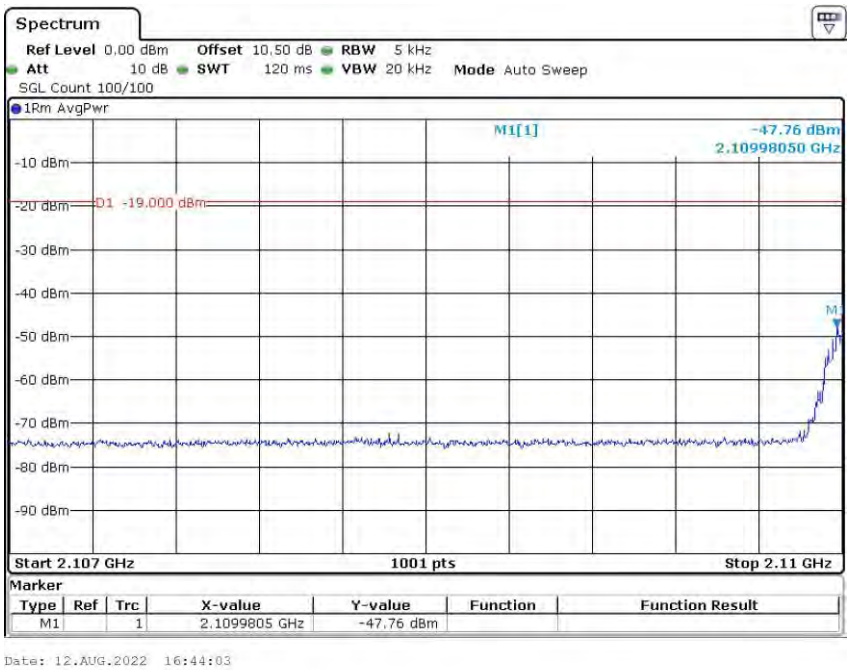
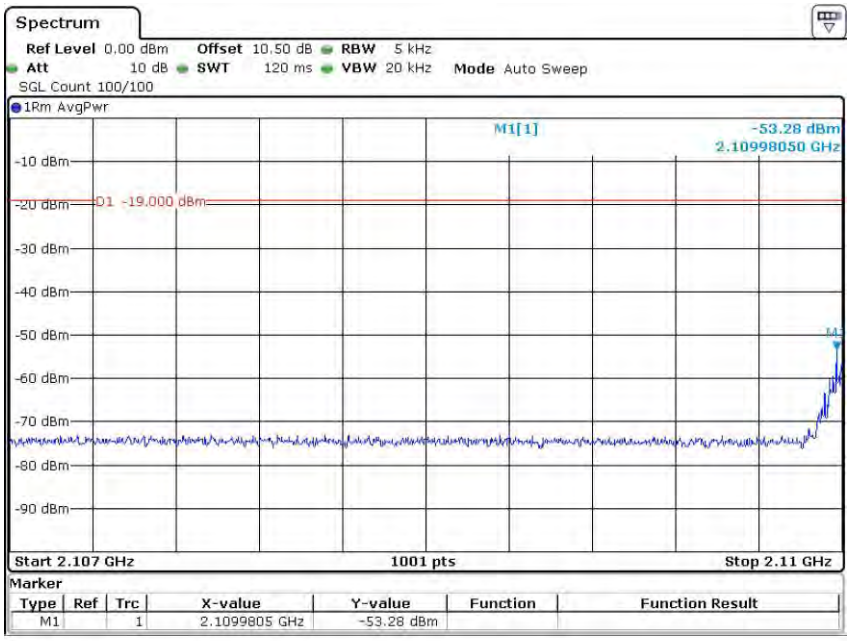
AWS Band GSM Left Side Pre-AGC



