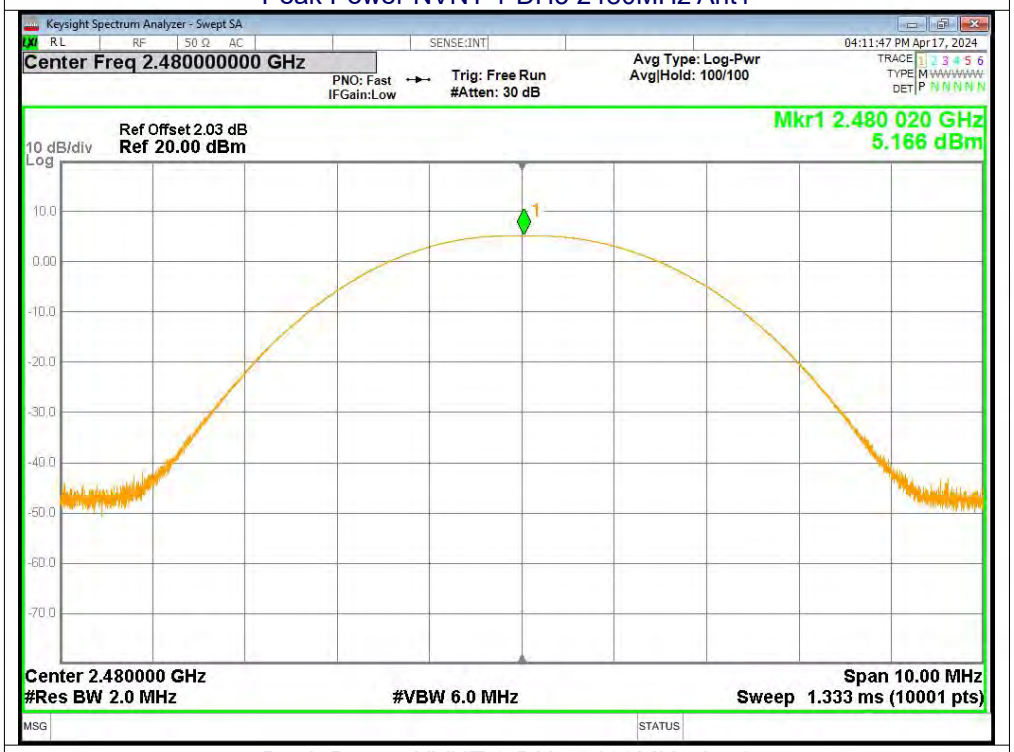
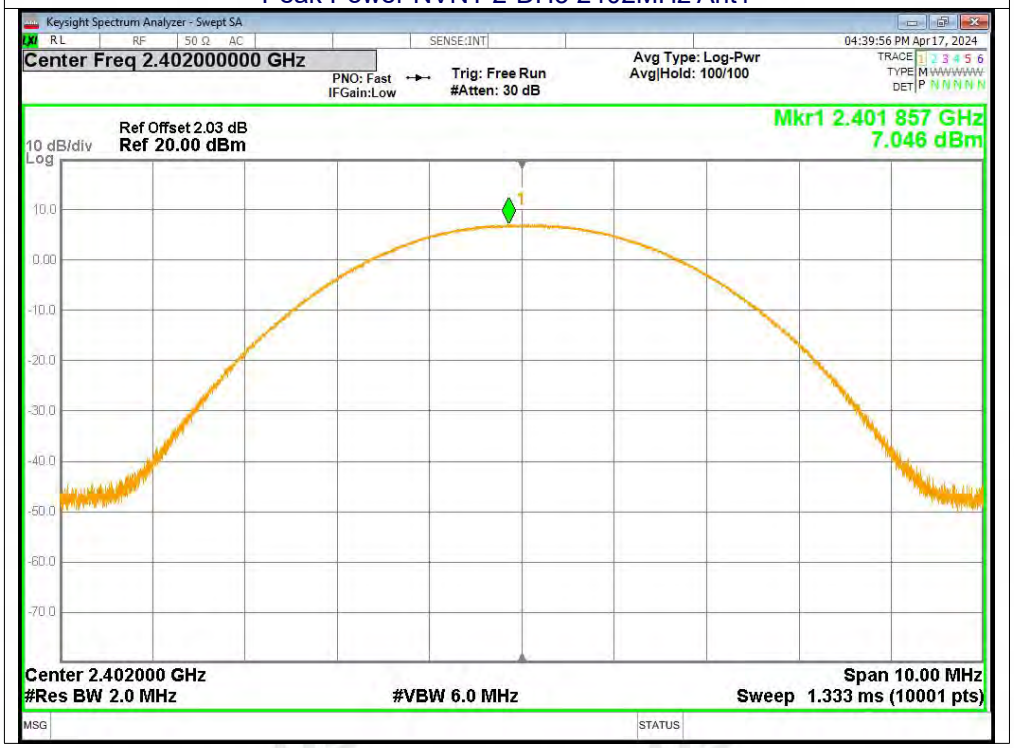
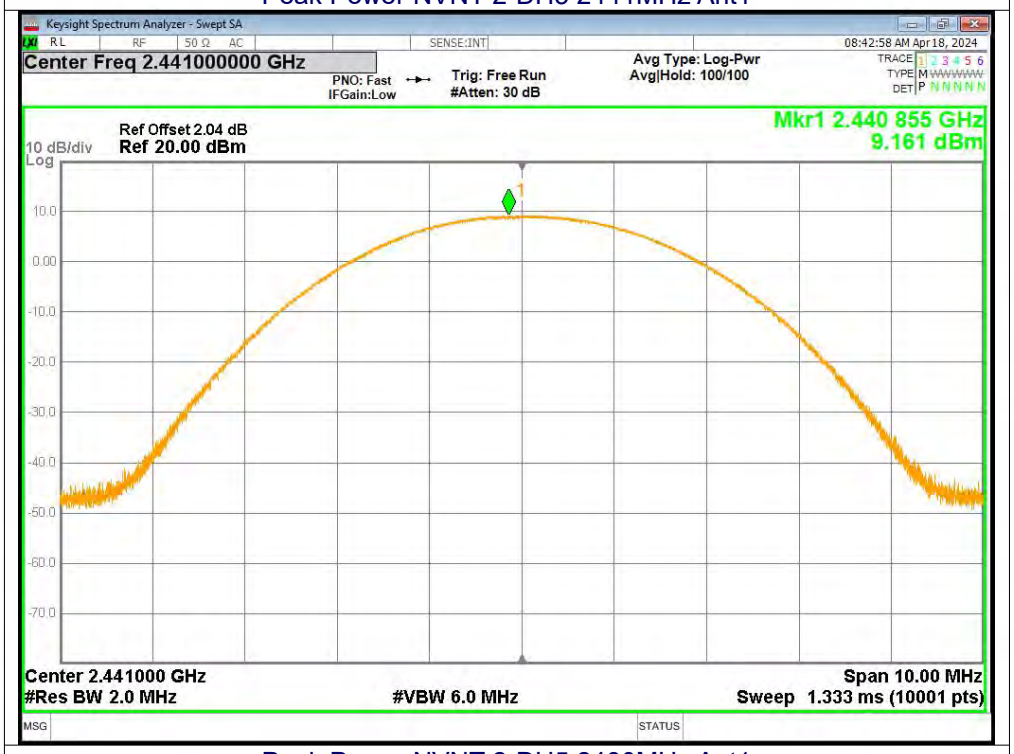
Peak Power NVNT 1-DH5 2480MHz Ant1



