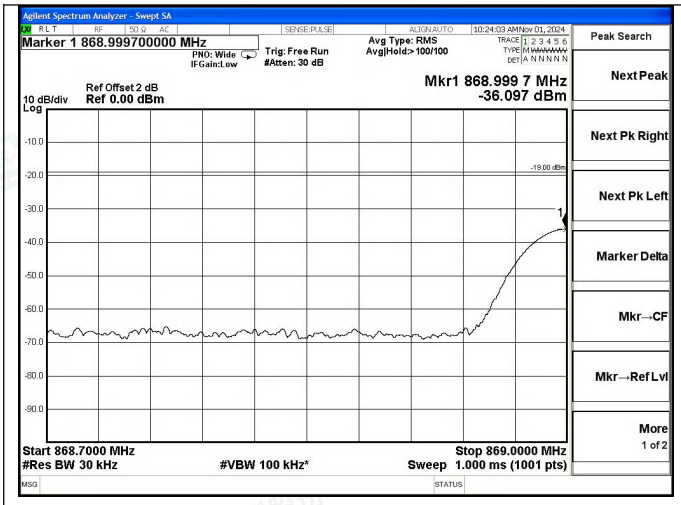
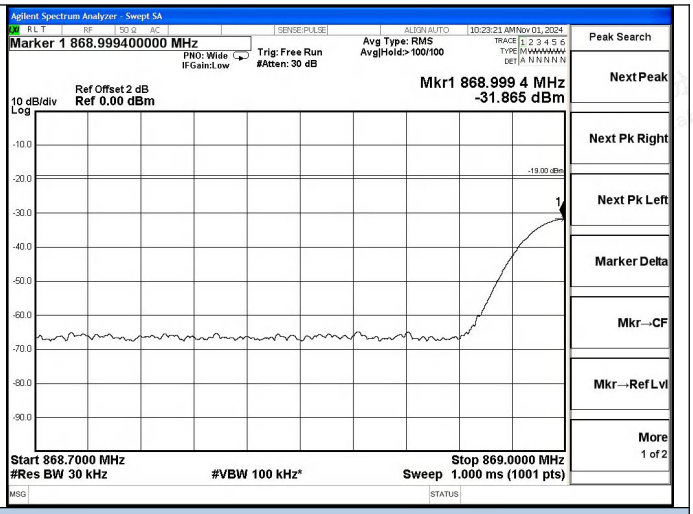
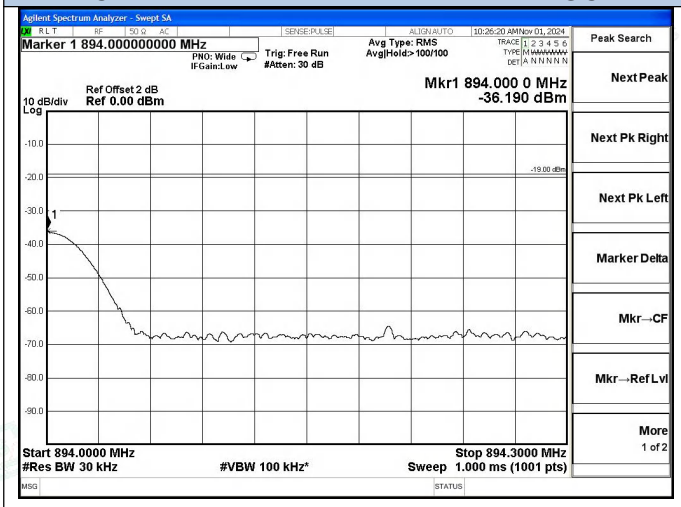


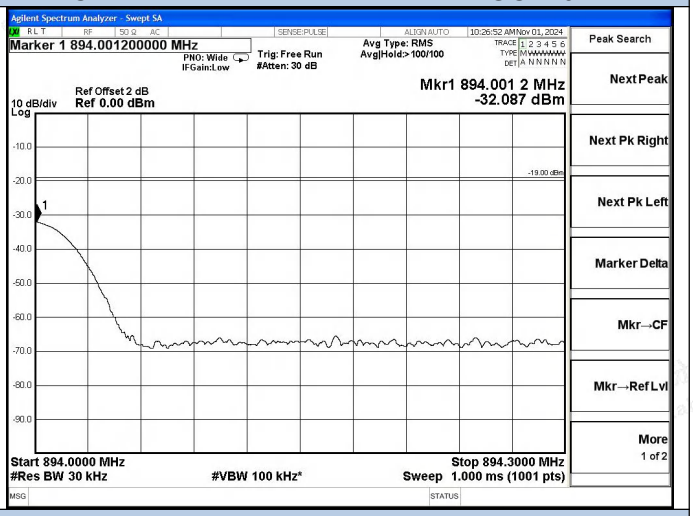
Cellular Band DL-LTE Left Side Pre AGC



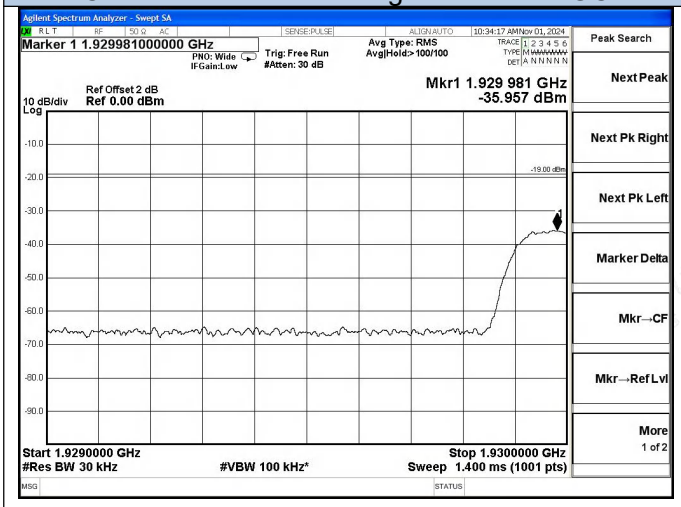
Cellular Band DL-LTE Left Side AGC+10dB



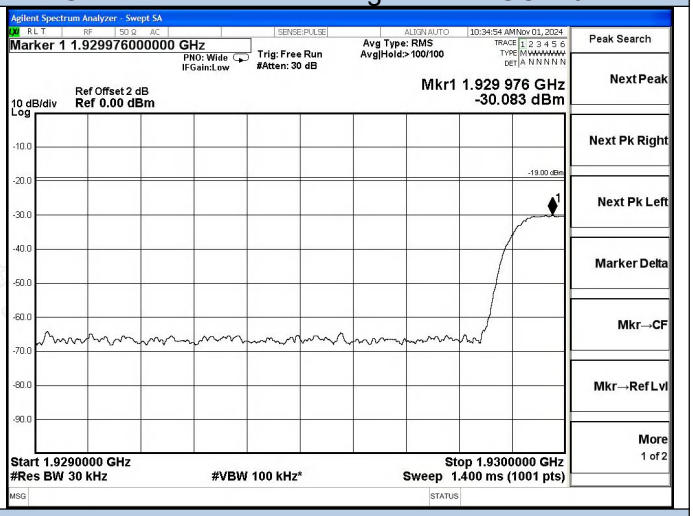
Cellular Band DL-LTE Right Side Pre AGC



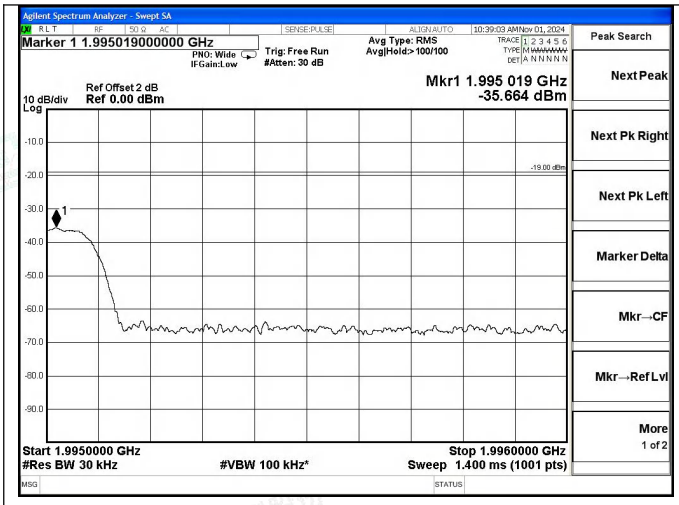
Cellular Band DL-LTE Right Side AGC+10dB



