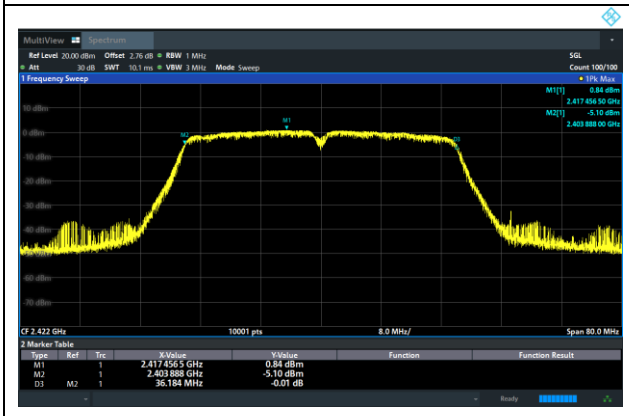
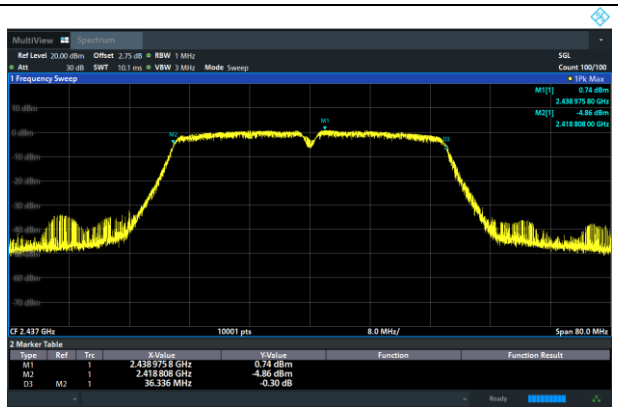
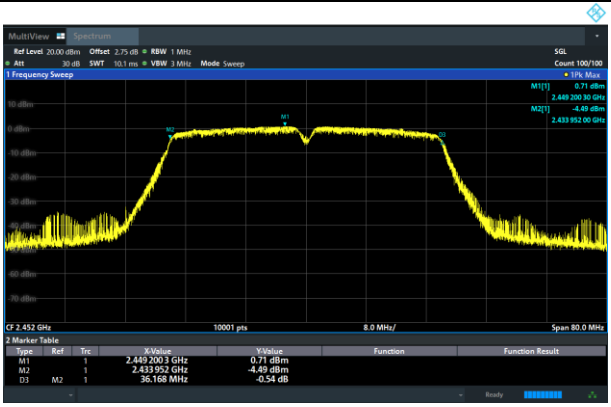
| EUT: | ST MAX | Model Name: | SKYTRAK MAX |
|---|---|---|---|
| Pressure: | 1012 hPa | Test Voltage: | DC 3.7V from battery |
| Test Mode: | ANT 2 TX n40 Mode /CH03, CH06, CH09 | | |

| Channel | Frequency (MHz) | 6dB bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| CH03 | 2422 | 36.184 | 500 | Pass |
| CH06 | 2437 | 36.336 | 500 | Pass |
| CH09 | 2452 | 36.168 | 500 | Pass |

Test plots

| TX CH 03 | TX CH 06 |
|---|---|
|  |  |
| TX CH 09 | / |
|  | / |

## 5.7 Duty Cycle

### 5.7.1 Limit

No limit requirement.

### 5.7.2 Test Procedure

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

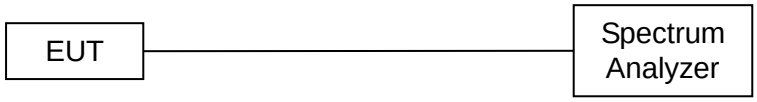
The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, 6.0(b) in KDB 558074 D01 DTS Meas Guidance v05r02.

The largest availble value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if T ≤ 6.25 microseconds. (50/6.25 = 8)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are > 50/T.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
The path loss was compensated to the results for each measurement.
Set to the maximum power setting and enable the EUT transmit continuously.
The EUT was operating in controlled its channel.
Use the following spectrum analyzer settings:
Span = Zero Span
RBW = 10MHz (the largest available value)
VBW = 10MHz (≥ RBW)
Number of points in Sweep >100
Detector function = peak
Trace = Clear write
Measure Total and Ton
Calculate Duty Cycle = Ton / Total

### 5.7.3 Test Setup



### 5.7.4 Test Results

| EUT: | ST MAX | Model Name: | SKYTRAK MAX |
|---|---|---|---|
| Pressure: | 1012 hPa | Test Voltage: | DC 3.7V from battery |
| Test Mode: | TX b/g/n(20/40) Mode / CH06 | | |

ANT 1:

| Mode | Data rate | Frequency (MHz) | $T_{on}$ (ms) | $T_{total}$ (ms) | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|---|---|---|---|---|---|---|---|
| b | 11 Mbps | 2412 | 12.422 | 12.816 | 96.93 | 0.14 | 0.08 |
| b | 11 Mbps | 2437 | 12.422 | 12.834 | 96.79 | 0.14 | 0.08 |
| b | 11 Mbps | 2462 | 12.422 | 12.852 | 96.65 | 0.15 | 0.08 |
| g | 54 Mbps | 2412 | 2.066 | 2.188 | 94.42 | 0.25 | 0.48 |
| g | 54 Mbps | 2437 | 2.064 | 2.214 | 93.22 | 0.3 | 0.48 |
| g | 54 Mbps | 2462 | 2.064 | 2.276 | 90.69 | 0.42 | 0.48 |

Note:
1. Duty Cycle = $T_{on}$ / $T_{total}$
2. Correction Factor = 10 log (1 / Duty Cycle)
3. 1 / T = 1 / $T_{on}$

ANT 2:

| Mode | Data rate | Frequency (MHz) | $T_{on}$ (ms) | $T_{total}$ (ms) | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|---|---|---|---|---|---|---|---|
| b | 11 Mbps | 2412 | 12.422 | 12.806 | 97 | 0.13 | 0.08 |
| b | 11 Mbps | 2437 | 12.422 | 12.770 | 97.27 | 0.12 | 0.08 |
| b | 11 Mbps | 2462 | 12.422 | 12.836 | 96.77 | 0.14 | 0.08 |
| g | 54 Mbps | 2412 | 2.066 | 2.180 | 94.77 | 0.23 | 0.48 |
| g | 54 Mbps | 2437 | 2.064 | 2.268 | 91.01 | 0.41 | 0.48 |
| g | 54 Mbps | 2462 | 2.064 | 2.206 | 93.56 | 0.29 | 0.48 |

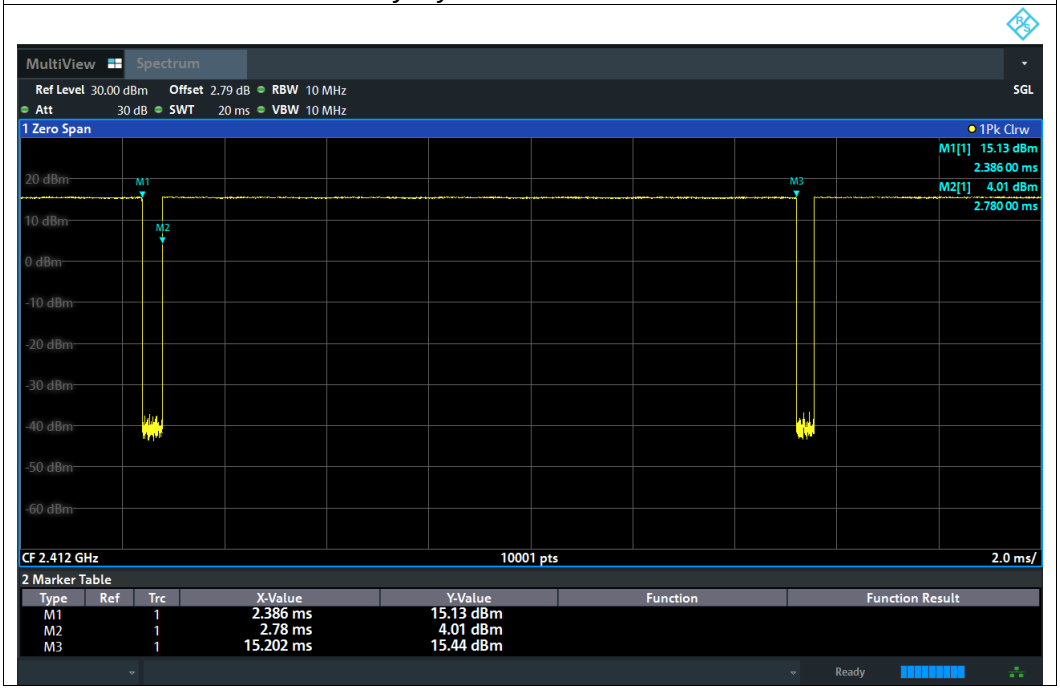
Note:
1. Duty Cycle = $T_{on}$ / $T_{total}$
2. Correction Factor = 10 log (1 / Duty Cycle)
3. 1 / T = 1 / $T_{on}$

ANT 1+ANT 2:

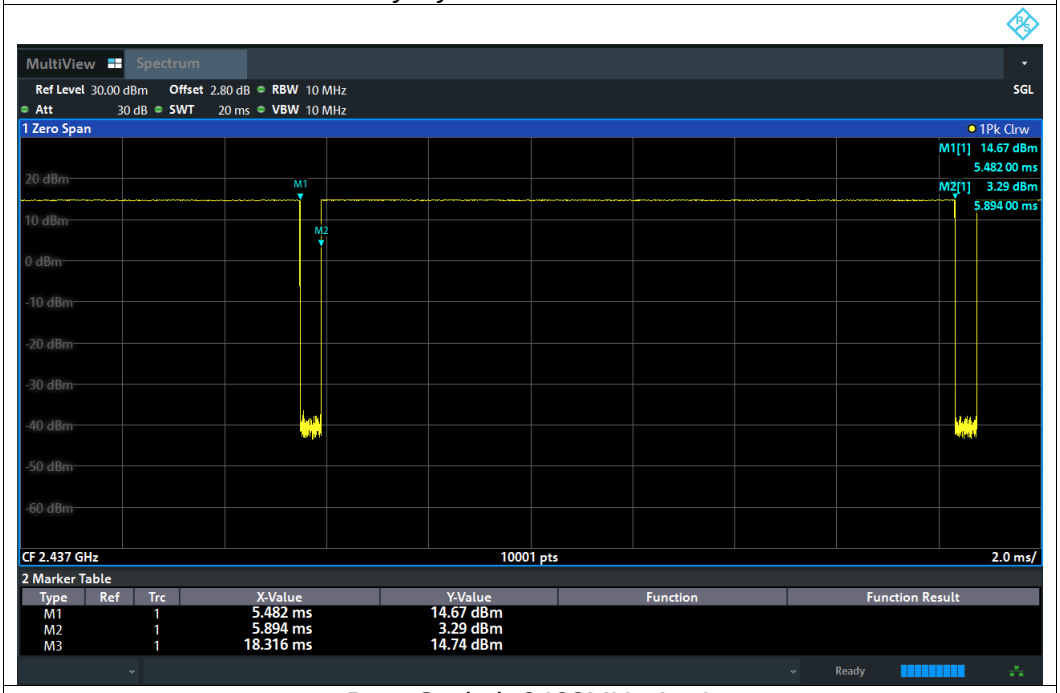
| Mode | Data rate | Frequency (MHz) | $T_{on}$ (ms) | $T_{total}$ (ms) | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|---|---|---|---|---|---|---|---|
| n20 | MCS15 | 2412 | 1.920 | 2.116 | 90.74 | 0.42 | 0.52 |
| n20 | MCS15 | 2437 | 1.920 | 2.052 | 93.57 | 0.29 | 0.52 |
| n20 | MCS15 | 2462 | 1.920 | 2.098 | 91.52 | 0.38 | 0.52 |
| n40 | MCS15 | 2422 | 0.944 | 1.158 | 81.52 | 0.89 | 1.06 |
| n40 | MCS15 | 2437 | 0.944 | 1.112 | 84.89 | 0.71 | 1.06 |
| n40 | MCS15 | 2452 | 0.944 | 1.148 | 82.23 | 0.85 | 1.06 |

Note:
1. Duty Cycle = $T_{on}$ / $T_{total}$
2. Correction Factor = 10 log (1 / Duty Cycle)
3. 1 / T = 1 / $T_{on}$

