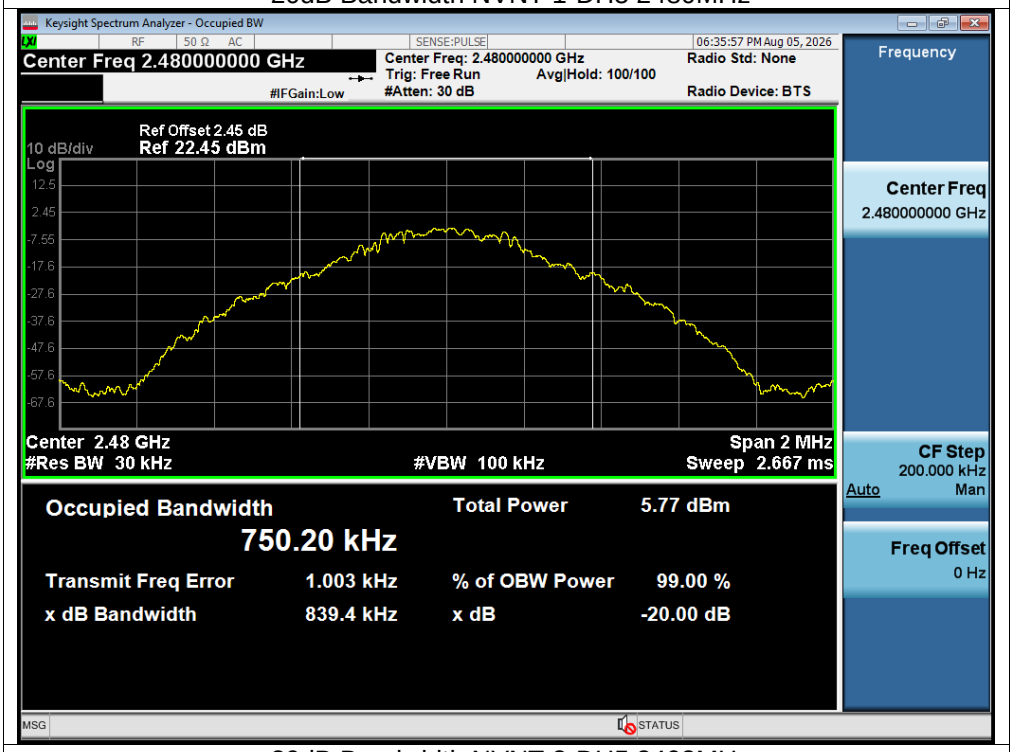
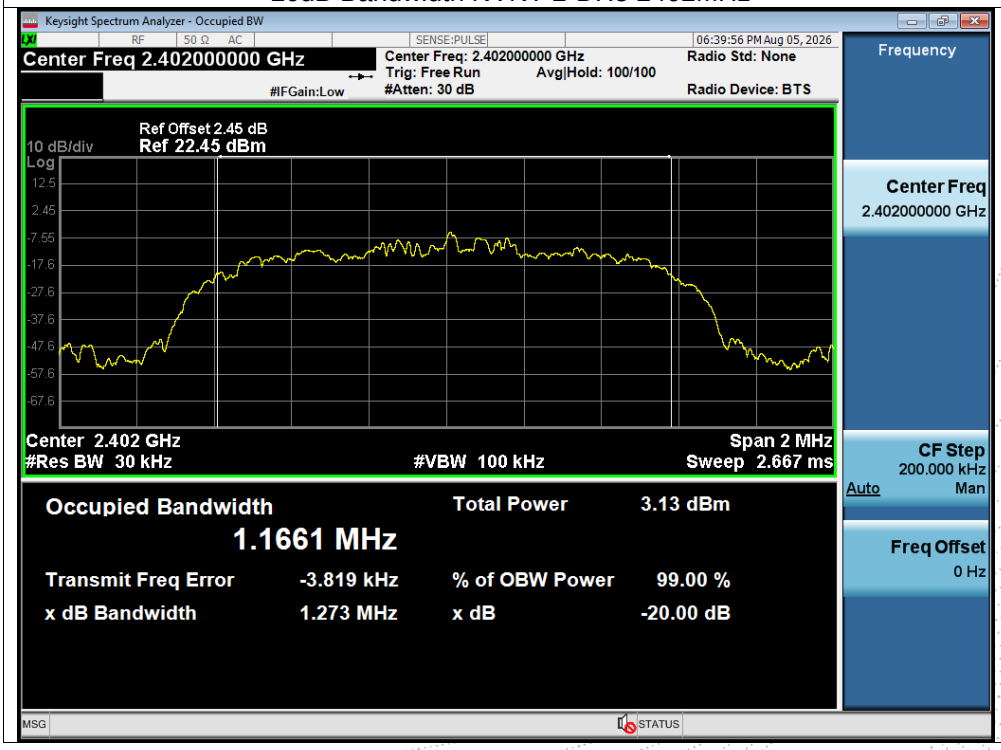
-20dB Bandwidth NVNT 1-DH5 2480MHz

