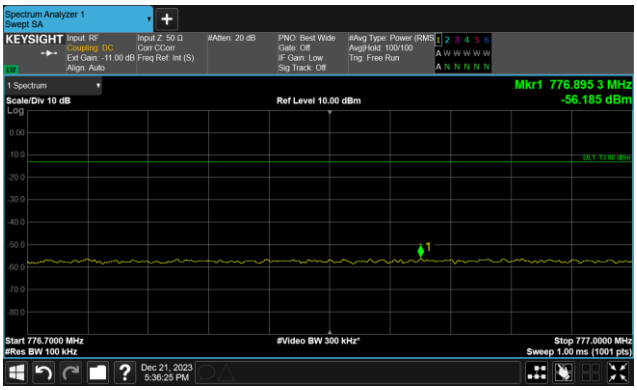
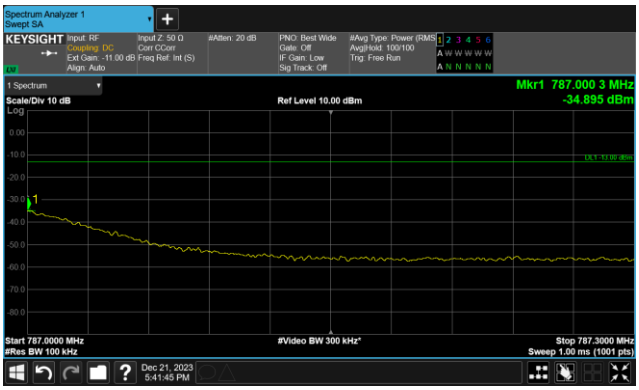
Band 13
Uplink of GSM Signal
Normal

