FCC/IC - TEST REPORT

Report Number	:	**68.950.20.0697.01**	Date of Issue:	November 26, 2020
Model	:	Levia Black, Fabula Crystal Brown, Memor Havana, Spiro Transparent Brown		
Product Type	:	Fauna Audio Glasses		
Applicant	:	Fauna Audio GmbH		
Address	:	Kratkystraße 2, 8020 Graz, Steiermark, Austria		
Factory	:	Shenzhen 3nod Digital Technology Co., Ltd		
Address	:	401, ZONE 101A, WORKSHOP 15, ZHONGFU ROAD, TANGXIAYONG		
	:	COMMUNITY, YANLUOSTREET, BAOAN DIRSTRICT, SHENZHEN		
	:	PEOPLE'S REPUBLC OF CHINA		
Test Result	:	**n Positive** **o Negative**		
Total pages including Appendices	:	98		

1 Table of Contents

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 518052 P.R. China
Telephone:	86 755 8828 6998
Fax:	86 755 8288 5299
FCC Registration No.:	514049
ISED#:	10320A

3 Description of the Equipment Under Test

Product:	Fauna Audio Glasses
Model no/HVIN/PMN:	Levia Black, Fabula Crystal Brown, Memor Havana, Spiro Transparent Brown
FVIN:	Levia Black, Fabula Crystal Brown, Memor Havana, Spiro Transparent Brown
FCC ID	2AX3H-FAUNAWEAR
IC:	26691-FAUNAWEAR
Options and accessories:	Type-C Cable, Charging Box
Rating:	Left: 3.7Vdc, 100mAh (Supply by rechargeable battery) Right: 3.7Vdc, 100mAh (Supply by rechargeable battery)
RF Transmission Frequency:	2402MHz-2480MHz
No. of Operated Channel:	79
Modulation:	GFSK, π/4-DQPSK, 8-DPSK
Antenna Type:	FPC antenna
Antenna Gain:	0.5dBi
Description of the EUT:	The Equipment Under Test (EUT) is a Fauna Audio Glasses support Bluetooth function.

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2019 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators
RSS-Gen Issue 5, Amendment 1, March 2019	General Requirements for the Certification of Radio Apparatus
RSS-247 Issue 2 February 2017	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSS) and License-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, KDB558074 D01 v05r02 and ANSI C63.10-2013.

5 Summary of Test Results

Technical Requirements				
FCC Part 15 Subpart C/ RSS-247 Issue 2/RSS-Gen Issue 5				
Test Condition			Test Site	Test Result
§15.207	RSS-GEN 8.8	Conducted emission AC power port	--	N/A
§15.247(b)(1)	RSS-247 Clause 5.4(b)	Conducted peak output power and e.i.r.p.	Site 1	PASS
§15.247(e)	RSS-247 Clause 5.2(b)	Power spectral density*	--	N/A
§15.247(a)(2)	RSS-247 Clause 5.2(a)	6dB bandwidth	--	N/A
§15.247(a)(1)	RSS-247 Clause 5.1(a) & RSS-Gen 6.7	20dB bandwidth and 99% Occupied Bandwidth	Site 1	PASS
§15.247(a)(1)	RSS-247 Clause 5.1(b)	Carrier frequency separation	Site 1	PASS
§15.247(a)(1)(iii)	RSS-247 Clause 5.1(d)	Number of hopping frequencies	Site 1	PASS
§15.247(a)(1)(iii)	RSS-247 Clause 5.1(d)	Dwell Time	Site 1	PASS
§15.247(d)	RSS-247 Clause 5.5	Spurious RF conducted emissions	Site 1	PASS
§15.247(d)	RSS-247 Clause 5.5	Band edge	Site 1	PASS
§15.247(d) & §15.209 & §15.205	RSS-247 Clause 5.5 & RSS-GEN 6.13 RSS-GEN 8.9 RSS-GEN 8.10	Spurious radiated emissions for transmitter and receiver	Site 1	PASS
§15.203	RSS-GEN 6.8	Antenna requirement	See note 2	PASS

Note 1: N/A=Not Applicable.
Note 2: The EUT uses FPC antenna, which gain is 0.5dBi. In accordance to §15.203 and RSS-GEN 6.8, it is considered sufficiently to comply with the provisions of this section.

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AX3H-FAUNAWEAR, IC: 26691-FAUNAWEAR complies with Section 15.205, 15.209, 15.247 of the FCC Part 15, Subpart and RSS-247 issue 2 and RSS-Gen issue 5 rules.

All models are identical except for model name and color. So the tests were applied on Levia Black, other models are deemed to fulfil the requirement without further testing.

Note: The report is for BDR+EDR only.

SUMMARY:

All tests according to the regulations cited on page 6 were

n - Performed

o - **Not** Performed

The Equipment Under Test

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

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

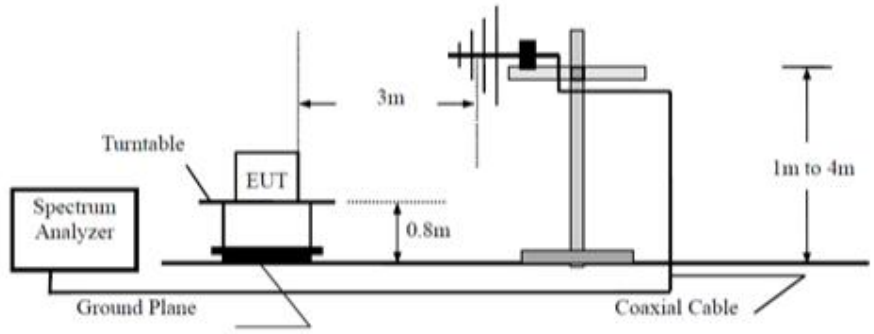
Sample Received Date:	September 21, 2020
Testing Start Date:	September 21, 2020
Testing End Date:	November 6, 2020

Reviewed by:	Prepared by:	Tested by:
John Zhi	Mark Chen	Tree Zhan
EMC Project Manager	EMC Project Engineer	EMC Test Engineer

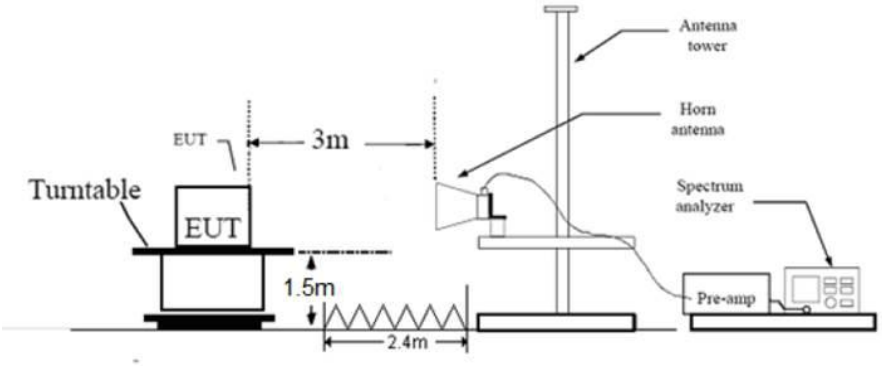
7 Test Setups

7.1 Radiated test setups

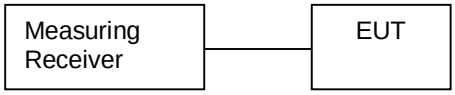
Below 1GHz



Above 1GHz



7.2 Conducted RF test setups



8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
Notebook	Lenovo	X220	---

Test software: Non-Signaling Test 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 peak output power and e.i.r.p.

Test Method

1. Use the following spectrum analyzer settings:
   Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel
   RBW > the 20dB 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

Conducted Peak Output Power:

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

For e.i.r.p.:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤4	≤36

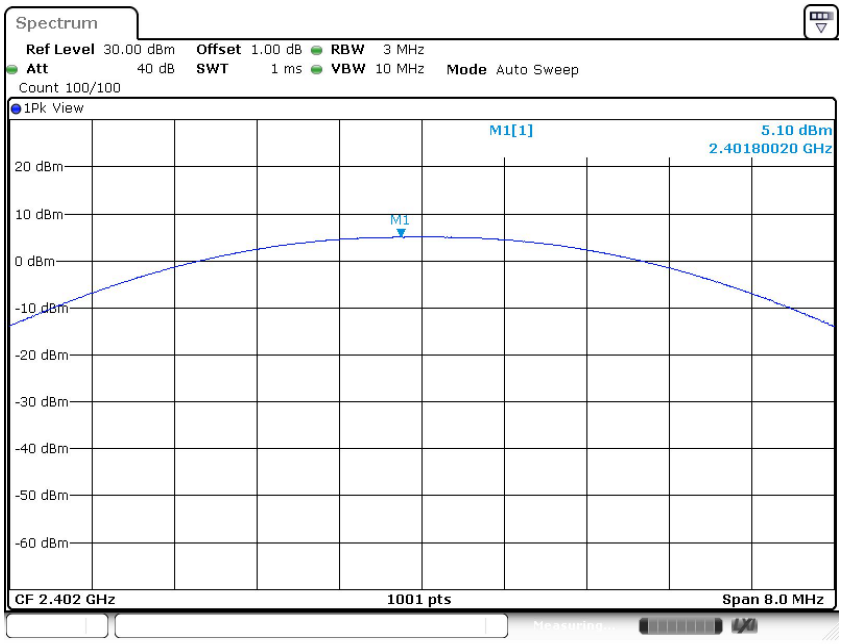
Conducted peak output power

Left Side

Bluetooth Mode GFSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	e.i.r.p. dBm	Result
Low channel 2402MHz	5.1	5.6	Pass
Middle channel 2441MHz	4.99	5.49	Pass
High channel 2480MHz	4.79	5.29	Pass

Low channel 2402MHz



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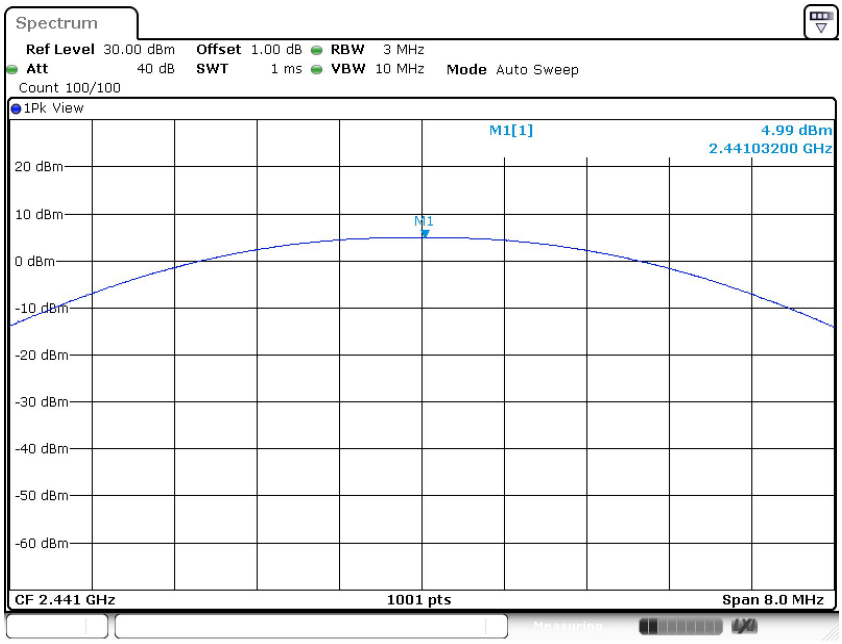
Middle channel 2441MHz



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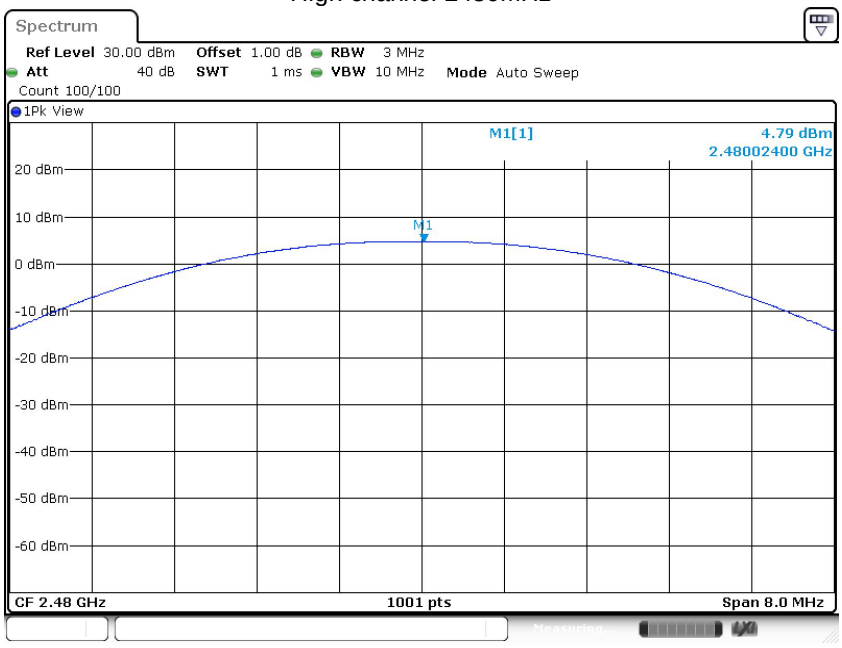
High channel 2480MHz



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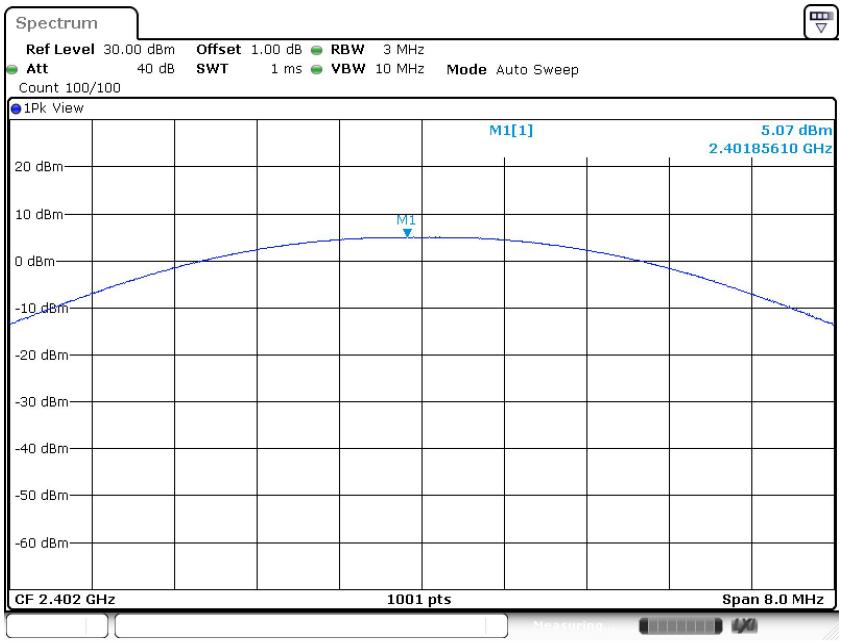
Bluetooth Mode π/4-DQPSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	e.i.r.p. dBm	Result
Low channel 2402MHz	5.07	5.57	Pass
Middle channel 2441MHz	4.96	5.46	Pass
High channel 2480MHz	4.77	5.27	Pass

