



FCC TEST REPORT

FCC ID: 2AJJ2-ACCUPPOINT

On Behalf of

NOKTA MUHENDISLIK A.S.

METAL DETECTOR

Model No.: AccuPOINT, AccuPOINT Max, AccuPOINT Pro,
AccuPOINT Ultra, AccuPOINT +, AccuPOINT Plus

Prepared for : NOKTA MUHENDISLIK A.S.
Address : Melek Aras Blv. No:1, 34953, Aydınlı, KOSB, Tuzla, Istanbul,
TÜRKİYE

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 : A2310044-C01-R09
Date of Receipt : October 19, 2023
Date of Test : October 19, 2023 – October 26, 2023
Date of Report : October 26, 2023
Version Number : V0
Test Result : Pass

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	24
5.1. Limit	24
5.2. Test Procedure	24
5.3. Test Result	24
6. Number Of Hopping Channel	26
6.1. Limit	26
6.2. Test Procedure	26
6.3. Test Result	26
7. Dwell Time	28
7.1. Test limit	28
7.2. Test Procedure	28
7.3. Test Result	28
8. Radiated Emissions	38
8.1. Limit	38
8.2. Block Diagram of Test setup	39
8.3. Test Procedure	40
8.4. Test Result	40
9. Band Edge Compliance	51

9.1. Block Diagram of Test Setup	51
9.2. Limit	51
9.3. Test Procedure	51
9.4. Test Result	51
10. Power Line Conducted Emissions	61
10.1. Block Diagram of Test Setup	61
10.2. Limit	61
10.3. Test Procedure	61
10.4. Test Result	62
11. Antenna Requirements	64
11.1. Limit	64
11.2. Result	64
12. Test Setup Photo	65
12.1. Photos of Radiated emission	65
12.2. Power Line Conducted Emissions	66
13. EUT Photo	67

TEST REPORT DECLARATION

Applicant : NOKTA MUHENDISLIK A.S.
Address : Melek Aras Blv. No:1, 34953, Aydınlı, KOSB, Tuzla, İstanbul, TÜRKİYE
Manufacturer : NOKTA MUHENDISLIK A.S.
Address : Melek Aras Blv. No:1, 34953, Aydınlı, KOSB, Tuzla, İstanbul, TÜRKİYE
EUT Description : METAL DETECTOR
(A) Model No. : AccuPOINT, AccuPOINT Max, AccuPOINT Pro,
AccuPOINT Ultra, AccuPOINT +, AccuPOINT Plus
(B) Trademark : **NOKTA DETECTION TECHNOLOGIES**

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).....: Yannis Wen
Project Engineer 

Approved by (name + signature).....: Reak Yang
Project Manager 

Date of issue..... : October 26, 2023

Revision History

Revision	Issue Date	Revisions	Revised By
V0	October 26, 2023	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	:	METAL DETECTOR
Model	:	AccuPOINT, AccuPOINT Max, AccuPOINT Pro, AccuPOINT Ultra, AccuPOINT
Number/HVIN(s)	:	+, AccuPOINT Plus
Diff.	:	There is no difference except the name of the model. All tests are made with the AccuPOINT model.
Test Voltage	:	DC 3.7V from battery, DC 5V from adapter
Radio Technology	:	Bluetooth EDR
Operation frequency	:	2402MHz-2480MHz
Modulation	:	GFSK, $\pi/4$ -DQPSK, 8DPSK
Channel No.	:	79 Channels
Channel Separation	:	1MHz
Antenna Type	:	PCB Antenna, max gain 1.3dBi. Antenna information is provided by applicant.
Software version	:	V1.0
Hardware version	:	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.

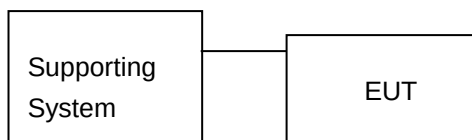
2.2. Accessories of Device (EUT)

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	SDOC

2.4. Block Diagram of connection between EUT and simulators



2.5. Test Mode Description

The test software “RFTestTool.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

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	2023.08.16	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2023.08.16	1Year
Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-10 2082-Wa	2023.08.16	1Year
Receiver	R&S	ESCI	4.42 SP1	101165	2023.08.16	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	/	VULB 9168#627	2023.08.28	1Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2023.08.19	1Year
Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00128	2023.08.19	1Year
RF Cable	Resenberger	Cable 1	/	RE1	2023.08.16	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2023.08.16	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2023.08.16	1Year
Pre-amplifier	HP	HP8347A	/	2834A00455	2023.08.16	1Year
Pre-amplifier	Agilent	8449B	/	3008A02664	2023.08.16	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	/	8126-466	2023.08.16	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2023.08.16	1Year
Horn Antenna	SCHWARZBECK	BBHA 9170	/	00946	2023.08.19	1Year
Preamplifier	SKET	LNPA_1840 -50	/	SK2018101801	2023.08.16	1 Year
Power Meter	Agilent	E9300A	/	MY41496628	2023.08.16	1 Year
Power Sensor	DARE	RPR3006W	/	15100041SNO91	2023.08.16	1 Year
Temp. & Humid. Chamber	Teelong	TL-HW408S	/	TL-20191205-01	2023.07.25	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2023.08.16	1 Year
Adjustable attenuator	MWRFTtest	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	Farad	Alpha-3A1
CE	EZ-EMC	Farad	Alpha-3A1
RF-CE	MTS 8310	MWRFtest	V2.0.0.0

3. Maximum Peak Output Power

3.1. Limit

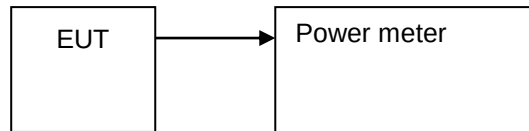
Please refer FCC part 15.247 & RSS-247..

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

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	E.I.R.P. (dBm)	Limit (dBm)	Verdict
NVNT	1-DH1	2402	Ant1	0.876	0	2.876	21	Pass
NVNT	1-DH1	2441	Ant1	0.818	0	2.818	21	Pass
NVNT	1-DH1	2480	Ant1	0.53	0	2.53	21	Pass
NVNT	1-DH3	2441	Ant1	1.315	0	3.315	21	Pass
NVNT	1-DH5	2441	Ant1	1.334	0	3.334	21	Pass
NVNT	2-DH1	2402	Ant1	1.205	0	3.205	21	Pass
NVNT	2-DH1	2441	Ant1	1.519	0	3.519	21	Pass
NVNT	2-DH1	2480	Ant1	1.45	0	3.45	21	Pass
NVNT	2-DH3	2441	Ant1	2.182	0	4.182	21	Pass
NVNT	2-DH5	2441	Ant1	1.981	0	3.981	21	Pass
NVNT	3-DH1	2402	Ant1	2.519	0	4.519	21	Pass
NVNT	3-DH1	2441	Ant1	2.319	0	4.319	21	Pass
NVNT	3-DH1	2480	Ant1	1.565	0	3.565	21	Pass
NVNT	3-DH3	2441	Ant1	2.356	0	4.356	21	Pass
NVNT	3-DH5	2441	Ant1	2.2	0	4.2	21	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.

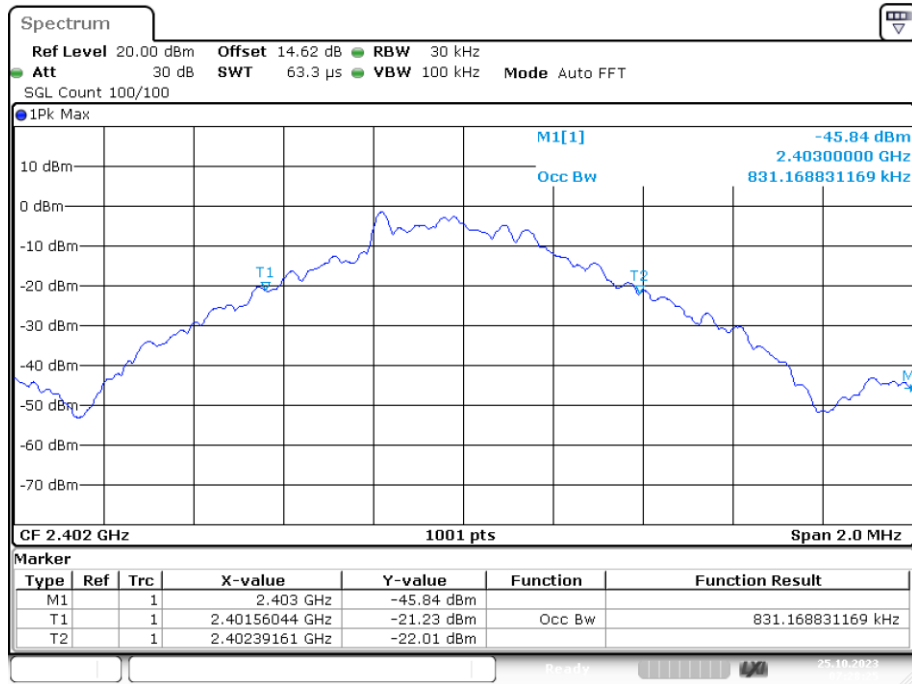
4.2. Test Procedure

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

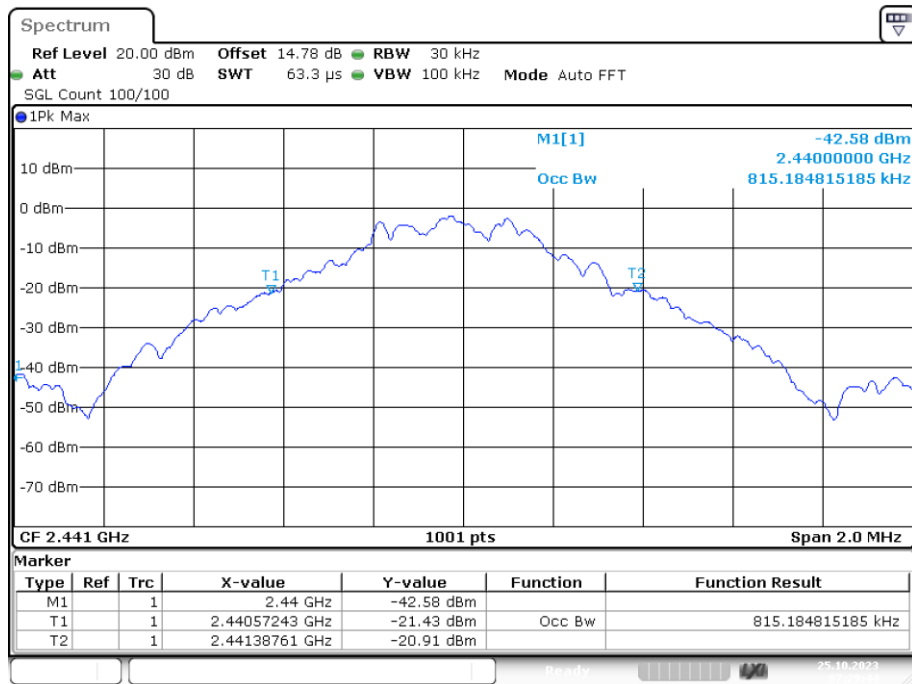
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	1-DH1	2402	Ant1	0.831
NVNT	1-DH1	2441	Ant1	0.815
NVNT	1-DH1	2480	Ant1	0.809
NVNT	2-DH1	2402	Ant1	1.163
NVNT	2-DH1	2441	Ant1	1.145
NVNT	2-DH1	2480	Ant1	1.163
NVNT	3-DH1	2402	Ant1	1.149
NVNT	3-DH1	2441	Ant1	1.155
NVNT	3-DH1	2480	Ant1	1.165

