



FCC TEST REPORT

FCC ID: 2AZUP-SP5269

On Behalf of

Shenzhen CHT Technology Co., Ltd.

Wireless Pro controller For Switch

Model No.: SP5269, BNK-9099

Prepared for : Shenzhen CHT Technology Co., Ltd.
Address : Building L, ShengGuang Industrial Area, No. 152 ShaJing DongHuan
Road, XinQiao Street, Bao'An District, Shenzhen, China

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.
Address : Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

Report Number : A2209172-C01-R01
Date of Receipt : September 27, 2022
Date of Test : September 27, 2022- October 11, 2022
Date of Report : October 11, 2022
Version Number : V0

TABLE OF CONTENTS

Description	Page
1. Summary of Standards And Results	6
1.1. Description of Standards and Results	6
2. General Information.....	7
2.1. Description of Device (EUT)	7
2.2. Accessories of Device (EUT)	8
2.3. Tested Supporting System Details	8
2.4. Block Diagram of connection between EUT and simulators	8
2.5. Test Mode Description	8
2.6. Test Conditions	9
2.7. Test Facility	9
2.8. Measurement Uncertainty	9
2.9. Test Equipment List	10
3. Maximum Peak Output power	12
3.1. Limit	12
3.2. Test Procedure	12
3.3. Test Setup.....	12
3.4. Test Result.....	12
4. Bandwidth	13
4.1. Limit	13
4.2. Test Procedure	13
4.3. Test Result.....	13
5. Carrier Frequency Separation	20
5.1. Limit	20
5.2. Test Procedure	20
5.3. Test Result.....	20
6. Number Of Hopping Channel	22
6.1. Limit	22
6.2. Test Procedure	22
6.3. Test Result.....	22
7. Dwell Time	24
7.1. Test limit.....	24
7.2. Test Procedure	24
7.3. Test Result.....	24
8. Radiated emissions	36
8.1. Limit	36
8.2. Block Diagram of Test setup.....	37
8.3. Test Procedure	38
8.4. Test Result.....	38
9. Band Edge Compliance	46

9.1. Block Diagram of Test Setup	46
9.2. Limit	46
9.3. Test Procedure	46
9.4. Test Result.....	46
10. Power Line Conducted Emissions.....	53
10.1. Block Diagram of Test Setup	53
10.2. Limit	53
10.3. Test Procedure	53
10.4. Test Result.....	54
12. Antenna Requirements	57
12.1. Limit	57
12.2. Result	57
13. Test Setup Photo	58
13.1. Photos of Radiated emission.....	58
13.2. Photos of Conducted Emission test	59
14. EUT photo.....	60

TEST REPORT DECLARATION

Applicant : Shenzhen CHT Technology Co., Ltd.
Address : Building L, ShengGuang Industrial Area, No. 152 ShaJing DongHuan Road,
XinQiao Street, Bao'An District, Shenzhen, China
Manufacturer : Shenzhen CHT Technology Co., Ltd.
Address : Building L, ShengGuang Industrial Area, No. 152 ShaJing DongHuan Road,
XinQiao Street, Bao'An District, Shenzhen, China
EUT Description : Wireless Pro controller For Switch
(A) Model No. : SP5269, BNK-9099
(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 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).....: Yanniss Wen
Project Engineer


.....

Approved by (name + signature).....: Jack Xu
Project Manager


.....

Date of issue.....: October 11, 2022

Revision History

Revision	Issue Date	Revisions	Revised By
V0	October 11, 2022	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)	P
Bandwidth	FCC Part 15: 15.215	P
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1)	P
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)	P
Dwell Time	FCC Part 15: 15.247(a)(1)	P
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d)	P
Band Edge Compliance	FCC Part 15: 15.247(d)	P
Power Line Conducted Emissions	FCC Part 15: 15.207	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 Pro controller For Switch

Model
Number/HVIN(s) : SP5269, BNK-9099

Diff. : There is no difference except the name of the model. All tests are made with the SP5269 model.

Trademark : N/A

Test Voltage : DC 5V from Notebook with DC 3.7V from Battery

Radio Technology : Bluetooth EDR

Operation
frequency : 2402MHz-2480MHz

Modulation : GFSK, $\pi/4$ -DQPSK

Channel No. : 79 Channels

Channel Separation : 1MHz

Antenna Type : PCB Antenna, max gain 0.61dBi.
Antenna information is provided by applicant.

Software version : 0831

Hardware version : SP5269-B-MAIN-V1.0

Remark:

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

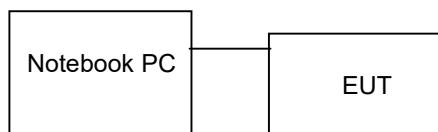
2.2. Accessories of Device (EUT)

Accessories :
 Manufacturer :
 Model :
 Input :
 Output :

2.3. Tested Supporting System Details

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

2.4. Block Diagram of connection between EUT and simulators



2.5. Test Mode Description

The test software “FCC_assist_1.0.1.2.app” was used to control EUT work in Continuous TX mode, and select test channel, wireless mode

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
Carrier Tx Mode	CH0	2402
	CH39	2441
	CH78	2480
GFSK / Pi/4-DQPSK hopping on Tx Mode	CH0 to CH78	2402 to 2480
GFSK / Pi/4-DQPSK hopping off Tx Mode	CH0	2402
	CH39	2441
	CH78	2480

Setting output power (Max)		
GFSK	$\pi/4$ -DQPSK	8DPSK
6±1dBm	6±1dBm	/

2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35°C	25°C
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

Designation Number: CN1236

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	1.63dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.74dB(Polarize: V)
	3.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for radio frequency	5.06×10^{-8} GHz
Uncertainty for conducted RF Power	0.40dB
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.	Firmware version	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	/	N/A	2022.05.17	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	2.3	102137	2022.08.22	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2022.08.22	1Year
Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-10 2082-Wa	2022.08.22	1Year
Receiver	R&S	ESCI	4.42 SP1	101165	2022.08.22	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	/	VULB 9168#627	2021.08.30	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2021.08.30	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00059	2021.08.30	2Year
RF Cable	Resenberger	Cable 1	/	RE1	2022.08.22	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2022.08.22	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2022.08.22	1Year
Pre-amplifier	HP	HP8347A	/	2834A00455	2022.08.22	1Year
Pre-amplifier	Agilent	8449B	/	3008A02664	2022.08.22	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	/	8126-466	2022.08.22	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2022.08.23	1 Year
Horn Antenna	SCHWARZBECK	BBHA9170	/	00946	2021.08.30	2 Year
Preamplifier	SKET	LNPA_1840 -50	/	SK2018101801	2022.08.22	1 Year
Power Meter	Agilent	E9300A	/	MY41496628	2022.08.22	1 Year
Power Sensor	DARE	RPR3006W	/	15100041SNO91	2022.08.22	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000 -40-880	/	100631	2022.08.22	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2022.08.22	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

3. Maximum Peak Output Power

3.1. Limit

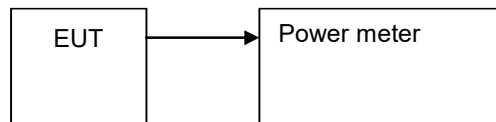
Please refer FCC part 15.247 & RSS-247..

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 Power meter is set to the peak power detection.

3.3. Test Setup



3.4. Test Result

Mode	Freq (MHz)	PK Output Power (dBm)	Limit (dBm)	Result
GFSK	2402	6.115	21	Pass
	2441	6.069	21	Pass
	2480	5.787	21	Pass
$\pi/4$ DQPSK	2402	6.188	21	Pass
	2441	6.221	21	Pass
	2480	6.039	21	Pass
Conclusion: PASS				

4. Bandwidth

4.1. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in RSS-GEN, FCC Section 15.247(a)(1), 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.

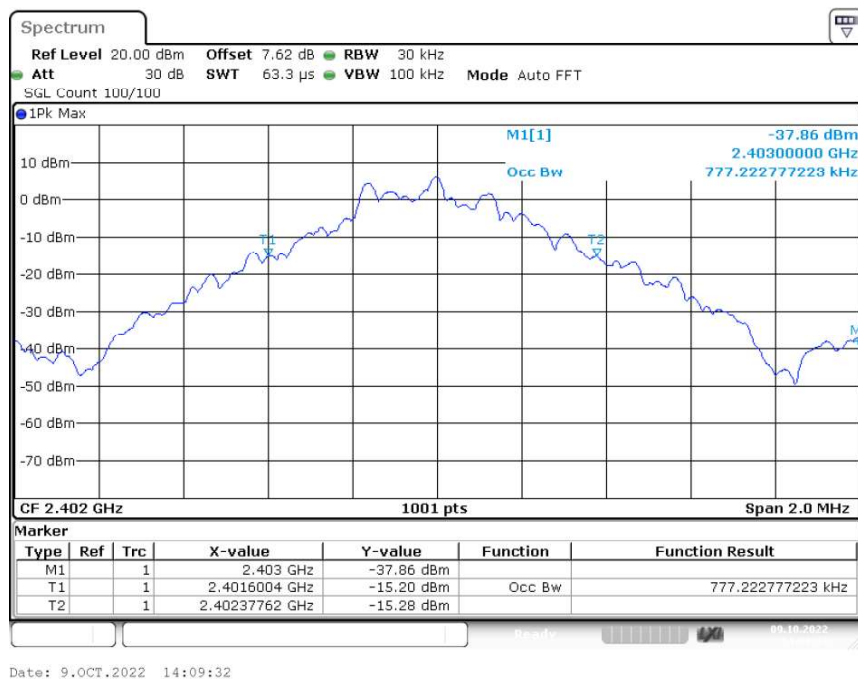
4.2. Test Procedure

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.