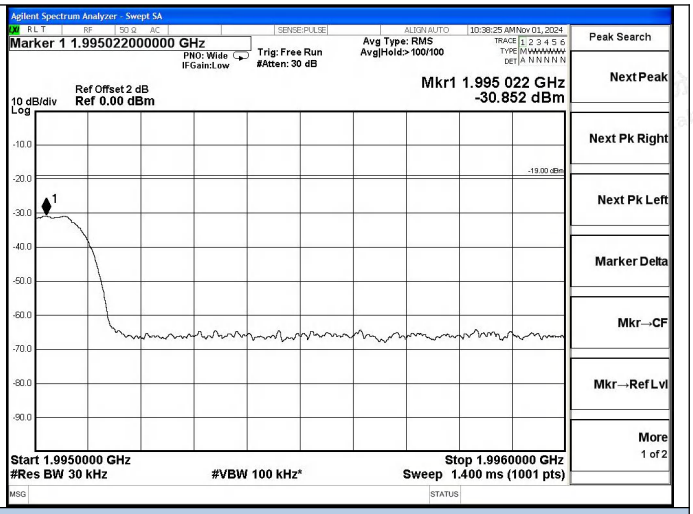
PCS Band DL-LTE Left Side Pre AGC



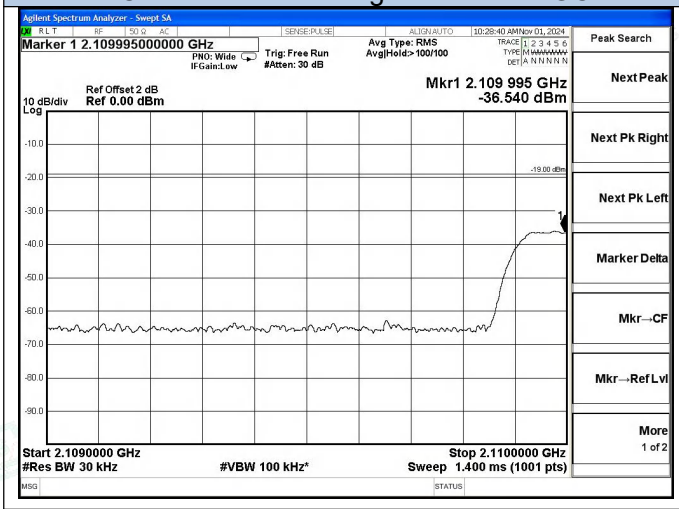
PCS Band DL-LTE Left Side AGC+10dB



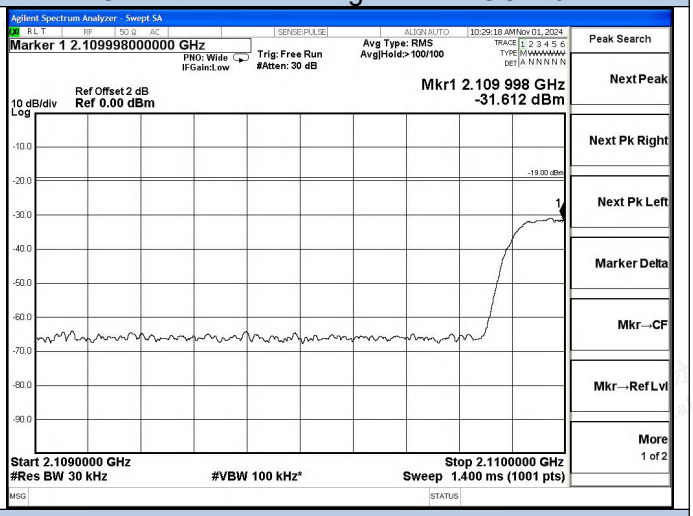
PCS Band DL-LTE Right Side Pre AGC



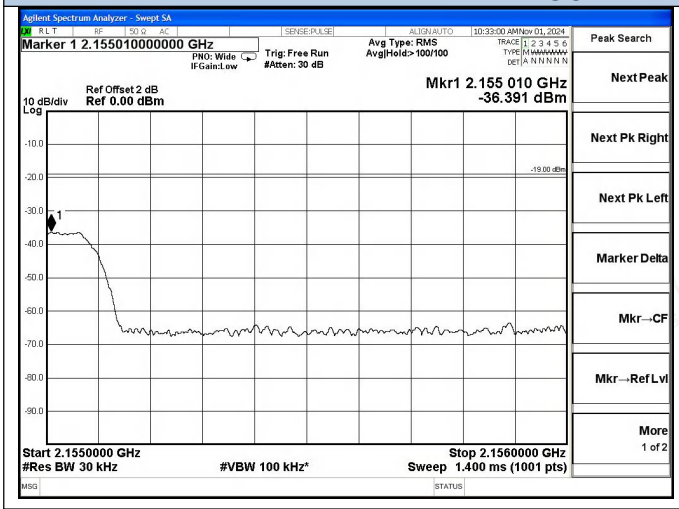
PCS Band DL-LTE Right Side AGC+10dB



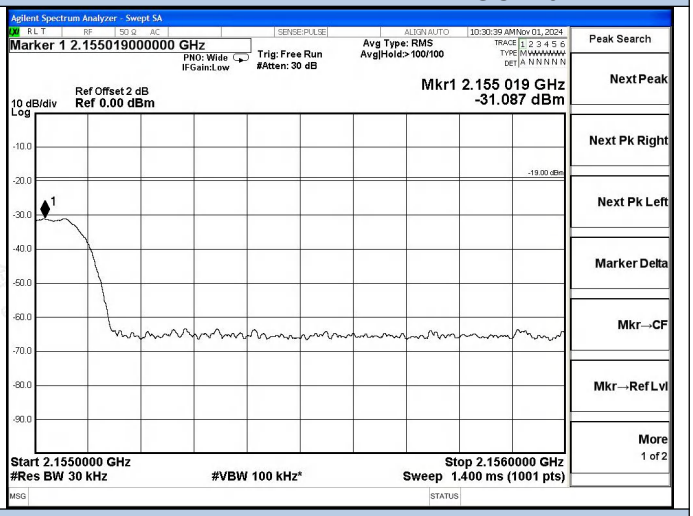
AWS Band DL-LTE Left Side Pre AGC



AWS Band DL-LTE Left Side AGC+10dB



AWS Band DL-LTE Right Side Pre AGC



AWS Band DL-LTE Right Side AGC+10dB

6.8. Conducted Spurious Emission

6.8.1 Applicable Standard

According to § 2.1051 Spurious emissions at antenna terminals:

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB.
So the Conducted emissions limit = -13 dBm

6.8.3 Test Procedure

According to section 7.6 of KDB 935210 D03 Signal Booster Measurement v04r04:

The following procedures shall be used to demonstrate compliance to the applicable conducted spurious emissions limits as per Section 2.1051.
NOTE–For frequencies below 1 GHz, an RBW of 1 MHz may be used in a preliminary measurement. If non-compliant emissions are detected, a final measurement shall be made with a 100 kHz RBW. Additionally, a peak detector may also be used for the preliminary measurement. If non-compliant emissions are detected then a final measurement of these emissions shall be made with the power averaging (rms) detector.

