

5.7 6 dB Bandwidth

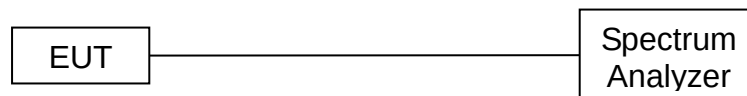
5.7.1 Limit

(e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

5.7.2 Test Procedure

1. Set RBW= 100 kHz.
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) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission.

5.7.3 Test Setup



5.7.4 Test Results

Note: This project is not applicable.

5.8 Out Of Band Emission

5.8.1 Limit

According to FCC §15.407(b).

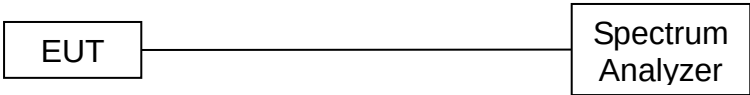
Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15–5.25 GHz band: All emissions outside of the 5.15–5.35 GHz band shall not exceed an e.i.r.p. of –27 dBm/MHz.
- (2) For transmitters operating in the 5.25–5.35 GHz band: All emissions outside of the 5.15–5.35 GHz band shall not exceed an e.i.r.p. of –27 dBm/MHz.
- (3) For transmitters operating in the 5.47–5.725 GHz band: All emissions outside of the 5.47–5.725 GHz band shall not exceed an e.i.r.p. of –27 dBm/MHz.
- (4) For transmitters operating solely in the 5.725–5.850 GHz band:
 - (i) All emissions shall be limited to a level of –27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

5.8.2 Test Procedure

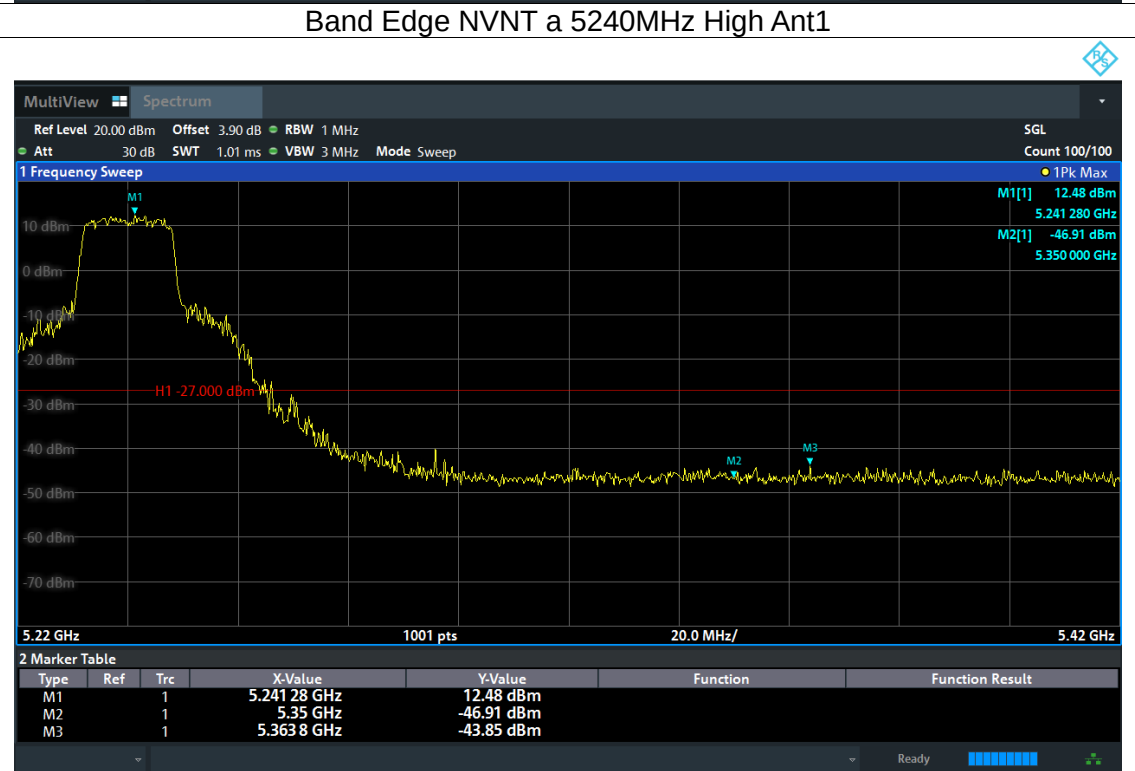
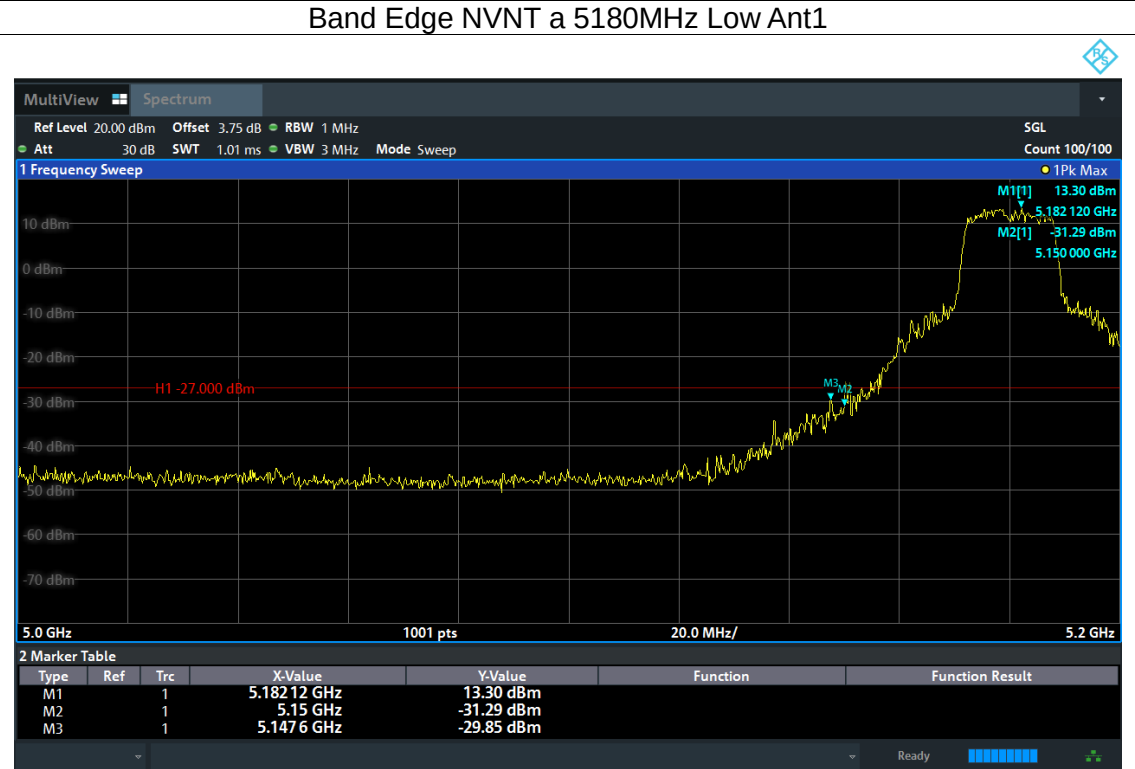
- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- c) Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
- d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- e) Repeat above procedures until all measured frequencies were complete.

