RADIO TEST REPORT

Report No: FCS202411320W01

Issued for

Applicant:	ShenZhen LVTEL Communication Equipment Co.,Ltd
Address:	2105A 2105, 21st Floor, Building 1, Yagang Industry and Trade Building, No. 18 Fu'an Avenue Pinghu Street, Longgang District, Shenzhen, China
Product Name:	Bluetooth glasses
Brand Name:	N/A
Model Name:	M10 Pro
Series Model:	M10 Pro A, M10 Pro B, M10 Pro C, M10 Pro D, M7 Pro, M11 Pro, M12 Pro, M20 Pro, M30 Pro
FCC ID:	2BEHS-LV-M10PRO
Test Standard:	FCC Part 15.247

Issued By: Flux Compliance Service Laboratory
Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan
Tel: 769-27280901 Fax:769-27280901 http://www.FCS-lab.com

TEST RESULT CERTIFICATION

Applicant's Name .....: ShenZhen LVTEL Communication Equipment Co.,Ltd

Address.....: 2105A 2105, 21st Floor, Building 1, Yagang Industry and Trade Building, No. 18 Fu'an Avenue Pinghu Street, Longgang District, Shenzhen, China

Manufacture's Name .....: ShenZhen LVTEL Communication Equipment Co.,Ltd

Address.....: 2105A 2105, 21st Floor, Building 1, Yagang Industry and Trade Building, No. 18 Fu'an Avenue Pinghu Street, Longgang District, Shenzhen, China

Product Description

Product Name .....: Bluetooth glasses

Brand Name.....: N/A

Model Name .....: M10 Pro

Series Model.....: M10 Pro A, M10 Pro B, M10 Pro C, M10 Pro D, M7 Pro, M11 Pro, M12 Pro, M20 Pro, M30 Pro

Test Standards .....: FCC Part15.247

Test Procedure.....: ANSI C63.10-2013

This device described above has been tested by FCS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Date of Test ..... :

Date (s) of performance of tests ..... : Nov. 11, 2024 ~ Nov. 24, 2024

Date of Issue..... : Nov. 24, 2024

Test Result ..... : Pass

Tested by : Scott Shen

(Scott Shen)

Reviewed by : Duke Qian

(Duke Qian)

Approved by : Jack Wang

(Jack Wang)

Table of Contents

Revision History 5
1. SUMMARY OF TEST RESULTS 6
1.1 TEST FACTORY 7
1.2 MEASUREMENT UNCERTAINTY 7
2. GENERAL INFORMATION 8
2.1 GENERAL DESCRIPTION OF THE EUT 8
2.2 DESCRIPTION OF THE TEST MODES 11
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED 12
2.4 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS 12
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS 13
3. EMC EMISSION TEST 14
3.1 CONDUCTED EMISSION MEASUREMENT 14
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS 14
3.1.2 TEST PROCEDURE 15
3.1.3 TEST SETUP 15
3.1.4 EUT OPERATING CONDITIONS 15
3.1.5 TEST RESULT 16
3.2 RADIATED EMISSION MEASUREMENT 18
3.2.1 RADIATED EMISSION LIMITS 18
3.2.2 TEST PROCEDURE 19
3.2.3 DEVIATION FROM TEST STANDARD 20
3.2.4 TESTSETUP 21
3.2.5 EUT OPERATING CONDITIONS 21
3.2.7 TEST RESULTS 23
4. CONDUCTED SPURIOUS & BAND EDGE EMISSION 32
4.1 LIMIT 32
4.2 TEST PROCEDURE 32
4.3 TEST SETUP 32
4.4 EUT OPERATION CONDITIONS 32
4.5 TEST RESULTS 32
5. NUMBER OF HOPPING CHANNEL 33
5.1 LIMIT 33
5.2 TEST PROCEDURE 33
5.3 TEST SETUP 33
5.4 EUT OPERATION CONDITIONS 33
5.5 TEST RESULTS 33
6. AVERAGE TIME OF OCCUPANCY 34
6.1 LIMIT 34
6.2 TEST PROCEDURE 34
6.3 TEST SETUP 34
6.4 EUT OPERATION CONDITIONS 34
6.5 TEST RESULTS 34
7. HOPPING CHANNEL SEPARATION MEASUREMEN 35
7.1 LIMIT 35
7.2 TEST PROCEDURE 35
7.3 TEST SETUP 35
7.4 EUT OPERATION CONDITIONS 35
7.5 TEST RESULTS 35
8. BANDWIDTH TEST 36
8.1 LIMIT 36
8.2 TEST PROCEDURE 36
8.3 TEST SETUP 36
8.4 EUT OPERATION CONDITIONS 36
8.5 TEST RESULTS 36

9. OUTPUT POWER TEST 37
9.1 LIMIT 37
9.2 TEST PROCEDURE 37
9.3 TEST SETUP 37
9.4 EUT OPERATION CONDITIONS 37
9.5 TEST RESULTS 37
10. ANTENNA REQUIREMENT 38
10.1 STANDARD REQUIREMENT 38
10.2 EUT ANTENNA 38
APPENDIX 1-TEST DATA 39
Left side: 39
1. Dwell Time 39
2. Maximum Peak Conducted Output Power 49
3. -20dB Bandwidth 55
4. Carrier Frequencies Separation 61
5. Number of Hopping Channel 67
6. Band Edge 70
7. Band Edge(Hopping) 77
8. Conducted RF Spurious Emission 84
Right side: 94
1. Dwell Time 94
2. Maximum Peak Conducted Output Power 104
3. -20dB Bandwidth 110
4. Carrier Frequencies Separation 116
5. Number of Hopping Channel 122
6. Band Edge 125
7. Band Edge(Hopping) 132
8. Conducted RF Spurious Emission 139
APPENDIX 2-PHOTOS OF TEST SETUP 149

Revision History

Rev.	Issue Date	Effect Page	Contents
00	Nov. 24, 2024	All	Initial Issue

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:
KDB 558074 D01 15.247 Meas Guidance v05r02.

FCC Part 15.247, Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	--
15.247(a)(1)	Hopping Channel Separation	PASS	--
15.247(a)(1)&(b)(1)	Output Power	PASS	--
15.209	Radiated Spurious Emission	PASS	--
15.247(d)	Conducted Spurious & Band Edge Emission	PASS	--
15.247(a)(1)(iii)	Number of Hopping Frequency	PASS	--
15.247(a)(1)(iii)	Dwell Time	PASS	--
15.247(a)(1)	Bandwidth	PASS	--
15.205	Restricted bands of operation	PASS	--
Part 15.247(d)/part 15.209(a)	Band Edge Emission	PASS	--
15.203	Antenna Requirement	PASS	--

NOTE:

(1) 'N/A' denotes test is not applicable in this Test Report.

(2) All tests are according to ANSI C63.10-2013.

1.1 TEST FACTORY

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
FCC Test Firm Registration Number: 514908 Designation number: CN0127 A2LA accreditation number：5545.01 ISED Number：25801 CAB ID ：CN0097	

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	RF output power, conducted	±0.68dB
2	Unwanted Emissions, conducted	±2.988dB
3	All emissions radiated (9KHz -30MHz)	±5.1 dB
4	All emissions, radiated 30-1GHz	±5.6dB
5	All emissions, radiated 1G-6GHz	±5.5dB
6	All emissions, radiated>6G	±5.8dB
7	Conducted Emission (9KHz-150KHz)	±3.37dB
8	Conducted Emission (150KHz-30MHz)	±3.83dB
9	Duty Cycle	±3.2%
10	Occupied bandwidth	±4%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

<table>
<tr><td>Product Name</td><td>Bluetooth glasses</td></tr>
<tr><td>Trade Name</td><td>N/A</td></tr>
<tr><td>Model Name</td><td>M10 Pro</td></tr>
<tr><td>Series Model</td><td>M10 Pro A, M10 Pro B, M10 Pro C, M10 Pro D, M7 Pro, M11 Pro, M12 Pro, M20 Pro, M30 Pro</td></tr>
<tr><td>Model Difference</td><td>Only different of model name and appearance.</td></tr>
<tr><td>Product Description</td><td>
<table>
<tr><td>Operation Frequency:</td><td>2402~2480 MHz</td></tr>
<tr><td>Modulation Type:</td><td>GFSK, π/4-DQPSK, 8DPSK</td></tr>
<tr><td>Bit Rate of Transmitter:</td><td>1 Mbps/2 Mbps/3 Mbps</td></tr>
<tr><td>Number of Channel:</td><td>79CH</td></tr>
<tr><td>Antenna Designation:</td><td>Please see Note 4.</td></tr>
<tr><td>Antenna Gain (dBi):</td><td>2.7 dBi</td></tr>
</table>
</td></tr>
<tr><td>Channel List</td><td>Please refer to the Note 2.</td></tr>
<tr><td>Power Supply</td><td>DC 5V</td></tr>
<tr><td>Battery</td><td>Rated Voltage: 3.7V
Capacity: 55mAh * 2</td></tr>
<tr><td>Test sample number</td><td>FCS202411212001</td></tr>
<tr><td>Hardware version number</td><td>V01</td></tr>
<tr><td>Software version number</td><td>V01</td></tr>
<tr><td>Connecting I/O Port(s)</td><td>Please refer to the User's Manual</td></tr>
</table>

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User Manual.

2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

3. 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:
Test Frequency:

BT	
Channel	Freq.(MHz)
00	2402
39	2441
78	2480

4.

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	RANT1608F 245C01	Chip	N/A	2.7	Antenna

Note: The antenna information refer the manufacturer provide report, applicable only to the tested sample identified in the report. Due to the incorrect antenna information, a series of problems such as the accuracy of the test results will be borne by the customer.

2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Worst Mode	Description	Data Rate/Modulation
Mode 1	TX CH00	1Mbps/GFSK
Mode 2	TX CH39	1Mbps/GFSK
Mode 3	TX CH78	1Mbps/GFSK
Mode 4	TX CH00	2 Mbps/π/4-DQPSK
Mode 5	TX CH39	2 Mbps/π/4-DQPSK
Mode 6	TX CH78	2 Mbps/π/4-DQPSK
Mode7	TX CH00	3 Mbps/8DPSK
Mode 8	TX CH39	3 Mbps/8DPSK
Mode 9	TX CH78	3 Mbps/8DPSK
Mode 10	Hopping	GFSK
Mode 11	Hopping	π/4-DQPSK
Mode 12	Hopping	8DPSK

Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.

(2) We tested for all available U.S. voltage and frequencies (For 120V, 50/60Hz and 240V, 50/60Hz) for which the device is capable of operation, and the worst case of 120V/ 60Hz is shown in the report.

(3) The battery is fully-charged during the radiated and RF conducted test.

For AC Conducted Emission

Test Case	
AC Conducted Emission	Mode 13 : Keeping BT TX

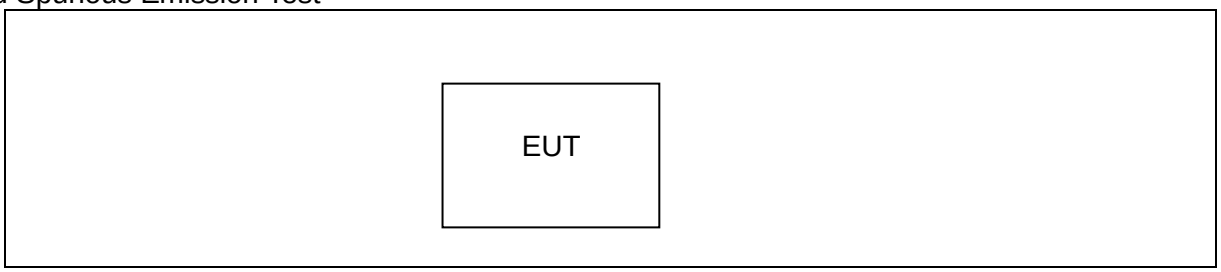
TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

Test software Version	Test program: Bluetooth		
(Power control software) Parameters(1/2/3Mbps)	Power class: DH1 rate:4:27 2DH1 rate:20:54 3DH1 rate:24:83	Power class: DH3 rate:11:183 2DH3 rate:26:367 3DH3 rate:27:552	Power class: DH5 rate:15:339 2DH5 rate:30:679 3DH5 rate:31:1021

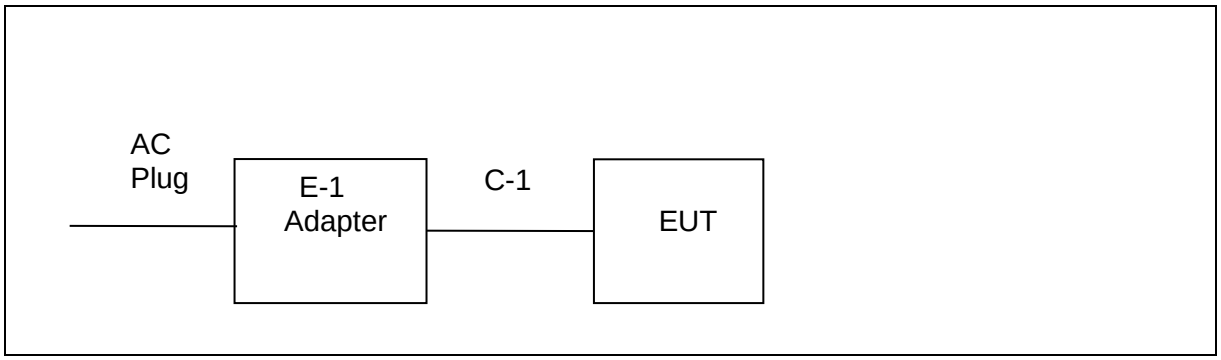
RF Function	Type	Mode Or Modulation type	Power Class	Software For Testing
BT	BR+EDR	GFSK	Default	FCC_assist_1.0.2.2
		π/4-DQPSK	Default	
		8DPSK	Default	

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Emission Test



2.4 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
N/A	N/A	N/A	N/A	N/A	N/A

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-1	Adapter	DOKE	ADLX45DLC	N/A	N/A
C-1	USB Cable	N/A	TPN01	N/A	120cm

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2024.08.28	2025.08.27
Signal Analyzer	R&S	FSV40-N	FCS-E012	2024.08.28	2025.08.27
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2024.08.28	2025.08.27
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2024.08.28	2025.08.27
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2024.08.28	2025.08.27
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2024.08.28	2025.08.27
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2024.08.28	2025.08.27
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2024.08.28	2025.08.27
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2024.08.28	2025.08.27
Temperature & Humidity	HTC-1	victor	FCS-E005	2024.08.28	2025.08.27
Low frequency cable（9k-1G Hz)	Gemma Technology	R03	FCS-E031	2024.08.28	2025.08.27
Low frequency cable（1-18G Hz)	Gemma Technology	R04	FCS-E032	2024.08.28	2025.08.27
Low frequency cable（18-40G Hz)	Gemma Technology	R05	FCS-E033	2024.08.28	2025.08.27

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESCI	FCS-E020	2024.08.28	2025.08.27
LISN	R&S	ENV216	FCS-E007	2024.08.28	2025.08.27
LISN	ETS	3810/2NM	FCS-E009	2024.08.28	2025.08.27
Temperature & Humidity	HTC-1	victor	FCS-E008	2024.08.28	2025.08.27

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
MXA SIGNAL Analyzer	Keysight	N9020A	FCS-E015	2024.08.28	2025.08.27
Spectrum Analyzer	Agilent	E4447A	MY50180039	2024.08.28	2025.08.27
Spectrum Analyzer	R&S	FSV-40	101499	2024.08.28	2025.08.27

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

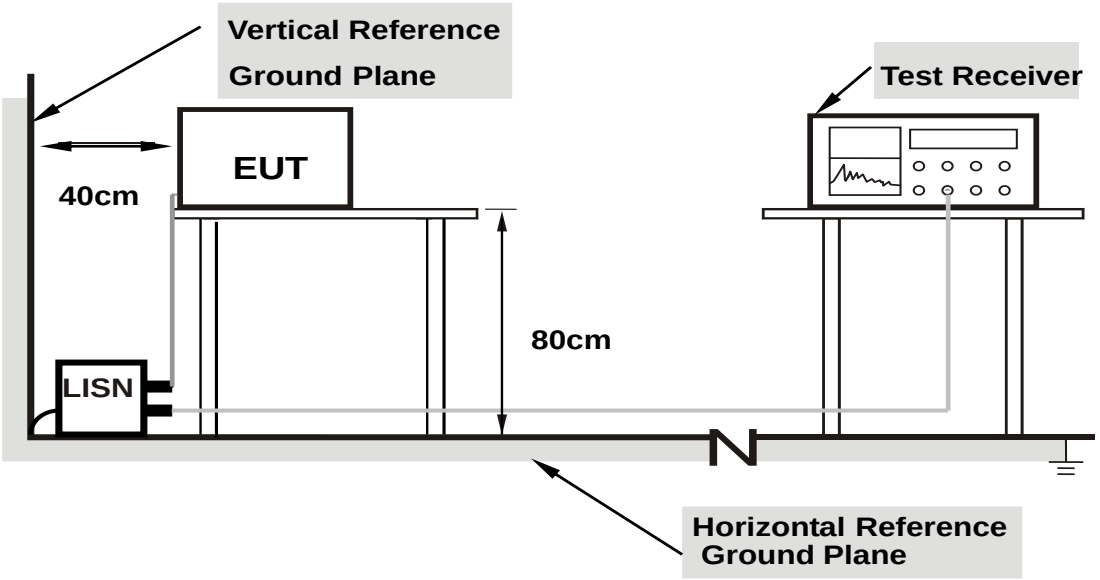
The following table is the setting of the receiver

Receiver Parameters	**Setting**
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

a. The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN is at least 80 cm from the nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support units.

3.1.4 EUT OPERATING CONDITIONS

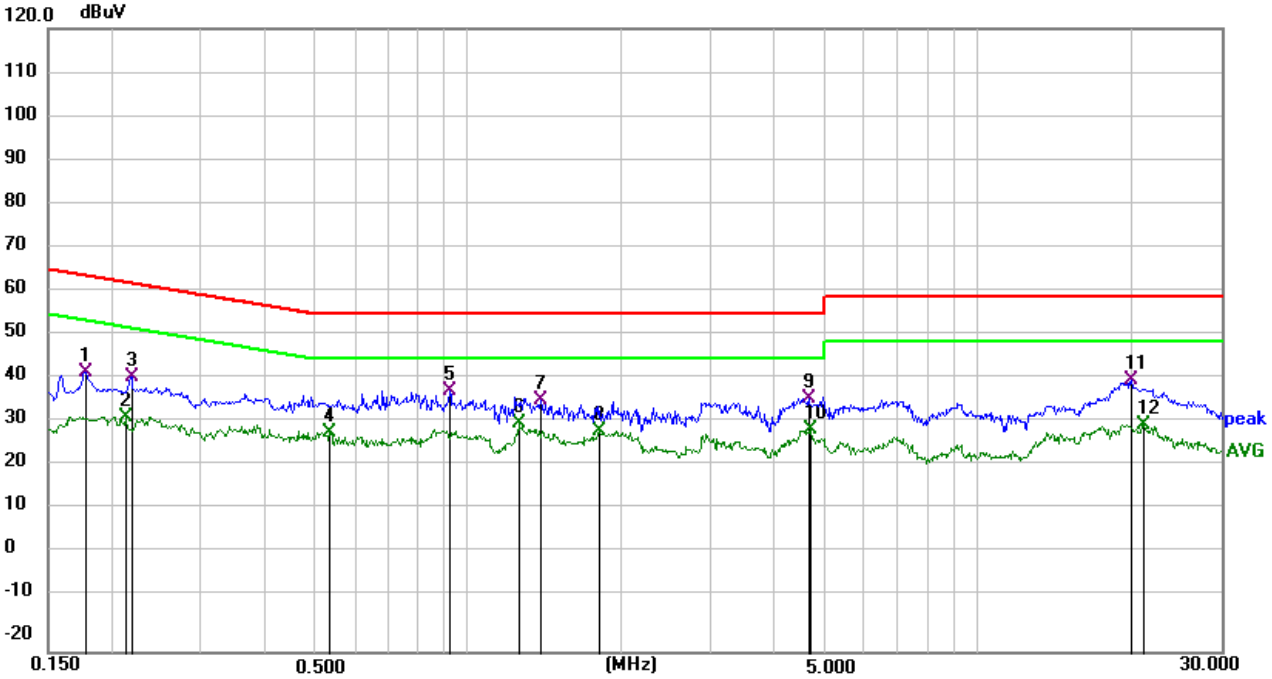
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.1.5 TEST RESULT

Temperature:	24.2(C)	Relative Humidity:	47%RH
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 13		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1770	32.30	10.68	42.98	64.63	-21.65	QP
2	0.2127	22.05	10.70	32.75	53.10	-20.35	AVG
3	0.2174	31.28	10.70	41.98	62.92	-20.94	QP
4	0.5350	18.75	10.69	29.44	46.00	-16.56	AVG
5	0.9193	28.23	10.65	38.88	56.00	-17.12	QP
6 *	1.2615	20.66	10.68	31.34	46.00	-14.66	AVG
7	1.3920	26.13	10.70	36.83	56.00	-19.17	QP
8	1.8104	19.03	10.76	29.79	46.00	-16.21	AVG
9	4.6634	26.15	11.01	37.16	56.00	-18.84	QP
10	4.6993	19.12	11.01	30.13	46.00	-15.87	AVG
11	19.9543	29.51	11.72	41.23	60.00	-18.77	QP
12	21.1965	19.55	11.73	31.28	50.00	-18.72	AVG

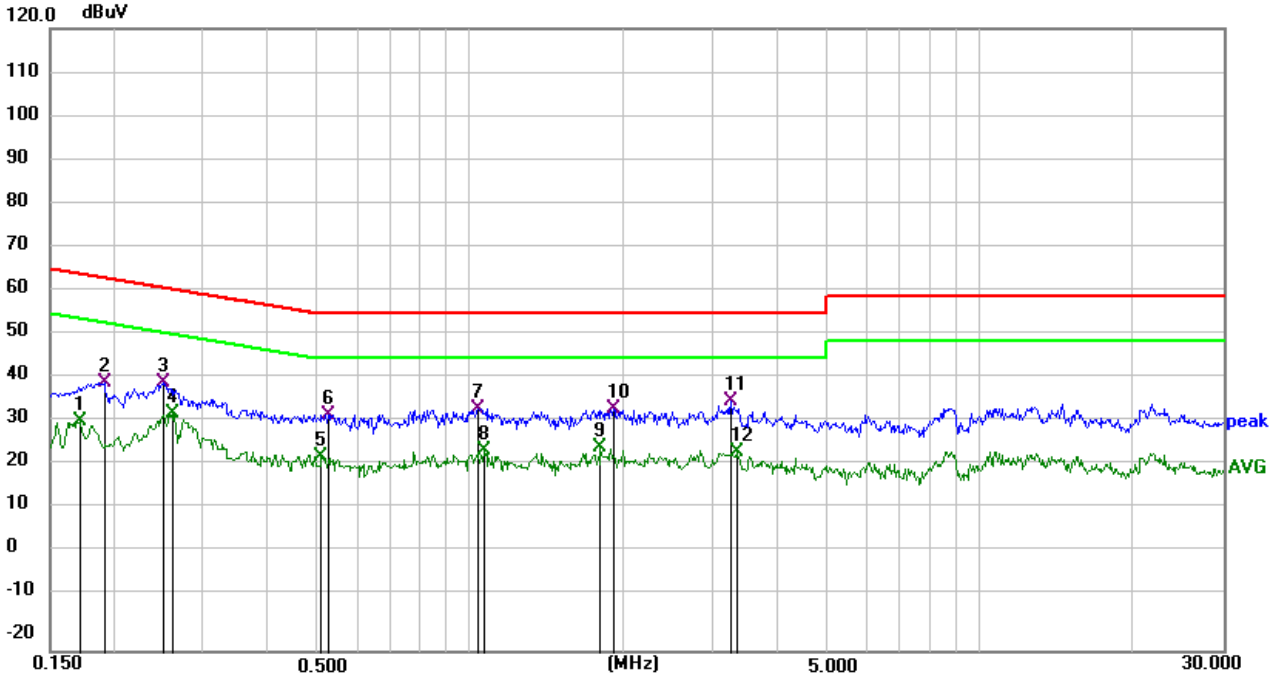
Remark:
1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)



Temperature:	24.2(C)	Relative Humidity:	47%RH
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 13		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1711	21.25	10.67	31.92	54.91	-22.99	AVG
2	0.1905	29.66	10.69	40.35	64.01	-23.66	QP
3	0.2506	29.88	10.69	40.57	61.74	-21.17	QP
4 *	0.2615	22.86	10.69	33.55	51.38	-17.83	AVG
5	0.5100	13.26	10.69	23.95	46.00	-22.05	AVG
6	0.5264	22.57	10.69	33.26	56.00	-22.74	QP
7	1.0320	23.95	10.64	34.59	56.00	-21.41	QP
8	1.0680	14.53	10.65	25.18	46.00	-20.82	AVG
9	1.8015	15.02	10.75	25.77	46.00	-20.23	AVG
10	1.9140	23.65	10.76	34.41	56.00	-21.59	QP
11	3.2550	25.37	10.84	36.21	56.00	-19.79	QP
12	3.3360	13.90	10.91	24.81	46.00	-21.19	AVG

Remark:
1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205 (a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RESTRICTED FREQUENCY BANDS

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
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	Above 38.6
13.36-13.41			

For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP/AV
Start Frequency	9 KHz/150KHz(Peak/QP/AV)
Stop Frequency	150KHz/30MHz(Peak/QP/AV)
RB / VB (emission in restricted band)	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz); 200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP
Start Frequency	30 MHz(Peak/QP)
Stop Frequency	1000 MHz (Peak/QP)
RB / VB (emission in restricted band)	120 KHz / 300 KHz

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/AV
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier hamonic(Peak/AV)
RB / VB (emission in restricted band)	1 MHz / 3 MHz(Peak) 1 MHz/1/T MHz(AVG)

For Restricted band

Spectrum Parameter	Setting
Detector	Peak/AV
Start/Stop Frequency	Lower Band Edge: 2310 to 2410 MHz Upper Band Edge: 2476 to 2500 MHz
RB / VB	1 MHz / 3 MHz(Peak) 1 MHz/1/T MHz(AVG)

Receiver Parameter	**Setting**
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

a. The measuring distance at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
b. The EUT was placed on the top of a rotating table 0.8 m (above 1GHz is 1.5 m) above the ground at a 3 m anechoic chamber test site. The table was rotated 360 degree to determine the position of the highest radiation.
c. The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarization of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and QuasiPeak detector mode will be re-measured.

e. If the Peak Mode measured value is compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and no additional QP Mode measurement was performed.

f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

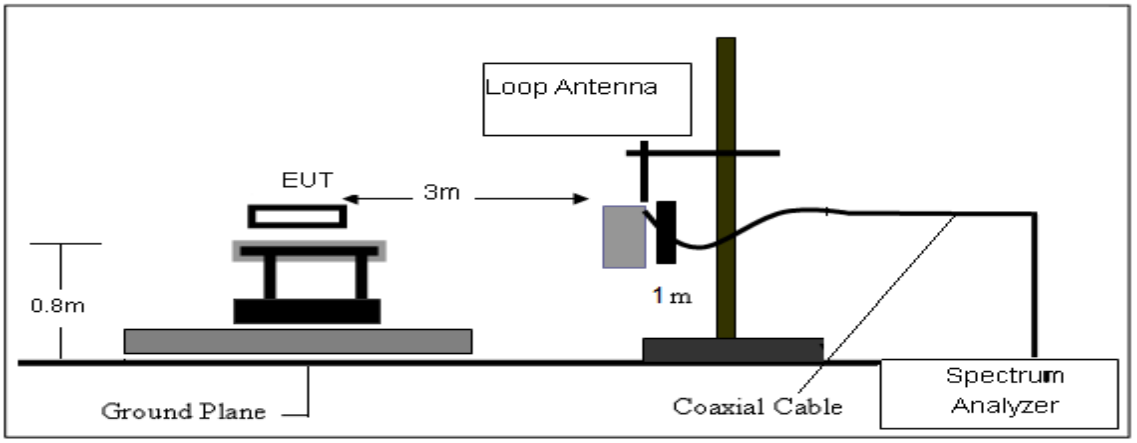
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

3.2.3 DEVIATION FROM TEST STANDARD

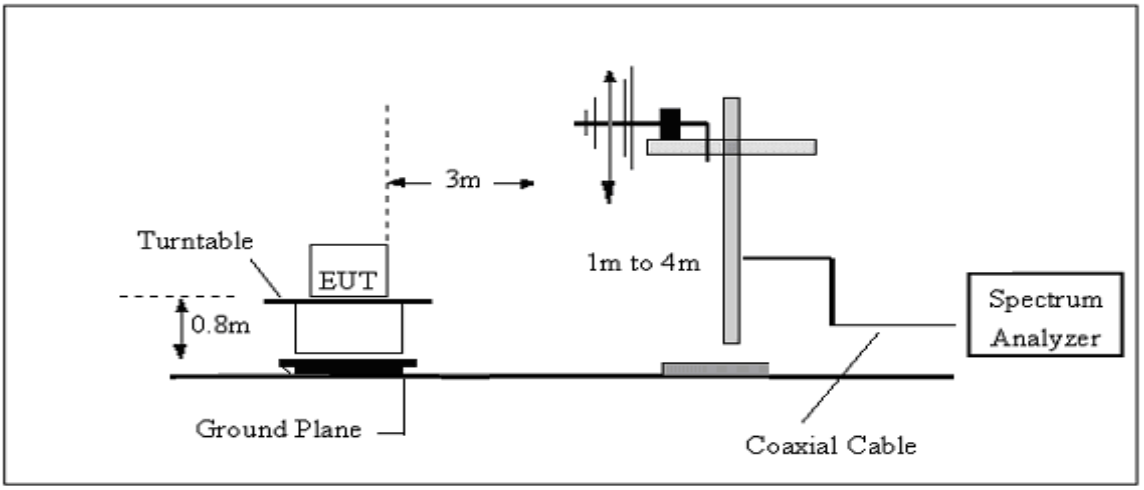
No deviation.