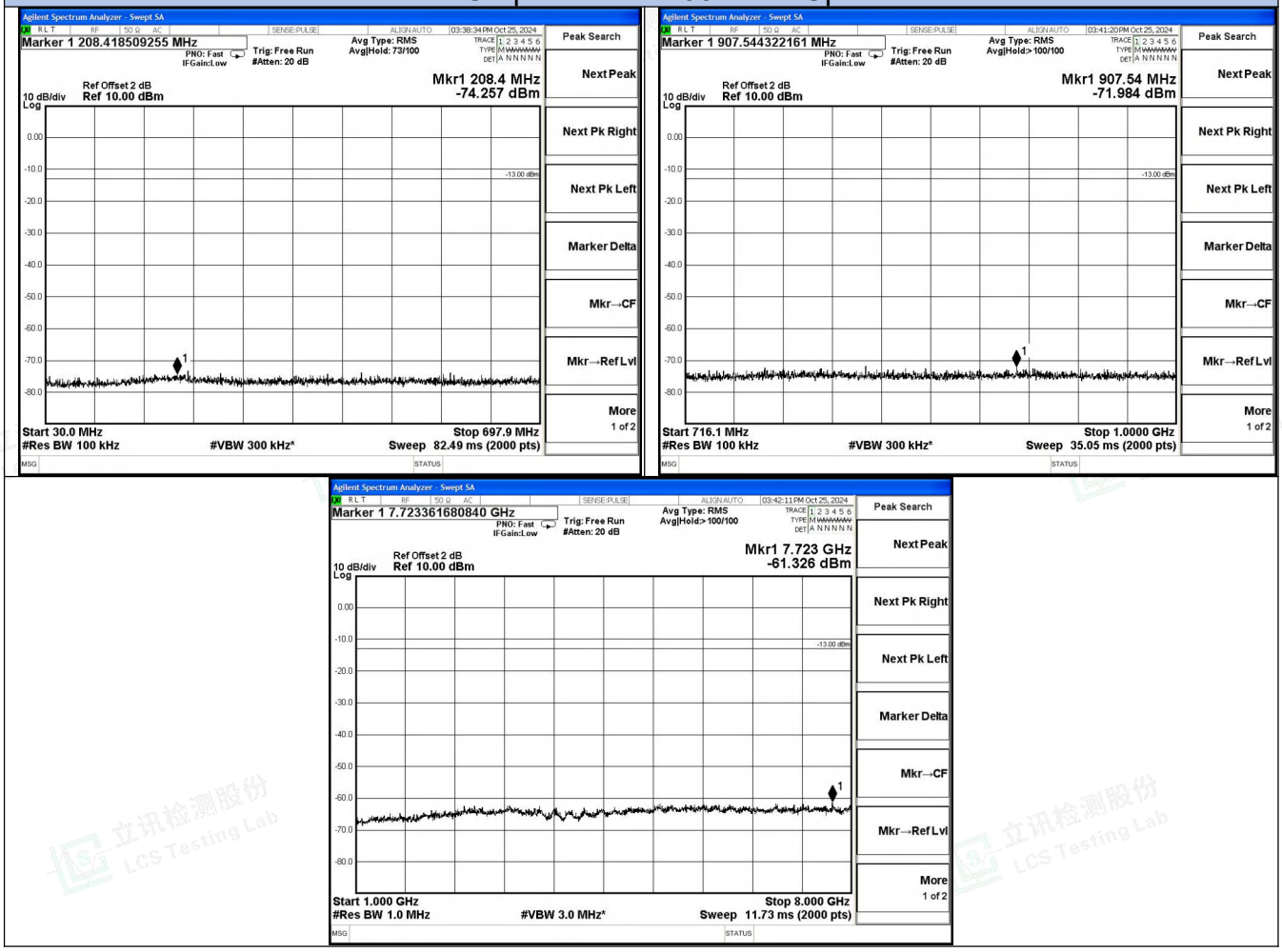
a) Connect the EUT to the test equipment as shown in Figure 1. Begin with the uplink output (donor) port connected to the spectrum analyzer.
b) Configure the signal generator for AWGN with a 99% OBW of 4.1 MHz, with a center frequency corresponding to the center of the CMRS band under test.
c) Set the signal generator amplitude to the level determined in the power measurement procedure in 7.2.
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 = measurement bandwidth specified in the applicable rule section for the operational frequency band under consideration (see Appendix A for relevant cross-references). Note that many of the individual rule sections permit the use of a narrower RBW [typically ≥ 1% of the emission bandwidth (EBW)] to enhance measurement accuracy, but the result must then be integrated over the specified measurement bandwidth.
2) Set VBW = 3 RBW.
3) Select the power averaging (rms) detector. (See above note regarding the use of a peak detector for preliminary measurements.)
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. Note that the number of measurement points in each sweep must be ≥ (2 span/RBW), which may require that the measurement range defined by the preceding start and stop frequencies be subdivided, depending on the available number of measurement points of the spectrum analyzer. Trace average at least 10 traces in power averaging (i.e., rms) mode.
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. Note that the number of measurement points in each sweep must be ≥ (2 span/RBW) which may require that the measurement range defined

by the start and stop frequencies above be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.
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 7.6b) through 7.6d) for each supported frequency band of operation.

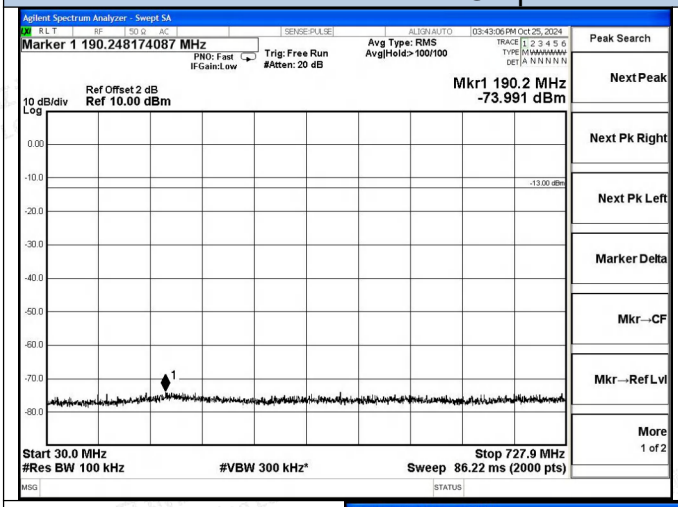
6.8.4 Test data

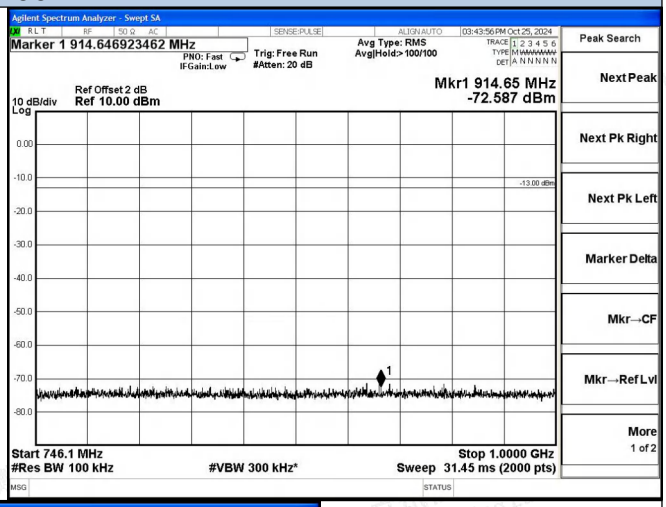
Temperature	23.6℃	Humidity	52.3%
Test Engineer	Paddi Chen	Test Mode	Transmitting