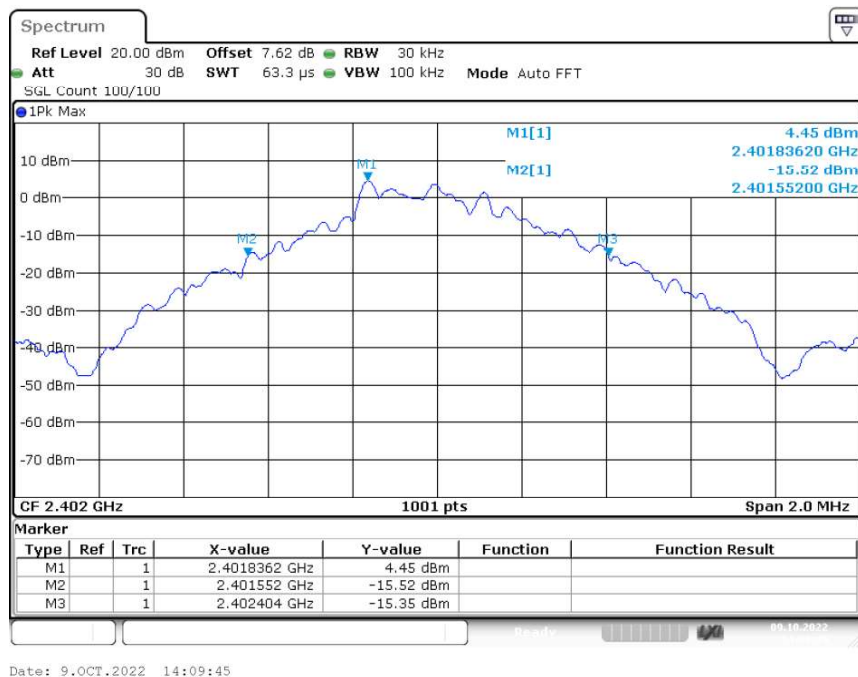
4.3. Test Result

Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH1	2402	Ant1	0.852	N/A	Pass
NVNT	1-DH1	2441	Ant1	0.738	N/A	Pass
NVNT	1-DH1	2480	Ant1	0.822	N/A	Pass
NVNT	2-DH1	2402	Ant1	1.184	N/A	Pass
NVNT	2-DH1	2441	Ant1	1.188	N/A	Pass
NVNT	2-DH1	2480	Ant1	1.184	N/A	Pass

