

FCC/IC - TEST REPORT

Report Number : **64.790.16.06052.01** Date of Issue: August 22, 2017

Model : BF200

Product Type : Bullfrog Bluetooth Outdoor Speaker System

Applicant : JAZZ HIPSTER CORPORATION

Address : 2Fd., No.512, Yaun-San Rd. Ghang-Ho City Taiwan

Manufacturer : Stillwater Designs and Audio, Inc.

Address : 3100 N. Husband, Stillwater, OK 74076, USA.

Test Result : ☒ **Positive** ☐ **Negative**



Total pages including Appendices : 51

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park,
Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052,
P. R. China

Telephone: 86 755 8828 6998

Fax: 86 755 8828 5299

3 Description of the Equipment Under Test

Product:	Bullfrog Bluetooth Outdoor Speaker System
Model no.:	BF200
FCC ID:	TQYBF200
IC ID:	6233A-BF200
Options and accessories:	NIL
Rating:	DC 11.4V (rechargeable battery) Powered by external power supply: Adaptor Input: 100-240VAC, 50/60Hz, 1.3A MAX Adaptor Output: 15.0VDC, 2.66A
RF Transmission Frequency:	2402-2480MHz
No. of Operated Channel:	79
Modulation:	GFSK, $\pi/4$ -DQPSK, 8DPSK
Antenna Type:	PCB layout antenna
Antenna Gain:	Maximum 1.93 dBi
Description of the EUT:	The Equipment Under Test (EUT) is a bluetooth speaker.

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2016 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators
RSS-Gen Issue 4 November 2014	General Requirements for the Certification of Radio Apparatus
RSS-247 Issue 2 February 2017	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

All the test methods were according to Public Notice DA 00-705 -Frequency Hopper Spread Spectrum Test Procedure released by FCC on March 30, 2000 and C63.10 (2013).

5 Summary of Test Results

Technical Requirements			
FCC Part 15 Subpart C, RSS-GEN, RSS-247			
Test Condition			Test Result
§15.207	RSS-GEN A8.8	Conducted emission AC power port	Pass
§15.247(b)(1)	RSS-247 Clause 5.4(b)	Conducted peak output power	Pass
§15.247(a)(1)	RSS-247 Clause 5.1(a)	20dB bandwidth and 99% Occupied Bandwidth	Pass
§15.247(a)(1)	RSS-247 Clause 5.1(b)	Carrier frequency separation	Pass
§15.247(a)(1)(iii)	RSS-247 Clause 5.1(d)	Number of hopping frequencies	Pass
§15.247(a)(1)(iii)	RSS-247 Clause 5.1(d)	Dwell Time	Pass
§15.247(d)	RSS-247 Clause 5.5	Spurious RF conducted emissions	Pass
§15.247(d)	RSS-247 Clause 5.5	Band edge	Pass
§15.247(d) & §15.209 &	RSS-GEN 7.2.5	Spurious radiated emissions for transmitter and receiver	Pass
§15.203	RSS-GEN 7.1.2	Antenna requirement	Pass

Note 1: N/A=Not Applicable.

Note 2: The EUT uses an Embedded Type antenna, which gain is 1dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

6 General Remarks

This submittal(s) (test report) is intended for FCC ID: TQYBF200, IC ID: 6233A-BF200 complies with Section 15.207, 15.209, 15.247 of the FCC Part 15 Subpart C Rules and RSS-GEN, RSS-247.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Testing Start Date: July 11, 2017

Testing End Date: July 20, 2017

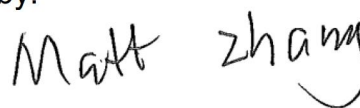
-- TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch --

Reviewed by:



Celia Xiang

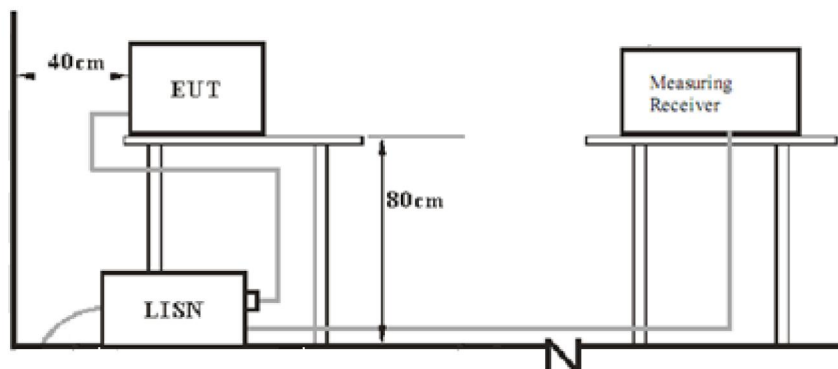
Prepared by:



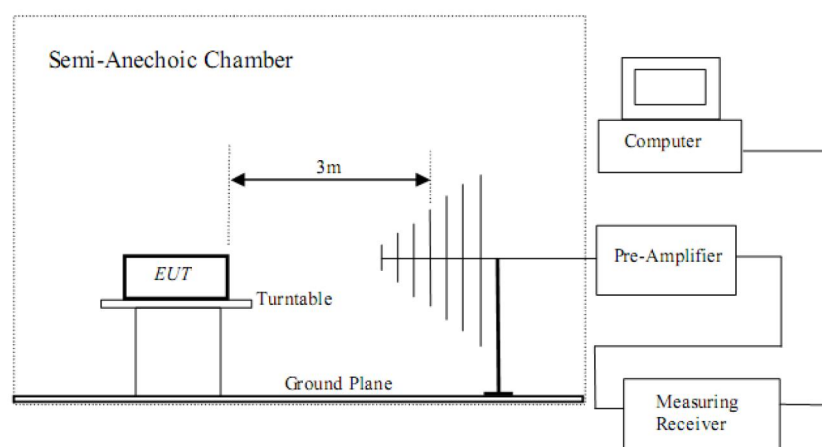
Matt Zhang

7 Test Setups

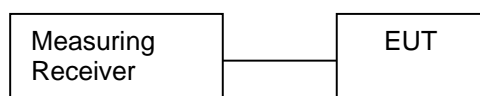
7.1 AC Power Line Conducted Emission test setups



7.2 Radiated test setups



7.3 Conducted RF test setups



8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
---	---	---	---

Test software: ISRT Tool, which used to control the EUT in continues transmitting mode

The system was configured to hopping mode and non-hopping mode.

Hopping mode: typical working mode (normal hopping status)

Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power

9 Technical Requirement

9.1 Conducted Emission

Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through an Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

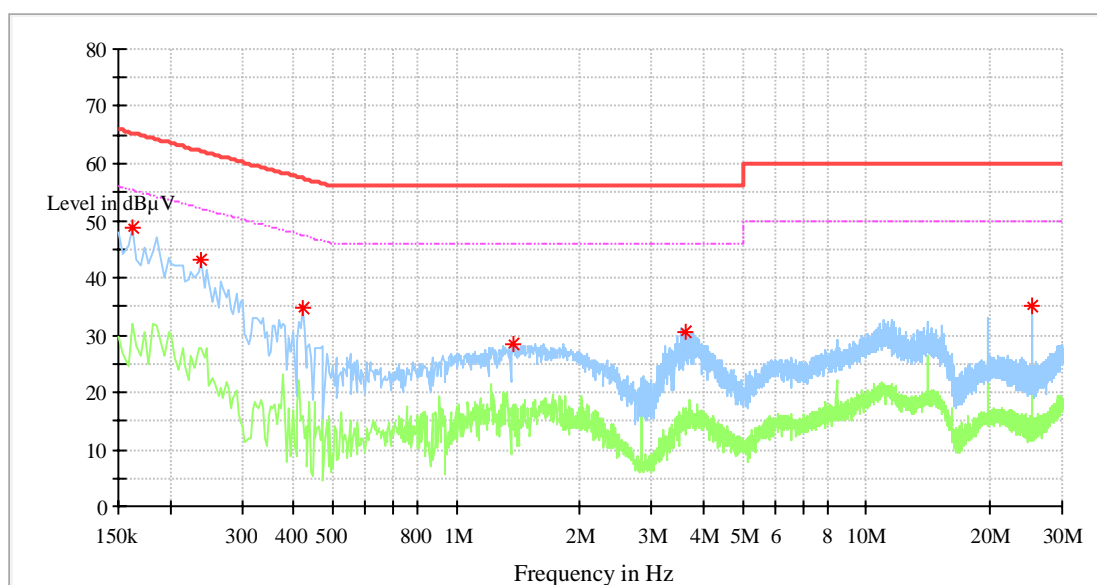
According to §15.207 & RSS-GEN A7.2.4, conducted emissions limit as below:

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linearly with logarithm of the frequency

Conducted Emission

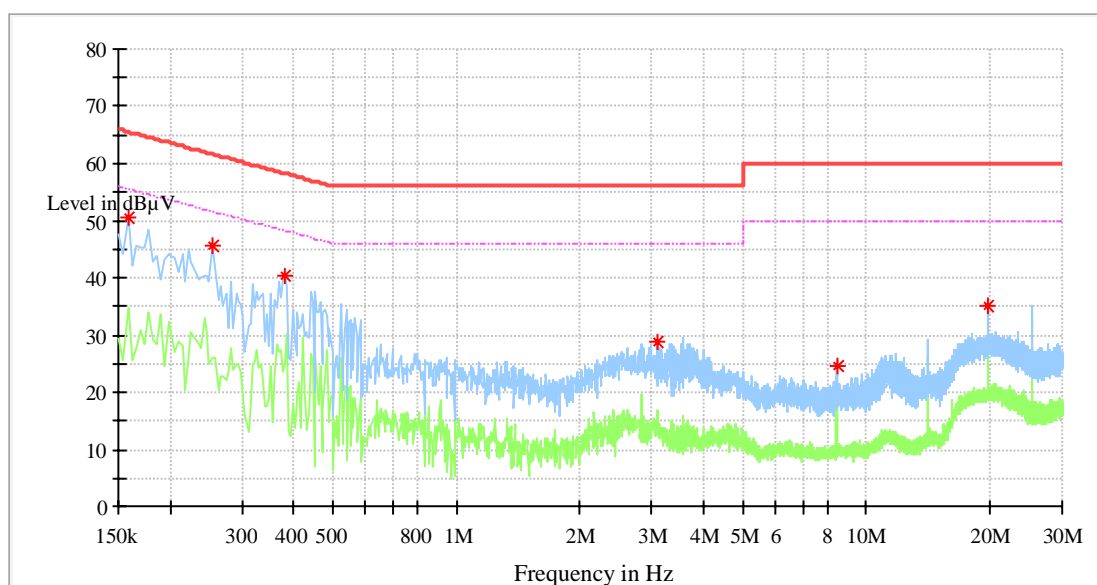
Product Type : Bullfrog Bluetooth Outdoor Speaker System
 M/N : BF200
 Operating Condition : Bluetooth function on and USB port discharging with 5V2.1A.
 Test Specification : Line
 Comment : AC 120V/60Hz



No significant emission was detected within 10 dB to limit

Conducted Emission

Product Type : Bullfrog Bluetooth Outdoor Speaker System
 M/N : BF200
 Operating Condition : Bluetooth function on and USB port discharging with 5V2.1A.
 Test Specification : Neutral
 Comment : AC 120V/60Hz



No significant emission was detected within 10 dB to limit

9.2 Conducted peak output power

Test Method

1. Use the following spectrum analyzer settings:
Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
RBW > the 20 dB bandwidth of the emission being measured, VBW ≥ RBW,
Sweep = auto, Detector function = peak, Trace = max hold
2. Add a correction factor to the display.
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power

Limits

According to §15.247 (b) (1) and RSS-247 clause 5.4(b), conducted peak output power limit as below:

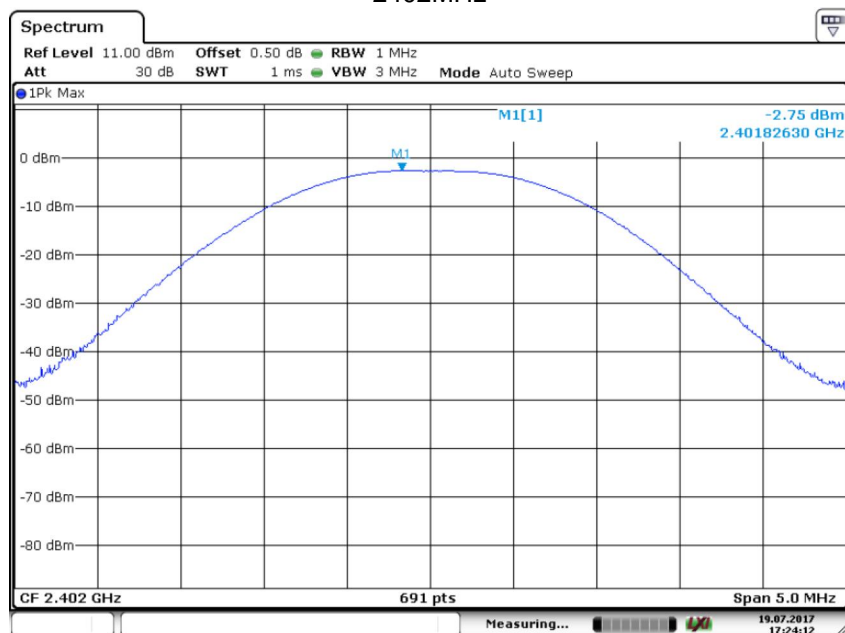
Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤1	≤30