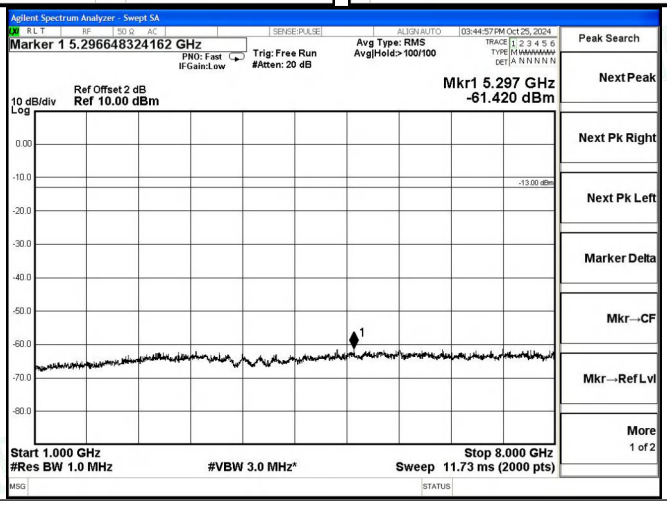
Test Graphs-Lower 700 Band Uplink



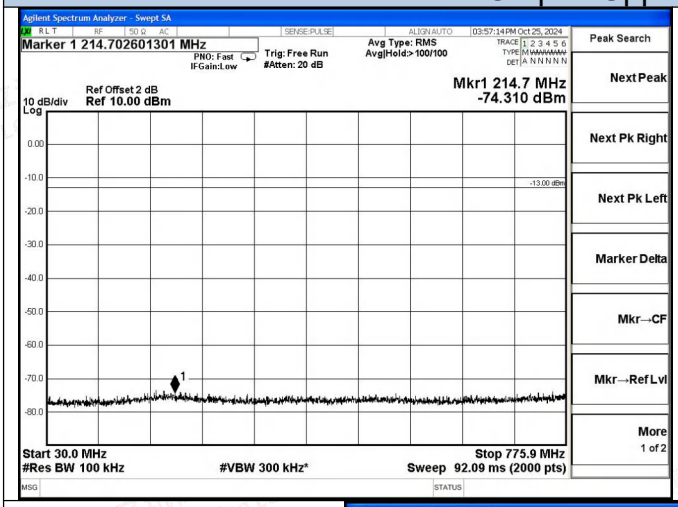
Test Graphs-Lower 700 Band Downlink

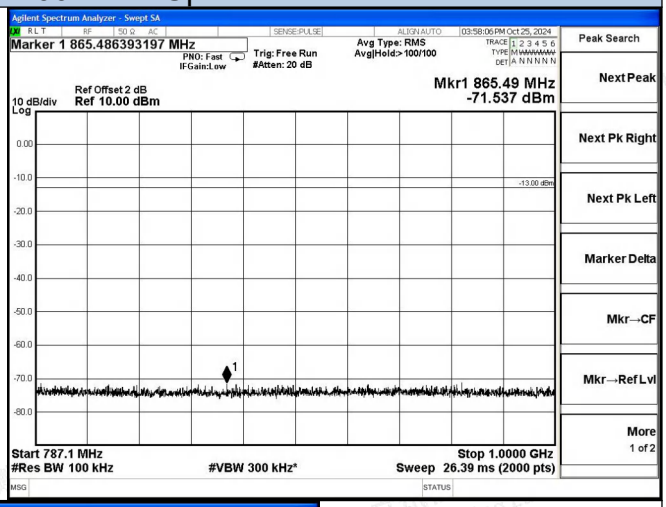


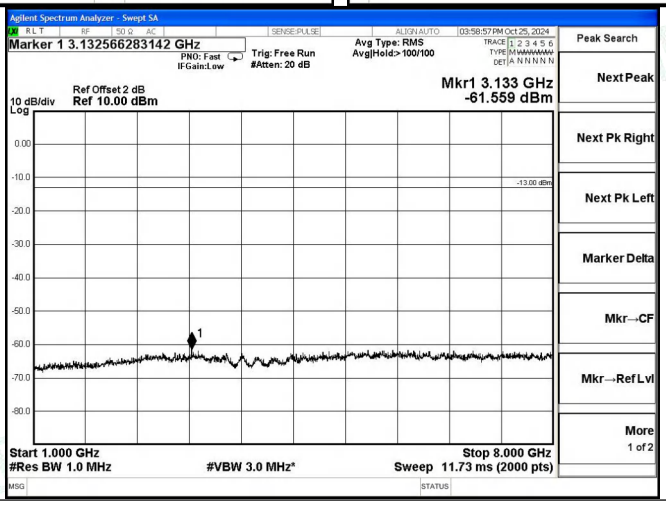




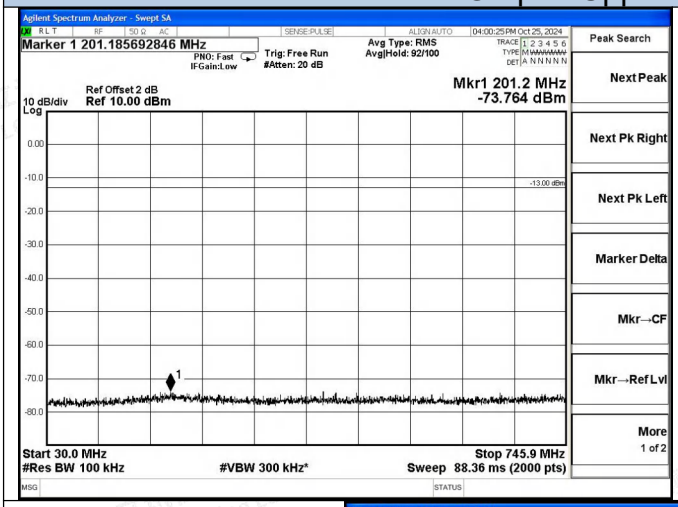
Test Graphs-Upper 700 Band Uplink

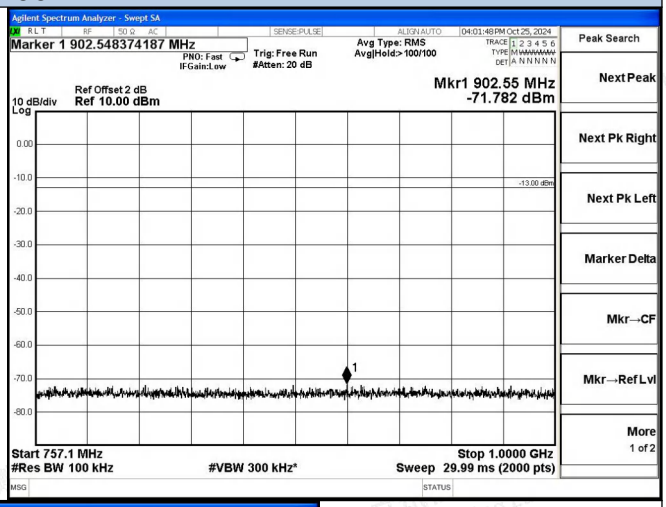


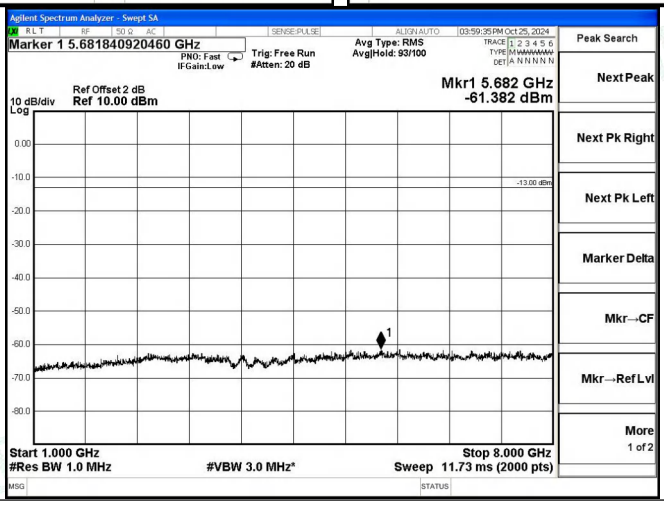




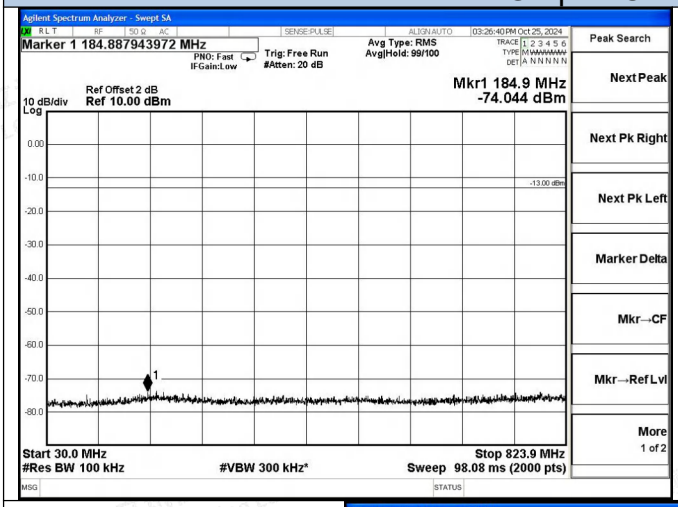
Test Graphs-Upper 700 Band Downlink

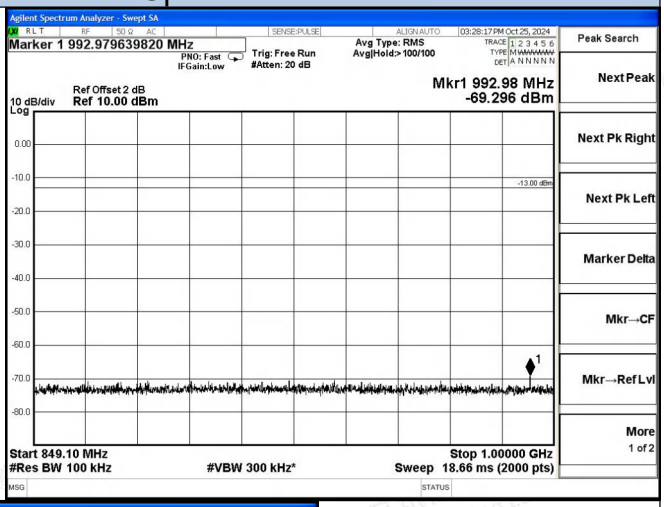


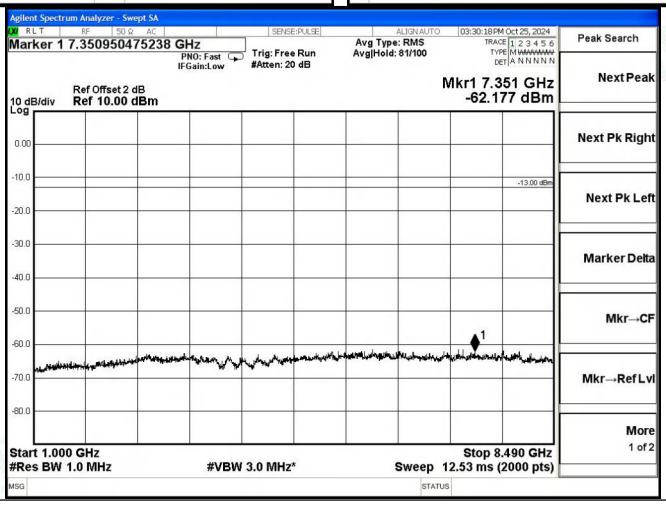




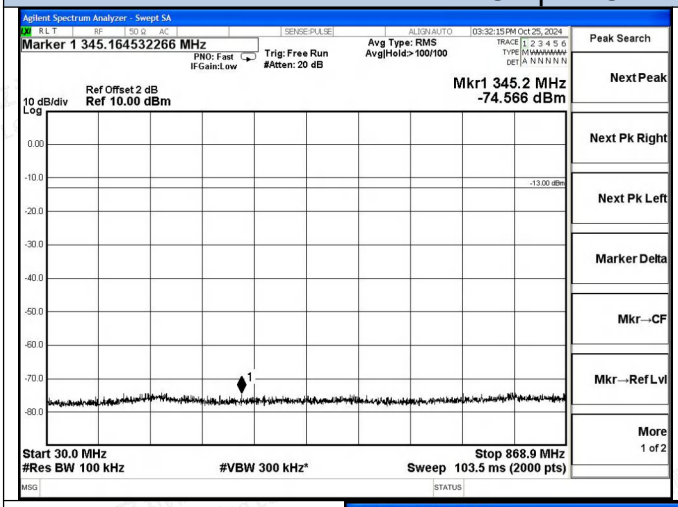
