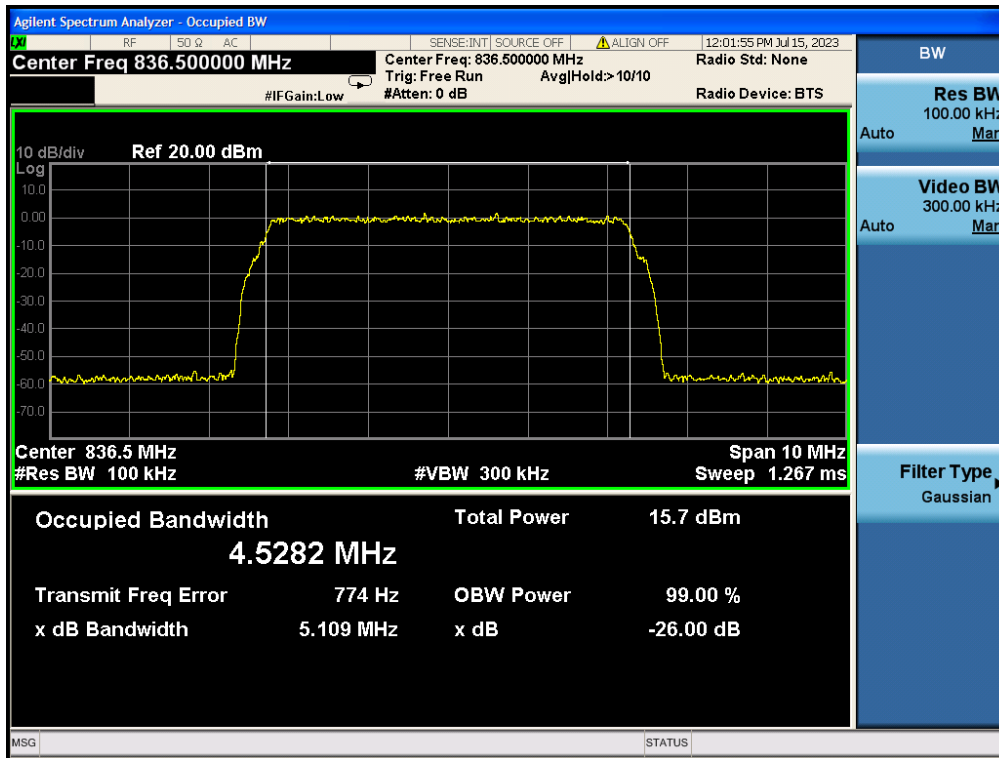
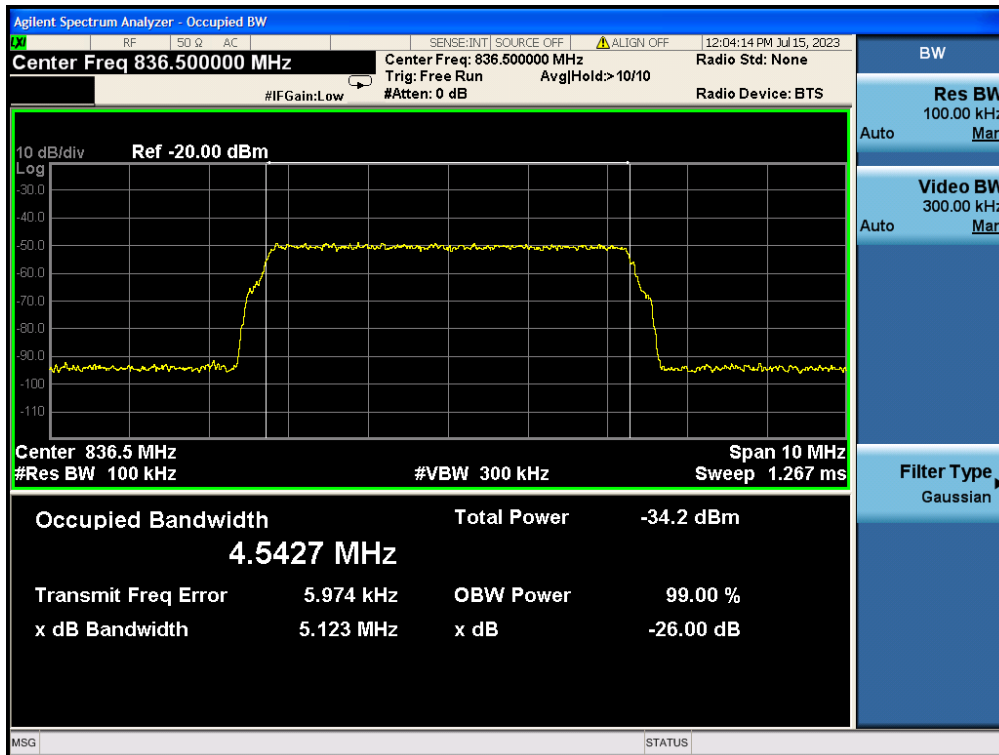


Operation Band		Signal	Input OBW [MHz]	Output OBW [MHz]	Results
Uplink	Cellular	AWGN	4.5282	4.5427	PASS
	AWS-1	AWGN	4.5193	4.5418	PASS
	Low A-E Blocks	AWGN	4.5696	4.5468	PASS
	700 MHz Upper C Block	AWGN	4.5146	4.5363	PASS
	Broadband PCS	AWGN	4.5156	4.5233	PASS
Downlink	Cellular	AWGN	4.5354	4.5595	PASS
	AWS-1	AWGN	4.5462	4.5463	PASS
	Low A-E Blocks	AWGN	4.5332	4.5268	PASS
	700 MHz Upper C Block	AWGN	4.5291	4.5487	PASS
	Broadband PCS	AWGN	4.5167	4.5384	PASS