Low channel 2402MHz



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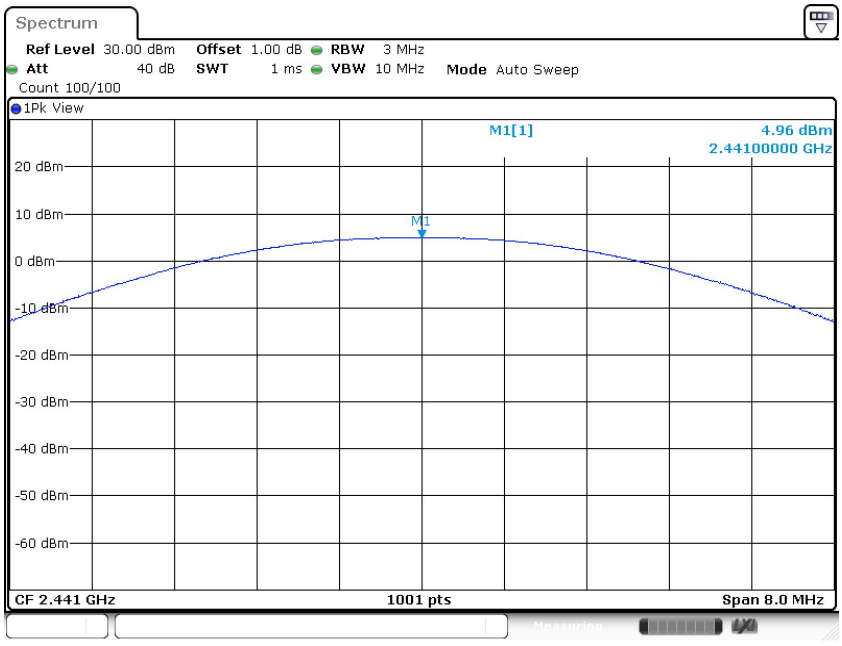
Middle channel 2441MHz



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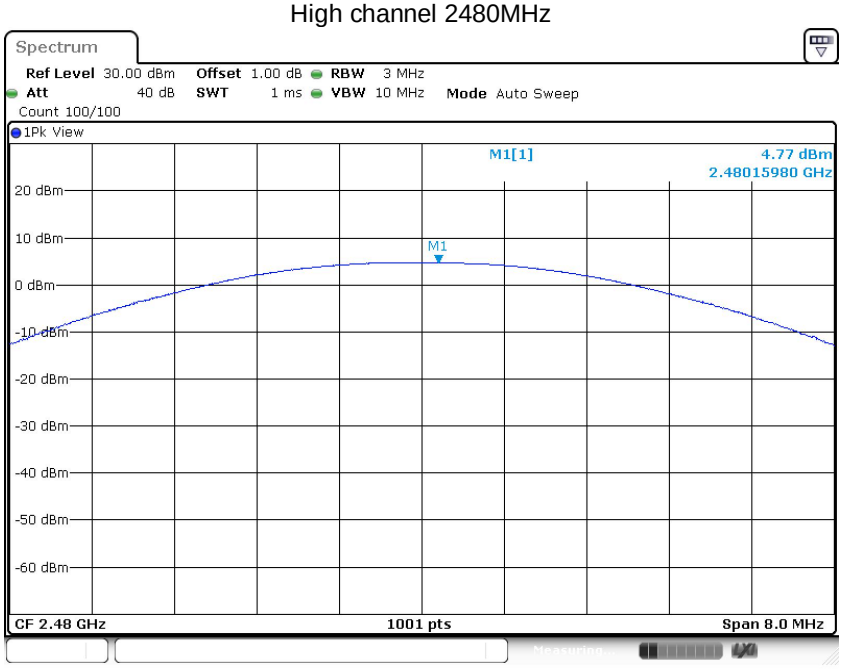
High channel 2480MHz



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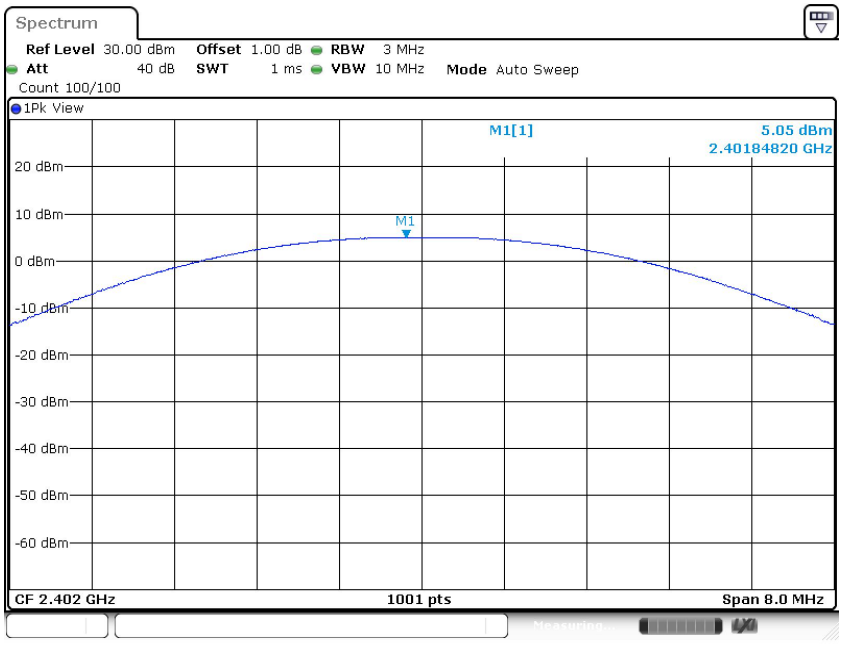
Bluetooth Mode 8DPSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	e.i.r.p. dBm	Result
Low channel 2402MHz	5.05	5.55	Pass
Middle channel 2441MHz	4.93	5.43	Pass
High channel 2480MHz	4.75	5.25	Pass

Low channel 2402MHz



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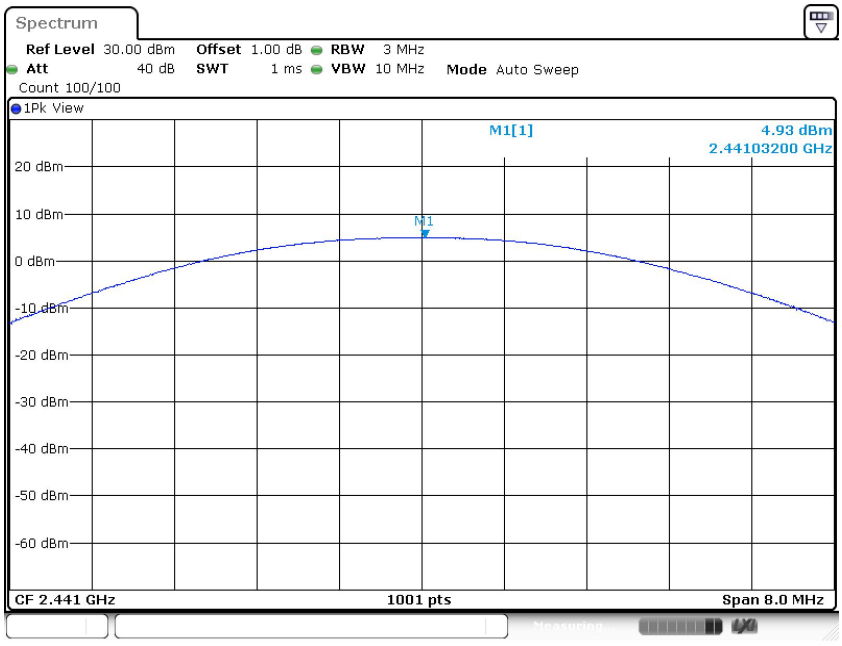
Middle channel 2441MHz



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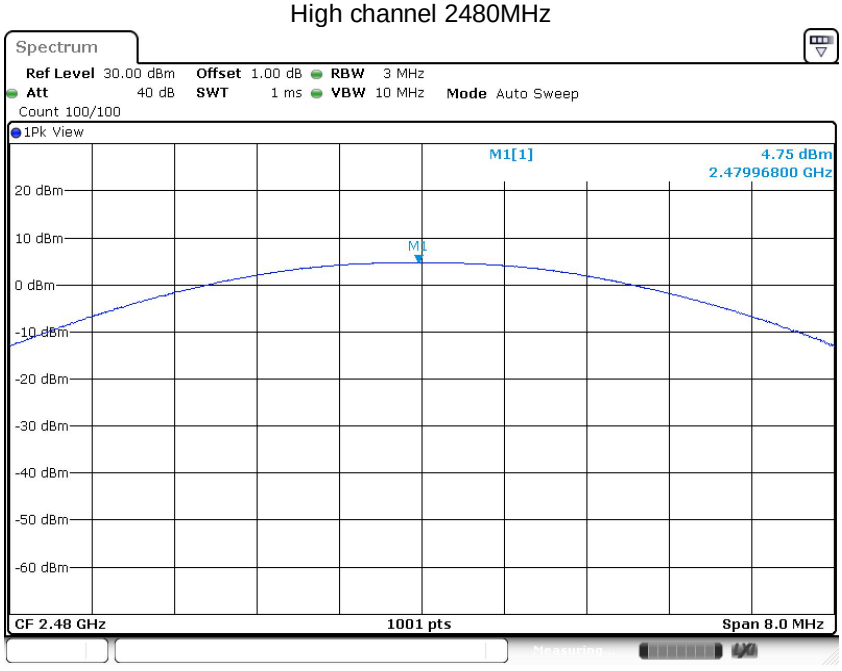
High channel 2480MHz



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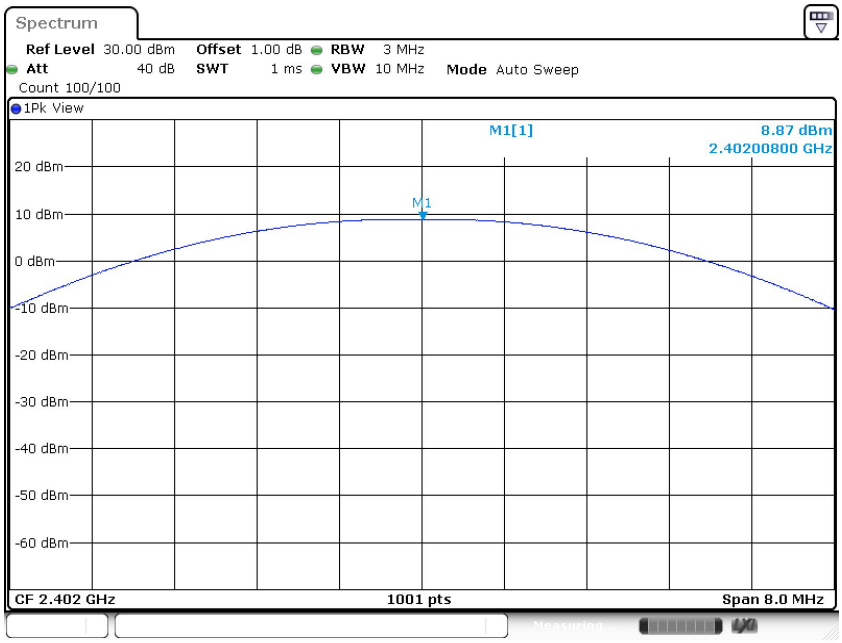
Right Side

Bluetooth Mode GFSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	e.i.r.p. dBm	Result
Low channel 2402MHz	8.87	9.37	Pass
Middle channel 2441MHz	8.85	9.35	Pass
High channel 2480MHz	9.21	9.71	Pass

Low channel 2402MHz



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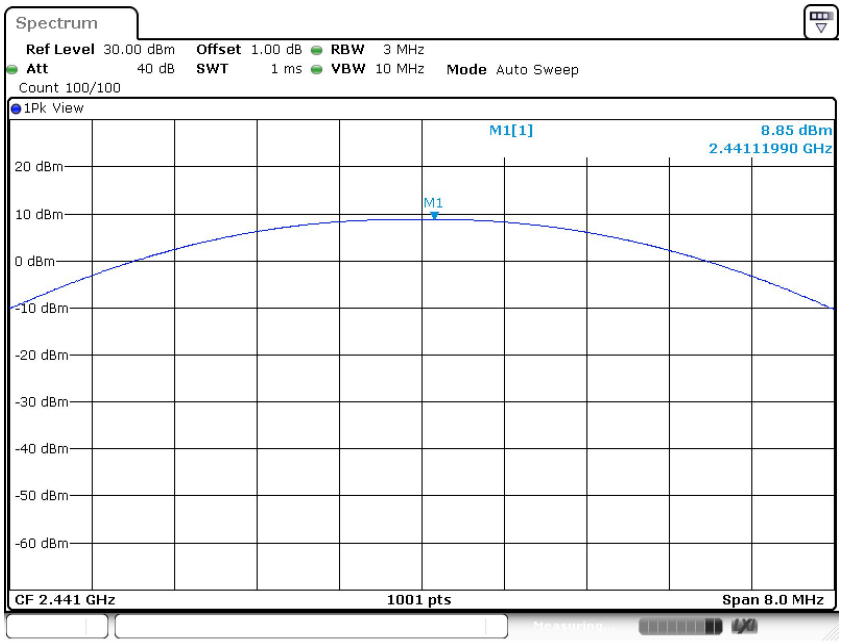
Middle channel 2441MHz



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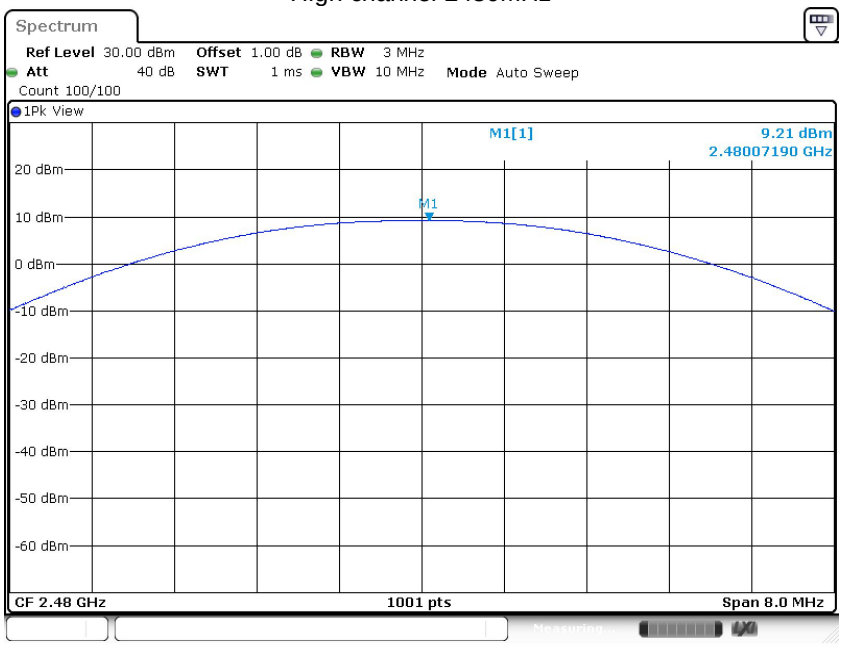
High channel 2480MHz



