777-787 MHz Uplink Band

Spurious Frequency Range(MHz)	Measured Frequency (MHz)	Measured Value (dBm)	RBW (KHz)	Final Value(dBm)	Limit (dBm)	Margin (dB)
763-775	774.461	-62.5	6.25	-62.45	-46	-16.45
793-805	797.354	-54.7	6.25	-54.79	-46	-8.79

746-756 MHz Downlink Band

Spurious Frequency Range(MHz)	Measured Frequency (MHz)	Measured Value (dBm)	RBW (KHz)	Final Value(dBm)	Limit (dBm)	Margin (dB)
763-775	768.632	-107.0	6.25	-107.04	-46	-61.04
793-805	797.354	-107.0	6.25	-107.09	-46	-61.09

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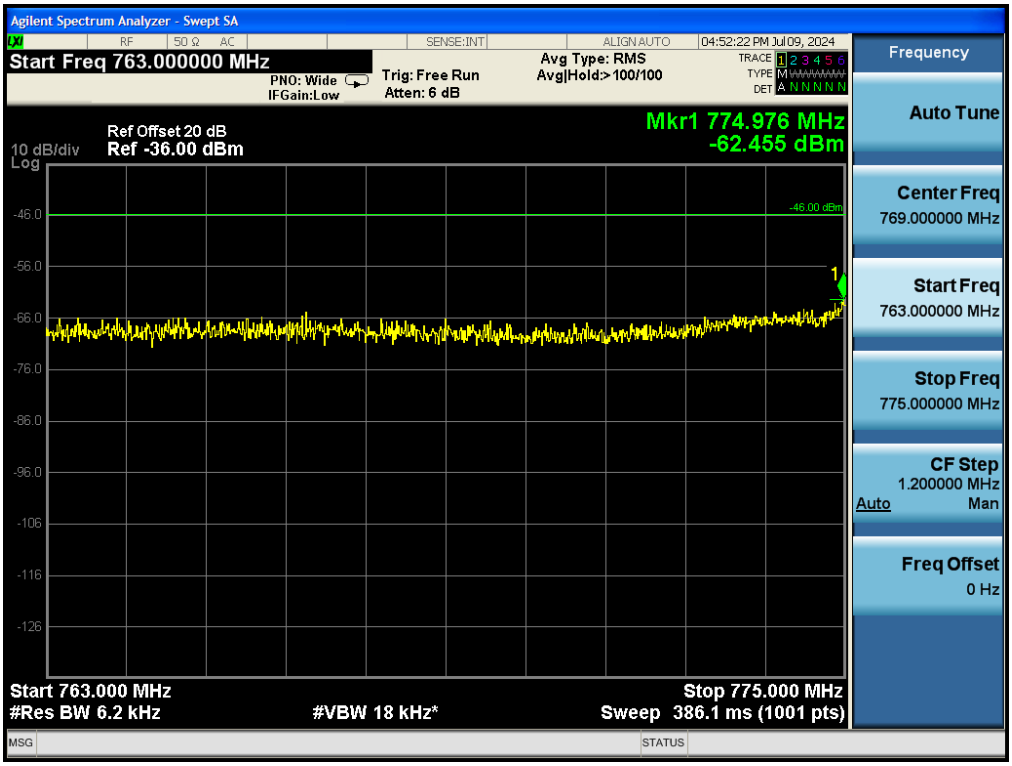
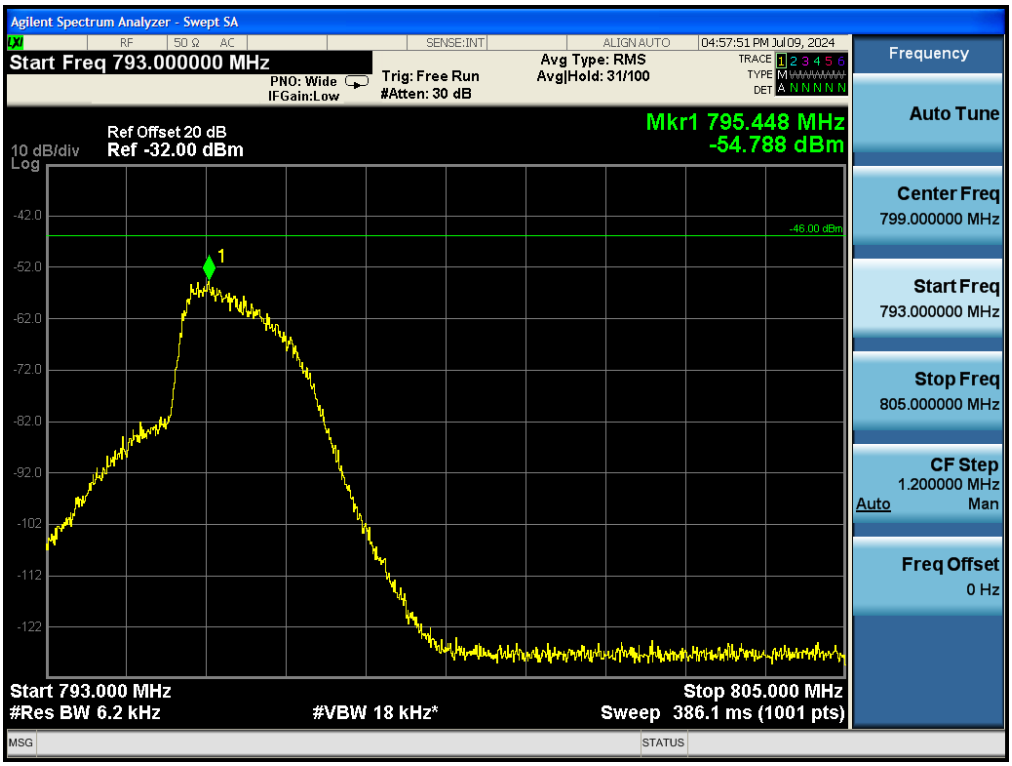
777-787 MHz Uplink Band





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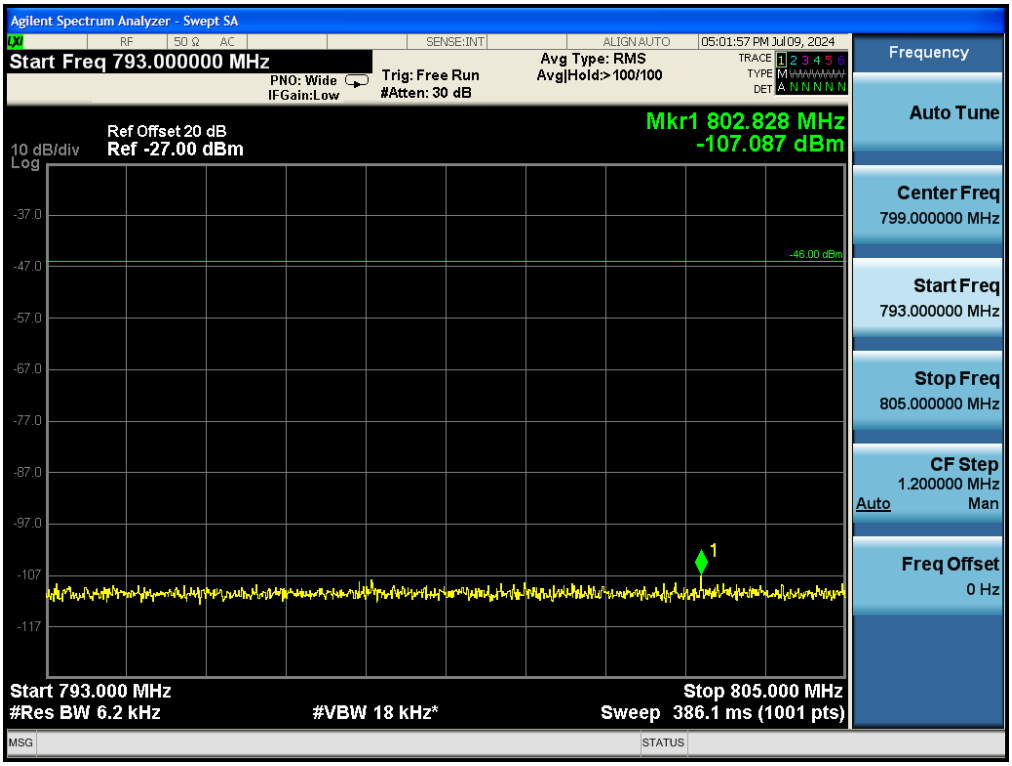
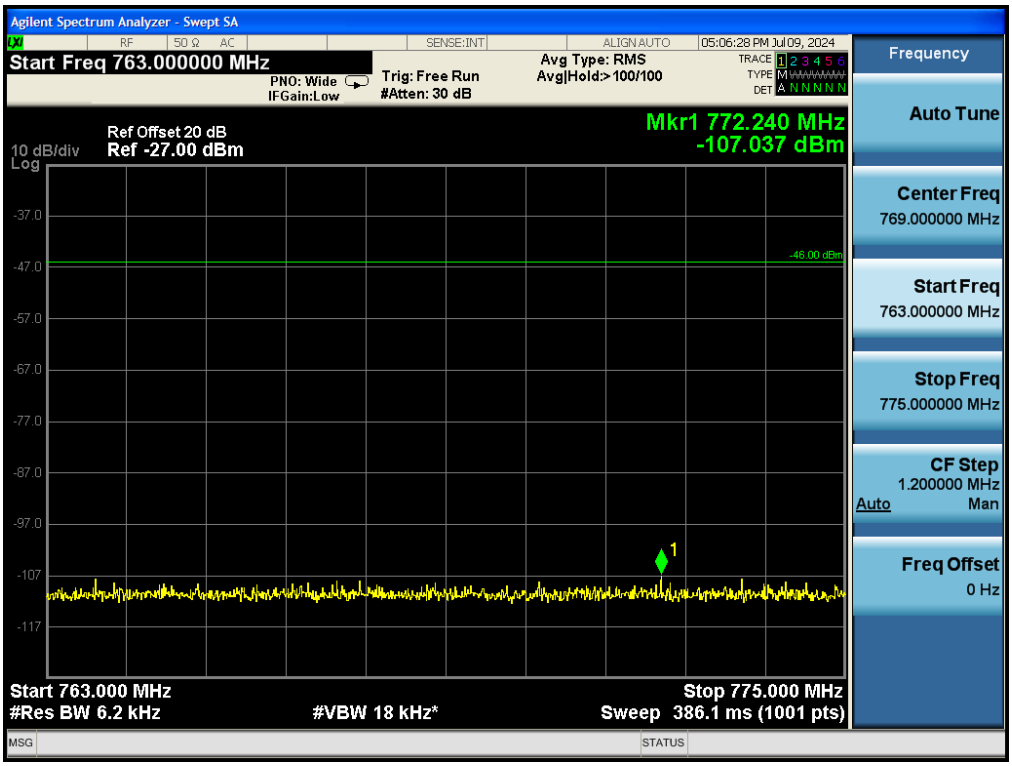
746-756 MHz Downlink Band





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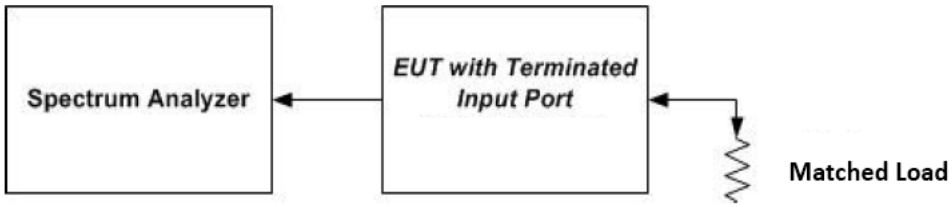
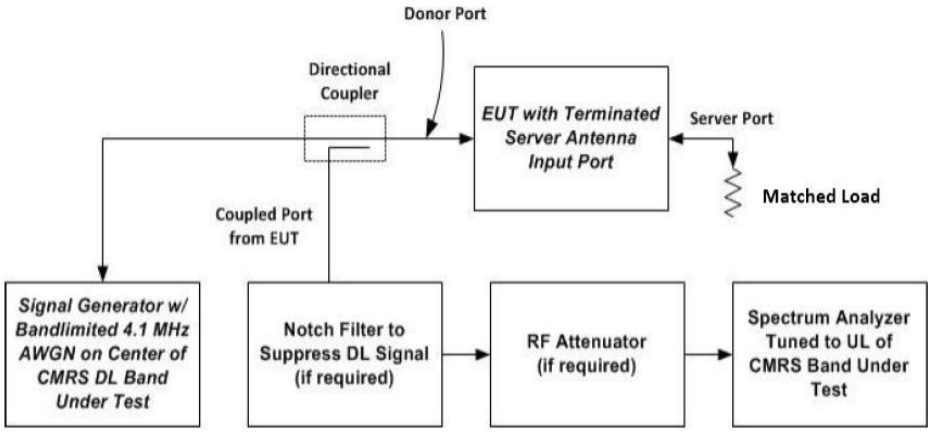
5.7 Noise Limits

Test Requirement:	This procedure provides a measurement methodology for demonstrating compliance to the noise limits specified in §20.21(e)(8)(i)(A) for Wideband Consumer Signal Boosters.
Limit:	not exceed −103 dBm/MHz—RSSI. not exceed−102.5 dBm/MHz + 20 log (F), where Frequency is the uplink mid-band frequency of the supported spectrum bands in MHz.
Test Setup:	 Figure 3 – Noise limit test setup (also used for 7.8)  Figure 4 – Test setup for uplink noise power measurement in the presence of a downlink signal
Procedure:	a) Connect the EUT to the test equipment as shown in Figure 3. Begin with the uplink output connected to the spectrum analyzer. b) Set the spectrum analyzer RBW to 1 MHz with the VBW ⩾ 3X 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 ⩾ 2X 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 steps 7.7.2 to 7.7.6 for all operational uplink and downlink bands. h) Connect the EUT to the test equipment as shown in Figure 4 for uplink and Figure 5 for downlink. Ensure the coupled path of the RF coupler is connected to the spectrum analyzer. i) Configure the signal generator for 4.1 MHz AWGN operation for uplink test and 200 kHz 99% OBW AWGN for downlink test. j) Set the spectrum analyzer RBW for 1 MHz with the VBW ⩾3X the RBW with an

	RMS AVERAGE 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 ⩾ 2X the CMRS band. This shall include all spectrum blocks in the particular CMRS band under test (see Annex A). 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. For downlink noise measurements, set the spectrum analyzer to the center of the downlink band and tune the signal generator to the upper or lower band-edge of the same band, ensuring that the maximum noise power is being measured. l) Measure the maximum Transmitter Noise Power Level when varying the downlink signal generator level from -90 to -10 dBm in 1 dB steps inside the RSSI dependent region and 10 dB steps outside the RSSI dependent region, report the six values closest to the limit with at least 2 points within the RSSI dependent region of the limit. m) Repeat 7.7.7 through 7.7.11 for all operational uplink and downlink bands. n) Variable Uplink noise timing is to be measured as follows. o) Set the spectrum analyzer to the uplink frequency to be measured. p) Set the span to 0 Hz with a sweep time of 10 seconds. q) Set the power level of signal generator 1 to the lowest level of the RSSI dependent noise. r) Select MAX HOLD and increase the power level of signal generator 1 by 10 dB for mobile boosters and 20 dB for fixed boosters. s) Ensure that the Uplink noise decrease to the specified levels within 1 second for mobile devices and 3 seconds for fixed devices. t) Repeat 7.7.14 – 7.7.19 for all operational uplink bands Note: Some signal boosters will require a signal generator input as they will not operate unless a signal is received at the input terminals. If this is the case connect a signal generator and cycle the RF output to simulate this function.

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5.7.1 E.U.T. Operation:

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

5.7.2 Test Data:

Frequency (MHz)	Max Noise Power Measured dBm/MHz	Limit dBm/MHz	Result (dB)
Cellula UL	-47.863	-44.05	PASS
Lower A-E Blocks UL	-48.578	-45.51	PASS
700MHz Upper C Block UL	-51.662	-44.64	PASS
Cellula DL	-50.909	-44.05	PASS
Lower A-E Blocks DL	-47.034	-45.51	PASS
700MHz Upper C Block DL	-52.404	-44.64	PASS

Note: Fixed booster maximum noise power shall not exceed − 102.5 dBm/MHz + 20 log (F), where Frequency is the uplink mid-band frequency of the supported spectrum bands in MHz.

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Operation Bands	RSSI dBm	Variable Uplink Noise Measured dBm/MHz	Limit dBm/MHz	Result (dB)
Cellula	-90	-47.540	-44.05	PASS
	-80	-47.235	-44.05	PASS
	-70	-46.138	-44.05	PASS
	-45	-62.371	-58.00	PASS
	-41	-61.692	-62.00	PASS
	-40	-63.380	-63.00	PASS
Lower A-E Blocks	-90	-50.527	-45.51	PASS
	-80	-49.520	-45.51	PASS
	-70	-46.535	-45.51	PASS
	-46	-56.981	-57.00	PASS
	-41	-63.682	-62.00	PASS
	-40	-65.573	-63.00	PASS
700MHz Upper C Block	-90	-48.278	-44.64	PASS
	-80	-48.129	-44.64	PASS
	-70	--47.323	-44.64	PASS
	-46	-57.131	-58.00	PASS
	-41	-62.960	-62.00	PASS
	-40	-66.011	-63.00	PASS

Note: According to the KDB 935210 D03 Signal Booster Measurements v04r04 APPENDIX D, when outside of RSSI Dependent limit (20.21.e.8.1.A.1),fixed booster maximum noise power shall not exceed −102.5 dBm/MHz + 20 log (F).RSSI limit not exceed −103 dBm/MHz-RSSI.

Variable Uplink Noise Timing

Operation Bands	Measured Sec	Limit Sec	Results
Cellula	1.70	3	PASS
Lower A-E Blocks	2.35	3	PASS
700 MHz Upper C Block	2.15	3	PASS

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Cellular Uplink Noise

Cellular Downlink Noise

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Lower A-E Blocks Uplink Noise

Lower A-E Blocks Downlink Noise

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700 MHz Upper C Block Uplink Noise

700 MHz Upper C Block Downlink Noise

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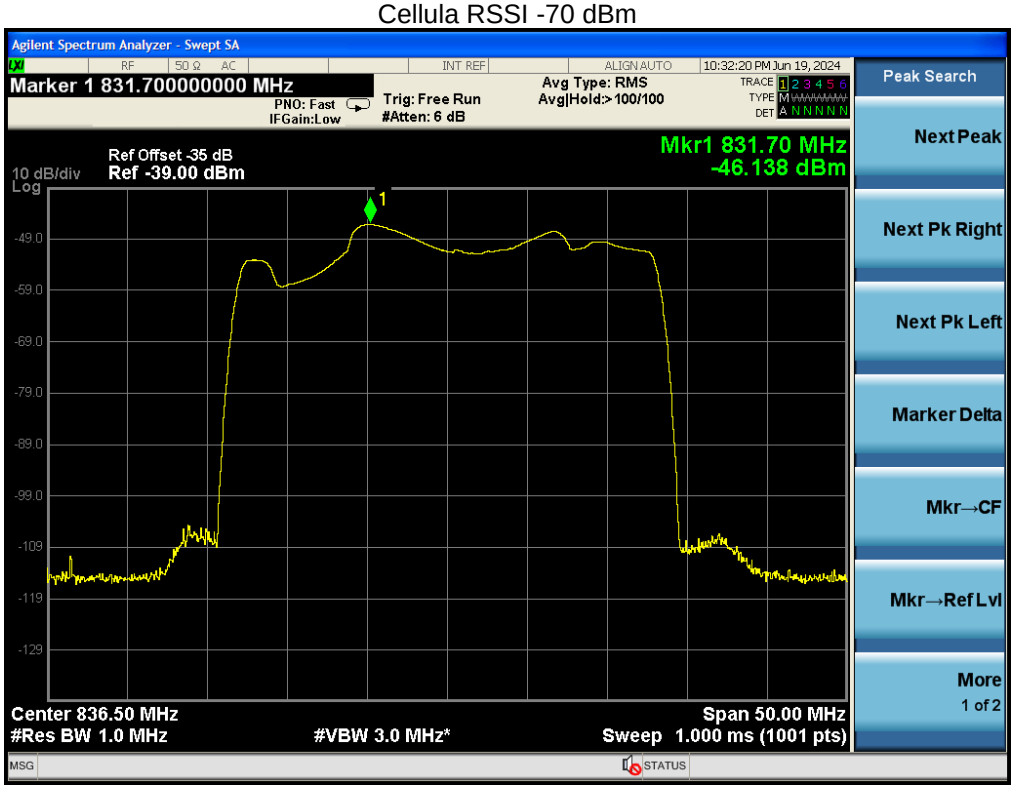
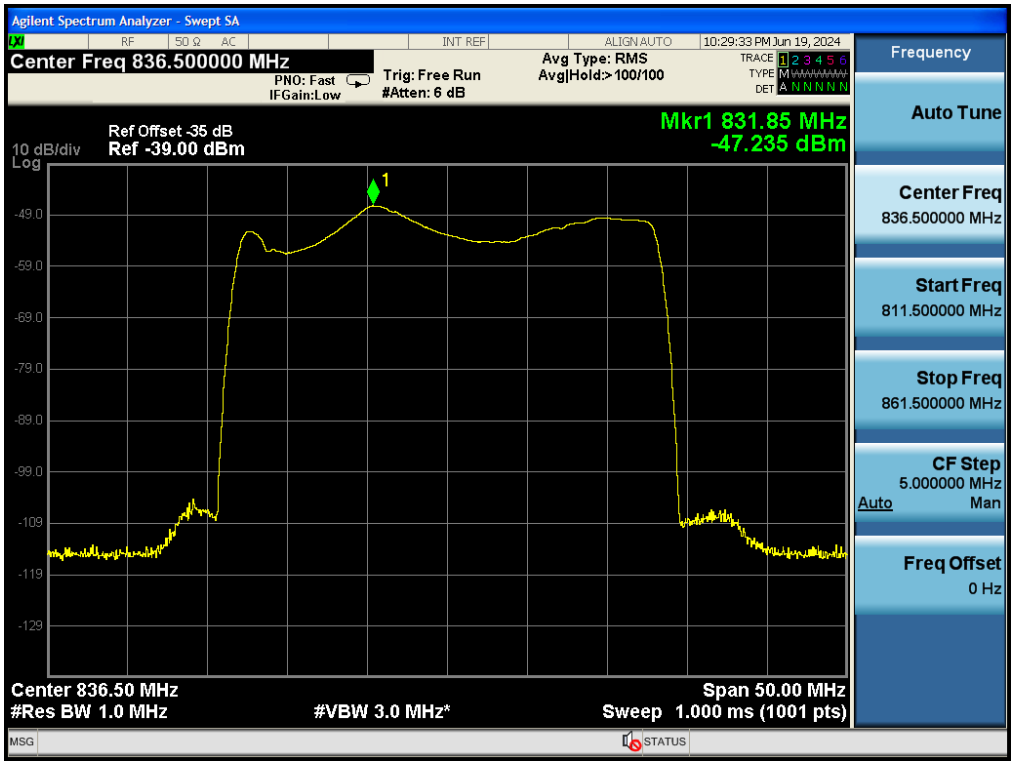
Variable Uplink Noise
Cellula RSSI -70 dBm



