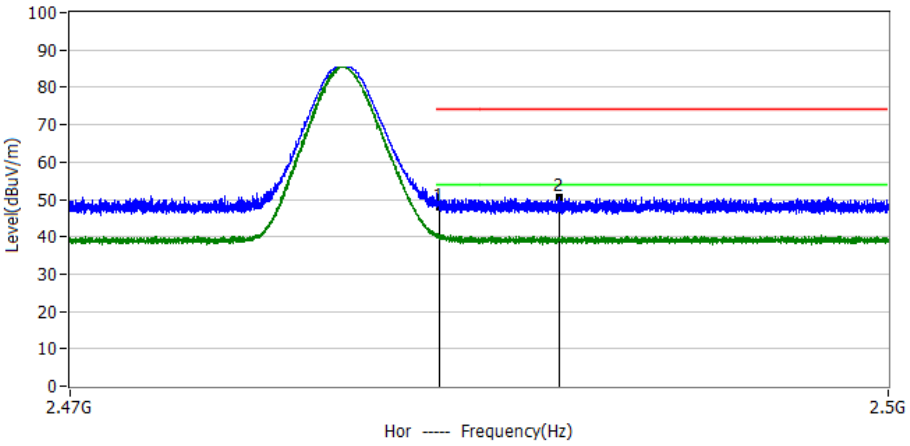
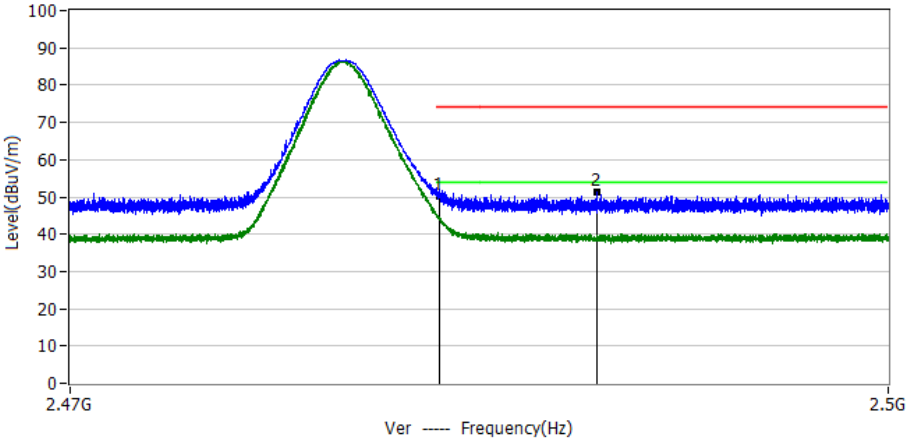
Project: LGT23C057	Test Engineer: Dylan.shi
EUT: Bluetooth headphone	Temperature: 25.2℃
M/N: NC95	Humidity: 63%RH
Test Voltage: Battery	Test Data: 2023-04-03
Test Mode: DH5 2480	
Note:	



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.4835GHz	13.67	34.13	47.80	74.00	-26.20	PK	Hor
2*	2.4879GHz	16.59	34.14	50.73	74.00	-23.27	PK	Hor



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.4835GHz	16.07	34.13	50.20	74.00	-23.80	PK	Ver
2*	2.4893GHz	17.29	34.14	51.43	74.00	-22.57	PK	Ver

4. CONDUCTED SPURIOUS & BAND EDGE EMISSION

4.1 LIMIT

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

For the measurement records，refer to the appendix I.

5. NUMBER OF HOPPING CHANNEL

5.1 LIMIT

FCC Part 15.247, Subpart C RSS-247 Issue 2				
Section	Test Item	Limit	FrequencyRange (MHz)	Result
Part 15.247 (a)(1)(iii)&RSS-247	Number of Hopping Channel	≥15	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating FrequencyRange
RB	300KHz
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= 300KHz, 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

For the measurement records, refer to the appendix I.

6. AVERAGE TIME OF OCCUPANCY

6.1 LIMIT

FCC Part 15.247, Subpart C RSS-247 Issue 2				
Section	Test Item	Limit	FrequencyRange (MHz)	Result
15.247 (a)(1)(iii)& RSS-247	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

For the measurement records，refer to the appendix I.

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

For the measurement records，refer to the appendix I.

8. BANDWIDTH TEST

8.1 LIMIT

FCC Part 15.247, Subpart C RSS-247 Issue 2				
Section	Test Item	Limit	FrequencyRange (MHz)	Result
15.247 (a)(1) &RSS-247	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

For the measurement records，refer to the appendix I.

9. OUTPUT POWER TEST

9.1 LIMIT

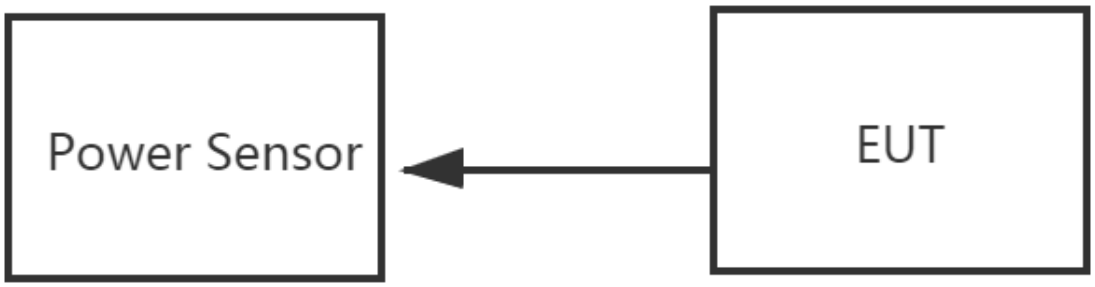
FCC Part 15.247, Subpart C RSS-247 Issue 2				
Section	Test Item	Limit	FrequencyRange (MHz)	Result
15.247 (a)(1)&(b)(1) RSS-247	Output Power	1 W or 0.125W if channel separation > 2/3 bandwidthprovided thesystems operatewith an output power no greater than125 mW(20.97dBm)	2400-2483.5	PASS
RSS-247	EIRP	4W	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

For the measurement records, refer to the appendix I.

