



FCC TEST REPORT

FCC ID: 2AZUP-SP5078

On Behalf of

Shenzhen CHT Technology Co., Ltd.

Wireless Joy-con controller for Switch

Model No.: SP5078, SP5096, SP5088, S5098, SP5099

Prepared for : Shenzhen CHT Technology Co., Ltd.
Address : Building L, Shengguang Industrial Park, No. 152 Shajing DongHuan
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Report Number : A2103076-C01-R04
Date of Receipt : August 4, 2021
Date of Test : August 4, 2021- September 24, 2021
Date of Report : September 24, 2021
Version Number : V0

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TEST REPORT DECLARATION

Applicant : Shenzhen CHT Technology Co., Ltd.
Address : Building L, Shengguang Industrial Park, No. 152 Shajing DongHuan Road, XinQiao Street, Bao'An District, Shenzhen, China
Manufacturer : Shenzhen CHT Technology Co., Ltd.
Address : Building L, Shengguang Industrial Park, No. 152 Shajing DongHuan Road, XinQiao Street, Bao'An District, Shenzhen, China
EUT Description : Wireless Joy-con controller for Switch
(A) Model No. : SP5078, SP5096, SP5088, S5098, SP5099
(B) Trademark : N/A

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247

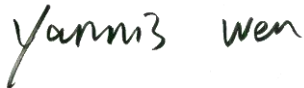
ANSI C63.10:2013

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....: Yannis Wen
Project Engineer



Approved by (name + signature).....: Simple Guan
Project Manager



Date of issue.....: September 24, 2021

Revision History

Revision	Issue Date	Revisions	Revised By
V0	September 24, 2021	Initial released Issue	Yannis Wen

1. Summary Of Standards And Results

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Test Item	Standards Paragraph	Result
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1) ANSI C63.10 :2013	P
Bandwidth	FCC Part 15: 15.215 ANSI C63.10 :2013	P
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1) ANSI C63.10 :2013	P
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.10 :2013	P
Dwell Time	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.10 :2013	P
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Band Edge Compliance	FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Power Line Conducted Emissions	FCC Part 15: 15.207 ANSI C63.10 :2013	P
Antenna requirement	FCC Part 15: 15.203	P
Note: 1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable.		

2. General information

2.1. Description of Device (EUT)

Description/PMN	: Wireless Joy-con controller for Switch
Model	: SP5078, SP5096, SP5088, S5098, SP5099
Number/HVIN(s)	
Diff.	: There is no difference between the models except the appearance color. So all the test were performed on the model SP5078. The difference between left controller (red) and right controller (blue) is only the PCB layout.
Trademark	: N/A
Test Voltage	: DC 5V from Notebook, DC 3.7V from battery
Bluetooth Version	: Bluetooth (BR+ EDR)
Operation frequency	: 2402-2480MHz
Channel No.	: 79 Channels
Modulation type	: GFSK, $\pi/4$ DQPSK, 8- DPSK
Antenna Type	: Internal antenna, Maximum Gain is 2dBi
Software version	: V1.0
Hardware Version/FVIN	: V1.0

Remark: The worst-case simultaneous transmission configuration was evaluated with no non-compliance found. Results in this report are only for Bluetooth (BR+ EDR) function, and there is no other transmitter involved.

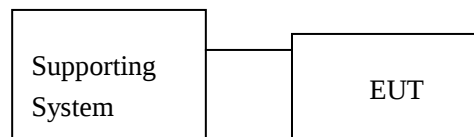
2.2.Accessories of Device (EUT)

Accessories1 : /
 Manufacturer : /
 Model : /
 Ratings : /

2.3.Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification
1.	Notebook	Lenovo	ThinkPad E14	N/A	N/A

2.4.Block Diagram of connection between EUT and simulators



2.5.Test Mode Description

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
GFSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480
π /4 DQPSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480
8- DPSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480

2.6.Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	24℃
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

2.7.Test Facility

Shenzhen Alpha Product Testing Co., Ltd

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961

July 15, 2019 Certificated by IC
Registration Number: CN0085

2.8.Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	2.74dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB(Polarize: V)
	2.57dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.13dB(Polarize: H)
	4.16dB(Polarize: V)
Uncertainty for radio frequency	5.4×10^{-8}
Uncertainty for conducted RF Power	0.37dB
Uncertainty for temperature	0.2°C
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2.9.Test Equipment List

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2020.09.02	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	102137	2021.08.25	1Year
Spectrum analyzer	Agilent	N9020A	MY499100060	2021.08.25	1Year
Receiver	ROHDE&SCHWARZ	ESR	1316.3003K03-10208 2-Wa	2021.08.25	1Year
Receiver	R&S	ESCI	101165	2021.08.25	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2020.04.12	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2020.04.12	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2021.08.30	2Year
RF Cable	Resenberger	Cable 1	RE1	2021.08.25	1Year
RF Cable	Resenberger	Cable 2	RE2	2021.08.25	1Year
RF Cable	Resenberger	Cable 3	CE1	2021.08.25	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2021.08.25	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2021.08.25	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126-466	2021.08.25	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2021.08.25	1 Year
Horn Antenna	SCHWARZBECK	BBHA9170	00946	2021.08.30	2 Year
Preamplifier	SKET	LNPA_1840 -50	SK2018101801	2021.08.25	1 Year
Power Meter	Agilent	E9300A	MY41496628	2021.08.25	1 Year
Power Sensor	DARE	RPR3006W	15100041SNO91	2021.08.25	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000 -40-880	100631	2021.04.21	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2021.08.25	1 Year
Adjustable attenuator	MWRFtest	N/A	N/A	N/A	N/A
10dB Attenuator	Mini-Circuits	DC-6G	N/A	N/A	N/A

Software Information			
Test Item	Software Name	Manufacturer	Version
RE	EZ-EMC	EZ	Alpha-3A1
CE	EZ-EMC	EZ	Alpha-3A1

RF-CE	MTS 8310	MW	V2.0.0.0
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3. Maximum Peak Output Power

3.1.Limit

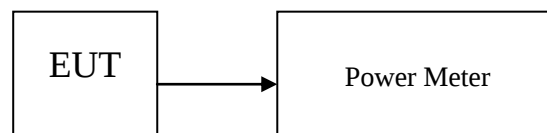
Please refer section15.247.

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 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts, the e.i.r.p shall not exceed 4W

3.2.Test Procedure

The transmitter output is connected to the RF Power Meter. The RF Power Meter is set to the average power detection.

3.3.Test Setup



3.4.Test Result

For SP5078(blue)				
Mode	Freq (MHz)	Average Output Power (dBm)	Limit (dBm)	Result
GFSK	2402	-2.293	21	Pass
	2441	-2.065	21	Pass
	2480	-2.763	21	Pass
$\pi/4$ DQPSK	2402	-0.752	21	Pass
	2441	-0.323	21	Pass
	2480	-1.023	21	Pass
8- DPSK	2402	-0.844	21	Pass
	2441	-0.036	21	Pass
	2480	-1.664	21	Pass
Conclusion: PASS				

For SP5078(red)				
Mode	Freq (MHz)	Average Output Power (dBm)	Limit (dBm)	Result
GFSK	2402	-2.338	21	Pass
	2441	-2.144	21	Pass
	2480	-2.958	21	Pass
$\pi/4$ DQPSK	2402	-1.024	21	Pass
	2441	-1.072	21	Pass
	2480	-1.415	21	Pass
8- DPSK	2402	-0.117	21	Pass
	2441	-0.361	21	Pass
	2480	-1.158	21	Pass
Conclusion: PASS				

4. Bandwidth

4.1.Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

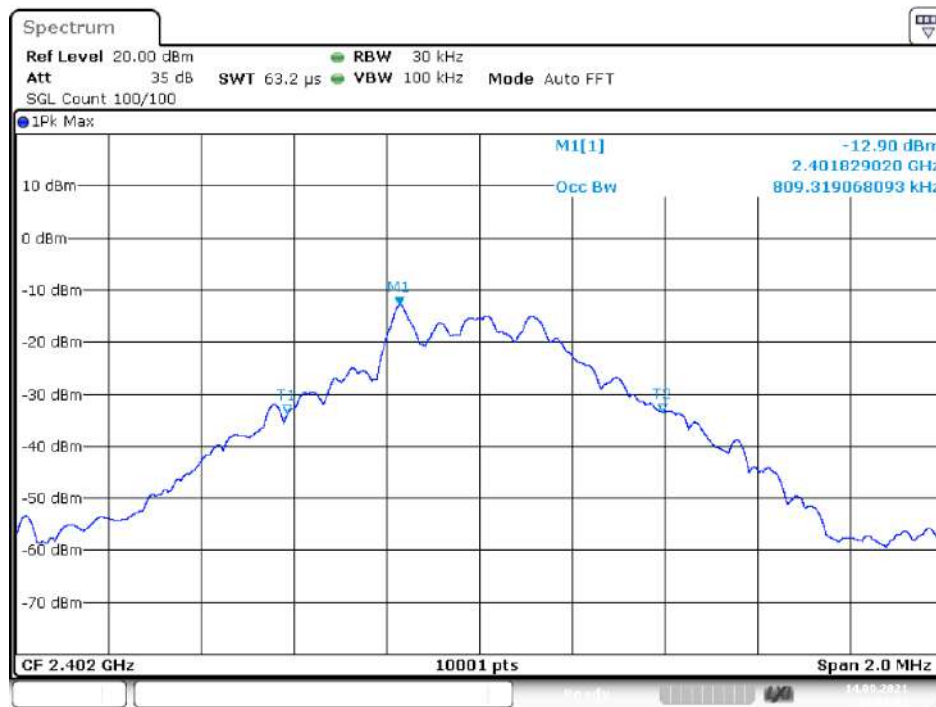
4.2.Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

4.3.Test Result

For SP5078(blue)							
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH1	2402	Ant 1	0.8093	0.8336	0	Pass
NVNT	1-DH1	2441	Ant 1	0.8163	0.8176	0	Pass
NVNT	1-DH1	2480	Ant 1	0.7985	0.8746	0	Pass
NVNT	2-DH1	2402	Ant 1	1.1517	1.245	0	Pass
NVNT	2-DH1	2441	Ant 1	1.1313	1.2504	0	Pass
NVNT	2-DH1	2480	Ant 1	1.1621	1.299	0	Pass
NVNT	3-DH1	2402	Ant 1	1.1507	1.2492	0	Pass
NVNT	3-DH1	2441	Ant 1	1.1431	1.2446	0	Pass
NVNT	3-DH1	2480	Ant 1	1.1359	1.2504	0	Pass

OBW NVNT 1-DH1 2402MHz Ant1



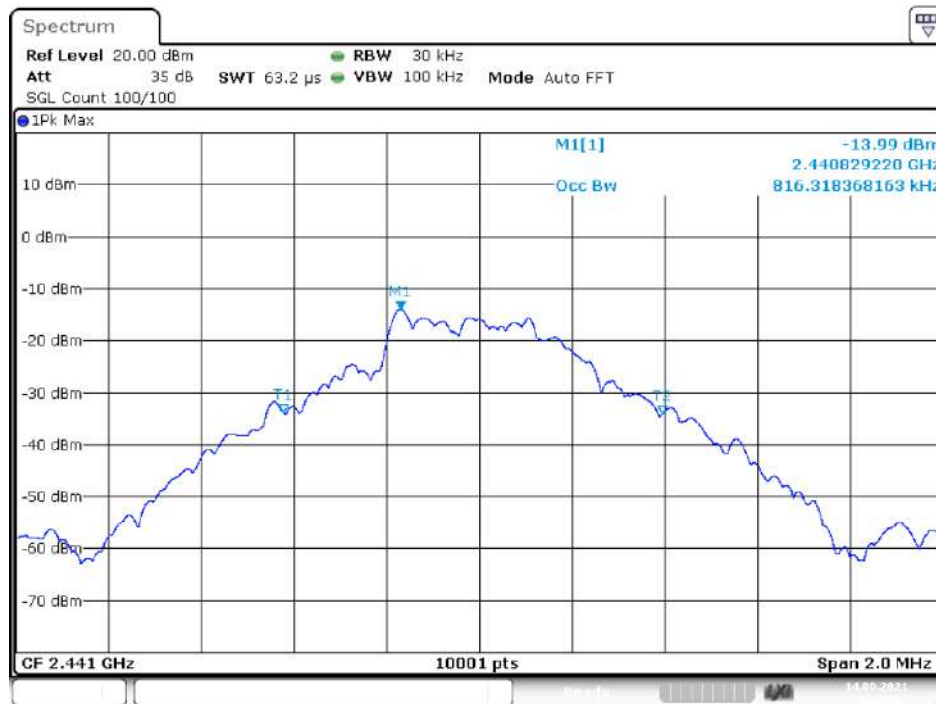
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OBW NVNT 1-DH1 2441MHz Ant1



Date: 14.SEP.2021 12:10:57

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Date: 14.SEP.2021 12:11:00

OBW NVNT 1-DH1 2480MHz Ant1



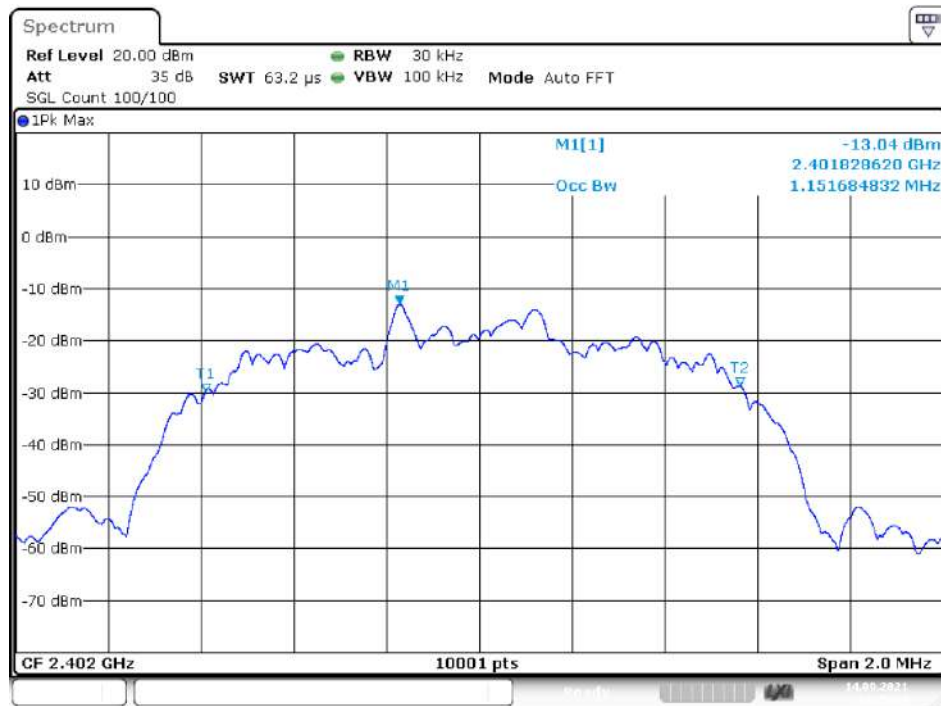
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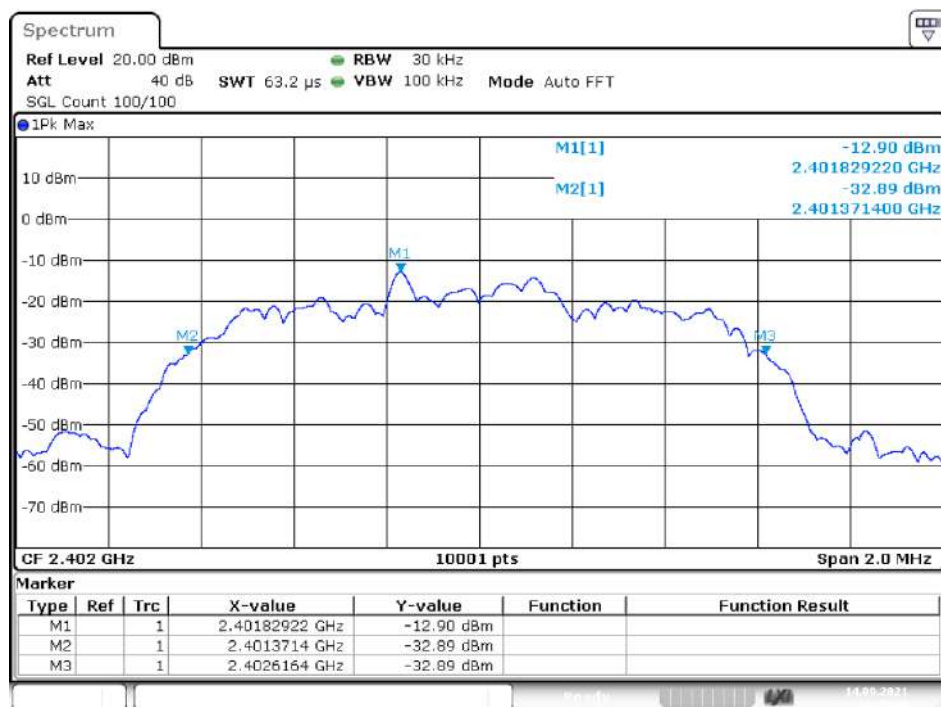
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OBW NVNT 2-DH1 2402MHz Ant1



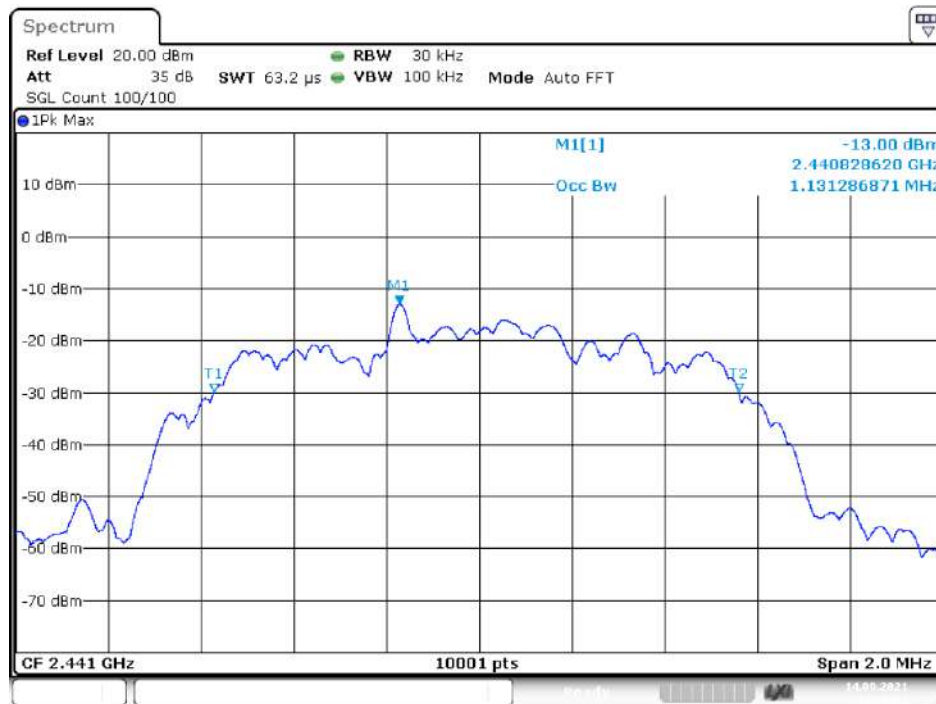
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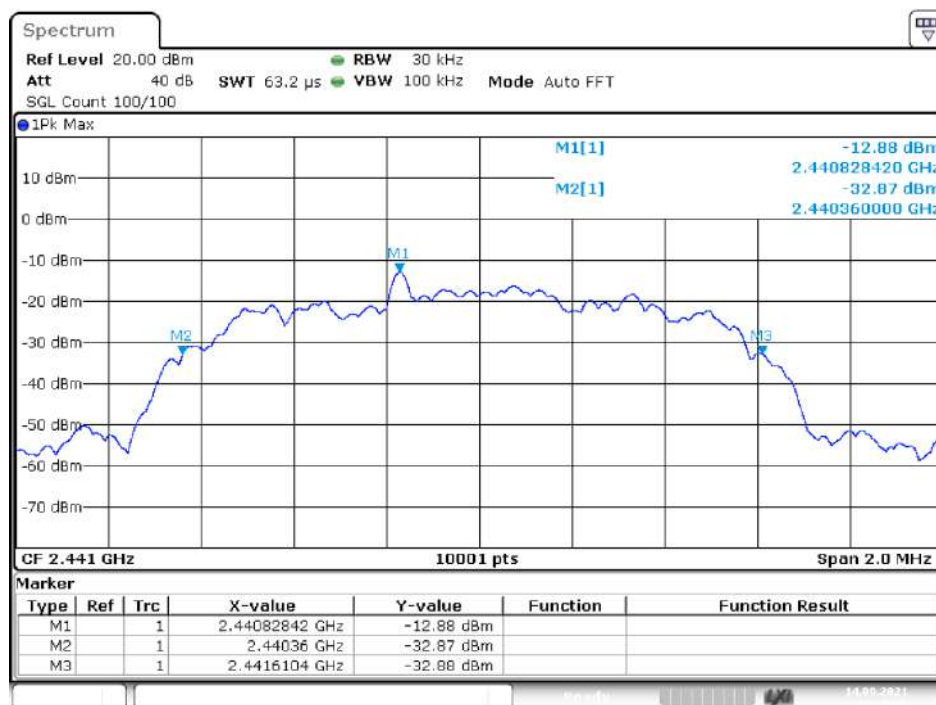
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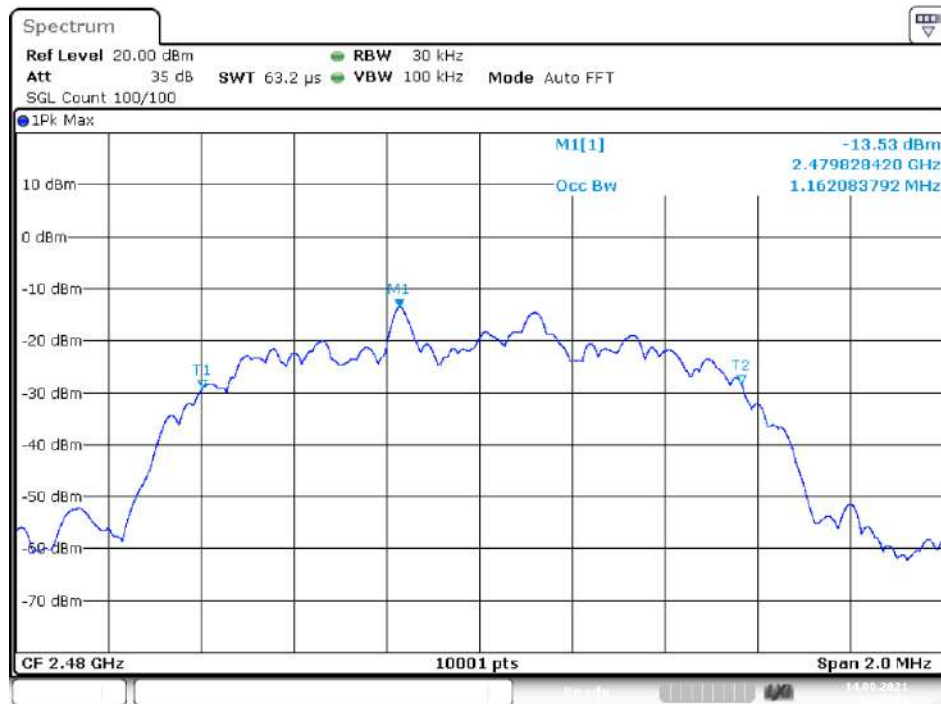
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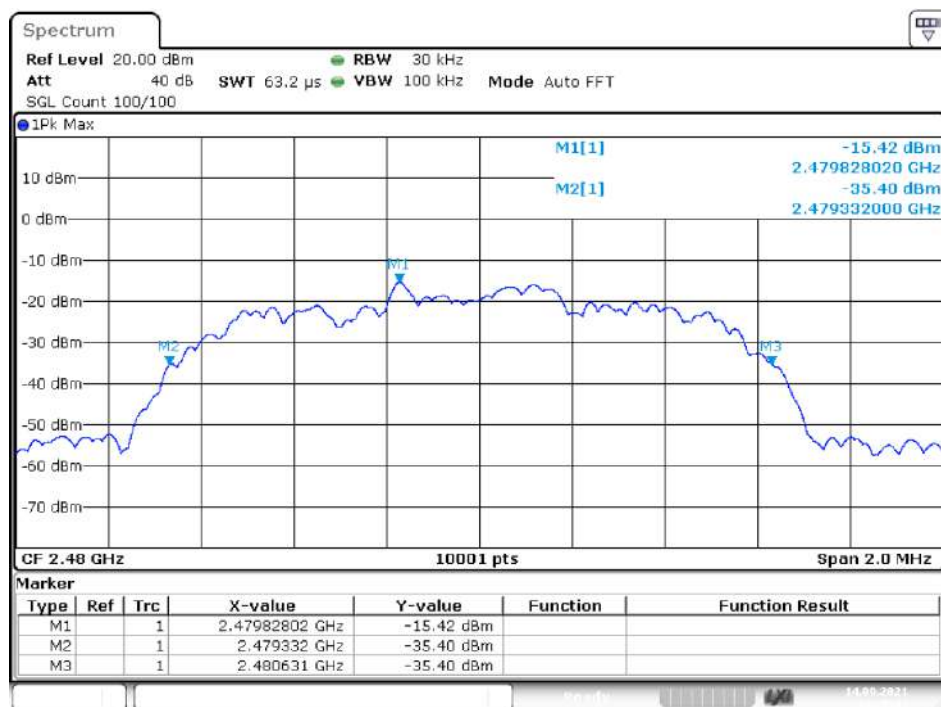
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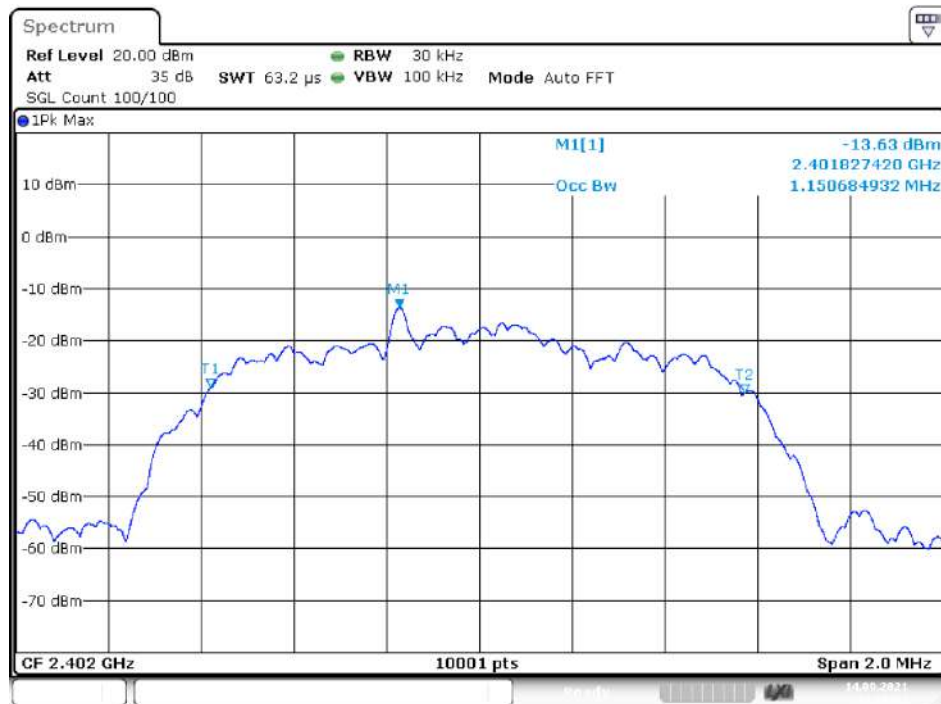
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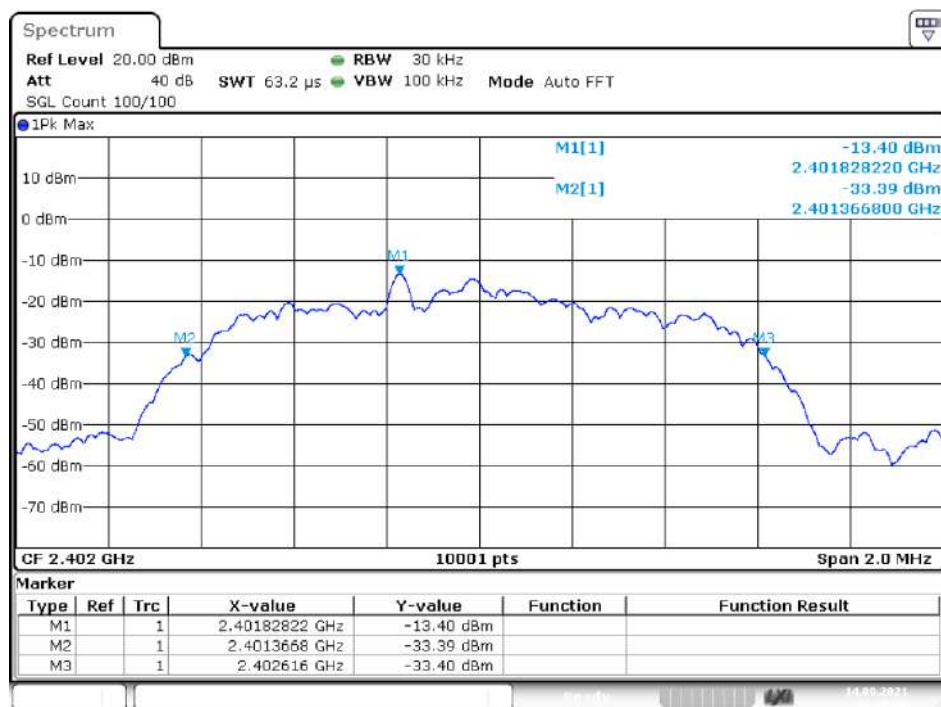
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OBW NVNT 3-DH1 2402MHz Ant1



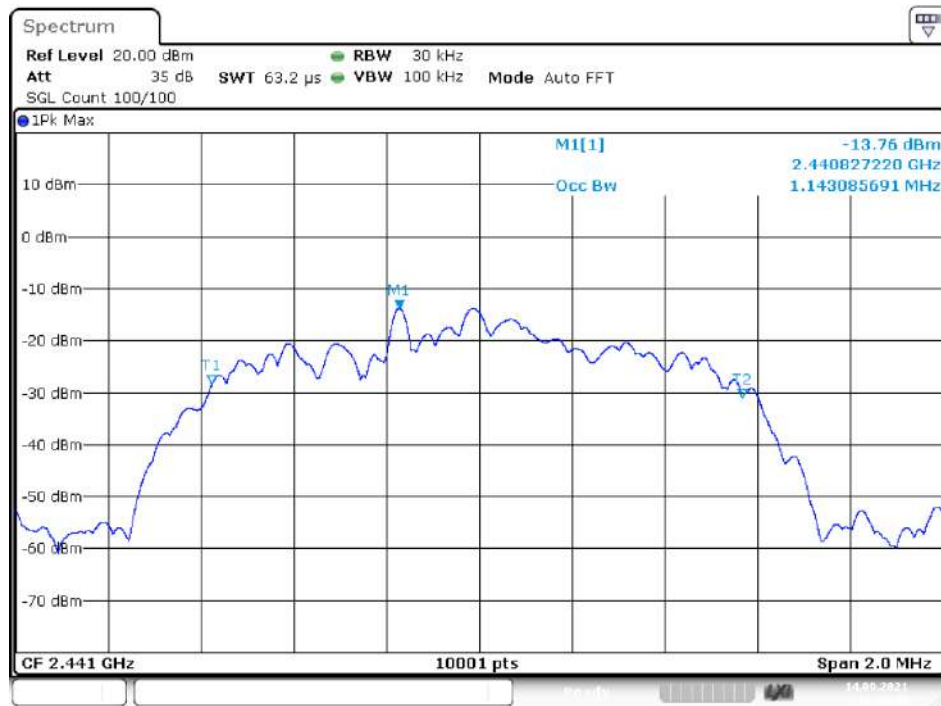
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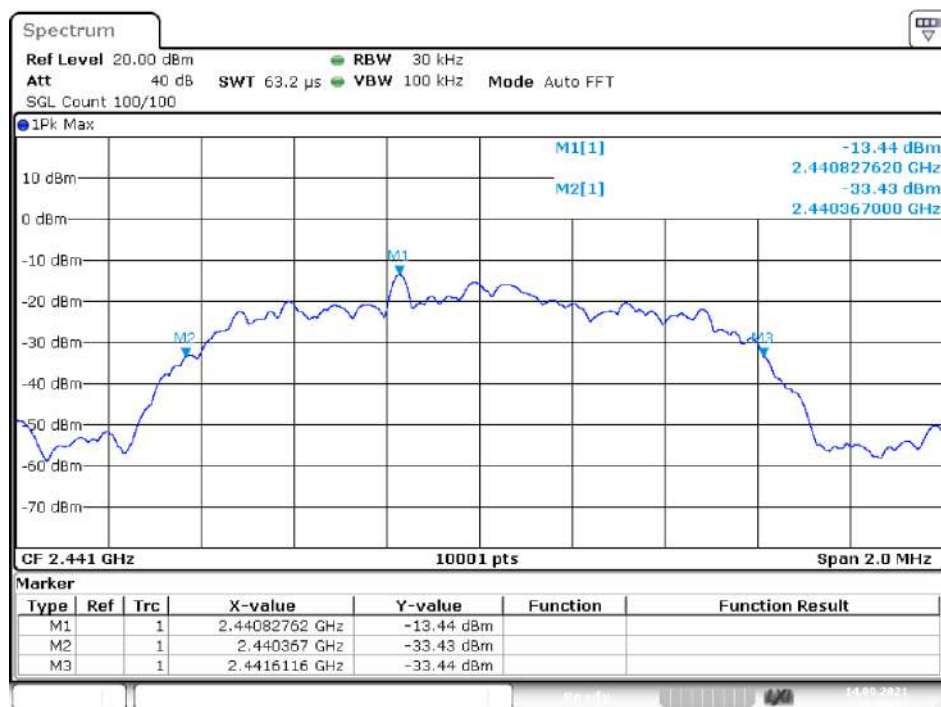
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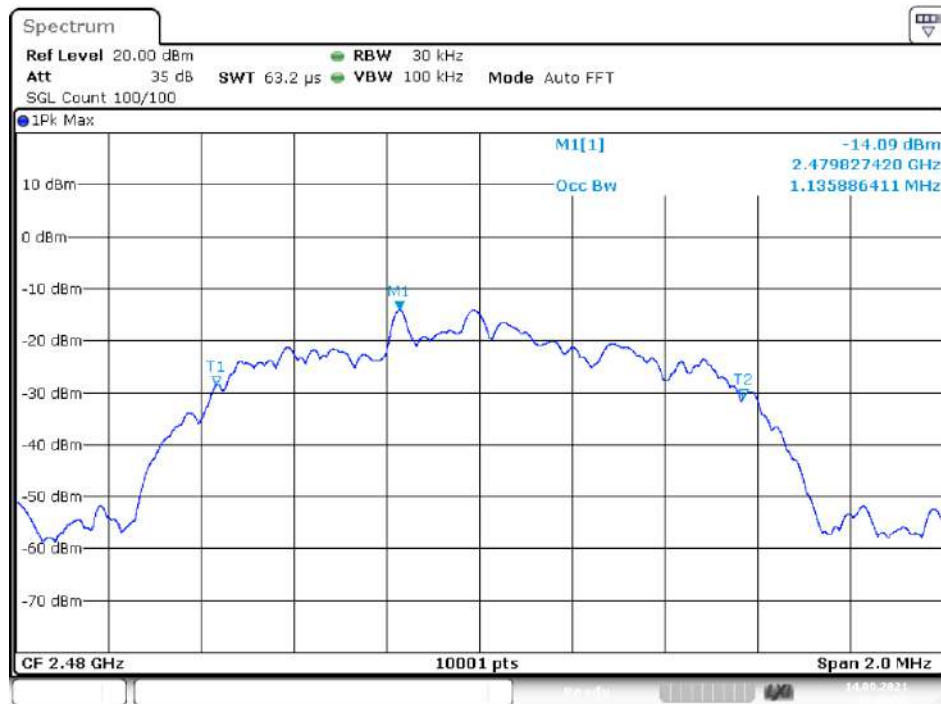
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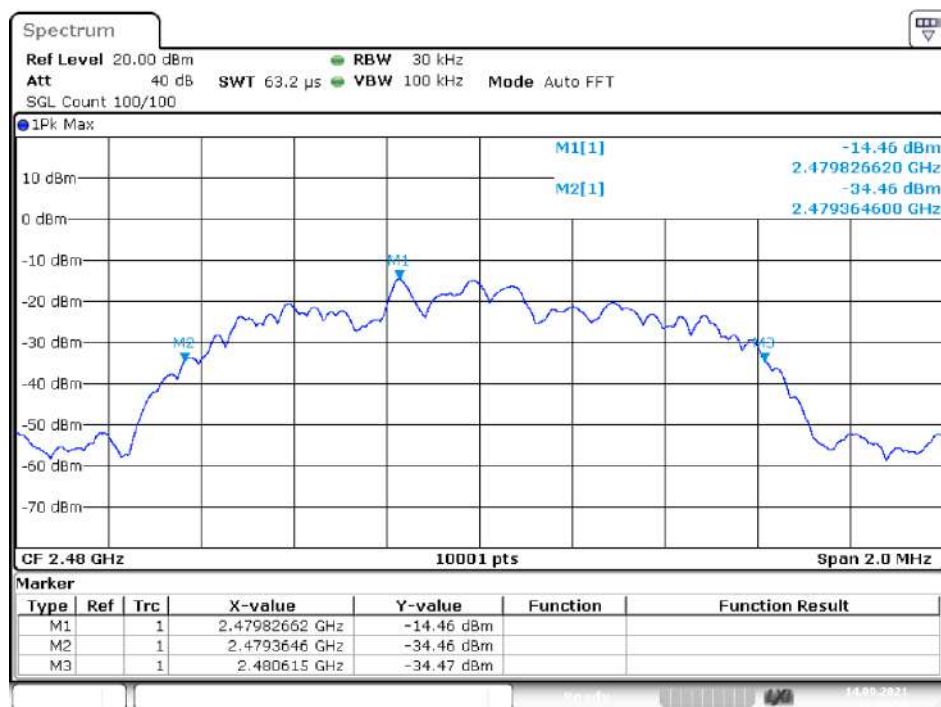
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OBW NVNT 3-DH1 2480MHz Ant1



