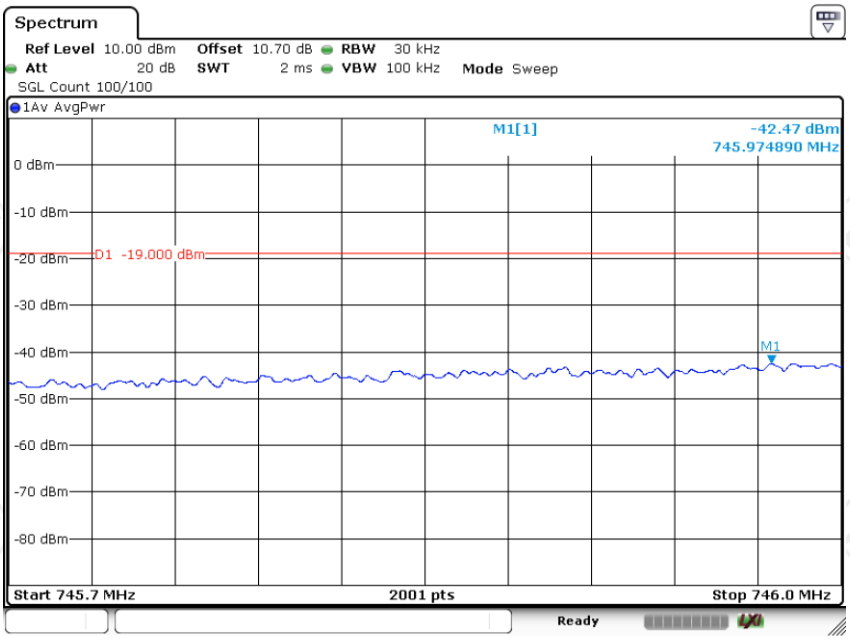
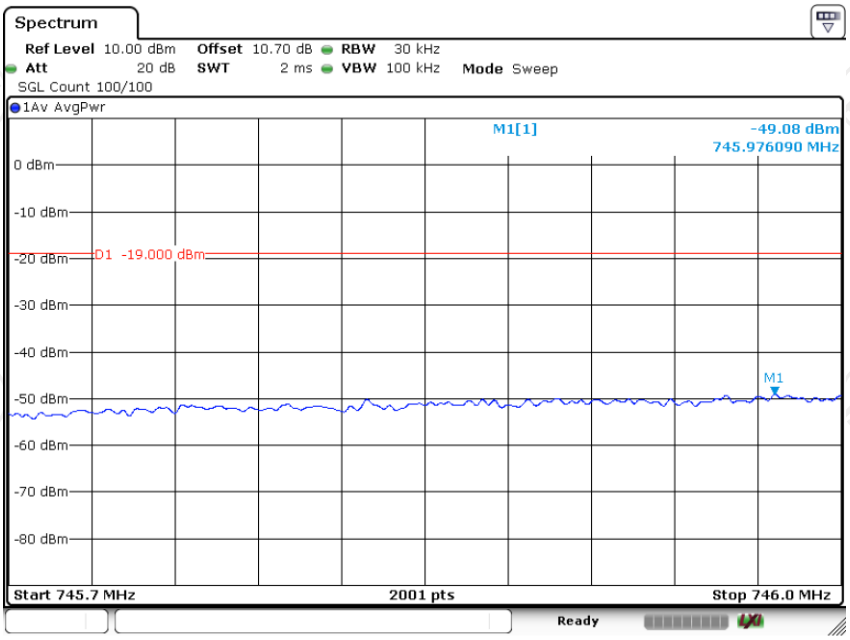
Upper700MHz CDMA DL Left Side Pre AGC



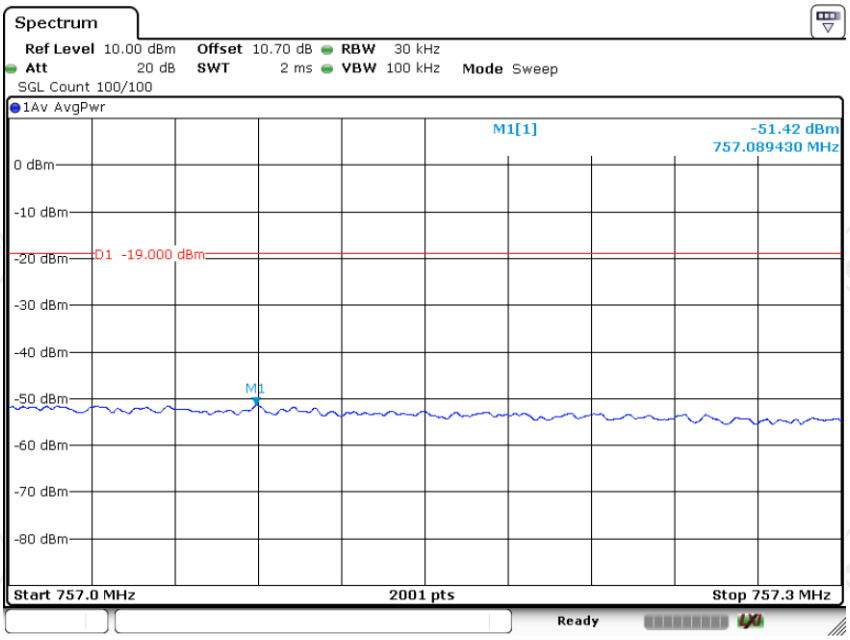
Date: 6.NOV.2024 16:44:42

Upper700MHz CDMA DL Left Side Pre AGC + 10 dB



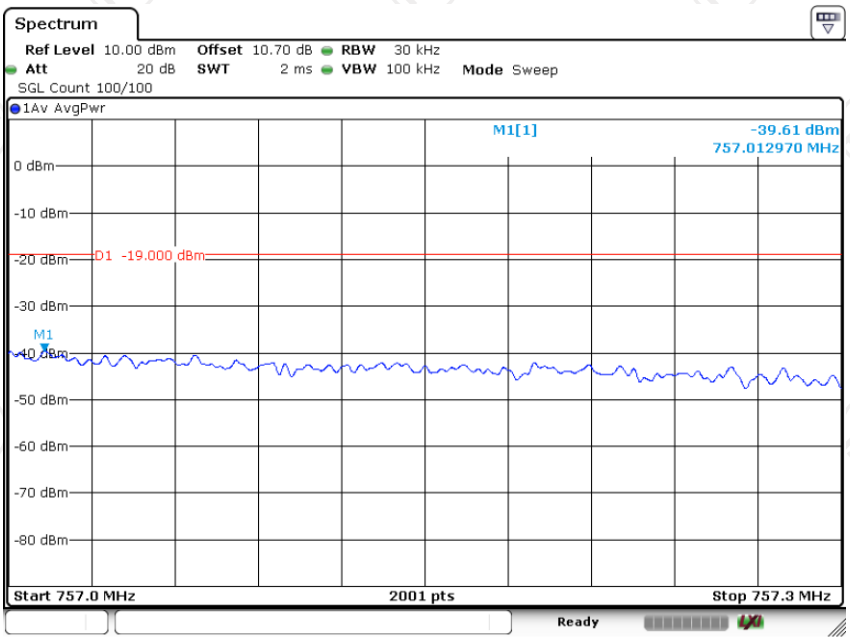
Date: 6.NOV.2024 16:45:06

Upper700MHz CDMA DL Right Side Pre AGC



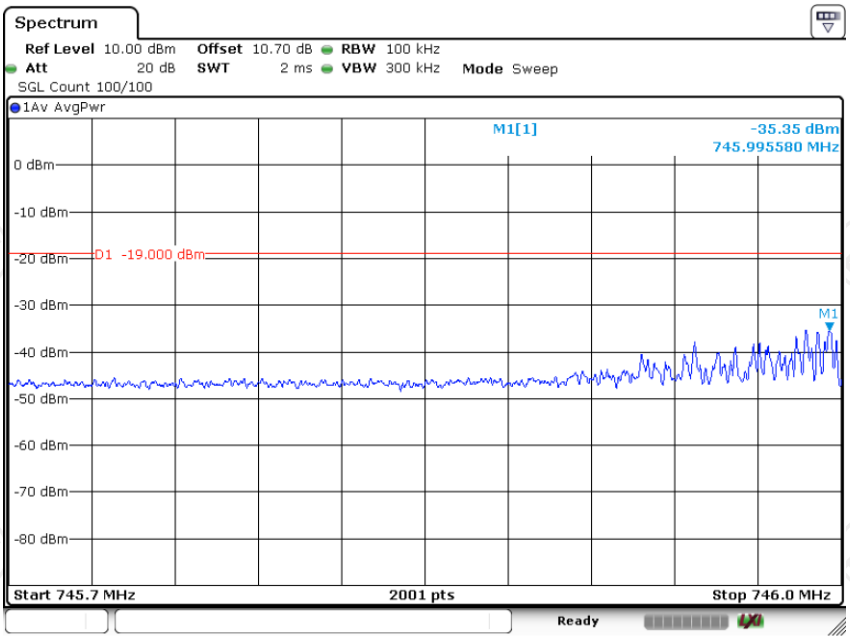
Date: 6.NOV.2024 16:49:27

Upper700MHz CDMA DL Right Side Pre AGC + 10 dB



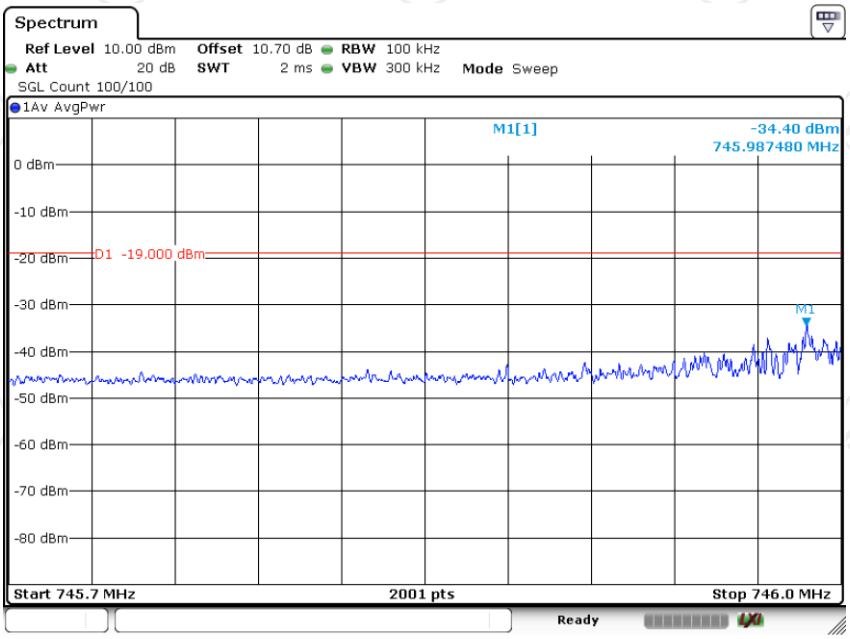
Date: 6.NOV.2024 16:50:00

Upper700MHz LTE DL Left Side Pre AGC



Date: 6.NOV.2024 16:45:45

Upper700MHz LTE DL Left Side Pre AGC + 10 dB



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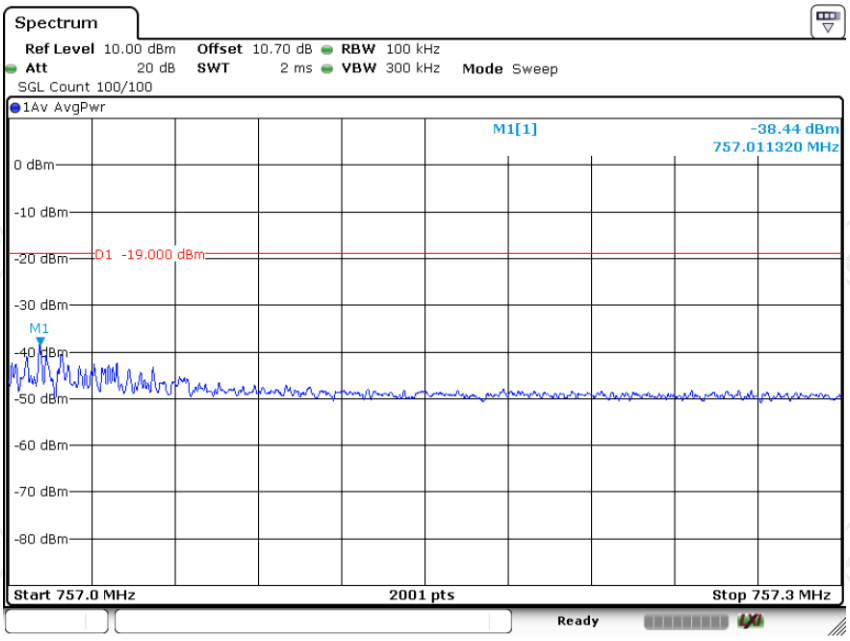
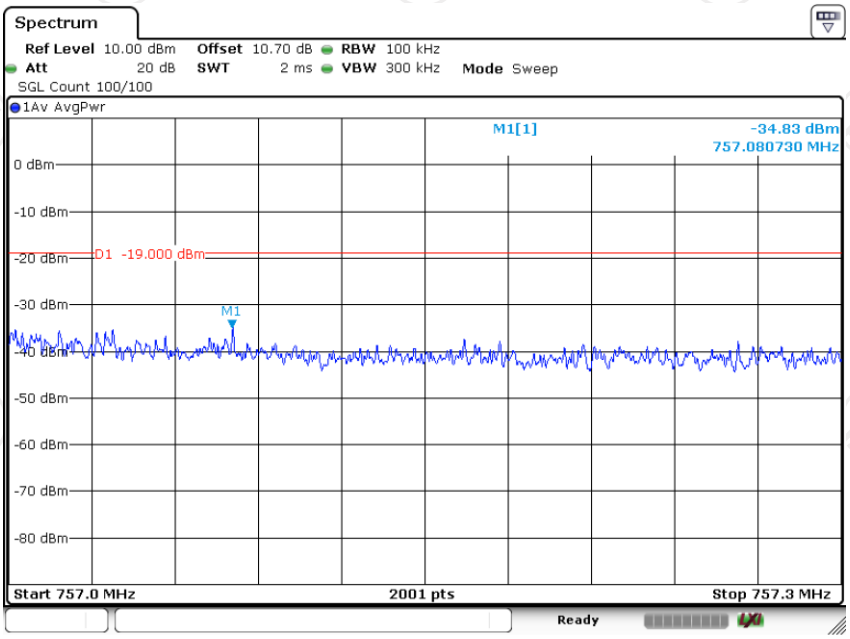
Upper700MHz LTE DL Right Side Pre AGC



Date: 6.NOV.2024 16:47:03

Upper700MHz LTE DL Right Side Pre AGC + 10 dB



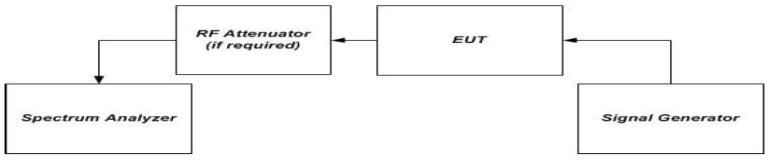
Date: 6.NOV.2024 16:47:29

Note: All the RF path have been tested, only the worst-case DL path (The table below is listed) reported.

Band	Uplink	Downlink
PCS	Sever1-Donor	Donor- Sever4
AWS	Sever1-Donor	Donor- Sever4
Cellular	Sever2-Donor	Donor- Sever1
Lower700	Sever2-Donor	Donor- Sever2
Upper700	Sever4-Donor	Donor- Sever2

5.5. Conducted Spurious Emission

5.5.1. Test Specification

Test Requirement:	FCC Part2 Section 1051; FCC Rules Part 27 Subpart C, Section 27.53
Test Method:	KDB 935210 D03 Signal Booster Measurements v04r04
Limit:	-13 dBm； For equipment operating in the frequency bands 746-756 MHz and 777-787 MHz, The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least: (i) 76 + 10 log10 p (watts), dB, for base and fixed equipment, and (ii) 65 + 10 log10 p (watts), dB, for mobile and portable equipment.
Test Setup:	
Test Procedure:	a) Connect the EUT to the test equipment as shown in Set-Up. Begin with the uplink output connected to the spectrum analyzer. b) Configure the signal generator for AWGN with a 99% occupied bandwidth of 4.1 MHz operation 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 Maximum power. d) Turn on the signal generator RF output and measure the spurious emission power levels with an appropriate measurement instrument as follows. e) Set RBW = measurement bandwidth specified in the applicable rule section for the operational frequency band under consideration (see Annex 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) to enhance measurement accuracy, but the result must then be integrated over the specified measurement bandwidth. f) Set VBW = 3 X RBW. g) Select the power averaging (RMS) detector. (See above note regarding the use of a peak detector for preliminary measurements.) h) Sweep time = auto-couple. i) 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 X 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. Trace average at least 10 traces in power averaging (i.e., RMS) mode.

	j) Use the peak marker function to identify the highest amplitude level over each measured frequency range Record the frequency and amplitude and capture a Test Plots for inclusion in the test report. k) 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 X 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. l) 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 Test Plots for inclusion in the test report. m) Repeat steps b) through l) for each supported frequency band of operation.
Test Result:	PASS

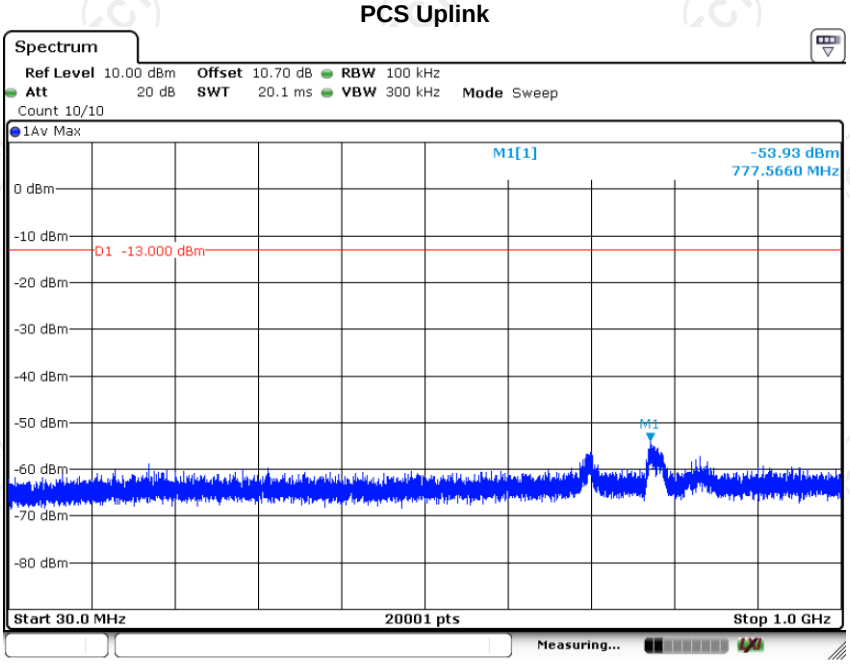
5.5.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Signal Generator	Agilent	N5182A	MY47070282	Feb. 01, 2024	Jan. 31, 2025
Spectrum Analyzer	R&S	FSV40-N	102188	Feb. 01, 2024	Jan. 31, 2025
Attenuator	50FP-006-H3	JFW	907763	/	/