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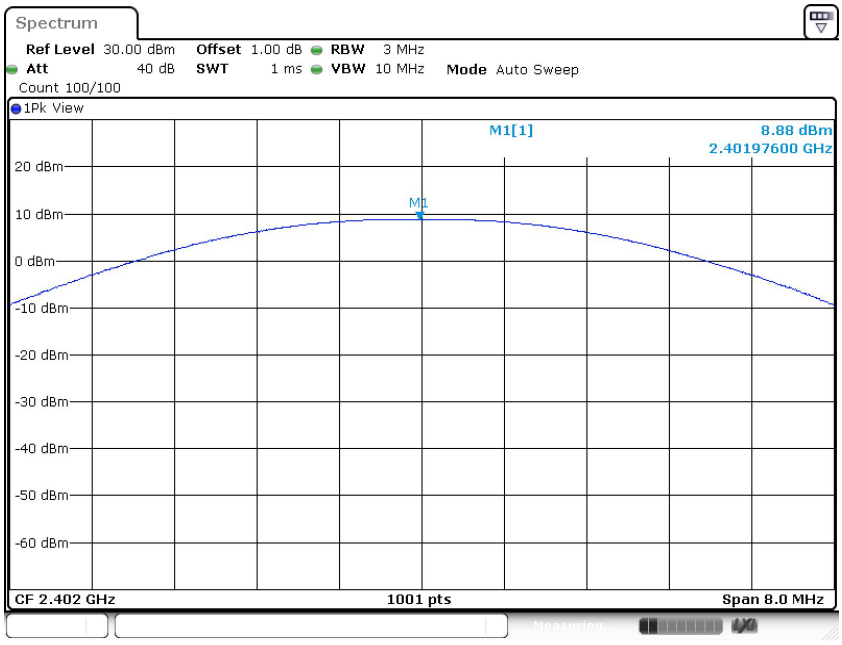
Bluetooth Mode π/4-DQPSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	e.i.r.p. dBm	Result
Low channel 2402MHz	8.88	9.38	Pass
Middle channel 2441MHz	8.86	9.36	Pass
High channel 2480MHz	9.21	9.71	Pass

Low channel 2402MHz



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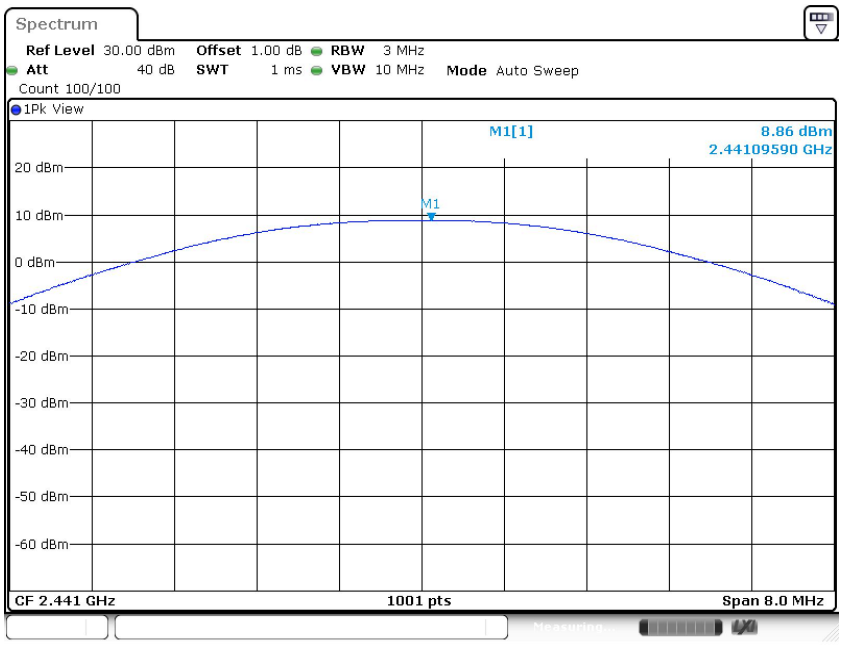
Middle channel 2441MHz



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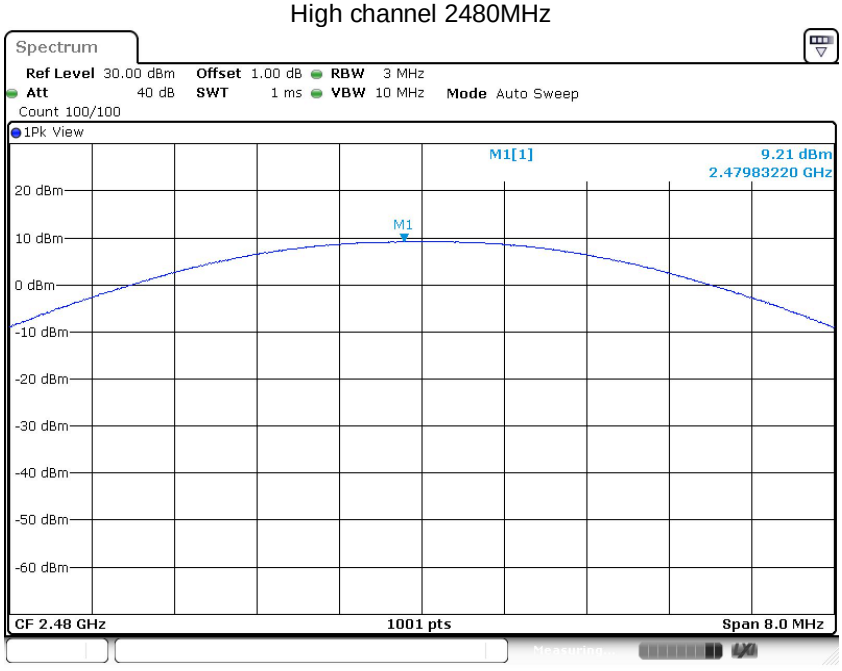
High channel 2480MHz



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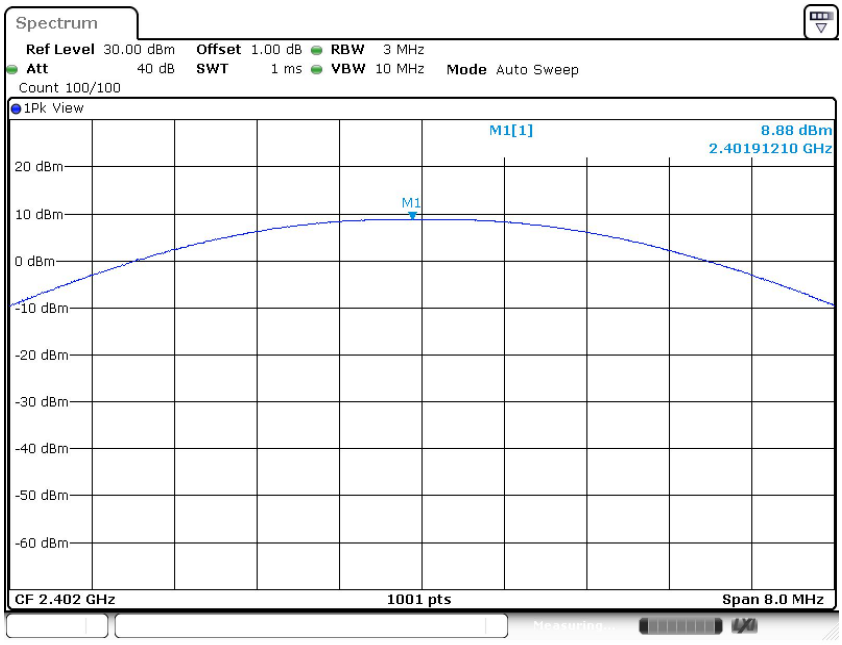
Bluetooth Mode 8DPSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	e.i.r.p. dBm	Result
Low channel 2402MHz	8.88	9.38	Pass
Middle channel 2441MHz	8.86	9.36	Pass
High channel 2480MHz	9.22	9.72	Pass

Low channel 2402MHz



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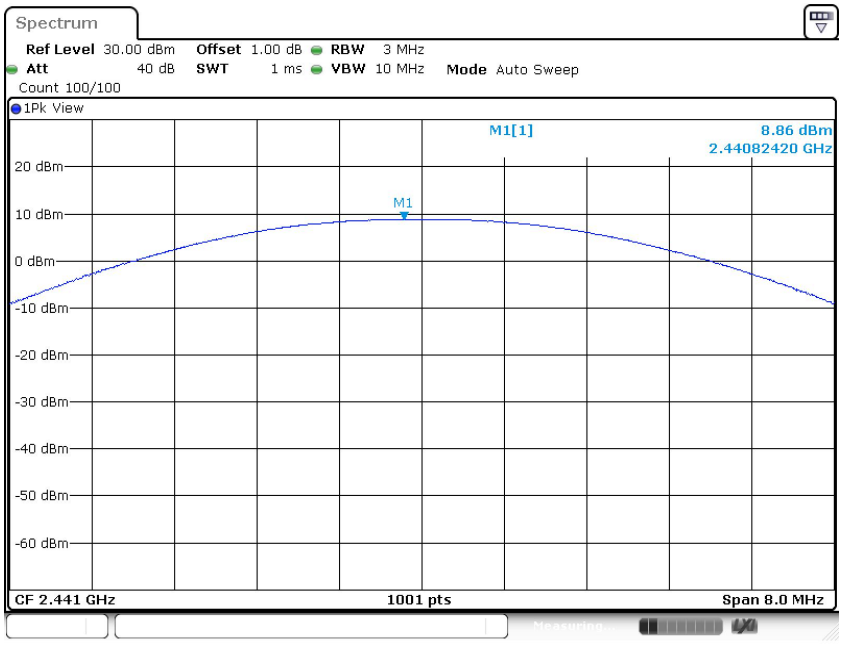
Middle channel 2441MHz



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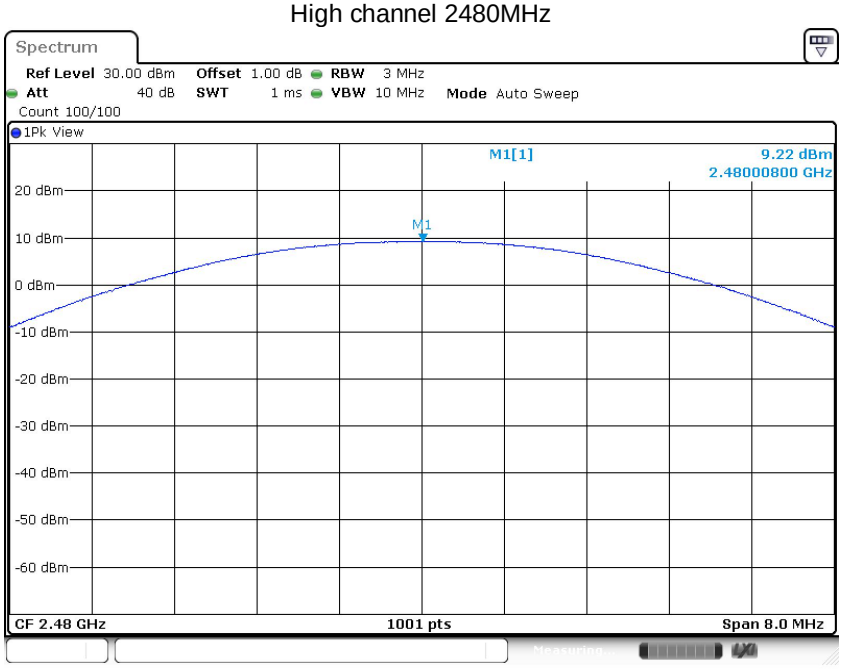
High channel 2480MHz



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9.2 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

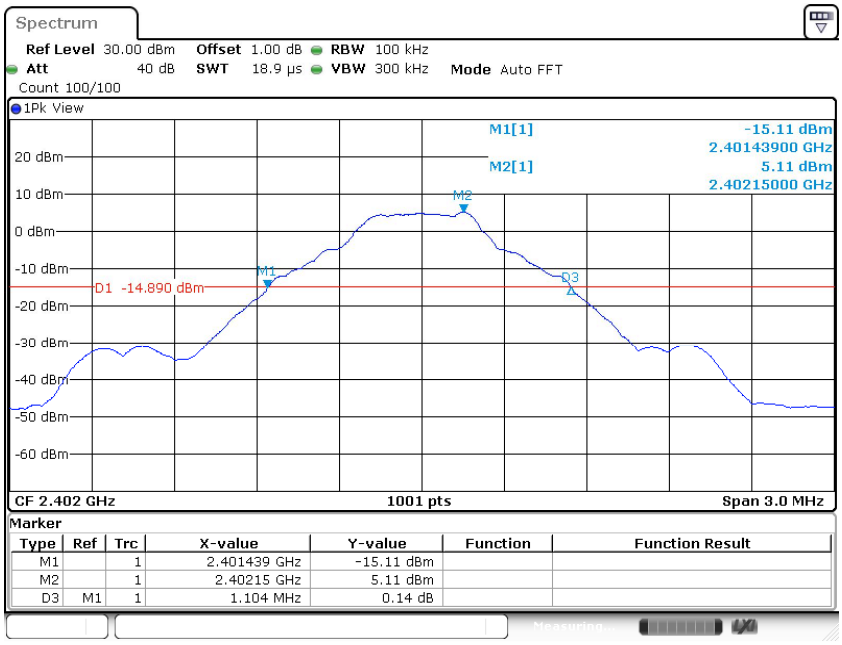
20 dB bandwidth and 99% Occupied Bandwidth

Left Side

Bluetooth Mode GFSK Modulation test result

Frequency	20 dB Bandwidth	99% Bandwidth	Limit	Result
MHz	kHz	kHz	kHz	
2402	1104	920	--	Pass
2441	1104	929	--	Pass
2480	1101	920	--	Pass

Low channel 2402MHz



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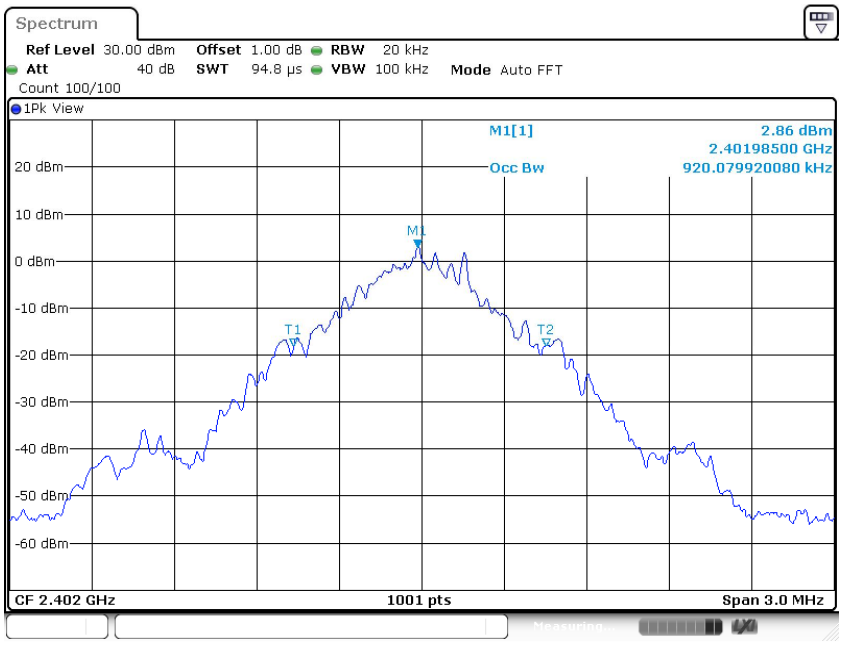