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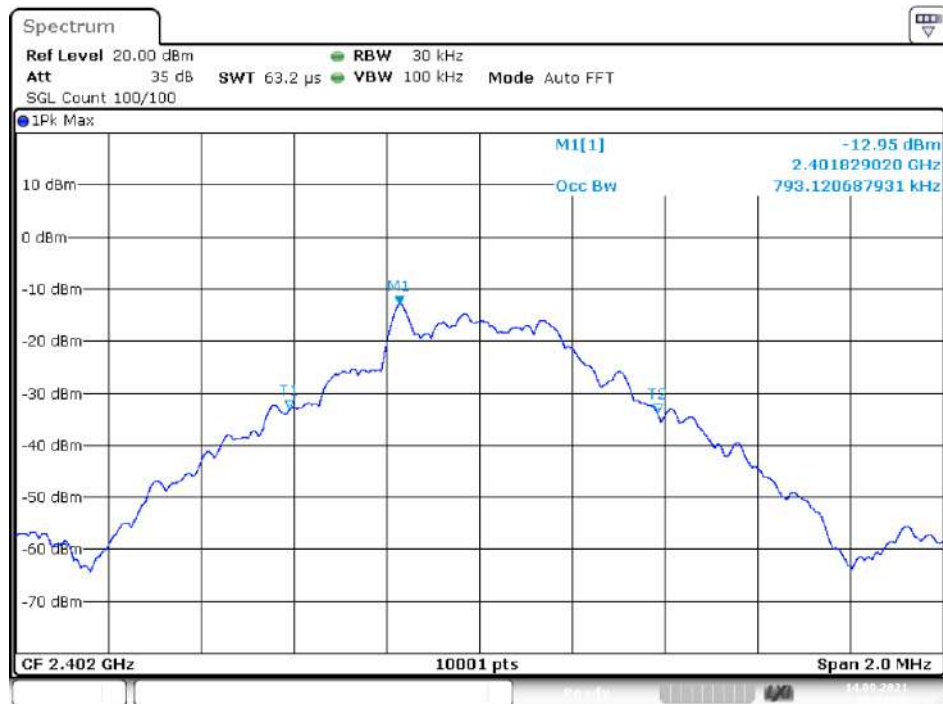
-20 dB BW NVNT 3-DH1 2480MHz Ant1



Date: 14.SEP.2021 12:33:58

For SP5078(red)							
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH1	2402	Ant 1	0.7931	0.7884	0	Pass
NVNT	1-DH1	2441	Ant 1	0.8027	0.7868	0	Pass
NVNT	1-DH1	2480	Ant 1	0.7929	0.8326	0	Pass
NVNT	2-DH1	2402	Ant 1	1.1403	1.2282	0	Pass
NVNT	2-DH1	2441	Ant 1	1.1479	1.22	0	Pass
NVNT	2-DH1	2480	Ant 1	1.1393	1.221	0	Pass
NVNT	3-DH1	2402	Ant 1	1.1529	1.2538	0	Pass
NVNT	3-DH1	2441	Ant 1	1.1489	1.2174	0	Pass
NVNT	3-DH1	2480	Ant 1	1.1495	1.2644	0	Pass

OBW NVNT 1-DH1 2402MHz Ant1



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-20 dB BW NVNT 1-DH1 2402MHz Ant1



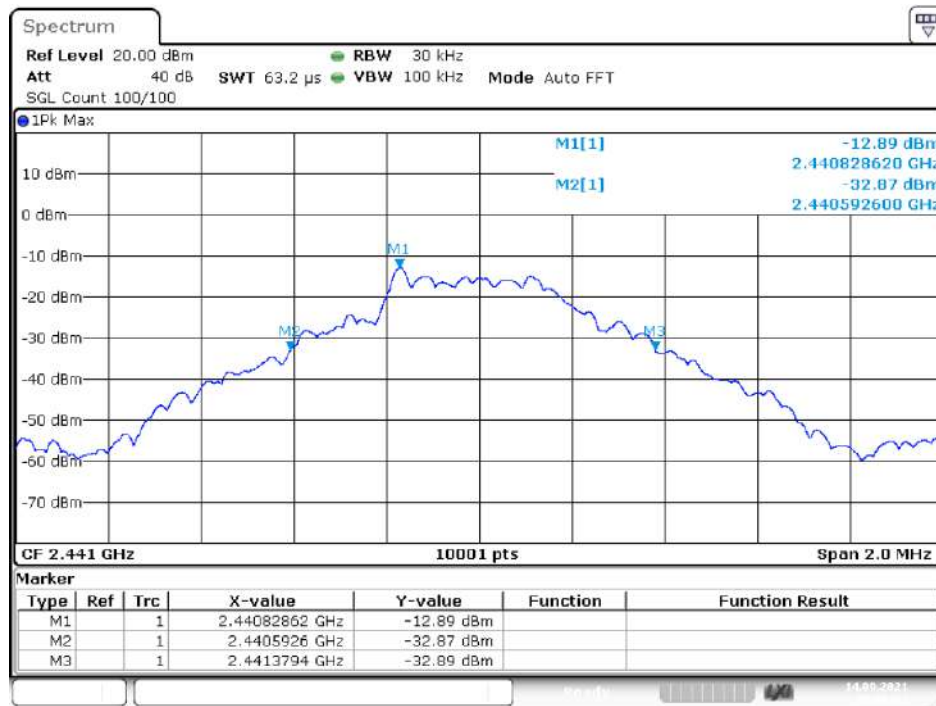
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OBW NVNT 1-DH1 2441MHz Ant1



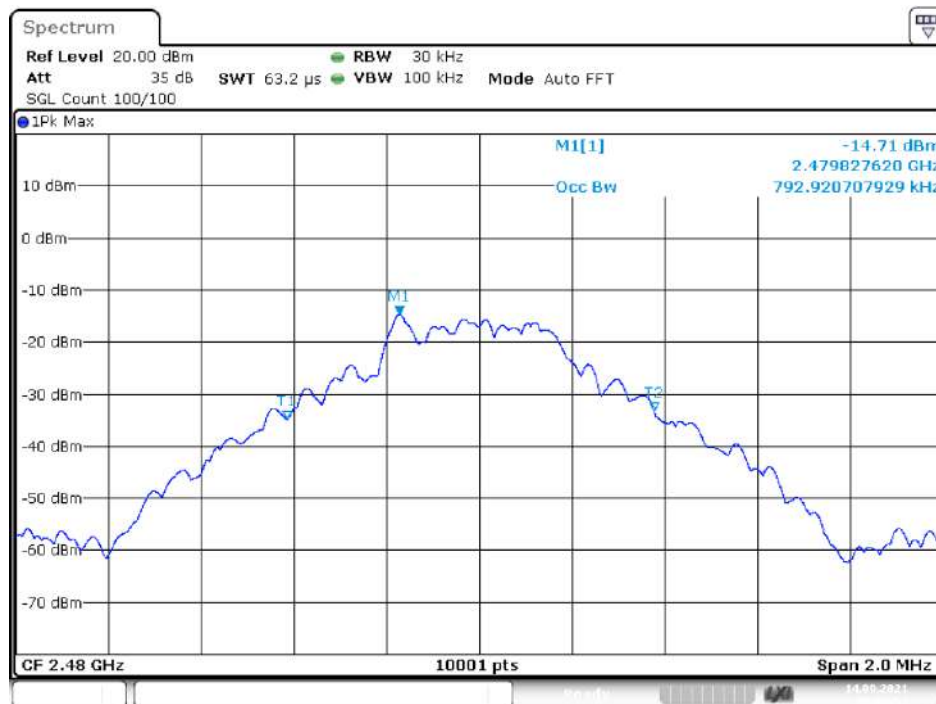
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-20 dB BW NVNT 1-DH1 2441MHz Ant1



Date: 14.SEP.2021 07:06:32

OBW NVNT 1-DH1 2480MHz Ant1



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-20 dB BW NVNT 1-DH1 2480MHz Ant1



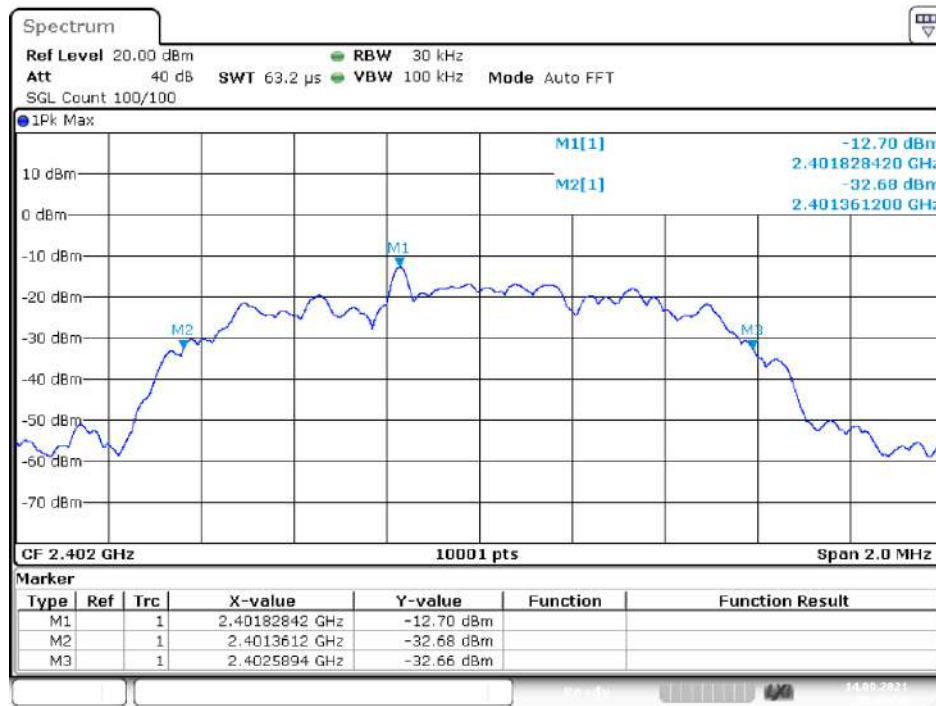
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OBW NVNT 2-DH1 2402MHz Ant1



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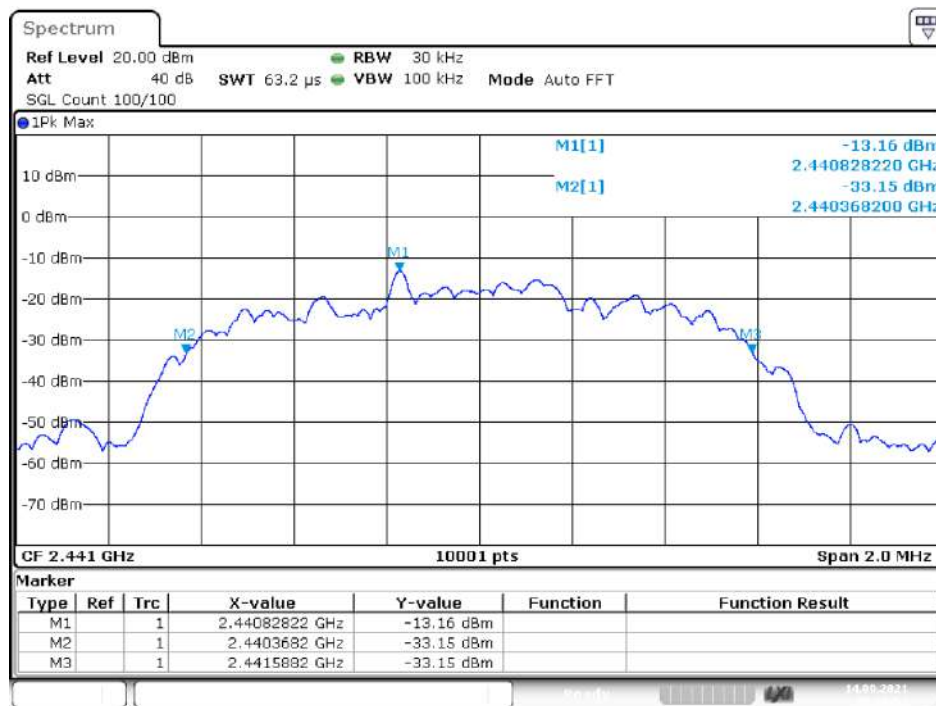
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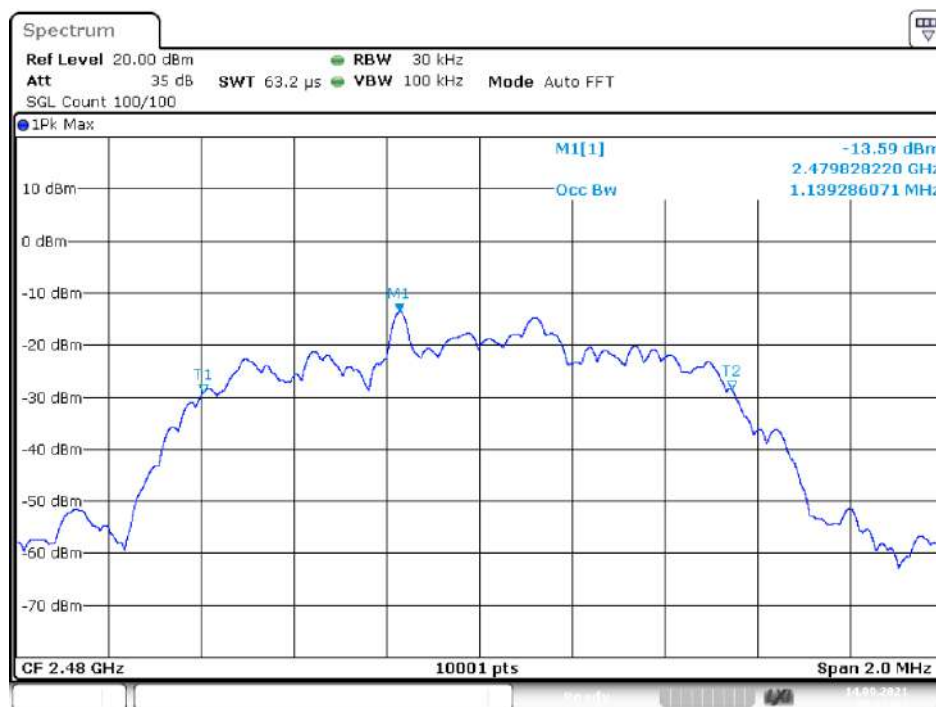
OBW NVNT 2-DH1 2441MHz Ant1



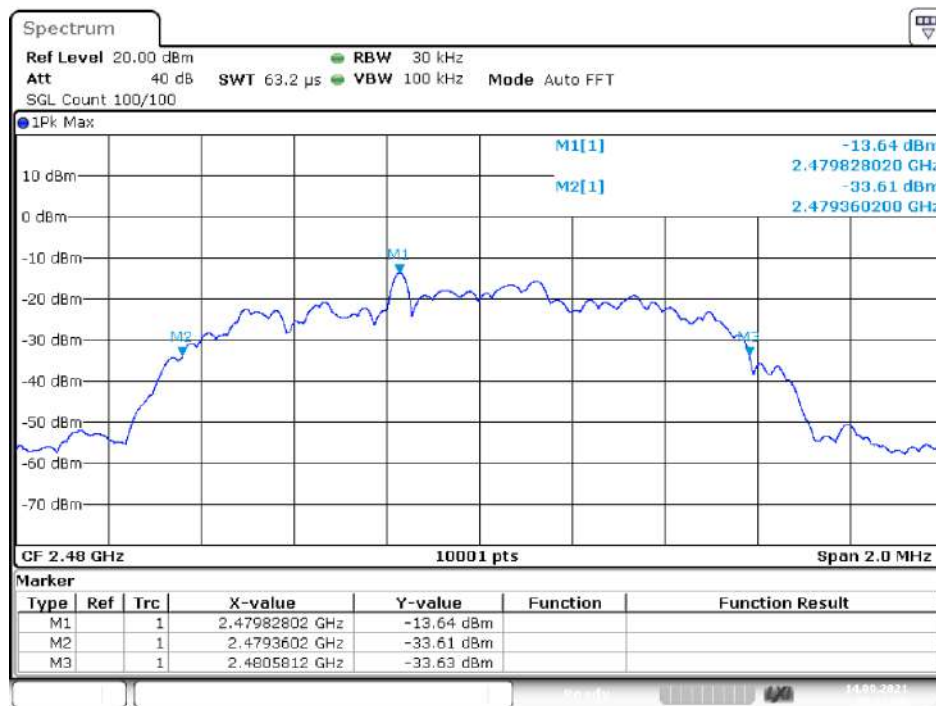
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OBW NVNT 2-DH1 2480MHz Ant1

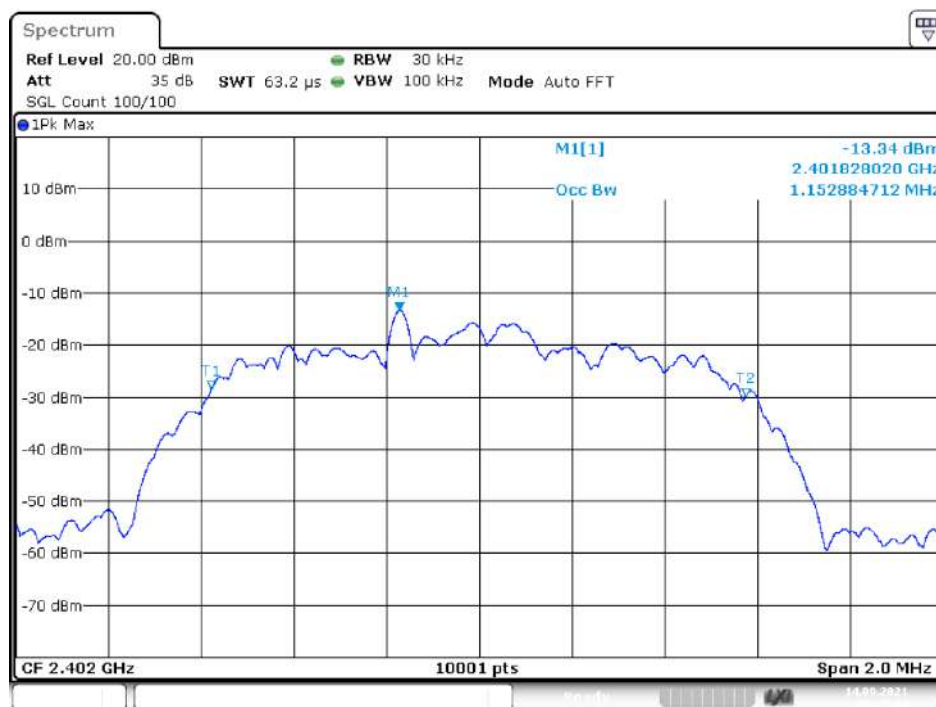


-20 dB BW NVNT 2-DH1 2480MHz Ant1



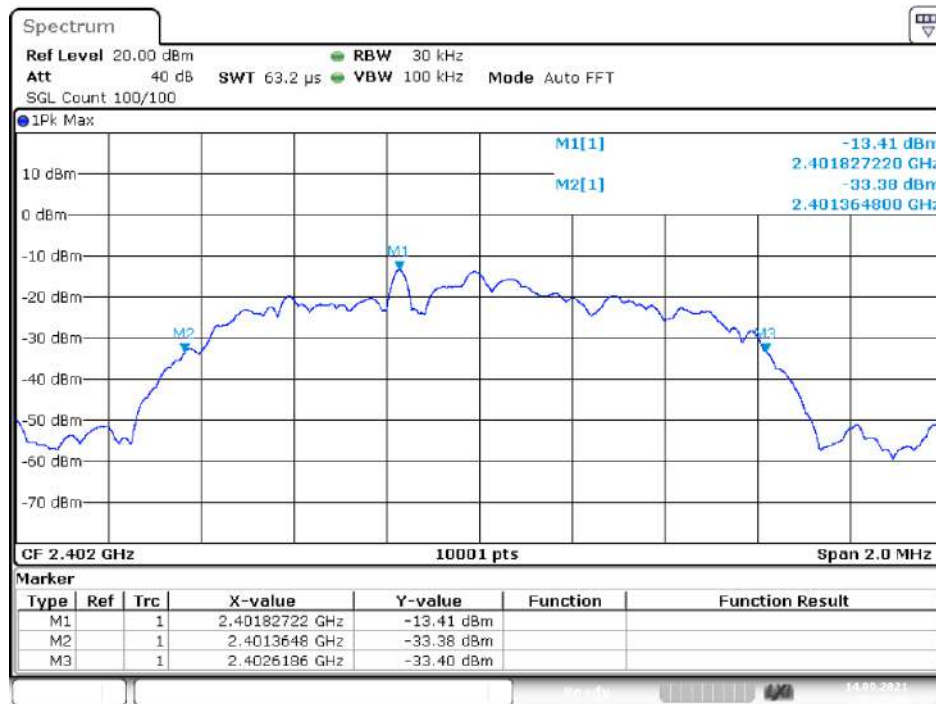
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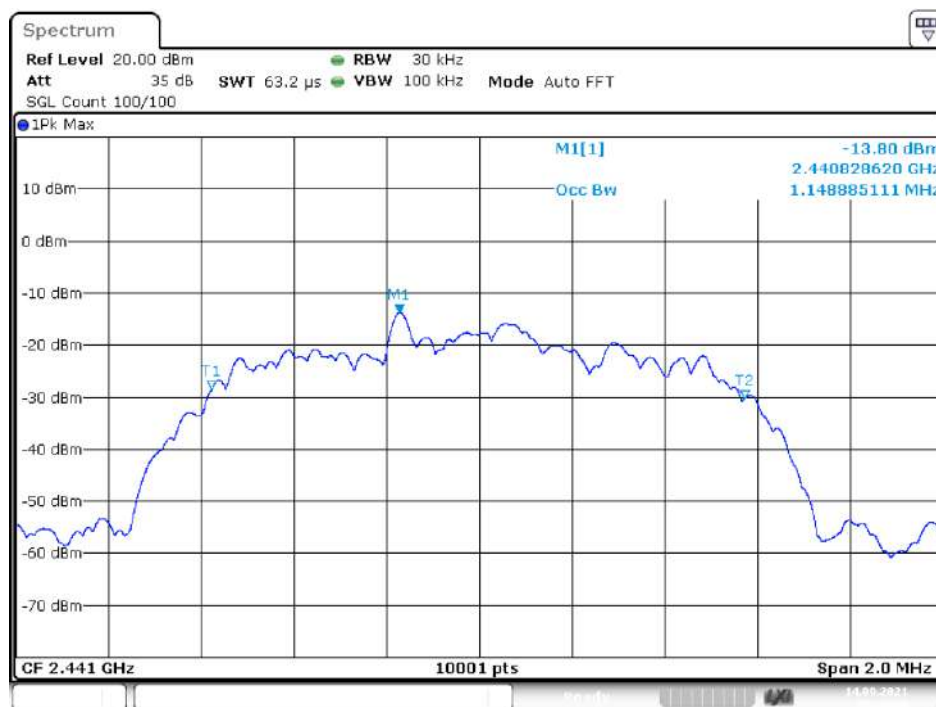


Date: 14.SEP.2021 07:22:05

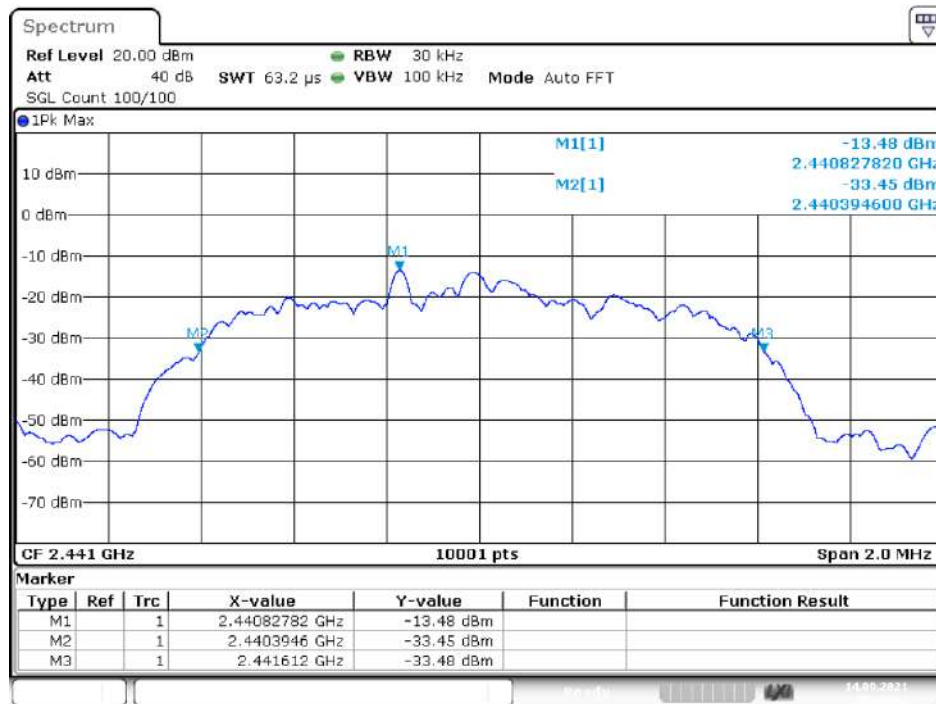
-20 dB BW NVNT 3-DH1 2402MHz Ant1



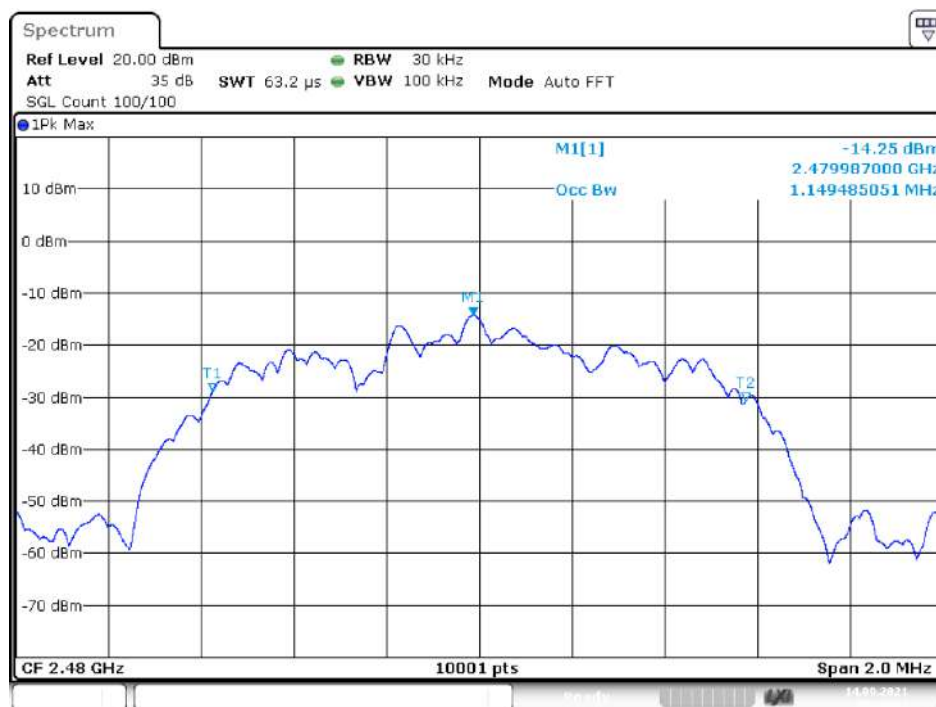
OBW NVNT 3-DH1 2441MHz Ant1



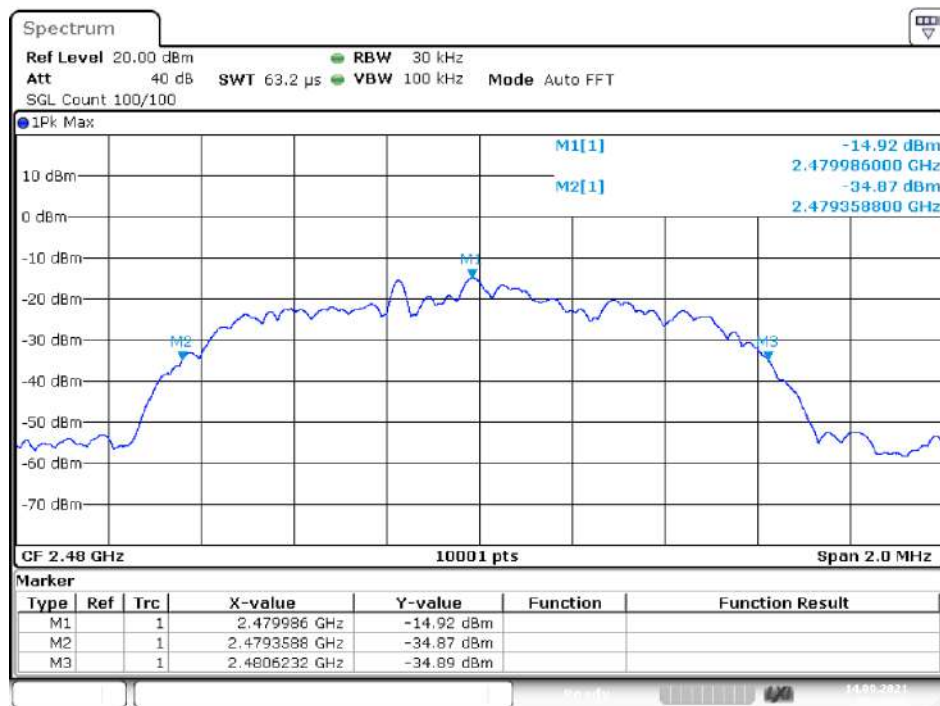
-20 dB BW NVNT 3-DH1 2441MHz Ant1



OBW NVNT 3-DH1 2480MHz Ant1



-20 dB BW NVNT 3-DH1 2480MHz Ant1



Date: 14.SEP.2021 07:24:34

5. Carrier Frequency Separation

5.1.Limit

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 2400-2483.5 MHz band 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 125 mW

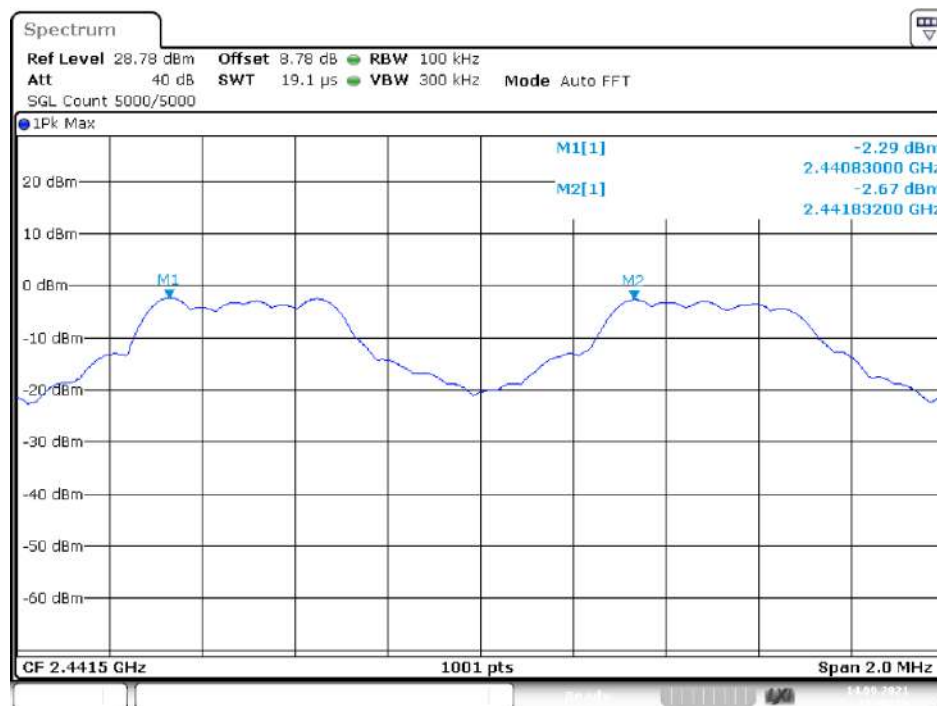
5.2.Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The carrier frequency was measured by spectrum analyzer with 20kHz RBW and 62kHz VBW.