10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

Part 15.203&RSS-Gen lssue 5 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.

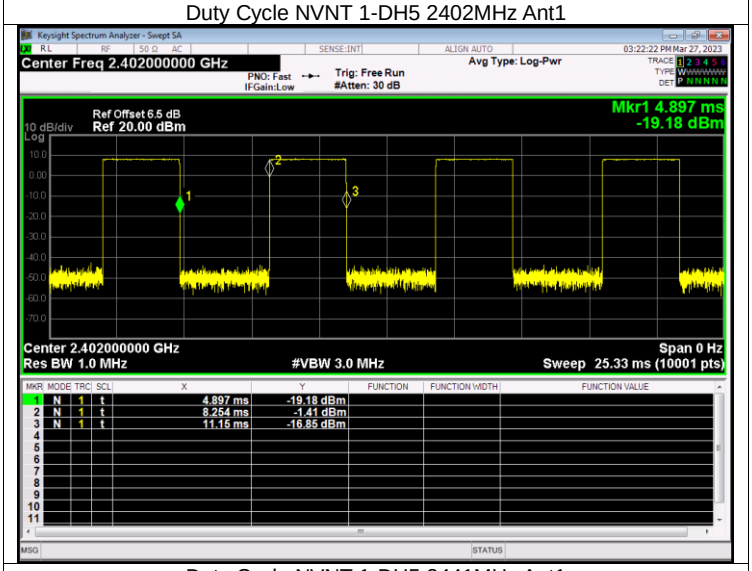
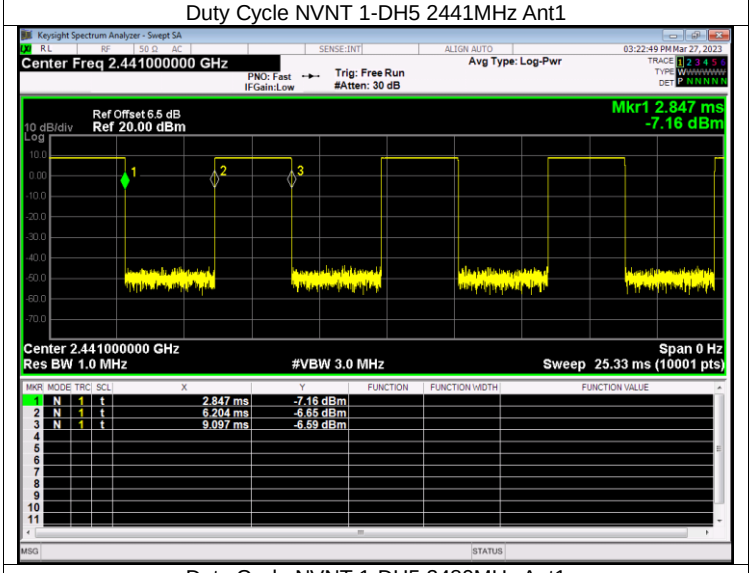
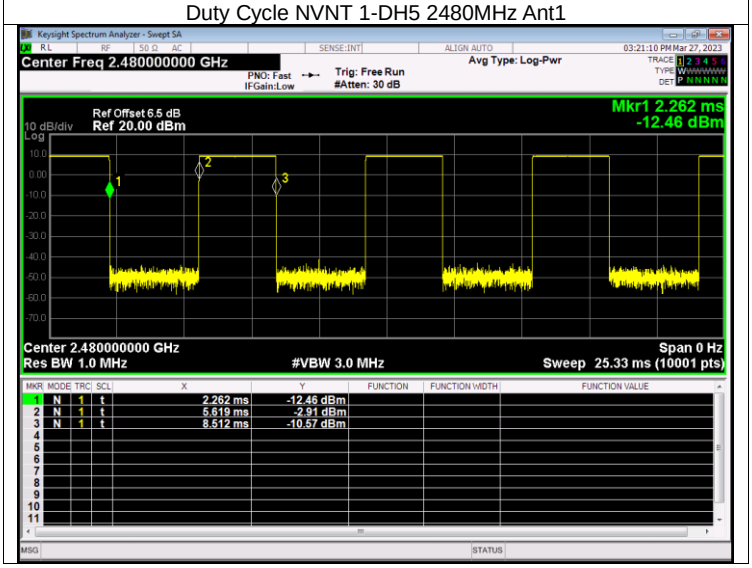
10.2 EUT ANTENNA

The EUT antenna is PCB antenna. It comply with the standard requirement.