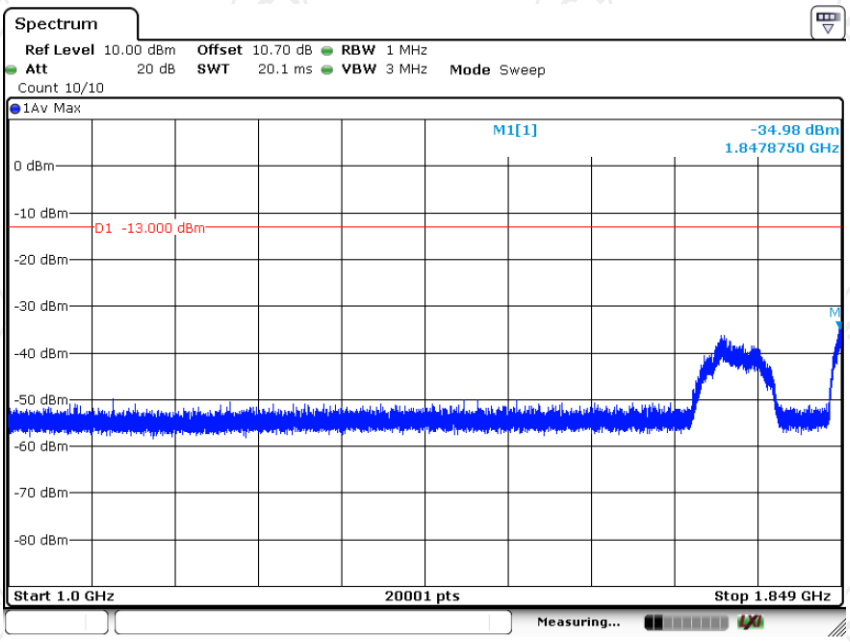
5.5.3. Test data

Test Plots

PCS Uplink



Date: 7.NOV.2024 15:43:41



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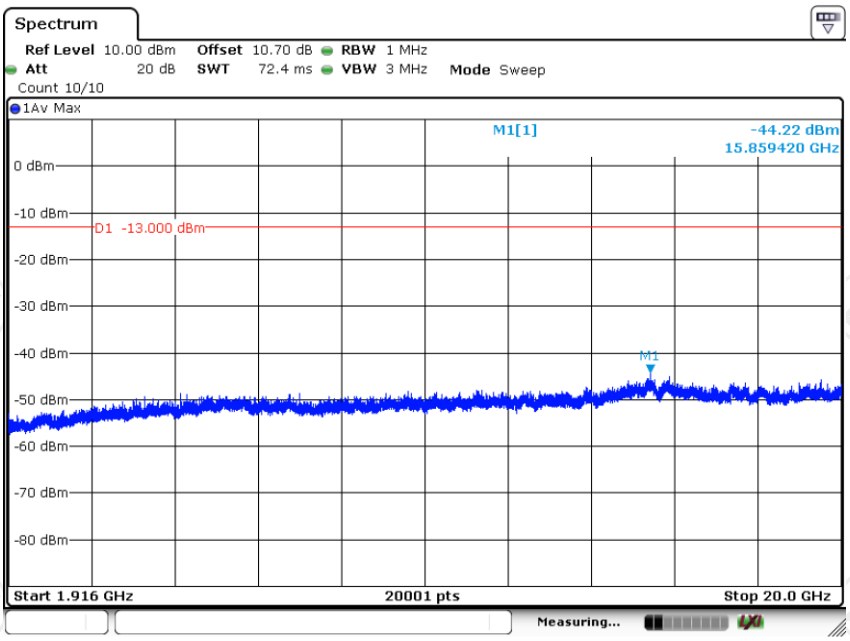

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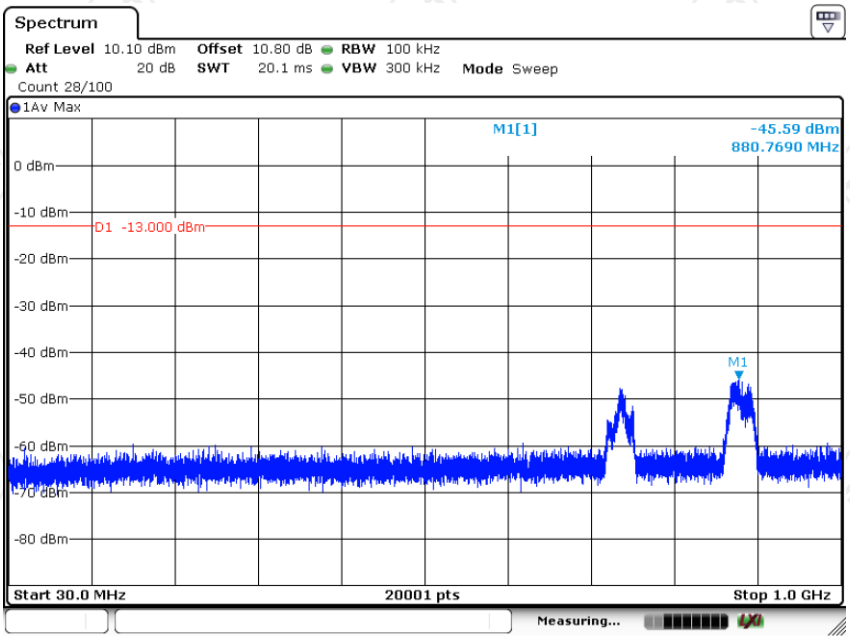
PCS Downlink



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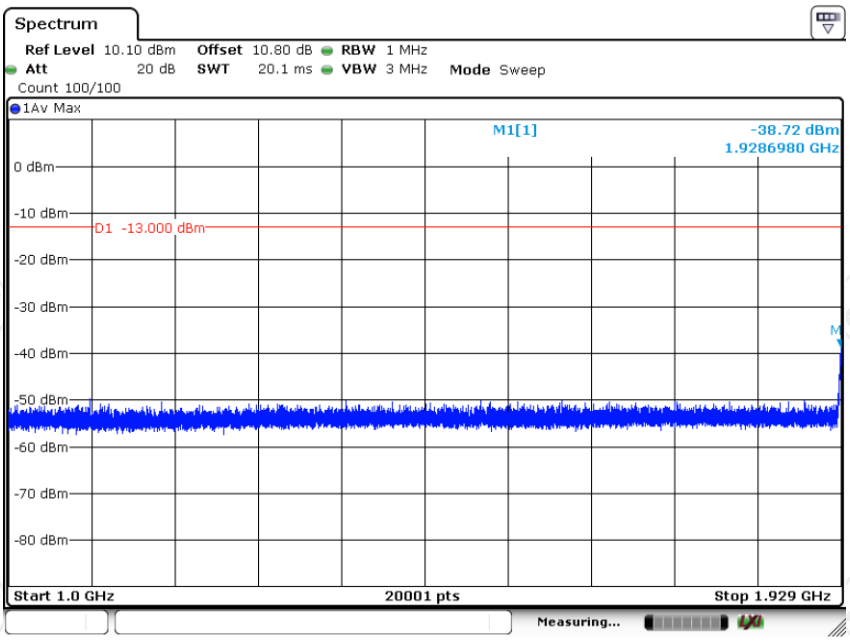

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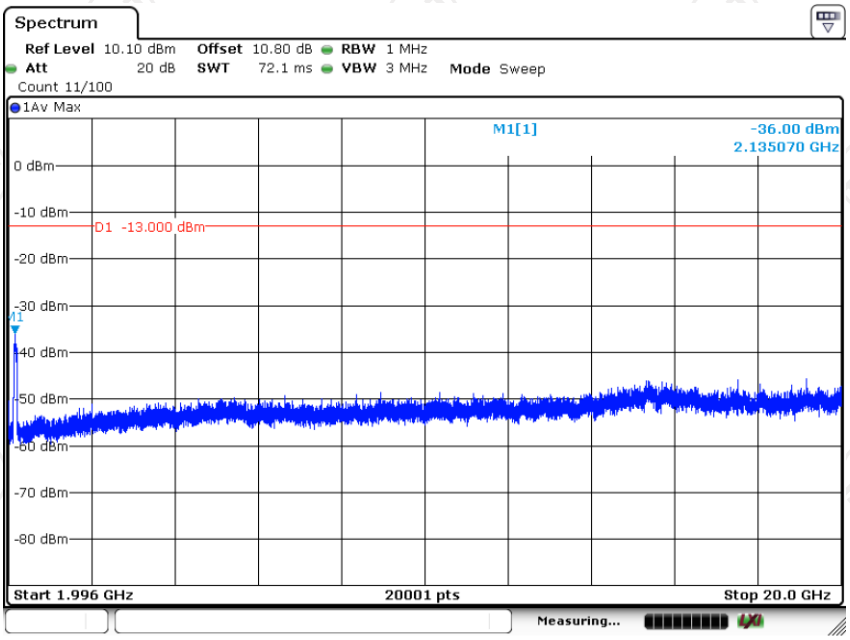

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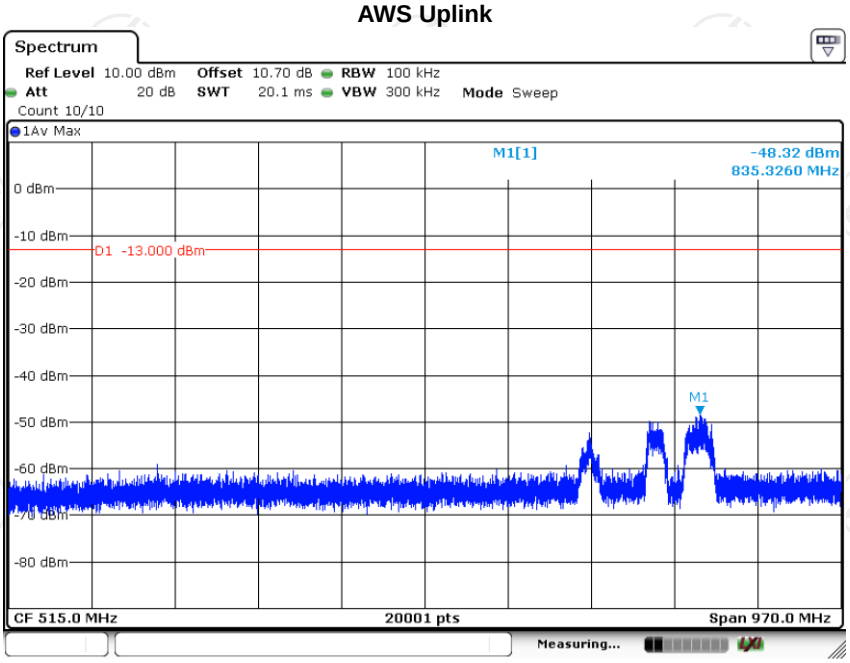
Test Plots

AWS Uplink



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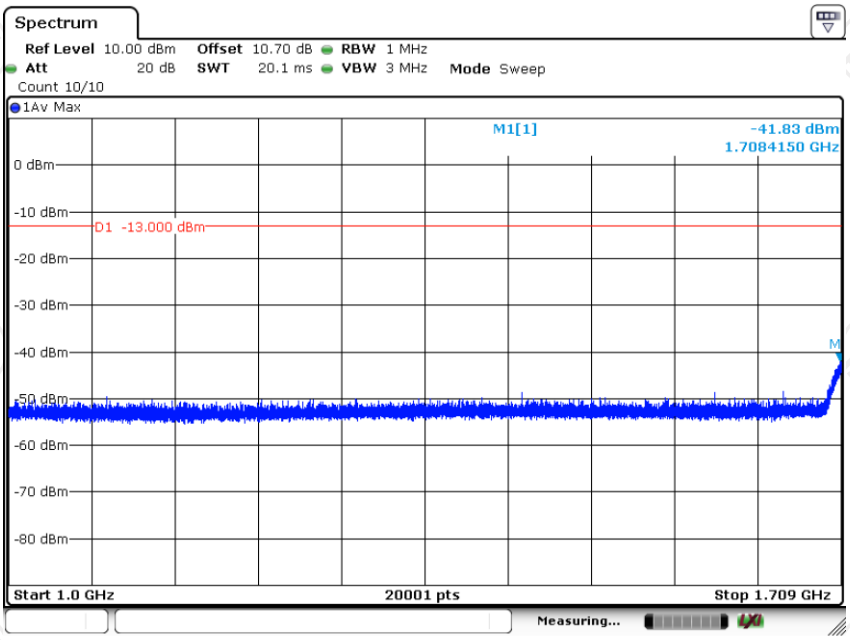

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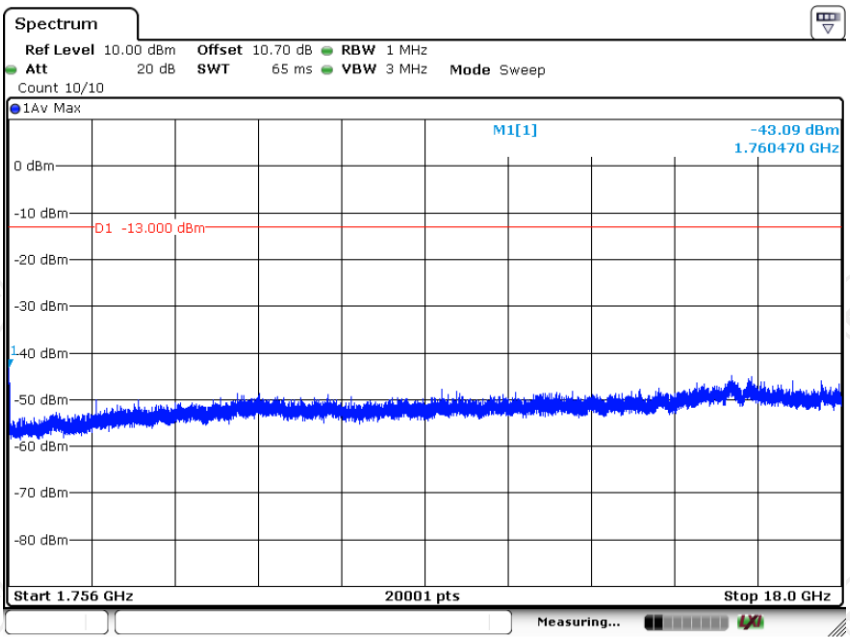

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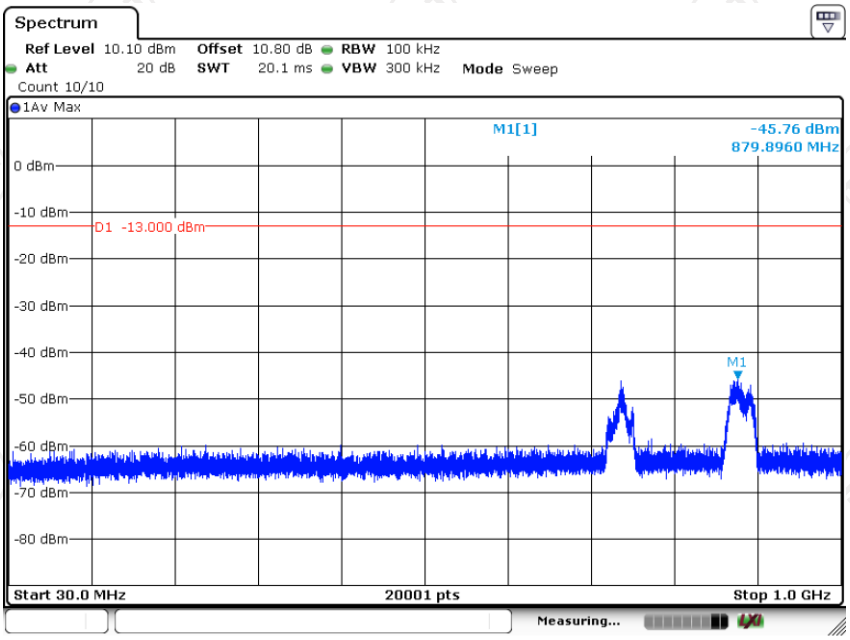
AWS Downlink



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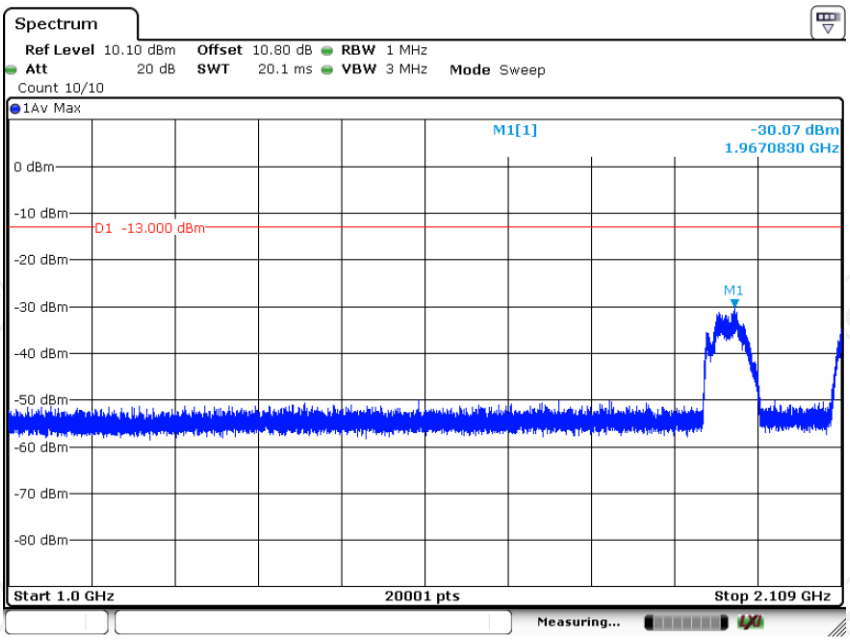

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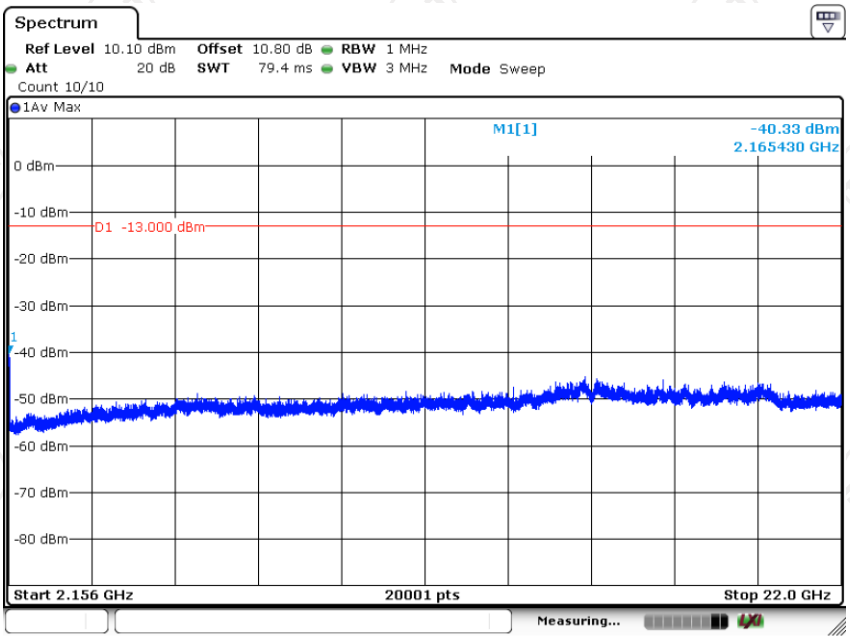
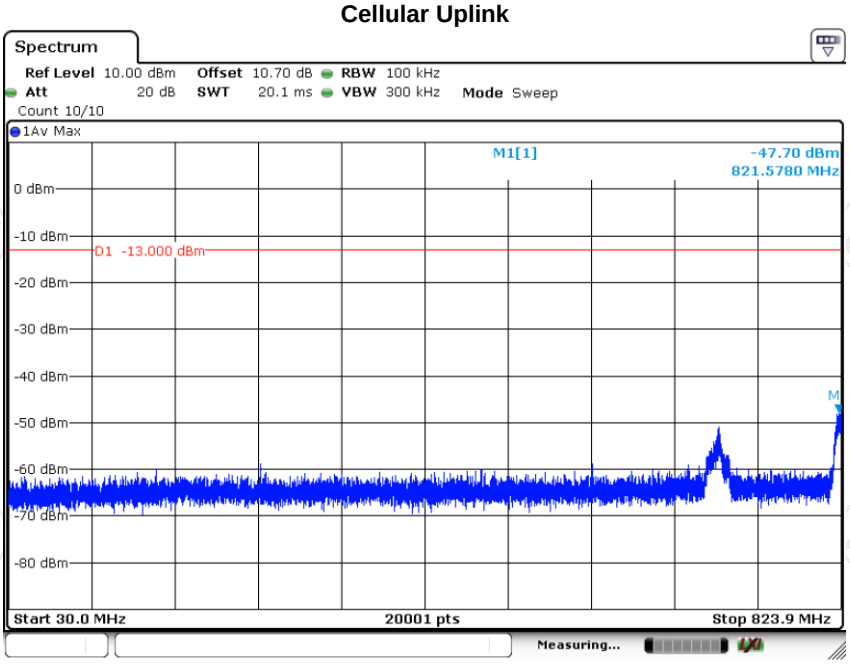


Date: 7.NOV.2024 13:38:39

Test Plots

Cellular Uplink



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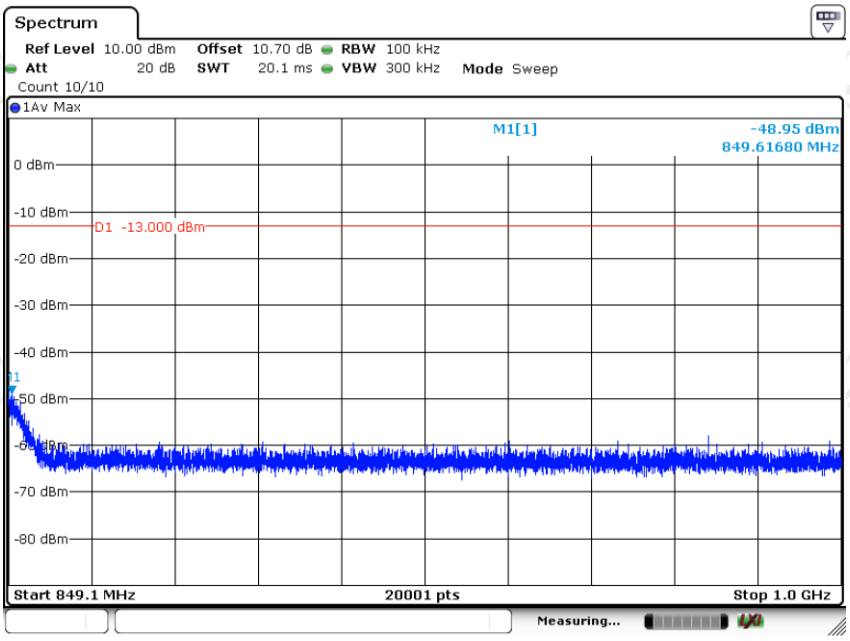