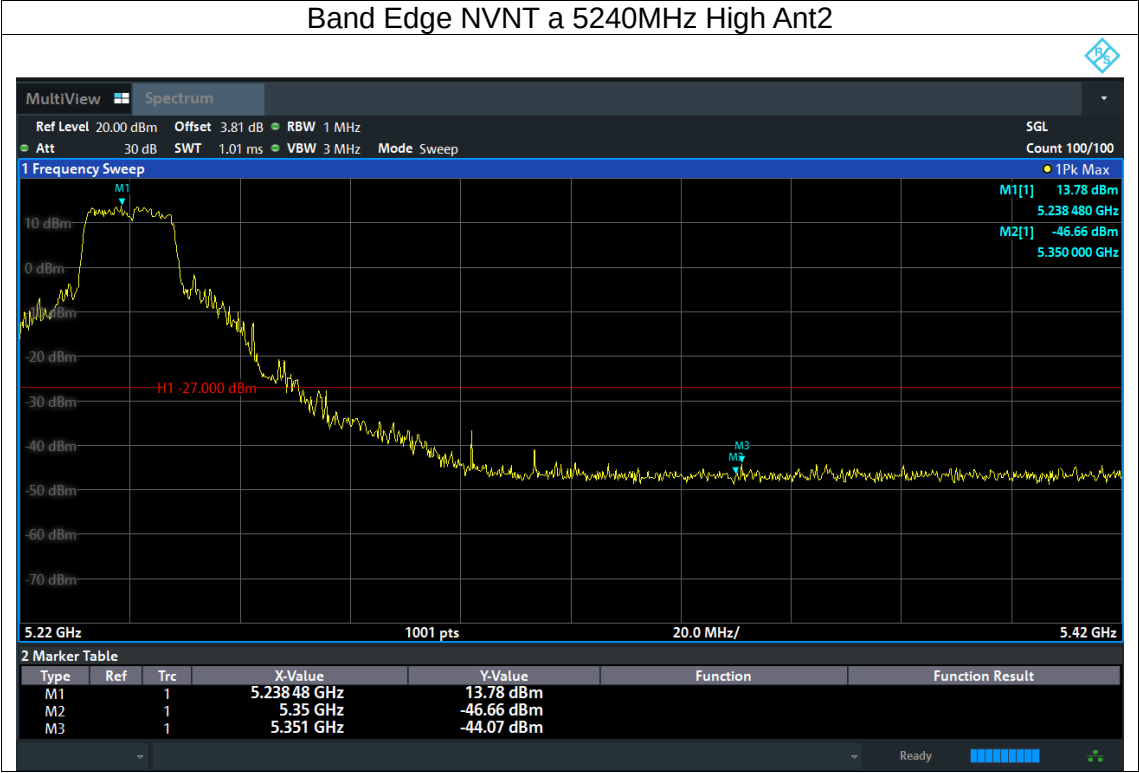
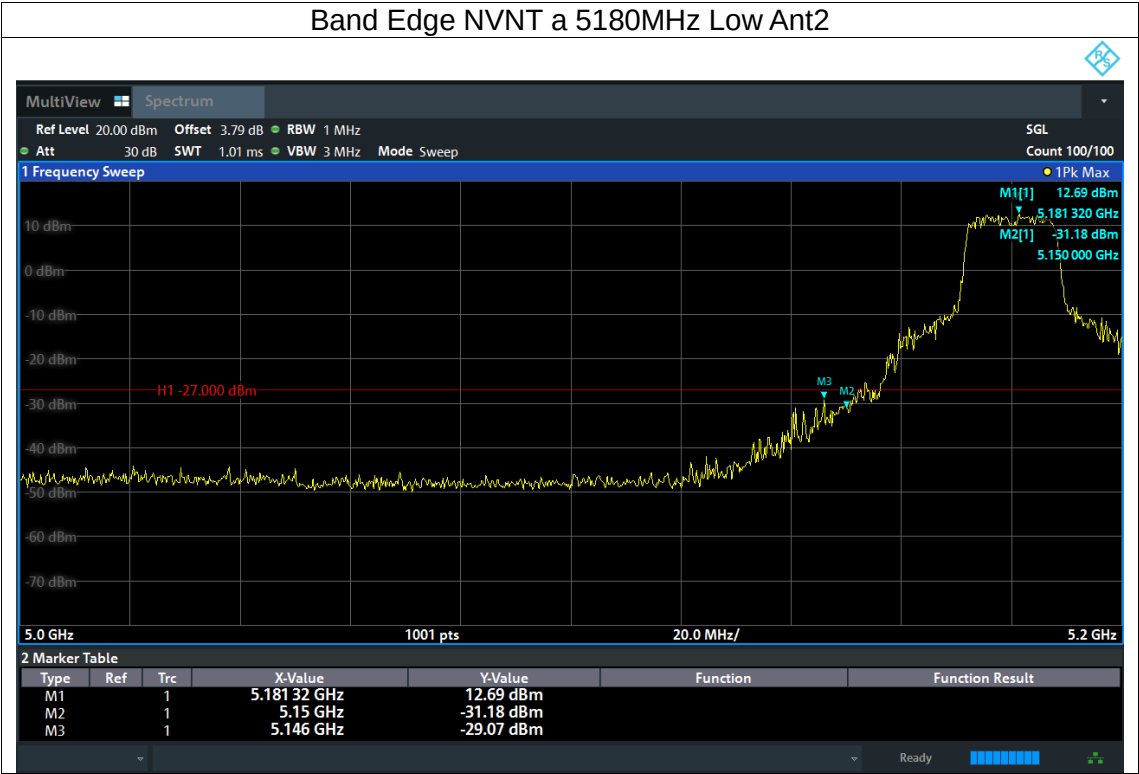
5.8.3 Test Setup



5.8.4 Test Results

For U-NII-1





Band Edge NVNT n20 5180MHz Low Ant1



Band Edge NVNT n20 5180MHz Low Ant2



Band Edge NVNT n20 5240MHz High Ant1



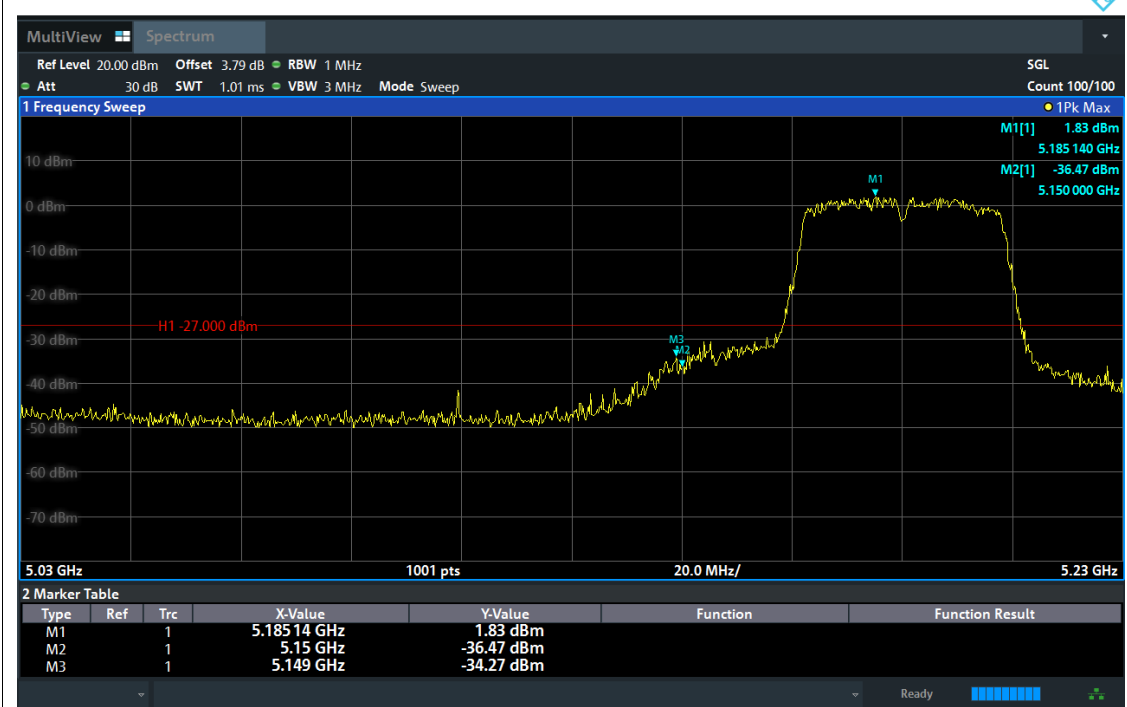
Band Edge NVNT n20 5240MHz High Ant2



Band Edge NVNT n40 5190MHz Low Ant1



Band Edge NVNT n40 5190MHz Low Ant2



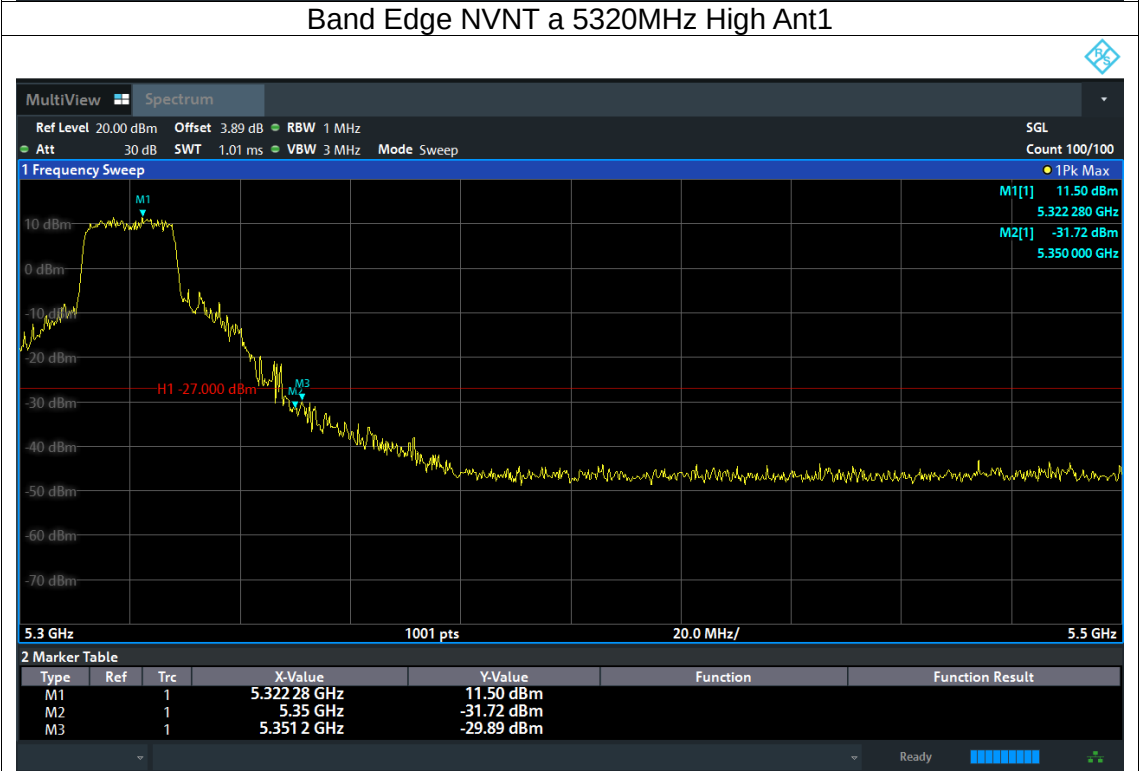
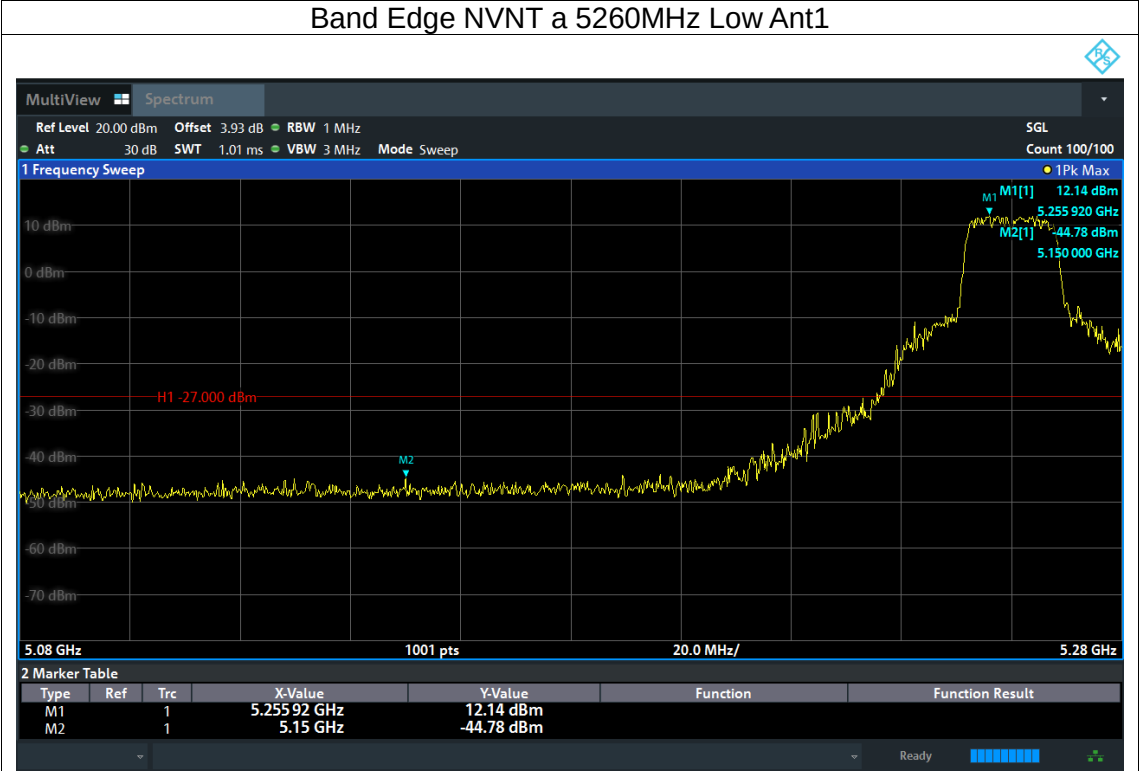
Band Edge NVNT n40 5230MHz High Ant1



