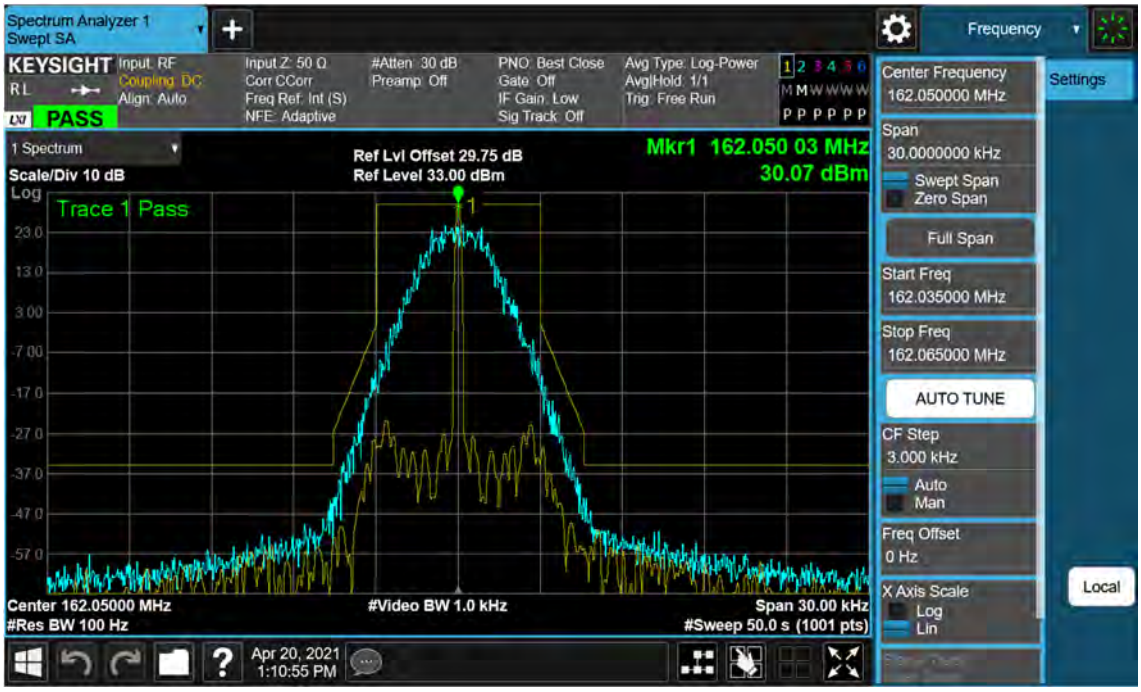
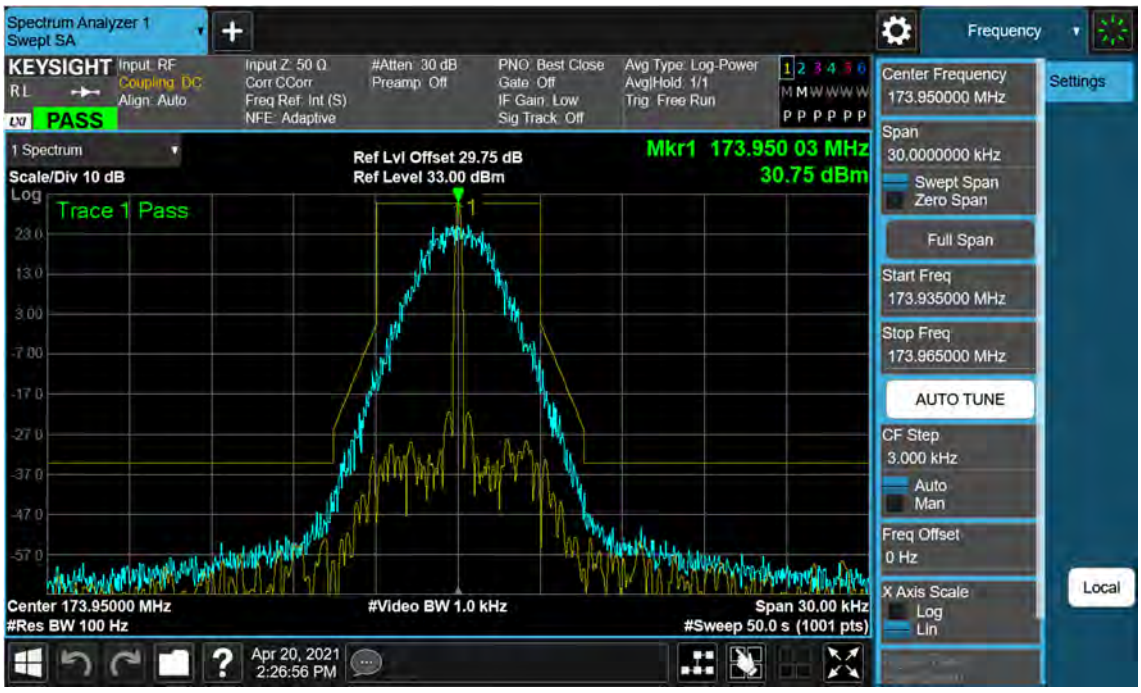
(162.05 MHz)_ Low

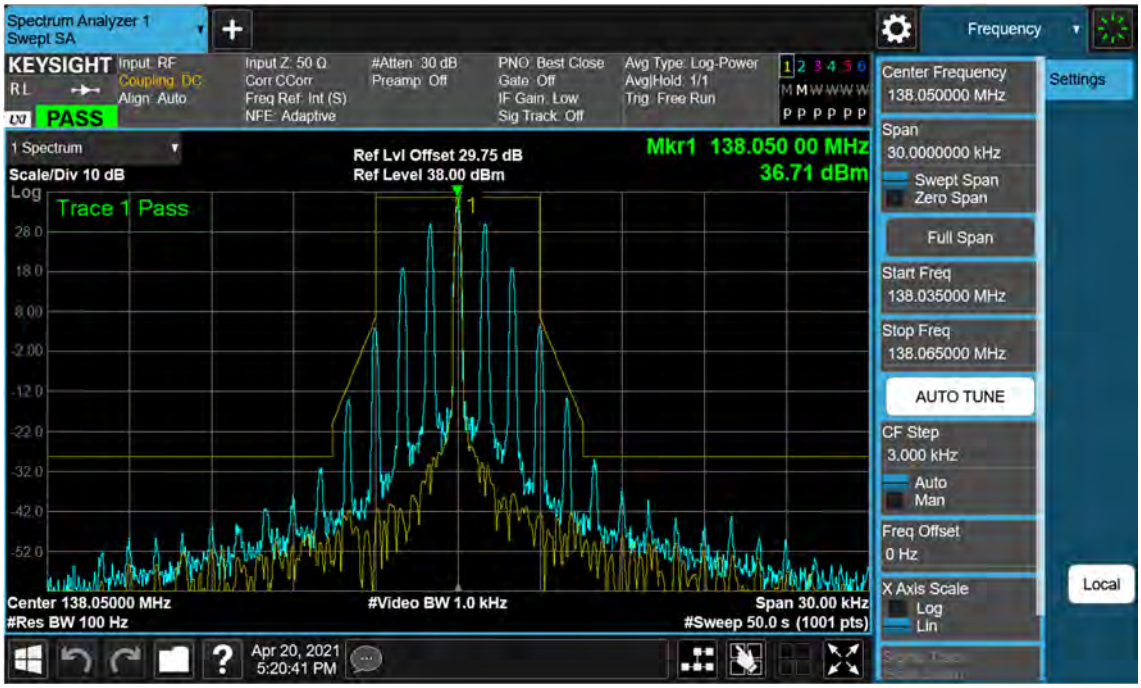



(173.95 MHz)_ Low

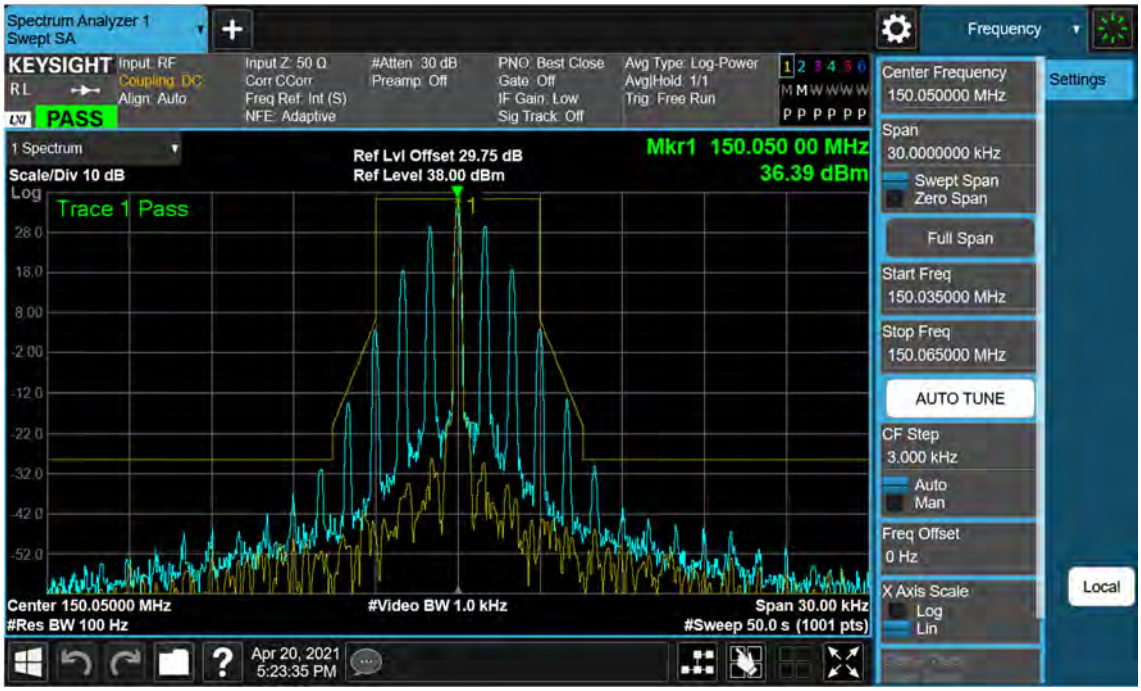


**4K00F2D_FCC/ISED**

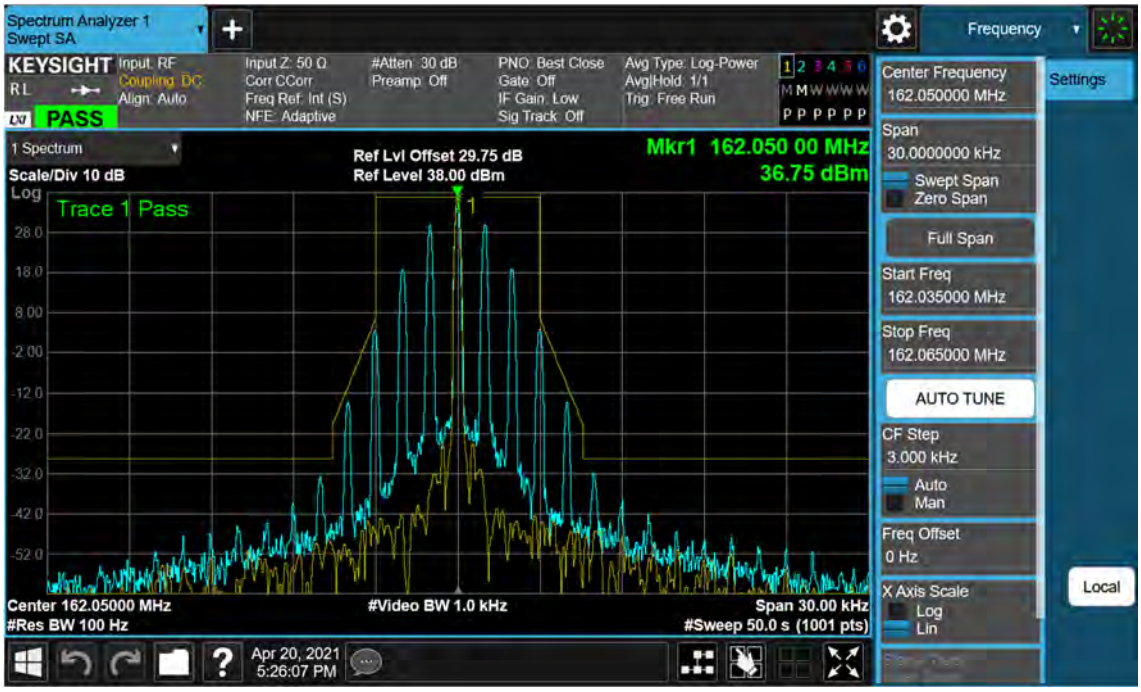
(138.05 MHz)_High



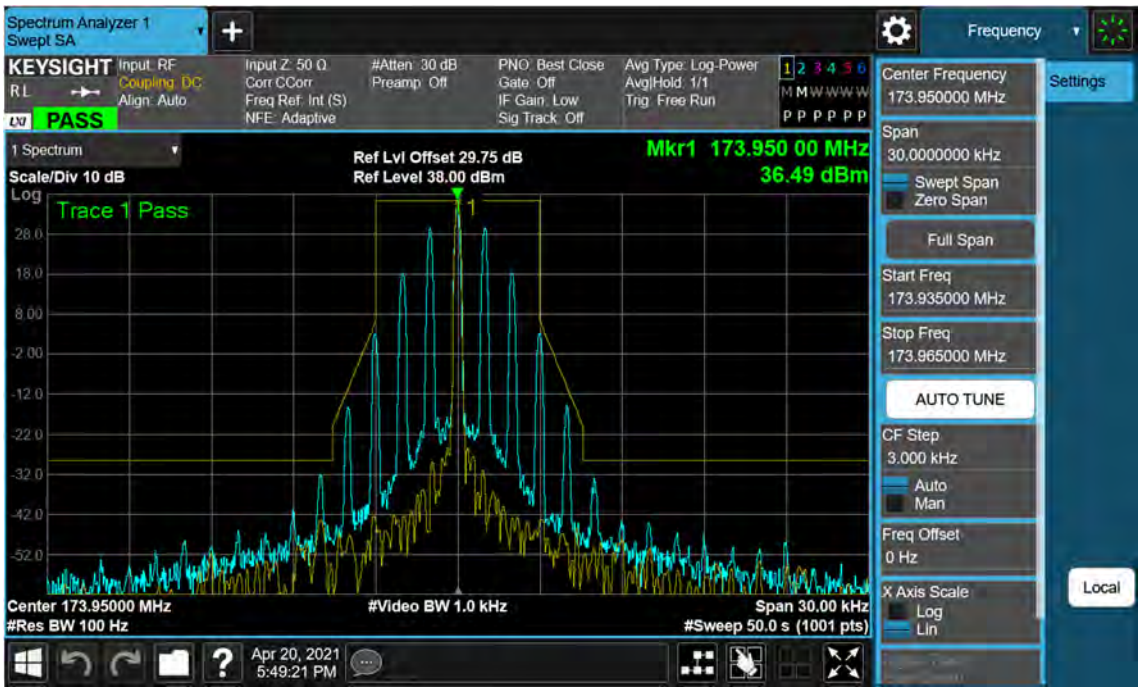

(150.05 MHz)_High



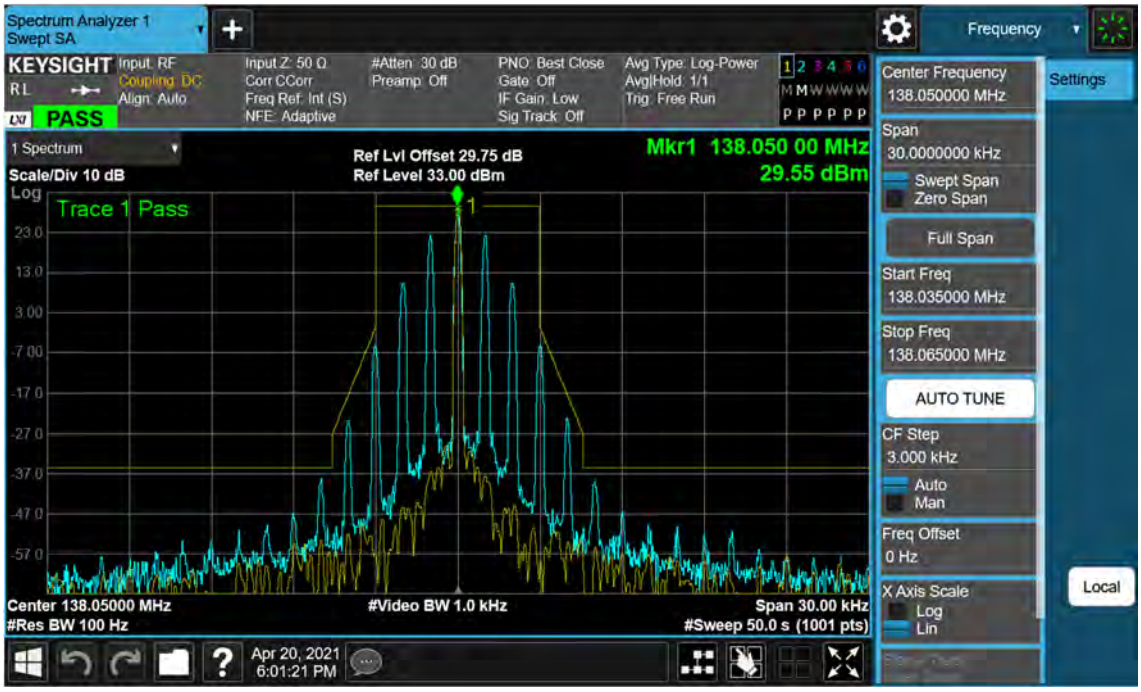
(162.05 MHz)_High




(173.95 MHz)_High

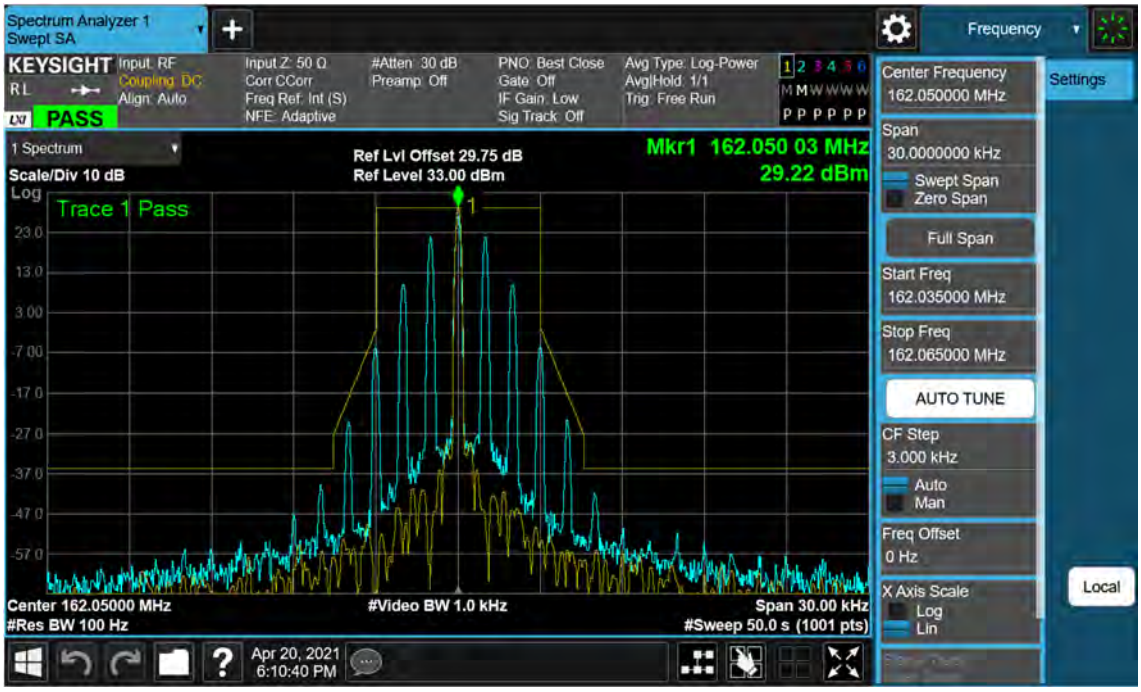


(138.05 MHz)_Low

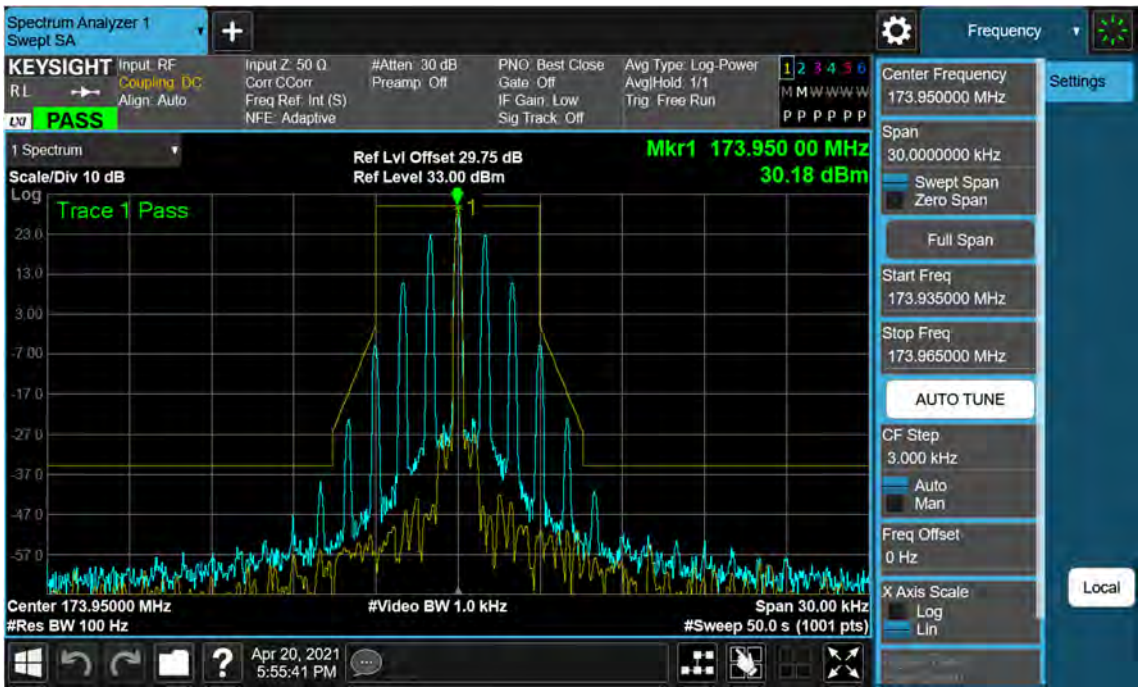



(150.05 MHz)_ Low

(162.05 MHz)_ Low




(173.95 MHz)_ Low



## 8.7 Transient Frequency Behavior

▣ Definition

Transient frequency behavior is a measure of the difference, as a function in time, of the actual transmitter frequency to the assigned transmitter frequency when the transmitted RF output power is switched on or off.

▣ TEST CONFIGURATION


▣ TEST PROCEDURE

According to 2.2.19 in TIA-603-E Standard.

a) Connect the equipment as illustrated.

b) Connect the output of the standard transmitter load to the RF power meter.
Supply sufficient attenuation via the RF attenuator to provide a level that is approximately 40 dB below the maximum allowable input to the modulation domain analyzer.

c) Unkey the transmitter.

d) Disconnect the RF power meter and connect the modulation domain analyzer in its place.
Set the envelope trigger of the modulation domain analyzer to the minimum level that will trigger when the transmitter is keyed.

e) Reduce the attenuation of the RF attenuator so that the input to the modulation domain analyzer is increased by 30 dB when the transmitter is keyed.

f) Set the modulation domain analyzer to trigger on the rising edge of the waveform in order to capture a single-shot turn-on of the transmitter signal.

g) Adjust the display of the modulation domain analyzer for proper viewing of the transmitter transient behavior. Set the time base reference to the left for observing the transmitter turn-on transient.

h) Key the transmitter.

i) Observe the stored display of the modulation domain analyzer.
The signal trace shall be maintained within the allowable limits during the periods $t_1$ and $t_2$, and shall also remain within limits following $t_2$.

j) Adjust the modulation domain analyzer to trigger on the falling edge of the transmitter waveform in order to capture a single-shot turn-off transient of the transmitter signal.

k) Adjust the display of the modulation domain analyzer for proper viewing of the transmitter transient behavior. Set the time base reference to the right for observing the transmitter turn-off transient.

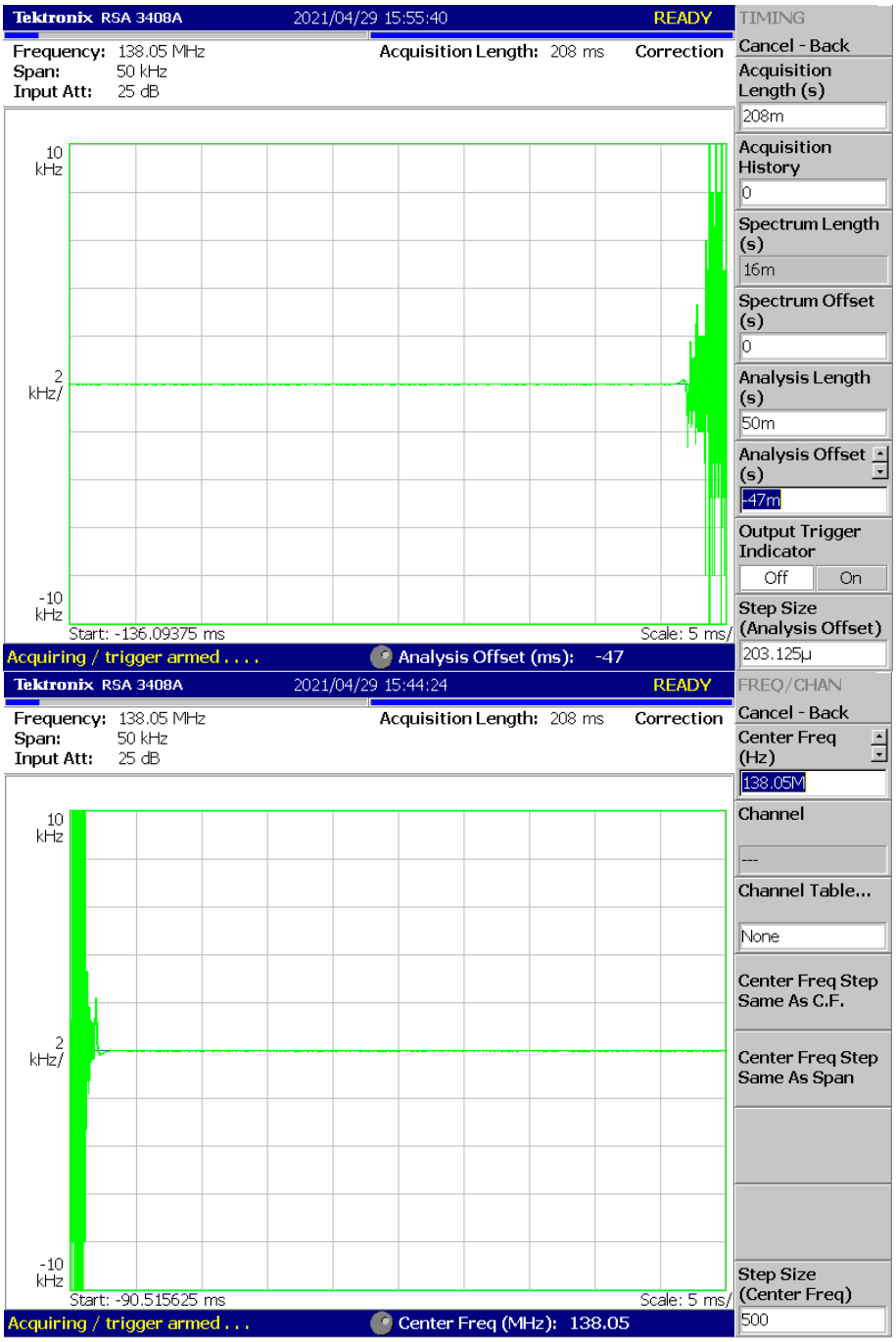
l) Unkey the transmitter.

m) Observe the stored display of the modulation domain analyzer. The signal trace shall be maintained within the allowable limits during the period $t_3$.

