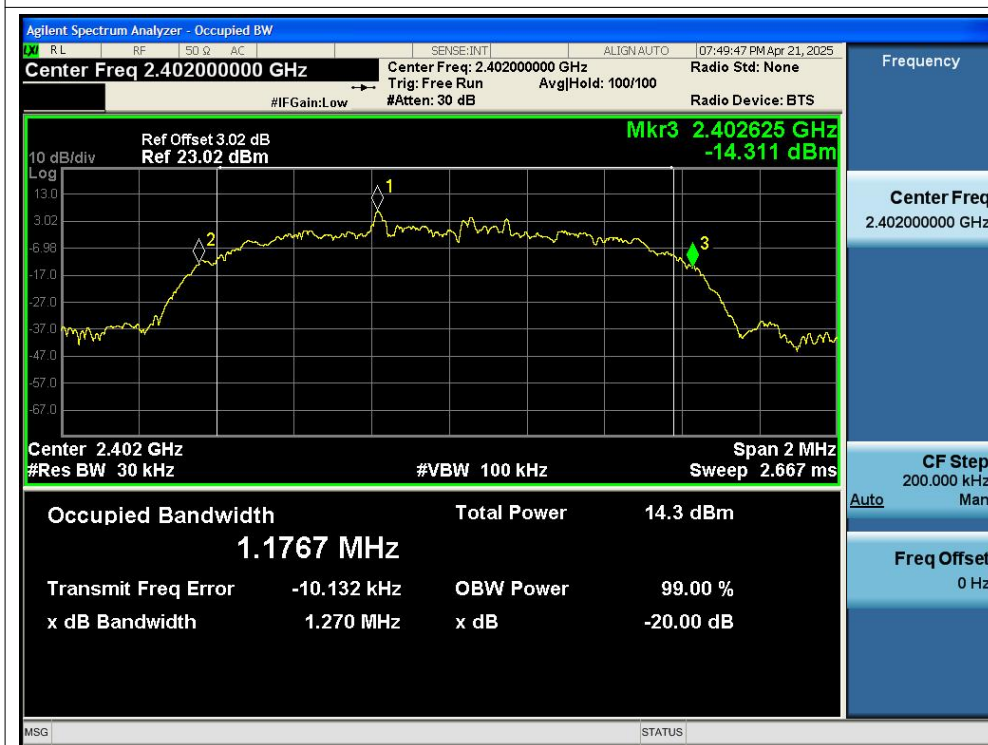
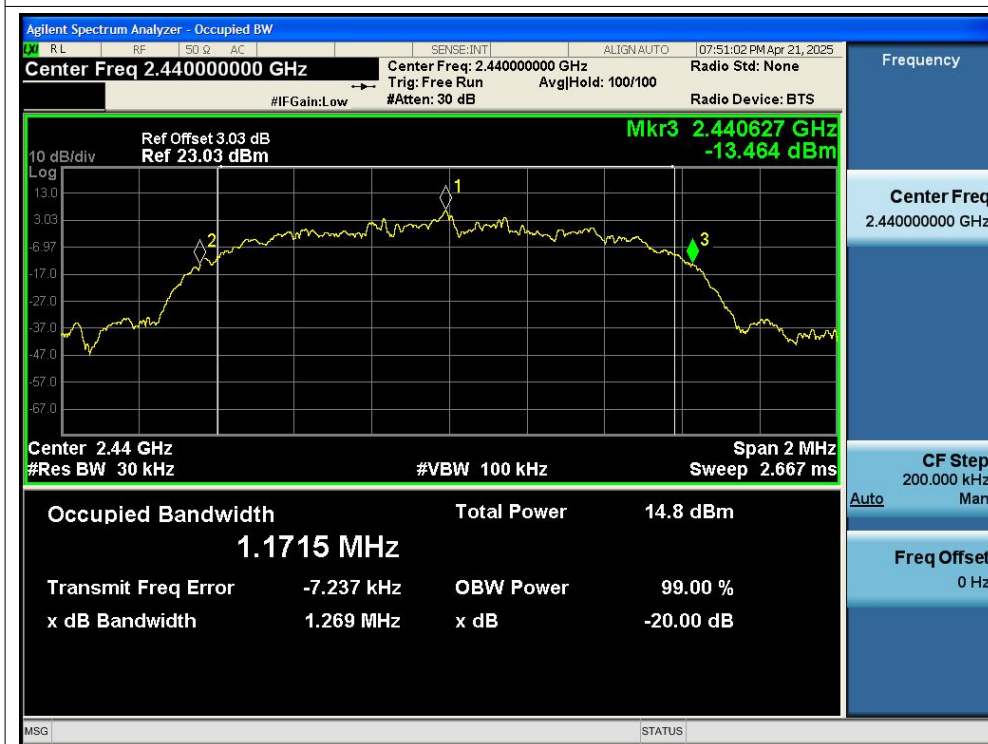
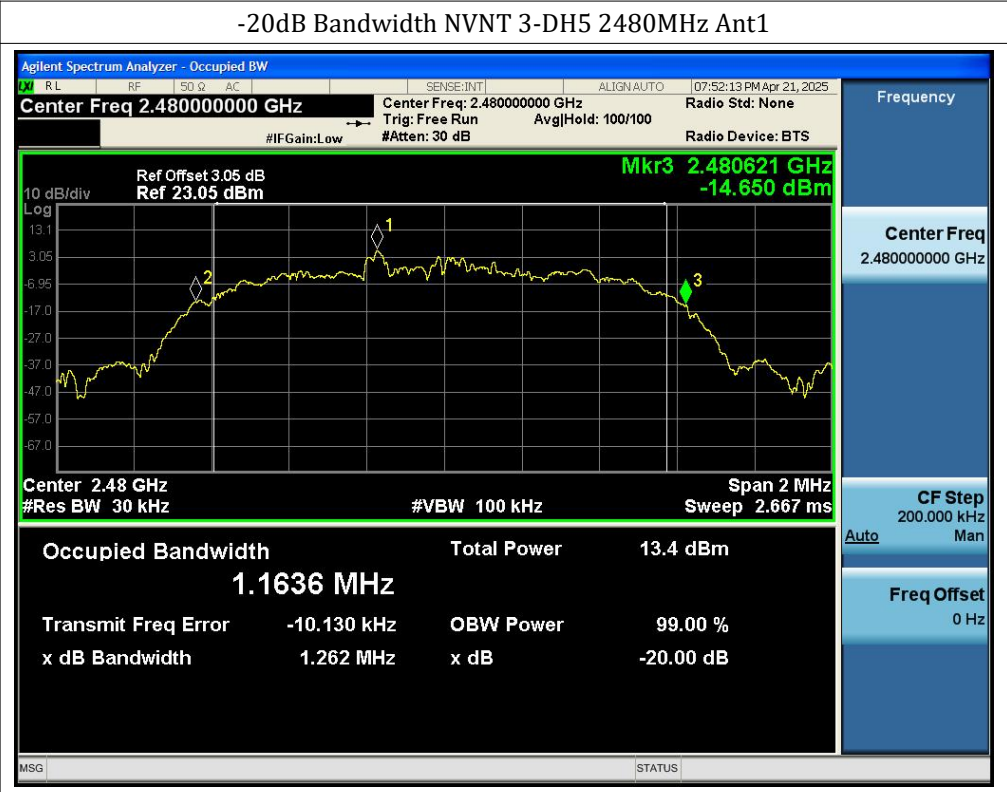


-20dB Bandwidth NVNT 3-DH5 2402MHz Ant1



-20dB Bandwidth NVNT 3-DH5 2440MHz Ant1





11. Carrier Frequencies Separation

11.1 Standard and Limit

According to FCC 15.247(a)(1), 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, and frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

11.2 Test Procedure

- 1) Remove the antenna from the EUT and connect to the spectrum analyzer via a low loss RF cable.
- 2) Set the spectrum analyzer to any one measured frequency within its operating range.
- 3) Set RBW = 30kHz, VBW = 100kHz, Sweep = Auto, Detector = Peak.
- 4) By using the Max Hold function, record the separation of two adjacent channels.
- 5) Measure the frequency difference of these two adjacent channels by spectrum analyzer mark function. and then plot the result on the screen of the spectrum analyzer.
- 6) Repeat above procedures until all frequencies measured were complete.