Band Edge NVNT n40 5230MHz High Ant2



U-NII-2A

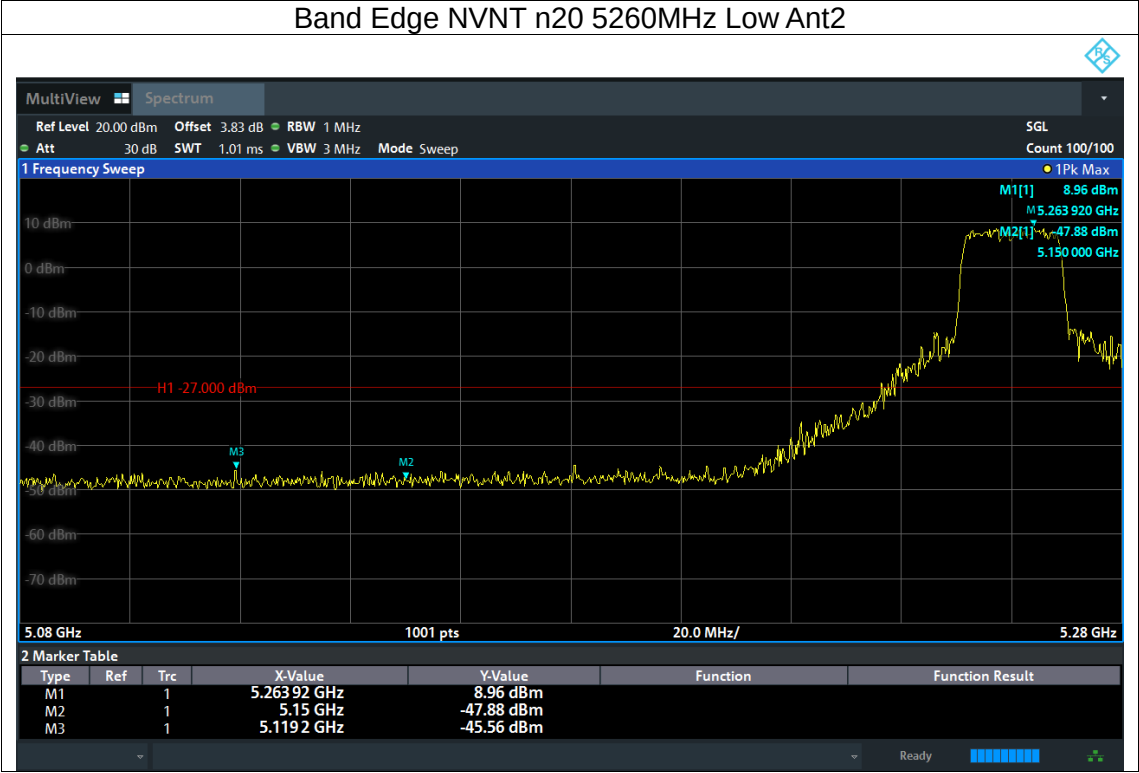
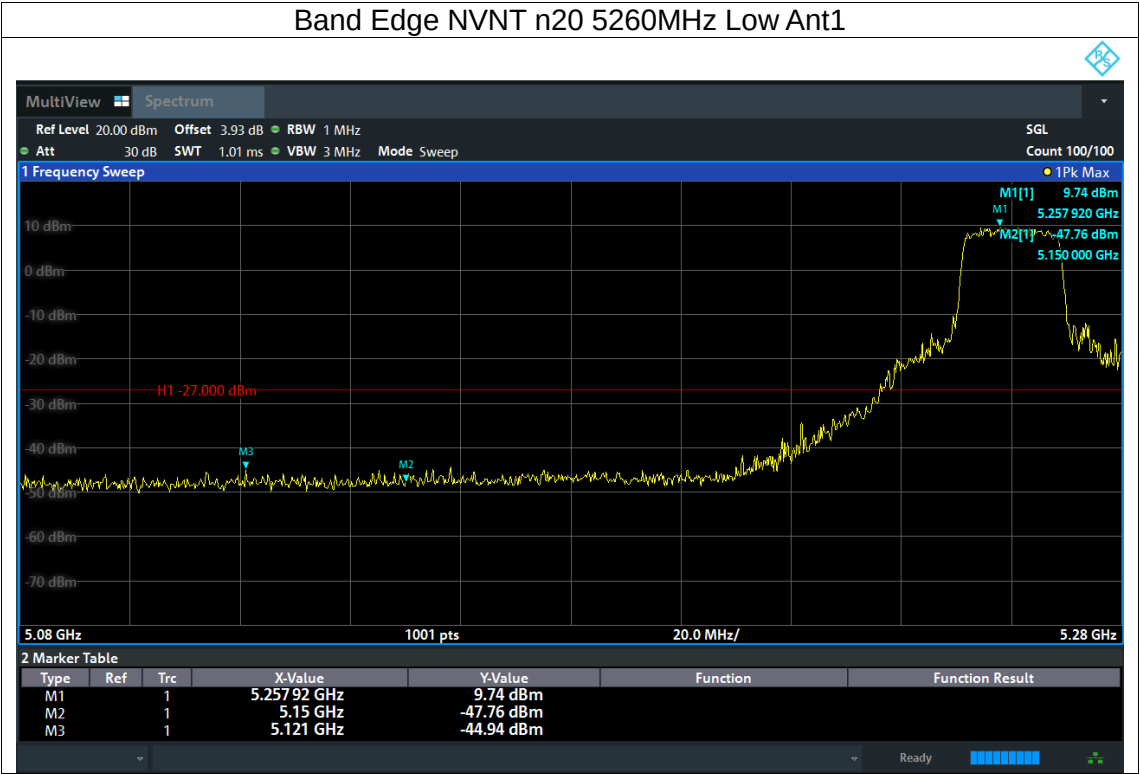