OBW NVNT 1-DH1 2402MHz Ant1



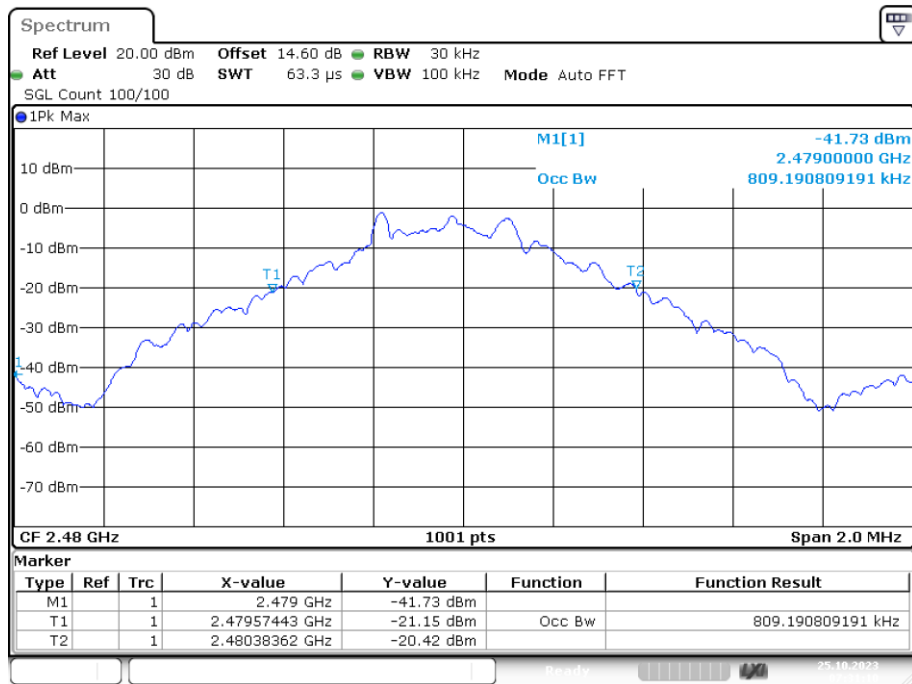
Date: 25.OCT.2023 07:28:25

OBW NVNT 1-DH1 2441MHz Ant1



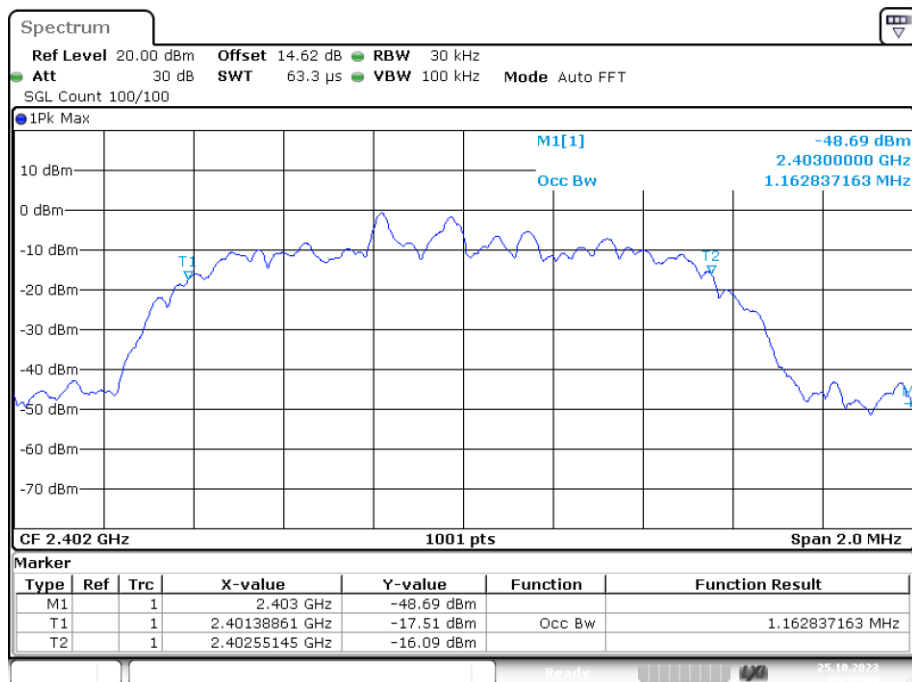
Date: 25.OCT.2023 07:29:44

OBW NVNT 1-DH1 2480MHz Ant1



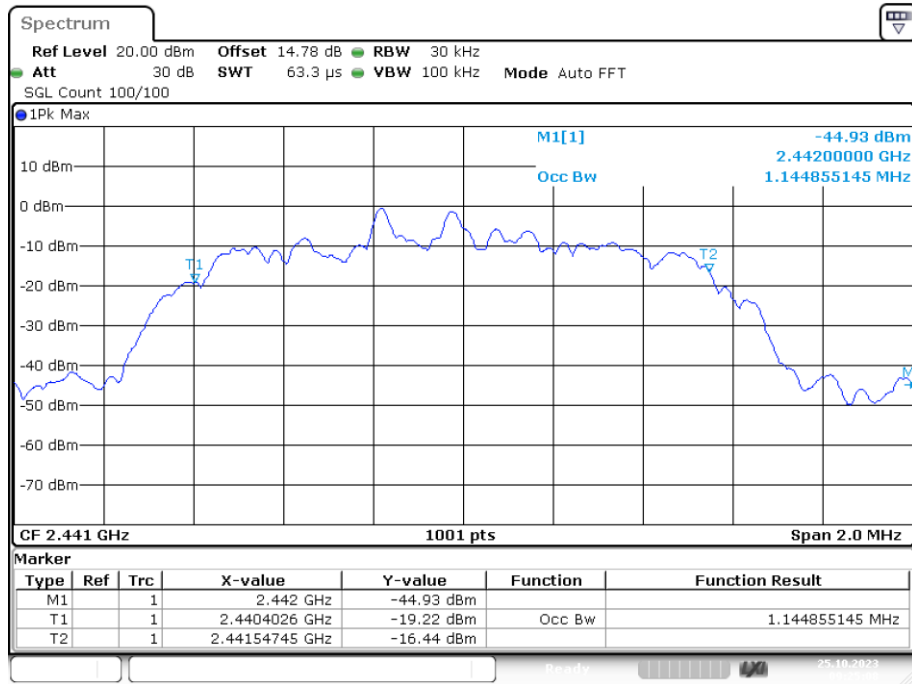
Date: 25.OCT.2023 07:31:09

OBW NVNT 2-DH1 2402MHz Ant1



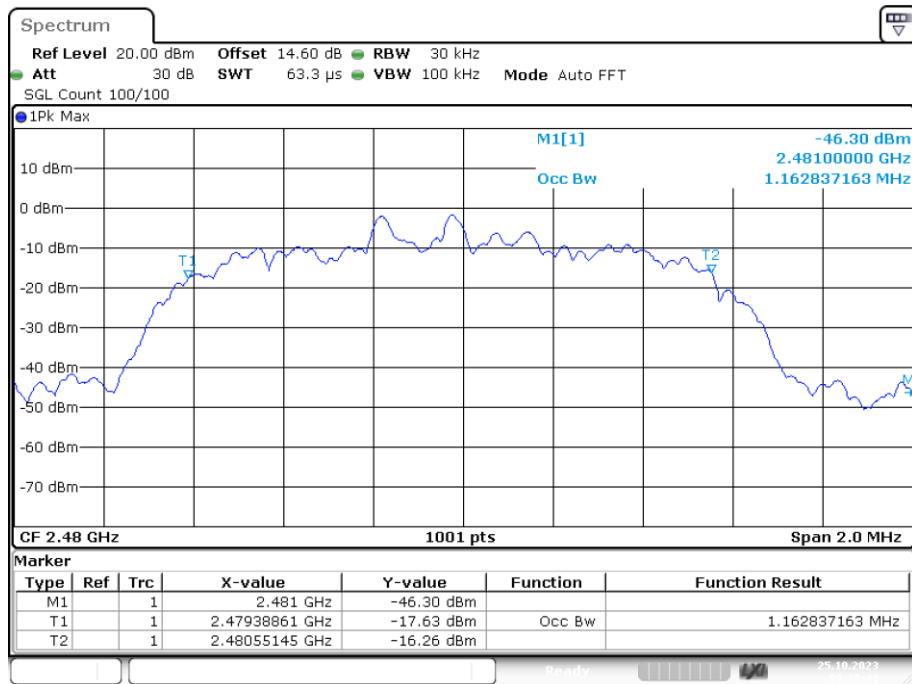
Date: 25.OCT.2023 09:22:04

OBW NVNT 2-DH1 2441MHz Ant1



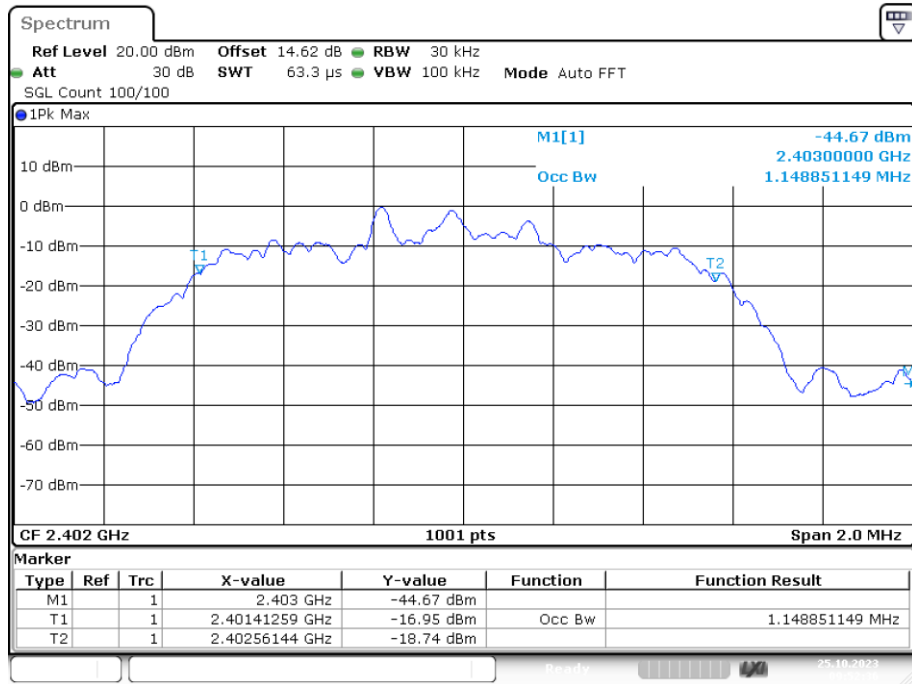
Date: 25.OCT.2023 09:25:08

OBW NVNT 2-DH1 2480MHz Ant1



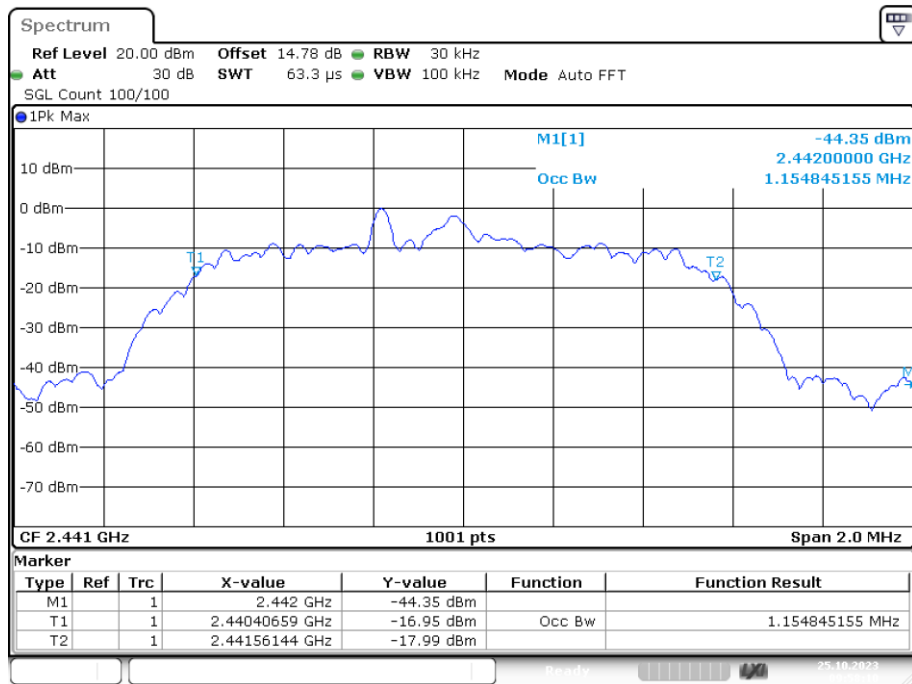
Date: 25.OCT.2023 09:28:42

OBW NVNT 3-DH1 2402MHz Ant1



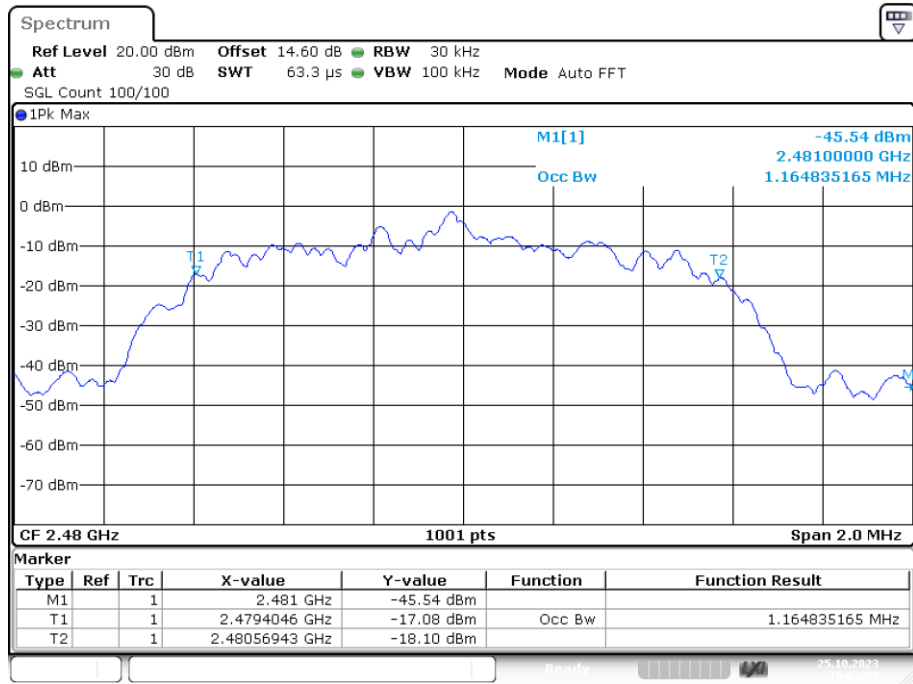
Date: 25.OCT.2023 09:52:36

OBW NVNT 3-DH1 2441MHz Ant1



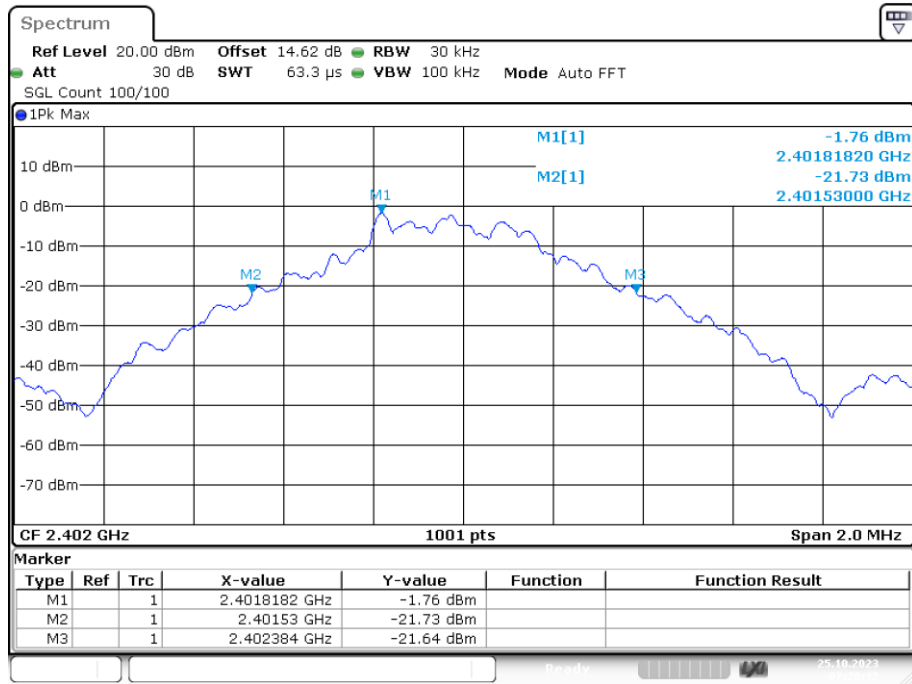
Date: 25.OCT.2023 09:58:09

OBW NVNT 3-DH1 2480MHz Ant1

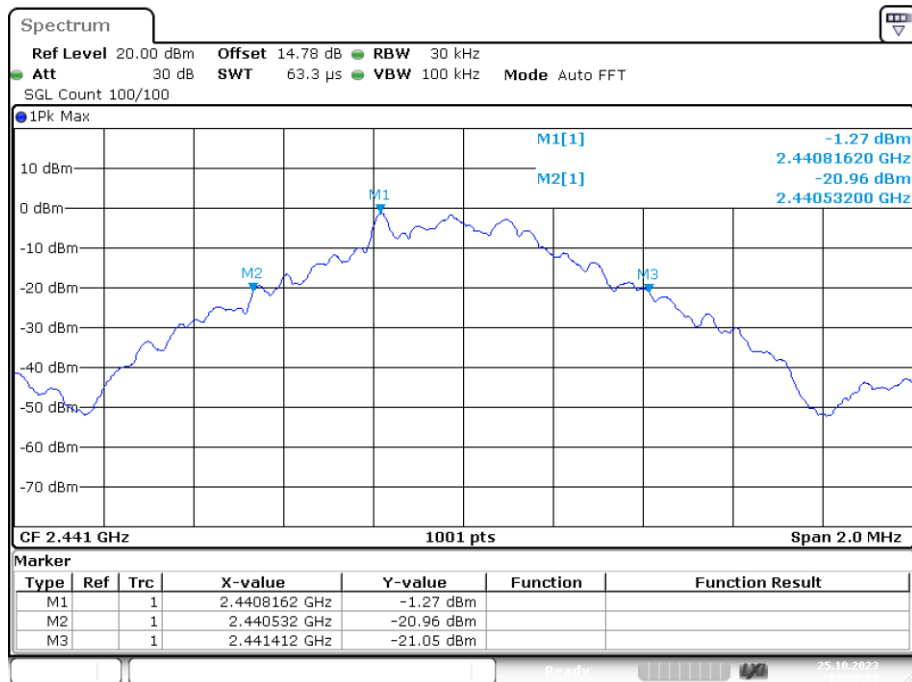


Date: 25.OCT.2023 10:02:35

Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH1	2402	Ant1	0.854	0	Pass
NVNT	1-DH1	2441	Ant1	0.88	0	Pass
NVNT	1-DH1	2480	Ant1	0.88	0	Pass
NVNT	2-DH1	2402	Ant1	1.22	0	Pass
NVNT	2-DH1	2441	Ant1	1.25	0	Pass
NVNT	2-DH1	2480	Ant1	1.256	0	Pass
NVNT	3-DH1	2402	Ant1	1.204	0	Pass
NVNT	3-DH1	2441	Ant1	1.208	0	Pass
NVNT	3-DH1	2480	Ant1	1.21	0	Pass