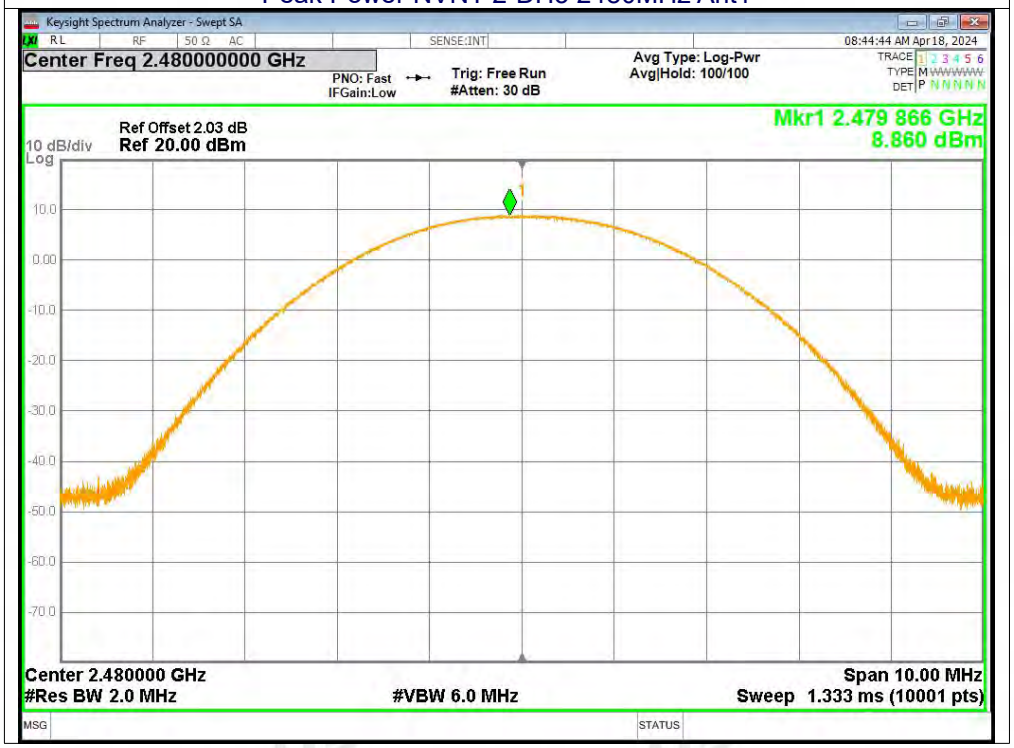
Peak Power NVNT 2-DH5 2402MHz Ant1



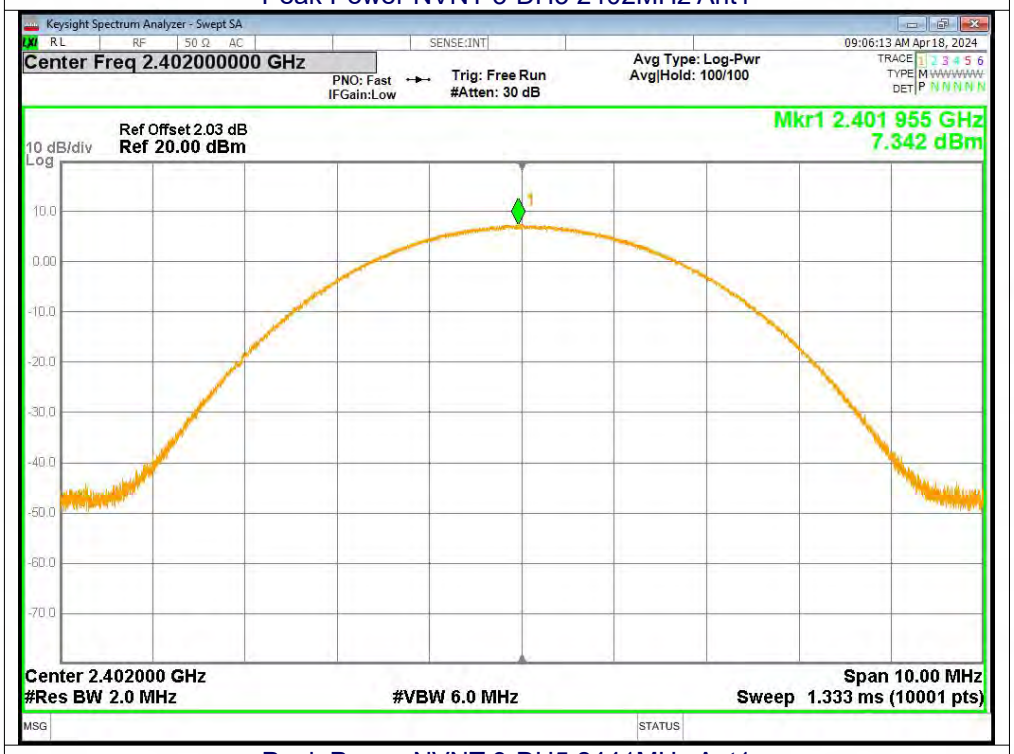
Peak Power NVNT 2-DH5 2441MHz Ant1



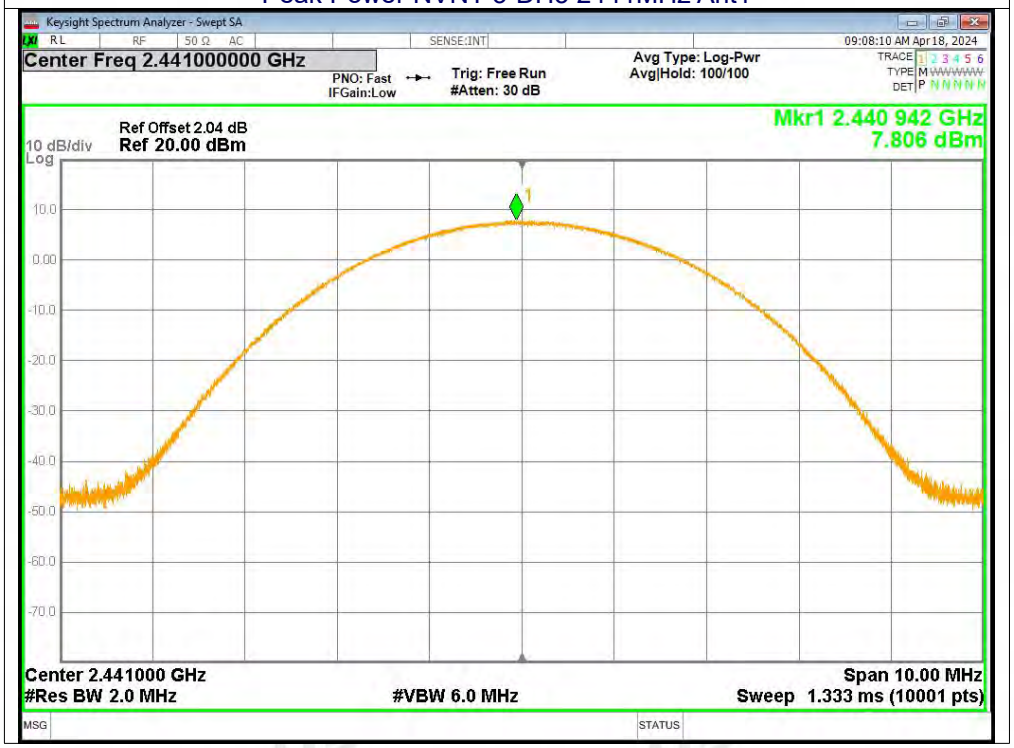
Peak Power NVNT 2-DH5 2480MHz Ant1



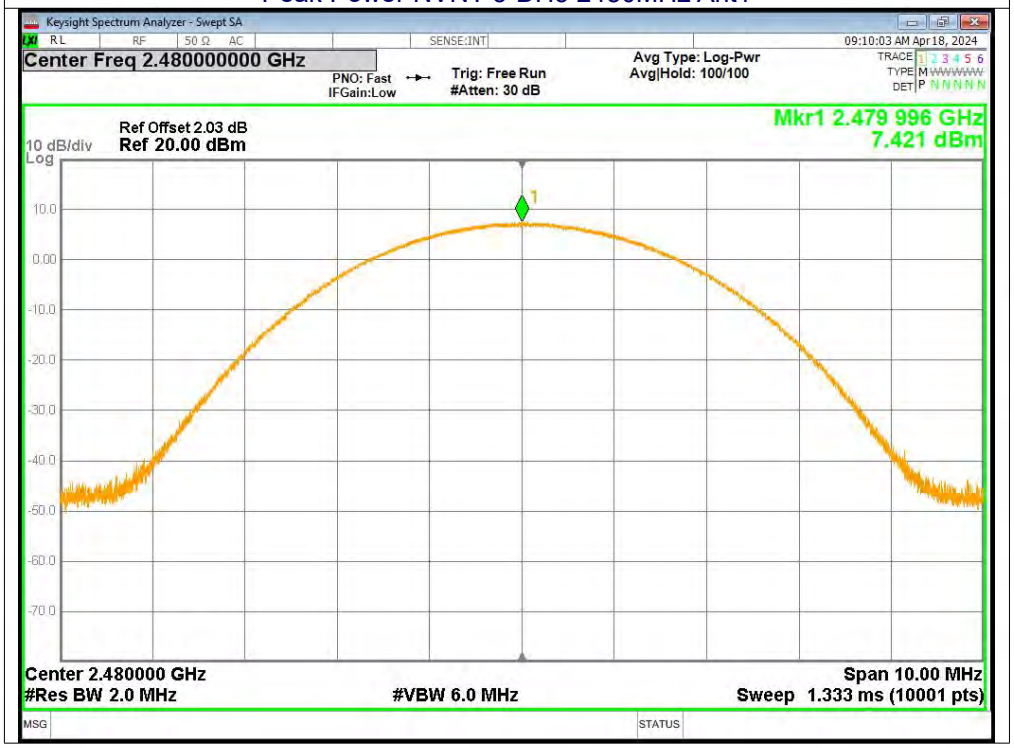
Peak Power NVNT 3-DH5 2402MHz Ant1



Peak Power NVNT 3-DH5 2441MHz Ant1



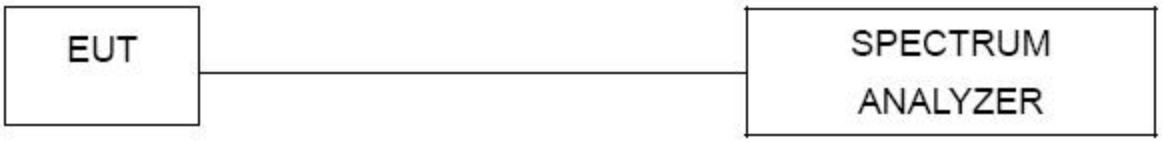
Peak Power NVNT 3-DH5 2480MHz Ant1



