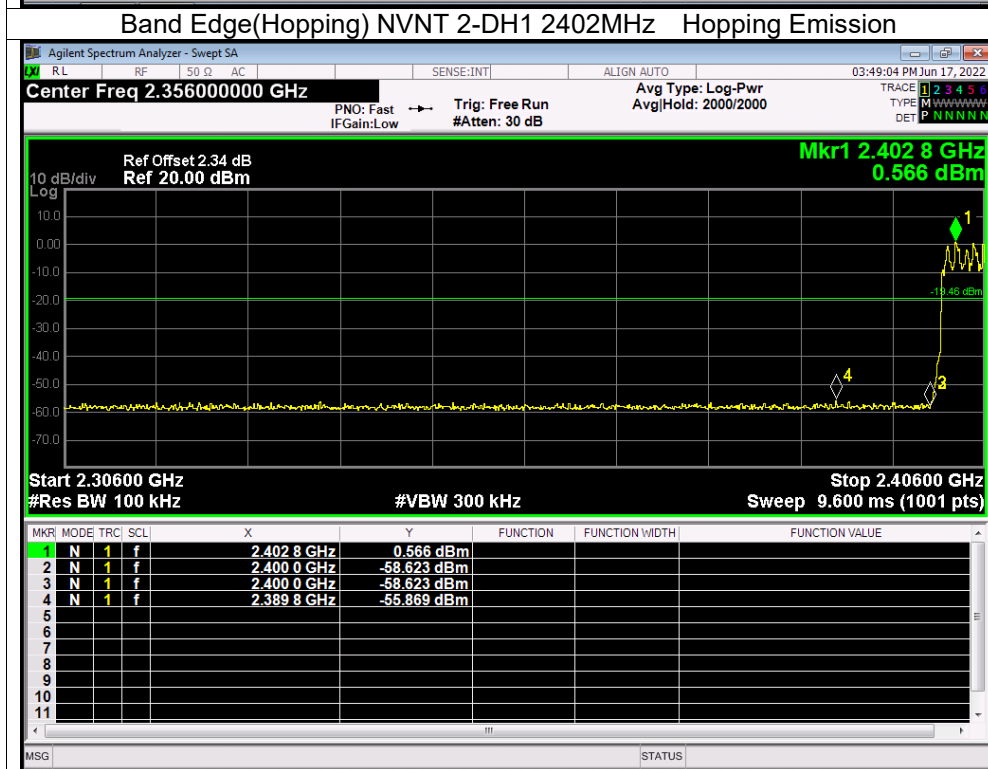
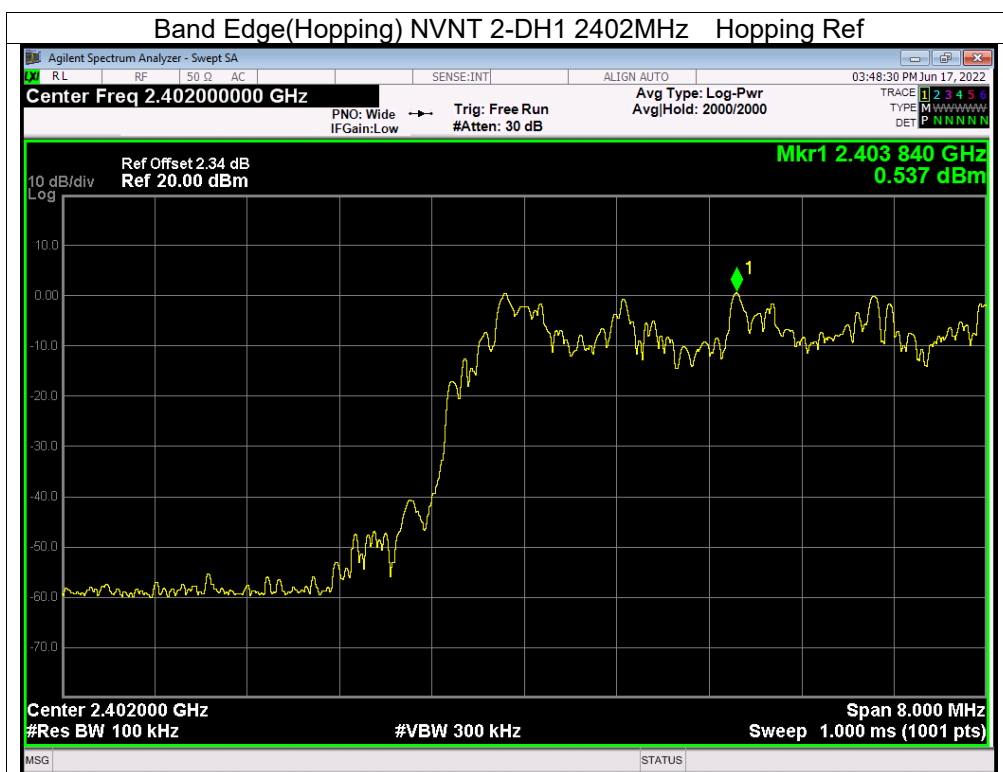
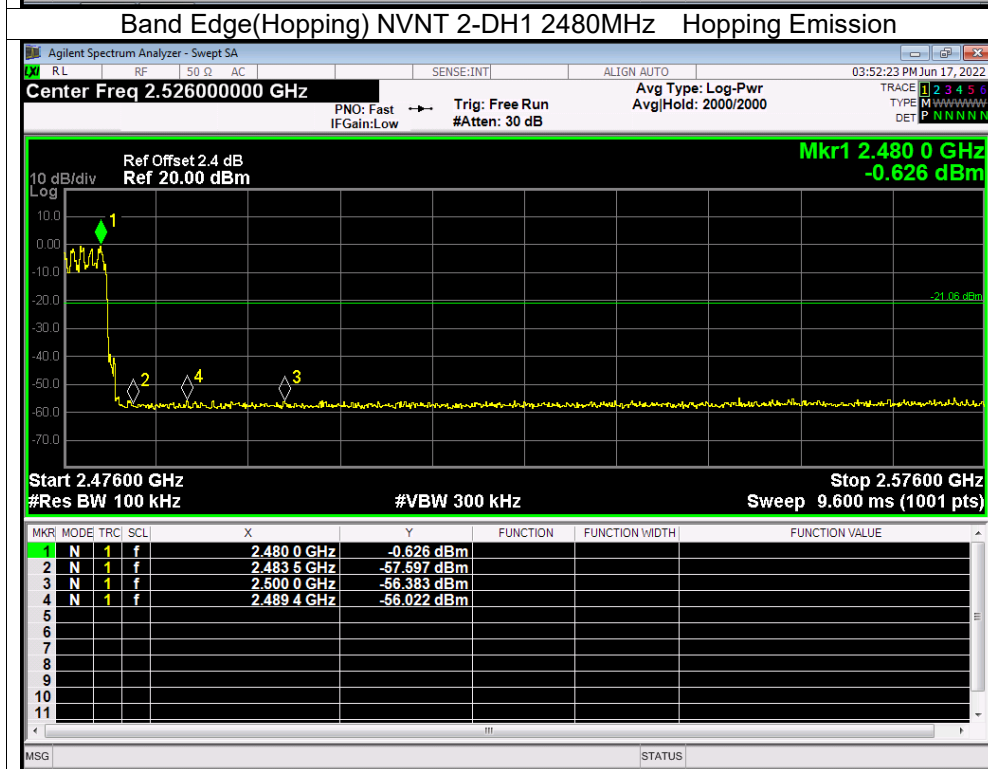
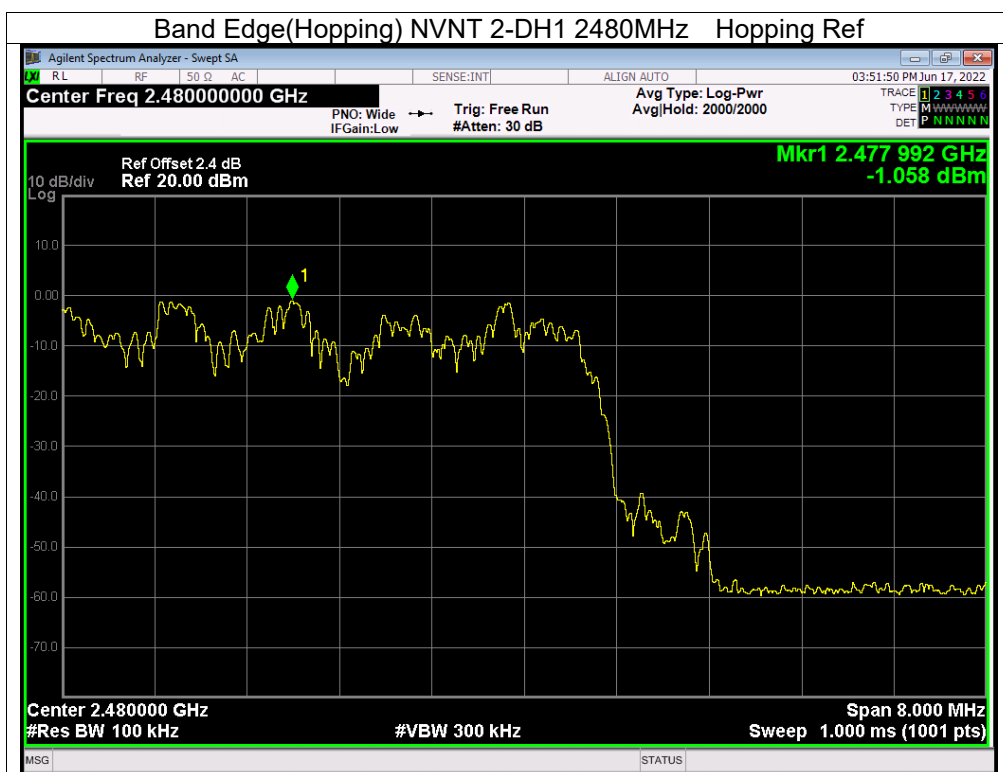
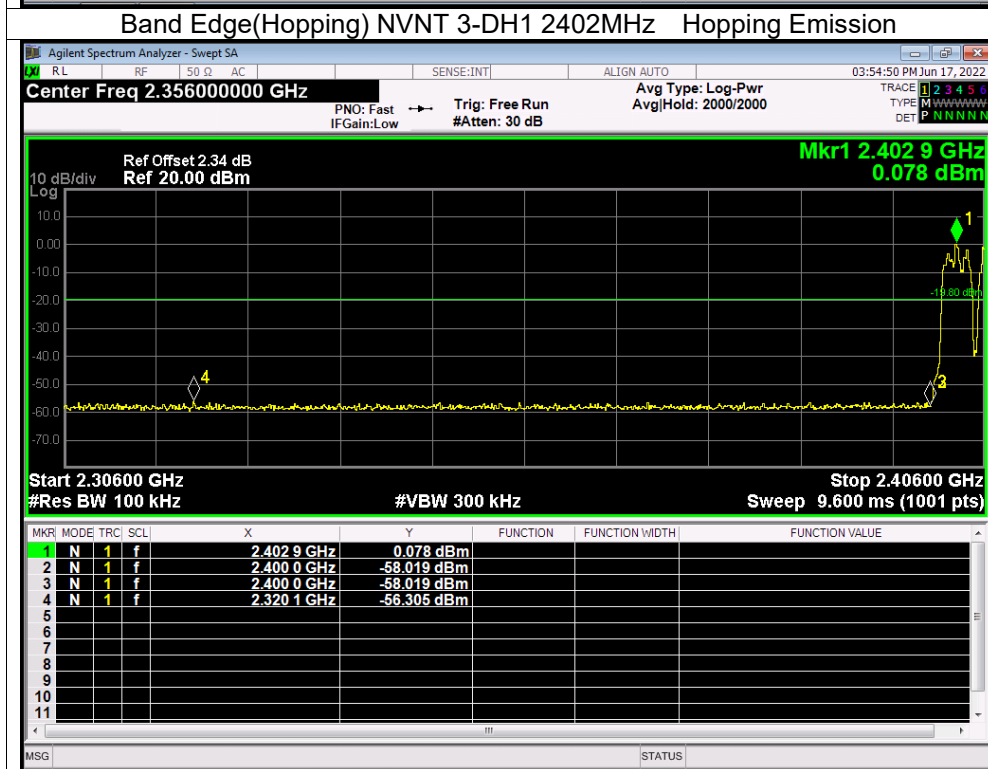
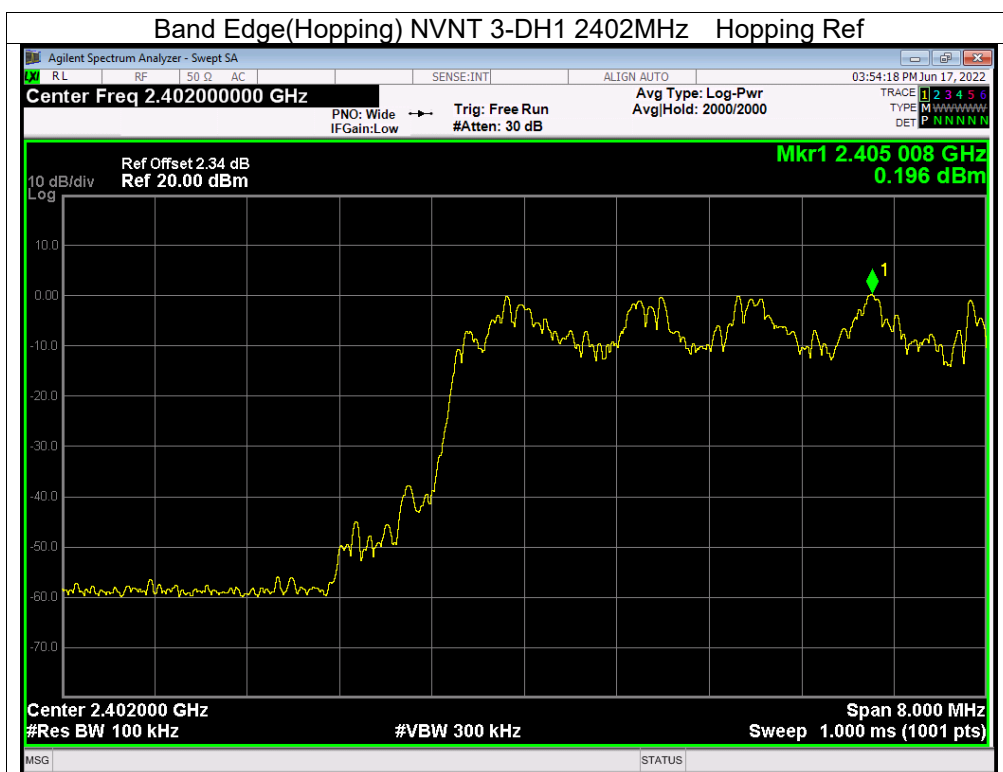
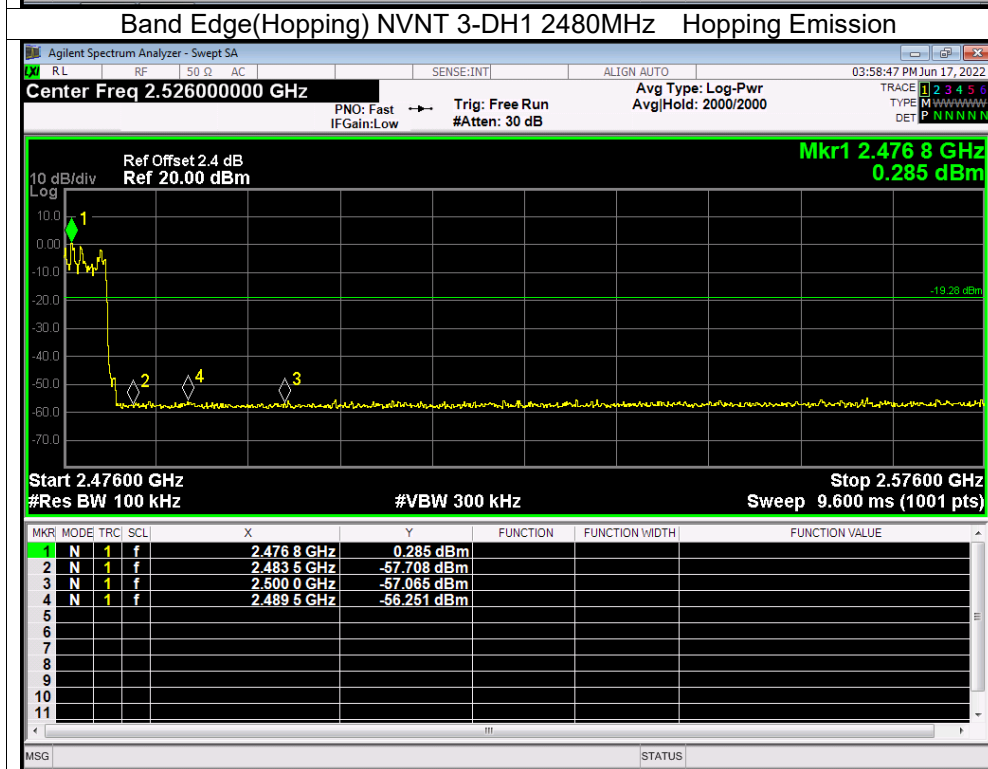
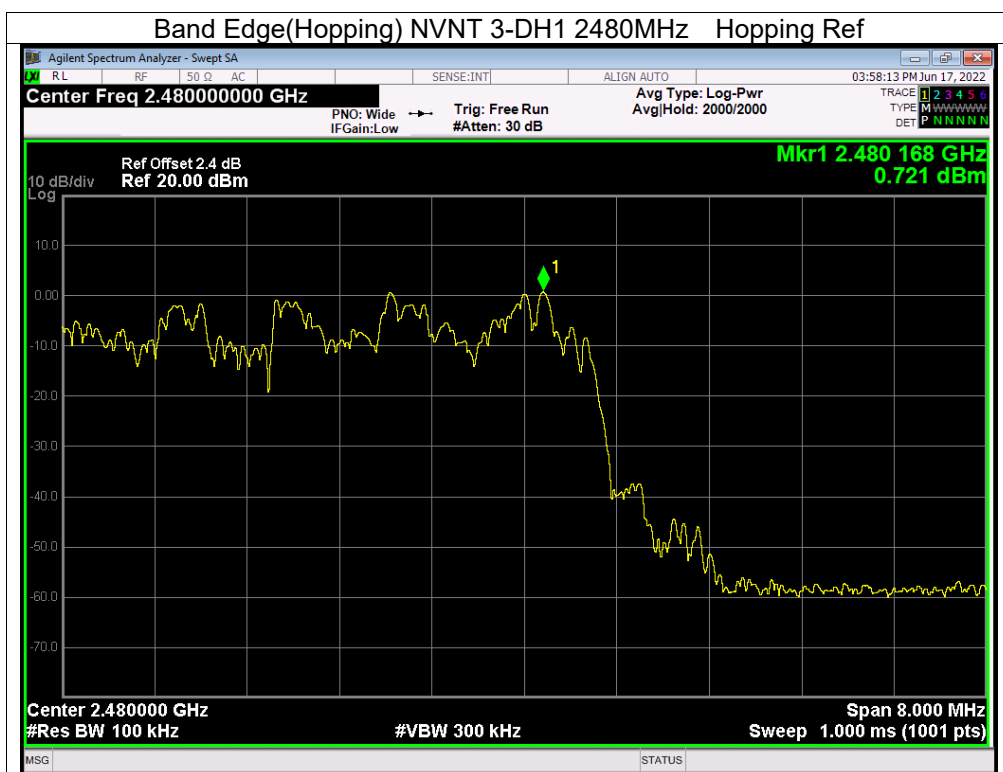










10. 20 DB Bandwidth

10.1 Block Diagram Of Test Setup



10.2 Limit

N/A

10.3 Test Procedure

1. Set RBW = 30kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

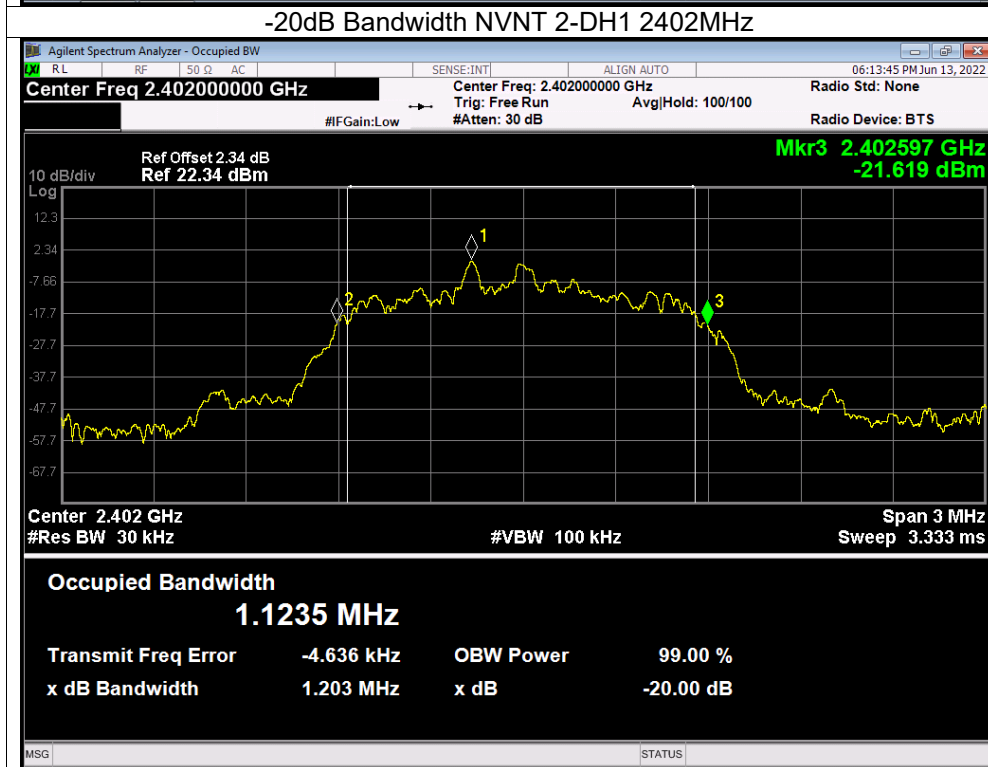
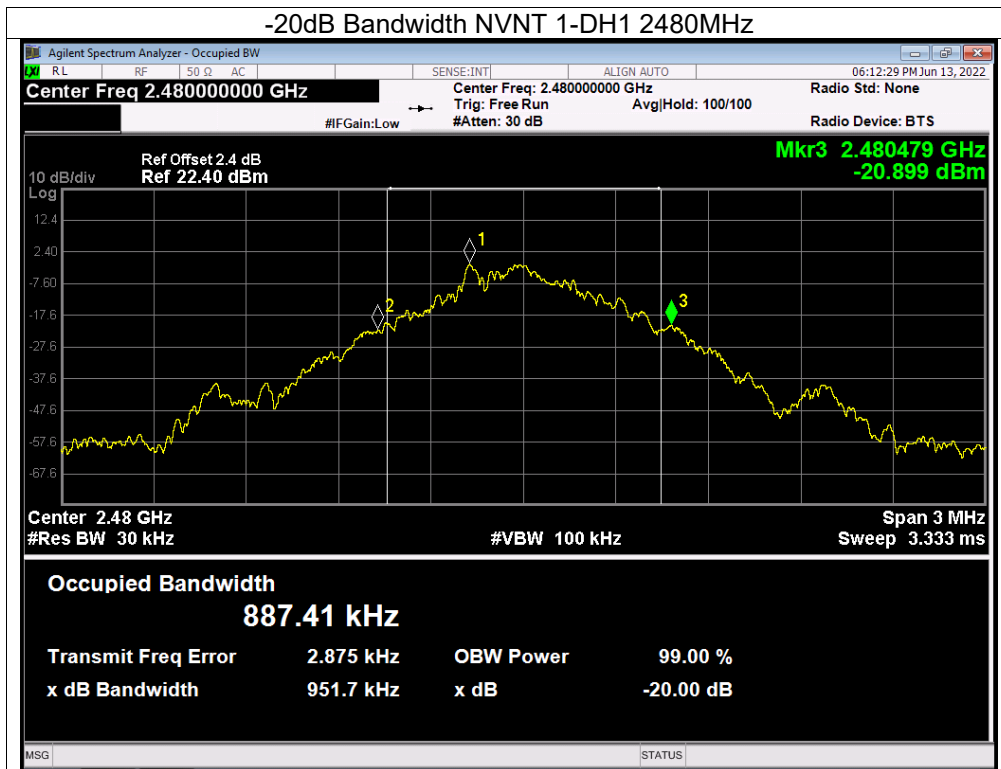
10.4 Test Result

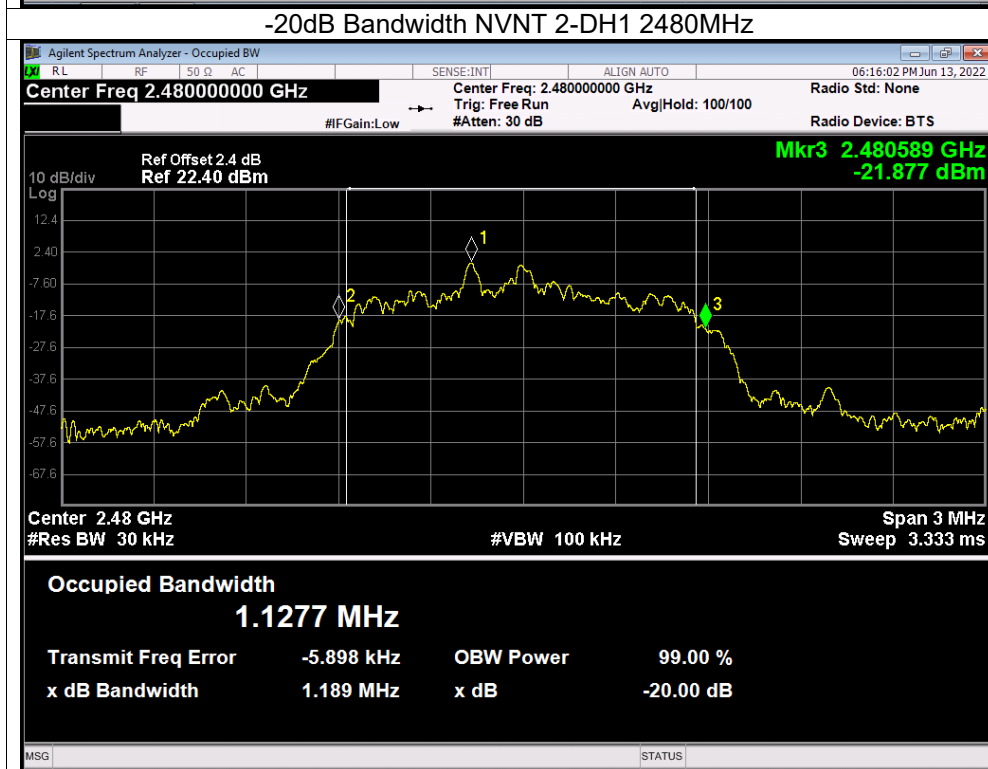
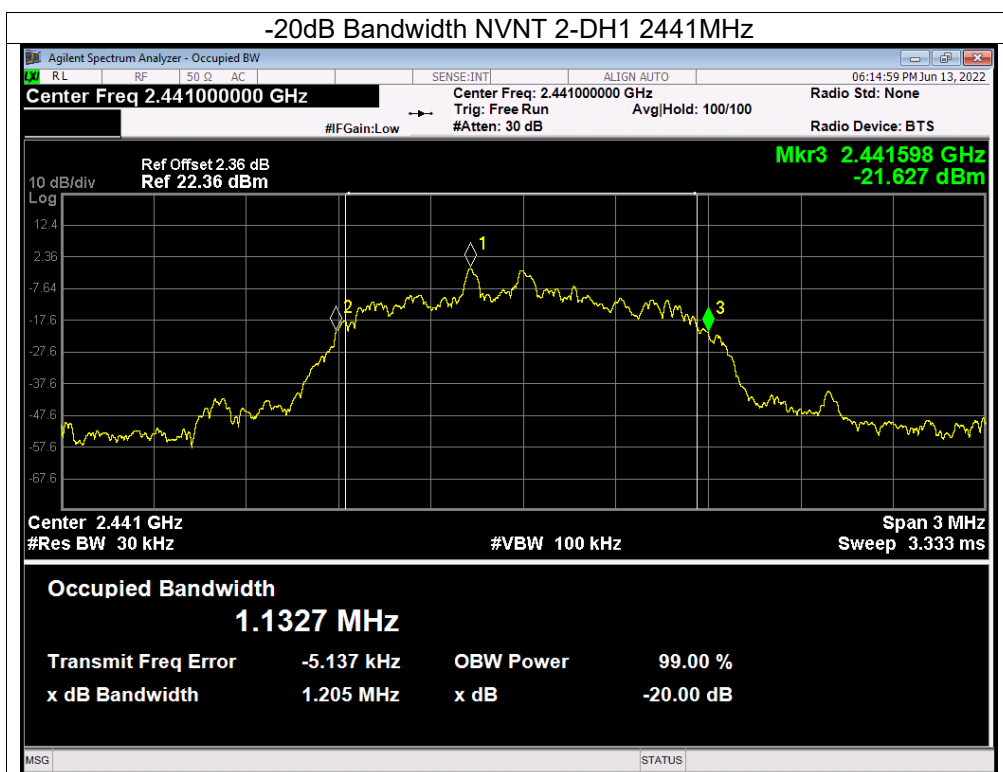
Left