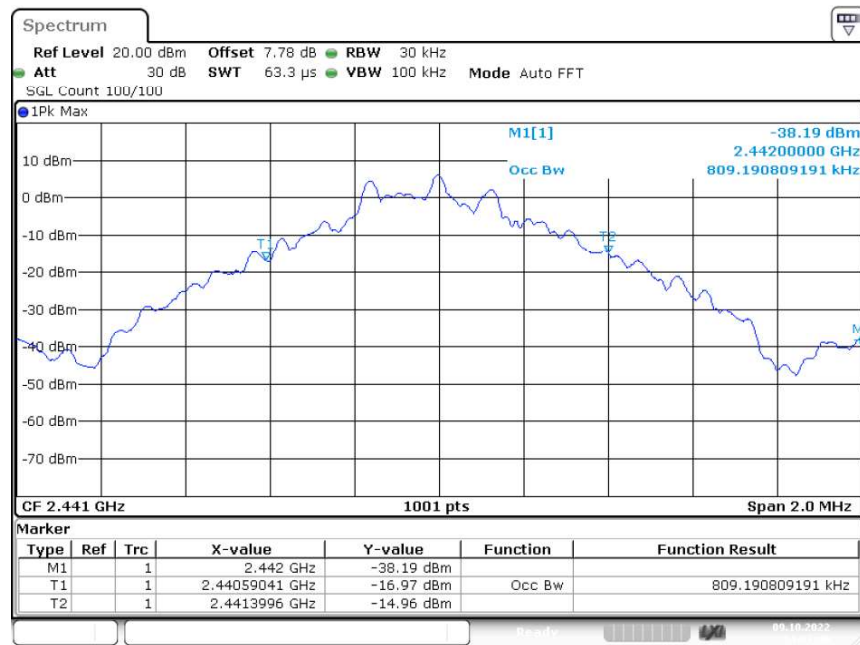
OBW NVNT 1-DH1 2402MHz Ant1



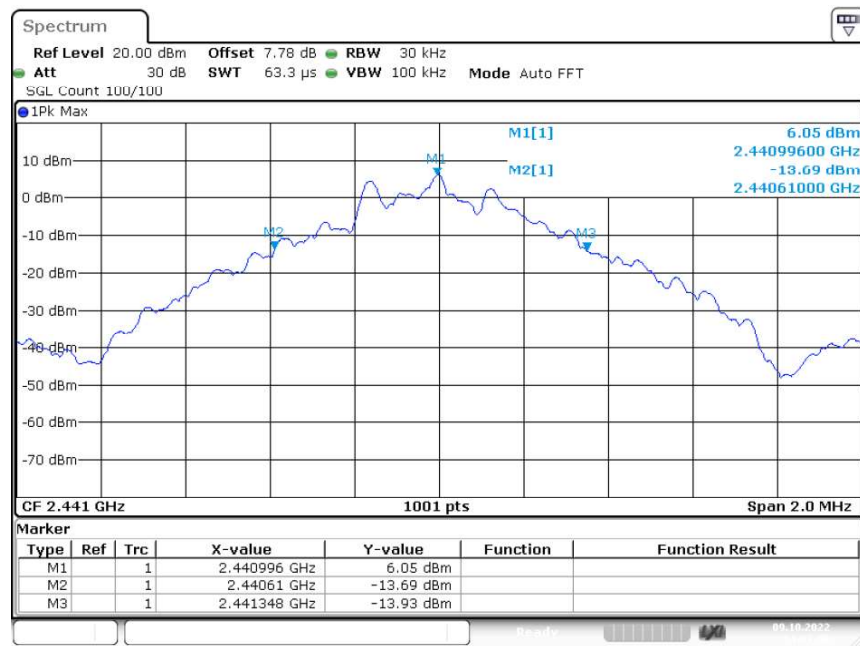
-20 dB BW NVNT 1-DH1 2402MHz Ant1



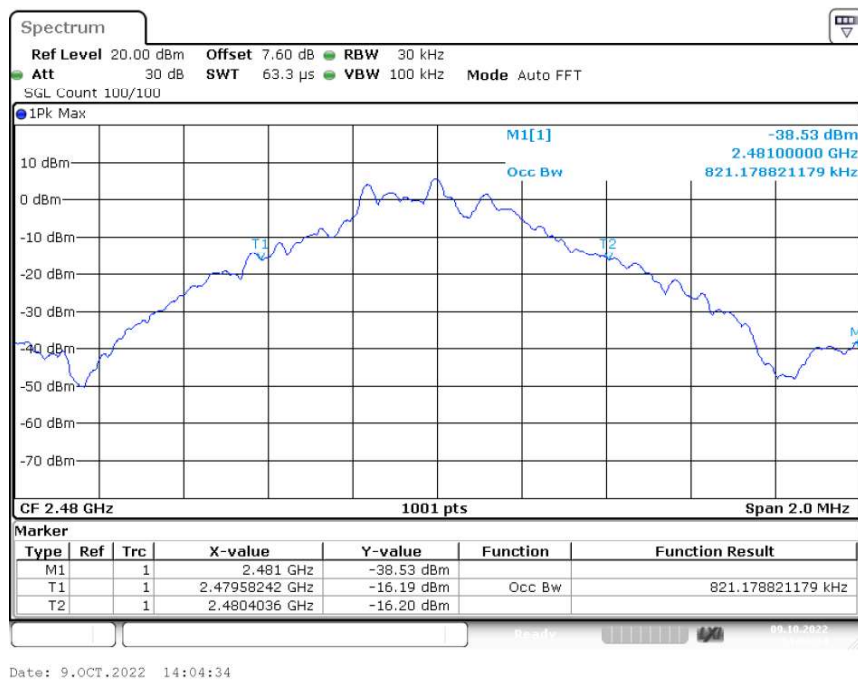
OBW NVNT 1-DH1 2441MHz Ant1



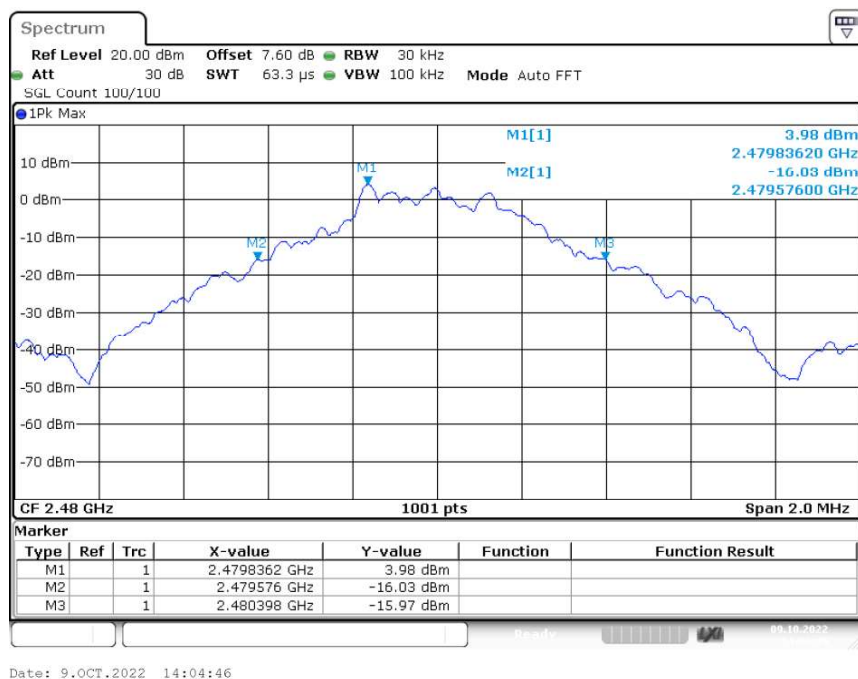
-20 dB BW NVNT 1-DH1 2441MHz Ant1



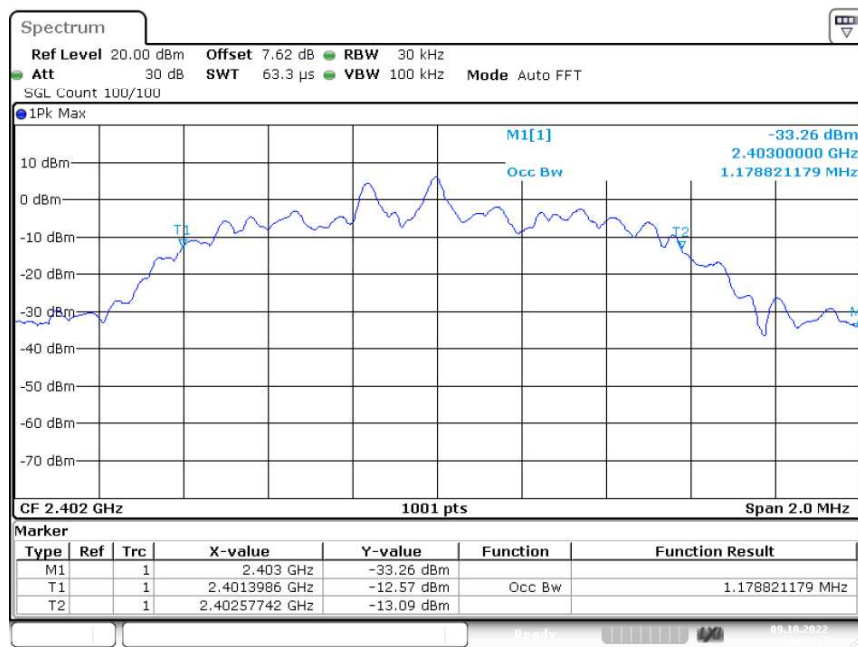
OBW NVNT 1-DH1 2480MHz Ant1



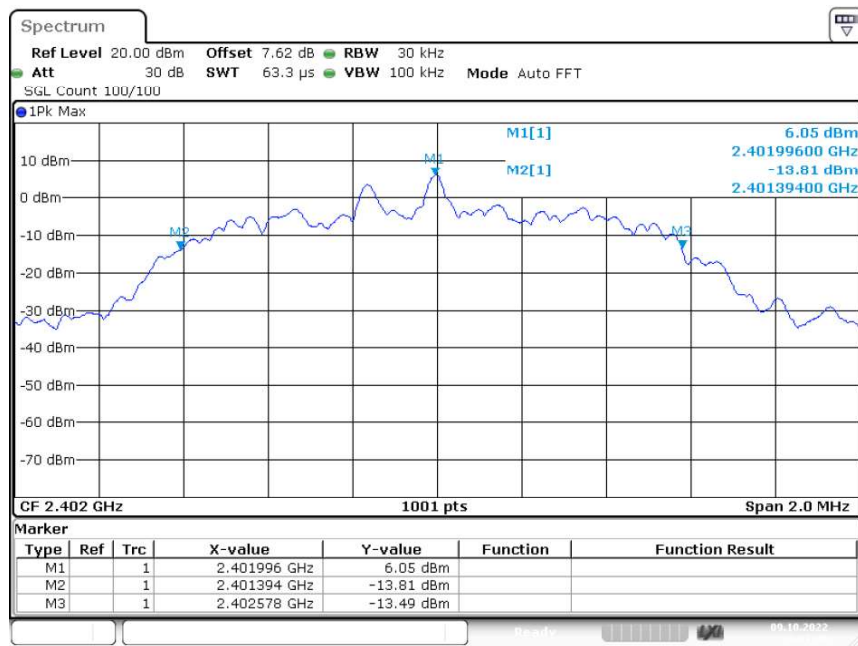
-20 dB BW NVNT 1-DH1 2480MHz Ant1



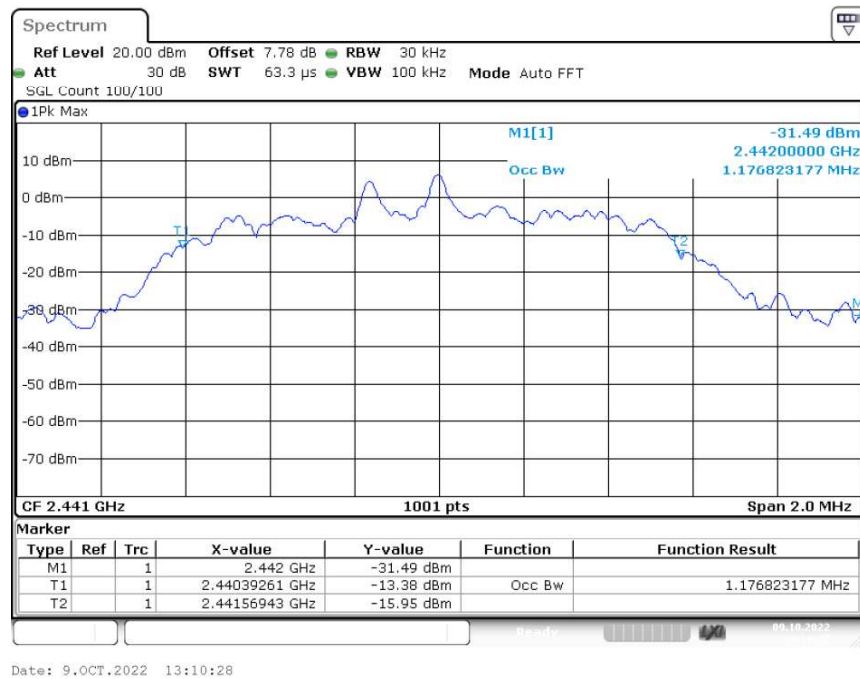
OBW NVNT 2-DH1 2402MHz Ant1



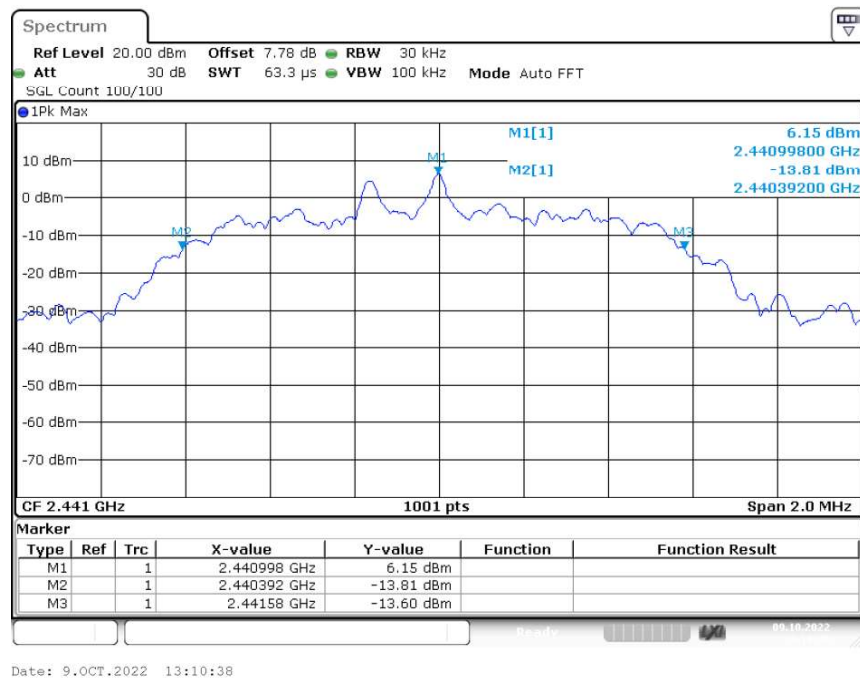
-20 dB BW NVNT 2-DH1 2402MHz Ant1



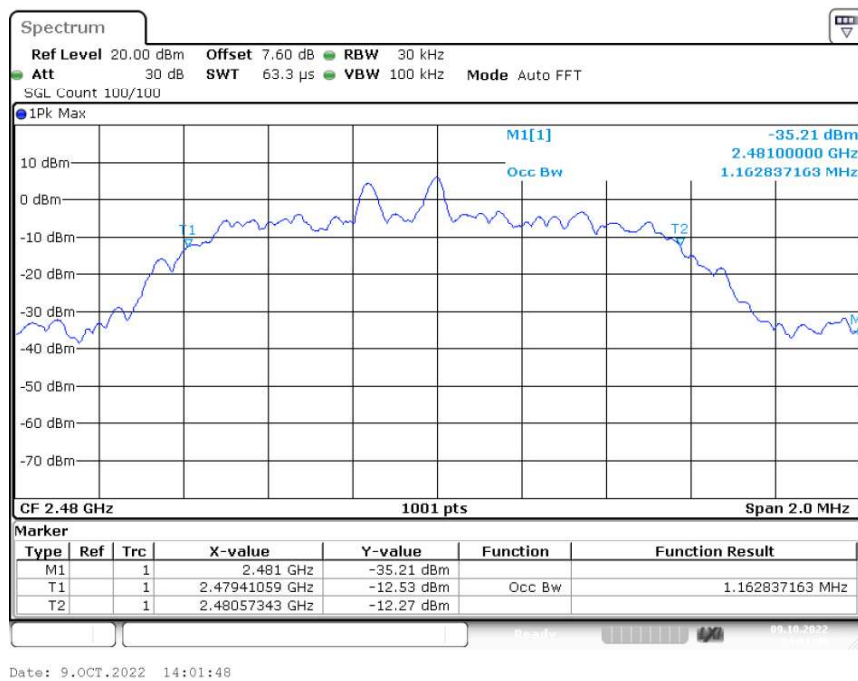
OBW NVNT 2-DH1 2441MHz Ant1



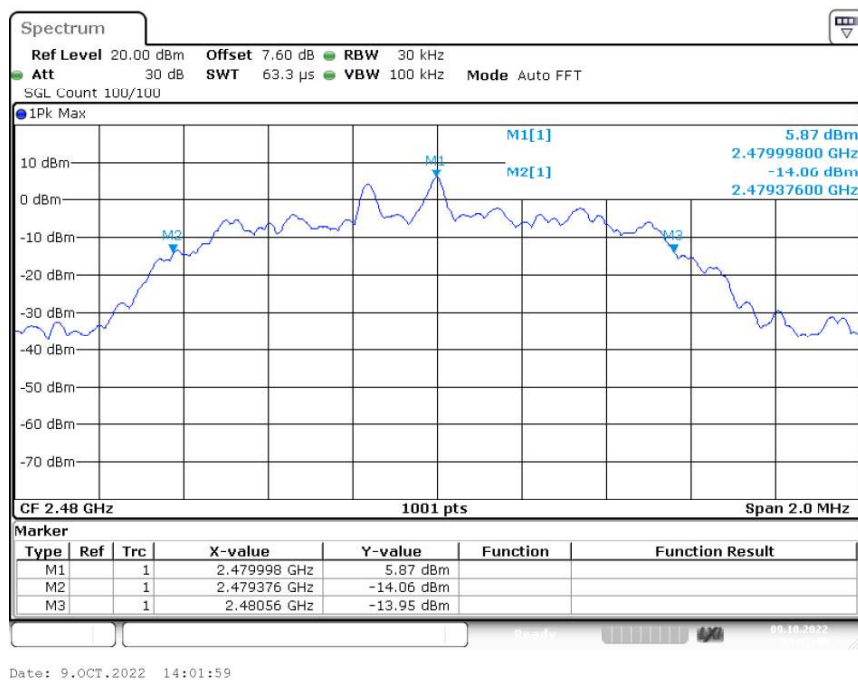
-20 dB BW NVNT 2-DH1 2441MHz Ant1



OBW NVNT 2-DH1 2480MHz Ant1



-20 dB BW NVNT 2-DH1 2480MHz Ant1



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

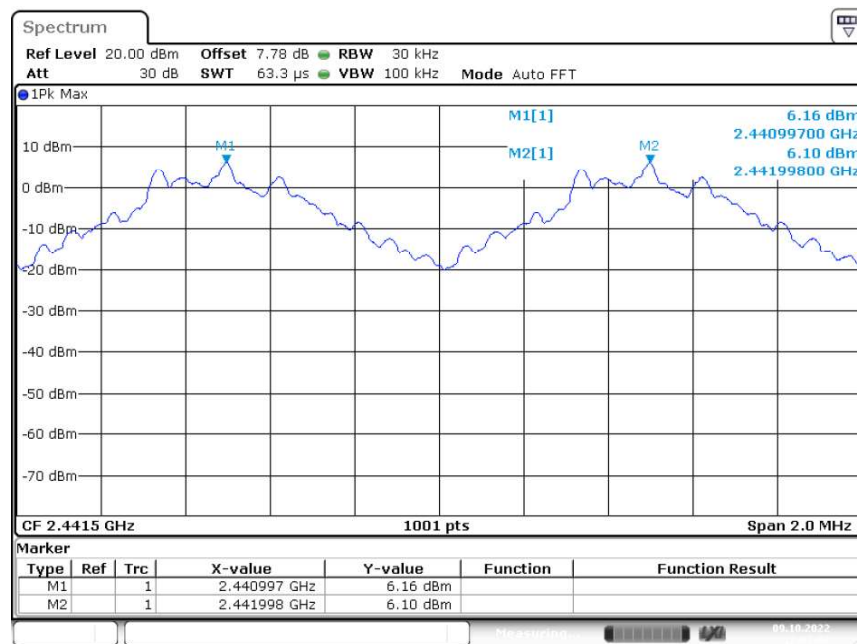
5.2. Test Procedure