Conducted peak output power

Bluetooth Mode GFSK modulation Test Result

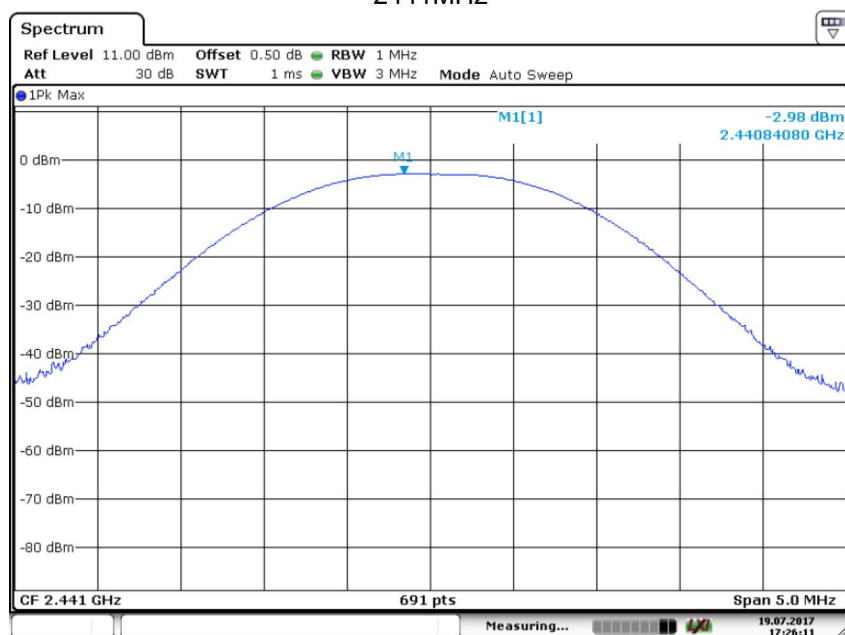
Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	-2.75	Pass
Middle channel 2441MHz	-2.98	Pass
High channel 2480MHz	-3.96	Pass

2402MHz



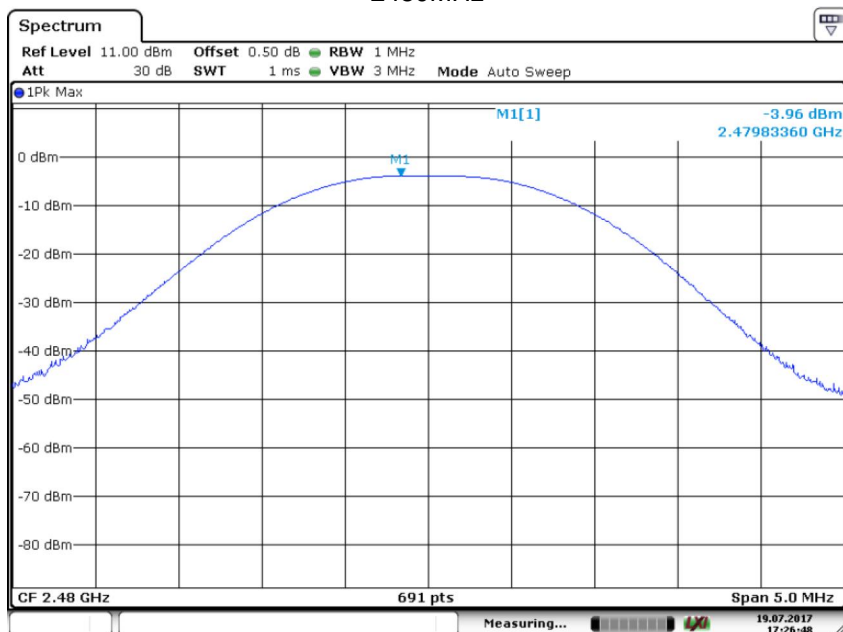
Date: 19.JUL.2017 17:24:12

2441MHz



Date: 19.JUL.2017 17:26:10

2480MHz

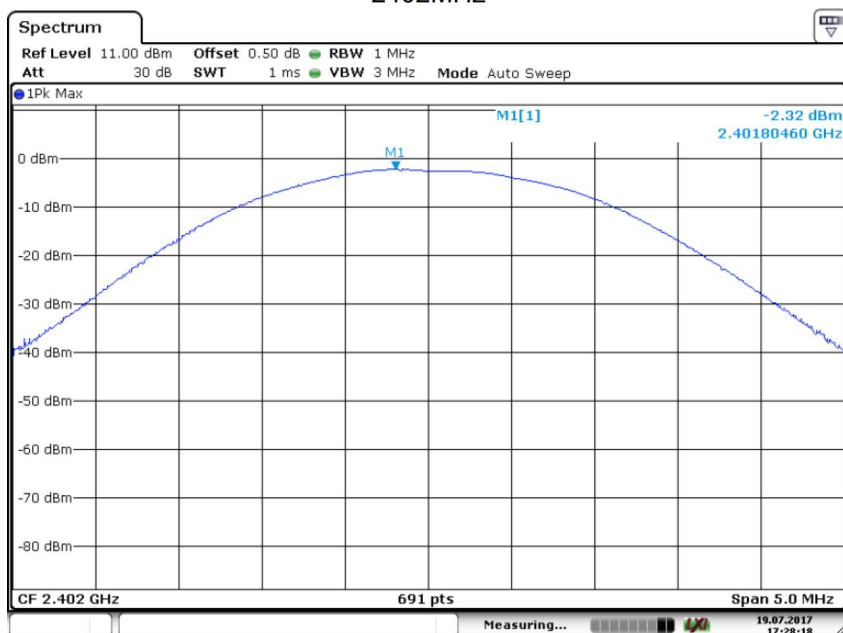


Date: 19.JUL 2017 17:26:48

Bluetooth Mode $\pi/4$ -DQPSK modulation Test Result

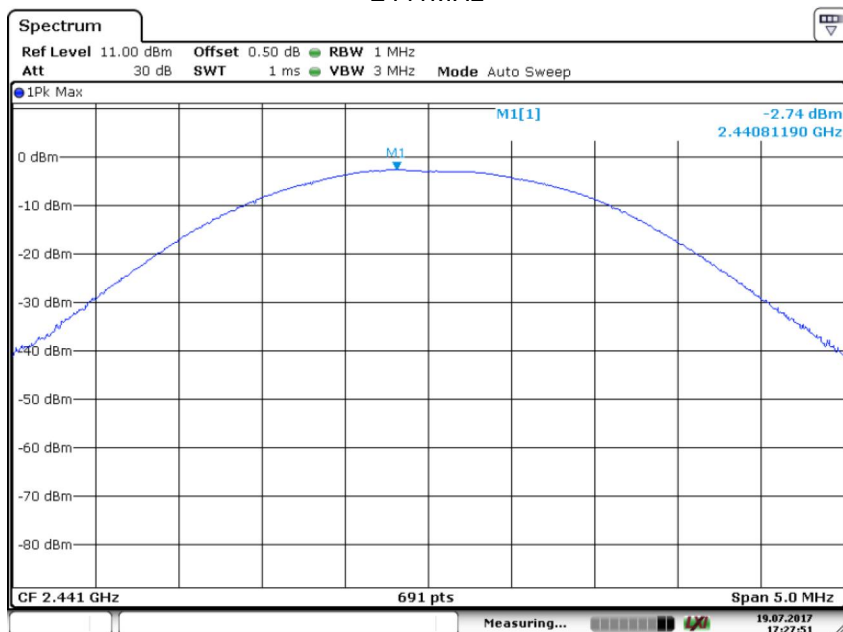
Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	-2.32	Pass
Middle channel 2441MHz	-2.74	Pass
High channel 2480MHz	-3.70	Pass

2402MHz



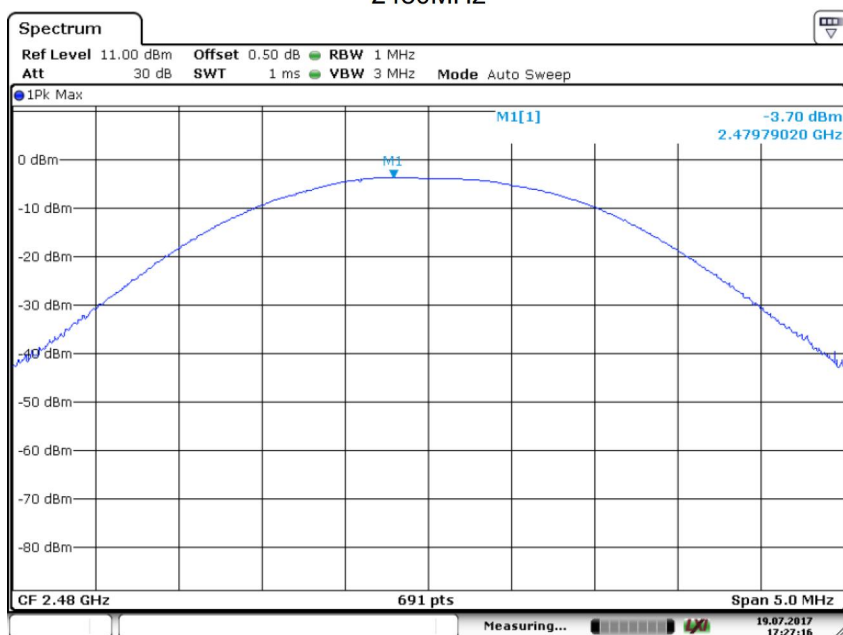
Date: 19.JUL 2017 17:28:18

2441MHz



Date: 19.JUL 2017 17:27:51

2480MHz

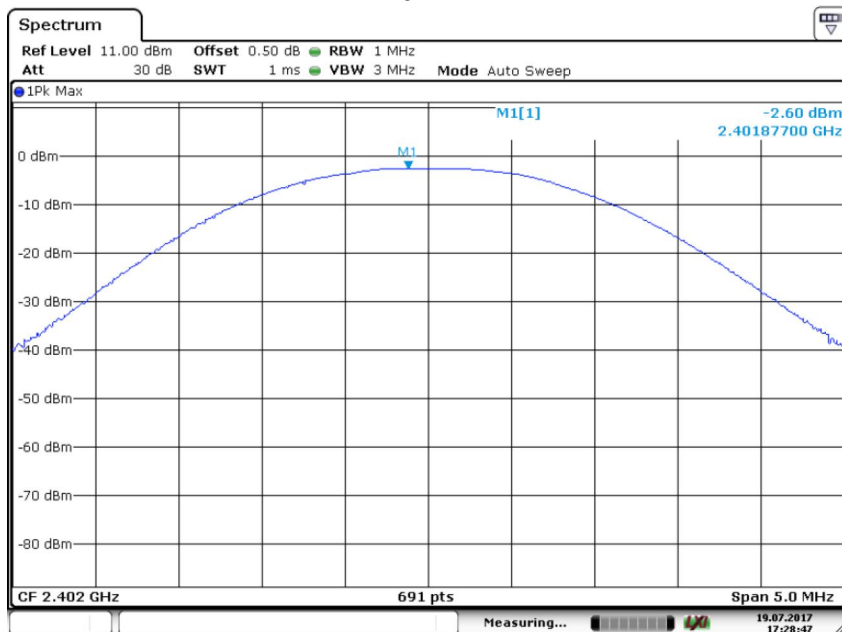


Date: 19.JUL 2017 17:27:17

Bluetooth Mode 8DPSK modulation Test Result

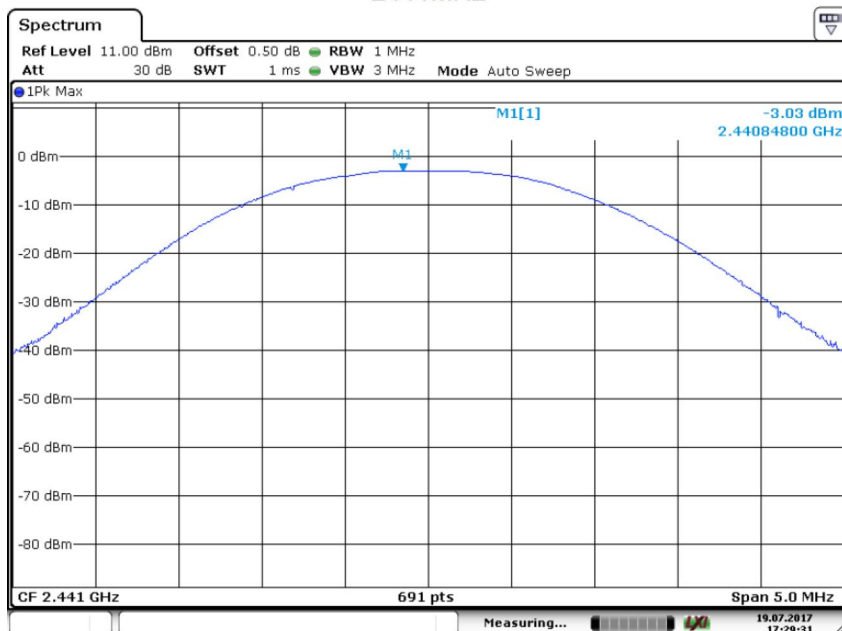
Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	-2.60	Pass
Middle channel 2441MHz	-3.03	Pass
High channel 2480MHz	-3.95	Pass