3.2.4 TESTSETUP

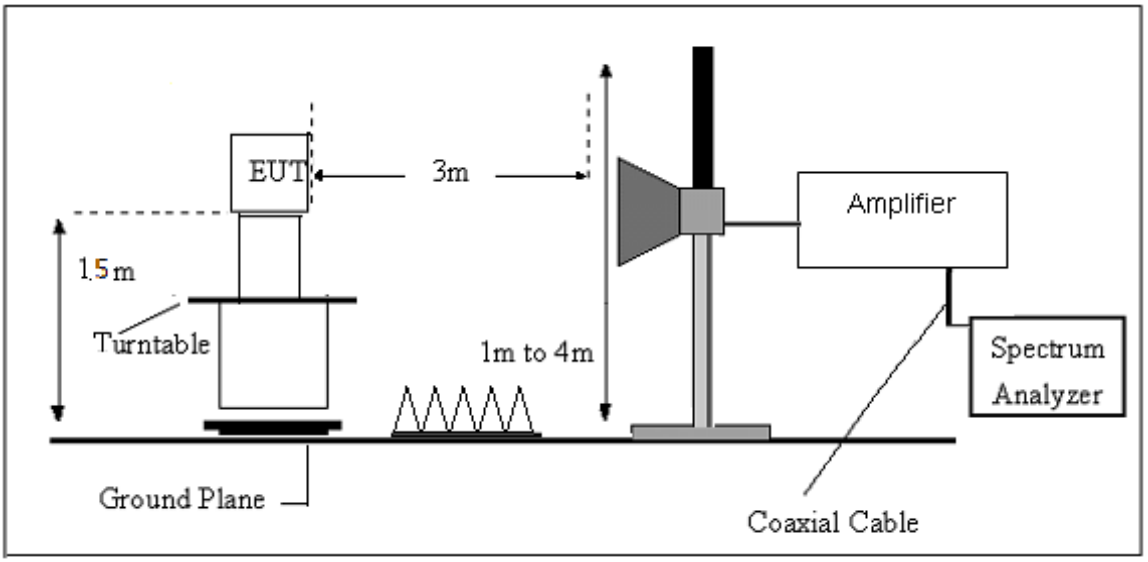
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

Please refer to section 3.1.4 of this report.

3.2.6 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

For example

Frequency	FS	RA	AF	CL	AG	Factor
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dB)	(dB)	(dB)
300	40	58.1	12.2	1.6	31.9	-18.1

Factor=AF+CL-AG

3.2.7 TEST RESULTS

(9KHz-30MHz)

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.7V	Test Mode:	TX Mode

Freq.	Reading	Limit	Margin	State	Test Result
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F	
--	--	--	--	--	PASS
--	--	--	--	--	PASS

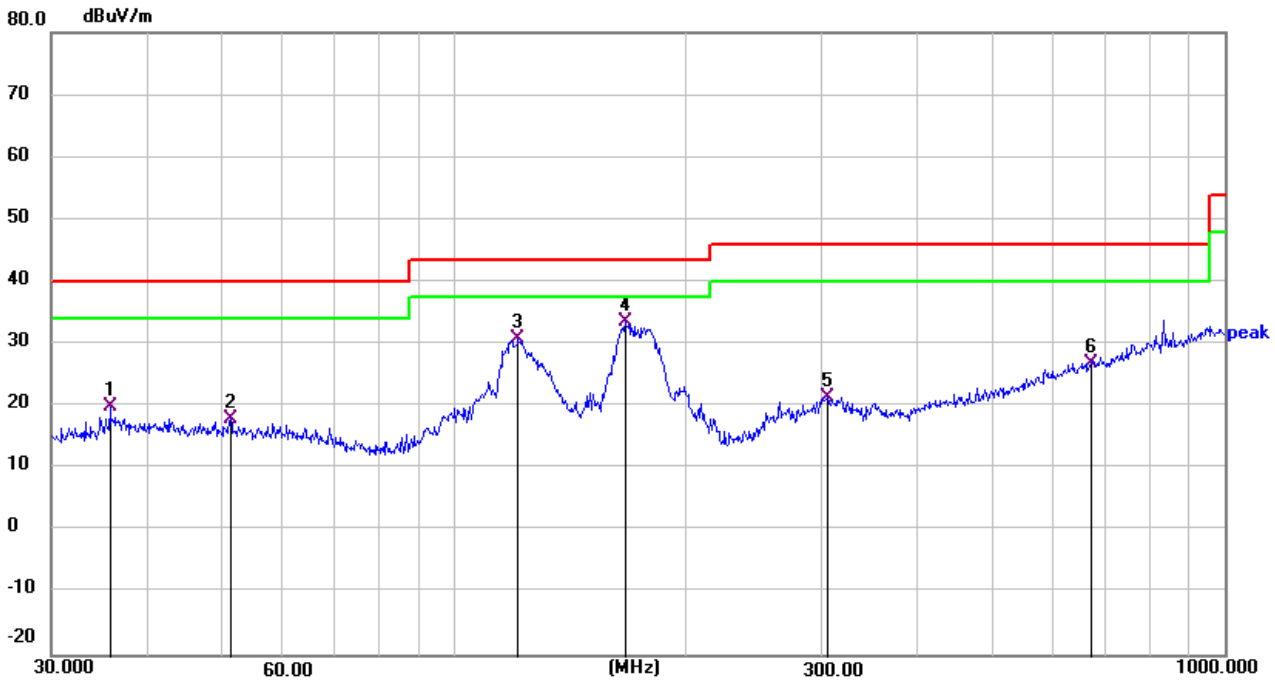
Note:
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits (dBuv) + distance extrapolation factor.

(30MHz-1000MHz)

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 1/2/3/4/5/6/7/8/9(Mode 2 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	35.7490	37.12	-17.11	20.01	40.00	-19.99	QP
2	51.3005	34.64	-16.71	17.93	40.00	-22.07	QP
3	121.1231	49.09	-18.32	30.77	43.50	-12.73	QP
4 *	166.6514	50.29	-16.74	33.55	43.50	-9.95	QP
5	305.6800	38.35	-16.79	21.56	46.00	-24.44	QP
6	670.4893	35.61	-8.65	26.96	46.00	-19.04	QP

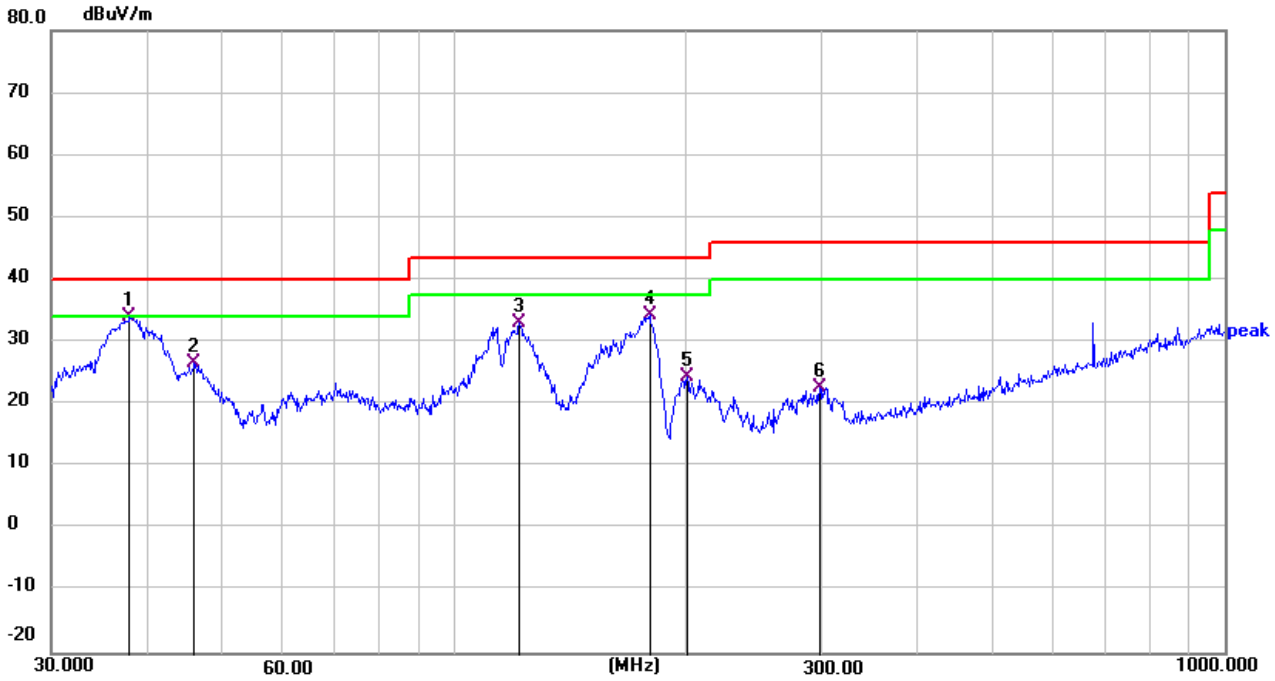
Remark:
1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 1/2/3/4/5/6/7/8/9(Mode 2 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1 *	37.9450	50.94	-16.75	34.19	40.00	-5.81	QP
2	46.0164	43.36	-16.69	26.67	40.00	-13.33	QP
3	121.5486	51.39	-18.29	33.10	43.50	-10.40	QP
4	179.3863	52.63	-18.23	34.40	43.50	-9.10	QP
5	200.6881	44.53	-20.07	24.46	43.50	-19.04	QP
6	298.2681	39.64	-16.99	22.65	46.00	-23.35	QP

Remark:
1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



Note: There are separate tests on the left and right side, and only the worst data is represented, and the worst is on the left side.

(1GHz~25GHz) Spurious emission Requirements

Left side:

Frequency	Meter Reading	Amplifier	Loss	Antenna Factor	Corrected Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBμV)	(dB)	(dB)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	Type	
Low Channel (GFSK/2402 MHz)										
3264.65	61.70	44.70	6.70	28.20	-9.80	51.90	74.00	-22.10	PK	Vertical
3264.65	51.24	44.70	6.70	28.20	-9.80	41.44	54.00	-12.56	AV	Vertical
3264.67	61.68	44.70	6.70	28.20	-9.80	51.88	74.00	-22.12	PK	Horizontal
3264.67	50.46	44.70	6.70	28.20	-9.80	40.66	54.00	-13.34	AV	Horizontal
4804.53	59.19	44.20	9.04	31.60	-3.56	55.63	74.00	-18.37	PK	Vertical
4804.53	50.51	44.20	9.04	31.60	-3.56	46.95	54.00	-7.05	AV	Vertical
4804.60	58.54	44.20	9.04	31.60	-3.56	54.98	74.00	-19.02	PK	Horizontal
4804.60	49.53	44.20	9.04	31.60	-3.56	45.97	54.00	-8.03	AV	Horizontal
5359.85	48.66	44.20	9.86	32.00	-2.34	46.32	74.00	-27.68	PK	Vertical
5359.85	40.34	44.20	9.86	32.00	-2.34	38.00	54.00	-16.00	AV	Vertical
5359.80	48.39	44.20	9.86	32.00	-2.34	46.05	74.00	-27.95	PK	Horizontal
5359.80	39.17	44.20	9.86	32.00	-2.34	36.83	54.00	-17.17	AV	Horizontal
7205.79	54.64	43.50	11.40	35.50	3.40	58.04	74.00	-15.96	PK	Vertical
7205.79	44.39	43.50	11.40	35.50	3.40	47.79	54.00	-6.21	AV	Vertical
7205.80	53.97	43.50	11.40	35.50	3.40	57.37	74.00	-16.63	PK	Horizontal
7205.80	43.49	43.50	11.40	35.50	3.40	46.89	54.00	-7.11	AV	Horizontal
Middle Channel (GFSK/2441 MHz)										
3264.65	61.03	44.70	6.70	28.20	-9.80	51.23	74.00	-22.77	PK	Vertical
3264.65	51.47	44.70	6.70	28.20	-9.80	41.67	54.00	-12.33	AV	Vertical
3264.71	62.19	44.70	6.70	28.20	-9.80	52.39	74.00	-21.61	PK	Horizontal
3264.71	50.57	44.70	6.70	28.20	-9.80	40.77	54.00	-13.23	AV	Horizontal
4882.32	59.51	44.20	9.04	31.60	-3.56	55.95	74.00	-18.05	PK	Vertical
4882.32	49.32	44.20	9.04	31.60	-3.56	45.76	54.00	-8.24	AV	Vertical
4882.52	59.23	44.20	9.04	31.60	-3.56	55.67	74.00	-18.33	PK	Horizontal
4882.52	50.06	44.20	9.04	31.60	-3.56	46.50	54.00	-7.50	AV	Horizontal
5359.67	47.99	44.20	9.86	32.00	-2.34	45.65	74.00	-28.35	PK	Vertical
5359.67	40.43	44.20	9.86	32.00	-2.34	38.09	54.00	-15.91	AV	Vertical
5359.69	47.45	44.20	9.86	32.00	-2.34	45.11	74.00	-28.89	PK	Horizontal
5359.69	38.69	44.20	9.86	32.00	-2.34	36.35	54.00	-17.65	AV	Horizontal
7323.80	54.05	43.50	11.40	35.50	3.40	57.45	74.00	-16.55	PK	Vertical
7323.80	44.43	43.50	11.40	35.50	3.40	47.83	54.00	-6.17	AV	Vertical
7323.76	53.53	43.50	11.40	35.50	3.40	56.93	74.00	-17.07	PK	Horizontal
7323.76	44.43	43.50	11.40	35.50	3.40	47.83	54.00	-6.17	AV	Horizontal

High Channel (GFSK/2480 MHz)										
3264.78	61.92	44.70	6.70	28.20	-9.80	52.12	74.00	-21.88	PK	Vertical
3264.78	50.08	44.70	6.70	28.20	-9.80	40.28	54.00	-13.72	AV	Vertical
3264.68	60.99	44.70	6.70	28.20	-9.80	51.19	74.00	-22.81	PK	Horizontal
3264.68	50.65	44.70	6.70	28.20	-9.80	40.85	54.00	-13.15	AV	Horizontal
4960.37	58.20	44.20	9.04	31.60	-3.56	54.64	74.00	-19.36	PK	Vertical
4960.37	50.50	44.20	9.04	31.60	-3.56	46.94	54.00	-7.06	AV	Vertical
4960.34	59.38	44.20	9.04	31.60	-3.56	55.82	74.00	-18.18	PK	Horizontal
4960.34	50.47	44.20	9.04	31.60	-3.56	46.91	54.00	-7.09	AV	Horizontal
5359.89	49.33	44.20	9.86	32.00	-2.34	46.99	74.00	-27.01	PK	Vertical
5359.89	39.07	44.20	9.86	32.00	-2.34	36.73	54.00	-17.27	AV	Vertical
5359.70	48.13	44.20	9.86	32.00	-2.34	45.79	74.00	-28.21	PK	Horizontal
5359.70	38.41	44.20	9.86	32.00	-2.34	36.07	54.00	-17.93	AV	Horizontal
7439.72	53.75	43.50	11.40	35.50	3.40	57.15	74.00	-16.85	PK	Vertical
7439.72	44.24	43.50	11.40	35.50	3.40	47.64	54.00	-6.36	AV	Vertical
7439.67	53.57	43.50	11.40	35.50	3.40	56.97	74.00	-17.03	PK	Horizontal
7439.67	44.47	43.50	11.40	35.50	3.40	47.87	54.00	-6.13	AV	Horizontal

Note:

1) Scan with GFSK, π/4-DQPSK, and 8DPSK, the worst case is GFSK Mode.
2) Factor = Antenna Factor + Cable Loss – Pre-amplifier.
   Emission Level = Reading + Factor
3) The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

Right side:

Frequency (MHz)	Meter Reading (dBμV)	Amplifier (dB)	Loss (dB)	Antenna Factor (dB/m)	Corrected Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
Low Channel (GFSK/2402 MHz)										
3264.79	61.55	44.70	6.70	28.20	-9.80	51.75	74.00	-22.25	PK	Vertical
3264.79	51.21	44.70	6.70	28.20	-9.80	41.41	54.00	-12.59	AV	Vertical
3264.73	62.09	44.70	6.70	28.20	-9.80	52.29	74.00	-21.71	PK	Horizontal
3264.73	51.23	44.70	6.70	28.20	-9.80	41.43	54.00	-12.57	AV	Horizontal
4804.48	58.73	44.20	9.04	31.60	-3.56	55.17	74.00	-18.83	PK	Vertical
4804.48	49.66	44.20	9.04	31.60	-3.56	46.10	54.00	-7.90	AV	Vertical
4804.56	58.86	44.20	9.04	31.60	-3.56	55.30	74.00	-18.70	PK	Horizontal
4804.56	49.60	44.20	9.04	31.60	-3.56	46.04	54.00	-7.96	AV	Horizontal
5359.61	48.23	44.20	9.86	32.00	-2.34	45.89	74.00	-28.11	PK	Vertical
5359.61	40.18	44.20	9.86	32.00	-2.34	37.84	54.00	-16.16	AV	Vertical
5359.67	48.19	44.20	9.86	32.00	-2.34	45.85	74.00	-28.15	PK	Horizontal
5359.67	39.16	44.20	9.86	32.00	-2.34	36.82	54.00	-17.18	AV	Horizontal
7205.79	54.65	43.50	11.40	35.50	3.40	58.05	74.00	-15.95	PK	Vertical
7205.79	43.60	43.50	11.40	35.50	3.40	47.00	54.00	-7.00	AV	Vertical
7205.94	54.19	43.50	11.40	35.50	3.40	57.59	74.00	-16.41	PK	Horizontal
7205.94	44.19	43.50	11.40	35.50	3.40	47.59	54.00	-6.41	AV	Horizontal
Middle Channel (GFSK/2441 MHz)										
3264.88	62.18	44.70	6.70	28.20	-9.80	52.38	74.00	-21.62	PK	Vertical
3264.88	51.29	44.70	6.70	28.20	-9.80	41.49	54.00	-12.51	AV	Vertical
3264.73	62.02	44.70	6.70	28.20	-9.80	52.22	74.00	-21.78	PK	Horizontal
3264.73	50.20	44.70	6.70	28.20	-9.80	40.40	54.00	-13.60	AV	Horizontal
4882.42	58.65	44.20	9.04	31.60	-3.56	55.09	74.00	-18.91	PK	Vertical
4882.42	50.18	44.20	9.04	31.60	-3.56	46.62	54.00	-7.38	AV	Vertical
4882.61	59.59	44.20	9.04	31.60	-3.56	56.03	74.00	-17.97	PK	Horizontal
4882.61	50.06	44.20	9.04	31.60	-3.56	46.50	54.00	-7.50	AV	Horizontal
5359.61	48.22	44.20	9.86	32.00	-2.34	45.88	74.00	-28.12	PK	Vertical
5359.61	39.25	44.20	9.86	32.00	-2.34	36.91	54.00	-17.09	AV	Vertical
5359.78	47.51	44.20	9.86	32.00	-2.34	45.17	74.00	-28.83	PK	Horizontal
5359.78	38.48	44.20	9.86	32.00	-2.34	36.14	54.00	-17.86	AV	Horizontal
7323.95	53.60	43.50	11.40	35.50	3.40	57.00	74.00	-17.00	PK	Vertical
7323.95	44.55	43.50	11.40	35.50	3.40	47.95	54.00	-6.05	AV	Vertical
7323.78	54.44	43.50	11.40	35.50	3.40	57.84	74.00	-16.16	PK	Horizontal
7323.78	44.23	43.50	11.40	35.50	3.40	47.63	54.00	-6.37	AV	Horizontal

High Channel (GFSK/2480 MHz)										
3264.76	61.50	44.70	6.70	28.20	-9.80	51.70	74.00	-22.30	PK	Vertical
3264.76	50.77	44.70	6.70	28.20	-9.80	40.97	54.00	-13.03	AV	Vertical
3264.71	62.20	44.70	6.70	28.20	-9.80	52.40	74.00	-21.60	PK	Horizontal
3264.71	50.82	44.70	6.70	28.20	-9.80	41.02	54.00	-12.98	AV	Horizontal
4960.57	58.20	44.20	9.04	31.60	-3.56	54.64	74.00	-19.36	PK	Vertical
4960.57	49.87	44.20	9.04	31.60	-3.56	46.31	54.00	-7.69	AV	Vertical
4960.44	59.38	44.20	9.04	31.60	-3.56	55.82	74.00	-18.18	PK	Horizontal
4960.44	49.13	44.20	9.04	31.60	-3.56	45.57	54.00	-8.43	AV	Horizontal
5359.67	48.50	44.20	9.86	32.00	-2.34	46.16	74.00	-27.84	PK	Vertical
5359.67	39.31	44.20	9.86	32.00	-2.34	36.97	54.00	-17.03	AV	Vertical
5359.85	48.10	44.20	9.86	32.00	-2.34	45.76	74.00	-28.24	PK	Horizontal
5359.85	38.29	44.20	9.86	32.00	-2.34	35.95	54.00	-18.05	AV	Horizontal
7439.84	54.45	43.50	11.40	35.50	3.40	57.85	74.00	-16.15	PK	Vertical
7439.84	44.57	43.50	11.40	35.50	3.40	47.97	54.00	-6.03	AV	Vertical
7439.95	53.67	43.50	11.40	35.50	3.40	57.07	74.00	-16.93	PK	Horizontal
7439.95	44.04	43.50	11.40	35.50	3.40	47.44	54.00	-6.56	AV	Horizontal

Note:

1) Scan with GFSK, π/4-DQPSK, and 8DPSK, the worst case is GFSK Mode.
2) Factor = Antenna Factor + Cable Loss – Pre-amplifier.
   Emission Level = Reading + Factor
3) The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

Restricted band Requirements

Left side:

GFSK 2402MHz

H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	2310	42.28	-5.82	36.46	74	-37.54	peak	100	360
2	2390	41.07	-5.72	35.35	74	-38.65	peak	100	360
3	2400	42.15	-5.61	36.54	74	-37.46	peak	100	360

V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	2310	41.85	-5.82	36.03	74	-37.97	peak	100	360
2	2390	37.18	-5.72	31.46	74	-42.54	peak	100	360
3	2400	40.53	-5.61	34.92	74	-39.08	peak	100	360

GFSK 2480MHz

H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	2483.5	37.38	-5.29	32.09	74	-41.91	peak	100	360
2	2500	37.68	-4.86	32.82	74	-41.18	peak	100	360

V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	2483.5	38.05	-5.29	32.76	74	-41.24	peak	100	360
2	2500	40.05	-4.86	35.19	74	-38.81	peak	100	360

Note:

1) Factor = Antenna Factor + Cable Loss – Pre-amplifier.
   Emission Level = Reading + Factor
2) GFSK, π/4-DQPSK and 8DPSK of the no hopping and hopping mode all have been test, the worst case is GFSK of the no hopping mode, this report only show the worst case.
3) The peak volue is less than AV limit, so AV measure is not need.

