

10. 20 dB Bandwidth

10.1 Block Diagram Of Test Setup



10.2 Limit

N/A

10.3 Test procedure

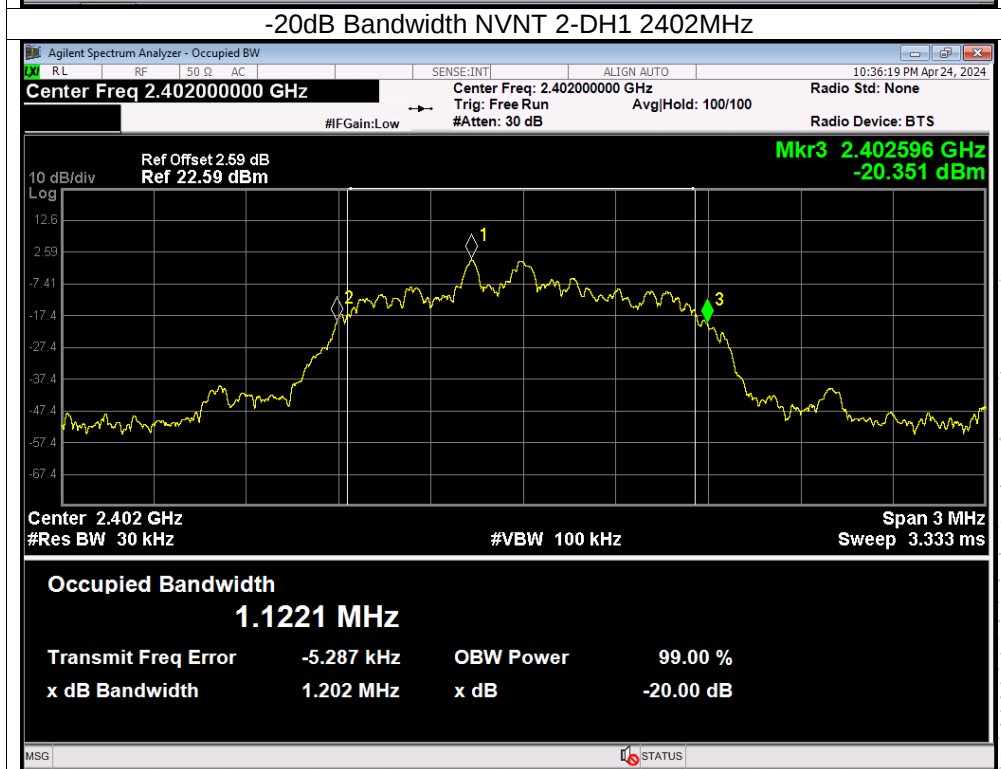
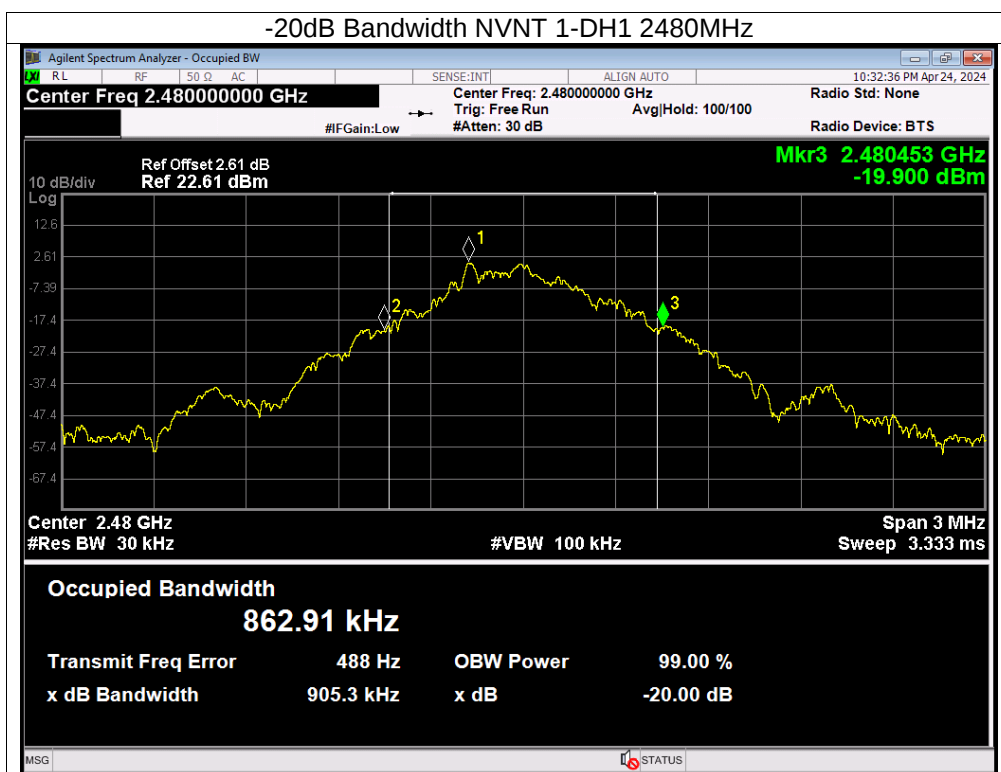
1. Set RBW = 30kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude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

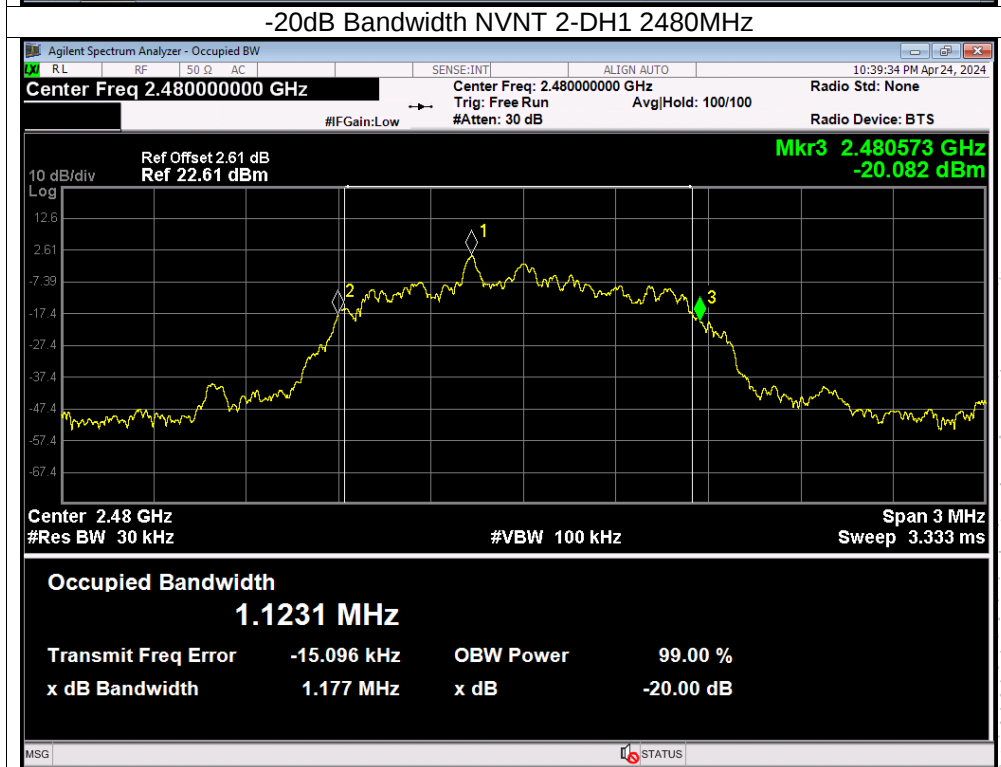
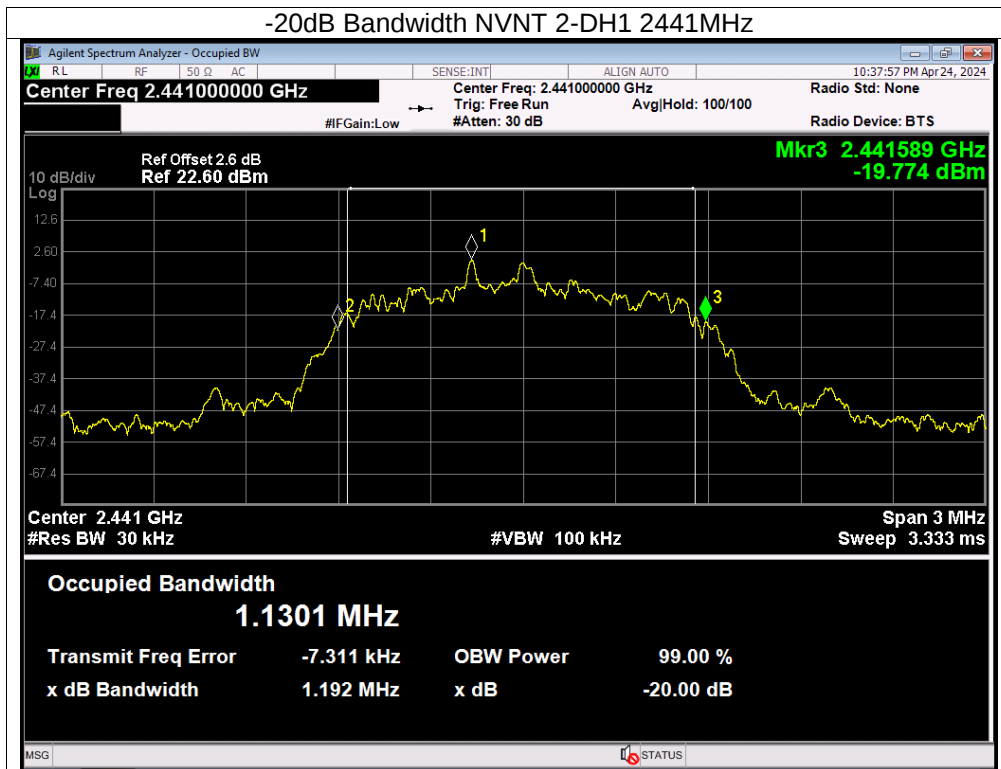
10.4 Test Result

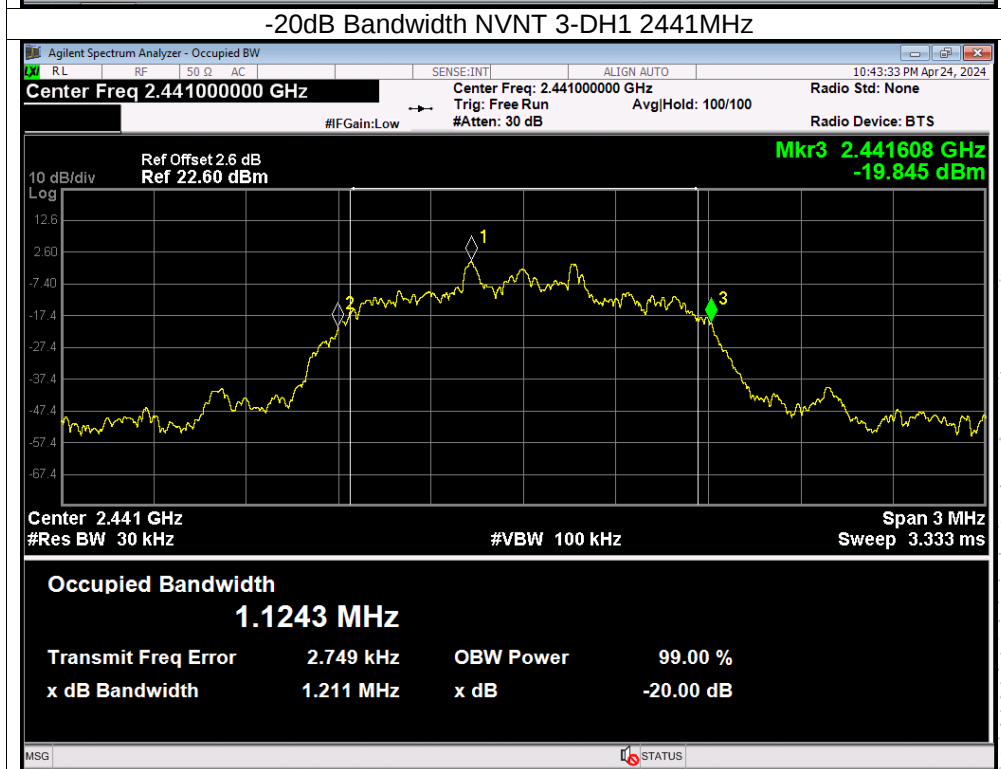
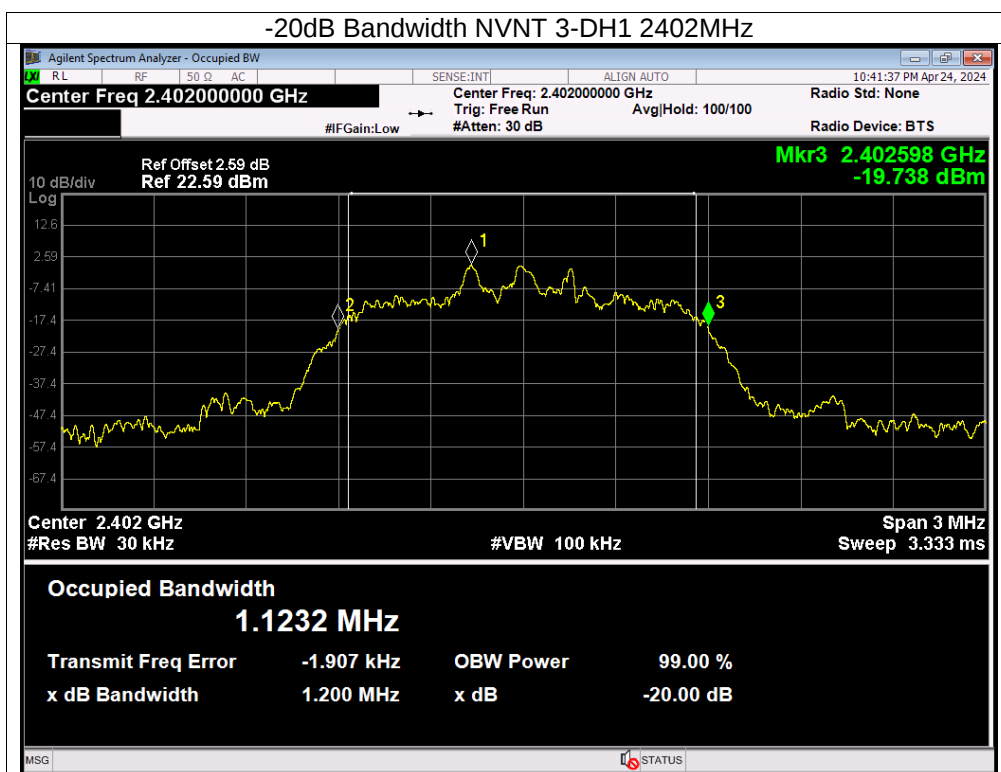
Left

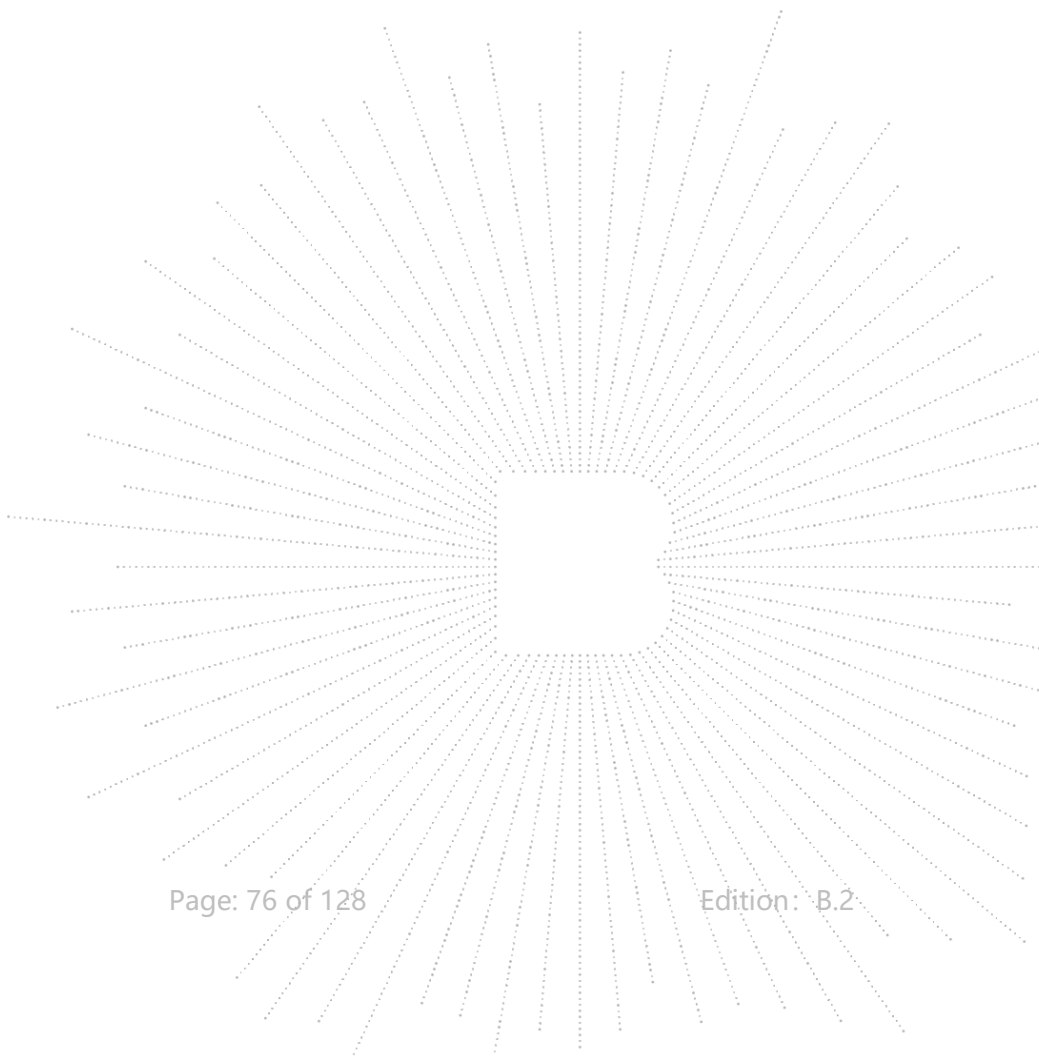
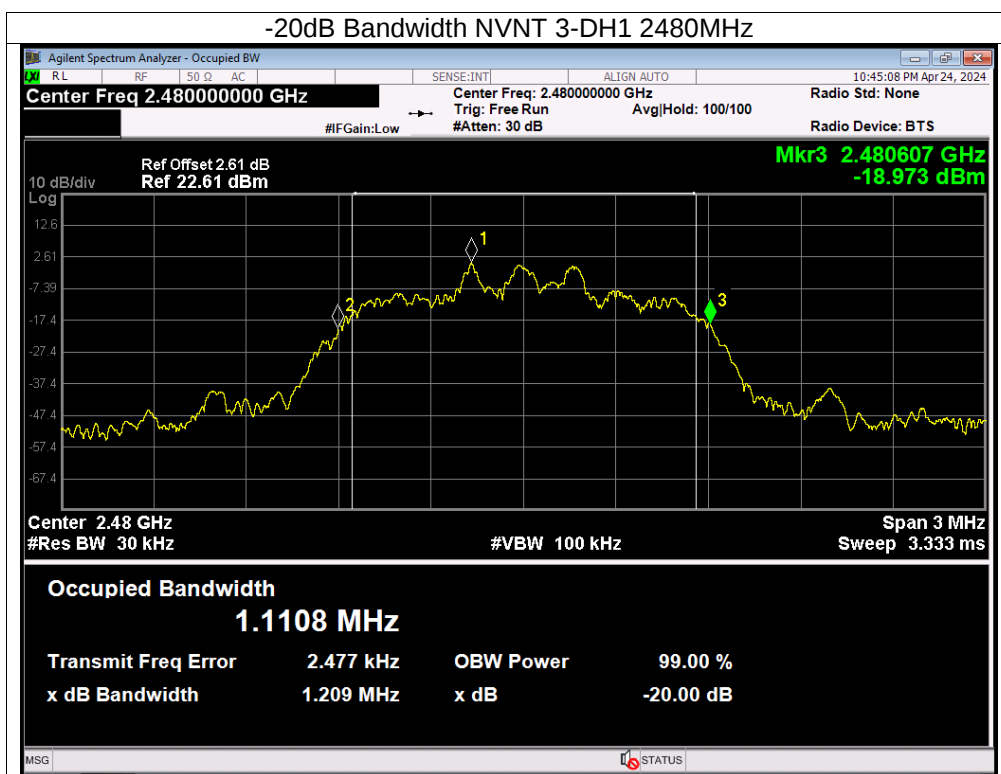
Condition	Mode	Frequency (MHz)	-20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH1	2402	0.855	Pass
NVNT	1-DH1	2441	0.866	Pass
NVNT	1-DH1	2480	0.905	Pass
NVNT	2-DH1	2402	1.202	Pass
NVNT	2-DH1	2441	1.192	Pass
NVNT	2-DH1	2480	1.177	Pass
NVNT	3-DH1	2402	1.2	Pass
NVNT	3-DH1	2441	1.211	Pass
NVNT	3-DH1	2480	1.209	Pass