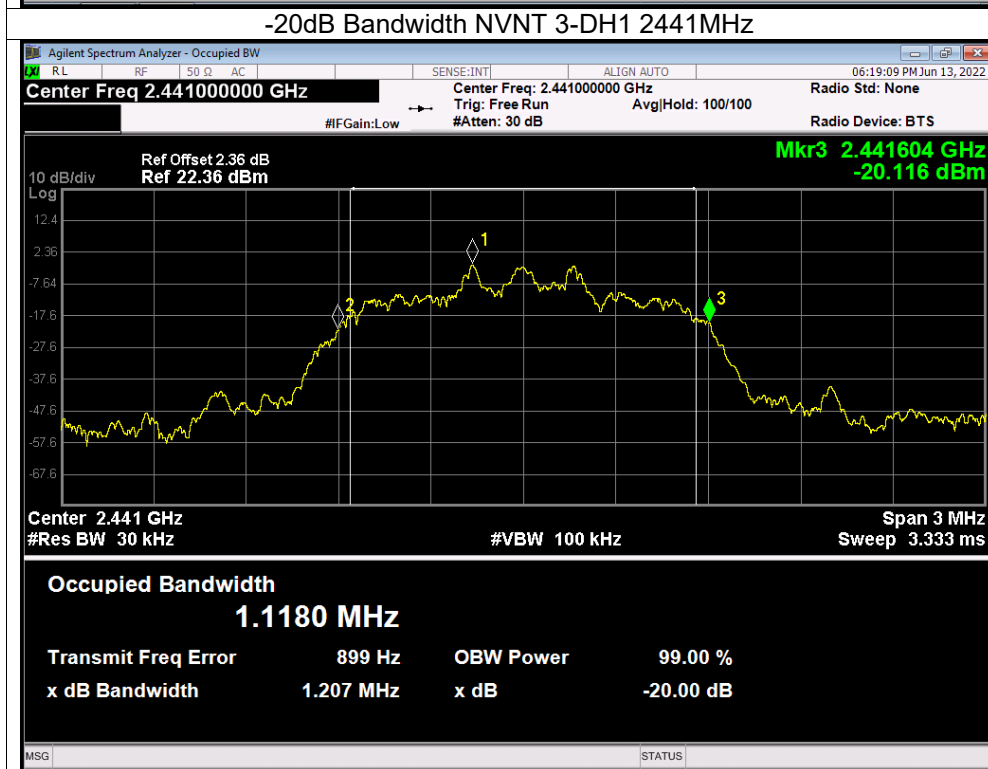
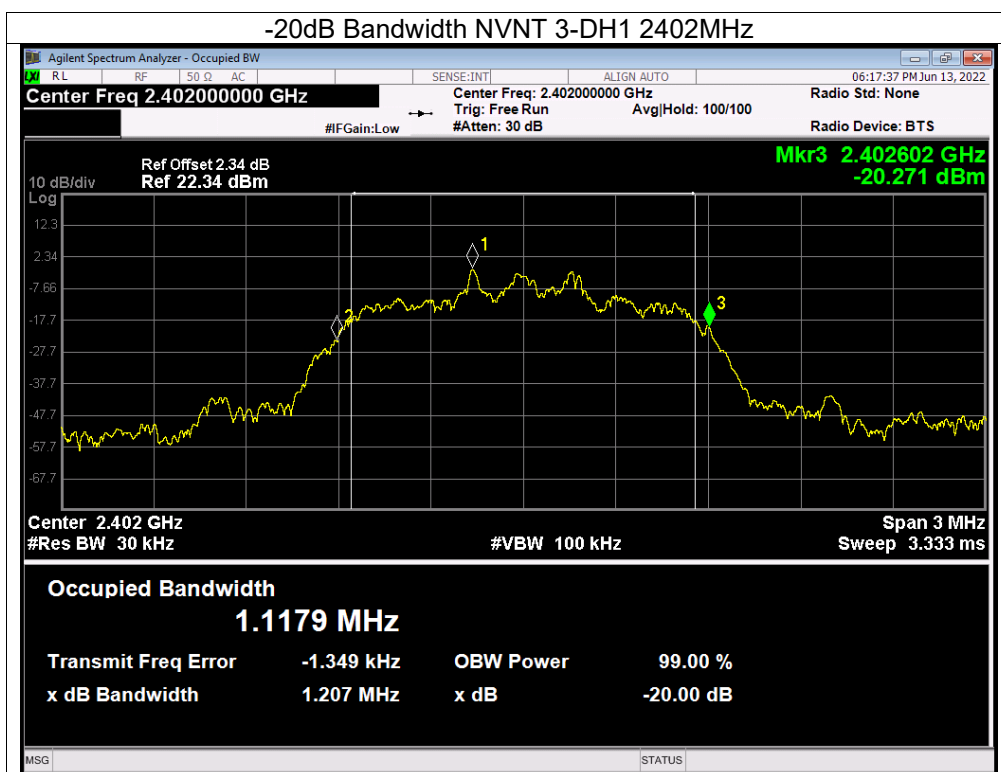
Temperature :	26℃	Relative Humidity :	54%
Test Voltage :	DC 3.7V	Remark	N/A

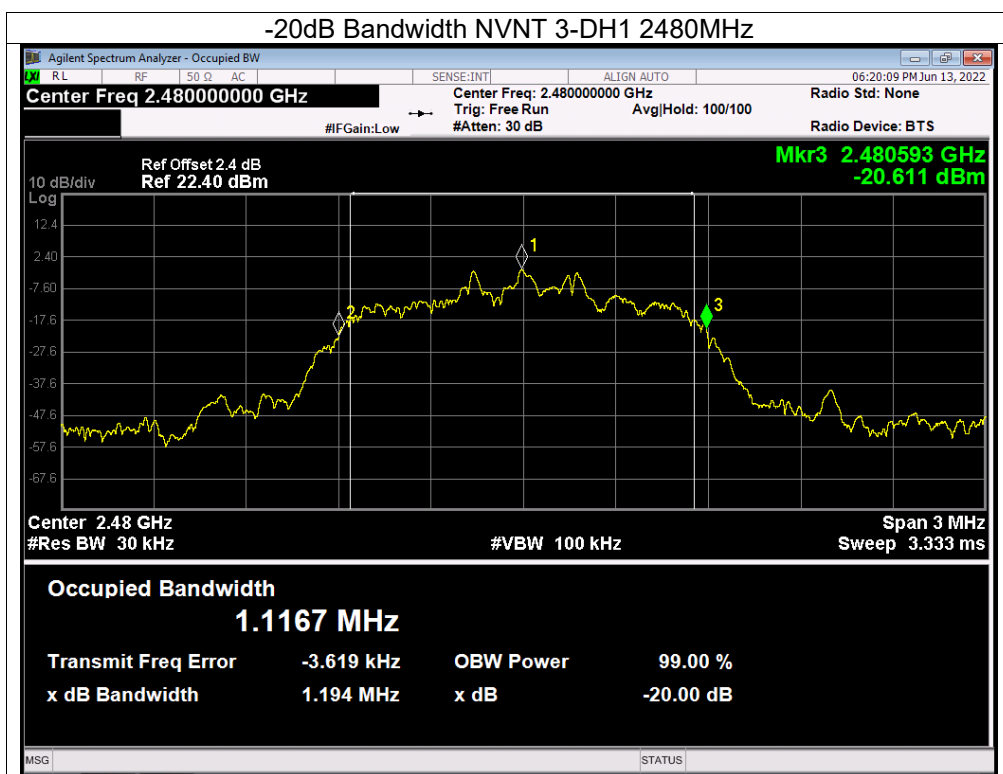
Modulation	Test Channel	Bandwidth(MHz)
GFSK	Low	0.944
GFSK	Middle	0.96
GFSK	High	0.952
$\pi/4$ DQPSK	Low	1.203
$\pi/4$ DQPSK	Middle	1.205
$\pi/4$ DQPSK	High	1.189
8DPSK	Low	1.207
8DPSK	Middle	1.207
8DPSK	High	1.194







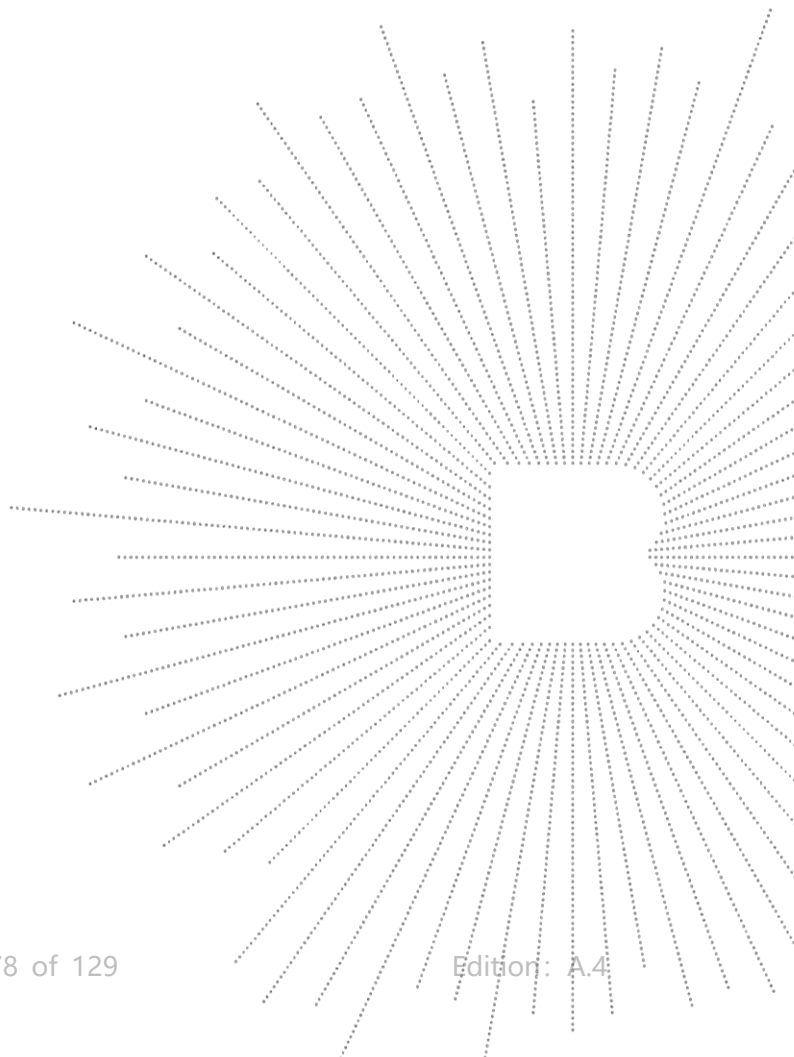




Right

Temperature :	26℃	Relative Humidity :	54%
Test Voltage :	DC 3.7V	Remark	N/A

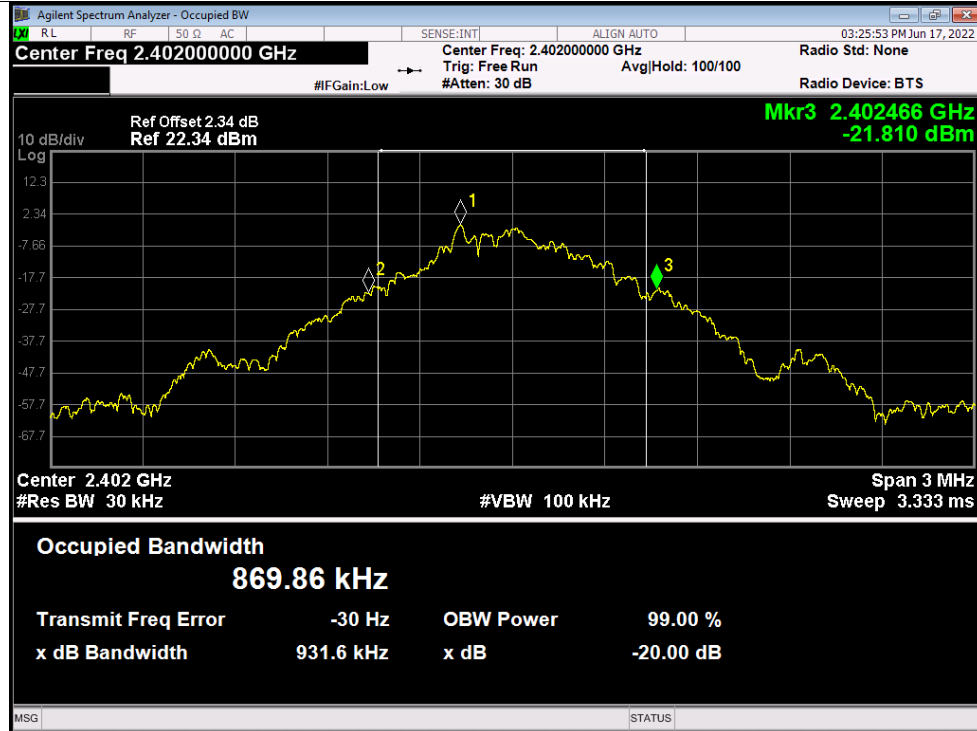
Modulation	Test Channel	Bandwidth(MHz)
GFSK	Low	0.932
GFSK	Middle	0.953
GFSK	High	0.964
$\pi/4$ DQPSK	Low	1.202
$\pi/4$ DQPSK	Middle	1.209
$\pi/4$ DQPSK	High	1.188
8DPSK	Low	1.199
8DPSK	Middle	1.206
8DPSK	High	1.212



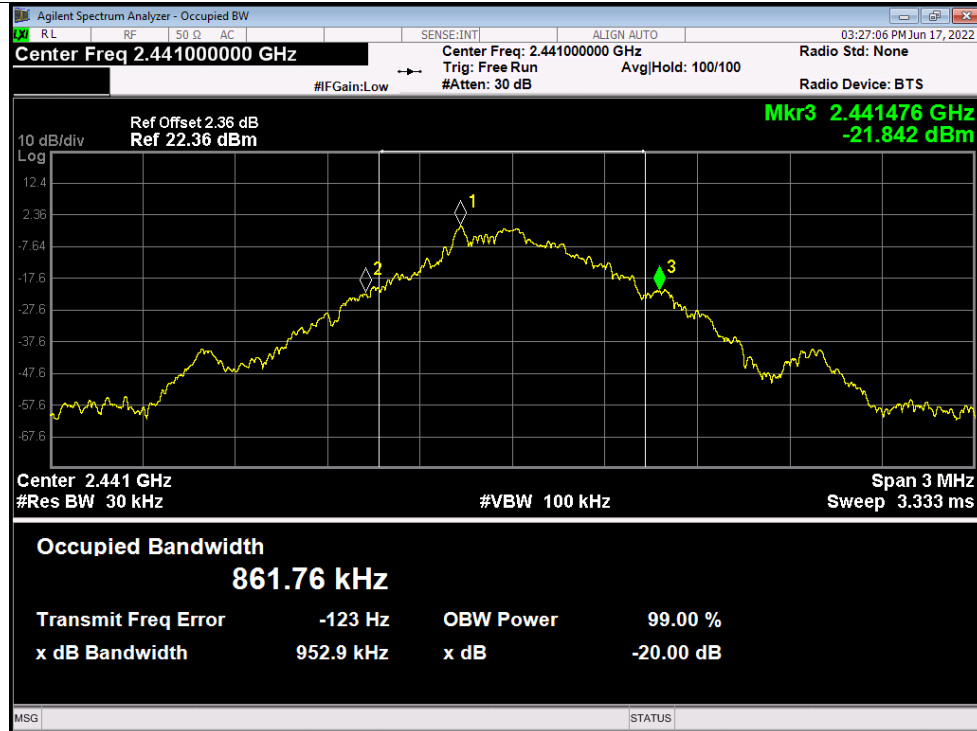


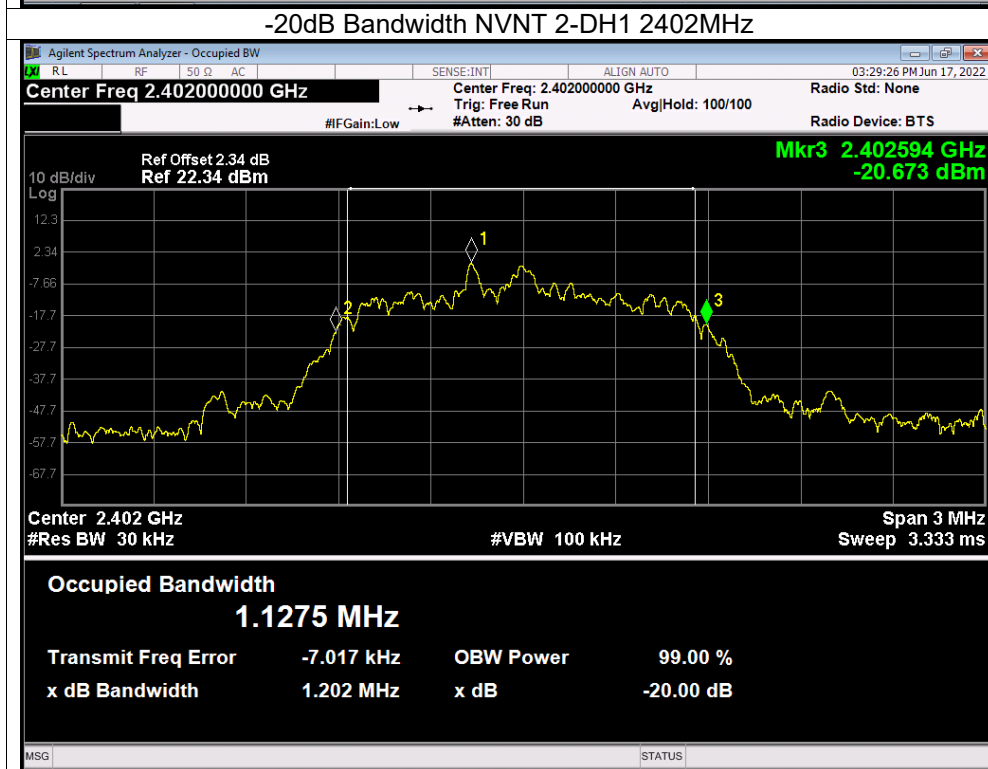
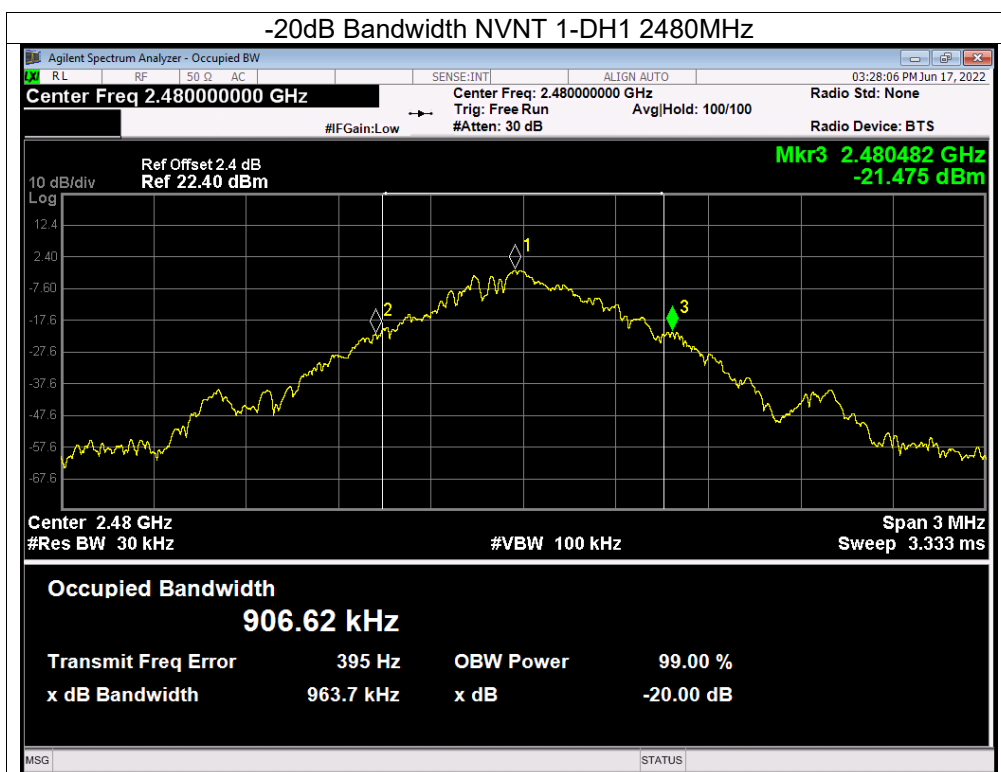
Test Graphs

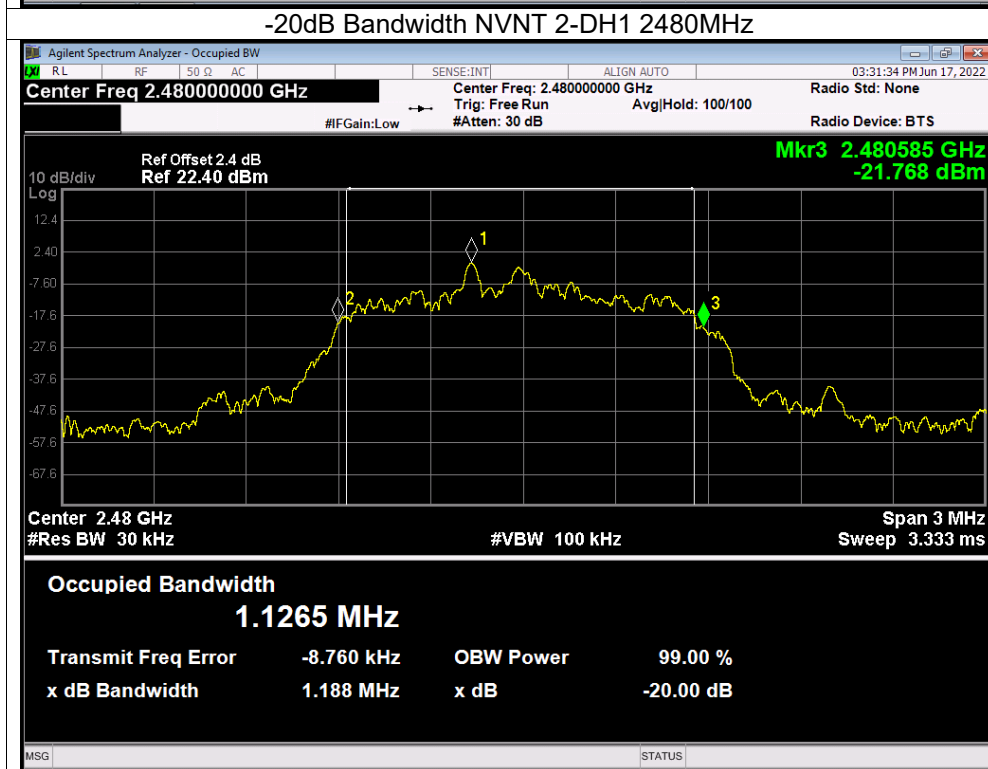
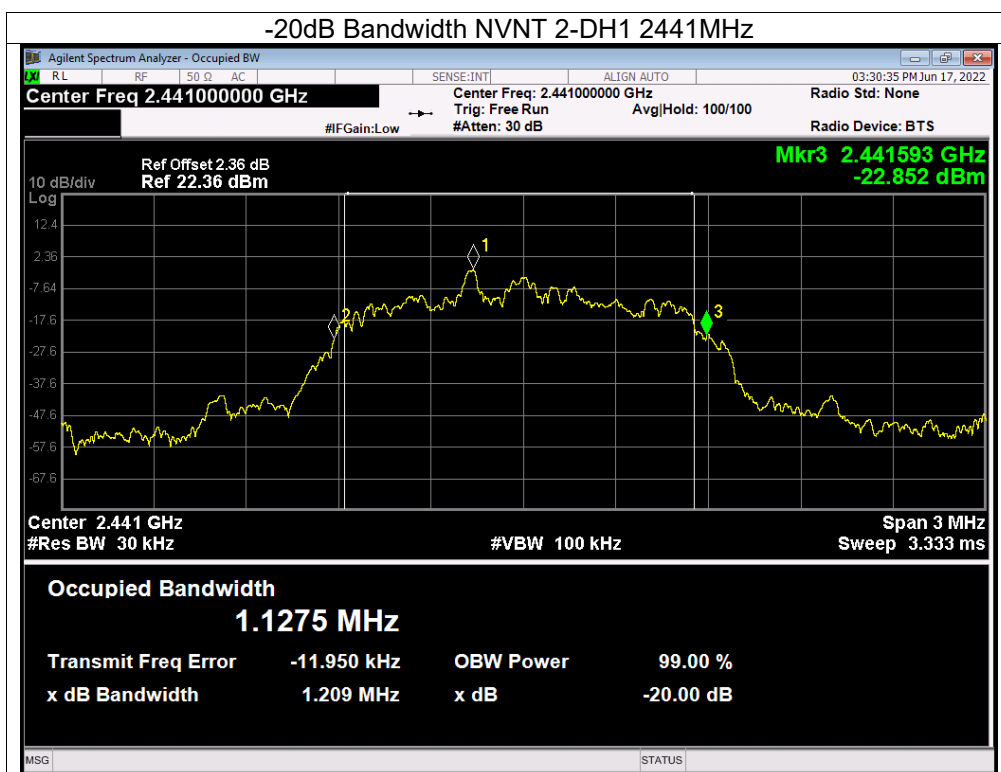
-20dB Bandwidth NVNT 1-DH1 2402MHz

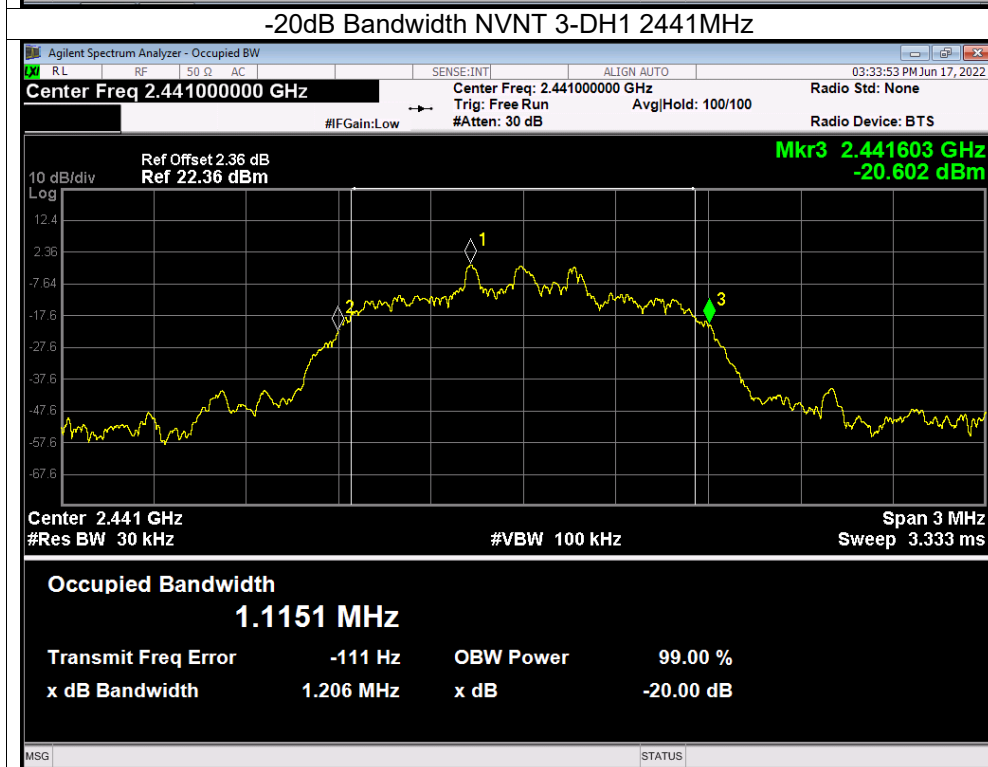
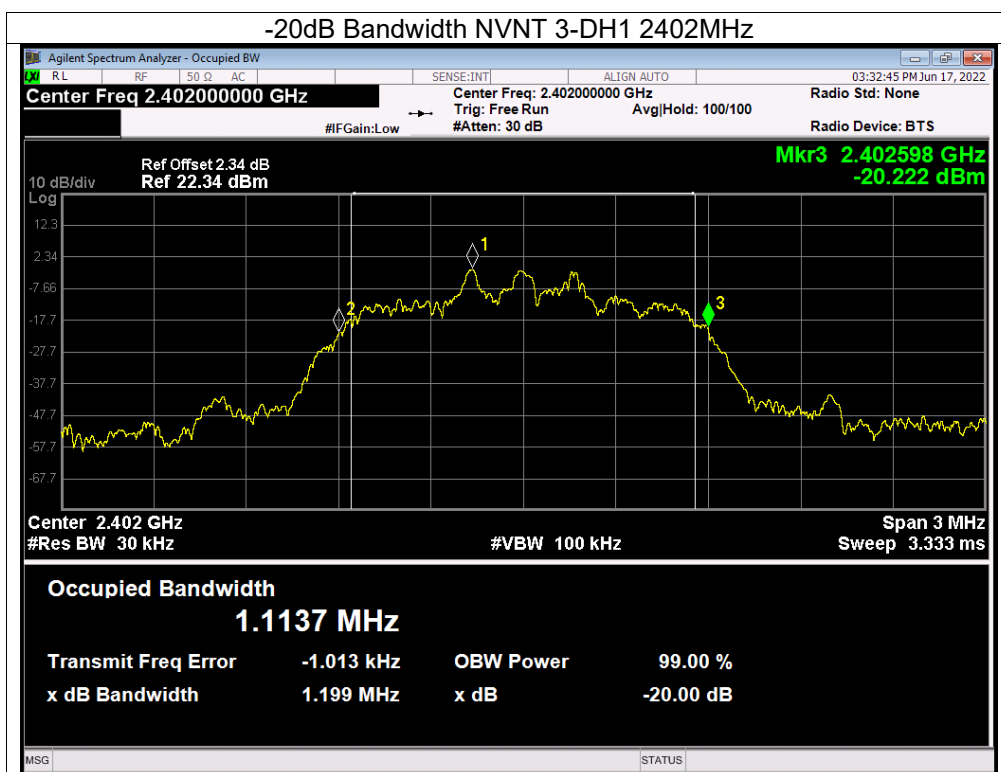