9. HOPPING CHANNEL SEPARATION

Test Requirement:	FCC Part15 C Section 15.247 (a)(1), RSS 247 5.1
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=30KHz, VBW=100KHz, detector=Peak
Limit:	GFSK: 20dB bandwidth π/4-DQPSK & 8DSK: 0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)

9.1 Test Setup



9.2 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.

9.3 DEVIATION FROM STANDARD

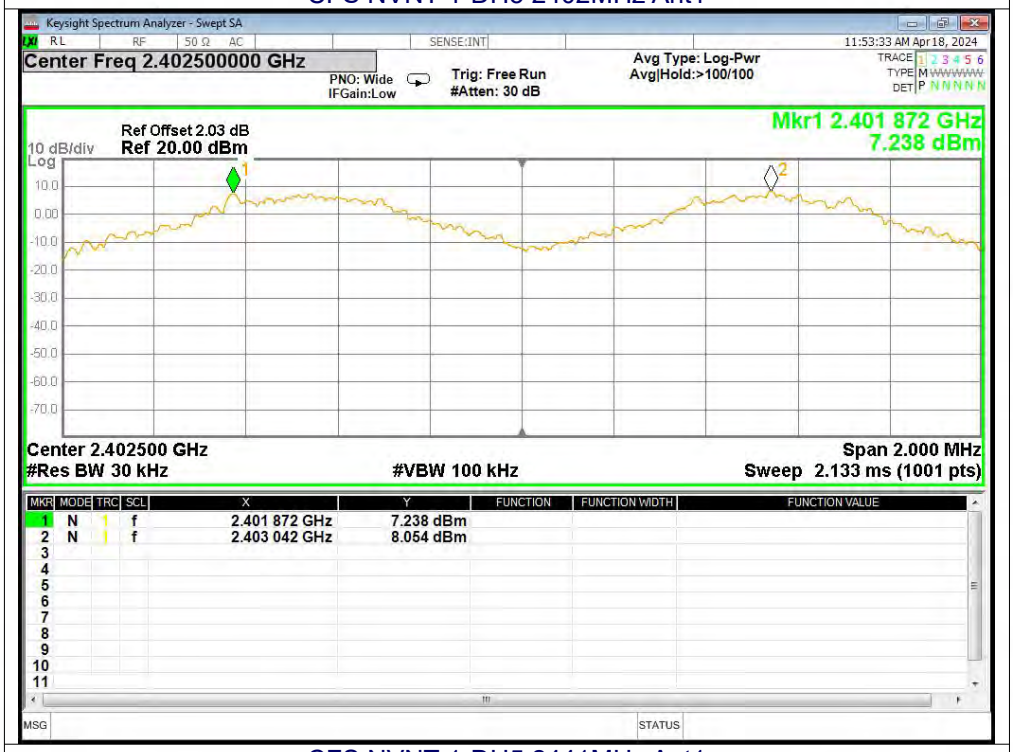
No deviation.

