



FCC/IC TEST REPORT

FCC ID: 2ABNA-2455A

On Behalf of

**Guangzhou Geoelectron Science & Technology Company
Limited**

Communication Module

Model No.: GEBW2455A

Prepared for : Guangzhou Geoelectron Science & Technology Company Limited
Address : No.704, 7/F, Building C, No.7, Cai Pin Road, Science City, Luogang
District, Guangzhou, China

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

Applicant : Guangzhou Geoelectron Science & Technology Company Limited
Address : No.704, 7/F, Building C, No.7, Cai Pin Road, Science City, Luogang District,
Guangzhou, China
Manufacturer : Guangzhou Geoelectron Science & Technology Company Limited
Address : No.704, 7/F, Building C, No.7, Cai Pin Road, Science City, Luogang District,
Guangzhou, China
EUT Description : Communication Module
(A) Model No. : GEBW2455A
(B) Trademark : Geoelectron

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247

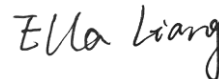
RSS-247 Issue 2, RSS-Gen Issue 5, ANSI C63.10:2013, CISPR 16-1-4:2010

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).....: Ella Liang
Project Engineer



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



Date of issue.....: December 11, 2019

Revision History

Revision	Issue Date	Revisions	Revised By
V0	December 11, 2019	Initial released Issue	Simple Guan

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) RSS-247(5.4 b) ANSI C63.10 :2013	P
Bandwidth	FCC Part 15: 15.215 RSS-247(5.1 a) ANSI C63.10 :2013	P
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1) RSS-247(5.1 b) ANSI C63.10 :2013	P
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1) RSS-247(5.1 d) ANSI C63.10 :2013	P
Dwell Time	FCC Part 15: 15.247(a)(1) RSS-247(5.1 d) ANSI C63.10 :2013	P
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) RSS-Gen(8.9), RSS-247(5.5) ANSI C63.10 :2013	P
Band Edge Compliance	FCC Part 15: 15.247(d) RSS-Gen(8.9), RSS-247(5.5) ANSI C63.10 :2013	P
Power Line Conducted Emissions	FCC Part 15: 15.207 RSS-GEN(8.8) ANSI C63.10 :2013	P
Frequency stability	RSS-GEN(6.11)	N/A
Antenna requirement	FCC Part 15: 15.203 RSS-GEN(6.8)	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	: Communication Module
Trademark	: Geoelectron
Model Number	: GEBW2455A
DIFF.	: N/A
Test Voltage	: DC 3.35-4.2V
Radio Technology	: Bluetooth V5.0
Operation frequency	: 2402-2480MHz
Channel No.	: 79 Channels
Modulation type	: GFSK, $\pi/4$ DQPSK, 8 - DPSK
Antenna Type	: Integrated antenna, Maximum Gain is 3dBi
Software version	: V1.0
Hardware version	: GEBW2455A_V1_1

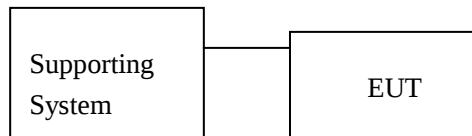
2.2. Accessories of Device (EUT)

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

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or DOC
1.	Notebook	ACER	ZQT	N/A	DOC

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)	4.16dB(Polarize: H)
	4.13dB(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	2019.09.06	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	102137	2019.09.05	1Year
Spectrum analyzer	Agilent	N9020A	MY499100060	2019.09.05	1Year
Receiver	ROHDE&SCHWARZ	ESR	1316.3003K03-10208 2-Wa	2019.09.06	1Year
Receiver	R&S	ESCI	101165	2019.09.05	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2018.04.13	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2018.04.13	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2019.09.07	2Year
Cable	Resenberger	N/A	No.1	2019.09.05	1Year
Cable	Resenberger	N/A	No.2	2019.09.05	1Year
Cable	Resenberger	N/A	No.3	2019.09.05	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2019.09.05	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2019.09.05	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2019.09.05	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2019.09.05	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2019.08.26	1 Year
Horn Antenna	SCHWARZBECK	BBHA9170	00946	2019.09.07	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2019.09.06	1 Year
Power Meter	Agilent	E9300A	MY41496625	2019.09.06	1 Year
Temp. & Humid. Chamber	Wei Huang	WHTH-1000-40-80	100631	2019.09.06	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2019.09.05	1 Year

3. MAXIMUM PEAK OUTPUT POWER

3.1.Limit

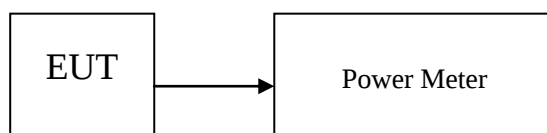
Please refer FCC part 15.247 & RSS-247.

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 RF Power Meter is set to the average power detection.

3.3.Test Setup



3.4.Test Result

Mode	Freq (MHz)	Average Output Power (dBm)	Limit (dBm)	Result
GFSK	2402	-6.482	21	Pass
	2441	-5.958	21	Pass
	2480	-6.461	21	Pass
$\pi/4$ DQPSK	2402	-6.859	21	Pass
	2441	-6.306	21	Pass
	2480	-7.087	21	Pass
8-DPSK	2402	-7.098	21	Pass
	2441	-6.429	21	Pass
	2480	-7.337	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.

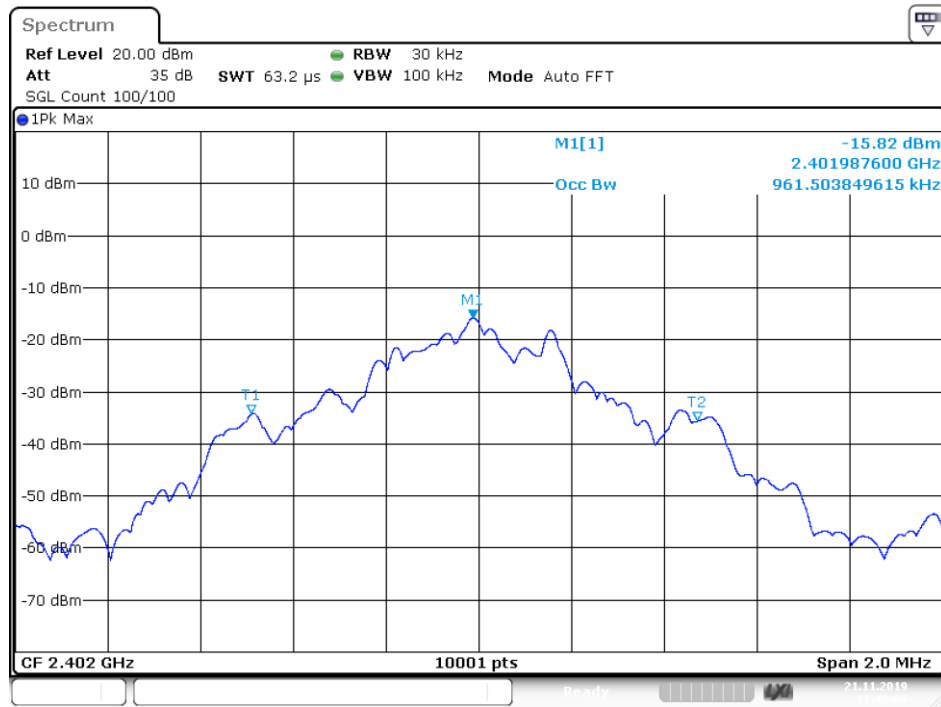
4.2.Test Procedure

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

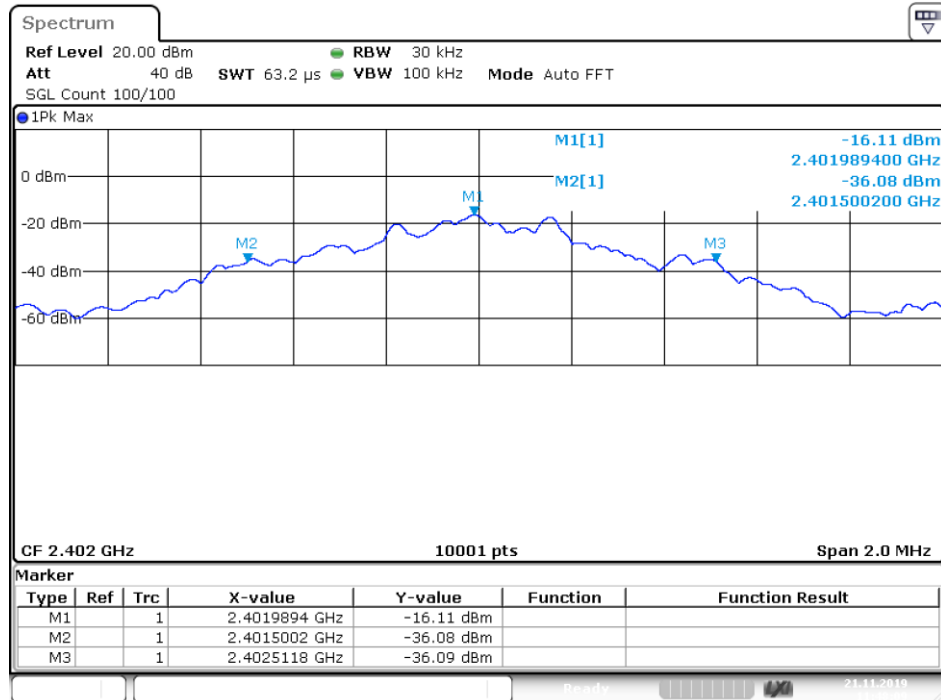
Condition	Mode	Frequency (MHz)	99% OBW (MHz)	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH1	2402	0.9615	1.0116	N/A	Pass
NVNT	1-DH1	2441	0.9529	1.0148	N/A	Pass
NVNT	1-DH1	2480	0.9609	1.0232	N/A	Pass
NVNT	2-DH1	2402	0.9787	1.0316	N/A	Pass
NVNT	2-DH1	2441	0.9591	1.0276	N/A	Pass
NVNT	2-DH1	2480	0.8785	1.0232	N/A	Pass
NVNT	3-DH1	2402	0.9603	1.0238	N/A	Pass
NVNT	3-DH1	2441	0.9757	0.7576	N/A	Pass
NVNT	3-DH1	2480	0.9301	0.9506	N/A	Pass

OBW NVNT 1-DH1 2402MHz Ant1



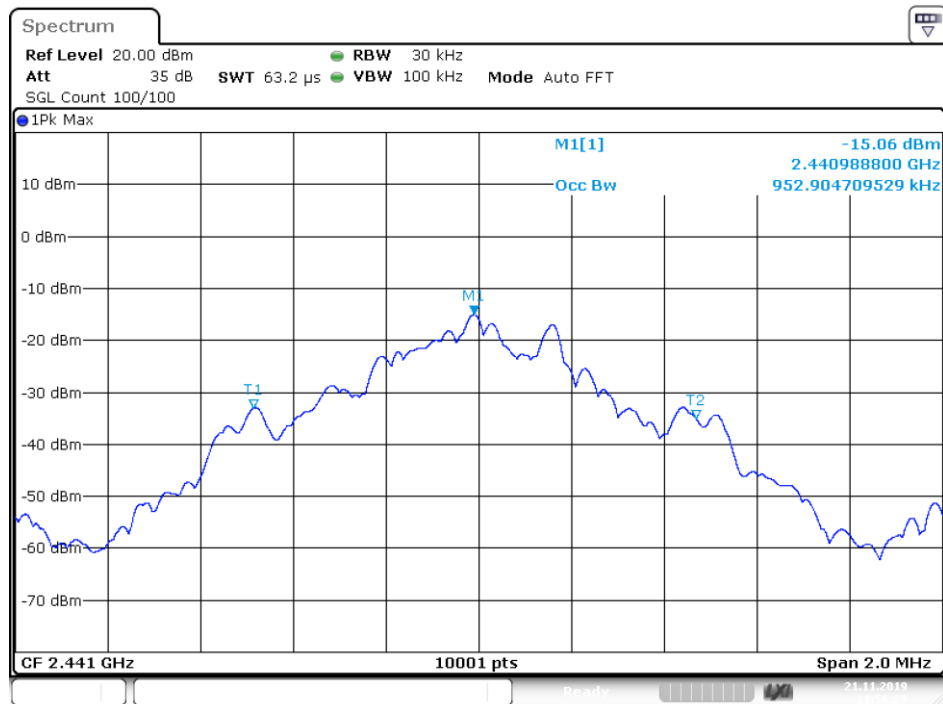
Date: 21.NOV.2019 11:48:06

-20 dB BW NVNT 1-DH1 2402MHz Ant1



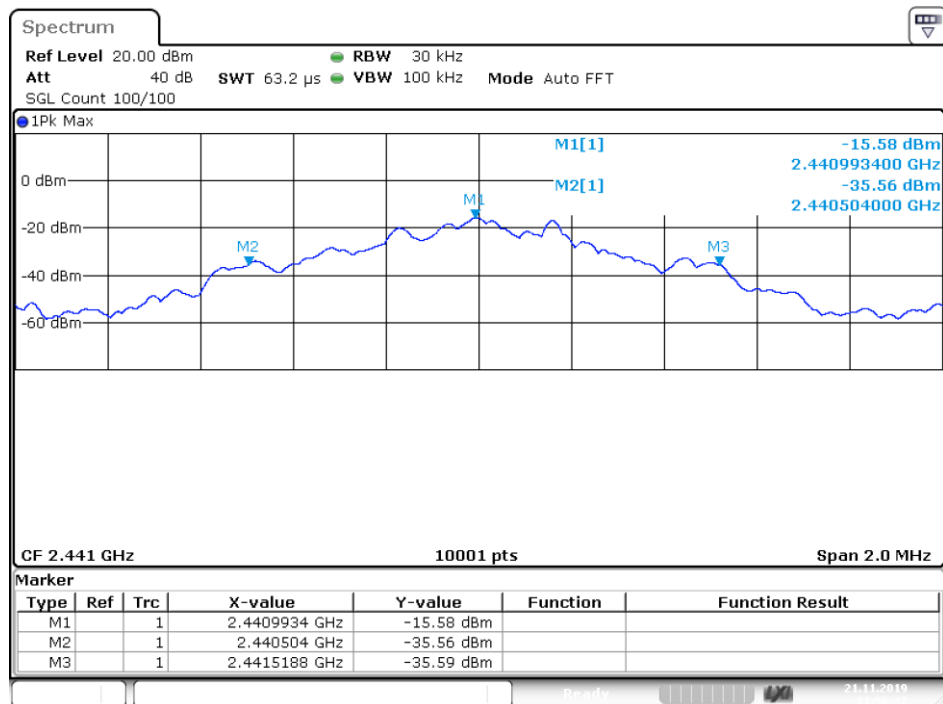
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OBW NVNT 1-DH1 2441MHz Ant1



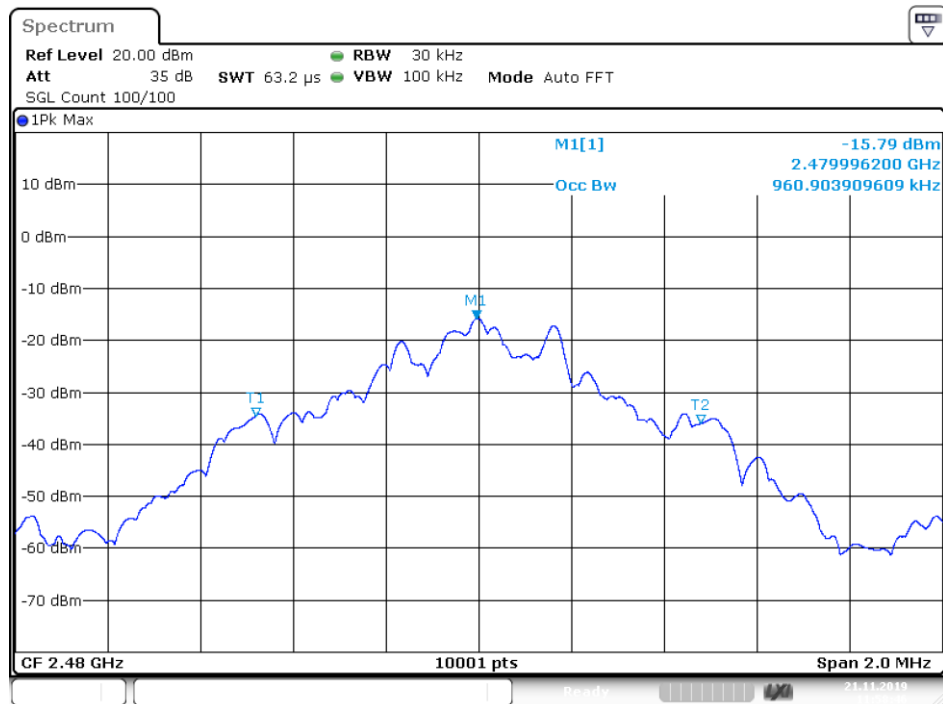
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-20 dB BW NVNT 1-DH1 2441MHz Ant1



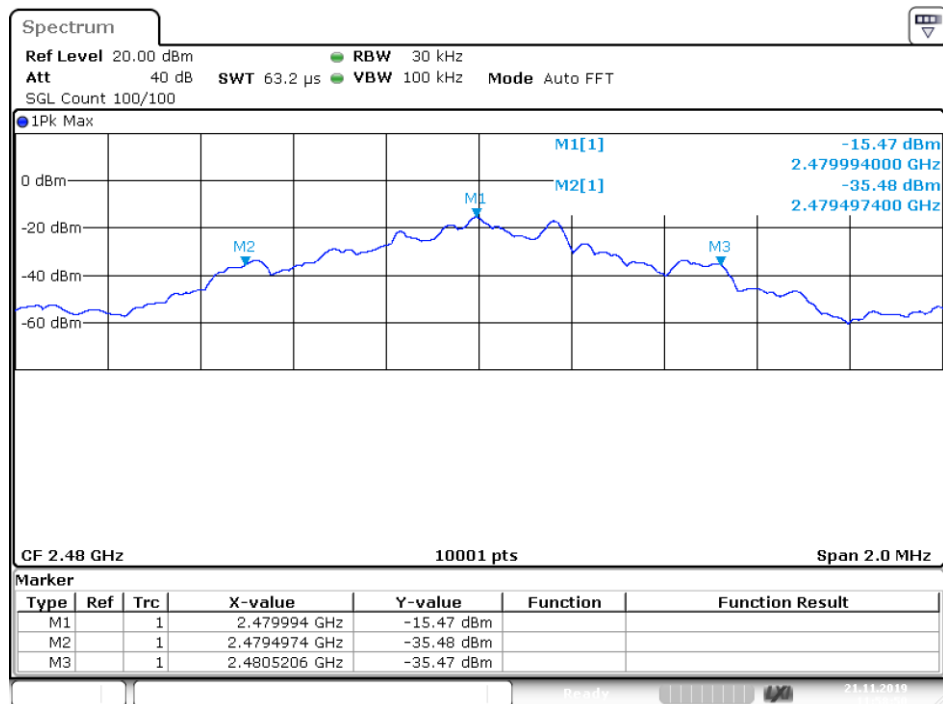
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OBW NVNT 1-DH1 2480MHz Ant1



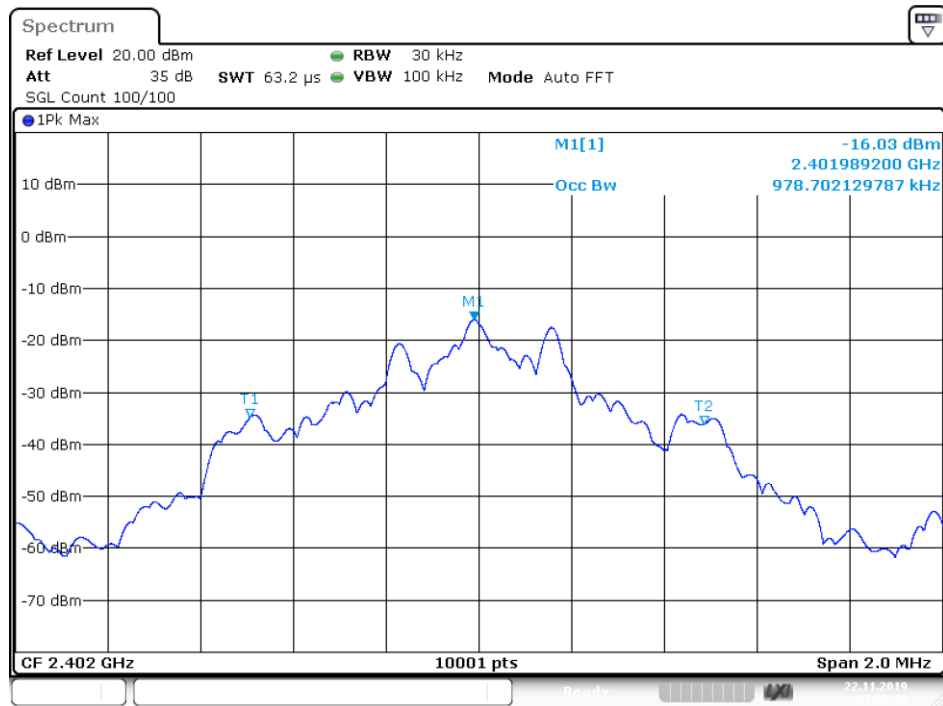
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-20 dB BW NVNT 1-DH1 2480MHz Ant1



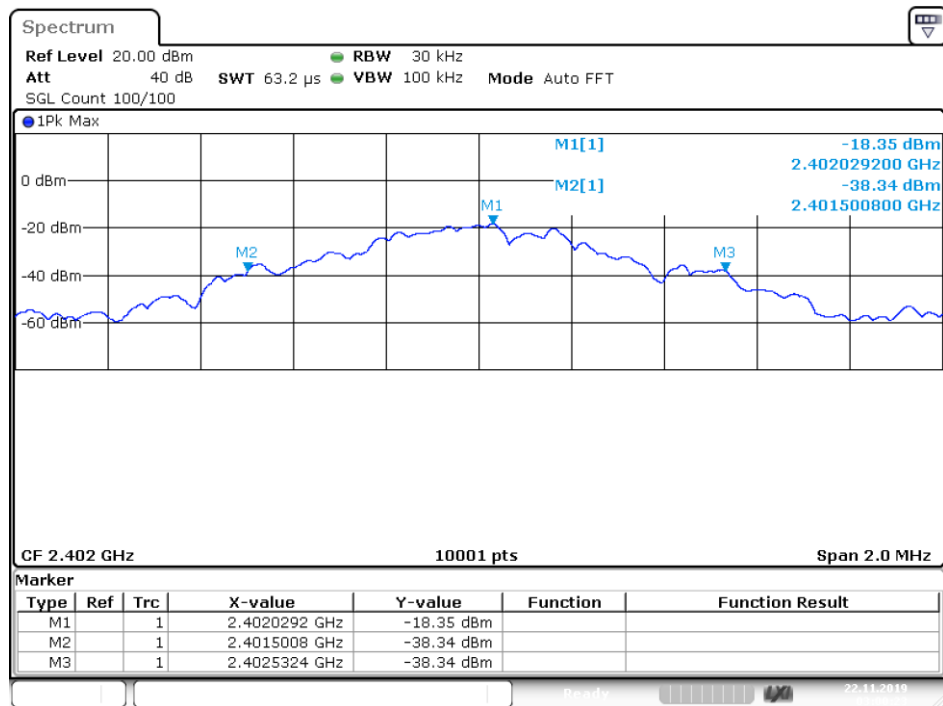
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OBW NVNT 2-DH1 2402MHz Ant1



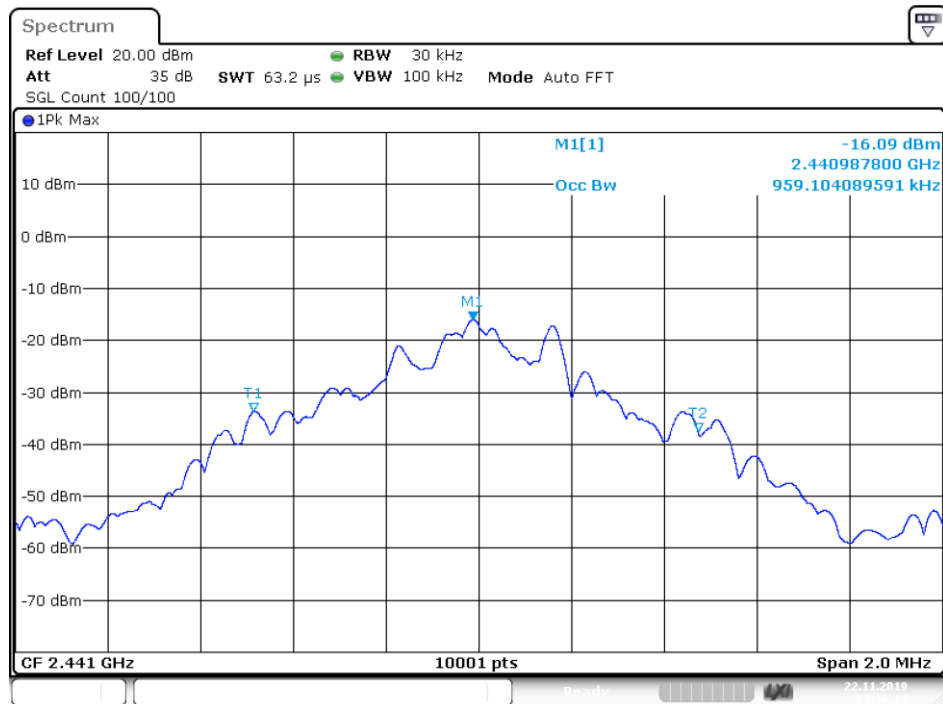
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-20 dB BW NVNT 2-DH1 2402MHz Ant1