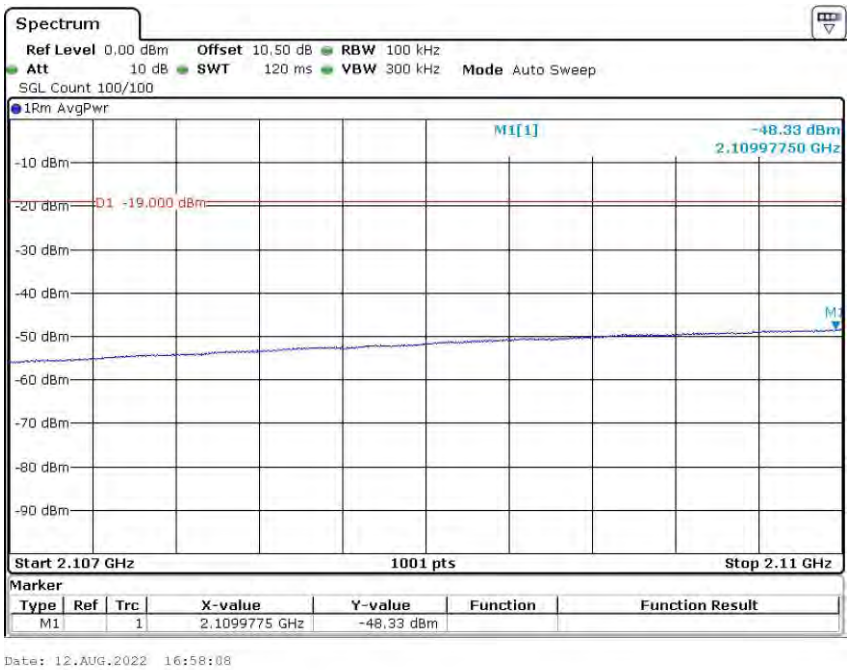
Date: 12.AUG.2022 16:44:03

AWS Band GSM Left Side Above AGC

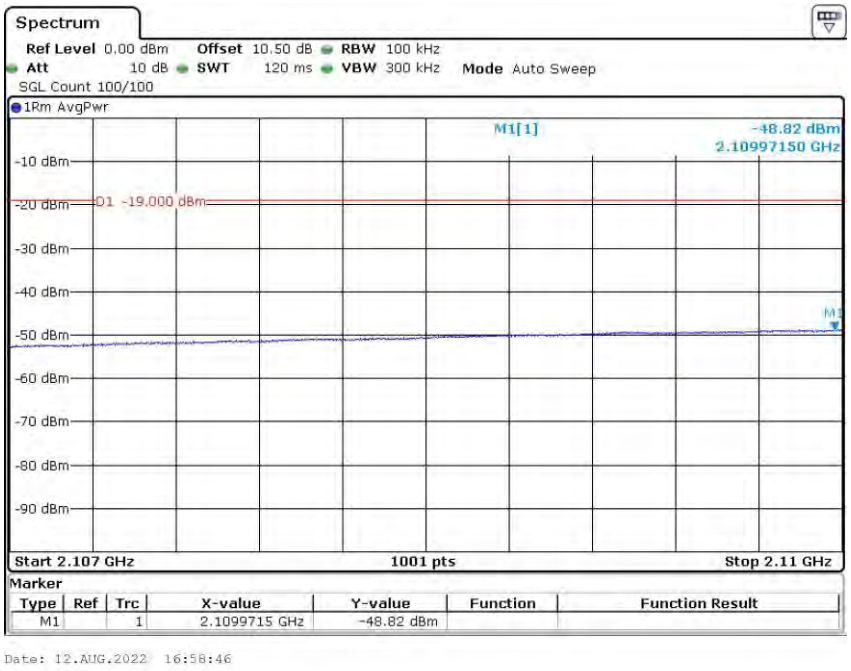


Date: 12.AUG.2022 16:45:03

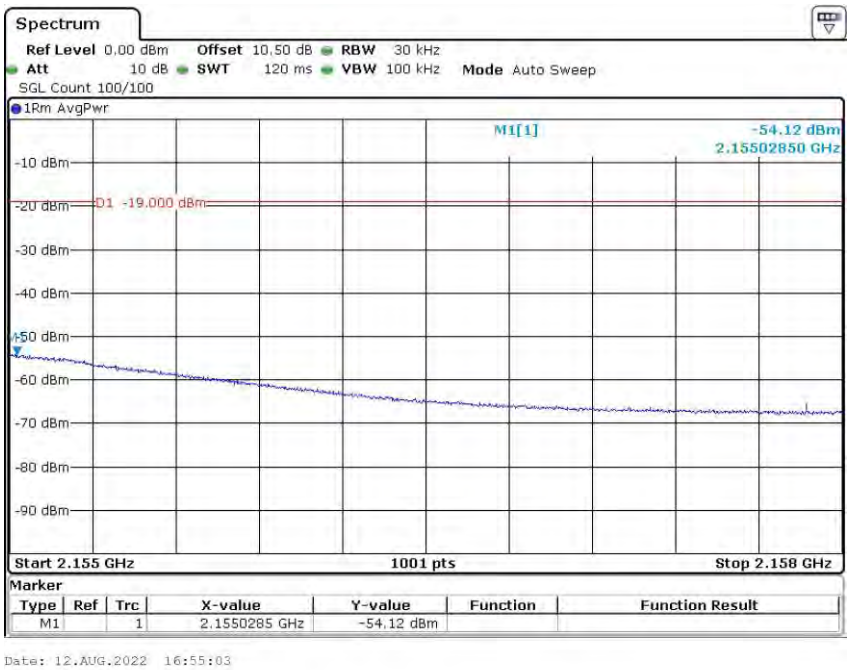
AWS Band WCDMA Left Side Pre-AGC



AWS Band WCDMA Left Side Above AGC

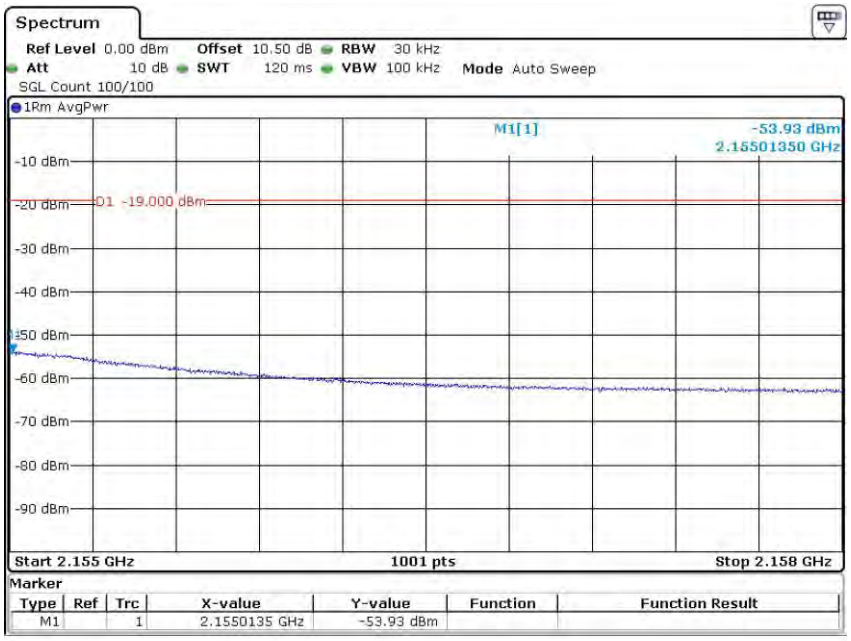


AWS Band CDMA Right Side Pre-AGC



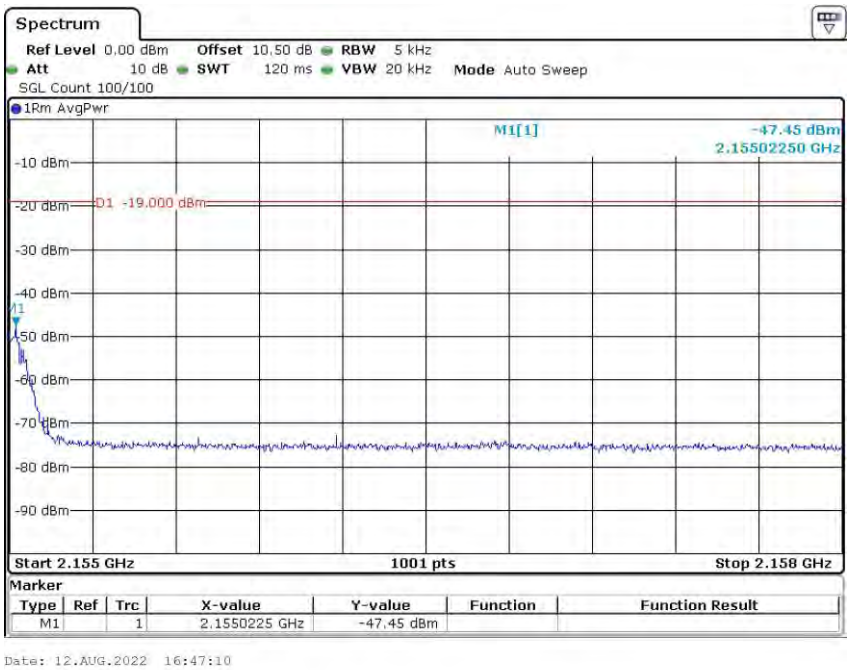
Date: 12.AUG.2022 16:55:03

AWS Band CDMA Right Side Above AGC



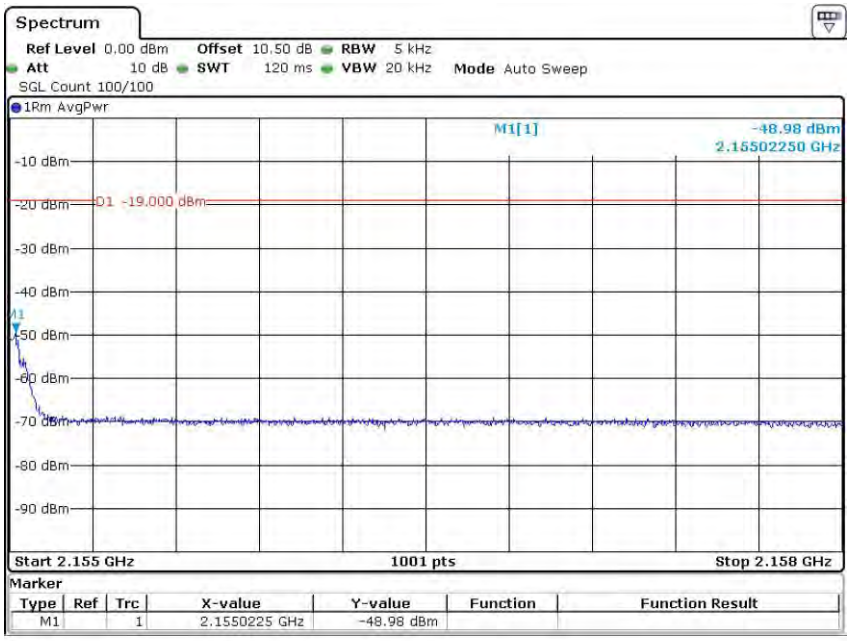
Date: 12.AUG.2022 16:55:40

AWS Band GSM Right Side Pre-AGC



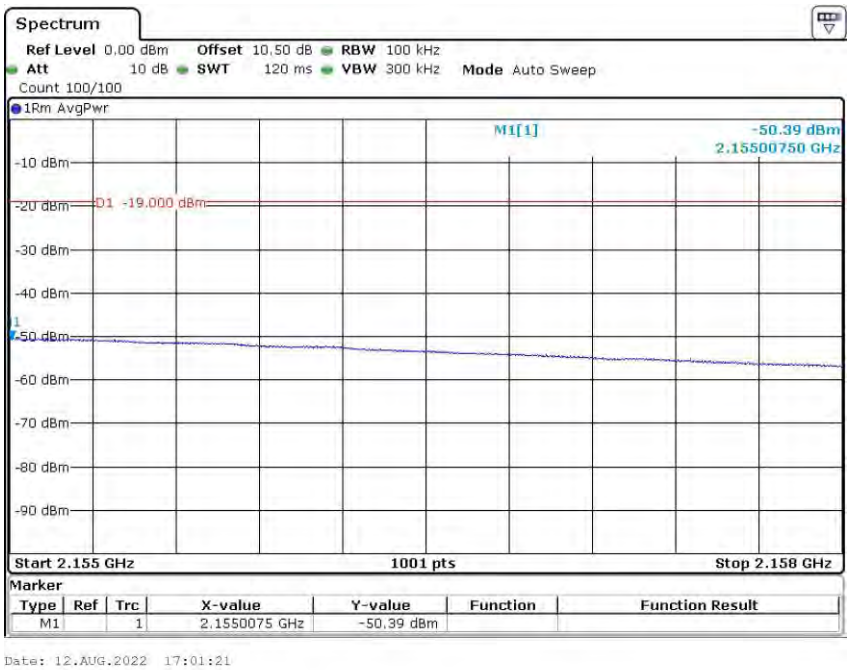
Date: 12.AUG.2022 16:47:10

AWS Band GSM Right Side Above AGC

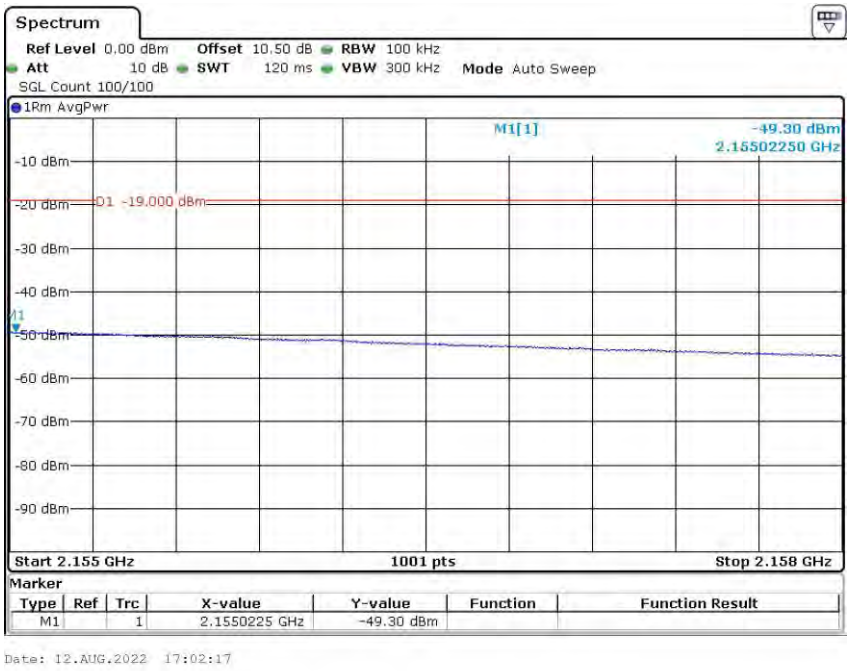


Date: 12.AUG.2022 16:48:59

AWS Band WCDMA Right Side Pre-AGC



AWS Band WCDMA Right Side Above AGC



§ 20.21(e)(8)(i)(A), § 20.21(e)(8)(i)(H) &§20.21(e)(4) - NOISE LIMITS

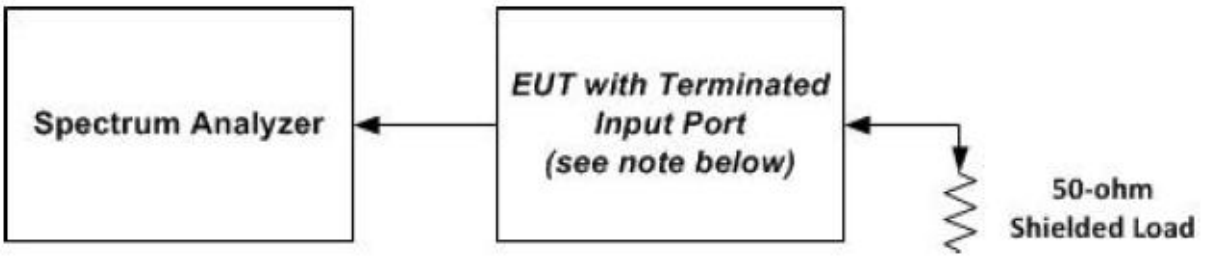
Applicable Standards

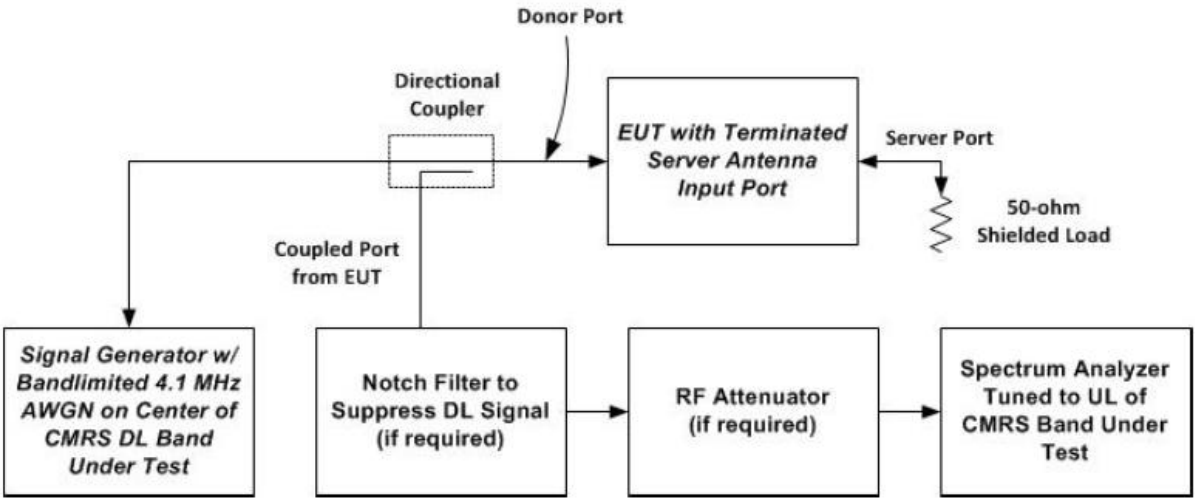
According to§ 20.21(e)(8)(i)(A) Noise Limits; § 20.21(e)(8)(i)(H) Transmit Power Off Mode (uplink and downlink noise power); §20.21(e)(4) Self-monitoring.

Test Procedure

Maximum transmitter noise power level
a) Connect the EUT to the test equipment as shown in **Figure 3**. Begin with the uplink output connected to the spectrum analyzer. When measuring downlink noise, connect the downlink output 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 plot 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. Affirm the coupled path of the RF coupler is connected to the spectrum analyzer.
i) Configure the signal generator for 4.1 MHz AWGN operation.
j) Set the spectrum analyzer RBW for 1 MHz with the 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 Annex 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 when varying the downlink signal generator output level from −90 dBm to −20 dBm, as measured at the input port, 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 noise limit in Annex D.
n) Repeat 7.7.1h) through 7.7.1m) for all operational uplink.

Variable uplink noise timing
Variable uplink noise timing is to be measured as follows.
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 noise.
d) Select MAX HOLD and increase the power level of signal generator 1 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 3 seconds for fixed devices
f) Repeat 7.7.2a) to 7.7.2e) for all operational uplink bands.
g) Include plots and summary table in test report.
Note: *Some signal boosters will require a signal generator input because they will not operate unless a signal is received at the input terminals. If this is the case, connect a second signal generator and cycle the RF output to simulate this function.*





Test Data

Environmental Conditions

Temperature:	24.8 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Andy Yu from 2022-08-11 to 2022-08-25.

Test Result: Pass

Please refer to following table.