Band Edge NVNT a 5260MHz Low Ant2



Band Edge NVNT a 5320MHz High Ant2



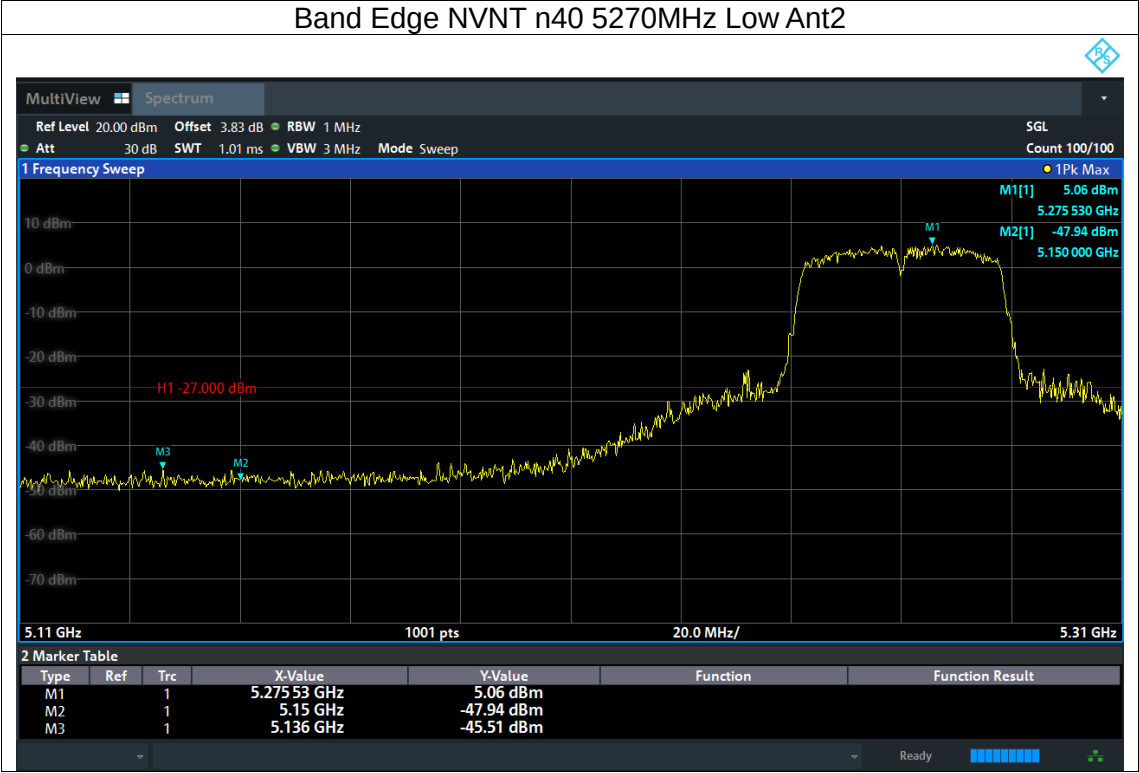
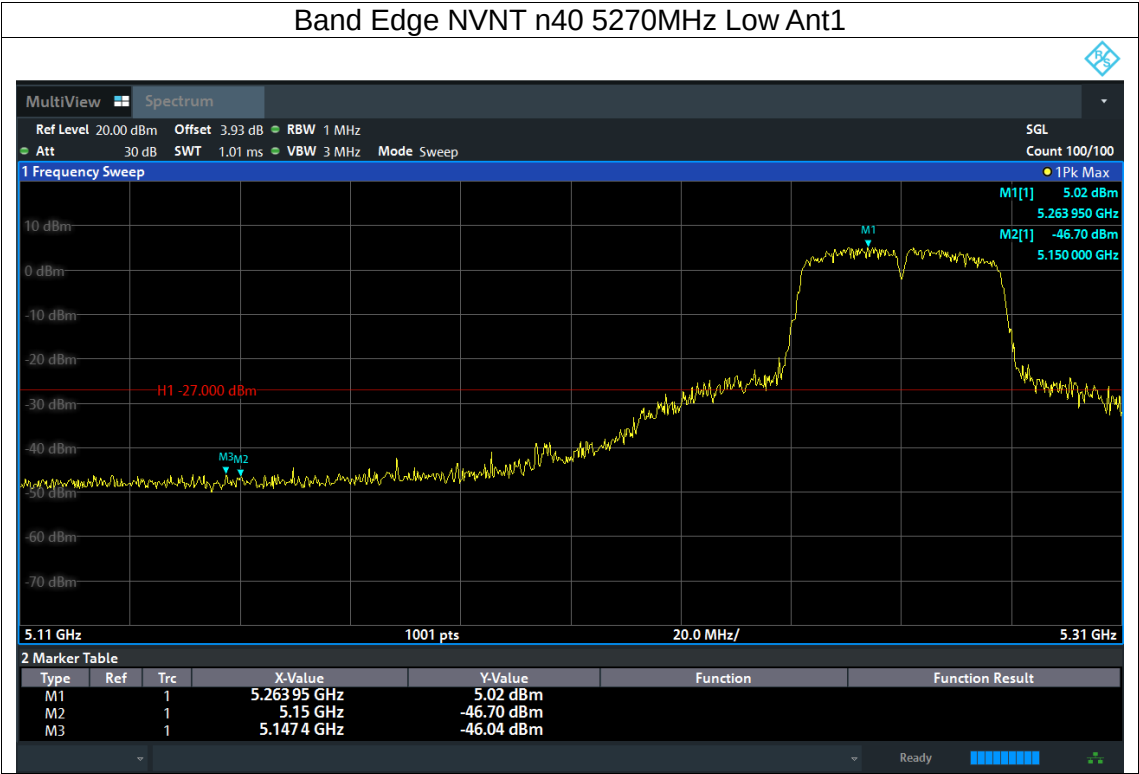


Band Edge NVNT n20 5320MHz High Ant1



Band Edge NVNT n20 5320MHz High Ant2





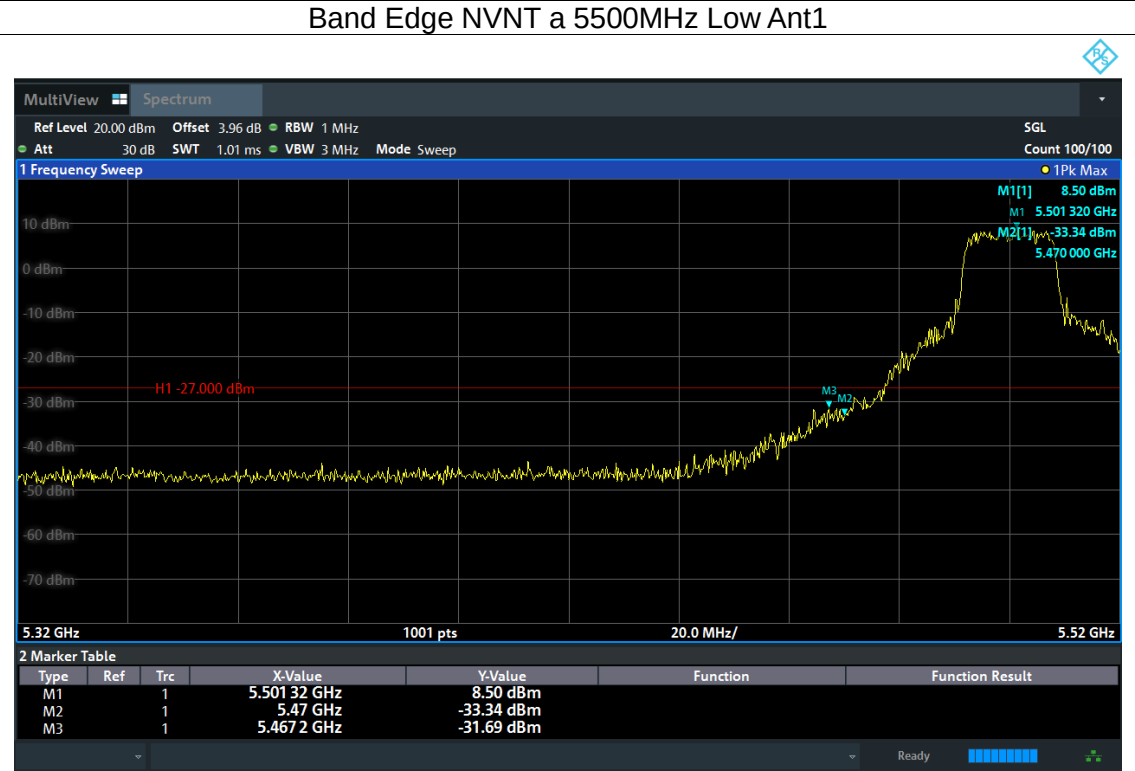
Band Edge NVNT n40 5310MHz High Ant1



Band Edge NVNT n40 5310MHz High Ant2



U-NII-2C

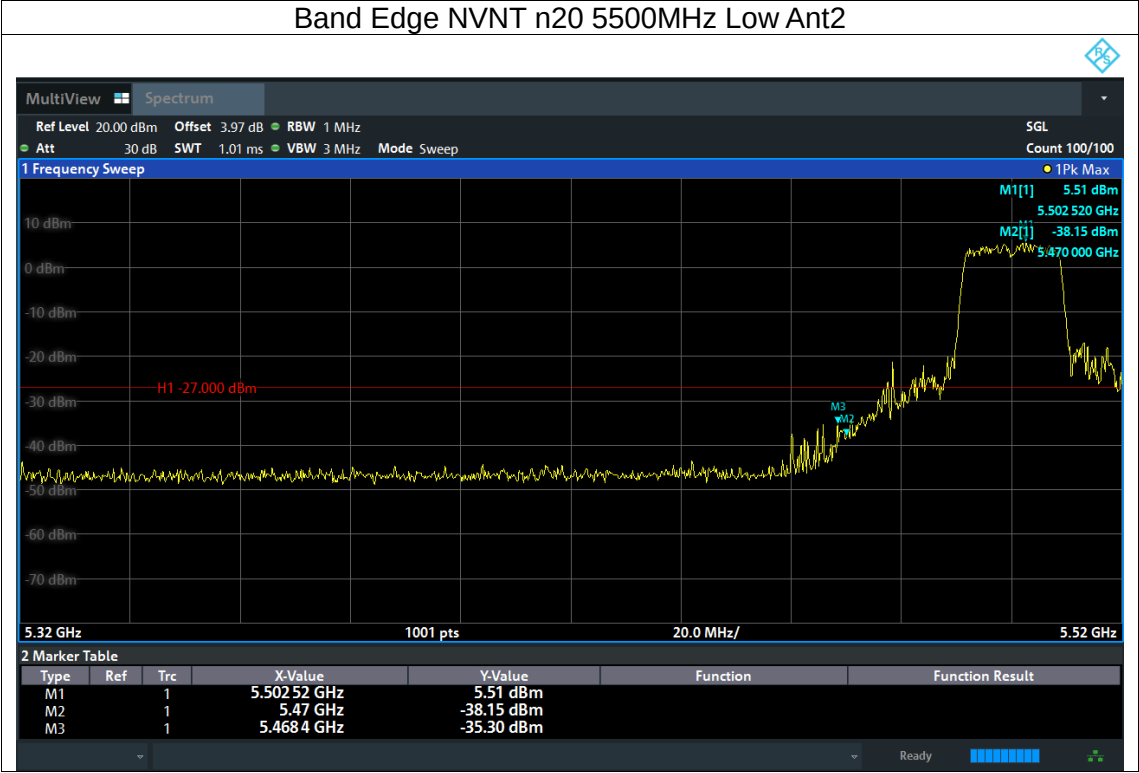
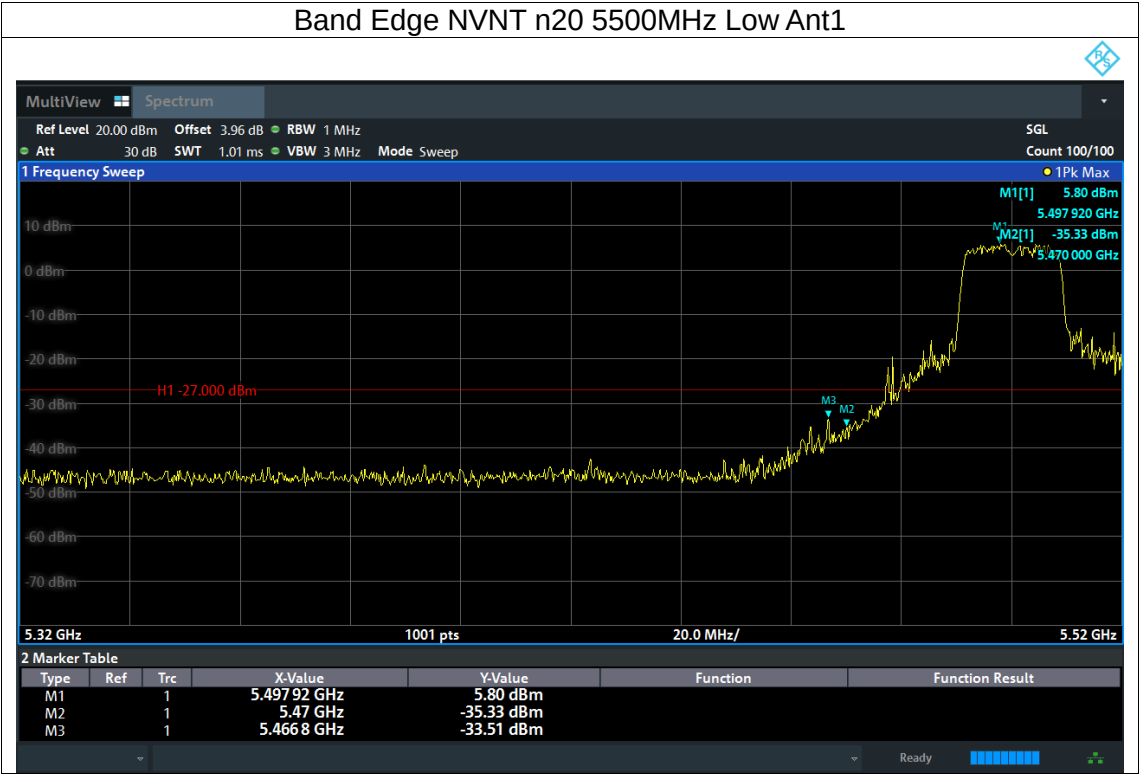