Right side:

GFSK 2402MHz

H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	2310	41.85	-5.82	36.03	74	-37.97	peak	100	360
2	2390	41.24	-5.72	35.52	74	-38.48	peak	100	360
3	2400	43.34	-5.61	37.73	74	-36.27	peak	100	360

V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	2310	41.15	-5.82	35.33	74	-38.67	peak	100	360
2	2390	36.41	-5.72	30.69	74	-43.31	peak	100	360
3	2400	39.46	-5.61	33.85	74	-40.15	peak	100	360

GFSK 2480MHz

H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	2483.5	38.13	-5.29	32.84	74	-41.16	peak	100	360
2	2500	38.34	-4.86	33.48	74	-40.52	peak	100	360

V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	2483.5	38.92	-5.29	33.63	74	-40.37	peak	100	360
2	2500	39.54	-4.86	34.68	74	-39.32	peak	100	360

Note:

1) Factor = Antenna Factor + Cable Loss – Pre-amplifier.
   Emission Level = Reading + Factor
2) GFSK, π/4-DQPSK and 8DPSK of the no hopping and hopping mode all have been test, the worst case is GFSK of the no hopping mode, this report only show the worst case.
3) The peak volue is less than AV limit, so AV measure is not need.

4. CONDUCTED SPURIOUS & BAND EDGE EMISSION

4.1 LIMIT

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

4.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 2300 – 2407 MHz Upper Band Edge: 2475 – 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

For Hopping Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 2300– 2403 MHz Upper Band Edge: 2479 – 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

4.3 TEST SETUP

The EUT is connected to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. Tune the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, the span is set to be greater than RBW.

4.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

4.5 TEST RESULTS

Note: The test data please refer to APPENDIX 1.

5. NUMBER OF HOPPING CHANNEL

5.1 LIMIT

FCC Part 15.247, Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Number of Hopping Channel	≥15	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100KHz
VB	300KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting: RBW= 100KHz, VBW=300KHz, Sweep time = Auto.

5.3 TEST SETUP

5.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

5.5 TEST RESULTS

Note: The test data please refer to APPENDIX 1.

6. AVERAGE TIME OF OCCUPANCY

6.1 LIMIT

FCC Part 15.247, Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

6.2 TEST PROCEDURE

a. The transmitter output (antenna port) was connected to the spectrum analyzer.
b. Set RBW =1MHz/VBW =3MHz.
c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
d. Sweep Time is more than once pulse time.
e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
f. Measure the maximum time duration of one single pulse.
g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
h. Measure the maximum time duration of one single pulse.
i. DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is 3.37 x 31.6 = 106.6.
j. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is 5.06 x 31.6 = 160.
k. DH1 Packet permit maximum 1600 / 79 / 2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is 10.12 x 31.6 = 320.

6.3 TEST SETUP

6.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

6.5 TEST RESULTS

Note: The test data please refer to APPENDIX 1.

7. HOPPING CHANNEL SEPARATION MEASUREMEN

7.1 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.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> 20 dB Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.2 TEST PROCEDURE

a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
b. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
c. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for channel separation measurement.

7.3 TEST SETUP

7.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.5 TEST RESULTS

Note: The test data please refer to APPENDIX 1.

8. BANDWIDTH TEST

8.1 LIMIT

FCC Part15 15.247, Subpart C				
Section	Test Item	Limit	FrequencyRange (MHz)	Result
15.247 (a)(1)	Bandwidth	N/A	2400-2483.5	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting: RBW= 30KHz, VBW=100KHz, Sweep time = Auto.

8.3 TEST SETUP

8.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

8.5 TEST RESULTS

Note: The test data please refer to APPENDIX 1.

9. OUTPUT POWER TEST

9.1 LIMIT

FCC Part 15.247, Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)&(b)(1)	Output Power	1 W or 0.125W if channel separation > 2/3 bandwidth provided the systems operate with an output power no greater than125 mW (20.97dBm)	2400-2483.5	PASS

9.2 TEST PROCEDURE

This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. The hopping shall be disabled for this test:
a) Use the following spectrum analyzer settings:
1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
2) RBW > 20 dB bandwidth of the emission being measured.
3) VBW ≥ RBW.
4) Sweep: Auto.
5) Detector function: Peak.
6) Trace: Max hold.
b) Allow trace to stabilize.
c) Use the marker-to-peak function to set the marker to the peak of the emission.
d) The indicated level is the peak output power, after any corrections for external attenuators and cables.
e) A plot of the test results and setup description shall be included in the test report.
NOTE—A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.
PKPM1 Peak power meter method:
The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DSS bandwidth and shall use a fast-responding diode detector.

9.3 TEST SETUP

9.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

9.5 TEST RESULTS

Note: The test data please refer to APPENDIX 1.

10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

FCC part 15.203 requirement: For intentional device, according to FCC part 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

10.2 EUT ANTENNA

The EUT antenna is Chip Antenna. It comply with the standard requirement.

APPENDIX 1-TEST DATA

Left side:

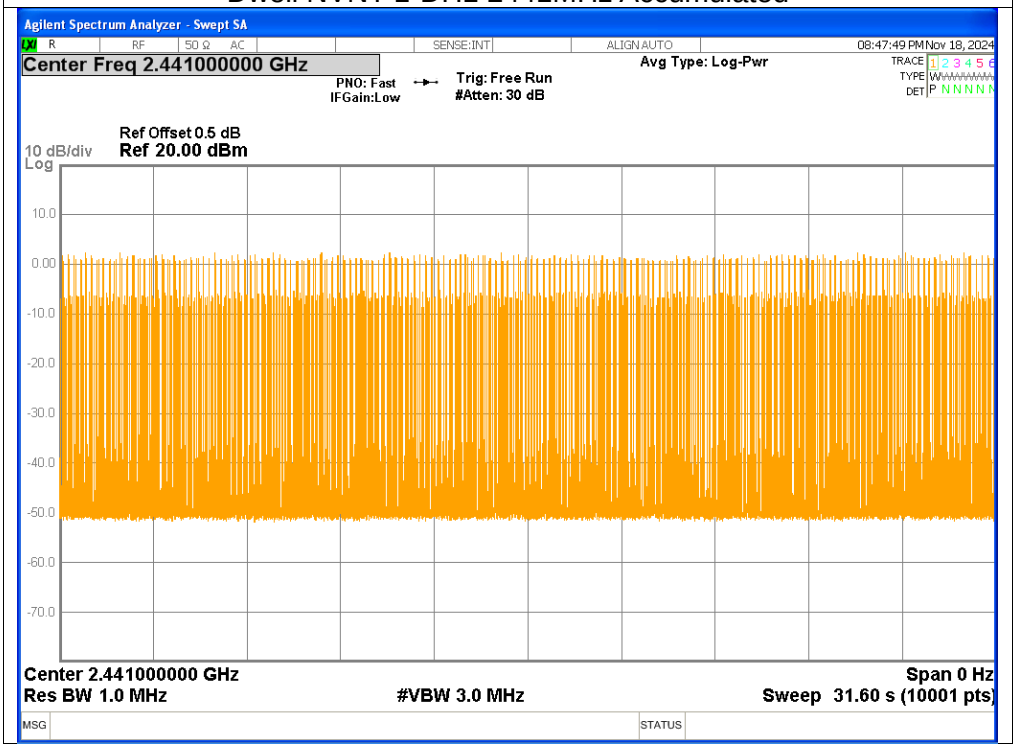
1. Dwell Time

Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2441	0.38	120.46	317	31600	<=400	Pass
NVNT	1-DH3	2441	1.636	271.576	166	31600	<=400	Pass
NVNT	1-DH5	2441	2.885	302.925	105	31600	<=400	Pass
NVNT	2-DH1	2441	0.389	123.702	318	31600	<=400	Pass
NVNT	2-DH3	2441	1.641	272.406	166	31600	<=400	Pass
NVNT	2-DH5	2441	2.89	338.13	117	31600	<=400	Pass
NVNT	3-DH1	2441	0.389	123.702	318	31600	<=400	Pass
NVNT	3-DH3	2441	1.64	270.6	165	31600	<=400	Pass
NVNT	3-DH5	2441	2.891	323.792	112	31600	<=400	Pass