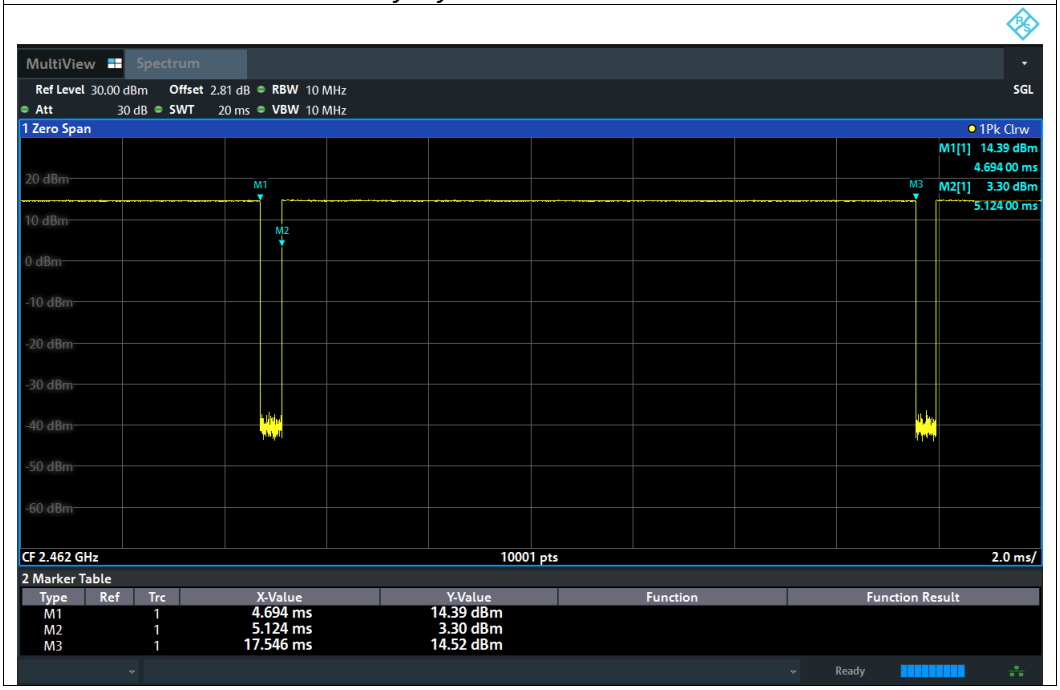
Duty Cycle b 2412MHz Ant1



Duty Cycle b 2437MHz Ant1

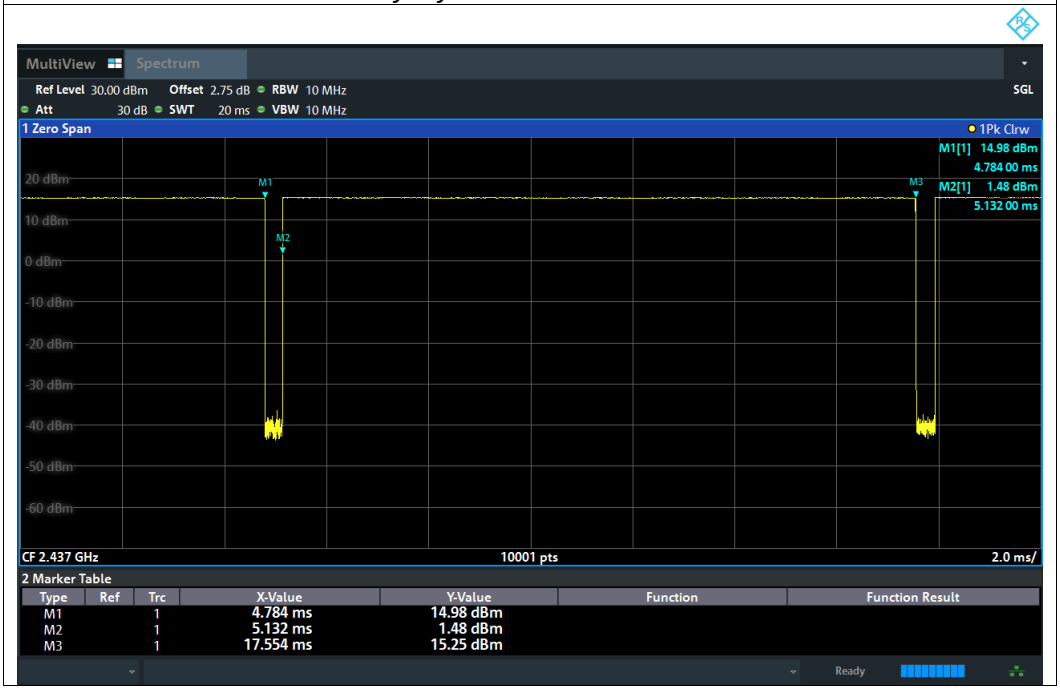



Duty Cycle b 2462MHz Ant1

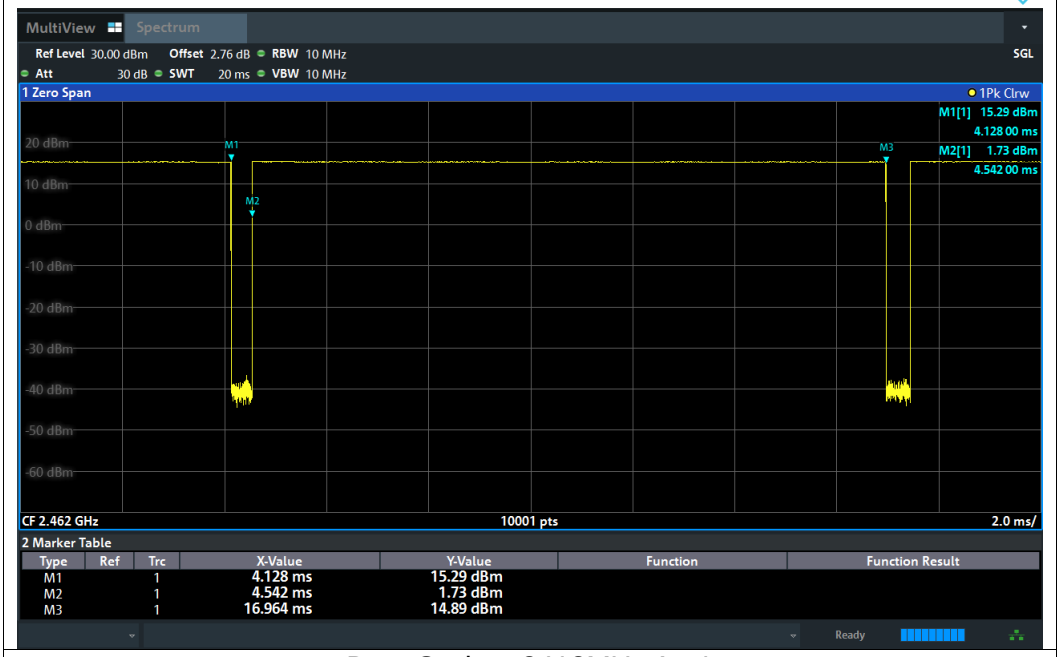


Duty Cycle b 2412MHz Ant2

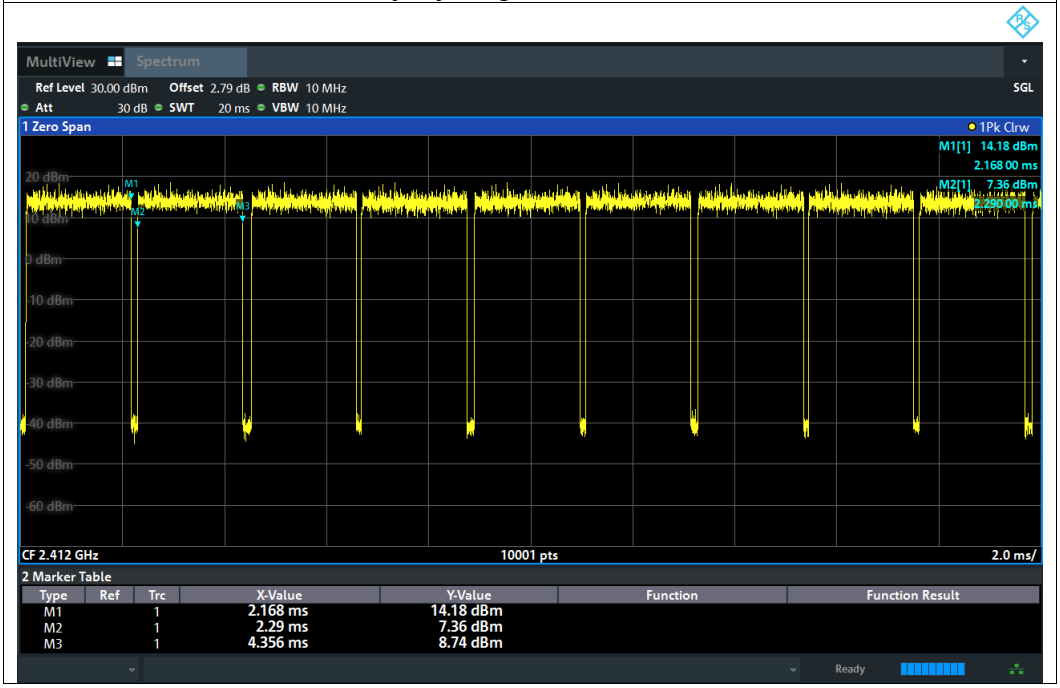

Duty Cycle b 2437MHz Ant2



Duty Cycle b 2462MHz Ant2

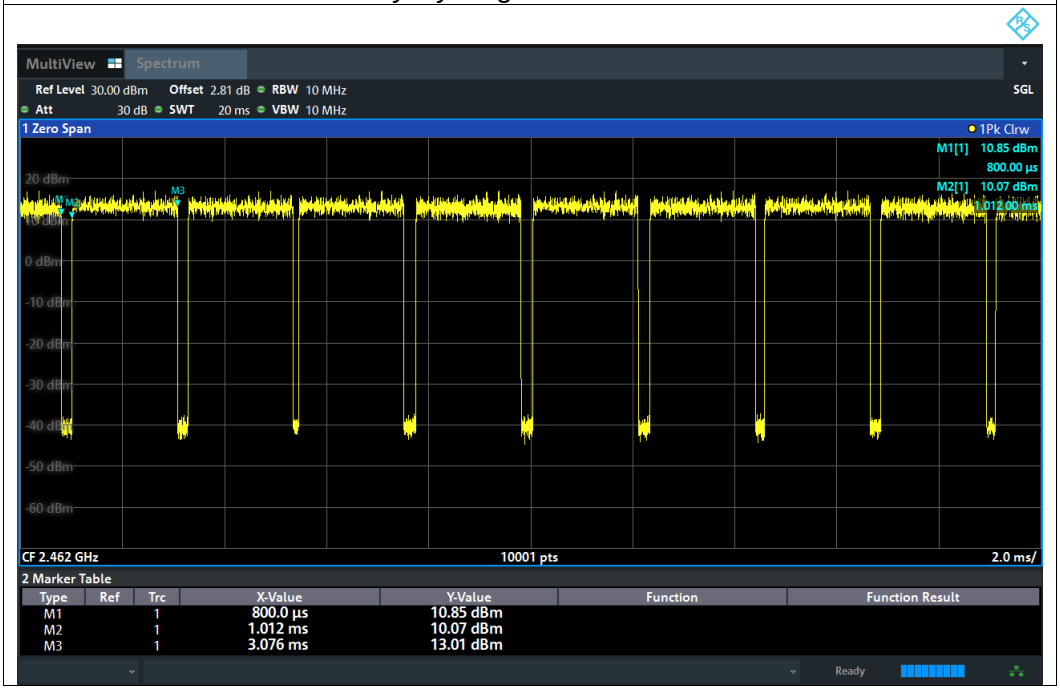



Duty Cycle g 2412MHz Ant1

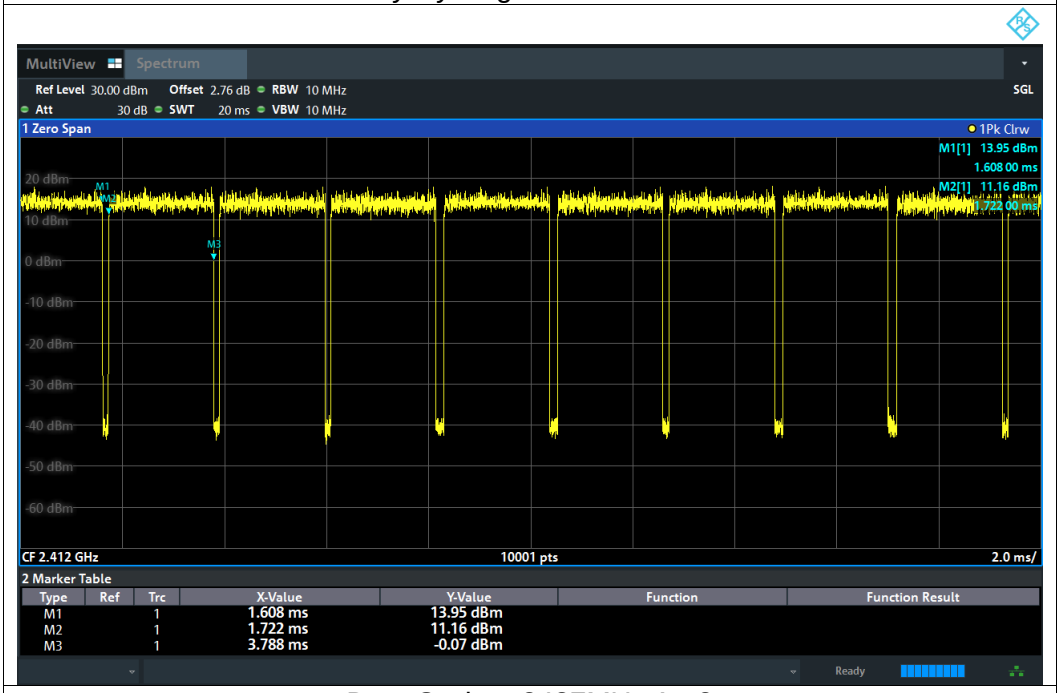


Duty Cycle g 2437MHz Ant1

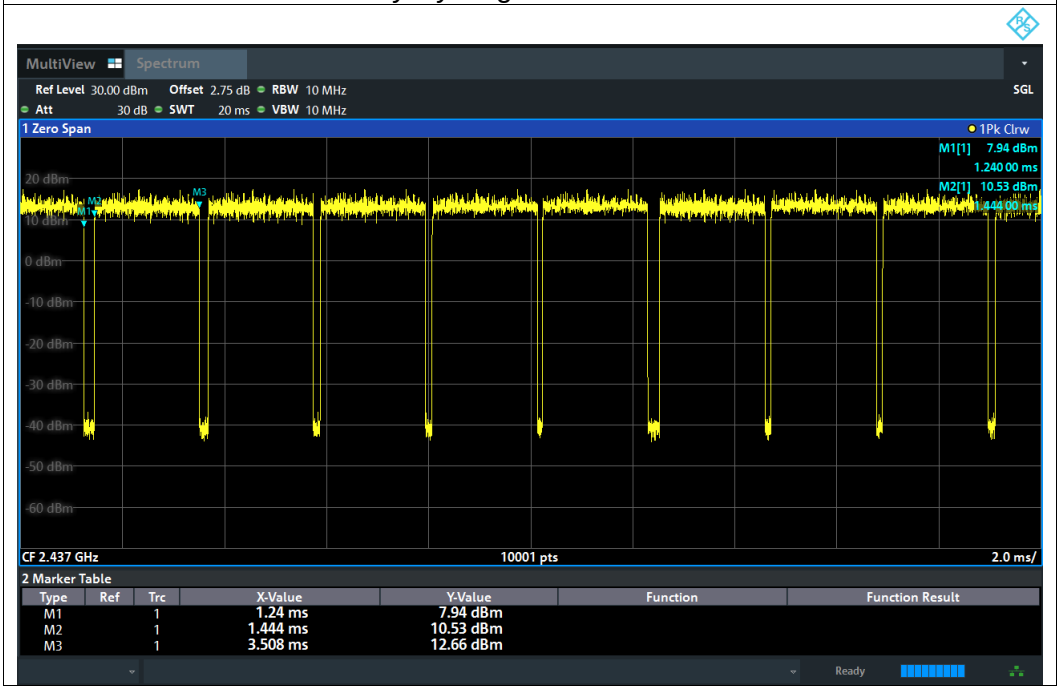

Duty Cycle g 2462MHz Ant1



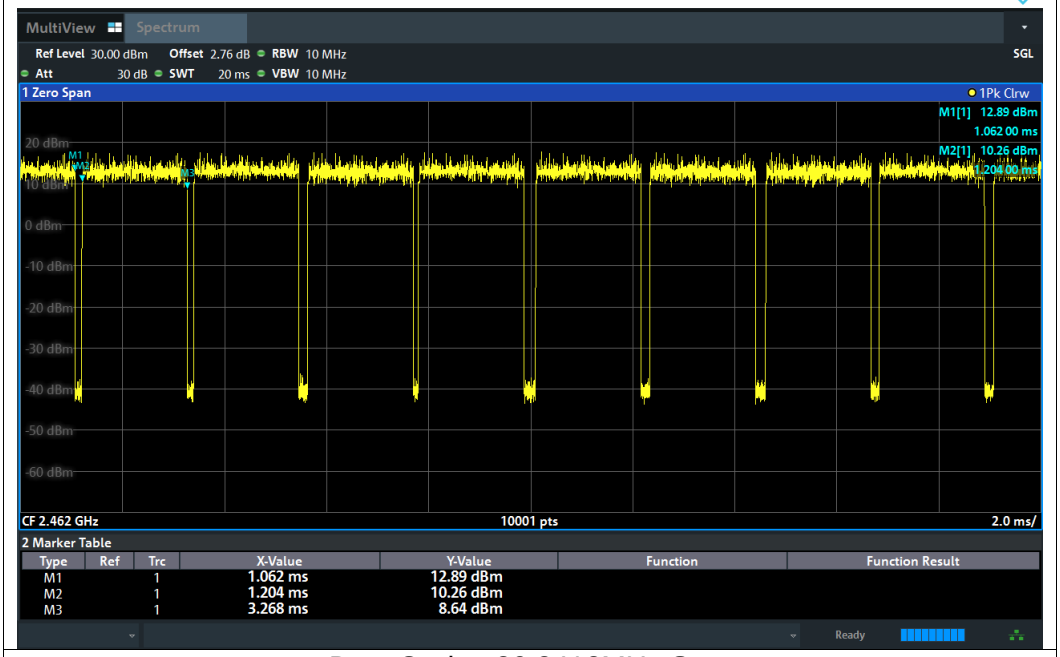
Duty Cycle g 2412MHz Ant2



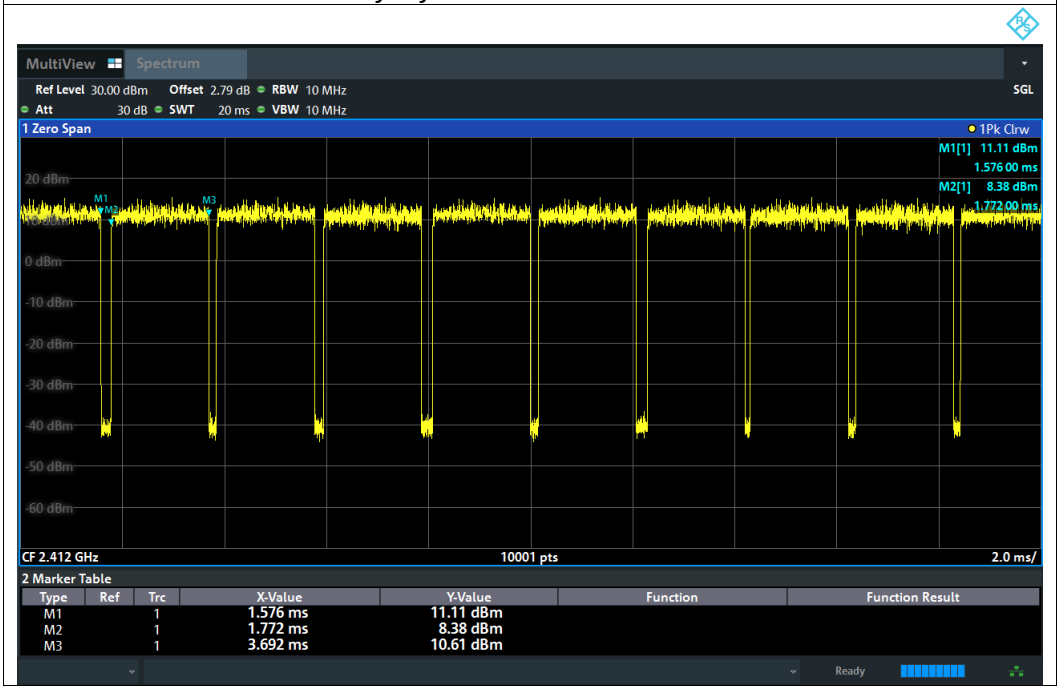

Duty Cycle g 2437MHz Ant2



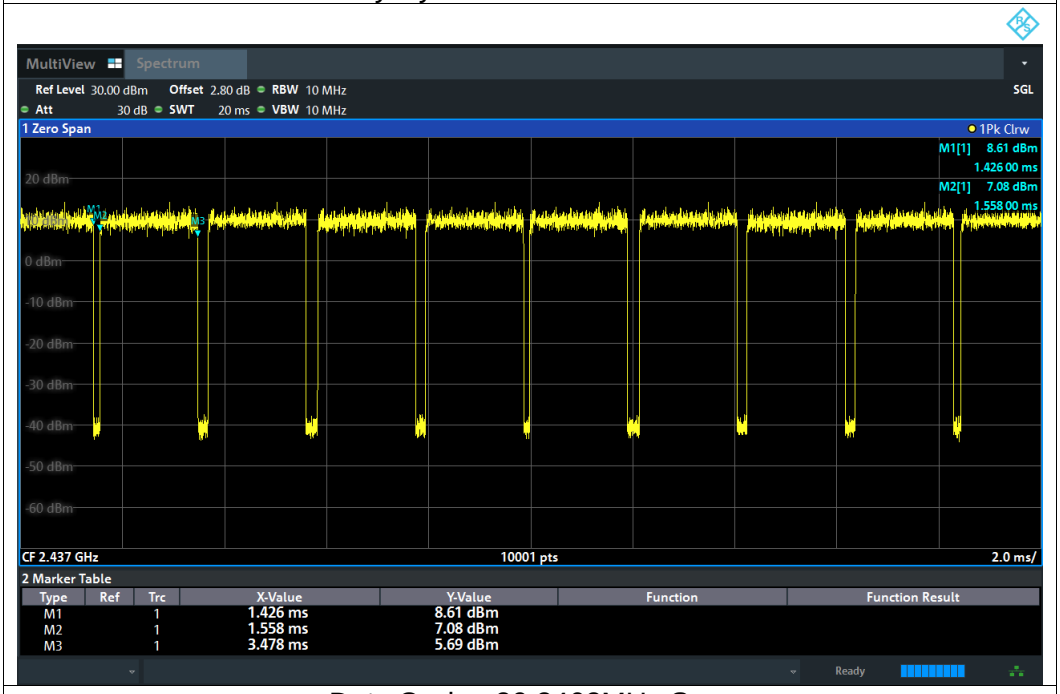
Duty Cycle g 2462MHz Ant2



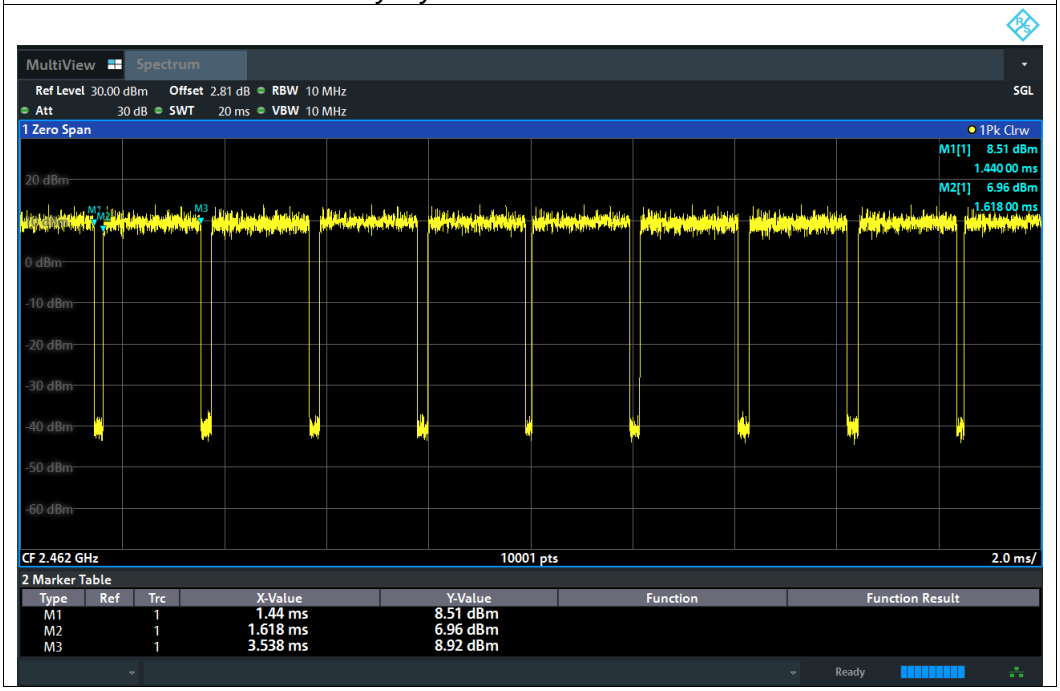

Duty Cycle n20 2412MHz Sum



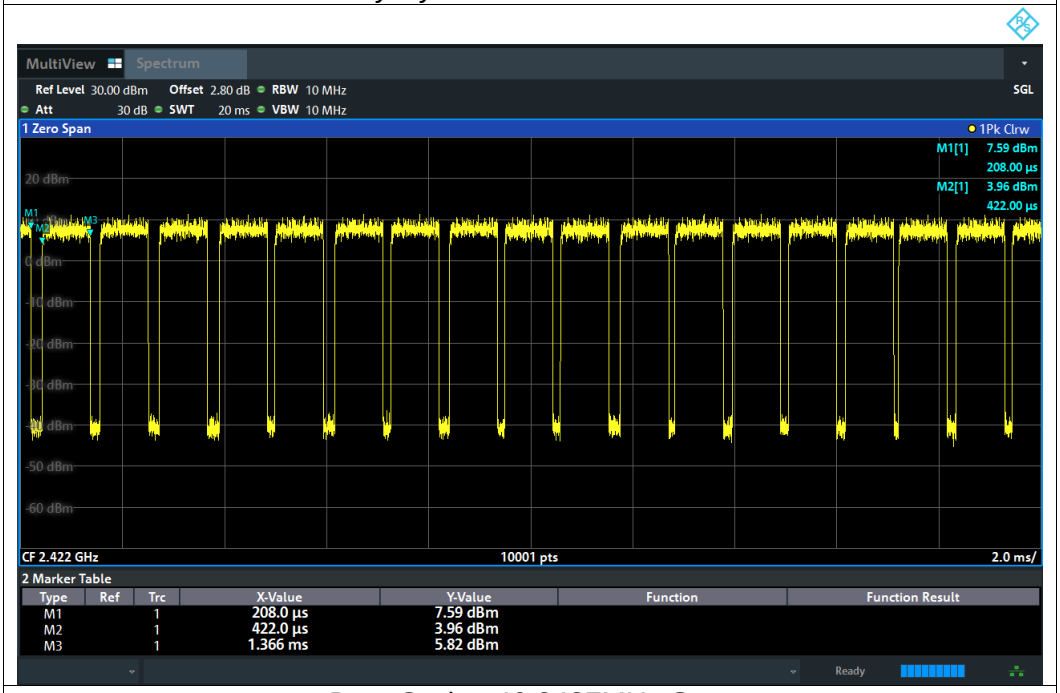
Duty Cycle n20 2437MHz Sum



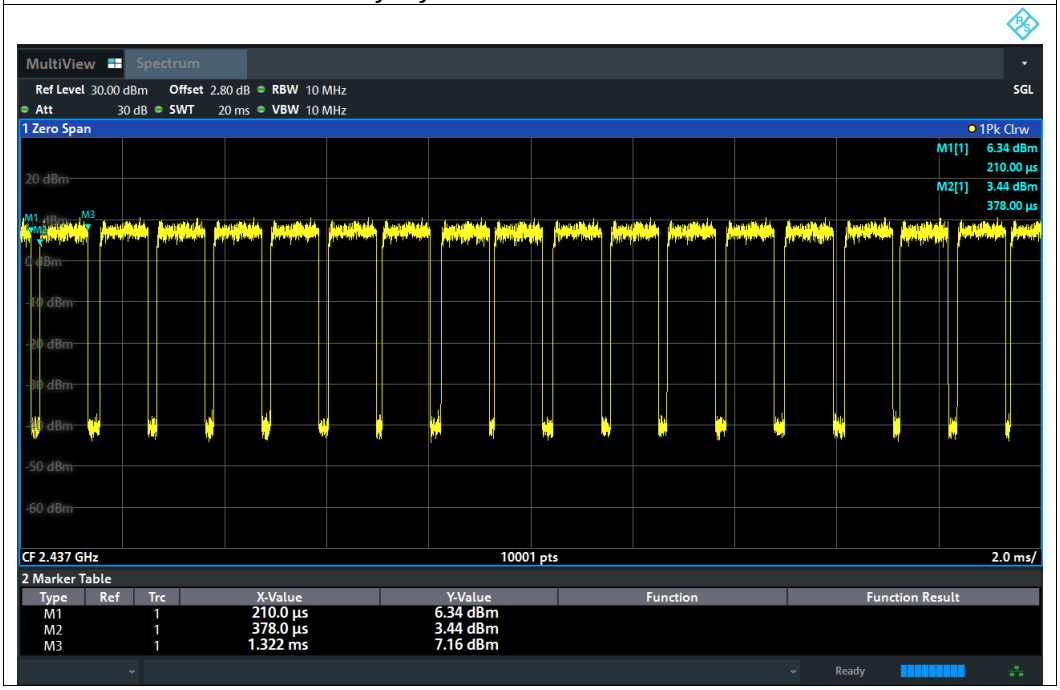

Duty Cycle n20 2462MHz Sum



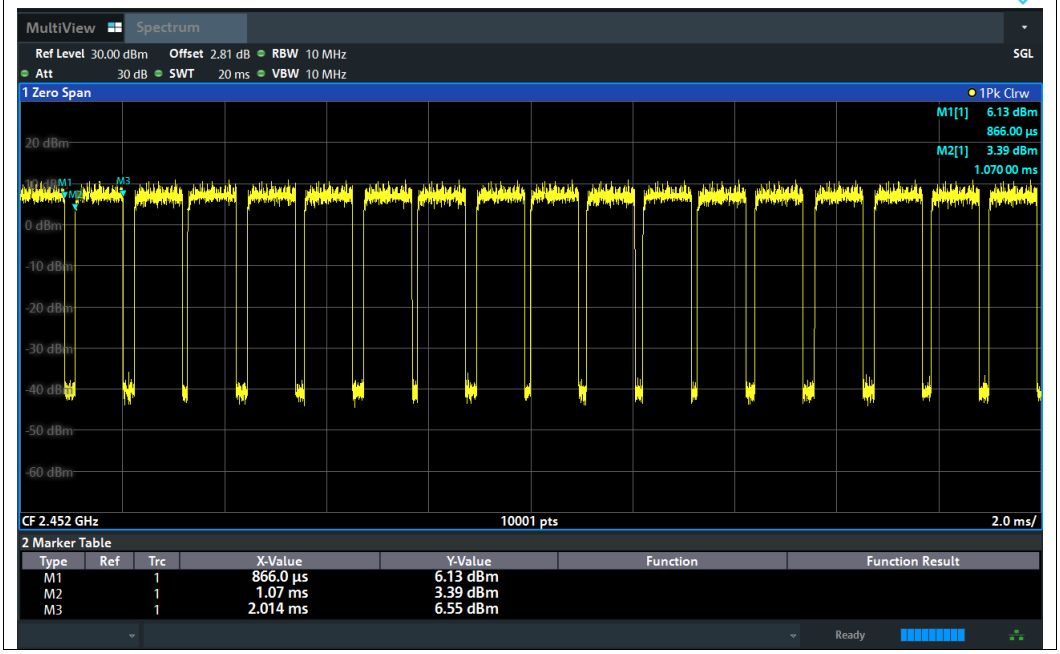
Duty Cycle n40 2422MHz Sum




Duty Cycle n40 2437MHz Sum



Duty Cycle n40 2452MHz Sum



## 5.8 Conducted Band Edge

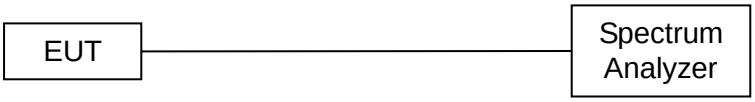
### 5.8.1 Limit

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)).

### 5.8.2 Test Procedure

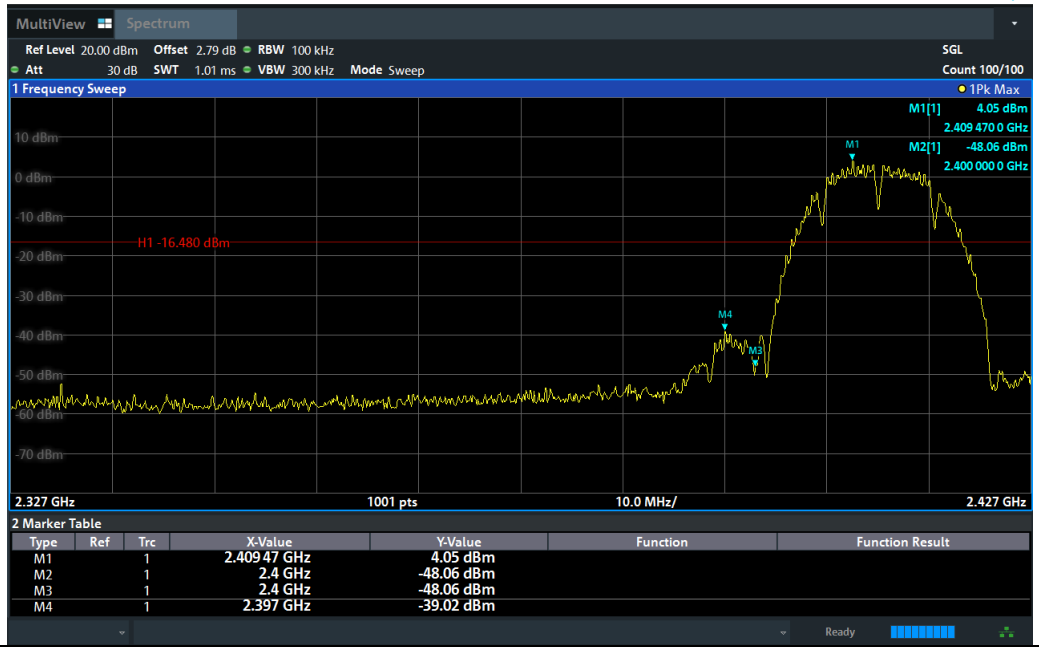
a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then 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 to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
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