Band Edge NVNT a 5500MHz Low Ant2



Band Edge NVNT a 5700MHz High Ant2



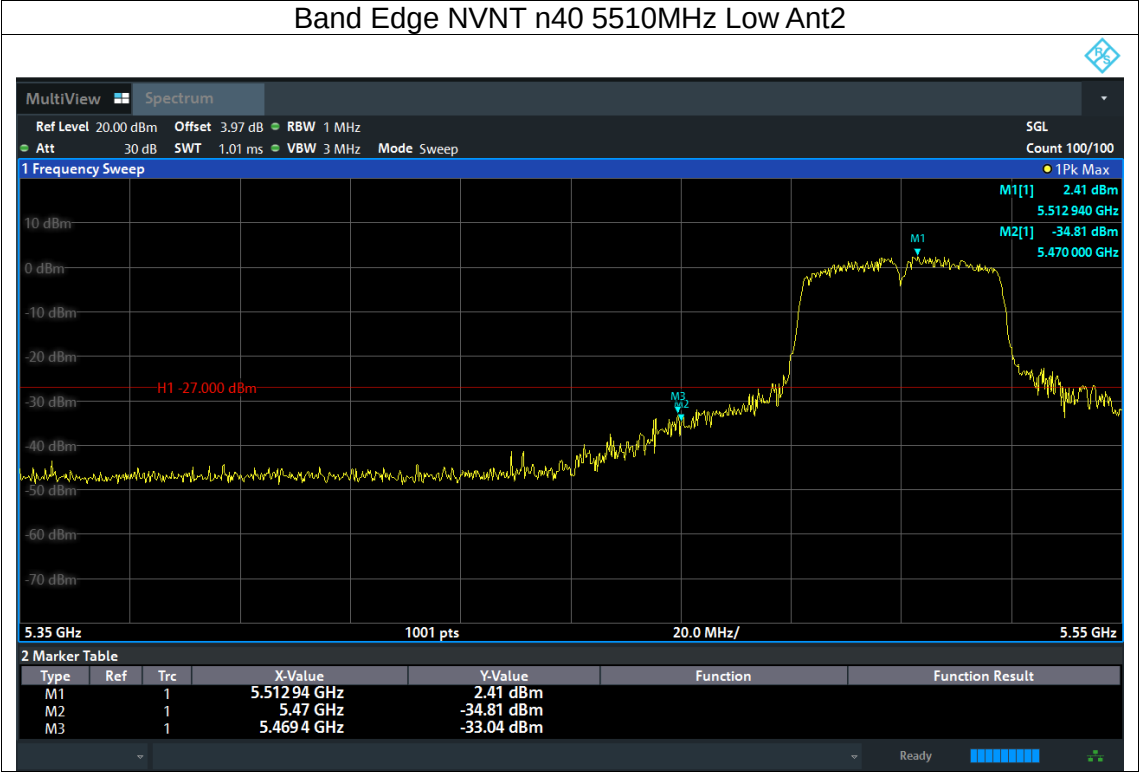
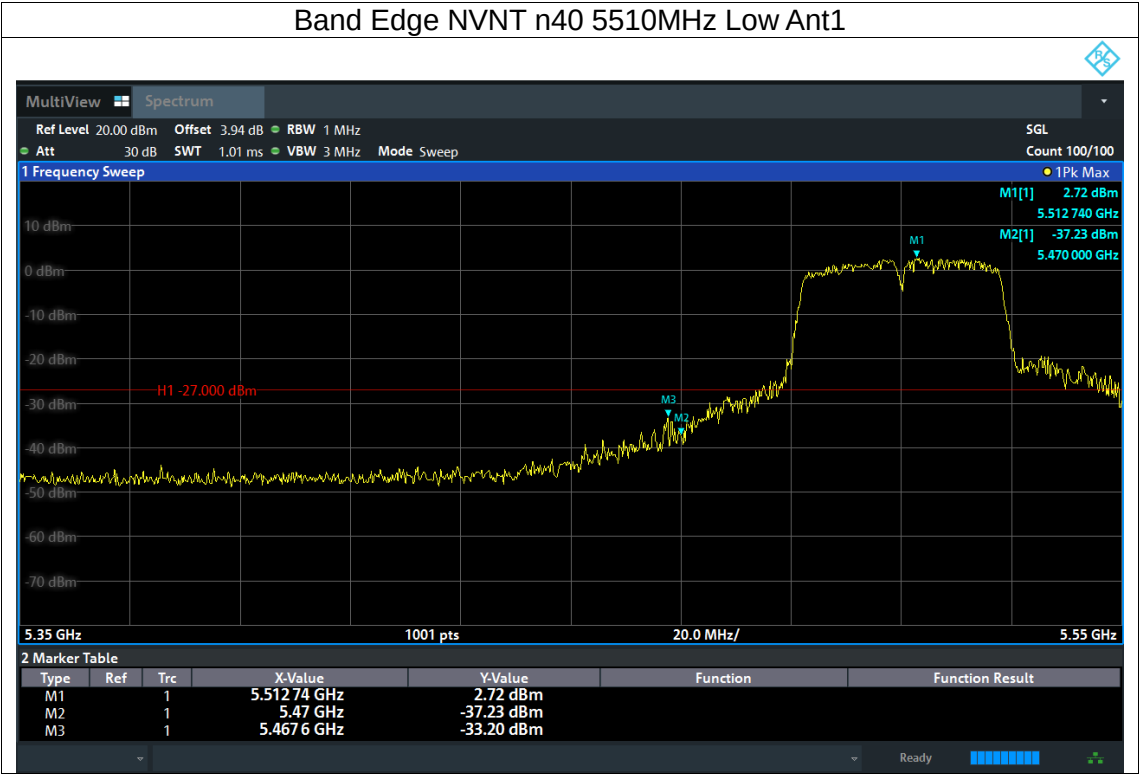


Band Edge NVNT n20 5700MHz High Ant1



Band Edge NVNT n20 5700MHz High Ant2





Band Edge NVNT n40 5670MHz High Ant1



Band Edge NVNT n40 5670MHz High Ant2



5.9 Spurious RF Conducted Emissions

5.9.1 Limit

According to FCC §15.407(b).

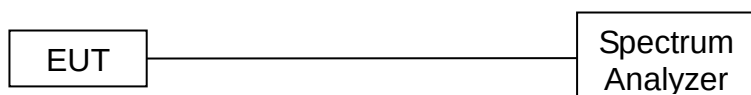
Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15–5.25 GHz band: All emissions outside of the 5.15–5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25–5.35 GHz band: All emissions outside of the 5.15–5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47–5.725 GHz band: All emissions outside of the 5.47–5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating solely in the 5.725–5.850 GHz band:
 - (i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