Test Graphs-Cellular Band Uplink

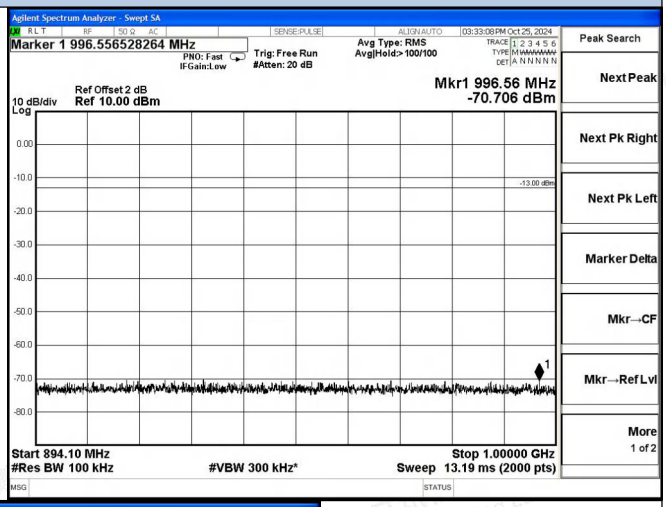


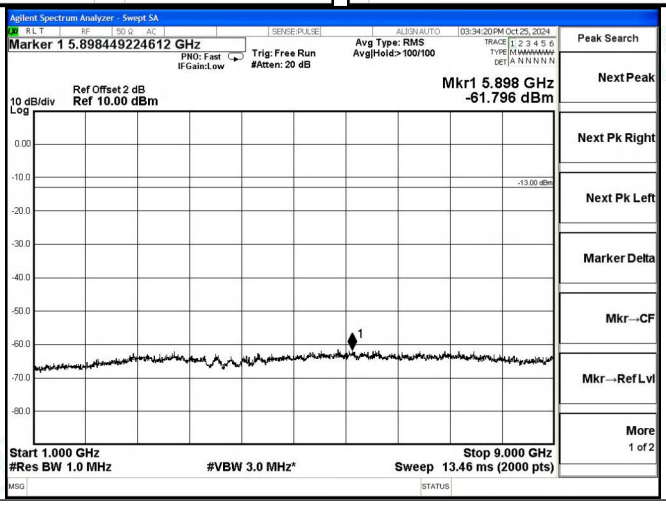




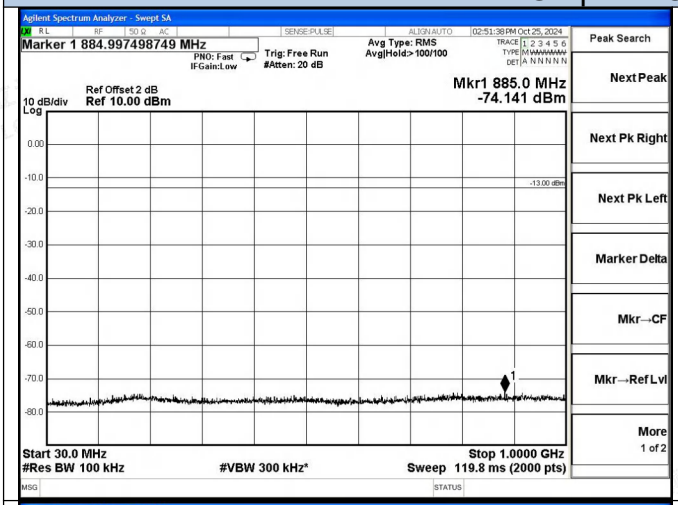
Test Graphs-Cellular Band Downlink

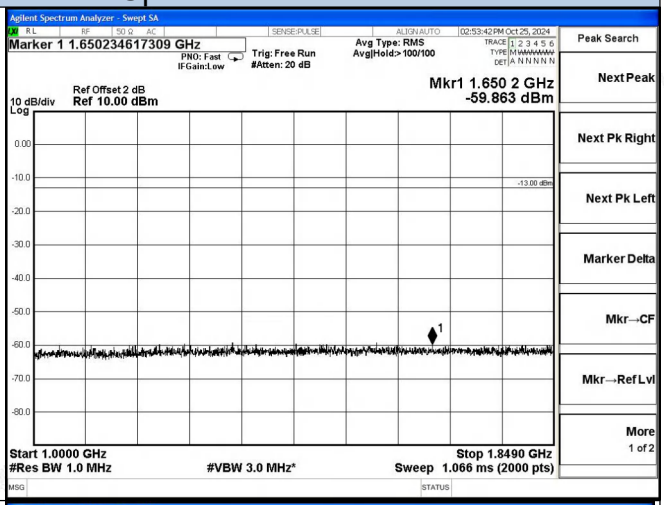


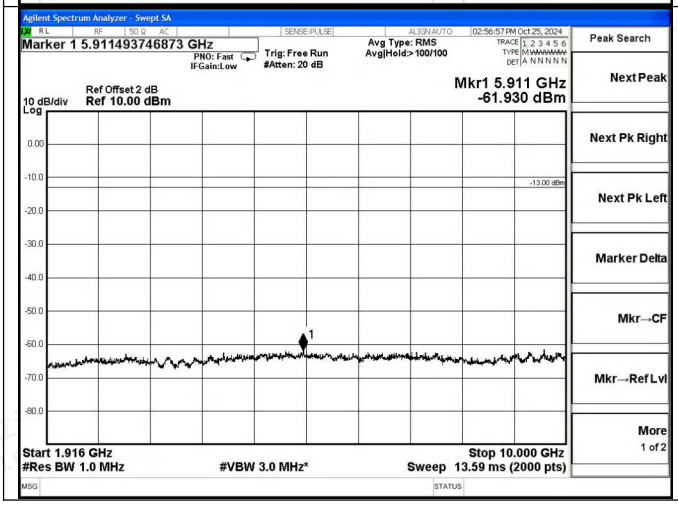


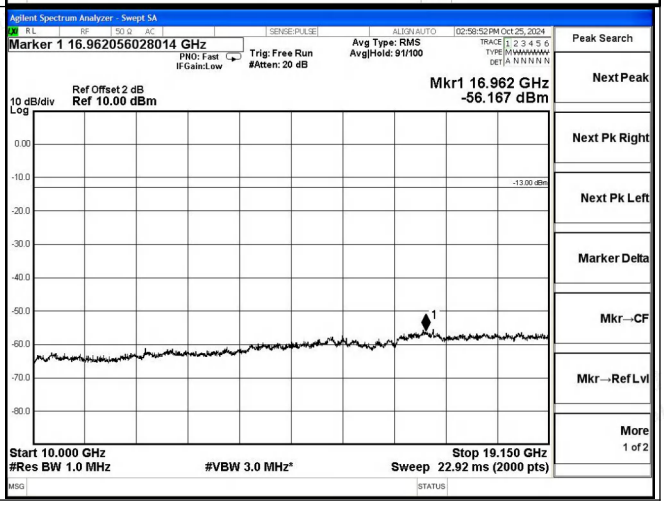


Test Graphs-PCS Band Uplink

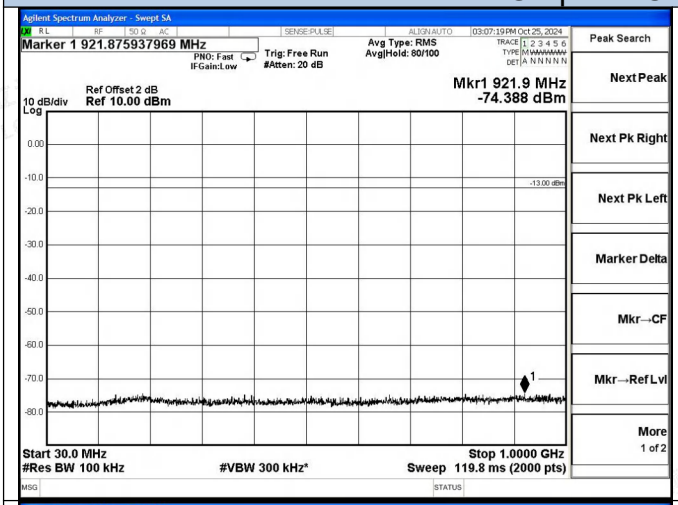


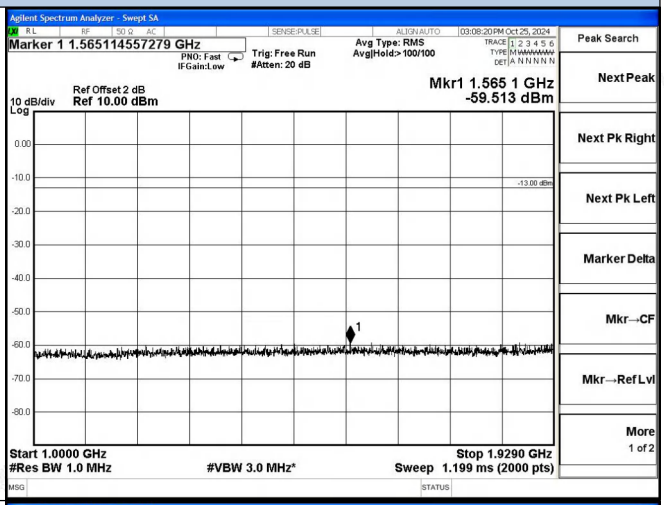


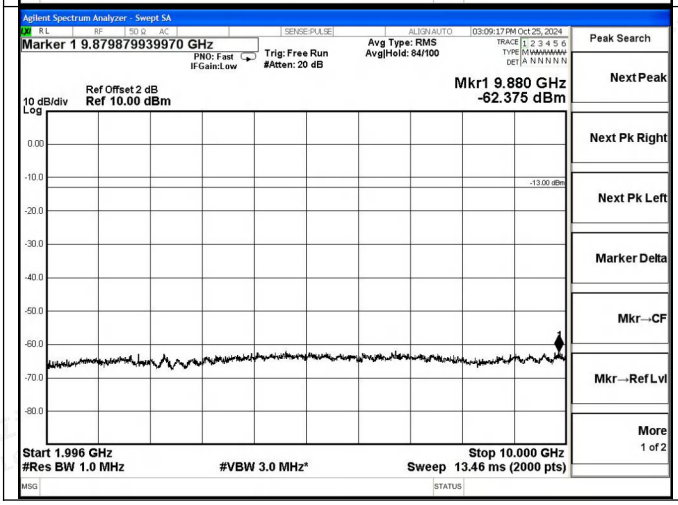


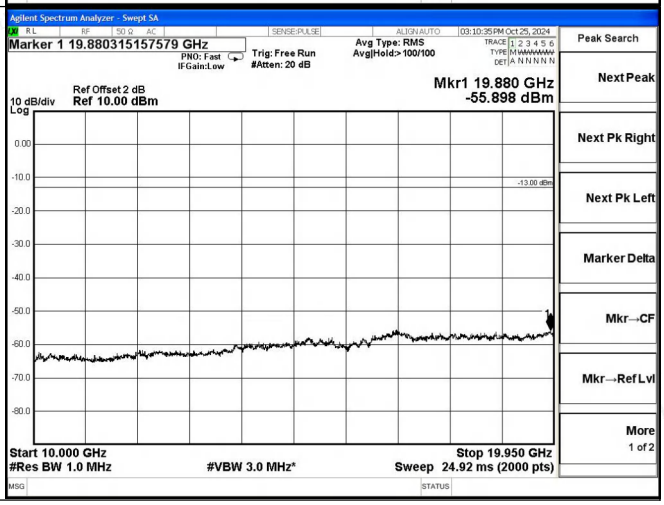


Test Graphs-PCS Band Downlink

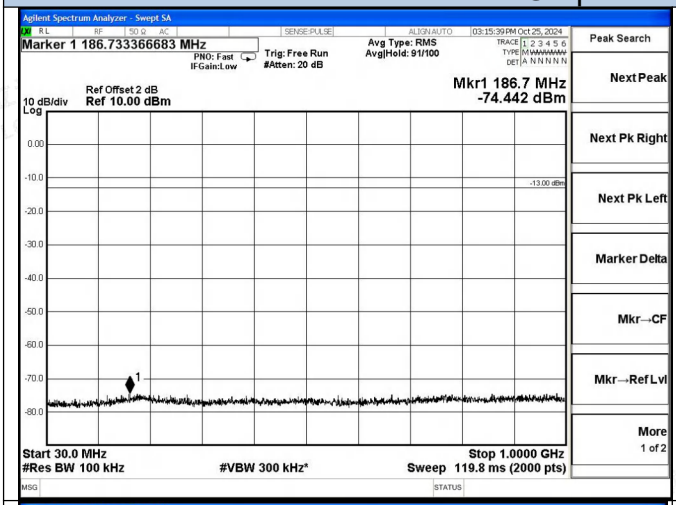