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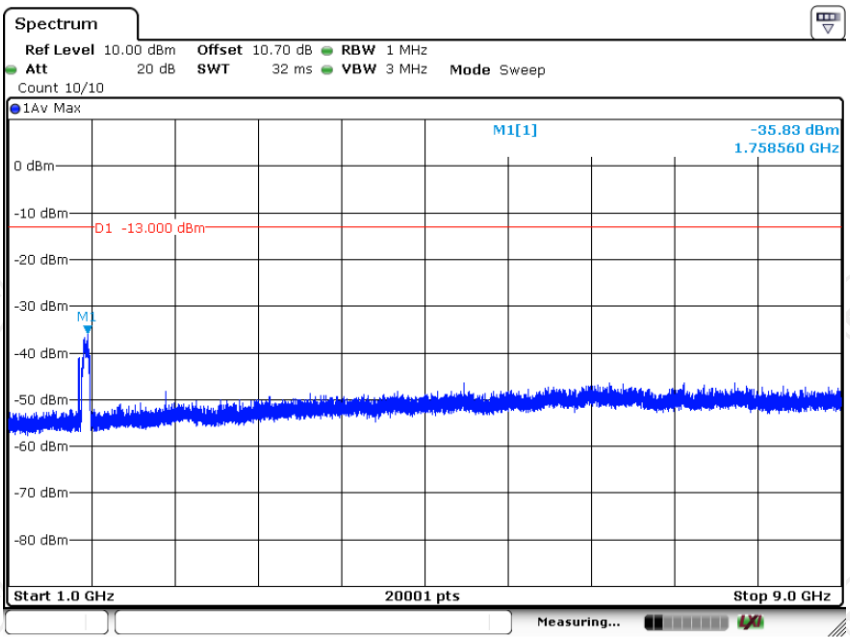

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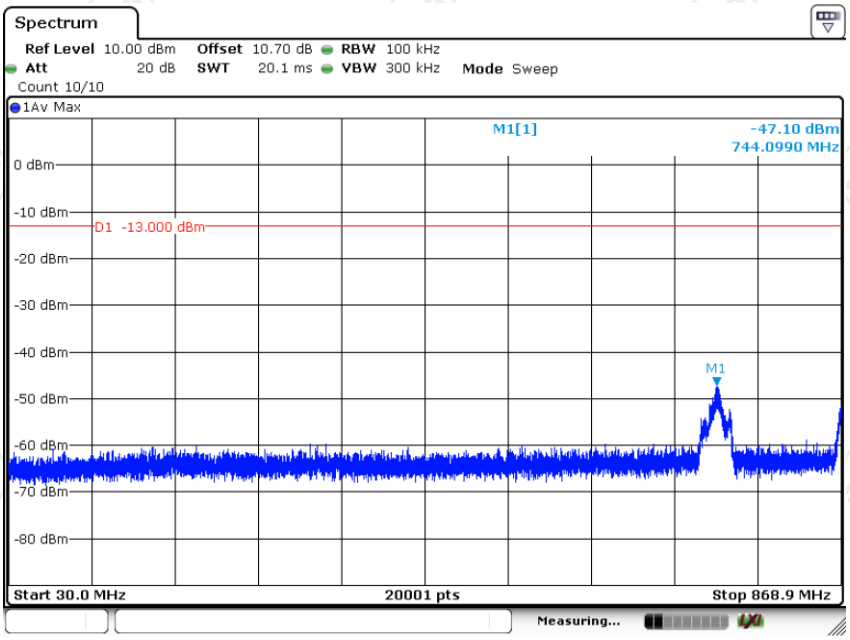
Cellular Downlink



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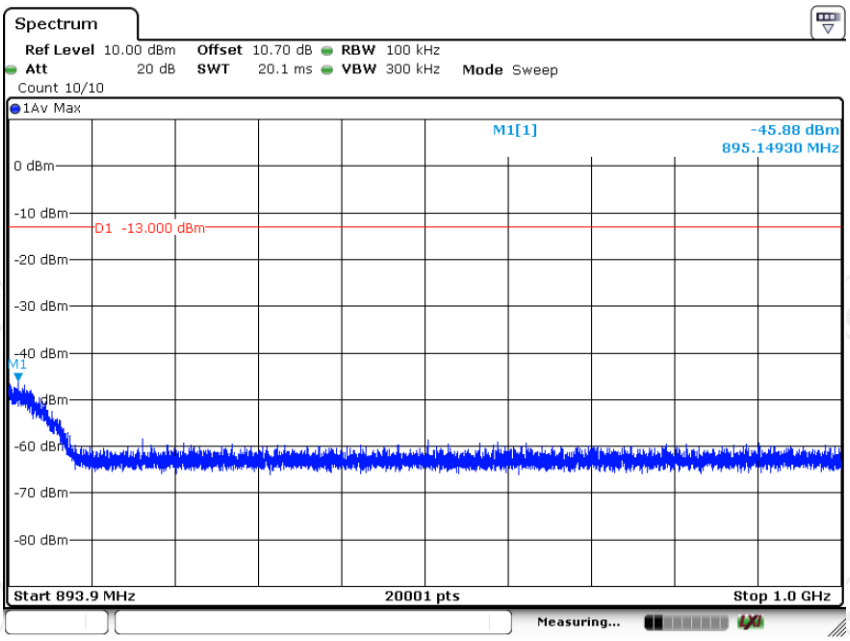

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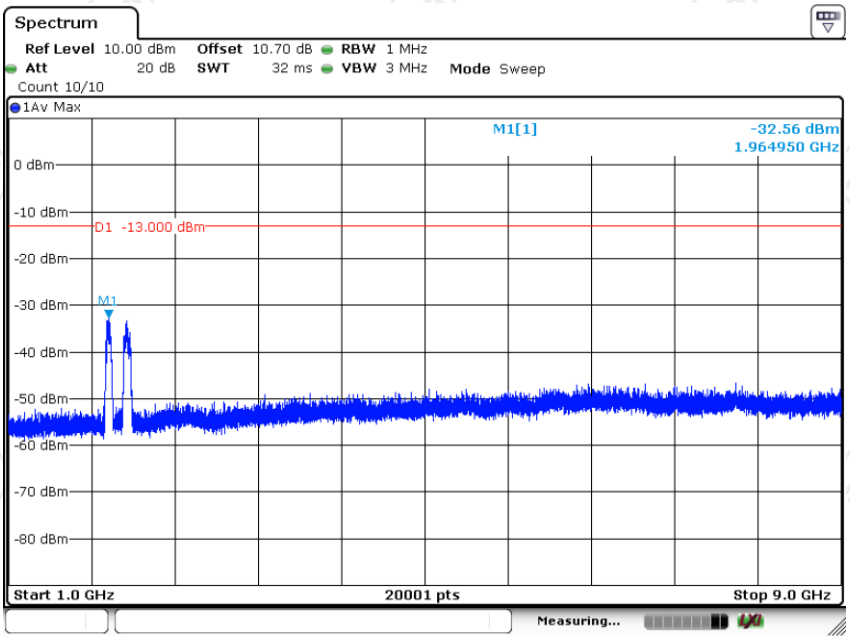

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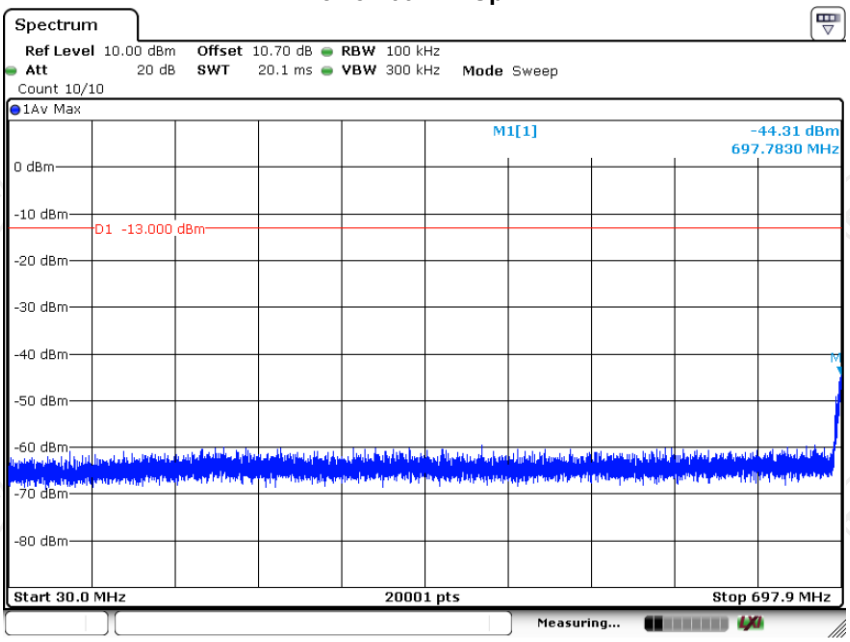
Test Plots

Lower700MHz Uplink



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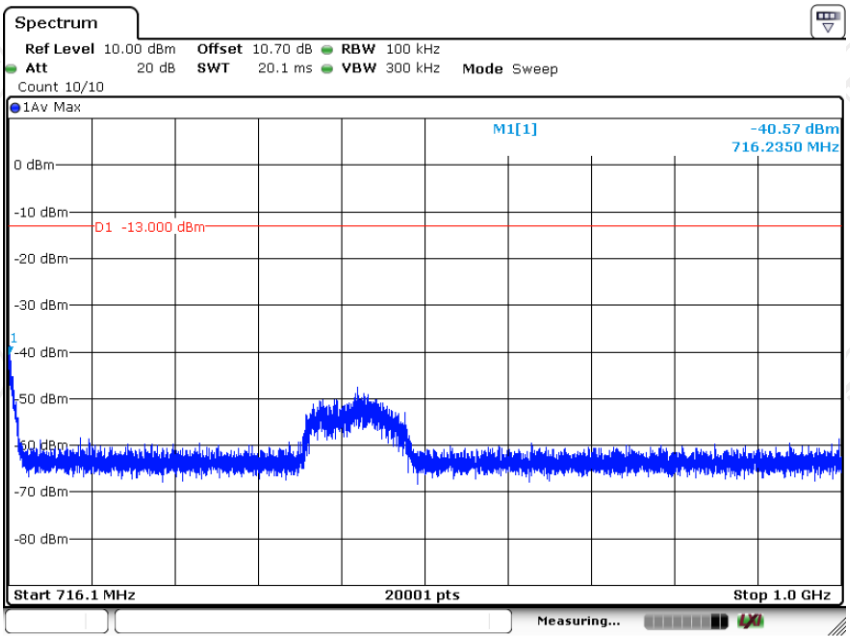

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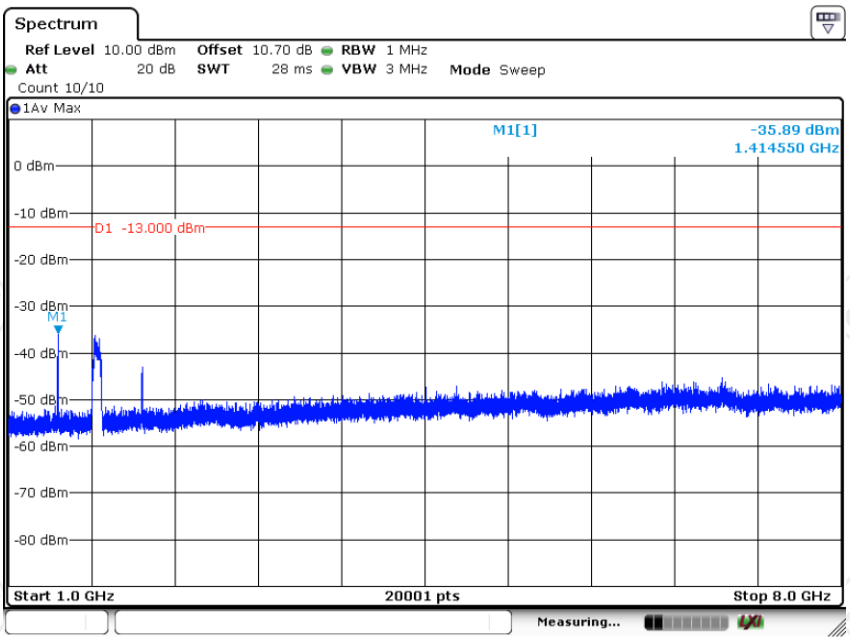

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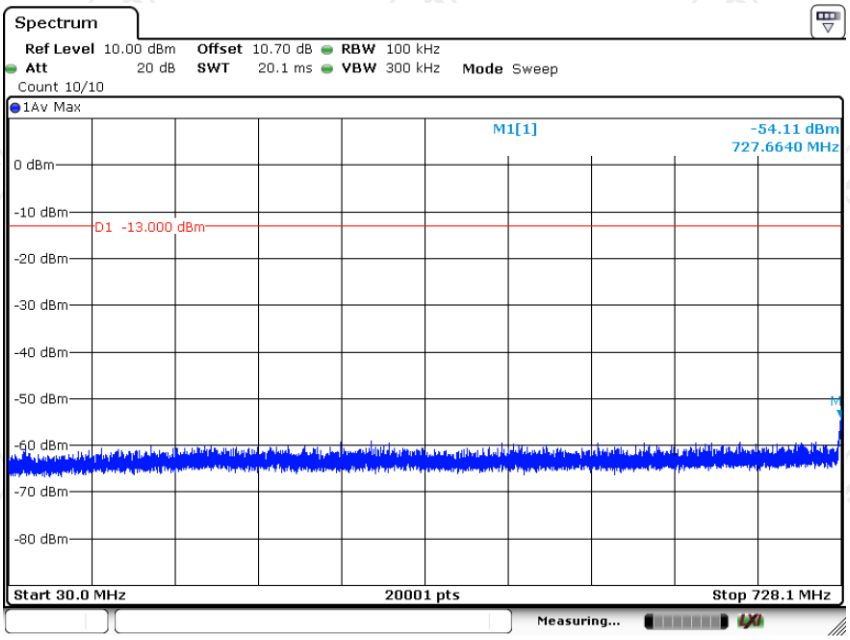
Lower700MHz Downlink



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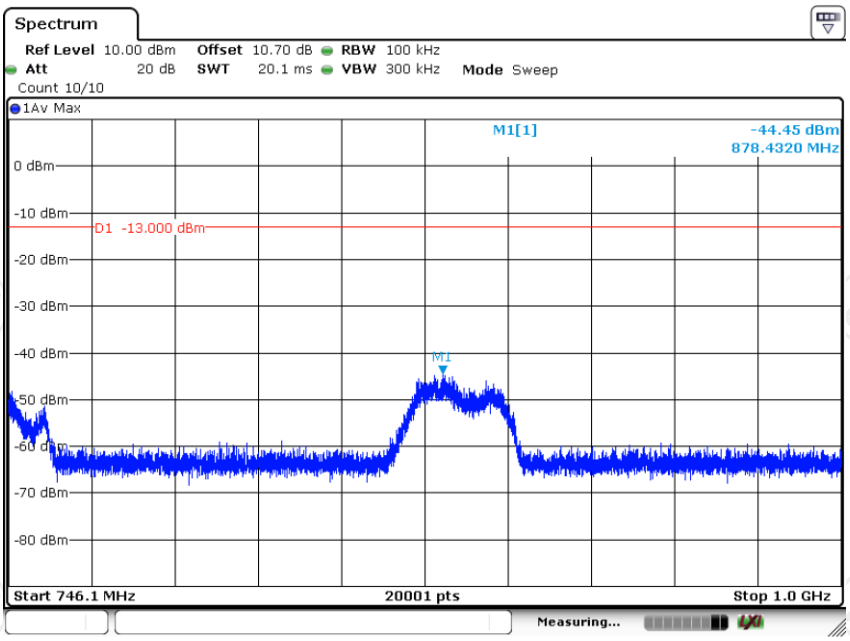

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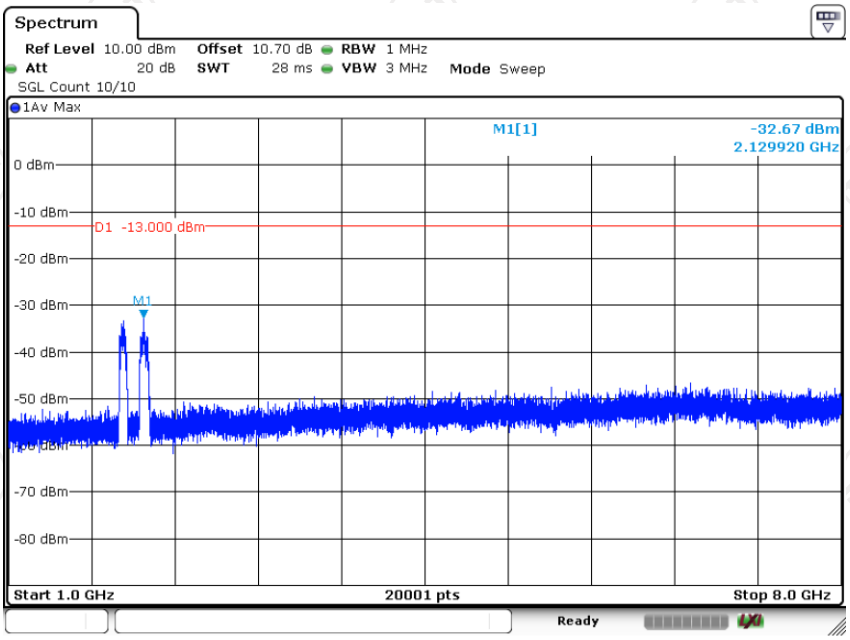

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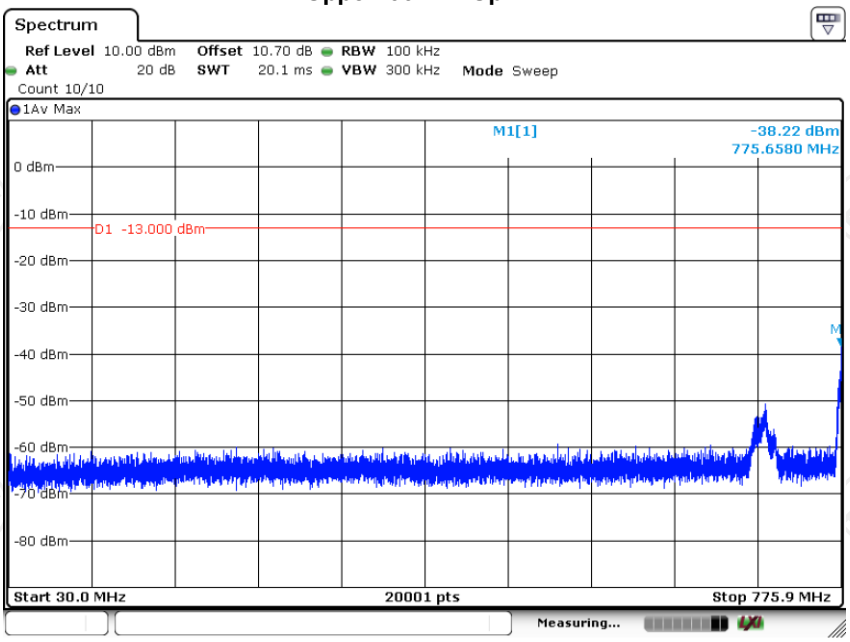
Test Plots

Upper700MHz Uplink



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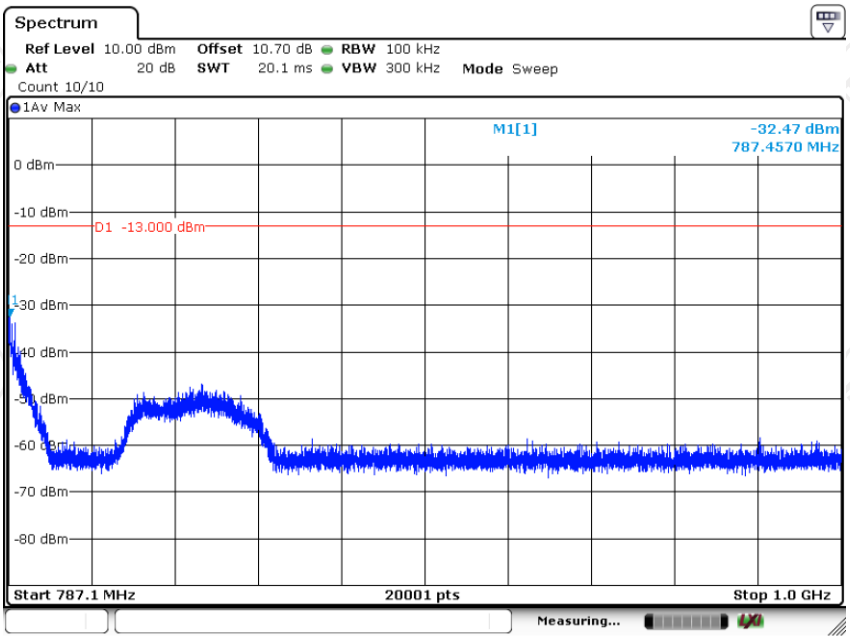