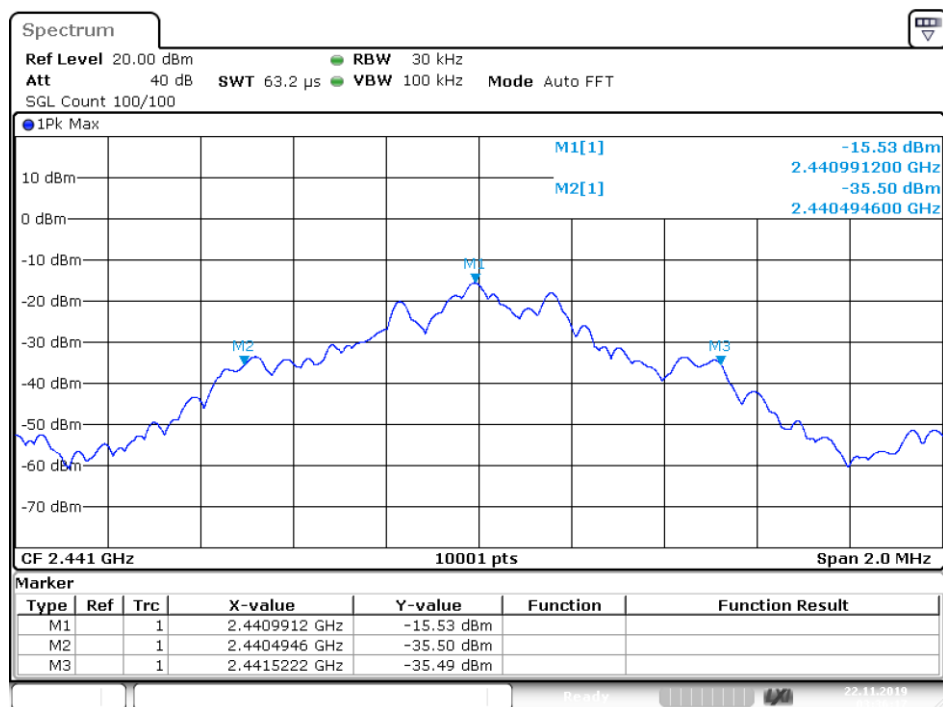
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OBW NVNT 2-DH1 2441MHz Ant1



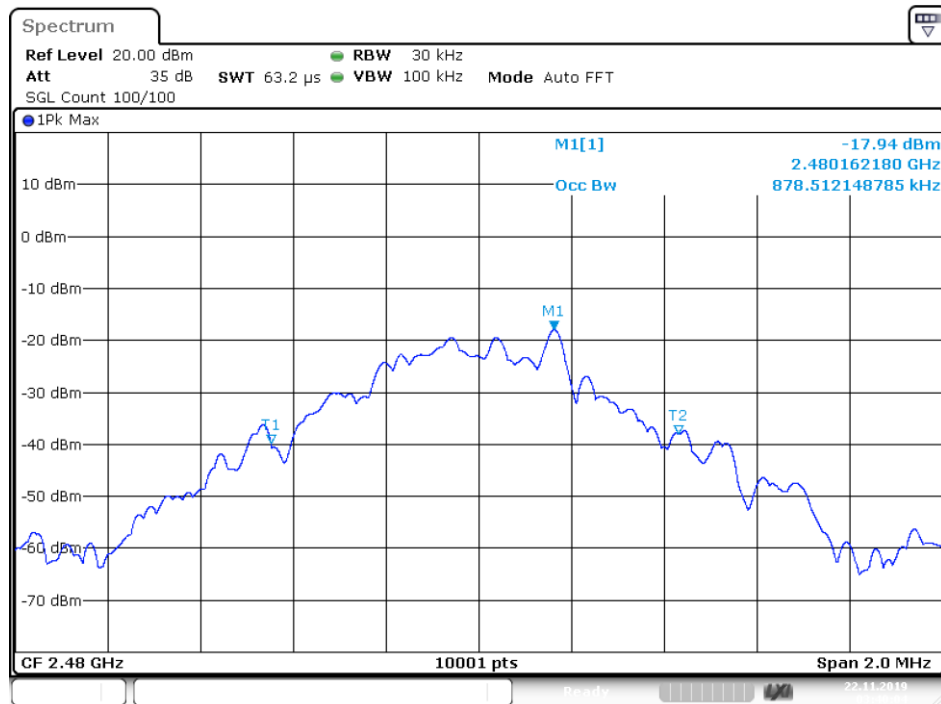
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-20 dB BW NVNT 2-DH1 2441MHz Ant1



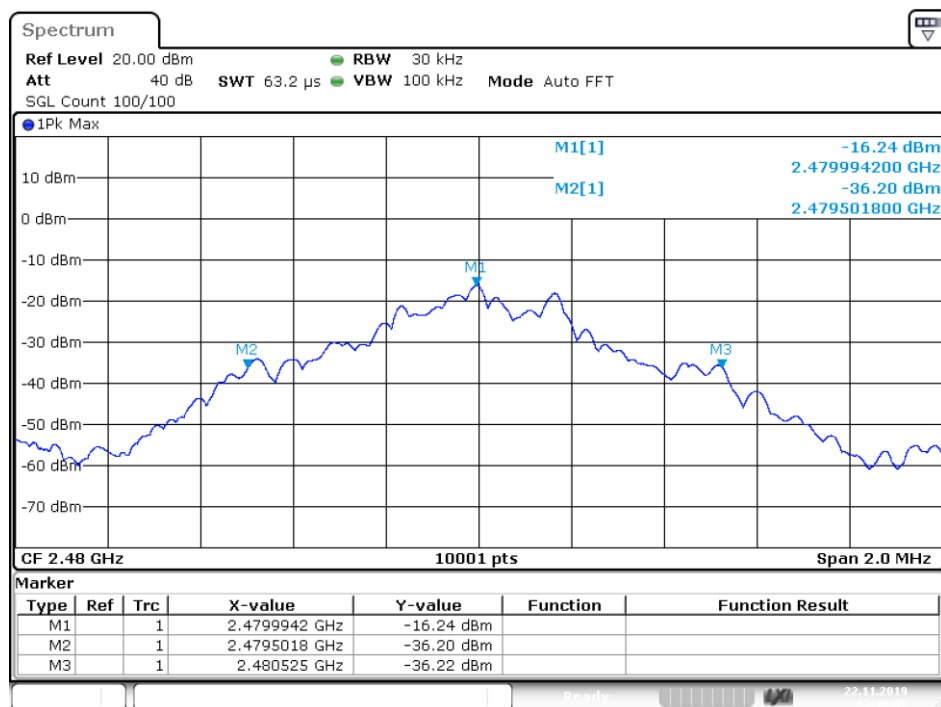
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OBW NVNT 2-DH1 2480MHz Ant1



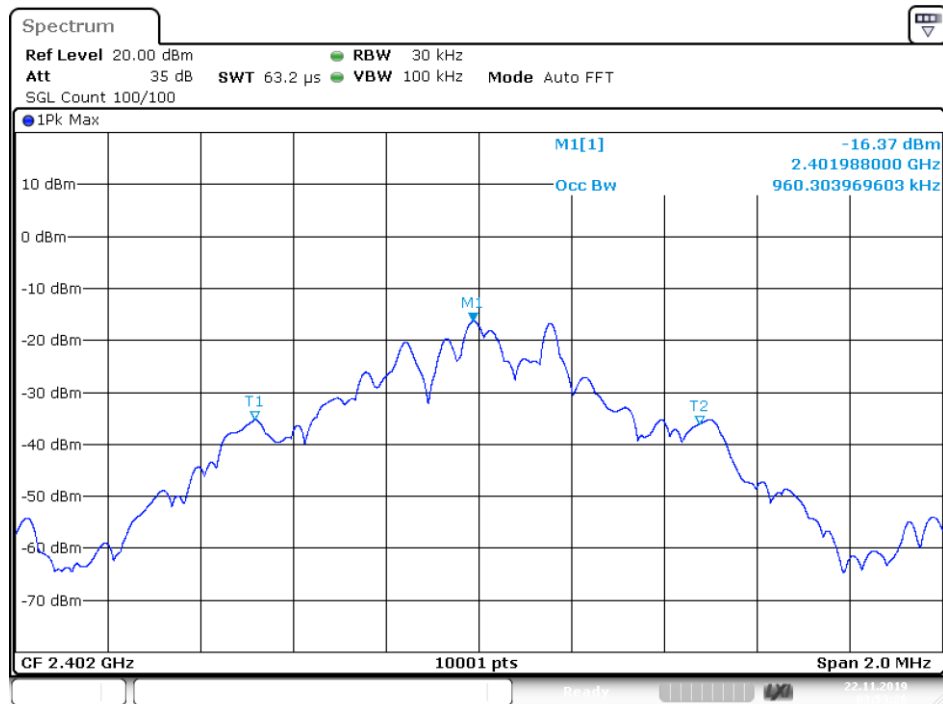
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-20 dB BW NVNT 2-DH1 2480MHz Ant1



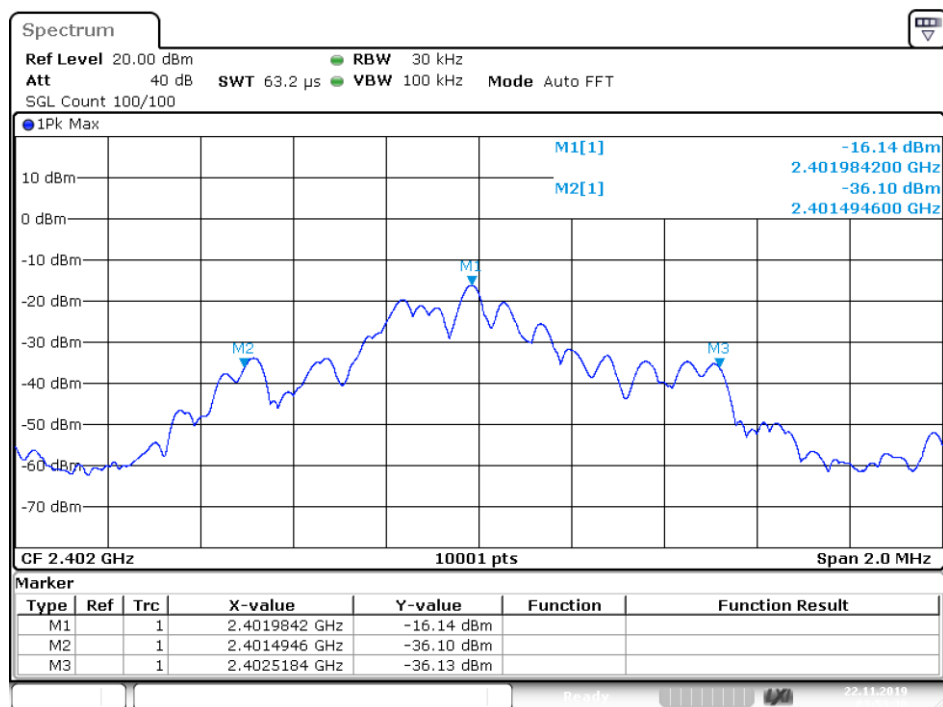
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OBW NVNT 3-DH1 2402MHz Ant1



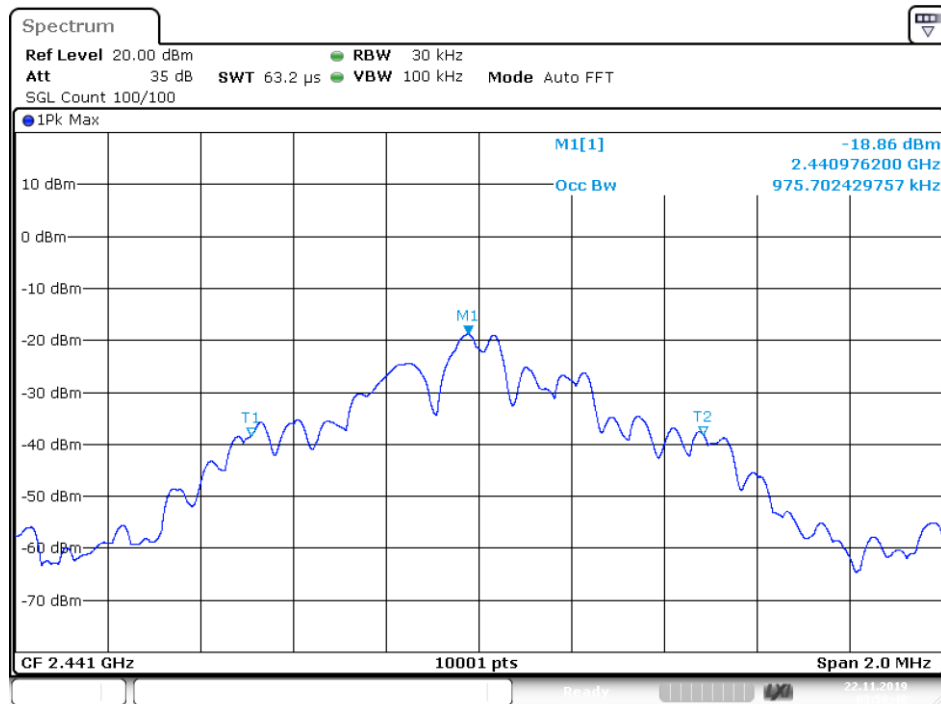
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-20 dB BW NVNT 3-DH1 2402MHz Ant1



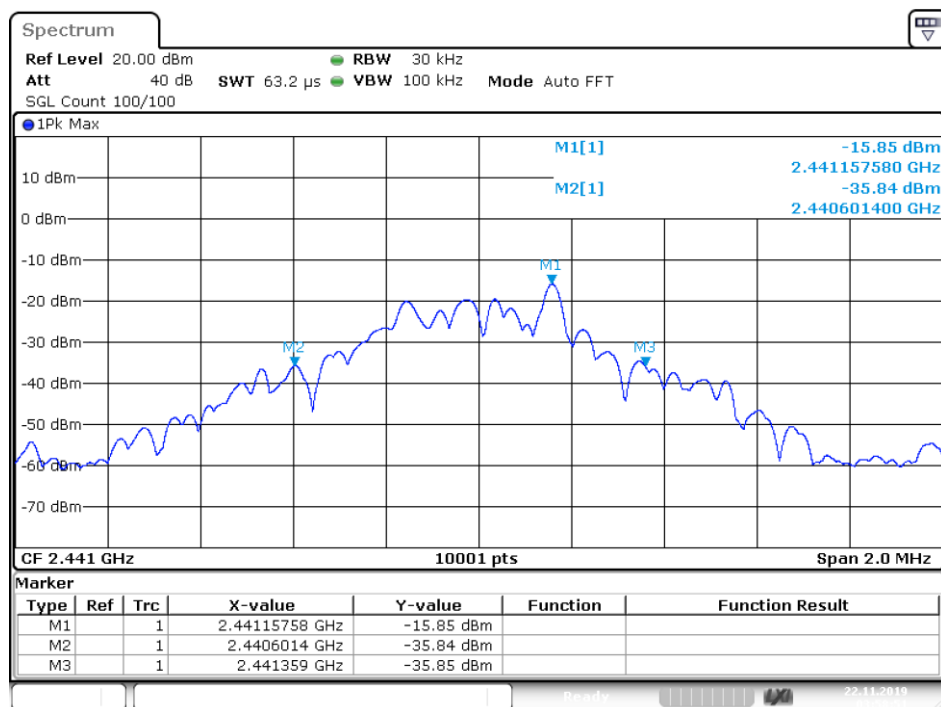
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OBW NVNT 3-DH1 2441MHz Ant1



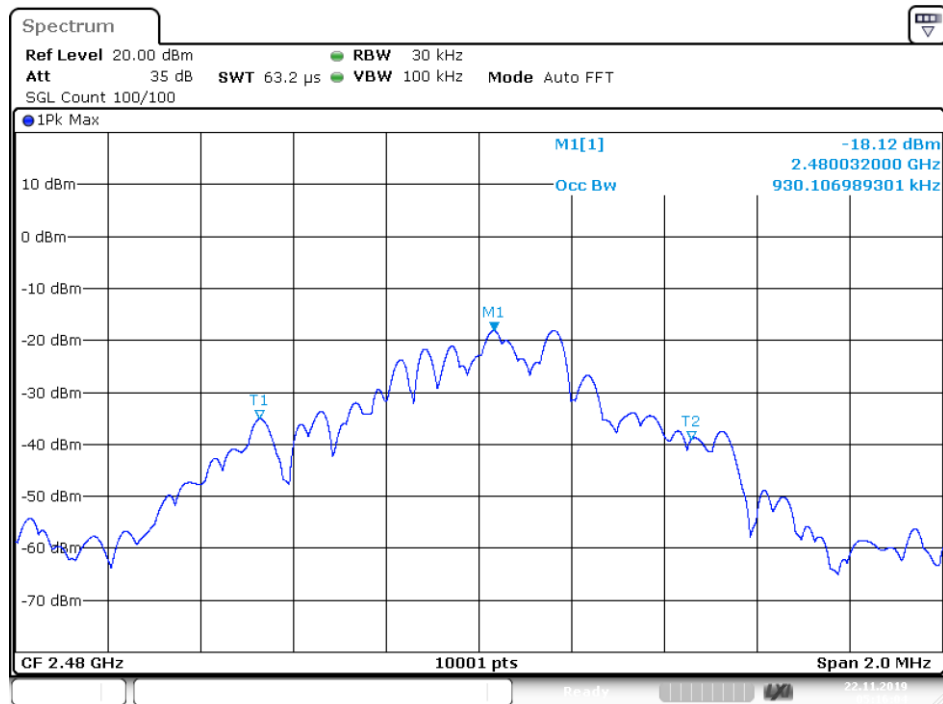
Date: 22.NOV.2019 03:58:48

-20 dB BW NVNT 3-DH1 2441MHz Ant1



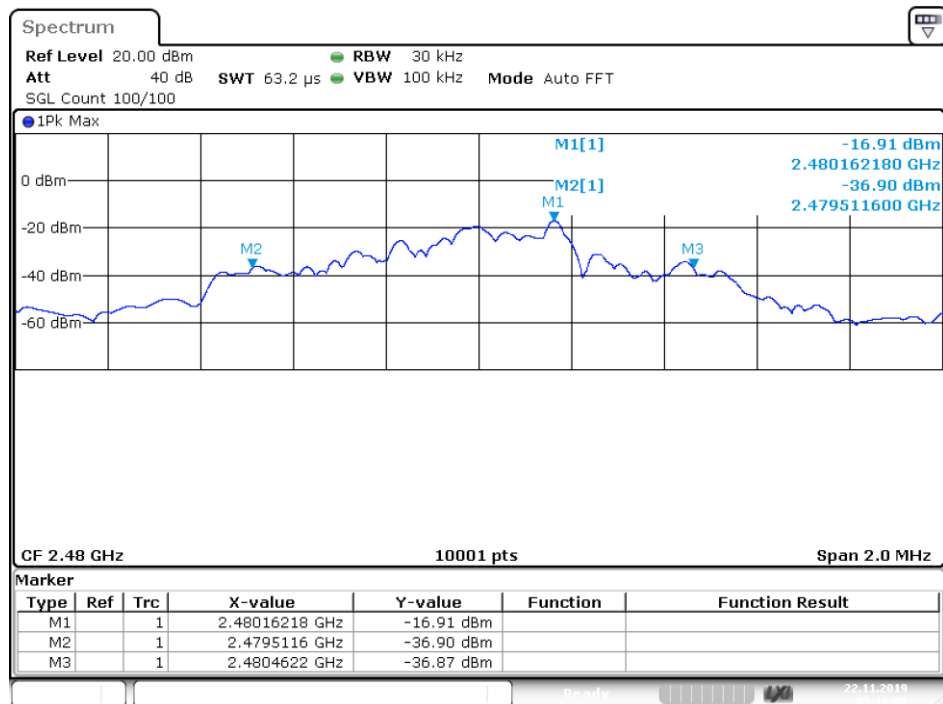
Date: 22.NOV.2019 03:58:51

OBW NVNT 3-DH1 2480MHz Ant1



Date: 22.NOV.2019 05:16:05

-20 dB BW NVNT 3-DH1 2480MHz Ant1



Date: 22.NOV.2019 05:16:08

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

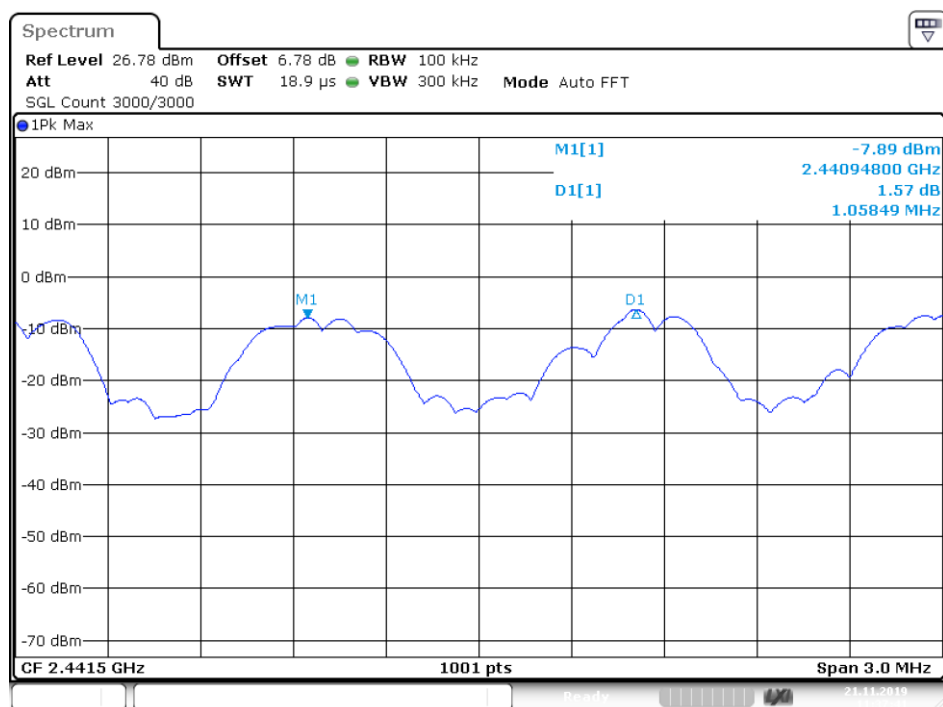
5.2.Test Procedure

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 100kHz RBW and 300kHz VBW.