Cellula RSSI -80 dBm



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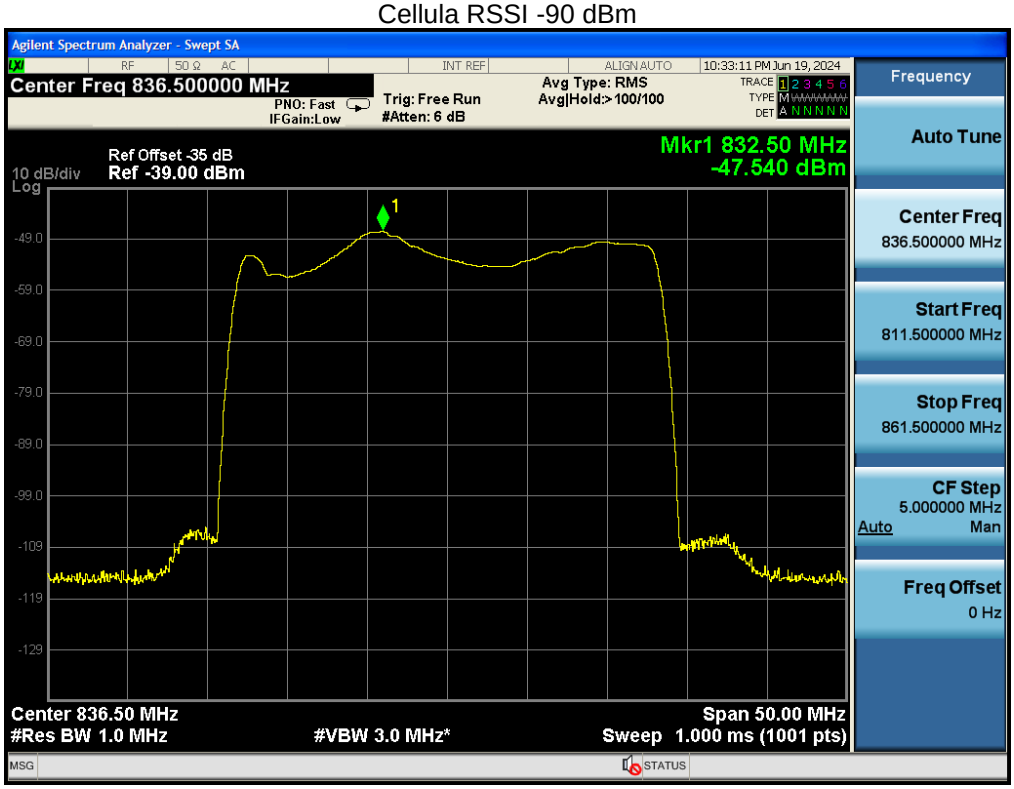
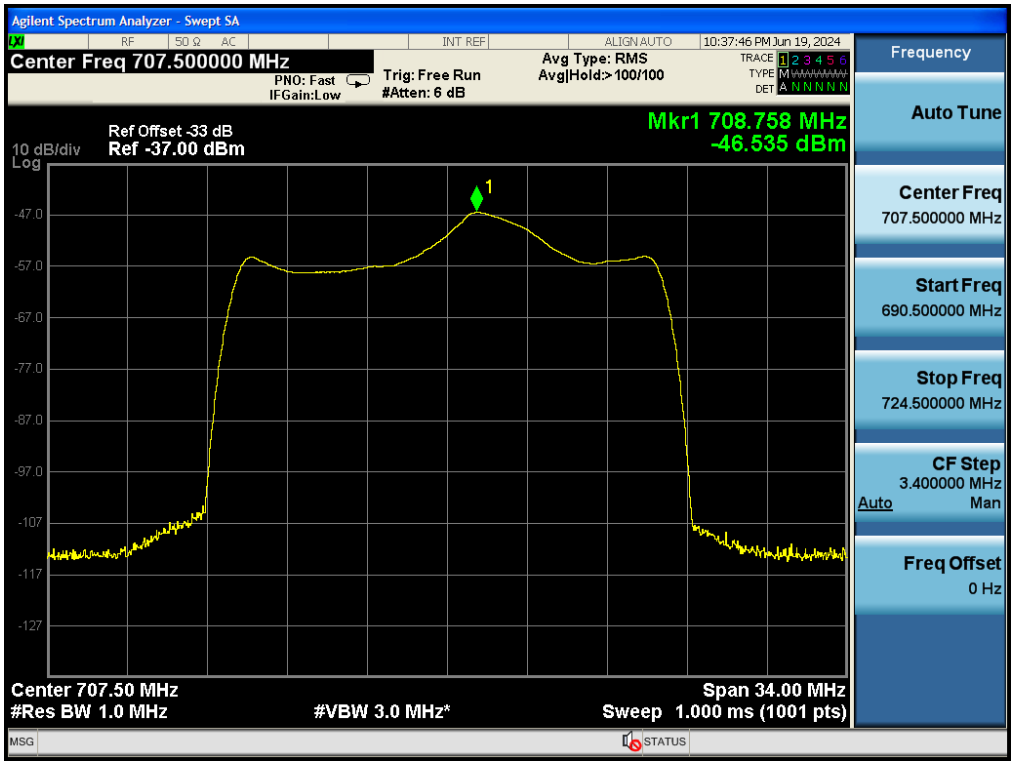
Cellula RSSI -90 dBm



Lower A-E Blocks RSSI -70 dBm



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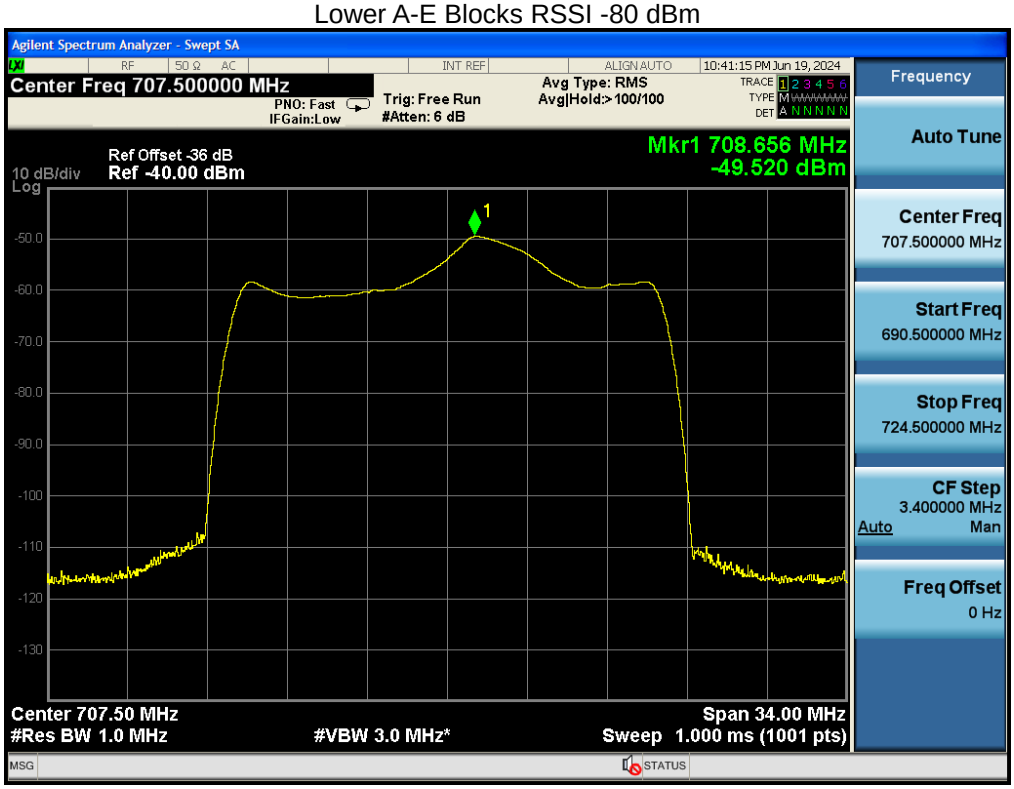
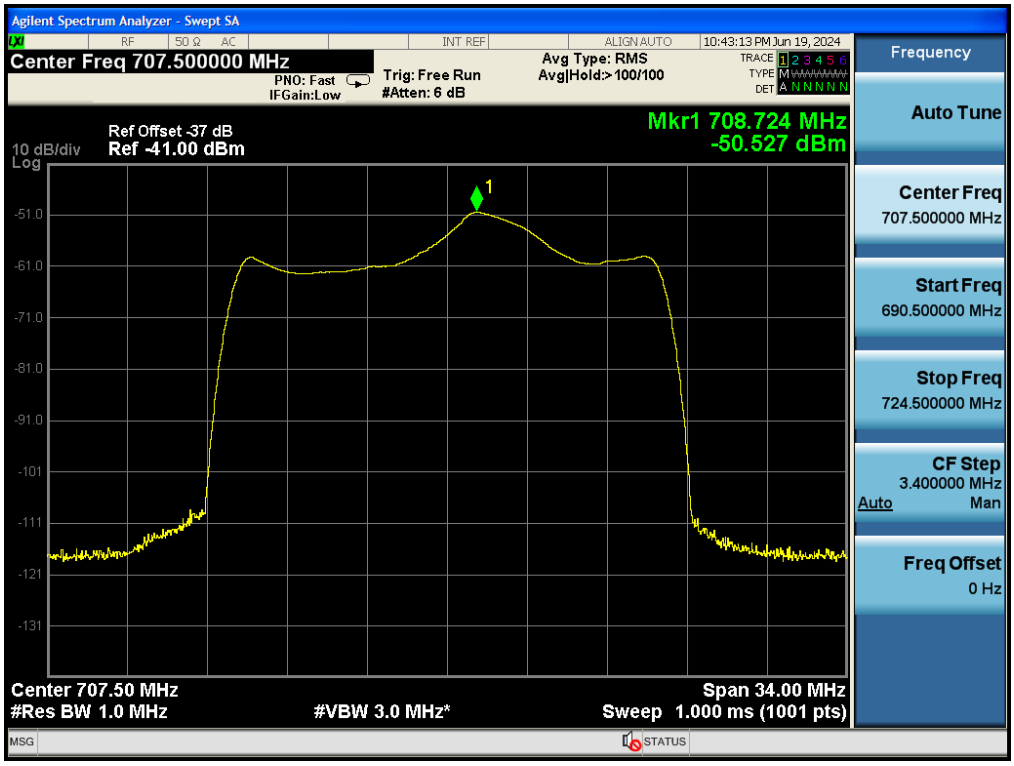
Lower A-E Blocks RSSI -80 dBm



Lower A-E Blocks RSSI -90 dBm



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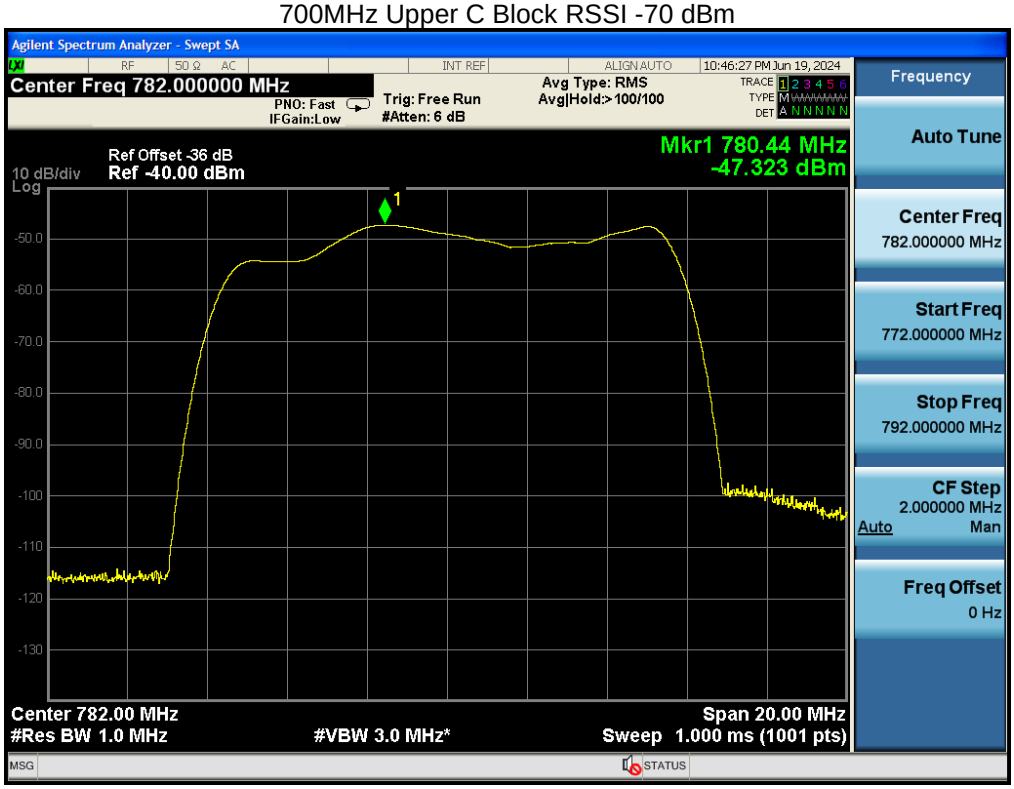
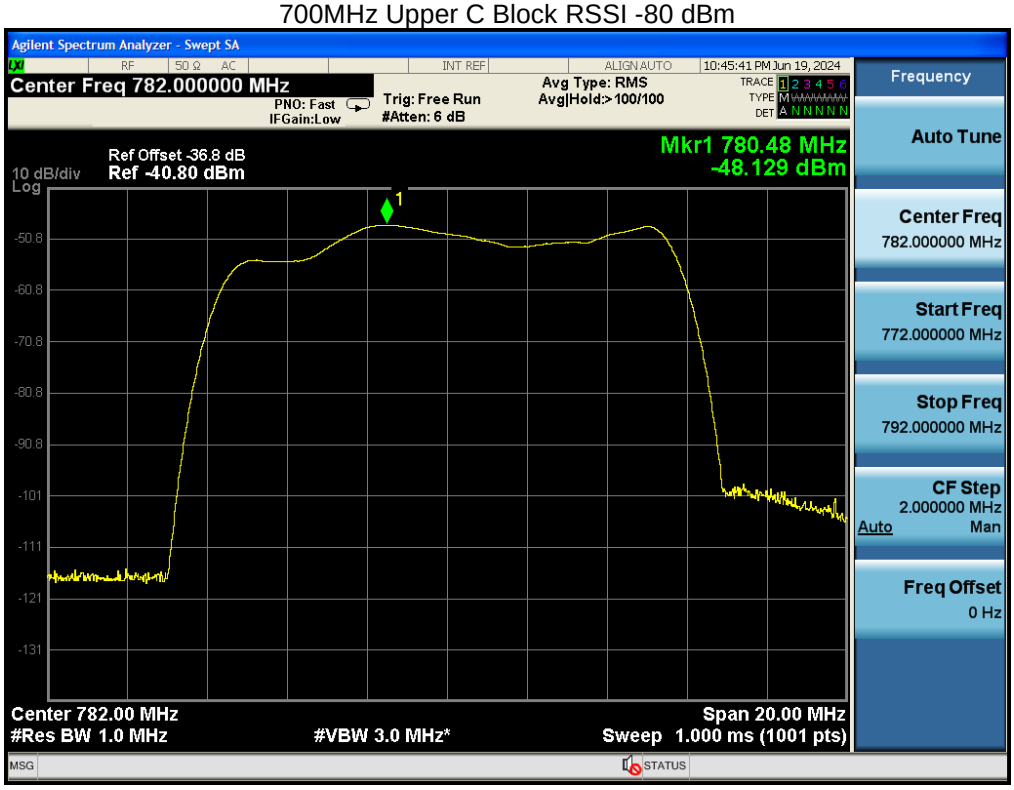
700MHz Upper C Block RSSI -70 dBm



700MHz Upper C Block RSSI -80 dBm



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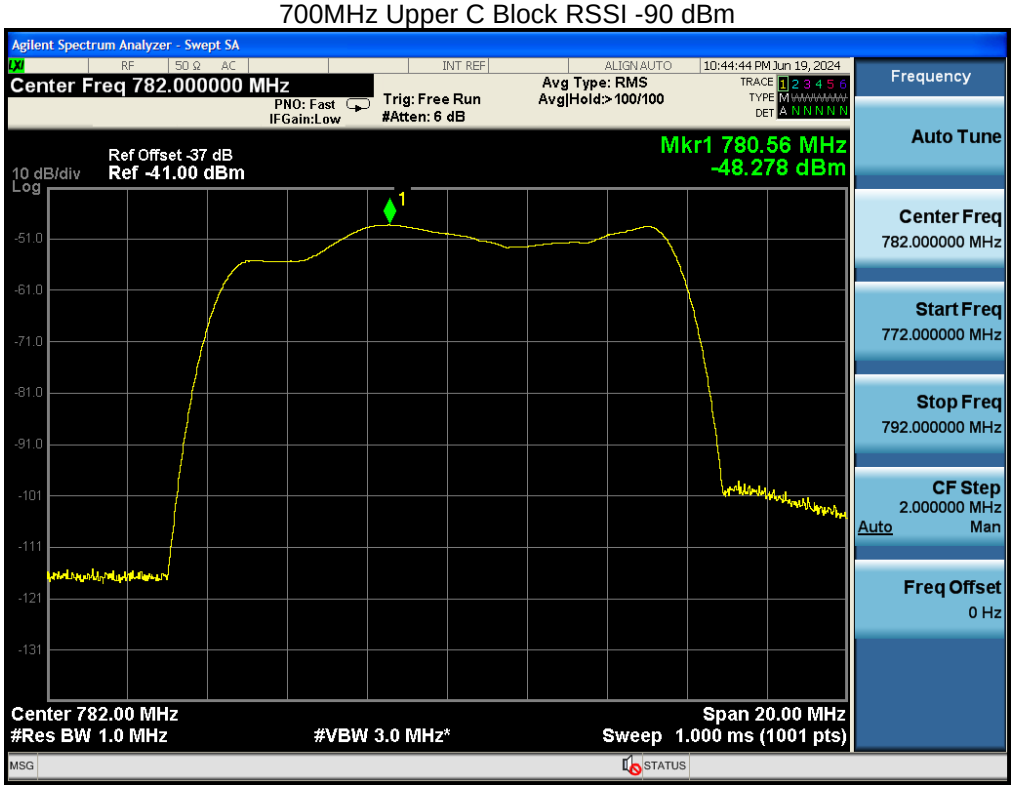
700MHz Upper C Block RSSI -90 dBm