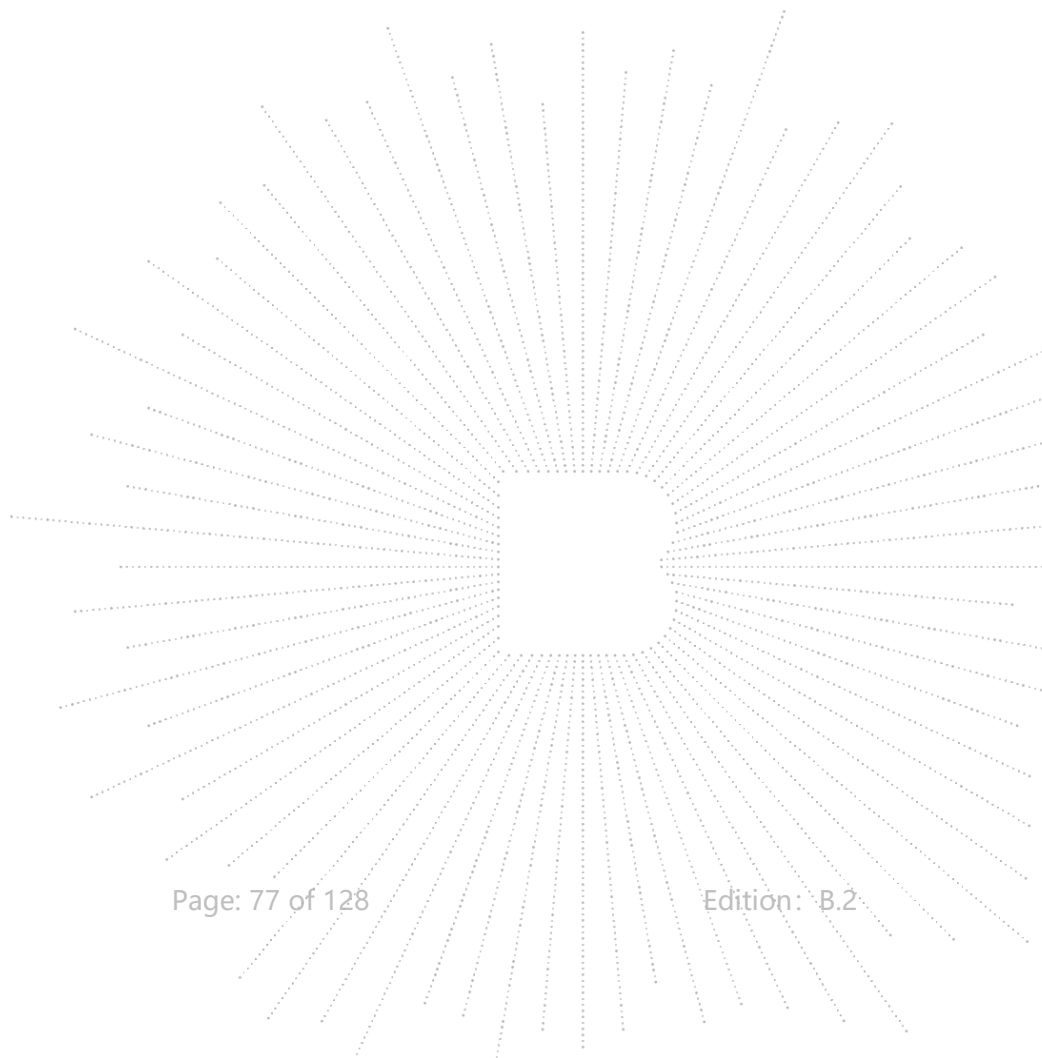




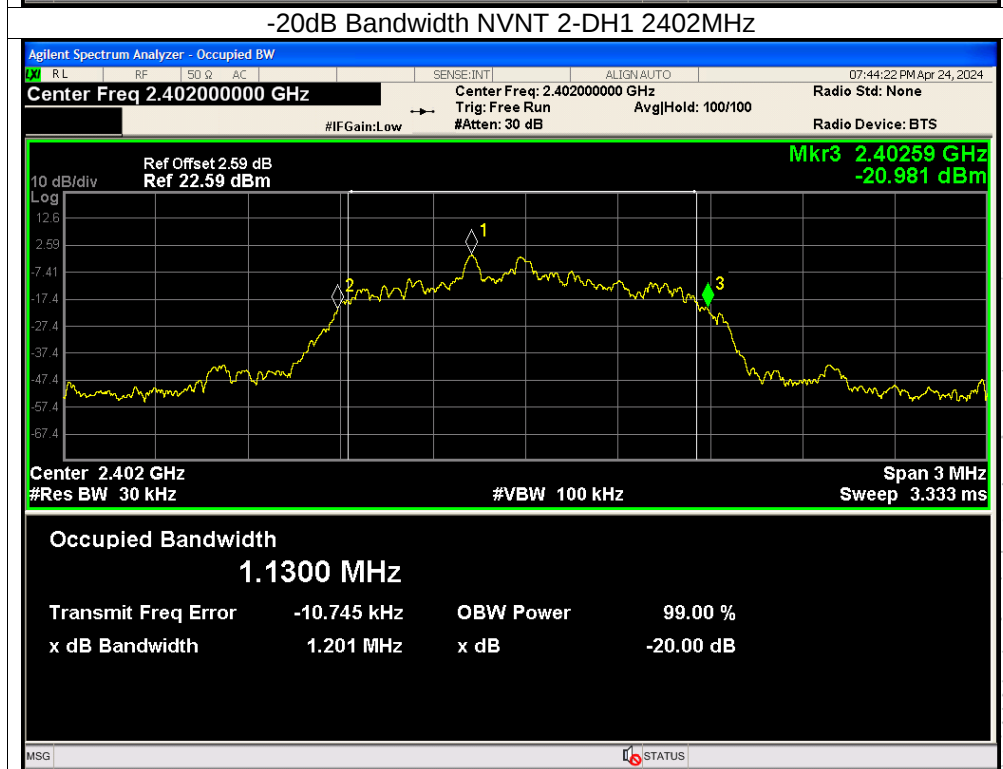
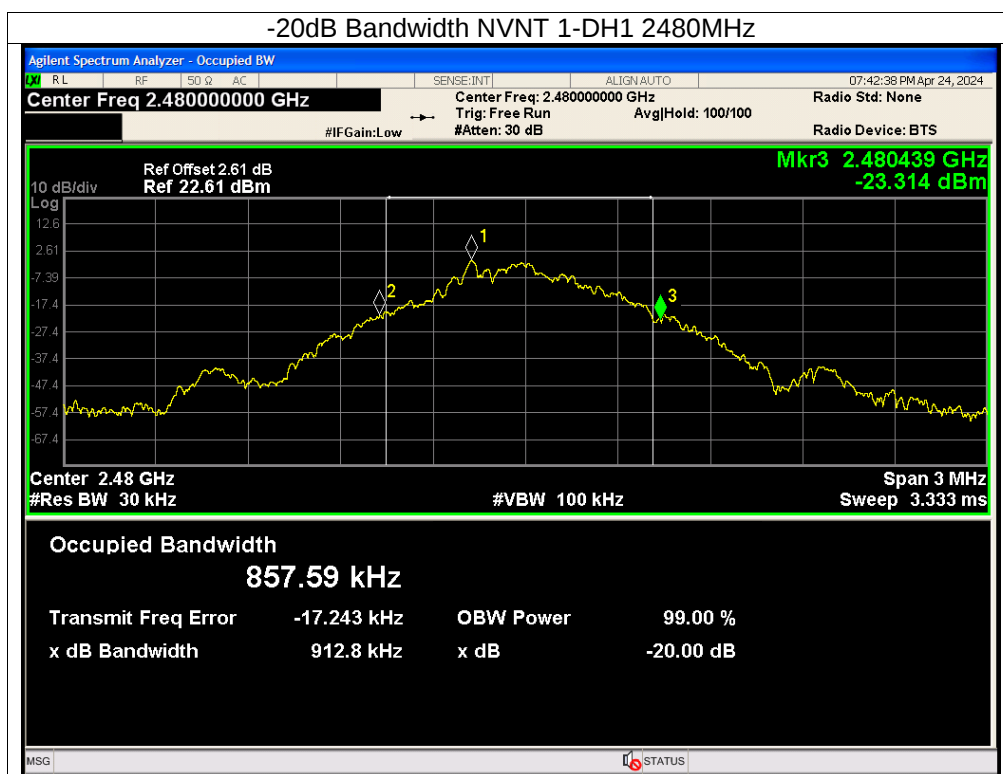


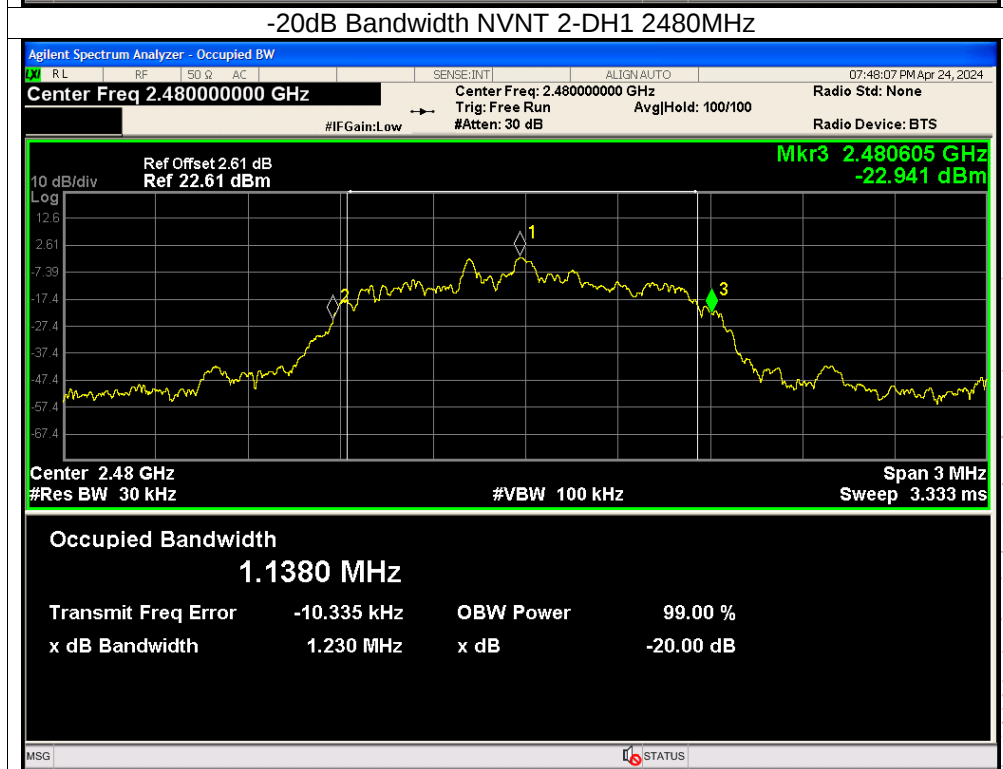
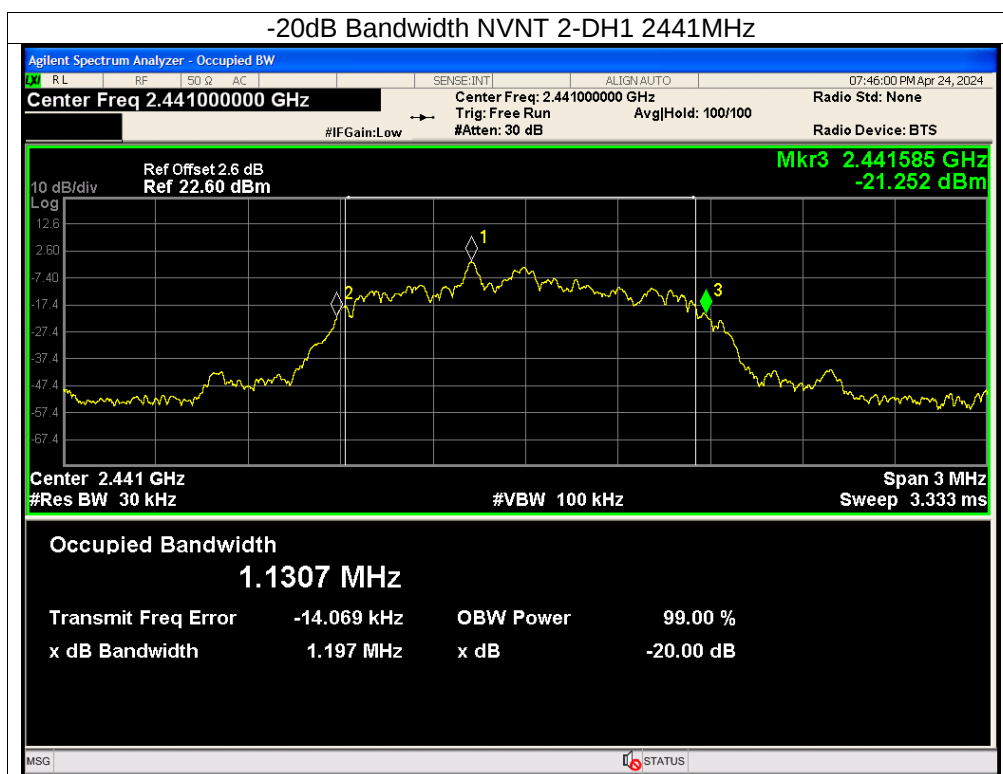
Right

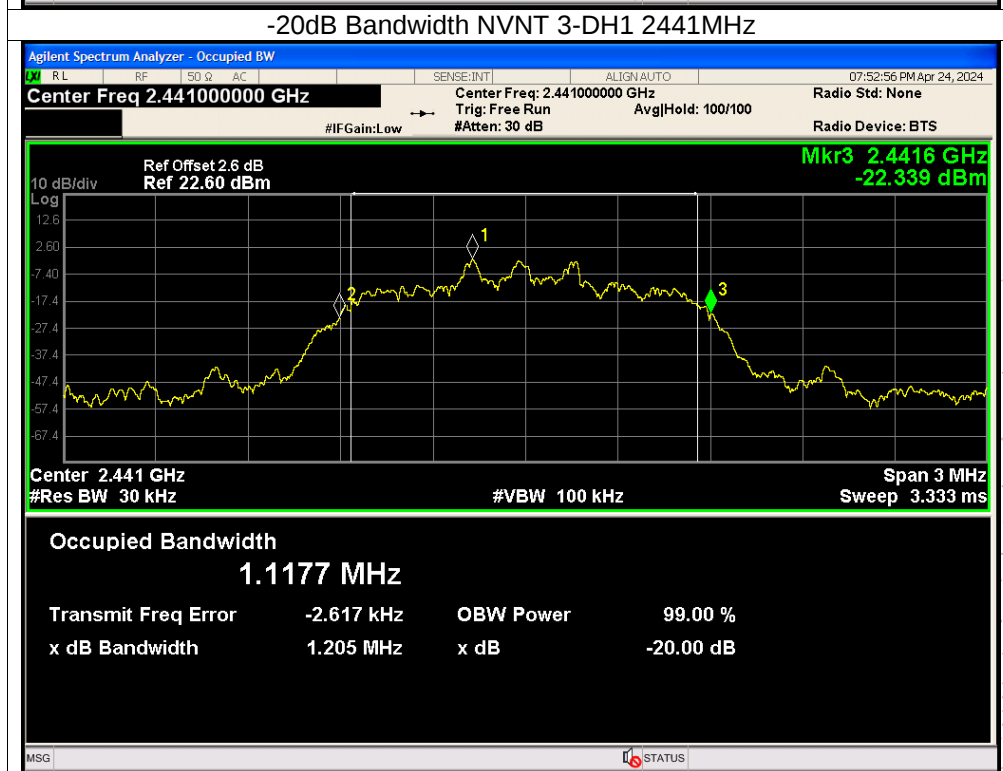
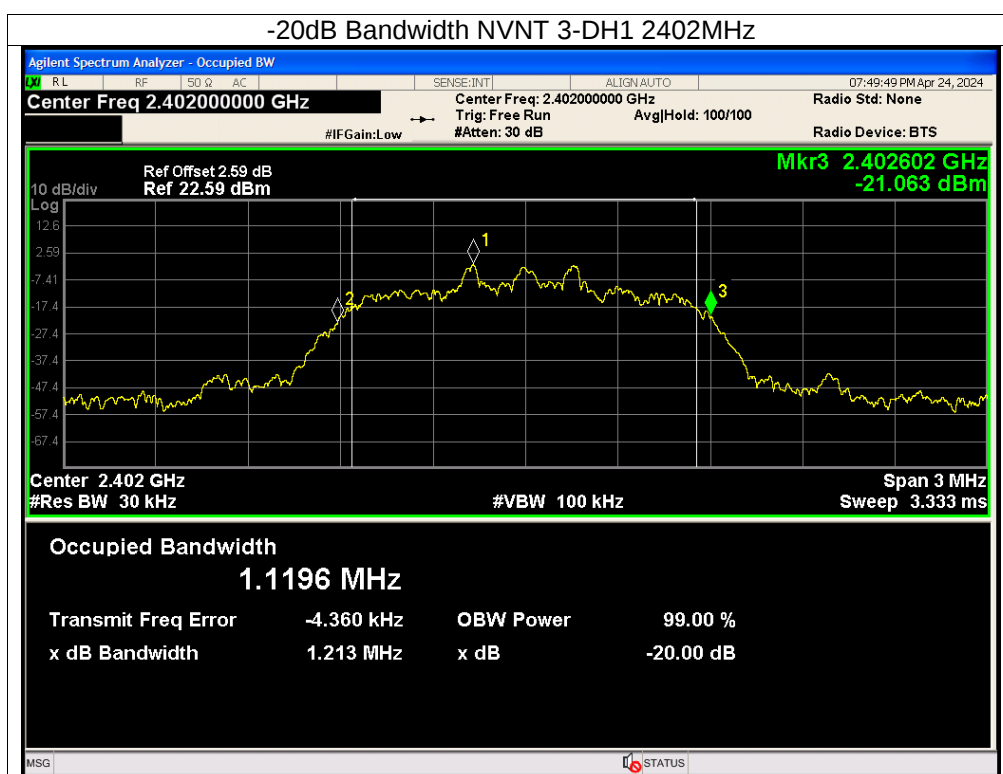
Condition	Mode	Frequency (MHz)	-20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH1	2402	0.935	Pass
NVNT	1-DH1	2441	0.865	Pass
NVNT	1-DH1	2480	0.913	Pass
NVNT	2-DH1	2402	1.201	Pass
NVNT	2-DH1	2441	1.197	Pass
NVNT	2-DH1	2480	1.23	Pass
NVNT	3-DH1	2402	1.213	Pass
NVNT	3-DH1	2441	1.205	Pass
NVNT	3-DH1	2480	1.208	Pass

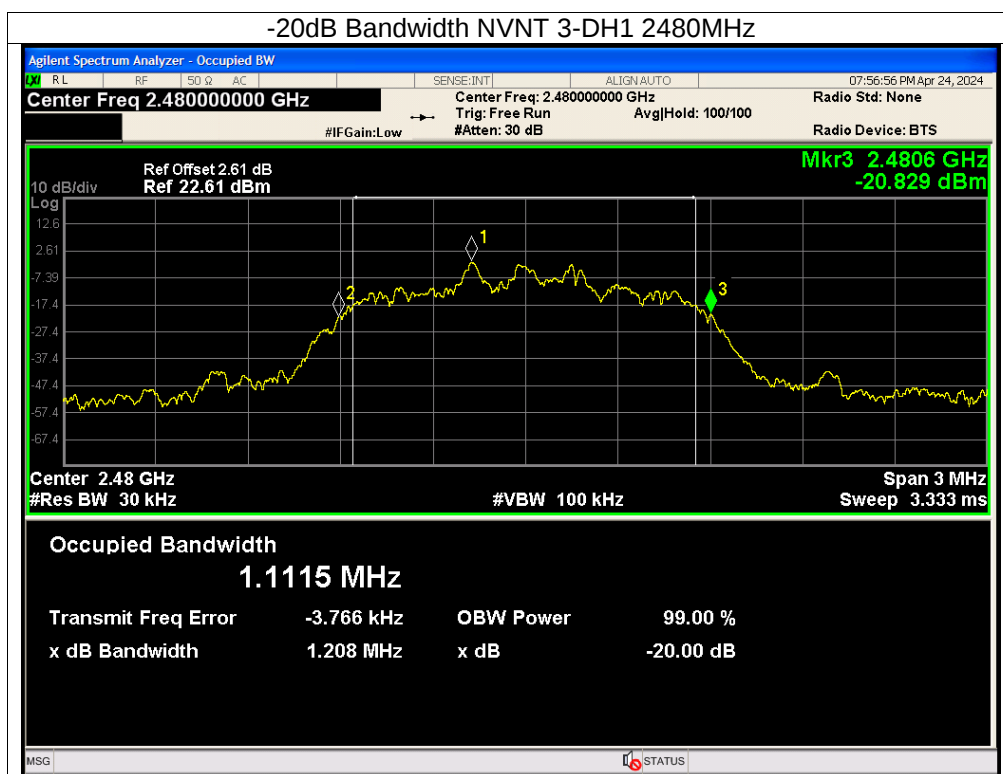












11. Maximum Peak Output Power

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

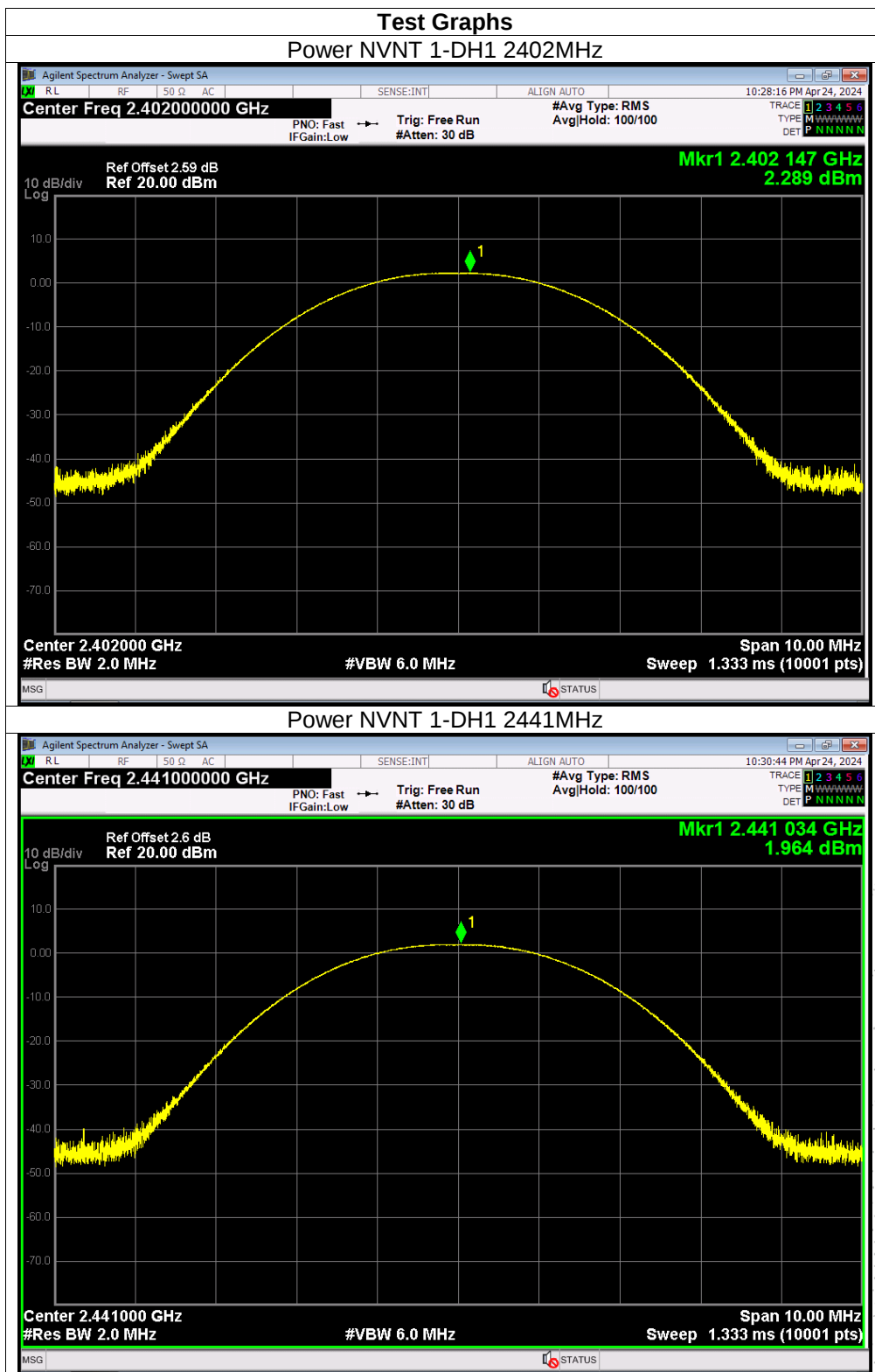
11.3 Test procedure

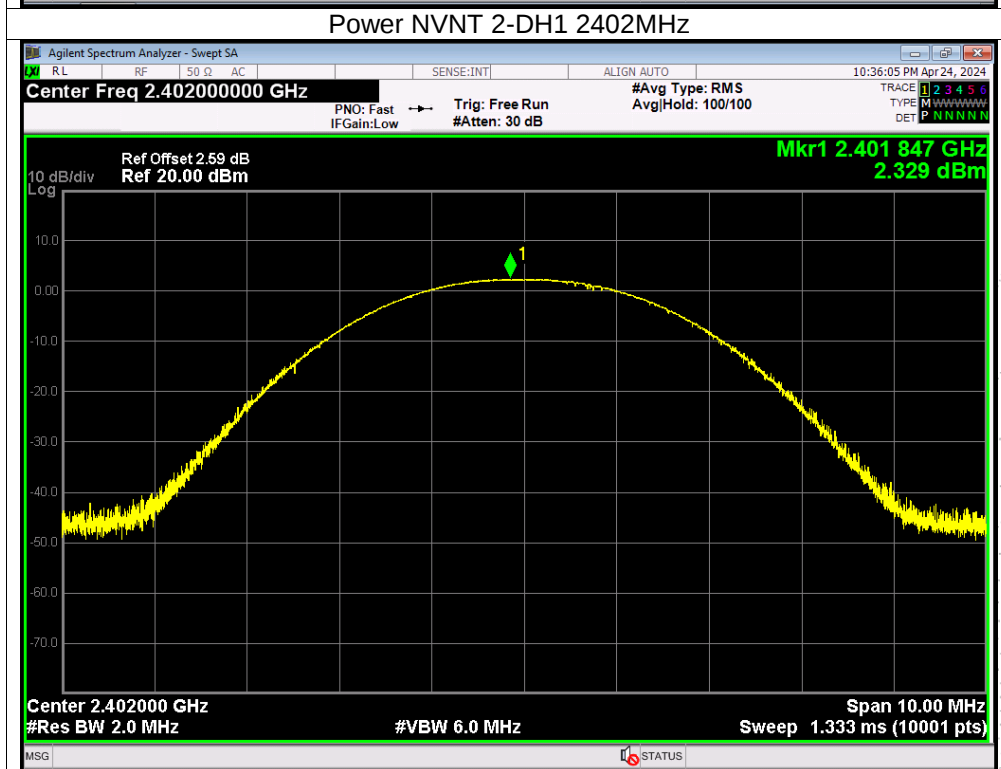
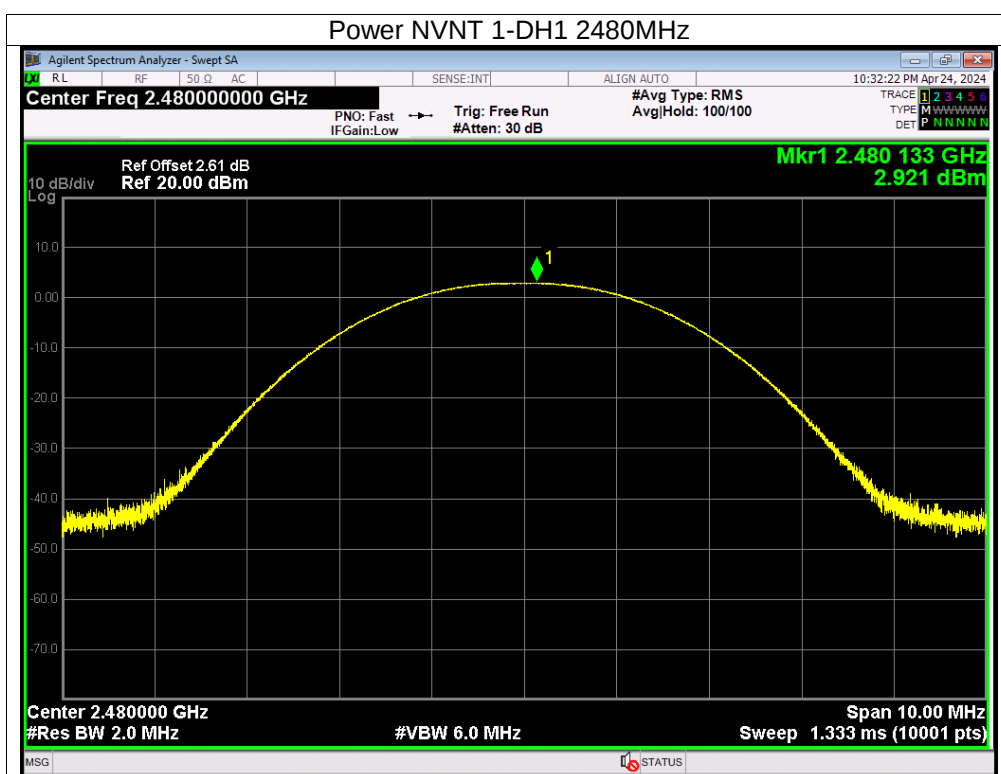
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 2MHz. VBW = 6MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