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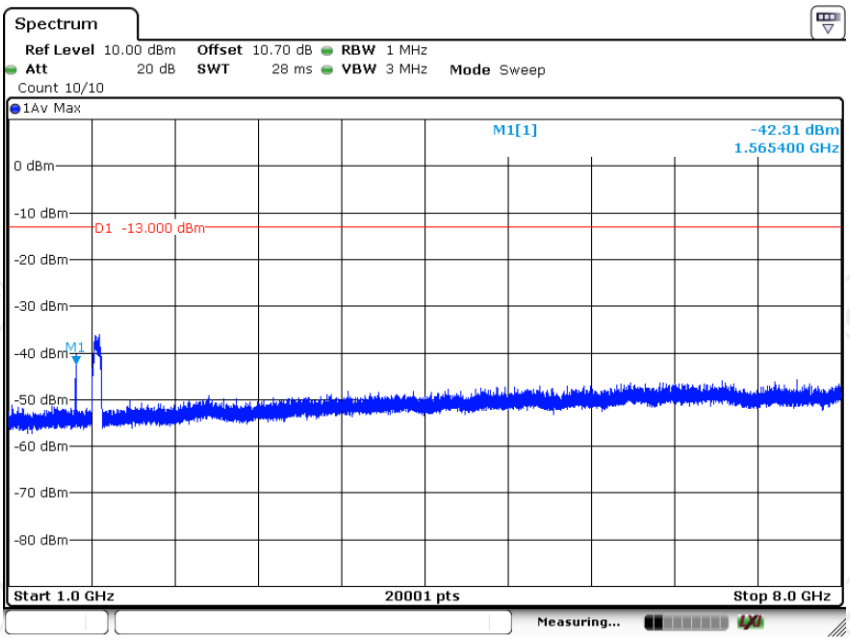
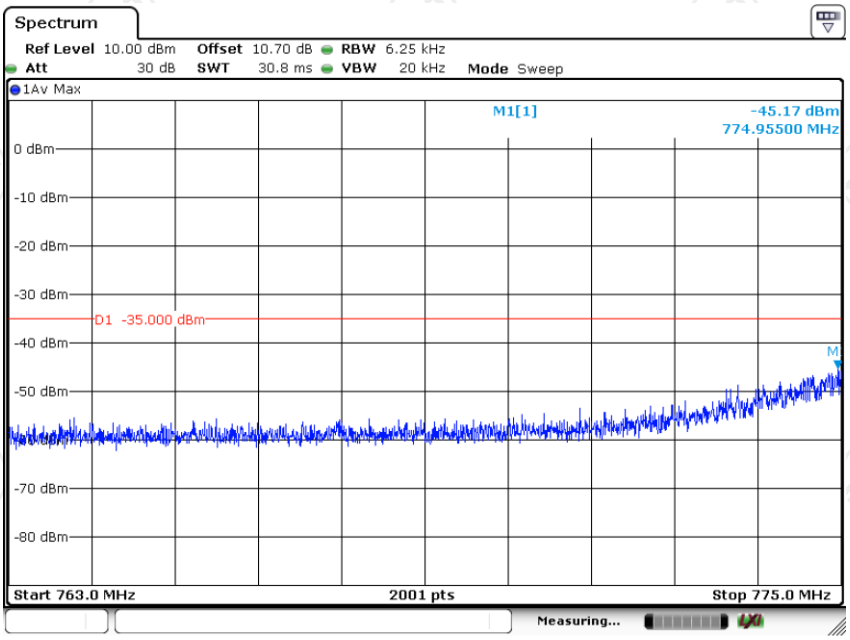


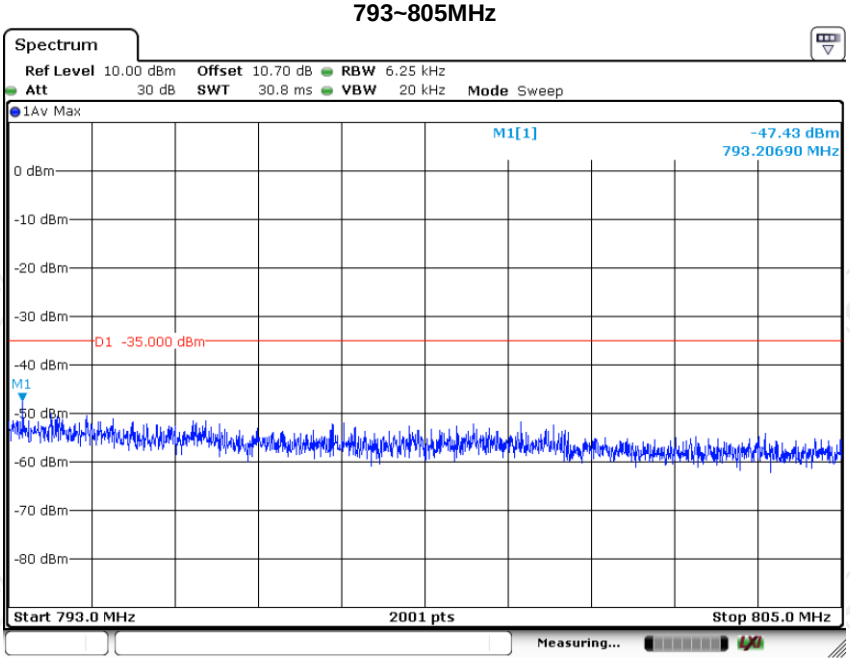
Date: 7.NOV.2024 14:36:08

763~775MHz



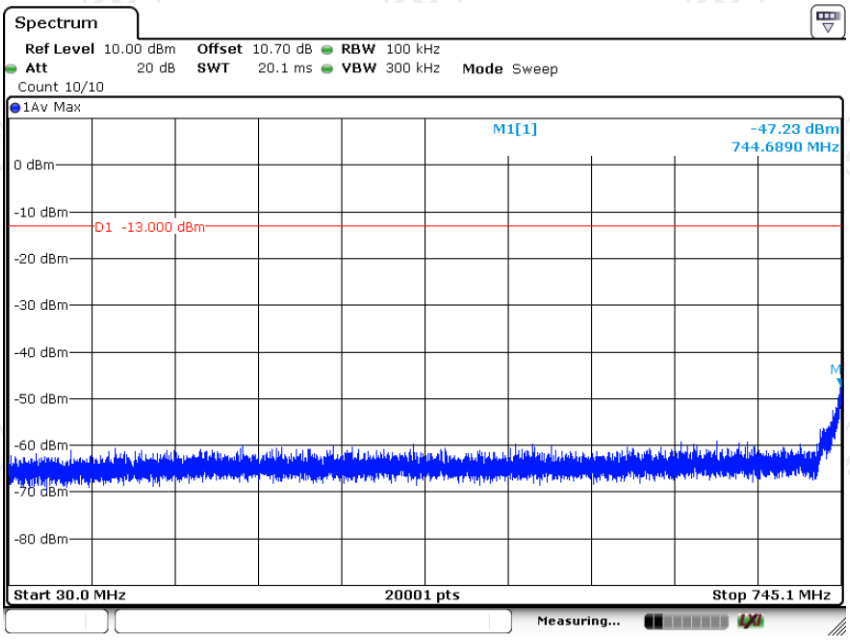
Date: 7.NOV.2024 13:21:24

793~805MHz

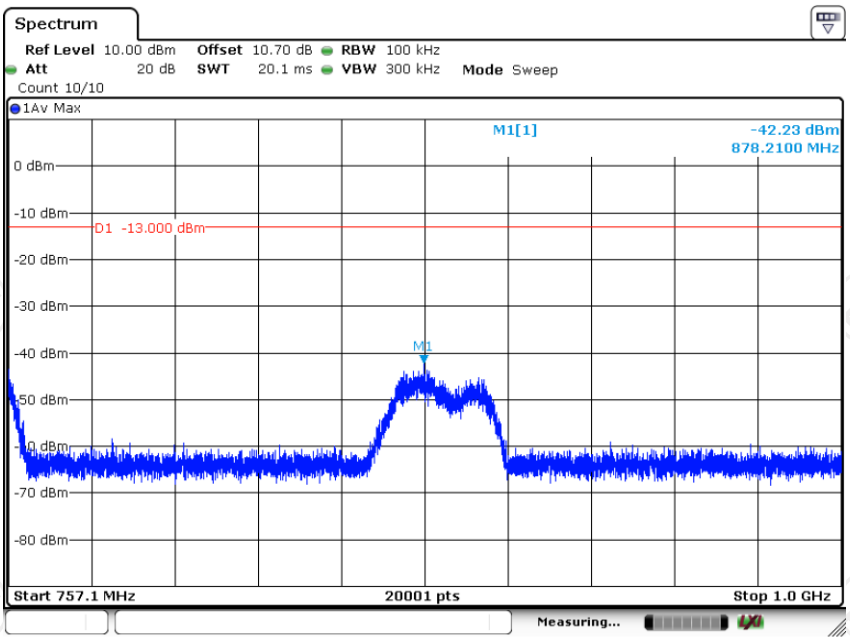


Date: 7.NOV.2024 13:20:29

Upper700MHz Downlink



Date: 7.NOV.2024 13:49:26



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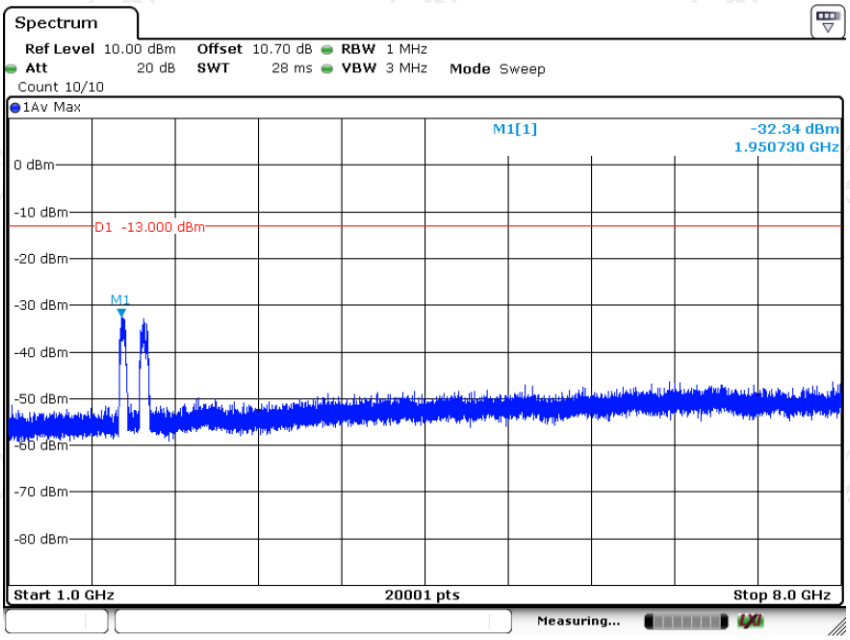
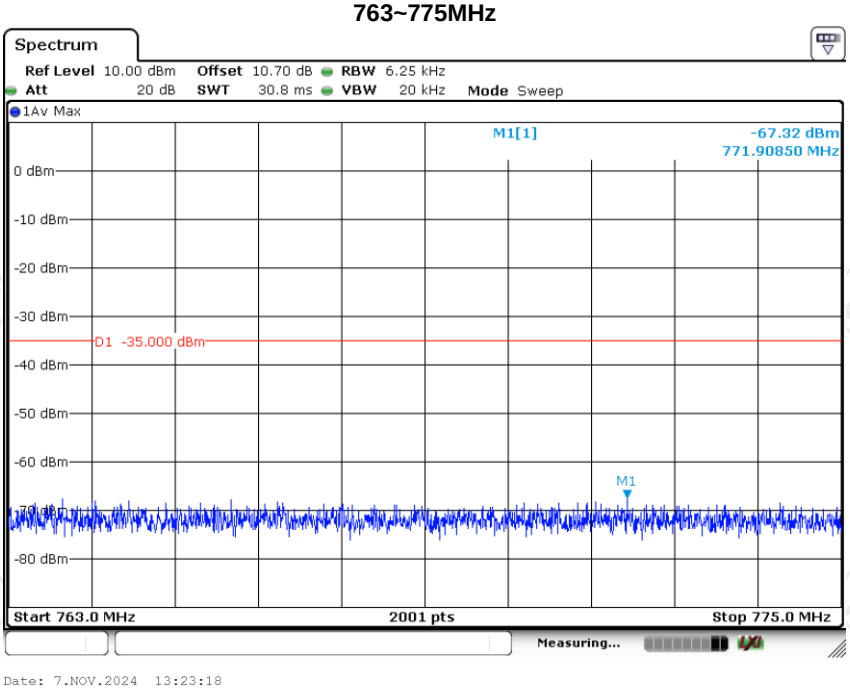
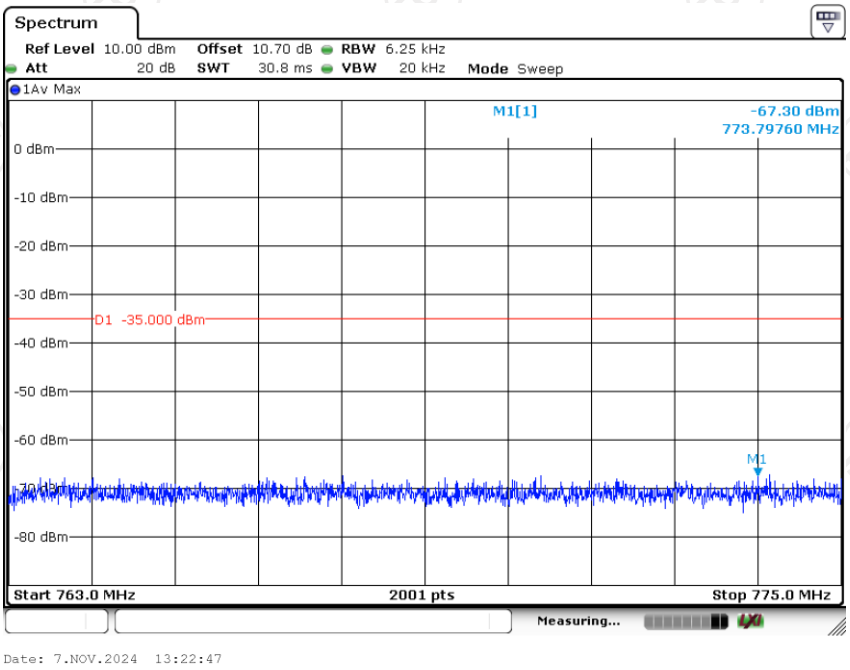


Date: 7.NOV.2024 13:51:03

763~775MHz



793~805MHz



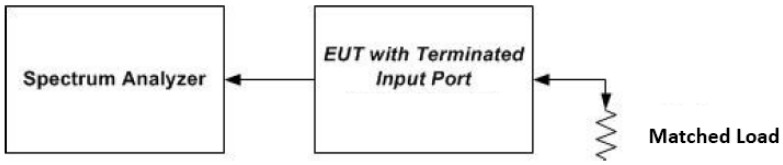
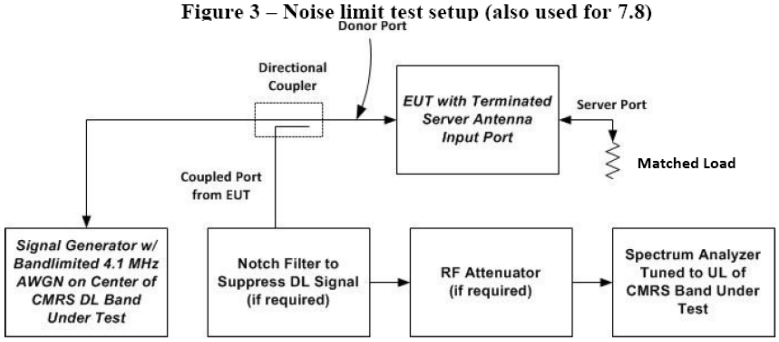
Note: 1. All the RF path have been tested, only the worst-case DL path (The table below is listed) reported.

Band	Uplink	Downlink
PCS	Sever1-Donor	Donor- Sever4
AWS	Sever1-Donor	Donor- Sever4
Cellular	Sever2-Donor	Donor- Sever1
Lower700	Sever2-Donor	Donor- Sever2
Upper700	Sever4-Donor	Donor- Sever2

2. Refer to the antenna kitting, the multiple server-port antennas will be installed at least 10 m apart and provide coverage to different areas of the building, and with minimal or no overlap of coverage areas. So the summation of downlink power, noise, and spurious emission test data across all server ports is not required.

5.6. Noise Limits

5.6.1. Test Specification

Test Requirement:	FCC Part20 Section 20.21(e)(8)(i)(A); 20.21(e)(8)(i)(H)
Test Method:	KDB935210 D03 Signal Booster Measurements v04r04
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
Test Procedure:	a) Connect the EUT to the test equipment as shown in Figure 3. 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 Test Plots as necessary for inclusion in the final test report. g) Repeat 7.7b) to 7.7f) for all operational uplink and downlink bands. h) Connect the EUT to the test equipment as shown in Figure 4 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 . 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 the CMRS band. This shall include all spectrum blocks in the particular CMRS band under test (see Appendix A). 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, as measured at the input port (i.e., downlink signal level at the booster donor port node of Figure 4), in 1 dB steps inside the RSSI-dependent region, and in 10 dB steps outside the RSSI-dependent region. Report the six values closest to the limit, with at least two points within the RSSI-dependent region of the limit. See Appendix D for noise limits graphs. n) Repeat 7.7.1h) through 7.7.1m) for all operational uplink bands. **Variable uplink noise timing** Variable uplink noise timing is to be measured as follows, using the test setup shown in Figure 4. 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 [see 7.7.1m)]. 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.12 f) Repeat 7.7.2a) to 7.7.2e) for all operational uplink bands. g) Include Test Plotss and summary table in test report.
Test Result:	PASS

5.6.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Signal Generator	Agilent	N5182A	MY47070282	Feb. 01, 2024	Jan. 31, 2025
Spectrum Analyzer	R&S	FSV40-N	102188	Feb. 01, 2024	Jan. 31, 2025
RF Combiner	SUNVNDN	SUD-CS 0800	16230009	/	/
Attenuator	50FP-006-H3	JFW	907763	/	/

5.6.3. Test Data

Max Noise Power			
Frequency Band (MHz)	Measured dBm/MHz	Limit dBm/MHz	Result (dB)
PCS Uplink	-37.82	-37.01	PASS
AWS Uplink	-37.95	-37.73	PASS
Cellular Uplink	-44.37	-44.05	PASS
Lower700MHz Uplink	-45.66	-45.51	PASS
Upper700MHz Uplink	-45.74	-44.64	PASS
PCS Downlink	-38.90	-37.01	PASS
AWS Downlink	-38.99	-37.73	PASS
Cellular Downlink	-44.83	-44.05	PASS
Lower700MHz Downlink	-46.05	-45.51	PASS
Upper700MHz Downlink	-46.17	-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.

Variable Uplink Noise				
Operation Bands	RSSI dBm	Measured dBm/MHz	Limit dBm/MHz	Results
PCS	-72	-37.66	-37.01	PASS
	-65	-48.16	-38.00	PASS
	-57	-51.50	-46.00	PASS
	-51	-62.86	-52.00	PASS
	-45	-66.92	-58.00	PASS
	-39	-75.56	-64.00	PASS
AWS	-71	-38.45	-37.73	PASS
	-66	-41.24	-37.73	PASS
	-60	-46.24	-43.00	PASS
	-56	-53.52	-47.00	PASS
	-49	-59.56	-54.00	PASS
	-42	-73.96	-61.00	PASS
Cellular	-62	-44.42	-44.05	PASS
	-58	-51.50	-45.00	PASS

	-54	-50.79	-49.00	PASS
	-49	-57.43	-54.00	PASS
	-44	-62.07	-59.00	PASS
	-37	-70.35	-66.00	PASS
Lower700MHz	-64	-45.76	-45.51	PASS
	-60	-47.88	-45.51	PASS
	-56	-50.91	-47.00	PASS
	-50	-63.68	-53.00	PASS
	-45	-68.23	-58.00	PASS
	-42	-71.02	-61.00	PASS
Upper700MHz	-63	-45.74	-44.64	PASS
	-60	-48.58	-44.64	PASS
	-57	-51.39	-46.00	PASS
	-52	-65.59	-51.00	PASS
	-49	-67.09	-54.00	PASS
	-44	-70.68	-59.00	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
PCS	0.010	2	PASS
AWS	0.010	2	PASS
Cellular	0.050	2	PASS
Lower700MHz	0.015	2	PASS
Upper700MHz	0.505	2	PASS

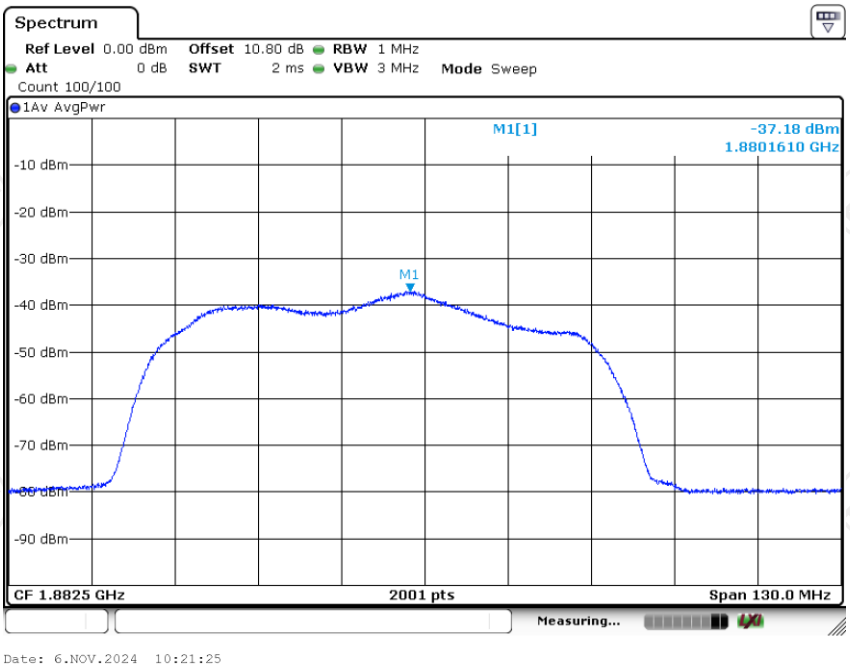
Note: 1. All the RF path have been tested, only the worst-case DL path (The table below is listed) reported.