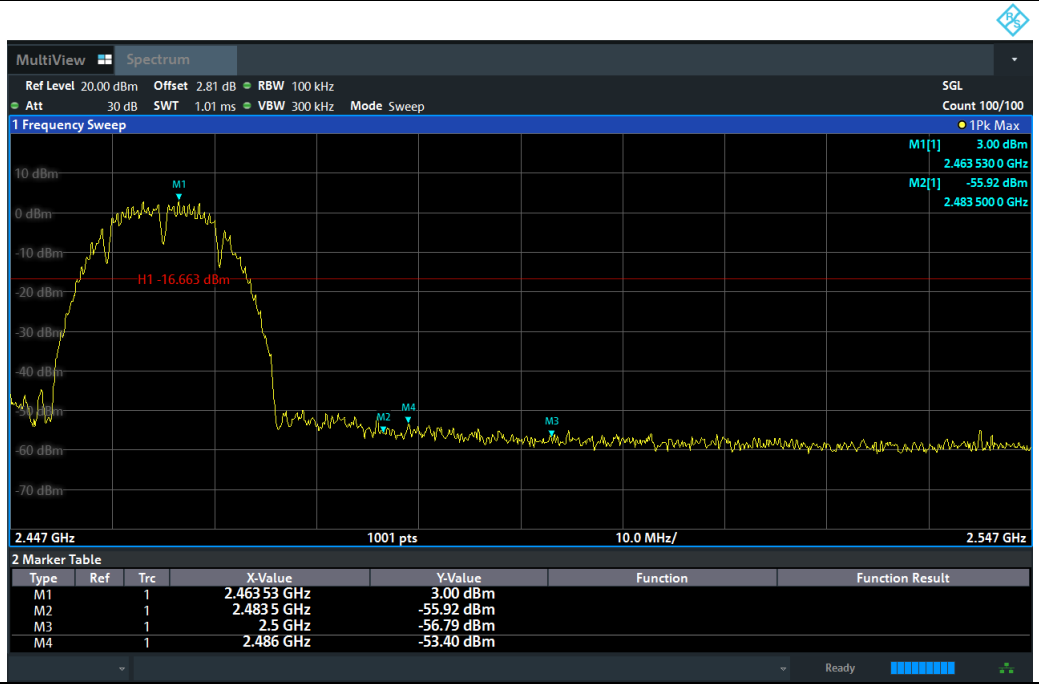



### 5.8.4 Test Results

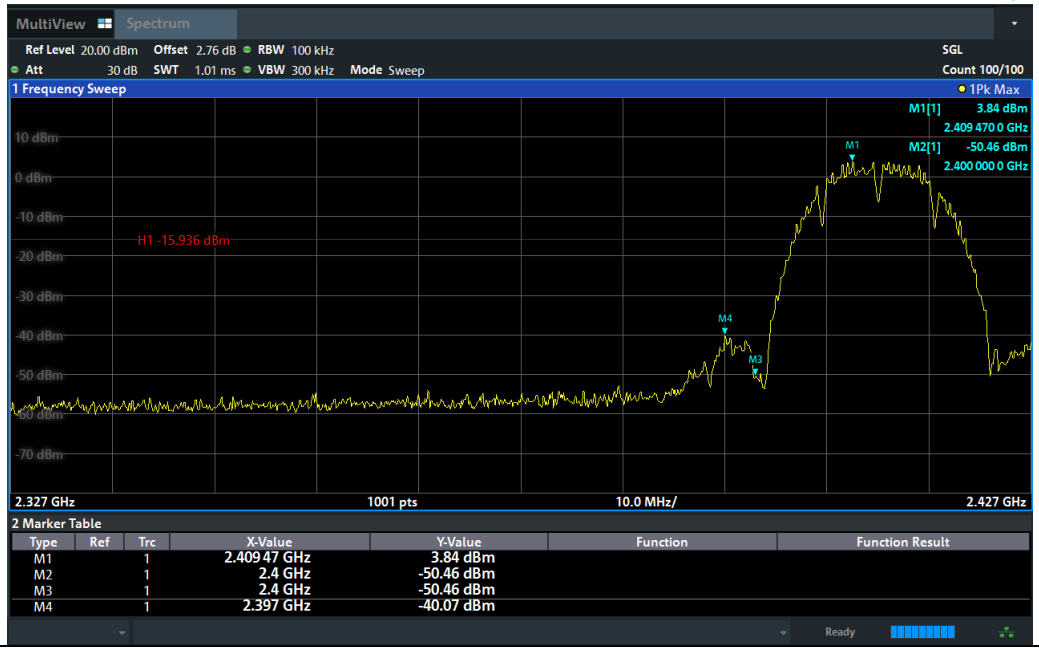
ANT 1 802.11b: Band Edge, Left Side



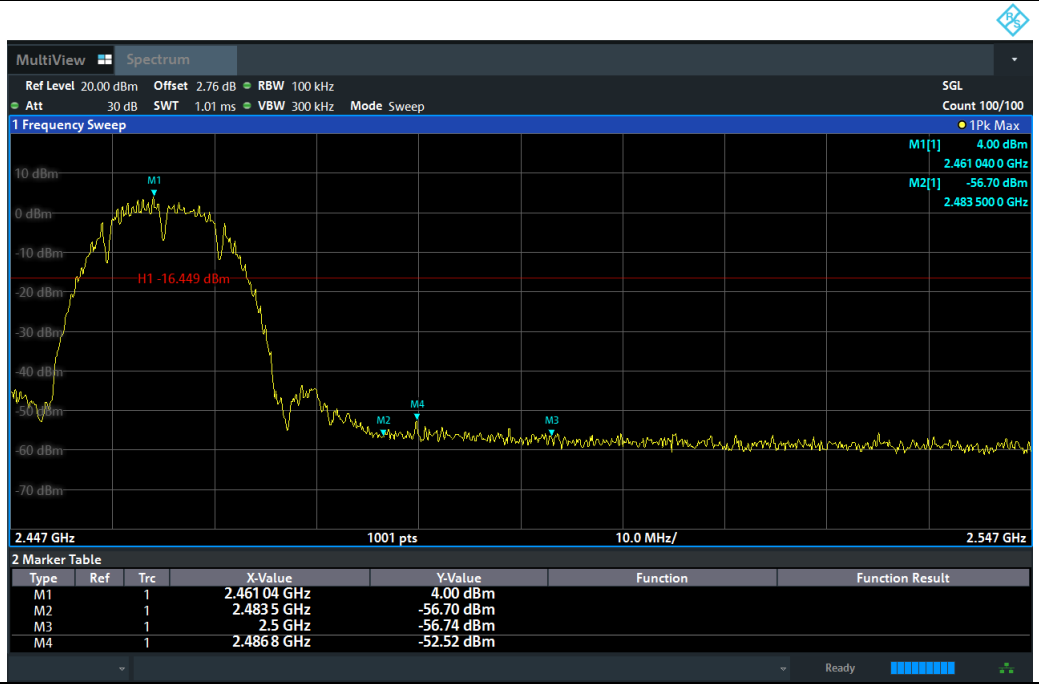

ANT 1 802.11b: Band Edge, Right Side



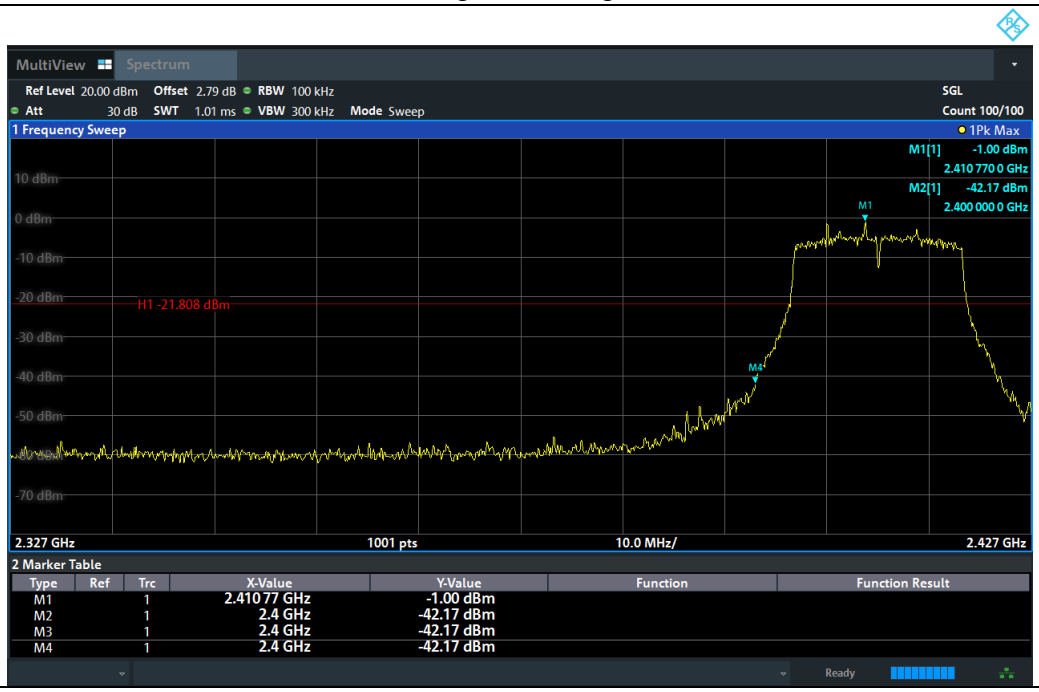
ANT 2 802.11b: Band Edge, Left Side



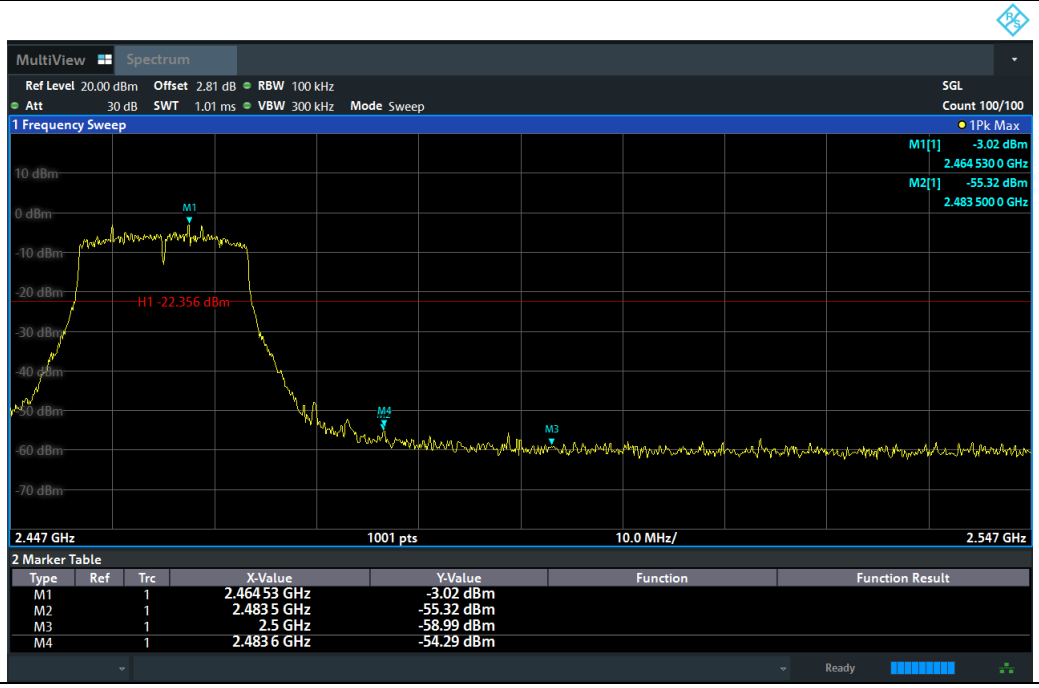

ANT 2 802.11b: Band Edge, Right Side



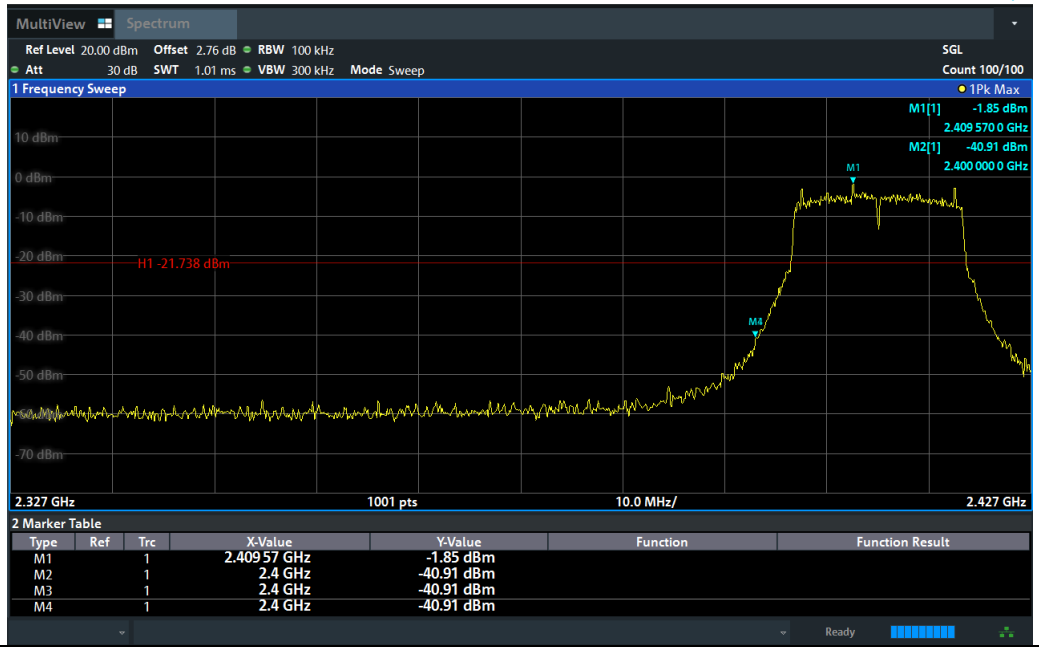
ANT 1 802.11g: Band Edge, Left Side



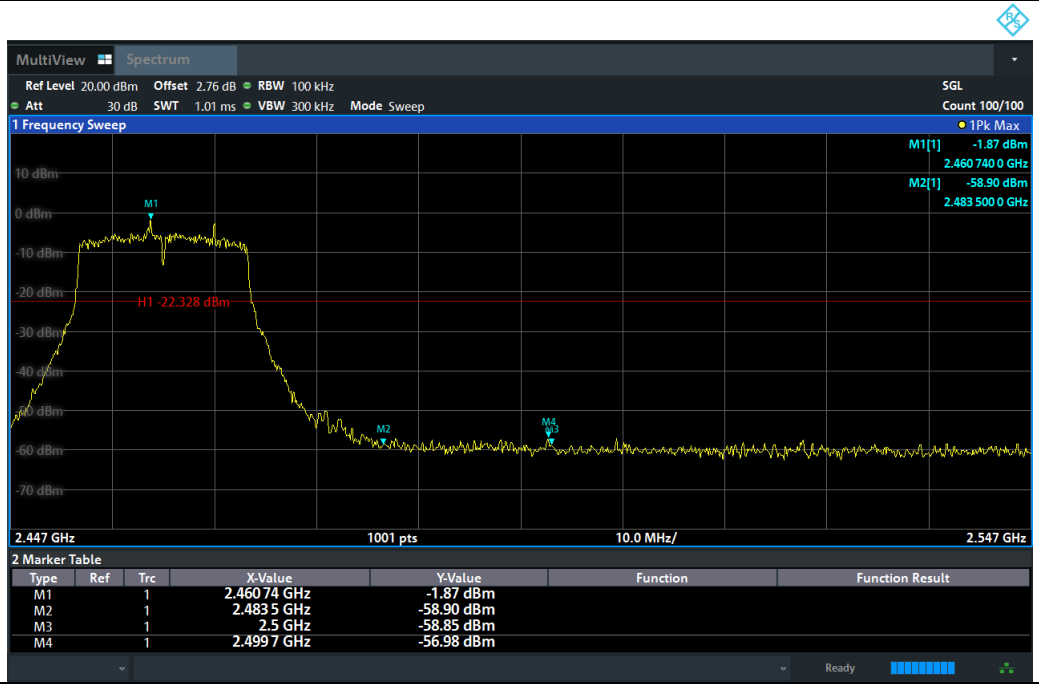

ANT 1 802.11g: Band Edge, Right Side



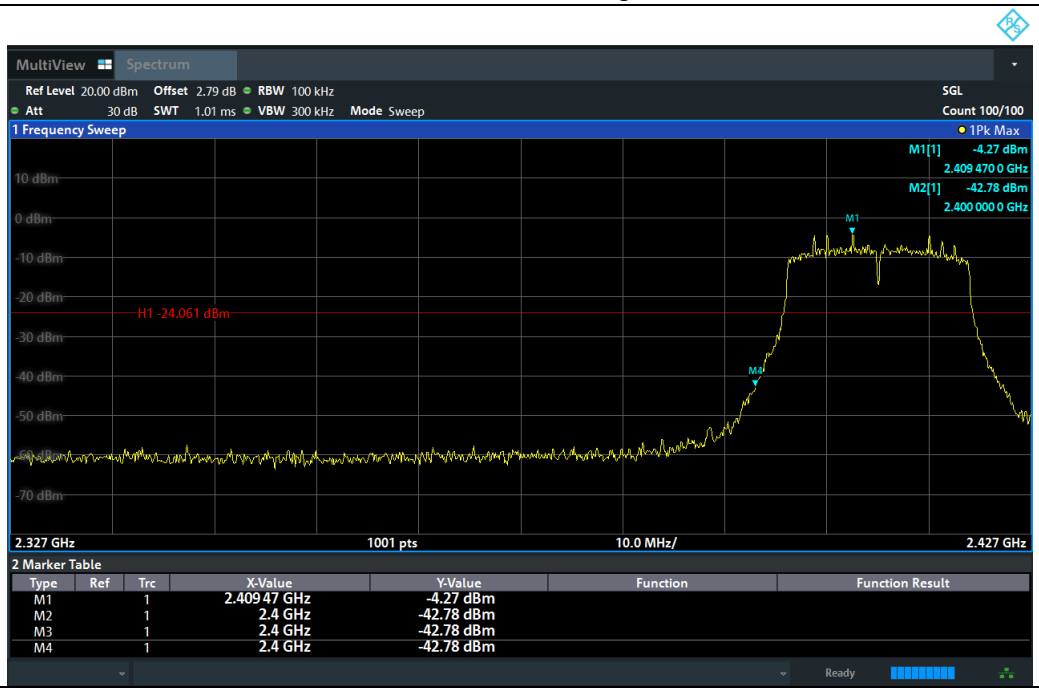
ANT 2 802.11g: Band Edge, Left Side



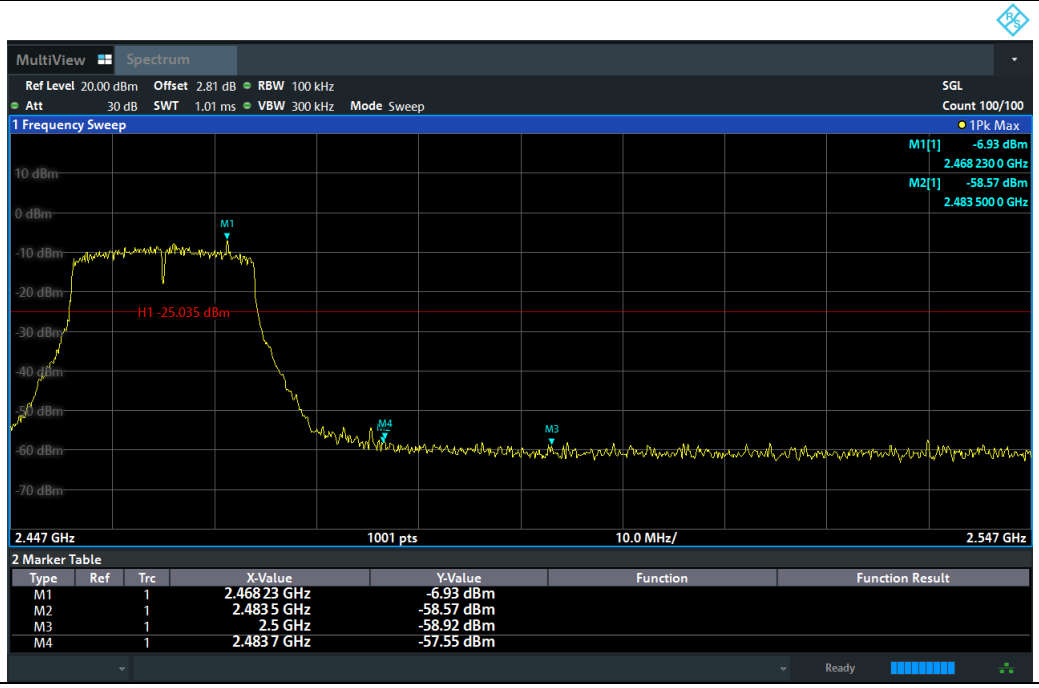

ANT 2 802.11g: Band Edge, Right Side



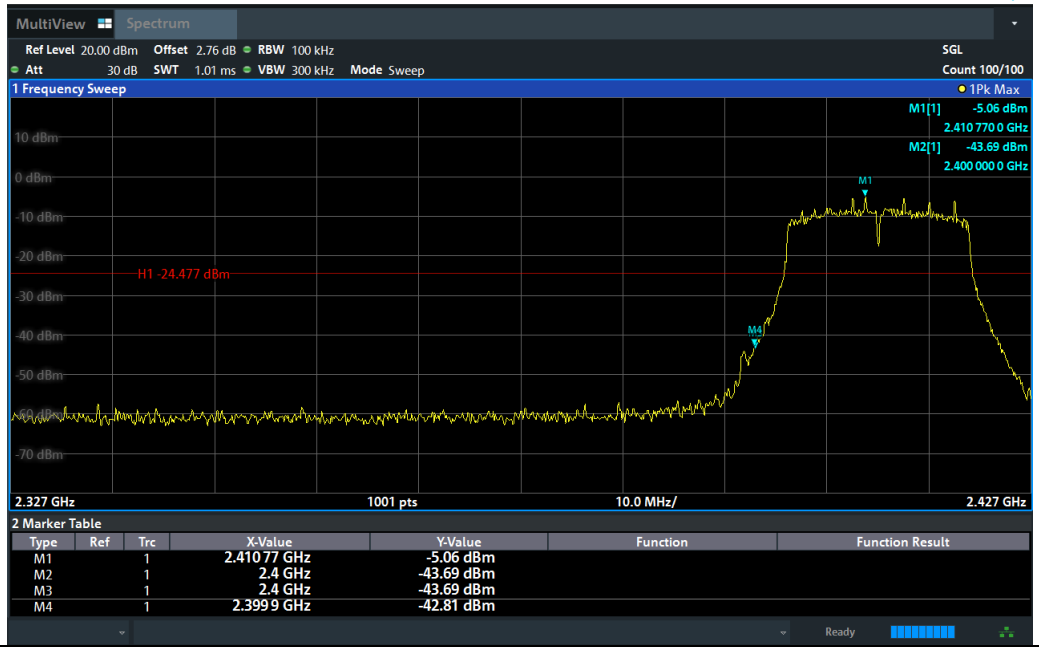
ANT 1 802.11n20: Band Edge, Left Side



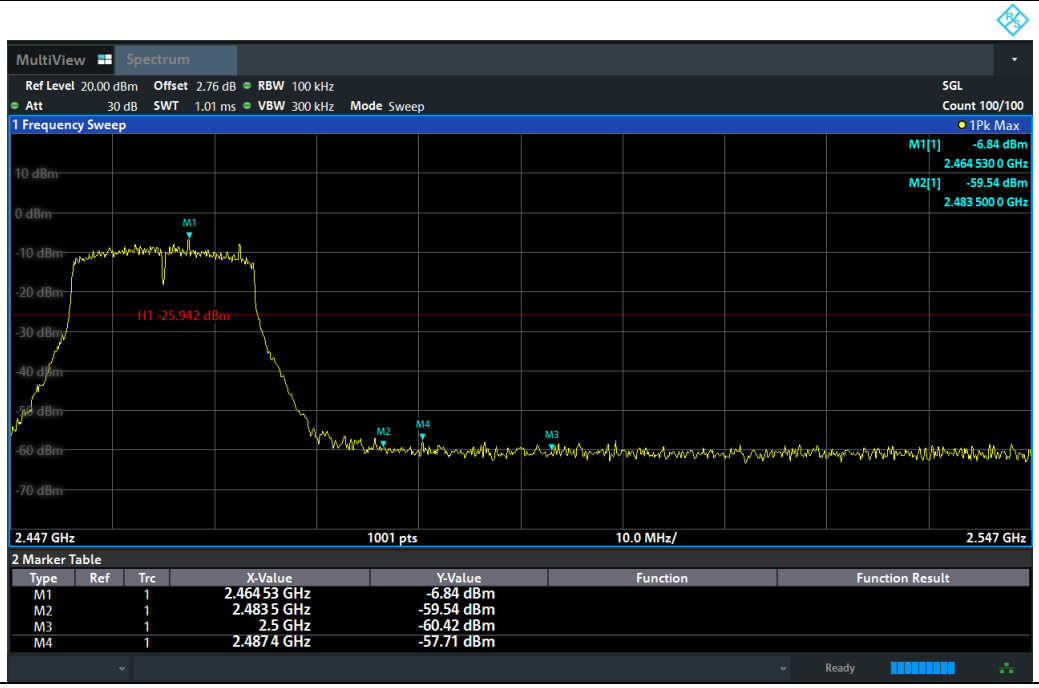

ANT 1 802.11n20: Band Edge, Right Side



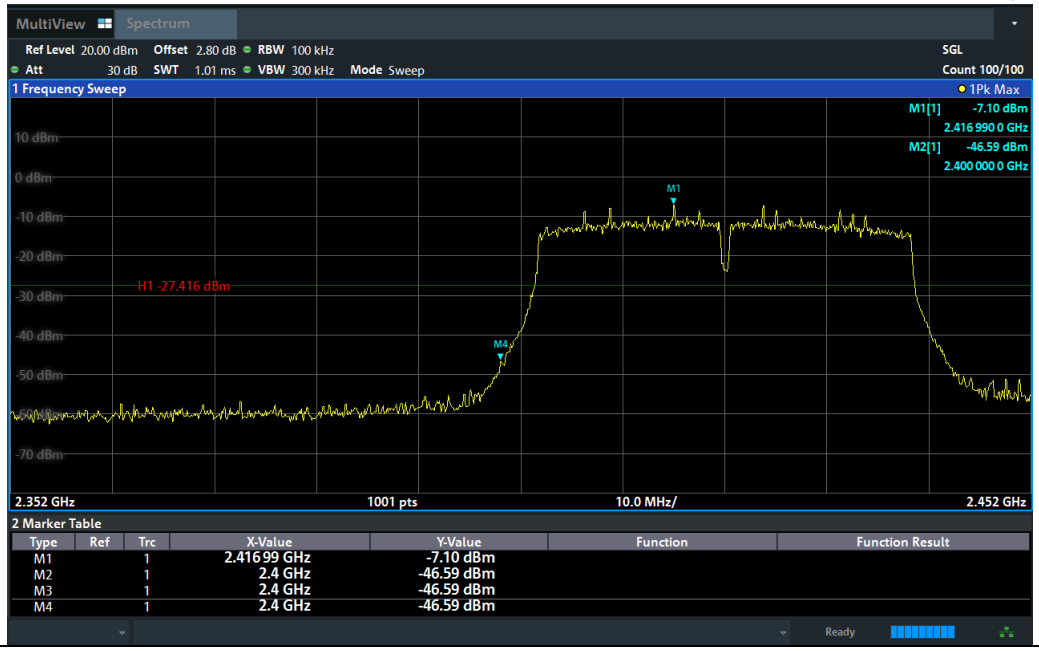
ANT 2 802.11n20: Band Edge, Left Side



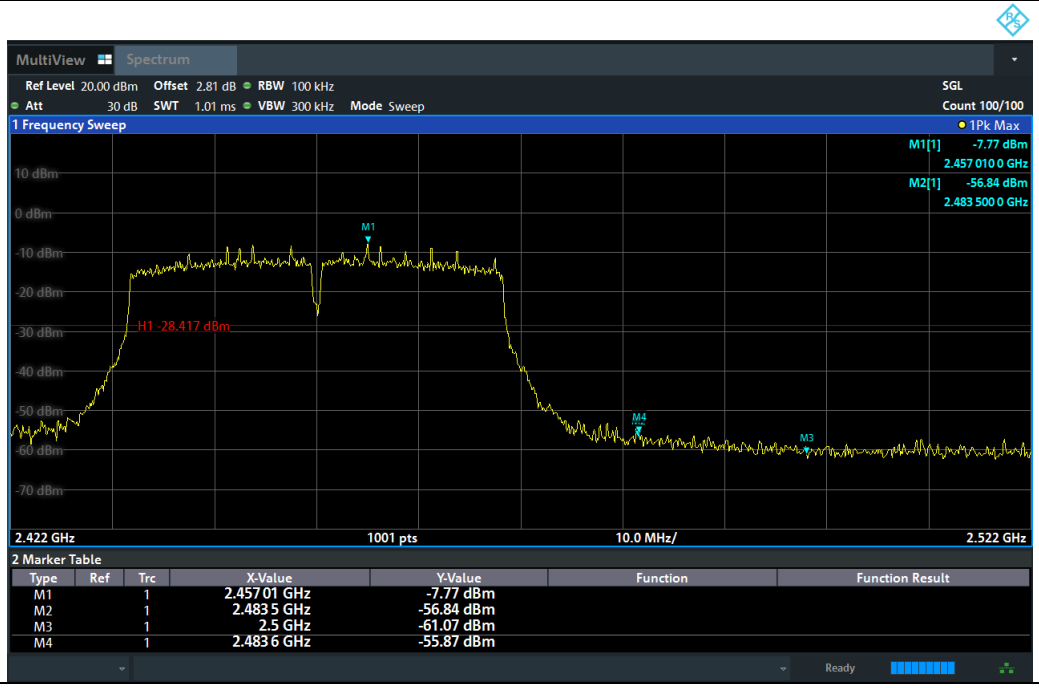

ANT 2 802.11n20: Band Edge, Right Side



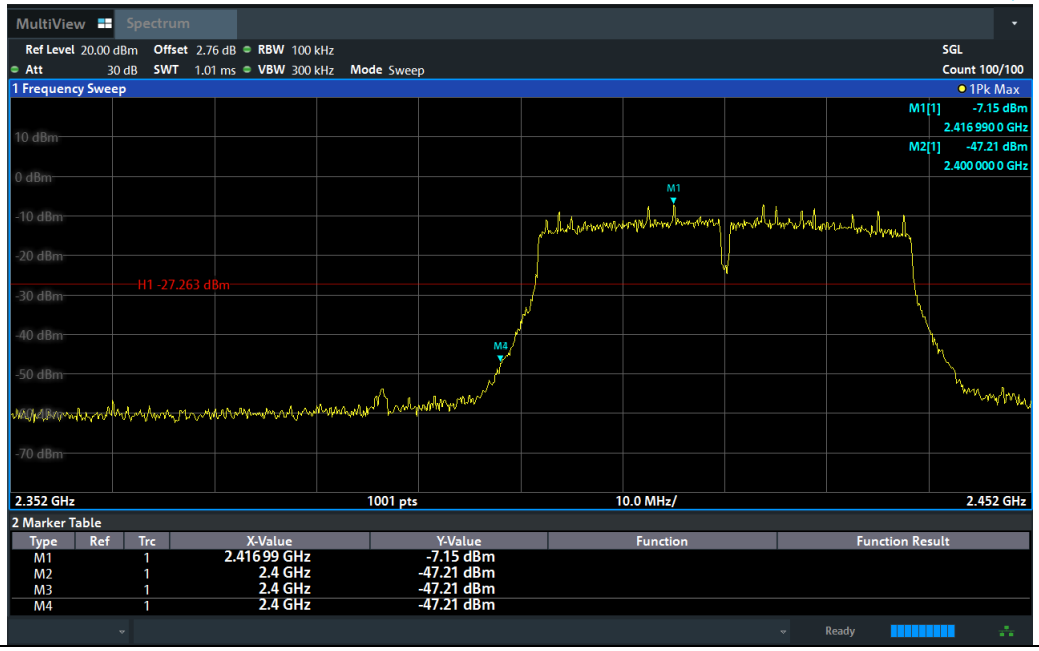
ANT 1 802.11n40: Band Edge, Left Side