2402MHz



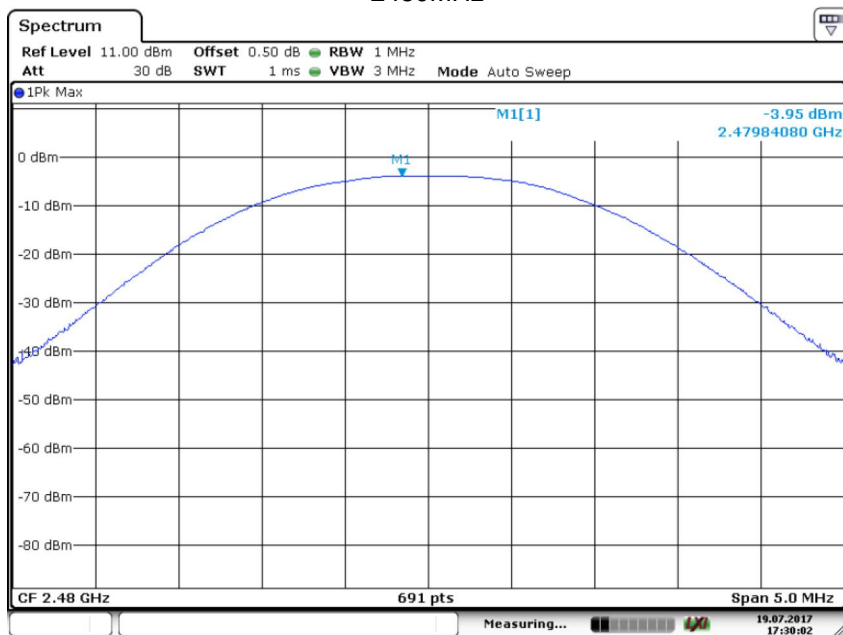
Date: 19.JUL 2017 17:28:46

2441MHz



Date: 19.JUL 2017 17:29:32

2480MHz



Date: 19.JUL.2017 17:30:01

9.3 20 dB bandwidth and 99% Occupied Bandwidth

Test Method

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Limit

Limit [kHz]

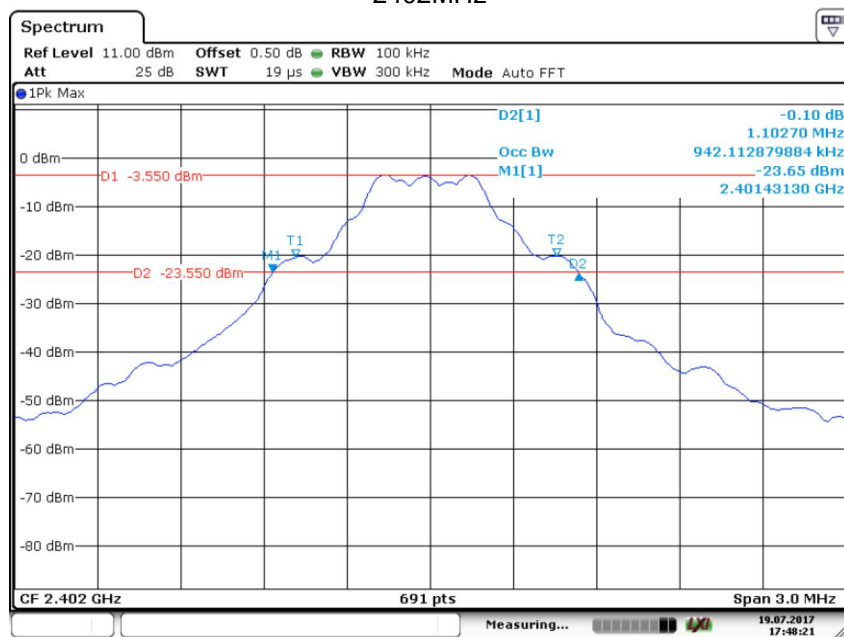
N/A

20 dB bandwidth and 99% Occupied Bandwidth

Bluetooth Mode GFSK Modulation test result

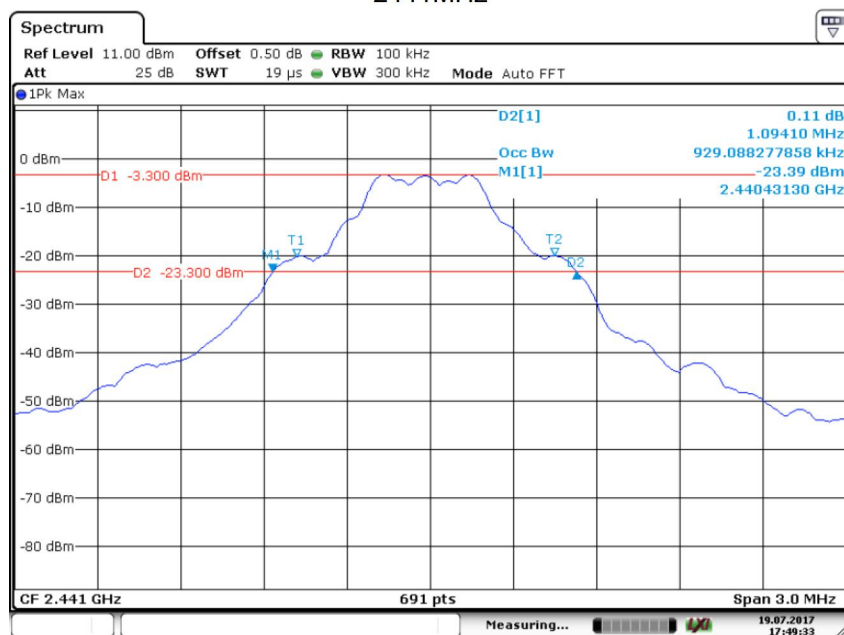
Frequency MHz	20 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz	Result
2402	1102.7	942.1	--	Pass
2441	1094.1	929.1	--	Pass
2480	1102.7	937.8	--	Pass

2402MHz



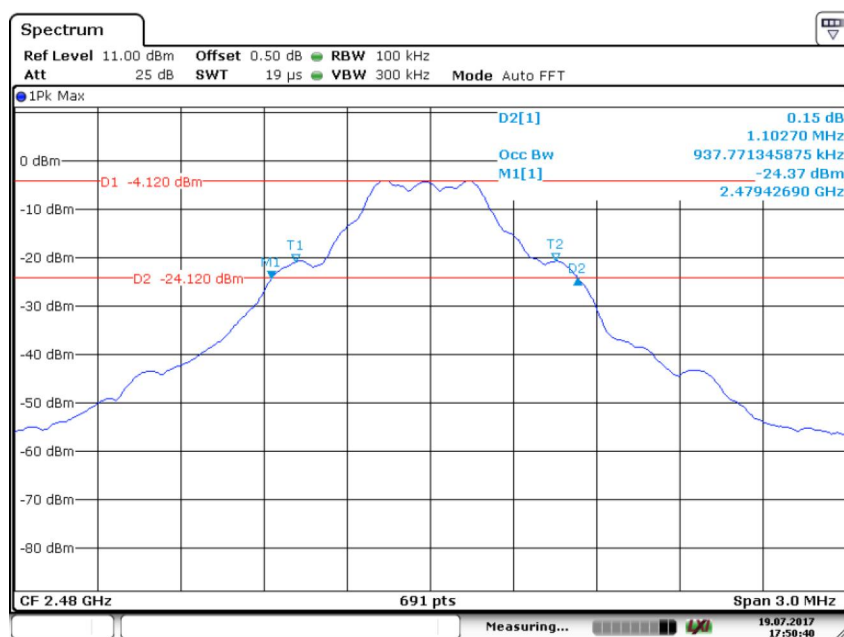
Date: 19.JUL 2017 17:48:21

2441MHz



Date: 19.JUL 2017 17:49:33

2480MHz

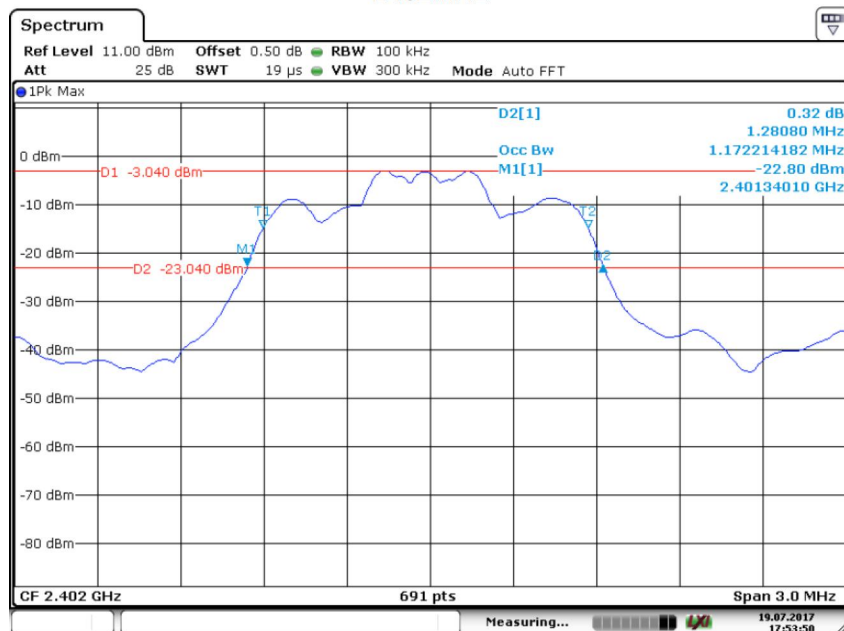


Date: 19.JUL.2017 17:50:40

Bluetooth Mode $\pi/4$ -DQPSK Modulation test result

Frequency MHz	20 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz	Result
2402	1280.8	1172.2	--	Pass
2441	1293.8	1172.2	--	Pass
2480	1298.1	1176.6	--	Pass