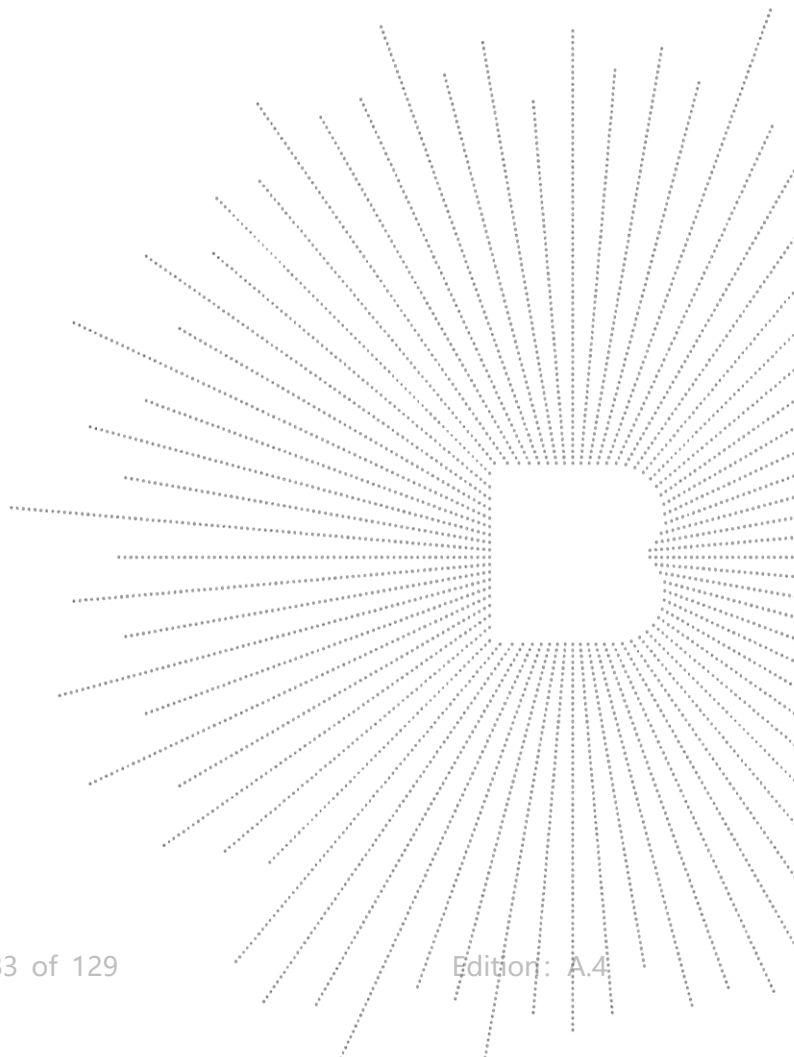
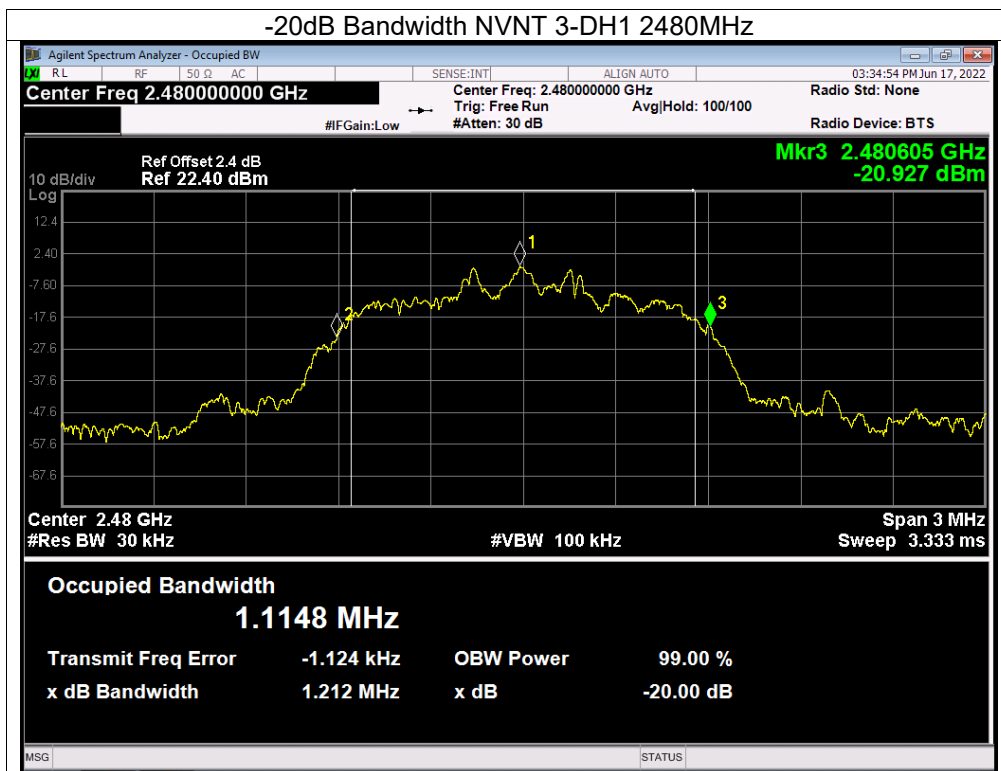
-20dB Bandwidth NVNT 1-DH1 2441MHz





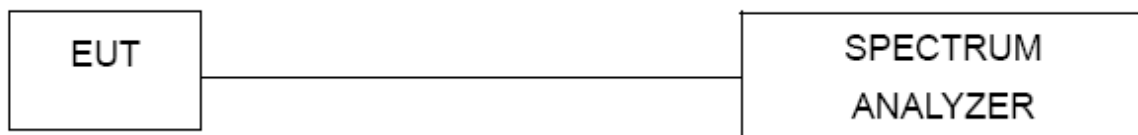






11. Maximum Peak Output Power

11.1 Block Diagram Of Test Setup



11.2 Limit

FCC Part15 (15.247), Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(1)	Peak Output Power	0.125 watt or 21dBm	2400-2483.5	PASS

11.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 2MHz. VBW = 6MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

11.4 Test Result

Left

Temperature :	26℃	Relative Humidity :	54%
Test Voltage :	DC 3.7V	Remark:	N/A

Modulation	Test Channel	Output Power (dBm)	Limit (dBm)
GFSK	Low	0.86	21
GFSK	Middle	0.89	21
GFSK	High	1	21
$\pi/4$ DQPSK	Low	0.97	21
$\pi/4$ DQPSK	Middle	0.94	21
$\pi/4$ DQPSK	High	1.04	21
8DPSK	Low	1.09	21
8DPSK	Middle	1.04	21
8DPSK	High	1.19	21

Right

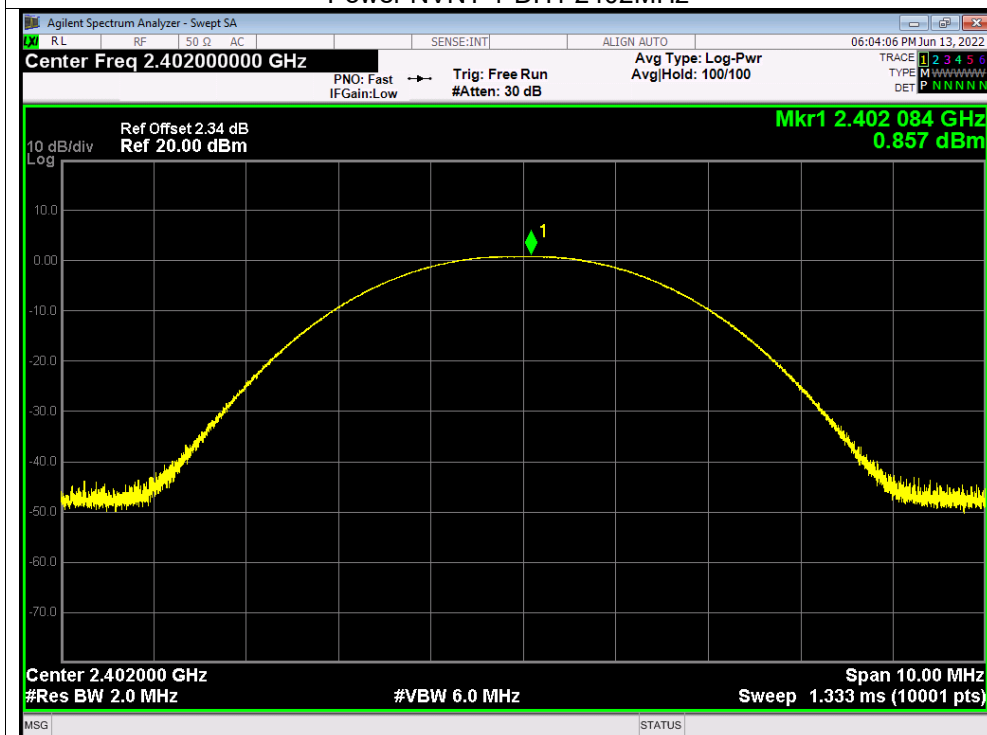
Temperature :	26℃	Relative Humidity :	54%
Test Voltage :	DC 3.7V	Remark:	N/A

Modulation	Test Channel	Output Power (dBm)	Limit (dBm)
GFSK	Low	0.83	21
GFSK	Middle	0.8	21
GFSK	High	0.94	21
$\pi/4$ DQPSK	Low	0.82	21
$\pi/4$ DQPSK	Middle	0.8	21
$\pi/4$ DQPSK	High	0.91	21
8DPSK	Low	0.93	21
8DPSK	Middle	0.88	21
8DPSK	High	1.01	21

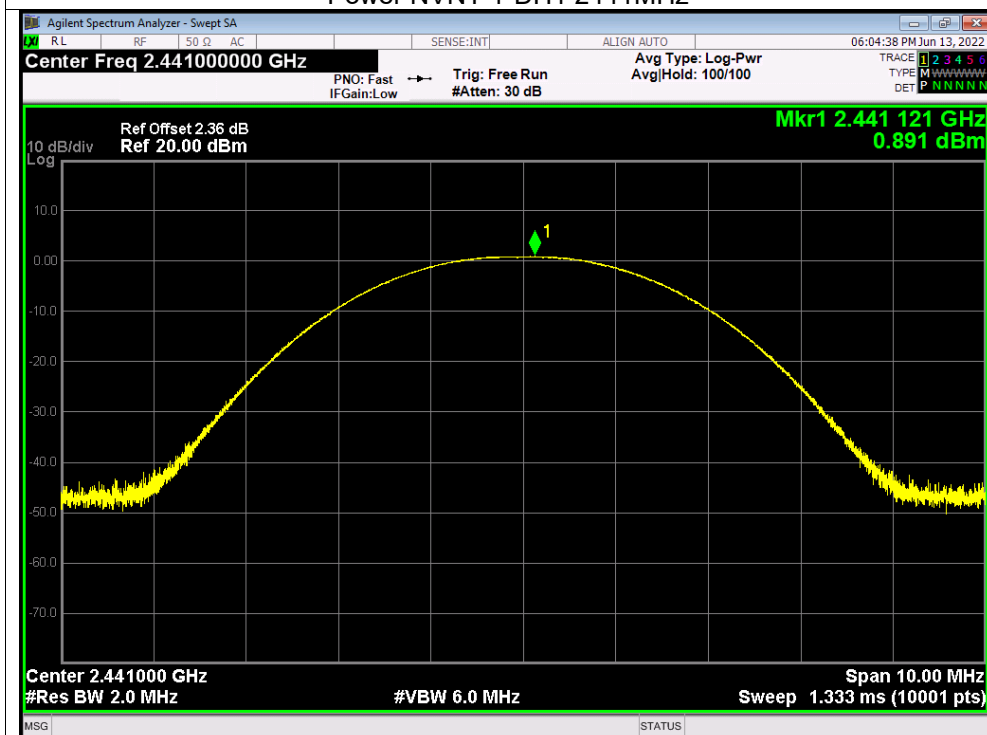
Left

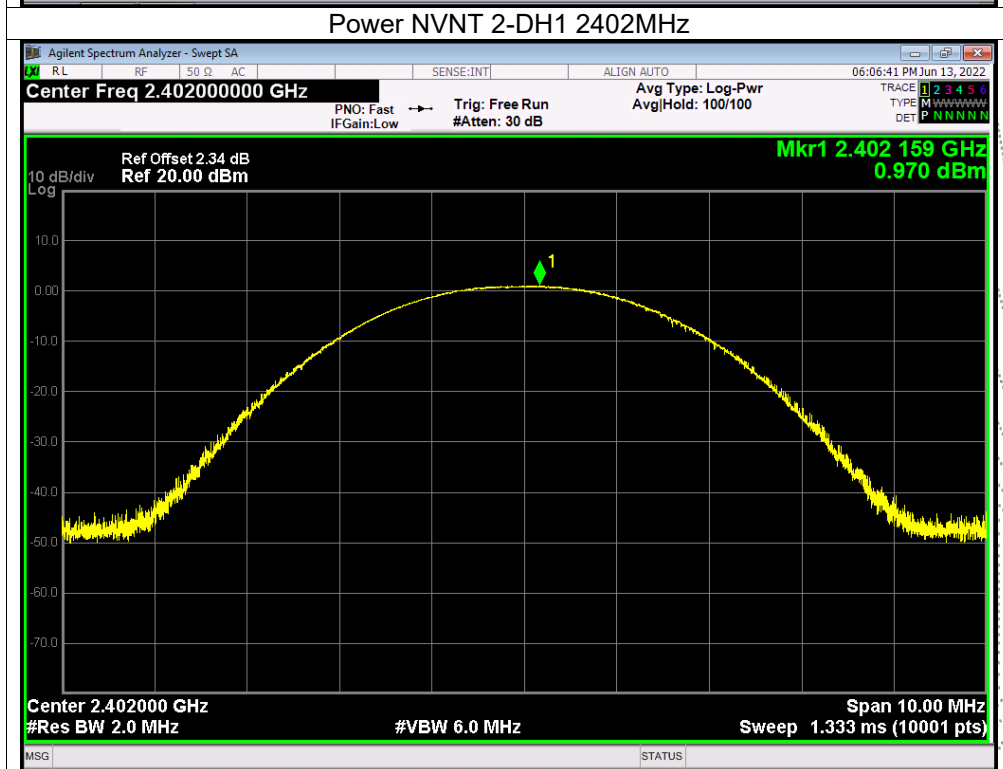
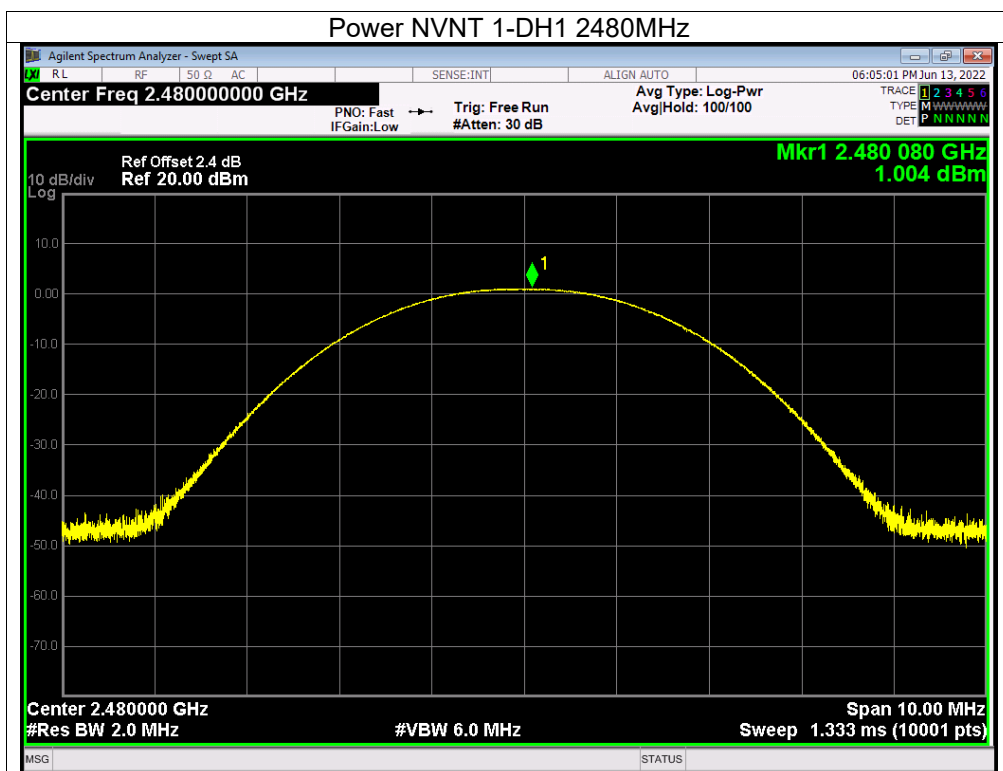
Test Graphs

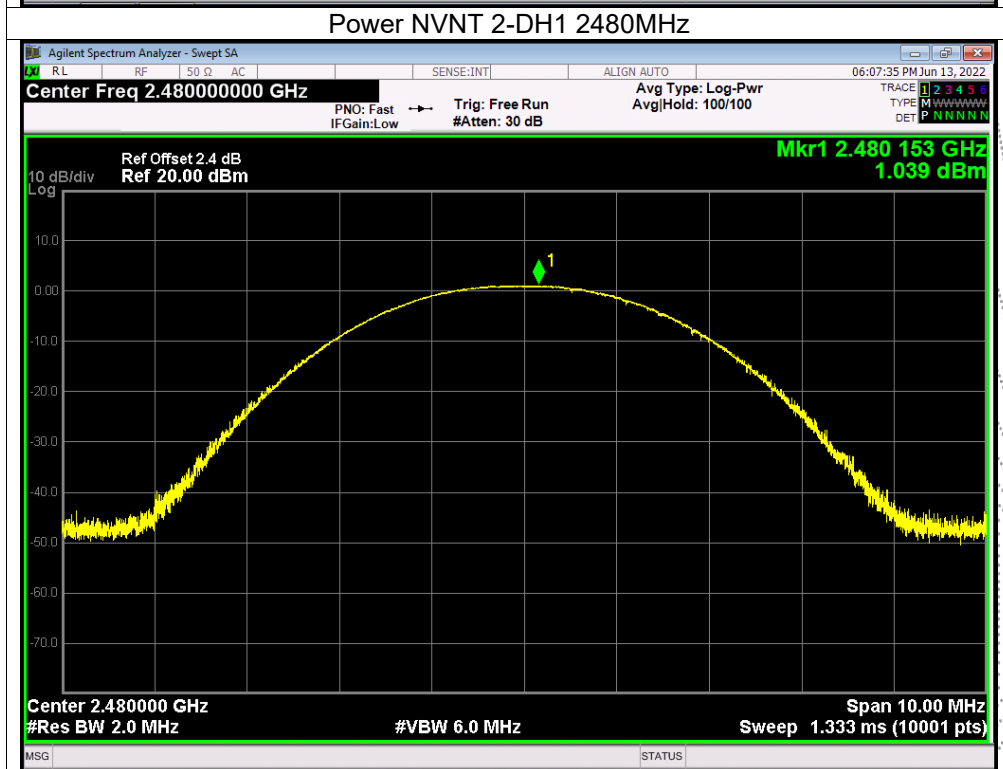
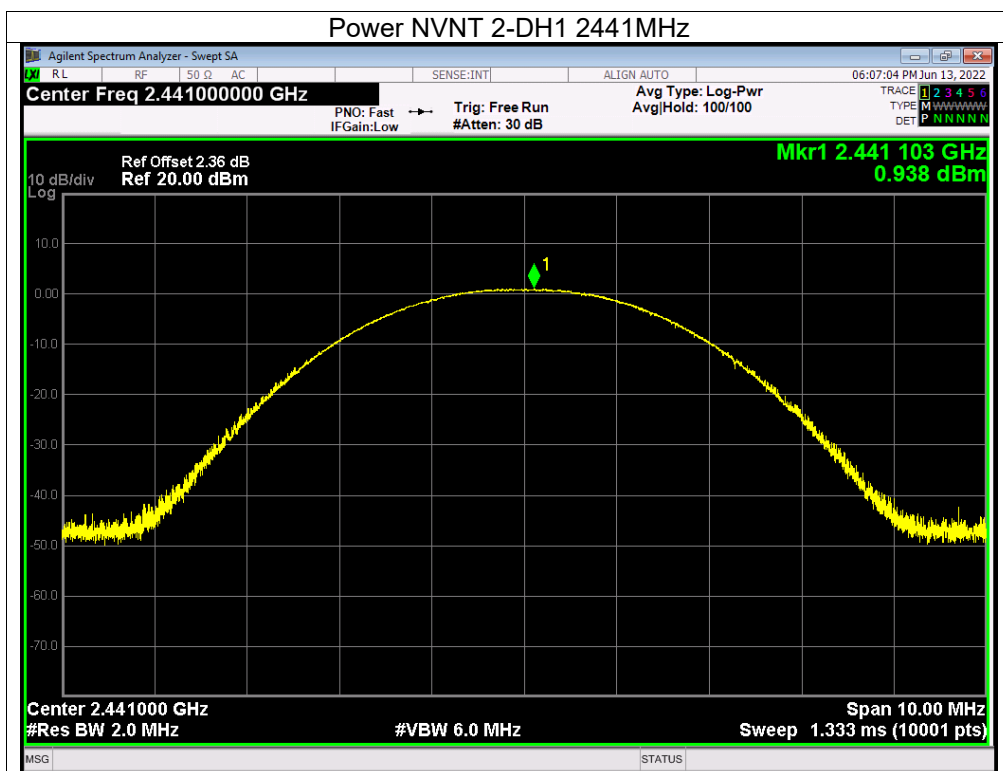
Power NVNT 1-DH1 2402MHz

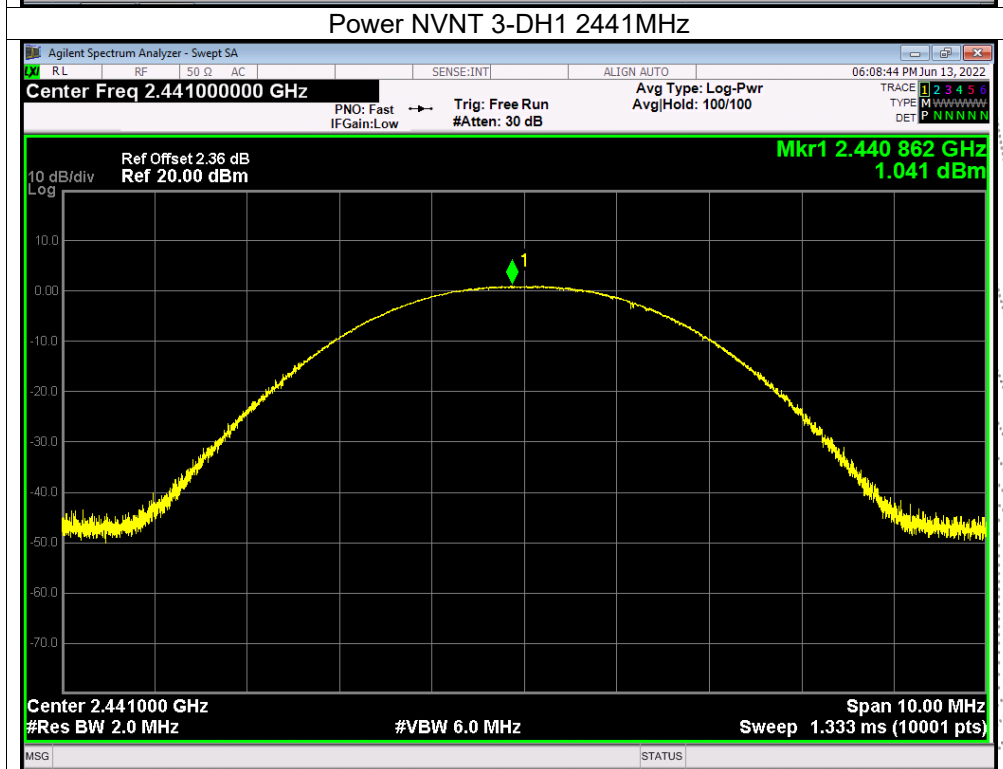
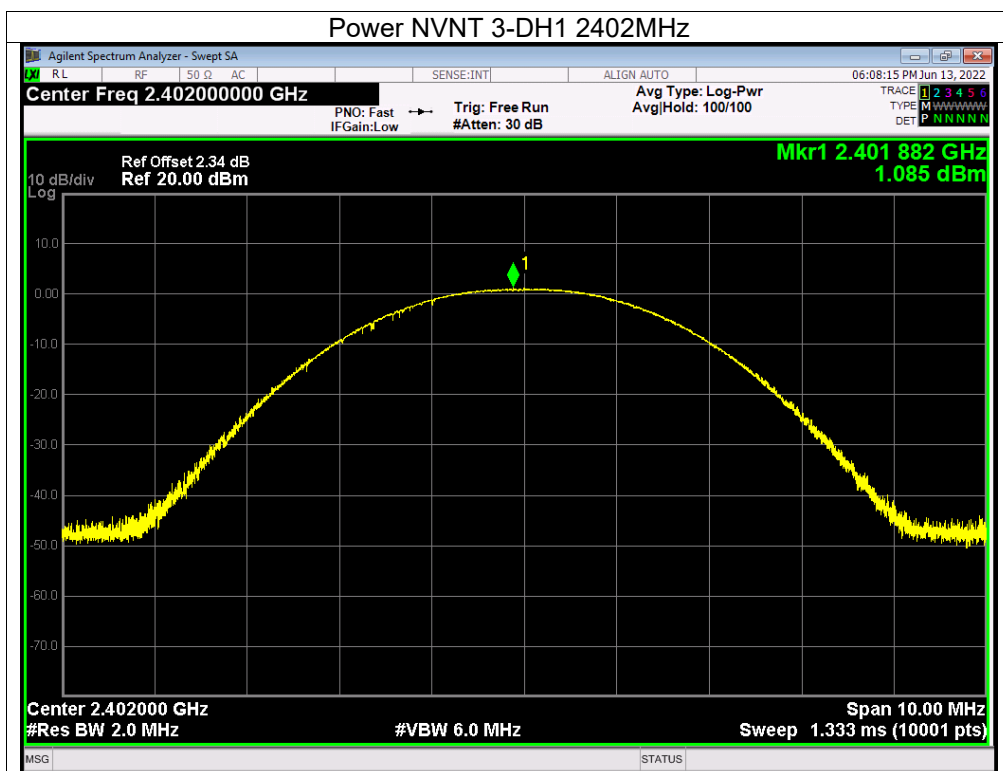