5.9.2 Test Procedure

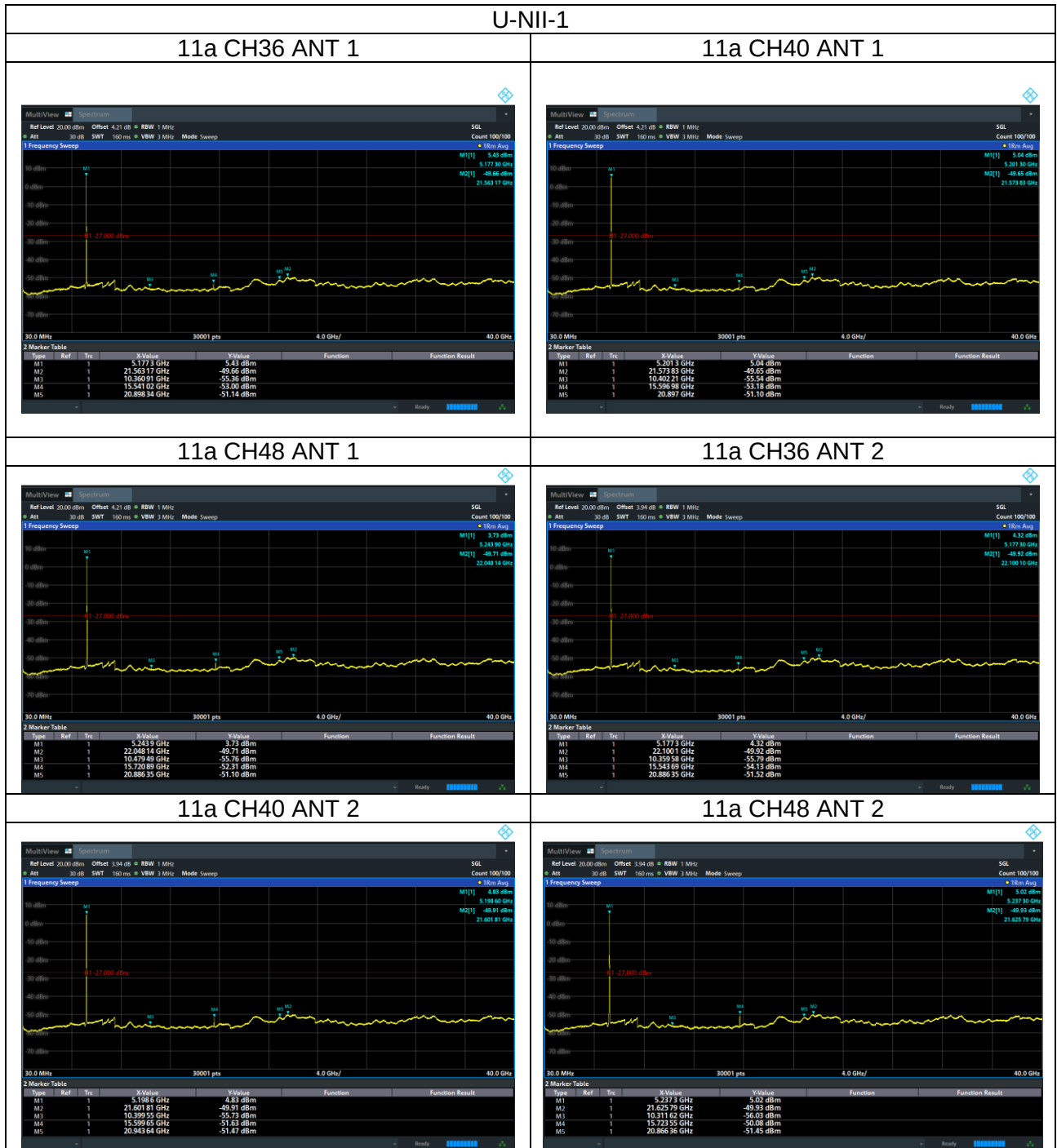
The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2020 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBW=300kHz to measure the peak field strength, and measure frequency range from 9kHz to 26.5GHz.

5.9.3 Test Setup



5.9.4 Test Results

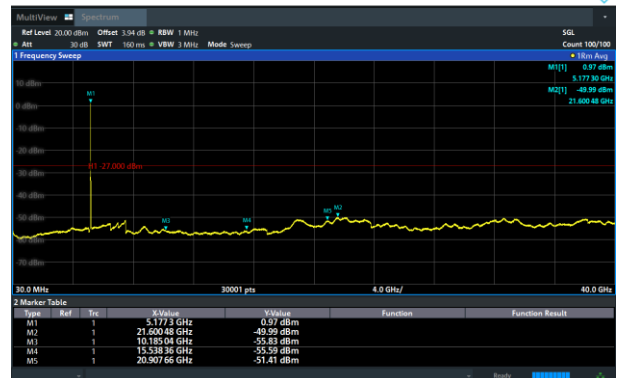
Note: The measurement frequency range is from 9kHz to the 10th harmonic of the fundamental frequency; The lowest, middle and highest channels are tested to verify the spurious emissions and band edge measurement data.