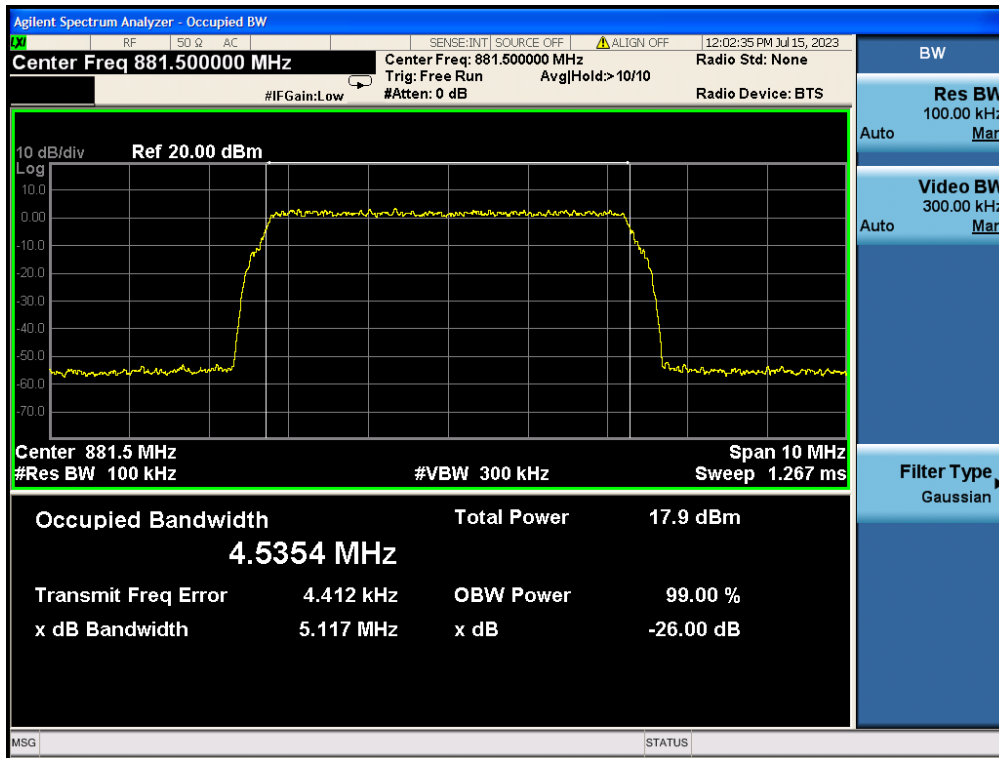
## Cellular AWGN UL Input



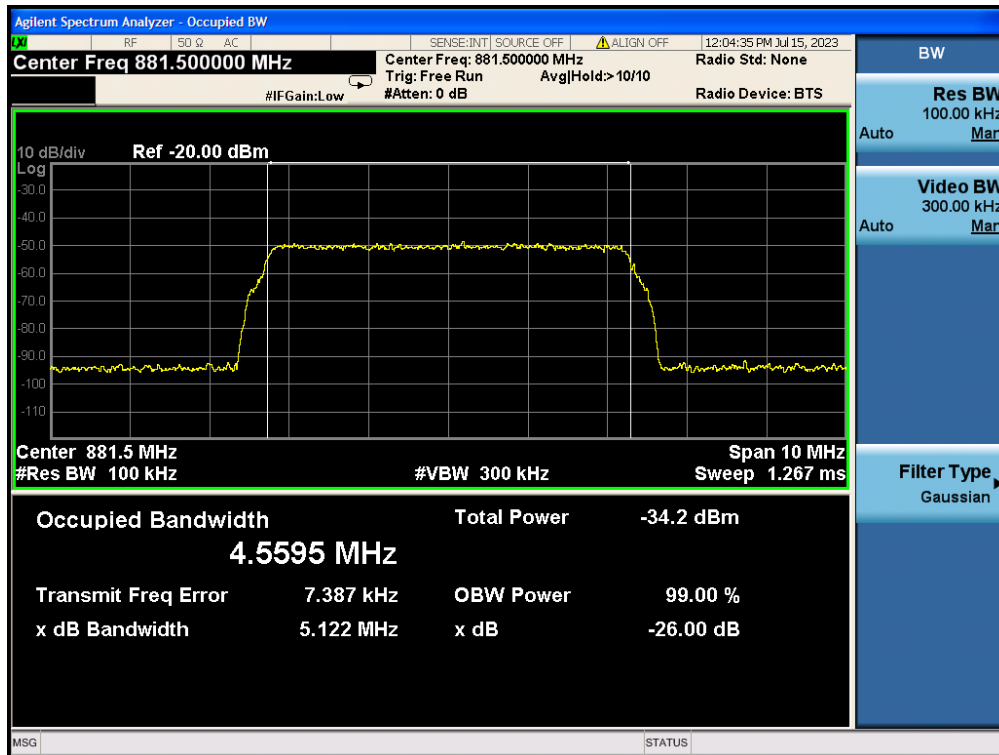
## Cellular AWGN UL output



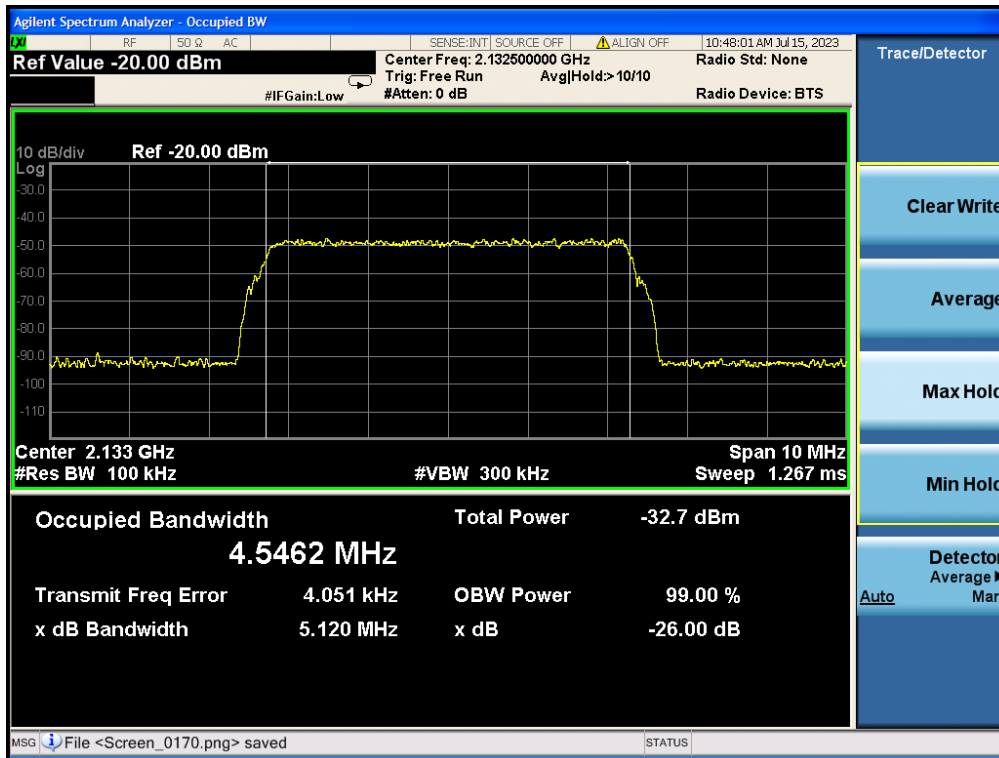
## Cellular AWGN DL Input



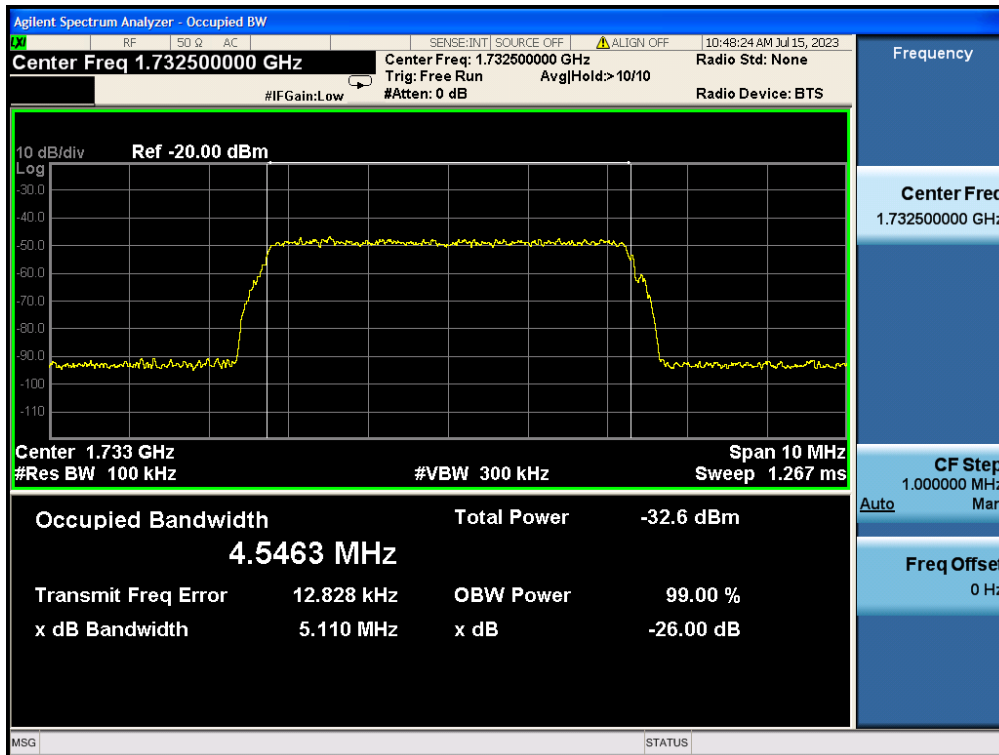
## Cellular AWGN DL output



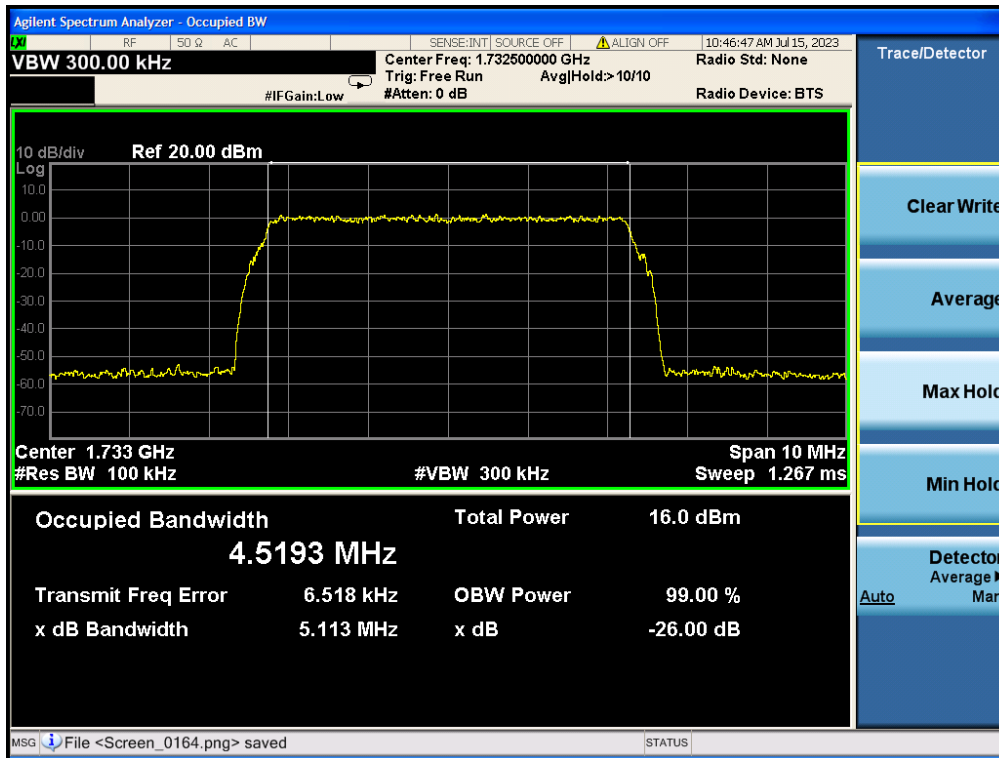
## AWS-1 AWGN DL Input



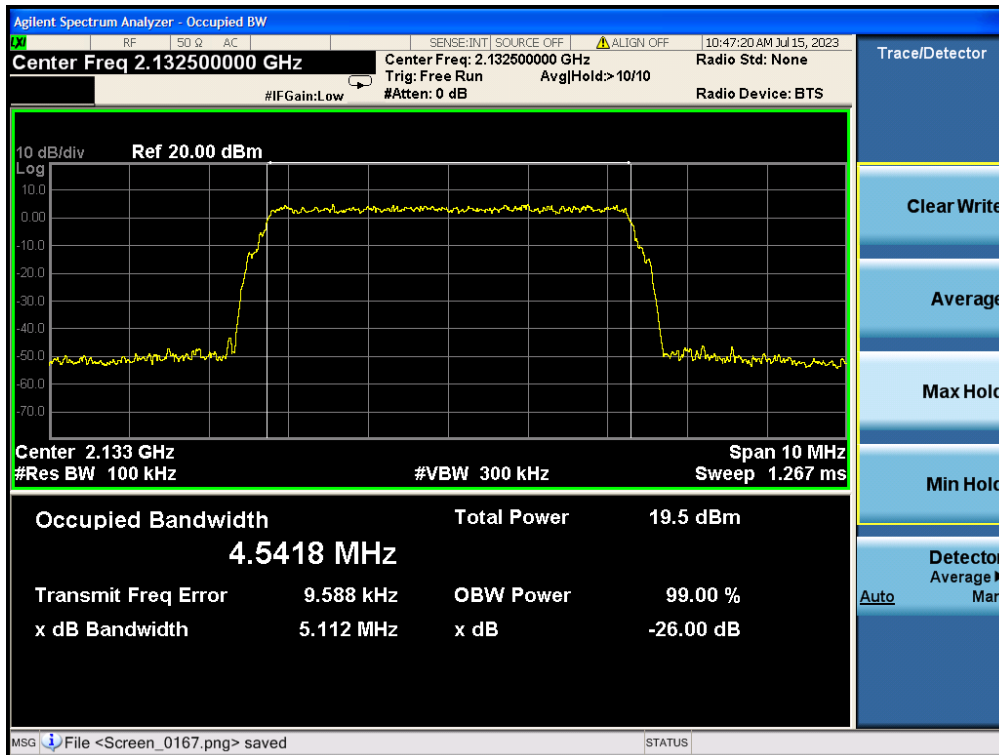
## AWS-1 AWGN DL output



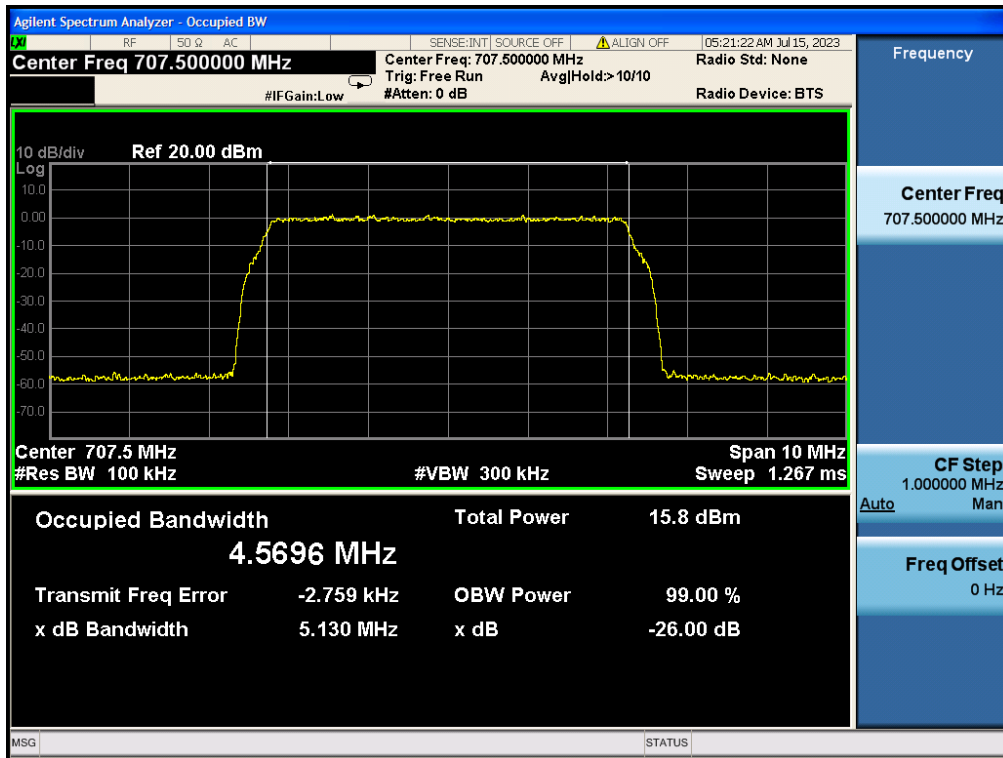
## AWS-1 AWGN UL Input



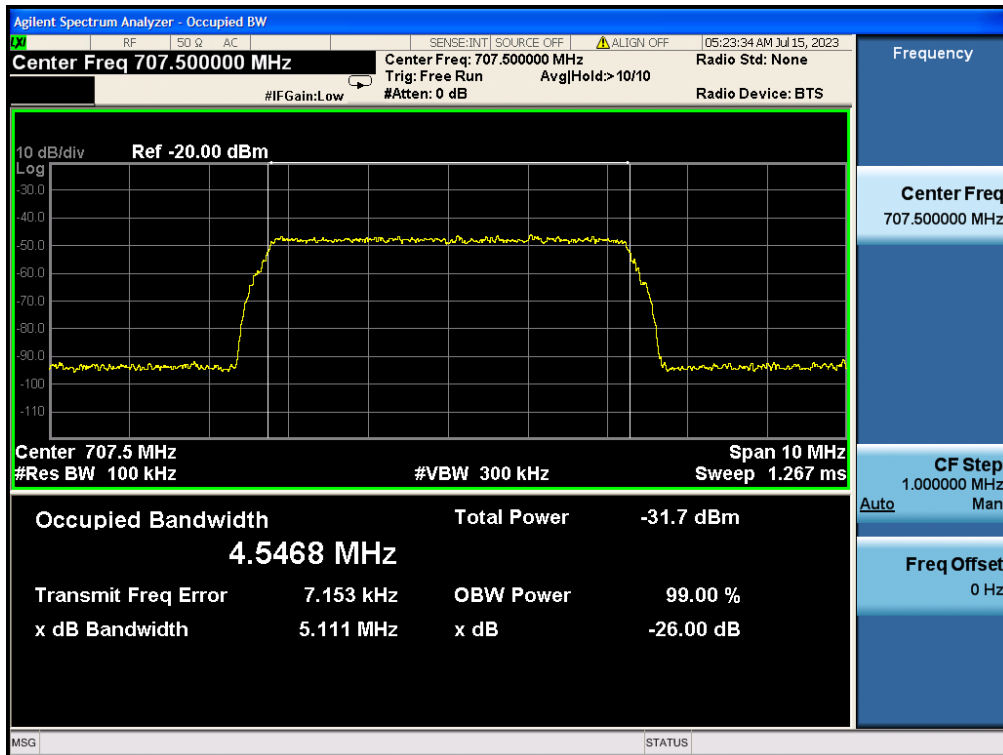
## AWS-1 AWGN UL output



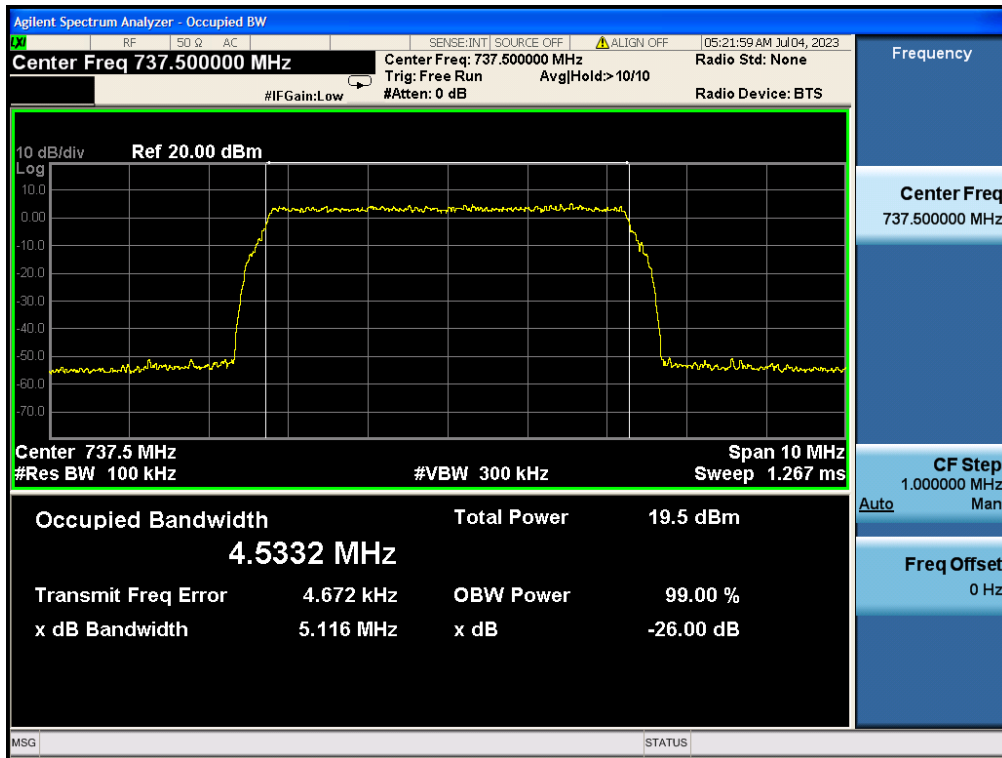
### Low A-E Blocks UL Input



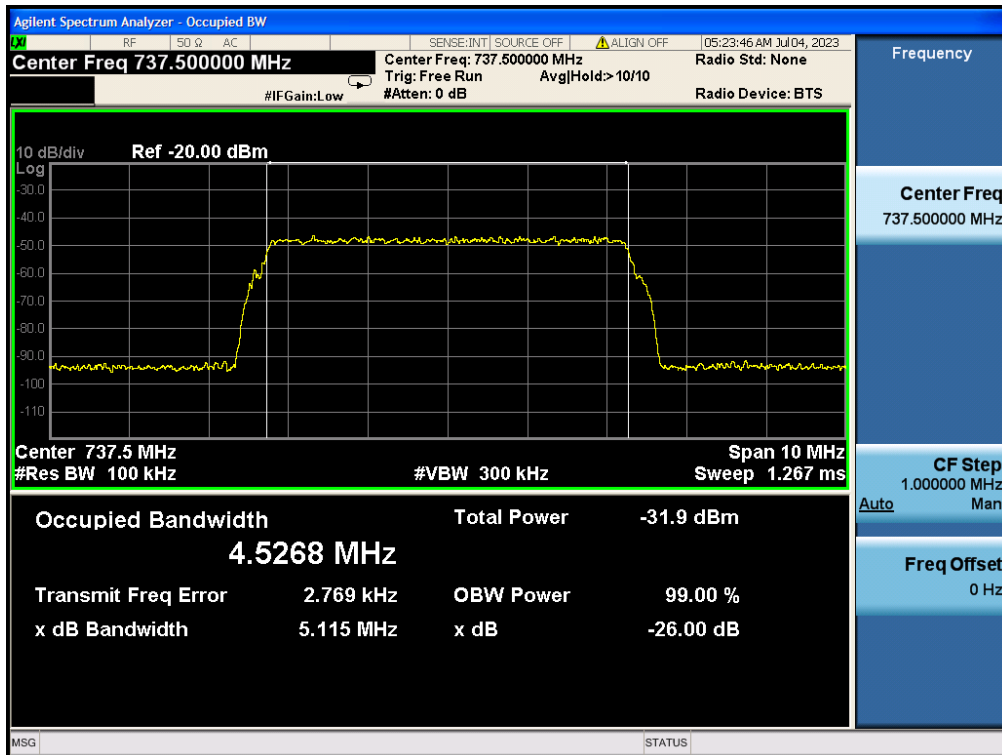
### Low A-E Blocks UL output



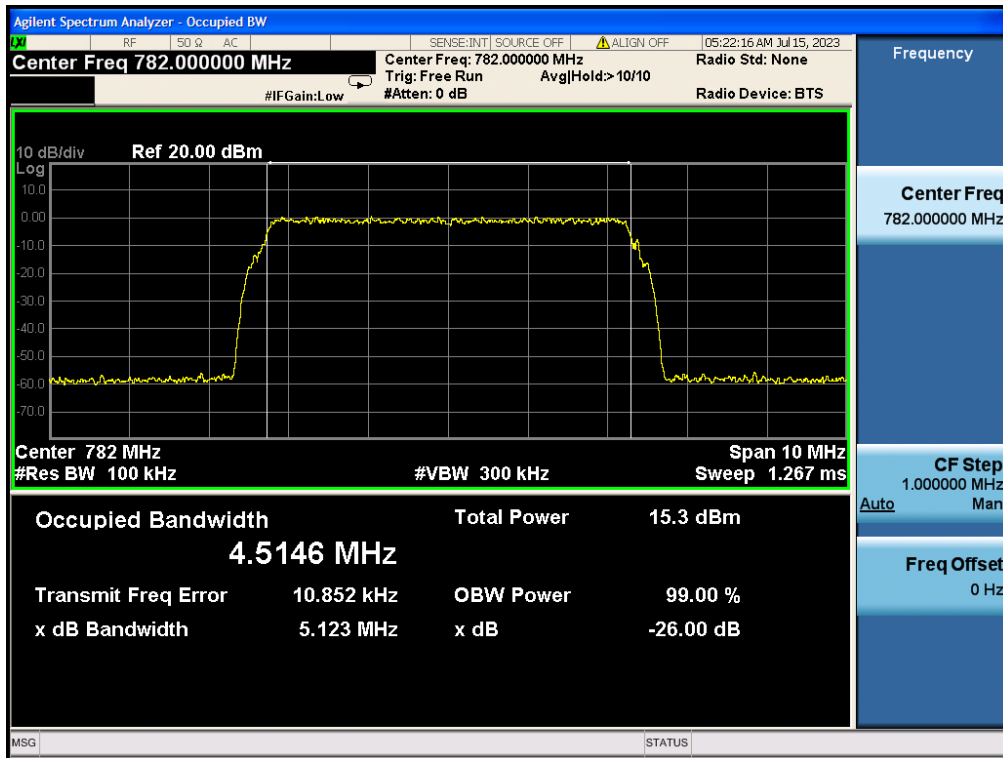
### Low A-E Blocks DL Input



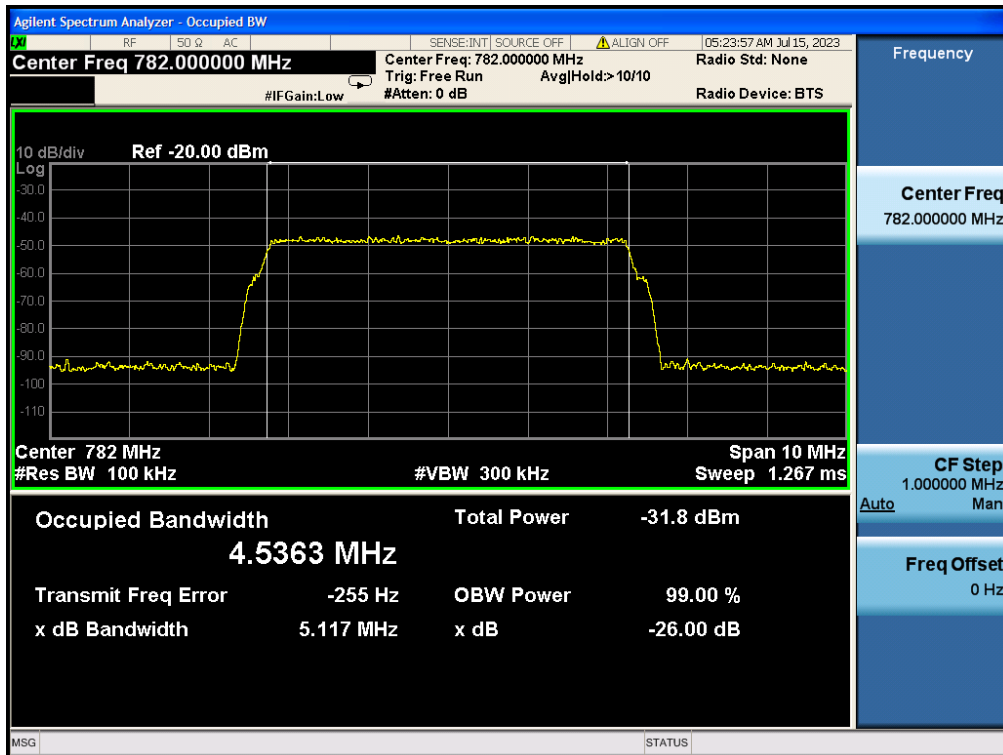
### Low A-E Blocks DL output



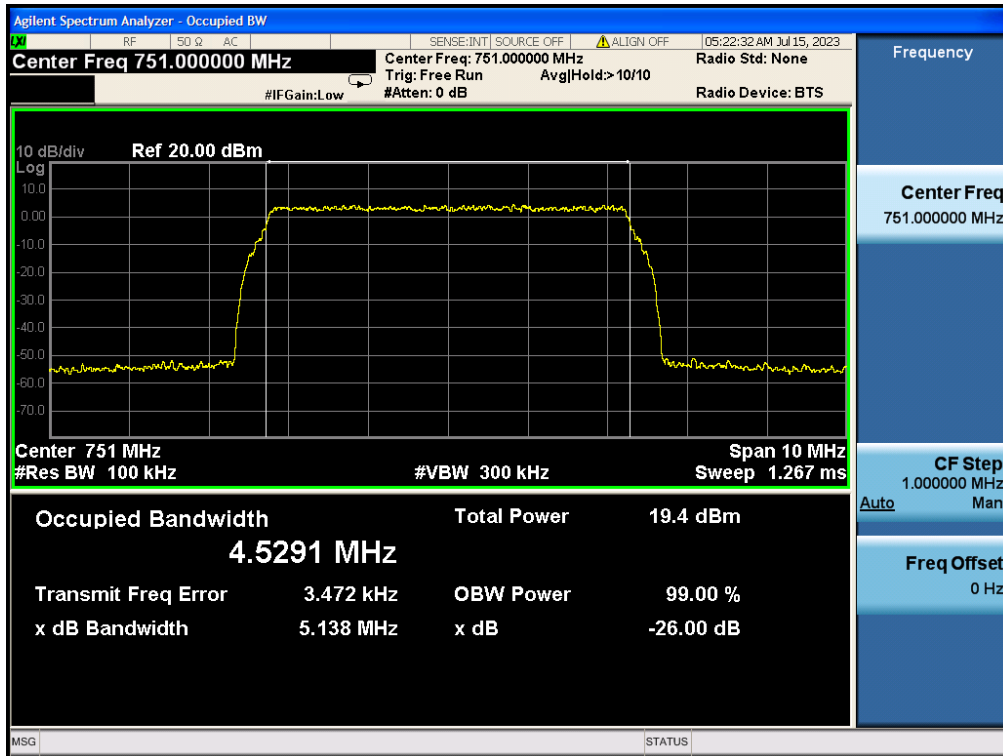
## 700 MHz Upper C Block UL Input



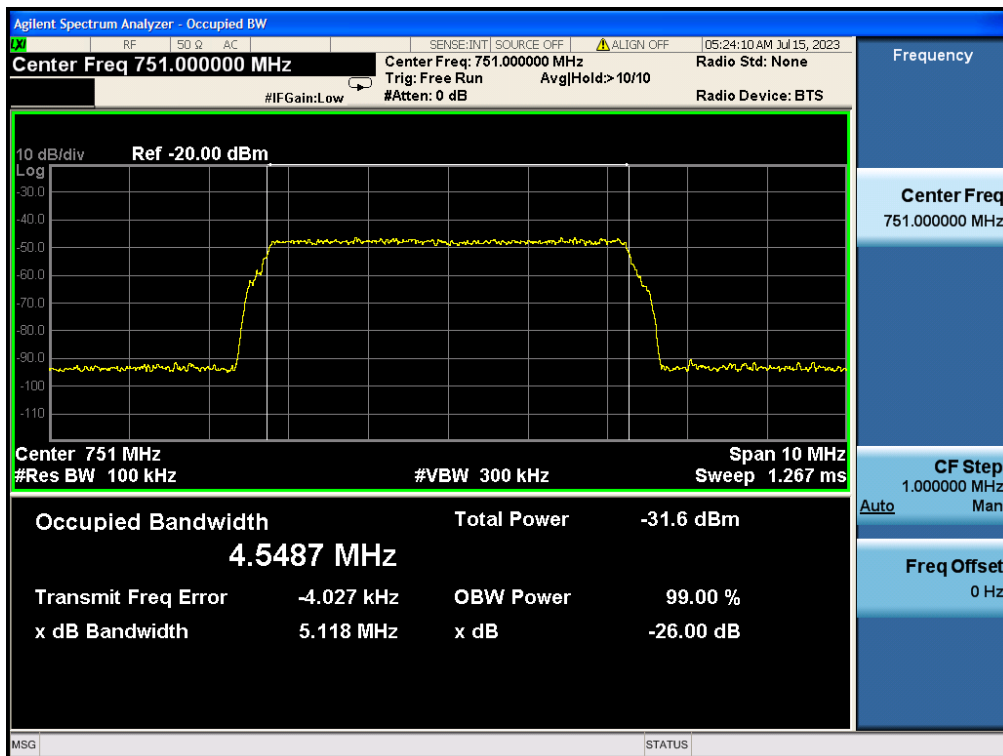
## 700 MHz Upper C Block UL output



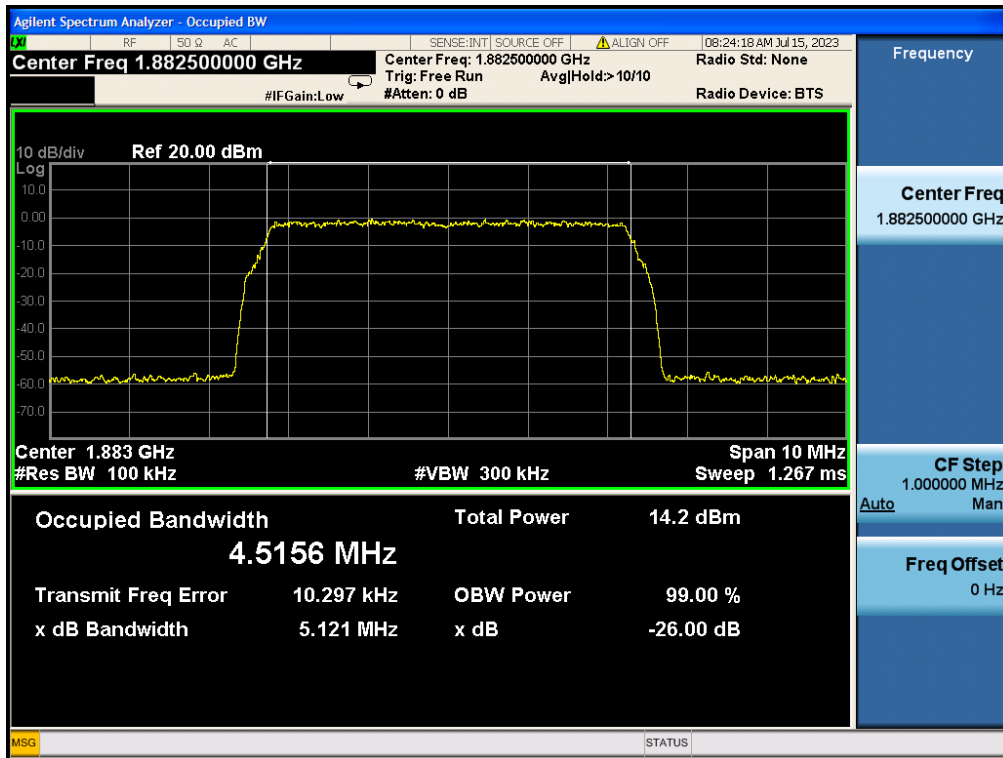
## 700 MHz Upper C Block DL Input



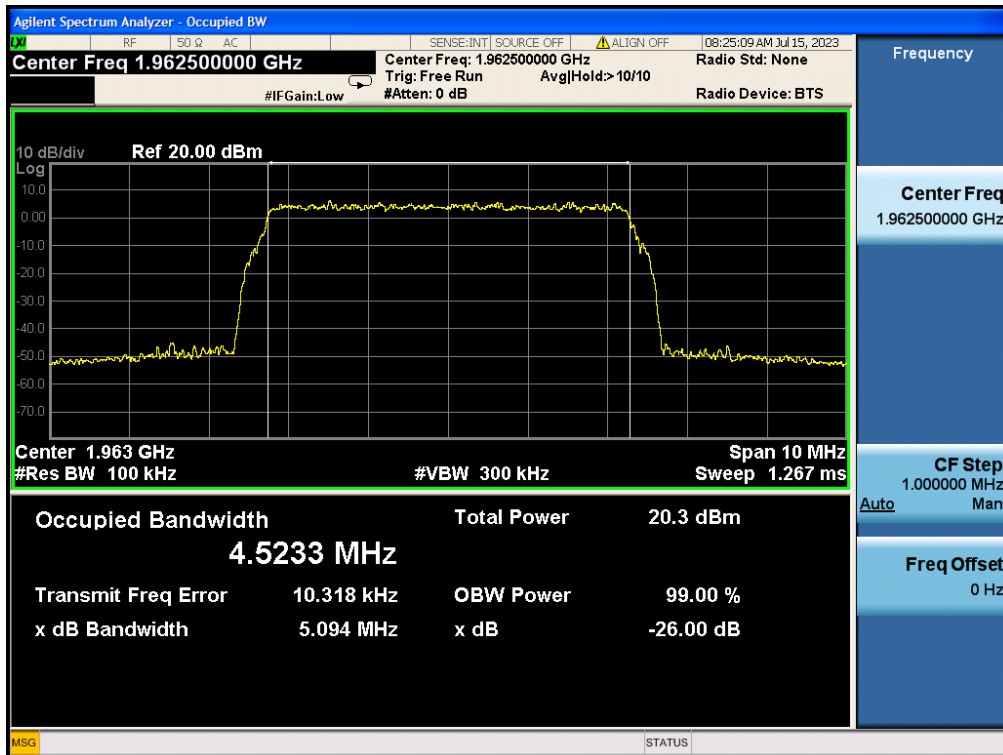
## 700 MHz Upper C Block DL output



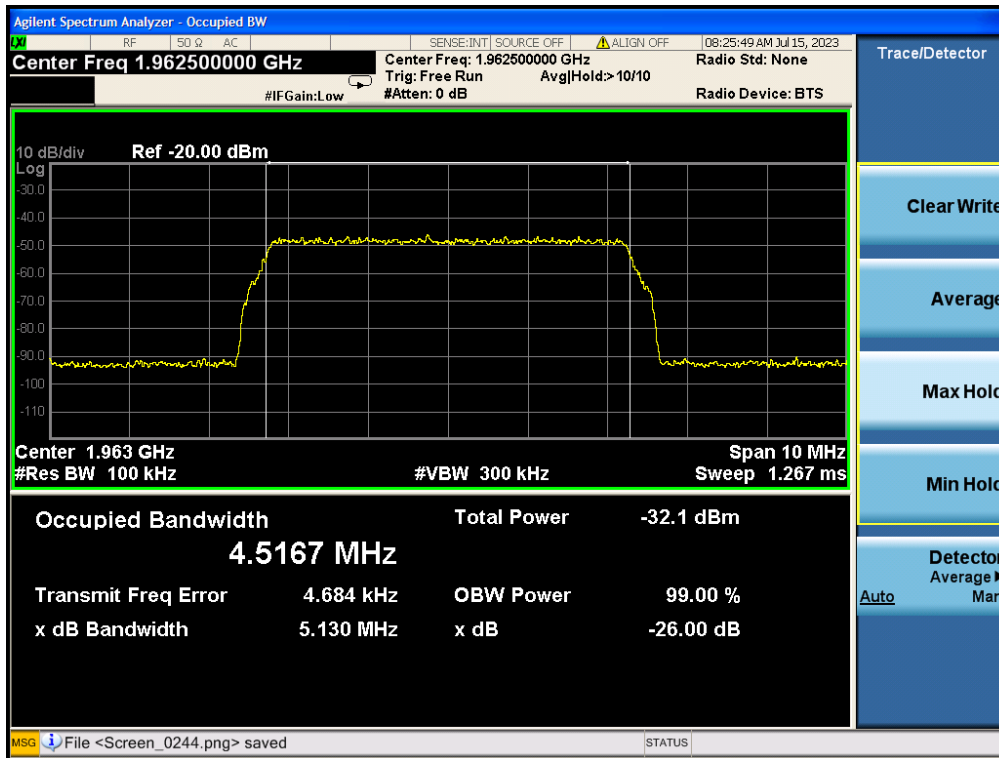
## Broadband PCS UL Input



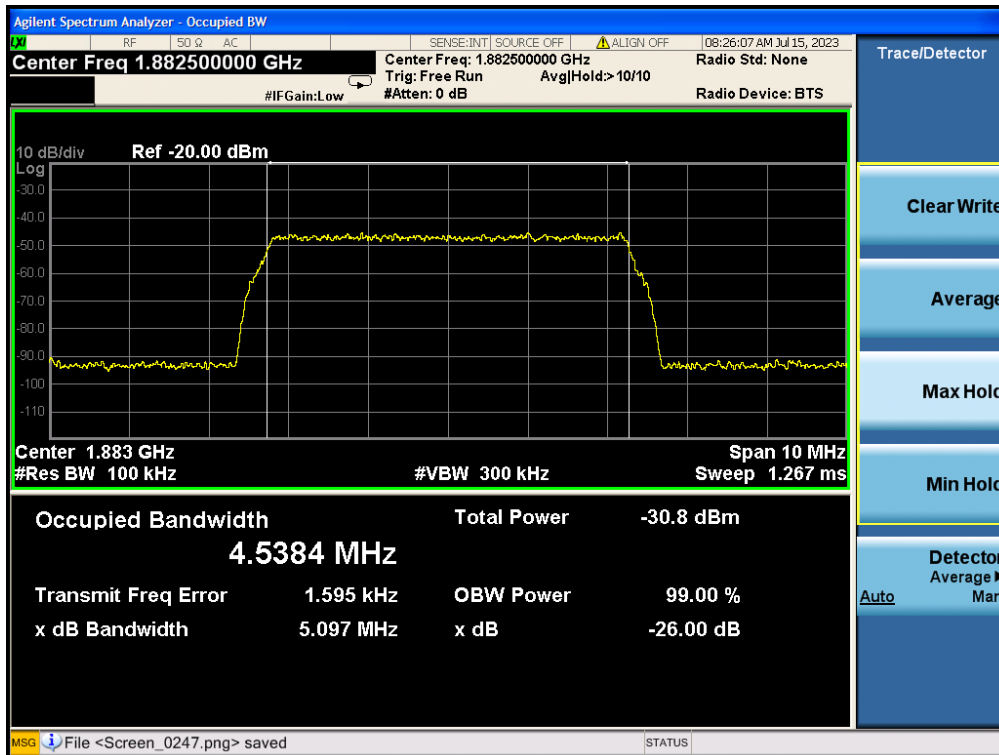
## Broadband PCS UL output



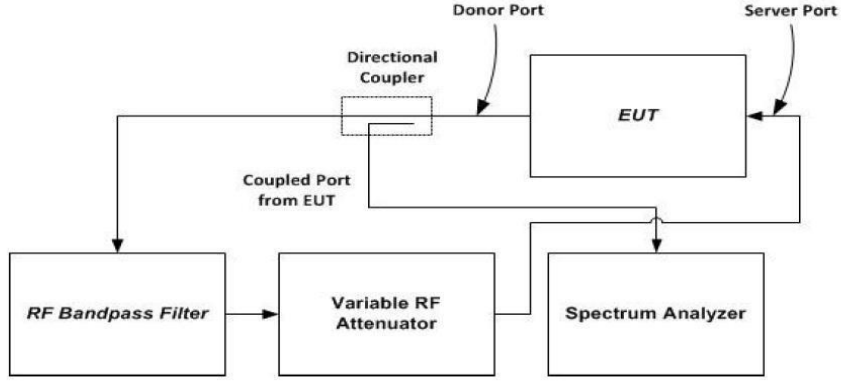
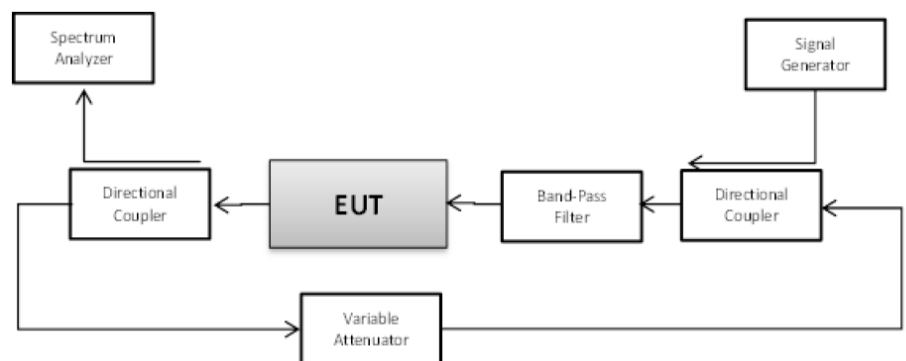
## Broadband PCS DL Input



## Broadband PCS DL output



## 5.11 Oscillation Detection

Test Requirement:	<p>This measurement is required to demonstrate compliance to the Anti-Oscillation specification for Wideband Consumer Signal Boosters provided in §20.21(e)(8)(ii)(A)</p> <p>For this measurement two EUTs will be permitted, one operating in a normal mode and the second operating in a test mode that is capable of disabling the uplink inactivity squelching and or a reduction of the time between restarts to 5 seconds. This will greatly decrease the test time required.</p>
