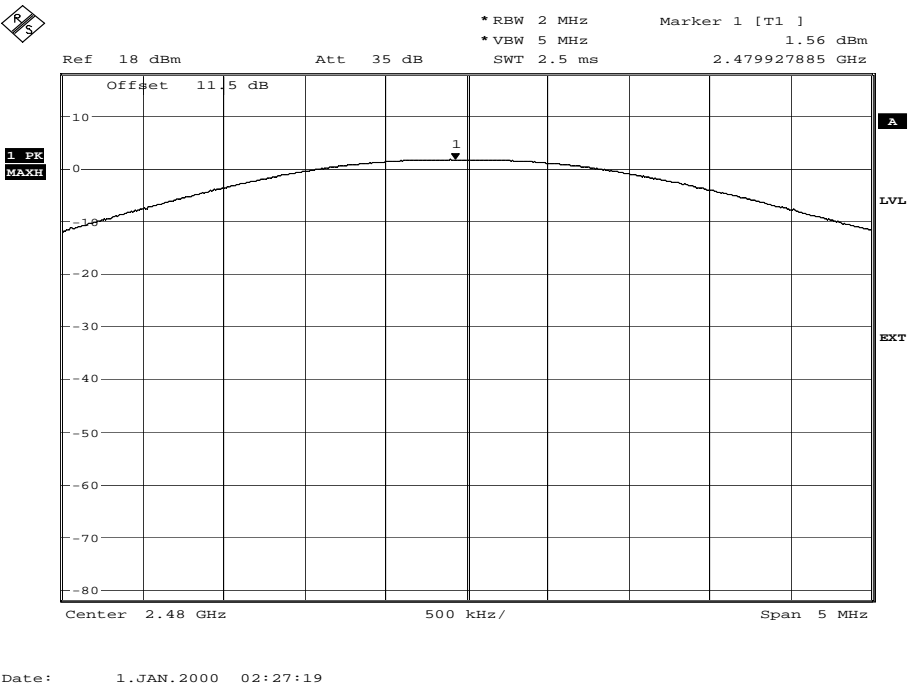


Product Service

Bluetooth, 2441 MHz, DH5, Maximum Conducted Output Power Plot



Bluetooth, 2480 MHz, DH5, Maximum Conducted Output Power Plot





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.



Product Service

2.7 SPURIOUS RADIATED EMISSIONS**2.7.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.247 (d), 15.205 and 15.209

2.7.2 Equipment Under Test and Modification State

S/N: IMEI 004401115723948 - Modification State 0

2.7.3 Date of Test

12 April 2016, 17 April 2016 & 19 April 2016

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

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

Remarks

Plots for average measurements were taken in accordance with ANSI C63.10, clause 4.1.4.2.3
Final average measurements were taken using a CISPR average detector as required by ANSI C63.10, clause 4.1.2.

2.7.6 Environmental Conditions

Ambient Temperature	18.6 - 20.3°C
Relative Humidity	25.0 - 34.0%



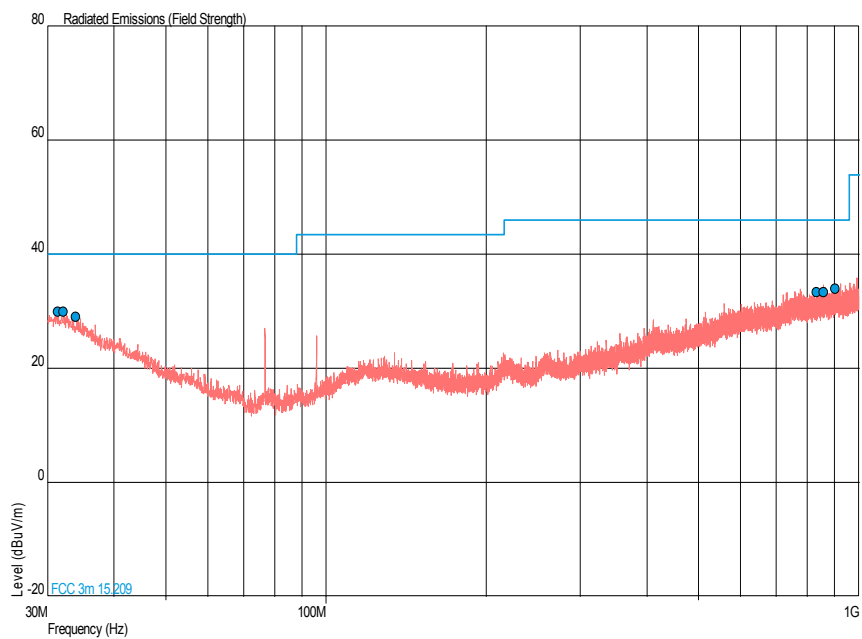
2.7.7 Test Results

4.0 V DC Supply

Bluetooth, 2402 MHz, DH5, 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
31.407	30.0	-10.0	31.6	-68.4	180	1.00	Vertical
32.183	29.9	-10.1	31.3	-68.7	180	1.00	Vertical
33.880	29.0	-11.0	28.2	-71.8	0	1.00	Vertical
833.160	33.3	-12.7	46.2	-153.8	180	1.00	Vertical
856.877	33.3	-12.7	46.2	-153.8	180	1.00	Vertical
903.776	34.0	-12.0	50.1	-149.9	0	1.00	Vertical

Bluetooth, 2402 MHz, DH5, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot





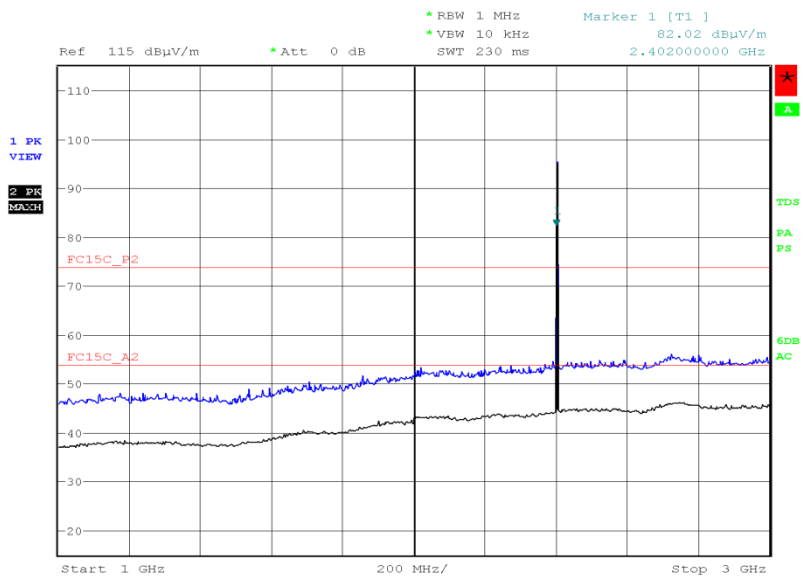
Product Service

Bluetooth, 2402 MHz, DH5, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

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

Bluetooth, 2402 MHz, DH5, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

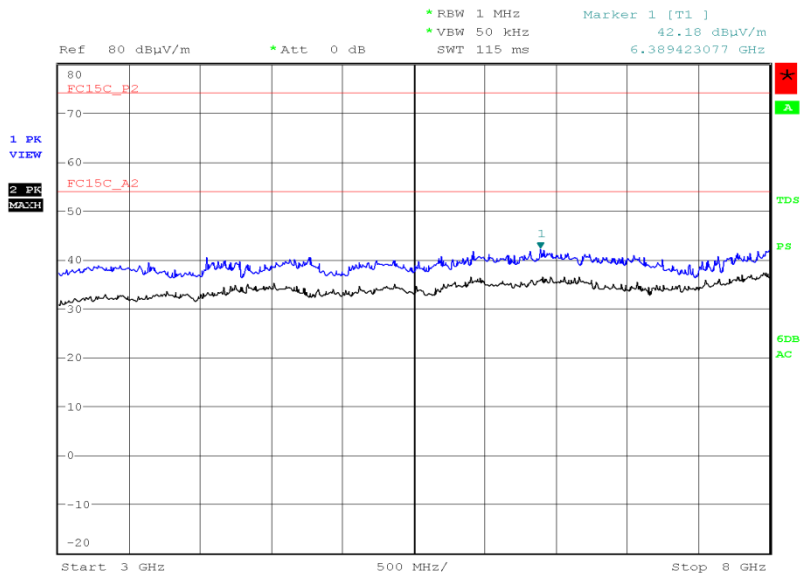


Date: 12.APR.2016 22:25:37



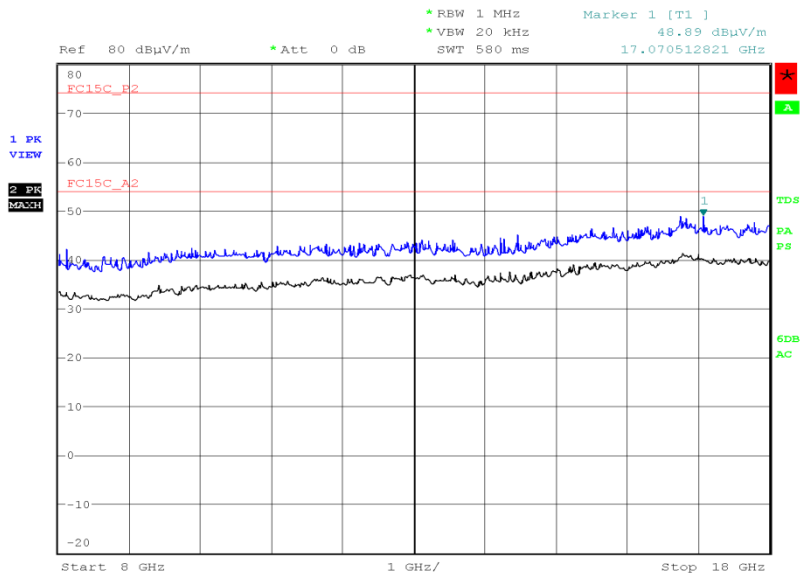
Product Service

Bluetooth, 2402 MHz, DH5, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 09:49:44