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 30kHz RBW and 100kHz VBW.

5.3. Test Result

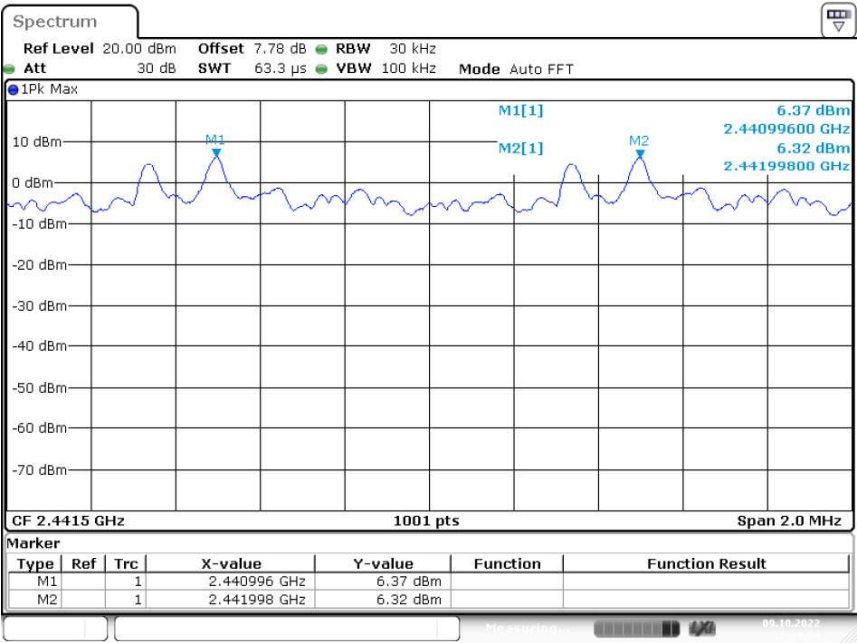
Condition	Mode	Antenna	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH1	Ant1	2440.997	2441.998	1.001	0.492	Pass
NVNT	2-DH1	Ant1	2440.996	2441.998	1.002	0.792	Pass

CFS NVNT 1-DH1 2441MHz Ant1



Date: 9.OCT.2022 12:03:01

CFS NVNT 2-DH1 2441MHz Ant1



Date: 9.OCT.2022 12:39:54

6. Number Of Hopping Channel

6.1.Limit

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

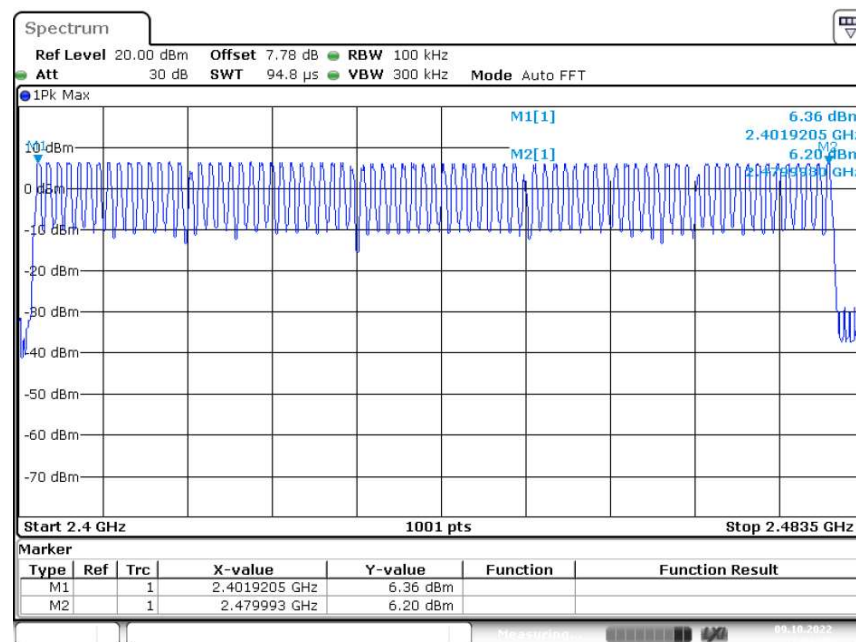
6.2. Test Procedure

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

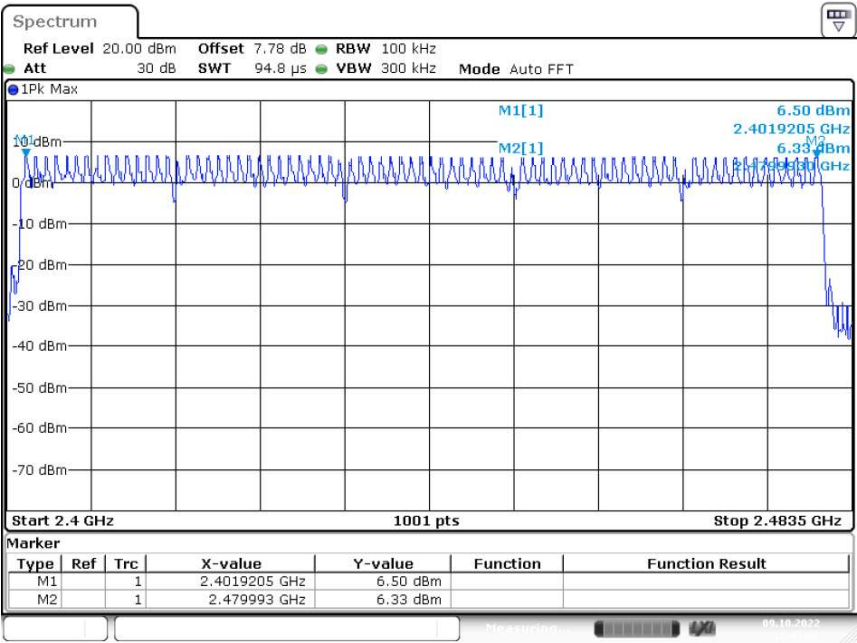
Condition	Mode	Antenna	Hopping Number	Limit	Verdict
NVNT	1-DH1	Ant1	79	15	Pass
NVNT	2-DH1	Ant1	79	15	Pass

Hopping No. NVNT 1-DH1 2441MHz Ant1



Date: 9.OCT.2022 12:06:28

Hopping No. NVNT 2-DH1 2441MHz Ant1



Date: 9.OCT.2022 12:43:22

7. Dwell Time

7.1. Test limit

Please refer FCC part 15.247 & RSS-247.