Test Setup Block Diagram

11.3 Test Data and Results

| Test Mode | Test Channel | Test Freq. 1 (MHz) | Test Freq. 2 (MHz) | CFS (MHz) | Limit (MHz) |
|------------|--------------|--------------------|--------------------|-----------|-------------|
| GFSK | Lowest | 2401.828 | 2402.82 | 0.992 | 0.639 |
| | Middle | 2439.824 | 2440.91 | 1.086 | 0.637 |
| | Highest | 2478.918 | 2480.164 | 1.246 | 0.633 |
| Pi/4 DQPSK | Lowest | 2401.822 | 2402.96 | 1.138 | 0.815 |
| | Middle | 2439.944 | 2440.952 | 1.008 | 0.877 |
| | Highest | 2478.834 | 2479.83 | 0.996 | 0.846 |
| 8DPSK | Lowest | 2401.944 | 2403.15 | 1.206 | 0.847 |
| | Middle | 2439.942 | 2440.95 | 1.008 | 0.846 |
| | Highest | 2478.944 | 2479.842 | 0.898 | 0.841 |

Note: CFS(Channel Frequency Separation) = Test Freq. 2 - Test Freq. 1

Test Graphs

CFS NVNT 1-DH5 2402MHz Ant1



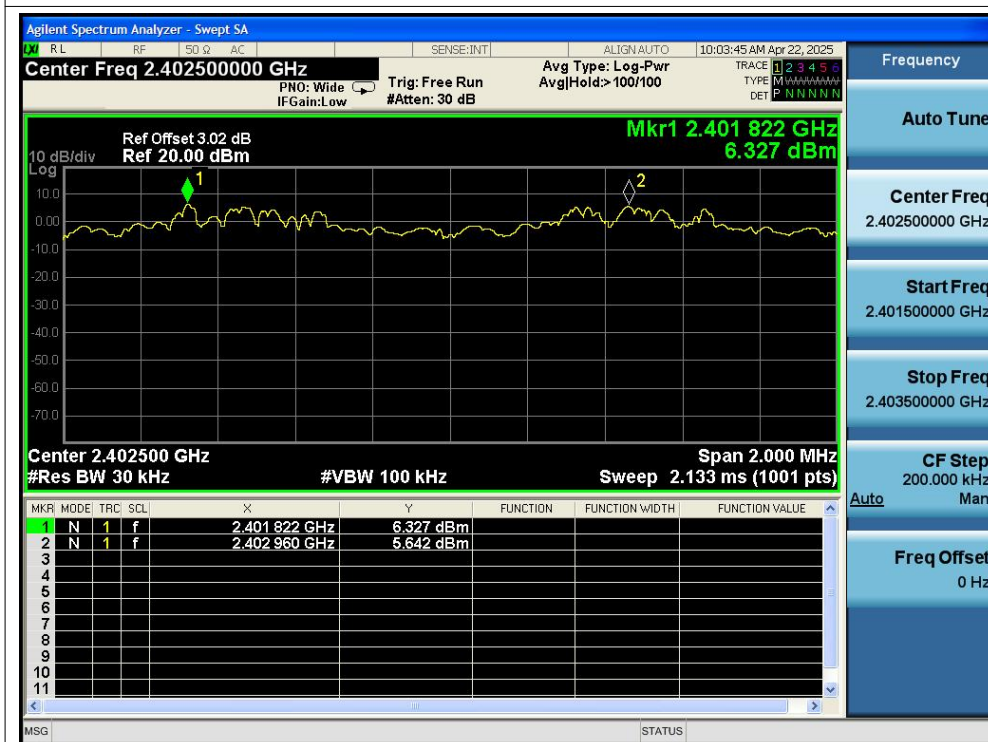
CFS NVNT 1-DH5 2440MHz Ant1



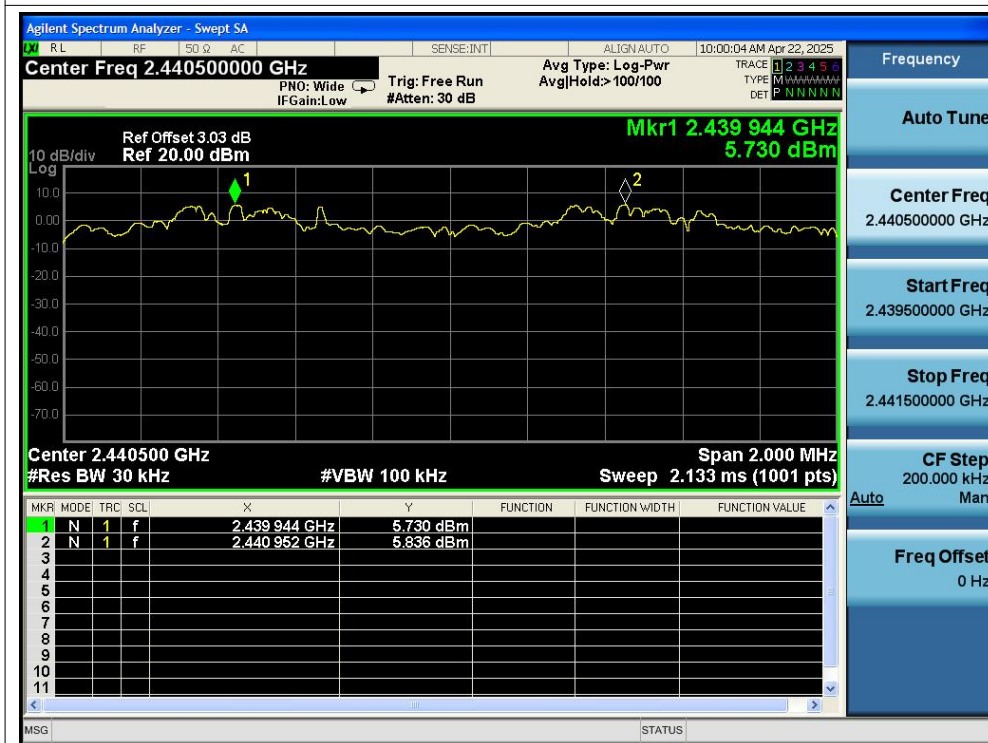
CFS NVNT 1-DH5 2480MHz Ant1



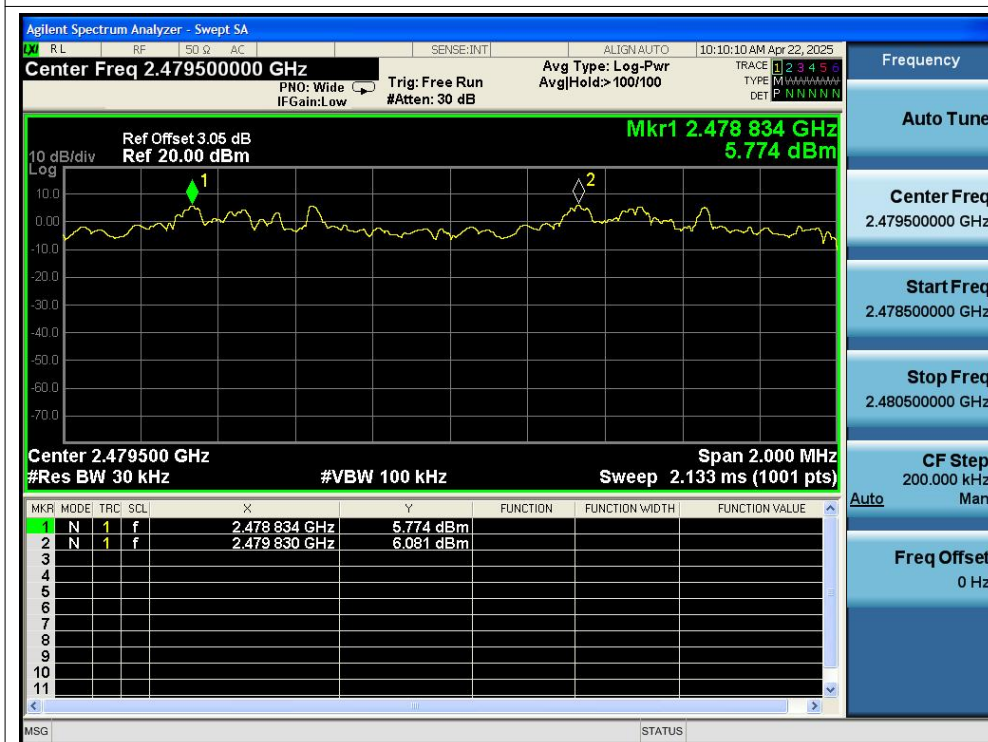