Bluetooth, 2402 MHz, DH5, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot

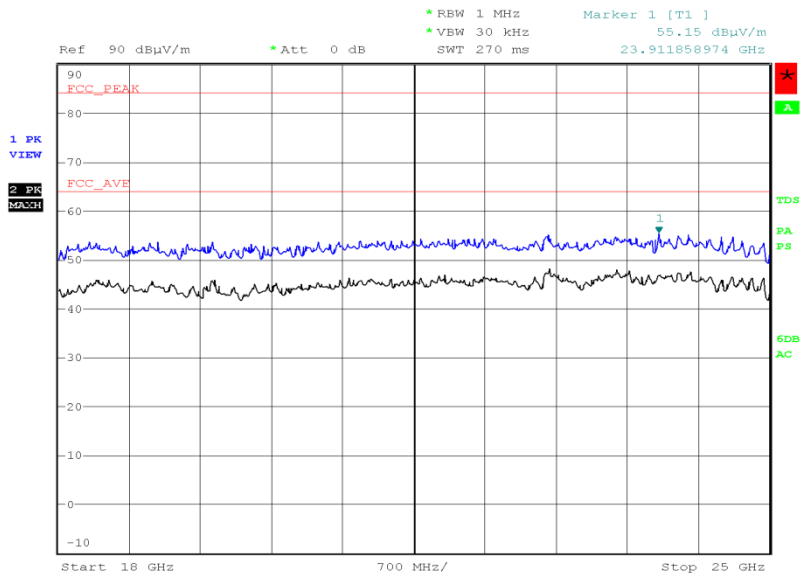


Date: 17.APR.2016 11:46:02



Product Service

Bluetooth, 2402 MHz, DH5, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



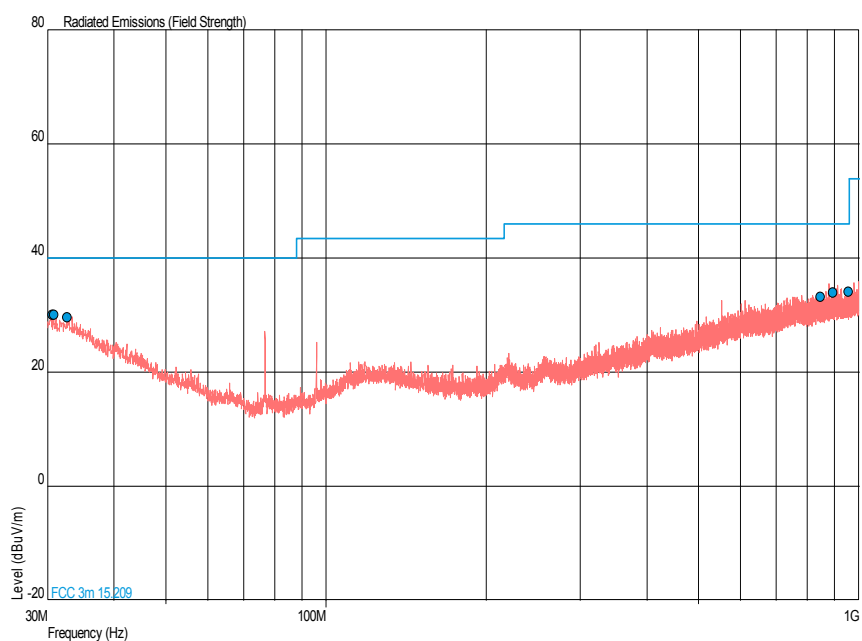
Date: 17.APR.2016 15:15:59



Bluetooth, 2441 MHz, DH5, 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
30.631	30.1	-9.9	32.0	-68.0	0	1.00	Vertical
30.825	30.1	-9.9	32.0	-68.0	180	1.00	Vertical
32.668	29.7	-10.3	30.5	-69.5	0	1.00	Vertical
845.722	33.2	-12.8	45.7	-154.3	180	1.00	Vertical
892.912	34.0	-12.0	50.1	-149.9	180	1.00	Vertical
956.352	34.0	-12.0	50.1	-149.9	180	1.00	Vertical

Bluetooth, 2441 MHz, DH5, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

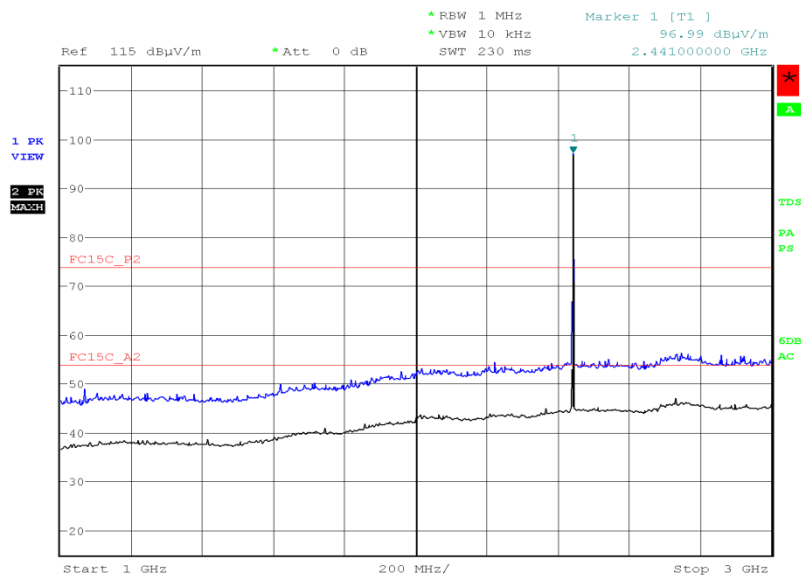


Bluetooth, 2441 MHz, DH5, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

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

Bluetooth, 2441 MHz, DH5, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

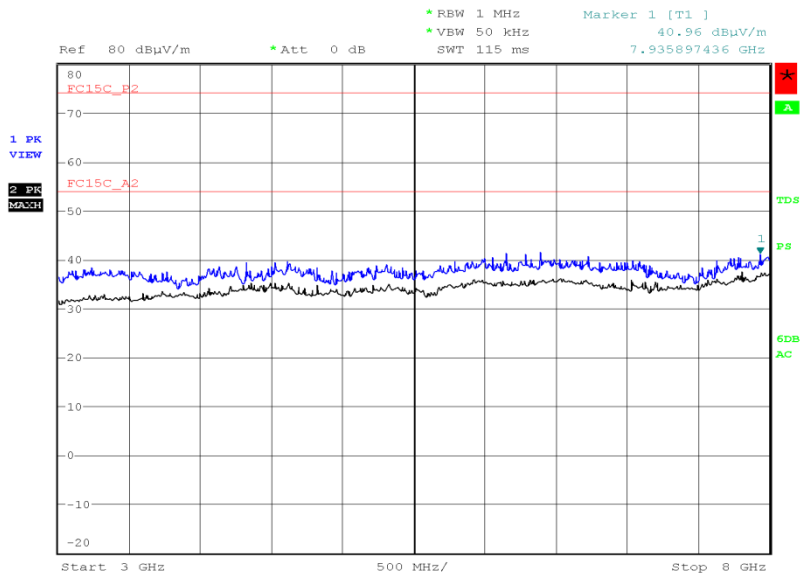


Date: 12.APR.2016 22:22:12



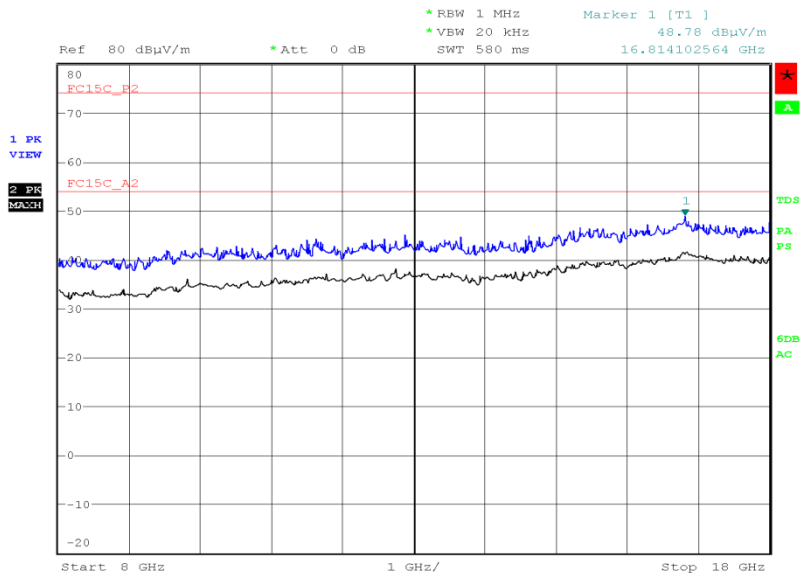
Product Service

Bluetooth, 2441 MHz, DH5, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 09:55:41

Bluetooth, 2441 MHz, DH5, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot

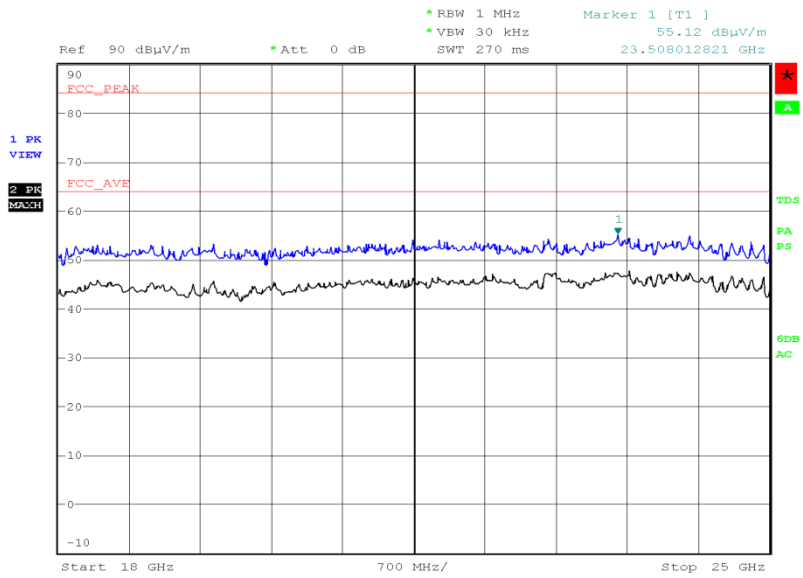


Date: 17.APR.2016 11:10:07



Product Service

Bluetooth, 2441 MHz, DH5, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 15:18:06

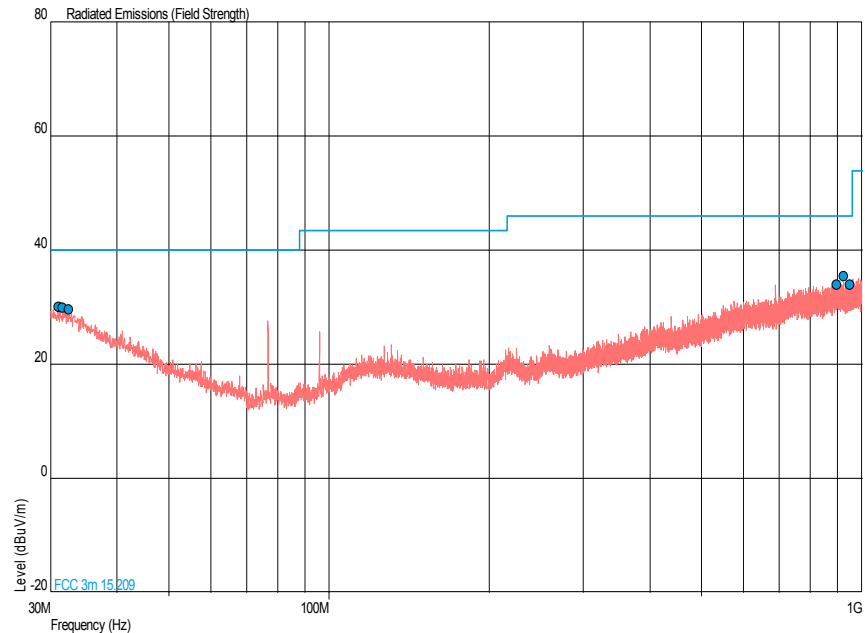


Product Service

Bluetooth, 2480 MHz, DH5, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
31.116	30.0	-10.0	31.6	-68.4	0	1.00	Vertical
31.601	30.0	-10.0	31.6	-68.4	180	1.00	Vertical
32.425	29.7	-10.3	30.5	-69.5	180	1.00	Vertical
897.326	34.0	-12.0	50.1	-149.9	180	1.00	Vertical
923.370	35.4	-10.6	58.9	-141.1	0	1.00	Vertical
947.960	34.0	-12.0	50.1	-149.9	180	1.00	Vertical