5.3.Test Result

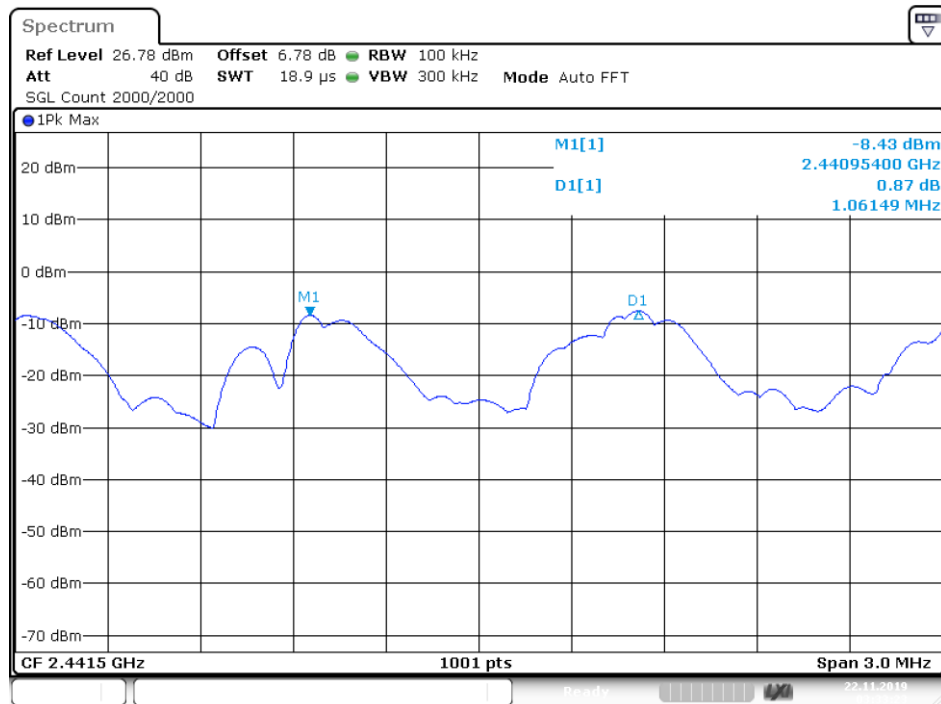
Condition	Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH1	2440.948	2442.007	1.059	0.667	Pass
NVNT	2-DH1	2440.954	2442.016	1.062	0.688	Pass
NVNT	3-DH1	2440.999	2442.004	1.005	0.505	Pass

CFS NVNT 1-DH1 2441MHz



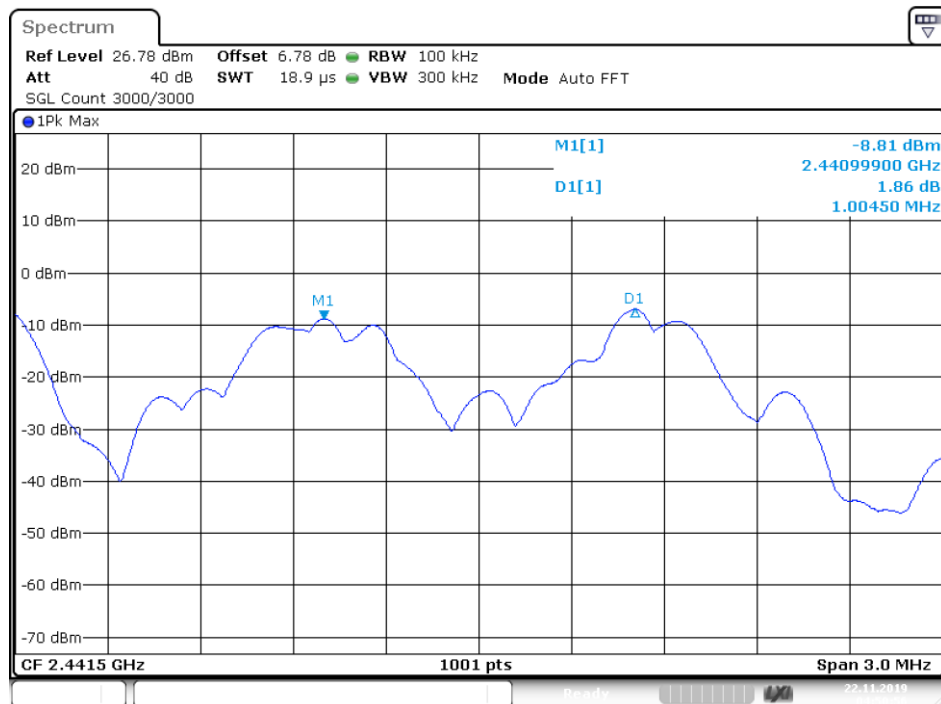
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CFS NVNT 2-DH1 2441MHz



Date: 22.NOV.2019 03:33:23

CFS NVNT 3-DH1 2441MHz



Date: 22.NOV.2019 04:50:55

6. NUMBER OF HOPPING CHANNEL

6.1.Limit

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

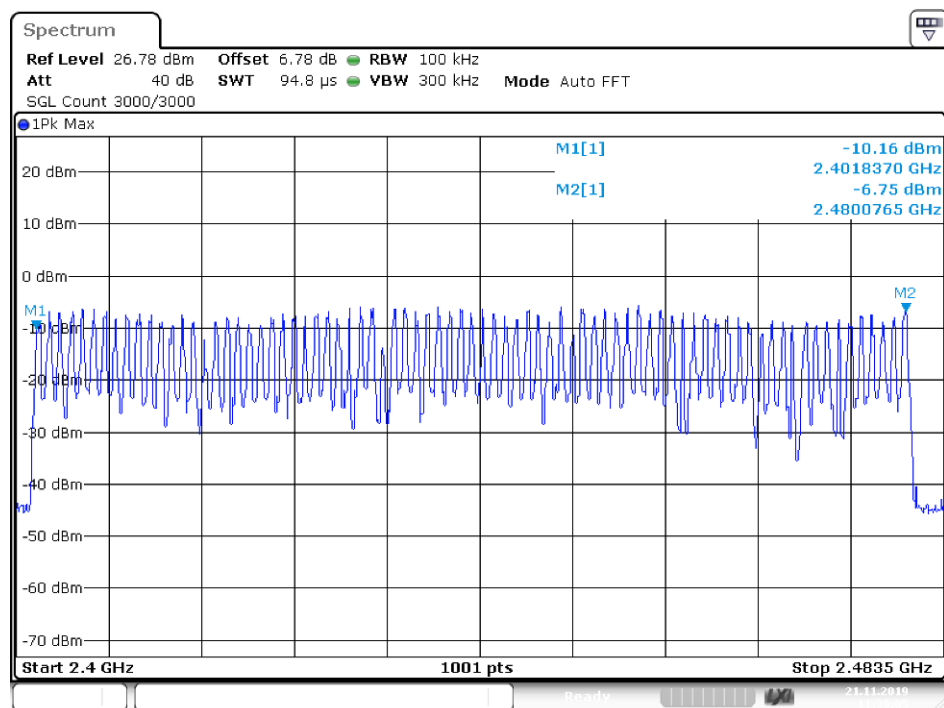
6.2.Test Procedure

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

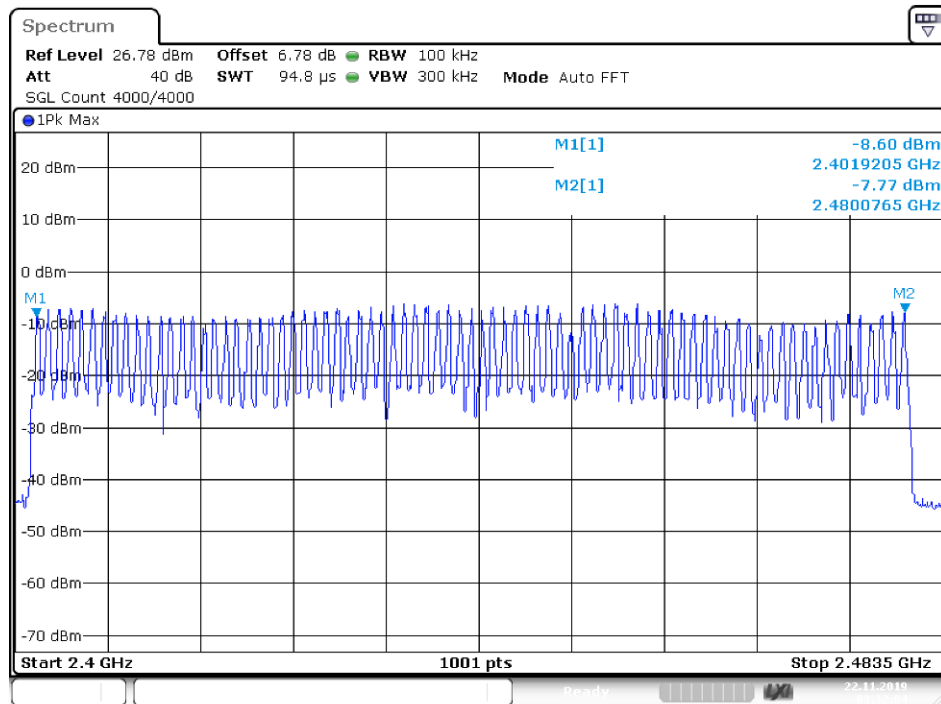
Condition	Mode	Hopping Number	Limit	Verdict
NVNT	1-DH1	79	15	Pass
NVNT	2-DH1	79	15	Pass
NVNT	3-DH1	79	15	Pass

Hopping No. NVNT 1-DH1 2441MHz



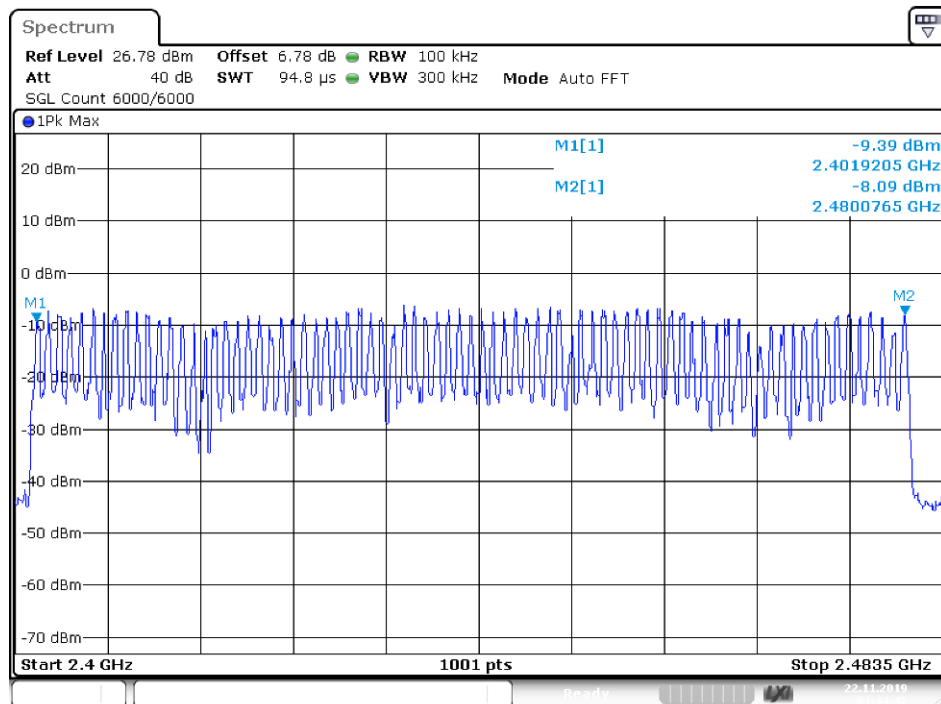
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Hopping No. NVNT 2-DH1 2441MHz



Date: 22.NOV.2019 03:32:04

Hopping No. NVNT 3-DH1 2441MHz



Date: 22.NOV.2019 04:44:42

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=1MHz, VBW=3MHz, Span = 0Hz, Sweep = auto.

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

7.3. Test Result

PASS.

Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2402	0.166	52.614	31600	400	Pass
NVNT	1-DH1	2441	0.166	52.614	31600	400	Pass
NVNT	1-DH1	2480	0.166	52.614	31600	400	Pass
NVNT	1-DH3	2441	0.175	27.587	31600	400	Pass
NVNT	1-DH5	2441	0.174	16.467	31600	400	Pass
NVNT	2-DH1	2402	0.166	52.614	31600	400	Pass
NVNT	2-DH1	2441	0.166	52.614	31600	400	Pass
NVNT	2-DH1	2480	0.166	52.614	31600	400	Pass
NVNT	2-DH3	2441	0.202	31.948	31600	400	Pass
NVNT	2-DH5	2441	0.202	19.112	31600	400	Pass
NVNT	3-DH1	2402	0.202	63.99	31600	400	Pass
NVNT	3-DH1	2441	0.202	63.99	31600	400	Pass
NVNT	3-DH1	2480	0.202	63.99	31600	400	Pass
NVNT	3-DH3	2441	0.175	27.587	31600	400	Pass
NVNT	3-DH5	2441	0.174	16.467	31600	400	Pass

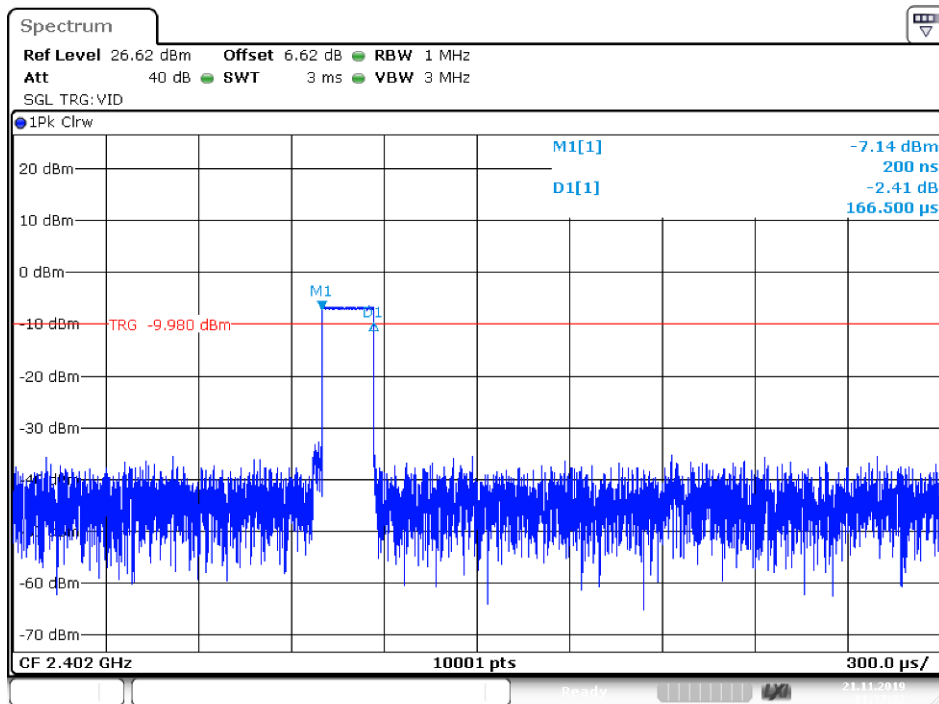
Note: 1. A period time = $0.4 \text{ (s)} * 79 = 31.6 \text{ (s)}$

2. DH1 time slot = Pulse Duration * $(1600/(2*79))$ * A period time

DH3 time slot = Pulse Duration * $(1600/(4*79))$ * A period time

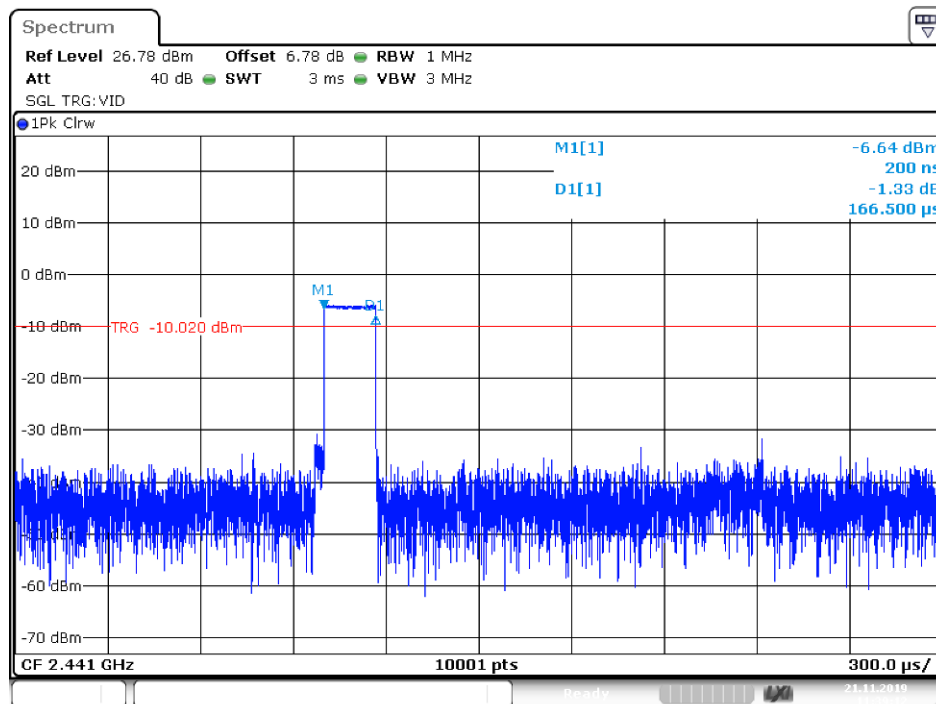
DH5 time slot = Pulse Duration * $(1600/(6*79))$ * A period time