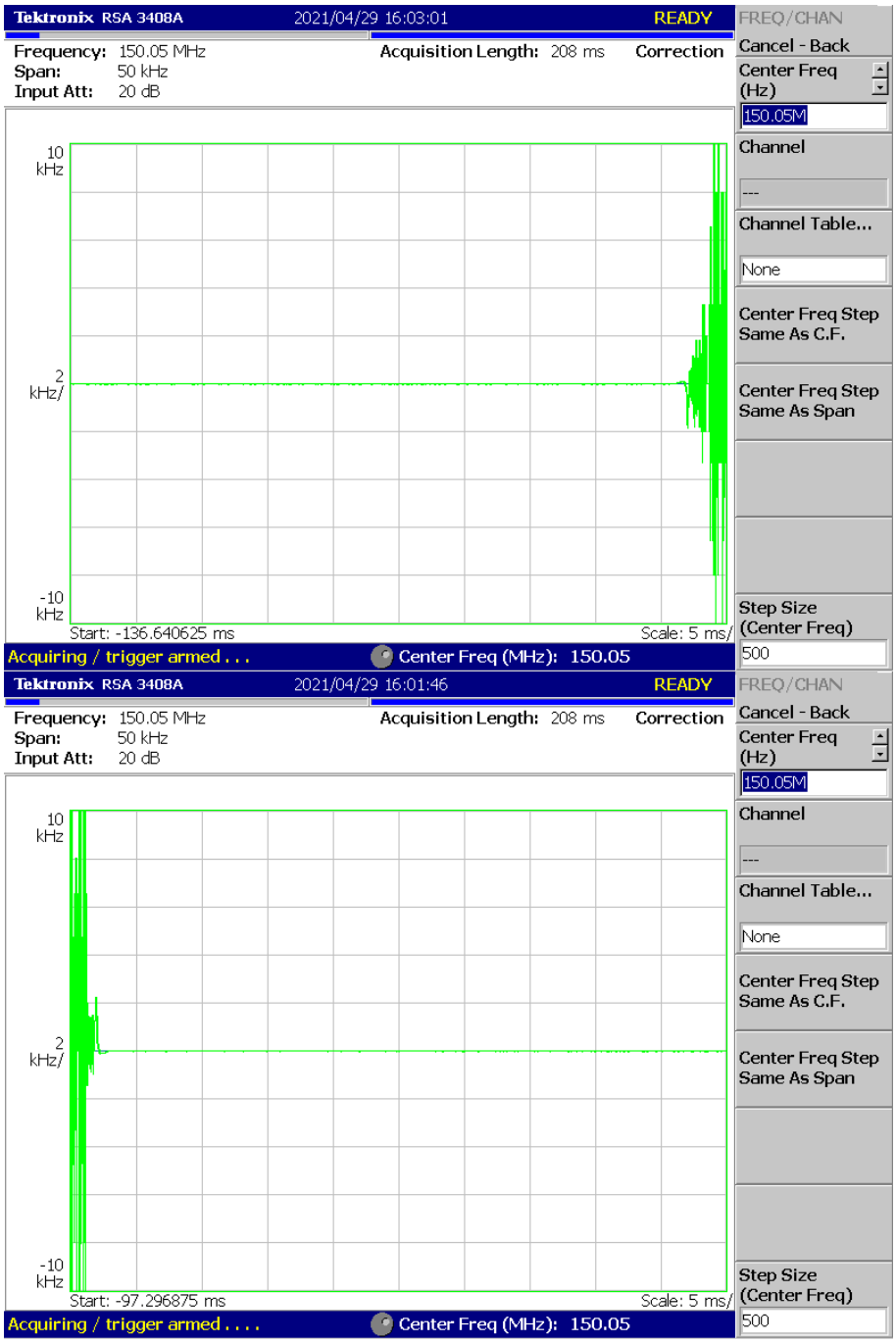
▣ Plots of Transient Frequency Behavior

**11K0F3E**

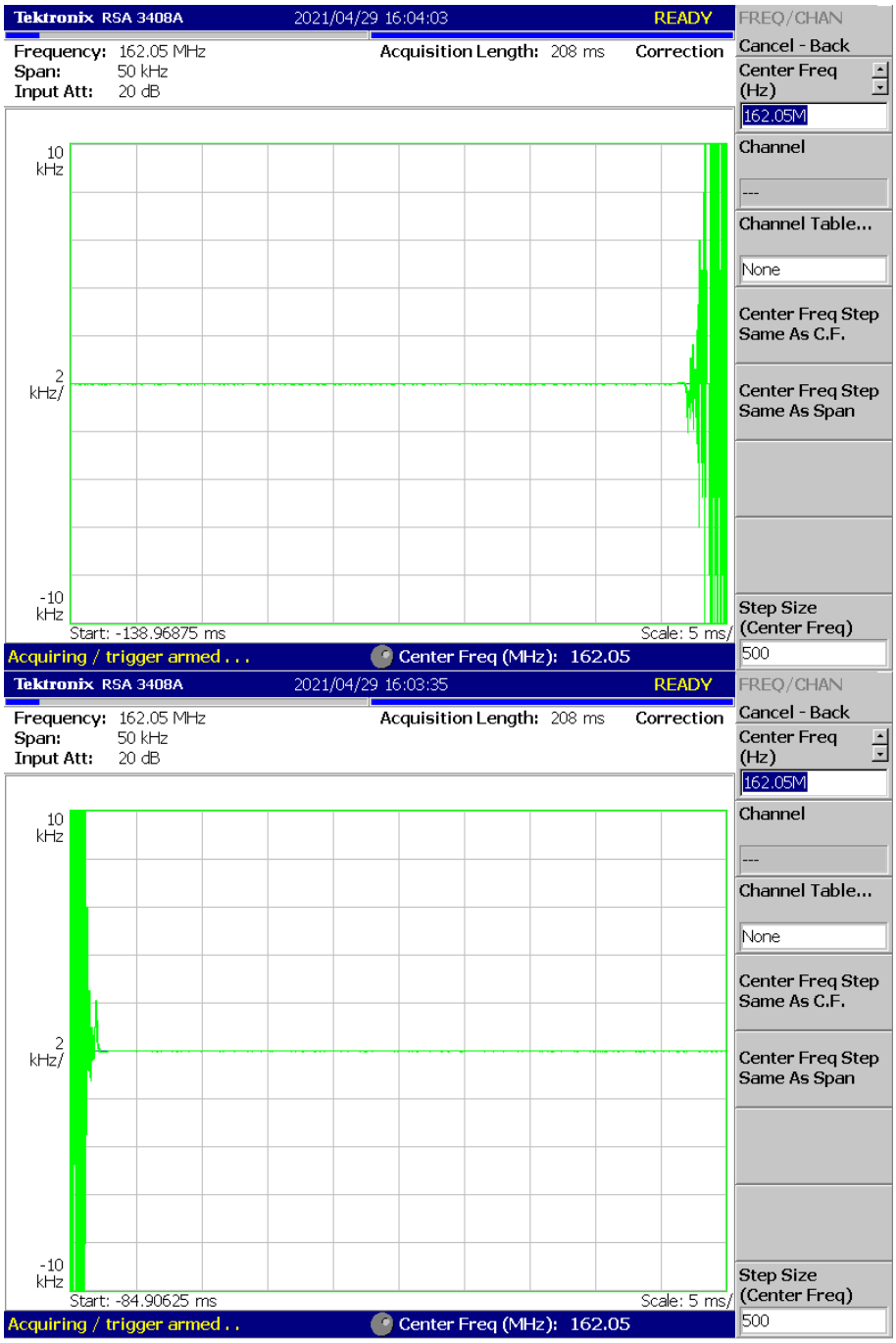
(138.05 MHz)_High



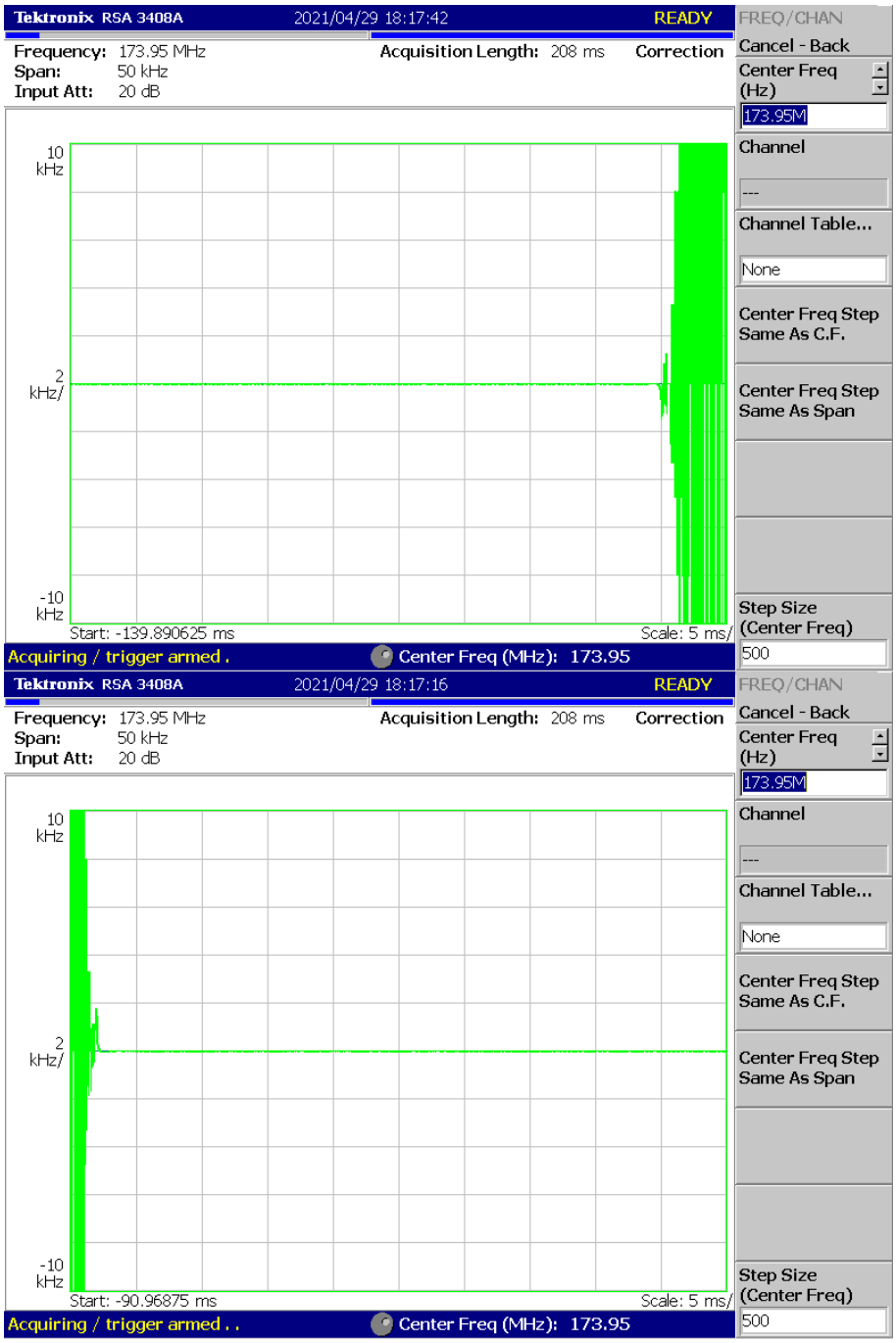
(150.05 MHz)_High



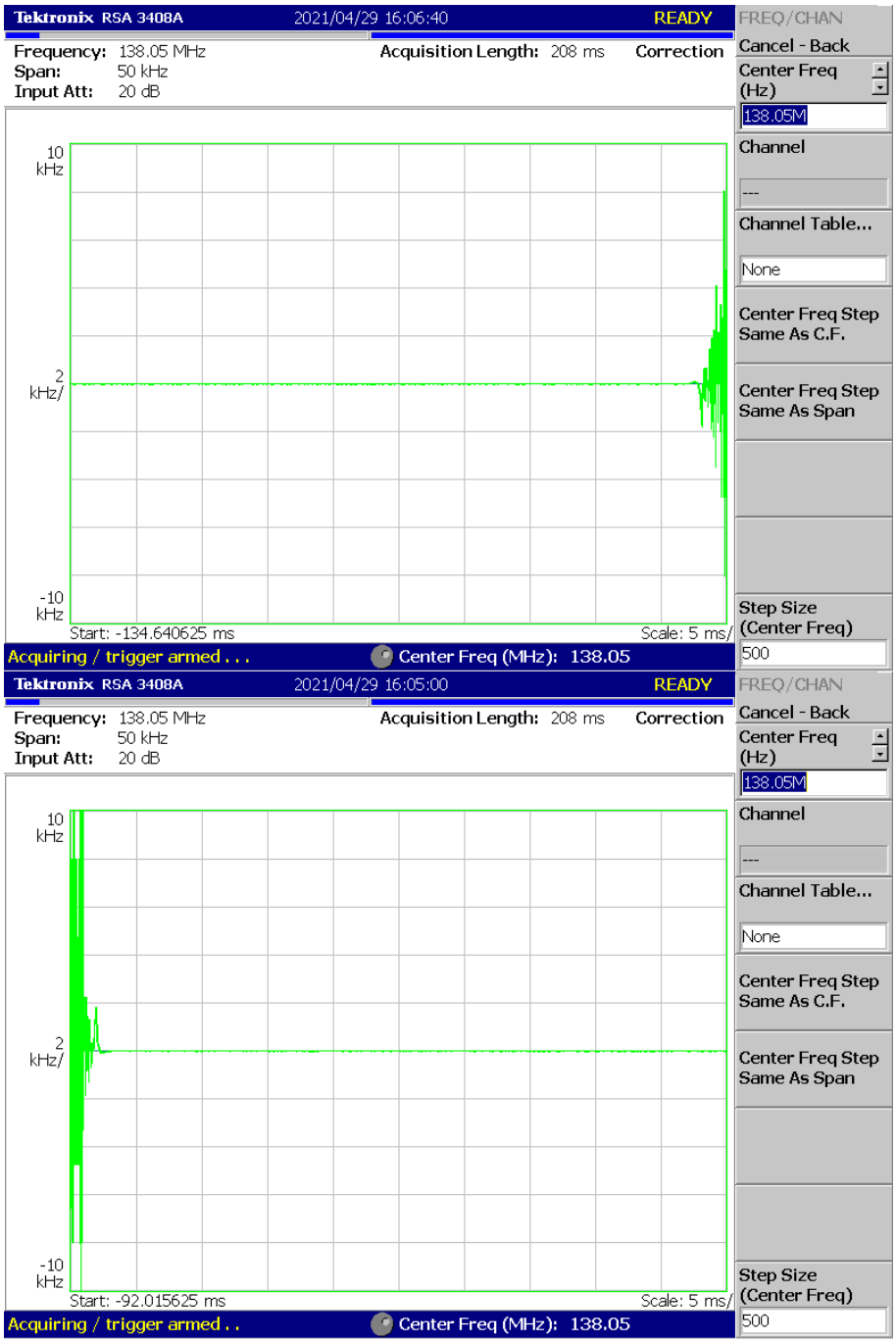
(162.05 MHz)_High



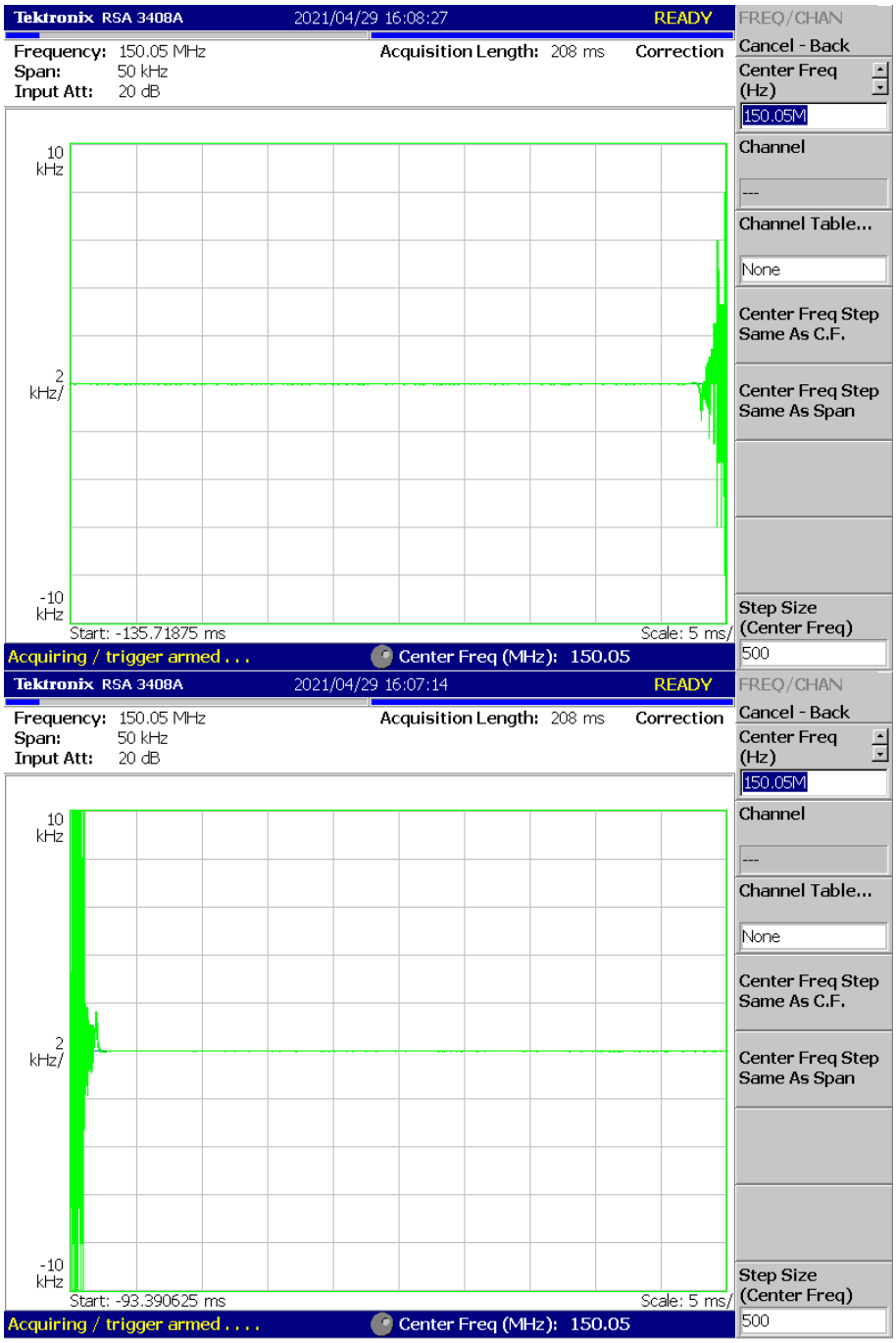
(173.95 MHz)_High



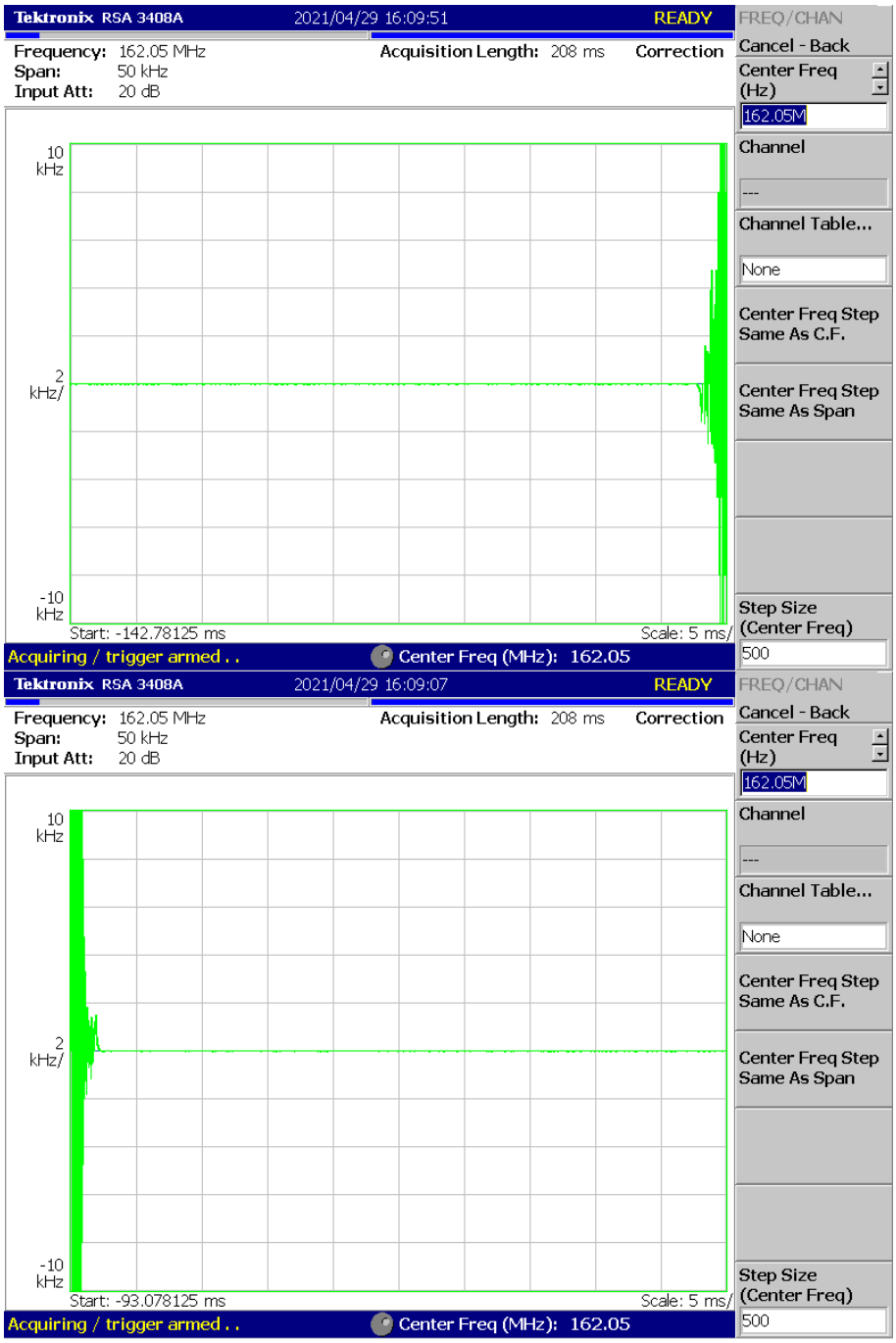
(138.05 MHz)_Low



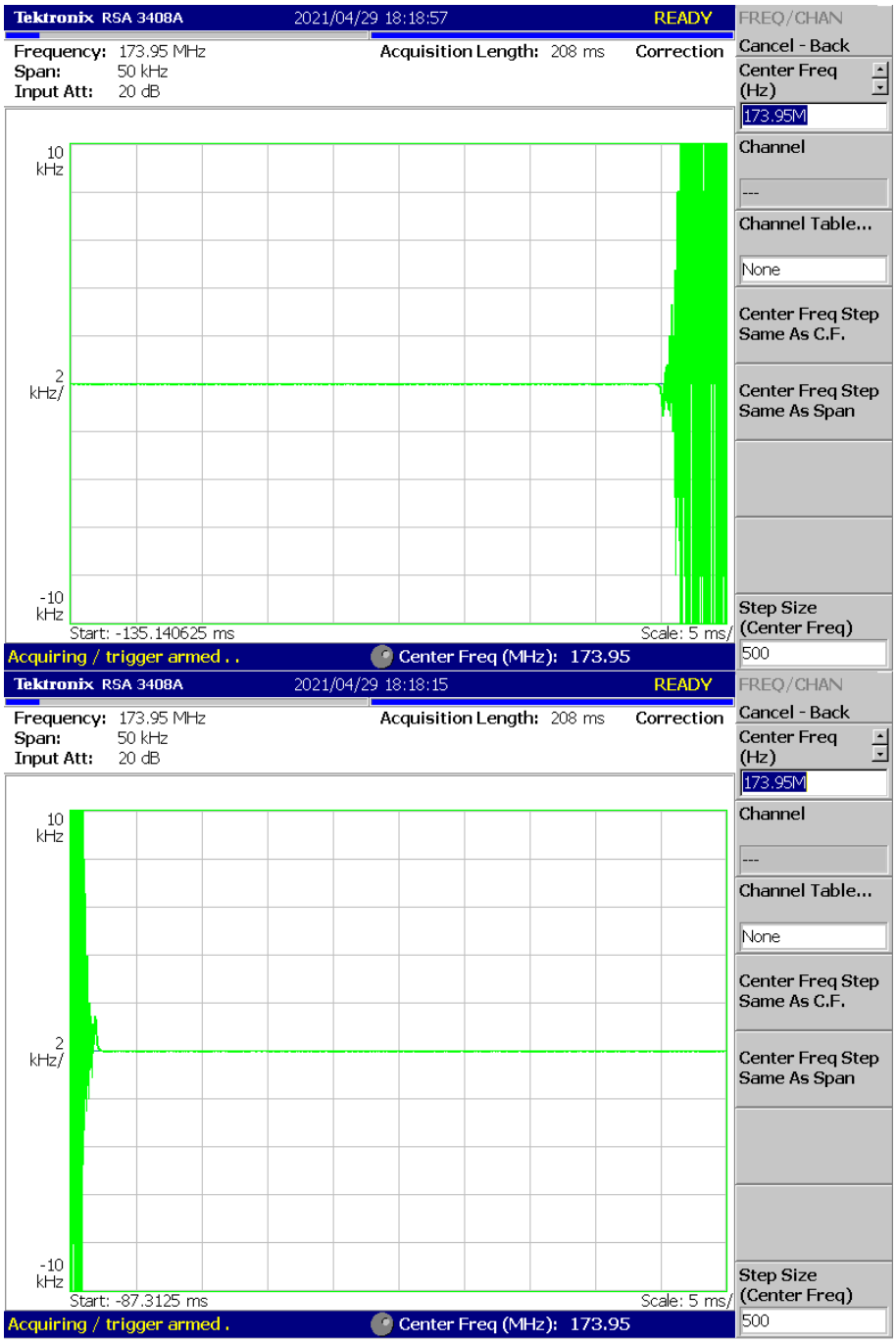
(150.05 MHz)_ Low



(162.05 MHz)_ Low

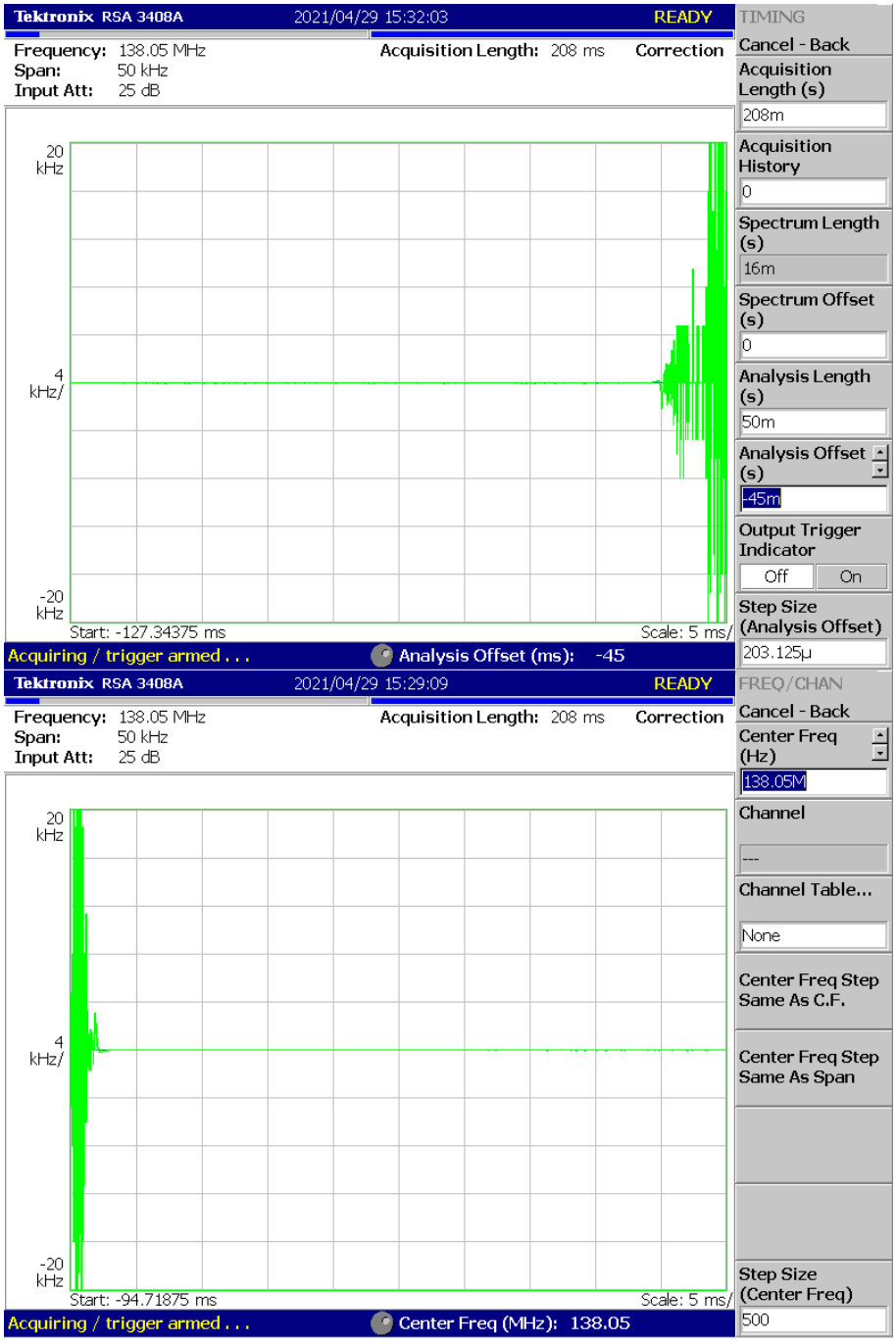


(173.95 MHz)_ Low

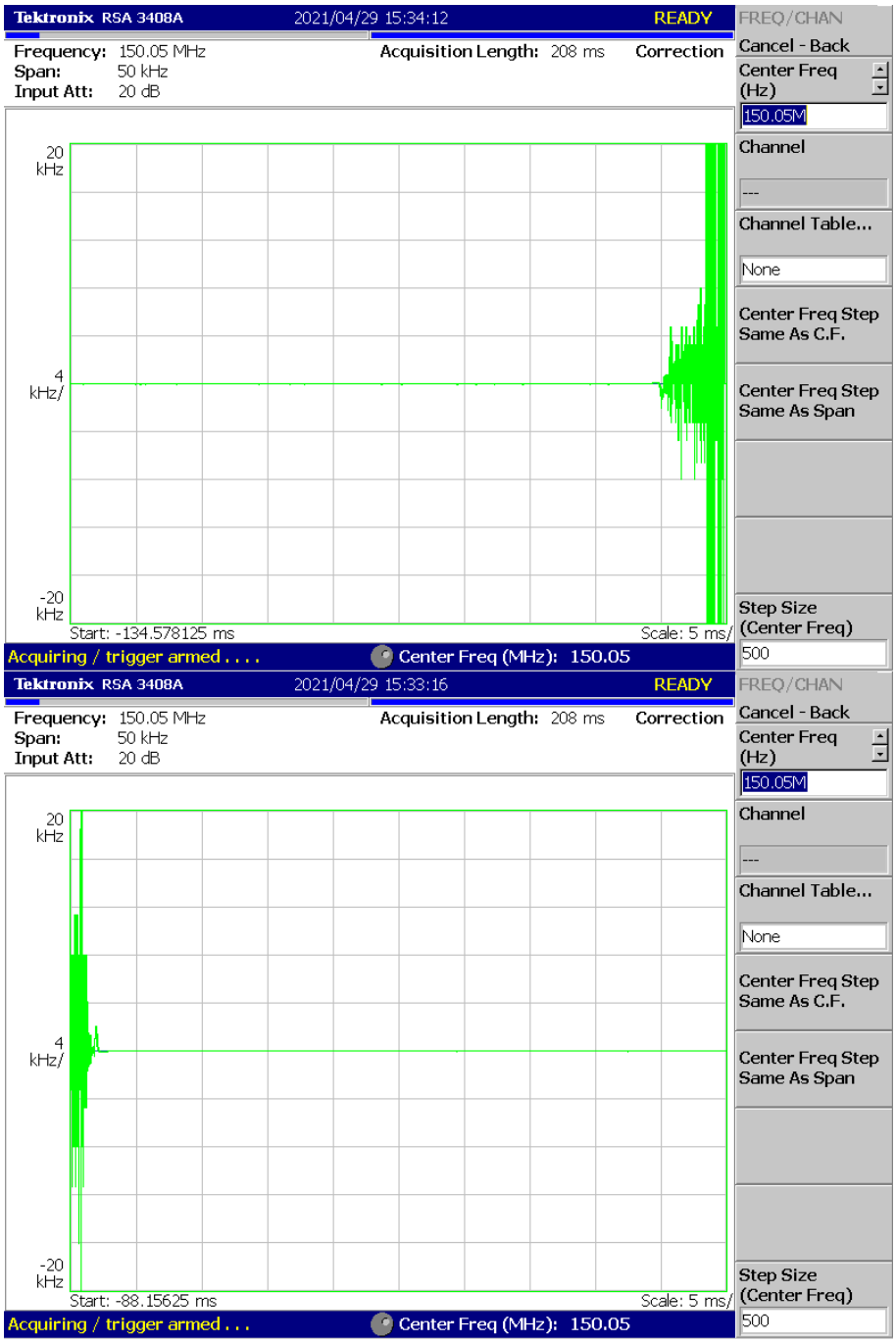


**16K0F3E**

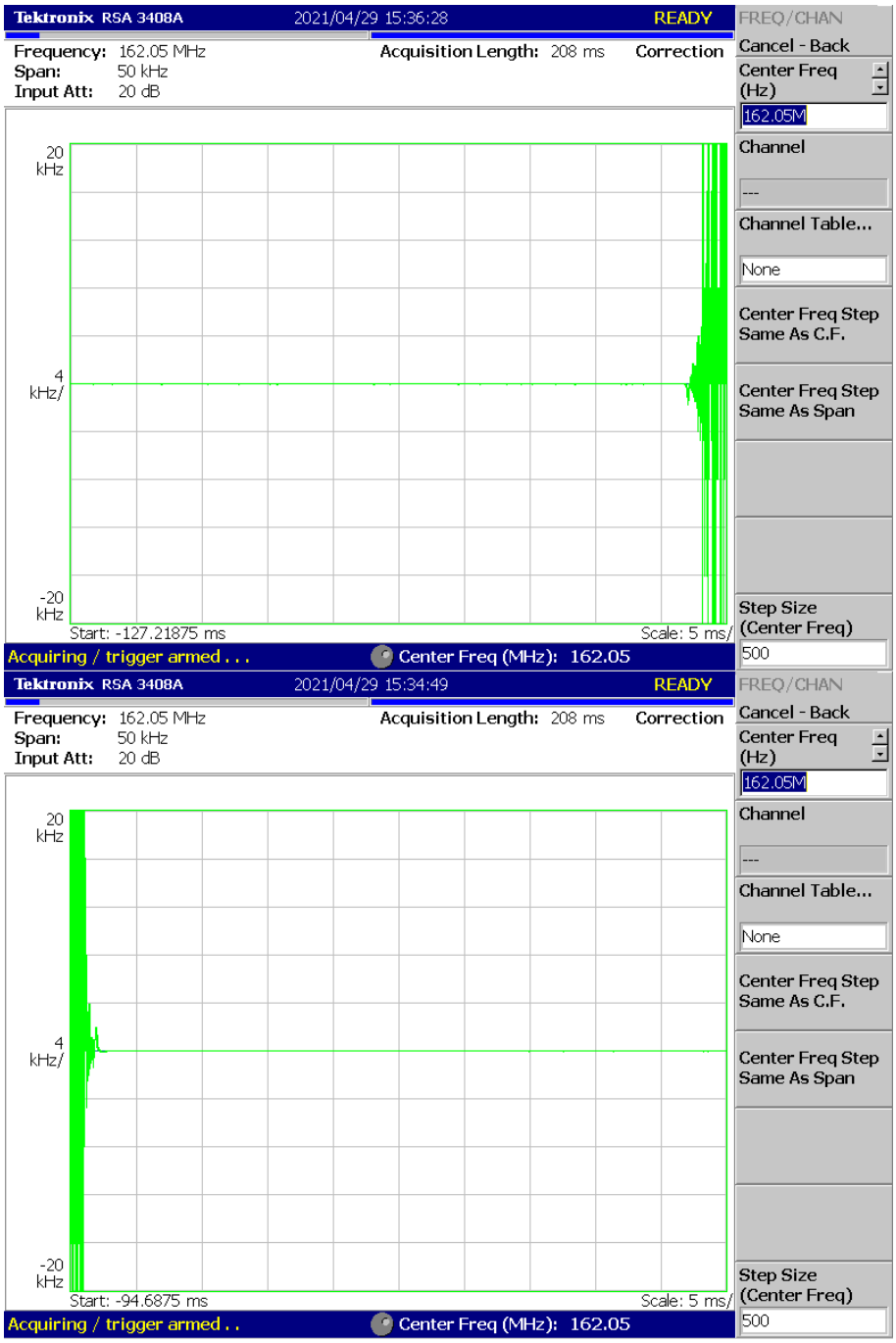
(138.05 MHz)_High



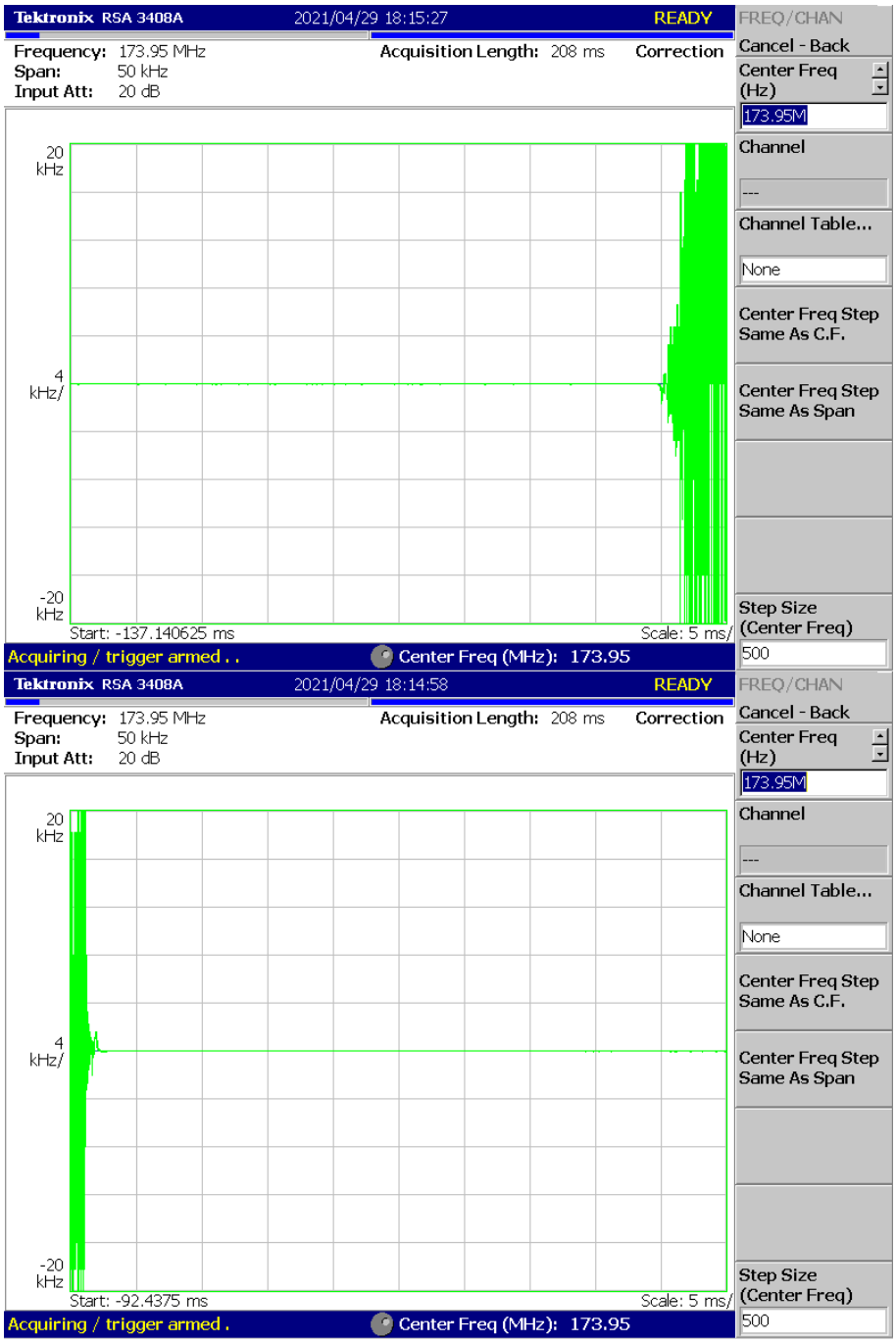
(150.05 MHz)_High



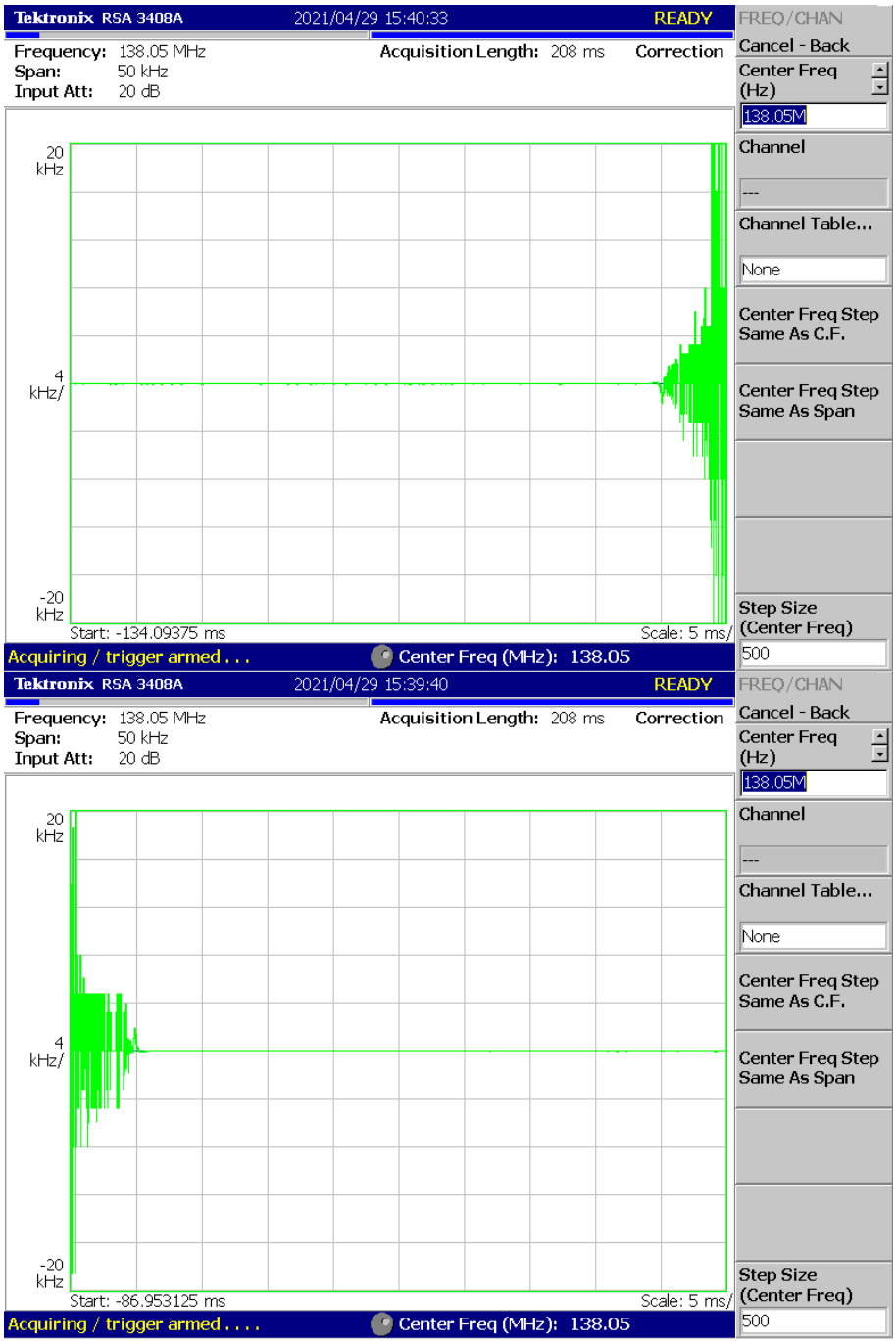
(162.05 MHz)_High



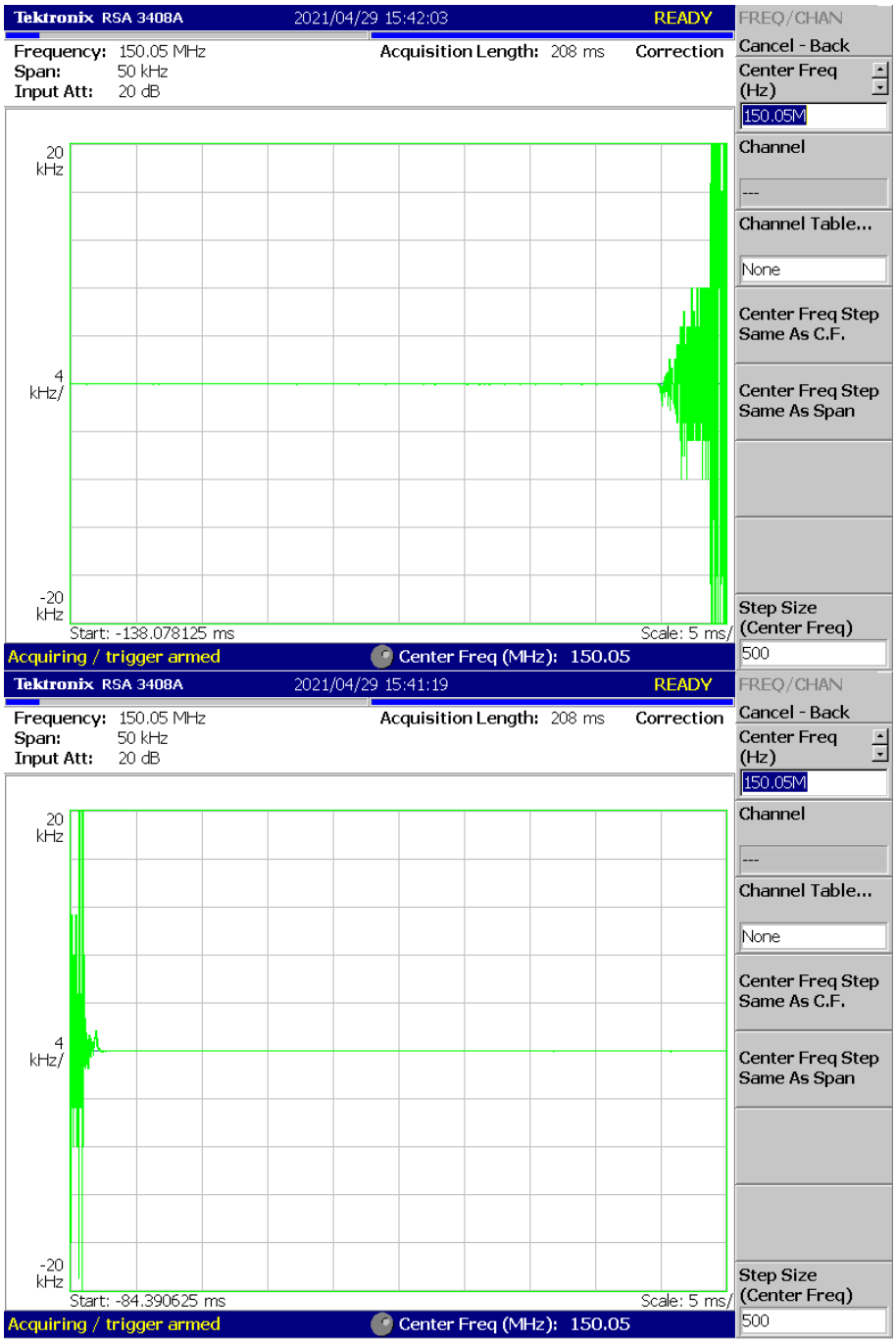
(173.95 MHz)_High



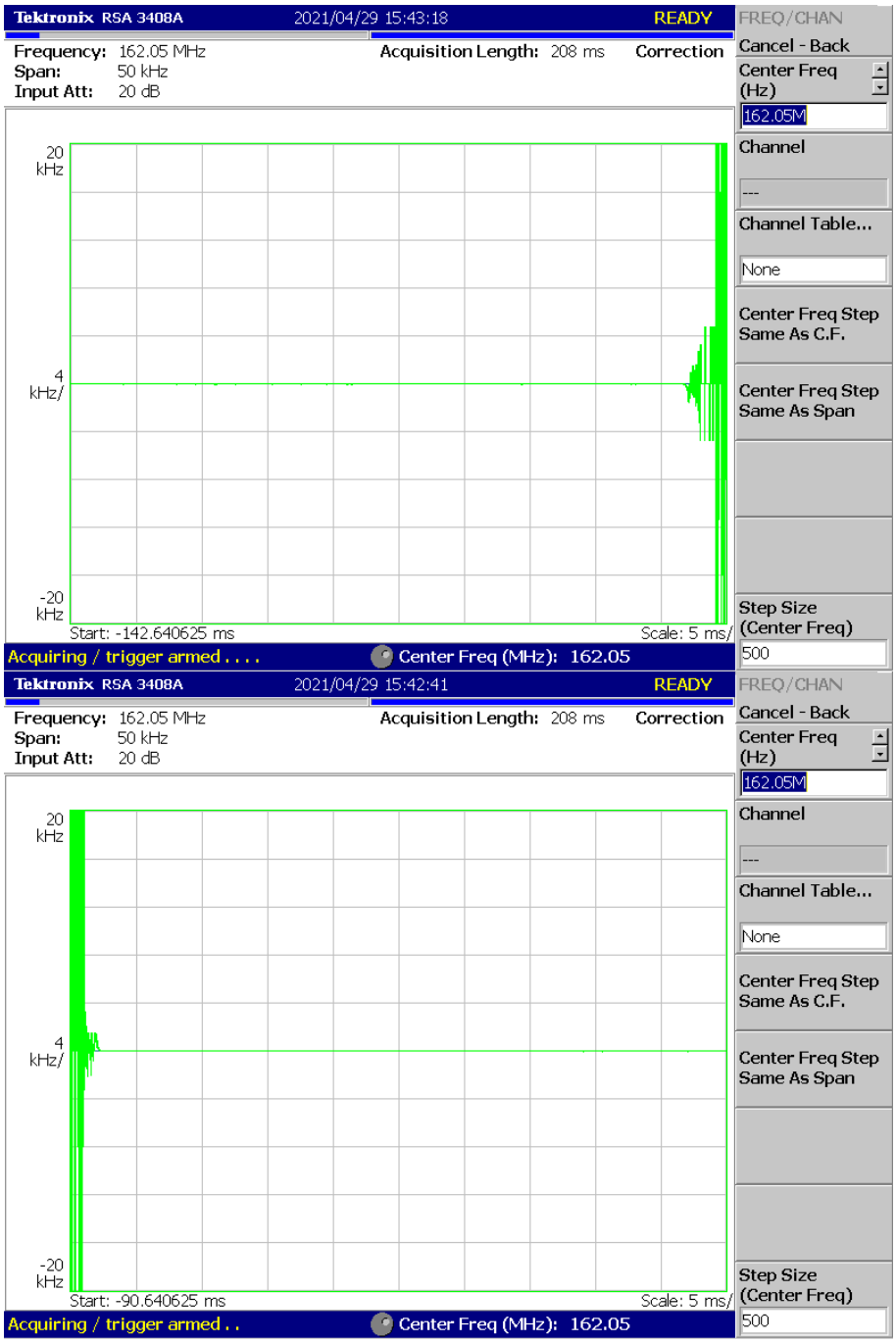
(138.05 MHz)_Low



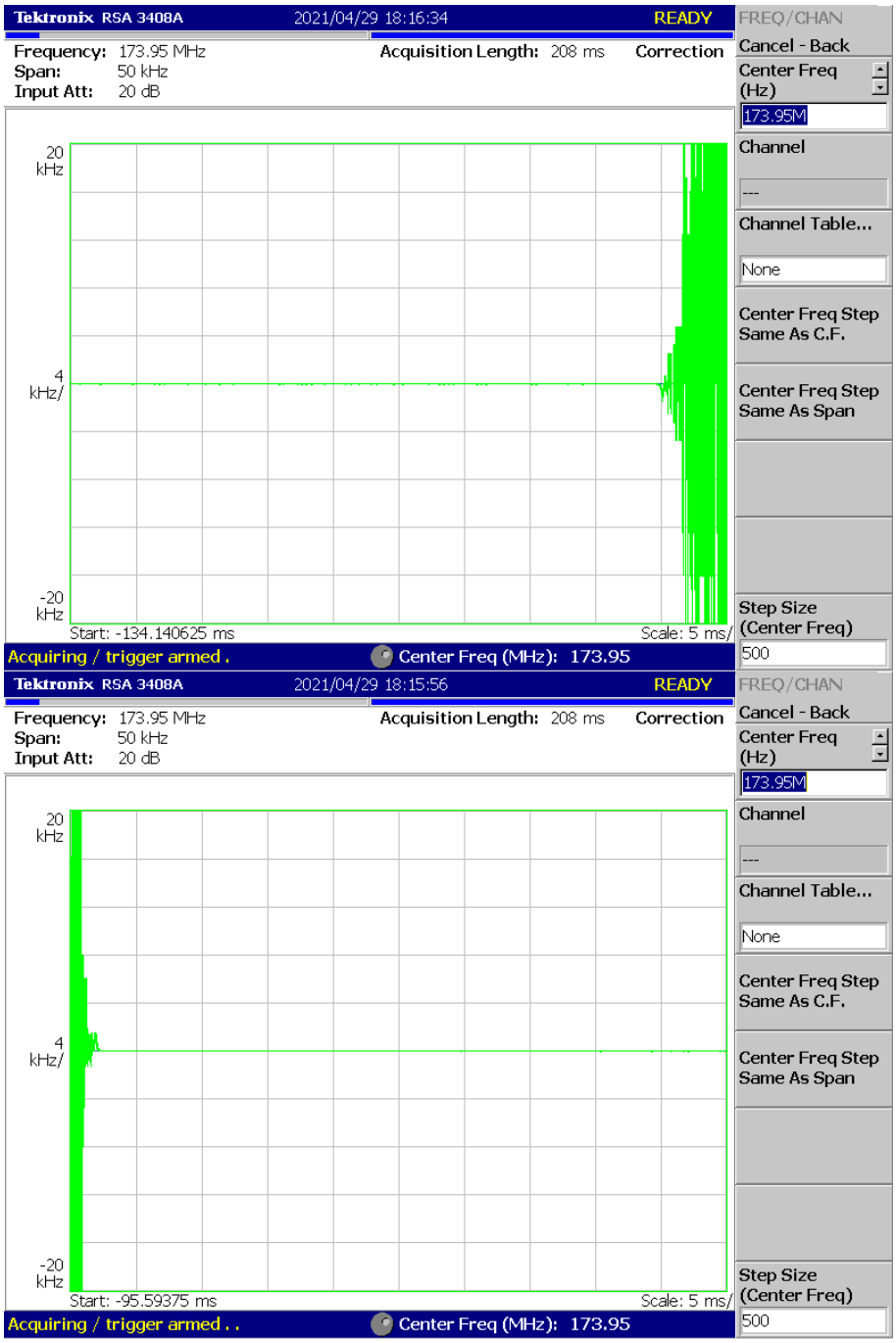