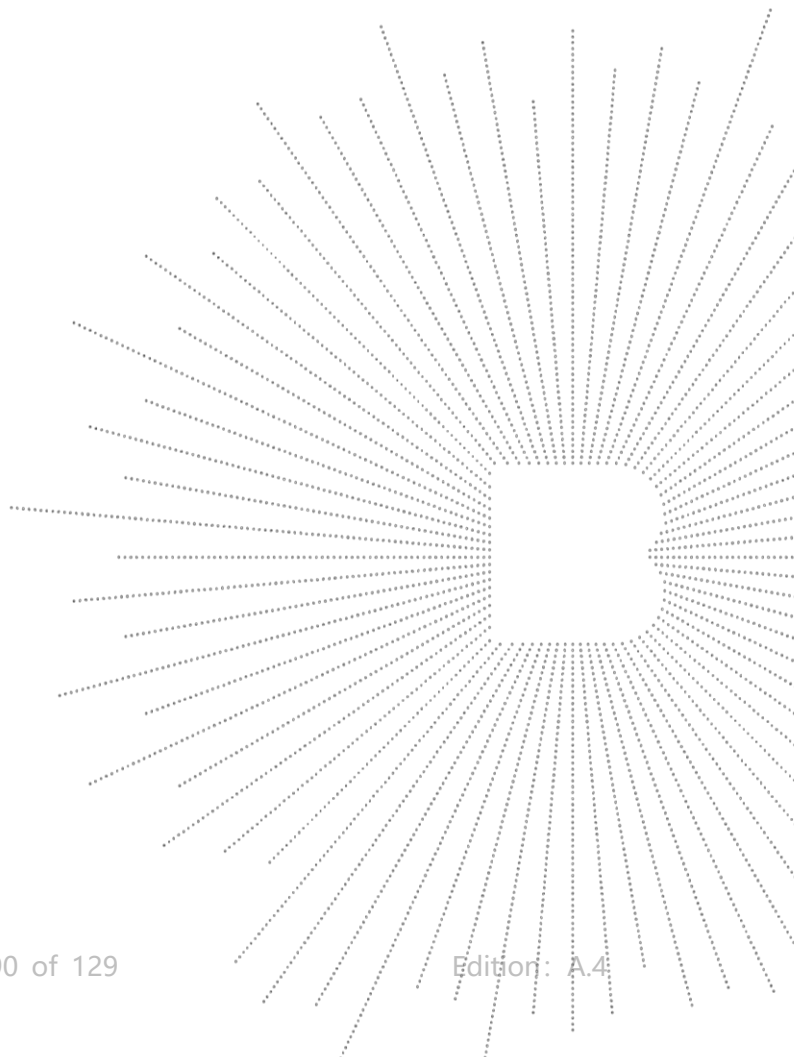
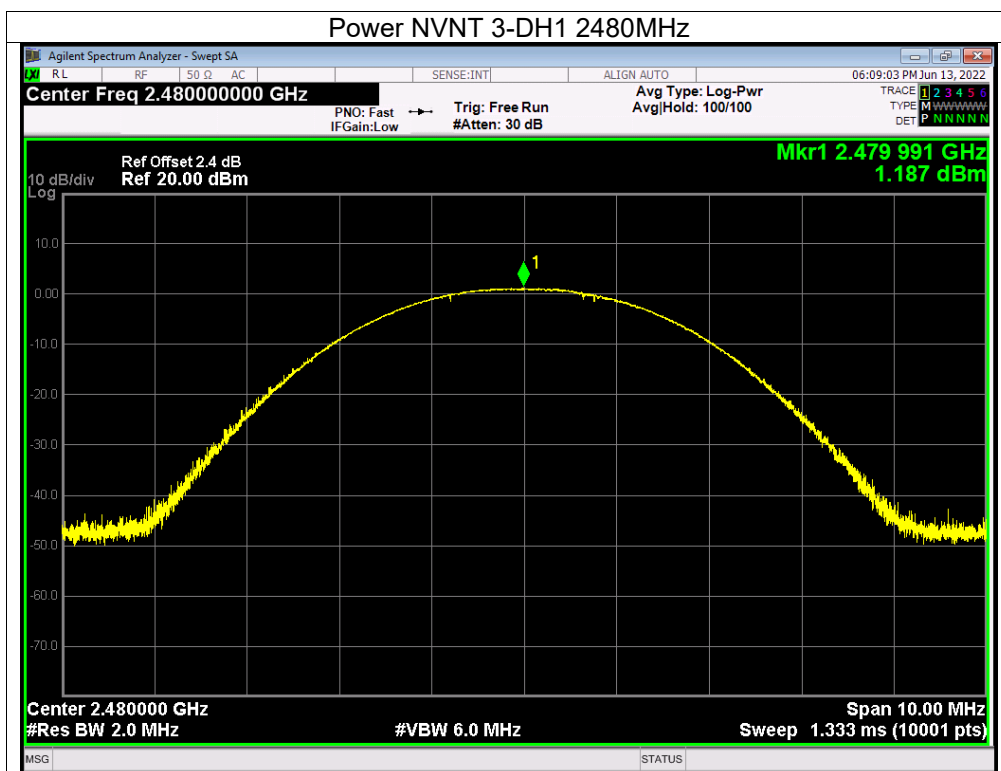
Power NVNT 1-DH1 2441MHz







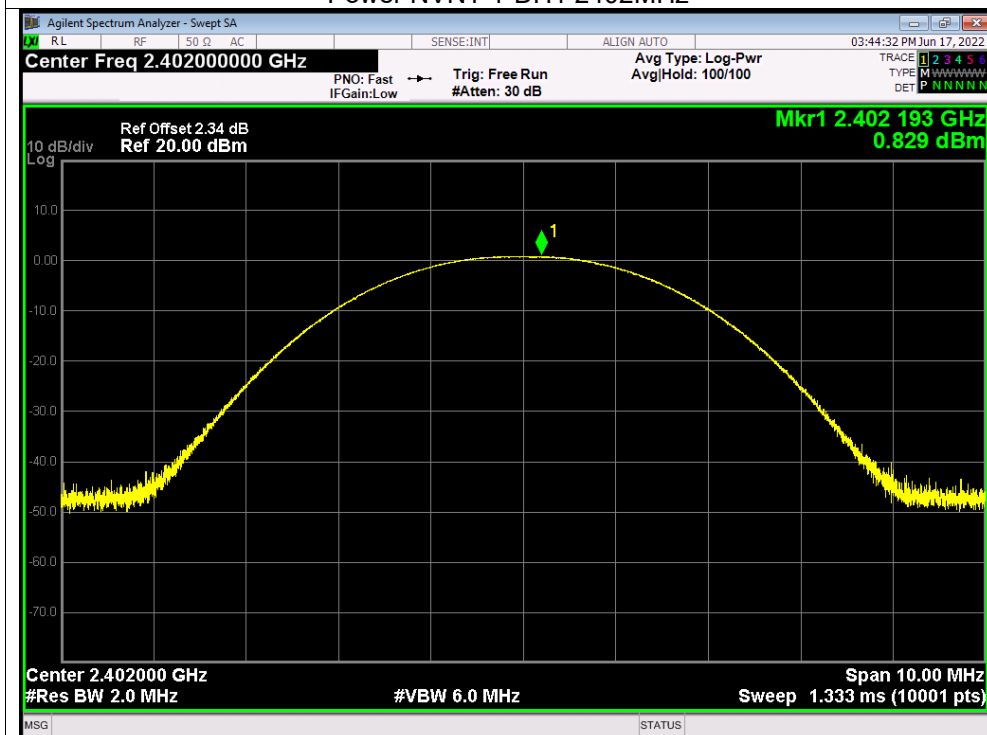




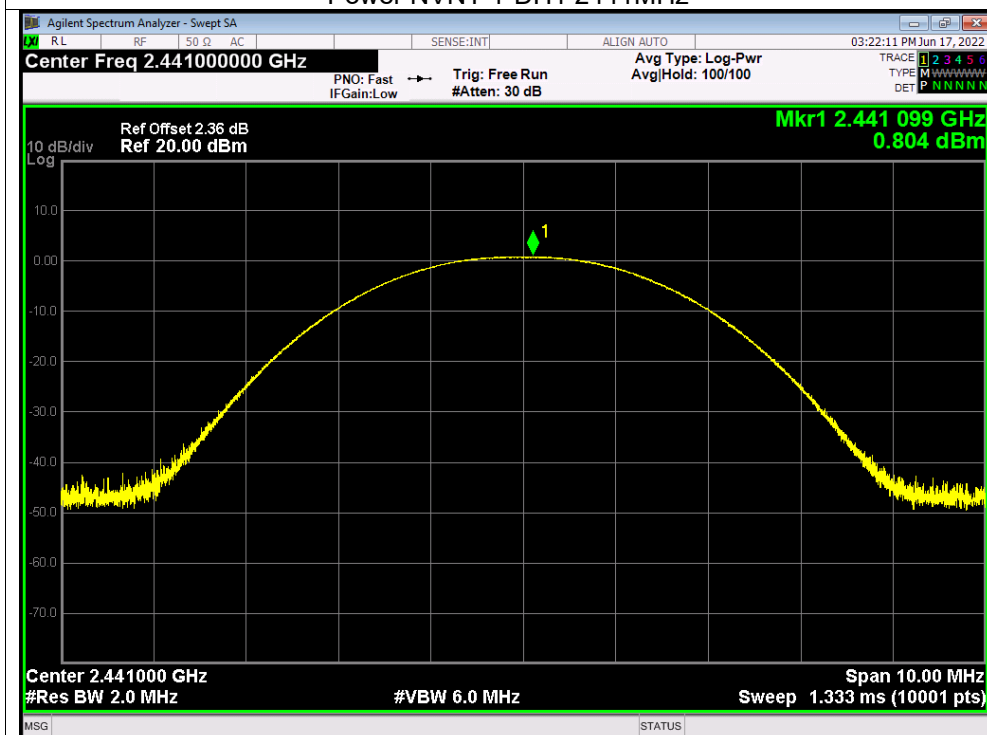
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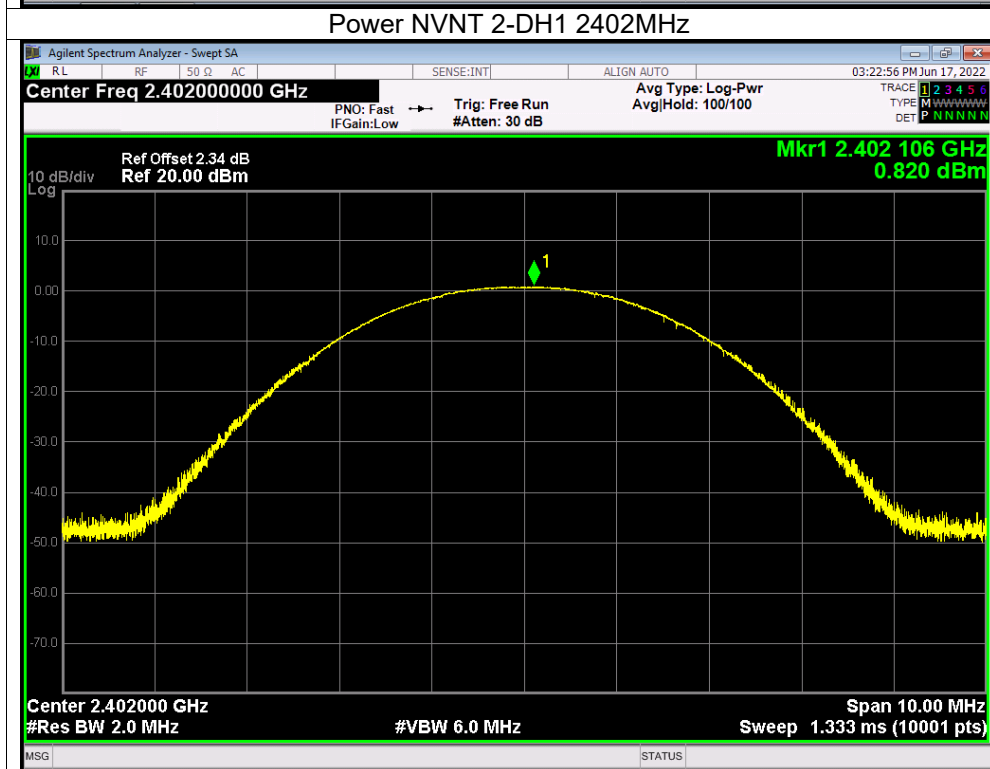
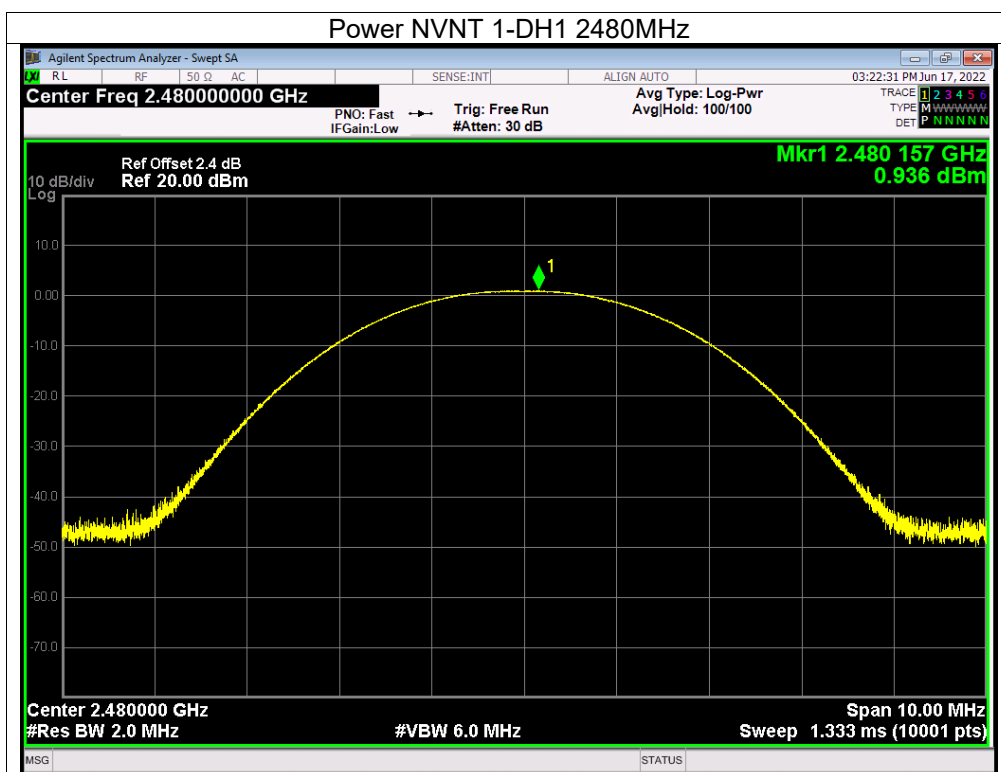
Test Graphs

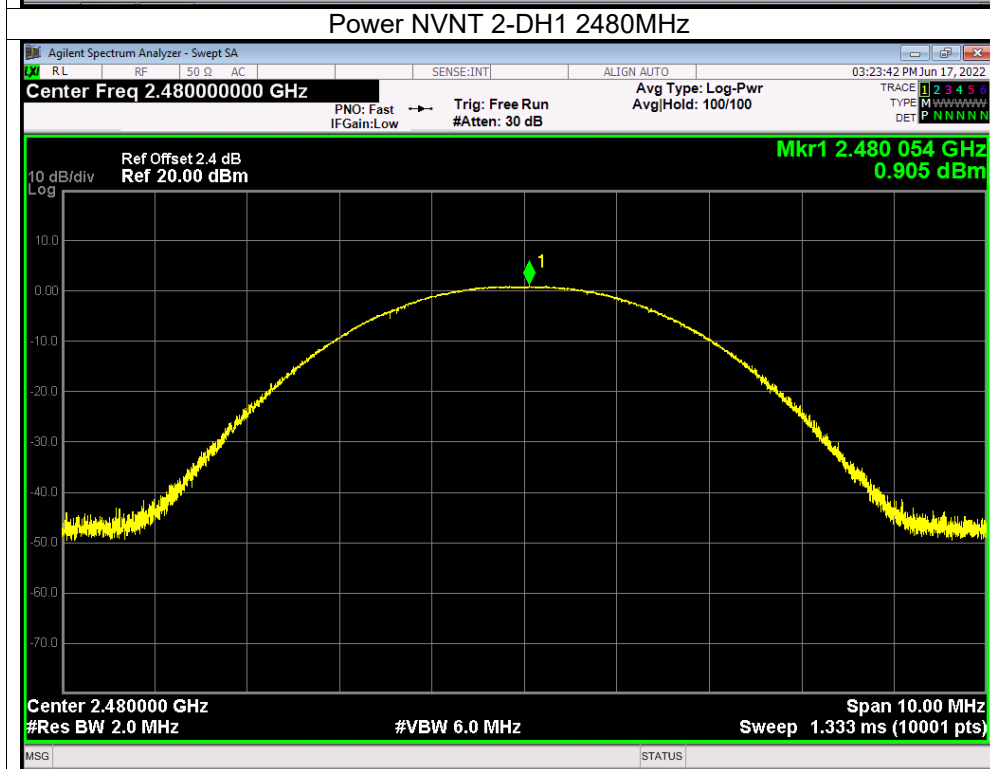
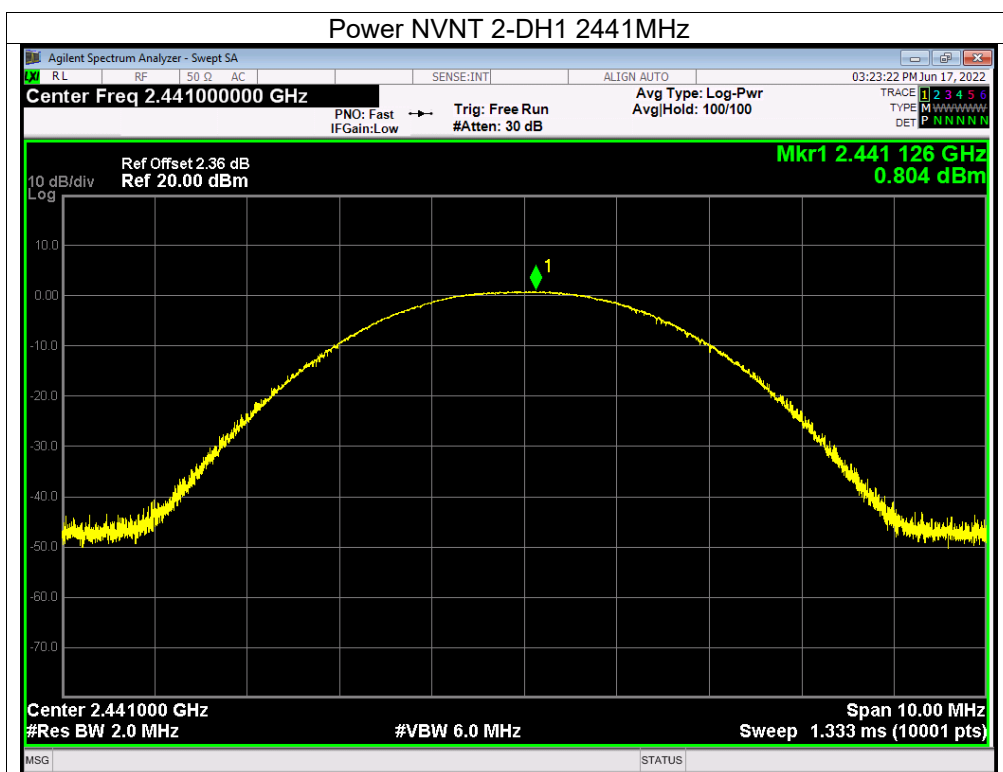
Power NVNT 1-DH1 2402MHz

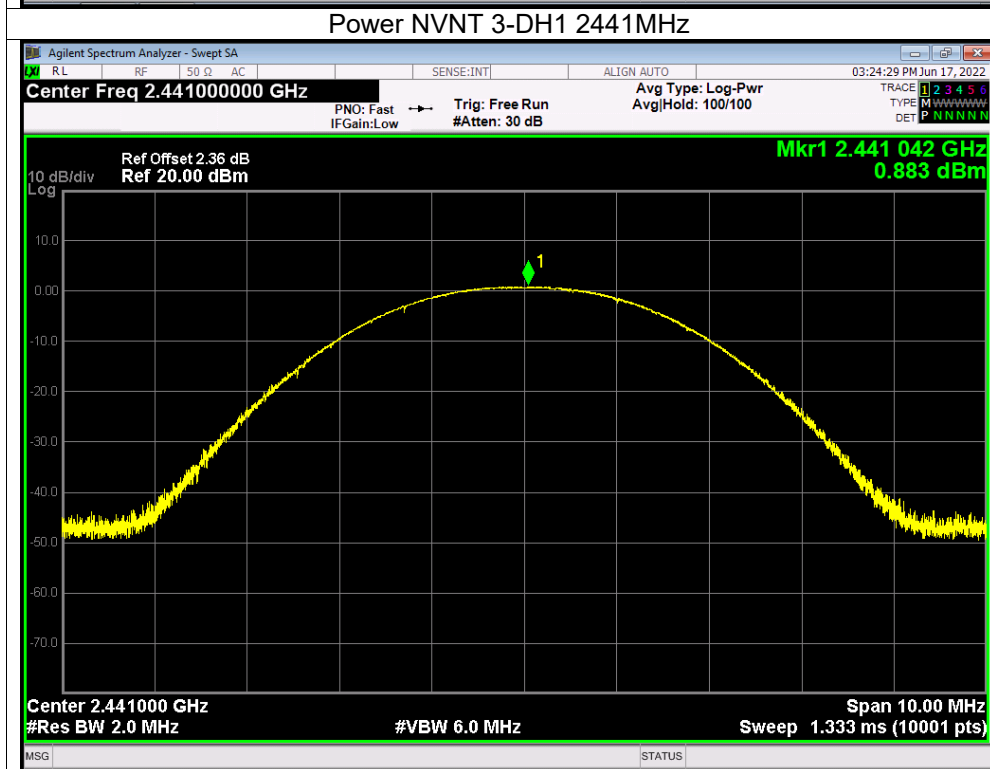
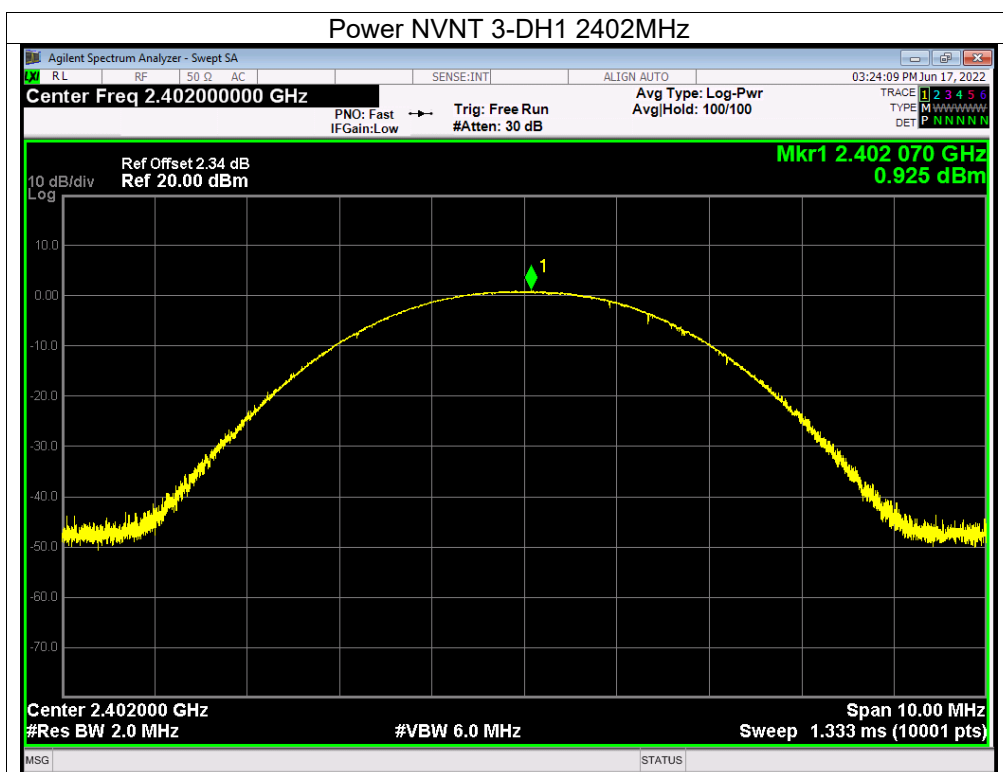


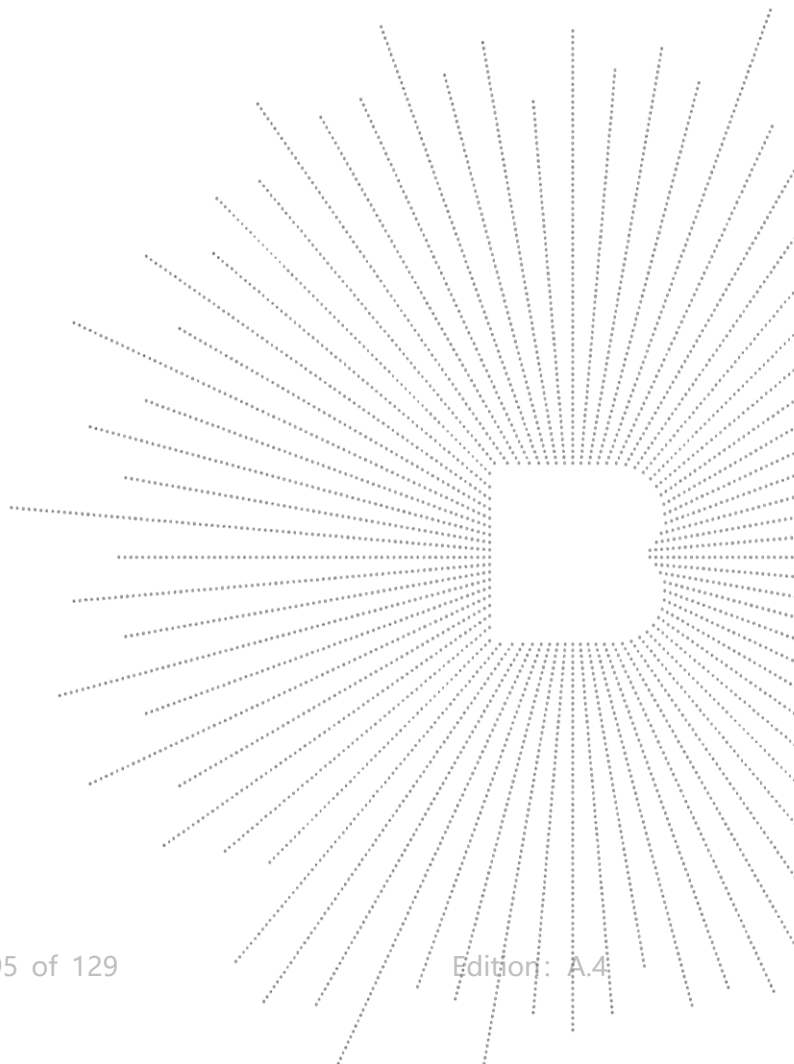
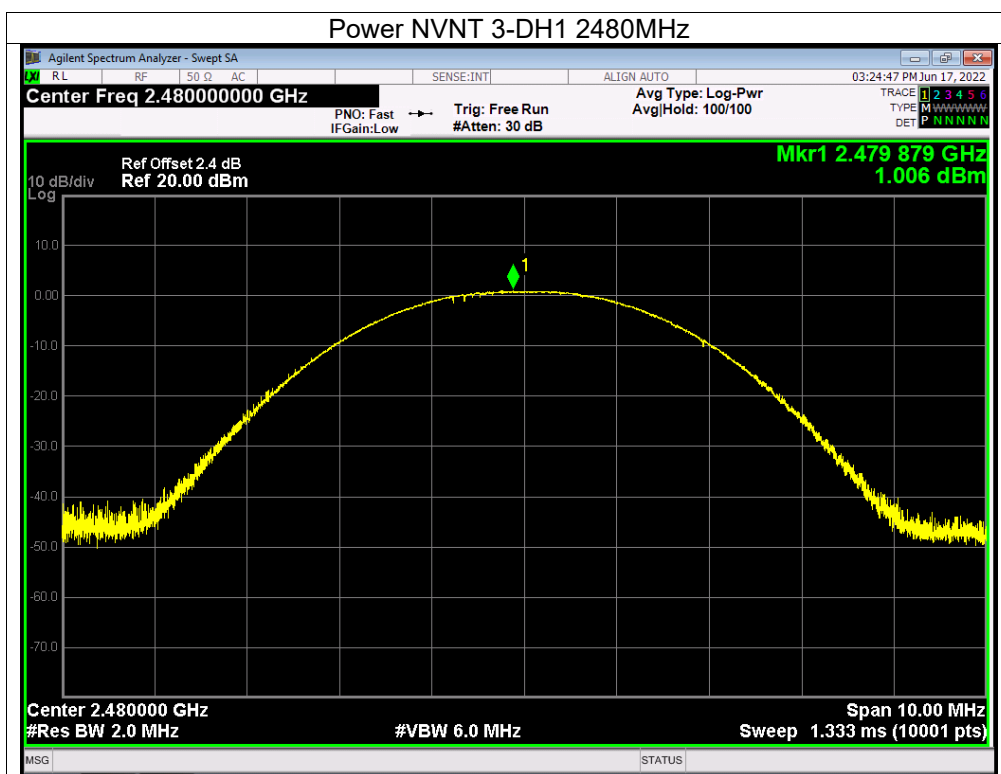
Power NVNT 1-DH1 2441MHz











12. Hopping Channel Separation

12.1 Block Diagram Of Test Setup



12.2 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 0.125W.