ANT 1 802.11n40: Band Edge, Right Side



ANT 2 802.11n40: Band Edge, Left Side




ANT 2 802.11n40: Band Edge, Right Side

## 5.9 Spurious RF Conducted Emissions

### 5.9.1 Limit

Below -20dB of the highest emission level in operating band.

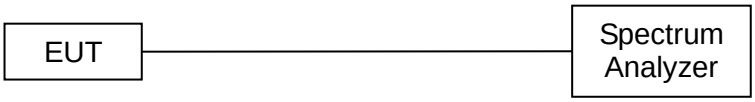
### 5.9.2 Measuring Instruments

The Measuring equipment is listed in the section 4 of this test report.

### 5.9.3 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.

### 5.9.4 Test Setup

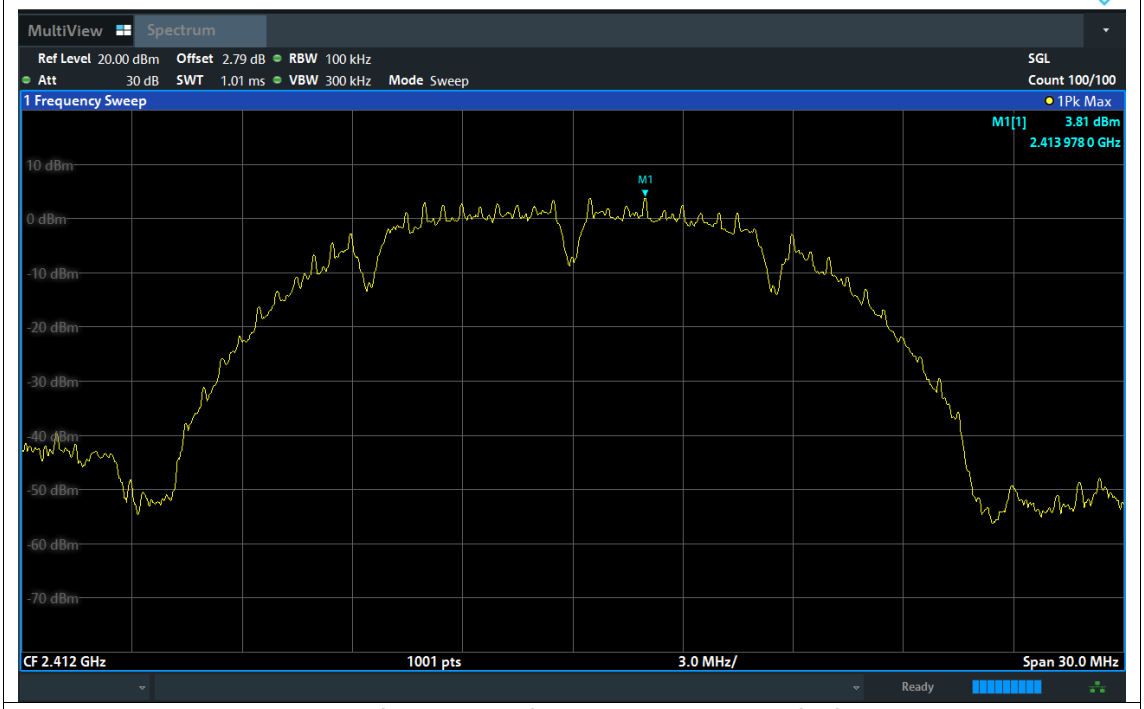



### 5.9.5 Test Results

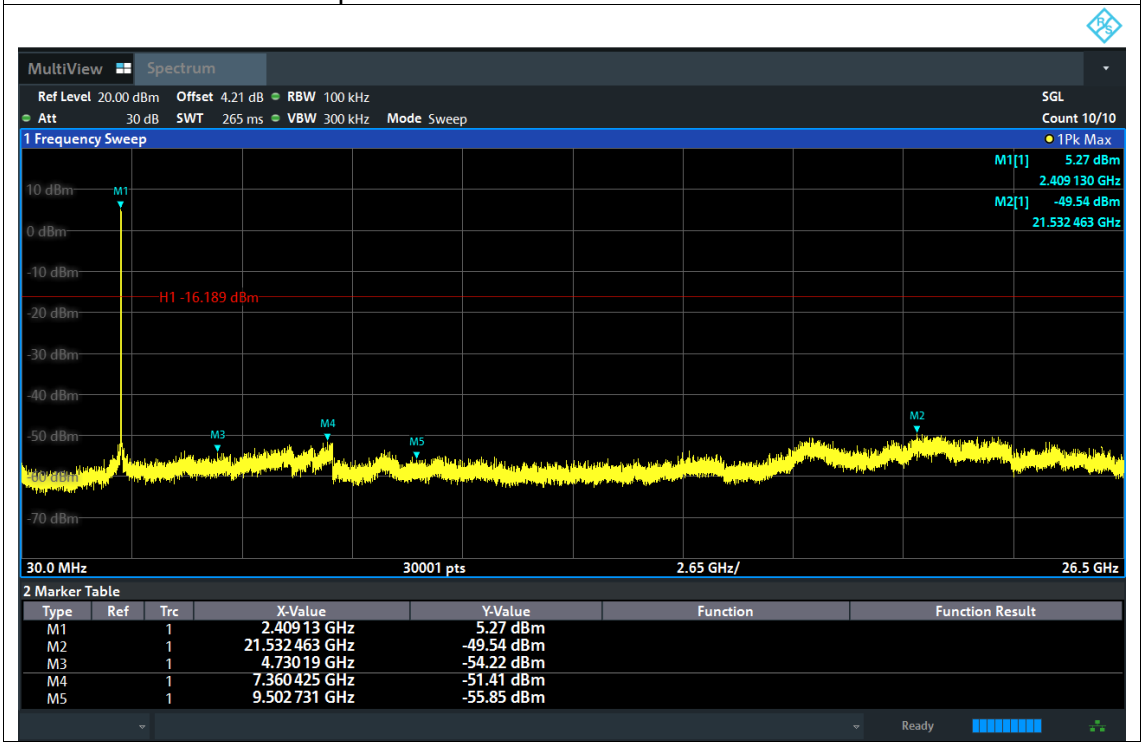
Note:

1: 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.

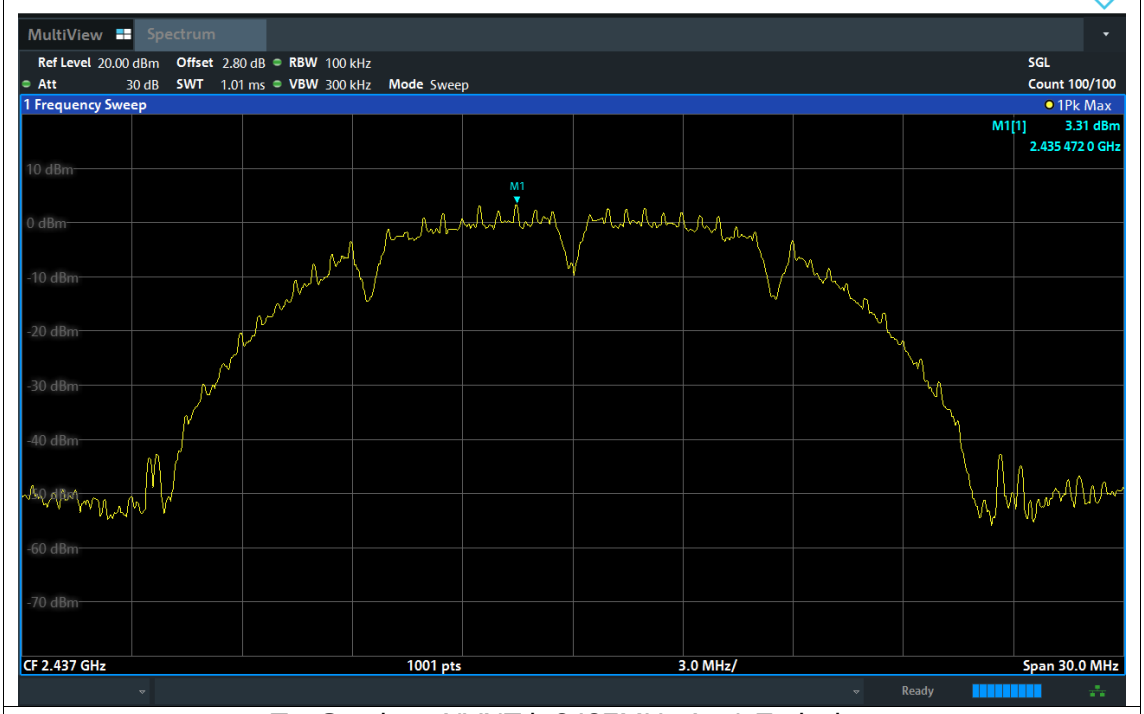
Tx. Spurious NVNT b 2412MHz Ant1 Ref



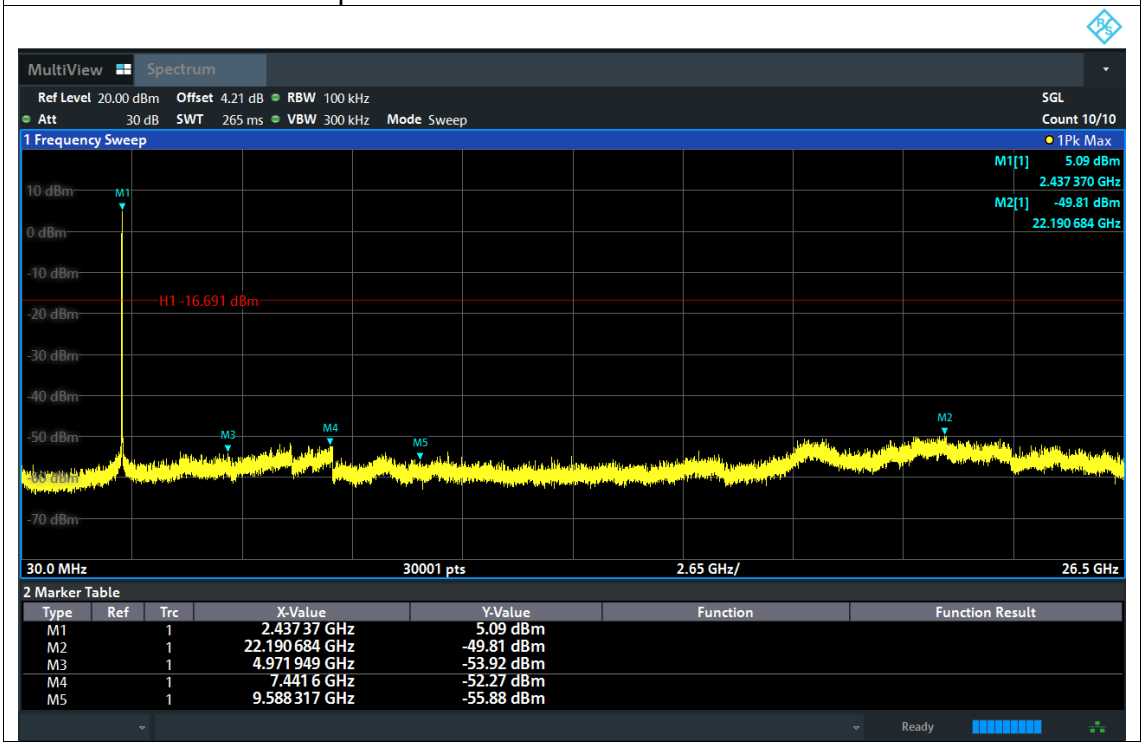

Tx. Spurious NVNT b 2412MHz Ant1 Emission



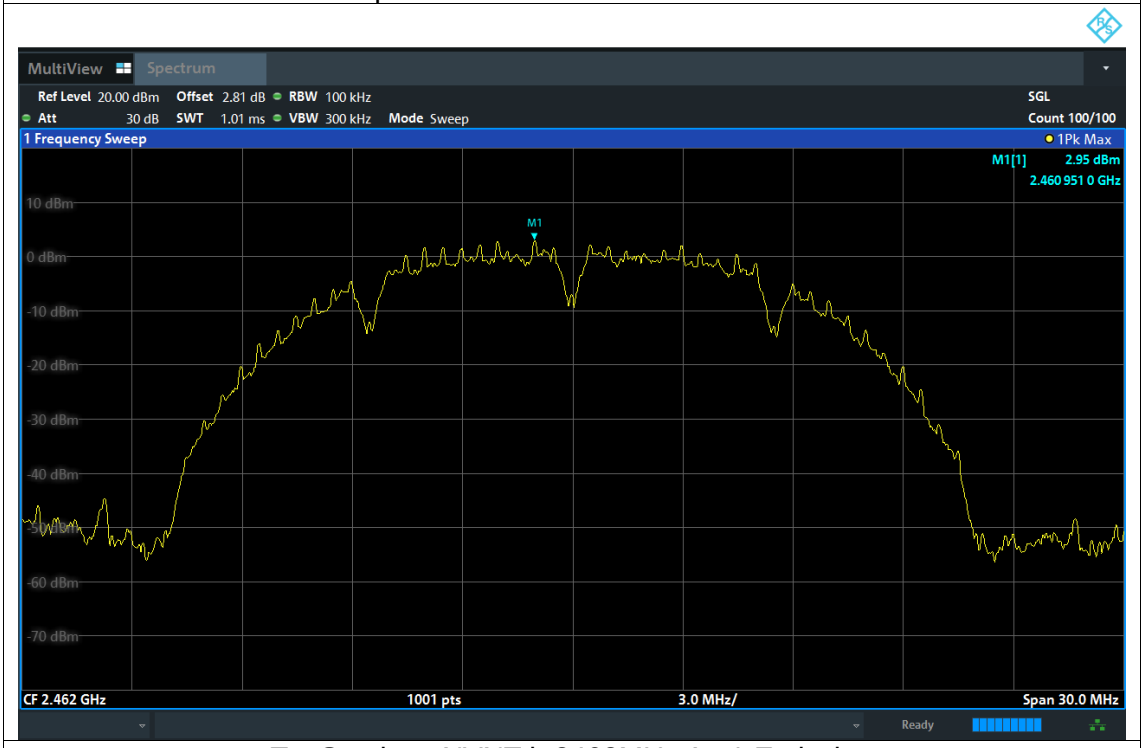
Tx. Spurious NVNT b 2437MHz Ant1 Ref



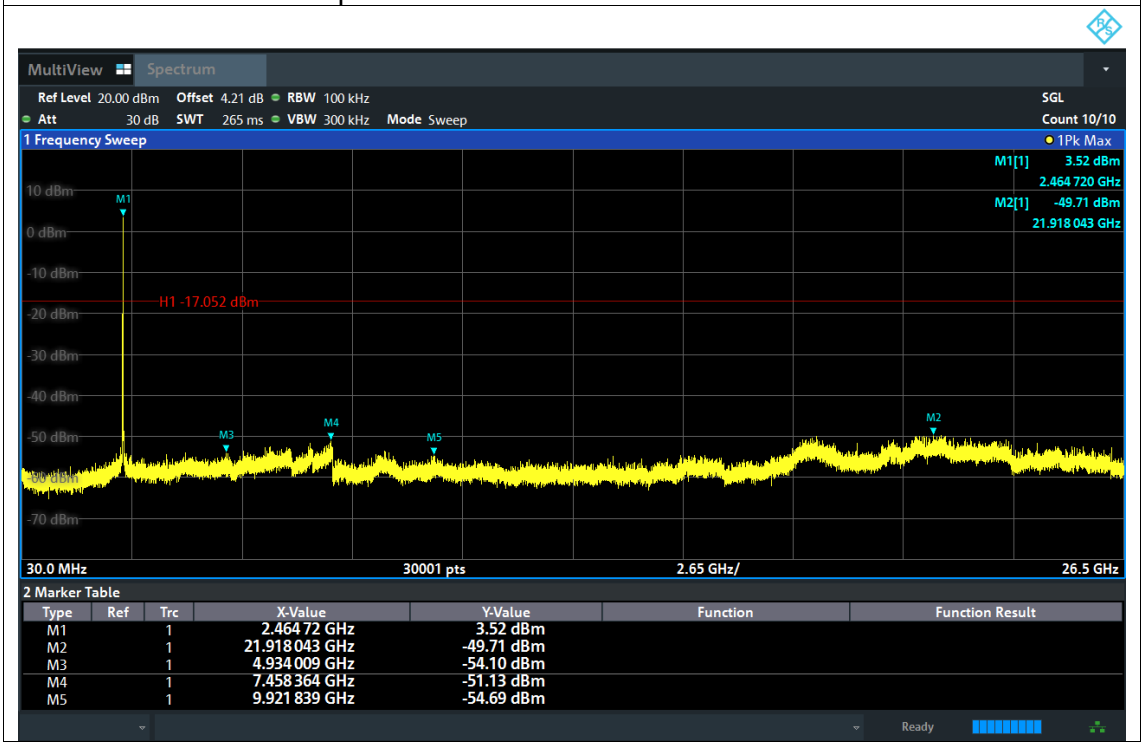

Tx. Spurious NVNT b 2437MHz Ant1 Emission



Tx. Spurious NVNT b 2462MHz Ant1 Ref




Tx. Spurious NVNT b 2462MHz Ant1 Emission



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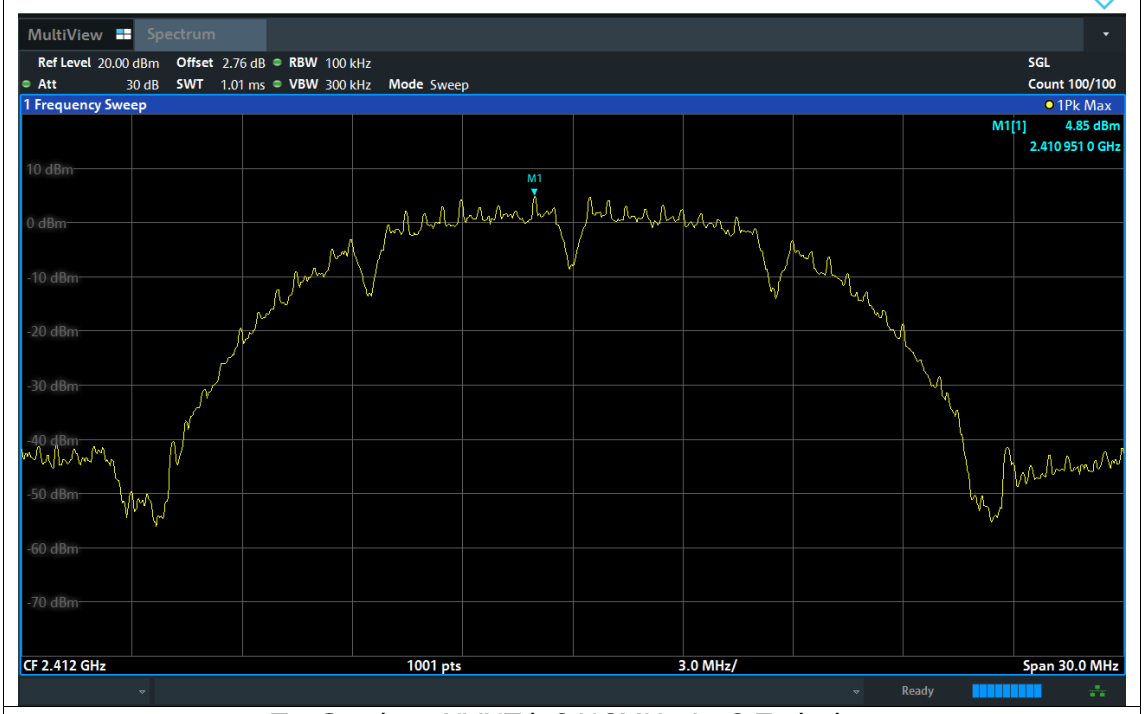


