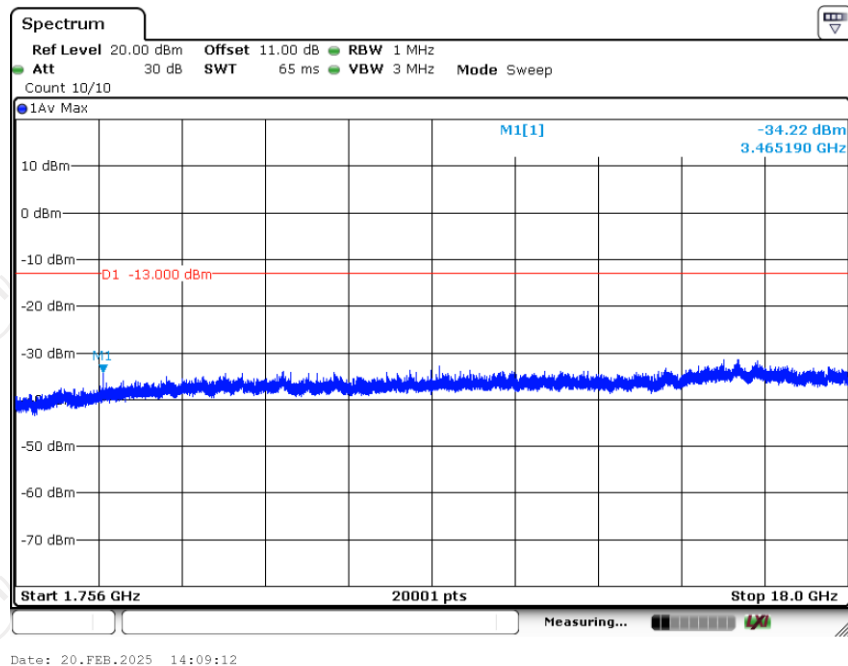
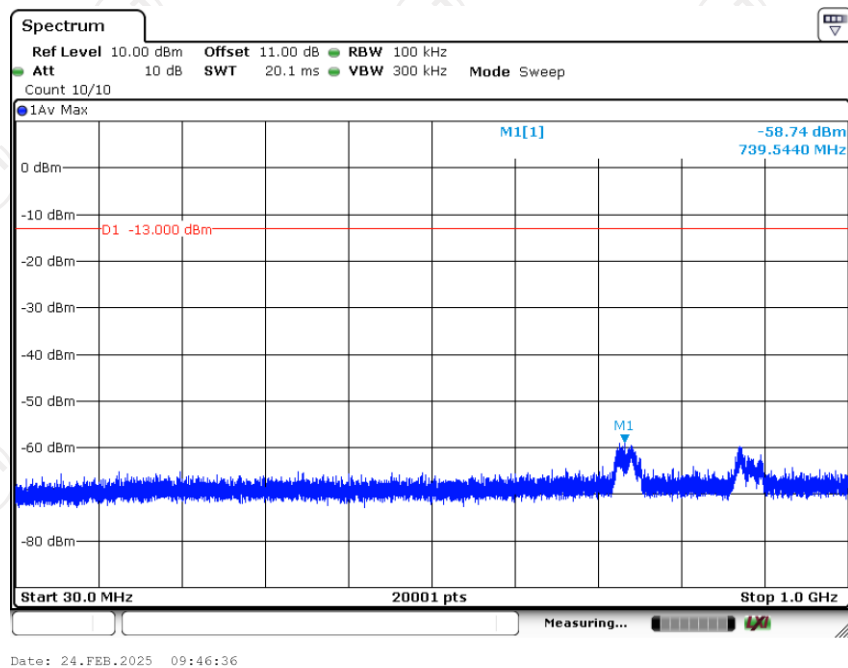
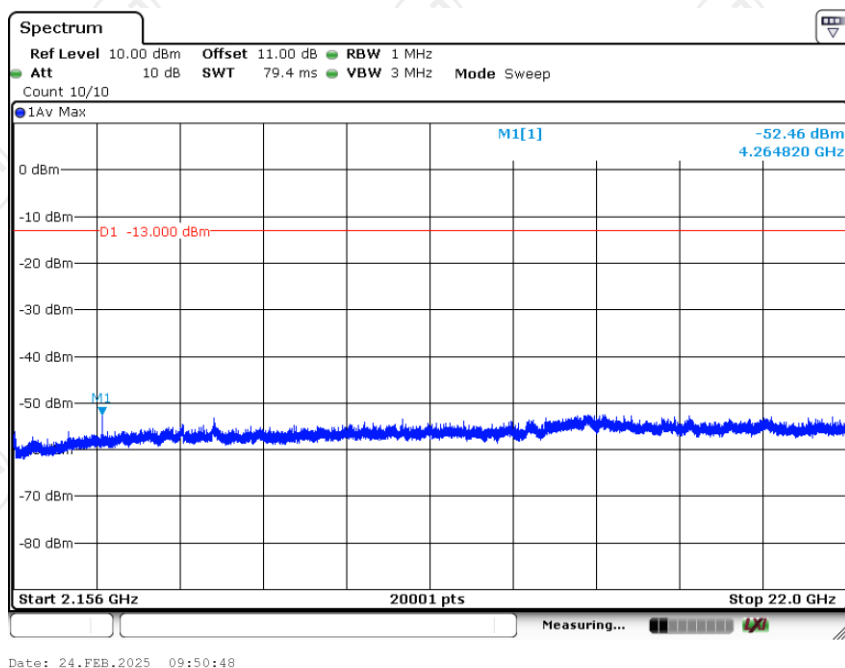
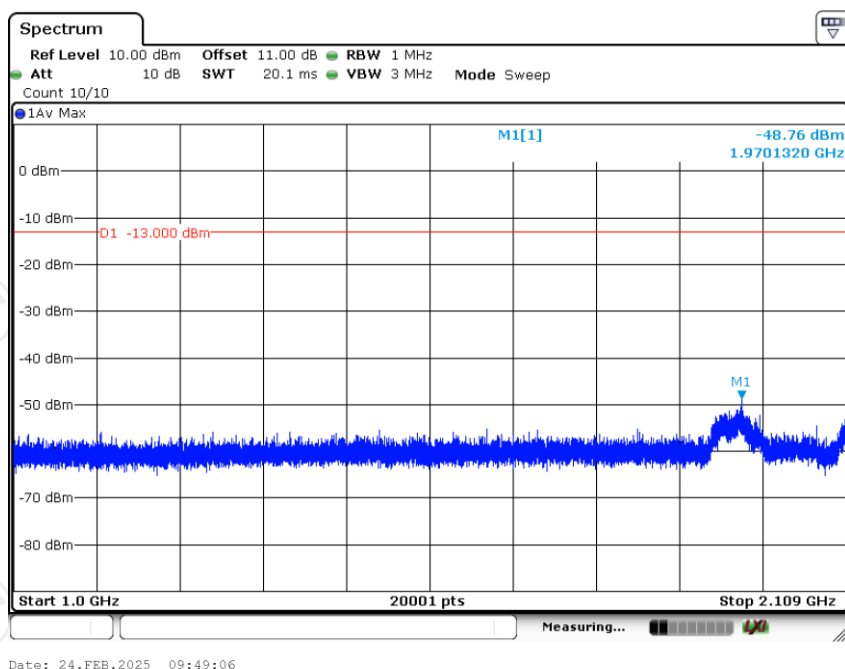




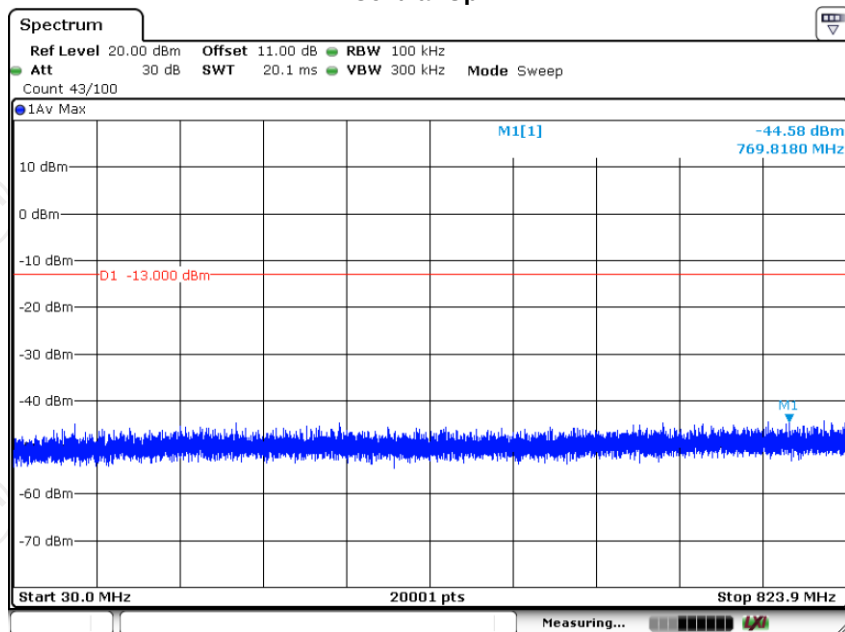
AWS-1 Downlink



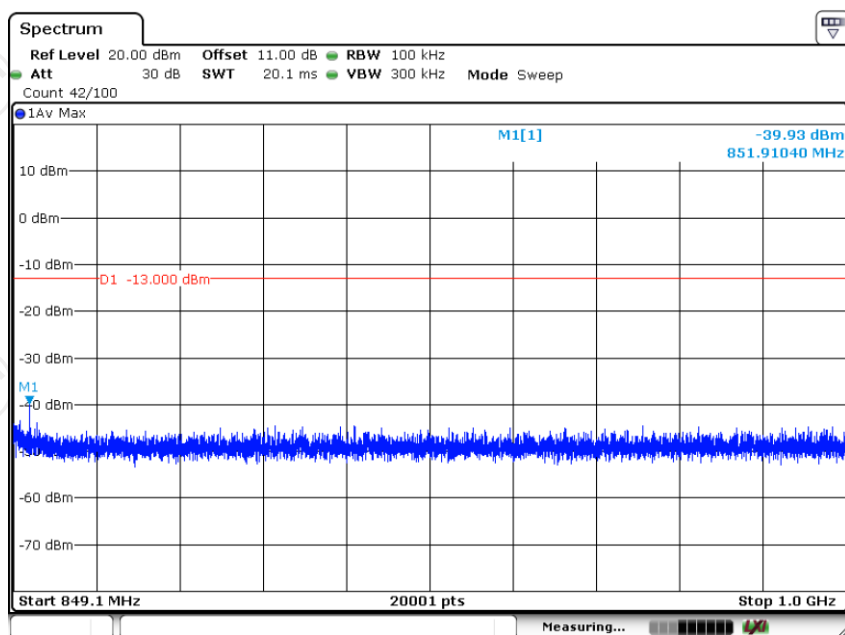


Test Plots

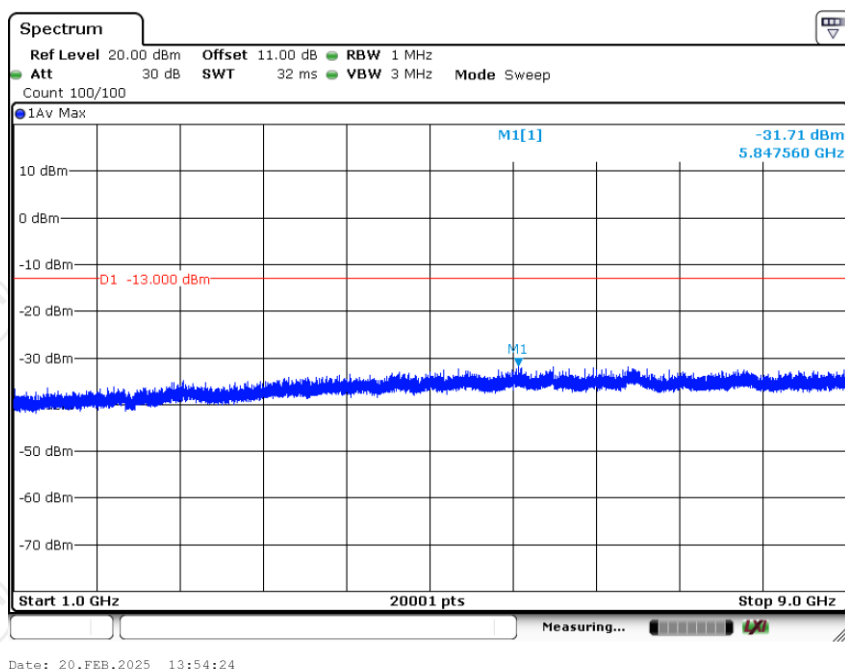
Cellular Uplink



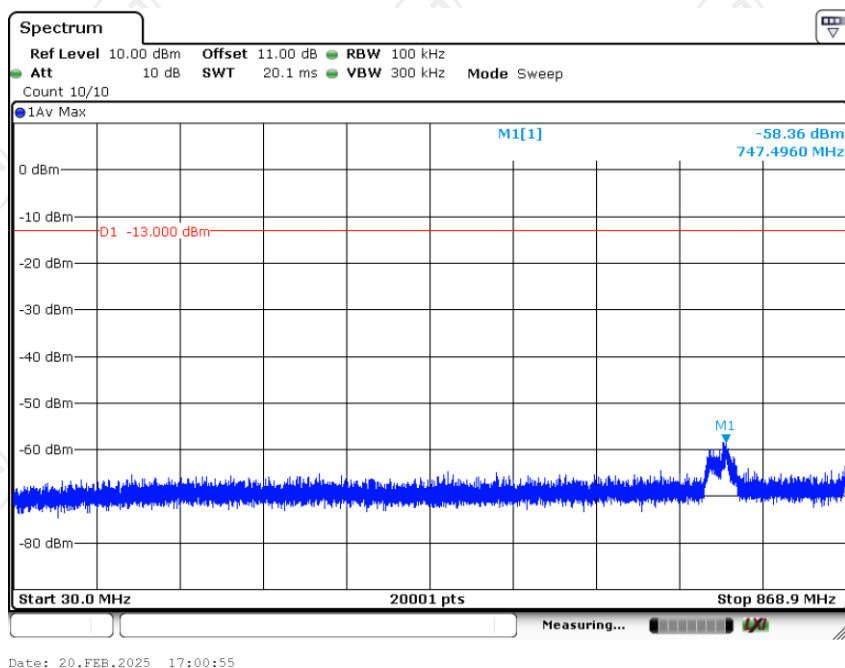
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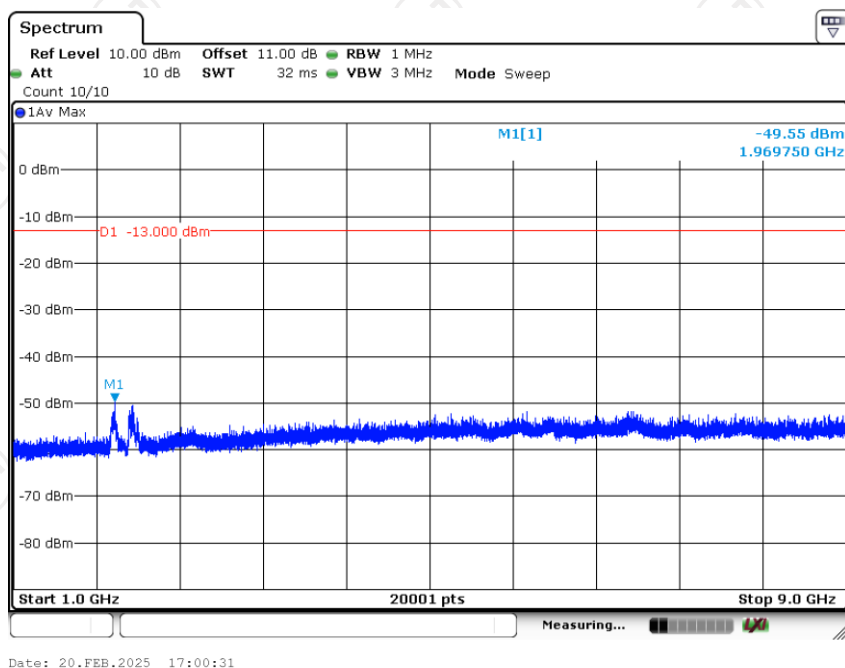
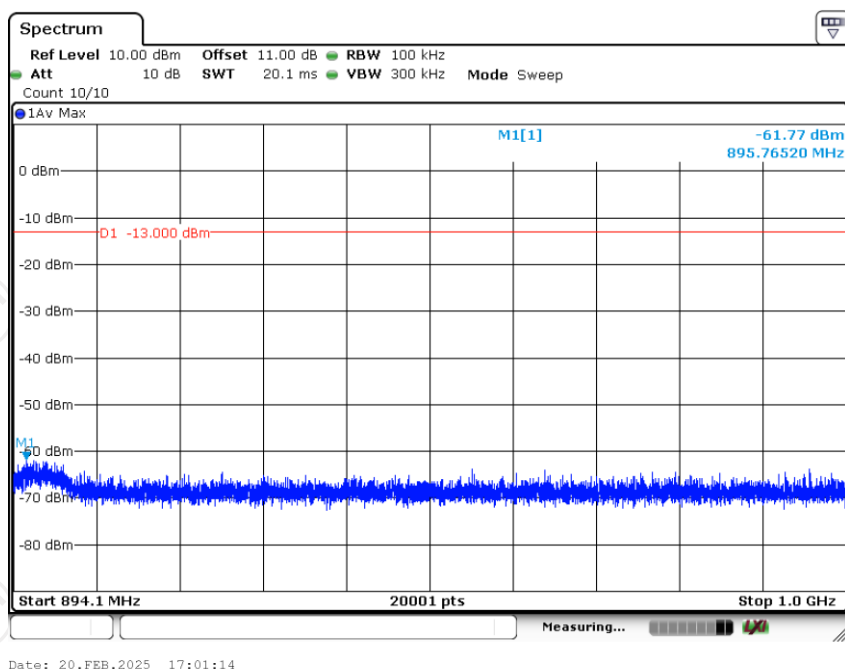