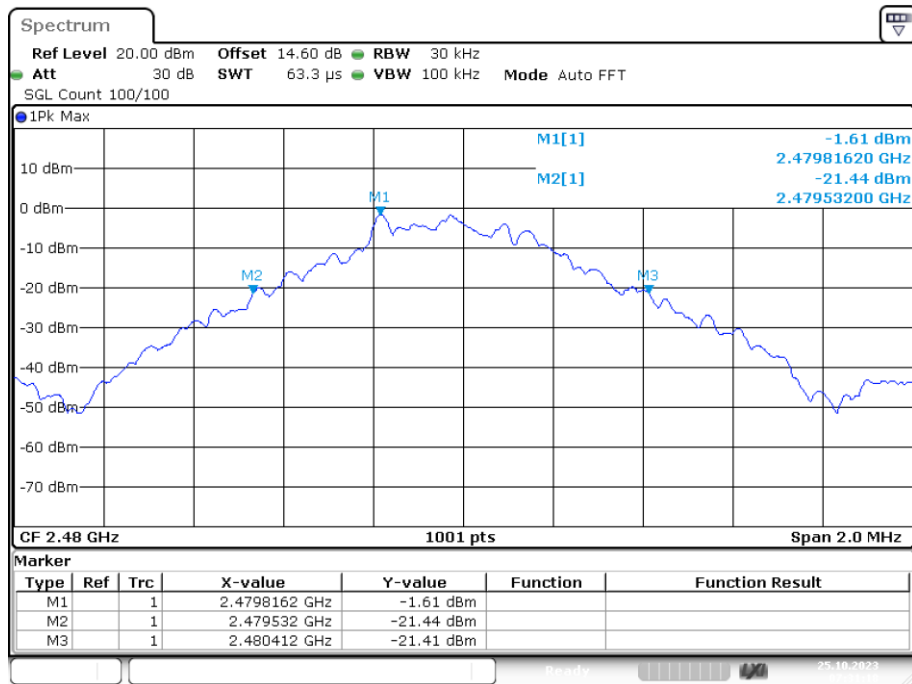
-20dB Bandwidth NVNT 1-DH1 2402MHz Ant1

Date: 25.OCT.2023 07:28:33

-20dB Bandwidth NVNT 1-DH1 2441MHz Ant1

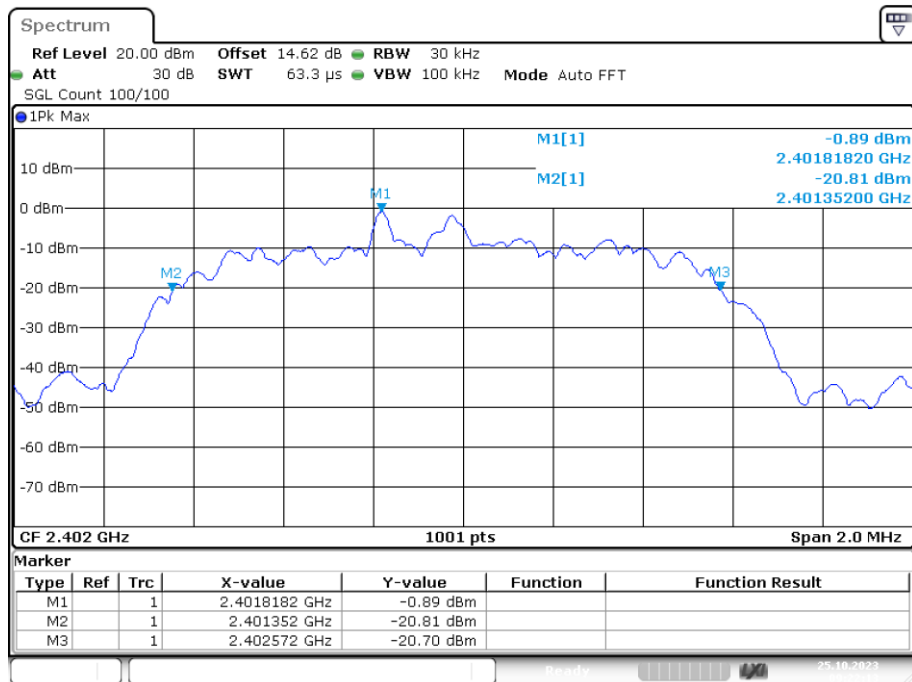
Date: 25.OCT.2023 07:29:52

-20dB Bandwidth NVNT 1-DH1 2480MHz Ant1



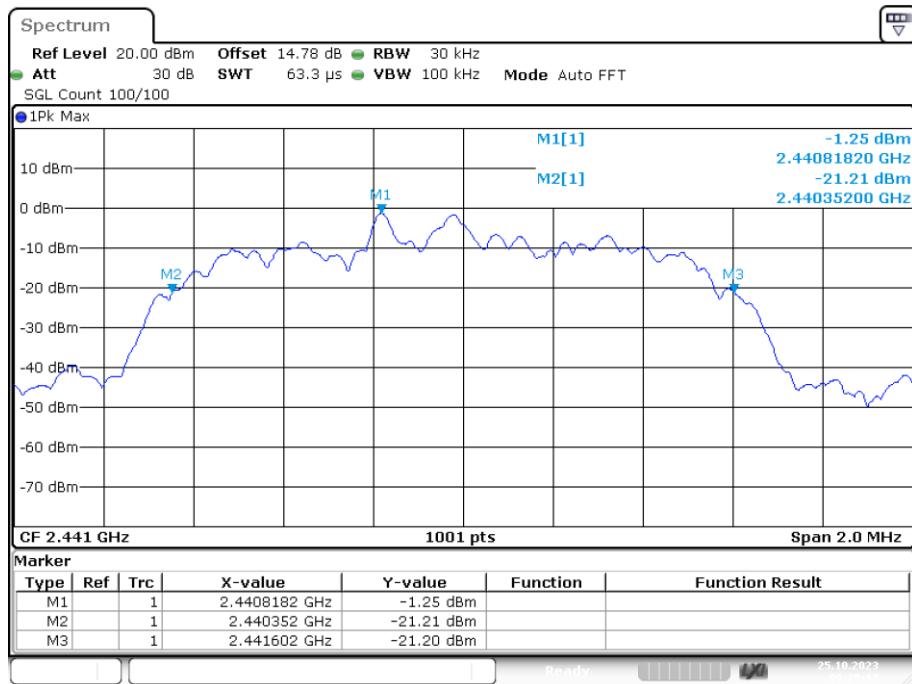
Date: 25.OCT.2023 07:31:18

-20dB Bandwidth NVNT 2-DH1 2402MHz Ant1



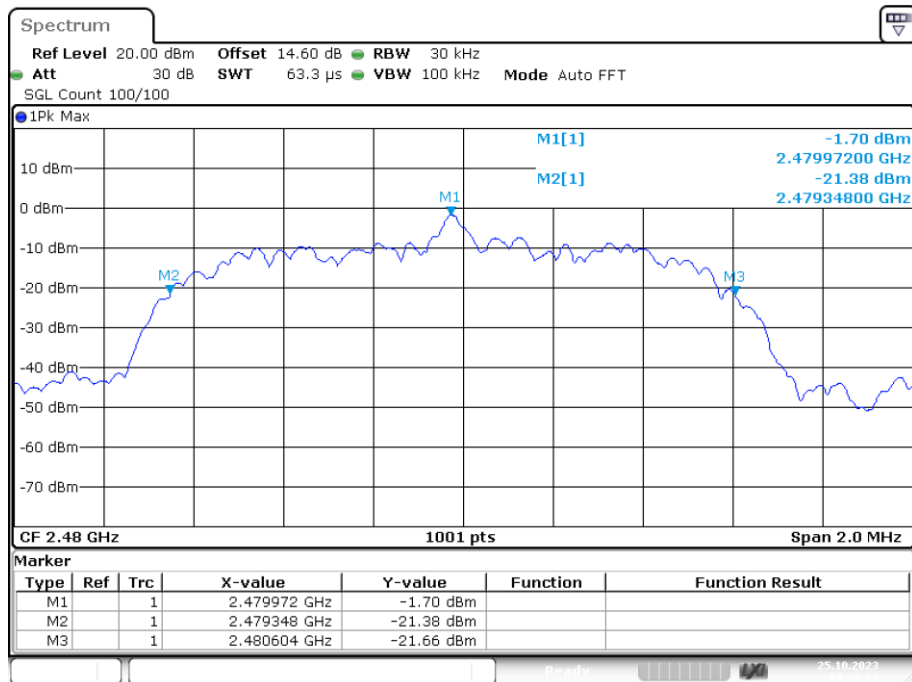
Date: 25.OCT.2023 09:22:13

-20dB Bandwidth NVNT 2-DH1 2441MHz Ant1



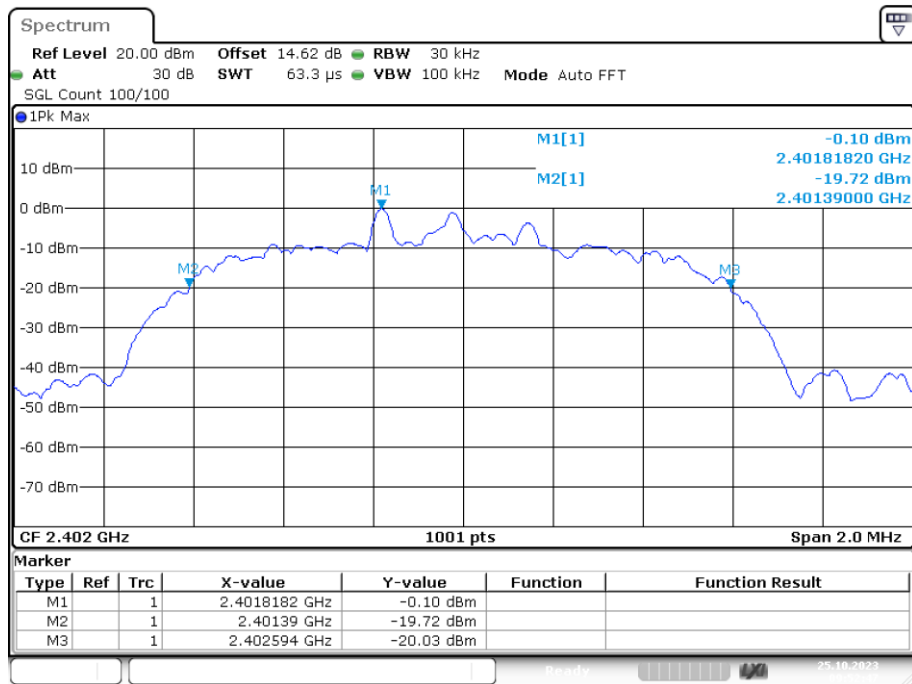
Date: 25.OCT.2023 09:25:16

-20dB Bandwidth NVNT 2-DH1 2480MHz Ant1



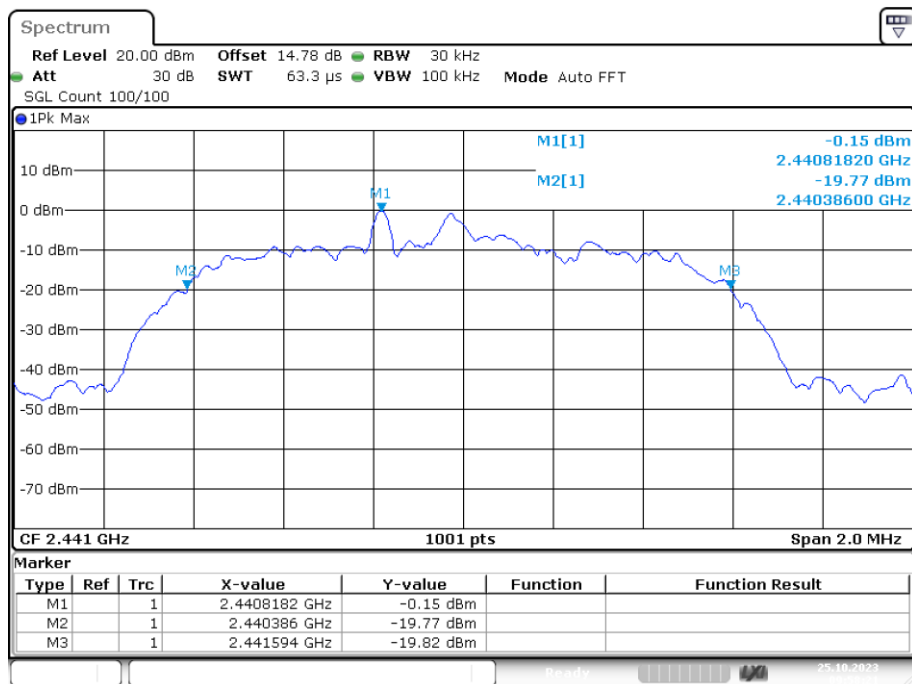
Date: 25.OCT.2023 09:28:51

-20dB Bandwidth NVNT 3-DH1 2402MHz Ant1



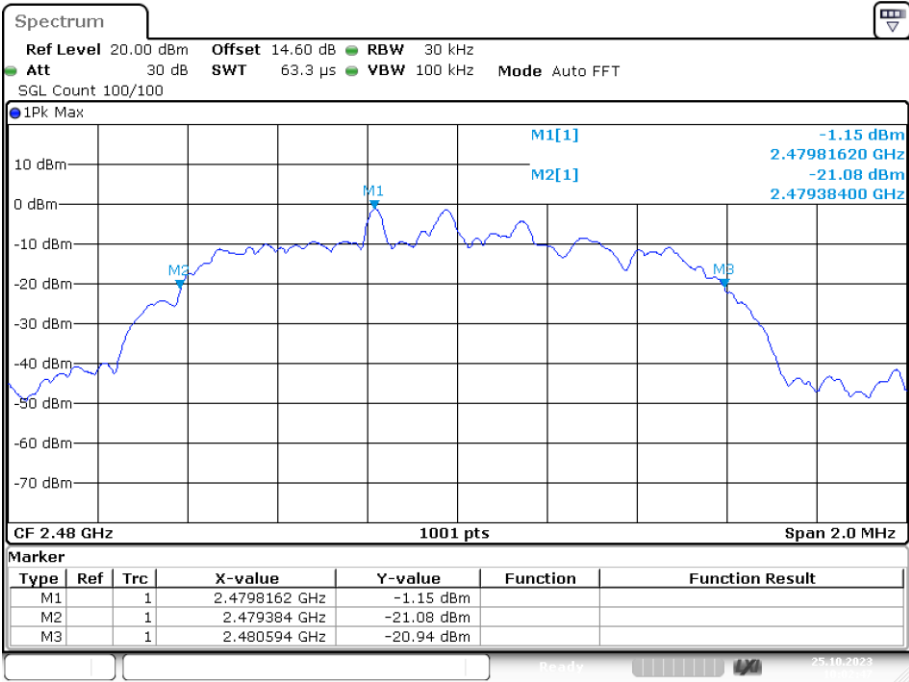
Date: 25.OCT.2023 09:52:46

-20dB Bandwidth NVNT 3-DH1 2441MHz Ant1



Date: 25.OCT.2023 09:58:21

-20dB Bandwidth NVNT 3-DH1 2480MHz Ant1



Date: 25.OCT.2023 10:02:47

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

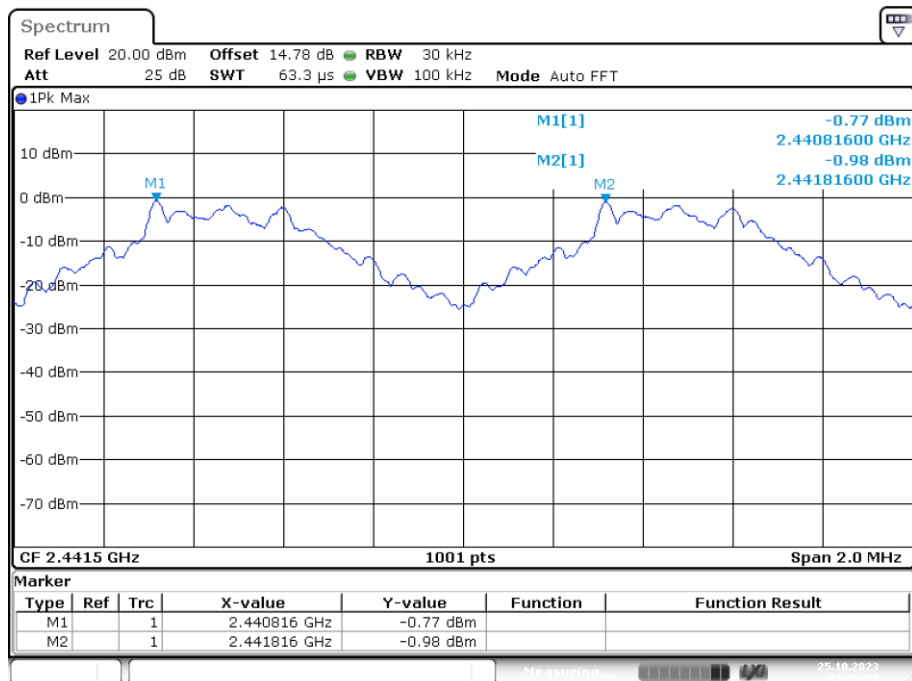
5.2. Test Procedure

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

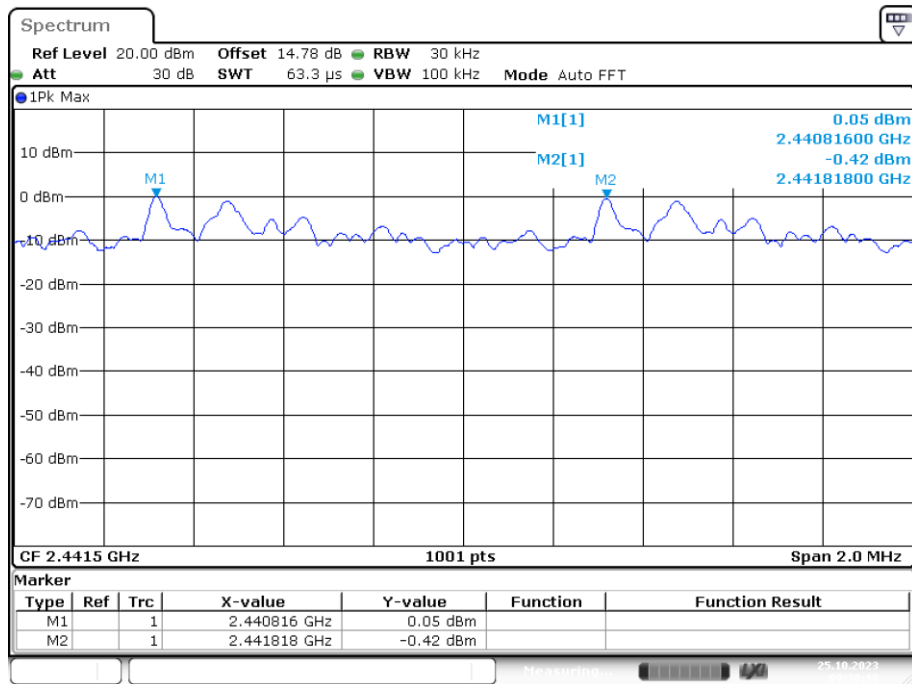
Condition	Mode	Antenna	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH1	Ant1	2440.816	2441.816	1	0.88	Pass
NVNT	2-DH1	Ant1	2440.816	2441.818	1.002	0.833	Pass
NVNT	3-DH1	Ant1	2440.818	2441.818	1	0.805	Pass