9.4 Test Result

Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
1-DH5	2401.872	2403.042	1.17	0.986	Pass
1-DH5	2441.062	2442.092	1.03	0.983	Pass
1-DH5	2479.01	2480.016	1.006	0.983	Pass
2-DH5	2401.856	2402.98	1.124	0.890	Pass
2-DH5	2441.032	2442.024	0.992	0.897	Pass
2-DH5	2479.034	2480.026	0.992	0.896	Pass
3-DH5	2402.03	2403.022	0.992	0.895	Pass
3-DH5	2441.024	2442.196	1.172	0.894	Pass
3-DH5	2478.868	2479.86	0.992	0.891	Pass

Test Graphs

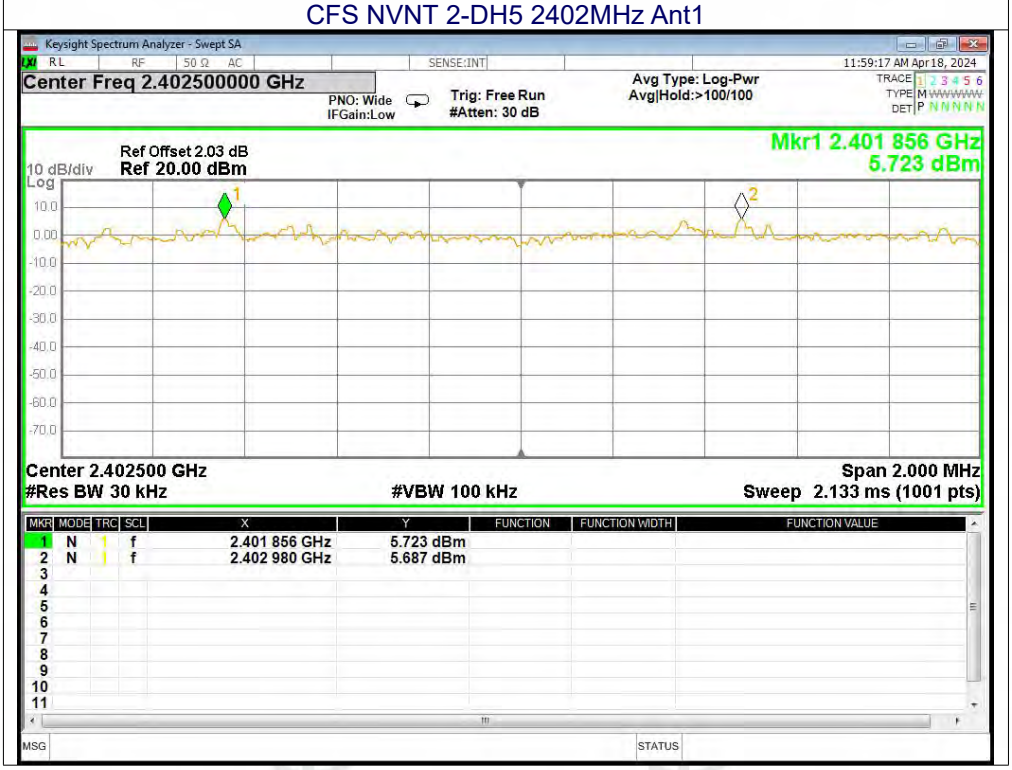
CFS NVNT 1-DH5 2402MHz Ant1



CFS NVNT 1-DH5 2441MHz Ant1

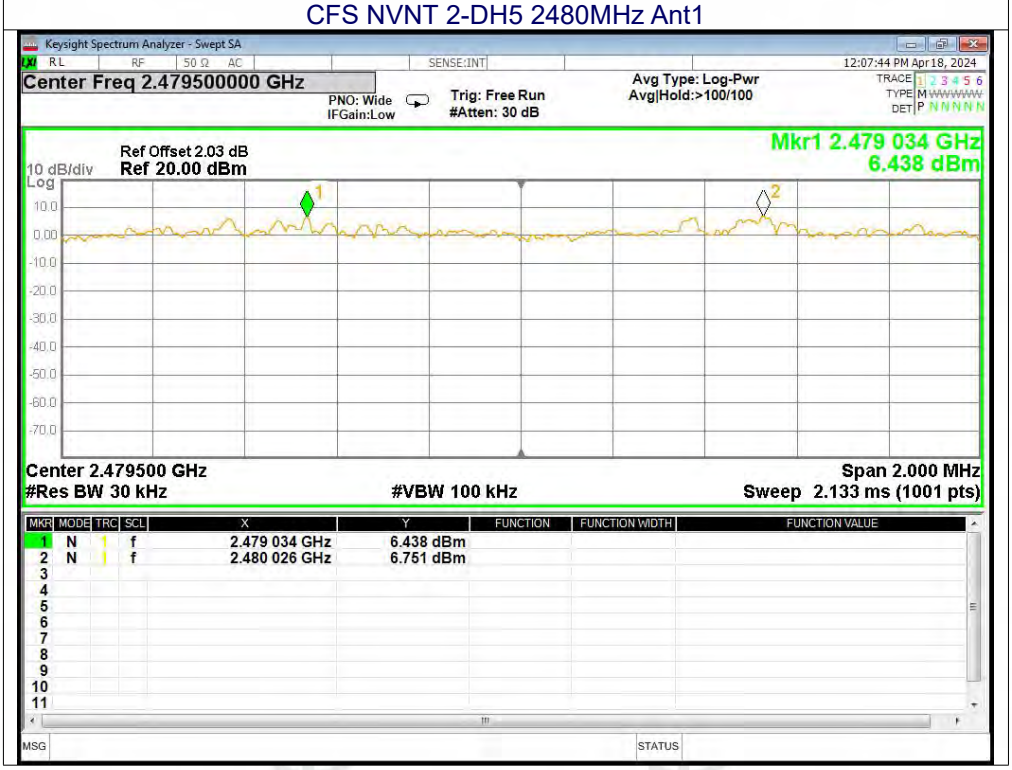
CFS NVNT 1-DH5 2480MHz Ant1

CFS NVNT 2-DH5 2402MHz Ant1

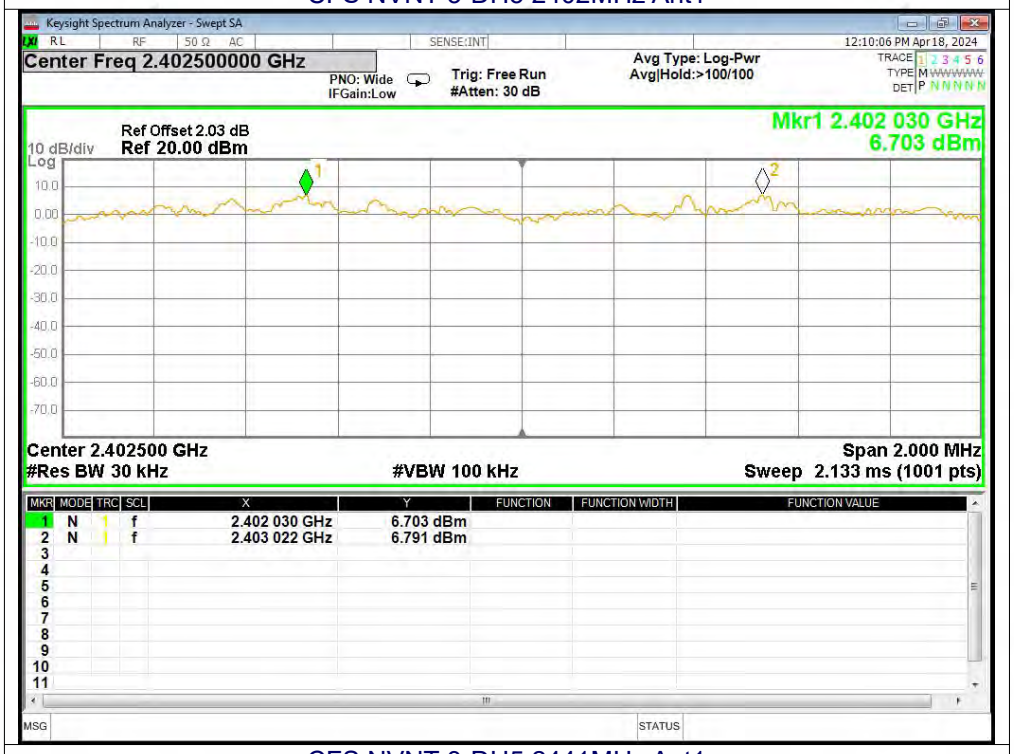


CFS NVNT 2-DH5 2441MHz Ant1

CFS NVNT 2-DH5 2480MHz Ant1



CFS NVNT 3-DH5 2402MHz Ant1



CFS NVNT 3-DH5 2441MHz Ant1

CFS NVNT 3-DH5 2480MHz Ant1

10.NUMBER OF HOPPING FREQUENCY

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii), RSS-247 5.1
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	15 channels