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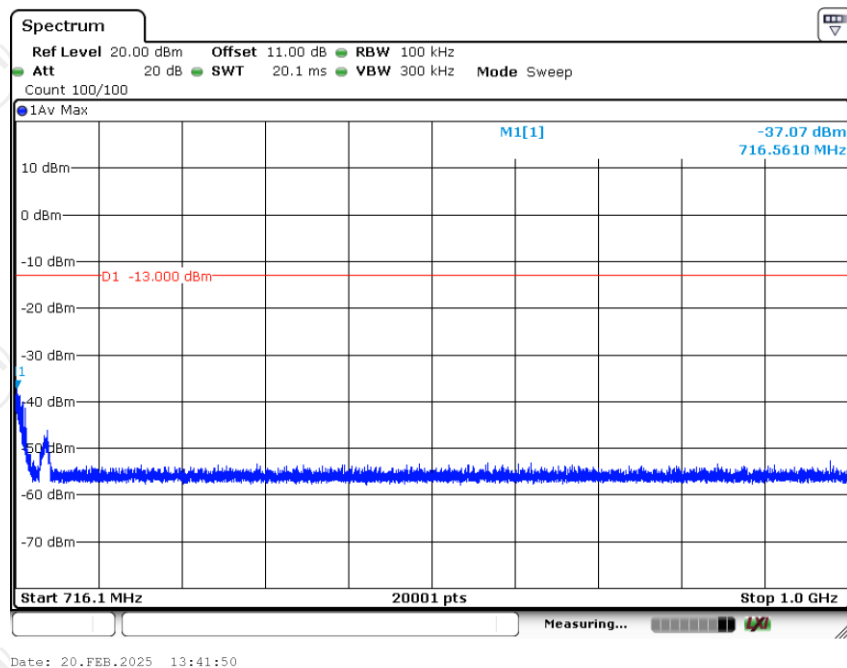
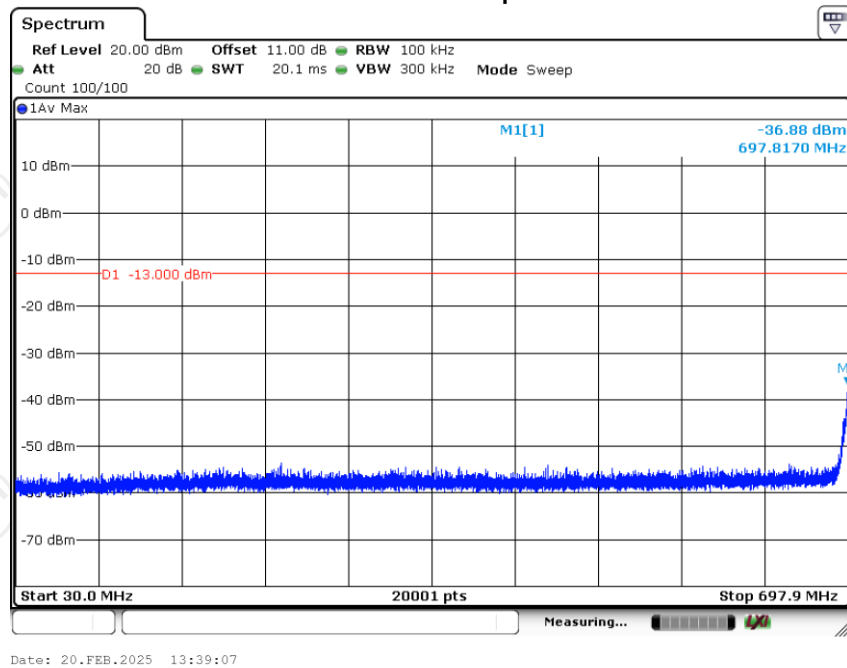
Cellular Downlink

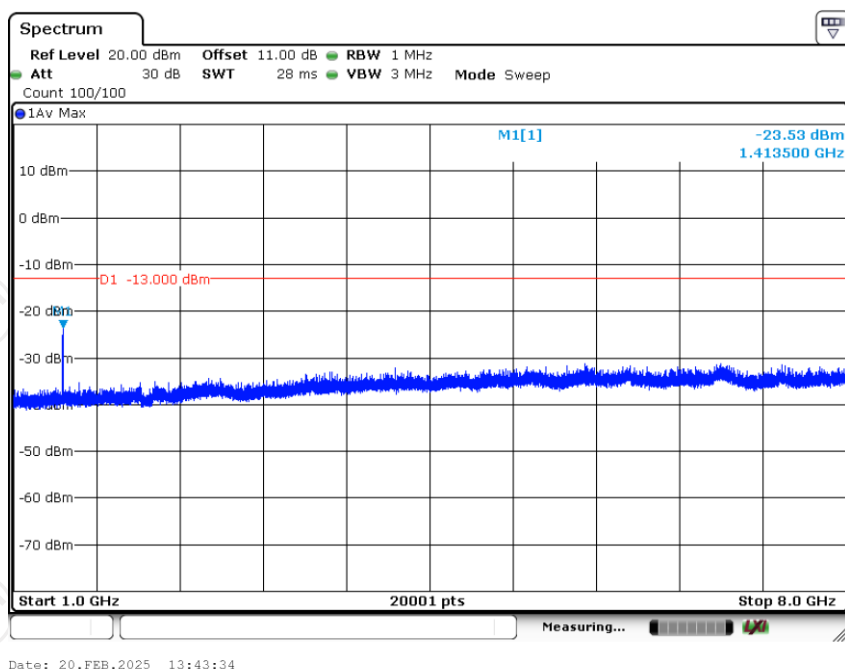




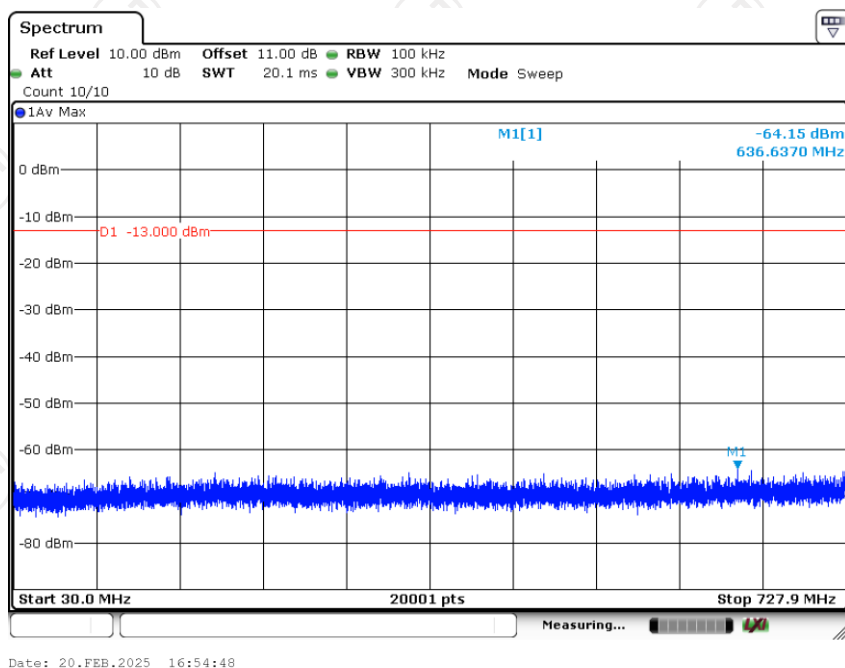
Test Plots

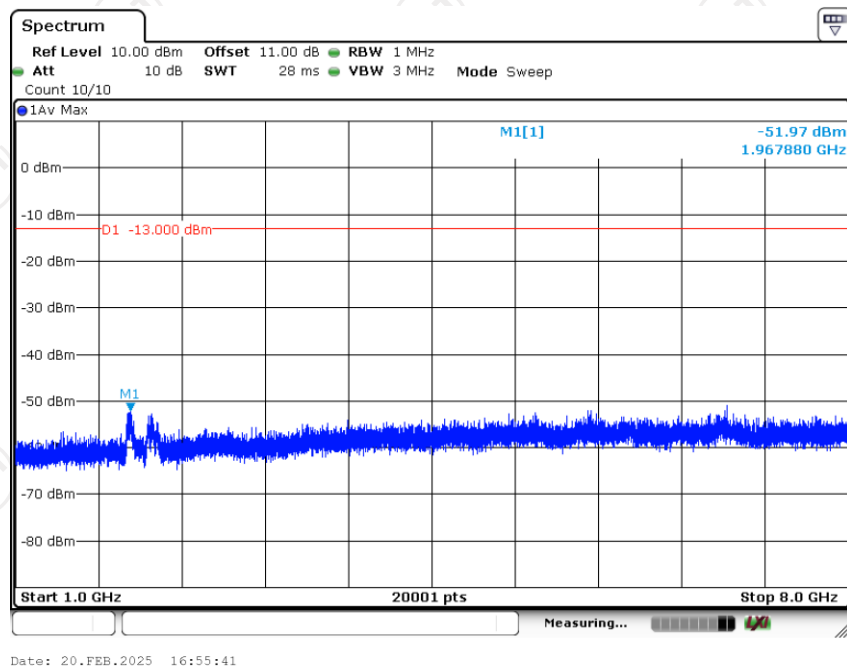
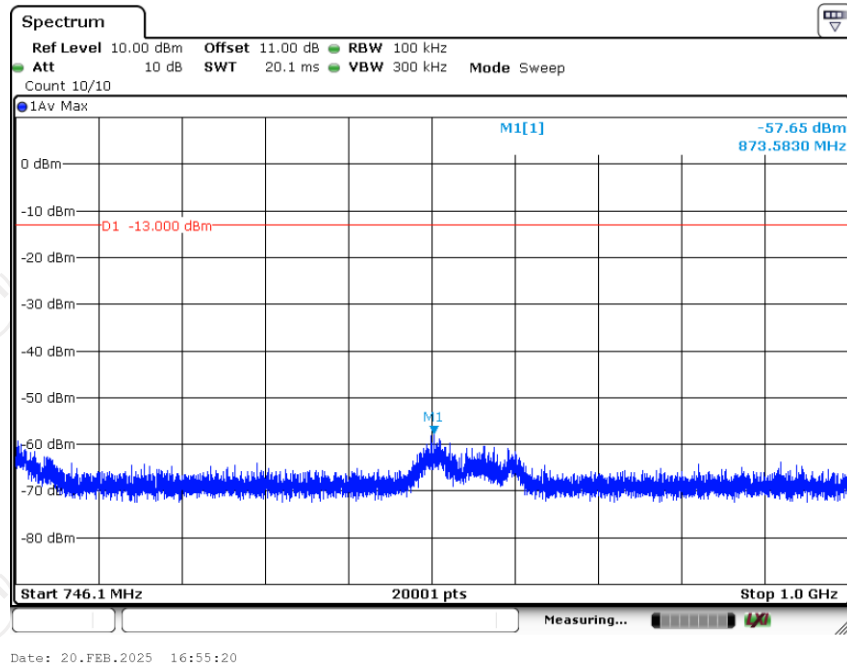
Lower700MHz Uplink





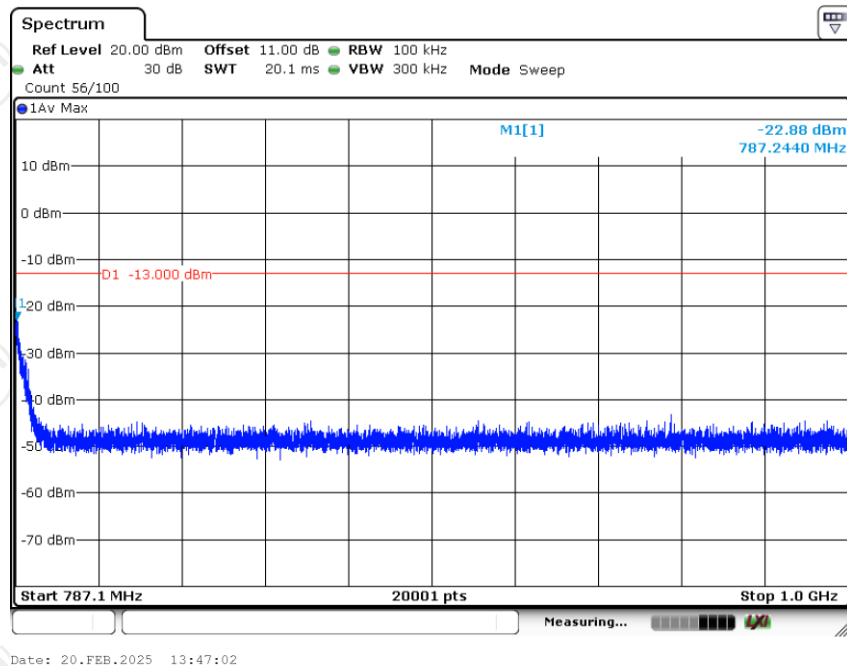
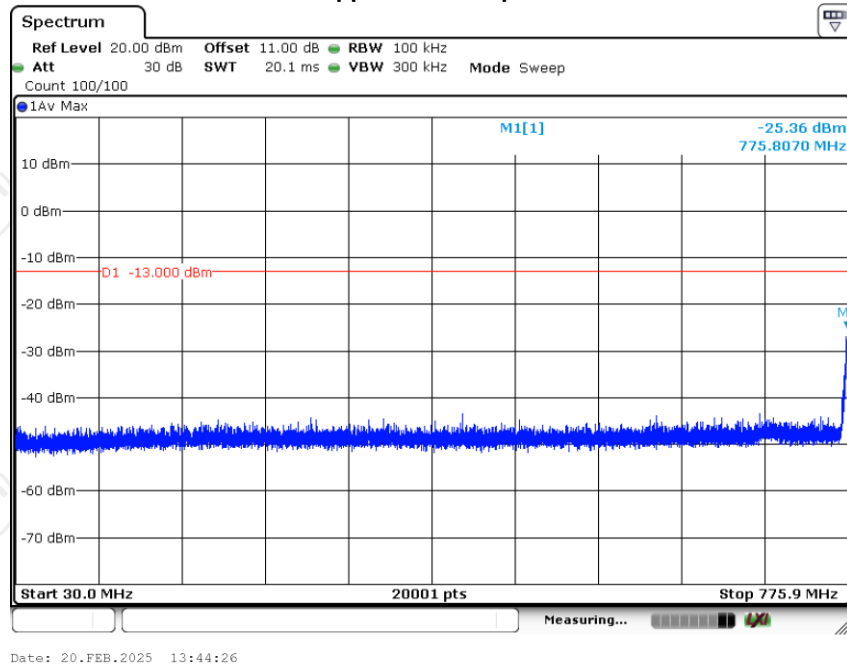
Lower700MHz Downlink