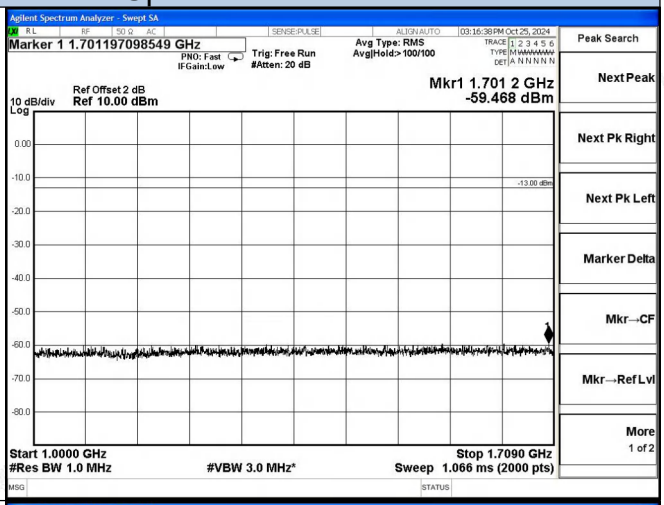


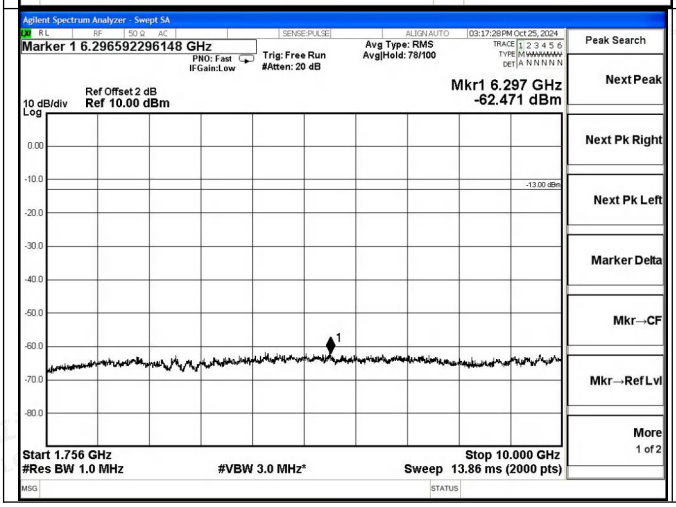


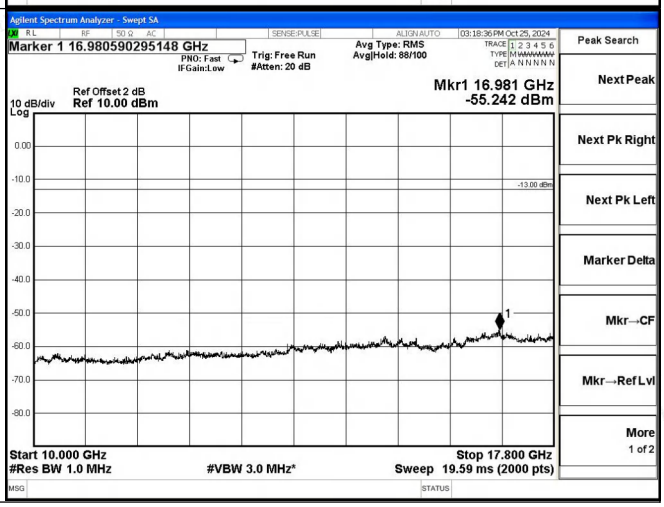


Test Graphs-AWS Band Uplink

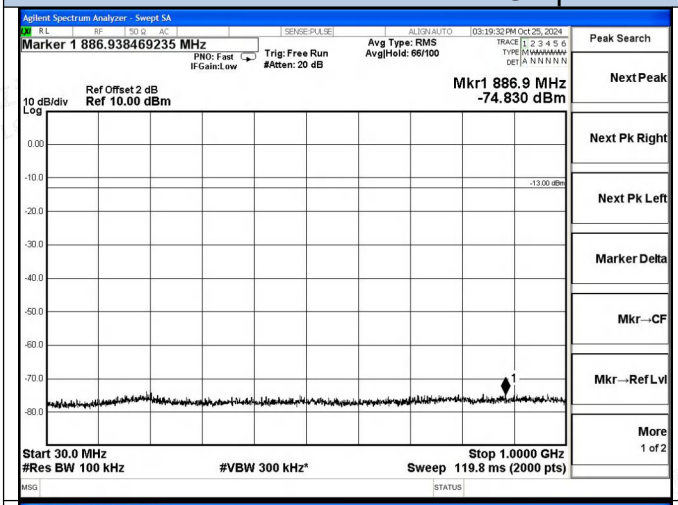


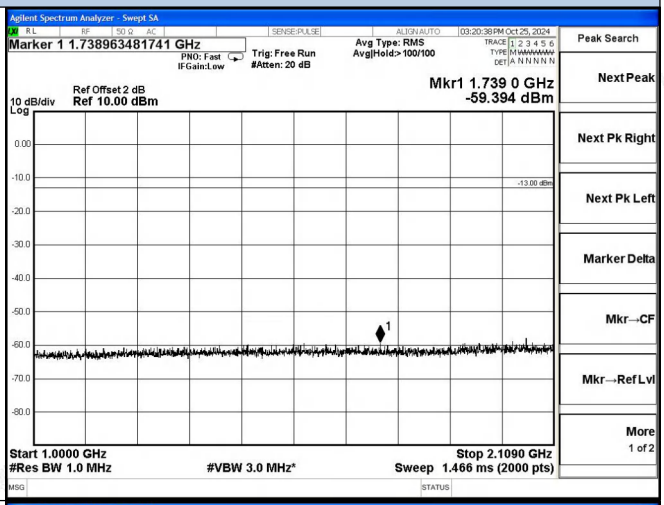


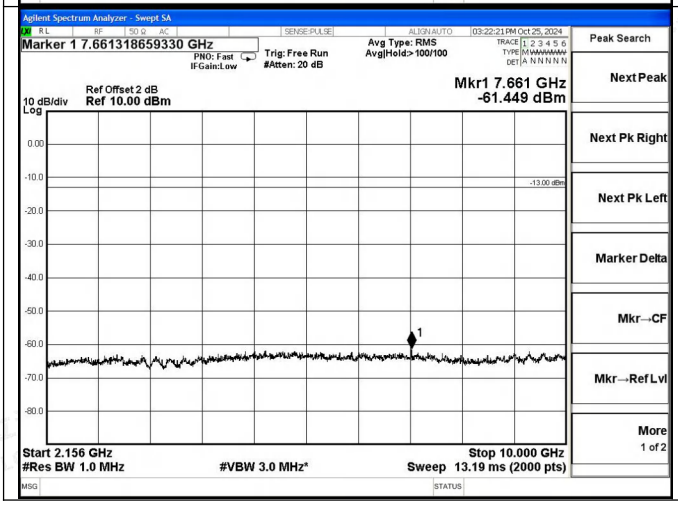


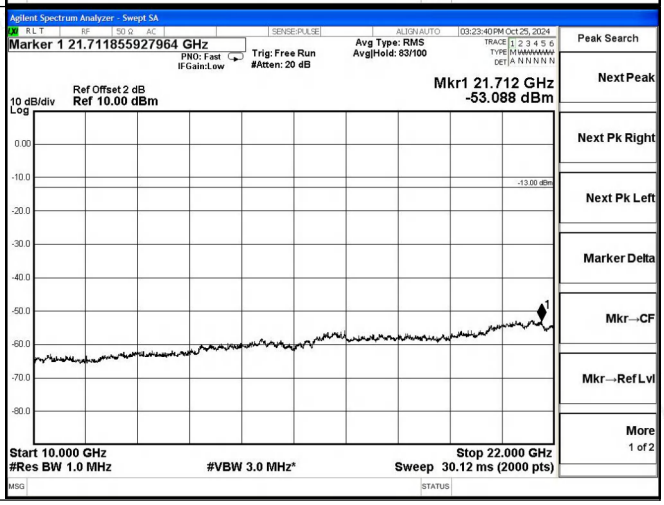


Test Graphs-AWS Band Downlink









6.9 Uplink Inactivity

6.9.1 Applicable Standard

According to §20.21(e)(8)(i)(I) Uplink Inactivity:
When a consumer booster is not serving an active device connection after 5 minutes the uplink noise power shall not exceed −70 dBm/MHz.