Frequency hopping systems operating in the 2400MHz-2483.5 MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 seconds multiplied by the number of hopping channel 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, VBW=1MHz, Span = 0Hz, Sweep = auto.

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

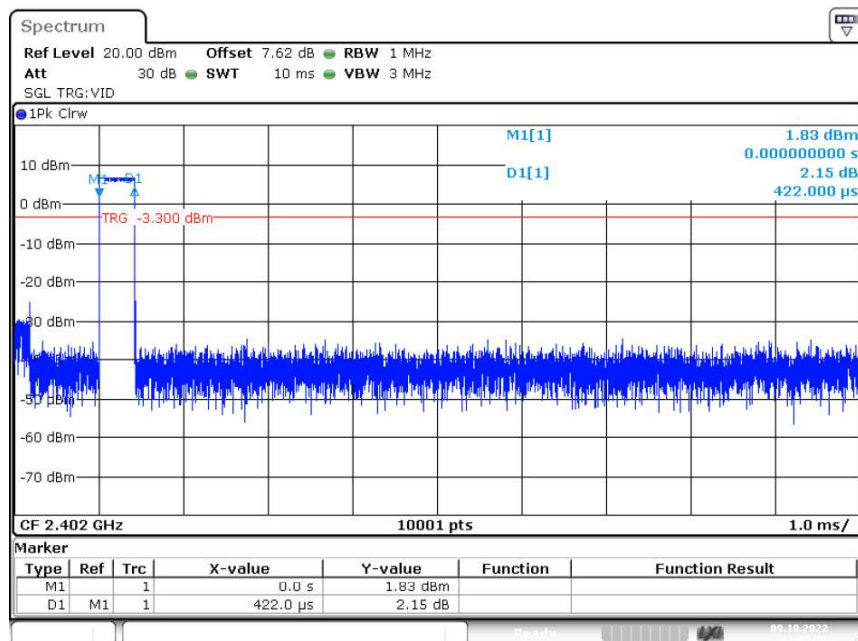
7.3. Test Result

PASS.

Detailed information please see the following page.

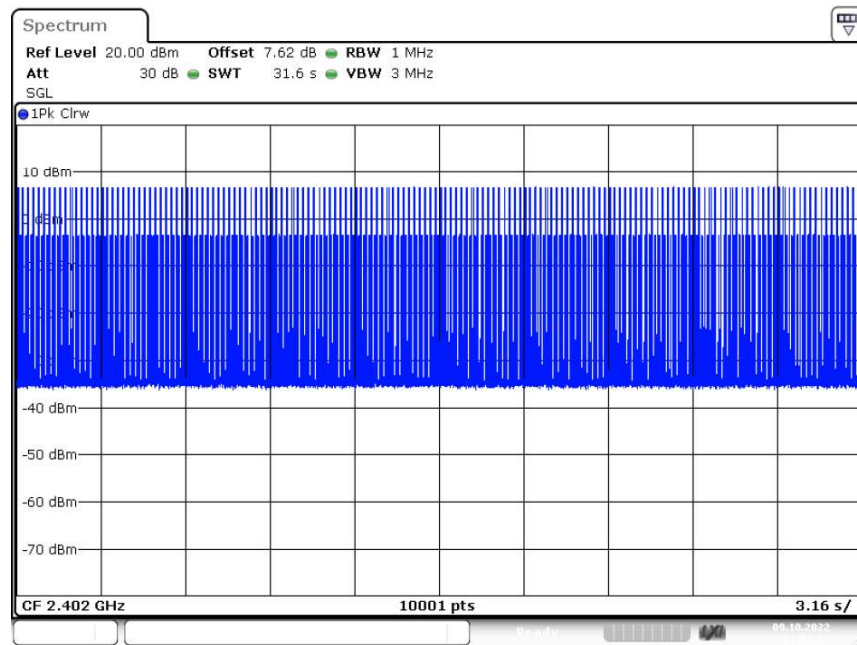
Condition	Mode	Frequency (MHz)	Antenna	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2402	Ant1	0.422	133.352	316	31600	400	Pass
NVNT	1-DH1	2441	Ant1	0.422	134.196	318	31600	400	Pass
NVNT	1-DH1	2480	Ant1	0.422	134.618	319	31600	400	Pass
NVNT	1-DH3	2441	Ant1	1.677	276.705	165	31600	400	Pass
NVNT	1-DH5	2441	Ant1	2.926	324.786	111	31600	400	Pass
NVNT	2-DH1	2402	Ant1	0.424	133.984	316	31600	400	Pass
NVNT	2-DH1	2441	Ant1	0.432	216.432	501	31600	400	Pass
NVNT	2-DH1	2480	Ant1	0.431	215.931	501	31600	400	Pass
NVNT	2-DH3	2441	Ant1	1.678	271.836	162	31600	400	Pass
NVNT	2-DH5	2441	Ant1	2.931	345.858	118	31600	400	Pass