Dwell NVNT 1-DH1 2402MHz



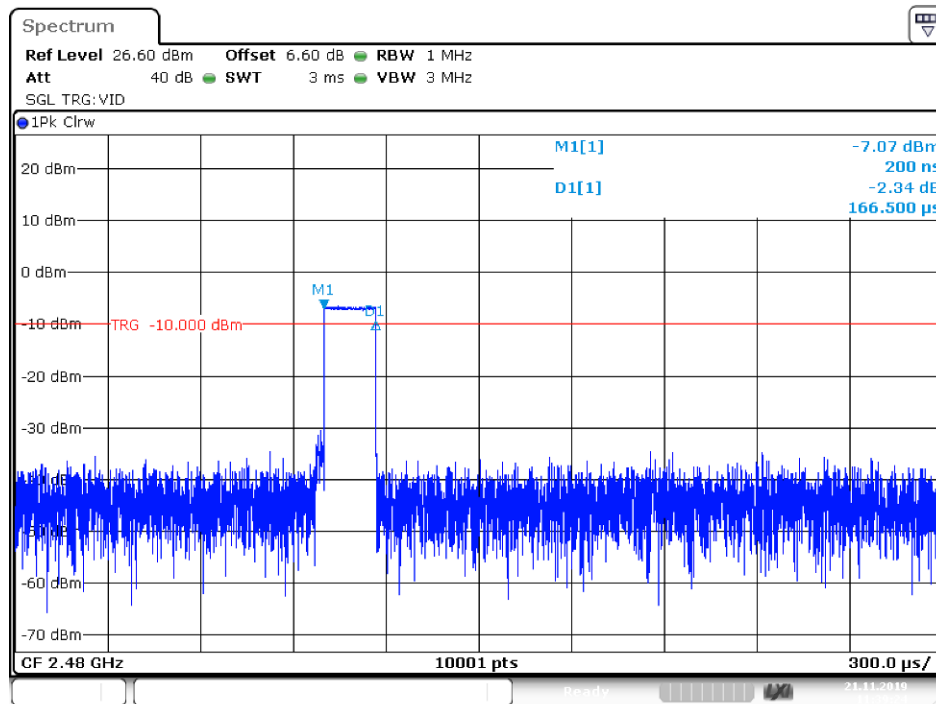
Date: 21.NOV.2019 11:37:22

Dwell NVNT 1-DH1 2441MHz



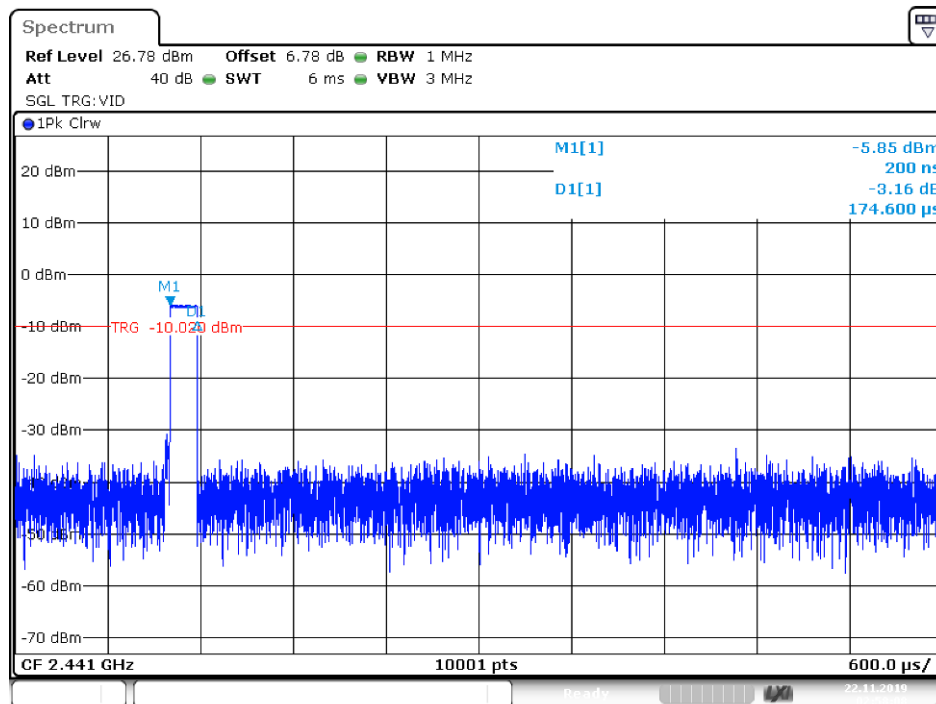
Date: 21.NOV.2019 11:39:12

Dwell NVNT 1-DH1 2480MHz



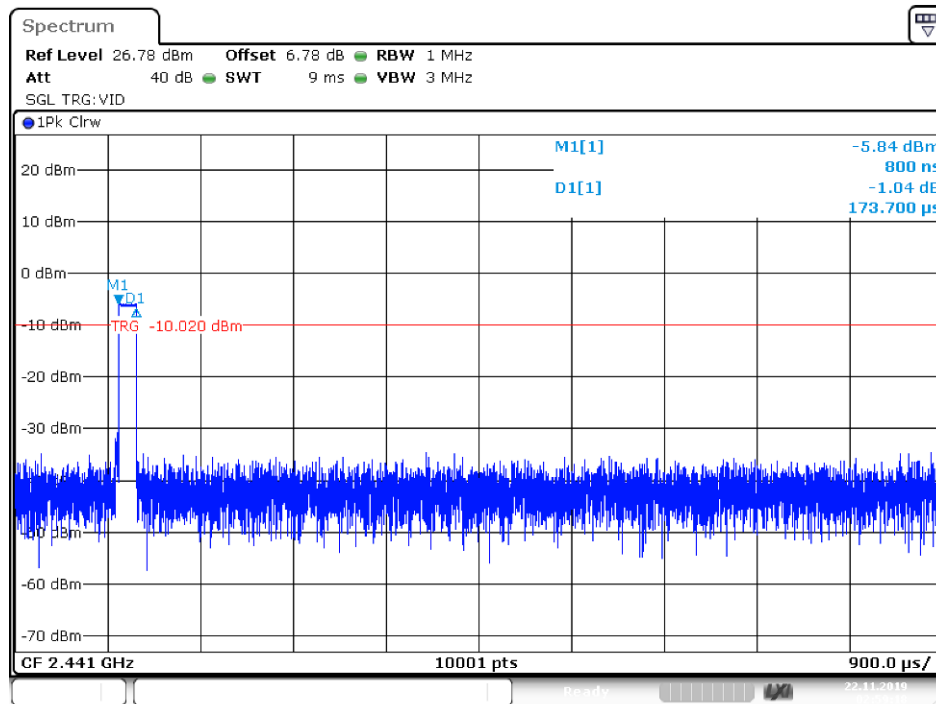
Date: 21.NOV.2019 11:39:24

Dwell NVNT 1-DH3 2441MHz



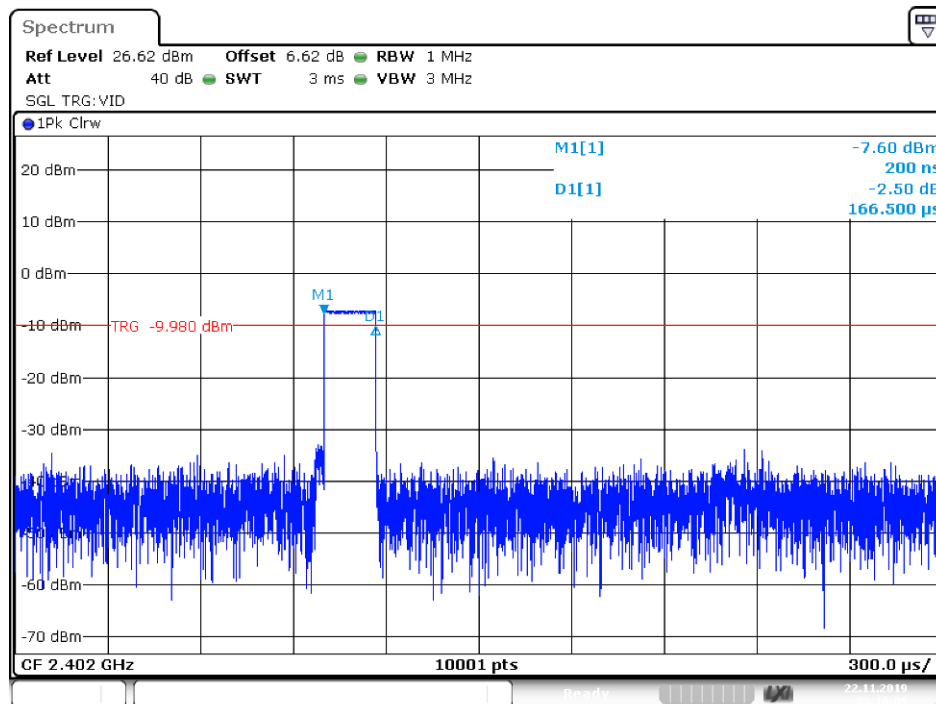
Date: 22.NOV.2019 02:58:07

Dwell NVNT 1-DH5 2441MHz



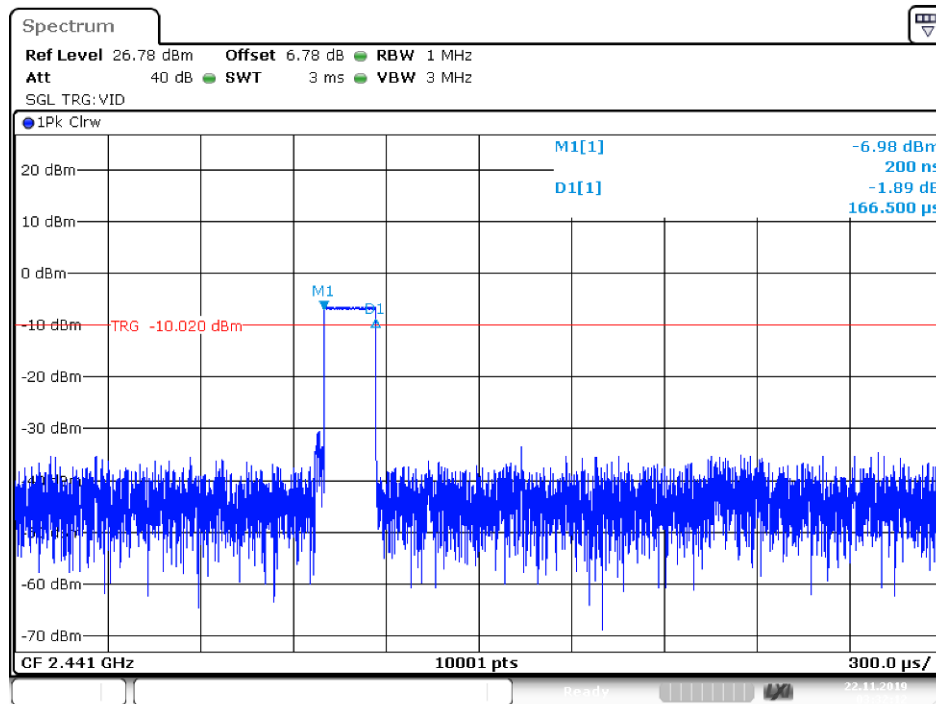
Date: 22.NOV.2019 02:59:17

Dwell NVNT 2-DH1 2402MHz



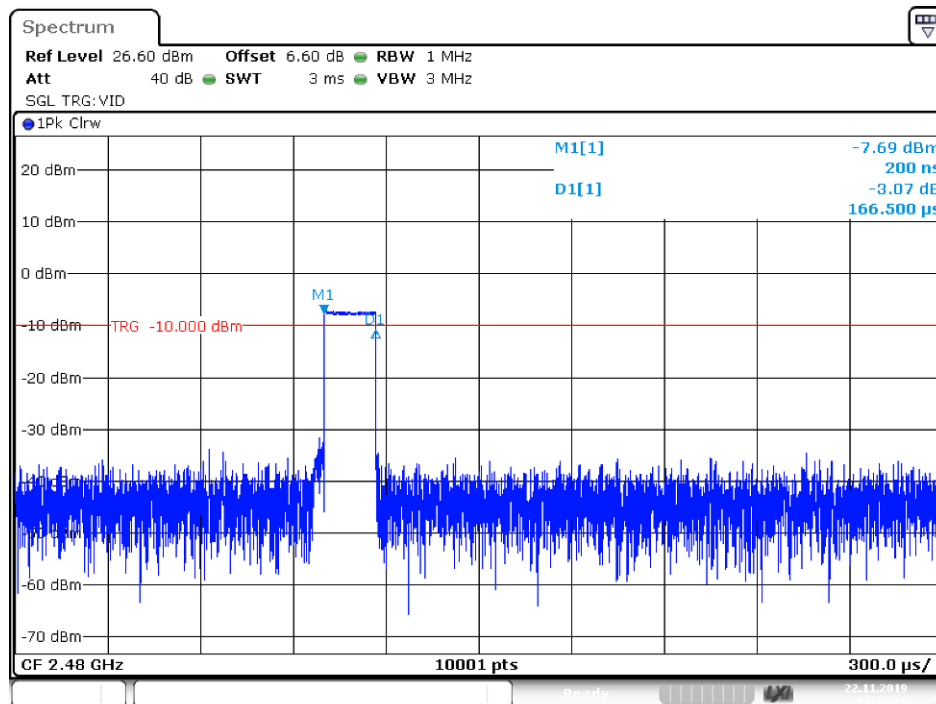
Date: 22.NOV.2019 03:10:09

Dwell NVNT 2-DH1 2441MHz



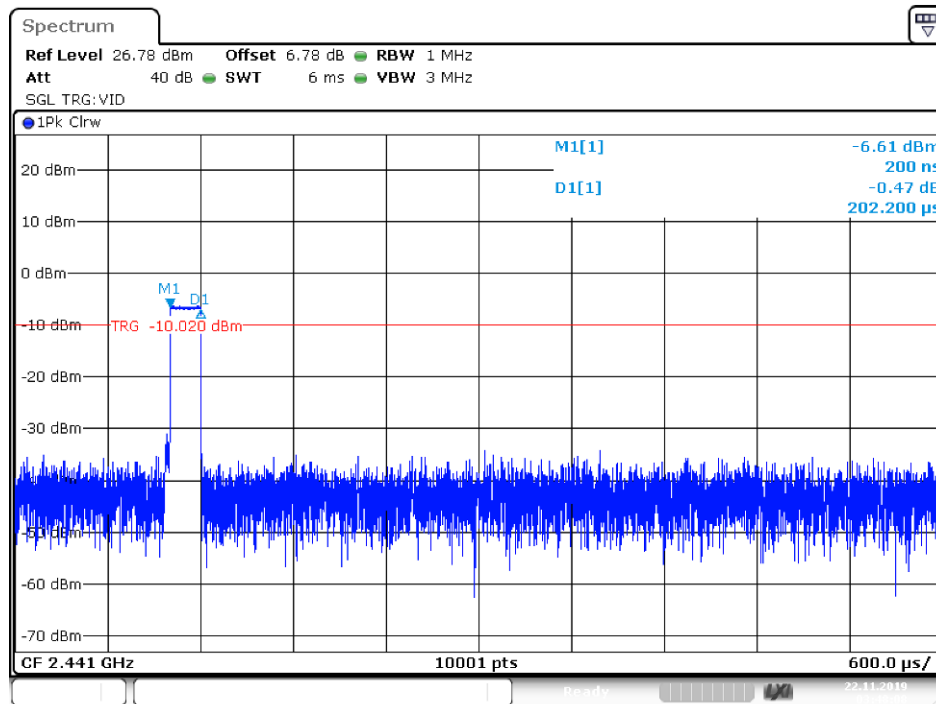
Date: 22.NOV.2019 03:32:12

Dwell NVNT 2-DH1 2480MHz



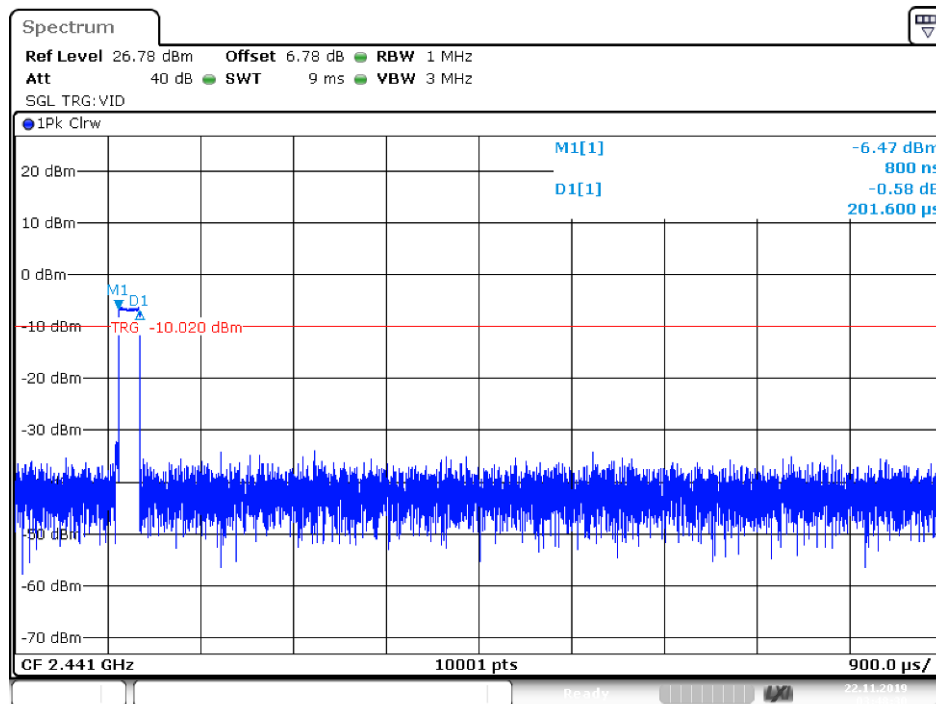
Date: 22.NOV.2019 03:35:26

Dwell NVNT 2-DH3 2441MHz



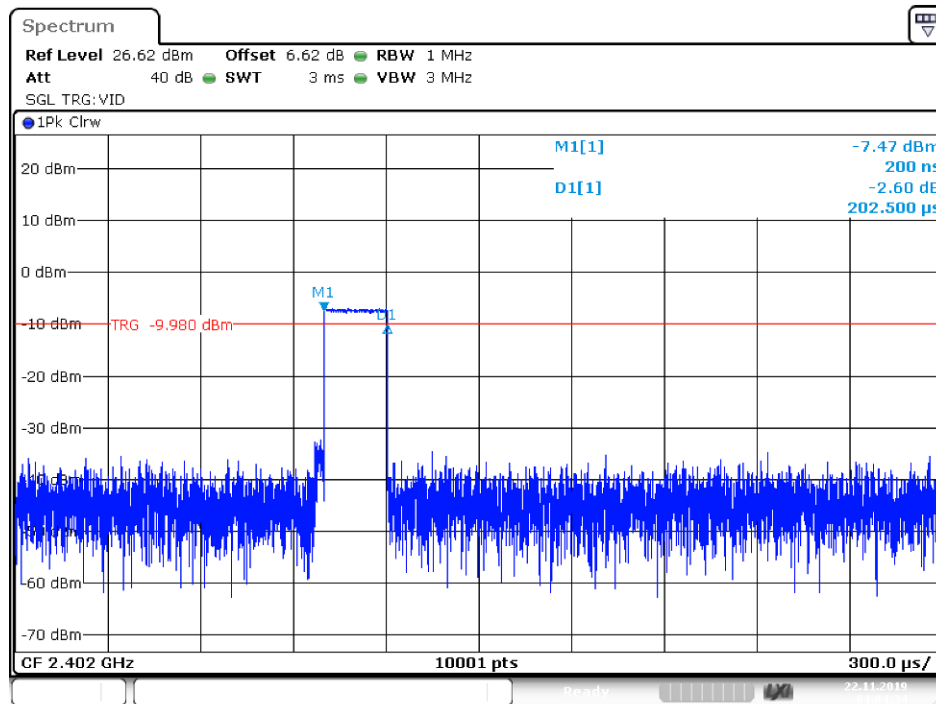
Date: 22.NOV.2019 03:48:08

Dwell NVNT 2-DH5 2441MHz



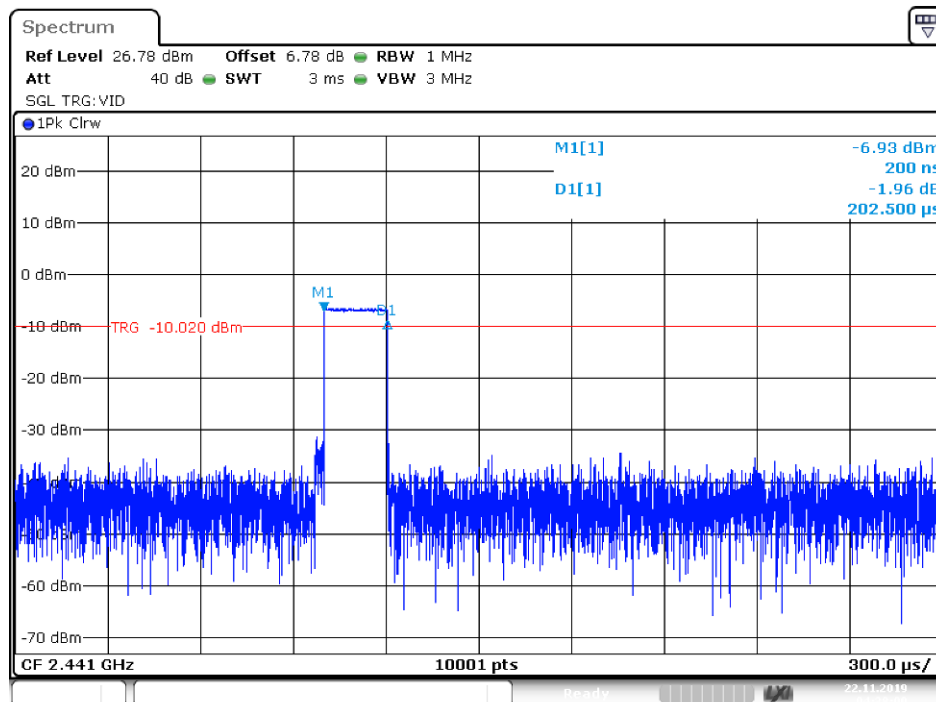
Date: 22.NOV.2019 03:48:30

Dwell NVNT 3-DH1 2402MHz



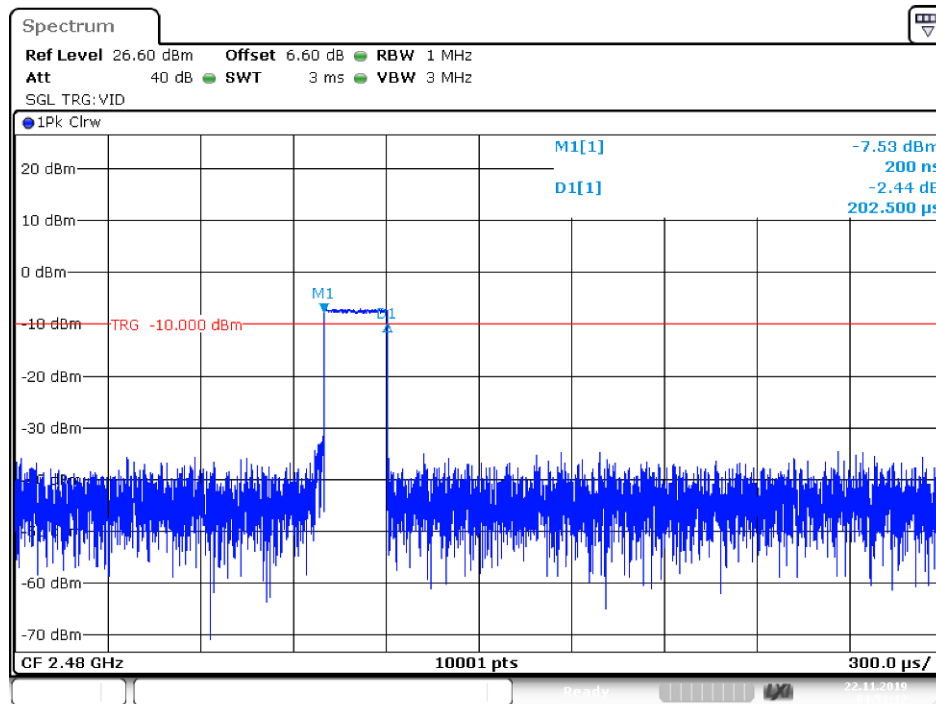
Date: 22.NOV.2019 04:04:33

Dwell NVNT 3-DH1 2441MHz



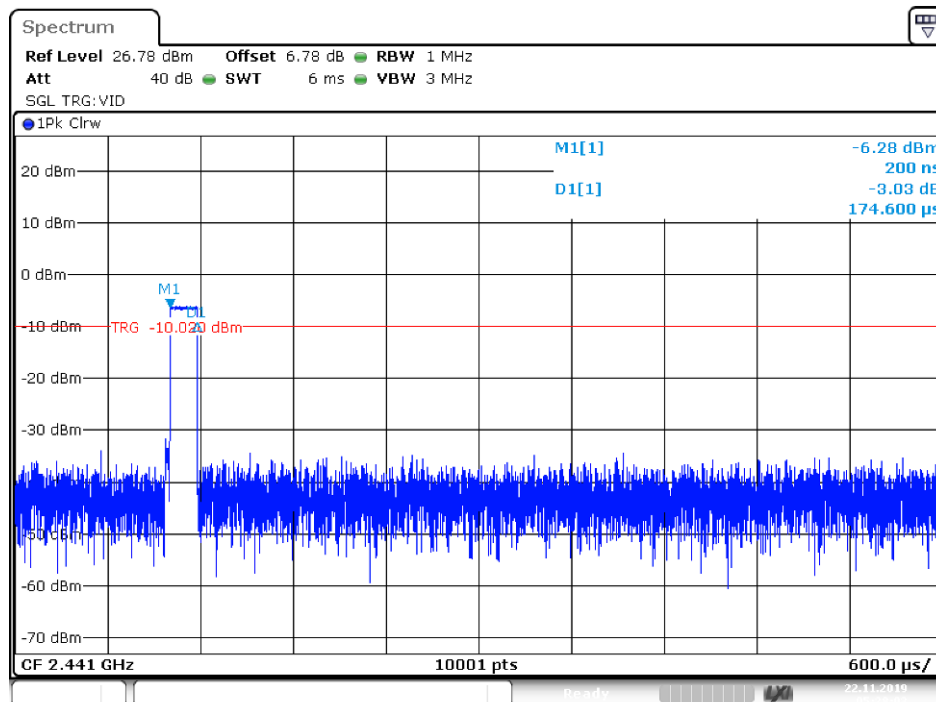
Date: 22.NOV.2019 04:38:00

Dwell NVNT 3-DH1 2480MHz



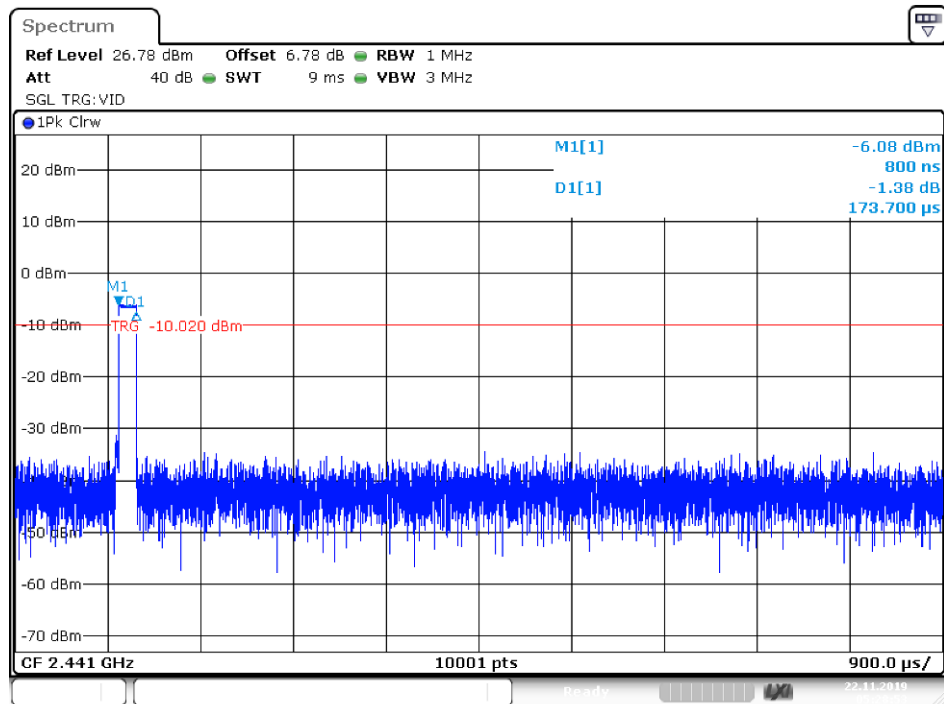
Date: 22.NOV.2019 04:51:11

Dwell NVNT 3-DH3 2441MHz



Date: 22.NOV.2019 05:28:04

Dwell NVNT 3-DH5 2441MHz



Date: 22.NOV.2019 05:28:53

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

Table 5 – General field strength limits at frequencies above 30 MHz	
Frequency (MHz)	Field strength (µV/m at 3 m)
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Table 6 – General field strength limits at frequencies below 30 MHz		
Frequency	Magnetic field strength (H-Field) (µA/m)	Measurement distance (m)
9 - 490 kHz ^{Note 1}	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

RSS-GEN Restricted frequency band

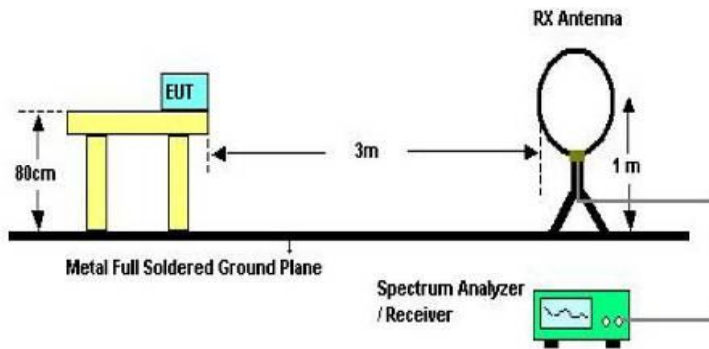
Table 7 – Restricted frequency bands ^{Note 1}		
MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 – 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12

6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 – 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 – 8500	
108 – 138		

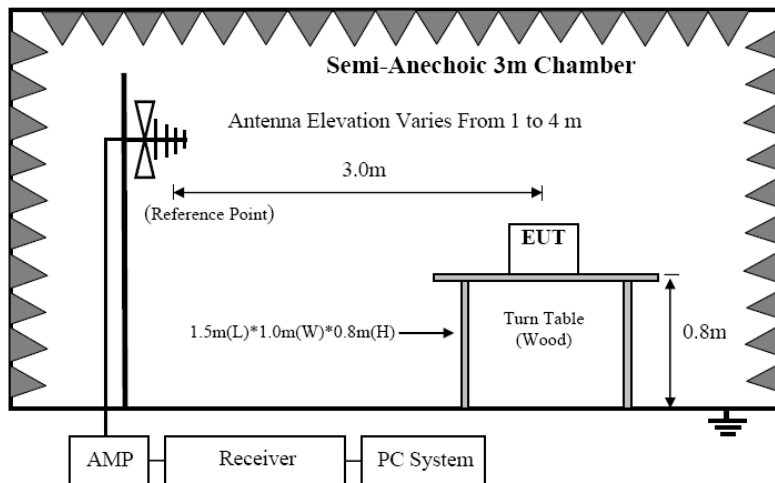
Note 1: Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

8.2. Block Diagram of Test setup

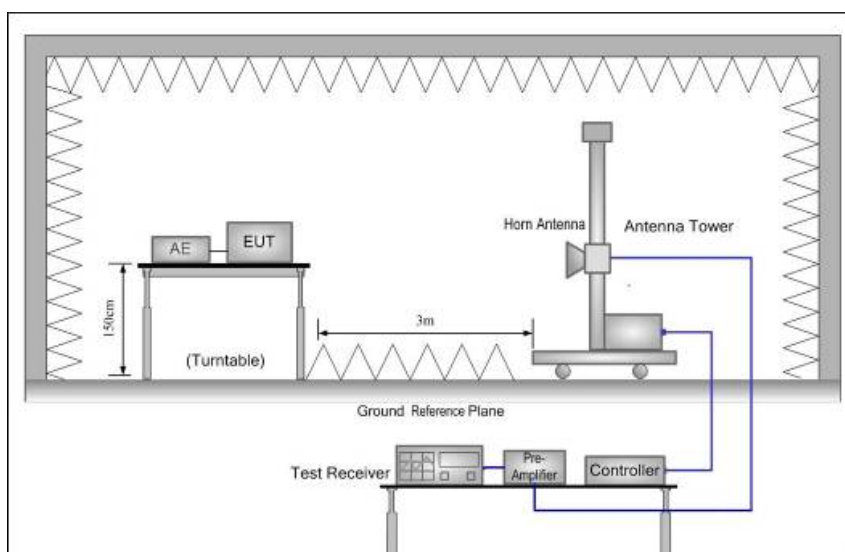
8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 30MHz



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

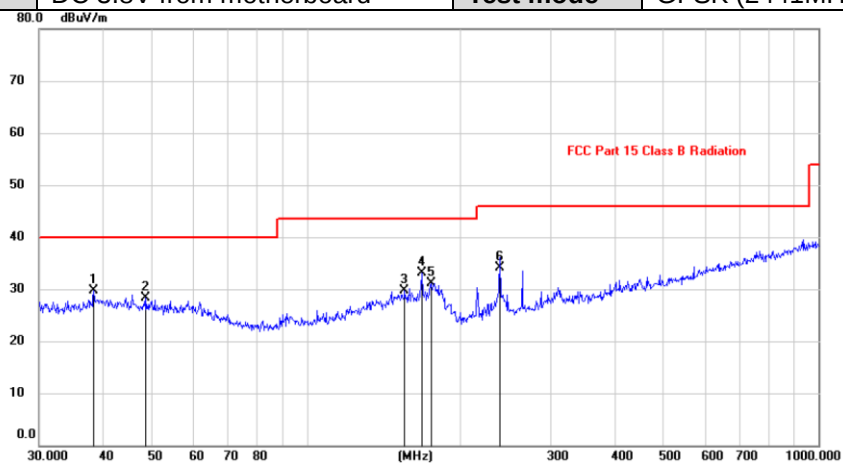
We have scanned the 10th harmonic from 9KHz to the EUT's highest frequency..
Detailed information please see the following page.

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.

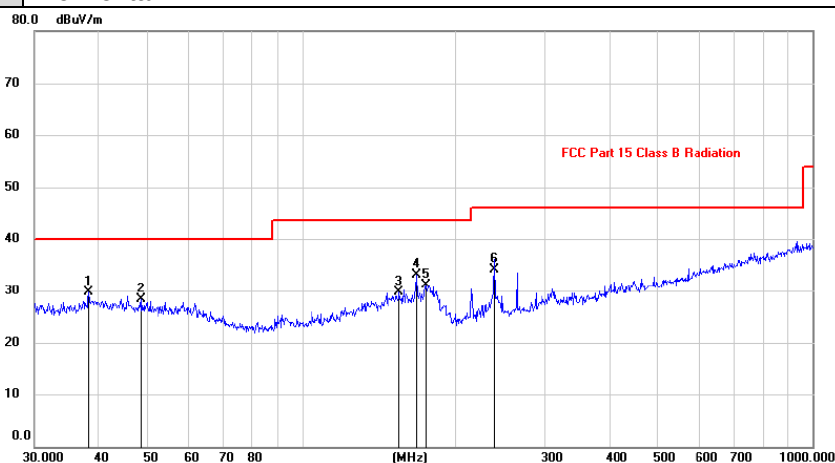
From 30MHz to 1000MHz: Conclusion: PASS

EUT Description	Communication Module	Model No.	GEBW2455A
Temperature	24°C	Humidity	56%
Pol	Vertical	Test date	2019/11/11
Test Voltage	DC 3.8V from motherboard	Test mode	GFSK (2441MHz)



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1	*	38.3631	15.54	14.25	29.79	40.00	-10.21	peak		
2		48.5653	14.26	14.01	28.27	40.00	-11.73	peak		
3		155.7734	14.65	14.99	29.64	43.50	-13.86	peak		
4		168.0449	18.82	14.25	33.07	43.50	-10.43	peak		
5		175.3437	17.92	13.28	31.20	43.50	-12.30	peak		
6		239.0425	21.64	12.52	34.16	46.00	-11.84	QP		

Pol	Horizontal
------------	------------



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1	*	38.3631	15.54	14.25	29.79	40.00	-10.21	peak		
2		48.5653	14.26	14.01	28.27	40.00	-11.73	peak		
3		155.7734	14.65	14.99	29.64	43.50	-13.86	peak		
4		168.0449	18.82	14.25	33.07	43.50	-10.43	peak		
5		175.3437	17.92	13.28	31.20	43.50	-12.30	peak		
6		239.0425	21.64	12.52	34.16	46.00	-11.84	QP		

*: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 (2441MHz) was listed in this report.