5.3.Test Result

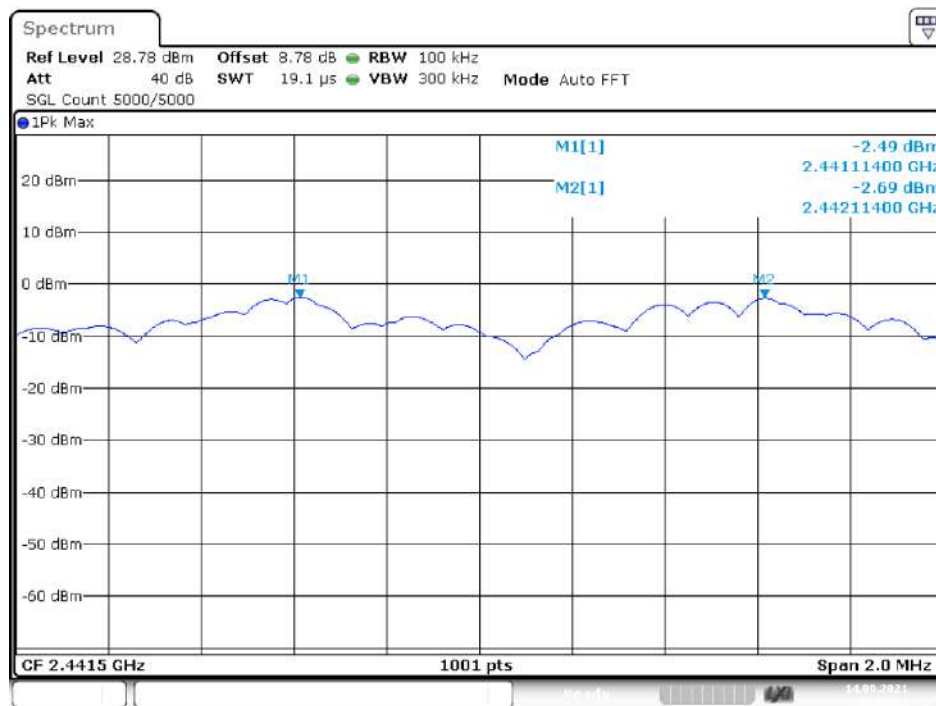
For SP5078(blue)						
Condition	Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH1	2440.83	2441.832	1.002	0.834	Pass
NVNT	2-DH1	2441.114	2442.114	1	0.834	Pass
NVNT	3-DH1	2440.988	2441.99	1.002	0.834	Pass

CFS NVNT 1-DH1 2441MHz

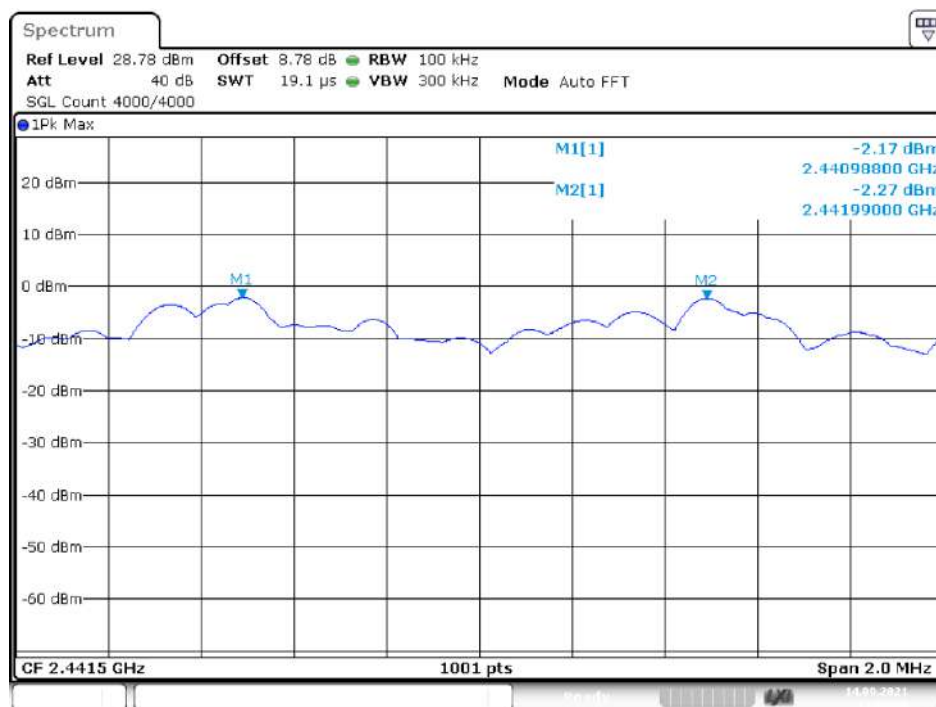


Date: 14.SEP.2021 12:40:16

CFS NVNT 2-DH1 2441MHz

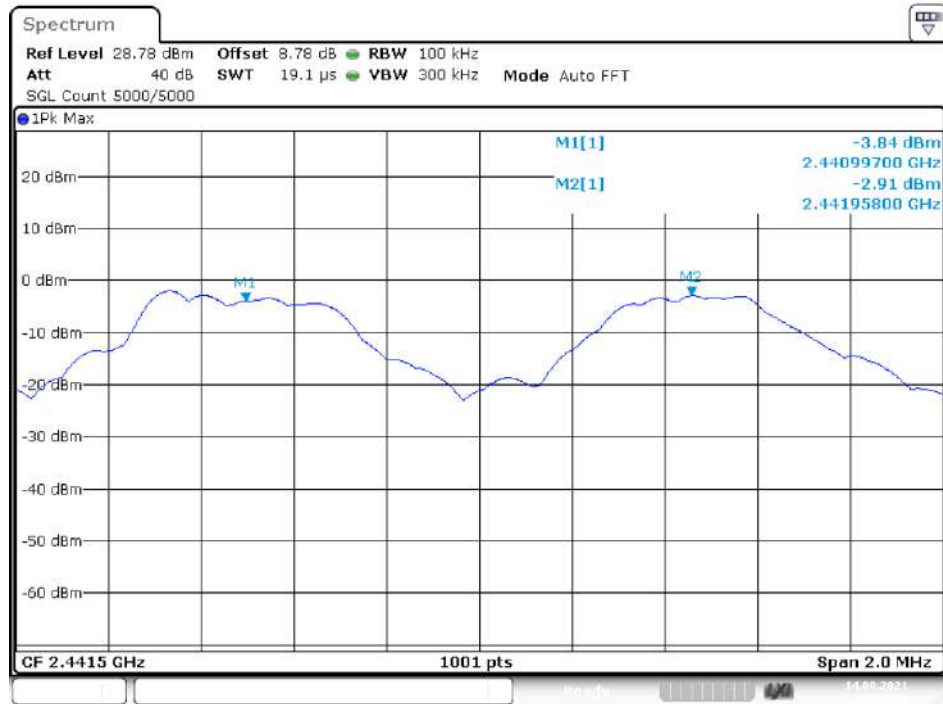


CFS NVNT 3-DH1 2441MHz



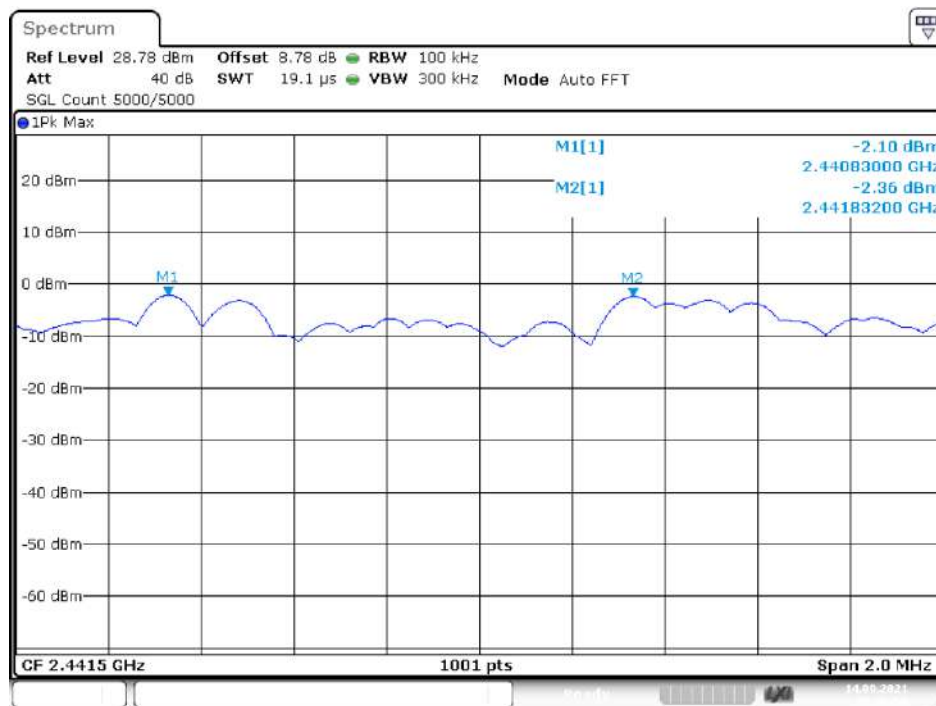
For SP5078(red)						
Condition	Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH1	2440.997	2441.958	0.961	0.667	Pass
NVNT	2-DH1	2440.83	2441.832	1.002	0.667	Pass
NVNT	3-DH1	2440.99	2441.99	1	0.667	Pass

CFS NVNT 1-DH1 2441MHz



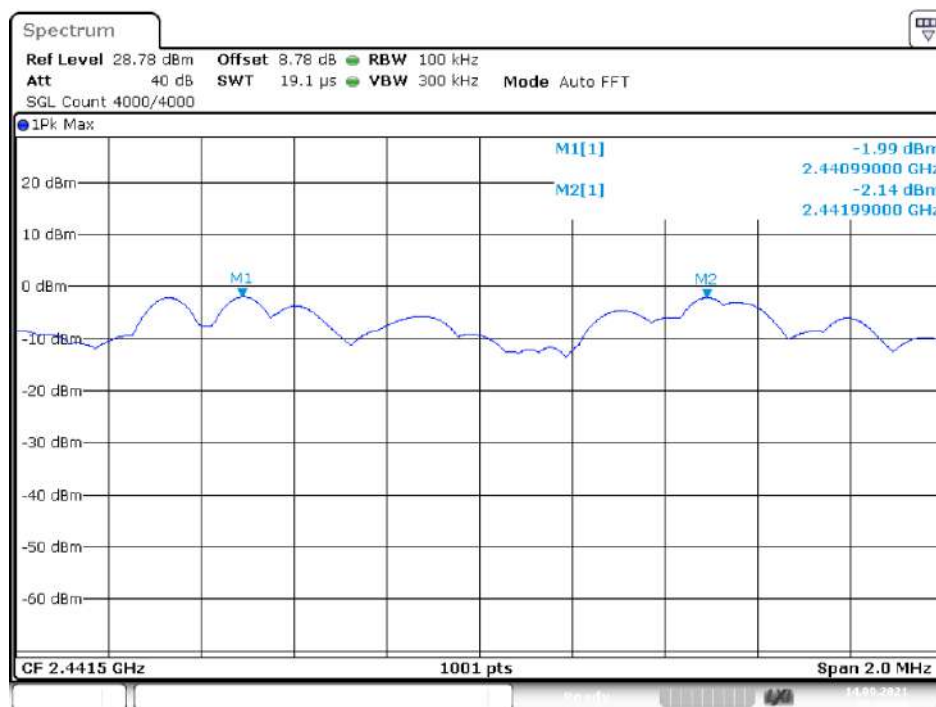
Date: 14.SEP.2021 09:57:36

CFS NVNT 2-DH1 2441MHz



Date: 14.SEP.2021 09:45:58

CFS NVNT 3-DH1 2441MHz



Date: 14.SEP.2021 09:49:39

6. Number Of Hopping Channel

6.1.Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

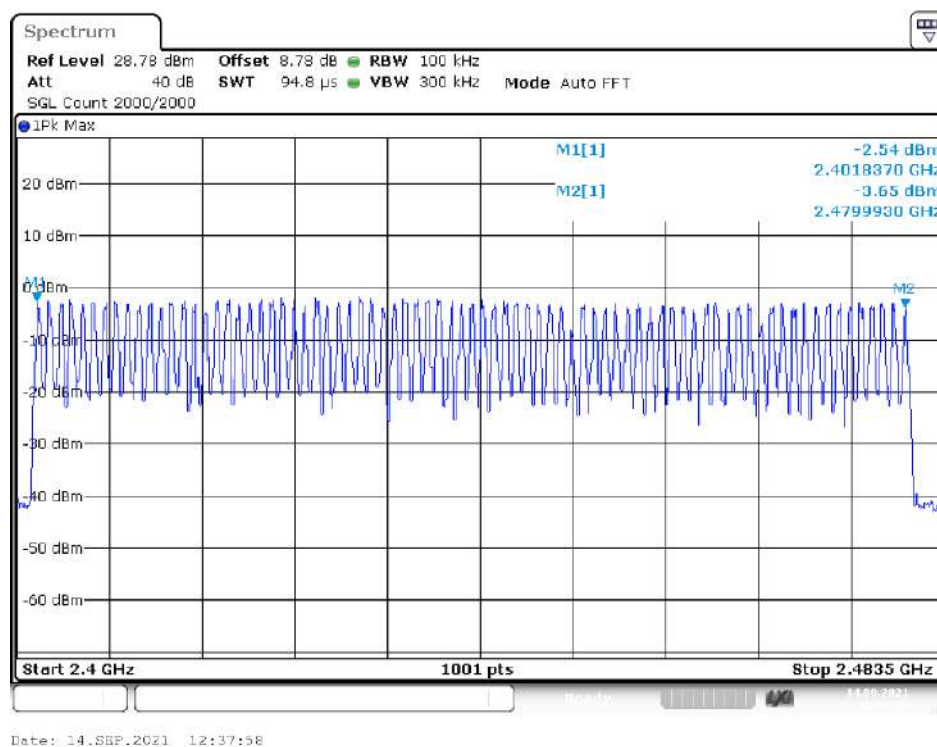
6.2.Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The number of hopping channel was measured by spectrum analyzer with 100kHz RBW and 300KHz VBW.

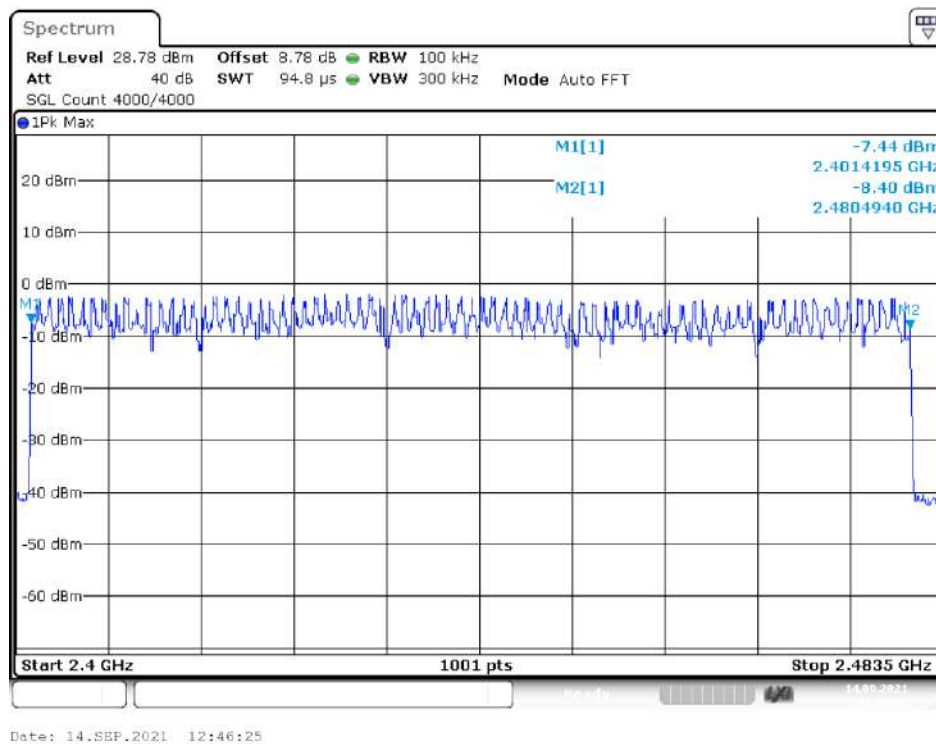
6.3.Test Result

For SP5078(blue)				
Condition	Mode	Hopping Number	Limit	Verdict
NVNT	1-DH1	79	15	Pass
NVNT	2-DH1	79	15	Pass
NVNT	3-DH1	79	15	Pass

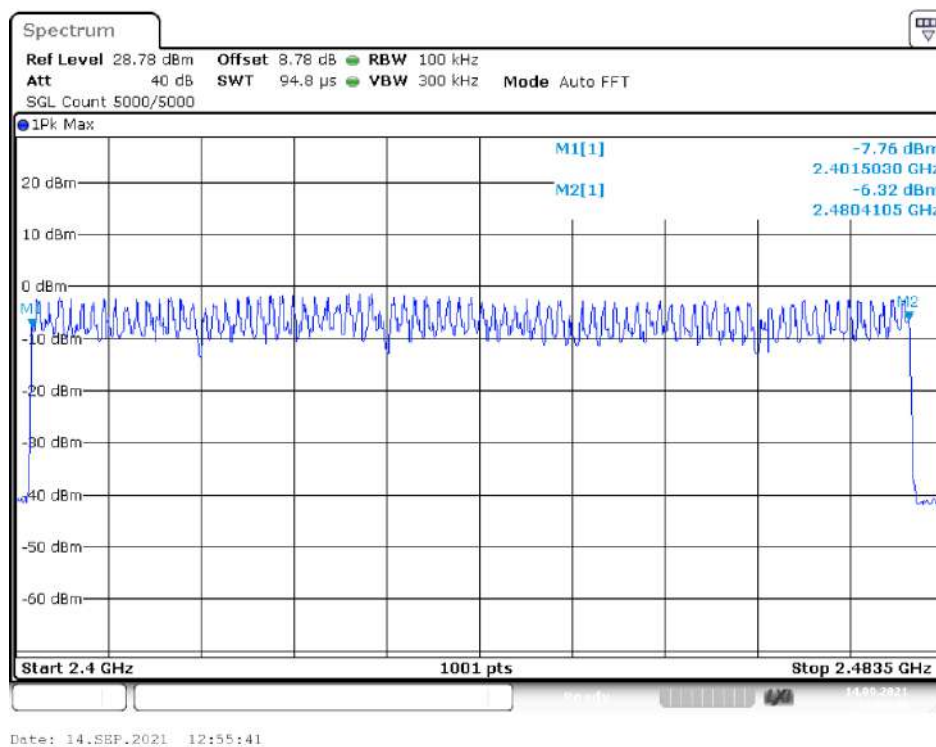
Hopping No. NVNT 1-DH1 2441MHz



Hopping No. NVNT 2-DH1 2441MHz

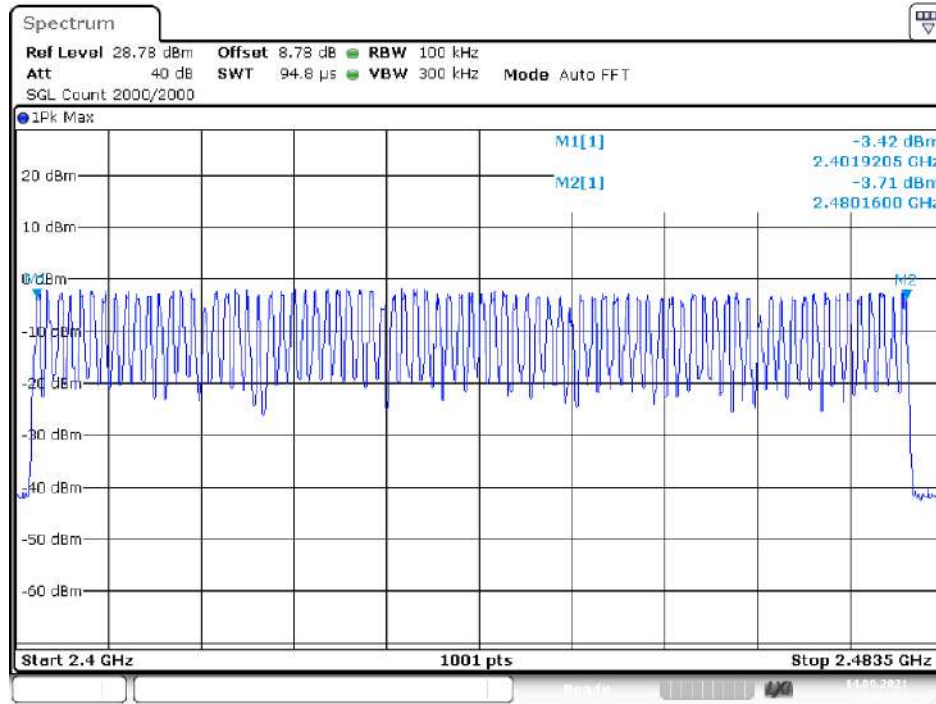


Hopping No. NVNT 3-DH1 2441MHz



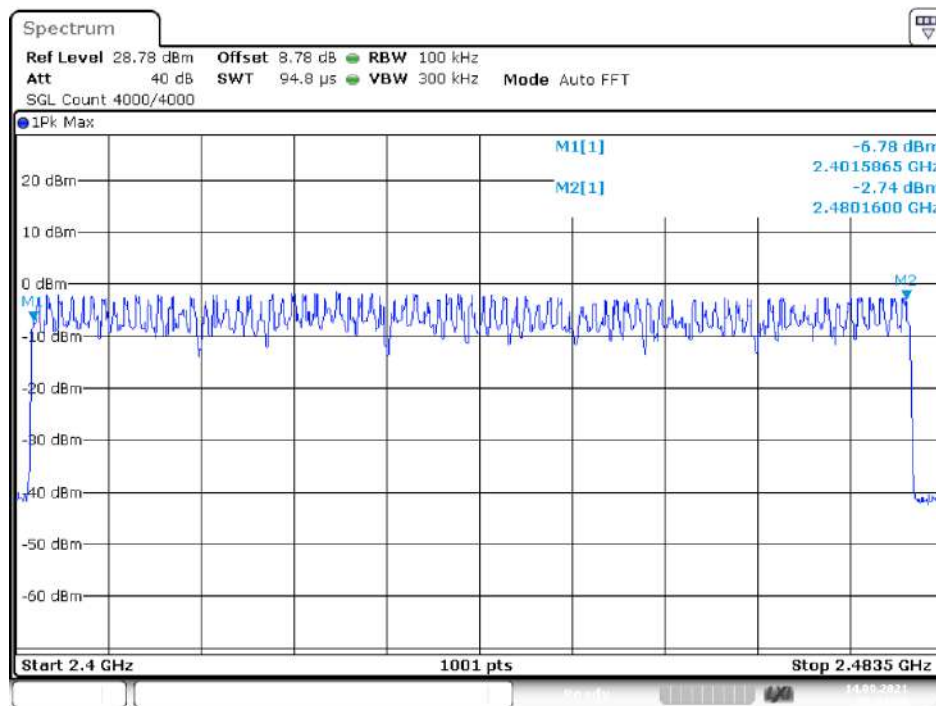
For SP5078(red)				
Condition	Mode	Hopping Number	Limit	Verdict
NVNT	1-DH1	79	15	Pass
NVNT	2-DH1	79	15	Pass
NVNT	3-DH1	79	15	Pass

Hopping No. NVNT 1-DH1 2441MHz



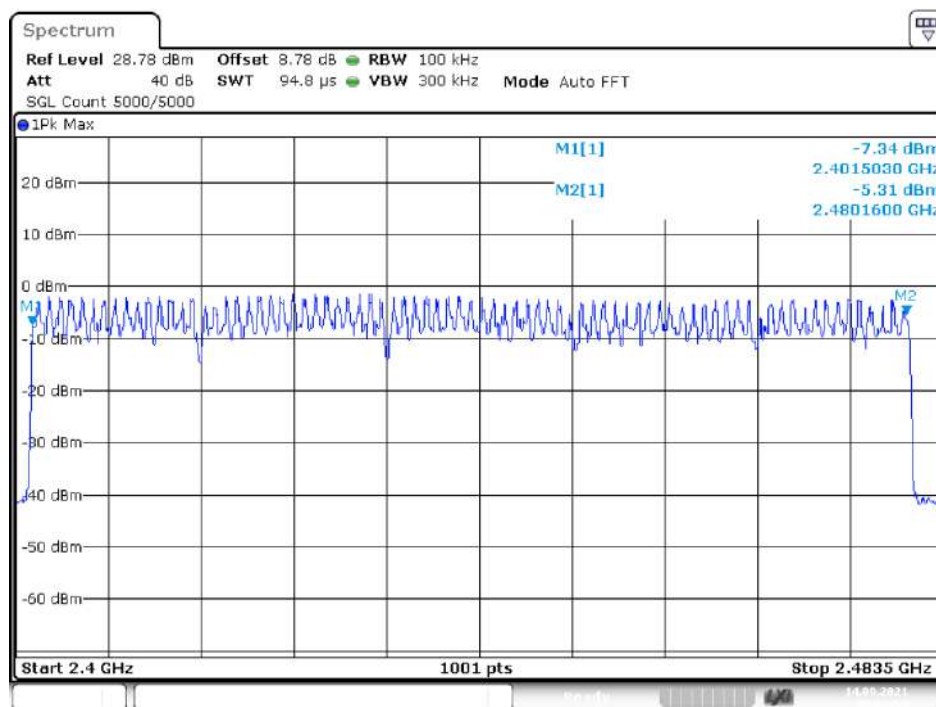
Date: 14.SEP.2021 10:01:51

Hopping No. NVNT 2-DH1 2441MHz



Date: 14.SEP.2021 09:41:29

Hopping No. NVNT 3-DH1 2441MHz



Date: 14.SEP.2021 09:51:54

7. Dwell Time

7.1. Test limit

Please refer section 15.247

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 s within period of 0.4 seconds multiplied by the number of hopping channels employed.

7.2. Test Procedure

7.2.1. Place the EUT on the table and set it in transmitting mode.

7.2.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

7.2.3. Set center frequency of spectrum analyzer = operating frequency.

7.2.4. Set the spectrum analyzer as RBW=1MHz, VBW=1MHz, Span = 0Hz, Sweep = auto.

7.2.5. Repeat above procedures until all frequency measured were complete.

7.3. Test Result

PASS.

For SP5078(blue)							
Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2441	0.367	117.440	31600	400	Pass
NVNT	1-DH3	2441	1.642	262.720	31600	400	Pass
NVNT	1-DH5	2441	2.889	308.160	31600	400	Pass
NVNT	2-DH1	2441	0.395	126.400	31600	400	Pass
NVNT	2-DH3	2441	1.648	263.680	31600	400	Pass
NVNT	2-DH5	2441	2.889	308.160	31600	400	Pass
NVNT	3-DH1	2441	0.373	119.360	31600	400	Pass
NVNT	3-DH3	2441	1.623	259.680	31600	400	Pass
NVNT	3-DH5	2441	2.869	306.027	31600	400	Pass

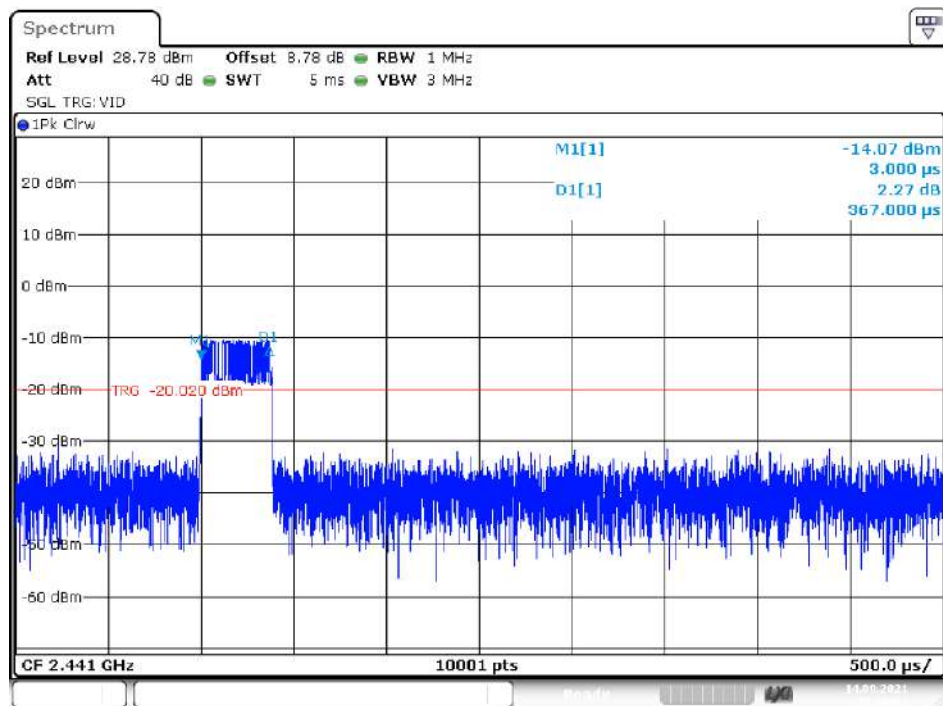
Note: 1 A period time = $0.4 \text{ (s)} * 79 = 31.6 \text{ (s)}$

DH1 Dwell Time = Pulse Time * $(1600/(2*79))$ * A period time

DH3 Dwell Time = Pulse Time * $(1600/(4*79))$ * A period time

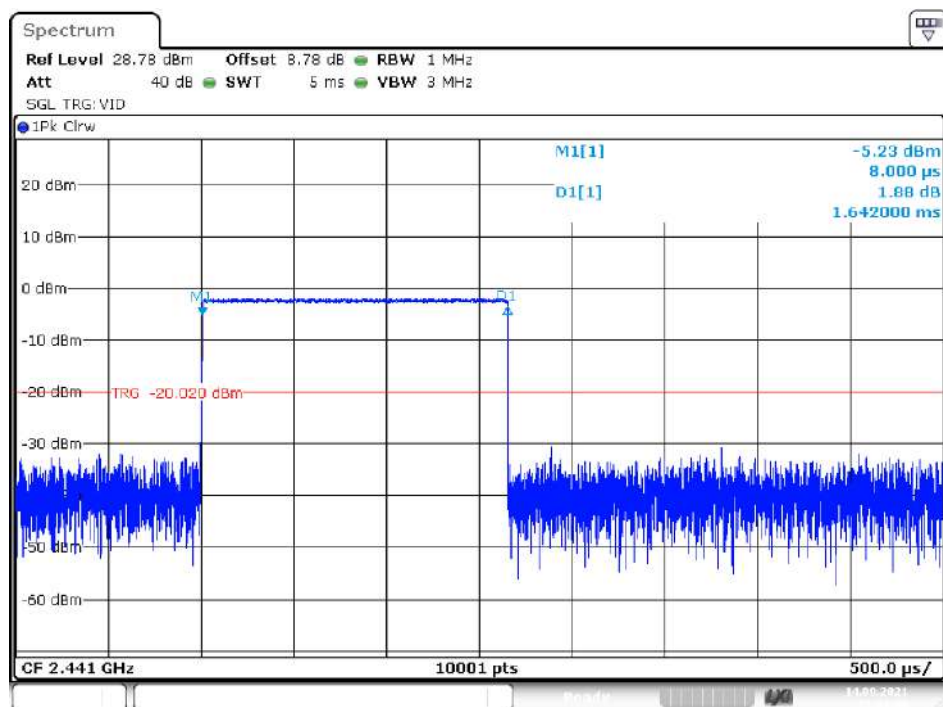
DH5 Dwell Time = Pulse Time * $(1600/(6*79))$ * A period time