6.9.2 Test Procedure

According to section 7.8 of KDB 935210 D03 Signal Booster Measurement v04r04:

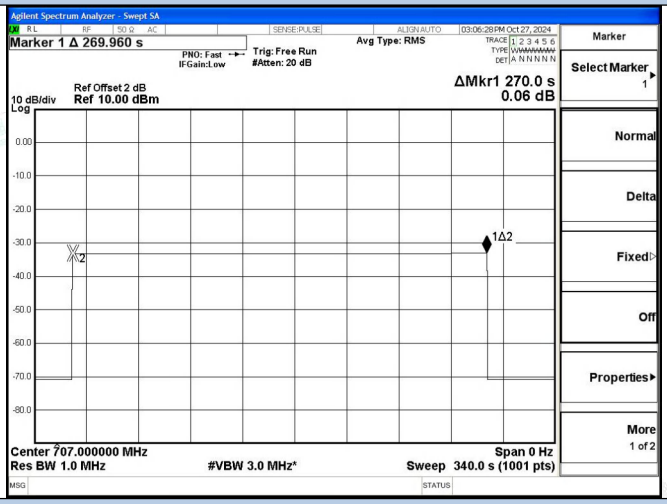
a. Connect the EUT to the test equipment as shown in Figure 1 with the uplink output (donor) port connected to the spectrum analyzer.
b. Select the power averaging (rms) detector.
c. Set the spectrum analyzer RBW for 1 MHz with the VBW ≥ 3 RBW.
d. Set the center frequency of the spectrum analyzer to 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 7.7.1a) to 7.7.1f).
Repeat 7.8d) through 7.8k) for all operational uplink bands.