CFS NVNT 2-DH5 2402MHz Ant1



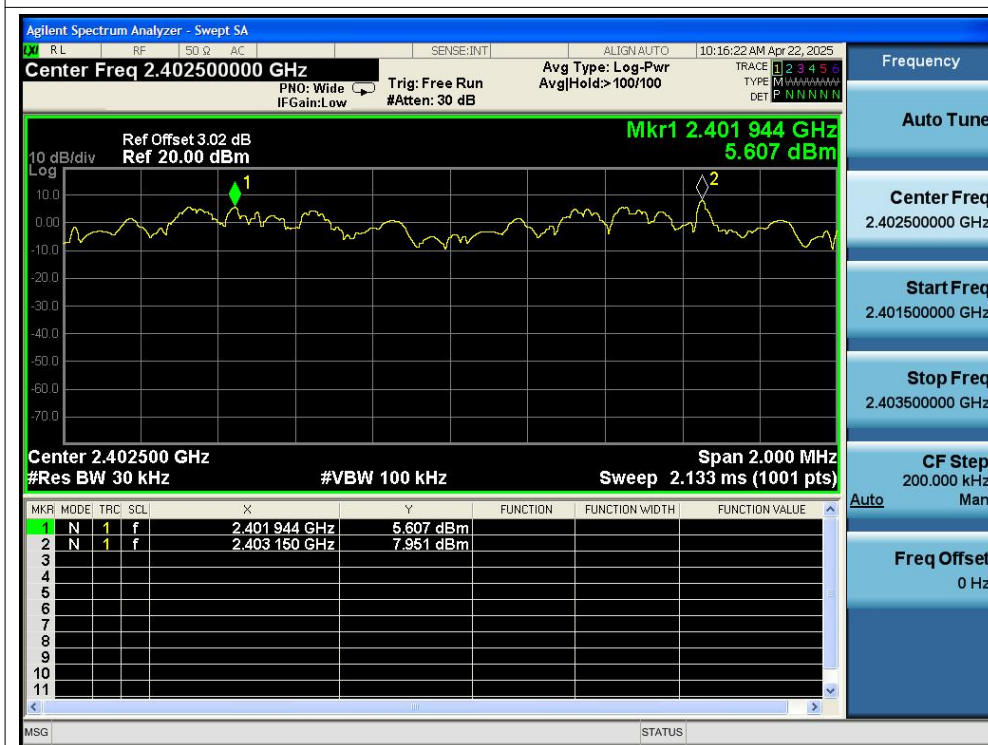
CFS NVNT 2-DH5 2440MHz Ant1



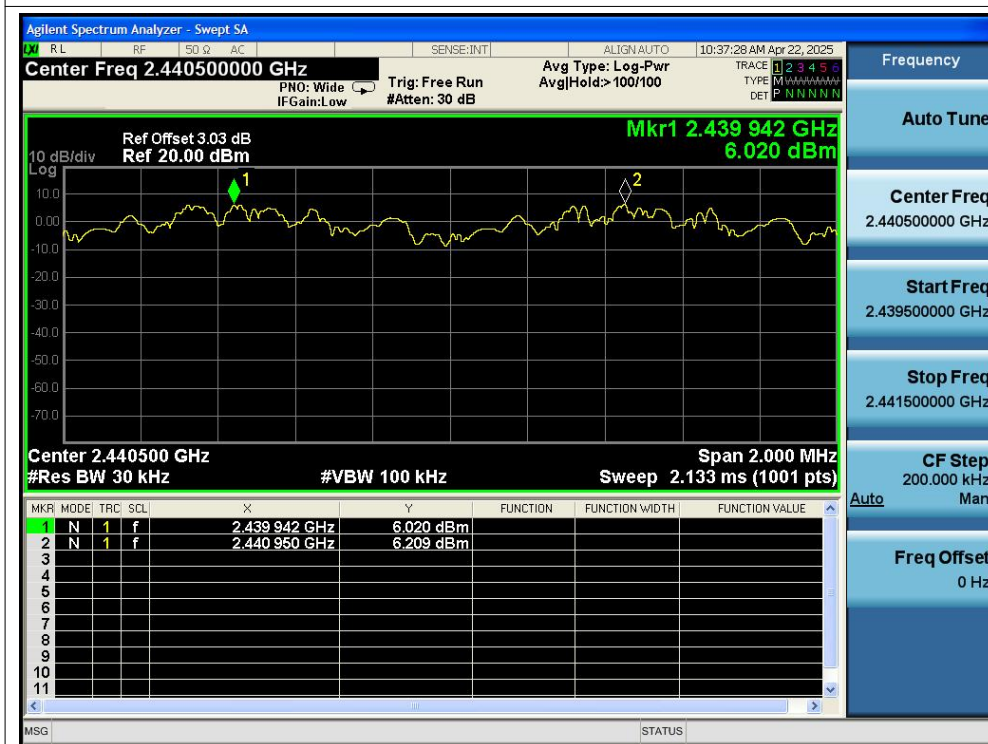
CFS NVNT 2-DH5 2480MHz Ant1

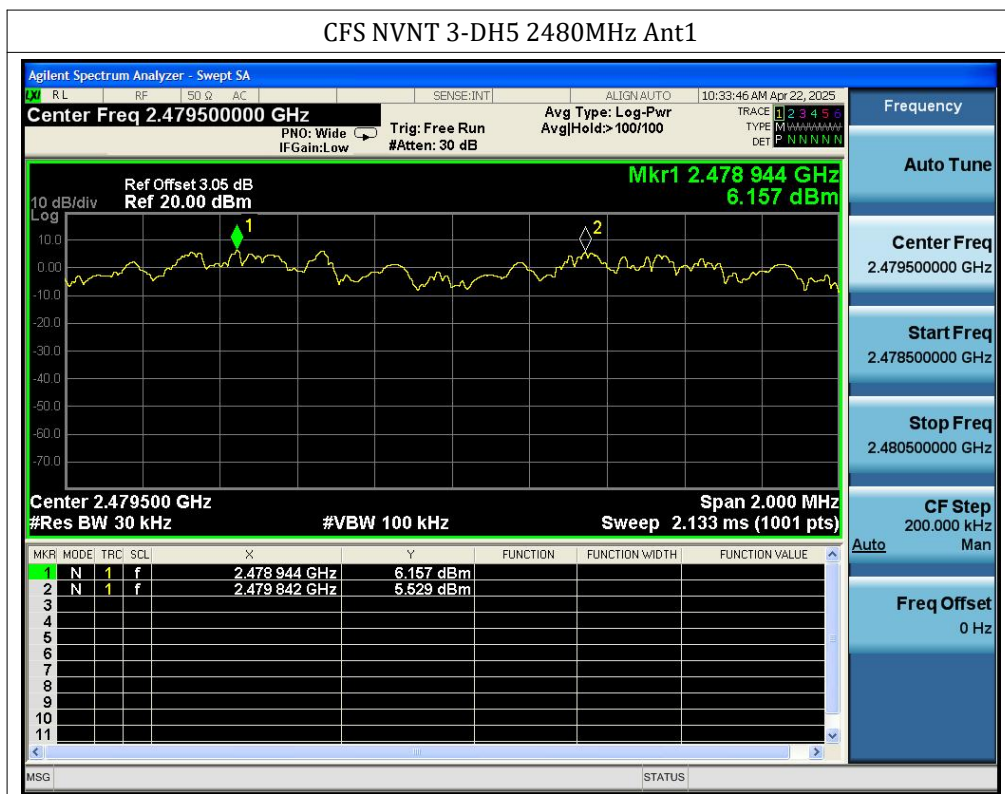


CFS NVNT 3-DH5 2402MHz Ant1



CFS NVNT 3-DH5 2440MHz Ant1





12. Number of Hopping Channel

12.1 Standard and Limit

According to FCC 15.247(a)(1), 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, and frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

12.2 Test Procedure

- 1) Remove the antenna from the EUT and connect to the spectrum analyzer via a low loss RF cable.
- 2) Set the spectrum analyzer to any one measured frequency within its operating range.
- 3) Set RBW = 100kHz, VBW = 300kHz, Sweep = Auto, Detector = Peak.
- 4) Set the spectrum analyzer on Max hold mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
- 5) Set the spectrum analyzer on View mode and then plot the result on the screen of the spectrum analyzer.
- 6) Repeat the above procedures until all frequencies measured were complete.