(150.05 MHz)_ Low



(162.05 MHz)_ Low

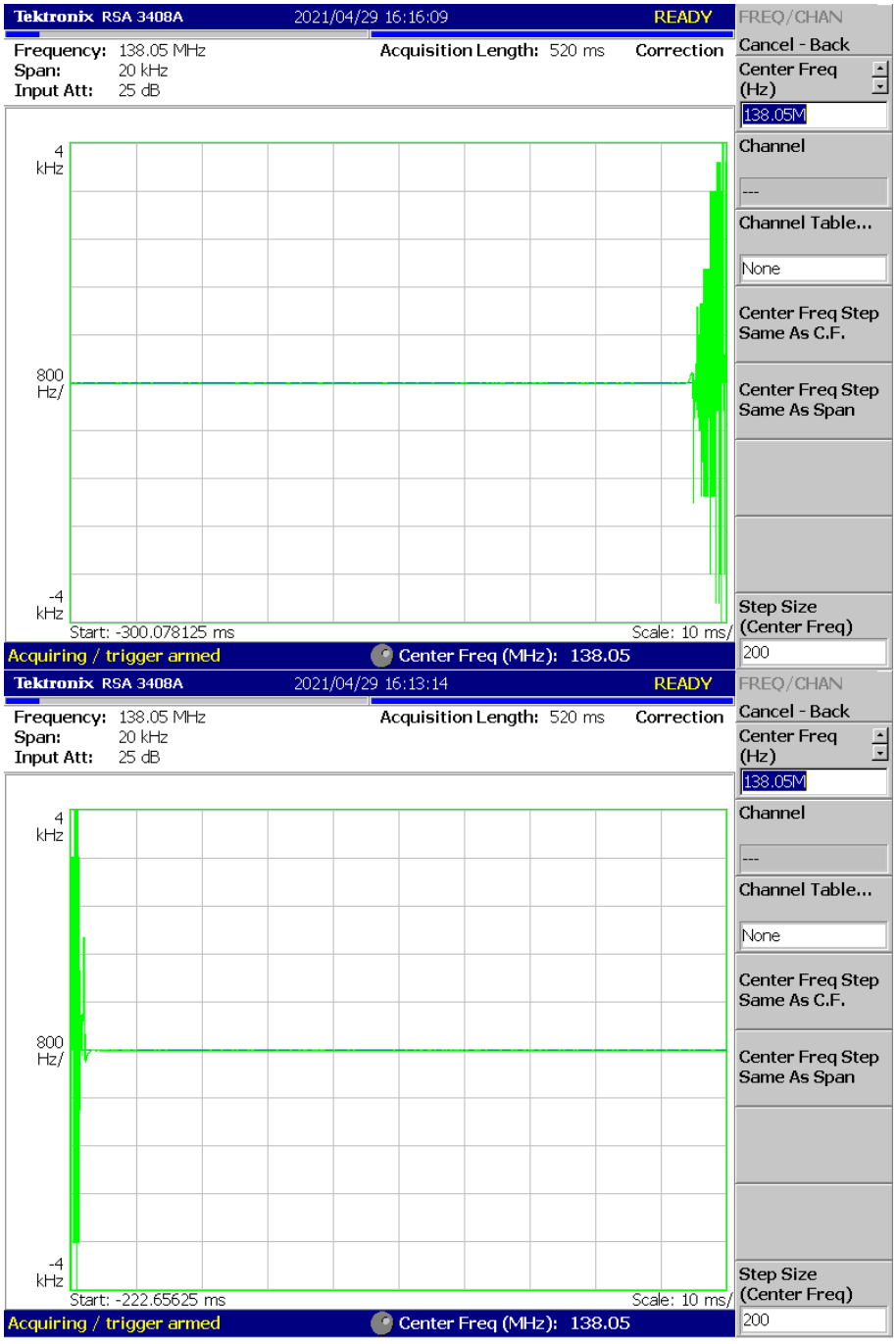


(173.95 MHz)_ Low

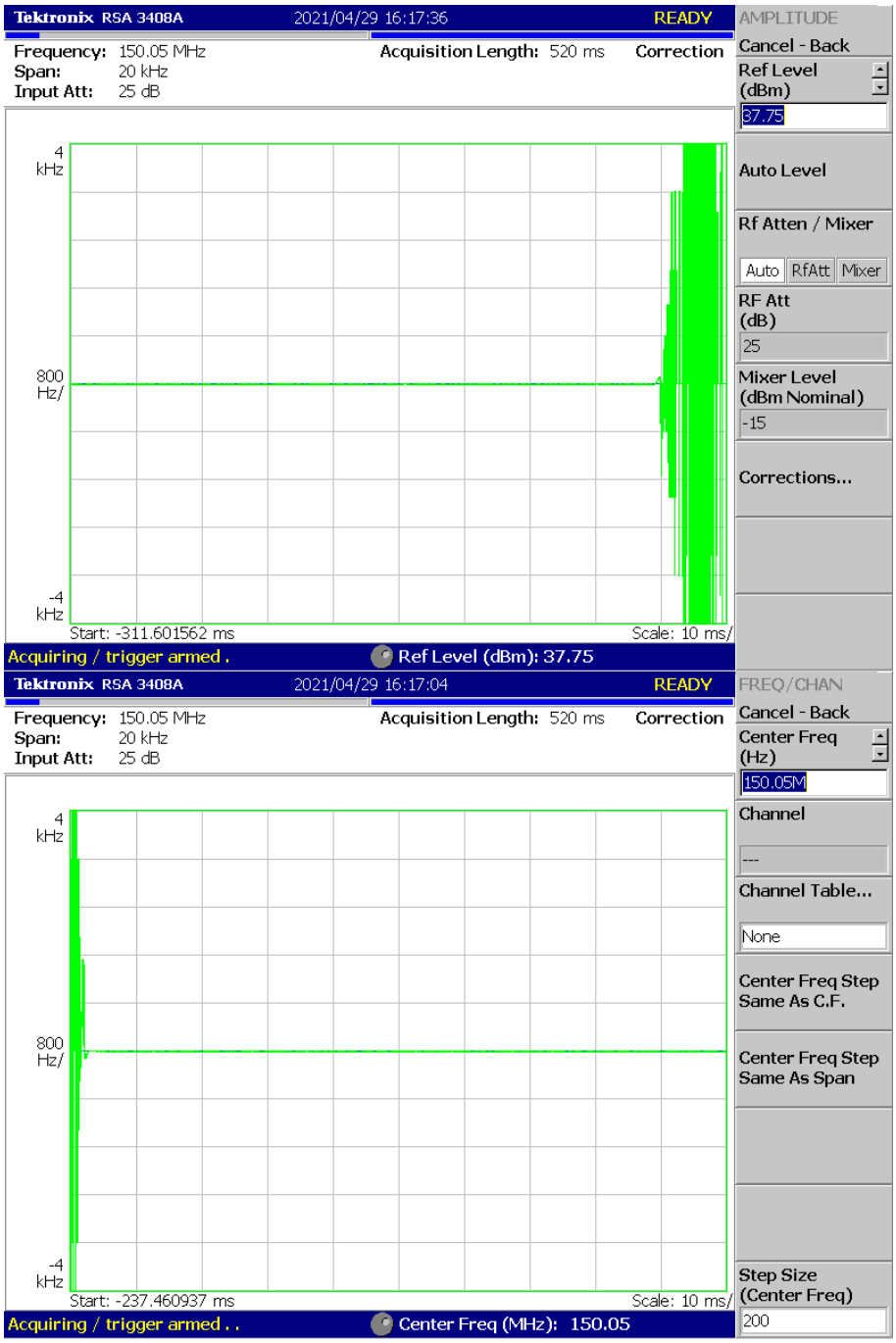


**4K00F1E, 4K00F1D, 4K00F7W**

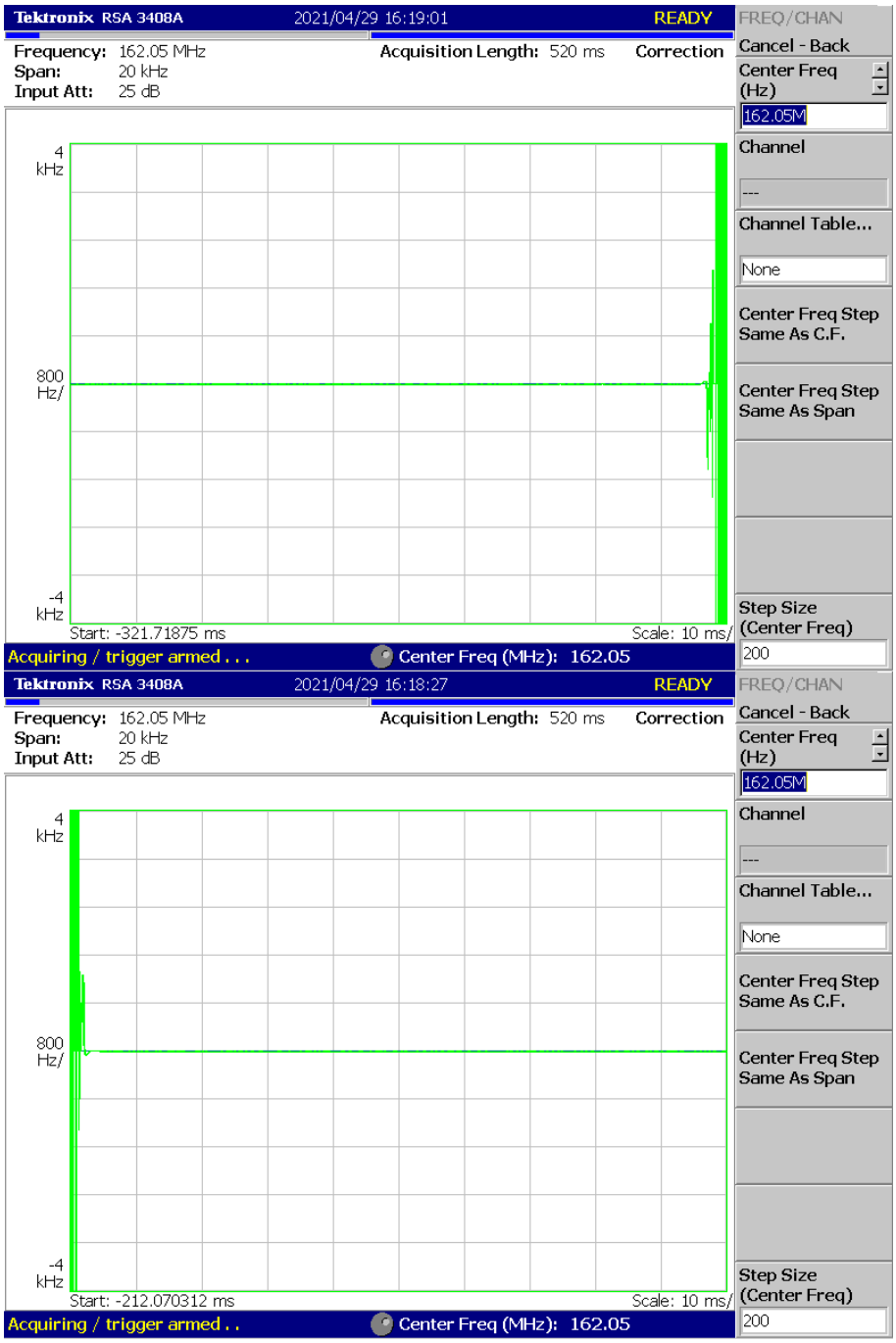
(138.05 MHz)_High



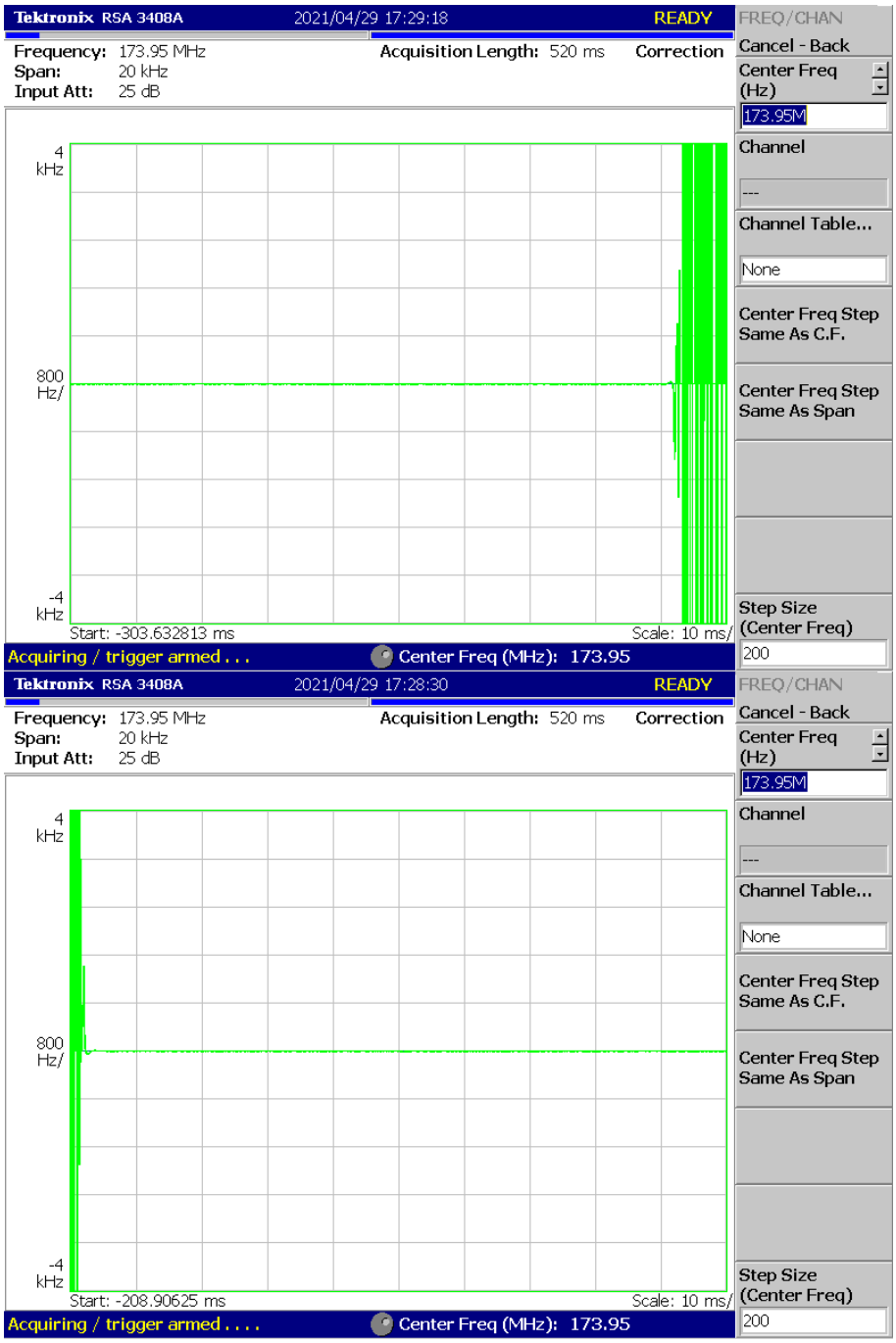
(150.05 MHz)_High



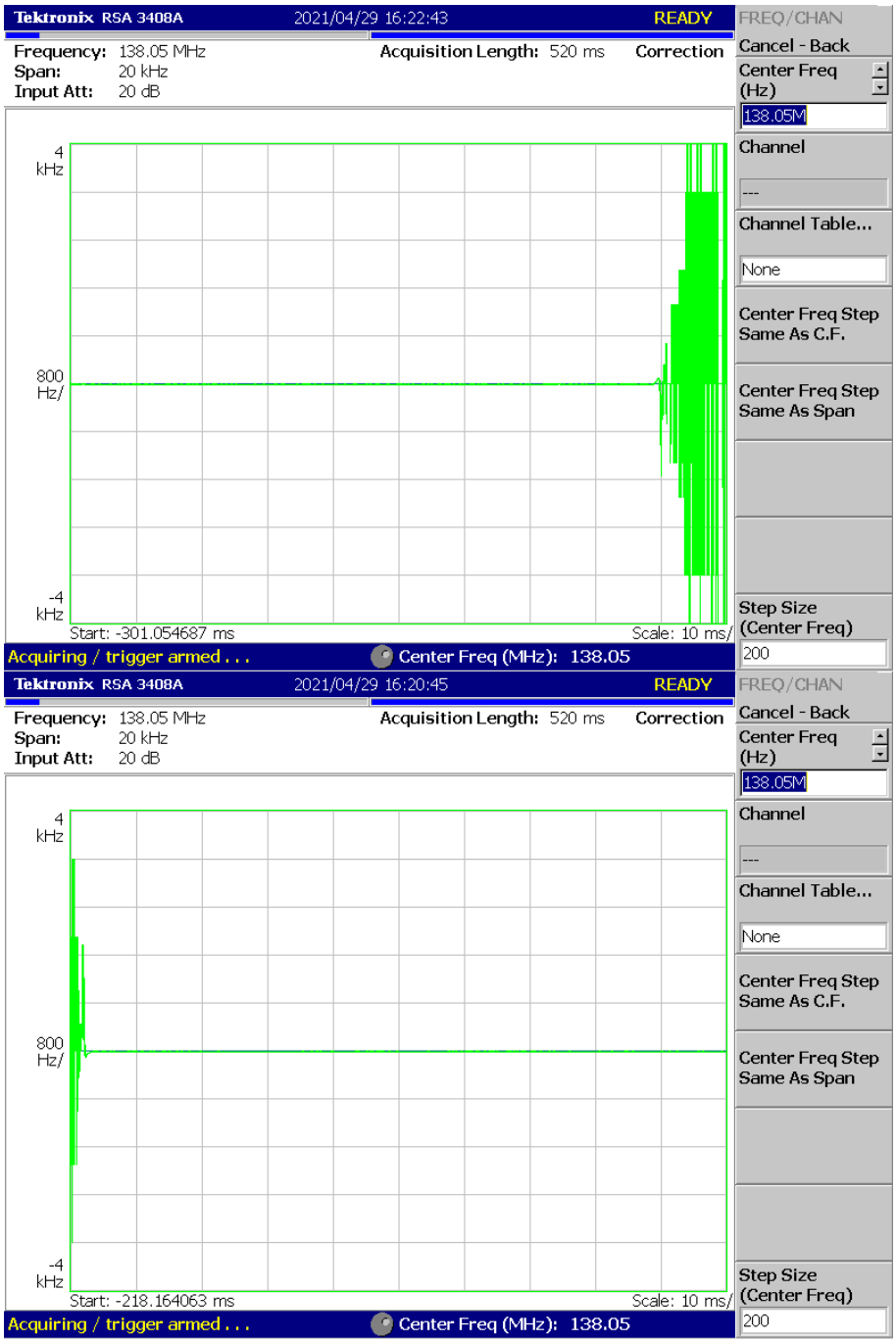
(162.05 MHz)_High



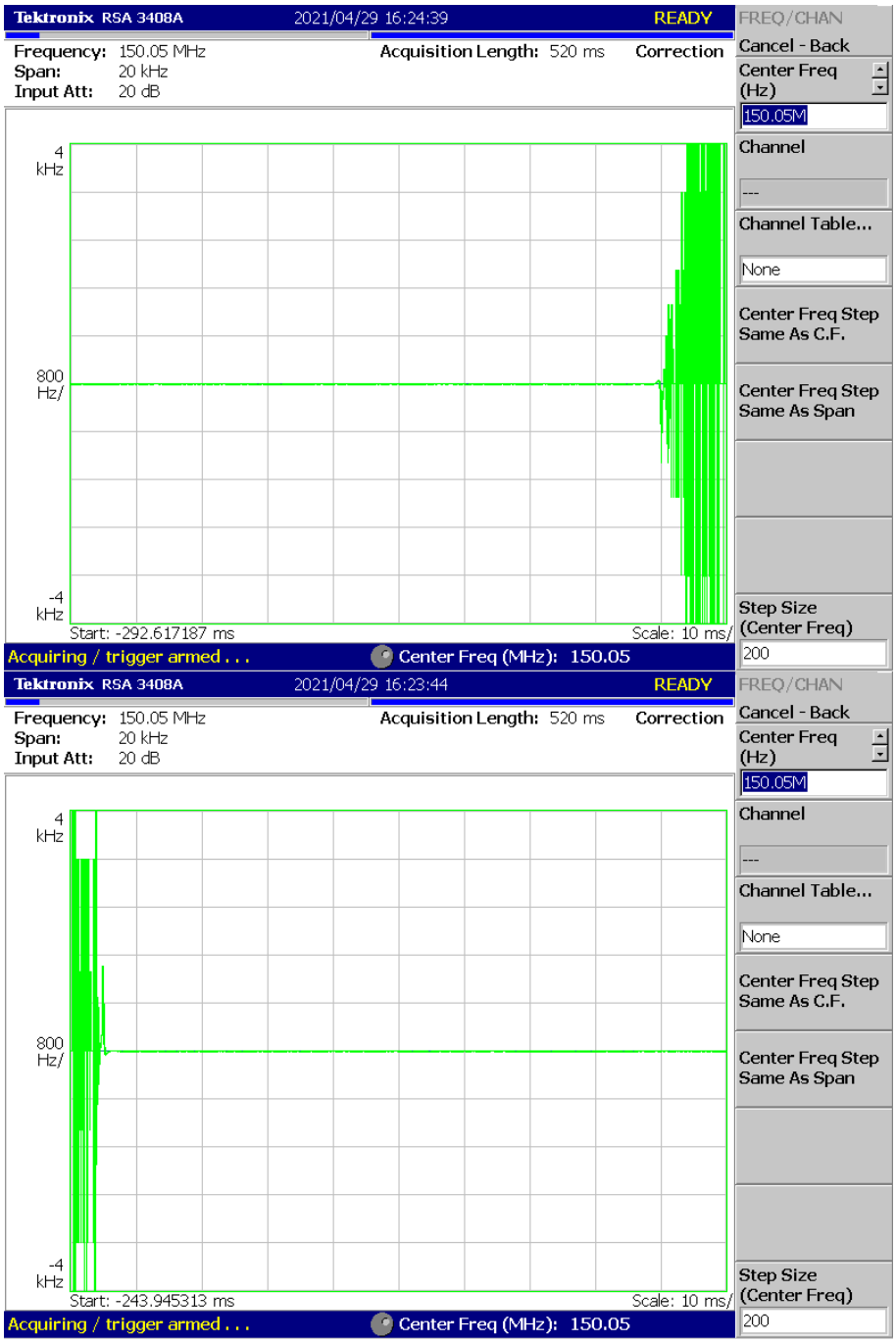
(173.95 MHz)_High



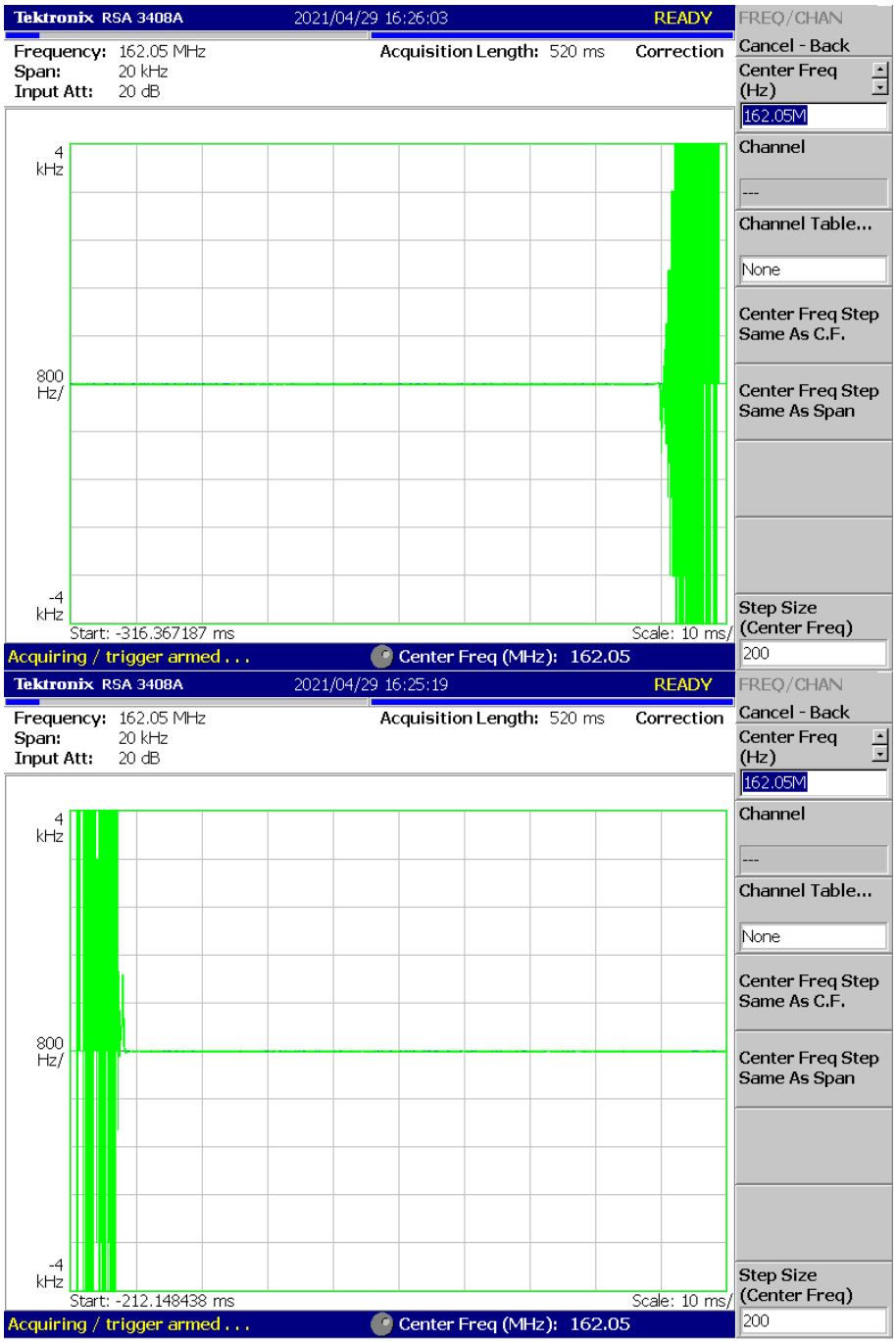
(138.05 MHz)_Low



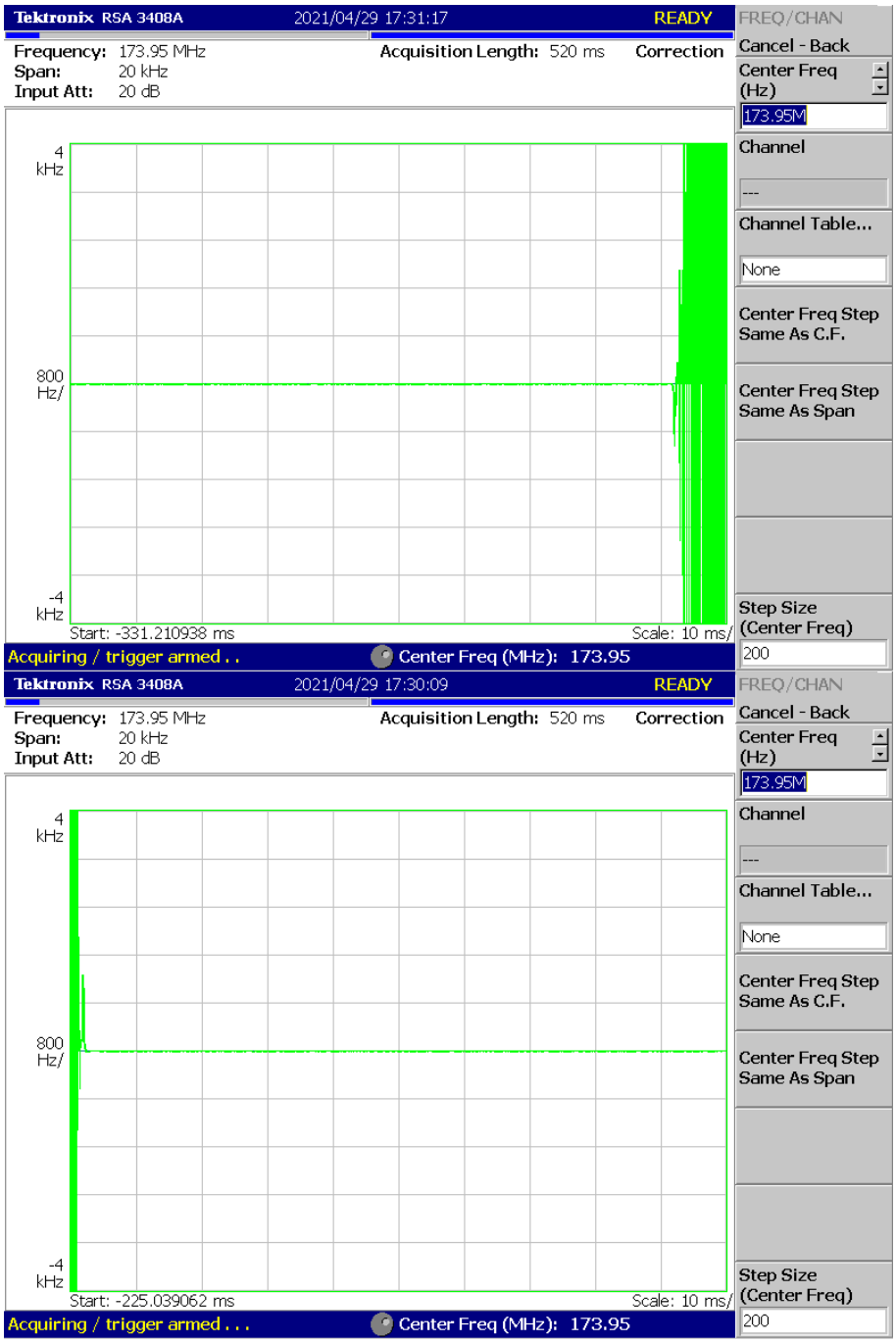
(150.05 MHz)_ Low



(162.05 MHz)_ Low



(173.95 MHz)_ Low

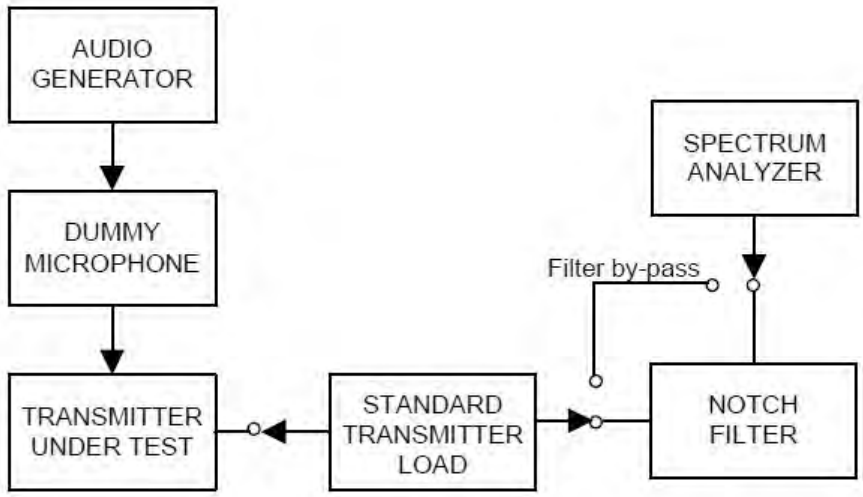


## 8.8 Unwanted Emissions : Conducted Spurious Emission

▣ Definition

Conducted spurious emissions are emissions at the antenna terminals on a frequency or frequencies that are outside a band sufficient to ensure transmission of information of required quality for the class of communication desired.