10.1 Test Setup

10.2 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;

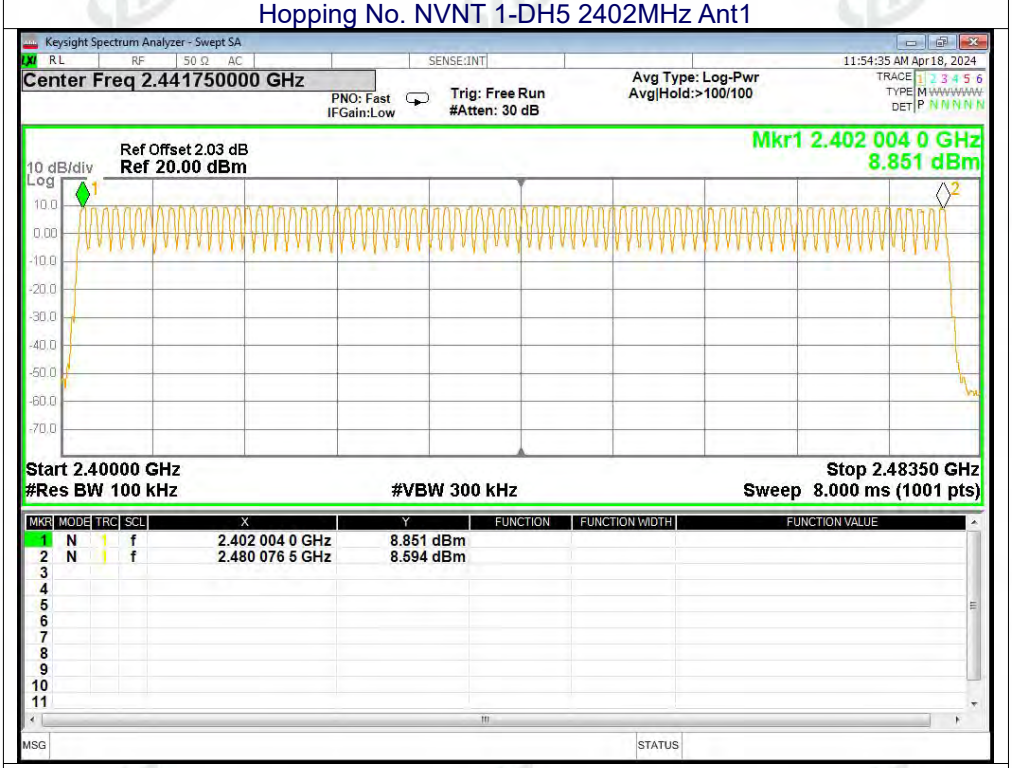
10.3 DEVIATION FROM STANDARD

No deviation.