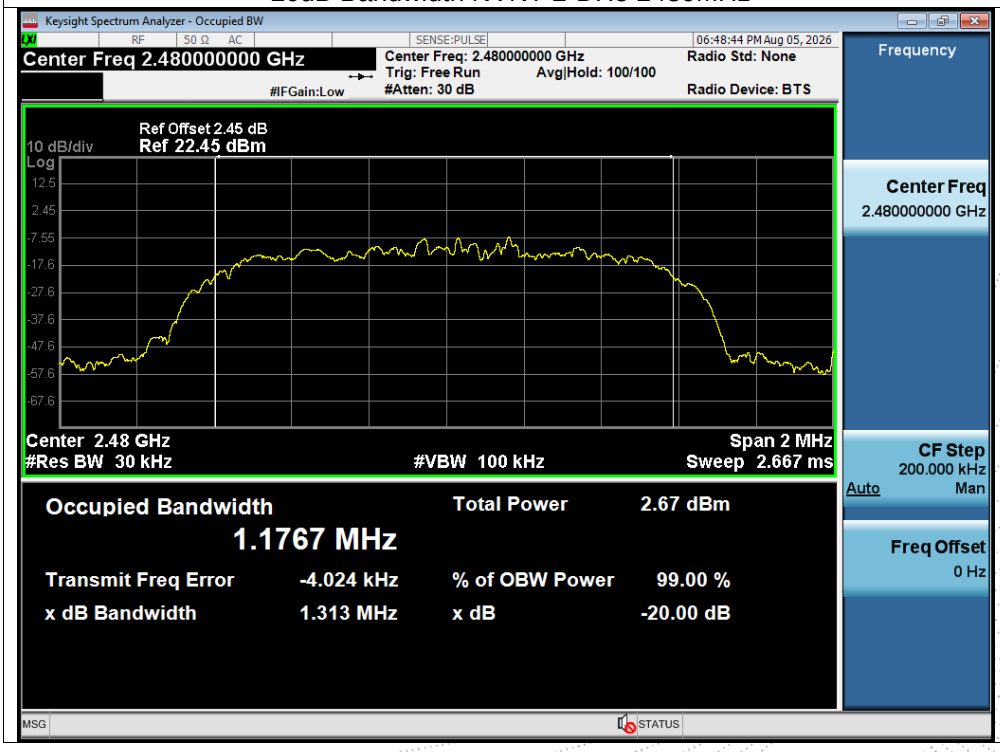


-20dB Bandwidth NVNT 2-DH5 2402MHz

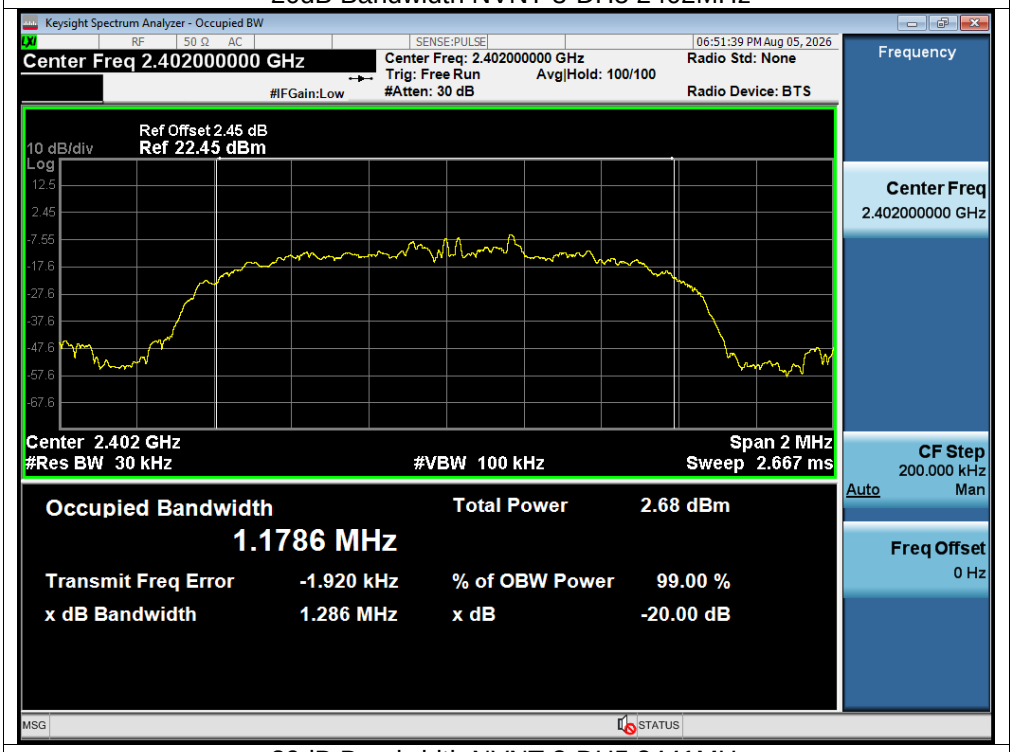


-20dB Bandwidth NVNT 2-DH5 2441MHz

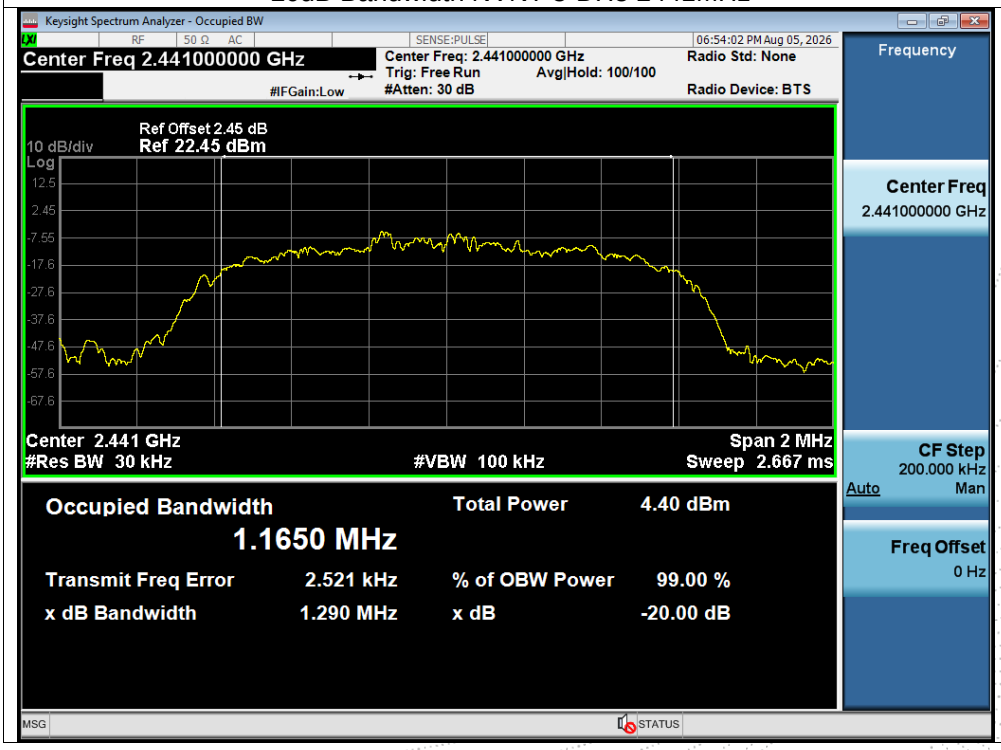
-20dB Bandwidth NVNT 2-DH5 2480MHz



-20dB Bandwidth NVNT 3-DH5 2402MHz



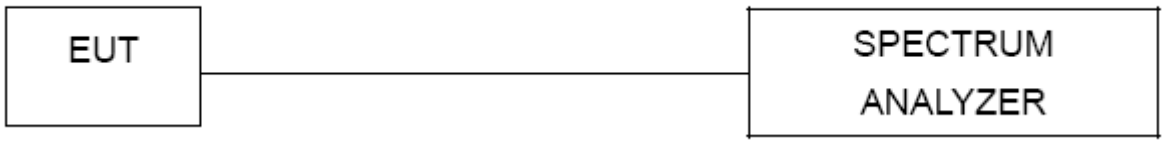
-20dB Bandwidth NVNT 3-DH5 2441MHz



-20dB Bandwidth NVNT 3-DH5 2480MHz

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

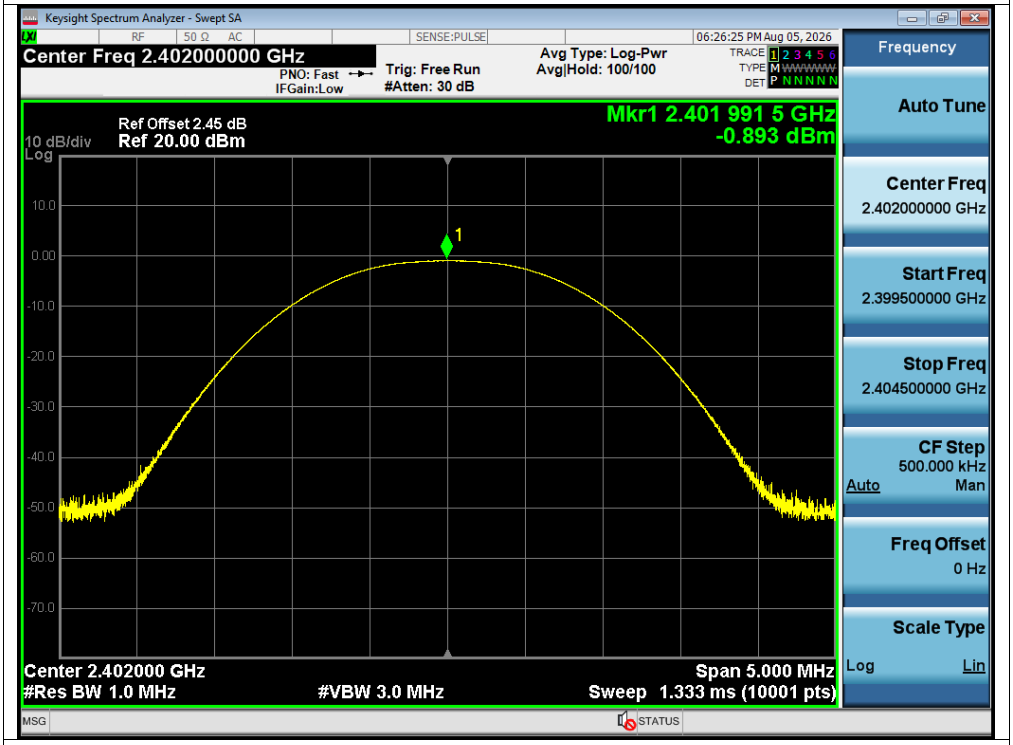
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 2MHz. VBW = 6MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

11.4 Test Result

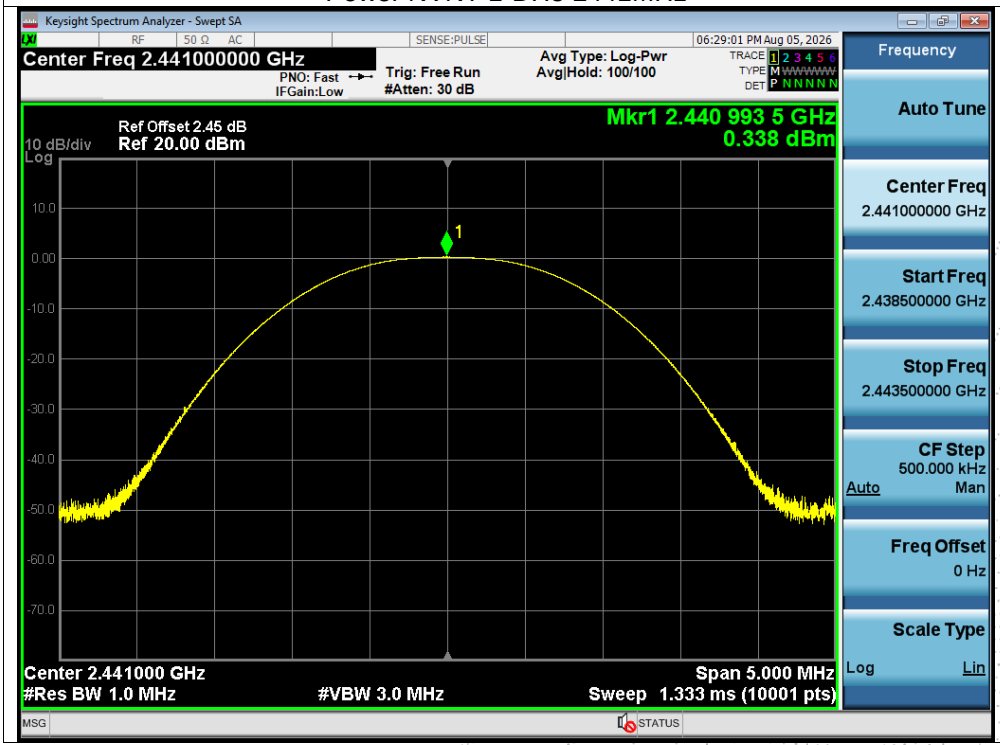
Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	-0.89	21	Pass
NVNT	1-DH5	2441	0.34	21	Pass
NVNT	1-DH5	2480	-0.65	21	Pass
NVNT	2-DH5	2402	-1.53	21	Pass
NVNT	2-DH5	2441	-0.32	21	Pass
NVNT	2-DH5	2480	-1.27	21	Pass
NVNT	3-DH5	2402	-1.57	21	Pass
NVNT	3-DH5	2441	-0.34	21	Pass
NVNT	3-DH5	2480	-1.32	21	Pass