2402MHz



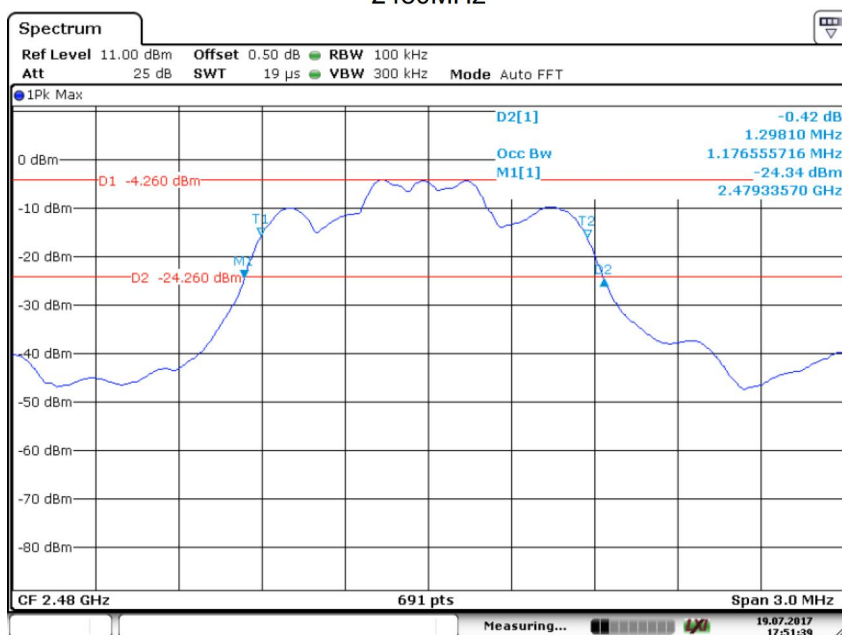
Date: 19.JUL.2017 17:53:50

2441MHz



Date: 19.JUL 2017 17:52:44

2480MHz

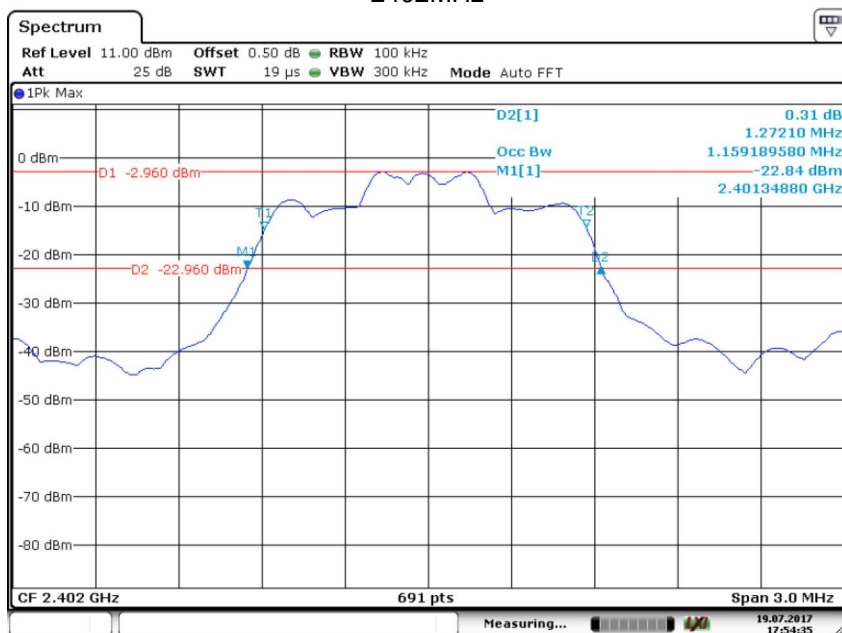


Date: 19.JUL 2017 17:51:39

Bluetooth Mode 8DPSK Modulation test result

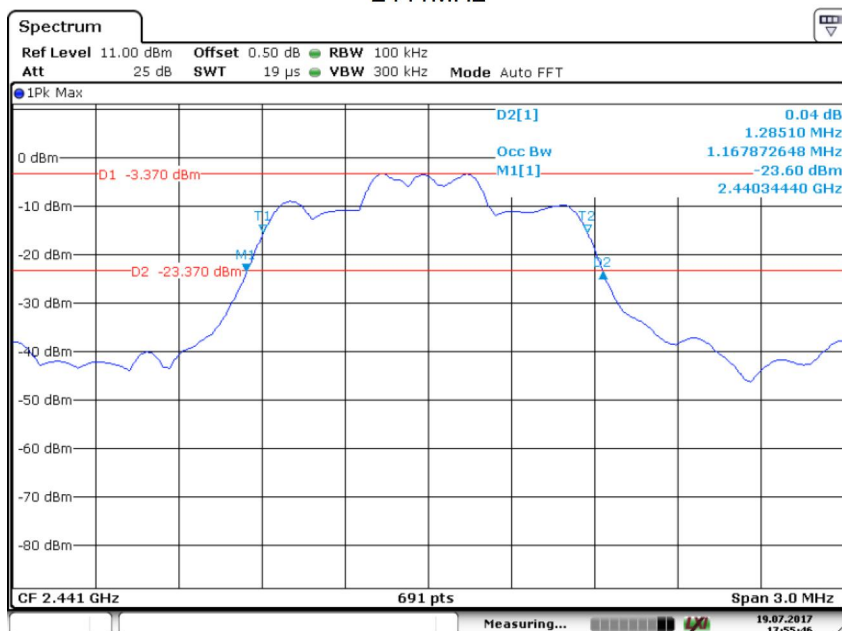
Frequency MHz	20 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz	Result
2402	1272.1	1159.2	--	Pass
2441	1285.1	1167.9	--	Pass
2480	1289.4	1167.9	--	Pass

2402MHz



Date: 19.JUL 2017 17:54:36

2441MHz



Date: 19.JUL 2017 17:55:46

2480MHz



Date: 19.JUL 2017 17:56:42

9.4 Carrier Frequency Separation

Test Method

1. Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels, $RBW \geq 1\%$ of the span, $VBW \geq RBW$, Sweep = auto, Detector function = peak
2. By using the Max-Hold function record the separation of two adjacent channels.
3. Measure the frequency difference of these two adjacent channels by spectrum analyzer marker function.
4. Repeat above procedures until all frequencies measured were complete.

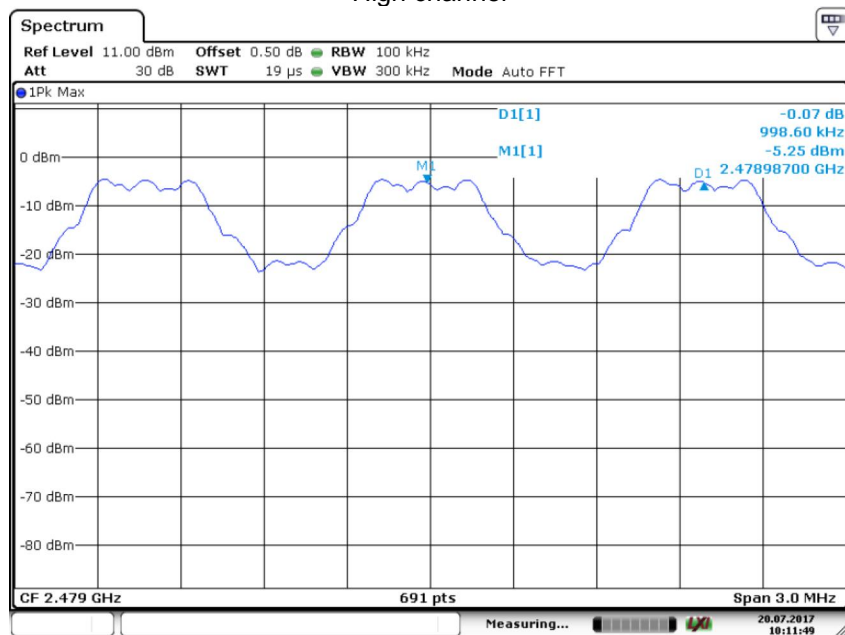
Limit

Limit kHz
$\geq 25\text{kHz}$ or $2/3$ of the 20 dB bandwidth which is greater

GFSK Modulation Limit

Frequency MHz	2/3 of 20 dB Bandwidth kHz
2402	735
2441	796
2480	735

High channel



Date: 20.JUL 2017 10:11:49

9.5 Number of hopping frequencies

Test Method

1. Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels, $RBW \geq 1\%$ of the span, $VBW \geq RBW$, Sweep = auto, Detector function = peak
2. Set the spectrum analyzer on Max-Hold Mode, and then keep the EUT in hopping mode.
3. Record all the signals from each channel until each one has been recorded.
4. Repeat above procedures until all frequencies measured were complete.

Limit

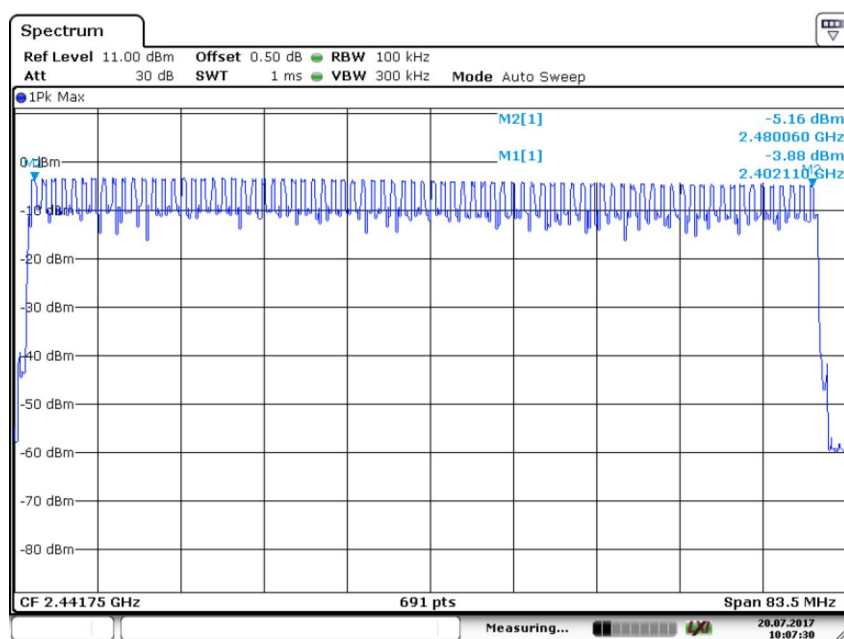
Limit
number

≥ 15

Number of hopping frequencies

Test result: The measurement was performed with the typical configuration (normal hopping status), and the total hopping channels is constant for the all modulation mode according with the Bluetooth Core Specification. Here GFSK modulation mode was used to show compliance.

Number of hopping frequencies	Result
79	Pass



Date: 20 JUL 2017 10:07:31

9.6 Dwell Time

Test Method

1. Connect EUT antenna terminal to the spectrum analyzer with a low loss cable.
Equipment mode: Spectrum analyzer
2. RBW: 1MHz; VBW: 1MHz; SPAN: Zero Span
3. Adjust the center frequency of spectrum analyzer on any frequency be measured.
4. Measure the Dwell Time by spectrum analyzer Marker function.
5. Repeat above procedures until all frequencies measured were complete.

Limit

According to §15.247(a)(1)(iii) & RSS-247 clause 5.1(d) The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Dwell Time

Dwell time

The maximum dwell time shall be 0,4 s.

According to the Bluetooth Core Specification, the worse result (DH5 mode) was reported to show compliance.

The Dwell Time = Burst Width * Total Hops. The detailed calculations are showed as follows:

The duration for dwell time calculation: 0.4 [s] * hopping number = 0.4 [s] * 79 [ch] = 31.6 [s*ch];

The burst width, which is directly measured, refers to the duration on one channel hop.

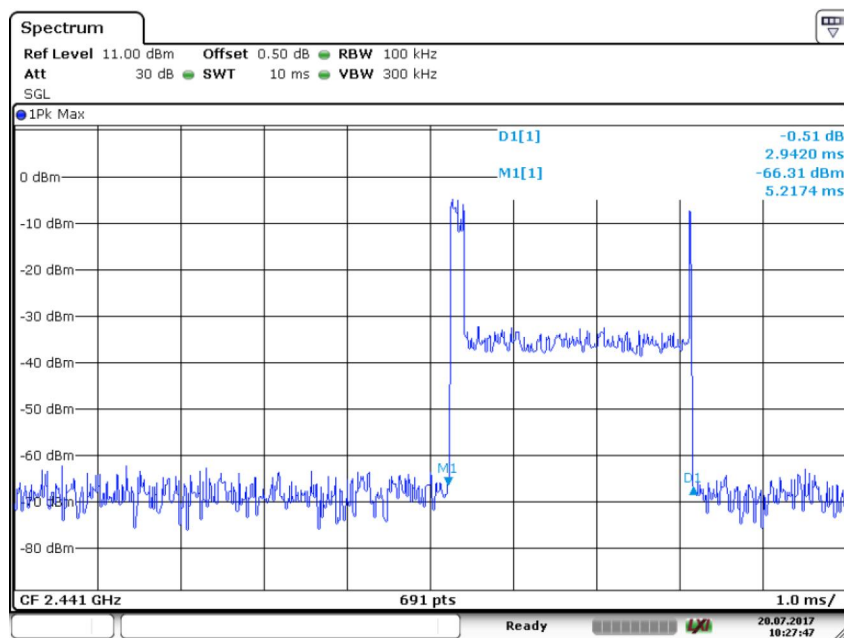
The maximum number of hopping channels in 31.6s for DH5=1600 / 6 / 79 *31.6=106.67

Test Result

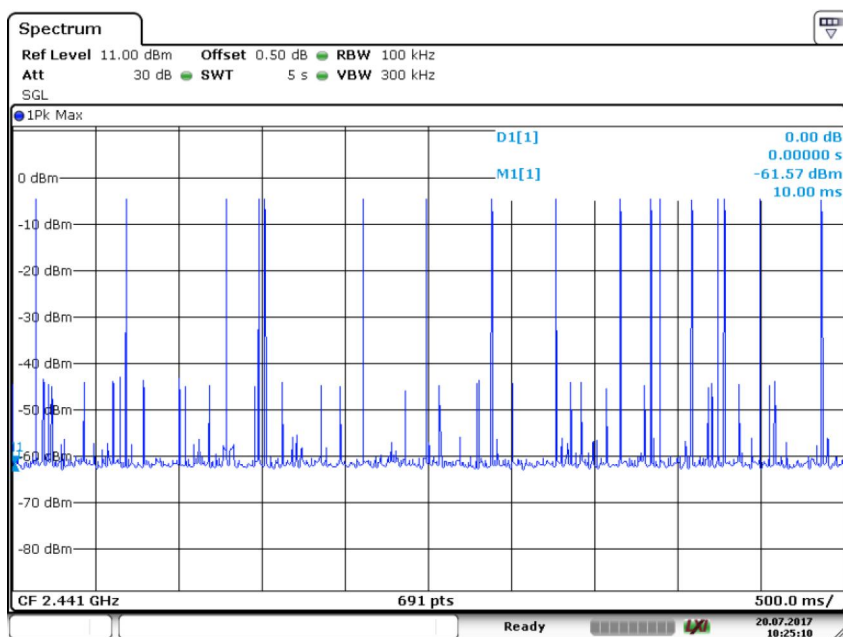
Modulation	Mode	Reading (μs)	Total Hops	Test Result (ms)	Limit (ms)	Result
GFSK	DH5	2942.0	106.67	313.82	≤ 400	Pass
π/4-DQPSK	2DH5	2956.5	106.67	315.37	≤ 400	Pass
8-DPSK	3DH5	2956.5	106.67	315.37	≤ 400	Pass