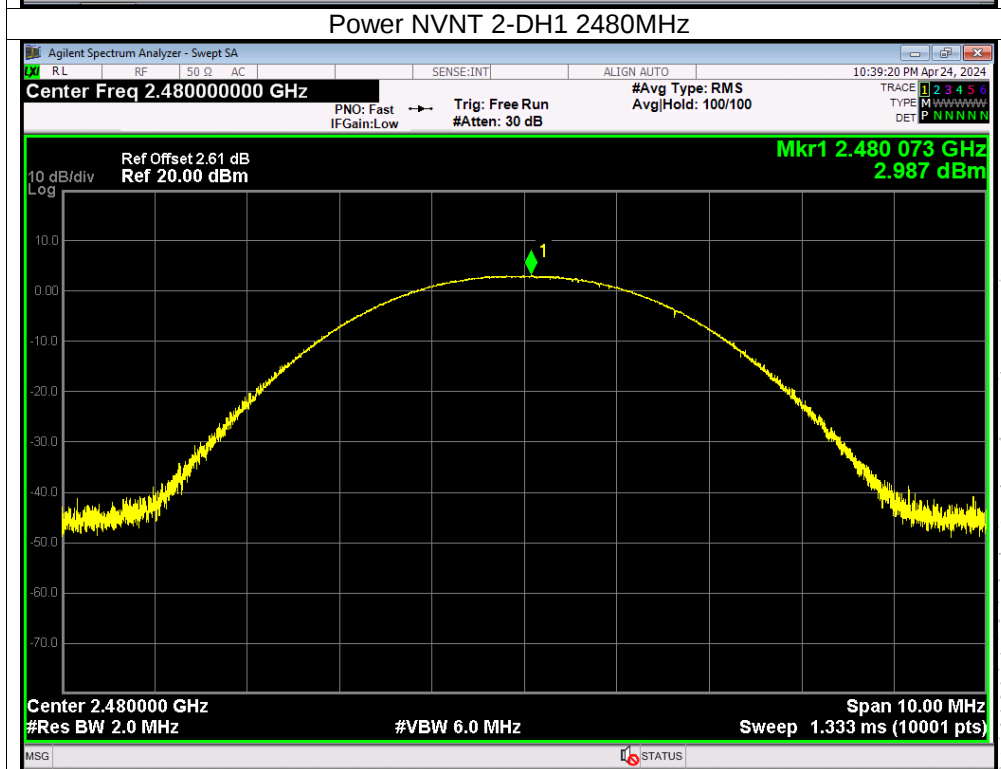
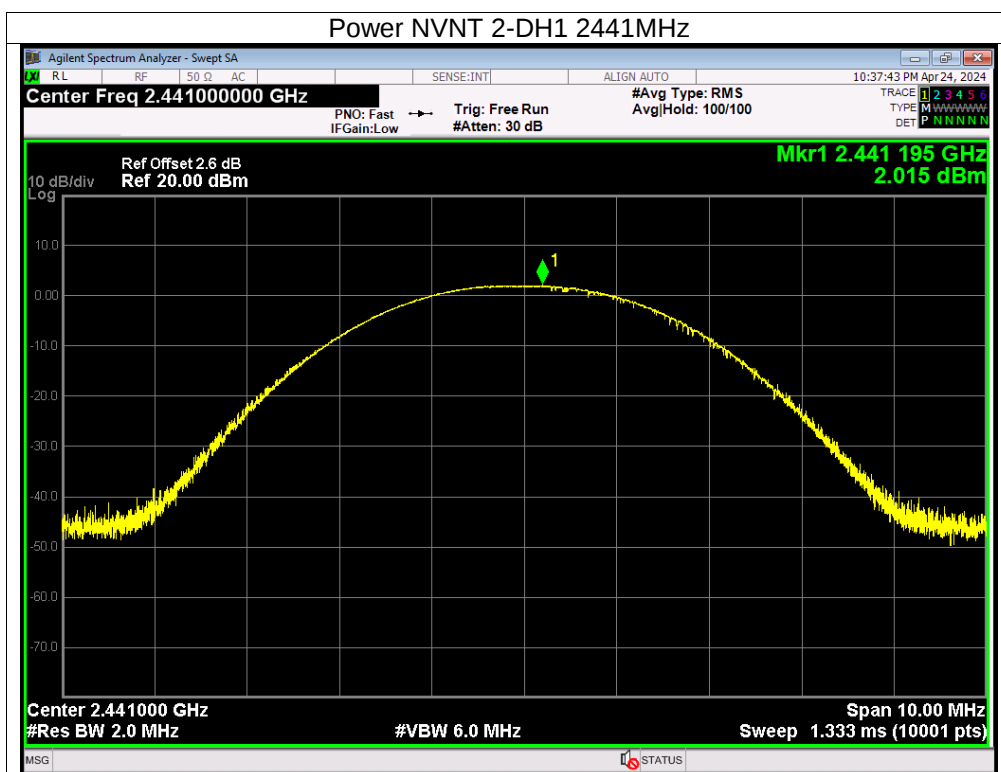
11.4 Test Result

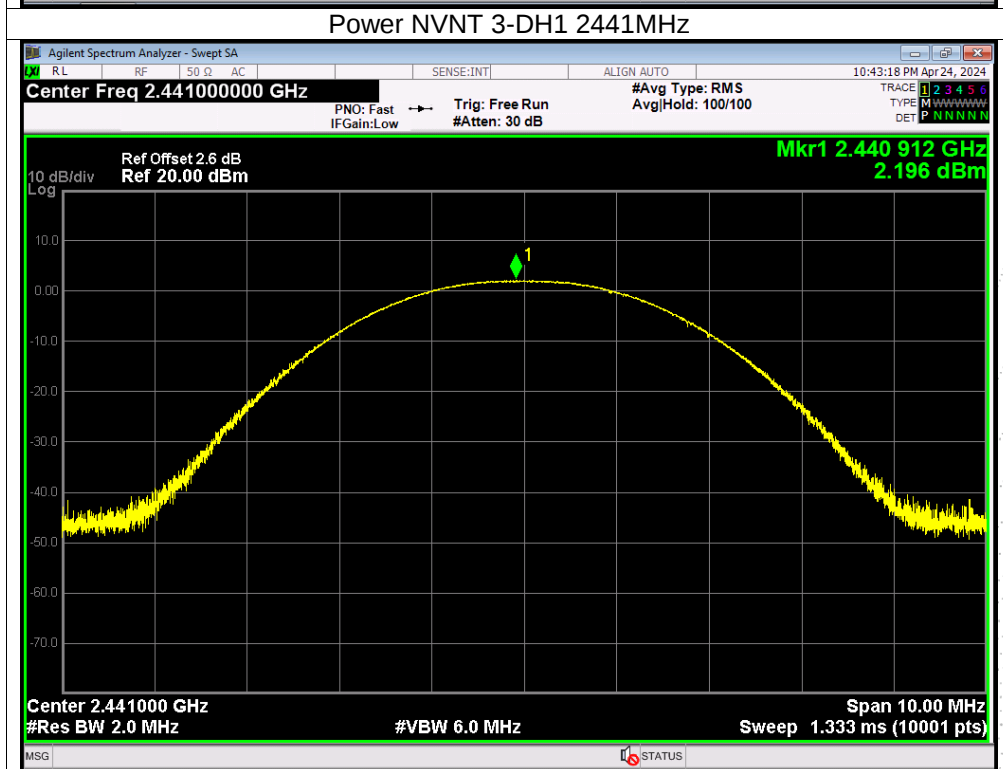
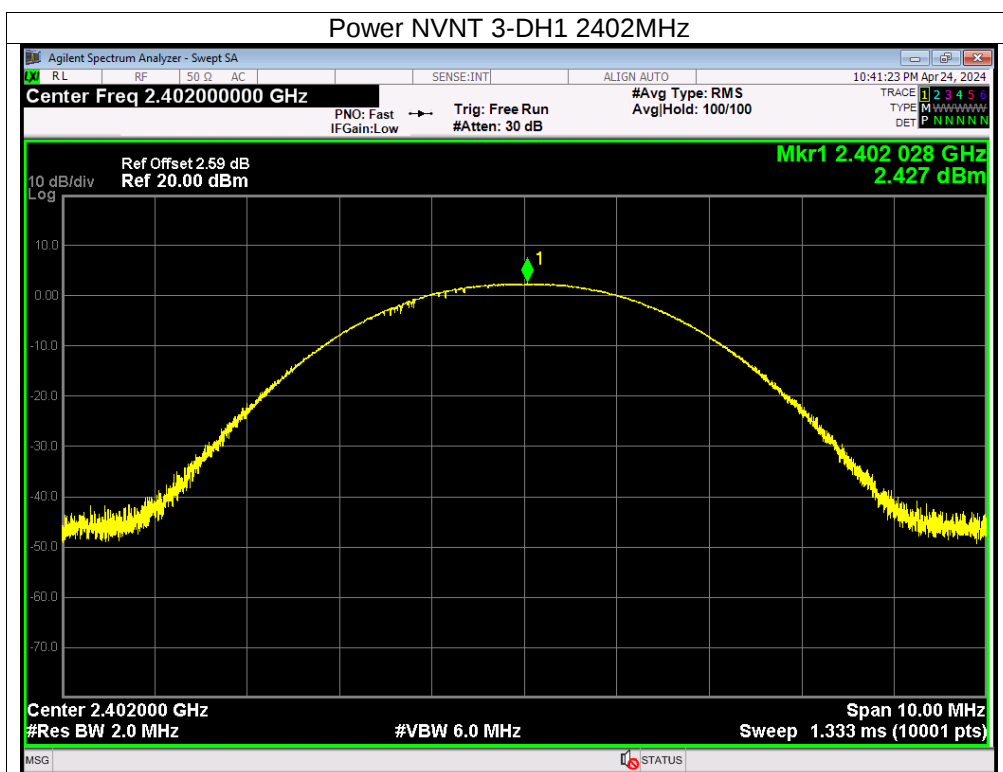
Left

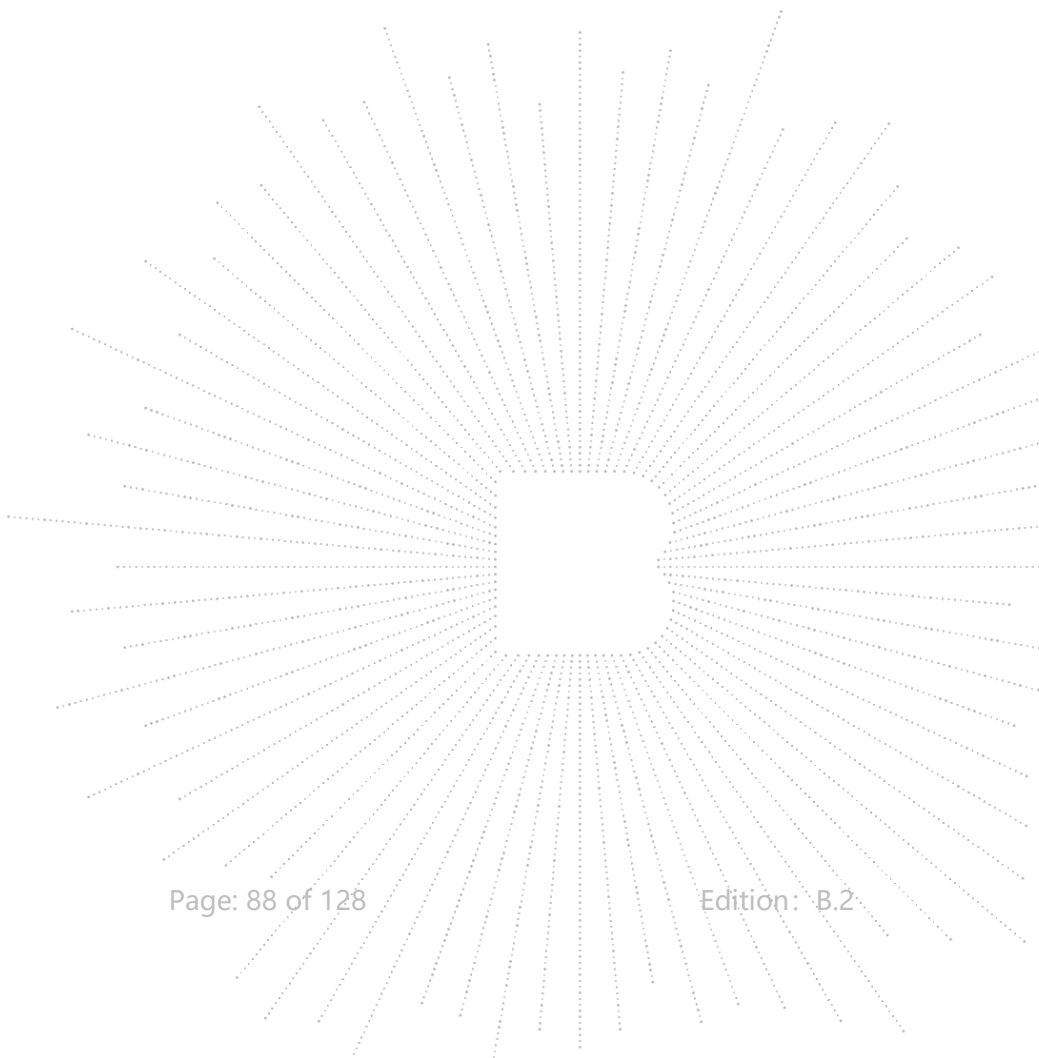
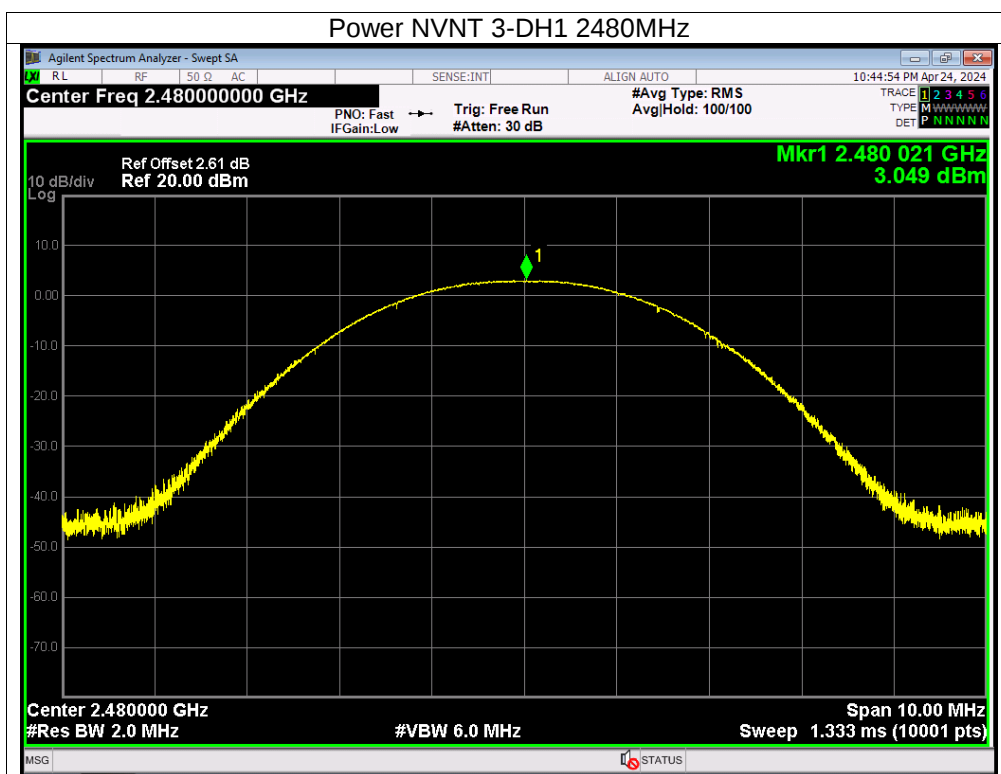
Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH1	2402	2.29	21	Pass
NVNT	1-DH1	2441	1.96	21	Pass
NVNT	1-DH1	2480	2.92	21	Pass
NVNT	2-DH1	2402	2.33	21	Pass
NVNT	2-DH1	2441	2.02	21	Pass
NVNT	2-DH1	2480	2.99	21	Pass
NVNT	3-DH1	2402	2.43	21	Pass
NVNT	3-DH1	2441	2.2	21	Pass
NVNT	3-DH1	2480	3.05	21	Pass





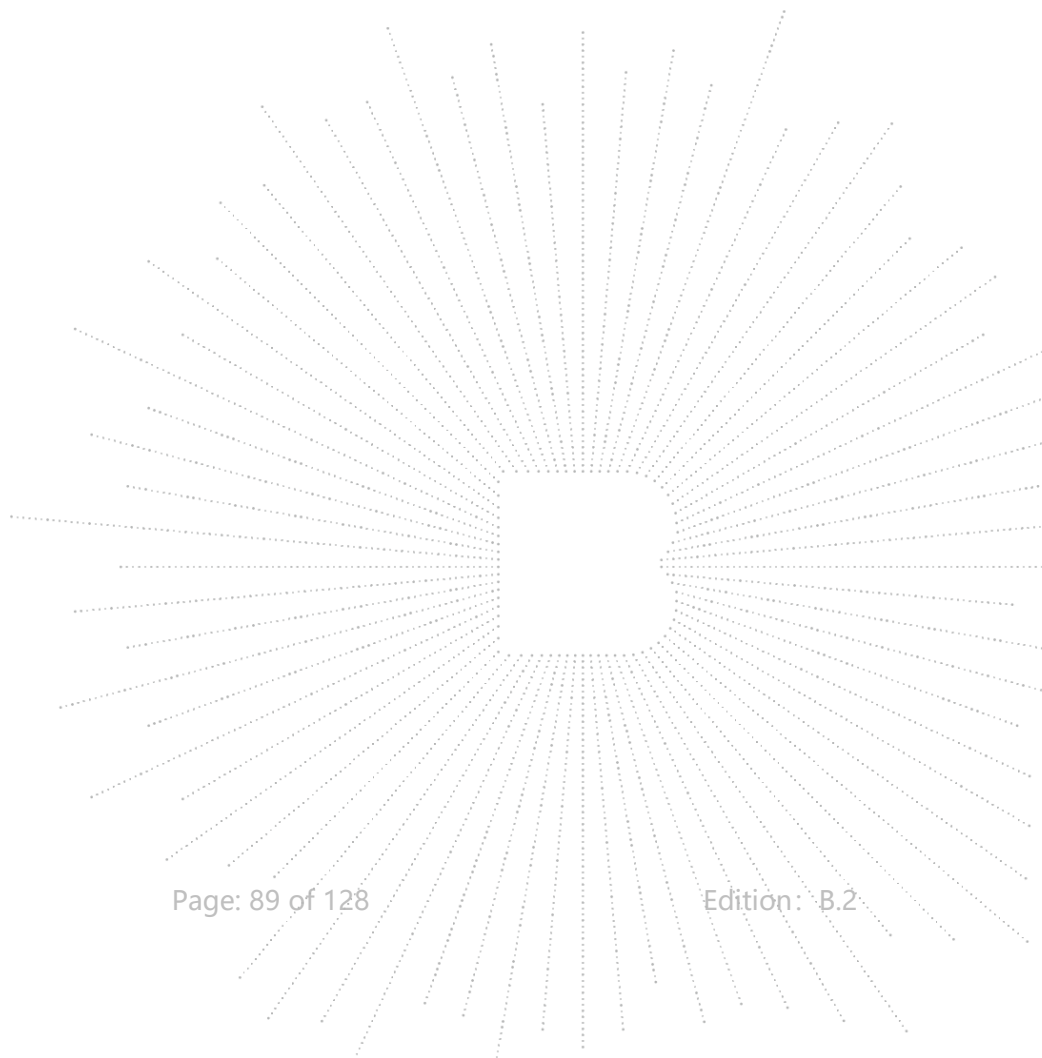


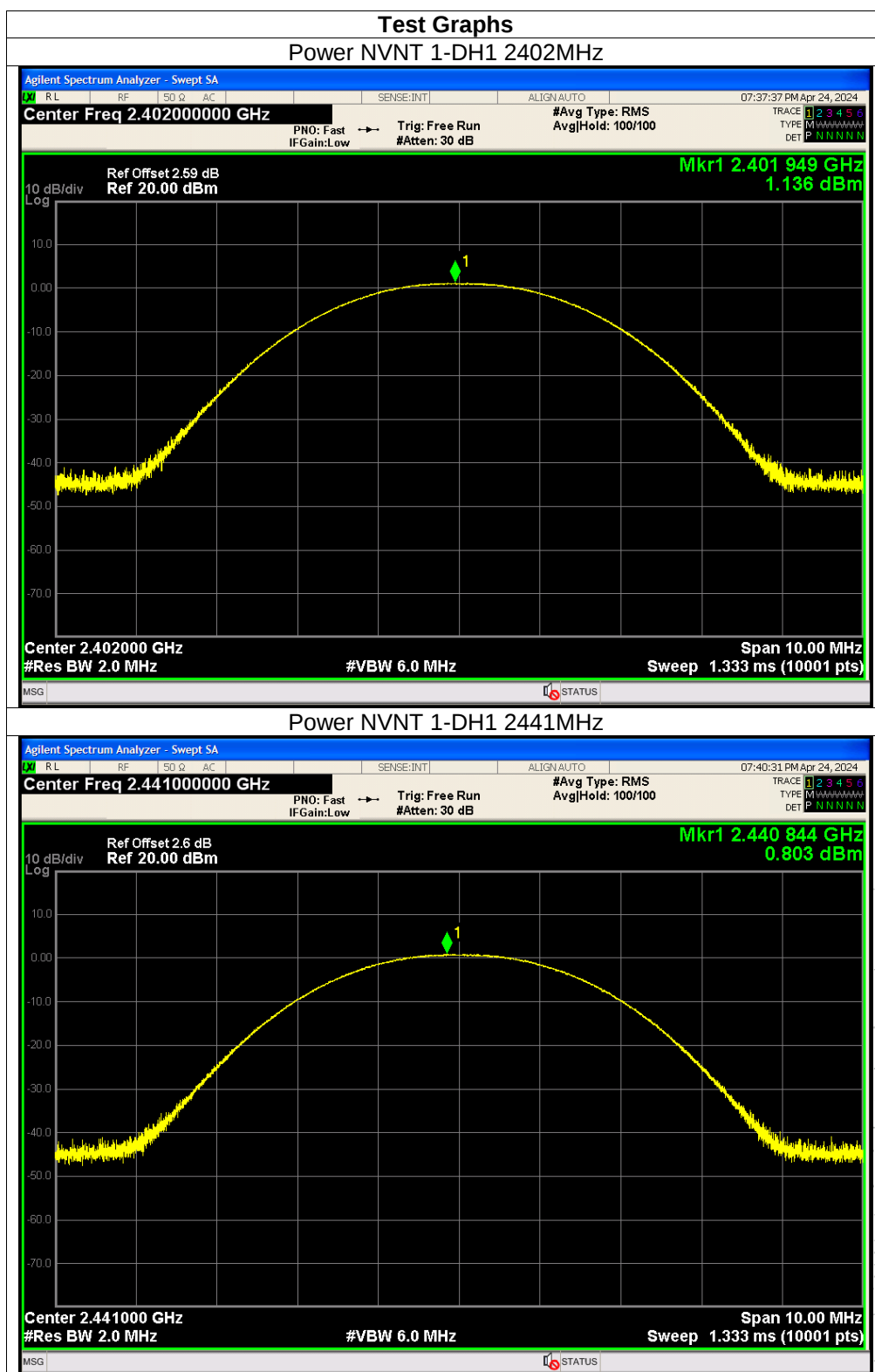


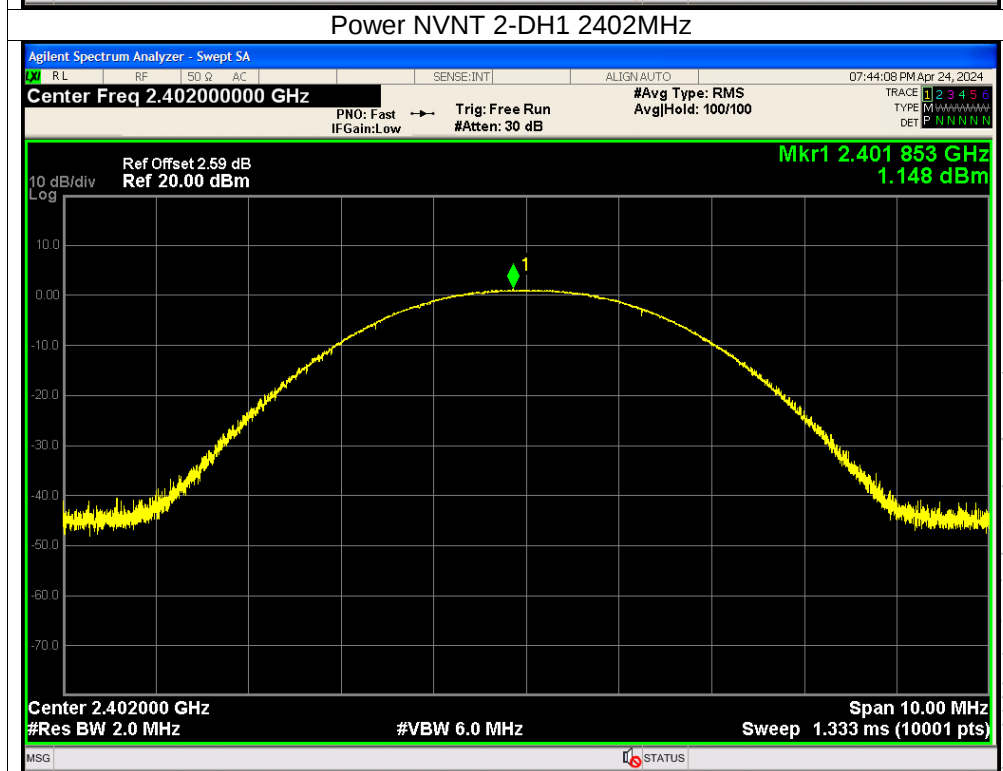
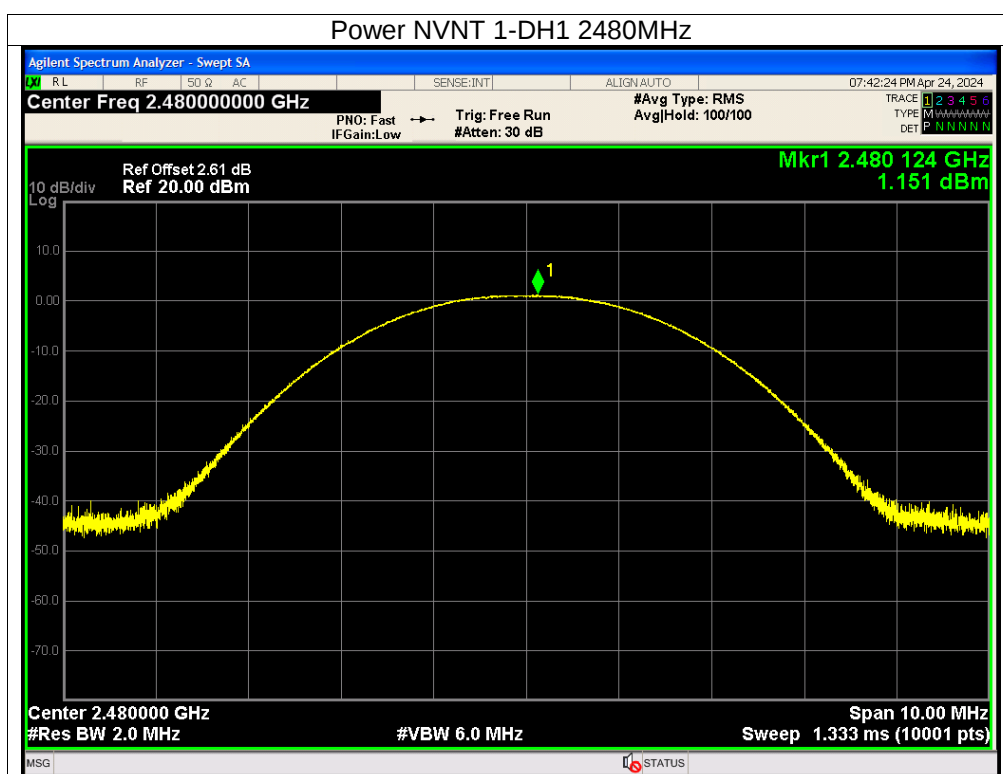