CFS NVNT 1-DH1 2441MHz Ant1



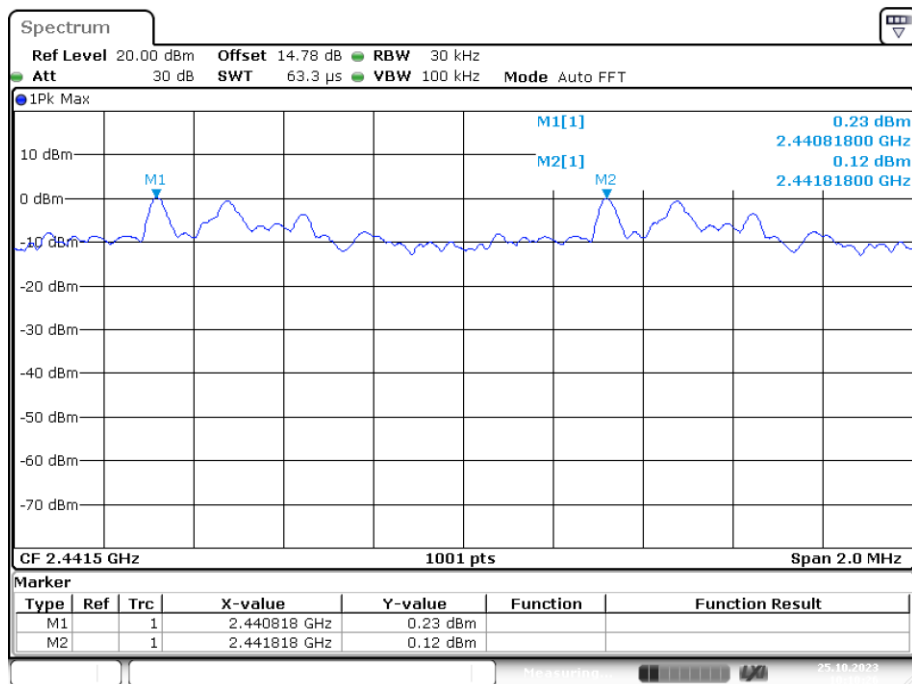
Date: 25.OCT.2023 07:33:58

CFS NVNT 2-DH1 2441MHz Ant1



Date: 25.OCT.2023 09:38:18

CFS NVNT 3-DH1 2441MHz Ant1



Date: 25.OCT.2023 10:10:26

6. Number Of Hopping Channel

6.1. Limit

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

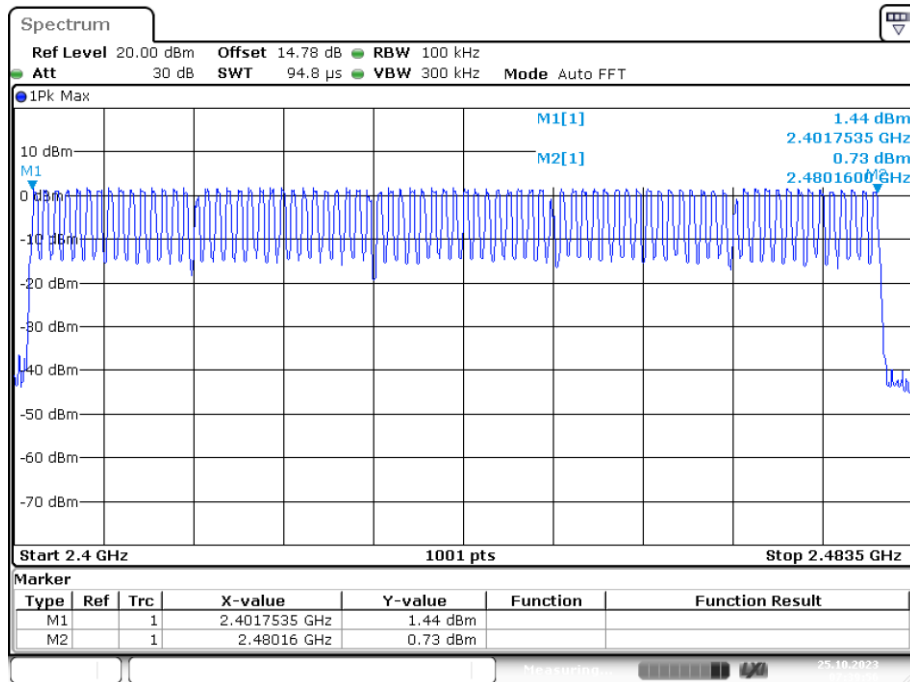
6.2. Test Procedure

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

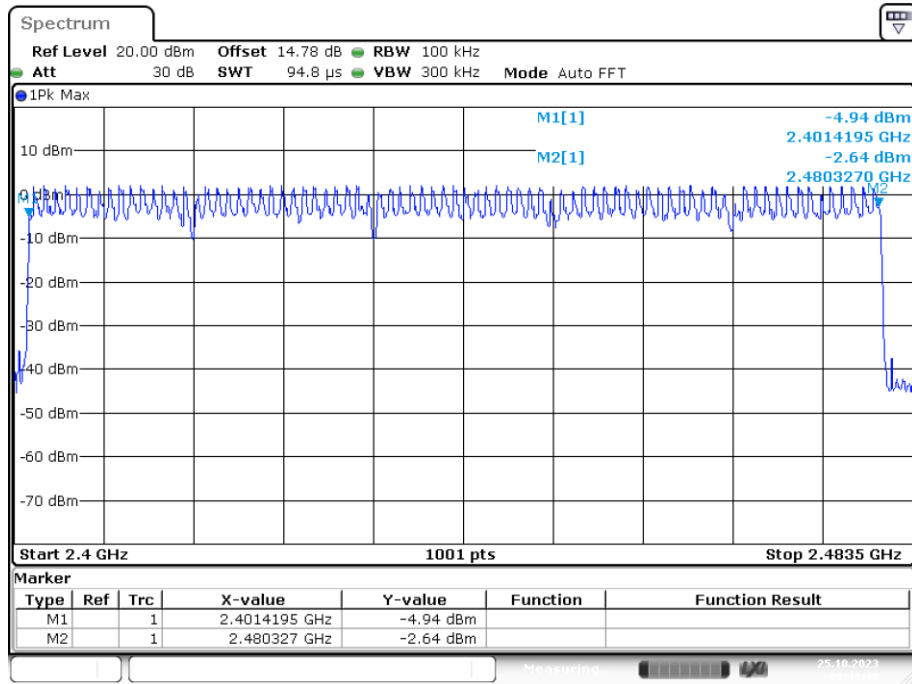
Condition	Mode	Antenna	Hopping Number	Limit	Verdict
NVNT	1-DH1	Ant1	79	15	Pass
NVNT	2-DH1	Ant1	79	15	Pass
NVNT	3-DH1	Ant1	79	15	Pass

Hopping No. NVNT 1-DH1 2441MHz Ant1



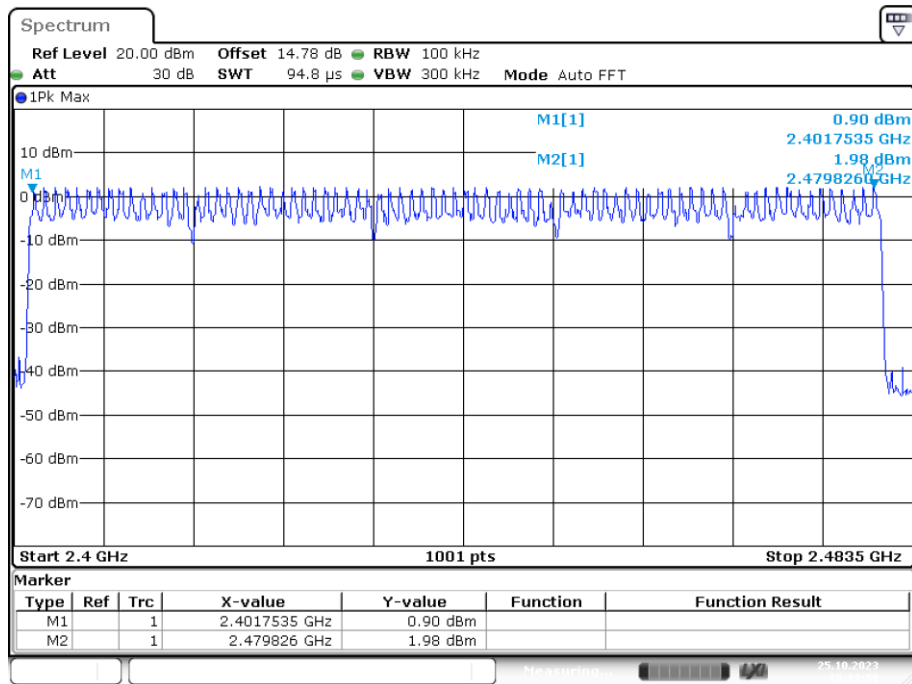
Date: 25.OCT.2023 07:39:56

Hopping No. NVNT 2-DH1 2441MHz Ant1



Date: 25.OCT.2023 09:41:48

Hopping No. NVNT 3-DH1 2441MHz Ant1



Date: 25.OCT.2023 10:13:59

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.

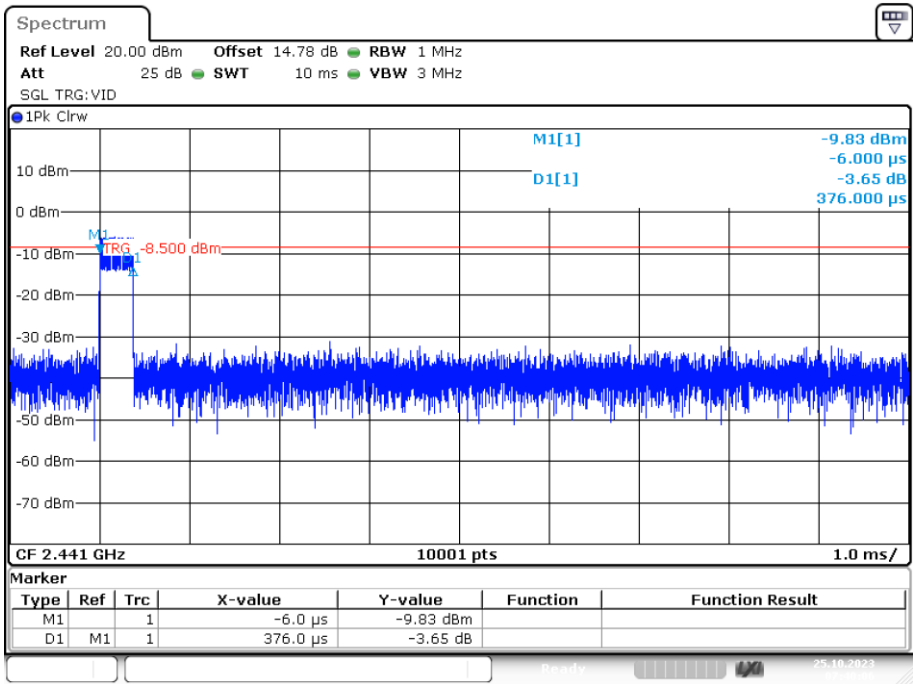
7.3. Test Result

PASS.

Detailed information please see the following page.

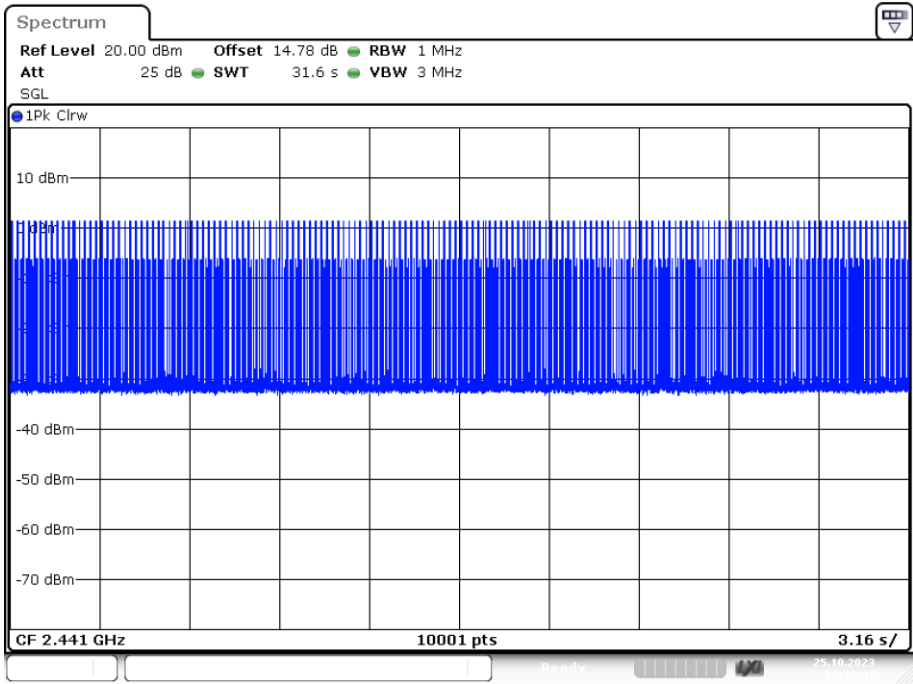
Condition	Mode	Frequency (MHz)	Antenna	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2441	Ant1	0.376	120.320	316	31600	400	Pass
NVNT	1-DH3	2441	Ant1	1.631	260.960	155	31600	400	Pass
NVNT	1-DH5	2441	Ant1	2.879	307.093	93	31600	400	Pass
NVNT	2-DH1	2441	Ant1	0.385	123.200	315	31600	400	Pass
NVNT	2-DH3	2441	Ant1	1.637	261.920	161	31600	400	Pass
NVNT	2-DH5	2441	Ant1	2.885	307.733	110	31600	400	Pass
NVNT	3-DH1	2441	Ant1	0.386	123.520	320	31600	400	Pass
NVNT	3-DH3	2441	Ant1	1.636	261.760	154	31600	400	Pass
NVNT	3-DH5	2441	Ant1	2.886	307.840	109	31600	400	Pass