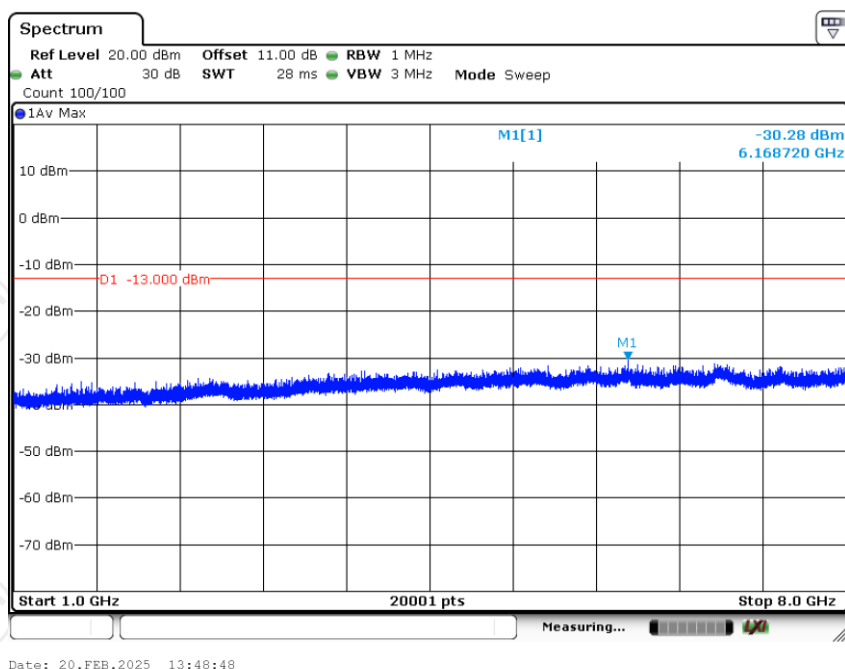




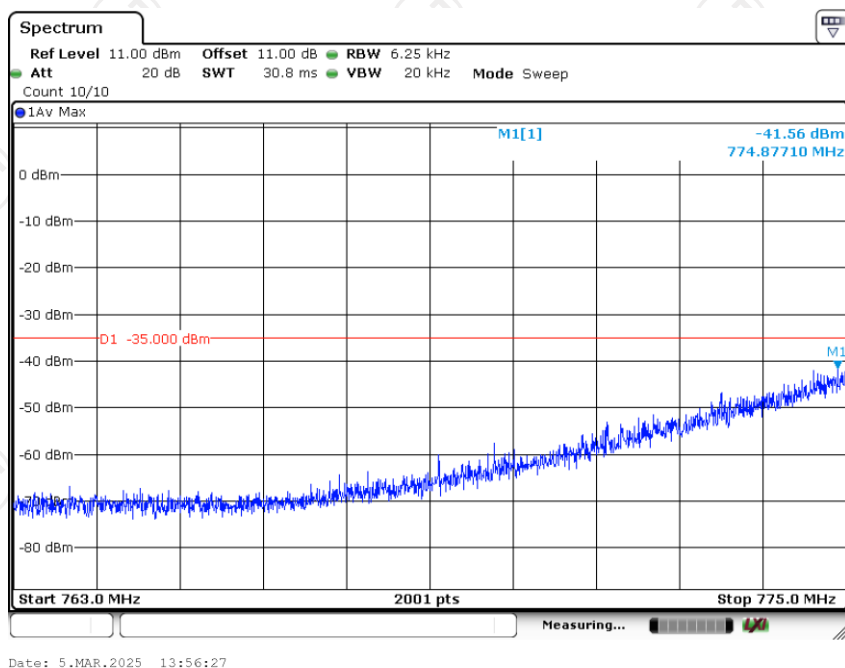
Test Plots

Upper700MHz Uplink

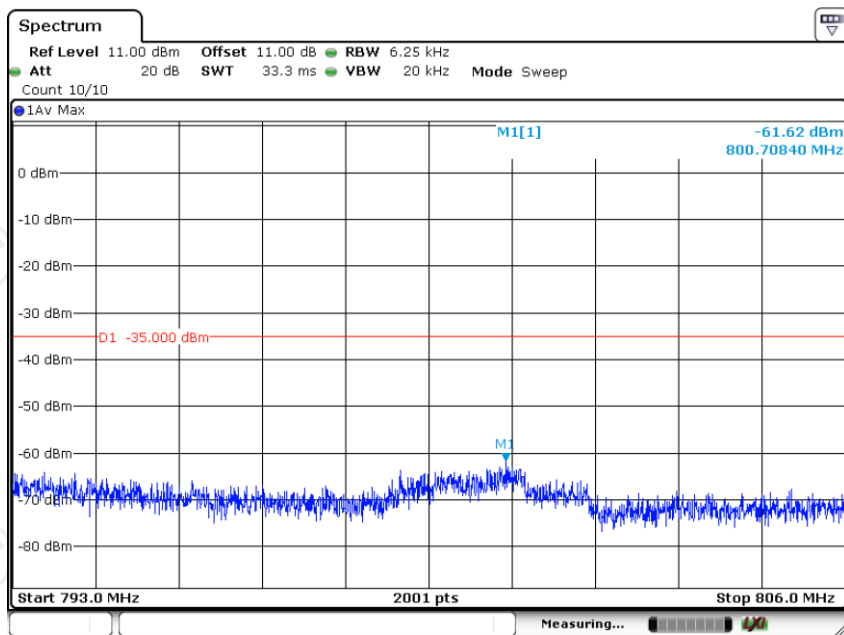




763~775MHz

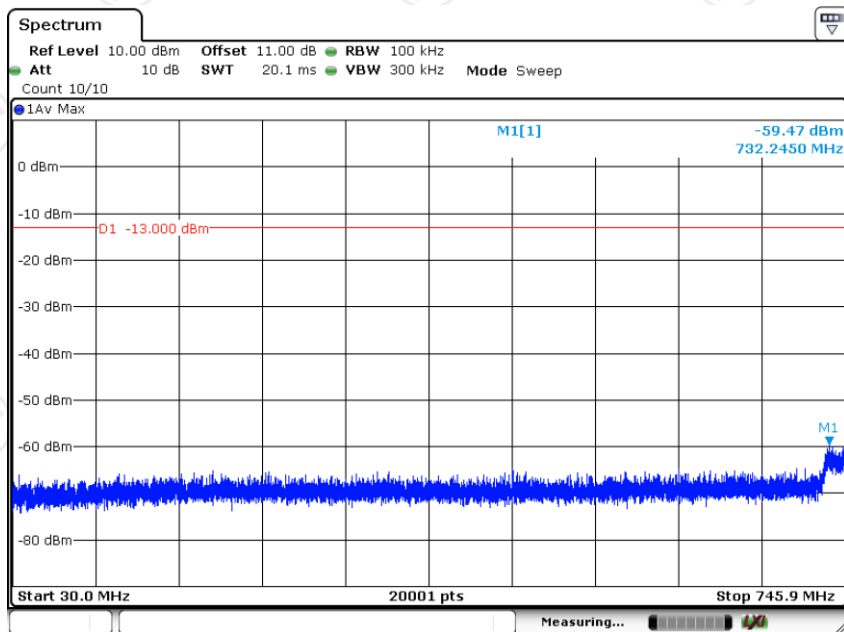


793~806MHz

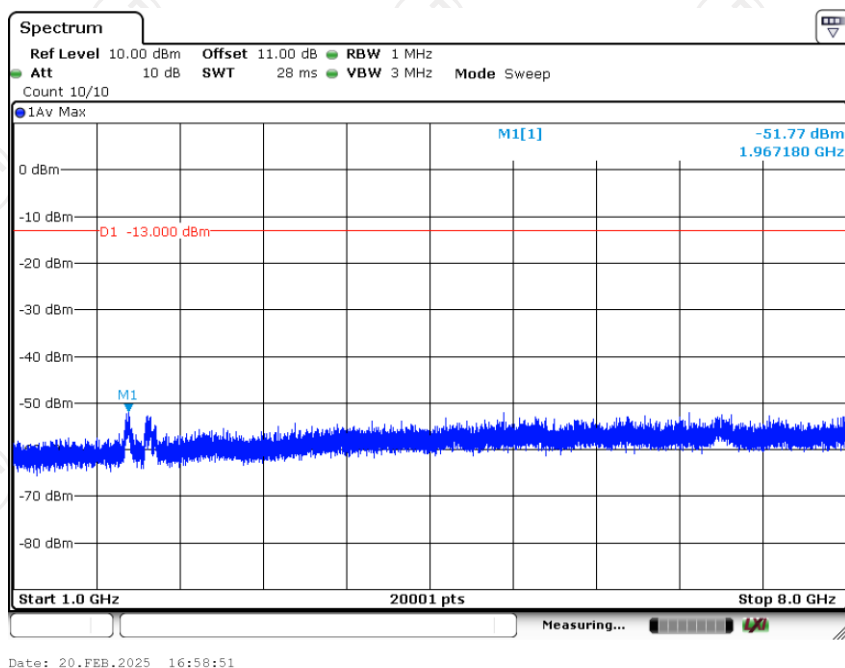
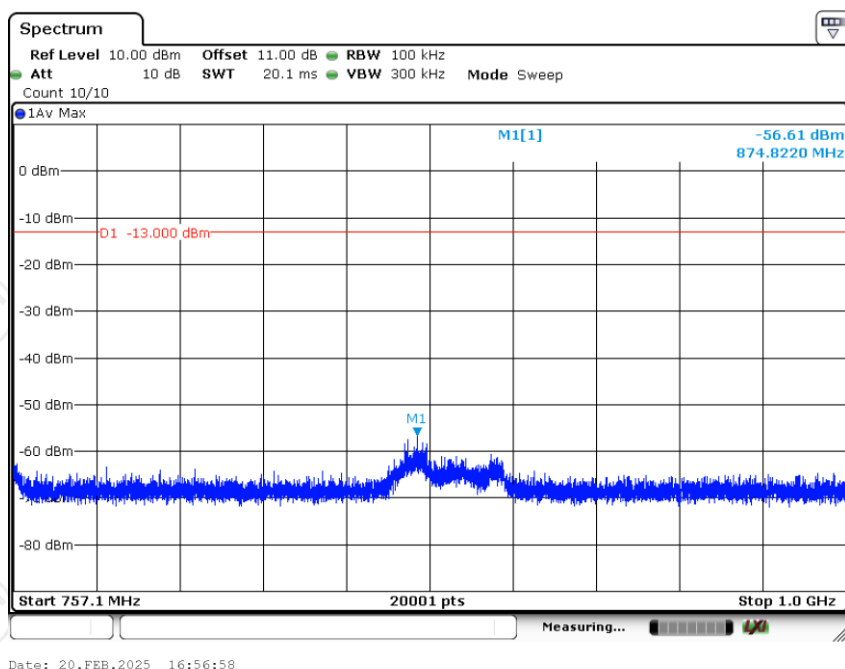


Date: 5.MAR.2025 13:57:02

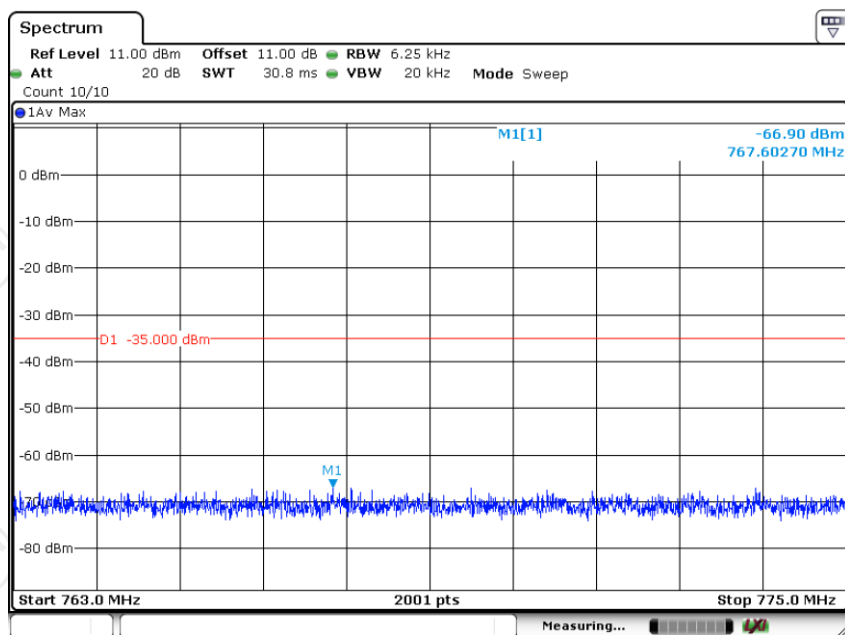
Upper700MHz Downlink



Date: 20.FEB.2025 16:56:26

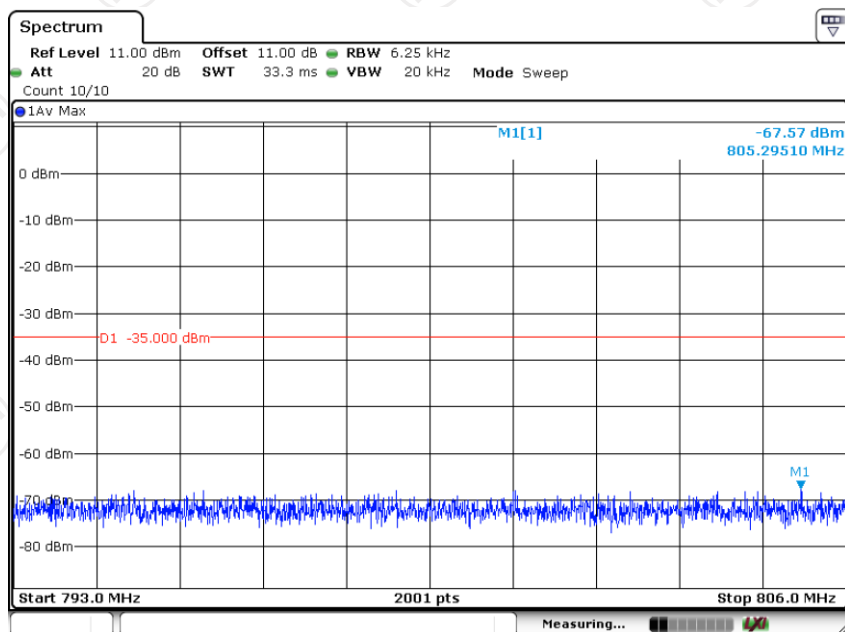


763~775MHz



Date: 5.MAR.2025 13:59:11

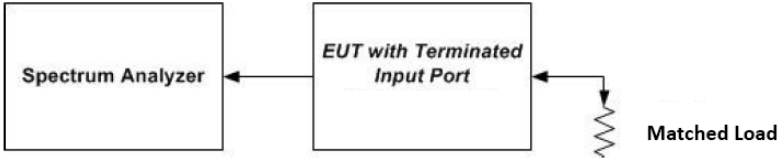
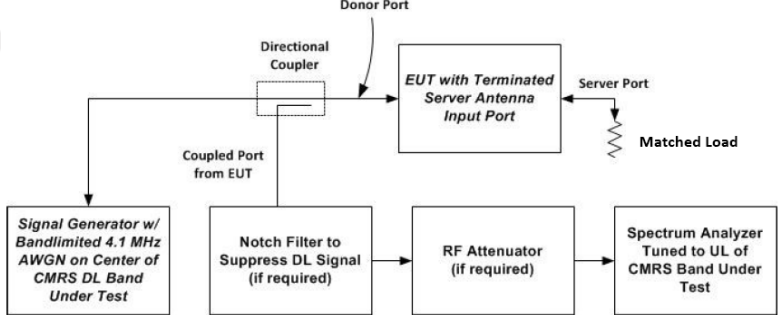
793~806MHz



Date: 5.MAR.2025 13:58:38

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:	-59 dBm/MHz or -103 dBm/MHz—RSSI which is less.
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:	- 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. - Set the spectrum analyzer RBW to 1 MHz with the VBW $\geq 3 \cdot$ RBW. - Select the power averaging (rms) detector and trace average over at least 100 traces. - Set the center frequency of the spectrum analyzer to the center of the CMRS band under test with the span $\geq 2 \cdot$ the CMRS band. - Measure the maximum transmitter noise power level. - Save the spectrum analyzer Test Plots as necessary for inclusion in the final test report. - Repeat 7.7b) to 7.7f) for all operational uplink and downlink bands. - 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. - Configure the signal generator for AWGN operation with a 99% OBW of 4.1 MHz. - Set the spectrum analyzer RBW for 1 MHz, VBW $\geq 3 \cdot$ RBW, with a power averaging (rms) detector with at least 100 trace averages. - Set the center frequency of the spectrum analyzer to the center of the CMRS band under test, with the span $\geq 2 \cdot$ 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	Jun. 27, 2024	Jun. 26, 2025
Spectrum Analyzer	R&S	FSV40-N	102188	Jun. 27, 2024	Jun. 26, 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	-61.64	-59	PASS
AWS-1 Uplink	-60.13	-59	PASS
Cellular Uplink	-62.60	-59	PASS
Lower700MHz Uplink	-62.59	-59	PASS
Upper700MHz Uplink	-60.90	-59	PASS
PCS Downlink	-60.67	-59	PASS
AWS-1 Downlink	-61.20	-59	PASS
Cellular Downlink	-61.08	-59	PASS
Lower700MHz Downlink	-60.02	-59	PASS
Upper700MHz Downlink	-60.08	-59	PASS

Variable Uplink Noise				
Operation Bands	RSSI dBm	Measured dBm/MHz	Limit dBm/MHz	Results
PCS	-48	-62.09	-59	PASS
	-45	-63.66	-59	PASS
	-42	-67.22	-61	PASS
	-39	-65.60	-64	PASS
	-36	-68.22	-67	PASS
	-37	-69.83	-66	PASS
AWS-1	-47	-61.19	-59	PASS
	-45	-62.31	-59	PASS
	-42	-65.32	-61	PASS
	-39	-67.59	-64	PASS
	-36	-67.39	-67	PASS
	-34	-69.07	-69	PASS
Cellular	-46	-63.11	-59	PASS
	-43	-64.72	-60	PASS
	-41	-66.03	-62	PASS

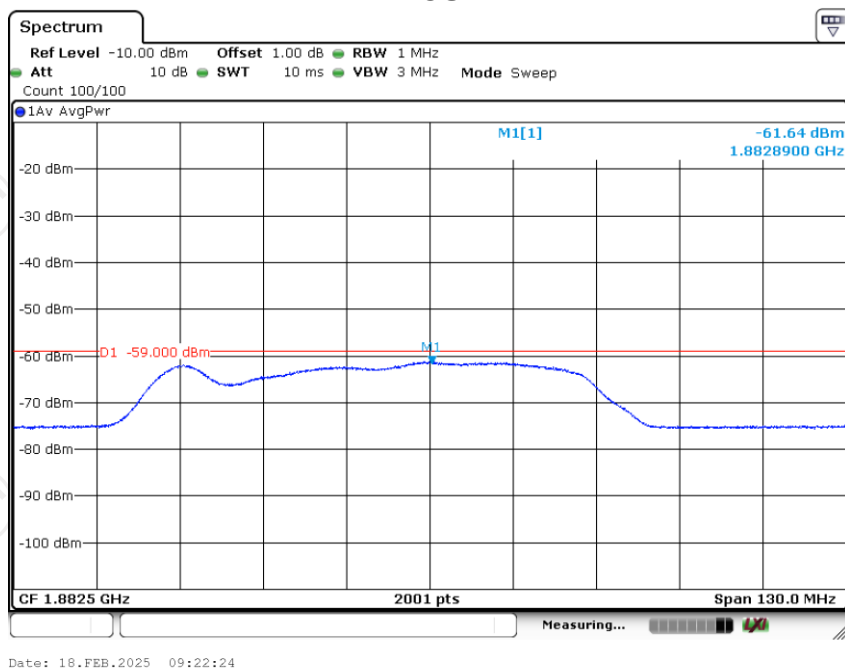
	-39	-67.64	-64	PASS
	-37	-68.94	-66	PASS
	-36	-69.59	-67	PASS
Lower700MHz	-51	-63.91	-59	PASS
	-49	-64.69	-59	PASS
	-47	-66.38	-59	PASS
	-46	-67.54	-59	PASS
	-45	-68.05	-59	PASS
	-44	-69.17	-59	PASS
Upper700MHz	-52	-60.84	-59	PASS
	-50	-62.51	-59	PASS
	-47	-64.34	-59	PASS
	-44	-66.84	-59	PASS
	-41	-69.04	-62	PASS
	-40	-69.69	-63	PASS