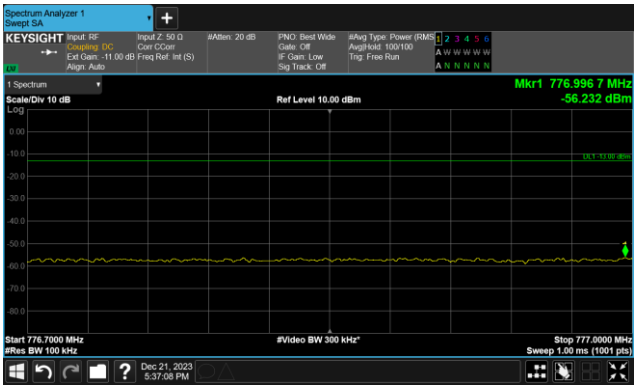
Lower **Upper**

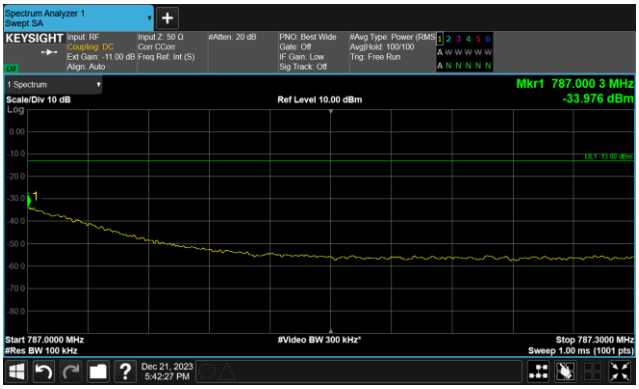




Increase 10 dB

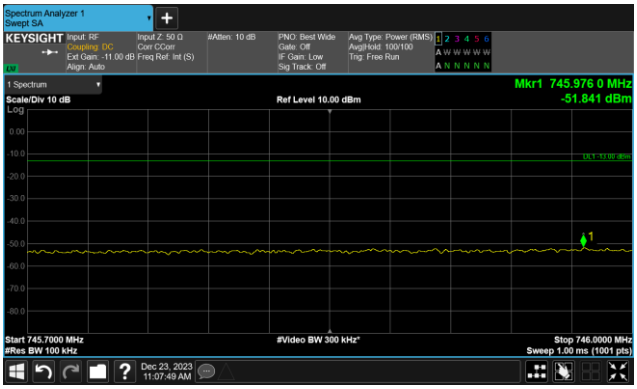
Lower **Upper**



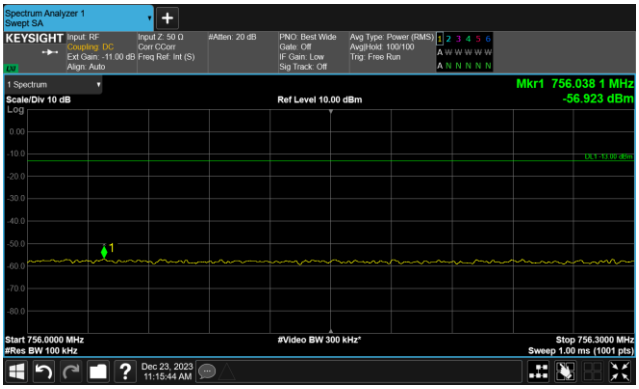


Band 13
Downlink of GSM Signal
Normal

Lower

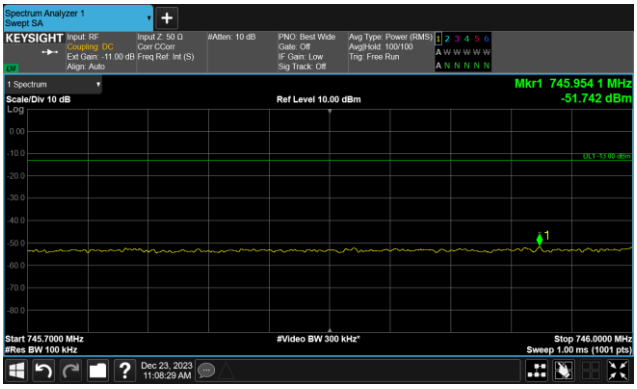


Upper

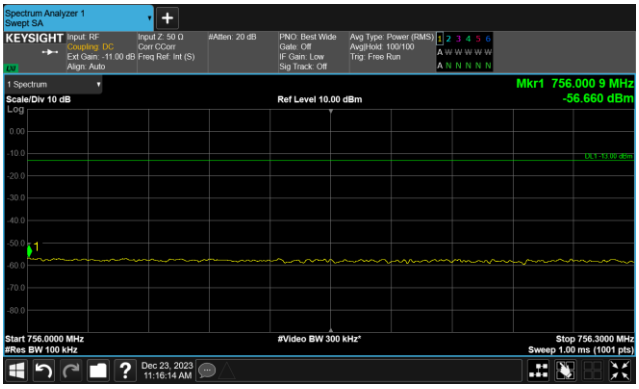


Increase 10 dB

Lower

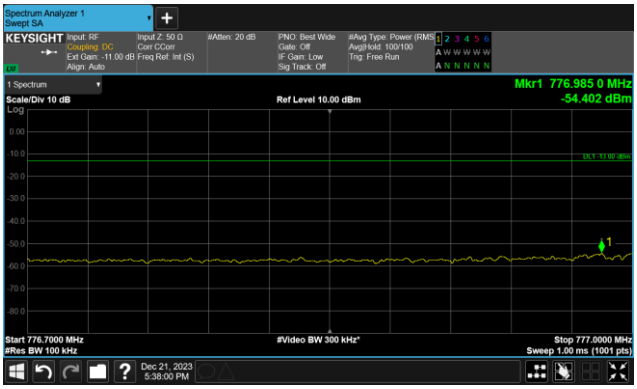


Upper

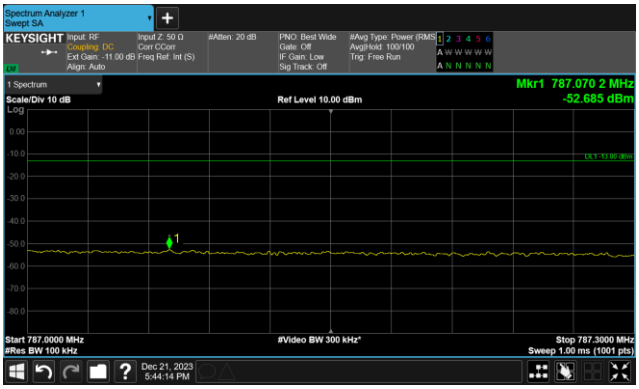


Band 13
Uplink of CDMA Signal
Normal

Lower

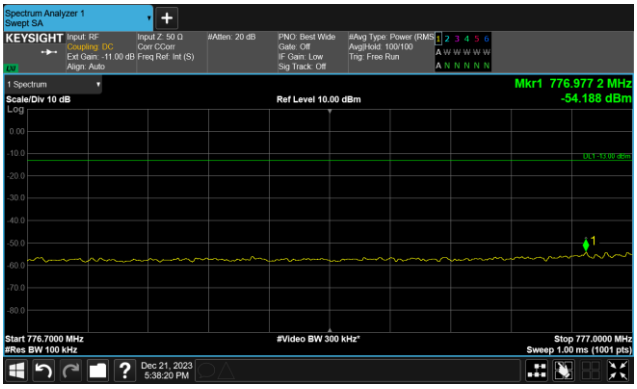


Upper

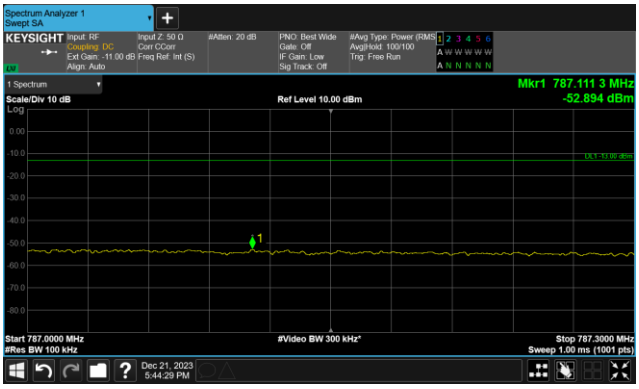


Increase 10 dB

Lower

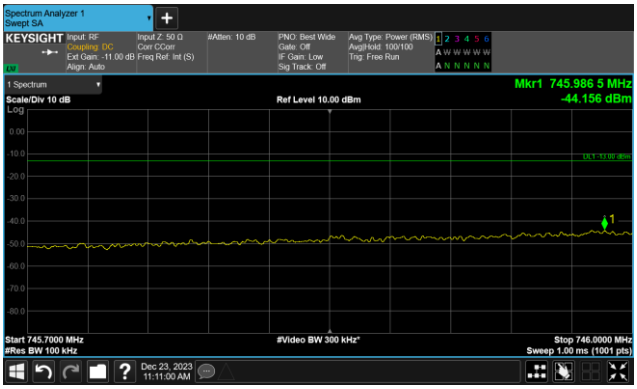


Upper

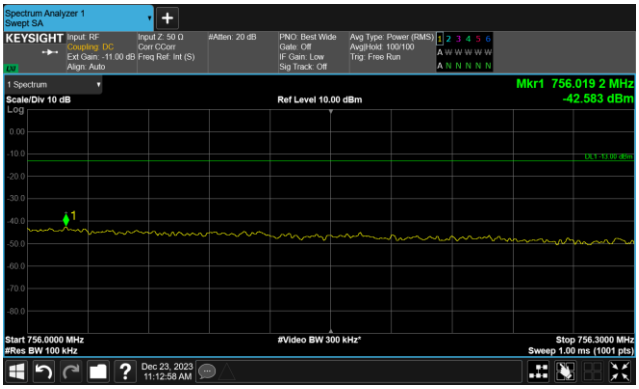


Band 13
Downlink of CDMA Signal
Normal

Lower

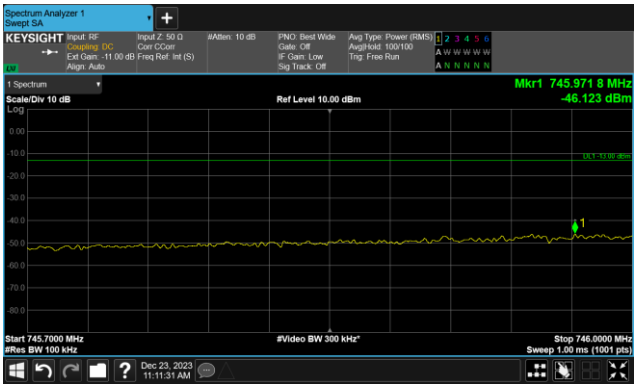


Upper

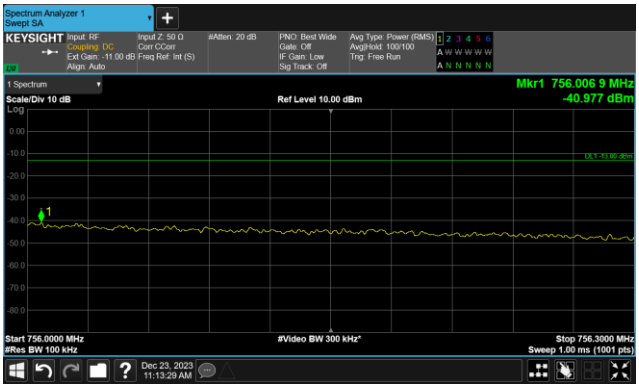


Increase 10 dB

Lower

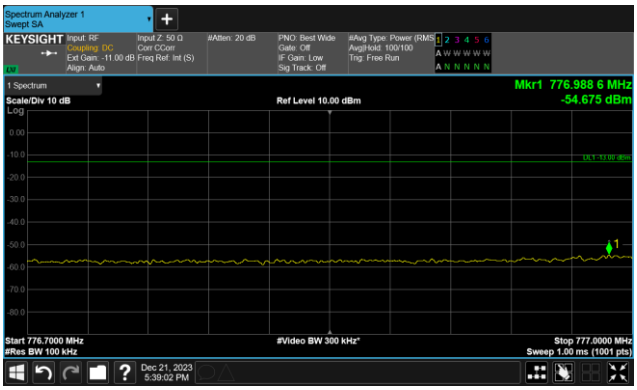


Upper

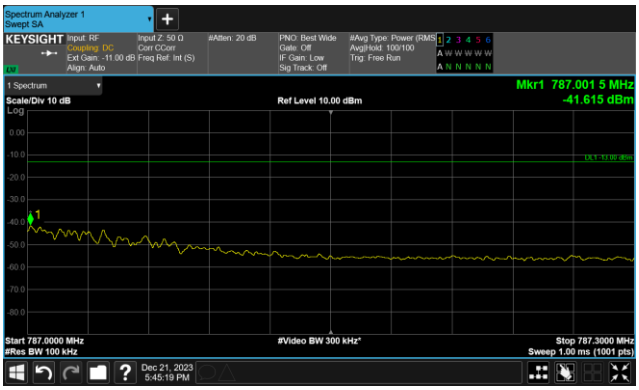


Band 13
Uplink of LTE Signal
Normal

Lower

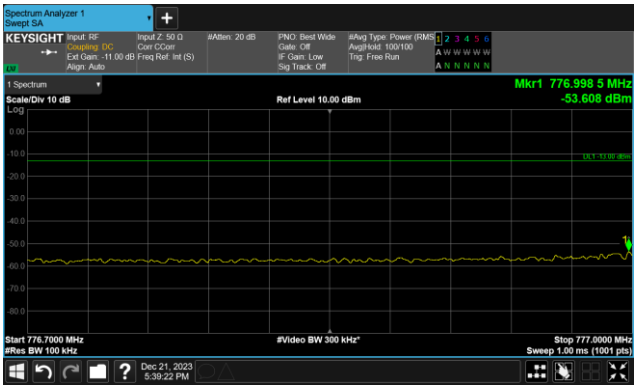


Upper

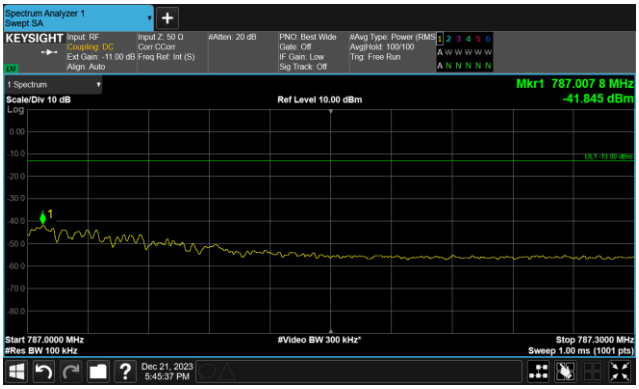


Increase 10 dB

Lower

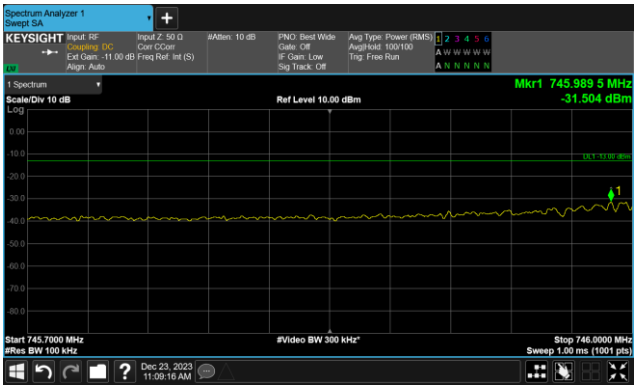


Upper

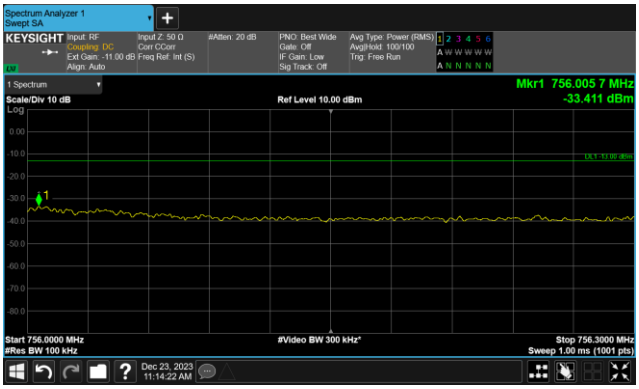