11n (HT20) CH36 ANT 1



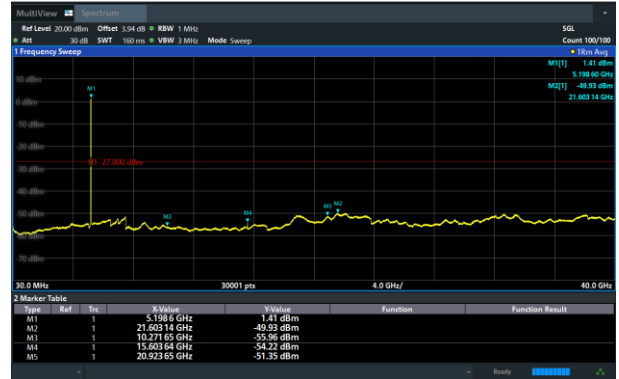
11n (HT20) CH40 ANT 1



11n (HT20) CH48 1 ANT 1



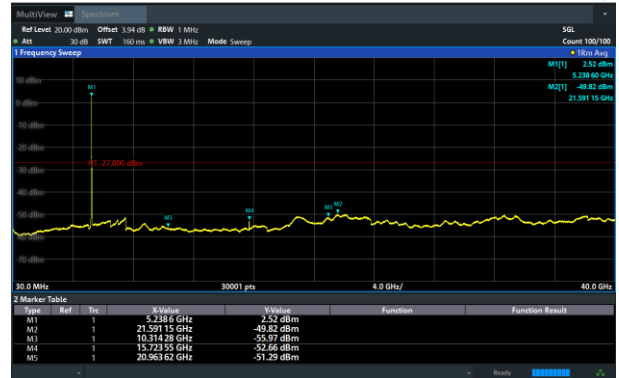
11n (HT20) CH36 ANT 2

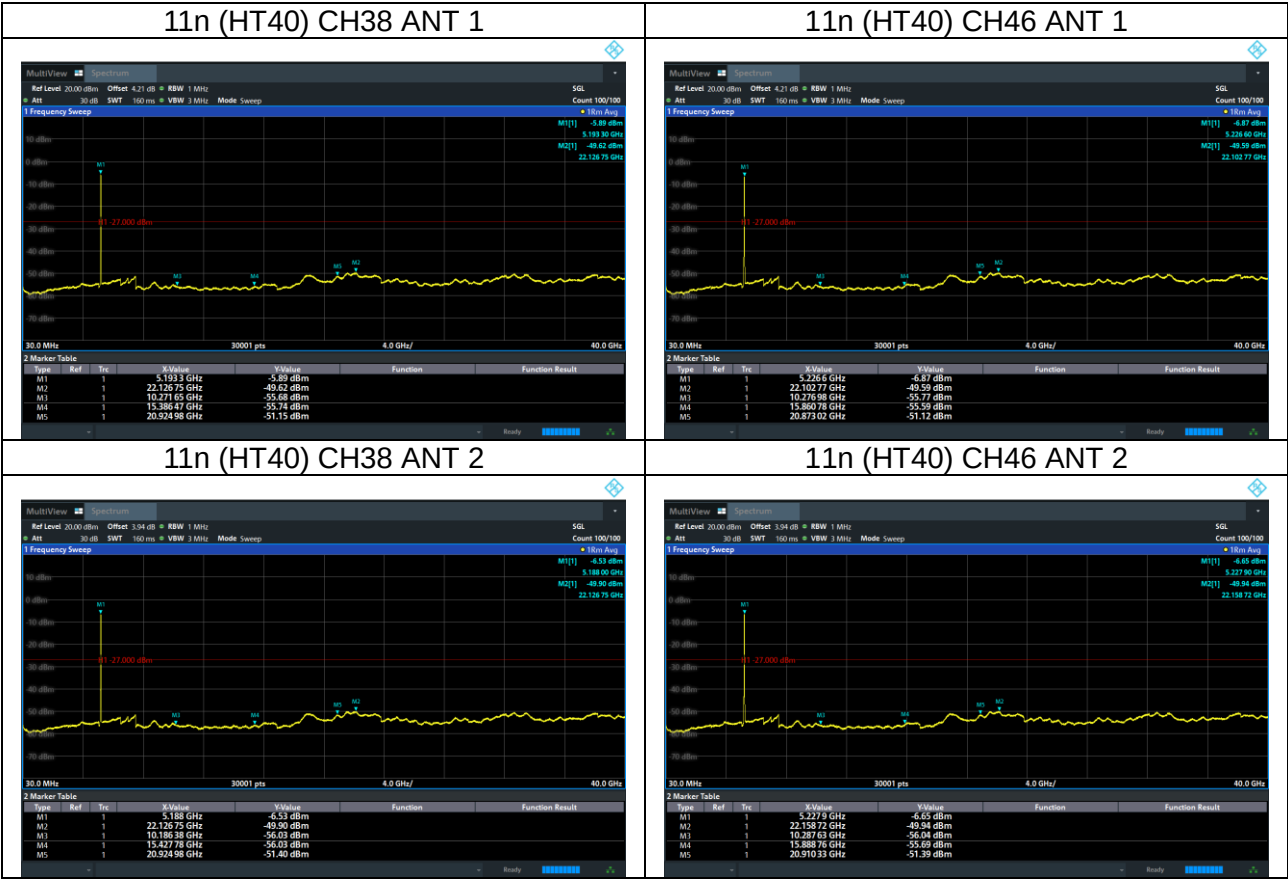


11n (HT20) CH40 ANT 2



11n (HT20) CH48 2



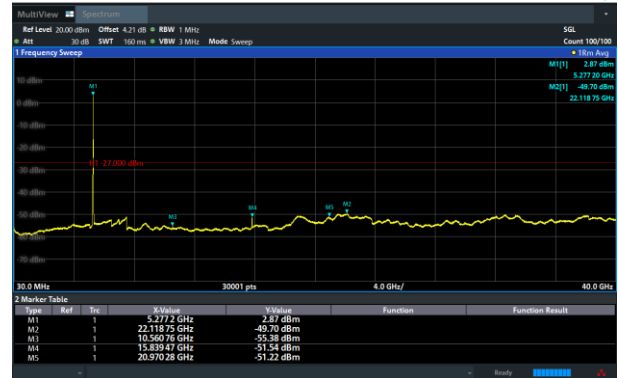


U-NII-2A

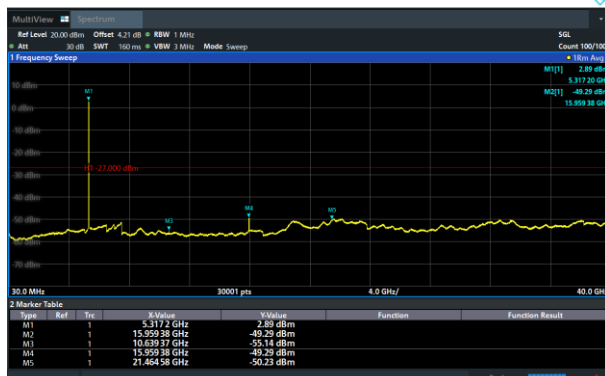
11a CH52 ANT 1



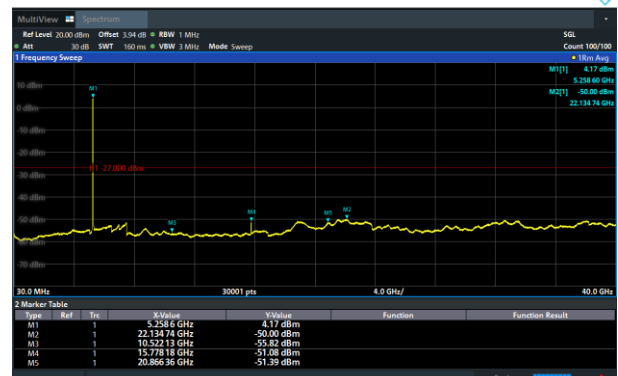
11a CH56 ANT 1



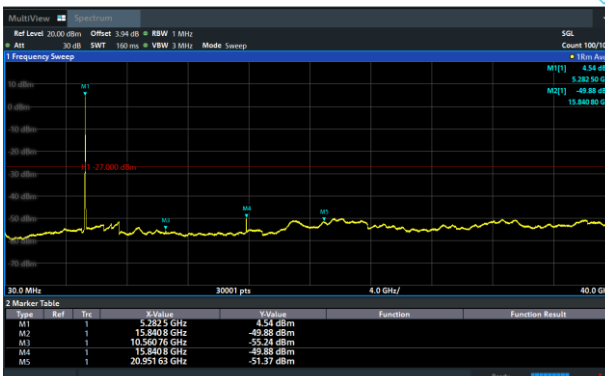
11a CH64 ANT 1



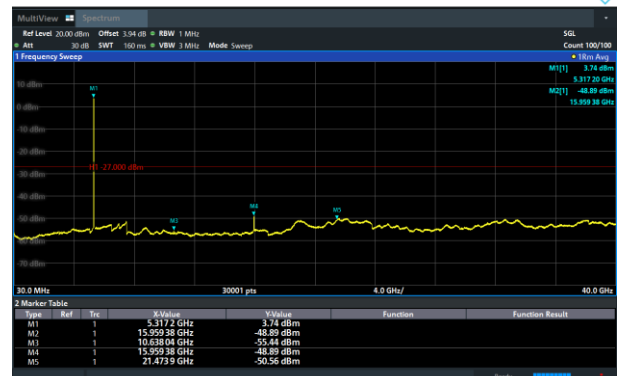
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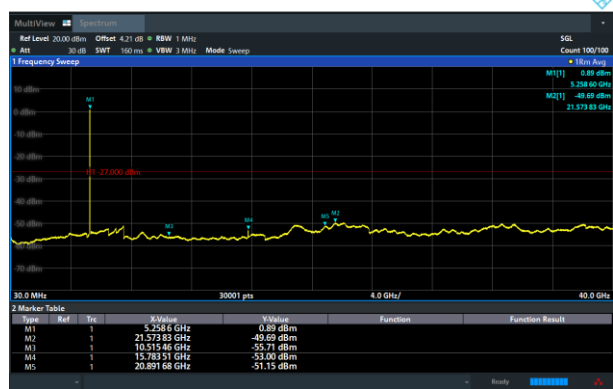
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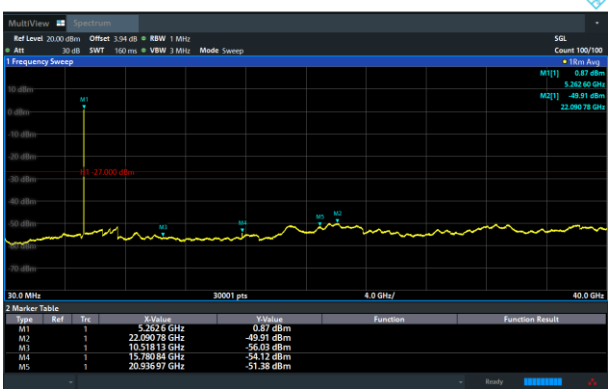
11a CH64 ANT 2