Test setup:	 <p>NOTE—This figure shows the test setup for uplink bands transmission path tests; i.e., signal flow is out from the donor port into the directional coupler. For downlink bands transmission path tests, the feedback signal flow path direction and equipment connections shall be reversed, i.e., signal flow is out from the server port into the directional coupler, and signal flow is into the donor port from the variable RF attenuator.</p> <p><b>Figure 7 – Oscillation detection (7.11.2) test setup</b></p>  <p><b>Figure 8 – Oscillation mitigation/shutdown test setup</b></p>
Procedure:	<ol style="list-style-type: none"> <li>Connect the EUT set for normal operation to the test equipment as shown in Figure 8 beginning with the RF detector on the uplink output side of the RF path. Ensure that the RF coupled path is connected to the RF detector.</li> <li>Note: The band pass filter shall provide sufficient out-of-band rejection to prevent oscillations from occurring in bands not under test.</li> <li>Set the oscilloscope for a positive edge trigger and single trigger operation.</li> <li>Set the attenuation as necessary until the oscilloscope triggers and increase the attenuation level to a point 10 dB above that point.</li> <li>Reset the trigger of the oscilloscope and reset the EUT with a power cycle.</li> <li>Force the EUT to oscillate this will trigger the oscilloscope.</li> <li>Use the CURSOR function of the oscilloscope to measure the time from the detection of oscillation until the EUT turns off by setting CURSOR 1 on the leading edge of the signal and CURSOR 2 on the trailing edge.</li> <li>Capture the oscilloscope trace for inclusion in the test report.</li> <li>Repeat steps 7.11.2 to 7.11.7 for all operational uplink and downlink bands.</li> <li>Set the oscilloscope time base for longer than 1 minute and measure the restart time for each operational uplink and downlink band.</li> <li>Replace the normal operating EUT for the EUT with the test mode.</li> <li>Set the oscilloscope time base for a minimum 120 seconds with an AUTO Trigger and a single sweep.</li> <li>Start the Oscilloscope and a manually force the booster into oscillation.</li> <li>When the sweep is complete place cursors between the first two oscillation</li> </ol>