Band	Uplink	Downlink
PCS	Sever1-Donor	Donor- Sever4
AWS	Sever1-Donor	Donor- Sever4
Cellular	Sever2-Donor	Donor- Sever1
Lower700	Sever2-Donor	Donor- Sever2
Upper700	Sever4-Donor	Donor- Sever2

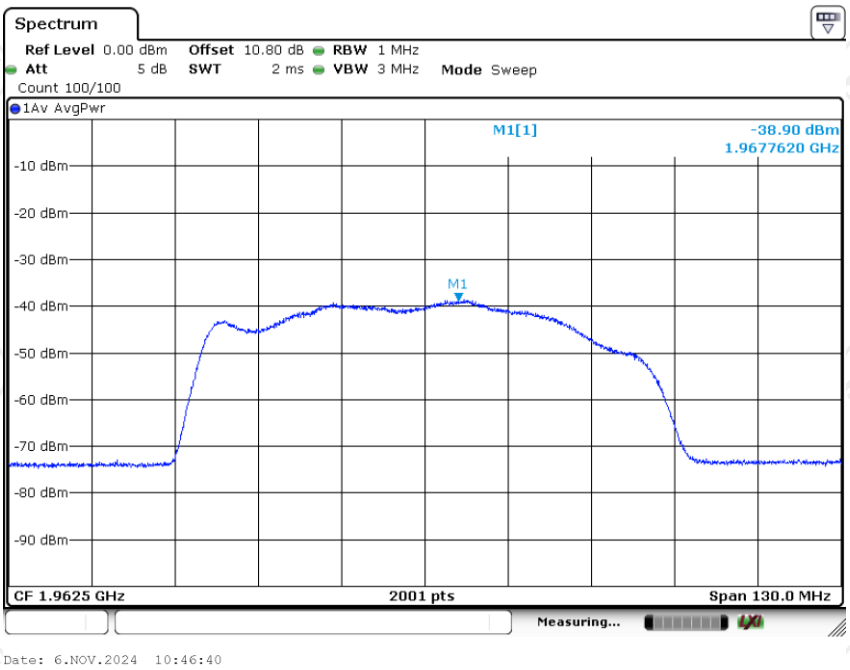
2. Refer to the antenna kitting, the multiple server-port antennas will be installed at least 10 m apart and provide coverage to different areas of the building, and with minimal or no overlap of coverage areas. So the summation of downlink power, noise, and spurious emission test data across all server ports is not required.

Test Plots

PCS

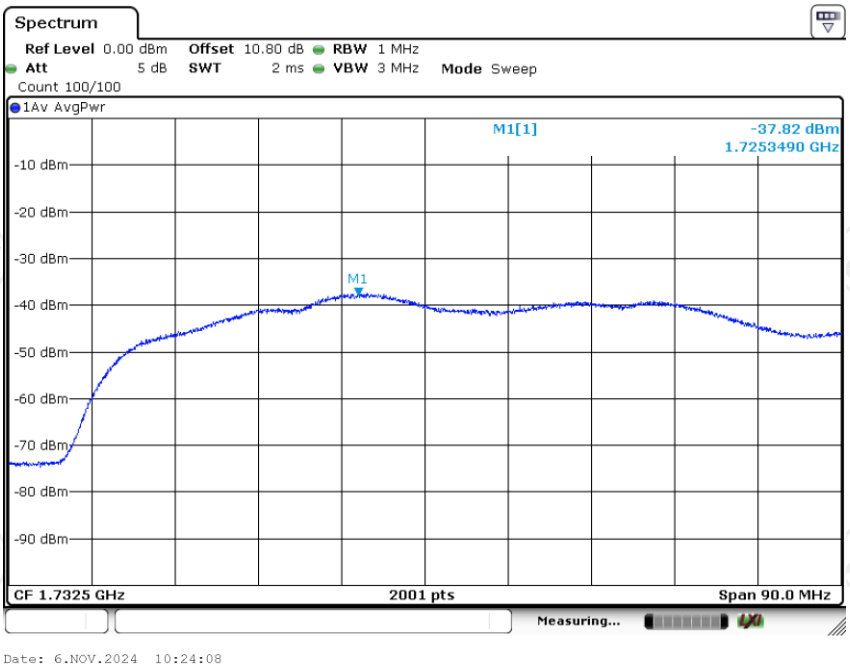


Uplink Noise

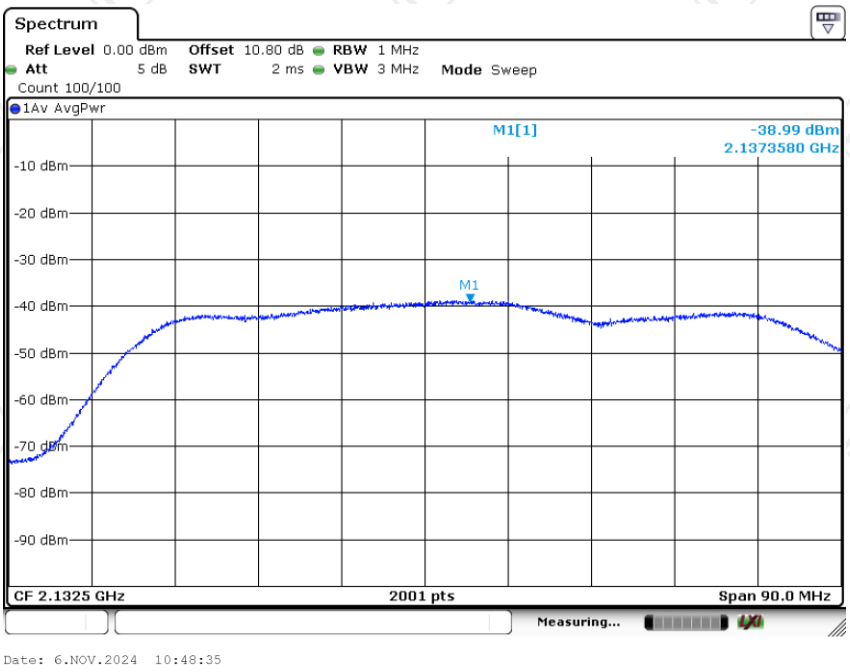


Downlink Noise

AWS

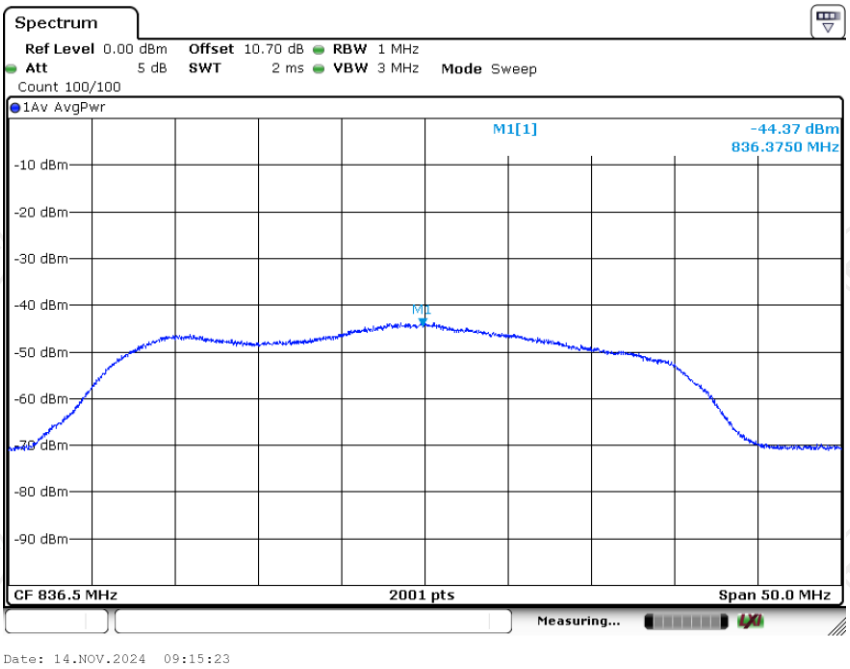


Uplink Noise



Downlink Noise

Cellular



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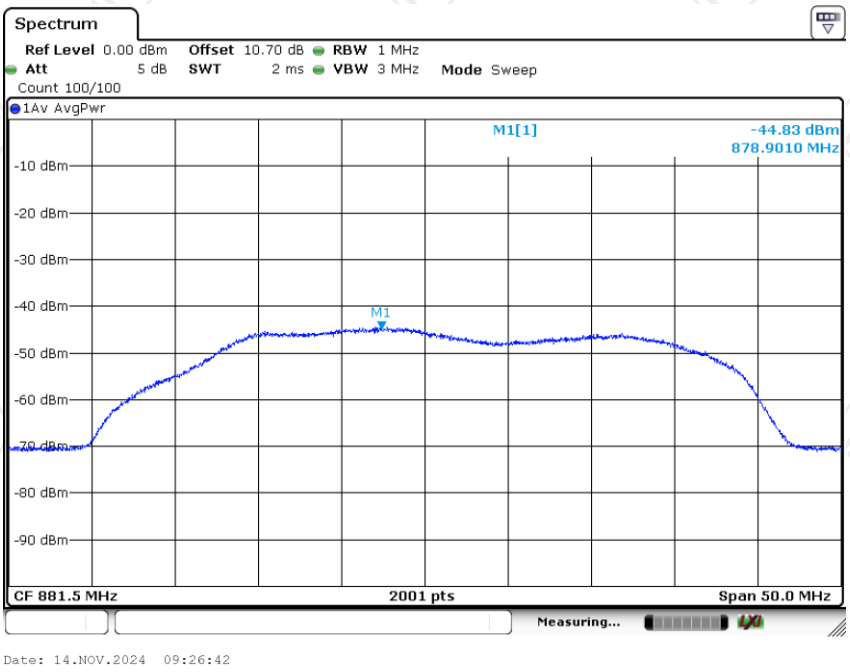
Uplink Noise



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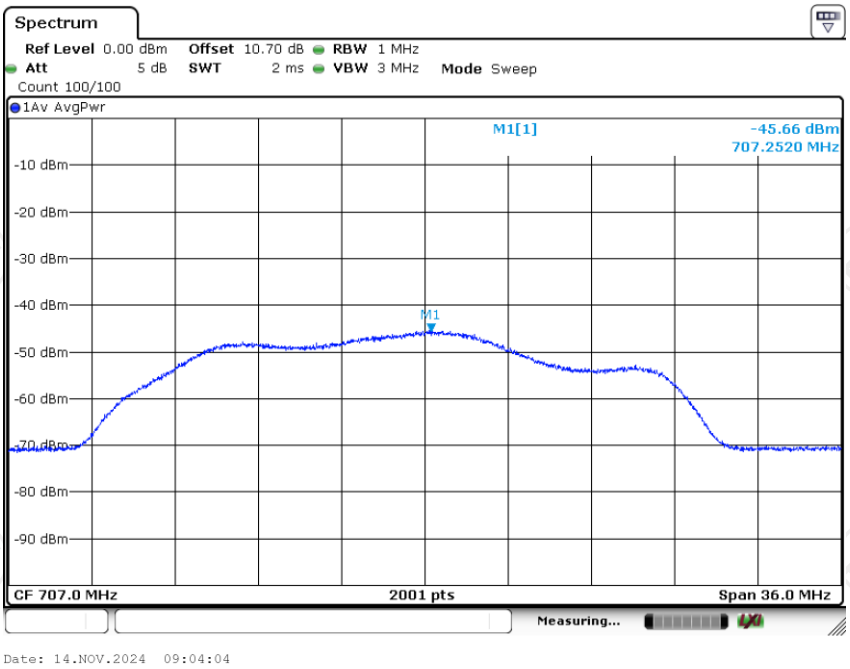
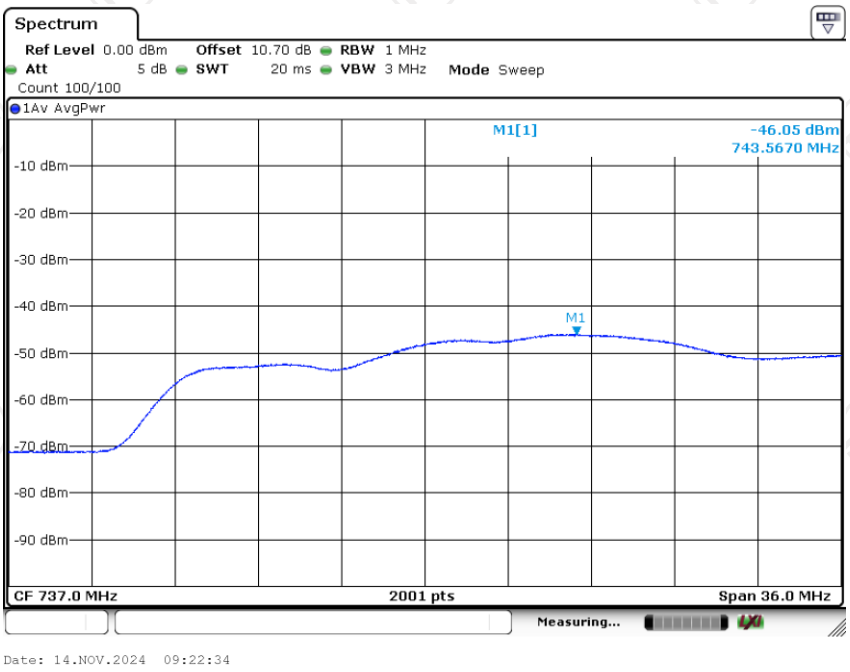
Downlink Noise