Test Graphs

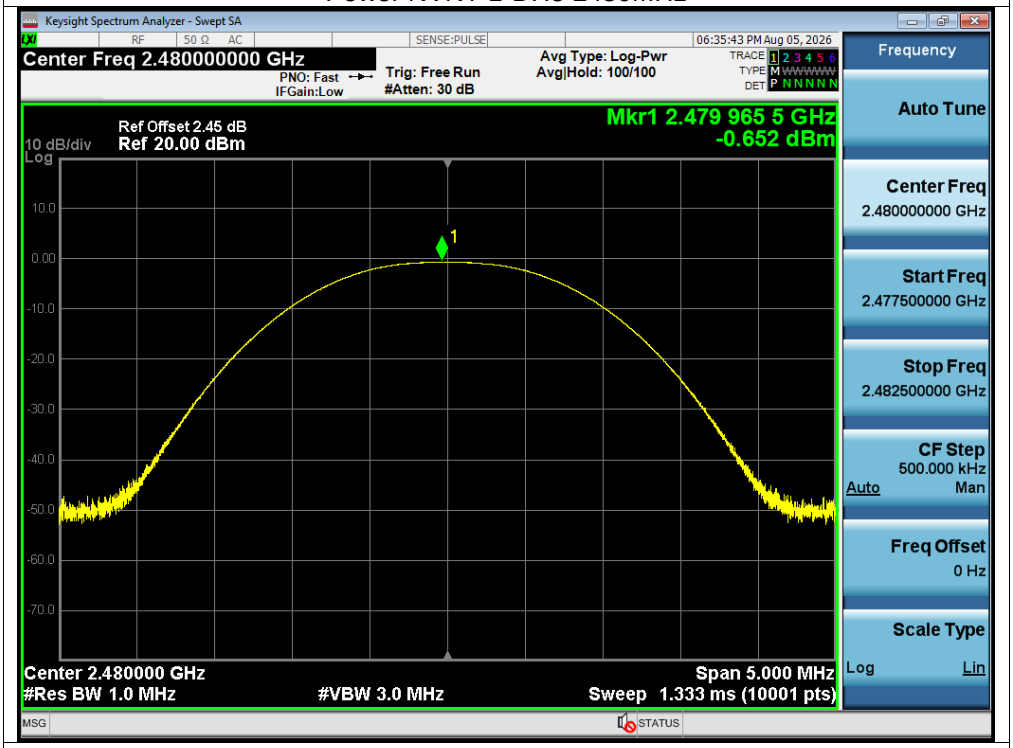
Power NVNT 1-DH5 2402MHz



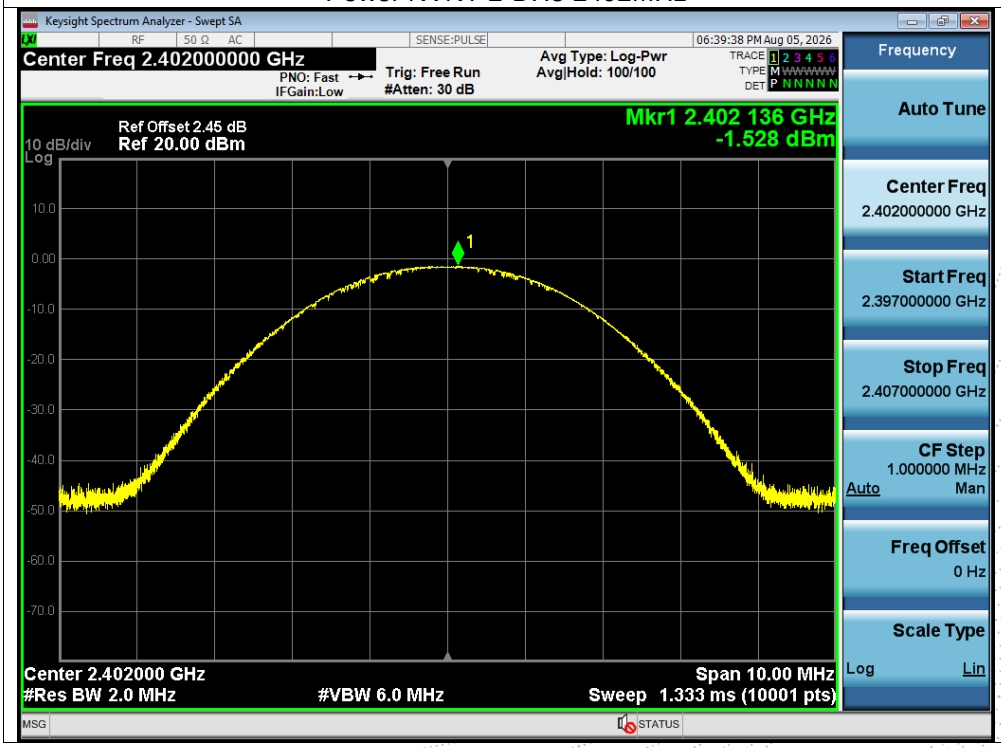
Power NVNT 1-DH5 2441MHz



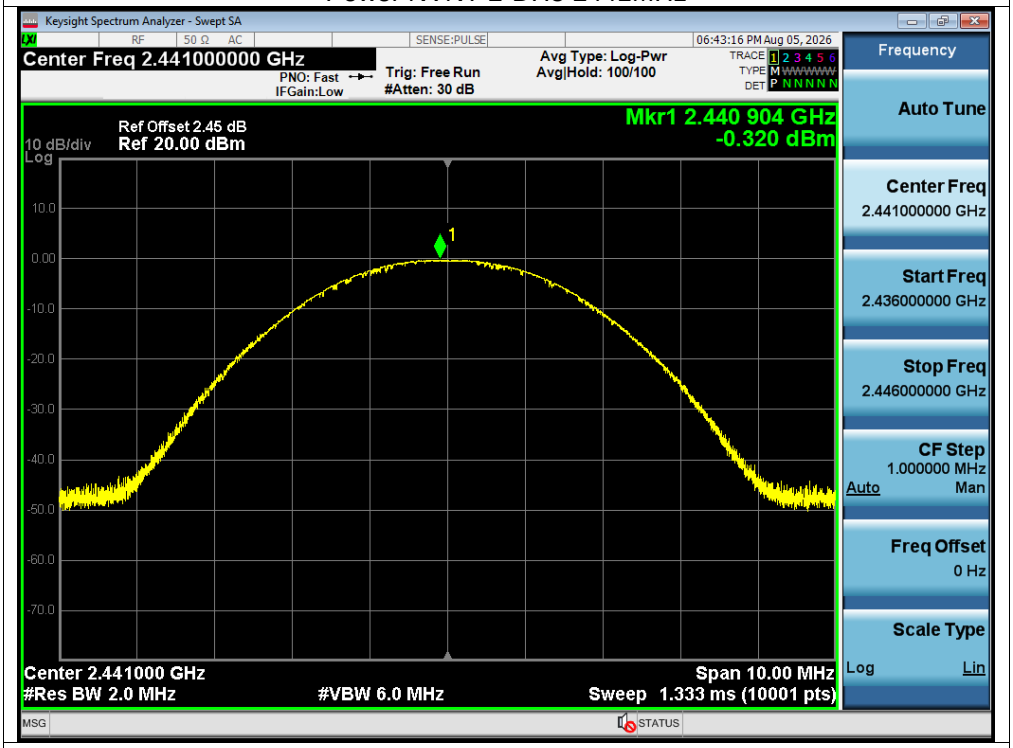
Power NVNT 1-DH5 2480MHz



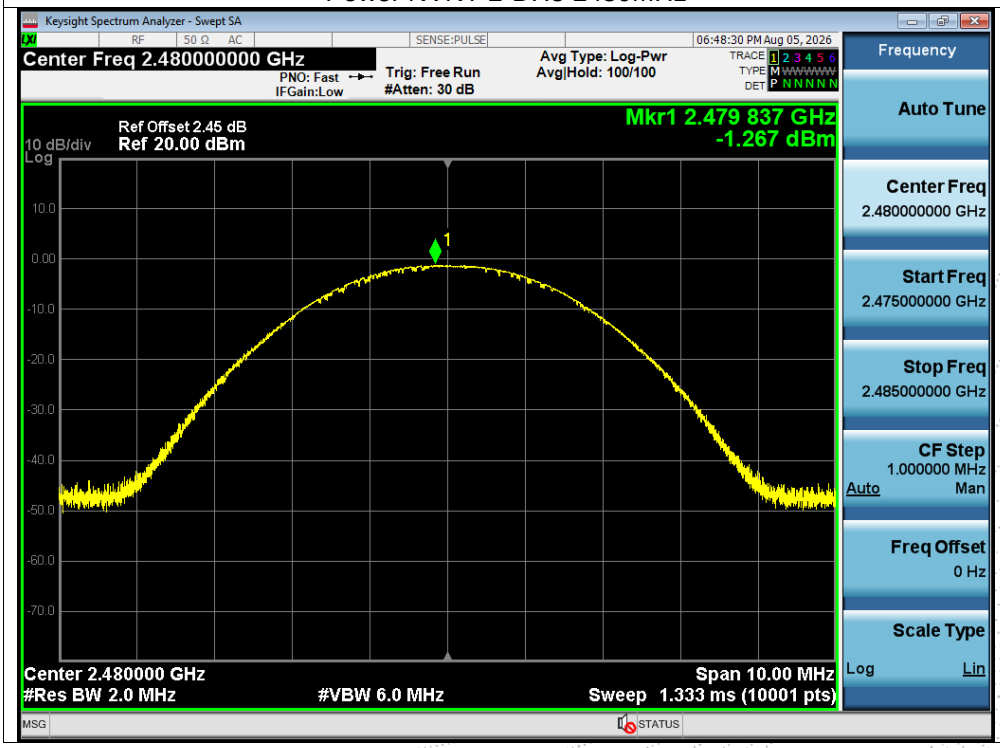
Power NVNT 2-DH5 2402MHz



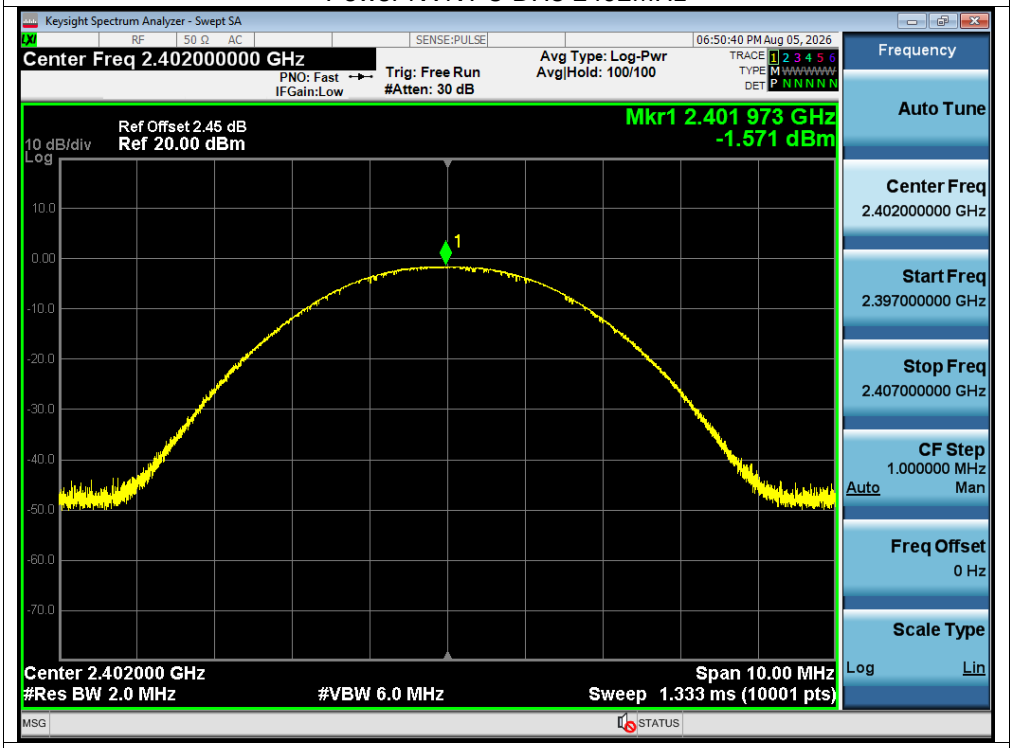
Power NVNT 2-DH5 2441MHz



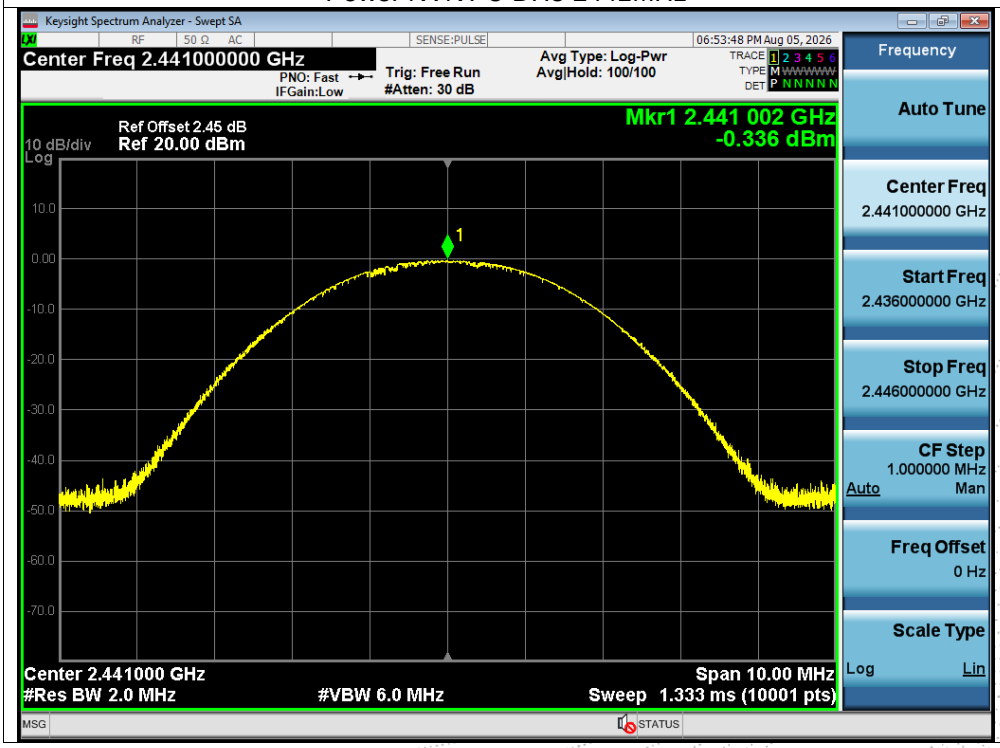
Power NVNT 2-DH5 2480MHz



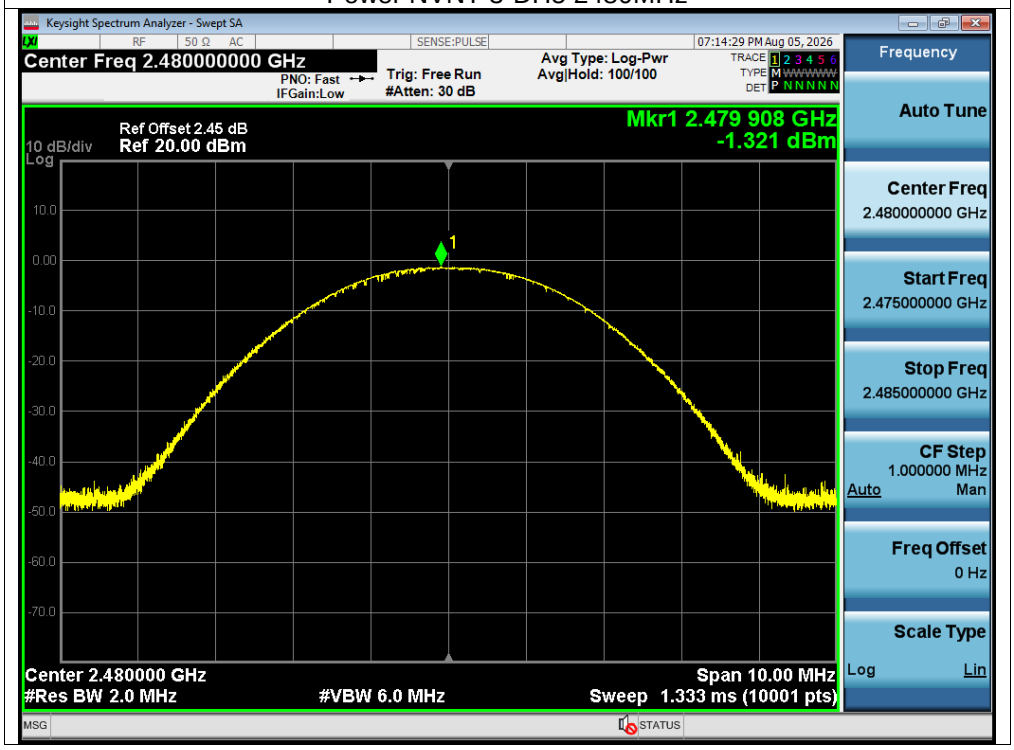
Power NVNT 3-DH5 2402MHz



Power NVNT 3-DH5 2441MHz



Power NVNT 3-DH5 2480MHz



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

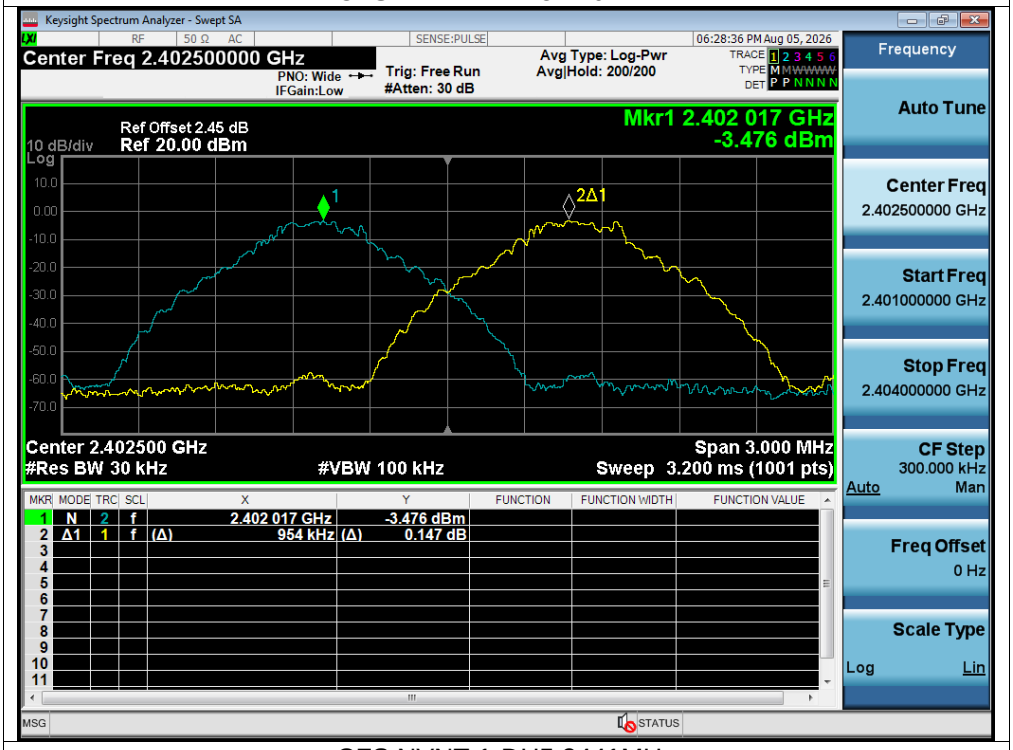
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 30kHz. VBW = 100kHz , Span = 2.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to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