	<p>detections and save the plot for inclusion in the test report. The time between restarts must match the manufacturer's timing for the test mode and there can be no more than 5 restarts.</p> <p>n) Repeat steps 7.11.12 to 7.11.13 for all operational uplink and downlink bands. Note: In lieu of an oscilloscope and RF detector, a spectrum analyzer set for 0 span, can be used to enhance sensitivity, with a center frequency set equal to the center of the operational band for broadband oscillation or a discrete frequency of oscillation. RBW shall be at least 1 MHz with VBW <math>\geq</math> 3 times RBW using a peak detector.</p>
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**5.11.1 E.U.T. Operation:**

Operating Environment:	
Temperature:	-30 °C and +50
Humidity:	46.3 %
Atmospheric Pressure:	1010 mbar

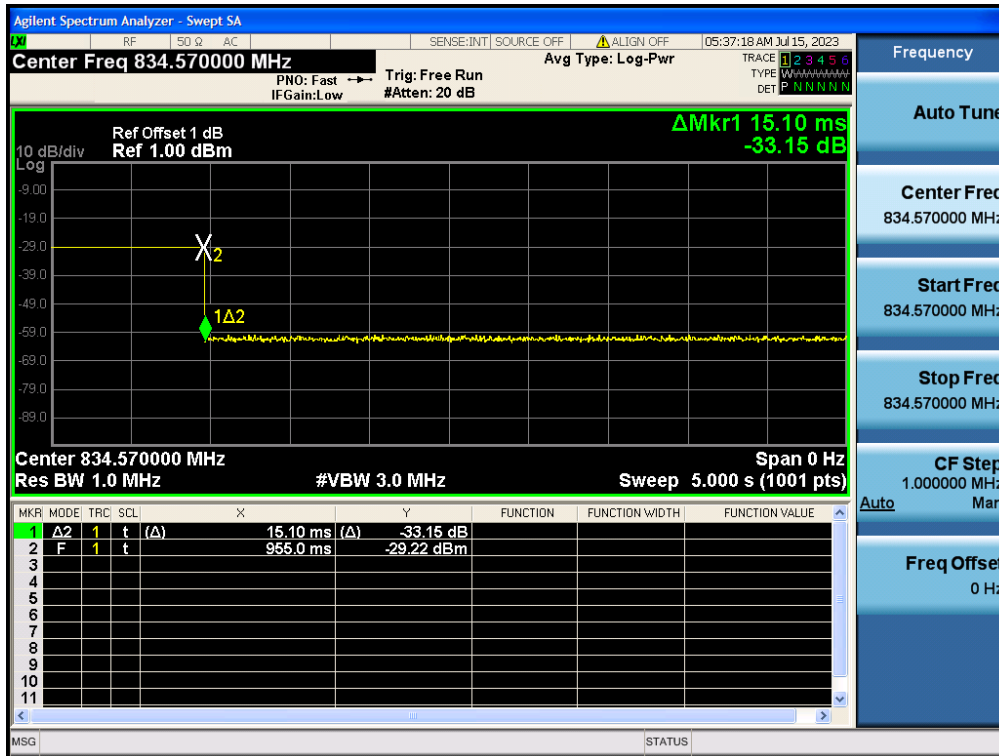
**5.11.2 Test Data:**

Test results of detection time				
Operation Bands		Detection Time(s)	Limit(s)	Result
Uplink	Cellular	0.015	0.300	PASS
	AWS-1	0.030	0.300	PASS
	Broadband PCS	0.041	0.300	PASS
	Low A-E Blocks	0.030	0.300	PASS
	700 MHz Upper C Block	0.032	0.300	PASS
Downlink	Cellular	0.030	0.300	PASS
	AWS-1	0.035	0.300	PASS
	700 MHz Upper C Block	0.036	0.300	PASS
	Low A-E Blocks	0.040	0.300	PASS
	Broadband PCS	0.030	0.300	PASS

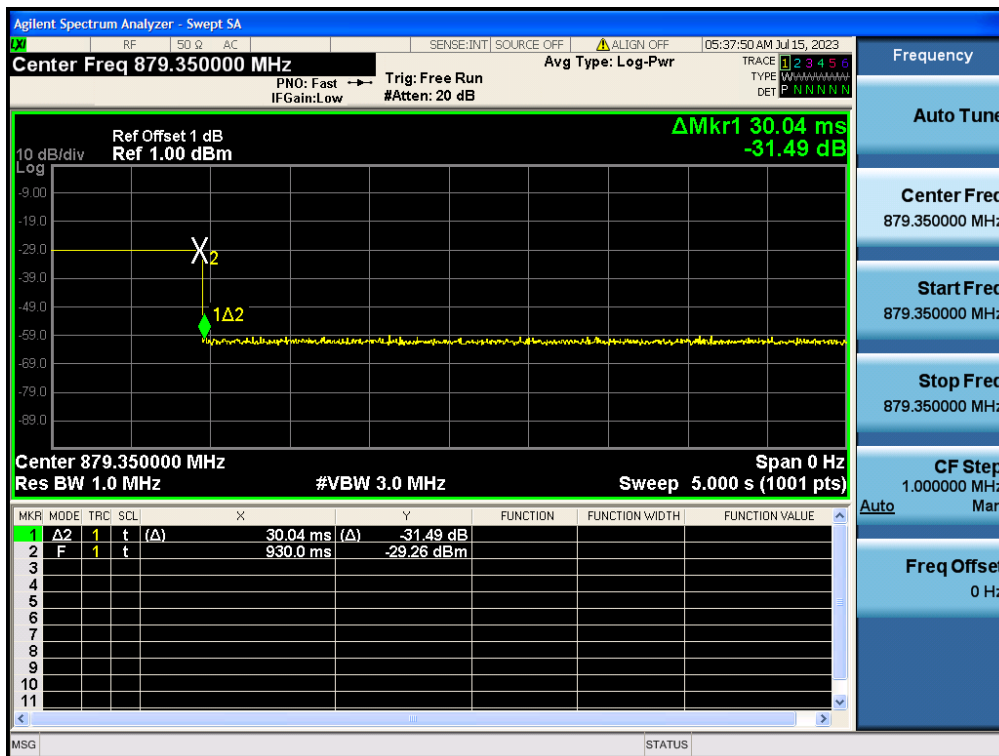
Test results of detection time						
Operation Bands		Restarting Time(s)	Limit(s)	Restarting Counts	Limit	Result
Uplink	Cellular	73.3	60	3	5	PASS
	AWS-1	75.6	60	3	5	PASS
	Broadband PCS	67.0	60	2	5	PASS
	Low A-E Blocks	60.7	60	2	5	PASS
	700 MHz Upper C Block	75.0	60	2	5	PASS
Downlink	Cellular	91.5	60	2	5	PASS
	AWS-1	60.9	60	2	5	PASS
	Broadband PCS	67.0	60	2	5	PASS
	Low A-E Blocks	71.6	60	2	5	PASS
	700 MHz Upper C Block	64.3	60	2	5	PASS