6.9.3 Test Data

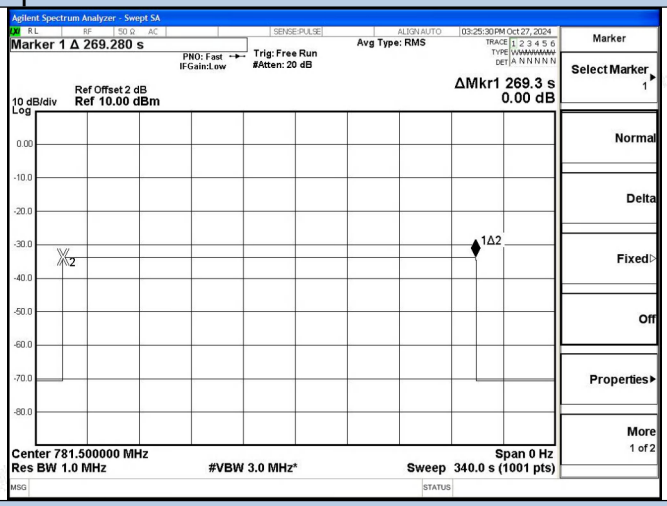
Temperature	23.6℃	Humidity	52.3%
Test Engineer	Paddi Chen	Test Mode	Transmitting

Uplink Inactivity			
Operation Band	Measured (s)	Limit (s)	Result
Lower 700 Band	270.0	300.0	PASS
Upper 700 Band	269.3	300.0	PASS
Cellular Band	268.9	300.0	PASS
PCS Band	278.8	300.0	PASS
AWS Band	268.9	300.0	PASS

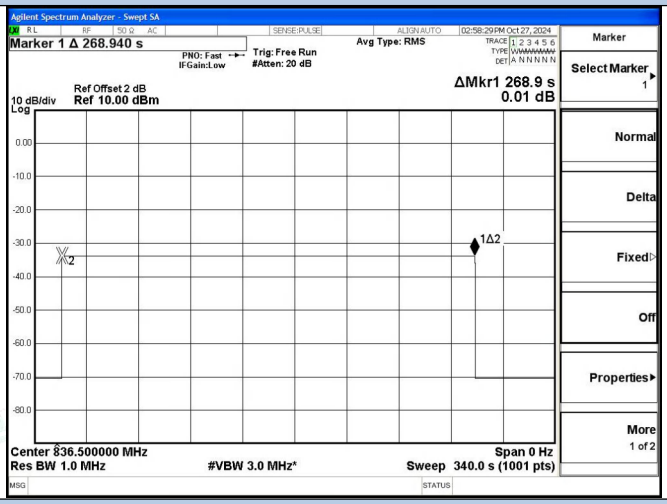
Test Graphs



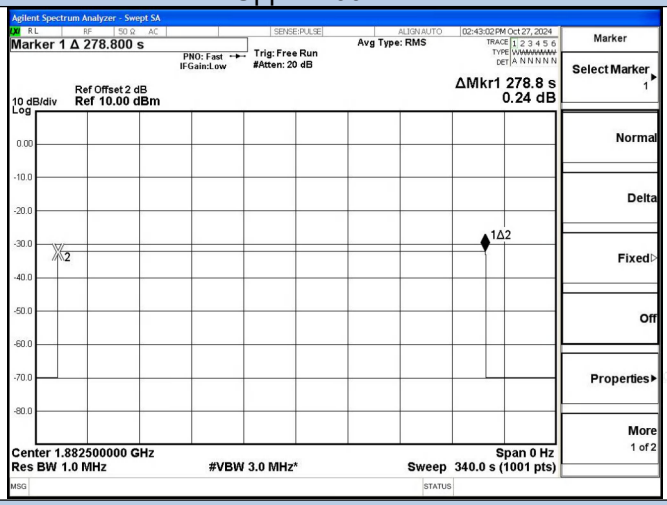
Lower 700 Band



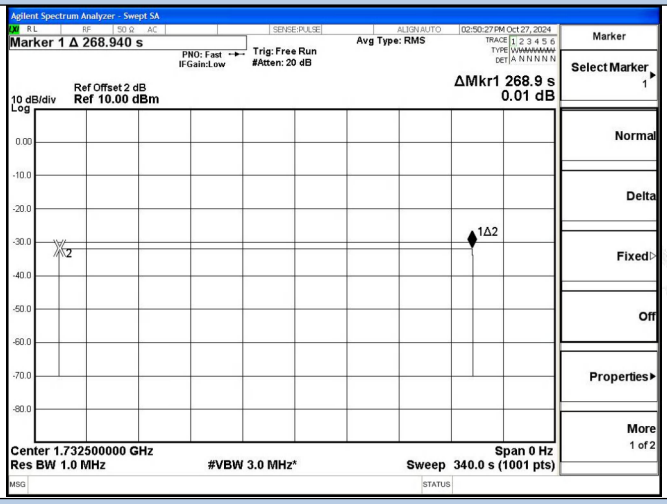
Upper 700 Band



Cellular Band



PCS Band



AWS Band

6.10 Occupied Bandwidth

6.10.1 Applicable Standard

According to §2.1049 Measurements required: Occupied bandwidth.

This measurement is required to compare the consistency of the output signal relative to the input signal, and to satisfy the requirements of Section 2.1049.

6.10.2 Test Procedure

According to section 7.10 of KDB 935210 D03 Signal Booster Measurement v04r04:

a) Connect the test equipment as shown in Figure 10 to firstly measure the characteristics of the test signals produced by the signal generator.
b) Set VBW ≥ 3 RBW.
c) Set the center frequency of the spectrum analyzer to the center of the operational band. The span will be adjusted for each modulation type and OBW as necessary for accurately viewing the signals.
d) Set the signal generator for power level to match the values obtained from the tests of 7.2.
e) Set the signal generator modulation type for GSM with a PRBS pattern and allow the trace on the signal generator to stabilize adjusting the span as necessary.
f) Set the spectrum analyzer RBW for 1% to 5% of the EBW.
g) Capture the spectrum analyzer trace for inclusion in the test report.
h) Repeat 7.10c) to 7.10g) for CDMA and W-CDMA modulation, adjusting the span as necessary. AWGN or LTE may be used in place of W-CDMA, as an option.
i) Repeat 7.10c) to 7.10h) for all uplink and downlink operational bands.
j) Connect the test equipment as shown in Figure 10, with the uplink output (donor) port connected to the spectrum analyzer, and the server port connected to the signal generator.
k) Repeat 7.10c) to 7.10i) with this EUT uplink path test setup.
l) Connect the test equipment as shown in Figure 10, with the downlink output (server) port connected to the spectrum analyzer, and the donor port connected to the signal generator.
m) Repeat 7.10c) to 7.10i) with this EUT downlink path test setup.

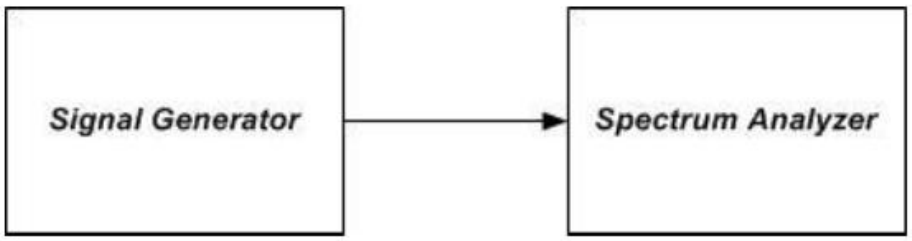


Figure 10 – Test setup for measuring characteristics of test signals used for subsequent EUT occupied bandwidth testing

6.10.3 Test data

Temperature	23.6℃	Humidity	52.3%
Test Engineer	Paddi Chen	Test Mode	Transmitting

Operation Band		Signal Type	Input OBW (MHz)	Output OBW (MHz)
Uplink	Lower 700 Band	GSM	0.247	0.245
		CDMA	1.2252	1.2252
		LTE	4.5081	4.506
	Upper 700 Band	GSM	0.2451	0.2455
		CDMA	1.2286	1.2258
		LTE	4.5102	4.5629
	Cellular Band	GSM	0.246	0.245
		CDMA	1.2245	1.2251
		LTE	4.5141	4.5751
	PCS Band	GSM	0.248	0.247
		CDMA	1.2257	1.2280
		LTE	4.5515	4.4994
	AWS Band	GSM	0.246	0.246
		CDMA	1.2267	1.2253
		LTE	4.5465	4.4969
Downlink	Lower 700 Band	GSM	0.247	0.246
		CDMA	1.2238	1.2266
		LTE	4.525	4.5531
	Upper 700 Band	GSM	0.2463	0.2455
		CDMA	1.2255	1.2261
		LTE	4.5283	4.5579
	Cellular Band	GSM	0.247	0.246
		CDMA	1.2209	1.2233
		LTE	4.5148	4.5509
	PCS Band	GSM	0.245	0.247
		CDMA	1.2285	1.2253
		LTE	4.5372	4.5499
	AWS Band	GSM	0.248	0.246
		CDMA	1.2279	1.2280
		LTE	4.5143	4.5454