Dwell NVNT 1-DH1 2441MHz Ant1 One Burst



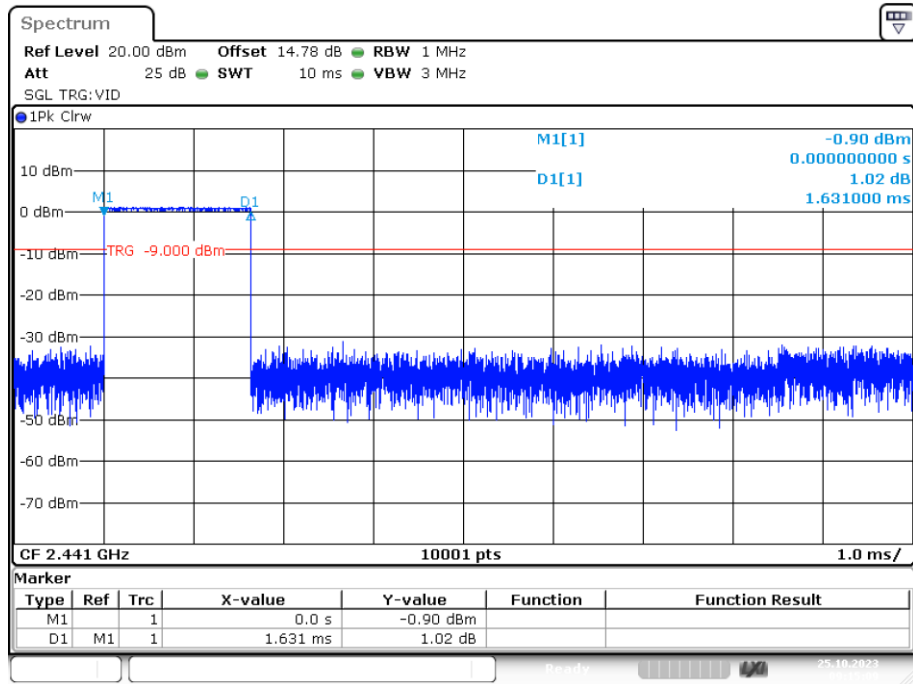
Date: 25.OCT.2023 07:40:06

Dwell NVNT 1-DH1 2441MHz Ant1 Accumulated



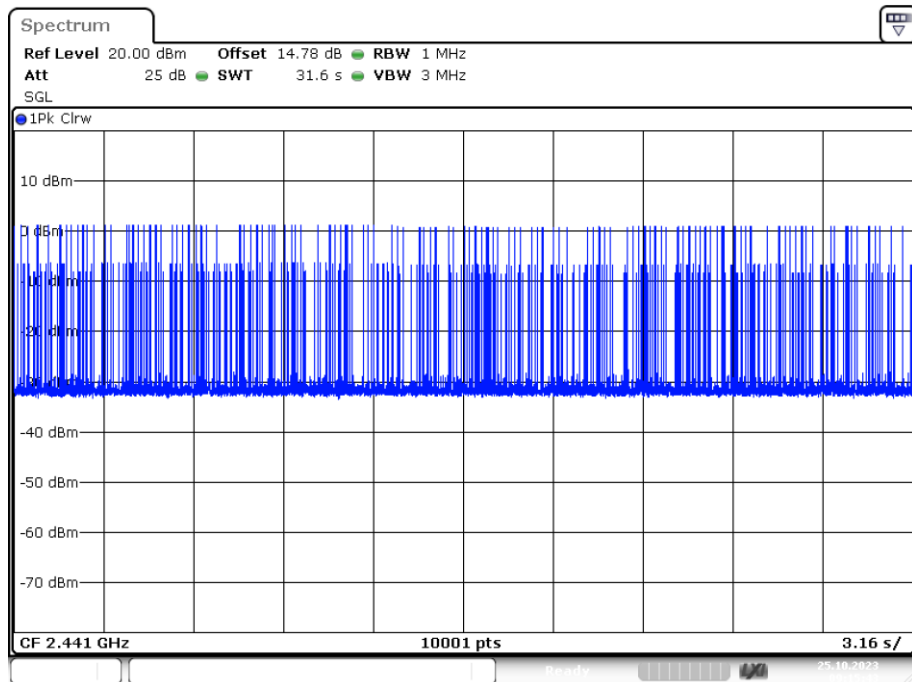
Date: 25.OCT.2023 07:40:41

Dwell NVNT 1-DH3 2441MHz Ant1 One Burst



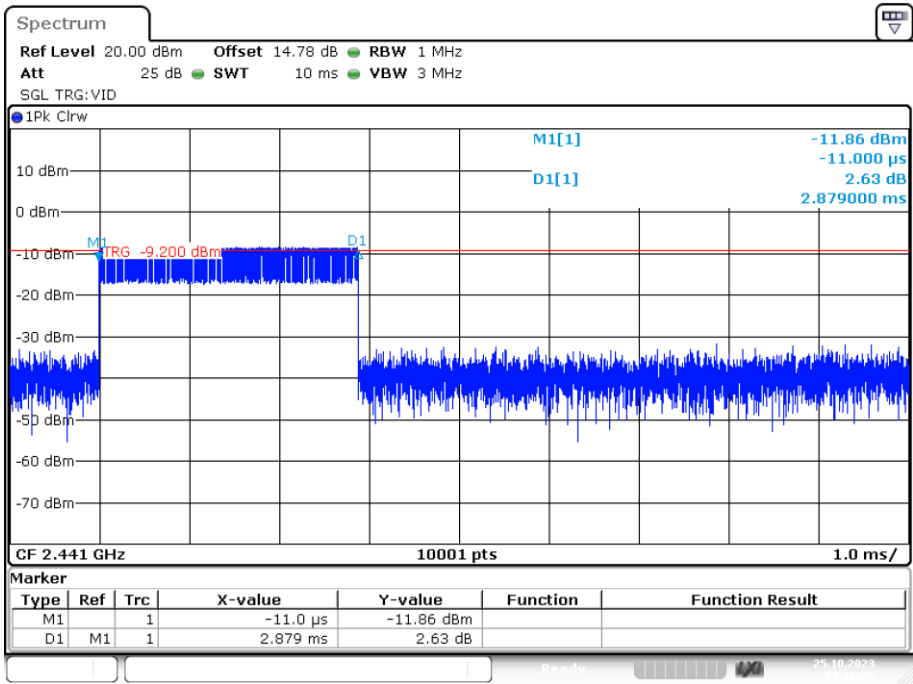
Date: 25.OCT.2023 09:15:09

Dwell NVNT 1-DH3 2441MHz Ant1 Accumulated



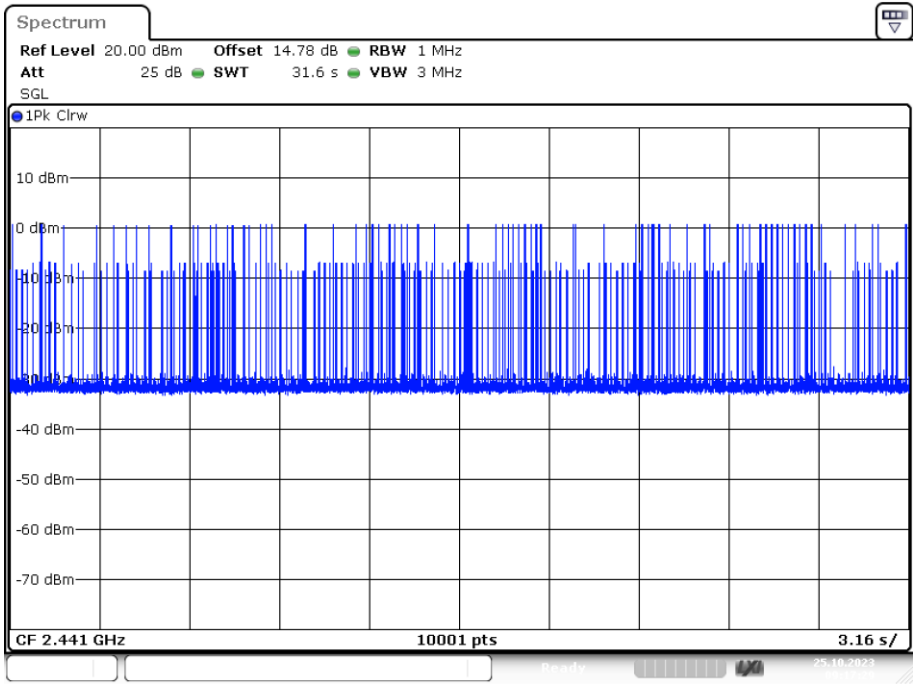
Date: 25.OCT.2023 09:15:43

Dwell NVNT 1-DH5 2441MHz Ant1 One Burst



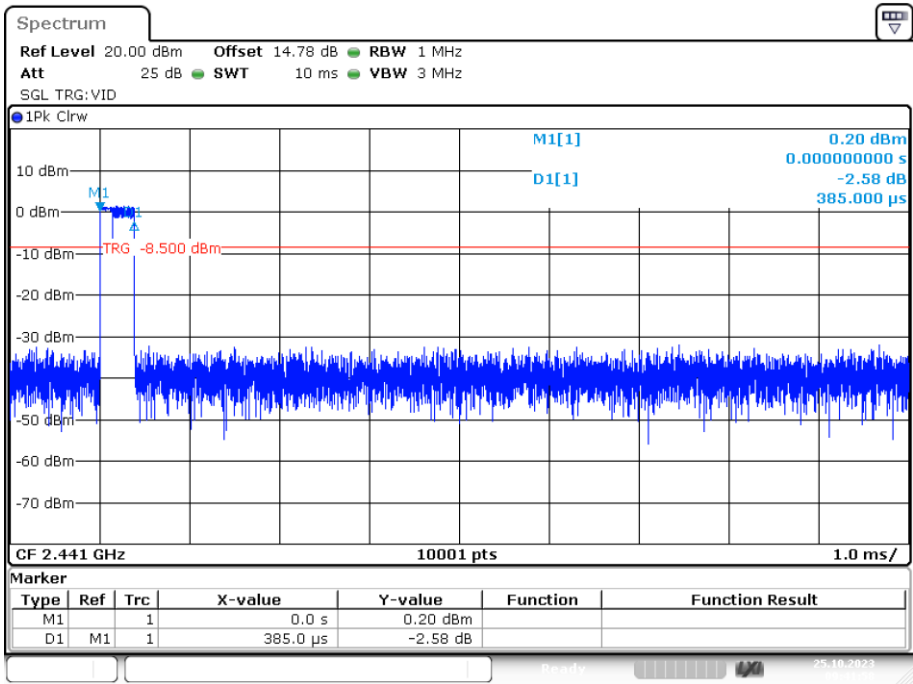
Date: 25.OCT.2023 09:16:55

Dwell NVNT 1-DH5 2441MHz Ant1 Accumulated



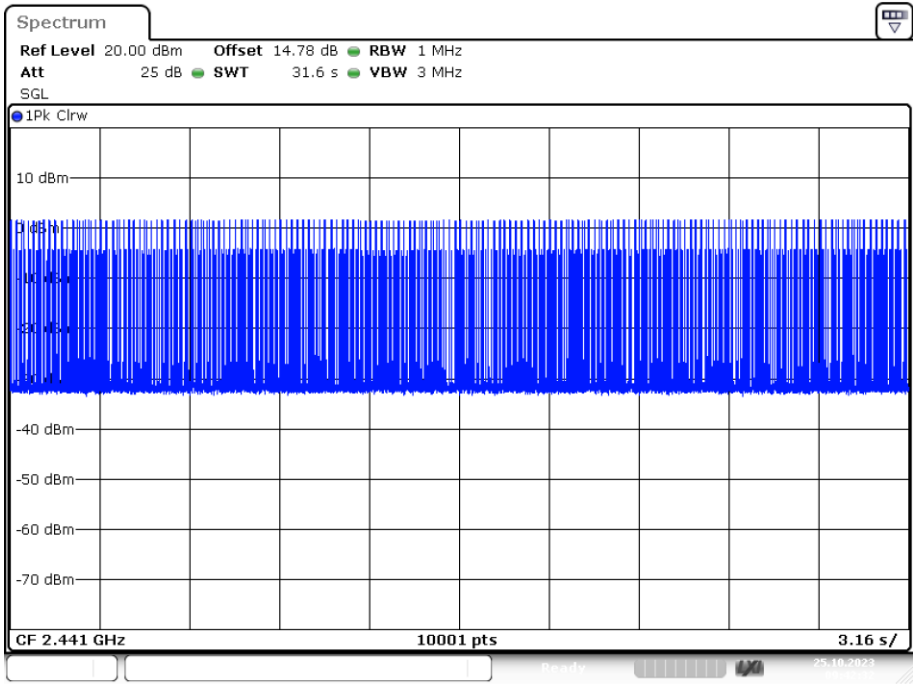
Date: 25.OCT.2023 09:17:29

Dwell NVNT 2-DH1 2441MHz Ant1 One Burst



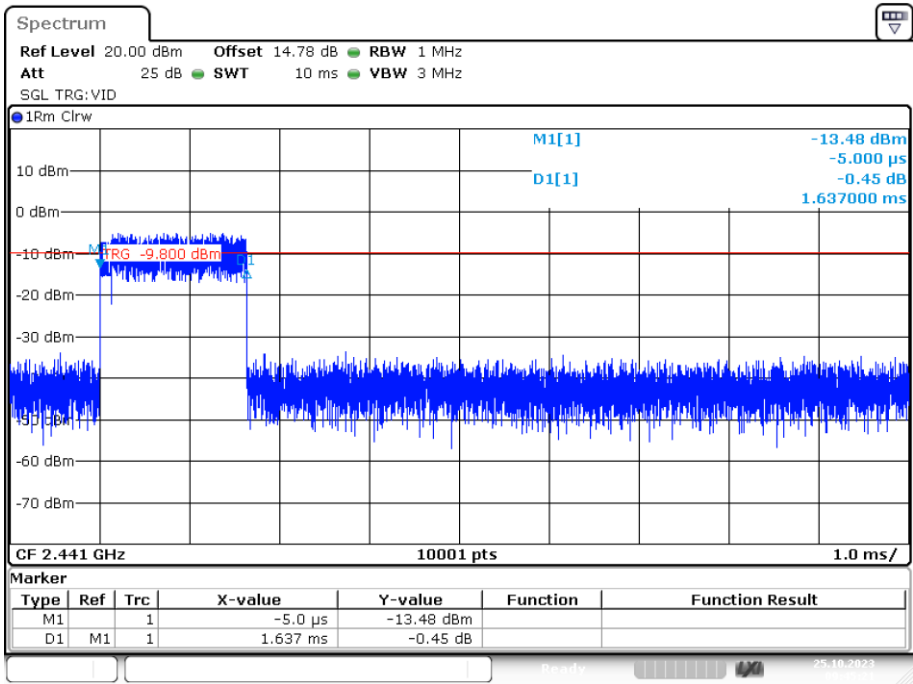
Date: 25.OCT.2023 09:41:58

Dwell NVNT 2-DH1 2441MHz Ant1 Accumulated



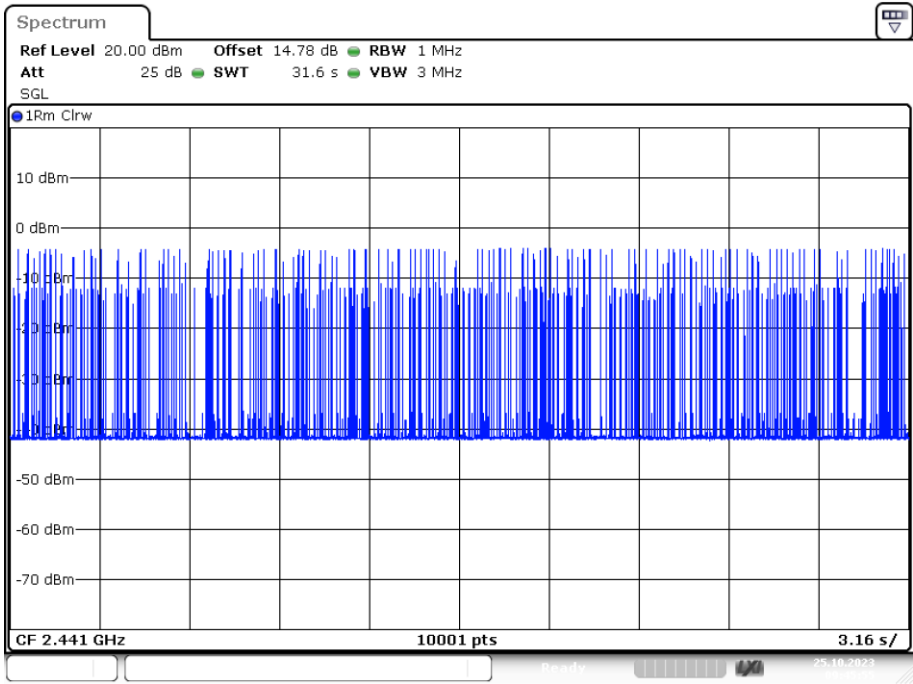
Date: 25.OCT.2023 09:42:32

Dwell NVNT 2-DH3 2441MHz Ant1 One Burst



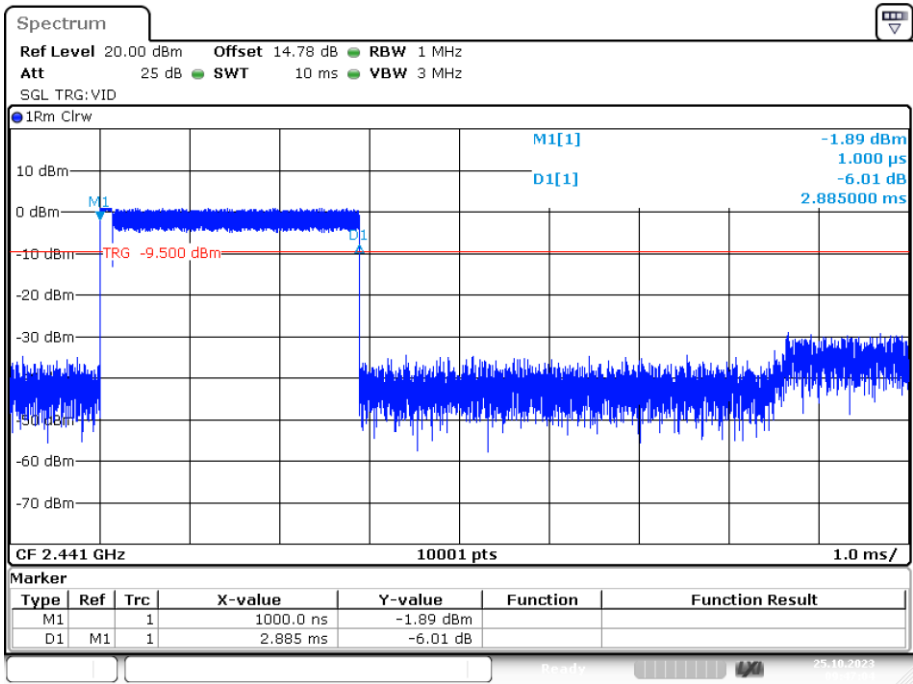
Date: 25.OCT.2023 09:45:20