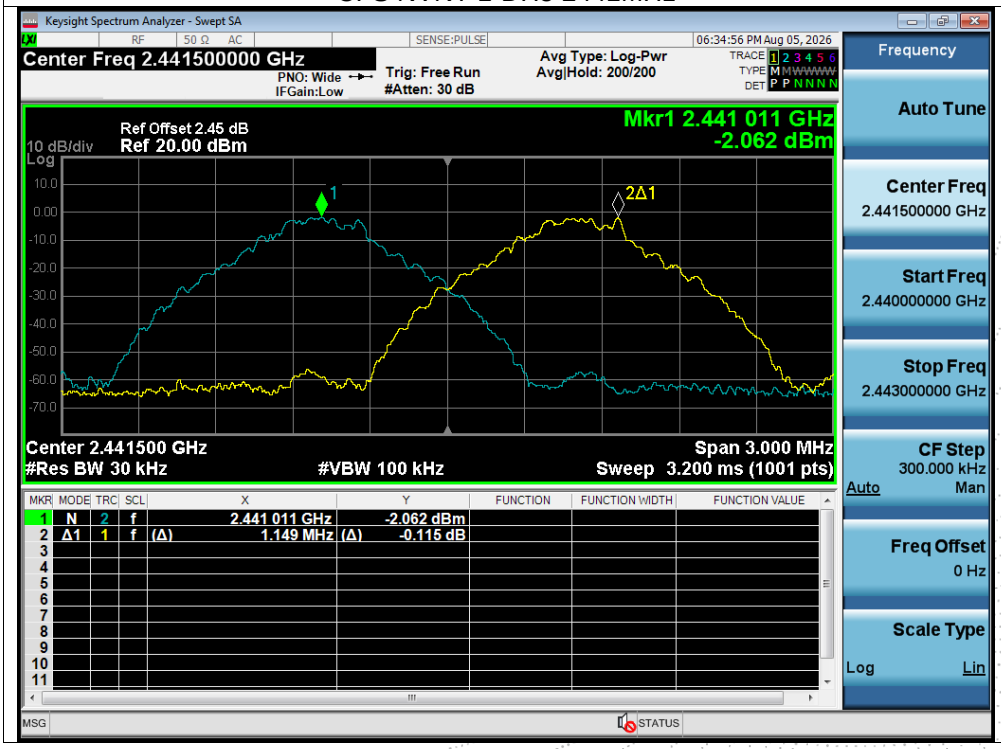
Condition	Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH5	2402.017	2402.971	0.954000000000178	0.559	Pass
NVNT	1-DH5	2441.011	2442.16	1.14899999999989	0.555	Pass
NVNT	1-DH5	2479.011	2480.013	1.00199999999995	0.632	Pass
NVNT	2-DH5	2402.161	2403.16	0.998999999999796	0.849	Pass
NVNT	2-DH5	2441.011	2442.163	1.15200000000004	0.849	Pass
NVNT	2-DH5	2479.017	2480.163	1.14600000000019	0.879	Pass
NVNT	3-DH5	2402.149	2403.145	0.996000000000095	0.857	Pass
NVNT	3-DH5	2441.014	2442.157	1.14300000000003	0.86	Pass
NVNT	3-DH5	2479.167	2480.151	0.983999999999924	0.863	Pass

Test Graphs

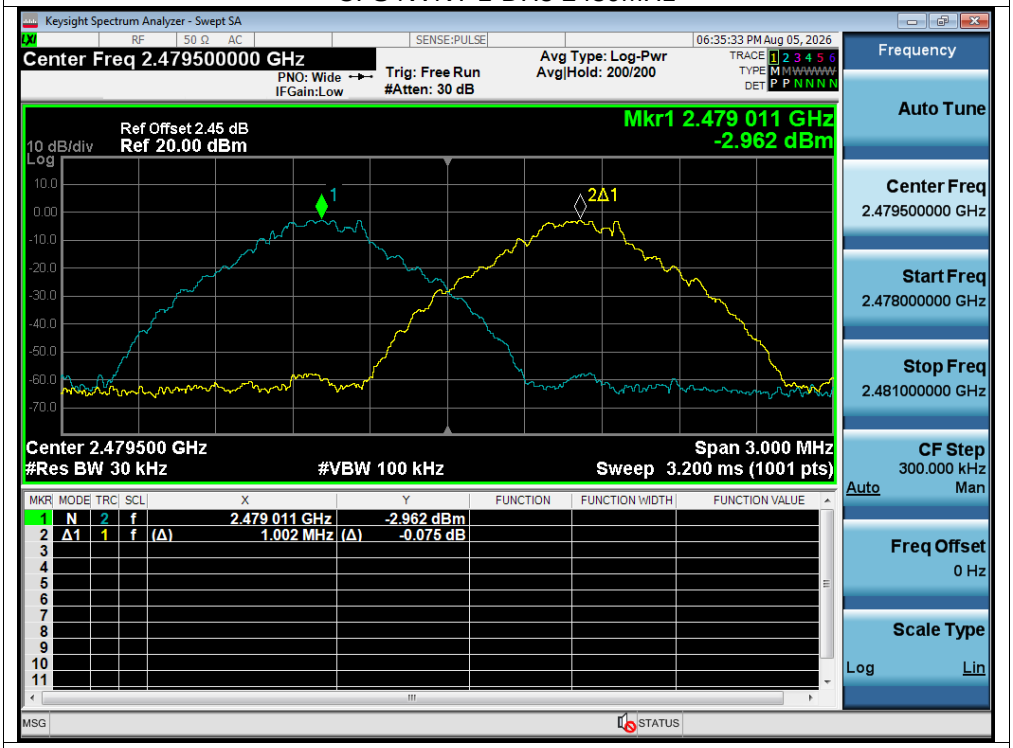
CFS NVNT 1-DH5 2402MHz



CFS NVNT 1-DH5 2441MHz



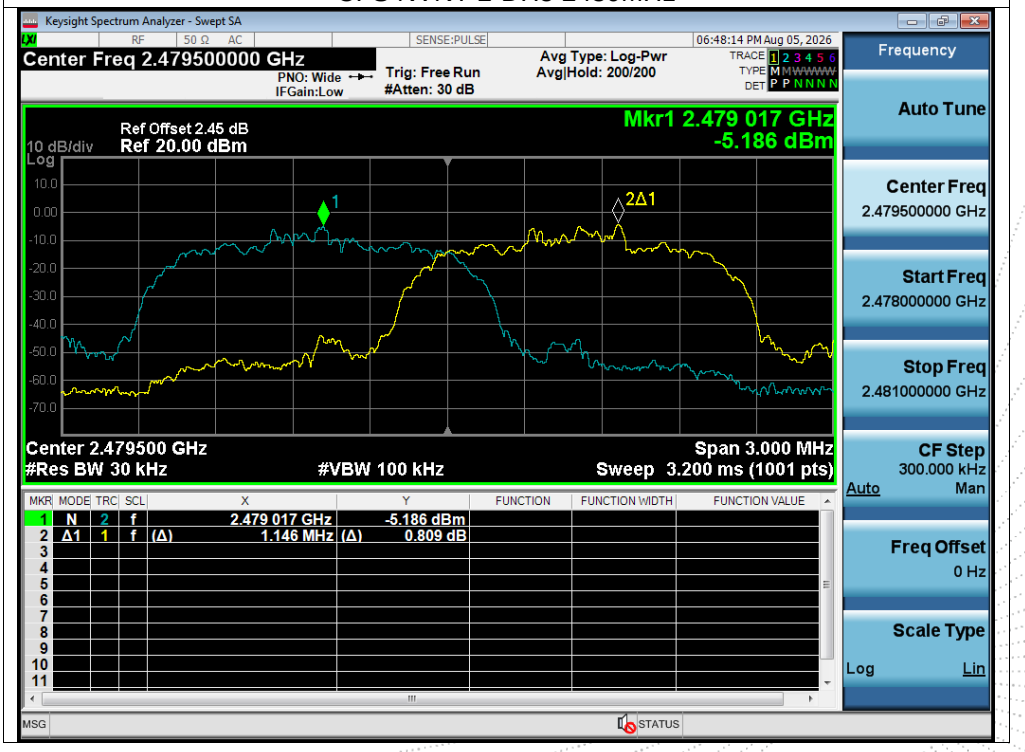
CFS NVNT 1-DH5 2480MHz



CFS NVNT 2-DH5 2402MHz

CFS NVNT 2-DH5 2441MHz

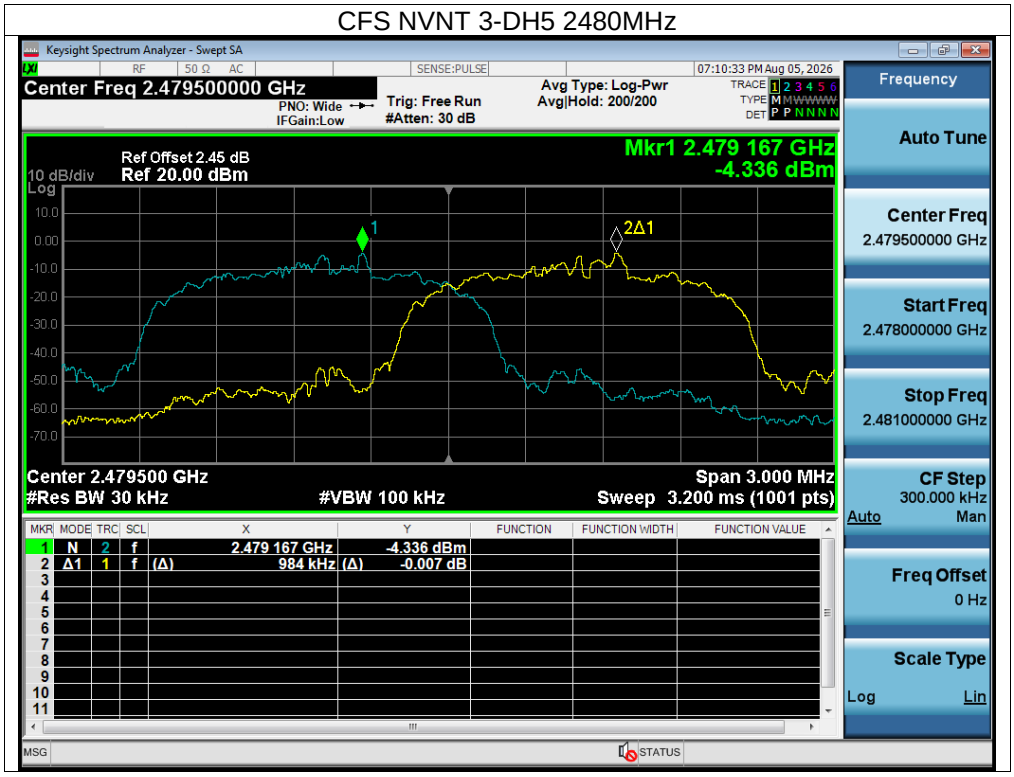
CFS NVNT 2-DH5 2480MHz



CFS NVNT 3-DH5 2402MHz

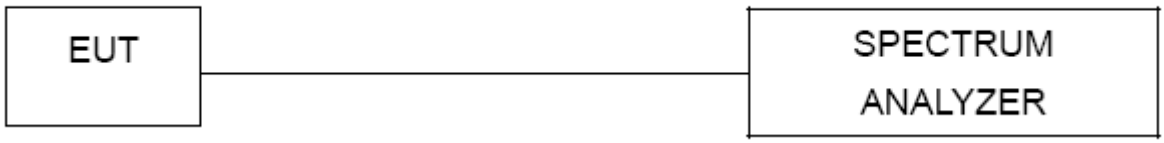
CFS NVNT 3-DH5 2441MHz

CFS NVNT 3-DH5 2480MHz



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.

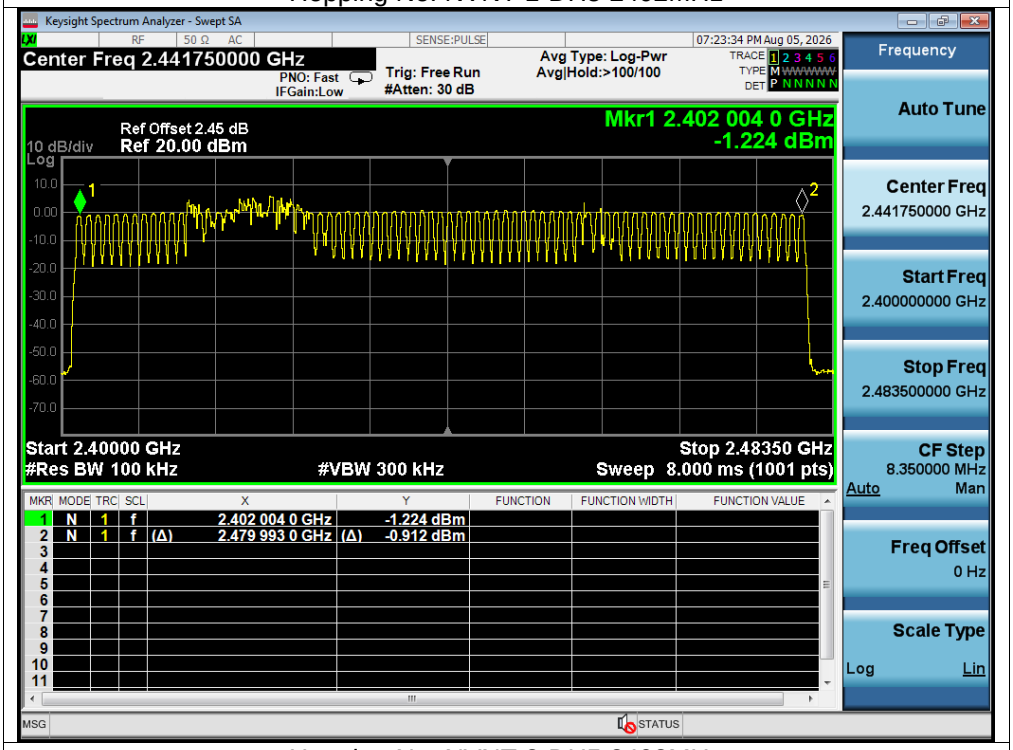
3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.