Band 13
Downlink of LTE Signal
Normal

Lower

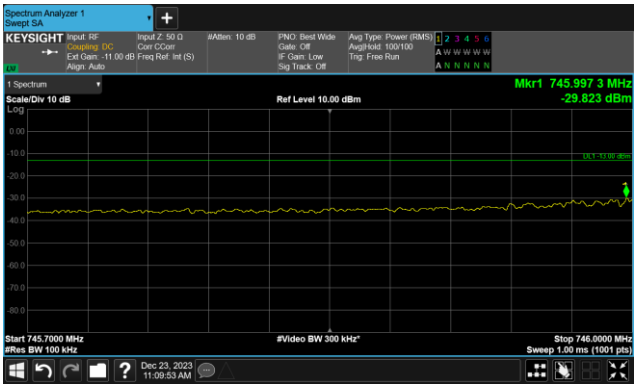


Upper

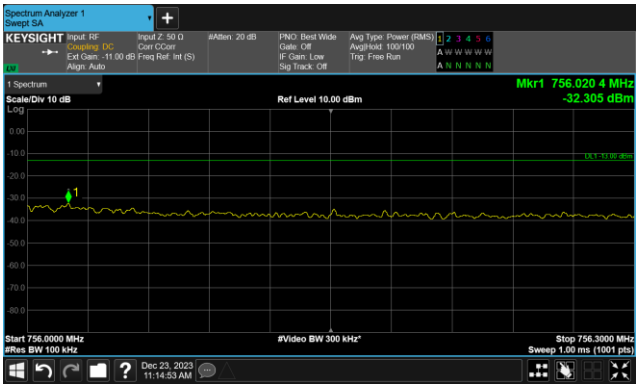


Increase 10 dB

Lower

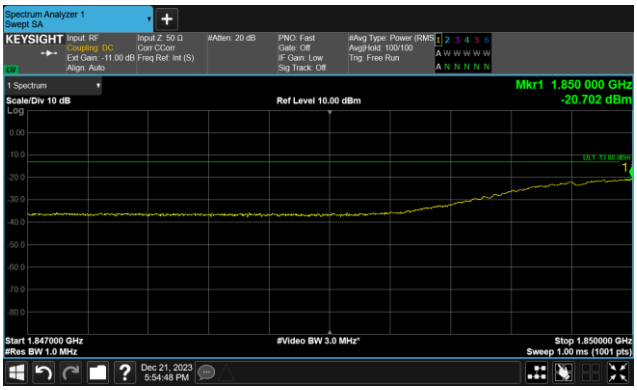


Upper

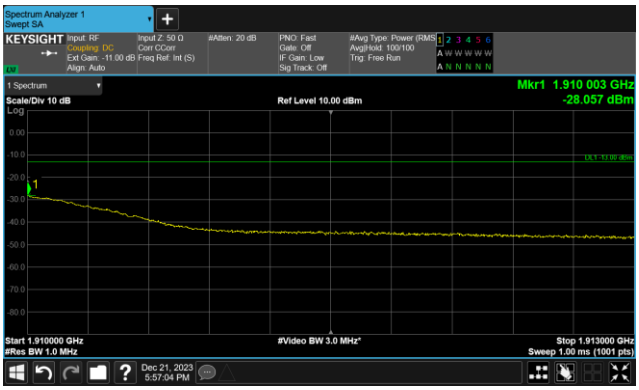


Band 25
Uplink of GSM Signal
Normal

Lower

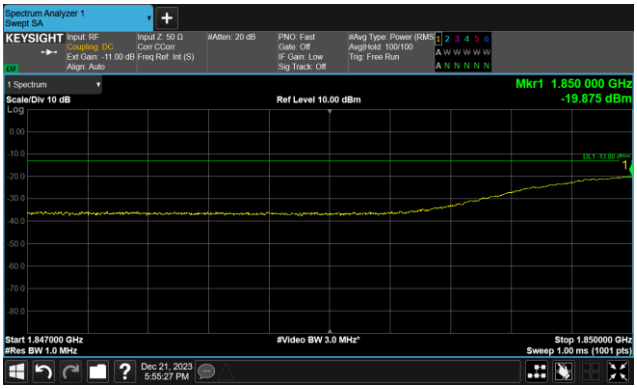


Upper

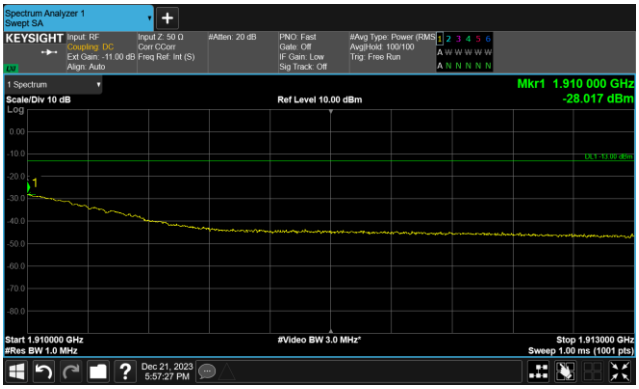


Increase 10 dB

Lower

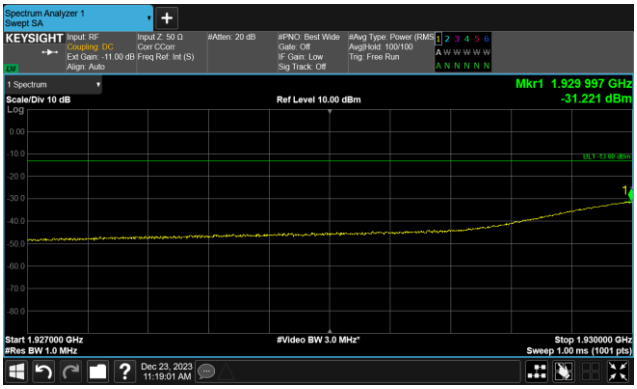


Upper

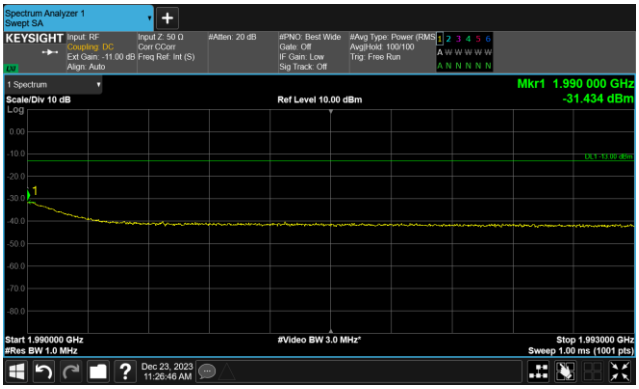


Band 25
Downlink of GSM Signal
Normal

Lower

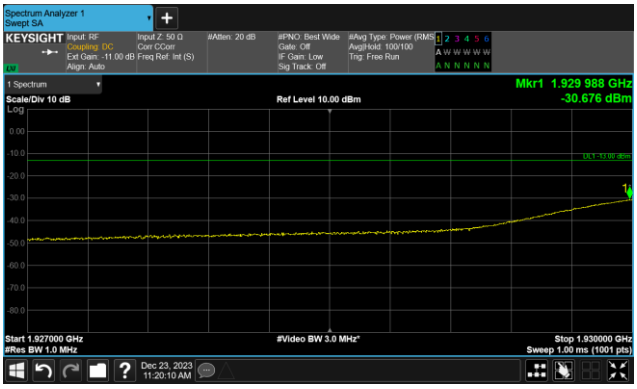


Upper

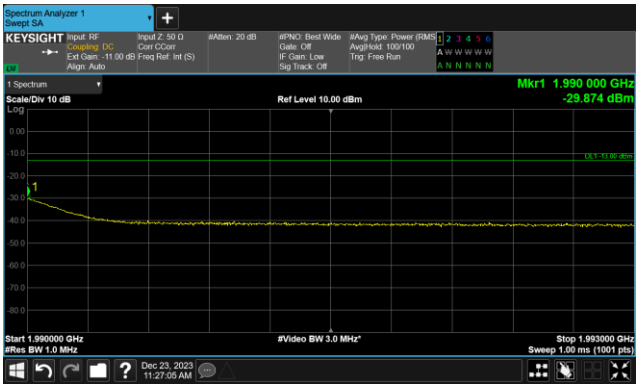


Increase 10 dB

Lower

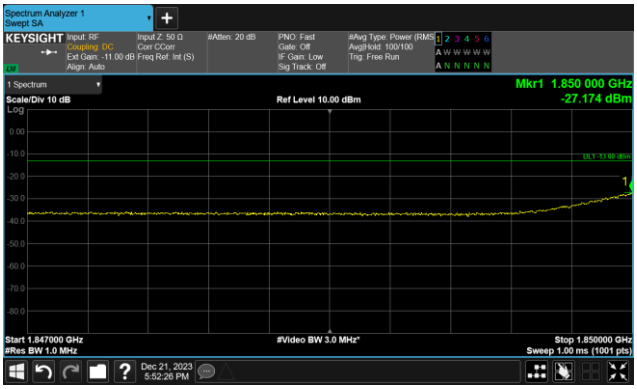


Upper

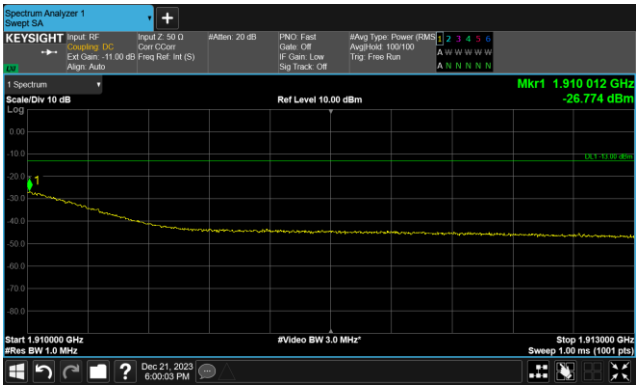


Band 25
Uplink of CDMA Signal
Normal

Lower

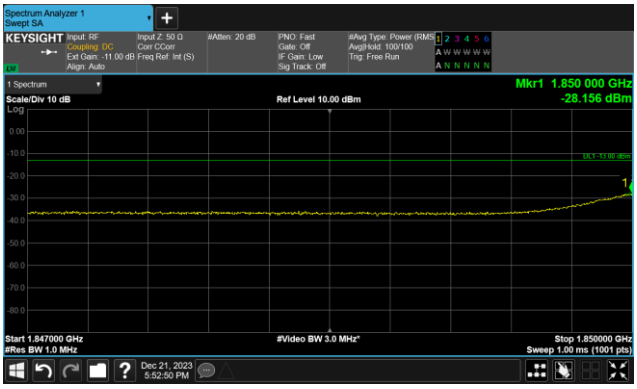


Upper

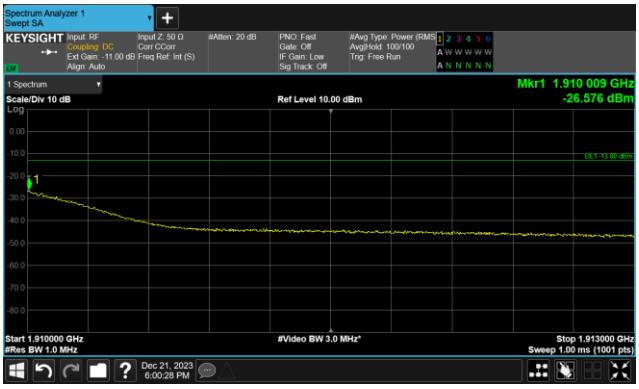


Increase 10 dB

Lower

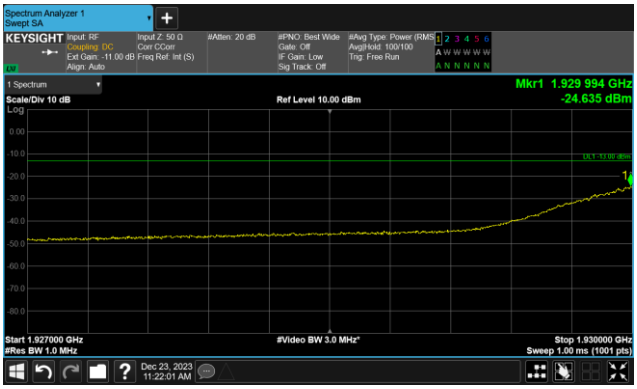


Upper

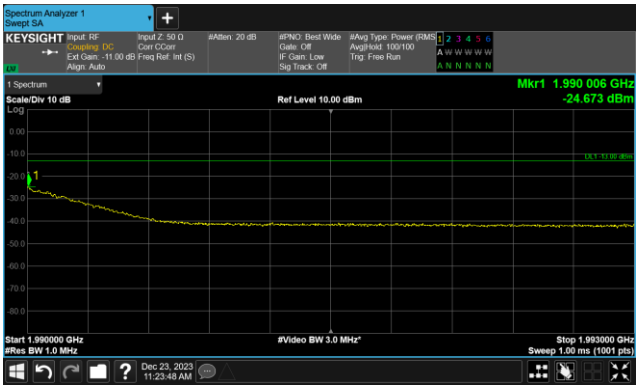


Band 25
Downlink of CDMA Signal
Normal

Lower

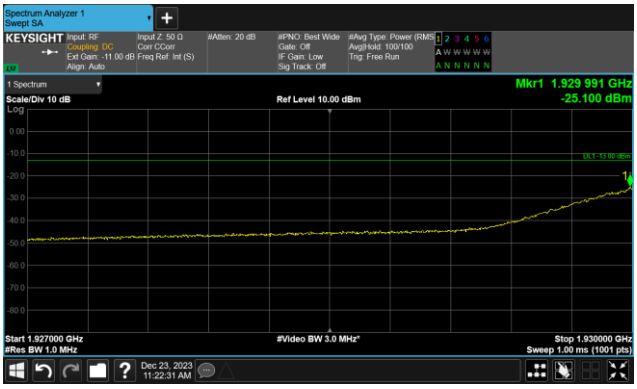


Upper

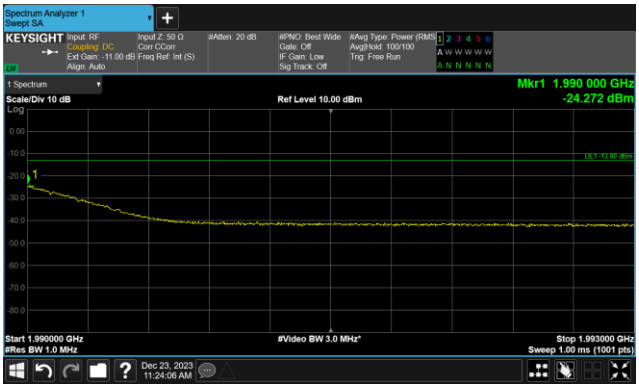


Increase 10 dB

Lower

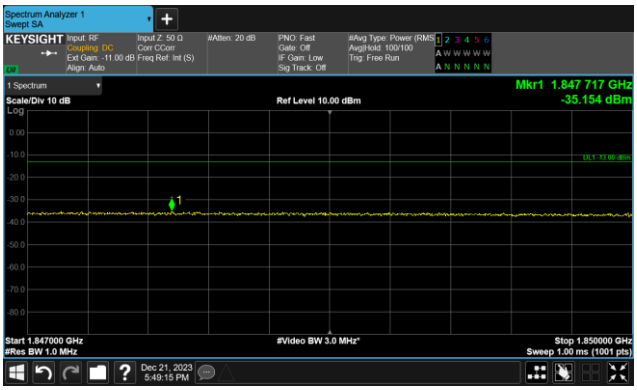