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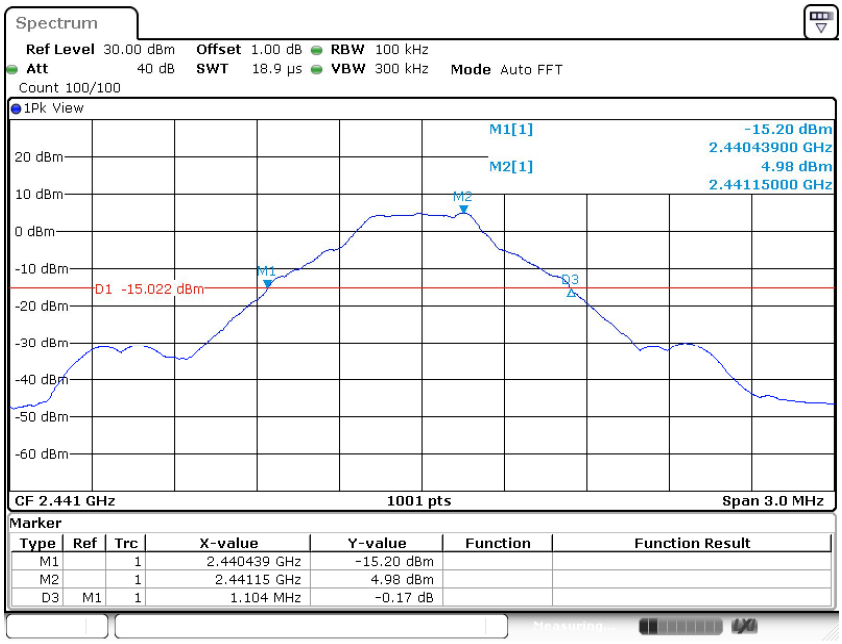
Middle channel 2441MHz



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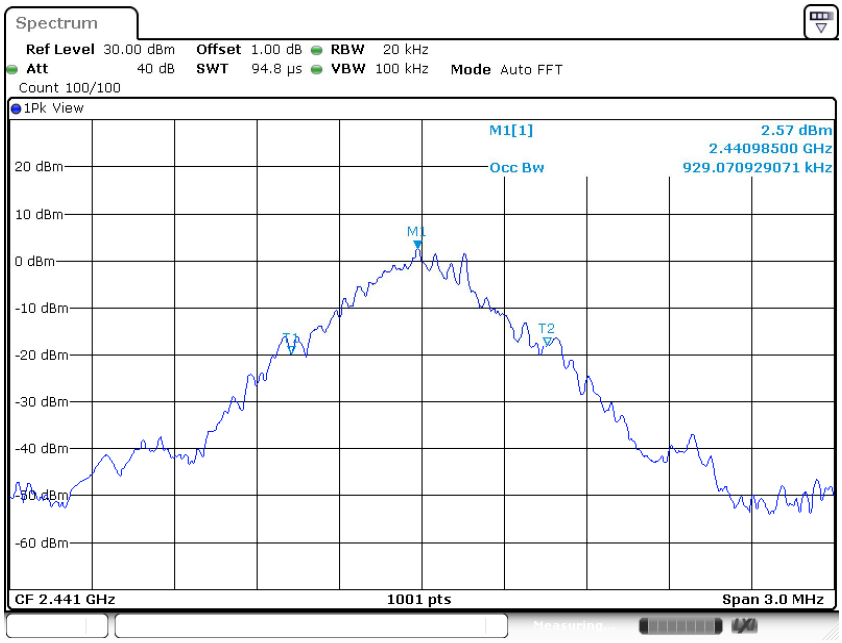

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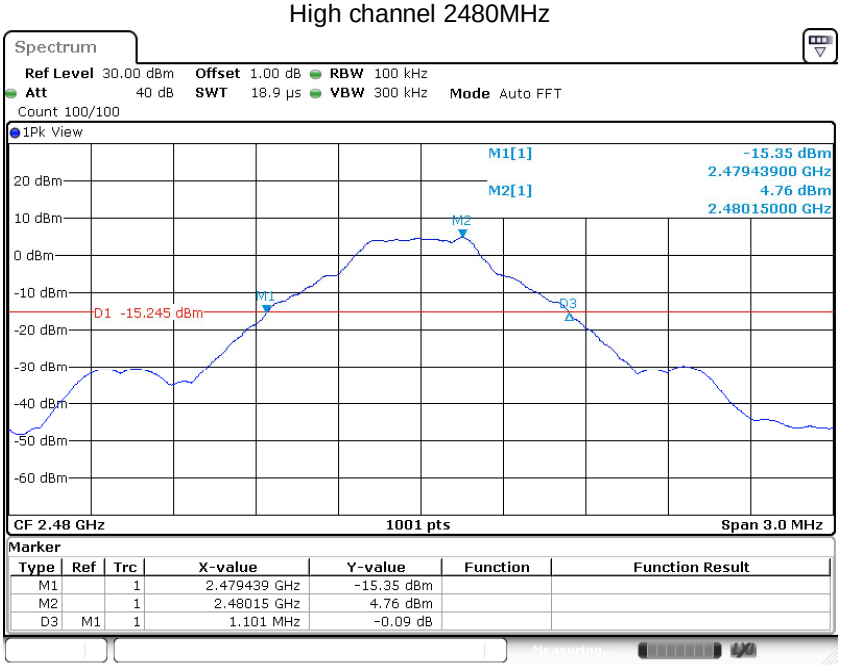
High channel 2480MHz



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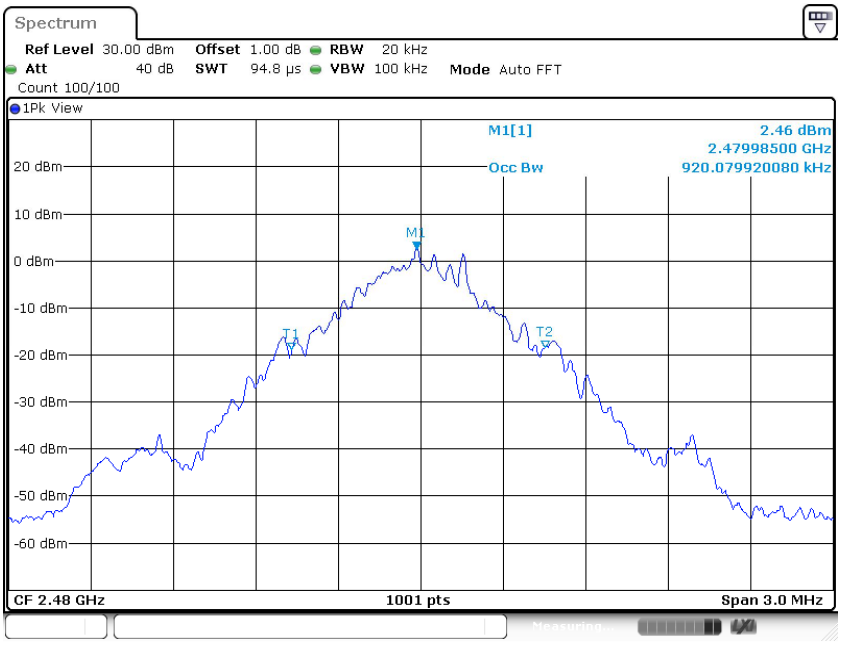

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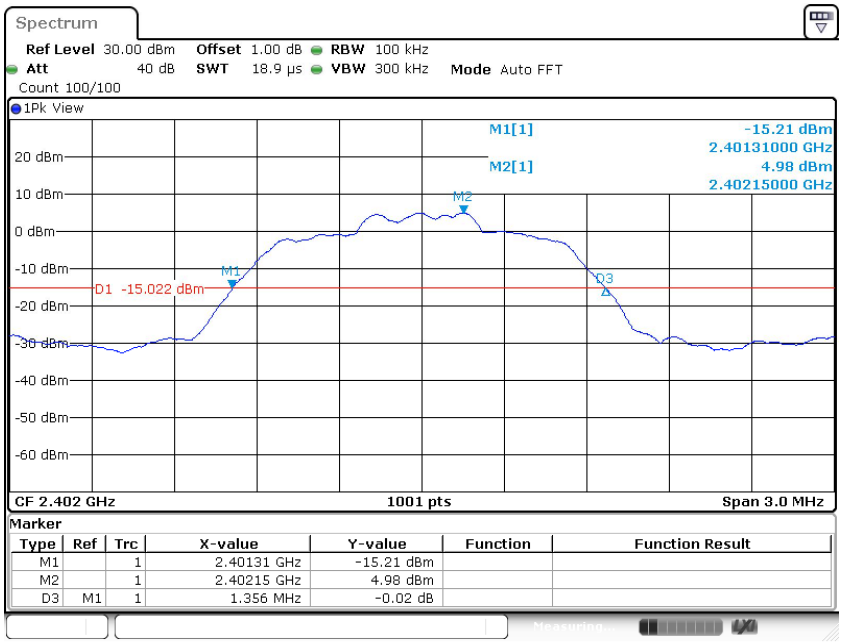
20 dB bandwidth and 99% Occupied Bandwidth

Bluetooth Mode π/4-DQPSK Modulation test result

Frequency	20 dB Bandwidth	99% Bandwidth	Limit	Result
MHz	kHz	kHz	kHz	
2402	1356	1166	--	Pass
2441	1383	1190	--	Pass
2480	1404	1211	--	Pass

Low channel 2402MHz



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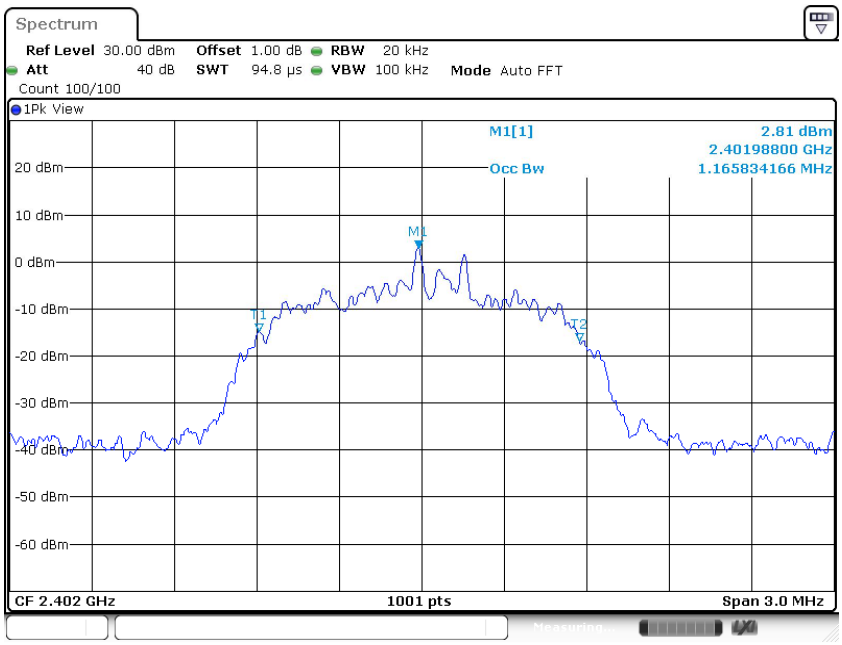

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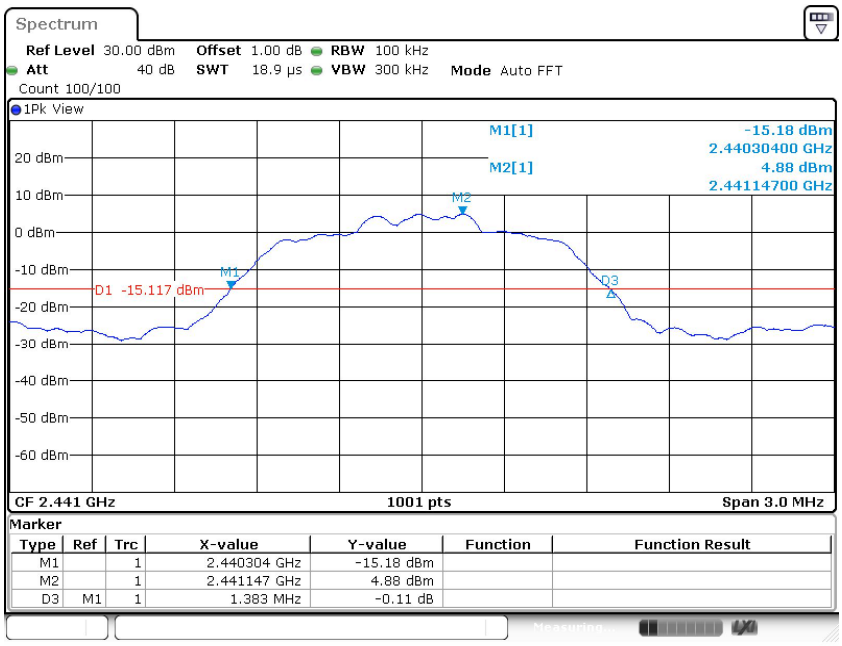
Middle channel 2441MHz



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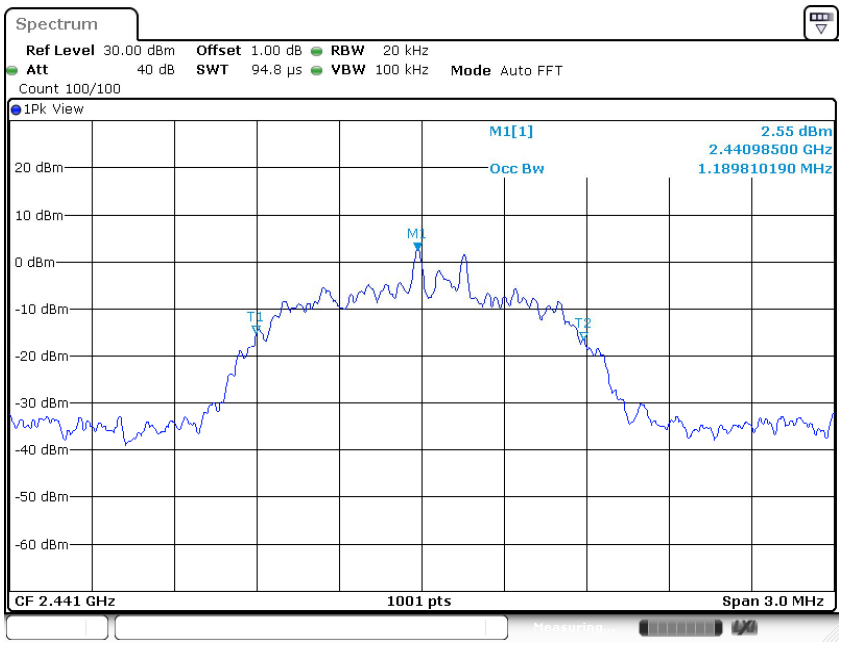

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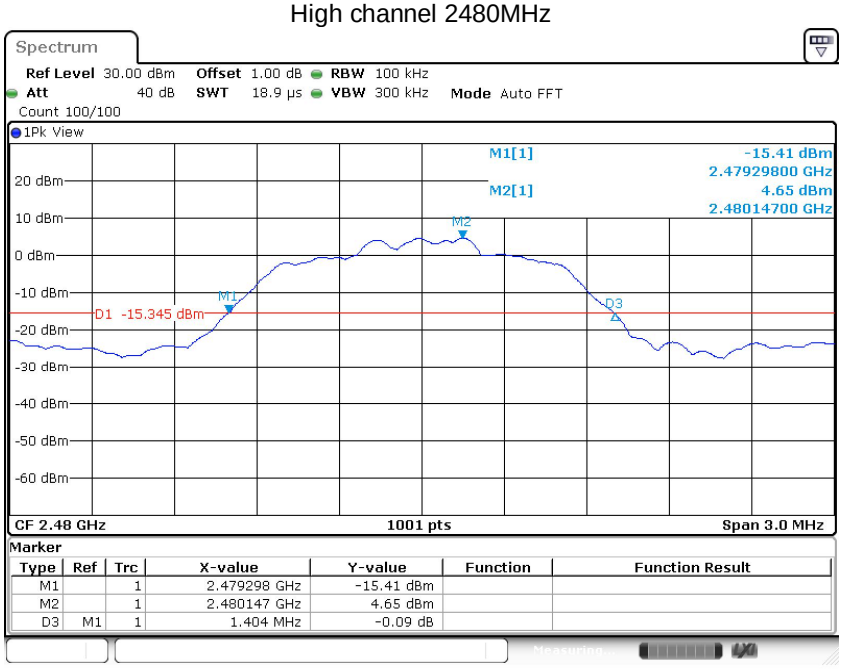
High channel 2480MHz