Dwell NVNT 1-DH1 2402MHz Ant1 One Burst



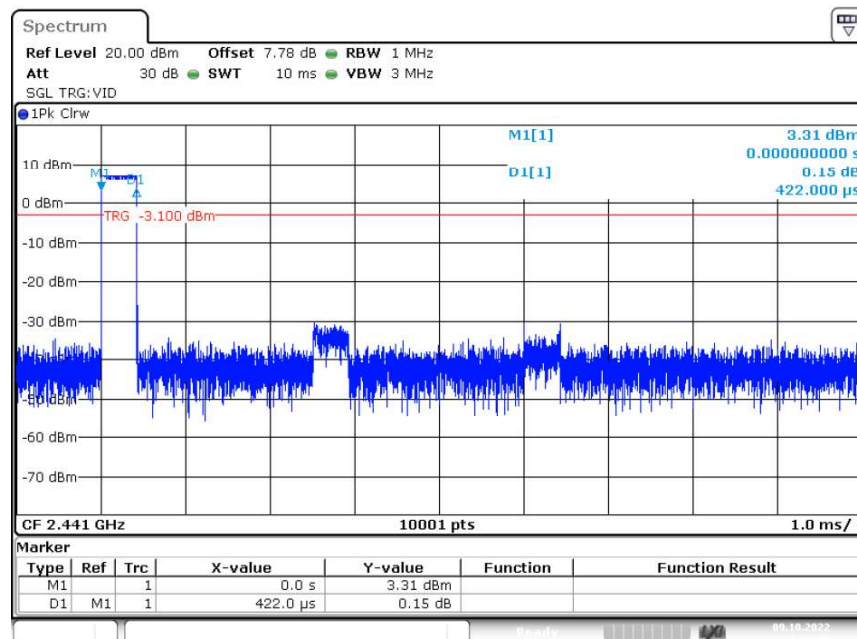
Date: 9.OCT.2022 11:57:23

Dwell NVNT 1-DH1 2402MHz Ant1 Accumulated



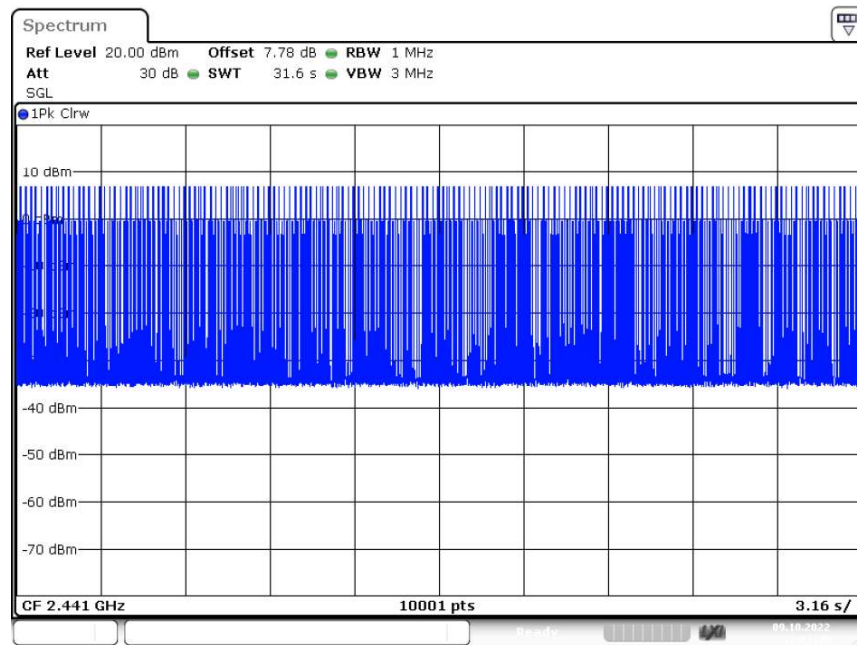
Date: 9.OCT.2022 11:57:57

Dwell NVNT 1-DH1 2441MHz Ant1 One Burst

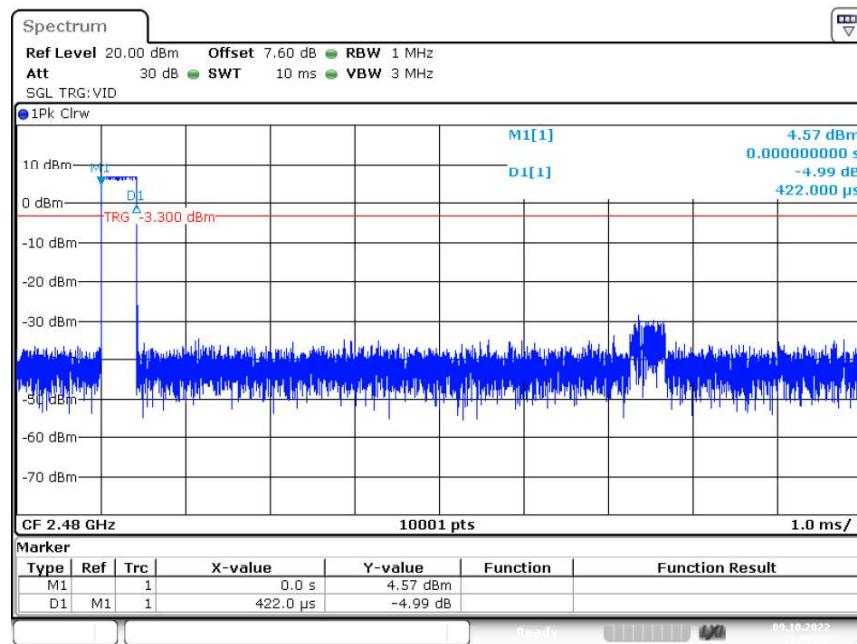


Date: 9.OCT.2022 12:06:35

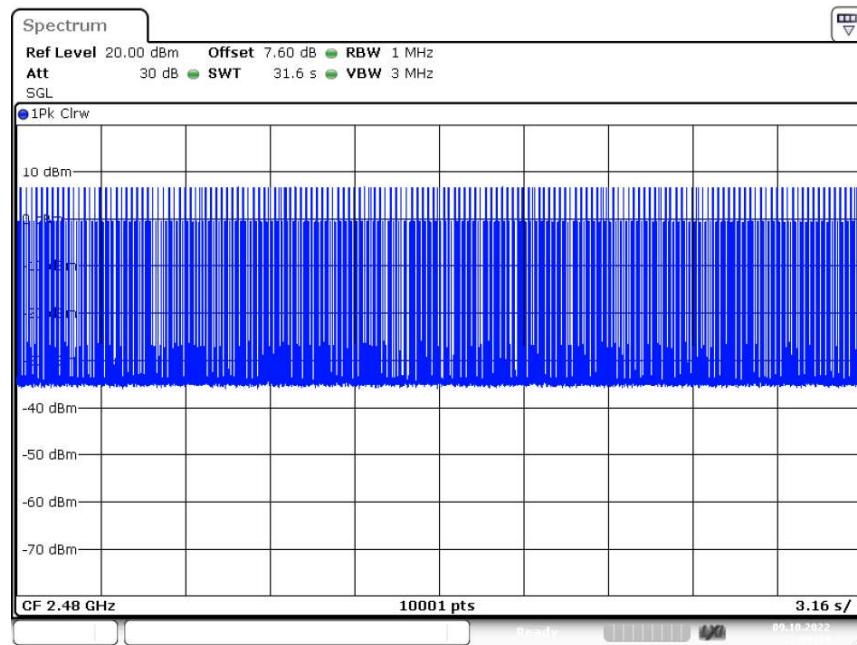
Dwell NVNT 1-DH1 2441MHz Ant1 Accumulated