GFSK Modulation

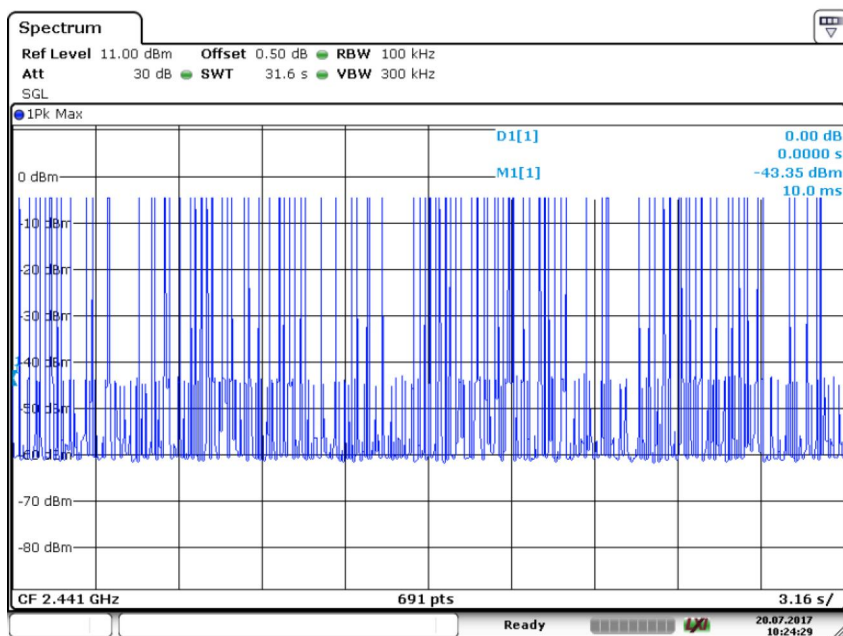
DH5



Date: 20.JUL.2017 10:27:47



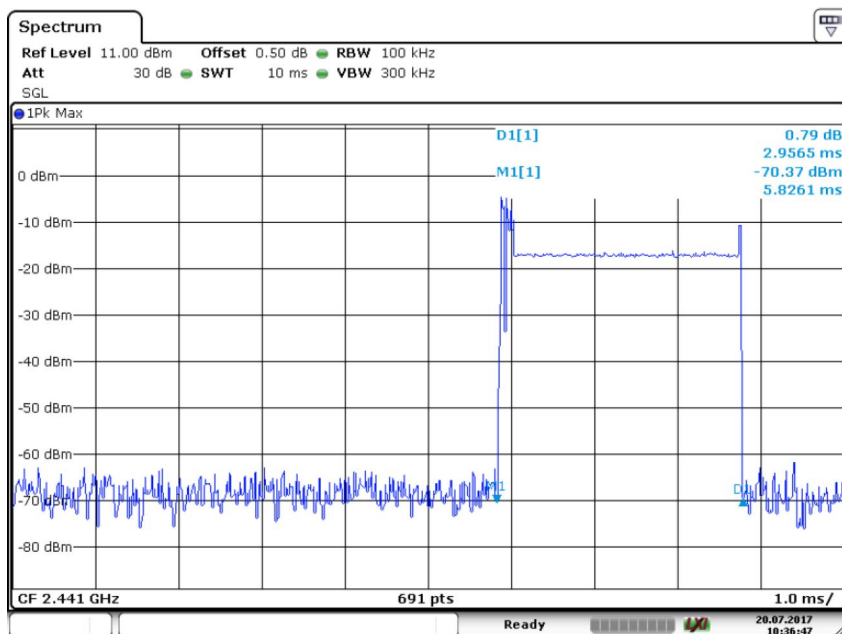
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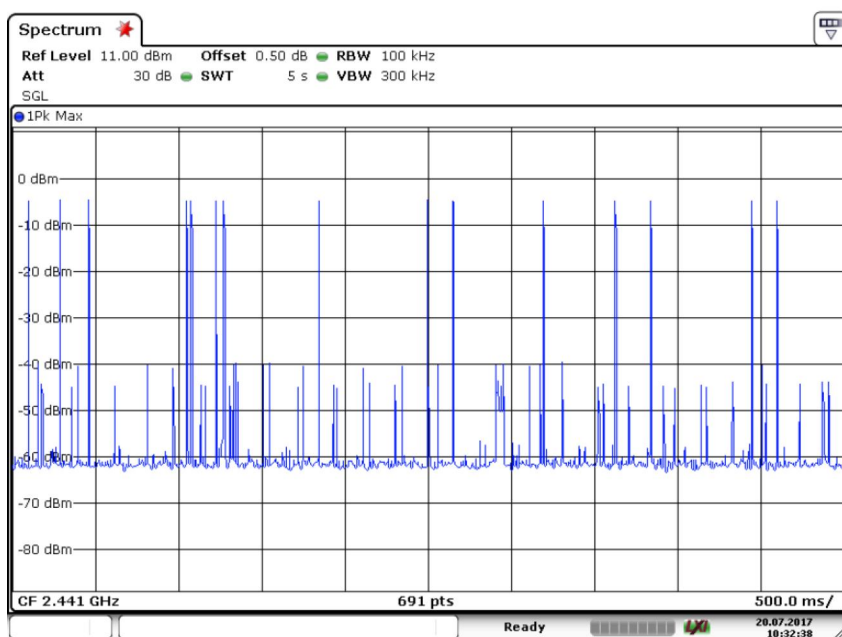
Date: 20.JUL.2017 10:24:29

$\pi/4$ -DQPSK Modulation

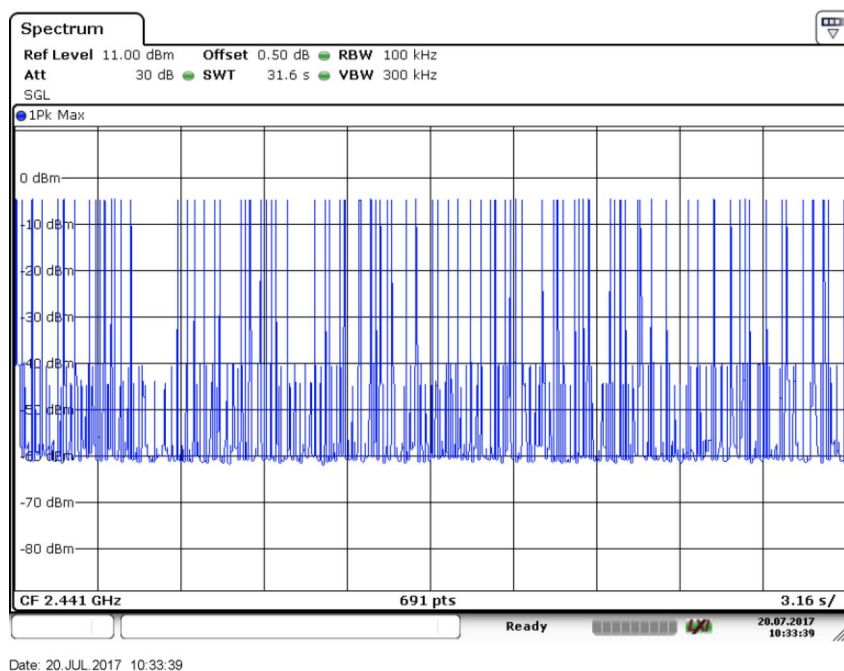
2DH5



Date: 20.JUL.2017 10:36:48

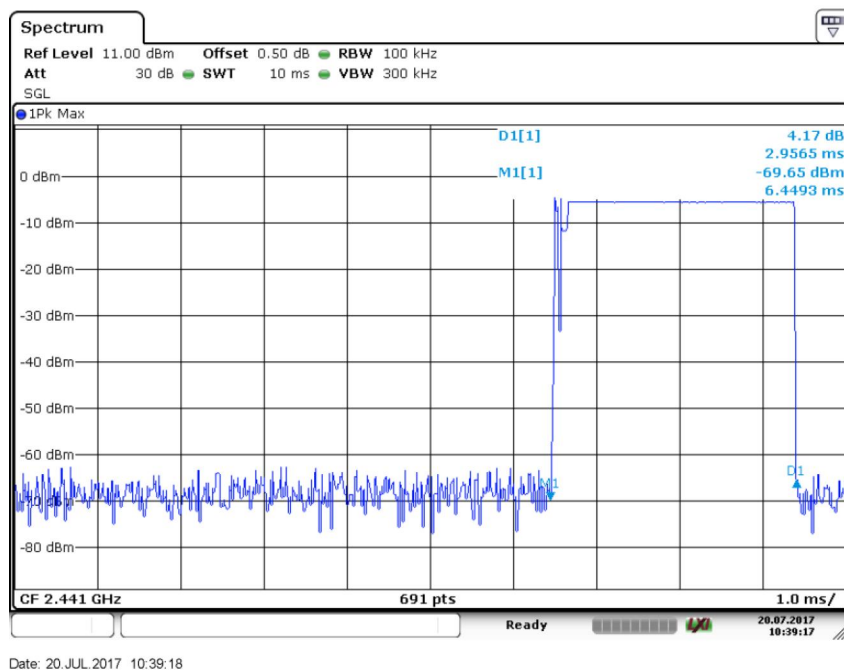


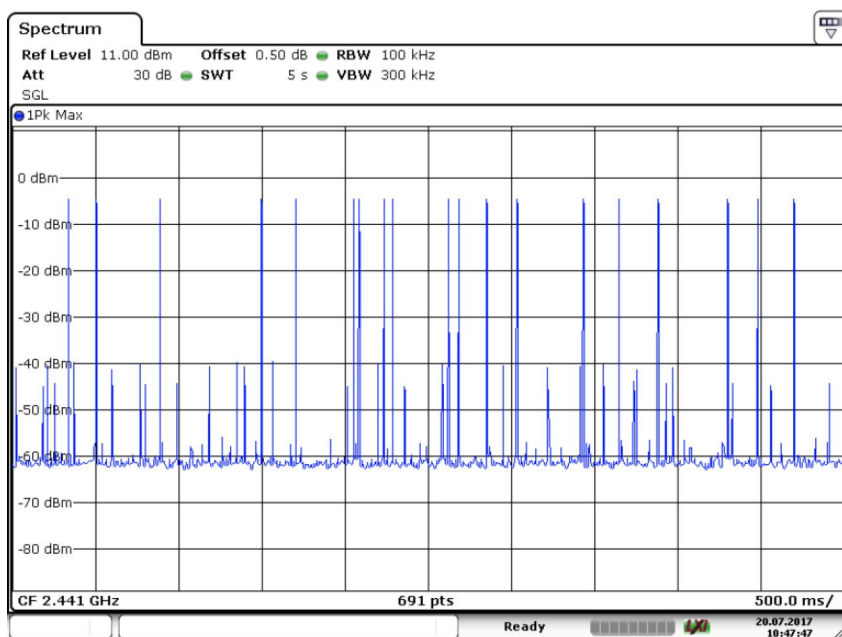
Date: 20.JUL.2017 10:32:38



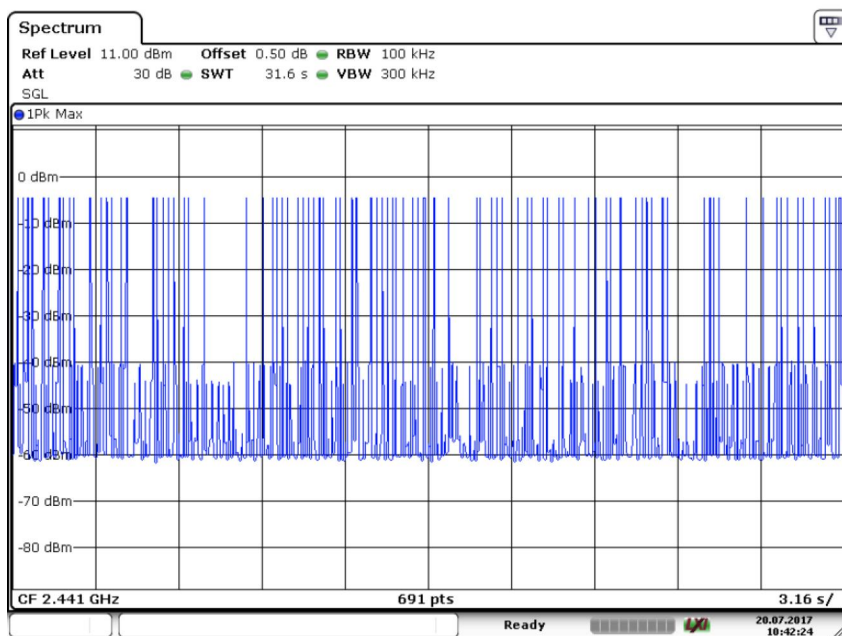
8-DPSK Modulation

3DH5





Date: 20.JUL.2017 10:47:47



Date: 20.JUL.2017 10:42:24

9.7 Spurious RF conducted emissions

Test Method

1. Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
RBW = 100 kHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
3. The level displayed must comply with the limit specified in this Section. Submit these plots.
4. Repeat above procedures until all frequencies measured were complete.