Variable Uplink Noise Timing

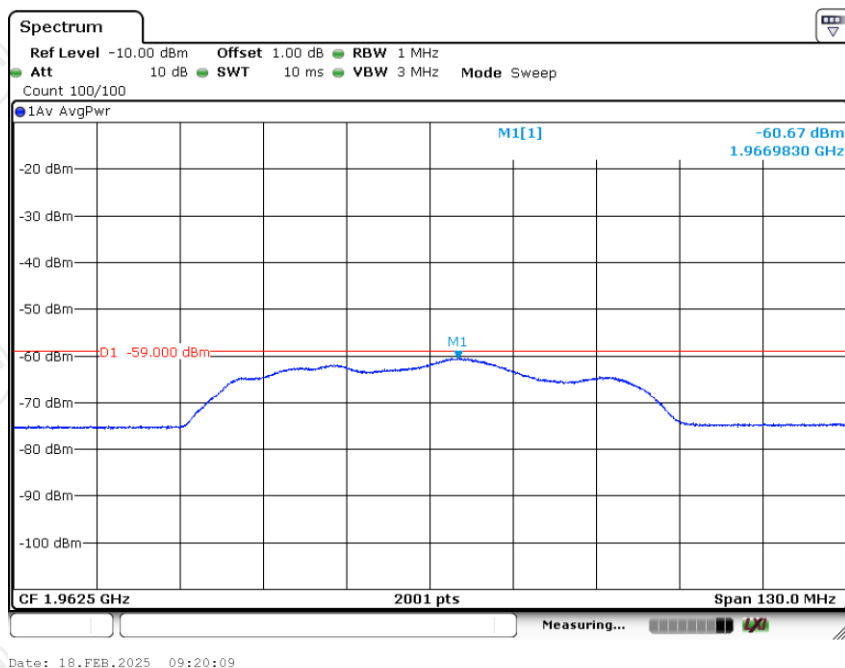
Operation Bands	Measured Sec	Limit Sec	Results
PCS	0.60	3	PASS
AWS-1	0.51	3	PASS
Cellular	0.63	3	PASS
Lower700MHz	0.61	3	PASS
Upper700MHz	0.48	3	PASS

Test Plots

PCS

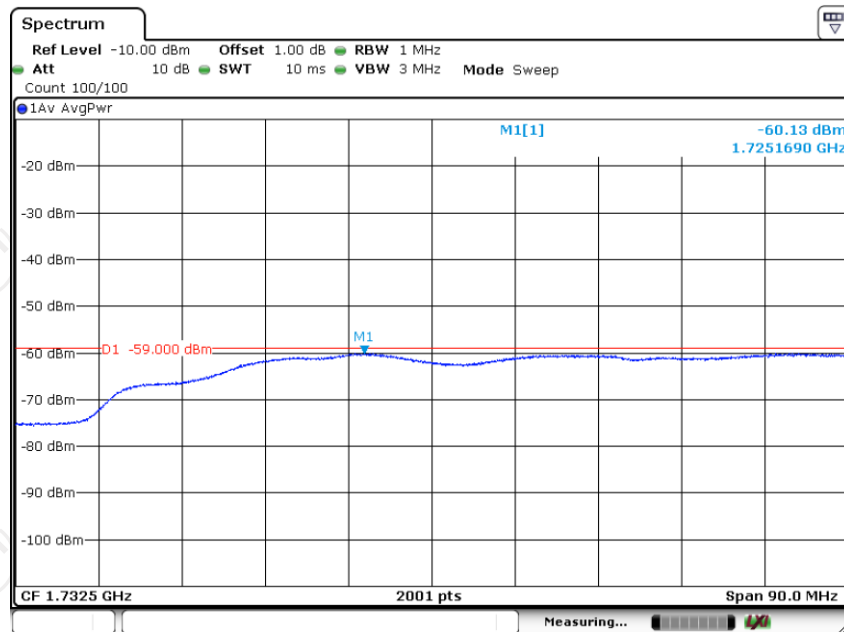


Uplink Noise



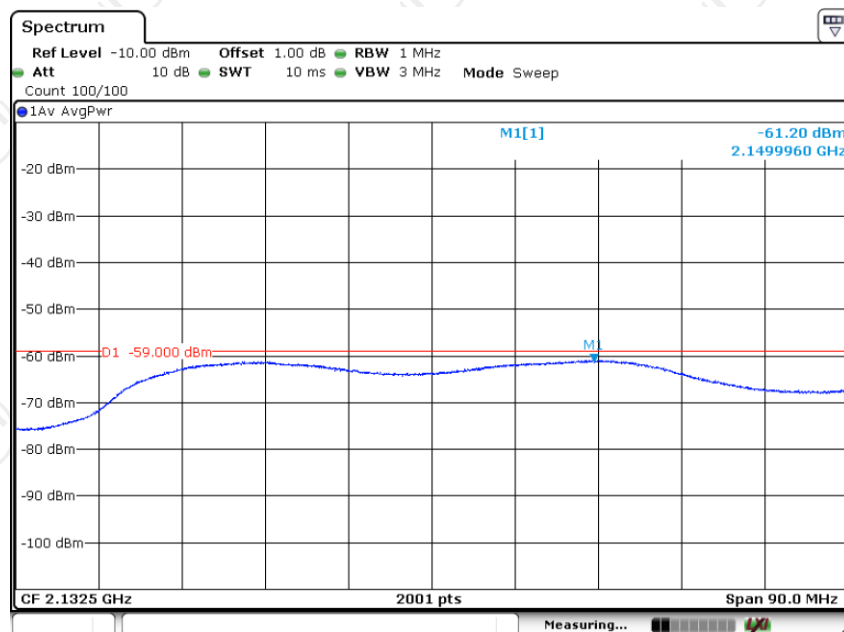
Downlink Noise

AWS-1



Date: 18.FEB.2025 09:23:02

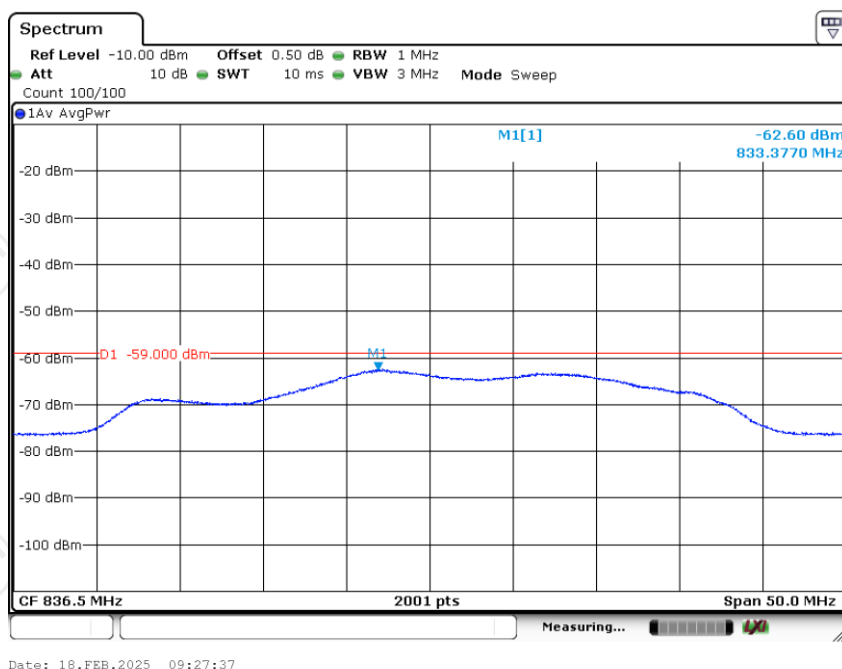
Uplink Noise



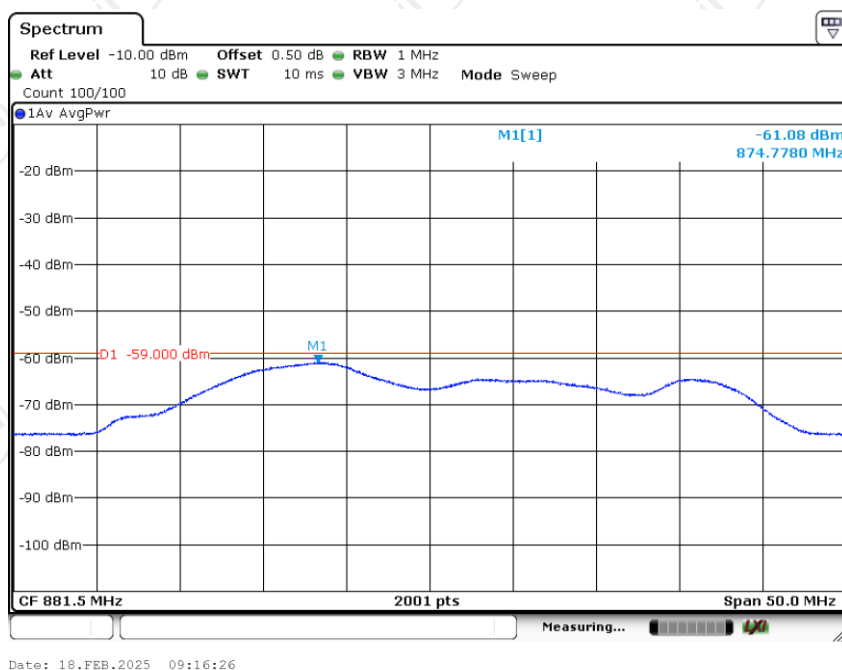
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Downlink Noise