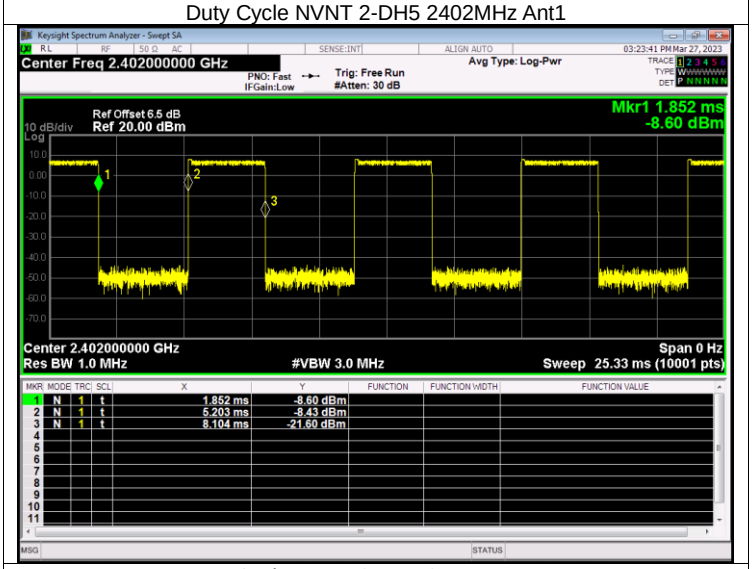
APPENDIX I: TEST RESULTS

Duty Cycle

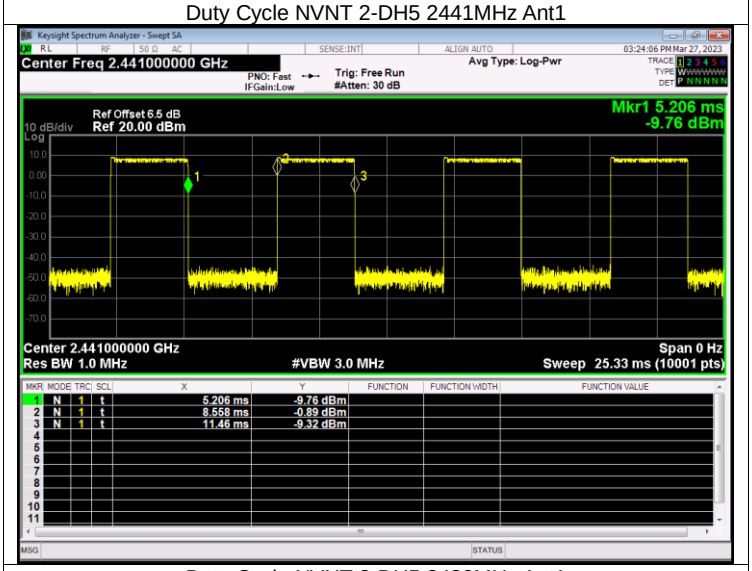
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	1-DH5	2402	Ant1	46.29	3.35	0.35
NVNT	1-DH5	2441	Ant1	46.29	3.35	0.35
NVNT	1-DH5	2480	Ant1	46.29	3.35	0.35
NVNT	2-DH5	2402	Ant1	46.39	3.34	0.34
NVNT	2-DH5	2441	Ant1	46.37	3.34	0.35
NVNT	2-DH5	2480	Ant1	46.37	3.34	0.35
NVNT	3-DH5	2402	Ant1	46.41	3.33	0.34
NVNT	3-DH5	2441	Ant1	46.37	3.34	0.35
NVNT	3-DH5	2480	Ant1	46.41	3.33	0.34