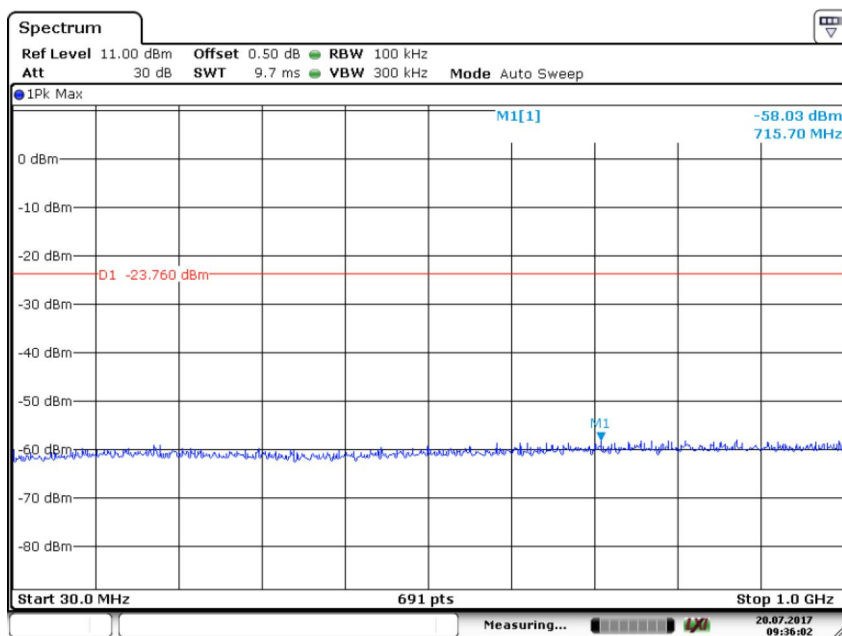
Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

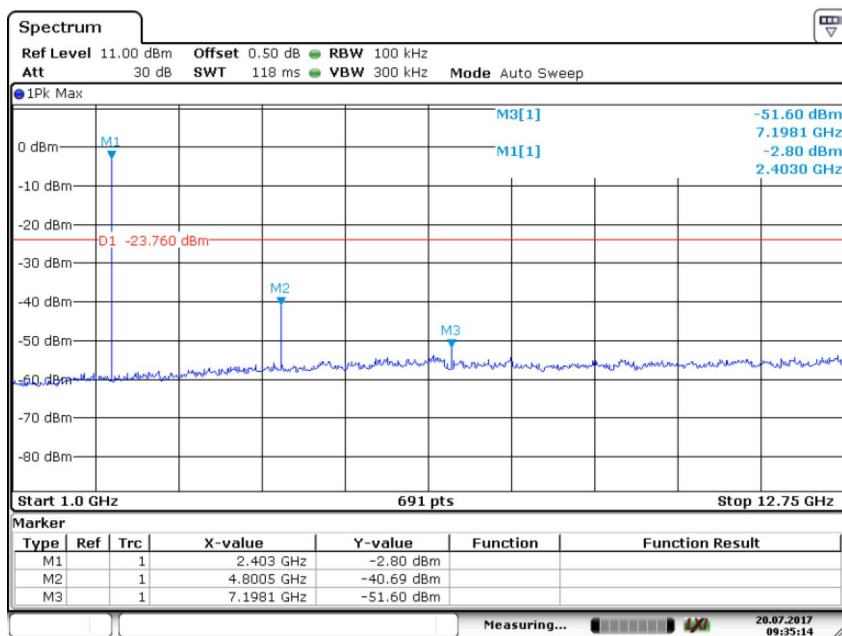
Spurious RF conducted emissions

Only the worst case ($\pi/4$ -DQPSK mode) test result is listed in the report.

2402MHz



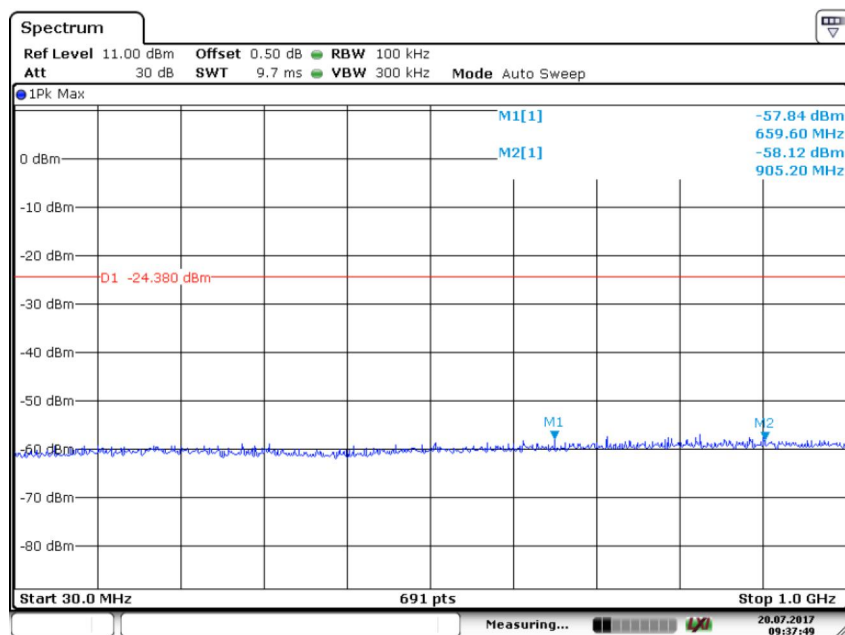
Date: 20.JUL.2017 09:36:02



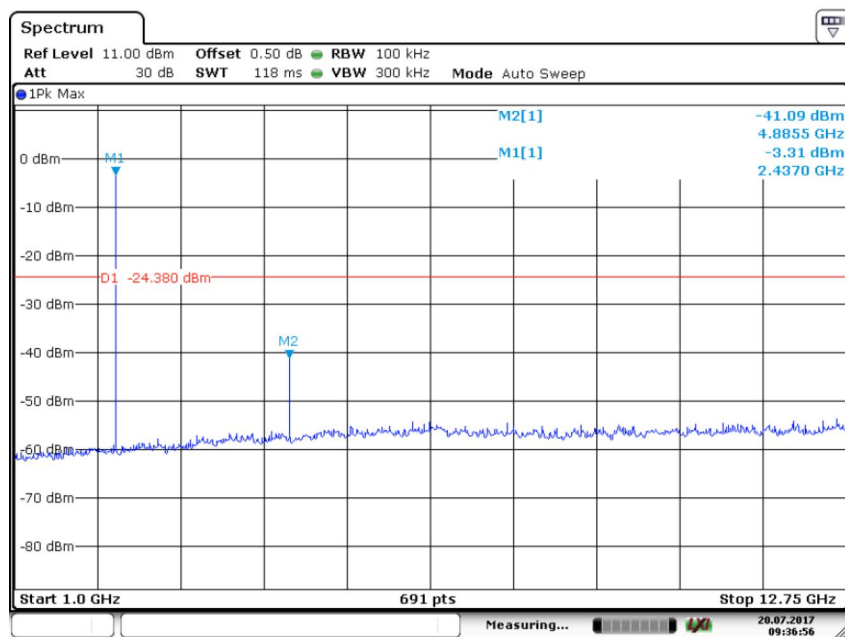
Date: 20.JUL.2017 09:35:14

Spurious RF conducted emissions

2441MHz



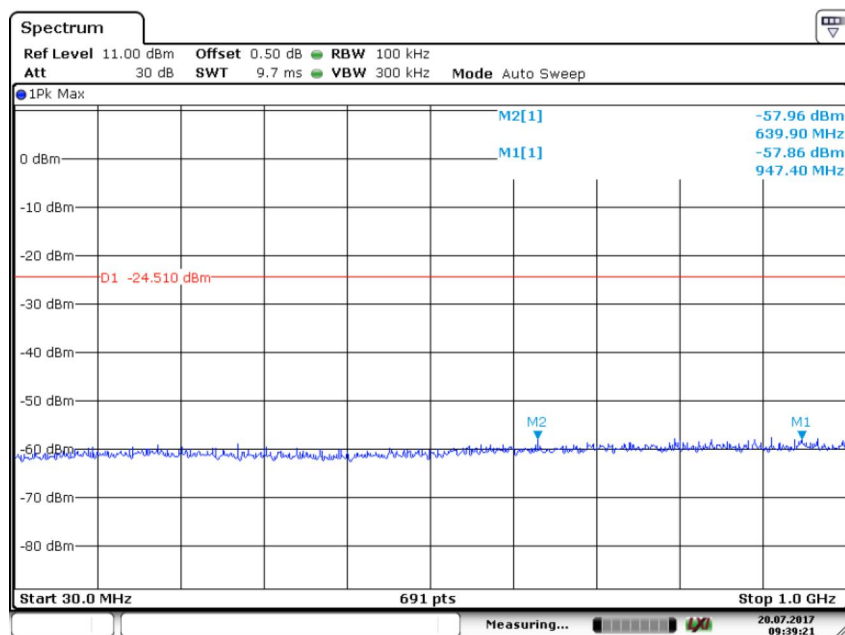
Date: 20.JUL.2017 09:37:49



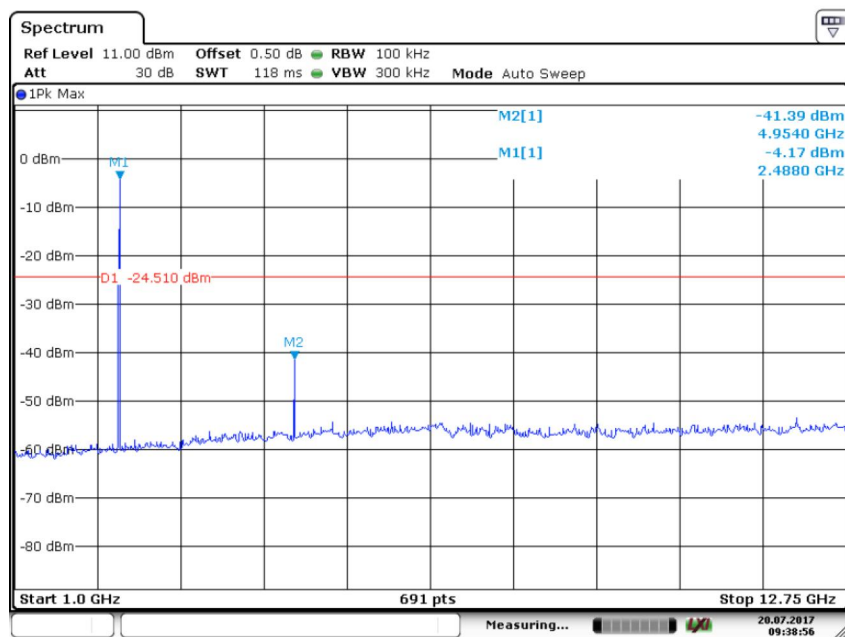
Date: 20.JUL.2017 09:36:55

Spurious RF conducted emissions

2480MHz



Date: 20.JUL.2017 09:39:21



Date: 20.JUL.2017 09:38:57

9.8 Band edge testing

Test Method

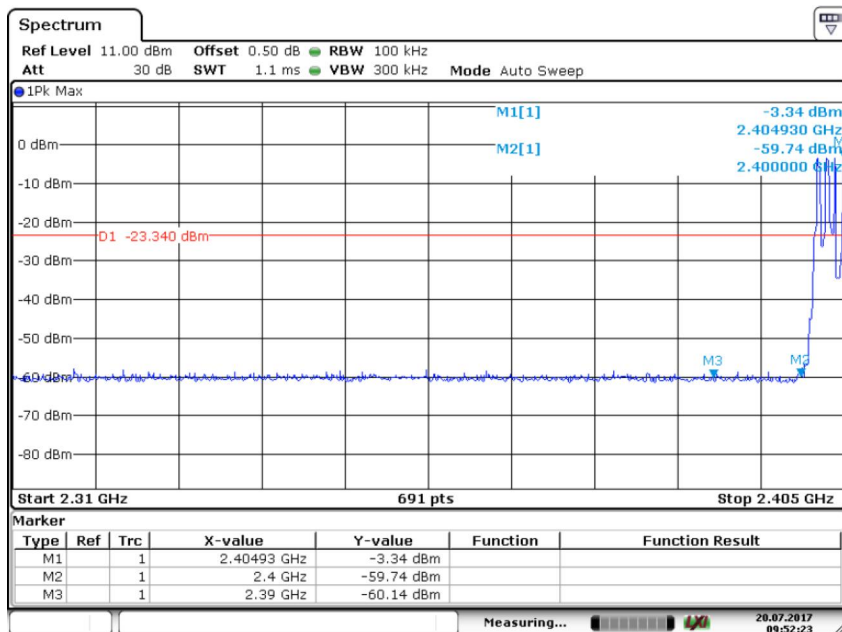
- 1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW \geq RBW, Sweep = auto, Detector function = peak, Trace = max hold
- 2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
- 3 The level displayed must comply with the limit specified in this Section. .
- 4 Repeat the test at the hopping off and hopping on mode, submit all the plots.