4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;

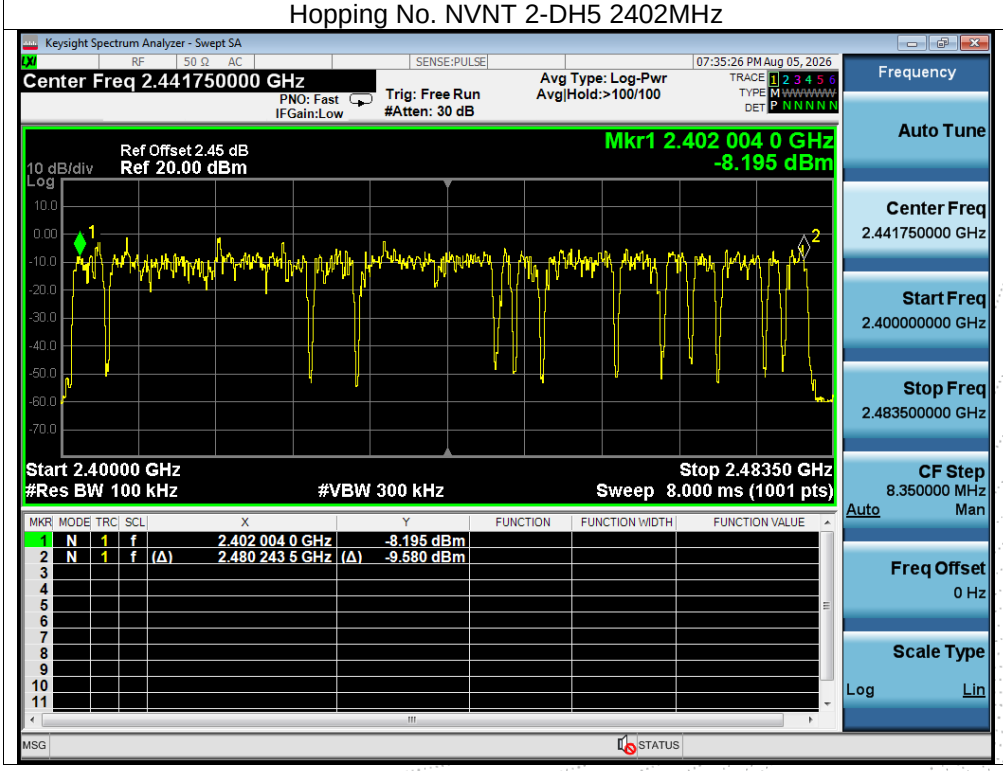
13.4 Test Result

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

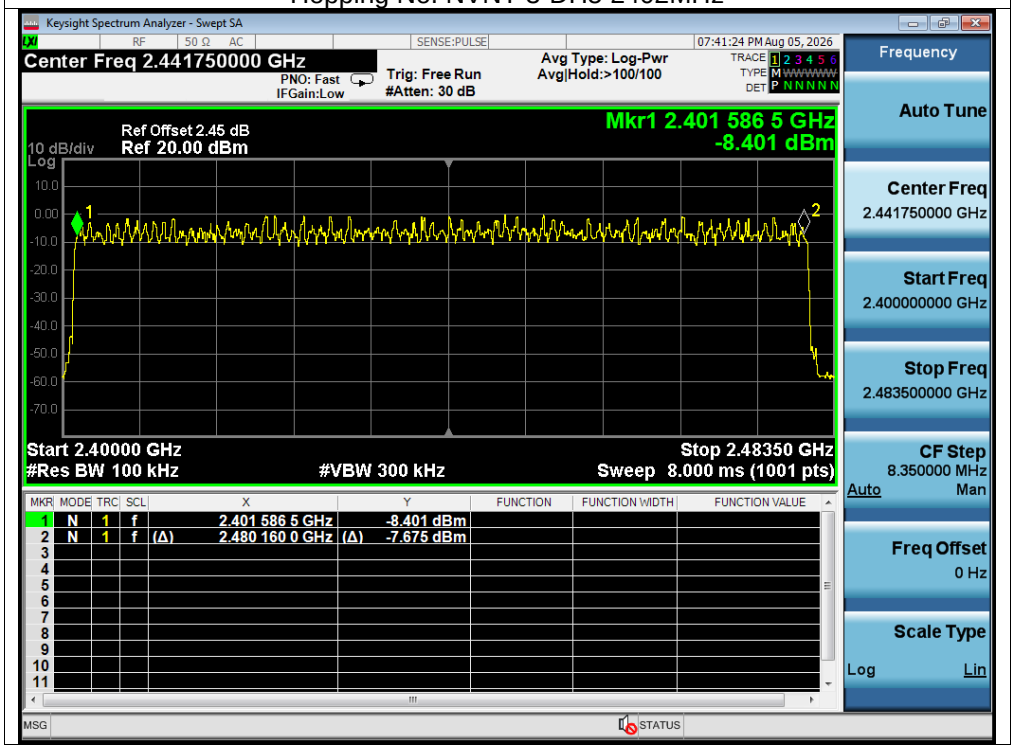
Test Graphs
Hopping No. NVNT 1-DH5 2402MHz



Hopping No. NVNT 2-DH5 2402MHz

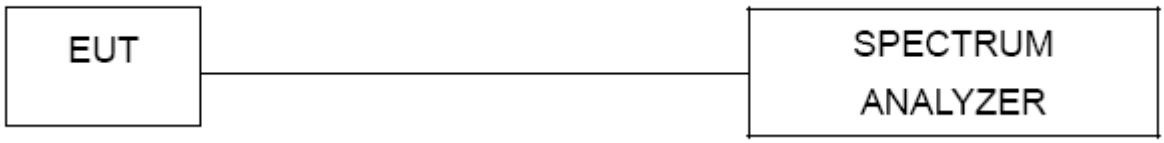


Hopping No. NVNT 3-DH5 2402MHz



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

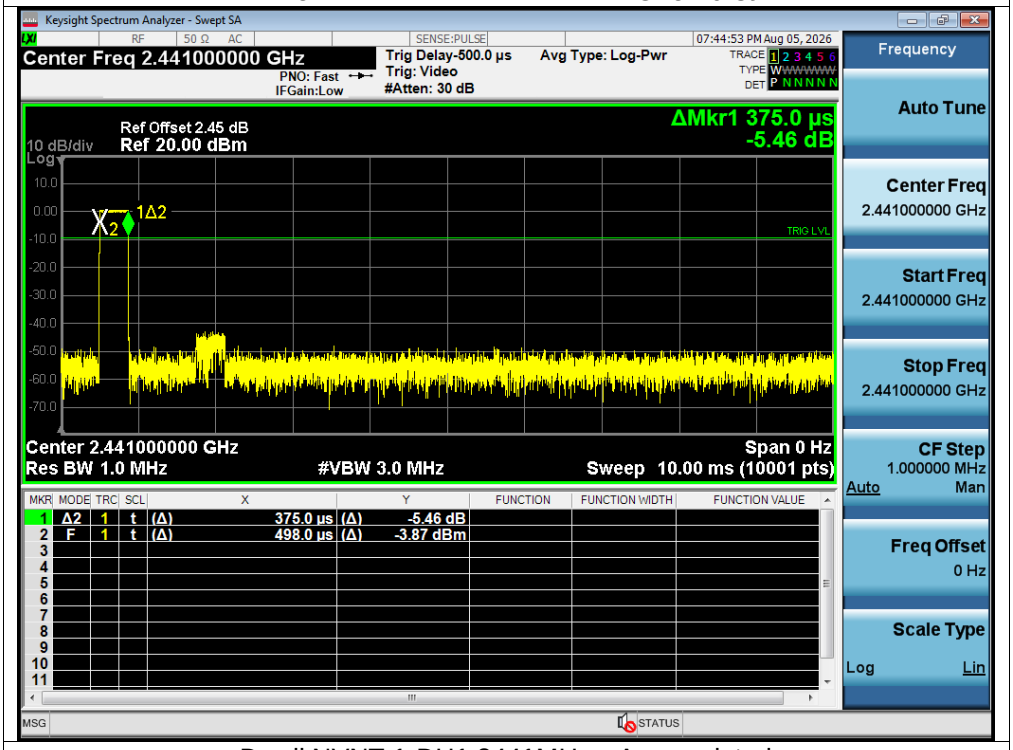
DH5 Packet permit maximum 1600 / 79 / 6 hops per second in each channel
(5 time slots RX, 1 time slot TX).
DH3 Packet permit maximum 1600 / 79 / 4 hops per second in each channel
(3 time slots RX, 1 time slot TX).
DH1 Packet permit maximum 1600 / 79 /2 hops per second in each channel
(1 time slot RX, 1 time slot TX). So, the Dwell Time can be calculated as follows:

DH5:1600/79/6*0.4*79*(MkrDelta)/1000
DH3:1600/79/4*0.4*79*(MkrDelta)/1000
DH1:1600/79/2*0.4*79*(MkrDelta)/1000
Remark: Mkr Delta is once pulse time.

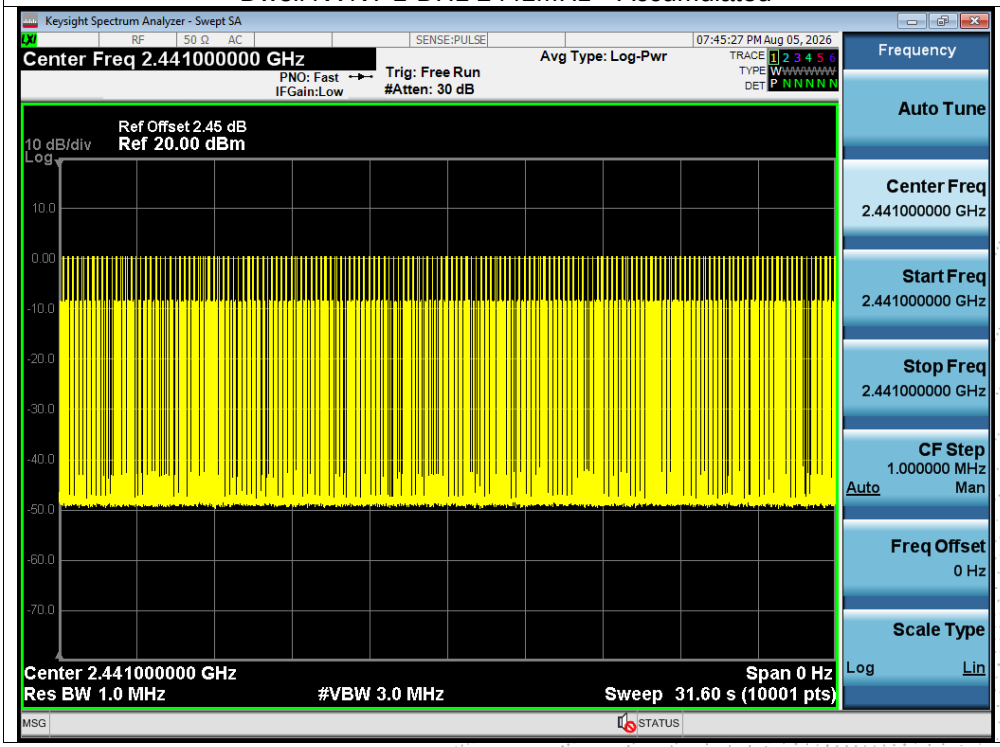
Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2441	0.375	118.5	400	Pass
NVNT	1-DH3	2441	1.63	254.28	400	Pass
NVNT	1-DH5	2441	2.879	308.053	400	Pass
NVNT	2-DH1	2441	0.382	119.948	400	Pass
NVNT	2-DH3	2441	1.634	3.268	400	Pass
NVNT	2-DH5	2441	2.869	275.424	400	Pass
NVNT	3-DH1	2441	0.382	120.33	400	Pass
NVNT	3-DH3	2441	1.634	258.172	400	Pass
NVNT	3-DH5	2441	2.883	2.883	400	Pass