Bluetooth, 2480 MHz, DH5, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot





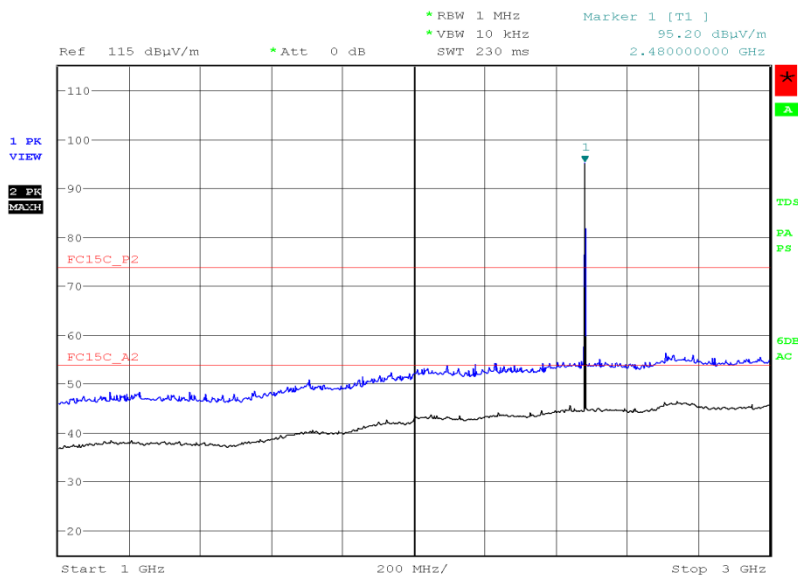
Product Service

Bluetooth, 2480 MHz, DH5, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

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

Bluetooth, 2480 MHz, DH5, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

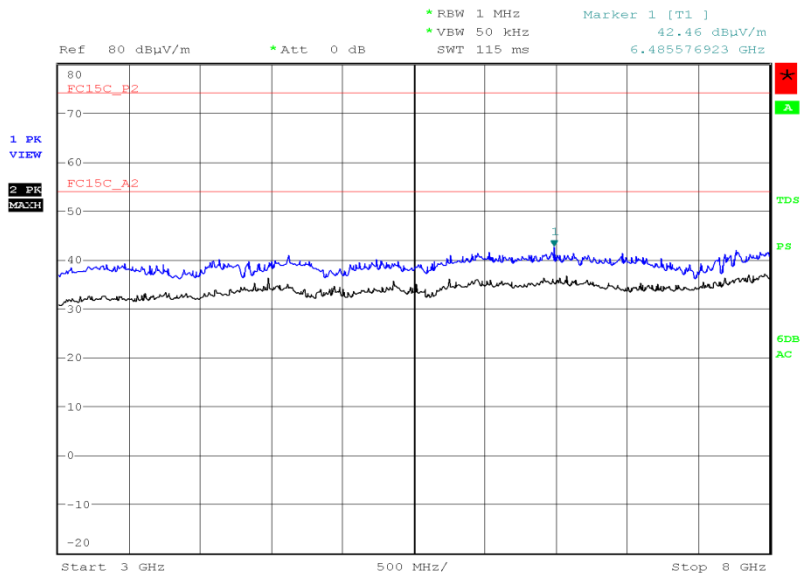


Date: 12.APR.2016 22:18:12



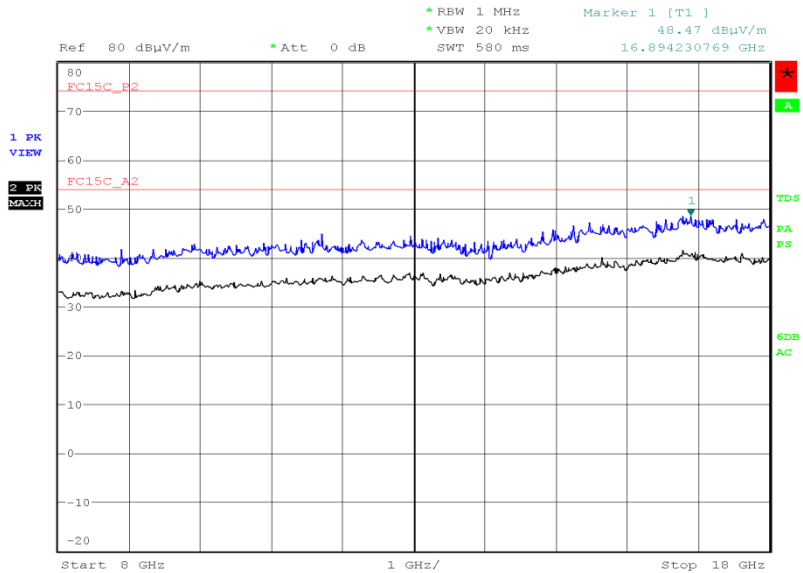
Product Service

Bluetooth, 2480 MHz, DH5, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 10:02:42

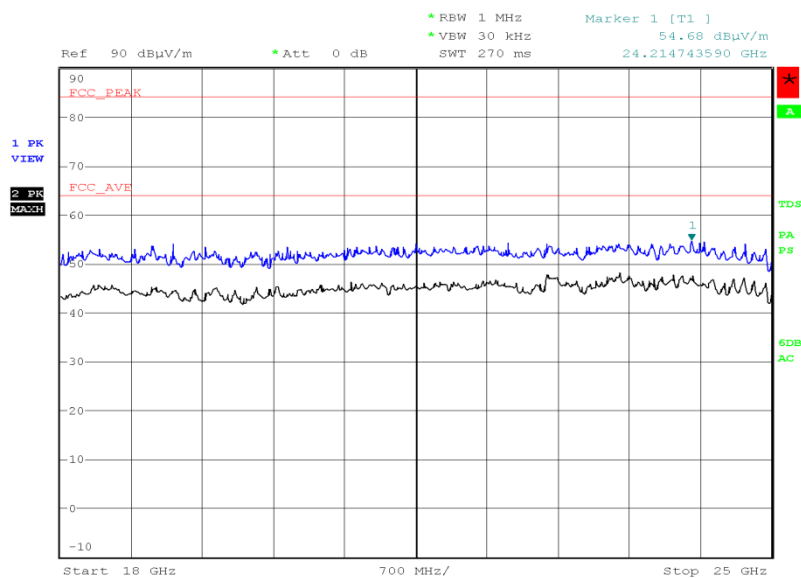
Bluetooth, 2480 MHz, DH5, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 10:52:05



Bluetooth, 2480 MHz, DH5, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



Date: 17.APR.2016 15:20:06

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

2.8 RESTRICTED BAND EDGES**2.8.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.205

2.8.2 Equipment Under Test and Modification State

S/N: IMEI 004401115723948 - Modification State 0

2.8.3 Date of Test

12 April 2016 & 13 April 2016

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

Testing was performed in accordance with ANSI C63.10, clause 6.10.5

Remarks

Plots for average measurements were taken in accordance with ANSI C63.10, clause 4.1.4.2.3. Final average measurements were taken using a CISPR average detector as required by ANSI C63.10, clause 4.1.2. In order to determine the maximum emissions with the restricted band near the band edge, the method described in ANSI C63.10 clause 6.10.5.2 has been used and these plots are included in the report.

2.8.6 Environmental Conditions

Ambient Temperature	20.3 - 20.5°C
Relative Humidity	33.0 - 34.0%



Product Service

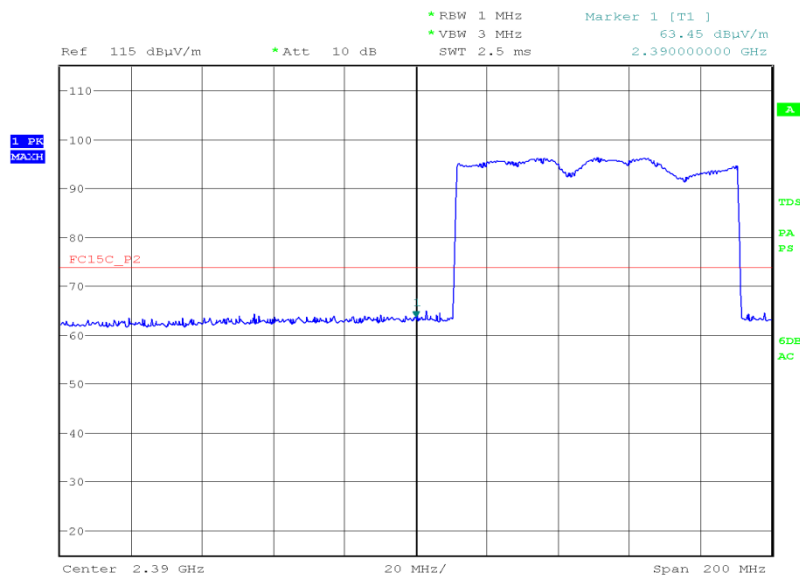
2.8.7 Test Results

4.0 V DC Supply

Hopping ModeBluetooth, GFSK, Restricted Band Edges Results

2402 MHz		2480 MHz	
Measured Frequency 2390 MHz		Measured Frequency 2483.5 MHz	
dBμV/m		dBμV/m	
Final Peak	Final Average	Final Peak	Final Average
63.45	46.34	62.94	46.49