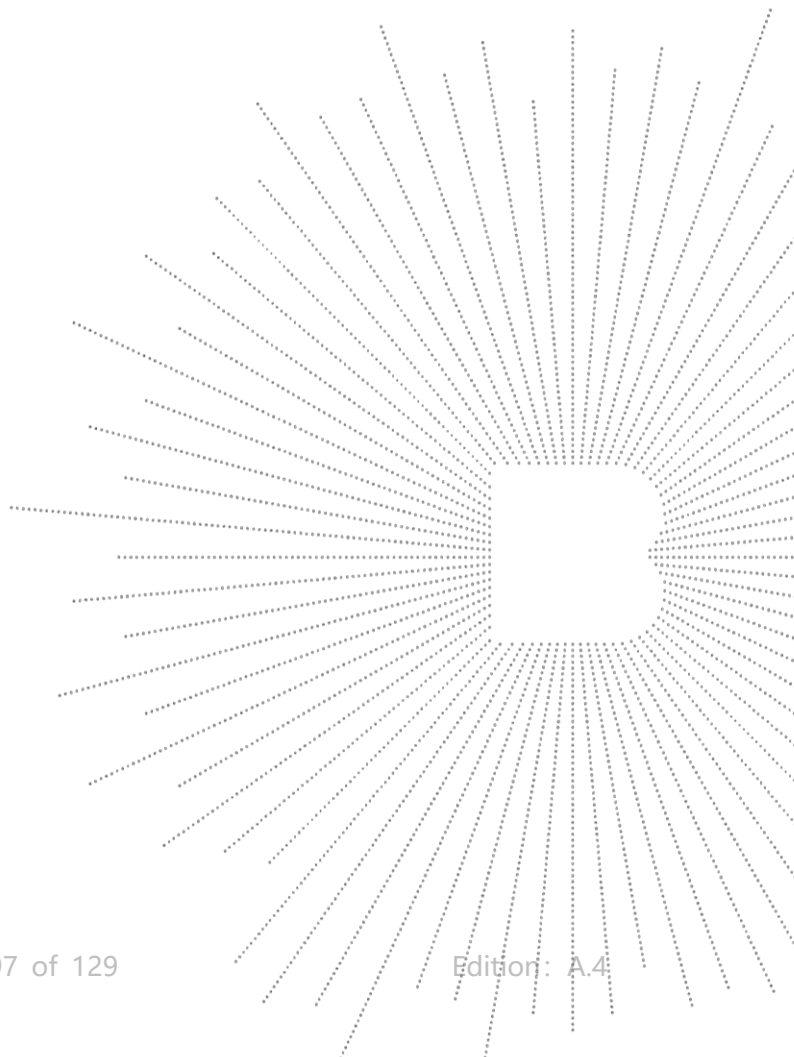
12.3 Test Procedure

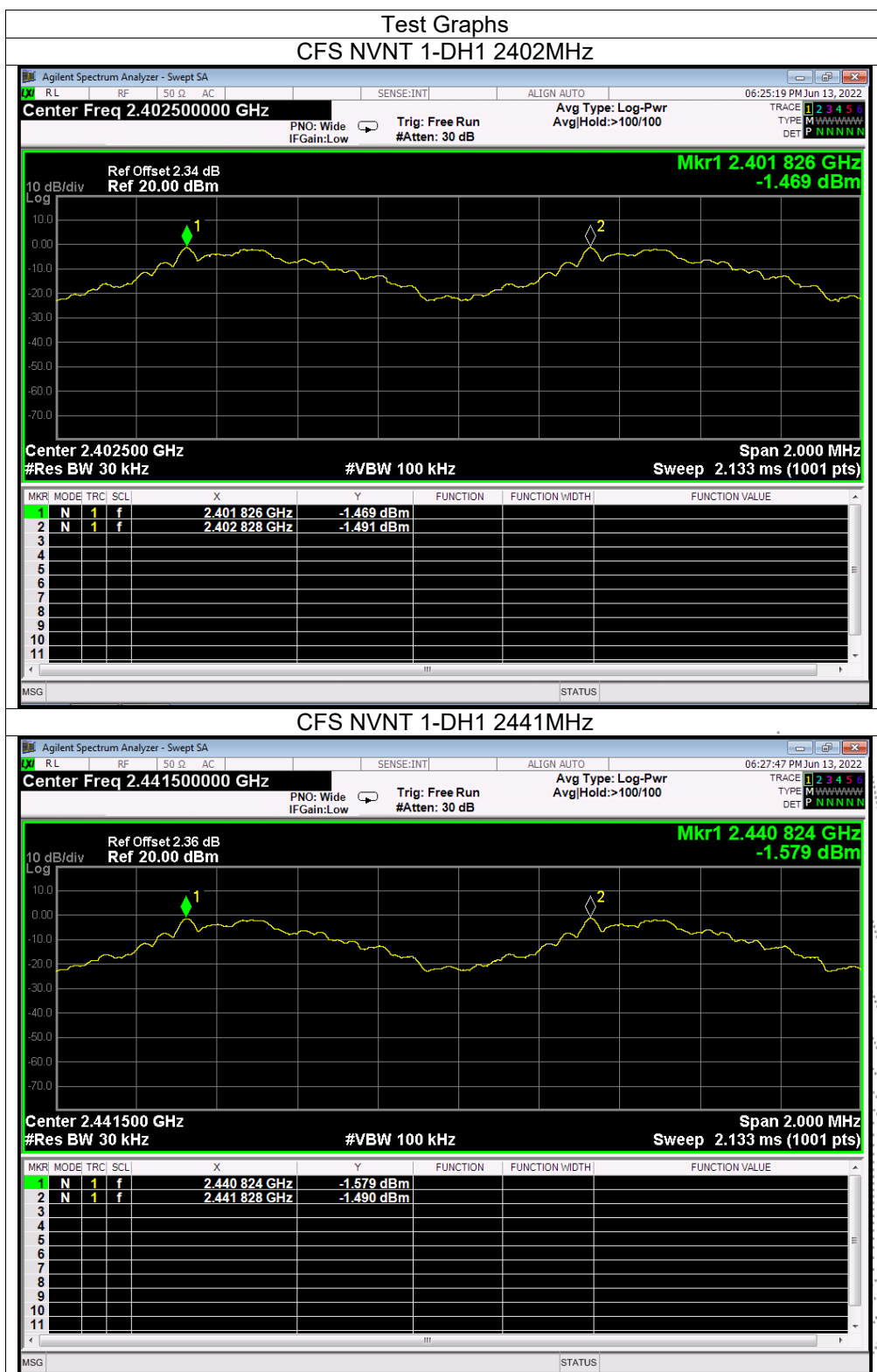
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 30kHz. VBW = 100kHz , Span = 2.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.

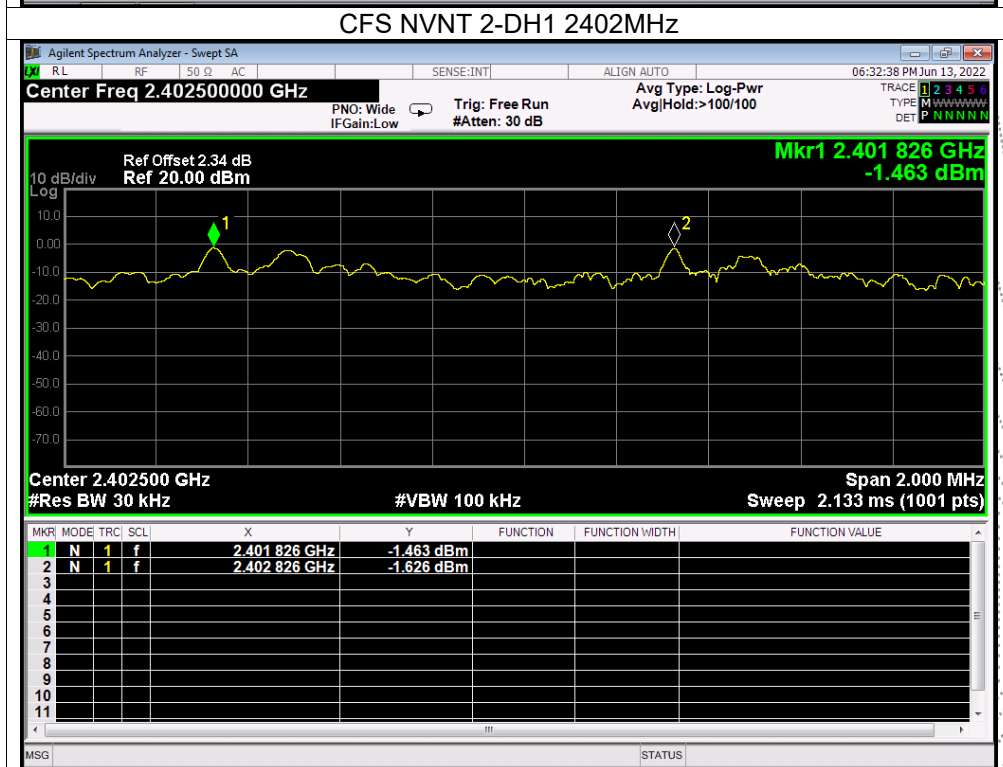
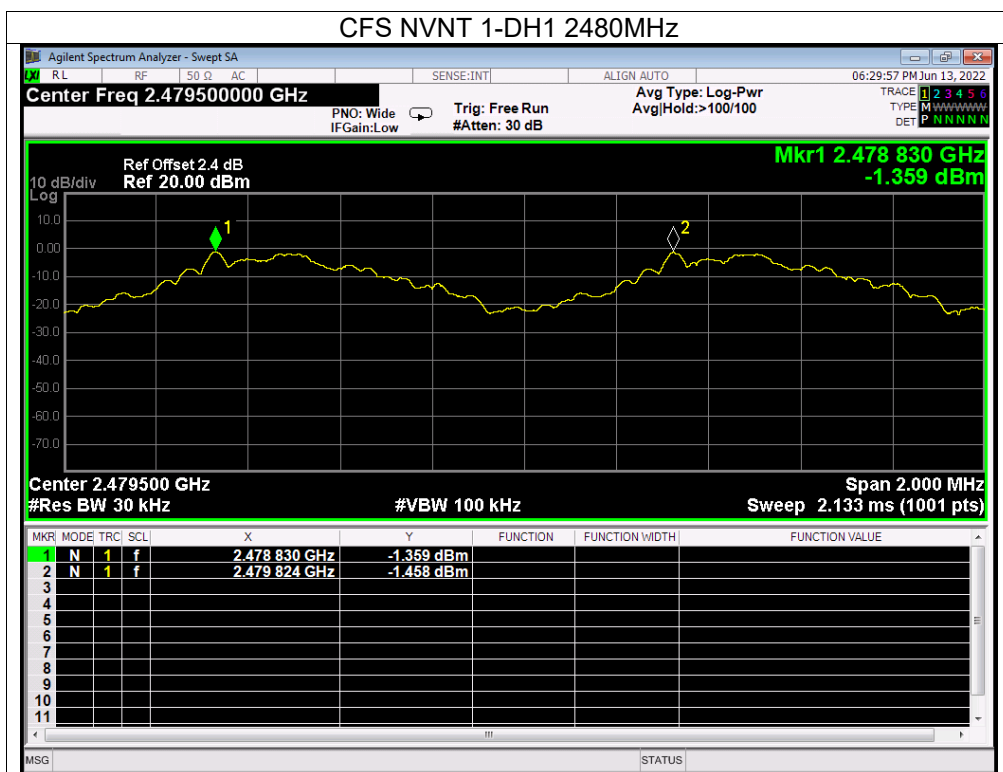
12.4 Test Result

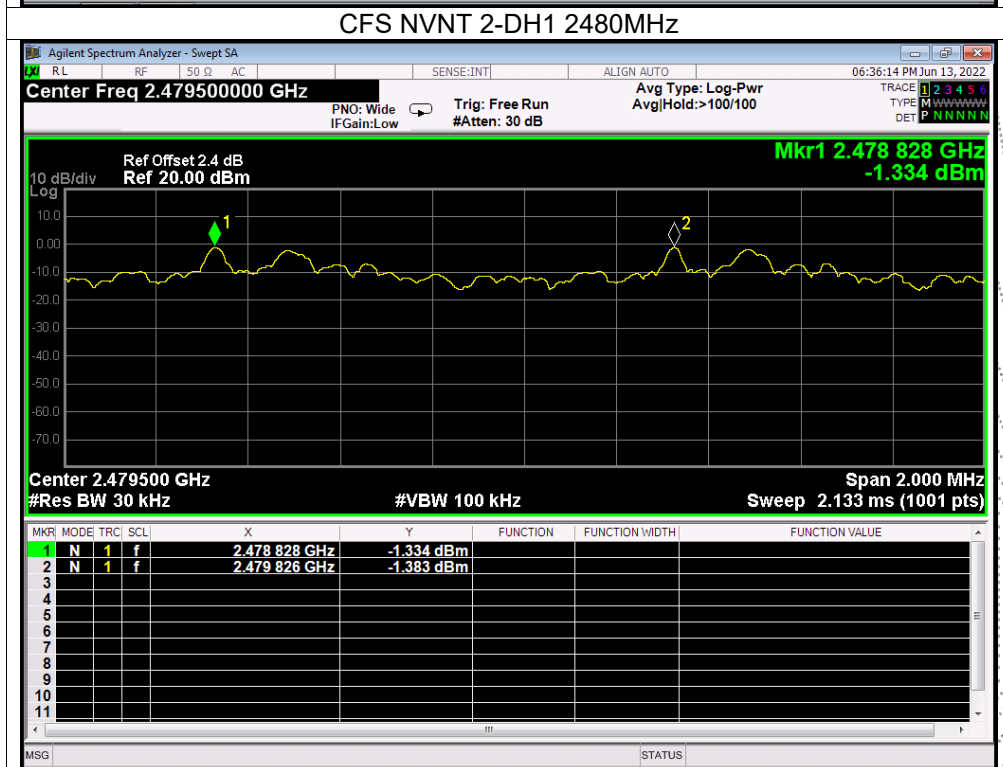
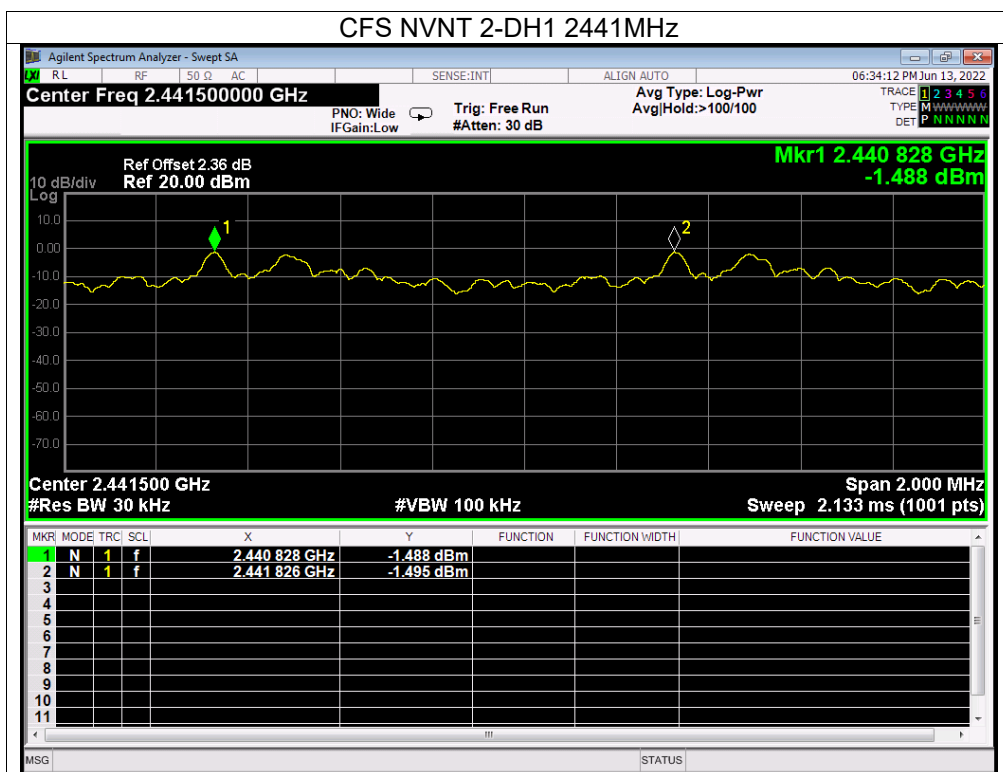
Left

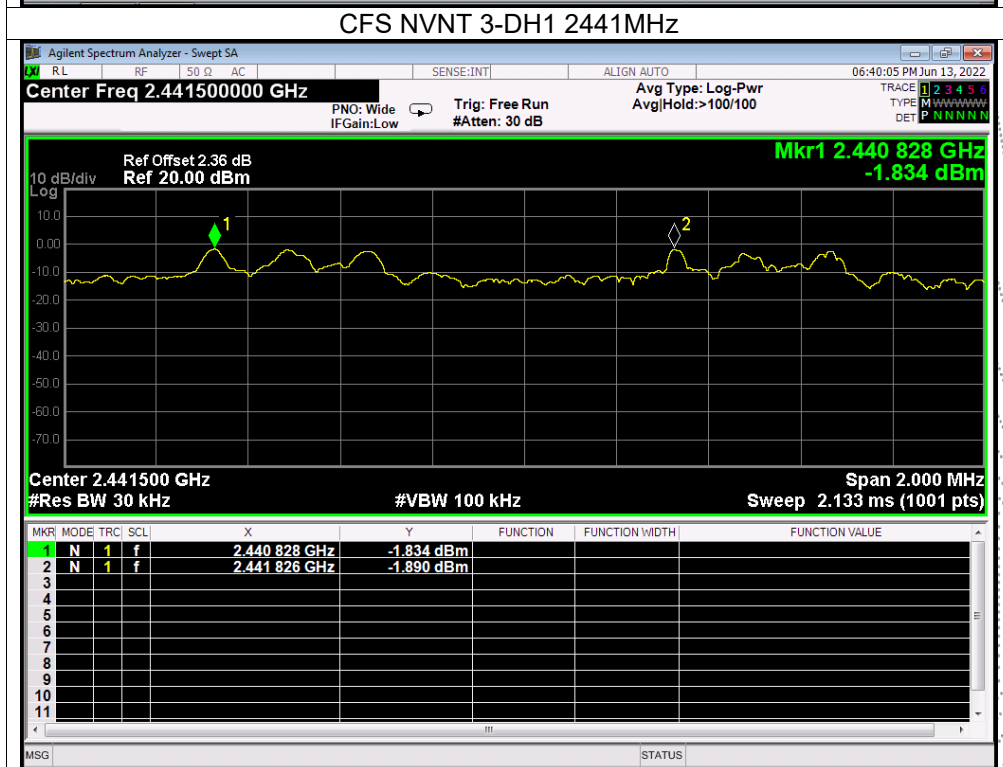
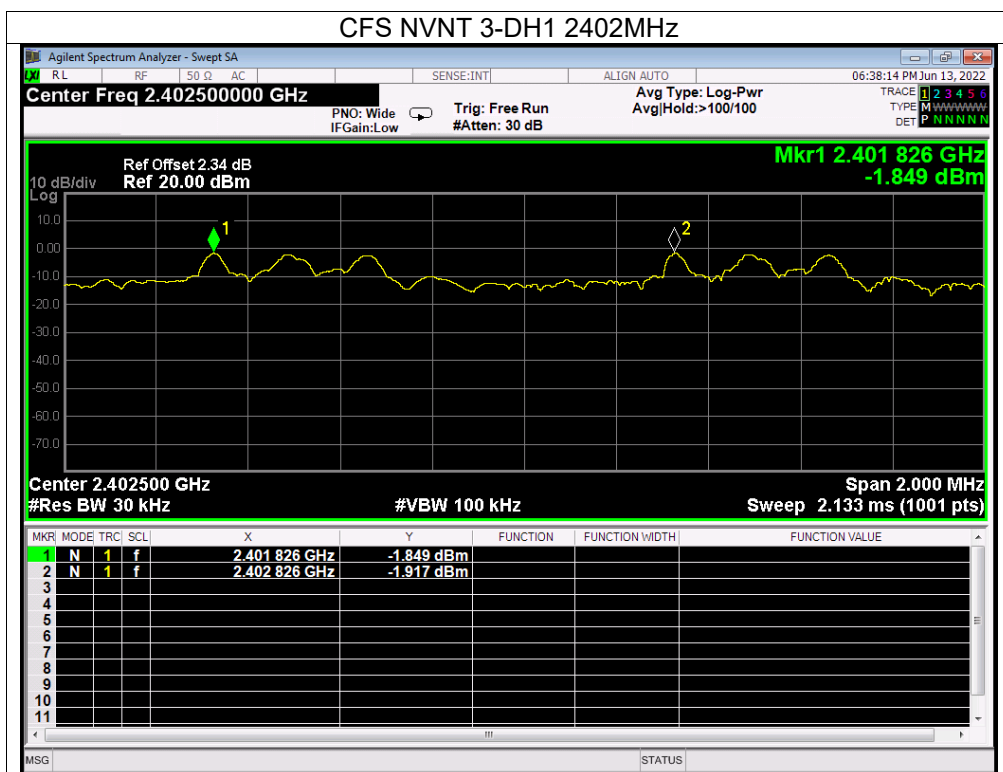
Modulation	Test Channel	Separation (MHz)	Limit(MHz)	Result
GFSK	Low	1.002	0.944	PASS
GFSK	Middle	1.004	0.960	PASS
GFSK	High	0.994	0.952	PASS
$\pi/4$ DQPSK	Low	1	0.802	PASS
$\pi/4$ DQPSK	Middle	0.998	0.803	PASS
$\pi/4$ DQPSK	High	0.998	0.793	PASS
8DPSK	Low	1	0.805	PASS
8DPSK	Middle	0.998	0.805	PASS
8DPSK	High	0.994	0.796	PASS

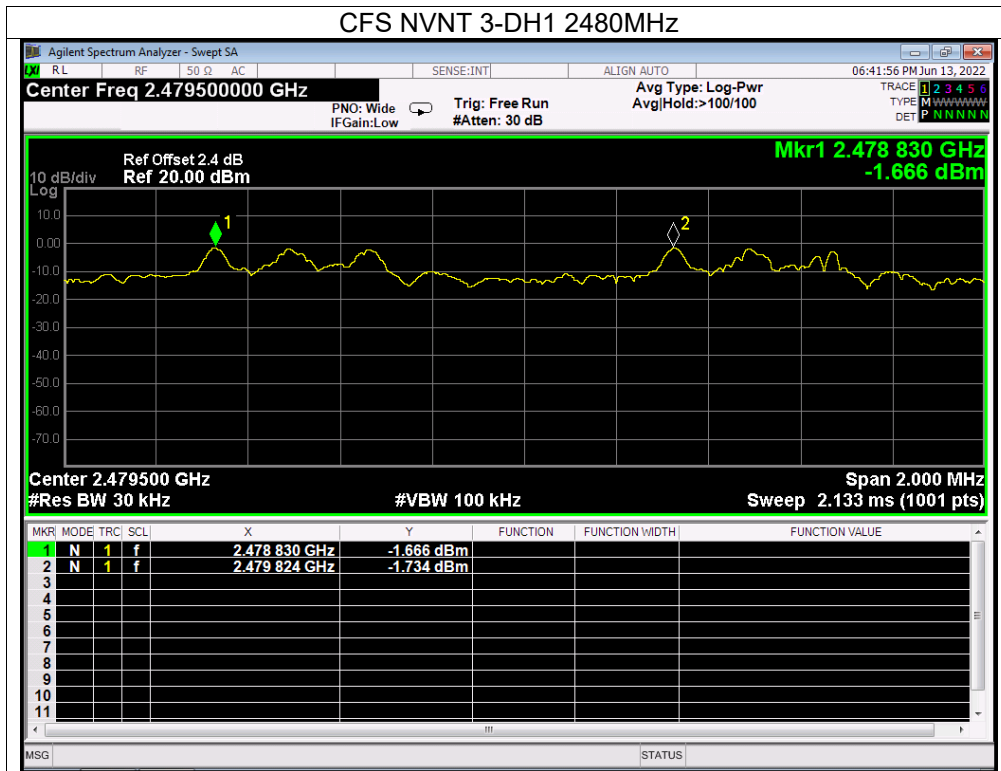






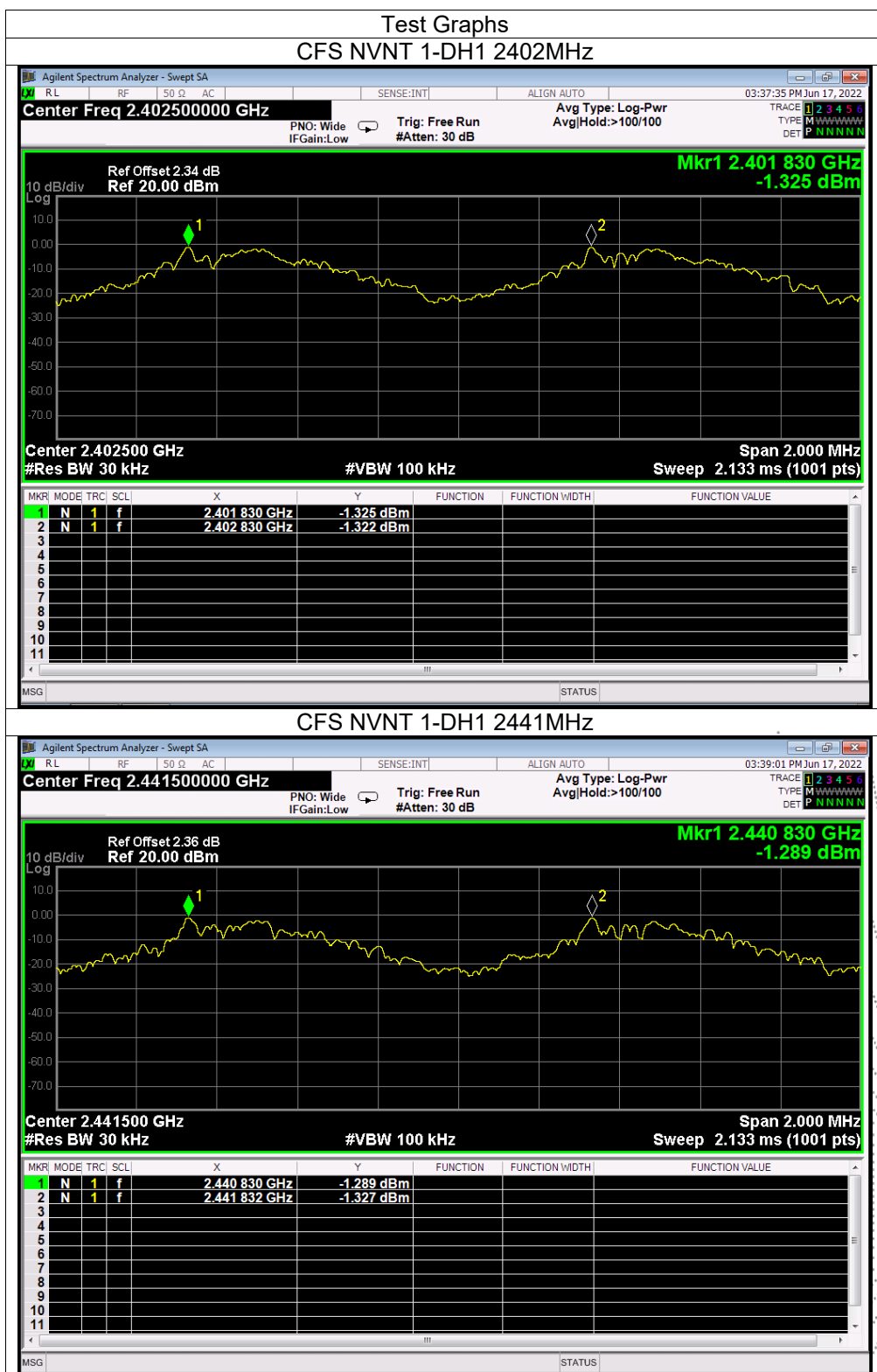


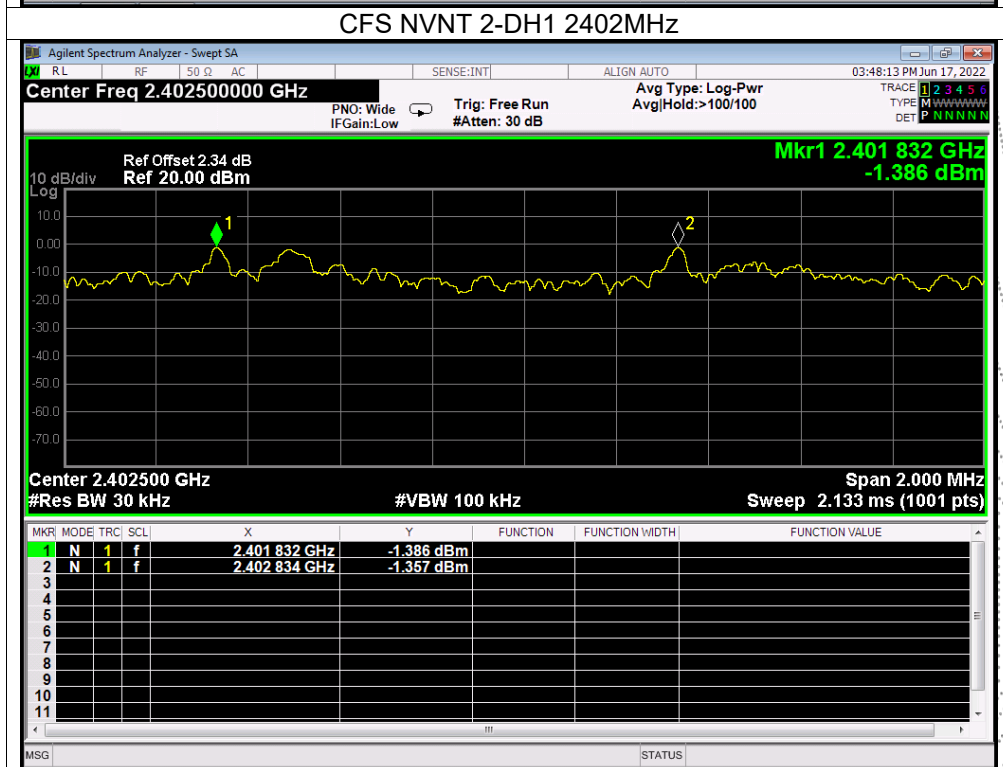
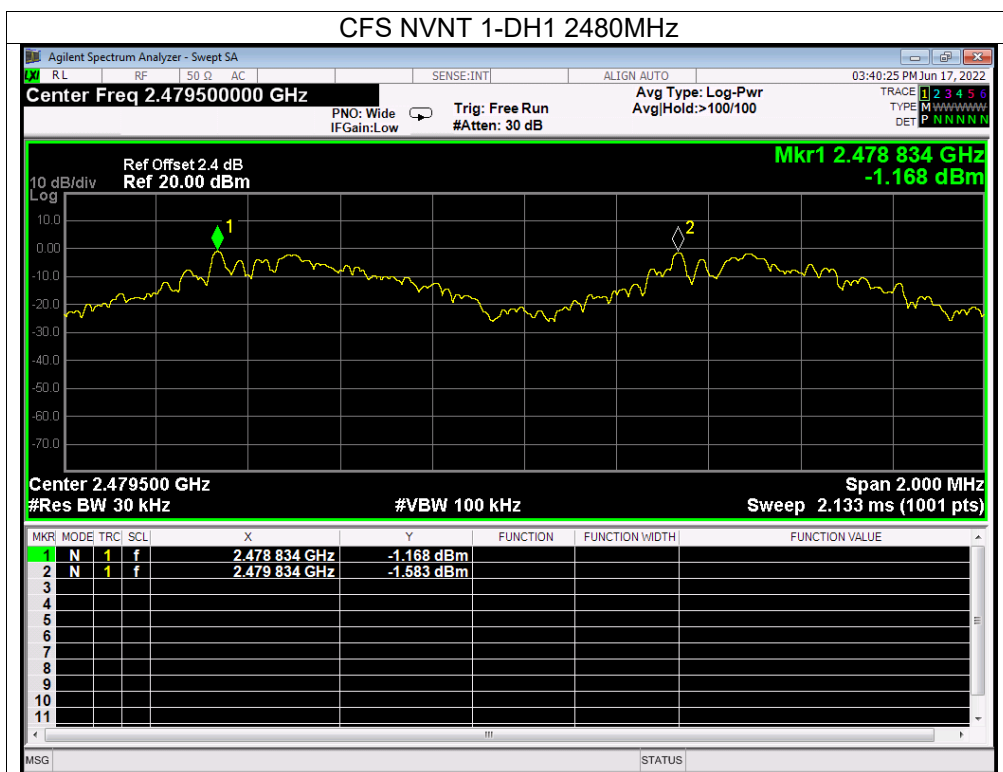