Test Graphs
Duty Cycle NVNT 1-DH5 2402MHz Ant1

Duty Cycle NVNT 1-DH5 2441MHz Ant1

Duty Cycle NVNT 1-DH5 2480MHz Ant1


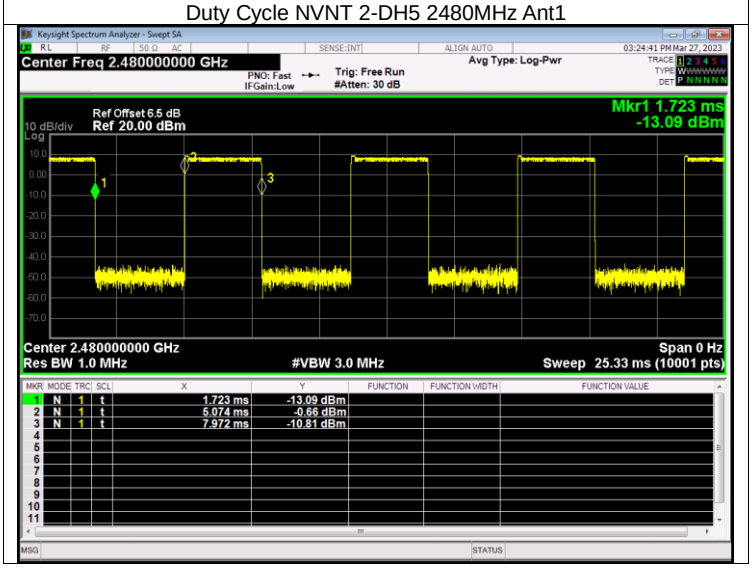
Duty Cycle NVNT 2-DH5 2402MHz Ant1



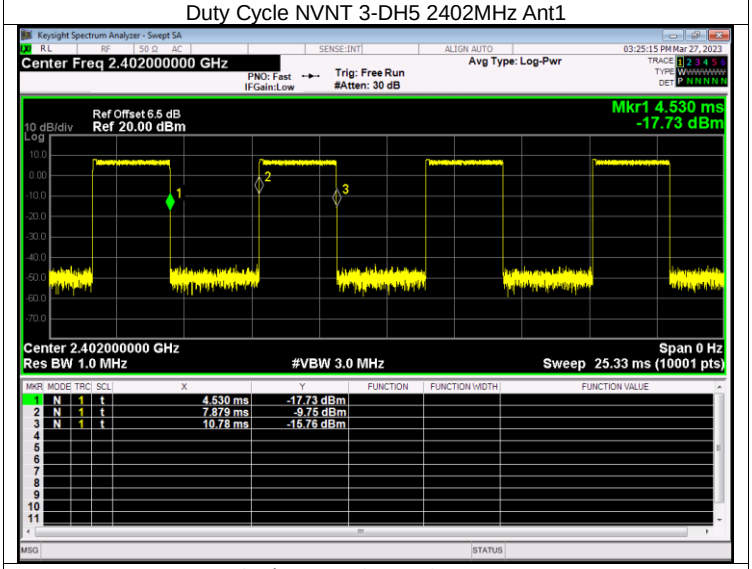
Duty Cycle NVNT 2-DH5 2441MHz Ant1



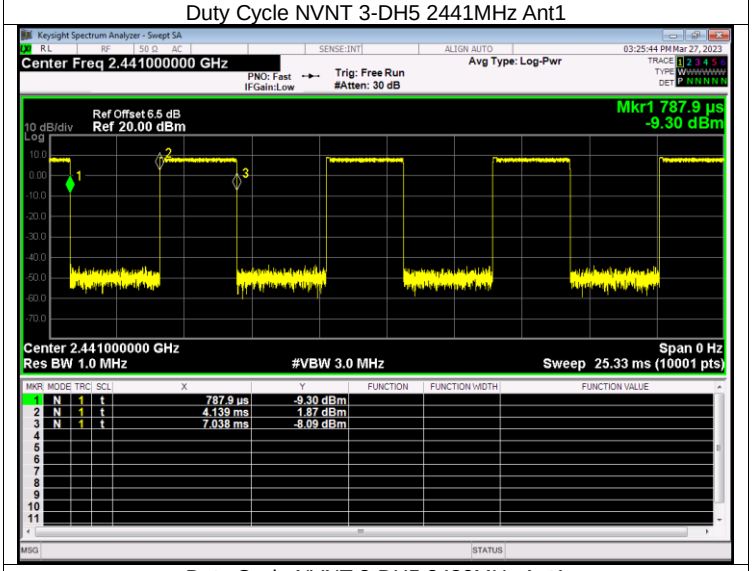
Duty Cycle NVNT 2-DH5 2480MHz Ant1



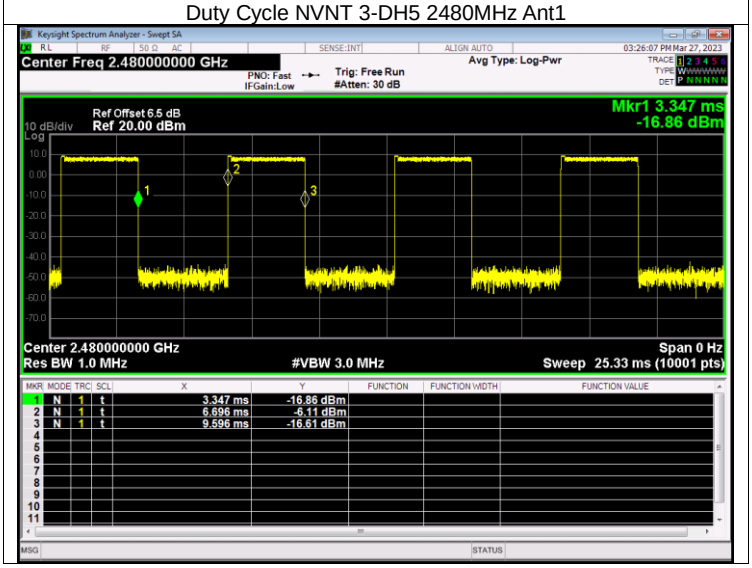
Duty Cycle NVNT 3-DH5 2402MHz Ant1



Duty Cycle NVNT 3-DH5 2441MHz Ant1



Duty Cycle NVNT 3-DH5 2480MHz Ant1

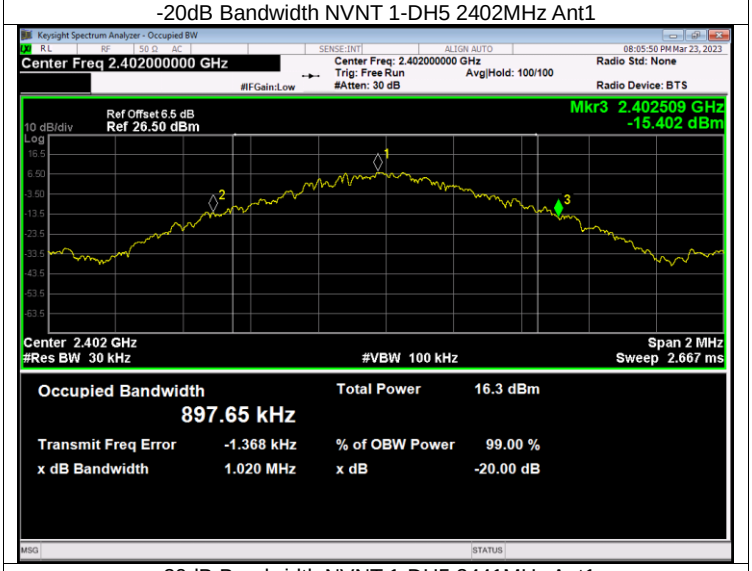
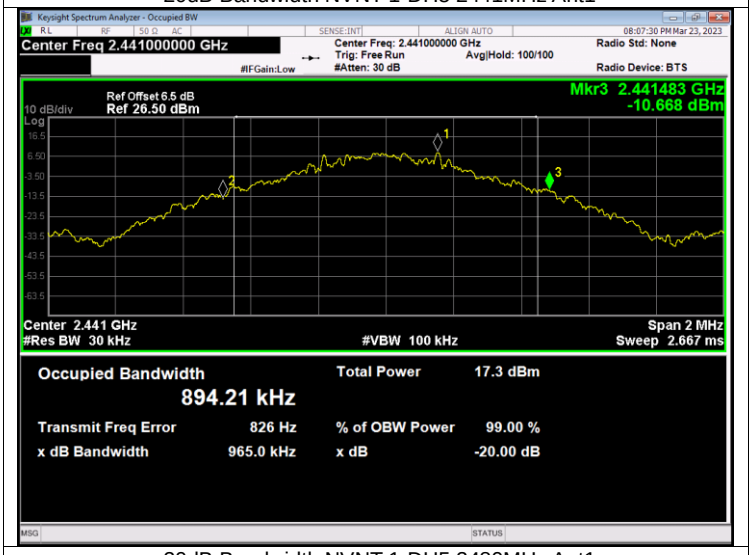
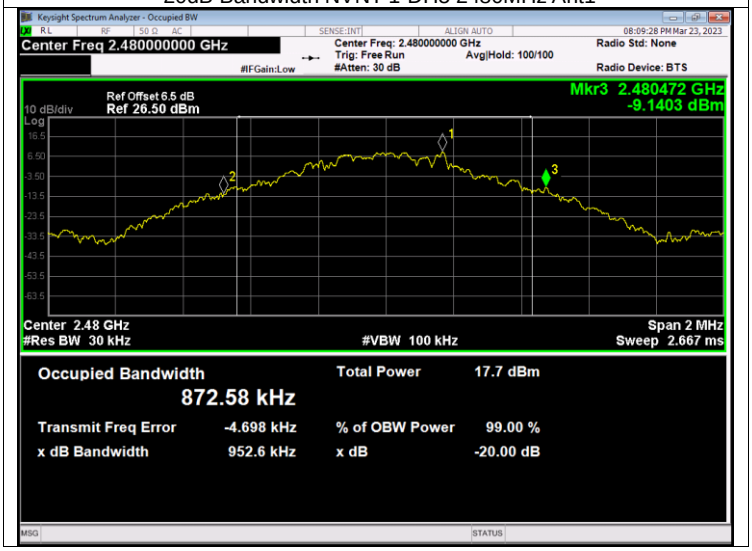