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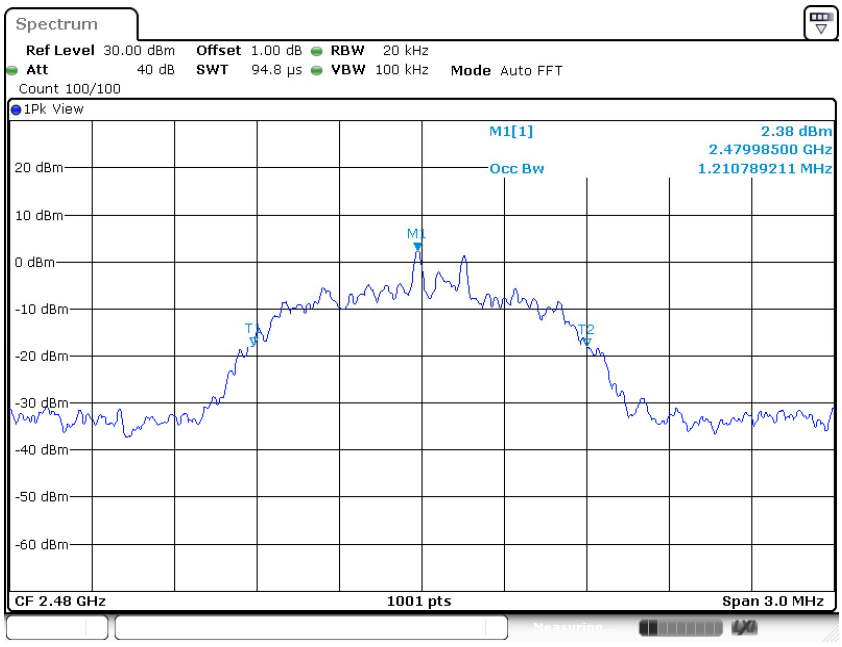

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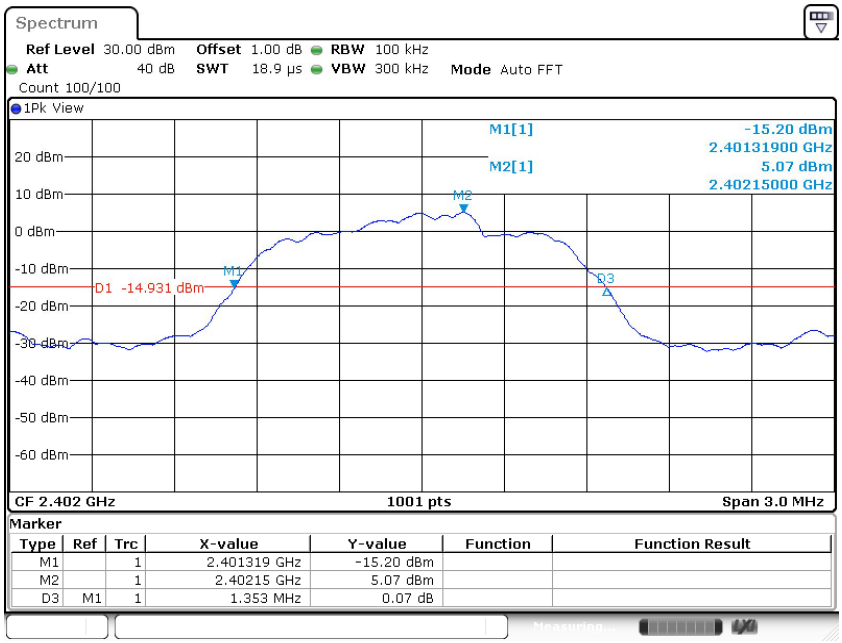
20 dB bandwidth and 99% Occupied Bandwidth

Bluetooth Mode 8DPSK Modulation test result

Frequency MHz	20 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz	Result
2402	1353	1160	--	Pass
2441	1380	1193	--	Pass
2480	1392	1214	--	Pass

Low channel 2402MHz



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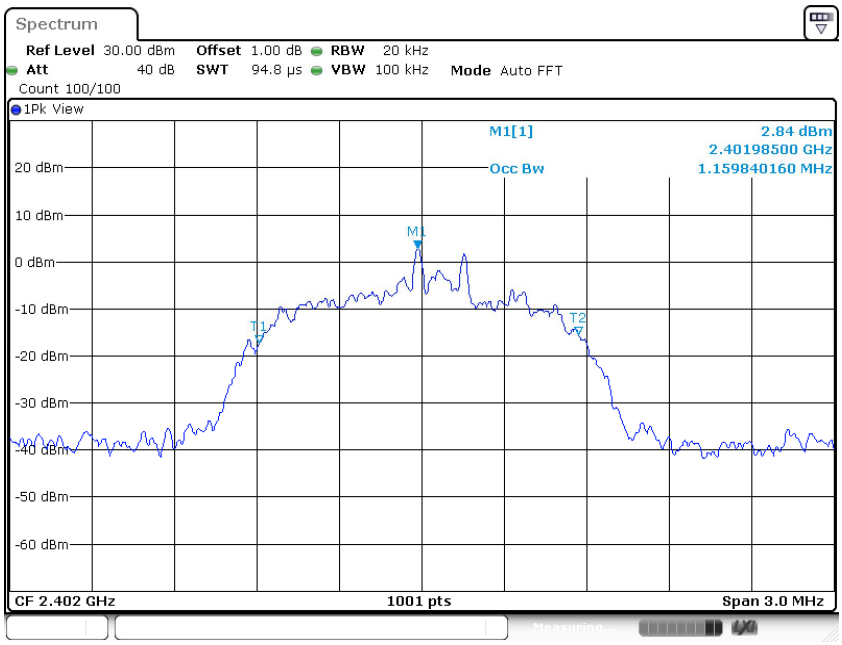
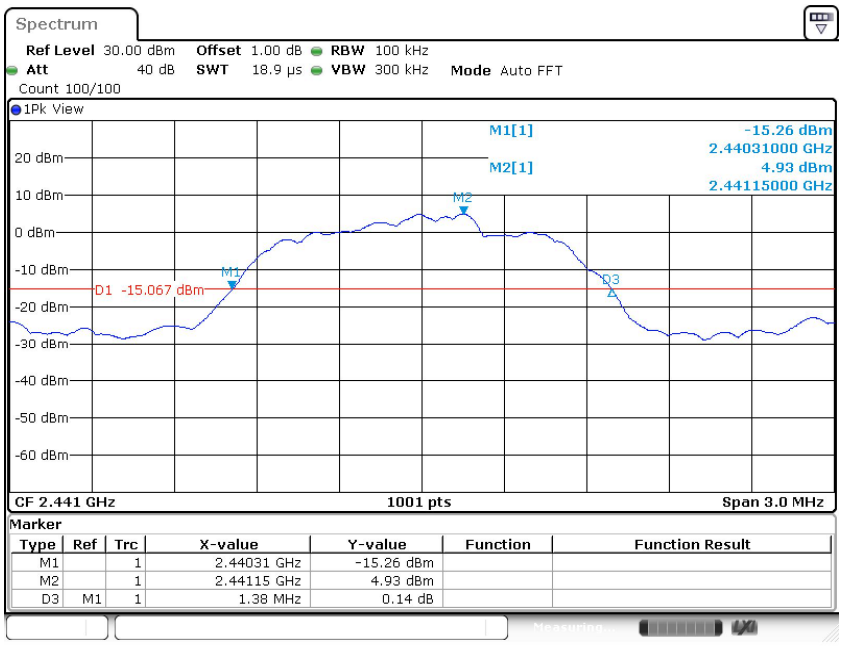
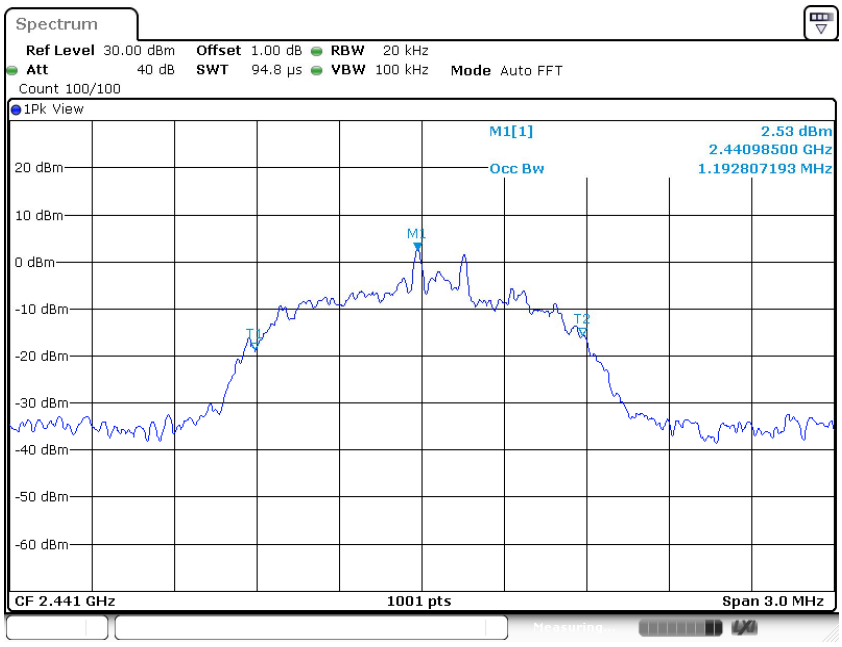


Date: 27.SEP.2020 15:13:42

Middle channel 2441MHz

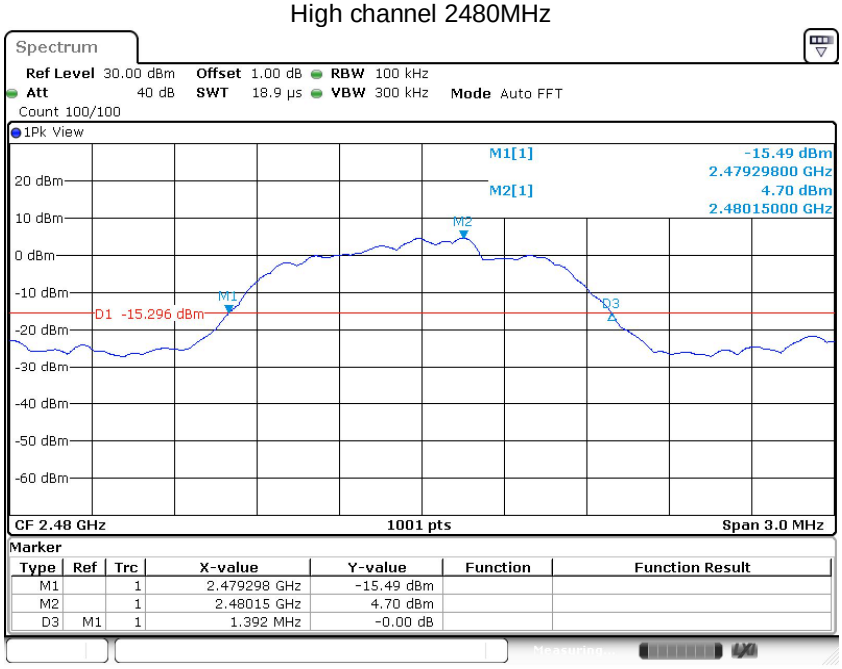


Date: 27.SEP.2020 15:15:08

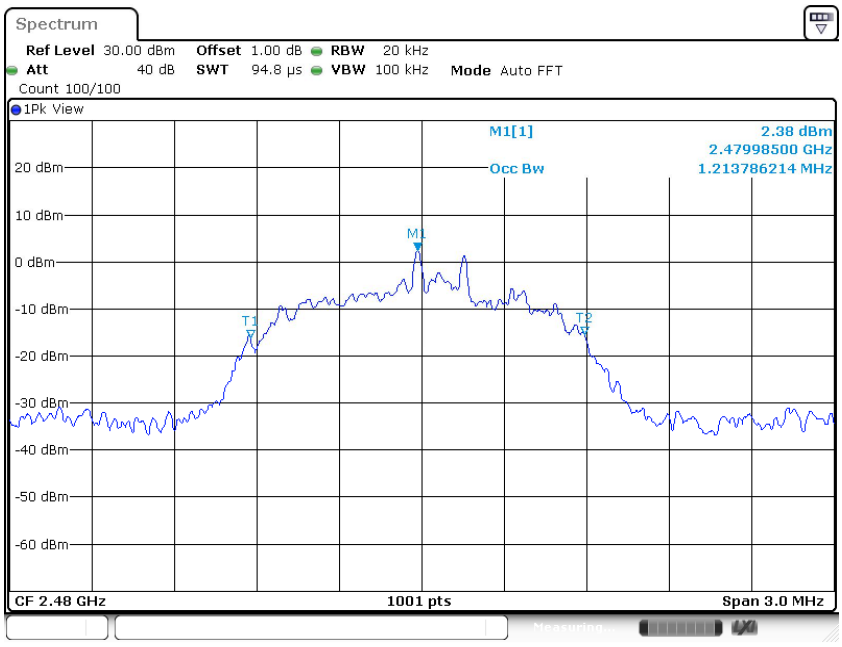


Date: 27.SEP.2020 15:15:18

High channel 2480MHz



Date: 27.SEP.2020 15:16:57



Date: 27.SEP.2020 15:17:08

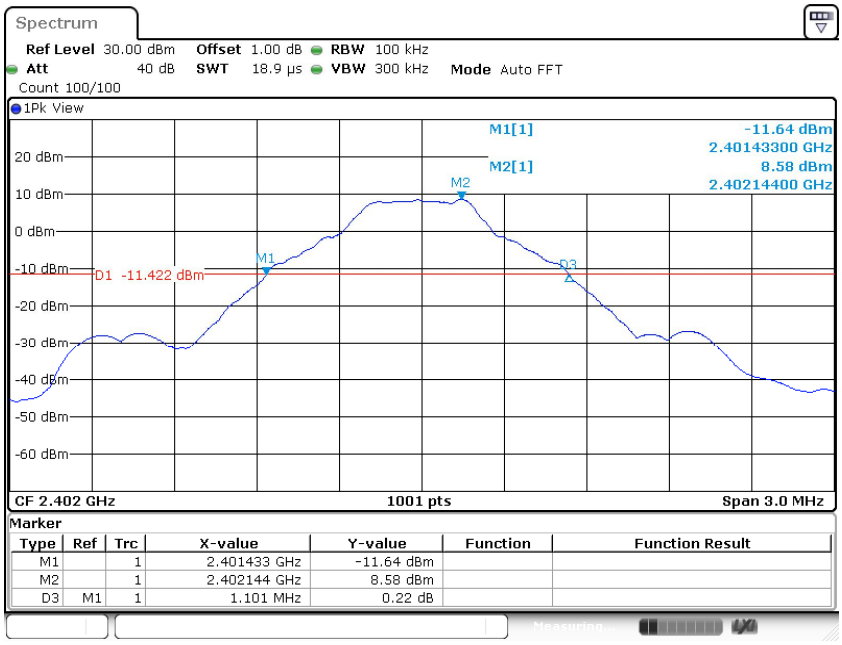
20 dB bandwidth and 99% Occupied Bandwidth