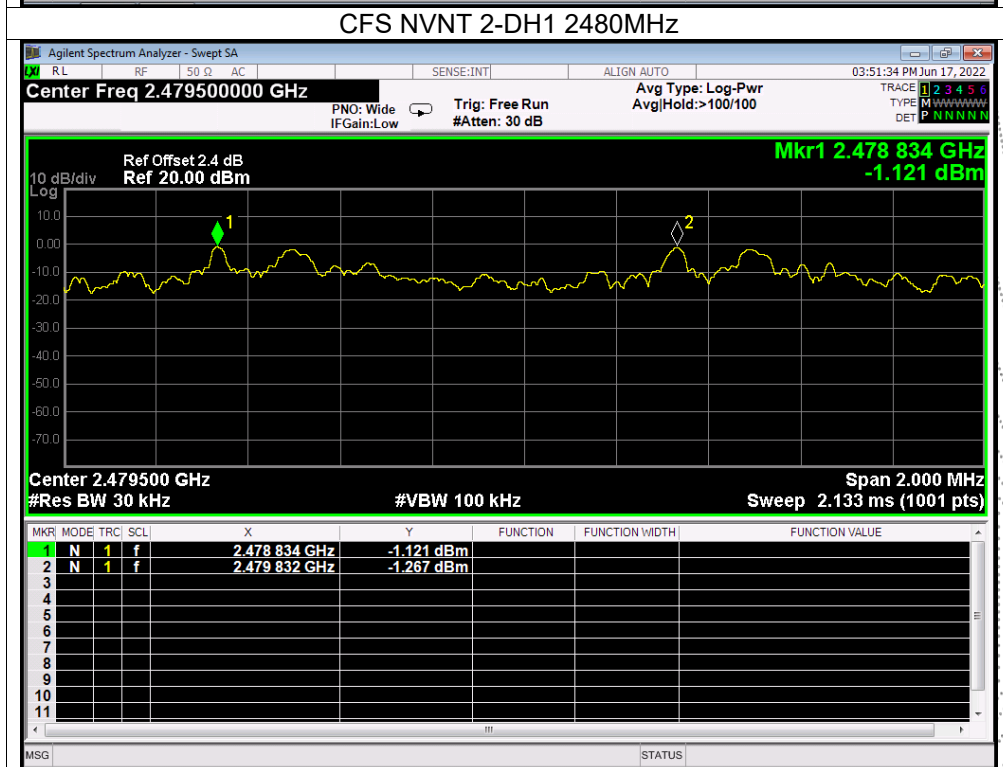
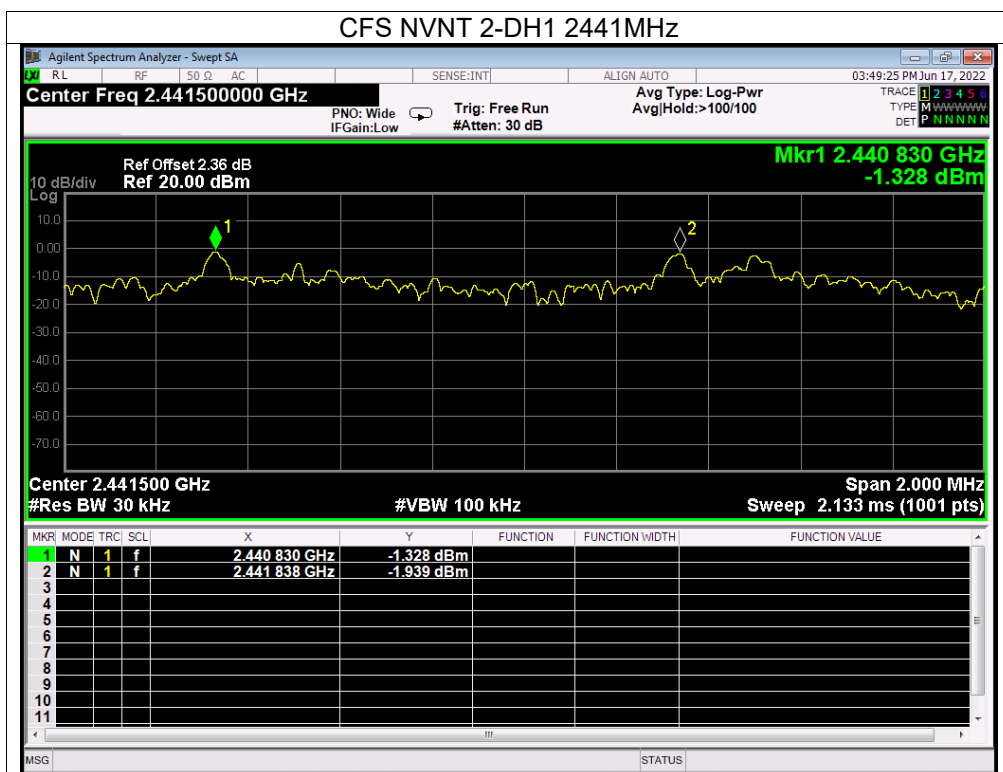


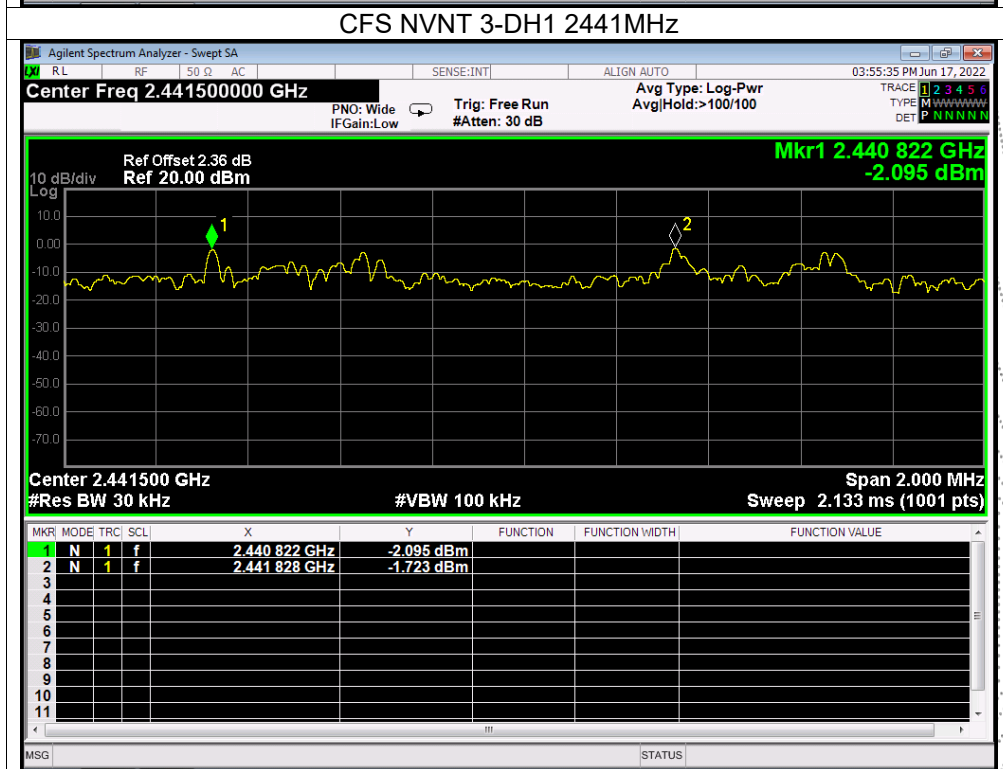
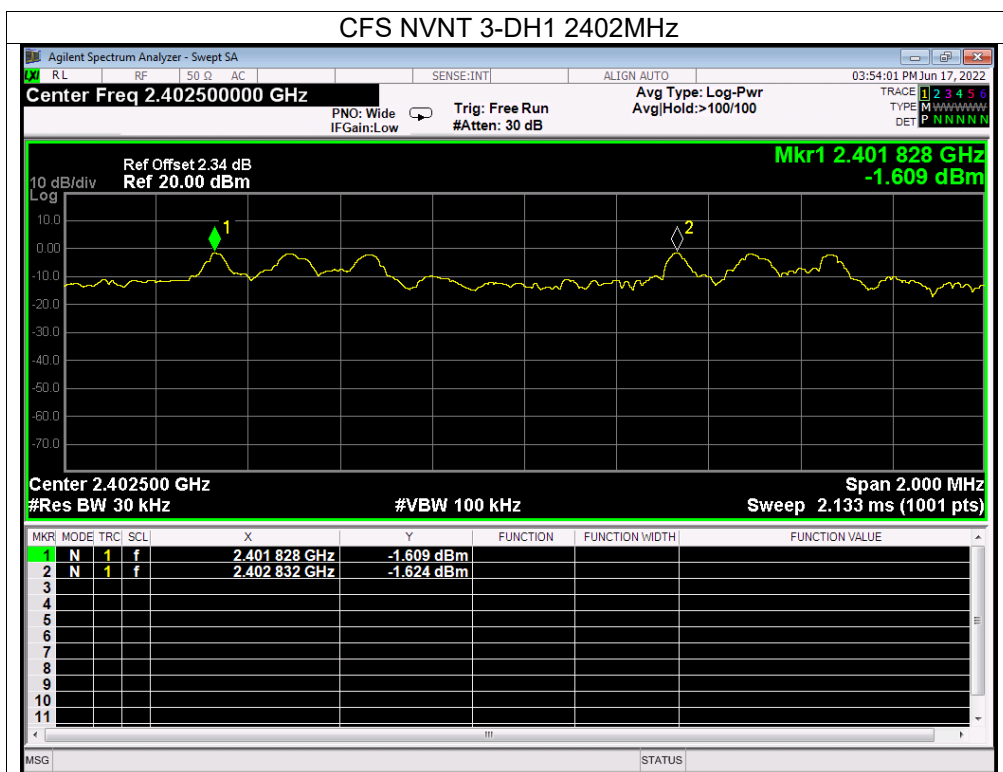
Right

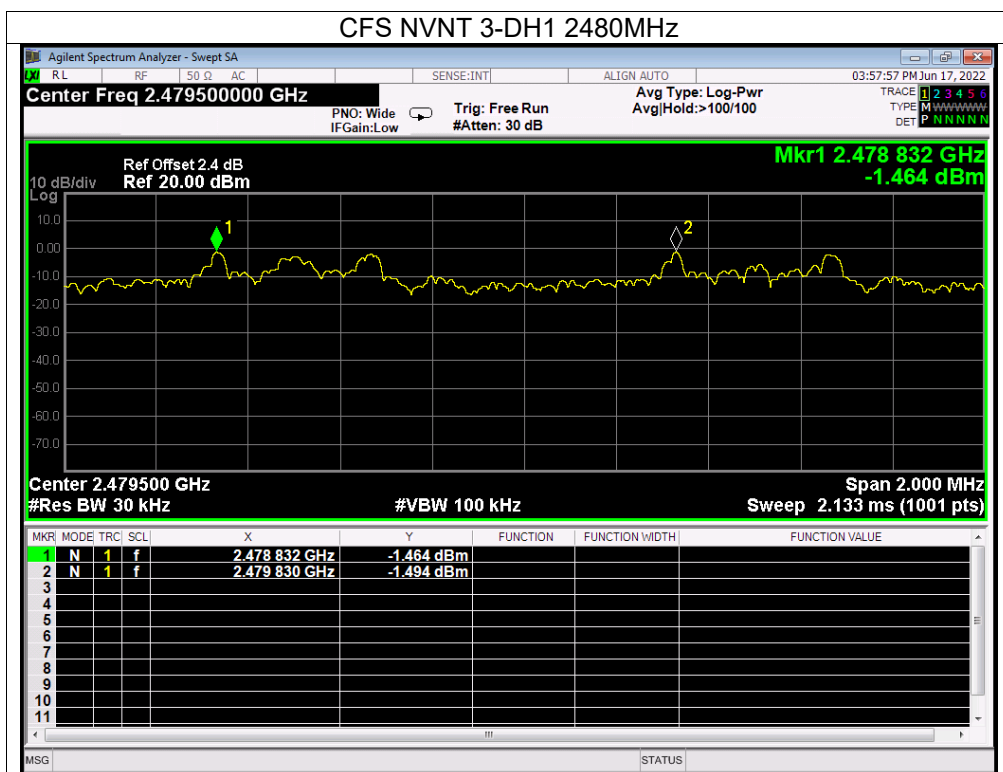
Modulation	Test Channel	Separation (MHz)	Limit(MHz)	Result
GFSK	Low	1	0.932	PASS
GFSK	Middle	1.002	0.953	PASS
GFSK	High	1	0.964	PASS
$\pi/4$ DQPSK	Low	1.002	0.801	PASS
$\pi/4$ DQPSK	Middle	1.008	0.806	PASS
$\pi/4$ DQPSK	High	0.998	0.792	PASS
8DPSK	Low	1.004	0.799	PASS
8DPSK	Middle	1.006	0.804	PASS
8DPSK	High	0.998	0.808	PASS











13. Number Of Hopping Frequency

13.1 Block Diagram Of Test Setup



13.2 Limit

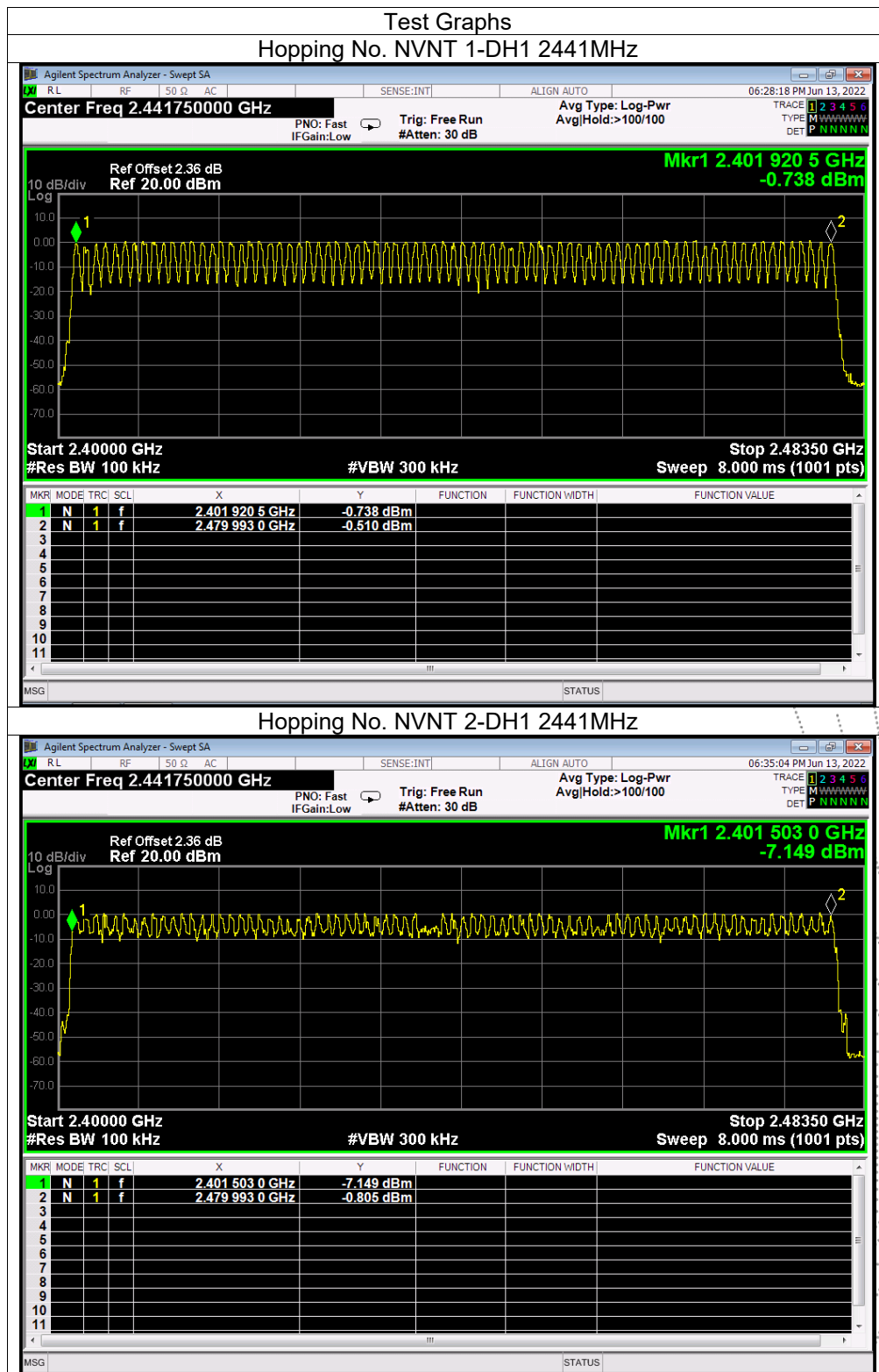
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

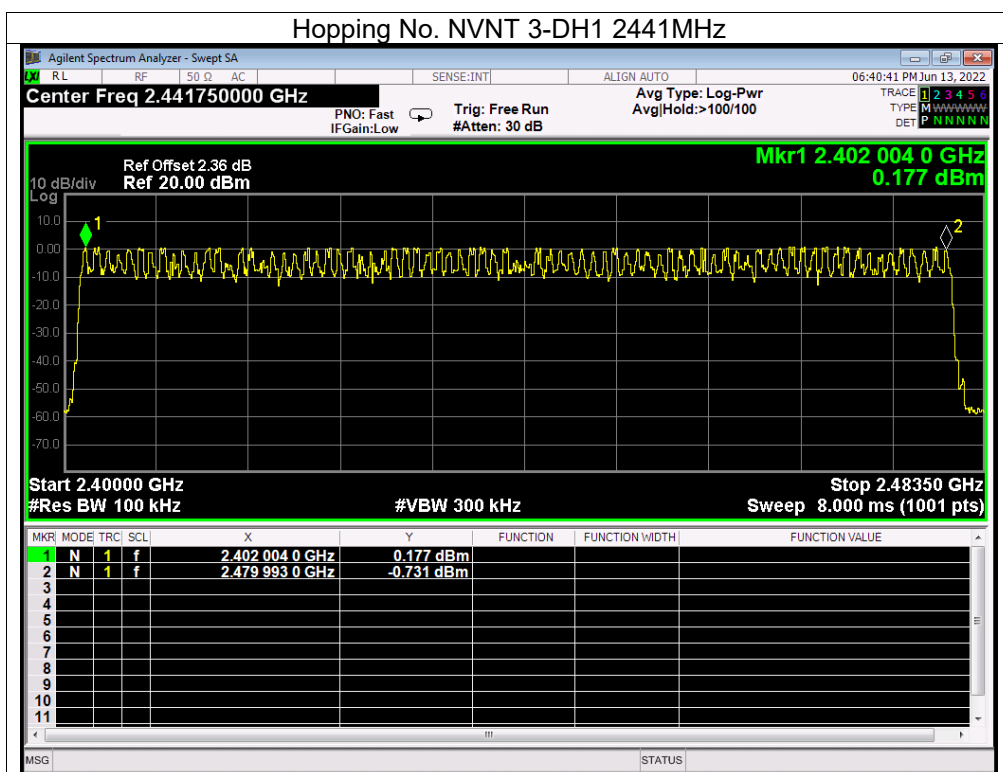
13.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.
4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;

13.4 Test Result

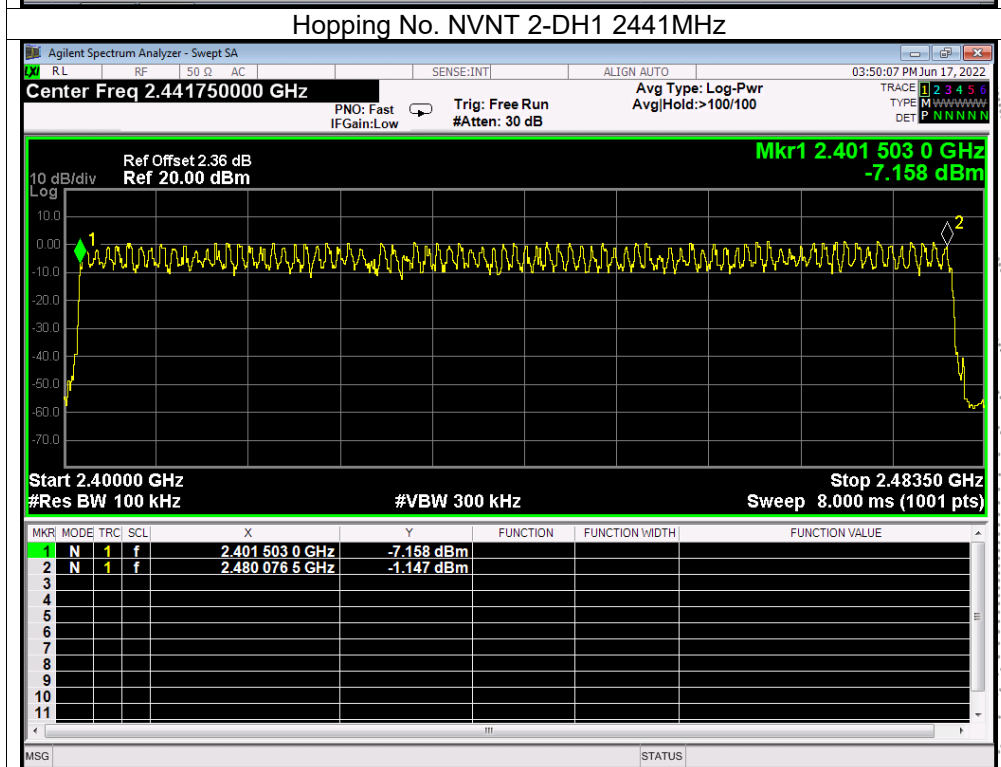
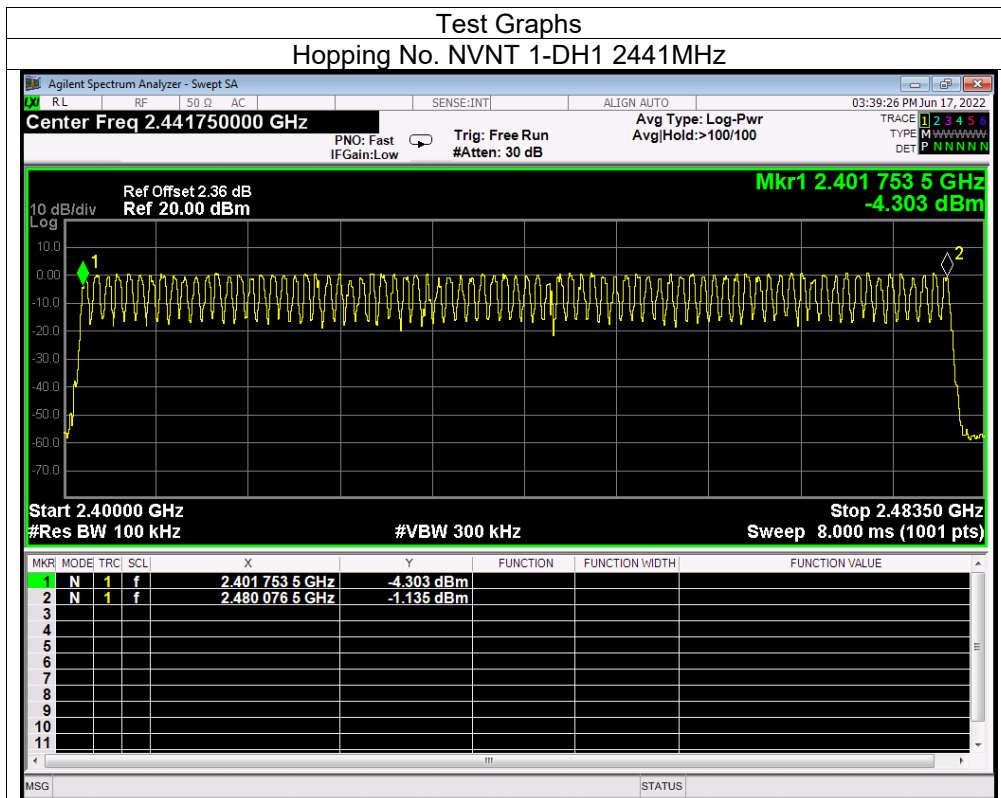
Left

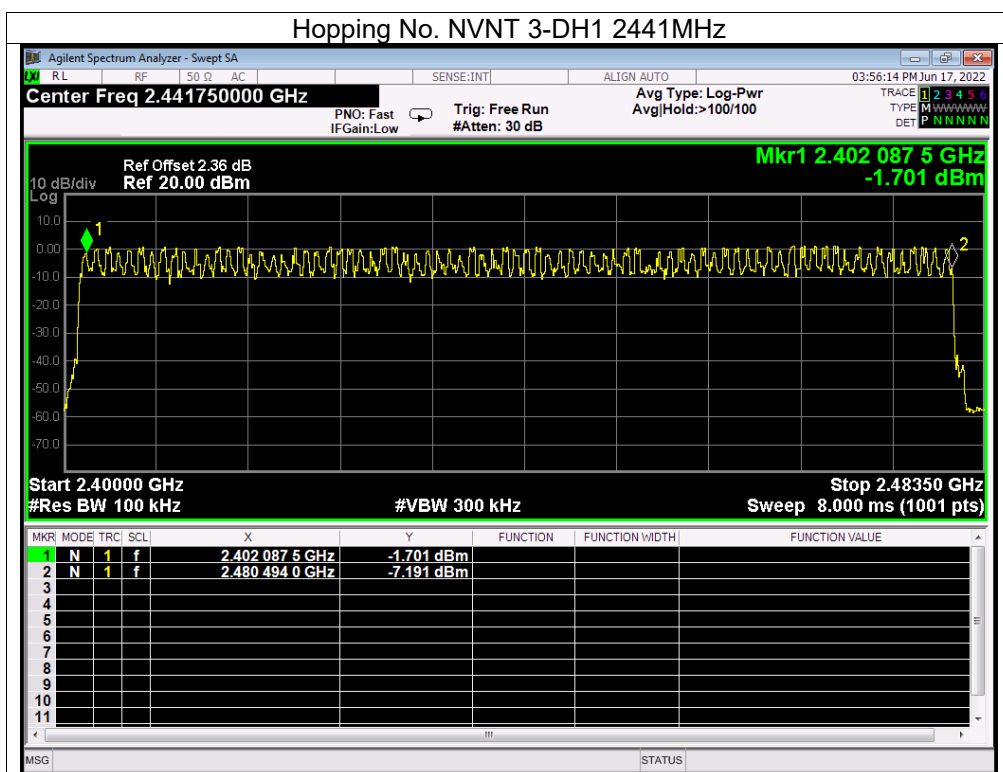






Right





14. Dwell Time

14.1 Block Diagram Of Test Setup



14.2 Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

14.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set spectrum analyzer span = 0. Centred on a hopping channel;
3. Set RBW = 1MHz and VBW = 3MHz. Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.
4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

14.4 Test Result

DH5 Packet permit maximum 1600 / 79 / 6 hops per second in each channel (5 time slots RX, 1 time slot TX).