Maximum Noise:

Mode	Operation Bands		Measured Value	Limit	Result
			dBm/MHz	dBm/MHz	
Uplink	Lower 700MHz		-46.35	-45.51	Pass
	Upper 700MHz		-46.16	-44.64	Pass
	Cellular		-45.59	-44.05	Pass
	PCS		-38.09	-37.01	Pass
	AWS		-38.79	-37.73	Pass
Downlink	Lower 700MHz	Indoor 1	-48.82	-45.51	Pass
		Indoor 2	-48.65		Pass
	Upper 700MHz	Indoor 1	-48.71	-44.64	Pass
		Indoor 2	-48.78		Pass
	Cellular	Indoor 1	-48.27	-44.05	Pass
		Indoor 2	-48.12		Pass
	PCS	Indoor 1	-42.90	-37.01	Pass
		Indoor 2	-42.71		Pass
	AWS	Indoor 1	-41.10	-37.73	Pass
		Indoor 2	-41.15		Pass

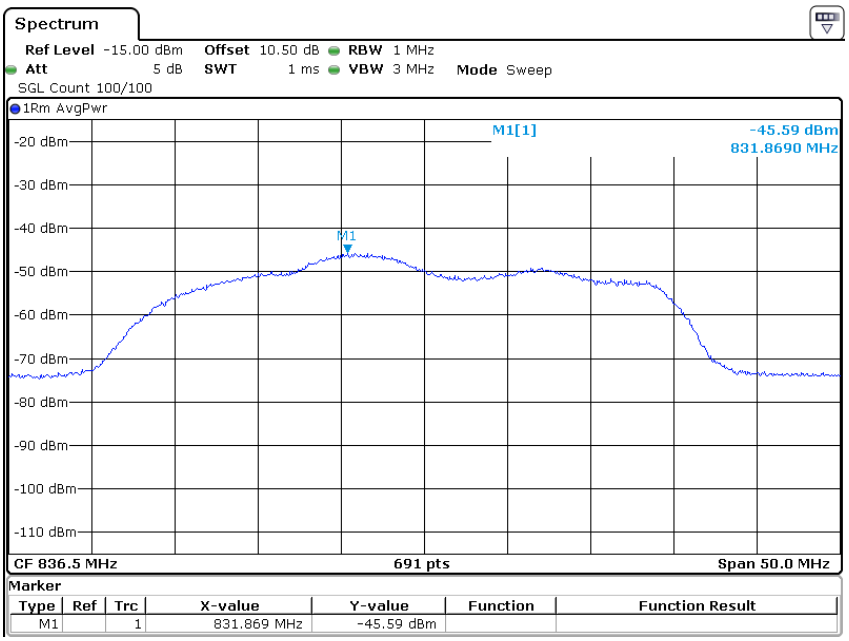
Note: Fixed booster maximum noise power shall not exceed −102.5 dBm/MHz + 20 Log10 (Frequency), where Frequency is the uplink mid-band frequency of the supported spectrum bands in MHz.

Variable Uplink Noise limit test result:

Operation Bands	RSSI	Measured Value	Limit	Results
	dBm	dBm/MHz	dBm/MHz	
Lower 700MHz	-61	-46.89	-45.51	Compliance
	-60	-47.96	-45.51	Compliance
	-59	-48.68	-45.51	Compliance
	-58	-49.61	-45.51	Compliance
	-57	-50.38	-46.00	Compliance
	-56	-51.67	-47.00	Compliance
Upper 700MHz	-61	-46.65	-44.64	Compliance
	-60	-47.50	-44.64	Compliance
	-59	-48.28	-44.64	Compliance
	-58	-48.96	-45.00	Compliance
	-57	-50.37	-46.00	Compliance
	-56	-51.62	-47.00	Compliance
Cellular	-60	-48.03	-44.05	Compliance
	-59	-48.88	-44.05	Compliance
	-58	-49.03	-45.00	Compliance
	-57	-50.01	-46.00	Compliance
	-56	-50.90	-47.00	Compliance
	-55	-51.85	-48.00	Compliance
PCS	-65	-41.05	-38.00	Compliance
	-64	-41.89	-39.00	Compliance
	-63	-43.00	-40.00	Compliance
	-62	-43.95	-41.00	Compliance
	-61	-45.07	-42.00	Compliance
	-60	-45.34	-43.00	Compliance
AWS	-66	-40.08	-37.73	Compliance
	-65	-41.27	-38.00	Compliance
	-64	-41.69	-39.00	Compliance
	-63	-42.42	-40.00	Compliance
	-62	-43.72	-41.00	Compliance
	-61	-45.36	-42.00	Compliance

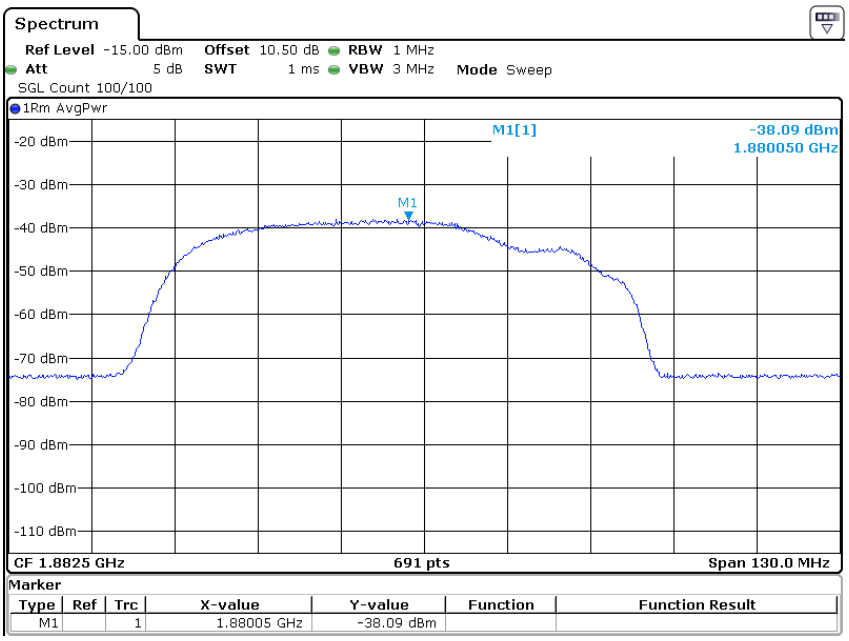
Note: The Limit refers to KDB935210 D03 APPENDIX D Figure D1.