Cellular

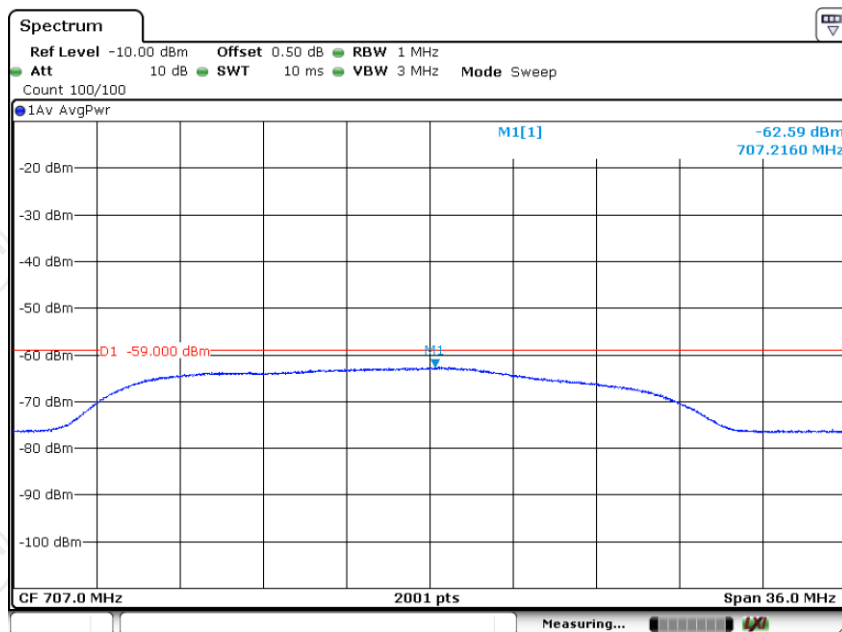


Uplink Noise



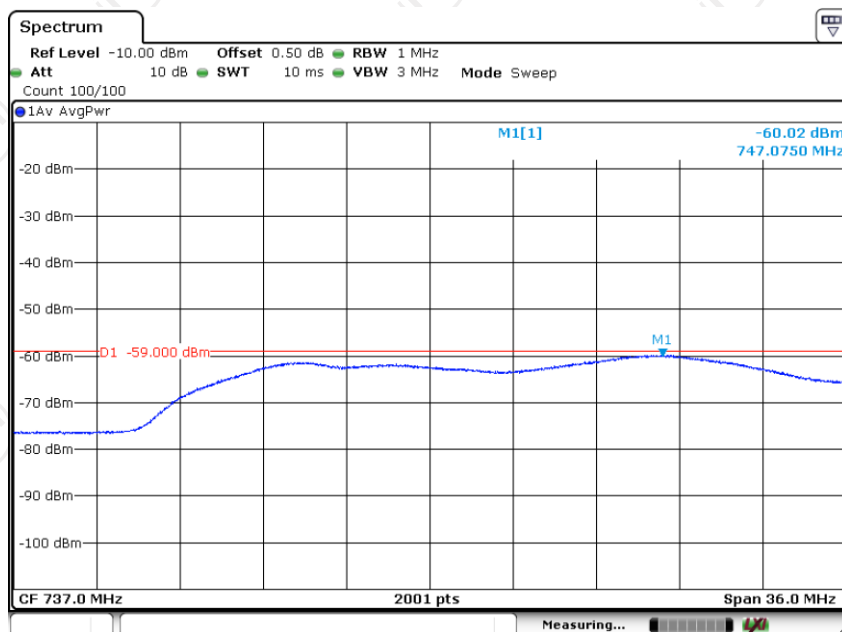
Downlink Noise

Lower700MHz



Date: 18.FEB.2025 09:25:34

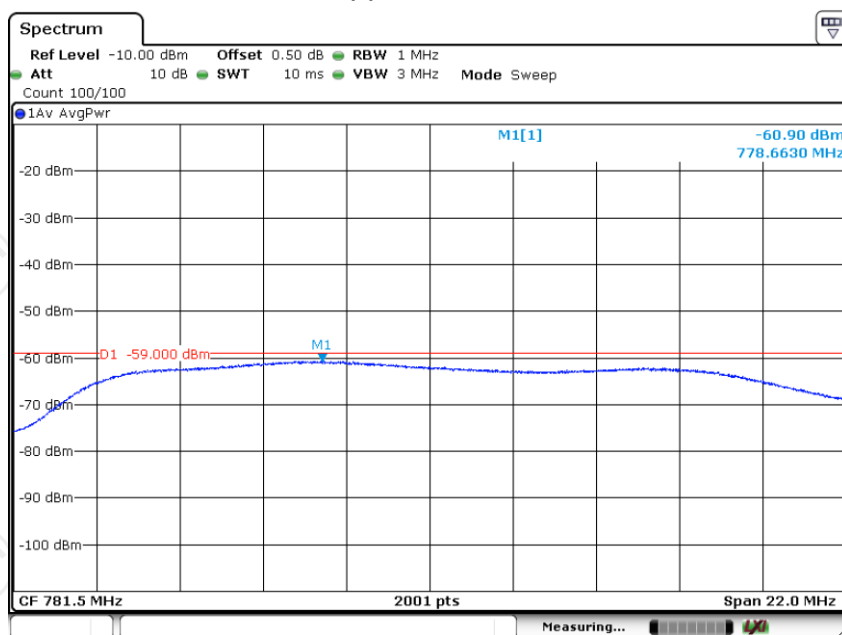
Uplink Noise



Date: 18.FEB.2025 09:17:01

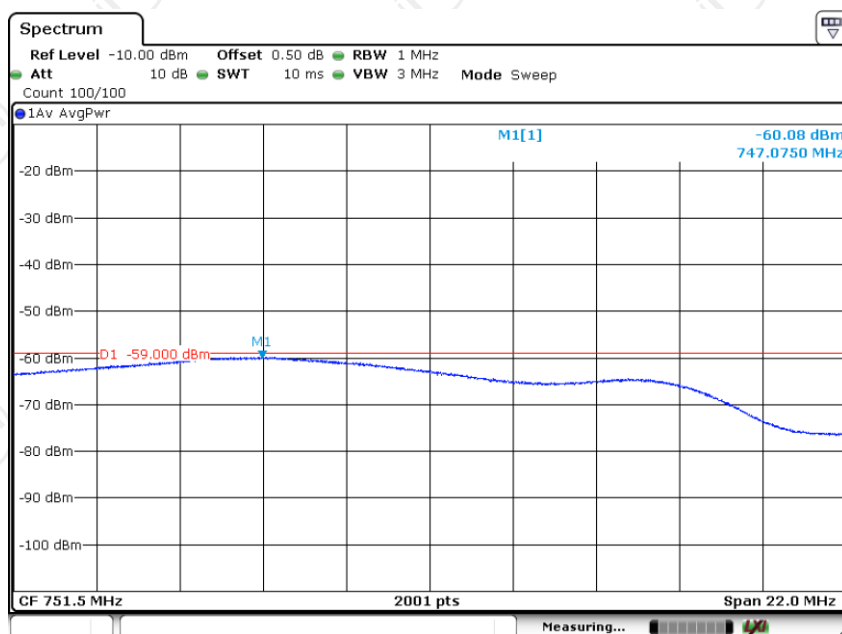
Downlink Noise

Upper700MHz



Date: 18.FEB.2025 09:26:12

Uplink Noise

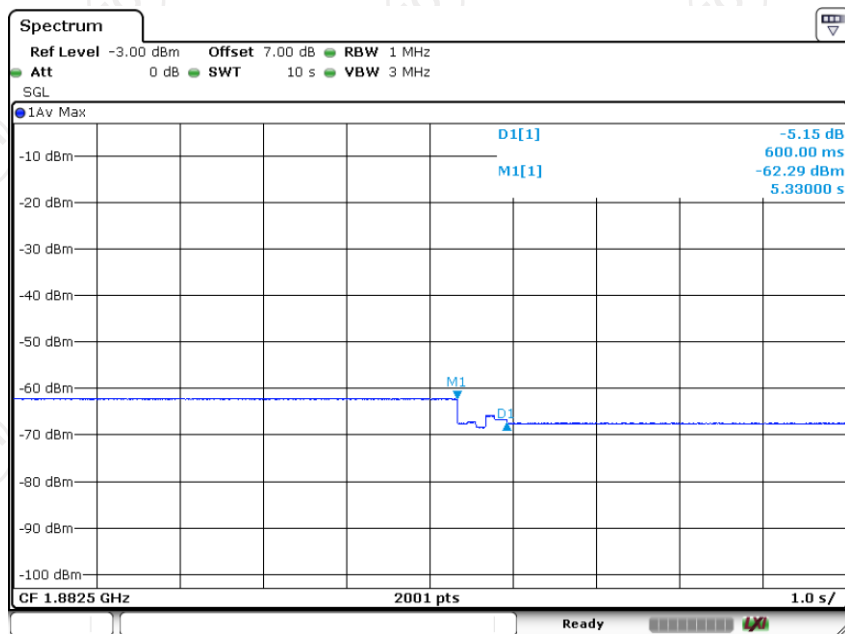


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Downlink Noise

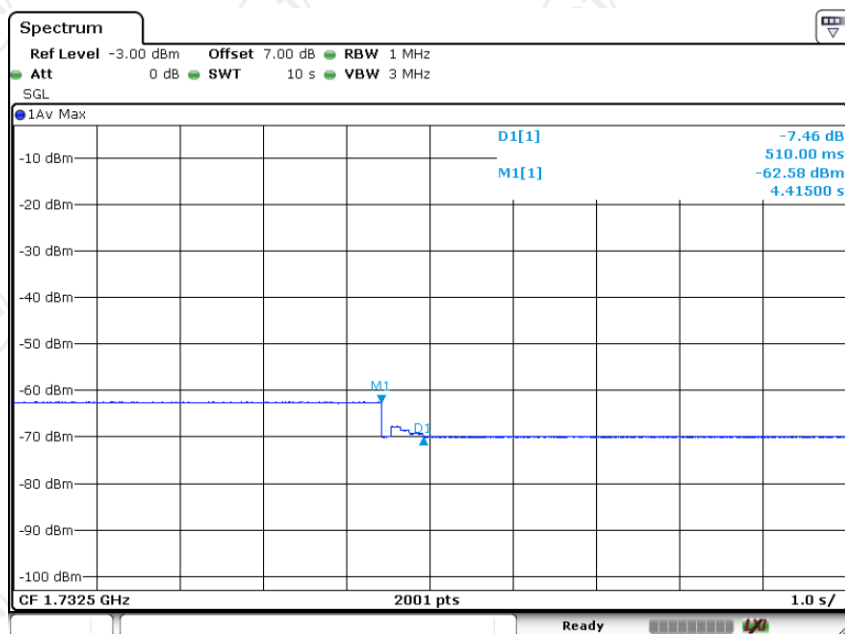
Variable Noise Timing Test Plots

PCS



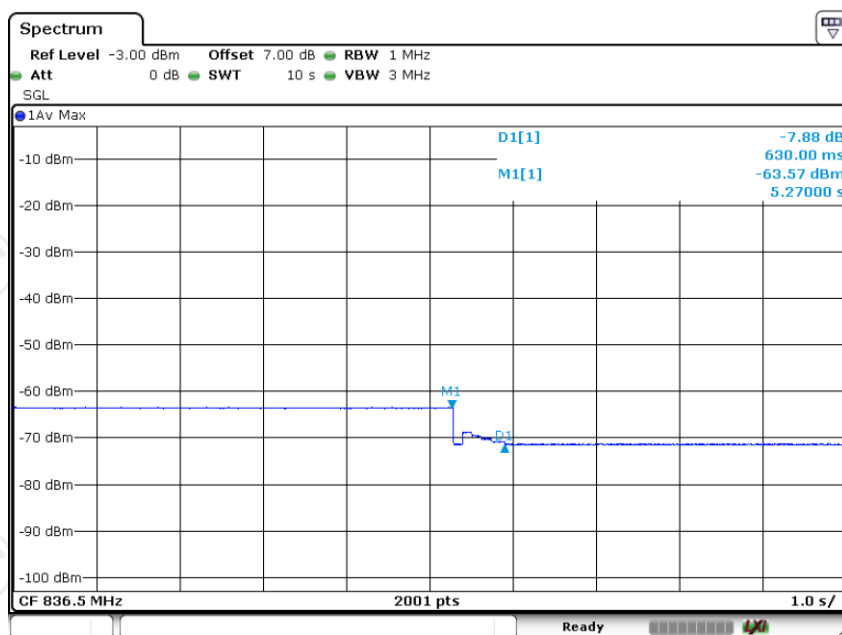
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AWS-1



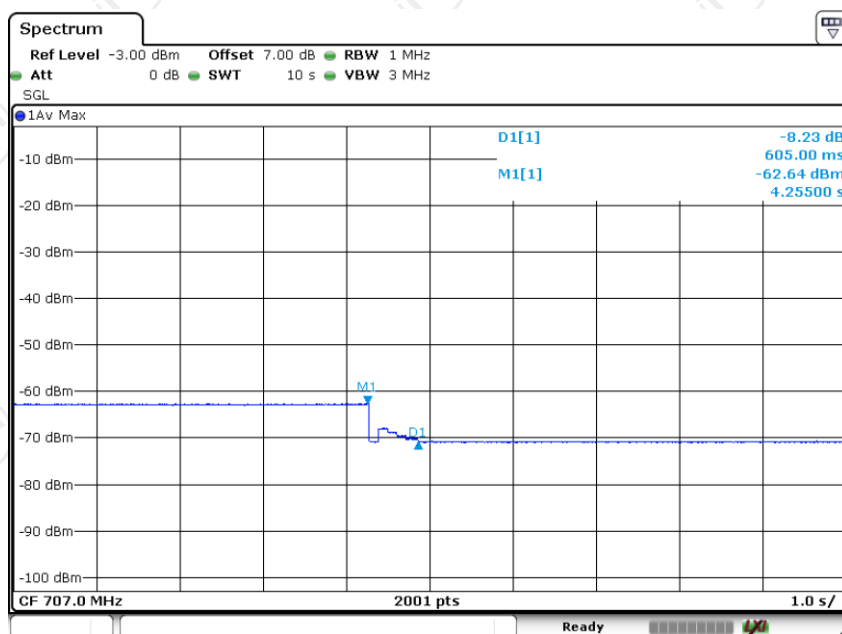
Date: 19.FEB.2025 16:31:22

Cellular



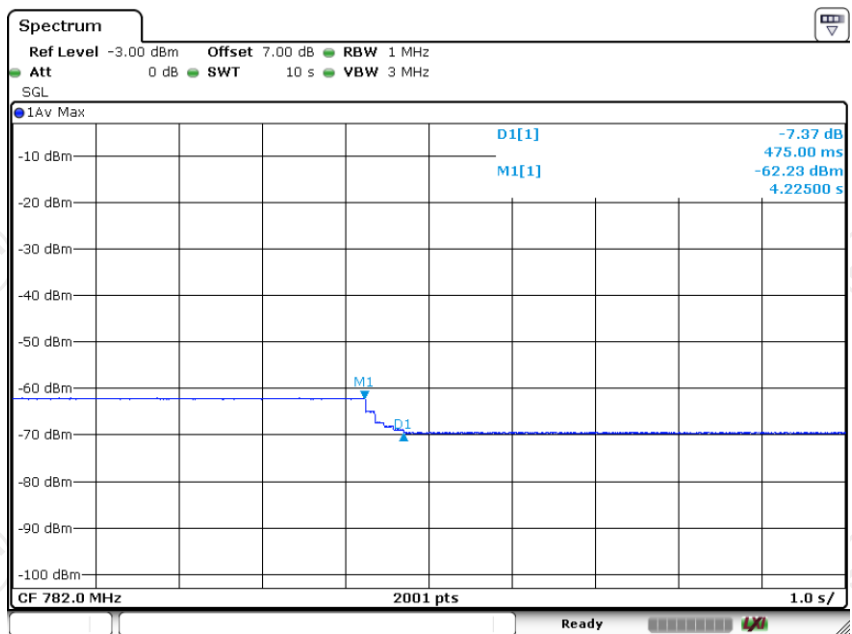
Date: 19.FEB.2025 16:28:09

Lower700MHz



Date: 19.FEB.2025 16:23:47

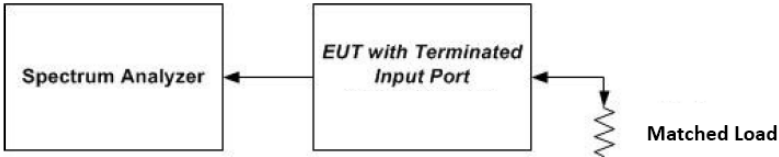
Upper700MHz



Date: 19.FEB.2025 16:29:42

5.7. Uplink Inactivity

5.7.1. Test Specification

Test Requirement:	FCC Part20 Section 20.21(e)(8)(i)(I)
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:	- Connect the EUT to the test equipment as shown in Set-Up with the uplink output connected to the spectrum analyzer. - Select the RMS power averaging detector. - Set the spectrum analyzer RBW for 1 MHz with the VBW $\geq 3X$ RBW. - Set the center frequency of the spectrum analyzer to the center of the uplink operational band. - Set the span for 0 Hz with a single sweep time for a minimum of 330 seconds. - Start to capture a new trace using MAX HOLD. - After approximately 15 seconds turn on the EUT power. - 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. - Ensure the noise level for the squelched signal is below the uplink inactivity noise power limit, as specified by the rules. - Capture the Test Plots for inclusion in the test report. - Measure noise using procedures in a) to e). - Repeat steps c) to k) for all operational uplink bands.
Test Result:	PASS

5.7.2. Test Instruments

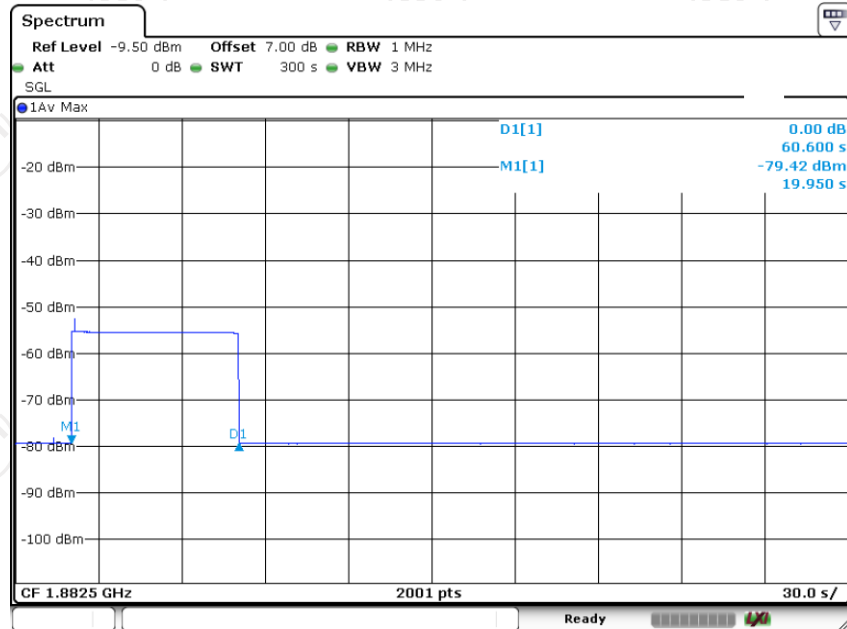
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	R&S	FSV40-N	102188	Jun. 27, 2024	Jun. 26, 2025

5.7.3. Test Data

Uplink Inactivity			
Operation Bands	Measured (s)	Limit (s)	Result
PCS	60.60	300.0	PASS
AWS-1	60.60	300.0	PASS
Cellular	60.60	300.0	PASS
Lower700MHz	60.60	300.0	PASS
Upper700MHz	60.60	300.0	PASS