DH3 Packet permit maximum 1600 / 79 / 4 hops per second in each channel (3 time slots RX, 1 time slot TX).

DH1 Packet permit maximum 1600 / 79 / 2 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the Dwell Time can be calculated as follows:

DH5: $1600/79/6 \times 0.4 \times 79 \times (\text{MkrDelta})/1000$

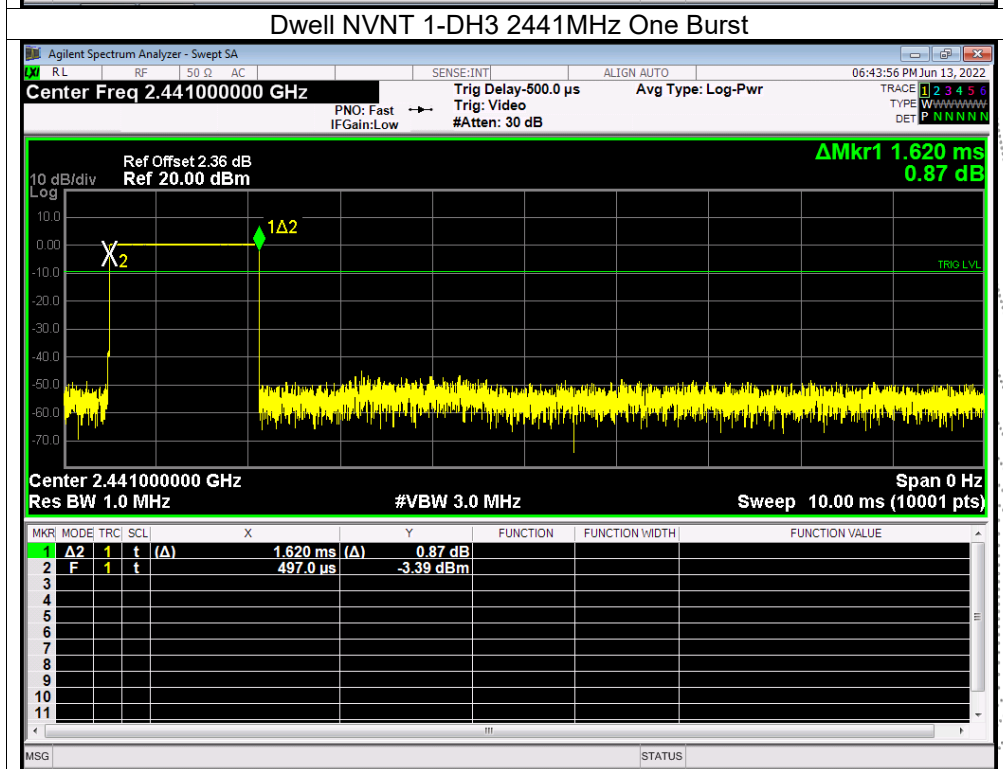
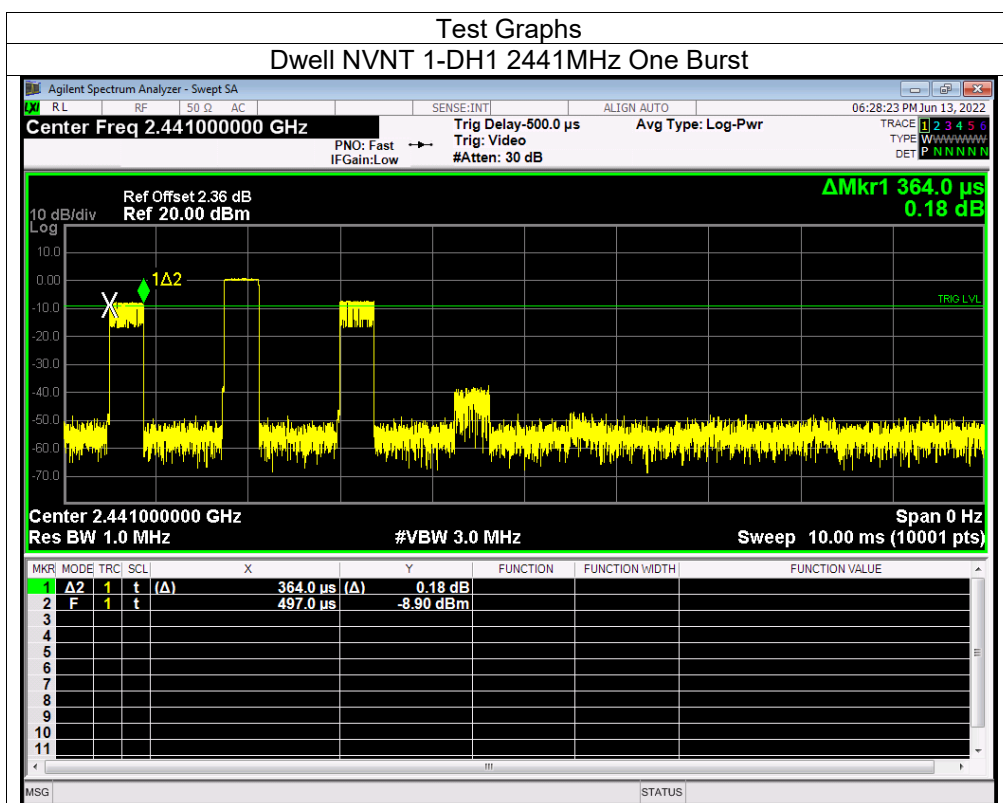
DH3: $1600/79/4 \times 0.4 \times 79 \times (\text{MkrDelta})/1000$

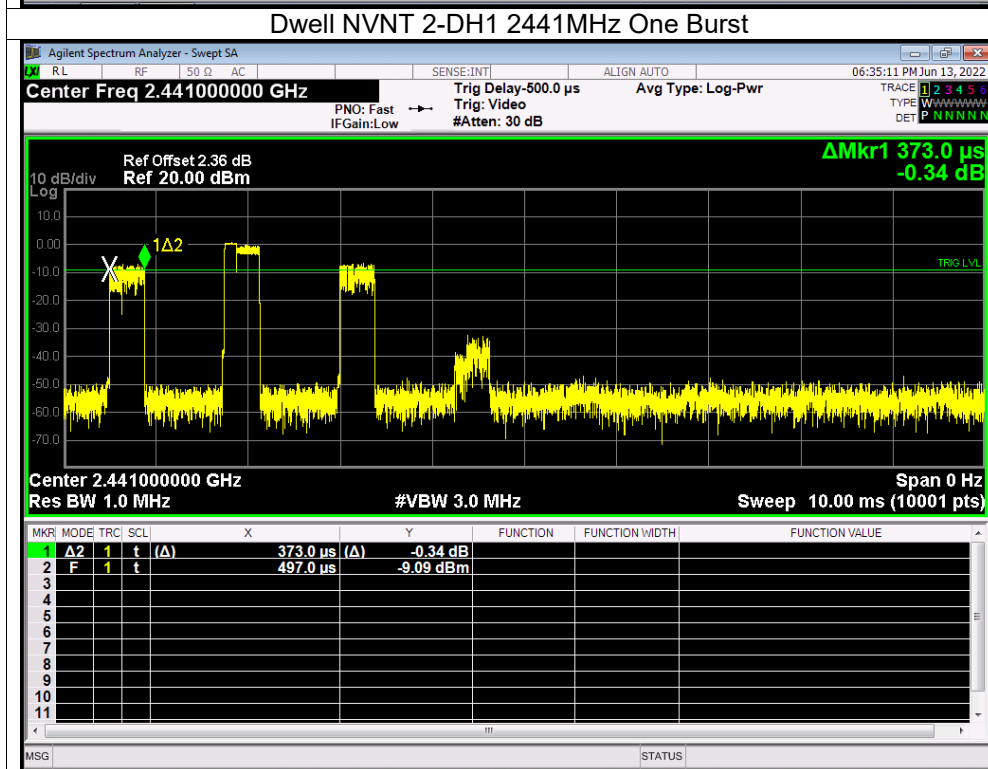
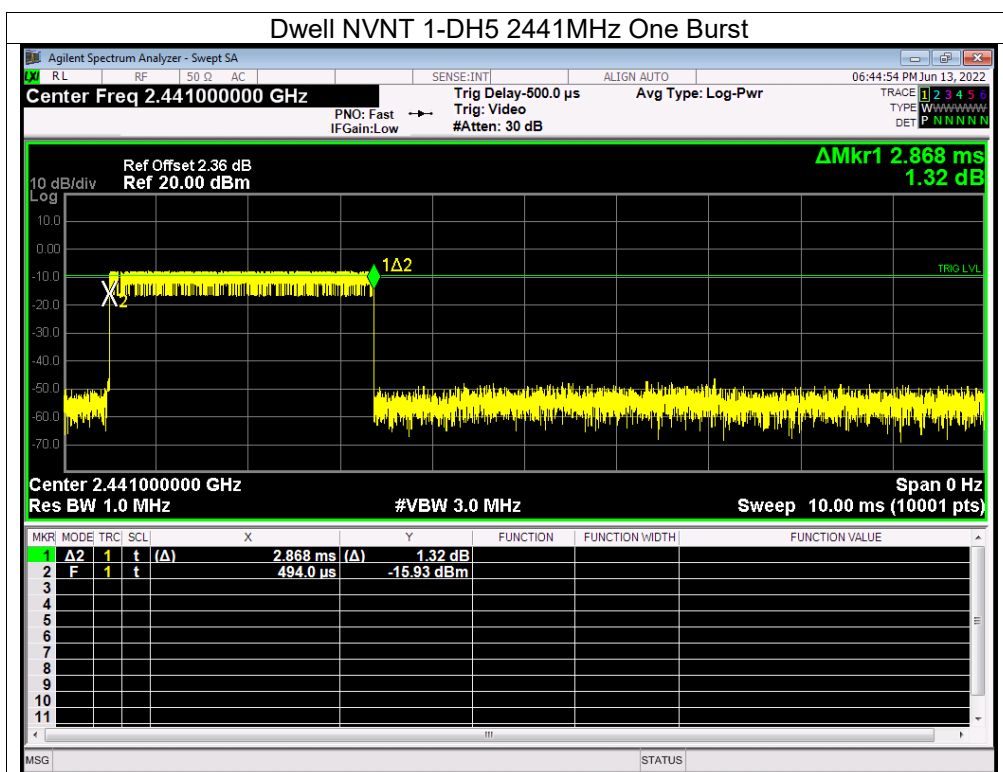
DH1: $1600/79/2 \times 0.4 \times 79 \times (\text{MkrDelta})/1000$

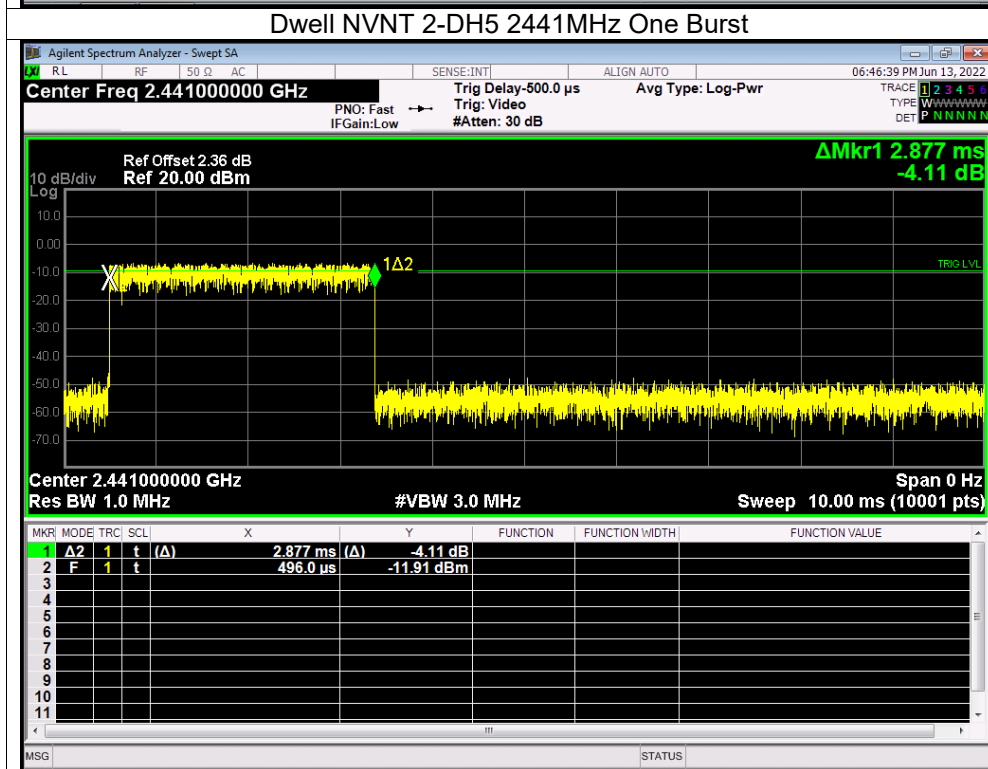
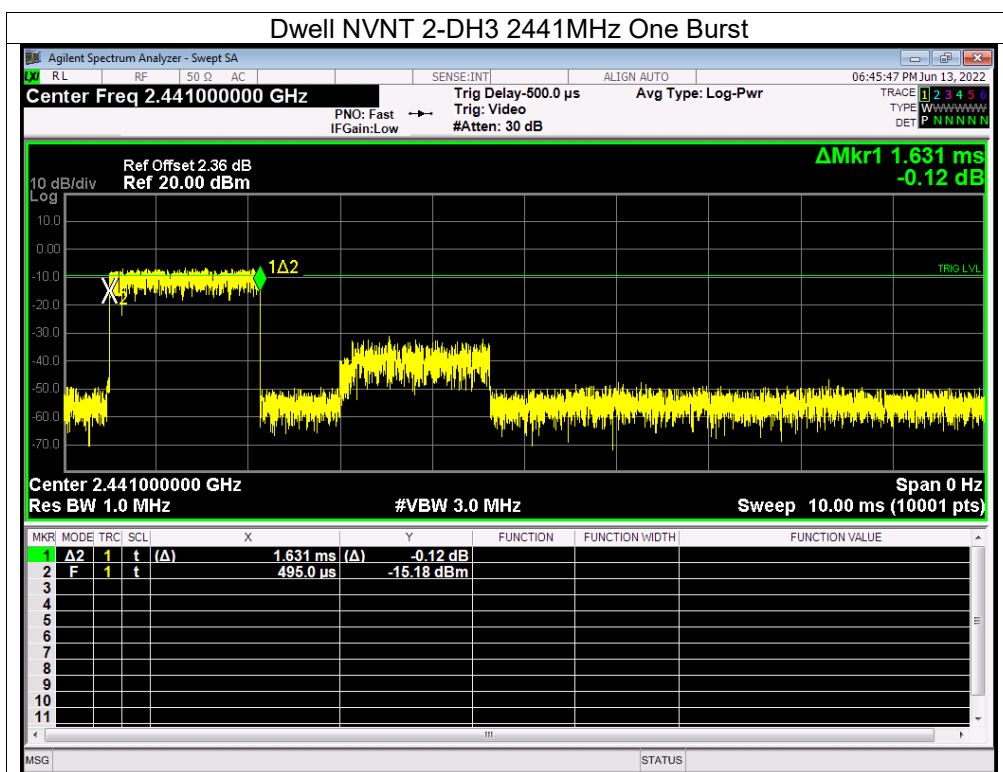
Remark: Mkr Delta is once pulse time.

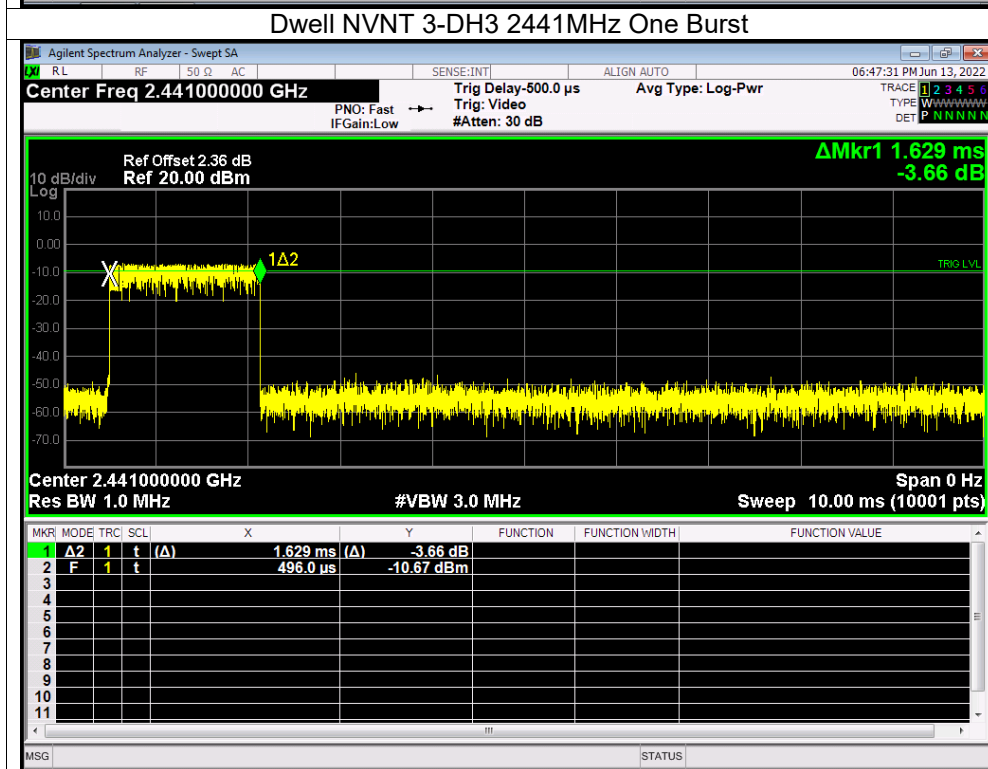
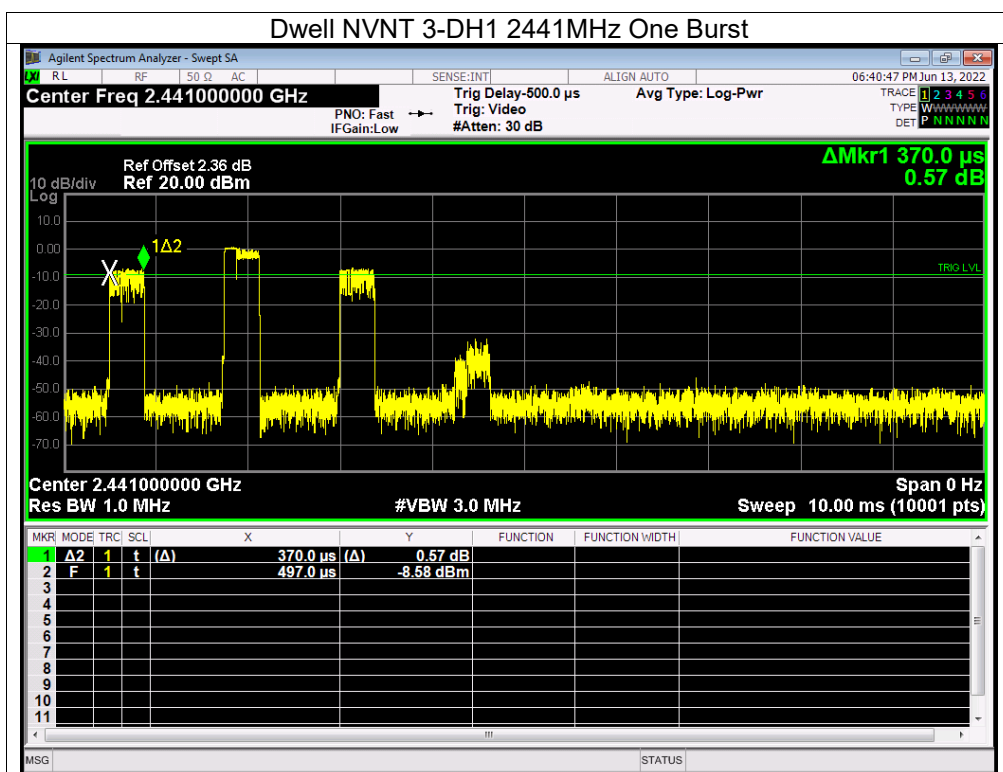
Left

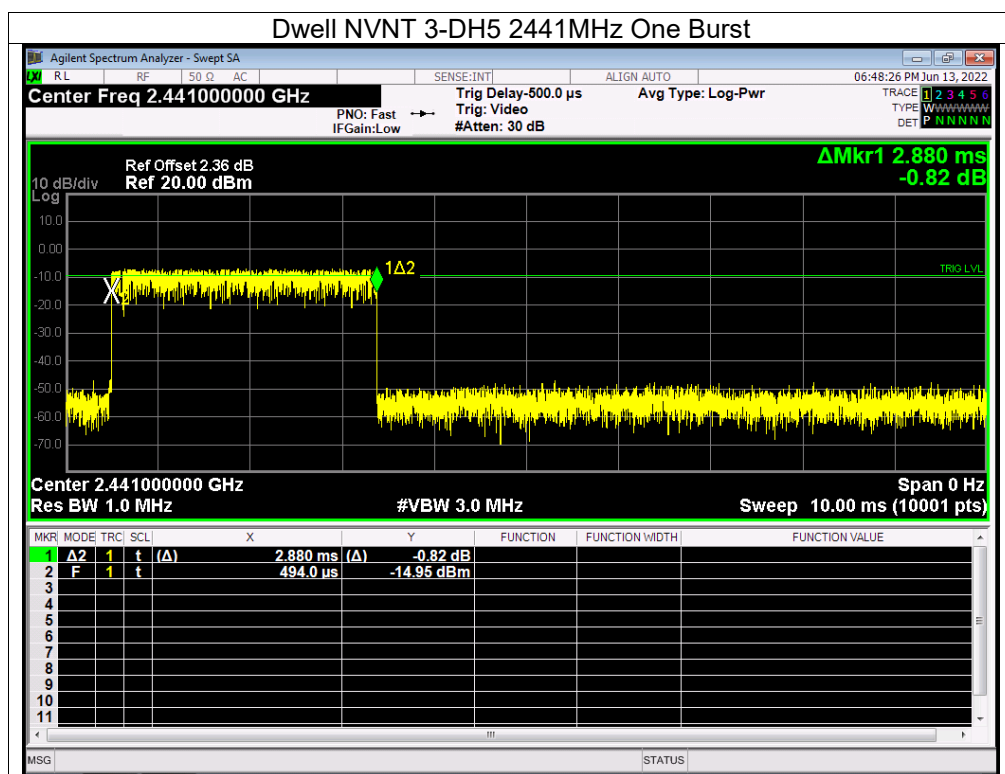
Modulation	Channel Data	Packet	pulse time(ms)	Dwell Time(s)	Limits(s)
GFSK	Middle	DH1	0.364	0.116	0.4
		DH3	1.62	0.259	0.4
		DH5	2.868	0.306	0.4
$\pi/4$ DQPSK	Middle	2DH1	0.373	0.119	0.4
		2DH3	1.631	0.261	0.4
		2DH5	2.877	0.307	0.4
8DPSK	Middle	3DH1	0.37	0.118	0.4
		3DH3	1.629	0.261	0.4
		3DH5	2.88	0.307	0.4









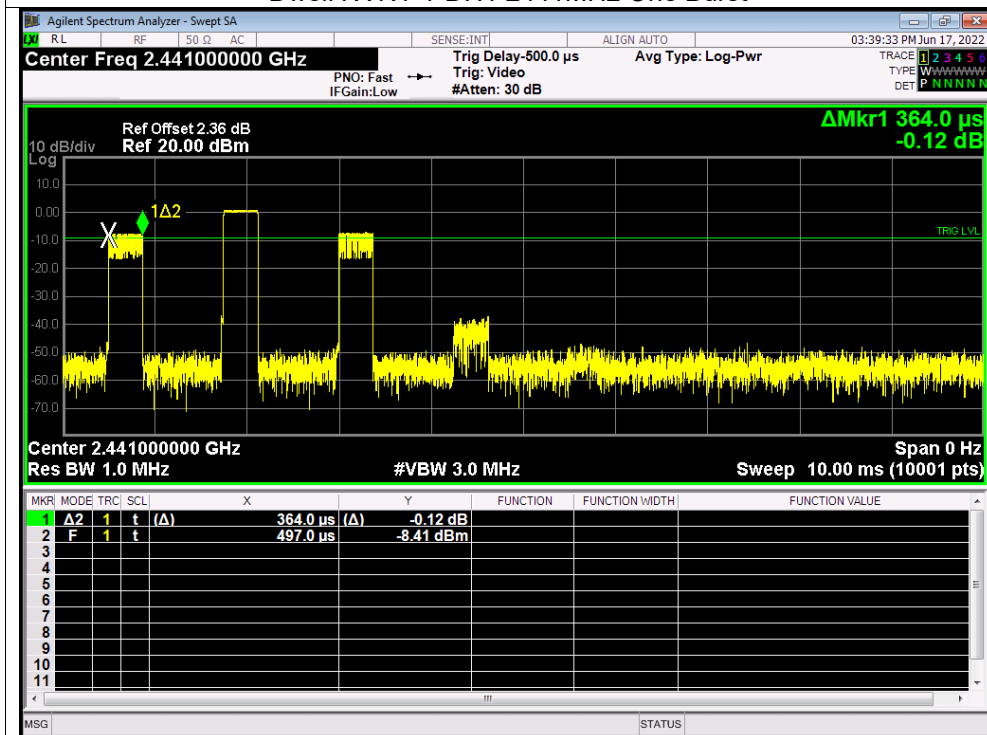


Right

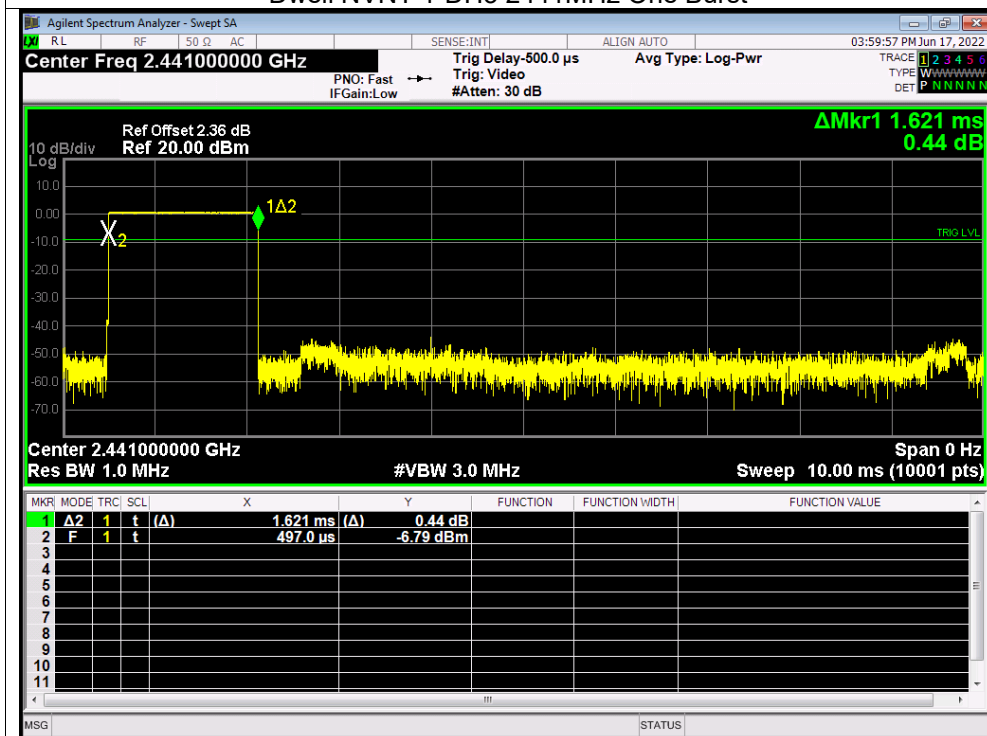
Modulation	Channel Data	Packet	pulse time(ms)	Dwell Time(s)	Limits(s)
GFSK	Middle	DH1	0.364	0.116	0.4
		DH3	1.621	0.259	0.4
		DH5	2.867	0.306	0.4
π /4DQPSK	Middle	2DH1	0.373	0.119	0.4
		2DH3	1.632	0.261	0.4
		2DH5	2.879	0.307	0.4
8DPSK	Middle	3DH1	0.371	0.119	0.4
		3DH3	1.631	0.261	0.4
		3DH5	2.881	0.307	0.4