Right Side

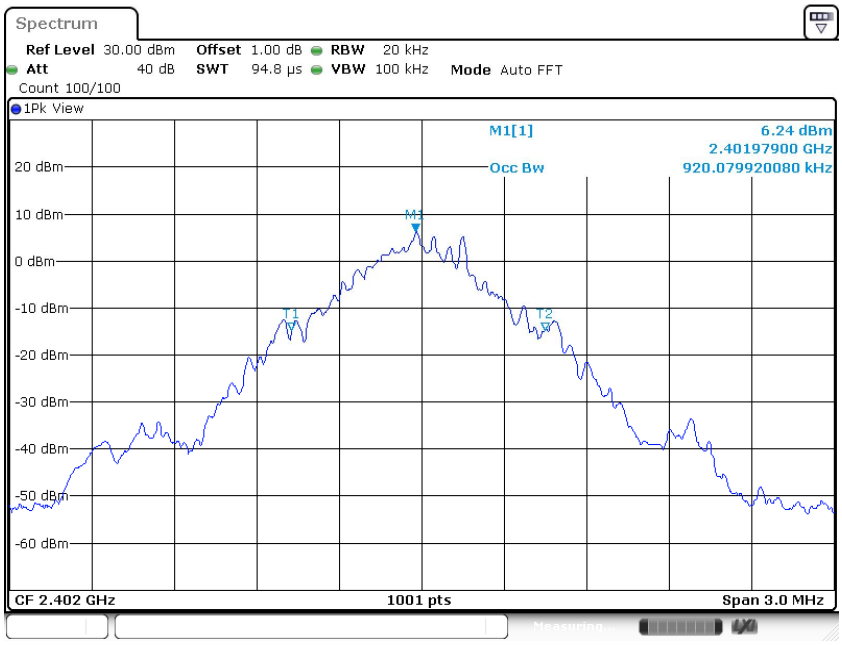
Bluetooth Mode GFSK Modulation test result

Frequency	20 dB Bandwidth	99% Bandwidth	Limit	Result
MHz	kHz	kHz	kHz	
2402	1101	920	--	Pass
2441	1101	917	--	Pass
2480	1104	914	--	Pass

Low channel 2402MHz

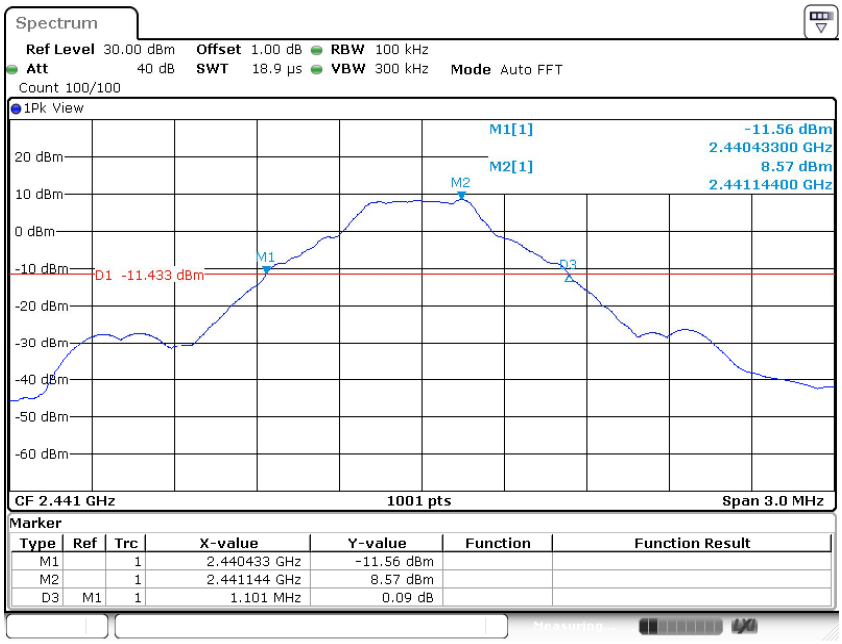


Date: 28.SEP.2020 10:53:30

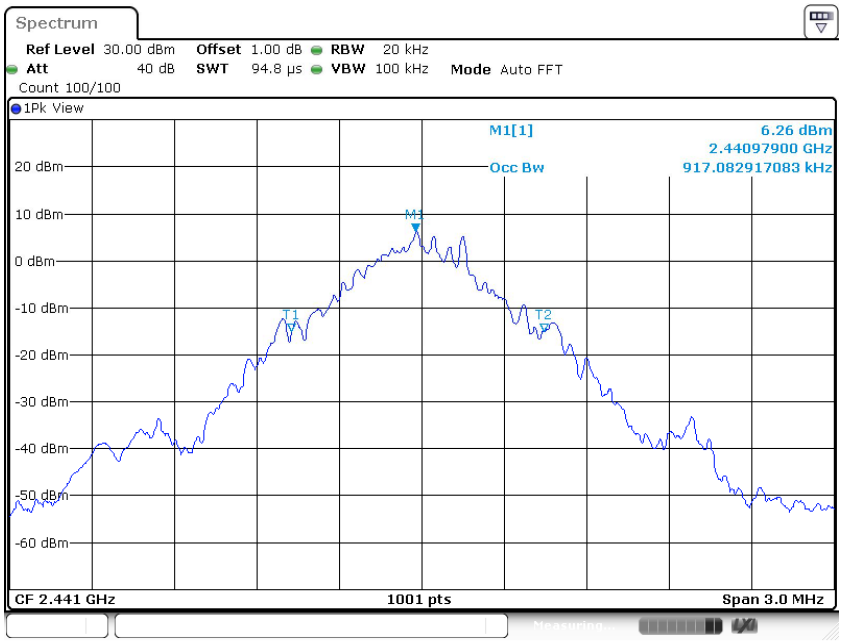


Date: 28.SEP.2020 10:53:40

Middle channel 2441MHz

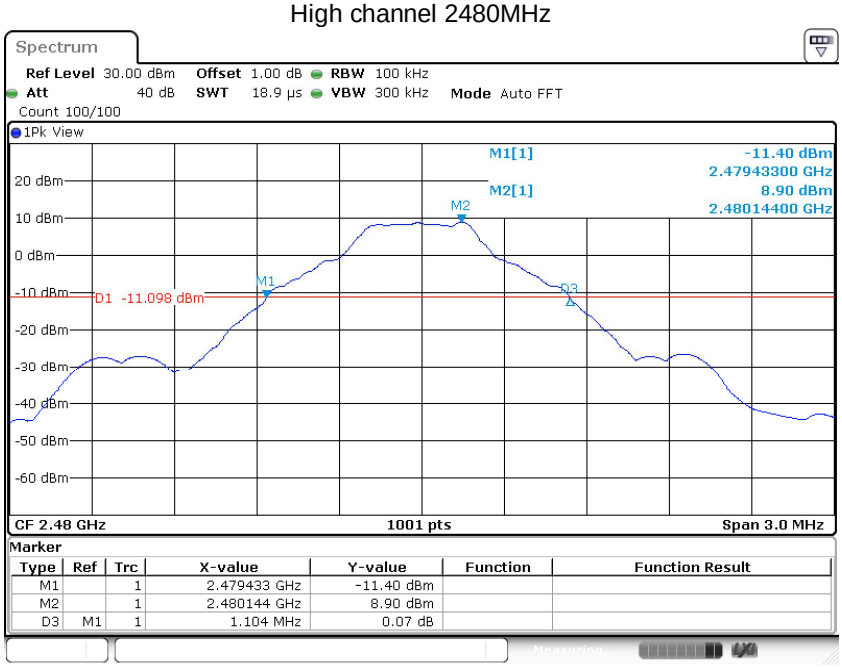


Date: 28.SEP.2020 10:55:27

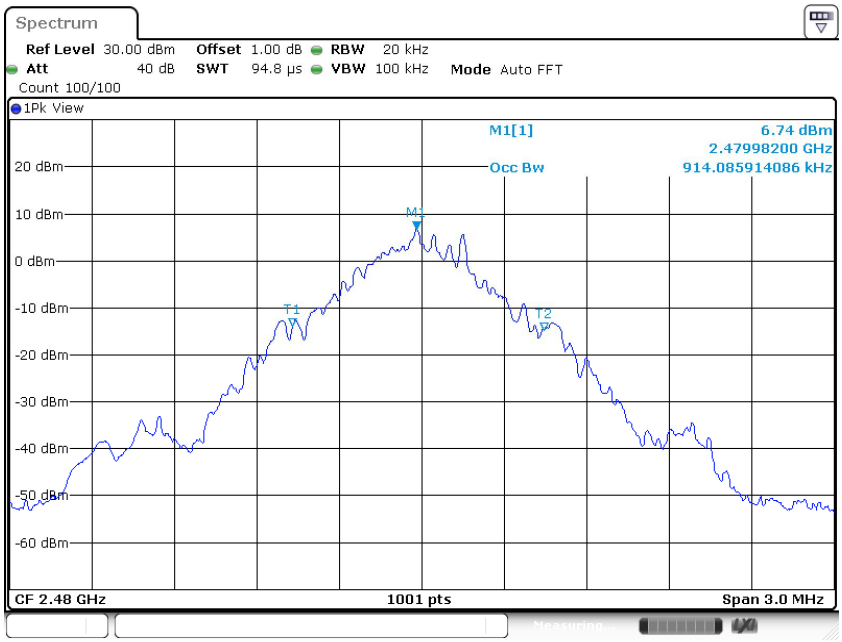


Date: 28.SEP.2020 10:55:38

High channel 2480MHz



Date: 28.SEP.2020 10:56:53



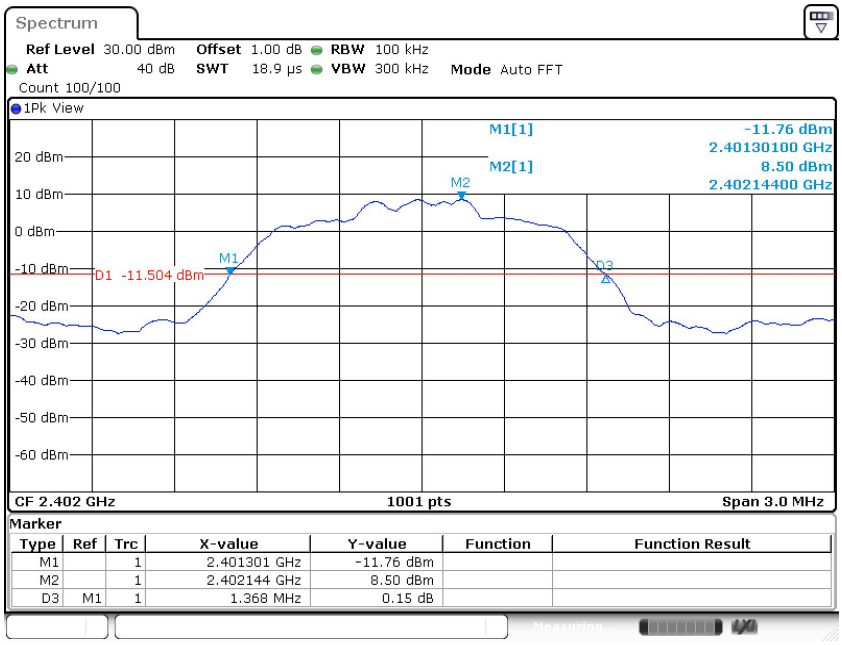
Date: 28.SEP.2020 10:57:03

20 dB bandwidth and 99% Occupied Bandwidth

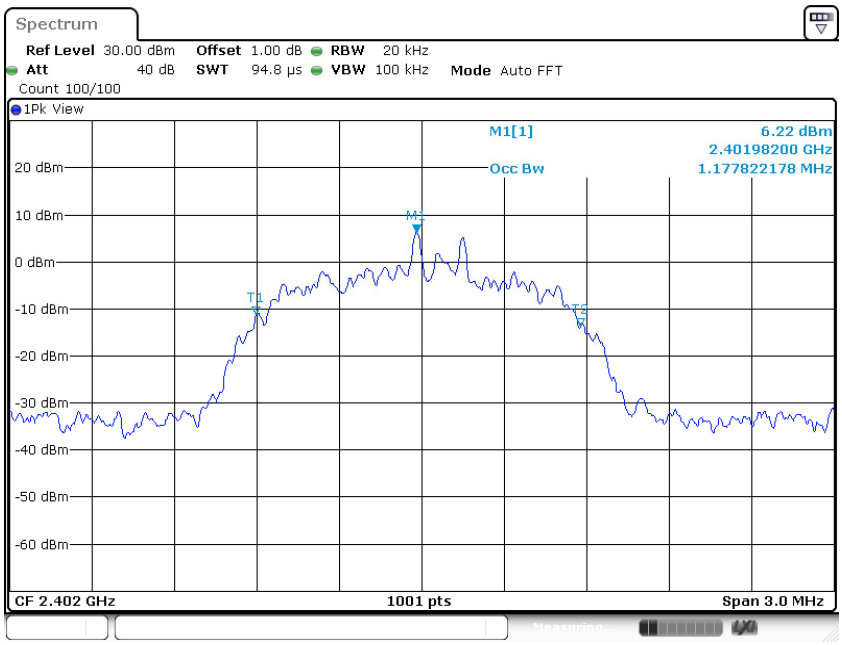
Bluetooth Mode π/4-DQPSK Modulation test result

Frequency	20 dB Bandwidth	99% Bandwidth	Limit	Result
MHz	kHz	kHz	kHz	
2402	1368	1178	--	Pass
2441	1392	1193	--	Pass
2480	1380	1187	--	Pass