Limit:

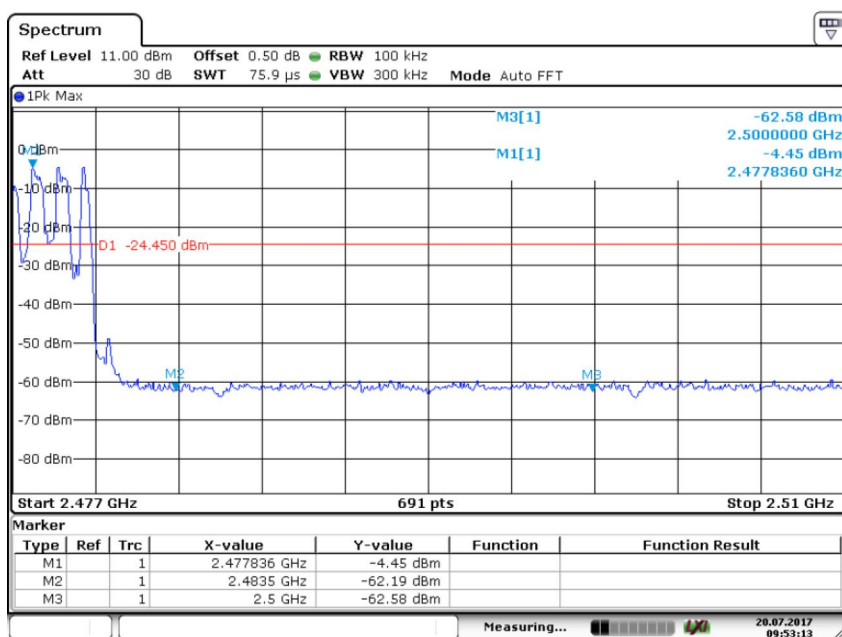
According to §15.247(d) and RSS-247 clause 5.5, in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) and RSS-Gen7.2.2, must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)) and RSS-Gen.

Band edge testing

GFSK Modulation Test Result:
Hopping on mode:



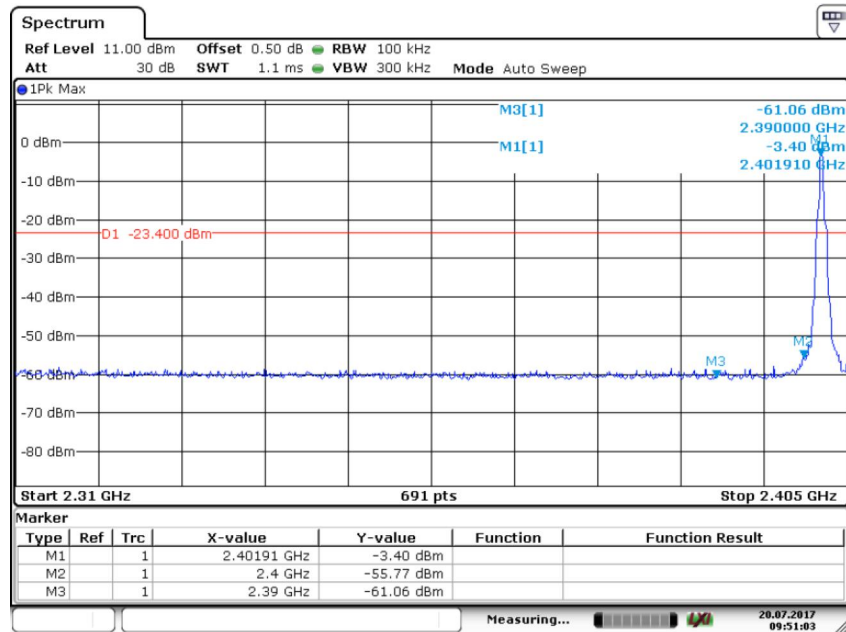
Date: 20.JUL.2017 09:52:23



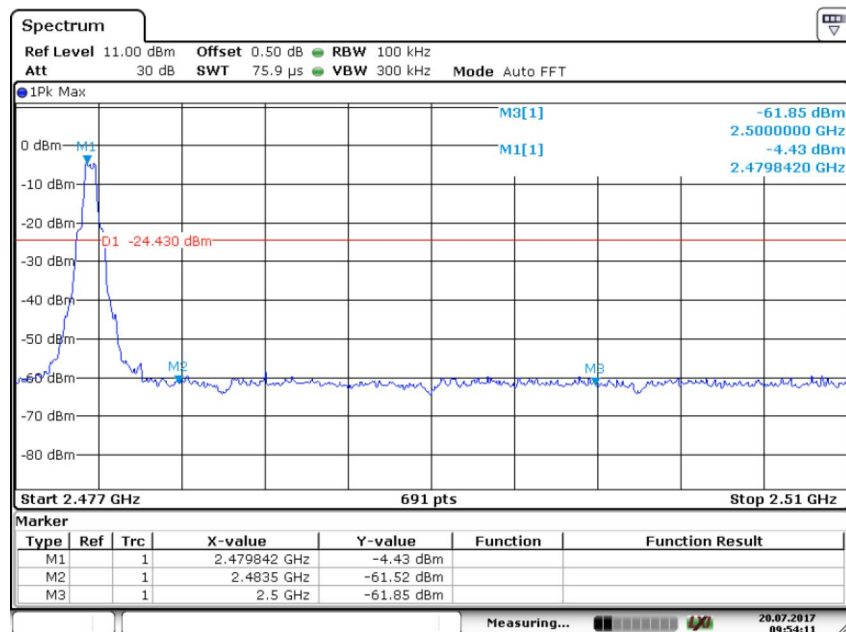
Date: 20.JUL.2017 09:53:14

Band edge testing

Hopping off mode:



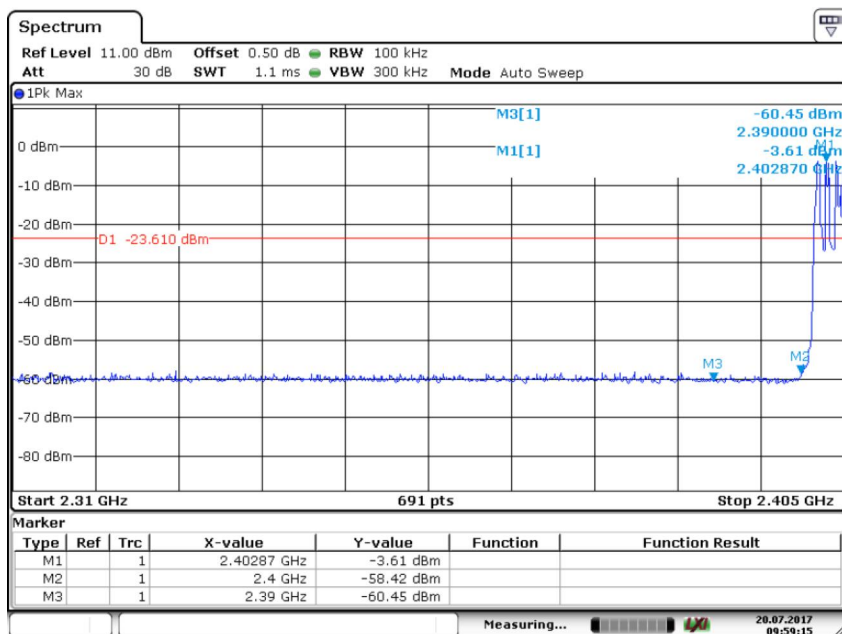
Date: 20.JUL.2017 09:51:04



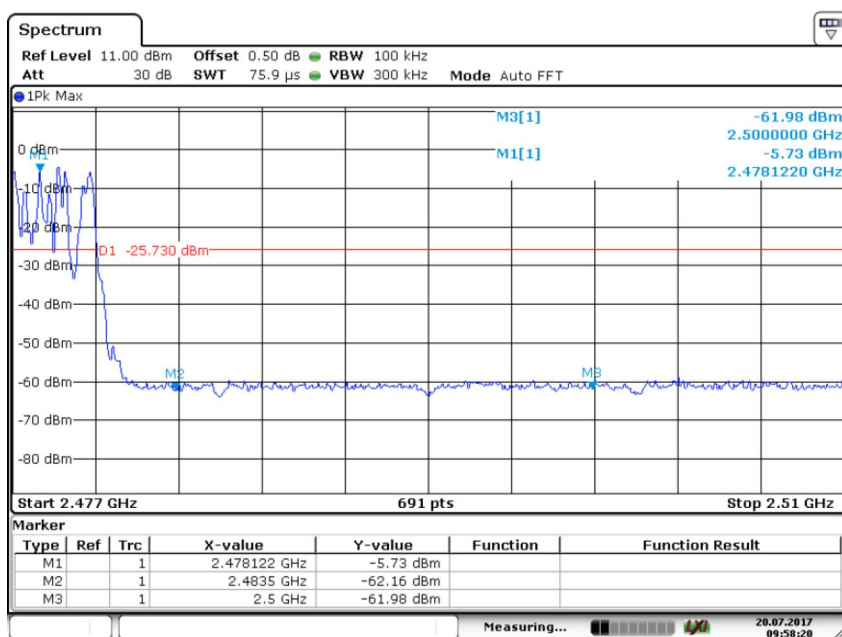
Date: 20.JUL.2017 09:54:11

Band edge testing

$\pi/4$ -DQPSK Modulation Test Result:
Hopping on mode:



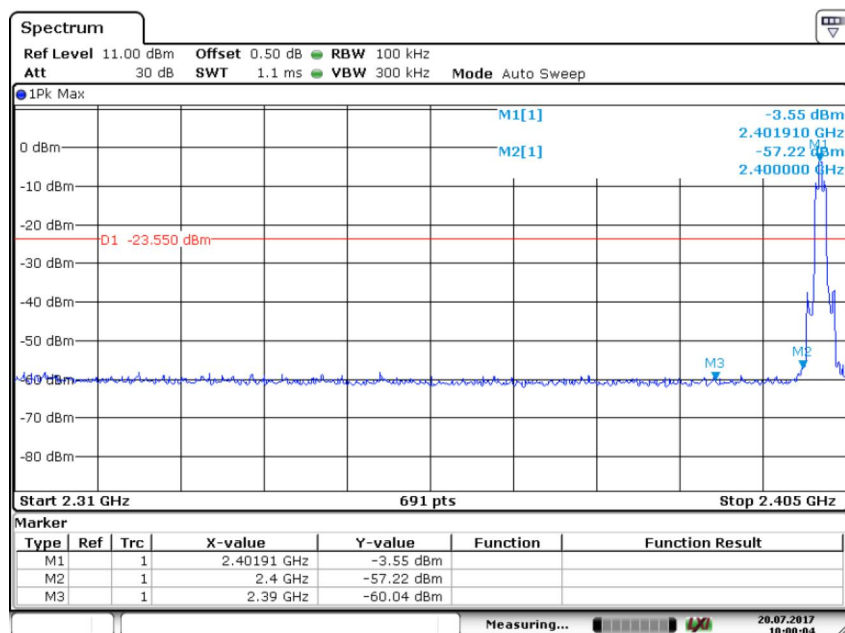
Date: 20.JUL.2017 09:59:16



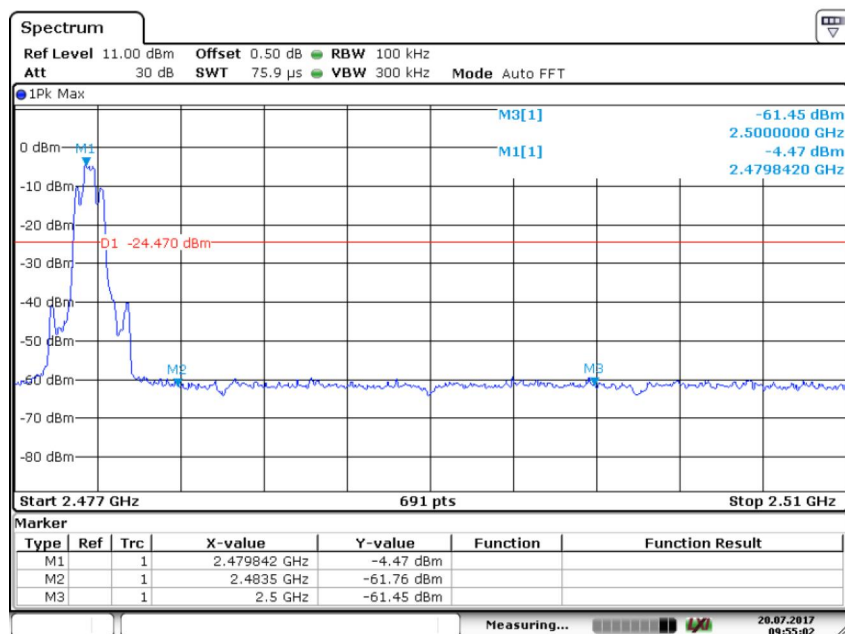
Date: 20.JUL.2017 09:58:20

Band edge testing

Hopping off mode:



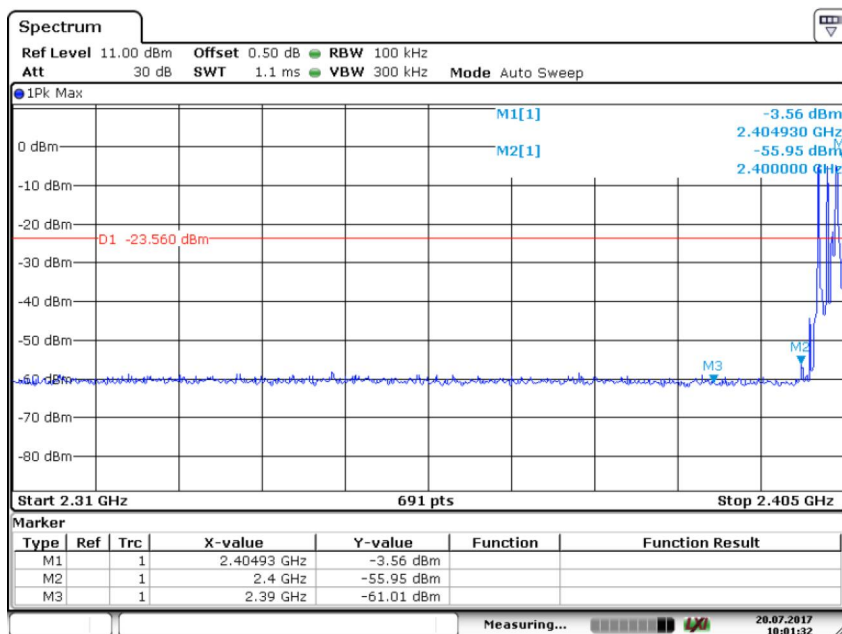
Date: 20.JUL.2017 10:00:04



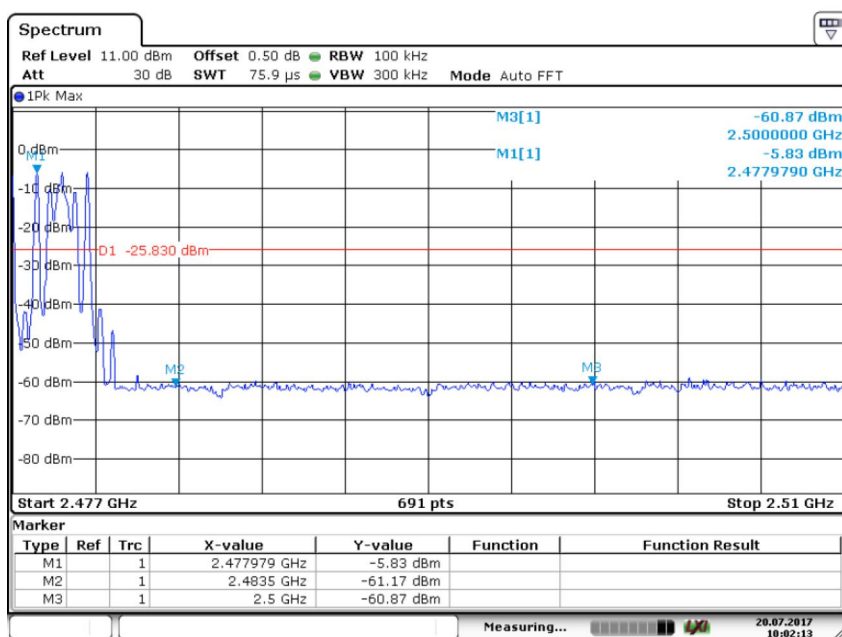
Date: 20.JUL.2017 09:55:02

Band edge testing

8DPSK Modulation Test Result:
Hopping on mode:



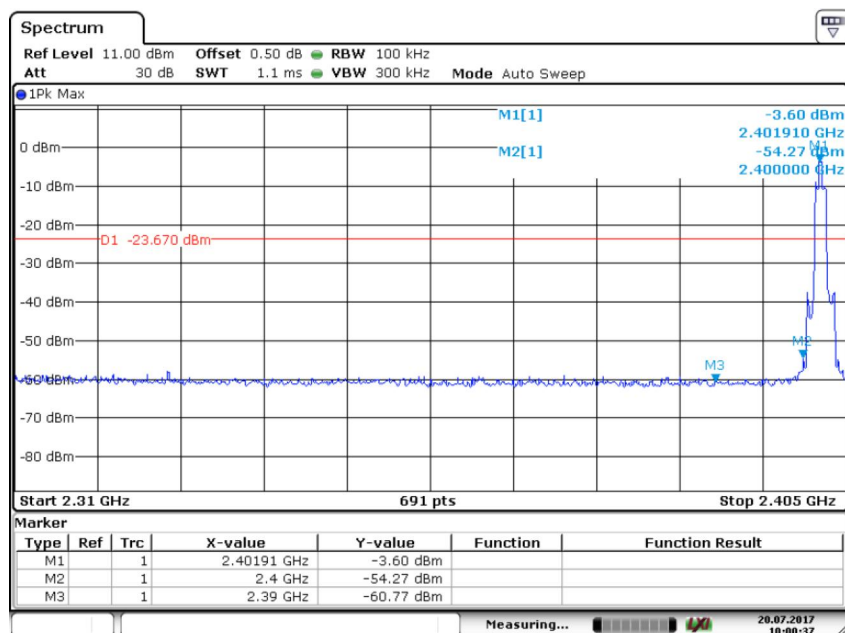
Date: 20.JUL.2017 10:01:32



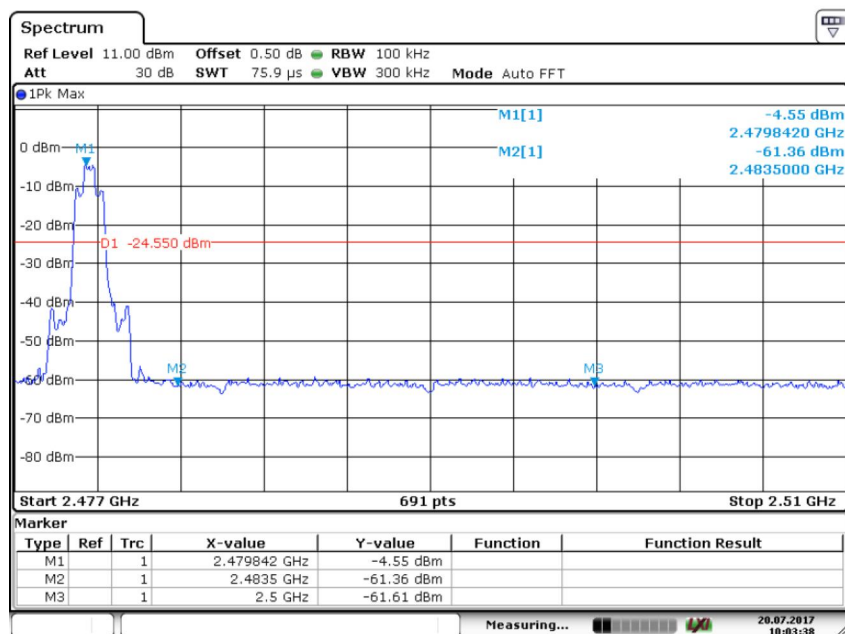
Date: 20.JUL.2017 10:02:13

Band edge testing

Hopping off mode:



Date: 20.JUL.2017 10:00:38



Date: 20.JUL.2017 10:03:38

9.9 Spurious radiated emissions for transmitter and receiver

Test Method

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
3. Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for $f \geq 1\text{GHz}$, 100 kHz for $f < 1\text{GHz}$, VBW \geq RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc.
The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the duty cycle per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from $20\log(\text{duty cycle}/100\text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Limit

According to part 15.247(d), the radio emission outside the operating frequency band 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. Radiated emissions which fall in the restricted bands, as defined in section 15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBμV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

Spurious radiated emissions for transmitter and receiver

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

The only worse case (GFSK mode) test result is listed in the report.

Transmitting spurious emission test result as below:

Emission below 1GHz

Frequency (MHz)	QP (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
33.233333	28.58	40.00	11.42	H	-26.5
53.603333	26.65	40.00	13.35	H	-26.3
74.943333	22.80	40.00	17.20	H	-31.9
171.458333	30.72	43.50	12.78	H	-31.3
270.991111	25.95	46.00	20.05	H	-22.8
31.724444	34.00	40.00	6.00	V	-26.5
53.603333	32.12	40.00	7.88	V	-26.3
64.866111	32.01	40.00	7.99	V	-29.2
171.404444	27.68	43.50	15.82	V	-31.3
288.020000	31.15	46.00	14.85	V	-22.9

Emission above 1GHz:

Bluetooth Mode GFSK Modulation 2402MHz Test Result

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
1314.625000	24.91	74.00	49.09	V	-11.9
1806.937500	26.95	74.00	47.05	V	-8.7
2214.625000	30.81	74.00	43.19	V	-6.9
2401.812500	30.43	74.00	43.57	V	-6.5
2507.187500	30.63	74.00	43.37	V	-6.0
4803.281250	44.39	74.00	29.61	V	1.8
6000.000000	39.37	74.00	34.63	V	3.4
11050.31250	41.59	74.00	32.41	V	10.0
1192.687500	28.90	74.00	45.10	H	-12.6
2136.187500	29.52	74.00	44.48	H	-7.1
2299.750000	30.82	74.00	43.18	H	-6.7
2401.812500	35.79	74.00	38.21	H	-6.5
4803.281250	46.46	74.00	27.54	H	1.8
7023.750000	38.26	74.00	35.74	H	5.7
9939.375000	41.28	74.00	32.72	H	9.0

Bluetooth Mode GFSK Modulation 2441MHz Test Result

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
1265.750000	26.76	74.00	47.24	V	-12.1
1594.687500	28.83	74.00	45.17	V	-10.2
2177.562500	31.21	74.00	42.79	V	-6.9
2527.312500	29.83	74.00	44.17	V	-6.1
4881.562500	45.38	74.00	28.62	V	1.8
6000.000000	39.43	74.00	34.57	V	3.4
11690.62500	42.02	74.00	31.98	V	10.8
1196.562500	29.06	74.00	44.94	H	-12.6
1595.812500	30.63	74.00	43.37	H	-10.1
2313.875000	30.34	74.00	43.66	H	-6.7
2697.875000	31.23	74.00	42.77	H	-4.9
4881.562500	45.93	74.00	28.07	H	1.8
7417.500000	38.80	74.00	35.20	H	6.1
15004.21875	47.76	74.00	26.24	H	18.4

Bluetooth Mode GFSK Modulation 2480MHz Test Result

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
1197.062500	25.21	74.00	48.79	V	-12.6
1407.437500	25.92	74.00	48.08	V	-11.4
2329.562500	30.27	74.00	43.73	V	-6.7
2703.375000	29.97	74.00	44.03	V	-4.9
4959.375000	41.03	74.00	32.97	V	2.0
7994.062500	39.54	74.00	34.46	V	6.9
13624.68750	44.86	74.00	29.14	V	14.2
1129.937500	25.26	74.00	48.74	H	-13.1
1594.062500	32.52	74.00	41.48	H	-10.2
2362.062500	30.80	74.00	43.20	H	-6.6
2583.000000	30.90	74.00	43.10	H	-5.8
4959.375000	45.63	74.00	28.37	H	2.0
8171.250000	39.76	74.00	34.24	H	7.3
13124.06250	43.51	74.00	30.49	H	12.8

Remark:

- (1) AV Emission Level= PK Emission Level+20log(dutycycle)
- (2) Data of measurement within this frequency range shown “-” in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
- (3) “*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

10 Test Equipment List

List of Test Instruments

Conducted Emission Test				
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2018-7-14
LISN	Rohde & Schwarz	ENV216	100326	2018-7-14
Attenuator	Shanghai Huaxiang	TS2-26-3	080928189	2018-7-7
Test software	Rohde & Schwarz	EMC32	Version9.15.00	N/A
Radiated Emission Test				
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2018-7-14
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2018-7-14
Horn Antenna	Rohde & Schwarz	HF907	102294	2018-7-14
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2018-7-14
Signal Generator	Rohde & Schwarz	SMY01	839369/005	2018-7-7
Attenuator	Agilent	8491A	MY39264334	2018-7-7
3m Semi-anechoic chamber	TDK	9X6X6	----	2020-7-14
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A
Conducted RF Test				
Signal Generator	Rohde & Schwarz	SMB100A	108272	2018-7-7
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2018-7-7
Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	2018-7-7
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2018-7-7
Power Splitter	Weinschel	1580	SC319	2018-7-7
10dB Attenuator	Weinschel	56-10	58764	2018-7-14
10dB Attenuator	R&S	DNF	DNF-001	2018-7-14
10dB Attenuator	R&S	DNF	DNF-002	2018-7-14
10dB Attenuator	R&S	DNF	DNF-003	2018-7-14
10dB Attenuator	R&S	DNF	DNF-004	2018-7-14
Test software	Rohde & Schwarz	EMC32	Version 9.26.01	N/A

C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth
- 20dB bandwidth and 99% Occupied Bandwidth
- Carrier frequency separation
- Number of hopping frequencies
- Dwell Time
- Power spectral density*
- Spurious RF conducted emissions
- Band edge

11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty

Items	Extended Uncertainty
Radiated spurious emission	4.32dB (30MHz-1GHz) 2.27dB (1GHz -25GHz)
Conducted spurious emission	2.10dB(30MHz-25GHz)
Bandwidth test	1×10^{-9}
Conducted emission	2.4dB