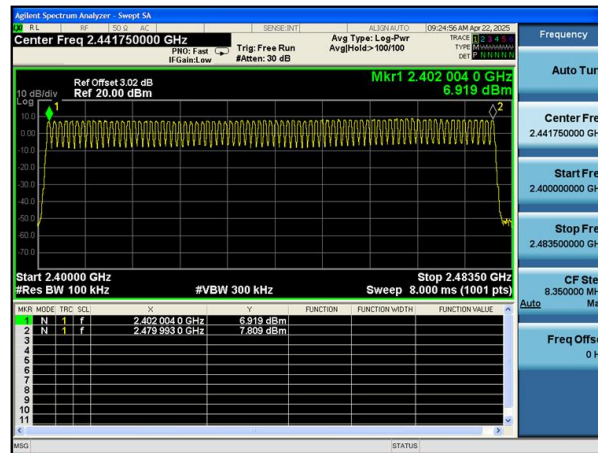


12.3 Test Data and Results

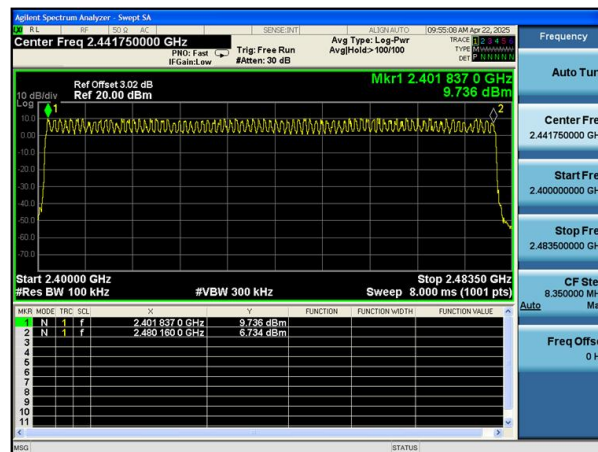
| Test Mode | Number of Hopping Channel | Limit | Test Result |
|------------|---------------------------|-------|-------------|
| GFSK | 79 | 15 | Pass |
| Pi/4 DQPSK | 79 | 15 | Pass |
| 8DPSK | 79 | 15 | Pass |

Number of Hopping Channel

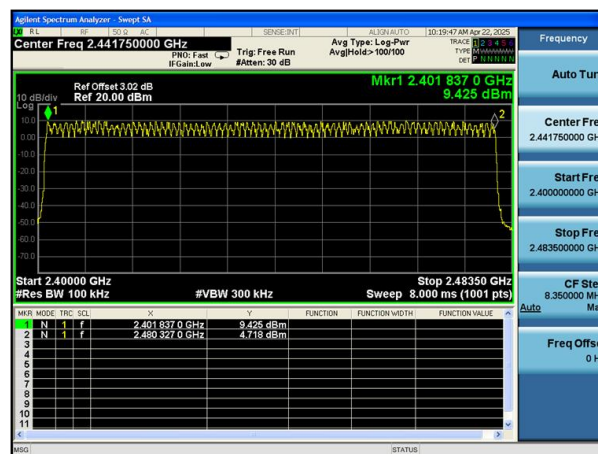
GFSK



Pi/4 DQPSK



8DPSK



13. Band-edge Emission(Conducted)

13.1 Standard and Limit

According to §15.247(d), In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

13.2 Test Procedure

Test is conducting under the description of ANSI C63.10 - 2013 section 6.10.

- 1) Remove the antenna from the EUT and connect to the spectrum analyzer via a low loss RF cable.
- 2) Set the spectrum analyzer to any one measured frequency within its operating range.
- 3) Set RBW = 100kHz, VBW = 300kHz, Sweep = Auto, Detector = Peak.
- 4) Measure the highest amplitude appearing on spectral display and set it as a reference level.
- 5) Set a convenient frequency span including 100 kHz bandwidth from band edge.
- 6) Measure the emission and marking the edge frequency.
- 7) Repeat above procedures until all frequencies measured were complete.



Test Setup Block Diagram

13.3 Test Data and Results

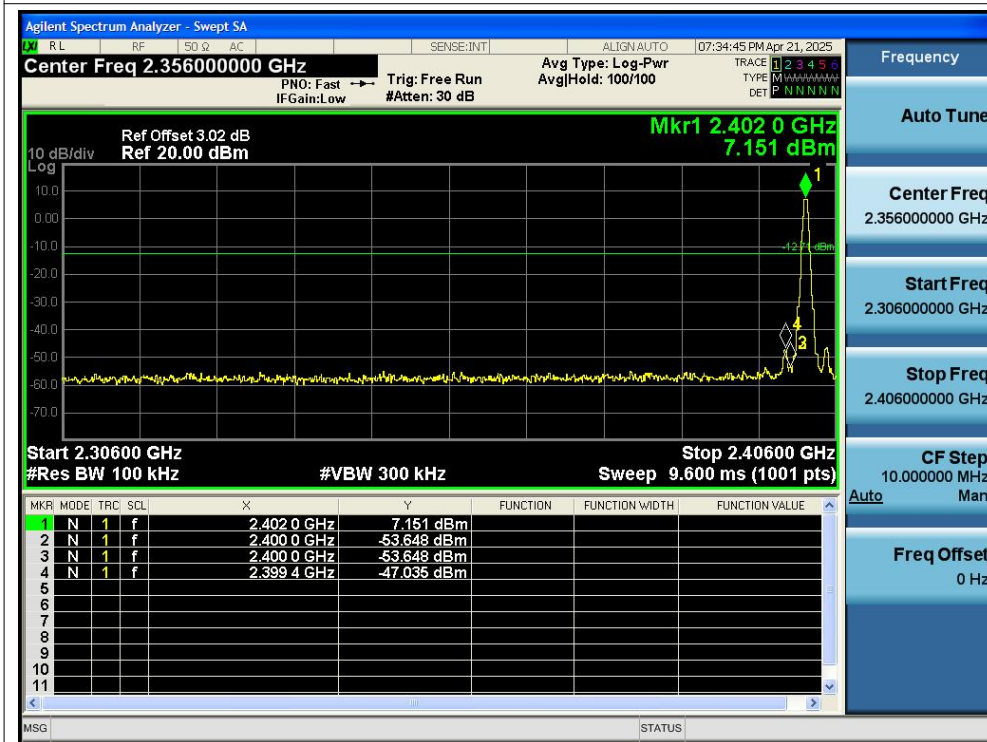
| Test Mode | Band-edge | Test Channel (MHz) | Max. Value (dBc) | Limit (dBc) | Test Result |
|------------|-----------|--------------------|------------------|-------------|-------------|
| No-Hopping | | | | | |
| GFSK | Lowest | 2402 | -54.32 | -20 | Pass |
| | Highest | 2480 | -59.8 | -20 | Pass |
| Pi/4 DQPSK | Lowest | 2402 | -56.2 | -20 | Pass |
| | Highest | 2480 | -63.58 | -20 | Pass |
| 8DPSK | Lowest | 2402 | -55.76 | -20 | Pass |
| | Highest | 2480 | -60.65 | -20 | Pass |
| Hopping | | | | | |
| GFSK | Lowest | 2402 | -55.21 | -20 | Pass |
| | Highest | 2480 | -58.68 | -20 | Pass |
| Pi/4 DQPSK | Lowest | 2402 | -56.17 | -20 | Pass |
| | Highest | 2480 | -56.91 | -20 | Pass |
| 8DPSK | Lowest | 2402 | -56.68 | -20 | Pass |
| | Highest | 2480 | -61.49 | -20 | Pass |

Test Graphs

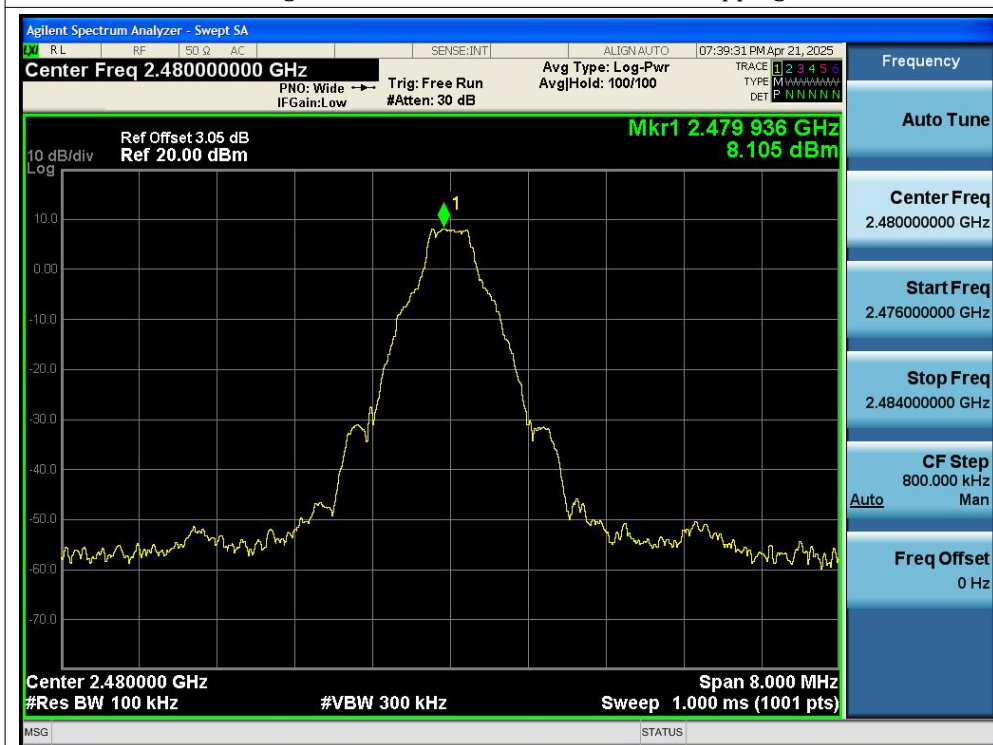
Band Edge NVNT 1-DH5 2402MHz Ant1 No-Hopping Ref