Dwell NVNT 2-DH3 2441MHz Ant1 Accumulated



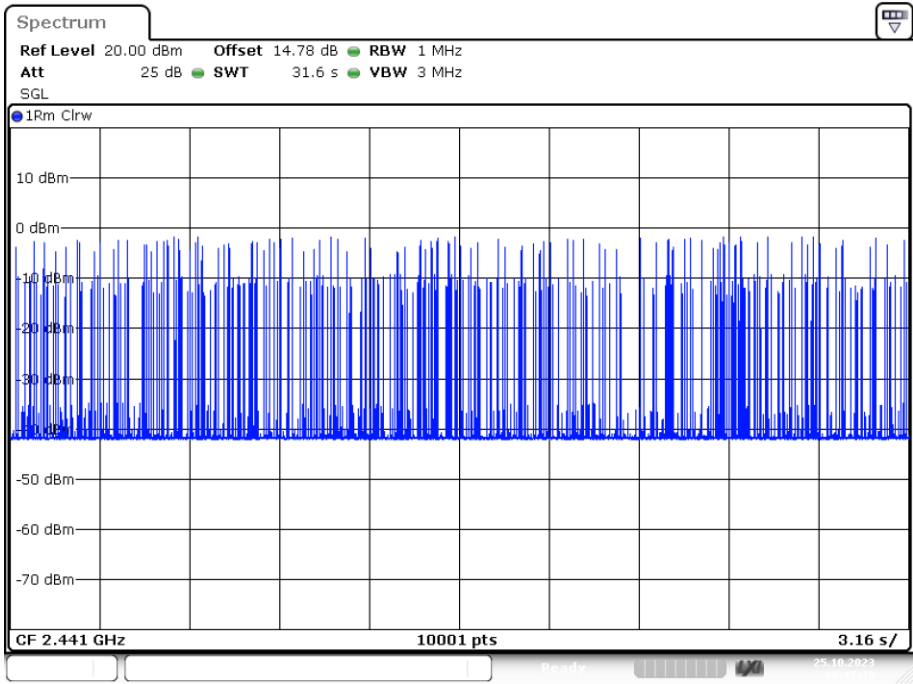
Date: 25.OCT.2023 09:45:55

Dwell NVNT 2-DH5 2441MHz Ant1 One Burst



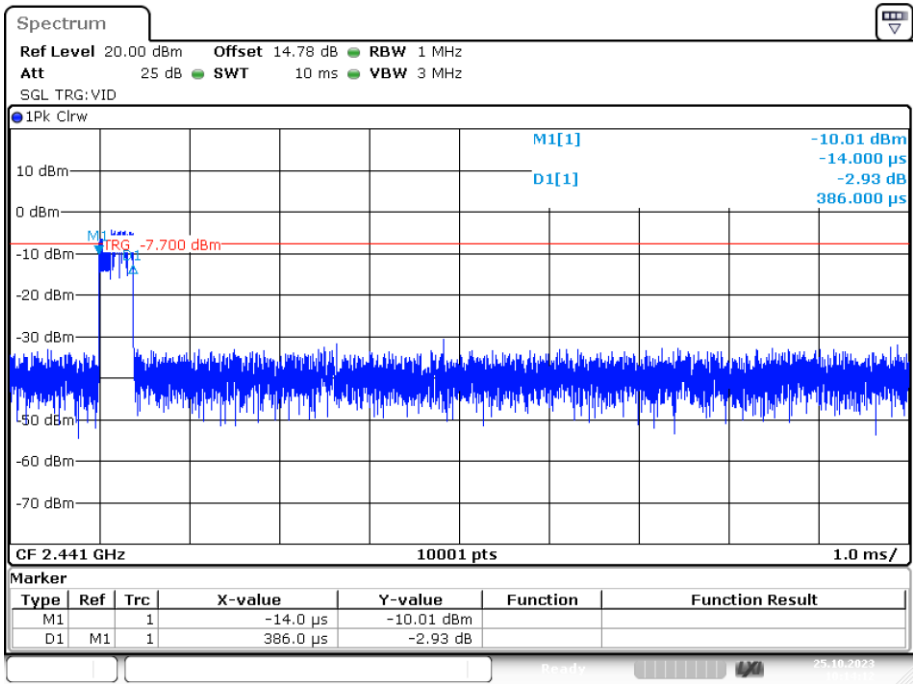
Date: 25.OCT.2023 09:47:04

Dwell NVNT 2-DH5 2441MHz Ant1 Accumulated



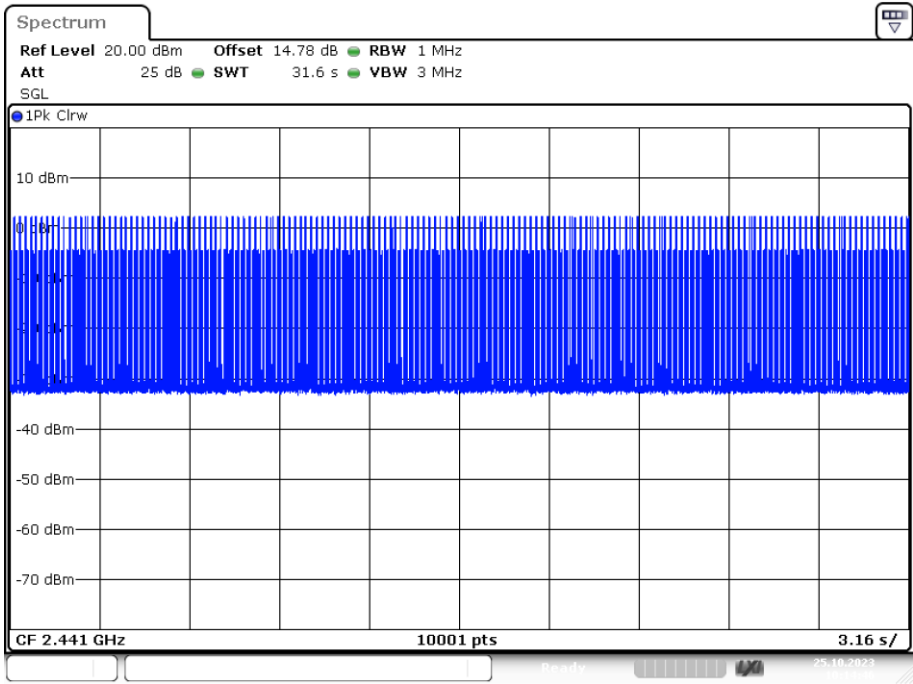
Date: 25.OCT.2023 09:47:39

Dwell NVNT 3-DH1 2441MHz Ant1 One Burst



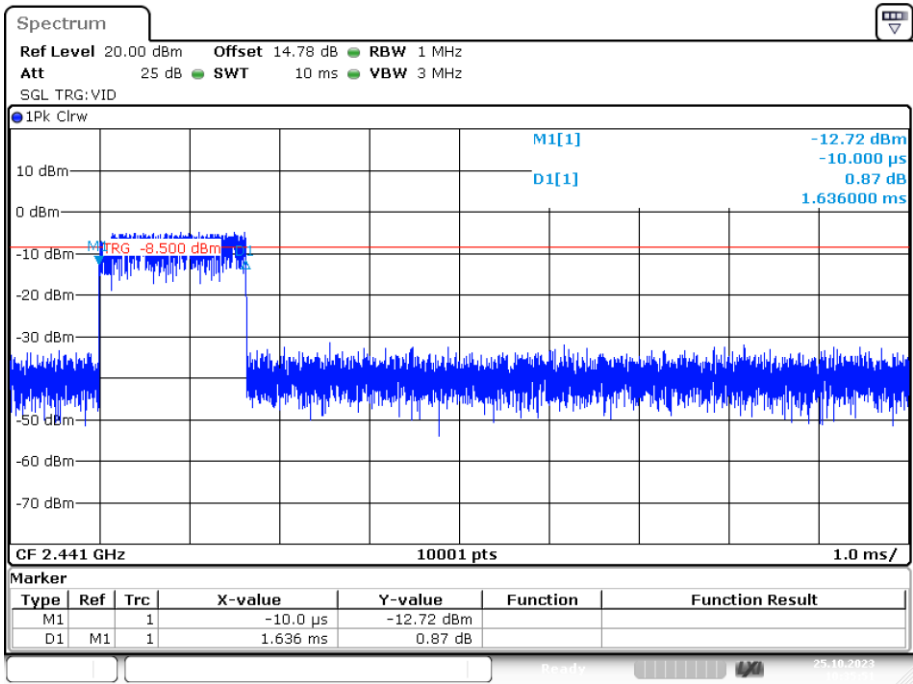
Date: 25.OCT.2023 10:14:12

Dwell NVNT 3-DH1 2441MHz Ant1 Accumulated



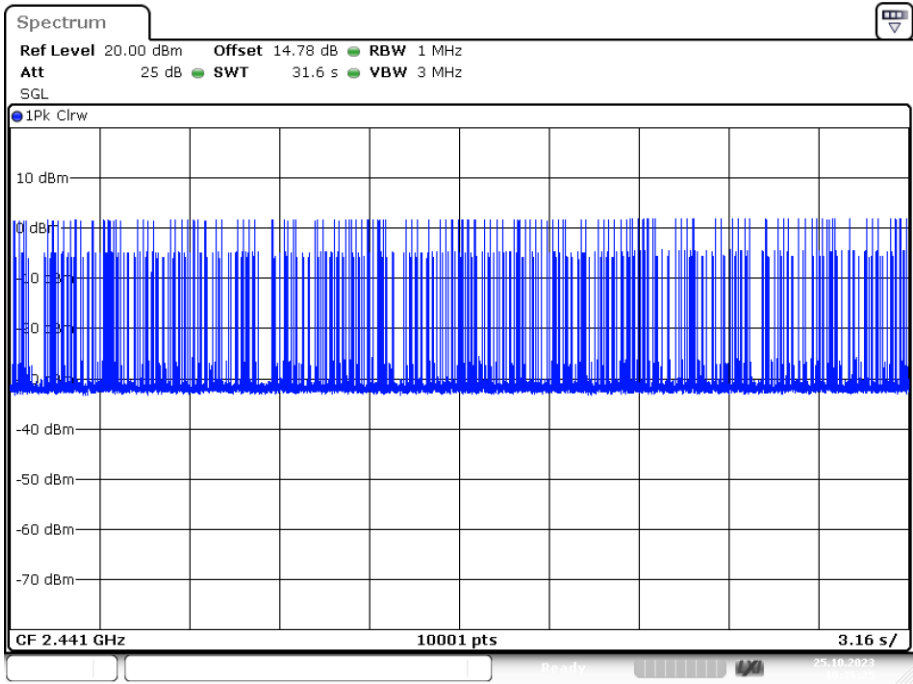
Date: 25.OCT.2023 10:14:46

Dwell NVNT 3-DH3 2441MHz Ant1 One Burst



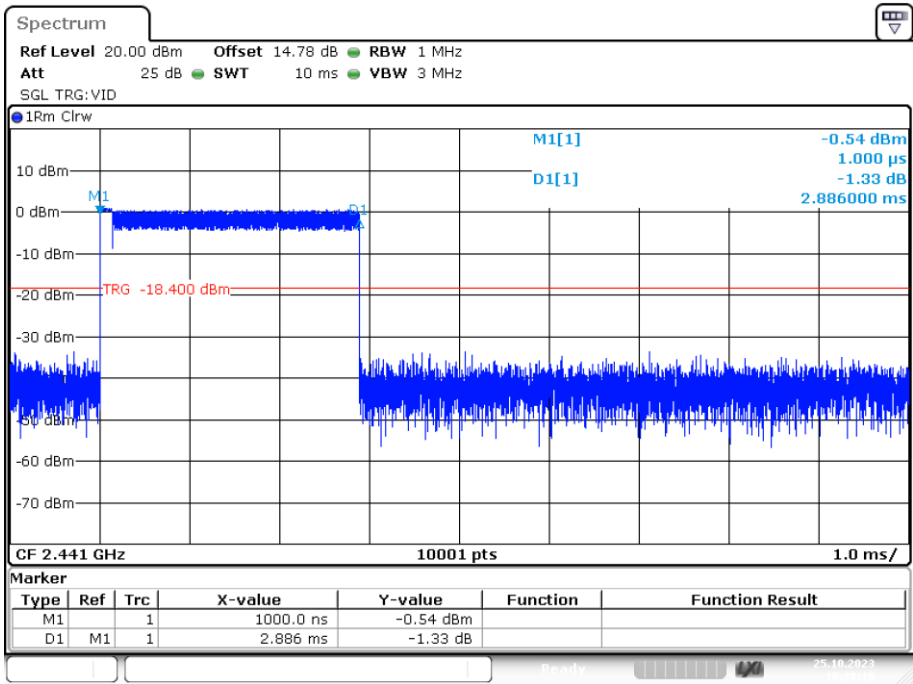
Date: 25.OCT.2023 10:35:51

Dwell NVNT 3-DH3 2441MHz Ant1 Accumulated



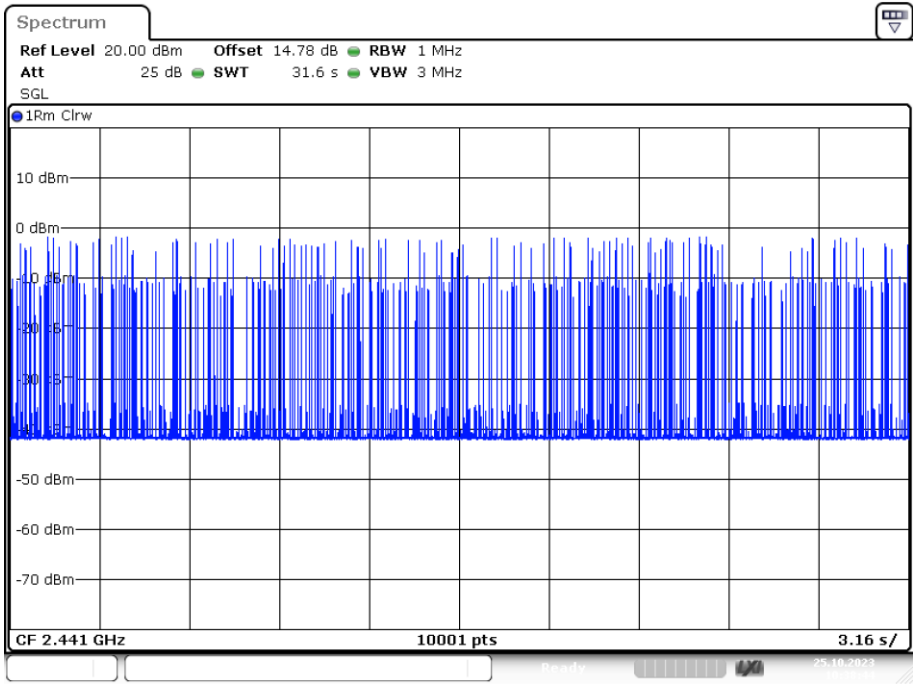
Date: 25.OCT.2023 10:36:25

Dwell NVNT 3-DH5 2441MHz Ant1 One Burst



Date: 25.OCT.2023 10:38:10

Dwell NVNT 3-DH5 2441MHz Ant1 Accumulated



Date: 25.OCT.2023 10:38:44

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)