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

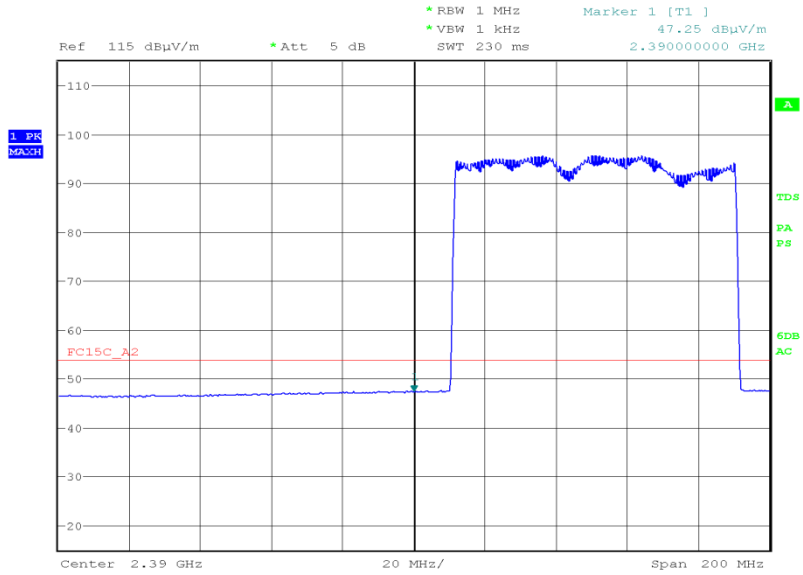


Date: 13.APR.2016 18:05:43



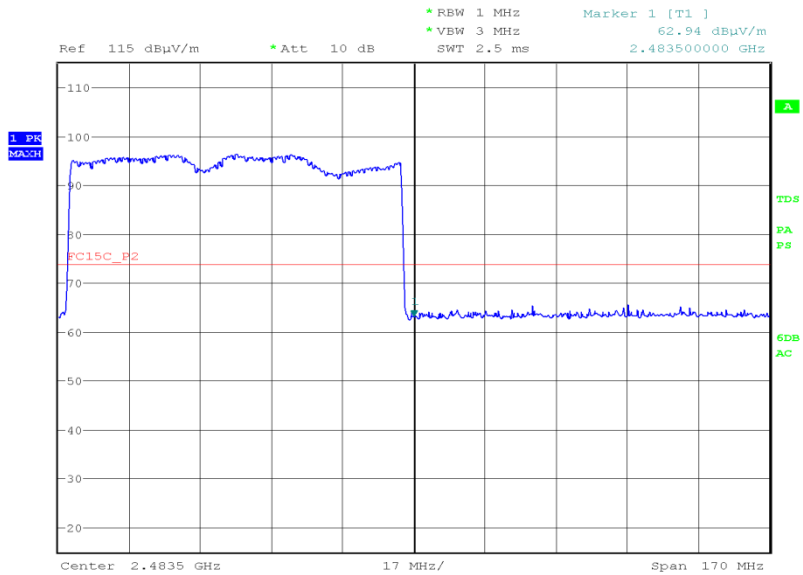
Product Service

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



Date: 13.APR.2016 18:10:13

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

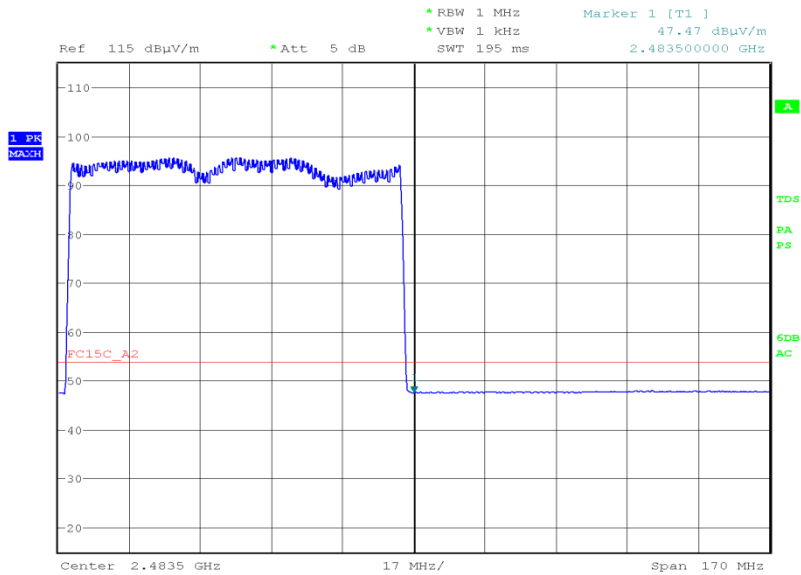


Date: 13.APR.2016 18:17:07



Product Service

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



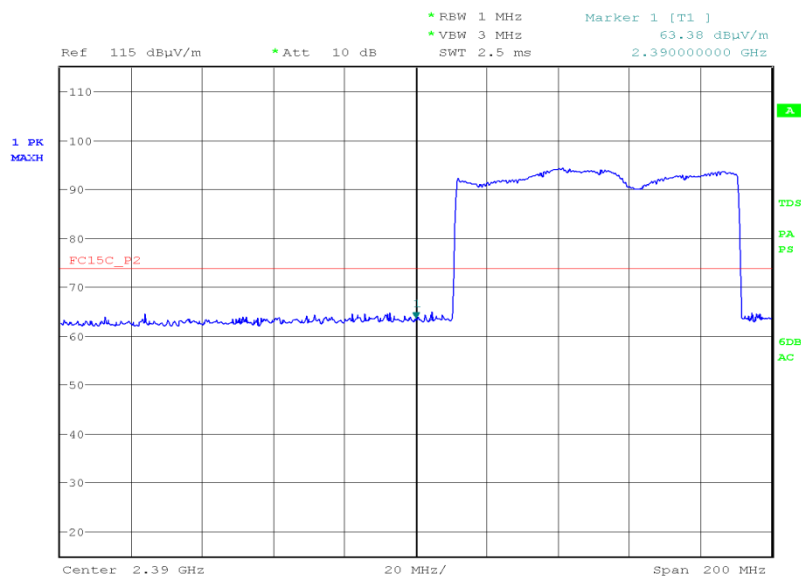
Date: 13.APR.2016 18:22:25



Bluetooth, pi/4 DQPSK, Restricted Band Edges Results

2402 MHz		2480 MHz	
Measured Frequency 2390 MHz		Measured Frequency 2483.5 MHz	
dBμV/m		dBμV/m	
Final Peak	Final Average	Final Peak	Final Average
63.38	46.35	63.15	46.50

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

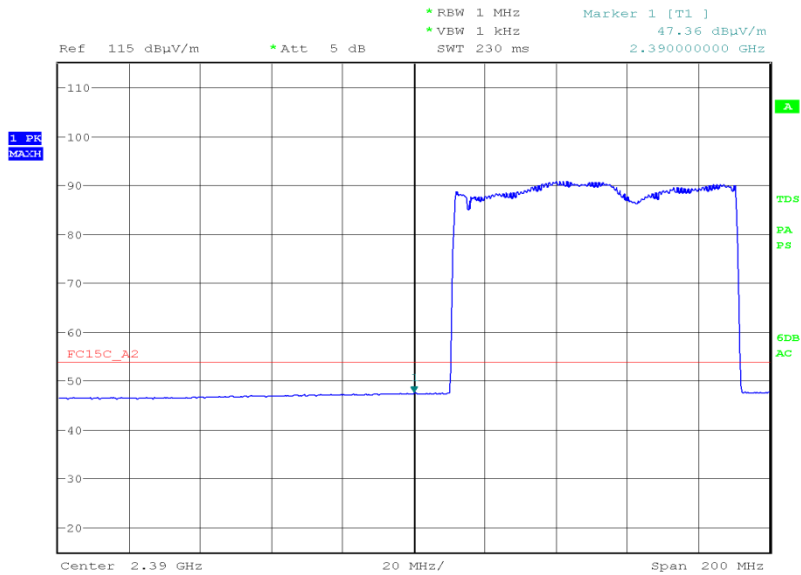


Date: 13.APR.2016 18:45:55



Product Service

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

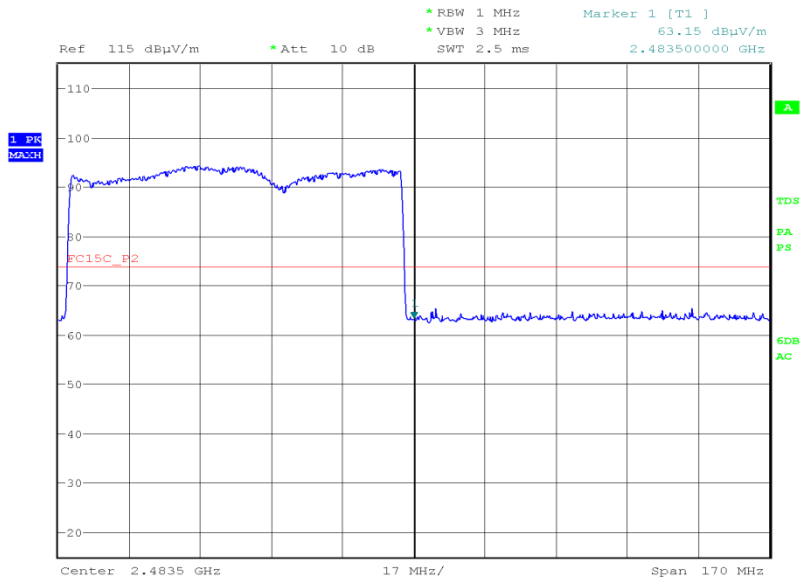


Date: 13.APR.2016 18:49:45



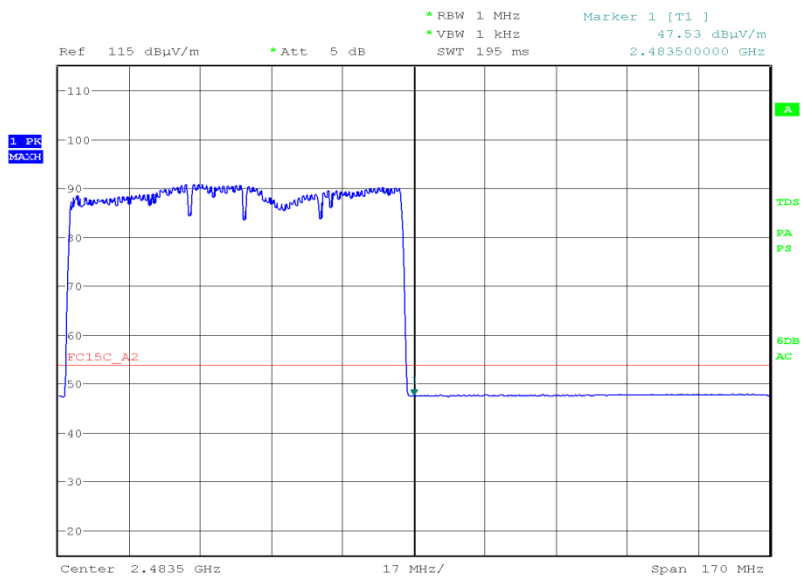
Product Service

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



Date: 13.APR.2016 18:55:31

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



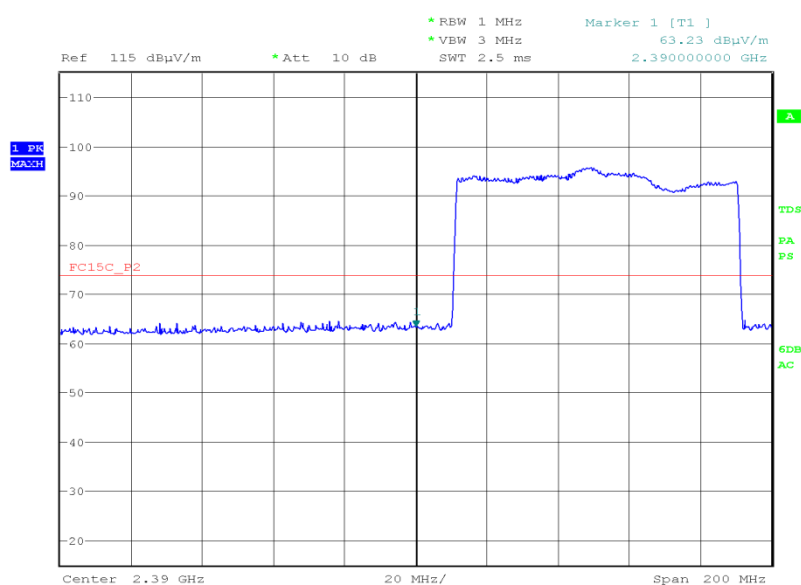
Date: 13.APR.2016 18:57:52



Bluetooth, 8-DPSK, Restricted Band Edges Results

2402 MHz		2480 MHz	
Measured Frequency 2390 MHz		Measured Frequency 2483.5 MHz	
dBμV/m		dBμV/m	
Final Peak	Final Average	Final Peak	Final Average
63.23	46.33	63.61	46.53