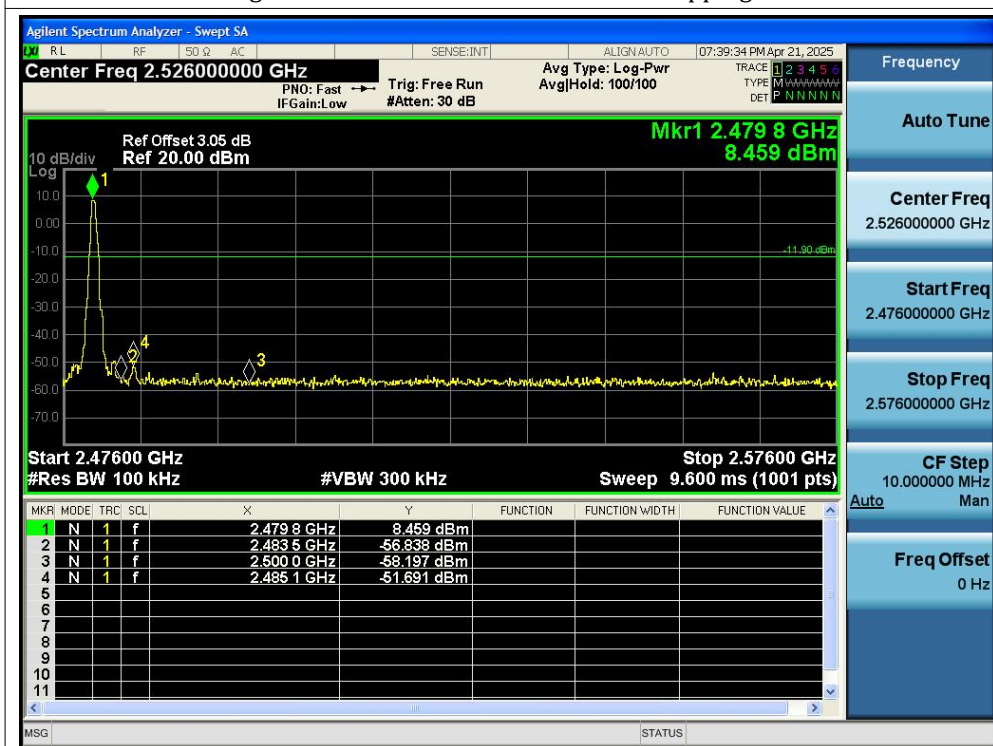
Band Edge NVNT 1-DH5 2402MHz Ant1 No-Hopping Emission



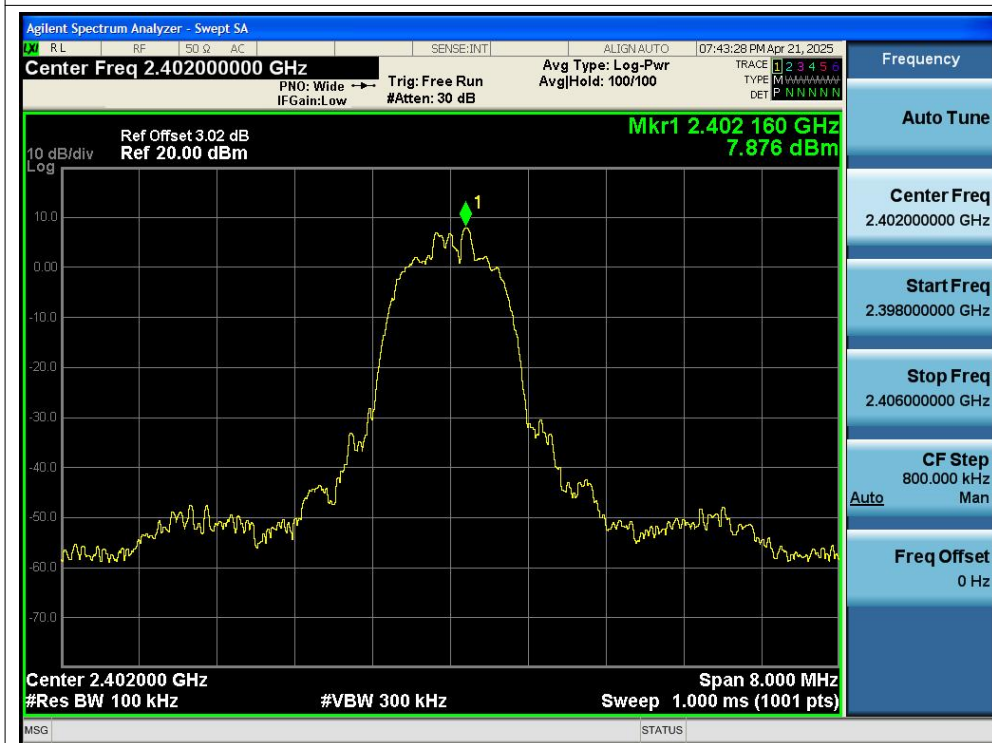
Band Edge NVNT 1-DH5 2480MHz Ant1 No-Hopping Ref



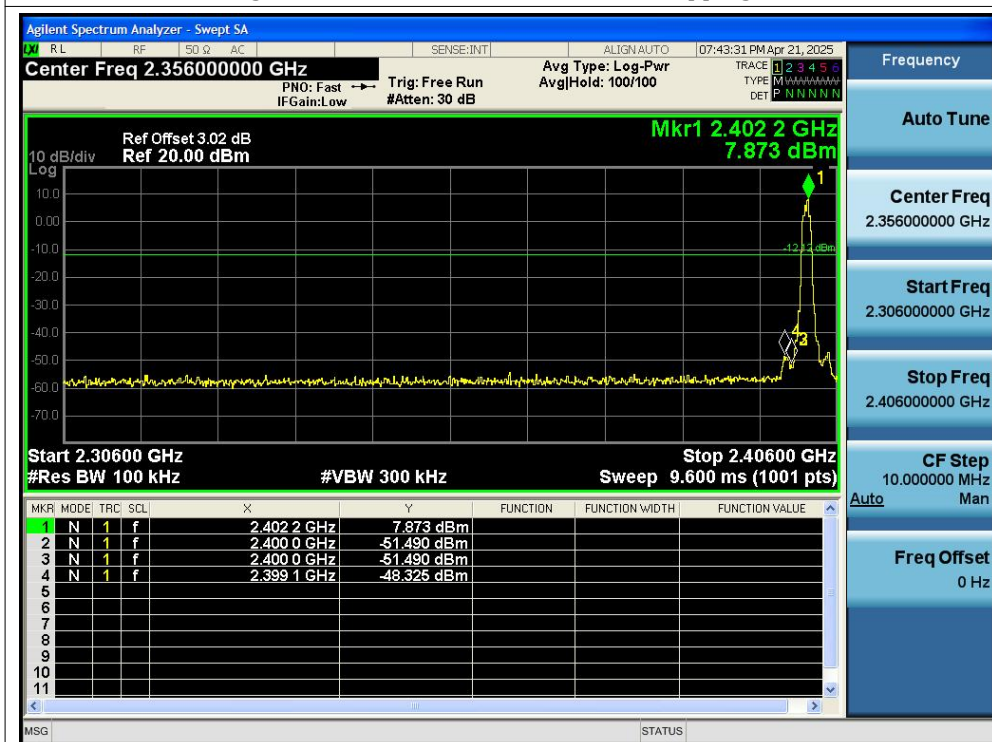
Band Edge NVNT 1-DH5 2480MHz Ant1 No-Hopping Emission