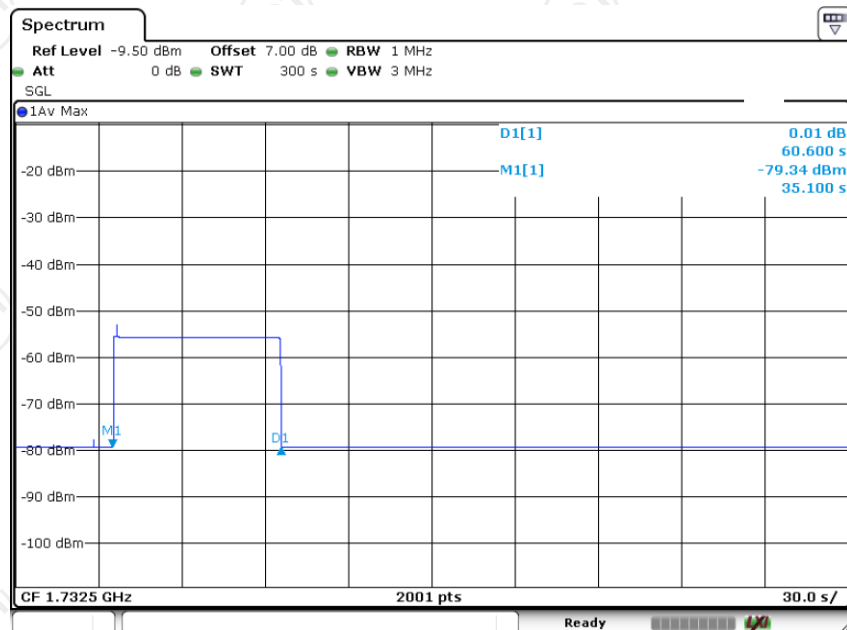
Test Plots

PCS



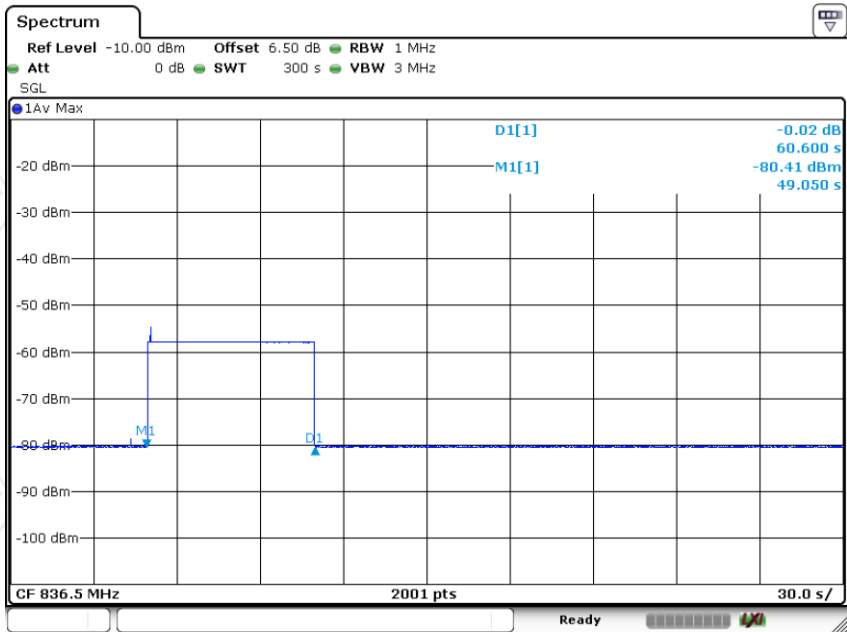
Date: 18.FEB.2025 13:18:12

AWS-1



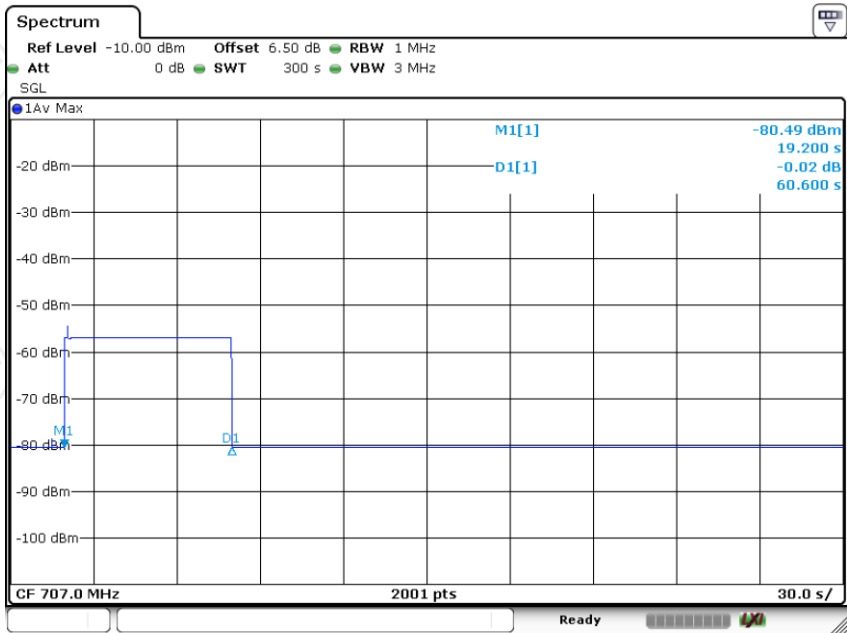
Date: 18.FEB.2025 13:32:04

Cellular



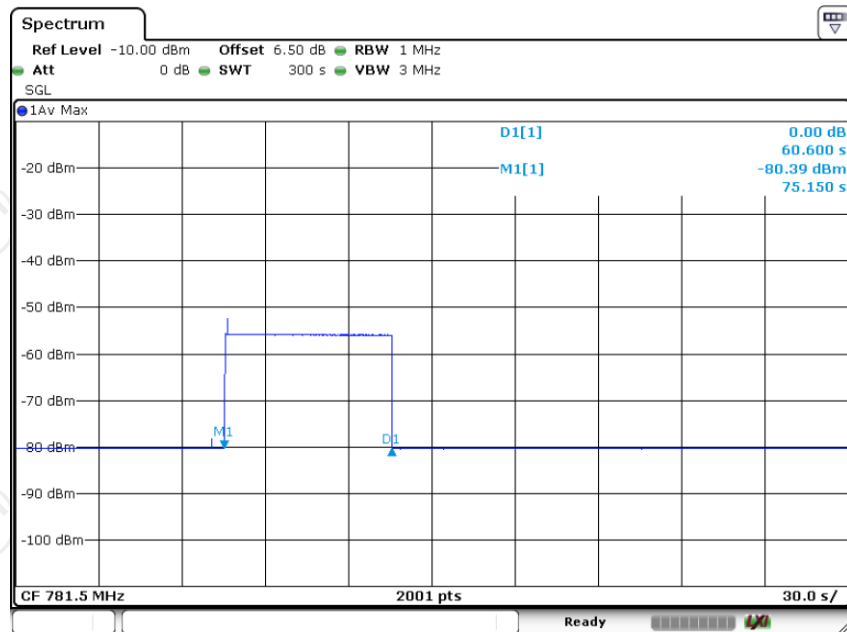
Date: 18-FEB-2025 13:41:23

Lower700MHz



Date: 18.FEB.2025 13:47:49

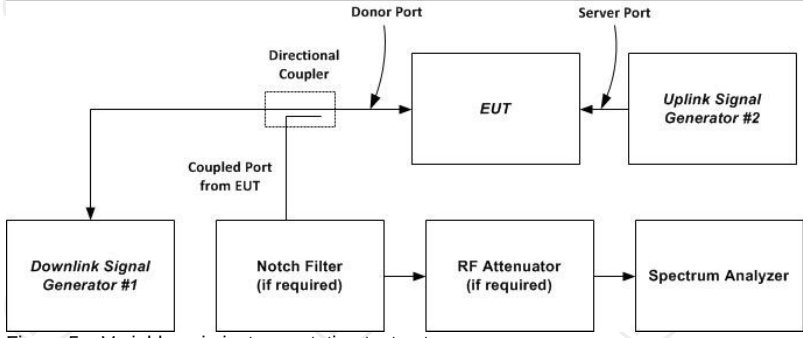
Upper700MHz



Date: 18.FEB.2025 13:59:46

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: - 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. - Configure downlink signal generator #1 for AWGN operation with a 99% OBW of 4.1 MHz, tuned to the center of the operational band. - 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. - Set RBW = 100 kHz. - Set VBW ≥ 300 kHz. - Select the CHANNEL POWER measurement mode. - Select the power averaging (rms) detector. - Affirm that the number of measurement points per sweep ≥ (2 . span)/RBW. - Sweep time = auto couple or as necessary (but no less than auto couple value). - Trace average at least 10 traces in power averaging (i.e., rms) mode. - 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. - 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. - 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	Jun. 27, 2024	Jun. 26, 2025
Spectrum Analyzer	R&S	FSV40-N	102188	Jun. 27, 2024	Jun. 26, 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	1	37.84	7	3.56	3.01	37.41
AWS-1	1710	1	37.16	7	3.36	3.01	36.53
Cellular	824	1	30.82	6	2.29	3.01	30.12
Lower700 MHz	698	1	29.38	5	2.06	3.01	29.45
Upper700 MHz	776	1	30.30	5	2.06	3.01	30.37

Note: Path loss = $20\log f + 20\log d - 27.5$

Polarity loss = $20\log (1/\sin (45\deg)) \text{ dB} = 3.01\text{dB}$

Variable booster gain

Operation Band	RSSI (dBm)	Input Power (dBm)	Output Power (dBm)	Measured Gain (dB)	MSCL	Limit	Results
PCS	-49	-25.6	21.05	46.65	37.41	50.00	PASS
	-45	-25.6	18.30	43.90	37.41	48.41	PASS
	-39	-25.6	13.04	38.64	37.41	42.41	PASS
	-35	-25.6	9.01	34.61	37.41	38.41	PASS
	-29	-25.6	-0.16	25.44	37.41	32.41	PASS
	-27	-25.6	-1.02	24.58	37.41	30.41	PASS
AWS-1	-48	-25.6	20.94	46.54	36.53	50.00	PASS
	-43	-25.6	16.37	41.97	36.53	45.53	PASS
	-39	-25.6	12.65	38.25	36.53	41.53	PASS
	-34	-25.6	3.93	29.53	36.53	36.53	PASS
	-28	-25.6	-3.10	22.50	36.53	30.53	PASS
	-26	-25.6	-4.98	20.62	36.53	28.53	PASS
Cellular	-46	-24.4	15.29	39.69	30.12	42.12	PASS
	-41	-24.4	10.02	34.42	30.12	37.12	PASS
	-37	-24.4	6.03	30.43	30.12	33.12	PASS
	-33	-24.4	1.94	26.34	30.12	29.12	PASS
	-29	-24.4	-2.14	22.26	30.12	25.12	PASS
	-27	-24.4	-3.26	21.14	30.12	23.12	PASS
Lower700MHz	-52	-23.8	17.72	41.52	29.45	47.45	PASS

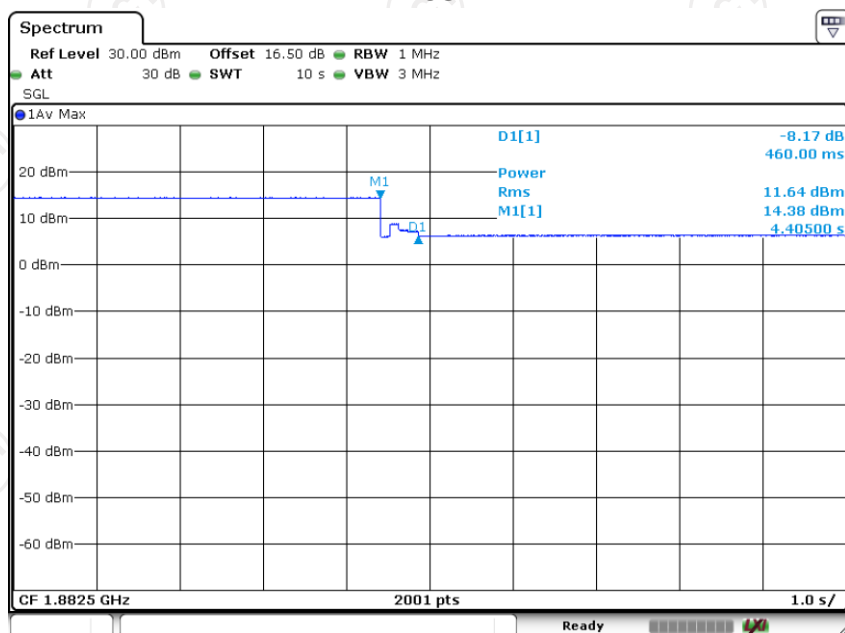
	-47	-23.8	13.49	37.29	29.45	42.45	PASS
	-41	-23.8	7.72	31.52	29.45	36.45	PASS
	-39	-23.8	5.52	29.32	29.45	34.45	PASS
	-37	-23.8	3.81	27.61	29.45	32.45	PASS
	-35	-23.8	1.61	25.41	29.45	30.45	PASS
Upper700MHz	-48	-23.6	16.60	40.20	30.37	44.37	PASS
	-43	-23.6	12.38	35.98	30.37	39.37	PASS
	-41	-23.6	10.44	34.04	30.37	37.37	PASS
	-39	-23.6	8.43	32.03	30.37	35.37	PASS
	-37	-23.6	6.52	30.12	30.37	33.37	PASS
	-35	-23.6	4.47	28.07	30.37	31.37	PASS

Variable Uplink Gain Timing

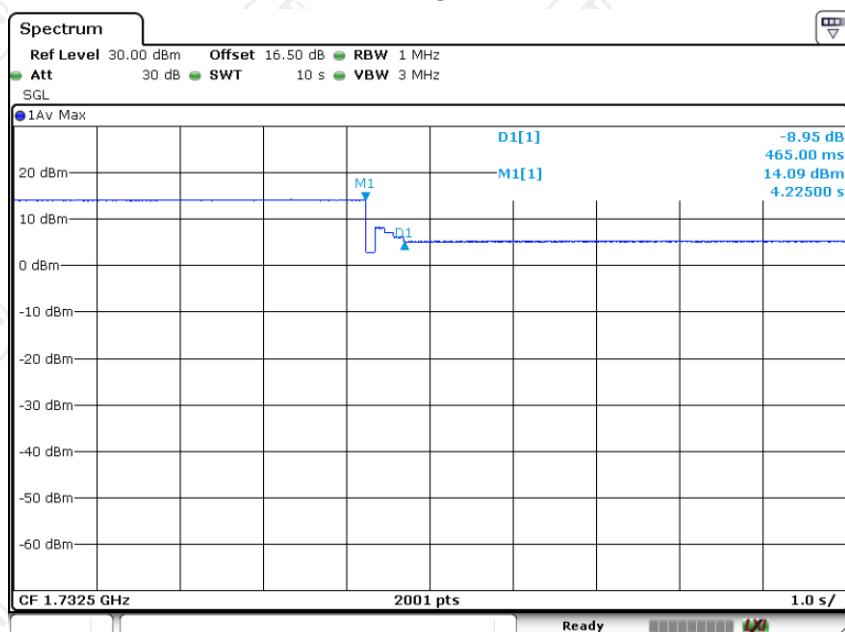
Operation Band	Measured Sec	Limit Sec	Result
PCS	0.460	3.0	PASS
AWS-1	0.465	3.0	PASS
Cellular	0.580	3.0	PASS
Lower700MHz	0.460	3.0	PASS
Upper700MHz	0.450	3.0	PASS

Variable Uplink Gain Timing Test Plots

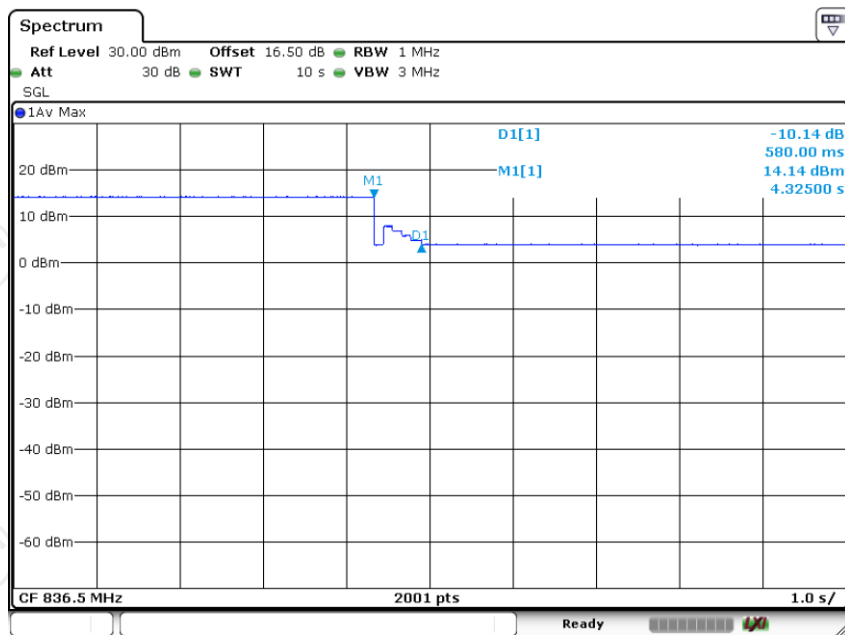
PCS



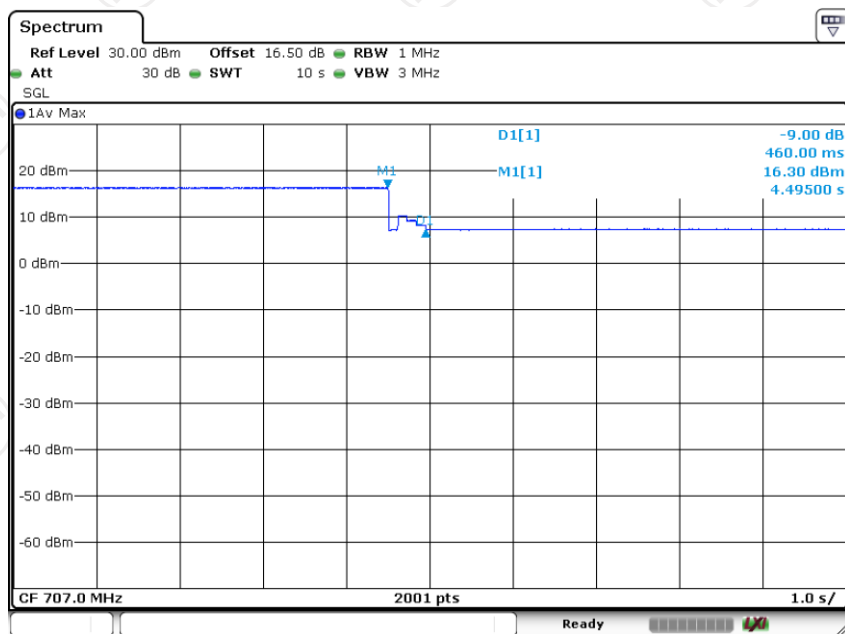
AWS-1



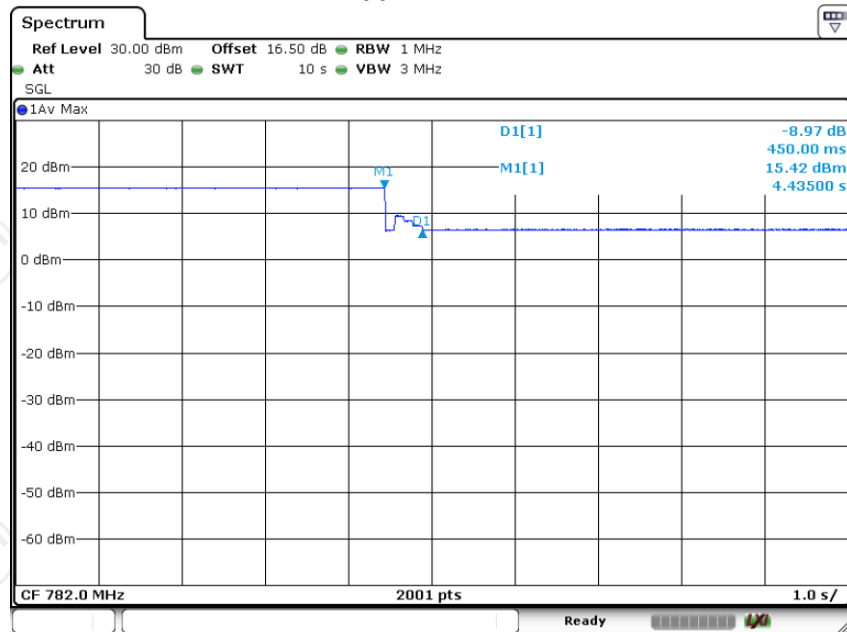
Cellular



Lower700MHz



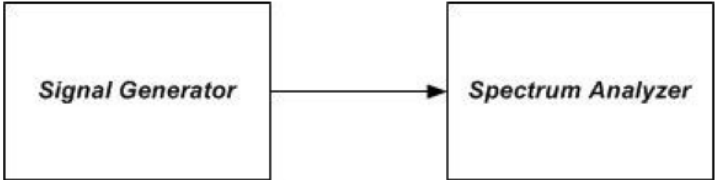
Upper700MHz



Date: 3.MAR.2025 13:10:32

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:	- Connect the test equipment as shown in Figure 6 to firstly measure the characteristics of the test signals produced by the signal generator. - Set VBW ≥ 3 RBW. - 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. - Set the signal generator for power level to match the values obtained from the tests of 7.2. - 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. - Set the spectrum analyzer RBW for 1% to 5% of the EBW. - Capture the spectrum analyzer trace for inclusion in the test report. - 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. - Repeat 7.10c) to 7.10h) for all uplink and downlink operational bands. - 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. - Repeat 7.10c) to 7.10i) with this EUT uplink path test setup. - 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. - Repeat 7.10c) to 7.10j) with this EUT downlink path test setup.
Test results:	PASS