Upper

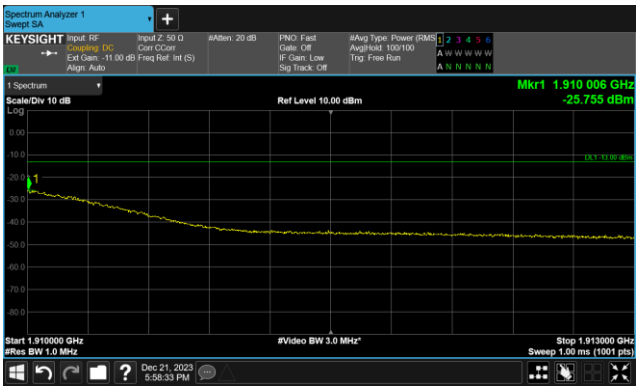


Band 25
Uplink of LTE Signal
Normal

Lower

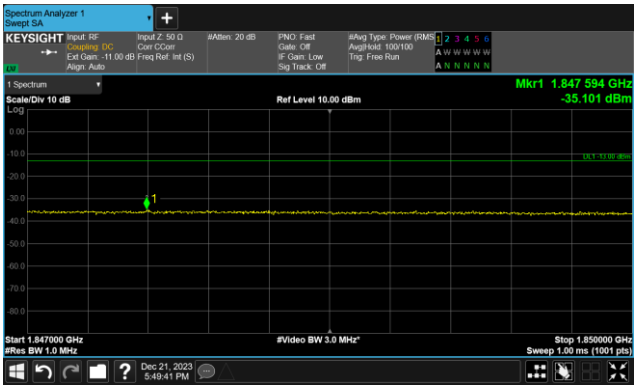


Upper

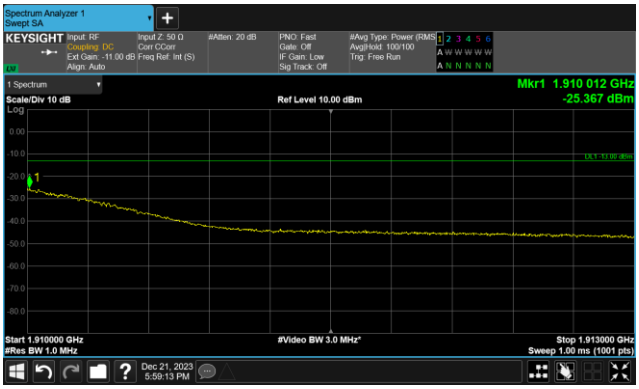


Increase 10 dB

Lower

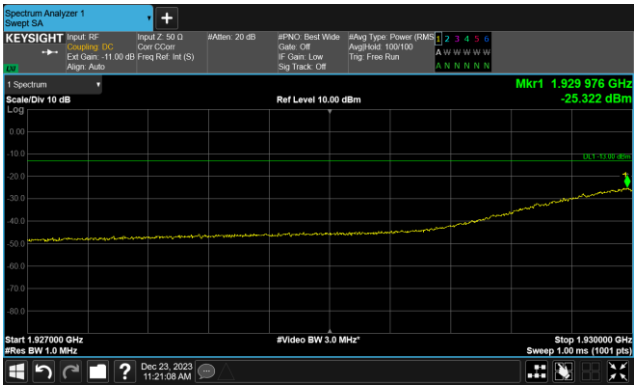


Upper

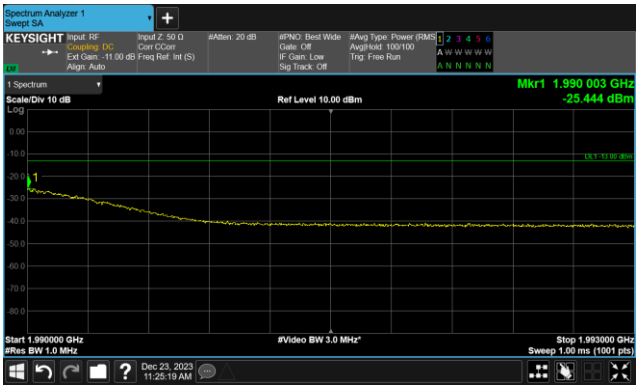


Band 25
Downlink of LTE Signal
Normal

Lower

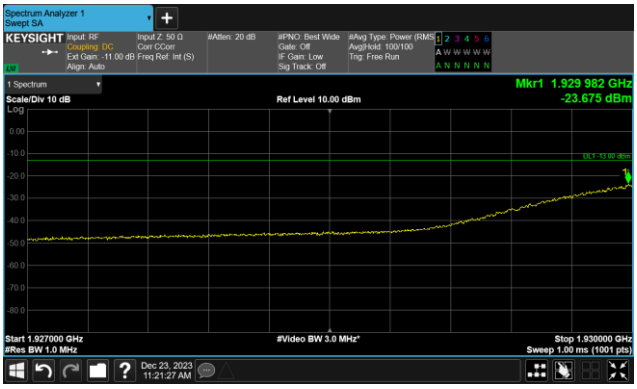


Upper

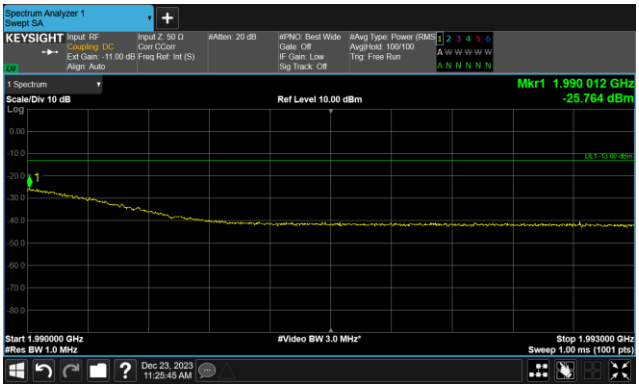


Increase 10 dB

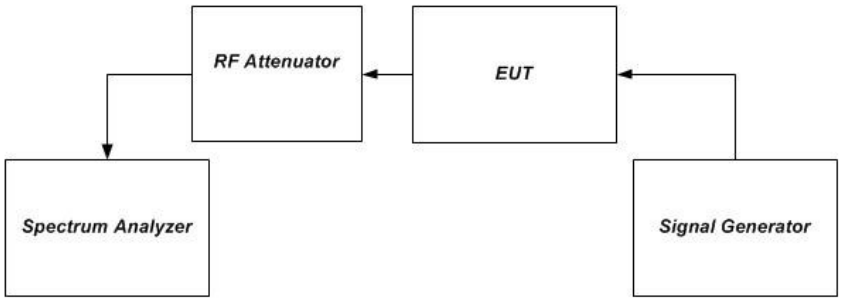
Lower



Upper



5.6 Conducted Spurious Emissions

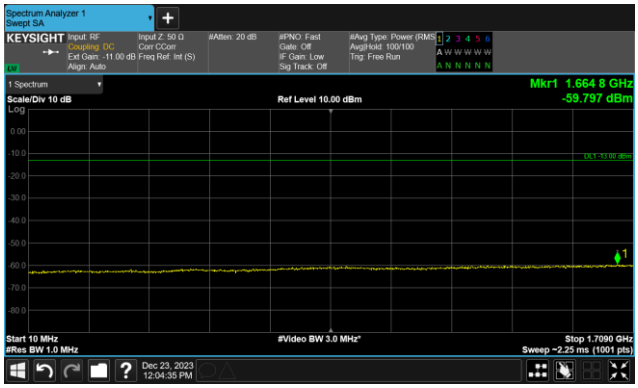
Test Requirement:	FCC part 2.1051, FCC part 27.53(g)
Limit:	-13dBm
Test setup:	
Test Procedure:	a) Connect the EUT to the test equipment as shown in test setup. Begin with the uplink output (donor) port connected to the spectrum analyzer. b) Configure the signal generator for AWGN with a 99% OBW of 4.1 MHz, with a center frequency corresponding to the center of the CMRS band under test. c) Set the signal generator amplitude to the EUT maximum power level. d) Turn on the signal generator RF output and measure the spurious emission power levels with an appropriate measuring instrument as follows. 1) Set RBW =100kHz(below 1GHz) or 1MHz (above 1GHz). 