Uplink Cellular Band



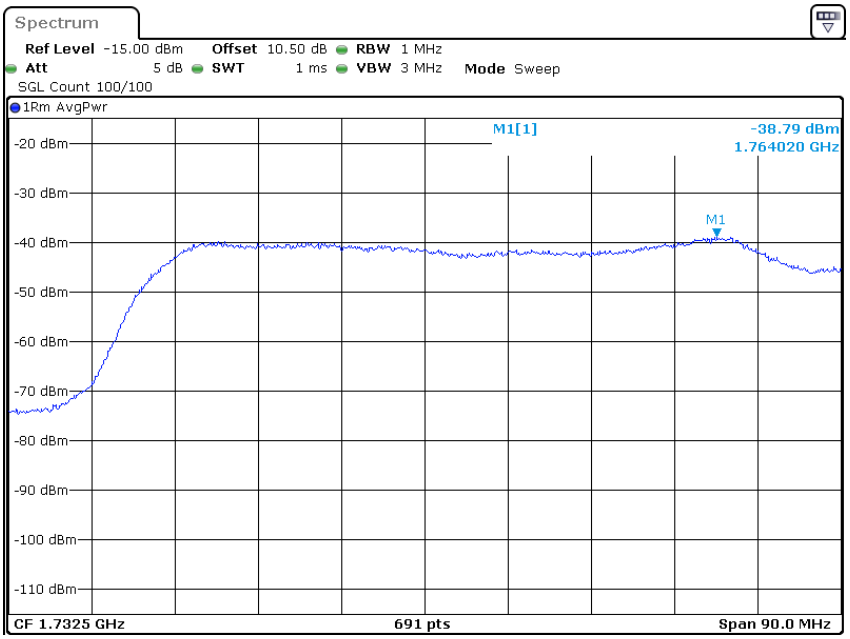
Date: 18.AUG.2022 11:31:55

Uplink PCS Band



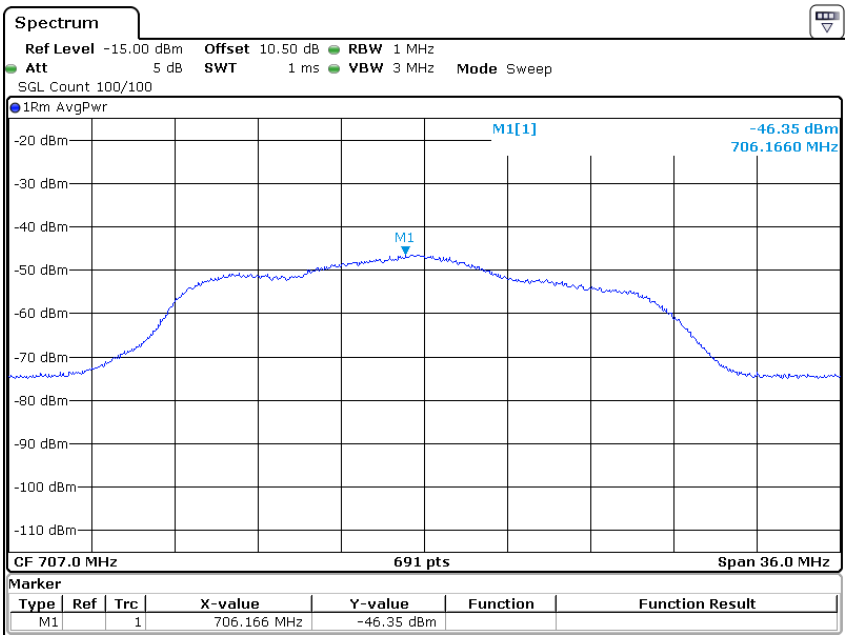
Date: 18.AUG.2022 11:35:46

Uplink AWS



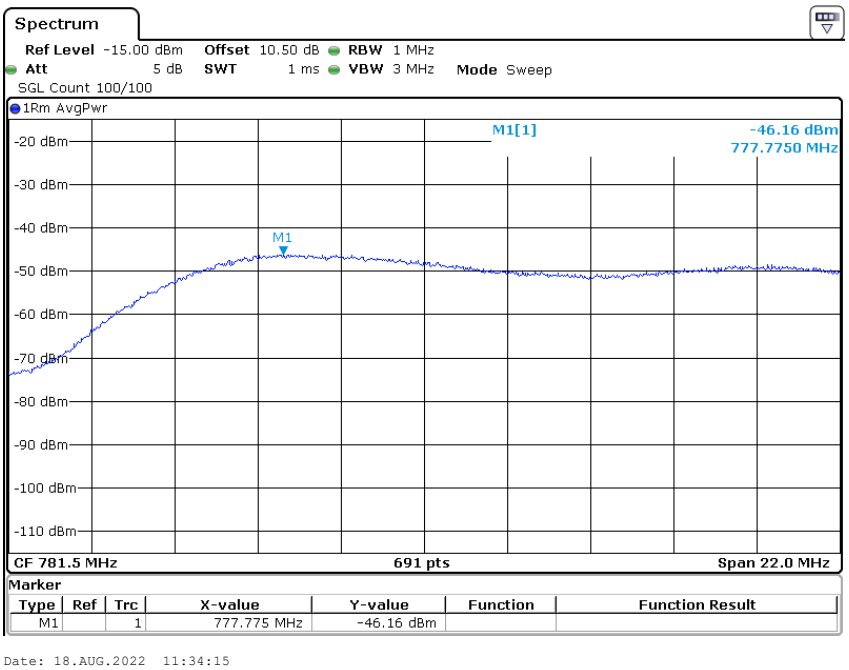
Date: 25.AUG.2022 14:28:03

Uplink Lower 700MHz



Date: 18.AUG.2022 11:32:57

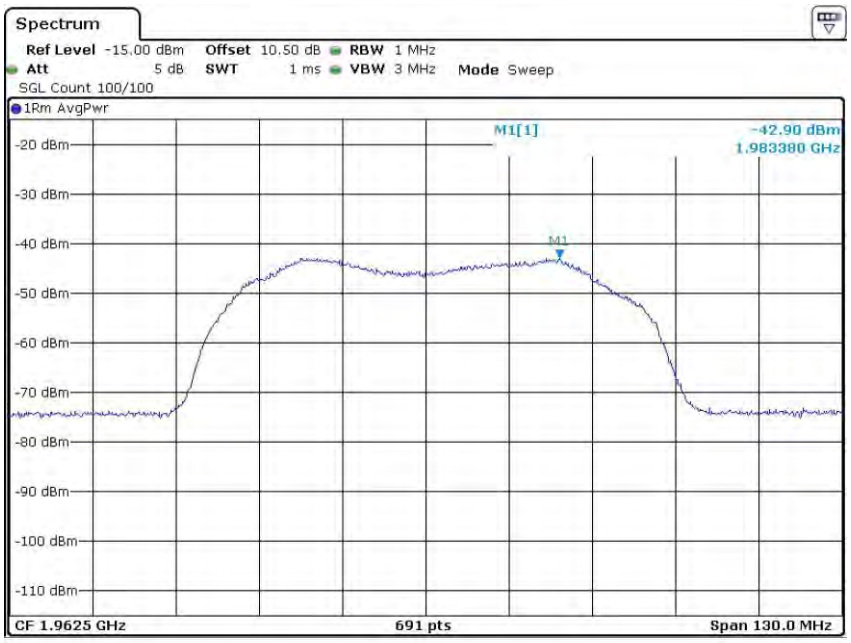
Uplink Upper 700MHz



Indoor 1

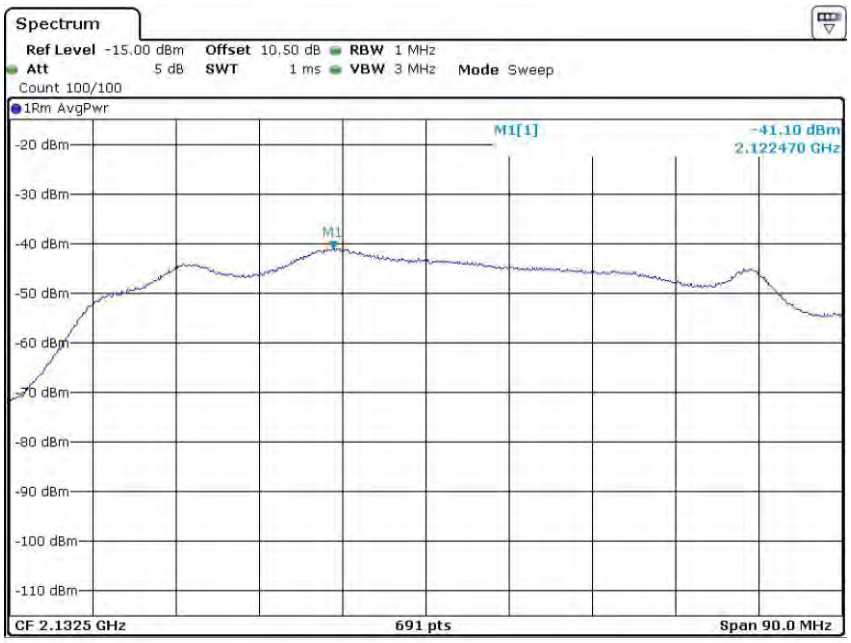
Downlink Cellular Band

Downlink PCS Band



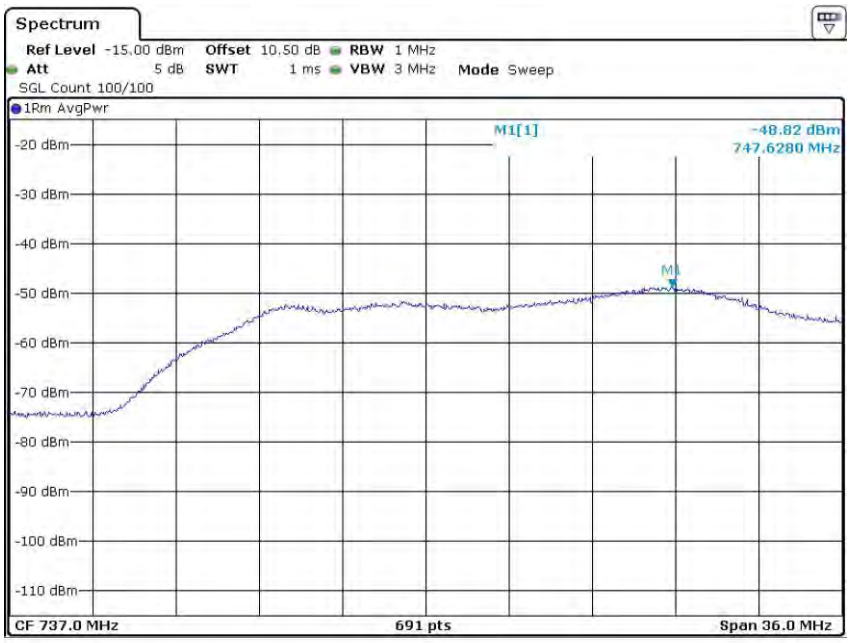
Date: 11.AUG.2022 10:16:42

Downlink AWS Band