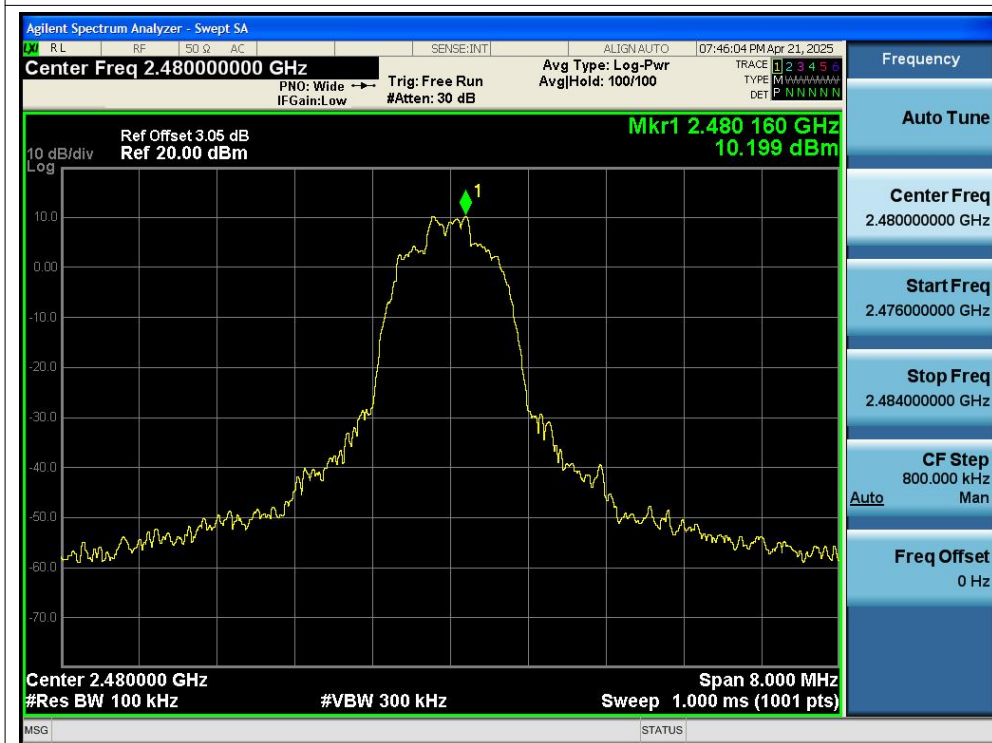
Band Edge NVNT 2-DH5 2402MHz Ant1 No-Hopping Ref



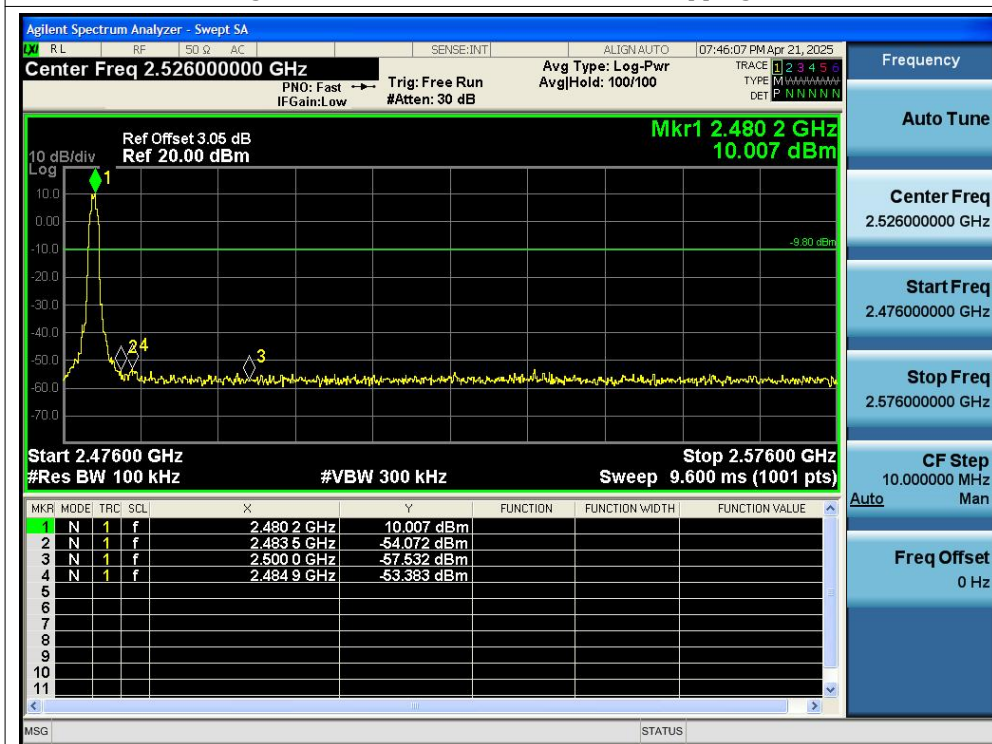
Band Edge NVNT 2-DH5 2402MHz Ant1 No-Hopping Emission