▣ TEST CONFIGURATION




▣ TEST PROCEDURE

According to 2.2.13 in TIA-603-E Standard.

a) Connect the equipment as illustrated, with the notch filter by-passed.

b) Set the center frequency of the spectrum analyzer to the assigned transmitter frequency, key the transmitter, and set the level of the carrier to the full scale reference line.

c) Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of rated system deviation. The input level shall be established at the frequency of maximum response of the audio modulation circuit.

d) Adjust the spectrum analyzer for the following settings:

1) Resolution Bandwidth = 10 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1 GHz.

2) Video Bandwidth ≥3 times the resolution bandwidth.

3) Sweep Speed ≤2000 Hz per second.

4) Detector Mode = mean or average power.

e) Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from:

1) The lowest radio frequency generated in the equipment to the carrier frequency minus the test bandwidth (see 1.3.4.4).

2) The carrier frequency plus the test bandwidth to a frequency less than 2 times the carrier frequency.

f) Record the frequencies and levels of spurious emissions from step e).

g) Unkey the transmitter. Replace the transmitter under test with the signal generator and adjust the signal level to reproduce the frequencies and levels of every spurious emission recorded in step f). Record the signal generator levels in dBm.

h) Insert the notch filter.

i) Adjust the spectrum analyzer for the following settings:

1) Resolution Bandwidth = 10 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1 GHz.

2) Video Bandwidth ≥3 times the resolution bandwidth.

3) Sweep Speed ≤2000 Hz per second.

4) Detector Mode = mean or average power.

j) Key the transmitter. Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from a frequency equal to 2 times the carrier frequency and to the tenth harmonic of the carrier frequency.

▣ TEST RESULTS

| Type of Emission | Power | Test Frequency (MHz) | Measured Frequency (MHz) | Resilt (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| 16K0F3E (FCC) | High Power | 150.05 | 0.12 | -63.603 | -13.000 | 50.603 |
| | | | 16.45 | -55.334 | -13.000 | 42.334 |
| | | | 450.15 | -34.584 | -13.000 | 21.584 |
| | | | 3069.65 | -32.883 | -13.000 | 19.883 |
| | | 162.05 | 0.13 | -62.874 | -13.000 | 49.874 |
| | | | 12.28 | -55.137 | -13.000 | 42.137 |
| | | | 486.14 | -35.589 | -13.000 | 22.589 |
| | | | 3490.42 | -33.284 | -13.000 | 20.284 |
| | | 173.95 | 0.01 | -63.275 | -13.000 | 50.275 |
| | | | 3.38 | -54.642 | -13.000 | 41.642 |
| | | | 521.84 | -31.831 | -13.000 | 18.831 |
| | | | 3693.83 | -33.080 | -13.000 | 20.080 |

| Type of Emission | Power | Test Frequency (MHz) | Measured Frequency (MHz) | Resilt (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| 16K0F3E (ISED) | High Power | 138.05 | 0.13 | -49.755 | -13.000 | 36.755 |
| | | | 0.26 | -51.036 | -13.000 | 38.036 |
| | | | 414.16 | -27.292 | -13.000 | 14.292 |
| | | | 9876.69 | -35.879 | -13.000 | 22.879 |
| | | 150.05 | 0.13 | -49.839 | -13.000 | 36.839 |
| | | | 0.25 | -52.432 | -13.000 | 39.432 |
| | | | 450.15 | -30.620 | -13.000 | 17.620 |
| | | | 4061.50 | -34.963 | -13.000 | 21.963 |
| | | 162.05 | 0.13 | -49.682 | -13.000 | 36.682 |
| | | | 0.86 | -52.800 | -13.000 | 39.800 |
| | | | 486.14 | -32.016 | -13.000 | 19.016 |
| | | | 9987.85 | -35.968 | -13.000 | 22.968 |
| | | 173.95 | 0.12 | -49.939 | -13.000 | 36.939 |
| | | | 0.26 | -51.481 | -13.000 | 38.481 |
| | | | 521.84 | -27.517 | -13.000 | 14.517 |
| | | | 4000.30 | -35.731 | -13.000 | 22.731 |

| Type of Emission | Power | Test Frequency (MHz) | Measured Frequency (MHz) | Resilt (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| 11K0F3E | High Power | 138.05 | 0.01 | -36.637 | -20.000 | 16.637 |
| | | | 0.15 | -36.713 | -20.000 | 16.713 |
| | | | 414.16 | -26.896 | -20.000 | 6.896 |
| | | | 2221.81 | -32.203 | -20.000 | 12.203 |
| | | 150.05 | 0.01 | -35.775 | -20.000 | 15.775 |
| | | | 0.17 | -36.030 | -20.000 | 16.030 |
| | | | 450.15 | -29.208 | -20.000 | 9.208 |
| | | | 7201.31 | -31.611 | -20.000 | 11.611 |
| | | 162.05 | 0.01 | -34.783 | -20.000 | 14.783 |
| | | | 0.15 | -37.222 | -20.000 | 17.222 |
| | | | 486.14 | -29.608 | -20.000 | 9.608 |
| | | | 6592.88 | -31.903 | -20.000 | 11.903 |
| | | 173.95 | 0.01 | -34.139 | -20.000 | 14.139 |
| | | | 0.17 | -36.199 | -20.000 | 16.199 |
| | | | 521.84 | -26.557 | -20.000 | 6.557 |
| | | | 6253.11 | -32.187 | -20.000 | 12.187 |

| Type of Emission | Power | Test Frequency (MHz) | Measured Frequency (MHz) | Resilt (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| 8K30F1E, 8K30F1D, 8K30F7W | High Power | 138.05 | 0.13 | -49.104 | -20.000 | 29.104 |
| | | | 0.86 | -52.263 | -20.000 | 32.263 |
| | | | 414.16 | -26.840 | -20.000 | 6.840 |
| | | | 9676.88 | -35.809 | -20.000 | 15.809 |
| | | 150.05 | 0.13 | -49.206 | -20.000 | 29.206 |
| | | | 0.25 | -51.378 | -20.000 | 31.378 |
| | | | 450.15 | -29.372 | -20.000 | 9.372 |
| | | | 8907.35 | -35.442 | -20.000 | 15.442 |
| | | 162.05 | 0.13 | -49.208 | -20.000 | 29.208 |
| | | | 0.86 | -50.498 | -20.000 | 30.498 |
| | | | 486.14 | -31.005 | -20.000 | 11.005 |
| | | | 5214.91 | -36.411 | -20.000 | 16.411 |
| | | 173.95 | 0.13 | -49.550 | -20.000 | 29.550 |
| | | | 0.26 | -51.245 | -20.000 | 31.245 |
| | | | 521.84 | -27.388 | -20.000 | 7.388 |
| | | | 4044.85 | -35.565 | -20.000 | 15.565 |

| Type of Emission | Power | Test Frequency (MHz) | Measured Frequency (MHz) | Resilt (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| 7K60FXD, 7K60FXE | High Power | 138.05 | 0.13 | -49.812 | -20.000 | 29.812 |
| | | | 0.26 | -51.661 | -20.000 | 31.661 |
| | | | 414.16 | -26.727 | -20.000 | 6.727 |
| | | | 8911.40 | -35.962 | -20.000 | 15.962 |
| | | 150.05 | 0.13 | -49.025 | -20.000 | 29.025 |
| | | | 0.24 | -51.654 | -20.000 | 31.654 |
| | | | 450.15 | -29.038 | -20.000 | 9.038 |
| | | | 3827.49 | -34.704 | -20.000 | 14.704 |
| | | 162.05 | 0.13 | -49.283 | -20.000 | 29.283 |
| | | | 0.27 | -51.036 | -20.000 | 31.036 |
| | | | 486.14 | -30.805 | -20.000 | 10.805 |
| | | | 4033.15 | -36.094 | -20.000 | 16.094 |
| | | 173.95 | 0.13 | -49.304 | -20.000 | 29.304 |
| | | | 0.26 | -50.309 | -20.000 | 30.309 |
| | | | 521.84 | -27.272 | -20.000 | 7.272 |
| | | | 3827.49 | -35.280 | -20.000 | 15.280 |

| Type of Emission | Power | Test Frequency (MHz) | Measured Frequency (MHz) | Resilt (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| 4K00F1E, 4K00F1D, 4K00F7W | High Power | 138.05 | 0.13 | -49.018 | -25.000 | 24.018 |
| | | | 0.25 | -52.097 | -25.000 | 27.097 |
| | | | 414.16 | -26.787 | -25.000 | 1.787 |
| | | | 9718.74 | -35.805 | -25.000 | 10.805 |
| | | 150.05 | 0.13 | -49.304 | -25.000 | 24.304 |
| | | | 0.26 | -51.537 | -25.000 | 26.537 |
| | | | 450.15 | -29.405 | -25.000 | 4.405 |
| | | | 4024.60 | -35.938 | -25.000 | 10.938 |
| | | 162.05 | 0.13 | -48.962 | -25.000 | 23.962 |
| | | | 0.25 | -51.845 | -25.000 | 26.845 |
| | | | 486.14 | -31.072 | -25.000 | 6.072 |
| | | | 9430.27 | -36.159 | -25.000 | 11.159 |
| | | 173.95 | 0.12 | -49.148 | -25.000 | 24.148 |
| | | | 0.25 | -51.786 | -25.000 | 26.786 |
| | | | 521.84 | -27.249 | -25.000 | 2.249 |
| | | | 9162.51 | -35.845 | -25.000 | 10.845 |

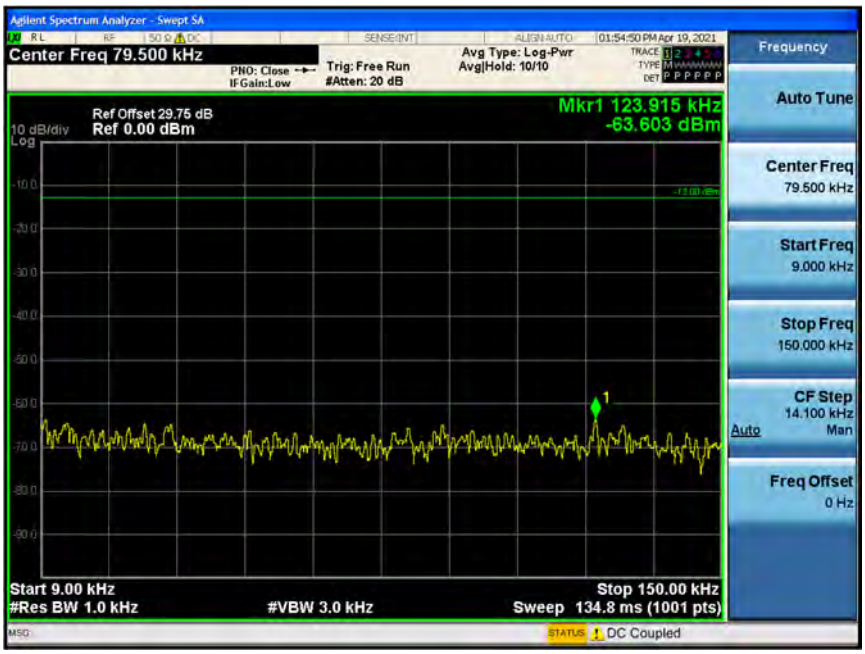
| Type of Emission | Power | Test Frequency (MHz) | Measured Frequency (MHz) | Resilt (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| 4K00F2D | High Power | 138.05 | 0.13 | -49.349 | -25.000 | 24.349 |
| | | | 0.26 | -51.006 | -25.000 | 26.006 |
| | | | 414.16 | -27.312 | -25.000 | 2.312 |
| | | | 9679.58 | -35.356 | -25.000 | 10.356 |
| | | 150.05 | 0.13 | -49.466 | -25.000 | 24.466 |
| | | | 0.25 | -51.939 | -25.000 | 26.939 |
| | | | 450.15 | -29.010 | -25.000 | 4.010 |
| | | | 9134.16 | -36.021 | -25.000 | 11.021 |
| | | 162.05 | 0.12 | -49.451 | -25.000 | 24.451 |
| | | | 0.86 | -52.022 | -25.000 | 27.022 |
| | | | 486.14 | -31.372 | -25.000 | 6.372 |
| | | | 9979.30 | -34.856 | -25.000 | 9.856 |
| | | 173.95 | 0.13 | -48.811 | -25.000 | 23.811 |
| | | | 0.86 | -51.733 | -25.000 | 26.733 |
| | | | 521.84 | -28.244 | -25.000 | 3.244 |
| | | | 9086.90 | -35.705 | -25.000 | 10.705 |