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	45.63	V	33.95	10.18	34.26	55.50	74	18.50	PK
4804	38.52	V	33.95	10.18	34.26	48.39	54	5.61	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	44.79	H	33.95	10.18	34.26	54.66	74	19.34	PK
4804	34.98	H	33.95	10.18	34.26	44.85	54	9.15	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: GFSK TX Mid									
4882	44.87	V	33.93	10.2	34.29	54.71	74	19.29	PK
4882	36.63	V	33.93	10.2	34.29	46.47	54	7.53	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
4882	45.21	H	33.93	10.2	34.29	55.05	74	18.95	PK
4882	35.29	H	33.93	10.2	34.29	45.13	54	8.87	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
Test Mode: GFSK TX High									
4960	43.79	V	33.98	10.22	34.25	53.74	74	20.26	PK
4960	33.90	V	33.98	10.22	34.25	43.85	54	10.15	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	43.26	H	33.98	10.22	34.25	53.21	74	20.79	PK
4960	34.42	H	33.98	10.22	34.25	44.37	54	9.63	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.									

Test Mode: π /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	48.06	V	33.95	10.18	34.26	57.93	74	16.07	PK
4804	36.54	V	33.95	10.18	34.26	46.41	54	7.59	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	46.09	H	33.95	10.18	34.26	55.96	74	18.04	PK
4804	34.46	H	33.95	10.18	34.26	44.33	54	9.67	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: π /4 DQPSK TX Mid									
4882	43.39	V	33.93	10.2	34.29	53.23	74	20.77	PK
4882	36.60	V	33.93	10.2	34.29	46.44	54	7.56	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
4882	45.95	H	33.93	10.2	34.29	55.79	74	18.21	PK
4882	33.01	H	33.93	10.2	34.29	42.85	54	11.15	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
Test Mode: π /4 DQPSK TX High									
4960	46.12	V	33.98	10.22	34.25	56.07	74	17.93	PK
4960	34.93	V	33.98	10.22	34.25	44.88	54	9.12	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	45.00	H	33.98	10.22	34.25	54.95	74	19.05	PK
4960	35.20	H	33.98	10.22	34.25	45.15	54	8.85	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.

Test Mode: 8- 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	45.32	V	33.95	10.18	34.26	55.19	74	18.81	PK
4804	35.62	V	33.95	10.18	34.26	45.49	54	8.51	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	45.94	H	33.95	10.18	34.26	55.81	74	18.19	PK
4804	36.34	H	33.95	10.18	34.26	46.21	54	7.79	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: 8- DQPSK TX Mid									
4882	43.92	V	33.93	10.2	34.29	53.76	74	20.24	PK
4882	35.98	V	33.93	10.2	34.29	45.82	54	8.18	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
4882	43.16	H	33.93	10.2	34.29	53.00	74	21.00	PK
4882	36.24	H	33.93	10.2	34.29	46.08	54	7.92	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
Test Mode: 8- DQPSK TX High									
4960	44.67	V	33.98	10.22	34.25	54.62	74	19.38	PK
4960	33.77	V	33.98	10.22	34.25	43.72	54	10.28	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	41.76	H	33.98	10.22	34.25	51.71	74	22.29	PK
4960	32.90	H	33.98	10.22	34.25	42.85	54	11.15	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/

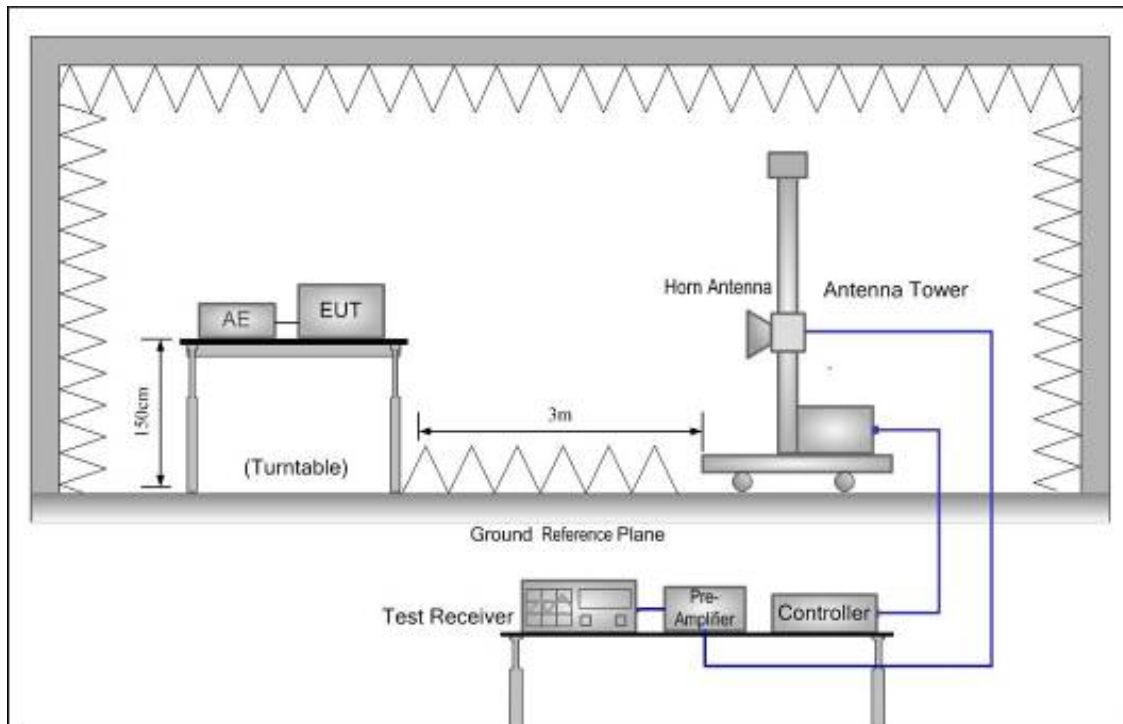
Note:

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.

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 FCC part 15.209 and RSS-GEN, all the other emissions outside operation shall be at least 20dB below the fundamental emissions, or comply with FCC part 15.209 and RSS-GEN limits.

9.3. Test Procedure

Refer to ANSI C 63.10, Clause 6.10.

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)

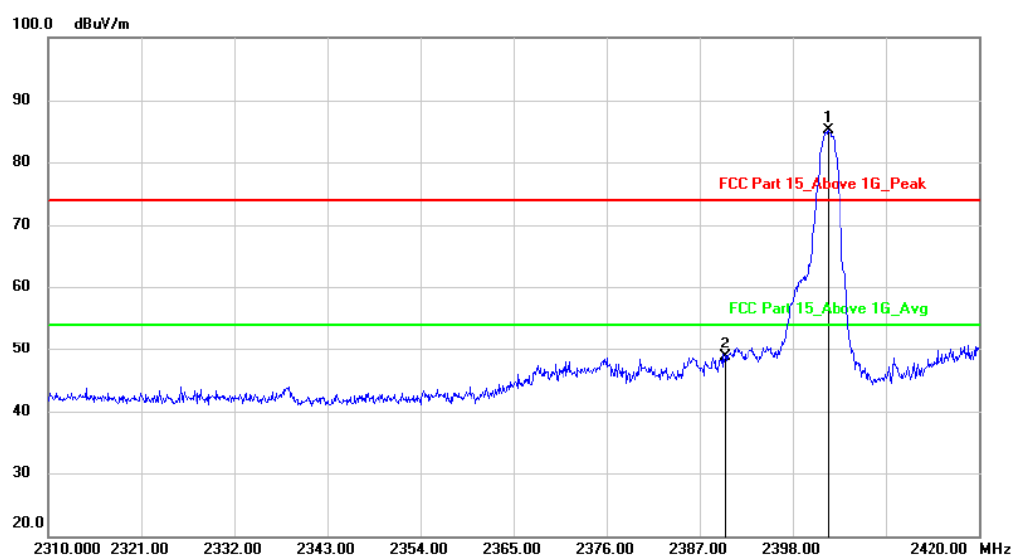
Radiated Method:

Hopping-off

Polarization: Vertical

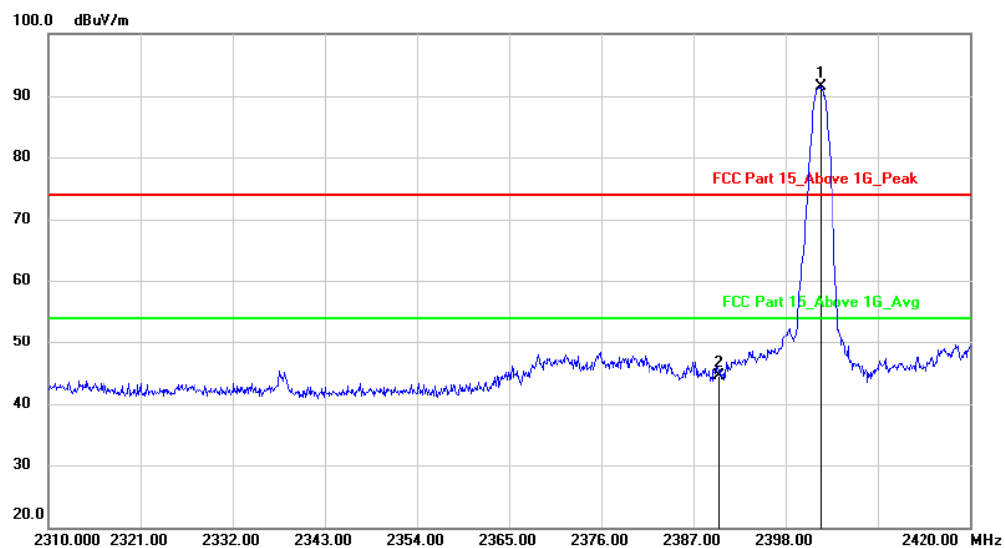
Test Mode:

GFSK-Low



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2402.180	88.51	-3.41	85.10	74.00	11.10	peak		
2		2390.000	52.01	-3.40	48.61	74.00	-25.39	peak		

Polarization: Horizontal

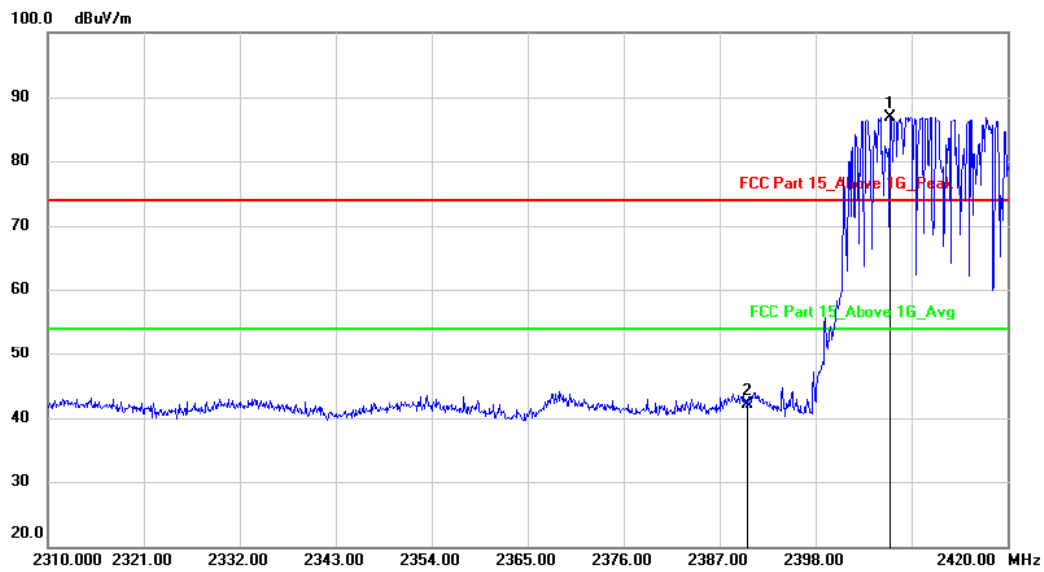


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2402.180	94.93	-3.41	91.52	74.00	17.52	peak		
2		2390.000	47.95	-3.40	44.55	74.00	-29.45	peak		

Hopping-on

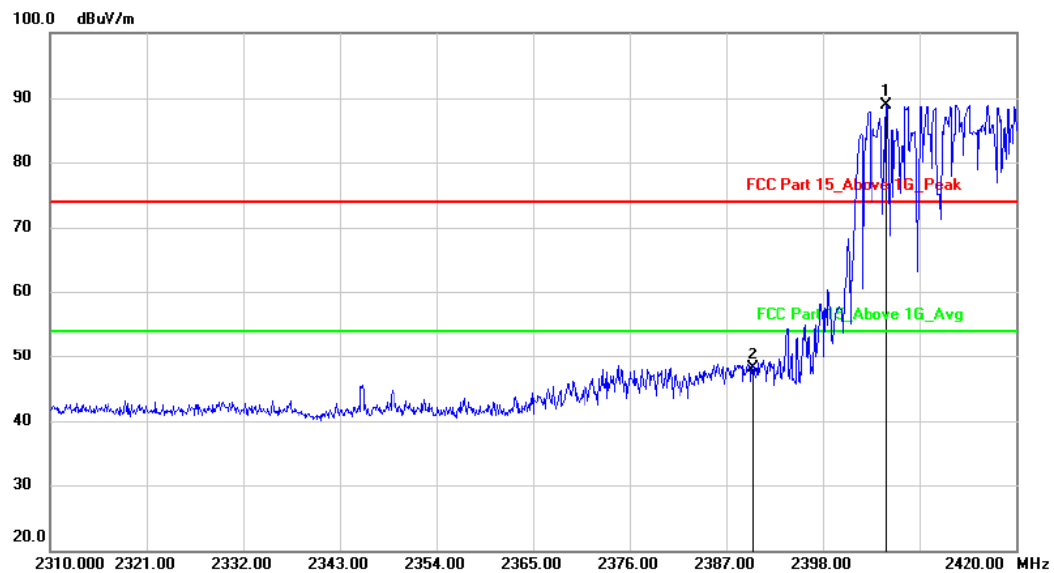
Polarization: Vertical

Test Mode: GFSK-Low



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	*	2406.580	90.37	-3.41	86.96	74.00	12.96	peak		
2		2390.000	45.47	-3.40	42.07	74.00	-31.93	peak		

Polarization: Horizontal

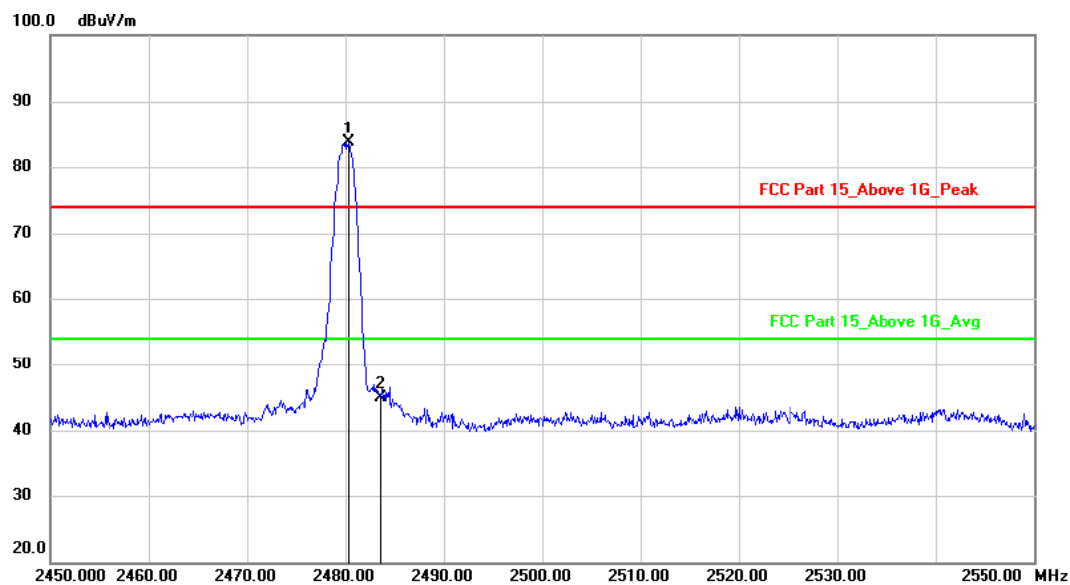


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2405.260	92.35	-3.41	88.94	74.00	14.94	peak		
2		2390.000	51.46	-3.40	48.06	74.00	-25.94	peak		

Hopping-off

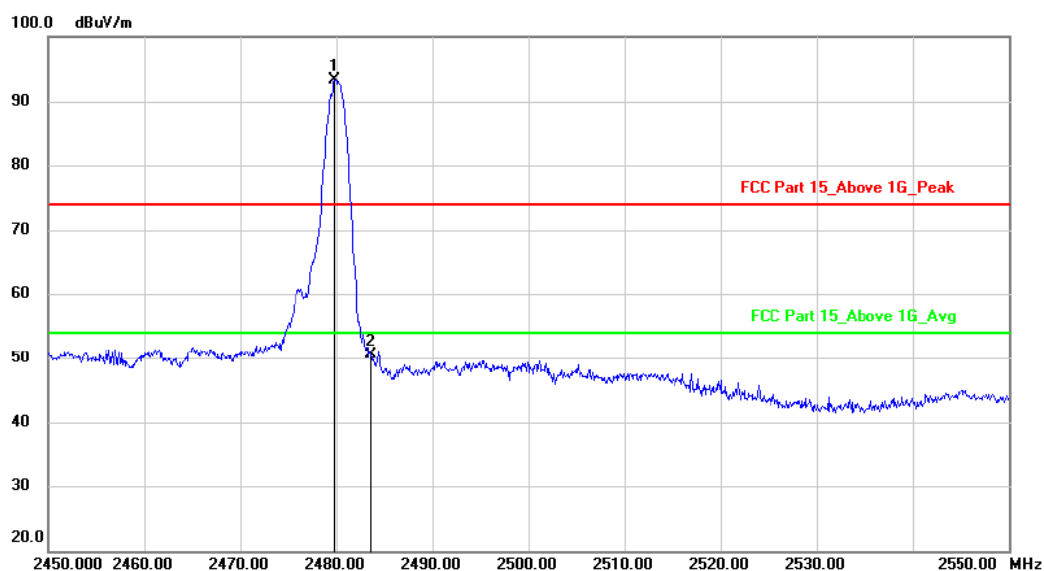
Polarization: Vertical

Test Mode: GFSK-High



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2480.300	86.99	-3.38	83.61	74.00	9.61	peak		
2		2483.500	48.36	-3.38	44.98	74.00	-29.02	peak		

Polarization: Horizontal



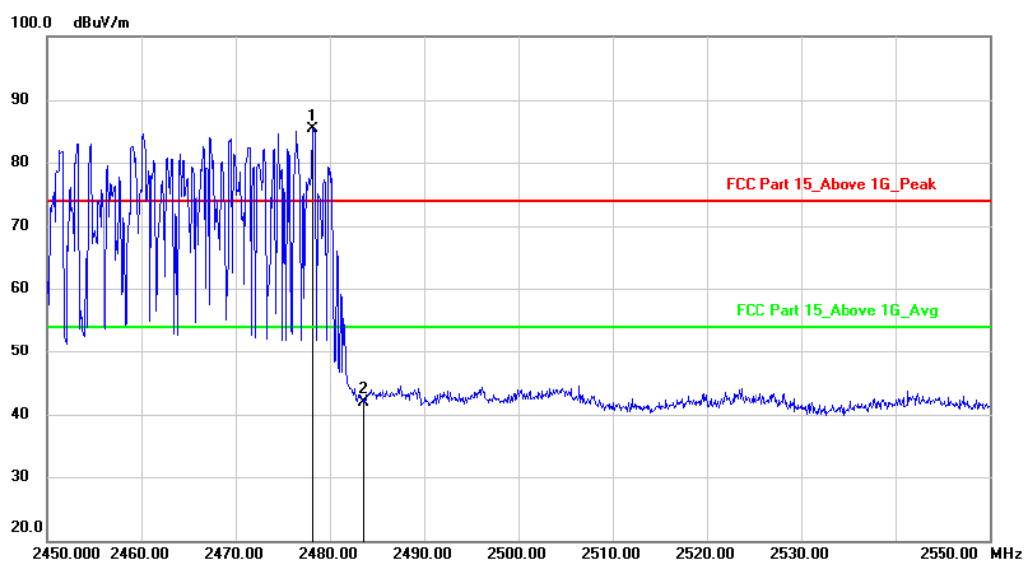
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2479.800	96.66	-3.38	93.28	74.00	19.28	peak		
2		2483.500	53.82	-3.38	50.44	74.00	-23.56	peak		

Hopping-on

Polarization: Vertical

Test Mode:

GFSK-High

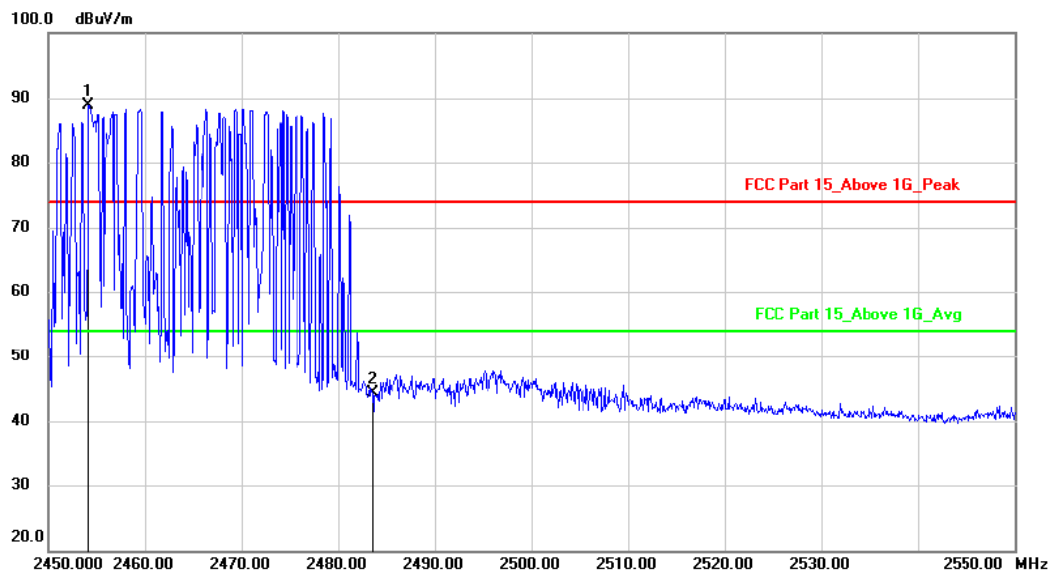


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	dBuV	Factor	ment			Height	Degree	
					dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2478.200	88.72	-3.39	85.33	74.00	11.33	peak		
2		2483.500	45.26	-3.38	41.88	74.00	-32.12	peak		

Polarization: Horizontal

Test Mode:

GFSK-High

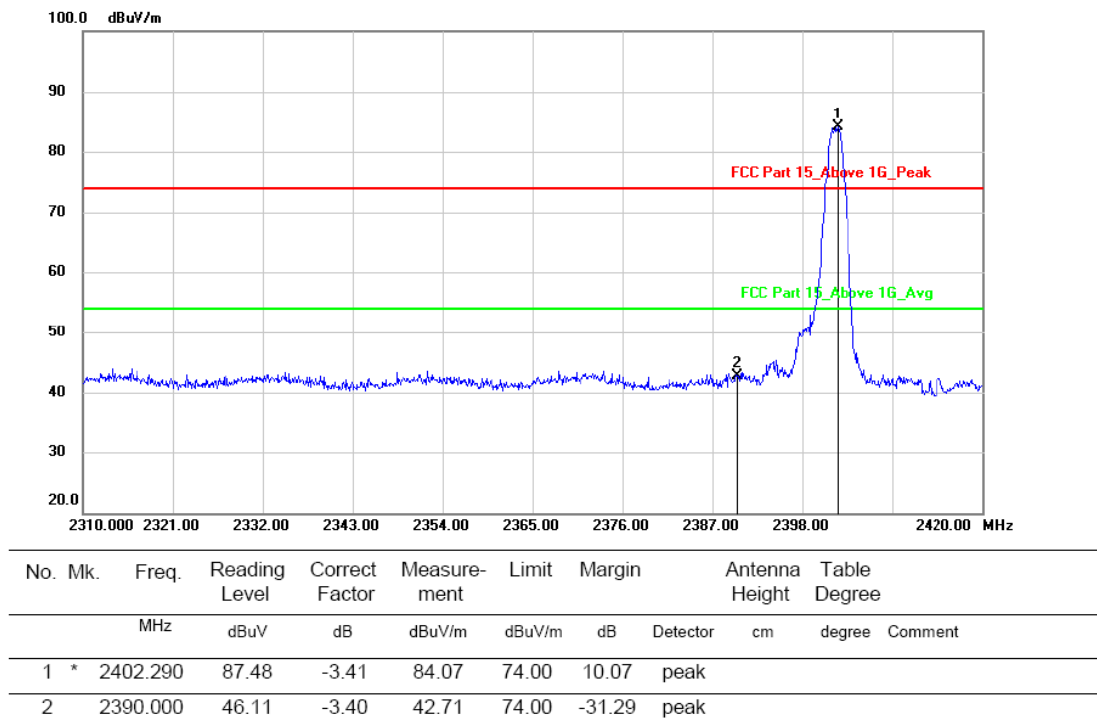


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	dBuV	Factor	ment			Height	Degree	
					dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2454.100	92.28	-3.39	88.89	74.00	14.89	peak		
2		2483.500	47.67	-3.38	44.29	74.00	-29.71	peak		