## Test Test Plots of detection time

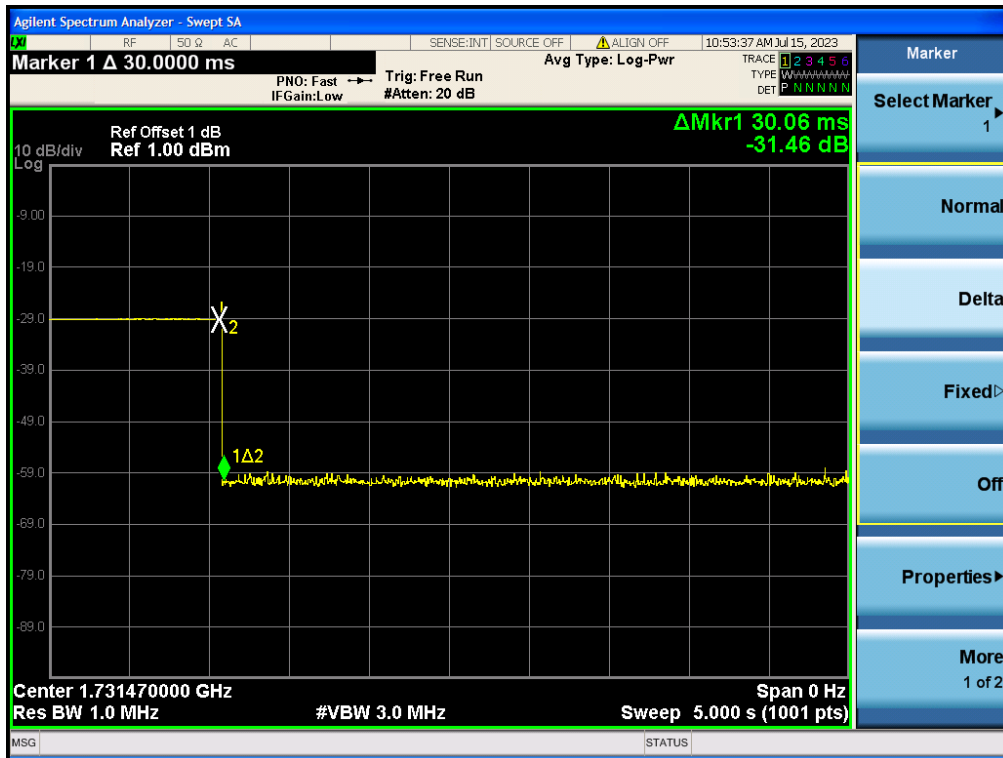
## Cellular UL



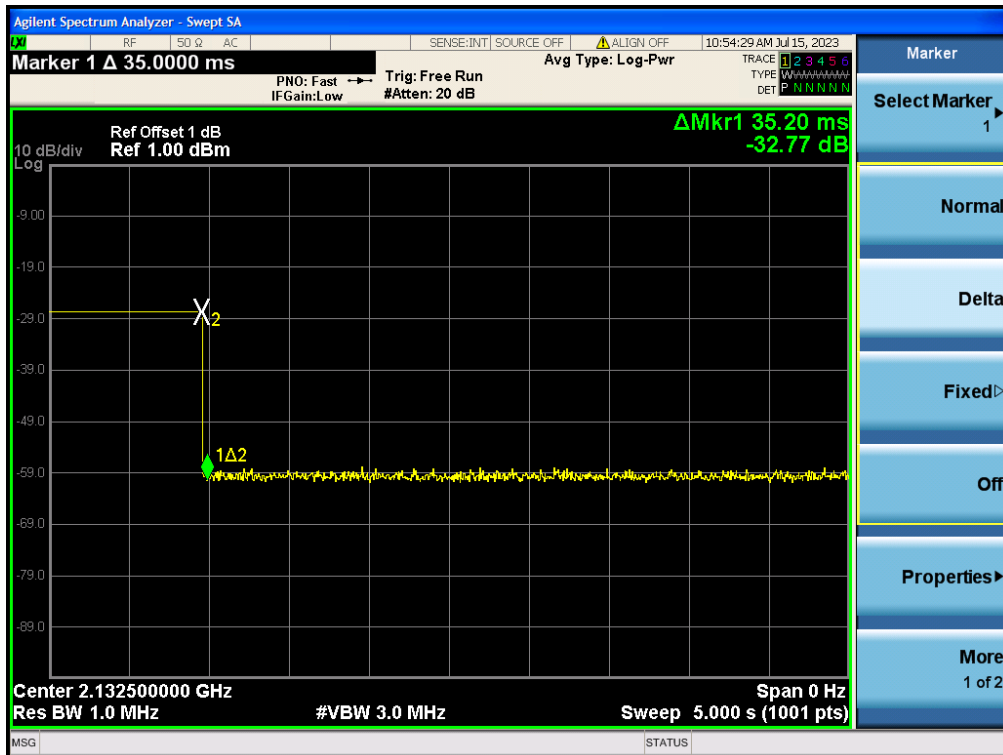
## Cellular DL



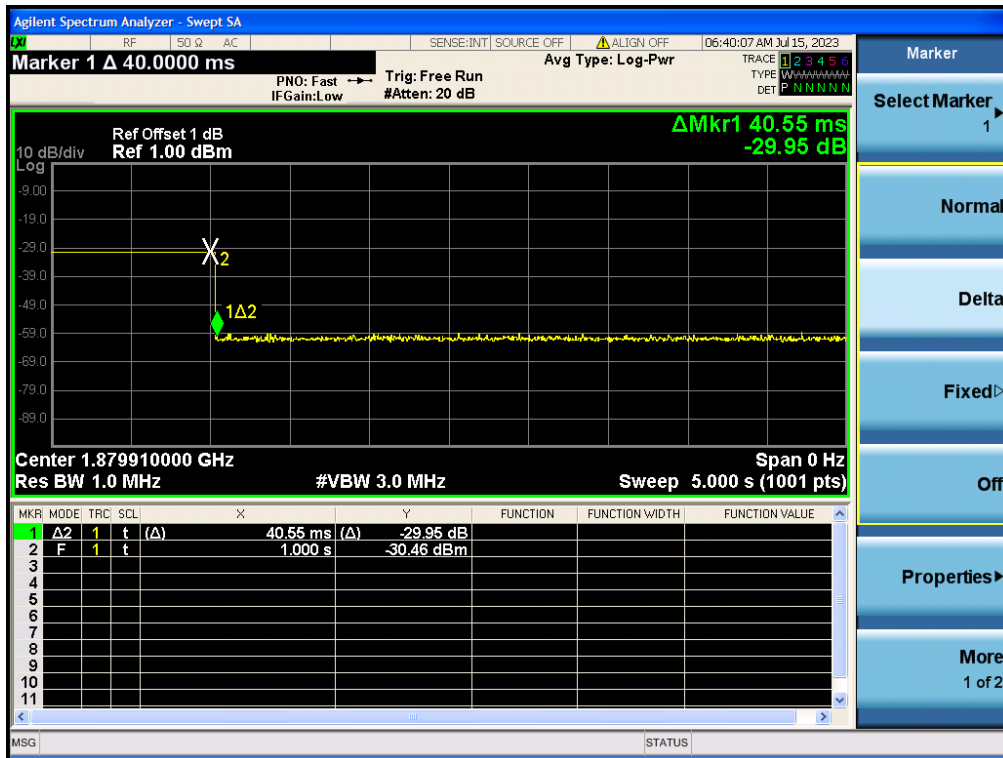
## AWS-1 UL



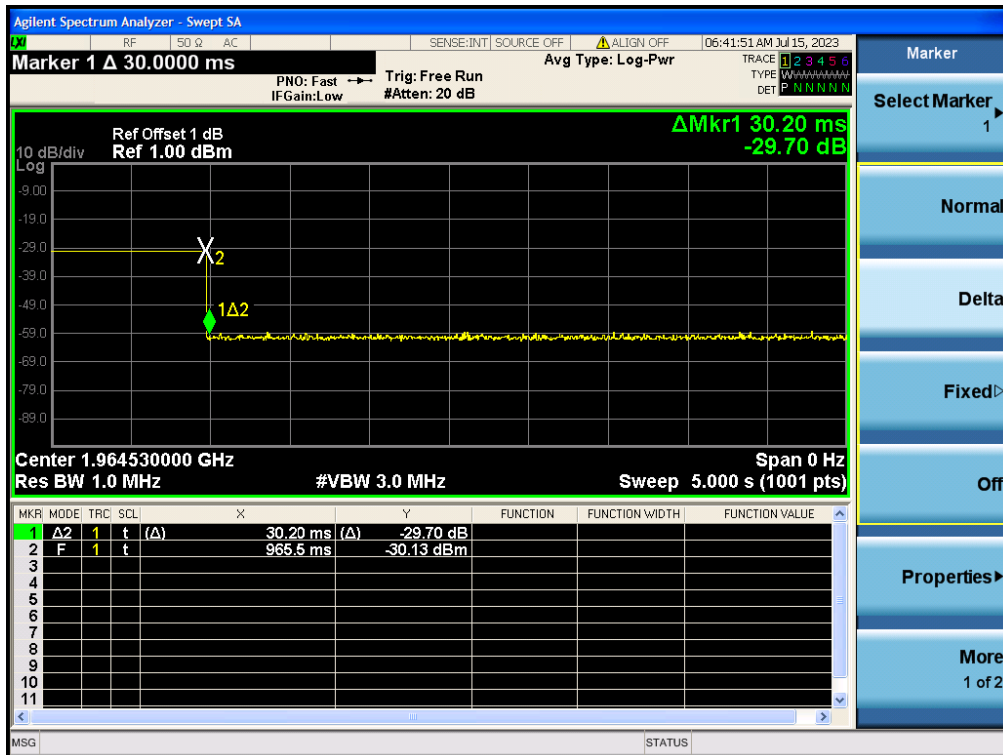
## AWS-1 DL



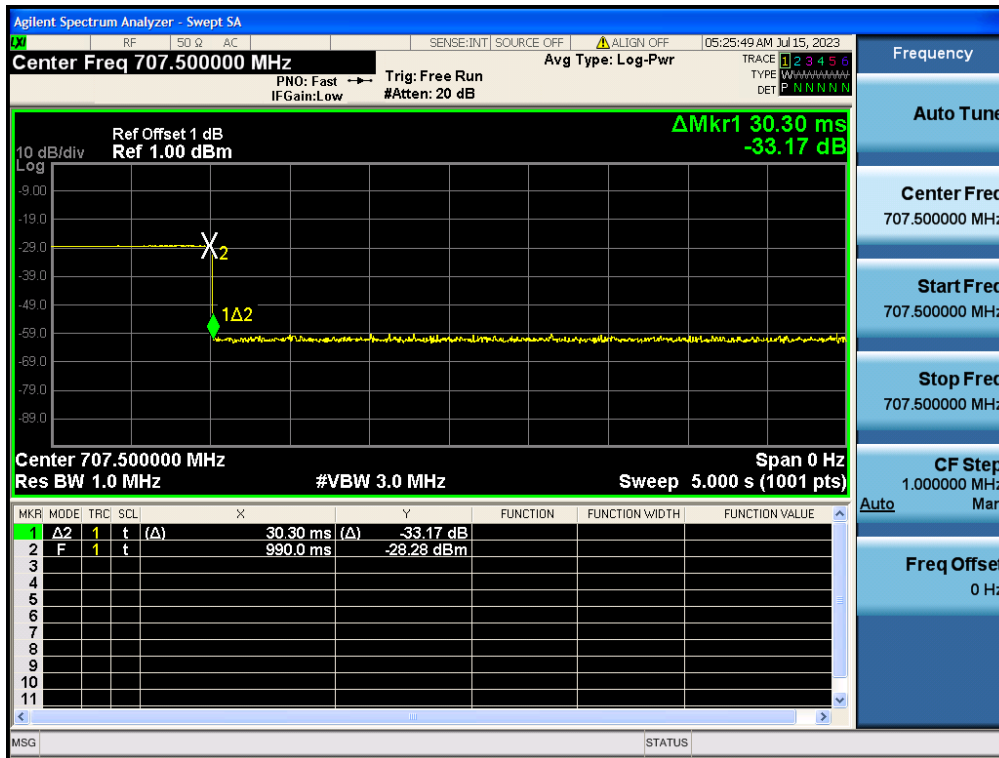
## Broadband PCS UL



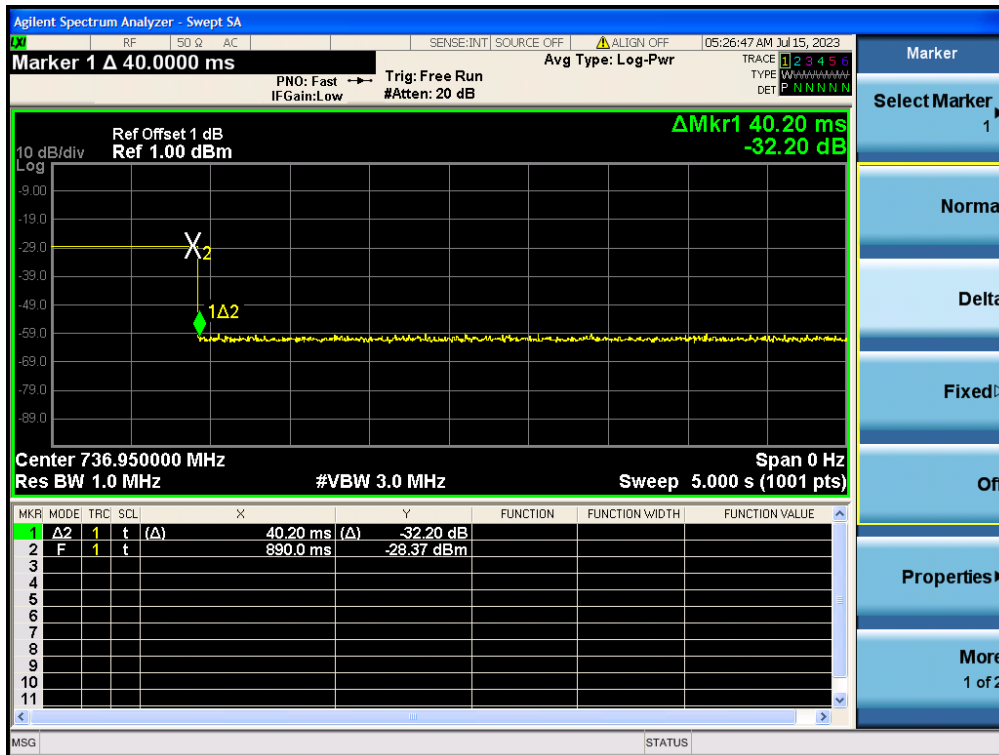