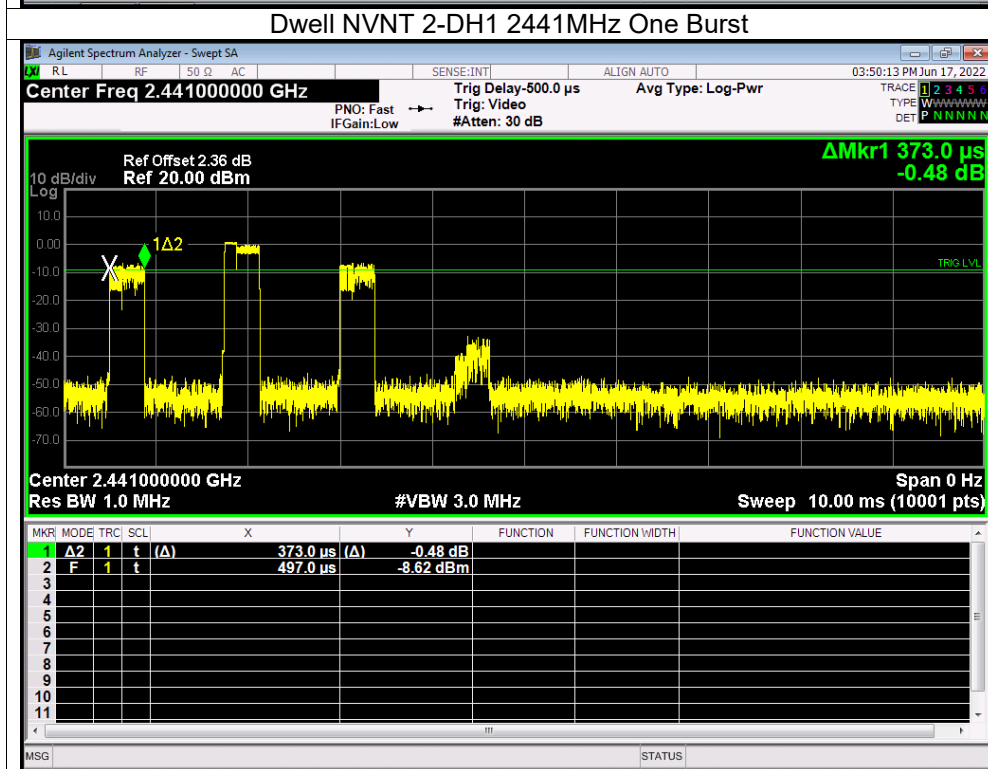
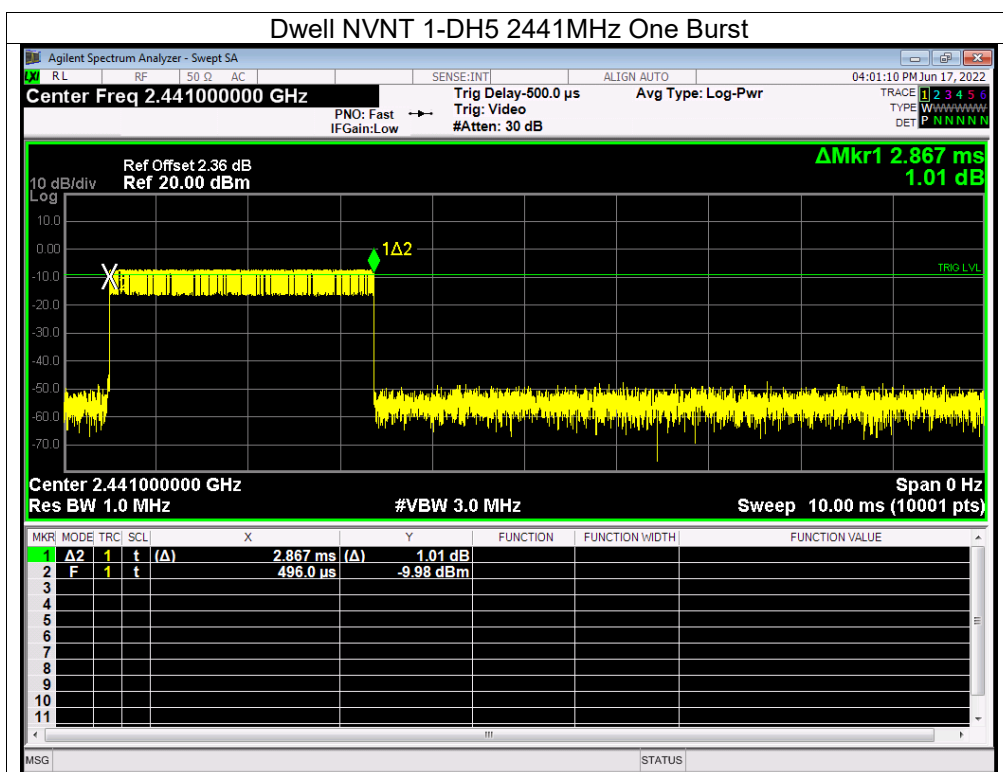
Test Graphs

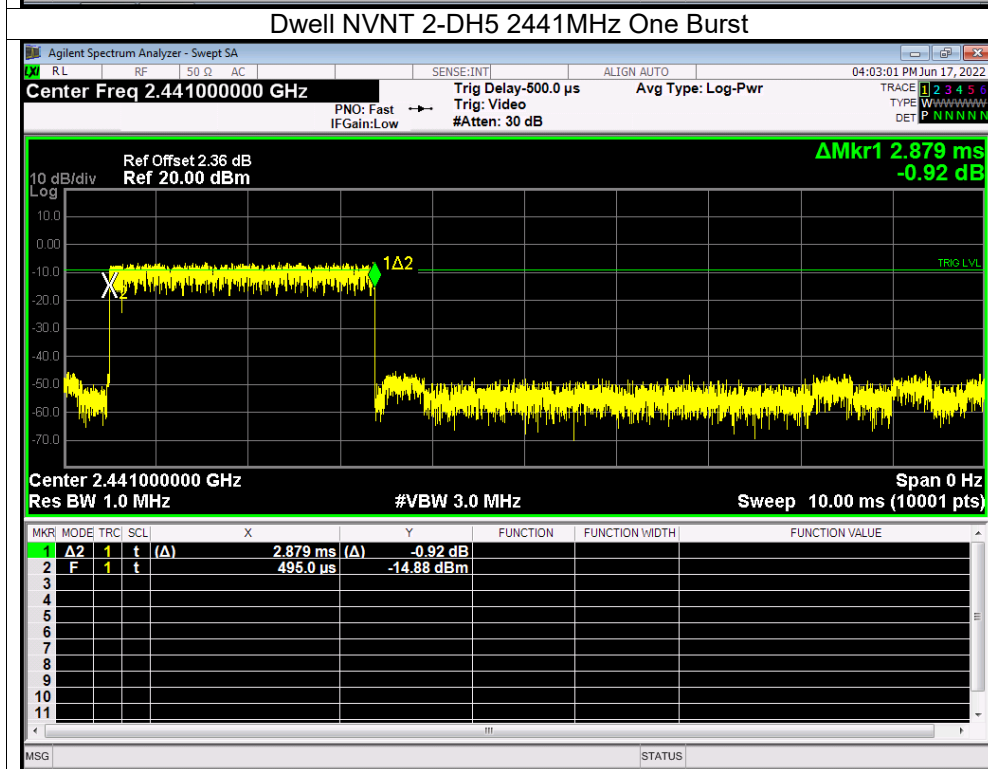
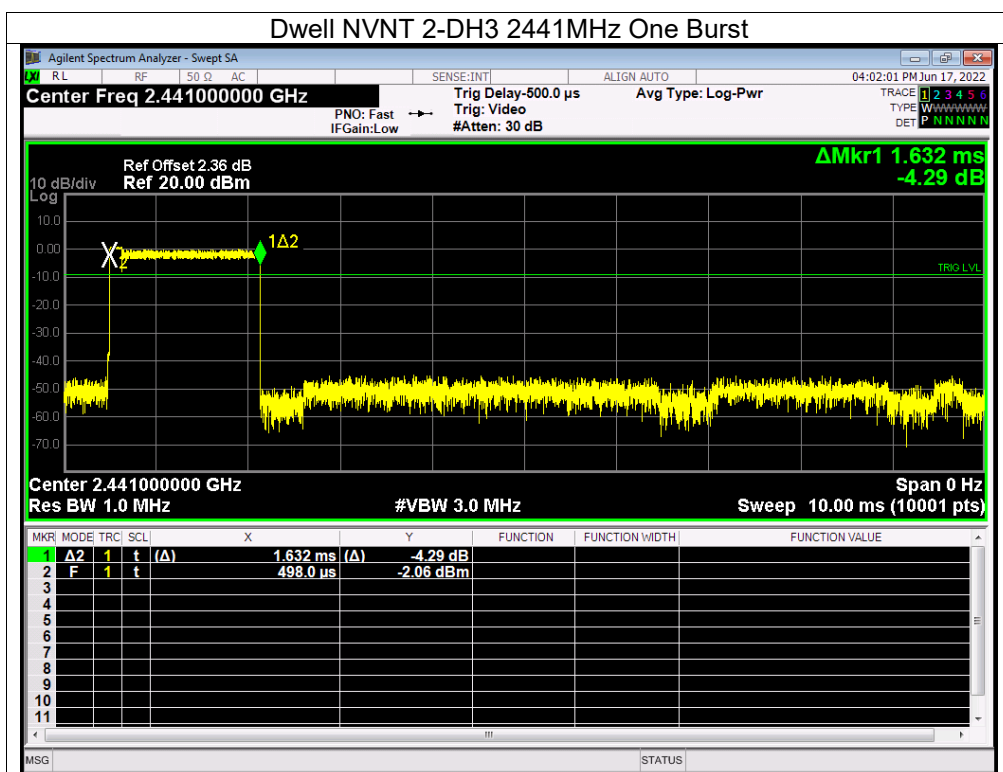
Dwell NVNT 1-DH1 2441MHz One Burst

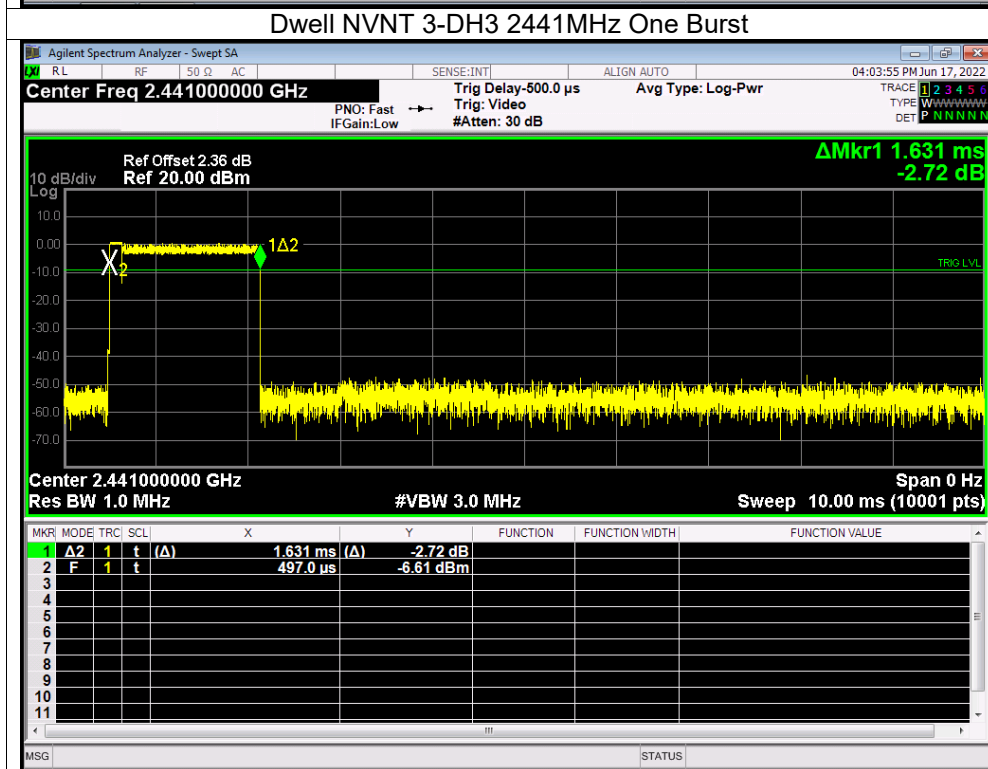
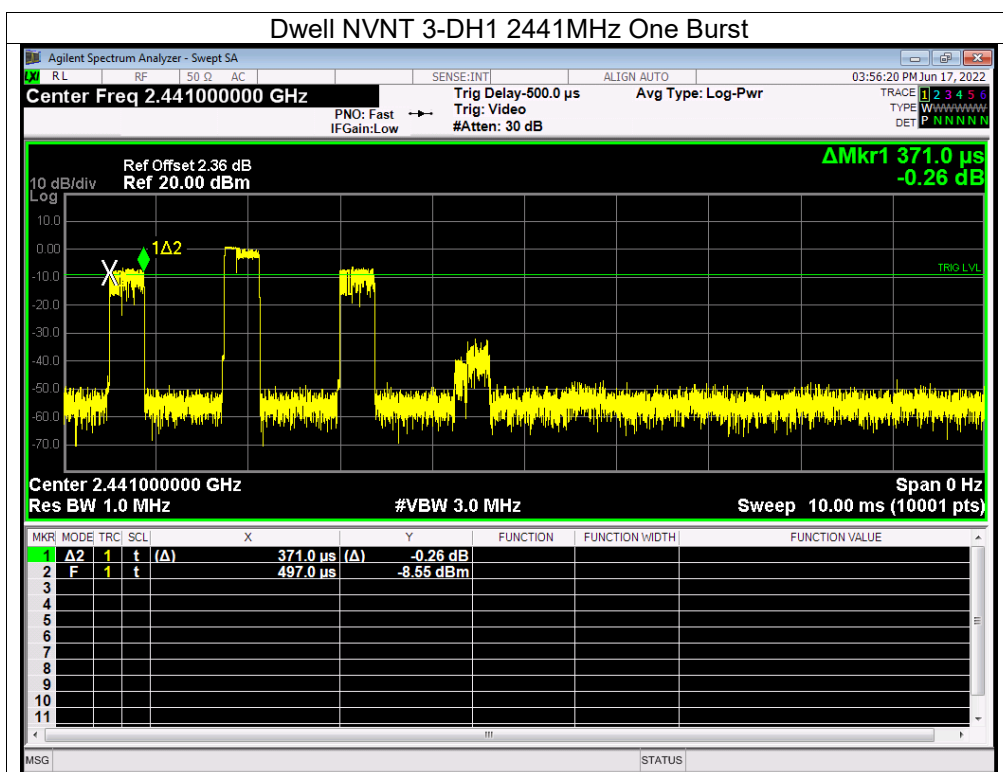


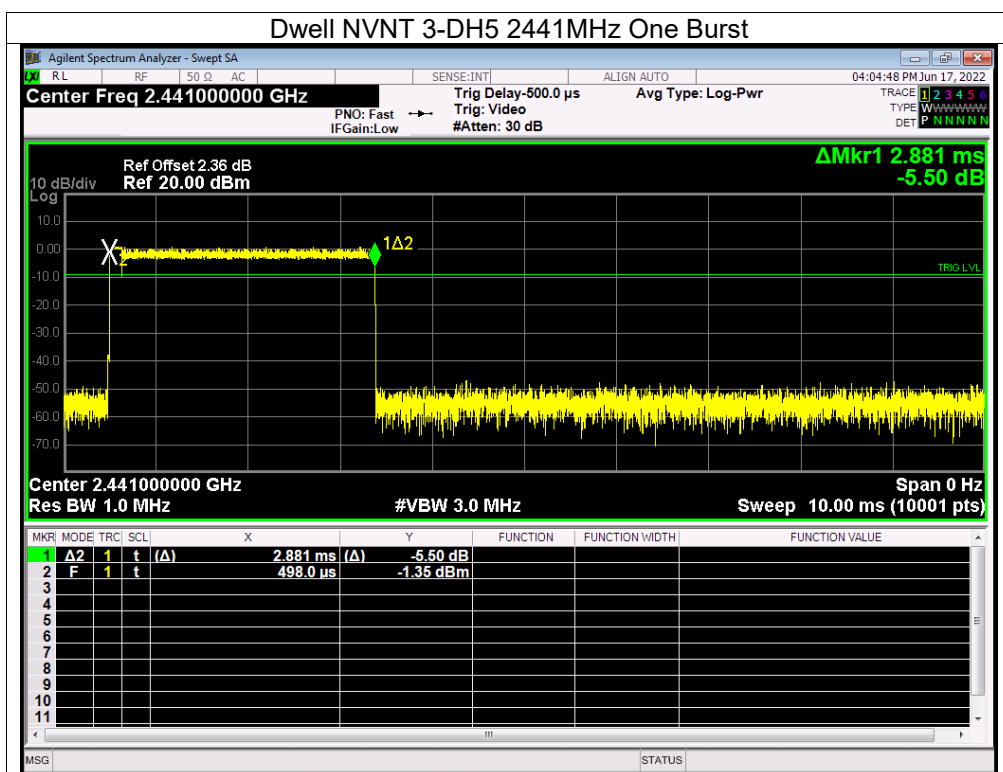
Dwell NVNT 1-DH3 2441MHz One Burst











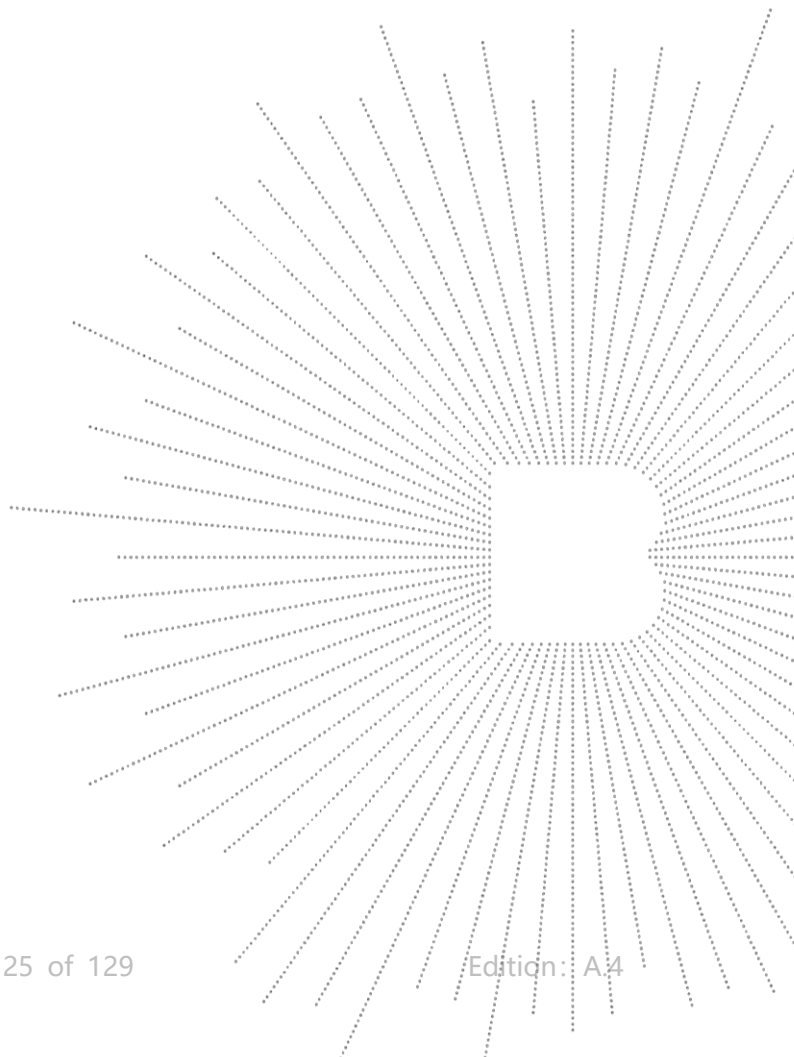
15. Antenna Requirement

15.1 Limit

15.203 requirement: For intentional device, according to 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.

15.2 Test Result

The EUT antenna is Chip antenna, fulfill the requirement of this section.



16. EUT Photographs

EUT Photo 1

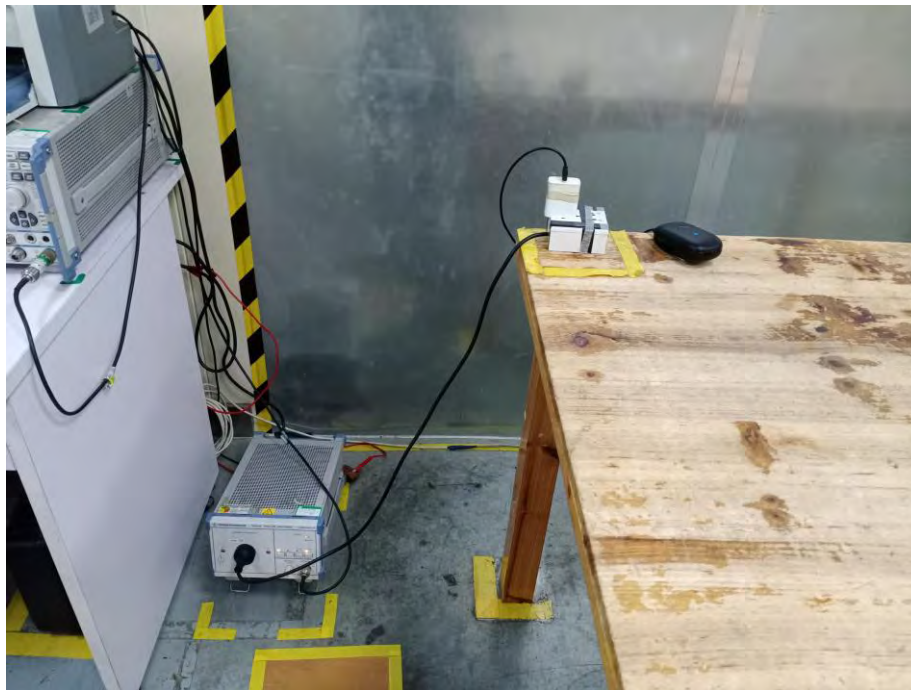


EUT Photo 2

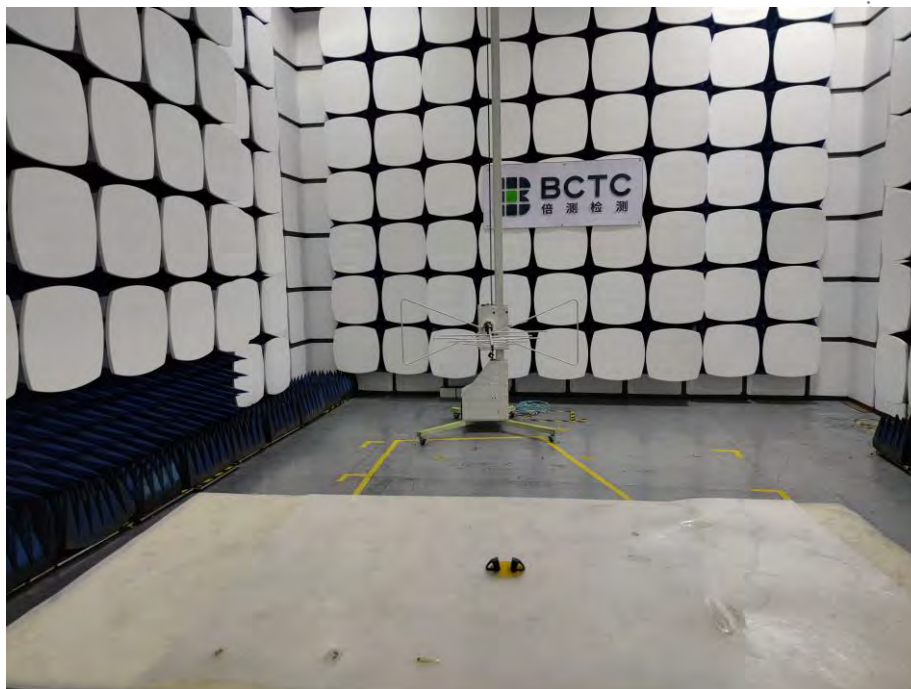


17. EUT Test Setup Photographs

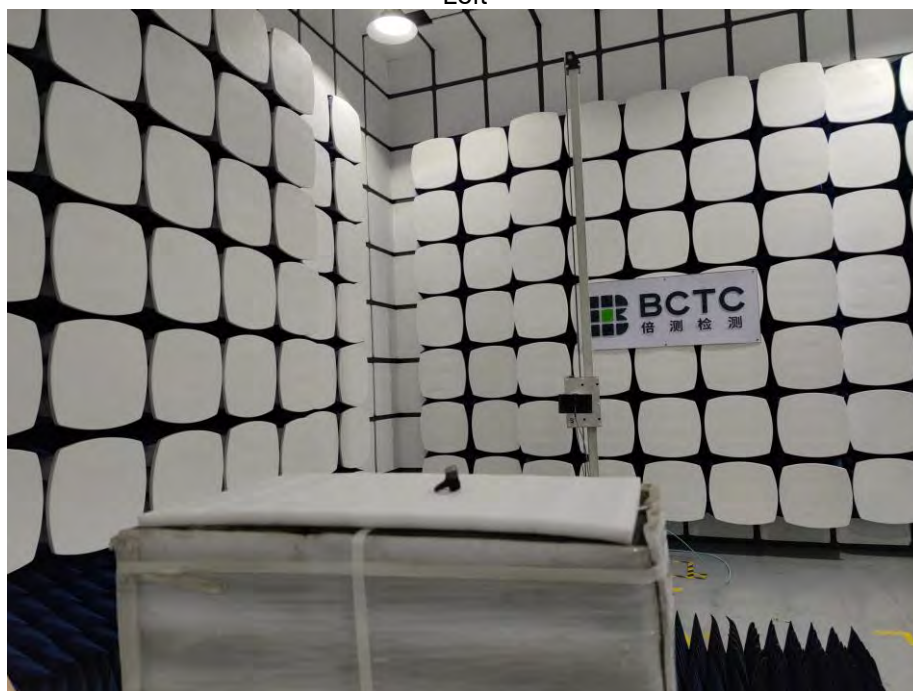
Conducted Measurement Photo



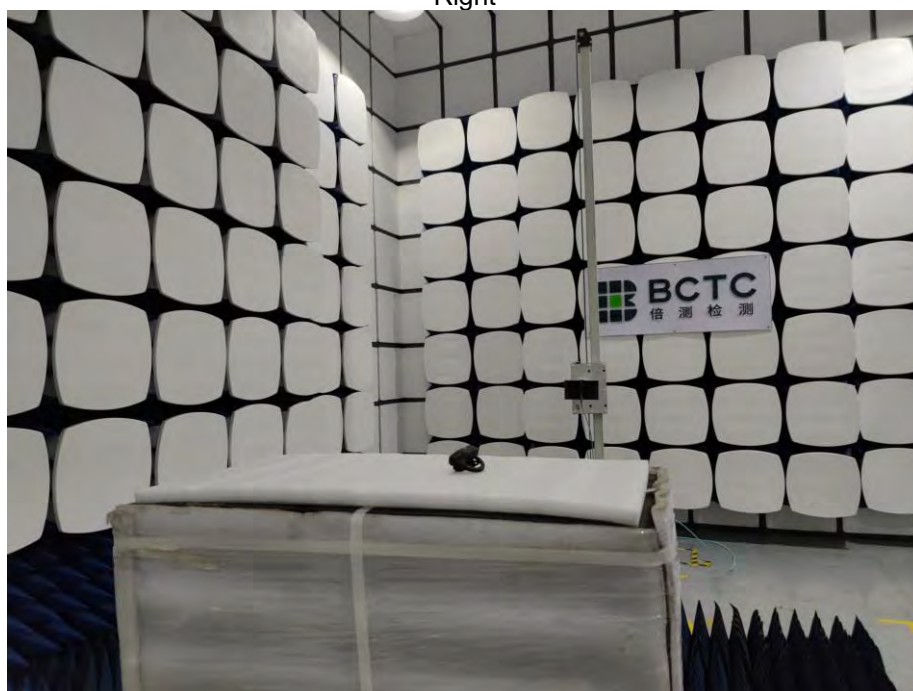
Radiated Measurement Photos



Left



Right



STATEMENT

- 1.The equipment lists are traceable to the national reference standards.
- 2.The test report can not be partially copied unless prior written approval is issued from our lab.
- 3.The test report is invalid without stamp of laboratory.
- 4.The test report is invalid without signature of person(s) testing and authorizing.
- 5.The test process and test result is only related to the Unit Under Test.
- 6.The quality system of our laboratory is in accordance with ISO/IEC17025.
- 7.If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:

1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: 400-788-9558

P.C.: 518103

FAX: 0755-33229357

Website: <http://www.chnbctc.com>

E-Mail: bctc@bctc-lab.com.cn

***** END *****