Test Graphs

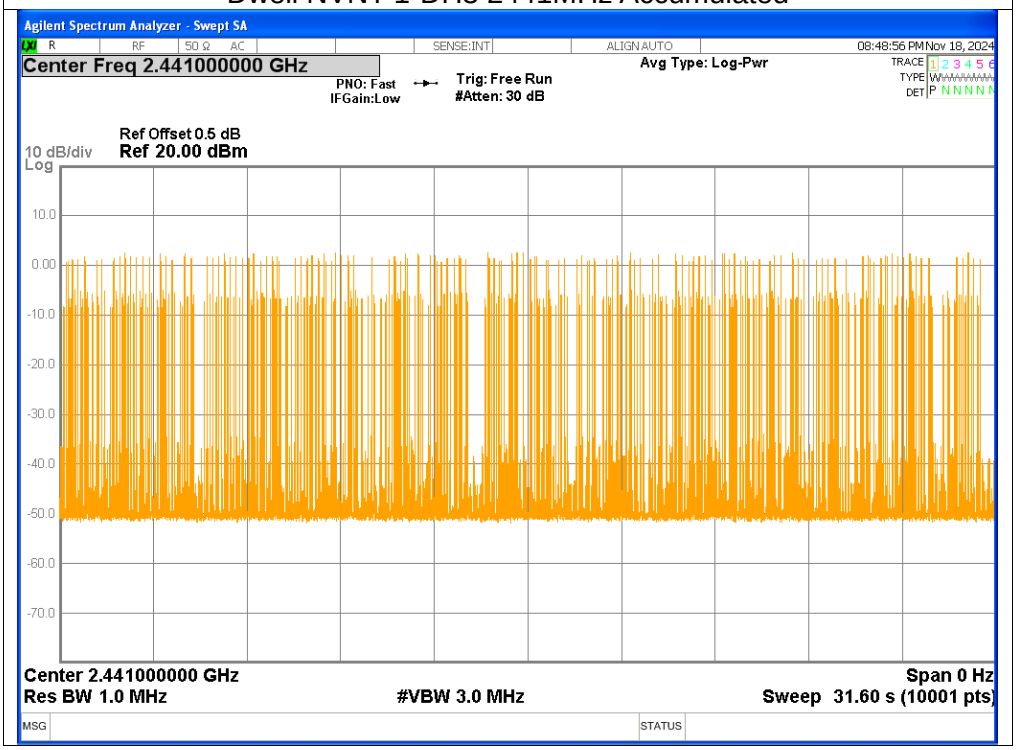
Dwell NVNT 1-DH1 2441MHz One Burst

Dwell NVNT 1-DH1 2441MHz Accumulated

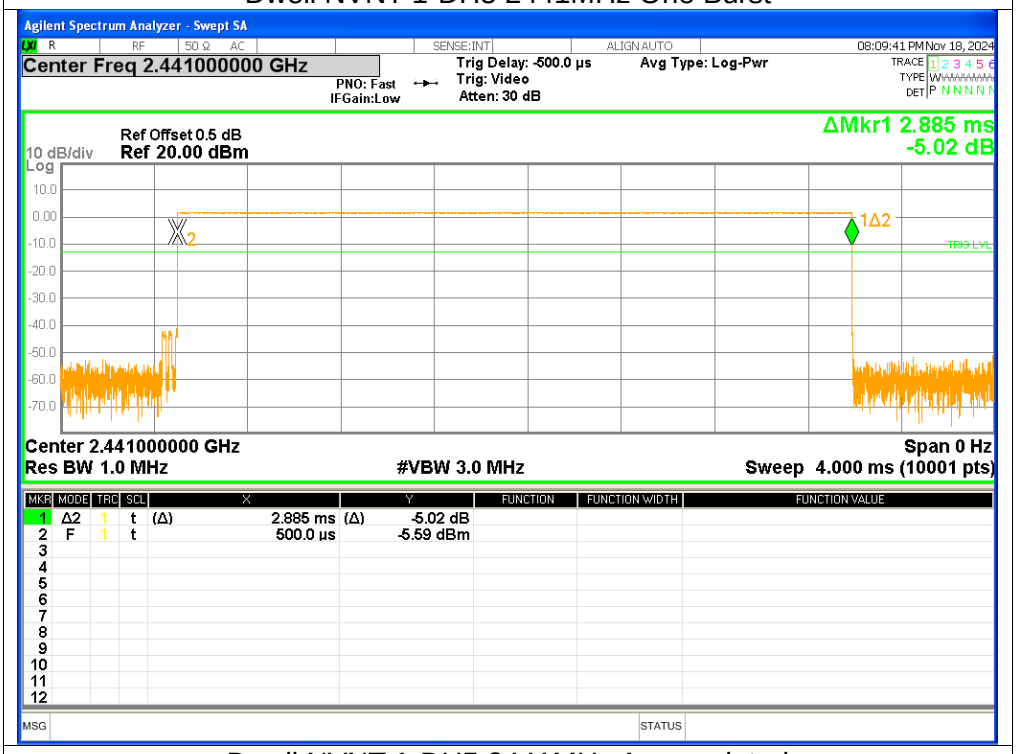


Dwell NVNT 1-DH3 2441MHz One Burst

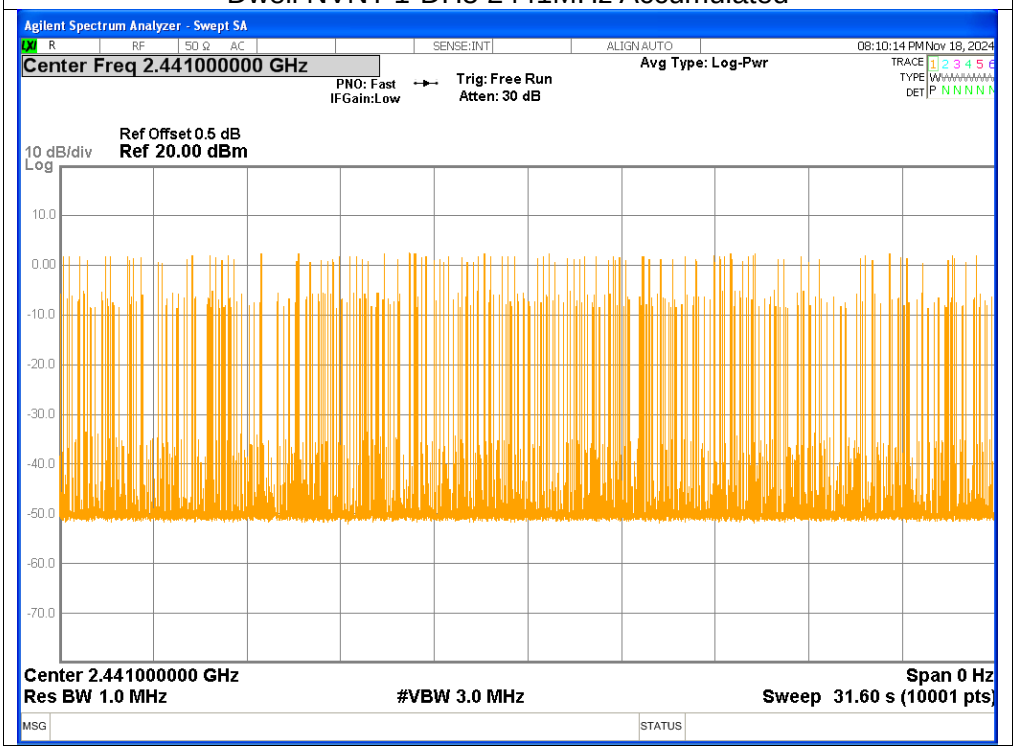
Dwell NVNT 1-DH3 2441MHz Accumulated



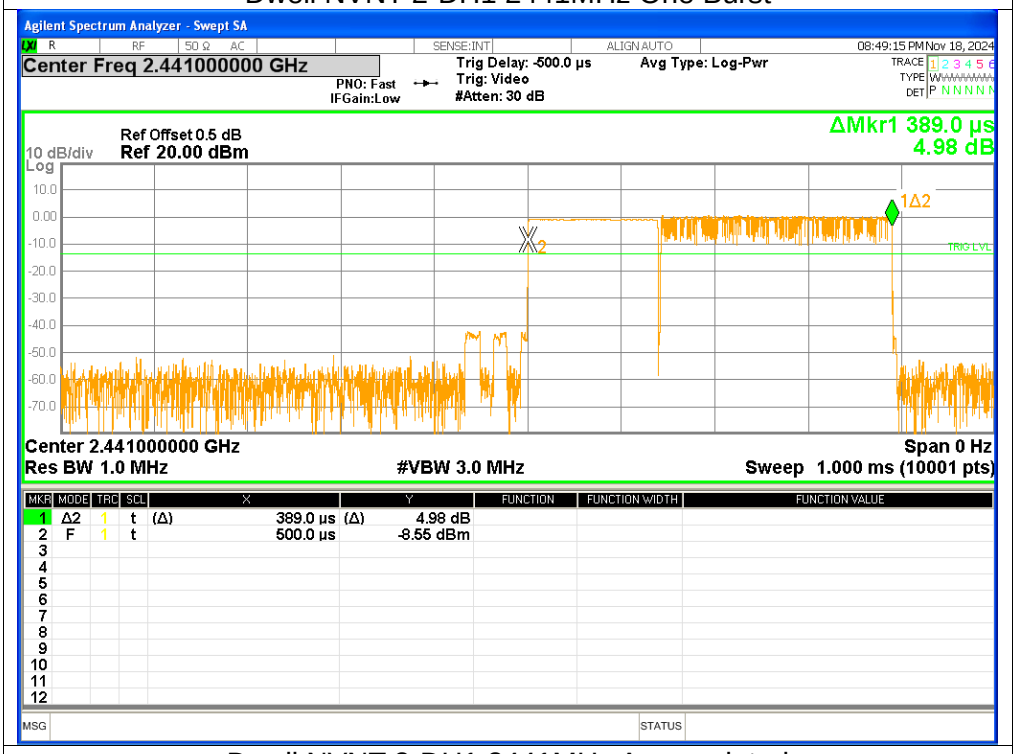
Dwell NVNT 1-DH5 2441MHz One Burst



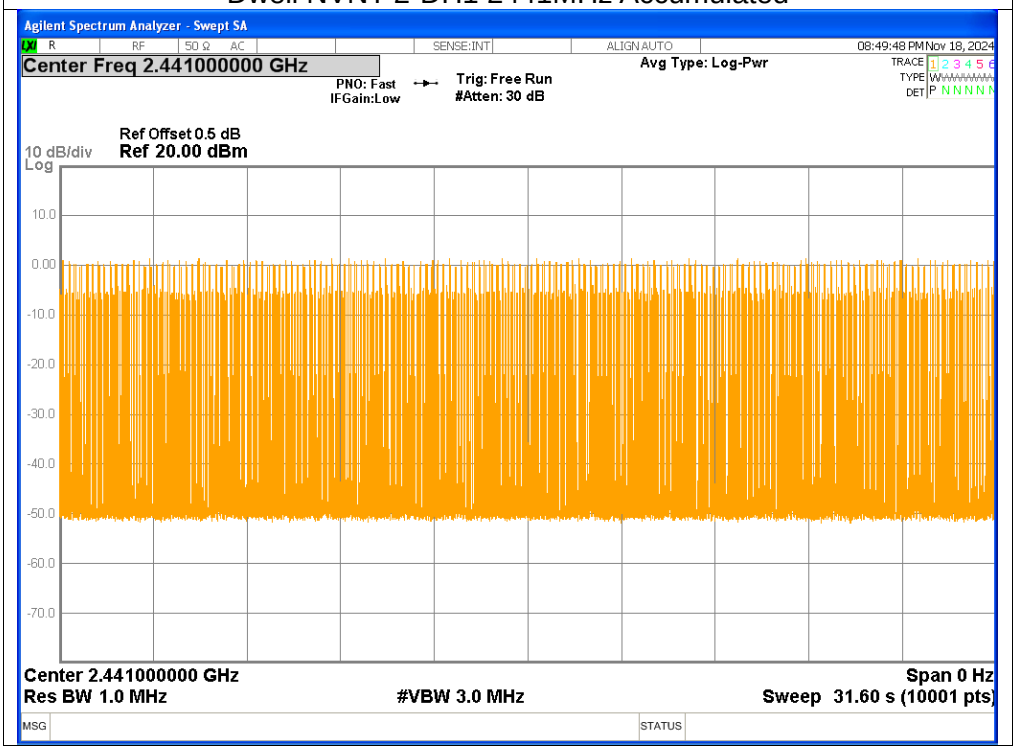
Dwell NVNT 1-DH5 2441MHz Accumulated



Dwell NVNT 2-DH1 2441MHz One Burst

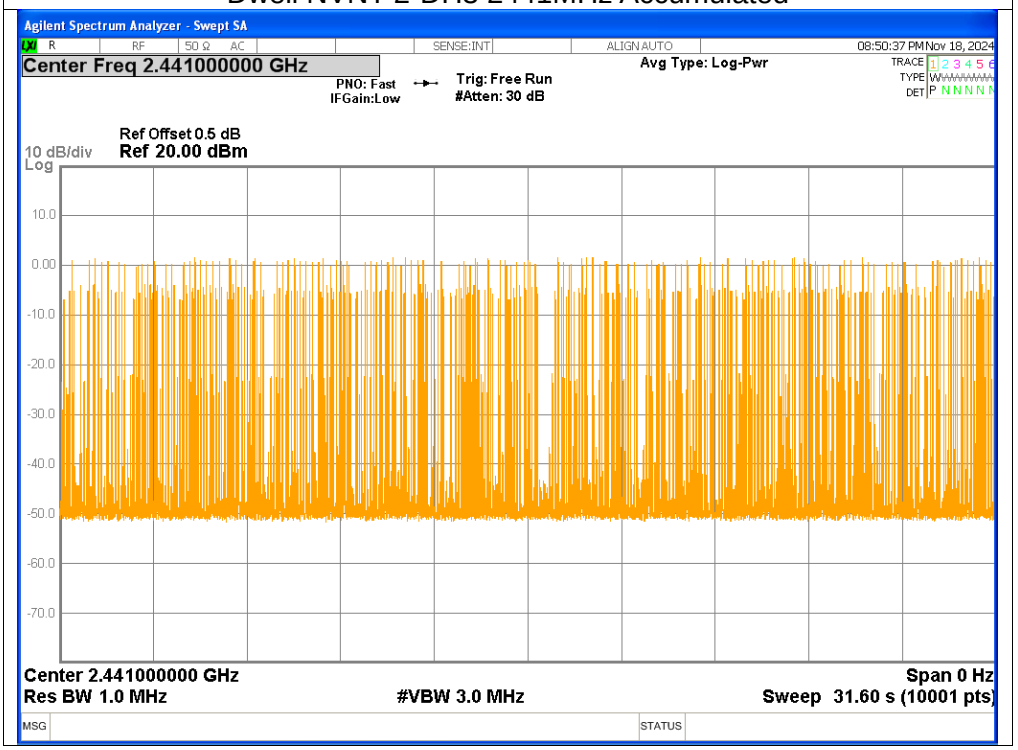


Dwell NVNT 2-DH1 2441MHz Accumulated



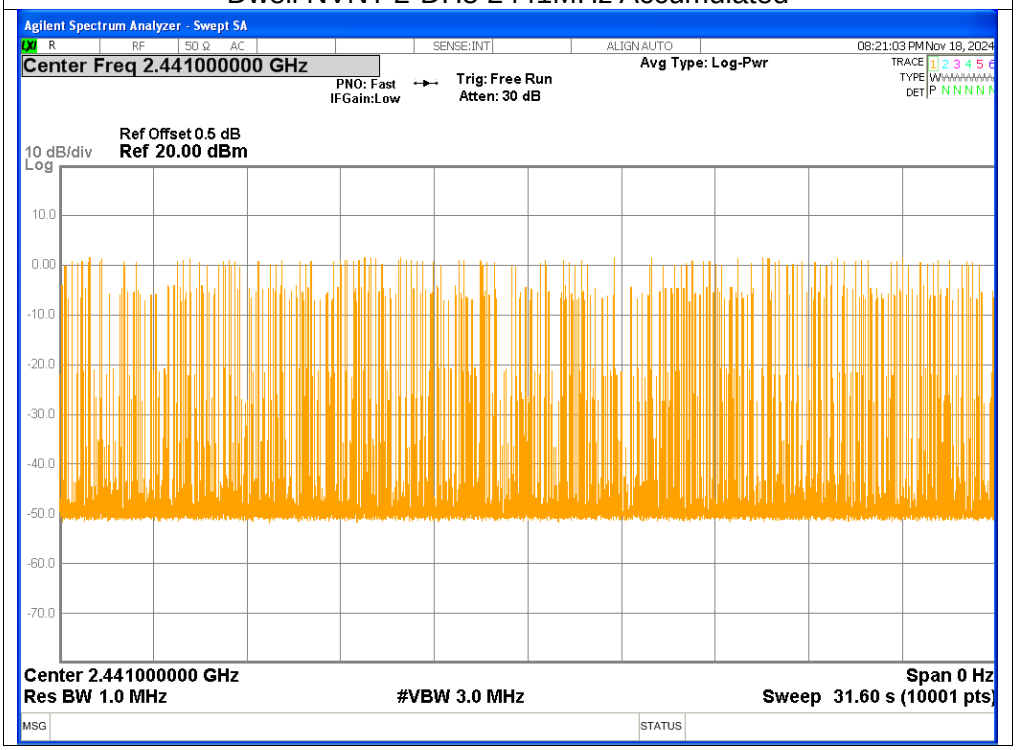
Dwell NVNT 2-DH3 2441MHz One Burst

Dwell NVNT 2-DH3 2441MHz Accumulated

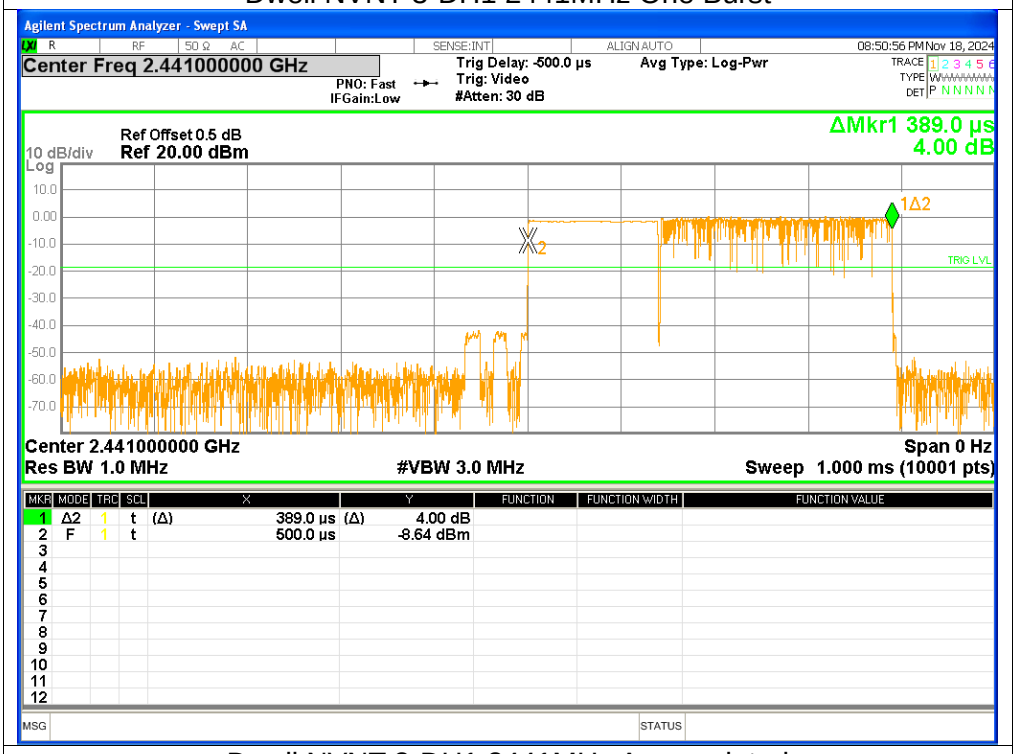


Dwell NVNT 2-DH5 2441MHz One Burst

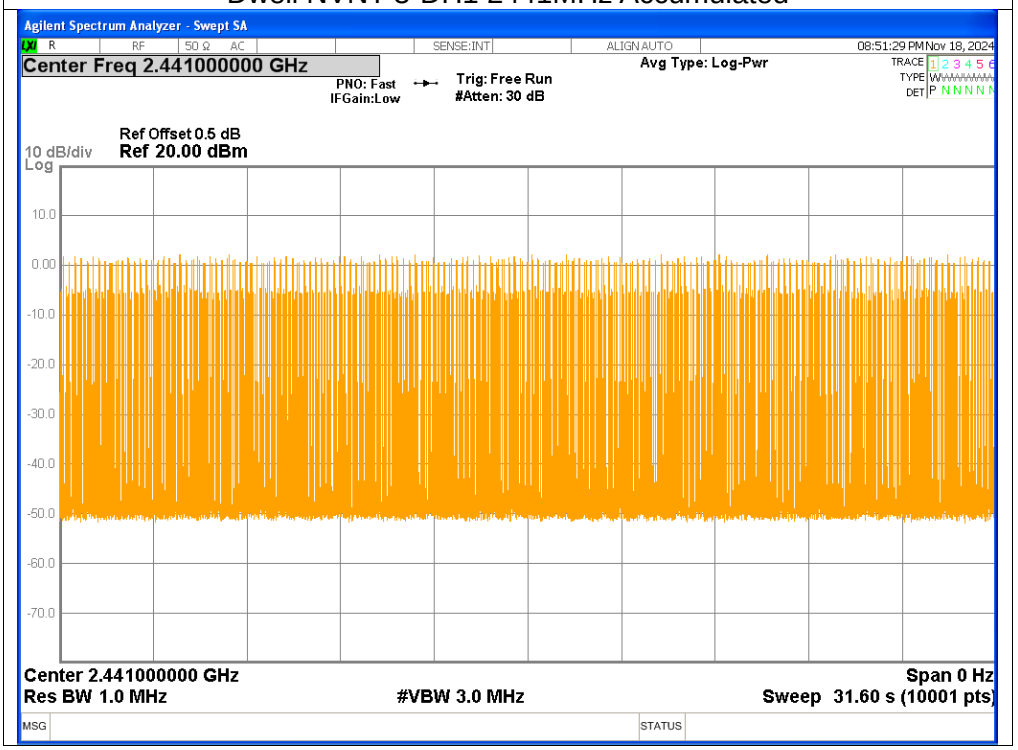
Dwell NVNT 2-DH5 2441MHz Accumulated



Dwell NVNT 3-DH1 2441MHz One Burst

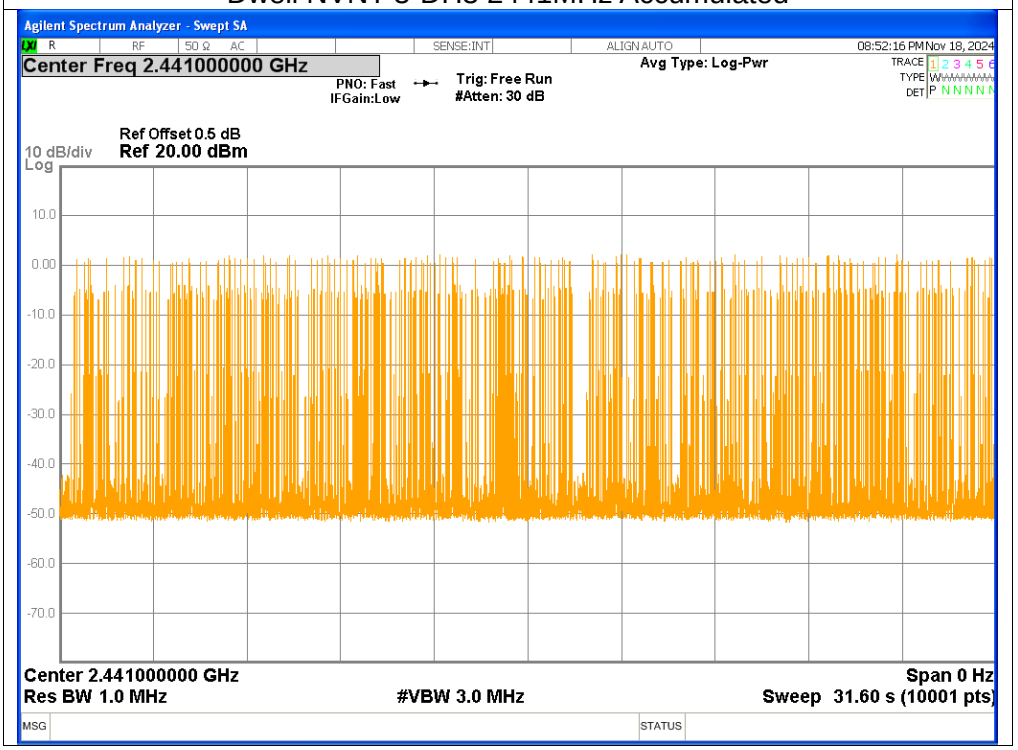


Dwell NVNT 3-DH1 2441MHz Accumulated



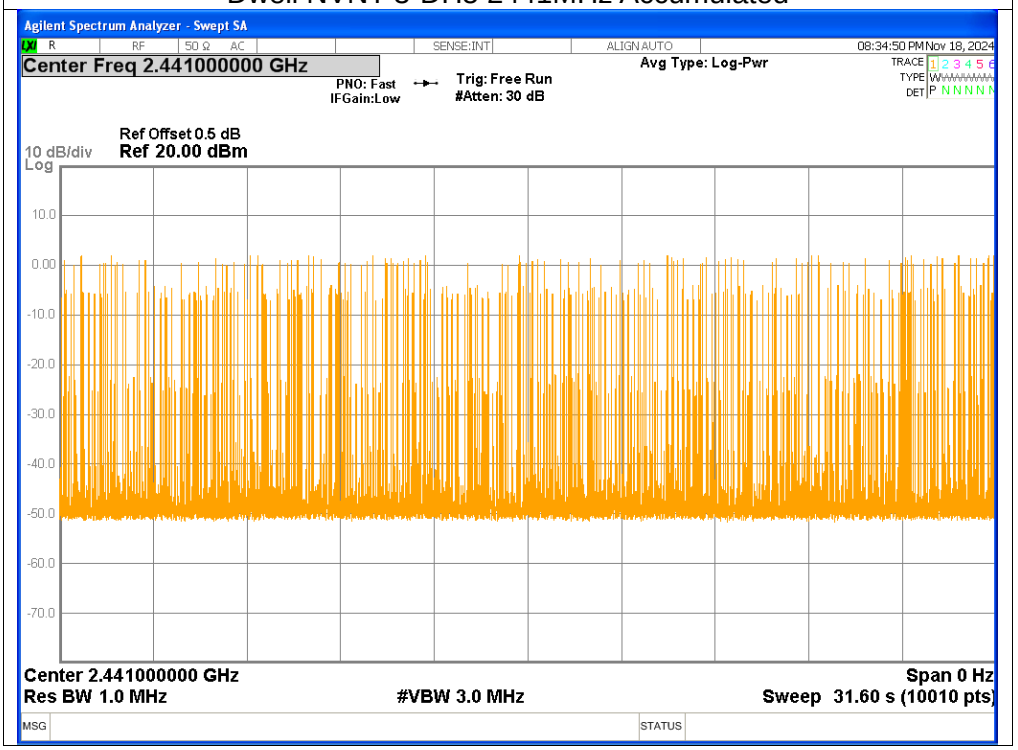
Dwell NVNT 3-DH3 2441MHz One Burst

Dwell NVNT 3-DH3 2441MHz Accumulated



Dwell NVNT 3-DH5 2441MHz One Burst

Dwell NVNT 3-DH5 2441MHz Accumulated

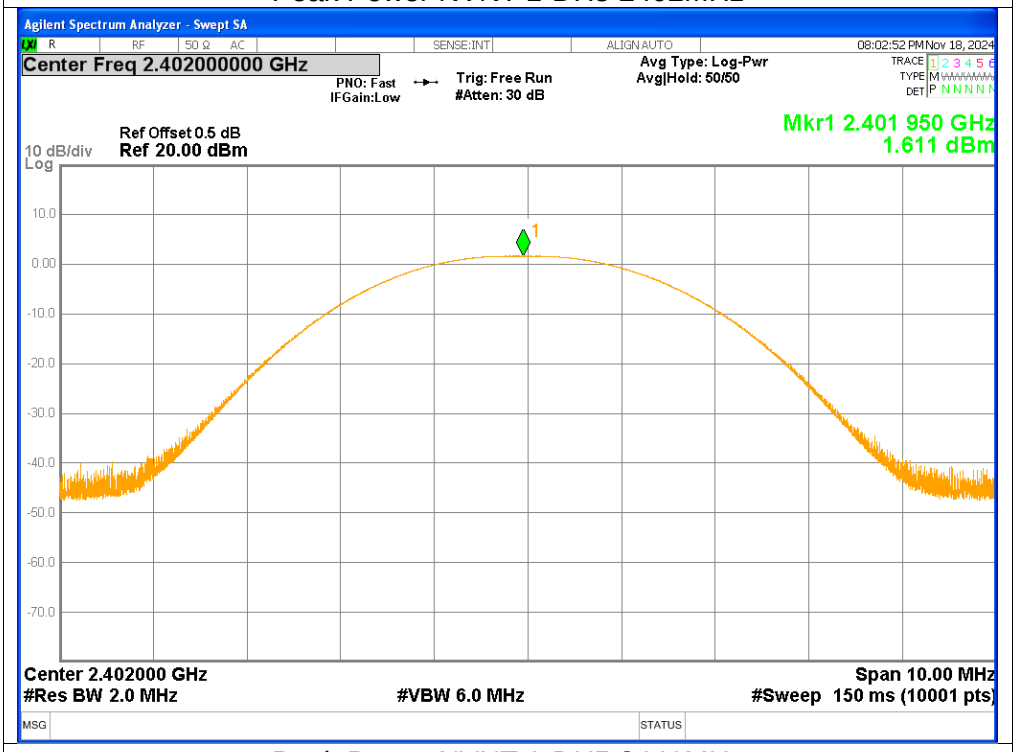


2. Maximum Peak Conducted Output Power

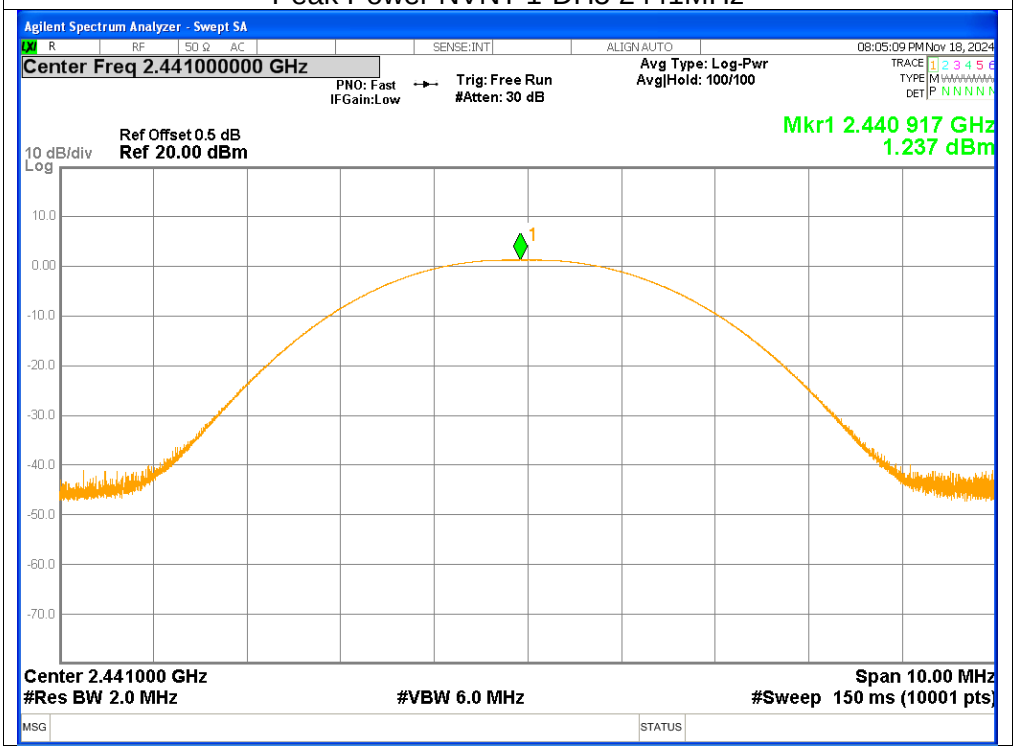
Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	1.61	<=20.97	Pass
NVNT	1-DH5	2441	1.24	<=20.97	Pass
NVNT	1-DH5	2480	1.91	<=20.97	Pass
NVNT	2-DH5	2402	1.67	<=20.97	Pass
NVNT	2-DH5	2441	1.3	<=20.97	Pass
NVNT	2-DH5	2480	1.99	<=20.97	Pass
NVNT	3-DH5	2402	1.88	<=20.97	Pass
NVNT	3-DH5	2441	1.55	<=20.97	Pass
NVNT	3-DH5	2480	2.2	<=20.97	Pass

