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Report Template Version: V02
Report Template Revision Date: 2021-06-01

FCC Test Report

Applicant:	Shenzhen MeiDong Acoustics Co., LTD.
Address of Applicant:	Cell B, 3th Floor, Tower B, Hongzhuyongqi Technology Park, Lezhujiao, Xixiang, Baoan, 518100 Shenzhen, Guangdong, PEOPLE’S REPUBLIC OF CHINA
Manufacturer:	Shenzhen MeiDong Acoustics Co., LTD.
Address of Manufacturer:	Cell B, 3th Floor, Tower B, Hongzhuyongqi Technology Park, Lezhujiao, Xixiang, Baoan, 518100 Shenzhen, Guangdong, PEOPLE’S REPUBLIC OF CHINA
Factory:	Shenzhen MeiDong Acoustics Co., LTD.
Address of Factory:	Cell B, 3th Floor, Tower B, Hongzhuyongqi Technology Park, Lezhujiao, Xixiang, Baoan, 518100 Shenzhen, Guangdong, PEOPLE’S REPUBLIC OF CHINA

Equipment Under Test (EUT):

Product:	2.0 Channel Bluetooth Sound bar
Model No.:	KY-2020D
Brand Name:	MORWIN | MZEIBO
FCC ID:	2AB5T-KY-2020D
Standards:	47 CFR Part 15, Subpart C
Date of Test:	2021-11-03 to 2021-12-10
Date of Issue:	2021-12-10
Report No. :	D210927003-1
Test Result :	**PASS***

Tested By: Damon

(Damon Deng)

Reviewed By: Chivas

(Chivas Zeng)

Approved By: Victor

(Victor Meng)

1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
D210927003-1	Rev.01	Initial report	2021-12-10

2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203/15.247 (c)	ANSI C63.10 (2013)	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 (2013)	PASS
Conducted Peak Output Power	47 CFR Part 15, Subpart C Section 15.247 (b)(1)	ANSI C63.10 (2013)	PASS
20dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.247 (a)(1)	ANSI C63.10 (2013)	PASS
Carrier Frequencies Separation	47 CFR Part 15, Subpart C Section 15.247 (a)(1)	ANSI C63.10 (2013)	PASS
Hopping Channel Number	47 CFR Part 15, Subpart C Section 15.247 (a)(1)	ANSI C63.10 (2013)	PASS
Dwell Time	47 CFR Part 15, Subpart C Section 15.247 (a)(1)	ANSI C63.10 (2013)	PASS
Pseudorandom Frequency Hopping Sequence	47 CFR Part 15, Subpart C Section 15.247(b)(4)	ANSI C63.10 (2013)	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 (2013)	PASS
RF Conducted Spurious Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 (2013)	PASS
Radiated Spurious emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 (2013)	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 (2013)	PASS

3 Contents

4 General Information

4.1 Client Information

Applicant:	Shenzhen MeiDong Acoustics Co., LTD.
Address of Applicant:	Cell B, 3th Floor, Tower B, Hongzhuyongqi Technology Park, Lezhujiao, Xixiang, Baoan, 518100 Shenzhen, Guangdong, PEOPLE'S REPUBLIC OF CHINA
Manufacturer:	Shenzhen MeiDong Acoustics Co., LTD.
Address of Manufacturer:	Cell B, 3th Floor, Tower B, Hongzhuyongqi Technology Park, Lezhujiao, Xixiang, Baoan, 518100 Shenzhen, Guangdong, PEOPLE'S REPUBLIC OF CHINA
Factory:	Shenzhen MeiDong Acoustics Co., LTD.
Address of Factory:	Cell B, 3th Floor, Tower B, Hongzhuyongqi Technology Park, Lezhujiao, Xixiang, Baoan, 518100 Shenzhen, Guangdong, PEOPLE'S REPUBLIC OF CHINA

4.2 General Description of EUT

Product Name:	2.0 Channel Bluetooth Sound bar
Model No.:	KY-2020D
Trade Mark:	MORWIN | MZEIBO
Hardware Version:	V1.1
Software Version:	V06
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V5.0
Modulation Technique:	Frequency Hopping Spread Spectrum (FHSS)
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Sample Type:	Mobile production
Sample number:	20211109001
Test Software of EUT:	BT Tool _V1.1.0 (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	0 dBi
Power Supply:	Adapter Model :NT-150200AU Input:100-240V-50/60Hz 1.0A Max Output:15V/2A

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz
1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz
2	2404MHz	22	2424MHz	42	2444MHz	62	2464MHz
3	2405MHz	23	2425MHz	43	2445MHz	63	2465MHz
4	2406MHz	24	2426MHz	44	2446MHz	64	2466MHz
5	2407MHz	25	2427MHz	45	2447MHz	65	2467MHz
6	2408MHz	26	2428MHz	46	2448MHz	66	2468MHz
7	2409MHz	27	2429MHz	47	2449MHz	67	2469MHz
8	2410MHz	28	2430MHz	48	2450MHz	68	2470MHz
9	2411MHz	29	2431MHz	49	2451MHz	69	2471MHz
10	2412MHz	30	2432MHz	50	2452MHz	70	2472MHz
11	2413MHz	31	2433MHz	51	2453MHz	71	2473MHz
12	2414MHz	32	2434MHz	52	2454MHz	72	2474MHz
13	2415MHz	33	2435MHz	53	2455MHz	73	2475MHz
14	2416MHz	34	2436MHz	54	2456MHz	74	2476MHz
15	2417MHz	35	2437MHz	55	2457MHz	75	2477MHz
16	2418MHz	36	2438MHz	56	2458MHz	76	2478MHz
17	2419MHz	37	2439MHz	57	2459MHz	77	2479MHz
18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
19	2421MHz	39	2441MHz	59	2461MHz		

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The Lowest channel	2402MHz
The Middle channel	2441MHz
The Highest channel	2480MHz

4.3 Test Environment

Operating Environment:	
Temperature:	25.0 °C
Humidity:	53 % RH
Atmospheric Pressure:	995mbar
Test Mode:	Use test software (RF Test) to set the lowest frequency, the middle frequency and the highest frequency keep transmitting of the EUT.

4.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Remark	FCC certification
/	/	/	/	/

4.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the **ITL Co., LTD.** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for **ITL** laboratory is reported:

Test	Range	Uncertainty	Notes
Radiated Emission	Below 1GHz	±4.54dB	(1)
Radiated Emission	Above 1GHz	±4.10dB	(1)
Conducted Disturbance	0.15~30MHz	±3.58dB	(1)

(1)This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.6 Test Location

ITL Co., Ltd
No.8, JinQianLing street 5, Huangjiang Town, Dongguan,
Guangdong, 523757 P.R.C

4.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS(Lab code: L9342)**
- **NVLAP LAB CODE 600199-0**
- **FCC Designation Number: CN5035**
- **FCC Test Firm Registration Number: 239076**

4.8 Abnormalities from Standard Conditions

None.

4.9 Other Information Requested by the Customer

None.

4.10 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Radiated Emission:

Temperature:	25 ° C
Humidity:	48%
Atmospheric pressure:	950-1050mbar

AC Main Conducted testing：

Temperature:	25 ° C
Humidity:	44 %
Atmospheric pressure:	950-1050mbar

Conducted testing：

Temperature:	25° C
Humidity:	42 %
Atmospheric pressure:	950-1050mbar

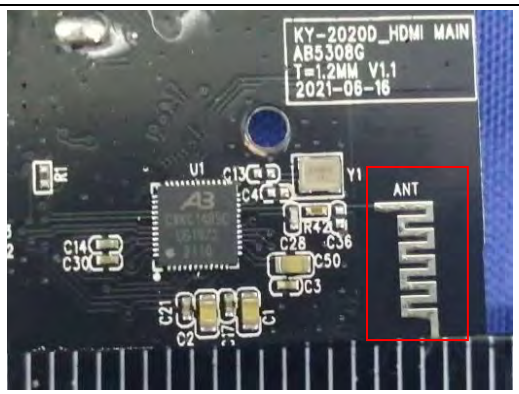
4.11 Equipment List

No.	Test Equipment	Manufacturer	Model	Serial No.	Cal Data	Due Date
DGITL-301	Semi-Anechoic chamber	ETS•Lindgren	9*6*6	CT000874-1181	2021.08.02	2022.08.01
DGITL-307	EMI test receiver	SCHWARZBECK	ESVS10	833616 /003	2021.05.11	2022.05.10
DGITL-376	Wideband Radio Communication Tester	SCHWARZBECK	CMW500	LR114195	2021.05.11	2022.05.10
DGITL-349	MXG Vector Signal Generator	Agilent Technologies	N5182A	MY47071034	2021.05.11	2022.05.10
DGITL-306	Spectrum Analyzer	Agilent Technologies	N9010A	MY54200334	2021.05.11	2022.05.10
DGITL-352	Pre Amplifier	Mlnl-Clrcuits	ZFC-1000HX	SN292801110	2021.05.11	2022.05.10
DGITL-375	Spectrum Analyzer	SCHWARZBECK	FSV40-N	6625-01-588-5515	2021.05.11	2022.05.10
DGITL-309	Horn Antenna	ETS Lindgren	3117	SN00152265	2021.05.11	2024.05.10
DGITL-308	Bilog Antenna	ETS· Lindgren	3142E	156975	2020.06.20	2023.06.19
DGITL-350	Wideband Amplifier Super Ultra	Mlnl-Clrcuits	ZVA-183X-S+	SN986401426	2021.05.11	2022.05.10
DGITL-365	Broad-band Horn Antenna	SCHWARZBECK	9170	795	2020.07.05	2022.07.04
DGITL-371	Pre Amplifier	teramicrowave	TALA-0040G35	18081001	2021.05.11	2022.05.10
DGITL-363	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	062	2020.07.04	2022.07.03

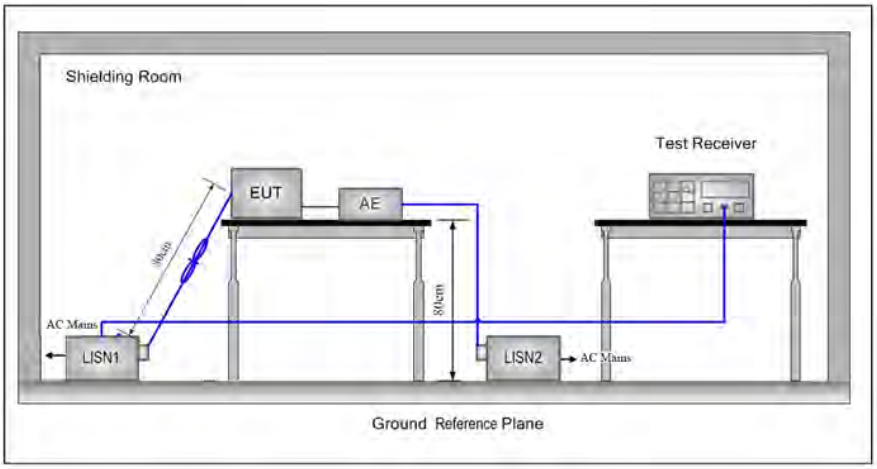
Software list			
Testing software	**Manufacturer**	**Model**	**Version number**
e3	AUDIX	e3.Ink	Version:6.2009-11-3c(itl)
MTS	MWRFTEST	MTS 8310	Version:2.0

5 Test results and Measurement Data

5.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203 /247(c)
15.203 requirement: 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
EUT Antenna:	
The antenna is PCB antenna, The best case gain of the antenna is 0 dBi.	

5.2 Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	150kHz to 30MHz
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test Procedure:	1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.
Test Setup:	
Exploratory Test Mode:	Non-hopping transmitting mode with all kind of modulation and all kind of

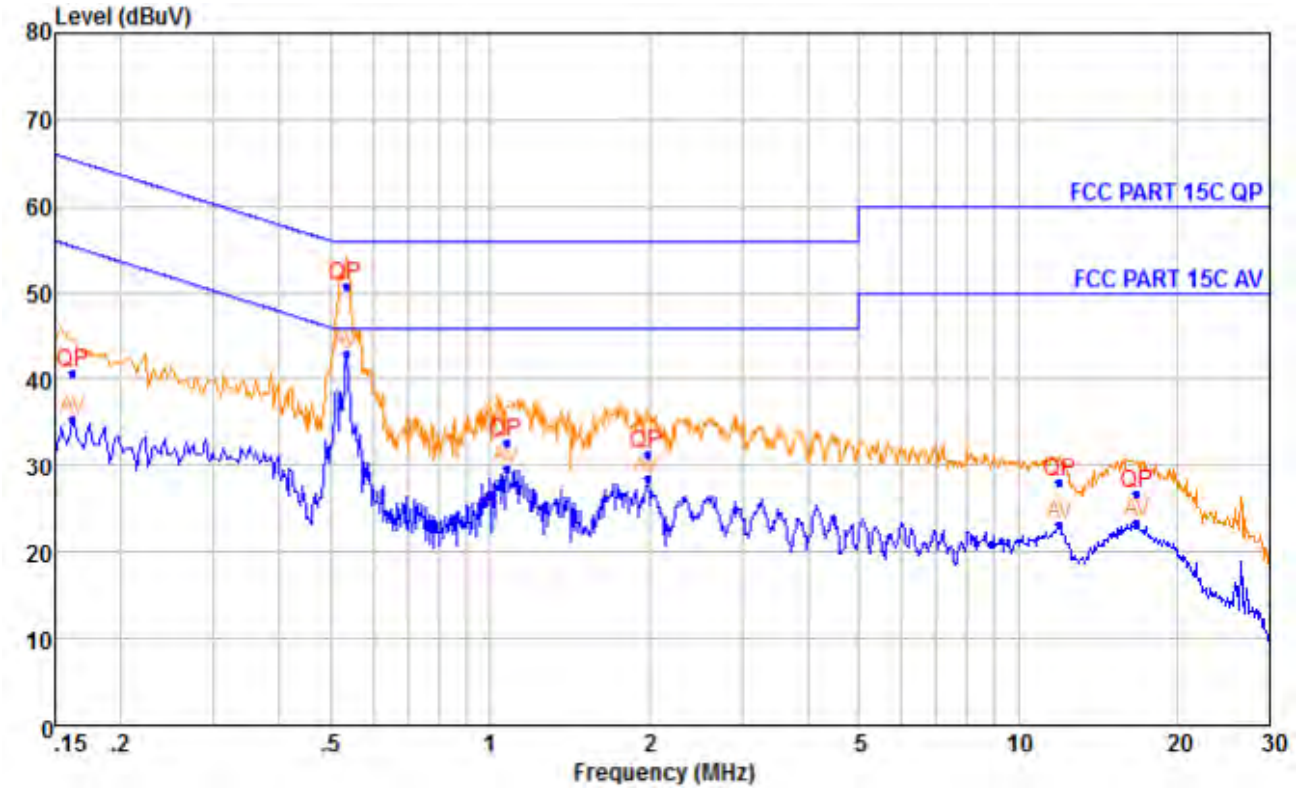
	data type at the lowest, middle, high channel.
Final Test Mode:	Through Pre-scan, find the DH1 of data type and GFSK modulation at the lowest channel is the worst case. Only the worst case is recorded in the report.
Test Voltage:	AC 120V/60Hz
Test Results:	Pass

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

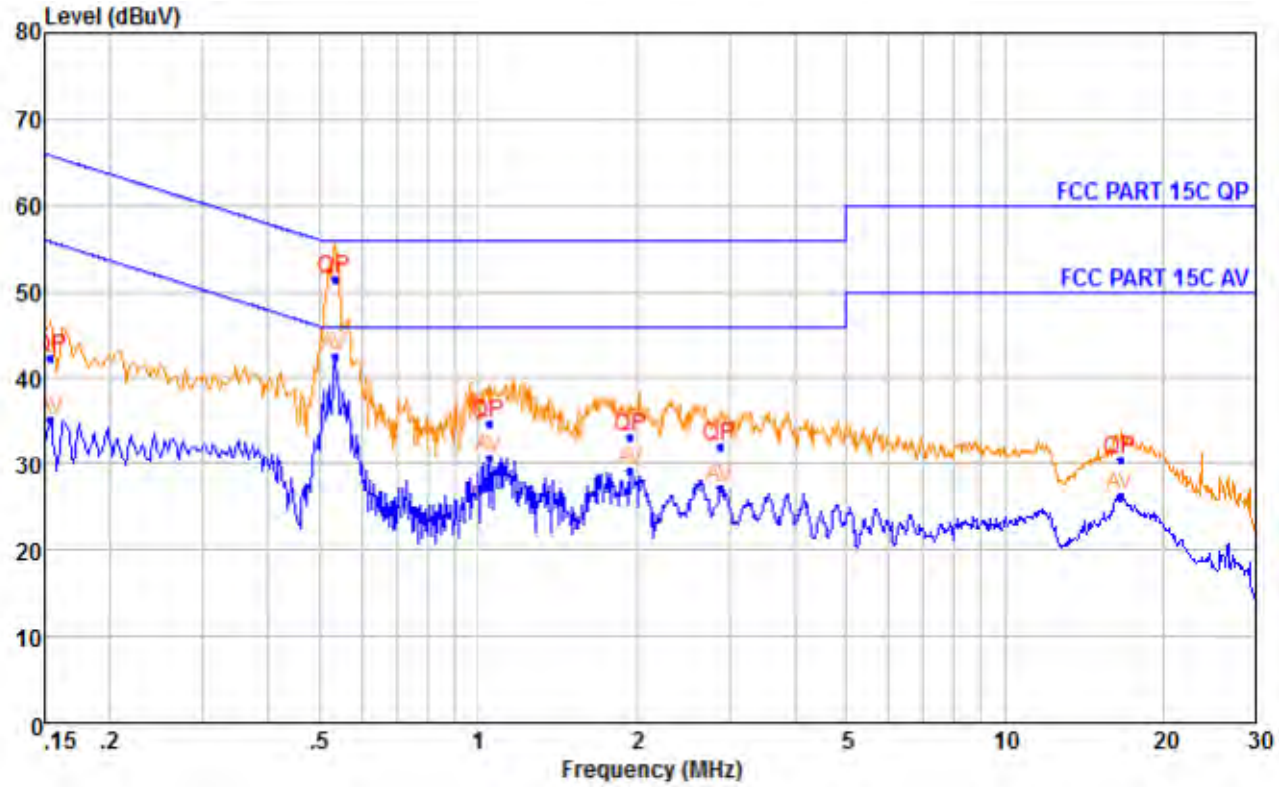
Live line:



NO.	Freq MHz	Reading dBuV	LISN Factor dB	Cable Loss dB	Measured dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.162	25.12	10.32	0.02	35.46	55.34	-19.88	Average
2	0.162	30.43	10.32	0.02	40.77	65.34	-24.57	QP
3	0.535	32.54	10.36	0.03	42.93	46.00	-3.07	Average
4	0.535	40.40	10.36	0.03	50.79	56.00	-5.21	QP
5	1.077	19.30	10.31	0.05	29.66	46.00	-16.34	Average
6	1.077	22.50	10.31	0.05	32.86	56.00	-23.14	QP
7	1.991	18.06	10.43	0.07	28.56	46.00	-17.44	Average
8	1.991	21.01	10.43	0.07	31.51	56.00	-24.49	QP
9	11.996	12.32	10.76	0.15	23.23	50.00	-26.77	Average
10	11.996	17.17	10.76	0.15	28.08	60.00	-31.92	QP
11	16.839	12.32	10.86	0.18	23.36	50.00	-26.64	Average
12	16.839	15.65	10.86	0.18	26.69	60.00	-33.31	QP

1:Measured=Reading + LISN Factor + Cable Loss

Neutral line:



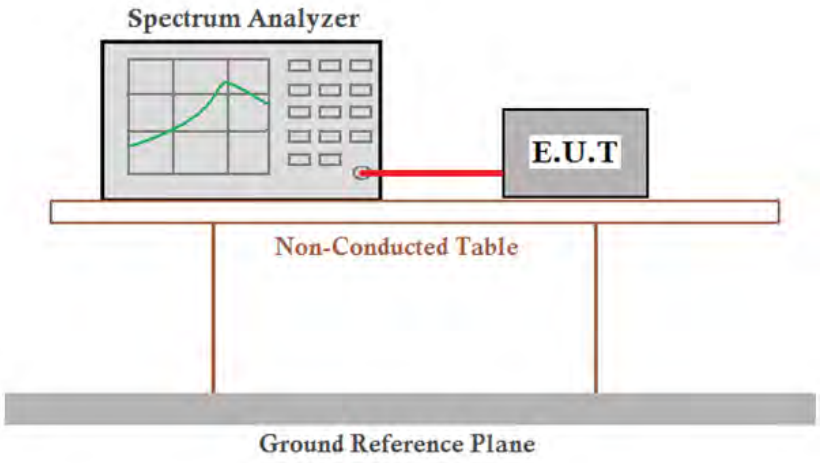
NO.	Freq MHz	Reading dBuV	LISN Factor dB	Cable Loss dB	Measured dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.154	24.72	10.49	0.02	35.23	55.78	-20.55	Average
2	0.154	31.84	10.49	0.02	42.35	65.78	-23.43	QP
3	0.535	31.99	10.53	0.03	42.55	46.00	-3.45	Average
4	0.535	40.86	10.53	0.03	51.42	56.00	-4.58	QP
5	1.049	20.08	10.67	0.05	30.80	46.00	-15.20	Average
6	1.049	24.15	10.67	0.05	34.87	56.00	-21.13	QP
7	1.949	18.43	10.62	0.07	29.12	46.00	-16.88	Average
8	1.949	22.51	10.62	0.07	33.20	56.00	-22.80	QP
9	2.884	16.49	10.60	0.08	27.17	46.00	-18.83	Average
10	2.884	21.31	10.60	0.08	31.99	56.00	-24.01	QP
11	16.573	15.30	10.90	0.18	26.38	50.00	-23.62	Average
12	16.573	19.42	10.90	0.18	30.50	60.00	-29.50	QP

1:Measured=Reading + LISN Factor + Cable Loss

Remark:

The following Quasi-Peak and Average measurements were performed on the EUT:

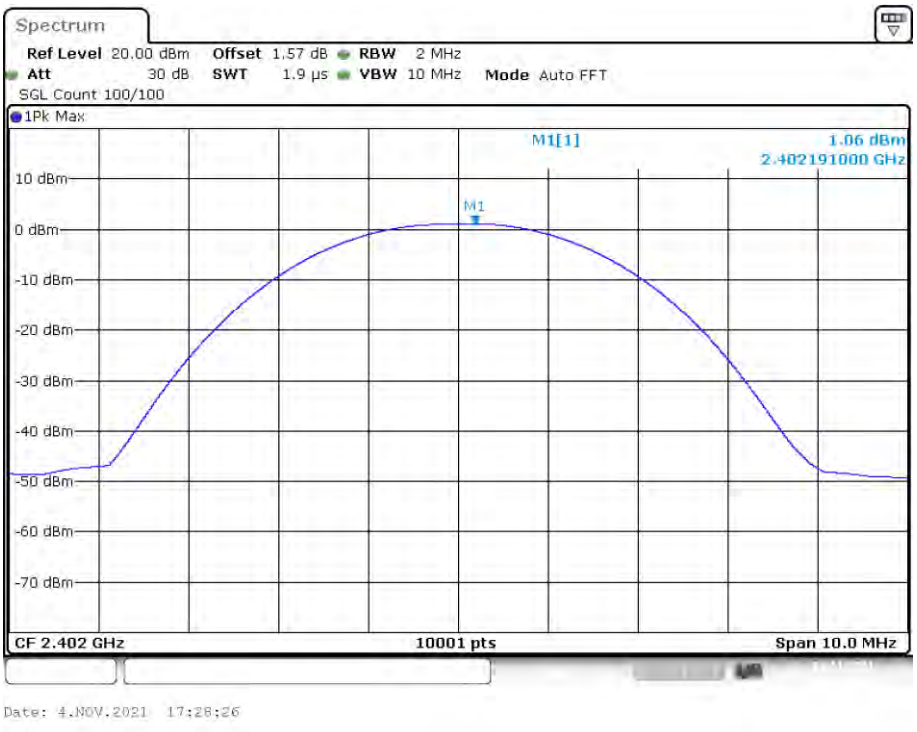
5.3 Conducted Peak Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(1)
Test Method:	ANSI C63.10:2013
Test Setup:	 *Remark:* *Factor: the High-Frequency cable loss 1.5dB in the spectrum analyzer.*
Limit:	21dBm
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type, 2-DH1 of data type is the worst case of π/4DQPSK modulation type, 3-DH1 of data type is the worst case of 8DPSK modulation type.
Test Results:	Pass

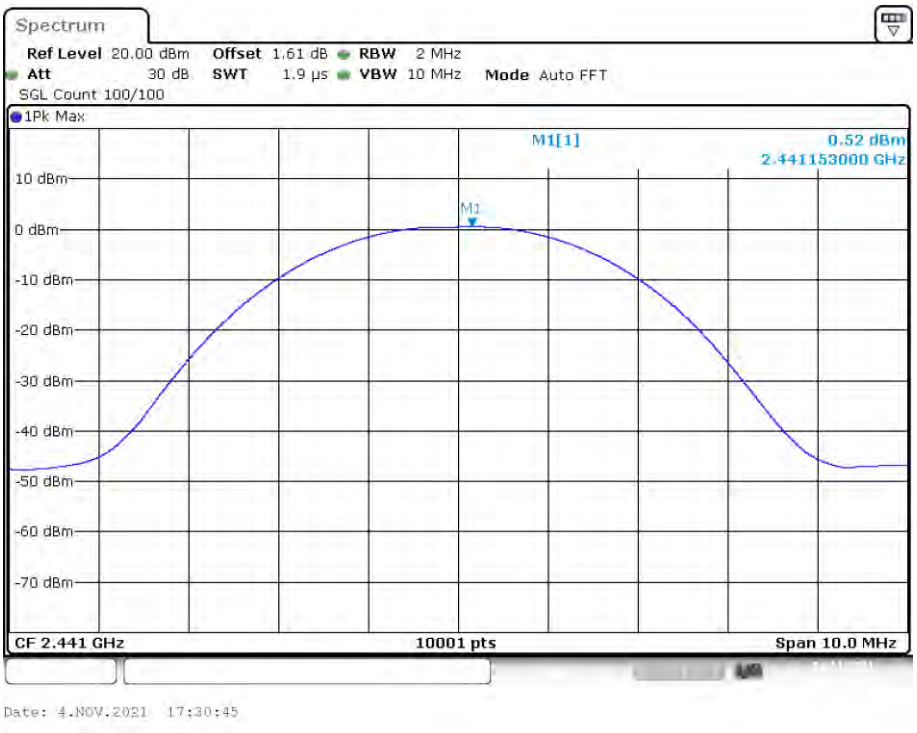
Measurement Data

GFSK mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	1.06	30.0	Pass
Middle	0.52	30.0	Pass
Highest	0.53	30.0	Pass
π/4DQPSK mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	0.75	21.00	Pass
Middle	0.20	21.00	Pass
Highest	0.20	21.00	Pass
8DPSK mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	0.86	21.00	Pass
Middle	0.47	21.00	Pass
Highest	0.41	21.00	Pass

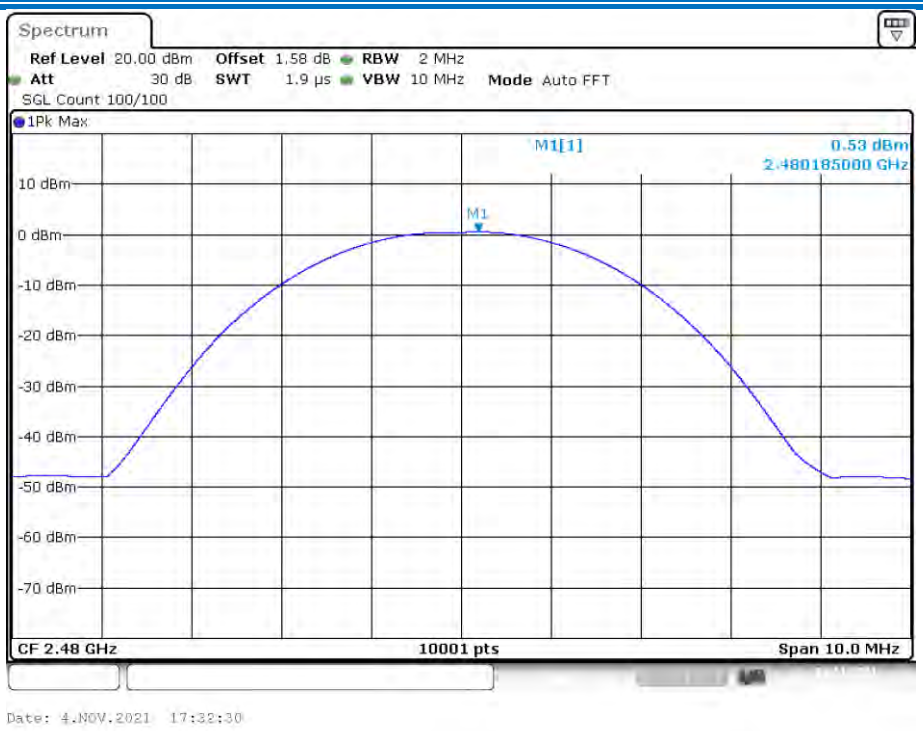
Test plot as follows:



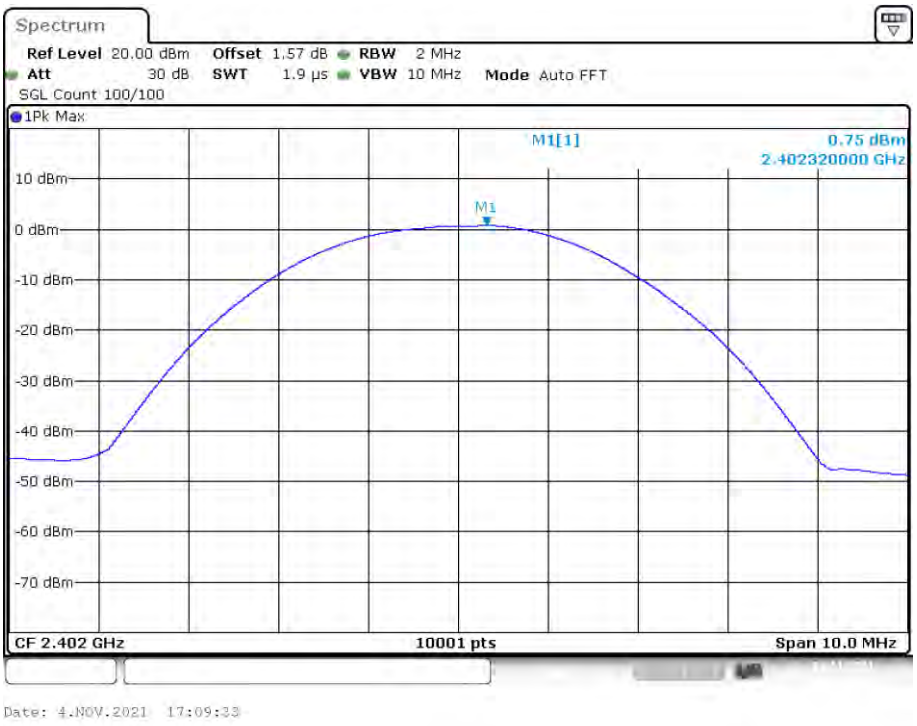
Power NVNT 1-DH5 2402MHz Ant1



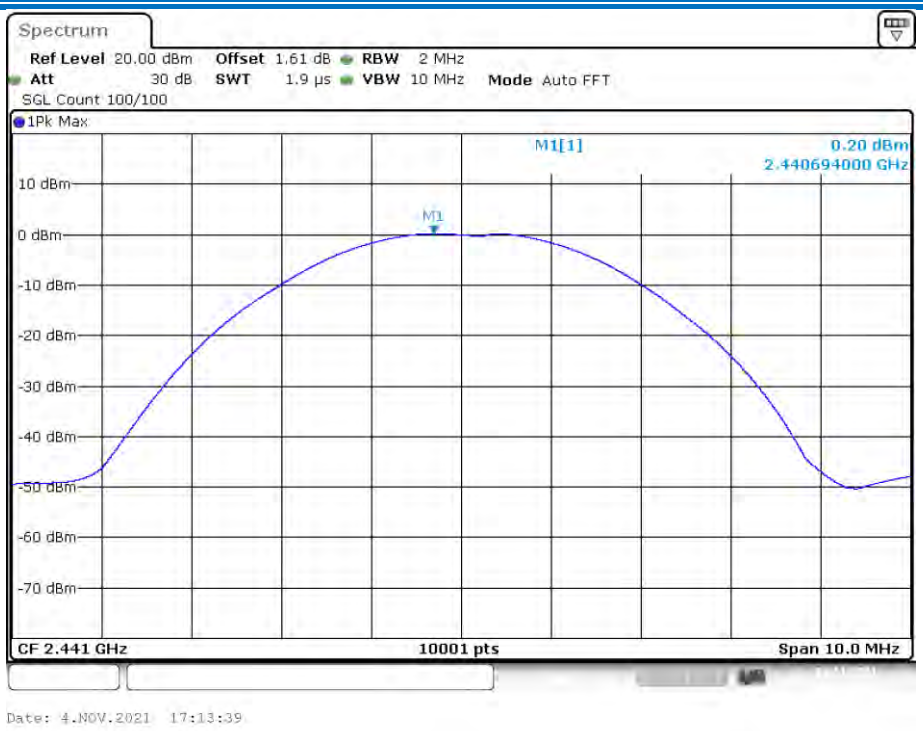
Power NVNT 1-DH5 2441MHz Ant1



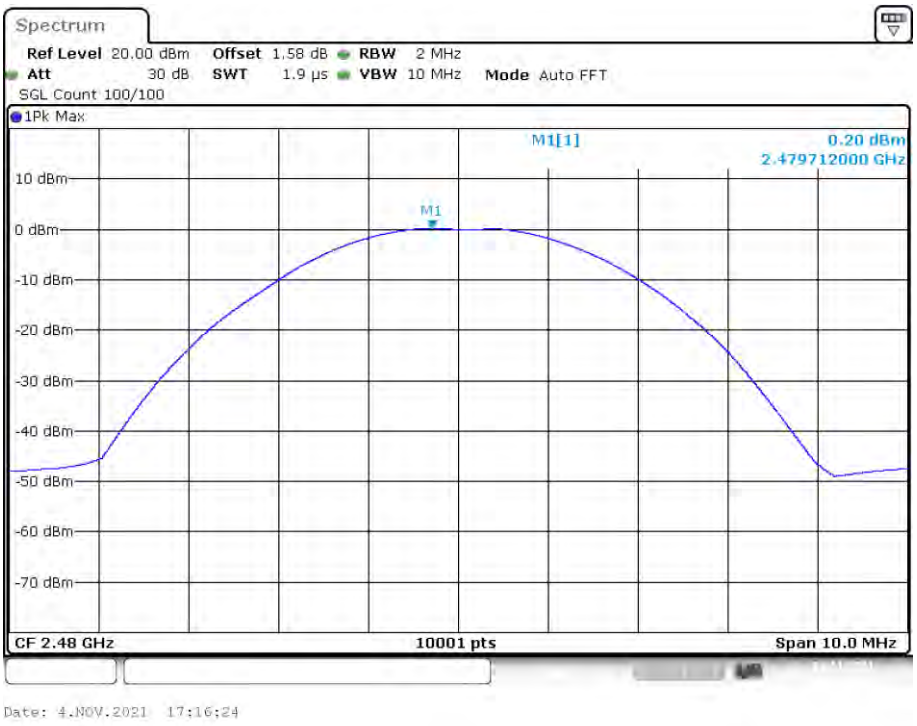
Power NVNT 1-DH5 2480MHz Ant1



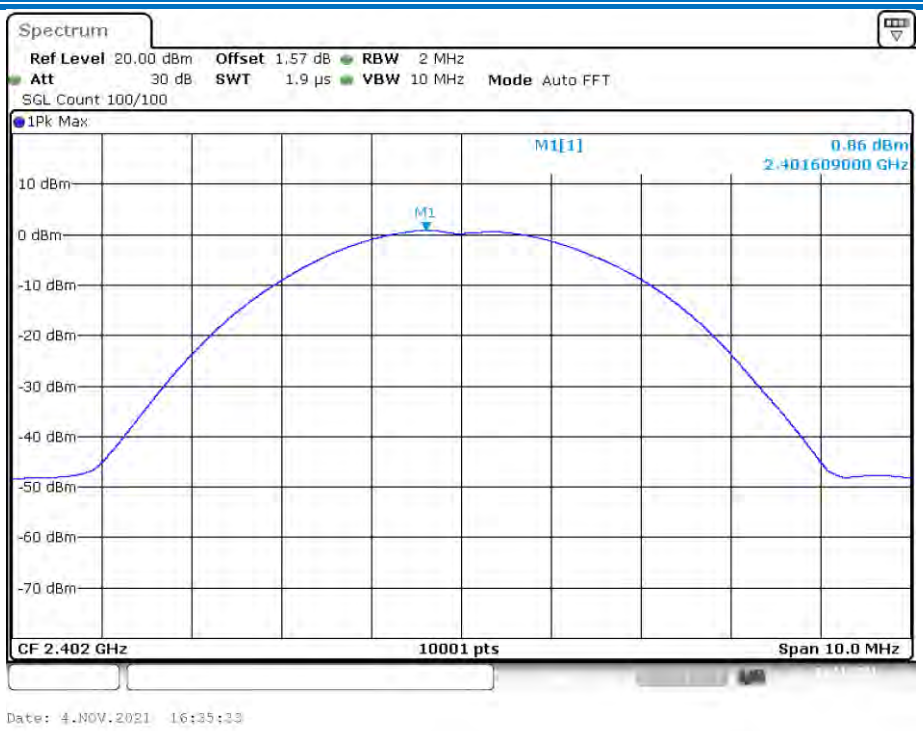
Power NVNT 2-DH5 2402MHz Ant1



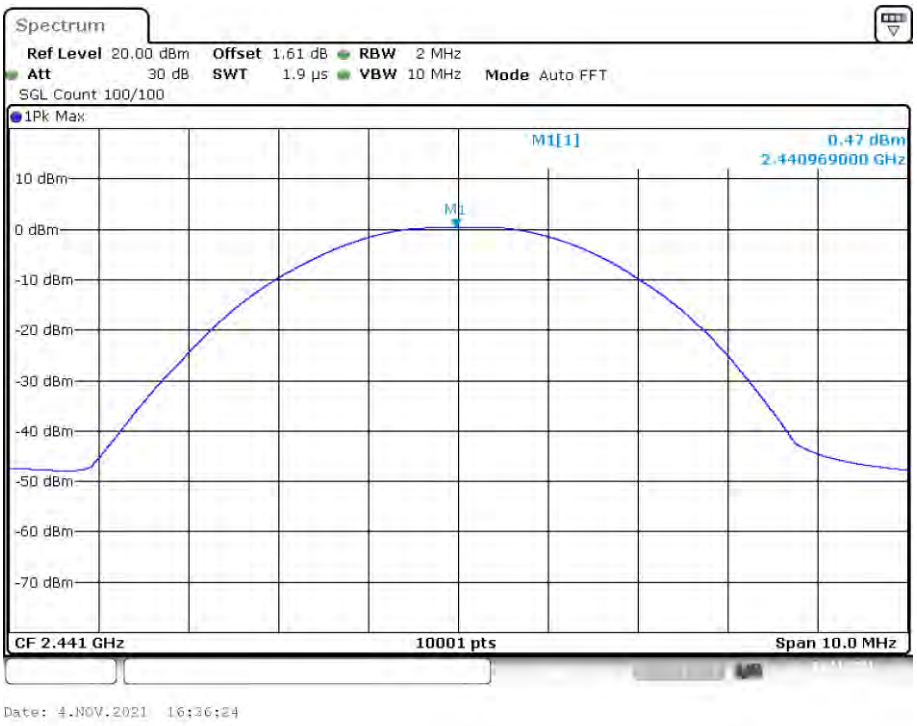
Power NVNT 2-DH5 2441MHz Ant1



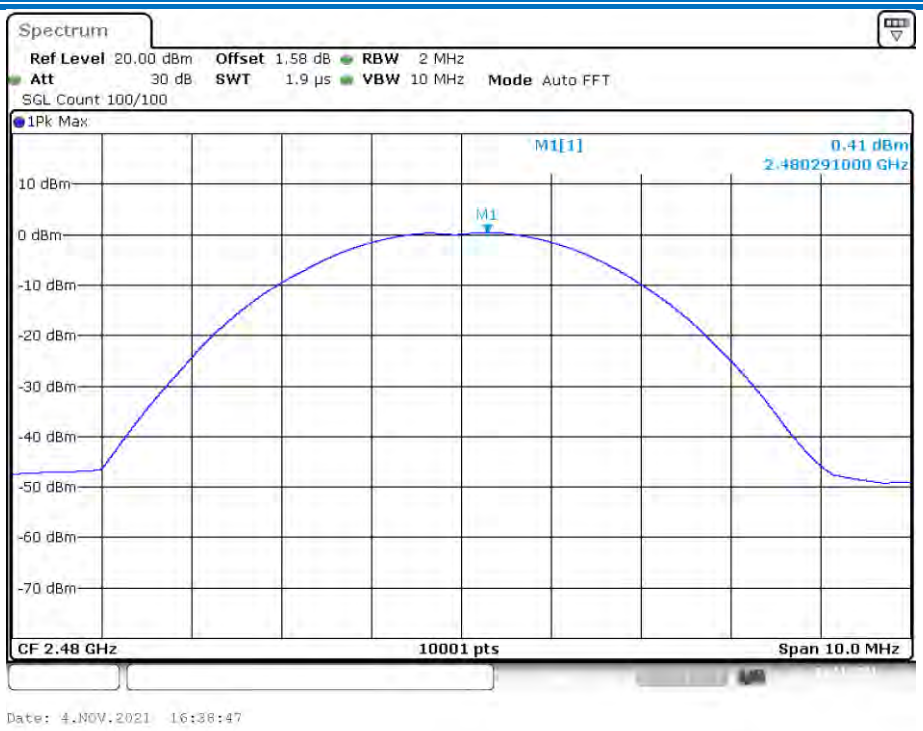
Power NVNT 2-DH5 2480MHz Ant1



Power NVNT 3-DH5 2402MHz Ant1

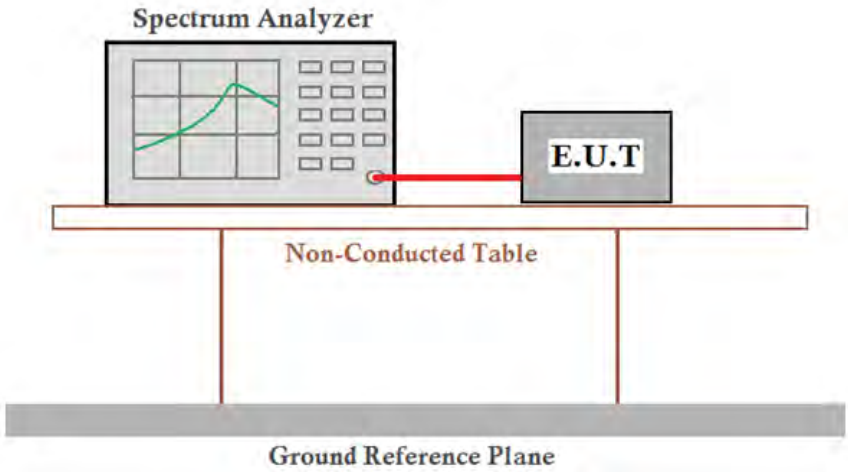


Power NVNT 3-DH5 2441MHz Ant1



Power NVNT 3-DH5 2480MHz Ant1

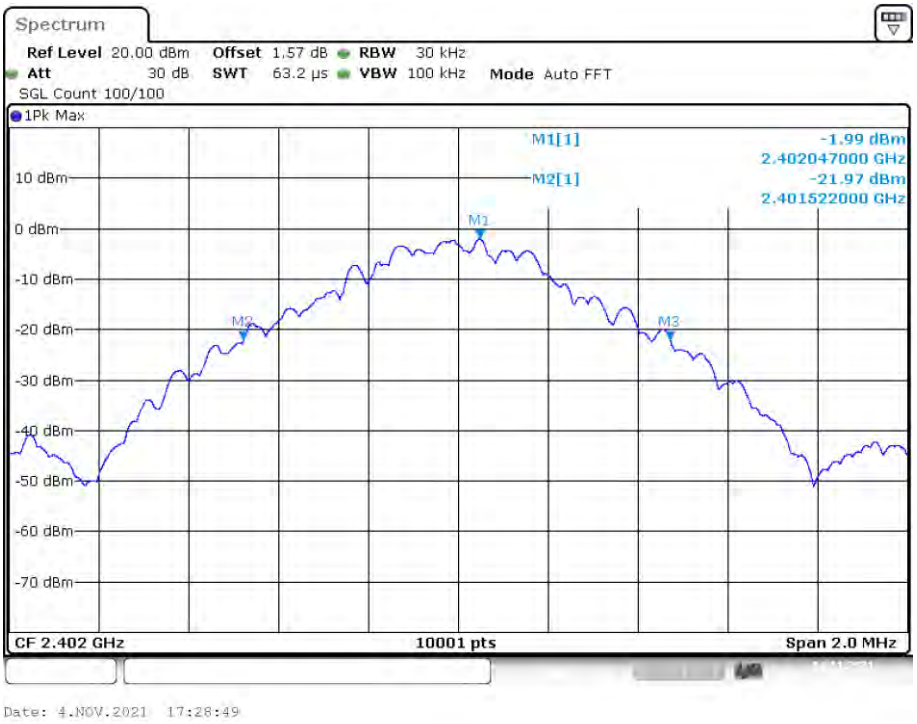
5.4 20dB Occupy Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Test Setup:	
Limit:	NA
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type, 2-DH1 of data type is the worst case of π/4DQPSK modulation type, 3-DH1 of data type is the worst case of 8DPSK modulation type.
Test Results:	Pass

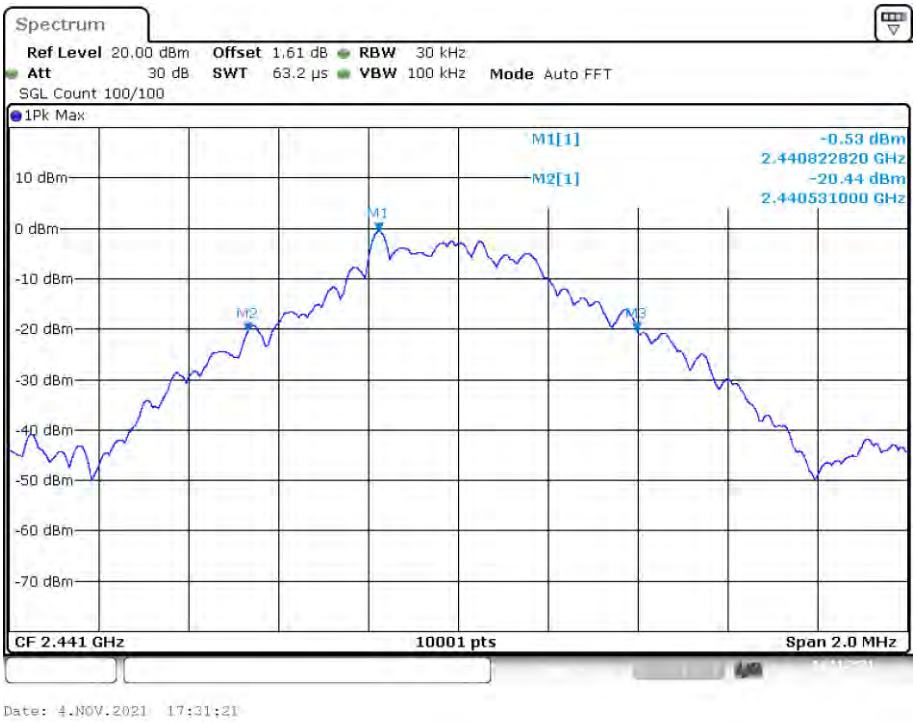
Measurement Data

Test channel	20dB Occupy Bandwidth (kHz)		
	GFSK	π/4DQPSK	8DPSK
Lowest	0.949	1.351	1.237
Middle	0.868	1.346	1.266
Highest	0.933	1.275	1.256

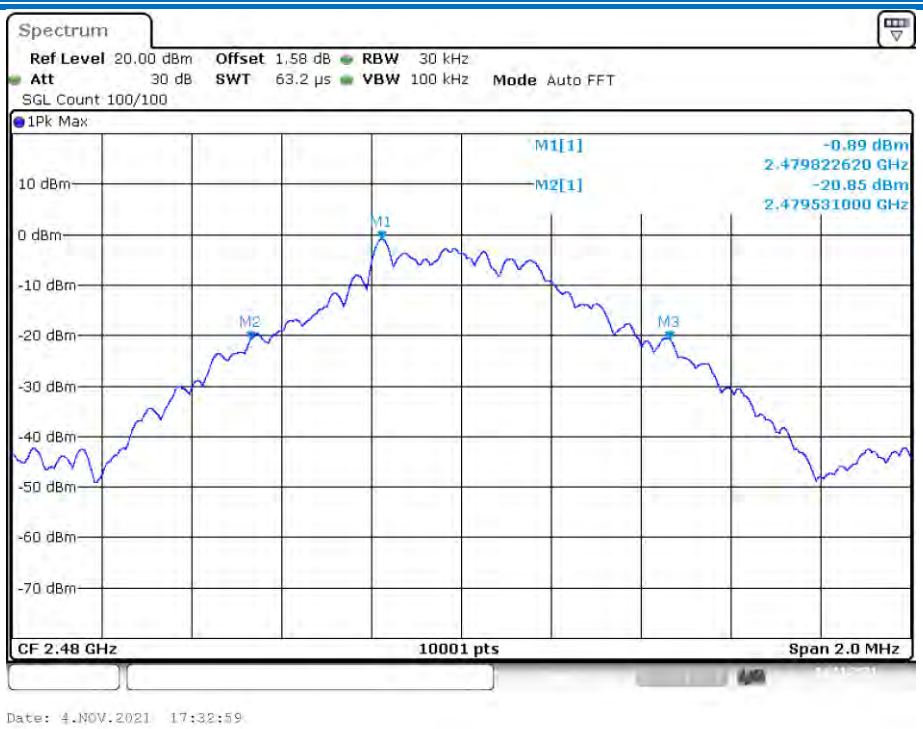
Test plot as follows:-



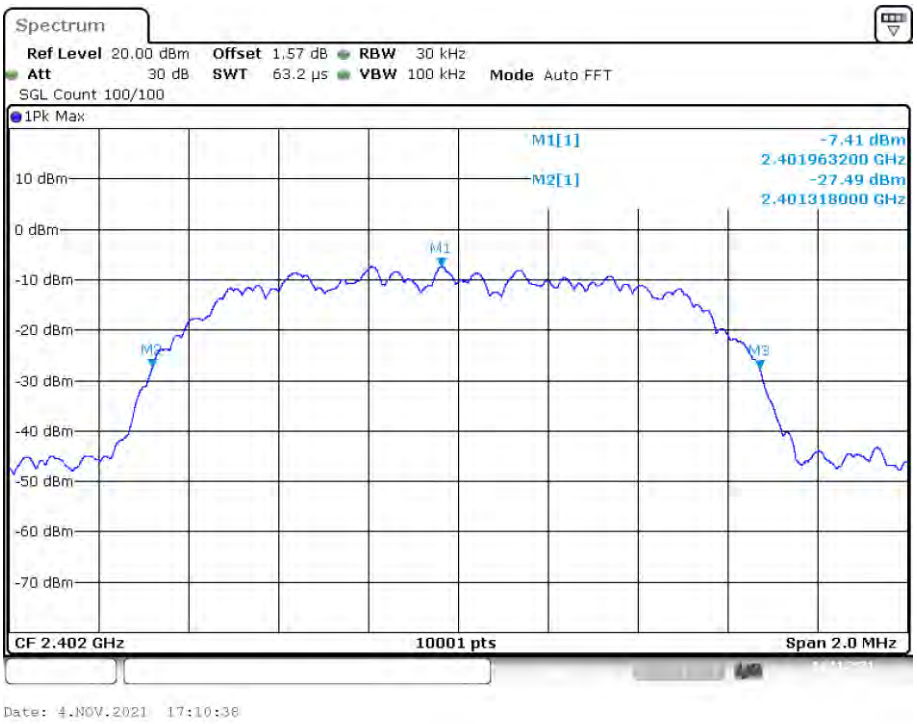
-20dB Bandwidth NVNT 1-DH5 2402MHz Ant1



-20dB Bandwidth NVNT 1-DH5 2441MHz Ant1

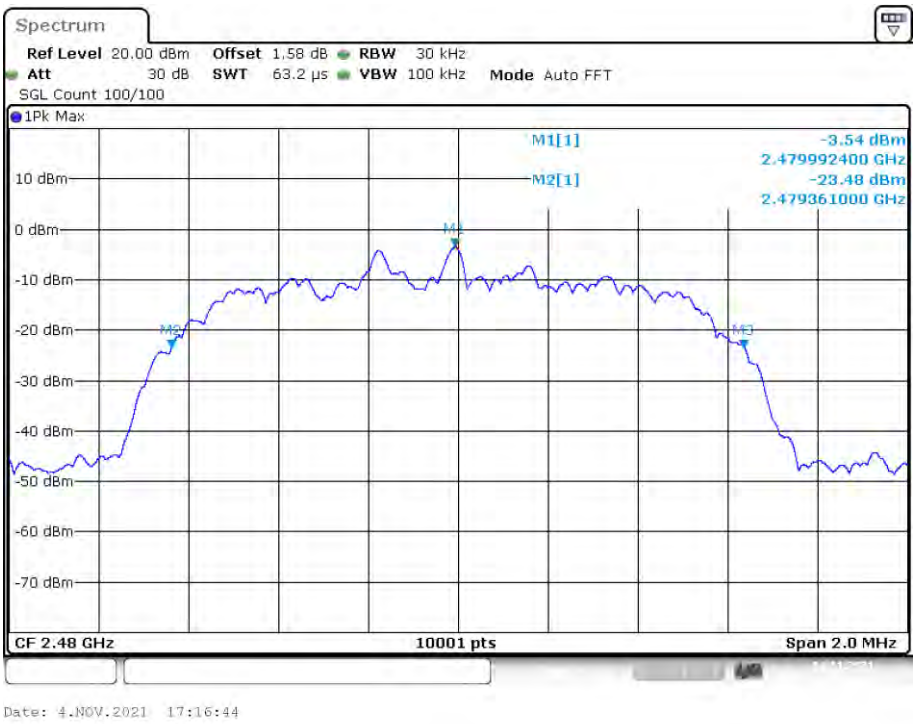


-20dB Bandwidth NVNT 1-DH5 2480MHz Ant1



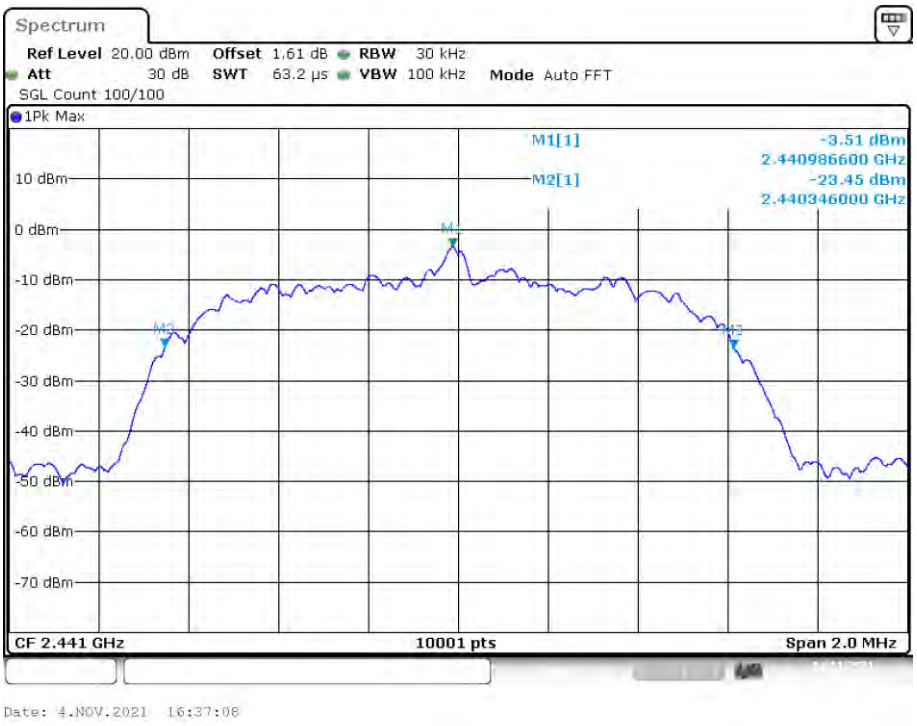
-20dB Bandwidth NVNT 2-DH5 2402MHz Ant1

-20dB Bandwidth NVNT 2-DH5 2441MHz Ant1



-20dB Bandwidth NVNT 2-DH5 2480MHz Ant1

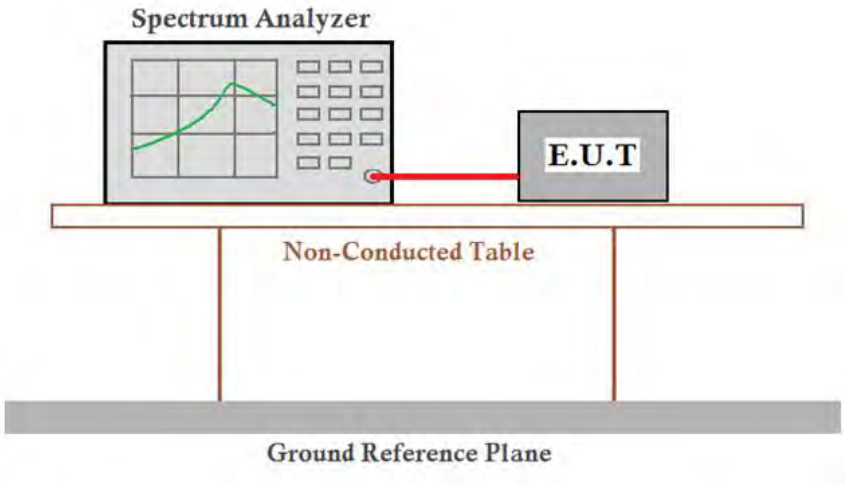
-20dB Bandwidth NVNT 3-DH5 2402MHz Ant1



-20dB Bandwidth NVNT 3-DH5 2441MHz Ant1

-20dB Bandwidth NVNT 3-DH5 2480MHz Ant1

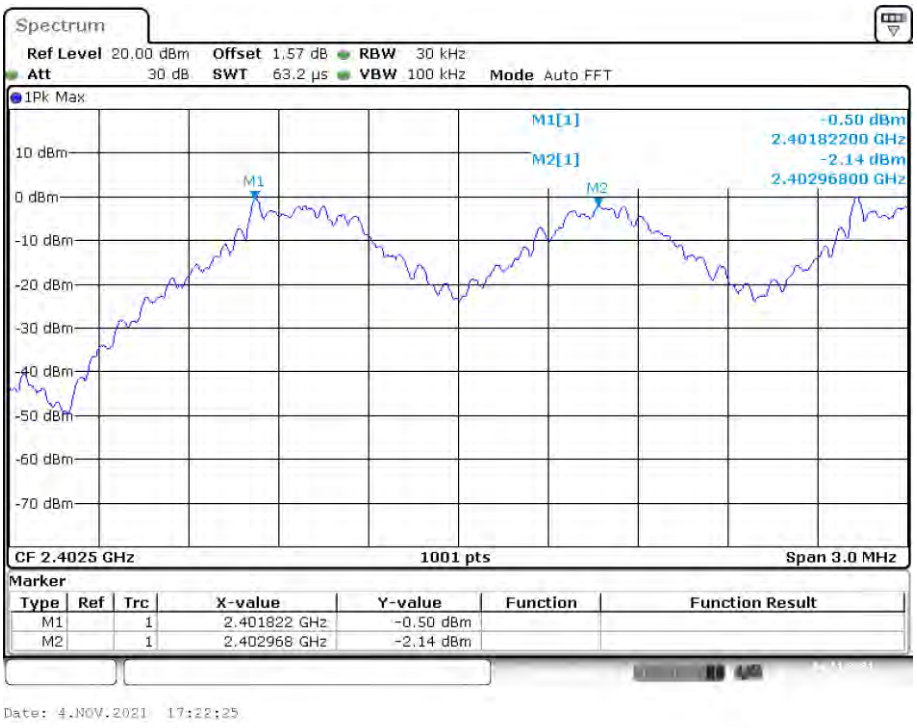
5.5 Carrier Frequencies Separation

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Test Setup:	
Limit:	2/3 of the 20dB bandwidth
	Remark: the transmission power is less than 0.125W.
Exploratory Test Mode:	Hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type, 2-DH1 of data type is the worst case of π/4DQPSK modulation type, 3-DH1 of data type is the worst case of 8DPSK modulation type.
Test Results:	Pass

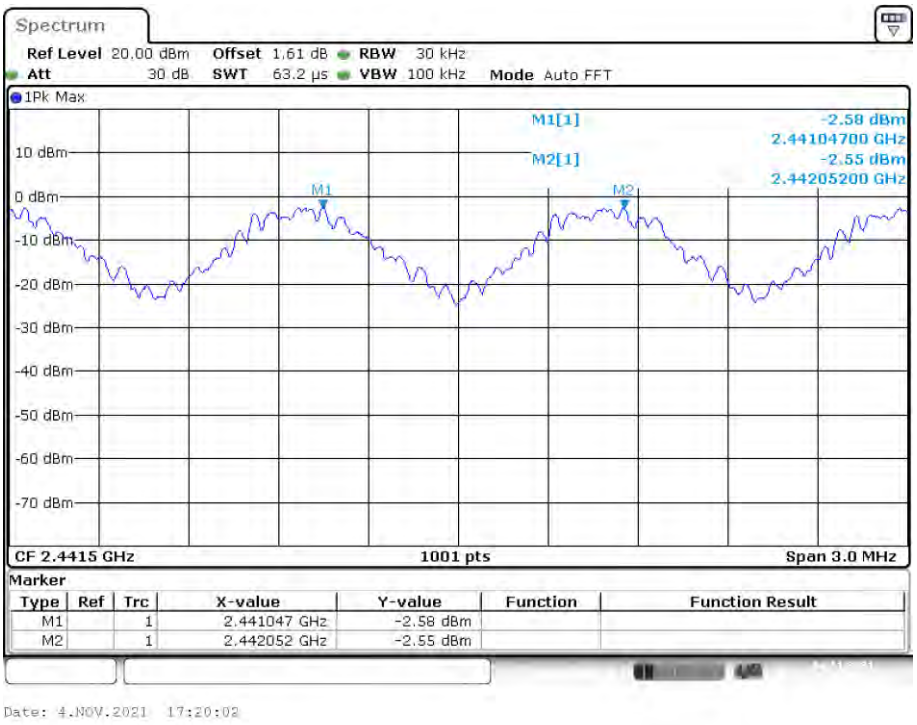
Measurement Data

GFSK mode			
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	1.146	≥0.998	Pass
Middle	1.005	≥0.94	Pass
Highest	0.774	≥0.868	Pass
π/4DQPSK mode			
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	1.002	≥0.891	Pass
Middle	1.008	≥0.899	Pass
Highest	1.002	≥0.853	Pass
8DPSK mode			
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	1.002	≥0.837	Pass
Middle	1.005	≥0.823	Pass
Highest	1.161	≥0.822	Pass