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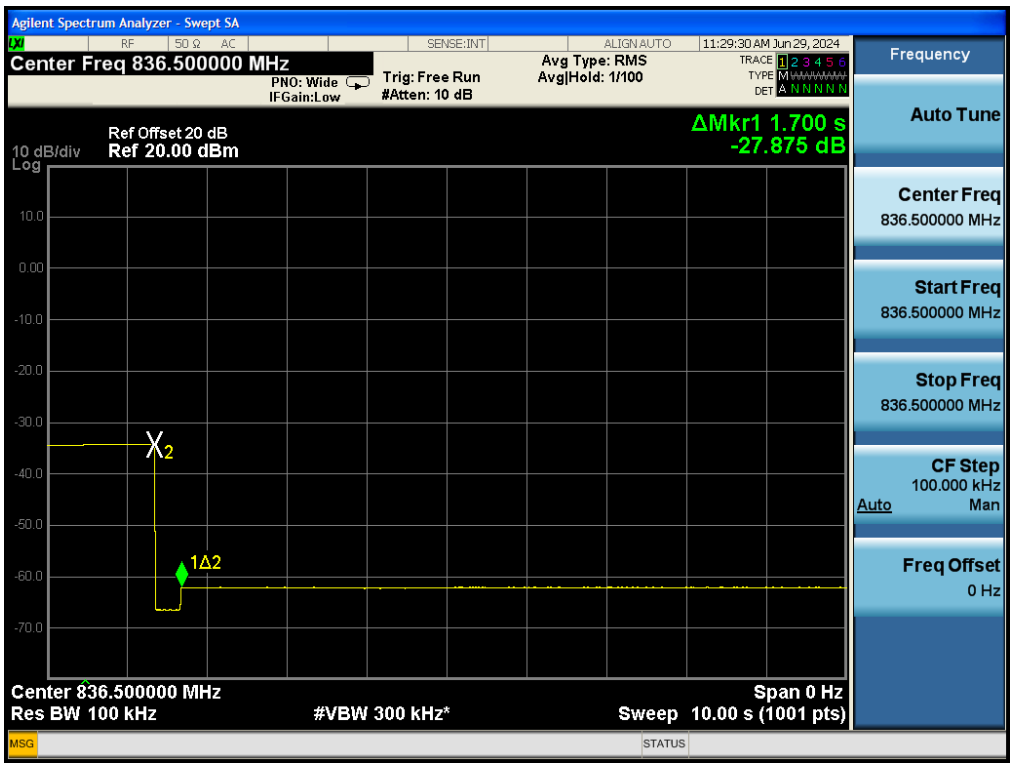
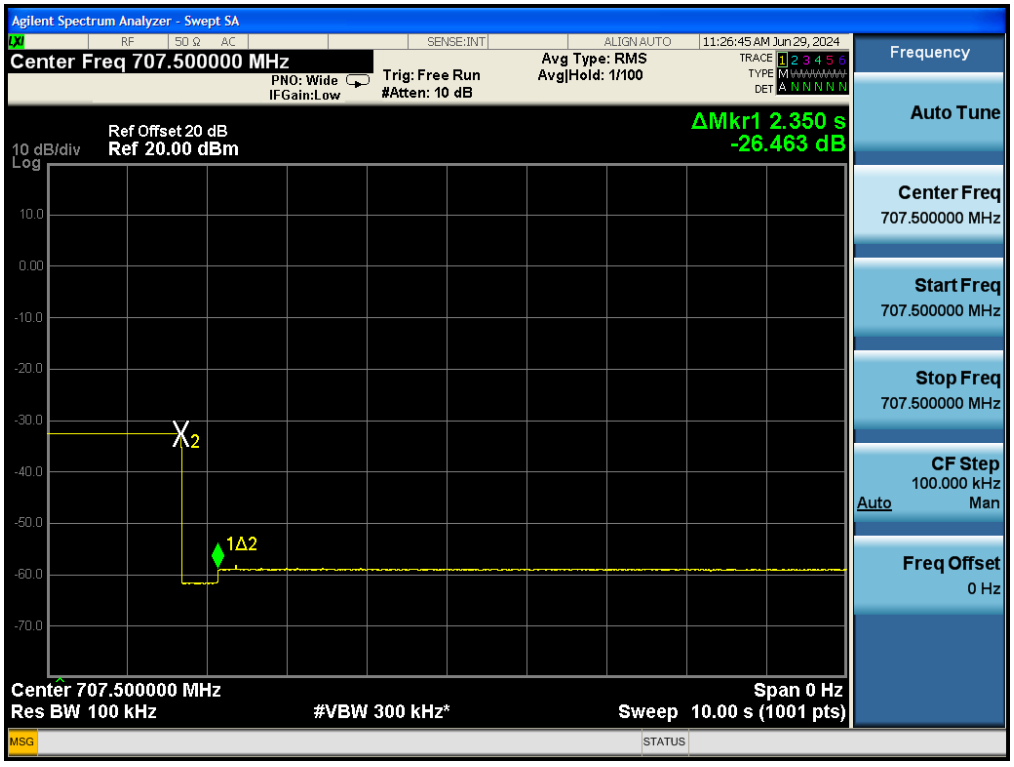
Variable Noise Timing Test Plots

Cellular



Lower A-E Blocks



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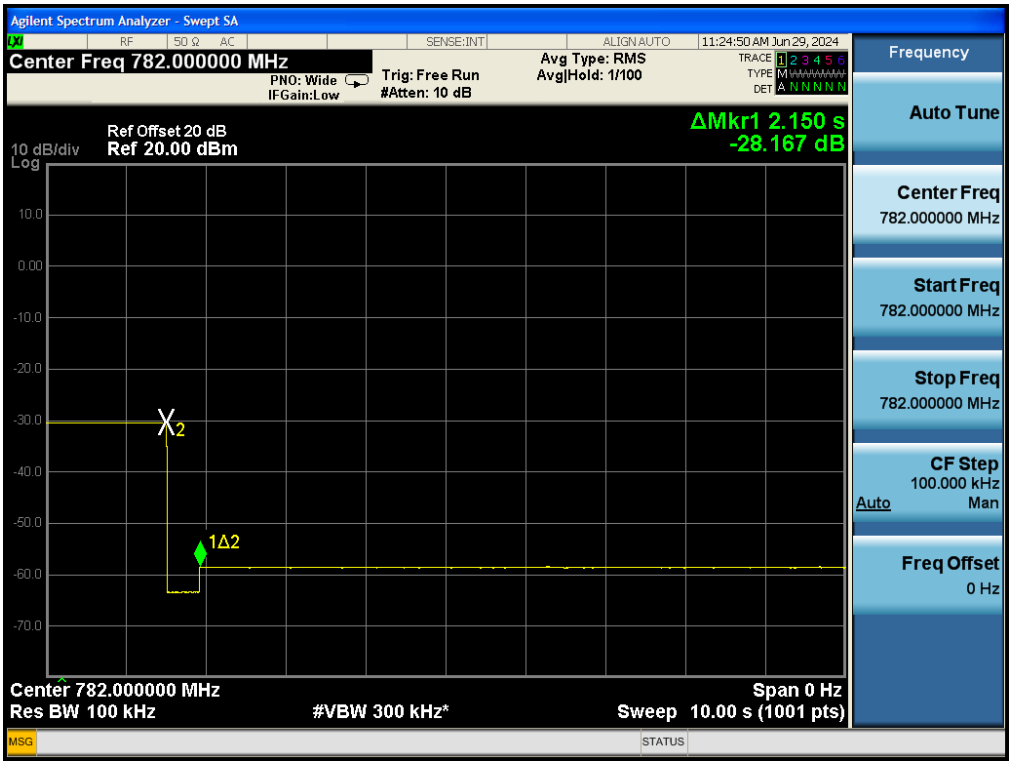
700 MHz Upper C Block



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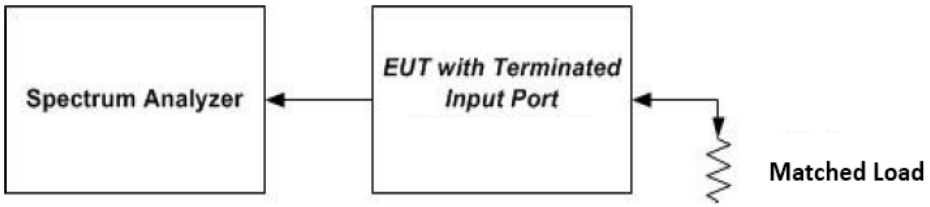
5.8 Uplink Inactivity

Test Requirement:	This measurement procedure is intended to demonstrate compliance to the uplink inactivity requirements specified for Wideband Consumer Signal Boosters in §20.21(e)(8)(i)(I).
Limit:	20.21(e), When a consumer booster is not serving an active device connection after 5 minutes the uplinknoise power shall not exceed -70 dBm/MHz.
Test Setup:	 Figure 3 – Noise limit test setup (also used for 7.8)
Procedure:	a) Connect the EUT to the test equipment as shown in Figure 3 with the uplink output connected to the spectrum analyzer. b) Select the RMS power averaging detector. c) Set the spectrum analyzer RBW for 1 MHz with the VBW ⩾ 3X 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) Once the full spectrum analyzer trace is complete place a MARKER on the leading edge of the pulse and use the DELTA MARKER METHOD to measure the time until the uplink was squelched. i) Ensure the noise level for the squelched signal 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 sections 7.7.1- 7.7.5. l) Repeat steps 7.8.3 to 7.8.10 for all operational uplink bands. Note: Some signal boosters will require a signal generator input as they will not operate unless a signal is received at the input terminals. If this is the case connect a signal generator and cycle the RF output to simulate this function.

5.8.1 E.U.T. Operation:

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

5.8.2 Test Data:

Operation Bands	Uplink Inactivity Measured(s)	Limit(s)	Result
Cellula	280.8	300.0	PASS
Lower A-E Blocks	285.8	300.0	PASS
700 MHz Upper C Block	285.8	300.0	PASS

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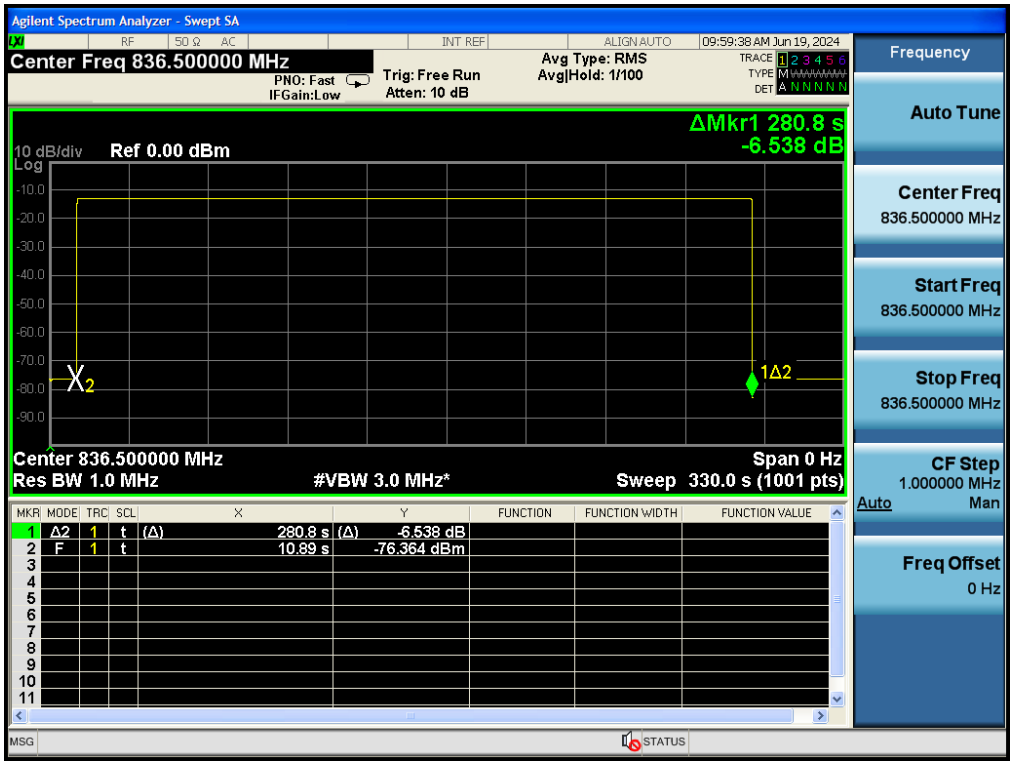
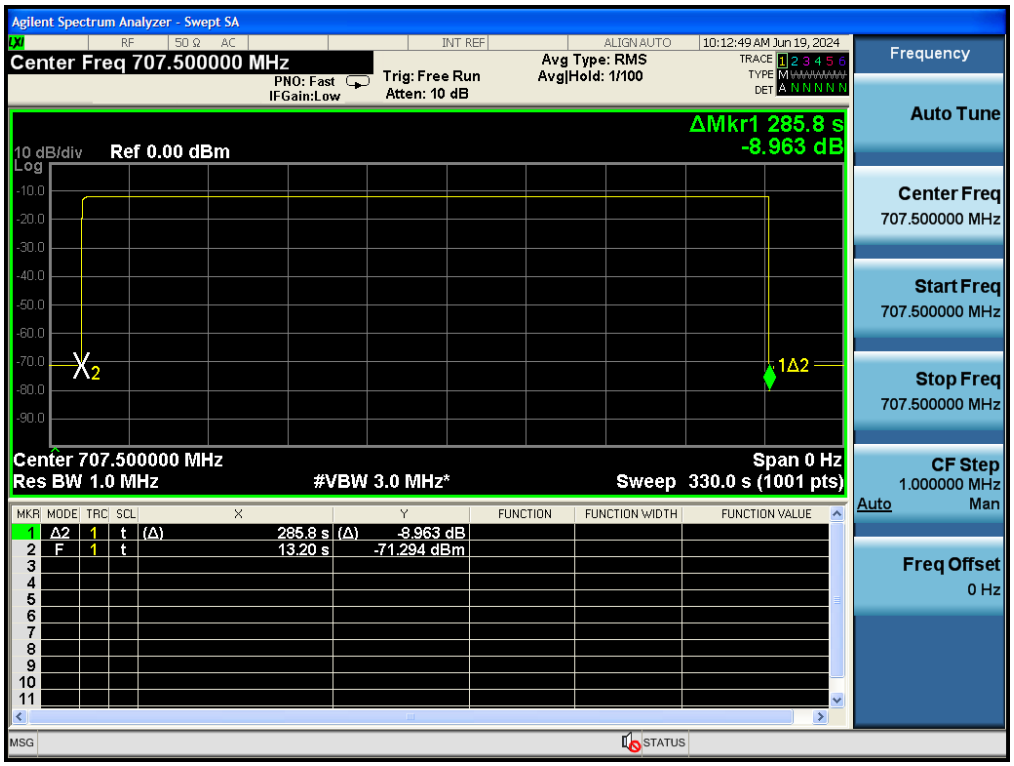
Cellula



Lower A-E Blocks



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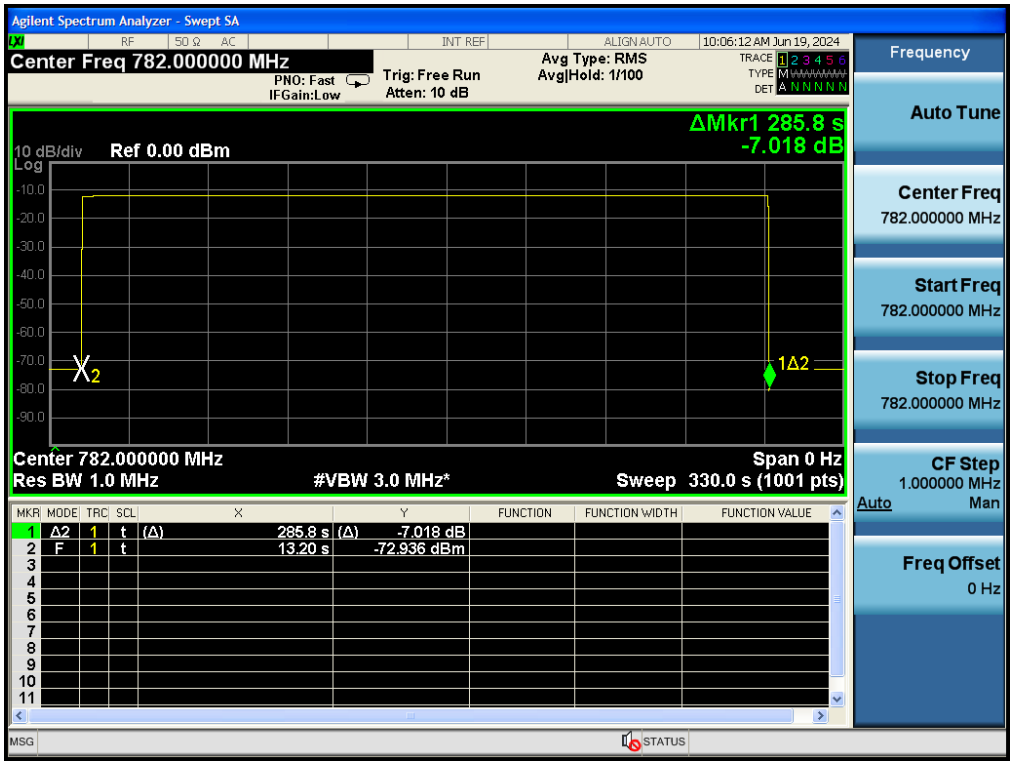
700 MHz Upper C Block



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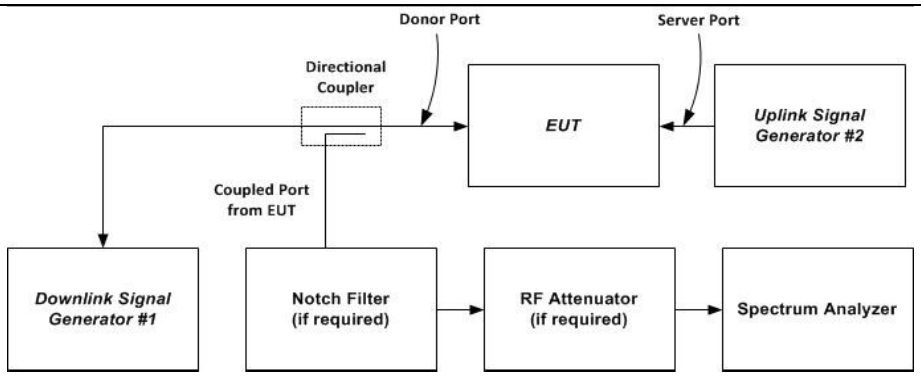
5.9 Variable Booster Gain

Test Requirement:	This procedure shall be used to demonstrate compliance to the Booster Gain Limits specified for Wideband Consumer Signal Boosters in §21(e)(8)(i)(C). The variable booster gain limits are expressed as a function of RSSI and MSCL. The RSSI is varied over a range of values as specified within the procedure. Refer to Annex B of this document for guidance with respect to determining the applicable MSCL value.
Limit:	-34 dB -RSSI + MSCL
Test Setup:	
Procedure:	a) Connect the EUT to the test equipment as shown in Figure 6 with the uplink output connected to signal generator 1. Ensure the coupled path of the RF coupler is connected to the spectrum analyzer. b) Configure downlink signal generator #1 for AWGN operation with an 99% occupied bandwidth of 4.1 MHz tuned to the center of the operational band. c) Set the power level and frequency of signal generator # 2 to a value 5 dB below the AGC level from section 7.2. The signal type is AWGN with a 99% OBW of 4.1 MHz. d) Set RBW = 100 kHz. e) Set VBW ⩾ 300 kHz. f) Select the CHANNEL POWER measurement tool. g) Select the RMS (power averaging) detector. h) Ensure that the number of measurement points per sweep ⩾ (2 x span)/RBW. i) Sweep time = auto couple or as necessary. j) Trace average at least 10 traces in power averaging (i.e., RMS) mode. k) Measure the maximum channel power and compute maximum gain when varying the signal generator 1 to a level from -90 to -10 dBm in 1 dB steps inside the RSSI dependent region and 10 dB steps outside the RSSI dependent region and report the six values closest to the limit, including at least two points from within the RSSI dependent region of operation. l) Repeat 7.9.3 – 7.9.11 for all operational uplink bands. m) Variable Uplink gain timing is to be measured as follows. n) Set the spectrum analyzer to the uplink frequency to be measured. o) Set the span to 0 Hz with a sweep time of 10 seconds. p) Set the power level of signal generator 1 to the lowest level of the RSSI dependent gain. q) Select MAX HOLD and increase the power level of signal generator 1 by 10 dB for mobile booster and 20 dB for fixed indoor boosters. r) Ensure that the Uplink gain decrease to the specified levels within 1 second for mobile devices and 3 seconds for fixed devices. s) Repeat 7.9.13 – 7.9.18 for all operational uplink bands.