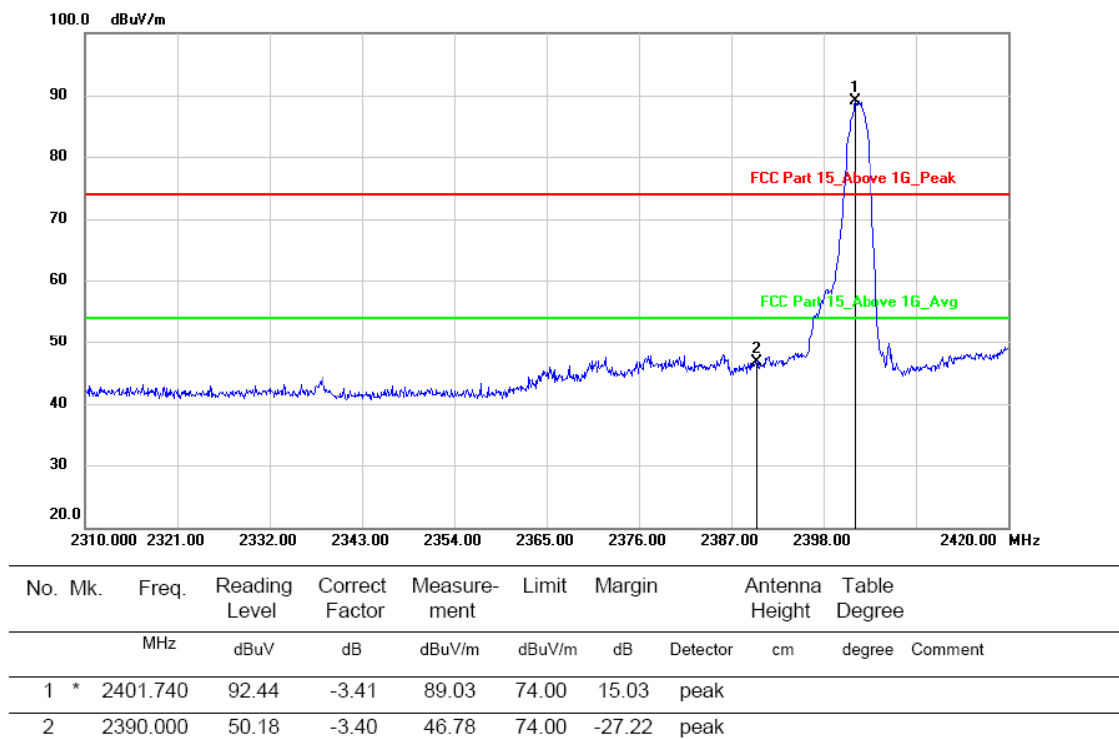
hopping-on

Hopping-off

Polarization: Vertical

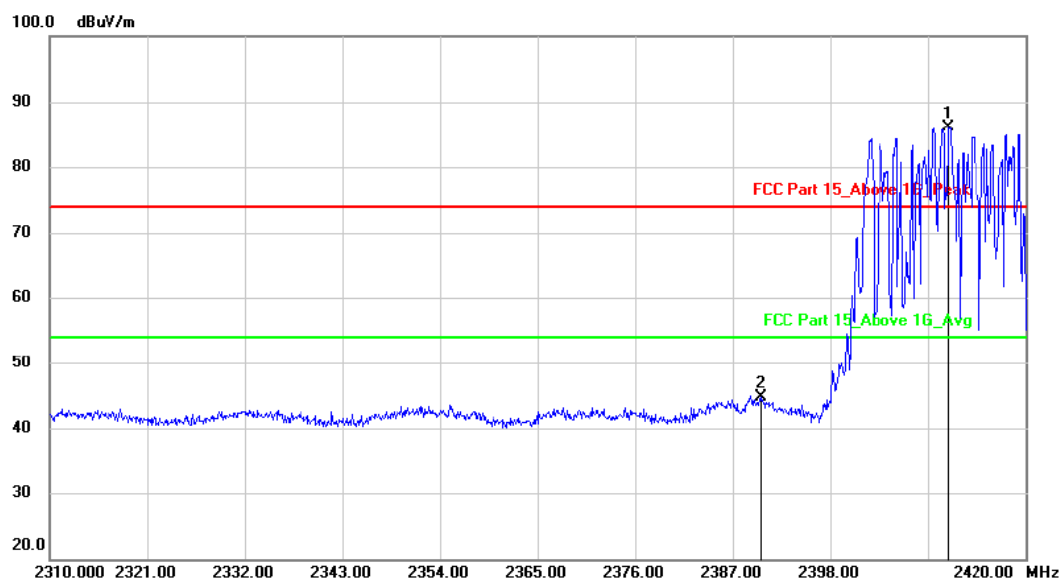
Test Mode: $\pi/4$ DQPSK -Low

Polarization: Horizontal



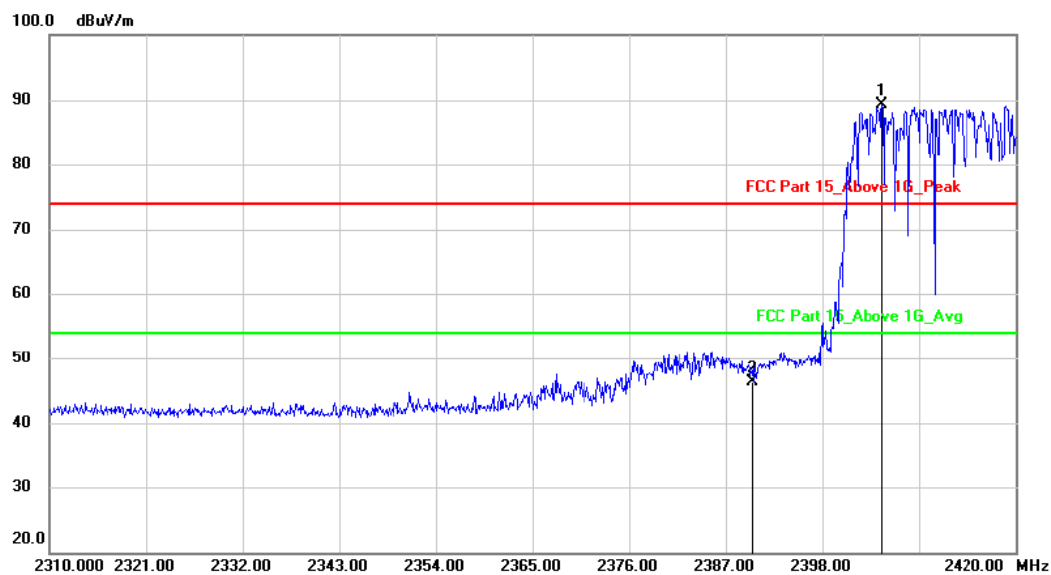
Hopping-on

Polarization: Vertical

Test Mode: $\pi/4$ DQPSK -Low

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2411.310	89.44	-3.40	86.04	74.00	12.04	peak		
2		2390.000	48.07	-3.40	44.67	74.00	-29.33	peak		

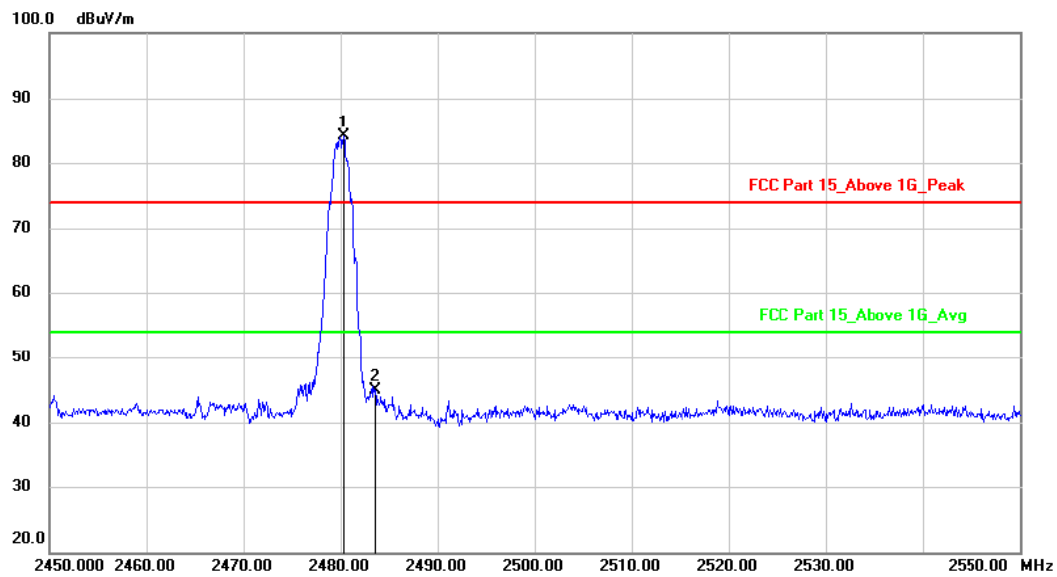
Polarization: Horizontal



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2404.820	92.74	-3.41	89.33	74.00	15.33	peak		
2		2390.000	49.79	-3.40	46.39	74.00	-27.61	peak		

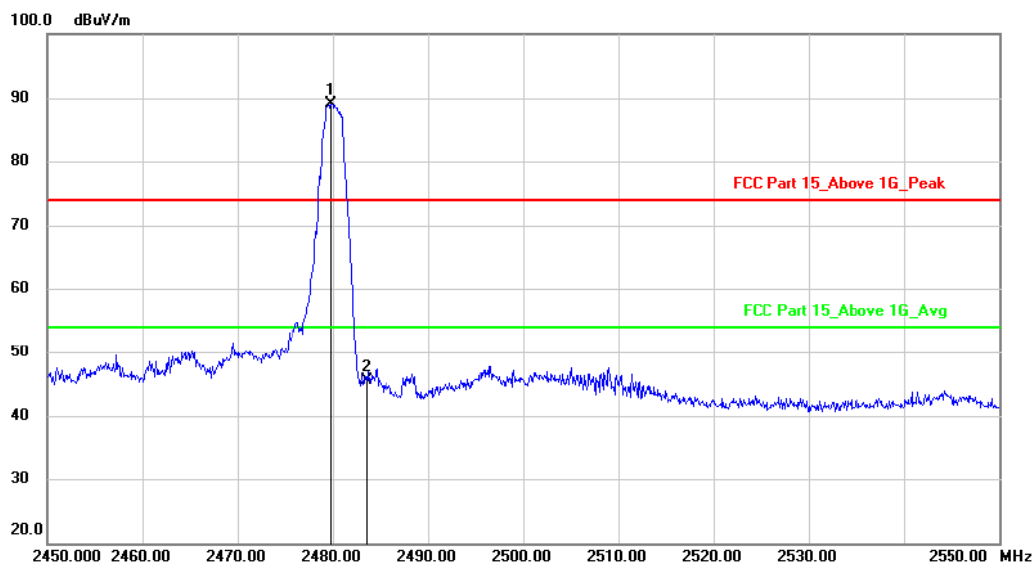
Hopping-off

Polarization: Vertical

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

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	*	2480.300	87.54	-3.38	84.16	74.00	10.16			peak
2		2483.500	48.21	-3.38	44.83	74.00	-29.17			peak

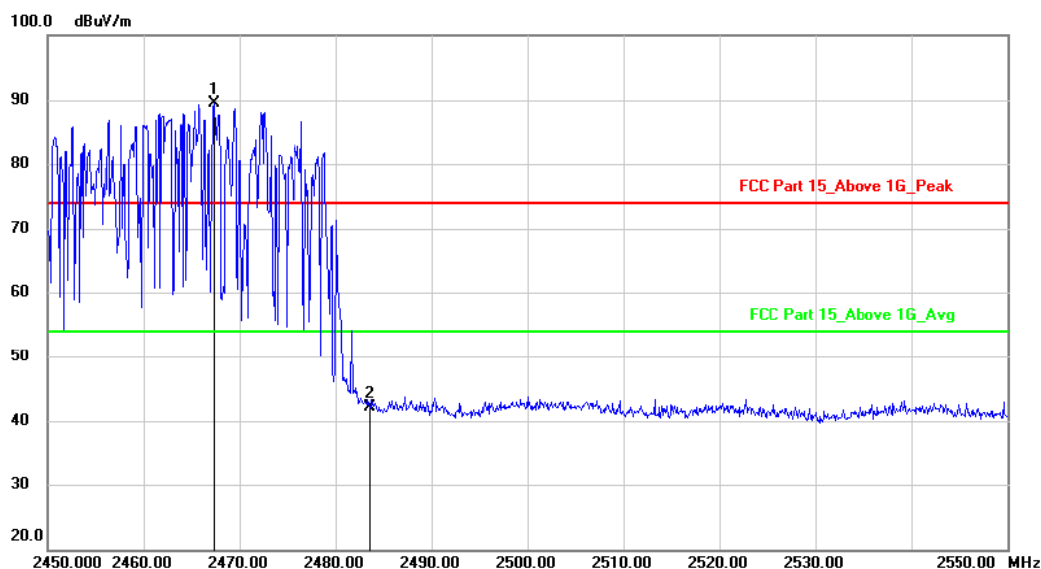
Polarization: Horizontal



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	*	2479.800	92.54	-3.38	89.16	74.00	15.16			peak
2		2483.500	48.86	-3.38	45.48	74.00	-28.52			peak

Hopping-on

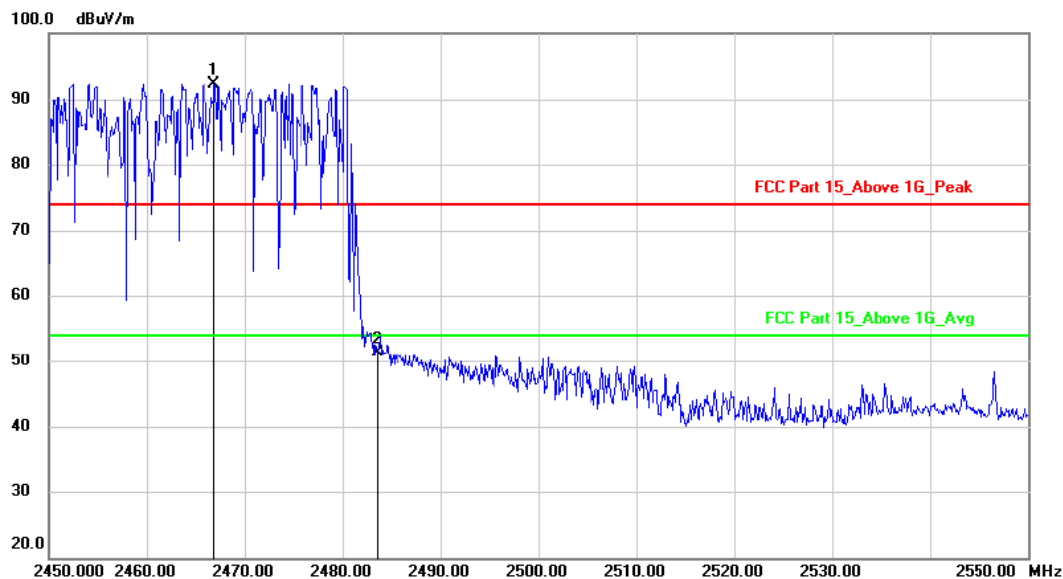
Polarization: Vertical

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

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2467.400	92.83	-3.39	89.44	74.00	15.44	peak		
2		2483.500	45.42	-3.38	42.04	74.00	-31.96	peak		

Polarization: Horizontal

Test Mode: GFSK-High



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2466.900	95.69	-3.39	92.30	74.00	18.30	peak		
2		2483.500	54.74	-3.38	51.36	74.00	-22.64	peak		

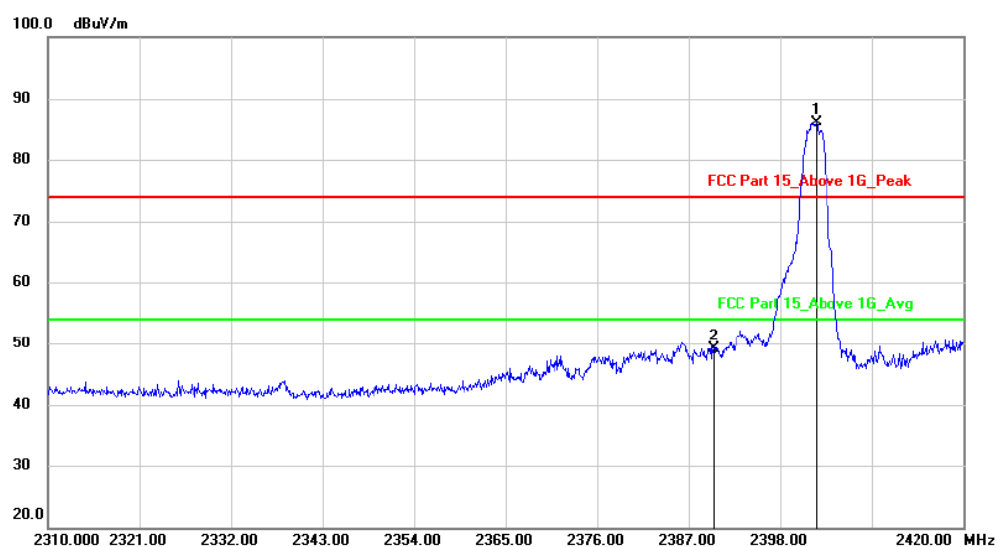
hopping-on

Hopping-off

Polarization: Vertical

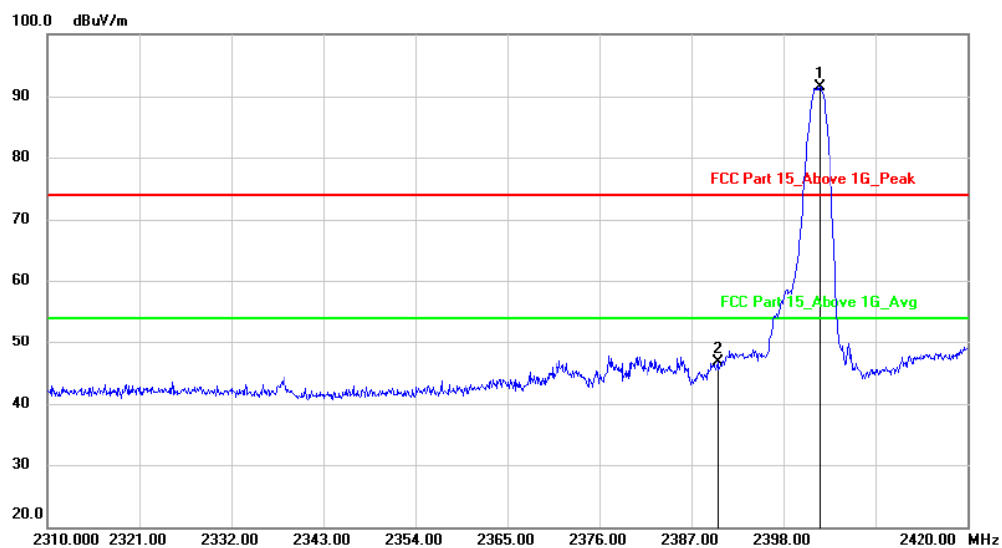
Test Mode:

8DPSK-Low



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	dBuV	Factor	ment			Height	Degree	
				dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2402.290	89.59	-3.41	86.18	74.00	12.18	peak		
2		2390.000	52.51	-3.40	49.11	74.00	-24.89	peak		

Polarization: Horizontal

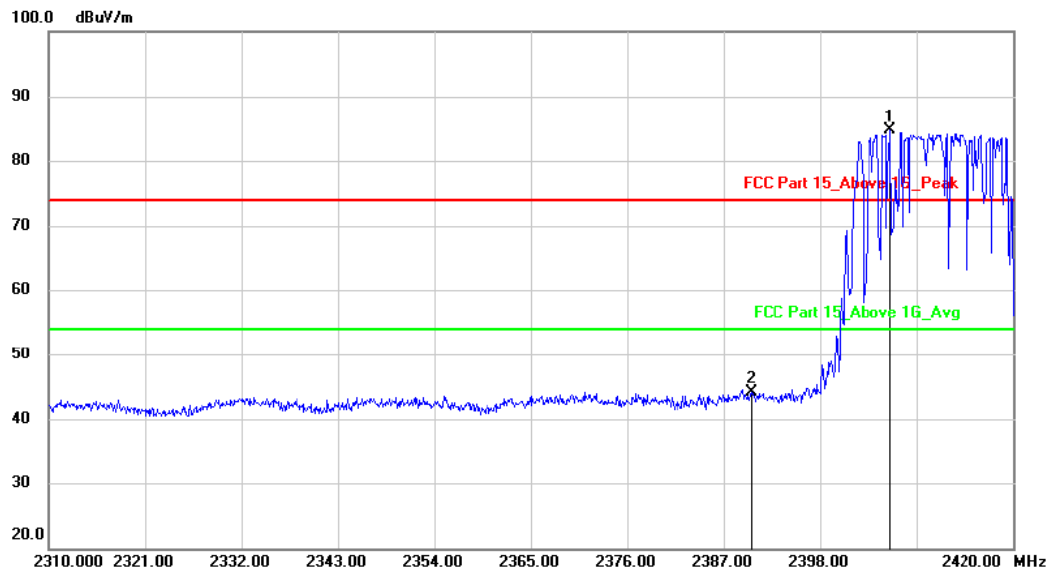


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	dBuV	Factor	ment			Height	Degree	
				dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2402.290	94.93	-3.41	91.52	74.00	17.52	peak		
2		2390.000	50.18	-3.40	46.78	74.00	-27.22	peak		

Hopping-on

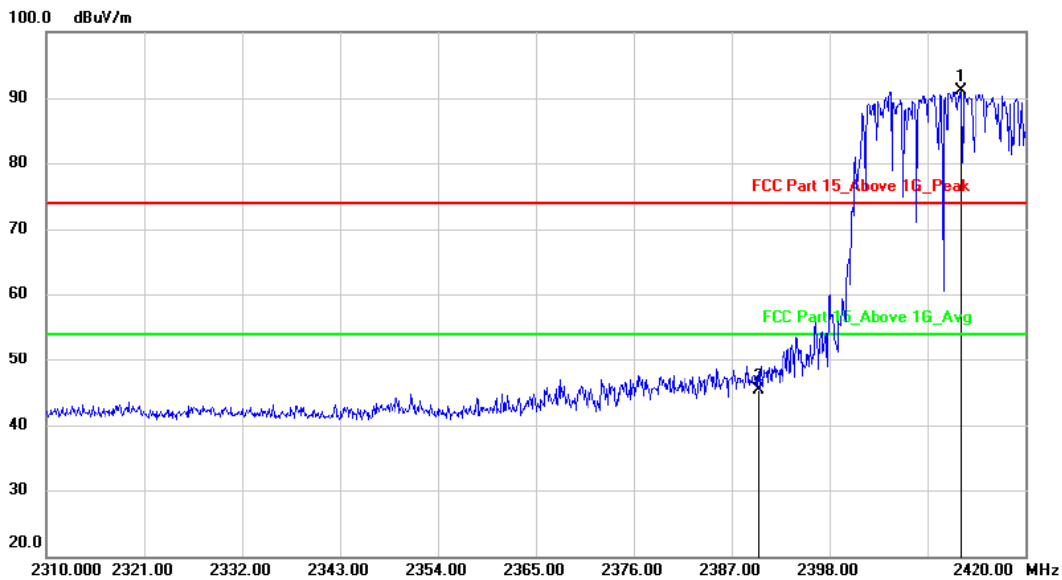
Polarization: Vertical

Test Mode: 8DPSK-Low



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree Comment
1	*	2406.030	88.16	-3.41	84.75	74.00	10.75	peak		
2		2390.000	47.57	-3.40	44.17	74.00	-29.83	peak		

Polarization: Horizontal

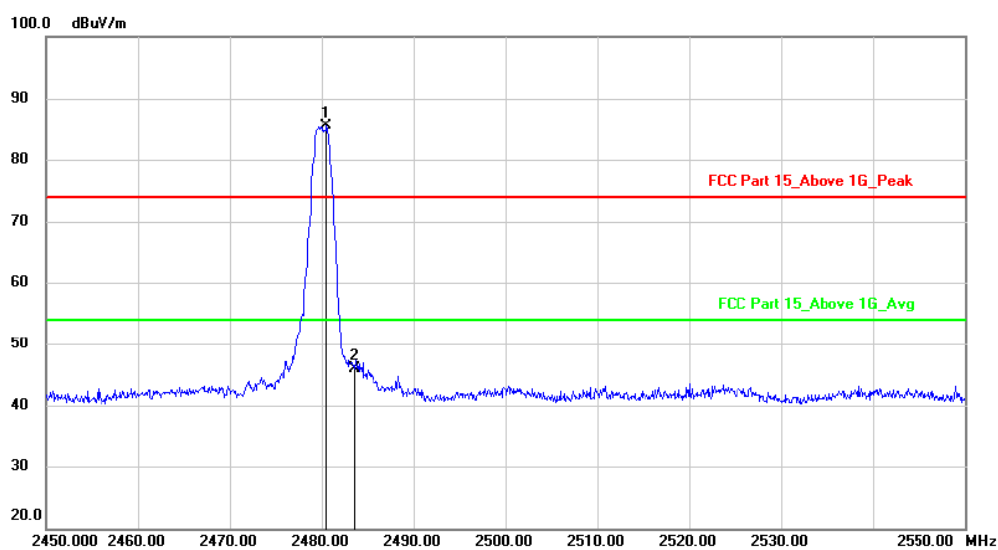


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree Comment
1	*	2412.740	94.44	-3.41	91.03	74.00	17.03	peak		
2		2390.000	48.79	-3.40	45.39	74.00	-28.61	peak		