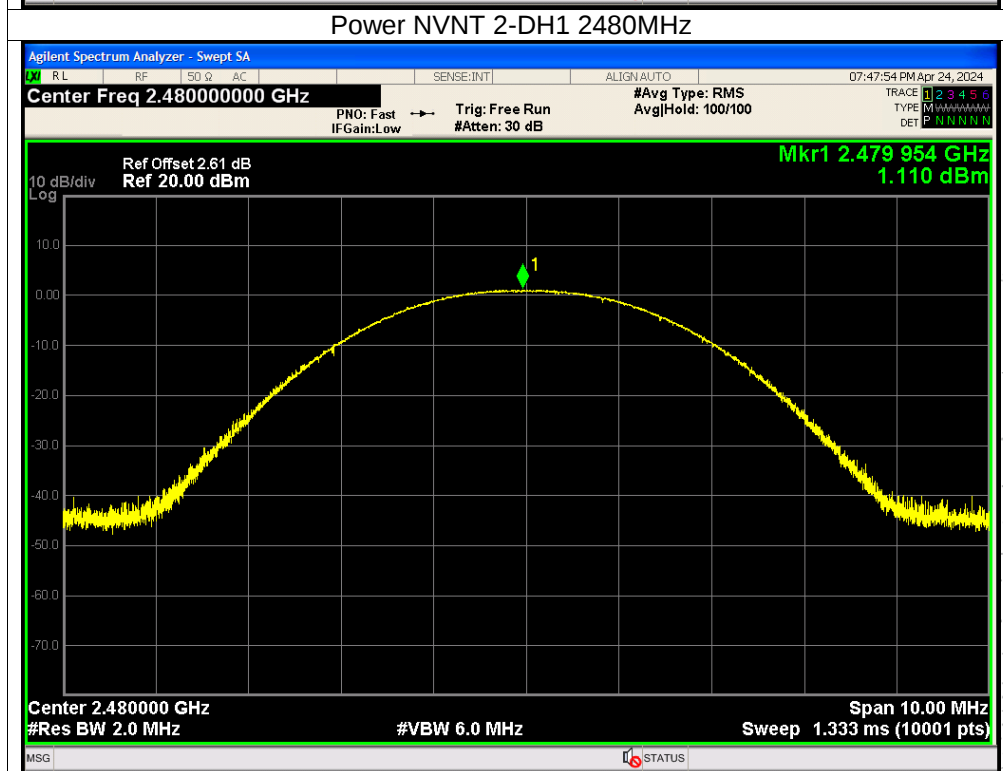
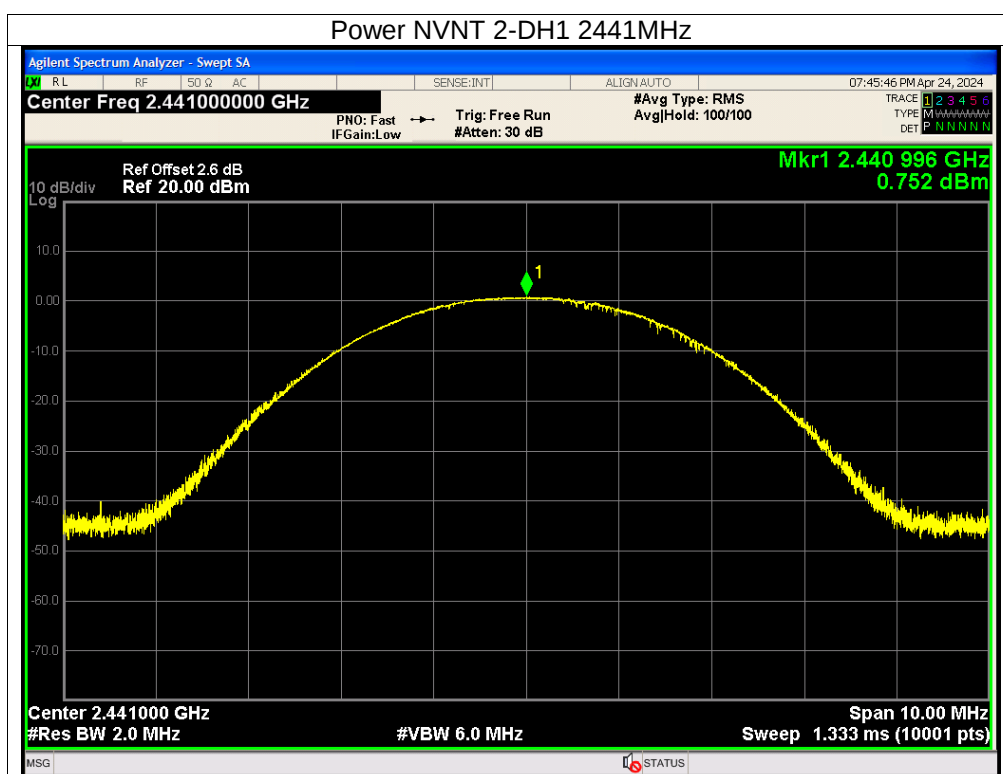
Right

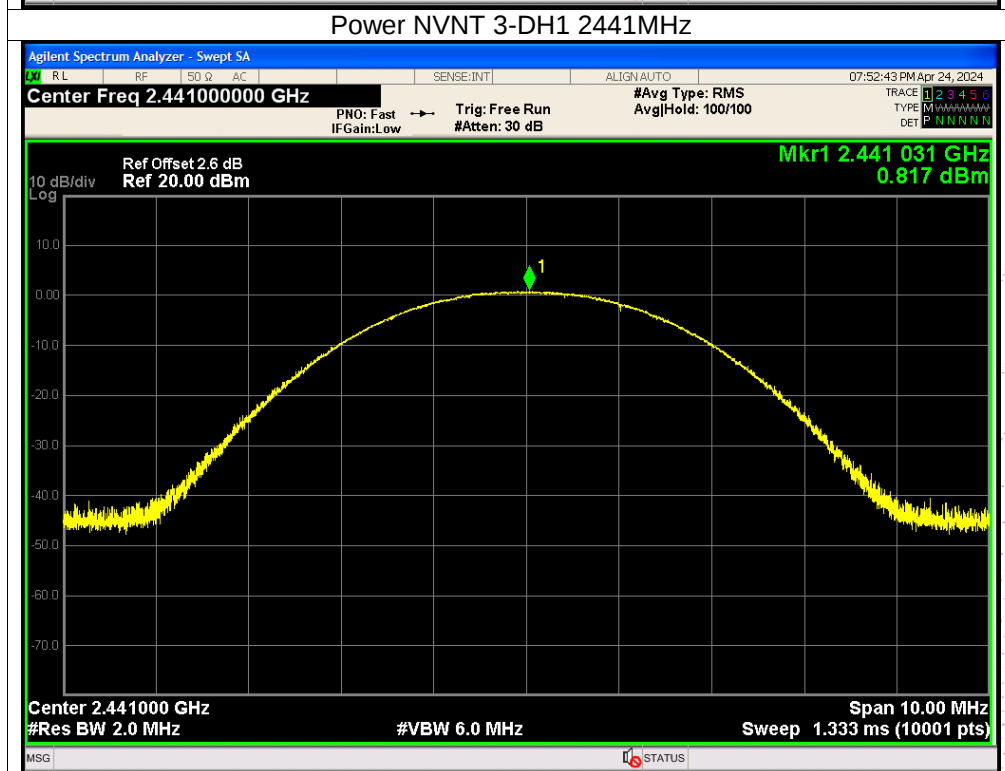
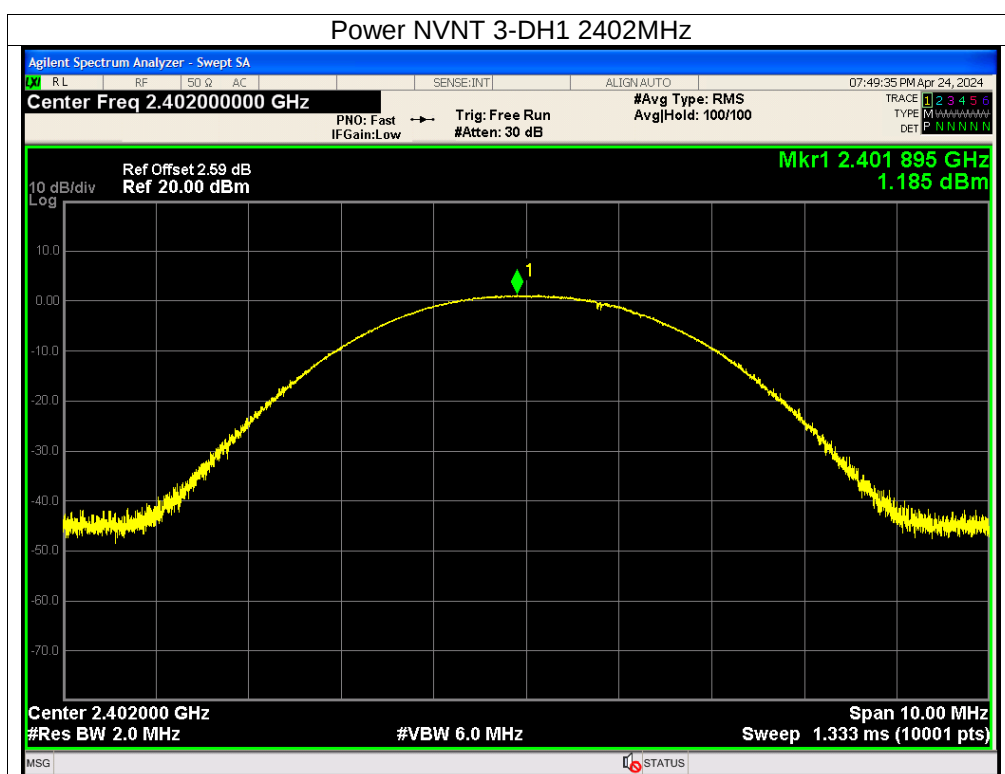
Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH1	2402	1.14	21	Pass
NVNT	1-DH1	2441	0.8	21	Pass
NVNT	1-DH1	2480	1.15	21	Pass
NVNT	2-DH1	2402	1.15	21	Pass
NVNT	2-DH1	2441	0.75	21	Pass
NVNT	2-DH1	2480	1.11	21	Pass
NVNT	3-DH1	2402	1.19	21	Pass
NVNT	3-DH1	2441	0.82	21	Pass
NVNT	3-DH1	2480	1.12	21	Pass

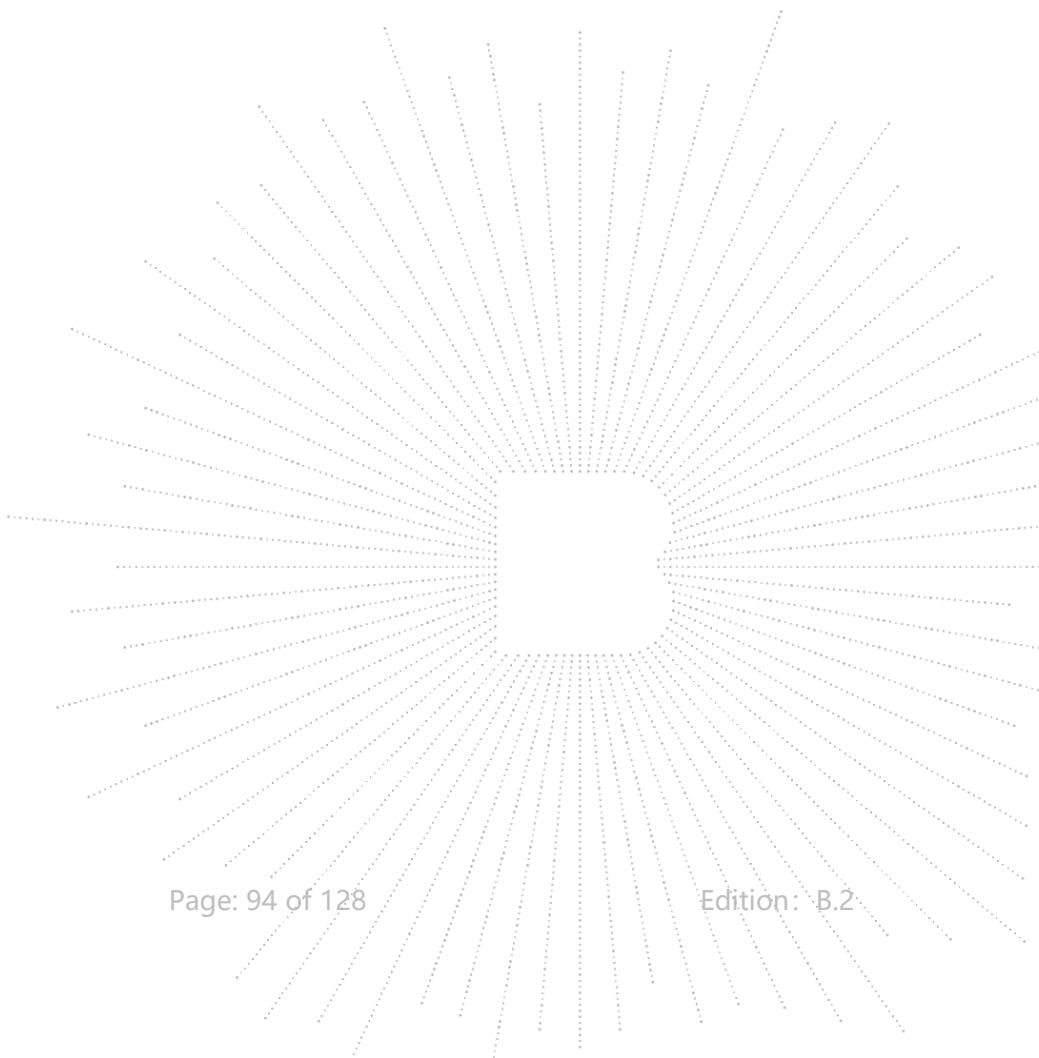
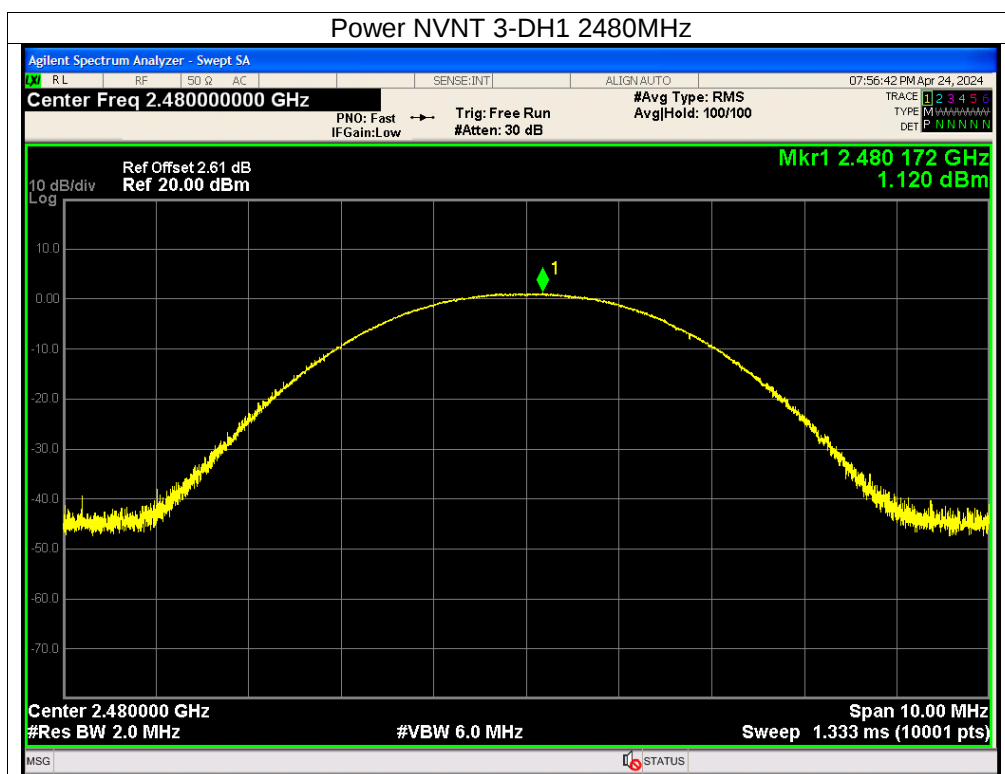












12. Hopping Channel Separation

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.

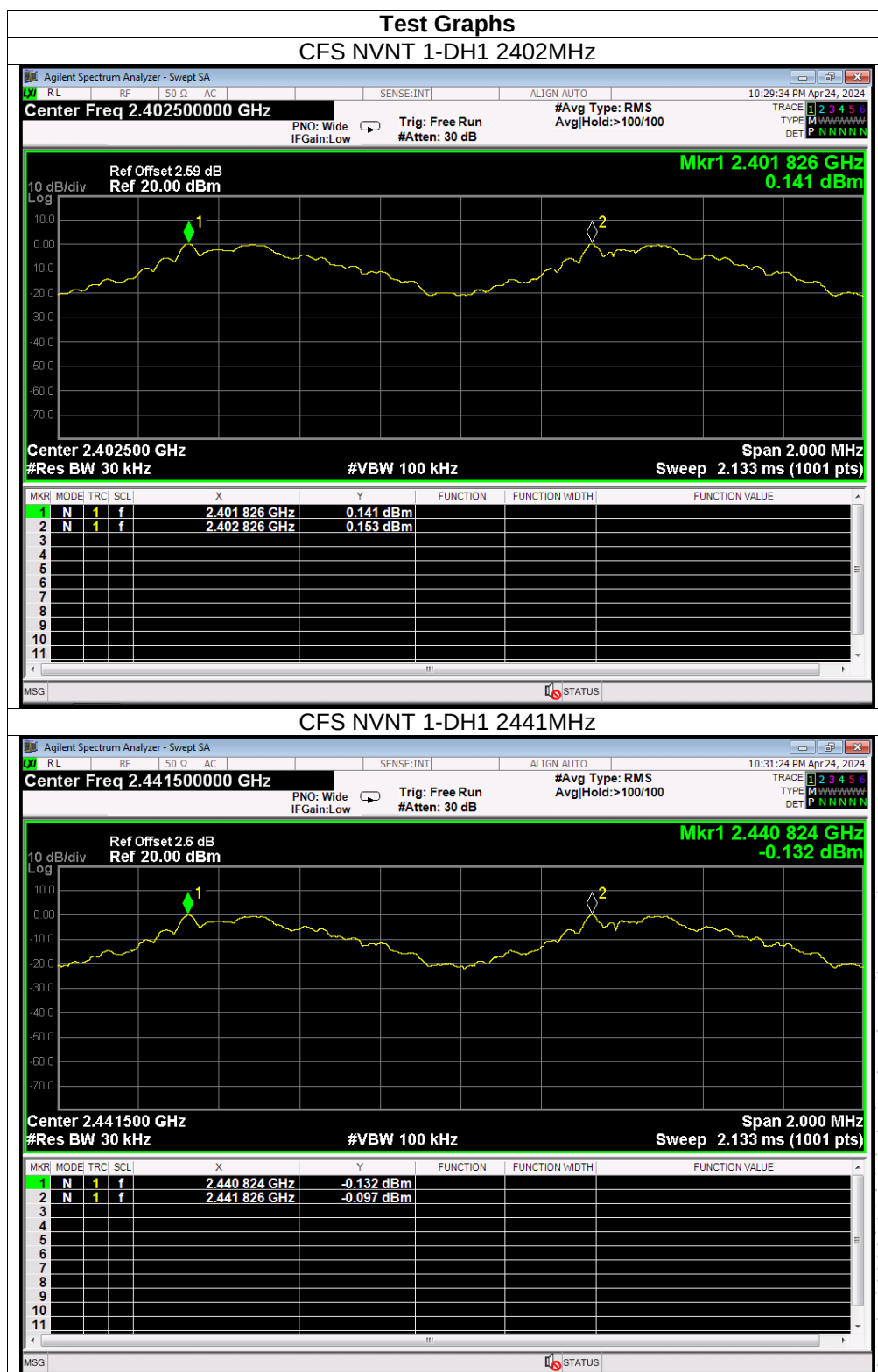
12.3 Test procedure

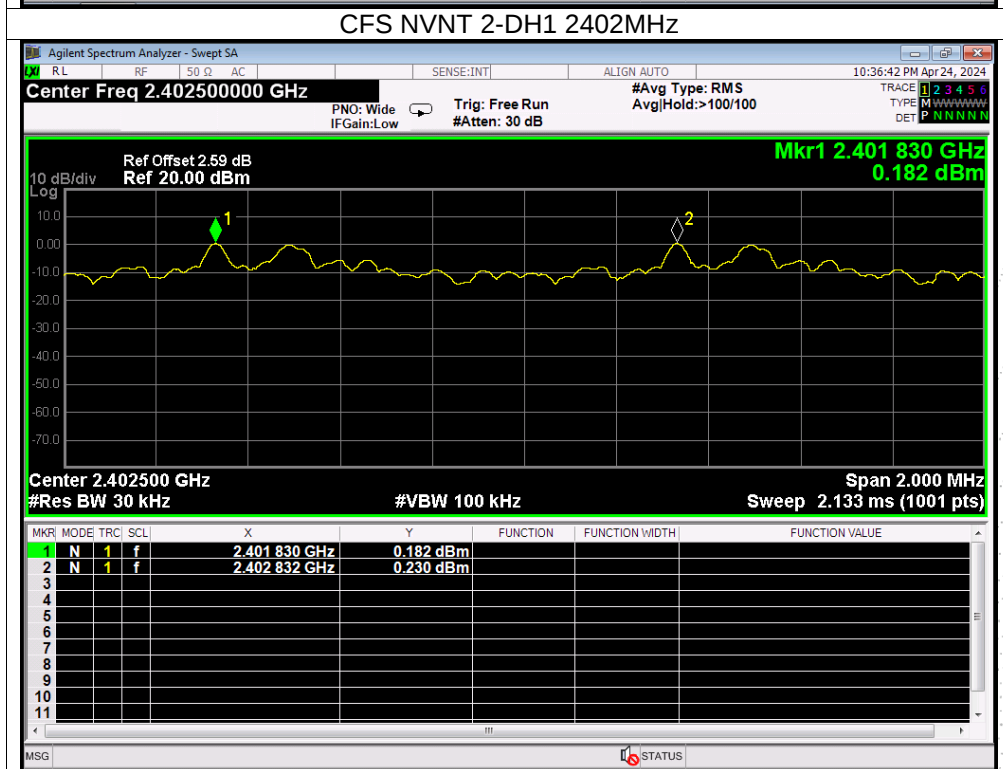
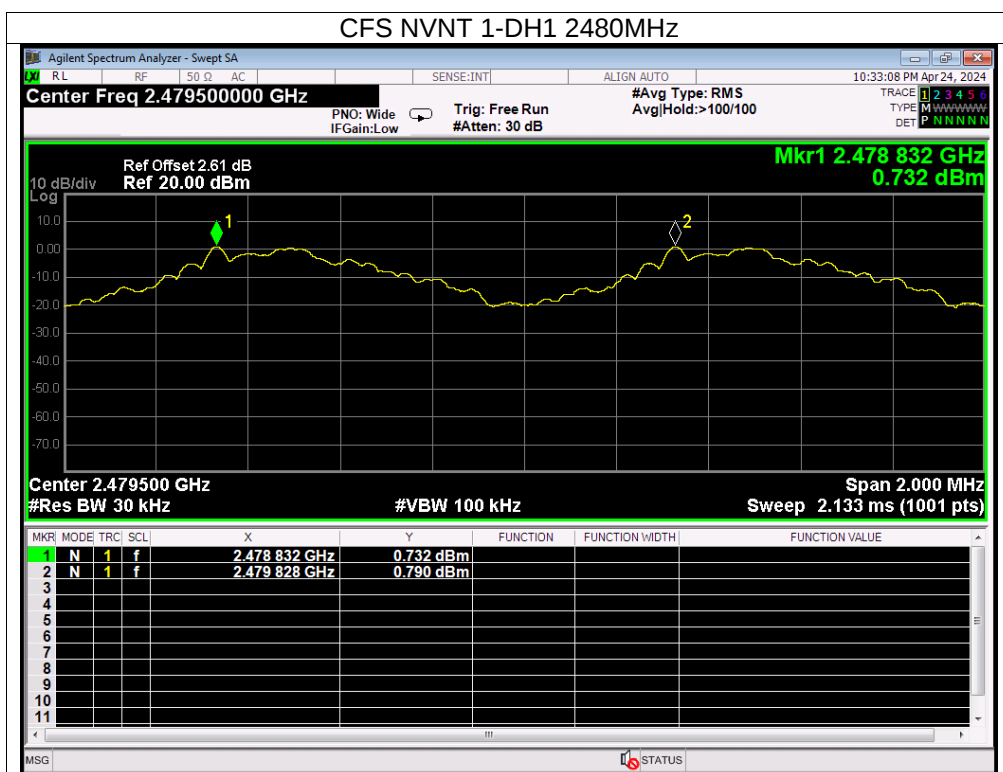
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 30kHz. VBW = 100kHz , Span = 2.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to 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.