▣ Plots of Unwanted Emissions : Conducted Spurious Emission

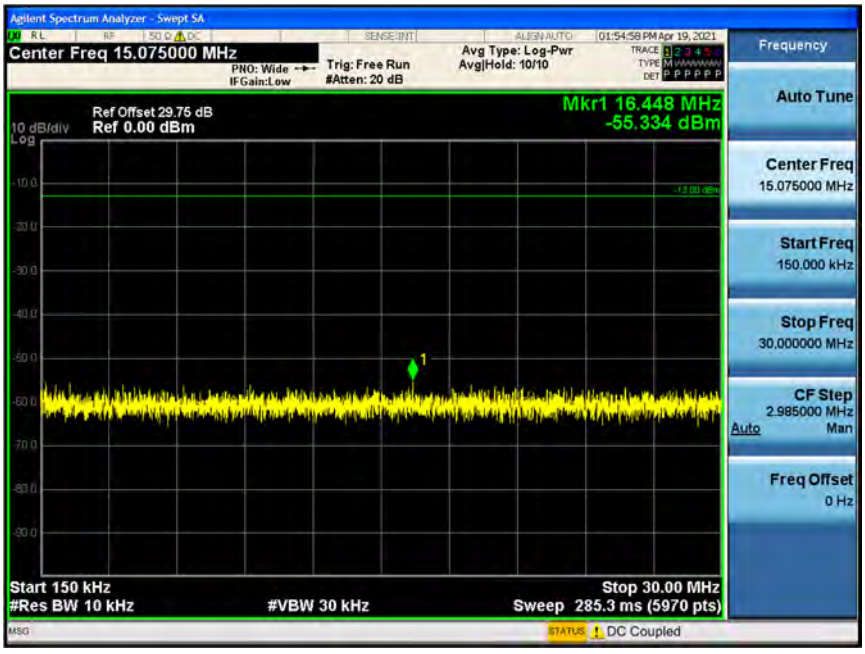
**16K0F3E_FCC**

(150.05 MHz)_High

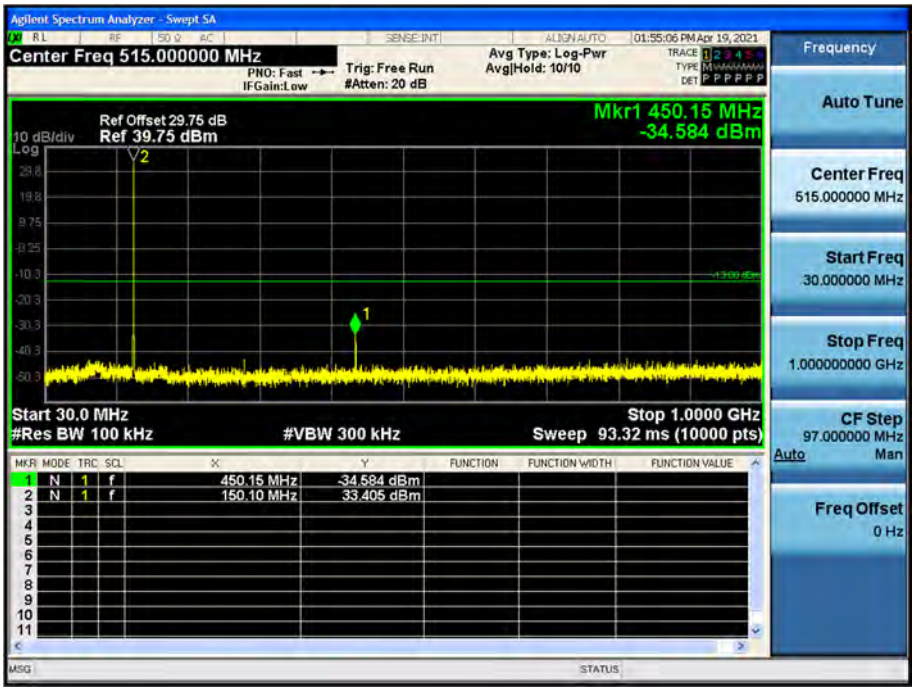
9 kHz~150 kHz




150 kHz~30 MHz



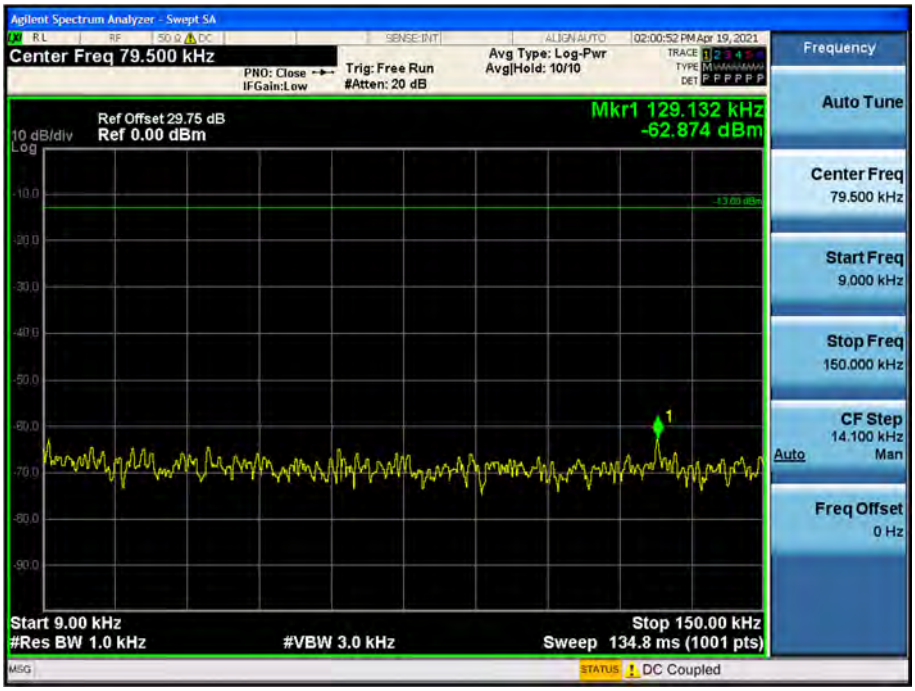
30 MHz~1 GHz



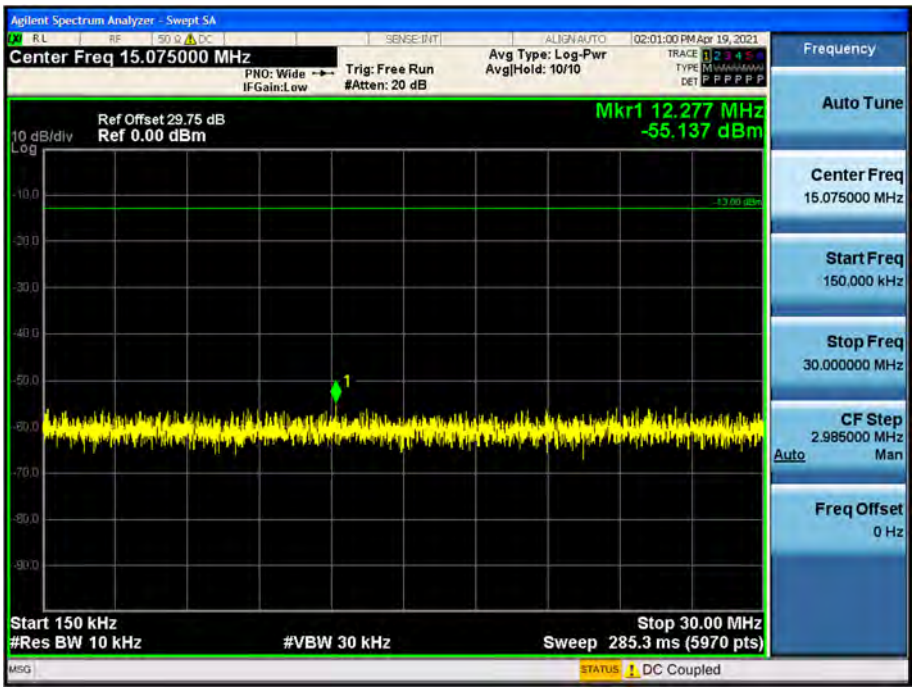

1 GHz~10 GHz

(162.05 MHz)_High

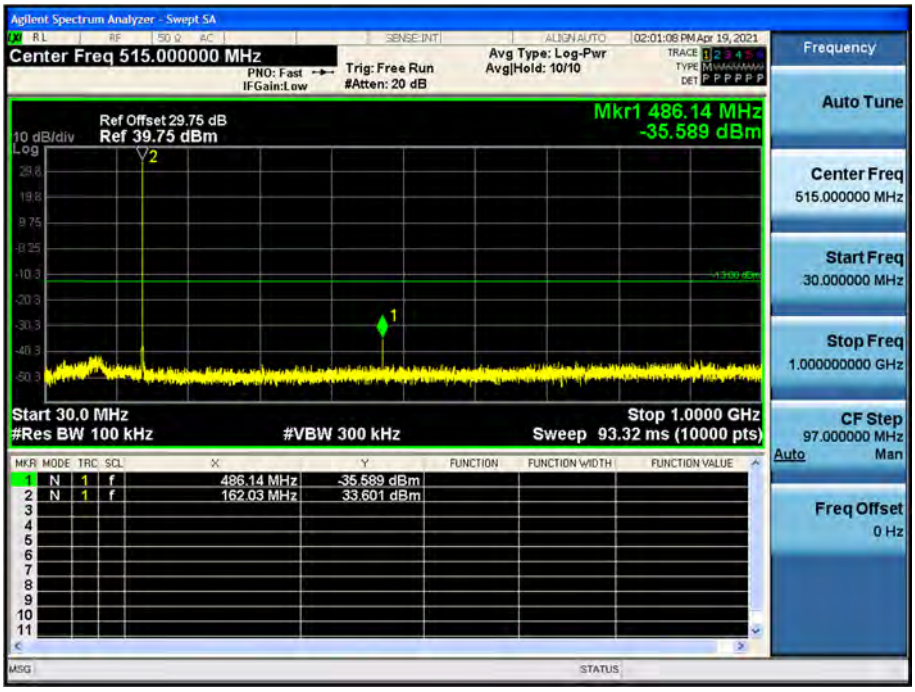
9 kHz~150 kHz



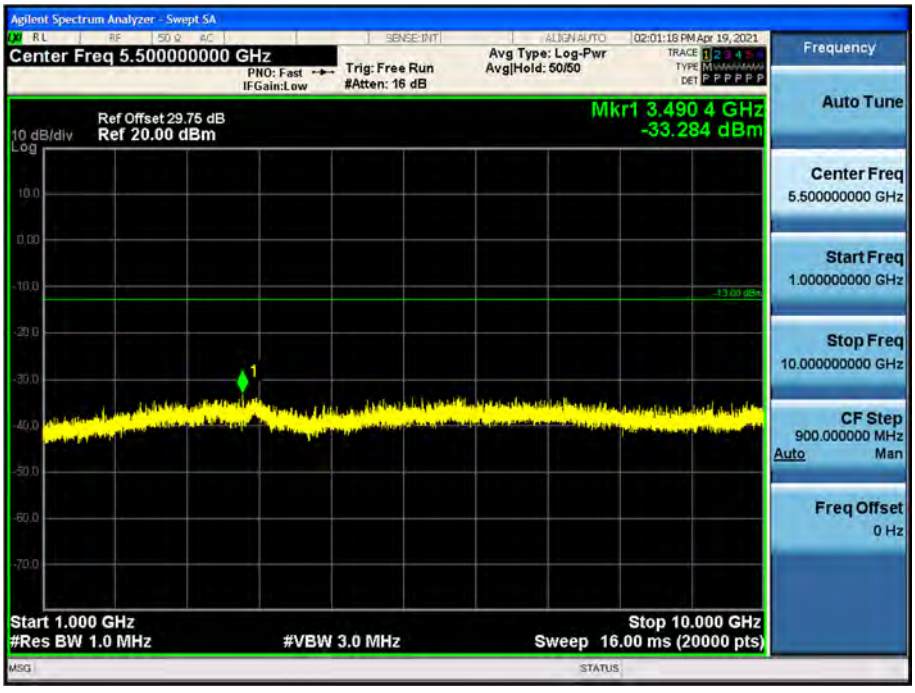

150 kHz~30 MHz



30 MHz~1 GHz

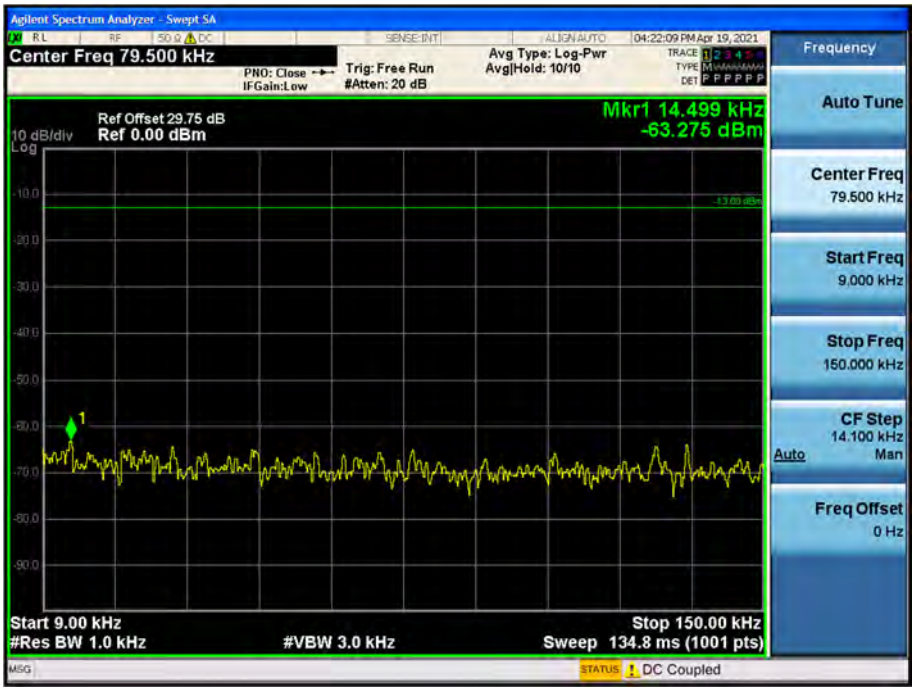



1 GHz~10 GHz

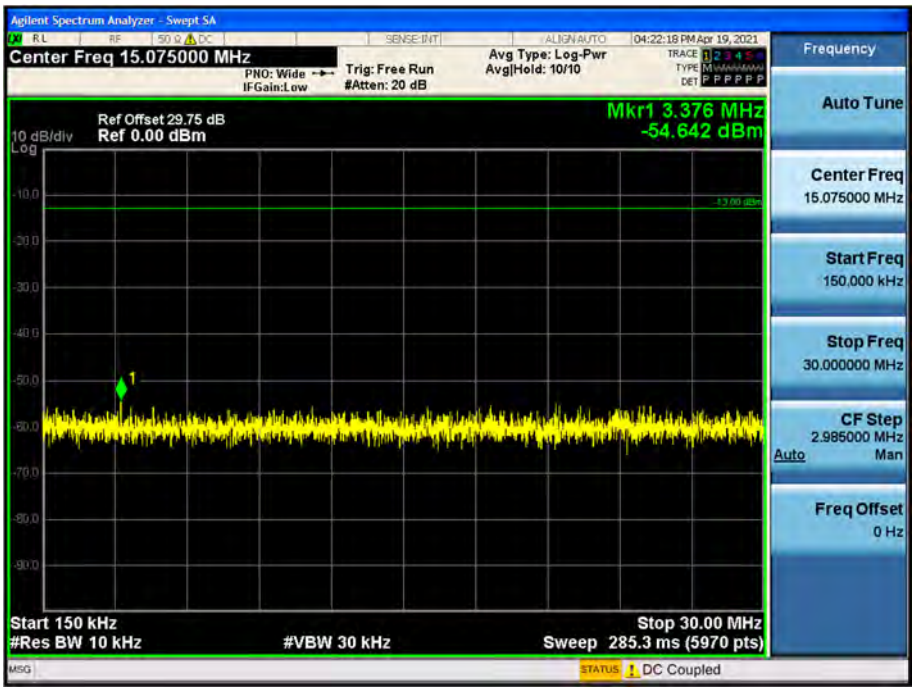


(173.95 MHz)_High

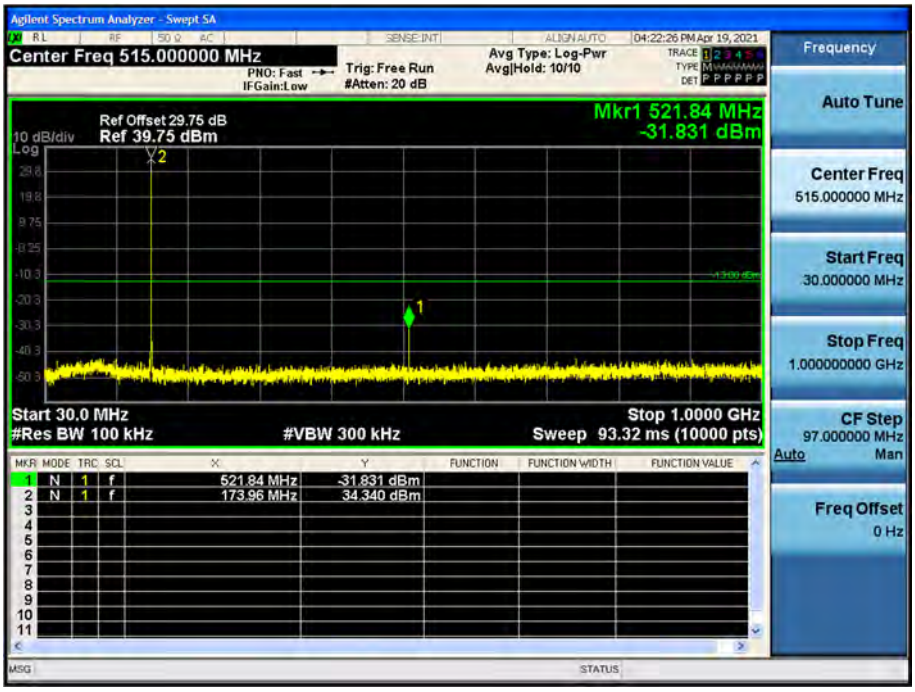
9 kHz~150 kHz




150 kHz~30 MHz



30 MHz~1 GHz

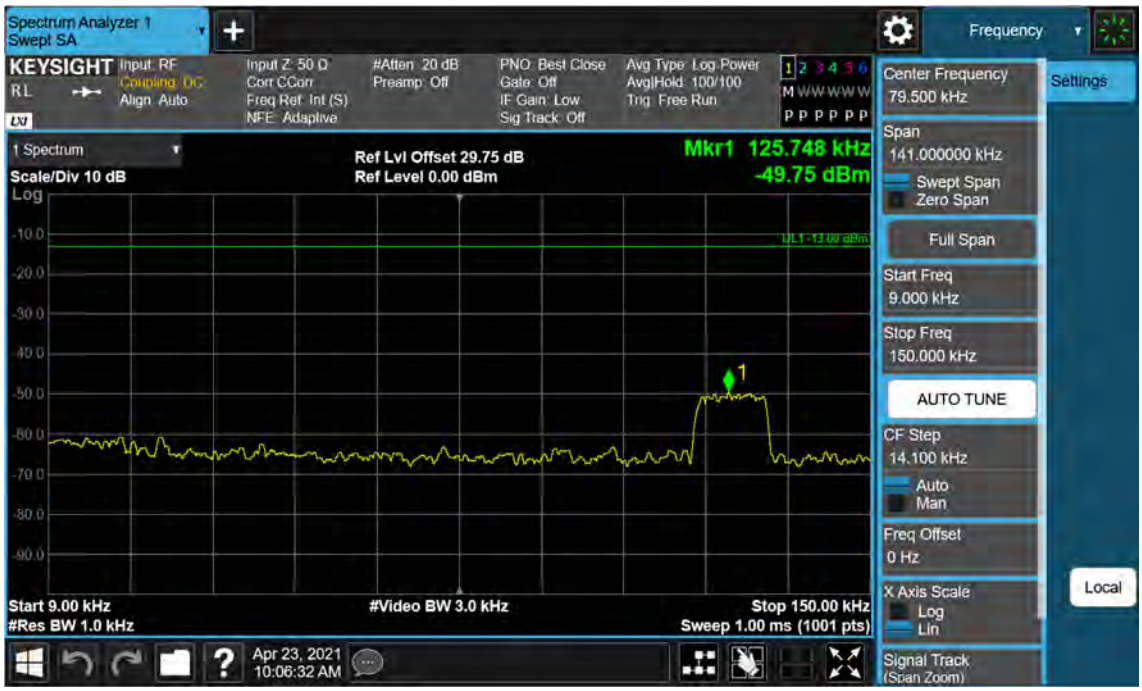



1 GHz~10 GHz

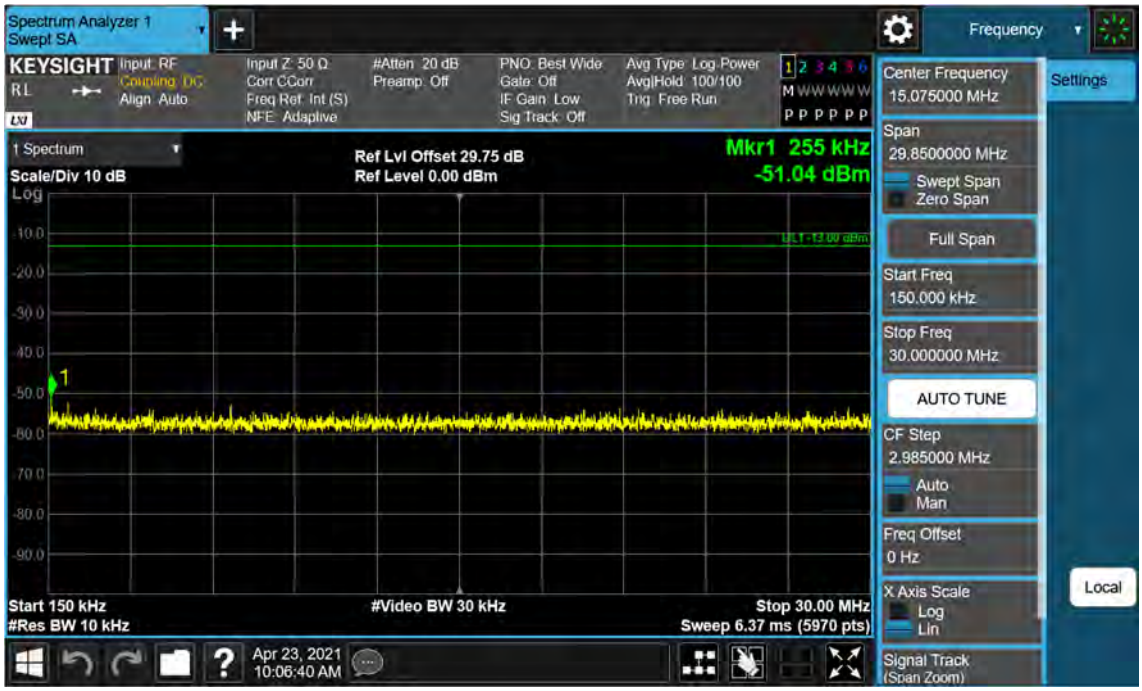
**16K0F3E_ISED**

(138.05 MHz)_High

9 kHz~150 kHz

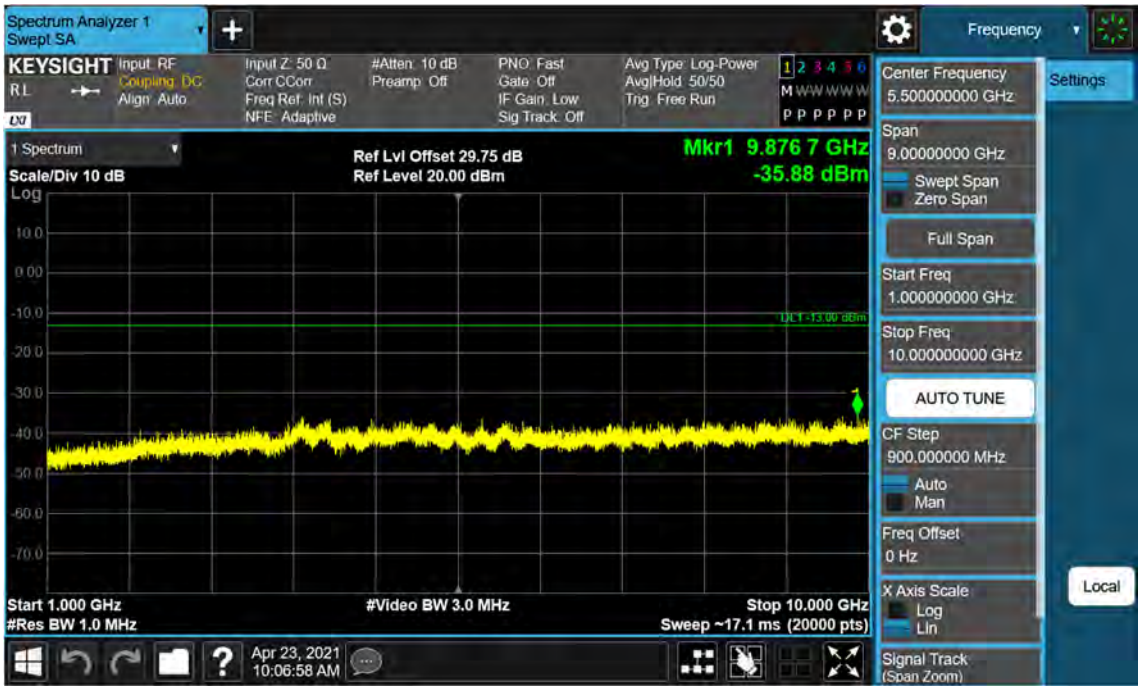



150 kHz~30 MHz



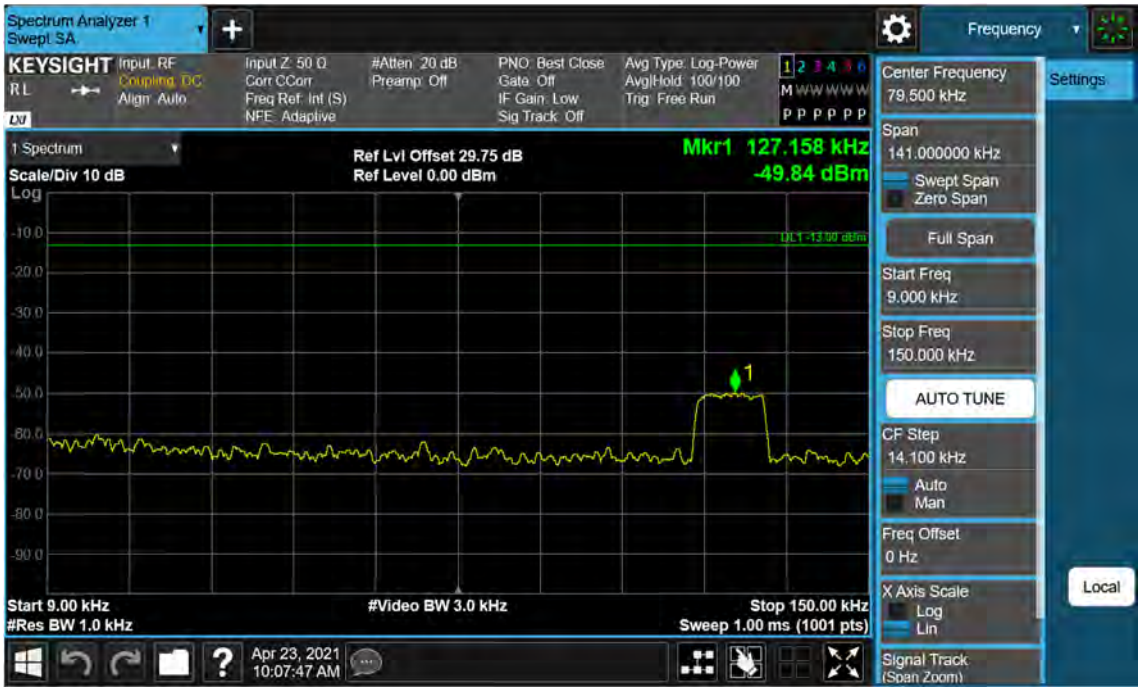
30 MHz~1 GHz


1 GHz~10 GHz

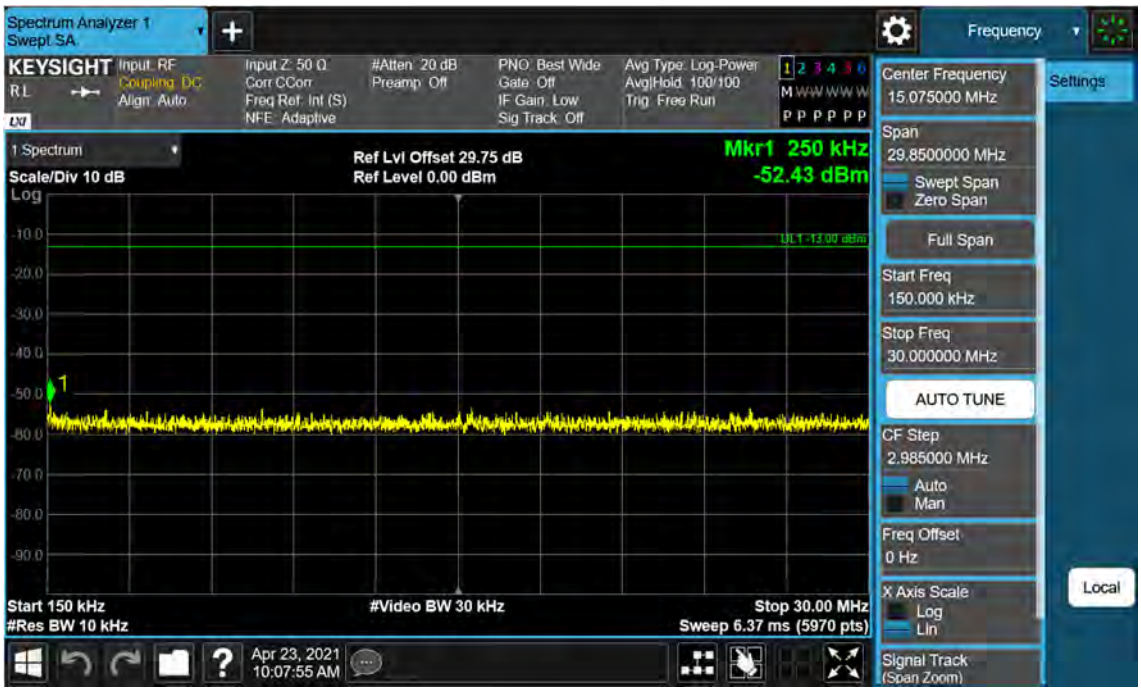


(150.05 MHz)_High

9 kHz~150 kHz

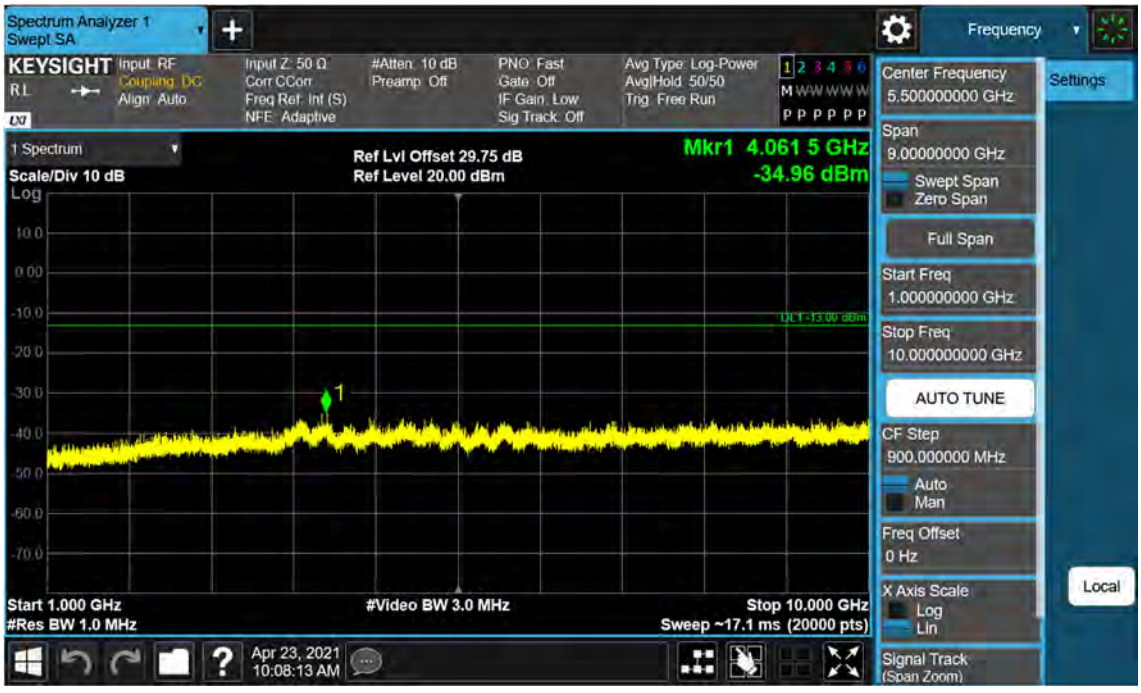



150 kHz~30 MHz



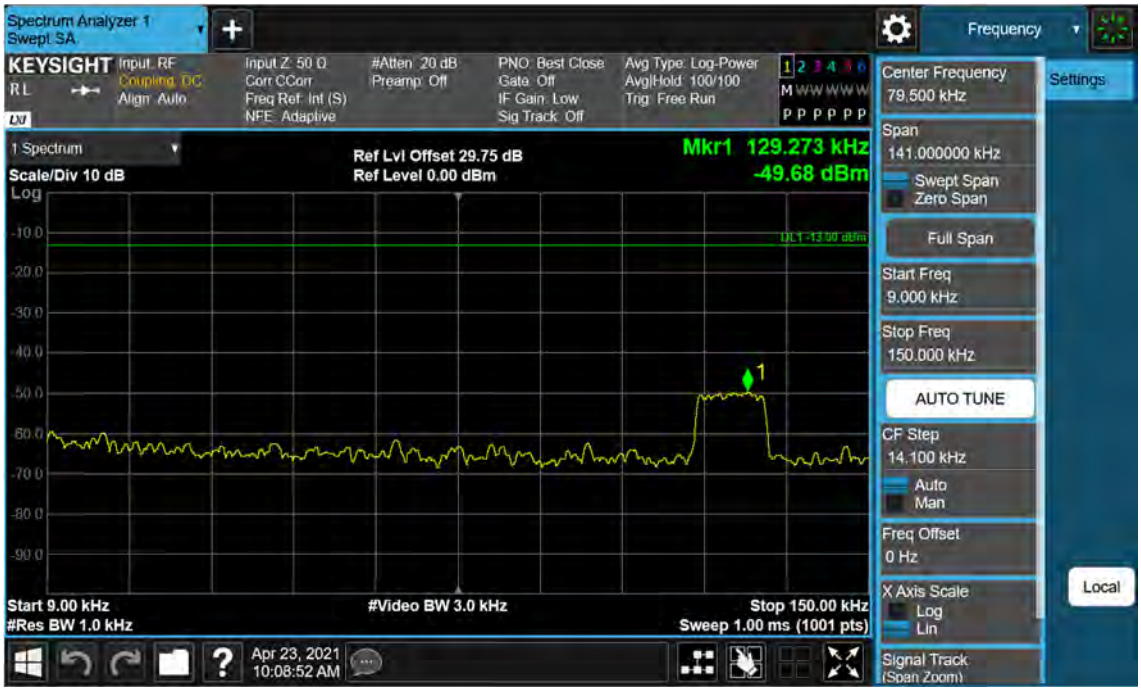
30 MHz~1 GHz


1 GHz~10 GHz



(162.05 MHz)_High

9 kHz~150 kHz



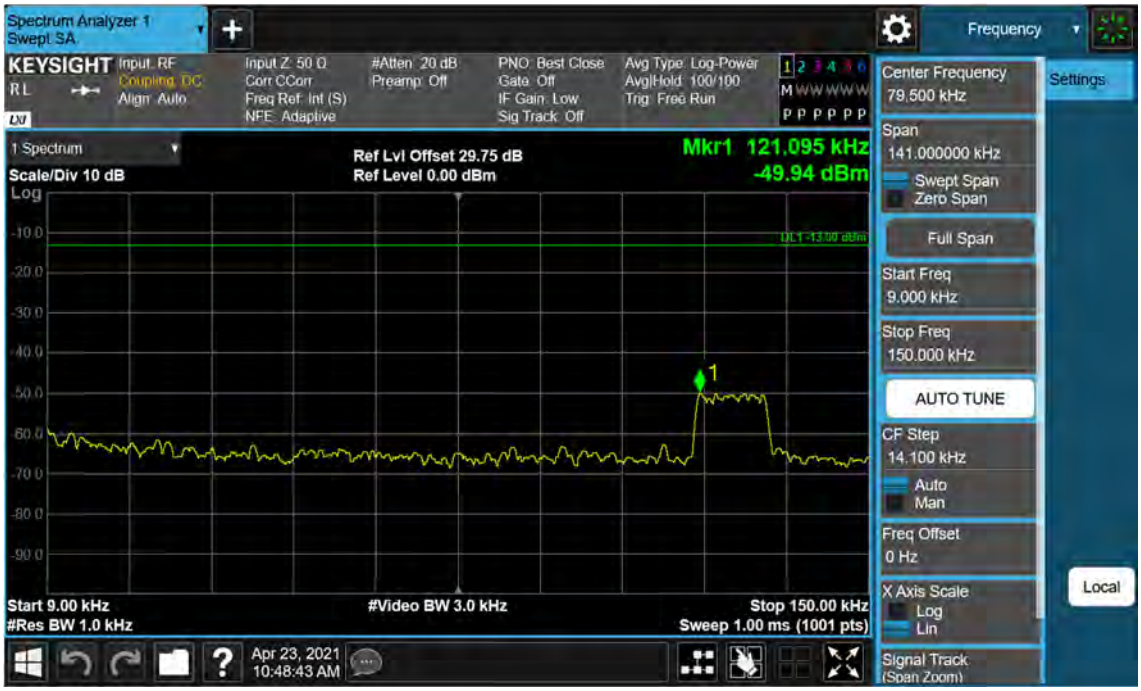

150 kHz~30 MHz

30 MHz~1 GHz


1 GHz~10 GHz

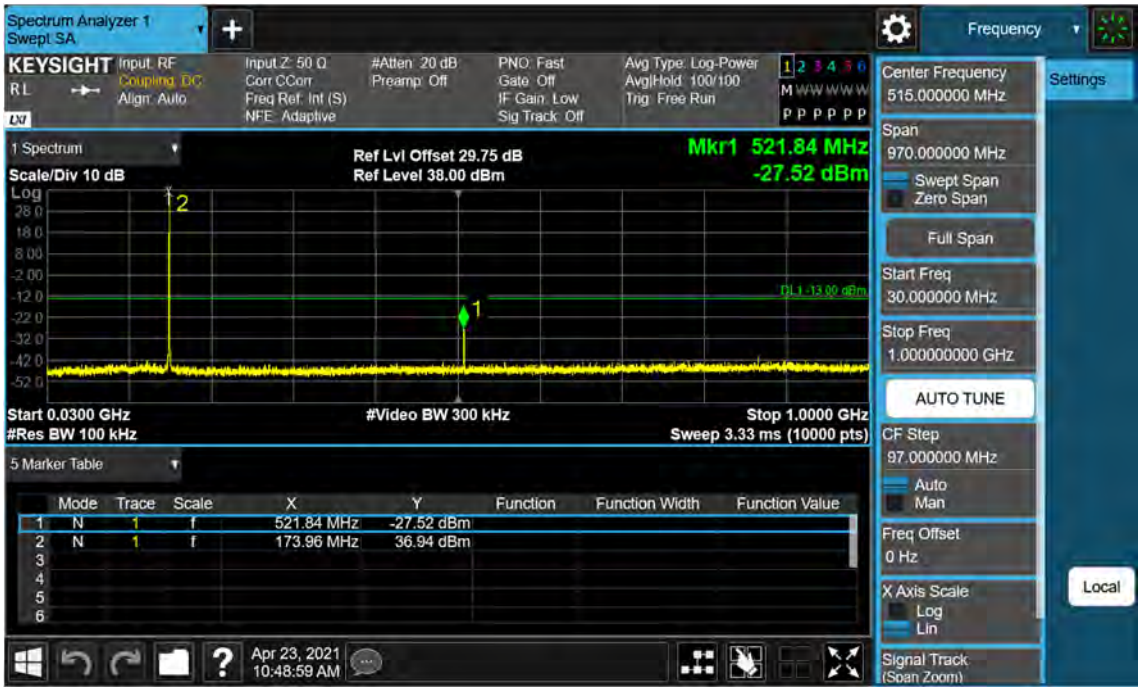
(173.95 MHz)_High

9 kHz~150 kHz




150 kHz~30 MHz

30 MHz~1 GHz

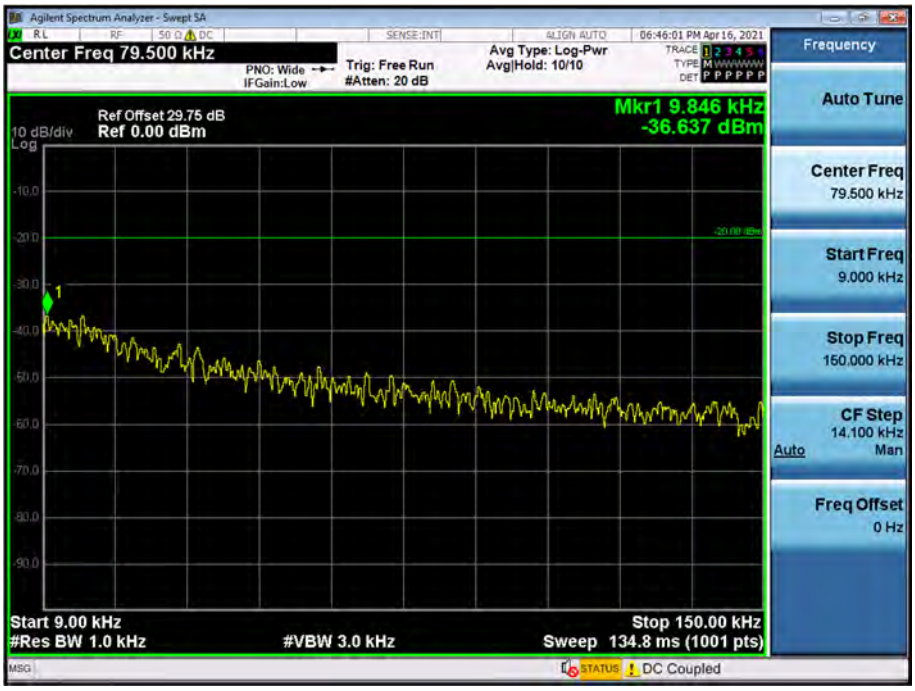



1 GHz~10 GHz

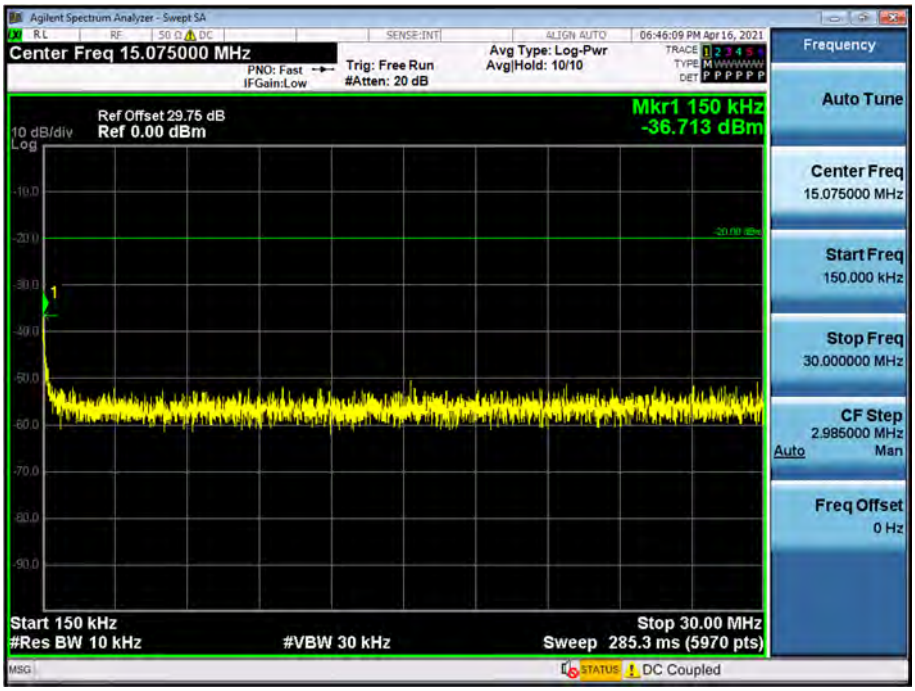
**11K0F3E_FCC/ISED**

(138.05 MHz)_High

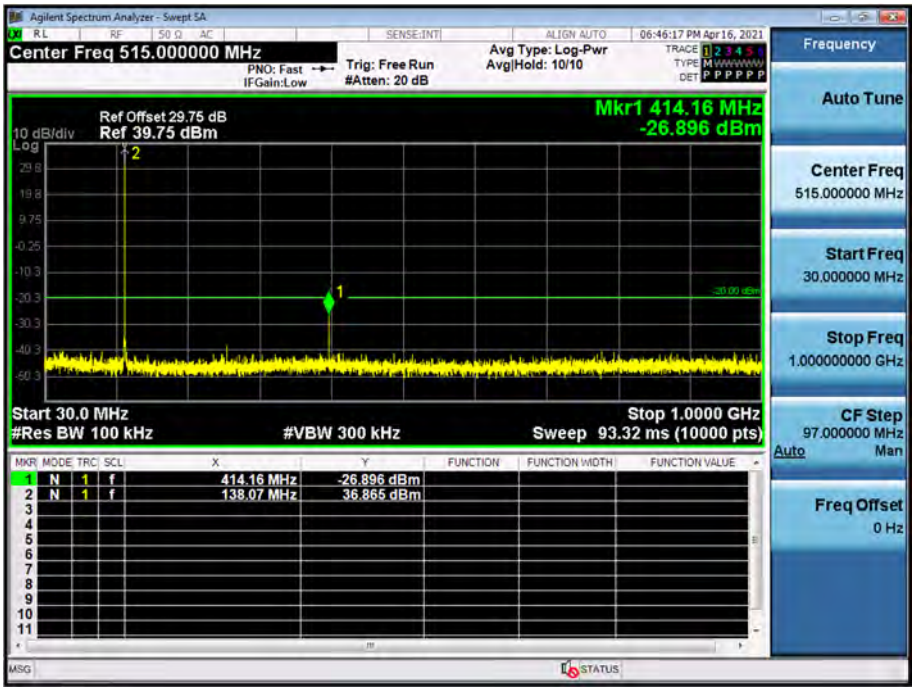
9 kHz~150 kHz



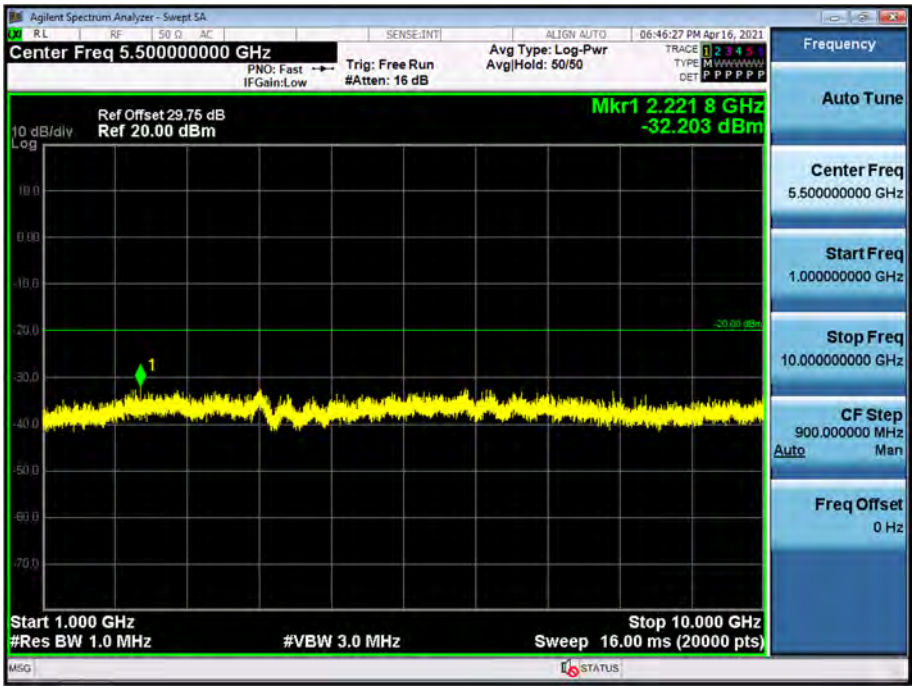

150 kHz~30 MHz



30 MHz~1 GHz

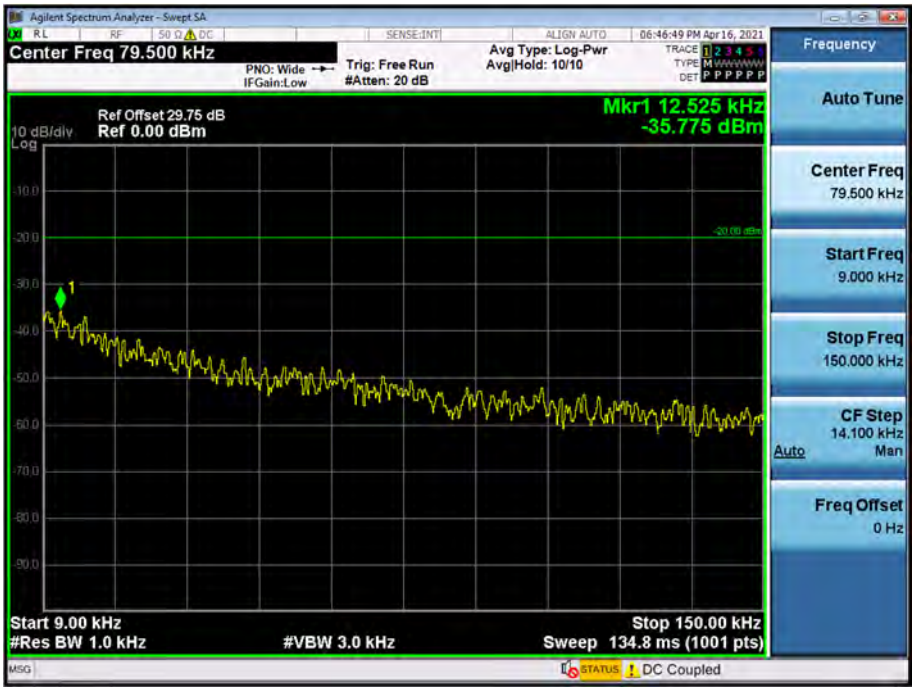



1 GHz~10 GHz

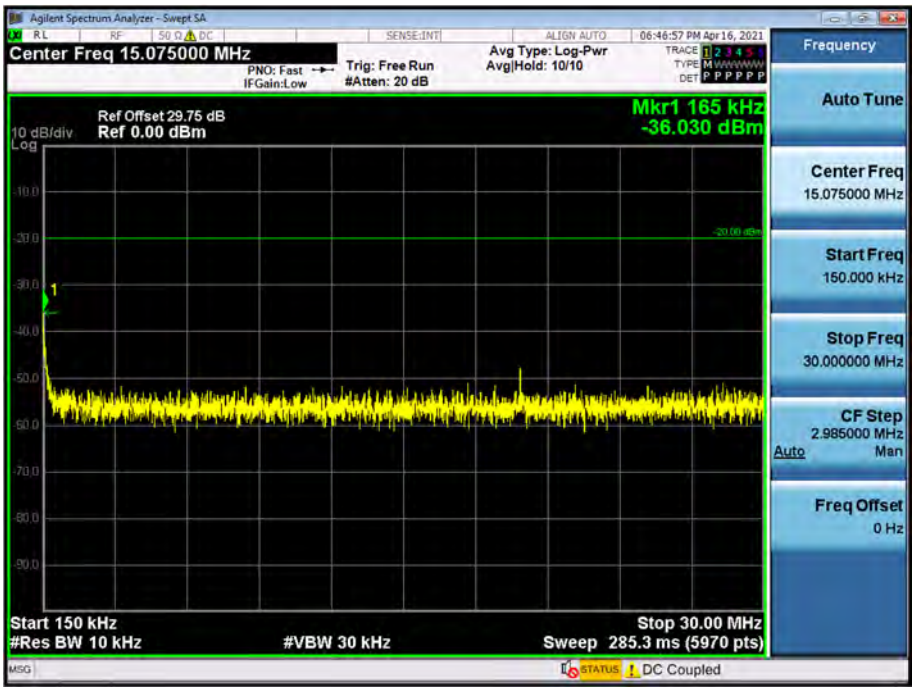


(150.05 MHz)_High

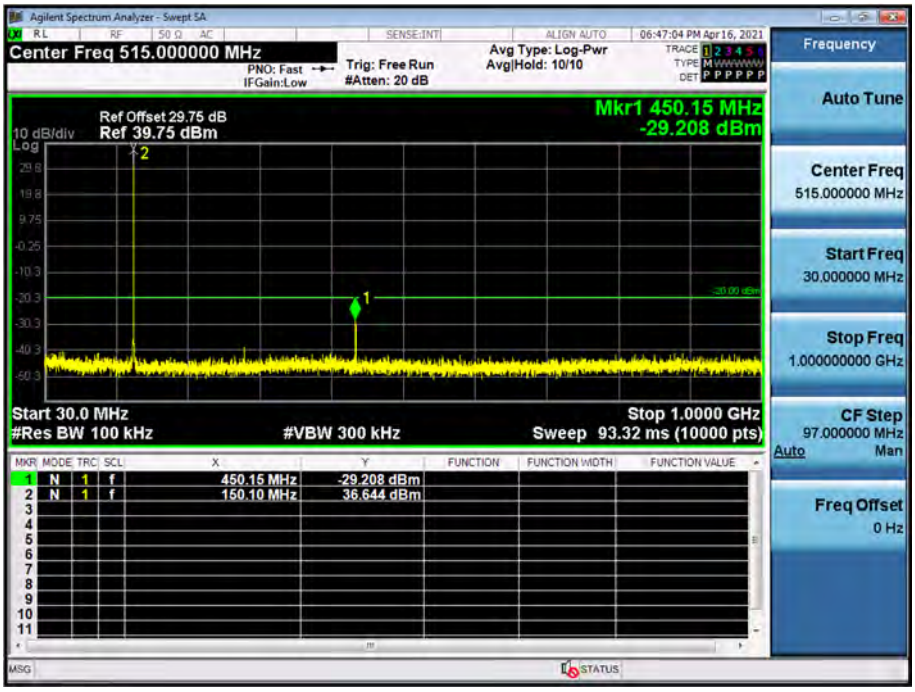
9 kHz~150 kHz



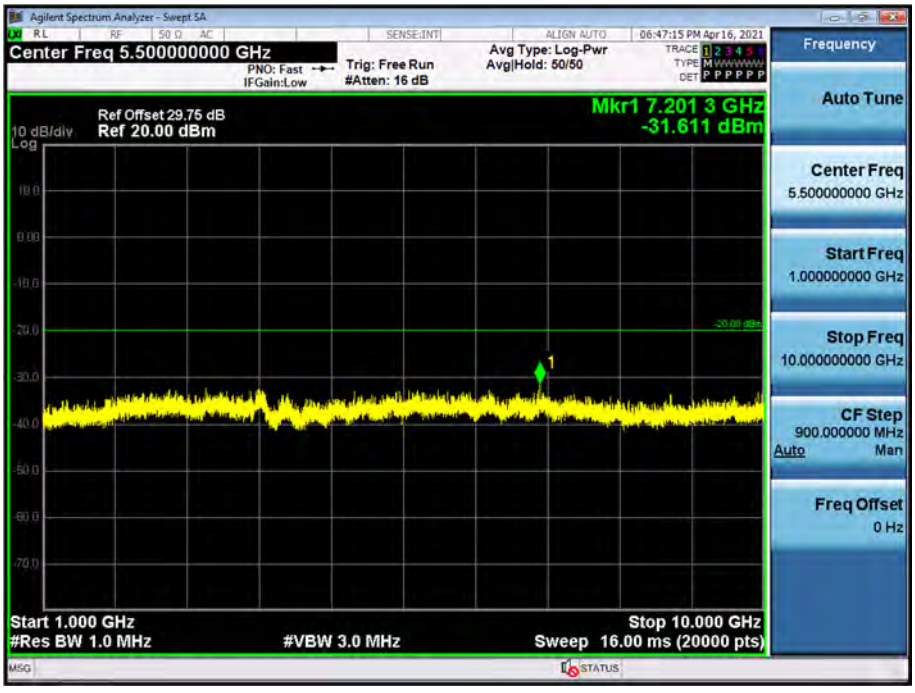

150 kHz~30 MHz



30 MHz~1 GHz

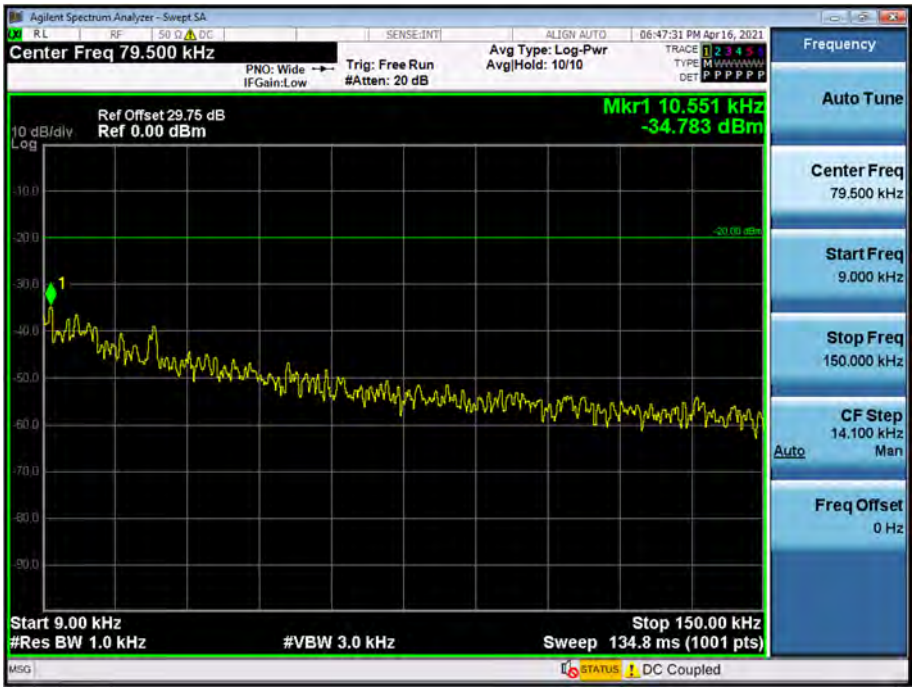



1 GHz~10 GHz

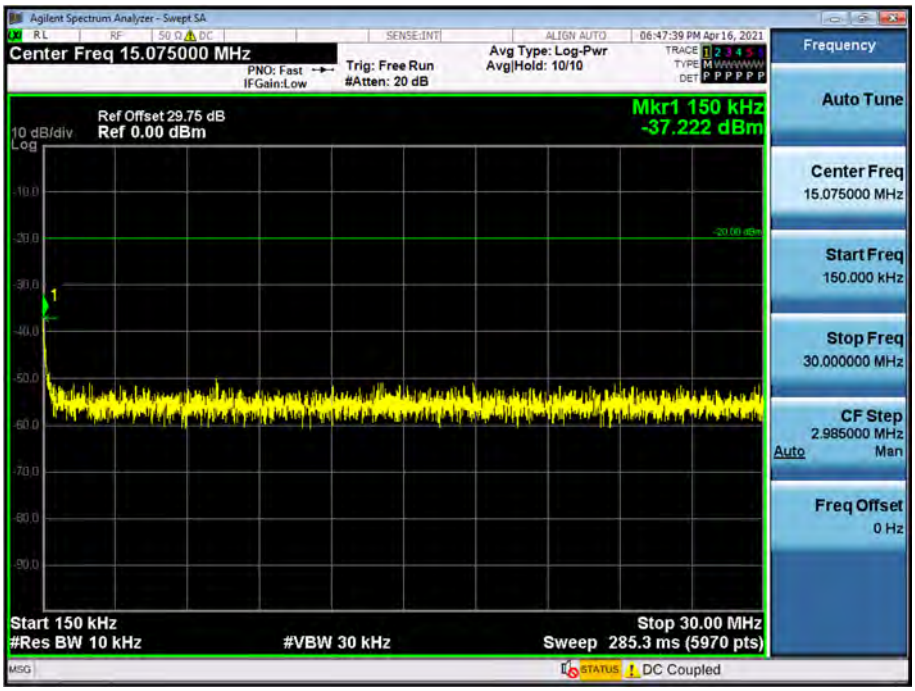


(162.05 MHz)_High

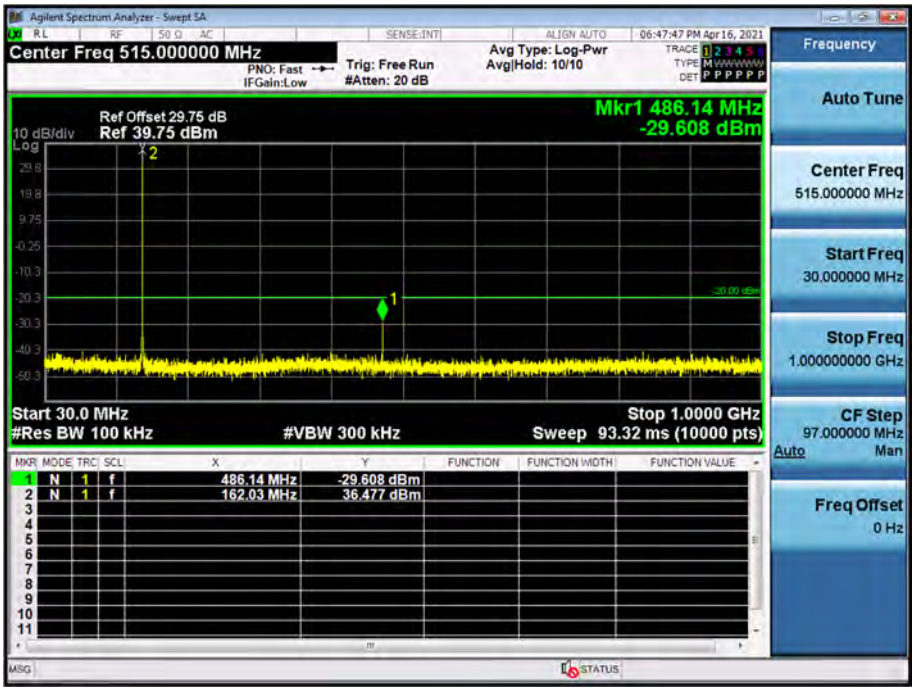
9 kHz~150 kHz



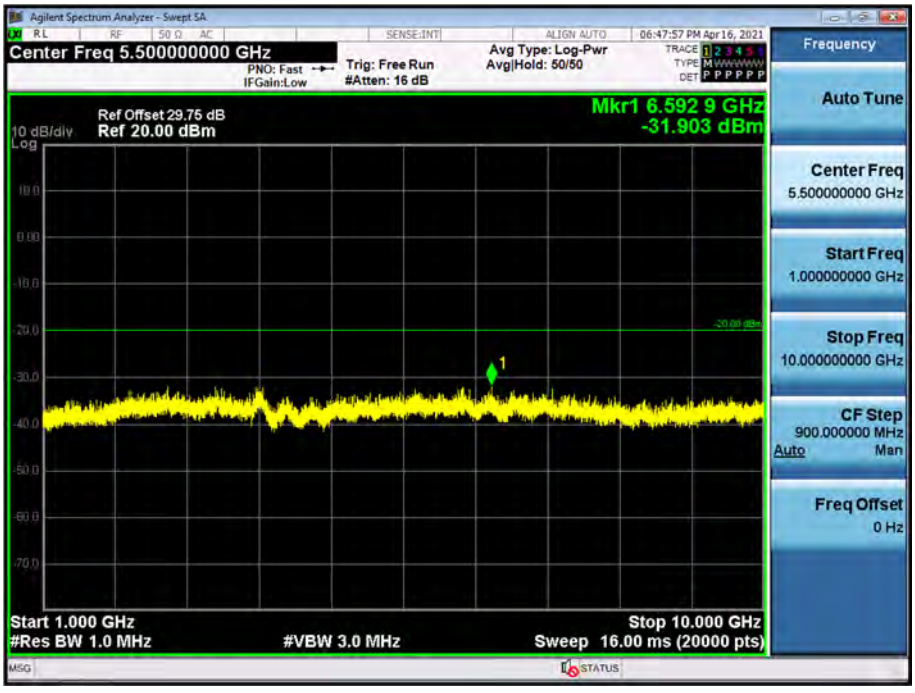

150 kHz~30 MHz



30 MHz~1 GHz

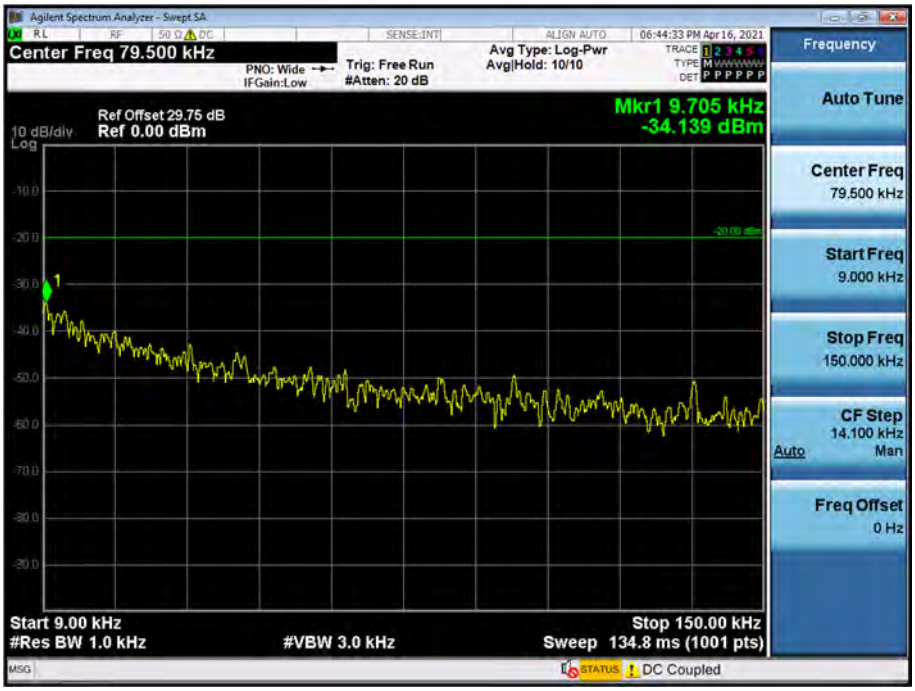



1 GHz~10 GHz

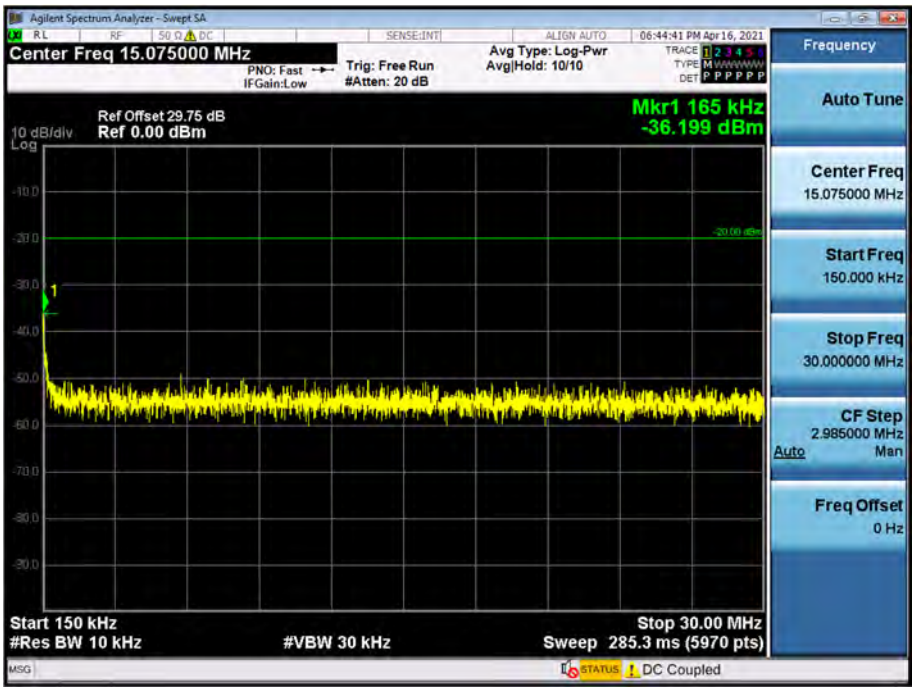


(173.95 MHz)_High

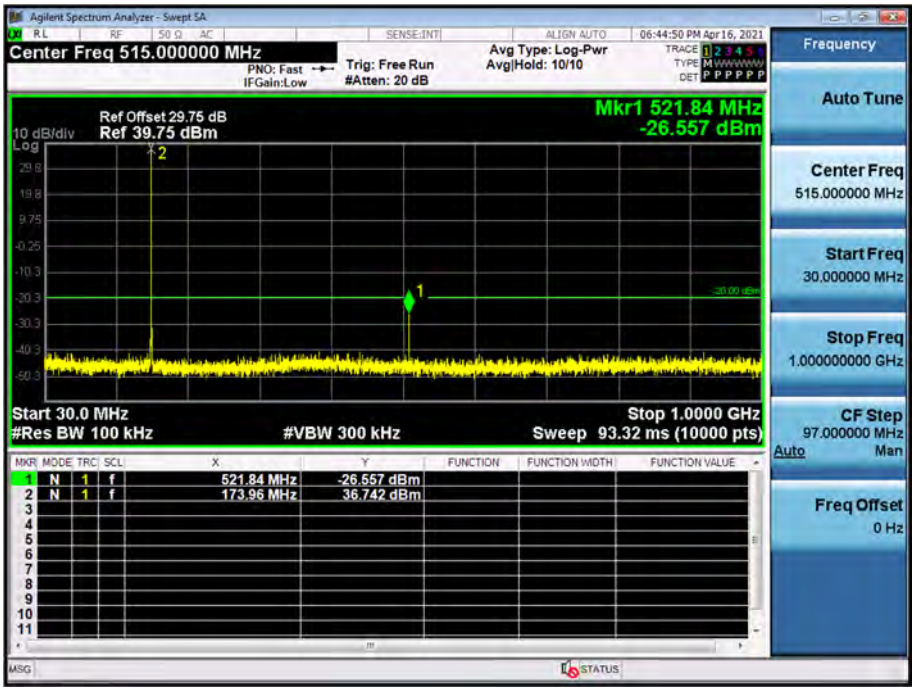
9 kHz~150 kHz



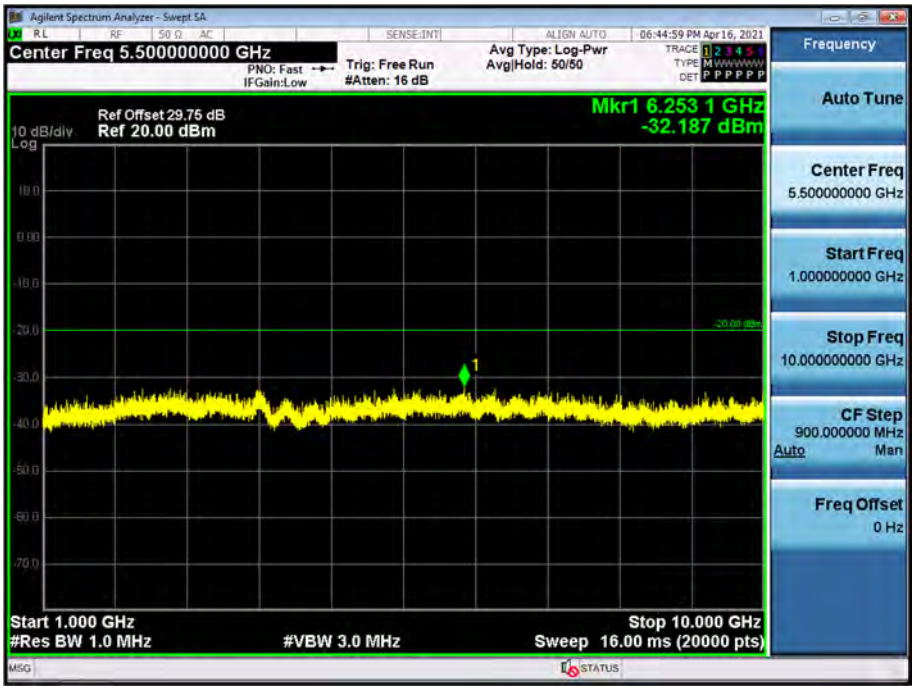

150 kHz~30 MHz



30 MHz~1 GHz




1 GHz~10 GHz

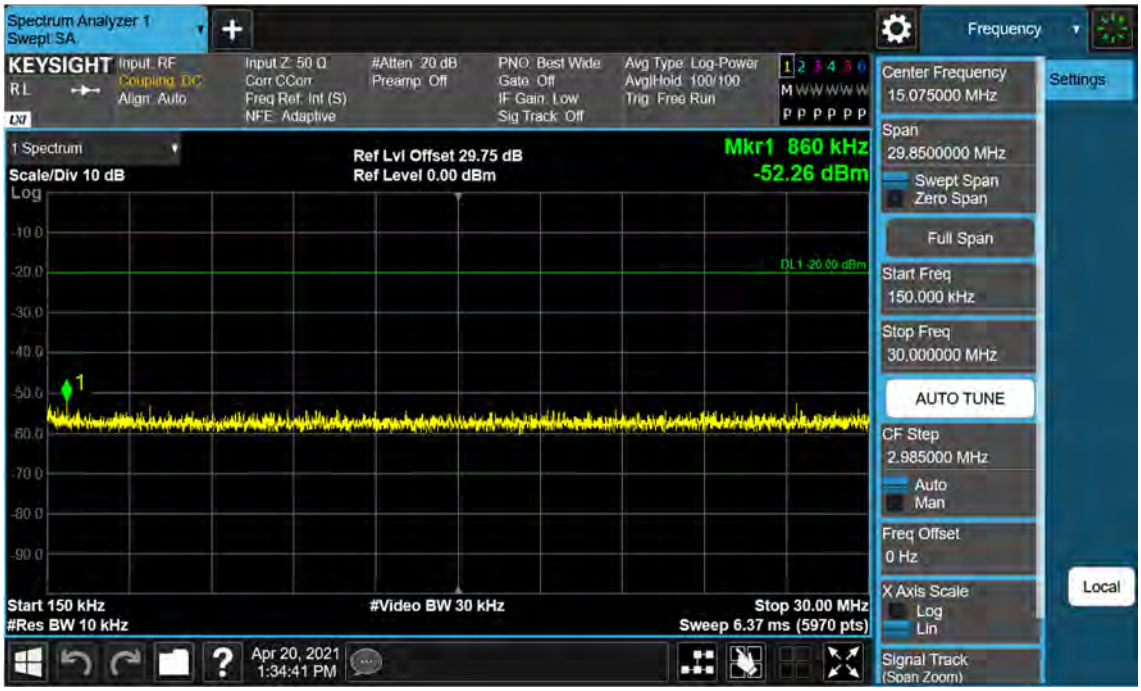


**8K30F1E, 8K30F1D, 8K30F7W_FCC/ISED**

(138.05 MHz)_High

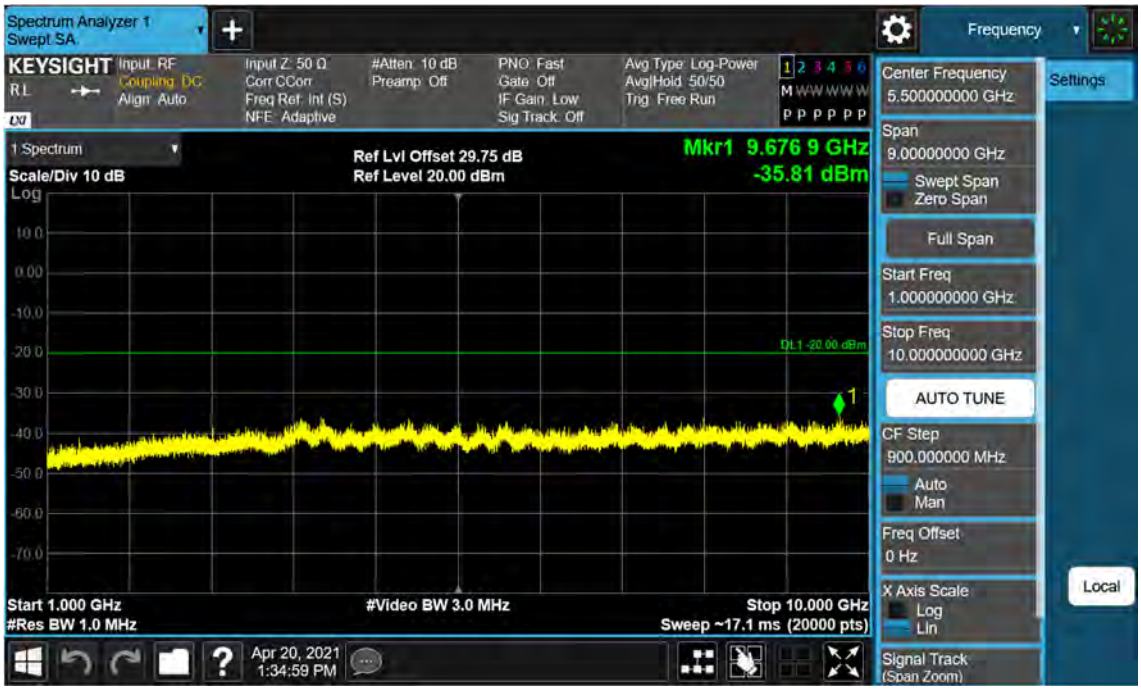
9 kHz~150 kHz


150 kHz~30 MHz



30 MHz~1 GHz

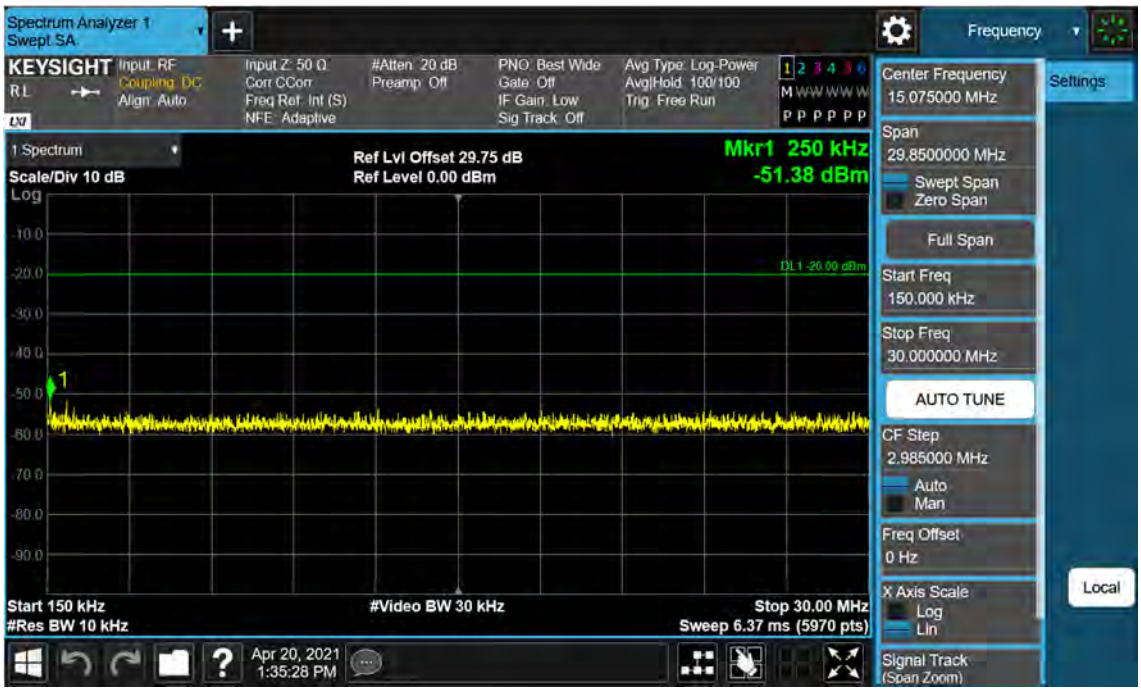

1 GHz~10 GHz



(150.05 MHz)_High

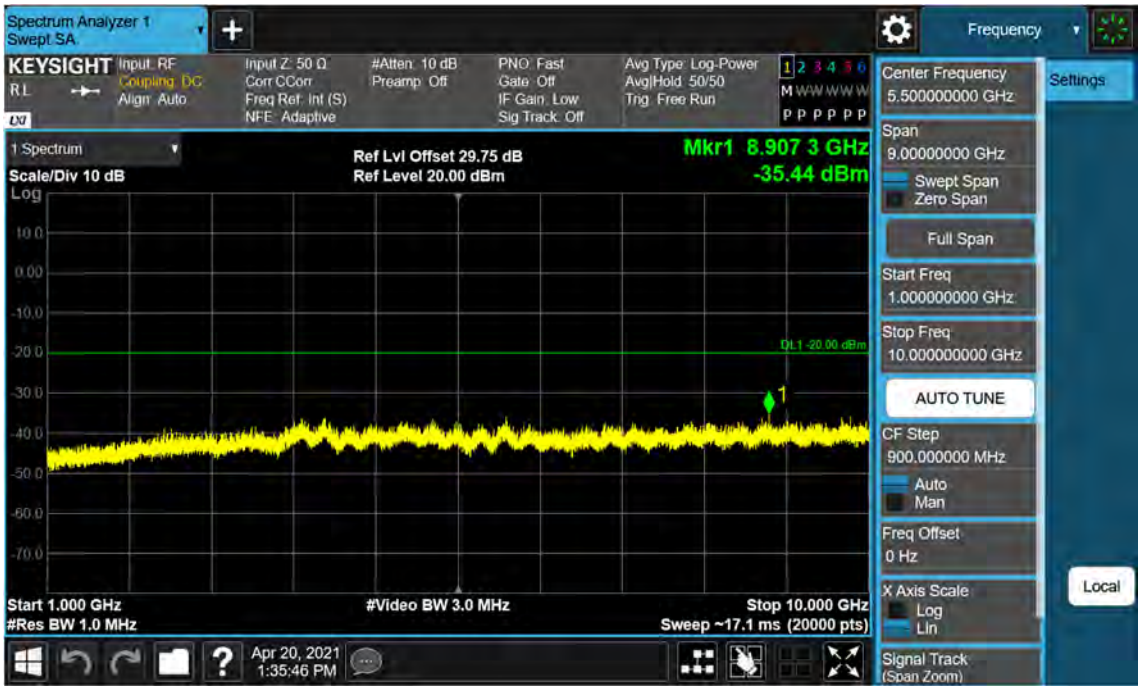
9 kHz~150 kHz


150 kHz~30 MHz



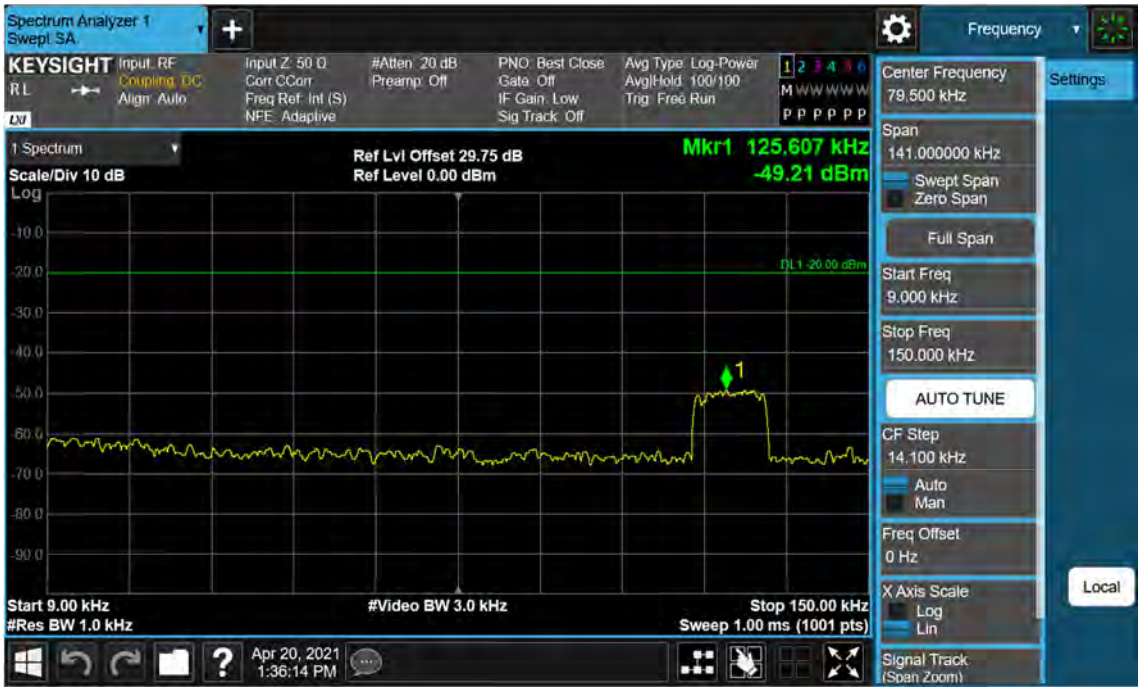
30 MHz~1 GHz


1 GHz~10 GHz

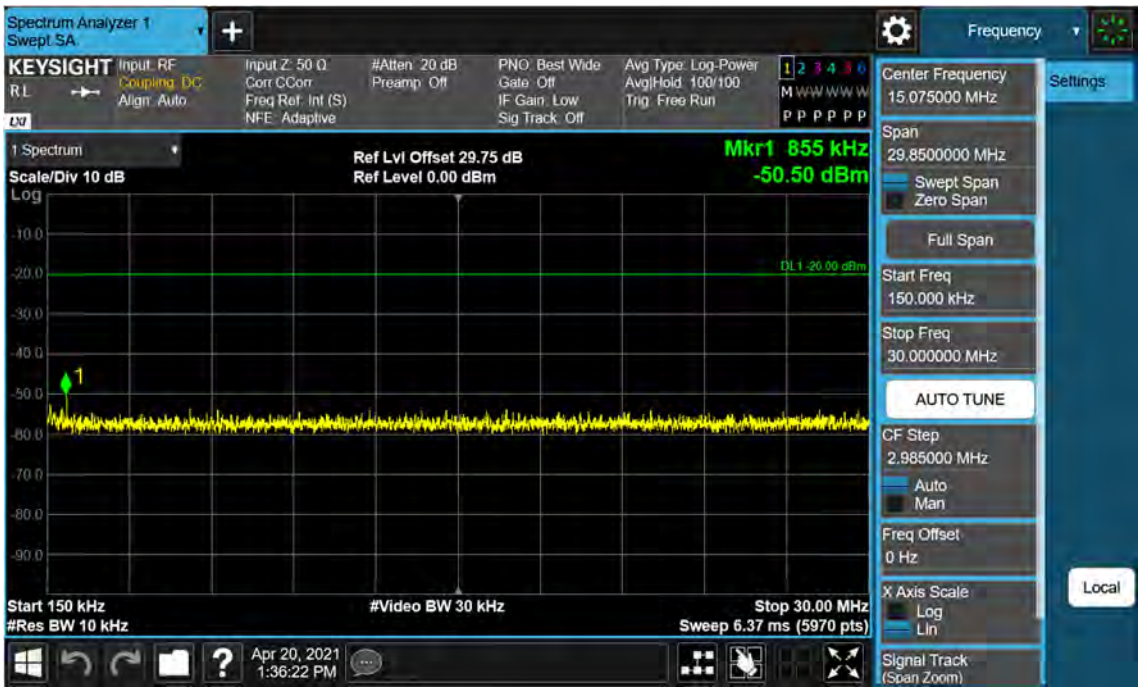


(162.05 MHz)_High

9 kHz~150 kHz

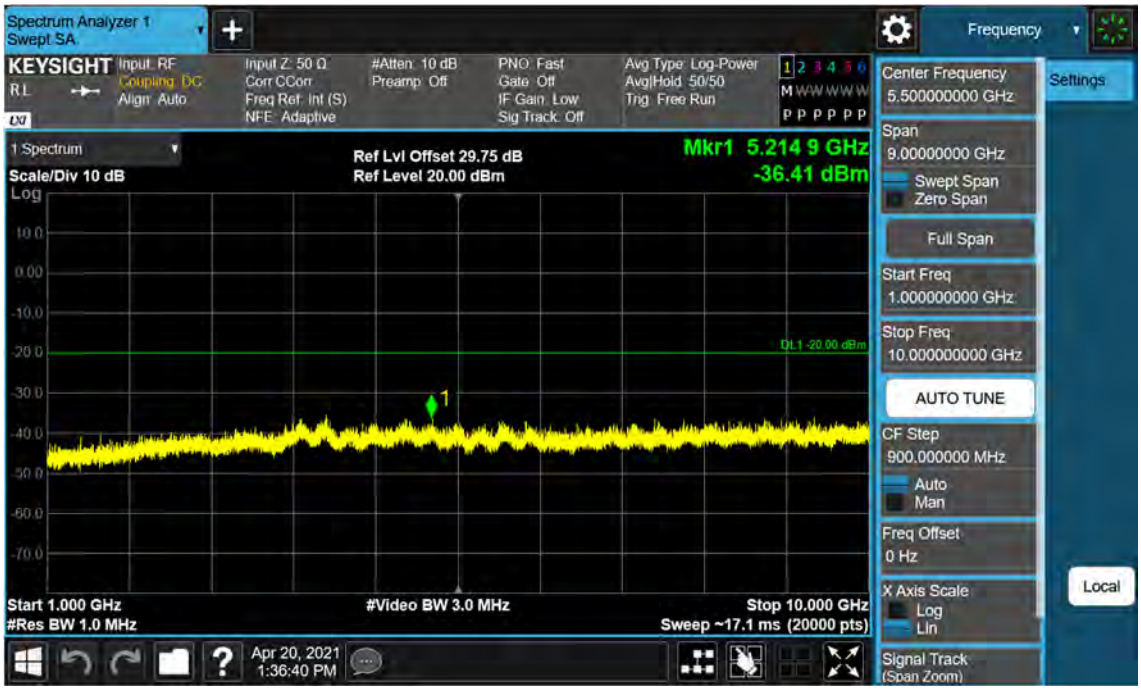



150 kHz~30 MHz



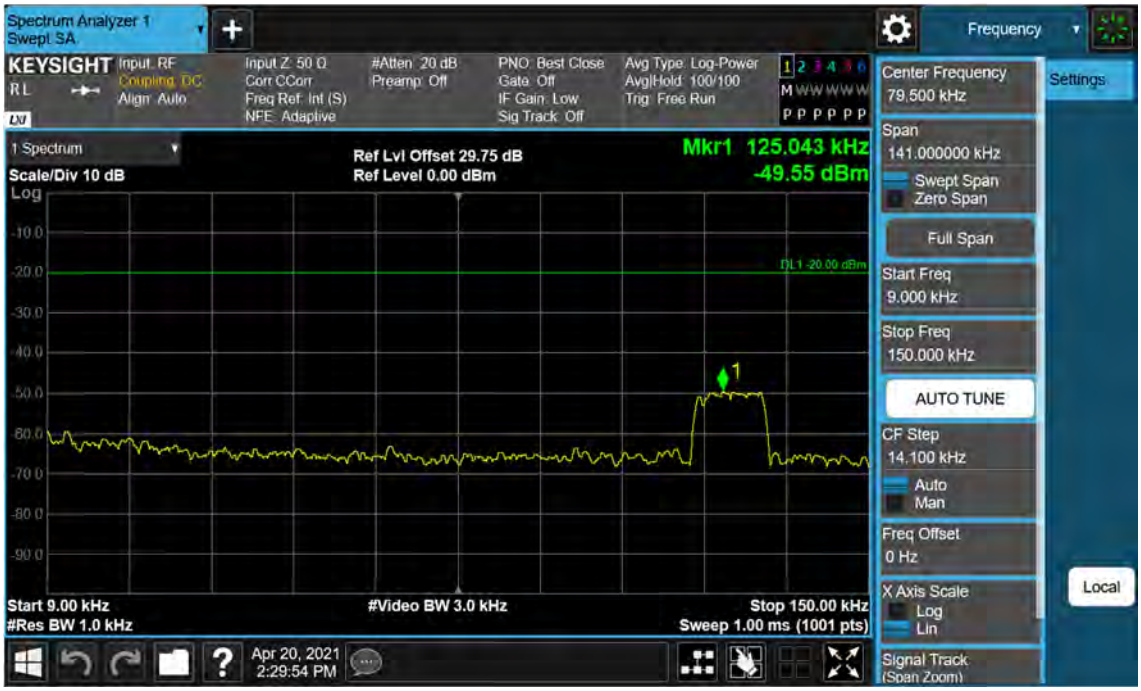
30 MHz~1 GHz


1 GHz~10 GHz



(173.95 MHz)_High

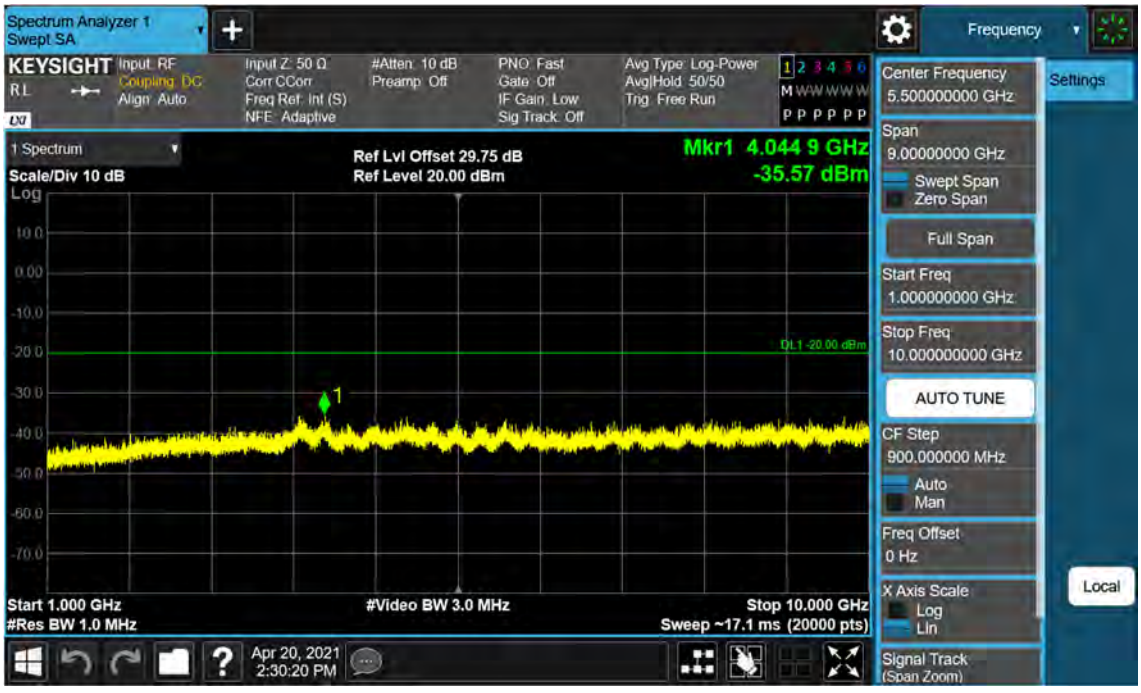
9 kHz~150 kHz




150 kHz~30 MHz

30 MHz~1 GHz


1 GHz~10 GHz

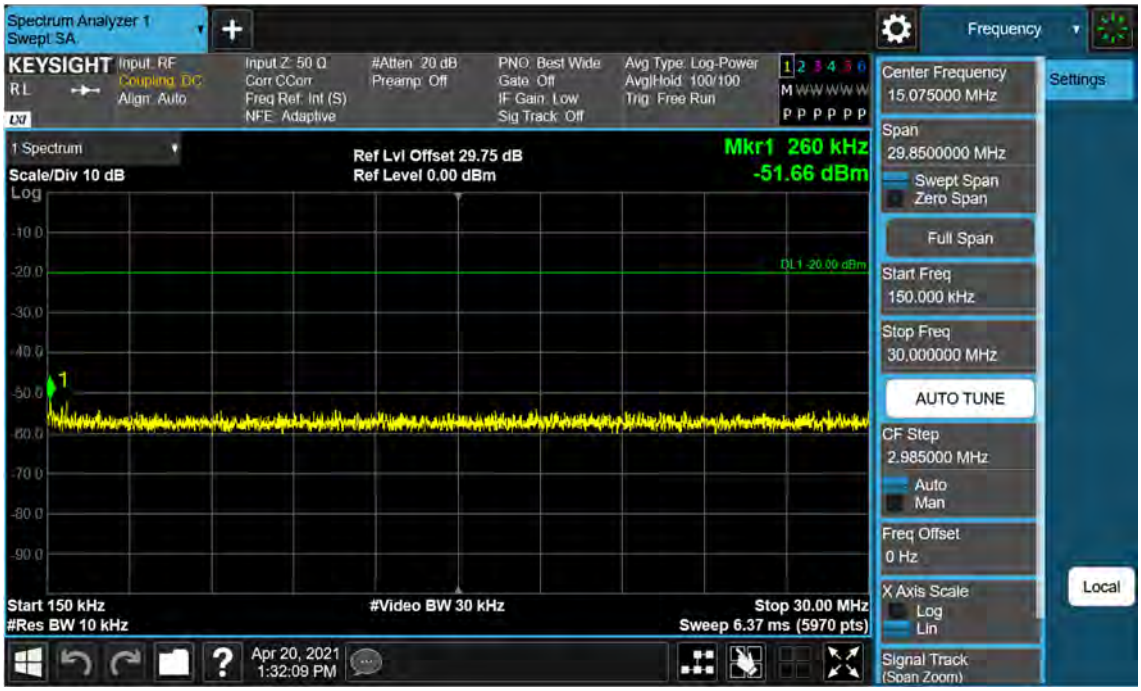


**7K60FXD, 7K60FXE_FCC/ISED**

(138.05 MHz)_High

9 kHz~150 kHz


150 kHz~30 MHz

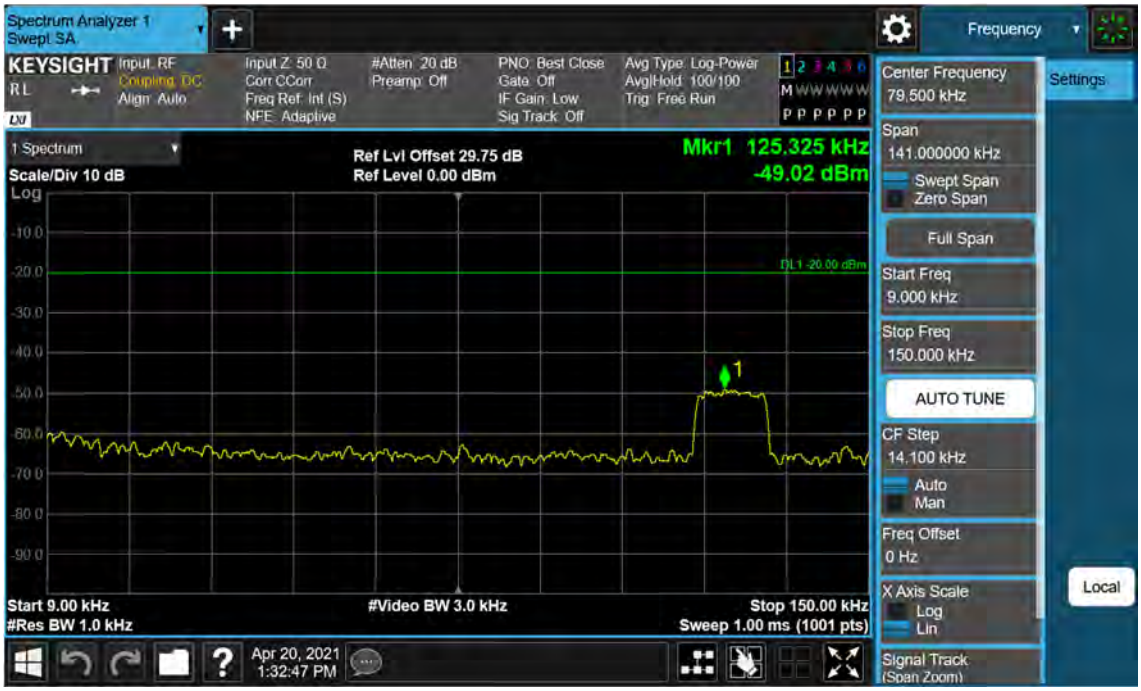


30 MHz~1 GHz

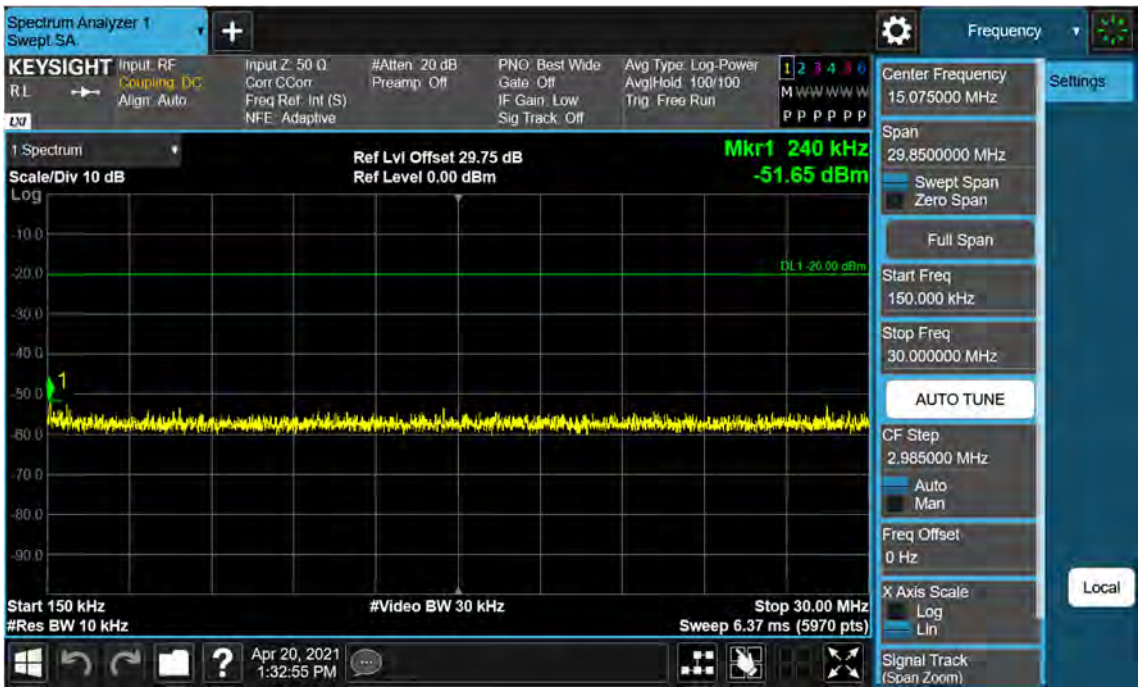

1 GHz~10 GHz

(150.05 MHz)_High

9 kHz~150 kHz

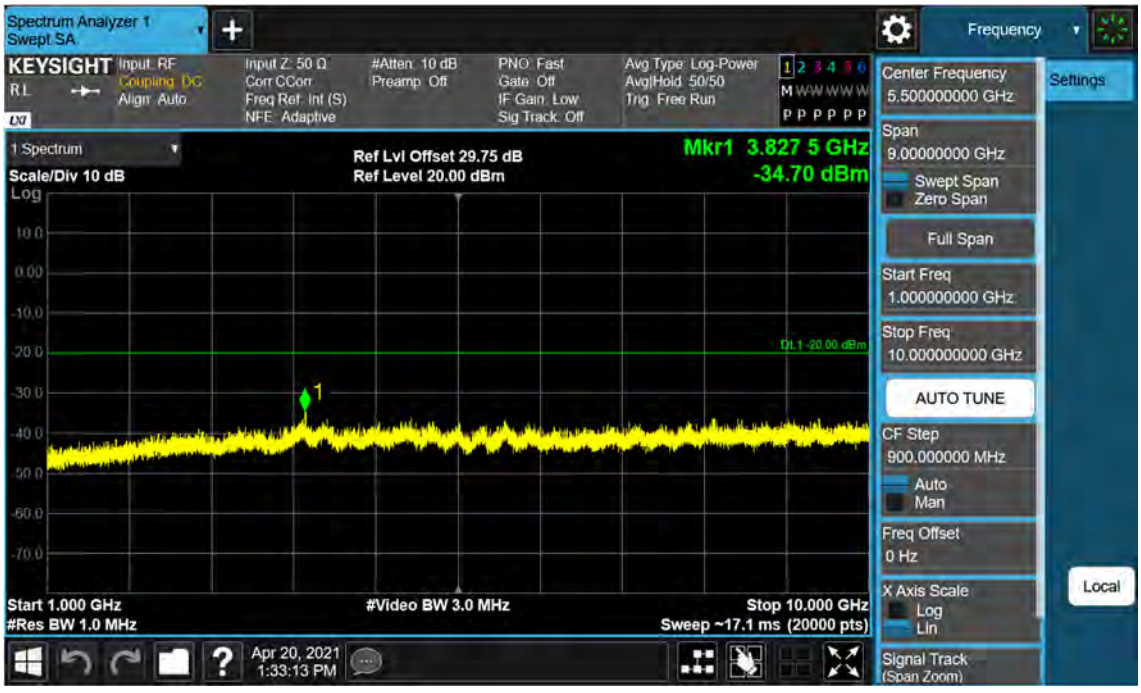



150 kHz~30 MHz



30 MHz~1 GHz

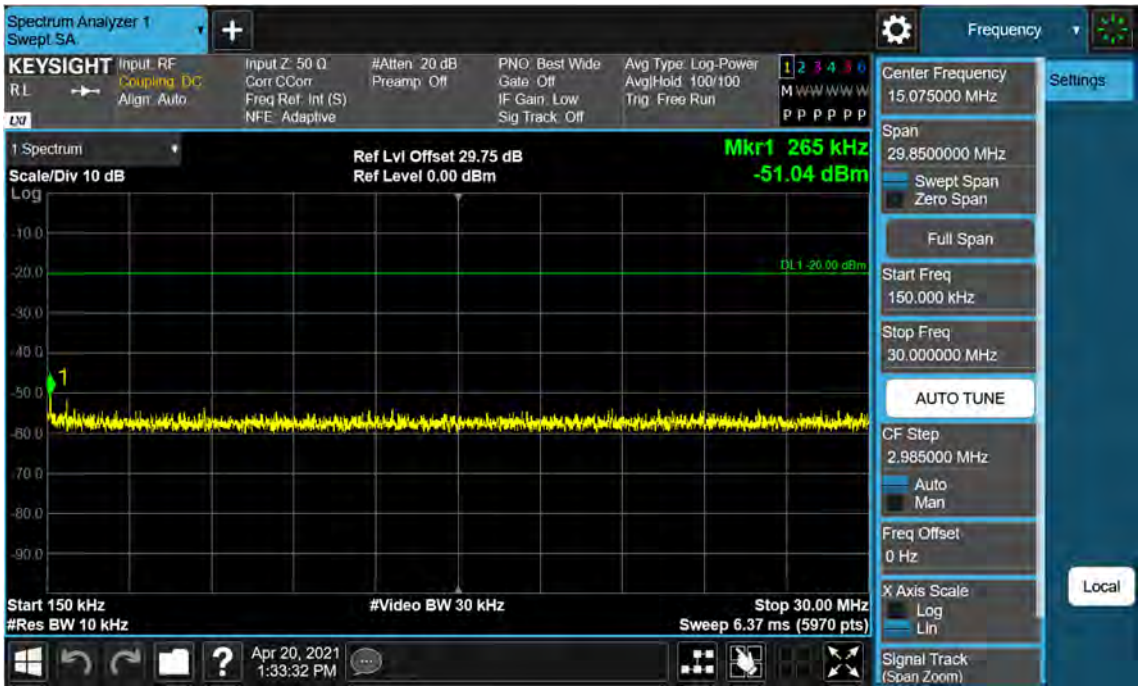

1 GHz~10 GHz



(162.05 MHz)_High

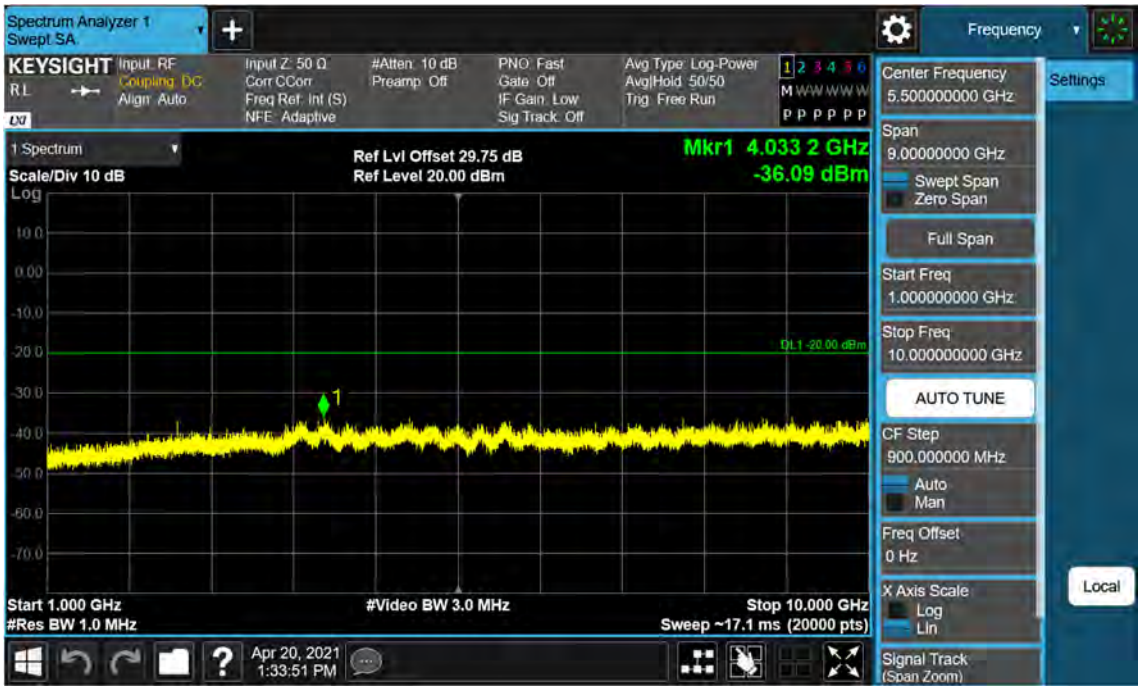
9 kHz~150 kHz


150 kHz~30 MHz



30 MHz~1 GHz

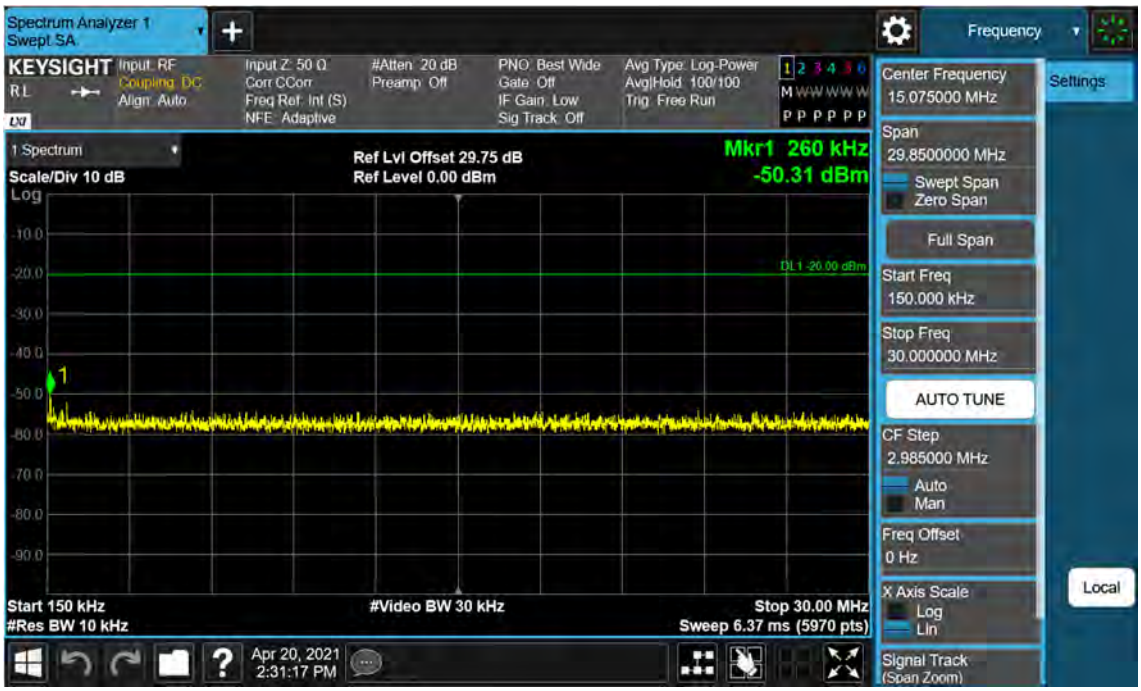

1 GHz~10 GHz



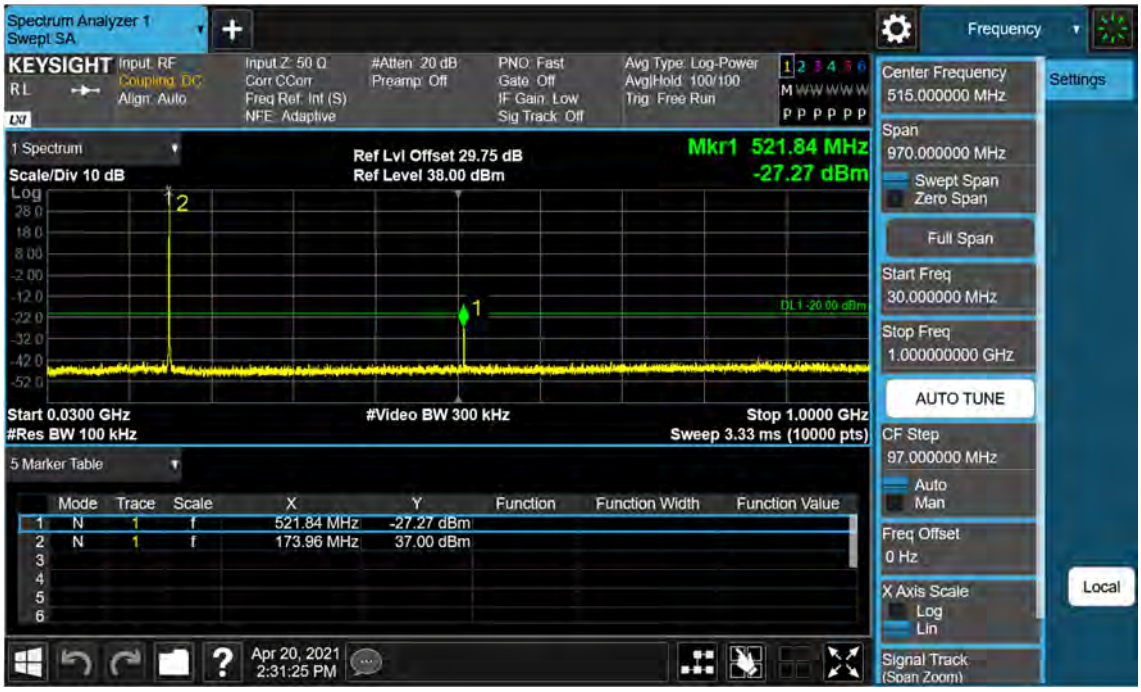
(173.95 MHz)_High

9 kHz~150 kHz