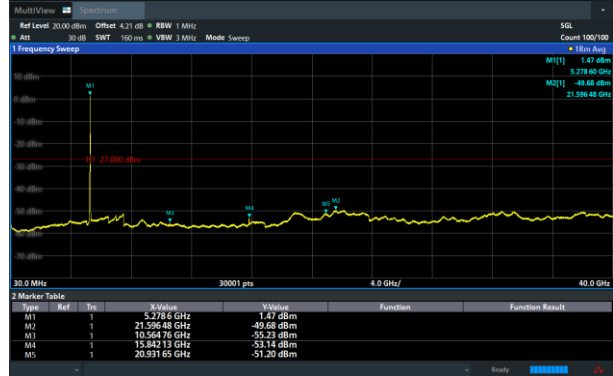
11n (HT20) CH52 ANT 1



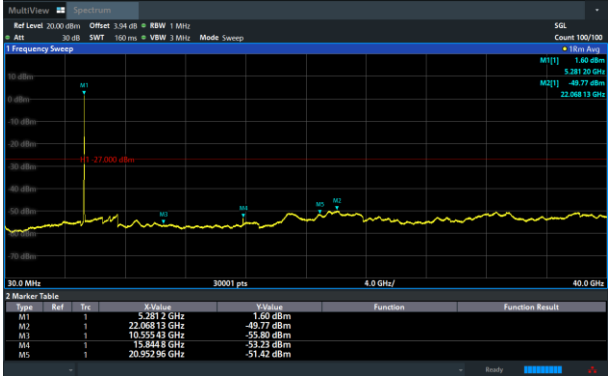
11n (HT20) CH56 ANT 1



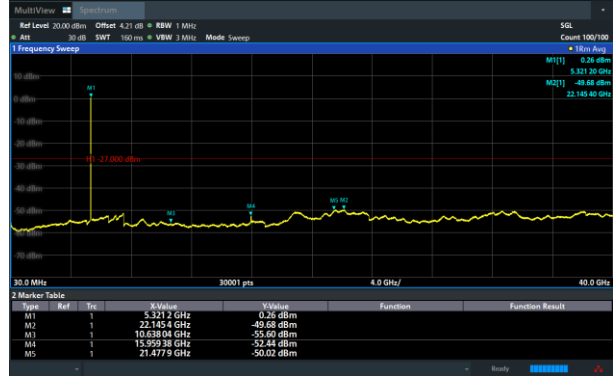
11n (HT20) CH64 ANT 1



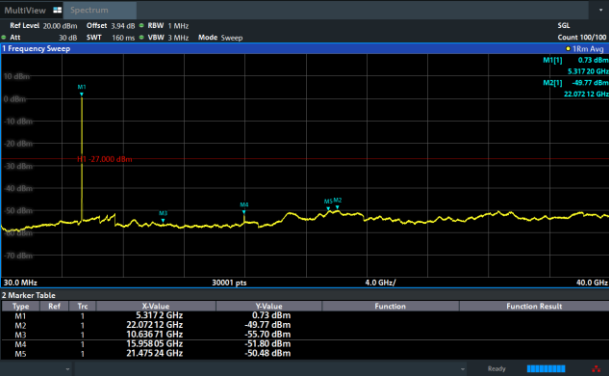
11n (HT20) CH52 ANT 2

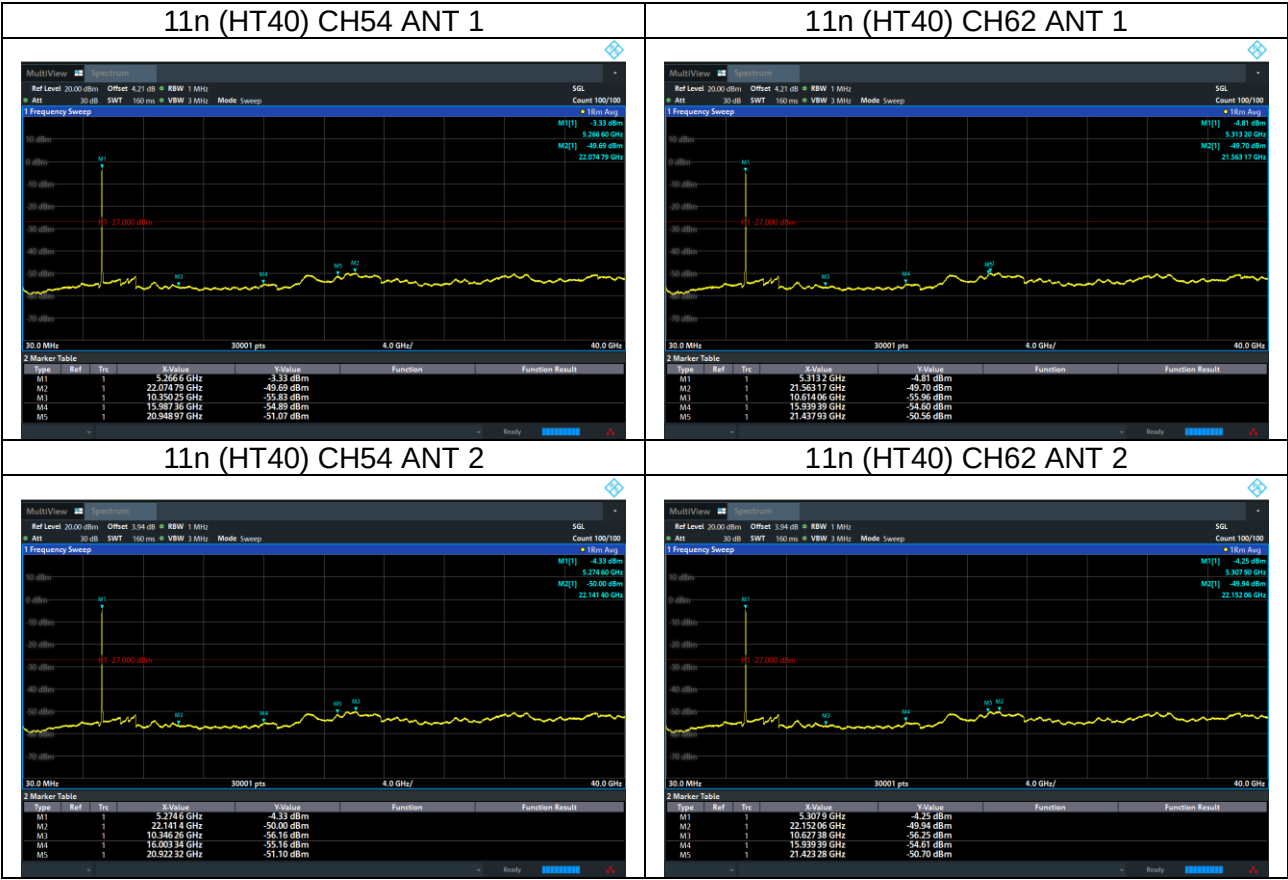


11n (HT20) CH56 ANT 2



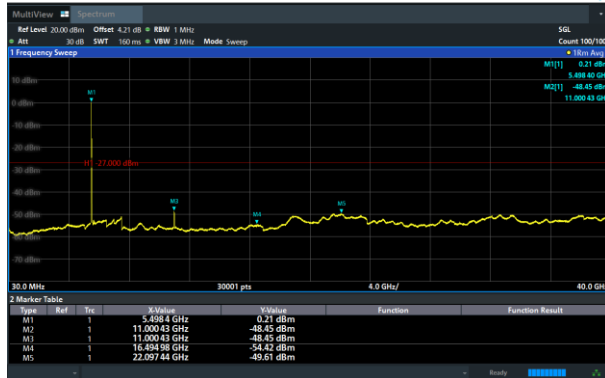
11n (HT20) CH64 ANT 2



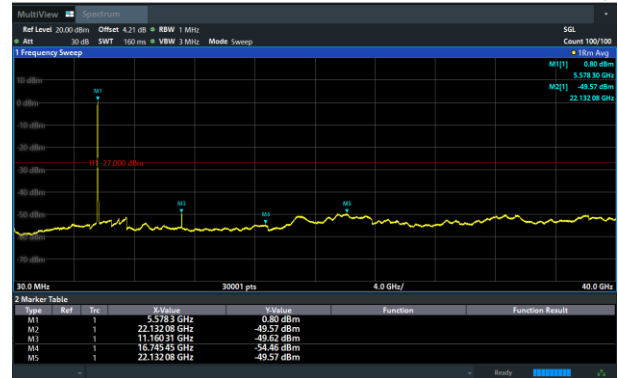


U-NII-2C

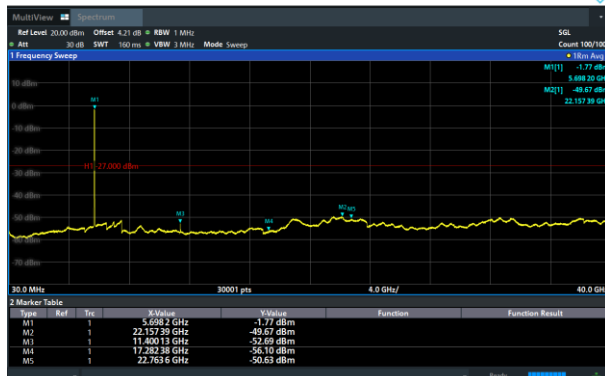
11a CH100 ANT 1



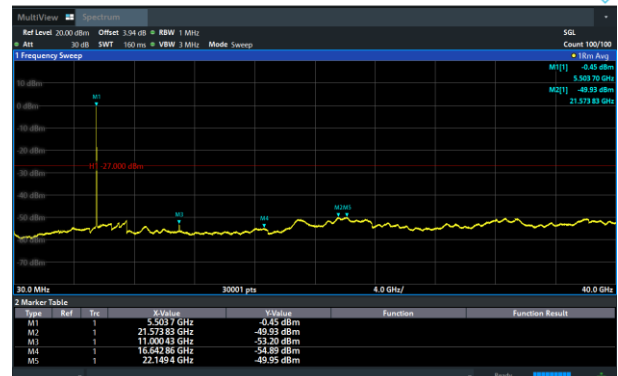
11a CH116 ANT 1



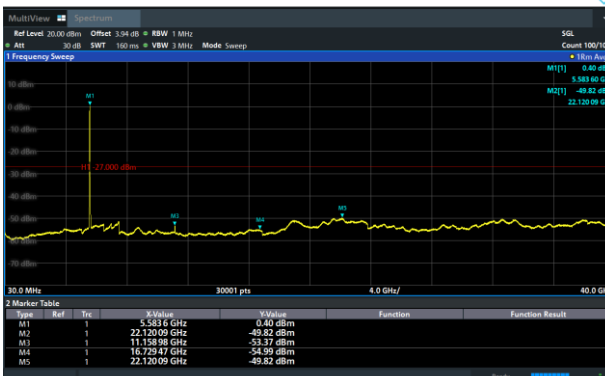
11a CH140 ANT 1



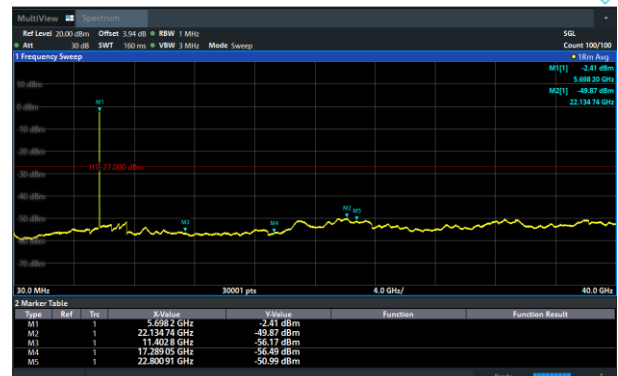
11a CH100 ANT 2

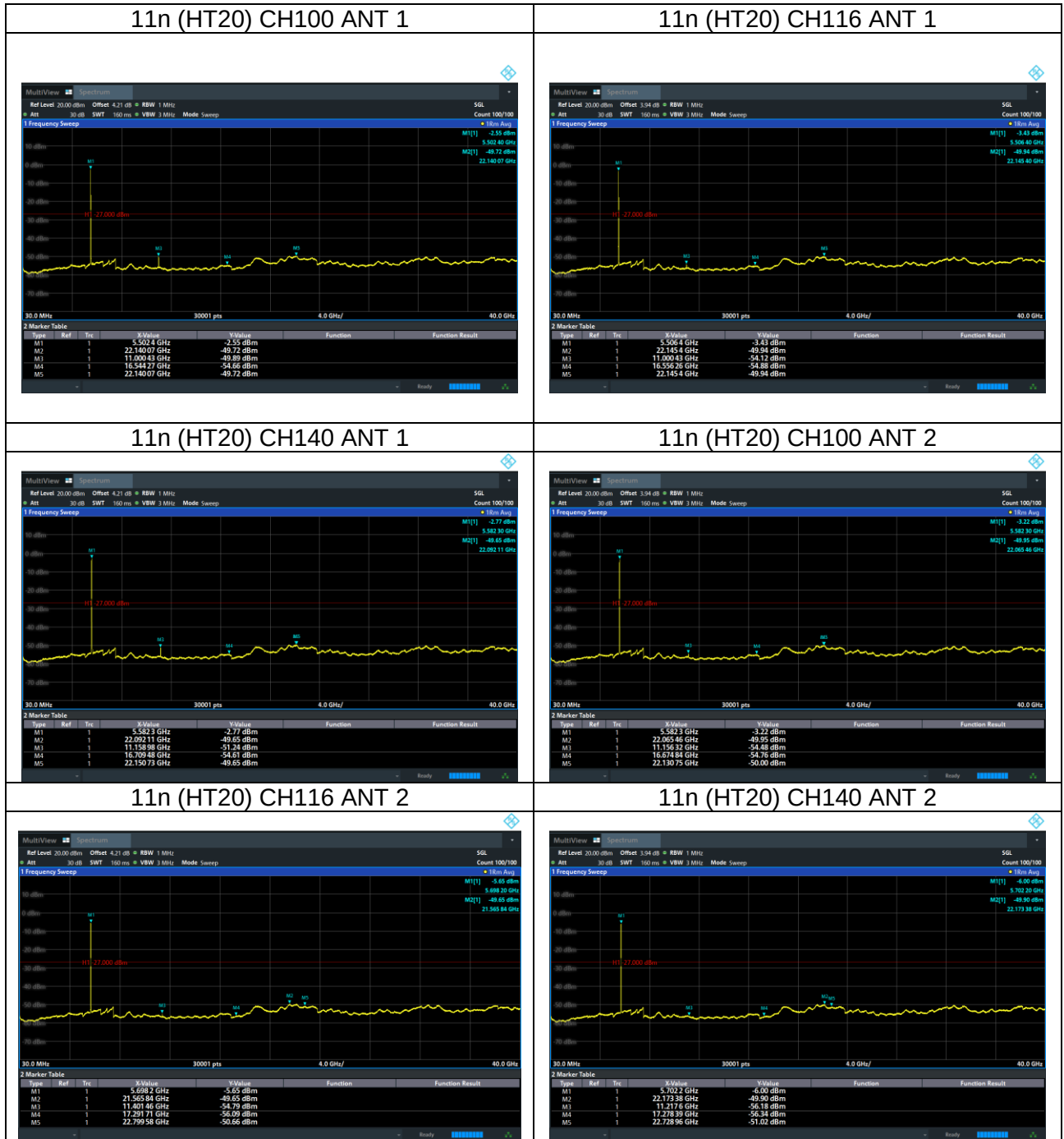


11a CH116 ANT 2



11a CH140 ANT 2







Note: The margin meets the modified requirement of $10\log N$.

5.10 Frequency Stability

5.10.1 Limit

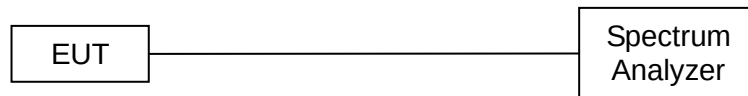
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

5.10.2 Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm and the limit is less than ± 20 ppm (IEEE 802.11n specification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is $-20^\circ\text{C} \sim 70^\circ\text{C}$.

5.10.3 Test Setup



5.10.4 Test Results