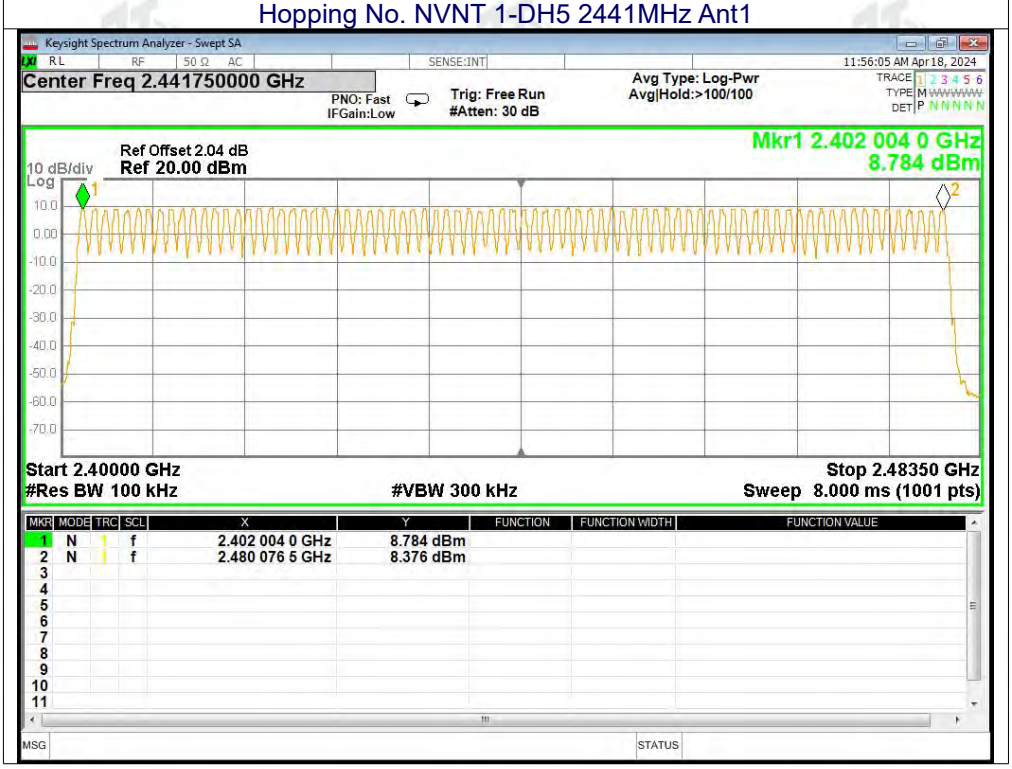
10.4 Test Result

Test Graphs

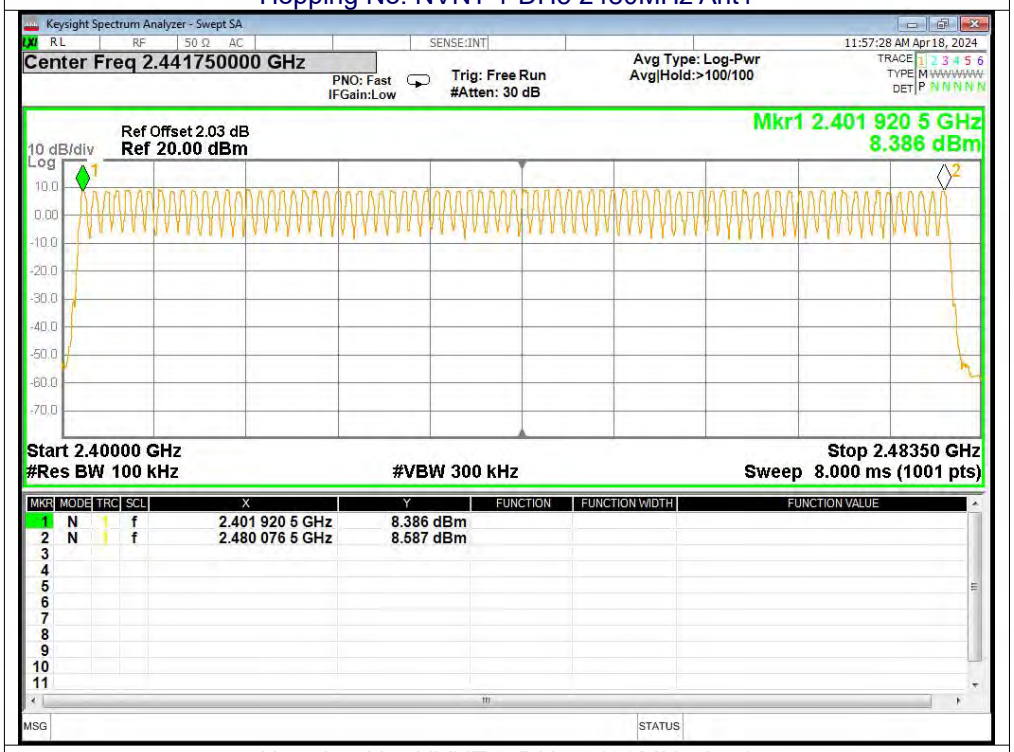
Hopping No. NVNT 1-DH5 2402MHz Ant1



Hopping No. NVNT 1-DH5 2441MHz Ant1



Hopping No. NVNT 1-DH5 2480MHz Ant1

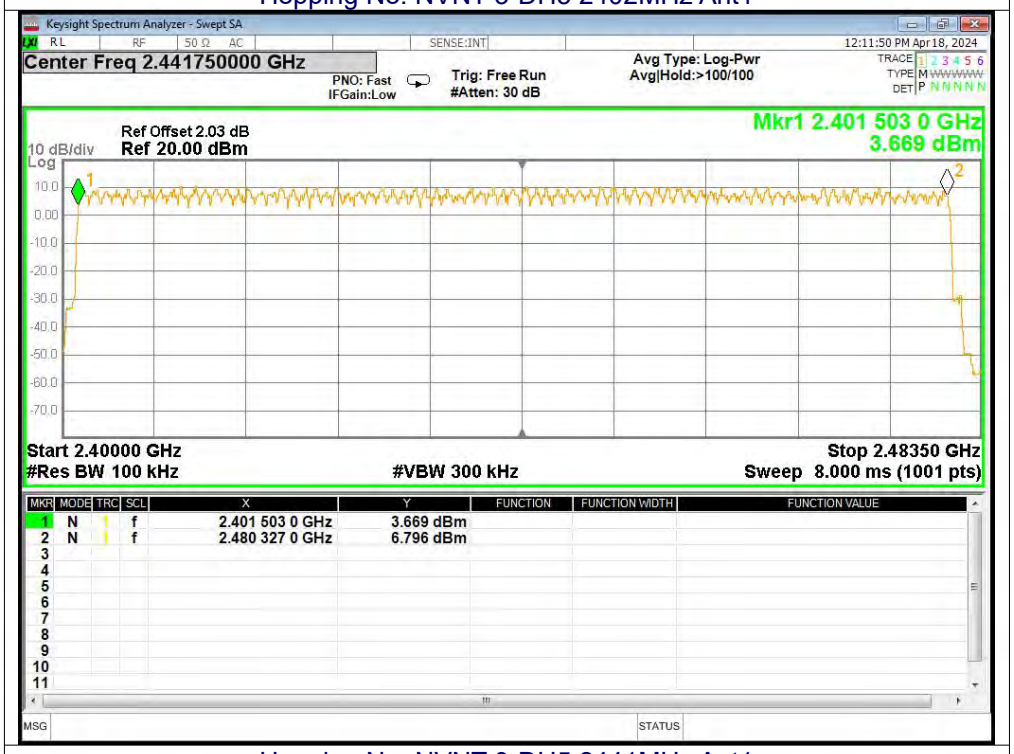


Hopping No. NVNT 2-DH5 2402MHz Ant1

Hopping No. NVNT 2-DH5 2441MHz Ant1

Hopping No. NVNT 2-DH5 2480MHz Ant1

Hopping No. NVNT 3-DH5 2402MHz Ant1



Hopping No. NVNT 3-DH5 2441MHz Ant1

Hopping No. NVNT 3-DH5 2480MHz Ant1

11. DWELL TIME

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii), RSS-247 5.1
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=1MHz, VBW=3MHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second

11.1 Test Setup

11.2 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 = 0Hz;

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).

11.3 DEVIATION FROM STANDARD

No deviation.

11.4 Test Result

Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
1-DH1	2441	0.383	121.028	316	31600	400	Pass
1-DH3	2441	1.639	257.323	157	31600	400	Pass
1-DH5	2441	2.887	280.039	97	31600	400	Pass
2-DH1	2441	0.391	123.556	316	31600	400	Pass
2-DH3	2441	1.643	253.022	154	31600	400	Pass
2-DH5	2441	2.891	318.01	110	31600	400	Pass
3-DH1	2441	0.391	123.165	315	31600	400	Pass
3-DH3	2441	1.642	257.794	157	31600	400	Pass
3-DH5	2441	2.893	350.053	121	31600	400	Pass

Remarks:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

(1 / 2 / 3)-DH1: Dwell time (ms) = Pulse Time (ms) * [1600 / (2 * 79)] * 31.6s

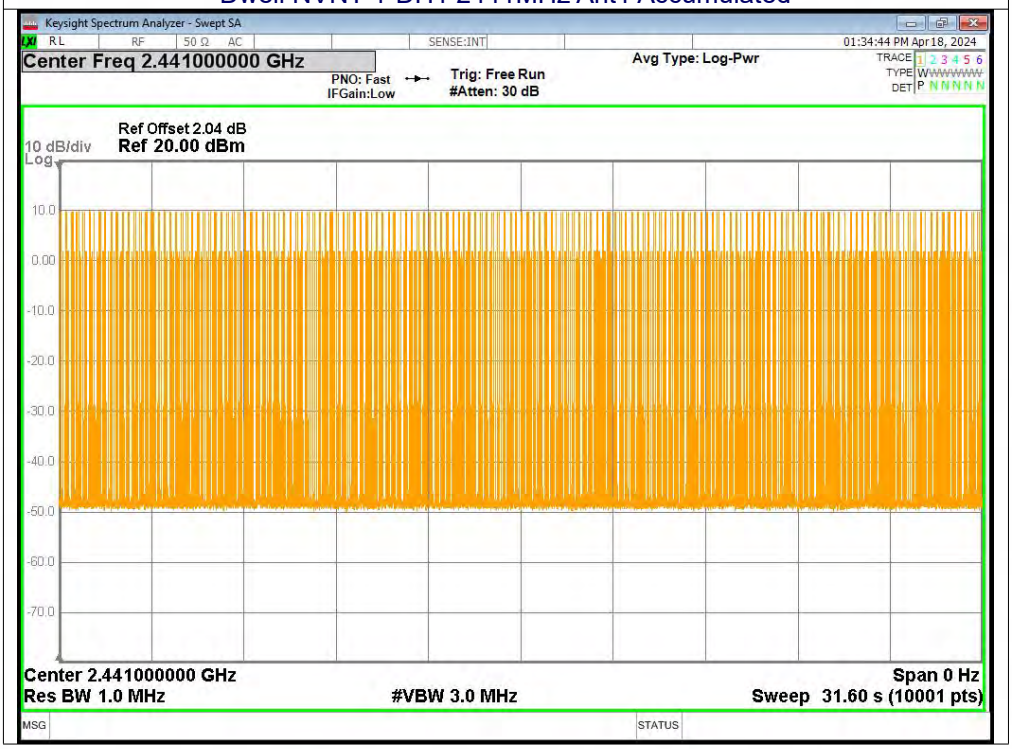
(1 / 2 / 3)-DH3: Dwell time (ms) = Pulse Time (ms) * [1600 / (4 * 79)] * 31.6s