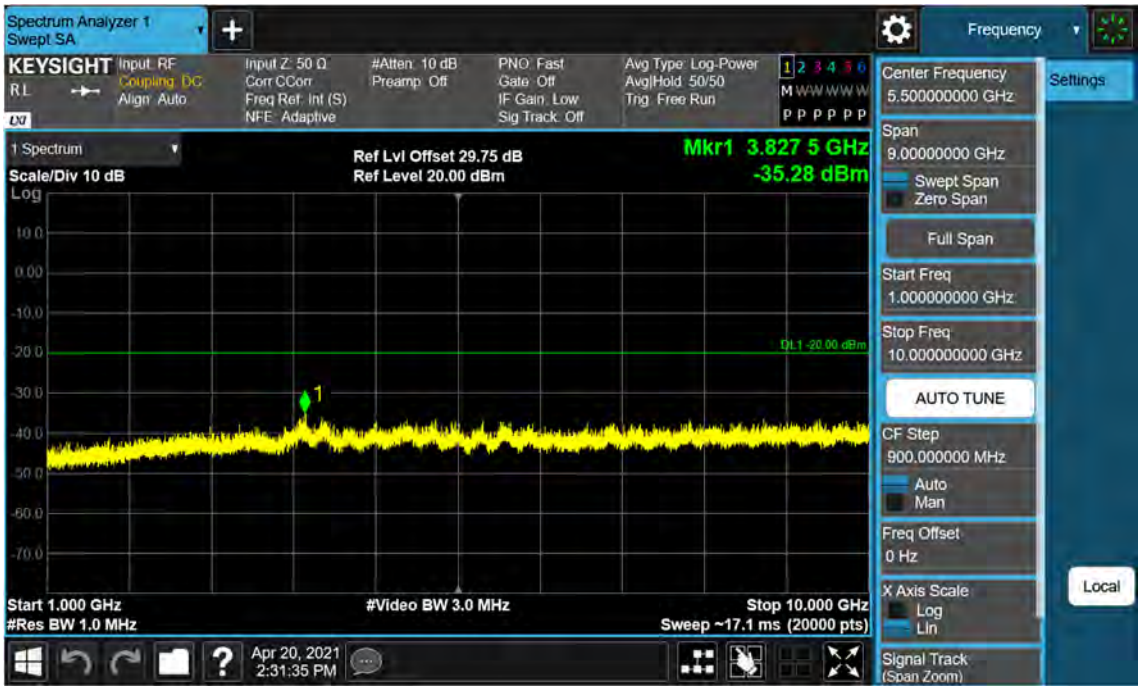

150 kHz~30 MHz



30 MHz~1 GHz




1 GHz~10 GHz

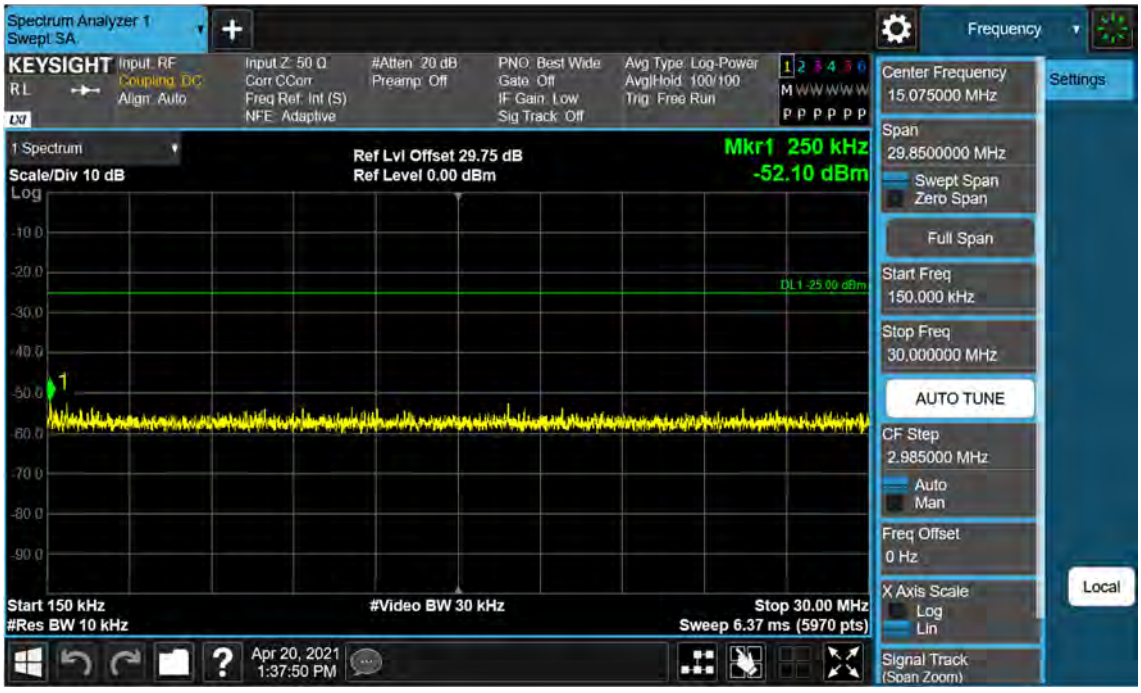


**4K00F1E, 4K00F1D, 4K00F7W_FCC/ISED**

(138.05 MHz)_High

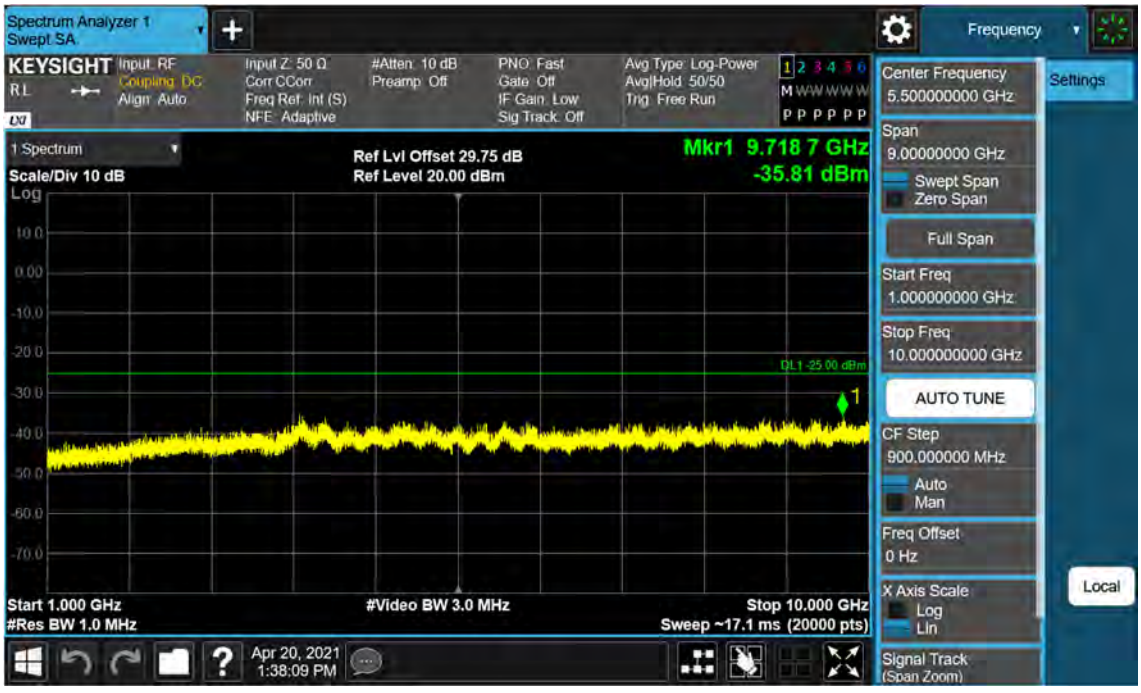
9 kHz~150 kHz


150 kHz~30 MHz



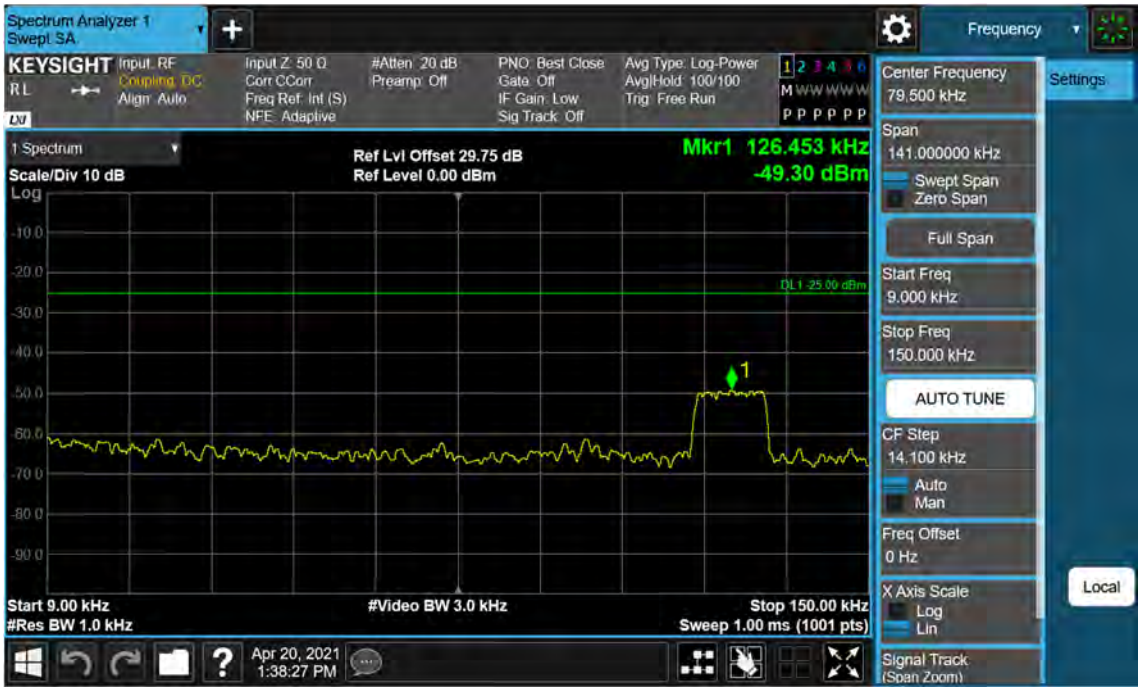
30 MHz~1 GHz


1 GHz~10 GHz

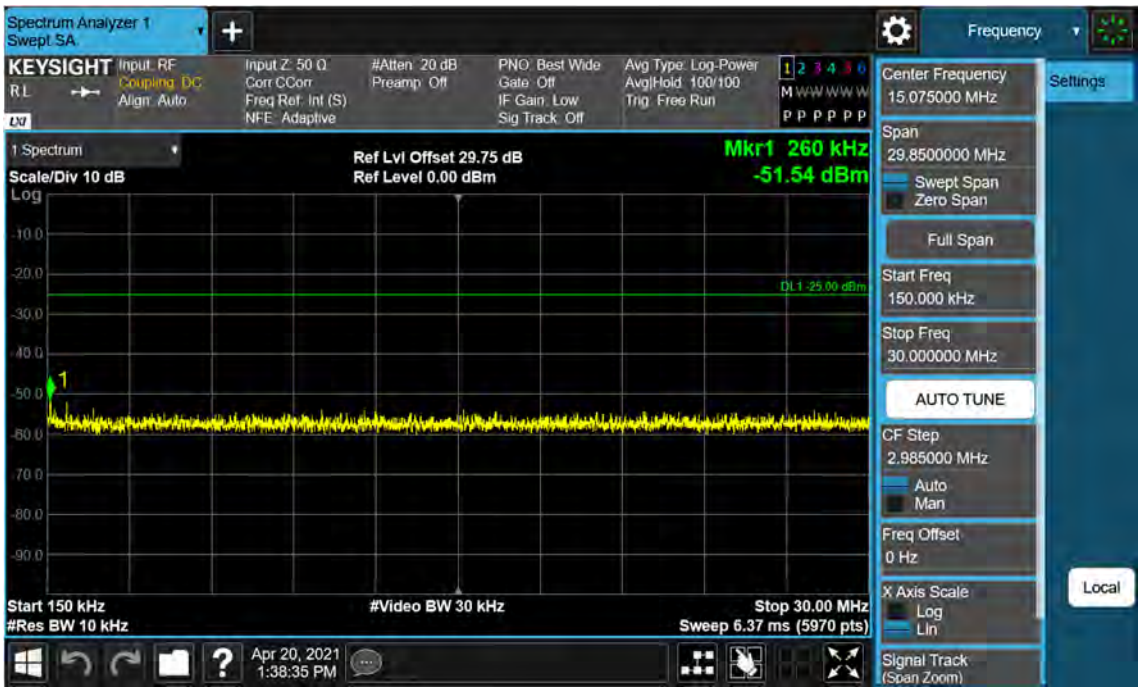


(150.05 MHz)_High

9 kHz~150 kHz

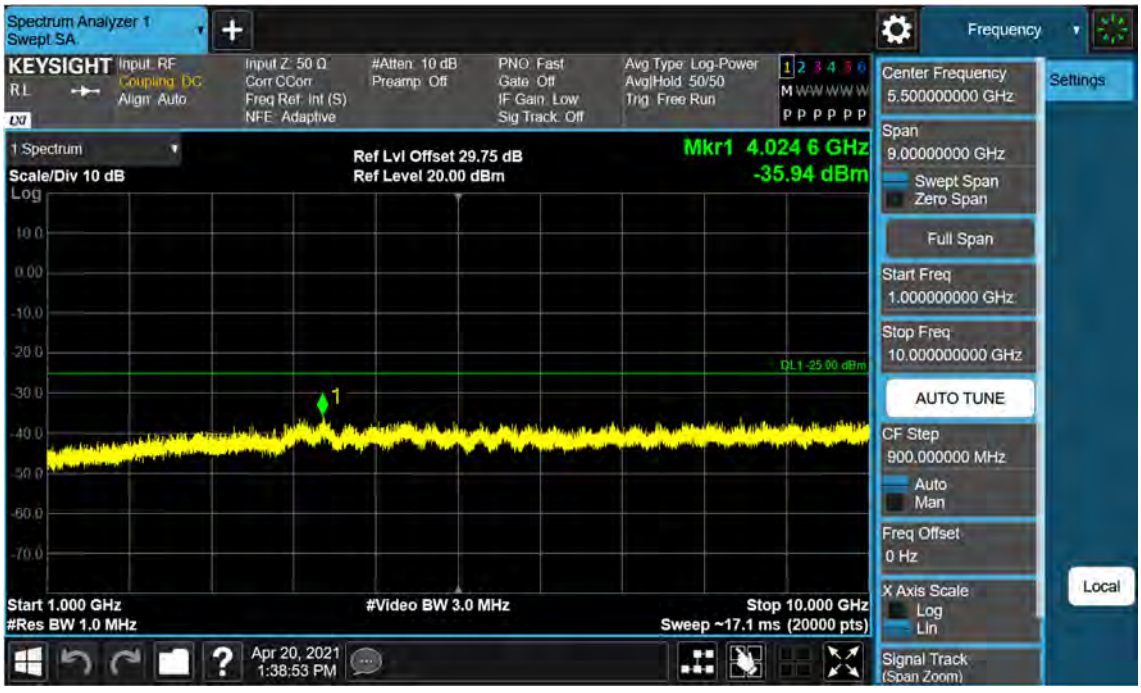



150 kHz~30 MHz



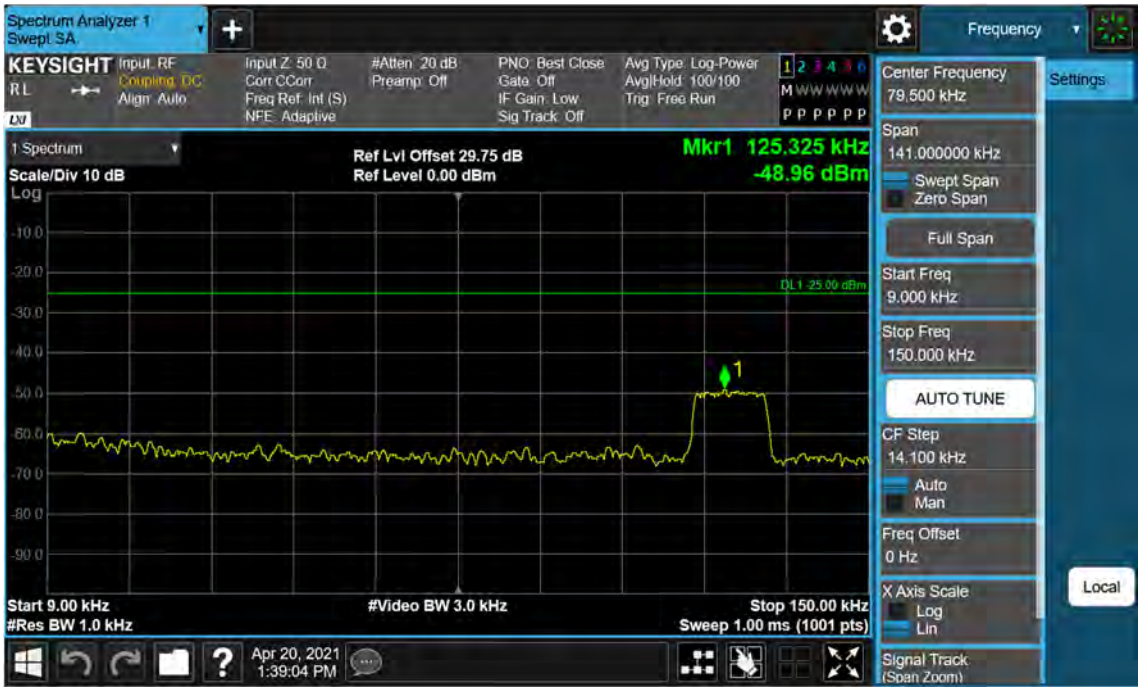
30 MHz~1 GHz


1 GHz~10 GHz

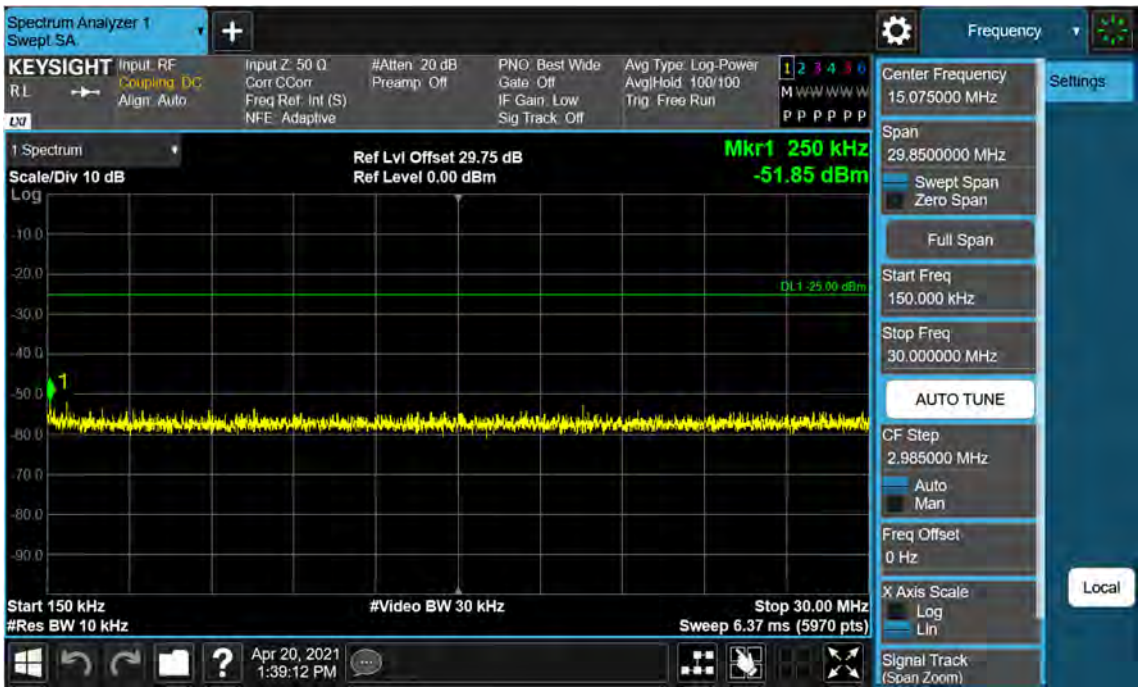


(162.05 MHz)_High

9 kHz~150 kHz

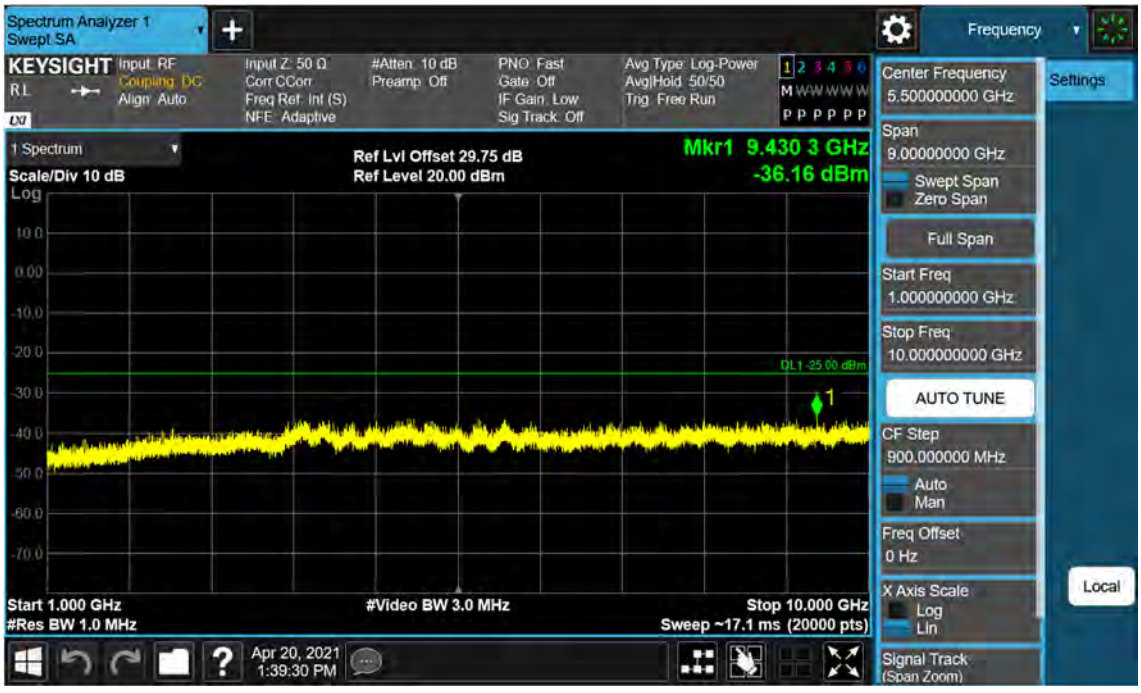



150 kHz~30 MHz



30 MHz~1 GHz

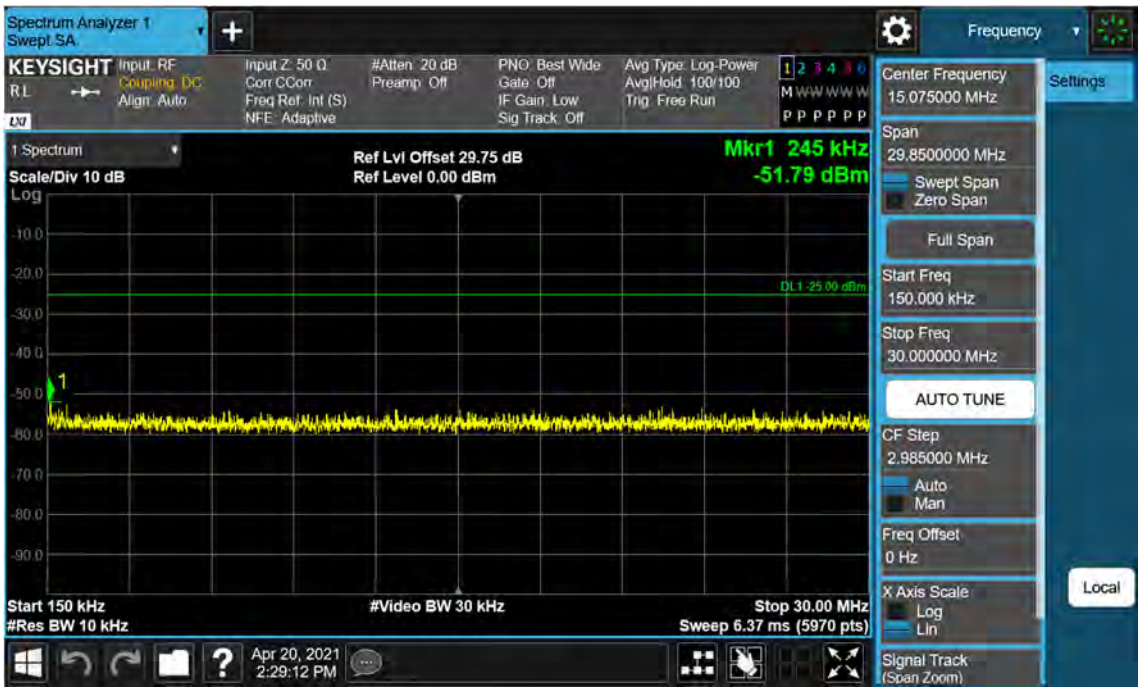

1 GHz~10 GHz



(173.95 MHz)_High

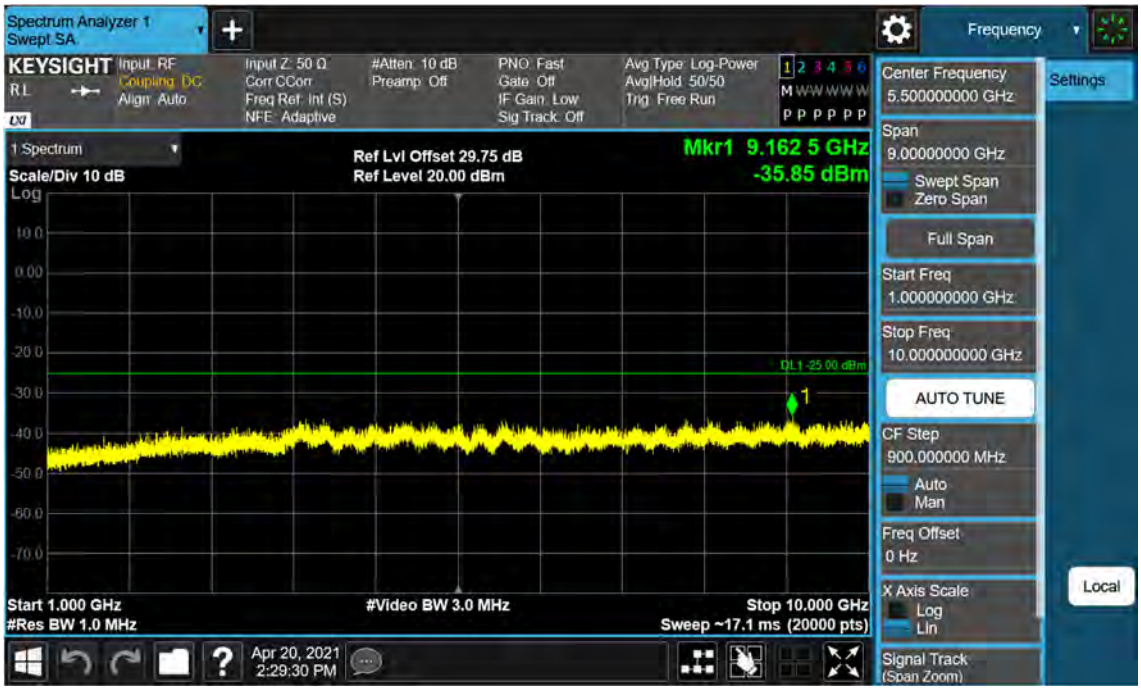
9 kHz~150 kHz


150 kHz~30 MHz



30 MHz~1 GHz


1 GHz~10 GHz

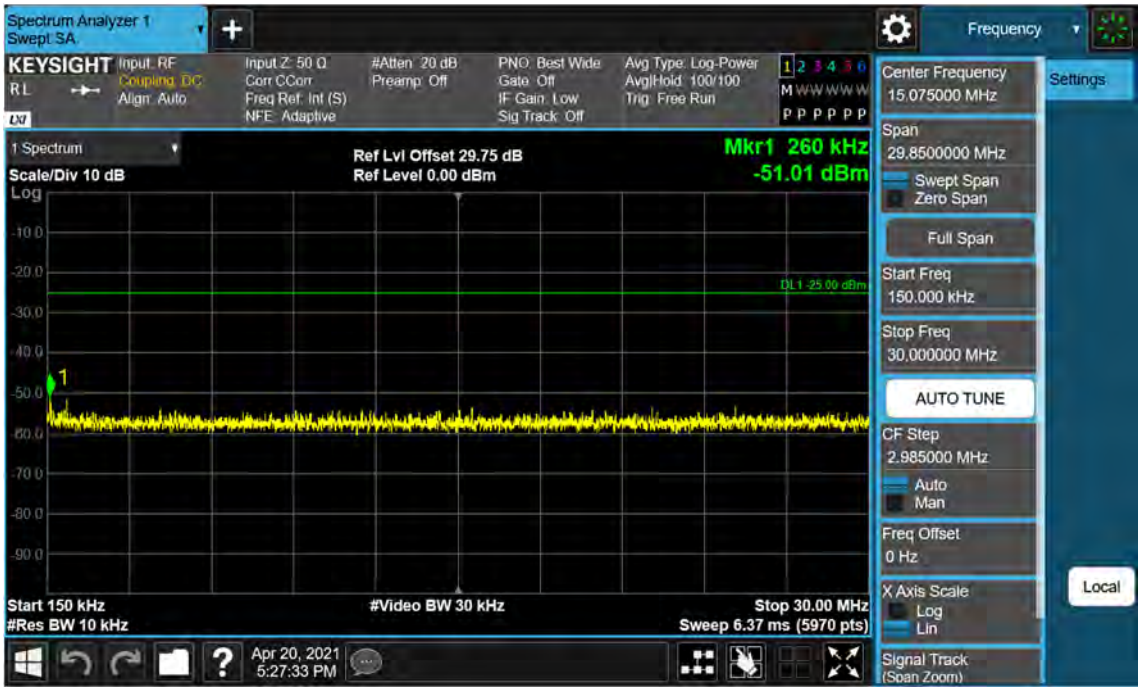


**4K00F2D_FCC/ISED**

(138.05 MHz)_High

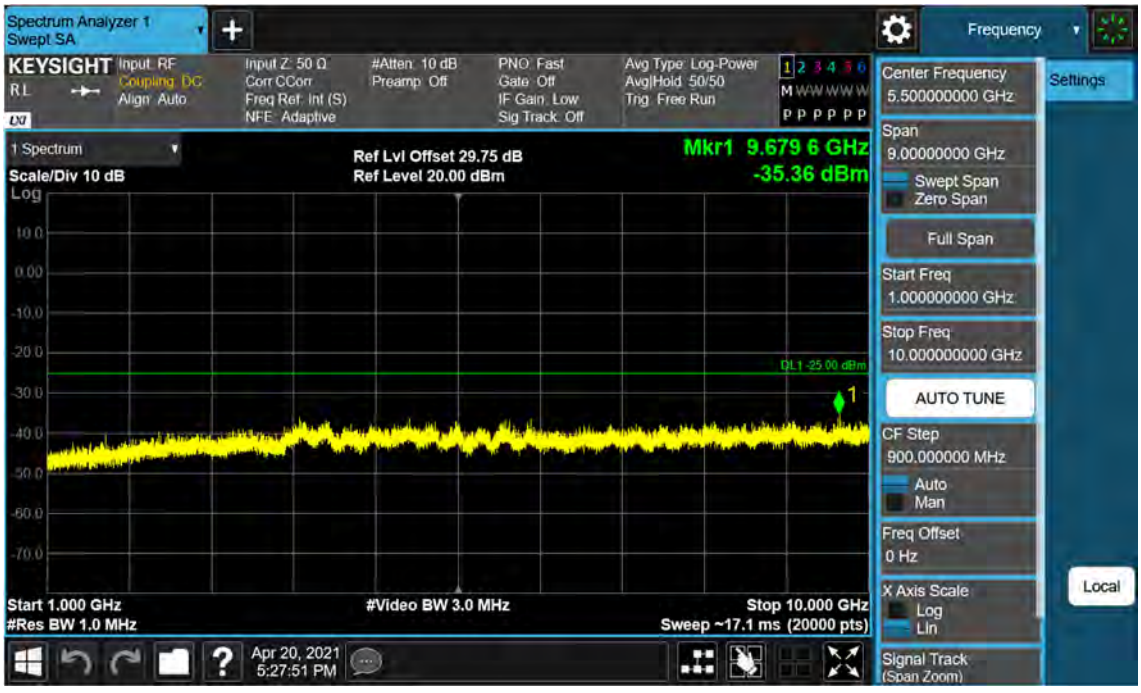
9 kHz~150 kHz


150 kHz~30 MHz



30 MHz~1 GHz


1 GHz~10 GHz



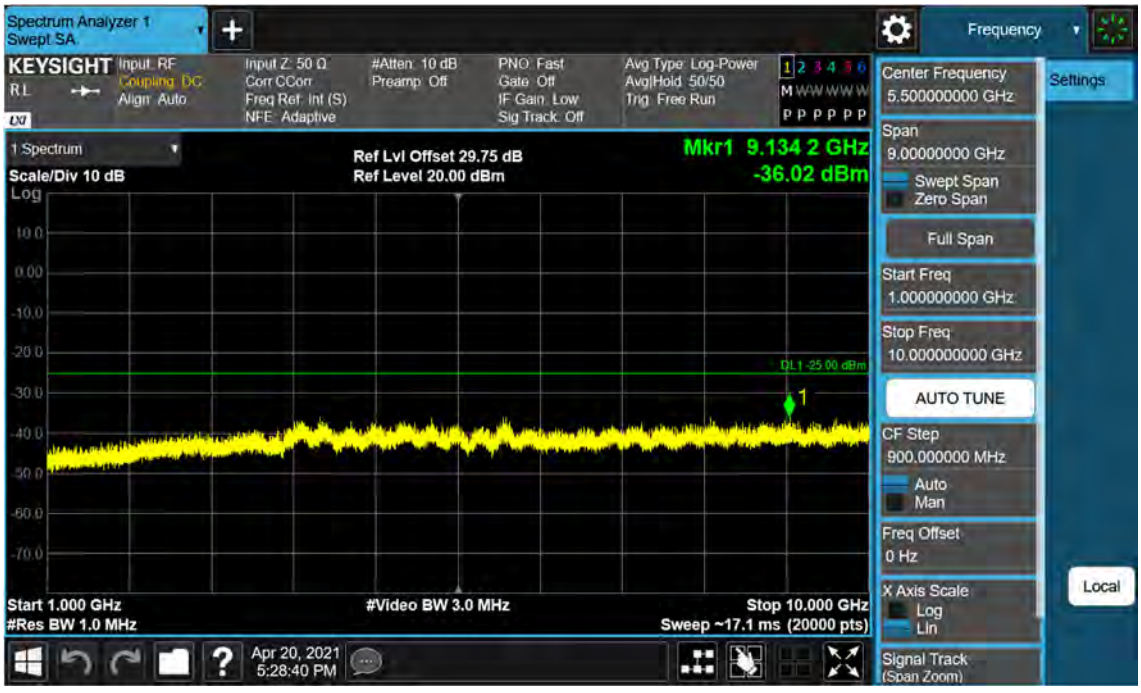
(150.05 MHz)_High

9 kHz~150 kHz


150 kHz~30 MHz

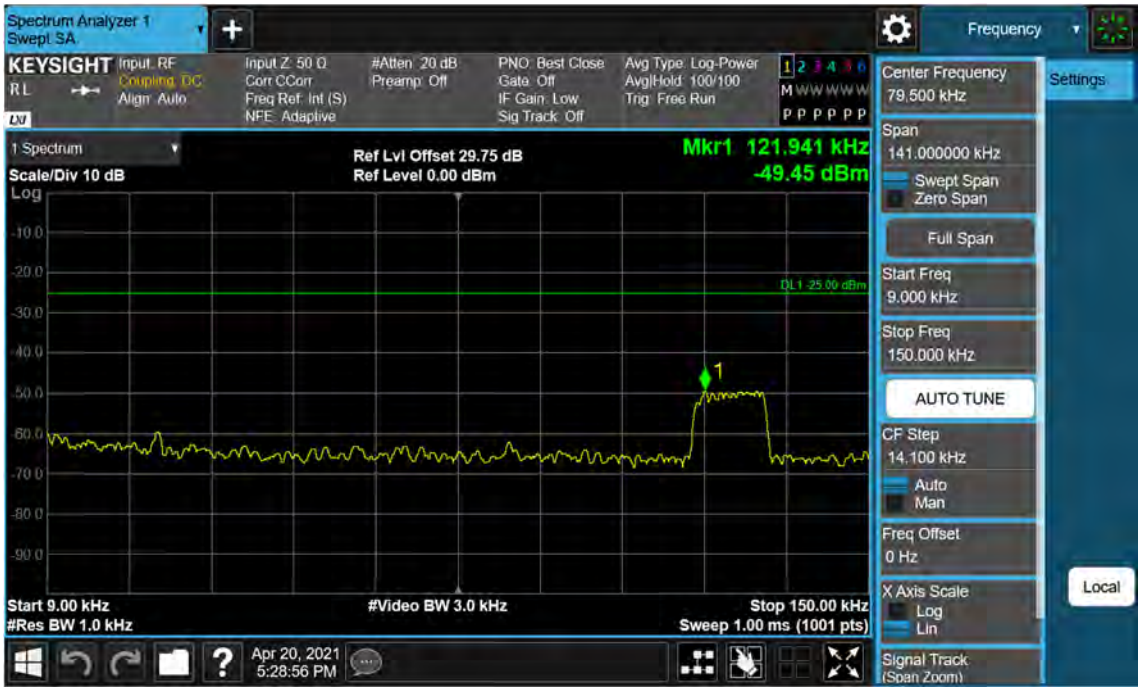
30 MHz~1 GHz


1 GHz~10 GHz



(162.05 MHz)_High

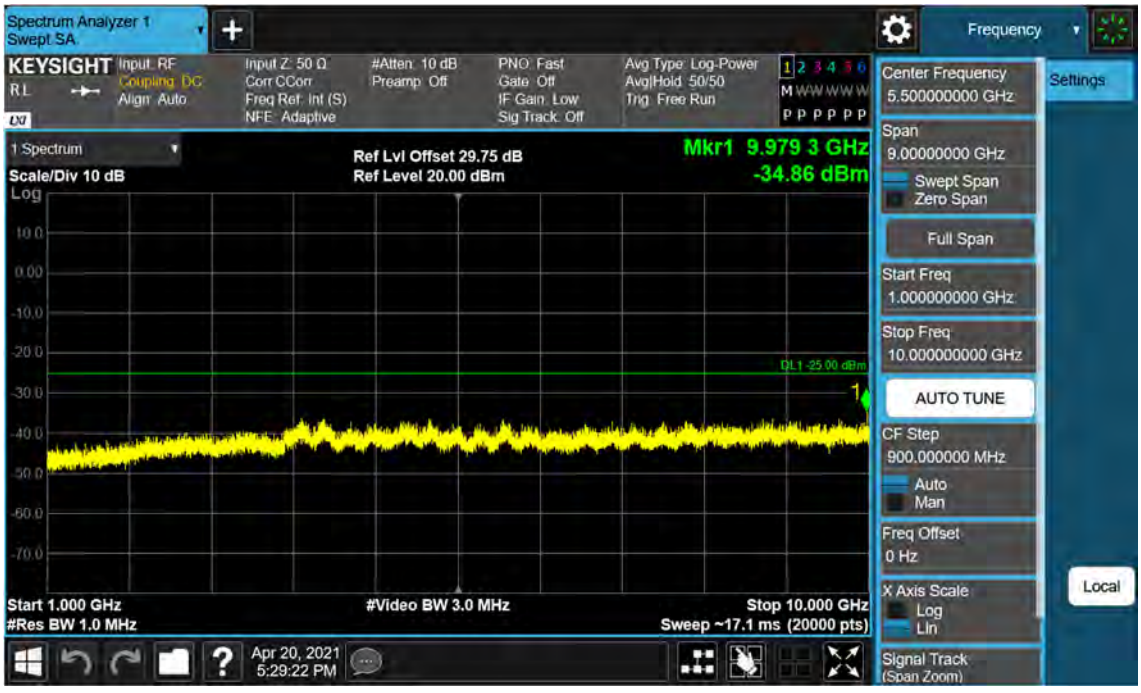
9 kHz~150 kHz




150 kHz~30 MHz

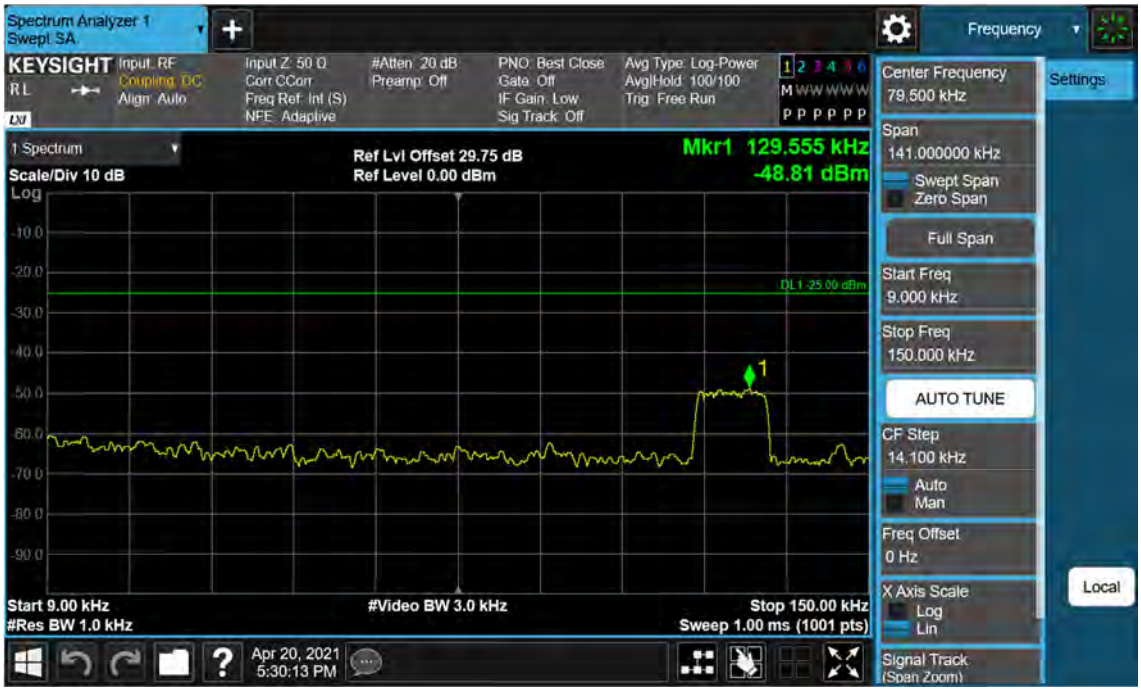
30 MHz~1 GHz


1 GHz~10 GHz



(173.95 MHz)_High

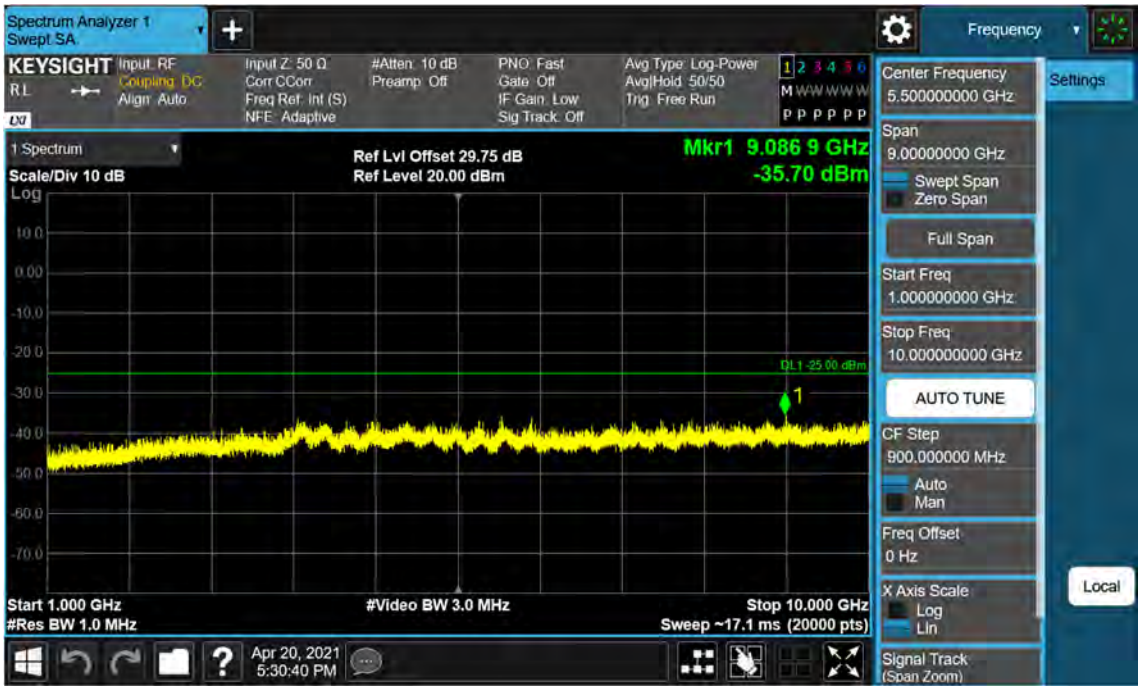
9 kHz~150 kHz




150 kHz~30 MHz

30 MHz~1 GHz


1 GHz~10 GHz



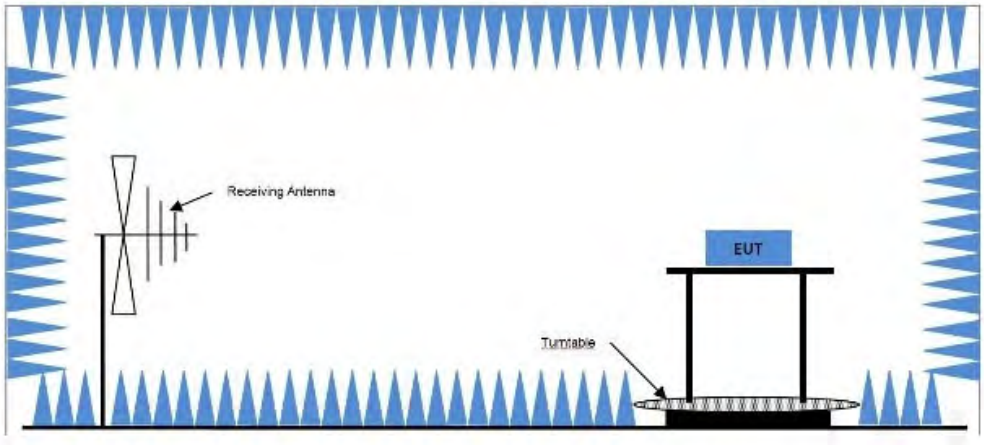
## 8.9 Unwanted Emissions : Radiated Spurious Emission

▣ Definition

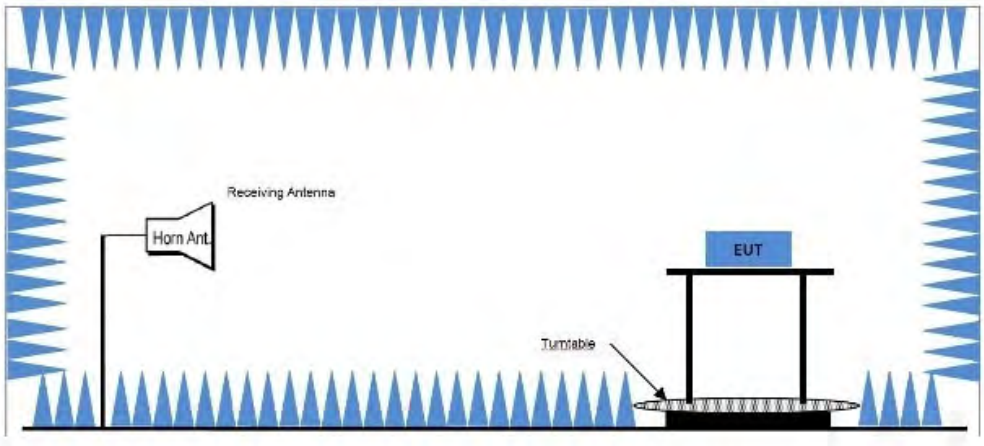
Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies that are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

▣ TEST CONFIGURATION

Below 30 MHz




Above 1 GHz



TEST PROCEDURE USED

Radiated tests are performed in the Fully-anechoic chamber.
Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA-603E-2016.

a) The Resolution Bandwidth for scanning Radiated Emission below 1 GHz is 100 kHz with Video Bandwidth = 300 kHz and Resolution Bandwidth for above 1 GHz is 1 MHz with Video Bandwidth = 3 MHz.
b) Detector mode is peak.
c) In the fully-anechoic chamber, setup as illustrated above the DUT placed on the 2.5m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization.
The “Read Value” is the spectrum reading the maximum power value.
d) The substitution antenna is substituted for DUT at the same position and signals generator (S.G) export the CW signal to the substitution antenna via a TX cable. The receiver antenna shall be rotated vertical and horizontal polarization to find the maximum radiation power.
Record the power level of maximum radiation power from spectrum.
So, the measured Factor value = Ref level of S.G + TX cables loss – Substituted Antenna Gain.
4) Result(dBm) = “Reading” + Factor

▣ TEST RESULTS

16K0F3E_FCC

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 150.05 | 300.10 | V | -66.67 | 31.11 | -35.56 | -13.00 | 22.56 | Peak |
| | 450.15 | H | -69.51 | 34.11 | -35.40 | -13.00 | 22.40 | Peak |

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 162.05 | 324.10 | V | -66.12 | 31.39 | -34.73 | -13.00 | 21.73 | Peak |
| | 486.15 | V | -72.56 | 34.75 | -37.81 | -13.00 | 24.81 | Peak |

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 173.95 | 347.90 | V | -64.16 | 31.70 | -32.46 | -13.00 | 19.46 | Peak |
| | 521.85 | V | -62.97 | 35.03 | -27.94 | -13.00 | 14.94 | Peak |

16K0F3E_ISED

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 138.05 | 276.10 | V | -67.12 | 30.17 | -36.95 | -13.00 | 23.95 | Peak |
| | 414.15 | H | -69.53 | 33.14 | -36.39 | -13.00 | 23.39 | Peak |

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 150.05 | 300.10 | V | -66.44 | 31.11 | -35.33 | -13.00 | 22.33 | Peak |