Dwell NVNT 1-DH1 2441MHz



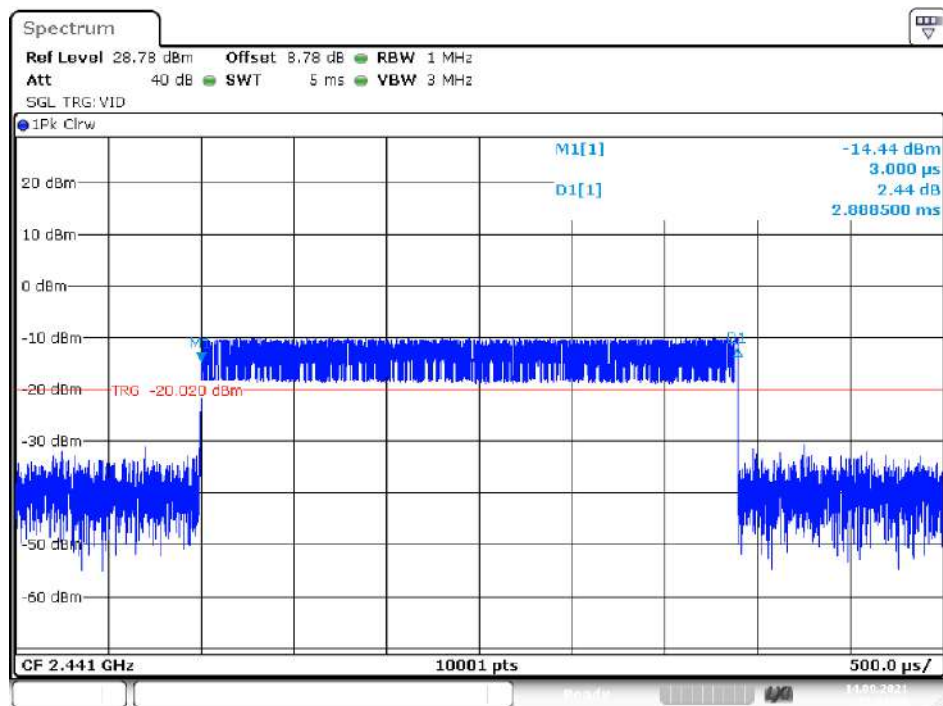
Date: 14.SEP.2021 12:38:12

Dwell NVNT 1-DH3 2441MHz



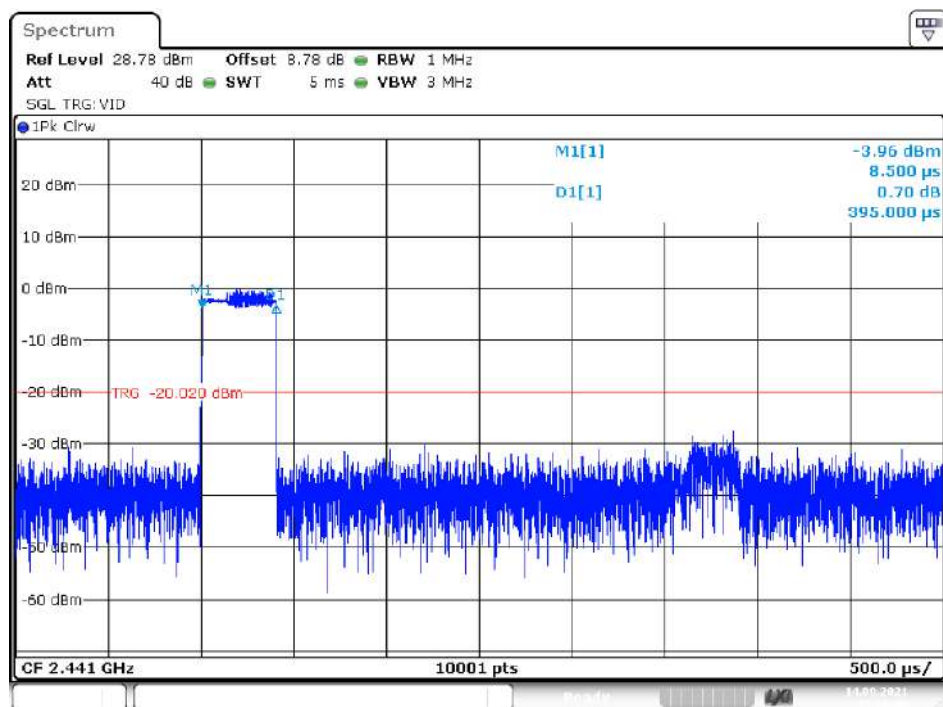
Date: 14.SEP.2021 12:41:59

Dwell NVNT 1-DH5 2441MHz



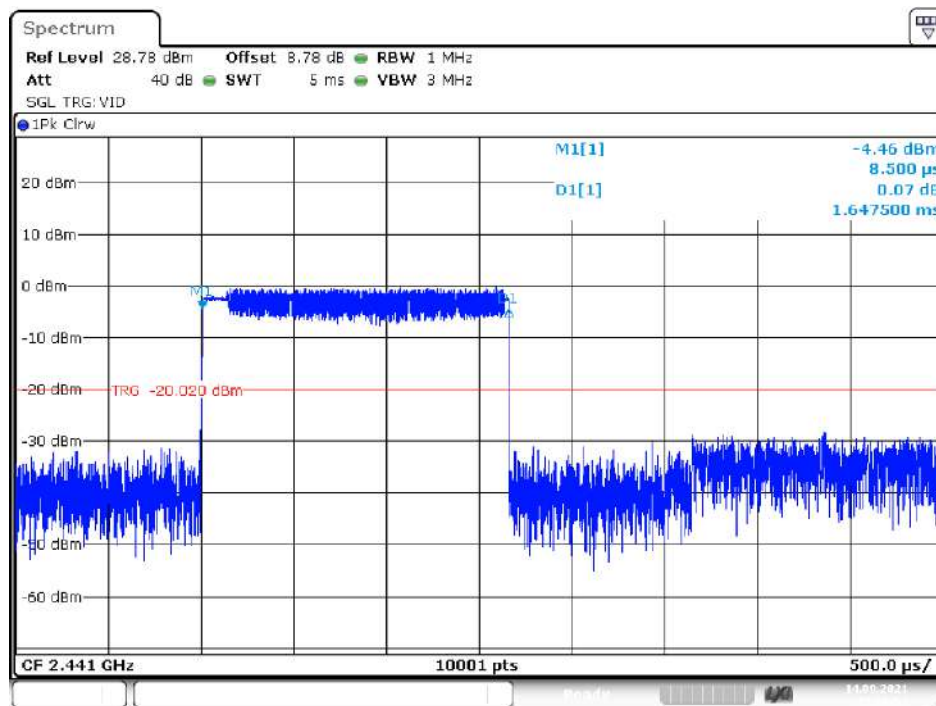
Date: 14.SEP.2021 12:42:18

Dwell NVNT 2-DH1 2441MHz



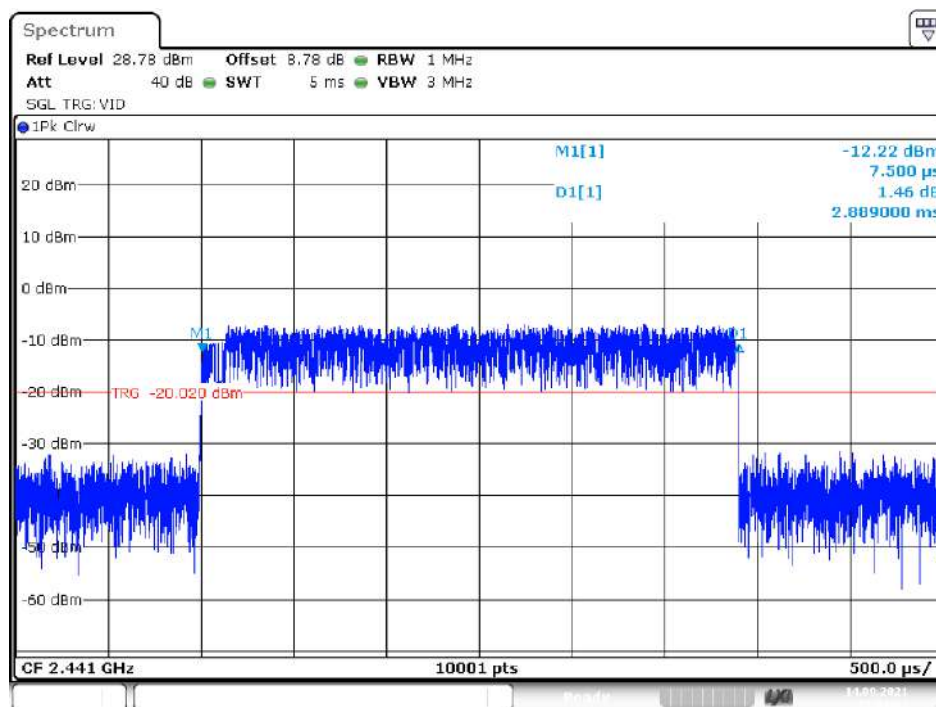
Date: 14.SEP.2021 12:50:06

Dwell NVNT 2-DH3 2441MHz



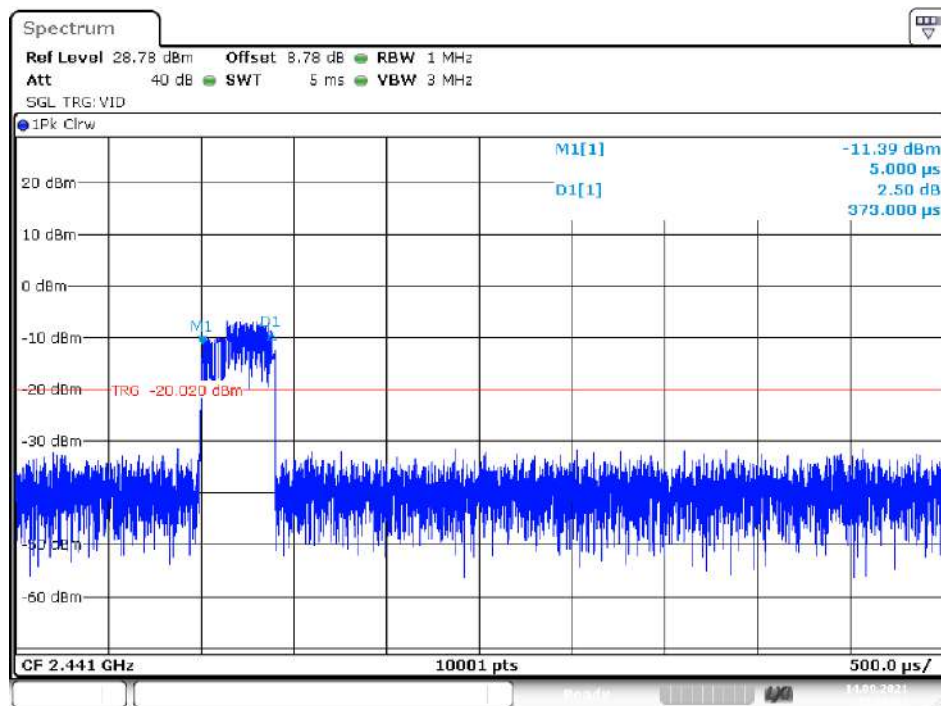
Date: 14.SEP.2021 12:50:57

Dwell NVNT 2-DH5 2441MHz



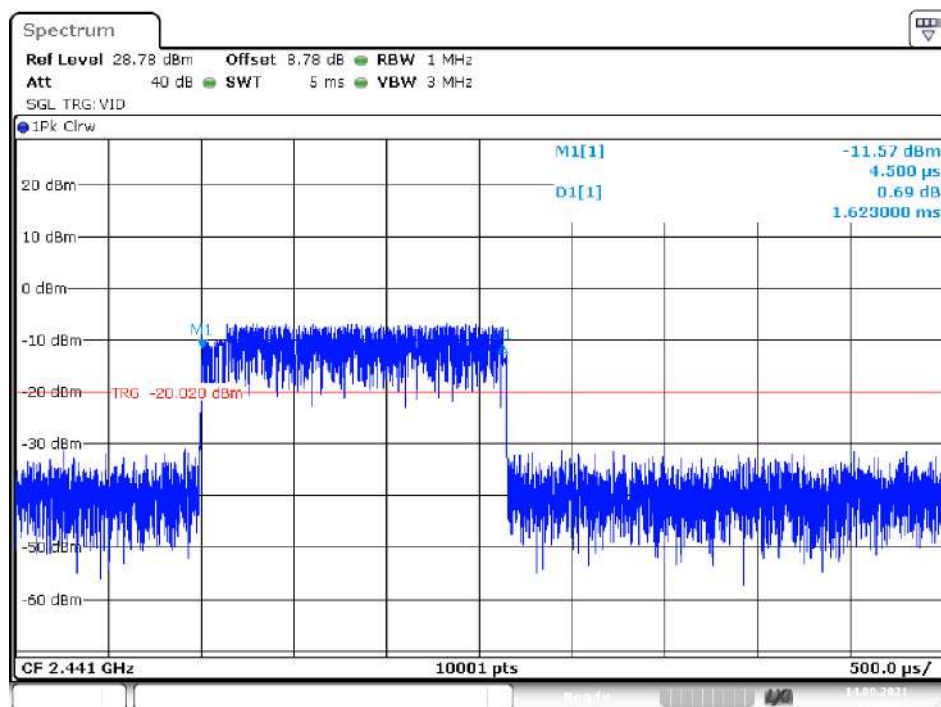
Date: 14.SEP.2021 12:51:12

Dwell NVNT 3-DH1 2441MHz



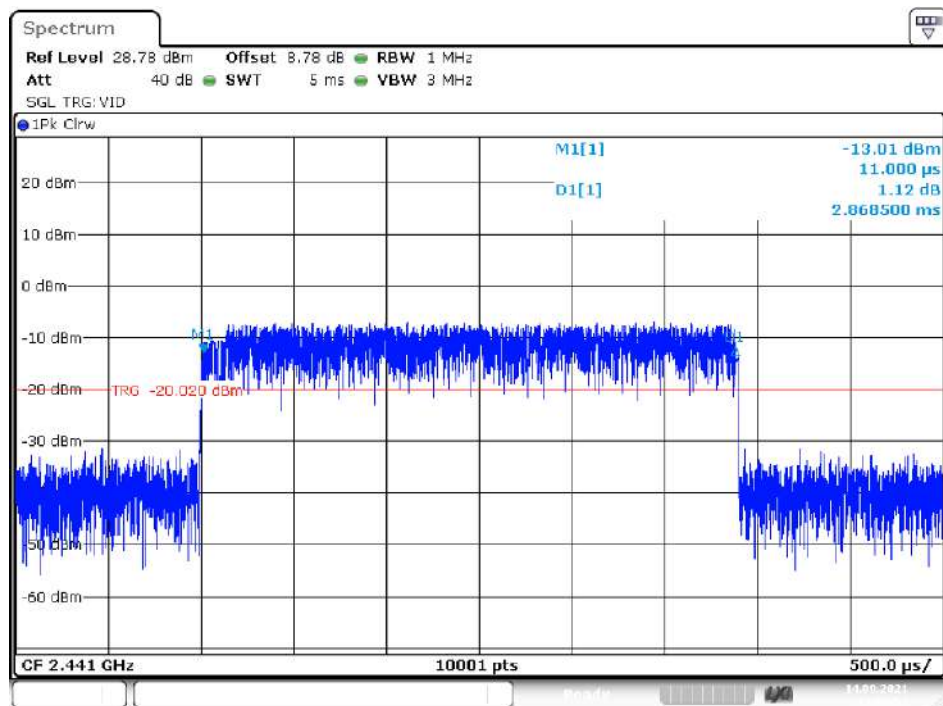
Date: 14.SEP.2021 12:59:11

Dwell NVNT 3-DH3 2441MHz



Date: 14.SEP.2021 13:00:37

Dwell NVNT 3-DH5 2441MHz



Date: 14.SEP.2021 13:00:57

For SP5078(red)							
Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2441	0.386	123.520	31600	400	Pass
NVNT	1-DH3	2441	1.64	262.400	31600	400	Pass
NVNT	1-DH5	2441	2.889	308.160	31600	400	Pass
NVNT	2-DH1	2441	0.373	119.360	31600	400	Pass
NVNT	2-DH3	2441	1.623	259.680	31600	400	Pass
NVNT	2-DH5	2441	2.892	308.480	31600	400	Pass
NVNT	3-DH1	2441	0.374	119.680	31600	400	Pass
NVNT	3-DH3	2441	1.646	263.360	31600	400	Pass
NVNT	3-DH5	2441	2.875	306.667	31600	400	Pass

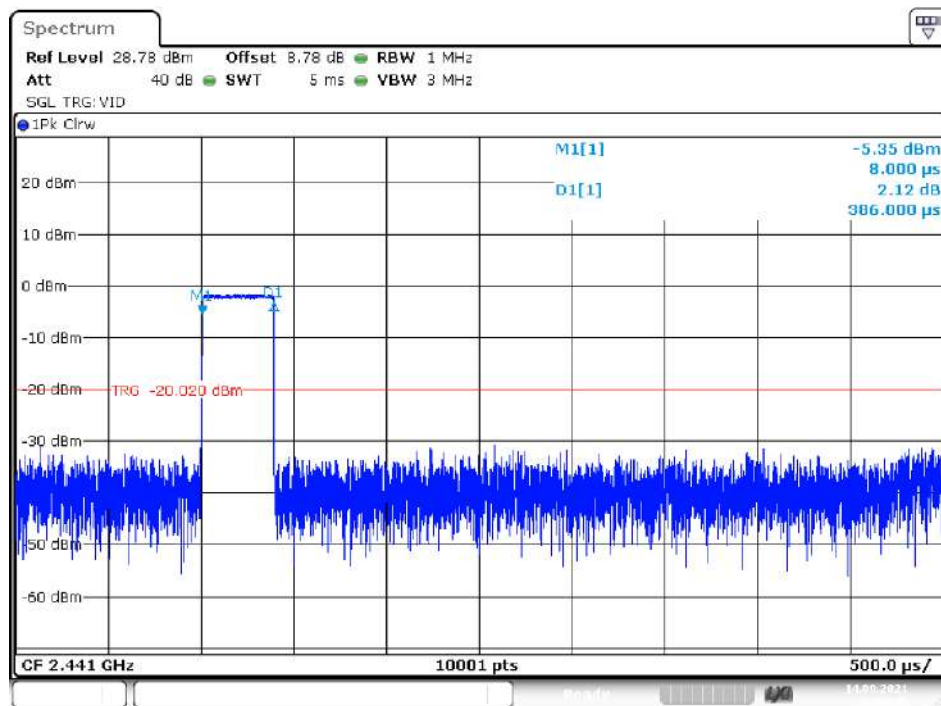
Note: 1 A period time = $0.4 \text{ (s)} * 79 = 31.6 \text{ (s)}$

DH1 Dwell Time = Pulse Time * $(1600 / (2 * 79)) * \text{A period time}$

DH3 Dwell Time = Pulse Time * $(1600 / (4 * 79)) * \text{A period time}$

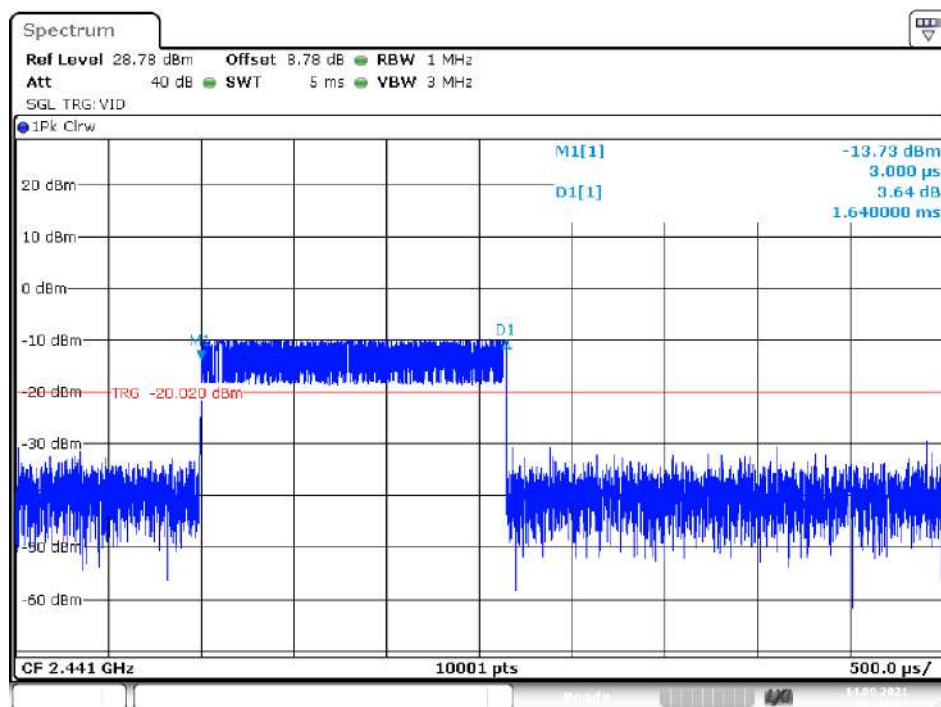
DH5 Dwell Time = Pulse Time * $(1600 / (6 * 79)) * \text{A period time}$

Dwell NVNT 1-DH1 2441MHz



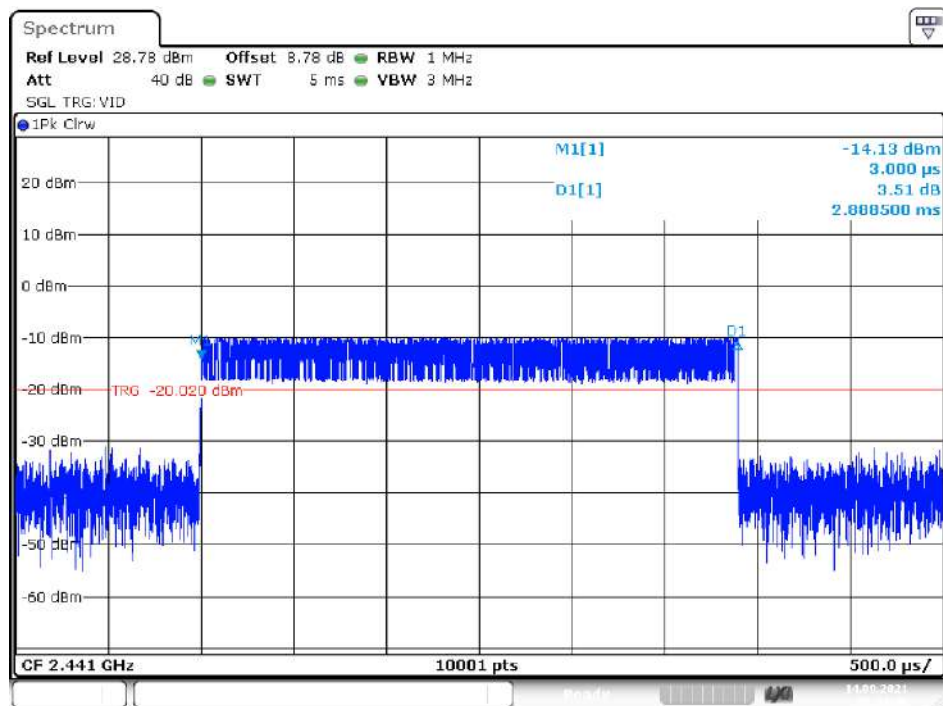
Date: 14.SEP.2021 10:00:44

Dwell NVNT 1-DH3 2441MHz



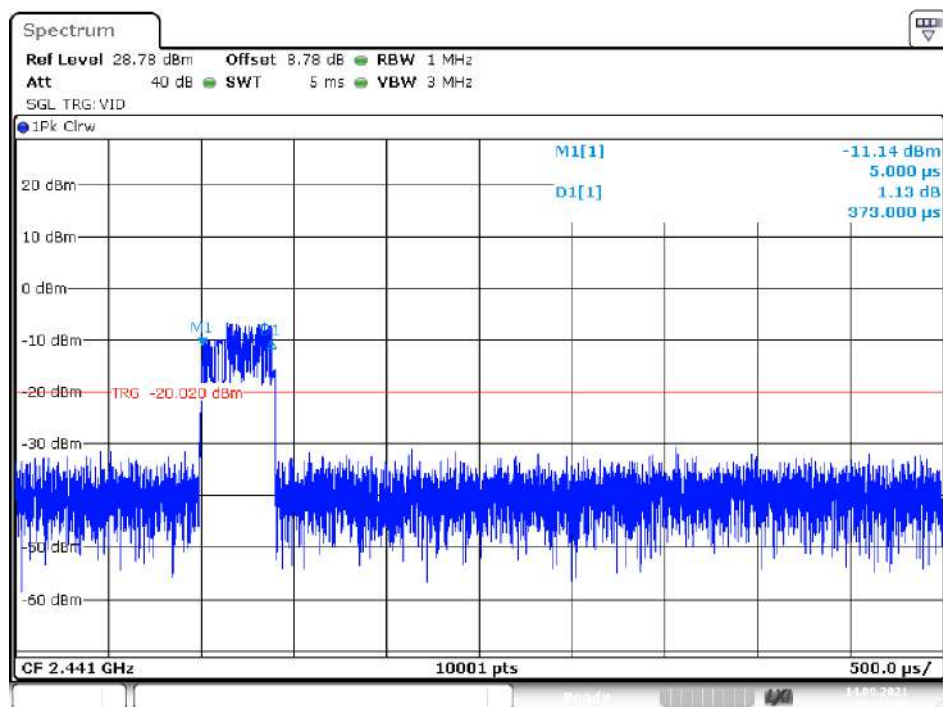
Date: 14.SEP.2021 09:33:33

Dwell NVNT 1-DH5 2441MHz



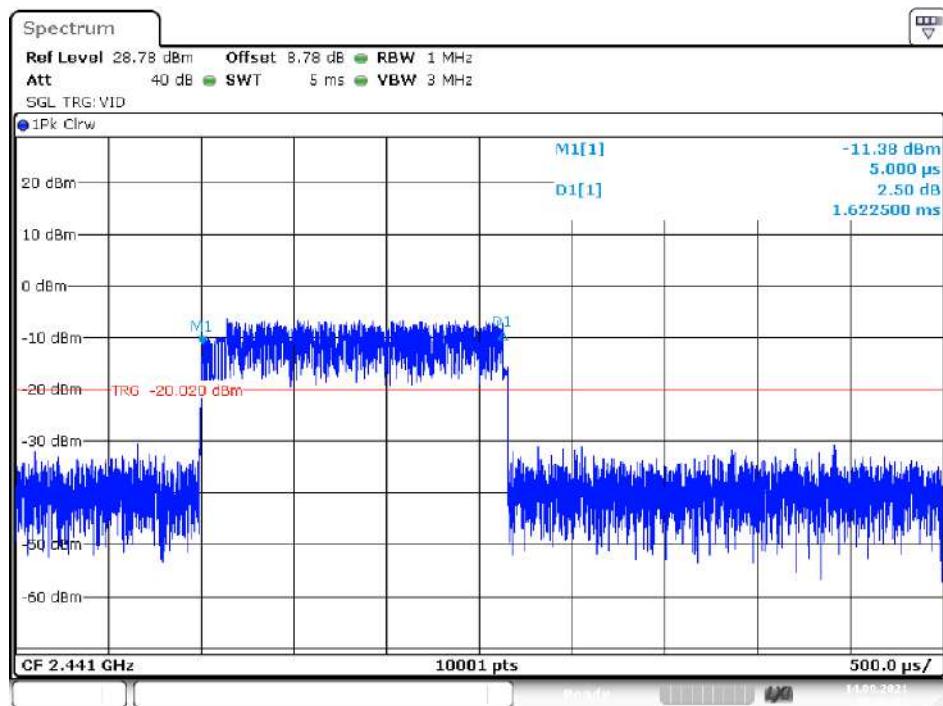
Date: 14.SEP.2021 09:33:46

Dwell NVNT 2-DH1 2441MHz



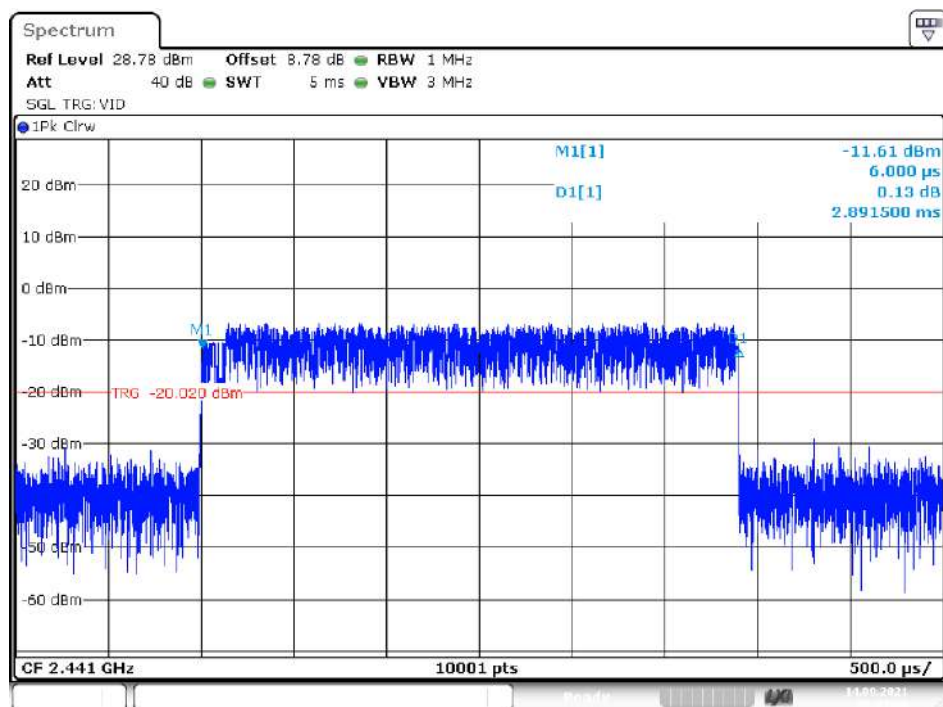
Date: 14.SEP.2021 09:41:38

Dwell NVNT 2-DH3 2441MHz



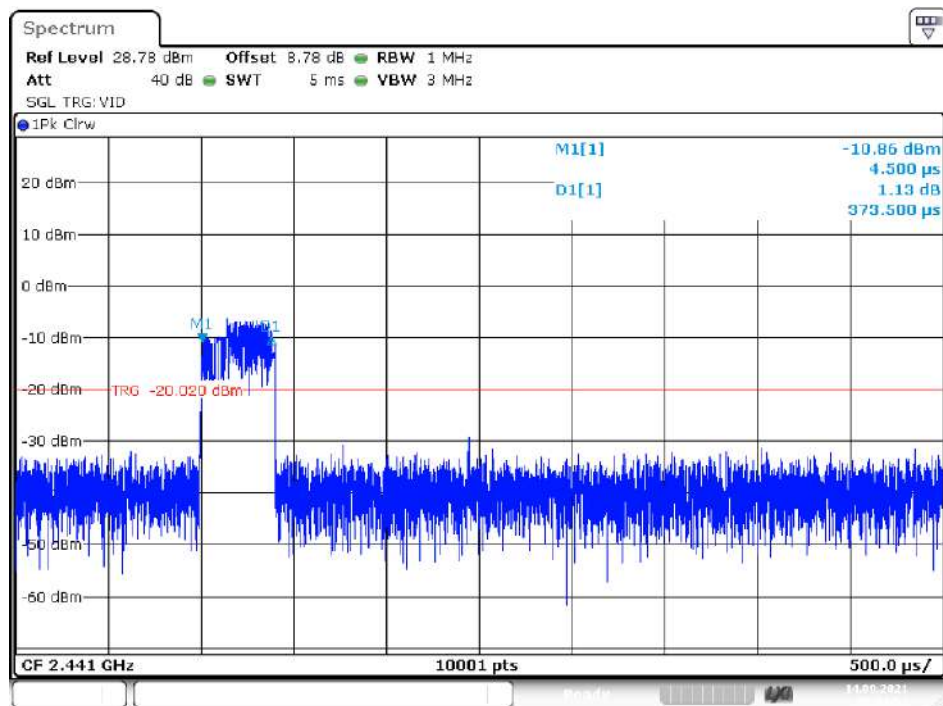
Date: 14.SEP.2021 09:46:21

Dwell NVNT 2-DH5 2441MHz



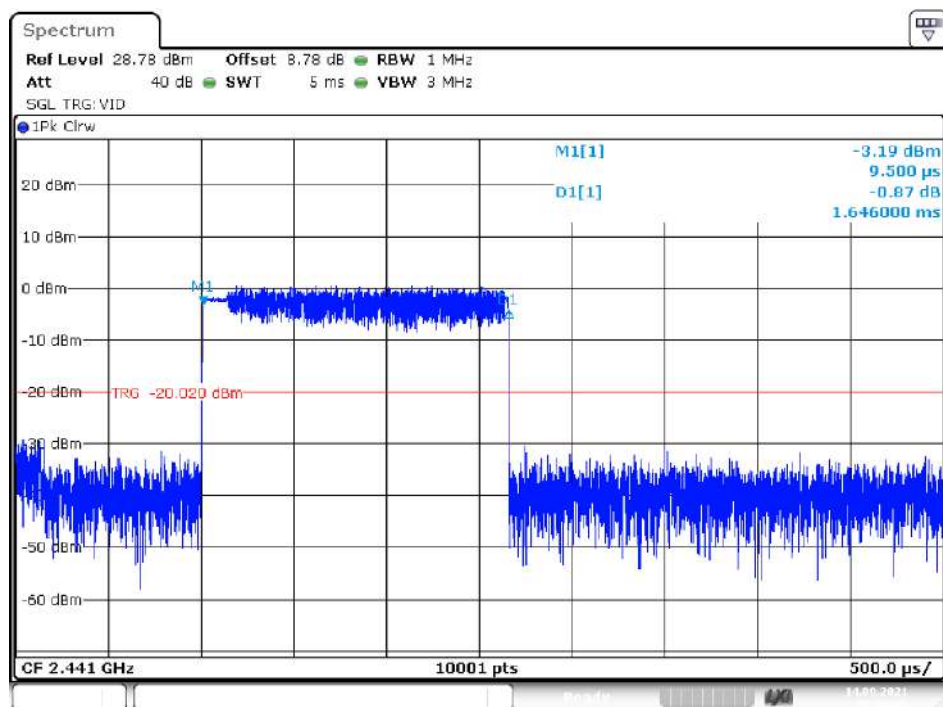
Date: 14.SEP.2021 09:47:11

Dwell NVNT 3-DH1 2441MHz



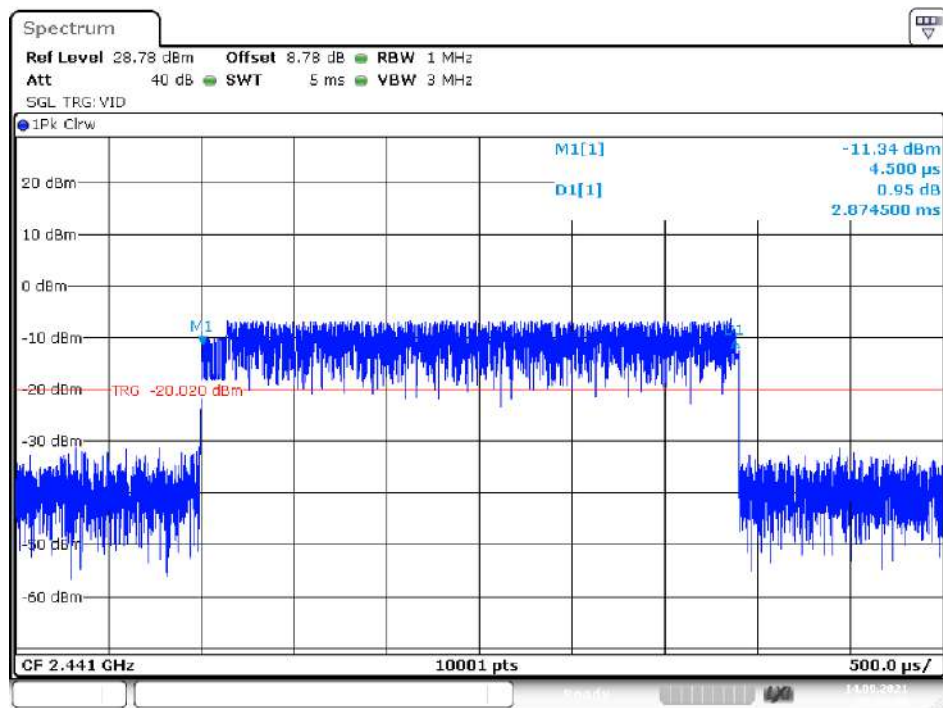
Date: 14.SEP.2021 09:54:52

Dwell NVNT 3-DH3 2441MHz



Date: 14.SEP.2021 09:55:15

Dwell NVNT 3-DH5 2441MHz



8. Radiated Emissions

8.1.Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

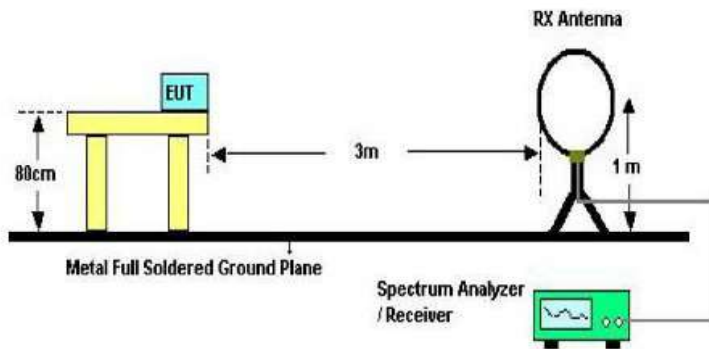
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

15.209 Limit

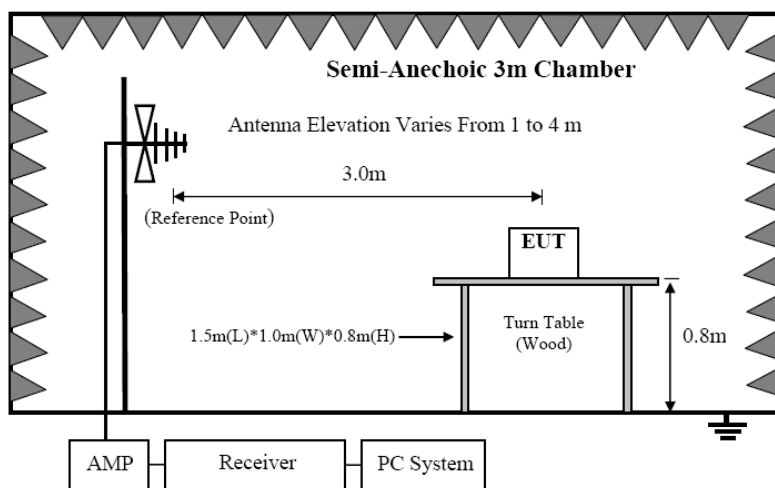
FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

8.2. Block Diagram of Test setup

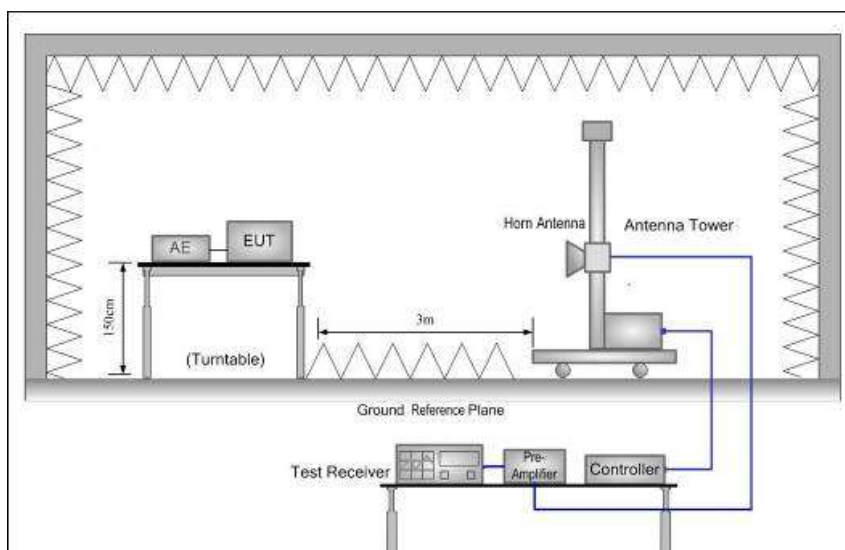
8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 30MHz



8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



8.2.2 In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

8.3. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and simulator as shown in section 1.4 and 6.1
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
 - (a) Change work frequency or channel of device if practicable.
 - (b) Change modulation type of device if practicable.
- (c) Rotated EUT through three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 :2013on Radiated Emission test.
- (6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

8.4. Test Result

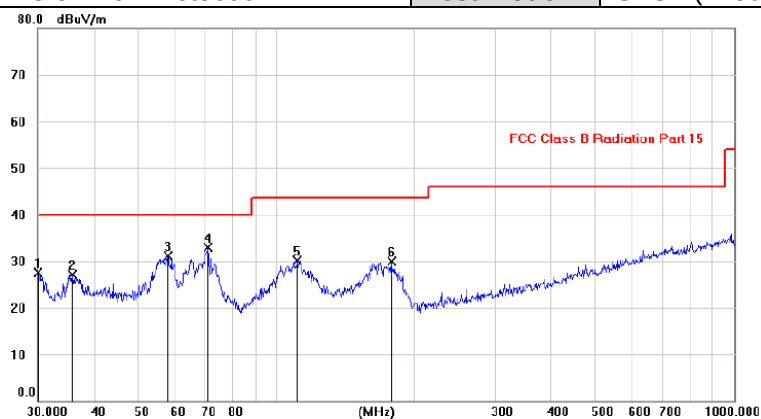
We have scanned the 10th harmonic from 9KHz to the EUT's highest frequency..
Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

From 30MHz to 1000MHz: Conclusion: PASS

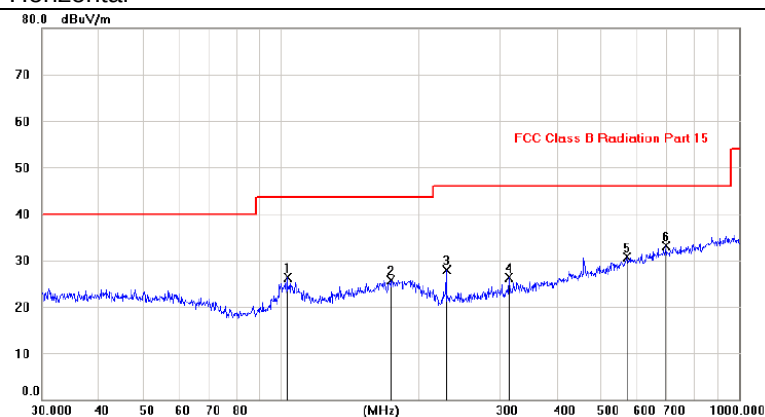
EUT Description	Wireless Joy-con controller for Switch	Model No.	SP5078(blue)
Temperature	24°C	Humidity	56%
Pol	Vertical	Test date	2021/08/17
Test Voltage	DC 5V from Notebook	Test mode	GFSK (2480MHz)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		30.0981	13.88	13.53	27.41	40.00	-12.59	peak		
2		35.7700	13.35	13.75	27.10	40.00	-12.90	peak		
3		57.9789	17.73	13.41	31.14	40.00	-8.86	peak		
4	*	70.9804	21.76	11.12	32.88	40.00	-7.12	peak		
5		111.0998	18.19	11.96	30.15	43.50	-13.35	peak		
6		178.2160	17.02	12.93	29.95	43.50	-13.55	peak		

Pol

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		103.2245	15.18	11.17	26.35	43.50	-17.15	peak		
2		174.2203	12.28	13.49	25.77	43.50	-17.73	peak		
3		229.4269	15.60	12.28	27.88	46.00	-18.12	peak		
4		314.8543	11.73	14.48	26.21	46.00	-19.79	peak		
5		569.6104	11.26	19.53	30.79	46.00	-15.21	peak		
6	*	692.6340	11.47	21.60	33.07	46.00	-12.93	peak		

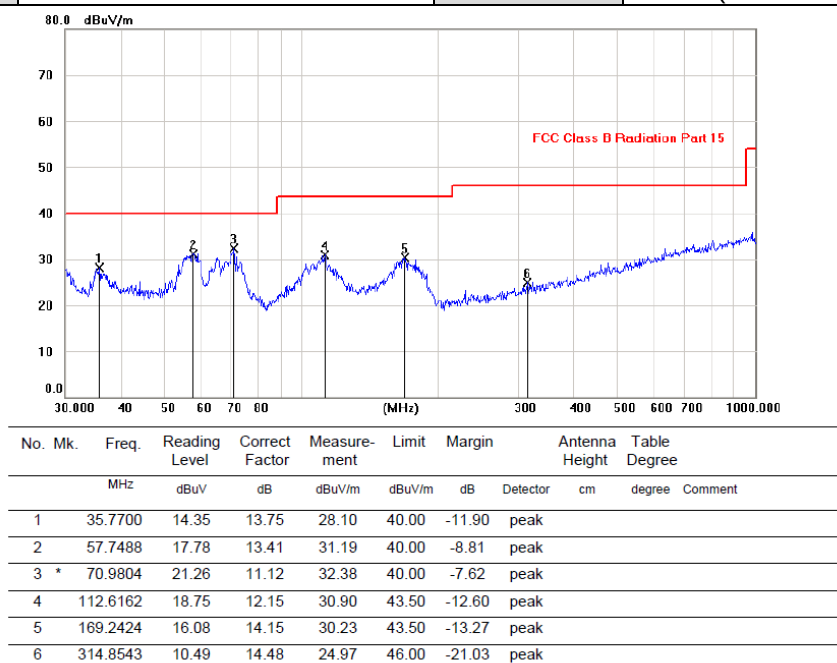
*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

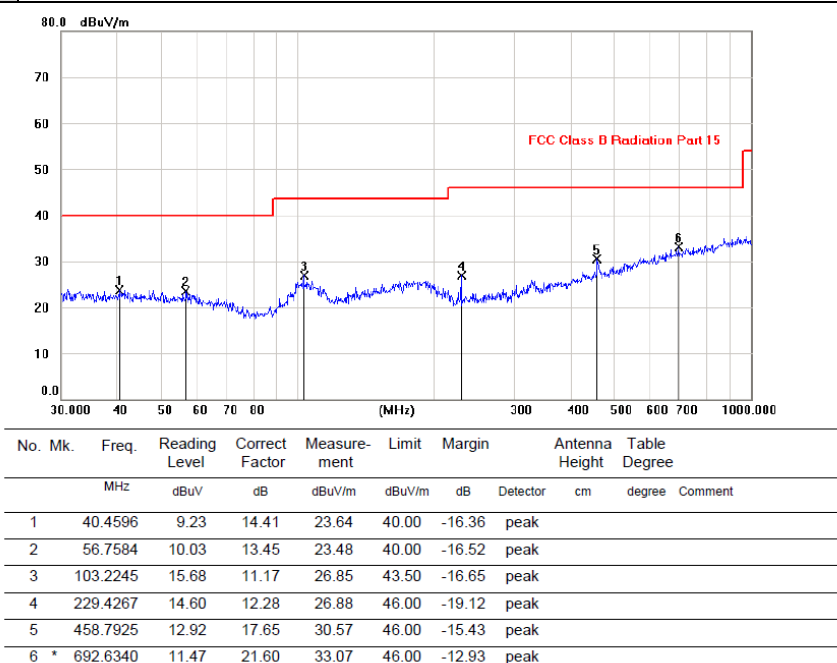
Remark: All modes have been tested, and only worst data of (GFSK) was listed in this report.