Maximum Peak Conducted Output Power

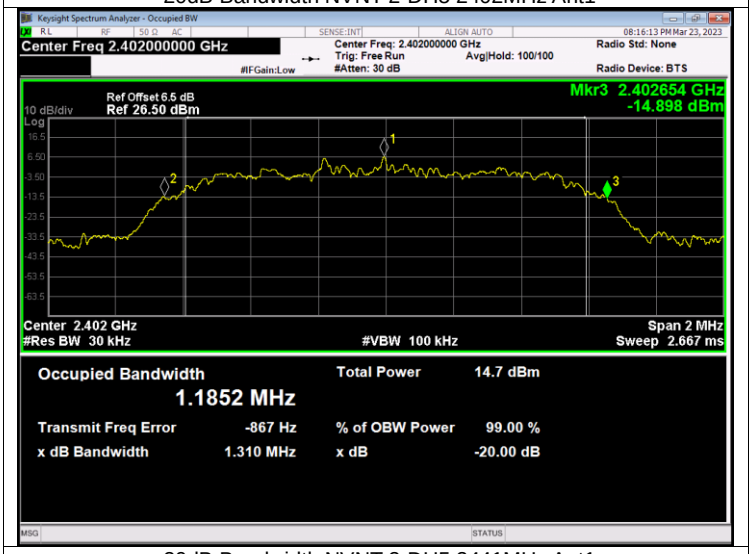
Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	ANT GAIN (dBi)	EIRP (dBm)	EIRP LIMIT(dBm)	Verdict
1-DH5	2402	8.01	21	0	8.01	36	Pass
1-DH5	2441	8.80	21	0	8.80	36	Pass
1-DH5	2480	9.15	21	0	9.15	36	Pass
2-DH5	2402	8.00	21	0	8.00	36	Pass
2-DH5	2441	8.77	21	0	8.77	36	Pass
2-DH5	2480	9.09	21	0	9.09	36	Pass
3-DH5	2402	7.98	21	0	7.98	36	Pass
3-DH5	2441	8.77	21	0	8.77	36	Pass
3-DH5	2480	9.11	21	0	9.11	36	Pass

-20dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH5	2402	Ant1	1.020	Pass
NVNT	1-DH5	2441	Ant1	0.965	Pass
NVNT	1-DH5	2480	Ant1	0.953	Pass
NVNT	2-DH5	2402	Ant1	1.310	Pass
NVNT	2-DH5	2441	Ant1	1.366	Pass
NVNT	2-DH5	2480	Ant1	1.303	Pass
NVNT	3-DH5	2402	Ant1	1.287	Pass
NVNT	3-DH5	2441	Ant1	1.308	Pass
NVNT	3-DH5	2480	Ant1	1.271	Pass

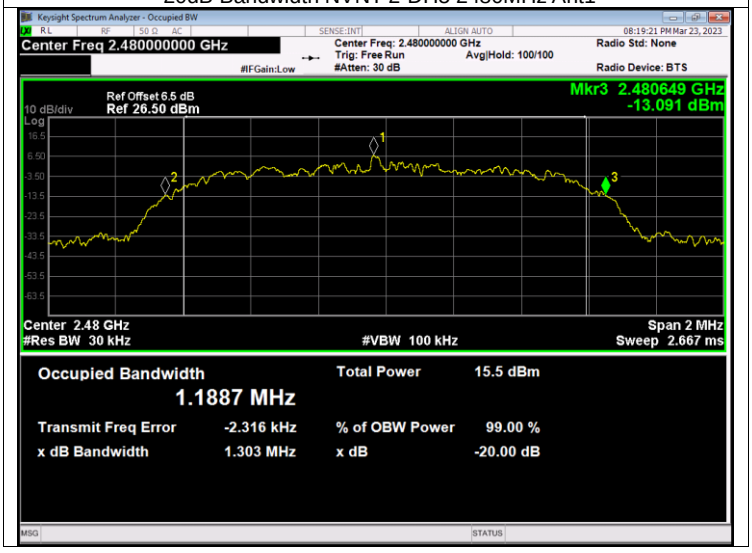
Test Graphs
-20dB Bandwidth NVNT 1-DH5 2402MHz Ant1