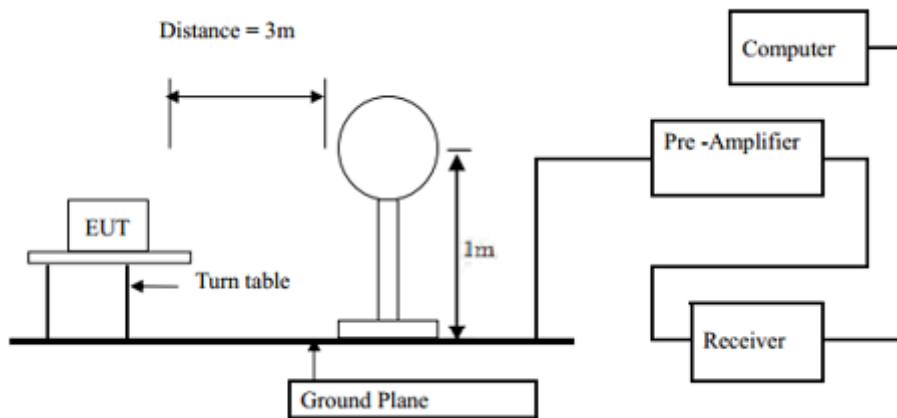
15.209 Limit

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)	

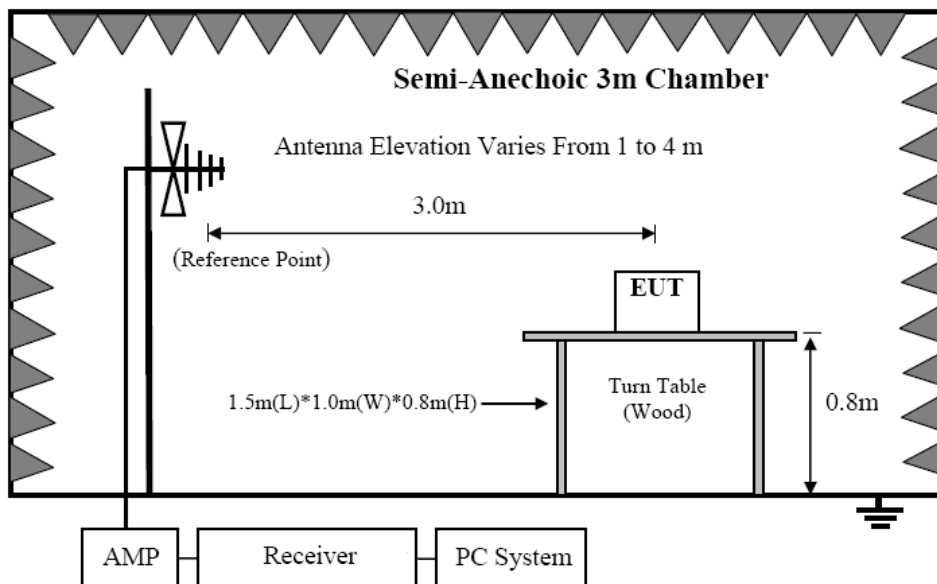
Note: The peak limit is 20 dB higher than the average limit

8.2. Block Diagram of Test setup

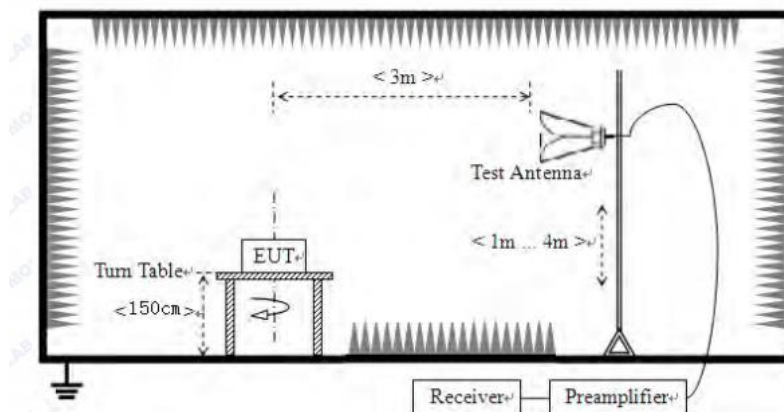
8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 30MHz



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
- (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 though 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

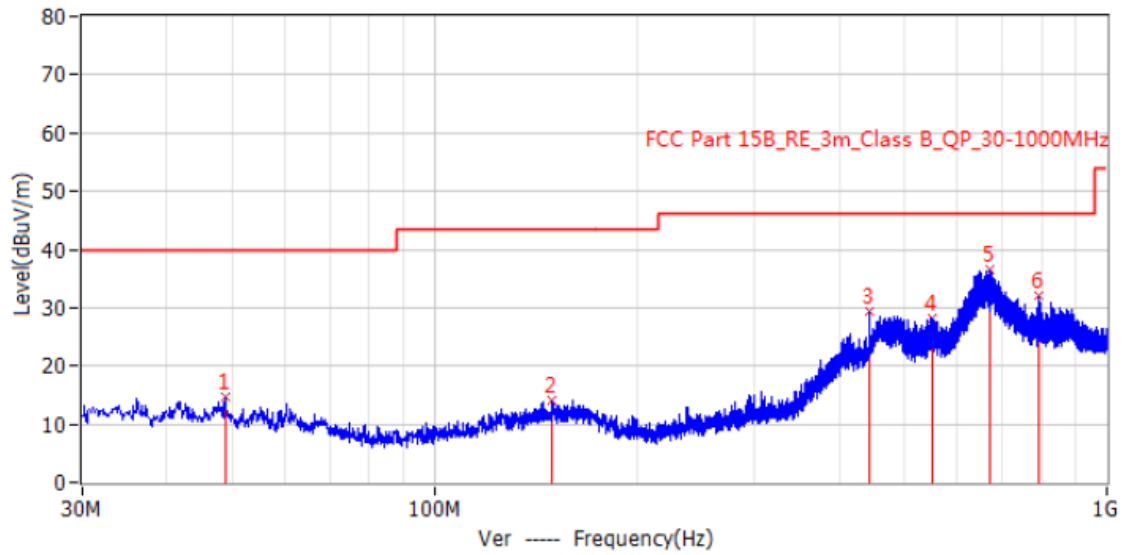
We have scanned from 9kHz to the 10th harmonic of the EUT's highest frequency.
Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

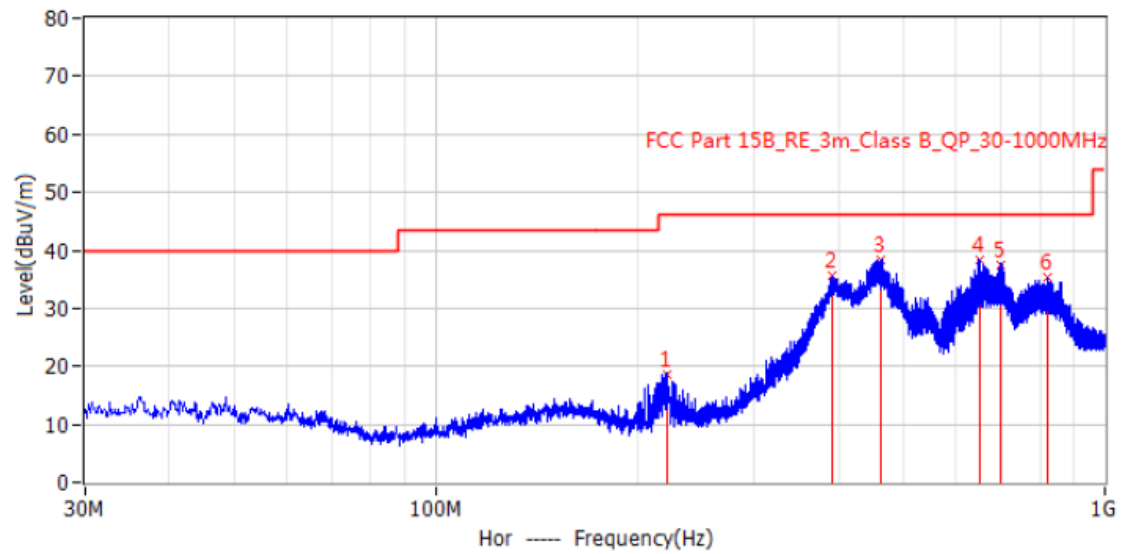
Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

From 30MHz to 1000MHz: Conclusion: PASS

Vertical:



No.	Frequency	Limit dBuV/m	Level dBuV/m	Margin dB	Factor dB/m	Detector	Polar	Height cm	Angle deg
1*	48.915MHz	40.0	14.6	-25.4	15.9	PK	Ver	100.0	191.0
2*	149.674MHz	43.5	14.1	-29.4	15.6	PK	Ver	100.0	166.0
3*	444.675MHz	46.0	29.4	-16.6	17.7	PK	Ver	100.0	263.0
4*	549.435MHz	46.0	28.1	-17.9	19.8	PK	Ver	100.0	88.0
5*	670.806MHz	46.0	36.5	-9.5	22.0	PK	Ver	100.0	97.0
6*	790.601MHz	46.0	32.0	-14.0	24.0	PK	Ver	100.0	25.0

Horizontal:

No.	Frequency	Limit dBuV/m	Level dBuV/m	Margin dB	Factor dB/m	Detector	Polar	Height cm	Angle deg
1*	221.939MHz	46.0	18.7	-27.3	11.9	PK	Hor	100.0	0.0
2*	391.568MHz	46.0	35.6	-10.4	16.5	PK	Hor	100.0	0.0
3*	461.408MHz	46.0	38.5	-7.5	18.0	PK	Hor	100.0	0.0
4*	649.951MHz	46.0	38.5	-7.5	21.8	PK	Hor	135.0	0.0
5*	696.754MHz	46.0	37.6	-8.4	22.3	PK	Hor	127.0	0.0
6*	823.096MHz	46.0	35.3	-10.7	24.3	PK	Hor	100.0	336.0

Remark: All modes have been tested, and only worst data of GFSK mode, Channel 2441MHz was listed in this report.

From 1G-25GHz

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	44.44	V	33.95	10.18	34.26	54.31	74	-19.69	PK
4804	36.31	V	33.95	10.18	34.26	46.18	54	-7.82	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	46.44	H	33.95	10.18	34.26	56.31	74	-17.69	PK
4804	36.77	H	33.95	10.18	34.26	46.64	54	-7.36	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: GFSK TX Mid									
4882	42.10	V	33.93	10.2	34.29	51.94	74	-22.06	PK
4882	37.00	V	33.93	10.2	34.29	46.84	54	-7.16	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
4882	44.13	H	33.93	10.2	34.29	53.97	74	-20.03	PK
4882	34.66	H	33.93	10.2	34.29	44.50	54	-9.50	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
Test Mode: GFSK TX High									
4960	44.73	V	33.93	10.2	34.29	54.57	74	-19.43	PK
4960	34.15	V	33.93	10.2	34.29	43.99	54	-10.01	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	43.05	H	33.93	10.2	34.29	52.89	74	-21.11	PK
4960	35.07	H	33.93	10.2	34.29	44.91	54	-9.09	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.

From 1G-25GHz

Test Mode: $\pi/4$ DQPSK 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	44.63	V	33.95	10.18	34.26	54.50	74	-19.50	PK
4804	35.56	V	33.95	10.18	34.26	45.43	54	-8.57	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	47.08	H	33.95	10.18	34.26	56.95	74	-17.05	PK
4804	36.07	H	33.95	10.18	34.26	45.94	54	-8.06	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: $\pi/4$ DQPSK TX Mid									
4882	44.75	V	33.93	10.2	34.29	54.59	74	-19.41	PK
4882	34.64	V	33.93	10.2	34.29	44.48	54	-9.52	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
4882	43.40	H	33.93	10.2	34.29	53.24	74	-20.76	PK
4882	35.90	H	33.93	10.2	34.29	45.74	54	-8.26	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
Test Mode: $\pi/4$ DQPSK TX High									
4960	44.43	V	33.93	10.2	34.29	54.27	74	-19.73	PK
4960	35.12	V	33.93	10.2	34.29	44.96	54	-9.04	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	44.18	H	33.93	10.2	34.29	54.02	74	-19.98	PK
4960	32.71	H	33.93	10.2	34.29	42.55	54	-11.45	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.

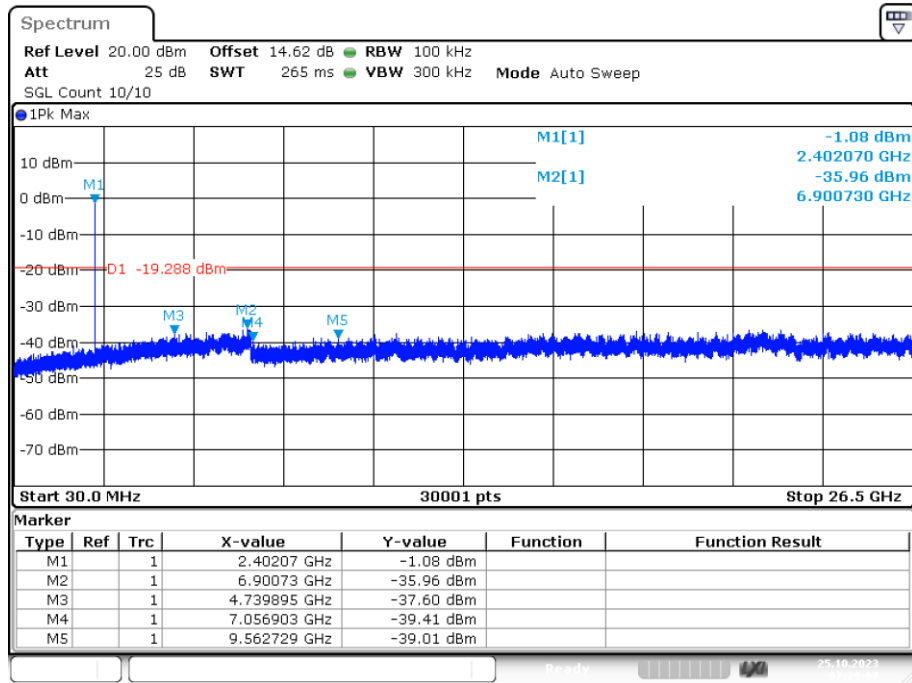
From 1G-25GHz

Test Mode: 8DPSK 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	44.79	V	33.95	10.18	34.26	54.66	74	-19.34	PK
4804	35.65	V	33.95	10.18	34.26	45.52	54	-8.48	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	44.87	H	33.95	10.18	34.26	54.74	74	-19.26	PK
4804	37.94	H	33.95	10.18	34.26	47.81	54	-6.19	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: 8DPSK TX Mid									
4882	42.77	V	33.93	10.2	34.29	52.61	74	-21.39	PK
4882	33.20	V	33.93	10.2	34.29	43.04	54	-10.96	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
4882	44.71	H	33.93	10.2	34.29	54.55	74	-19.45	PK
4882	34.25	H	33.93	10.2	34.29	44.09	54	-9.91	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
Test Mode: 8DPSK TX High									
4960	45.35	V	33.93	10.2	34.29	55.19	74	-18.81	PK
4960	36.01	V	33.93	10.2	34.29	45.85	54	-8.15	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	42.60	H	33.93	10.2	34.29	52.44	74	-21.56	PK
4960	32.66	H	33.93	10.2	34.29	42.50	54	-11.50	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/

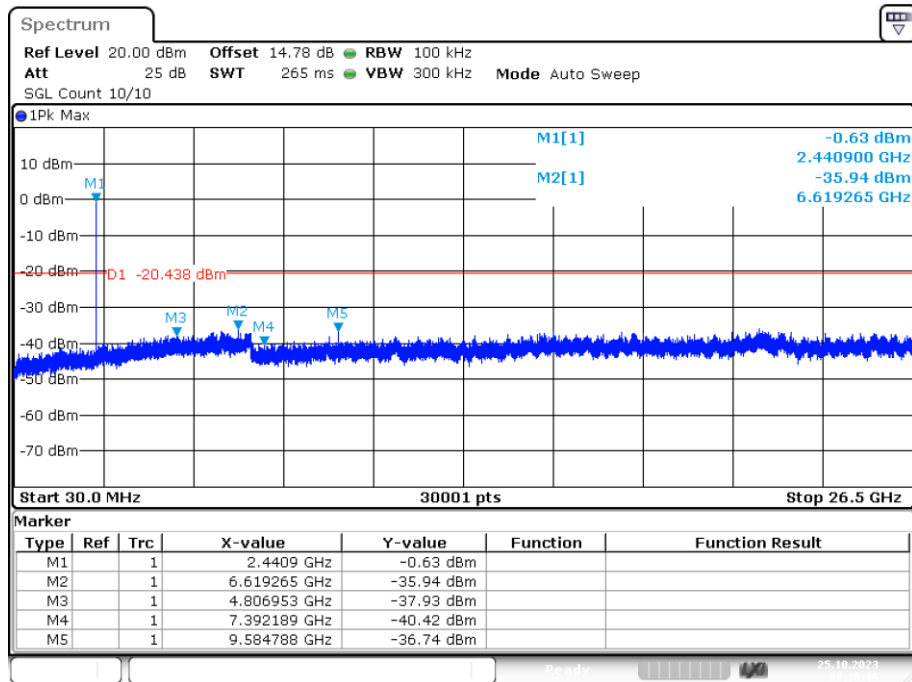
Note:

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.