Hopping-off

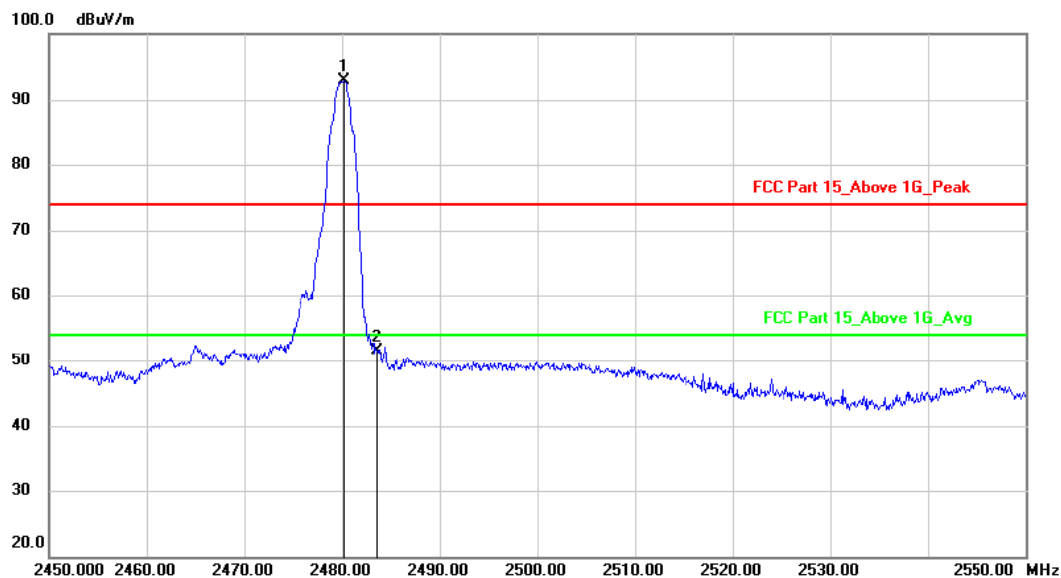
Polarization: Vertical

Test Mode: 8DPSK-High



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2480.500	88.88	-3.38	85.50	74.00	11.50	peak		
2		2483.500	49.36	-3.38	45.98	74.00	-28.02	peak		

Polarization: Horizontal



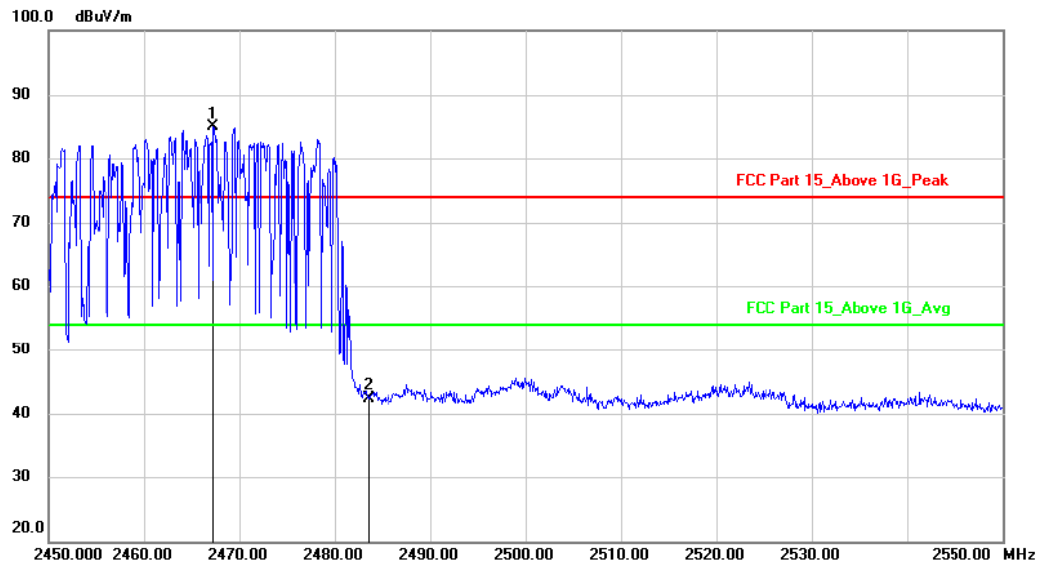
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2480.200	96.25	-3.38	92.87	74.00	18.87	peak		
2		2483.500	54.82	-3.38	51.44	74.00	-22.56	peak		

Hopping-on

Polarization: Vertical

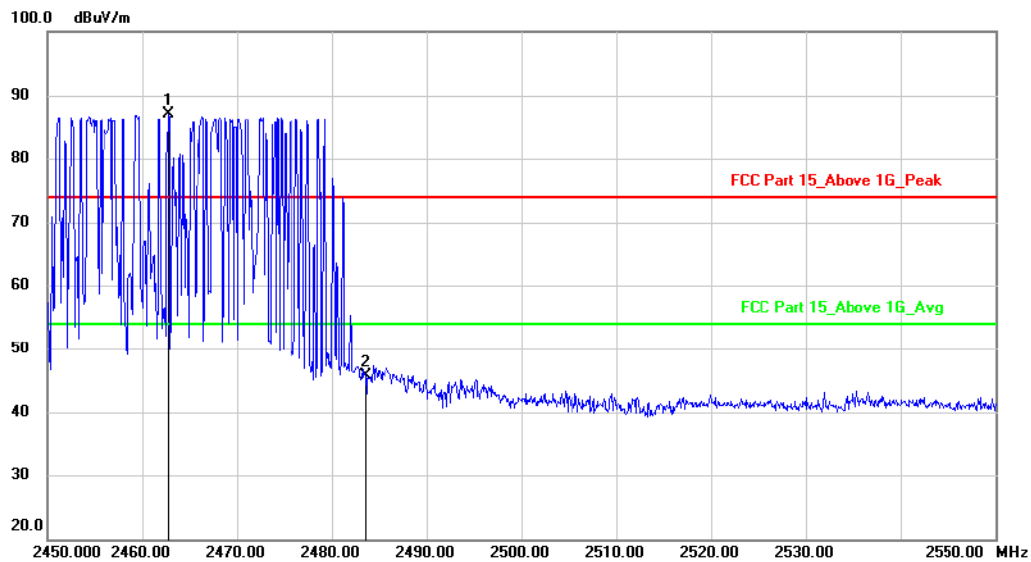
Test Mode:

8DPSK-High



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2467.300	88.25	-3.39	84.86	74.00	10.86	peak		
2		2483.500	45.76	-3.38	42.38	74.00	-31.62	peak		

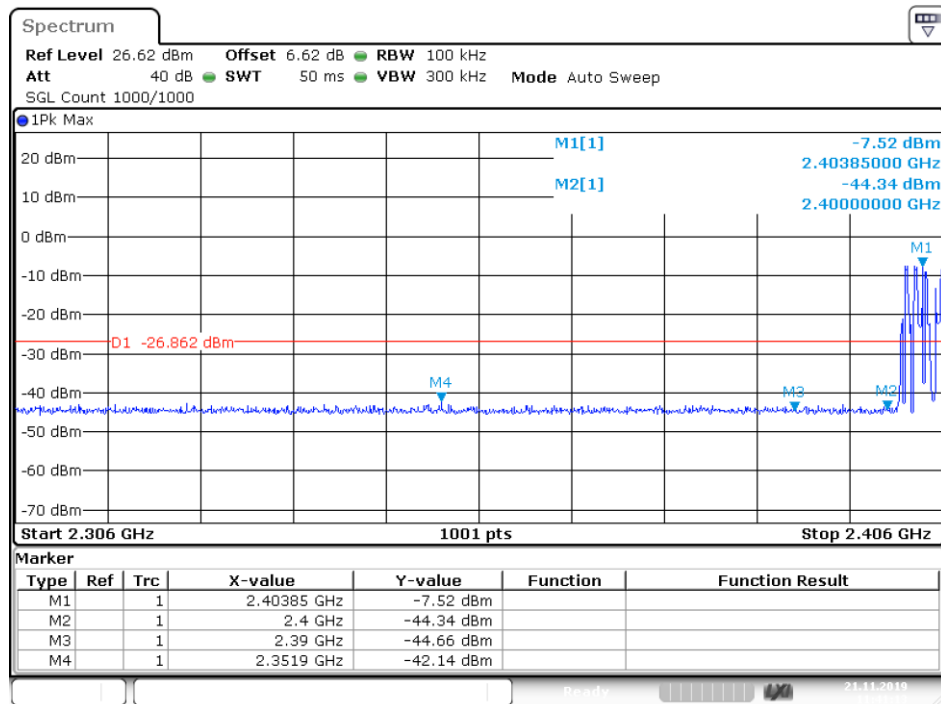
Polarization: Horizontal



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2462.700	90.42	-3.40	87.02	74.00	13.02	peak		
2		2483.500	49.17	-3.38	45.79	74.00	-28.21	peak		

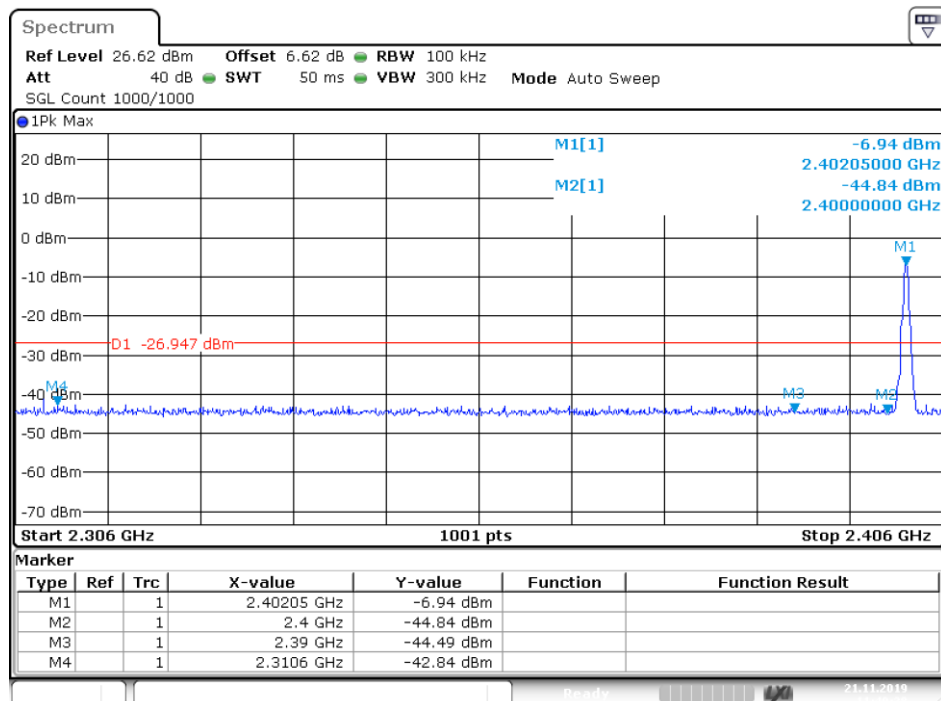
Conducted Method

Band Edge NVNT 1-DH1 2402MHz Ant1 Hopping Emission



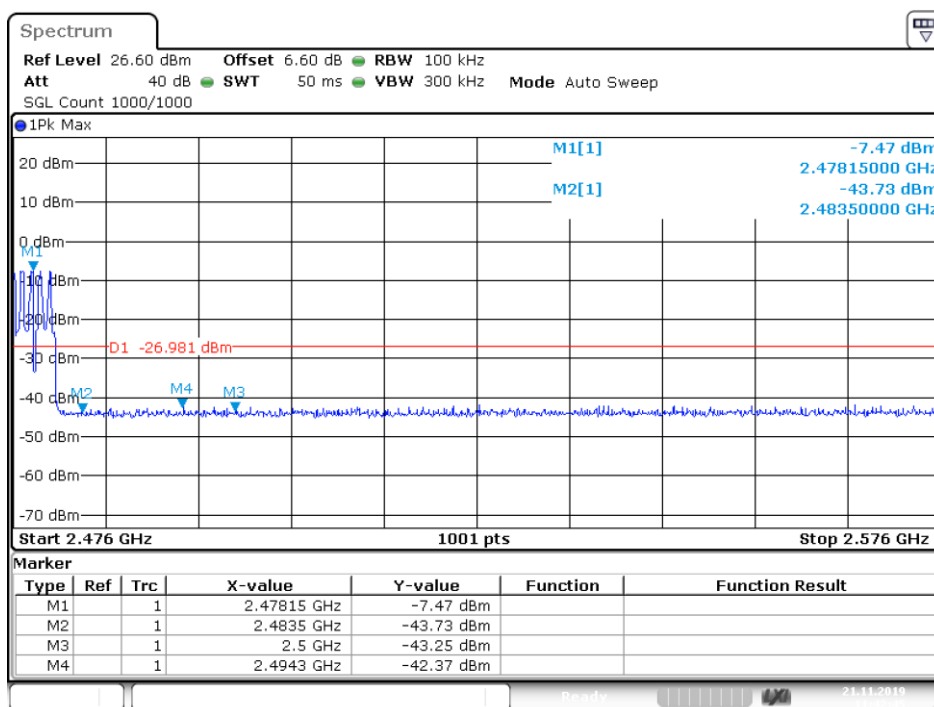
Date: 21.NOV.2019 11:41:13

Band Edge NVNT 1-DH1 2402MHz Ant1 No-Hopping Emission



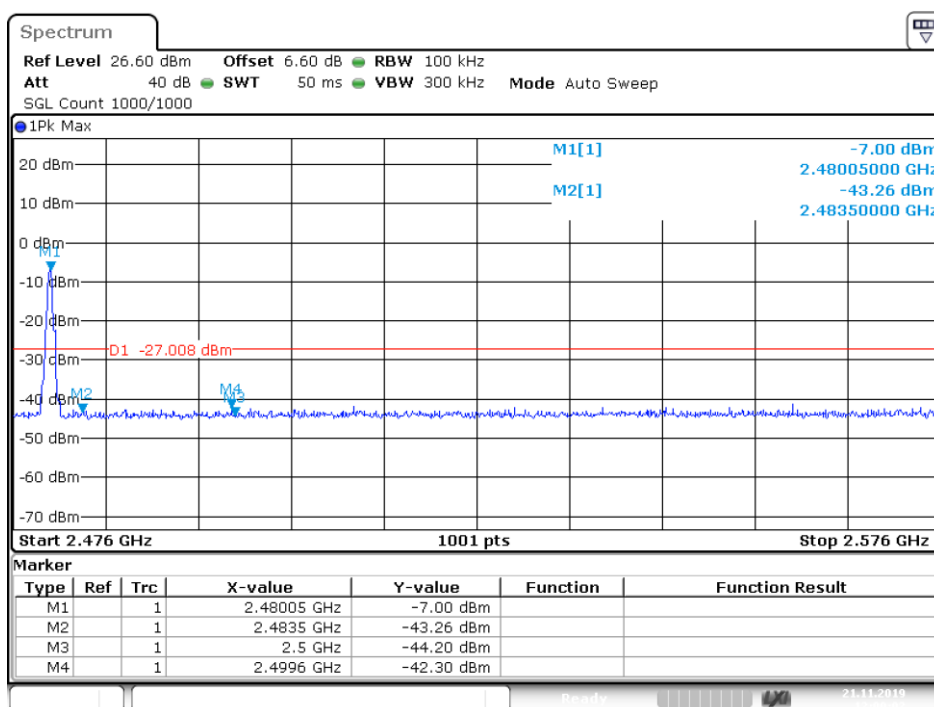
Date: 21.NOV.2019 11:49:28

Band Edge NVNT 1-DH1 2480MHz Ant1 Hopping Emission



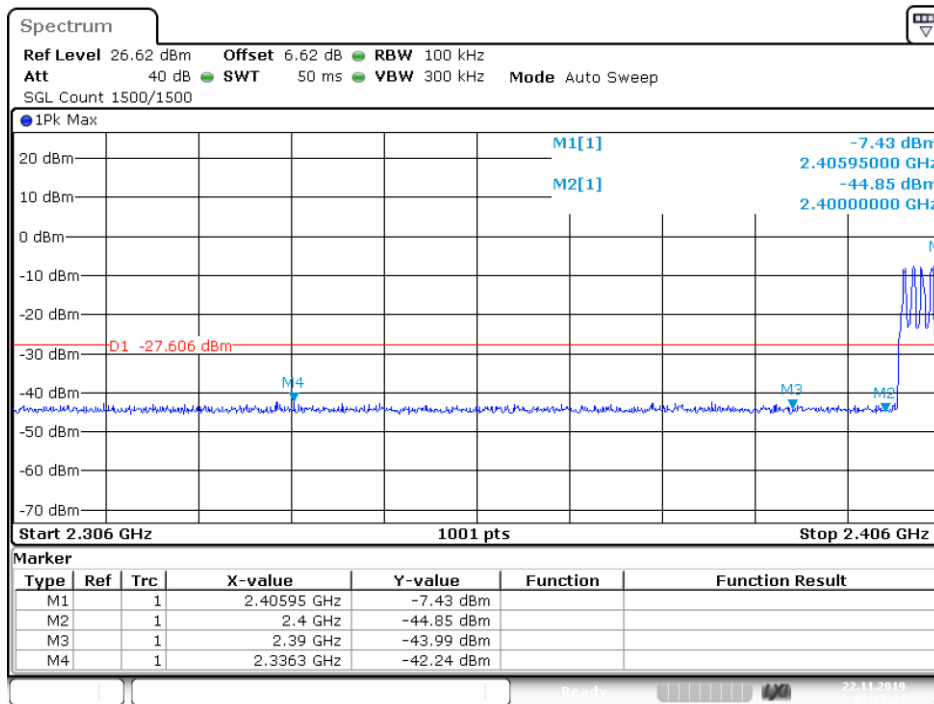
Date: 21.NOV.2019 11:42:45

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



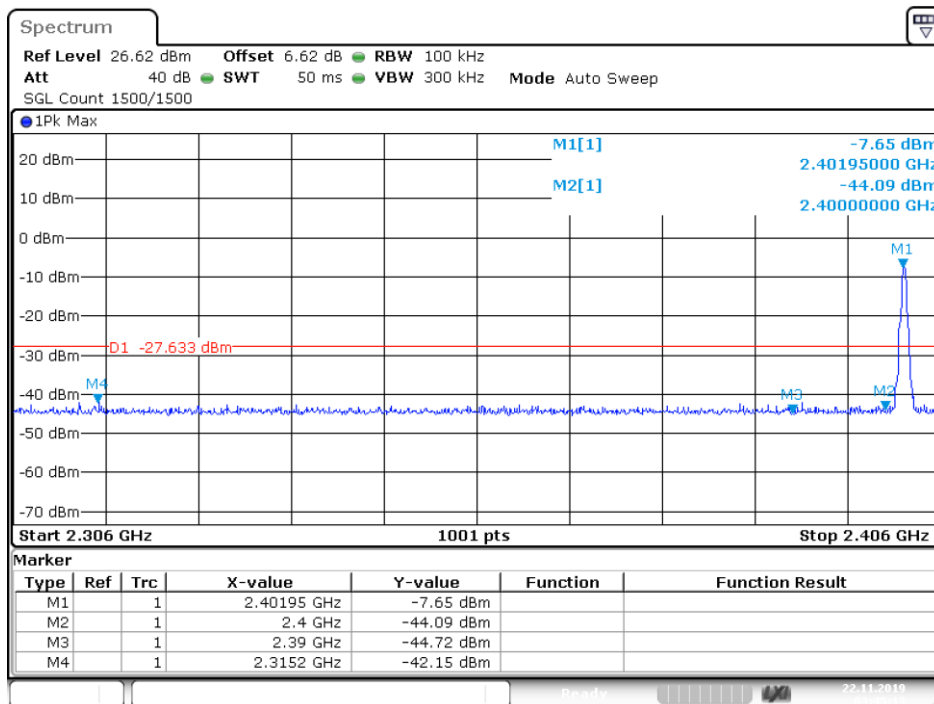
Date: 21.NOV.2019 12:00:01

Band Edge NVLT 2-DH1 2402MHz Ant1 Hopping Emission



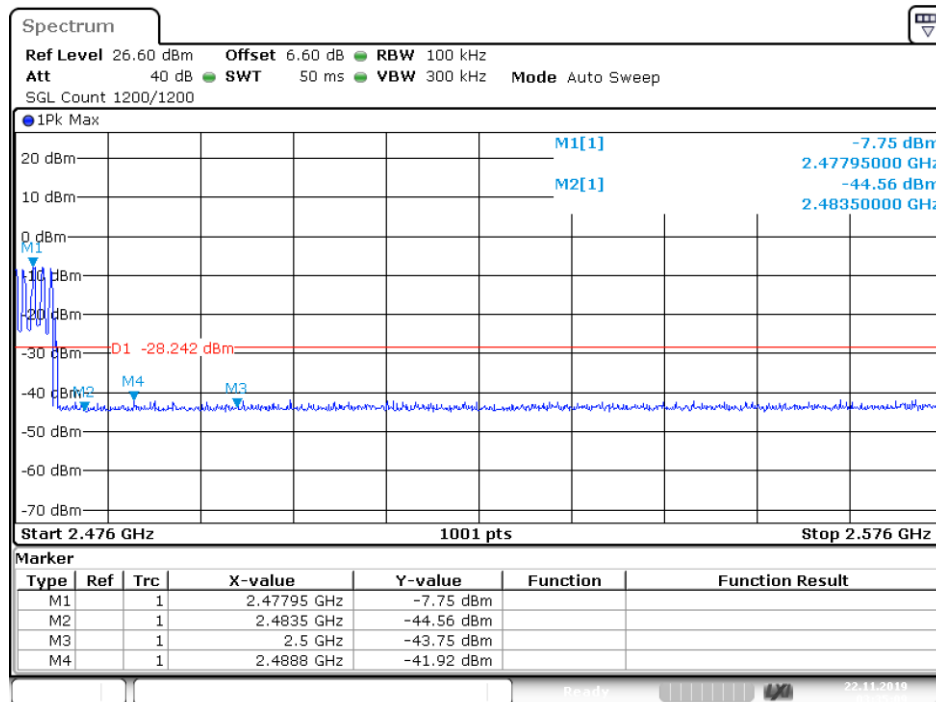
Date: 22.NOV.2019 03:28:24

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



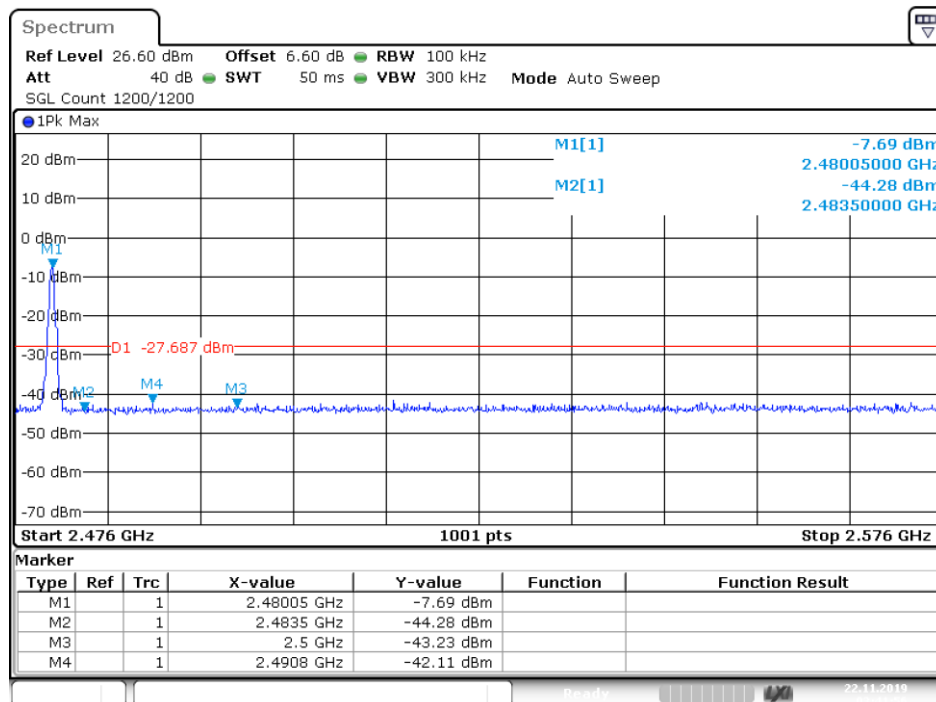
Date: 22.NOV.2019 03:45:13

Band Edge NVLT 2-DH1 2480MHz Ant1 Hopping Emission



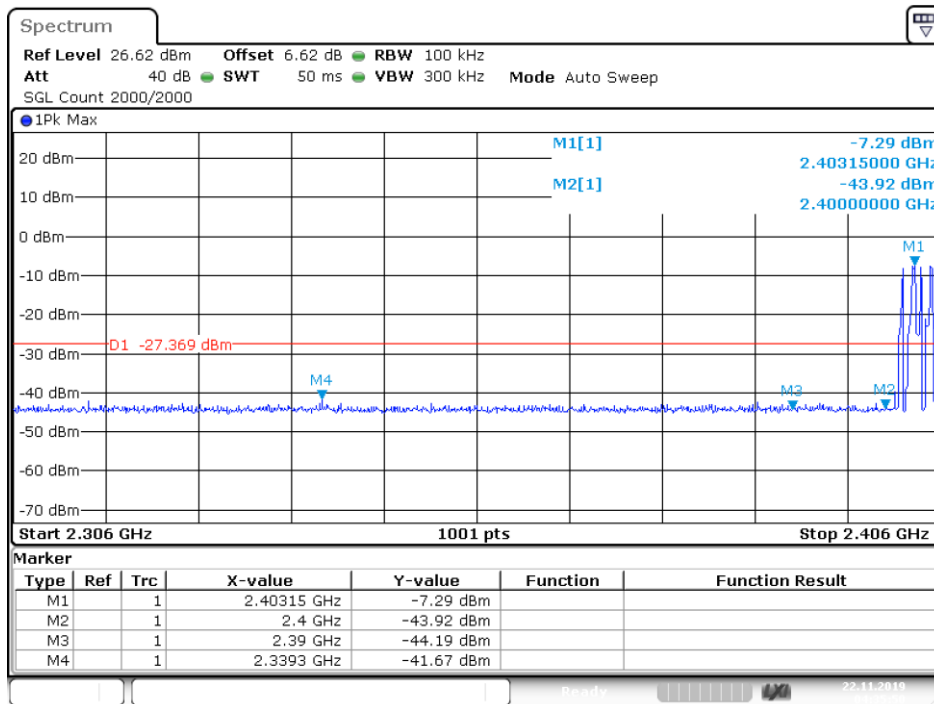
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Band Edge NVNT 2-DH1 2480MHz Ant1 No-Hopping Emission