Test Graphs

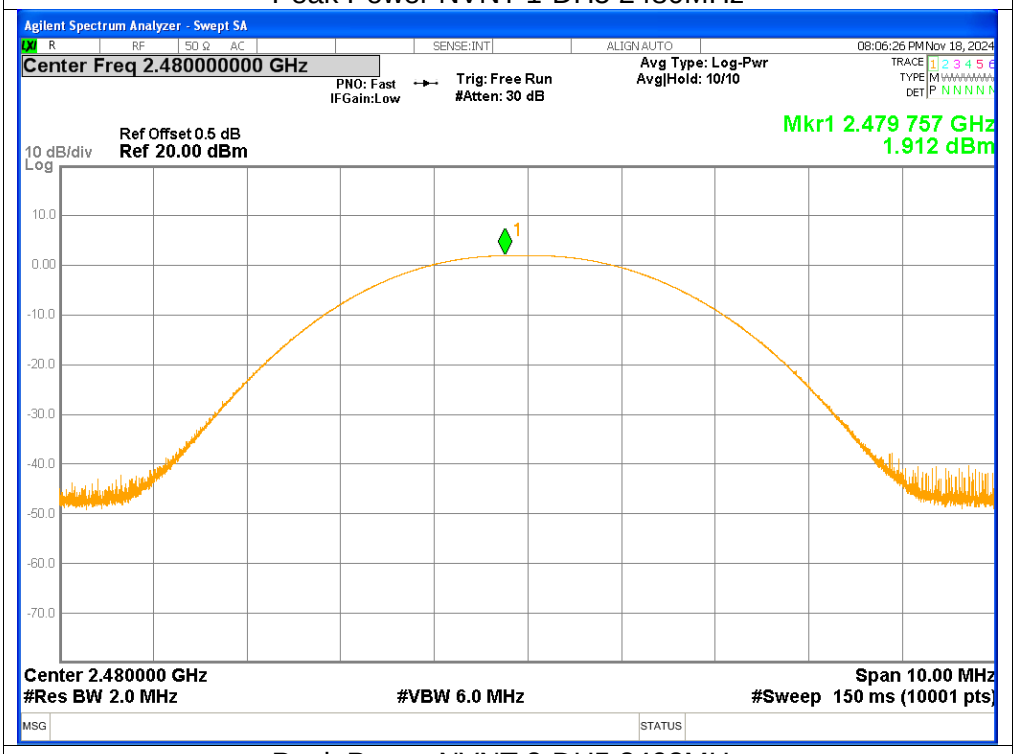
Peak Power NVNT 1-DH5 2402MHz



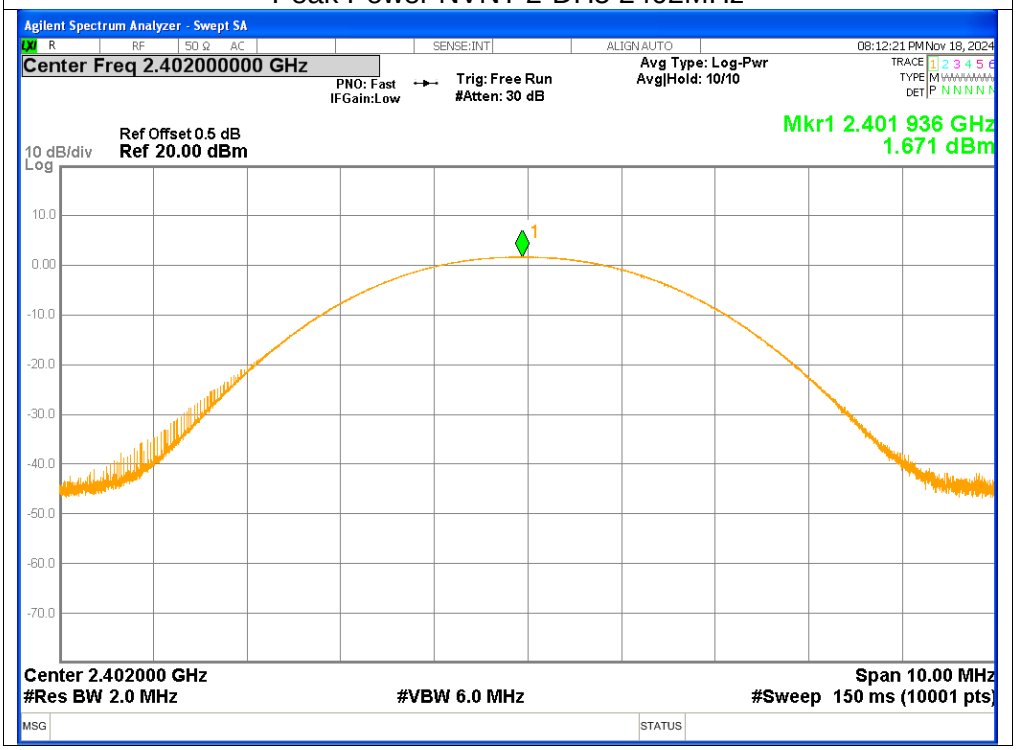
Peak Power NVNT 1-DH5 2441MHz



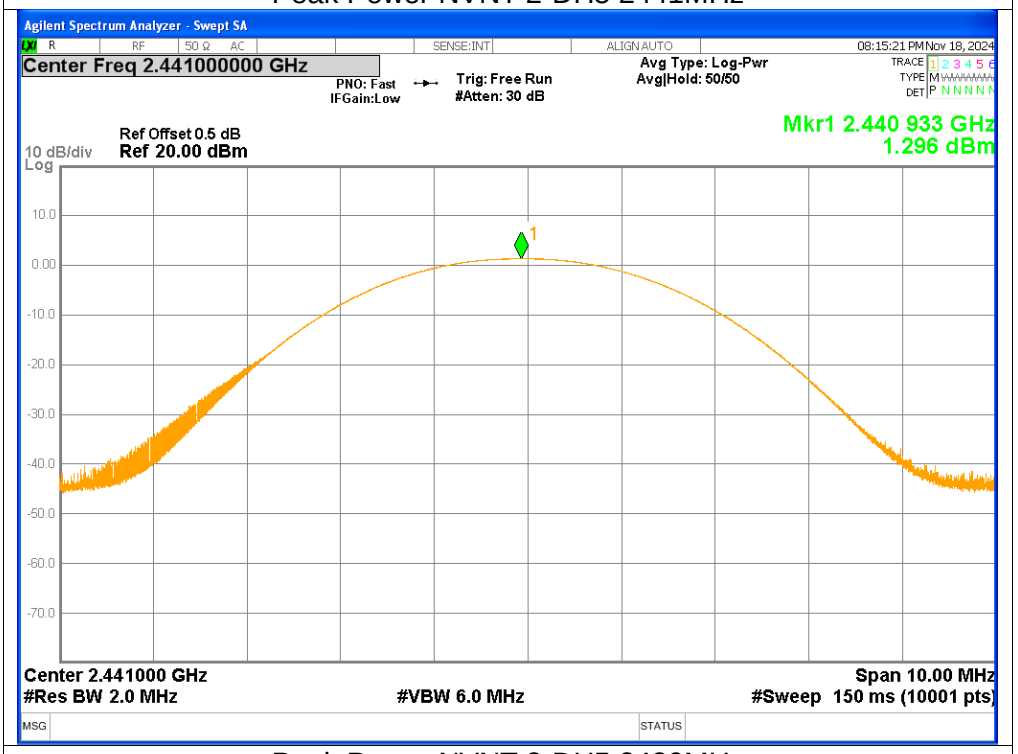
Peak Power NVNT 1-DH5 2480MHz



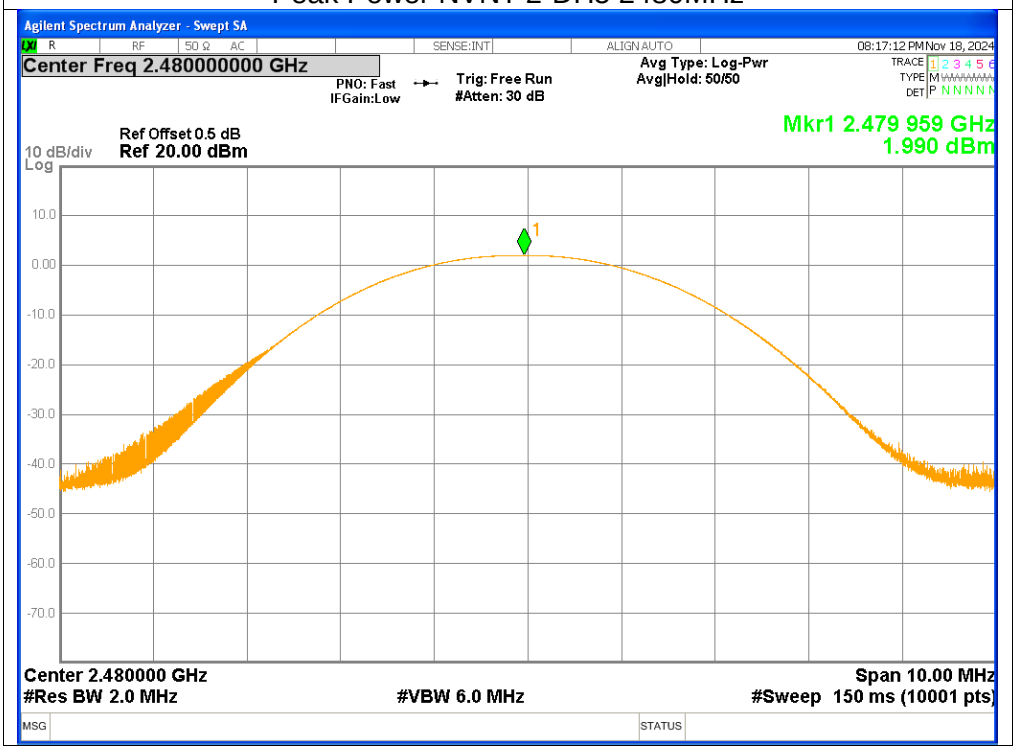
Peak Power NVNT 2-DH5 2402MHz



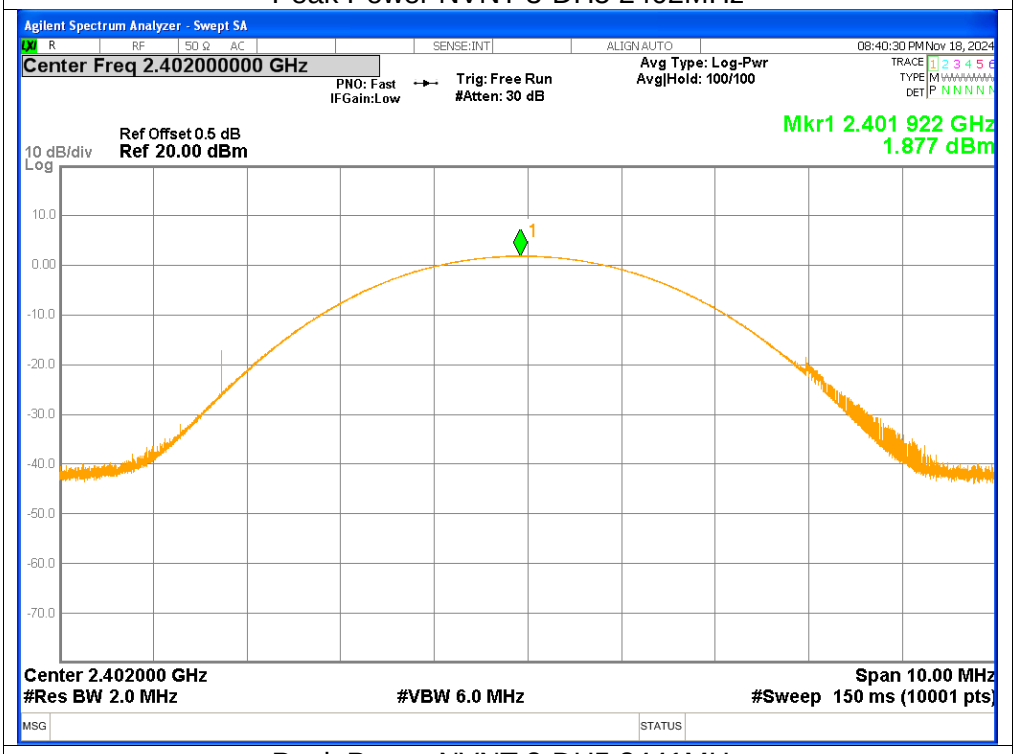
Peak Power NVNT 2-DH5 2441MHz



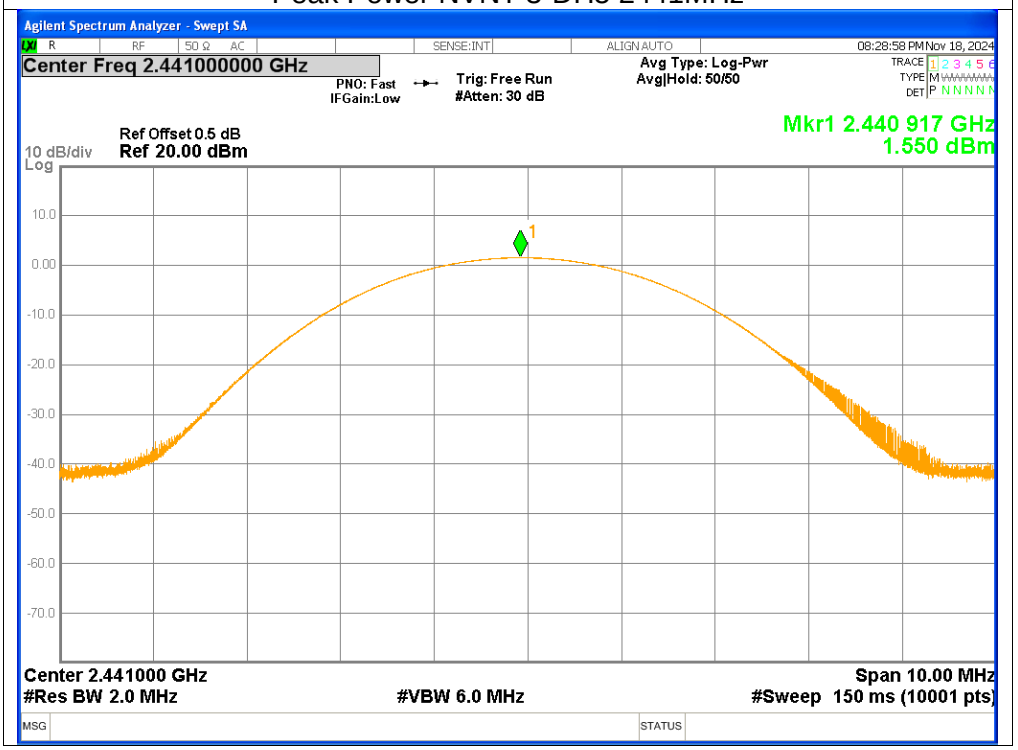
Peak Power NVNT 2-DH5 2480MHz



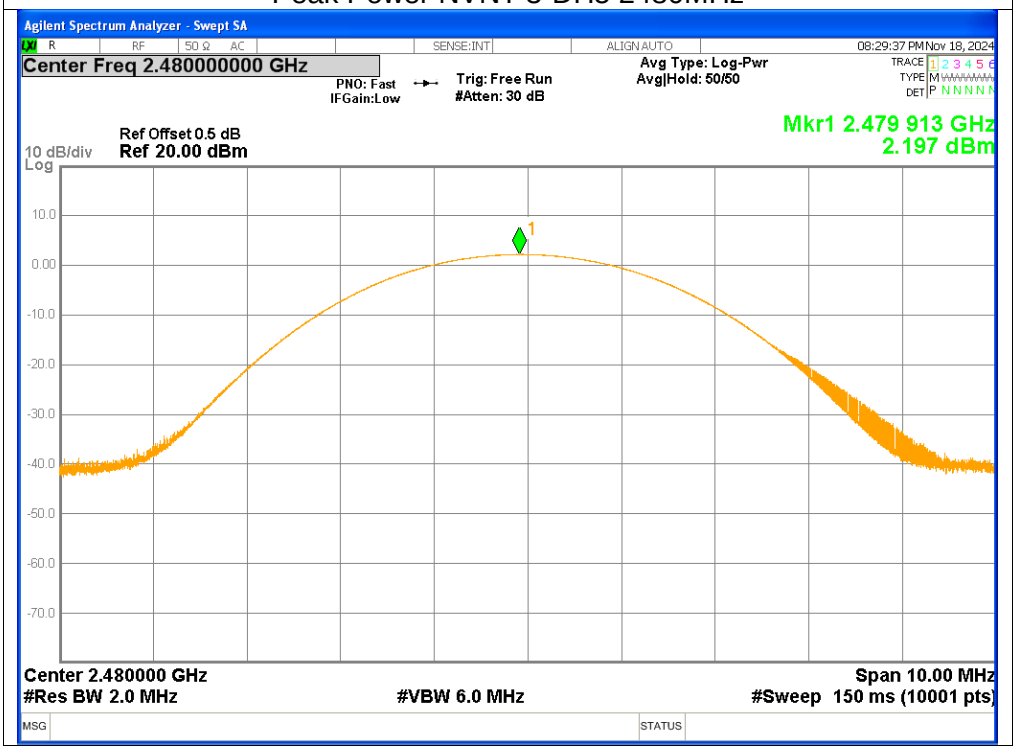
Peak Power NVNT 3-DH5 2402MHz



Peak Power NVNT 3-DH5 2441MHz



Peak Power NVNT 3-DH5 2480MHz

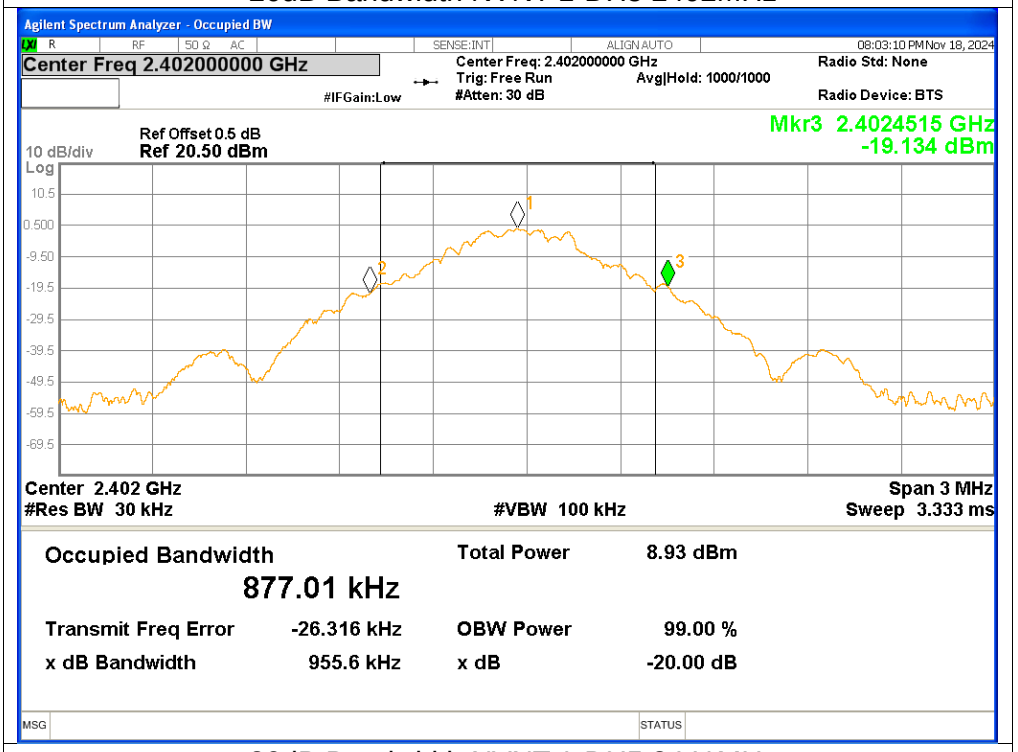


3. -20dB Bandwidth

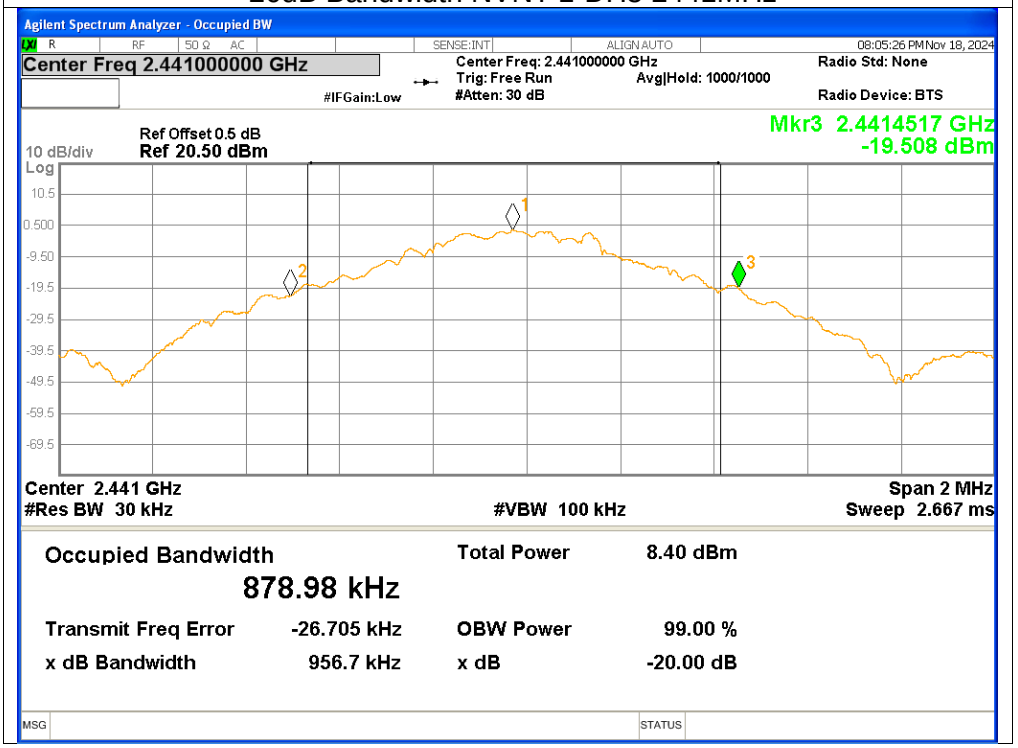
Condition	Mode	Frequency (MHz)	-20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH5	2402	0.9556	Pass
NVNT	1-DH5	2441	0.9567	Pass
NVNT	1-DH5	2480	0.955	Pass
NVNT	2-DH5	2402	1.4877	Pass
NVNT	2-DH5	2441	1.4909	Pass
NVNT	2-DH5	2480	1.4895	Pass
NVNT	3-DH5	2402	1.483	Pass
NVNT	3-DH5	2441	1.4894	Pass
NVNT	3-DH5	2480	1.4833	Pass