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

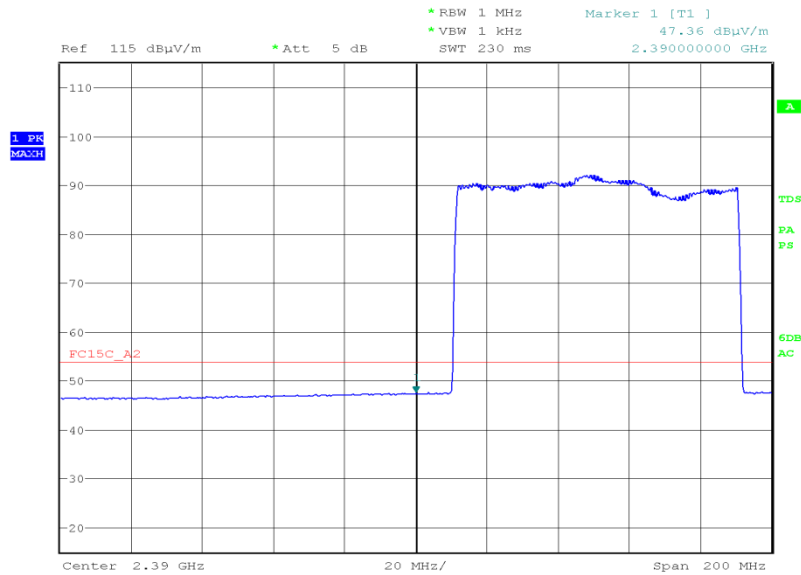


Date: 13.APR.2016 19:34:49



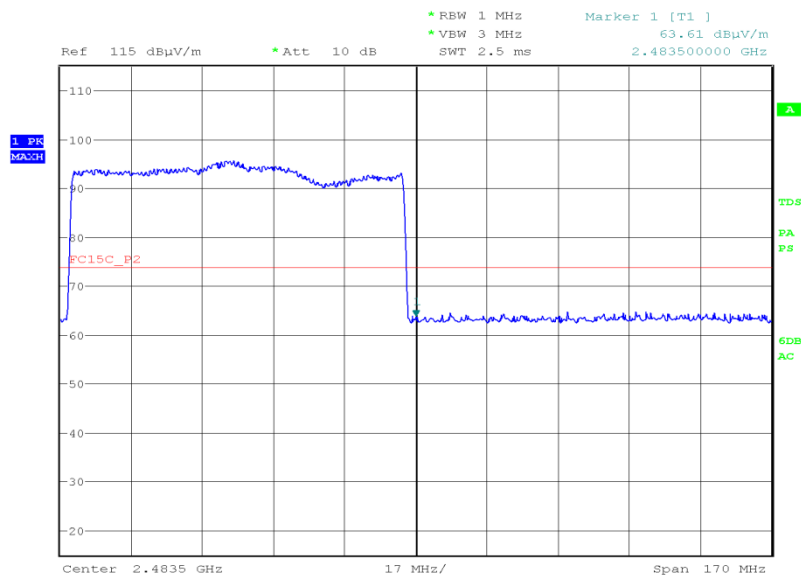
Product Service

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



Date: 13.APR.2016 19:37:35

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



Date: 13.APR.2016 20:09:26



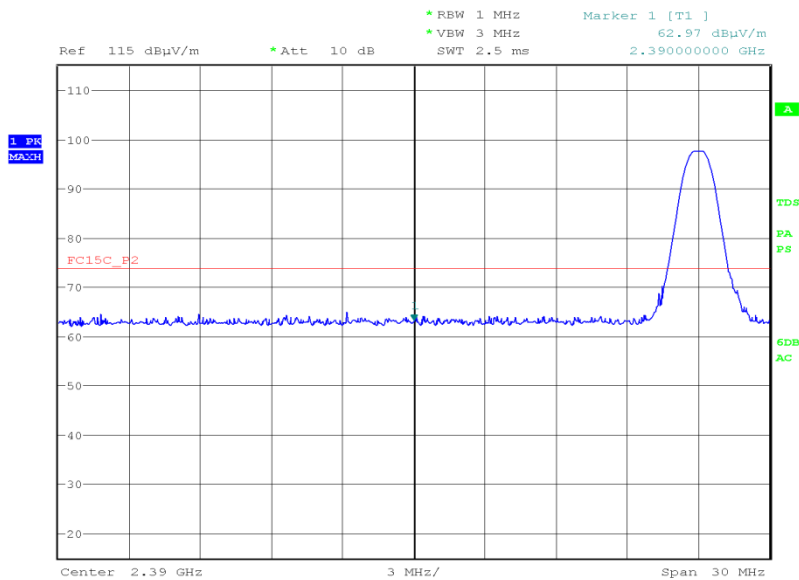
Product Service

Static Mode

Bluetooth, GFSK, Restricted Band Edges Results

2402 MHz		2480 MHz,	
Measured Frequency 2390 MHz		Measured Frequency 2483.5 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
62.97	46.14	62.31	46.29

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

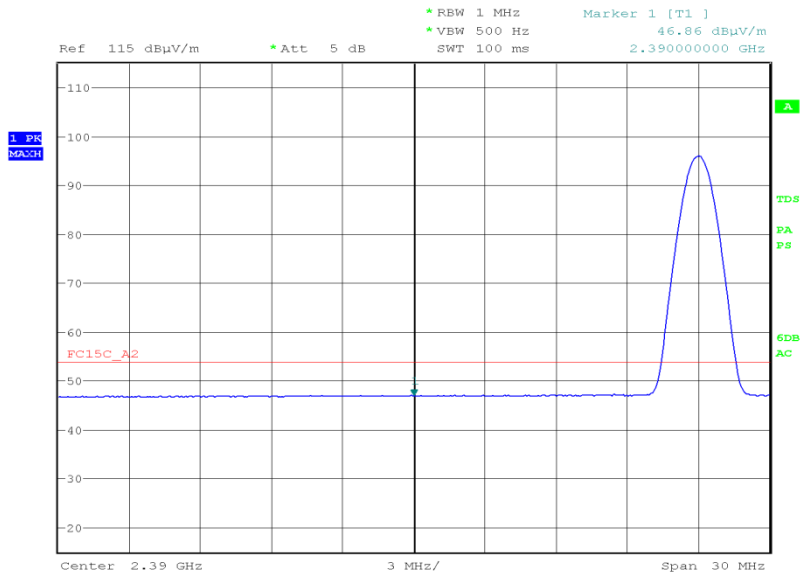


Date: 12.APR.2016 21:34:26



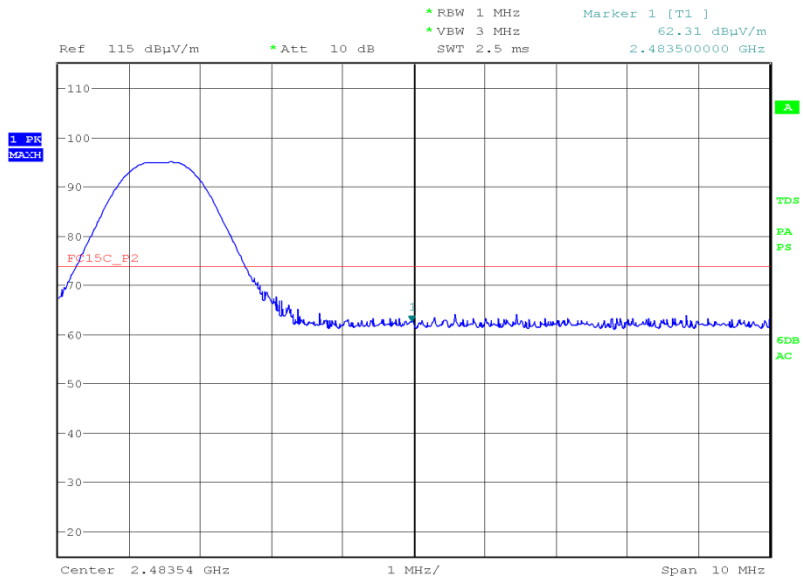
Product Service

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



Date: 13.APR.2016 17:45:34

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

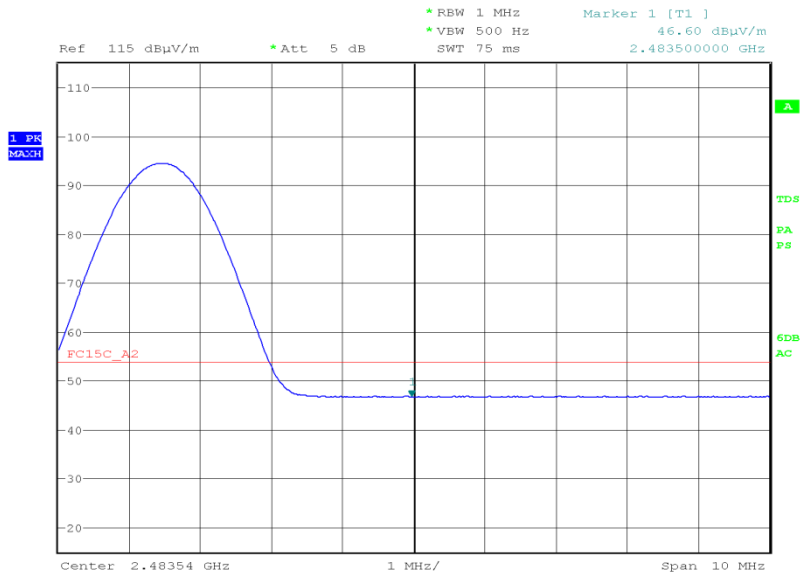


Date: 12.APR.2016 22:09:39



Product Service

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



Date: 12.APR.2016 22:11:01

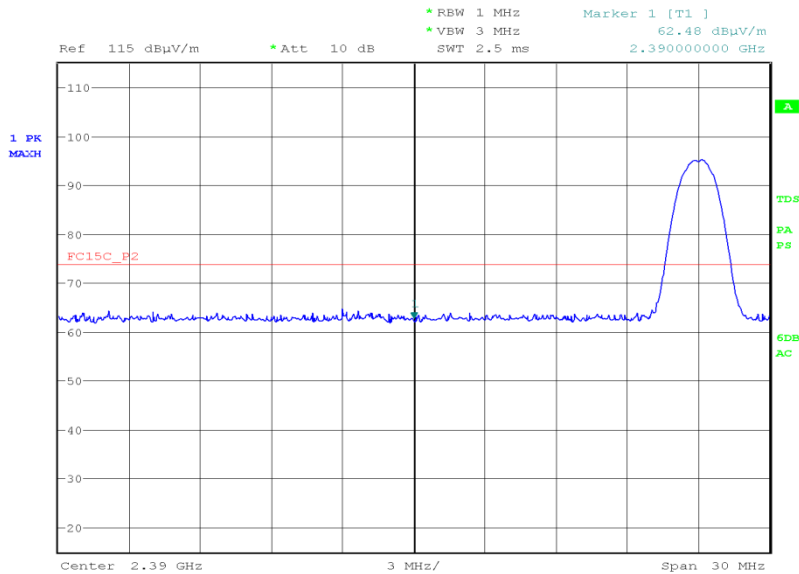


Product Service

Bluetooth, pi/4 DQPSK, Restricted Band Edges Results

2402 MHz		2480 MHz,	
Measured Frequency 2390 MHz		Measured Frequency 2483.5 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
62.48	46.15	62.18	46.28