| | 450.15 | V | -72.89 | 34.11 | -38.78 | -13.00 | 25.78 | Peak |

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 162.05 | 324.10 | V | -64.61 | 31.39 | -33.22 | -13.00 | 20.22 | Peak |
| | 486.15 | V | -62.56 | 34.75 | -27.81 | -13.00 | 14.81 | Peak |
| | 810.25 | H | -80.10 | 39.57 | -40.54 | -13.00 | 27.54 | Peak |
| | 1458.45 | V | -70.15 | 34.31 | -35.84 | -13.00 | 22.84 | Peak |

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 173.95 | 347.90 | V | -63.07 | 31.70 | -31.37 | -13.00 | 18.37 | Peak |
| | 521.85 | V | -67.48 | 35.03 | -32.45 | -13.00 | 19.45 | Peak |

7K60FXD, 7K60FXE

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 138.05 | 276.10 | H | -67.93 | 30.17 | -37.76 | -20.00 | 17.76 | Peak |
| | 414.15 | H | -65.42 | 33.14 | -32.28 | -20.00 | 12.28 | Peak |
| | 1380.50 | H | -79.04 | 34.71 | -44.33 | -20.00 | 24.33 | Peak |

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 150.05 | 300.10 | V | -62.70 | 31.11 | -31.59 | -20.00 | 11.59 | Peak |
| | 450.15 | V | -68.34 | 34.11 | -34.23 | -20.00 | 14.23 | Peak |
| | 1200.40 | H | -69.23 | 34.26 | -34.97 | -20.00 | 14.97 | Peak |
| | 1500.50 | H | -79.22 | 34.41 | -44.81 | -20.00 | 24.81 | Peak |

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 162.05 | 324.10 | V | -60.44 | 31.39 | -29.05 | -20.00 | 9.05 | Peak |
| | 486.15 | V | -60.08 | 34.75 | -25.33 | -20.00 | 5.33 | Peak |
| | 810.25 | H | -83.27 | 39.57 | -43.71 | -20.00 | 23.71 | Peak |
| | 1134.35 | V | -77.30 | 33.92 | -43.38 | -20.00 | 23.38 | Peak |
| | 1296.40 | V | -68.82 | 34.78 | -34.04 | -20.00 | 14.04 | Peak |
| | 1620.50 | H | -79.30 | 33.86 | -45.44 | -20.00 | 25.44 | Peak |

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 173.95 | 347.90 | H | -65.53 | 31.70 | -33.83 | -20.00 | 13.83 | Peak |
| | 521.85 | H | -63.59 | 35.03 | -28.56 | -20.00 | 8.56 | Peak |
| | 1739.50 | V | -78.39 | 34.28 | -44.11 | -20.00 | 24.11 | Peak |

4K00F1E, 4K00F1D, 4K00F7W

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 138.05 | 276.10 | V | -67.02 | 30.17 | -36.85 | -25.00 | 11.85 | Peak |
| | 414.15 | H | -69.12 | 33.14 | -35.98 | -25.00 | 10.98 | Peak |

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 150.05 | 300.10 | V | -66.44 | 31.11 | -35.33 | -25.00 | 10.33 | Peak |
| | 450.15 | V | -72.69 | 34.11 | -38.57 | -25.00 | 13.57 | Peak |

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 162.05 | 324.10 | V | -64.45 | 31.39 | -33.06 | -25.00 | 8.06 | Peak |
| | 486.15 | V | -63.07 | 34.75 | -28.32 | -25.00 | 3.32 | Peak |

| Test Frequency (MHz) | Measured Frequency (MHz) | Pol | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 173.95 | 347.90 | V | -62.63 | 31.70 | -30.93 | -25.00 | 5.93 | Peak |
| | 521.85 | V | -67.10 | 35.03 | -32.07 | -25.00 | 7.07 | Peak |

## 8.10 Unwanted Emissions : Receiver Radiated Spurious Emission

Test Settings

| | |
|---|---|
| ISED Rule(s) | RSS-Gen(7.0) |
| Chamber | Semi Anechoic Chamber |
| Operating conditions: | Under normal test conditions |
| Operation Mode: | Receive |
| Method of testing: | Radiated |
| S/A. Settings: | F < 1 GHz: RBW: 120 kHz, VBW: 300 kHz (Quasi-Peak)<br>F > 1 GHz: RBW: 1 MHz, VBW: 1 MHz (Average) |
| Mode of operation: | Receive |

Test Limit

| Frequency (MHz) | Field Strength (μv/m at 3 meters) |
|---|---|
| 30 – 88 | 100 |
| 88 - 216 | 150 |
| 216 – 960 | 200 |
| Above 960 | 500 |

Test Result

Frequency Range : 30 MHz ~ 1 GHz

| Frequency | Reading | Ant. factor+Cable loss- Amp Gain | Ant. POL | Total | Limit | Margin |
|---|---|---|---|---|---|---|
| MHz | dB μV | dB /m | (H/V) | dB μV/m | dB μV/m | dB |
| No Peak Found | | | | | | |

Frequency Range : Above 1 GHz

| Frequency | Reading | Ant. factor+Cable loss- Amp Gain | Ant. POL | Total | Limit | Margin |
|---|---|---|---|---|---|---|
| MHz | dB μV | dB /m | (H/V) | dB μV/m | dB μV/m | dB |
| No Peak Found | | | | | | |