Test Graphs

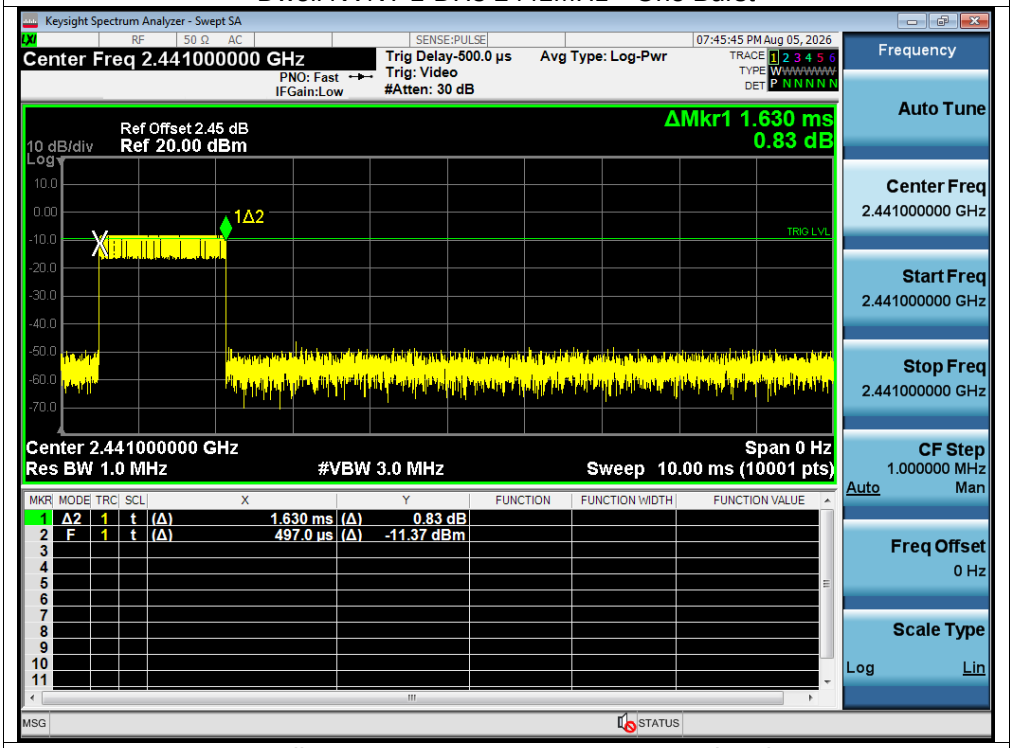
Dwell NVNT 1-DH1 2441MHz One Burst



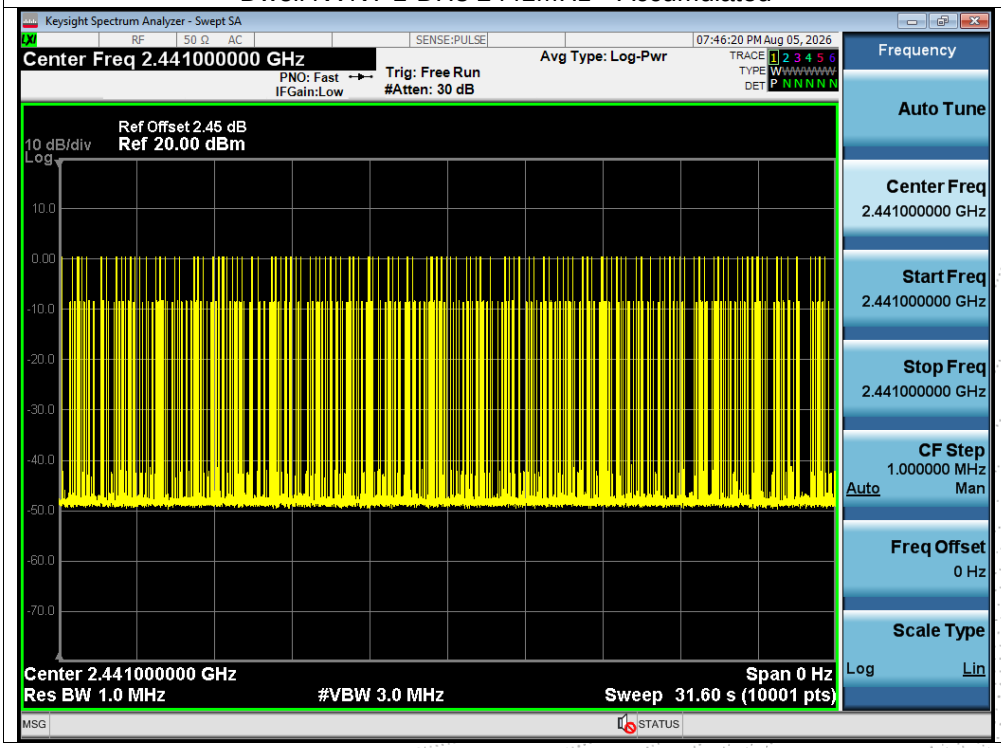
Dwell NVNT 1-DH1 2441MHz Accumulated



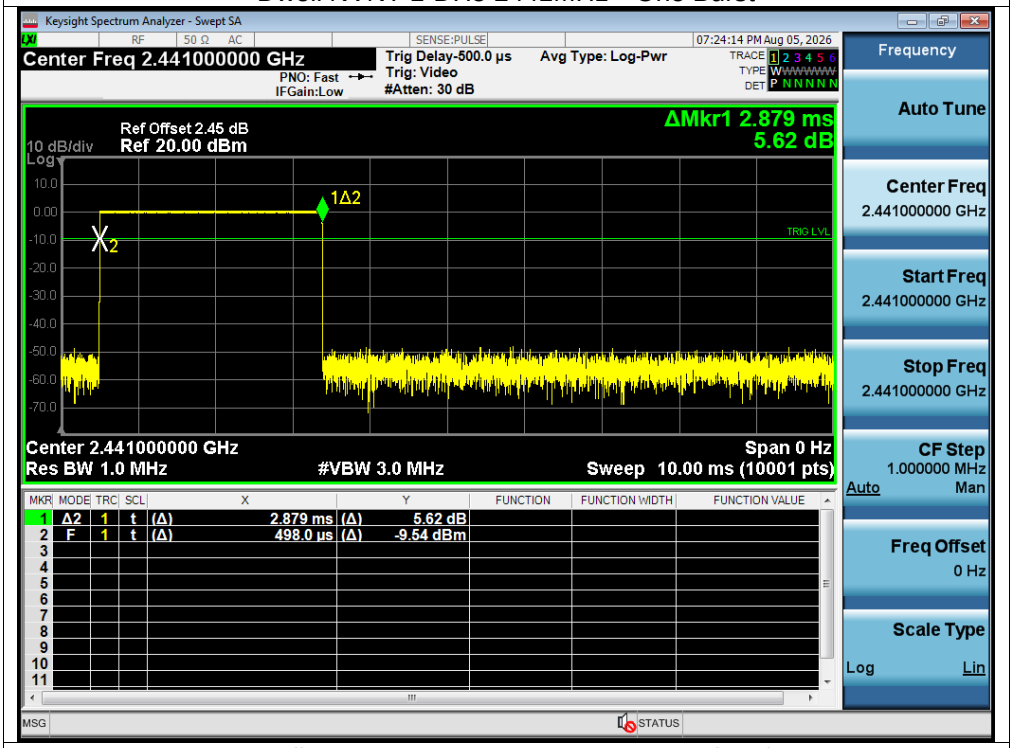
Dwell NVNT 1-DH3 2441MHz One Burst



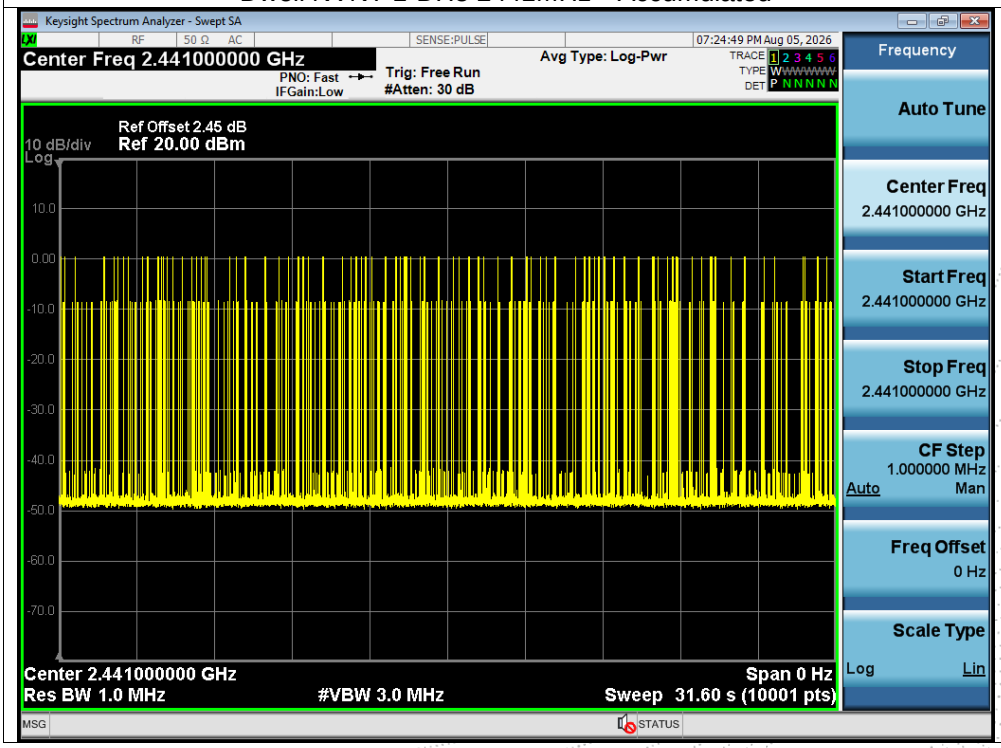
Dwell NVNT 1-DH3 2441MHz Accumulated



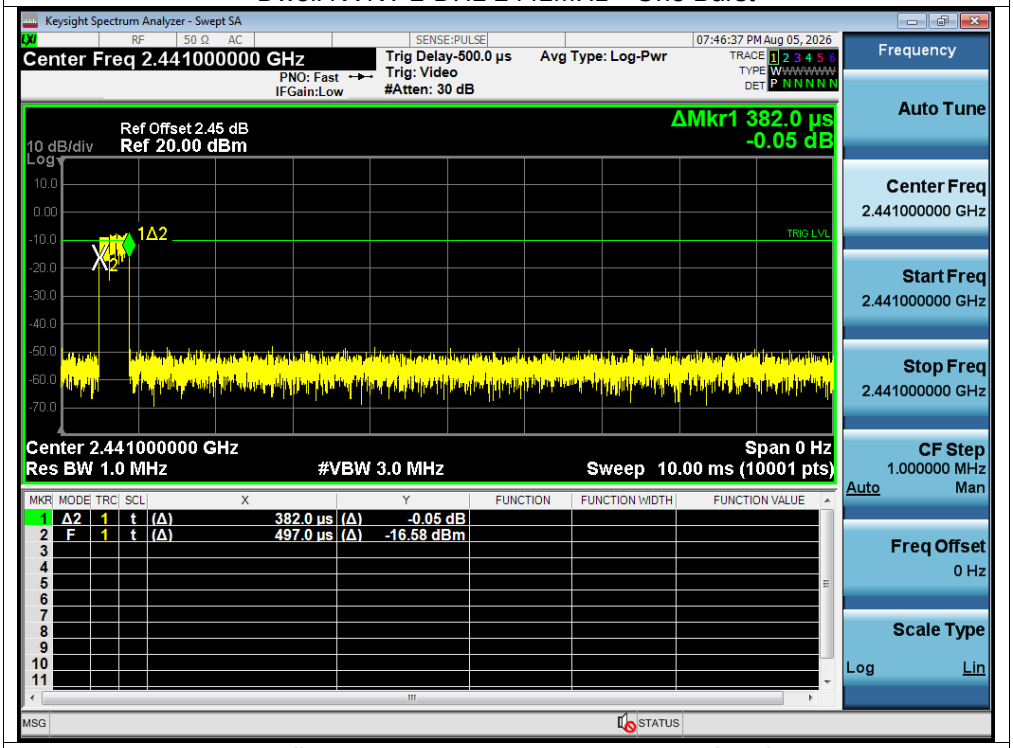
Dwell NVNT 1-DH5 2441MHz One Burst



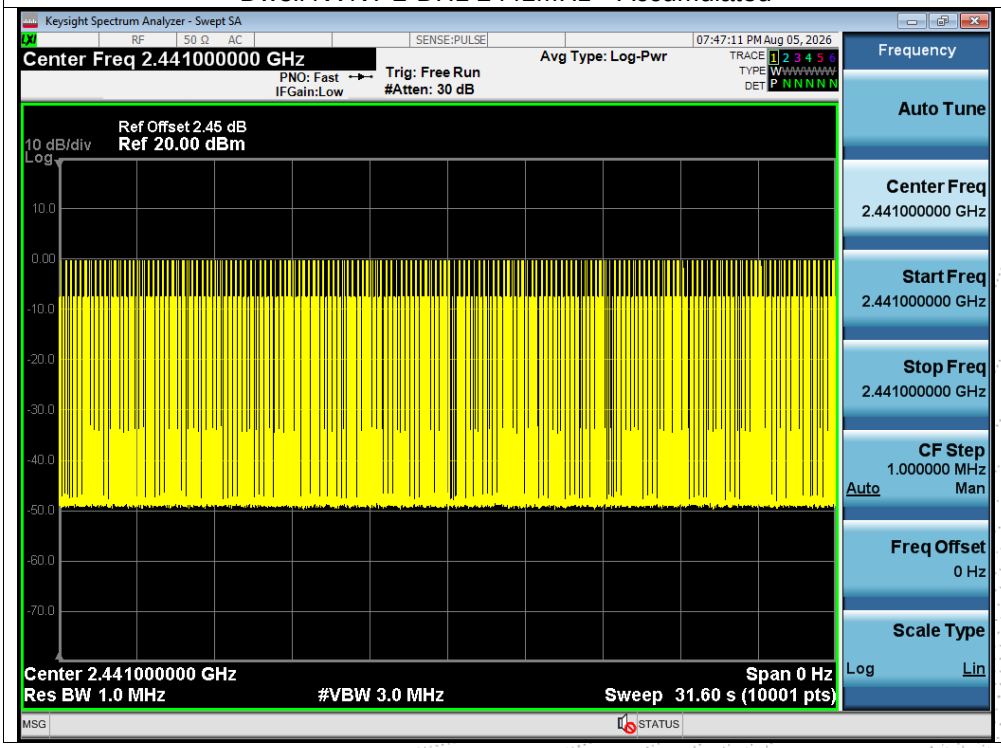
Dwell NVNT 1-DH5 2441MHz Accumulated



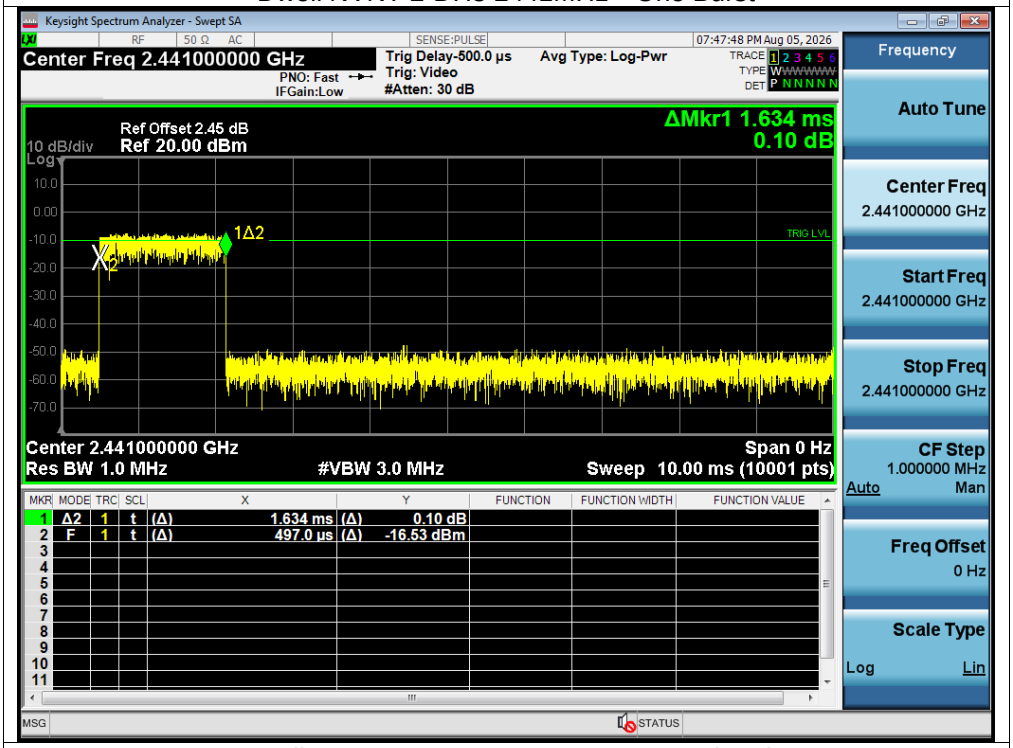
Dwell NVNT 2-DH1 2441MHz One Burst



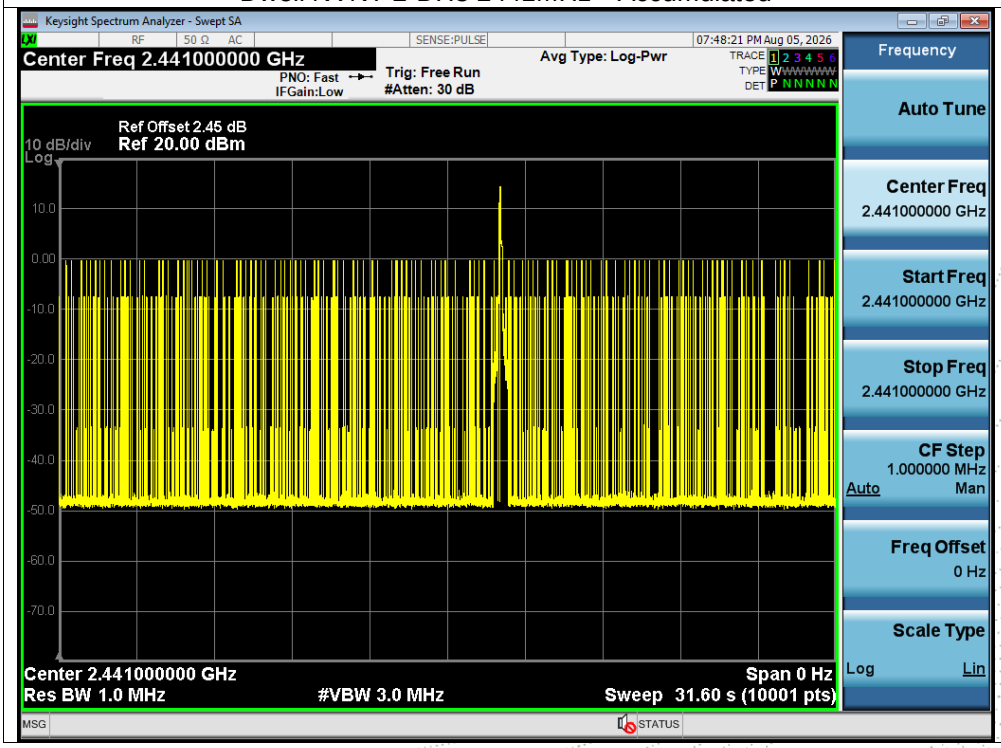