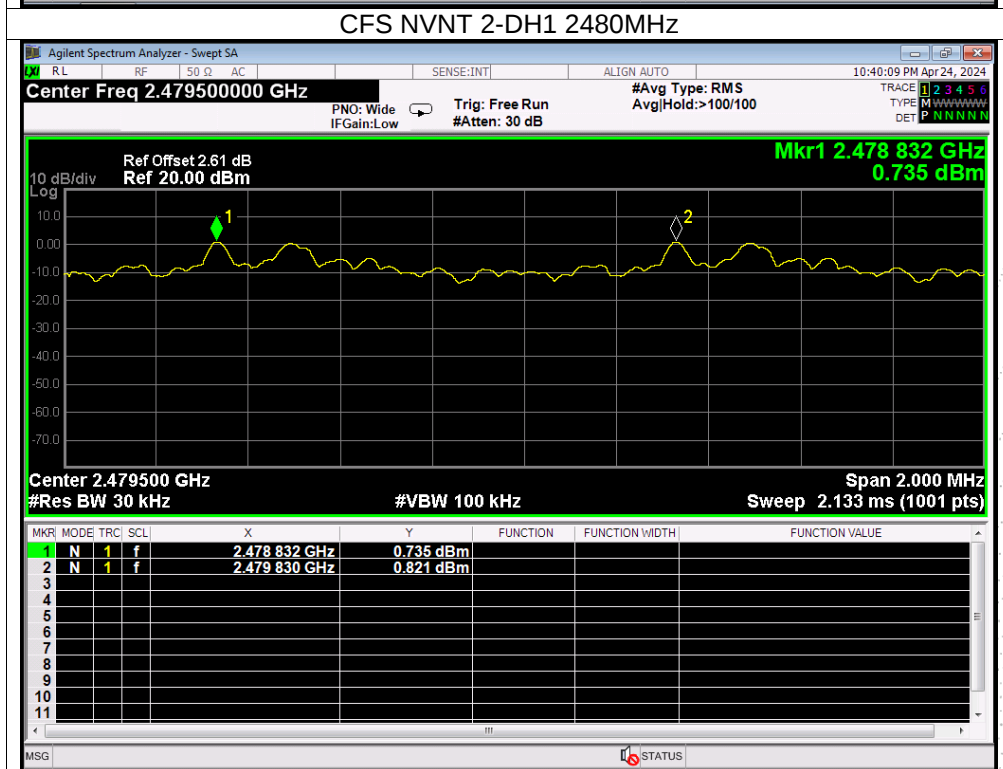
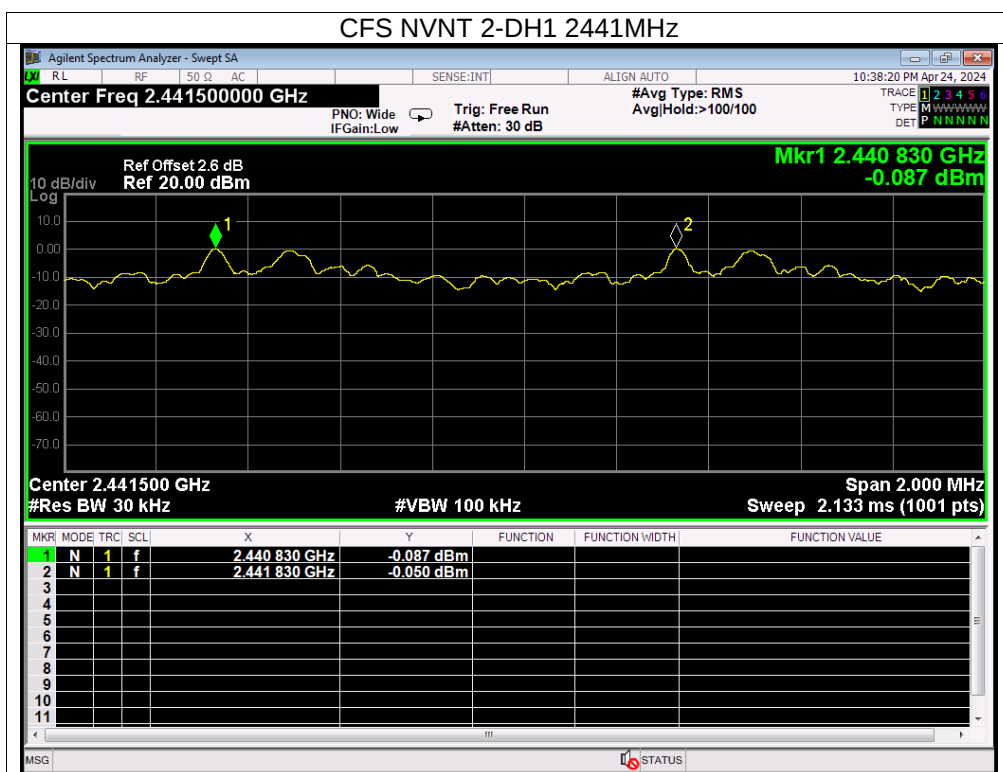
12.4 Test Result

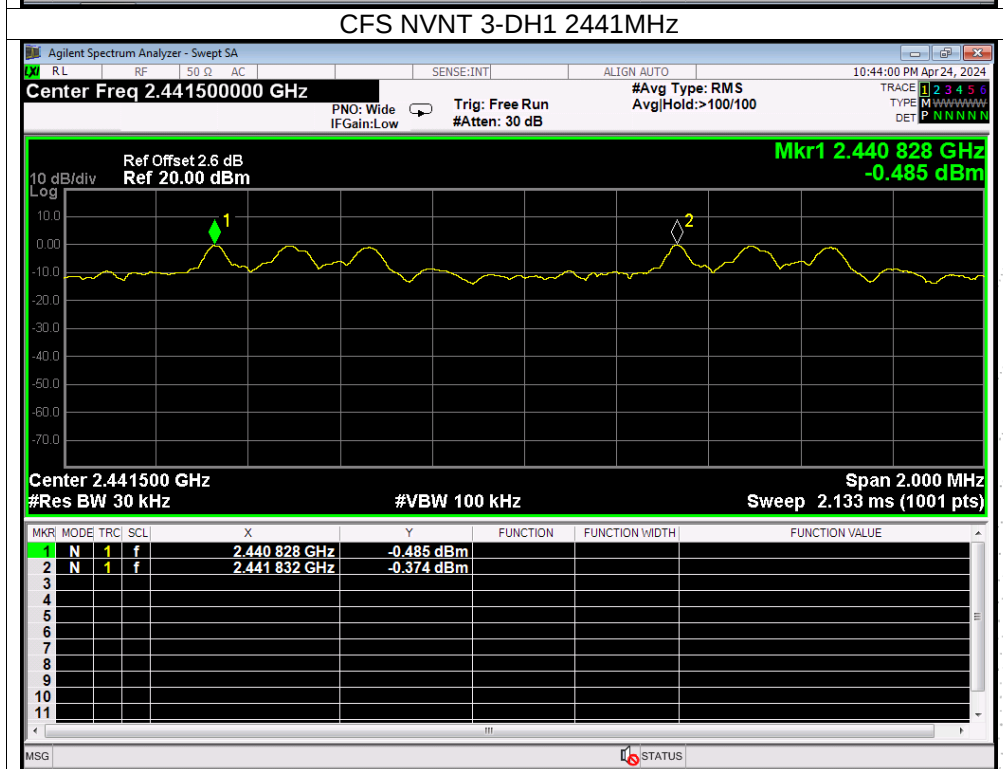
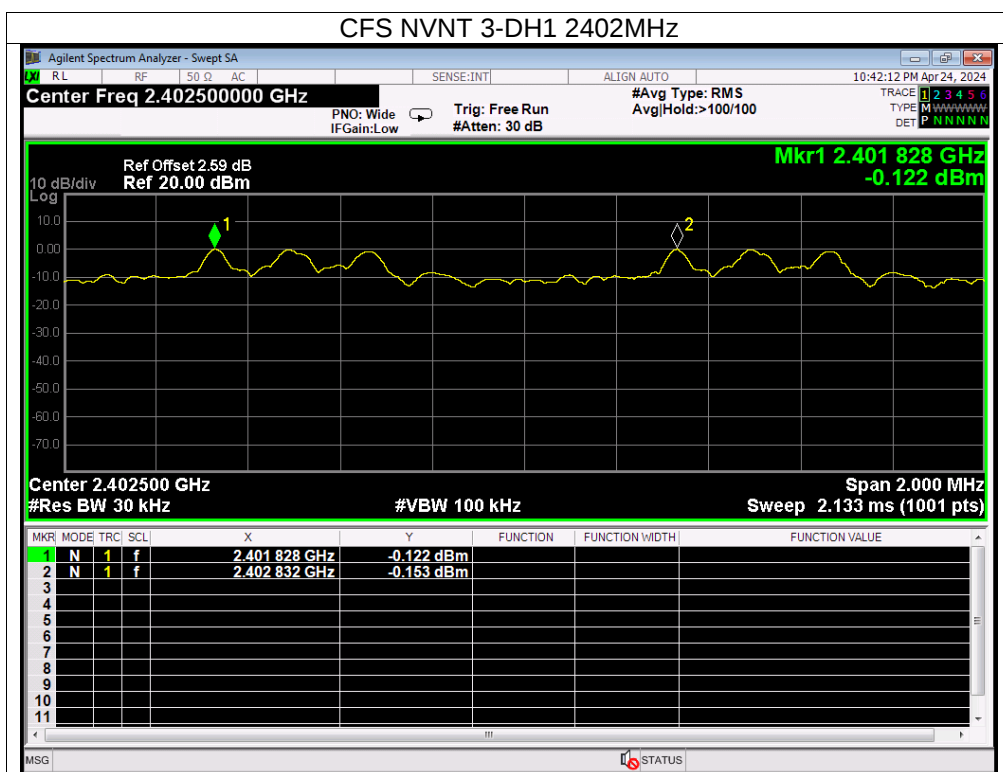
Left

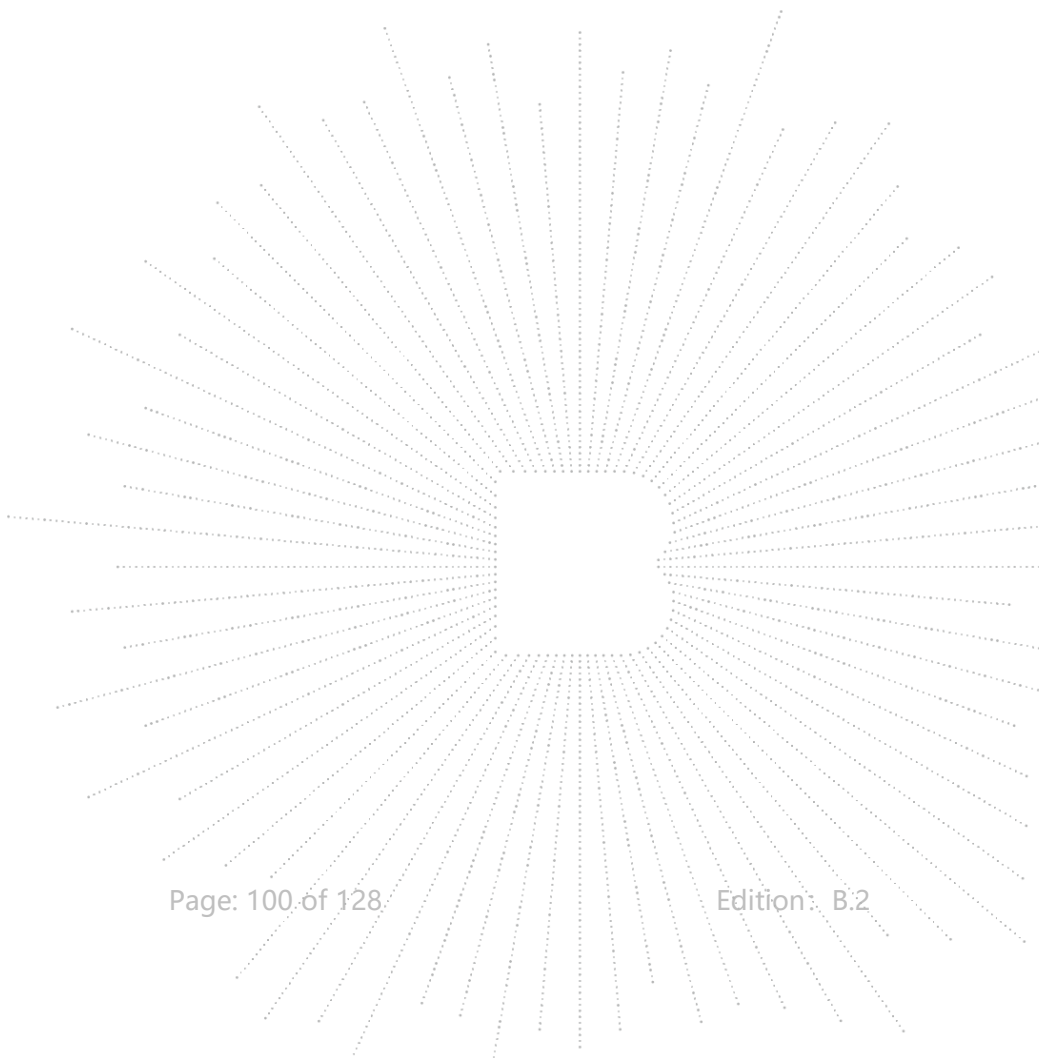
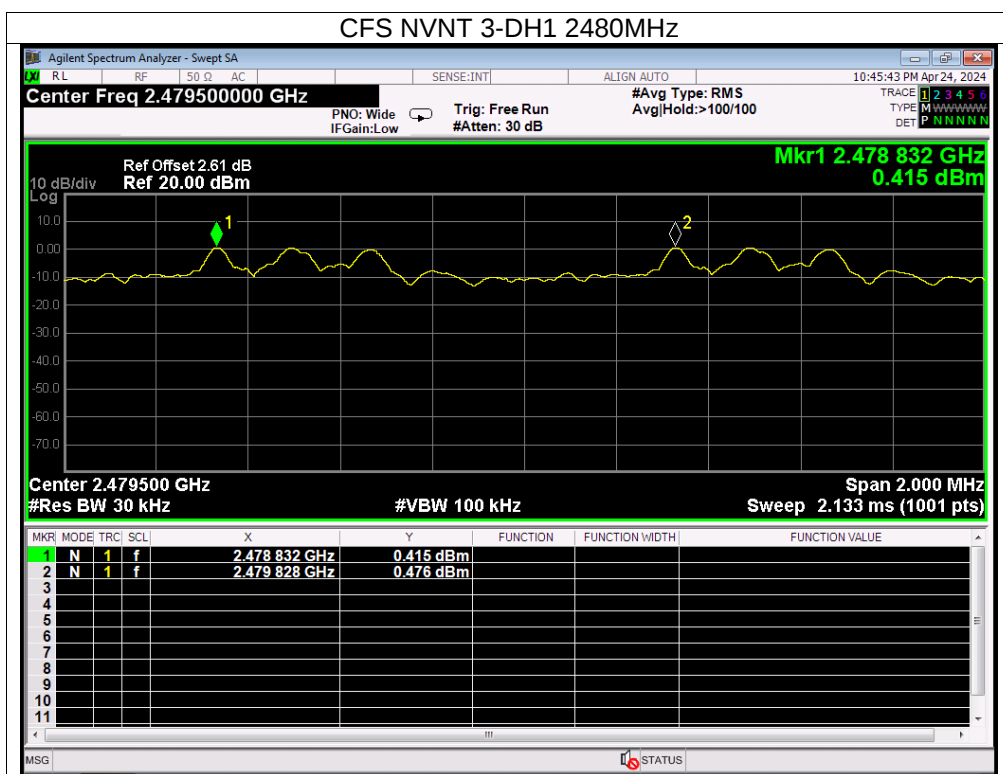
Condition	Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH1	2401.826	2402.826	1	0.57	Pass
NVNT	1-DH1	2440.824	2441.826	1.002	0.577	Pass
NVNT	1-DH1	2478.832	2479.828	0.996	0.603	Pass
NVNT	2-DH1	2401.83	2402.832	1.002	0.801	Pass
NVNT	2-DH1	2440.83	2441.83	1	0.795	Pass
NVNT	2-DH1	2478.832	2479.83	0.998	0.785	Pass
NVNT	3-DH1	2401.828	2402.832	1.004	0.8	Pass
NVNT	3-DH1	2440.828	2441.832	1.004	0.807	Pass
NVNT	3-DH1	2478.832	2479.828	0.996	0.806	Pass





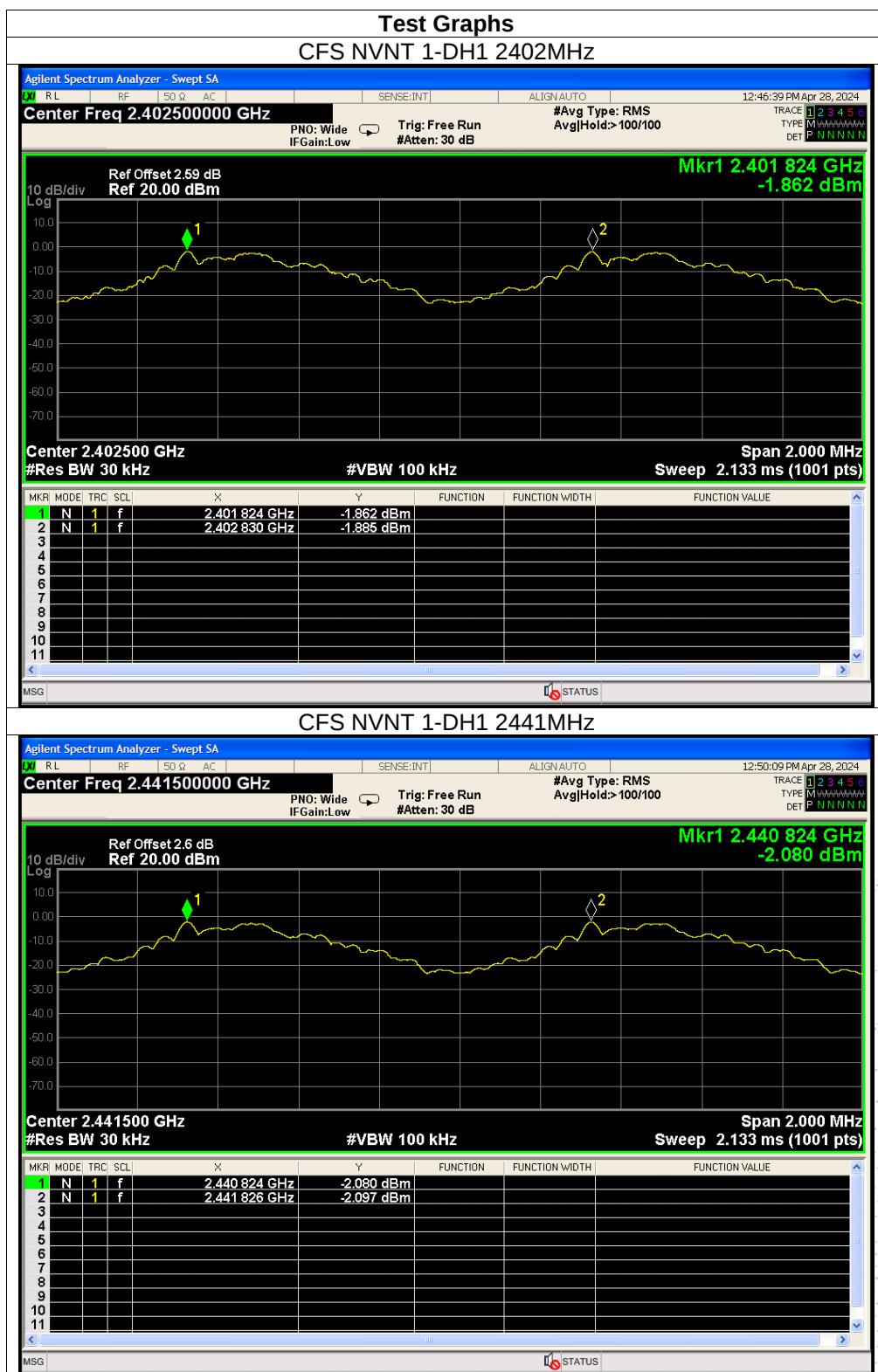


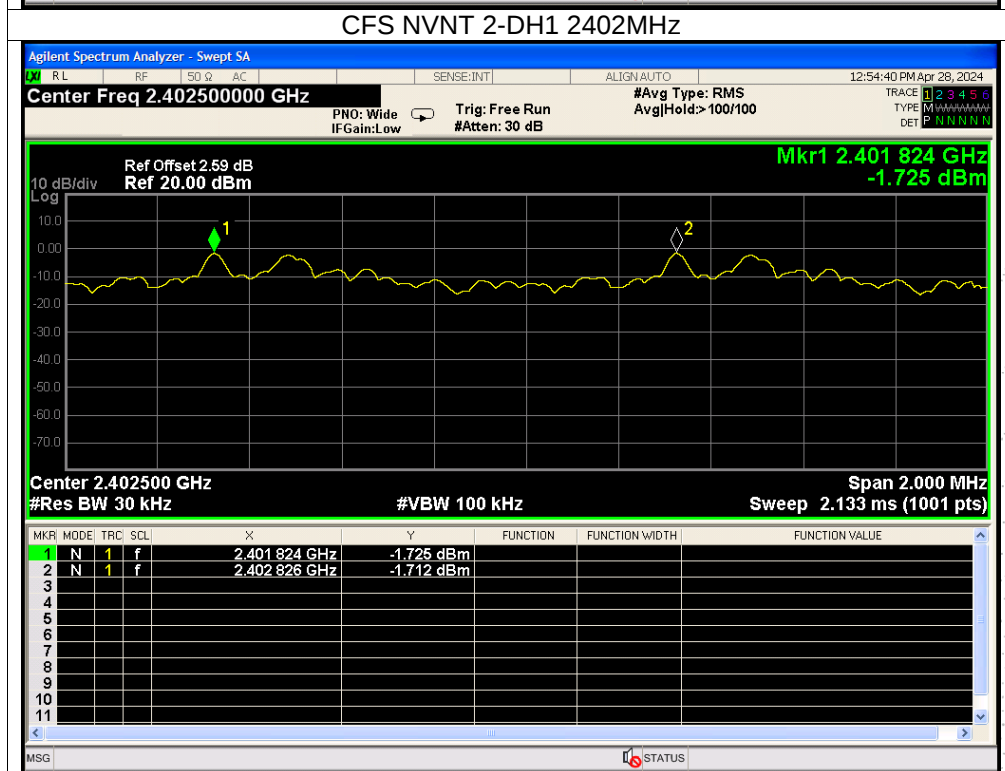
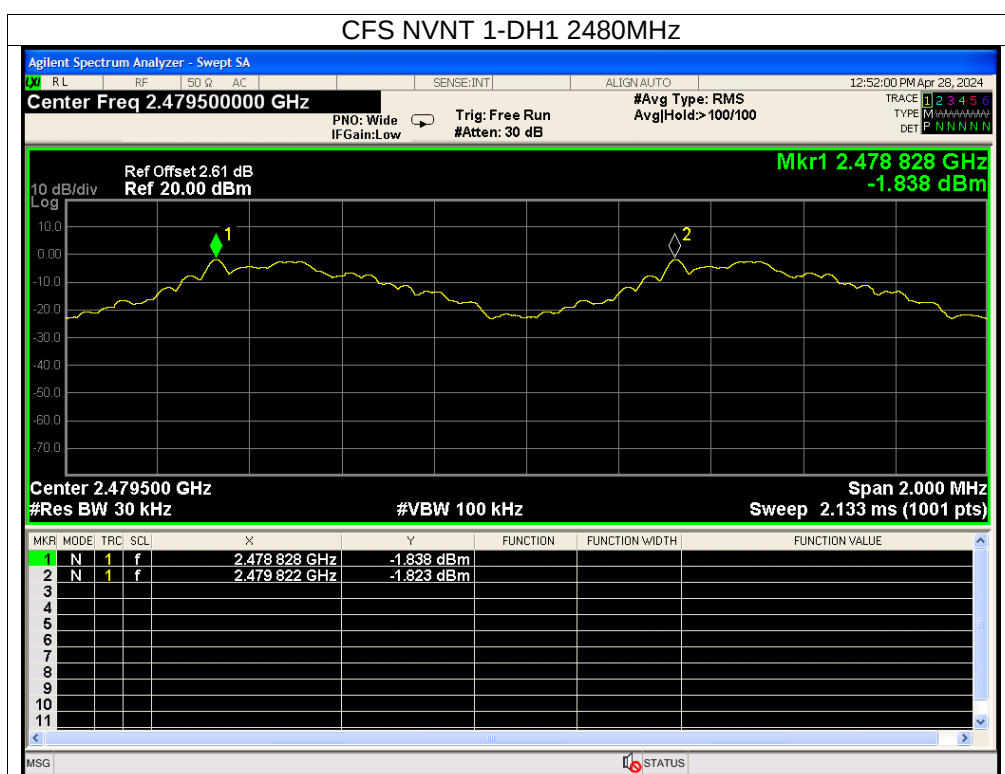