Lower700MHz

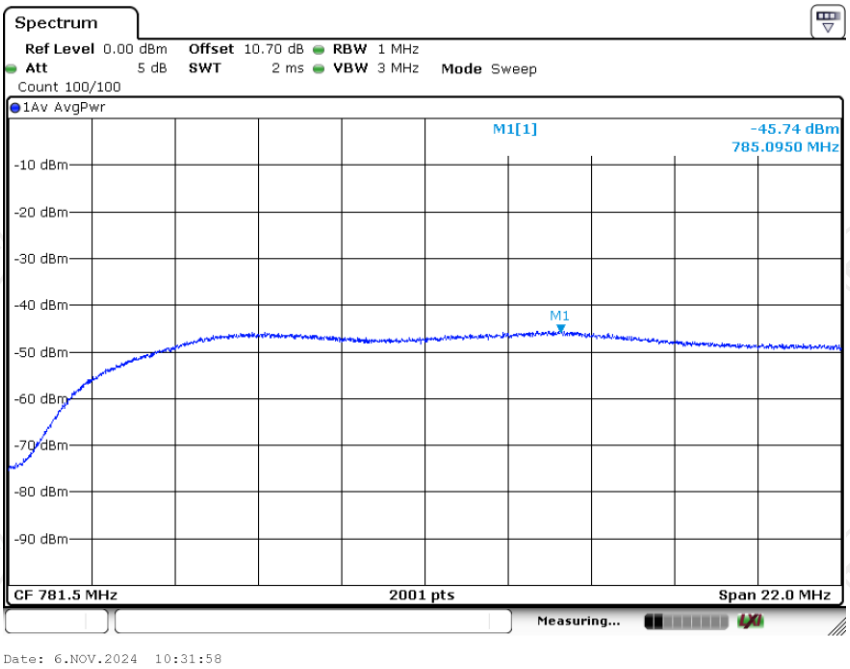


Uplink Noise

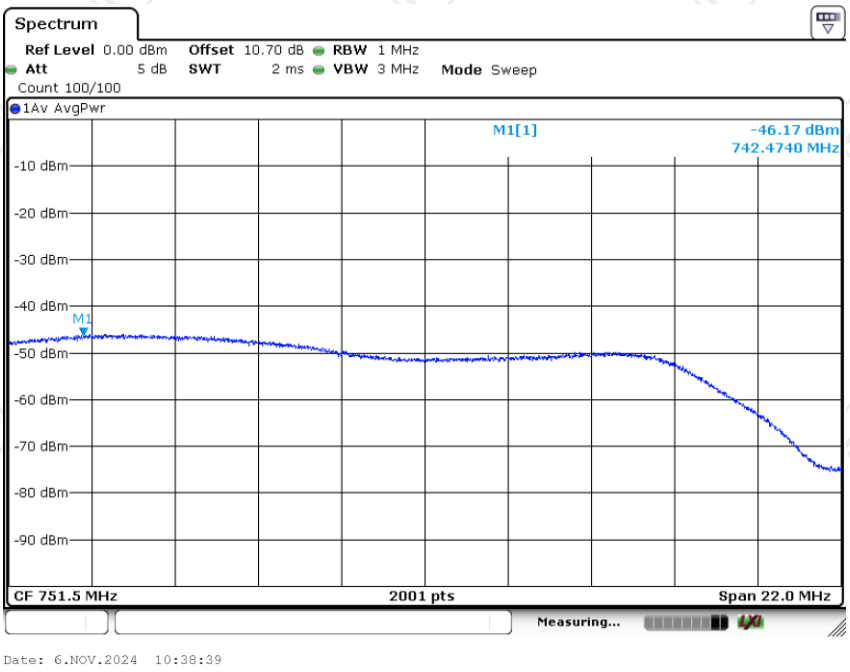


Downlink Noise

Upper700MHz



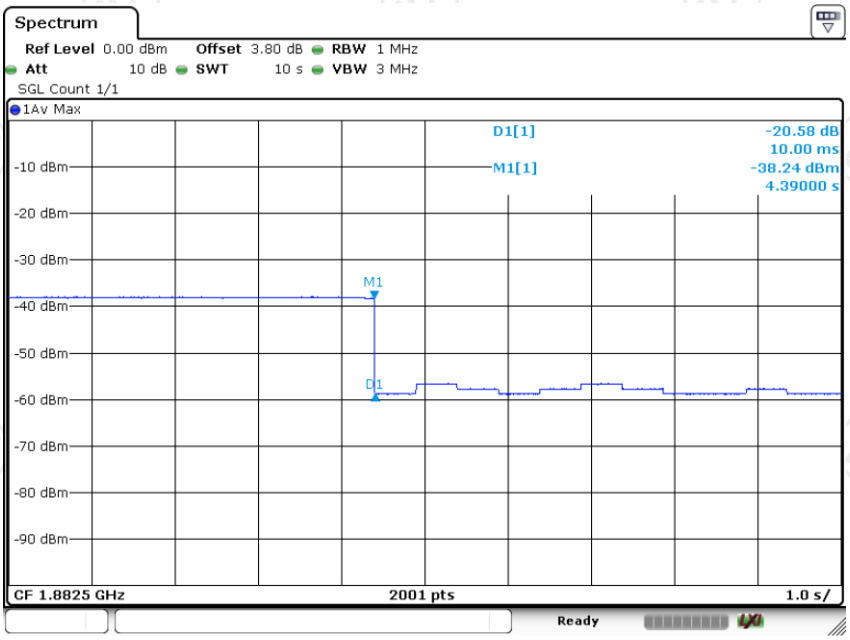
Uplink Noise



Downlink Noise

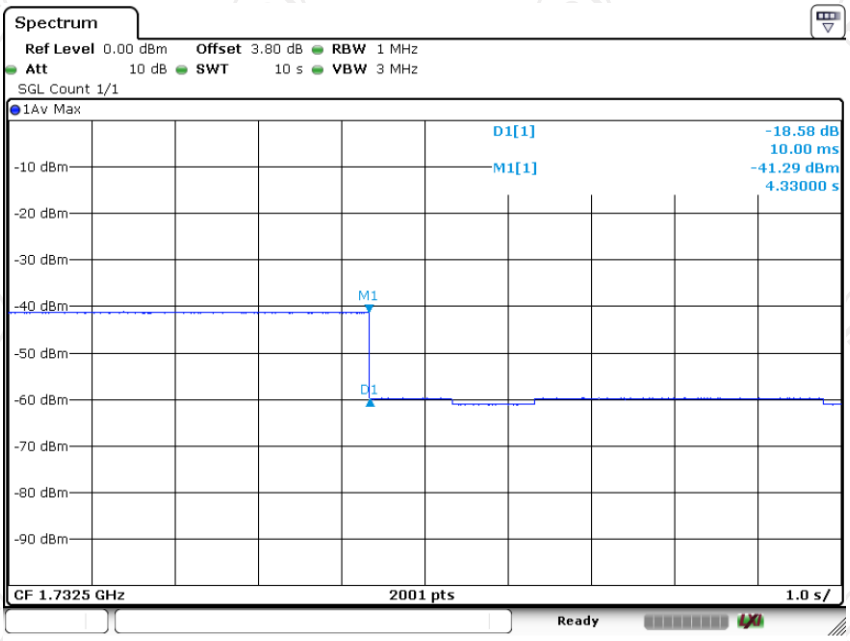
Variable Noise Timing Test Plots

PCS



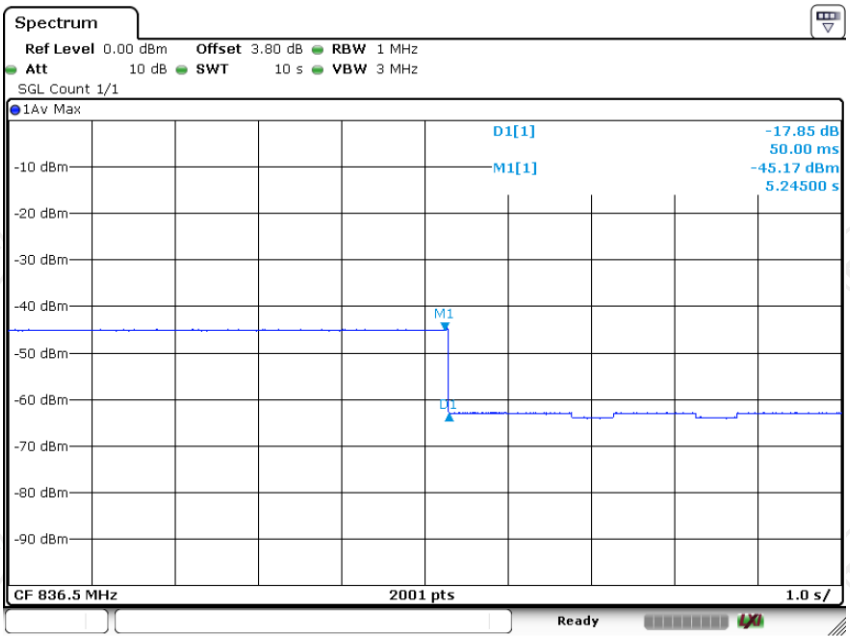
Date: 8.NOV.2024 15:37:39

AWS



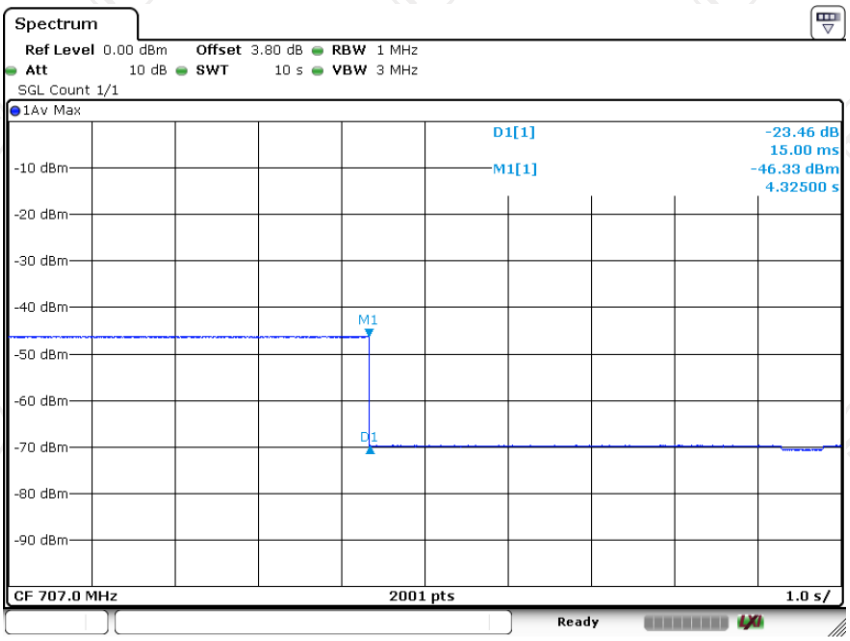
Date: 8.NOV.2024 15:45:19

Cellular



Date: 8.NOV.2024 15:53:15

Lower700MHz



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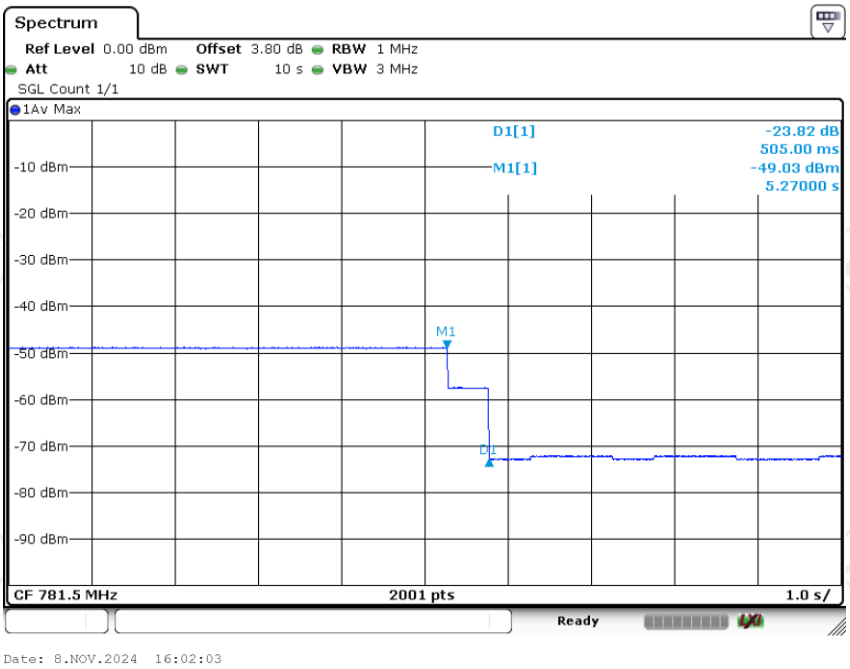
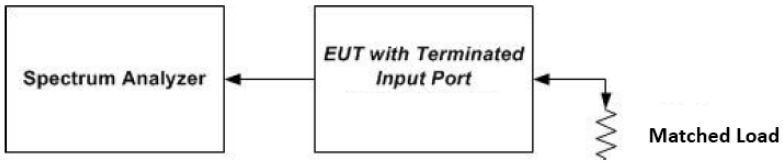
Upper700MHz



5.7. Uplink Inactivity

5.7.1. Test Specification

Test Requirement:	FCC Part20 Section 20.21(e)(8)(i)(l)
Test Method:	KDB935210 D03 Signal Booster Measurements v04r04
Limit:	20.21(e), When a consumer booster is not serving an active device connection after 5 minutes the uplink noise power shall not exceed -70 dBm/MHz.
Test Setup:	 Figure 3 – Noise limit test setup (also used for 7.8)
Test Procedure:	a) Connect the EUT to the test equipment as shown in Set-Up 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 Test Plots for inclusion in the test report. k) Measure noise using procedures in a) to e). l) Repeat steps c) to k) for all operational uplink bands.
Test Result:	PASS

5.7.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	R&S	FSV40-N	102188	Feb. 01, 2024	Jan. 31, 2025

5.7.3. Test Data

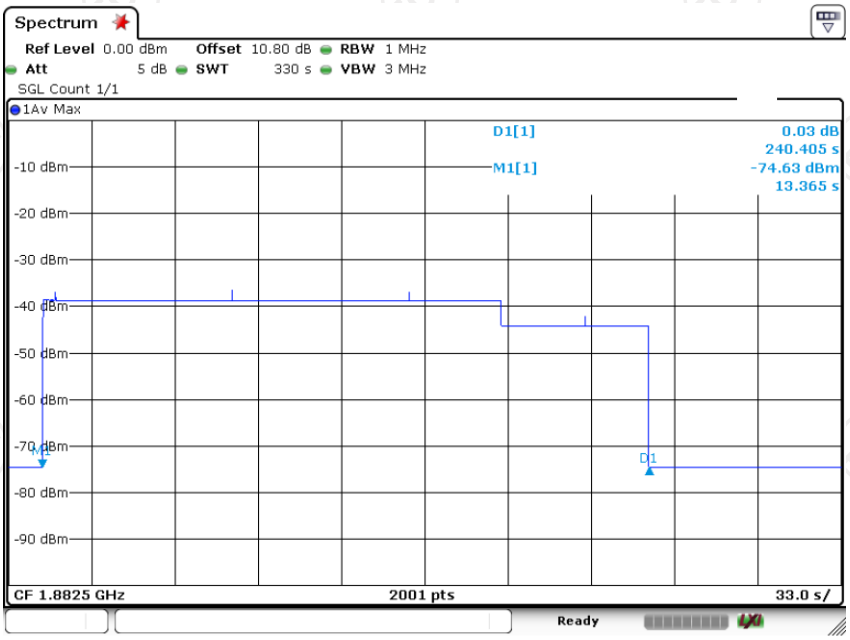
Uplink Inactivity			
Operation Bands	Measured (s)	Limit (s)	Result
PCS	240.4	300.0	PASS
AWS	240.4	300.0	PASS
Cellular	240.4	300.0	PASS
Lower700MHz	240.6	300.0	PASS
Upper700MHz	240.4	300.0	PASS

Note: All the RF path have been tested, only the worst-case DL path (The table below is listed) reported.

Band	Uplink	Downlink
PCS	Sever1-Donor	Donor- Sever4
AWS	Sever1-Donor	Donor- Sever4
Cellular	Sever2-Donor	Donor- Sever1
Lower700	Sever2-Donor	Donor- Sever2
Upper700	Sever4-Donor	Donor- Sever2

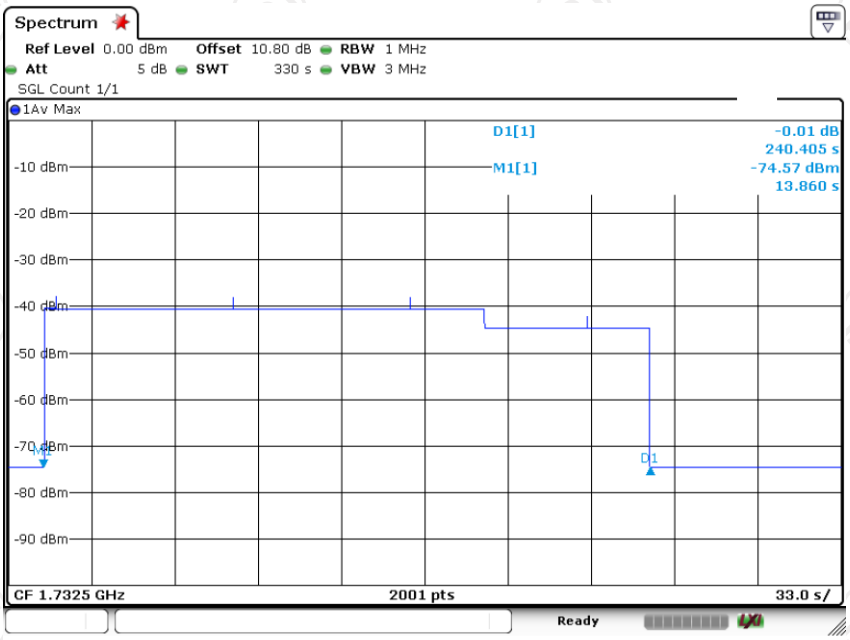
Test Plots

PCS



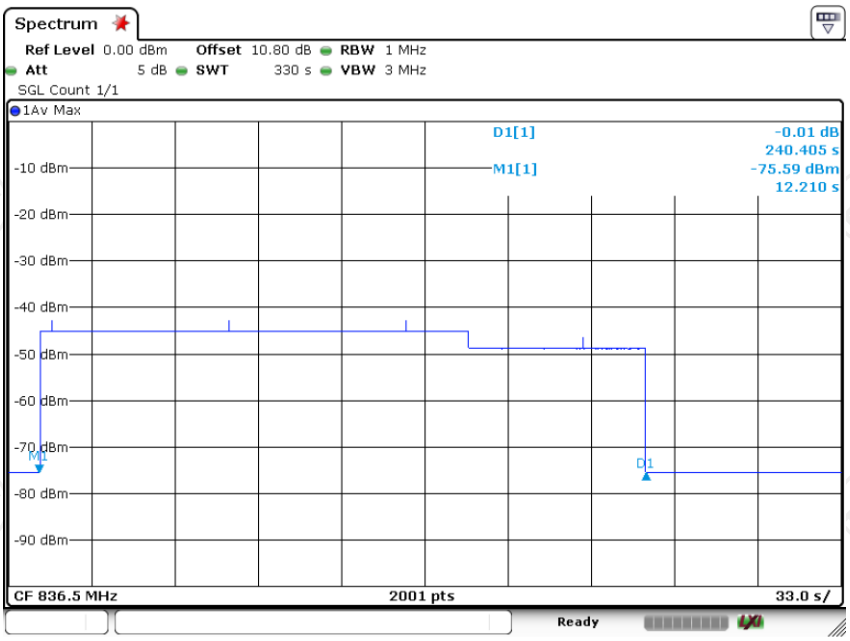
Date: 6.NOV.2024 13:46:48

AWS



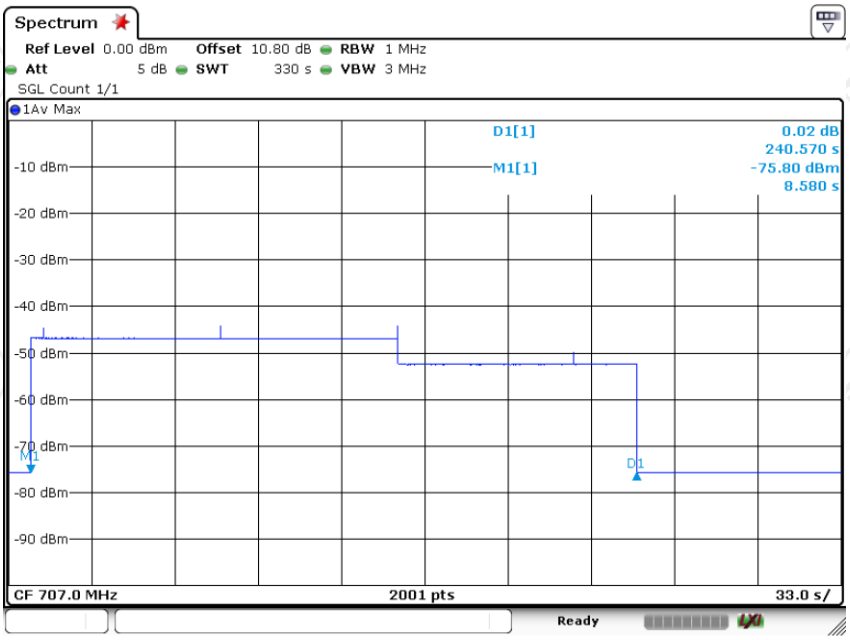
Date: 6.NOV.2024 13:33:52

Cellular



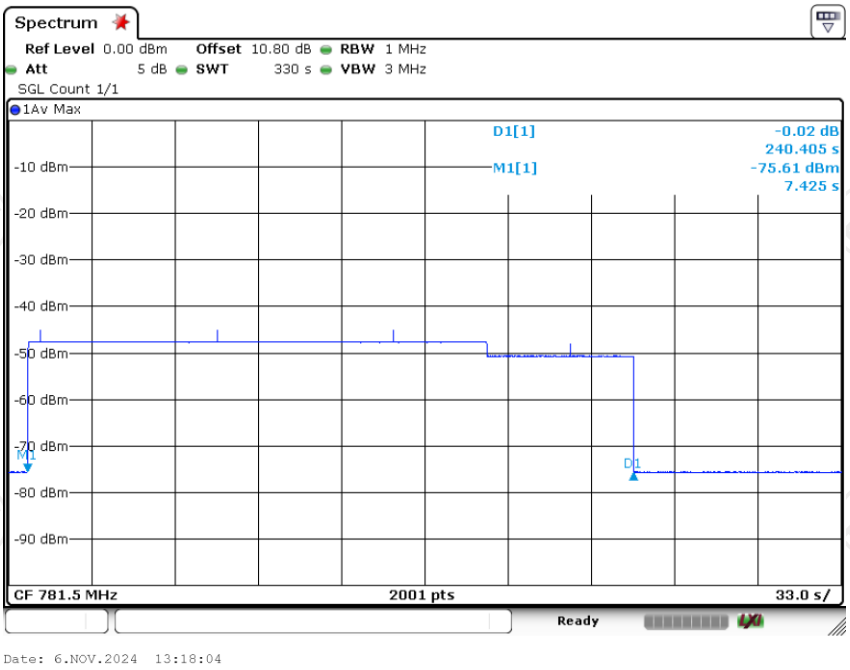
Date: 6.NOV.2024 13:25:36

Lower700MHz



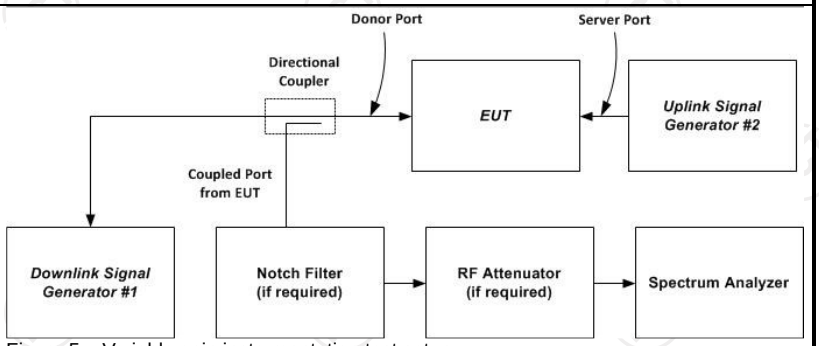
Date: 6.NOV.2024 13:03:07

Upper700MHz



5.8. Variable Booster Gain

5.8.1. Test Specification

Test Requirement:	FCC Part20 Section 120.21(e)(8)(i)(C)(1) FCC Part20 Section 120.21(e)(8)(i)(H)
Test Method:	KDB935210 D03 Signal booster Measurements v04r04
Limit:	-34 dB - RSSI + MSCL
Test Setup:	 Figure 5 – Variable gain instrumentation test setup
Test Procedure:	**Variable gain:** a) Connect the EUT to the test equipment as shown in Figure 5 with the uplink output (donor) port connected to signal generator #1. Affirm that the coupled path of the RF coupler is connected to the spectrum analyzer. b) Configure downlink signal generator #1 for AWGN operation with a 99% OBW 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 that is 5 dB below the AGC level determined from 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 mode. g) Select the power averaging (rms) detector. h) Affirm that the number of measurement points per sweep ≥ (2 . span)/RBW. i) Sweep time = auto couple or as necessary (but no less than auto couple value). 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 output to a level from .90 dBm to .20 dBm, as measured at the input port (i.e., downlink signal level at the booster donor port node of Figure 5), 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, including at least two points from within the RSSI-dependent region of operation. See gain limit in charts in Appendix D for uplink gain requirements. Additionally, document that the EUT provides equivalent uplink and downlink gain, and when operating in shutoff mode that the uplink and downlink gain is within the transmit power off mode gain limits. l) Repeat 7.9.1b) to 7.9.1k) for all operational uplink bands. **Variable uplink gain timing:** Variable uplink gain timing is to be measured as follows, using the test setup shown in Figure 5. 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 #1 to the lowest level of the RSSI-dependent gain [see 7.9.1k)]. d) Select MAX HOLD and increase the power level of signal generator #1 by 10 dB for mobile boosters, and by 20 dB for fixed indoor boosters. Signal generator #2 remains same, as described in 7.9.1c). e) Confirm that the uplink gain decreases to the specified levels, within 1 second for mobile devices, and within 3 seconds for fixed devices.13 f) Repeat 7.9.2a) to 7.9.2e) for all operational uplink bands.
Test Result:	PASS

5.8.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Signal Generator	Agilent	N5182B	MY53052214	Jun. 27, 2024	Jun. 26, 2025
Signal Generator	Agilent	N5182A	MY47070282	Feb. 01, 2024	Jan. 31, 2025
Spectrum Analyzer	R&S	FSV40-N	102188	Feb. 01, 2024	Jan. 31, 2025
RF Combiner	SUNVNDN	SUD-CS 0800	16230009	/	/
Attenuator	50FP-006-H3	JFW	907763	/	/