## 8.11 Necessary Bandwidth Calculations

| Modulation : 16K0F3E (Authorized Bandwidth 20 kHz) | |
|---|---|
| Maximum Modulation (M), kHz | 3 |
| Maximum Deviation (D), kHz | 5 |
| Constant Factor (K) | 1 |
| Necessary Bandwidth (BN), kHz | (2xM)+(2xDxK) = 16.0 |

| Modulation : 11K0F3E (Authorized Bandwidth 11.25 kHz) | |
|---|---|
| Maximum Modulation (M), kHz | 3 |
| Maximum Deviation (D), kHz | 2.5 |
| Constant Factor (K) | 1 |
| Necessary Bandwidth (BN), kHz | (2xM)+(2xDxK) = 11.0 |

| Modulation : 8K30F1E, 8K30F1D, 8K30F7W<br>(4Level FSK / 9600bps, Authorized Bandwidth 11.25 kHz) | |
|---|---|
| Digital information rate (R), bps | 9600 |
| Maximum Deviation (D), kHz | 3.391 |
| Signaling States (S) | 4 |
| Numerical factor (K) | 0.516 |
| Necessary Bandwidth (BN), kHz | (R/log2S)+2DK = 8.3 |

| Modulation : 4K00F1E, 4K00F1D, 4K00F7W<br>(4Level FSK / 4800bps, Authorized Bandwidth 6 kHz) | |
|---|---|
| Digital information rate (R), bps | 4800 |
| Maximum Deviation (D), kHz | 1.55 |
| Signaling States (S) | 4 |
| Numerical factor (K) | 0.516 |
| Necessary Bandwidth (BN), kHz | (R/log2S)+2DK = 4.0 |

| Modulation : 7K60FXD, 7K60FXE | |
|---|---|
| Digital information rate (R), bps | 9600 |
| Maximum Deviation (D), kHz | 3.024 |
| Signaling States (S) | 4 |
| Numerical factor (K) | 0.463 |
| Necessary Bandwidth (BN), kHz | $(R/\log_2 S)+2DK = 7.6$ |

| Modulation : 4K00F2D (CWID, Authorized Bandwidth 6 kHz) | |
|---|---|
| Maximum Modulation (M), kHz | 0.8 |
| Maximum Deviation (D), kHz | 1.2 |
| Numerical factor (K) | 1 |
| Necessary Bandwidth (BN), kHz | (2xM)+(2xDxK) = 4.0 |

## 9. LIST OF TEST EQUIPMENT

| Manufacturer | Model / Equipment | Calibration Date | Calibration Interval | Calibration Due | Serial No. |
|---|---|---|---|---|---|
| Agilent | N9020A/ Signal Analyzer | 2020-11-17 | Annual | 2021-11-17 | MY50200093 |
| Agilent | N9030B / Signal Analyzer | 2020-06-04 | Annual | 2021-06-04 | MY55480167 |
| Hewlett Packard | E3632A / DC Power Supply | 2020-06-12 | Annual | 2021-06-12 | KR75303960 |
| Agilent | N1911A/Power Meter | 2021-04-08 | Annual | 2022-04-08 | MY45100523 |
| Agilent | N1921A /POWER SENSOR | 2021-04-08 | Annual | 2022-04-08 | MY57820067 |
| TEKTRONIX | RSA3408A/SPECTRUM ANALYZER | 2020-08-21 | Annual | 2021-08-21 | B010198 |
| Hewlett Packard | 8903B/Audio Analyzer | 2020-09-18 | Annual | 2021-09-18 | 3413A13913 |
| Hewlett Packard | 8901B/Modulation Analyzer | 2020-09-16 | Annual | 2021-09-16 | 3438A05231 |
| Weinschel Associates | WA93-30-33 /30 dB Attenuator | 2020-04-01 | Annual | 2021-04-01 | 0138 |
| Hewlett Packard | 8493C/ATTENUATOR(20dB) | 2020-06-04 | Annual | 2021-06-04 | 17280 |
| EAGLE | 230NFNM/Tuneable Notch Filter | 2020-10-12 | Annual | 2021-10-12 | H00564-9 |
| EAGLE | 230NFNM/Tuneable Notch Filter | 2020-10-12 | Annual | 2021-10-12 | H00564-10 |
| ESPEC | SU-642 / Chamber | 2021-03-15 | Annual | 2022-03-15 | 0093008124 |
| CERNEX | CBLU1183540B-01/AMP | 2020-06-04 | Annual | 2021-06-04 | 26822 |
| Wainwright | WHKX10-900-1000-15000/H.P.F | 2020-07-13 | Annual | 2021-07-13 | 5 |
| Rohde & Schwarz | Loop Antenna | 2020-05-18 | Biennial | 2022-05-18 | 1513-175 |
| Schwarzbeck | VULB9160/ Bilog Antenna | 2021-03-03 | Biennial | 2023-03-03 | 3150 |
| Schwarzbeck | VULB9160/ Bilog Antenna | 2020-08-19 | Biennial | 2022-08-19 | 9160-3368 |
| Schwarzbeck | BBHA 9120D/ Horn Antenna(1~18GHz) | 2019-08-29 | Biennial | 2021-08-29 | 147 |
| Schwarzbeck | BBHA 9120D/ Horn Antenna(1~18GHz) | 2019-09-25 | Biennial | 2021-09-25 | 9120D-1298 |
| REOHDE&SCHWARZ | FSV40-N /Spectrum Analyzer | 2020-09-22 | Annual | 2021-09-22 | 101068-SZ |
| Inn-co GmbH | DE 3260/Turn table | N/A | N/A | N/A | N/A |
| EMERSON&CUMING | 10m×5m×5m/ Full anechoic chamber | N/A | N/A | N/A | N/A |

## 10. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

| No. | Description |
|---|---|
| 1 | HCT-RF-2105-FI004-P |