## Broadband PCS DL



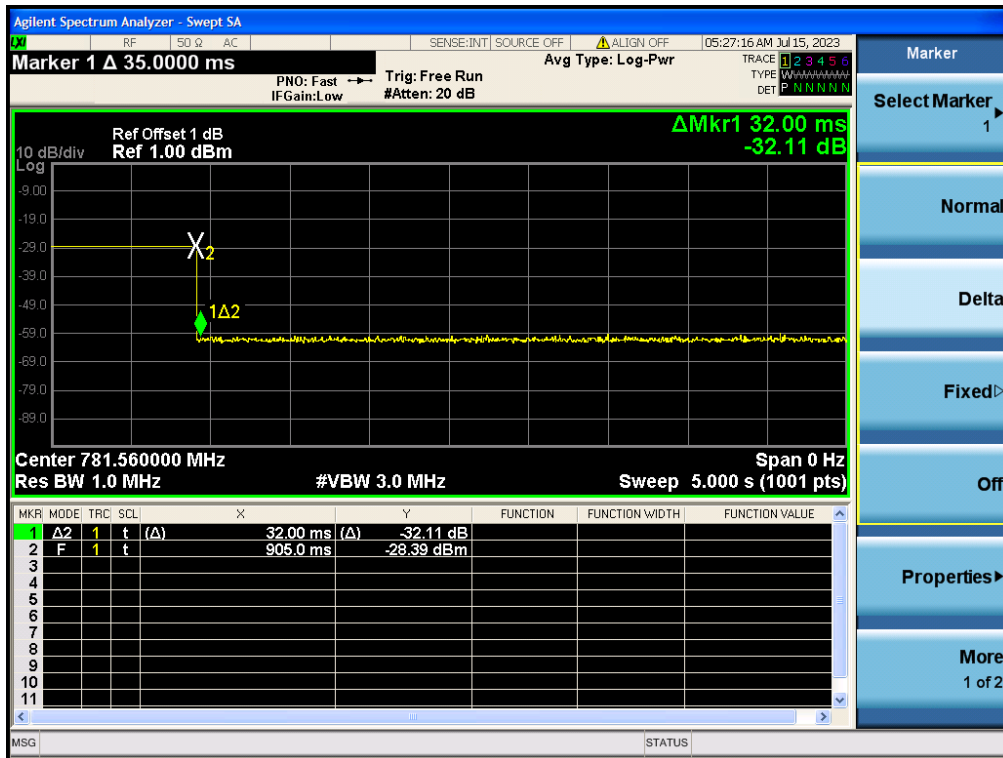
### Low A-E Blocks UL



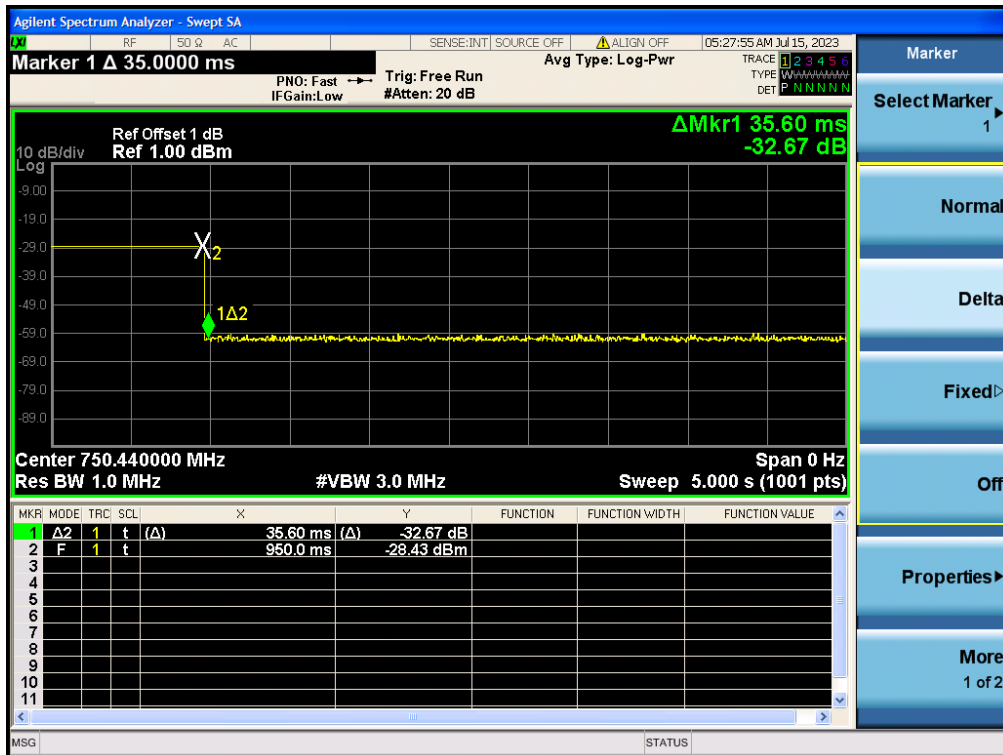
### Low A-E Blocks DL



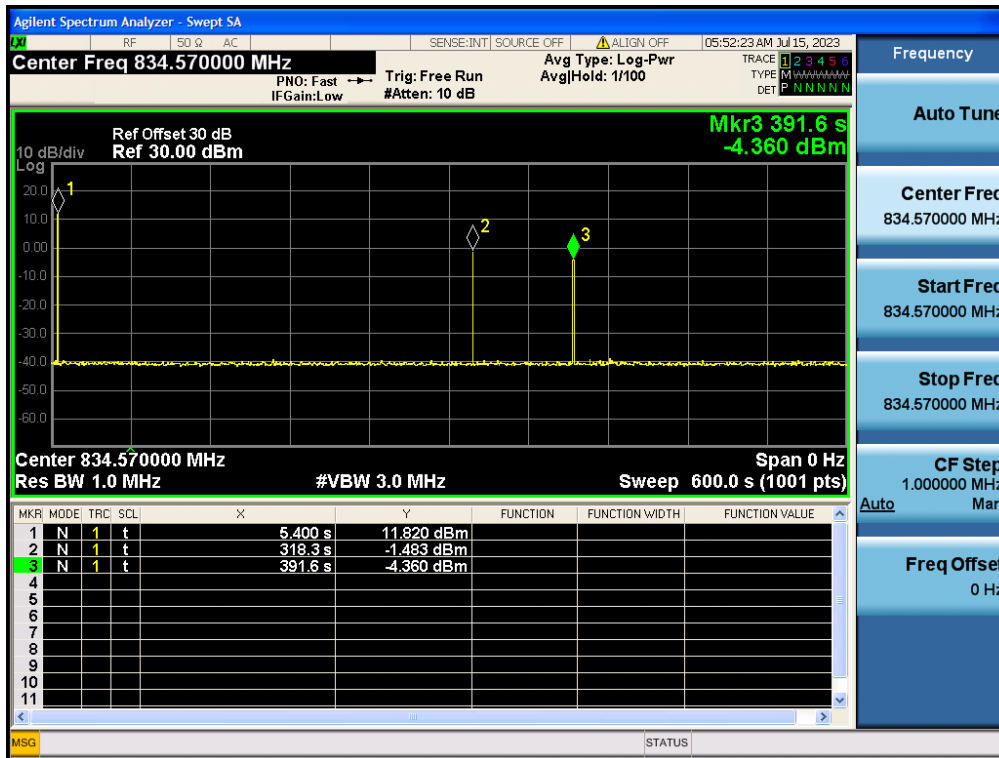
## 700 MHz Upper C Block UL



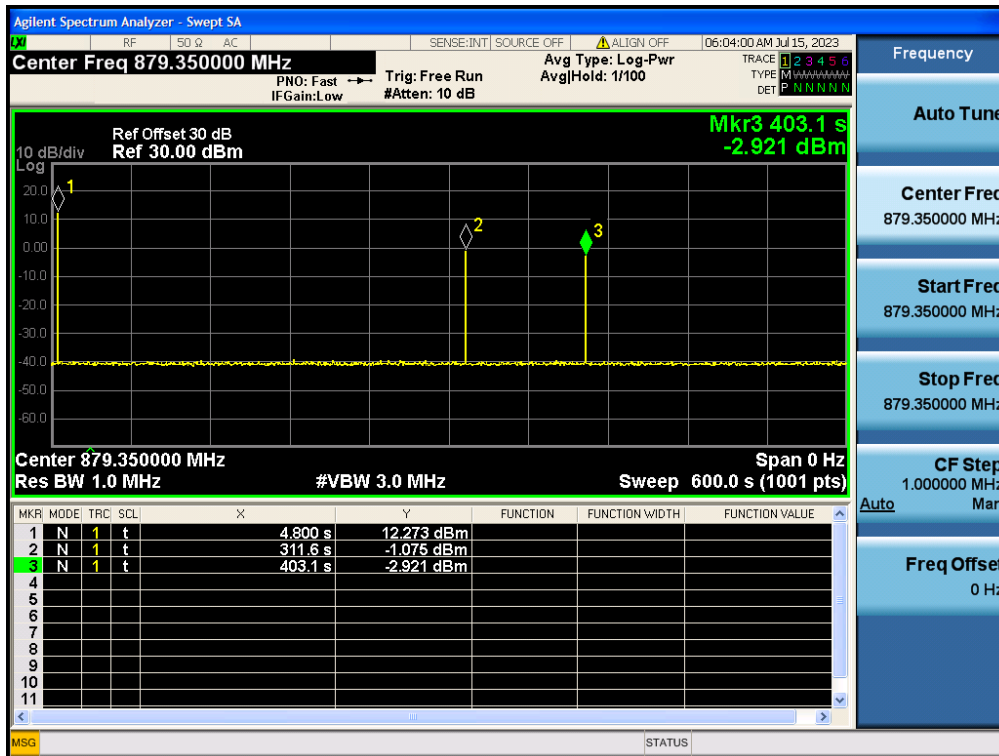
## 700 MHz Upper C Block DL



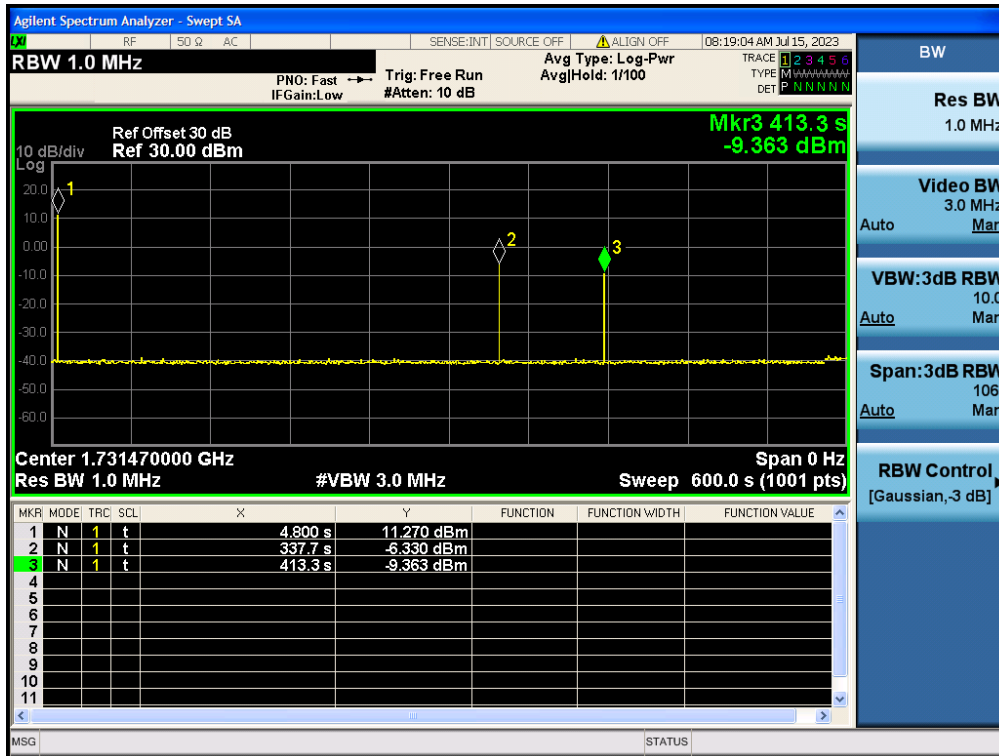
### Test Test Plots of restarting time Cellular UL