Test Graphs

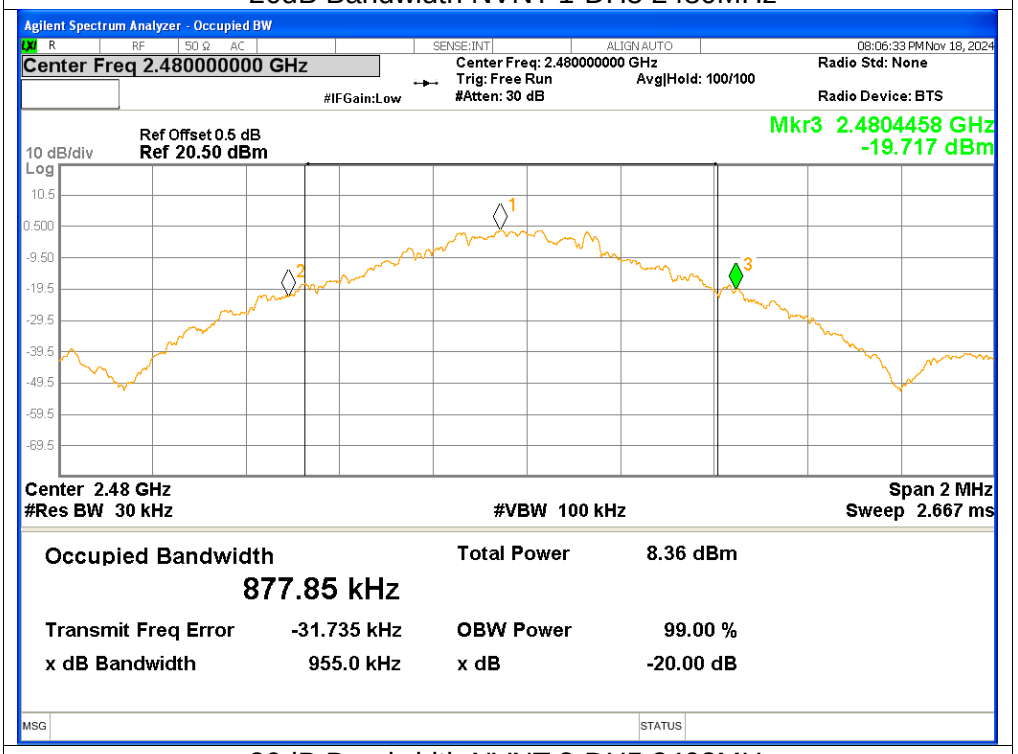
-20dB Bandwidth NVNT 1-DH5 2402MHz



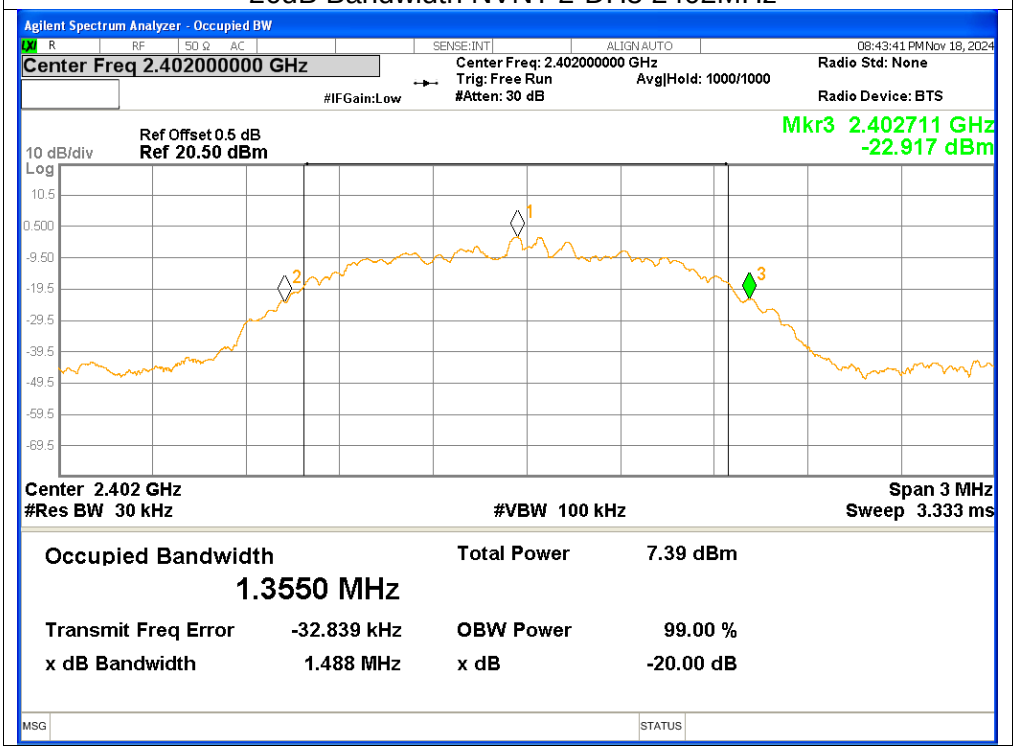
-20dB Bandwidth NVNT 1-DH5 2441MHz



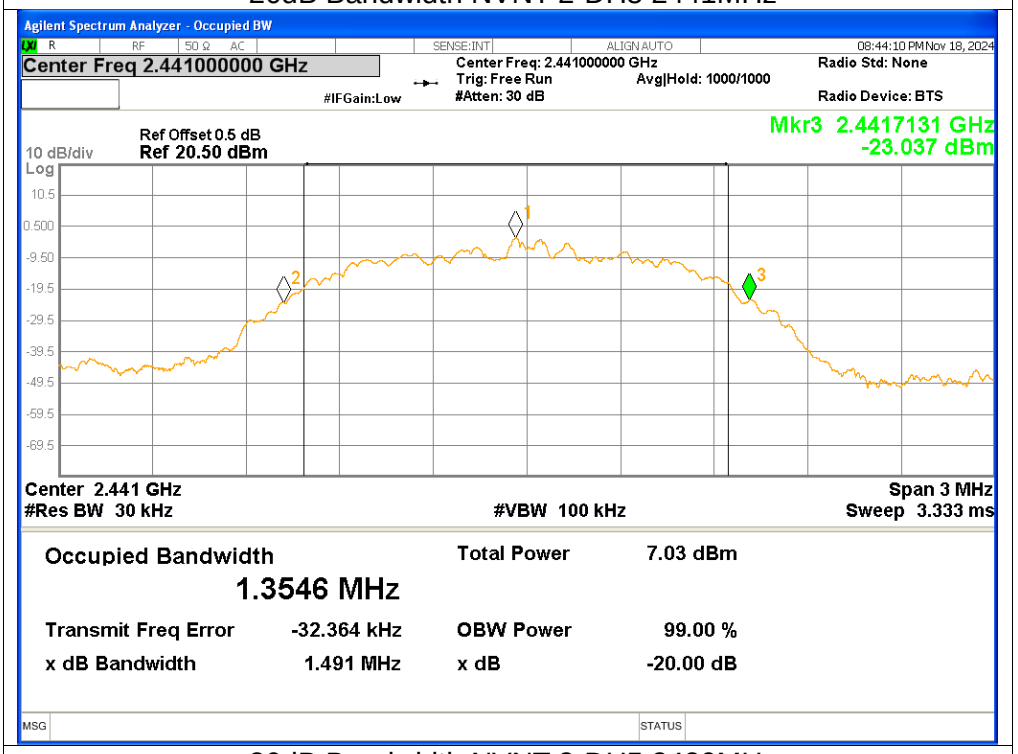
-20dB Bandwidth NVNT 1-DH5 2480MHz



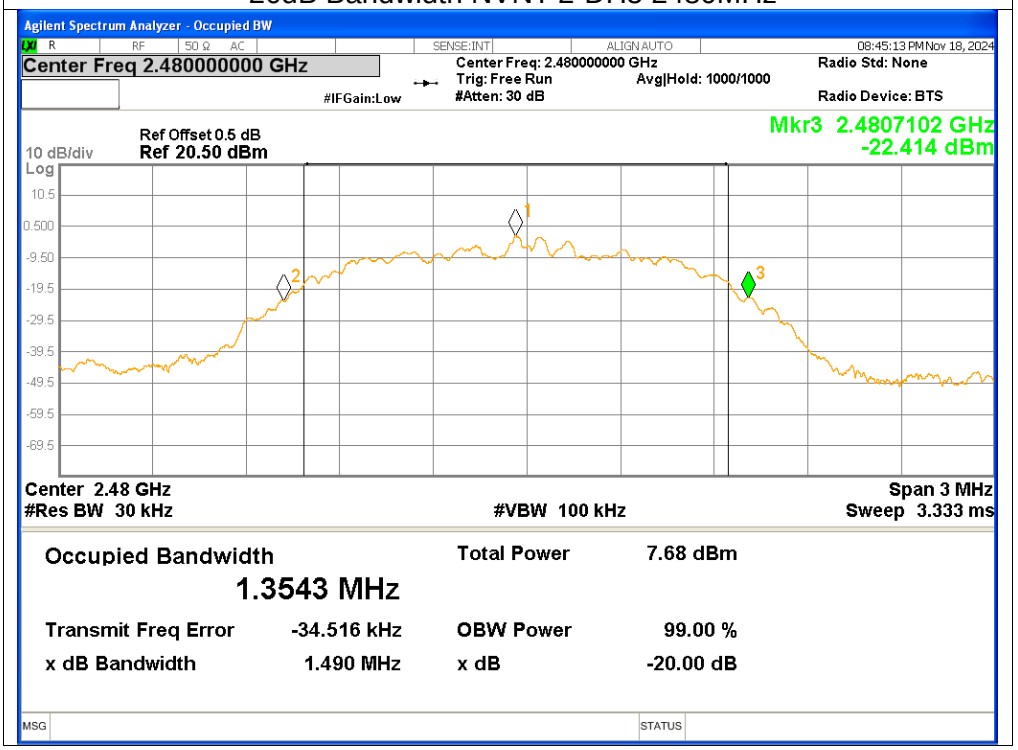
-20dB Bandwidth NVNT 2-DH5 2402MHz



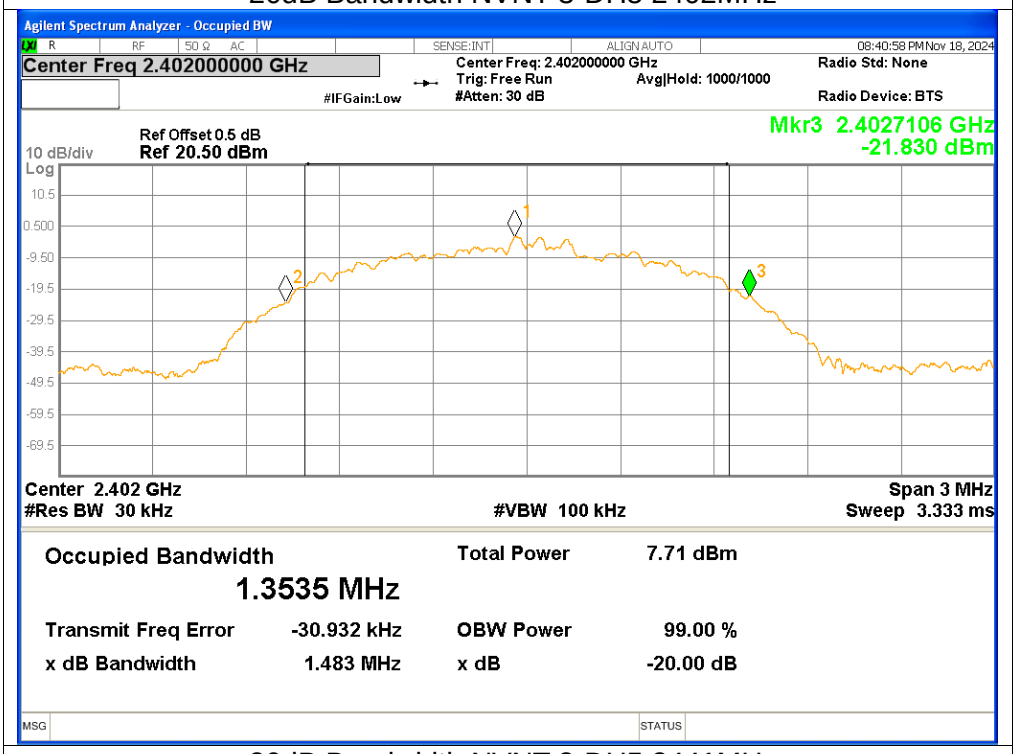
-20dB Bandwidth NVNT 2-DH5 2441MHz



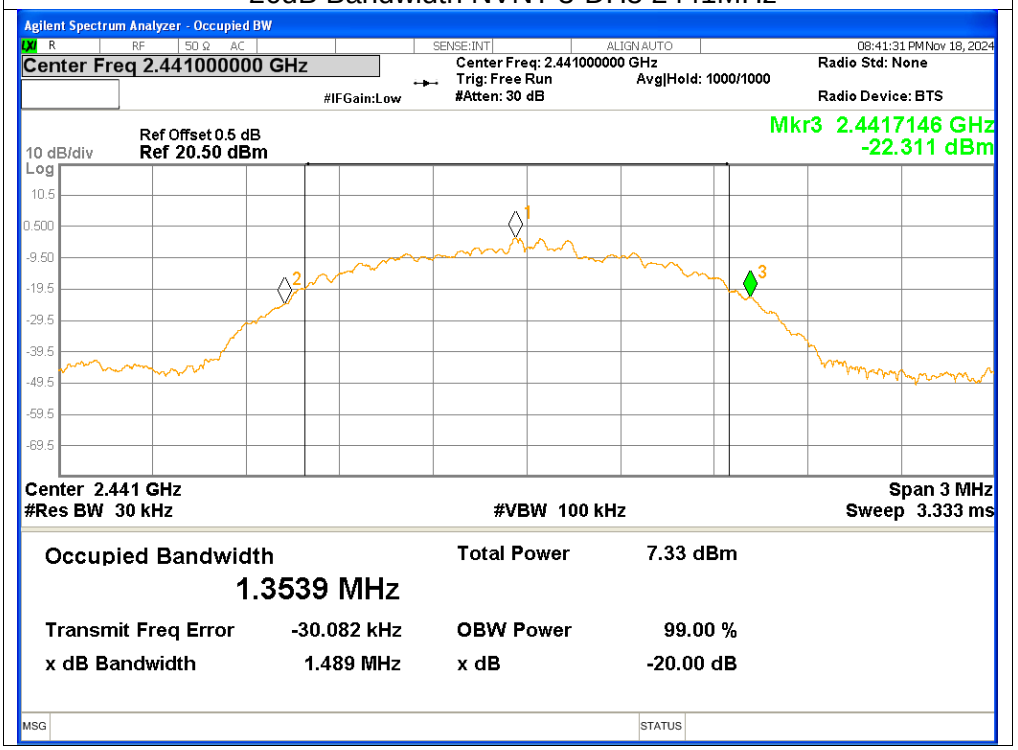
-20dB Bandwidth NVNT 2-DH5 2480MHz



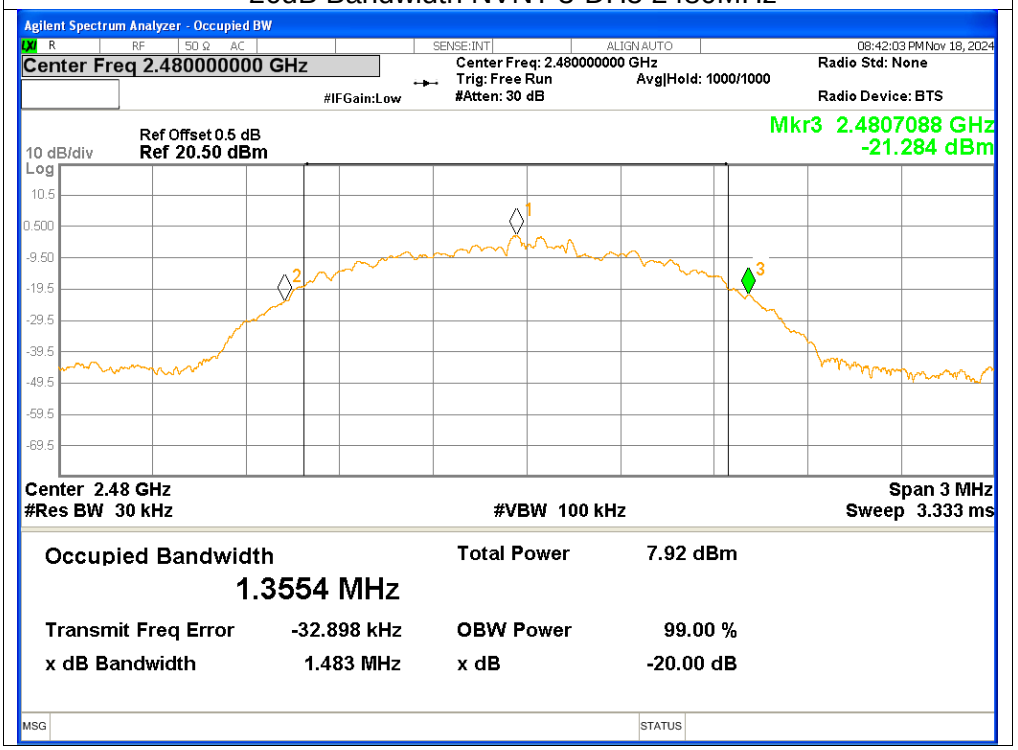
-20dB Bandwidth NVNT 3-DH5 2402MHz



-20dB Bandwidth NVNT 3-DH5 2441MHz



-20dB Bandwidth NVNT 3-DH5 2480MHz

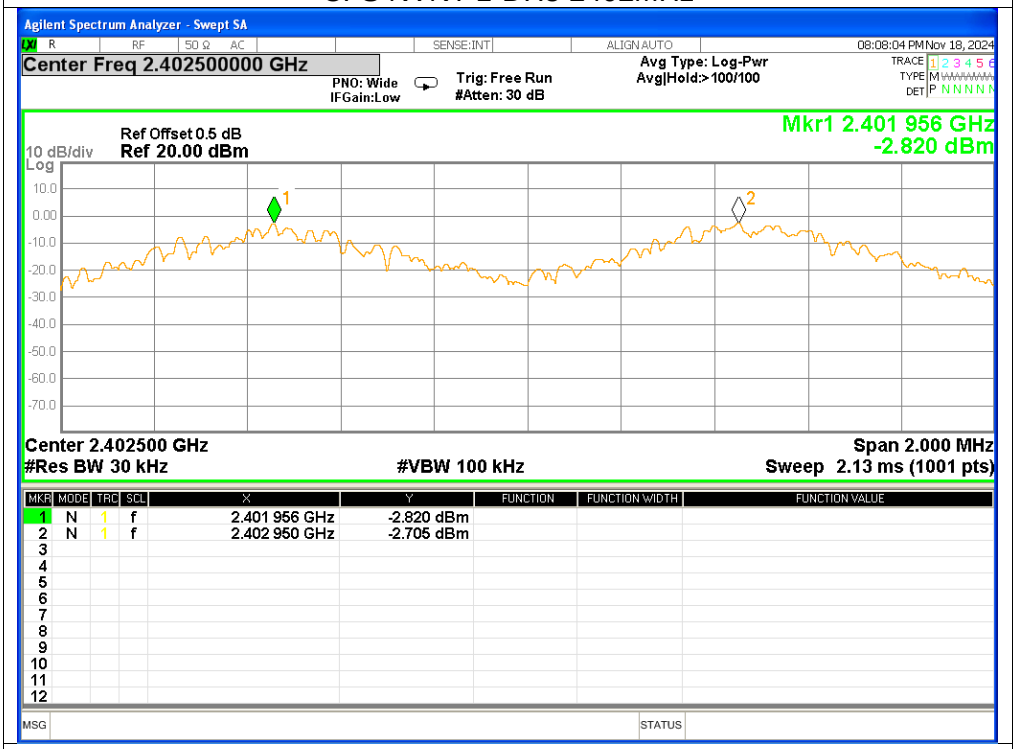


4. Carrier Frequencies Separation

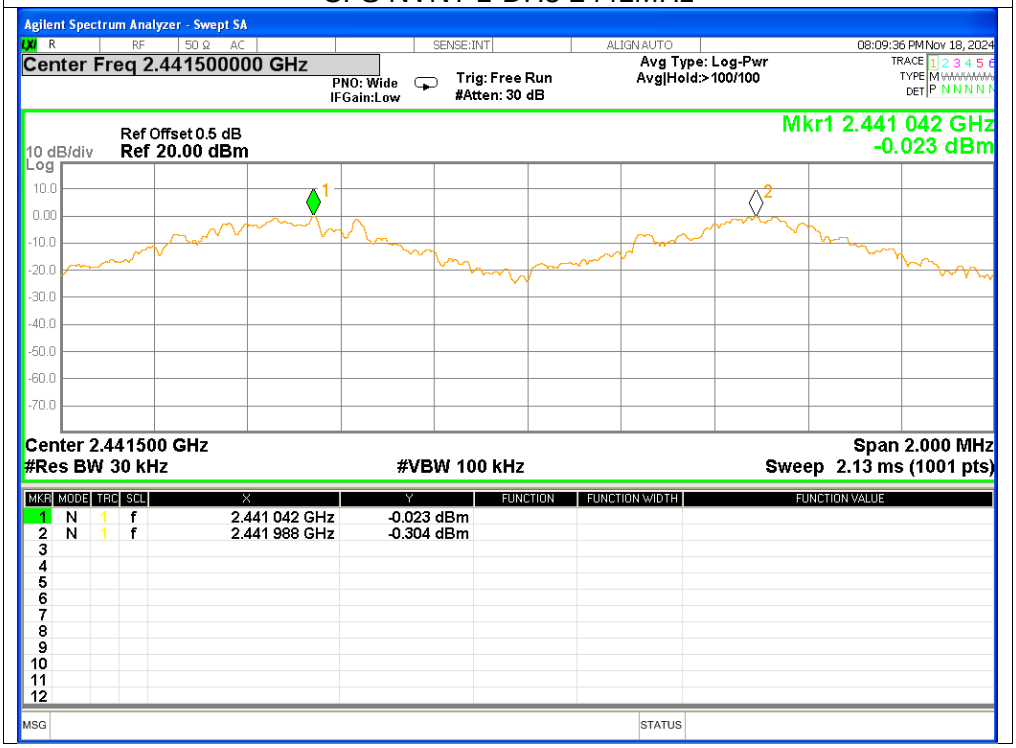
Condition	Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH5	2401.956	2402.95	0.994	>=0.637	Pass
NVNT	1-DH5	2441.042	2441.988	0.946	>=0.638	Pass
NVNT	1-DH5	2478.982	2479.958	0.976	>=0.637	Pass
NVNT	2-DH5	2401.968	2403.308	1.34	>=0.992	Pass
NVNT	2-DH5	2440.842	2441.85	1.008	>=0.99	Pass
NVNT	2-DH5	2479.064	2480.102	1.038	>=0.989	Pass
NVNT	3-DH5	2401.974	2402.968	0.994	>=0.989	Pass
NVNT	3-DH5	2440.966	2441.956	0.99	>=0.988	Pass
NVNT	3-DH5	2479.098	2480.096	0.998	>=0.988	Pass

Test Graphs

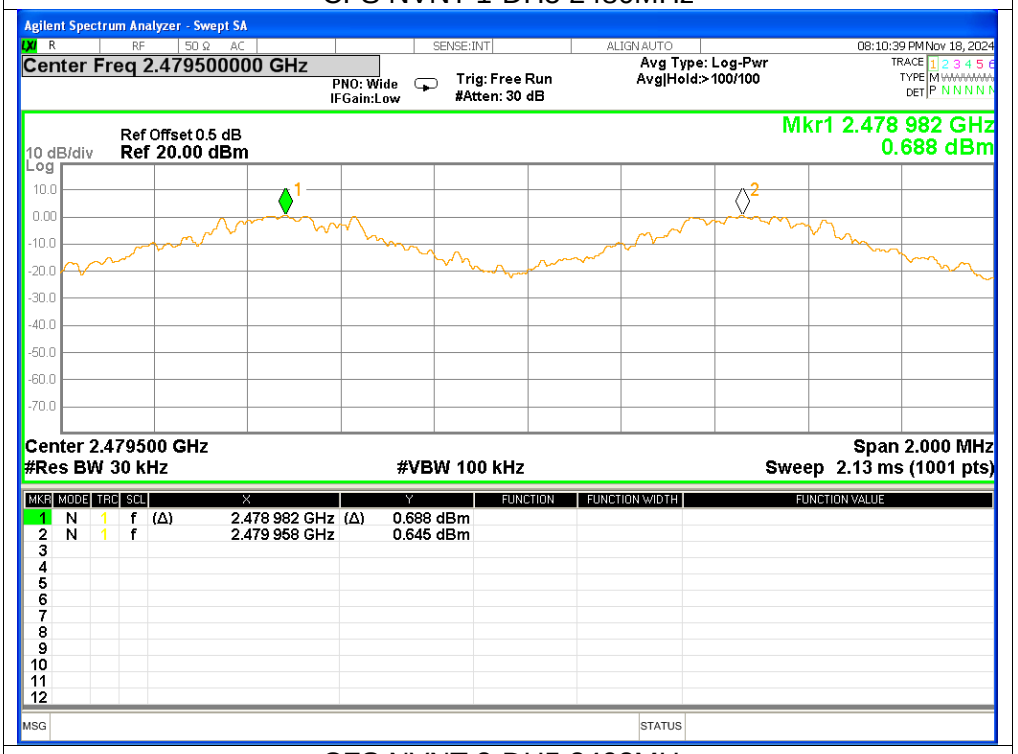
CFS NVNT 1-DH5 2402MHz



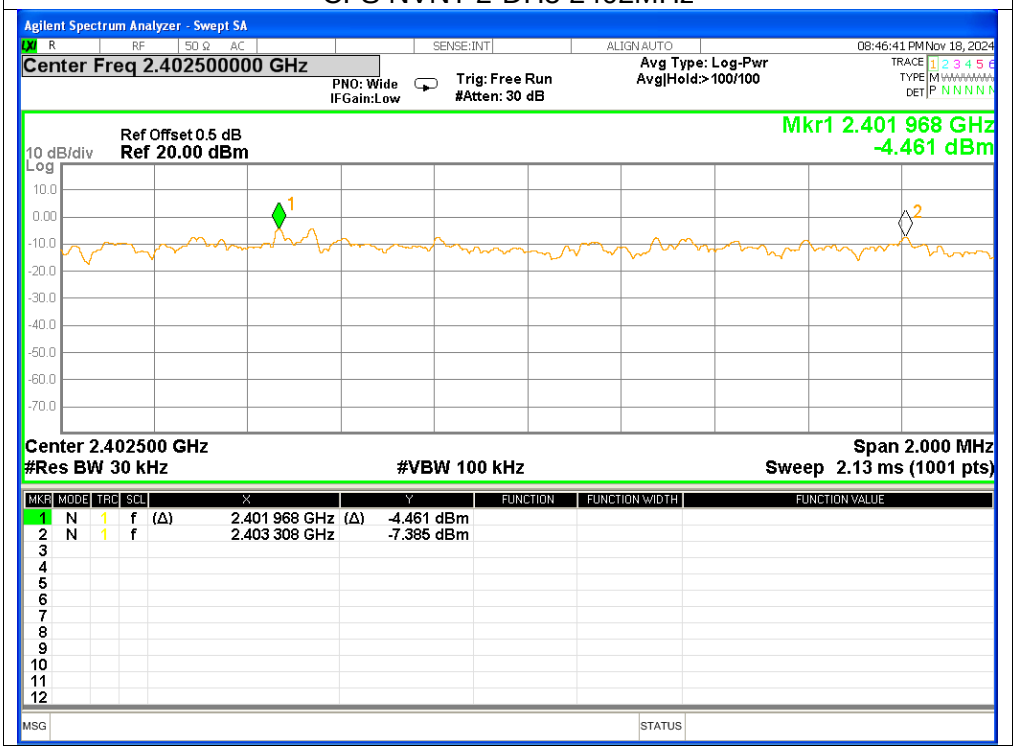
CFS NVNT 1-DH5 2441MHz



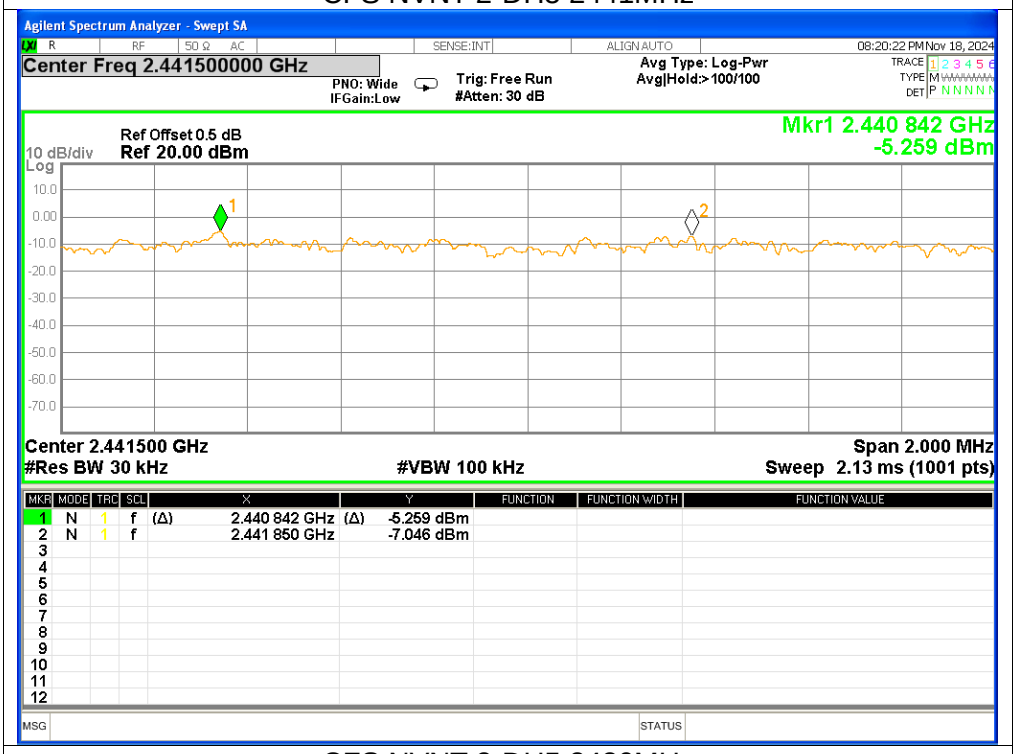
CFS NVNT 1-DH5 2480MHz



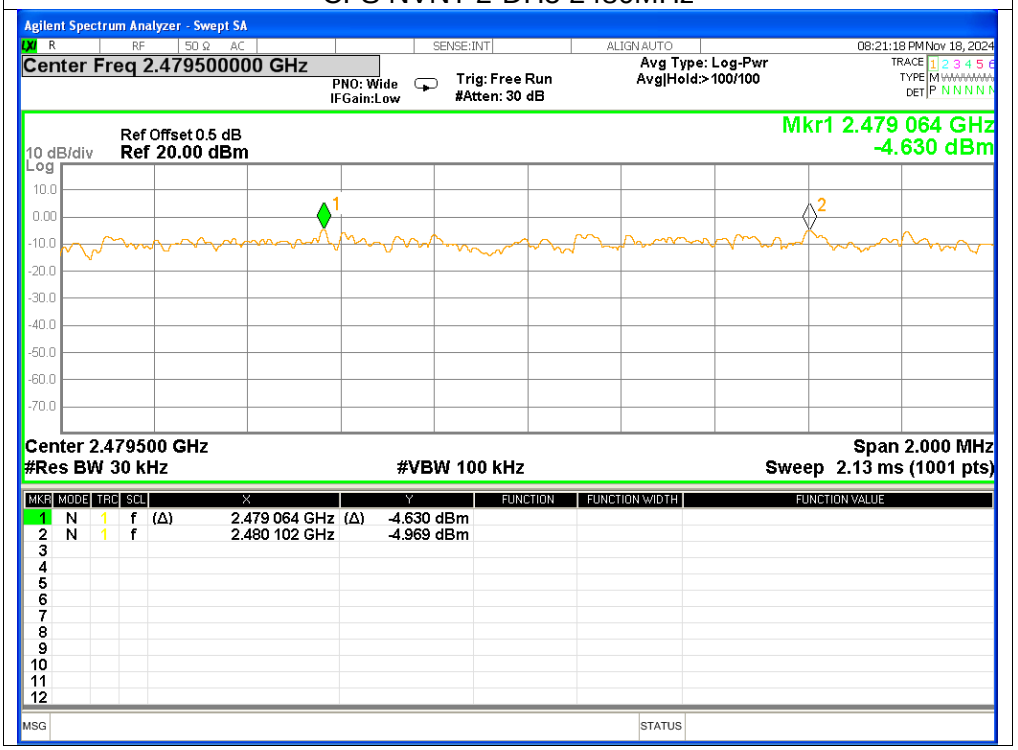
CFS NVNT 2-DH5 2402MHz



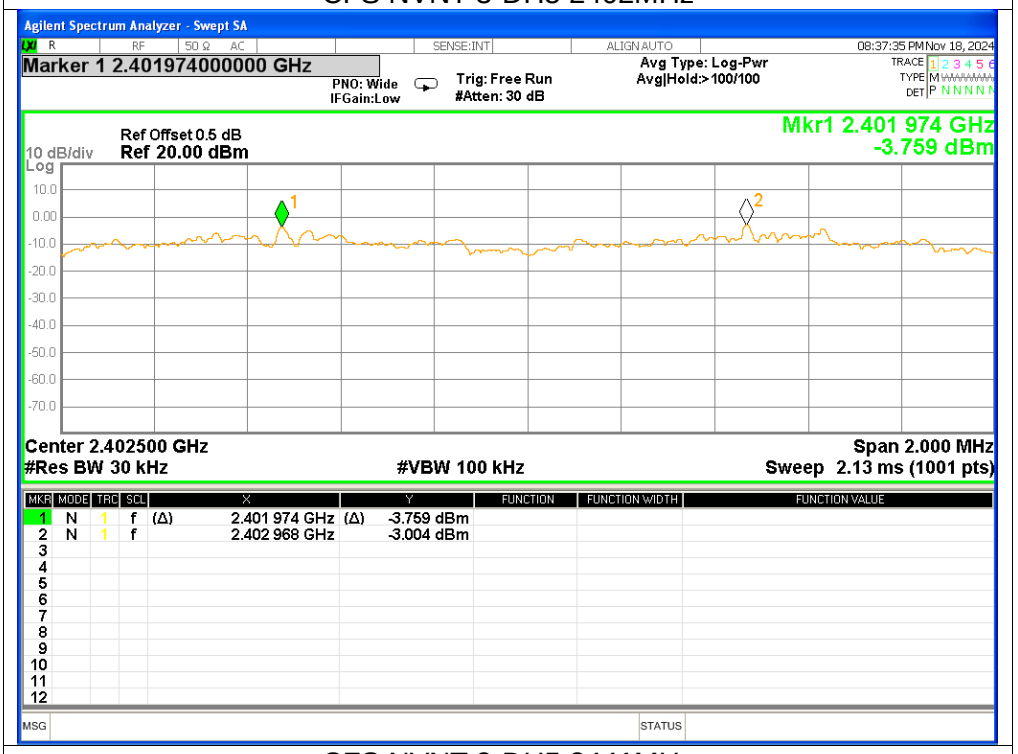
CFS NVNT 2-DH5 2441MHz



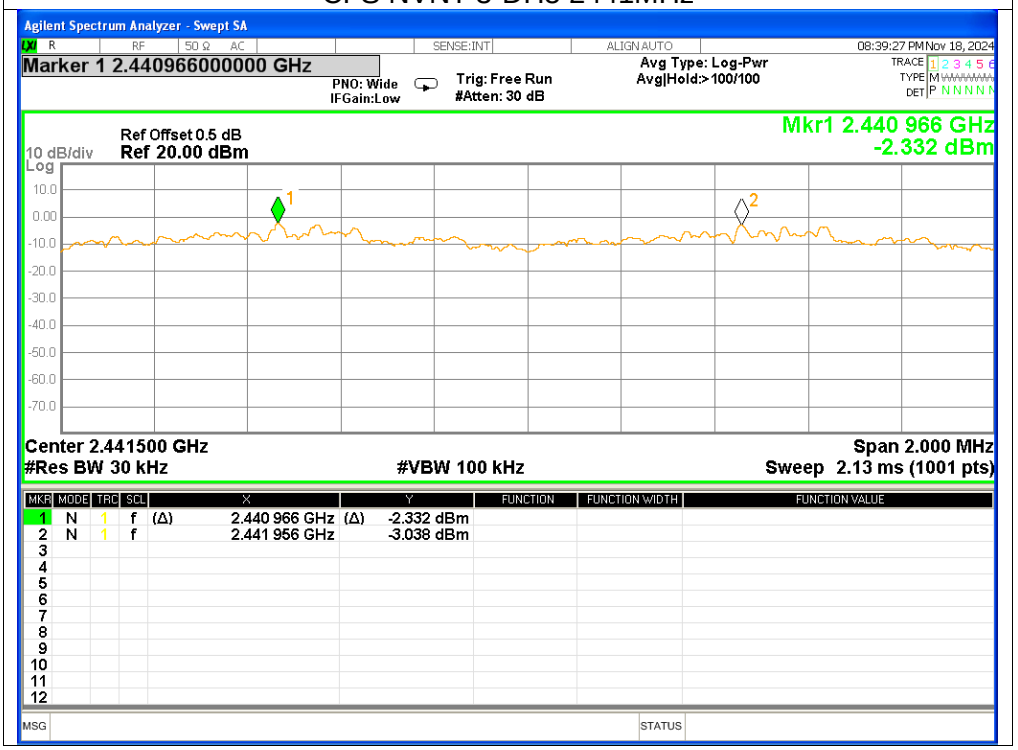
CFS NVNT 2-DH5 2480MHz



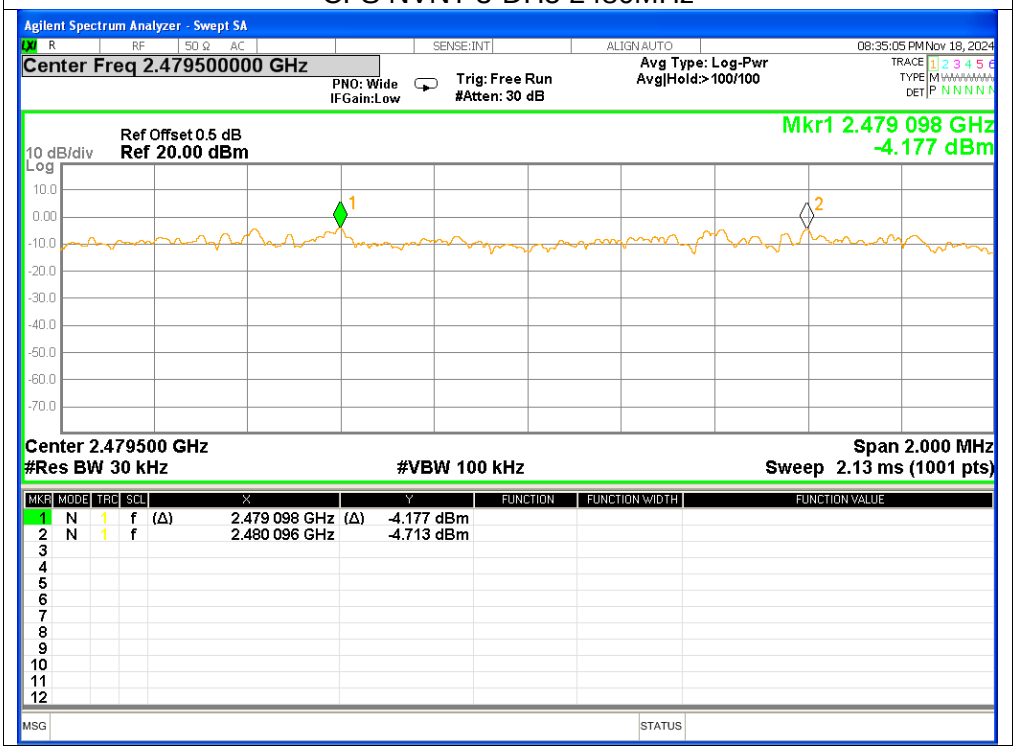
CFS NVNT 3-DH5 2402MHz



CFS NVNT 3-DH5 2441MHz



CFS NVNT 3-DH5 2480MHz

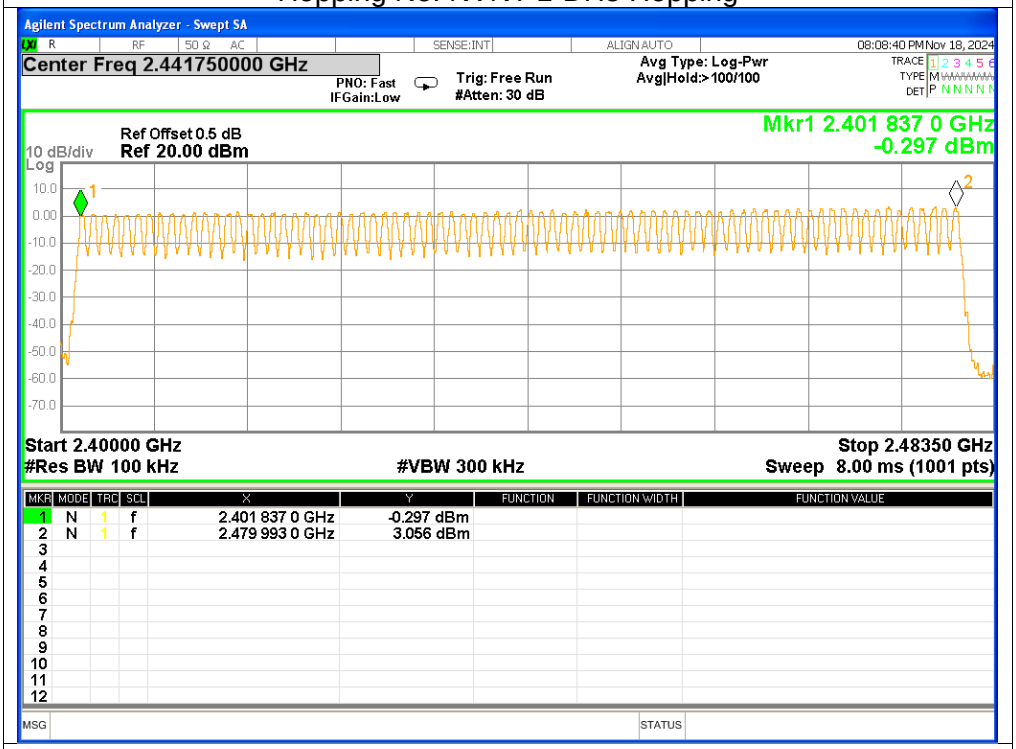


5. Number of Hopping Channel

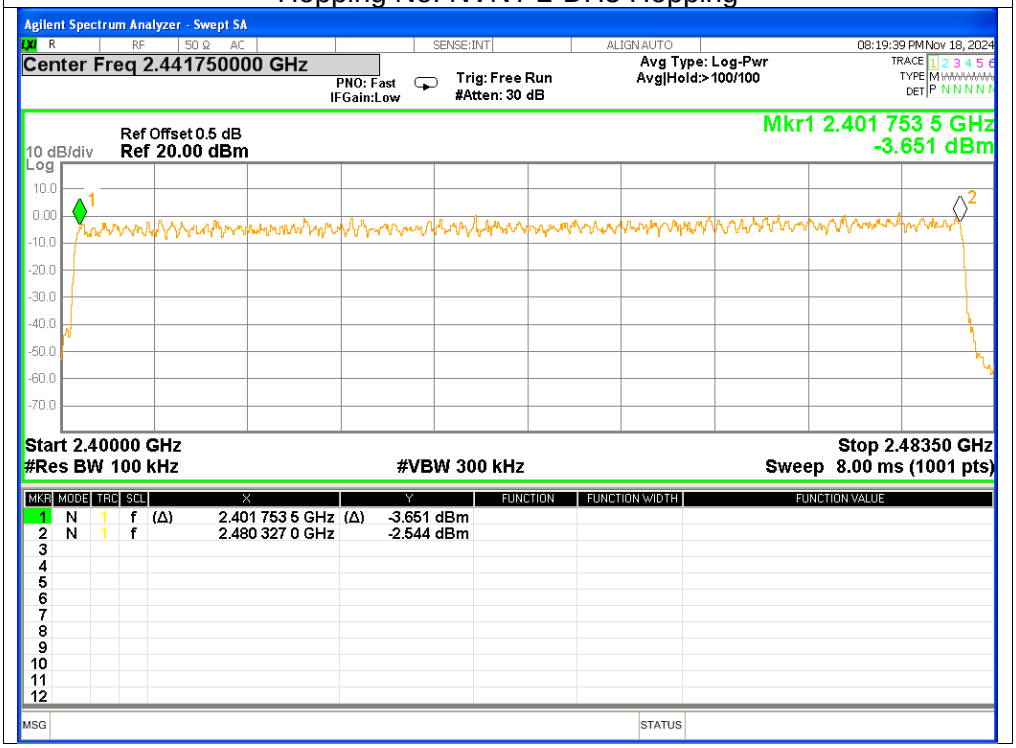
Condition	Mode	Hopping Number	Limit	Verdict
NVNT	1-DH5	79	>=15	Pass
NVNT	2-DH5	79	>=15	Pass
NVNT	3-DH5	79	>=15	Pass