2) Set VBW = 3 x RBW. 3) Select the power averaging (rms) detector. 4) Sweep time = auto-couple. 5) Set the analyzer start frequency to the lowest radio frequency signal generated in the equipment, without going below 9 kHz, and the stop frequency to the lower band/block edge frequency minus 100 kHz or 1 MHz, as specified in the applicable rule part. 6) Sweep time = auto-couple. 7) Use the peak marker function to identify the highest amplitude level over each measured frequency range. Record the frequency and amplitude and capture a plot for inclusion in the test report. 8) Reset the analyzer start frequency to the upper band/block edge frequency plus 100 kHz or 1 MHz, as specified in the applicable rule part, and the analyzer stop frequency to 10 times the highest frequency of the fundamental emission. 9) Use the peak marker function to identify the highest amplitude level over each of the measured frequency ranges. Record the frequency and amplitude and capture a plot for inclusion in the test report. e) Repeat b) through d) for each supported frequency band of operation.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

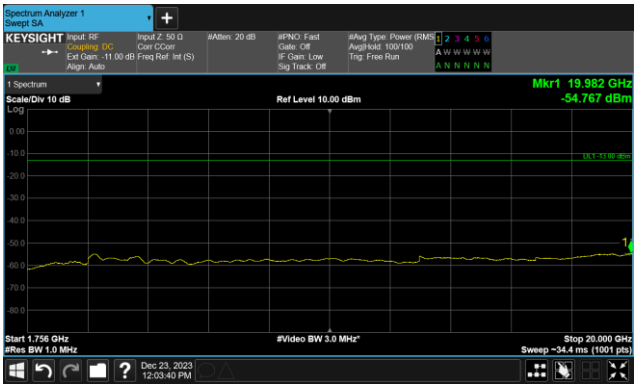
Test plots as follows:

Band 4

Uplink

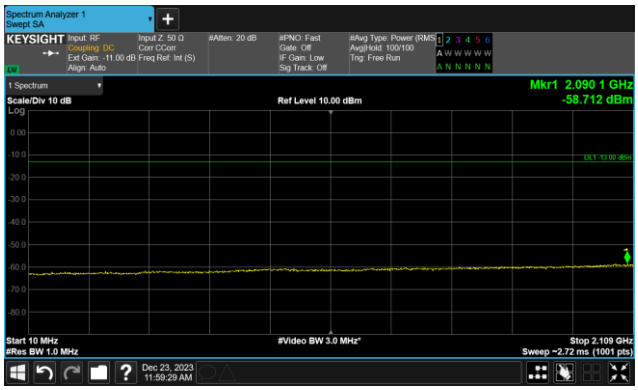


10MHz ~ 1709MHz

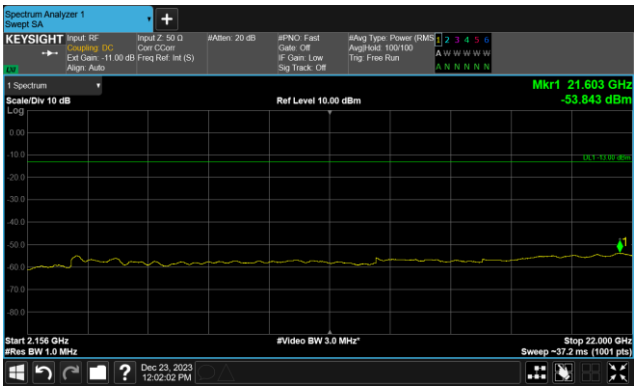


1756MHz ~ 20GHz

Downlink



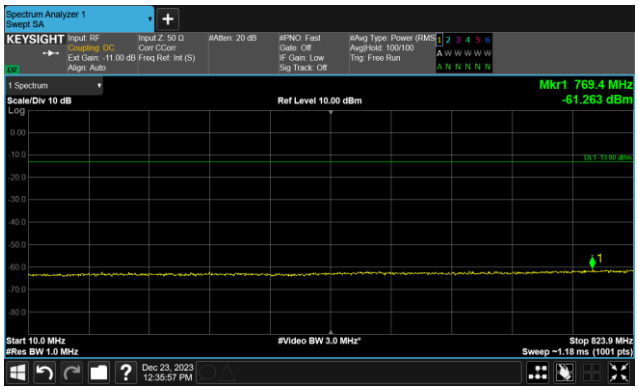
10MHz ~ 2109MHz



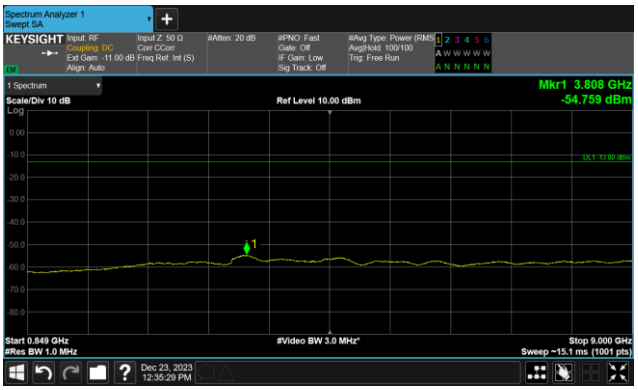
2156MHz ~ 22GHz

Band 5

Uplink

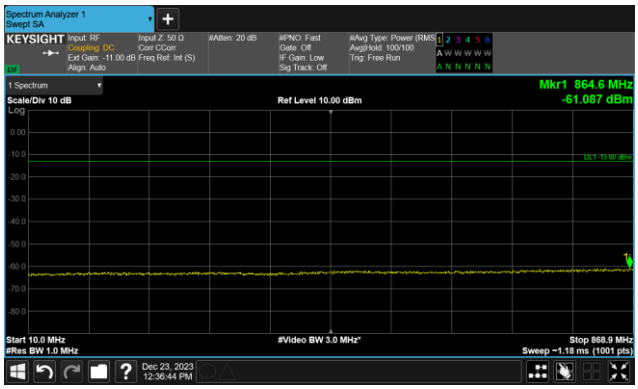


10MHz ~ 823.9MHz

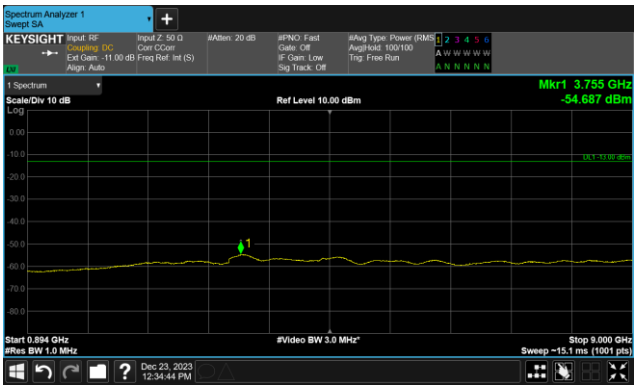


849MHz ~ 9GHz

Downlink



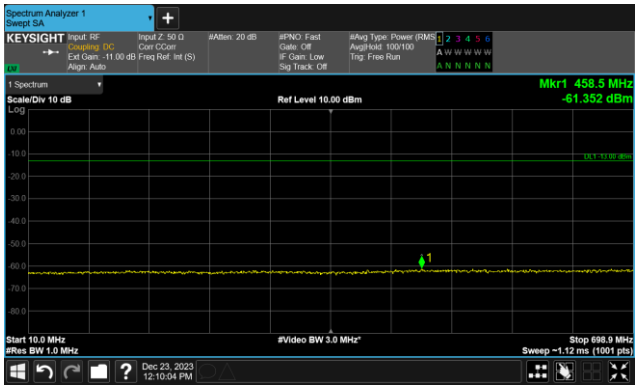
10MHz ~ 868.9MHz



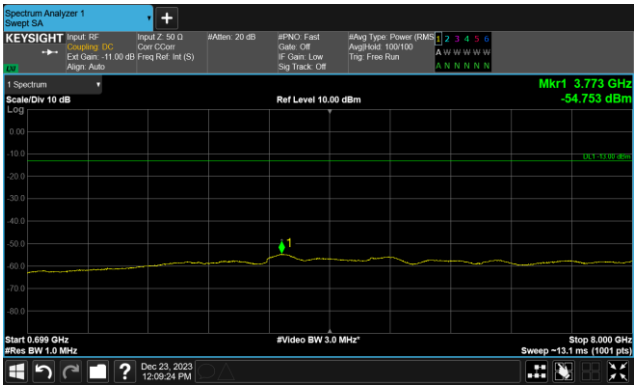
894GHz ~ 9GHz

Band 12

Uplink

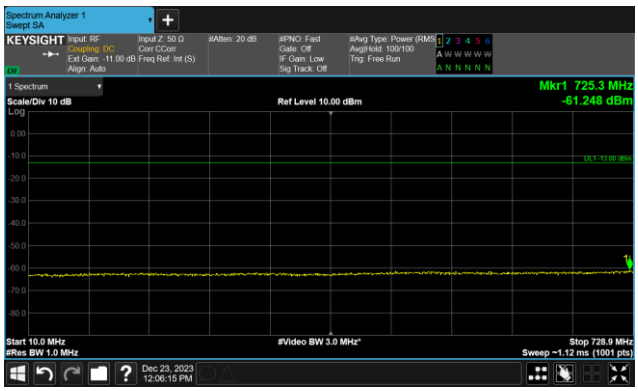


10MHz ~ 698.9MHz

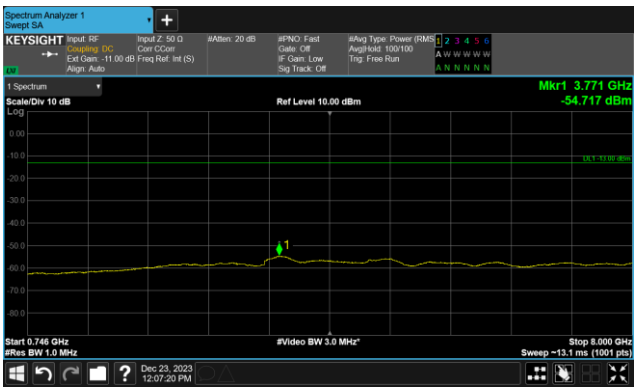


699MHz ~ 8GHz

Downlink



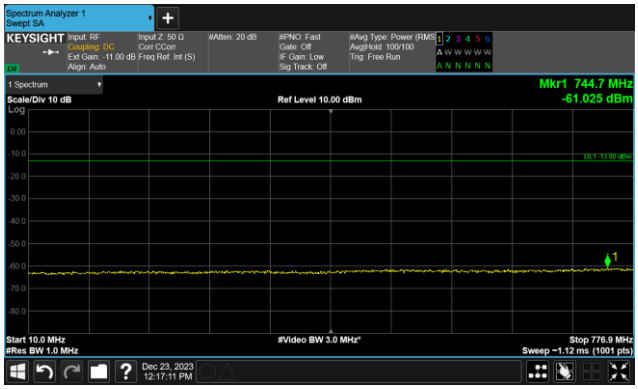
10MHz ~ 728.9MHz



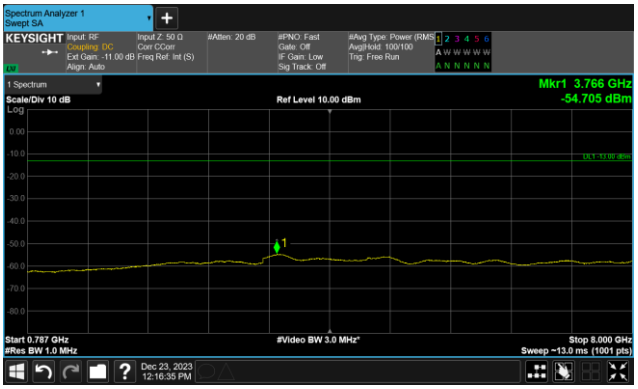
746GHz ~ 8GHz

Band 13

Uplink

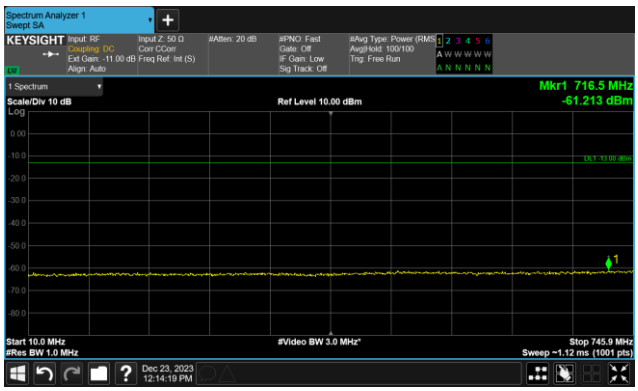


10MHz ~ 776.9MHz

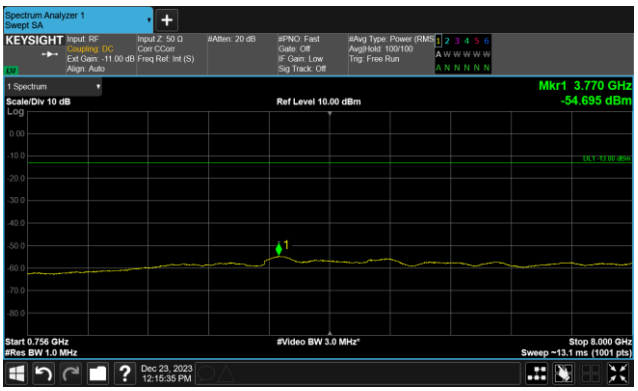


787MHz ~ 8GHz

Downlink



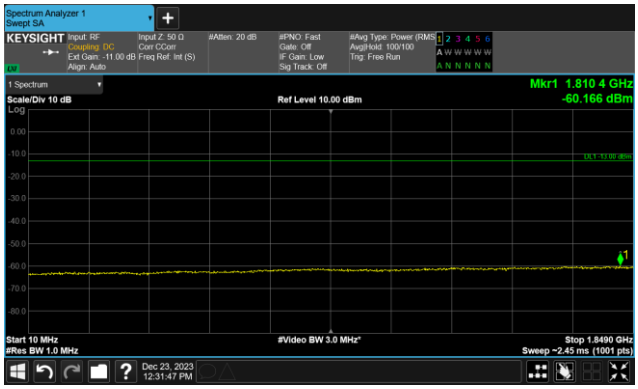
10MHz ~ 745.9MHz



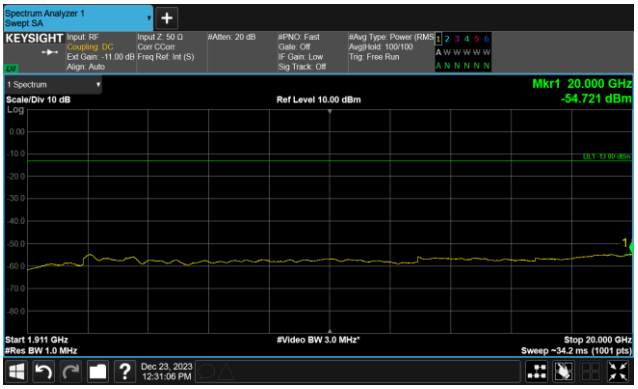
756GHz ~ 8GHz

Band 25

Uplink

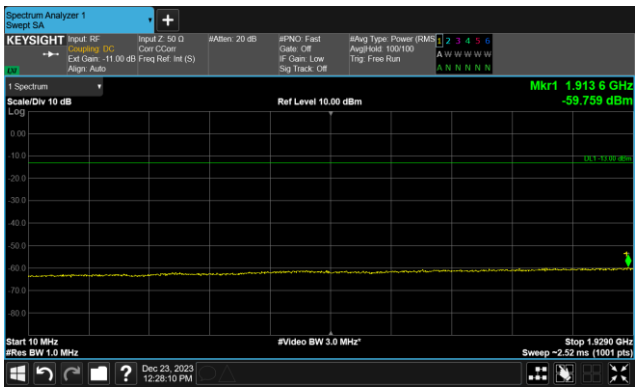


10MHz ~ 1849MHz

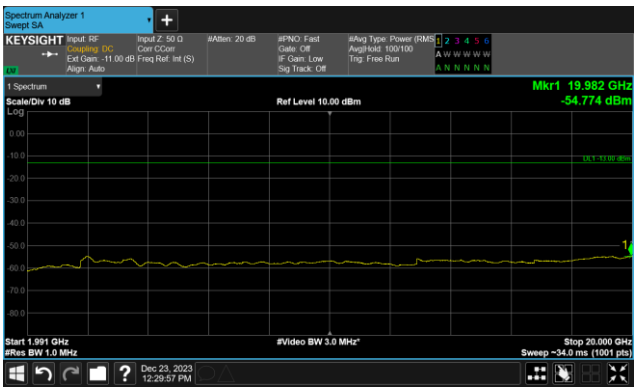


1911MHz ~ 20GHz

Downlink

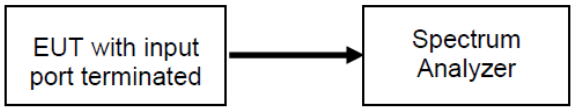
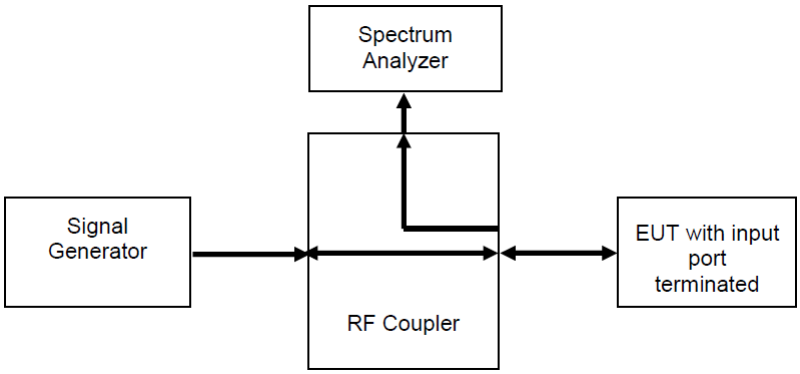


10MHz ~ 1929MHz



1991GHz ~ 20GHz

5.7 Noise Limits

Test Requirement:	FCC part 20.21(e)(i)(A), FCC Part 20.21(e)(8)(i)(H)
Limit:	Noise Power = -102.5+20 LOG_{10}(Band Center Frequency) Variable Noise = -103 dBm/MHz-RSSI
Test setup:	Test setup 1(Maximum transmitter noise power):  Test setup 2(Variable uplink noise timing): 
Test Procedure:	1. Maximum transmitter noise power: a) Connect the EUT to the test equipment as shown in test setup 1. Begin with the uplink output (donor) port connected to the spectrum analyzer. When measuring downlink noise, connect the downlink output (server) port to the spectrum analyzer. b) Set the spectrum analyzer RBW to 1 MHz with the VBW ⩾ 3 ? RBW. c) Select the power averaging (rms) detector and trace average over at least 100 traces. d) Set the center frequency of the spectrum analyzer to the center of the CMRS band under test with the span ⩾ 2 ? the CMRS band. e) Measure the maximum transmitter noise power level. f) Save the spectrum analyzer plot as necessary for inclusion in the final test report. g) Repeat b) to f) for all operational uplink and downlink bands. h) Connect the EUT to the test equipment as shown in test setup 2 for uplink noise power measurement in the presence a downlink signal. Affirm the coupled path of the RF coupler is connected to the spectrum analyzer. i) Configure the signal generator for AWGN operation with a 99% OBW of 4.1 MHz. j) Set the spectrum analyzer RBW for 1 MHz, VBW ⩾ 3 x RBW, with a power averaging (rms) detector with at least 100 trace averages. k) Set the center frequency of the spectrum analyzer to the center of the CMRS band under test, with the span ⩾ 2 x the CMRS band. l) For uplink noise measurements, set the spectrum analyzer center frequency for the uplink band under test, and tune the signal generator to the center of the paired downlink band. m) Measure the maximum transmitter noise power level while varying the downlink signal generator output level from ?90 dBm to ?20 dBm. n) Repeat h) through m) for all operational uplink bands. 2. Variable uplink noise timing: a) Set the spectrum analyzer to the uplink frequency to be measured. b) Set the span to 0 Hz, with a sweep time of 10 seconds. c) Set the power level of signal generator to the lowest level of the RSSI-dependent noise.