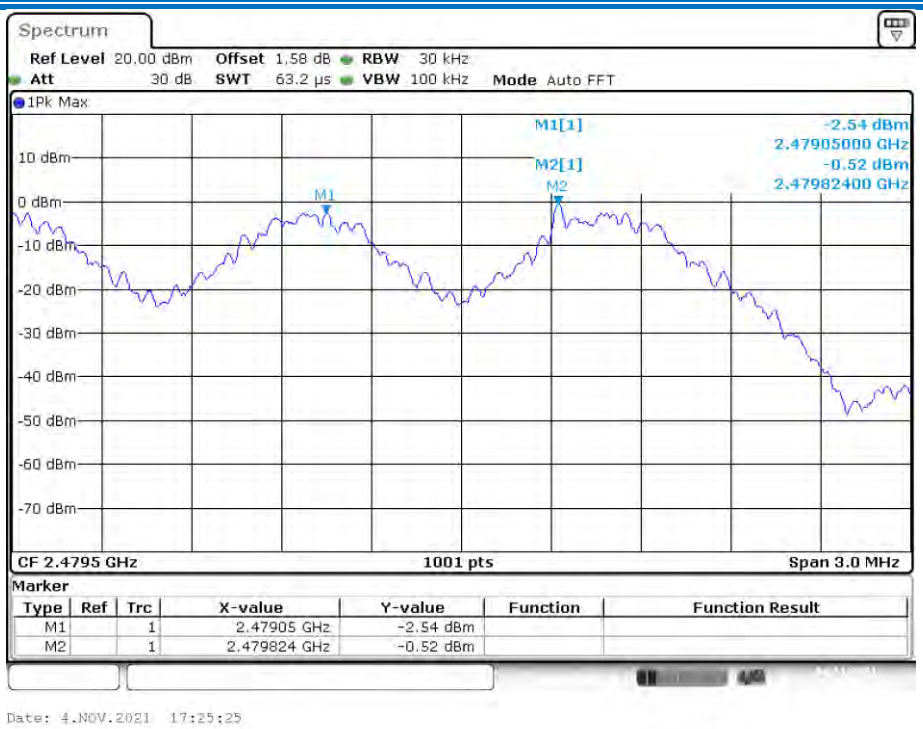
Test plot as follows:



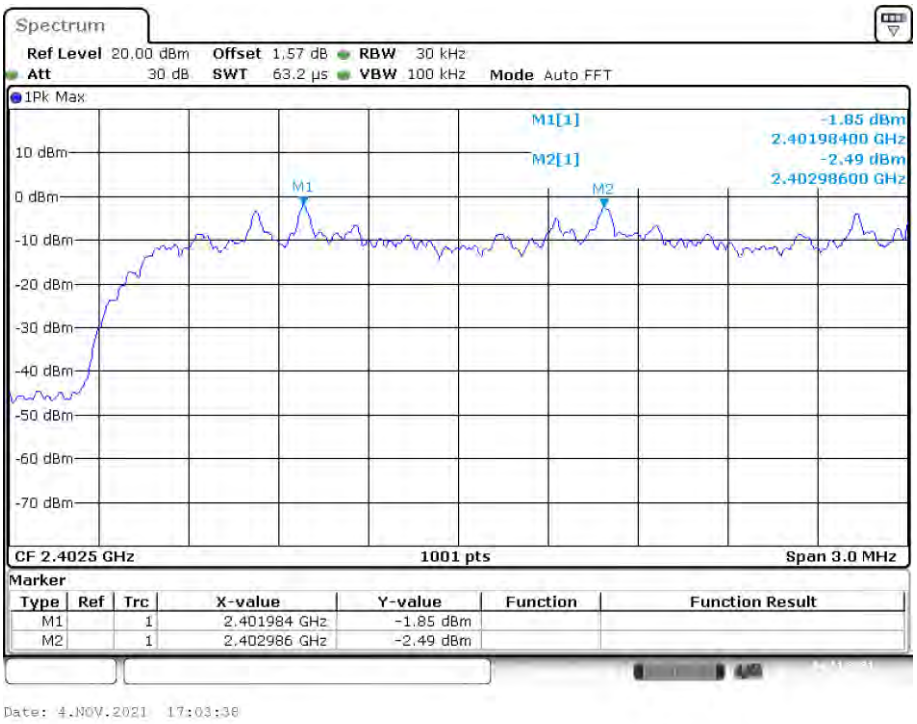
CFS NVNT 1-DH5 2402MHz Ant1



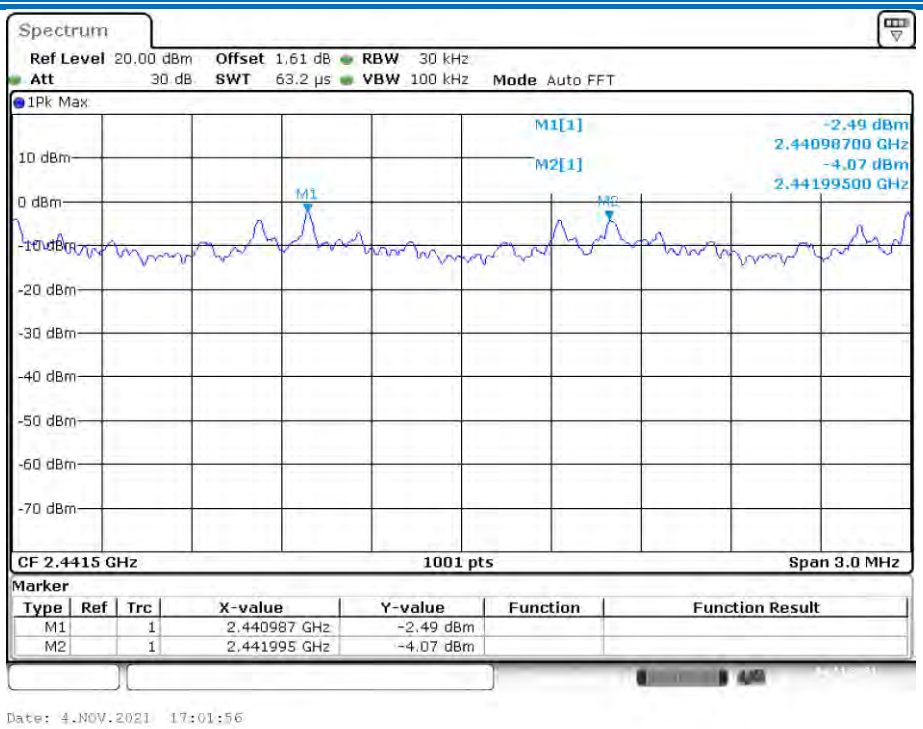
CFS NVNT 1-DH5 2441MHz Ant1



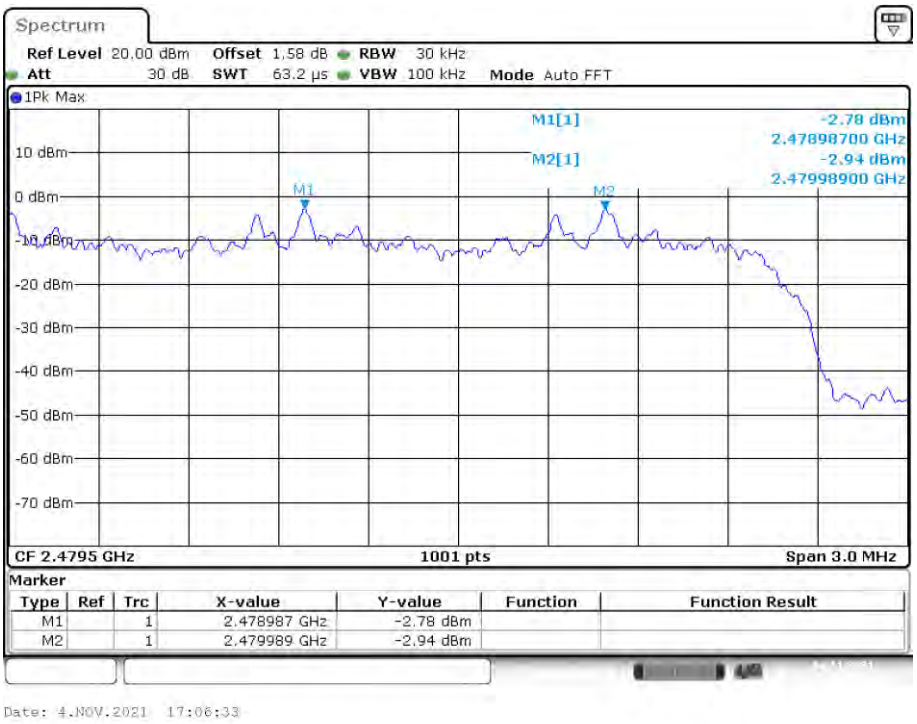
CFS NVNT 1-DH5 2480MHz Ant1



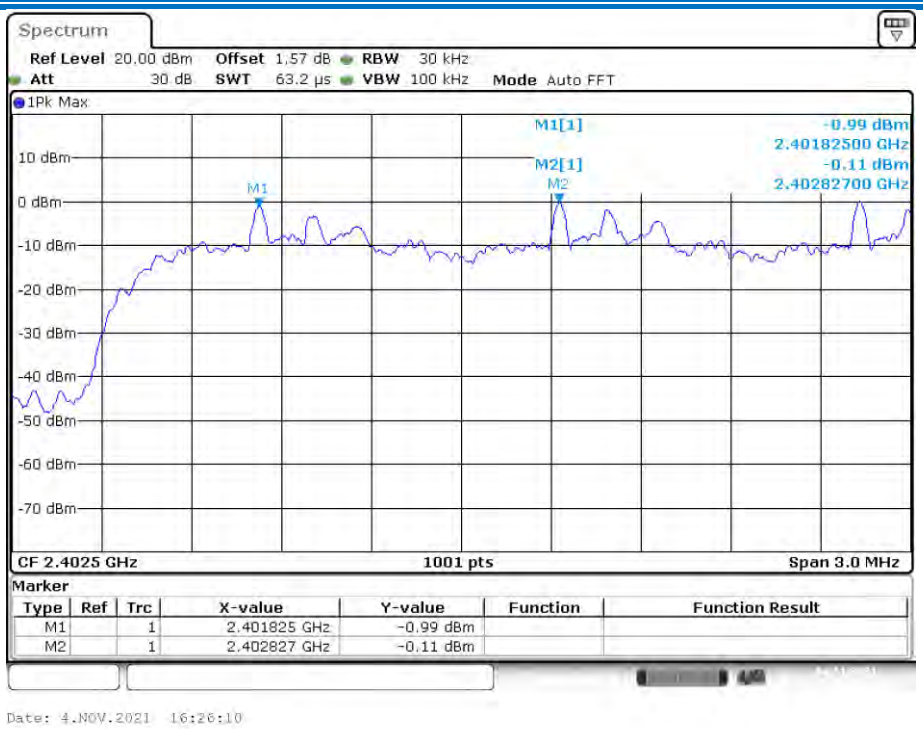
CFS NVNT 2-DH5 2402MHz Ant1



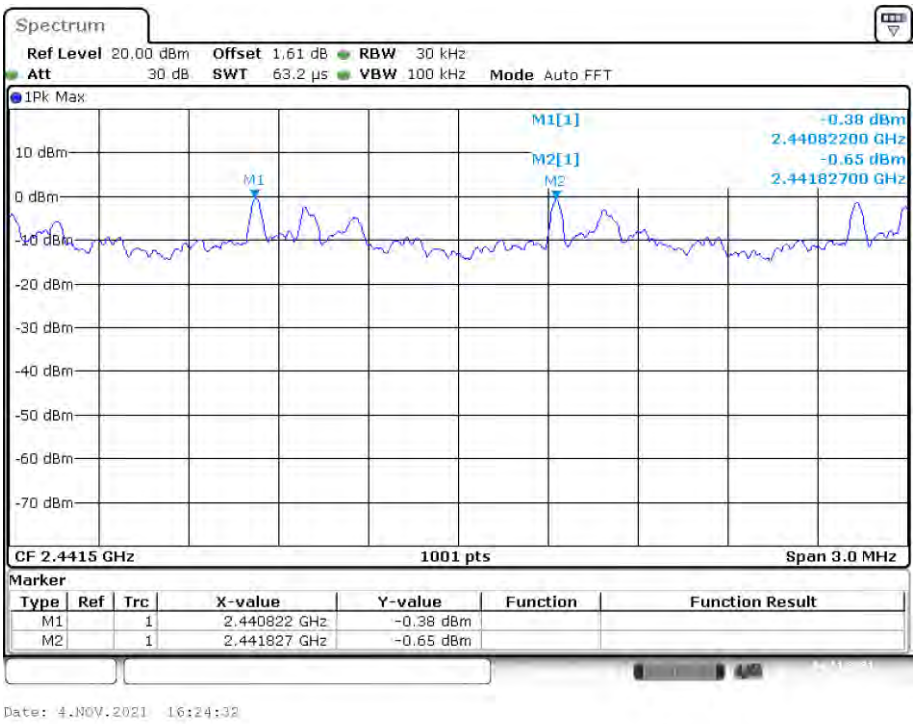
CFS NVNT 2-DH5 2441MHz Ant1



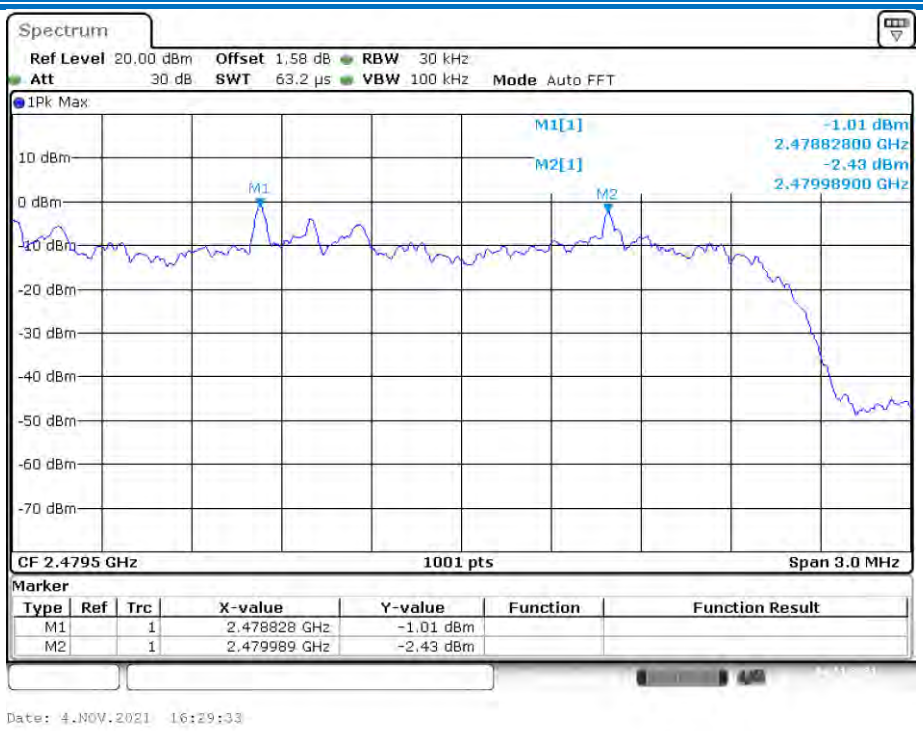
CFS NVNT 2-DH5 2480MHz Ant1



CFS NVNT 3-DH5 2402MHz Ant1

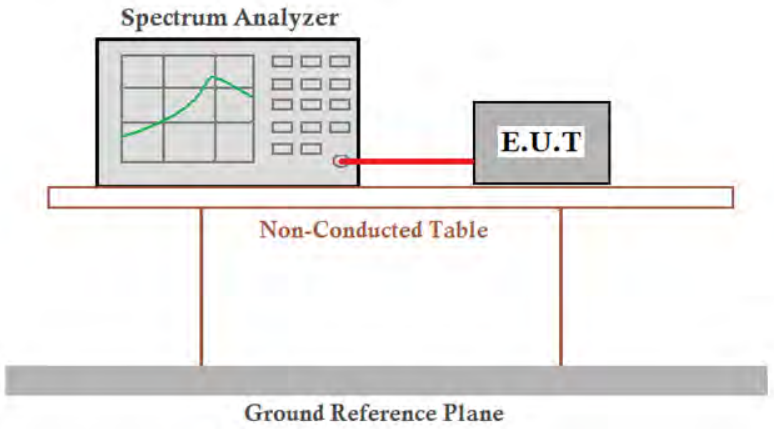


CFS NVNT 3-DH5 2441MHz Ant1



CFS NVNT 3-DH5 2480MHz Ant1

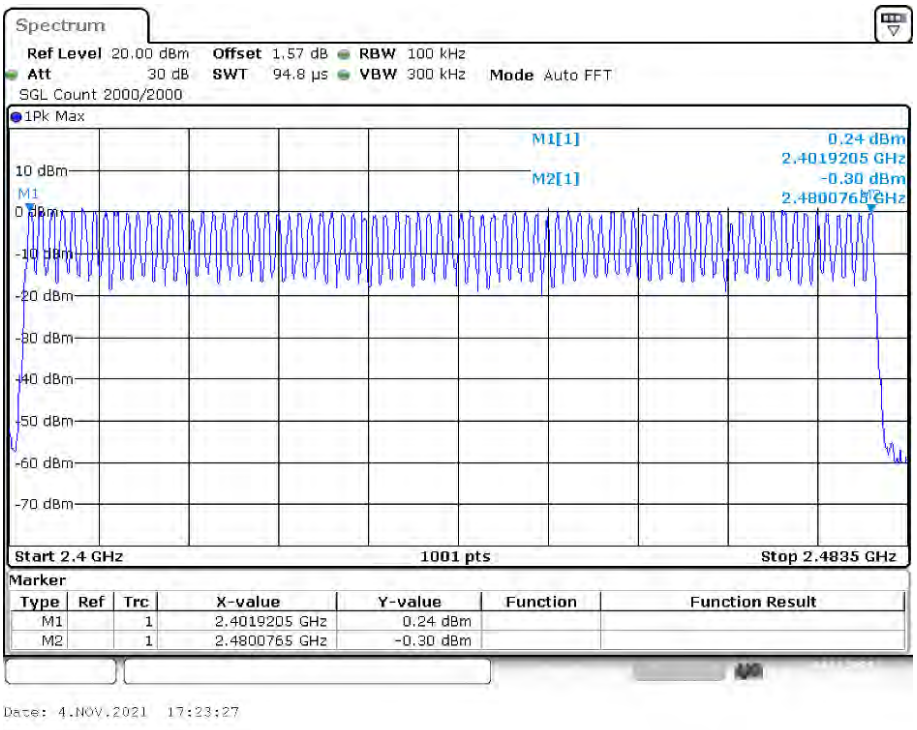
5.6 Hopping Channel Number

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Test Setup:	
Limit:	At least 15 channels
Test Mode:	Hopping transmitting with all kind of modulation
Test Results:	Pass

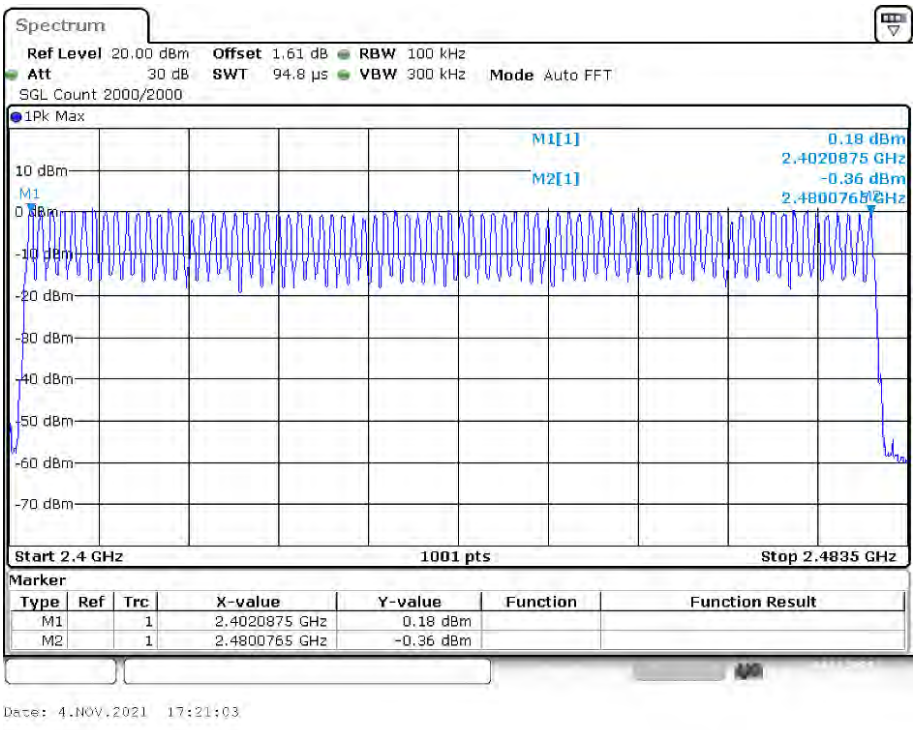
Measurement Data

Mode	Hopping channel numbers	Limit
GFSK	79	≥15
π/4DQPSK	79	≥15
8DPSK	79	≥15

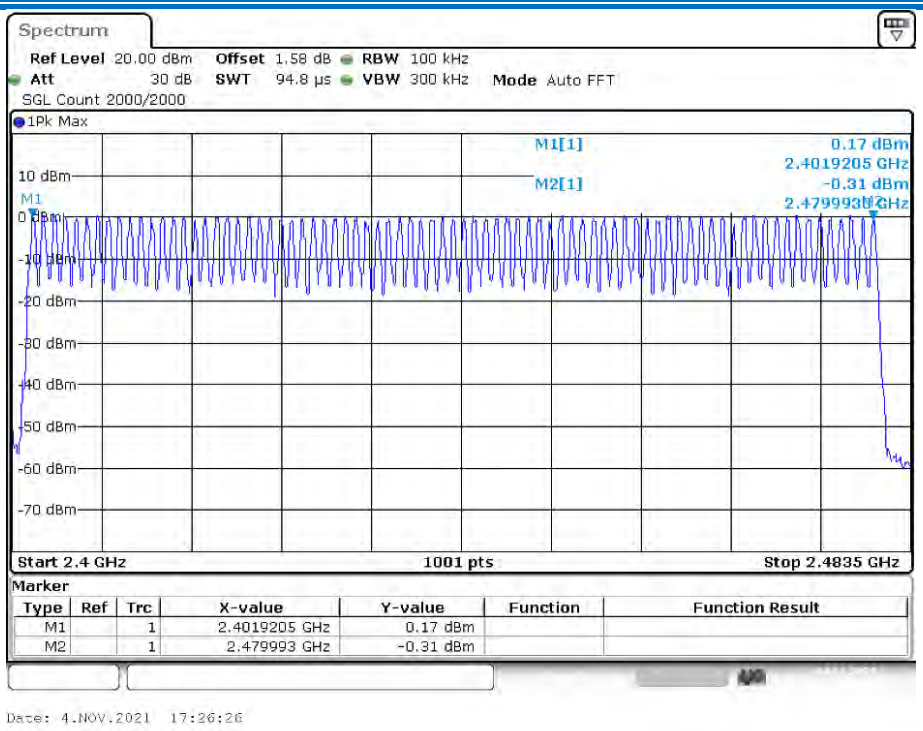
Test plot as follows:



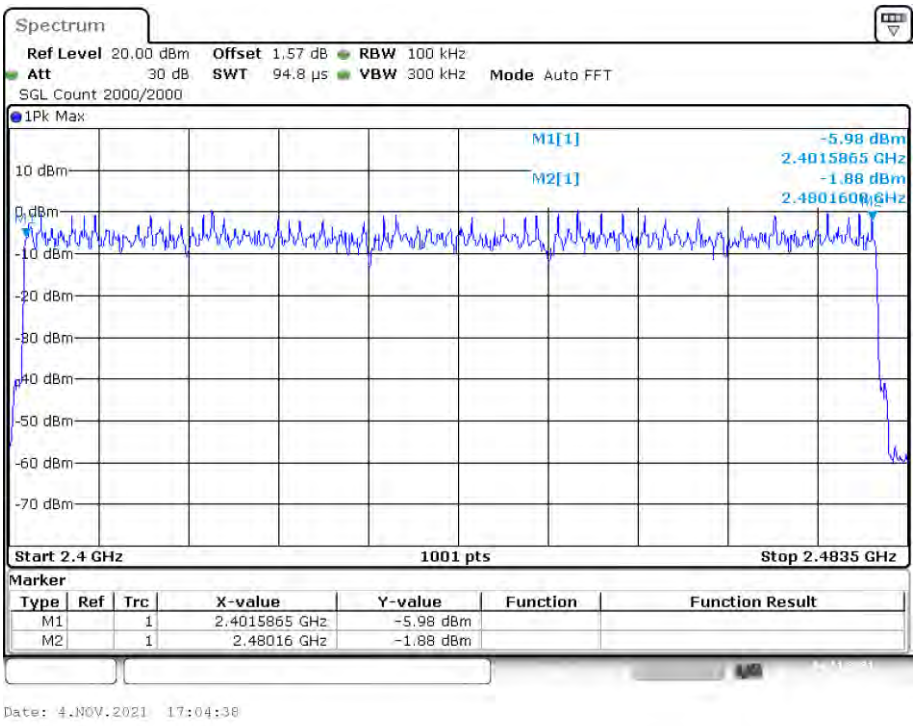
Hopping No. NVNT 1-DH5 2402MHz Ant1



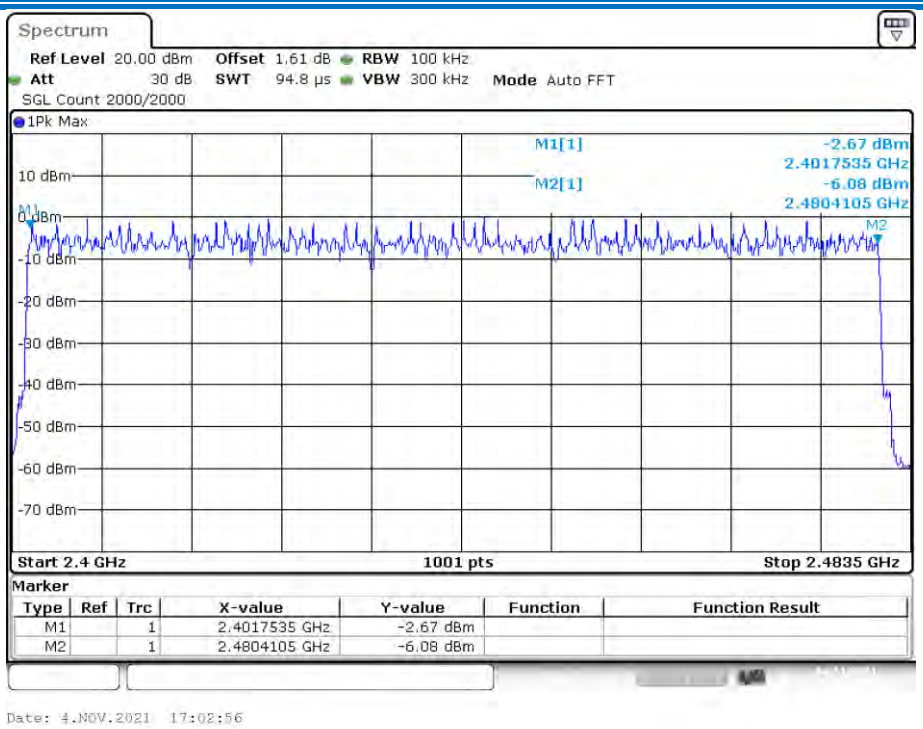
Hopping No. NVNT 1-DH5 2441MHz Ant1



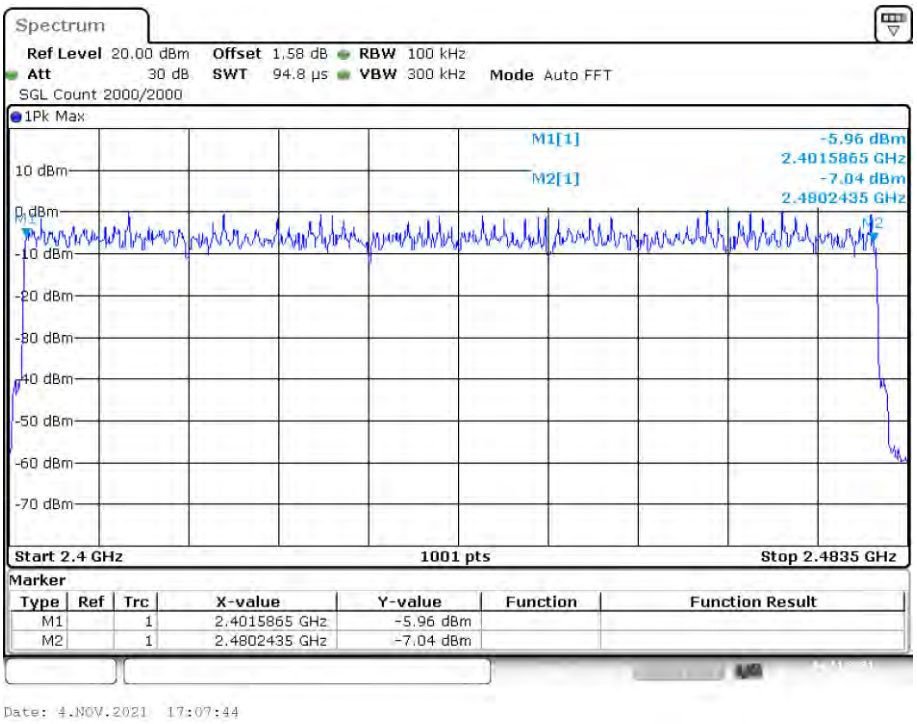
Hopping No. NVNT 1-DH5 2480MHz Ant1



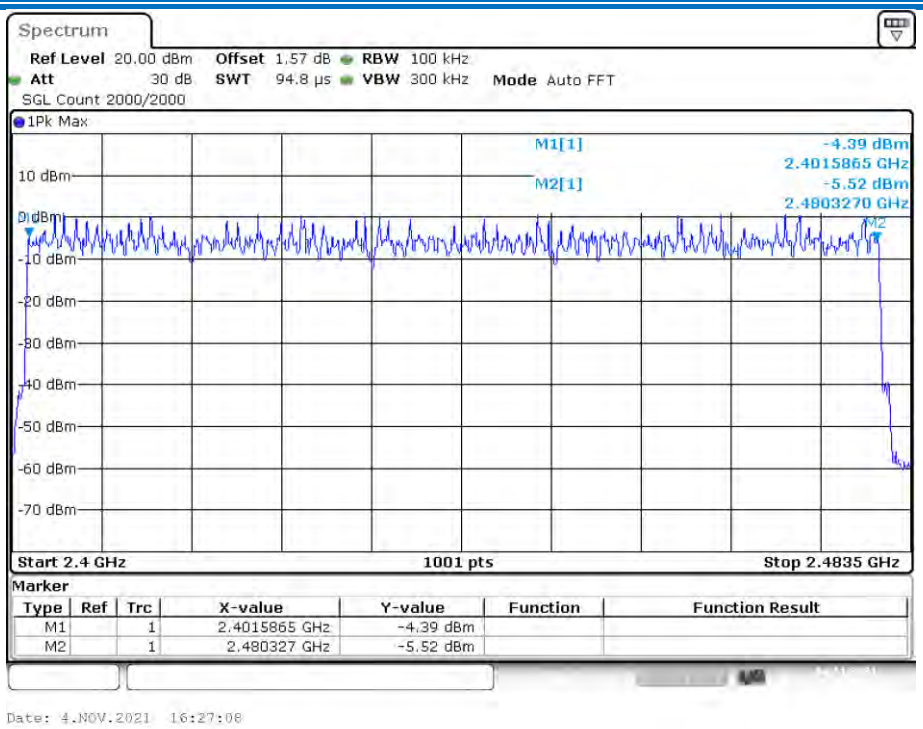
Hopping No. NVNT 2-DH5 2402MHz Ant1



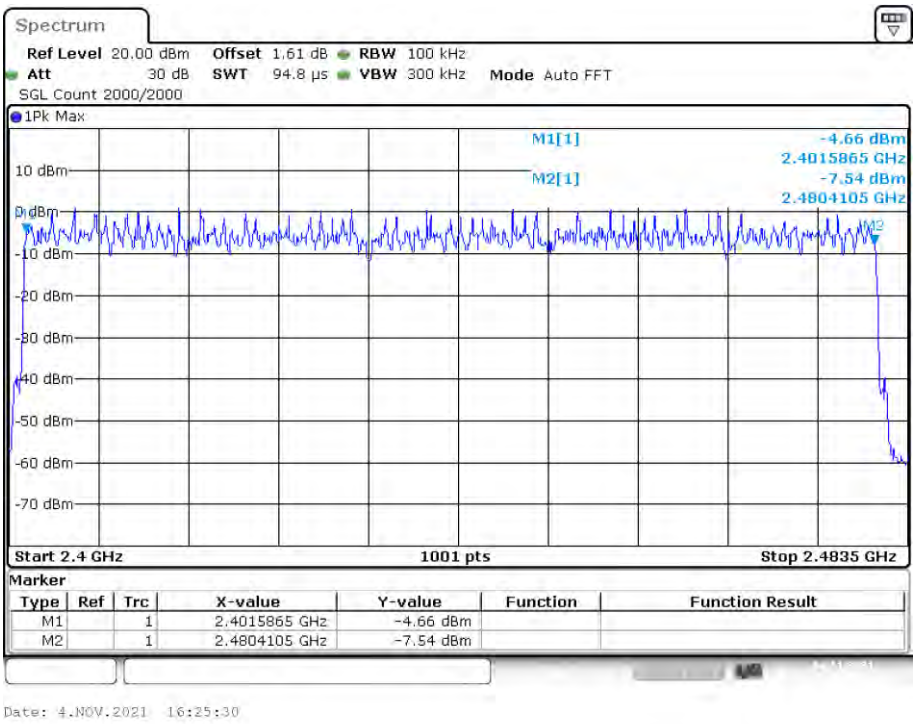
Hopping No. NVNT 2-DH5 2441MHz Ant1



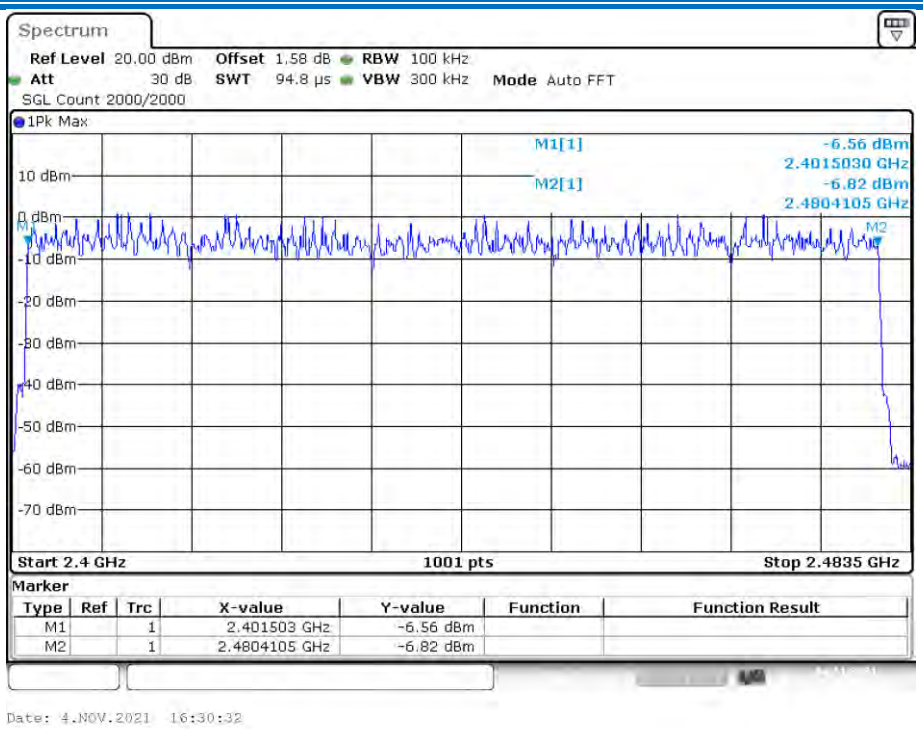
Hopping No. NVNT 2-DH5 2480MHz Ant1



Hopping No. NVNT 3-DH5 2402MHz Ant1

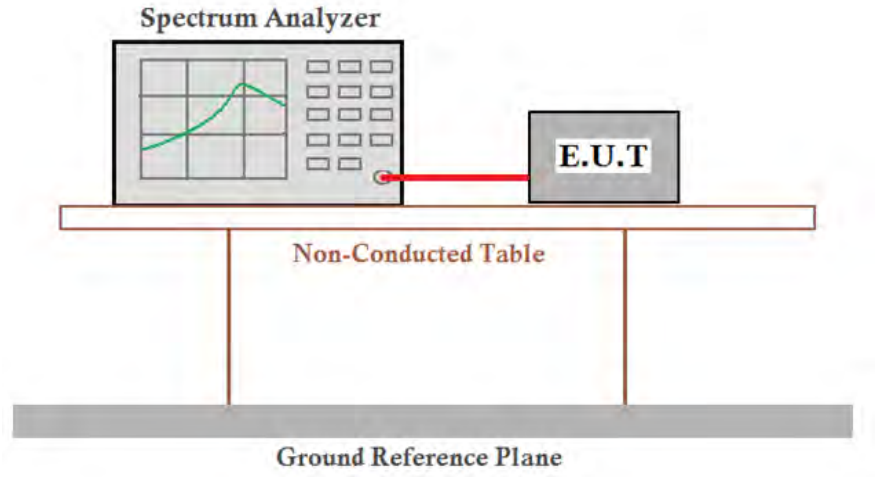


Hopping No. NVNT 3-DH5 2441MHz Ant1



Hopping No. NVNT 3-DH5 2480MHz Ant1

5.7 Dwell Time

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Test Setup:	
Test Mode:	Hopping transmitting with all kind of modulation and all kind of data type.
Limit:	0.4 Second
Test Results:	Pass

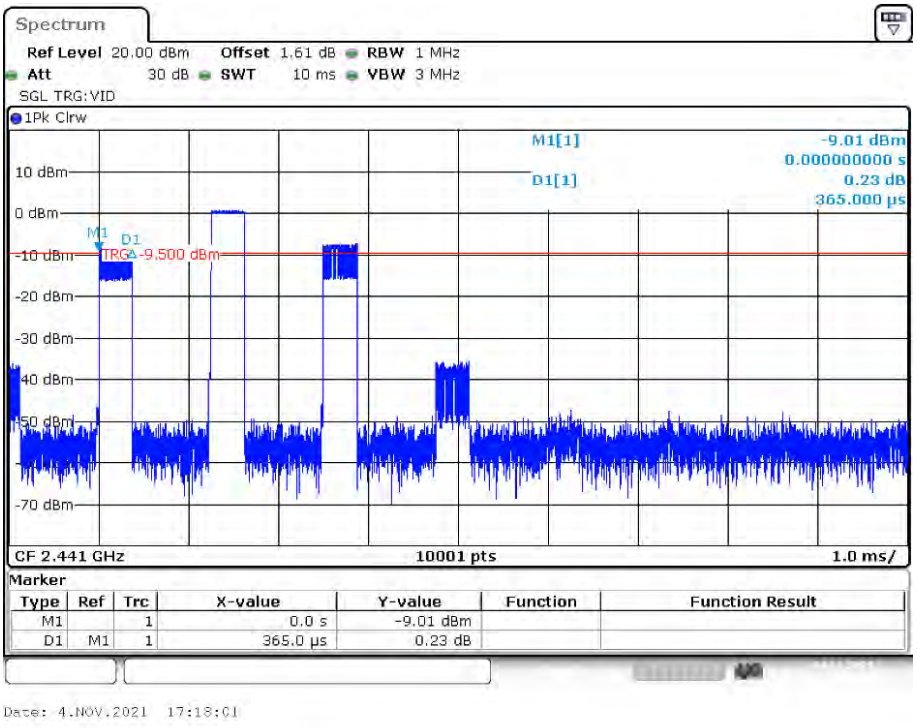
Measurement Data

Mode	Packet	Pulse time (ms)	Dwell time [s]	Limit (second)
GFSK	DH1	0.365	0.117	≤0.4
	DH3	1.621	0.259	≤0.4
	DH5	2.868	0.306	≤0.4
π/4DQPSK	2-DH1	0.373	0.119	≤0.4
	2-DH3	1.632	0.261	≤0.4
	2-DH5	2.879	0.307	≤0.4
8DPSK	3-DH1	0.371	0.119	≤0.4
	3-DH3	1.63	0.261	≤0.4
	3-DH5	2.881	0.307	≤0.4

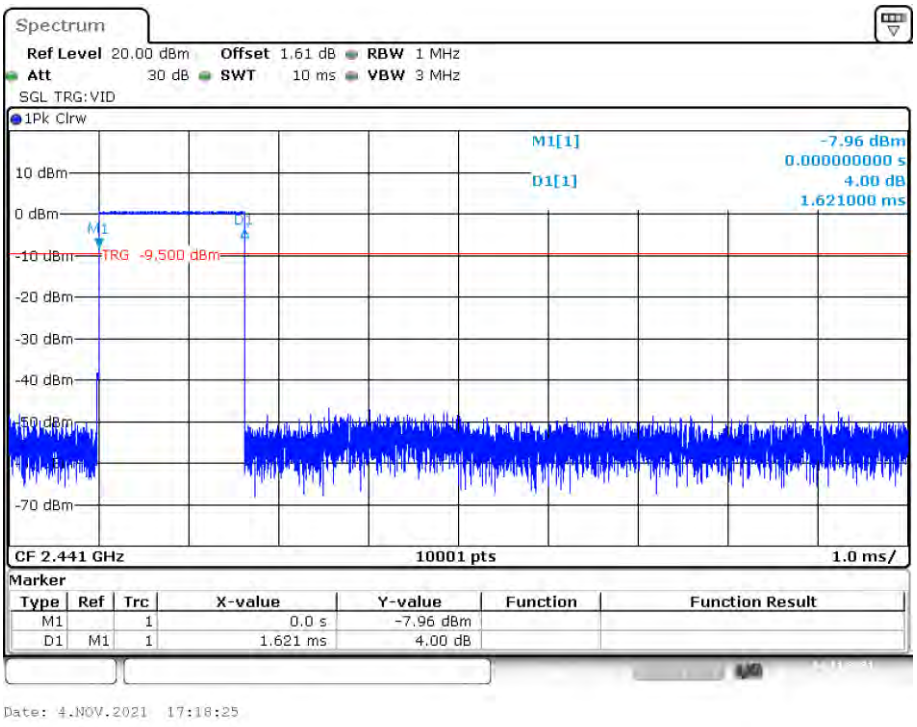
Test Result:

1. We have tested all mode at high,middle and low channel,and recoreded worst case.
2. Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second for DH1, 2-DH1, 3-DH1
   Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second for DH3, 2-DH3, 3-DH3
   Dwell time=Pulse time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second for DH5, 2-DH5, 3-DH5

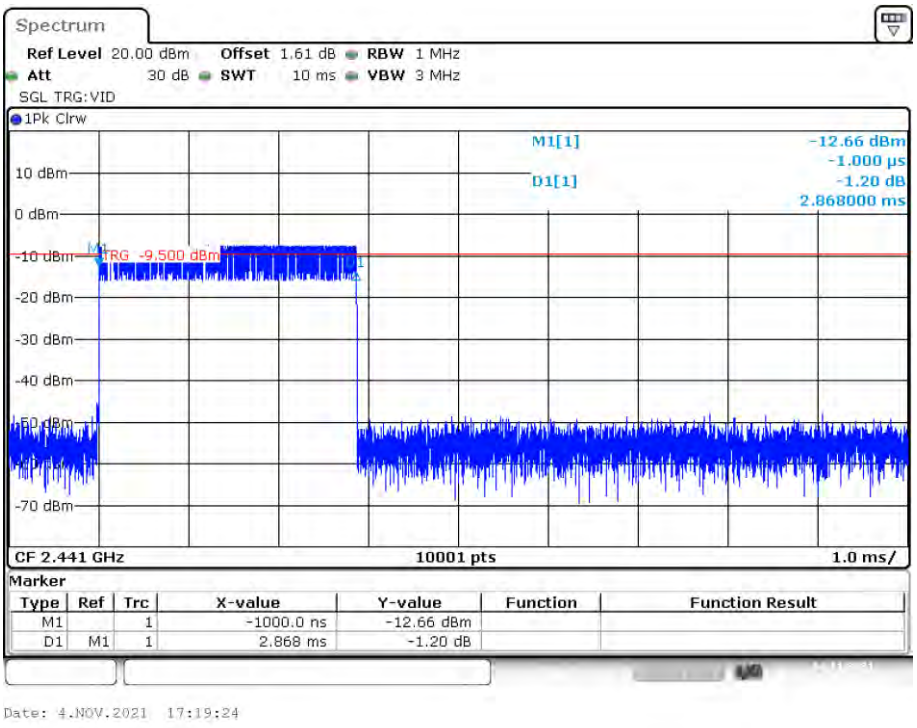
Test plot as follows:



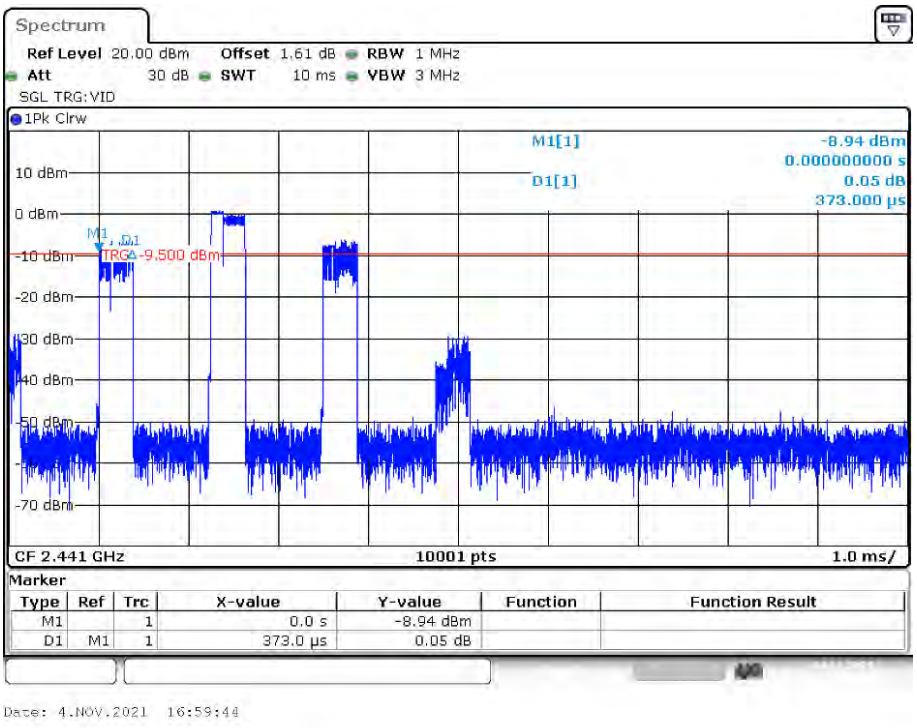
Dwell NVNT 1-DH1 2441MHz Ant1



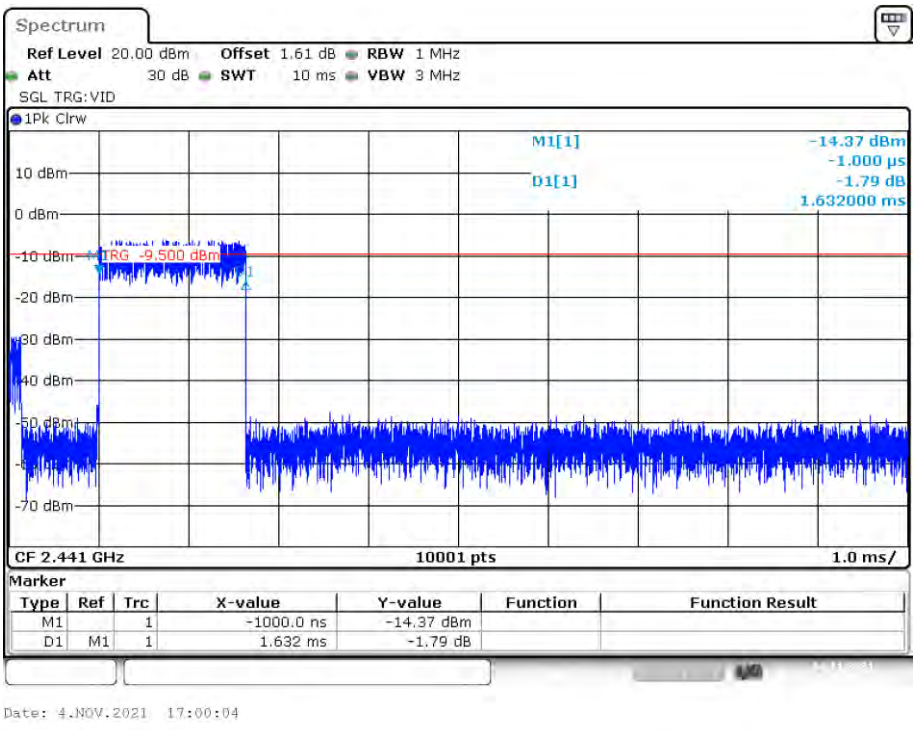
Dwell NVNT 1-DH3 2441MHz Ant1



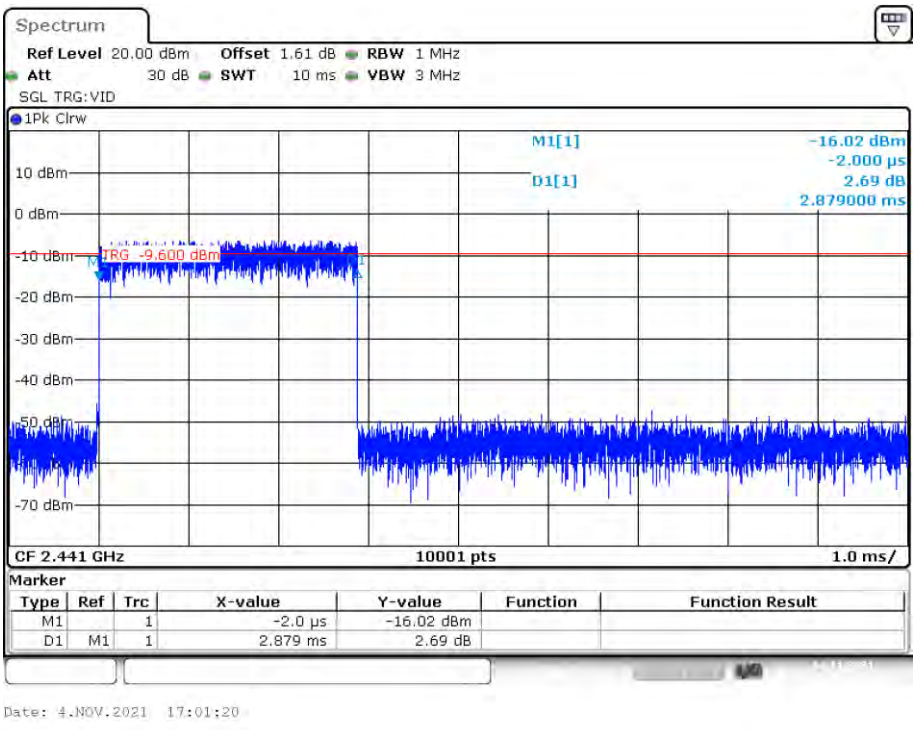
Dwell NVNT 1-DH5 2441MHz Ant1



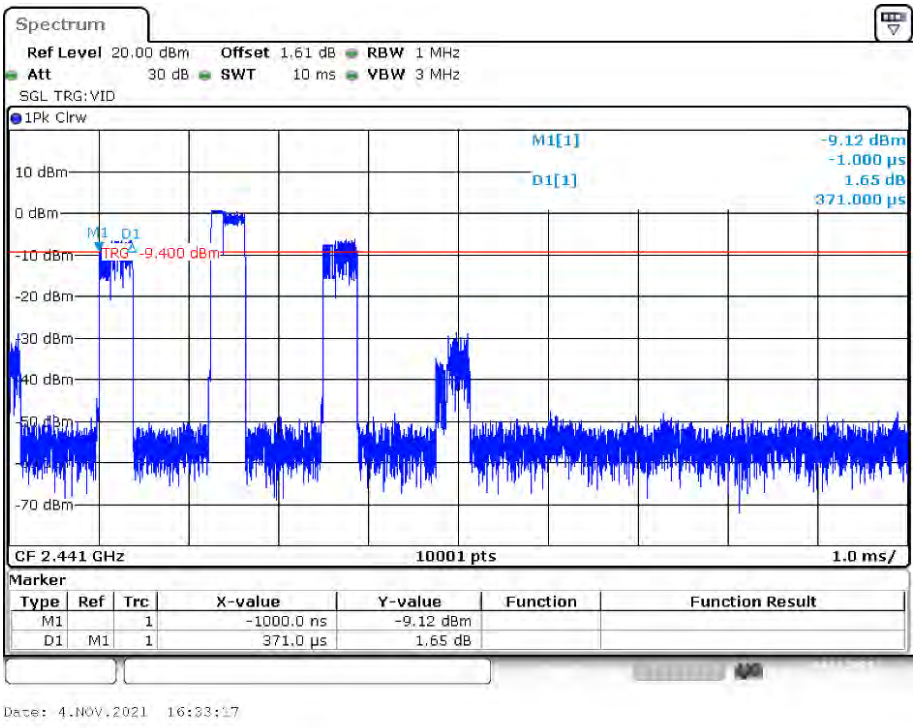
Dwell NVNT 2-DH1 2441MHz Ant1



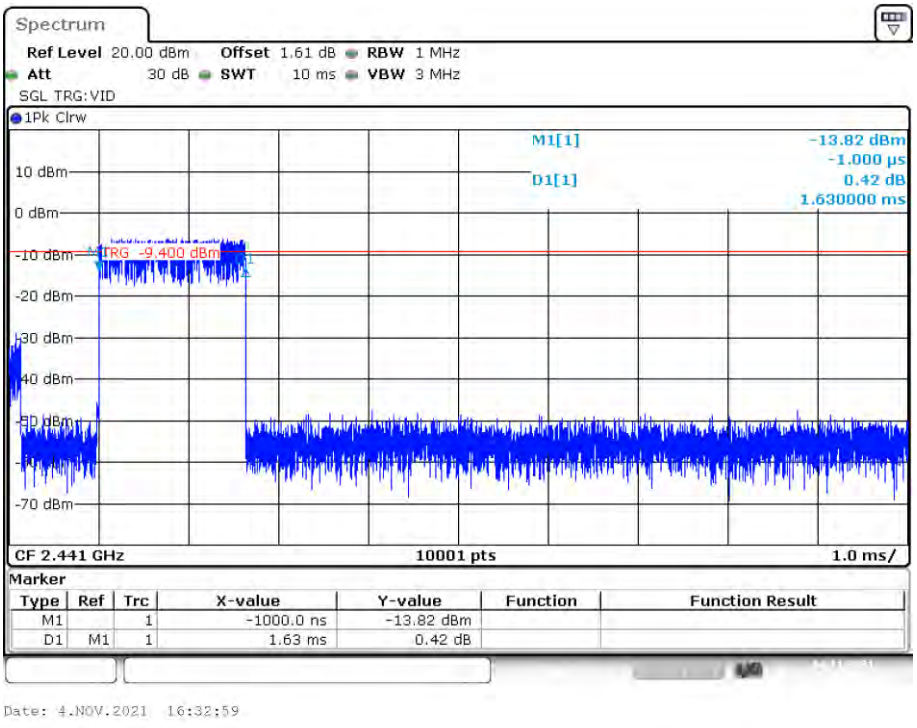
Dwell NVNT 2-DH3 2441MHz Ant1



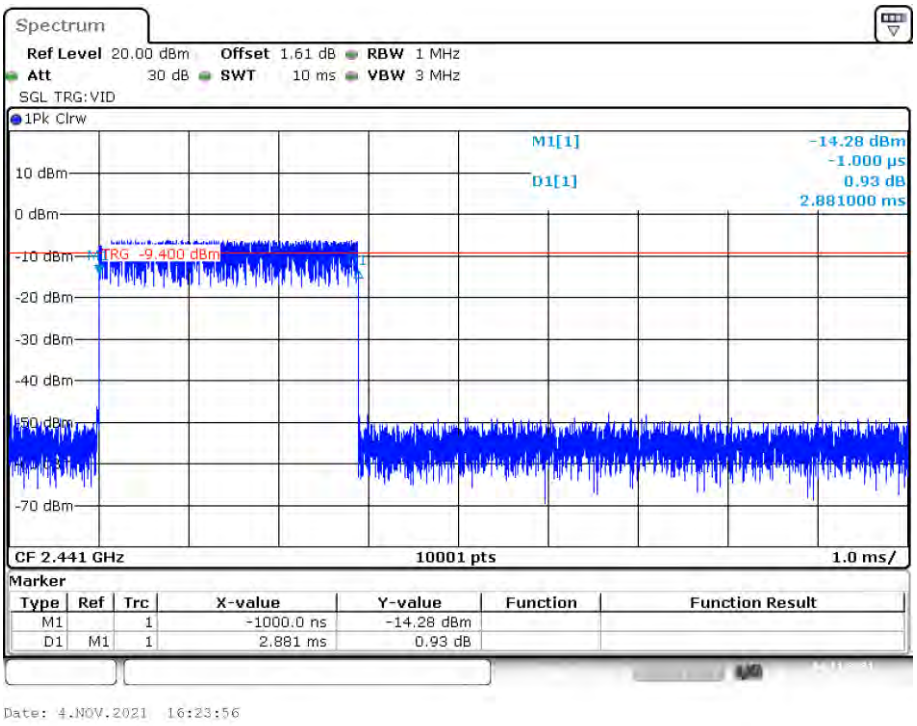
Dwell NVNT 2-DH5 2441MHz Ant1



Dwell NVNT 3-DH1 2441MHz Ant1

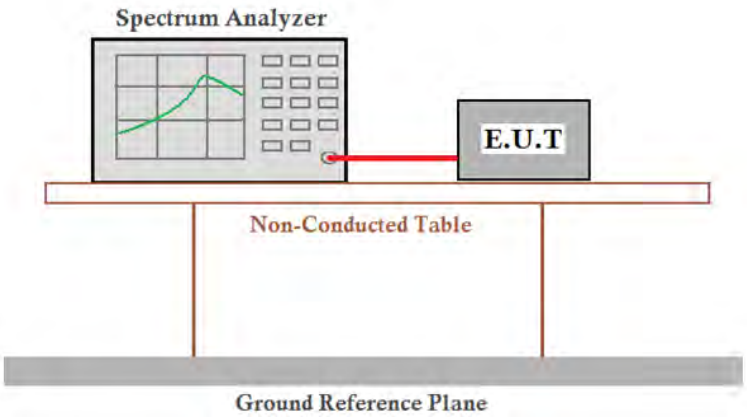


Dwell NVNT 3-DH3 2441MHz Ant1



Dwell NVNT 3-DH5 2441MHz Ant1

5.8 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Test Setup:	 Remark: Factor: the High-Frequency cable loss 1.5dB in the spectrum analyzer.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Exploratory Test Mode:	Hopping and Non-hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type, 2-DH1 of data type is the worst case of π/4DQPSK modulation type, 3-DH1 of data type is the worst case of 8DPSK modulation type.
Test Results:	Pass

No-hopping mode

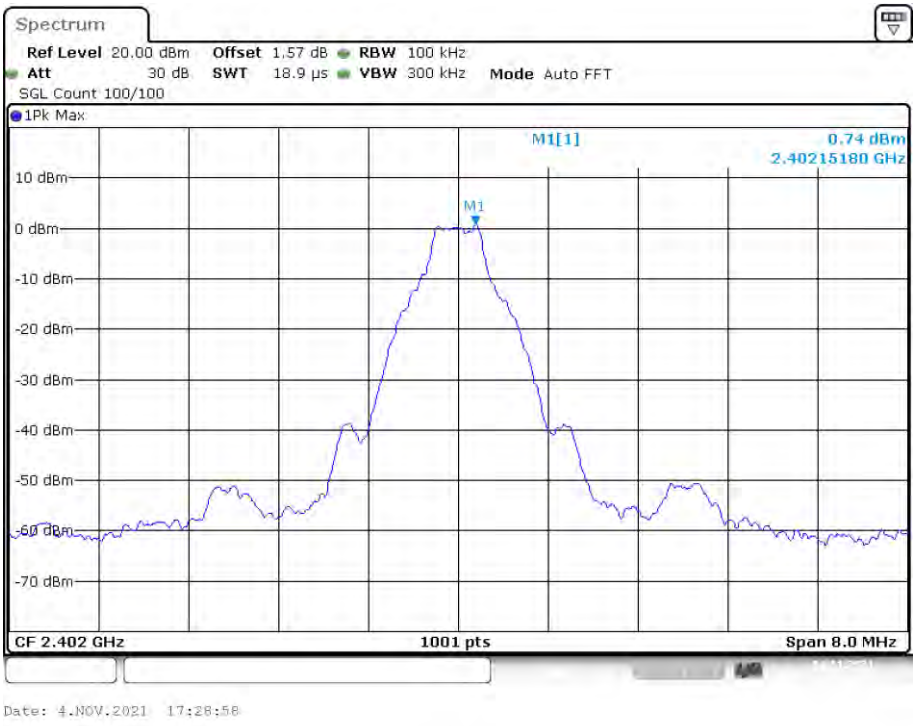
GFSK mode				
Test channel	Frequency(MHz)	Emission Level(dBc)	Limit(dBc)	Result
Lowest	2400	<-20	-20	Pass
Highest	2483.5	<-20	-20	Pass
π/4DQPSK mode				
Test channel	Frequency(MHz)	Emission Level(dBc)	Limit(dBc)	Result
Lowest	2400	<-20	-20	Pass
Highest	2483.5	<-20	-20	Pass
8DPSK mode				
Test channel	Frequency(MHz)	Emission Level(dBc)	Limit(dBc)	Result
Lowest	2400	<-20	-20	Pass
Highest	2483.5	<-20	-20	Pass