From 30MHz to 1000MHz: Conclusion: PASS

EUT Description	Wireless Joy-con controller for Switch	Model No.	SP5078(red)
Temperature	24°C	Humidity	56%
Pol	Vertical	Test date	2021/08/17
Test Voltage	DC 5V from Notebook	Test mode	GFSK (2480MHz)



Pol	Horizontal
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*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Remark: All modes have been tested, and only worst data of (GFSK) was listed in this report.

From 1G-25GHz

For SP5078(blue)

Test Mode: GFSK TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804	44.72	V	33.95	10.18	34.26	54.59	74	-19.41	PK
4804	37.00	V	33.95	10.18	34.26	46.87	54	-7.13	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4824	45.84	H	33.95	10.18	34.26	55.71	74	-18.29	PK
4824	34.56	H	33.95	10.18	34.26	44.43	54	-9.57	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: GFSK TX Mid									
4882	42.80	V	33.93	10.2	34.29	52.64	74	-21.36	PK
4882	35.14	V	33.93	10.2	34.29	44.98	54	-9.02	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
4882	44.03	H	33.93	10.2	34.29	53.87	74	-20.13	PK
4882	35.92	H	33.93	10.2	34.29	45.76	54	-8.24	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
Test Mode: GFSK TX High									
4960	45.73	V	33.98	10.22	34.25	55.68	74	-18.32	PK
4960	36.78	V	33.98	10.22	34.25	46.73	54	-7.27	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	44.33	H	33.98	10.22	34.25	54.28	74	-19.72	PK
4960	31.84	H	33.98	10.22	34.25	41.79	54	-12.21	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
Note:									
1, Result = Read level + Antenna factor + cable loss-Amp factor									
2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

Remark: All modes have been tested, and only worst data of (GFSK) was listed in this report.

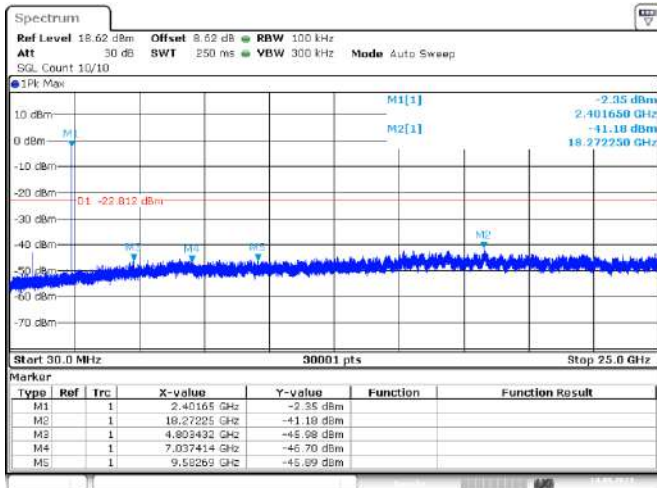
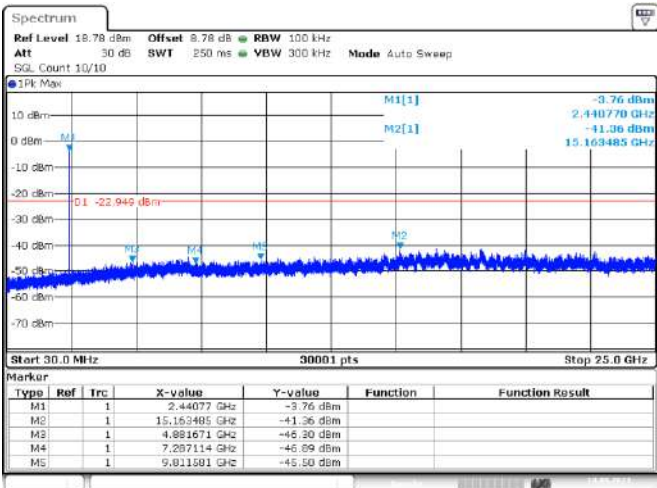
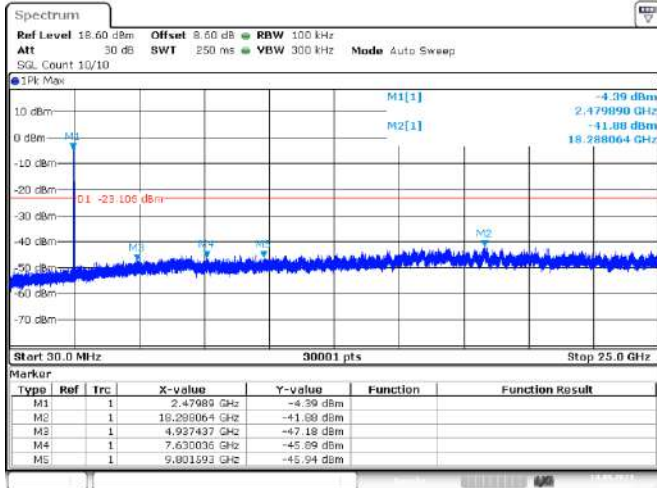
From 1G-25GHz

For SP5078(red)

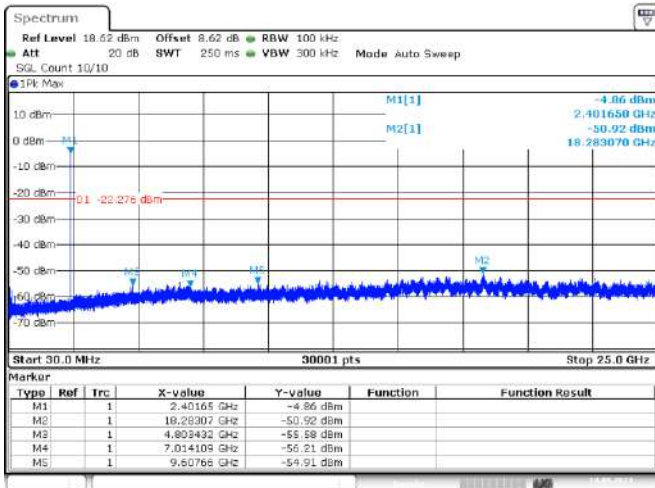
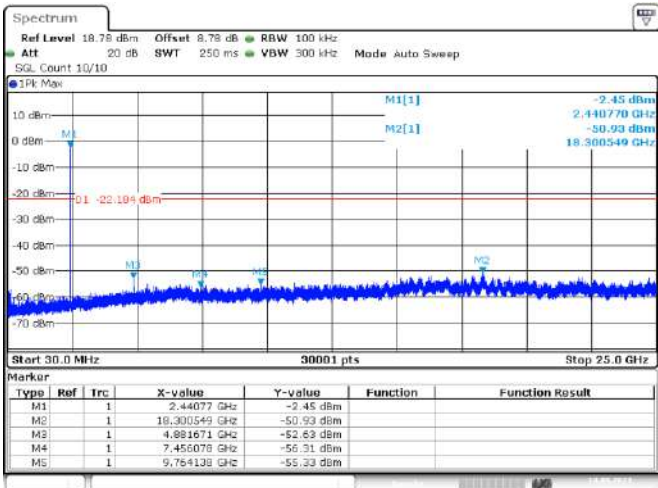
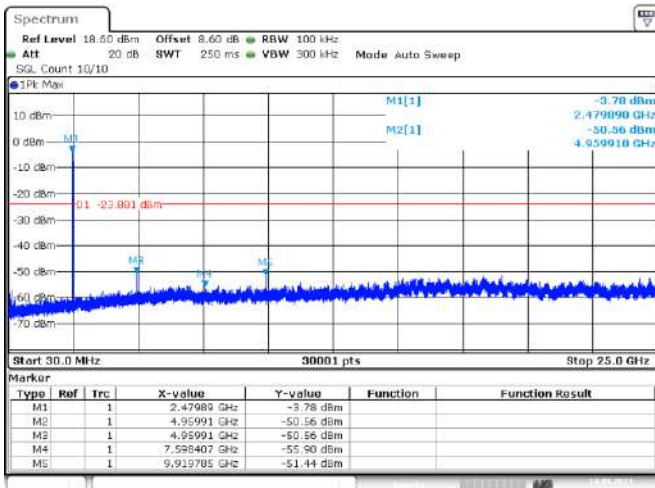
Test Mode: GFSK TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804	45.43	V	34.68	10.18	35.10	55.19	74	-18.81	PK
4804	37.71	V	34.84	10.18	34.86	47.86	54	-6.14	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4824	46.76	H	34.73	10.18	35.71	55.96	74	-18.04	PK
4824	35.04	H	34.92	10.18	35.68	44.46	54	-9.54	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: GFSK TX Mid									
4882	43.60	V	34.69	10.2	35.13	53.36	74	-20.64	PK
4882	35.92	V	34.33	10.2	34.83	45.62	54	-8.38	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
4882	44.92	H	34.61	10.2	35.72	54.01	74	-19.99	PK
4882	36.34	H	34.34	10.2	34.89	46.00	54	-8.00	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
Test Mode: GFSK TX High									
4960	46.22	V	34.95	10.22	35.62	55.76	74	-18.24	PK
4960	37.38	V	34.54	10.22	35.06	47.07	54	-6.93	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	45.06	H	34.88	10.22	35.56	54.60	74	-19.40	PK
4960	32.79	H	34.39	10.22	35.10	42.30	54	-11.70	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
Note:									
1, Result = Read level + Antenna factor + cable loss-Amp factor									
2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

Remark: All modes have been tested, and only worst data of (GFSK) was listed in this report

Conducted method

EUT Description	Wireless Joy-con controller for Switch	Model No.	SP5078(blue)
Temperature	24°C	Humidity	56%
Test mode	GFSK (2402MHz)	Test mode	GFSK (2441MHz)
			
Test mode	GFSK (2480MHz)		
			

EUT Description	Wireless Joy-con controller for Switch	Model No.	SP5078(blue)																																																																																				
Temperature	24°C	Humidity	56%																																																																																				
Test mode	π /4 DQPSK (2402MHz)	Test mode	π /4 DQPSK (2441MHz)																																																																																				
Spectrum Ref Level 18.62 dBm Offset 8.62 dB RBW 100 kHz Att 20 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep SQL Count 10/10 1Pk Max 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm M1[1] M2[1] 4.74 dBm 2.401650 GHz -51.58 dBm 15.915914 GHz 01 -22.593 dBm Start 30.0 MHz 30001 pts Stop 25.0 GHz Marker <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>2.40165 GHz</td><td>-4.74 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>15.915914 GHz</td><td>-51.58 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>4.896653 GHz</td><td>-57.06 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>7.393653 GHz</td><td>-56.20 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>9.60765 GHz</td><td>-55.70 dBm</td><td></td><td></td></tr></table> Date: 14.SEP.2021 12:24:26		Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		2.40165 GHz	-4.74 dBm			M2	1		15.915914 GHz	-51.58 dBm			M3	1		4.896653 GHz	-57.06 dBm			M4	1		7.393653 GHz	-56.20 dBm			M5	1		9.60765 GHz	-55.70 dBm			Spectrum Ref Level 18.78 dBm Offset 8.78 dB RBW 100 kHz Att 20 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep SQL Count 10/10 1Pk Max 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm M1[1] M2[1] -4.40 dBm 2.440770 GHz -50.44 dBm 18.265591 GHz 01 -22.401 dBm Start 30.0 MHz 30001 pts Stop 25.0 GHz Marker <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>2.44077 GHz</td><td>-4.40 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>18.265591 GHz</td><td>-50.44 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>5.049802 GHz</td><td>-57.52 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>7.178911 GHz</td><td>-55.75 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>9.764138 GHz</td><td>-54.91 dBm</td><td></td><td></td></tr></table> Date: 14.SEP.2021 12:26:19		Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		2.44077 GHz	-4.40 dBm			M2	1		18.265591 GHz	-50.44 dBm			M3	1		5.049802 GHz	-57.52 dBm			M4	1		7.178911 GHz	-55.75 dBm			M5	1		9.764138 GHz	-54.91 dBm		
Type	Ref	Trc	X-value	Y-value	Function	Function Result																																																																																	
M1	1		2.40165 GHz	-4.74 dBm																																																																																			
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M1	1		2.44077 GHz	-4.40 dBm																																																																																			
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M3	1		5.049802 GHz	-57.52 dBm																																																																																			
M4	1		7.178911 GHz	-55.75 dBm																																																																																			
M5	1		9.764138 GHz	-54.91 dBm																																																																																			
Test mode	π /4 DQPSK (2480MHz)																																																																																						
Spectrum Ref Level 18.60 dBm Offset 8.60 dB RBW 100 kHz Att 20 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep SQL Count 10/10 1Pk Max 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm M1[1] M2[1] -7.11 dBm 2.479890 GHz -47.32 dBm 4.959078 GHz 01 -23.017 dBm Start 30.0 MHz 30001 pts Stop 25.0 GHz Marker <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>2.47989 GHz</td><td>-7.11 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>4.959078 GHz</td><td>-47.32 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>4.959078 GHz</td><td>-47.32 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>7.354533 GHz</td><td>-56.59 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>9.919785 GHz</td><td>-51.64 dBm</td><td></td><td></td></tr></table> Date: 14.SEP.2021 12:29:28		Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		2.47989 GHz	-7.11 dBm			M2	1		4.959078 GHz	-47.32 dBm			M3	1		4.959078 GHz	-47.32 dBm			M4	1		7.354533 GHz	-56.59 dBm			M5	1		9.919785 GHz	-51.64 dBm																																														
Type	Ref	Trc	X-value	Y-value	Function	Function Result																																																																																	
M1	1		2.47989 GHz	-7.11 dBm																																																																																			
M2	1		4.959078 GHz	-47.32 dBm																																																																																			
M3	1		4.959078 GHz	-47.32 dBm																																																																																			
M4	1		7.354533 GHz	-56.59 dBm																																																																																			
M5	1		9.919785 GHz	-51.64 dBm																																																																																			

EUT Description	Wireless Joy-con controller for Switch	Model No.	SP5078(blue)
Temperature	24°C	Humidity	56%
Test mode	8- DPSK (2402MHz)	Test mode	8- DPSK (2441MHz)
			
Test mode	8- DPSK (2480MHz)		
			

EUT Description	Wireless Joy-con controller for Switch	Model No.	SP5078(red)
Temperature	24°C	Humidity	56%
Test mode	GFSK(2402MHz)	Test mode	GFSK(2441MHz)

Spectrum

Ref Level 18.62 dBm Offset 8.62 dB RBW 100 kHz

Att 30 dB SWI 250 ns VBW 300 kHz Mode Auto Sweep

SQL Count 10/10

1PK Max

10 dBm

0 dBm

-10 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

-60 dBm

-70 dBm

M1[1]

-5.08 dBm

2.402490 GHz

-41.71 dBm

M2[1]

16.863109 GHz

01 -22.364 dBm

Start 30.0 MHz

30001 pts

Stop 25.0 GHz

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1	1	1	2.40249 GHz	-5.08 dBm		
M2	1	1	16.863109 GHz	-41.71 dBm		
M3	1	1	4.895653 GHz	-46.33 dBm		
M4	1	1	7.351204 GHz	-46.29 dBm		
M5	1	1	9.79327 GHz	-46.13 dBm		

Date: 14.SEP.2021 07:05:11

Spectrum

Ref Level 18.78 dBm Offset 8.78 dB RBW 100 kHz

Att 30 dB SWI 250 ns VBW 300 kHz Mode Auto Sweep

SQL Count 10/10

1PK Max

10 dBm

0 dBm

-10 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

-60 dBm

-70 dBm

M1[1]

-3.15 dBm

2.440770 GHz

-41.62 dBm

M2[1]

18.340501 GHz

01 -22.585 dBm

Start 30.0 MHz

30001 pts

Stop 25.0 GHz

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1	1	1	2.44077 GHz	-3.15 dBm		
M2	1	1	18.340501 GHz	-41.62 dBm		
M3	1	1	4.881671 GHz	-46.71 dBm		
M4	1	1	7.204713 GHz	-47.12 dBm		
M5	1	1	9.879033 GHz	-46.91 dBm		

Date: 14.SEP.2021 07:06:16

Test mode	GFSK(2480MHz)
-----------	---------------

Spectrum

Ref Level 18.60 dBm Offset 8.60 dB RBW 100 kHz

Att 30 dB SWI 250 ns VBW 300 kHz Mode Auto Sweep

SQL Count 10/10

1PK Max

10 dBm

0 dBm

-10 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

-60 dBm

-70 dBm

M1[1]

-4.16 dBm

2.479890 GHz

-41.97 dBm

M2[1]

16.891409 GHz

01 -23.153 dBm

Start 30.0 MHz

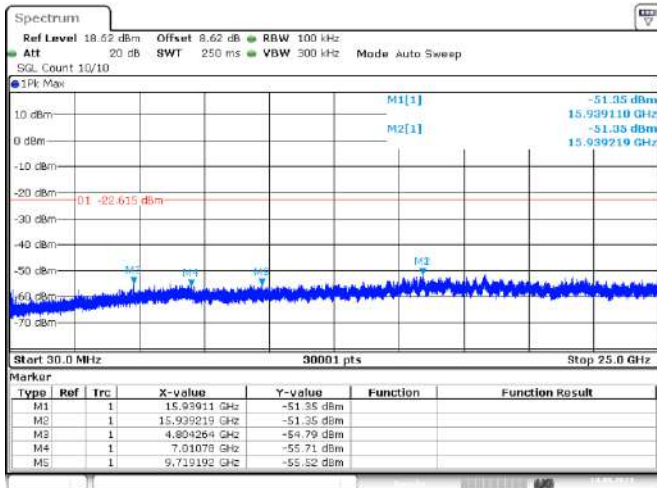
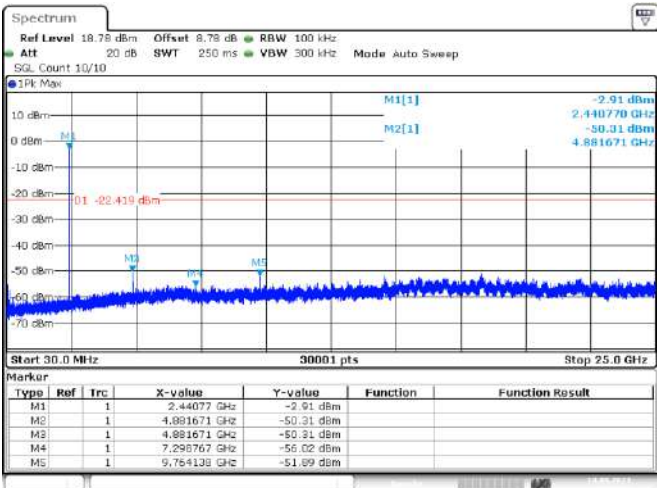
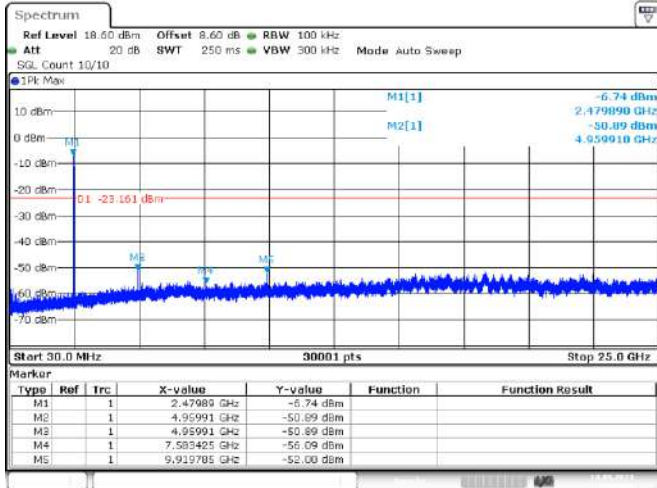
30001 pts

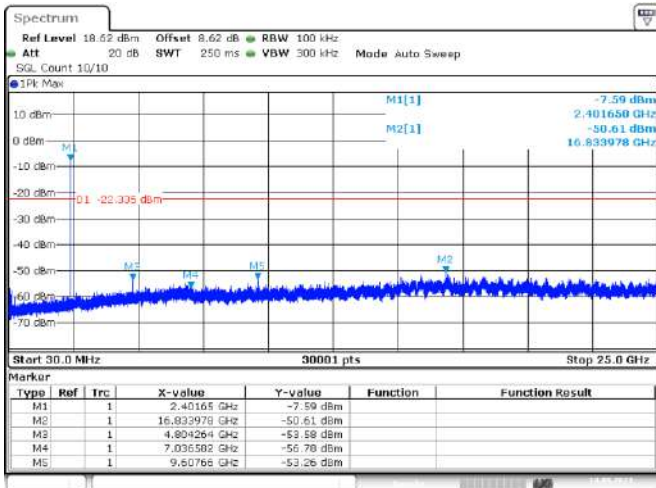
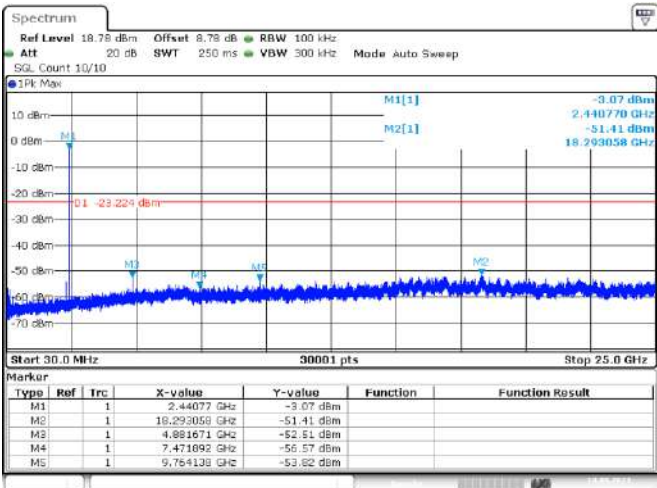
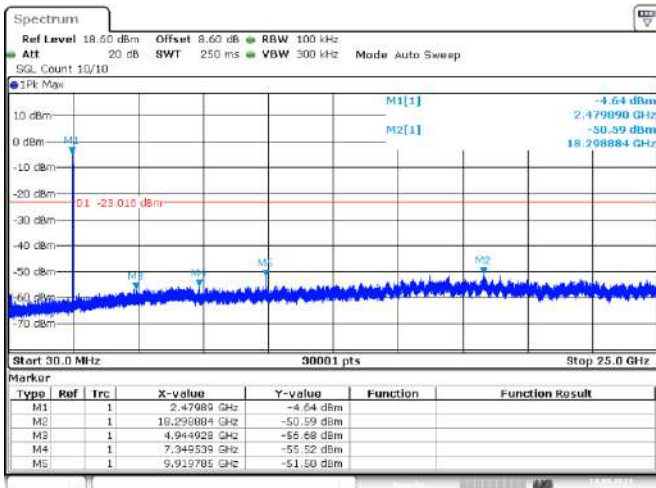
Stop 25.0 GHz

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1	1	1	2.47989 GHz	-4.16 dBm		
M2	1	1	16.891409 GHz	-41.97 dBm		
M3	1	1	4.970731 GHz	-46.88 dBm		
M4	1	1	7.295773 GHz	-46.34 dBm		
M5	1	1	9.780785 GHz	-46.49 dBm		

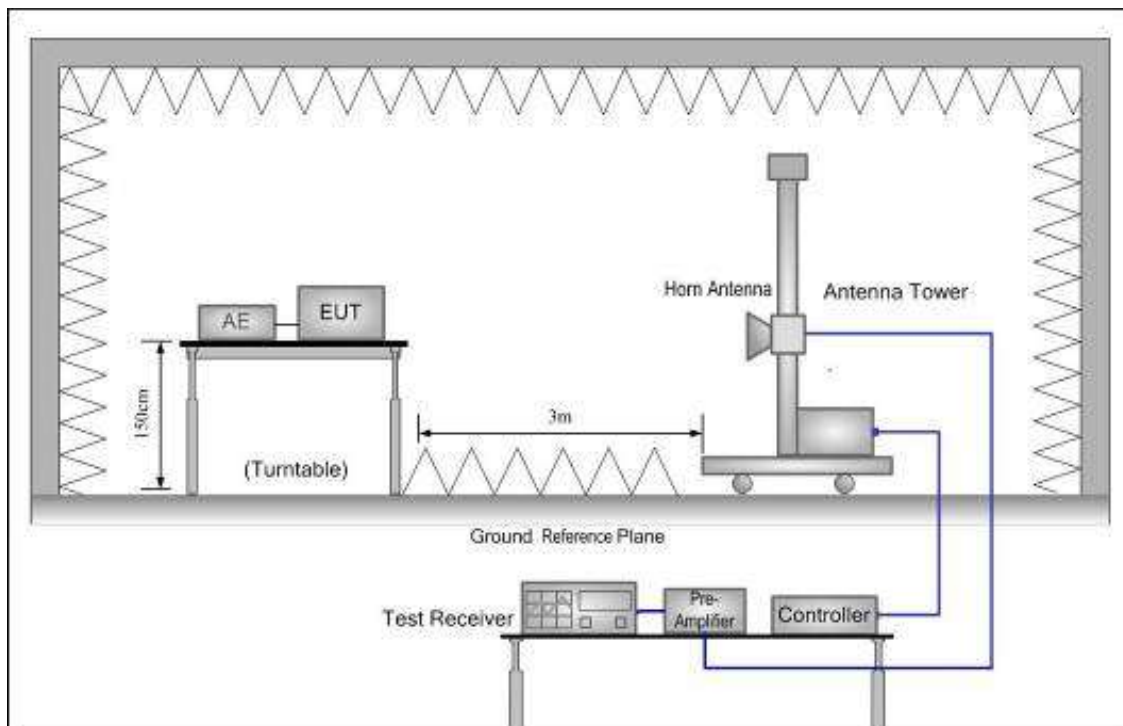
Date: 14.SEP.2021 07:07:40

EUT Description	Wireless Joy-con controller for Switch	Model No.	SP5078(red)
Temperature	24°C	Humidity	56%
Test mode	π / 4 DQPSK (2402MHz)	Test mode	π / 4 DQPSK (2441MHz)
			
Test mode	π / 4 DQPSK (2480MHz)		
			

EUT Description	Wireless Joy-con controller for Switch	Model No.	SP5078(red)
Temperature	24°C	Humidity	56%
Test mode	8-DPSK(2402MHz)	Test mode	8-DPSK((2441MHz)
			
Test mode	8-DPSK((2480MHz)		
			

9. Band Edge Compliance

9.1. Block Diagram of Test Setup



9.2. Limit

All the lower and upper band-edges emissions appearing within restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

9.3. Test Procedure

All restriction band and non- restriction band have been tested, only worse case is reported.

9.4. Test Result

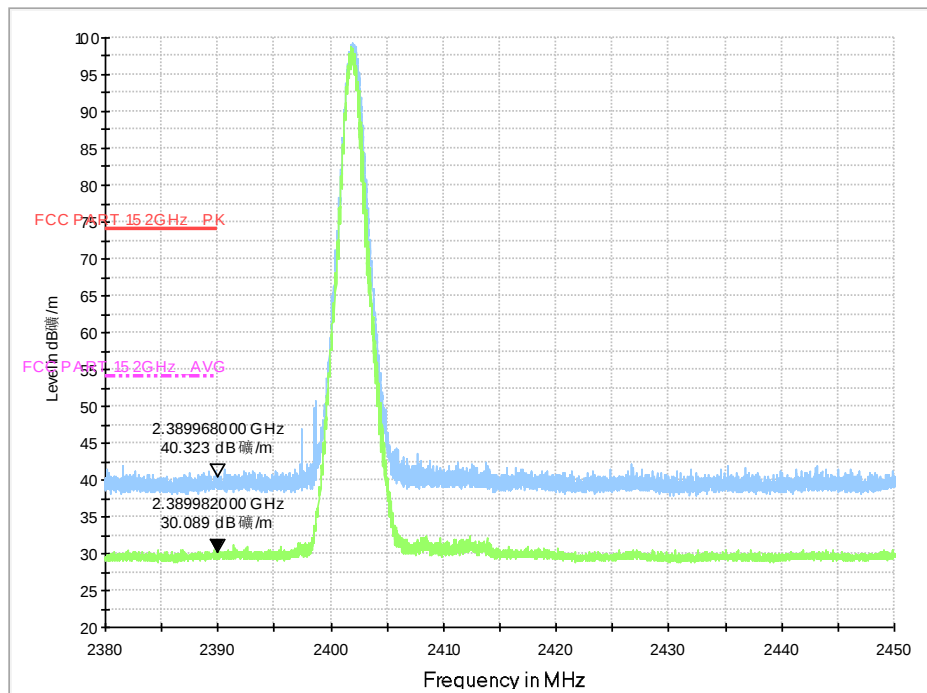
PASS. (See below detailed test data)

Radiated Method:For SP5078(blue)

Hopping-off

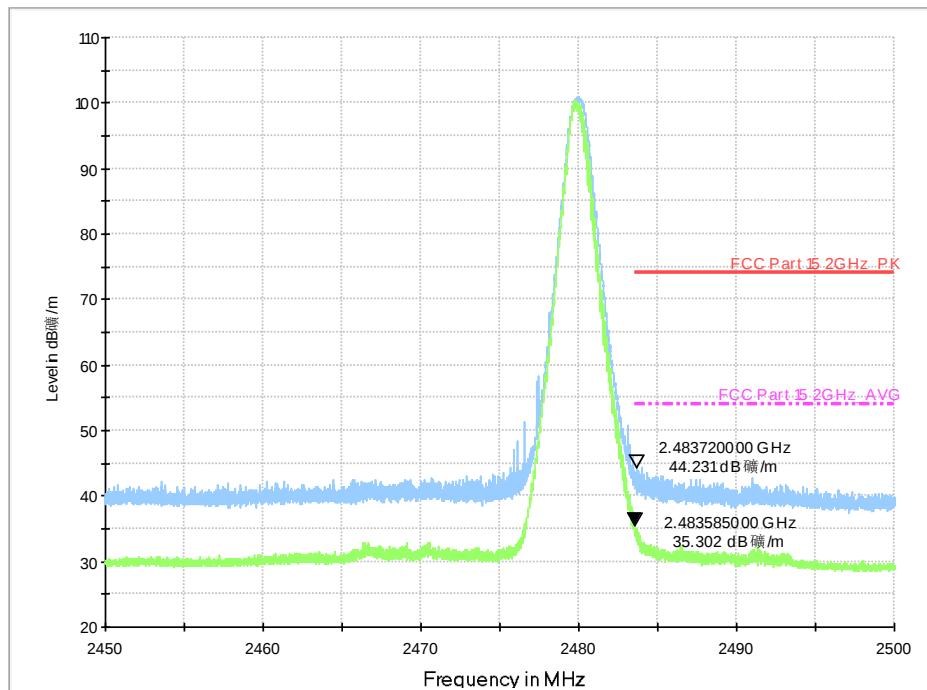
Test Mode:

GFSK-Low



Test Mode:

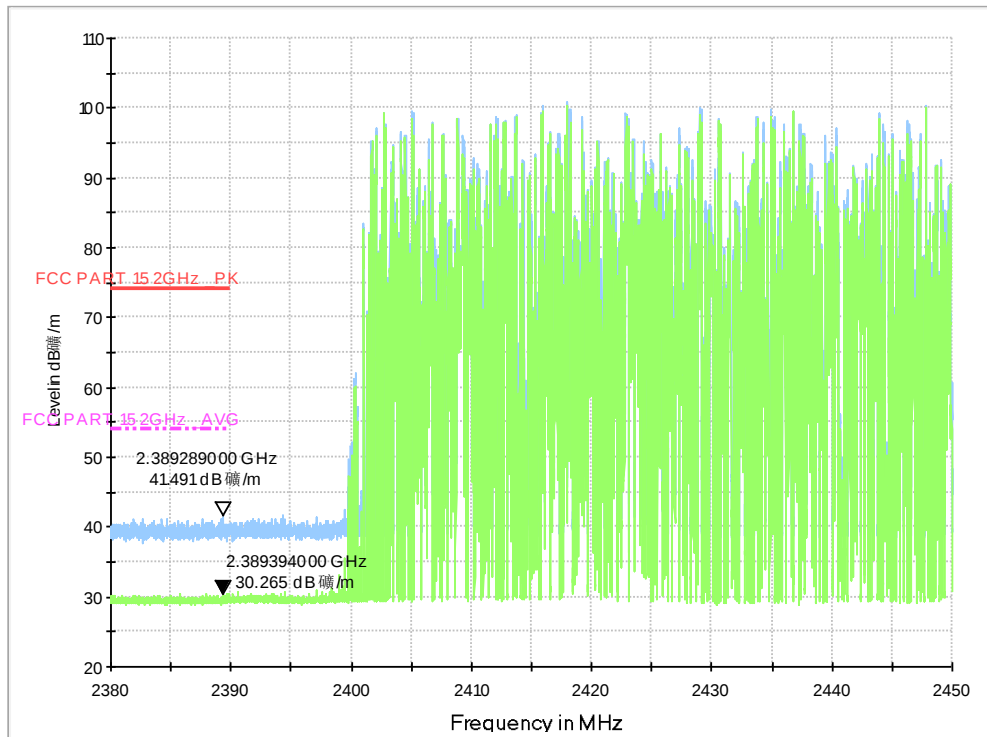
GFSK-High



Hopping-on

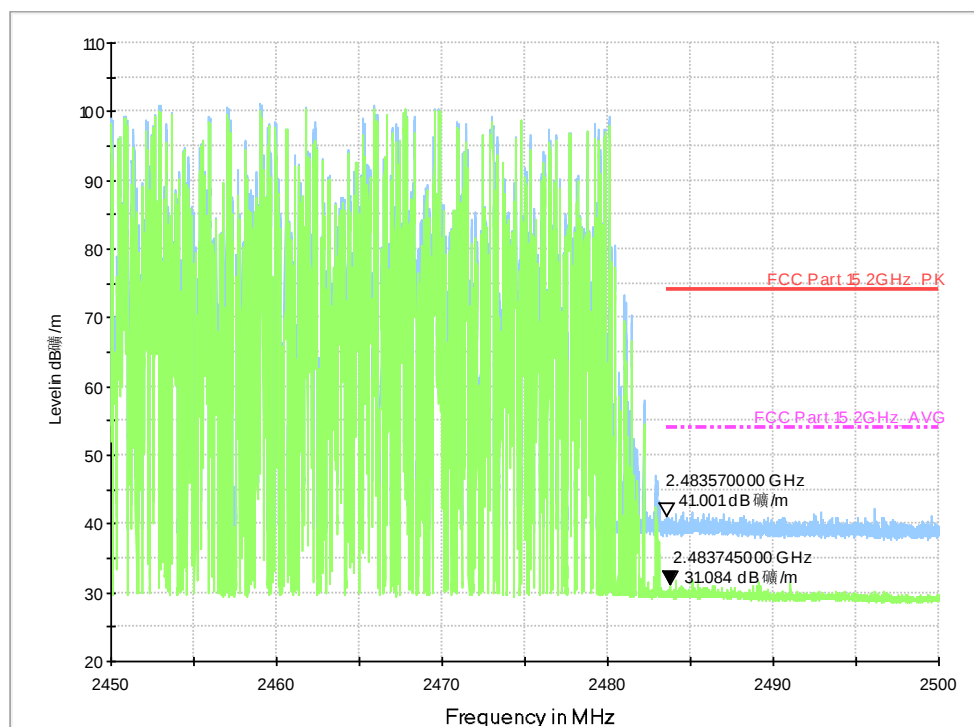
Test Mode:

GFSK-Low

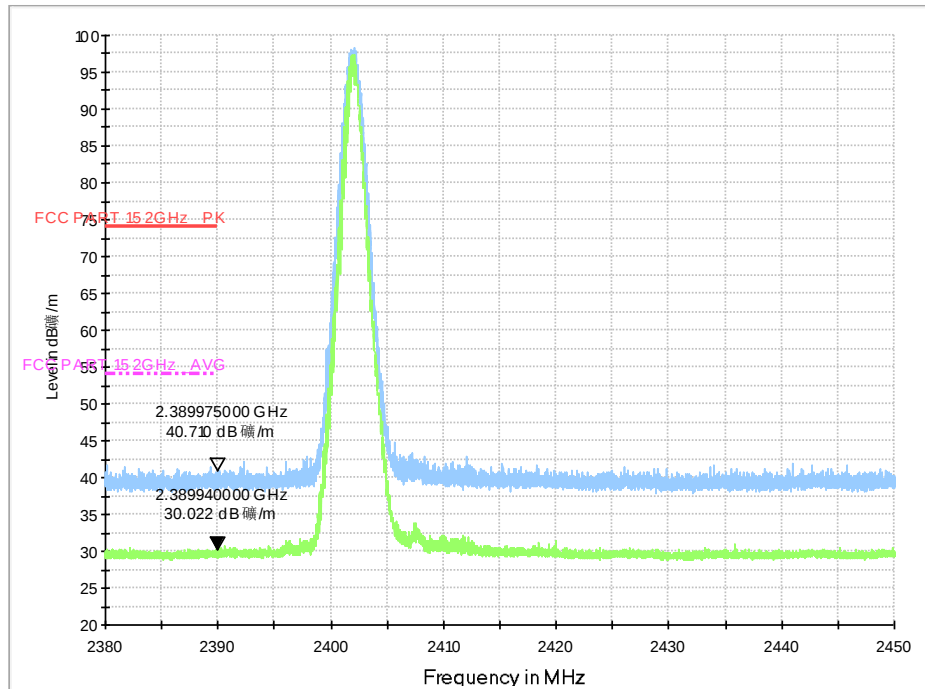
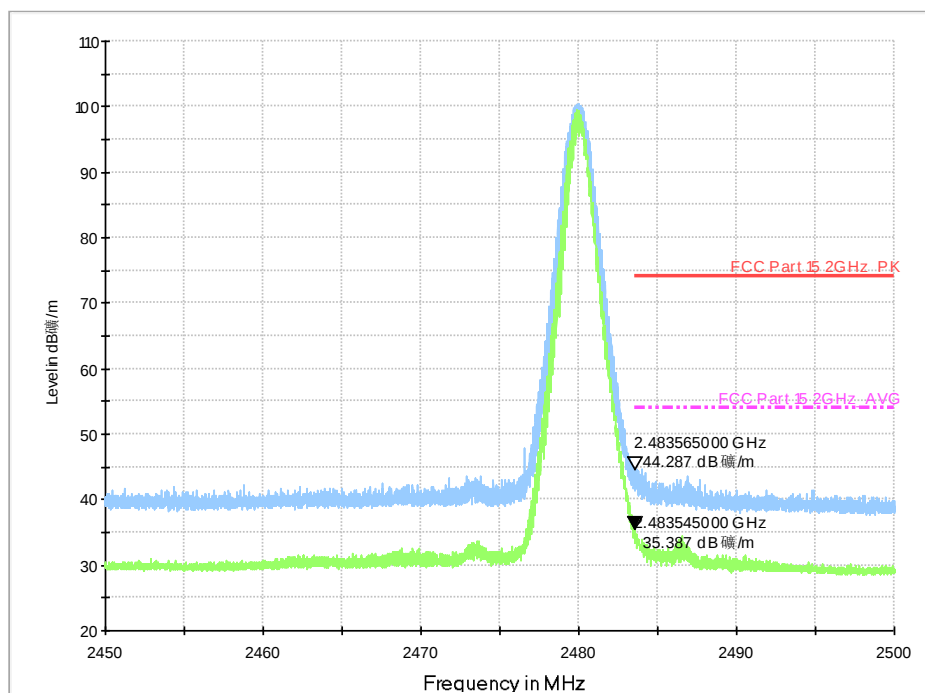


Test Mode:

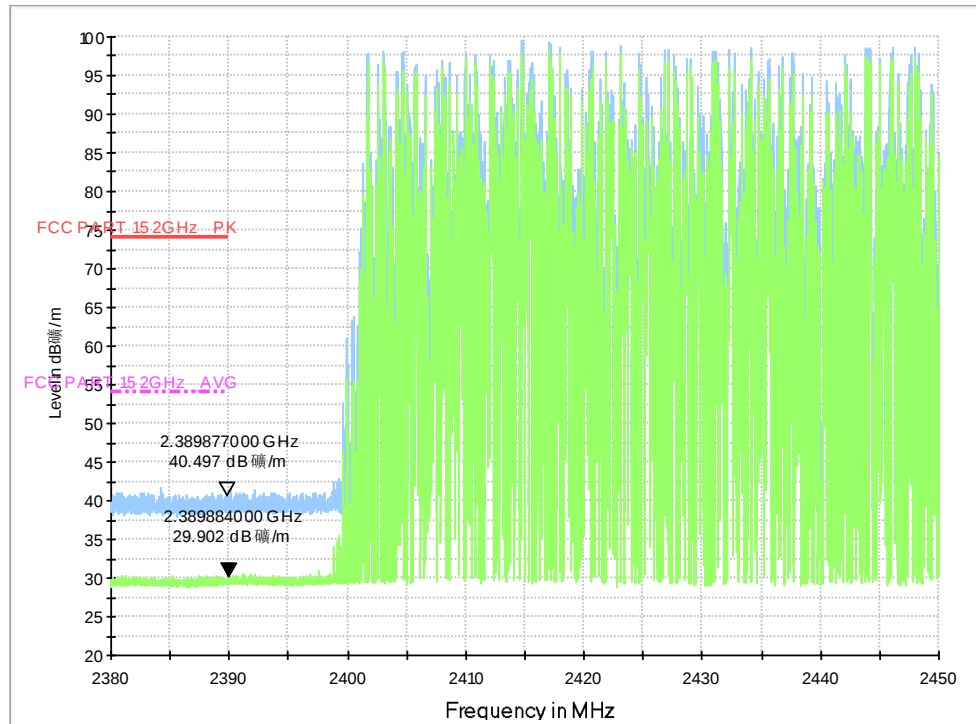
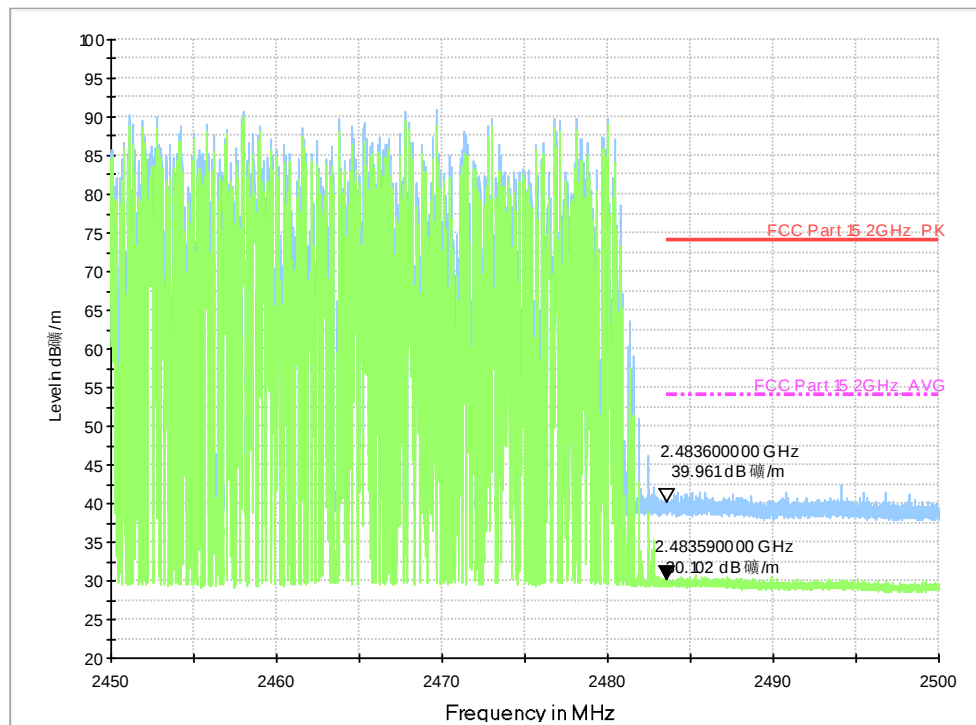
GFSK-High



Hopping-off

Test Mode: $\pi/4$ -DQPSK-LowTest Mode: $\pi/4$ -DQPSK-High

Hopping-on

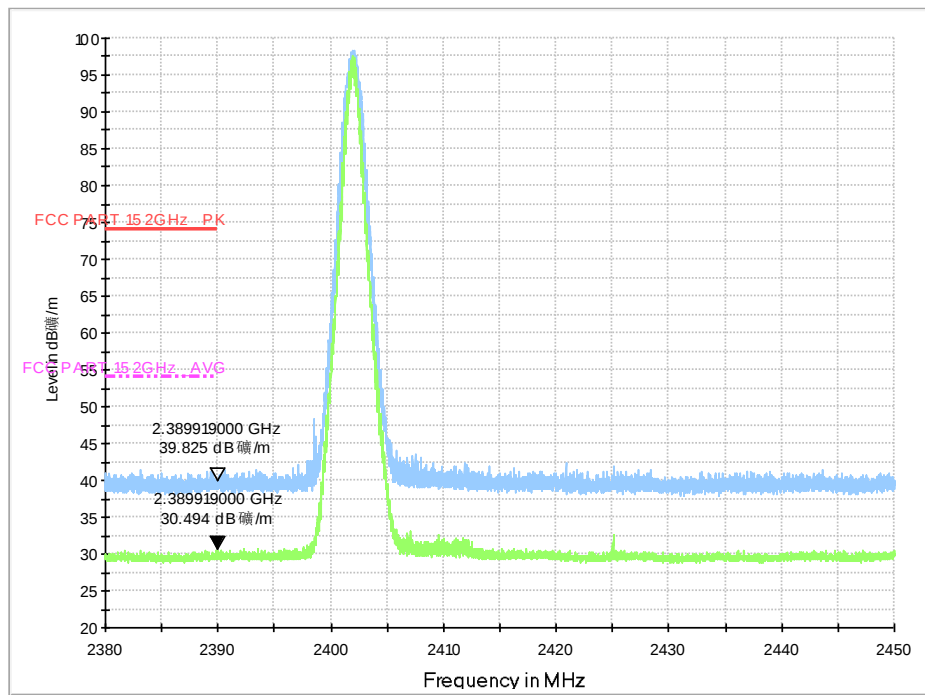
Test Mode: $\pi/4$ -DQPSK-LowTest Mode: $\pi/4$ -DQPSK-High

hopping-on

Hopping-off

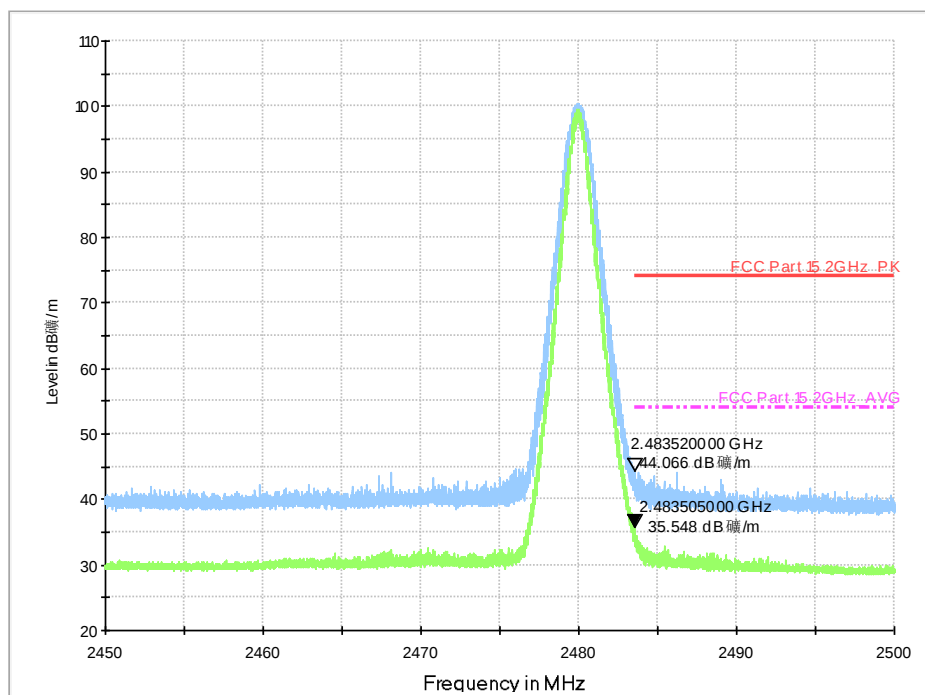
Test Mode:

8-DPSK-Low



Test Mode:

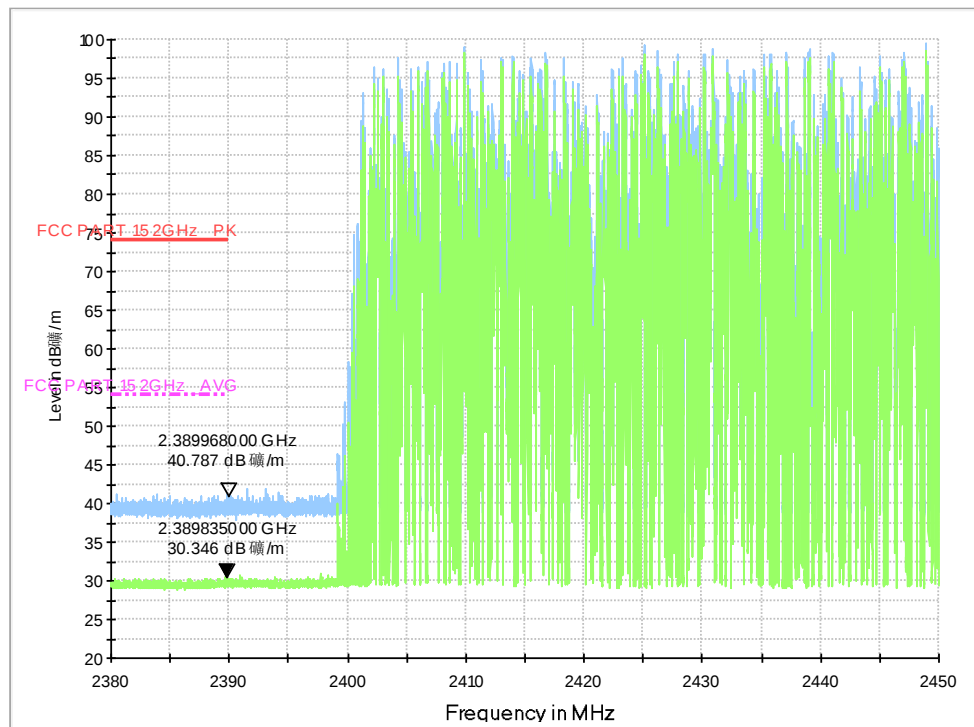
8-DPSK-High



Hopping-on

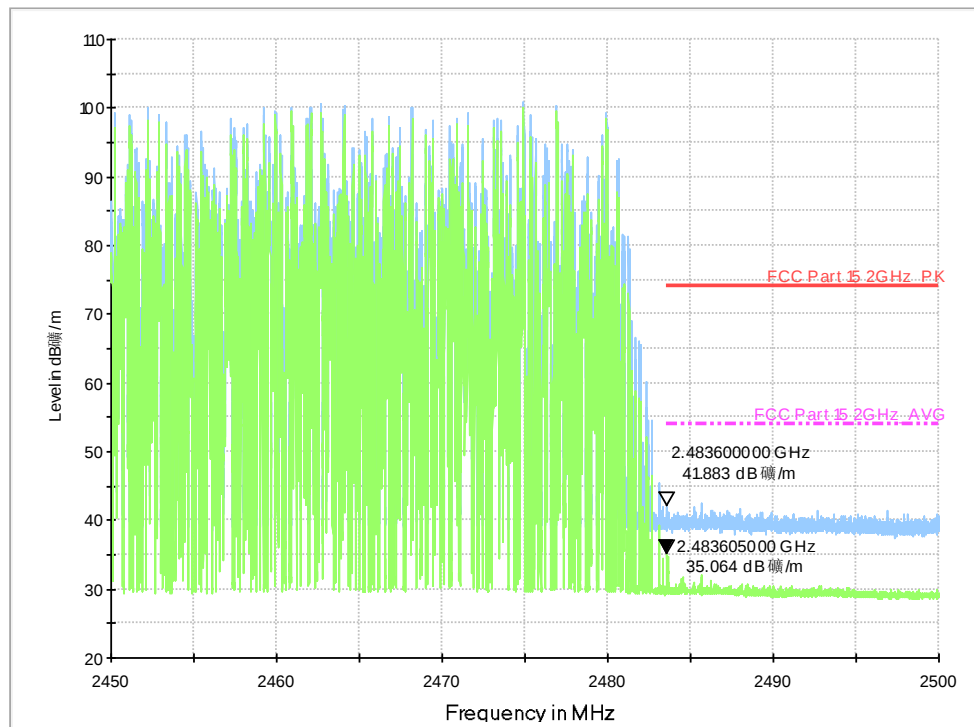
Test Mode:

8-DPSK-Low



Test Mode:

8-DPSK-High



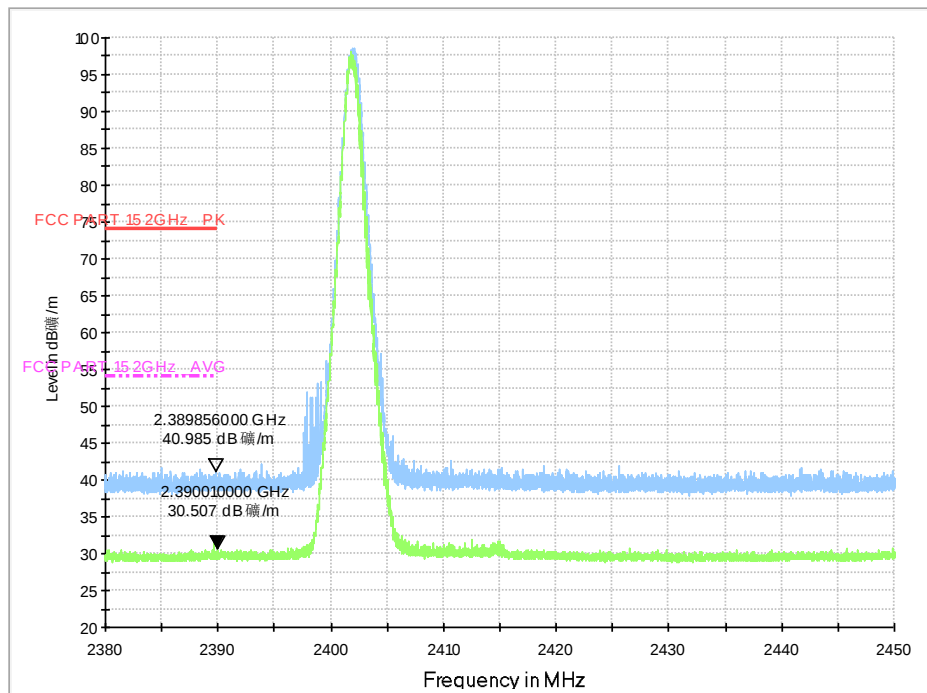
hopping-on

For SP5078(red)

Hopping-off

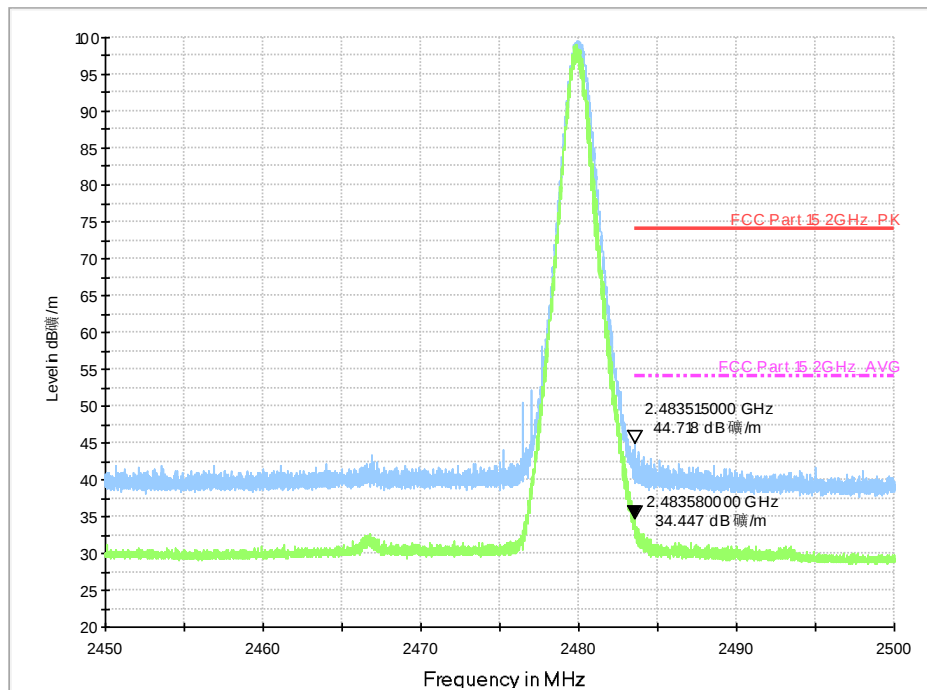
Test Mode:

GFSK-Low



Test Mode:

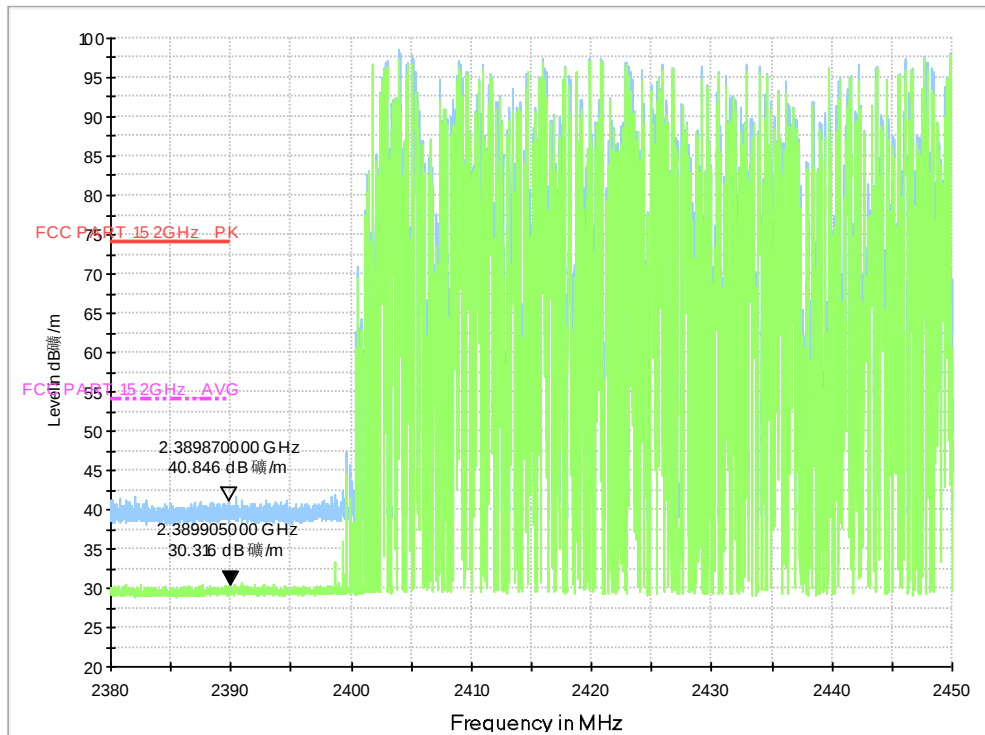
GFSK-High



Hopping-on

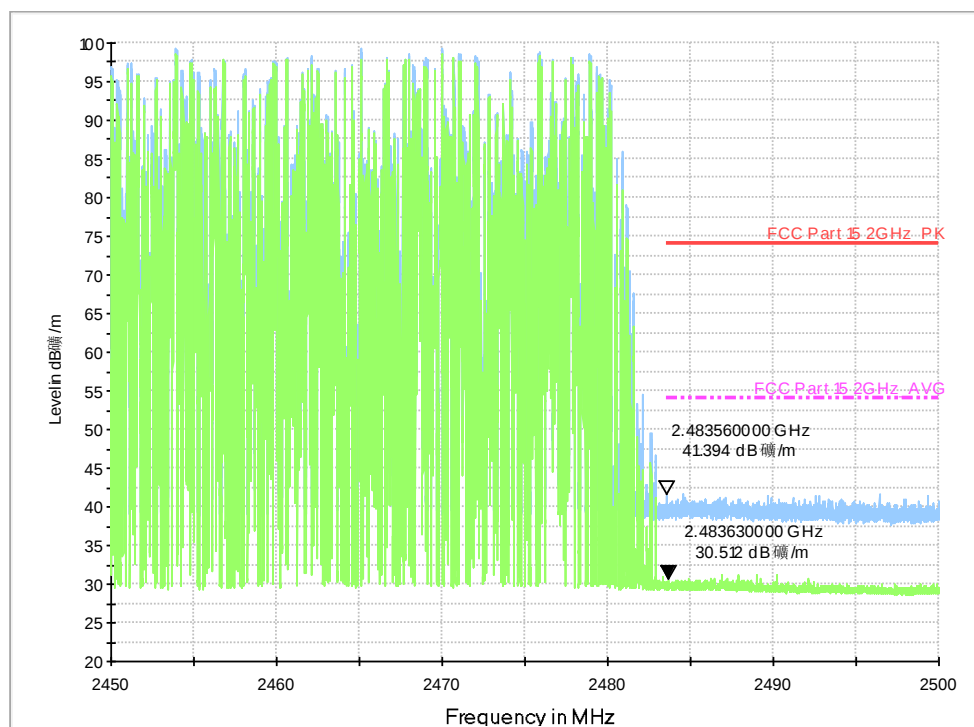
Test Mode:

GFSK-Low

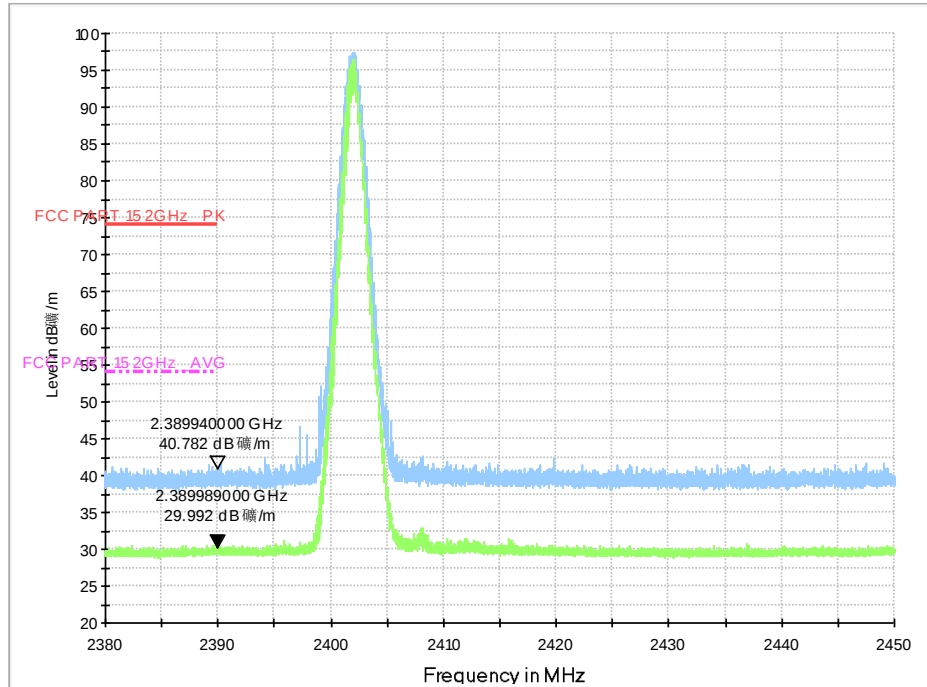
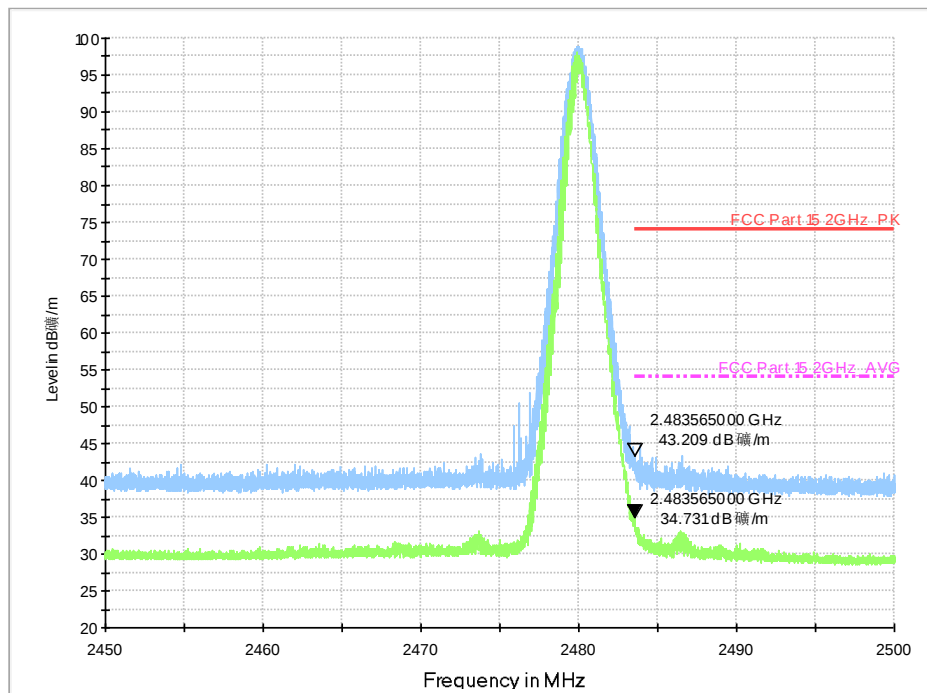


Test Mode:

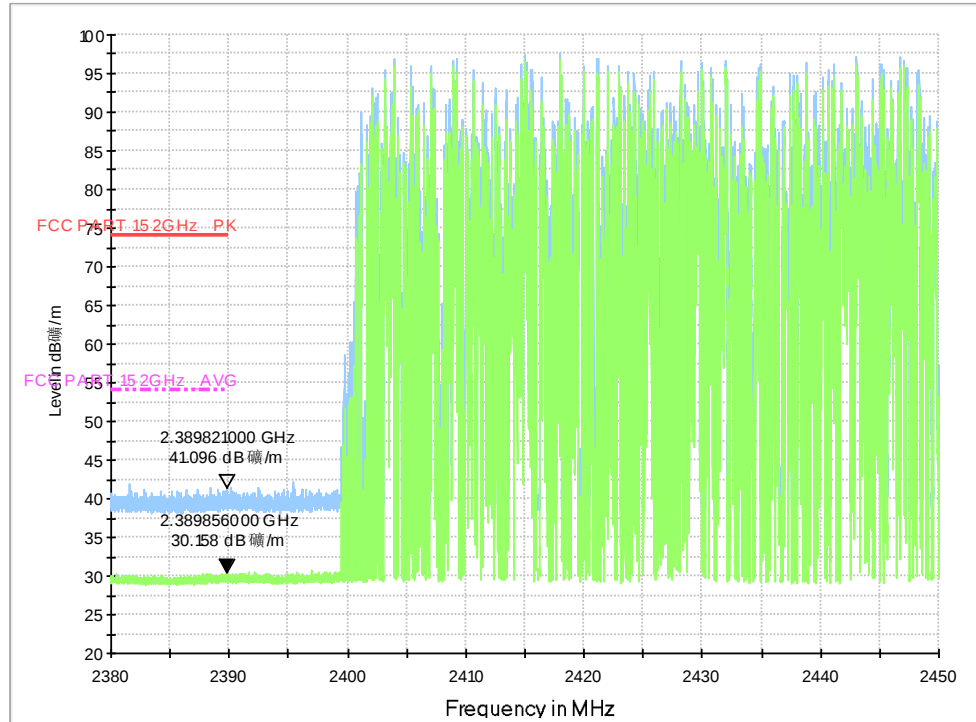
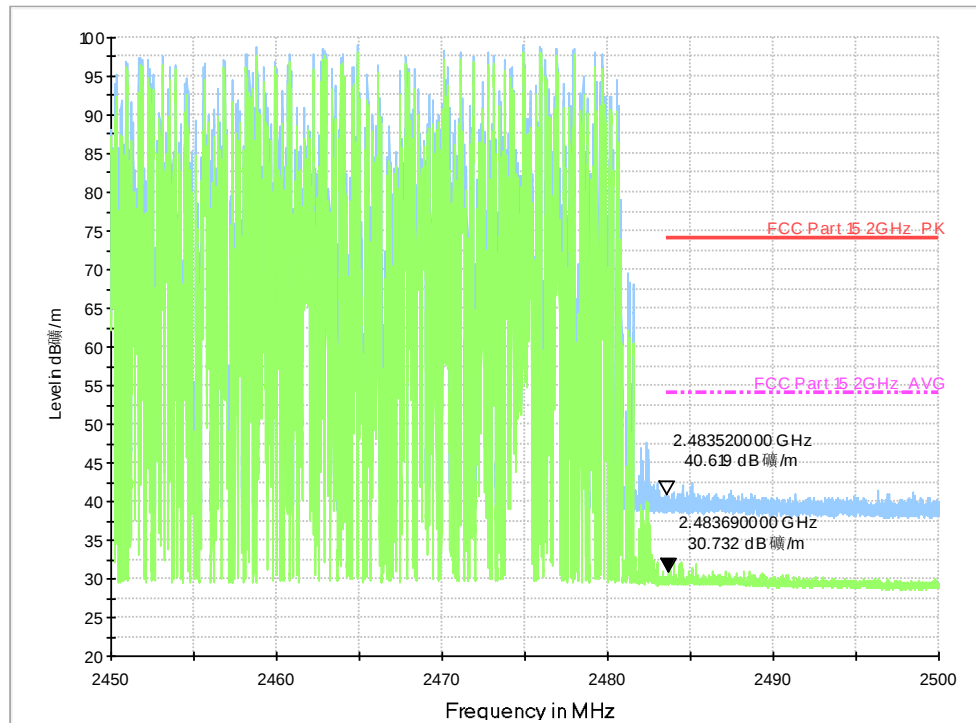
GFSK-High



Hopping-off

Test Mode: $\pi/4$ -DQPSK-LowTest Mode: $\pi/4$ -DQPSK-High

Hopping-on

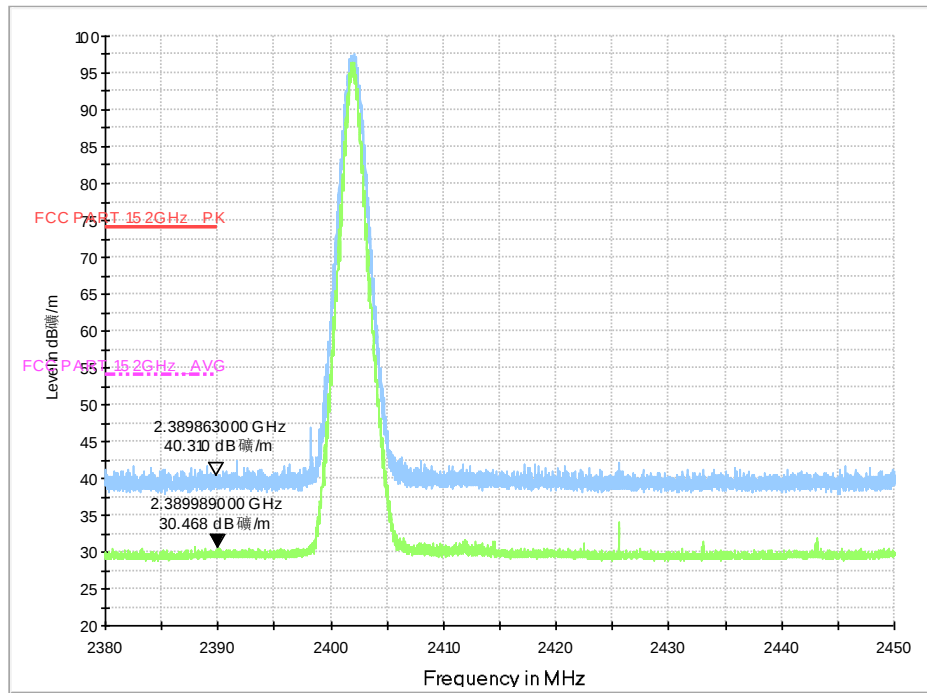
Test Mode: $\pi/4$ -DQPSK-LowTest Mode: $\pi/4$ -DQPSK-High

hopping-on

Hopping-off

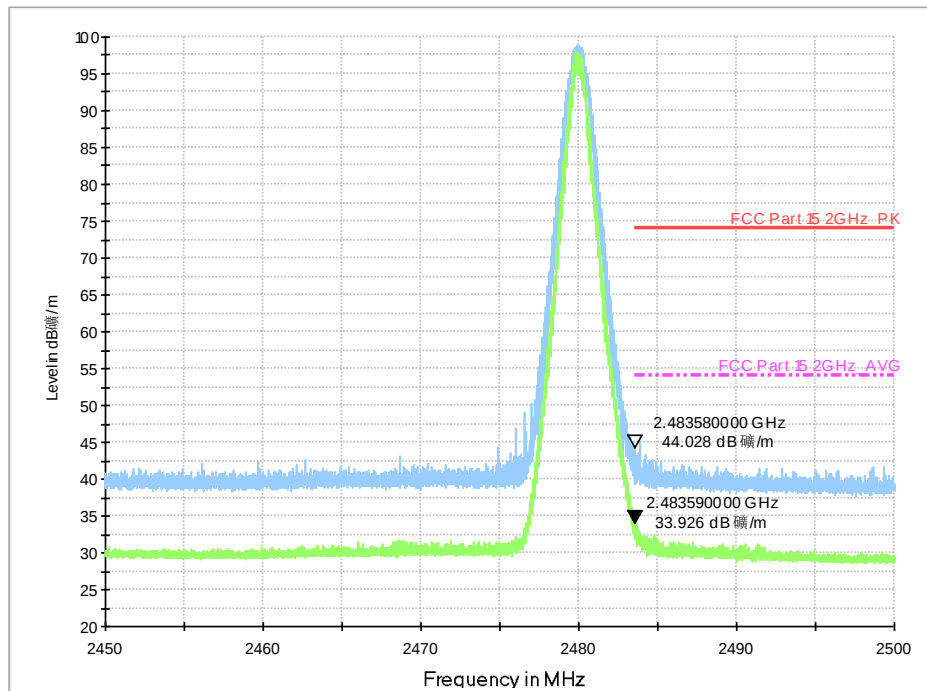
Test Mode:

8-DPSK-Low



Test Mode:

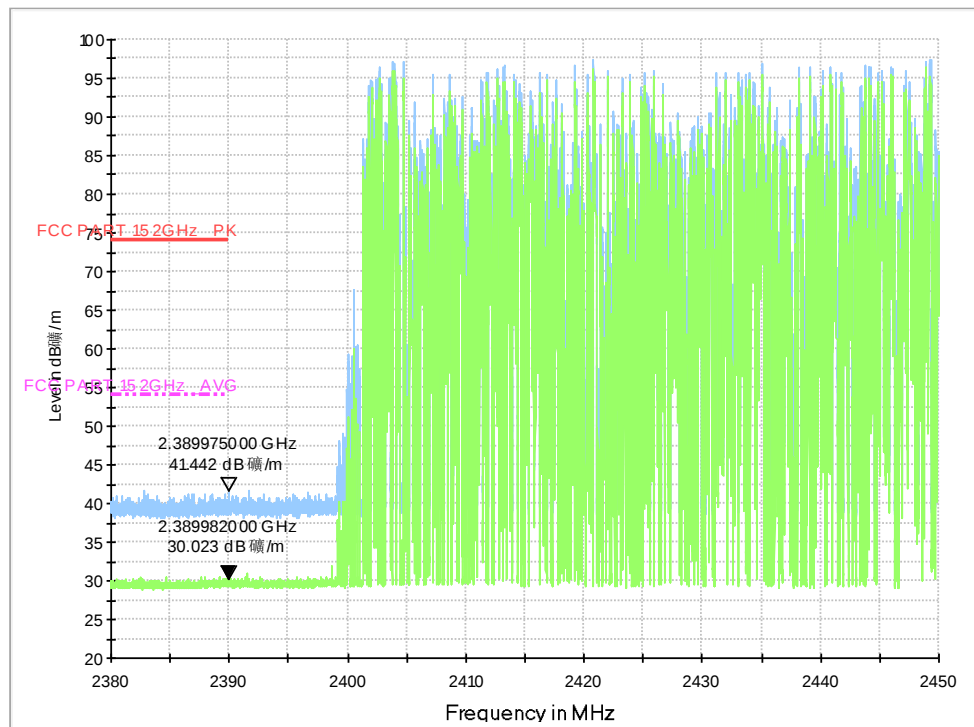
8-DPSK-High



Hopping-on

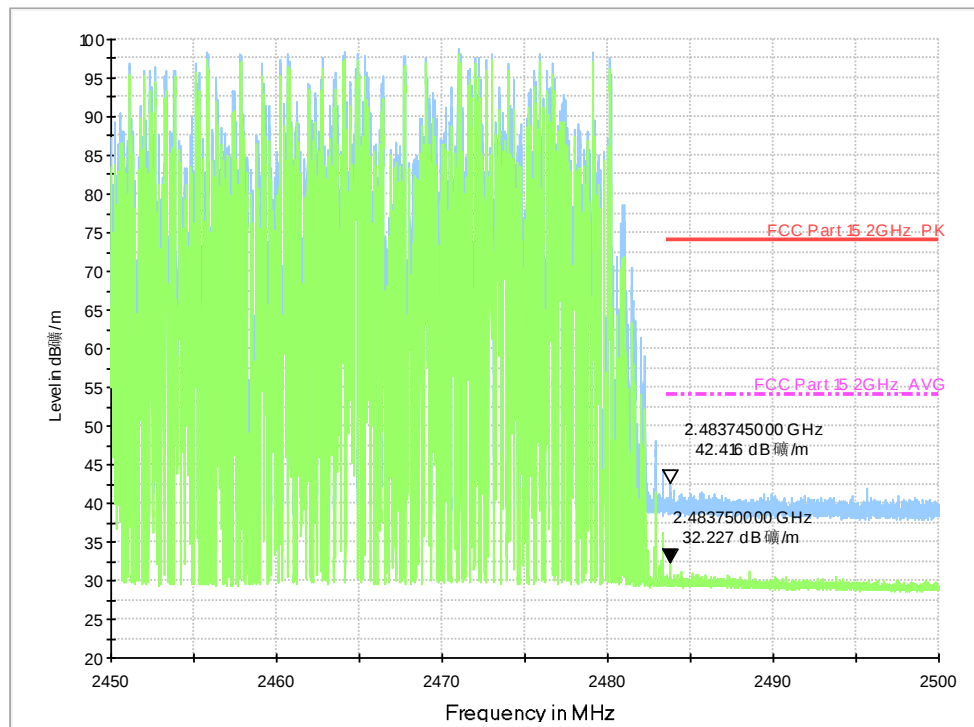
Test Mode:

8-DPSK-Low



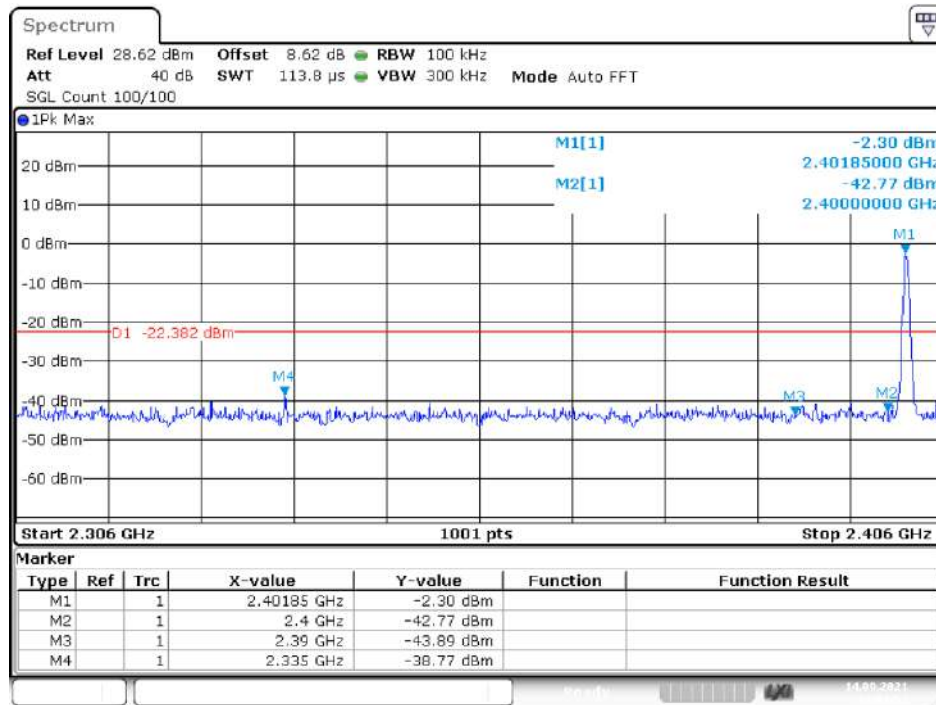
Test Mode:

8-DPSK-High



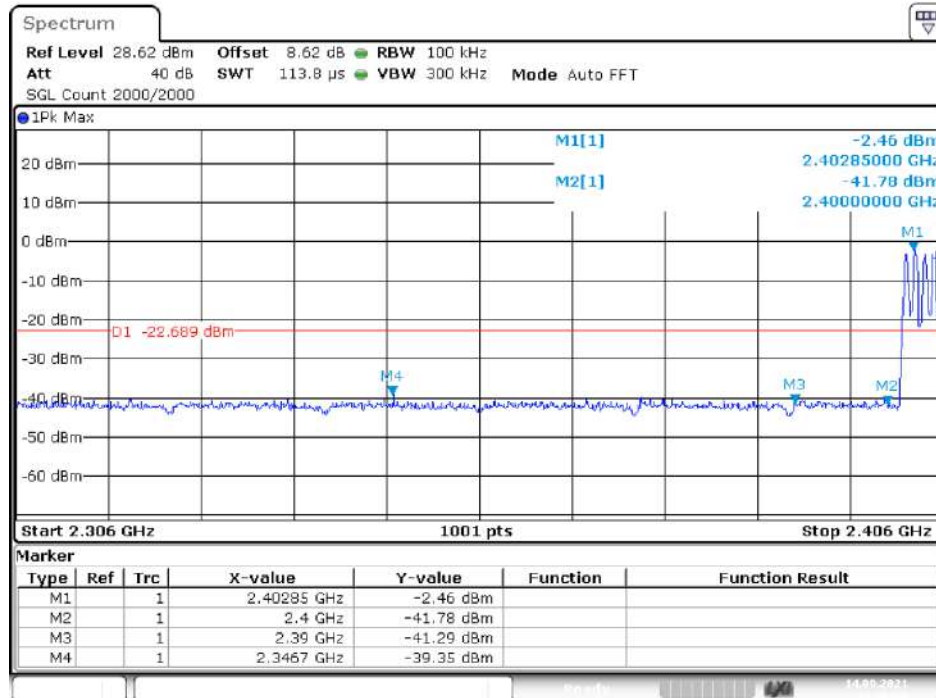
hopping-on

Conducted Method: For SP5078(blue)
Band Edge NVNT 1-DH1 2402MHz Ant1 No-Hopping Emission



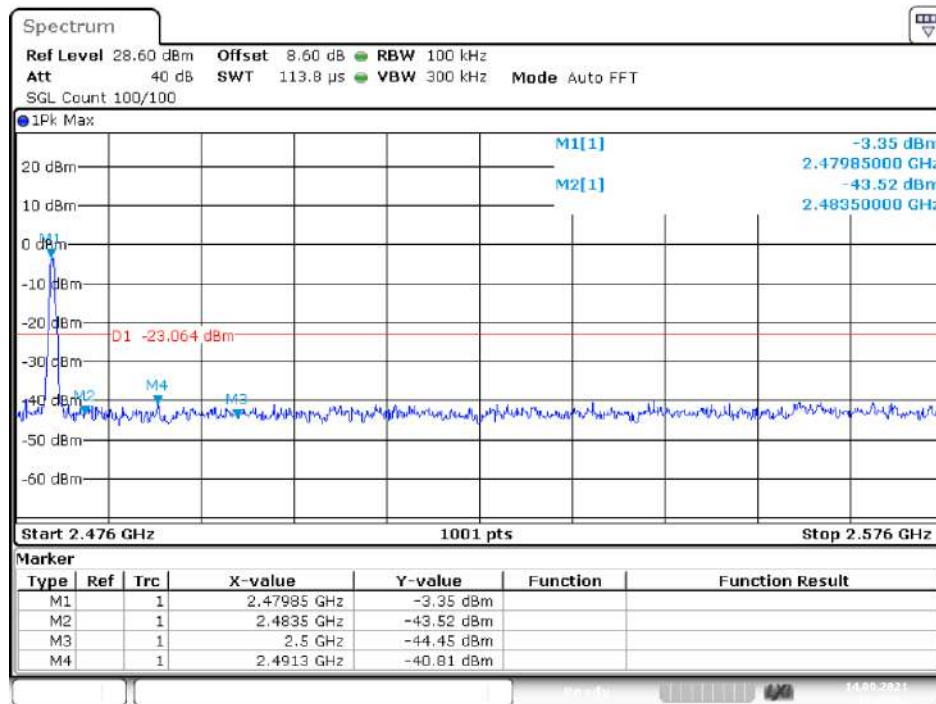
Date: 14.SEP.2021 12:01:53

Band Edge(Hopping) NVNT 1-DH1 2402MHz Ant1 Hopping Emission



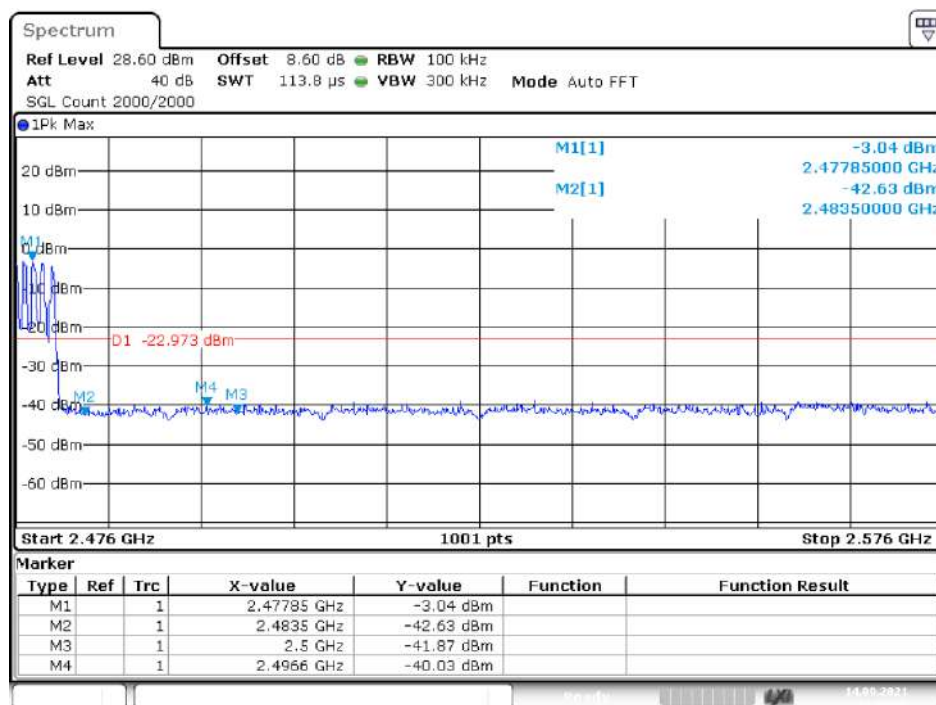
Date: 14.SEP.2021 12:36:28

Band Edge NVNT 1-DH1 2480MHz Ant1 No-Hopping Emission



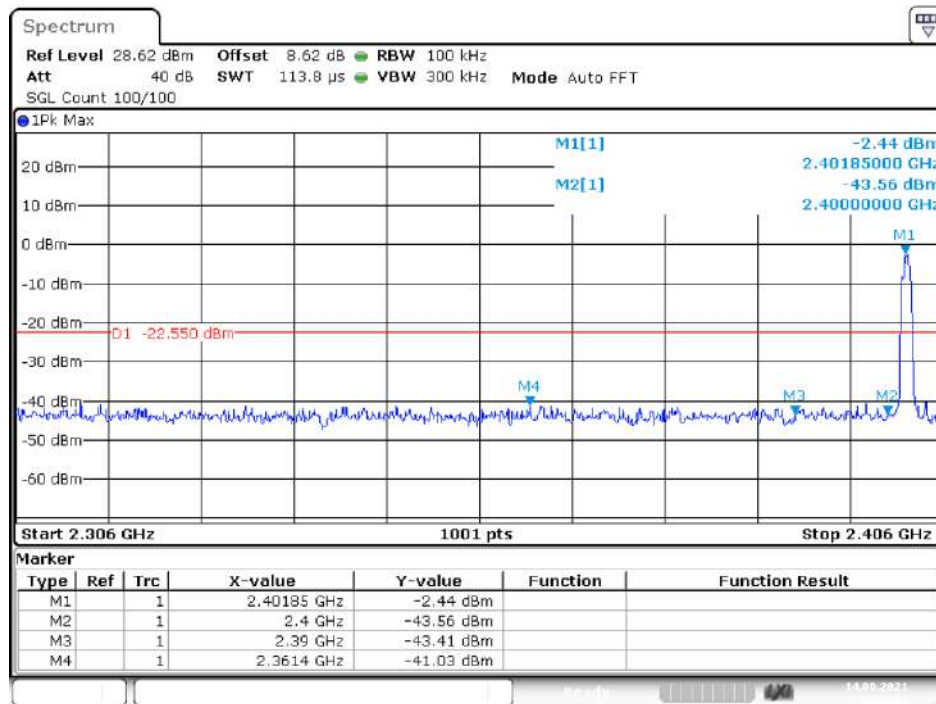
Date: 14.SEP.2021 12:14:22

Band Edge(Hopping) NVNT 1-DH1 2480MHz Ant1 Hopping Emission

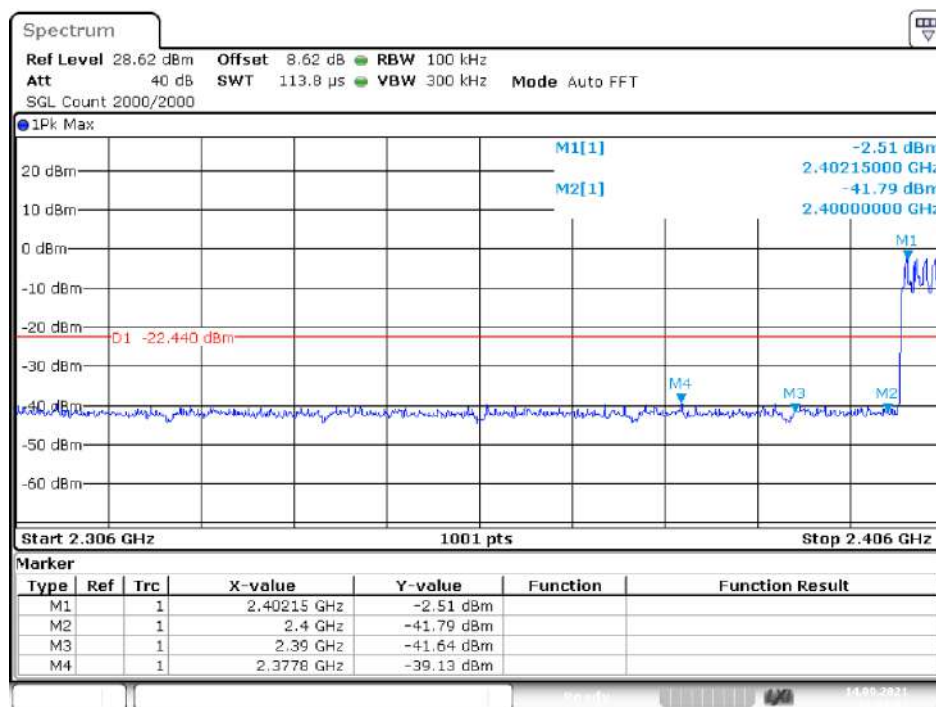


Date: 14.SEP.2021 12:39:35

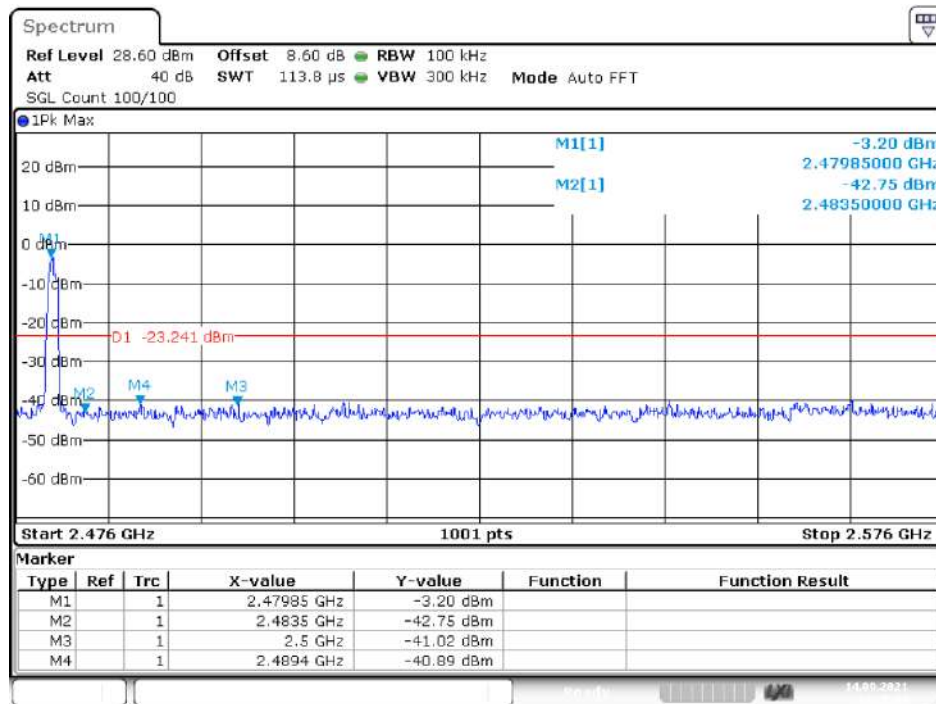
Band Edge NVNT 2-DH1 2402MHz Ant1 No-Hopping Emission



Band Edge(Hopping) NVNT 2-DH1 2402MHz Ant1 Hopping Emission

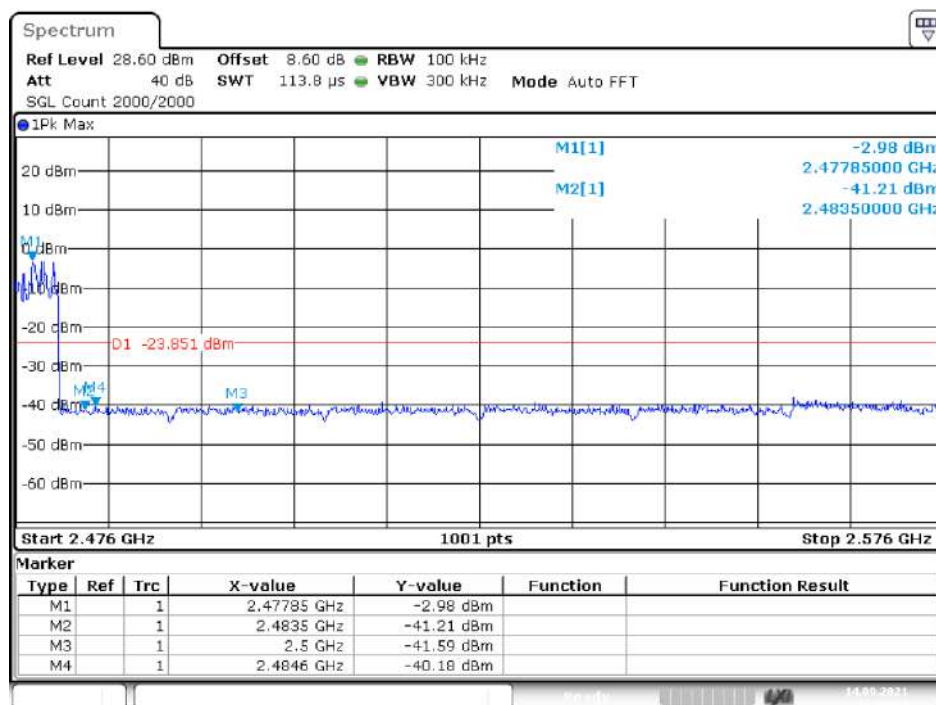


Band Edge NVNT 2-DH1 2480MHz Ant1 No-Hopping Emission



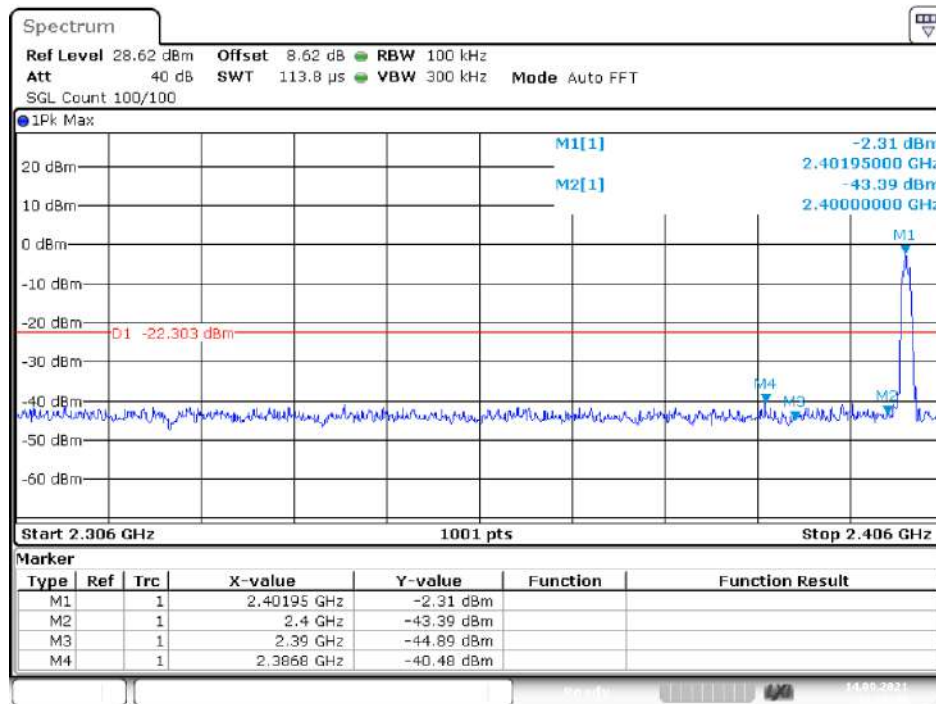
Date: 14.SEP.2021 12:29:03

Band Edge(Hopping) NVNT 2-DH1 2480MHz Ant1 Hopping Emission



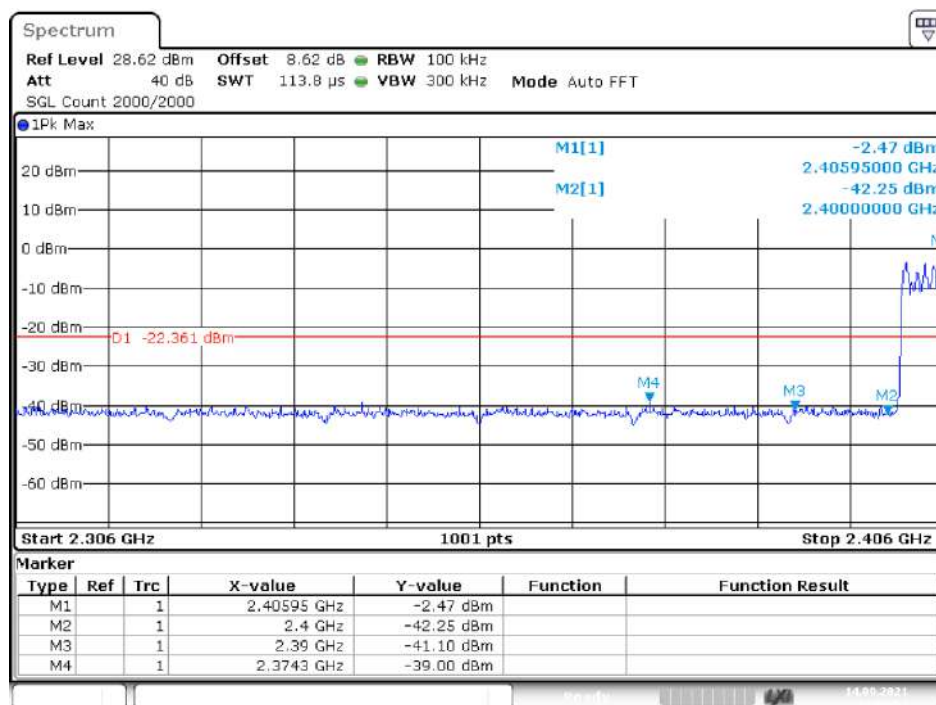
Date: 14.SEP.2021 12:49:34

Band Edge NVNT 3-DH1 2402MHz Ant1 No-Hopping Emission



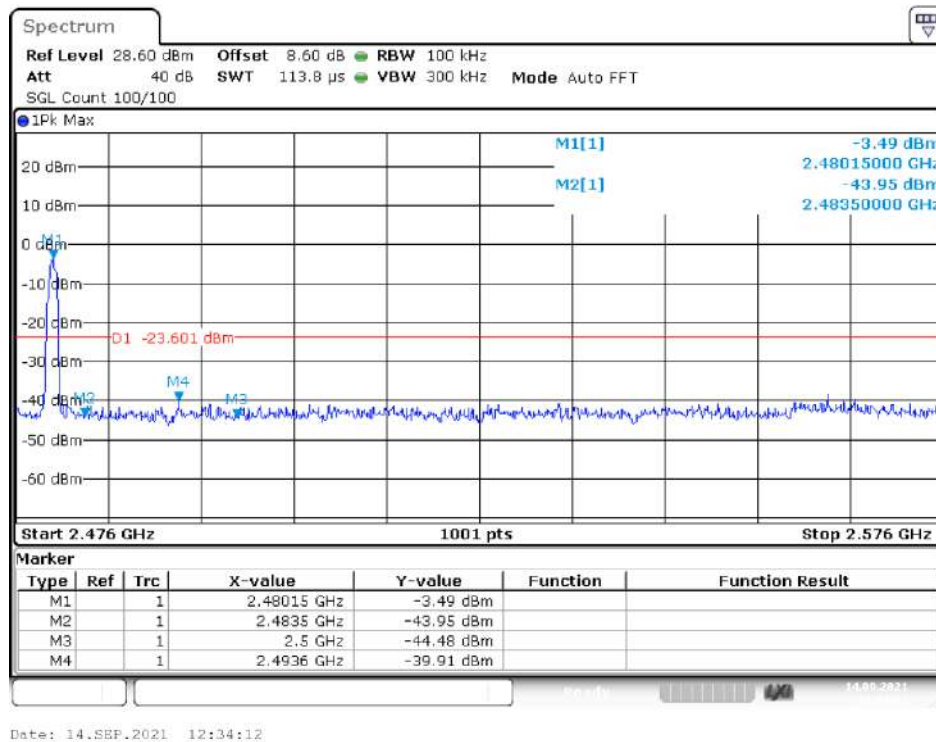
Date: 14.SEP.2021 12:30:40

Band Edge(Hopping) NVNT 3-DH1 2402MHz Ant1 Hopping Emission

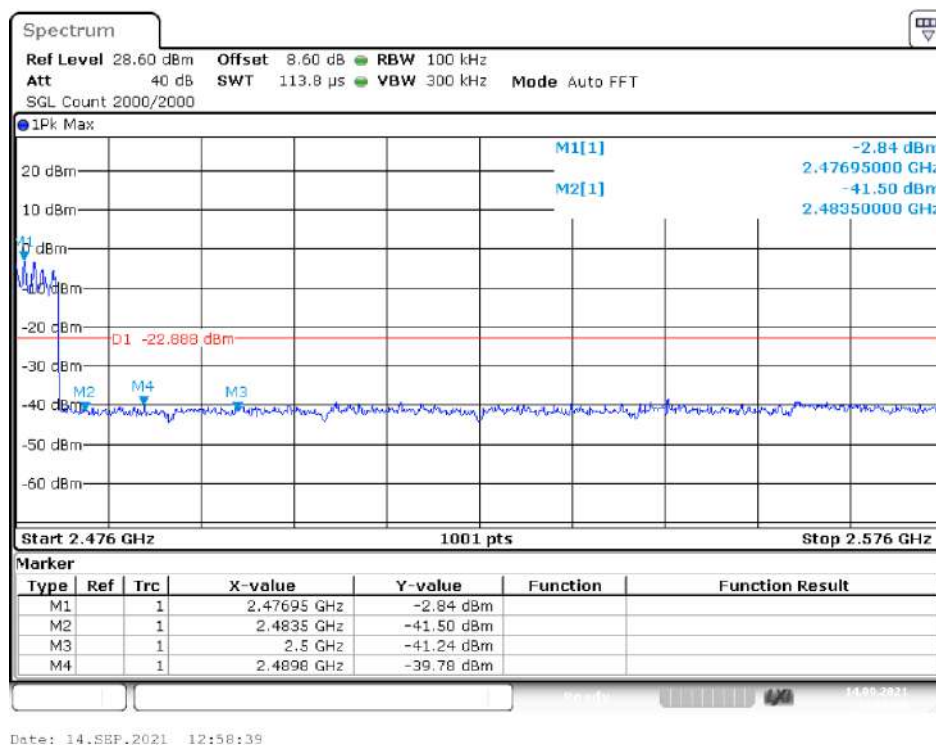


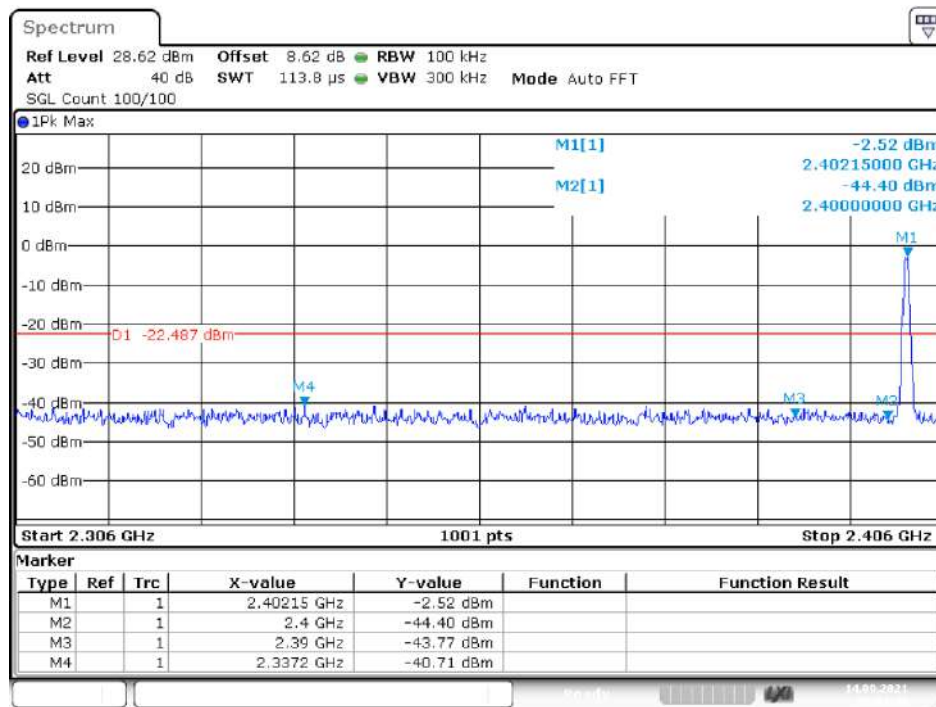
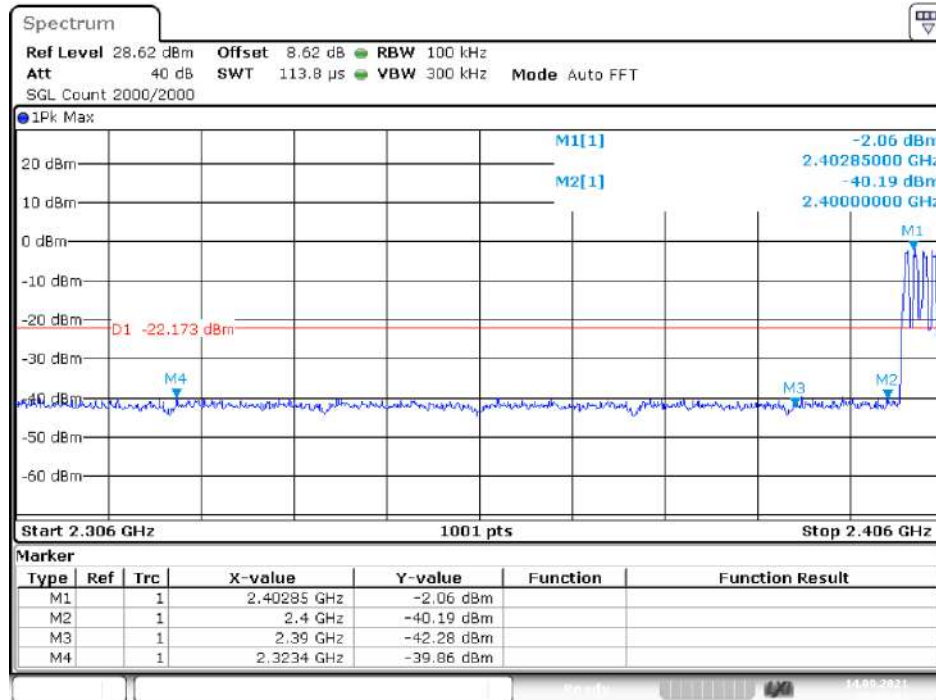
Date: 14.SEP.2021 12:52:54