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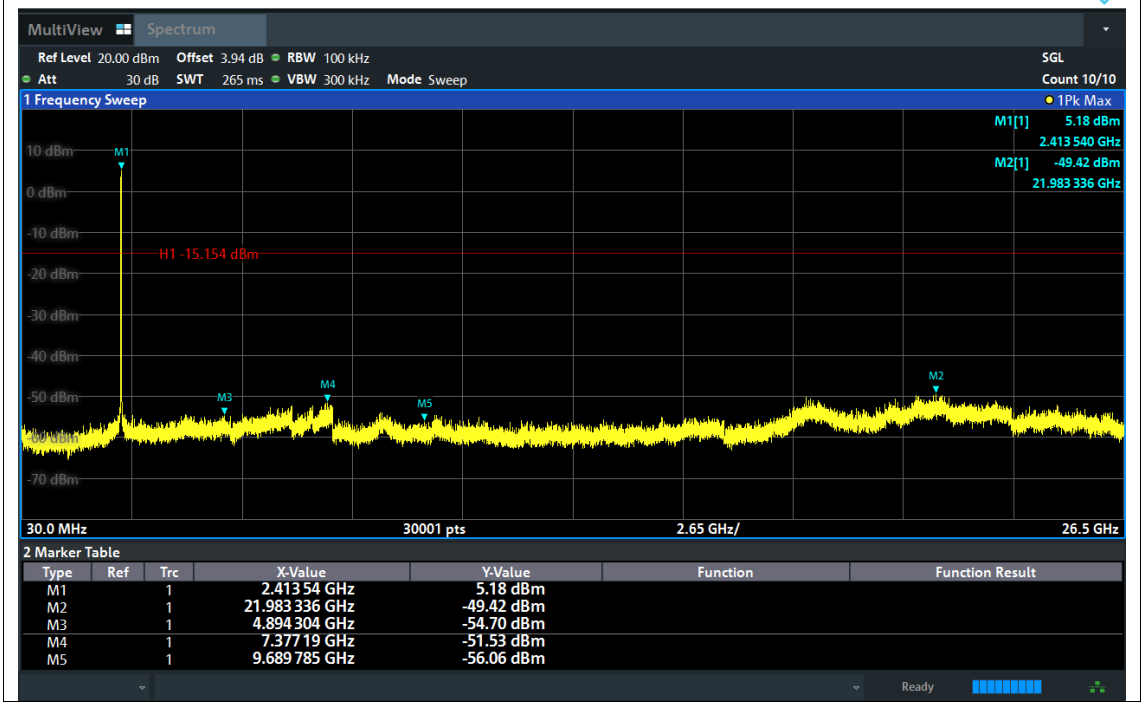
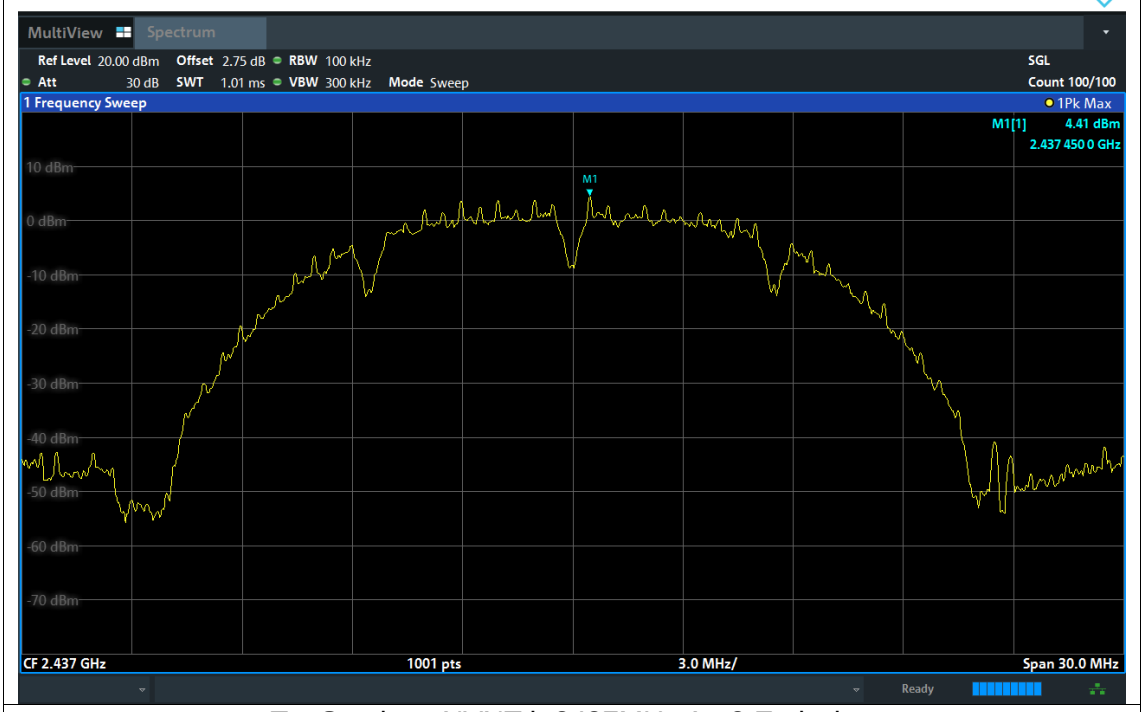


Tx. Spurious NVNT b 2437MHz Ant2 Ref

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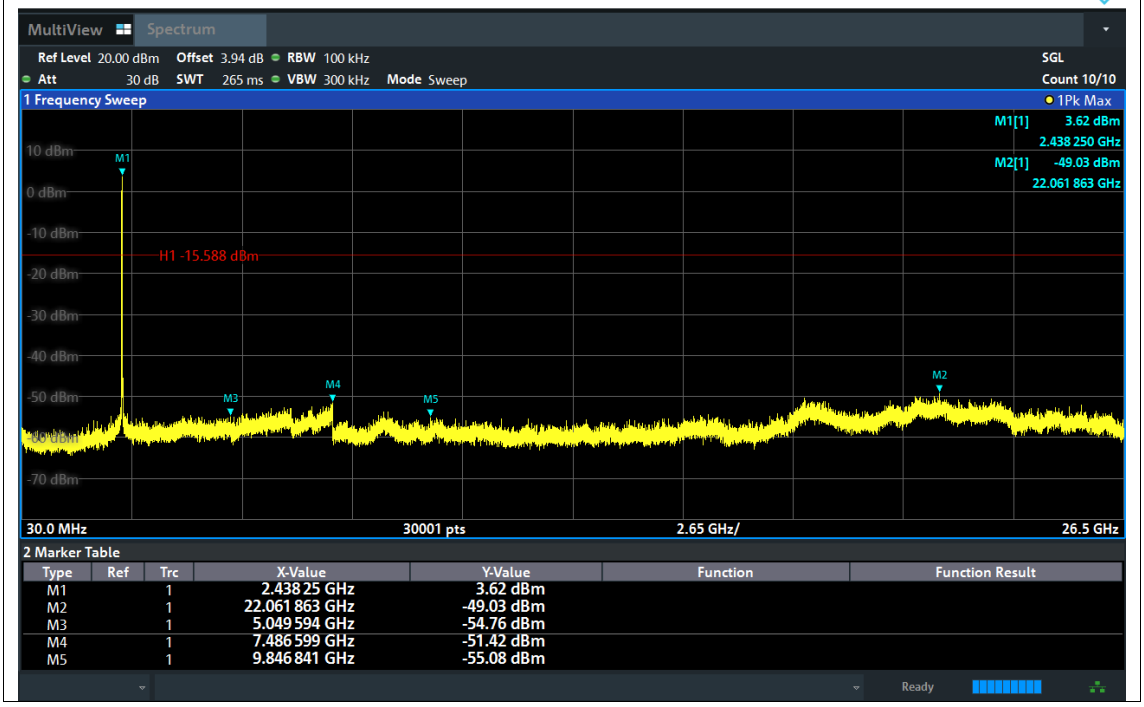

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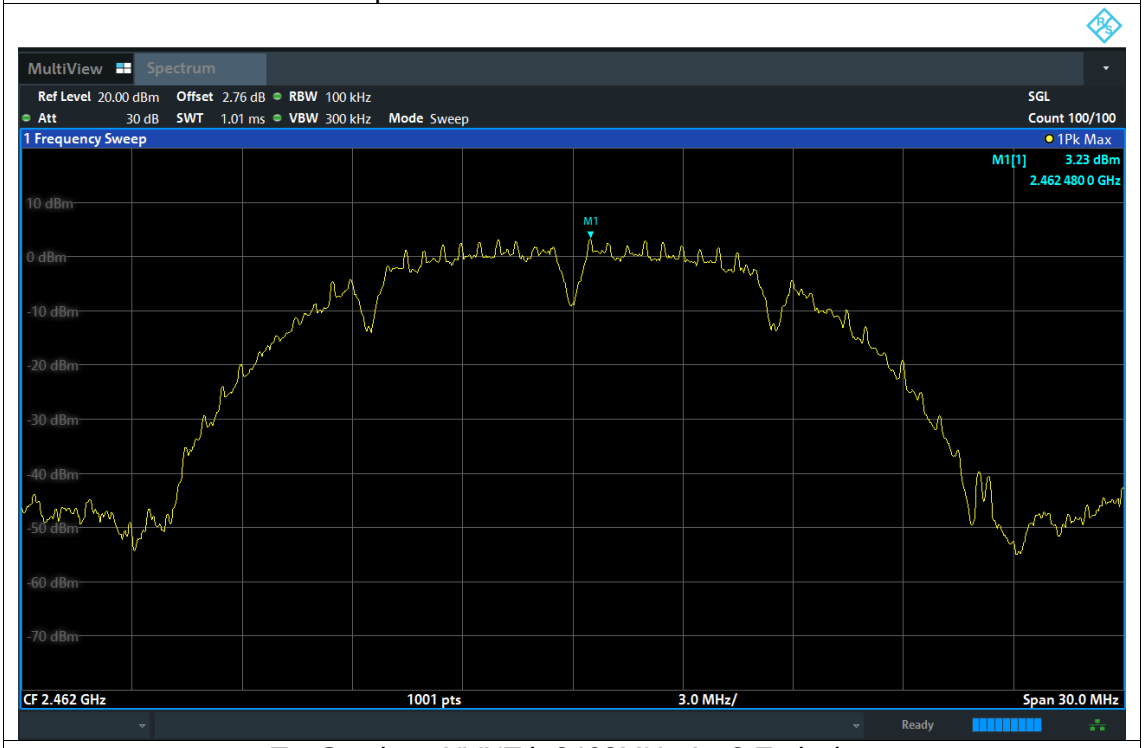


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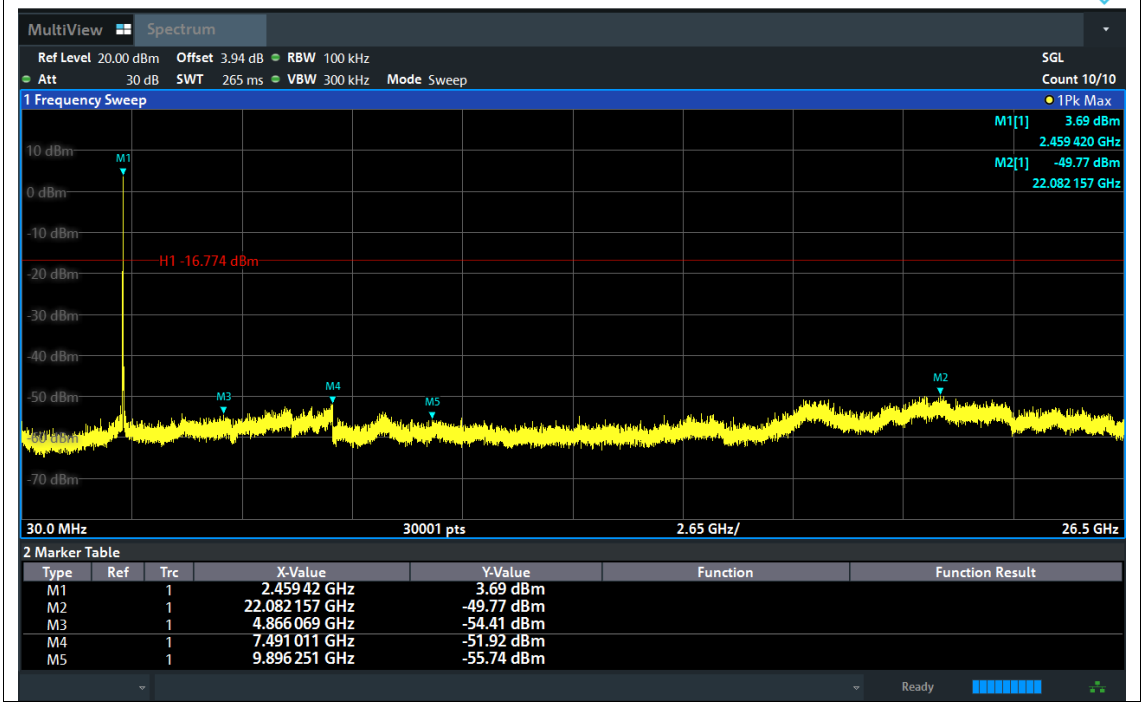
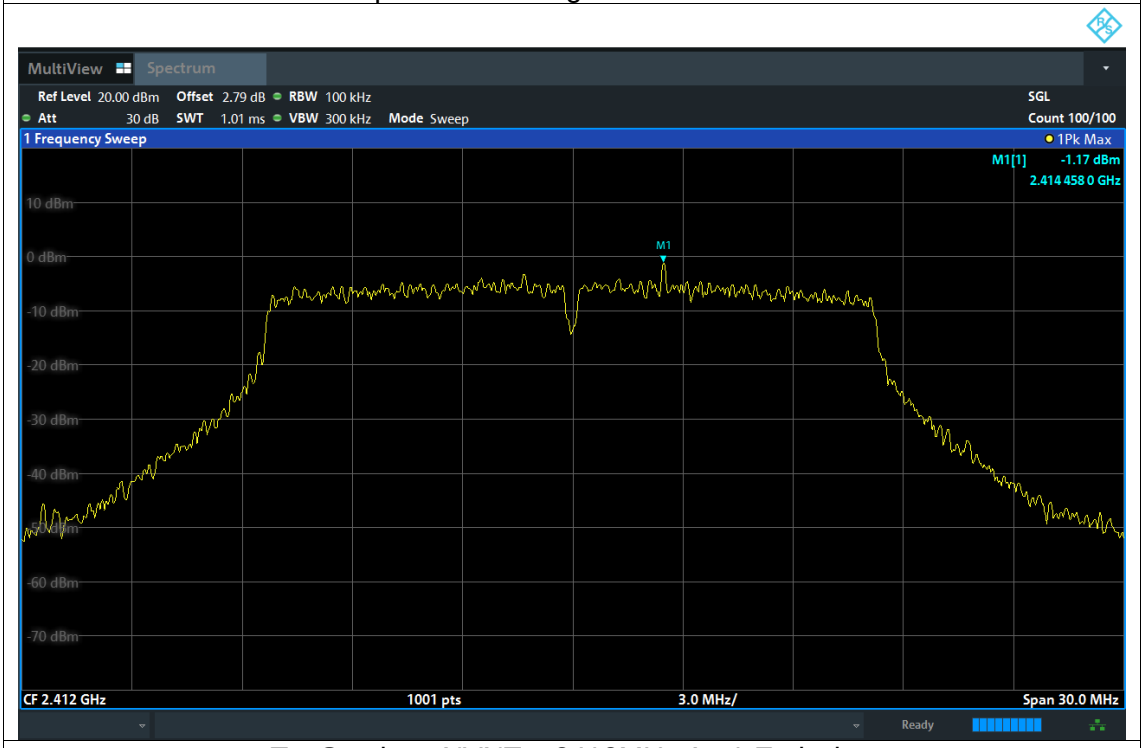


Tx. Spurious NVNT g 2412MHz Ant1 Ref

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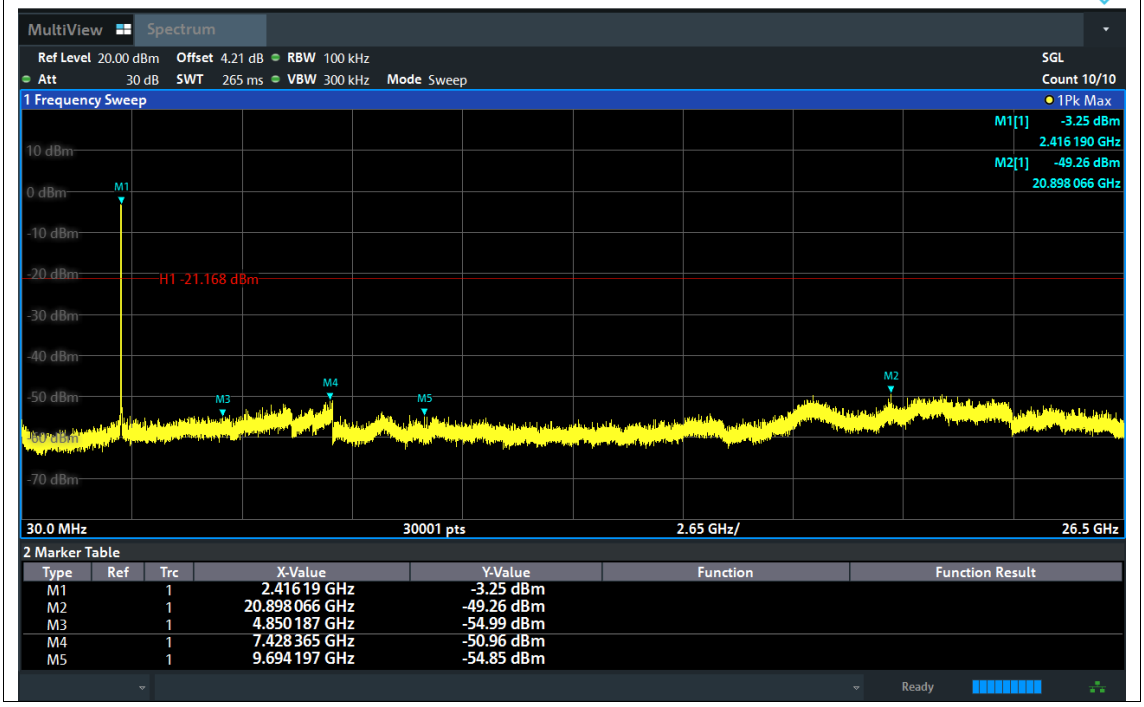

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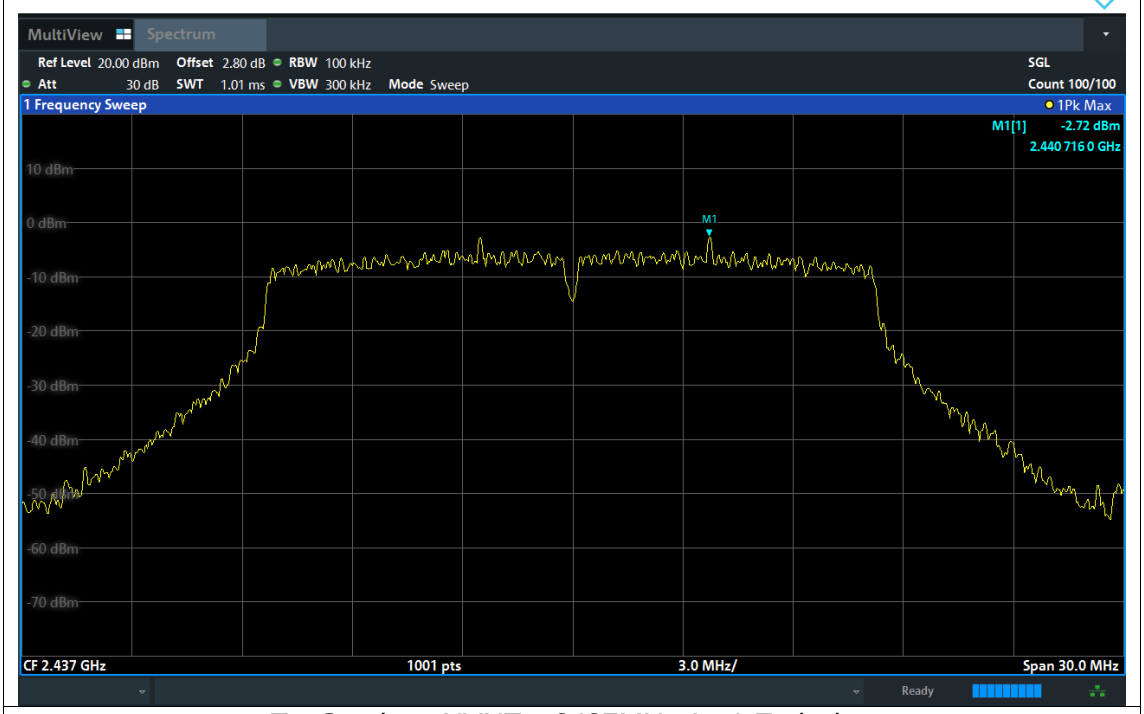
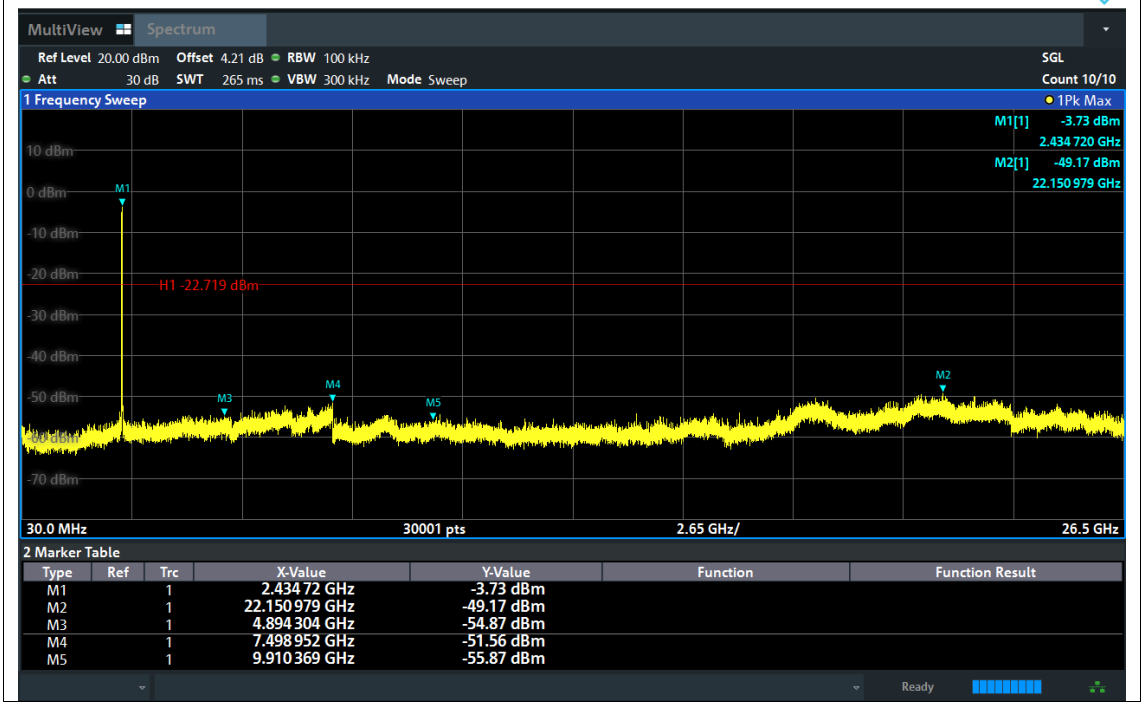