Dwell NVNT 1-DH1 2480MHz Ant1 One Burst

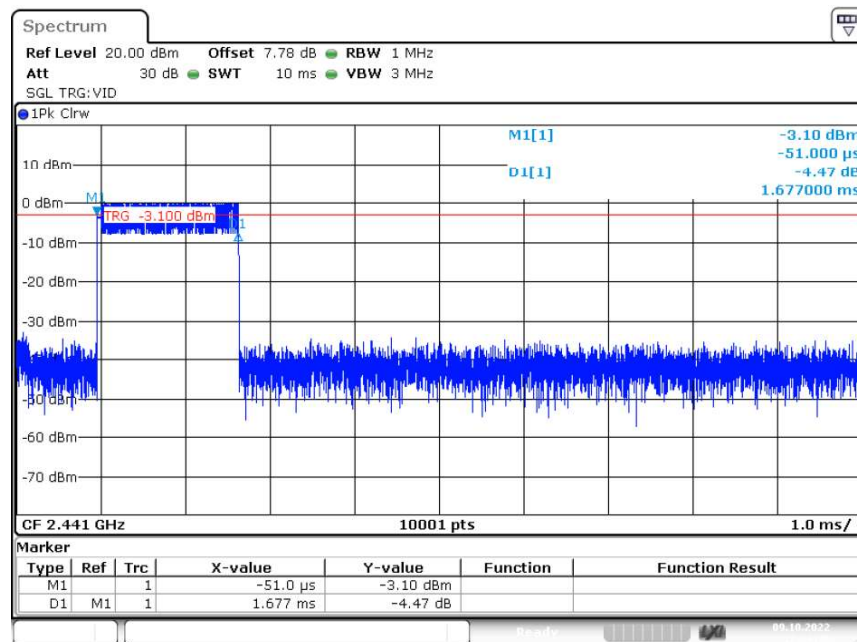


Dwell NVNT 1-DH1 2480MHz Ant1 Accumulated



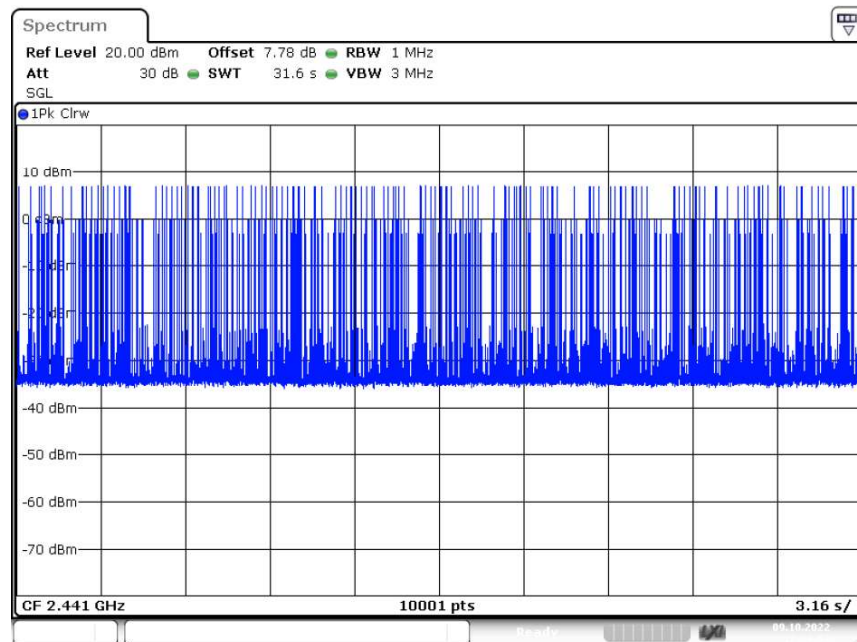
Date: 9.OCT.2022 12:09:14

Dwell NVNT 1-DH3 2441MHz Ant1 One Burst



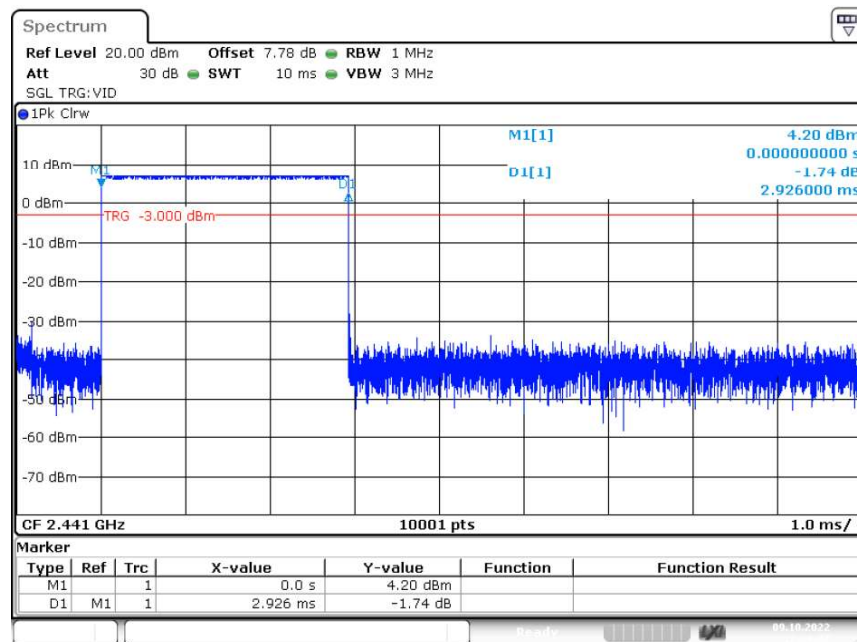
Date: 9.OCT.2022 12:26:18

Dwell NVNT 1-DH3 2441MHz Ant1 Accumulated



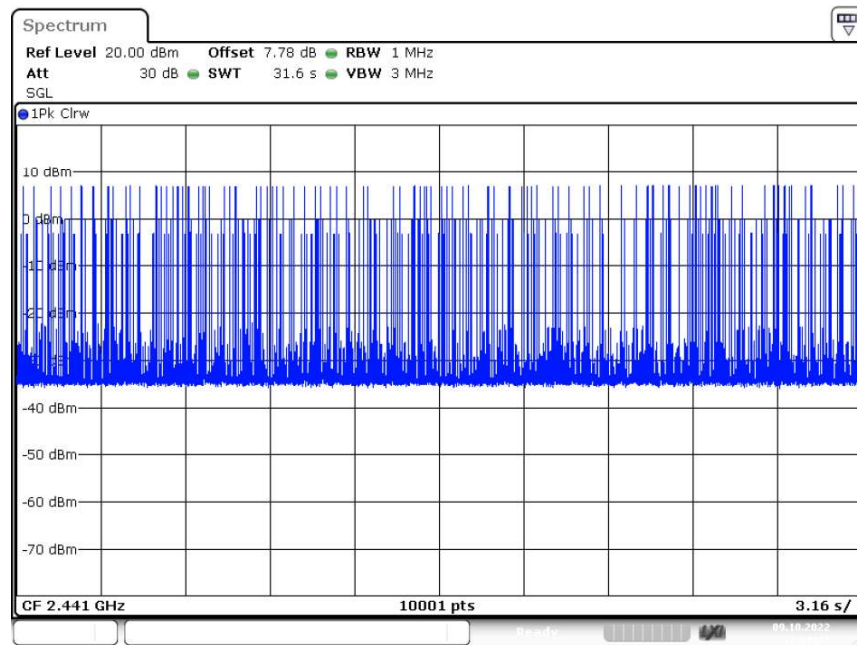
Date: 9.OCT.2022 12:26:52

Dwell NVNT 1-DH5 2441MHz Ant1 One Burst



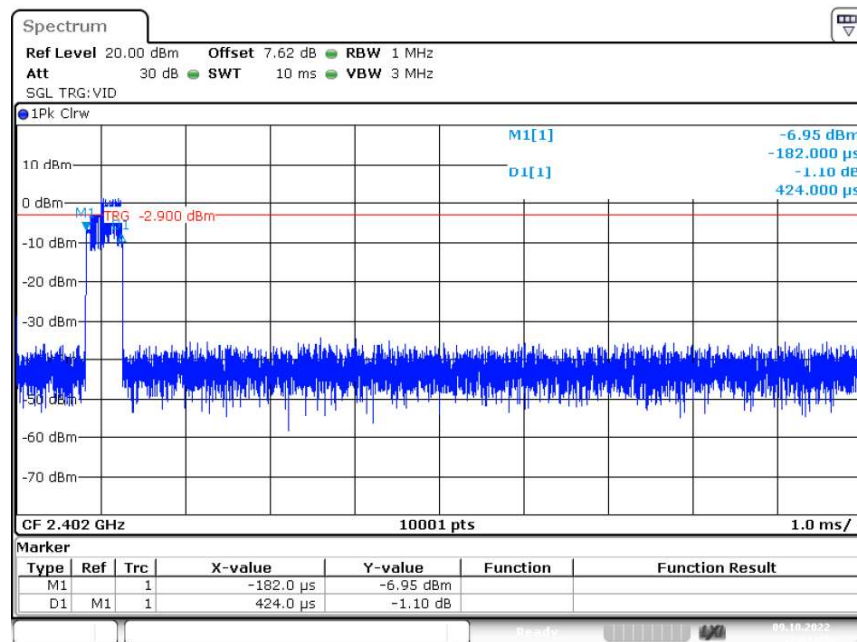
Date: 9.OCT.2022 12:30:06

Dwell NVNT 1-DH5 2441MHz Ant1 Accumulated



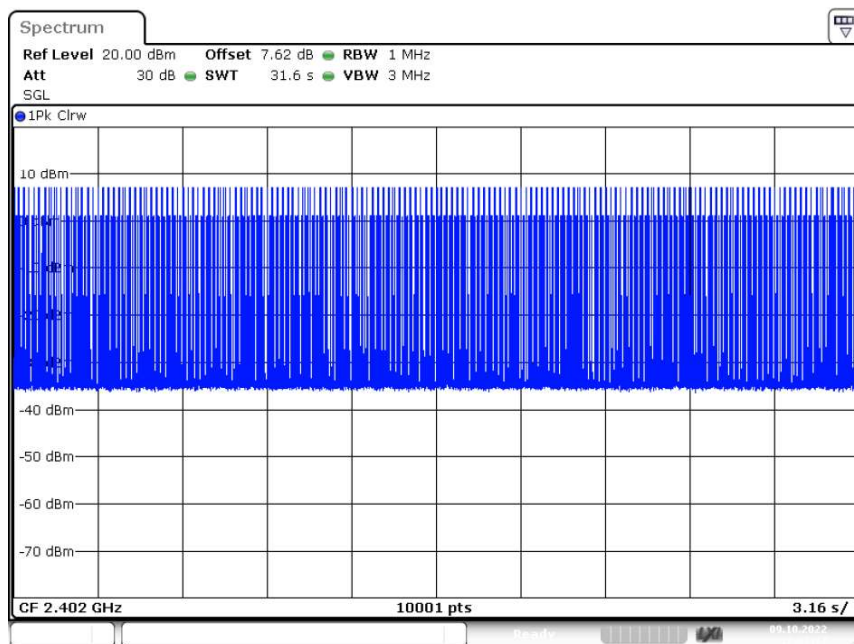
Date: 9.OCT.2022 12:30:41

Dwell NVNT 2-DH1 2402MHz Ant1 One Burst



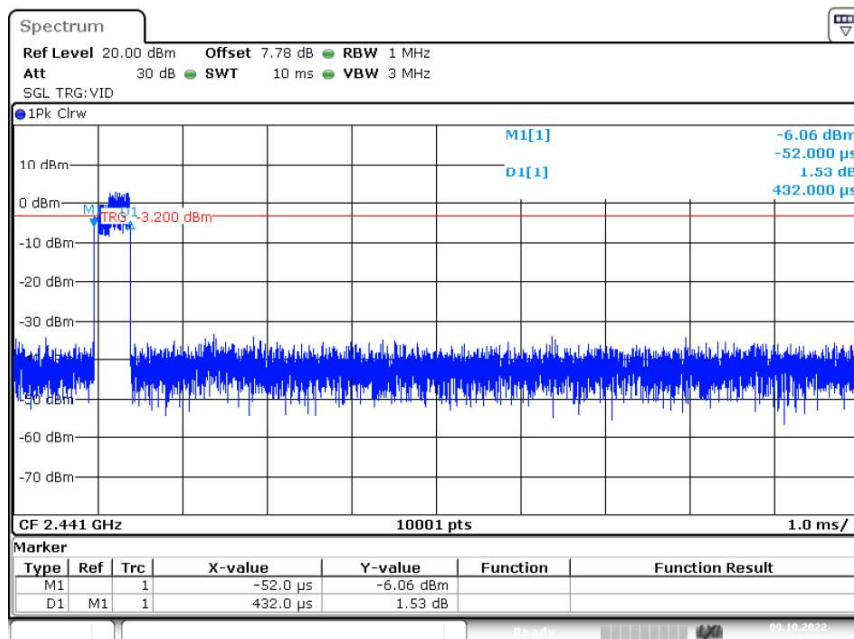
Date: 9.OCT.2022 12:31:43

Dwell NVNT 2-DH1 2402MHz Ant1 Accumulated