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

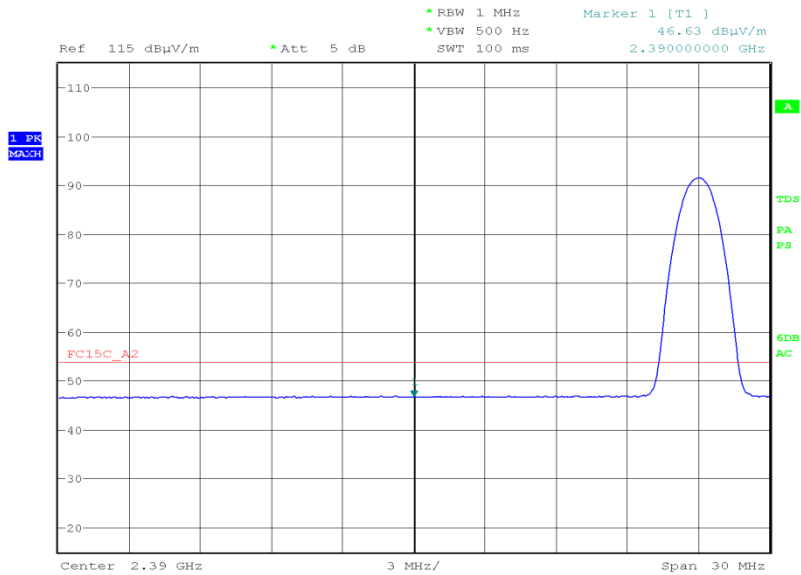


Date: 12.APR.2016 22:35:43



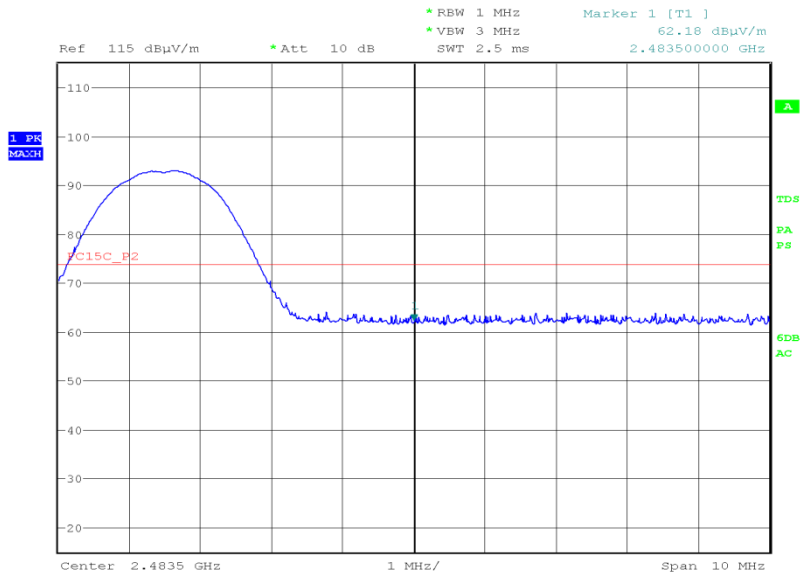
Product Service

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



Date: 12.APR.2016 22:36:29

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

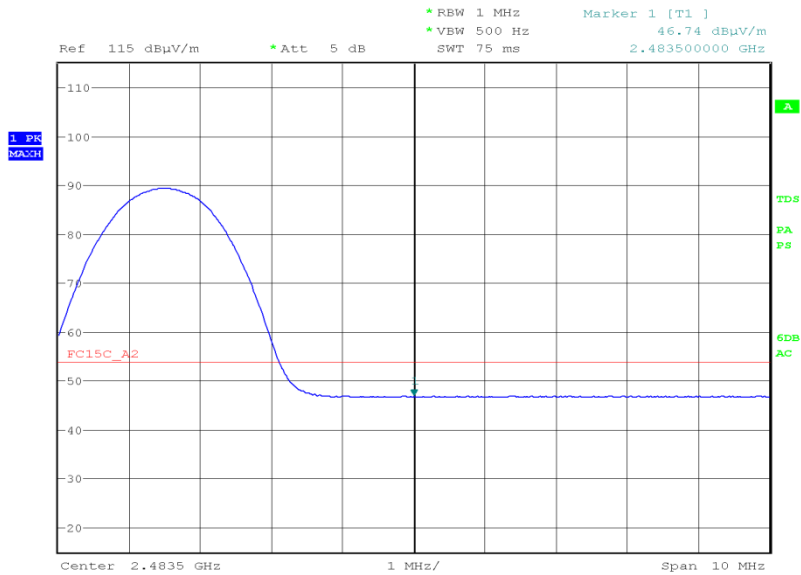


Date: 12.APR.2016 22:43:59



Product Service

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



Date: 12.APR.2016 22:44:52

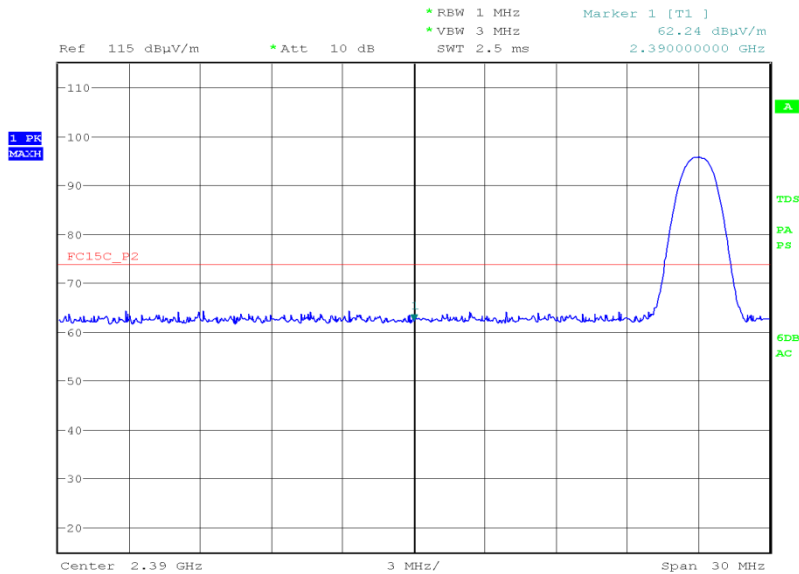


Product Service

Bluetooth, 8-DPSK, Restricted Band Edges Results

2402 MHz		2480 MHz	
Measured Frequency 2390 MHz		Measured Frequency 2483.5 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
62.24	46.15	62.66	46.26

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

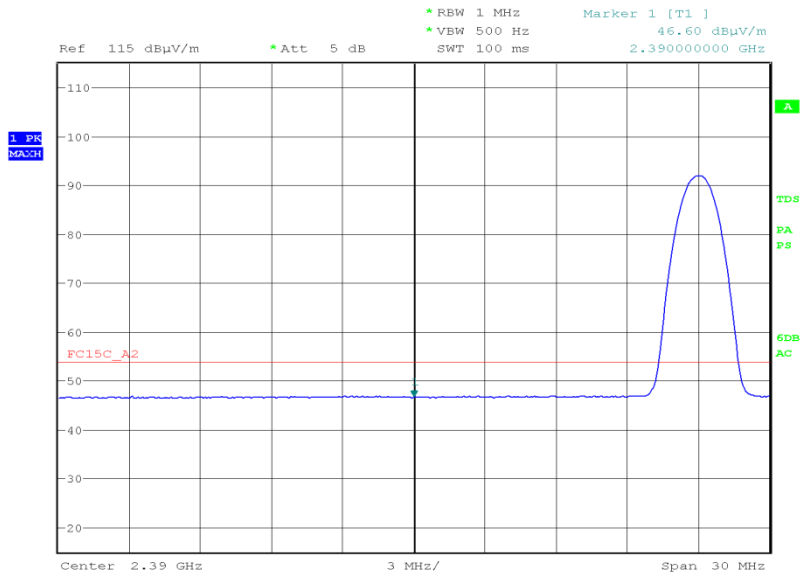


Date: 12.APR.2016 22:54:04



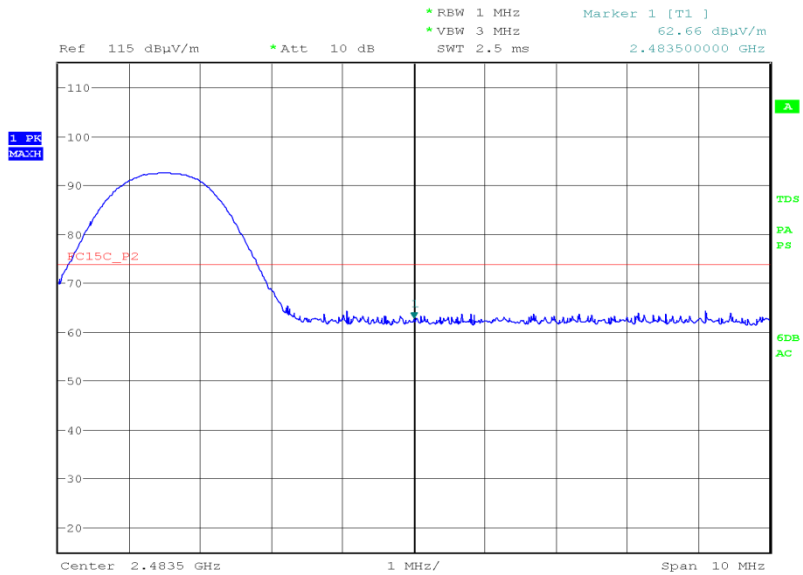
Product Service

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



Date: 12.APR.2016 22:54:43

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

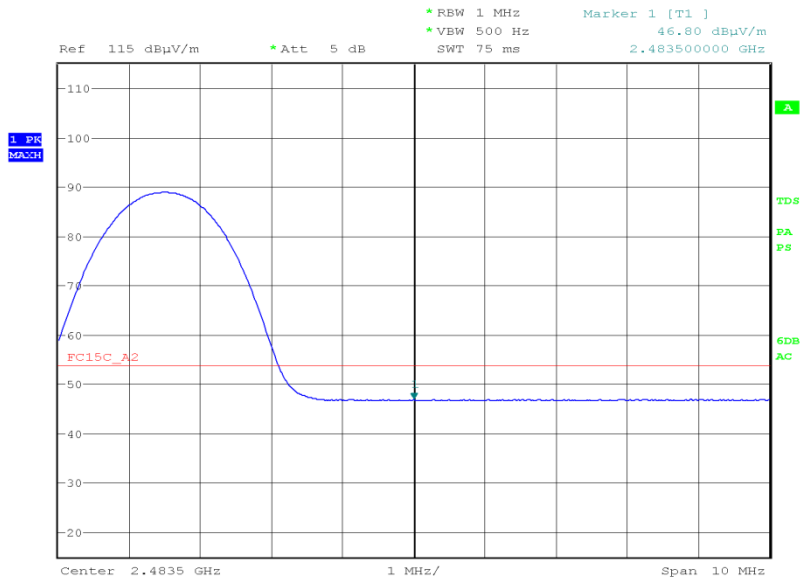


Date: 12.APR.2016 23:04:10



Product Service

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



Date: 12.APR.2016 23:04:42

Remarks

Final average results shown in the tables above were recorded using a CISPR average detector as described in ANSI C63.10 clause 4.1.2. In order to determine the maximum emissions with the restricted band near the band edge, the method described in ANSI C63.10 clause 6.10.5.2 has been used and these plots are included in the report.

FCC 47 CFR Part 15, Limit Clause 15.205

	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)

2.9.2 Equipment Under Test and Modification State

S/N: IMEI 004401115723948 - Modification State 0

2.9.3 Date of Test

12 April 2016 & 13 April 2016

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

Testing was performed in accordance with ANSI C63.10, clause 6.10.4.