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5.9.1 E.U.T. Operation:

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

5.9.2 Test Data:

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MSCL Calculation							
Operation Bands	Frequency (MHz)	Distance (m)	Path loss (dB)	Indoor Antenna Gain(dBi)	Indoor Cable Loss(dB)	Polarity Loss(dB)	MSCL (dB)
Cellular	869	2	37.30	9	3	9.03	40.33
Lower A-E Blocks	729	2	35.78	9	3	9.03	38.81
700 MHz Upper C Block	746	2	35.98	9	3	9.03	39.01

Note : Path loss = 20logf + 20logd – 27.5
Polarity loss = 20Log (2/Sin (45deg)) dB = 9.03dB

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Variable booster gain							
Operation Band	RSSI (dBm)	Input Power (dBm)	Output Power (dBm)	Measured Gain (dB)	MSCL	Limit	Results
Cellular	-52	-41	19.96	60.96	40.33	58.33	PASS
	-50	-41	18.64	59.64	40.33	56.33	PASS
	-47	-41	17.96	58.96	40.33	53.33	PASS
	-45	-41	16.85	57.85	40.33	51.33	PASS
	-43	-41	16.01	57.01	40.33	49.33	PASS
	-42	-41	12.85	53.85	40.33	48.33	PASS
Lower A-E Blocks	-53	-41	23.54	64.54	38.81	57.81	PASS
	-51	-41	22.61	63.61	38.81	55.81	PASS
	-50	-41	20.74	61.74	38.81	54.81	PASS
	-45	-41	19.84	60.84	38.81	49.81	PASS
	-40	-41	18.01	59.01	38.81	44.81	PASS
	-39	-41	16.74	57.74	38.81	43.81	PASS
700 MHz Upper C Block	-52	-41	25.31	66.31	39.01	57.01	PASS
	-50	-41	24.08	65.08	39.01	55.01	PASS
	-49	-41	23.41	64.41	39.01	54.01	PASS
	-46	-41	20.41	61.41	39.01	51.01	PASS
	-40	-41	19.75	60.75	39.01	45.01	PASS
	-38	-41	18.74	59.74	39.01	43.01	PASS

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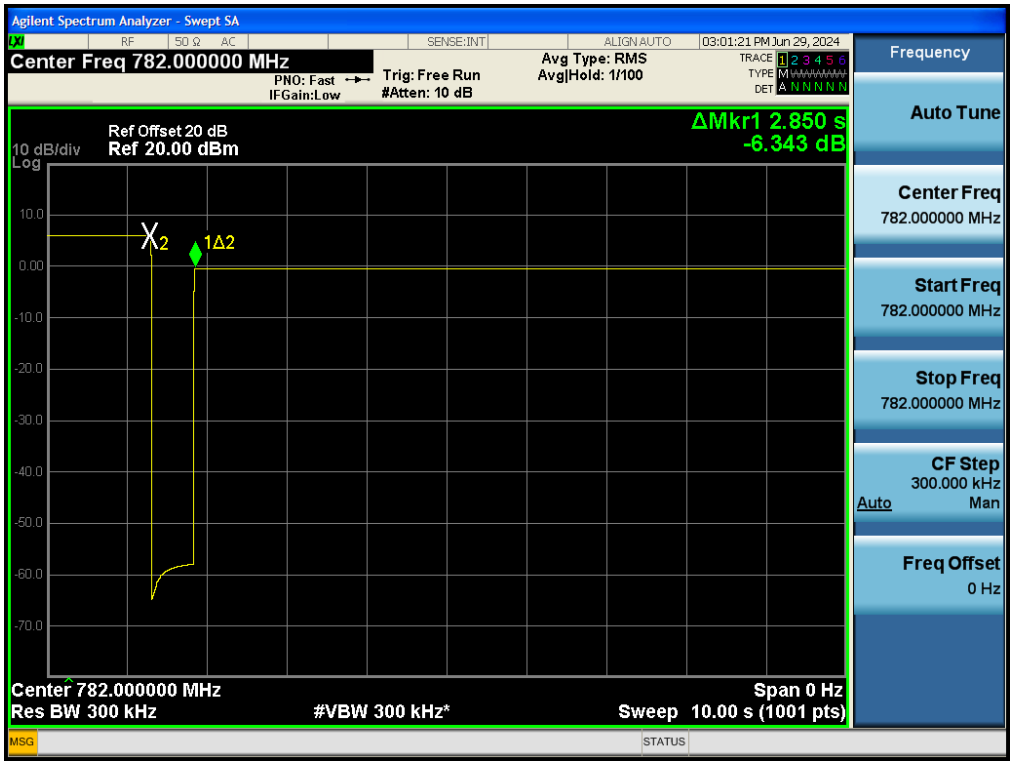
Variable Uplink Gain Timing

Variable Uplink Gain Timing			
Operation Band	Measured Sec	Limit Sec	Result
Cellular	2.10	3.0	PASS
Lower A-E Blocks	2.55	3.0	PASS
700 MHz Upper C Block	2.85	3.0	PASS

Cellular

Lower A-E Blocks

700 MHz Upper C Block



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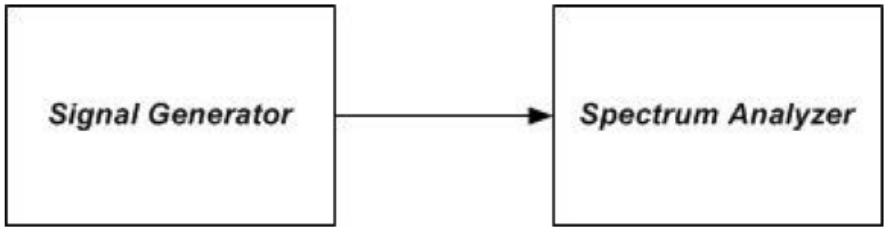
5.10 Occupied Bandwidth

Test Requirement:	This measurement is required to compare the uniformity of the output signal relative to the input signal and to satisfy the requirements of §2.1049.
Test setup:	 Figure 6 – Test setup for measuring characteristics of test signals used for subsequent EUT occupied bandwidth testing
Procedure:	a) Connect the test equipment as shown in Figure 7 to measure the characteristics of the test signals produced by the signal generator. b) Set VBW to ⩾ 3X 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 occupied bandwidth as necessary for accurately viewing the signals. d) Set the signal generator for power level to match the values obtained in section 7.2. e) Set the signal generator modulation type for GSM with a PBRS 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 emissions bandwidth. g) Capture the spectrum analyzer trace for inclusion in the test report. h) Repeat steps 7.10.3 – 7.10.7 for Cellular and WCellular modulation adjusting the span as necessary for all uplink and downlink operational bands. [AWGN or LTE may be used in place of WCellular, as an option] i) Connect the test equipment as shown in Figure 1. Begin with the uplink output connected to the spectrum analyzer j) Repeat steps 7.10.3 – 7.10.8 in this new configuration.

5.10.1 E.U.T. Operation:

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

5.10.2 Test Data:

Operation Band		Signal	Input OBW [MHz]	Output OBW [MHz]	Results
Uplink	Cellula	AWGN	4.1991	4.1572	PASS
	Lower A-E Blocks	AWGN	4.3129	4.2861	PASS
	700 MHz Upper C Block	AWGN	4.9329	4.8835	PASS
Downlink	Cellula	AWGN	4.2422	4.2292	PASS
	Lower A-E Blocks	AWGN	4.2871	4.2674	PASS
	700 MHz Upper C Block	AWGN	4.8757	4.8565	PASS

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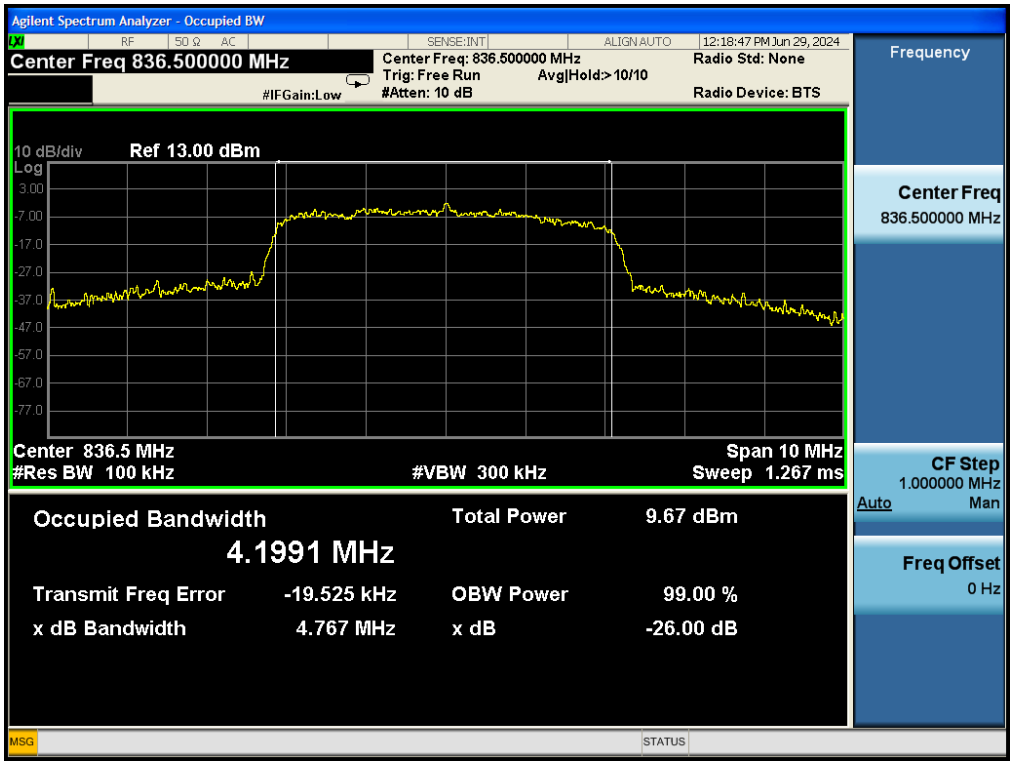
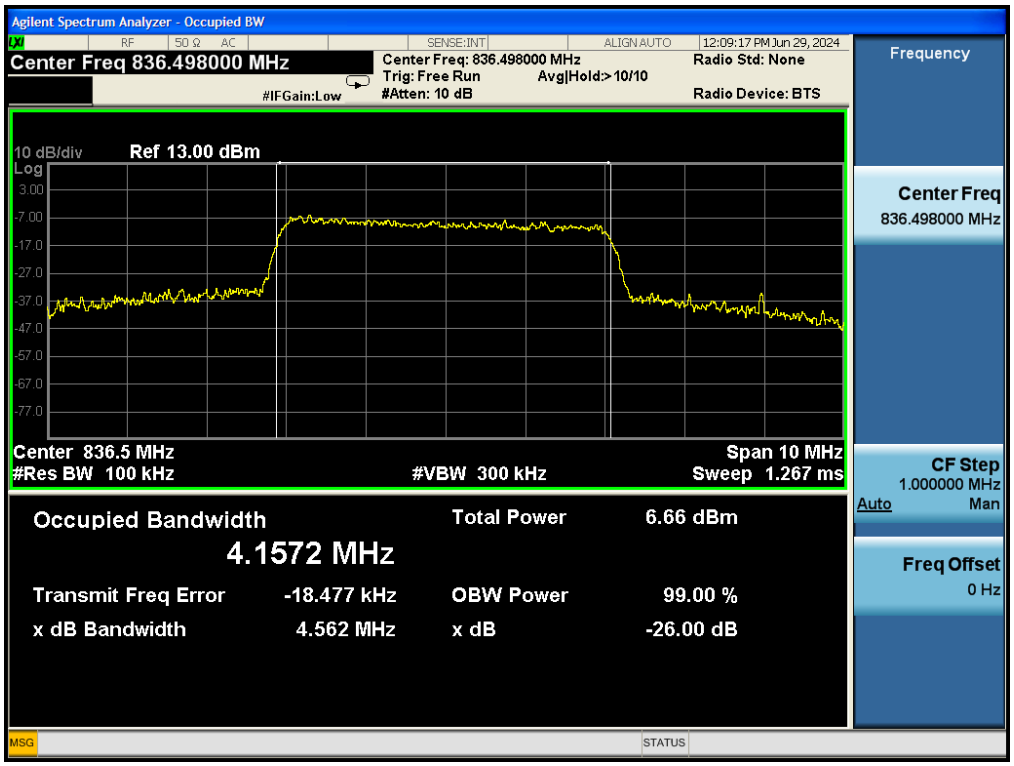
Cellula AWGN UL Input



Cellula AWGN UL output



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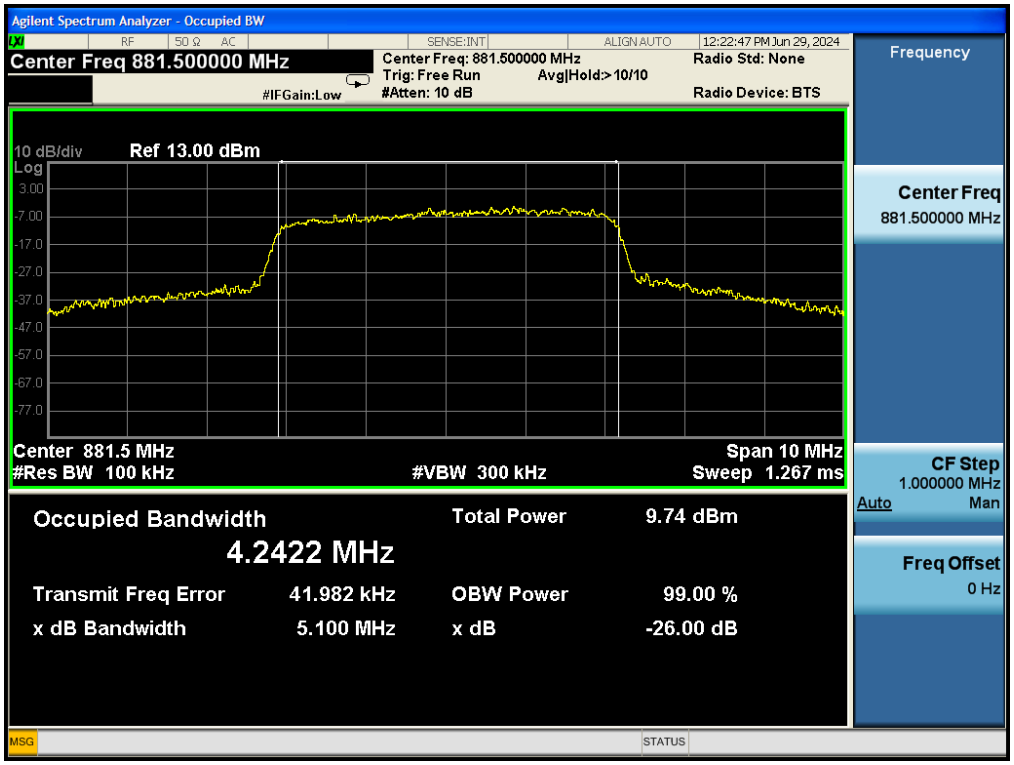
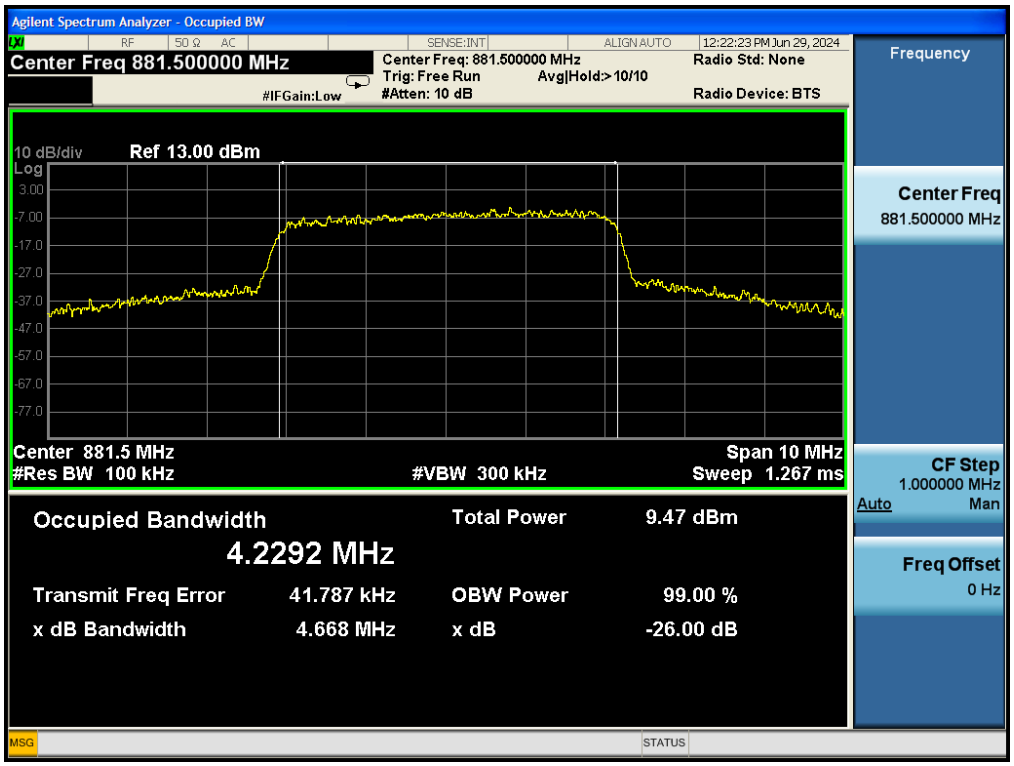
Cellula AWGN DL Input



Cellula AWGN DL output



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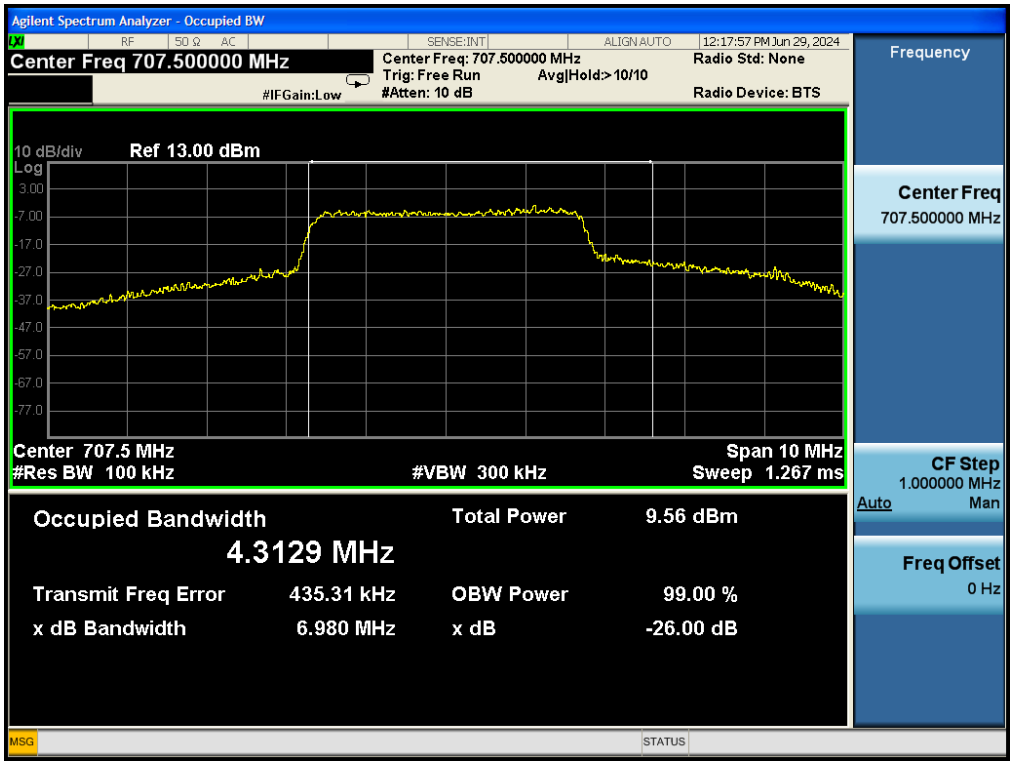
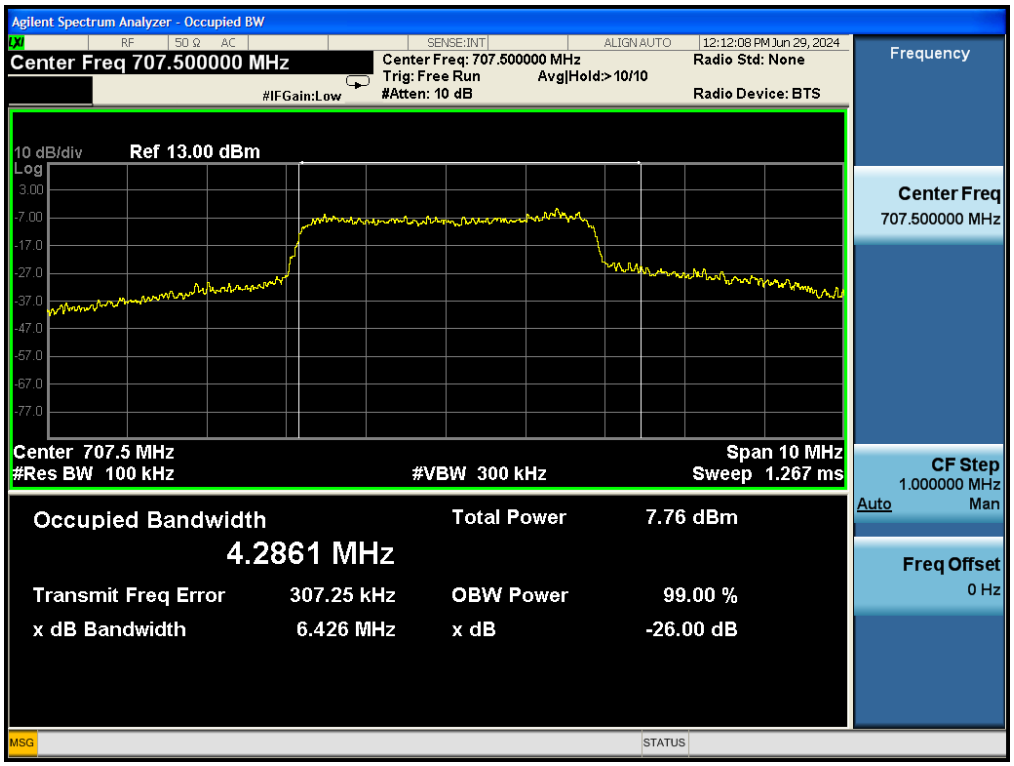
Lower A-E Blocks AWGN UL Input