-20dB Bandwidth NVNT 1-DH5 2441MHz Ant1

-20dB Bandwidth NVNT 1-DH5 2480MHz Ant1


-20dB Bandwidth NVNT 2-DH5 2402MHz Ant1

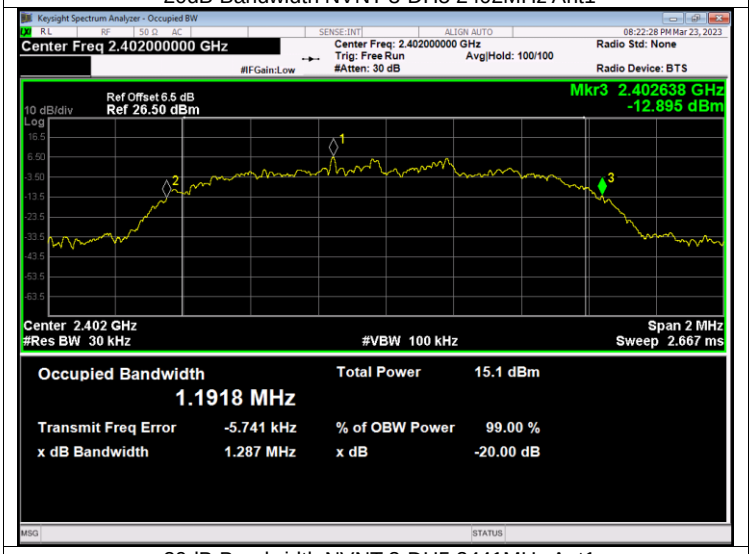


-20dB Bandwidth NVNT 2-DH5 2441MHz Ant1

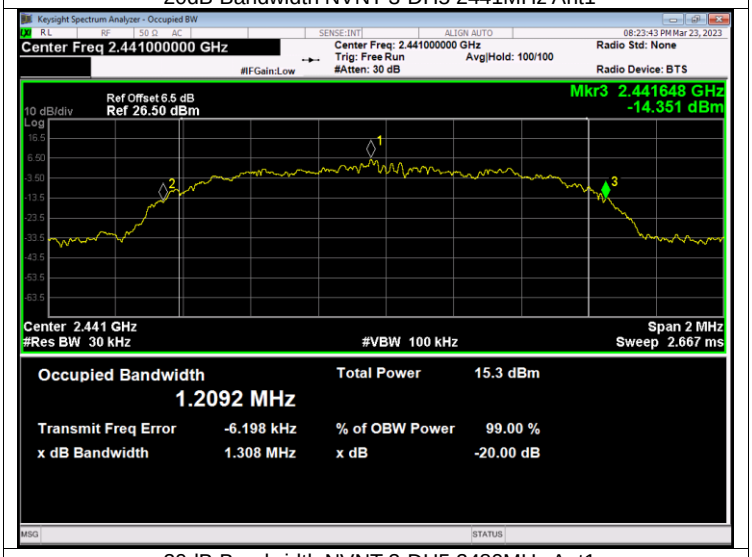
-20dB Bandwidth NVNT 2-DH5 2480MHz Ant1



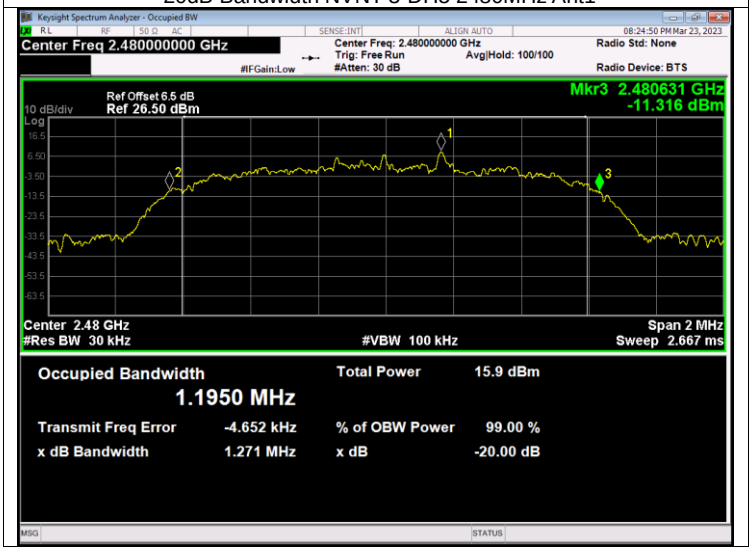
-20dB Bandwidth NVNT 3-DH5 2402MHz Ant1



-20dB Bandwidth NVNT 3-DH5 2441MHz Ant1

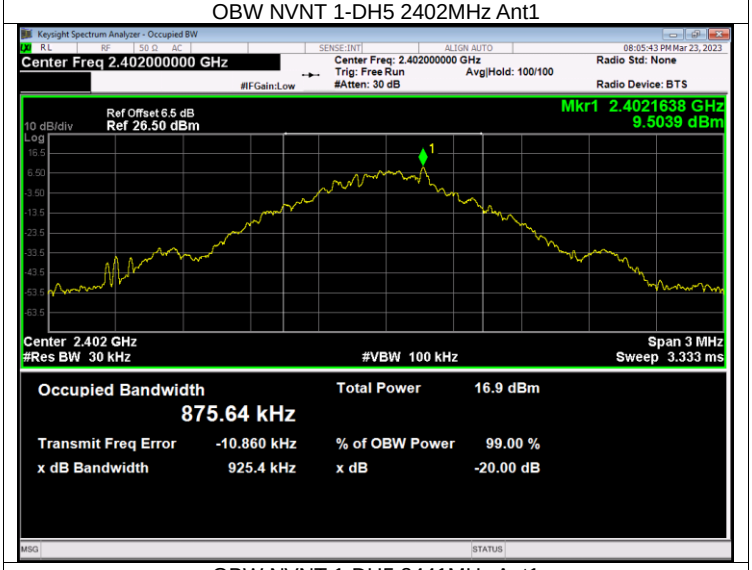
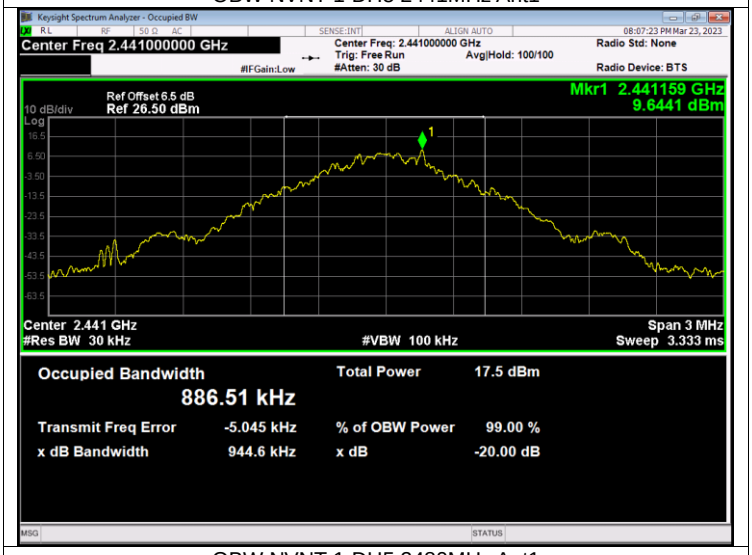
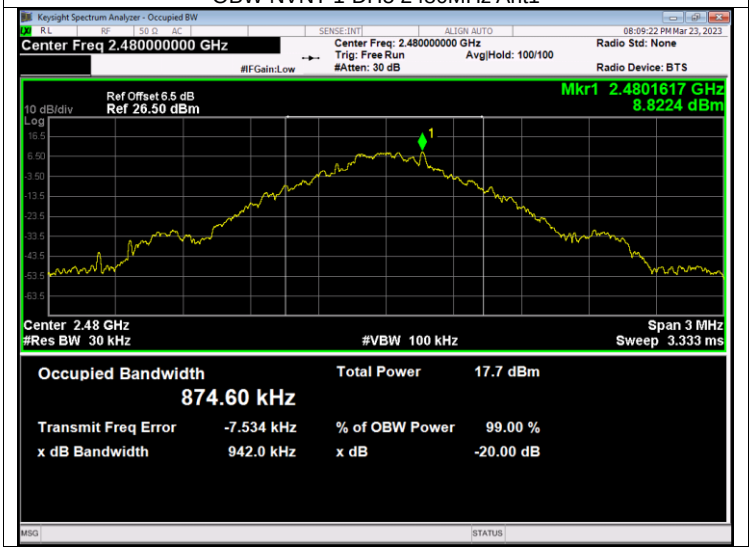