Date: 11.AUG.2022 10:10:29

Downlink Lower 700MHz



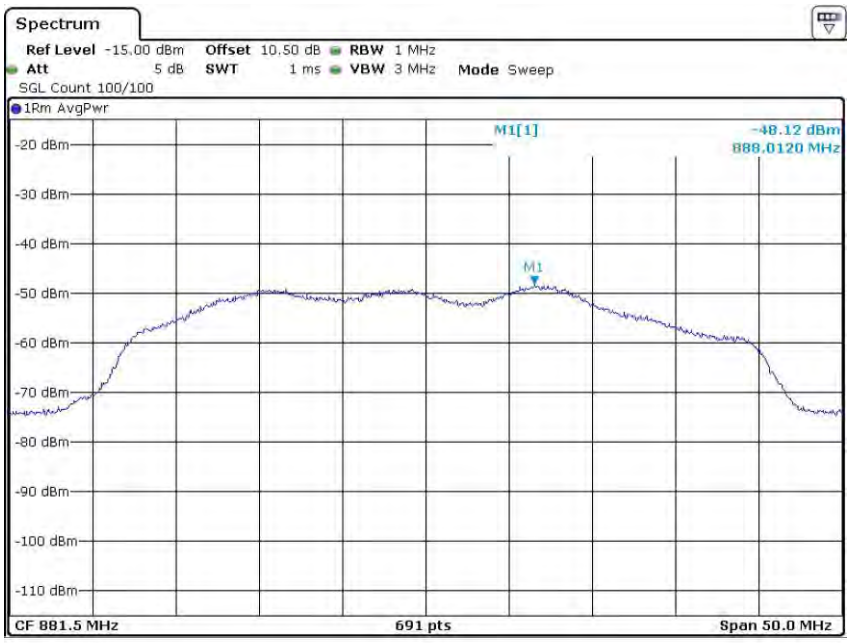
Date: 11.AUG.2022 10:15:20

Downlink Upper 700MHz

Date: 11.AUG.2022 10:15:57

Indoor 2

Downlink Cellular Band

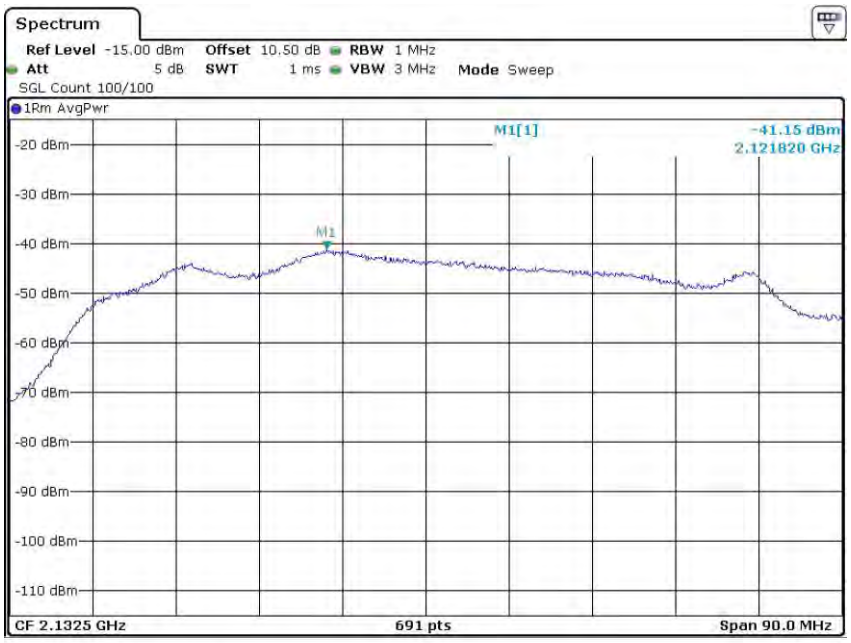


Date: 11.AUG.2022 10:19:37

Downlink PCS Band

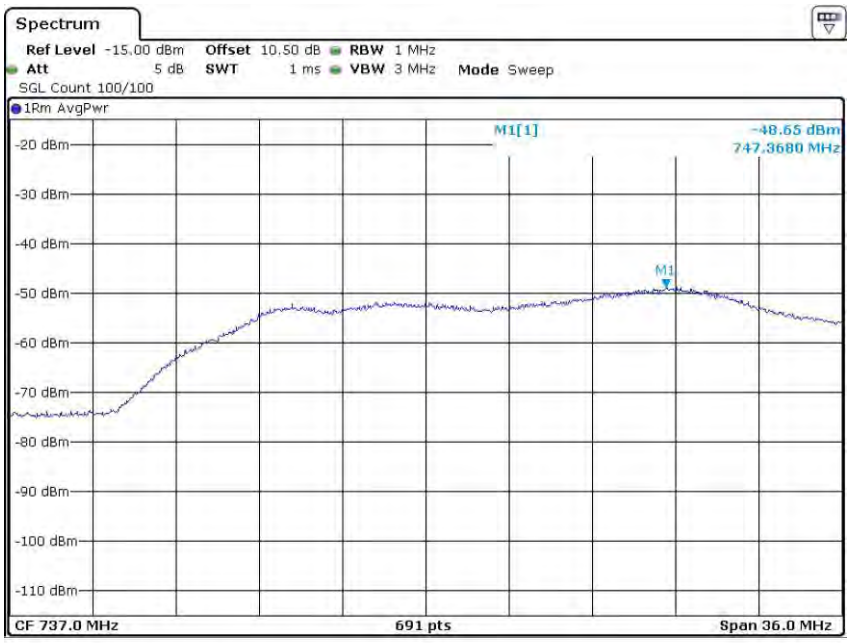
Date: 11.AUG.2022 10:22:47

Downlink AWS Band



Date: 11.AUG.2022 10:18:51

Downlink Lower 700MHz



Date: 11.AUG.2022 10:20:21

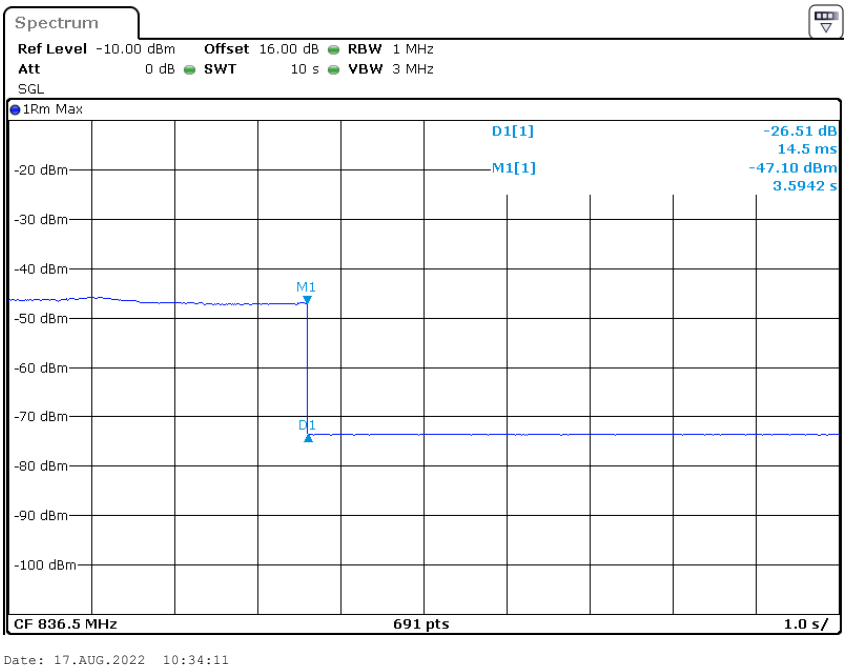
Downlink Upper 700MHz

Variable Uplink Noise Timing:

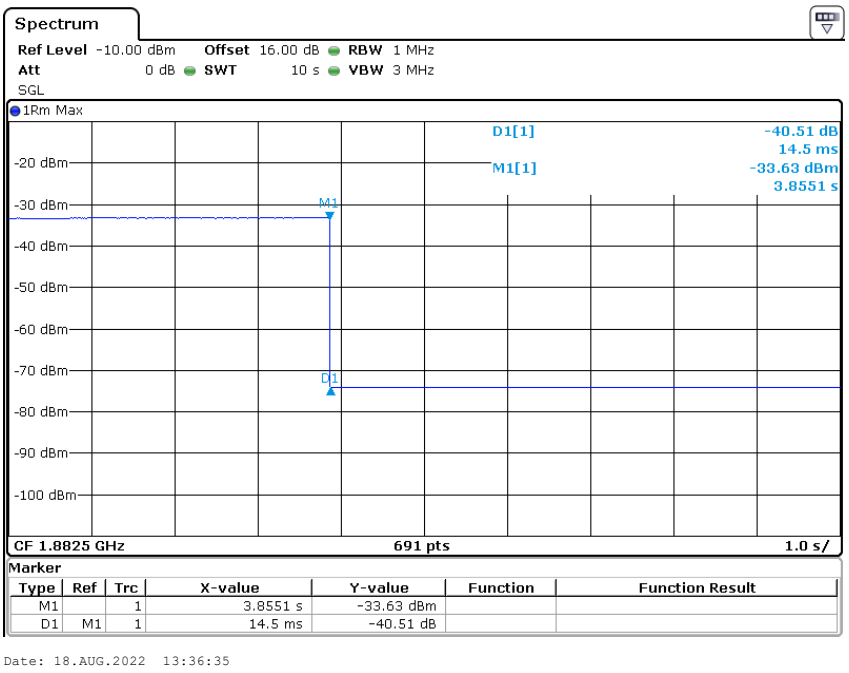
Operation Bands	Measured Value	Limit	Result
	s	s	
Lower 700MHz	0.029	3	Compliance
Upper 700MHz	0.029	3	Compliance
cellular	0.015	3	Compliance
PCS	0.015	3	Compliance
AWS	0.029	3	Compliance

Note: The uplink noise decreases to the specified level within 1 second for mobile devices and 3 seconds for fixed devices.

Cellular Band

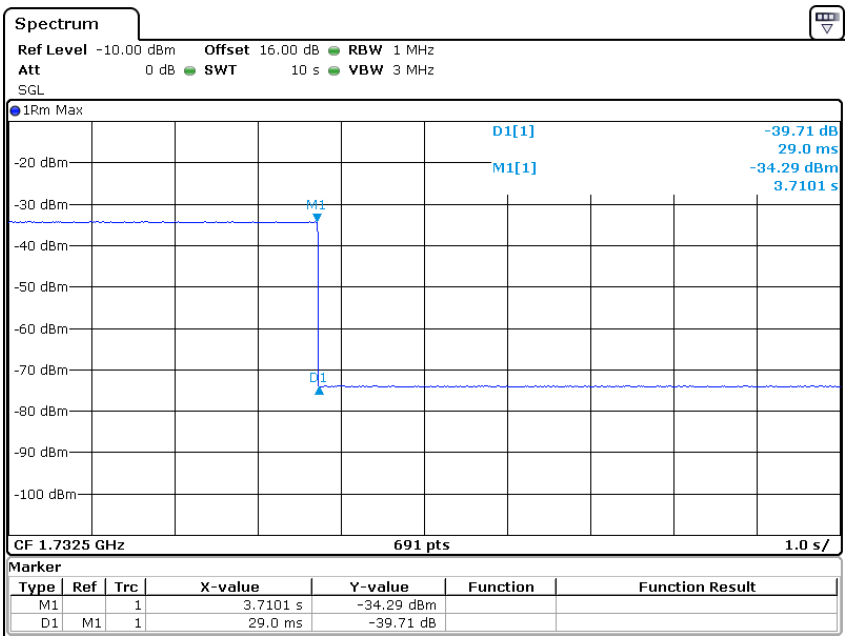


PCS Band



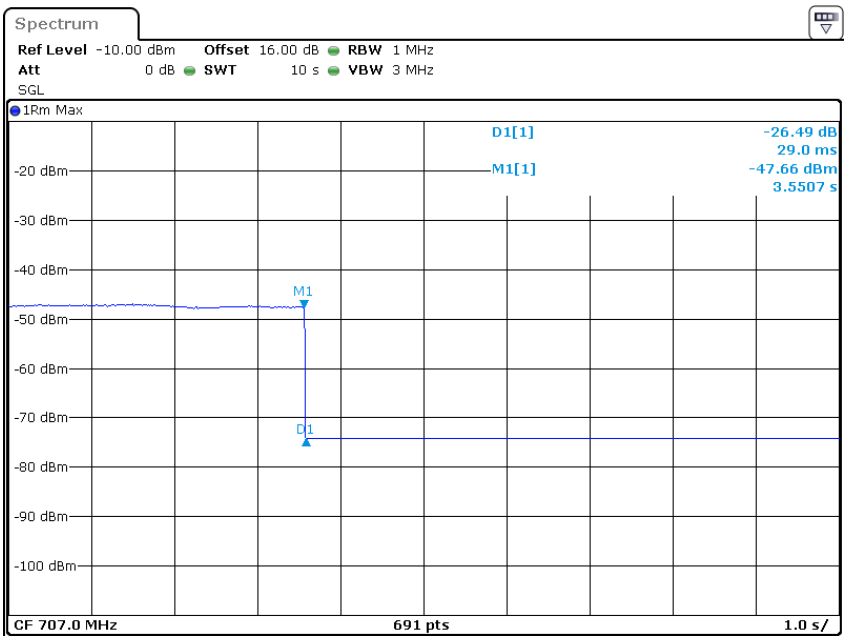
Date: 18.AUG.2022 13:36:35

AWS Band



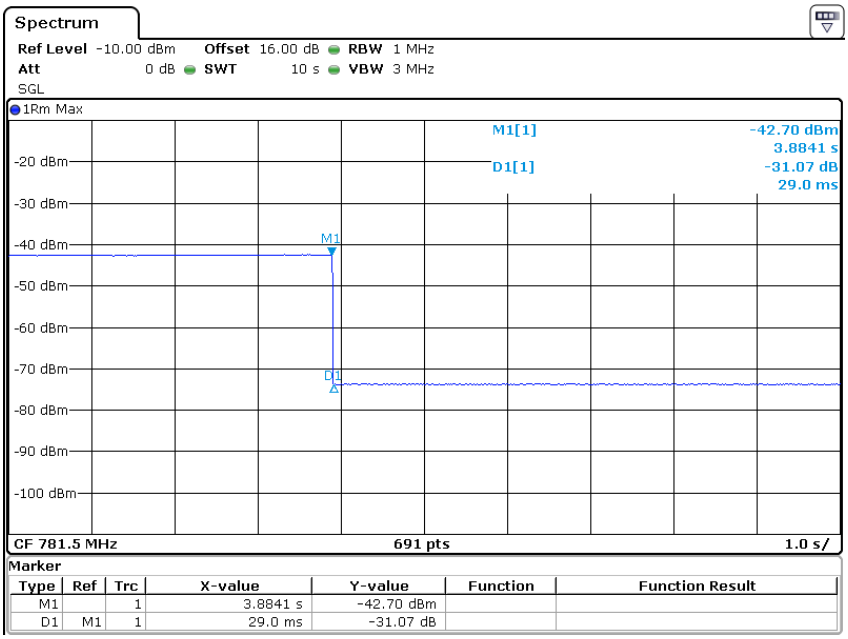
Date: 18.AUG.2022 13:25:29

Lower 700MHz



Date: 17.AUG.2022 10:40:32

Upper 700MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	3.8841 s	-42.70 dBm		
D1	M1	1	29.0 ms	-31.07 dB		