	d) Select MAX HOLD and increase the power level of signal generator by 10 dB for mobile boosters, and 20 dB for fixed boosters. e) Confirm that the uplink noise decreases to the specified level within 1 second for mobile devices, and within 3 seconds for fixed devices. f) Repeat a) to e) for all operational uplink bands. g) Include plots and summary table in test report.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data (worst case):

Band 4:

Maximum Noise			
Frequency Band	Measured Noise (dBm)	Limit (dBm)	Result
Maximum Uplink Noise			
1710-1755MHz	-39.482	-37.0	Pass
Maximum Downlink Noise			
2110-2155MHz	-41.30	-37.0	Pass

Uplink Noise Timing			
Frequency Band	Measured Timing (ms)	Limit (ms)	Result
1710-1755MHz	150.00	3000	Pass

Variable Uplink Noise Limit				
Frequency Band	RSSI (dBm)	Measured Noise (dBm)	Limit (dBm)	Result
1710-1755MHz	-88	-51.2	-37	Pass
	-85	-51.83	-37	Pass
	-78	-53.21	-37	Pass
	-73	-65.52	-37	Pass
	-65	-67.91	-38	Pass
	-61	-71.59	-42	Pass

Band 5:

Maximum Noise			
Frequency Band	Measured Noise (dBm)	Limit (dBm)	Result
Maximum Uplink Noise			
824～849 MHz	-49.394	-44.0	Pass
Maximum Downlink Noise			
869～894 MHz	-47.649	-44.0	Pass

Uplink Noise Timing			
Frequency Band	Measured Timing (ms)	Limit (ms)	Result
824～849 MHz	70	3000	Pass

Variable Uplink Noise Limit				
Frequency Band	RSSI (dBm)	Measured Noise (dBm)	Limit (dBm)	Result
824～849 MHz	-87	-50.94	-44.0	Pass
	-84	-52.91	-44.0	Pass
	-78	-52.91	-44.0	Pass
	-73	-65.54	-44.0	Pass
	-69	-68.3	-44.0	Pass
	-61	-71.22	-44.0	Pass

Band 12:

Maximum Noise			
Frequency Band	Measured Noise (dBm)	Limit (dBm)	Result
Maximum Uplink Noise			
699～716 MHz	-49.881	-45.50	Pass
Maximum Downlink Noise			
729～746 MHz	-46.669	-45.50	Pass

Uplink Noise Timing			
Frequency Band	Measured Timing (ms)	Limit (ms)	Result
699 ~ 716 MHz	200	3000	Pass

Variable Uplink Noise Limit				
Frequency Band	RSSI (dBm)	Measured Noise (dBm)	Limit (dBm)	Result
699 ~ 716 MHz	-89	-51.26	-45.50	Pass
	-83	-52.59	-45.50	Pass
	-76	-53.04	-45.50	Pass
	-74	-65.58	-45.50	Pass
	-67	-68.17	-45.50	Pass
	-62	-70.83	-45.50	Pass

Band 13:

Maximum Noise			
Frequency Band	Measured Noise (dBm)	Limit (dBm)	Result
Maximum Uplink Noise			
777～787 MHz	-54.544	-44.46	Pass
Maximum Downlink Noise			
746～756 MHz	-46.498	-44.46	Pass

Uplink Noise Timing			
Frequency Band	Measured Timing (ms)	Limit (ms)	Result
777～787 MHz	80	3000	Pass

Variable Uplink Noise Limit				
Frequency Band	RSSI (dBm)	Measured Noise (dBm)	Limit (dBm)	Result
777～787 MHz	-88	-51.56	-44.46	Pass
	-86	-53.03	-44.46	Pass
	-77	-52.74	-44.46	Pass
	-72	-65.97	-44.46	Pass
	-69	-68.57	-44.46	Pass
	-64	-70.47	-44.46	Pass

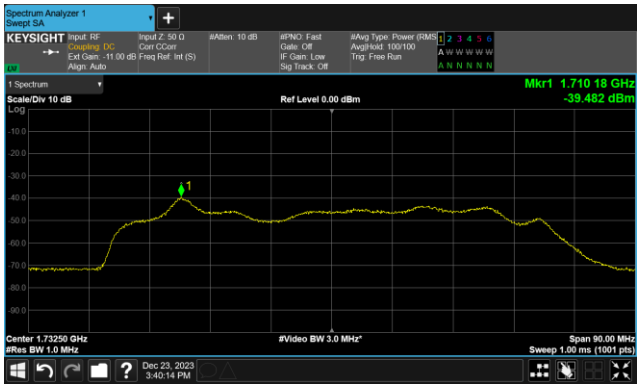
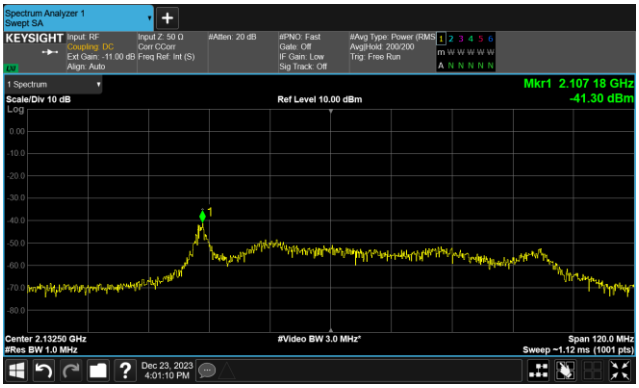
Band 25:

Maximum Noise			
Frequency Band	Measured Noise (dBm)	Limit (dBm)	Result
Maximum Uplink Noise			
1850～1910 MHz	-41.329	-37.7	Pass
Maximum Downlink Noise			
2110～2155 MHz	-42.385	-37.7	Pass

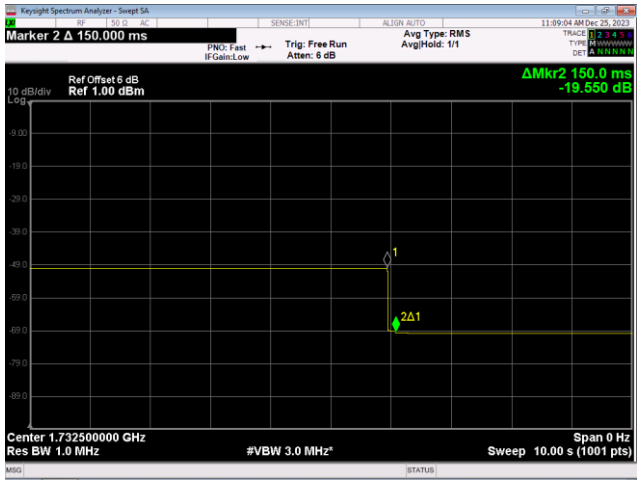
Uplink Noise Timing			
Frequency Band	Measured Timing (ms)	Limit (ms)	Result
1930～1990 MHz	220.0	3000	Pass

Variable Uplink Noise Limit				
Frequency Band	RSSI (dBm)	Measured Noise (dBm)	Limit (dBm)	Result
1850～1910 MHz	-88	-51.86	-37.7	Pass
	-85	-53.06	-37.7	Pass
	-77	-52.55	-37.7	Pass
	-72	-65.95	-37.7	Pass
	-67	-68.85	-37.7	Pass
	-62	-70.76	-41	Pass

Test plots as follows:

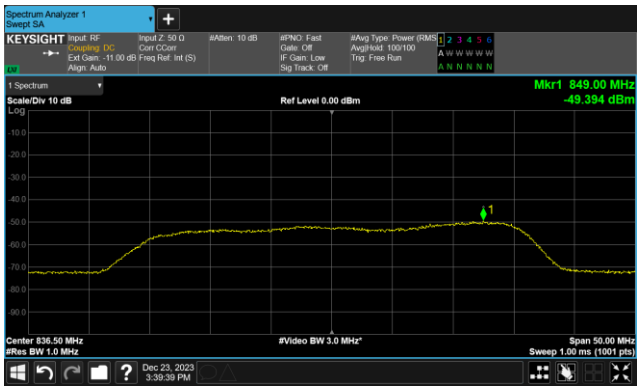
Band 4	
Maximum Uplink Noise	Maximum Downlink Noise
	