Tx. Spurious NVNT g 2437MHz Ant1 Emission



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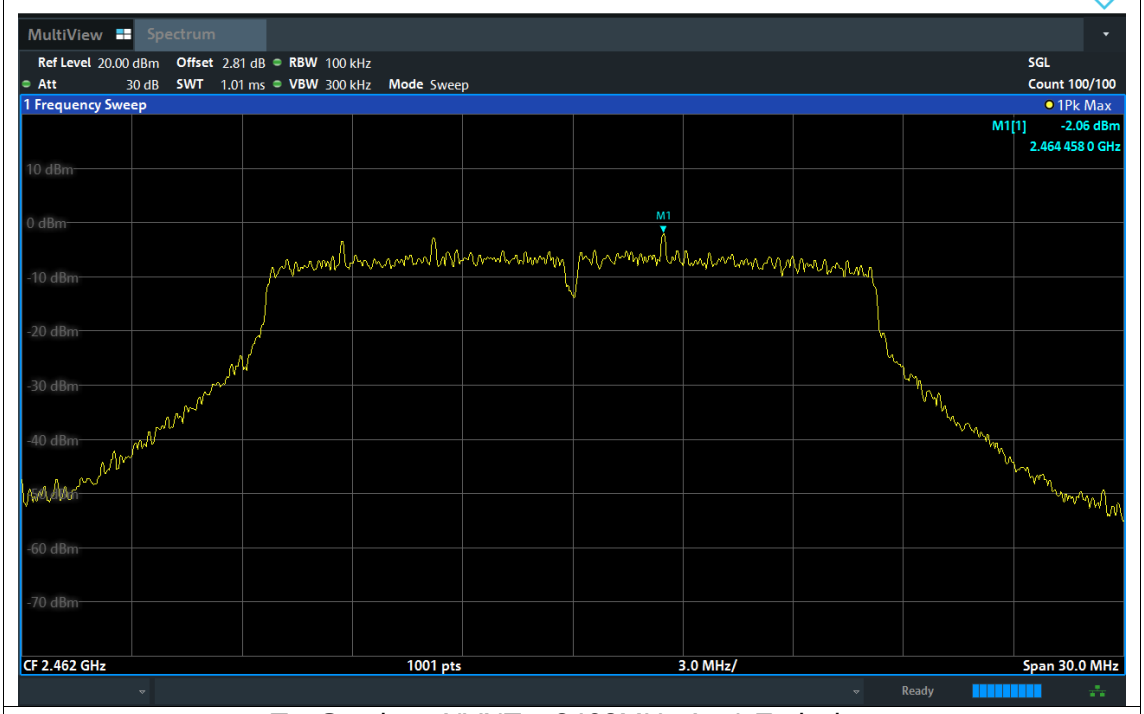
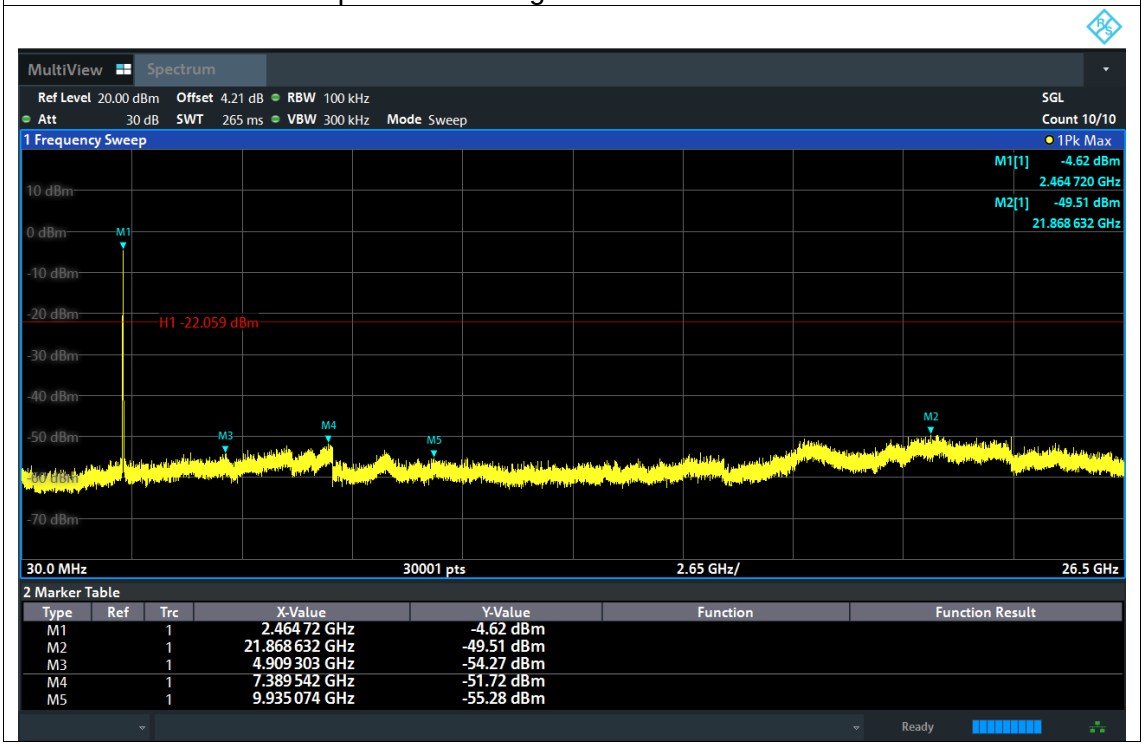
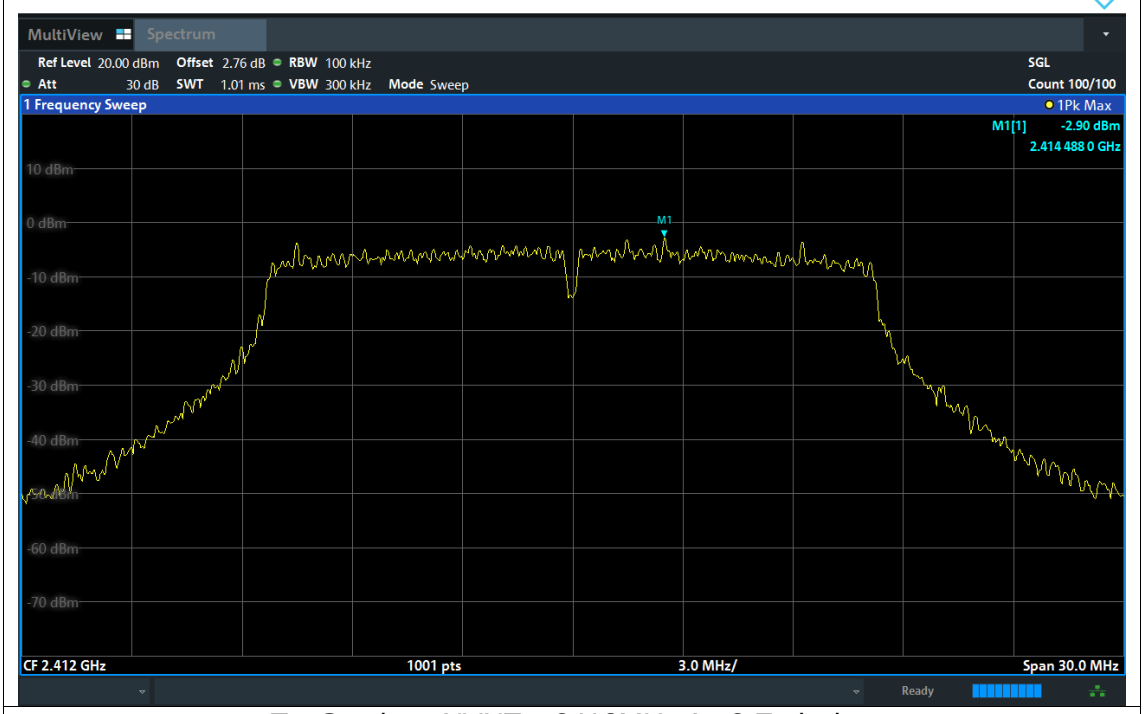


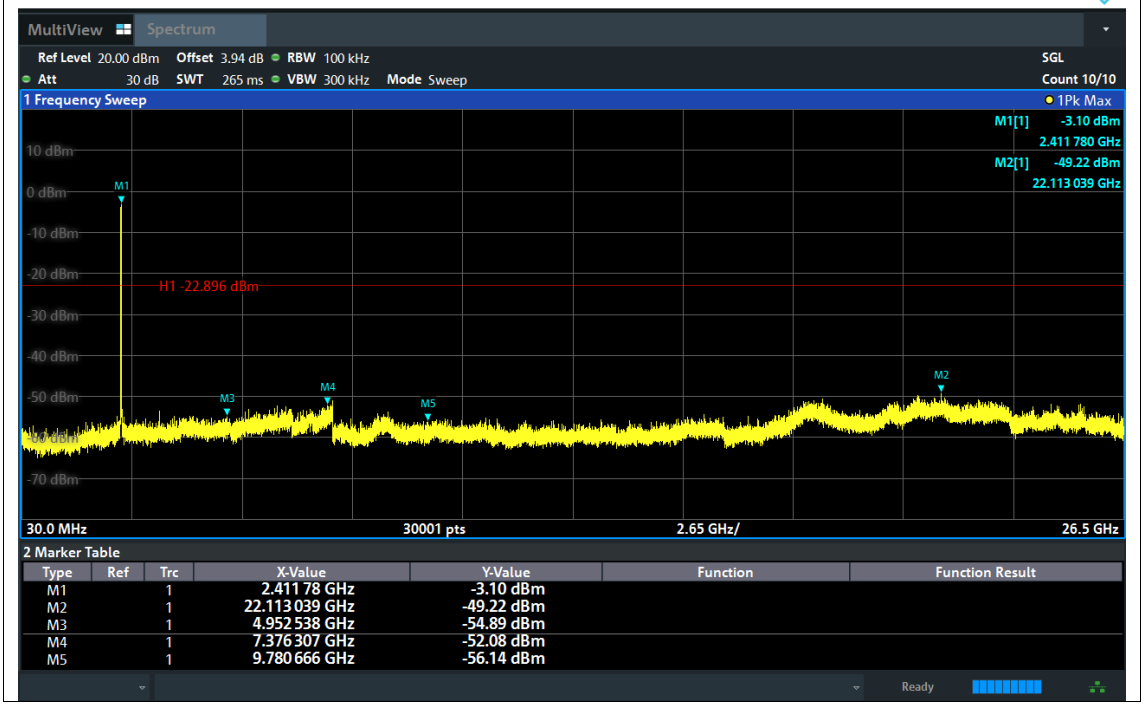

Tx. Spurious NVNT g 2462MHz Ant1 Emission



Tx. Spurious NVNT g 2412MHz Ant2 Ref




Tx. Spurious NVNT g 2412MHz Ant2 Emission



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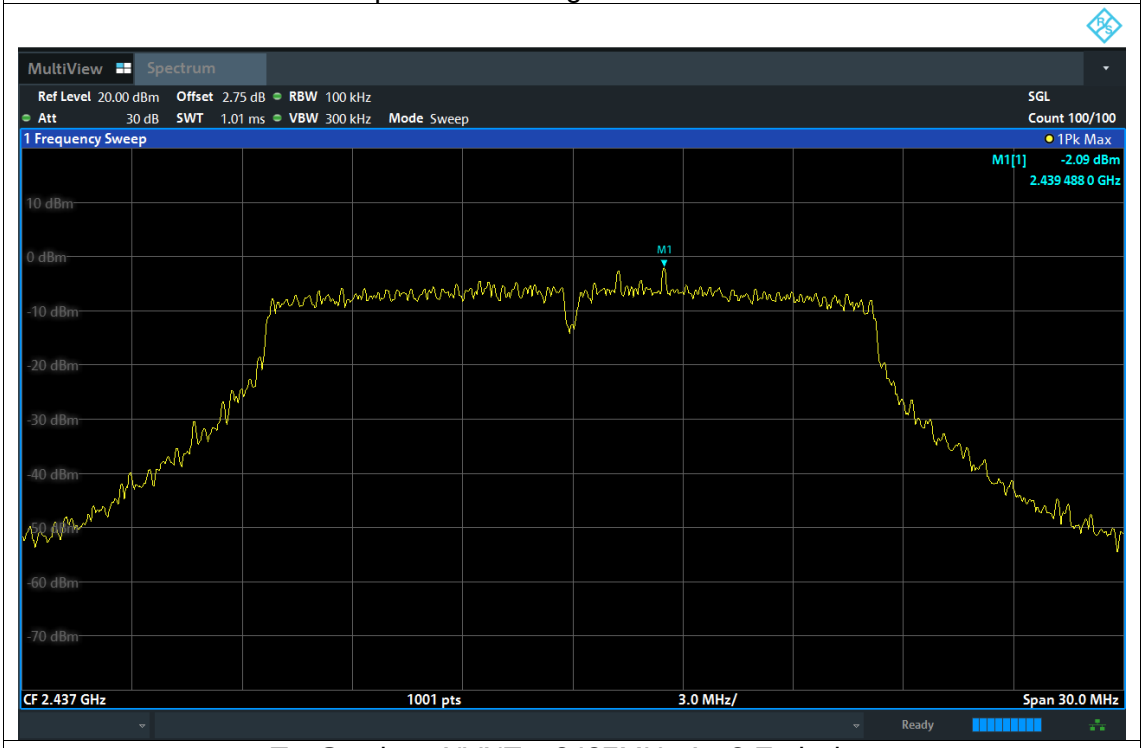


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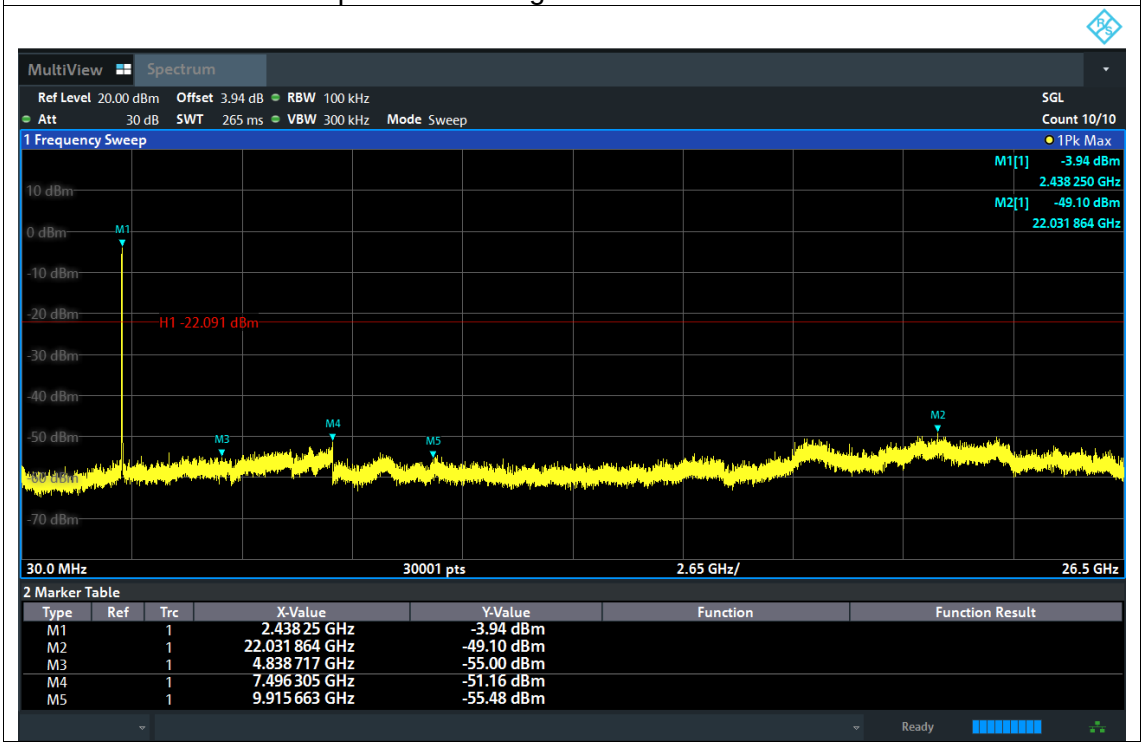

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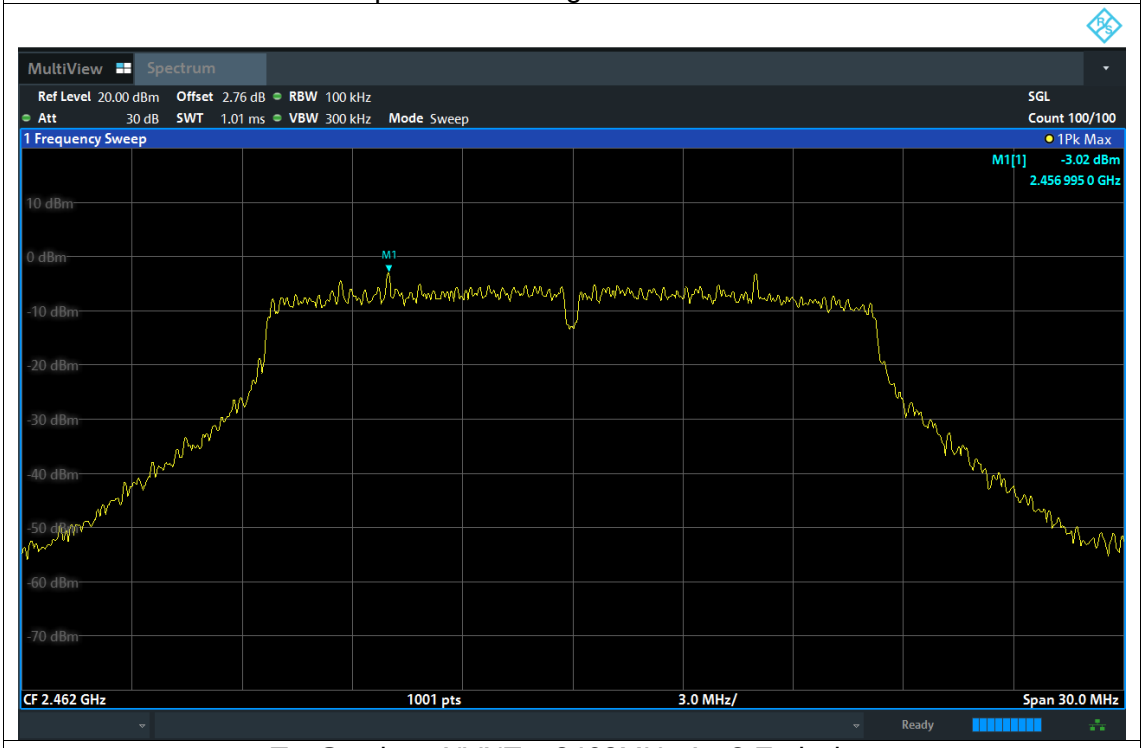


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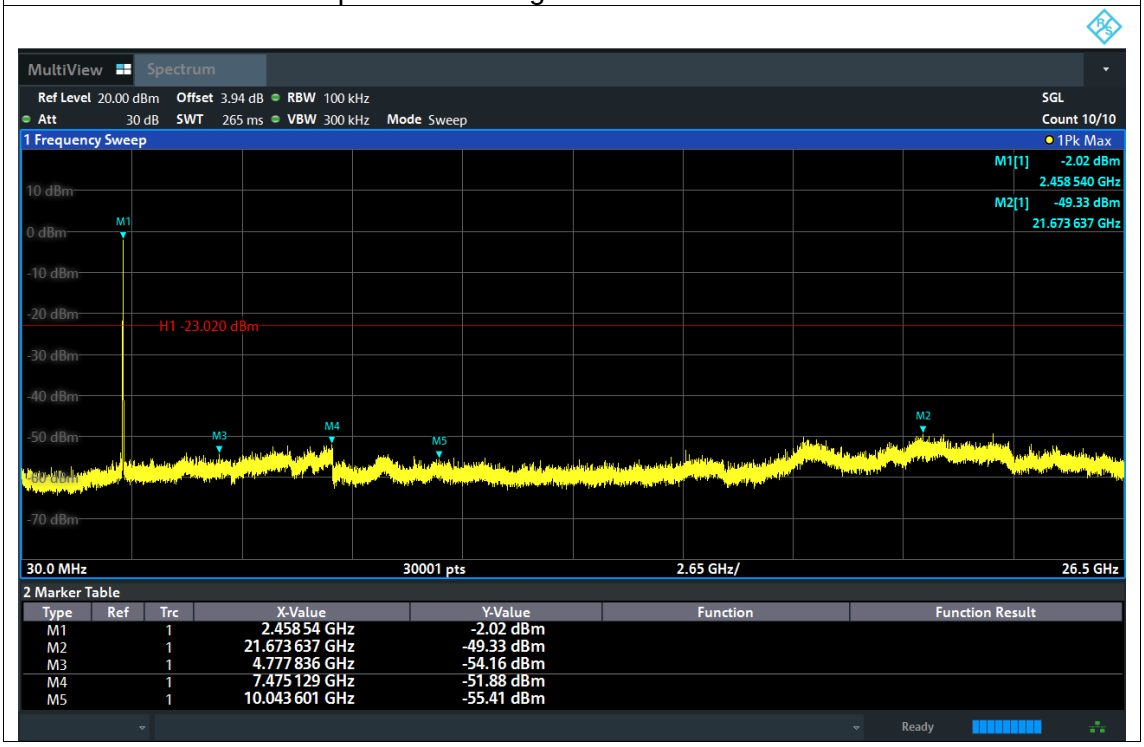
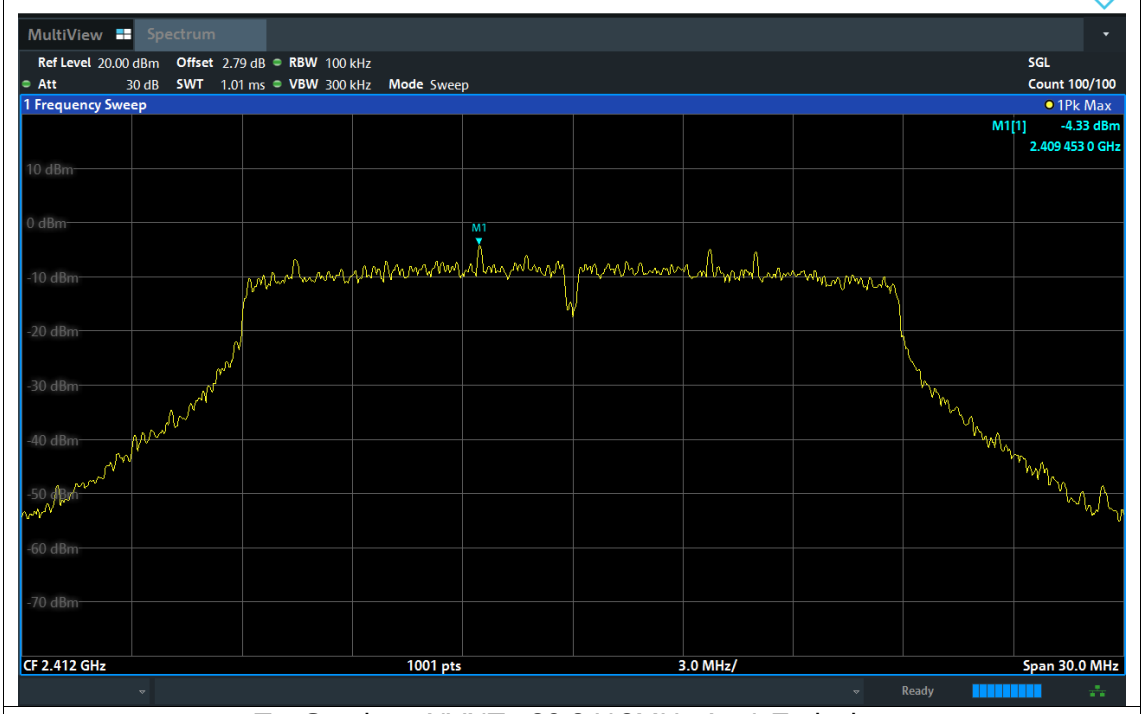


Tx. Spurious NVNT n20 2412MHz Ant1 Ref

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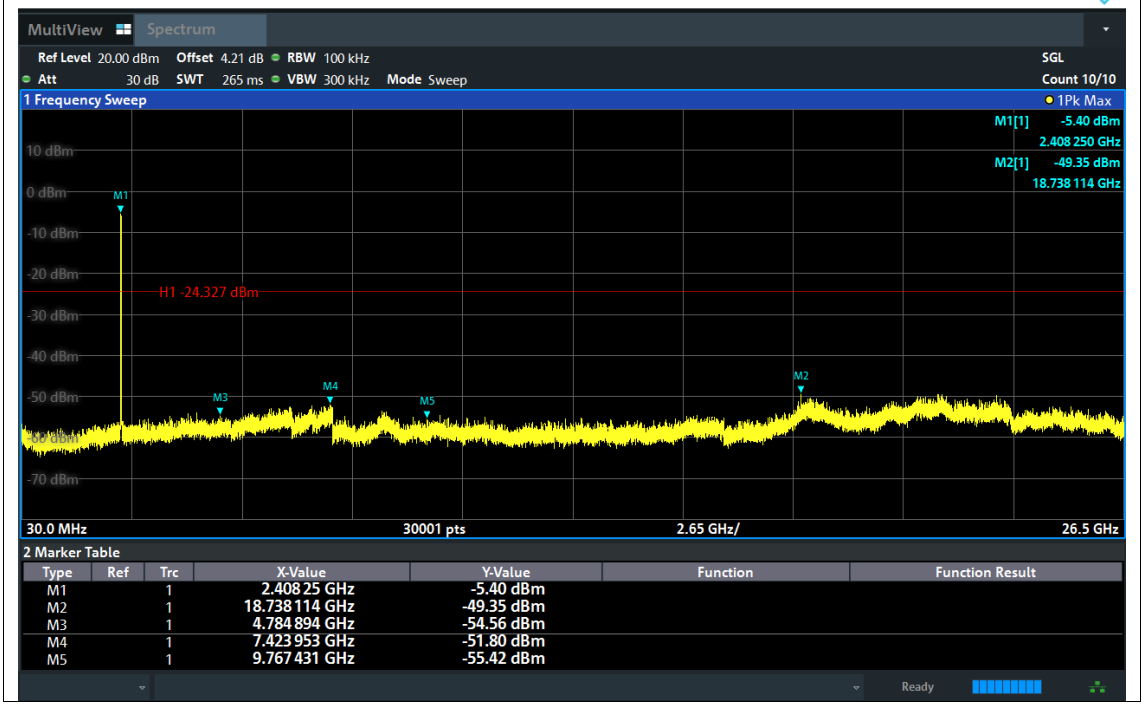