Lower A-E Blocks AWGN UL output



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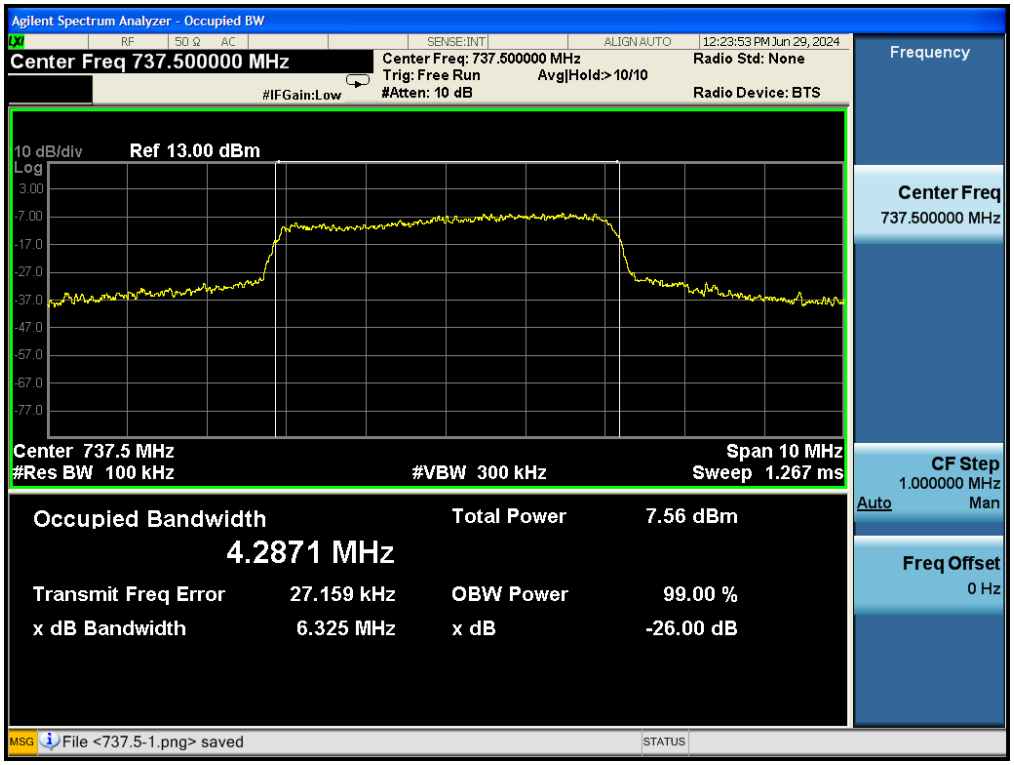
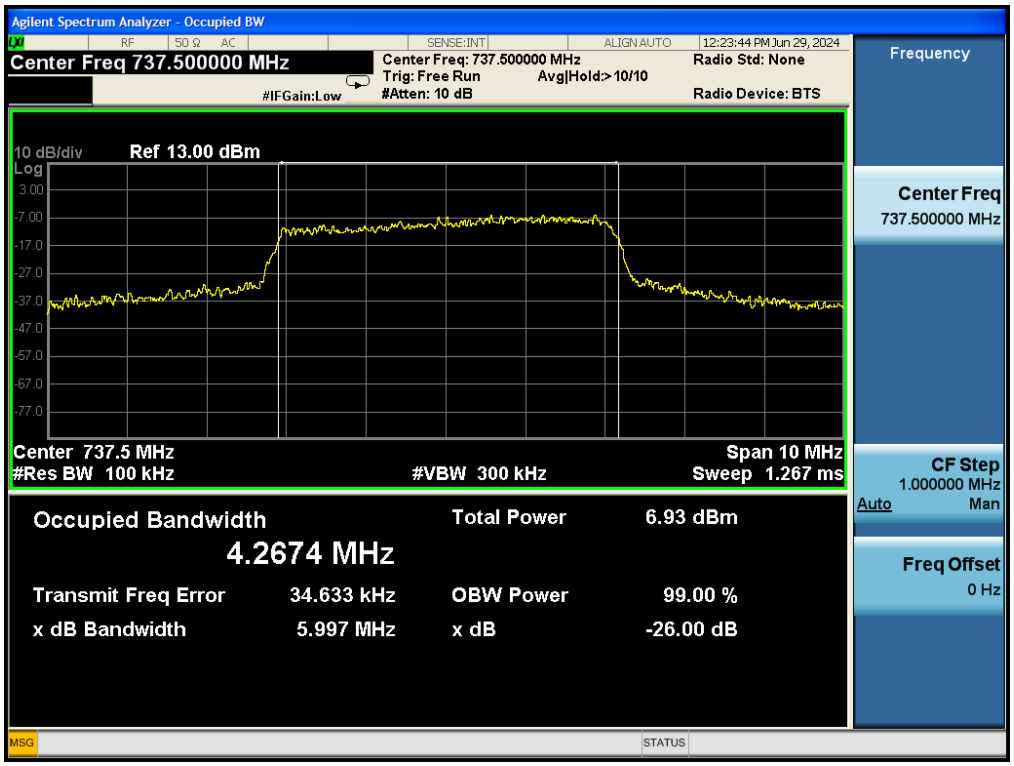
Lower A-E Blocks AWGN DL Input



Lower A-E Blocks AWGN DL output



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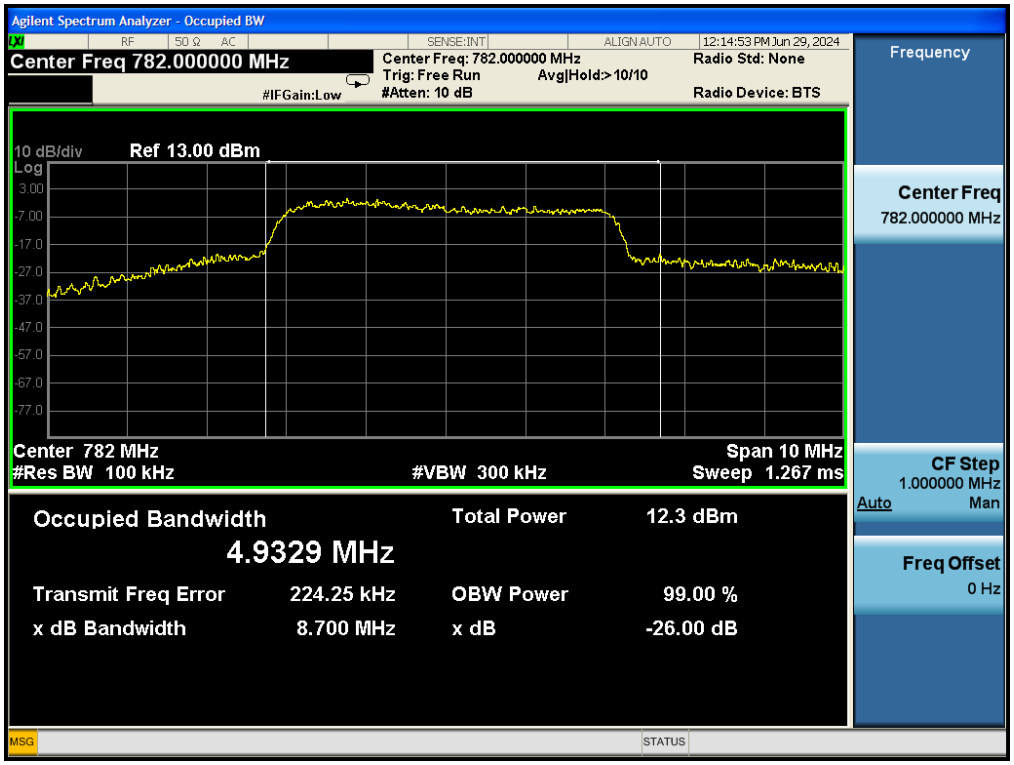
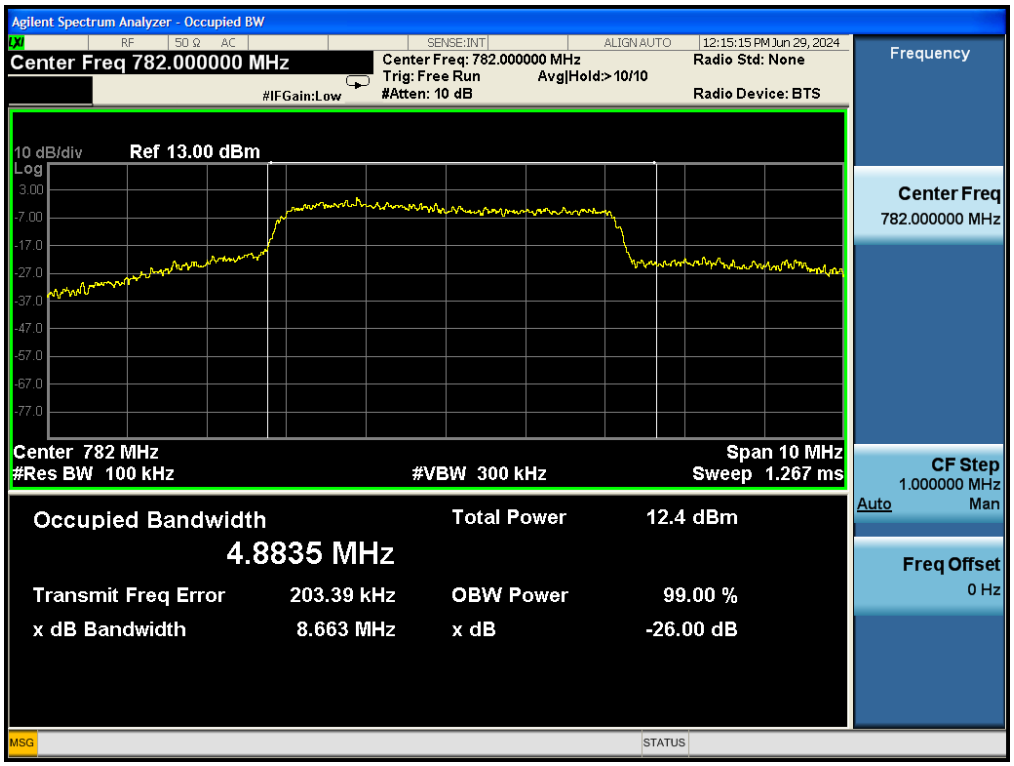
700 MHz Upper C Block UL Input



700 MHz Upper C Block UL output



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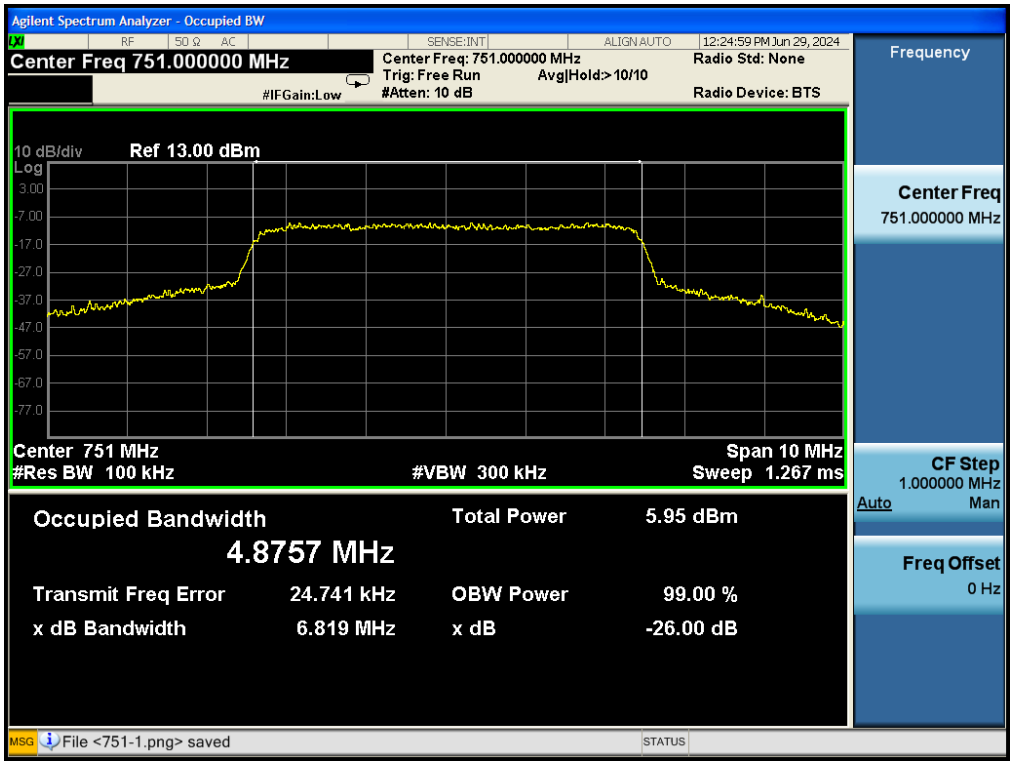
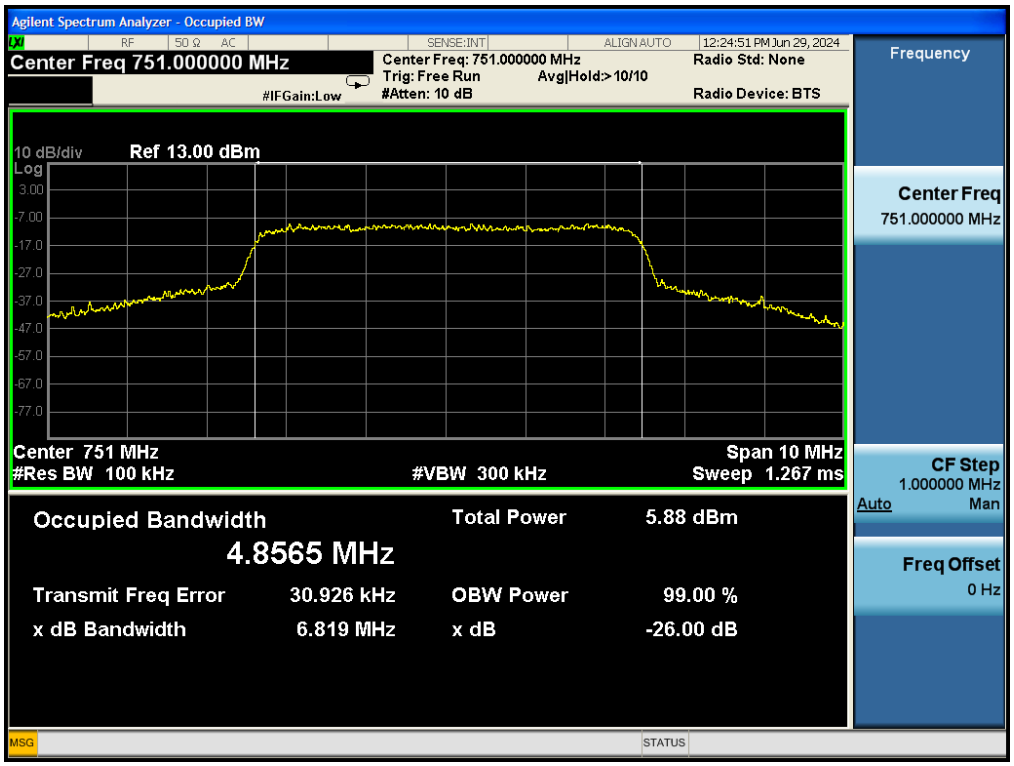
700 MHz Upper C Block DL Input



700 MHz Upper C Block DL output



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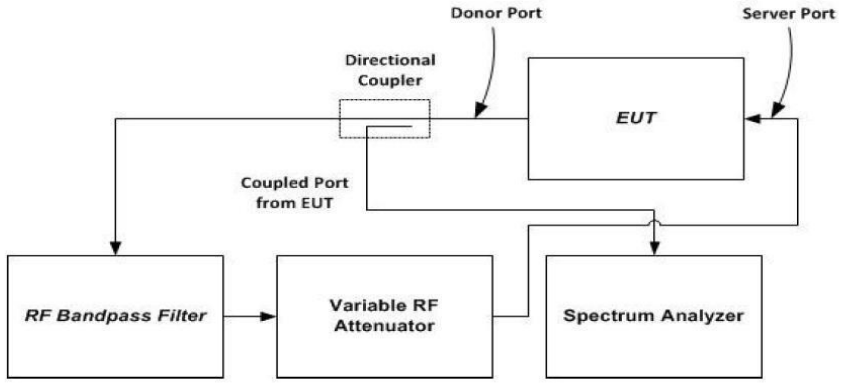
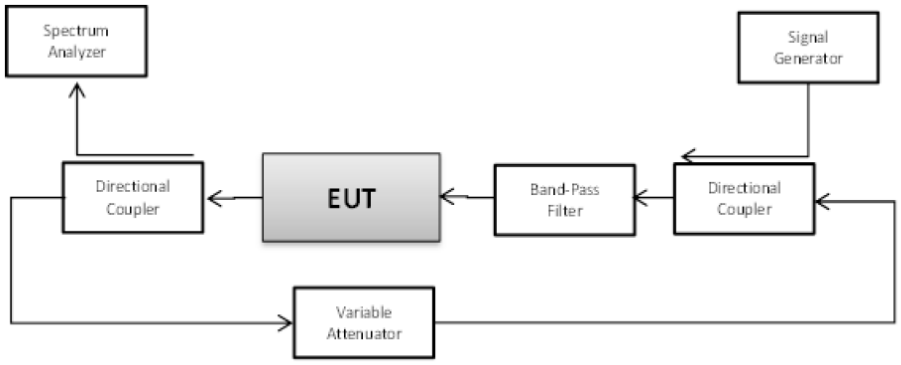
5.11 Oscillation Detection

Test Requirement:	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) 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.
Test setup:	 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. **Figure 7 – Oscillation detection (7.11.2) test setup**  **Figure 8 – Oscillation mitigation/shutdown test setup**
Procedure:	a) 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. Note: The band pass filter shall provide sufficient out-of-band rejection to prevent oscillations from occurring in bands not under test. b) Set the oscilloscope for a positive edge trigger and single trigger operation. c) Set the attenuation as necessary until the oscilloscope triggers and increase the attenuation level to a point 10 dB above that point. d) Reset the trigger of the oscilloscope and reset the EUT with a power cycle. e) Force the EUT to oscillate this will trigger the oscilloscope. f) 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. g) Capture the oscilloscope trace for inclusion in the test report. h) Repeat steps 7.11.2 to 7.11.7 for all operational uplink and downlink bands. i) Set the oscilloscope time base for longer than 1 minute and measure the restart

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	time for each operational uplink and downlink band. j) Replace the normal operating EUT for the EUT with the test mode. k) Set the oscilloscope time base for a minimum 120 seconds with an AUTO Trigger and a single sweep. l) Start the Oscilloscope and a manually force the booster into oscillation. m) When the sweep is complete place cursors between the first two oscillation 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. 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 ⩾ 3 times RBW using a peak detector.