5.9.2. Test Instruments

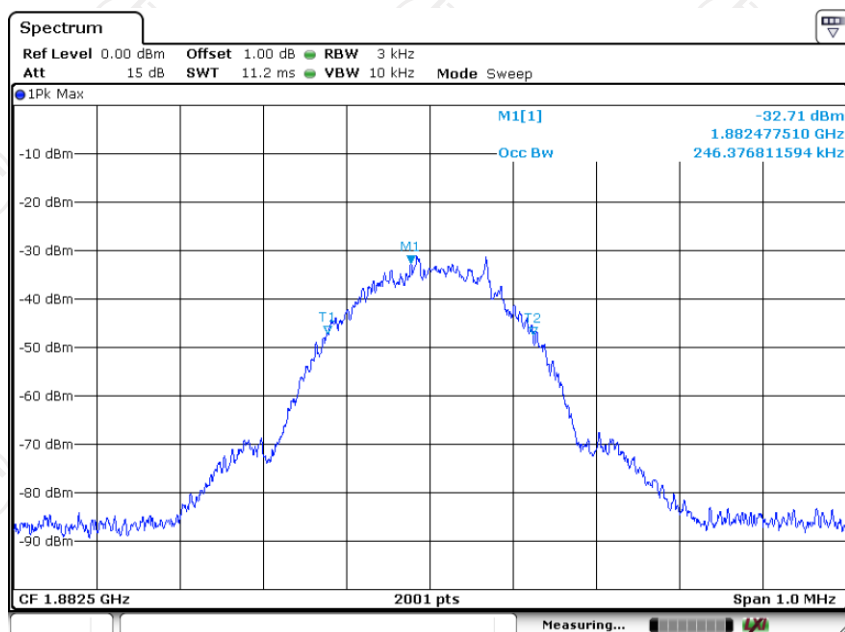
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Signal Generator	Agilent	N5182A	MY47070282	Jun. 27, 2024	Jun. 26, 2025
Spectrum Analyzer	R&S	FSV40-N	102188	Jun. 27, 2024	Jun. 26, 2025

5.9.3. Test Data

Operation Band		Signal Type	Input OBW [MHz]	Output OBW [MHz]	Results
Uplink	PCS	GSM	0.246	0.245	PASS
		CDMA	1.246	1.244	PASS
		LTE	4.503	4.503	PASS
	AWS-1	GSM	0.243	0.247	PASS
		CDMA	1.243	1.240	PASS
		LTE	4.508	4.508	PASS
	Cellular	GSM	0.246	0.246	PASS
		CDMA	1.241	1.241	PASS
		LTE	4.503	4.503	PASS
	Lower700M Hz	GSM	0.246	0.247	PASS
		CDM	1.234	1.244	PASS
		LTE	4.488	4.493	PASS
	Upper700M Hz	GSM	0.245	0.247	PASS
		CDMA	1.246	1.237	PASS
		LTE	4.518	4.513	PASS
Downlink	PCS	GSM	0.249	0.243	PASS
		CDMA	1.246	1.241	PASS
		LTE	4.533	4.503	PASS
	AWS-1	GSM	0.247	0.247	PASS
		CDMA	1.250	1.244	PASS
		LTE	4.523	4.498	PASS
	Cellular	GSM	0.248	0.245	PASS
		CDMA	1.238	1.243	PASS
		LTE	4.523	4.523	PASS
	Lower700M Hz	GSM	0.245	0.246	PASS
		CDM	1.241	1.241	PASS
		LTE	4.518	4.508	PASS
	Upper700M Hz	GSM	0.245	0.247	PASS
		CDMA	1.247	1.244	PASS
		LTE	4.518	4.493	PASS

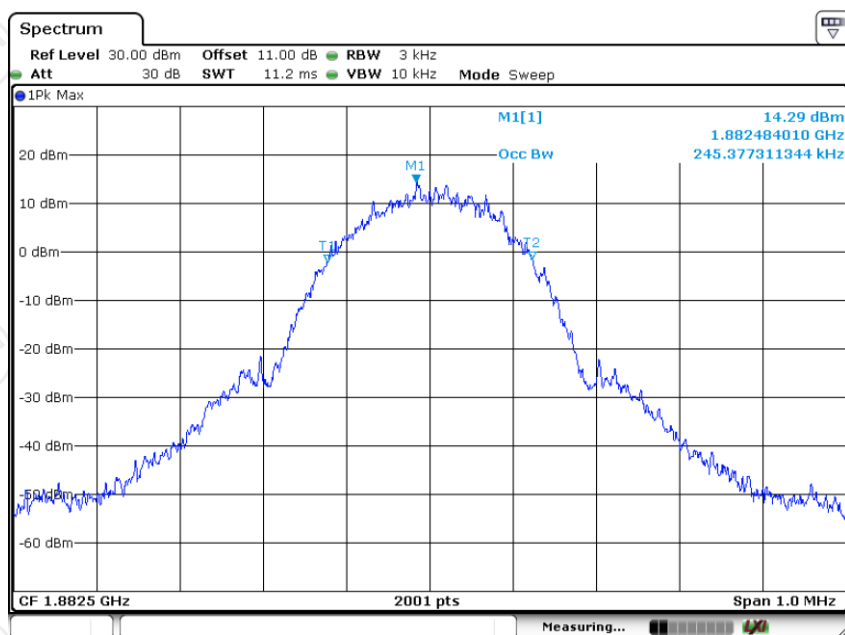
Test Plots

PCS GSM UL Input



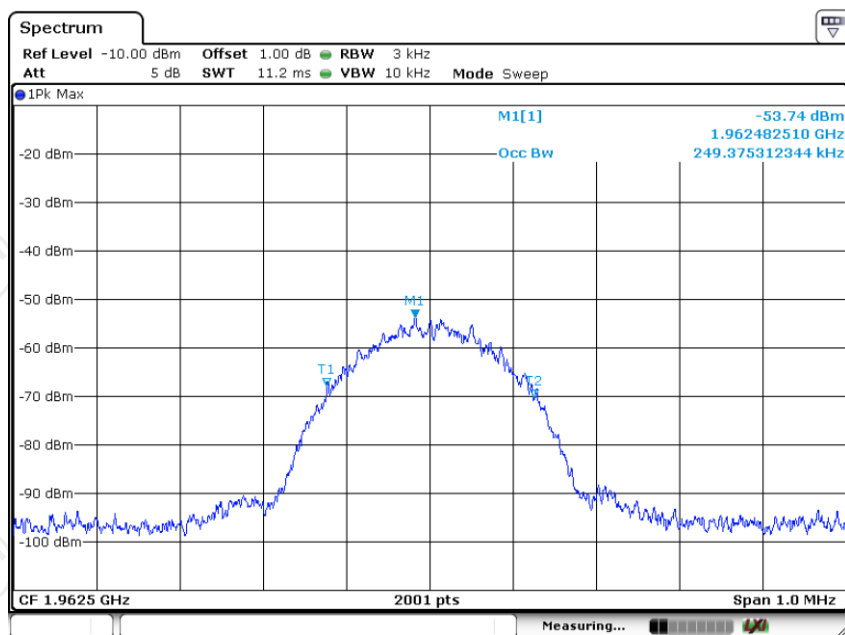
Date: 18.FEB.2025 15:21:00

PCS GSM UL output



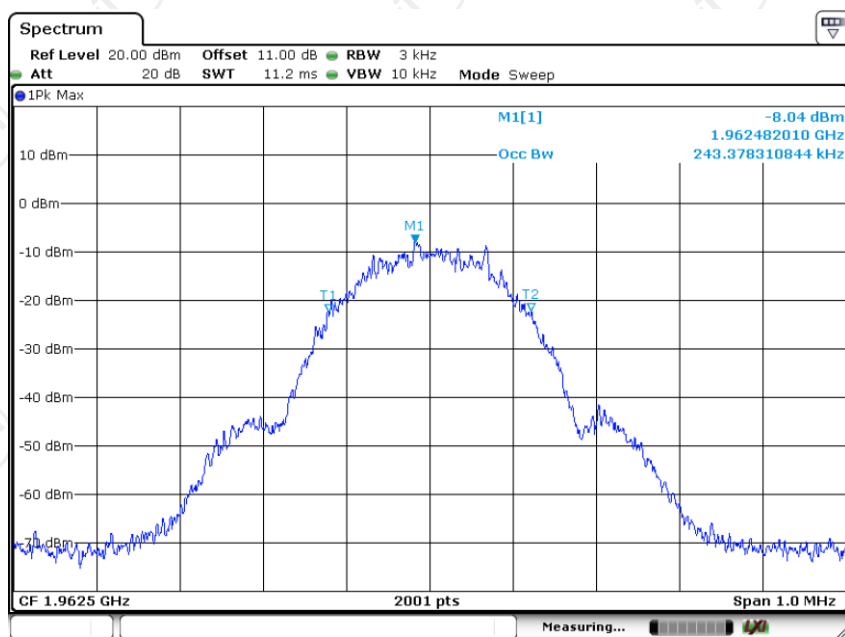
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PCS GSM DL Input



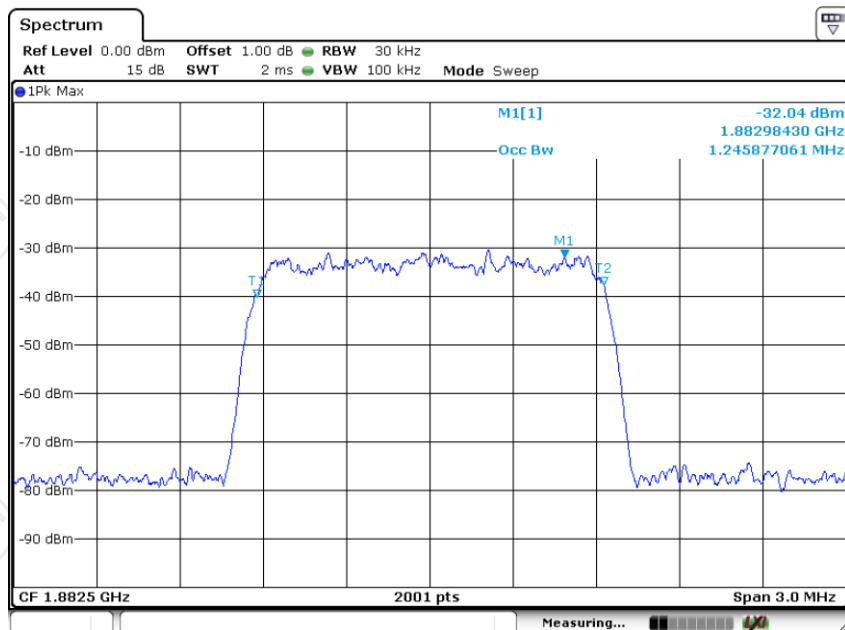
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PCS GSM DL Output



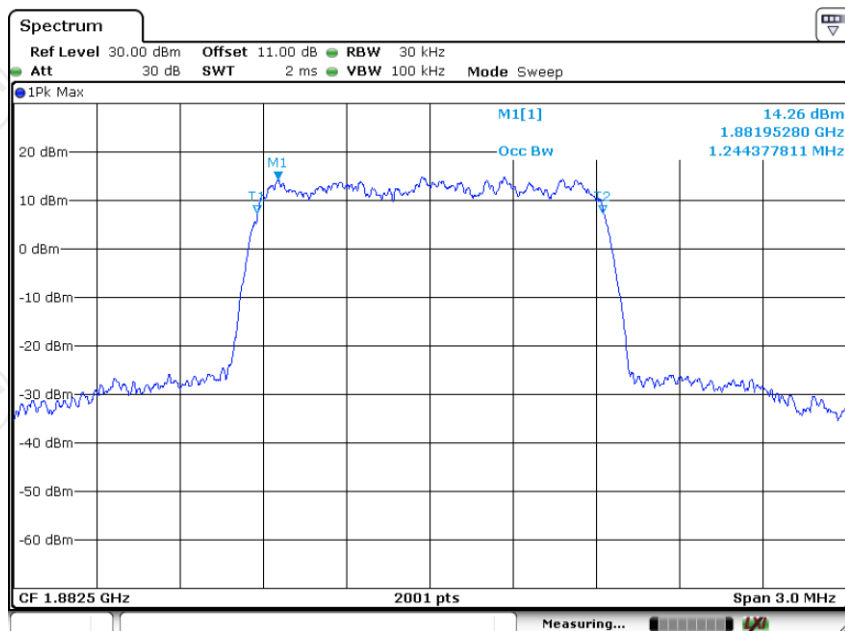
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PCS CDMA UL Input



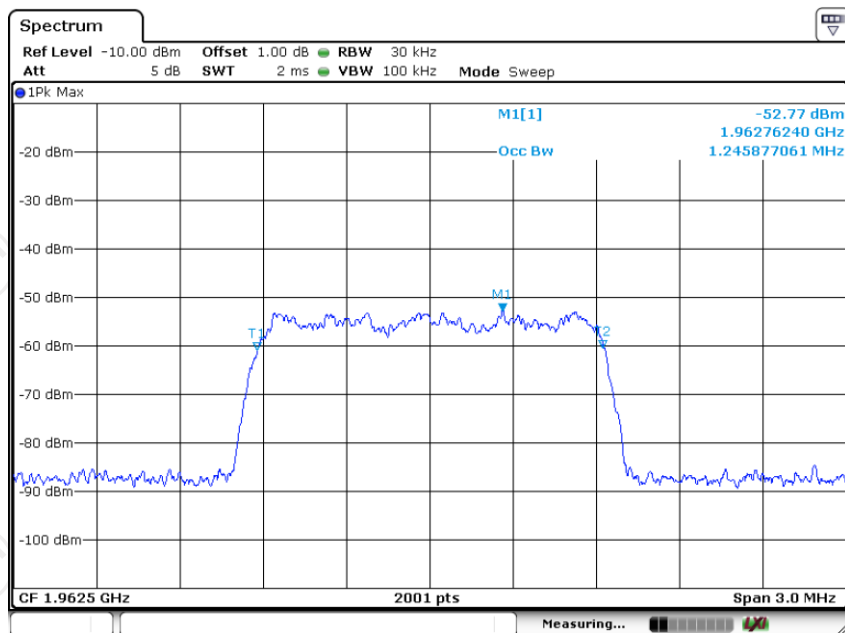
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PCS CDMA UL output

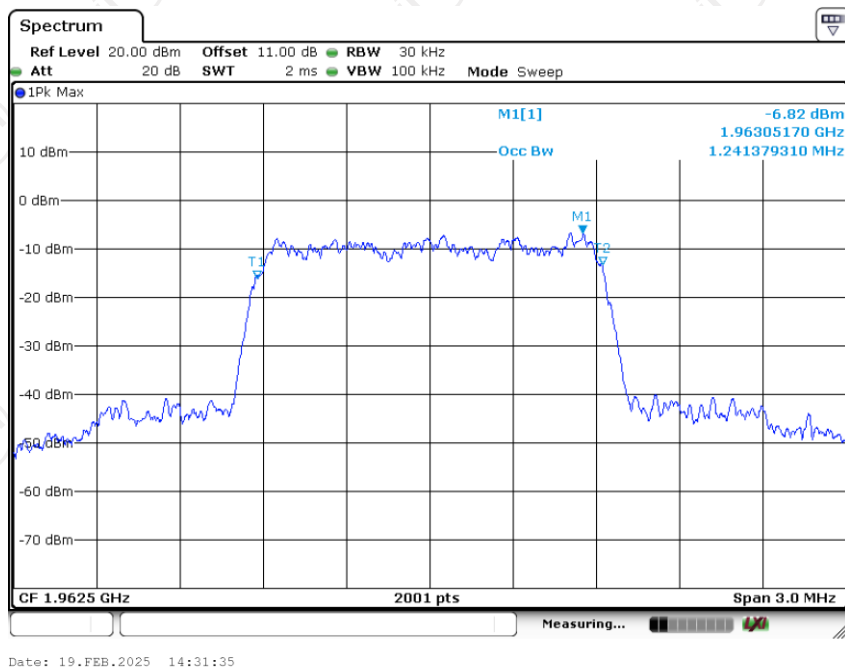


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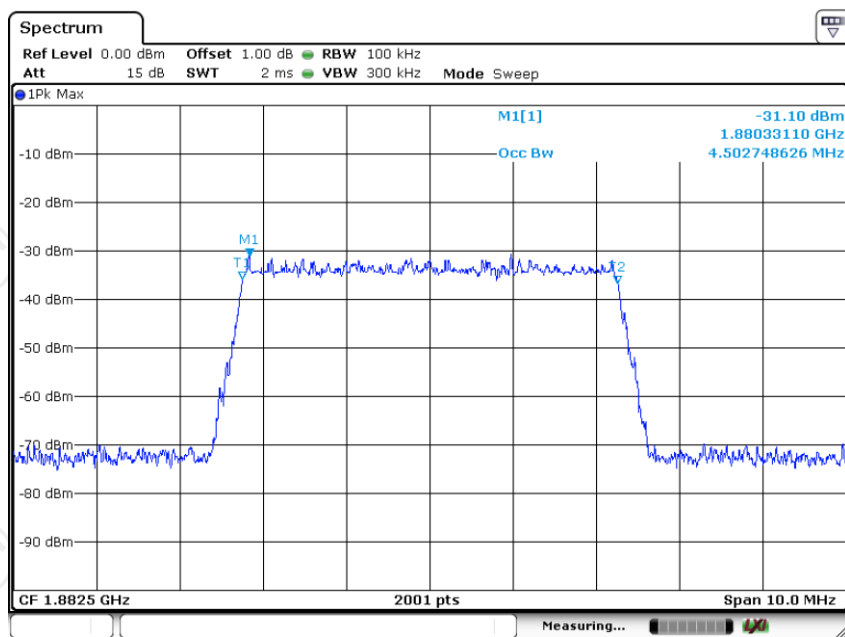
PCS CDMA DL Input