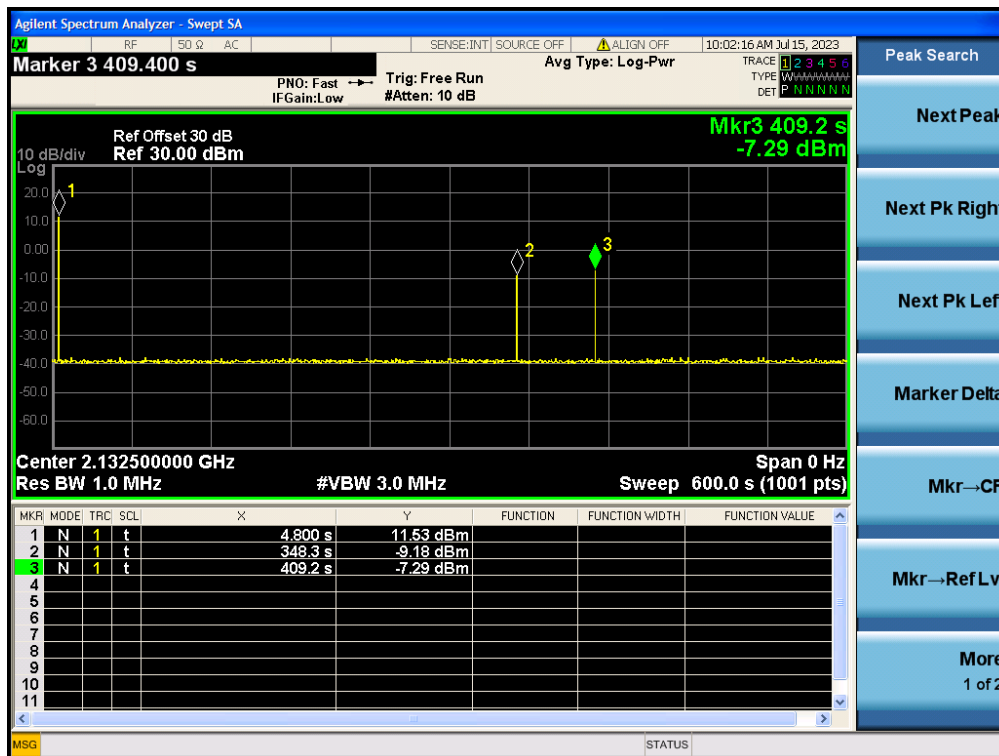
### Cellular DL



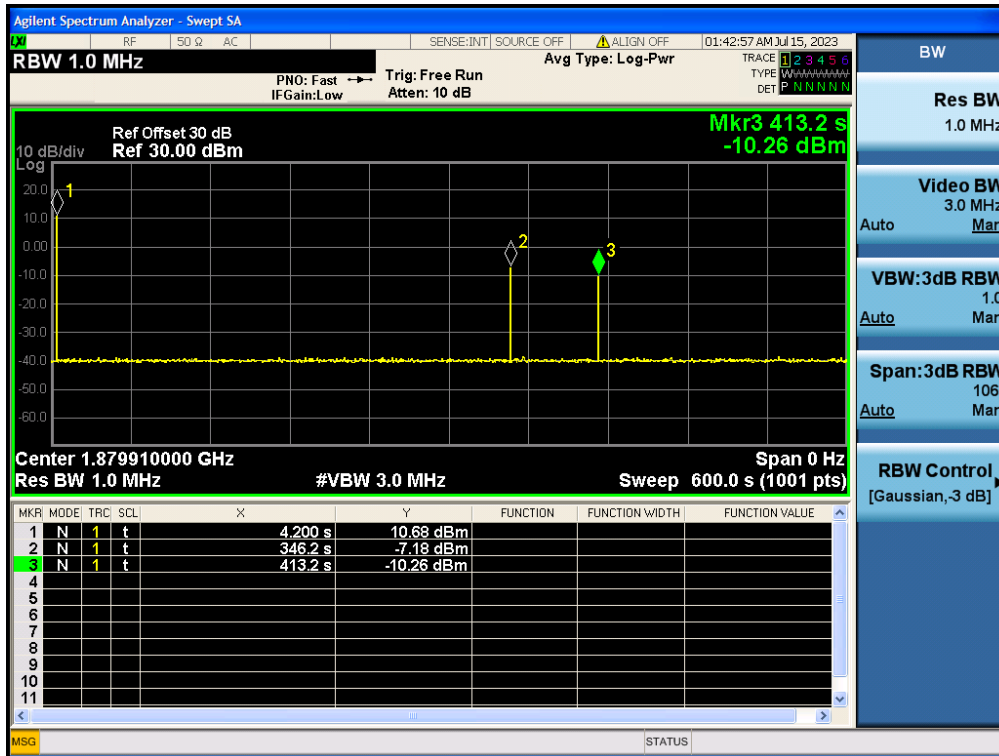
## AWS-1 UL



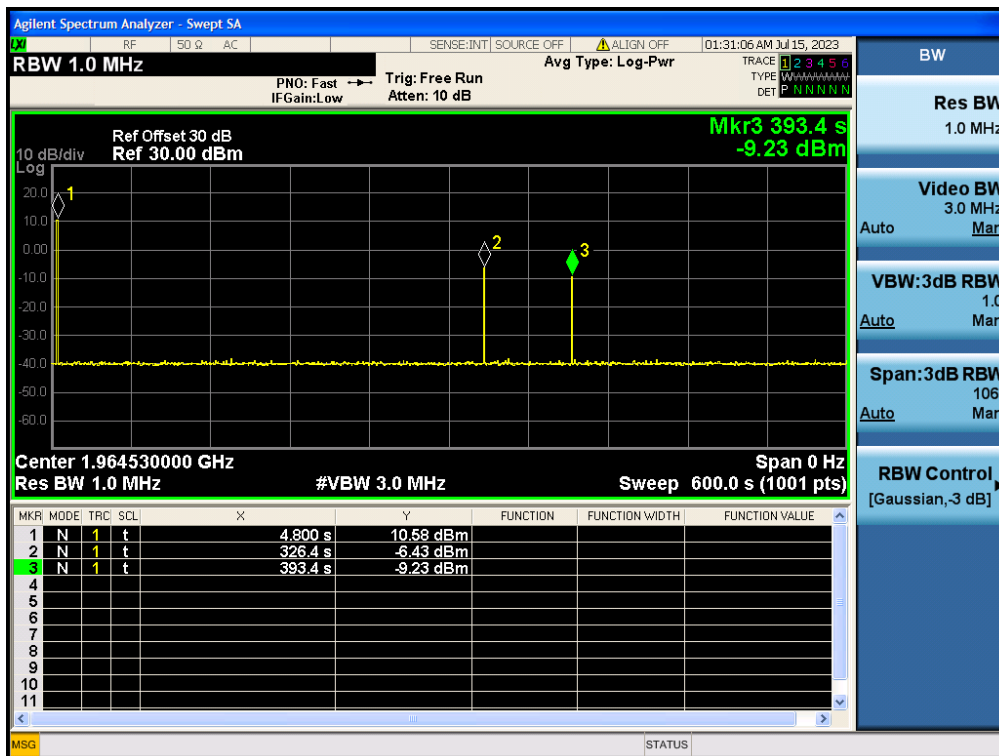
## AWS-1 DL



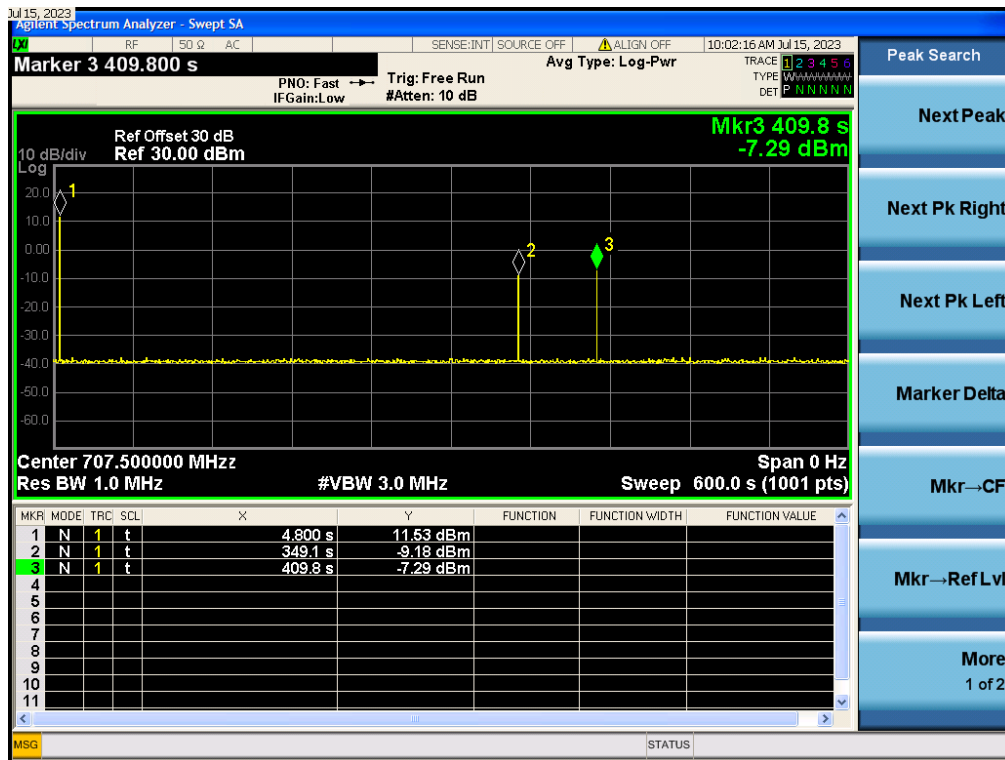
## Broadband PCS UL



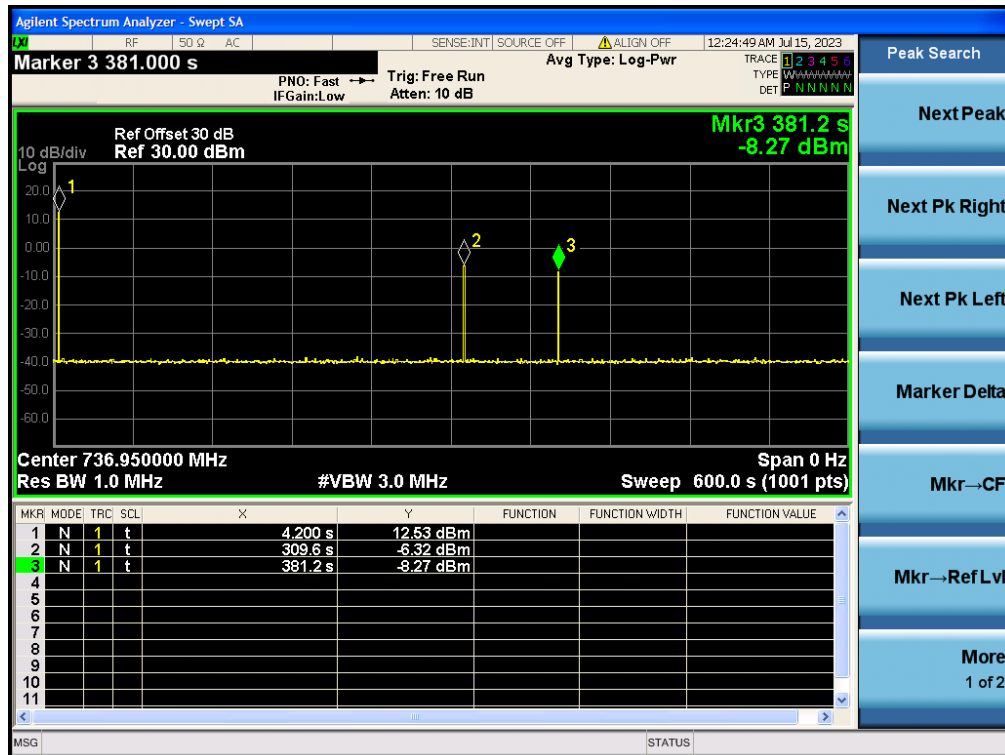
## Broadband PCS DL



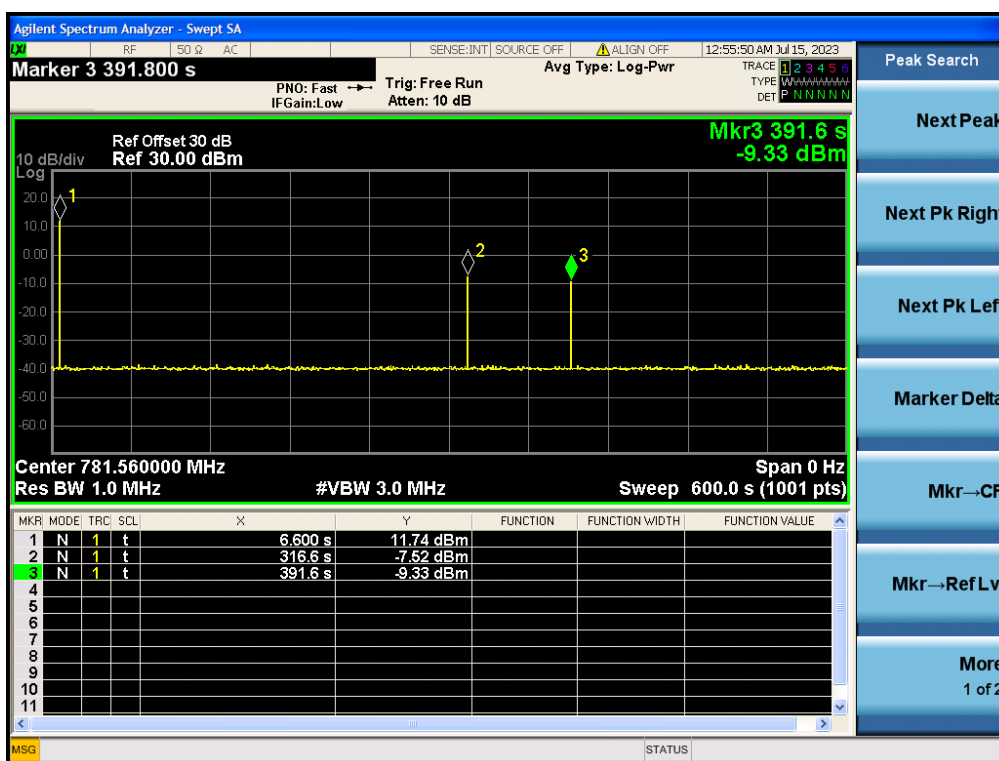
### Low A-E Blocks UL



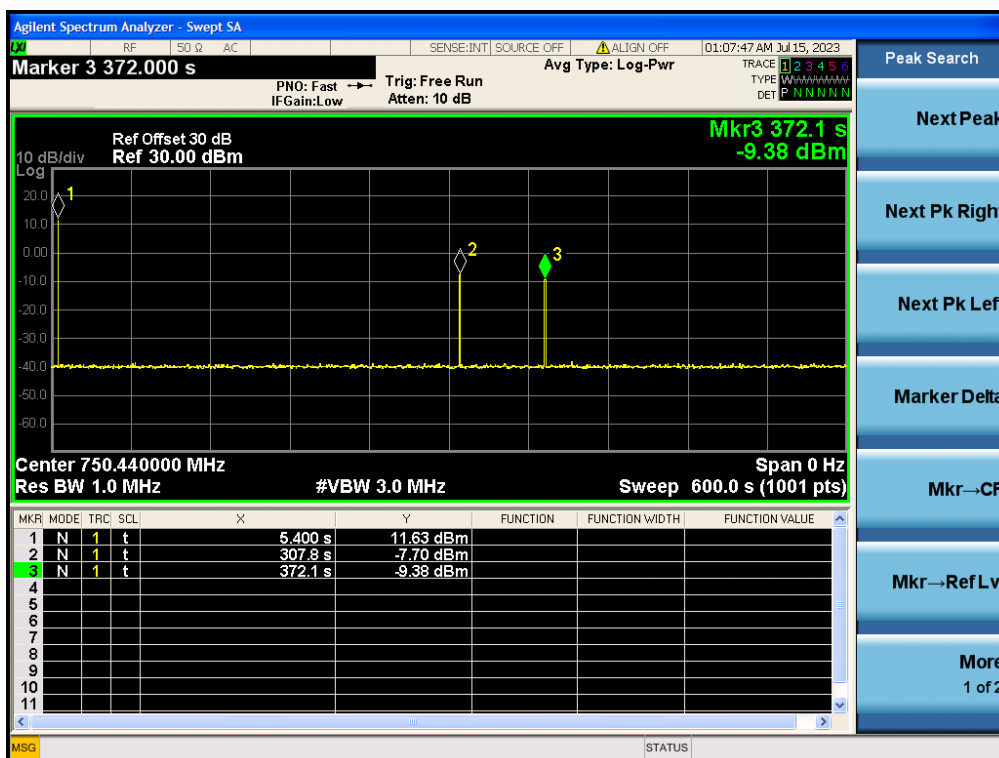
### Low A-E Blocks DL



## 700 MHz Upper C Block UL



## 700 MHz Upper C Block DL



Test results of Mitigation or Shutdown:

Cellular	Uplink(824-849MHz)						
Signal Type	AWGN						
Isolation	Peak Oscillations		Minimal Level		Difference	Limit	Result
	Freq.	Level	Freq.	Level			
dB	MHz	dBm	MHz	dBm	dB	dB	PASS
+5	825.38	-57.78	848.86	-65.15	7.37	<12	PASS
+4	825.38	-58.15	848.86	-66.28	8.13	<12	PASS
+3	825.38	-59.24	848.86	-67.83	8.59	<12	PASS
+2	825.38	-60.78	848.86	-68.17	7.39	<12	PASS
+1	825.38	-61.17	848.86	-69.67	8.50	<12	PASS
+0	825.38	-62.86	848.86	-70.15	7.29	<12	PASS
-1	825.38	-63.75	848.86	-71.81	8.06	<12	PASS
-2	825.38	-64.21	848.86	-72.58	8.37	<12	PASS
-3	EUT Shutdown						

Cellular	Downlink(869-894MHz)						
Signal Type	AWGN						
Isolation	Peak Oscillations		Minimal Level		Difference	Limit	Result
	Freq.	Level	Freq.	Level			
dB	MHz	dBm	MHz	dBm	dB	dB	PASS
+5	870.86	-57.28	893.04	-66.04	8.76	<12	PASS
+4	870.86	-58.35	893.04	-66.89	8.54	<12	PASS
+3	870.86	-59.14	893.04	-67.01	7.87	<12	PASS
+2	870.86	-60.86	893.04	-68.13	7.27	<12	PASS
+1	870.86	-61.28	893.04	-69.86	8.58	<12	PASS
+0	870.86	-62.17	893.04	-70.18	8.01	<12	PASS
-1	870.86	-63.03	893.04	-70.84	7.81	<12	PASS
-2	EUT Shutdown						

Broadband PCS	Uplink(1850-1915MHz)						
Signal Type	AWGN						
Isolation	Peak Oscillations		Minimal Level		Difference	Limit	Result
	Freq.	Level	Freq.	Level			
dB	MHz	dBm	MHz	dBm	dB	dB	PASS
+5	1851.89	-58.28	1914.86	-67.25	8.97	<12	PASS
+4	1884.89	-59.01	1914.86	-68.07	9.06	<12	PASS
+3	1851.89	-60.38	1914.86	-69.53	9.15	<12	PASS
+2	1884.89	-61.02	1914.86	-70.46	9.44	<12	PASS
+1	1851.89	-62.13	1914.86	-71.01	8.88	<12	PASS
+0	1884.89	-62.58	1914.86	-72.38	9.80	<12	PASS
-1	1851.89	-63.15	1914.86	-73.06	9.91	<12	PASS
-2	1884.89	-64.28	1914.86	-73.17	8.89	<12	PASS
-3	EUT Shutdown						