Band Edge NVNT 3-DH1 2480MHz Ant1 No-Hopping Emission

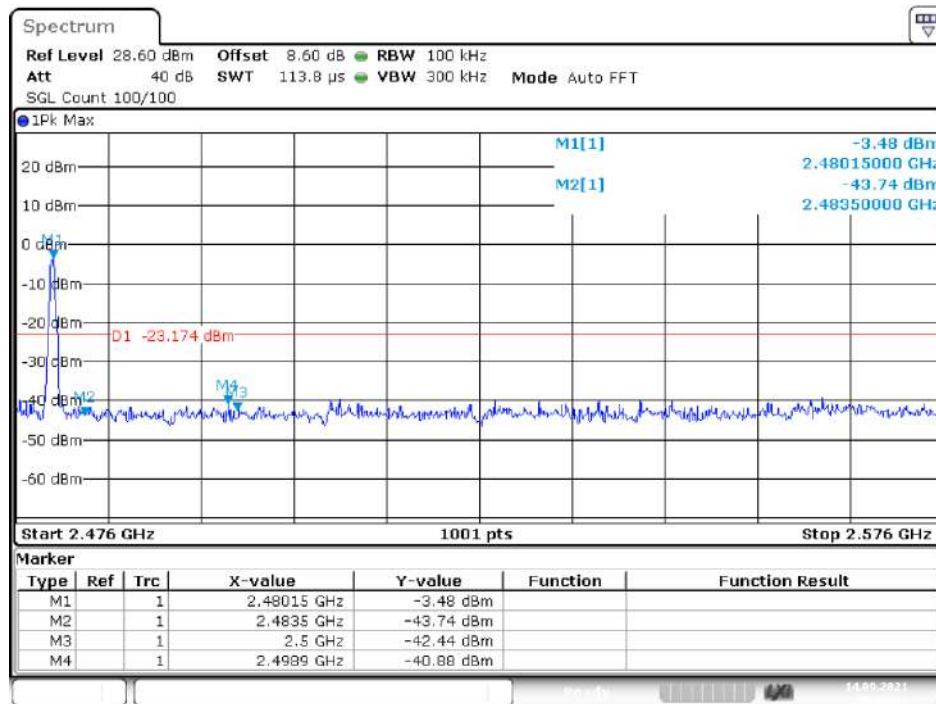


Band Edge(Hopping) NVNT 3-DH1 2480MHz Ant1 Hopping Emission



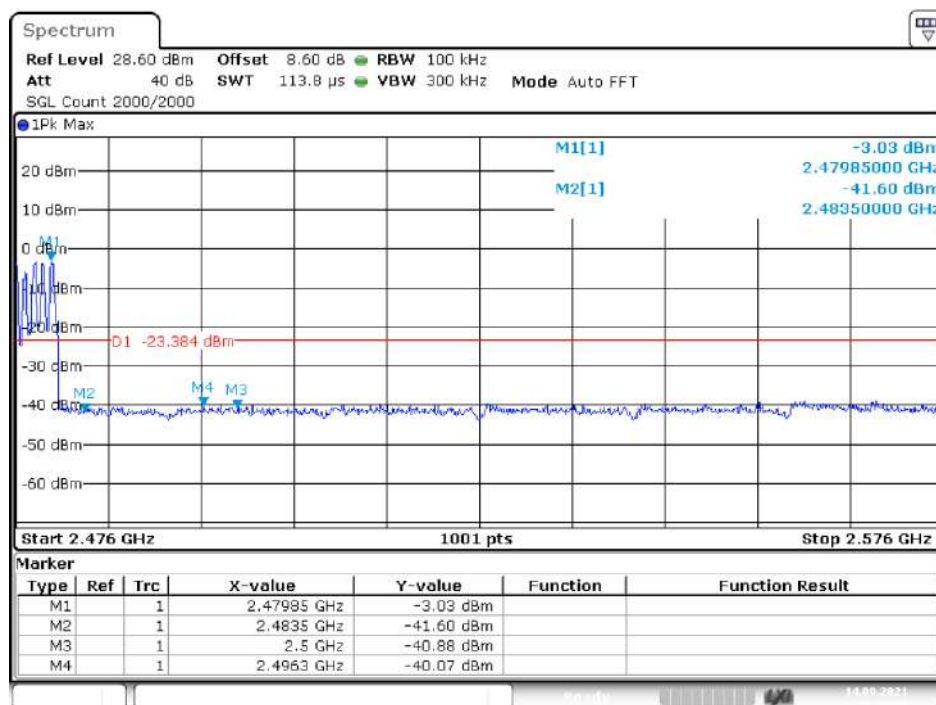
Conducted Method:SP5078(red)**Band Edge NVNT 1-DH1 2402MHz Ant1 No-Hopping Emission****Band Edge(Hopping) NVNT 1-DH1 2402MHz Ant1 Hopping Emission**

Band Edge NVNT 1-DH1 2480MHz Ant1 No-Hopping Emission



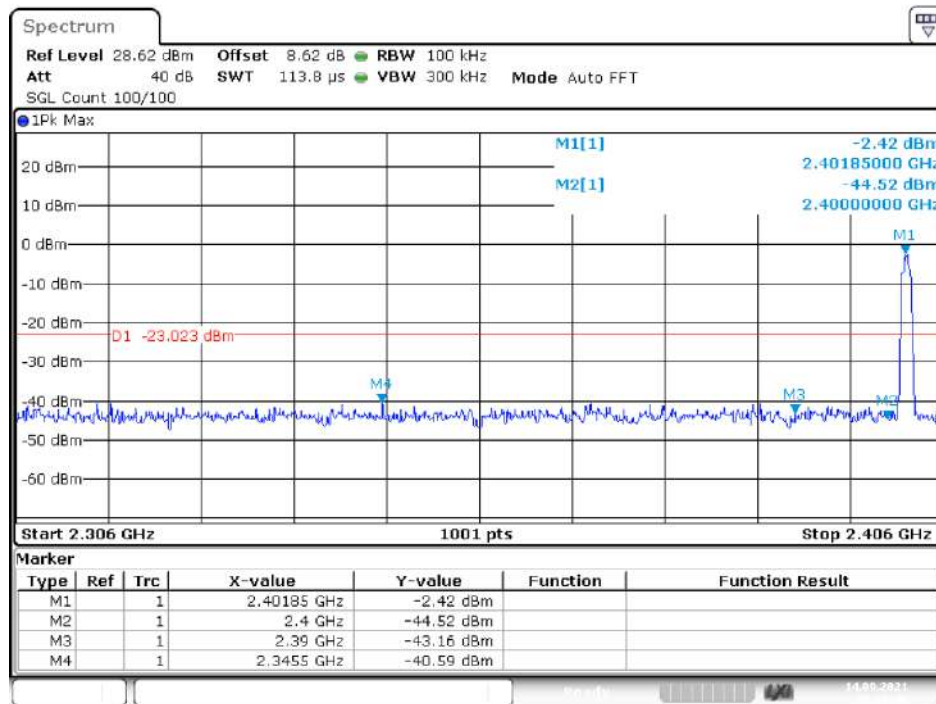
Date: 14.SEP.2021 07:07:17

Band Edge(Hopping) NVNT 1-DH1 2480MHz Ant1 Hopping Emission



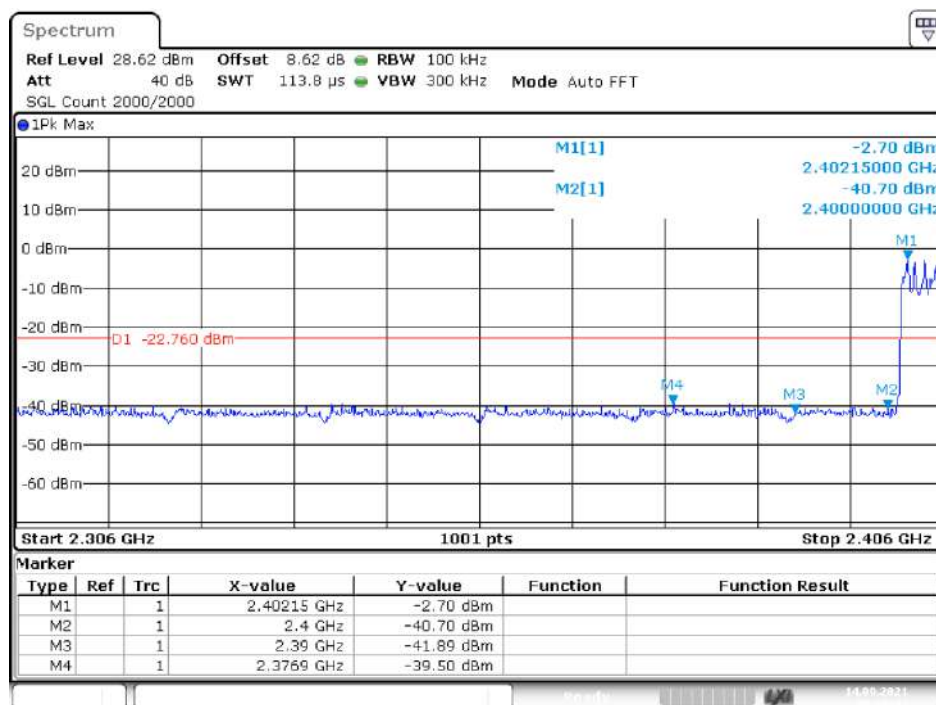
Date: 14.SEP.2021 10:13:38

Band Edge NVNT 2-DH1 2402MHz Ant1 No-Hopping Emission



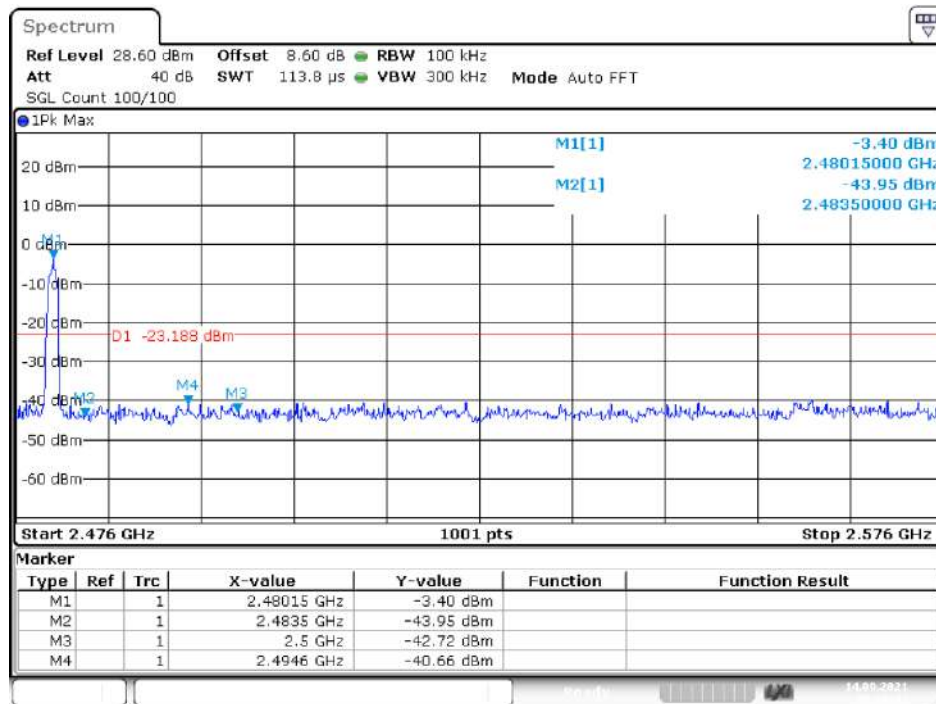
Date: 14.SEP.2021 07:10:46

Band Edge(Hopping) NVNT 2-DH1 2402MHz Ant1 Hopping Emission



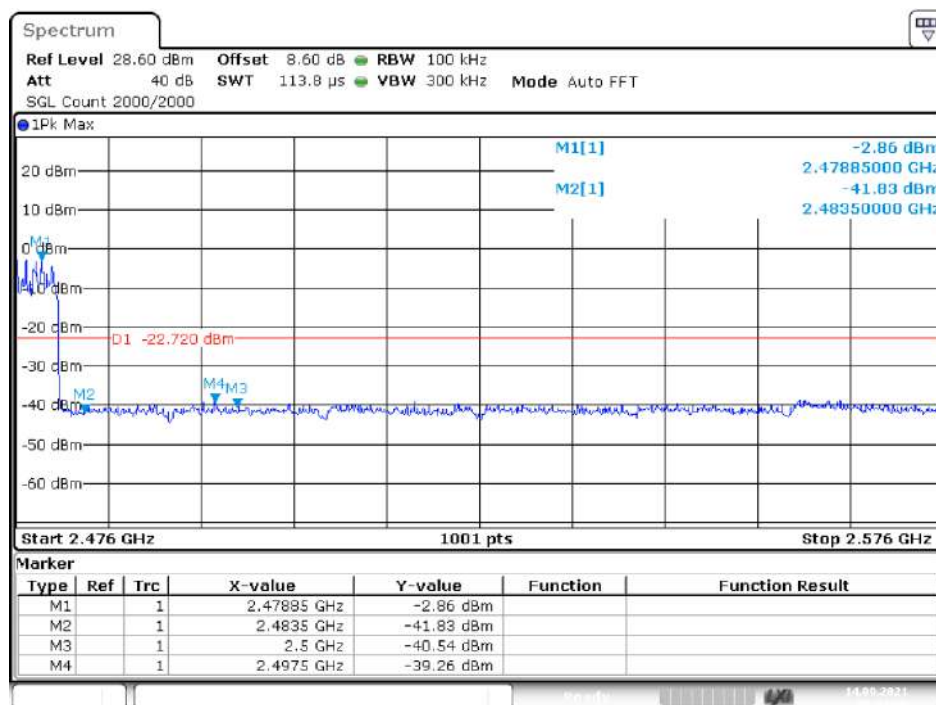
Date: 14.SEP.2021 09:38:46

Band Edge NVNT 2-DH1 2480MHz Ant1 No-Hopping Emission



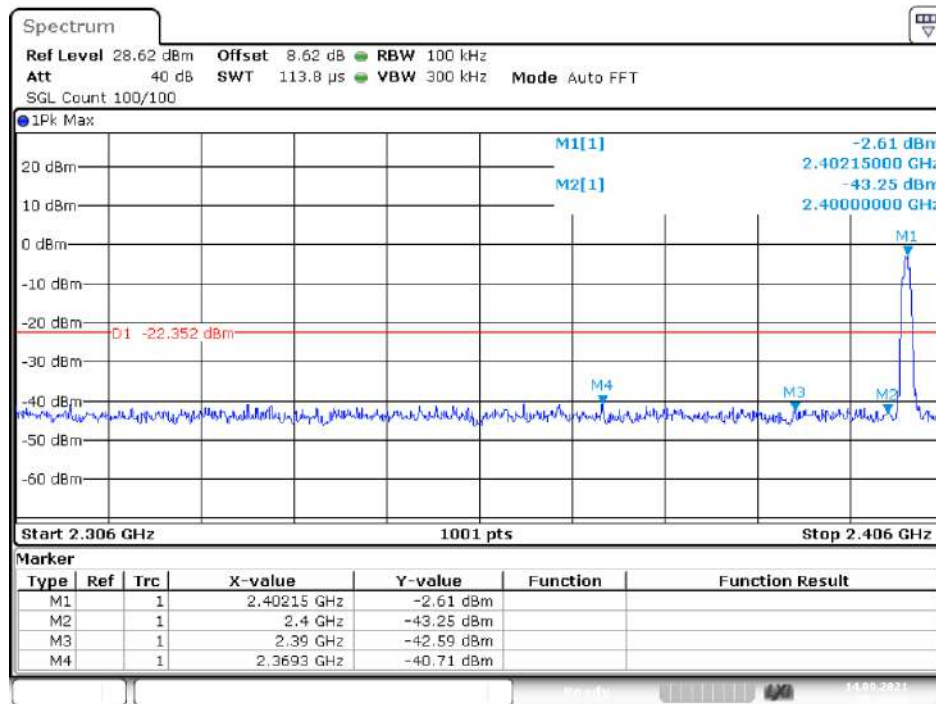
Date: 14.SEP.2021 07:16:41

Band Edge(Hopping) NVNT 2-DH1 2480MHz Ant1 Hopping Emission



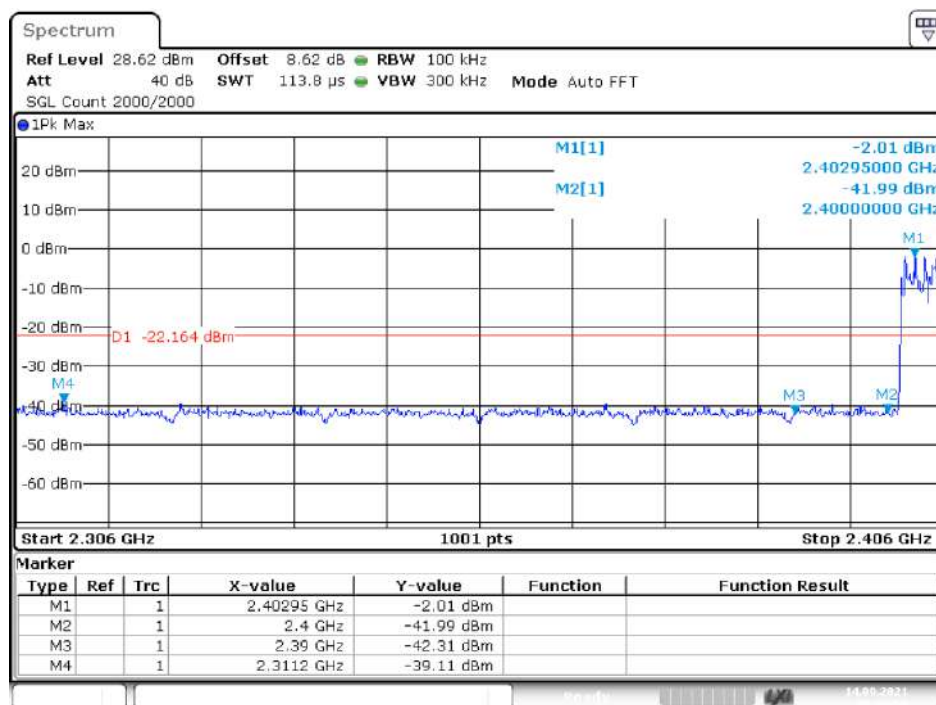
Date: 14.SEP.2021 09:43:16

Band Edge NVNT 3-DH1 2402MHz Ant1 No-Hopping Emission



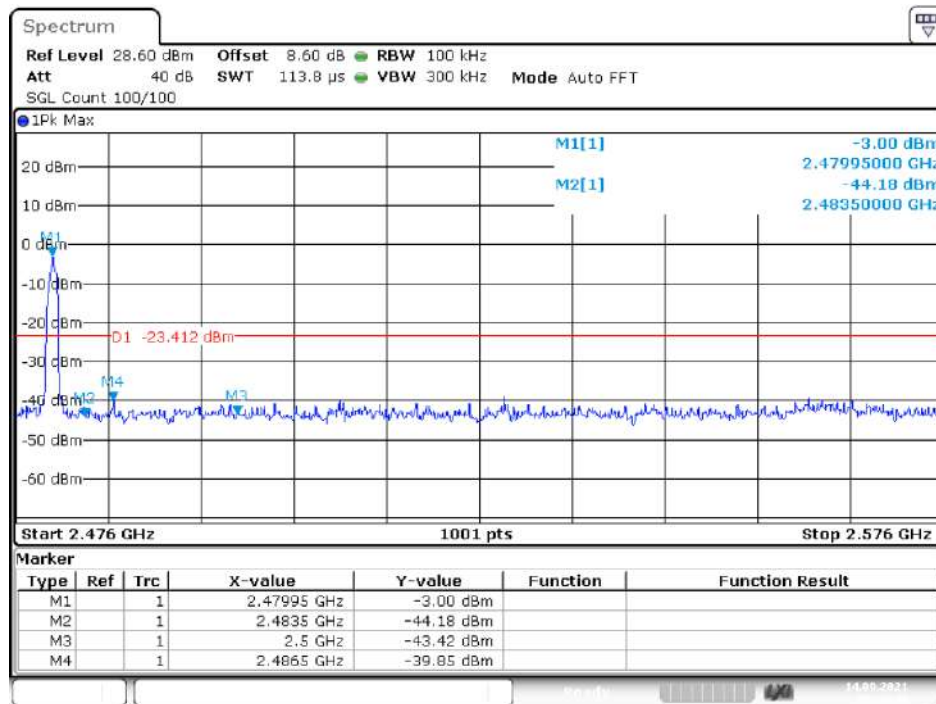
Date: 14.SEP.2021 07:18:21

Band Edge(Hopping) NVNT 3-DH1 2402MHz Ant1 Hopping Emission



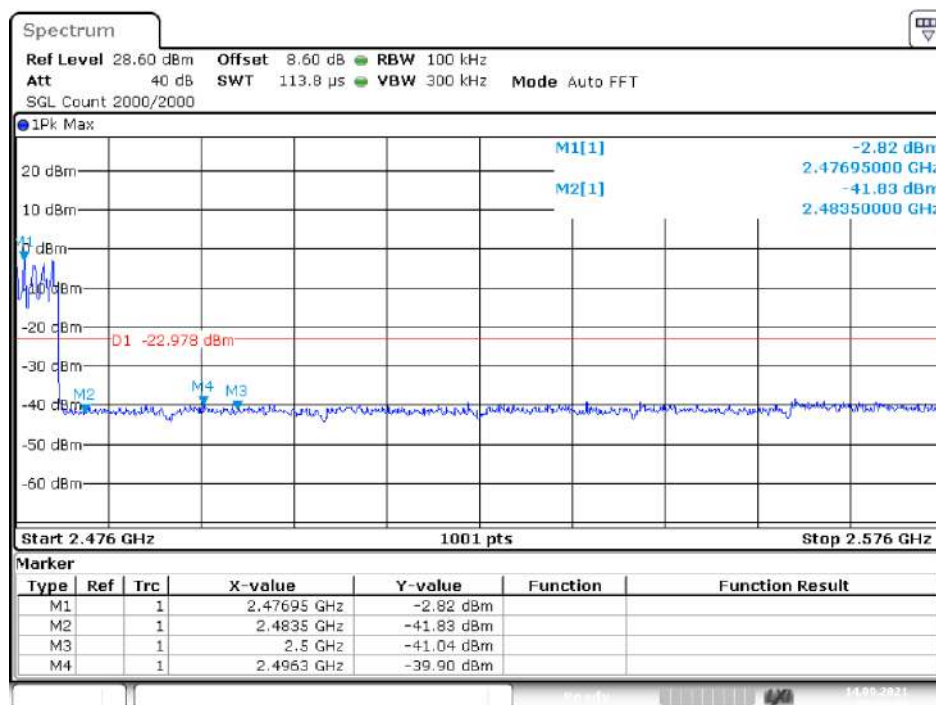
Date: 14.SEP.2021 09:48:57

Band Edge NVNT 3-DH1 2480MHz Ant1 No-Hopping Emission



Date: 14.SEP.2021 07:24:49

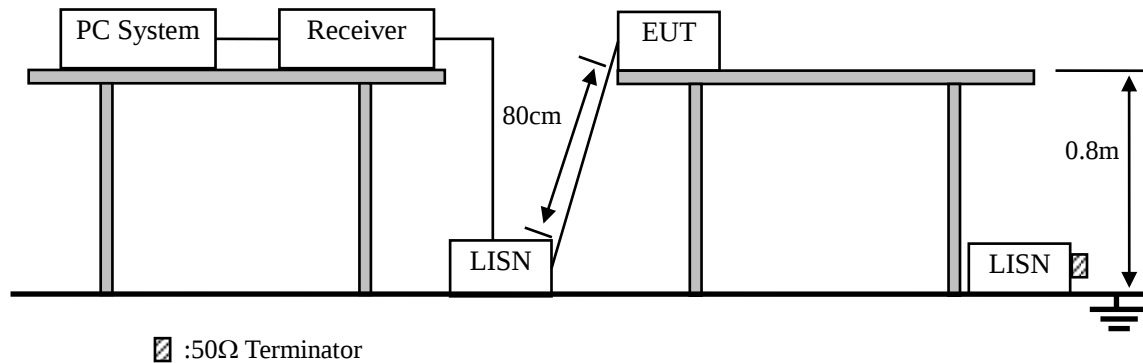
Band Edge(Hopping) NVNT 3-DH1 2480MHz Ant1 Hopping Emission



Date: 14.SEP.2021 09:54:07

10. Power Line Conducted Emissions

10.1. Block Diagram of Test Setup



10.2. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

10.3. Test Procedure

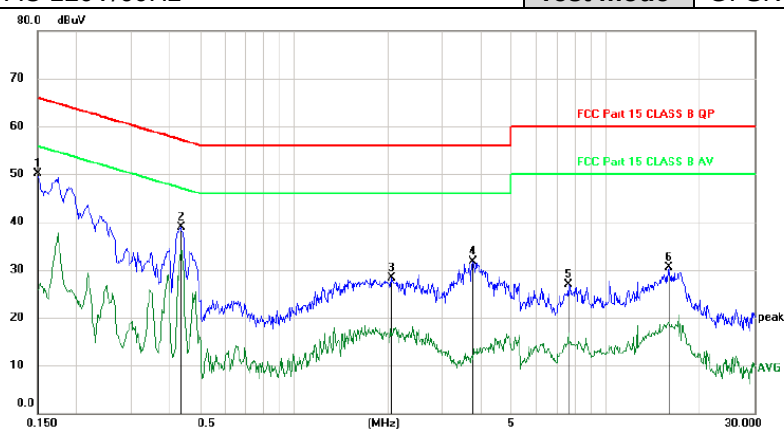
- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
- (2) Setup the EUT and simulator as shown in 10.1
- (3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 :2013on conducted Emission test.
- (4) The bandwidth of test receiver is set at 10KHz.
- (5) The frequency range from 150 KHz to 30MHz is checked.

10.4. Test Result

PASS. (See below detailed test data)

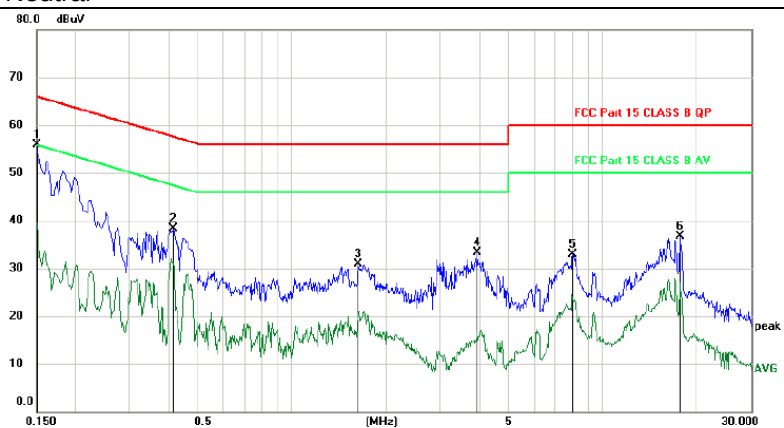
Note: If peak Result comply with AV limit, QP and AV Result is deemed to comply with AV limit

EUT Description	Wireless Joy-con controller for Switch	Model No.	SP5078(blue)
Temperature	24℃	Humidity	56%
Pol	Line	Test date	2021/09/23
Test Voltage	AC 120V/60Hz	Test mode	GFSK (2480MHz)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1500	40.14	9.94	50.08	66.00	-15.92	peak	
2		0.4339	28.92	9.95	38.87	57.18	-18.31	peak	
3		2.0579	18.46	9.88	28.34	56.00	-27.66	peak	
4		3.7540	21.74	9.96	31.70	56.00	-24.30	peak	
5		7.5739	16.69	10.14	26.83	60.00	-33.17	peak	
6		15.9657	20.07	10.36	30.43	60.00	-29.57	peak	

Pol	Neutral
------------	---------



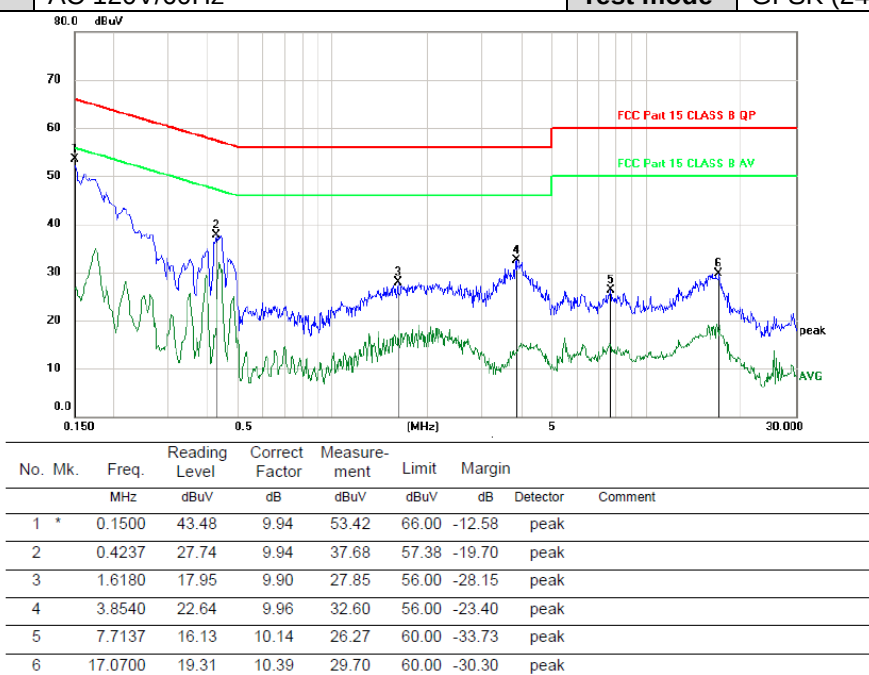
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1500	45.87	9.94	55.81	66.00	-10.19	peak	
2		0.4140	28.41	9.94	38.35	57.57	-19.22	peak	
3		1.6320	21.10	9.90	31.00	56.00	-25.00	peak	
4		3.9450	23.38	9.96	33.34	56.00	-22.66	peak	
5		7.9860	22.81	10.15	32.96	60.00	-27.04	peak	
6		17.7450	26.24	10.41	36.65	60.00	-23.35	peak	

*:Maximum data x:Over limit !:over margin

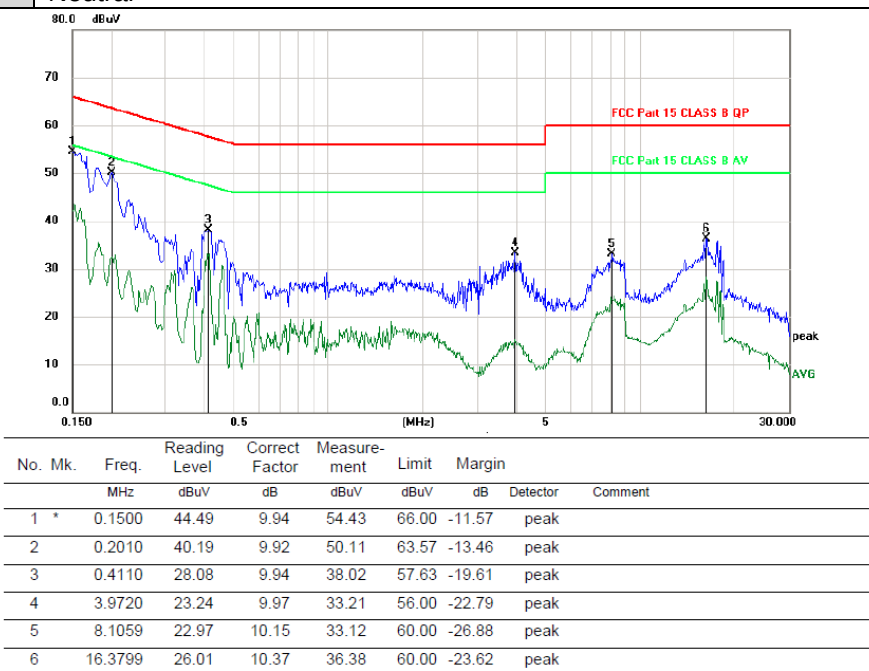
Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Remark: All modes have been tested, and only worst data of Charging was listed in this report.

EUT Description	Wireless Joy-con controller for Switch	Model No.	SP5078(red)
Temperature	24°C	Humidity	56%
Pol	Line	Test date	2021/09/23
Test Voltage	AC 120V/60Hz	Test mode	GFSK (2480MHz)



Pol	Neutral
------------	---------



*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Remark: All modes have been tested, and only worst data of Charging was listed in this report.

11. Antenna Requirements

11.1. Limit

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

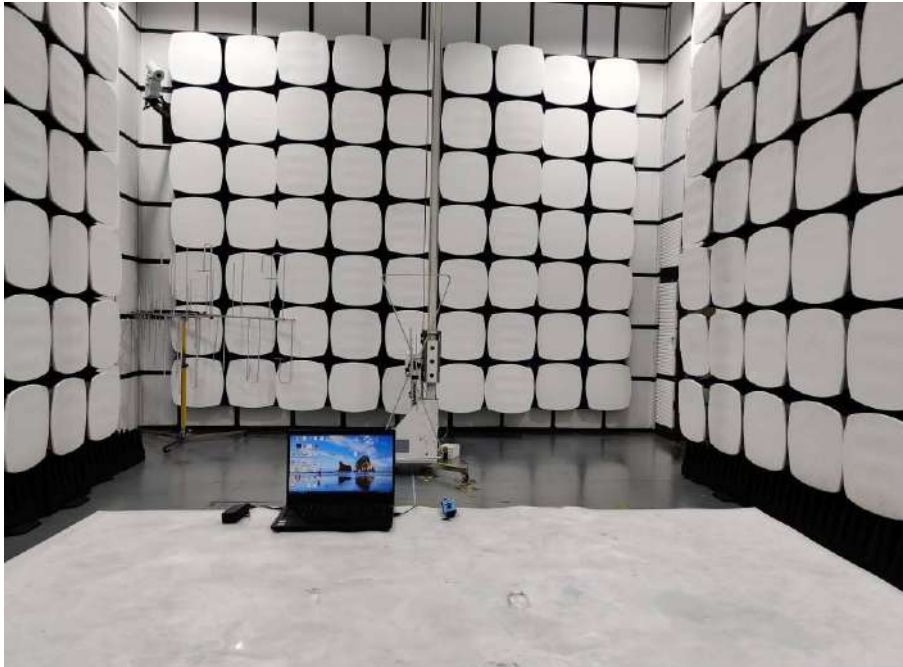
11.2. Result

The EUT antenna is internal antenna. It complies with the standard requirement.

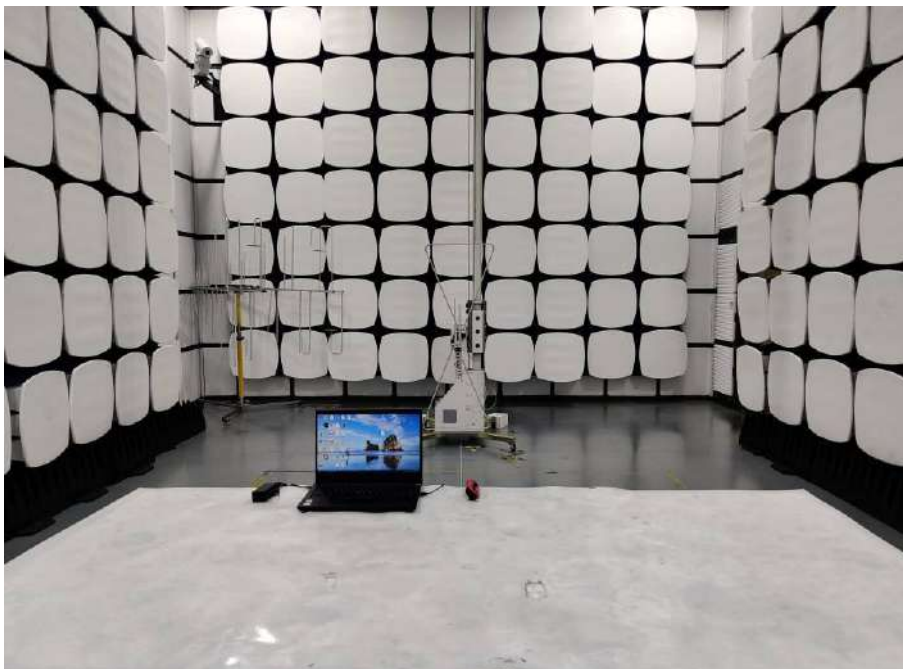
12. Test Setup Photo

12.1. Photos of Radiated emission

For SP5078(blue)



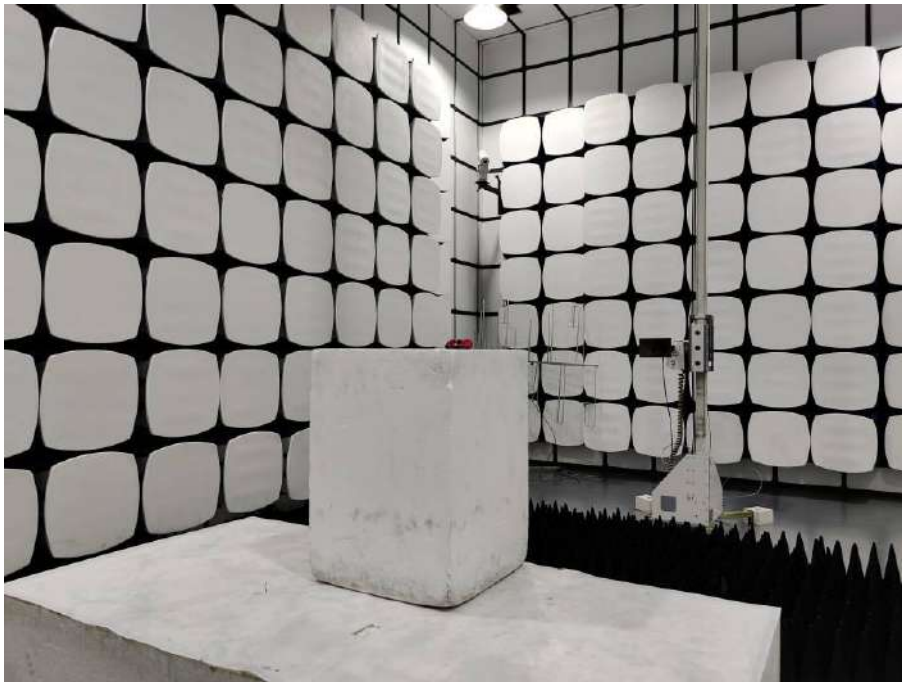
For SP5078(red)



For SP5078(blue)



For SP5078(red)



12.2.Photos of Power Line Conducted Emission Test

For SP5078(blue)



For SP5078(red)