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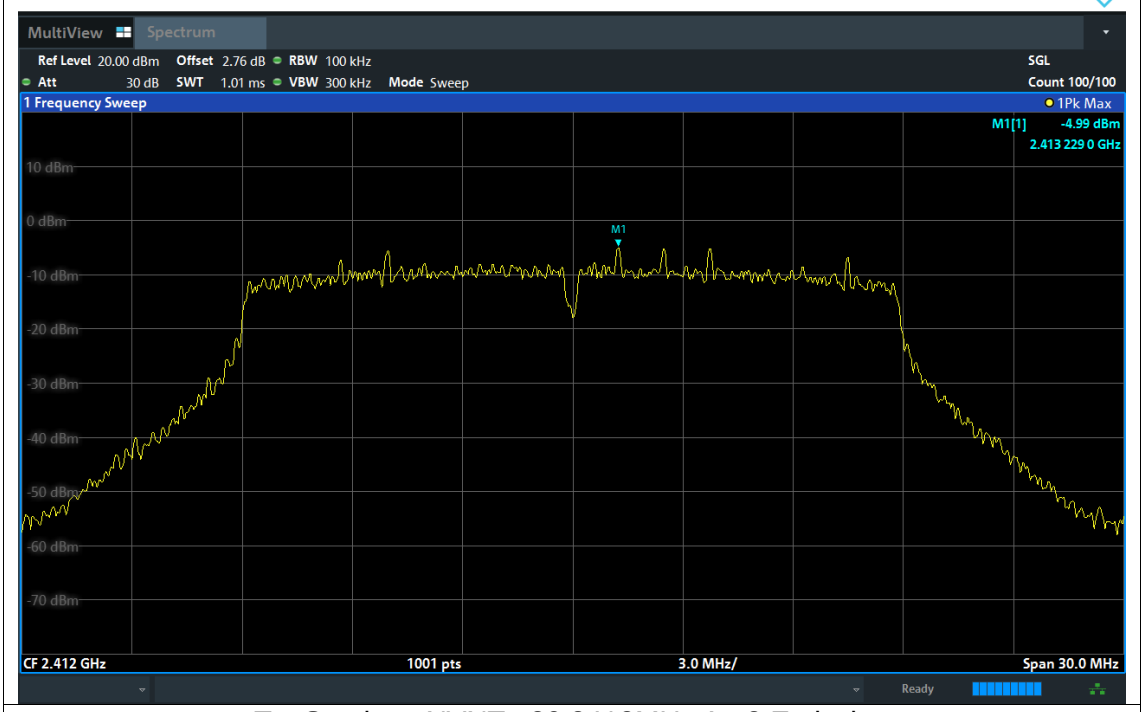


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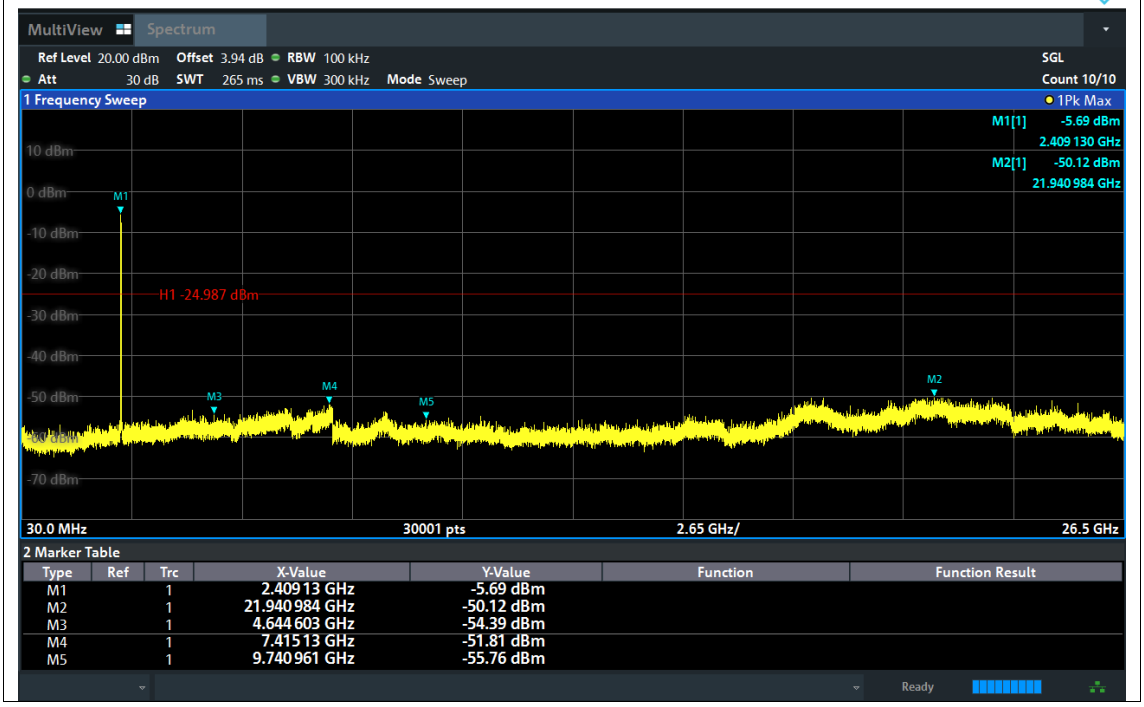

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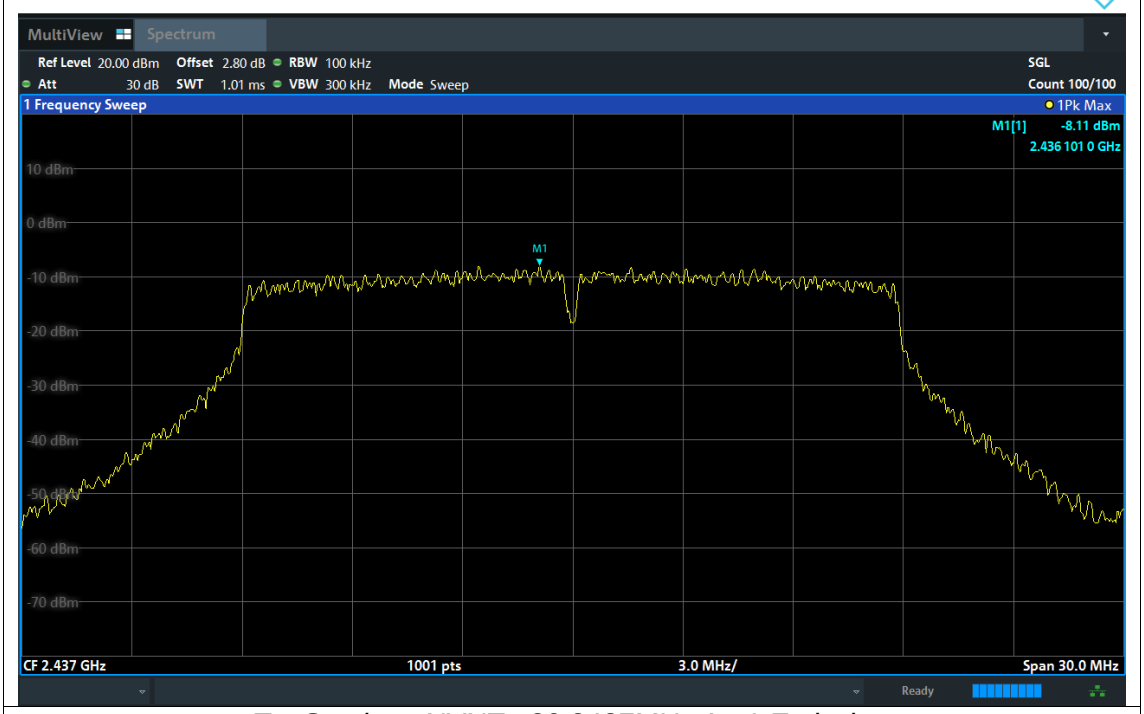


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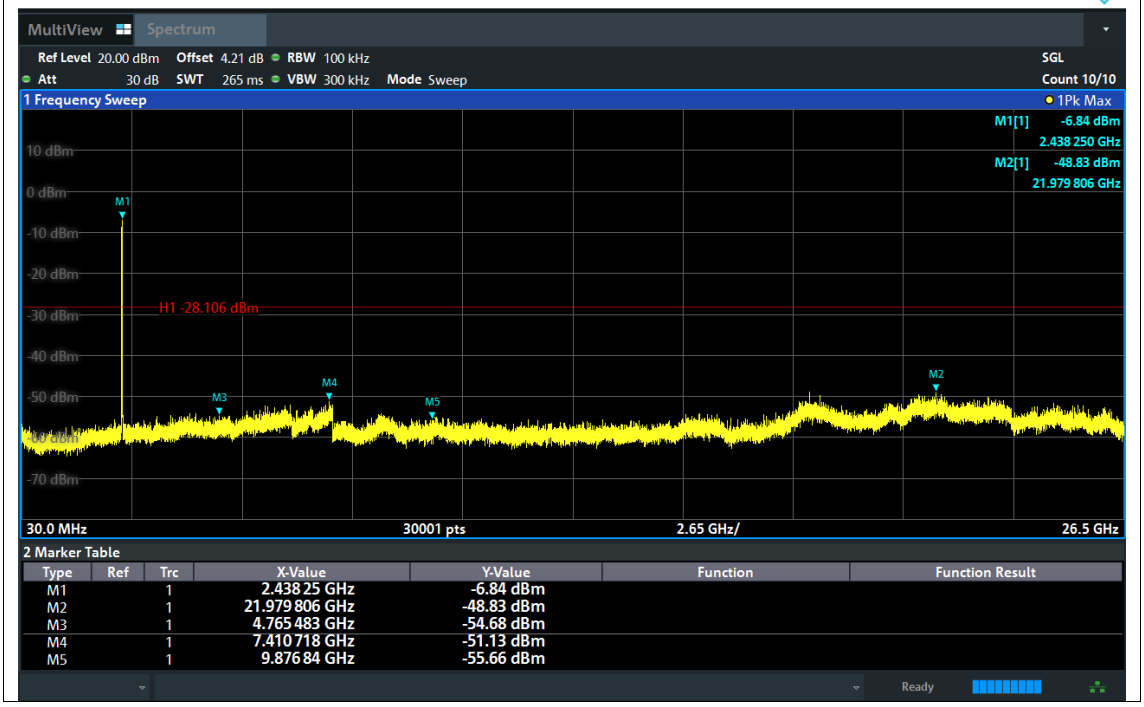

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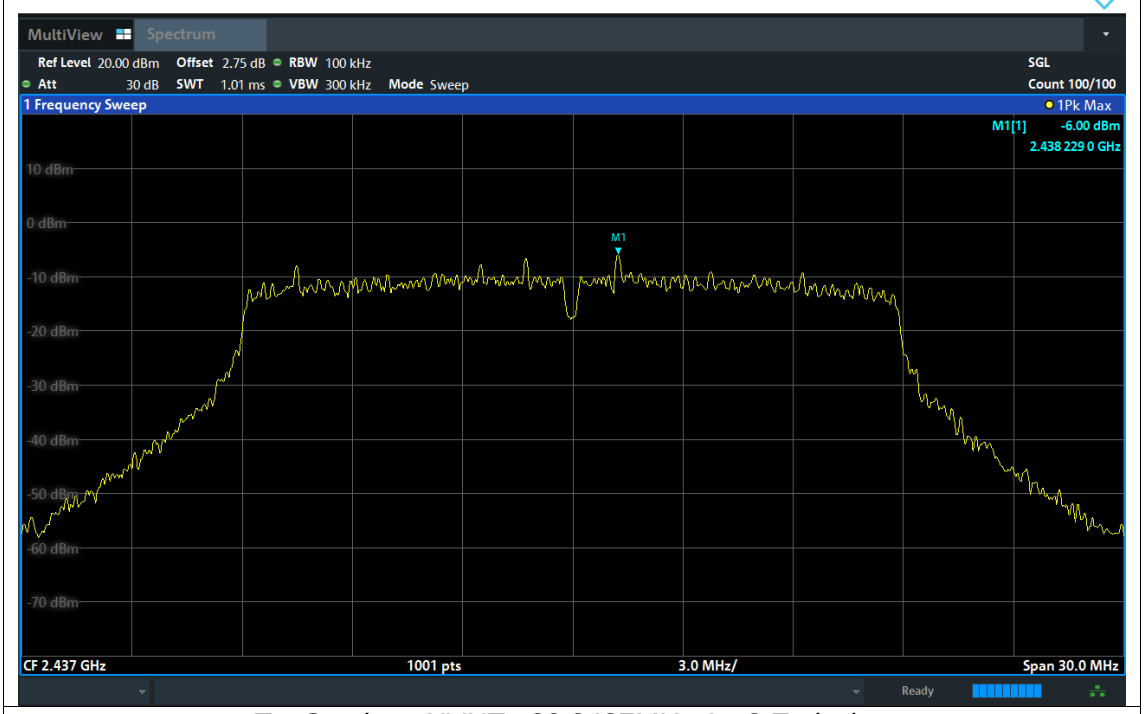


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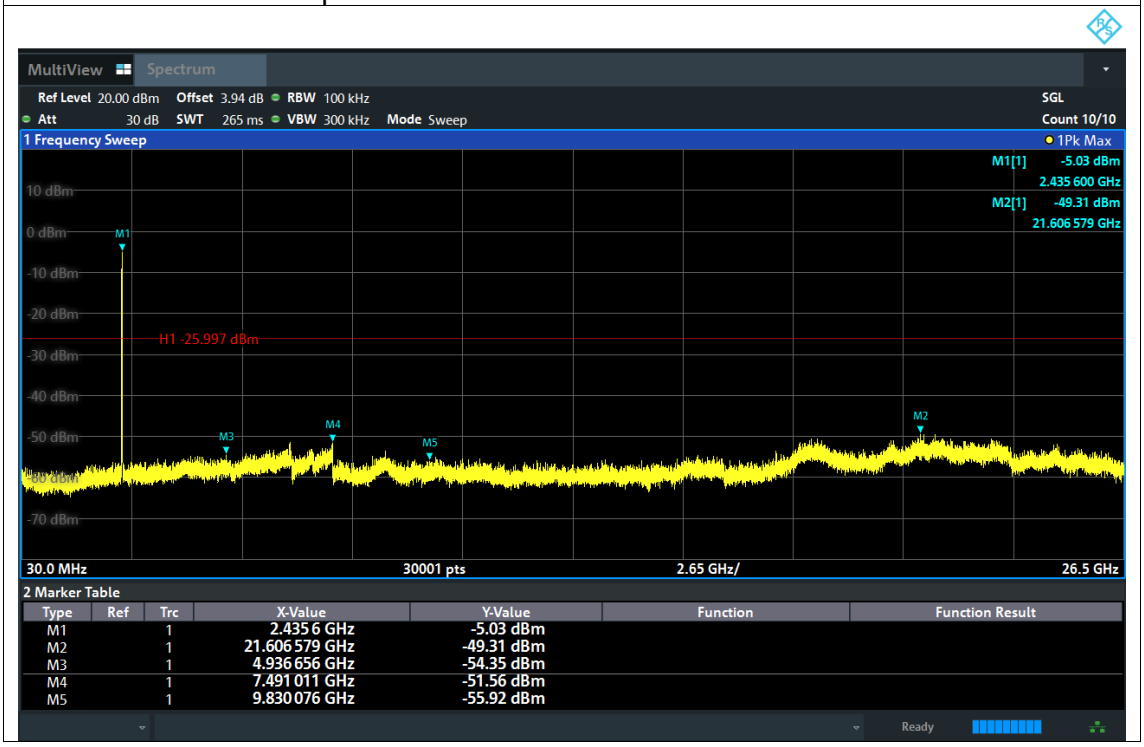

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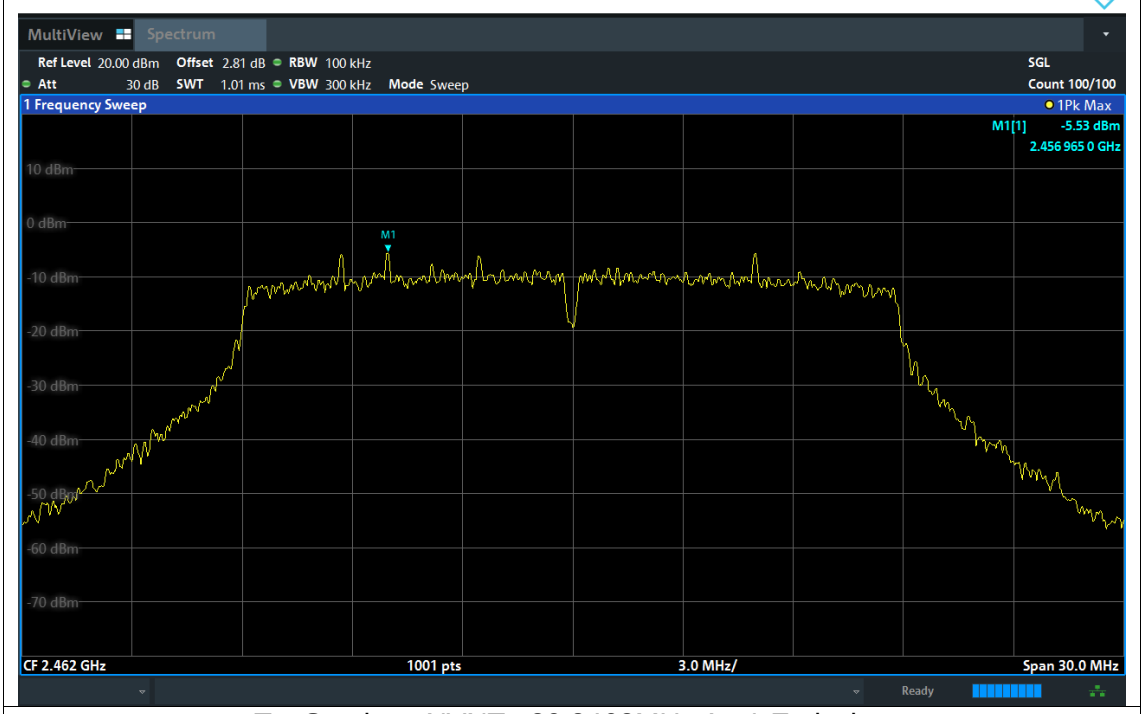


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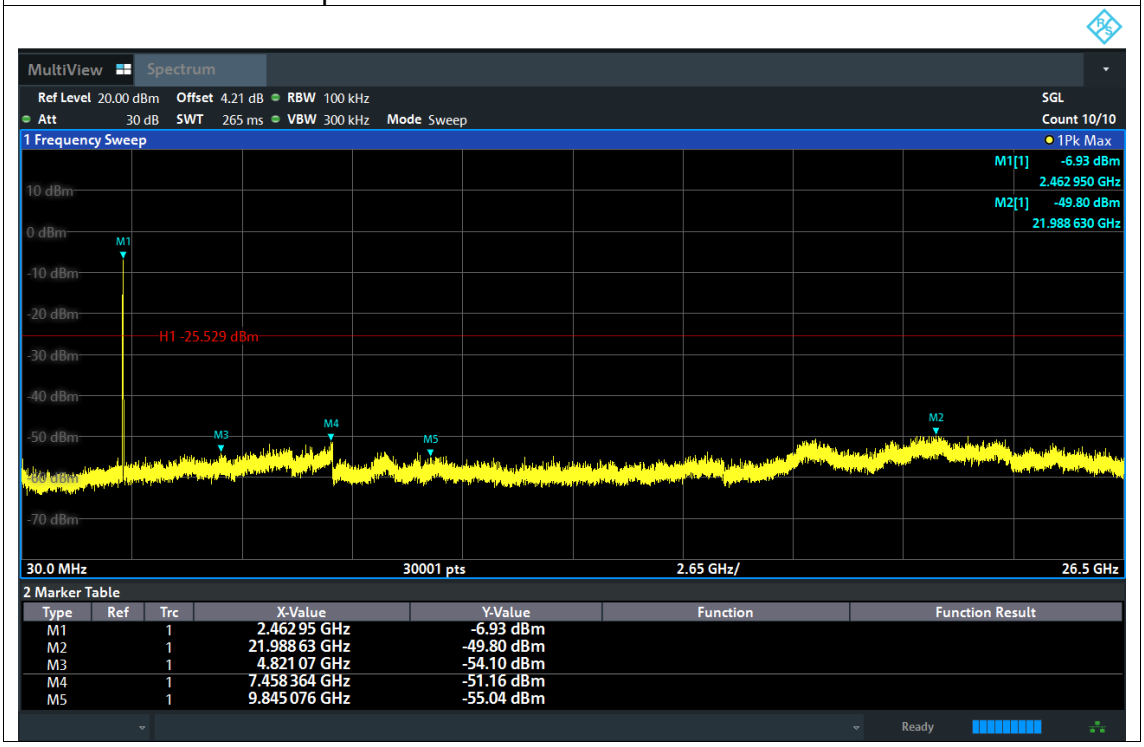

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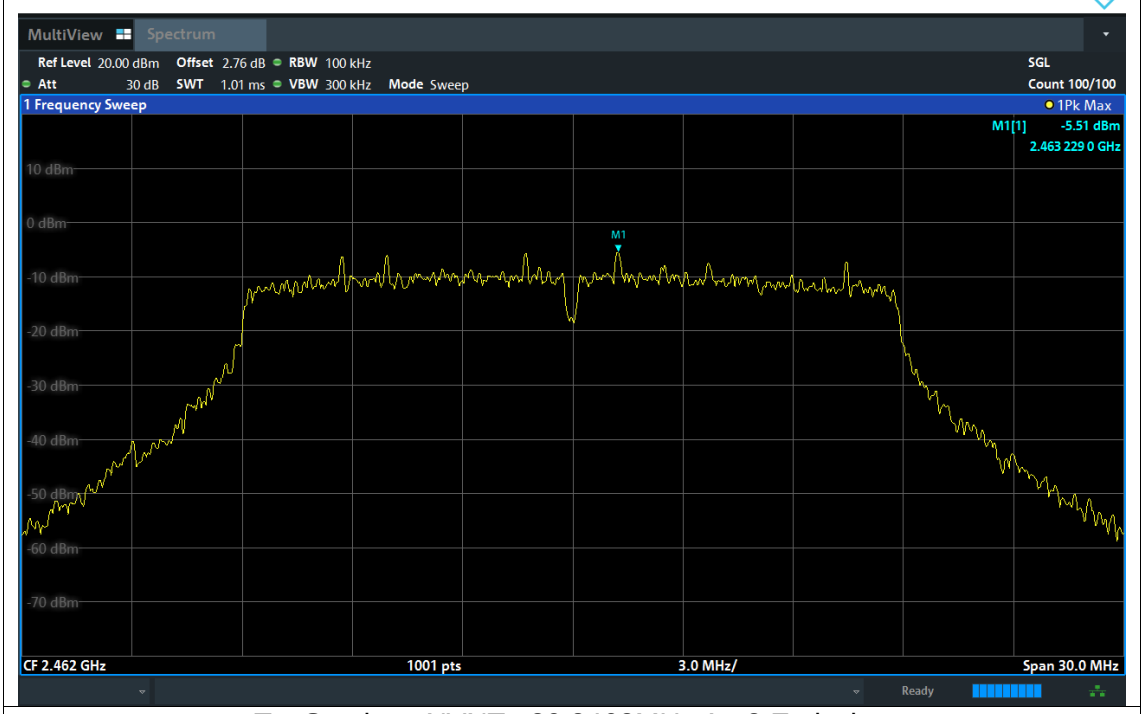