2.9.6 Environmental Conditions

Ambient Temperature	20.3 - 20.5°C
Relative Humidity	33.0 - 34.0%



Product Service

2.9.7 Test Results

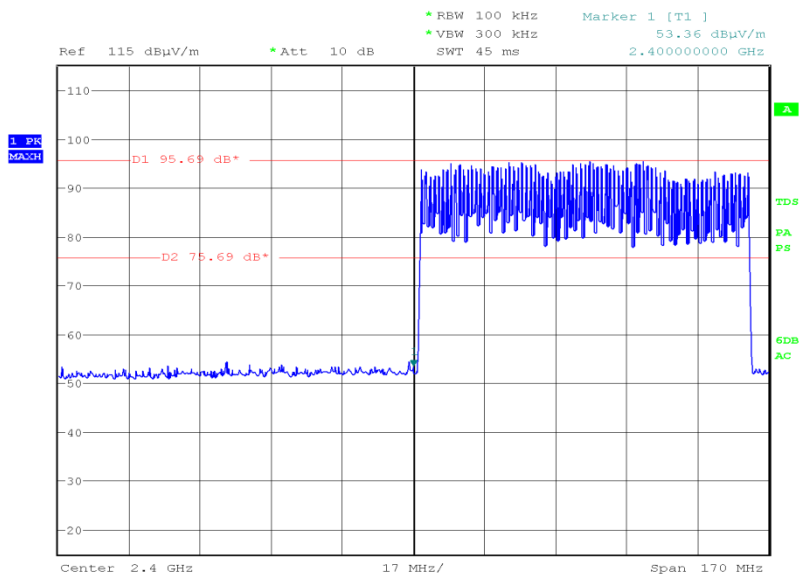
4.0 V DC Supply

Hopping Mode

Bluetooth, GFSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
53.36	53.12

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

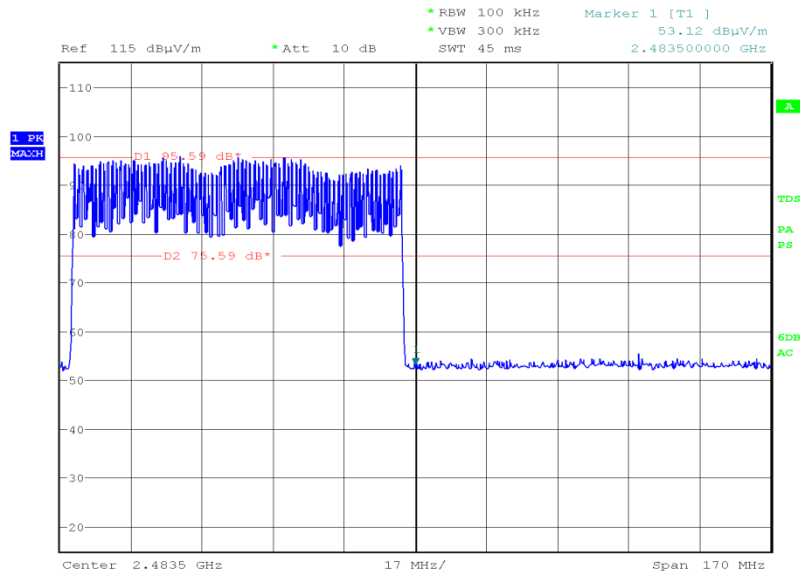


Date: 13.APR.2016 18:14:07



Product Service

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



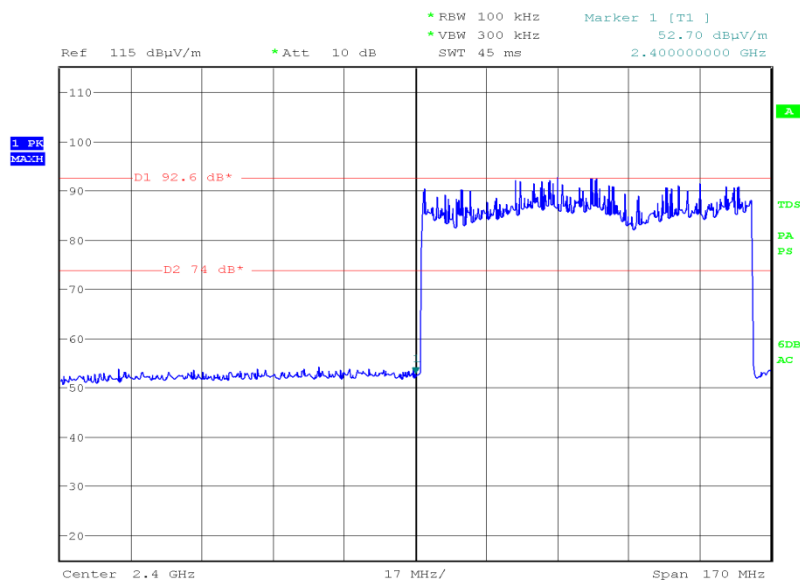
Date: 13.APR.2016 18:16:19



Bluetooth, pi/4 DQPSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBμV/m	dBμV/m
Final Peak	Final Peak
52.70	53.73

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

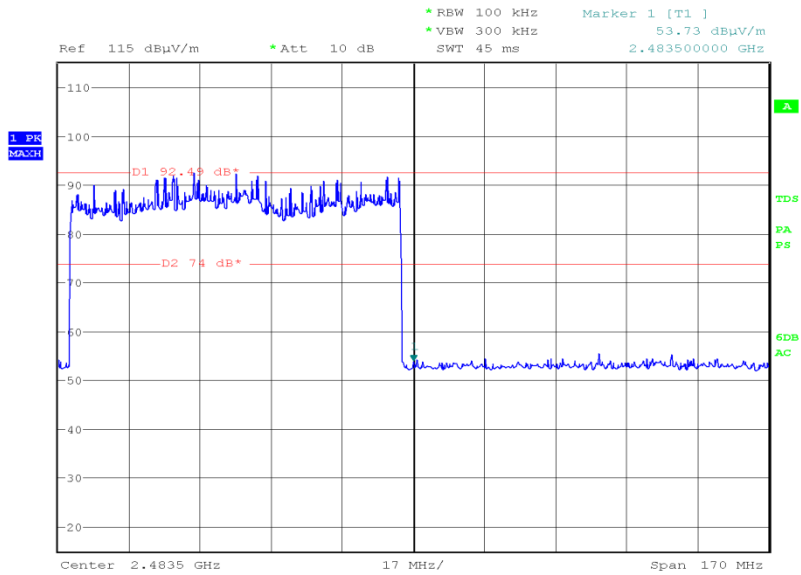


Date: 13.APR.2016 18:52:47



Product Service

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



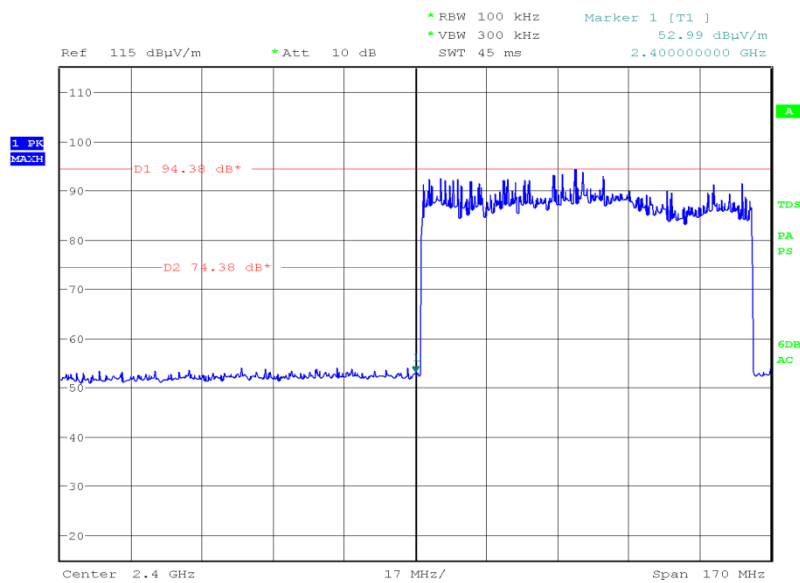
Date: 13.APR.2016 18:54:24



Bluetooth, 8-DPSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
52.99	53.52

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

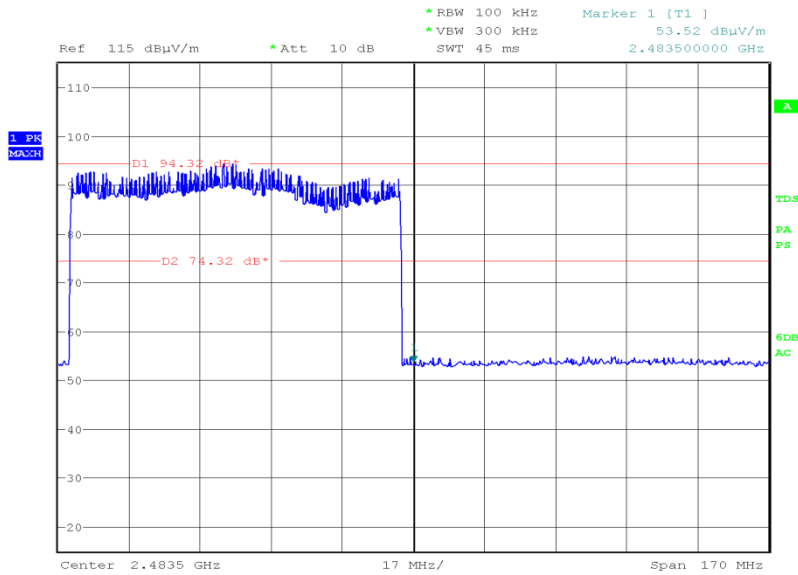


Date: 13.APR.2016 20:02:23



Product Service

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



Date: 13.APR.2016 20:08:48



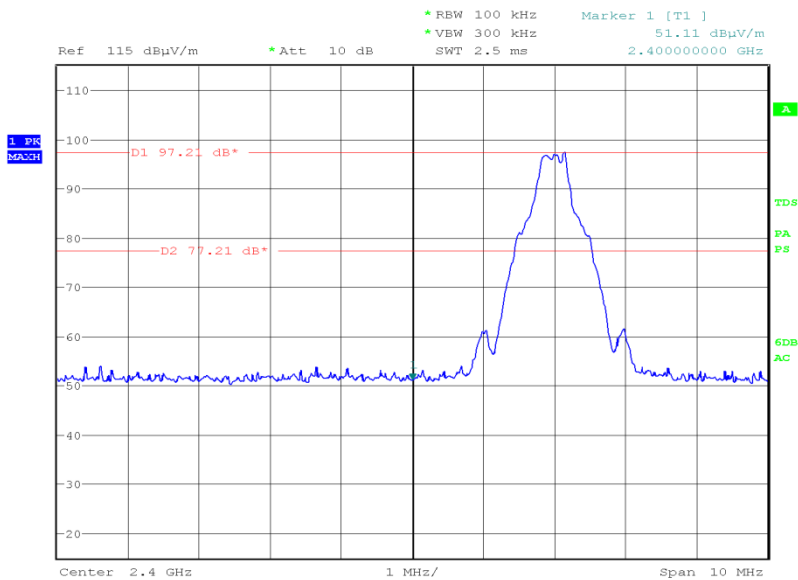
Product Service

Static Mode

Bluetooth, GFSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
51.11	51.85

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



Date: 12.APR.2016 21:39:55

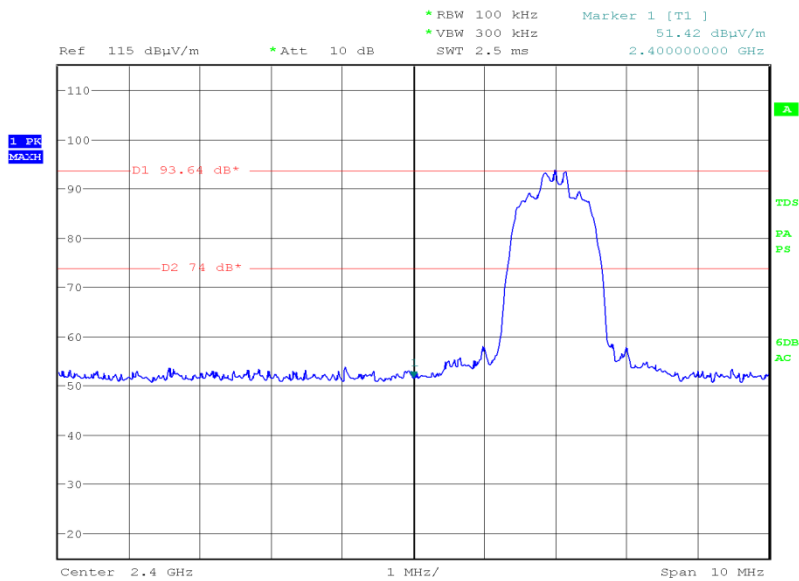


Product Service

Bluetooth, pi/4 DQPSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
51.42	52.45