Broadband PCS	Downlink(1930-1995MHz)						
Signal Type	AWGN						
Isolation	Peak Oscillations		Minimal Level		Difference	Limit	Result
	Freq.	Level	Freq.	Level			
dB	MHz	dBm	MHz	dBm	dB	dB	PASS
+5	1935.17	-57.35	1953.75	-65.18	7.83	<12	PASS
+4	1935.17	-58.24	1953.75	-66.38	8.14	<12	PASS
+3	1935.17	-59.86	1953.75	-67.14	7.28	<12	PASS
+2	1935.17	-60.73	1953.75	-68.27	7.54	<12	PASS
+1	1935.17	-61.27	1953.75	-69.37	8.10	<12	PASS
+0	1935.17	-62.45	1953.75	-70.01	7.56	<12	PASS
-1	1935.17	-63.01	1953.75	-70.13	7.12	<12	PASS
-2	EUT Shutdown						

AWS-1	Uplink(1710-1755MHz)						
Signal Type	AWGN						
Isolation	Peak Oscillations		Minimal Level		Difference	Limit	Result
	Freq.	Level	Freq.	Level			
dB	MHz	dBm	MHz	dBm	dB	dB	PASS
+5	1732.85	-59.85	1754.57	-68.18	8.33	<12	PASS
+4	1732.85	-58.06	1754.57	-68.86	10.80	<12	PASS
+3	1732.85	-60.47	1754.57	-70.17	9.70	<12	PASS
+2	1732.85	-61.89	1754.57	-69.38	7.49	<12	PASS
+1	1732.85	-62.45	1754.57	-70.96	8.51	<12	PASS
+0	1732.85	-63.02	1754.57	-71.17	8.15	<12	PASS
-1	1732.85	-64.76	1754.57	-72.99	8.23	<12	PASS
-2	1732.85	-65.01	1754.57	-73.82	8.81	<12	PASS
-3	EUT Shutdown						

AWS-1	Downlink(2110-2155MHz)						
Signal Type	AWGN						
Isolation	Peak Oscillations		Minimal Level		Difference	Limit	Result
	Freq.	Level	Freq.	Level			
dB	MHz	dBm	MHz	dBm	dB	dB	PASS
+5	2112.78	-58.87	2154.48	-68.36	9.49	<12	PASS
+4	2112.78	-59.47	2154.48	-68.87	9.40	<12	PASS
+3	2112.78	-60.27	2154.48	-67.17	6.90	<12	PASS
+2	2112.78	-60.96	2154.48	-68.29	7.33	<12	PASS
+1	2112.78	-61.13	2154.48	-70.36	9.23	<12	PASS
+0	2112.78	-61.89	2154.48	-70.85	8.96	<12	PASS
-1	2112.78	-62.75	2154.48	-71.86	9.11	<12	PASS
-2	EUT Shutdown						

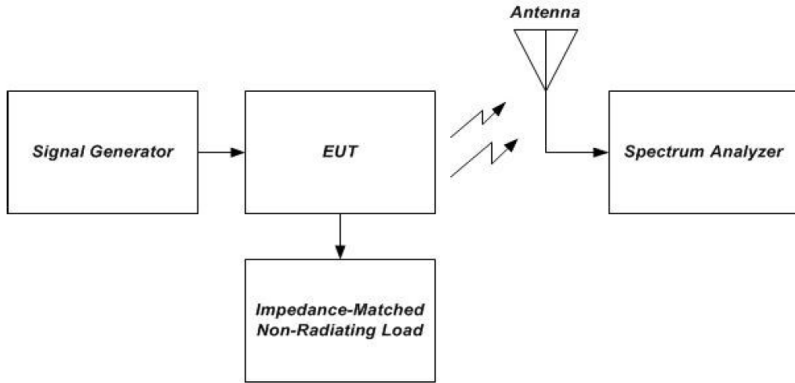
Low A-E Blocks	Uplink(699-716MHz)						
Signal Type	AWGN						
Isolation	Peak Oscillations		Minimal Level		Difference	Limit	Result
	Freq.	Level	Freq.	Level			
dB	MHz	dBm	MHz	dBm	dB	dB	PASS
+5	701.86	-59.87	715.78	-68.15	8.28	<12	PASS
+4	701.86	-60.18	715.78	-69.98	9.80	<12	PASS
+3	701.86	-61.02	715.78	-70.84	9.82	<12	PASS
+2	701.86	-62.87	715.78	-71.86	8.99	<12	PASS
+1	701.86	-63.18	715.78	-72.75	9.57	<12	PASS
+0	701.86	-62.28	715.78	-72.98	10.70	<12	PASS
-1	701.86	-63.23	715.78	-73.15	9.92	<12	PASS
-2	701.86	-64.25	715.78	-73.86	9.61	<12	PASS
-3	EUT Shutdown						

Low A-E Blocks	Downlink(729-746MHz)						
Signal Type	AWGN						
Isolation	Peak Oscillations		Minimal Level		Difference	Limit	Result
	Freq.	Level	Freq.	Level			
dB	MHz	dBm	MHz	dBm	dB	dB	PASS
+5	730.89	-60.87	745.43	-66.89	6.02	<12	PASS
+4	730.89	-61.09	745.43	-67.05	5.96	<12	PASS
+3	730.89	-62.34	745.43	-68.85	6.51	<12	PASS
+2	730.89	-63.01	745.43	-68.99	5.98	<12	PASS
+1	730.89	-64.86	745.43	-69.04	4.18	<12	PASS
+0	730.89	-64.99	745.43	-69.59	4.60	<12	PASS
-1	730.89	-65.13	745.43	-70.33	5.20	<12	PASS
-2	730.89	-65.98	745.43	-71.89	5.91	<12	PASS
-3	EUT Shutdown						

700 MHz Upper C Block	Uplink(777-787MHz)						
Signal Type	AWGN						
Isolation	Peak Oscillations		Minimal Level		Difference	Limit	Result
	Freq.	Level	Freq.	Level			
dB	MHz	dBm	MHz	dBm	dB	dB	PASS
+5	778.54	-57.51	786.75	-65.56	8.05	<12	PASS
+4	778.54	-58.36	786.75	-66.14	7.78	<12	PASS
+3	778.54	-60.18	786.75	-68.37	8.19	<12	PASS
+2	778.54	-61.38	786.75	-69.18	7.80	<12	PASS
+1	778.54	-62.78	786.75	-70.47	7.69	<12	PASS
+0	778.54	-63.01	786.75	-71.56	8.55	<12	PASS
-1	778.54	-64.38	786.75	-71.39	7.01	<12	PASS
-2	778.54	-65.78	786.75	-72.14	6.36	<12	PASS
-3	EUT Shutdown						

700 MHz Upper C Block	Downlink(746-756MHz)						
Signal Type	AWGN						
Isolation	Peak Oscillations		Minimal Level		Difference	Limit	Result
	Freq.	Level	Freq.	Level			
dB	MHz	dBm	MHz	dBm	dB	dB	PASS
+5	746.58	-59.78	755.65	-66.78	7.00	<12	PASS
+4	746.58	-60.43	755.65	-68.04	7.61	<12	PASS
+3	746.58	-60.89	755.65	-68.96	8.07	<12	PASS
+2	746.58	-61.38	755.65	-67.02	5.64	<12	PASS
+1	746.58	-62.86	755.65	-68.86	6.00	<12	PASS
+0	746.58	-63.01	755.65	-69.01	6.00	<12	PASS
-1	746.58	-63.37	755.65	-70.19	6.82	<12	PASS
-2	746.58	-63.47	755.65	-70.47	7.00	<12	PASS
-3	EUT Shutdown						

## 5.12 Radiated Spurious Emissions

Test Requirement:	This procedure is intended to satisfy the requirements specified in §2.1053. The applicable limits are those specified for mobile emissions in the rule part applicable to the band of operation (see Annex A).
Test setup:	 <p style="text-align: center;">Figure 10 – Radiated spurious emissions test and instrumentation setup</p>
Procedure:	<ol style="list-style-type: none"> <li>Place the EUT on an OATS or Anechoic chamber turntable 3m from the receiving antenna.</li> <li>Connect the EUT to the test equipment as shown in Figure 9 beginning with the uplink output</li> <li>Set the signal generator for the center frequency of the operational band under test with the power level set at PIN from section 7.2 with CW signal.</li> <li>Measure the radiated spurious emissions from the EUT from lowest to the highest frequencies as specified in §2.1057. Maximize the radiated emissions by utilizing the procedures described in C63.4.</li> <li>Capture the peak emissions plots using a peak detector with max-Hold for inclusion in the test report. Tabular data is acceptable in lieu of spectrum analyzer plots.</li> <li>Repeat steps 7.12.3 to 7.12.5 for all operational bands.</li> </ol>

### 5.12.1 E.U.T. Operation:

Operating Environment:	
Temperature:	–30 °C and +50
Humidity:	46.3 %
Atmospheric Pressure:	1010 mbar

### 5.12.2 Test Data:

Frequency [MHz]	Antenna polarity [H/V]	Level [dBm]	Limit [dBm]	Margin [dB]
Cellular Uplink				
861.6	V	-37.02	-13.00	24.02
861.6	H	-39.27		26.27
1768.0	V	-38.01		25.01
1768.0	H	-40.02		27.02
-	-	-	-	-
Cellular Downlink				
880.2	V	-48.01	-13.00	35.01
880.2	H	-50.35		37.35
1726.0	V	-48.03		35.03
1726.0	H	-50.24		37.24
-	-	-	-	-

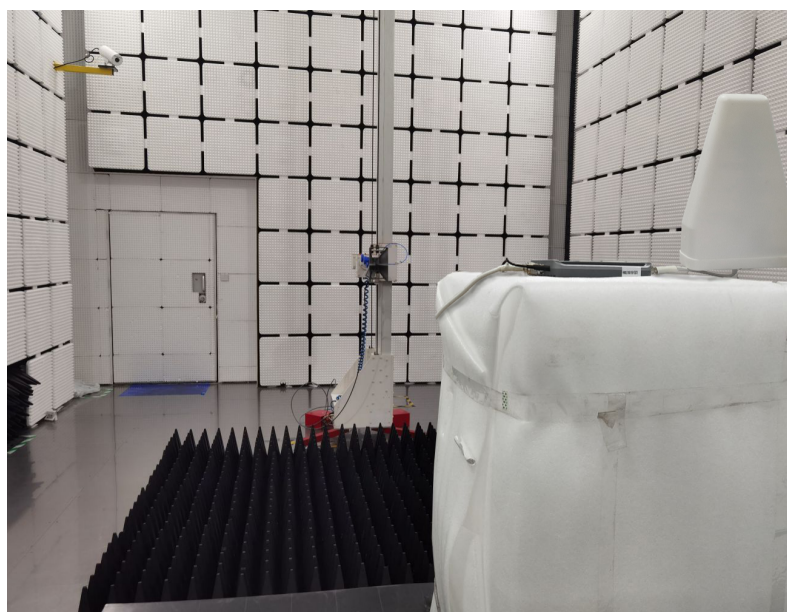
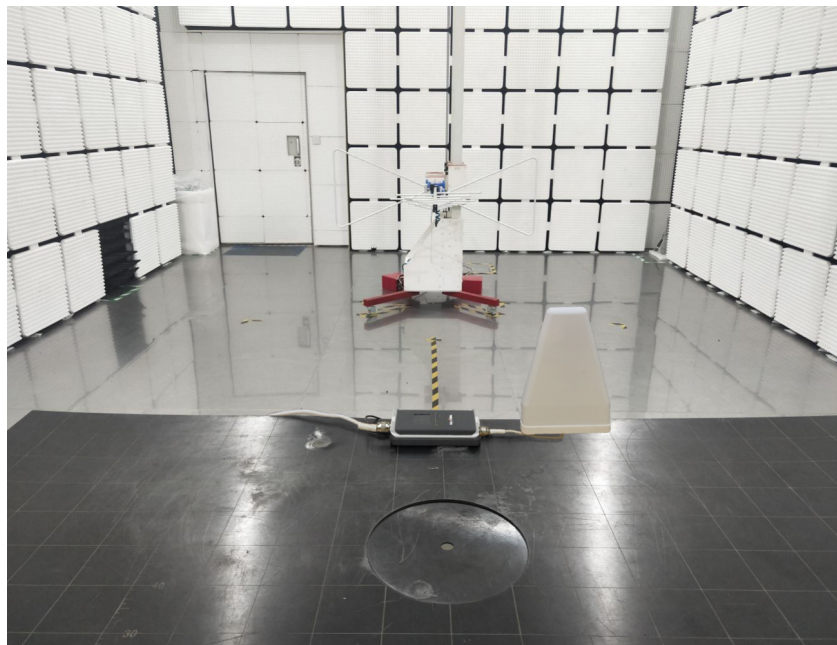
Frequency [MHz]	Antenna polarity [H/V]	Level [dBm]	Limit [dBm]	Margin [dB]
Broadband PCS Uplink				
948.2	V	-38.05	-13.00	25.05
948.2	H	-40.31		27.31
3771.0	V	-40.18		27.18
3771.0	H	-38.17		25.17
-	-	-	-	-
Broadband PCS Downlink				
979.3	V	-49.08	-13.00	36.08
979.3	H	-50.29		37.29
3975.5	V	-51.57		38.57
3975.5	H	-50.02		37.02

Frequency [MHz]	Antenna polarity [H/V]	Level [dBm]	Limit [dBm]	Margin [dB]
AWS-1 Uplink				
860.7	V	-45.01	-13.00	32.01
860.7	H	-42.14		29.14
2547.3	V	-43.27		30.27
2547.3	H	-43.04		30.04
-	-	-	-	-
AWS-1 Downlink				
926.7	V	-50.24	-13.00	37.24
926.7	H	-50.25		37.25
3885.6	V	-48.75		35.75
3885.6	H	-50.75		37.75
-	-	-	-	-

Frequency [MHz]	Antenna polarity [H/V]	Level [dBm]	Limit [dBm]	Margin [dB]
Low A-E Blocks Uplink				
978.3	V	-39.78	-13.00	26.78
978.3	H	-40.07		27.07
1687.7	V	-41.37		28.37
1687.7	H	-40.38		27.38
-	-	-	-	-
Low A-E Blocks Downlink				
974.1	V	-50.21	-13.00	37.21
974.1	H	-50.14		37.14
1878.7	V	-49.85		36.85
1878.7	H	-50.78		37.78
-	-	-	-	-

Frequency [MHz]	Antenna polarity [H/V]	Level [dBm]	Limit [dBm]	Margin [dB]
700 MHz Upper C Block Uplink				
968.1	V	-45.17	-13.00	32.17
968.1	H	-43.35		30.35
1886.4	V	-44.24		31.24
1886.4	H	-43.01		30.01
-	-	-	-	-
700 MHz Upper C Block Downlink				
947.1	V	-47.36	-13.00	34.36
947.1	H	-50.47		37.47
1885.2	V	-48.14		35.14
1885.2	H	-50.75		37.75
-	-	-	-	-

## 6 Test Setup Photos



## 7 EUT Photos