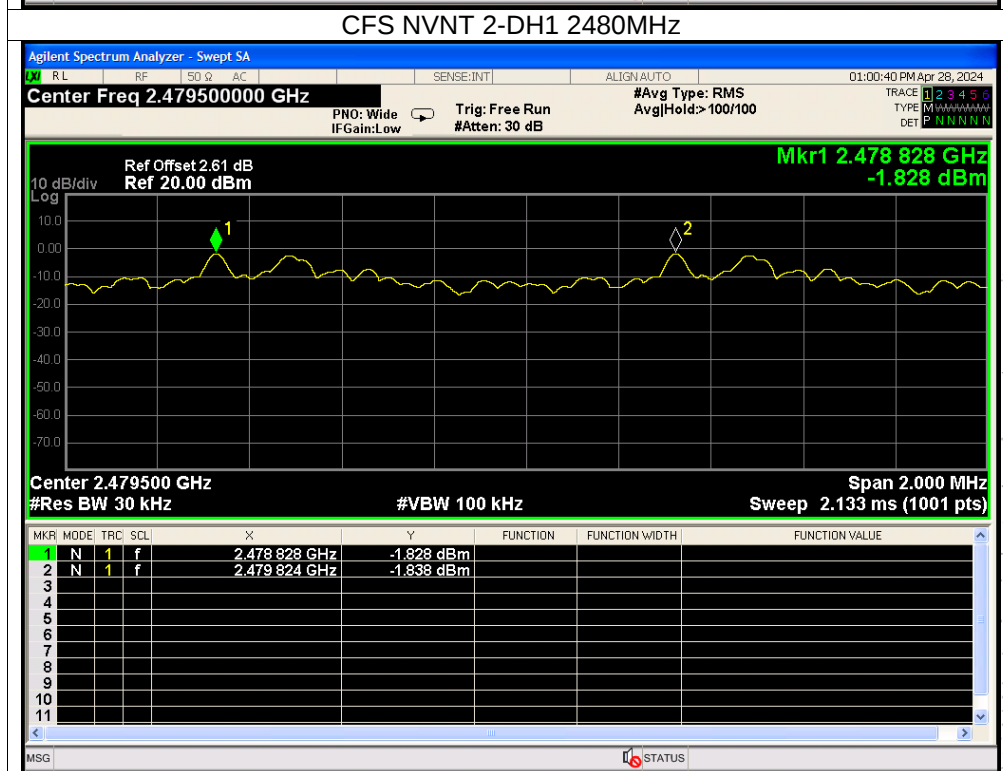
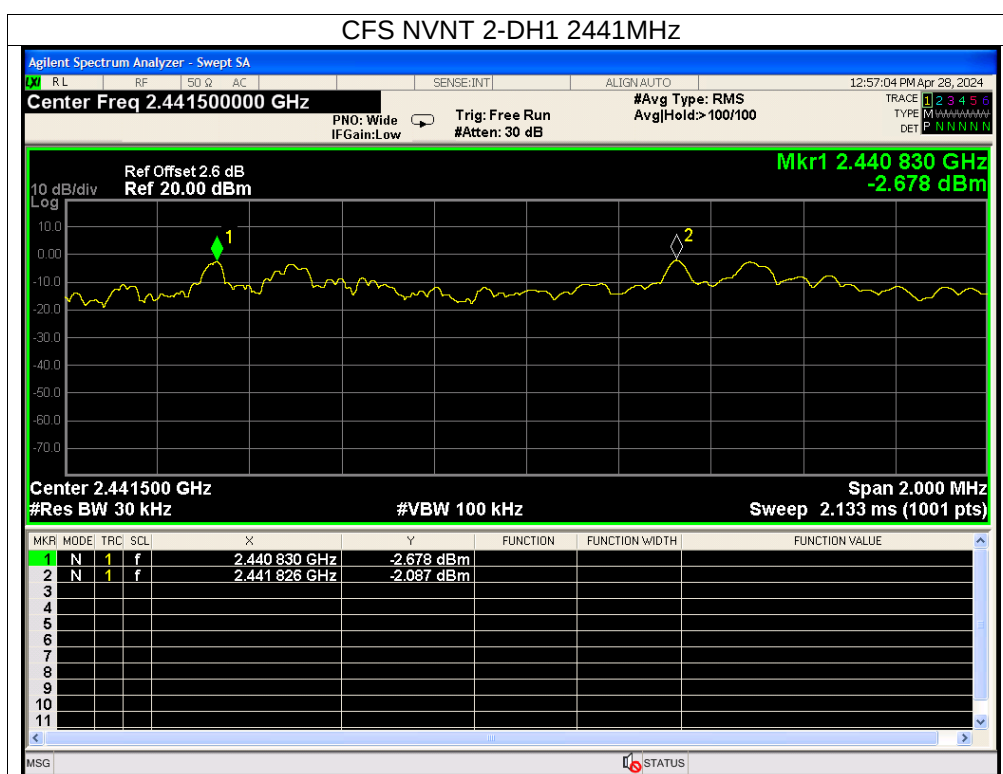


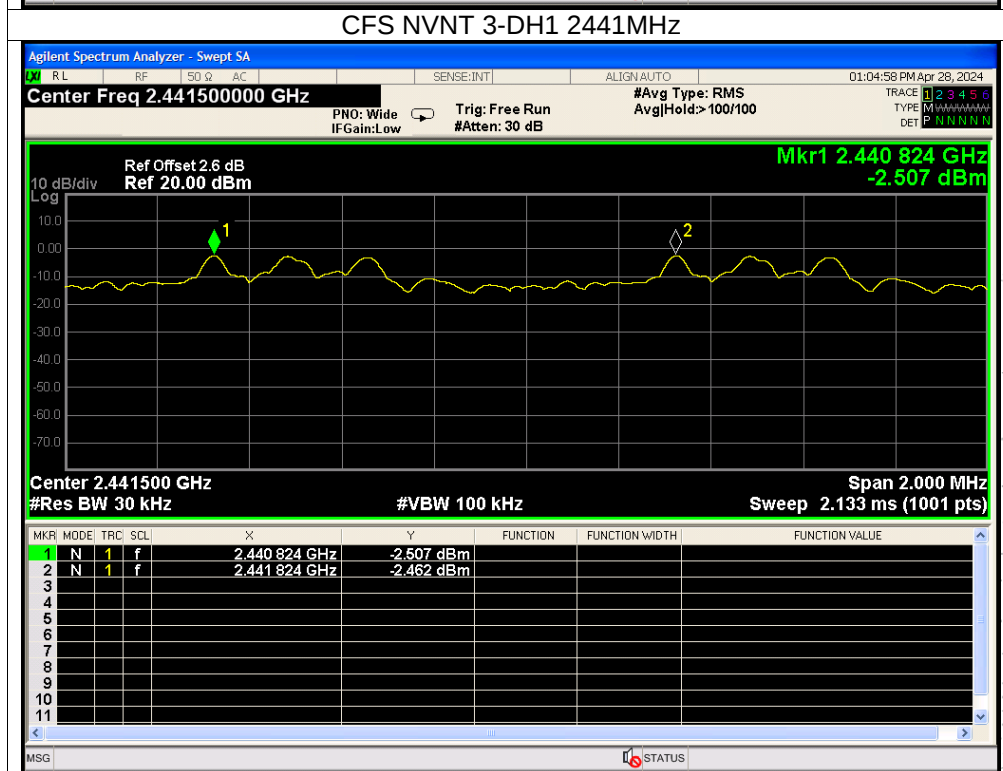
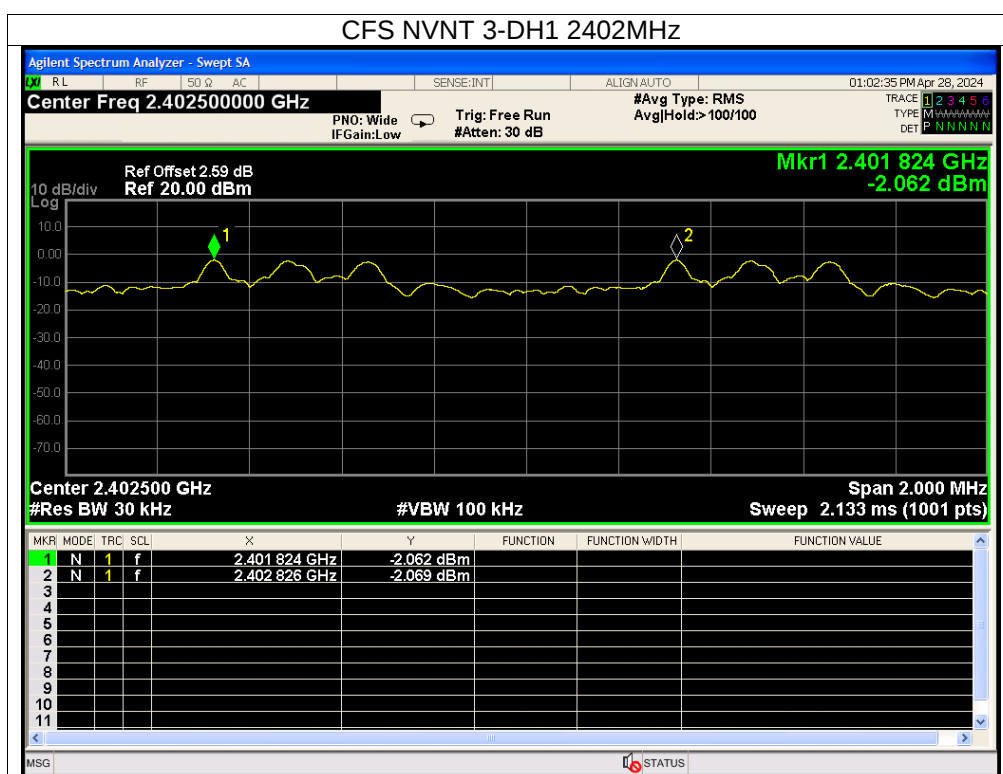
Right

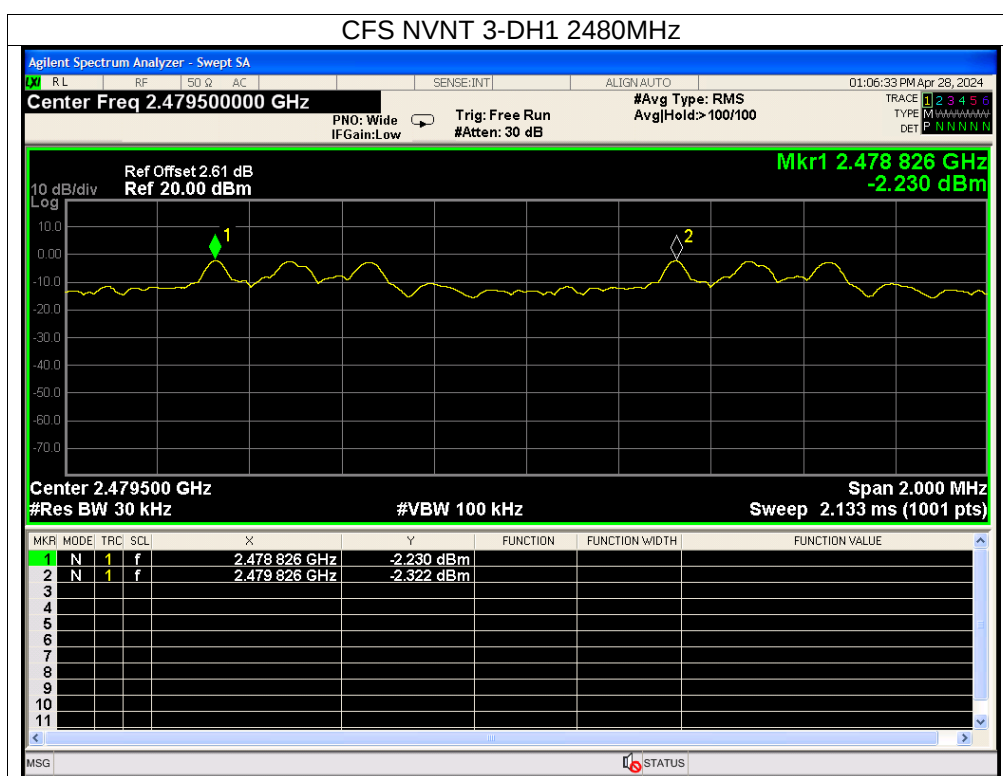
Condition	Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH1	2401.824	2402.83	1.006	0.025	Pass
NVNT	1-DH1	2440.824	2441.826	1.002	0.025	Pass
NVNT	1-DH1	2478.828	2479.822	0.994	0.025	Pass
NVNT	2-DH1	2401.824	2402.826	1.002	0.025	Pass
NVNT	2-DH1	2440.83	2441.826	0.996	0.025	Pass
NVNT	2-DH1	2478.828	2479.824	0.996	0.025	Pass
NVNT	3-DH1	2401.824	2402.826	1.002	0.025	Pass
NVNT	3-DH1	2440.824	2441.824	1	0.025	Pass
NVNT	3-DH1	2478.826	2479.826	1	0.025	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.

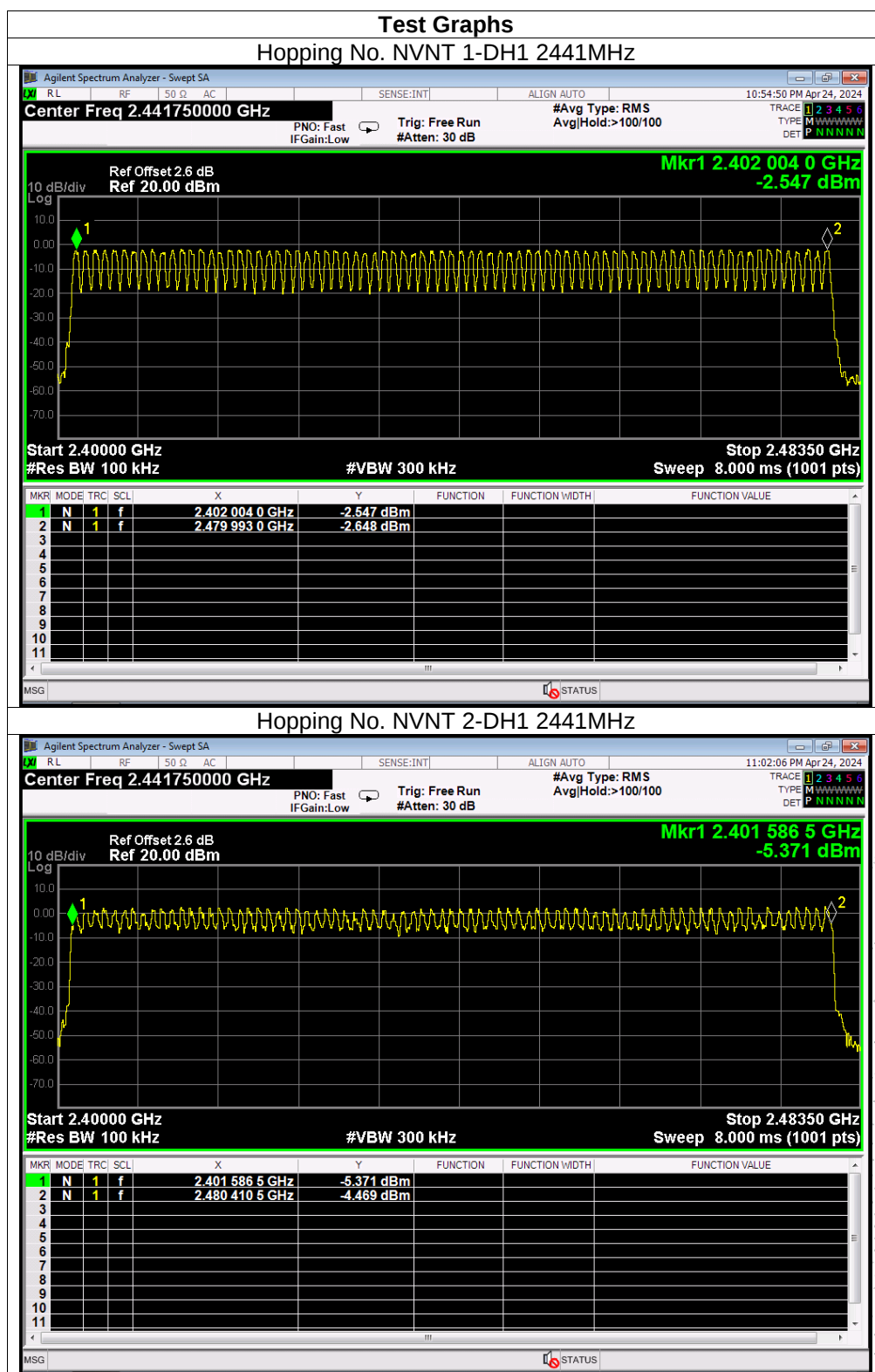
13.3 Test procedure

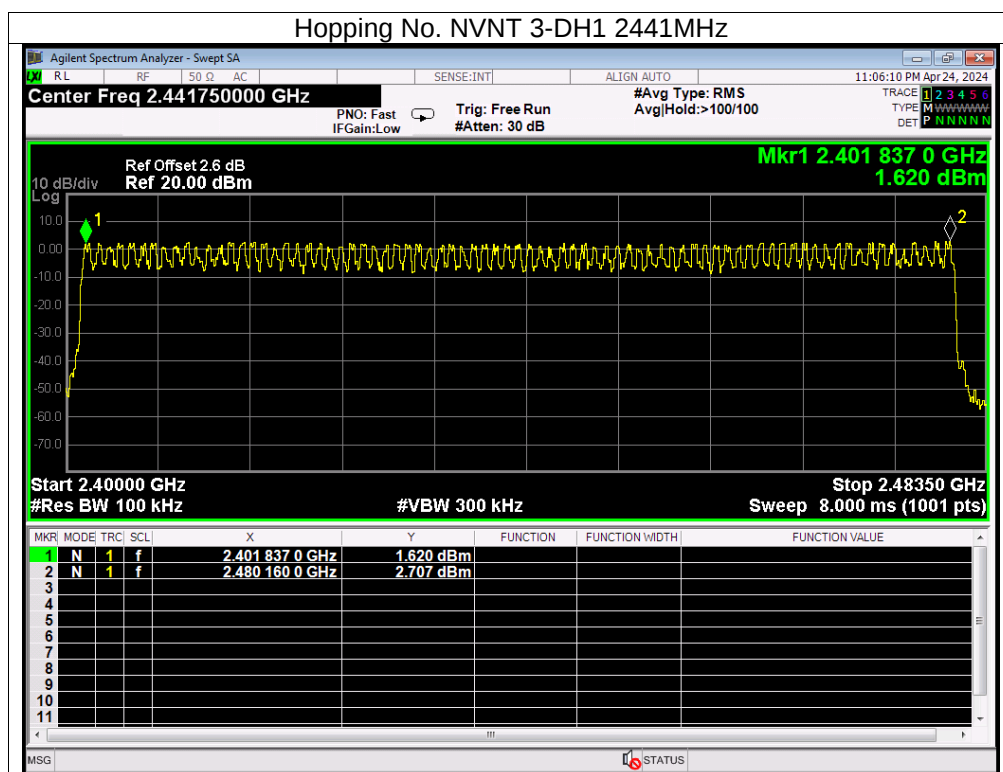
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to 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

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

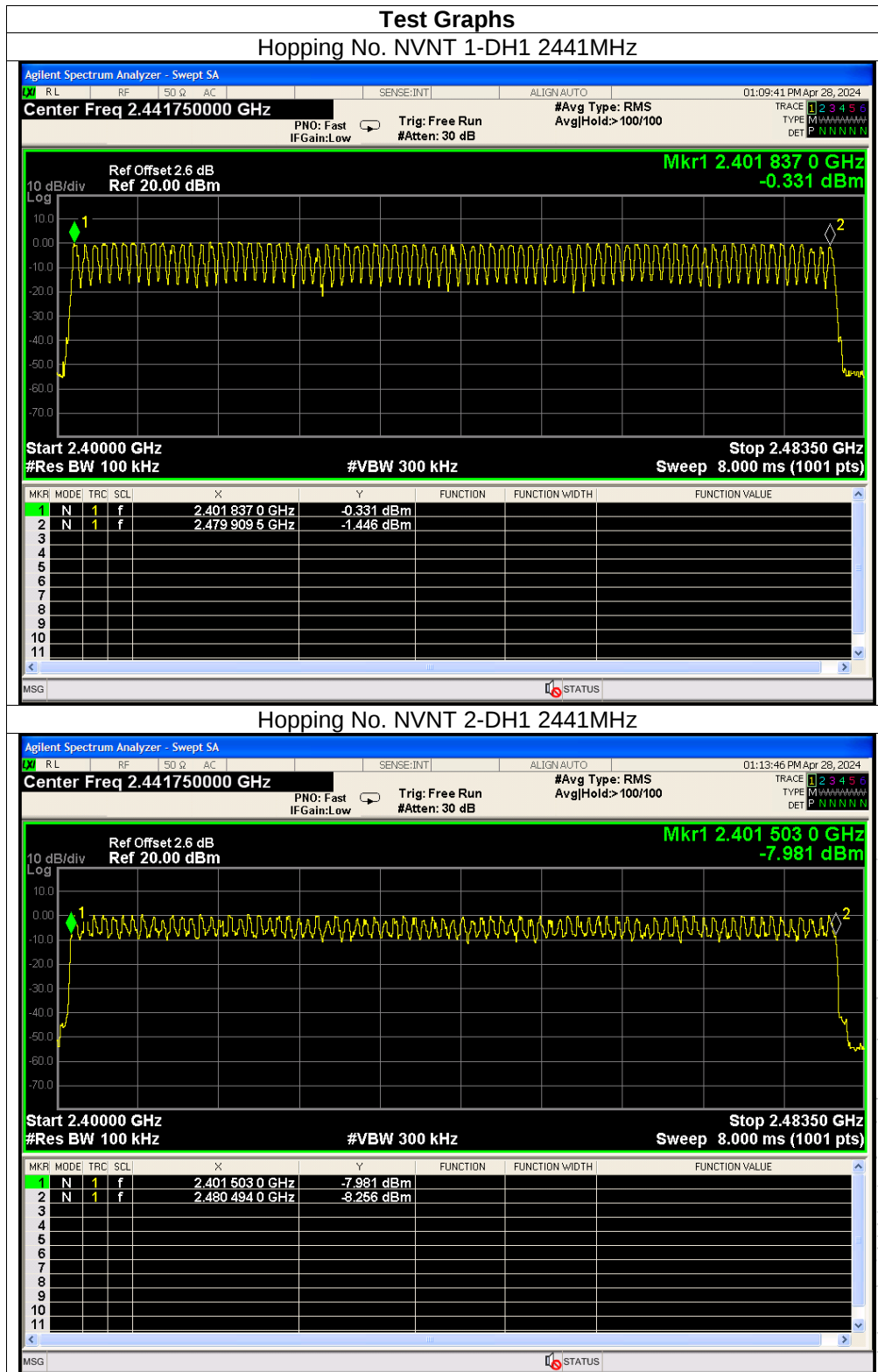
Left

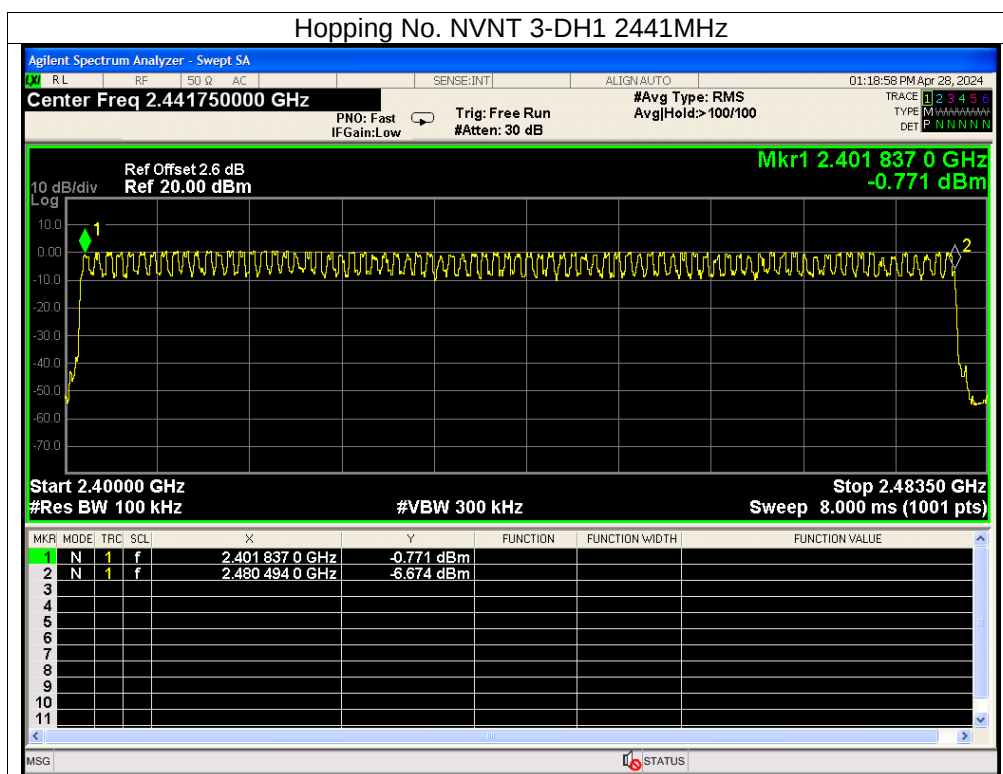






Right





14. Dwell Time

14.1 Block Diagram Of Test Setup



14.2 Limit

≤0.4 Second

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

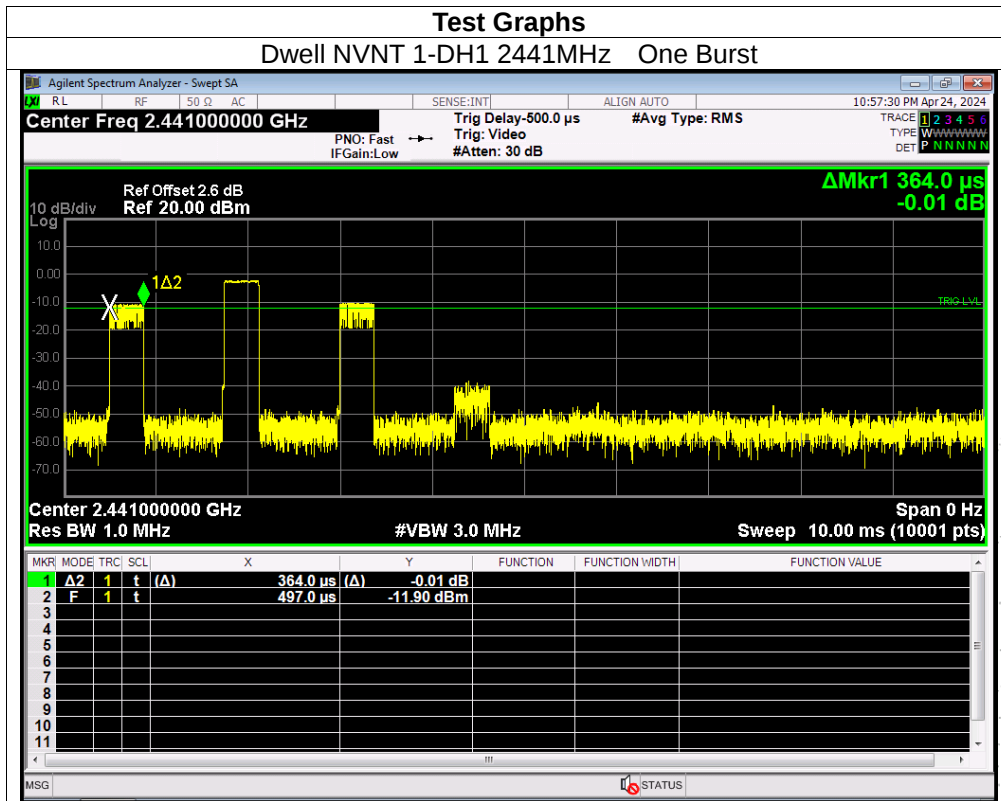
DH3: $1600/79/4 \times 0.4 \times 79 \times (\text{MkrDelta})/1000$