(1 / 2 / 3)-DH5: Dwell time (ms) = Pulse Time (ms) * [1600 / (6 * 79)] * 31.6s

Test Graphs

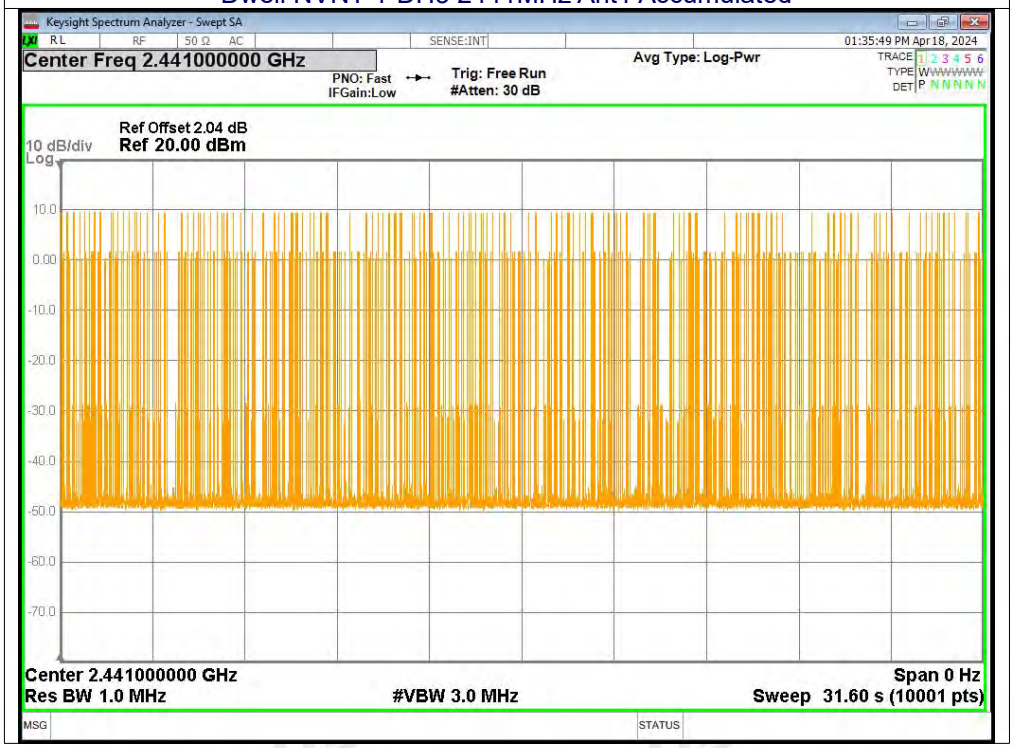
Dwell NVNT 1-DH1 2441MHz Ant1 One Burst

Dwell NVNT 1-DH1 2441MHz Ant1 Accumulated



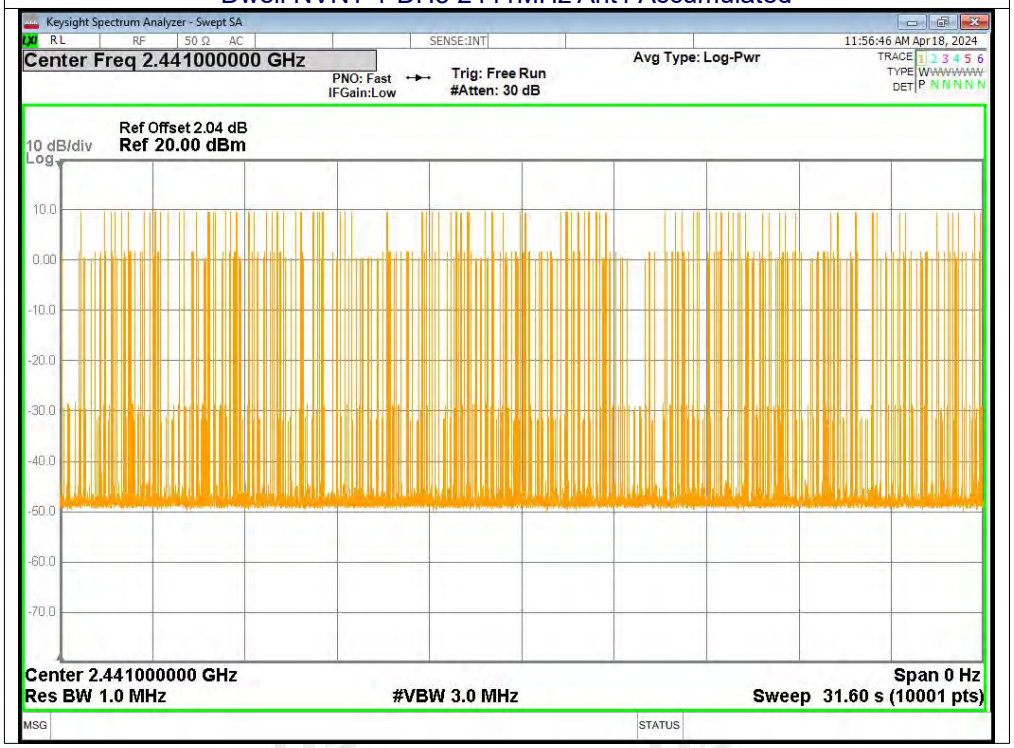
Dwell NVNT 1-DH3 2441MHz Ant1 One Burst

Dwell NVNT 1-DH3 2441MHz Ant1 Accumulated



Dwell NVNT 1-DH5 2441MHz Ant1 One Burst

Dwell NVNT 1-DH5 2441MHz Ant1 Accumulated

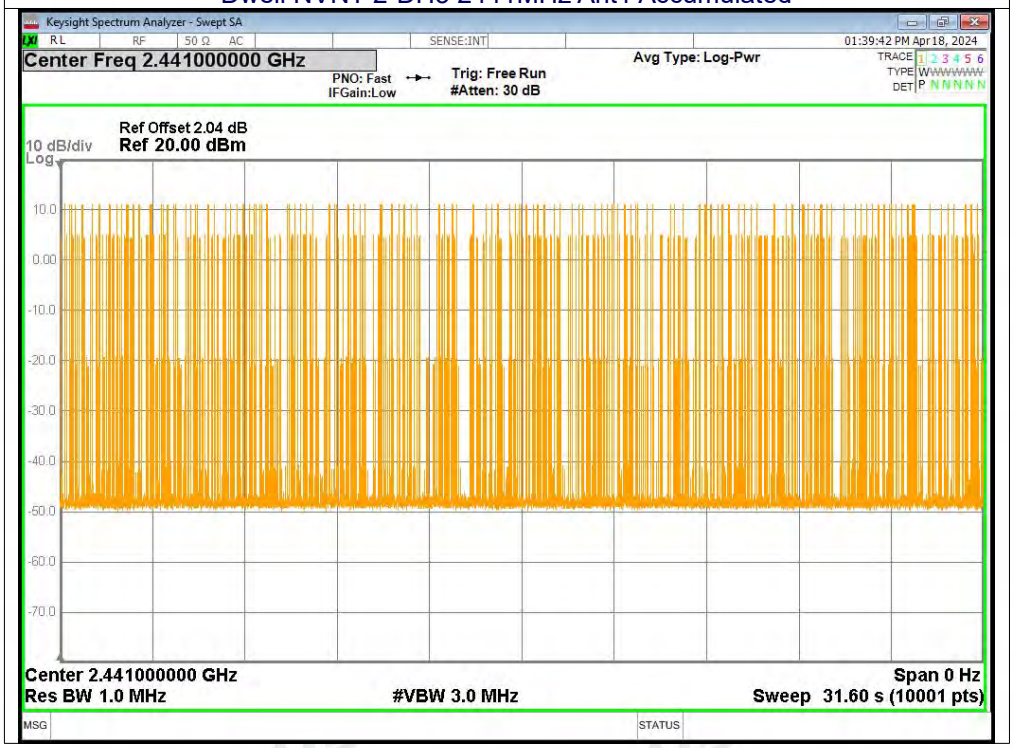


Dwell NVNT 2-DH1 2441MHz Ant1 One Burst

Dwell NVNT 2-DH1 2441MHz Ant1 Accumulated

Dwell NVNT 2-DH3 2441MHz Ant1 One Burst

Dwell NVNT 2-DH3 2441MHz Ant1 Accumulated



Dwell NVNT 2-DH5 2441MHz Ant1 One Burst

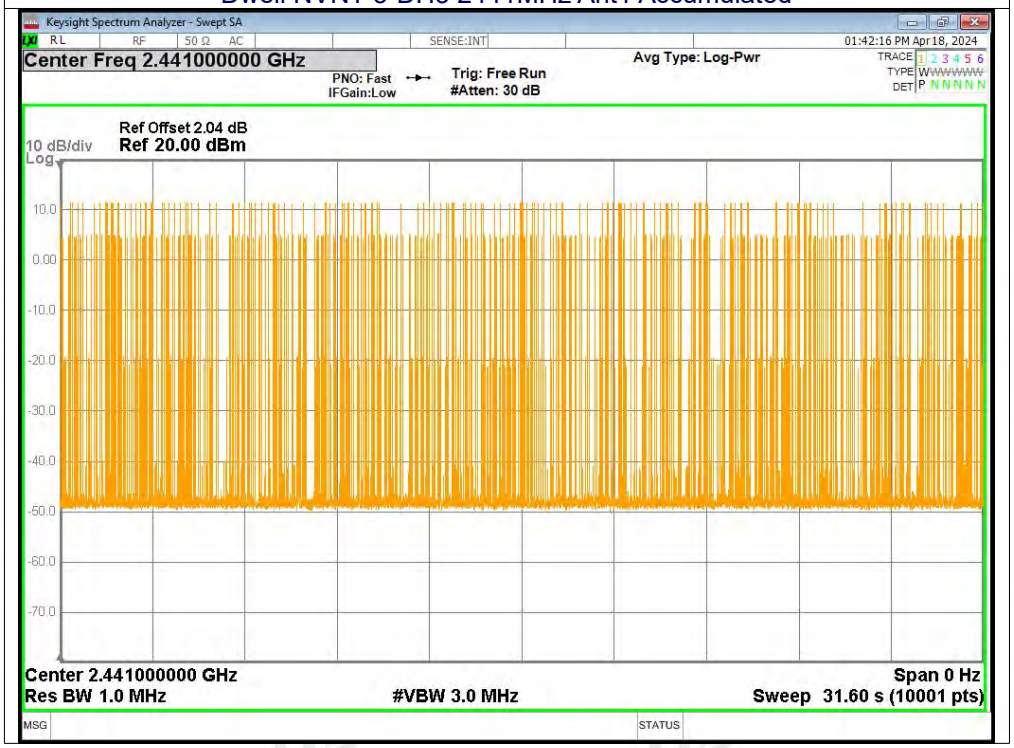
Dwell NVNT 2-DH5 2441MHz Ant1 Accumulated

Dwell NVNT 3-DH1 2441MHz Ant1 One Burst

Dwell NVNT 3-DH1 2441MHz Ant1 Accumulated