-20dB Bandwidth NVNT 3-DH5 2480MHz Ant1

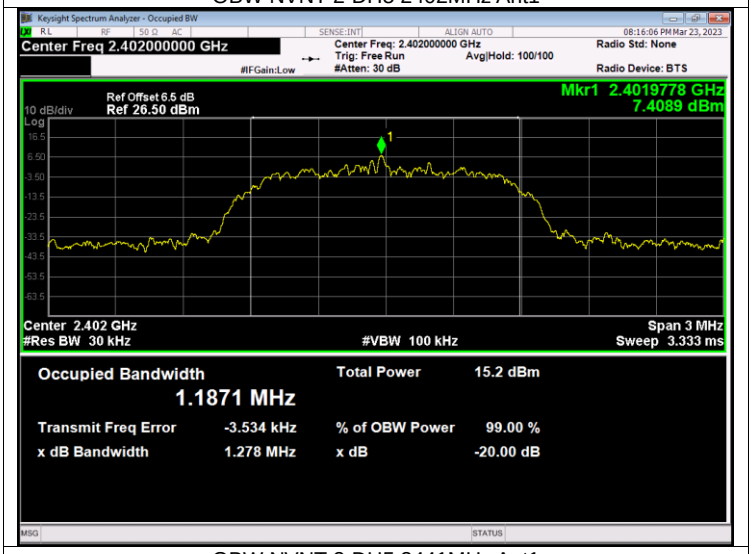


Occupied Channel Bandwidth

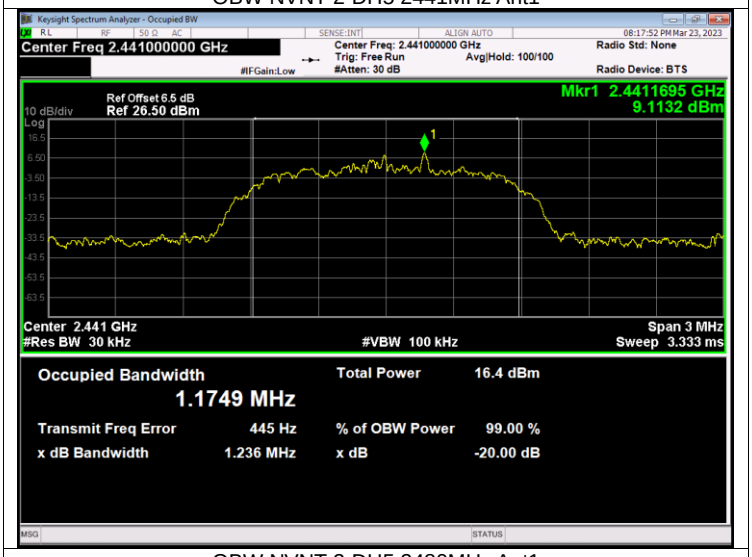
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	1-DH5	2402	Ant1	0.876
NVNT	1-DH5	2441	Ant1	0.887
NVNT	1-DH5	2480	Ant1	0.875
NVNT	2-DH5	2402	Ant1	1.187
NVNT	2-DH5	2441	Ant1	1.175
NVNT	2-DH5	2480	Ant1	1.179
NVNT	3-DH5	2402	Ant1	1.178
NVNT	3-DH5	2441	Ant1	1.203
NVNT	3-DH5	2480	Ant1	1.194