5.8.3. Test Data

Mobile station coupling loss (MSCL): *the minimum coupling loss (in dB) between the wireless device and the input (server) port of the consumer booster. MSCL must be calculated or measured for each band of operation and provided in compliance test reports. MSCL includes the path loss from the wireless device, and the booster's server antenna gain and cable loss. The wireless device is assumed to be an isotropic (0 dBi) antenna reference. Minimum standoff distances from inside wireless devices to the booster's server antenna must be reasonable and specified by the manufacturer in customer provided installation manuals.*

MSCL Calculation							
Operation Bands	Frequency (MHz)	Distance (m)	Path loss (dB)	Indoor Antenna Gain(dBi)	Indoor Cable Loss(dB)	Polarity Loss(dB)	MSCL (dB)
PCS	1850	2	43.86	6.5	4.31	3.01	**44.68**
AWS	1710	2	43.18	6.5	4.56	3.01	**44.25**
Cellular	824	2	36.84	3.5	3.14	3.01	**39.49**
Lower700 MHz	698	2	35.40	3.5	3.01	3.01	**37.92**
Upper700 MHz	776	2	36.32	3.5	3.01	3.01	**38.84**

Note: Path loss = 20logf + 20logd – 27.5

Polarity loss = 20Log (1/Sin (45deg)) dB = 3.01dB

Variable booster gain							
Operation Band	RSSI (dBm)	Input Power (dBm)	Output Power (dBm)	Measured Gain (dB)	MSCL	Limit	Results
PCS	-69	-53.4	15.15	68.55	44.68	71.99	PASS
	-64	-53.4	11.25	64.65	44.68	71.99	PASS
	-57	-53.4	2.97	56.37	44.68	67.68	PASS
	-51	-53.4	-3.09	50.31	44.68	61.68	PASS
	-45	-53.4	-8.81	44.59	44.68	55.68	PASS
	-40	-53.4	-36.70	16.70	44.68	50.68	PASS
AWS	-69	-52.4	16.32	68.72	44.25	71.34	PASS
	-63	-52.4	12.62	65.02	44.25	71.34	PASS
	-59	-52.4	8.81	61.21	44.25	69.25	PASS
	-53	-52.4	-0.66	51.74	44.25	63.25	PASS
	-47	-52.4	-6.59	45.81	44.25	57.25	PASS
	-41	-52.4	-36.66	15.74	44.25	51.25	PASS
Cellular	-62	-44.3	18.31	62.61	39.49	64.95	PASS
	-57	-44.3	15.65	59.95	39.49	62.49	PASS
	-53	-44.3	13.66	57.96	39.49	58.49	PASS
	-47	-44.3	3.93	48.23	39.49	52.49	PASS
	-41	-44.3	-1.12	43.18	39.49	46.49	PASS
	-35	-44.3	-37.26	7.04	39.49	40.49	PASS
Lower700MHz	-64	-43.6	17.58	61.18	37.92	63.49	PASS

	-59	-43.6	15.01	58.61	37.92	62.92	PASS
	-53	-43.6	11.22	54.82	37.92	56.92	PASS
	-48	-43.6	-1.94	41.66	37.92	51.92	PASS
	-41	-43.6	-10.09	33.51	37.92	44.92	PASS
	-37	-43.6	-39.74	3.86	37.92	40.92	PASS
Upper700MHz	-66	-42.5	17.91	60.41	38.84	64.36	PASS
	-60	-42.5	15.89	58.39	38.84	64.36	PASS
	-54	-42.5	11.07	53.57	38.84	58.84	PASS
	-47	-42.5	-1.01	41.49	38.84	51.84	PASS
	-41	-42.5	-11.66	30.84	38.84	45.84	PASS
	-36	-42.5	-37.30	5.20	38.84	40.84	PASS

Variable Uplink Gain Timing

Operation Band	Measured Sec	Limit Sec	Result
PCS	0.01	3.0	PASS
AWS	0.01	3.0	PASS
Cellular	0.01	3.0	PASS
Lower700MHz	0.01	3.0	PASS
Upper700MHz	0.01	3.0	PASS

Note: All the RF path have been tested, only the worst-case DL path (The table below is listed) reported.

Band	Uplink	Downlink
PCS	Sever1-Donor	Donor- Sever4
AWS	Sever1-Donor	Donor- Sever4
Cellular	Sever2-Donor	Donor- Sever1
Lower700	Sever2-Donor	Donor- Sever2
Upper700	Sever4-Donor	Donor- Sever2

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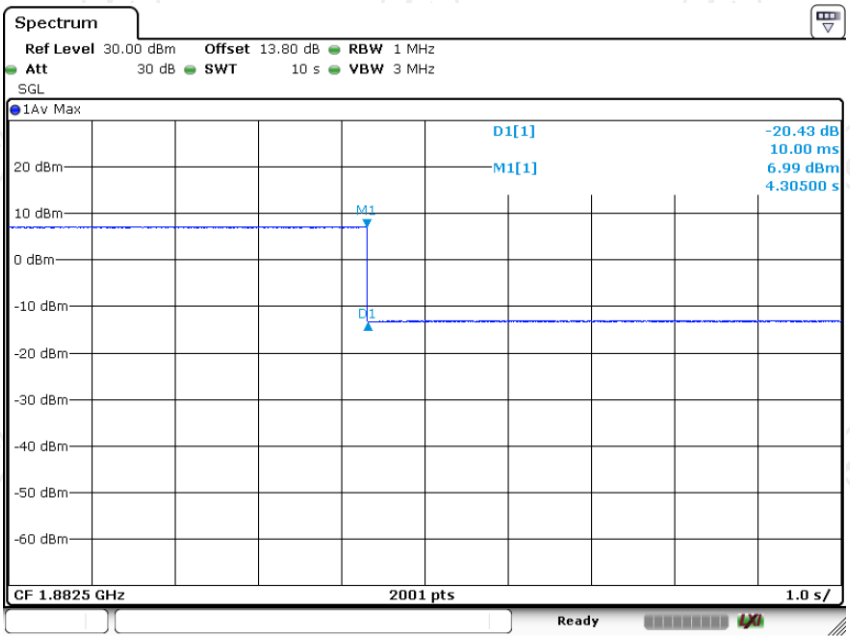
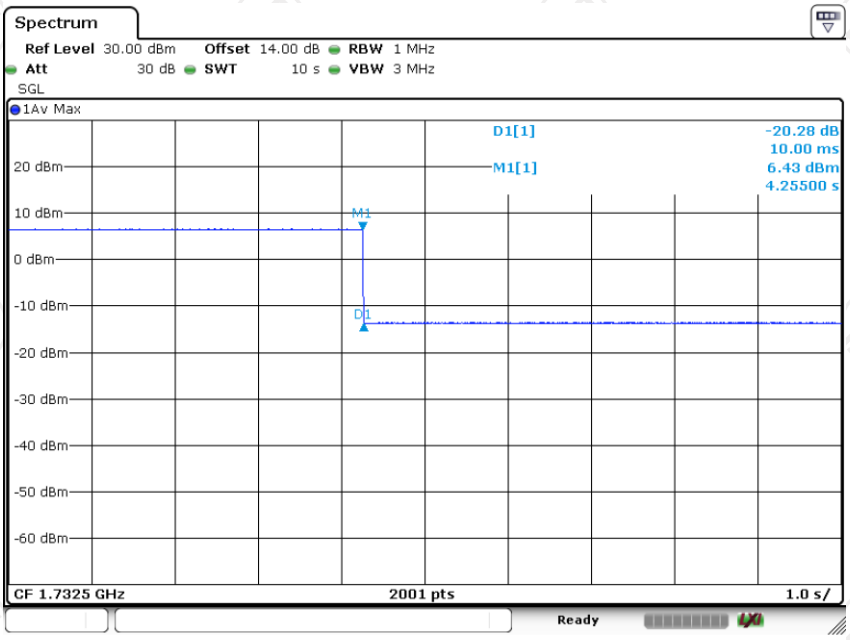
Variable Uplink Gain Timing Test Plots

PCS



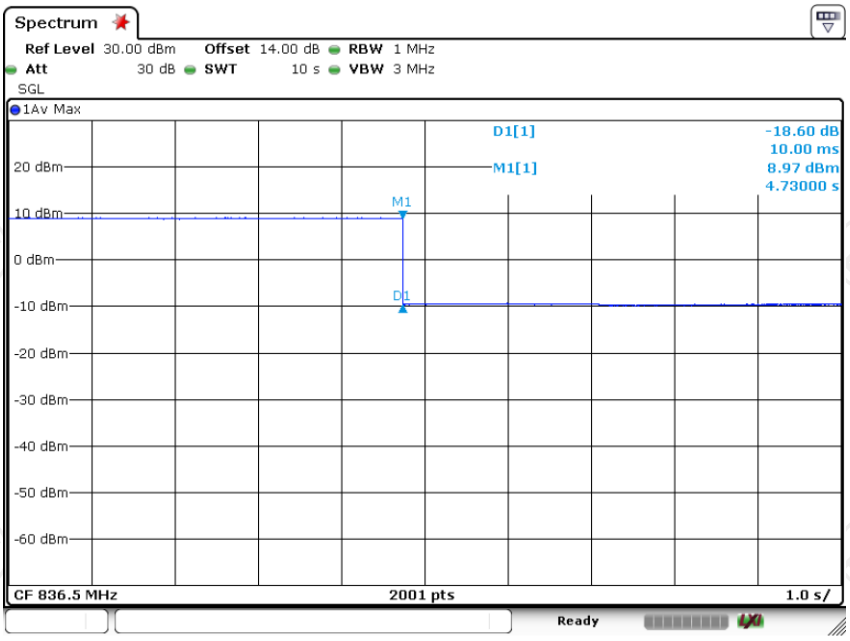
Date: 19.NOV.2024 14:29:23

AWS



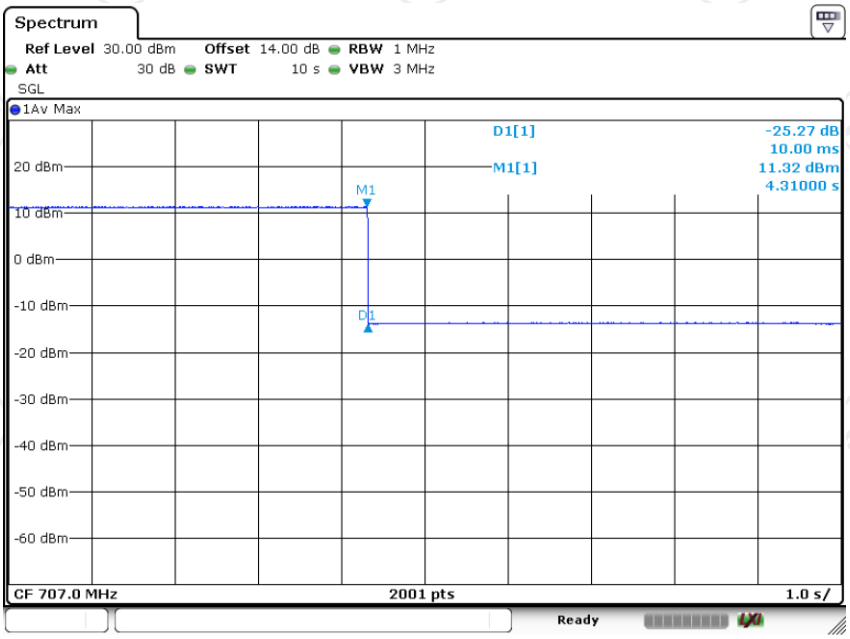
Date: 18.NOV.2024 14:26:05

Cellular



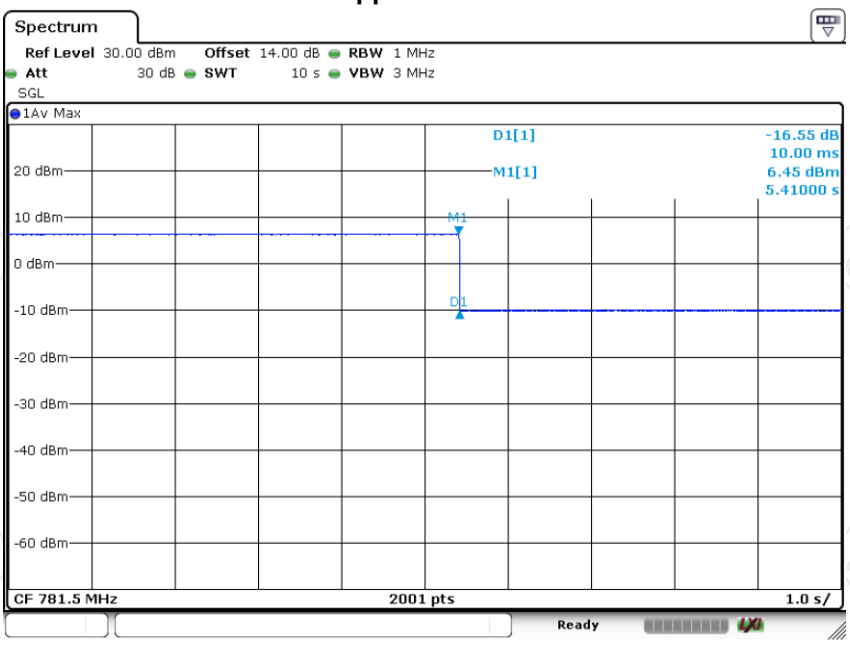
Date: 18.NOV.2024 14:15:45

Lower700MHz



Date: 18.NOV.2024 14:04:17

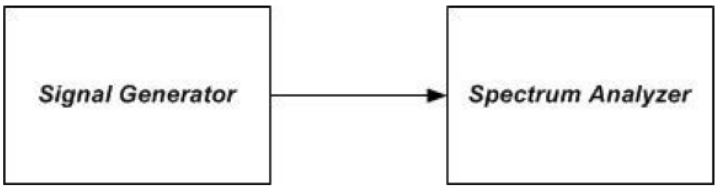
Upper700MHz



Date: 18.NOV.2024 14:08:04

5.9. Occupied Bandwidth

5.9.1. Test Specification

Test Requirement:	FCC Part2 Section 2.1049
Test Method:	KDB935210 D03 Signal booster Measurements v04r04
Limit:	N/A
Test setup:	 **Figure 6 – Test setup for measuring characteristics of test signals used for subsequent EUT occupied bandwidth testing**
Test Procedure:	a) Connect the test equipment as shown in Figure 6 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 1, 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 1, 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.
Test results:	PASS

5.9.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Signal Generator	Agilent	N5182A	MY47070282	Feb. 01, 2024	Jan. 31, 2025
Spectrum Analyzer	R&S	FSV40-N	102188	Feb. 01, 2024	Jan. 31, 2025

5.9.3. Test Data

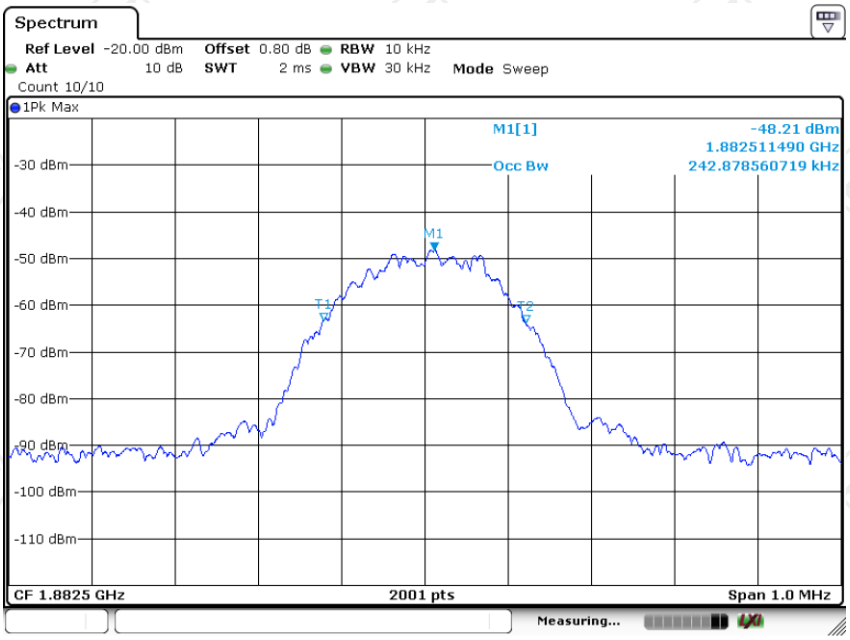
Operation Band		Signal Type	Input OBW [MHz]	Output OBW [MHz]	Results
Uplink	PCS	GSM	0.243	0.251	PASS
		CDMA	1.238	1.238	PASS
		LTE	4.518	4.498	PASS
	AWS	GSM	0.247	0.241	PASS
		CDMA	1.249	1.240	PASS
		LTE	4.528	4.498	PASS
	Cellular	GSM	0.246	0.247	PASS
		CDMA	1.235	1.244	PASS
		LTE	4.508	4.488	PASS
	Lower700MHz	GSM	0.244	0.245	PASS
		CDMA	1.252	1.241	PASS
		LTE	4.498	4.503	PASS
	Upper700MHz	GSM	0.243	0.245	PASS
		CDMA	1.235	1.241	PASS
		LTE	4.483	4.508	PASS
Downlink	PCS	GSM	0.254	0.245	PASS
		CDMA	1.274	1.240	PASS
		LTE	4.623	4.503	PASS
	AWS	GSM	0.252	0.244	PASS
		CDMA	1.271	1.235	PASS
		LTE	4.598	4.513	PASS
	Cellular	GSM	0.247	0.242	PASS
		CDMA	1.240	1.246	PASS
		LTE	4.513	4.473	PASS
	Lower700MHz	GSM	0.249	0.248	PASS
		CDMA	1.240	1.238	PASS
		LTE	4.523	4.443	PASS
	Upper700MHz	GSM	0.246	0.248	PASS
		CDMA	1.247	1.247	PASS
		LTE	4.518	4.498	PASS

Note: All the RF path have been tested, only the worst-case DL path (The table below is listed) reported.