Uplink Noise Timing

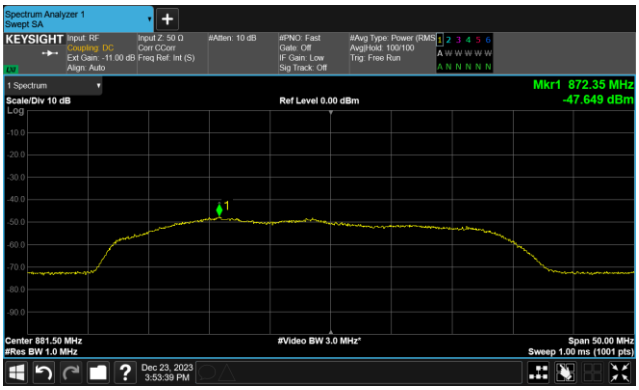


Band 5

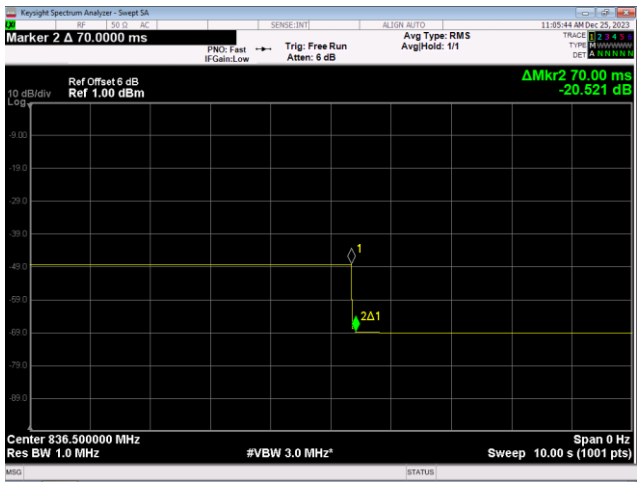
Maximum Uplink Noise



Maximum Downlink Noise

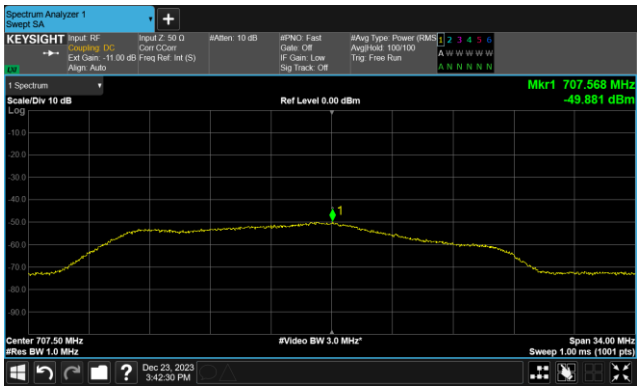


Uplink Noise Timing

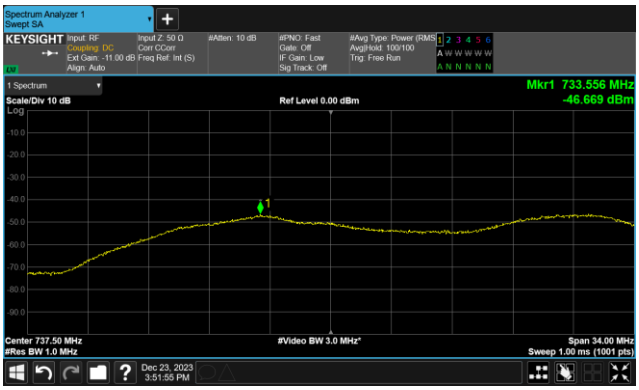


Band 12

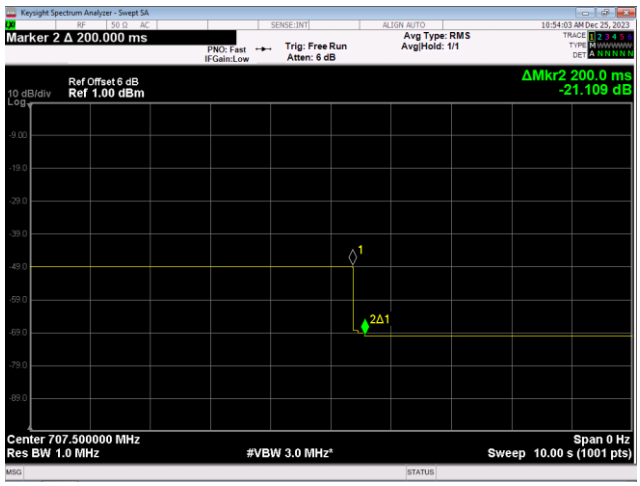
Maximum Uplink Noise



Maximum Downlink Noise

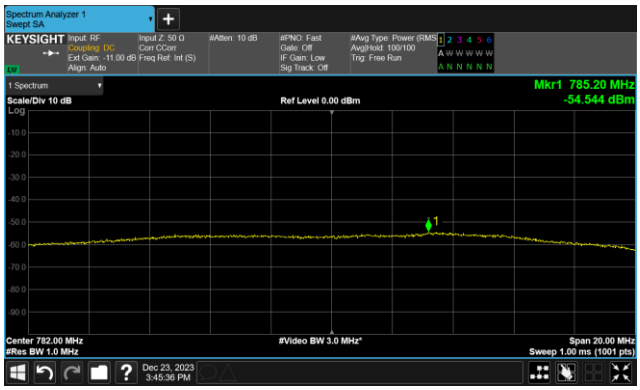


Uplink Noise Timing

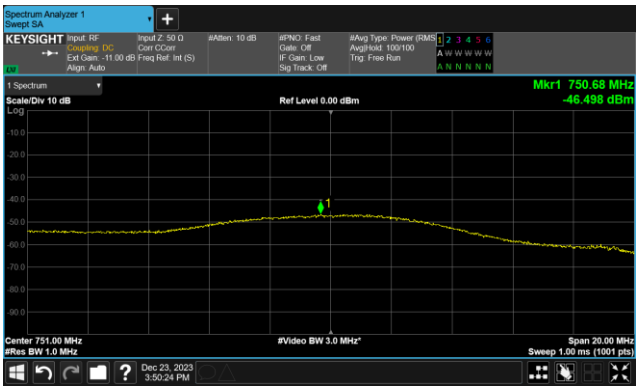


Band 13

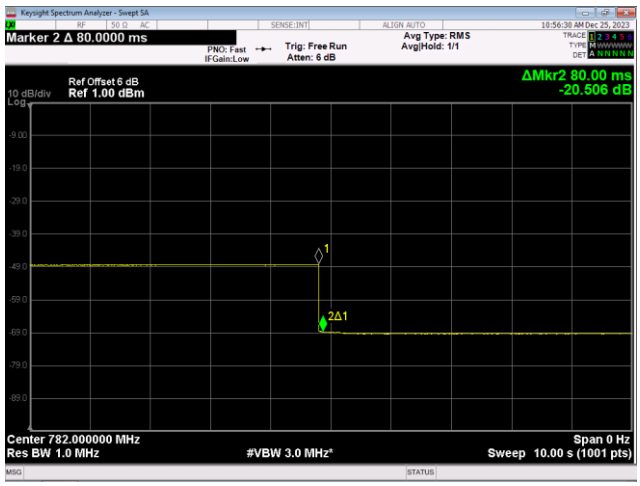
Maximum Uplink Noise



Maximum Downlink Noise

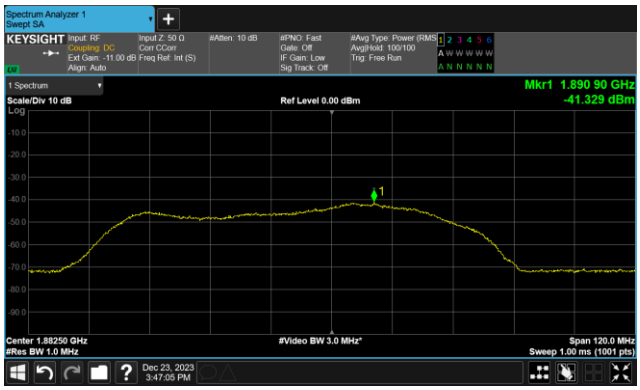


Uplink Noise Timing

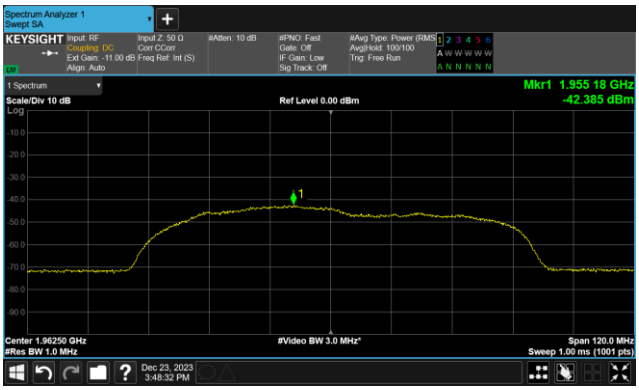


Band 25

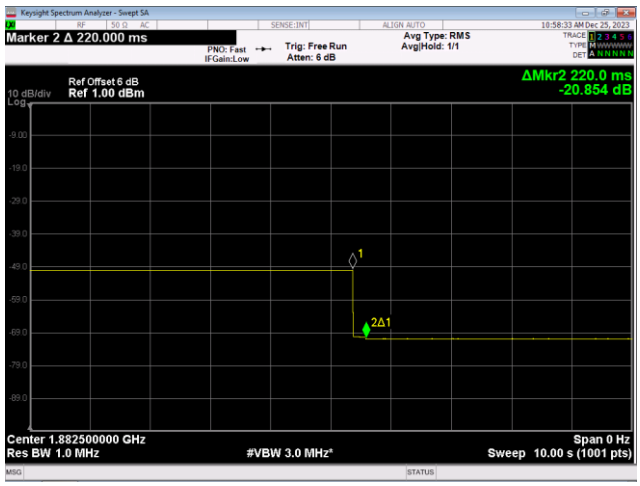
Maximum Uplink Noise



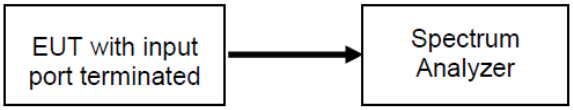
Maximum Downlink Noise



Uplink Noise Timing



5.8 Uplink Inactivity

Test Requirement:	FCC part 20.21(e)(8)(i)(I)
Limit:	?70 dBm/MHz
Test setup:	
Test Procedure:	a) Connect the EUT to the test equipment as shown in test setup with the uplink output (donor) port connected to the spectrum analyzer. b) Select the power averaging (rms) detector. c) Set the spectrum analyzer RBW for 1 MHz with the VBW ≥ 3 ? RBW. d) Set the center frequency of the spectrum analyzer to the center of the uplink operational band. e) Set the span for 0 Hz with a single sweep time for a minimum of 330 seconds. f) Start to capture a new trace using MAX HOLD. g) After approximately 15 seconds, turn on the EUT power. h) After the full spectrum analyzer trace is complete, place a MARKER on the leading edge of the pulse, then use the DELTA MARKER METHOD to measure the time until the uplink becomes inactive. i) Affirm that the noise level is below the uplink inactivity noise power limit, as specified by the rules. j) Capture the plot for inclusion in the test report. k) Measure noise using procedures in a) to f). l) Repeat d) through k) for all operational uplink bands.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details.
Test results:	Passed

Measurement Data:

Frequency Band	Measured Time (s)	Limit (s)	Measured noise (ms)	Limit (dBm/MHz)	Result
Band 4					
1710～1755 MHz	174.6	300	-76.569	-70.00	Pass
Band 5					
824～849 MHz	177.2	300	-76.733	-70.00	Pass
Band 12					
699～716 MHz	161.4	300	-77.297	-70.00	Pass
Band 13					
777～787 MHz	171.6	300	-76.718	-70.00	Pass
Band 25					
1850～1910 MHz	173.3	300	-75.956	-70.00	Pass