Test Graphs
OBW NVNT 1-DH5 2402MHz Ant1

OBW NVNT 1-DH5 2441MHz Ant1

OBW NVNT 1-DH5 2480MHz Ant1


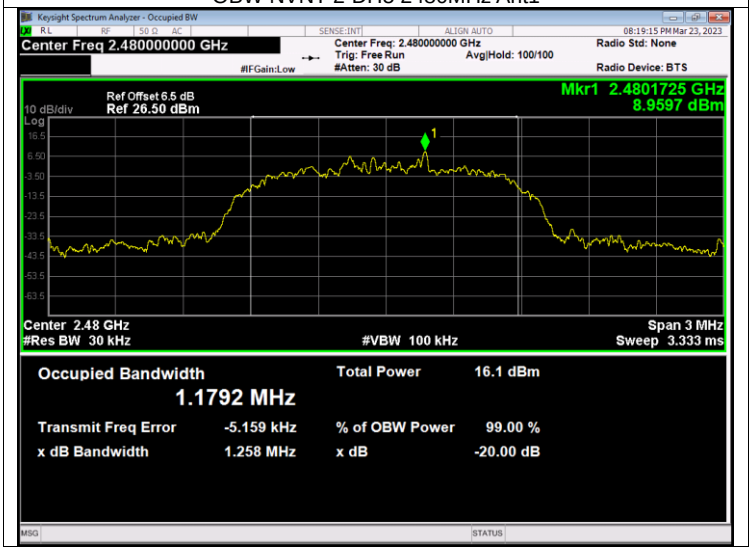
OBW NVNT 2-DH5 2402MHz Ant1



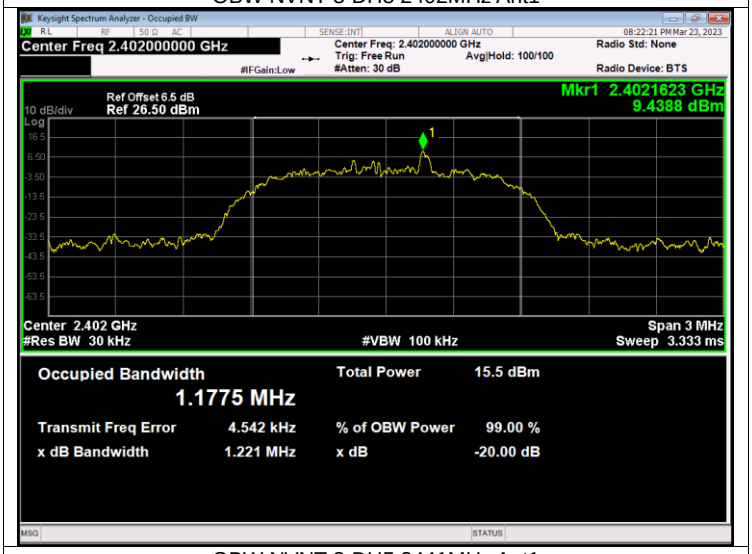
OBW NVNT 2-DH5 2441MHz Ant1



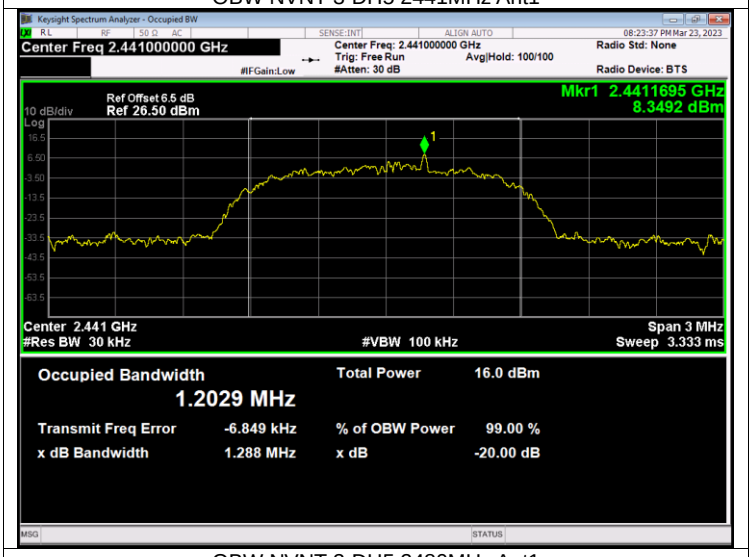
OBW NVNT 2-DH5 2480MHz Ant1



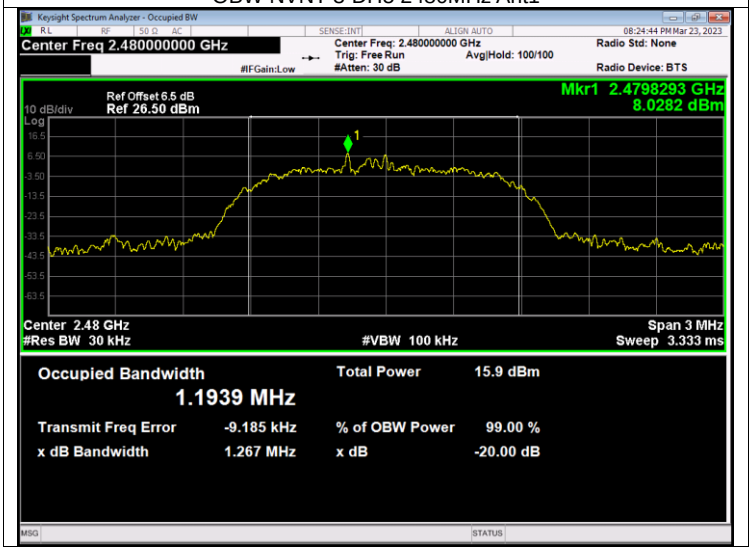
OBW NVNT 3-DH5 2402MHz Ant1



OBW NVNT 3-DH5 2441MHz Ant1



OBW NVNT 3-DH5 2480MHz Ant1



Carrier Frequencies Separation

Condition	Mode	Antenna	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH5	Ant1	2401.972	2403.06	1.088	0.68	Pass
NVNT	1-DH5	Ant1	2441.048	2441.988	0.94	0.643	Pass
NVNT	1-DH5	Ant1	2478.97	2479.992	1.022	0.635	Pass
NVNT	2-DH5	Ant1	2402.05	2402.944	0.894	0.873	Pass
NVNT	2-DH5	Ant1	2440.978	2442.048	1.07	0.911	Pass
NVNT	2-DH5	Ant1	2478.938	2480.05	1.112	0.869	Pass
NVNT	3-DH5	Ant1	2401.918	2402.986	1.068	0.858	Pass
NVNT	3-DH5	Ant1	2440.964	2441.948	0.984	0.872	Pass
NVNT	3-DH5	Ant1	2478.924	2479.99	1.066	0.847	Pass