Hopping mode

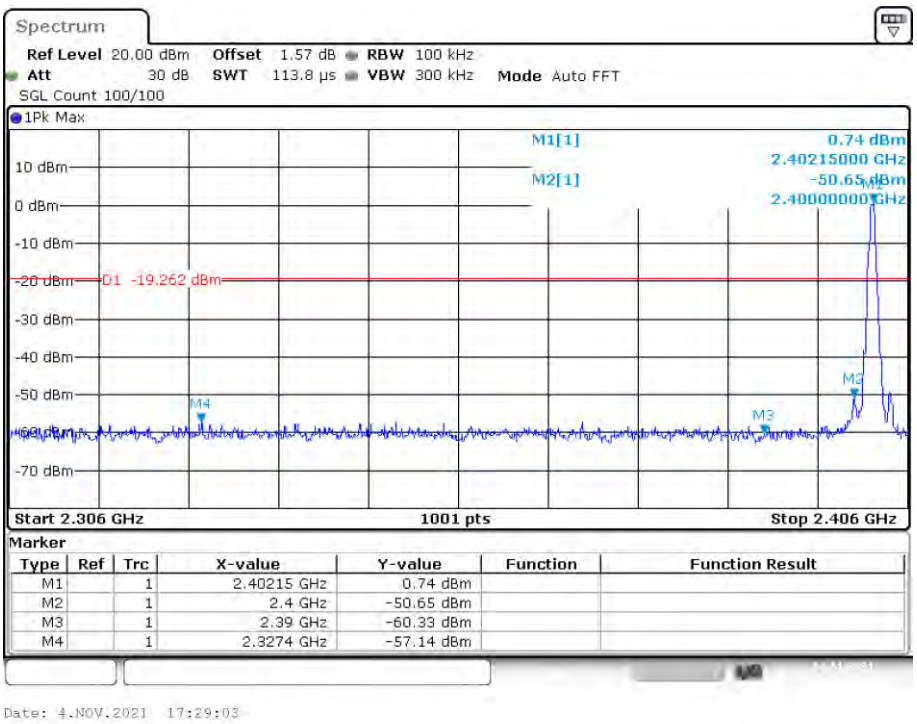
GFSK mode				
Test channel	Frequency(MHz)	Emission Level(dBc)	Limit(dBc)	Result
Lowest	2400	<-20	-20	Pass
Highest	2483.5	<-20	-20	Pass
π/4DQPSK mode				
Test channel	Frequency(MHz)	Emission Level(dBc)	Limit(dBc)	Result
Lowest	2400	<-20	-20	Pass
Highest	2483.5	<-20	-20	Pass
8DPSK mode				
Test channel	Frequency(MHz)	Emission Level(dBc)	Limit(dBc)	Result
Lowest	2400	<-20	-20	Pass
Highest	2483.5	<-20	-20	Pass

Test plot as follows:

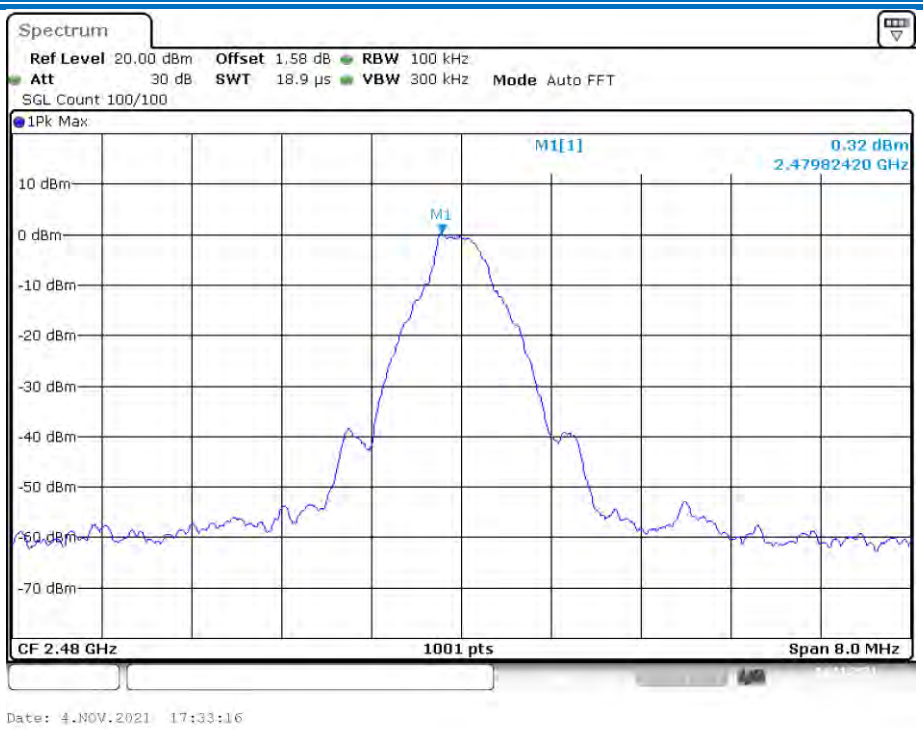
Band Edge



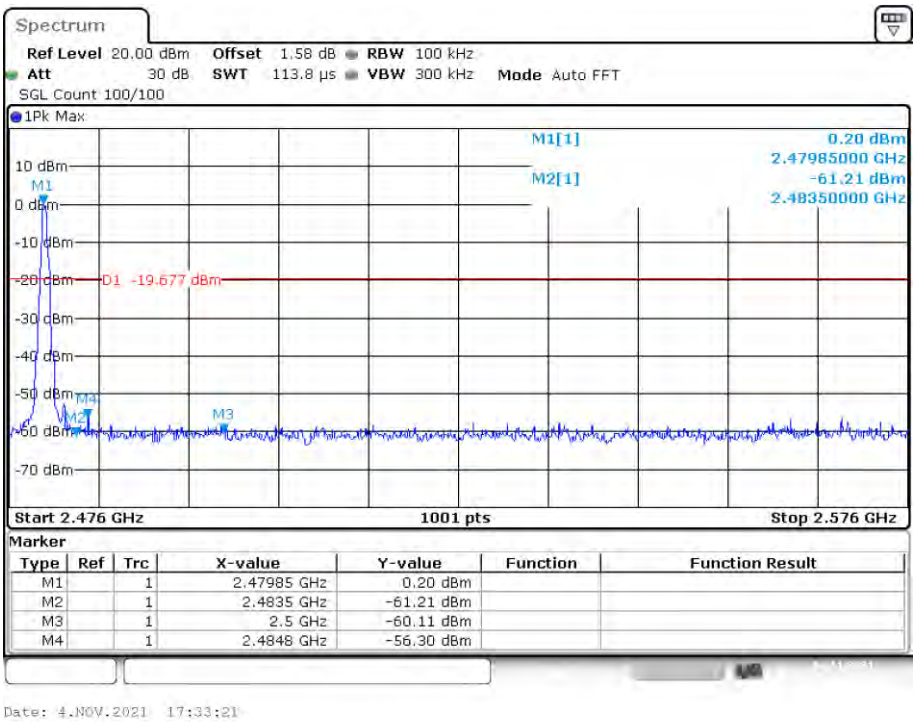
Band Edge NVNT 1-DH5 2402MHz Ant1 No-Hopping Ref



Band Edge NVNT 1-DH5 2402MHz Ant1 No-Hopping Emission

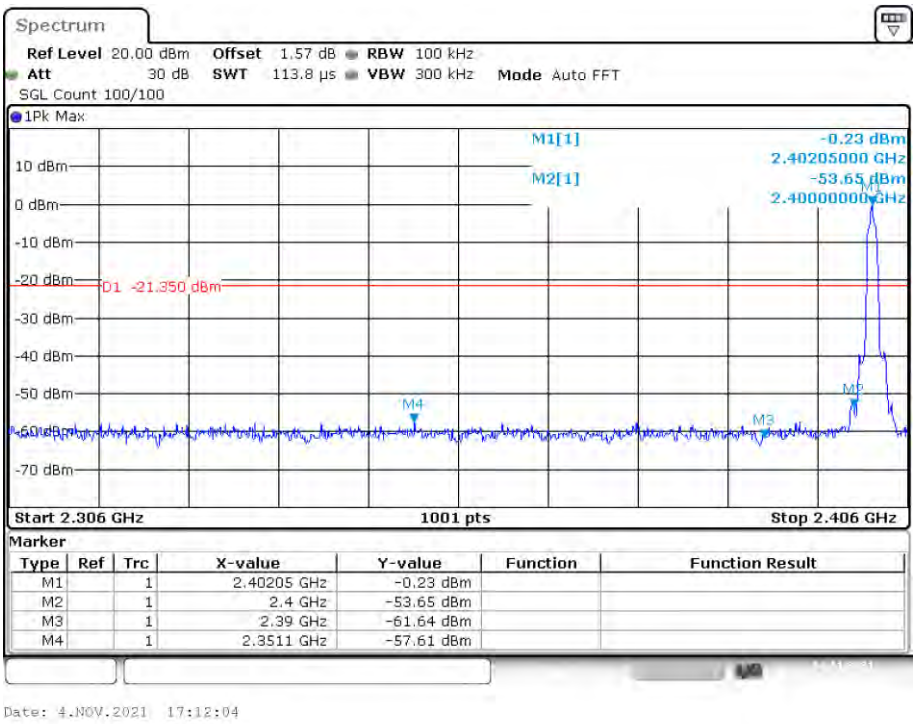


Band Edge NVNT 1-DH5 2480MHz Ant1 No-Hopping Ref

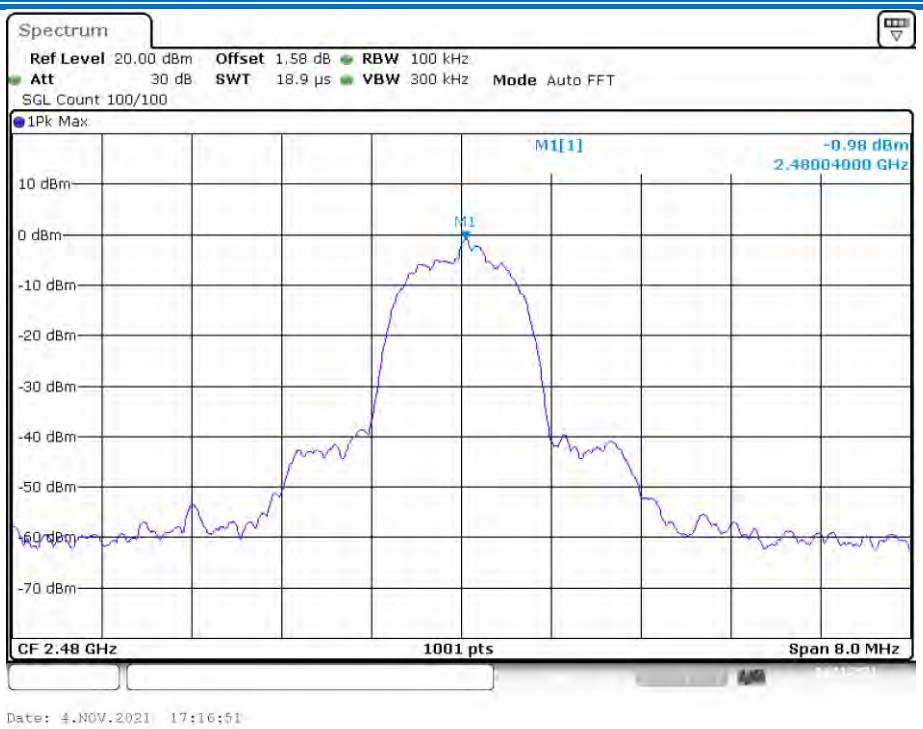


Band Edge NVNT 1-DH5 2480MHz Ant1 No-Hopping Emission

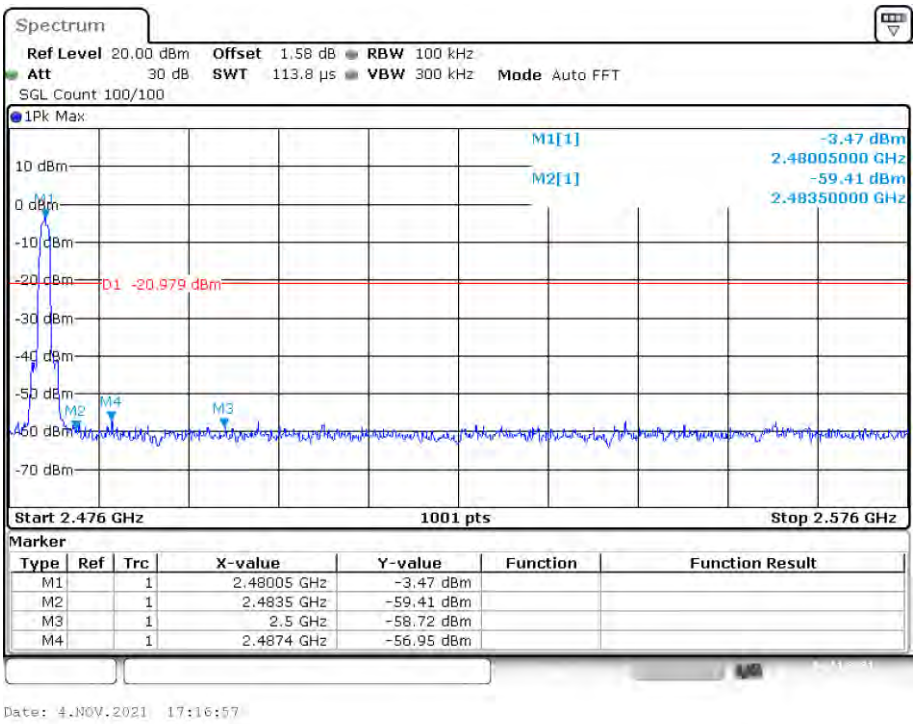
Band Edge NVNT 2-DH5 2402MHz Ant1 No-Hopping Ref



Band Edge NVNT 2-DH5 2402MHz Ant1 No-Hopping Emission

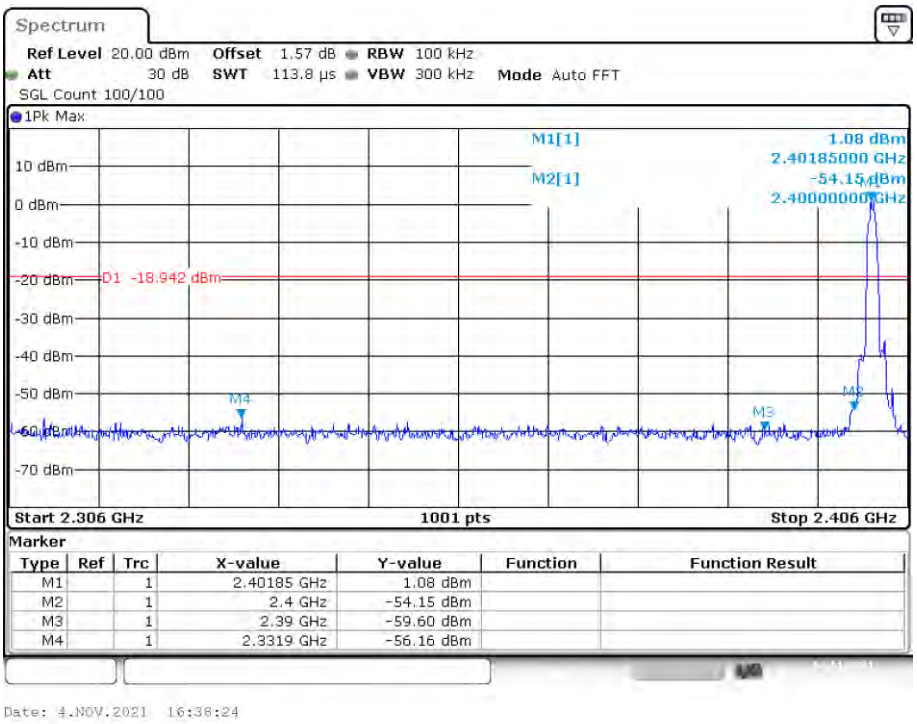


Band Edge NVNT 2-DH5 2480MHz Ant1 No-Hopping Ref

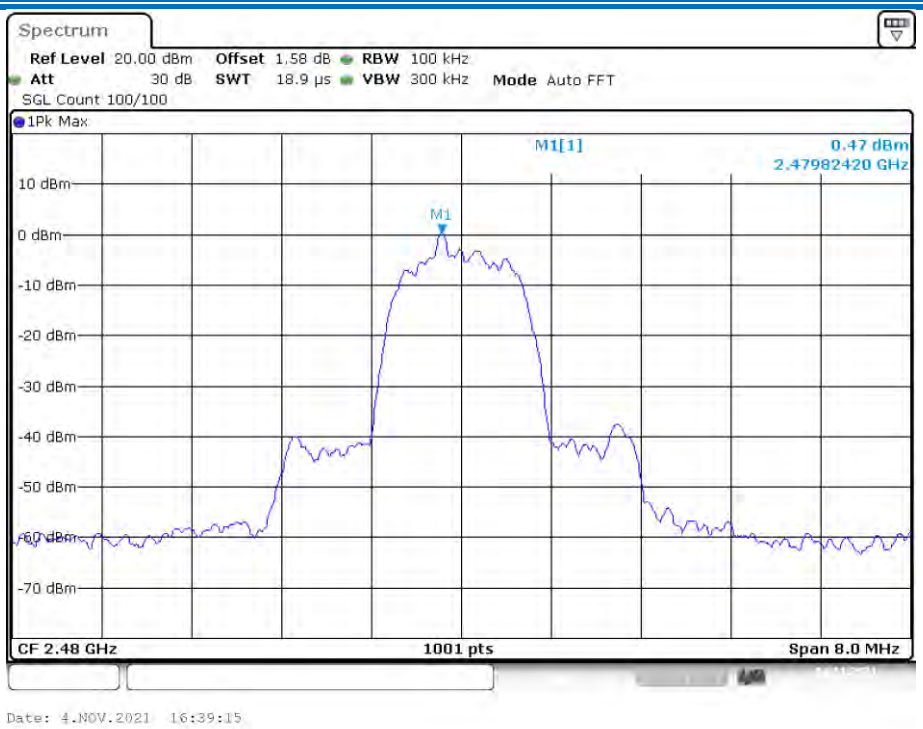


Band Edge NVNT 2-DH5 2480MHz Ant1 No-Hopping Emission

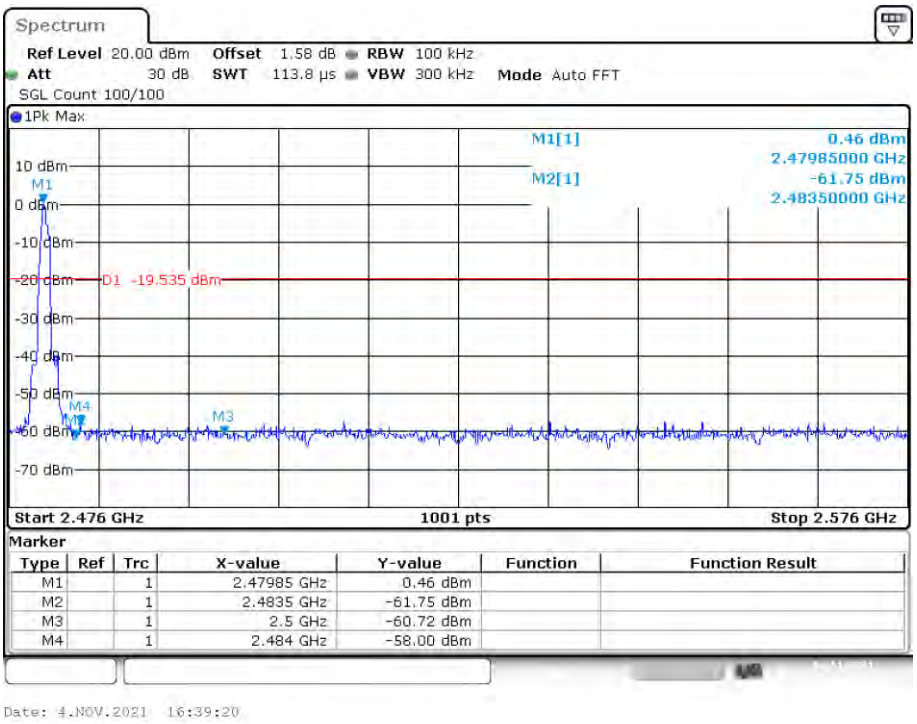
Band Edge NVNT 3-DH5 2402MHz Ant1 No-Hopping Ref



Band Edge NVNT 3-DH5 2402MHz Ant1 No-Hopping Emission



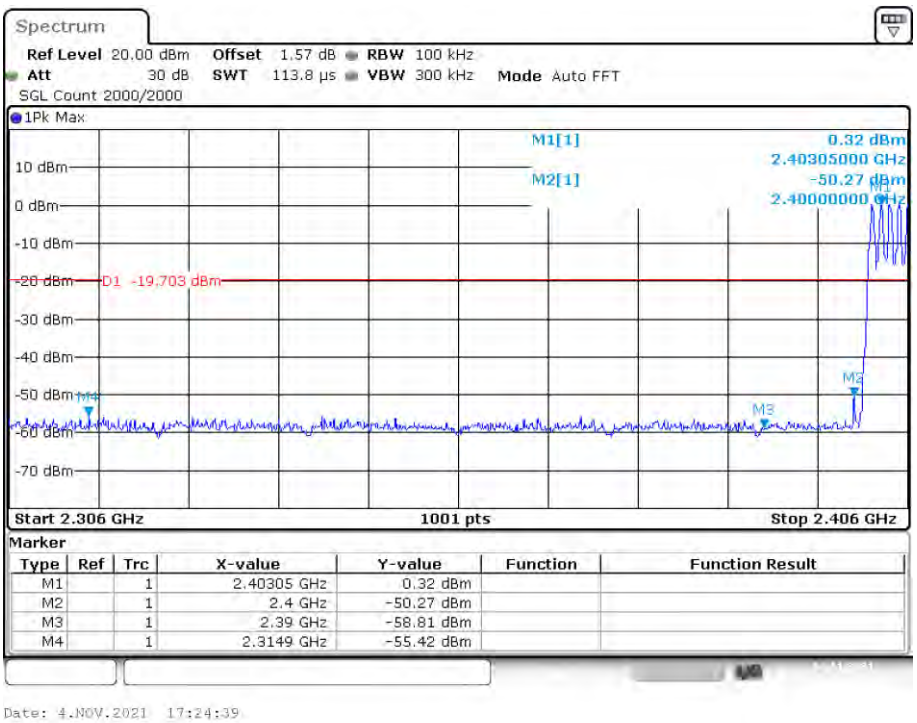
Band Edge NVNT 3-DH5 2480MHz Ant1 No-Hopping Ref



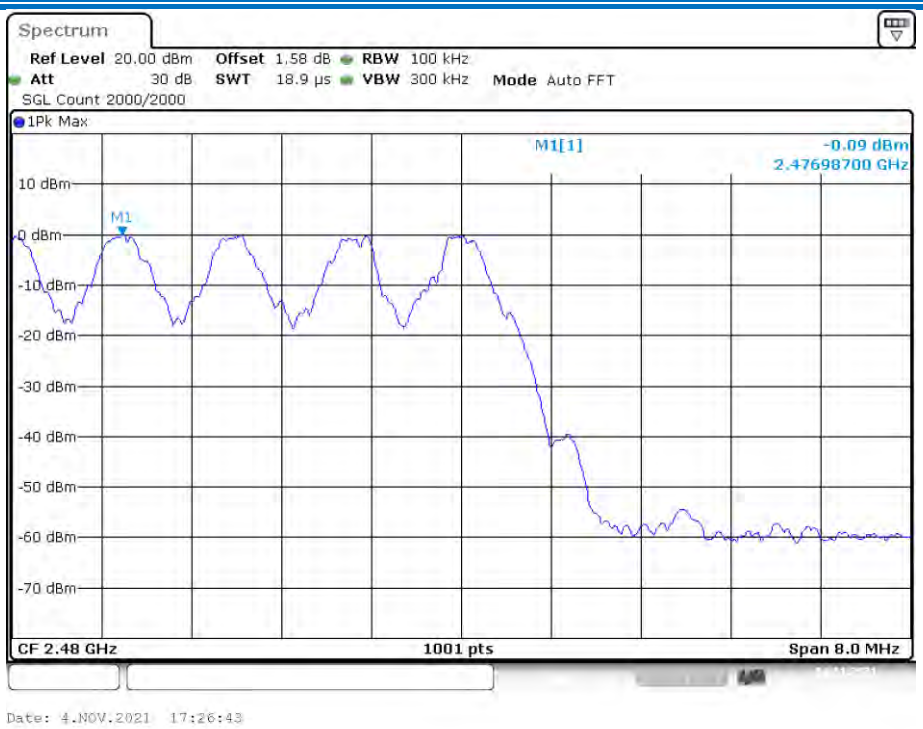
Band Edge NVNT 3-DH5 2480MHz Ant1 No-Hopping Emission

Band Edge(Hopping)

Band Edge(Hopping) NVNT 1-DH5 2402MHz Ant1 Hopping Ref



Band Edge(Hopping) NVNT 1-DH5 2402MHz Ant1 Hopping Emission



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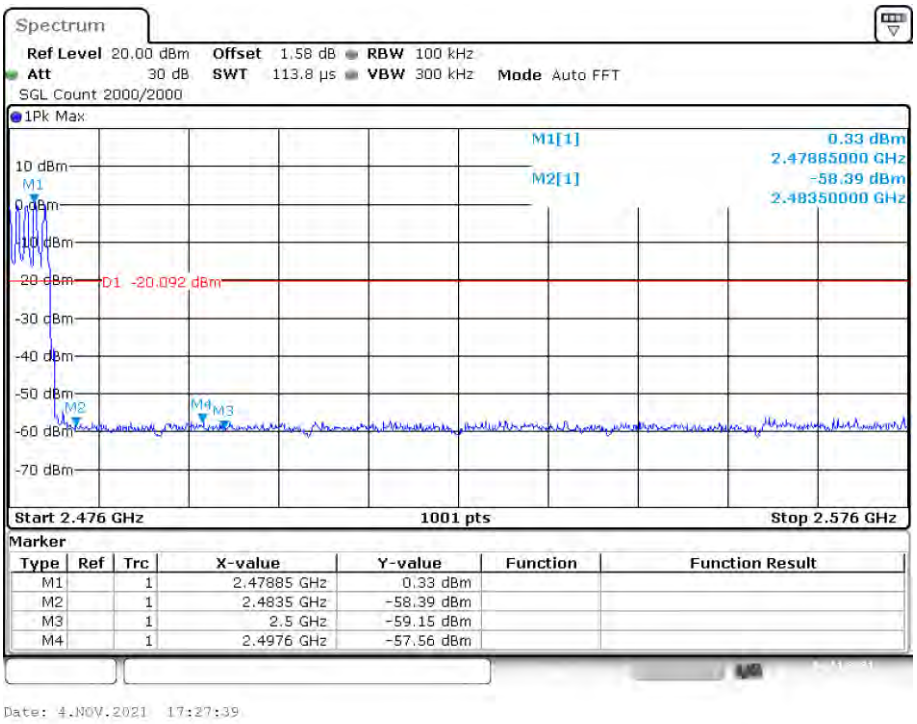
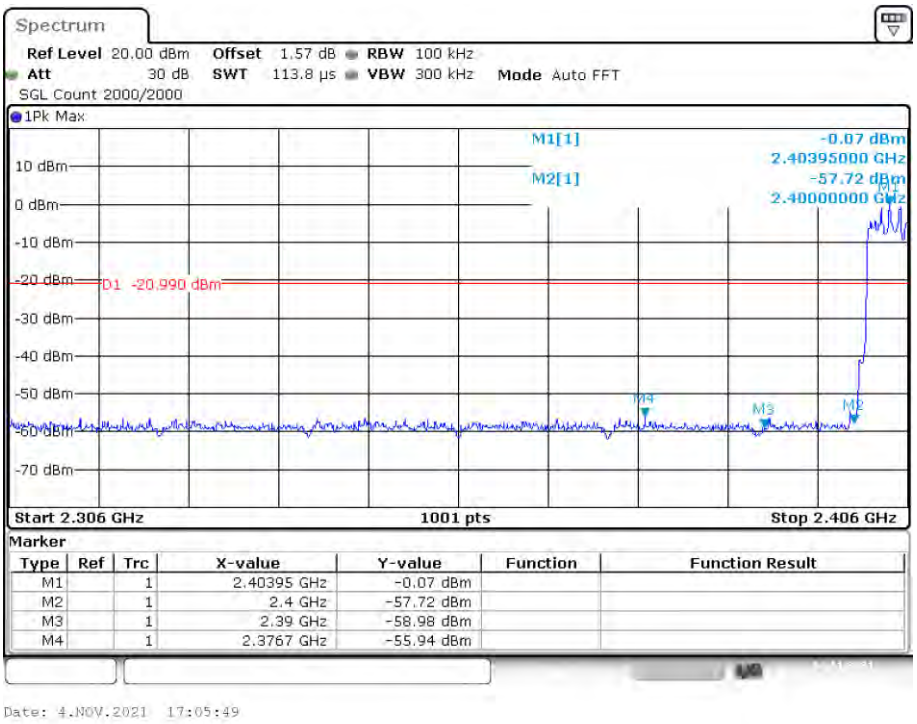