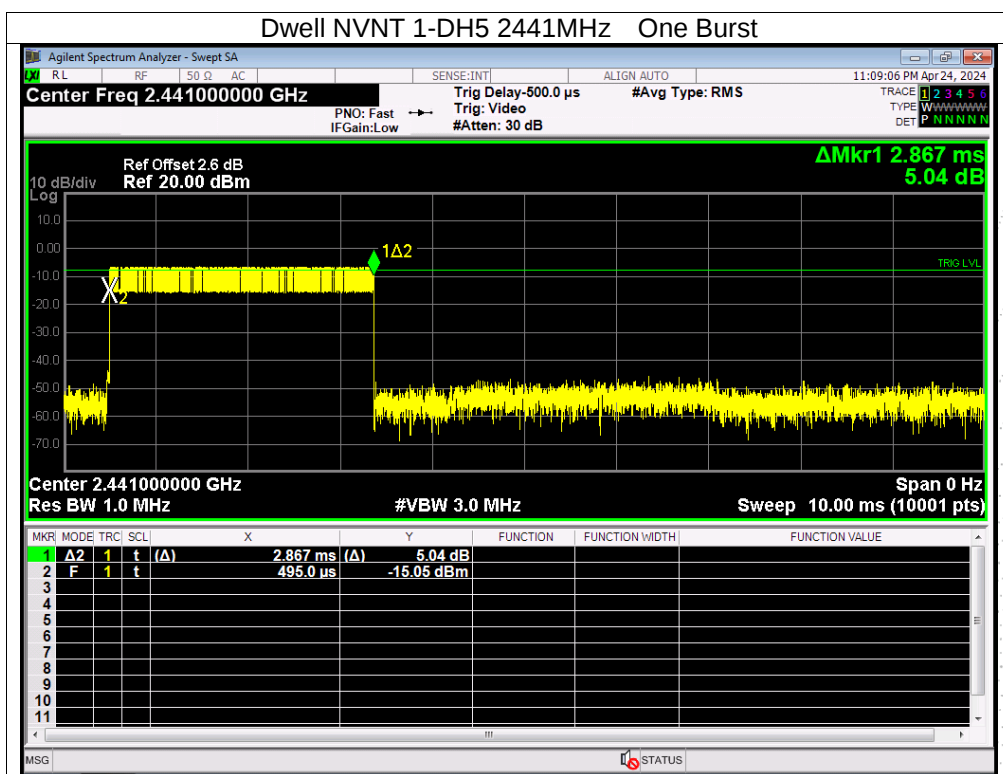
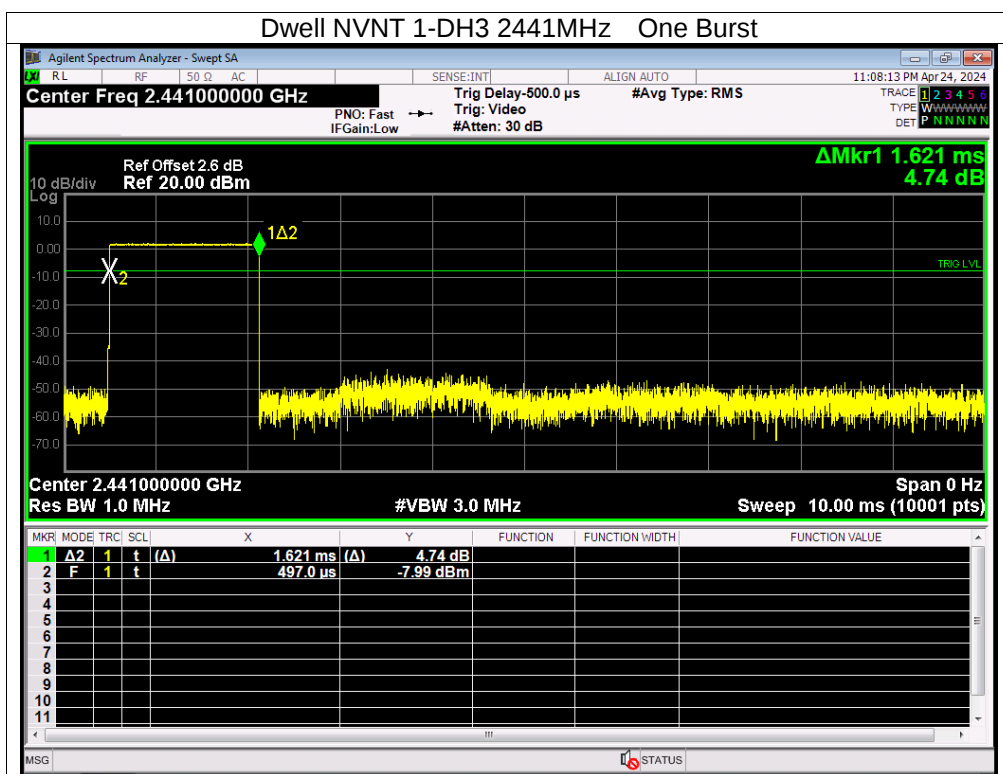
DH1: $1600/79/2 \times 0.4 \times 79 \times (\text{MkrDelta})/1000$

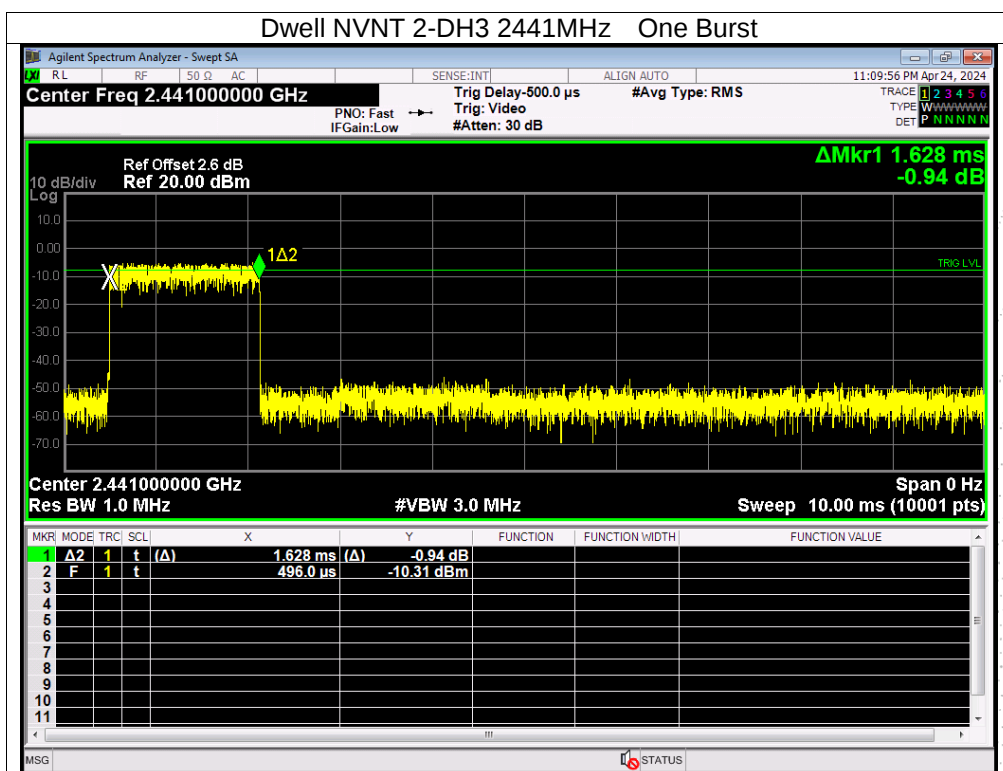
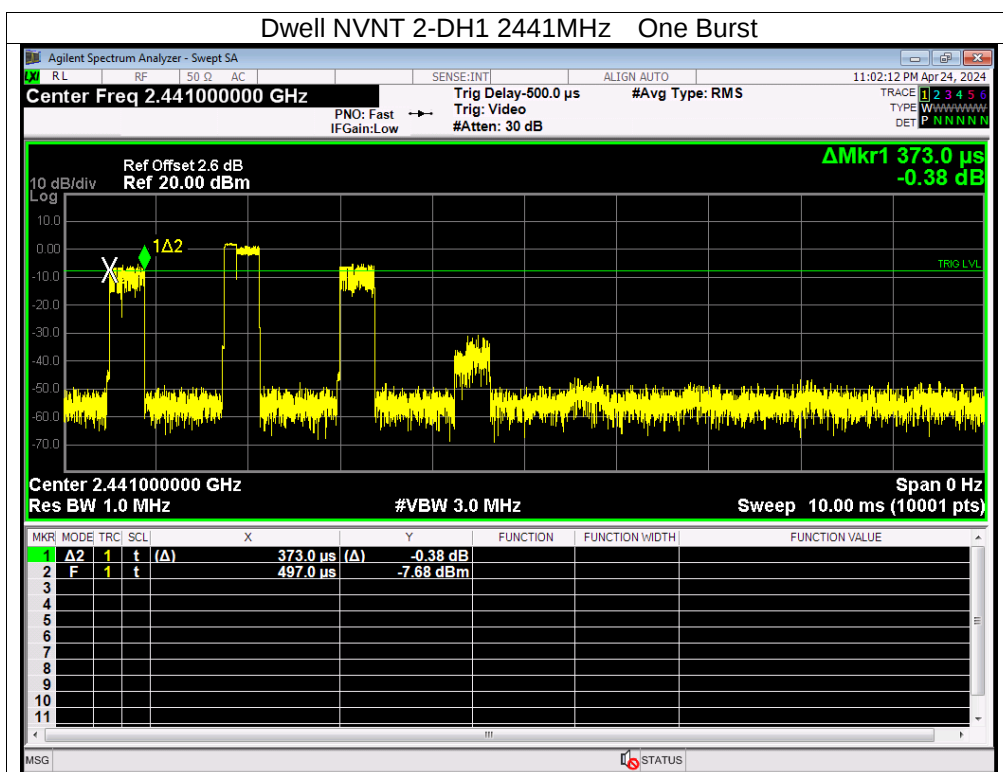
Remark: Mkr Delta is once pulse time.

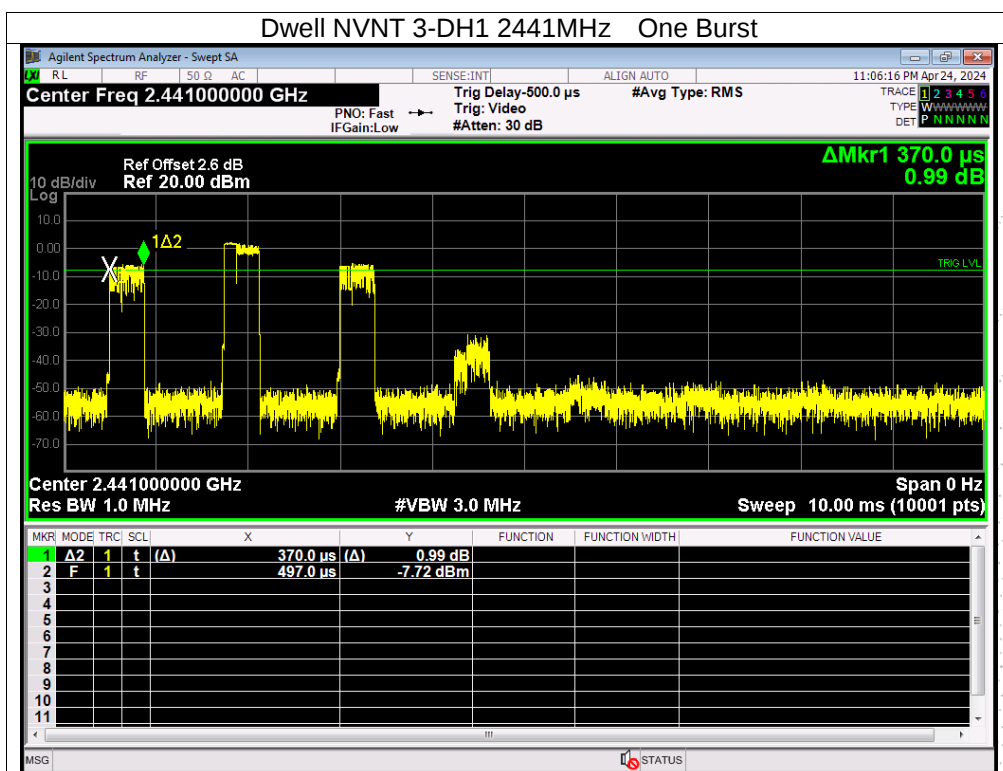
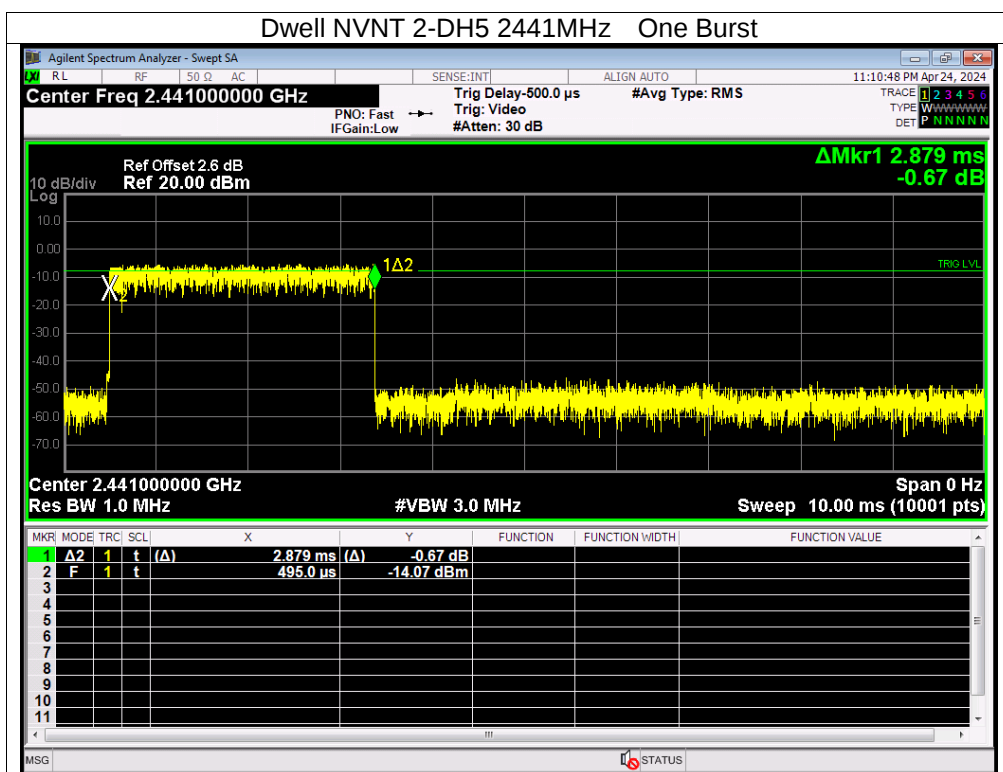
Left

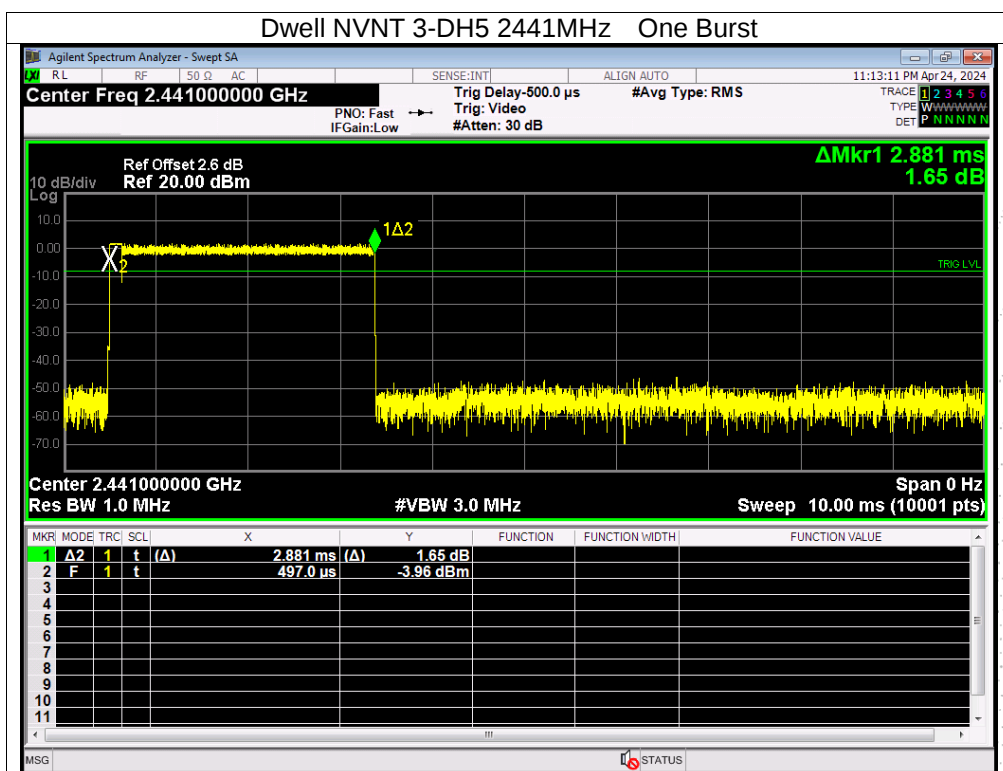
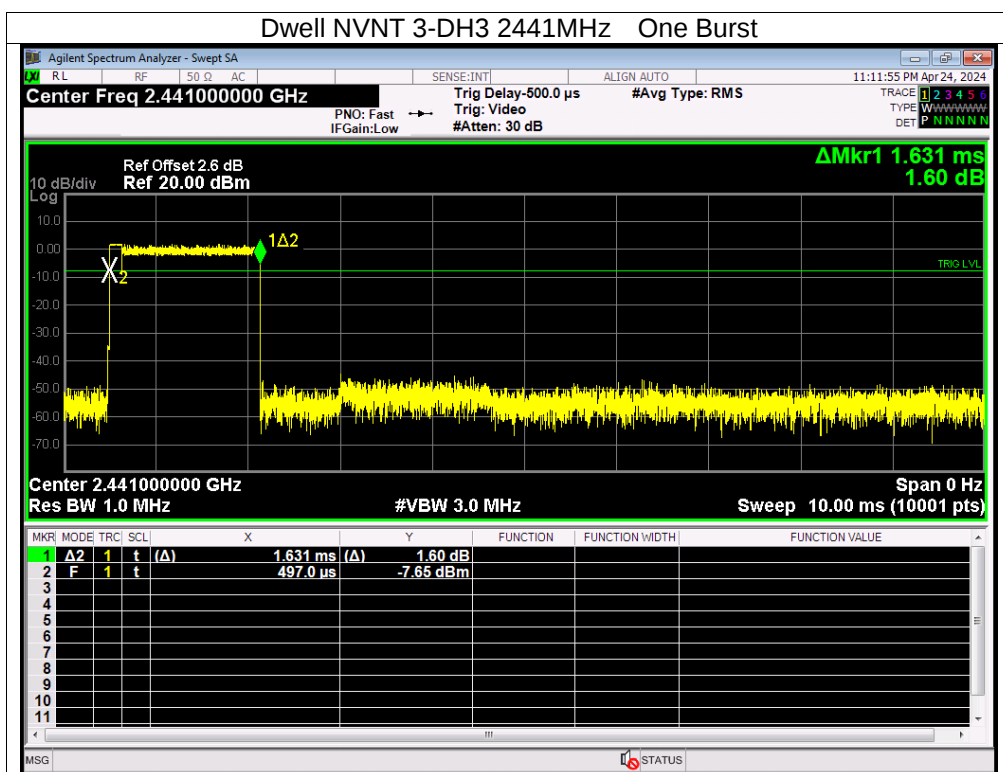
Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2441	0.364	116.116	319	31600	400	Pass
NVNT	1-DH3	2441	1.621	257.739	159	31600	400	Pass
NVNT	1-DH5	2441	2.867	303.902	106	31600	400	Pass
NVNT	2-DH1	2441	0.373	119.36	320	31600	400	Pass
NVNT	2-DH3	2441	1.628	260.48	160	31600	400	Pass
NVNT	2-DH5	2441	2.879	305.174	106	31600	400	Pass
NVNT	3-DH1	2441	0.37	118.03	319	31600	400	Pass
NVNT	3-DH3	2441	1.631	259.329	159	31600	400	Pass
NVNT	3-DH5	2441	2.881	308.267	107	31600	400	Pass