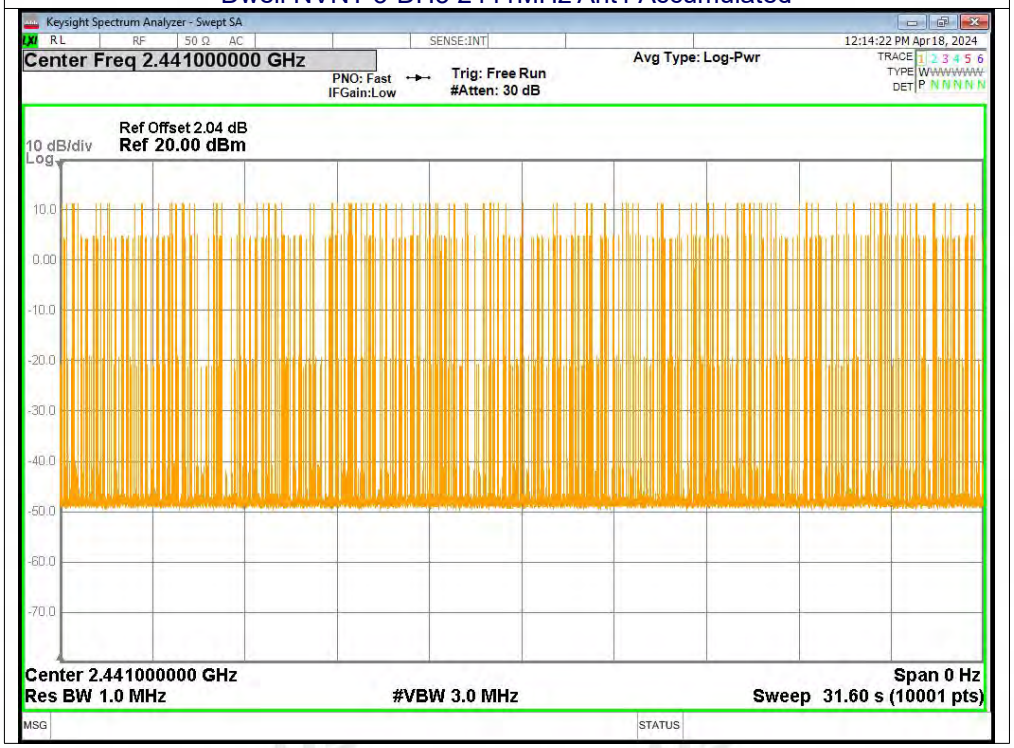
Dwell NVNT 3-DH3 2441MHz Ant1 One Burst

Dwell NVNT 3-DH3 2441MHz Ant1 Accumulated



Dwell NVNT 3-DH5 2441MHz Ant1 One Burst

Dwell NVNT 3-DH5 2441MHz Ant1 Accumulated



12. Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(b)(4), RSS-Gen 6.8
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent is tropically radiated power (EIRP) limits specified in the applicable standard (RSS) for the licence-exempt apparatus. Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level.9 When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.	
EUT Antenna:	
The antenna is FPC Antenna, the best case gain of the antennas is 2.16dBi, reference to the appendix II for details	

13. Test Setup Photo

Reference to the appendix I for details.

14. EUT Constructional Details

Reference to the appendix II for details.

※※※※※ **END OF REPORT** ※※※※※