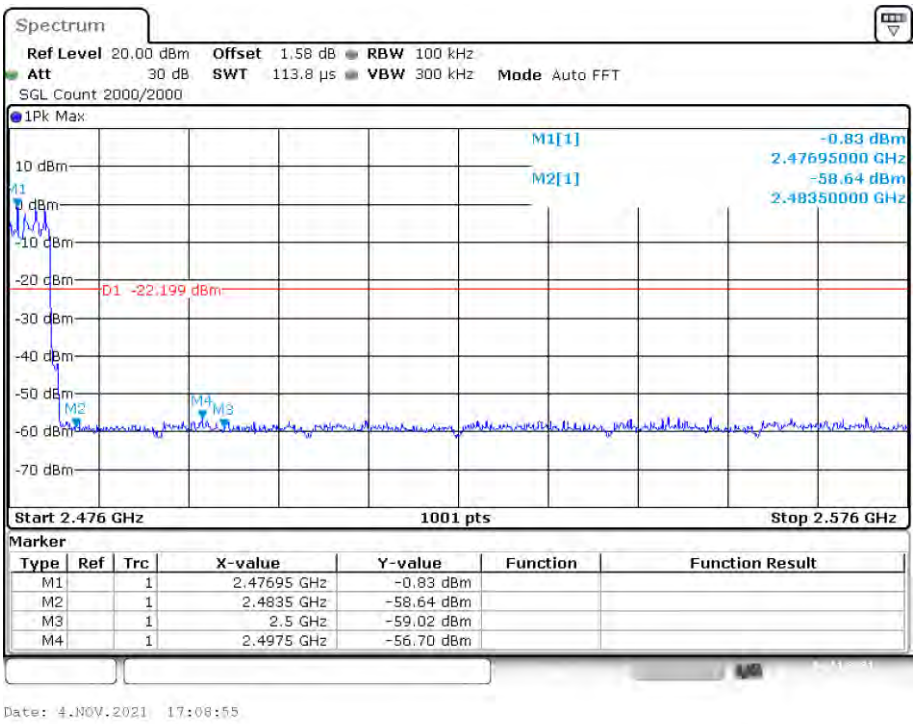
Band Edge(Hopping) NVNT 1-DH5 2480MHz Ant1 Hopping Emission

Band Edge(Hopping) NVNT 2-DH5 2402MHz Ant1 Hopping Ref

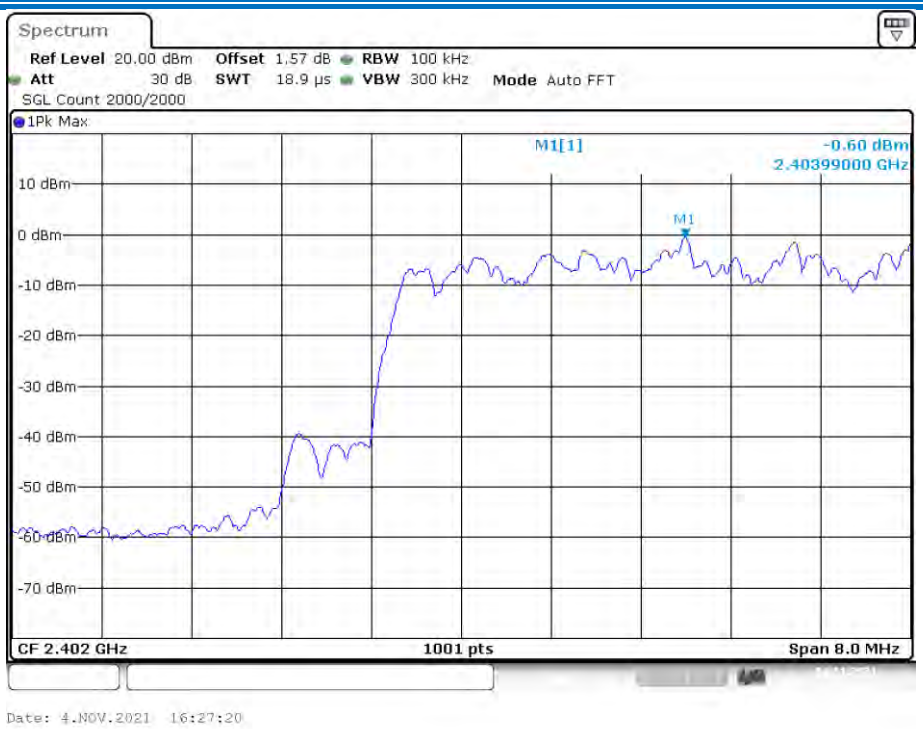


Band Edge(Hopping) NVNT 2-DH5 2402MHz Ant1 Hopping Emission

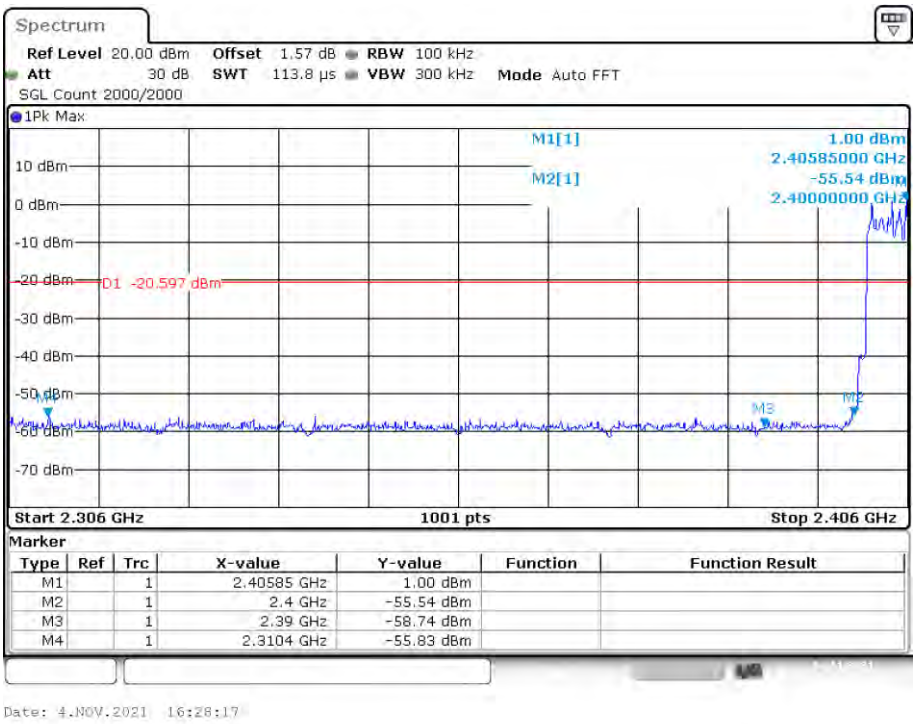
Band Edge(Hopping) NVNT 2-DH5 2480MHz Ant1 Hopping Ref



Band Edge(Hopping) NVNT 2-DH5 2480MHz Ant1 Hopping Emission

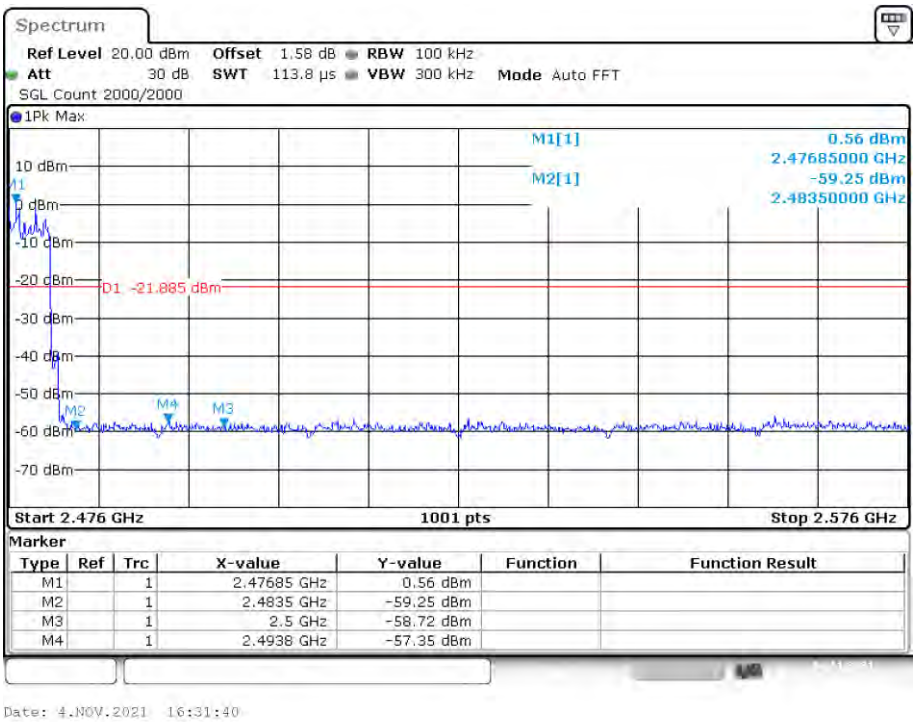


Band Edge(Hopping) NVNT 3-DH5 2402MHz Ant1 Hopping Ref



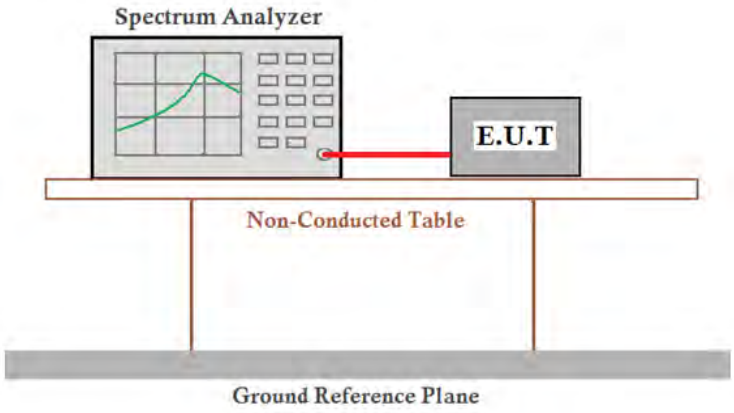
Band Edge(Hopping) NVNT 3-DH5 2402MHz Ant1 Hopping Emission

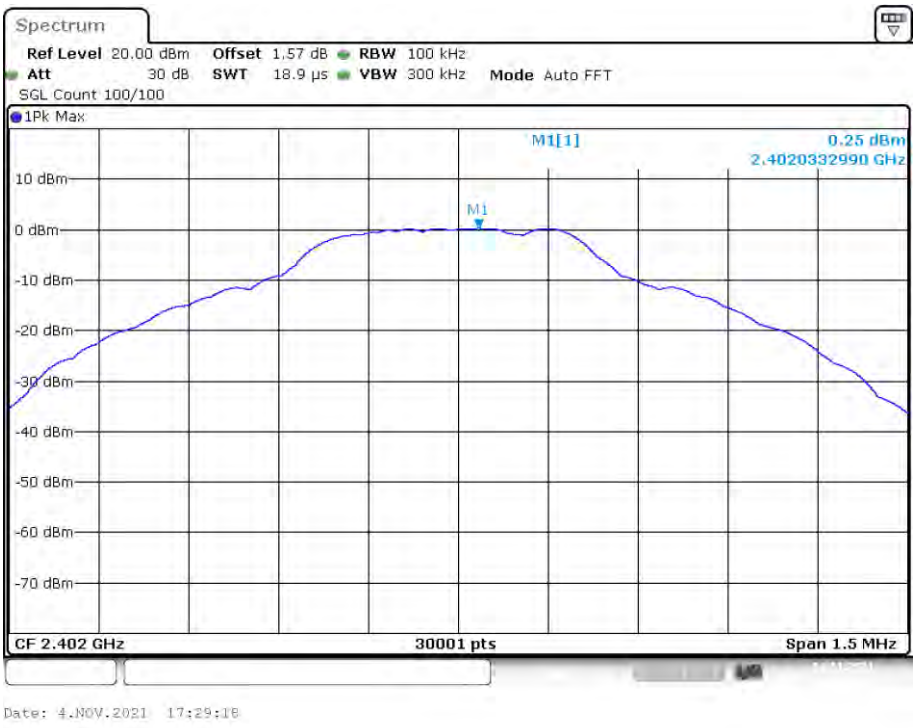
Band Edge(Hopping) NVNT 3-DH5 2480MHz Ant1 Hopping Ref



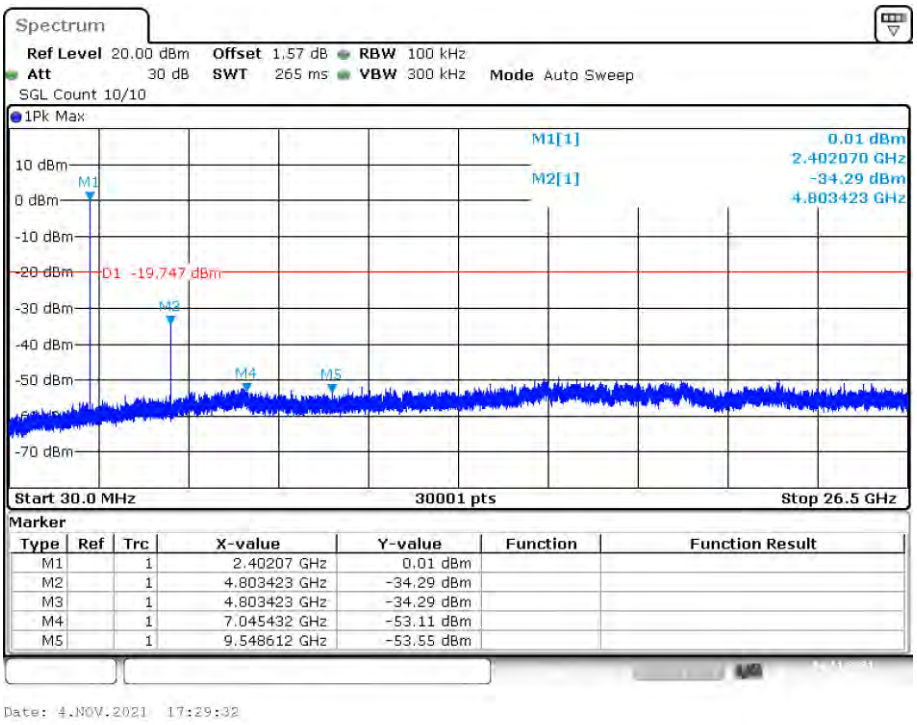
Band Edge(Hopping) NVNT 3-DH5 2480MHz Ant1 Hopping Emission

5.9 Spurious RF Conducted Emissions

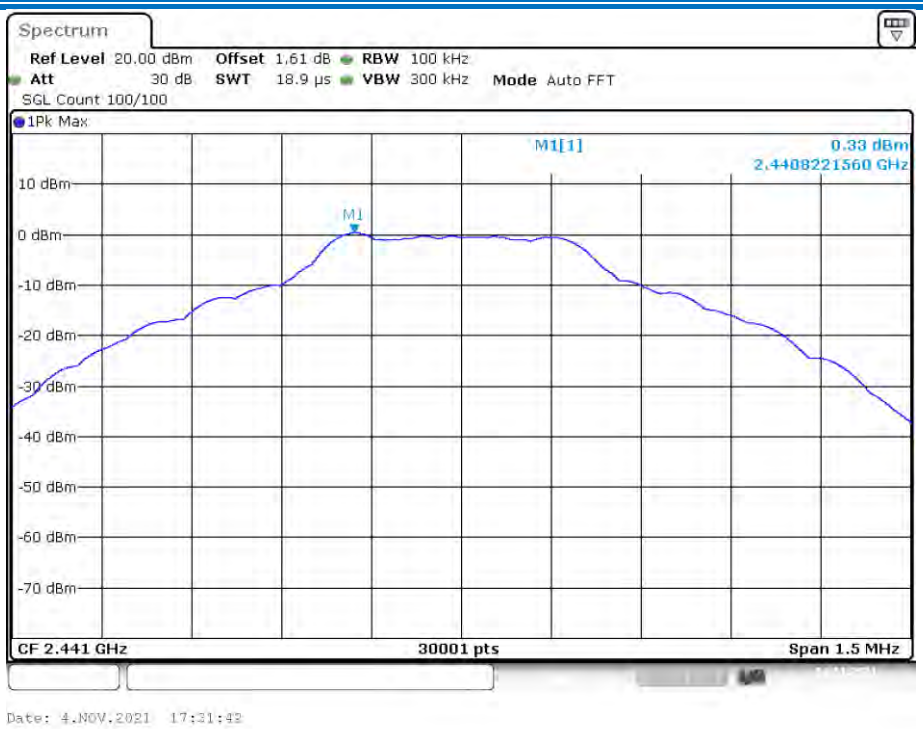
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Test Setup:	 Remark: Factor: the High-Frequency cable loss 1.5dB in the spectrum analyzer.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type, 2-DH1 of data type is the worst case of π/4DQPSK modulation type, 3-DH1 of data type is the worst case of 8DPSK modulation type.
Test Results:	Pass



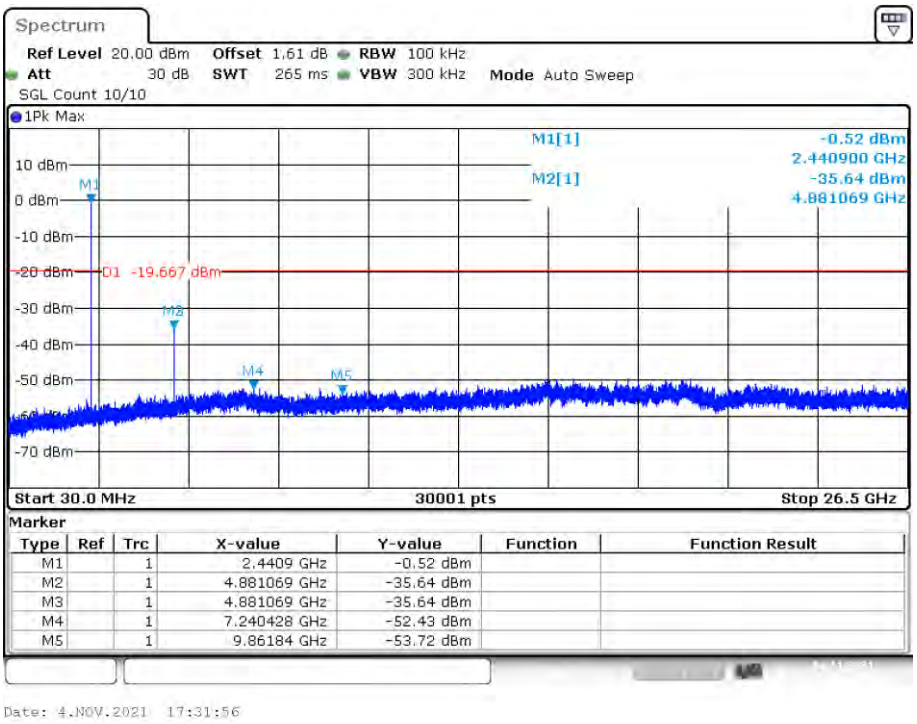
Tx. Spurious NVNT 1-DH5 2402MHz Ant1 Ref



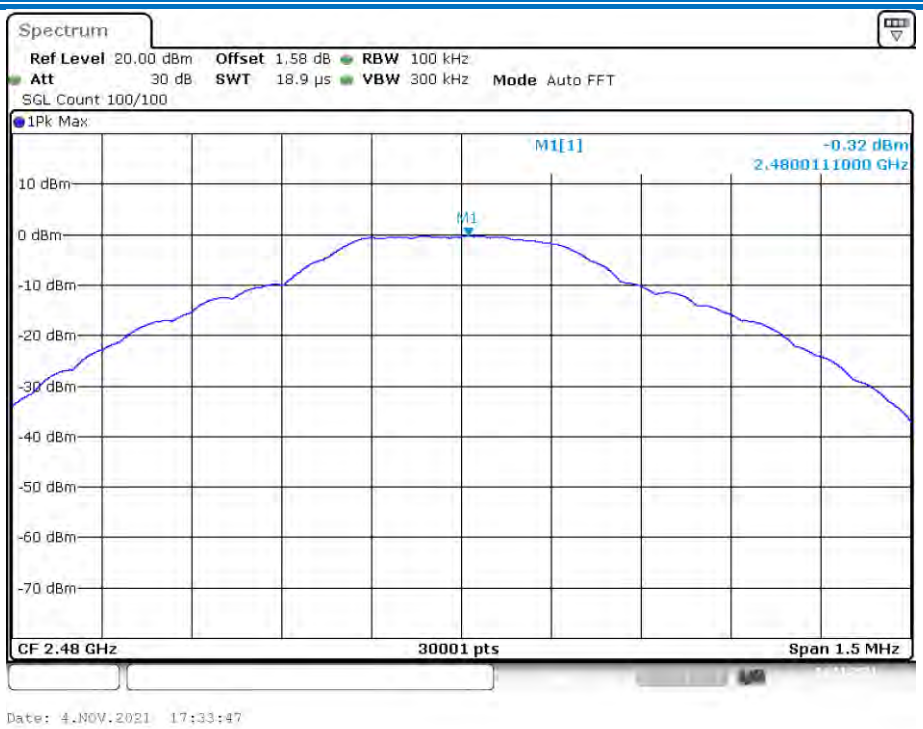
Tx. Spurious NVNT 1-DH5 2402MHz Ant1 Emission



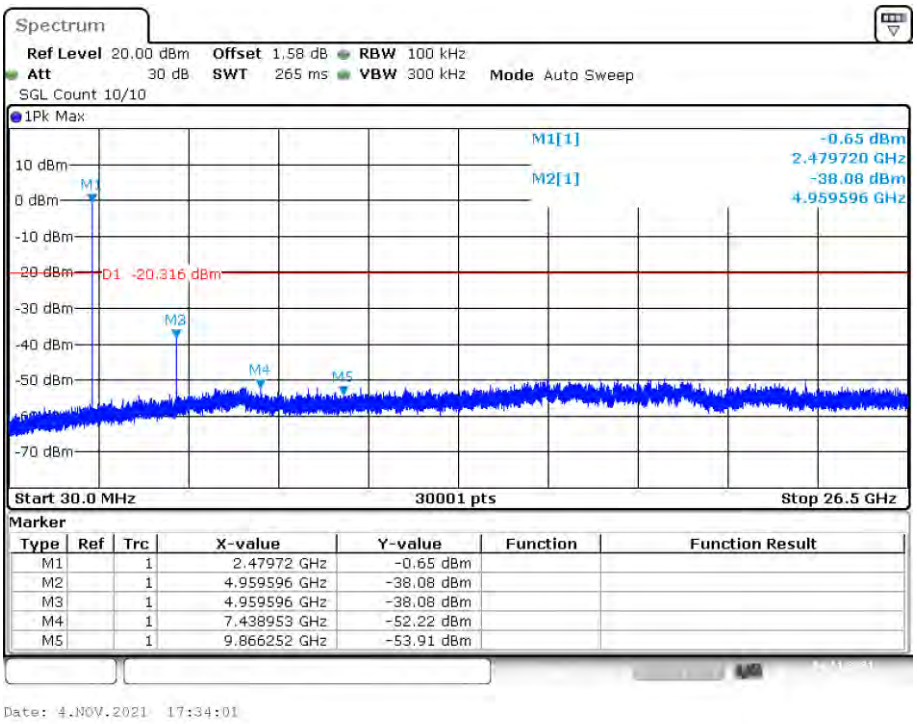
Tx. Spurious NVNT 1-DH5 2441MHz Ant1 Ref



Tx. Spurious NVNT 1-DH5 2441MHz Ant1 Emission

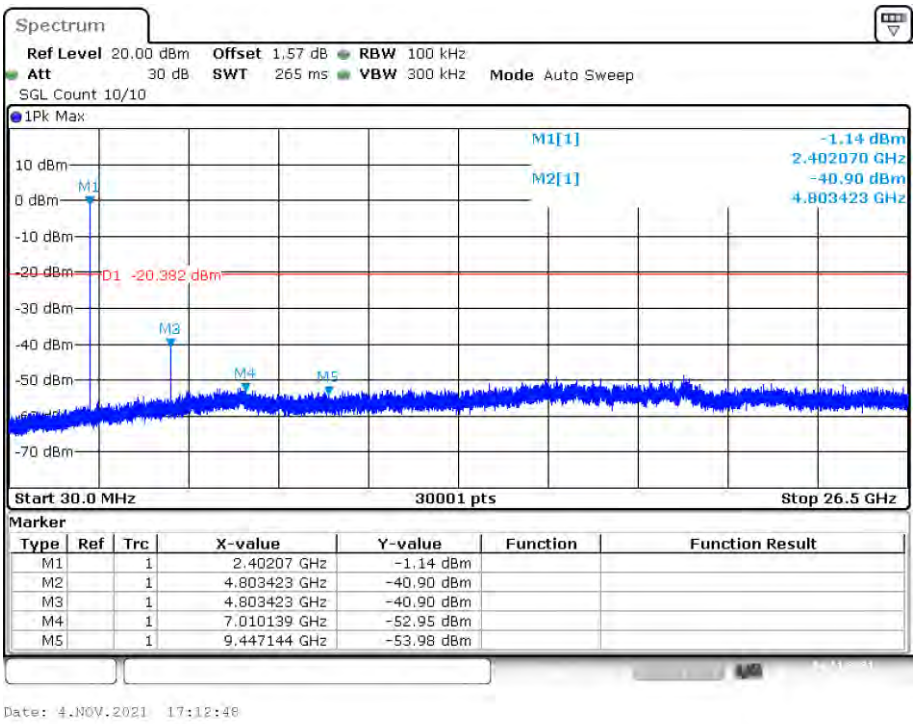


Tx. Spurious NVNT 1-DH5 2480MHz Ant1 Ref

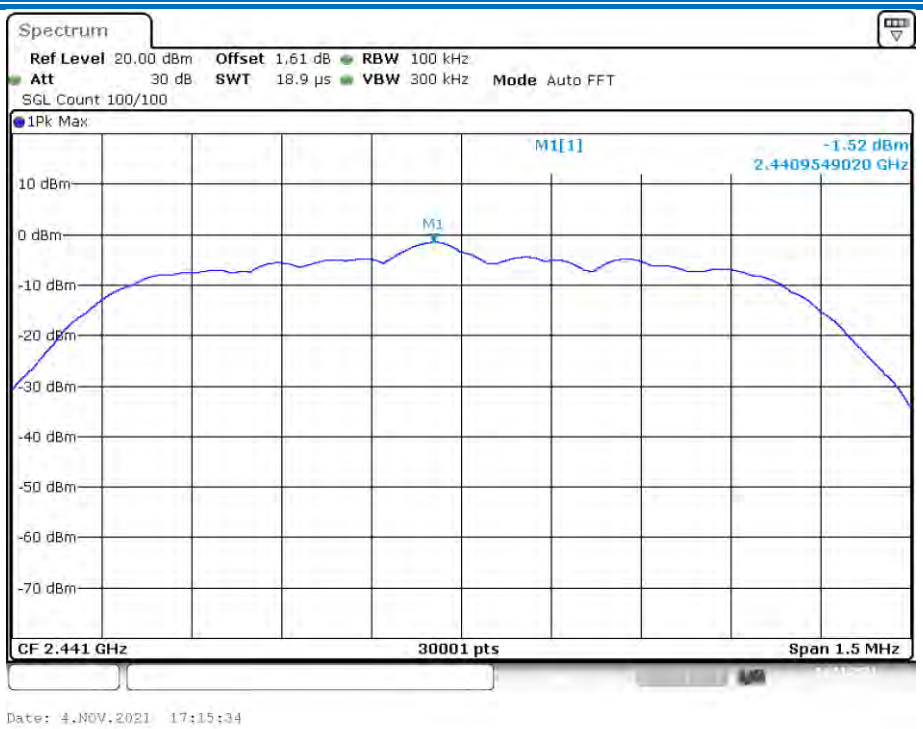


Tx. Spurious NVNT 1-DH5 2480MHz Ant1 Emission

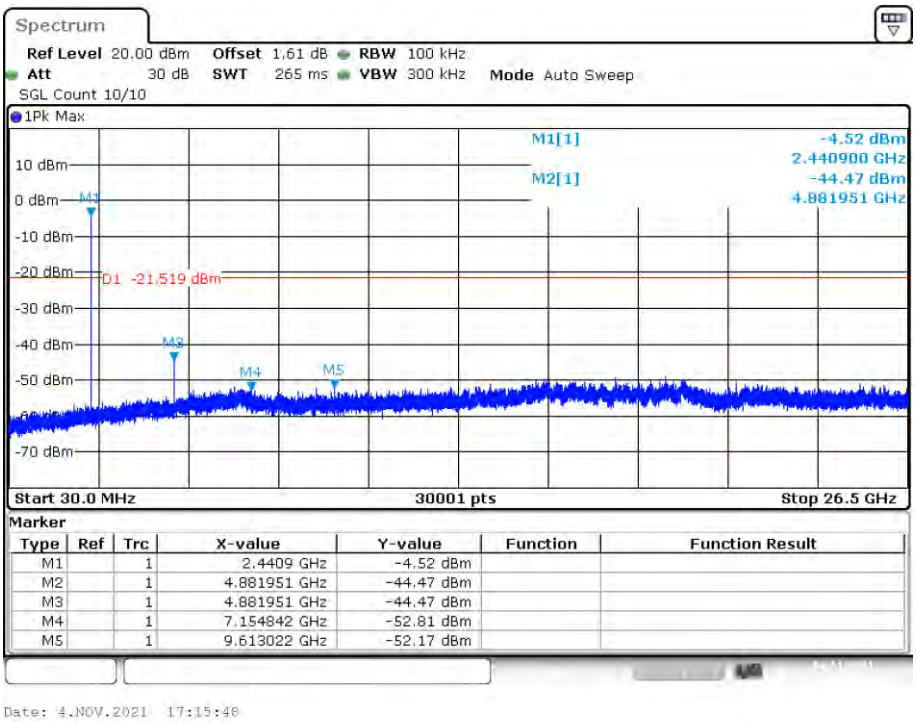
Tx. Spurious NVNT 2-DH5 2402MHz Ant1 Ref



Tx. Spurious NVNT 2-DH5 2402MHz Ant1 Emission



Tx. Spurious NVNT 2-DH5 2441MHz Ant1 Ref



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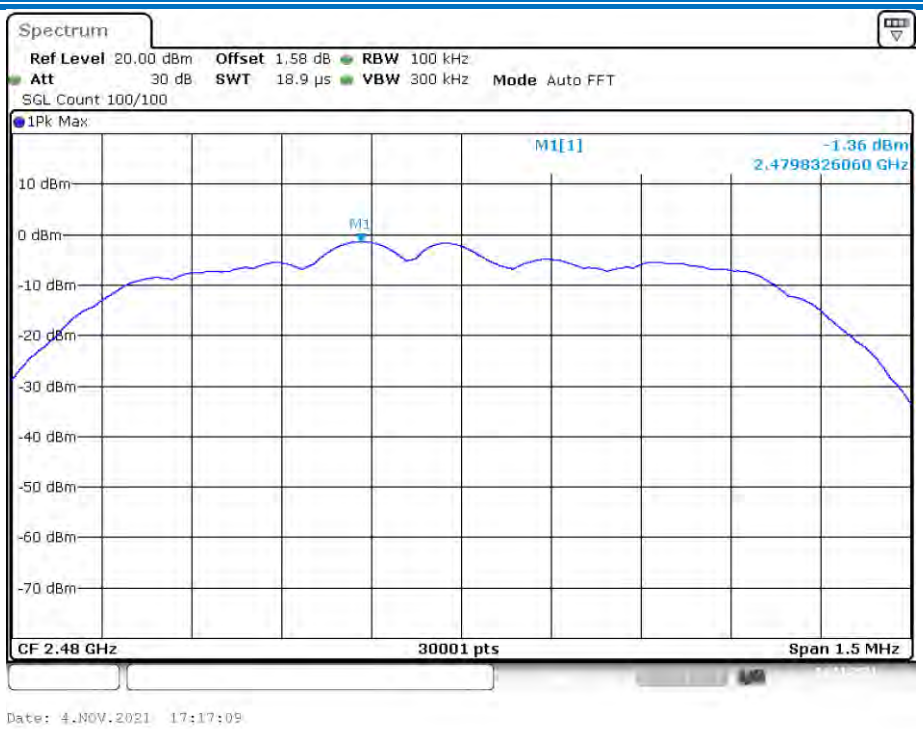
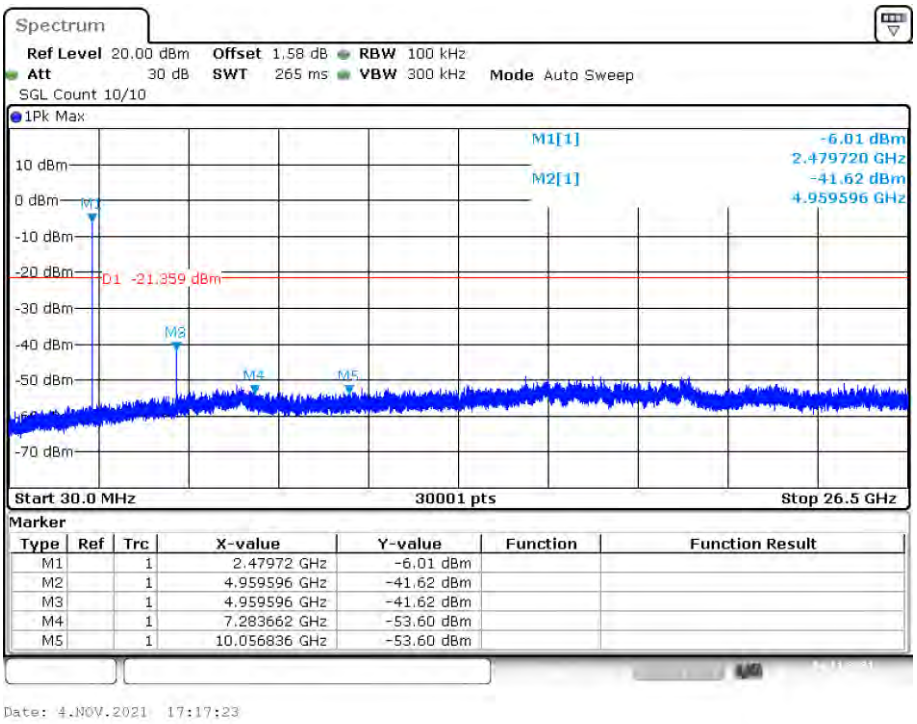