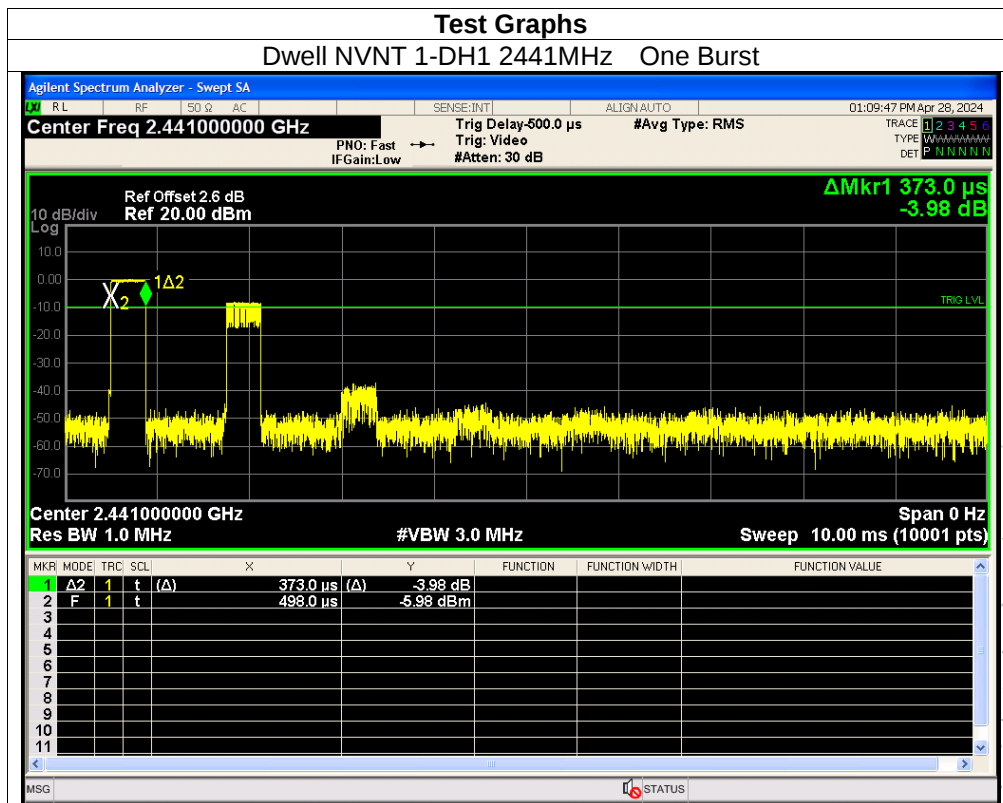


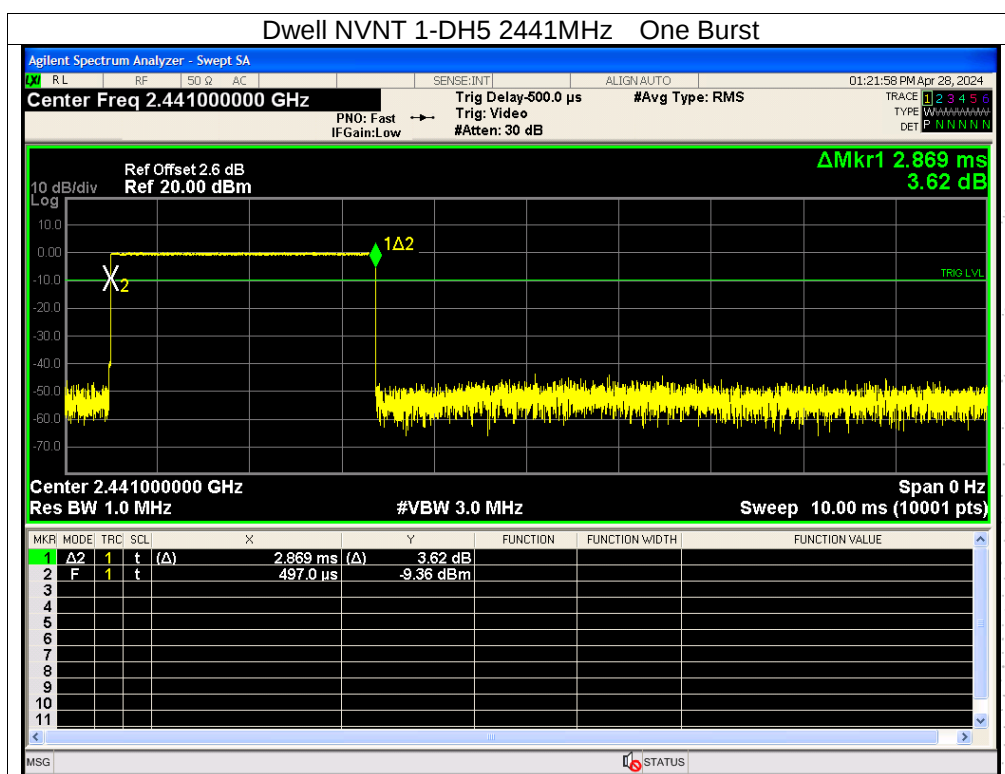
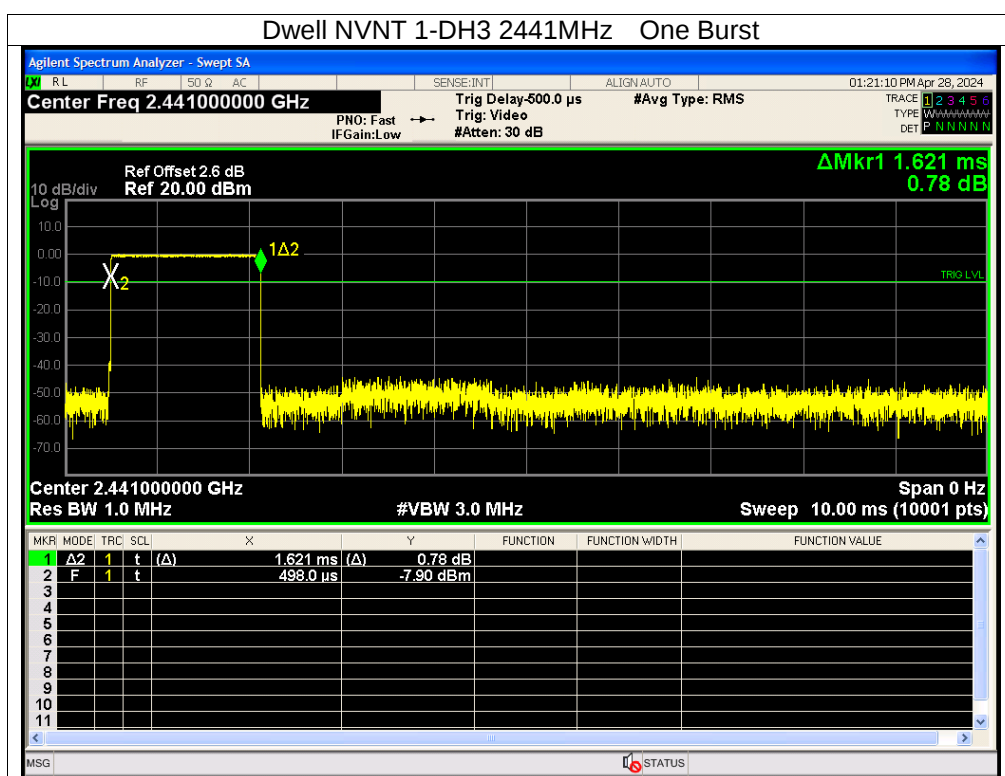


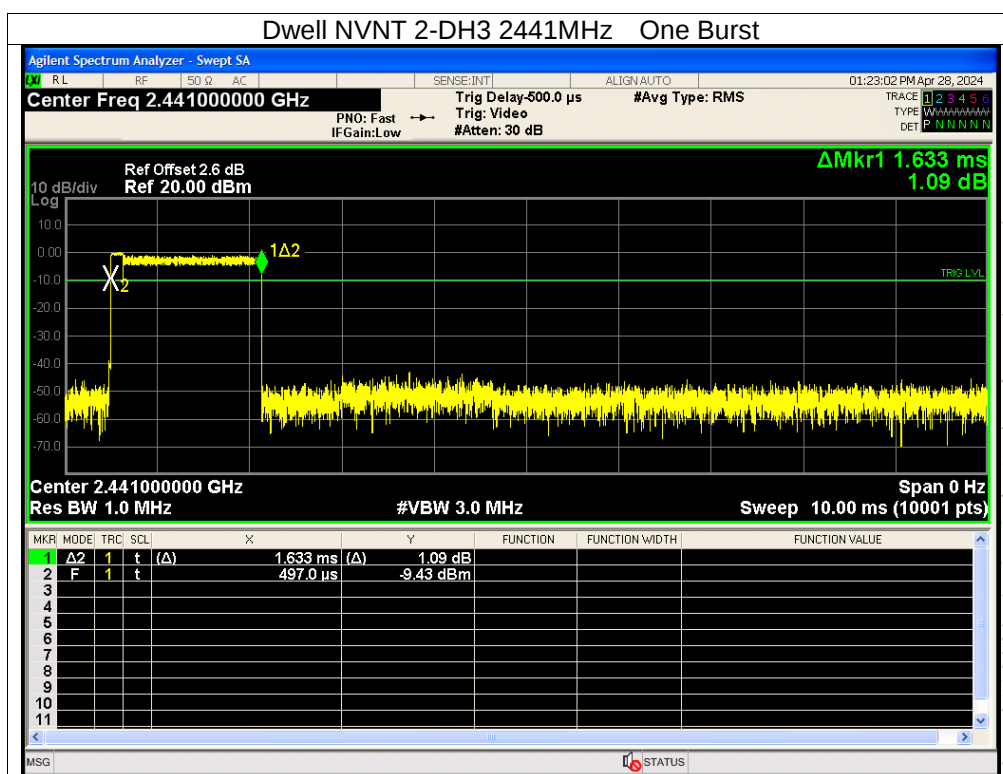
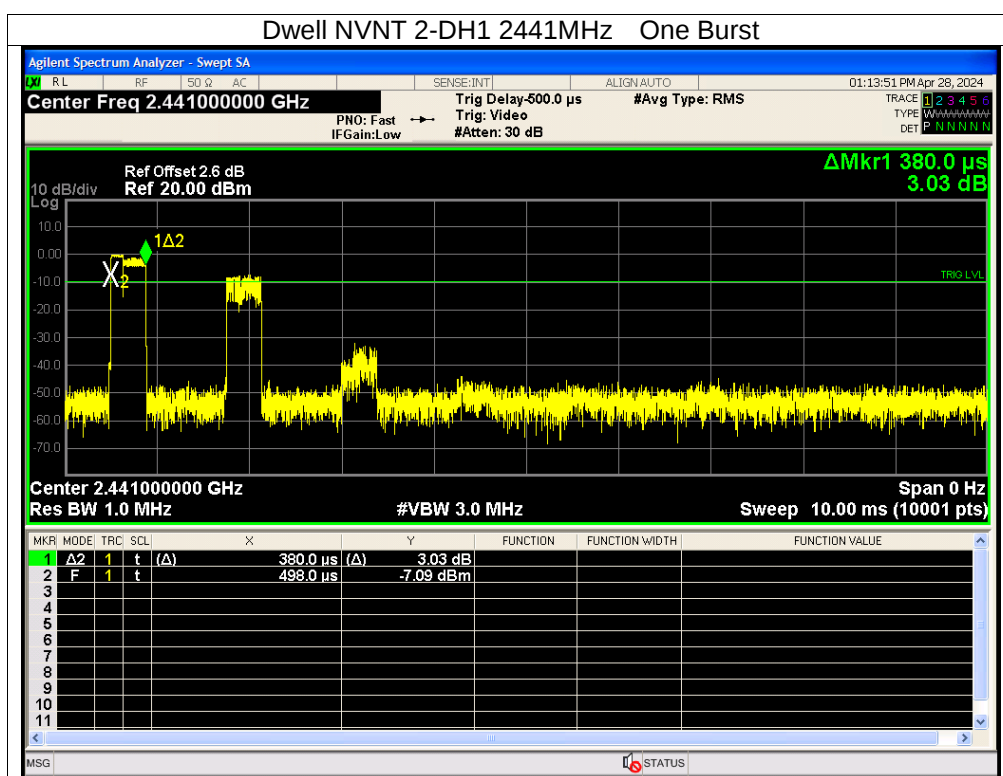


Right

Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2441	0.373	118.987	319	31600	400	Pass
NVNT	1-DH3	2441	1.621	259.36	160	31600	400	Pass
NVNT	1-DH5	2441	2.869	306.983	107	31600	400	Pass
NVNT	2-DH1	2441	0.38	121.22	319	31600	400	Pass
NVNT	2-DH3	2441	1.633	261.28	160	31600	400	Pass
NVNT	2-DH5	2441	2.842	301.252	106	31600	400	Pass
NVNT	3-DH1	2441	0.381	121.539	319	31600	400	Pass
NVNT	3-DH3	2441	1.63	259.17	159	31600	400	Pass
NVNT	3-DH5	2441	2.881	305.386	106	31600	400	Pass

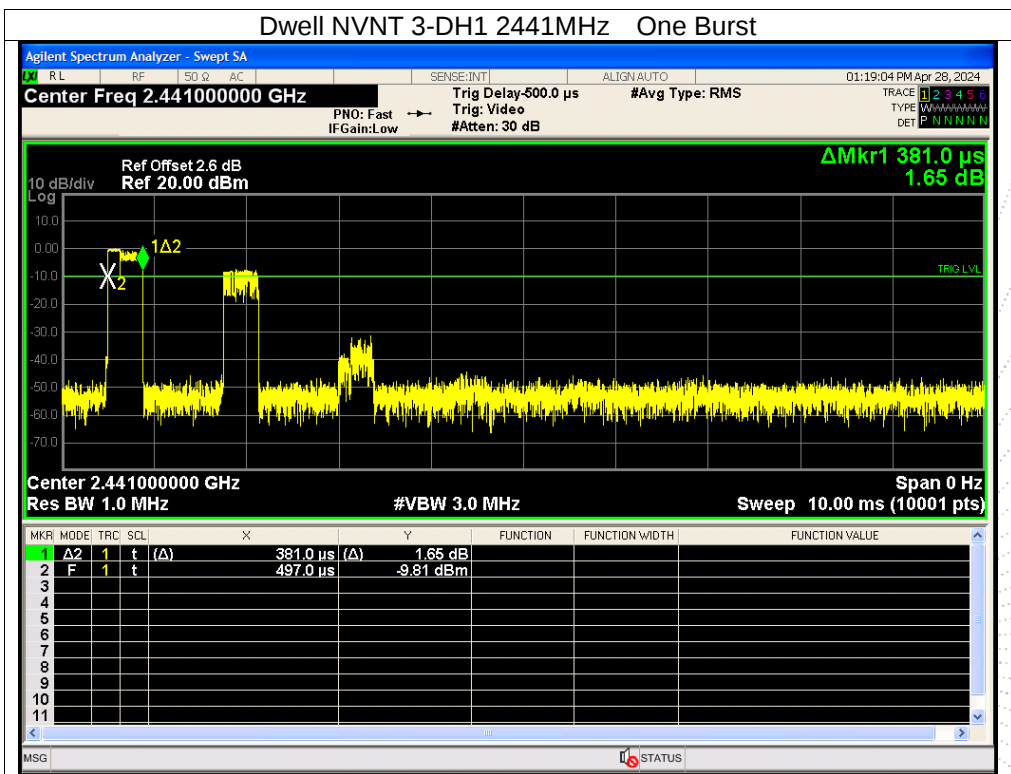
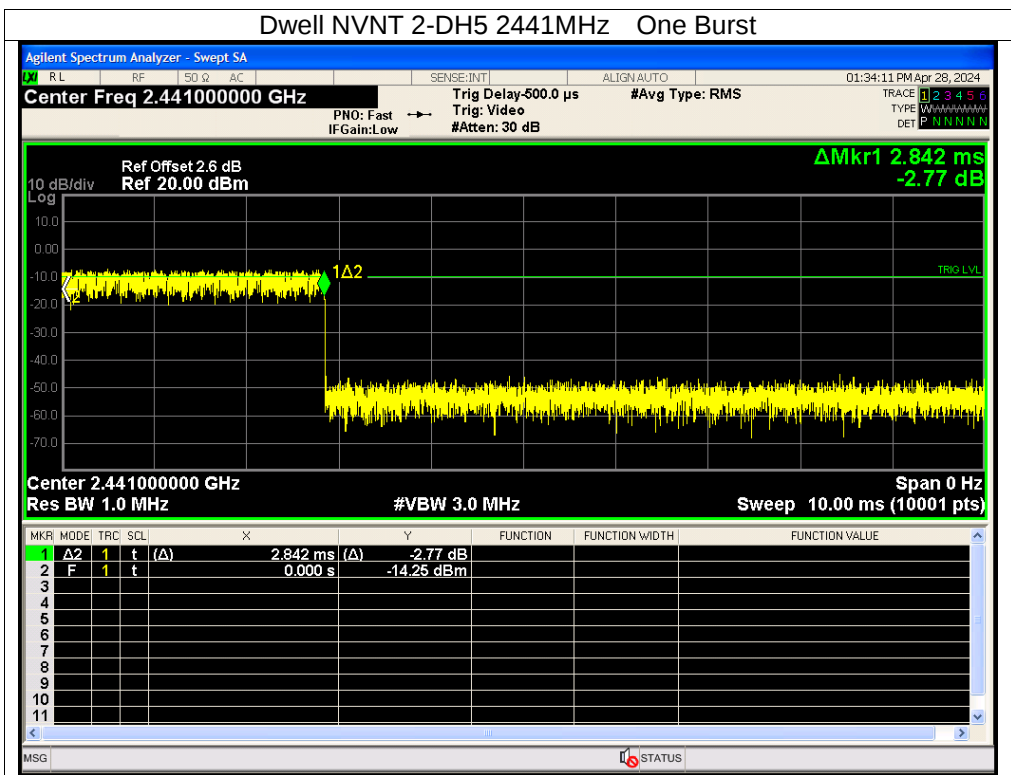


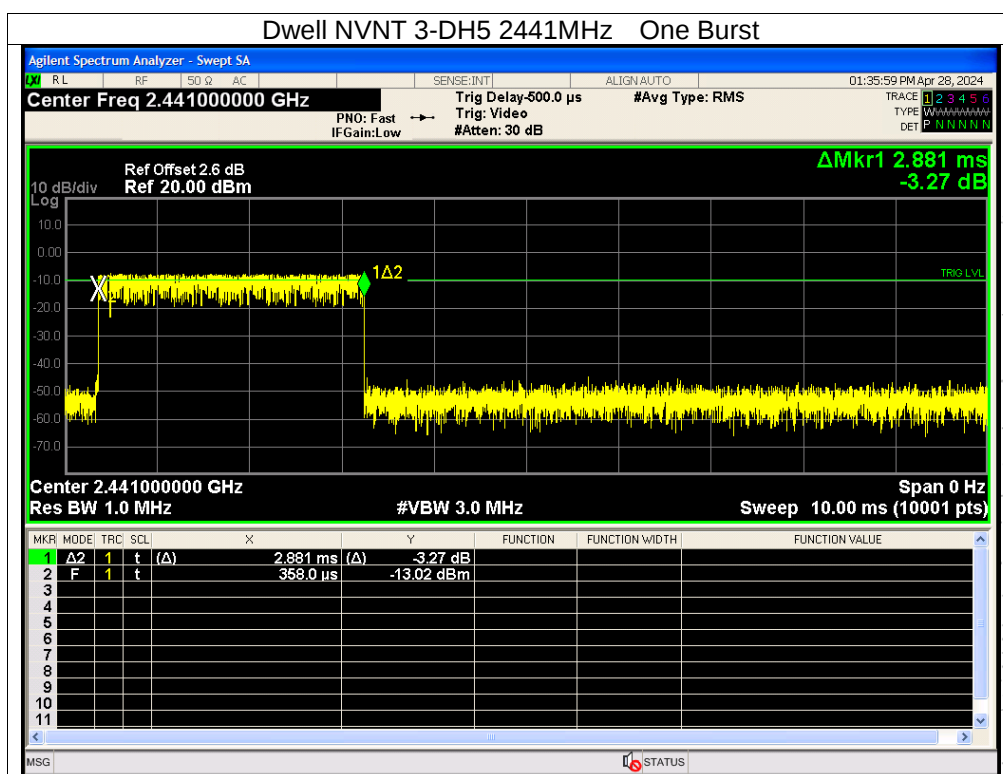
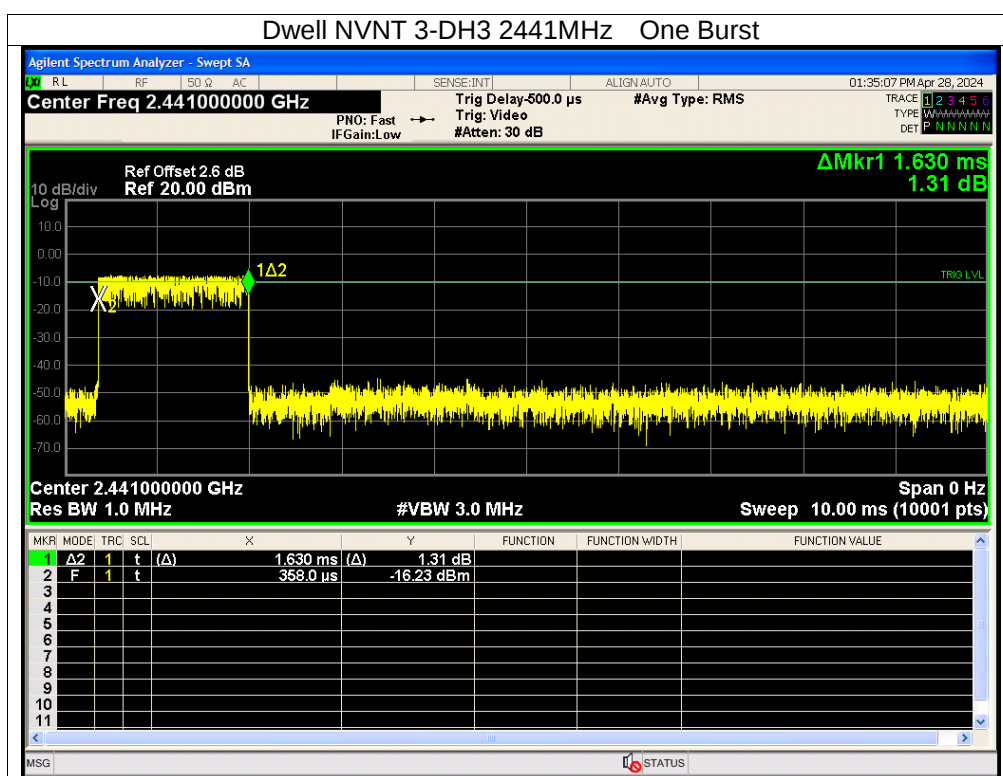






Report No.: BCTC2404071906-1E





15. Antenna Requirement

15.1 Limit

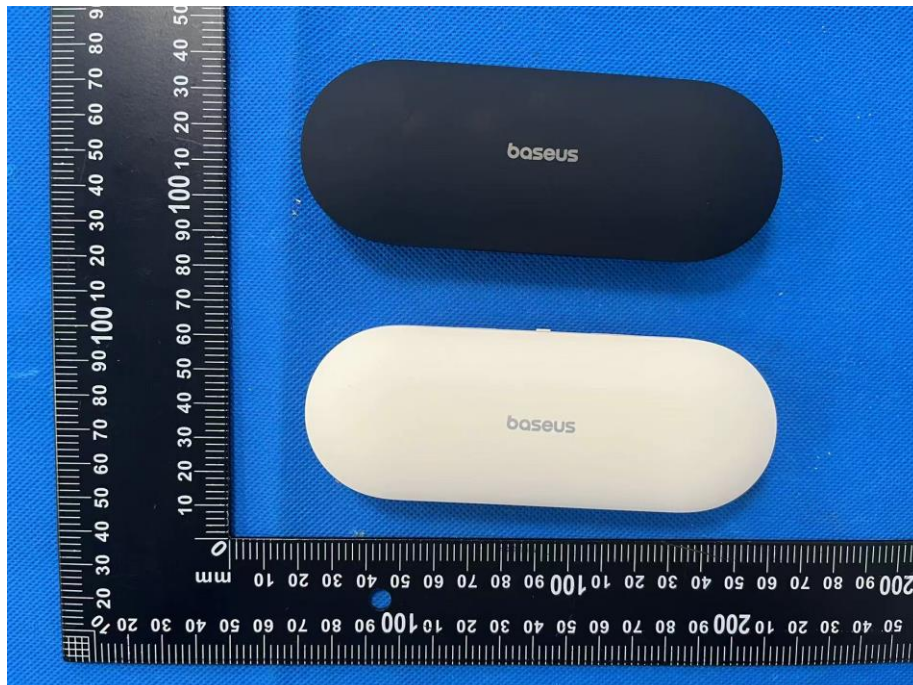
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

15.2 Test Result

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

16. EUT Photographs

EUT Photo 1



EUT Photo 2



EUT Photo 3



EUT Photo 4



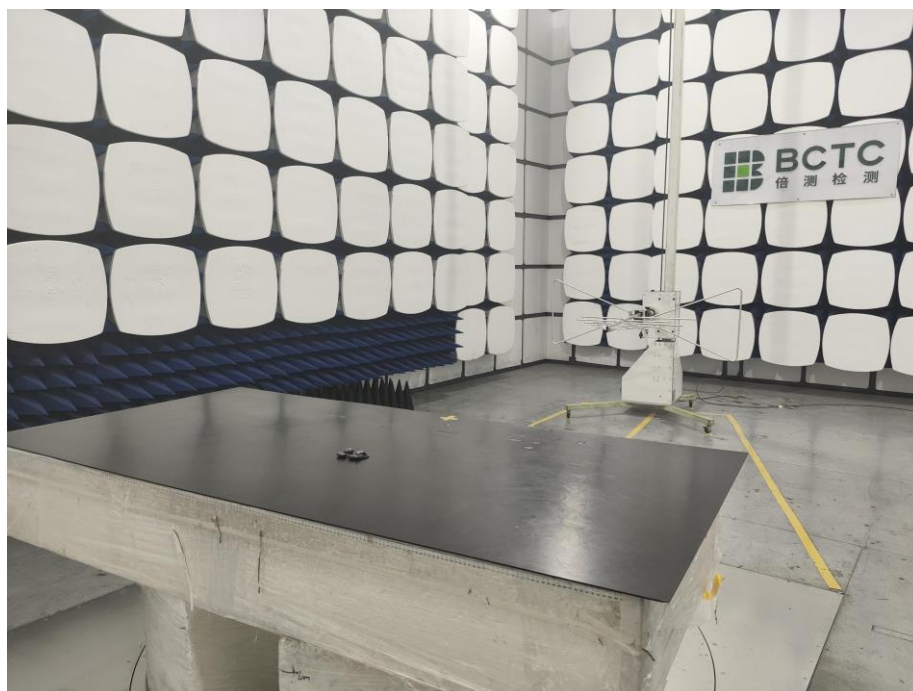
NOTE: Appendix-Photographs Of EUT Constructional Details.

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 the "special seal for inspection and testing".
4. The test report is invalid without the signature of the approver.
5. The test process and test result is only related to the Unit Under Test.
6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.
7. The quality system of our laboratory is in accordance with ISO/IEC17025.
8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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

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***** END *****