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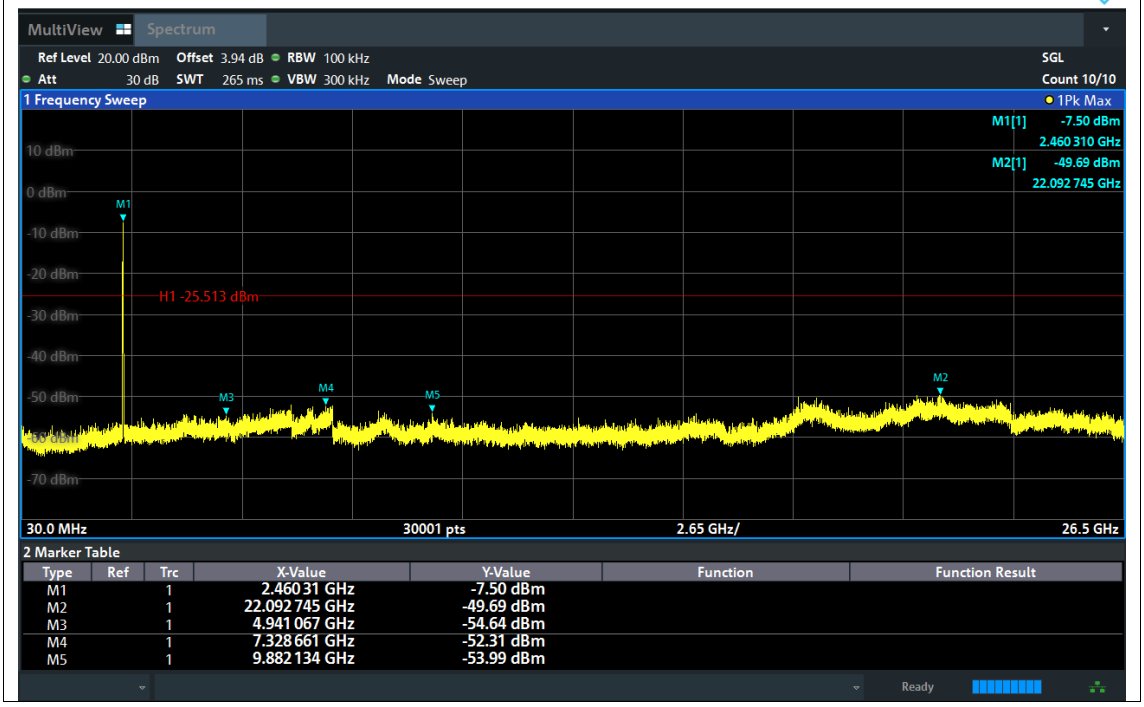

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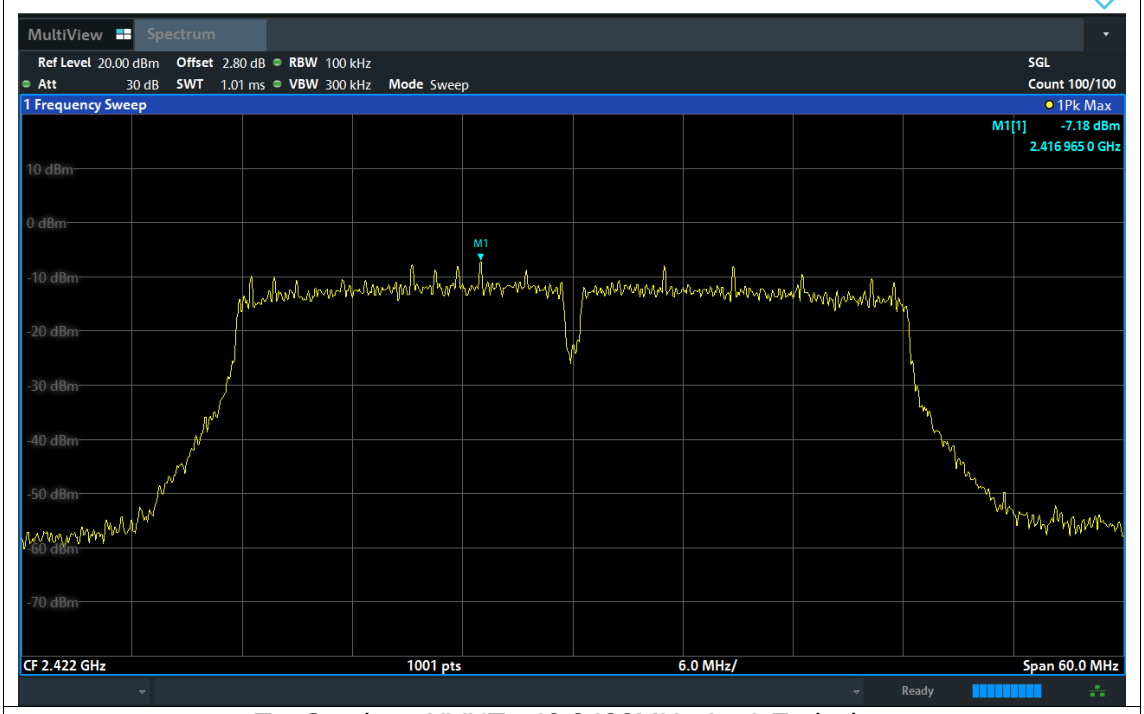


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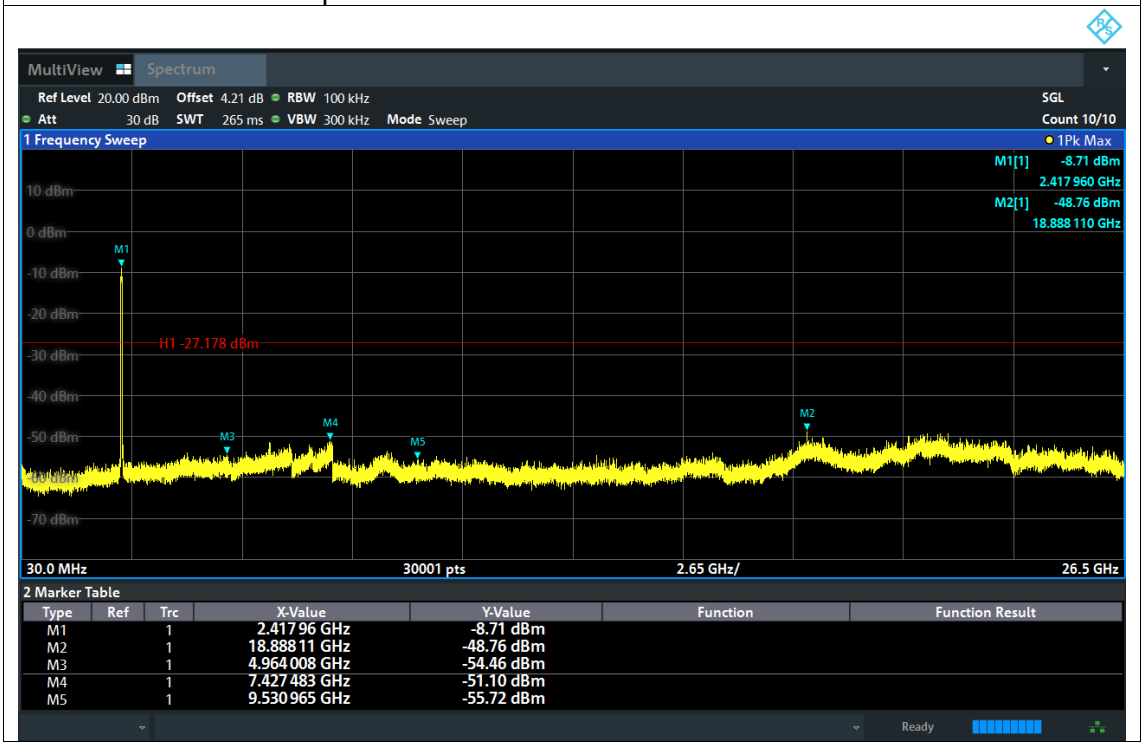

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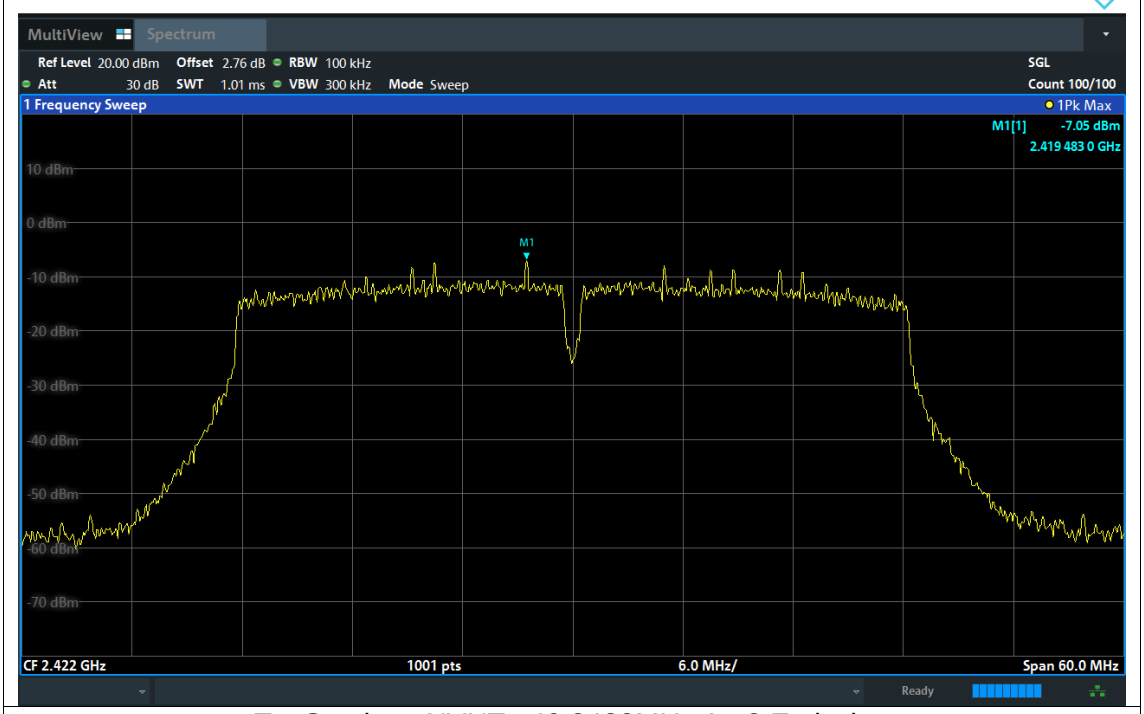


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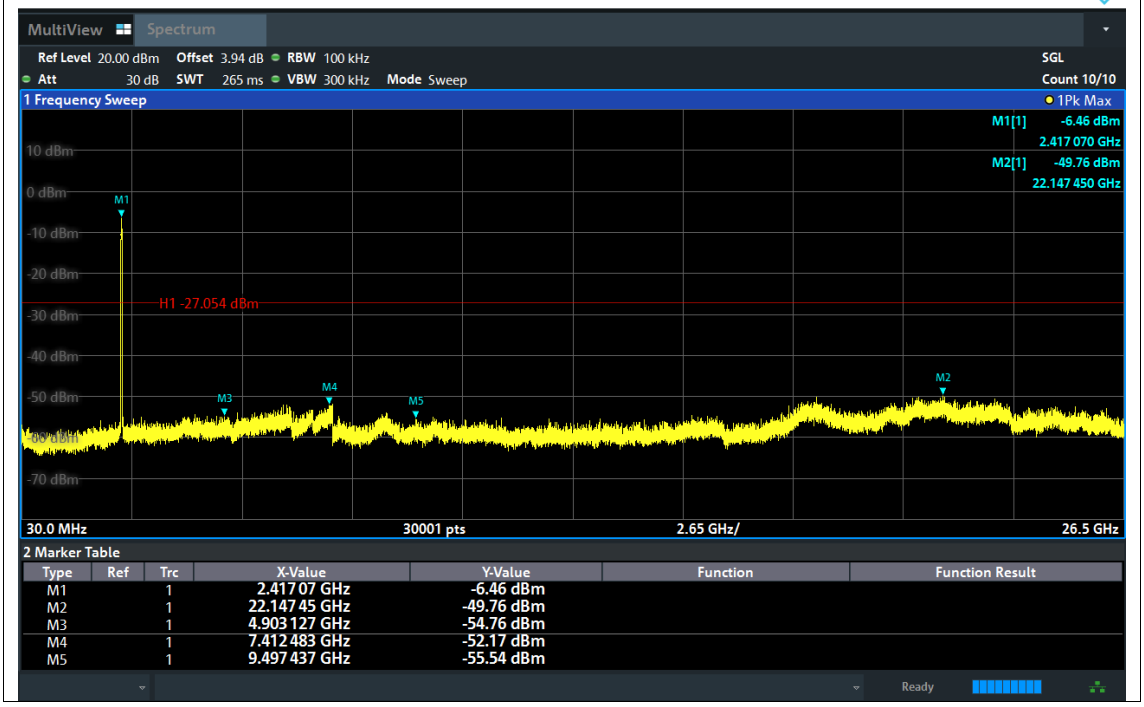

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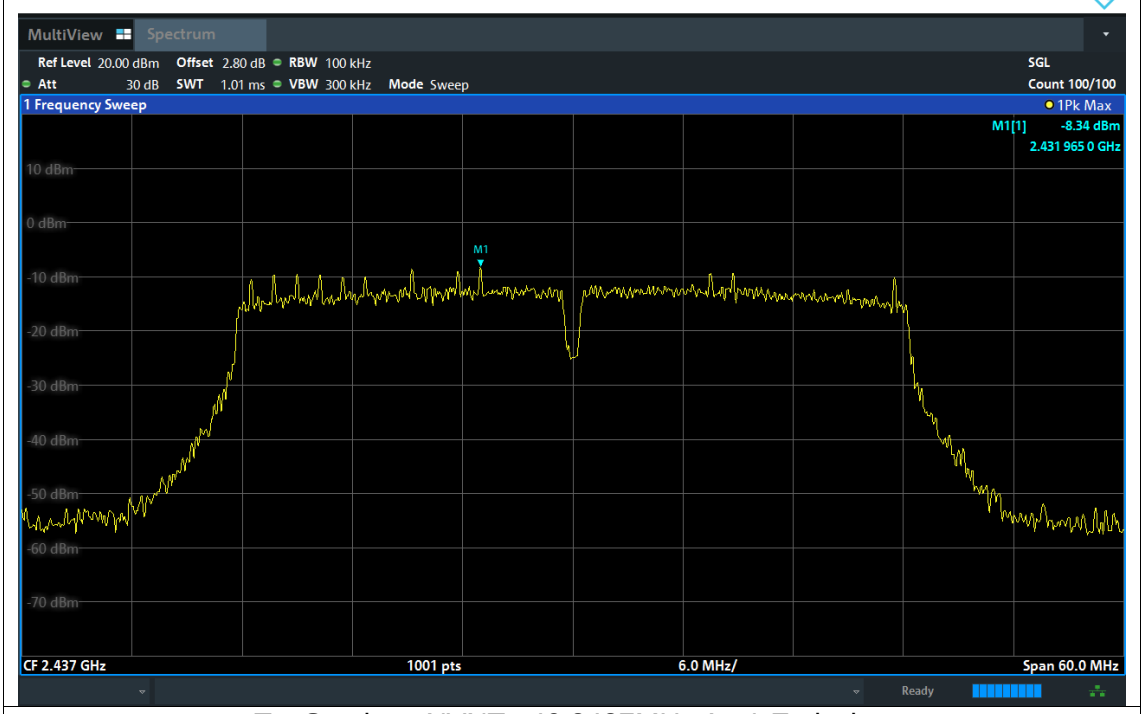


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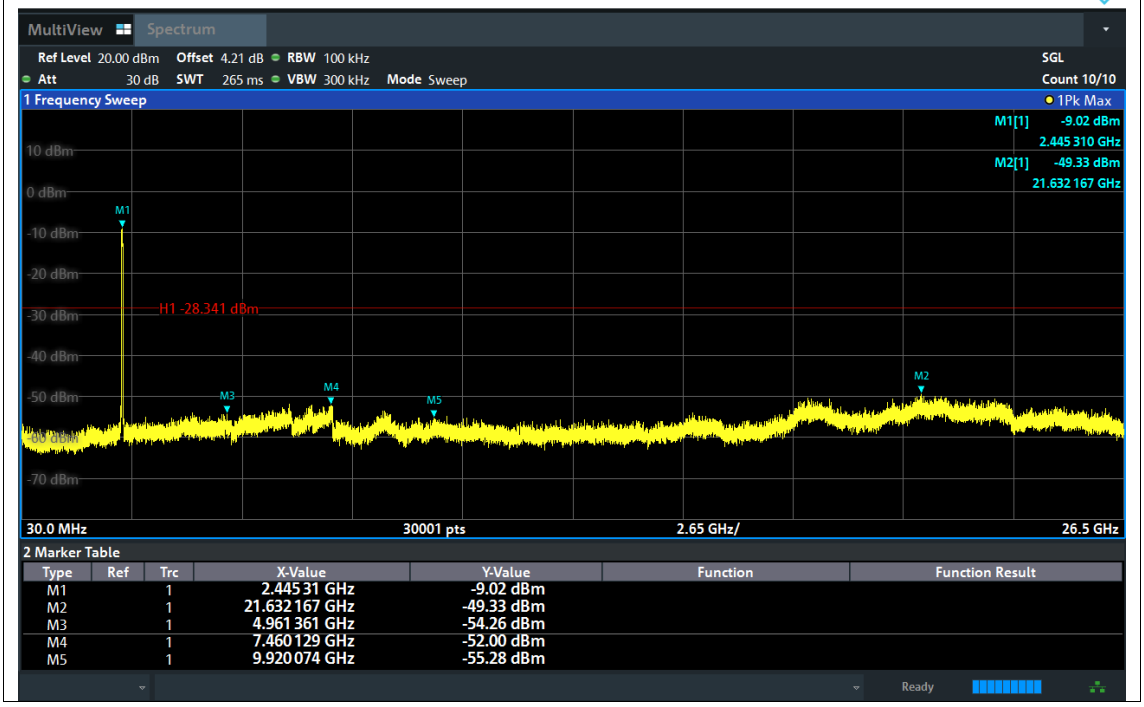

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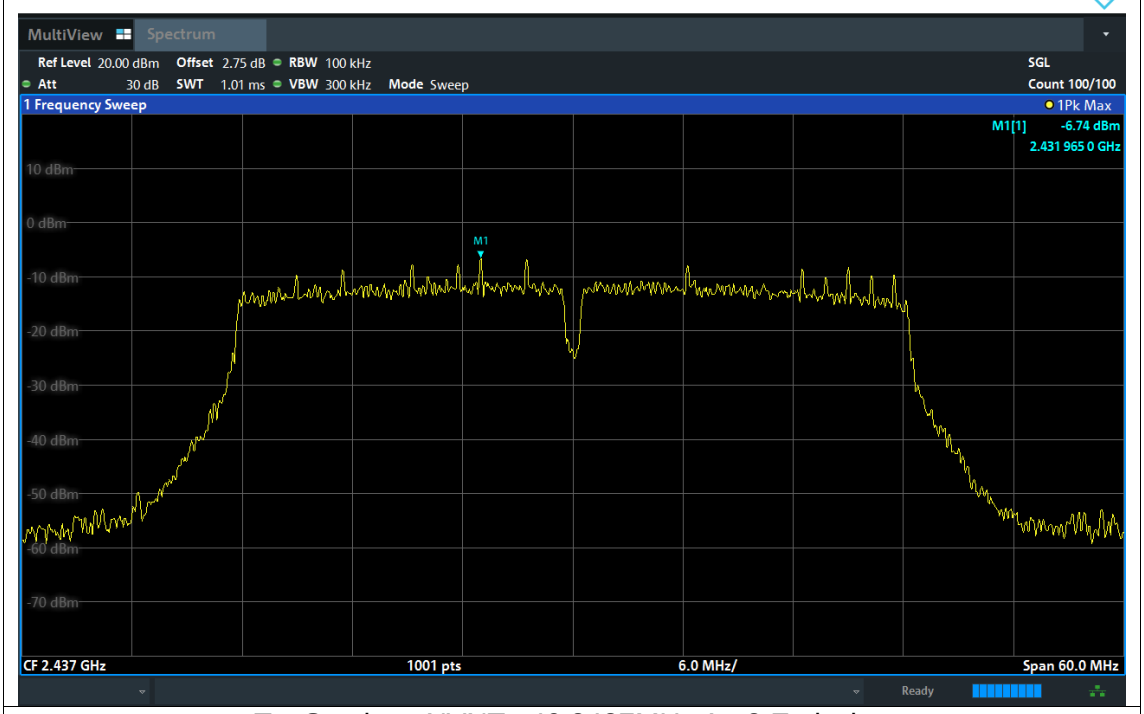


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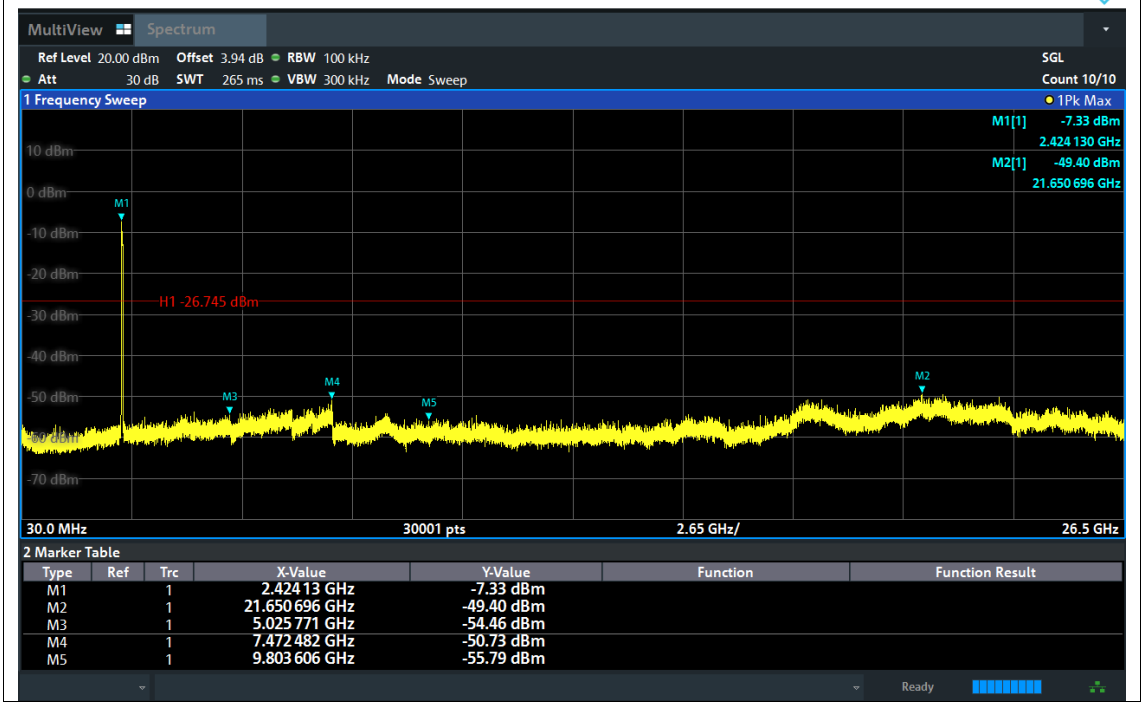

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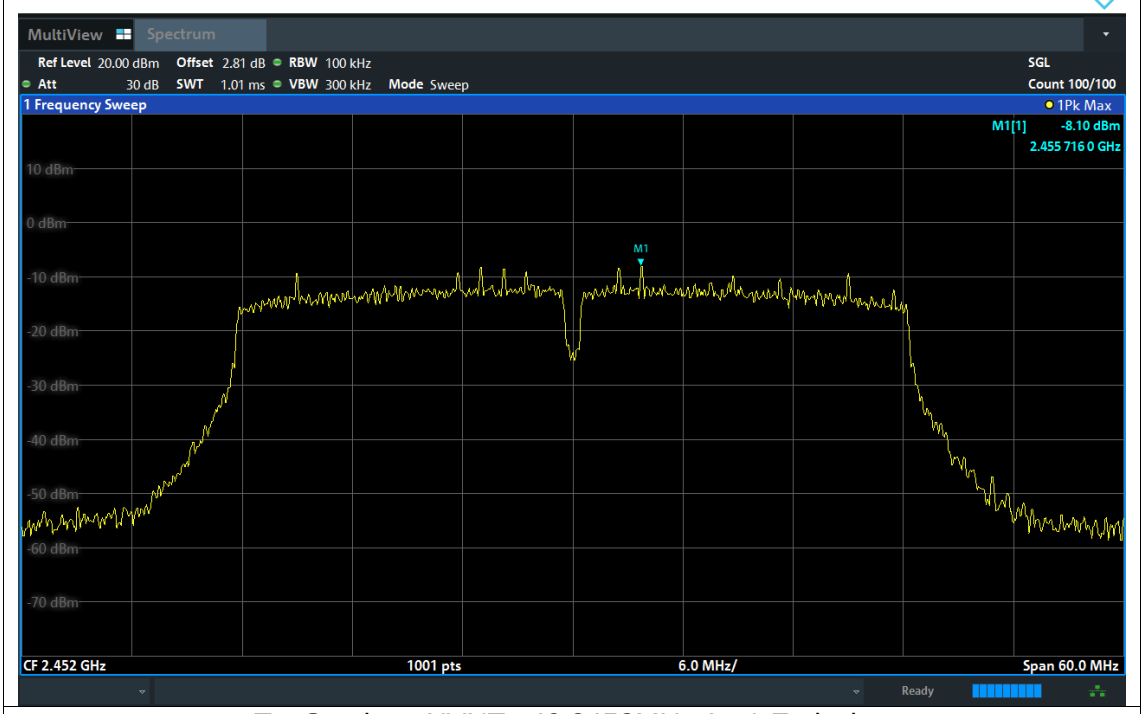


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