Tx. Spurious NVNT 2-DH5 2480MHz Ant1 Ref



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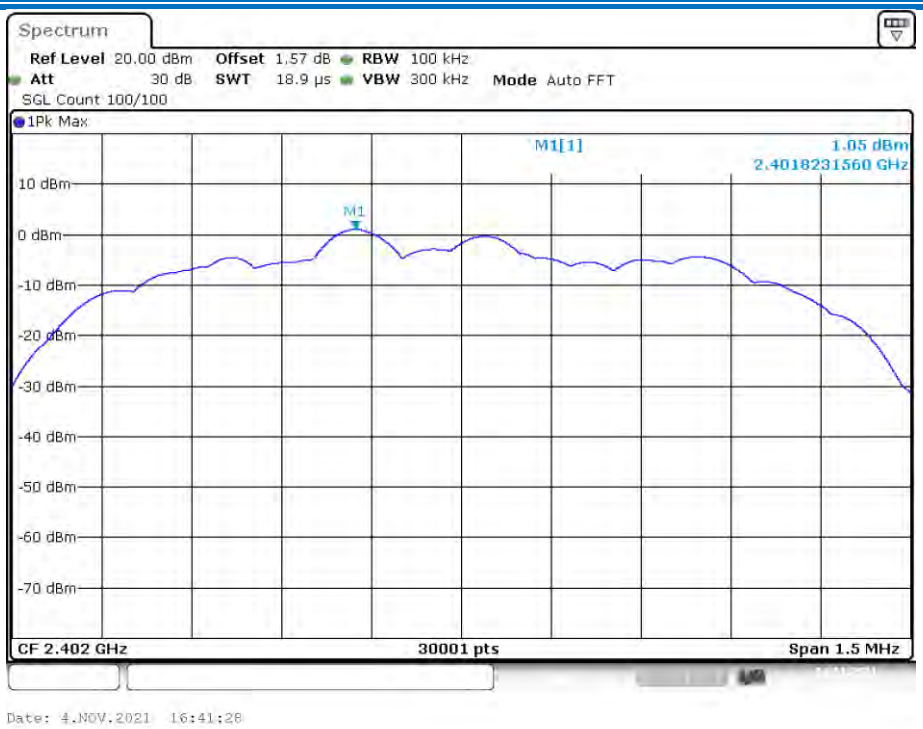
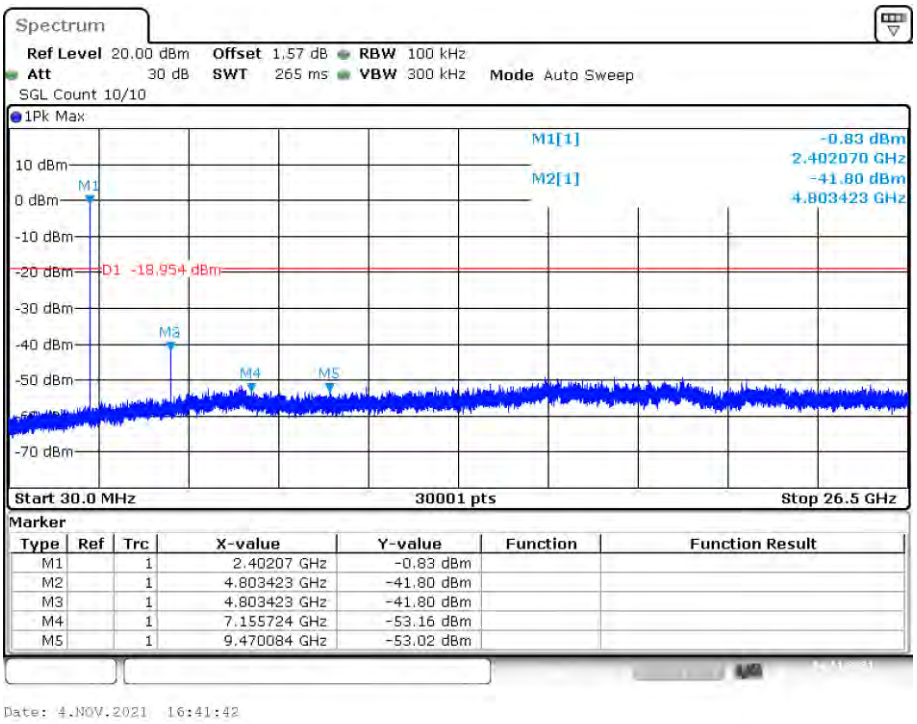
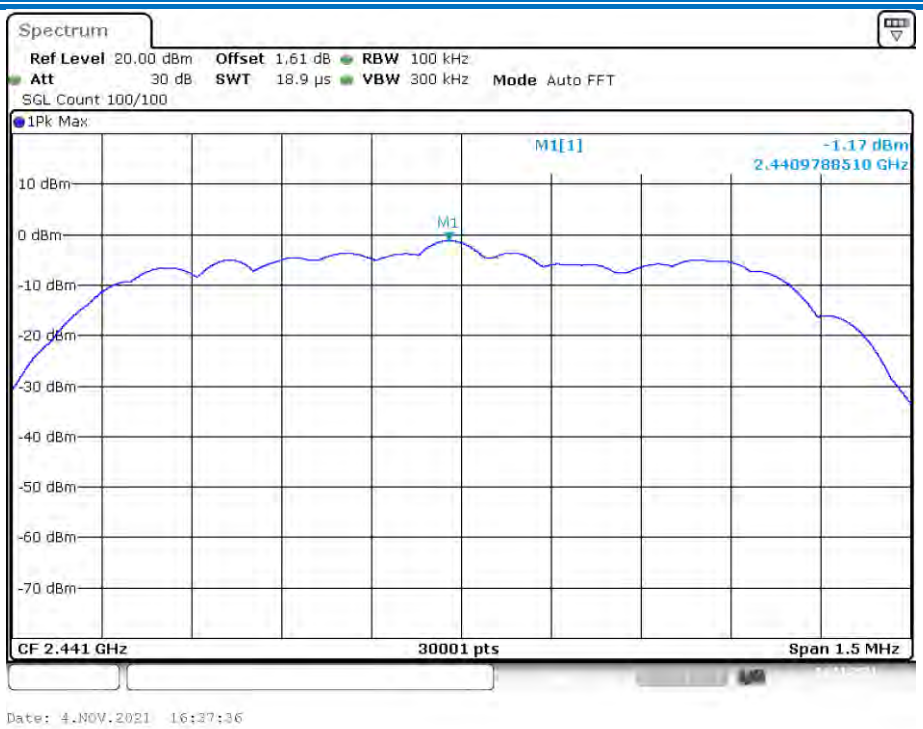


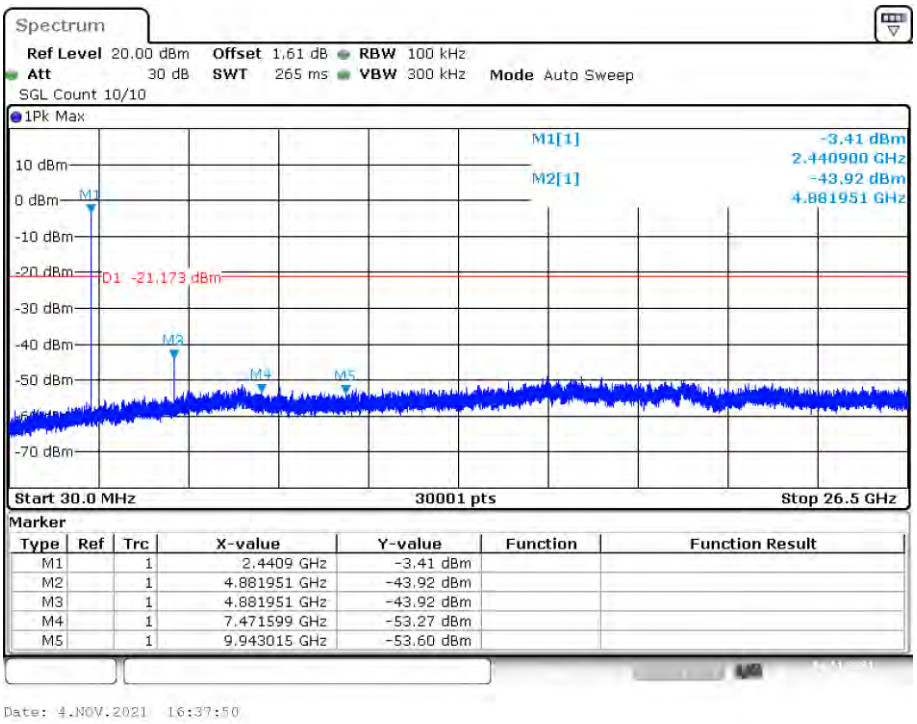
Tx. Spurious NVNT 3-DH5 2402MHz Ant1 Ref



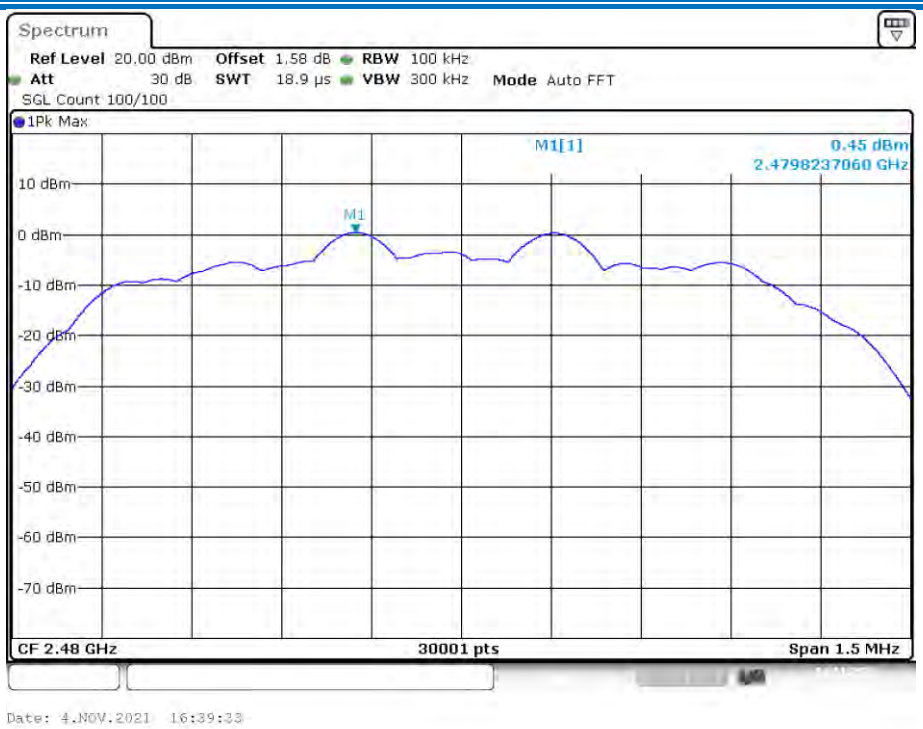
Tx. Spurious NVNT 3-DH5 2402MHz Ant1 Emission



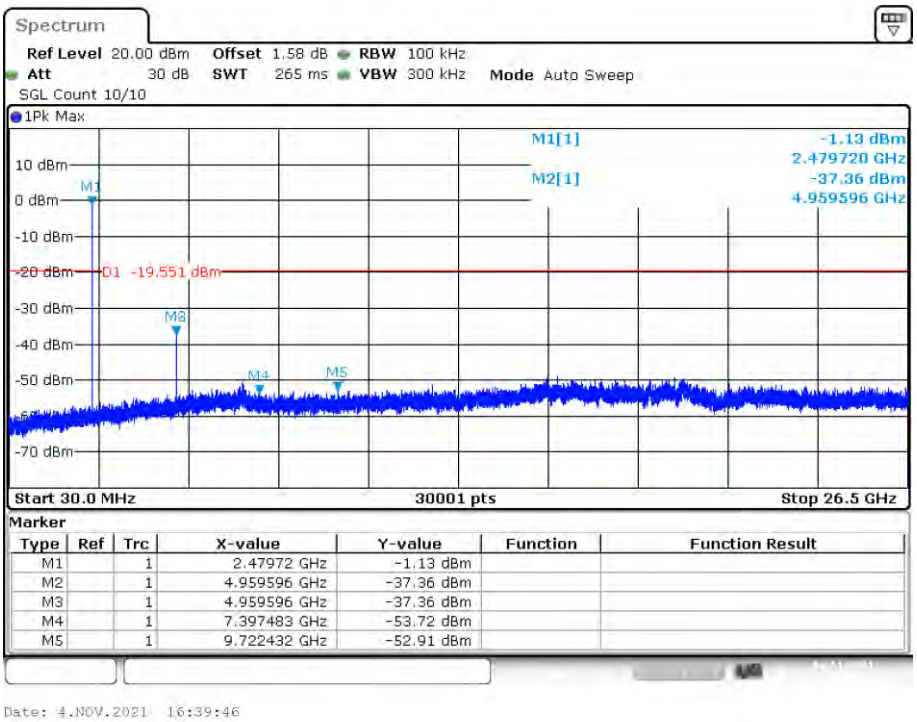
Tx. Spurious NVNT 3-DH5 2441MHz Ant1 Ref



Tx. Spurious NVNT 3-DH5 2441MHz Ant1 Emission



Tx. Spurious NVNT 3-DH5 2480MHz Ant1 Ref



Tx. Spurious NVNT 3-DH5 2480MHz Ant1 Emission

Remark:

Pre test 9kHz to 25GHz, find the highest point when testing, so only the worst data were shown in the test report. Per FCC Part 15.33 (a) and 15.31 (o) ,The amplitude of spurious emissions from intentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

5.10 Other requirements Frequency Hopping Spread Spectrum System

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1), (h) requirement:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

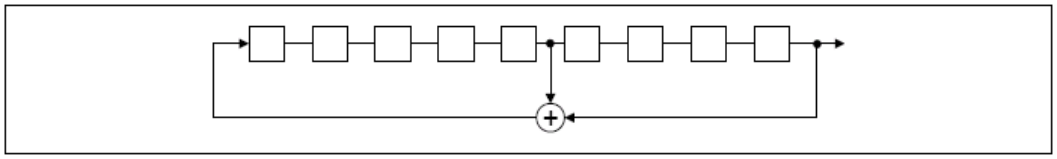
Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Compliance for section 15.247(a)(1)

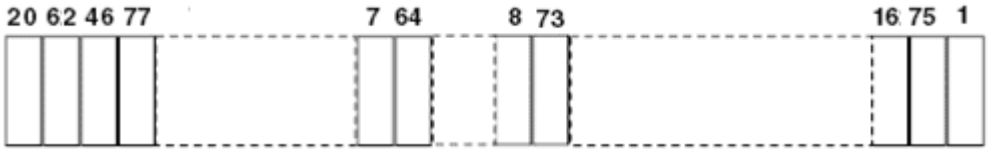
According to Bluetooth Core Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage
outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence: 2^9 -1 = 511 bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.

According to Bluetooth Core Specification, Bluetooth receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any Bluetooth transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g)

According to Bluetooth Core Specification, the Bluetooth system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the Bluetooth system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

Compliance for section 15.247(h)

According to Bluetooth Core specification, the Bluetooth system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the occupied channels.

According to the Bluetooth Core specification, the Bluetooth system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.

5.11 Radiated Spurious Emission & Restricted bands

<table>
<tr><td>Test Requirement:</td><td>47 CFR Part 15C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10: 2013</td></tr>
<tr><td>Test Site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver Setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<tr><td>0.009MHz-0.090MHz</td><td>Peak</td><td>10kHz</td><td>30kHz</td><td>Peak</td></tr>
<tr><td>0.009MHz-0.090MHz</td><td>Average</td><td>10kHz</td><td>30kHz</td><td>Average</td></tr>
<tr><td>0.090MHz-0.110MHz</td><td>Quasi-peak</td><td>10kHz</td><td>30kHz</td><td>Quasi-peak</td></tr>
<tr><td>0.110MHz-0.490MHz</td><td>Peak</td><td>10kHz</td><td>30kHz</td><td>Peak</td></tr>
<tr><td>0.110MHz-0.490MHz</td><td>Average</td><td>10kHz</td><td>30kHz</td><td>Average</td></tr>
<tr><td>0.490MHz -30MHz</td><td>Quasi-peak</td><td>10kHz</td><td>30kHz</td><td>Quasi-peak</td></tr>
<tr><td>30MHz-1GHz</td><td>Peak</td><td>100 kHz</td><td>300kHz</td><td>Peak</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Field strength (microvolt/meter)</th><th>Limit (dBuV/m)</th><th>Remark</th><th>Measurement distance (m)</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(kHz)</td><td>-</td><td>-</td><td>300</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(kHz)</td><td>-</td><td>-</td><td>30</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>-</td><td>-</td><td>30</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>40.0</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>43.5</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>46.0</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>54.0</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>Above 1GHz</td><td>500</td><td>54.0</td><td>Average</td><td>3</td></tr>
</table>
Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.
</td></tr>
</table>

Test Setup:	

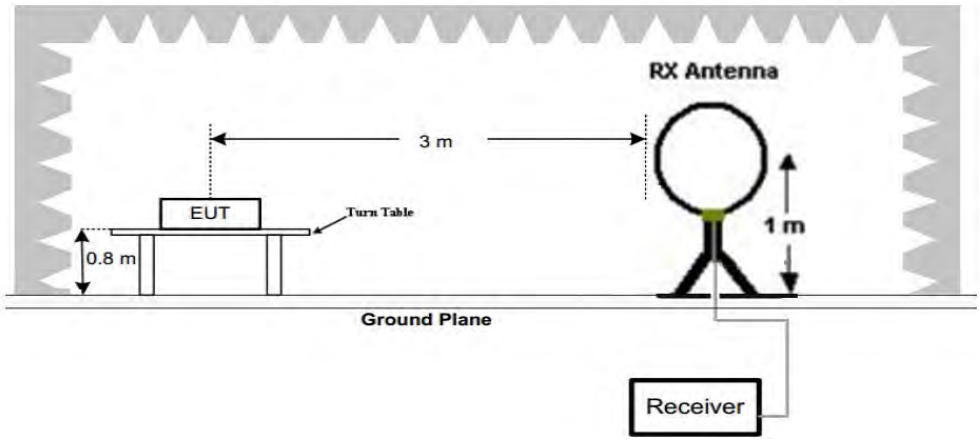


Figure 1. Below 30MHz

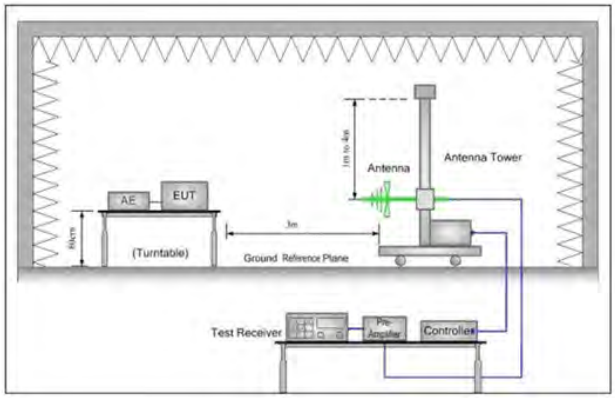


Figure 2. 30MHz to 1GHz

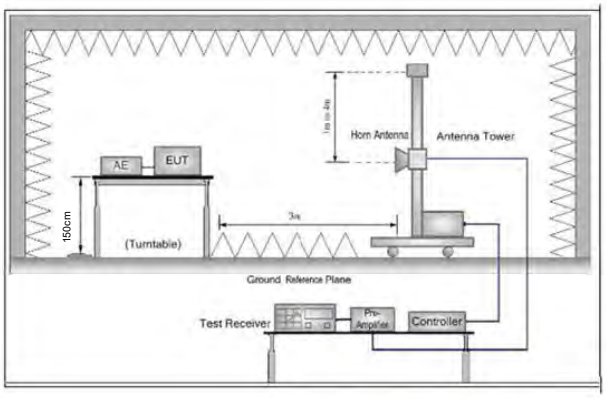


Figure 3. Above 1 GHz

Test Procedure:	a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. Note: For the radiated emission test above 1GHz: Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. d. For each suspected emission, the EUT was arranged to its worst case

	and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel (2402MHz),the middle channel (2441MHz),the Highest channel (2480MHz) h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case. i. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Non-hopping transmitting mode with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH5 of data type and GFSK modulation is the worst case. Pretest the EUT at Transmitting mode, For below 1GHz part, through pre-scan, the worst case is the lowest channel. Only the worst case is recorded in the report.
Test Results:	Pass

5.11.1 Radiated Emission below 1GHz

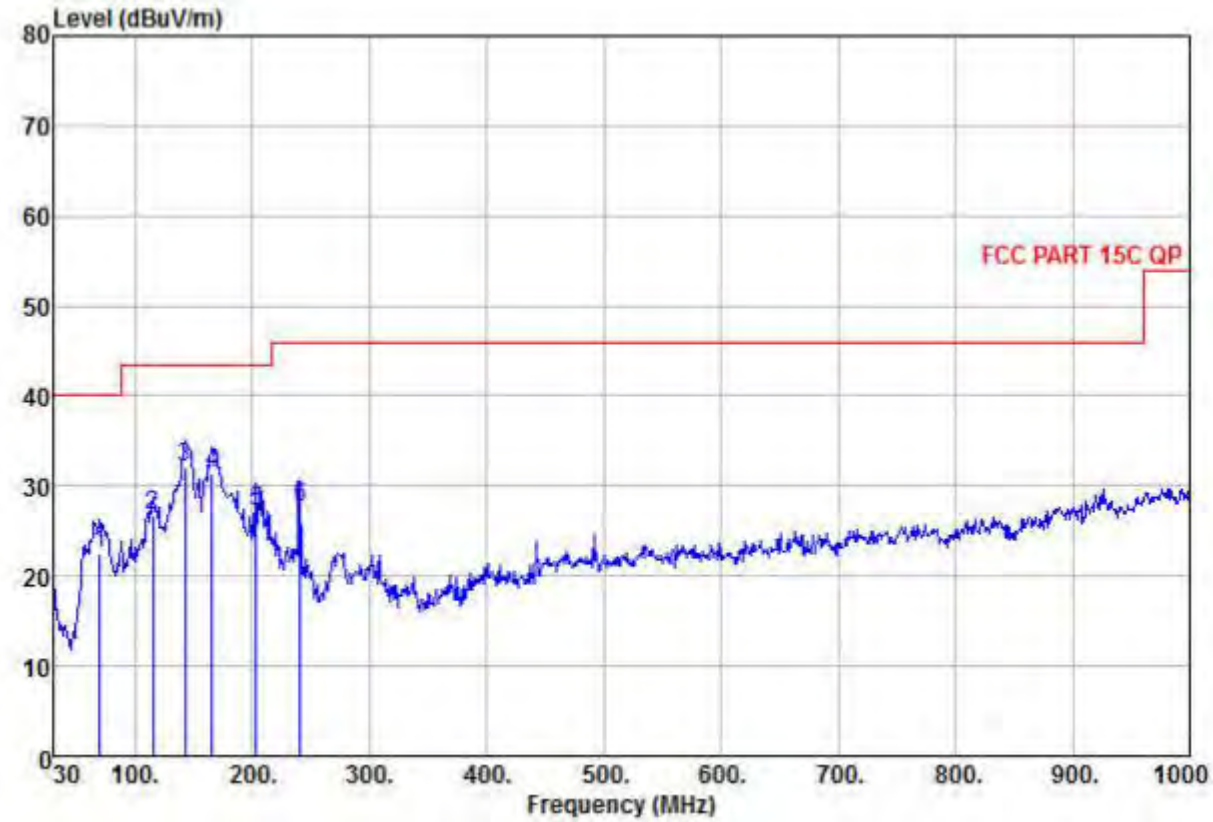
9kHz~30MHz (PEAK)		
Test mode:	Transmitting	Vertical

9kHz~30MHz Test result

The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

5.11.2 Radiated Emission below 1GHz

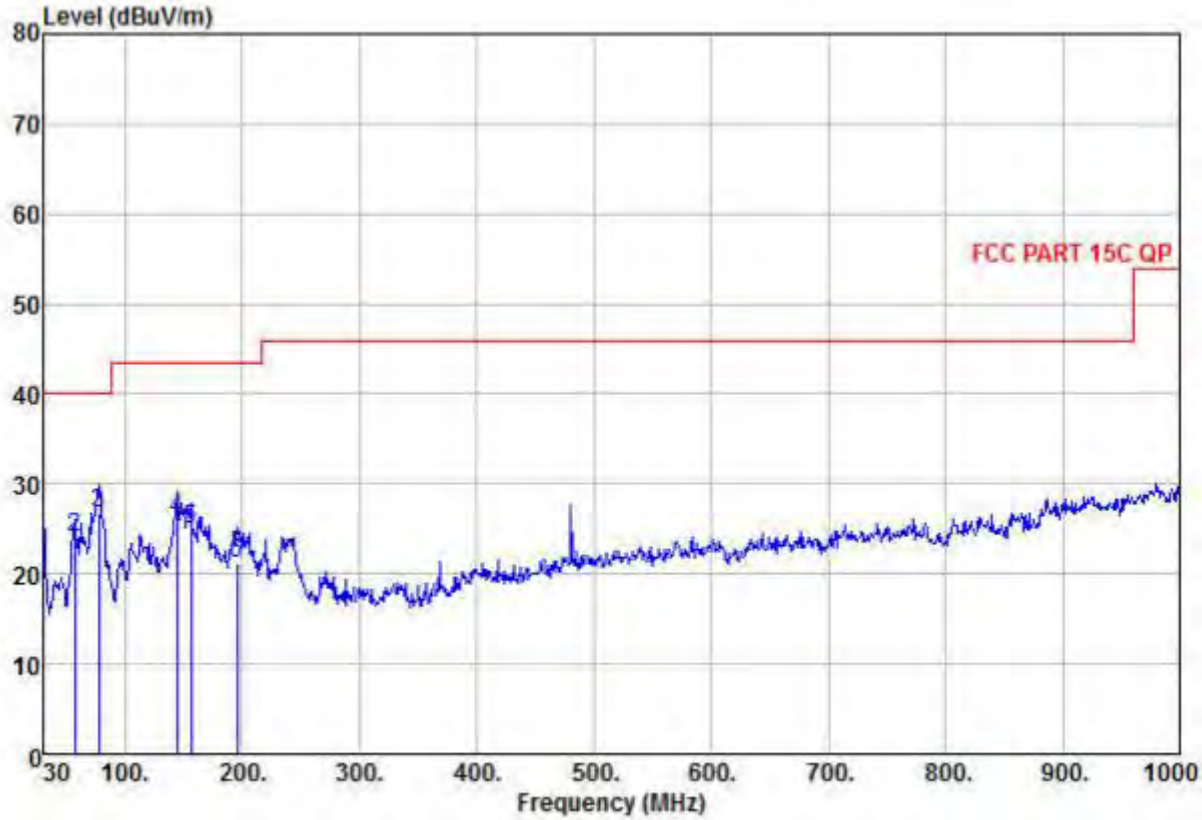
30MHz~1GHz (PEAK)		
Test mode:	Transmitting	Vertical



No.	Freq	Reading	Antenna Factor	Cable Loss	Measured	Limit Line	Preamp Factor	Over limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	dB	
1	69.77	46.35	8.39	0.16	22.40	40.00	32.50	-17.60	QP
2	115.36	50.28	8.35	0.22	26.68	43.50	32.17	-16.82	QP
3	142.52	54.14	9.75	0.24	32.02	43.50	32.11	-11.48	QP
4	165.80	52.87	10.31	0.27	31.38	43.50	32.07	-12.12	QP
5	203.63	48.02	10.83	0.31	27.20	43.50	31.96	-16.30	QP
6	240.49	46.70	12.16	0.35	27.61	46.00	31.60	-18.39	QP

Note: 1. Standards need to read Quasi-peak values.
2. Measured= Antenna Factor + Cable Loss + Reading - Preamp Factor

Test mode:	Transmitting	Horizontal



No.	Freq	Reading	Antenna Factor	Cable Loss	Measured	Limit Line	Preamp Factor	Over limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	dB	
1	30.00	37.30	17.20	0.12	22.22	40.00	32.40	-17.78	QP
2	57.16	48.66	7.87	0.15	24.05	40.00	32.63	-15.95	QP
3	77.53	51.12	7.95	0.17	26.82	40.00	32.42	-13.18	QP
4	144.46	48.16	9.87	0.24	26.16	43.50	32.11	-17.34	QP
5	156.10	46.35	10.44	0.26	24.96	43.50	32.09	-18.54	QP
6	195.87	42.43	10.53	0.31	21.26	43.50	32.01	-22.24	QP

Note: 1. Standards need to read Quasi-peak values.
2. Measured= Antenna Factor + Cable Loss + Reading - Preamp Factor