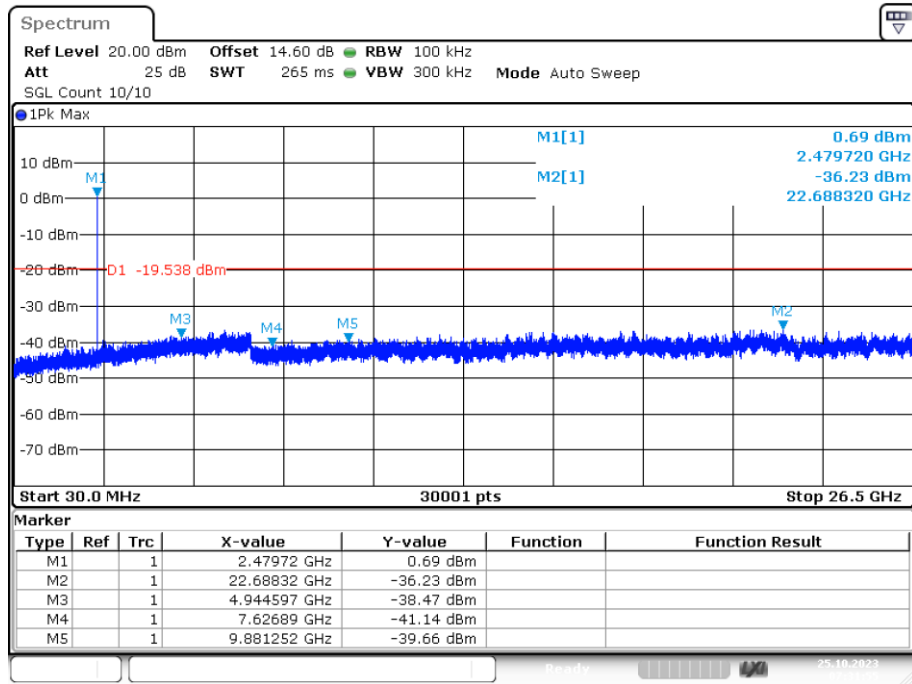
Conducted RF Spurious Emission**Tx. Spurious NVNT 1-DH1 2402MHz Ant1 Emission**

Date: 25.OCT.2023 07:29:07

Tx. Spurious NVNT 1-DH1 2441MHz Ant1 Emission

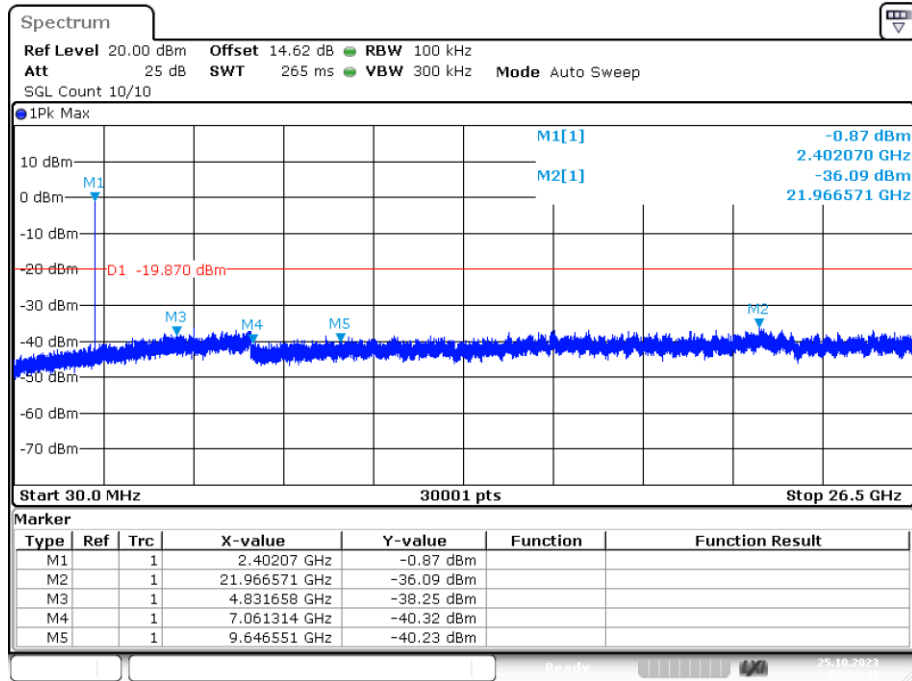
Date: 25.OCT.2023 07:30:15

Tx. Spurious NVNT 1-DH1 2480MHz Ant1 Emission



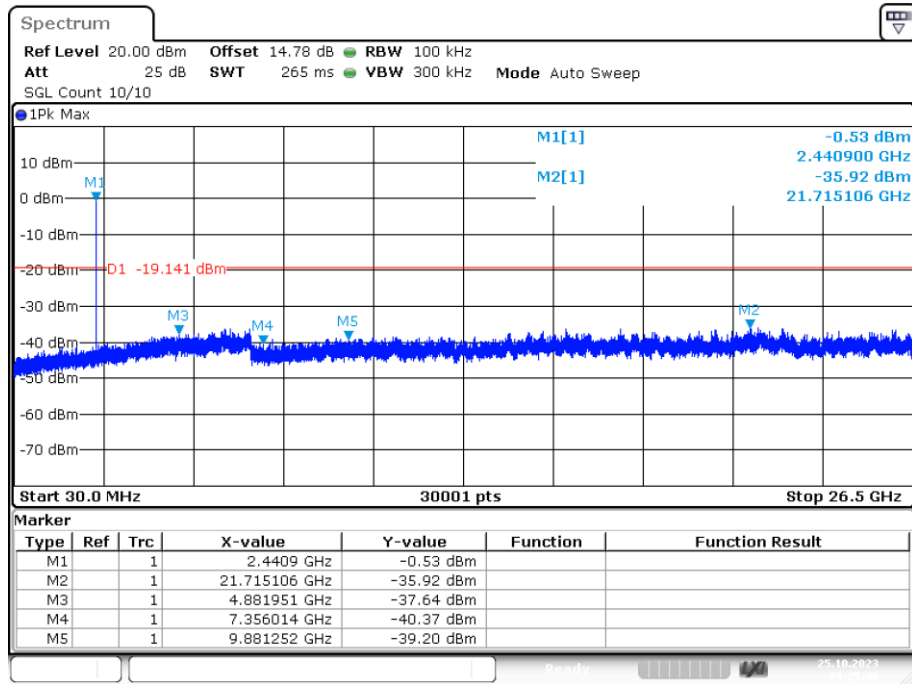
Date: 25.OCT.2023 07:31:55

Tx. Spurious NVNT 2-DH1 2402MHz Ant1 Emission

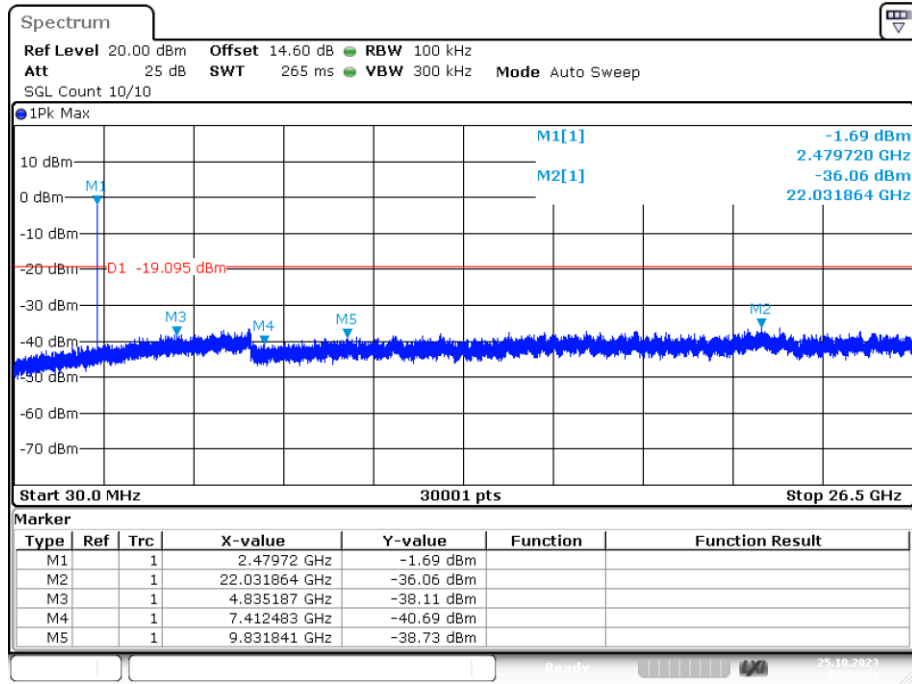


Date: 25.OCT.2023 09:22:49

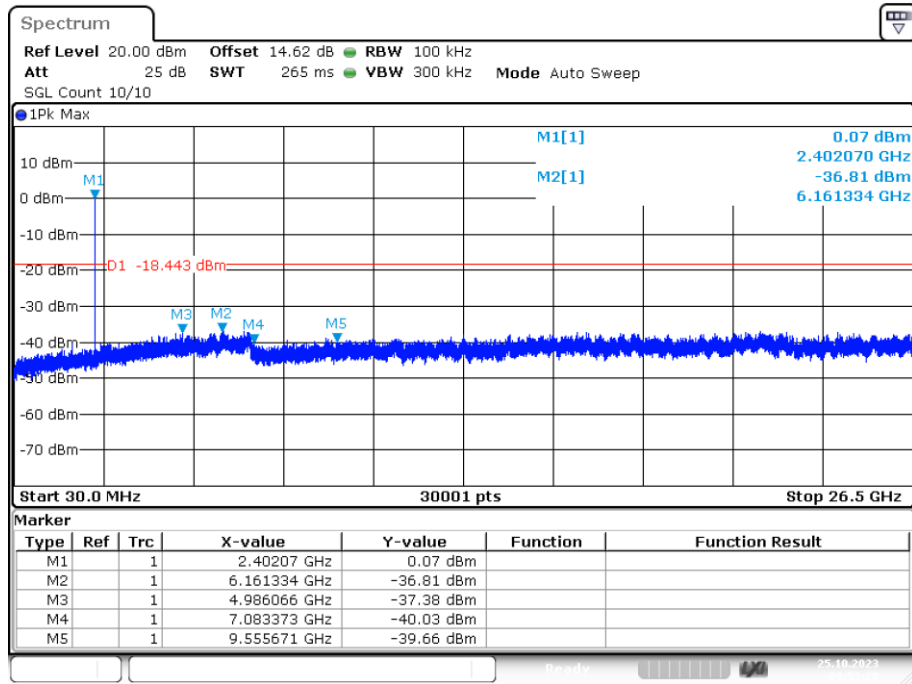
Tx. Spurious NVNT 2-DH1 2441MHz Ant1 Emission



Tx. Spurious NVNT 2-DH1 2480MHz Ant1 Emission

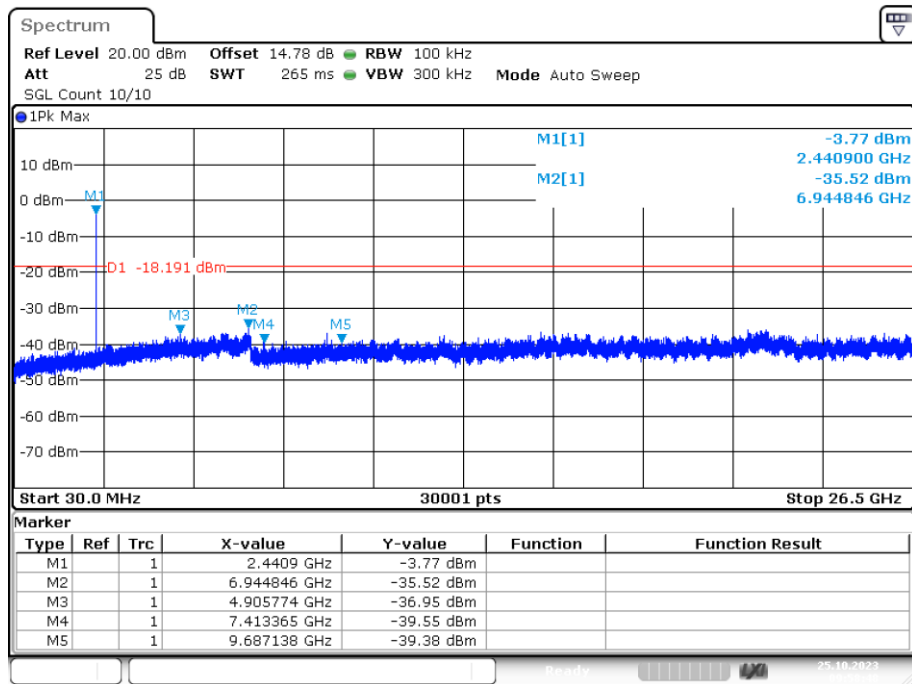


Tx. Spurious NVNT 3-DH1 2402MHz Ant1 Emission



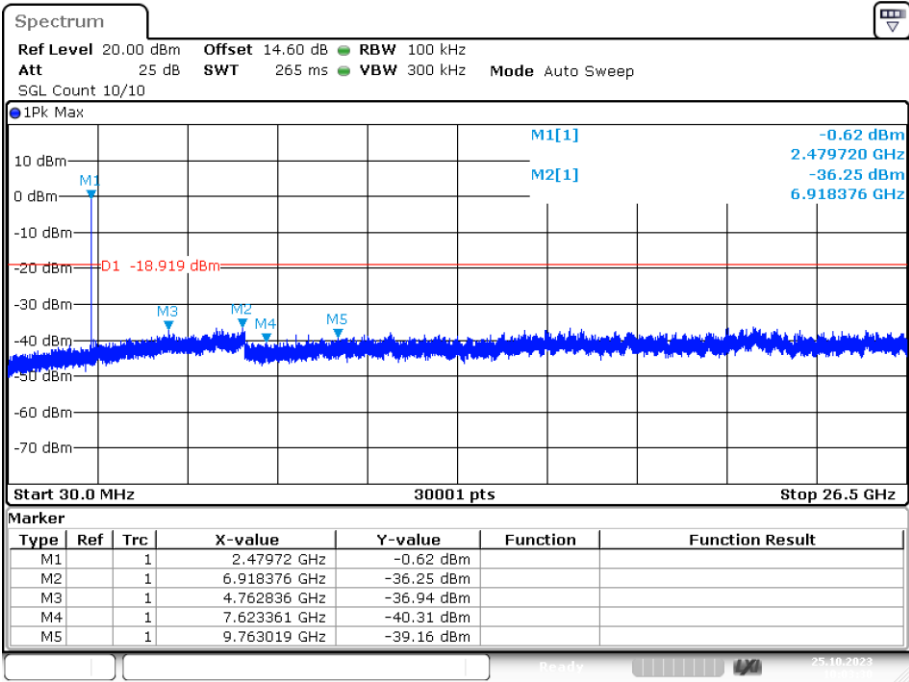
Date: 25.OCT.2023 09:53:28

Tx. Spurious NVNT 3-DH1 2441MHz Ant1 Emission



Date: 25.OCT.2023 09:58:48

Tx. Spurious NVNT 3-DH1 2480MHz Ant1 Emission



Date: 25.OCT.2023 10:03:31