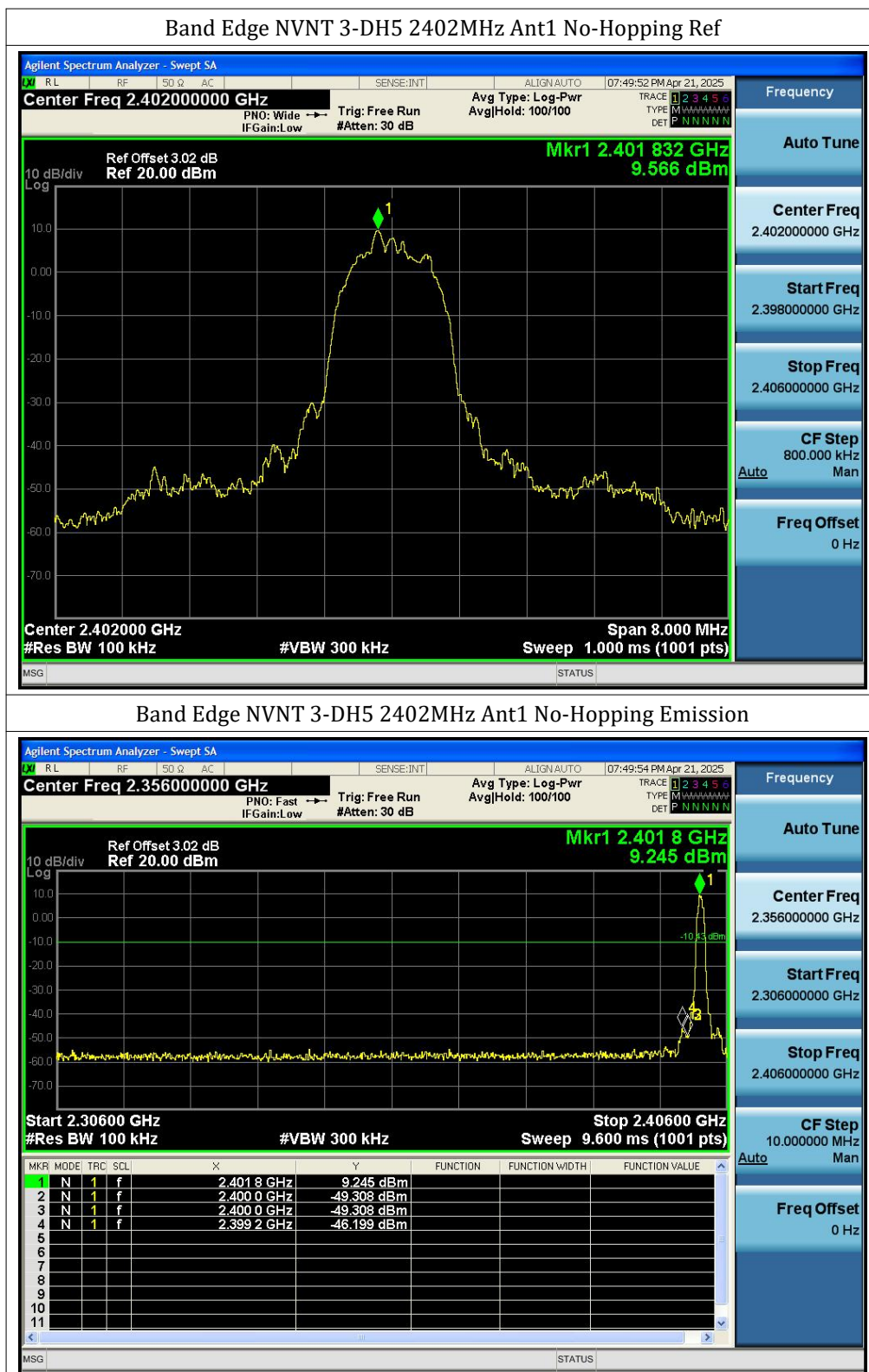


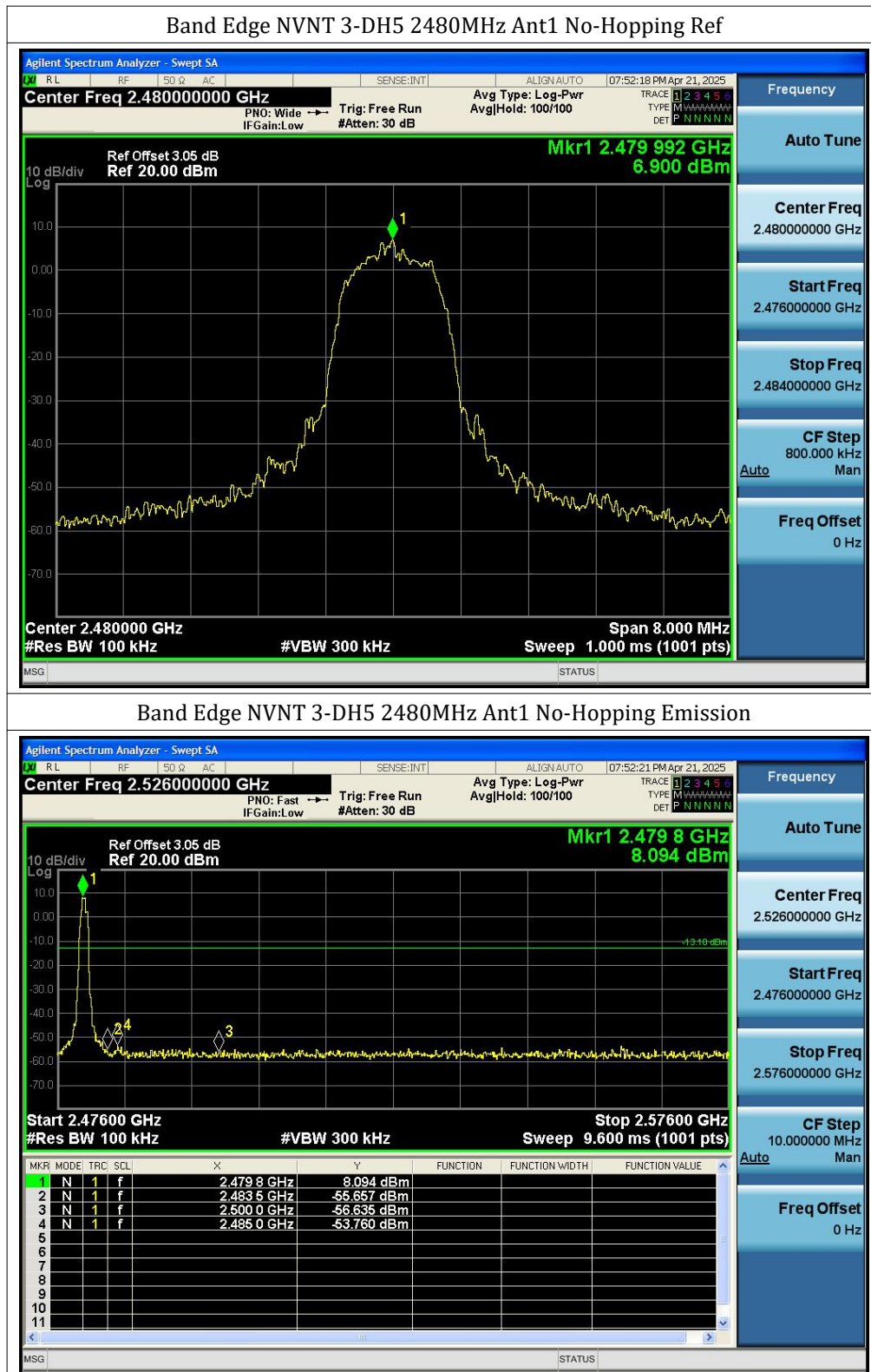
Band Edge NVNT 2-DH5 2480MHz Ant1 No-Hopping Ref