Band	Uplink	Downlink
PCS	Sever1-Donor	Donor- Sever4
AWS	Sever1-Donor	Donor- Sever4
Cellular	Sever2-Donor	Donor- Sever1
Lower700	Sever2-Donor	Donor- Sever2
Upper700	Sever4-Donor	Donor- Sever2

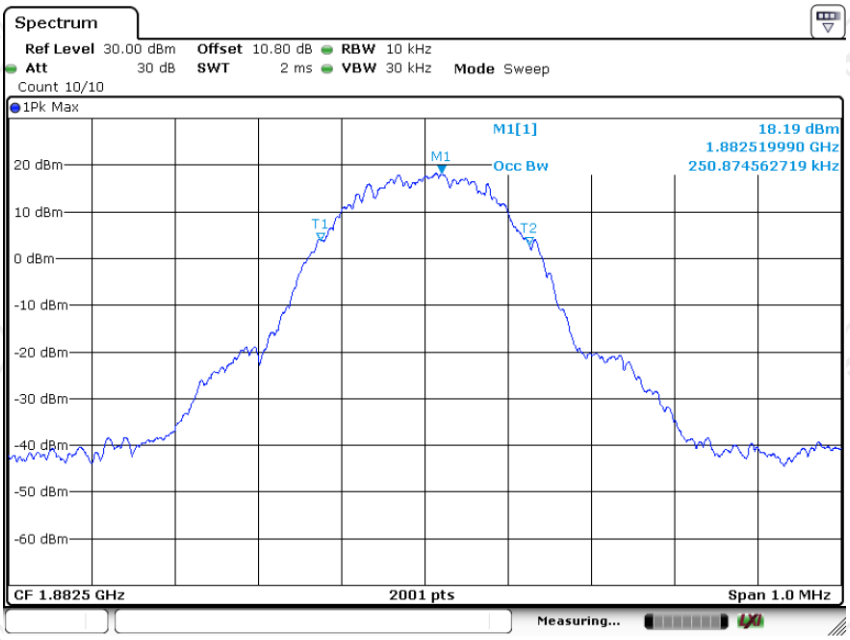
Test Plots

PCS GSM UL Input



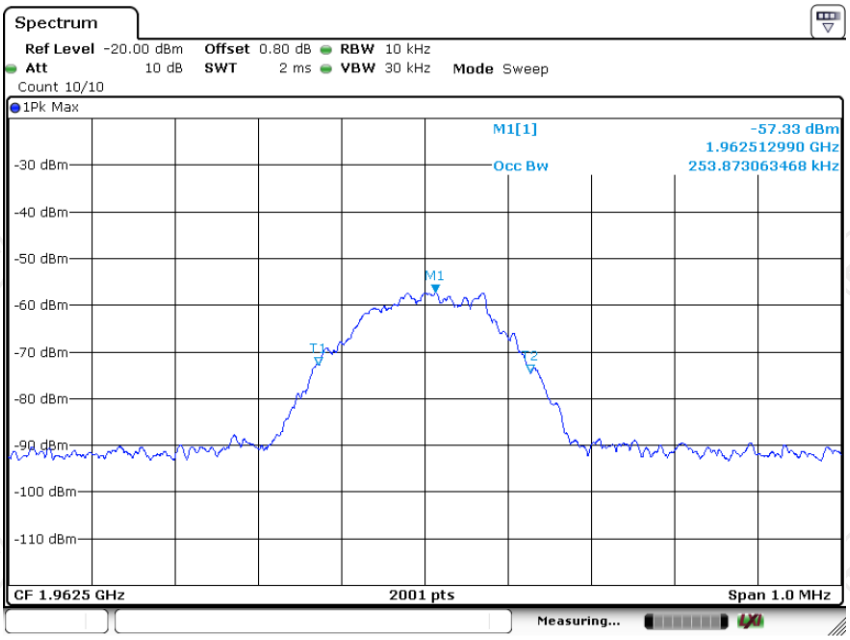
Date: 7.NOV.2024 16:05:43

PCS GSM UL output



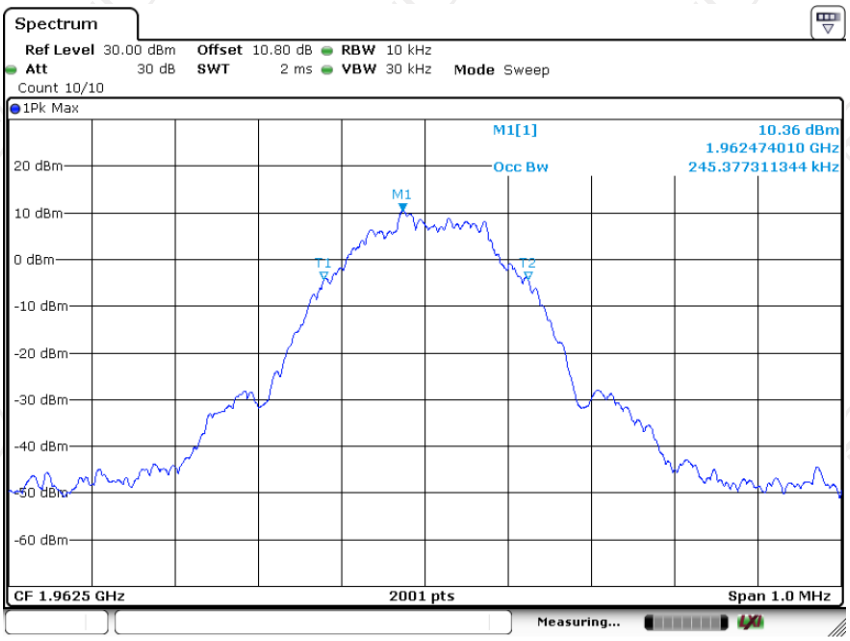
Date: 8.NOV.2024 09:27:04

PCS GSM DL Input



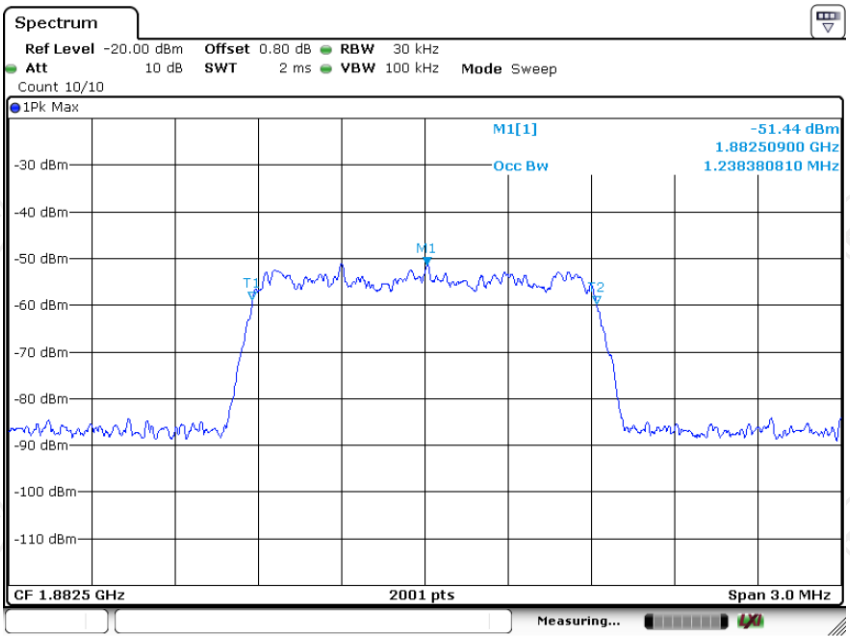
Date: 7.NOV.2024 16:06:23

PCS GSM DL Output



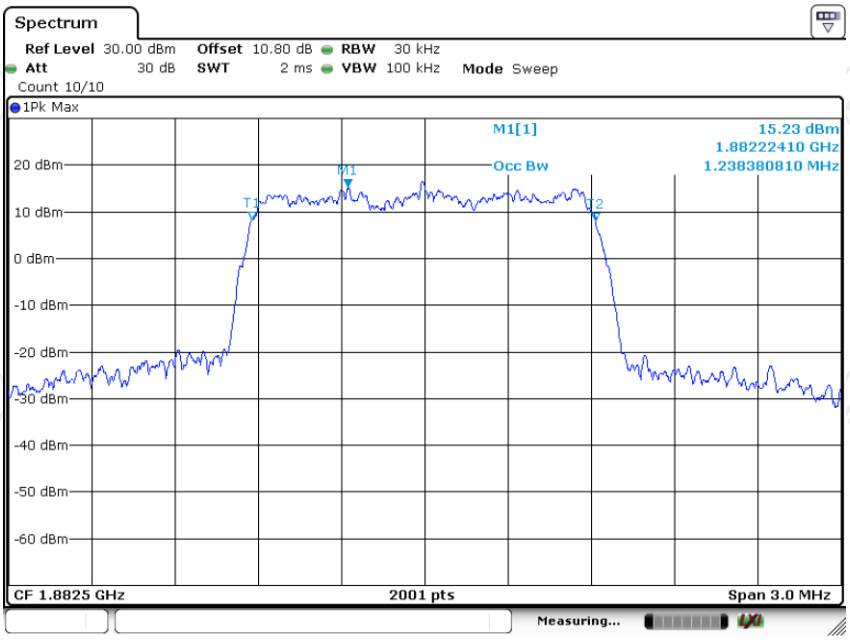
Date: 8.NOV.2024 10:33:03

PCS CDMA UL Input



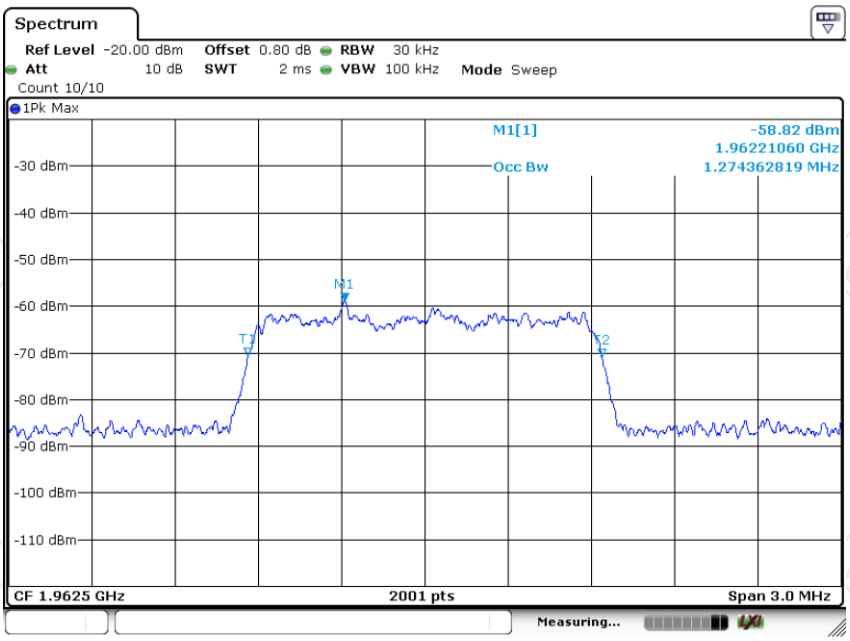
Date: 7.NOV.2024 16:20:39

PCS CDMA UL output



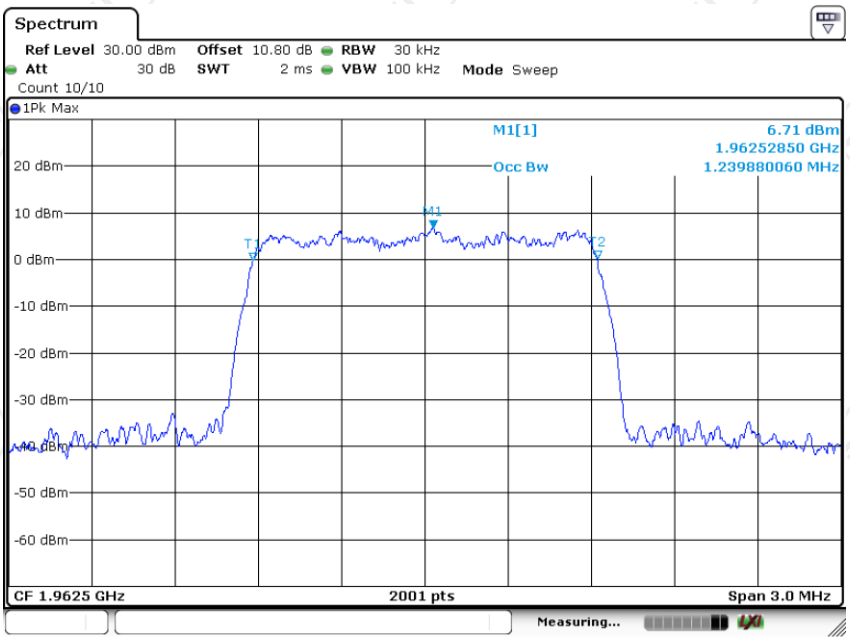
Date: 8.NOV.2024 09:28:26

PCS CDMA DL Input



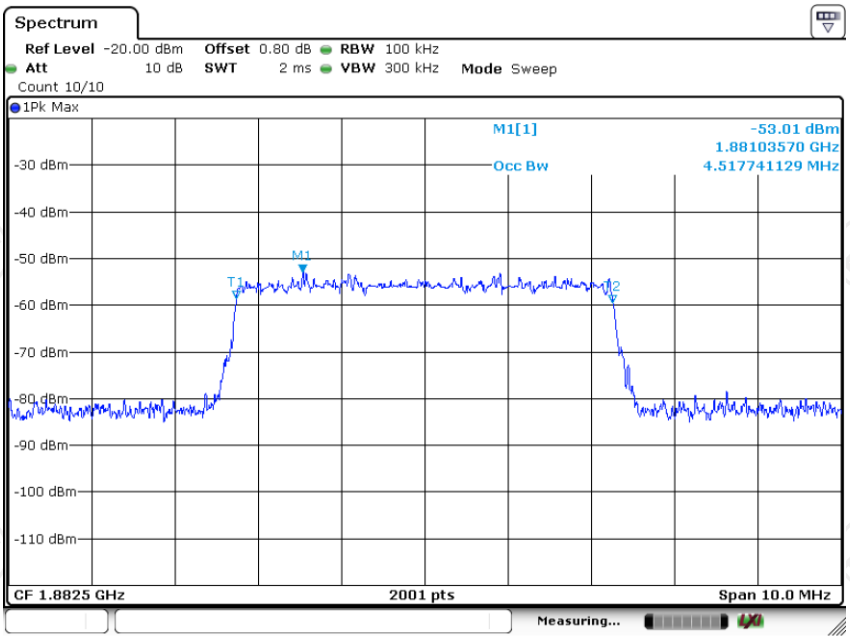
Date: 7.NOV.2024 16:14:37

PCS CDMA DL Output



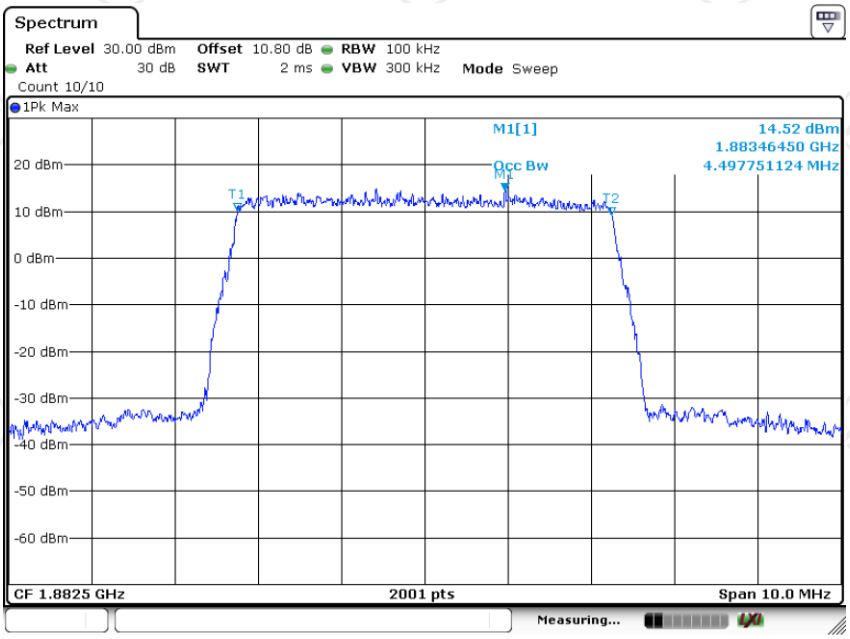
Date: 8.NOV.2024 10:27:15

PCS LTE UL Input



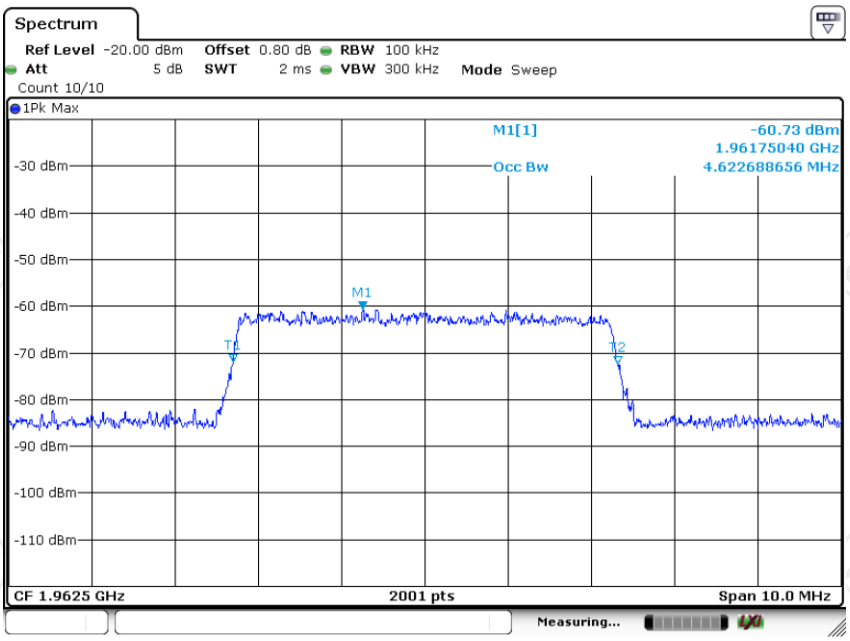
Date: 7.NOV.2024 16:28:44

PCS LTE UL output



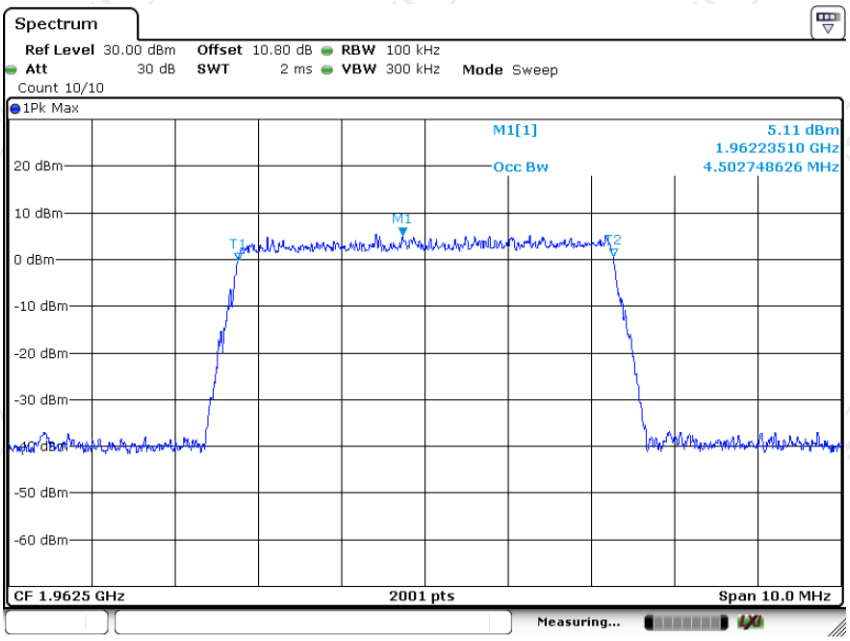
Date: 8.NOV.2024 09:45:51

PCS LTE DL Input



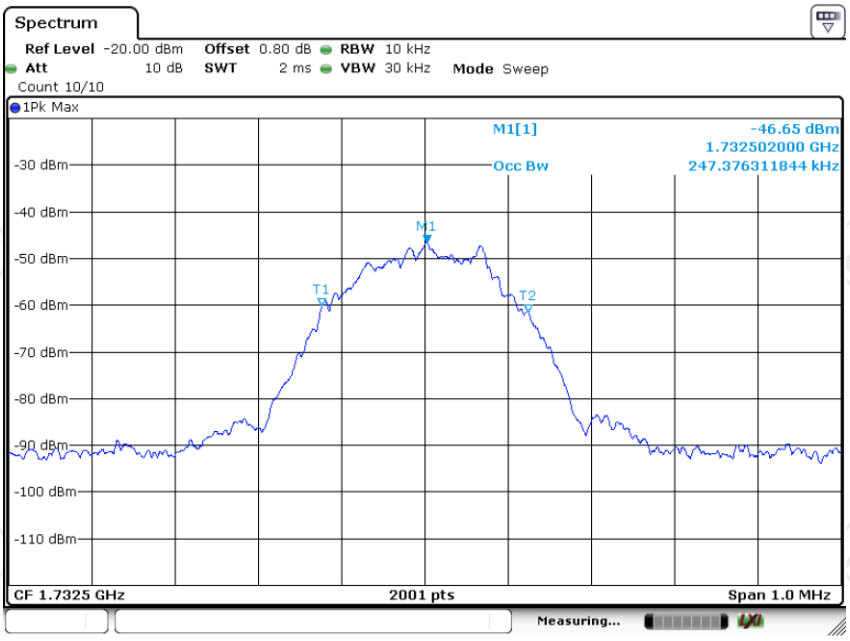
Date: 7.NOV.2024 16:29:29

PCS LTE DL Output



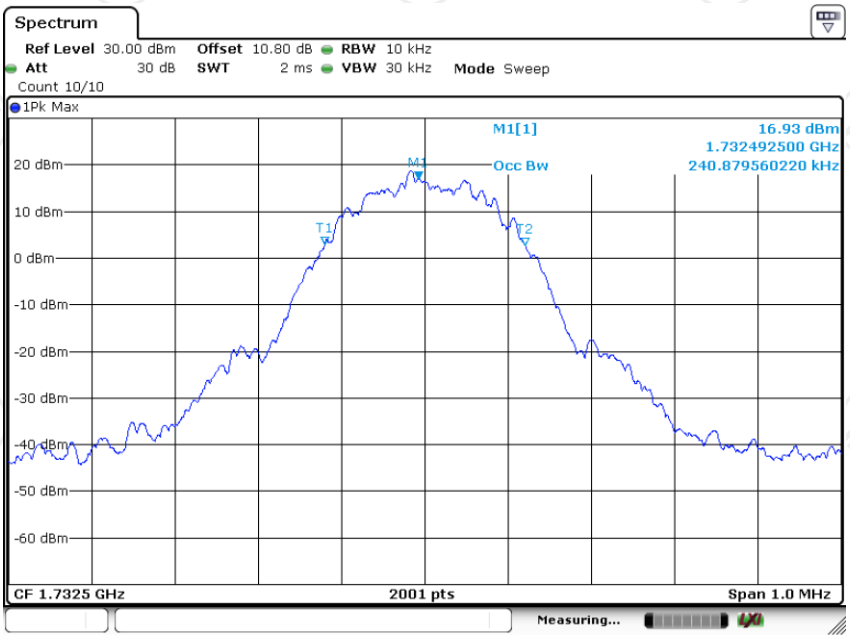
Date: 8.NOV.2024 10:13:07

AWS GSM UL Input



Date: 7.NOV.2024 16:04:42

AWS GSM UL output



Date: 8.NOV.2024 09:17:35