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

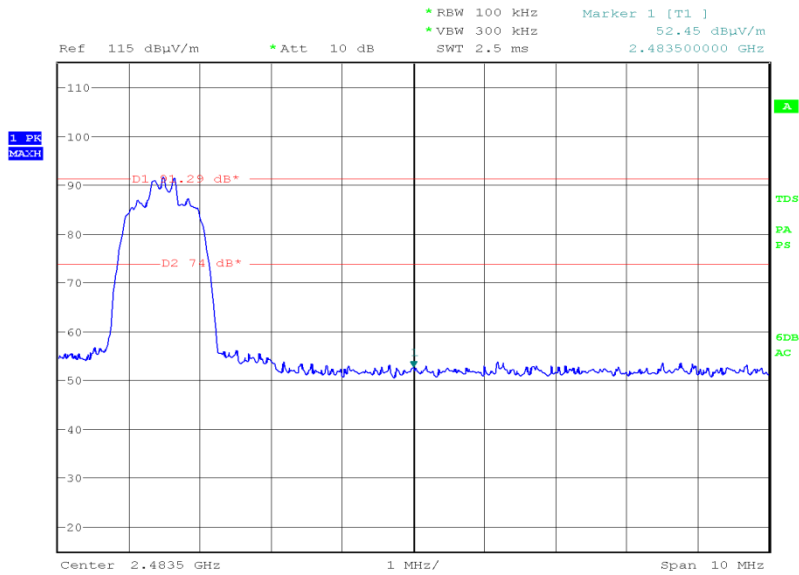


Date: 12.APR.2016 22:38:25



Product Service

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



Date: 12.APR.2016 22:43:06

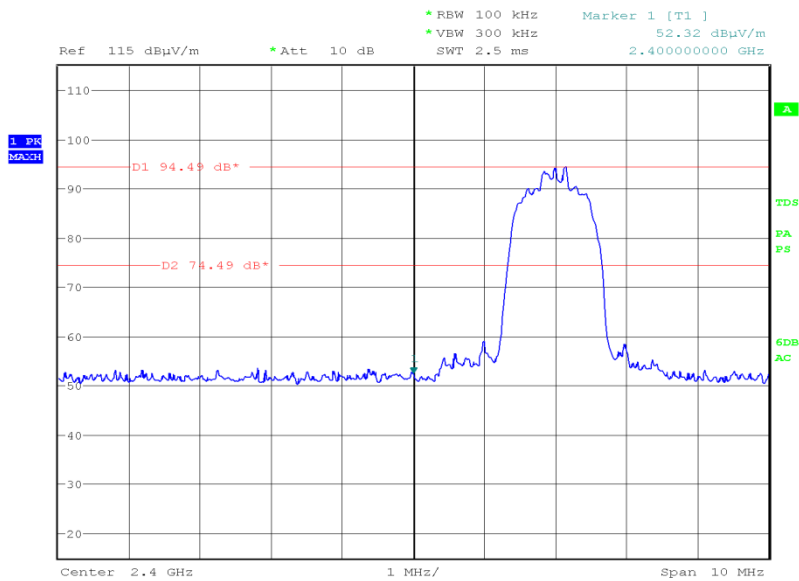


Product Service

Bluetooth, 8-DPSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
52.32	51.20

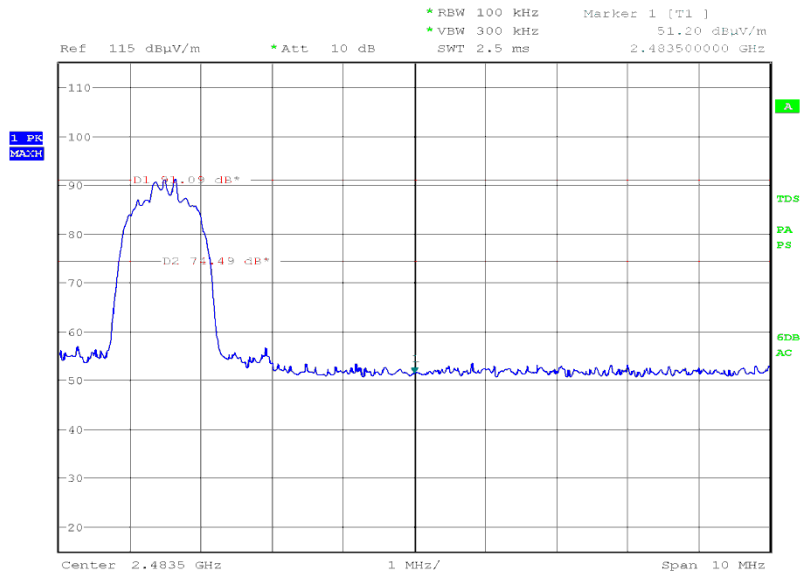
Bluetooth, 2402 MHz, Measured Frequency 2400.00 MHz, 8-DPSK, Final Peak, Authorised Band Edges Plot



Date: 12.APR.2016 22:56:38



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



Date: 12.APR.2016 23:03:24

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 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.



Product Service

SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1- AC Line Conducted Emissions					
LISN	Rohde & Schwarz	ESH2-Z5	17	12	11-Feb-2017
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Transient Limiter	Hewlett Packard	11947A	2377	12	16-Feb-2017
Multimeter	Iso-tech	IDM101	2417	12	29-Sep-2016
Hygrometer	Rotronic	A1	2677	12	11-Jun-2016
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
Section 2.2 - Frequency Hopping Systems - Number of Hopping Channels					
Power Supply Unit	Hewlett Packard	6253A	441	-	O/P Mon
Multimeter	Fluke	75 Mk3	455	12	10-Sep-2016
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	29-Jan-2017
Hygrometer	Rotronic	I-1000	2891	12	19-Aug-2016
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Sep-2016
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	7-Sep-2016
1 metre SMA Cable	Florida Labs	SMS-235SP-39.4-SMS	4512	12	29-Jan-2017
1 metre K-Type Cable	Florida Labs	KMS-180SP-39.4-KMS	4519	12	16-Feb-2017
Section 2.3 - Frequency Hopping Systems - 20 dB Bandwidth					
Power Supply Unit	Hewlett Packard	6253A	441	-	O/P Mon
Multimeter	Fluke	75 Mk3	455	12	10-Sep-2016
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	29-Jan-2017
Hygrometer	Rotronic	I-1000	2891	12	19-Aug-2016
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Sep-2016
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	7-Sep-2016
1 metre SMA Cable	Florida Labs	SMS-235SP-39.4-SMS	4512	12	29-Jan-2017
1 metre K-Type Cable	Florida Labs	KMS-180SP-39.4-KMS	4519	12	16-Feb-2017
Section 2.4 - Frequency Hopping Systems - Channel Separation					
Power Supply Unit	Hewlett Packard	6253A	441	-	O/P Mon
Multimeter	Fluke	75 Mk3	455	12	10-Sep-2016
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	29-Jan-2017
Hygrometer	Rotronic	I-1000	2891	12	19-Aug-2016
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Sep-2016
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	7-Sep-2016
1 metre SMA Cable	Florida Labs	SMS-235SP-39.4-SMS	4512	12	29-Jan-2017
1 metre K-Type Cable	Florida Labs	KMS-180SP-39.4-KMS	4519	12	16-Feb-2017
Section 2.5 - Frequency Hopping Systems - Average Time of Occupancy					
Power Supply Unit	Hewlett Packard	6253A	441	-	O/P Mon
Multimeter	Fluke	75 Mk3	455	12	10-Sep-2016
Hygrometer	Rotronic	I-1000	2891	12	19-Aug-2016
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Sep-2016
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	7-Sep-2016
1 metre SMA Cable	Florida Labs	SMS-235SP-39.4-SMS	4512	12	29-Jan-2017
1 metre K-Type Cable	Florida Labs	KMS-180SP-39.4-KMS	4519	12	16-Feb-2017
EMI Receiver	Keysight Technologies	N9038A MXE	4629	12	3-Sep-2016



Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.6 - Maximum Conducted Output Power					
Multimeter	Fluke	75 Mk3	455	12	10-Sep-2016
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	30-Oct-2016
Power Supply	Iso-tech	IPS 2010	2439	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	19-Aug-2016
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Sep-2016
Combiner/Splitter	Weinschel	1506A	3878	12	2-Jun-2016
P-Series Power Meter	Agilent Technologies	N1911A	3981	12	25-Sep-2016
50 MHz-18 GHz Wideband Power Sensor	Agilent Technologies	N1921A	3983	12	25-Sep-2016
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	7-Sep-2016
1 metre N-Type Cable	Florida Labs	NMS-235SP-39.4-NMS	4511	12	2-Mar-2017
1 metre SMA Cable	Florida Labs	SMS-235SP-39.4-SMS	4512	12	29-Jan-2017
Section 2.7- Spurious Radiated Emissions					
Antenna 18-40GHz (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	27-Nov-2016
Pre-Amplifier	Phase One	PS04-0086	1533	12	30-Jul-2016
18GHz - 40GHz Pre-Amplifier	Phase One	PS04-0087	1534	12	23-Dec-2016
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Cable (2m)	Rosenberger	FA147A2020002020	2195	12	19-Aug-2016
Hygrometer	Rotronic	A1	2677	12	11-Jun-2016
Antenna (Bilog)	Chase	CBL6143	2904	24	11-Jun-2017
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	28-Sep-2016
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
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
Cable 1503 2M 2.92(P)m 2.92(P)m	Rhophase	KPS-1503A-2000-KPS	4293	12	9-Jun-2016
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	6-Oct-2016
Suspended Substrate Highpass Filter	Advance Power Components	11SH10-3000/X18000-O/O	4411	12	23-Mar-2017
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU
Cable (Rx, SMAM-SMAM 0.5m)	Scott Cables	SLSLL18-SMSM-00.50M	4528	-	TU
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	29-Dec-2016



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.8 - Restricted Band Edges					
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	A1	2677	12	11-Jun-2016
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
10mohm Resistor	Cropico	RS3	3616	48	12-Mar-2017
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
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU
Cable (Rx, SMAM-SMAM 0.5m)	Scott Cables	SLSL18-SMSM-00.50M	4528	-	TU
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	29-Dec-2016
Section 2.9- Authorised Band Edges					
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	A1	2677	12	11-Jun-2016
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
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
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU
Cable (Rx, SMAM-SMAM 0.5m)	Scott Cables	SLSL18-SMSM-00.50M	4528	-	TU
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	29-Dec-2016

TU – Traceability Unscheduled

O/P MON – Output Monitored with Calibrated Equipment



3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Frequency Hopping Systems - 20 dB Bandwidth	± 16.74 kHz
Frequency Hopping Systems - Number of Hopping Channels	-
Frequency Hopping Systems - Average Time of Occupancy	-
AC Line Conducted Emissions	± 3.2 dB
Maximum Conducted Output Power	± 0.70 dB
Authorised Band Edges	Conducted: ± 3.08 dB Radiated: 30 MHz to 1 GHz: ± 5.1 dB Radiated: 1 GHz to 40 GHz: ± 6.3 dB
Restricted Band Edges	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 40 GHz: ± 6.3 dB
Spurious Radiated Emissions	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 40 GHz: ± 6.3 dB
Frequency Hopping Systems - Channel Separation	± 16.74 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
(Not UKAS Accredited).

This report must not be reproduced, except in its entirety, without the written permission of
TÜV SÜD Product Service

© 2016 TÜV SÜD Product Service