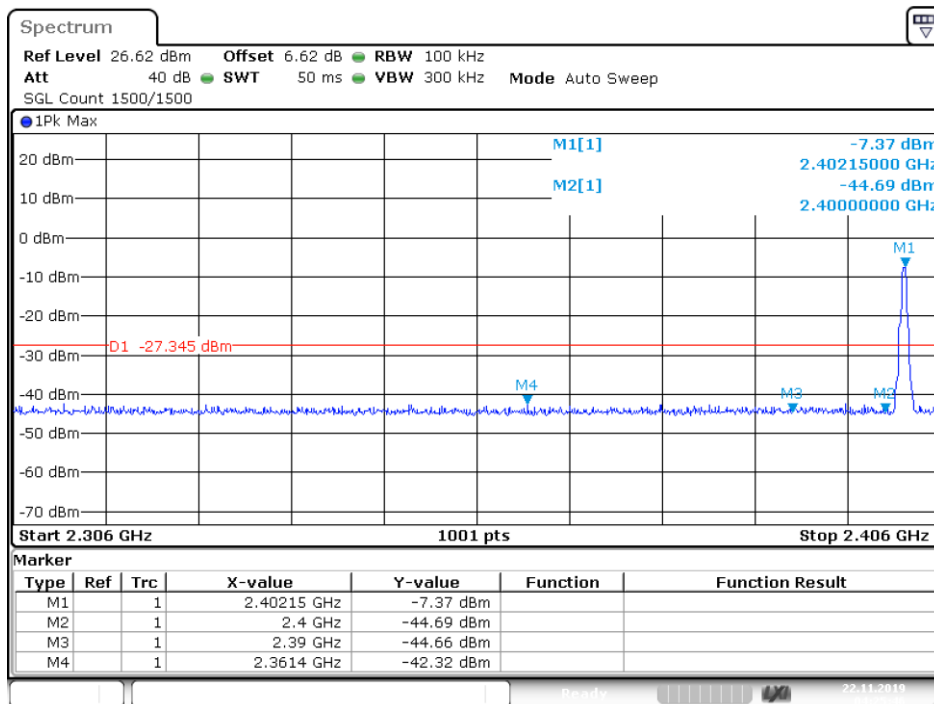
Date: 22.NOV.2019 03:41:56

Band Edge NVLT 3-DH1 2402MHz Ant1 Hopping Emission



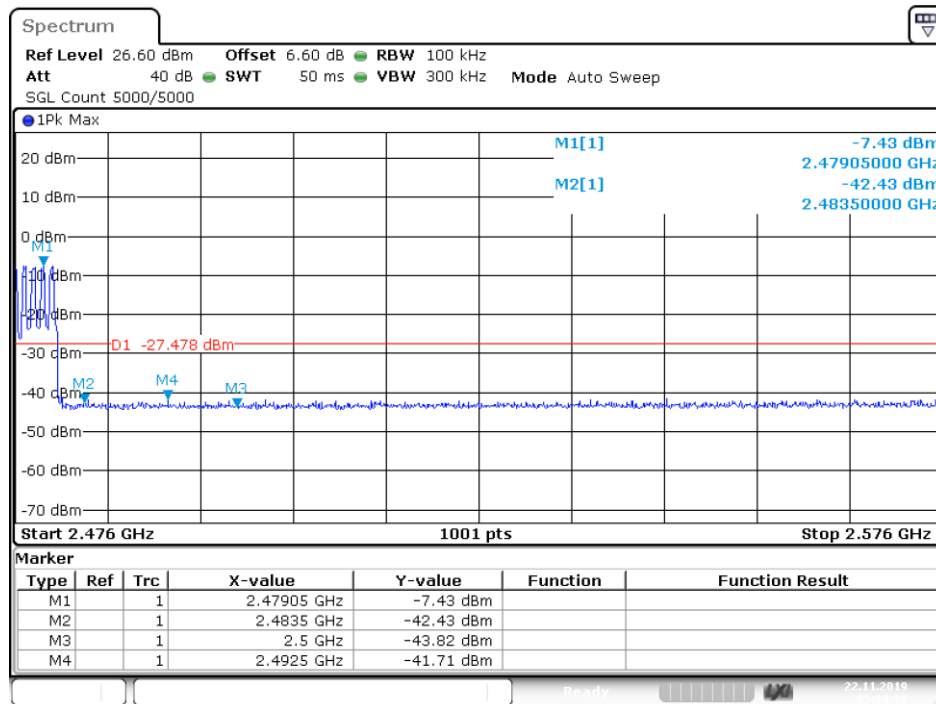
Date: 22.NOV.2019 04:35:50

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



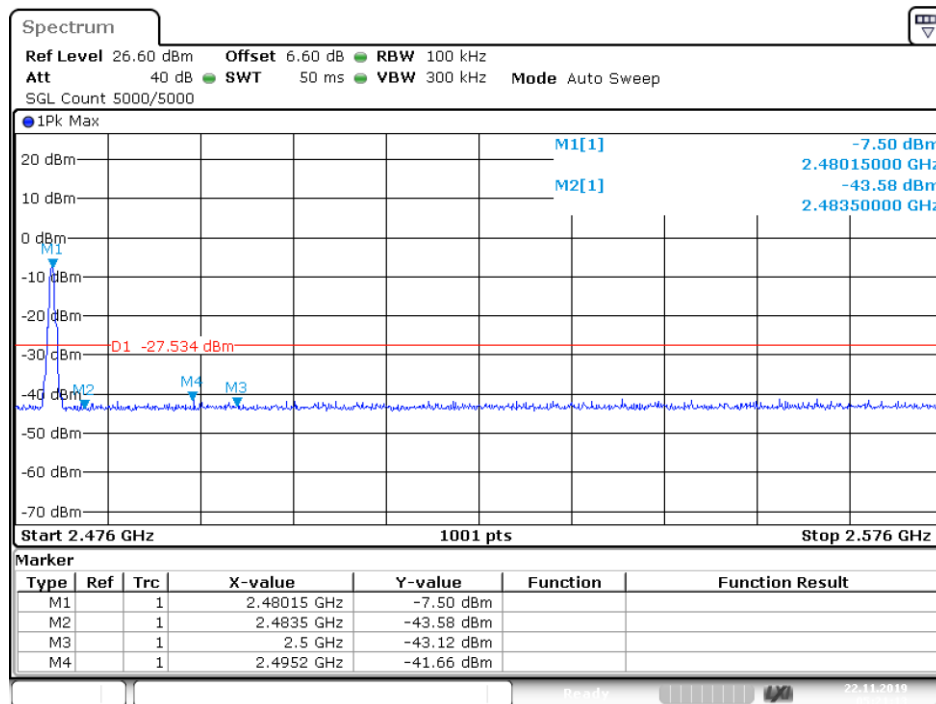
Date: 22.NOV.2019 04:25:46

Band Edge NVLT 3-DH1 2480MHz Ant1 Hopping Emission



Date: 22.NOV.2019 05:14:59

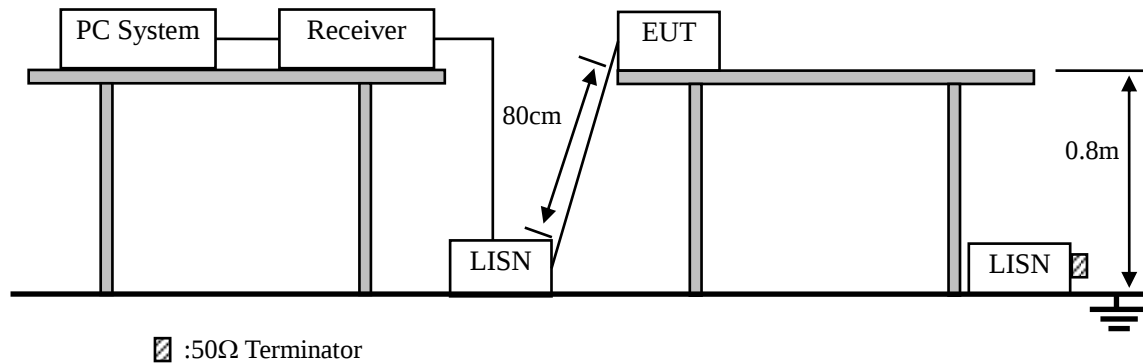
Band Edge NVNT 3-DH1 2480MHz Ant1 No-Hopping Emission



Date: 22.NOV.2019 05:21:13

10. POWER LINE CONDUCTED EMISSIONS

10.1. Block Diagram of Test Setup



□ :50Ω Terminator

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.

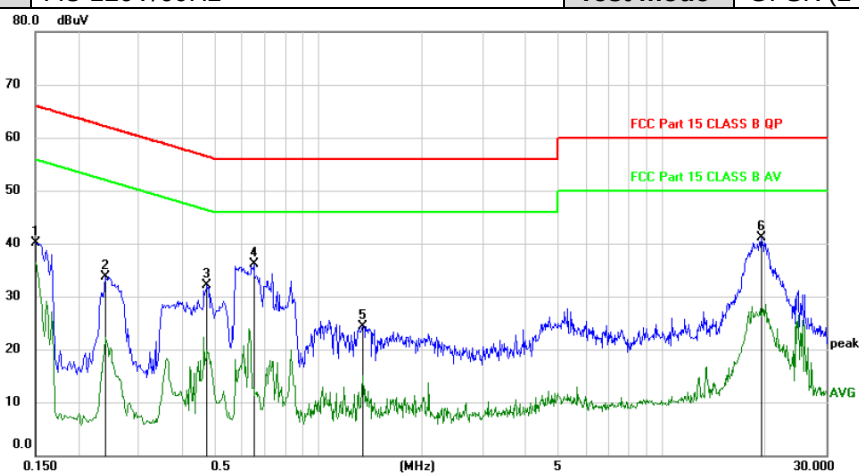
2. The lower limit shall apply at the transition frequencies.

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.

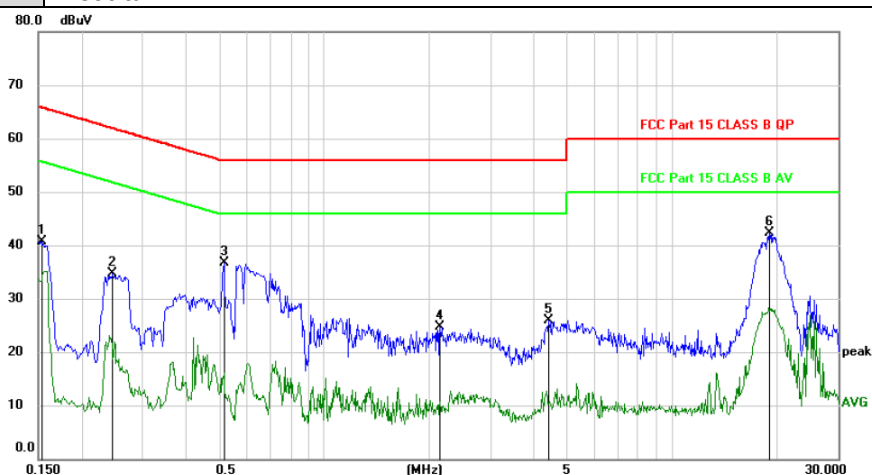
10.4. Test Result

EUT Description	Communication Module	Model No.	GEBW2455A
Temperature	24°C	Humidity	56%
Pol	Line	Test date	2019/11/8
Test Voltage	AC 120V/60Hz	Test mode	GFSK (2441MHz)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	30.25	9.94	40.19	66.00	-25.81	peak	
2		0.2400	23.74	9.96	33.70	62.10	-28.40	peak	
3		0.4740	22.07	9.95	32.02	56.44	-24.42	peak	
4		0.6480	26.09	9.92	36.01	56.00	-19.99	peak	
5		1.3470	14.50	9.90	24.40	56.00	-31.60	peak	
6	*	19.4790	30.55	10.46	41.01	60.00	-18.99	peak	

Pol	Neutral
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1539	30.79	9.94	40.73	65.79	-25.06	peak	
2		0.2460	24.71	9.97	34.68	61.89	-27.21	peak	
3		0.5130	26.72	9.95	36.67	56.00	-19.33	peak	
4		2.1480	14.80	9.88	24.68	56.00	-31.32	peak	
5		4.4250	15.97	10.00	25.97	56.00	-30.03	peak	
6	*	19.0680	31.88	10.44	42.32	60.00	-17.68	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

11.FREQUENCY STABILITY

11.1.Test limit

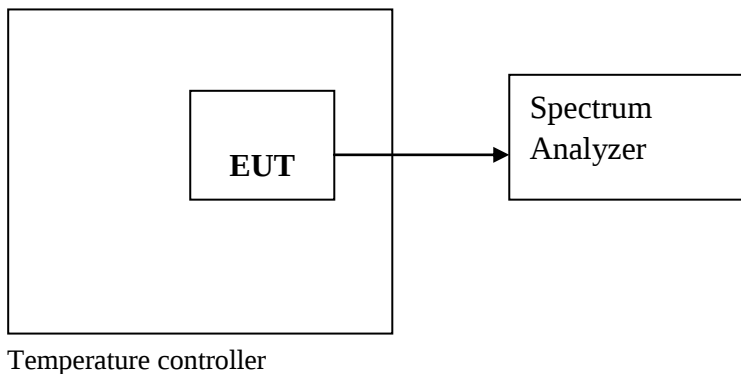
Please refer section RSS-Gen.

Regulation RSS-Gen If the frequency stability of the licence-exempt radio apparatus is not specified in the applicable RSS, the fundamental emissions of the radio apparatus should be kept within at least the central 80% of its permitted operating frequency band in order to minimize the possibility of out-of-band operation. In addition, its occupied bandwidth shall be entirely outside the restricted bands and the prohibited TV bands of 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-602 MHz, unless otherwise indicated.

11.2.Test Procedure

The following equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

11.3.Test Setup



11.4.Test Results

Not applicable.

12.ANTENNA REQUIREMENTS

12.1.Limit

For intentional device, according to FCC 47 CFR Section 15.203 and RSS-GEN, 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.

12.2.Antenna Connected Construction

The antenna connector is unique antenna and no consideration of replacement. Please see EUT photo for details.

12.3.Results

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

13. TEST SETUP PHOTO

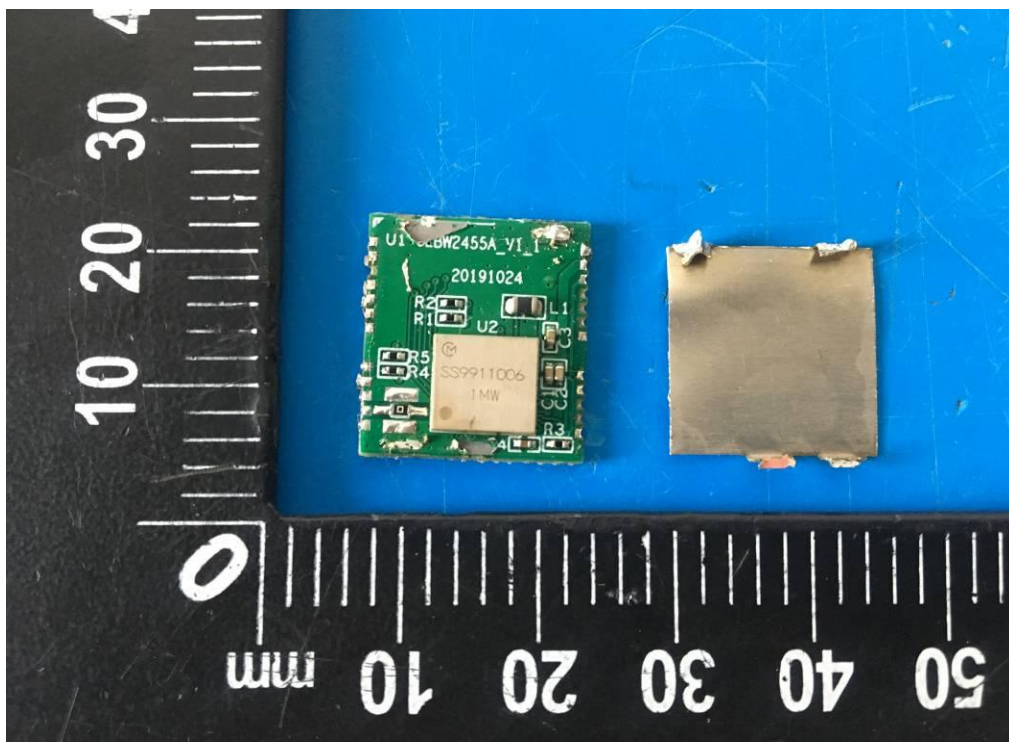
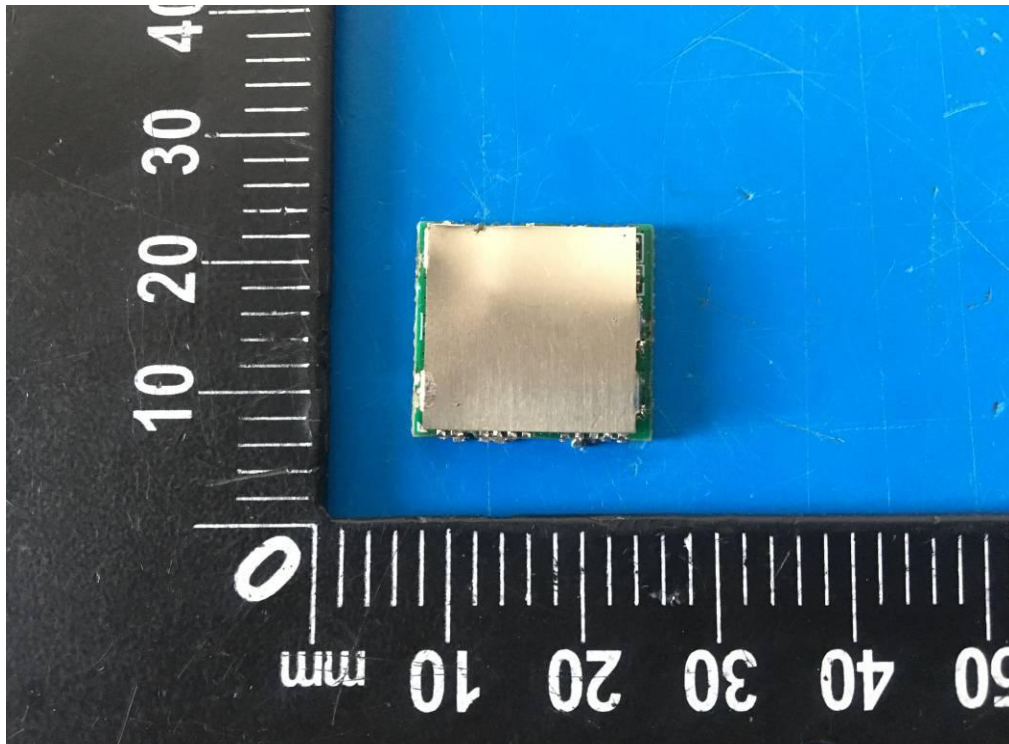
13.1. Photos of Radiated emission

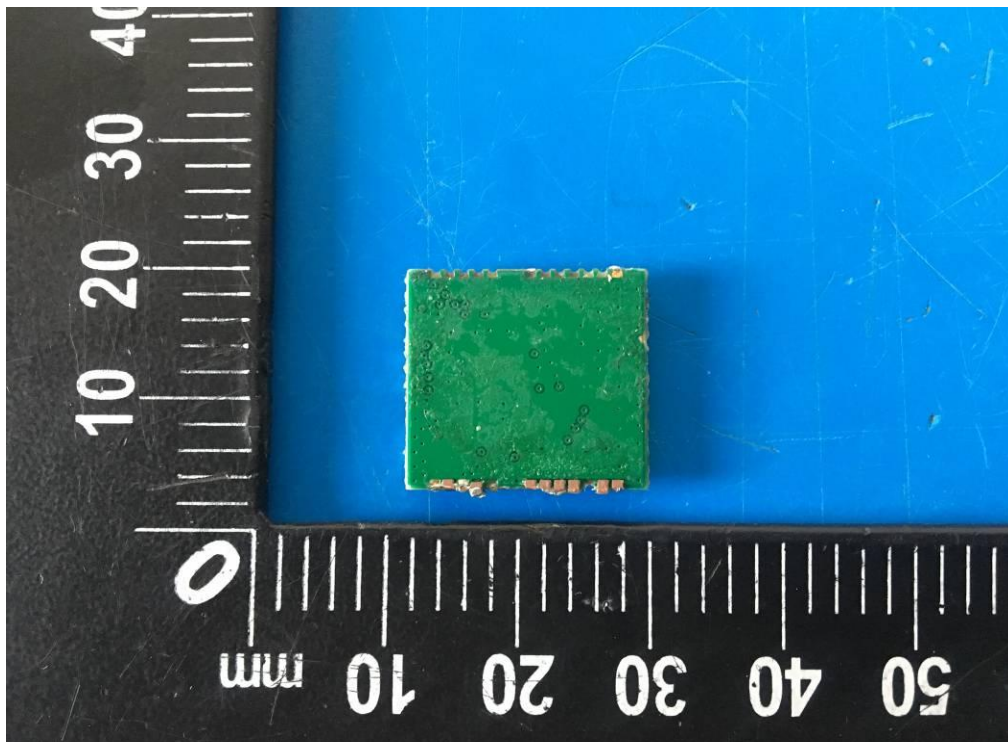
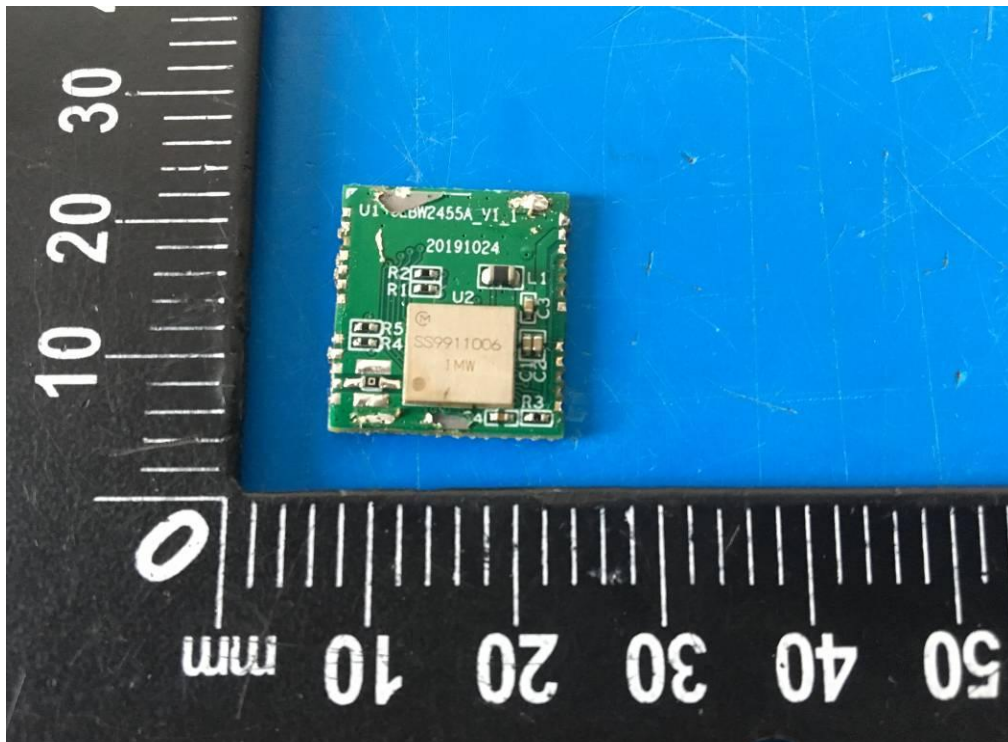


Conducted Emission



14. PHOTOS OF EUT





-----THE END OF REPORT-----