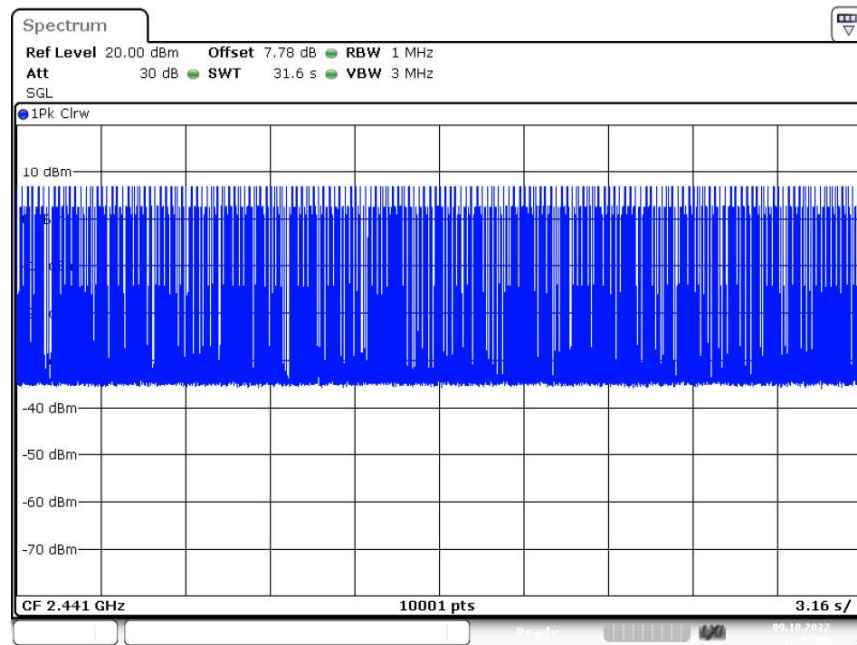
Date: 9.OCT.2022 12:32:17

Dwell NVNT 2-DH1 2441MHz Ant1 One Burst



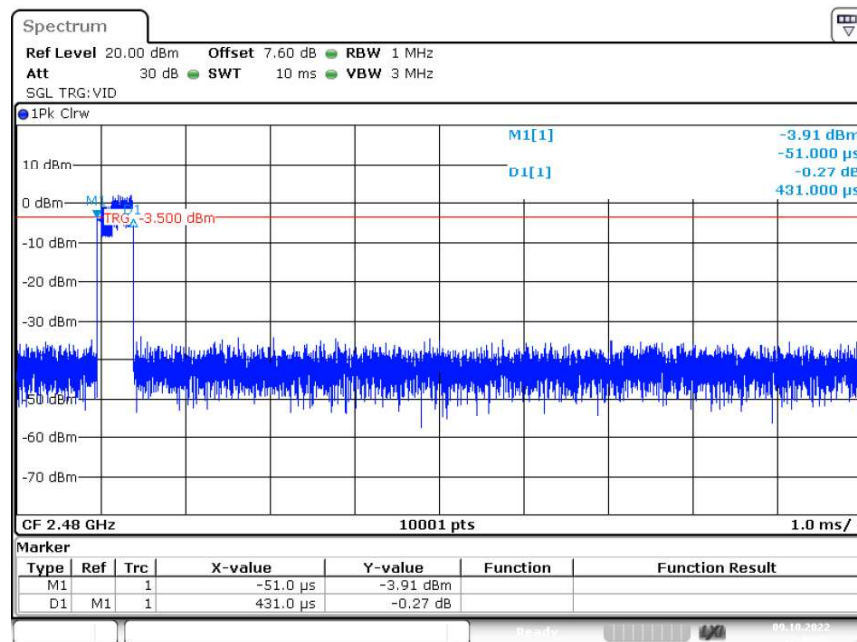
Date: 9.OCT.2022 12:47:12

Dwell NVNT 2-DH1 2441MHz Ant1 Accumulated



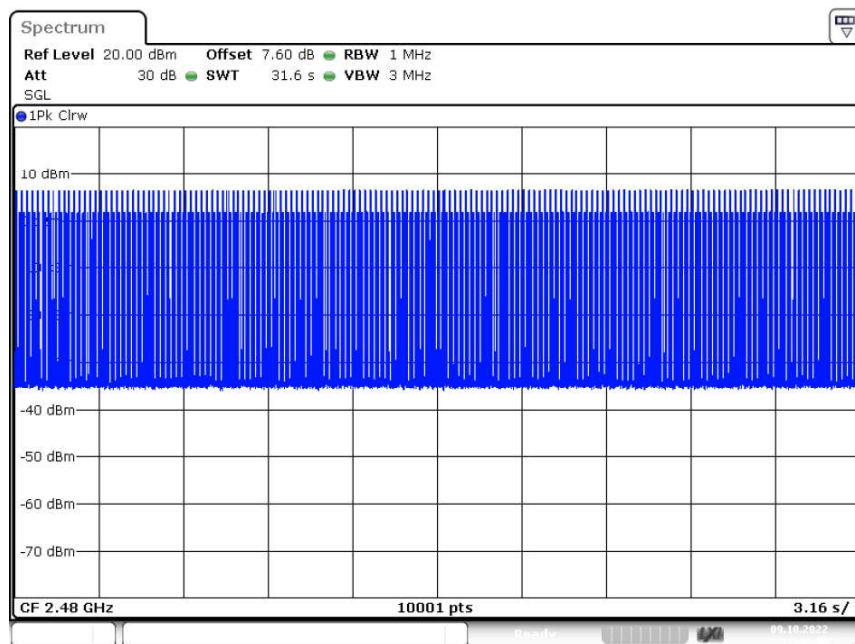
Date: 9.OCT.2022 12:47:46

Dwell NVNT 2-DH1 2480MHz Ant1 One Burst



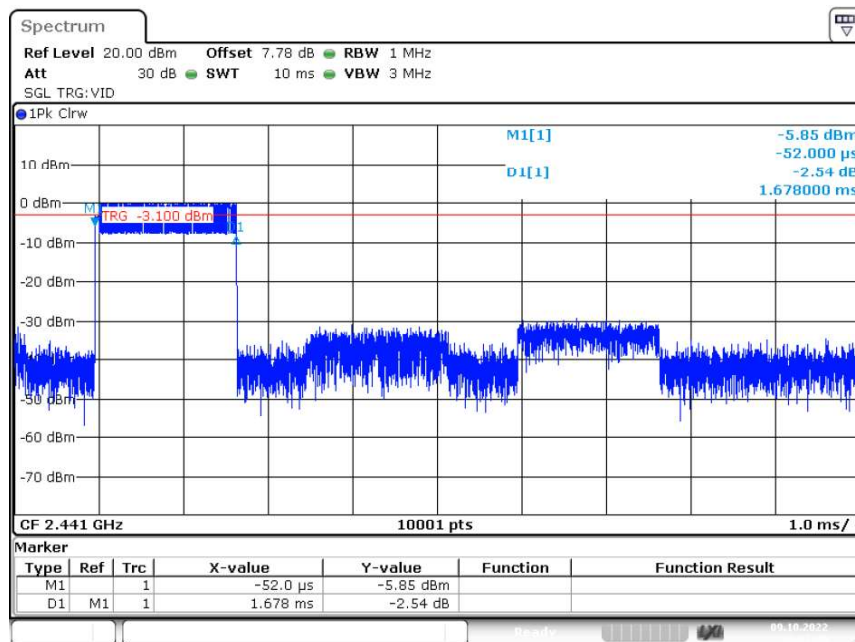
Date: 9.OCT.2022 12:44:21

Dwell NVNT 2-DH1 2480MHz Ant1 Accumulated



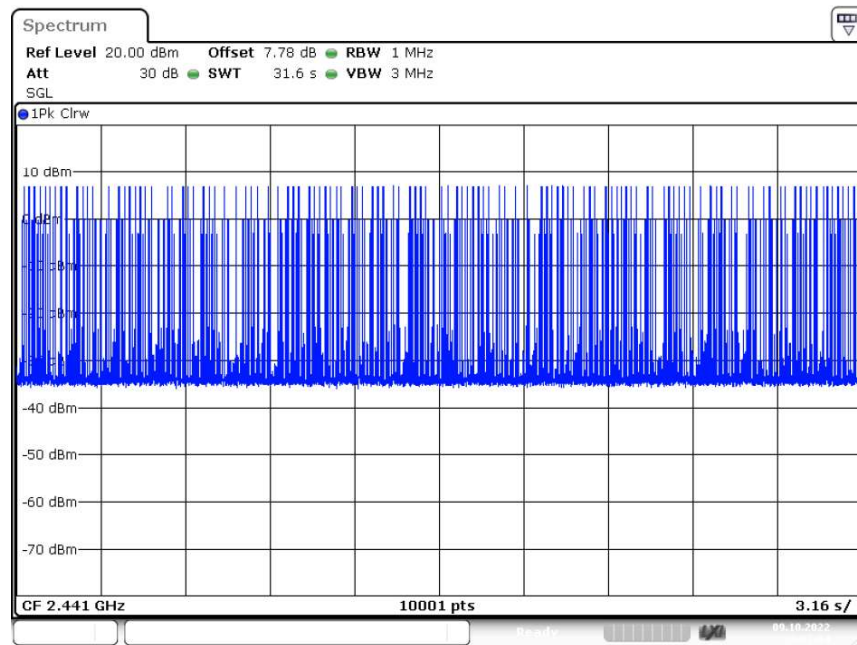
Date: 9.OCT.2022 12:44:56

Dwell NVNT 2-DH3 2441MHz Ant1 One Burst

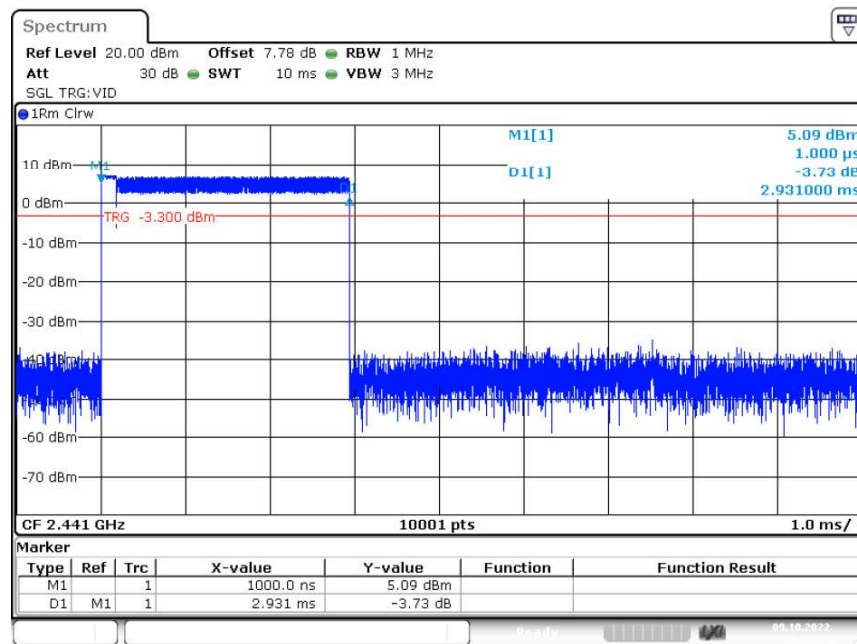


Date: 9.OCT.2022 13:02:30

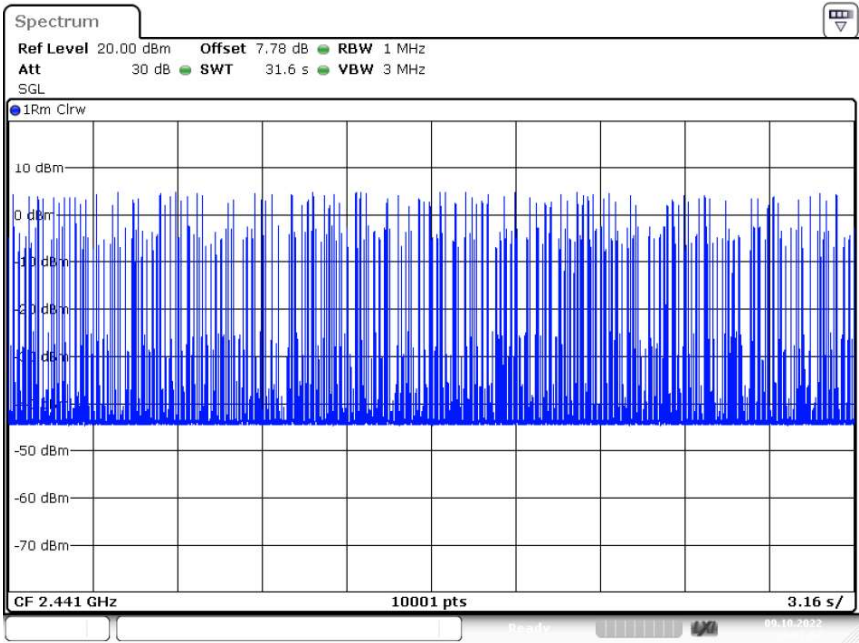
Dwell NVNT 2-DH3 2441MHz Ant1 Accumulated



Dwell NVNT 2-DH5 2441MHz Ant1 One Burst



Dwell NVNT 2-DH5 2441MHz Ant1 Accumulated



Date: 9.OCT.2022 13:03:57