Low channel 2402MHz

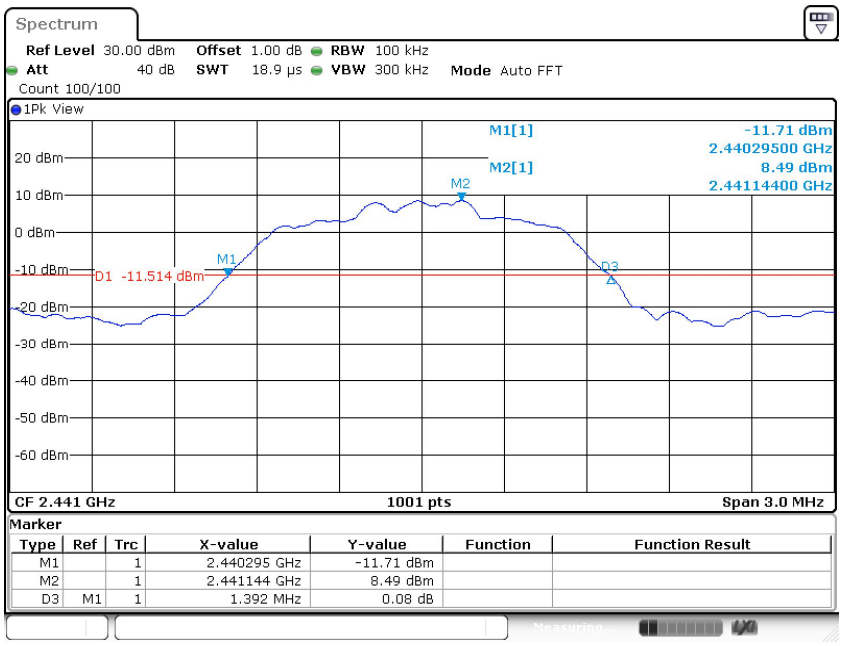


Date: 28.SEP.2020 10:58:44

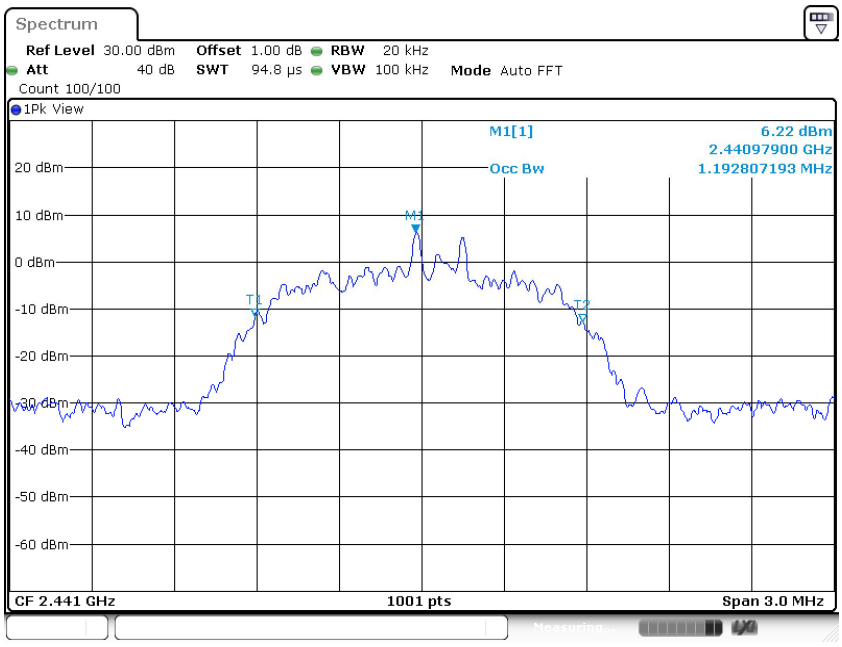


Date: 28.SEP.2020 10:58:54

Middle channel 2441MHz

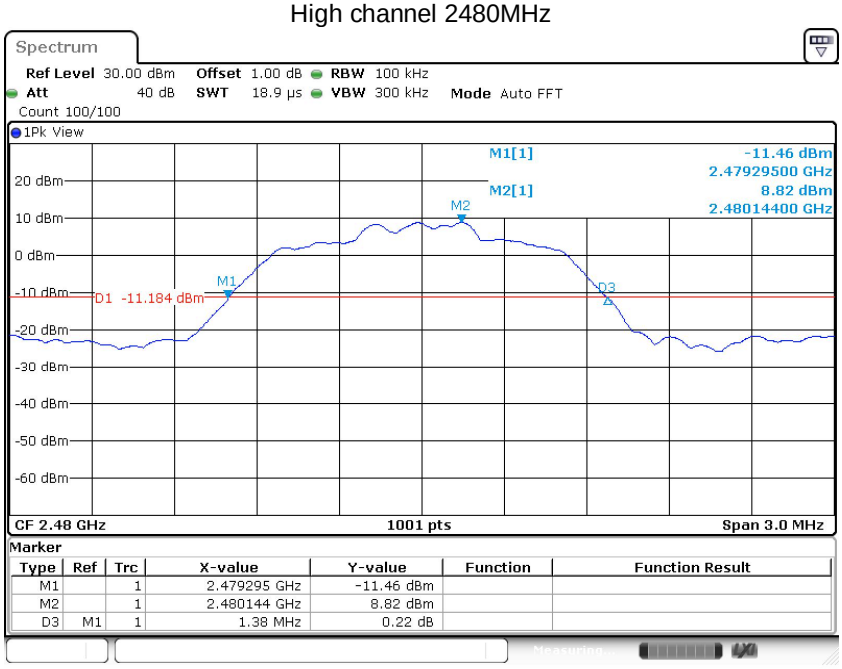


Date: 28.SEP.2020 11:00:17

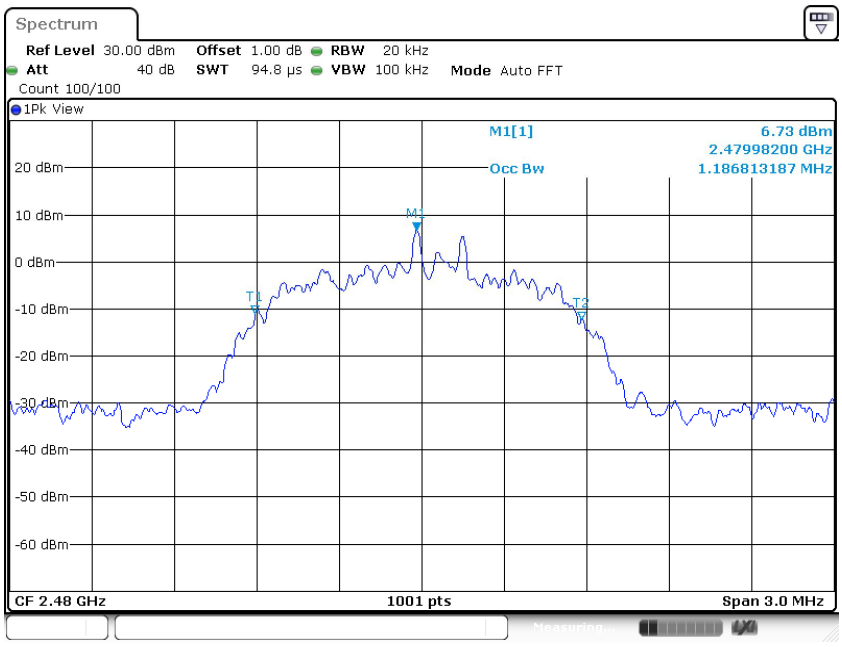


Date: 28.SEP.2020 11:00:28

High channel 2480MHz



Date: 28.SEP.2020 11:01:51



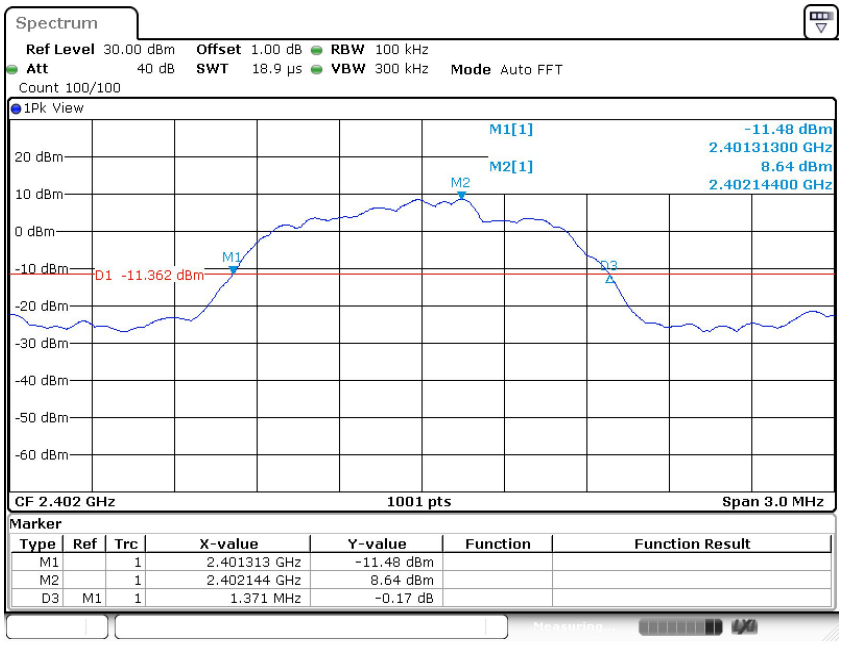
Date: 28.SEP.2020 11:02:02

20 dB bandwidth and 99% Occupied Bandwidth

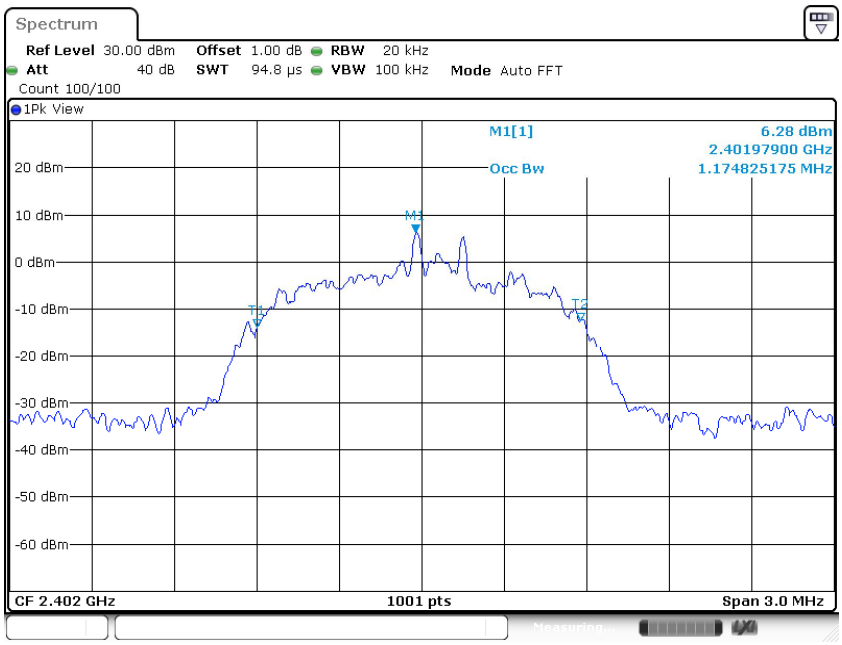
Bluetooth Mode 8DPSK Modulation test result

Frequency MHz	20 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz	Result
2402	1371	1175	--	Pass
2441	1386	1199	--	Pass
2480	1374	1196	--	Pass

Low channel 2402MHz

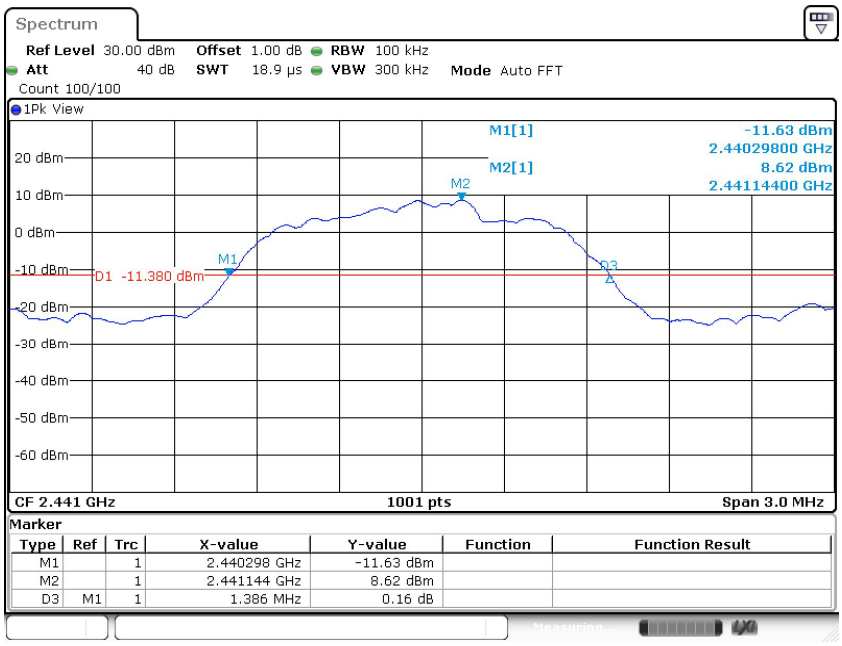


Date: 28.SEP.2020 11:03:30

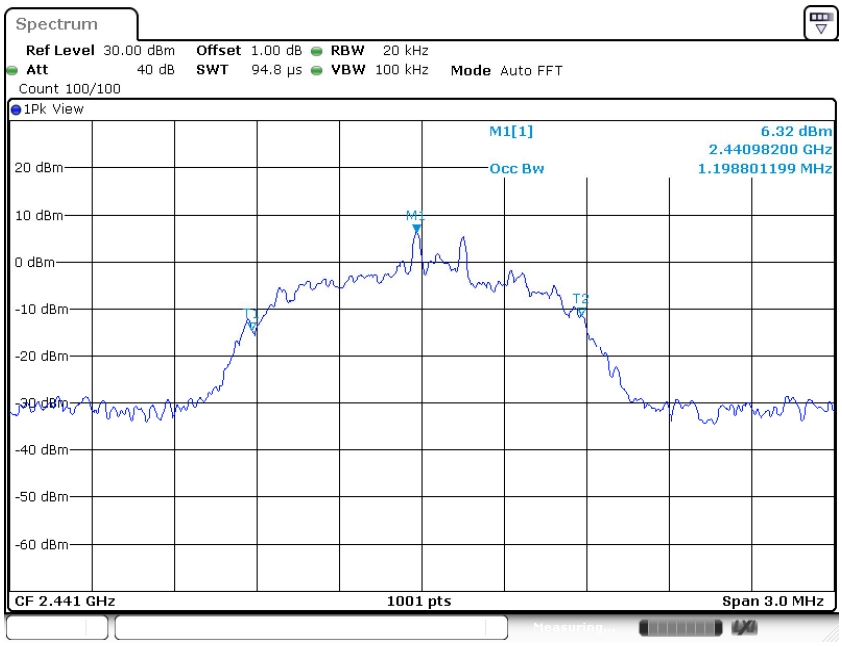


Date: 28.SEP.2020 11:03:41

Middle channel 2441MHz

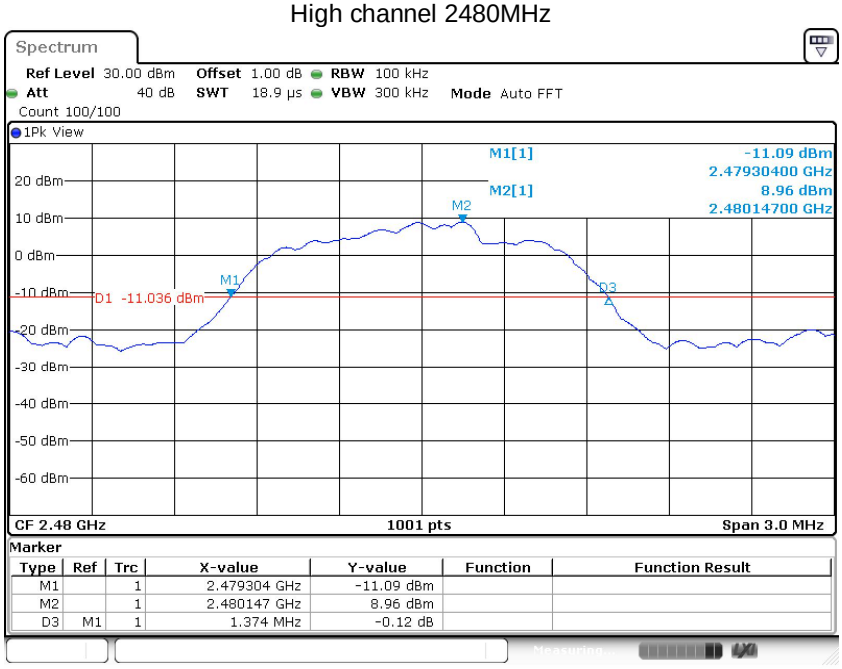


Date: 28.SEP.2020 11:05:02

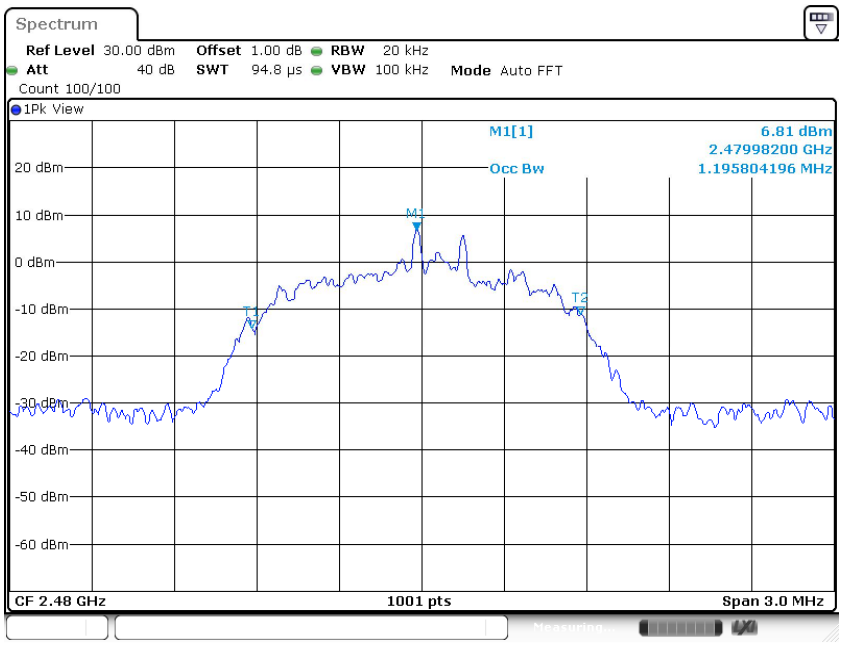


Date: 28.SEP.2020 11:05:13

High channel 2480MHz



Date: 28.SEP.2020 11:06:29



Date: 28.SEP.2020 11:06:39

9.3 Carrier Frequency Separation

Test Method

1. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels, RBW ≥ 1% of the span, VBW) ≥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
≥25KHz or 2/3 of the 20 dB bandwidth which is greater