5.11.3 Transmitter Emission 1-26.5GHz

Worse case mode:	GFSK(DH5)	Test channel:	Lowest

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
4804	50.05	-5.18	44.87	74	-29.13	peak	H
4804	38.47	-5.18	33.29	54	-20.71	AVG	H
7206	49.33	-6.45	42.88	74	-31.12	peak	H
7206	36.44	-6.45	29.99	54	-24.01	AVG	H
4804	51.1	-5.18	45.92	74	-28.08	peak	V
4804	38.55	-5.18	33.37	54	-20.63	AVG	V
7206	50.97	-6.45	44.52	74	-29.48	peak	V
7206	38.62	-6.45	32.17	54	-21.83	AVG	V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
2390	48.2	-4.36	43.84	74	-30.16	peak	H
2390	36.11	-4.36	31.75	54	-22.25	AVG	H
2400	55.54	-4.36	51.18	74	-22.82	peak	H
2400	44.28	-4.36	39.92	54	-14.08	AVG	H
2390	49.02	-4.36	44.66	74	-29.34	peak	V
2390	37.73	-4.36	33.37	54	-20.63	AVG	V
2400	56.93	-4.36	52.57	74	-21.43	peak	V
2400	43.52	-4.36	39.16	54	-14.84	AVG	V

Worse case mode:	GFSK(DH5)	Test channel:	Middle

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
4882	48.3	-5.19	43.11	74	-30.89	peak	H
4882	35.03	-5.19	29.84	54	-24.16	AVG	H
7325	46.03	-6.47	39.56	74	-34.44	peak	H
7325	32.91	-6.47	26.44	54	-27.56	AVG	H
4882	46.73	-5.19	41.54	74	-32.46	peak	V
4882	33.65	-5.19	28.46	54	-25.54	AVG	V
7325	47.12	-6.47	40.65	74	-33.35	peak	V
7325	34.58	-6.47	28.11	54	-25.89	AVG	V

Worse case mode:	GFSK(DH5)	Test channel:	Highest

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
4960	50.73	-5.2	45.53	74	-28.47	peak	H
4960	41.89	-5.2	36.69	54	-17.31	AVG	H
7440	40.51	-6.47	34.04	74	-39.96	peak	H
7440	34.55	-6.47	28.08	54	-25.92	AVG	H
4960	53.64	-5.2	48.44	74	-25.56	peak	V
4960	44.34	-5.2	39.14	54	-14.86	AVG	V
7440	45.07	-6.47	38.6	74	-35.4	peak	V
7440	35.87	-6.47	29.4	54	-24.6	AVG	V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
2483.5	60.77	-4.22	56.55	74	-17.45	peak	H
2483.5	48.39	-4.22	44.17	54	-9.83	AVG	H
2483.5	63.68	-4.22	59.46	74	-14.54	peak	V
2483.5	49.61	-4.22	45.39	54	-8.61	AVG	V

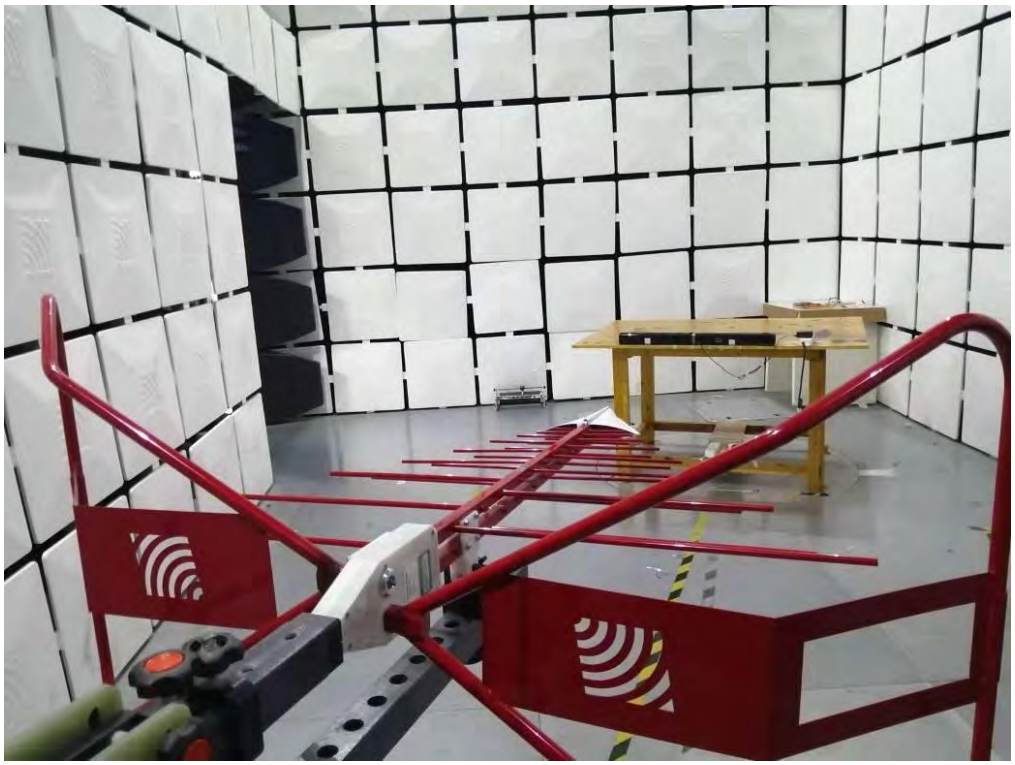
Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low.

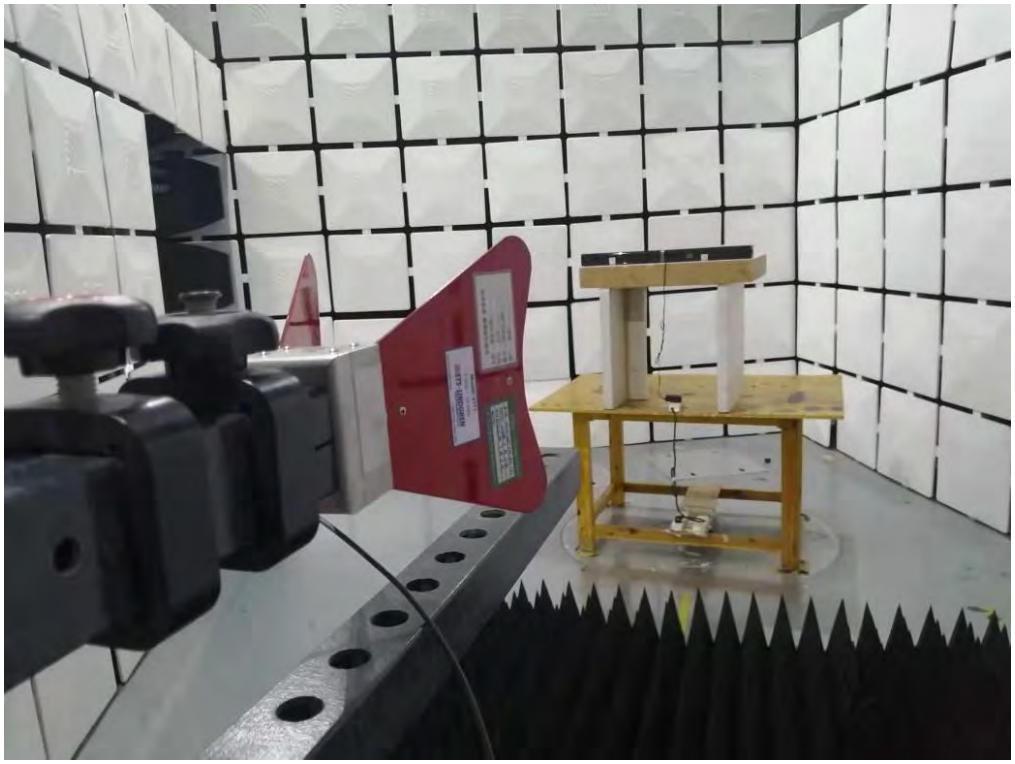
6 Photographs - EUT Test Setup

6.1 Radiated Emission

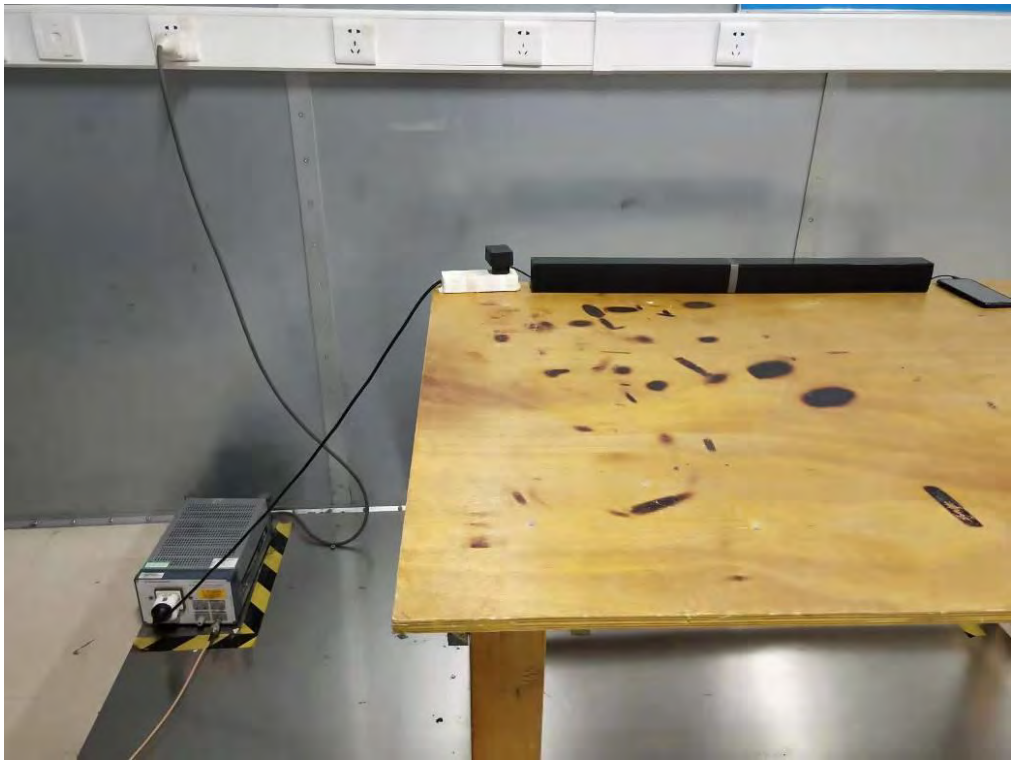
Below 1GHz:



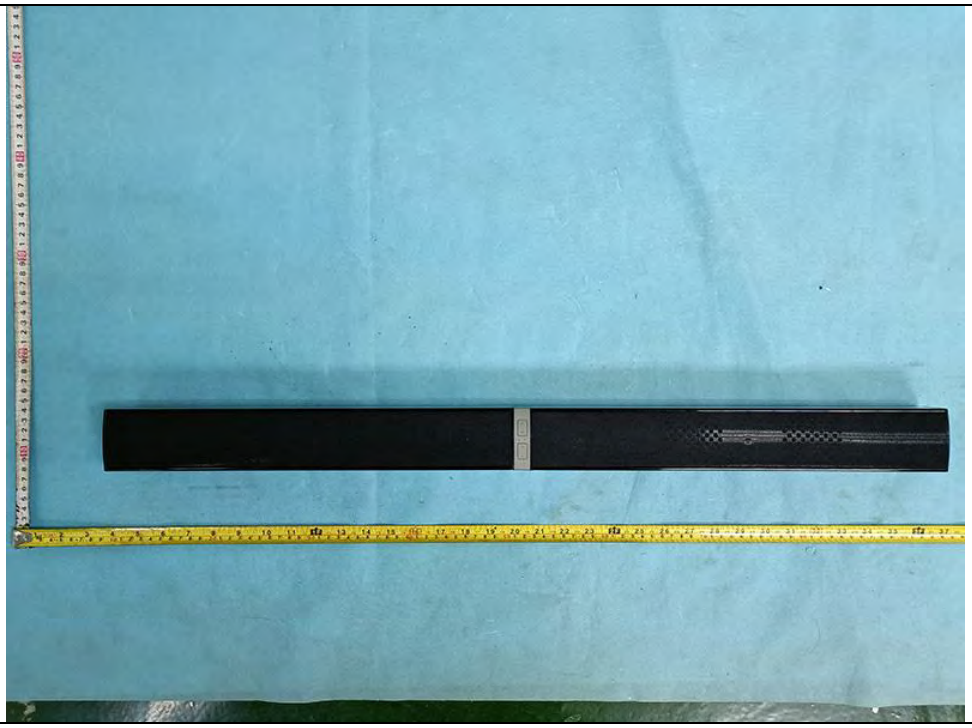
Above 1GHz:

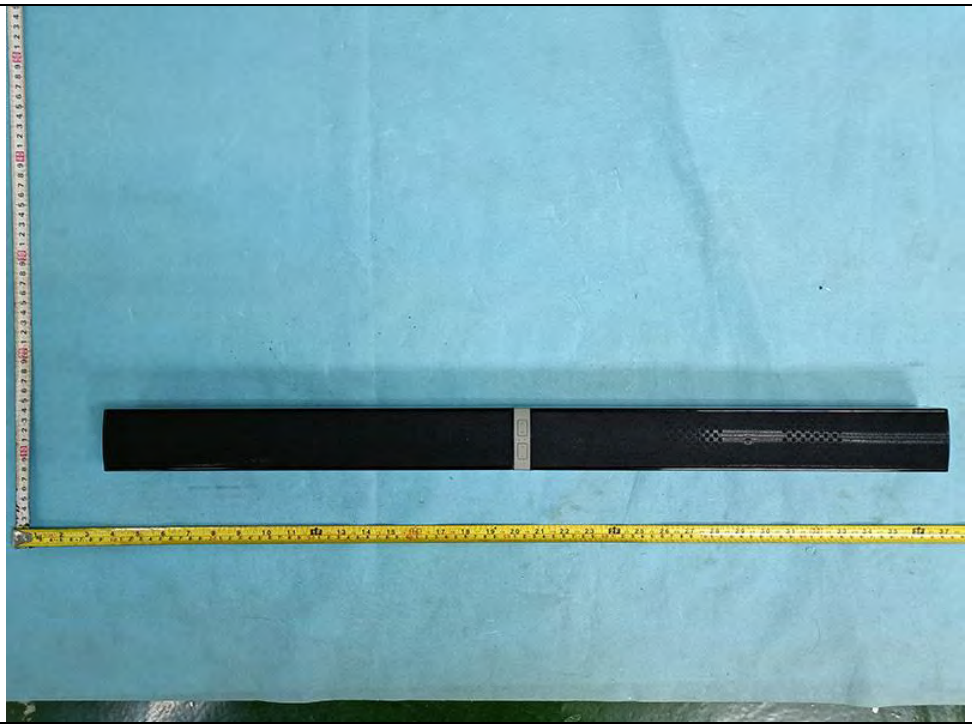


Conducted Emissions



7 Photographs - EUT Constructional Details






MORWIN | MOVSOU
Bluetooth 5.0
MODEL: KY-2828D
POWER DC IN : 15V
USE ONLY CORRECT ADAPTOR SUPPLIED.
OTHER ADAPTORS MAY DAMAGE THE UNIT.
MADE IN CHINA
SERVICE ONLY
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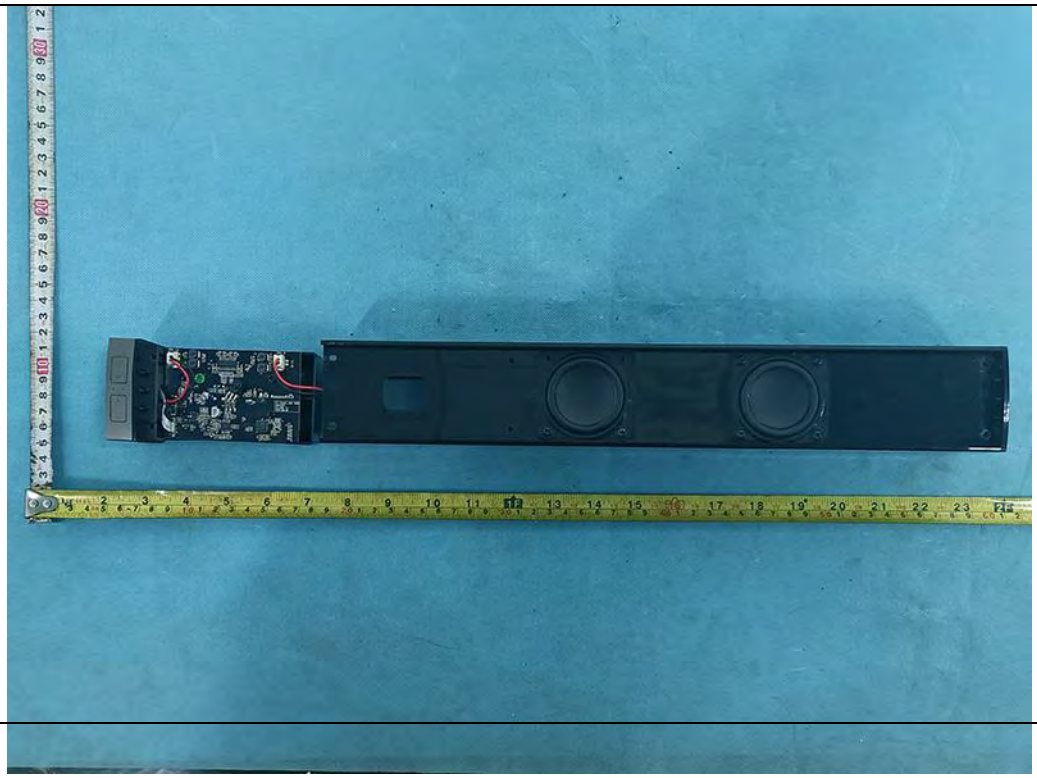

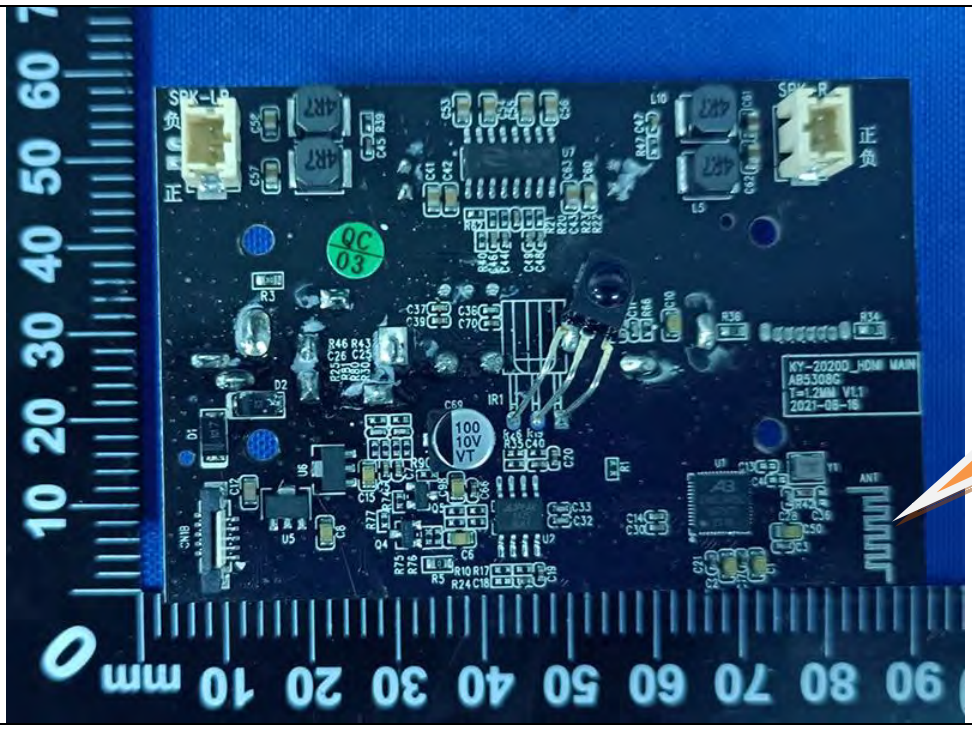
2.4G
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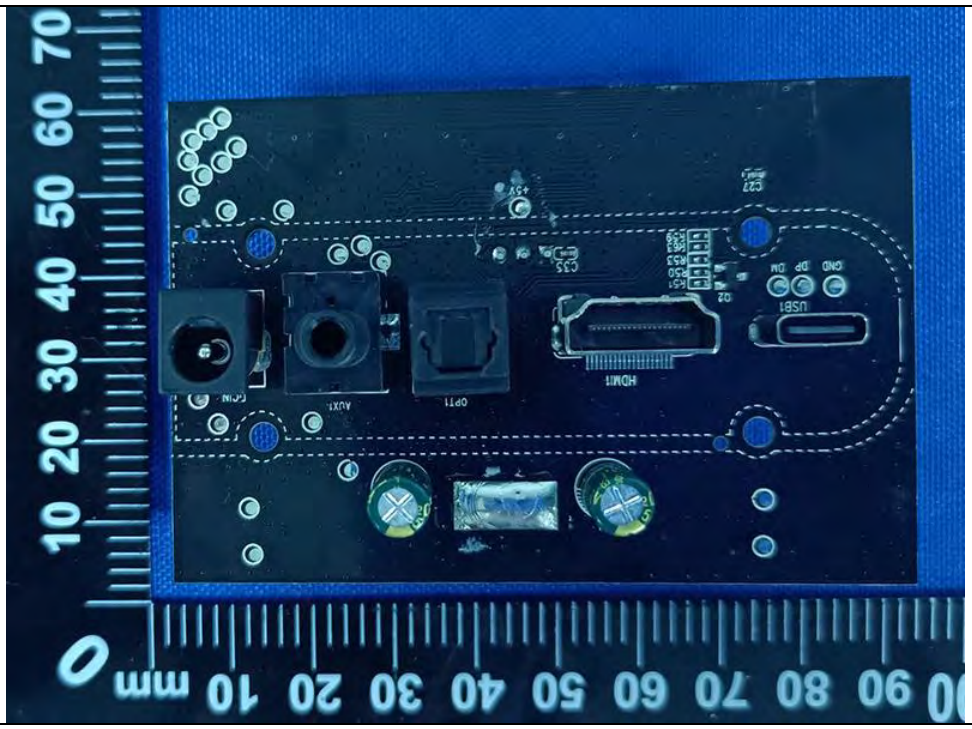

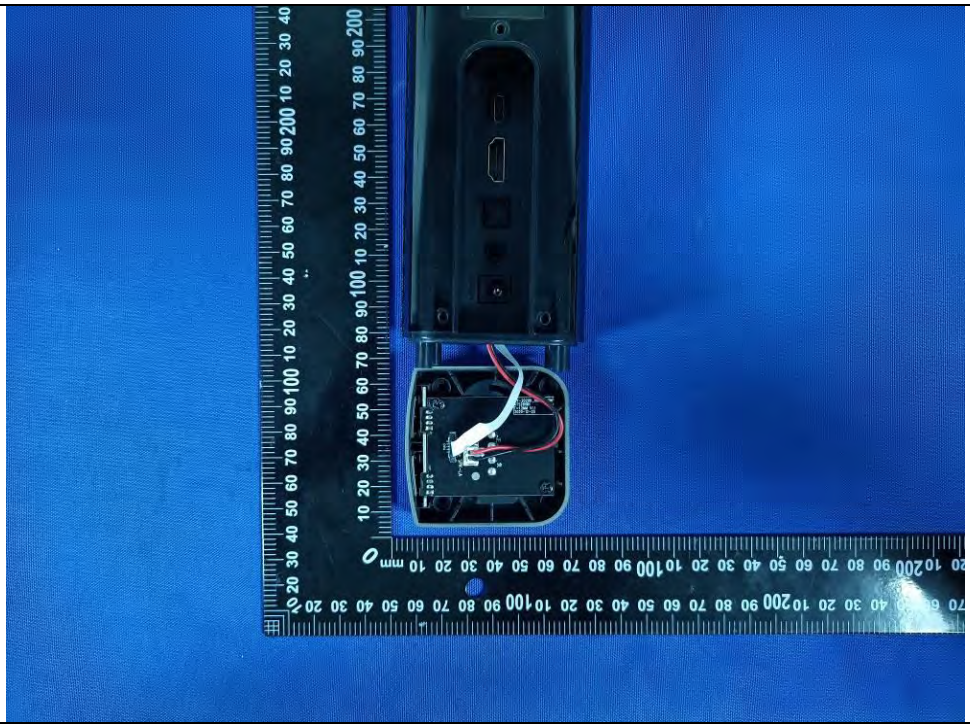

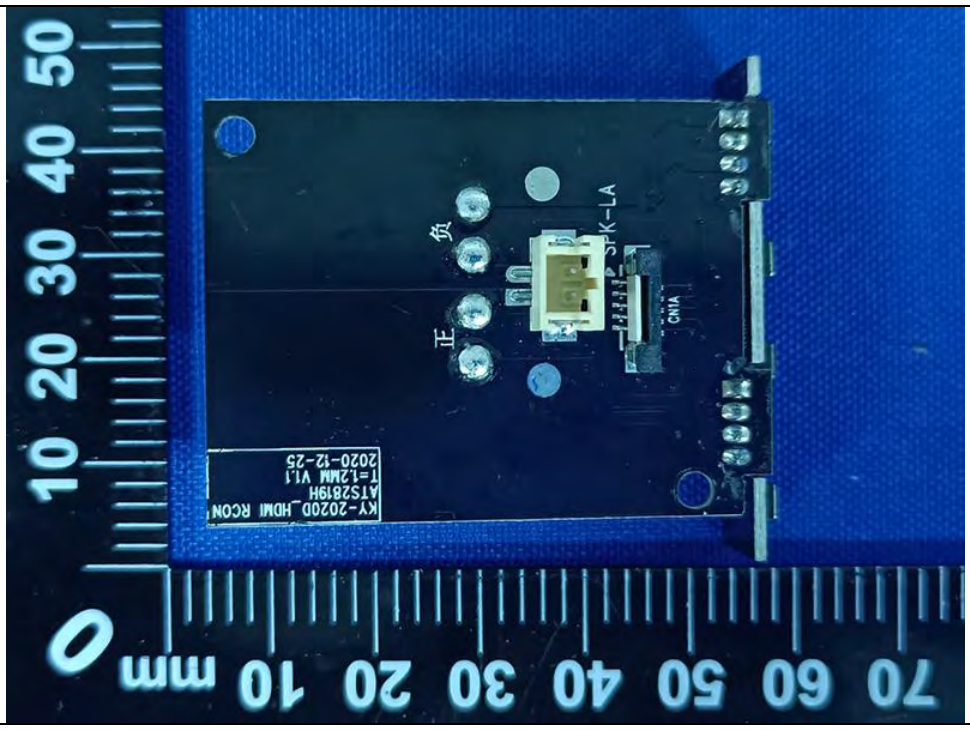
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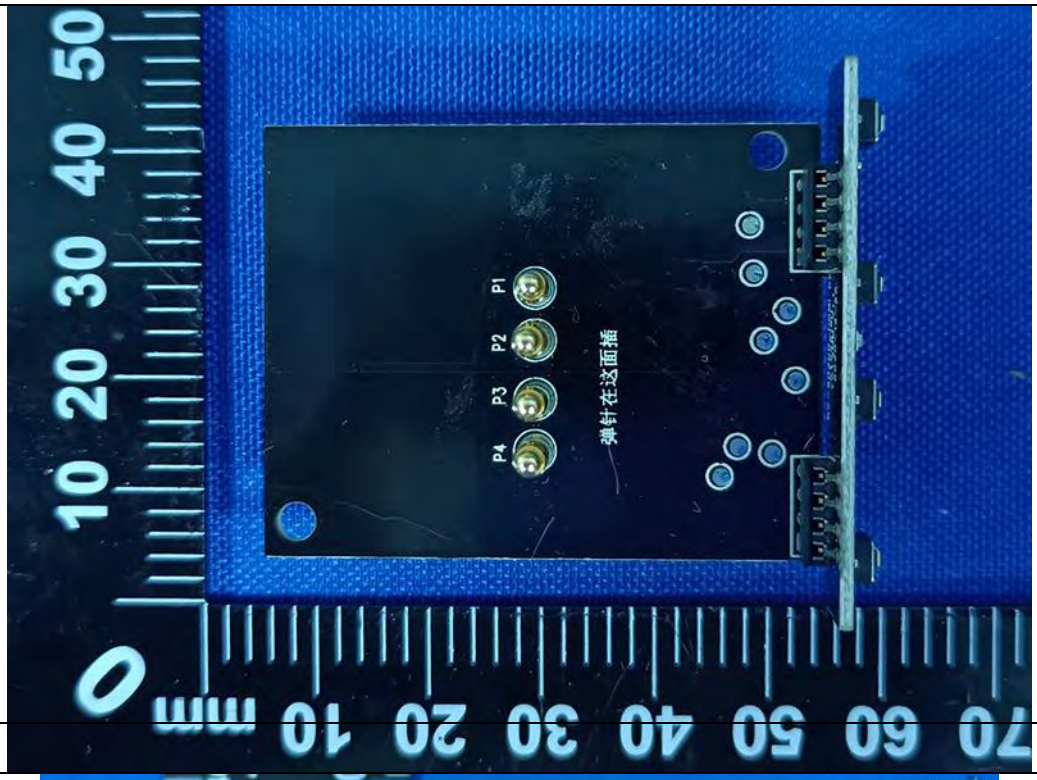

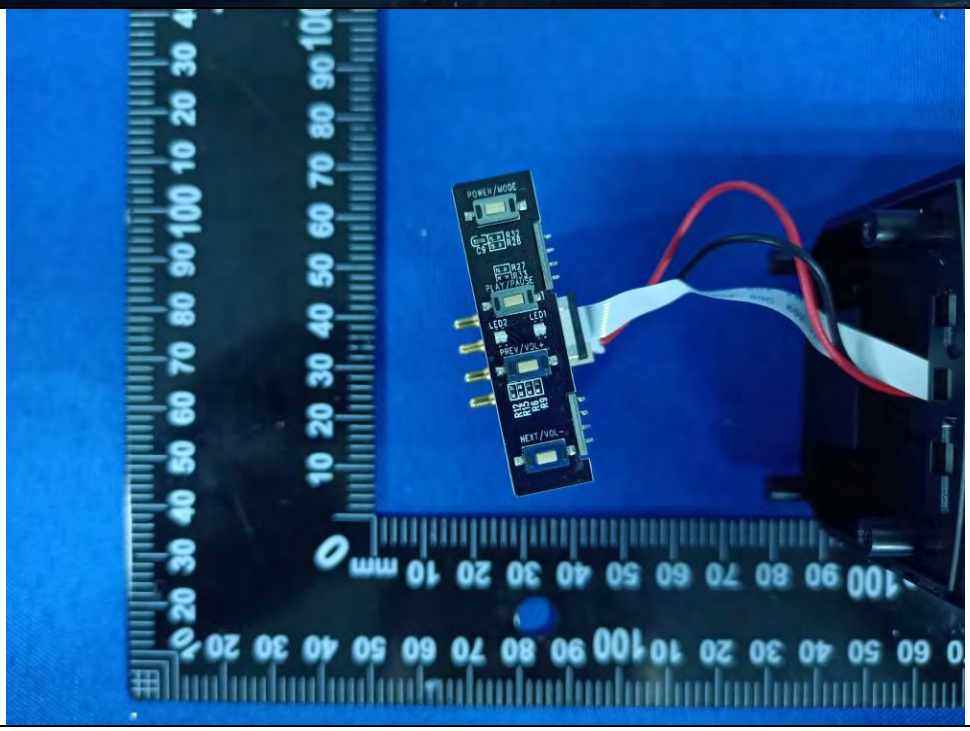

END OF THE REPORT