5.11.1E.U.T. Operation:

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

5.11.2Test Data:

Test results of detection time				
	Operation Bands	Detection Time(s)	Limit(s)	Result
Uplink	Cellula	0.200	0.300	PASS
	Lower A-E Blocks	0.200	0.300	PASS
	700 MHz Upper C Block	0.200	0.300	PASS
Downlink	Cellula	0.200	0.300	PASS
	Lower A-E Blocks	0.150	0.300	PASS
	700 MHz Upper C Block UL	0.200	0.300	PASS

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Test results of restarting time						
	Operation Bands	Restarting Time(s)	Limit(s)	Restarting Counts	Limit	Result
Uplink	Cellula	81.6	60	3	5	PASS
	Lower A-E Blocks	72.0	60	2	5	PASS
	700 MHz Upper C Block	103.8	60	2	5	PASS
Downlink	Cellula	86.4	60	2	5	PASS
	Lower A-E Blocks	77.4	60	2	5	PASS
	700 MHz Upper C Block	81.6	60	2	5	PASS

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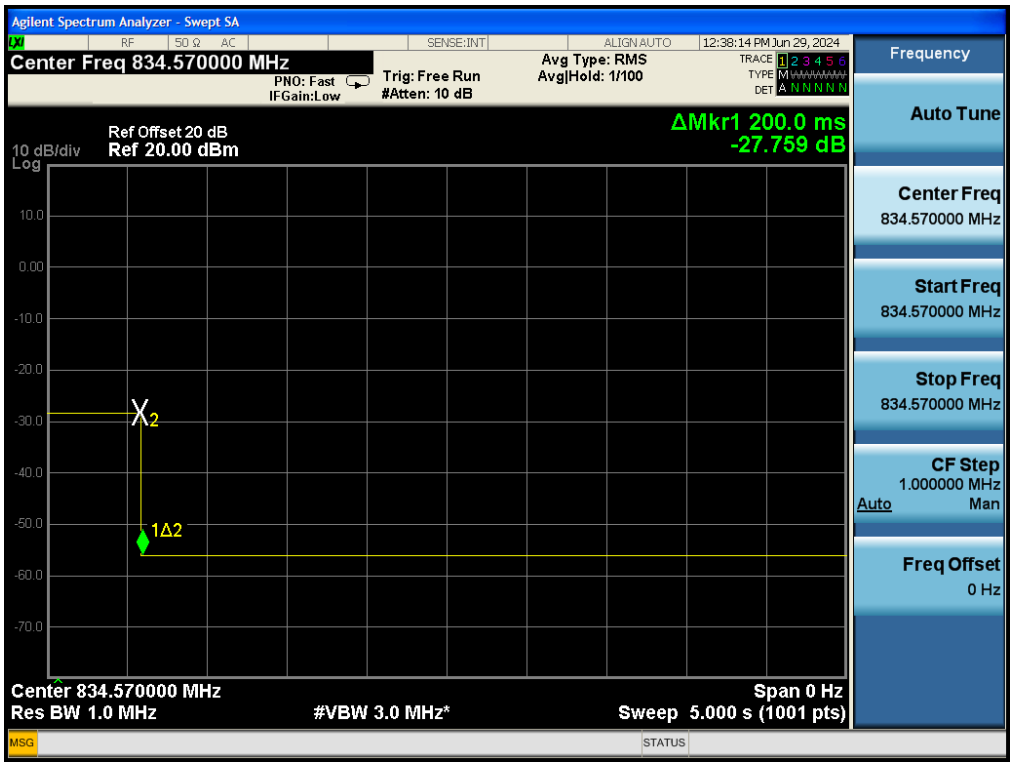
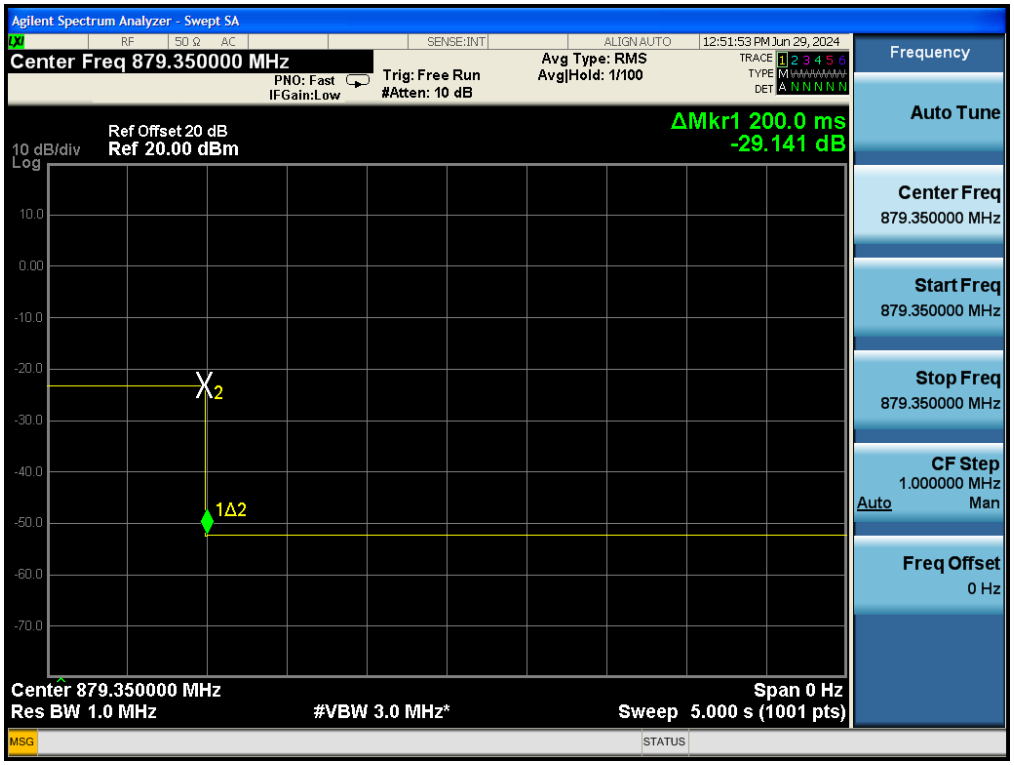
Test Test Plots of detection time

Cellula UL



Cellula DL



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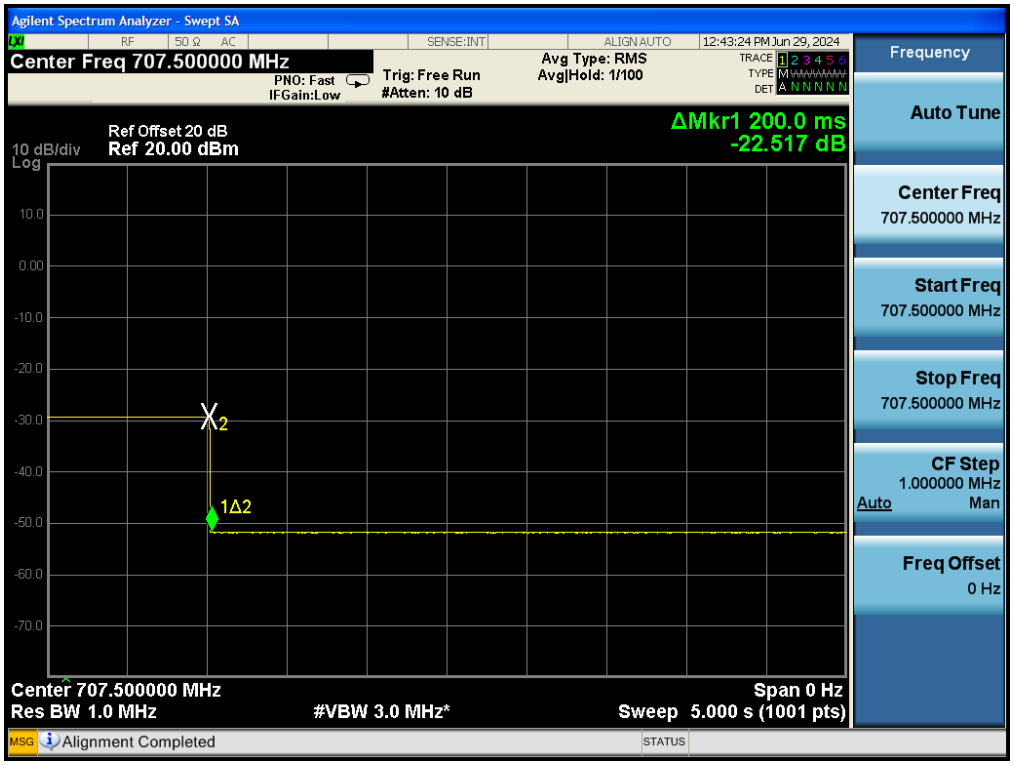
Lower A-E Blocks UL



Lower A-E Blocks DL

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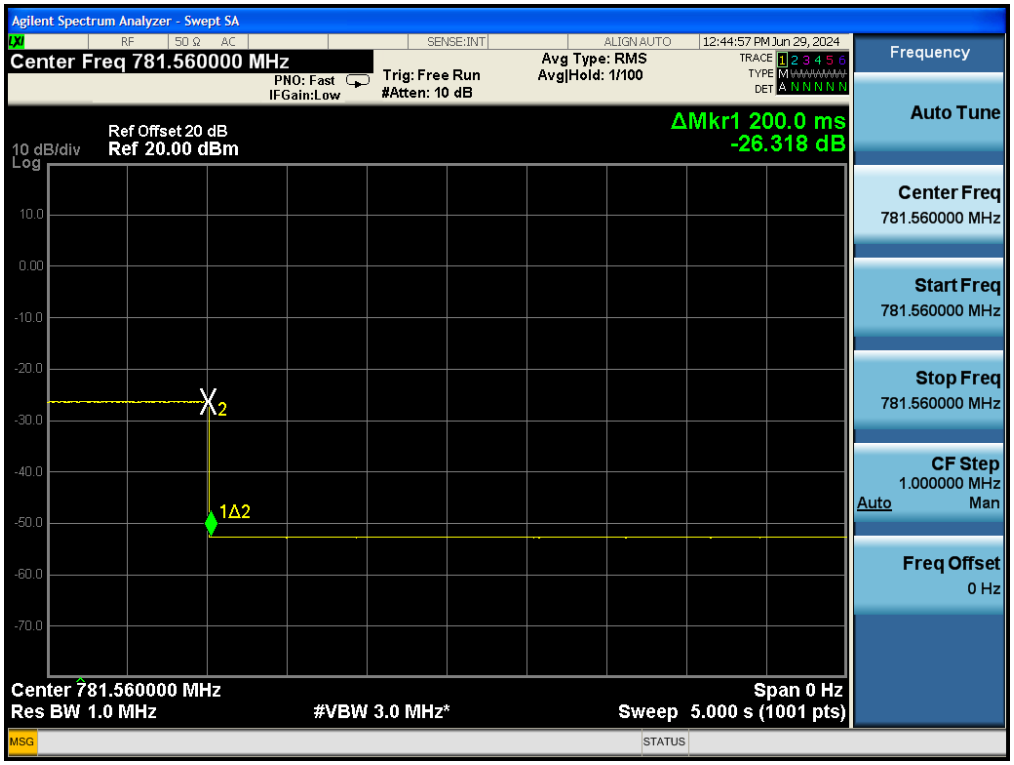
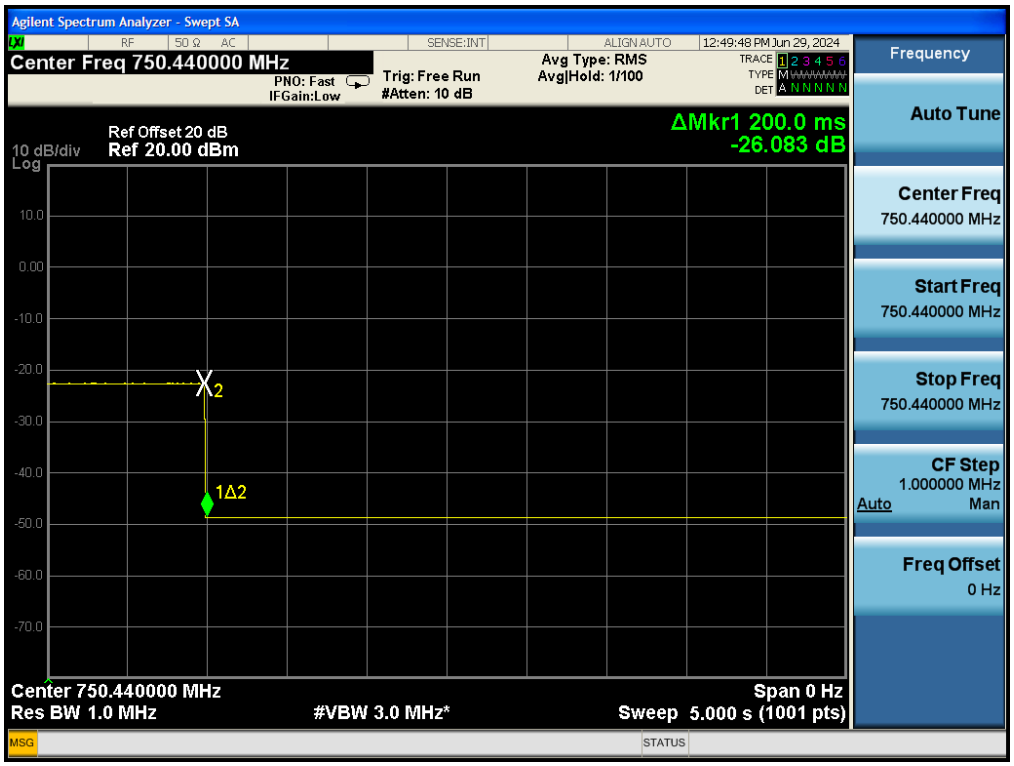
700 MHz Upper C Block UL



700 MHz Upper C Block DL



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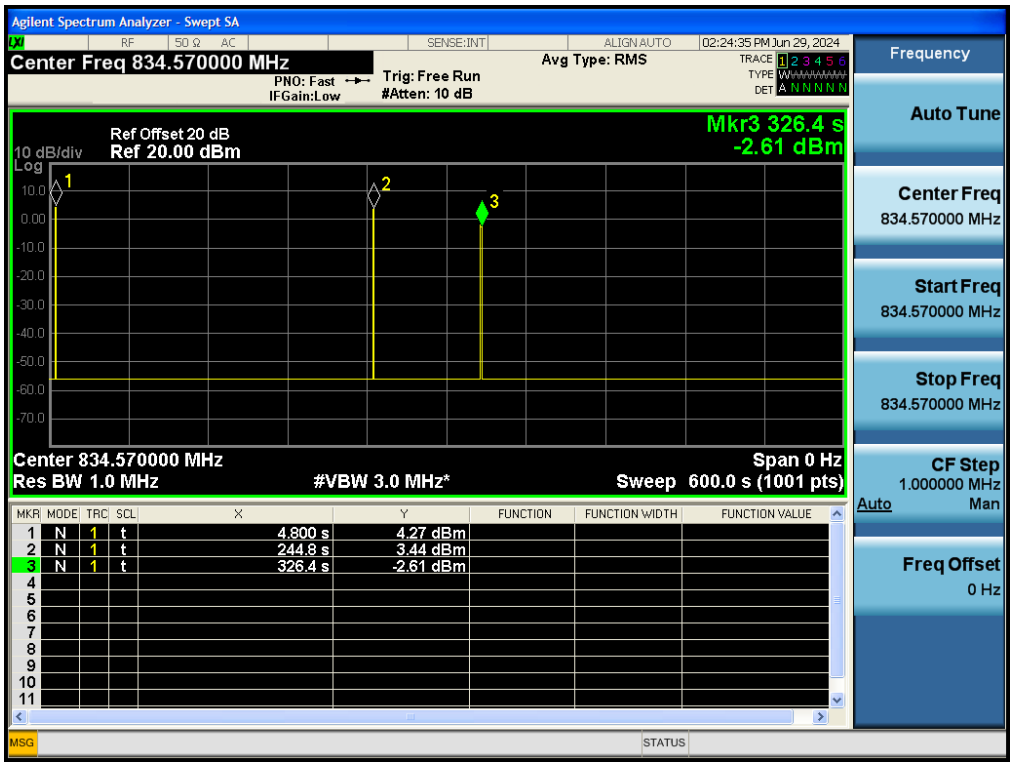
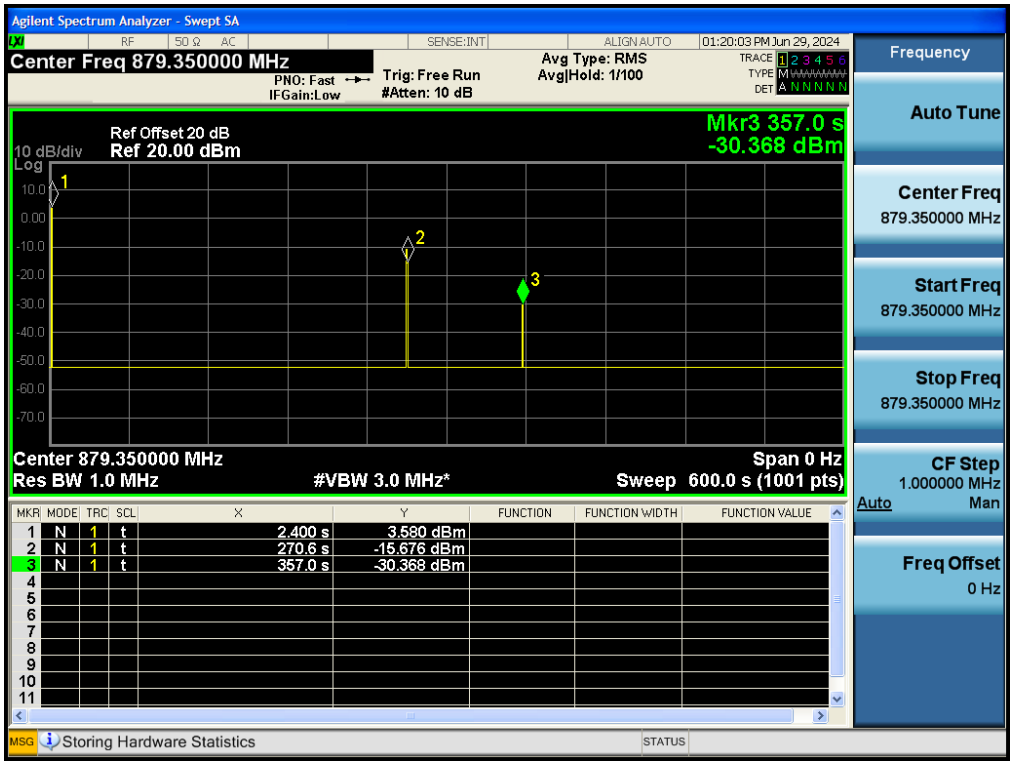
Test Test Plots of restarting time

Cellula UL



Cellula DL



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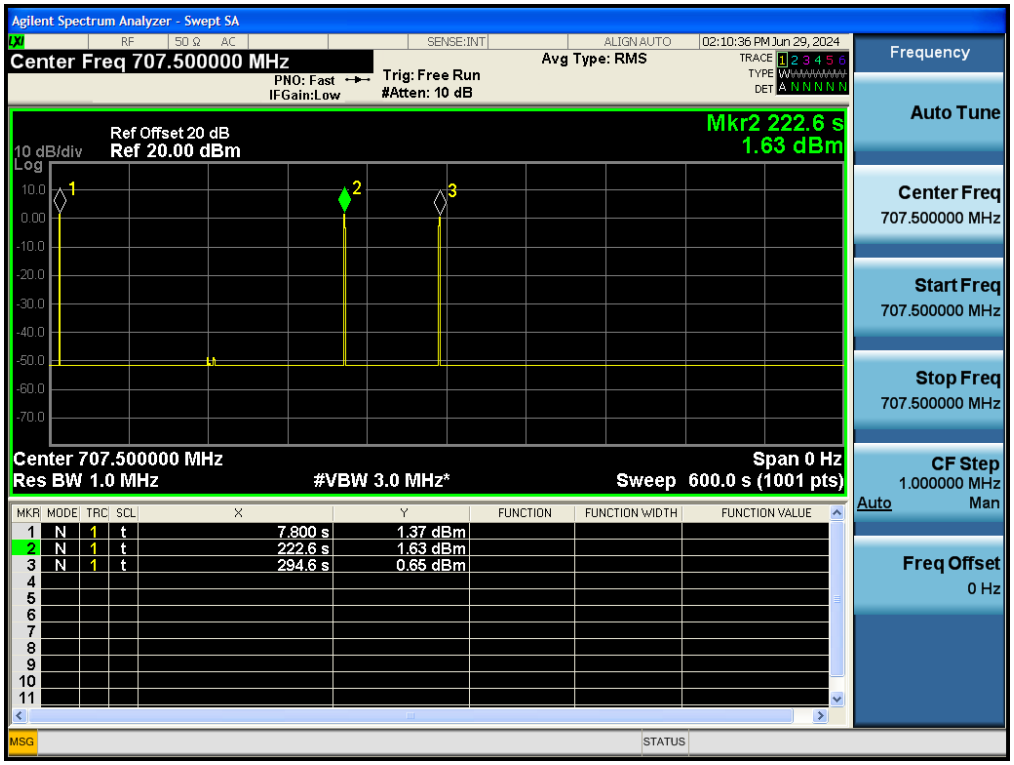
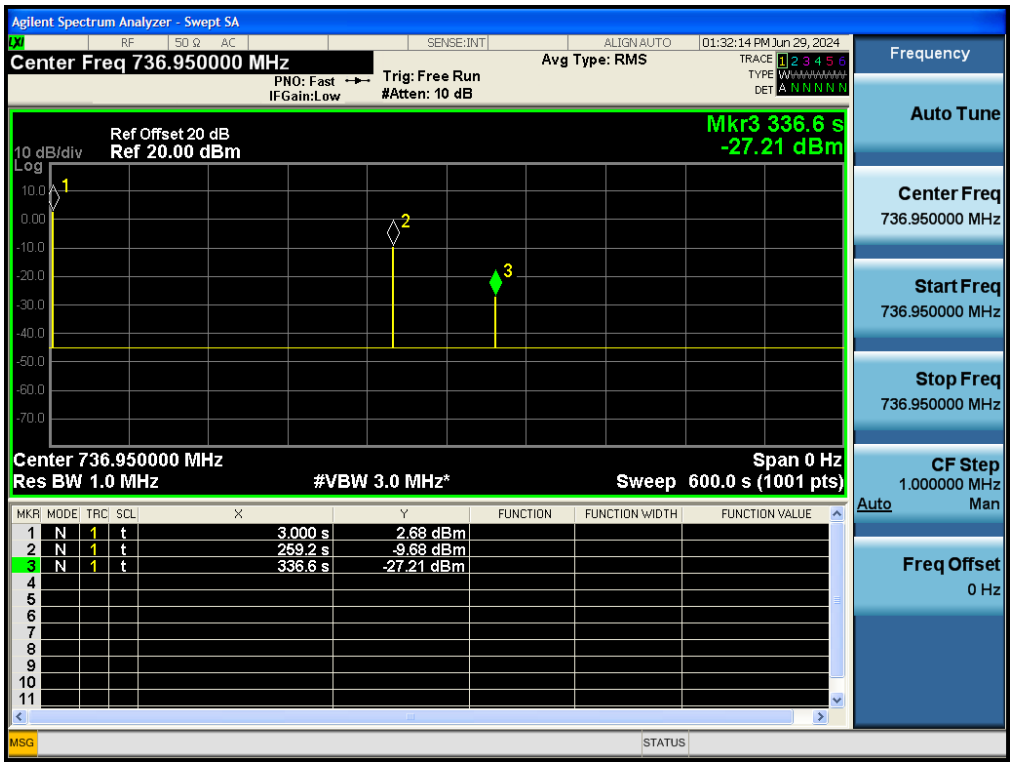
Lower A-E Blocks UL