Test Graphs

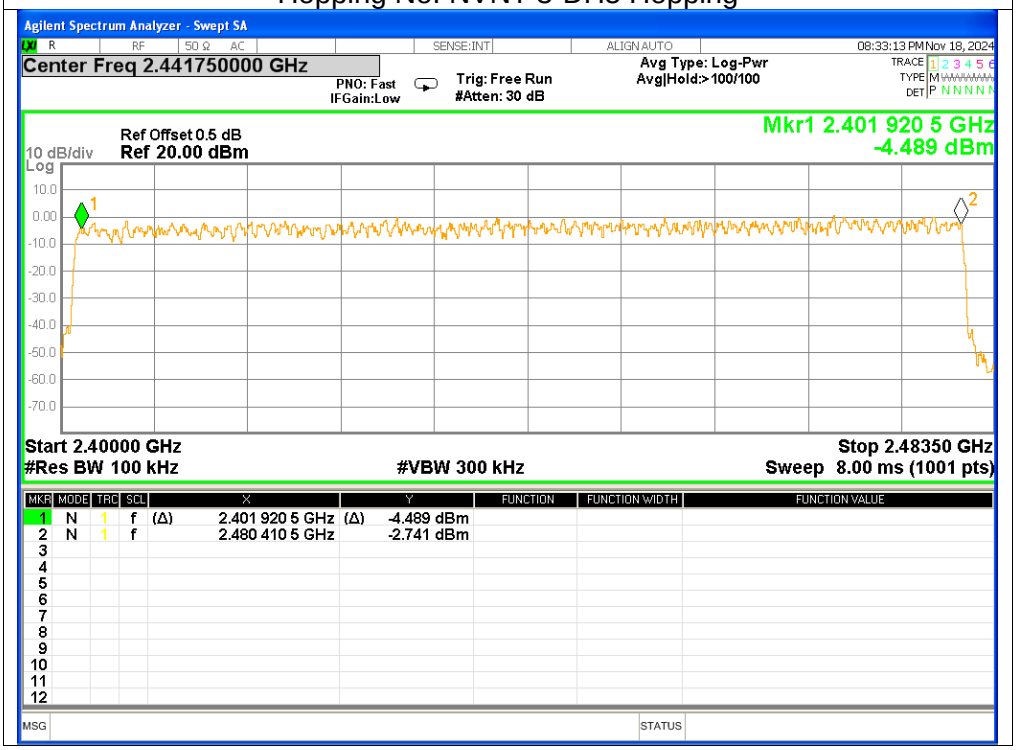
Hopping No. NVNT 1-DH5 Hopping



Hopping No. NVNT 2-DH5 Hopping



Hopping No. NVNT 3-DH5 Hopping

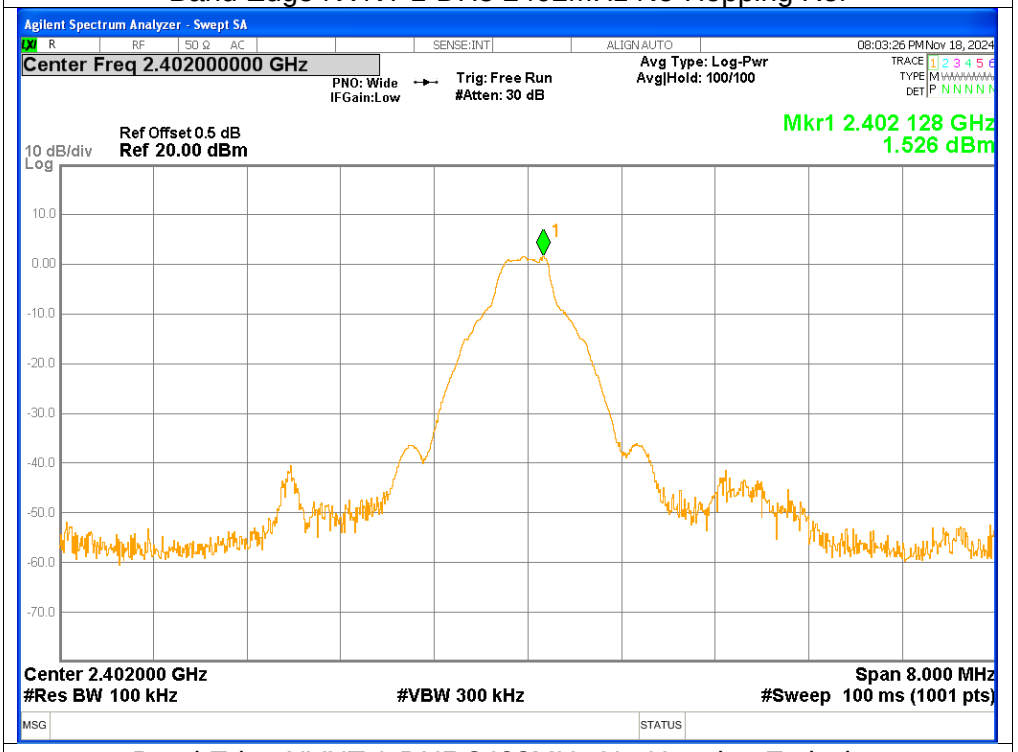


6. Band Edge

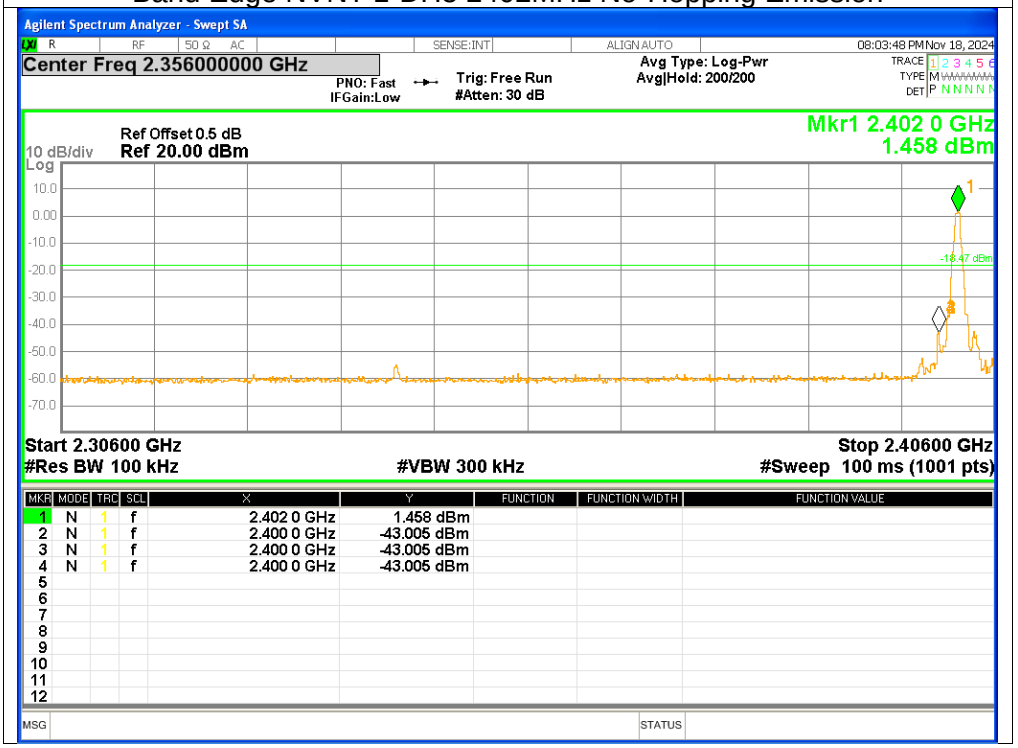
Condition	Mode	Frequency (MHz)	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	No-Hopping	-44.53	<=-20	Pass
NVNT	1-DH5	2480	No-Hopping	-43.53	<=-20	Pass
NVNT	2-DH5	2402	No-Hopping	-44.1	<=-20	Pass
NVNT	2-DH5	2480	No-Hopping	-41.22	<=-20	Pass
NVNT	3-DH5	2402	No-Hopping	-47.45	<=-20	Pass
NVNT	3-DH5	2480	No-Hopping	-41.2	<=-20	Pass

Test Graphs

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

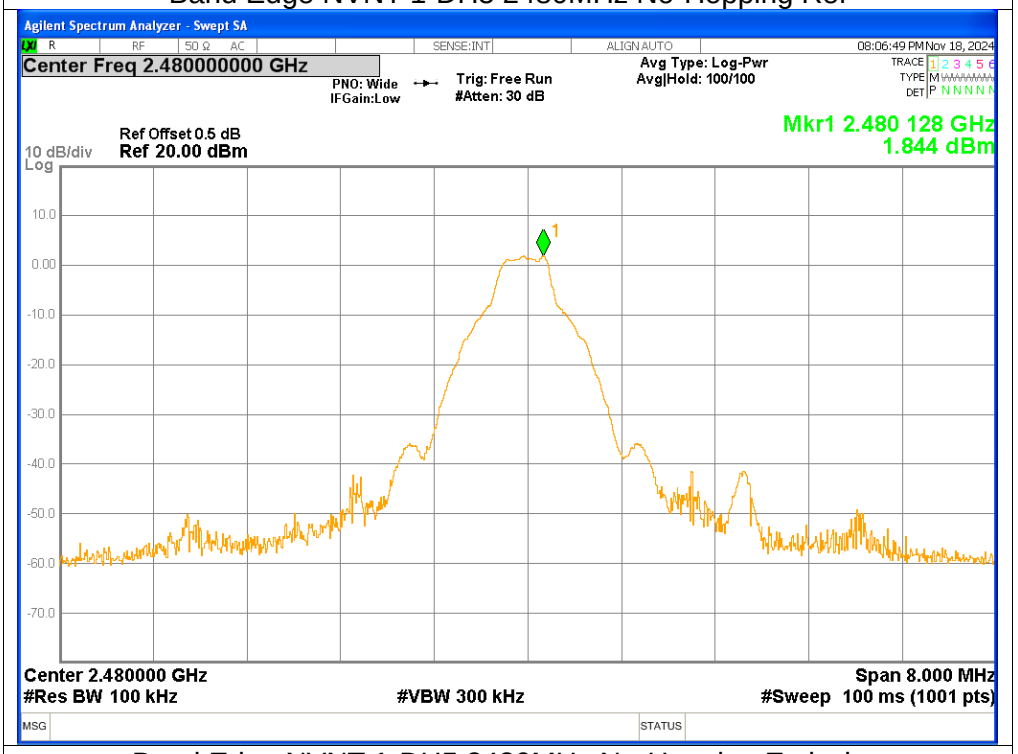


Band Edge NVNT 1-DH5 2402MHz No-Hopping Emission

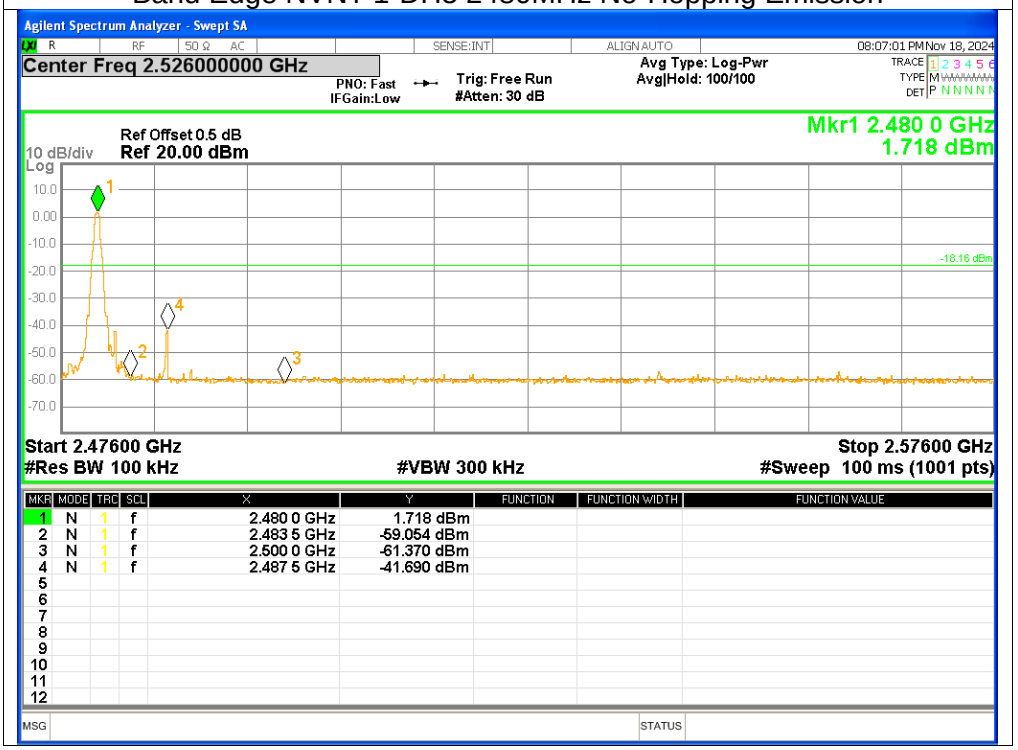


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 0 GHz	1.458 dBm			
2	N	1	f	2.400 0 GHz	-43.005 dBm			
3	N	1	f	2.400 0 GHz	-43.005 dBm			
4	N	1	f	2.400 0 GHz	-43.005 dBm			
5								
6								
7								
8								
9								
10								
11								
12								

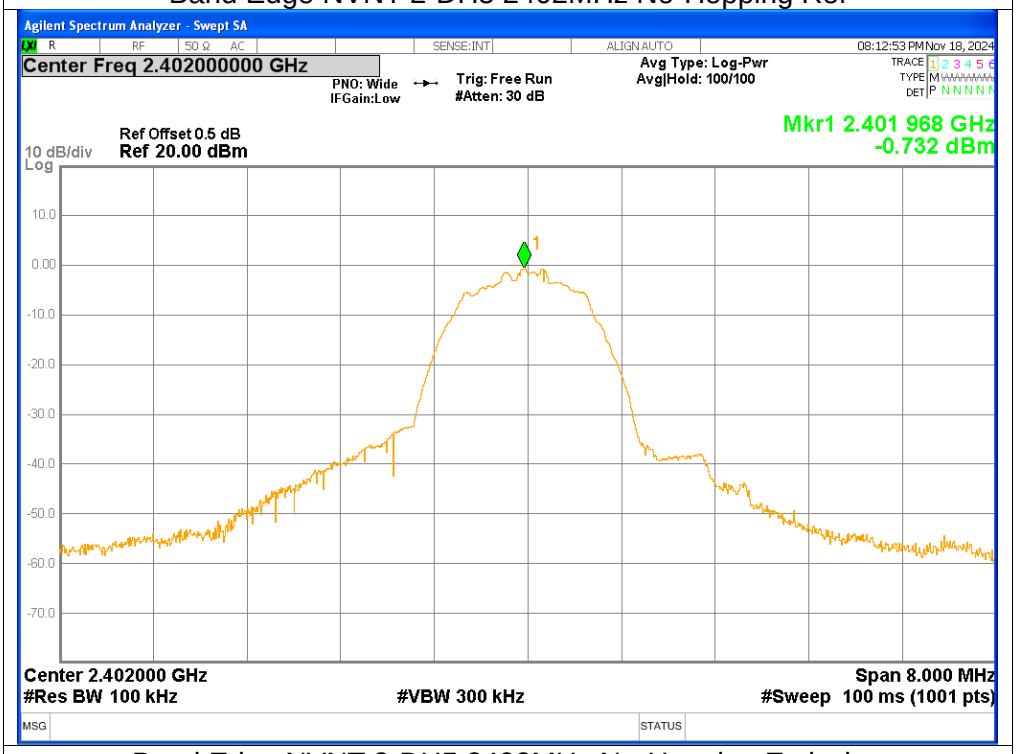
Band Edge NVNT 1-DH5 2480MHz No-Hopping Ref



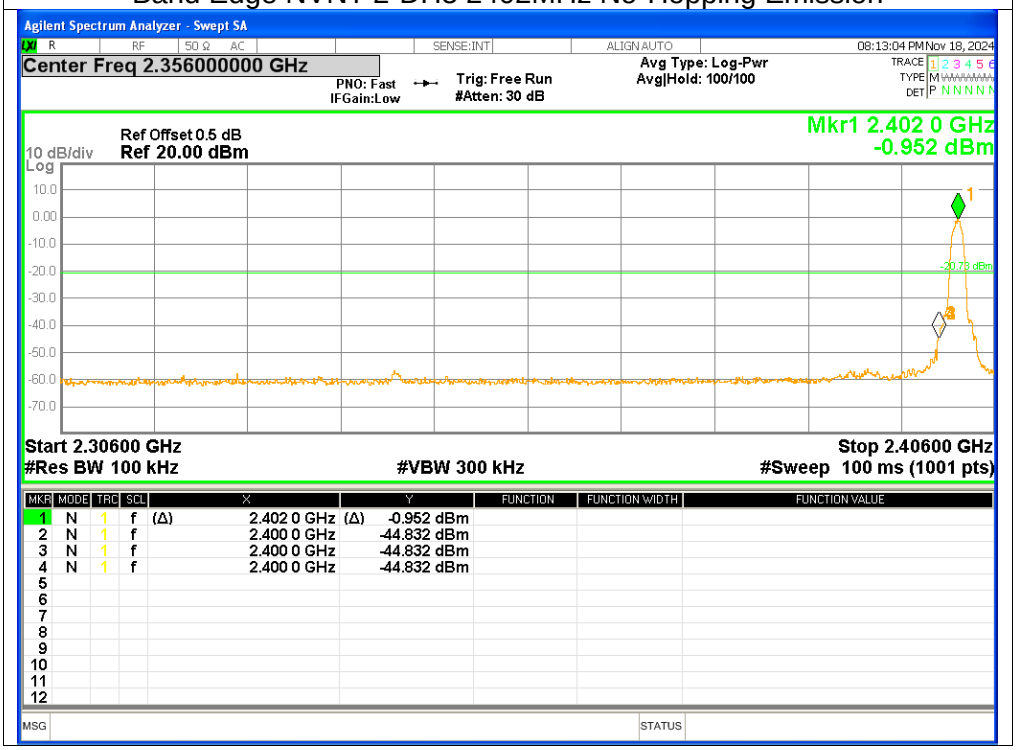
Band Edge NVNT 1-DH5 2480MHz No-Hopping Emission



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

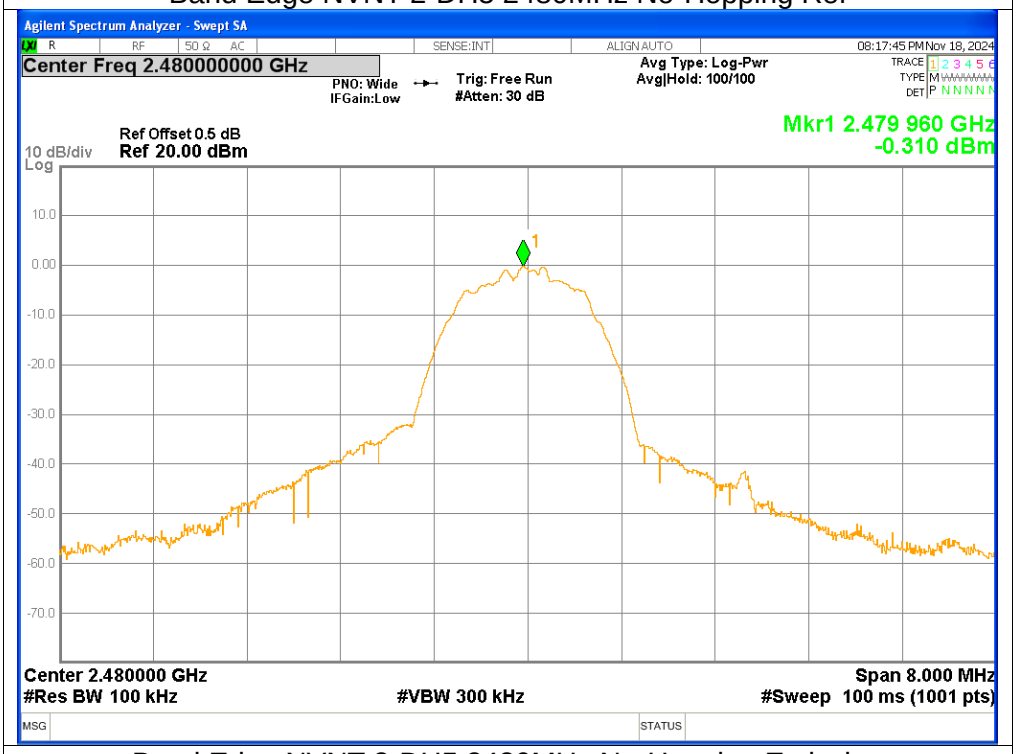


Band Edge NVNT 2-DH5 2402MHz No-Hopping Emission

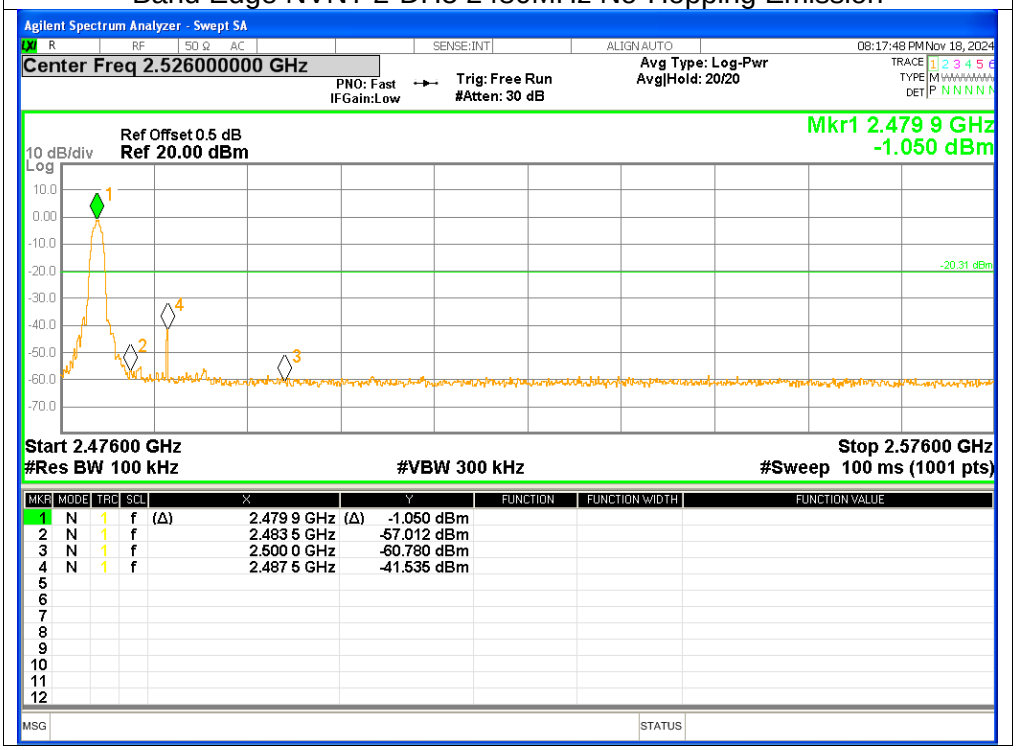


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	(Δ) 2.402 0 GHz	(Δ) -0.952 dBm			
2	N	1	f	2.400 0 GHz	-44.832 dBm			
3	N	1	f	2.400 0 GHz	-44.832 dBm			
4	N	1	f	2.400 0 GHz	-44.832 dBm			
5								
6								
7								
8								
9								
10								
11								
12								