PCS CDMA DL Output

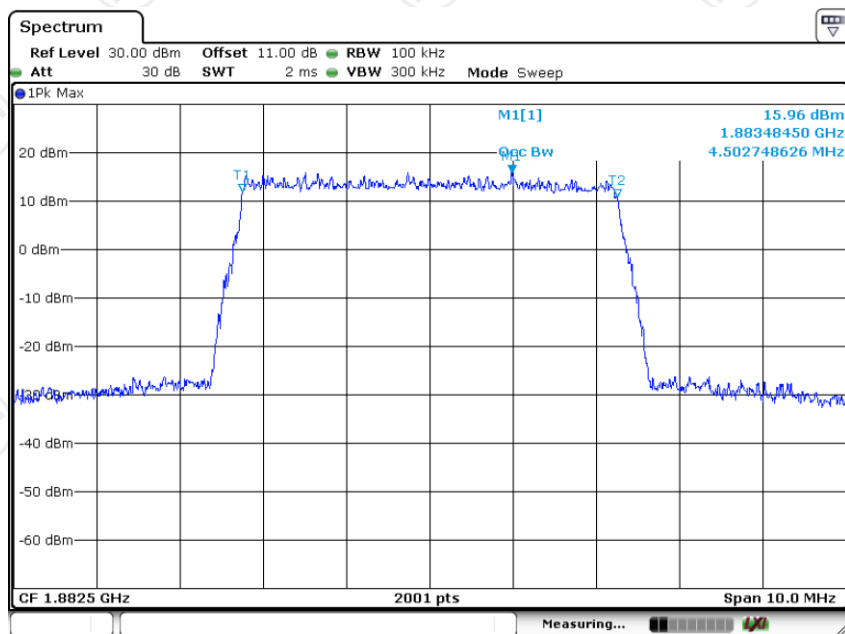


PCS LTE UL Input



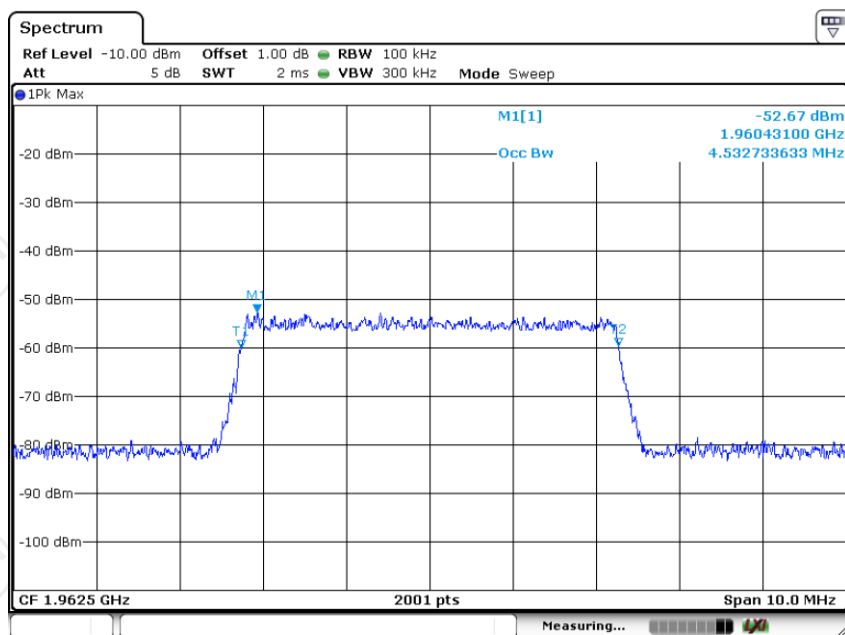
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PCS LTE UL output

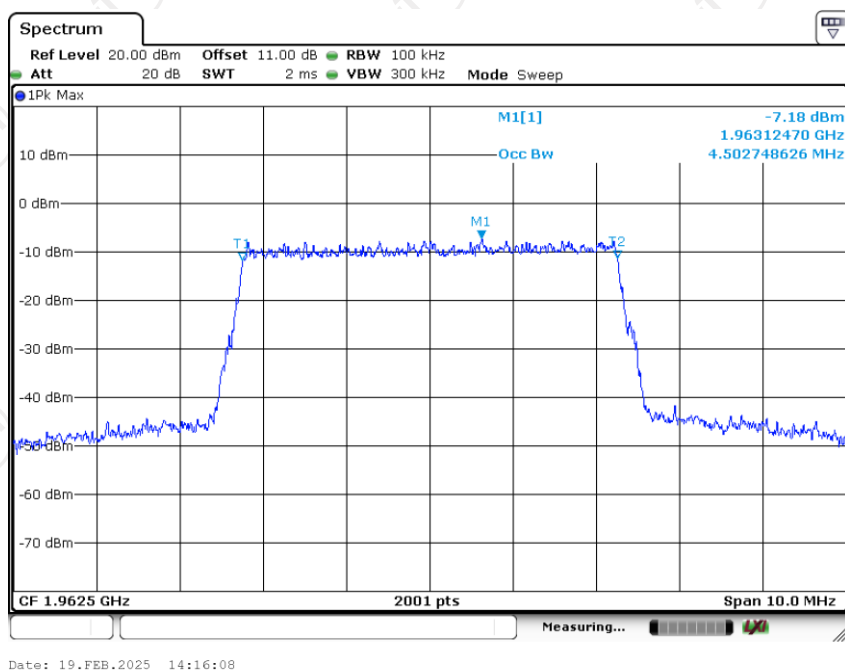


Date: 19.FEB.2025 14:09:00

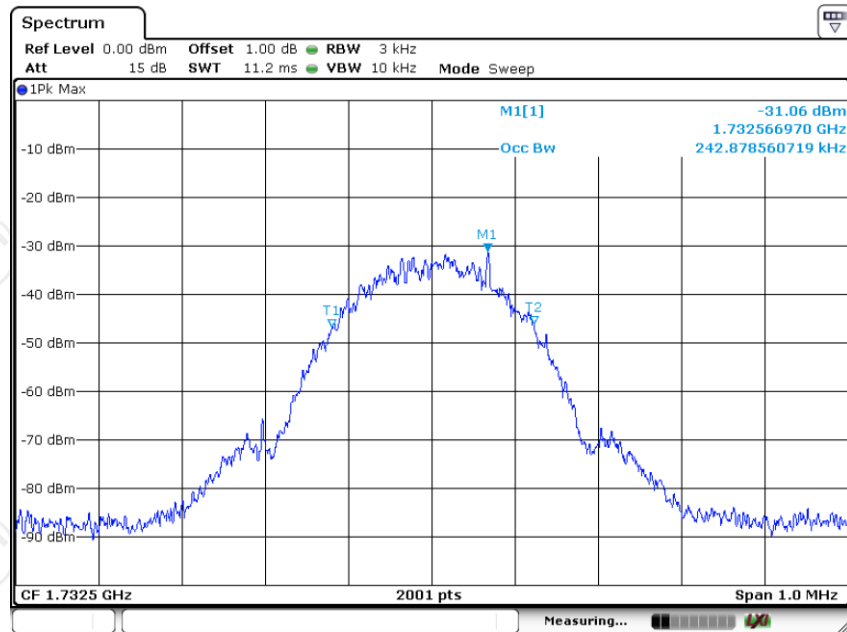
PCS LTE DL Input



PCS LTE DL Output

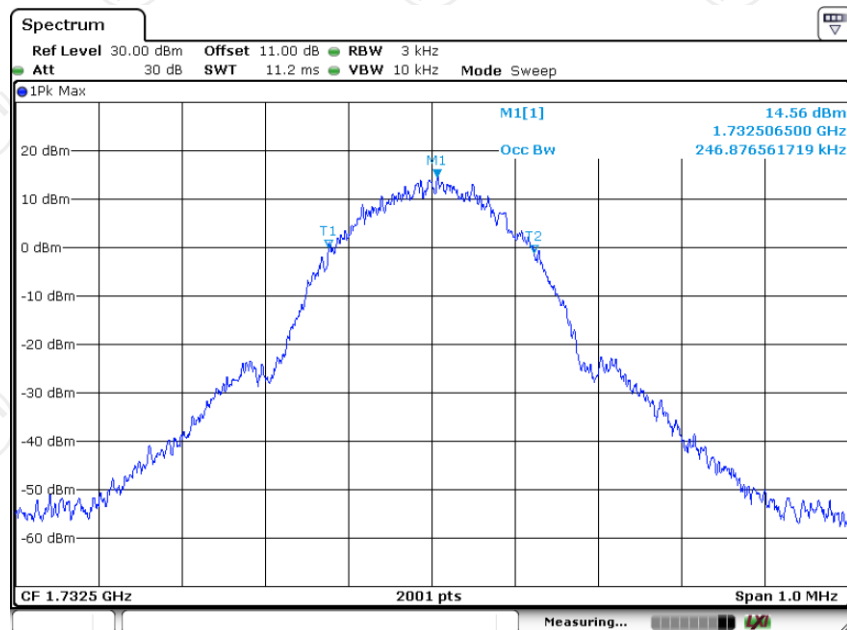


AWS-1 GSM UL Input



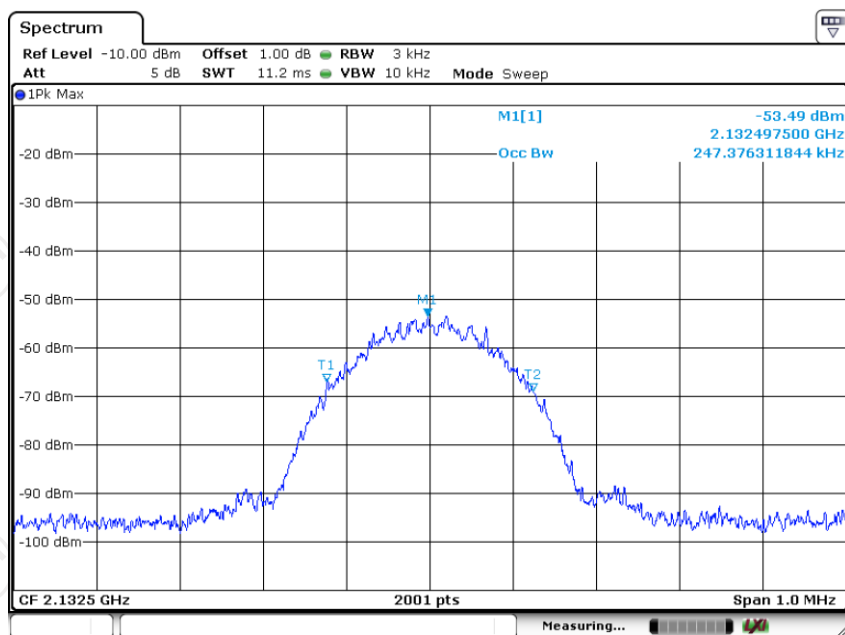
Date: 18.FEB.2025 15:19:19

AWS-1 GSM UL output



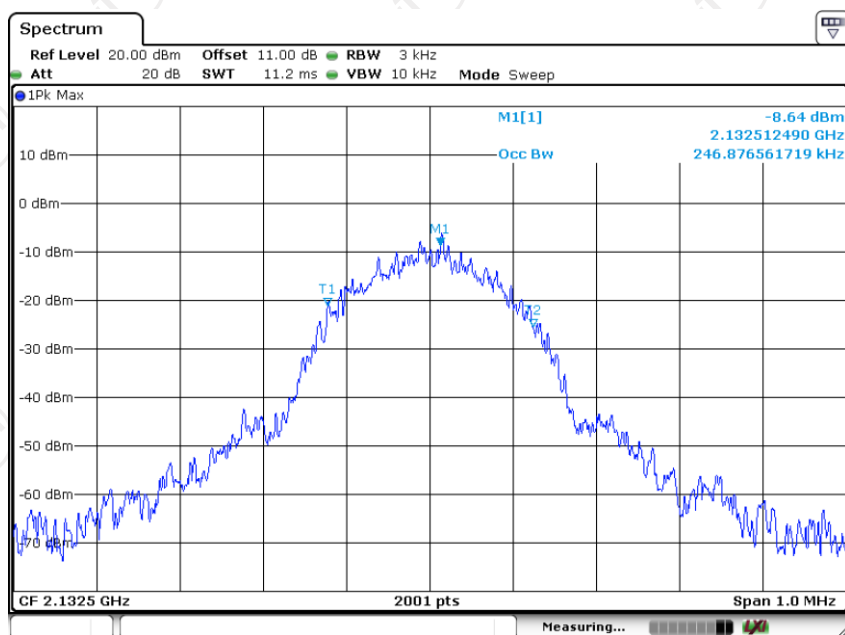
Date: 19.FEB.2025 13:45:43

AWS-1 GSM DL Input



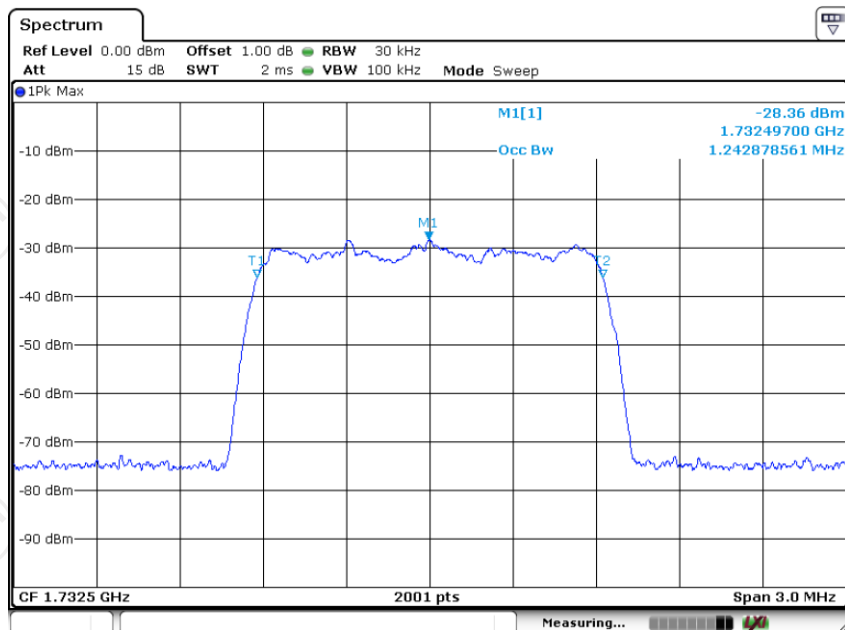
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AWS-1 GSM DL Output

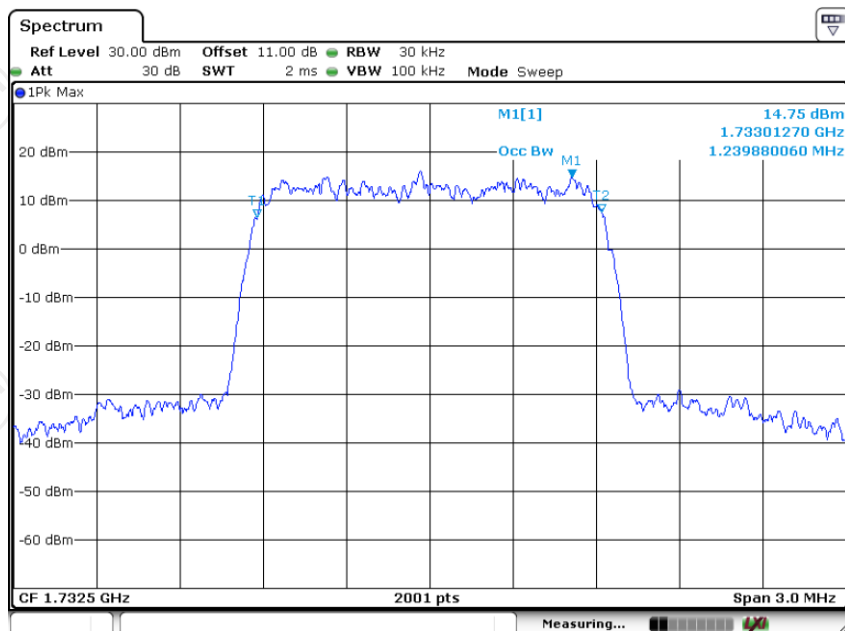


Date: 19.FEB.2025 14:35:21

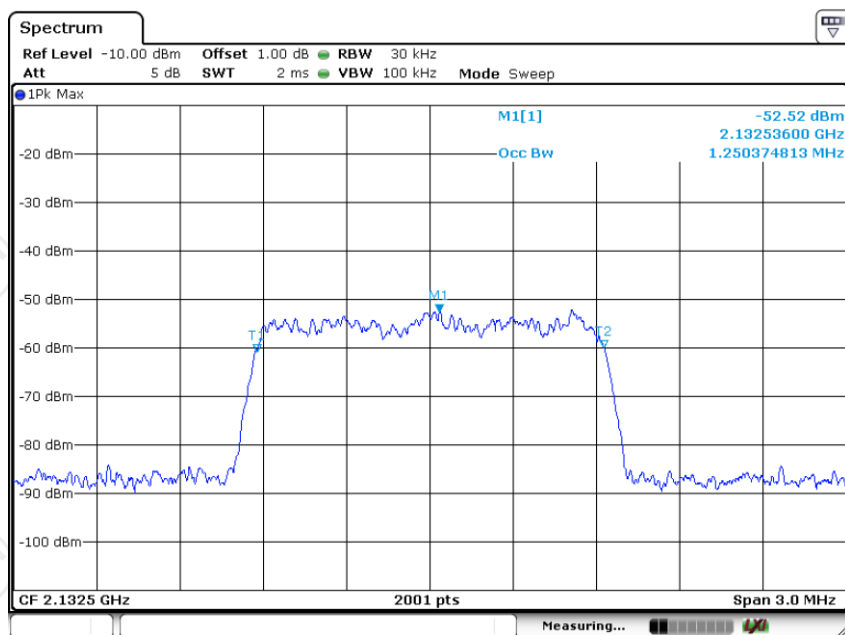
AWS-1 CDMA UL Input



AWS-1 CDMA UL output



AWS-1 CDMA DL Input



AWS-1 CDMA DL Output