Lower A-E Blocks DL



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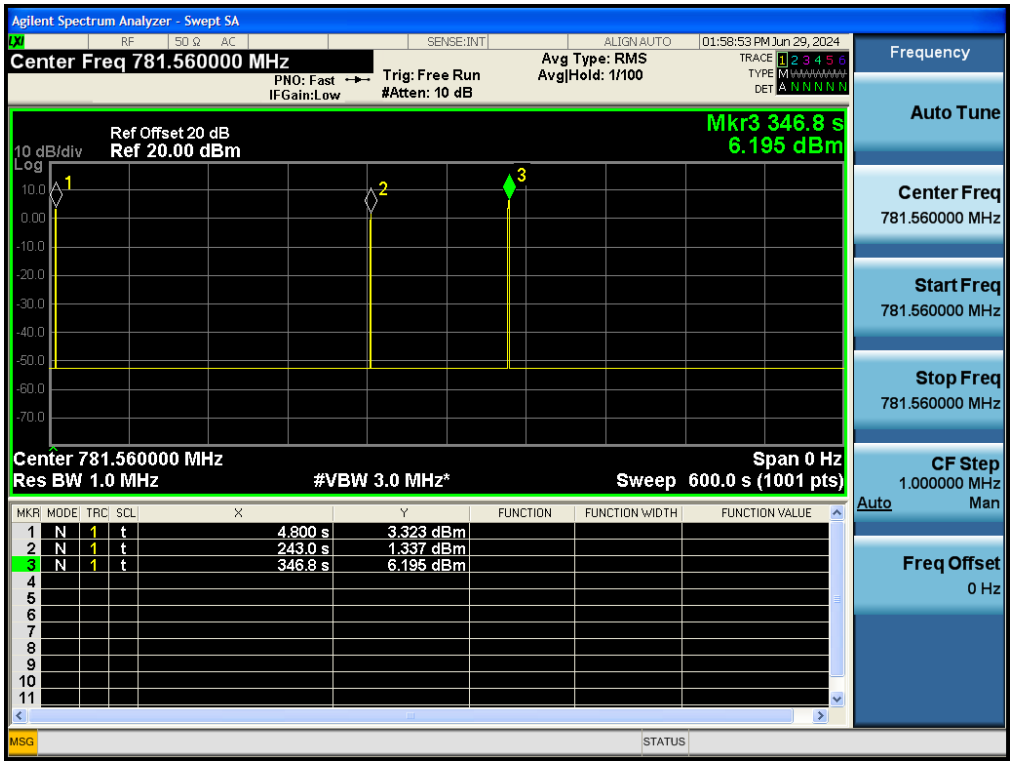
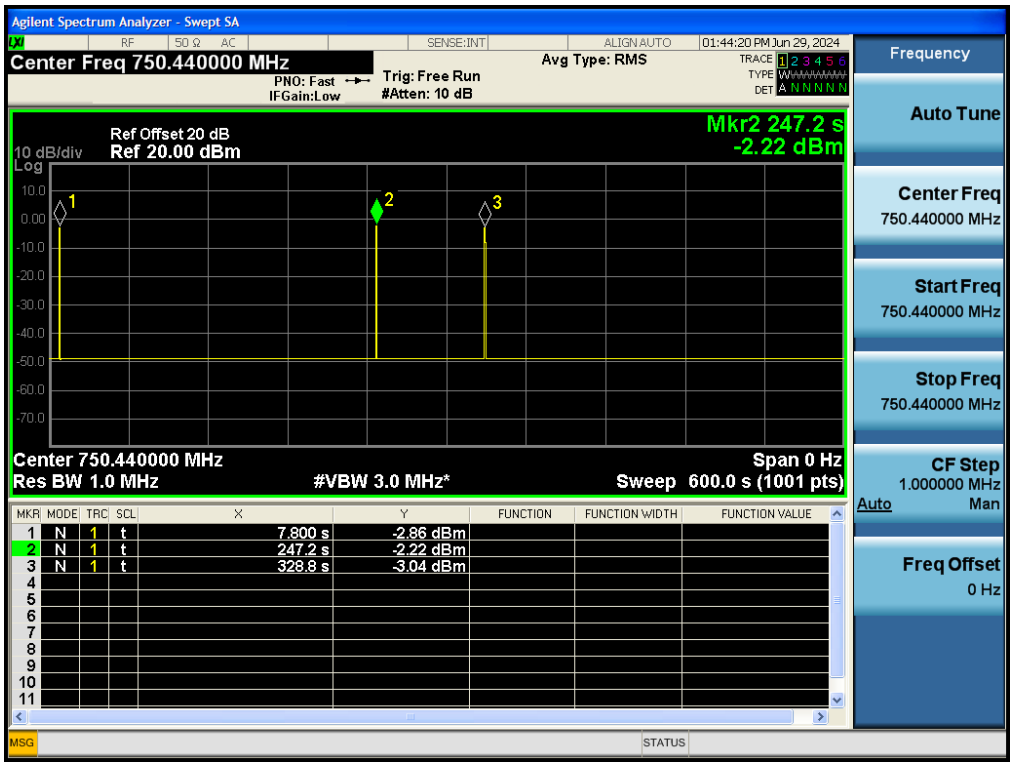
700 MHz Upper C Block UL



700 MHz Upper C Block DL



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Test results of Mitigation or Shutdown:

Cellula	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	824.3	-58.35	848.5	-67.25	8.90	<12	PASS
+4	824.3	-59.31	848.5	-68.41	9.10	<12	PASS
+3	824.3	-60.23	848.5	-69.38	9.15	<12	PASS
+2	824.3	-61.35	848.5	-70.21	8.86	<12	PASS
+1	824.3	-62.18	848.5	-71.38	9.20	<12	PASS
+0	824.3	-63.28	848.5	-72.14	8.86	<12	PASS
-1	824.3	-64.27	848.5	-72.56	8.29	<12	PASS
-2	824.3	-65.01	848.5	-73.01	8.00	<12	PASS
-3	/	/	/	/	/	<12	PASS
-4	/	/	/	/	/	<12	PASS
-5	/	/	/	/	/	<12	PASS

Cellula	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	870.5	-58.67	893.7	-66.35	7.68	<12	PASS
+4	870.5	-59.15	893.7	-67.03	7.88	<12	PASS
+3	870.5	-60.17	893.7	-68.07	7.90	<12	PASS
+2	870.5	-60.97	893.7	-69.42	8.45	<12	PASS
+1	870.5	-61.24	893.7	-70.64	9.40	<12	PASS
+0	870.5	-62.05	893.7	-71.35	9.30	<12	PASS
-1	870.5	-63.45	893.7	-71.72	8.27	<12	PASS
-2	/	/	/	/	/	<12	PASS
-3	/	/	/	/	/	<12	PASS
-4	/	/	/	/	/	<12	PASS
-5	/	/	/	/	/	<12	PASS

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Lower 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	707.6	-59.05	714.3	-68.51	9.46	<12	PASS
+4	707.6	-60.45	714.3	-69.35	8.90	<12	PASS
+3	707.6	-62.44	714.3	-70.65	8.21	<12	PASS
+2	707.6	-63.88	714.3	-71.34	7.46	<12	PASS
+1	707.6	-64.05	714.3	-71.61	7.46	<12	PASS
+0	707.6	-64.25	714.3	-72.03	7.78	<12	PASS
-1	707.6	-64.81	714.3	-72.35	7.54	<12	PASS
-2	707.6	-65.42	714.3	-73.18	7.76	<12	PASS
-3	/	/	/	/	/	<12	PASS
-4	/	/	/	/	/	<12	PASS
-5	/	/	/	/	/	<12	PASS

Lower 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	731.5	-60.25	743.8	-65.87	5.62	<12	PASS
+4	731.5	-61.64	743.8	-66.17	4.53	<12	PASS
+3	731.5	-62.25	743.8	-67.48	5.23	<12	PASS
+2	731.5	-63.47	743.8	-67.72	4.25	<12	PASS
+1	731.5	-63.28	743.8	-68.53	5.25	<12	PASS
+0	731.5	-64.84	743.8	-69.47	4.63	<12	PASS
-1	731.5	-65.21	743.8	-70.25	5.04	<12	PASS
-2	731.5	-65.79	743.8	-71.87	6.08	<12	PASS
-3	/	/	/	/	/	<12	PASS
-4	/	/	/	/	/	<12	PASS
-5	/	/	/	/	/	<12	PASS

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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	778.6	-59.36	785.8	-68.32	8.96	<12	PASS
+4	778.6	-61.58	785.8	-69.01	7.43	<12	PASS
+3	778.6	-62.25	785.8	-70.21	7.96	<12	PASS
+2	778.6	-63.64	785.8	-72.28	8.64	<12	PASS
+1	778.6	-63.58	785.8	-71.86	8.28	<12	PASS
+0	778.6	-63.26	785.8	-72.17	8.91	<12	PASS
-1	778.6	-65.05	785.8	-72.43	7.38	<12	PASS
-2	778.6	-65.33	785.8	-73.21	7.88	<12	PASS
-3	/	/	/	/	/	<12	PASS
-4	/	/	/	/	/	<12	PASS
-5	/	/	/	/	/	<12	PASS

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	746.3	-60.35	754.8	-66.13	5.78	<12	PASS
+4	746.3	-62.15	754.8	-67.29	5.14	<12	PASS
+3	746.3	-62.38	754.8	-68.41	6.03	<12	PASS
+2	746.3	-63.28	754.8	-67.29	4.01	<12	PASS
+1	746.3	-62.13	754.8	-69.01	6.88	<12	PASS
+0	746.3	-64.27	754.8	-69.32	5.05	<12	PASS
-1	746.3	-64.26	754.8	-71.46	7.2	<12	PASS
-2	746.3	-65.28	754.8	-71.53	6.25	<12	PASS
-3	/	/	/	/	/	<12	PASS
-4	/	/	/	/	/	<12	PASS
-5	/	/	/	/	/	<12	PASS

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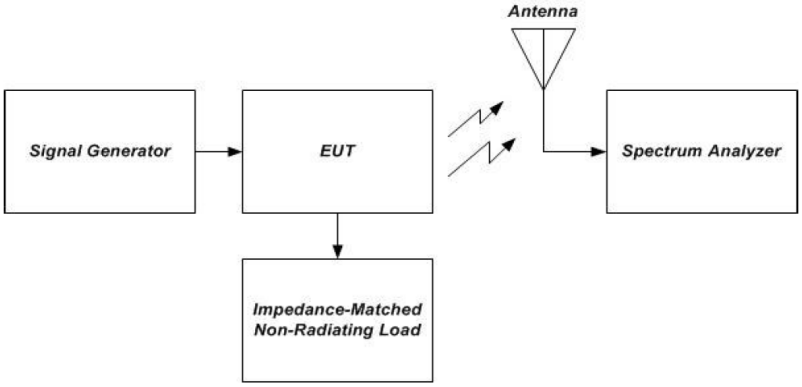
5.12 Radiated Spurious Emissions

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:	 Figure 10 – Radiated spurious emissions test and instrumentation setup
Procedure:	a) Place the EUT on an OATS or Anechoic chamber turntable 3m from the receiving antenna. b) Connect the EUT to the test equipment as shown in Figure 9 beginning with the uplink output c) 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. d) 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. e) 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. f) Repeat steps 7.12.3 to 7.12.5 for all operational bands.

5.12.1E.U.T. Operation:

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

5.12.2Test Data:

Frequency [MHz]	Antenna polarity [H/V]	Level [dBm]	Limit [dBm]	Margin [dB]
Cellula Uplink				
942.0	V	-44.03	-13.00	-31.03
942.0	H	-43.29		-30.29
3765.0	V	-42.28		-29.28
3765.0	H	-41.24		-28.24
-	-	-	-	-
Cellula Downlink				
981.3	V	-51.00	-13.00	-38.00
981.3	H	-52.29		-39.29
3925.0	V	-51.11		-38.11
3925.0	H	-52.05		-39.05
-	-	-	-	-

Frequency [MHz]	Antenna polarity [H/V]	Level [dBm]	Limit [dBm]	Margin [dB]
Lower A-E Blocks Uplink				
872.5	V	-46.37	-13.00	-33.37
872.5	H	-45.21		-32.21
3490.0	V	-43.24		-30.24
3490.0	H	-42.31		-29.31
-	-	-	-	-
Lower A-E Blocks Downlink				
858.0	V	-52.31	-13.00	-39.31
858.0	H	-51.42		-38.42
4290.0	V	-49.64		-36.64
4290.0	H	-49.98		-36.98
-	-	-	-	-

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Frequency [MHz]	Antenna polarity [H/V]	Level [dBm]	Limit [dBm]	Margin [dB]
700 MHz Upper C Block Uplink				
837	V	-45.62	-13.00	-32.62
837	H	-45.63		-32.63
1674	V	-44.25		-31.25
1674	H	-43.09		-30.09
-	-	-	-	-
700 MHz Upper C Block Downlink				
881.5	V	-52.68	-13.00	-39.68
881.5	H	-51.8		-38.80
1763.0	V	-49.84		-36.84
1763.0	H	-50.07		-37.07
-	-	-	-	-

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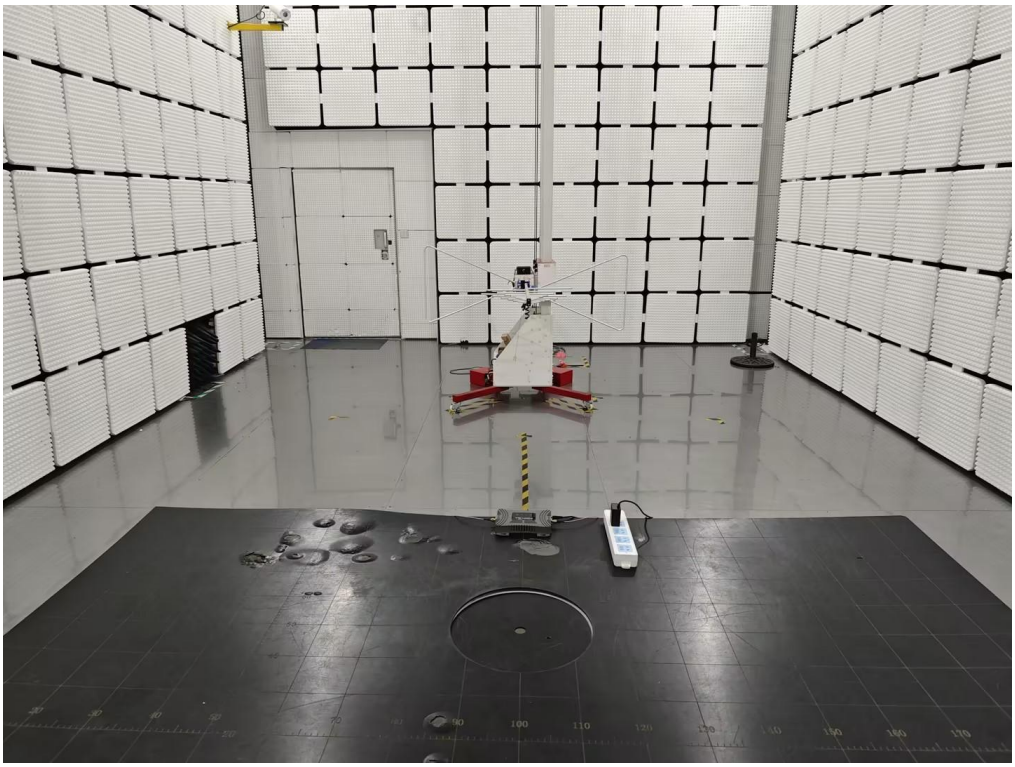
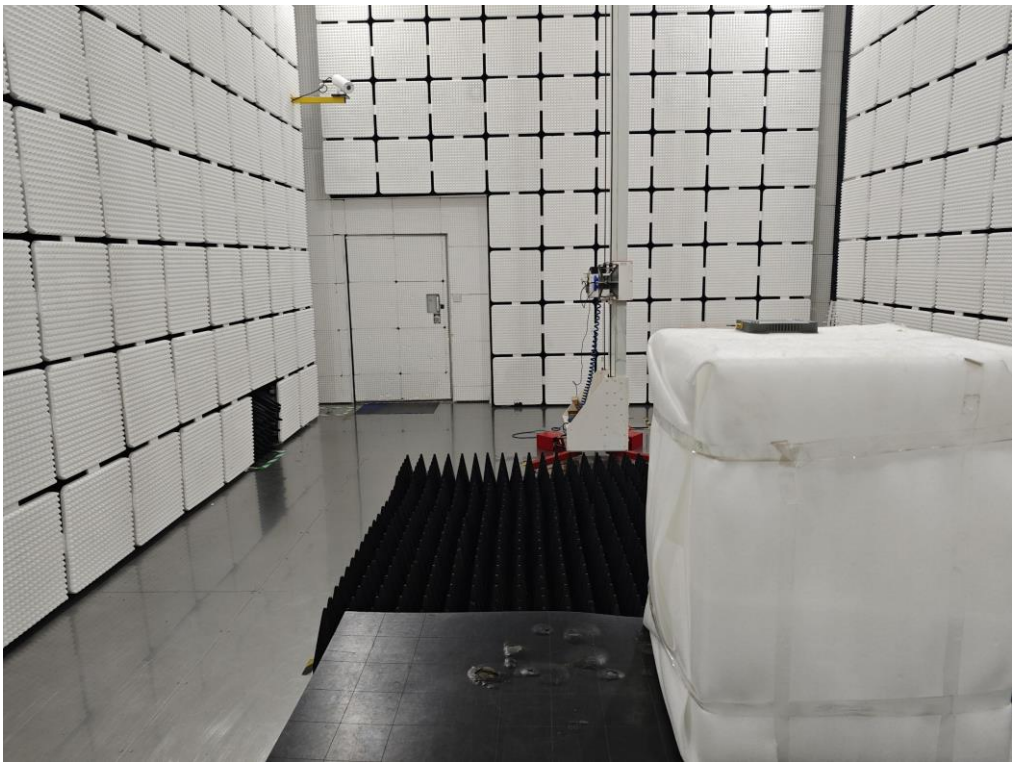
6 Test Setup Photos