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

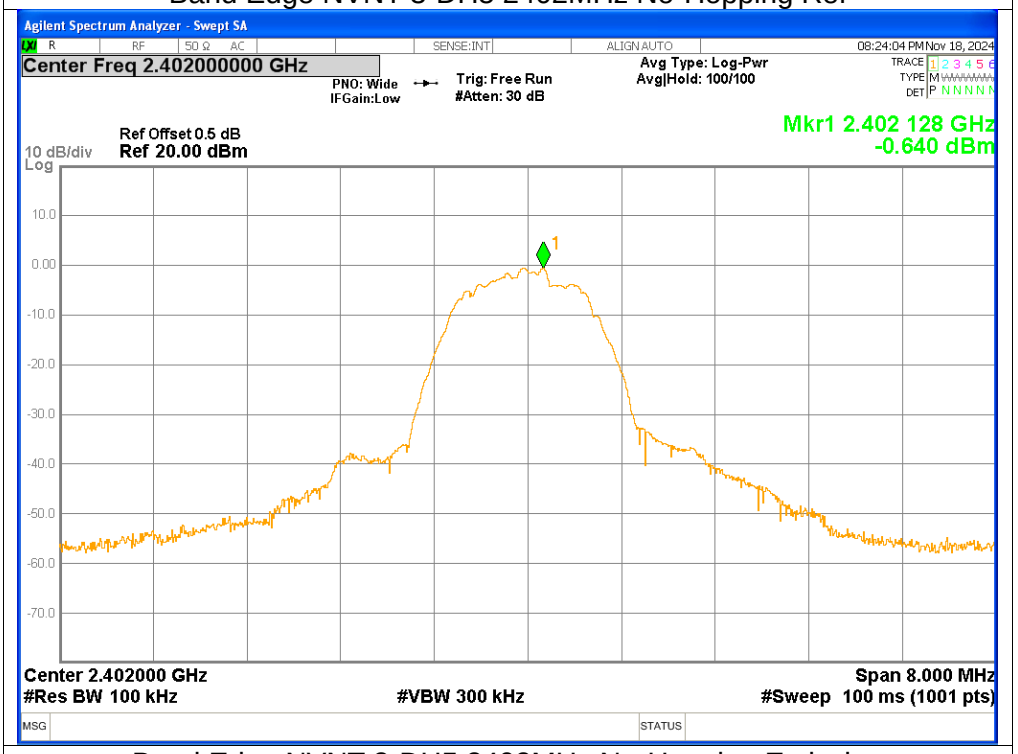


Band Edge NVNT 2-DH5 2480MHz No-Hopping Emission

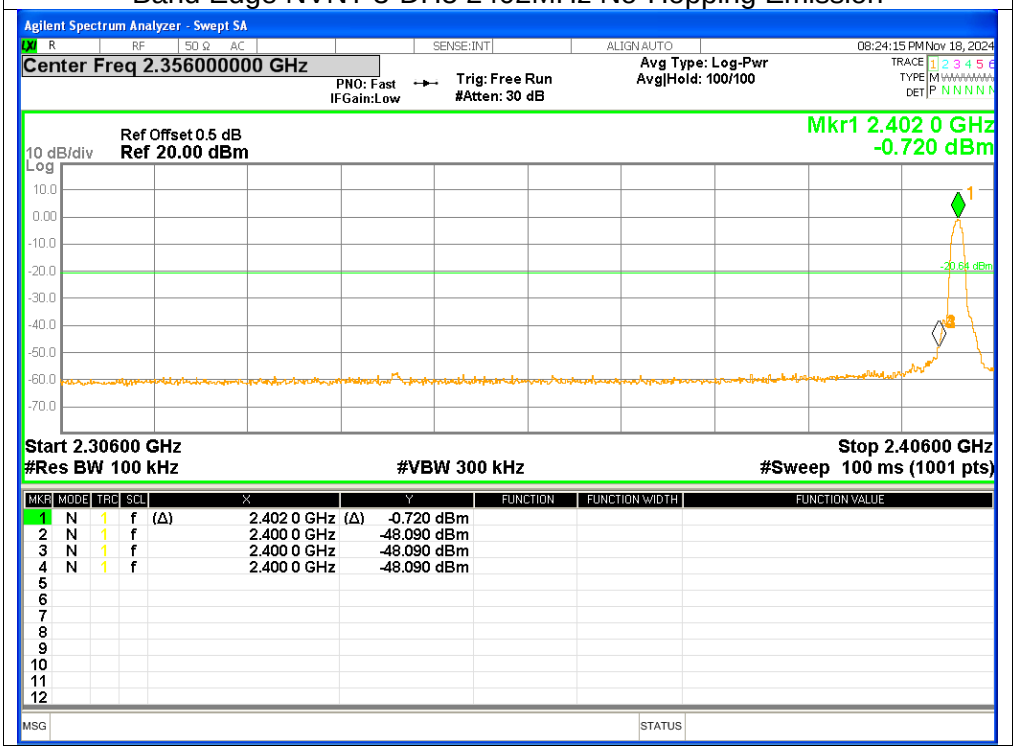


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	(Δ) 2.479 9 GHz	(Δ) -1.050 dBm			
2	N	1	f	2.483 5 GHz	-57.012 dBm			
3	N	1	f	2.500 0 GHz	-60.780 dBm			
4	N	1	f	2.487 5 GHz	-41.535 dBm			
5								
6								
7								
8								
9								
10								
11								
12								

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

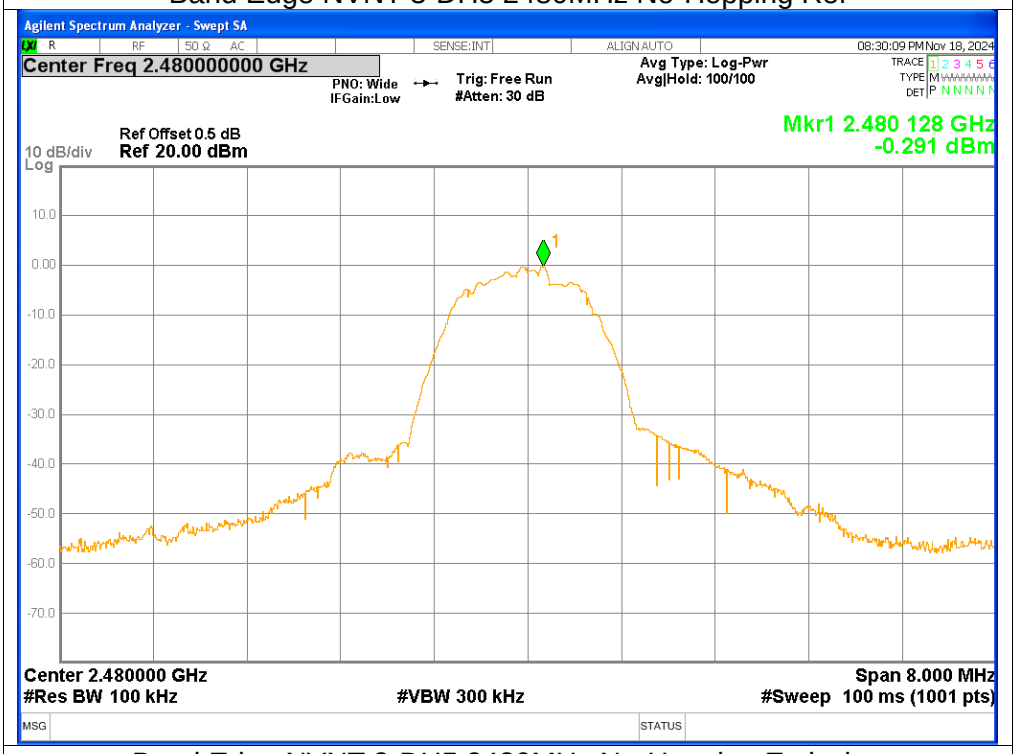


Band Edge NVNT 3-DH5 2402MHz No-Hopping Emission

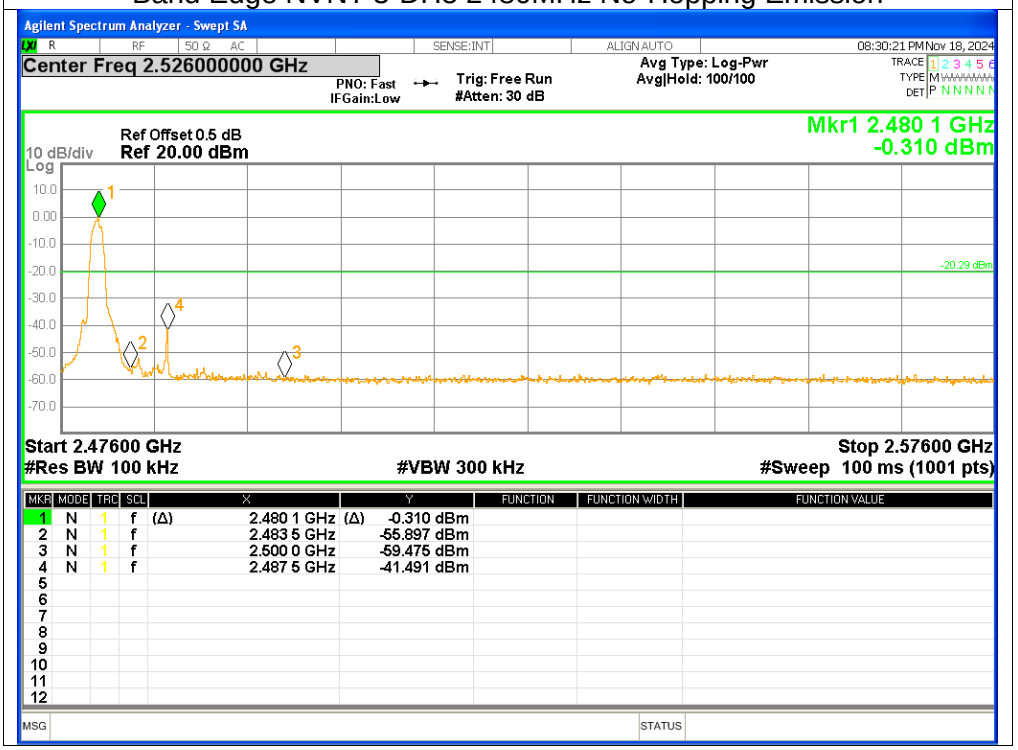


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	(Δ) 2.402 0 GHz	(Δ) -0.720 dBm			
2	N	1	f	2.400 0 GHz	-48.090 dBm			
3	N	1	f	2.400 0 GHz	-48.090 dBm			
4	N	1	f	2.400 0 GHz	-48.090 dBm			
5								
6								
7								
8								
9								
10								
11								
12								

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



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



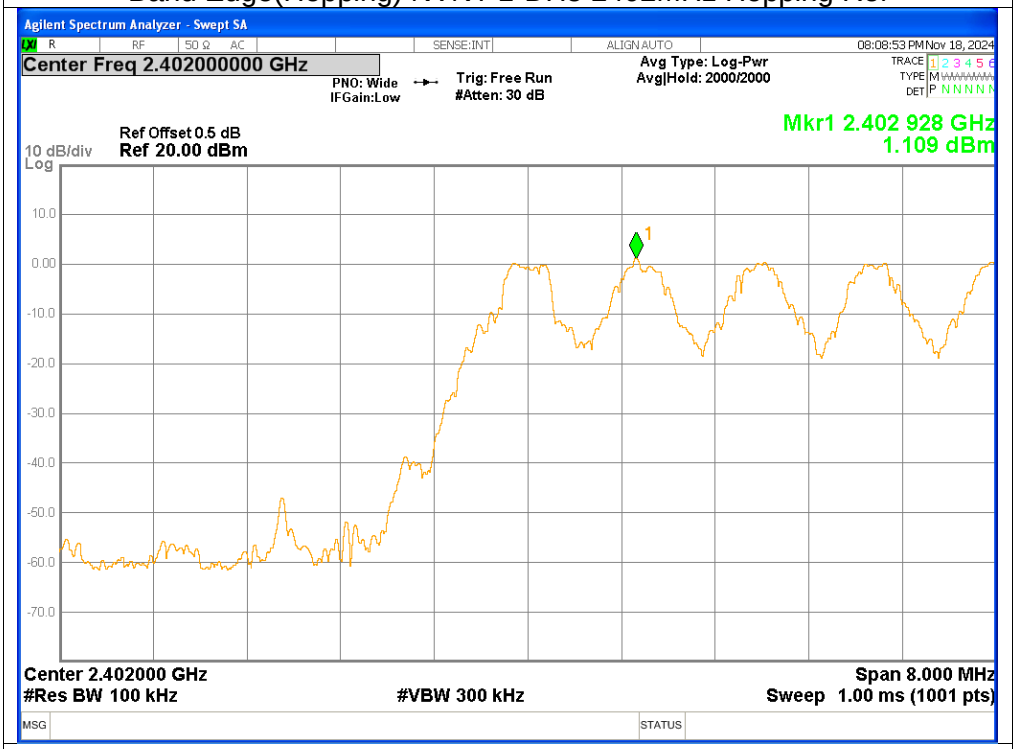
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	(Δ) 2.480 1 GHz	(Δ) -0.310 dBm			
2	N	1	f	2.483 5 GHz	-55.897 dBm			
3	N	1	f	2.500 0 GHz	-59.475 dBm			
4	N	1	f	2.487 5 GHz	-41.491 dBm			
5								
6								
7								
8								
9								
10								
11								
12								

7. Band Edge(Hopping)

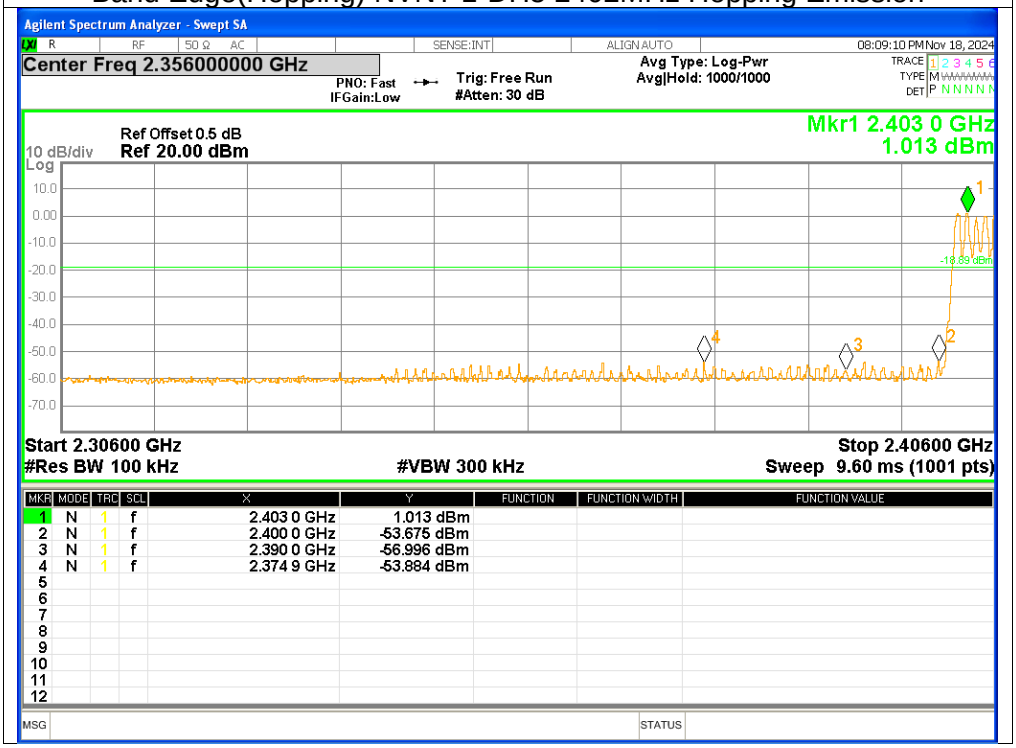
Condition	Mode	Frequency (MHz)	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Hopping	-54.99	<=-20	Pass
NVNT	1-DH5	2480	Hopping	-59.27	<=-20	Pass
NVNT	2-DH5	2402	Hopping	-53.67	<=-20	Pass
NVNT	2-DH5	2480	Hopping	-41.79	<=-20	Pass
NVNT	3-DH5	2402	Hopping	-54.75	<=-20	Pass
NVNT	3-DH5	2480	Hopping	-55.56	<=-20	Pass

Test Graphs

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

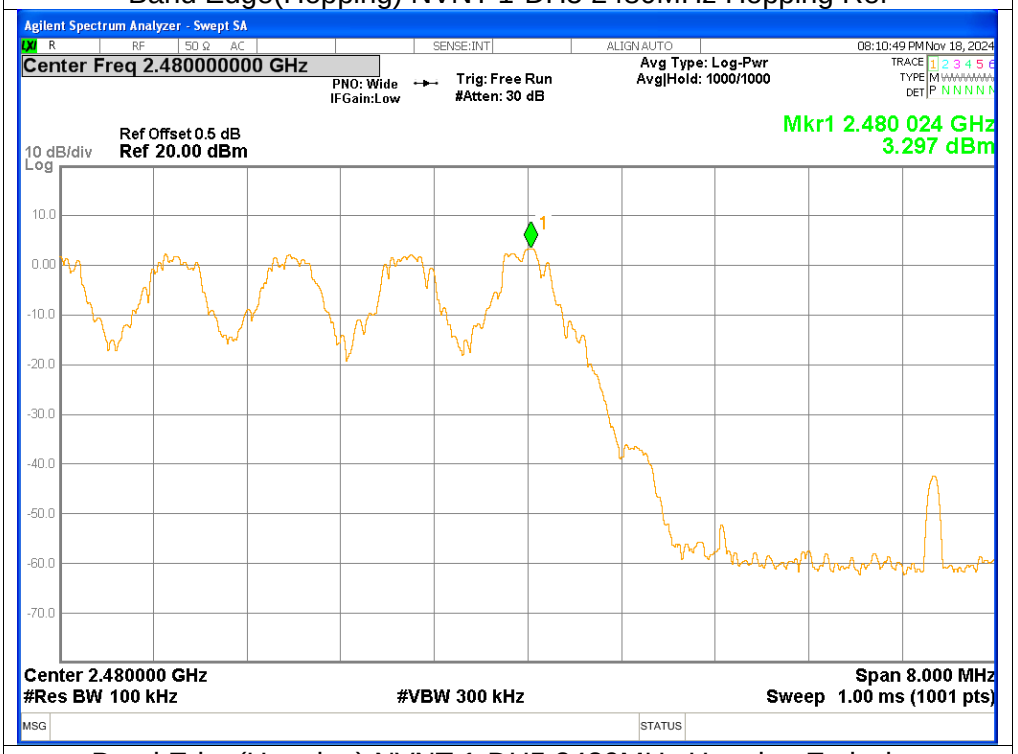


Band Edge(Hopping) NVNT 1-DH5 2402MHz Hopping Emission

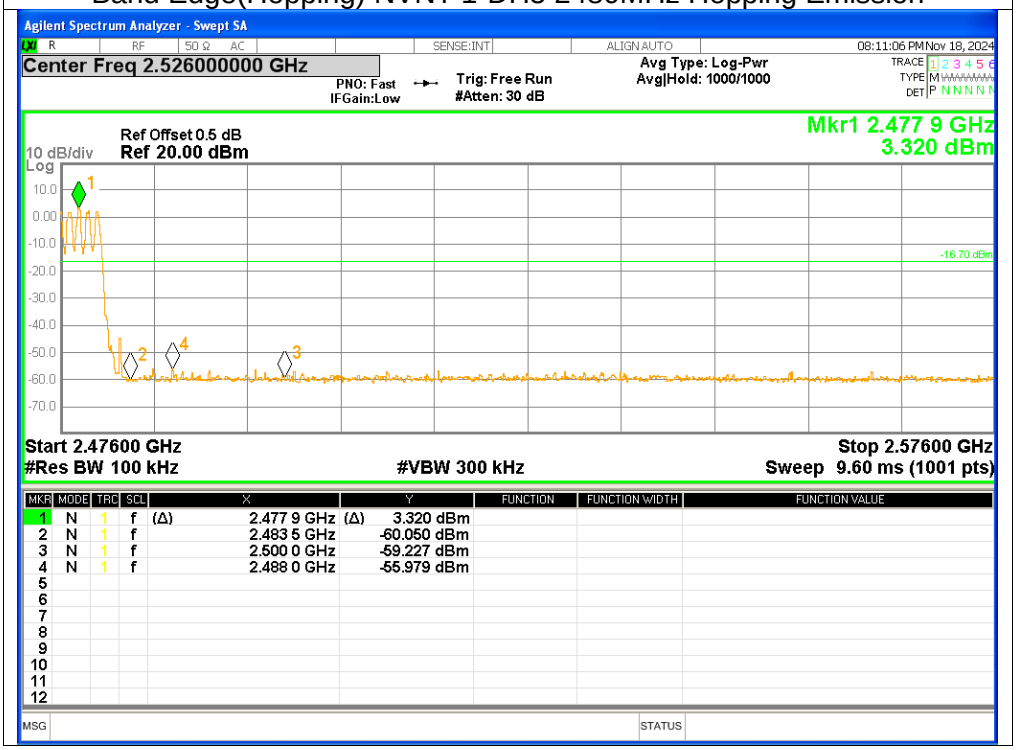


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.403 0 GHz	1.013 dBm			
2	N	1	f	2.400 0 GHz	-53.675 dBm			
3	N	1	f	2.390 0 GHz	-56.996 dBm			
4	N	1	f	2.374 9 GHz	-53.884 dBm			
5								
6								
7								
8								
9								
10								
11								
12								

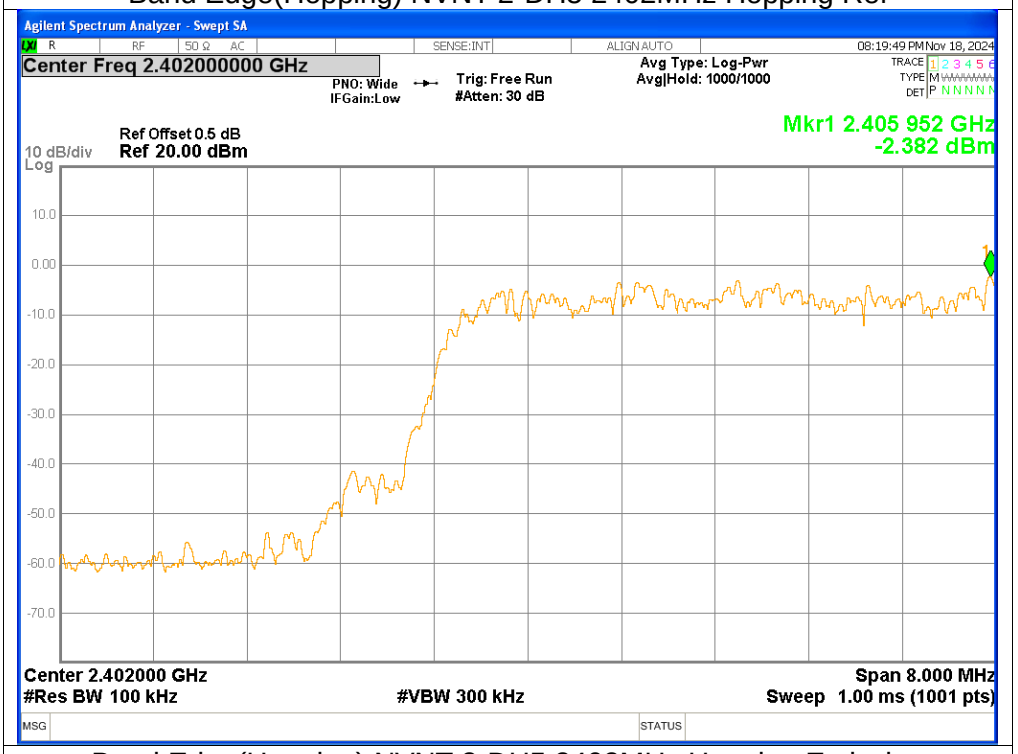
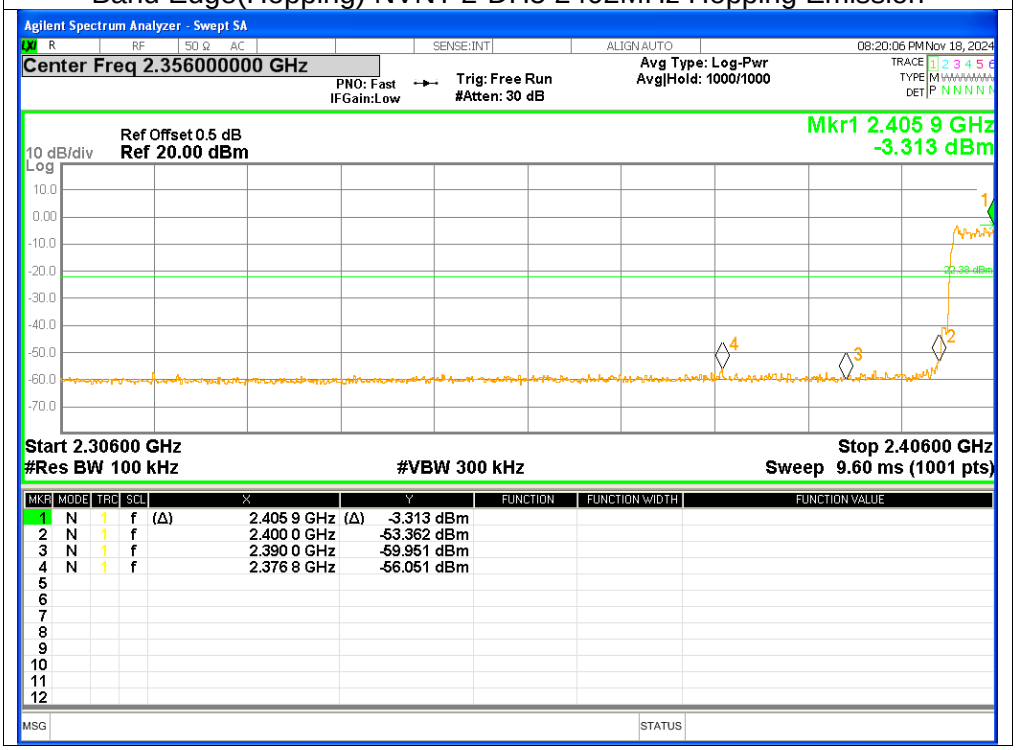
Band Edge(Hopping) NVNT 1-DH5 2480MHz Hopping Ref



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



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



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