Left Side
GFSK Modulation Limit

Test Mode	2/3 of 20 dB Bandwidth kHz
DH5	736
2DH5	736
3DH5	734

Right Side
GFSK Modulation Limit

Test Mode	2/3 of 20 dB Bandwidth kHz
DH5	734
2DH5	734
3DH5	736

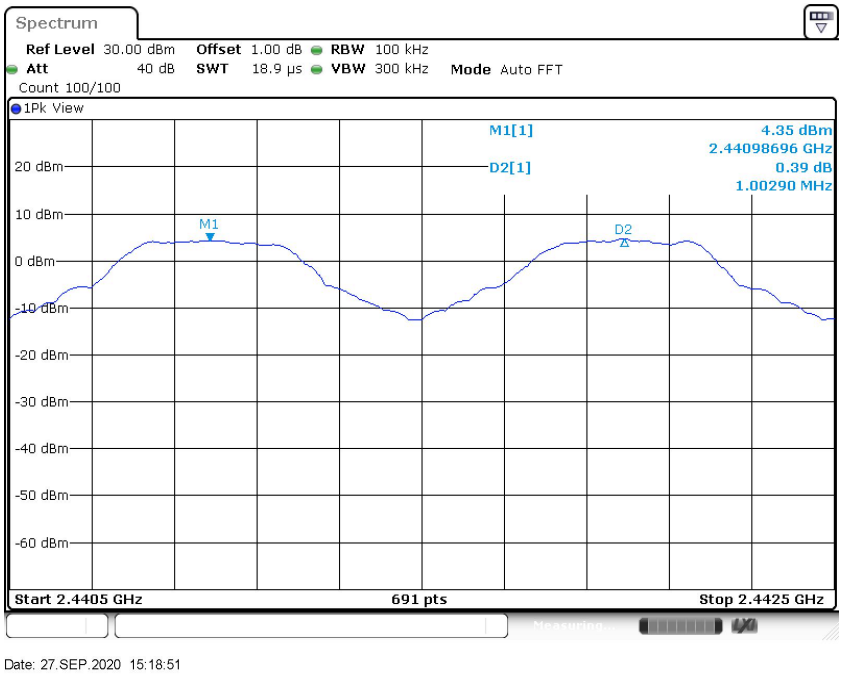
Carrier Frequency Separation

Test result: The measurement was performed with the typical configuration (normal hopping status), here GFSK modulation mode was used to show compliance.

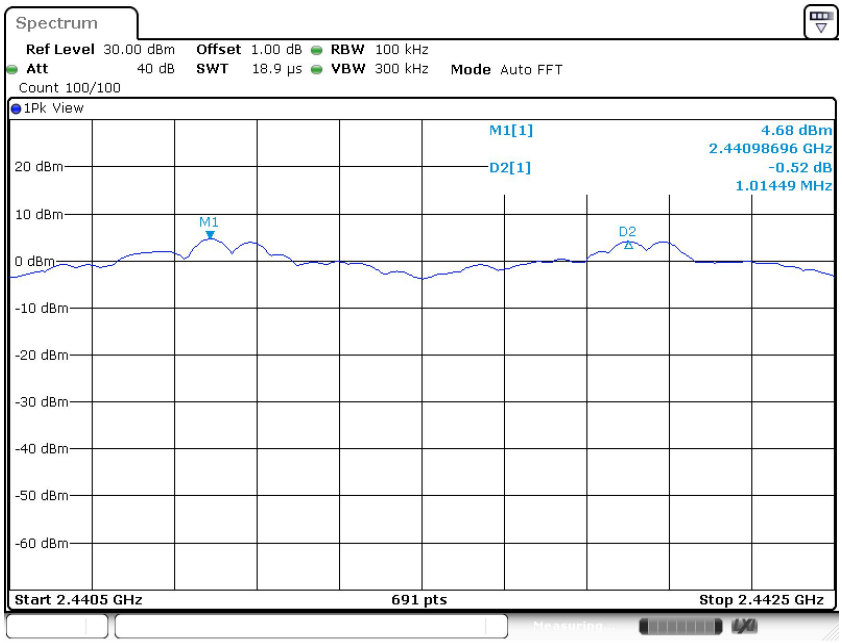
Left Side
GFSK Modulation test result

Test Mode	Carrier Frequency Separation kHz	Result
DH5	1003	Pass
2DH5	1014	Pass
3DH5	1162	Pass

DH5

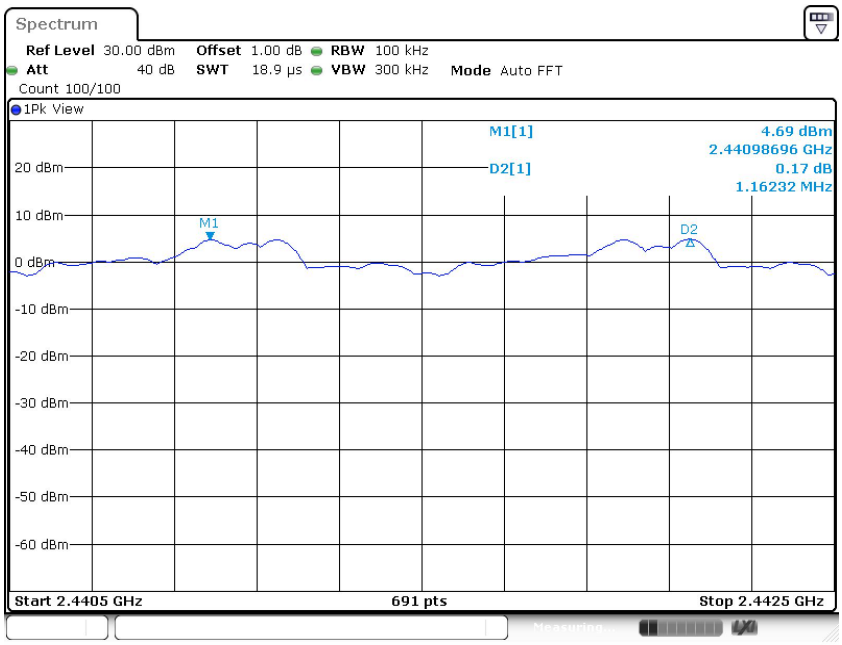


2DH5



Date: 27.SEP.2020 15:22:17

3DH5

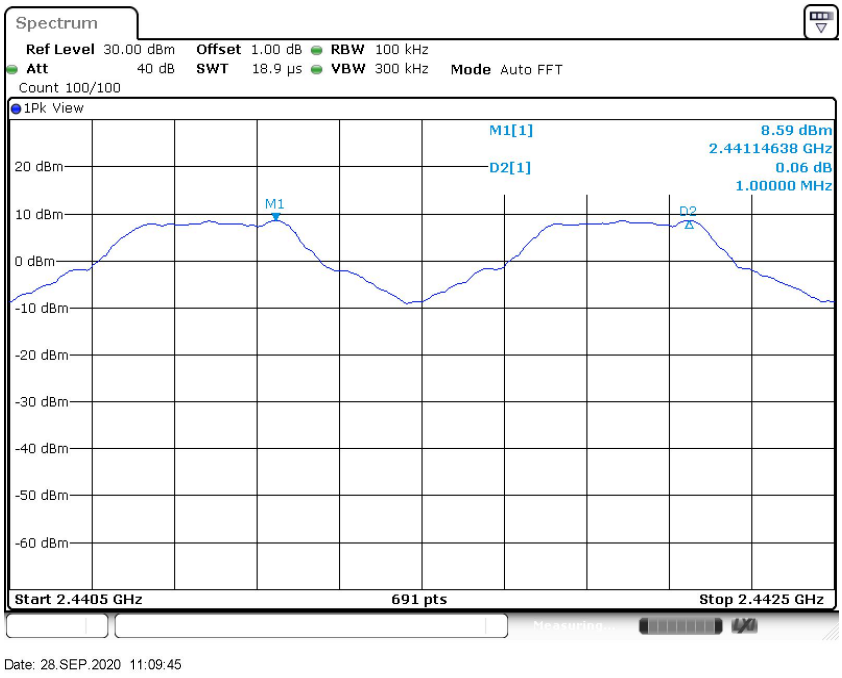


Date: 27.SEP.2020 15:23:52

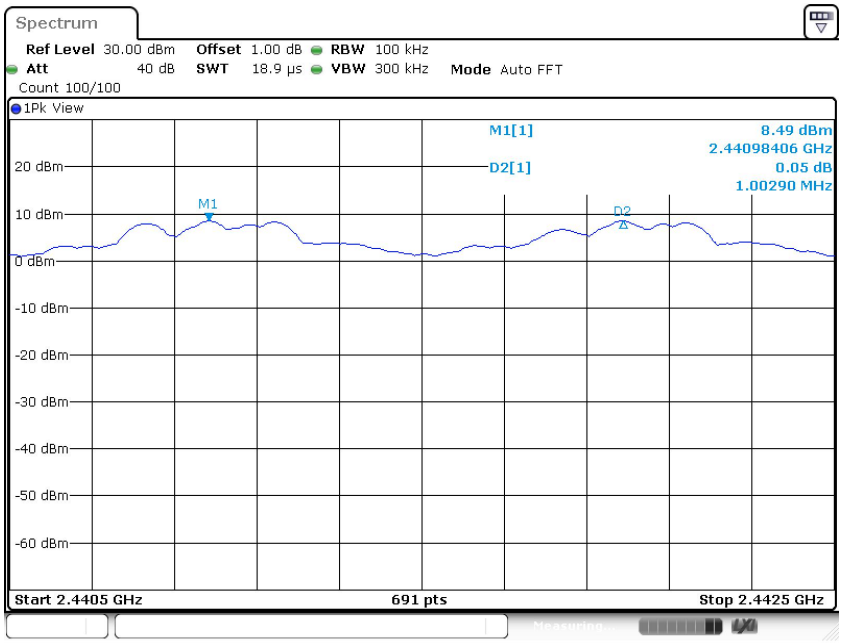
Right Side
GFSK Modulation test result

Test Mode	Carrier Frequency Separation kHz	Result
DH5	1000	Pass
2DH5	1003	Pass
3DH5	1000	Pass

DH5

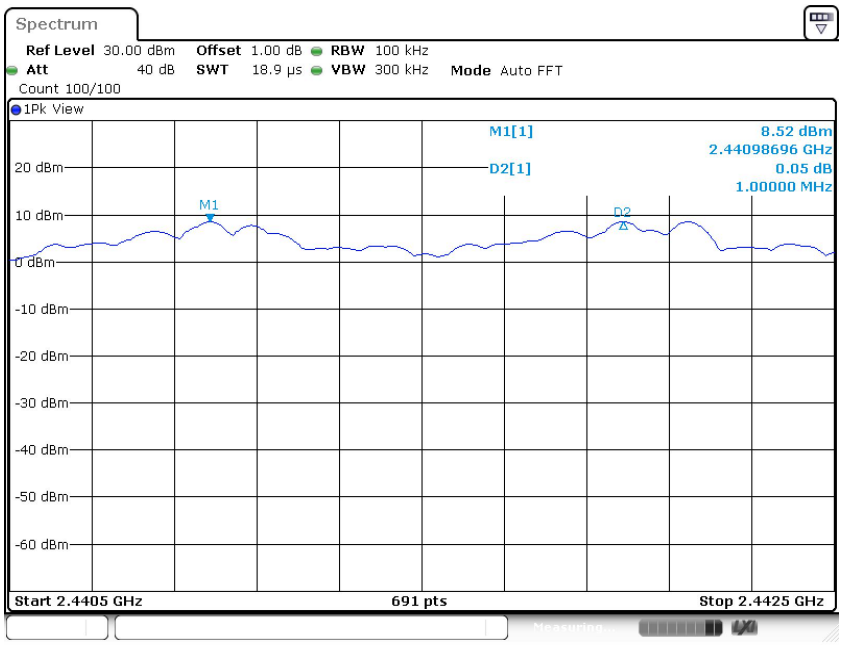


2DH5



Date: 28.SEP.2020 11:13:05

3DH5



Date: 28.SEP.2020 11:17:50

9.4 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 ≥ 1% of the span, VBW) ≥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.

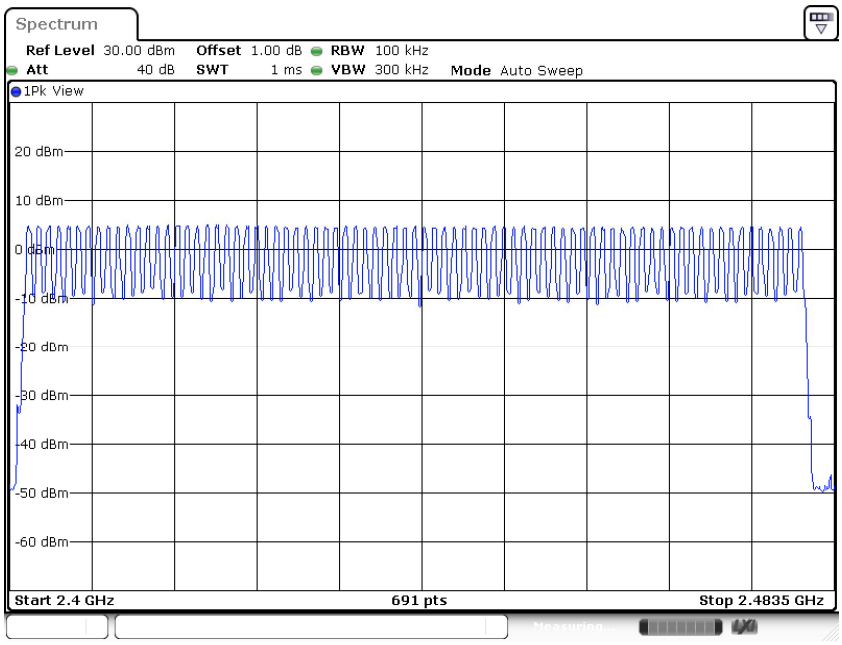
Limit

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: 27.SEP.2020 15:19:28