Dwell NVNT 2-DH1 2441MHz Accumulated



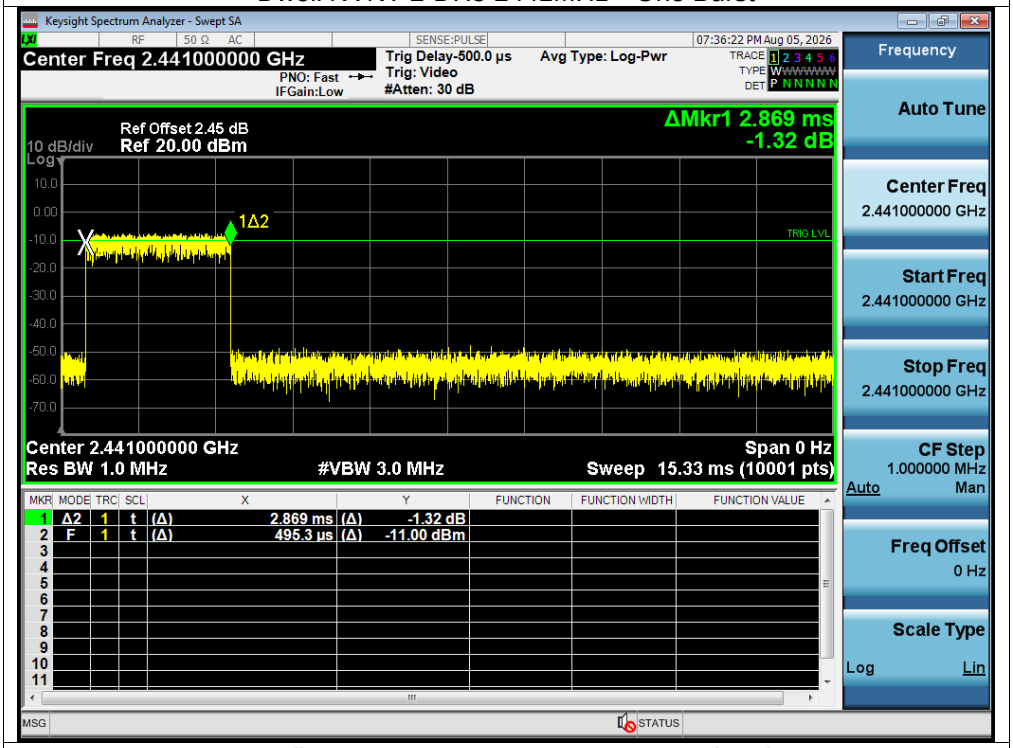
Dwell NVNT 2-DH3 2441MHz One Burst



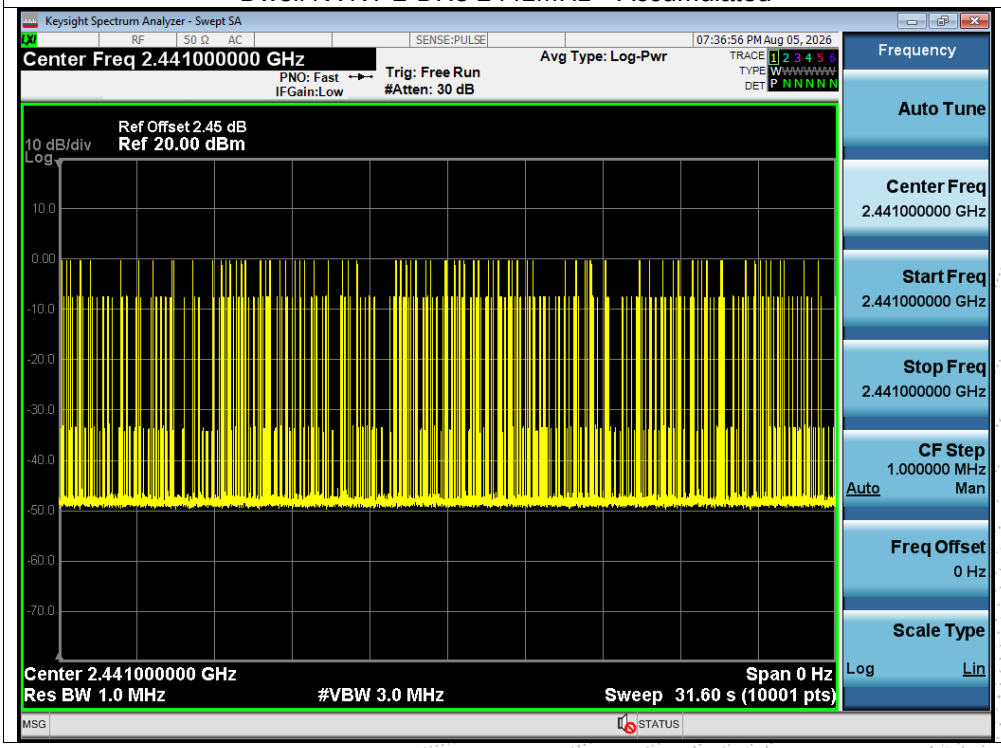
Dwell NVNT 2-DH3 2441MHz Accumulated



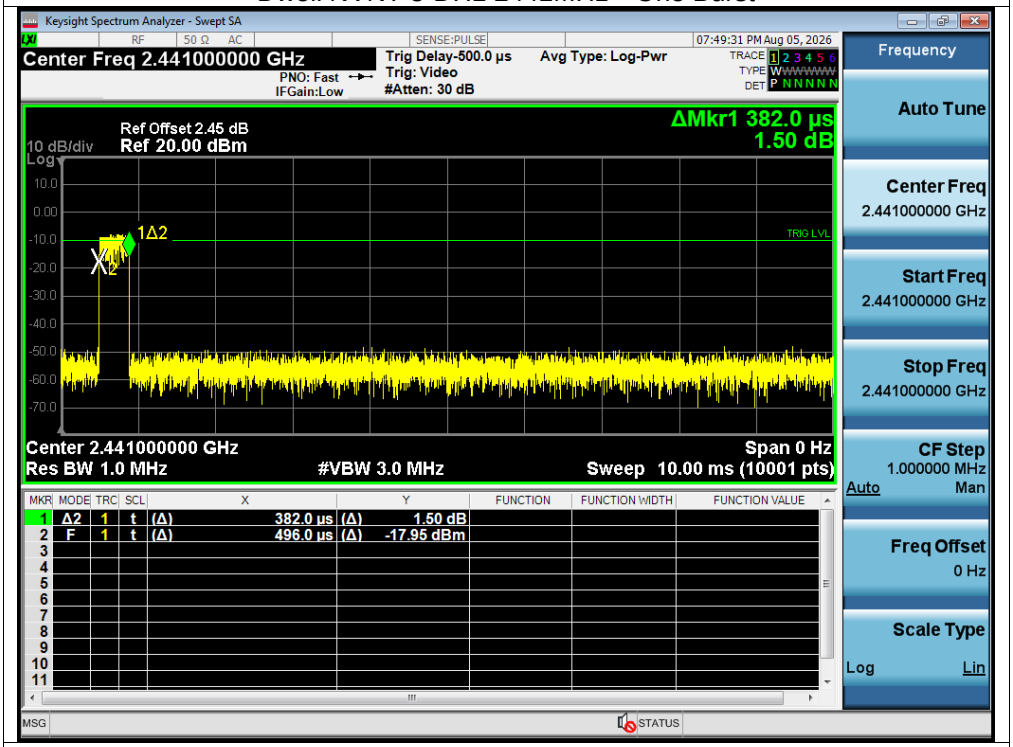
Dwell NVNT 2-DH5 2441MHz One Burst



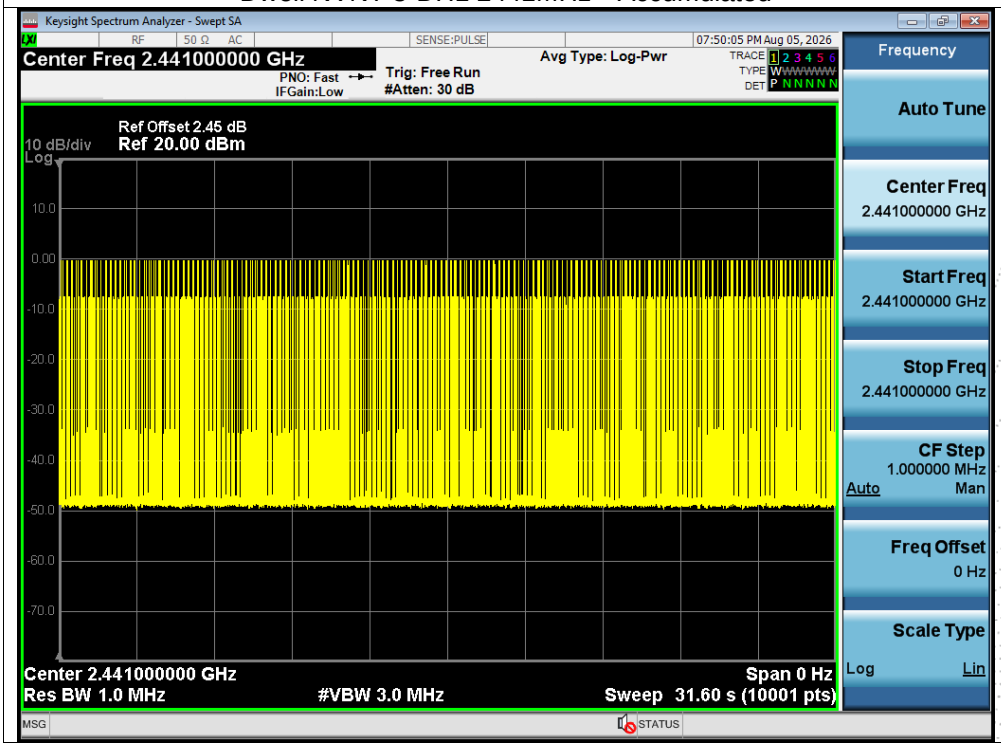
Dwell NVNT 2-DH5 2441MHz Accumulated



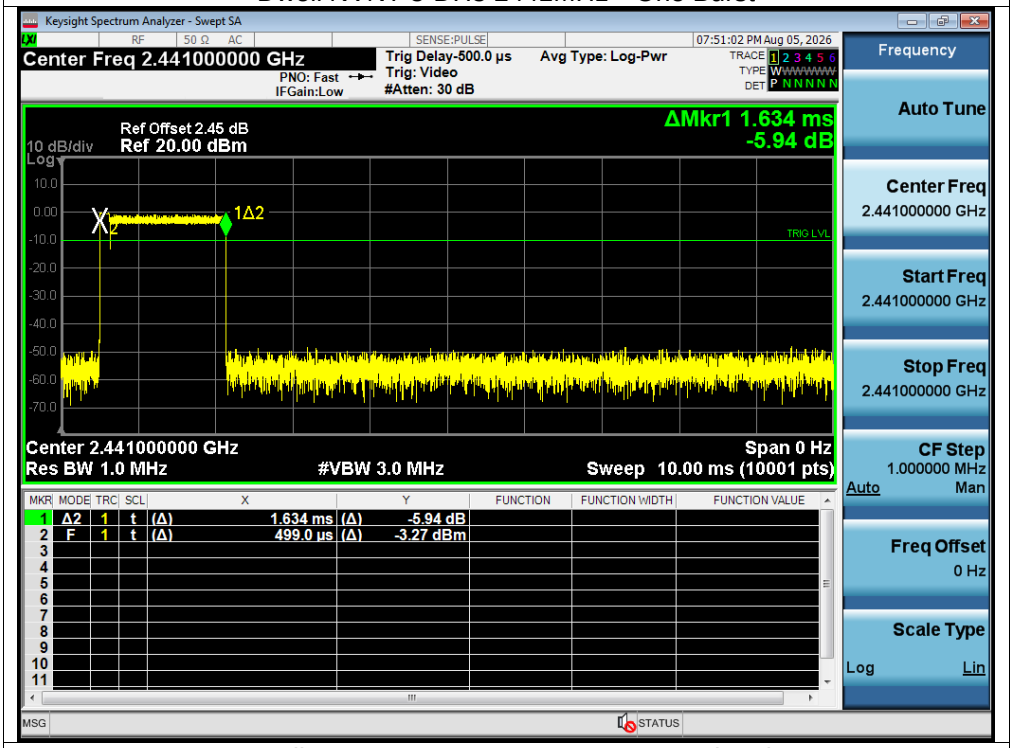
Dwell NVNT 3-DH1 2441MHz One Burst



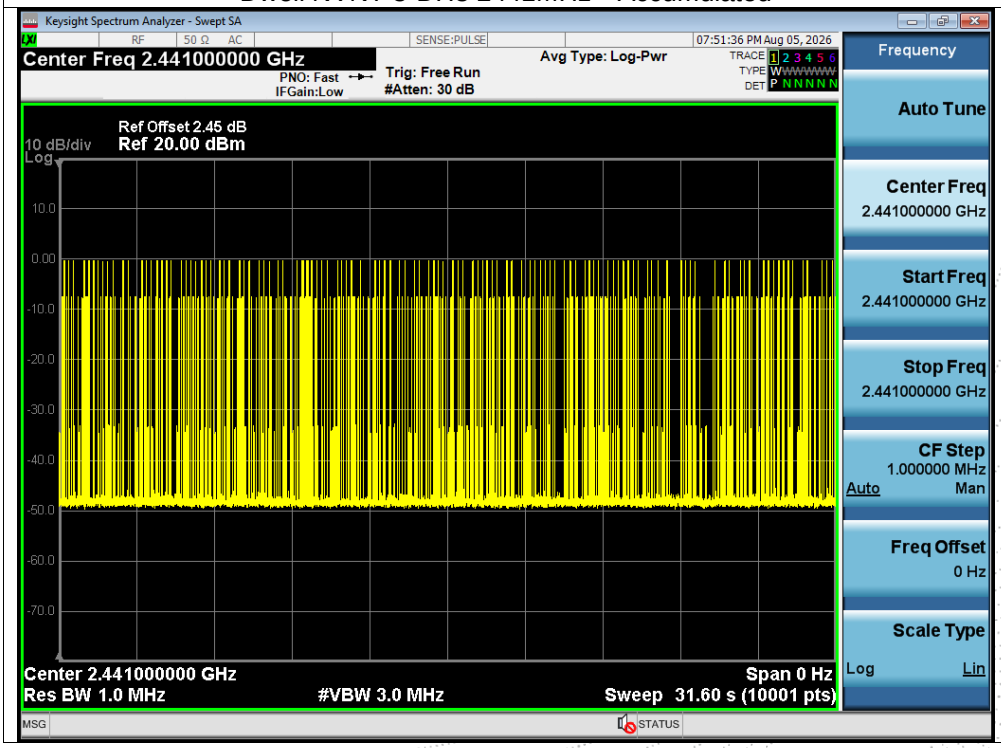
Dwell NVNT 3-DH1 2441MHz Accumulated



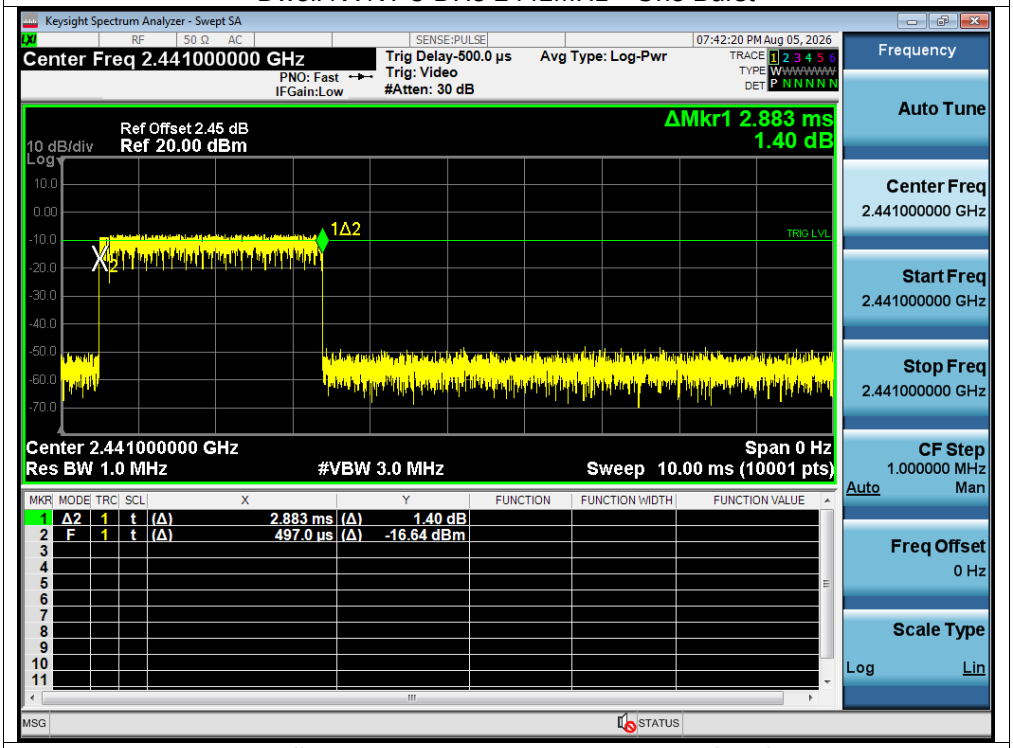
Dwell NVNT 3-DH3 2441MHz One Burst



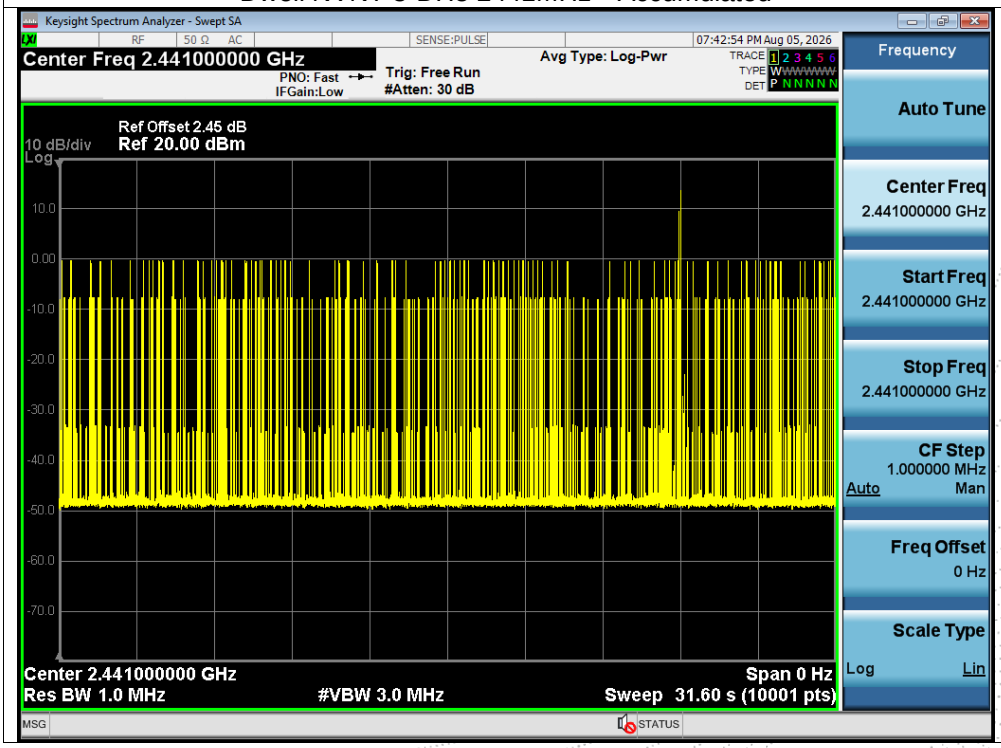
Dwell NVNT 3-DH3 2441MHz Accumulated



Dwell NVNT 3-DH5 2441MHz One Burst



Dwell NVNT 3-DH5 2441MHz Accumulated



15. Antenna Requirement

15.1 Limit

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

15.2 Test Result

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

16. EUT Test Setup Photographs

Note: Appendix - Product Test Photos.

STATEMENT

1. The equipment lists are traceable to the International System of Units (SI)

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/IEC 17025:2017.

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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