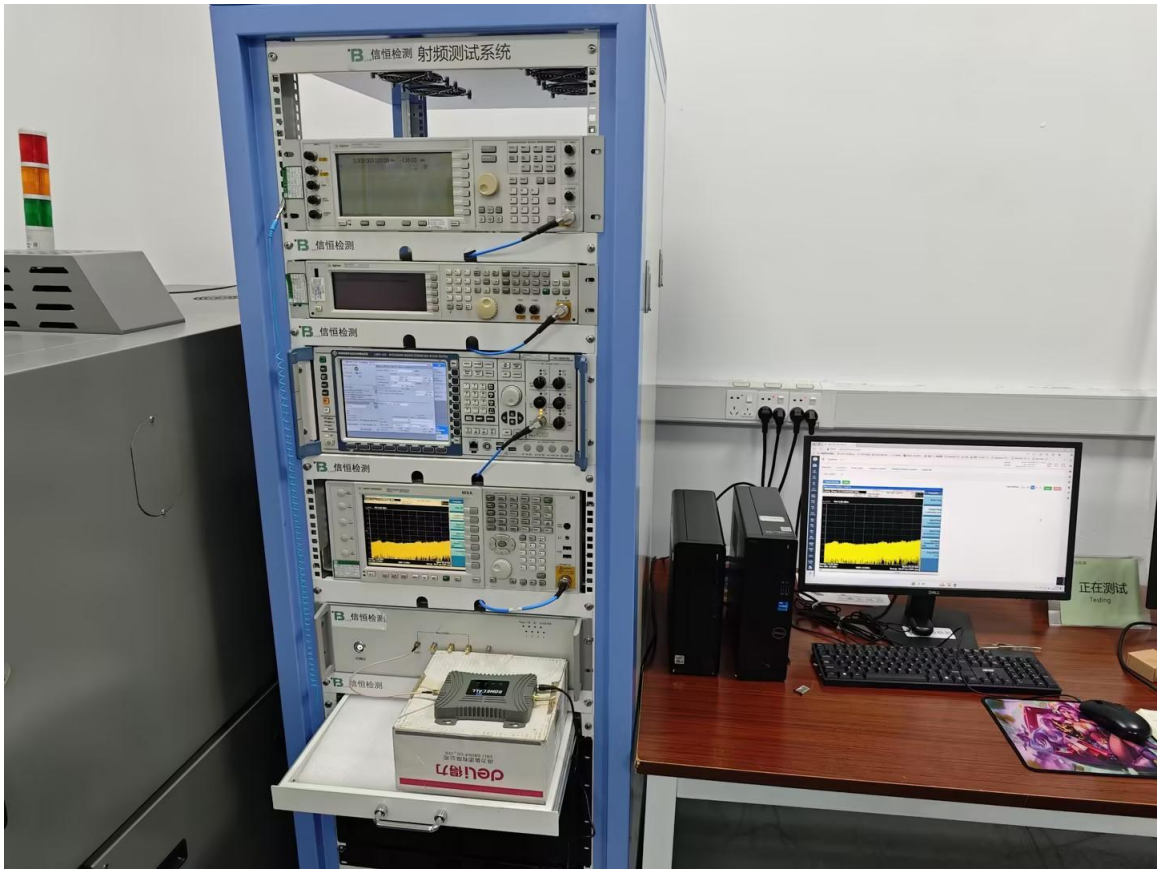
Below 1GHz



Above 1GHz



RF TEST



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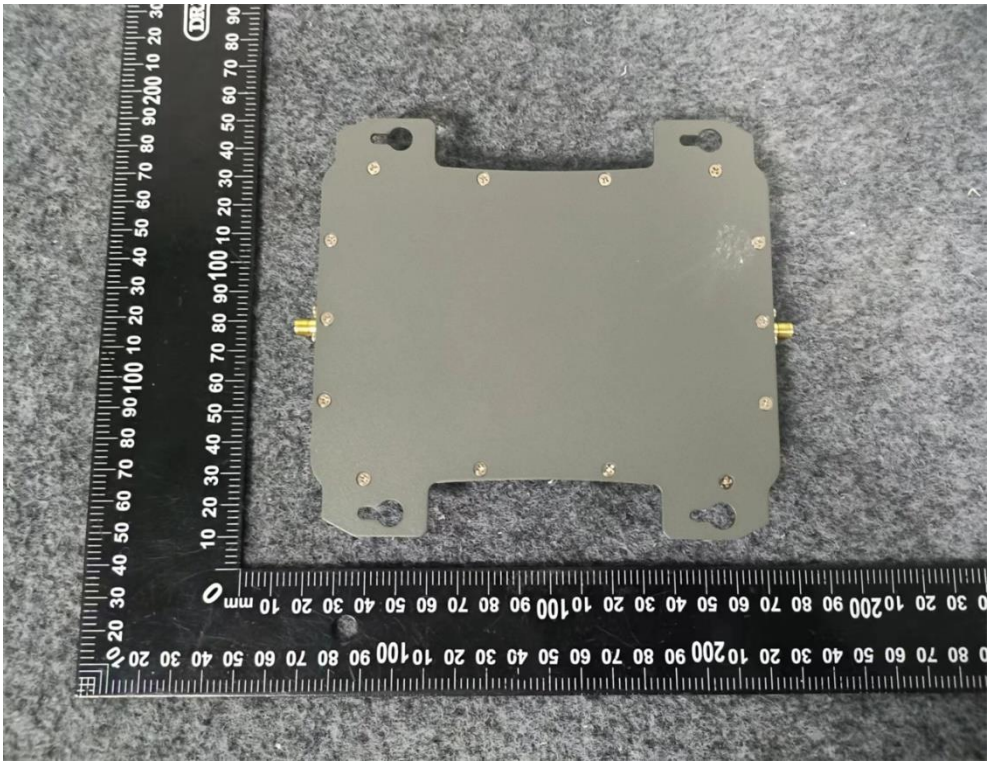
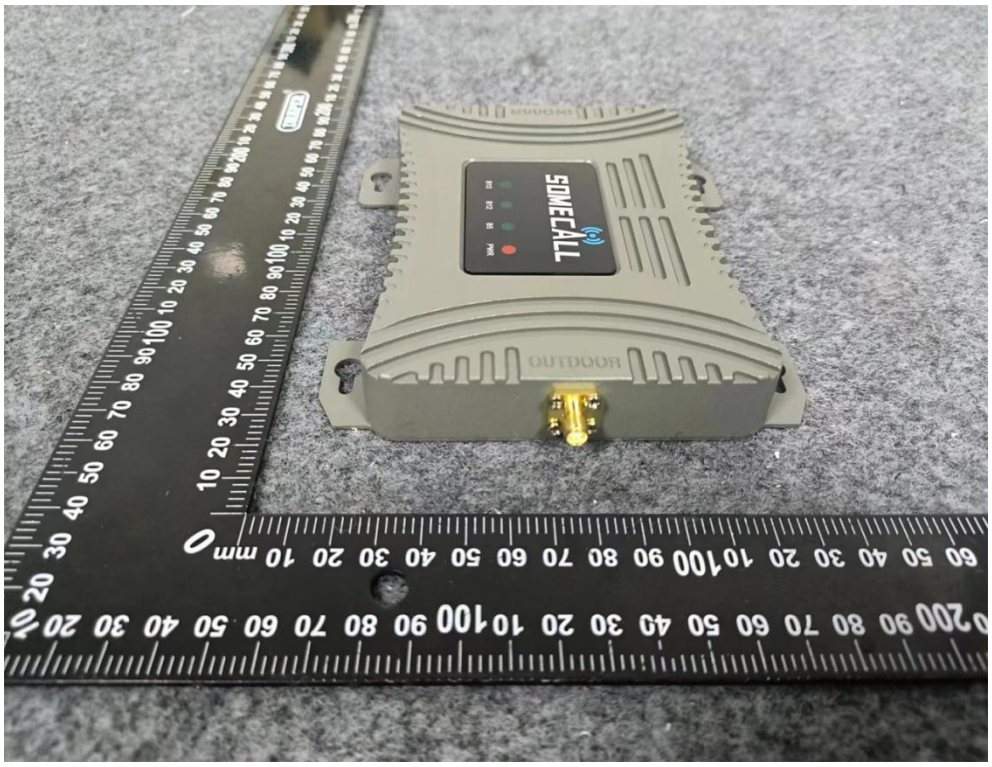
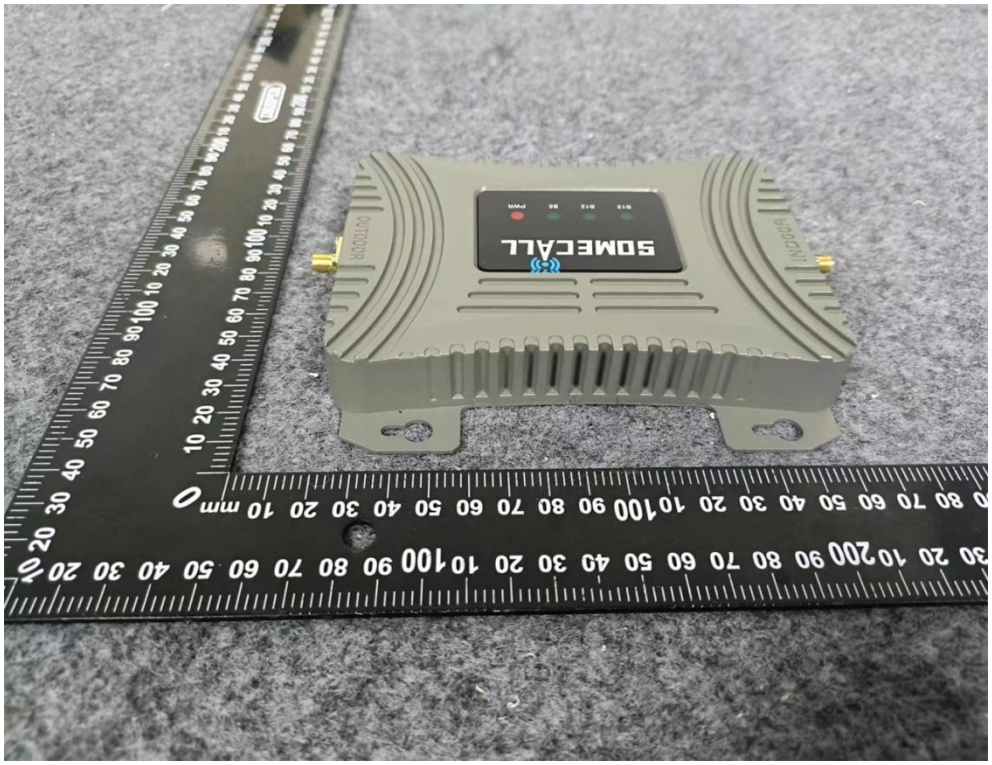
7 EUT Photos


SOMECALL
B13
B12
B5
PWR
INDOOR
OUTDOOR







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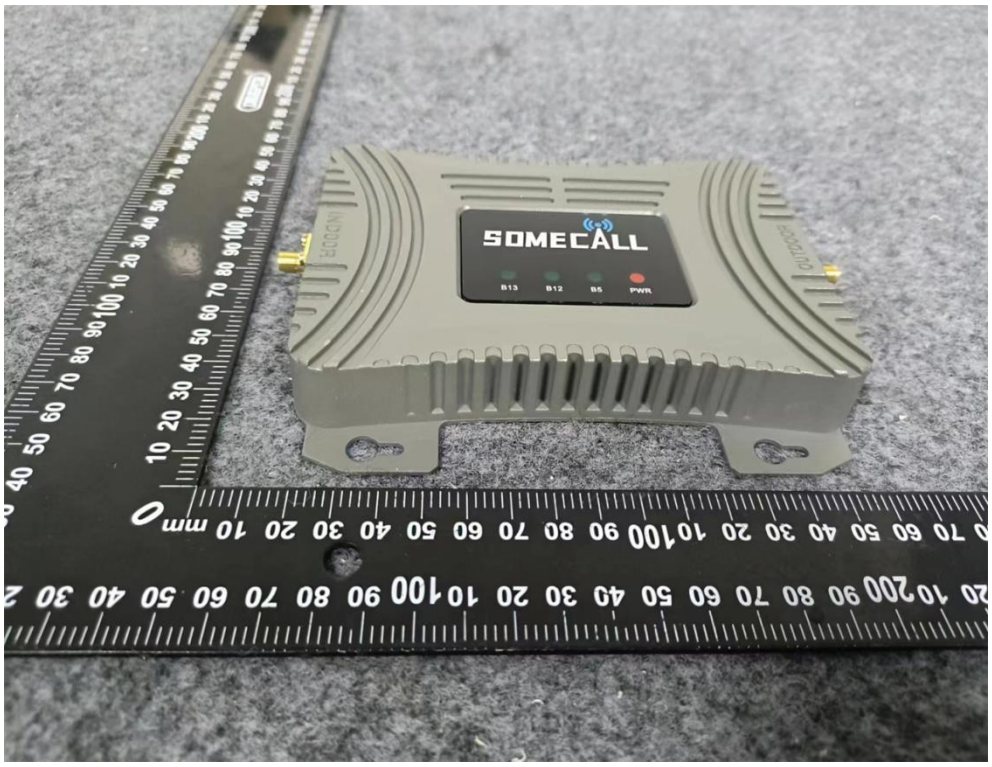

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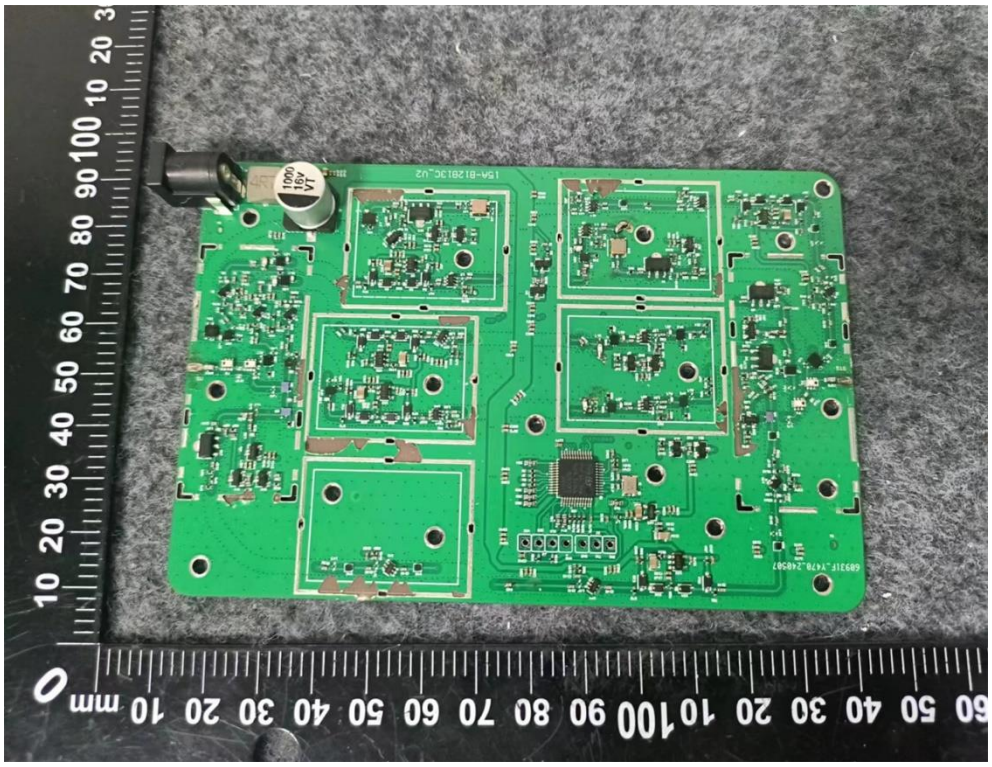

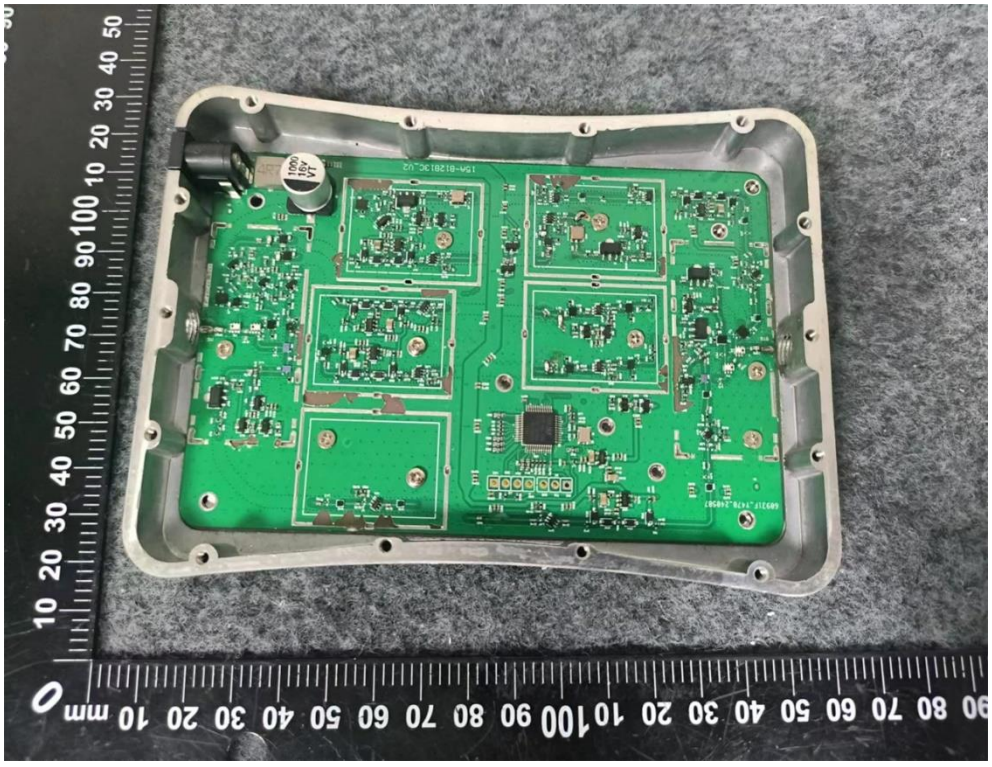

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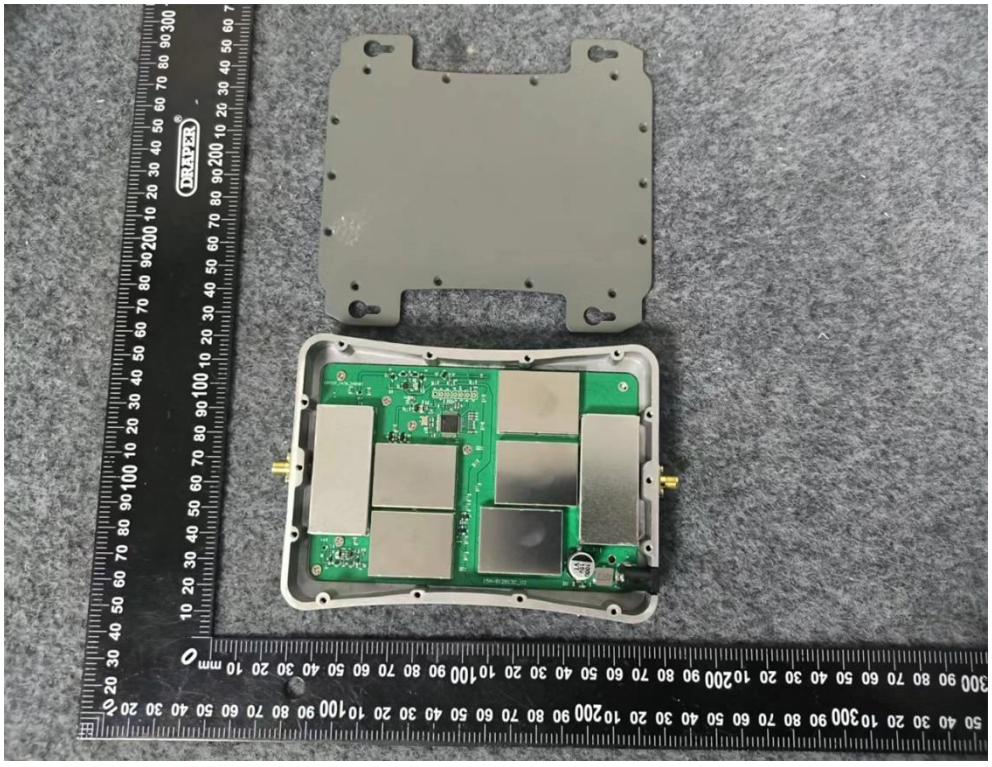

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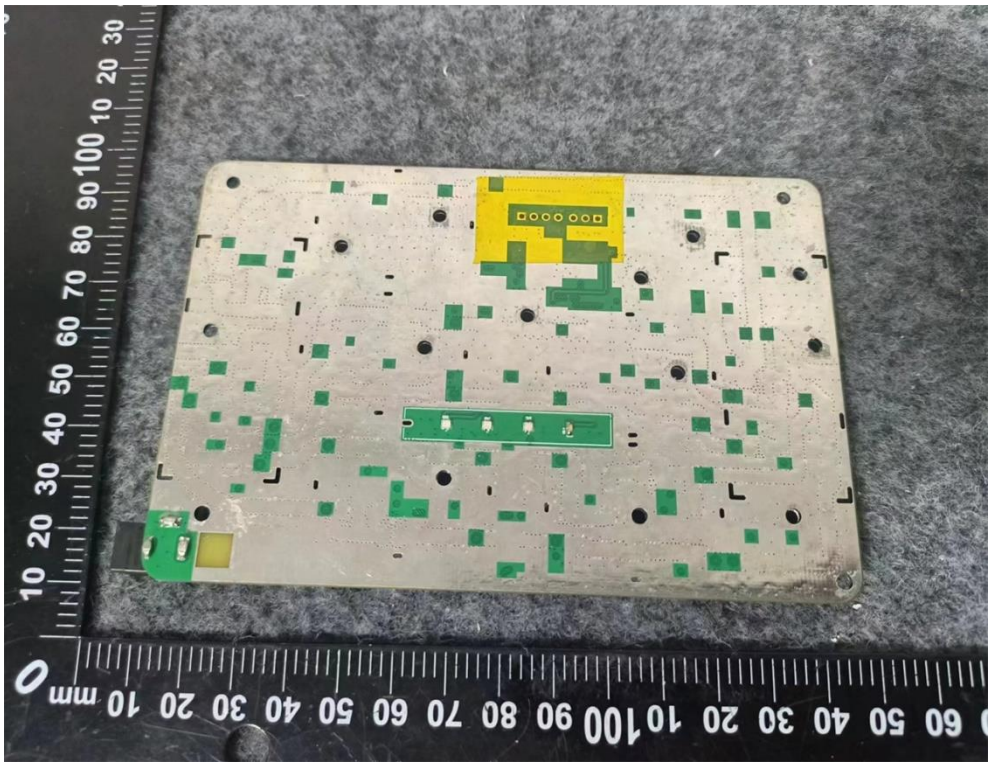

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-- END OF REPORT --

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