Band Edge NVNT 2-DH5 2480MHz Ant1 No-Hopping Emission

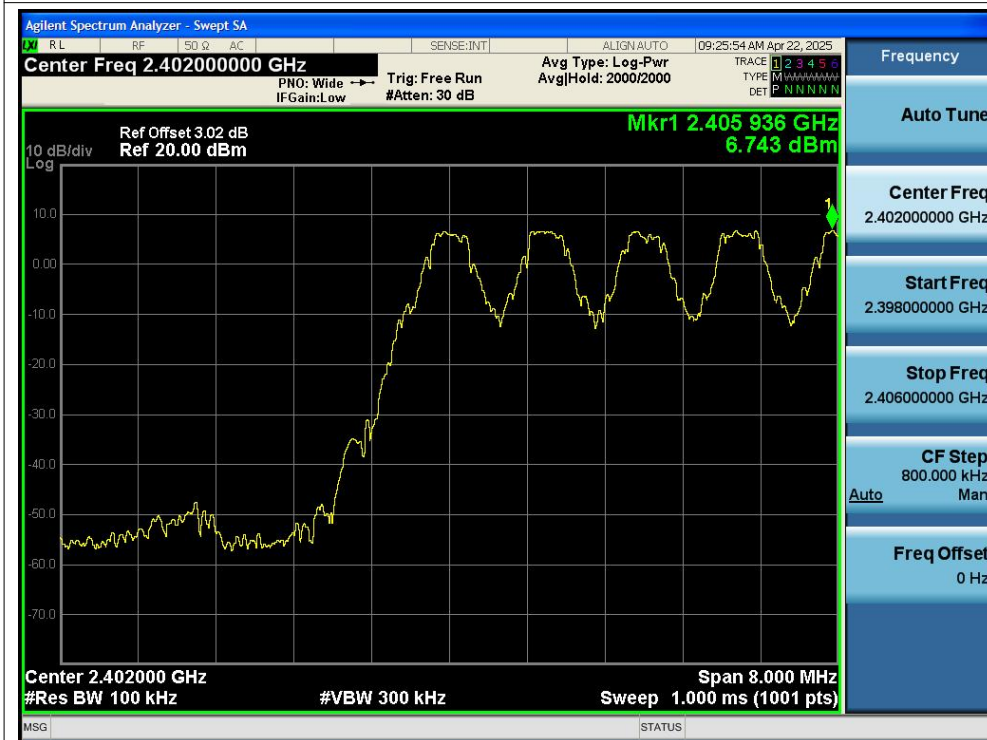




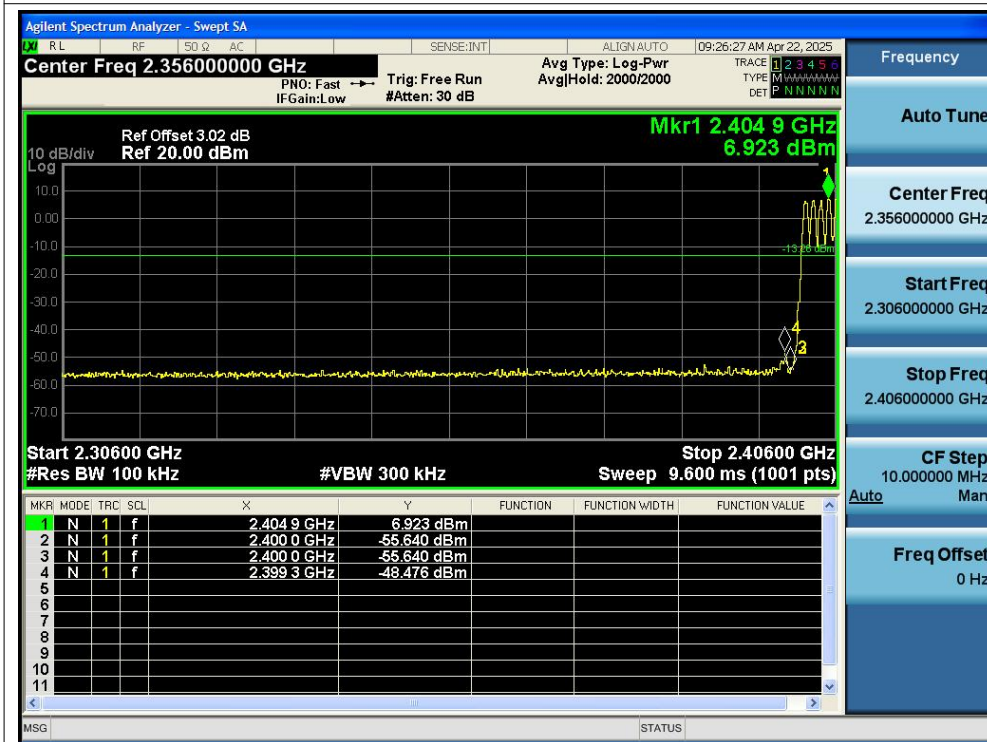


Test Graphs

Band Edge(Hopping) NVNT 1-DH5 2402MHz Ant1 Hopping Ref



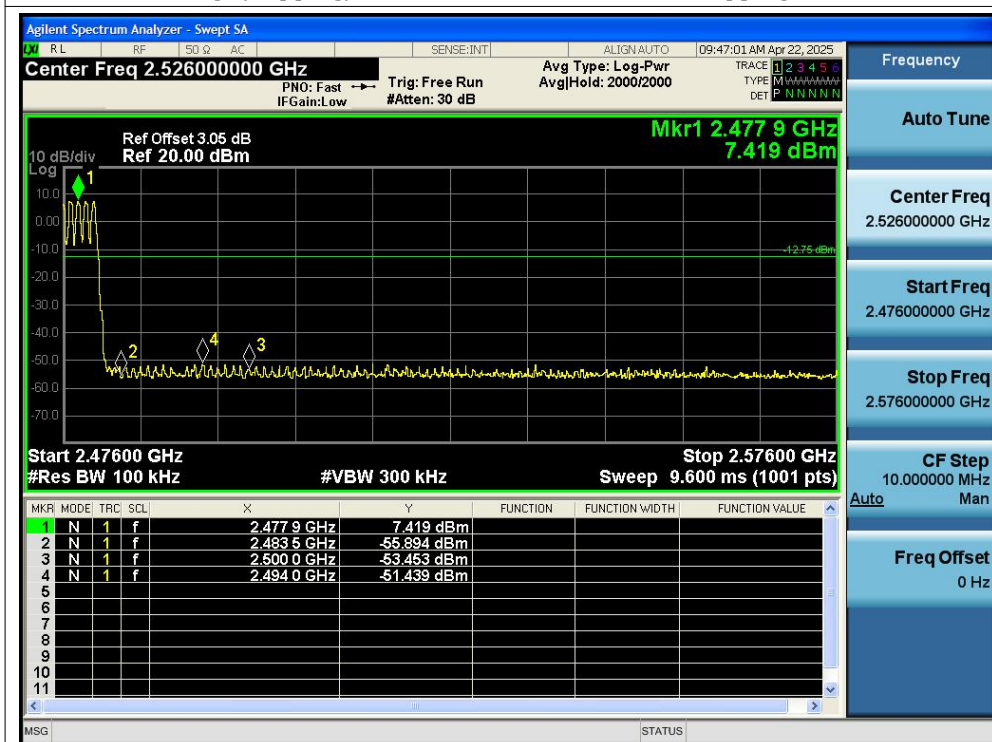
Band Edge(Hopping) NVNT 1-DH5 2402MHz Ant1 Hopping Emission



Band Edge(Hopping) NVNT 1-DH5 2480MHz Ant1 Hopping Ref



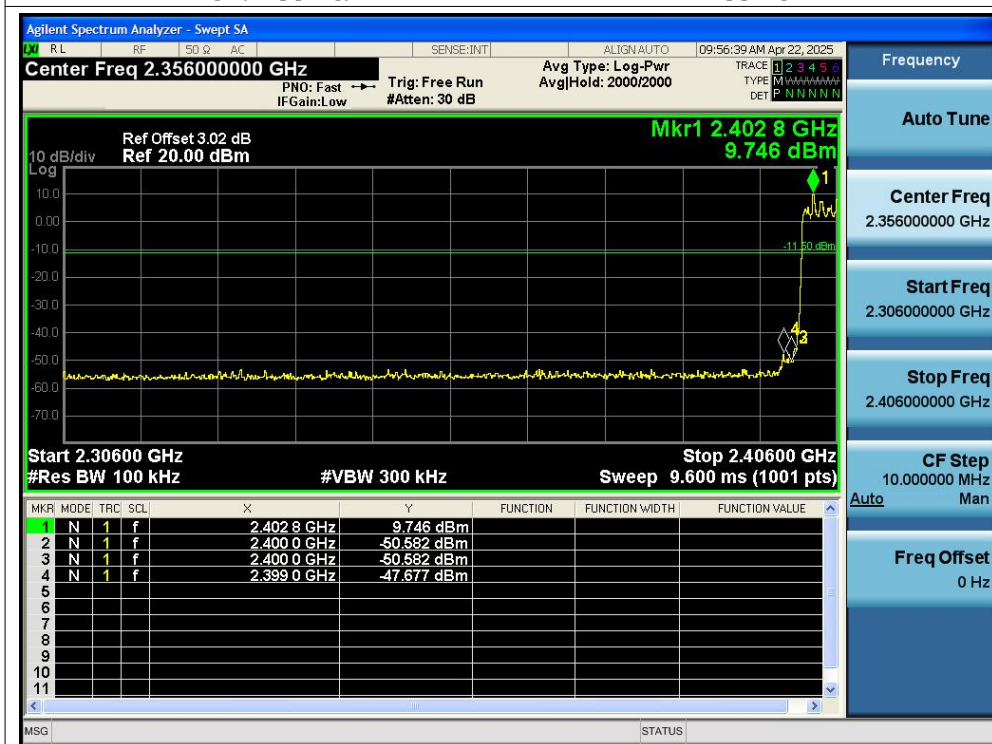
Band Edge(Hopping) NVNT 1-DH5 2480MHz Ant1 Hopping Emission



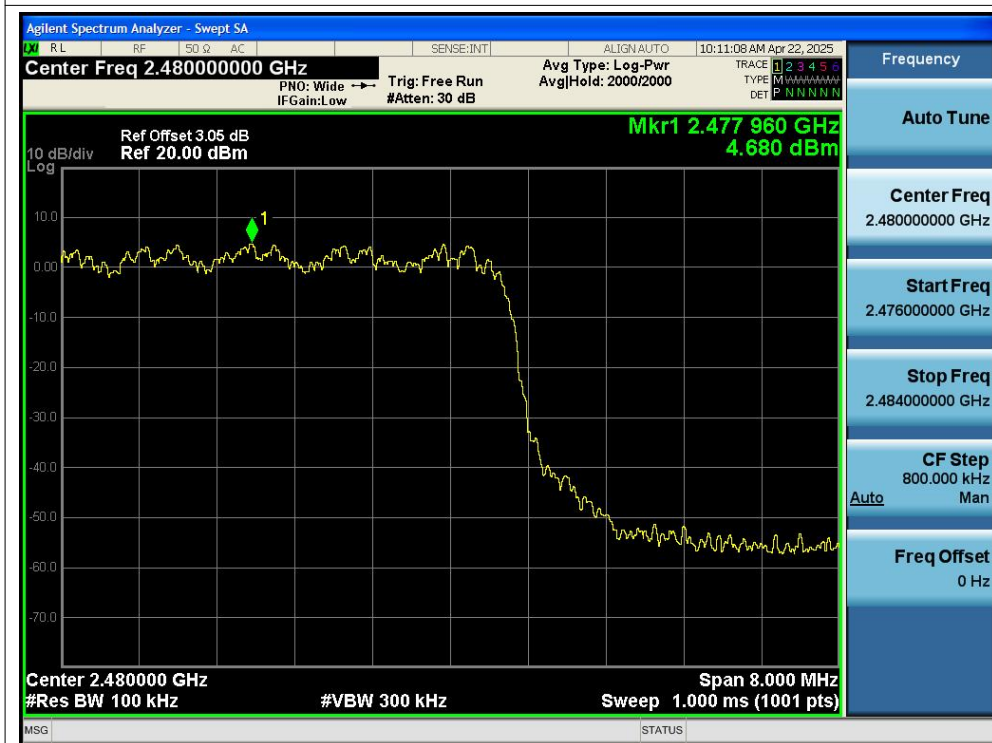
Band Edge(Hopping) NVNT 2-DH5 2402MHz Ant1 Hopping Ref



Band Edge(Hopping) NVNT 2-DH5 2402MHz Ant1 Hopping Emission



Band Edge(Hopping) NVNT 2-DH5 2480MHz Ant1 Hopping Ref



Band Edge(Hopping) NVNT 2-DH5 2480MHz Ant1 Hopping Emission