Date: 18.AUG.2022 13:34:58

§ 20.21(e)(8)(i)(I) &§20.21(e)(4) - UPLINK INACTIVITY

Applicable Standards

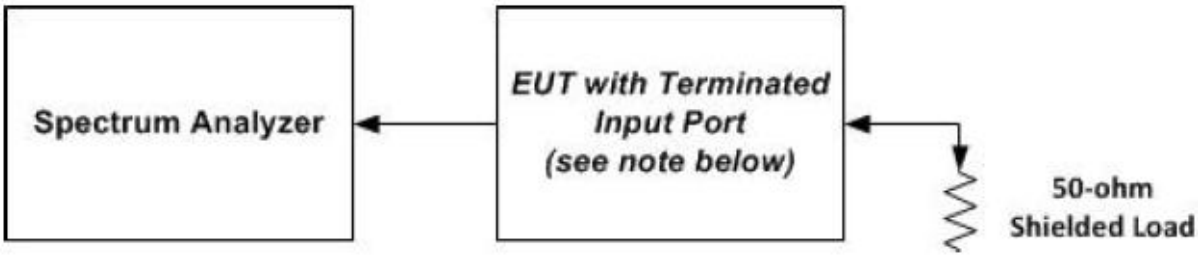
According to§ 20.21(e)(8)(i)(I) Uplink Inactivity&§20.21(e)(4); §20.21(e)(4) Self-monitoring.

Test Procedure

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).

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 ≥ 3 × RBW.
d) Set the center frequency of the spectrum analyzer to the center of the uplink operational band.
e) Set the span for 0 Hz with a single sweep time for a minimum of 330 seconds.
f) Start to capture a new trace using MAX HOLD.
g) After approximately 15 seconds turn on the EUT power.
h) 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 becomes inactive.
i) Affirm that 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 7.7.1a) to 7.7.1f).
l) Repeat 7.8d) through 7.8k) for all operational uplink bands.

Note: *Some signal boosters will require a signal generator input because 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.*



Test Data

Environmental Conditions

Temperature:	25.1 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Andy Yu from 2022-08-10 to 2022-08-11.

Test Result: Pass

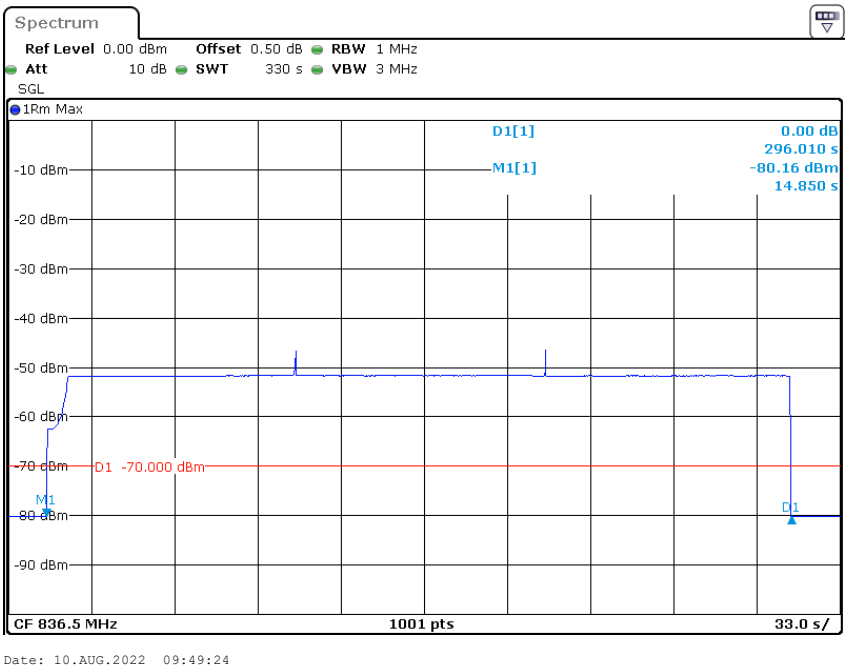
Worst case: Configuration 1:

Please refer to following table.

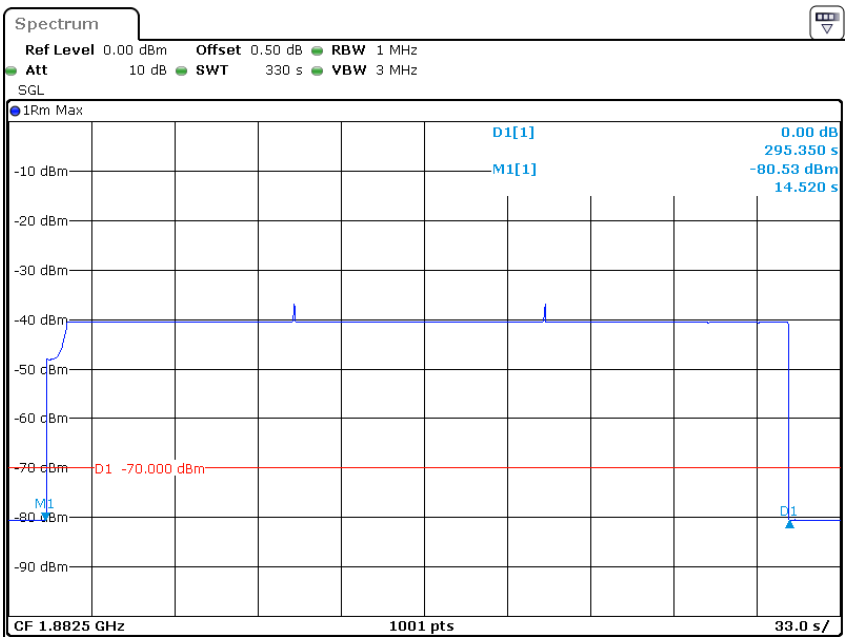
Operation Band	Measured value	Limit	Result
	s	s	
Lower 700 MHz	296.010	300	Compliance
Upper 700 MHz	295.680		Compliance
cellular	296.010		Compliance
PCS	295.350		Compliance
AWS	296.043		Compliance

Note: When the consumer booster is not serving an active device connection after 5 minutes the uplink noise power not exceed −70dBm/MHz.

Cellular Band

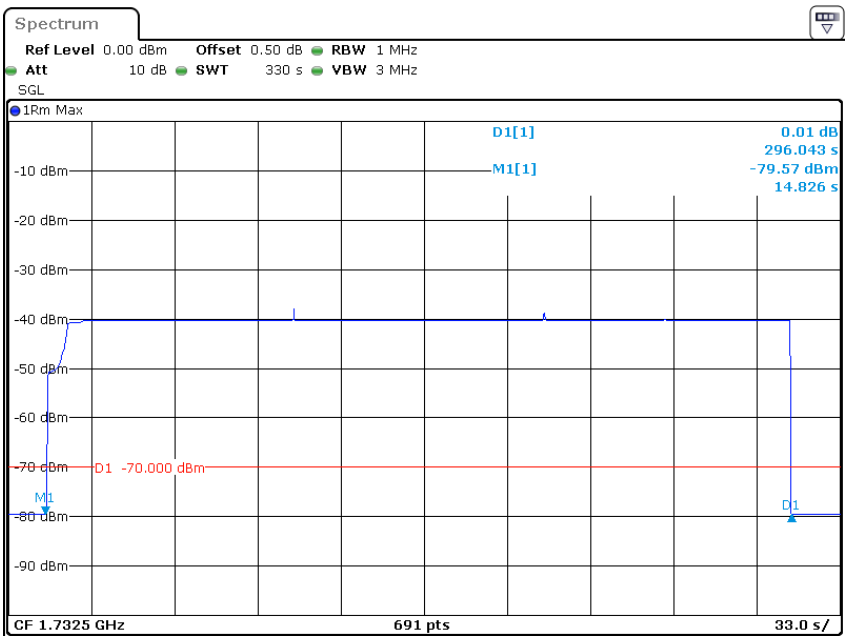


PCS Band



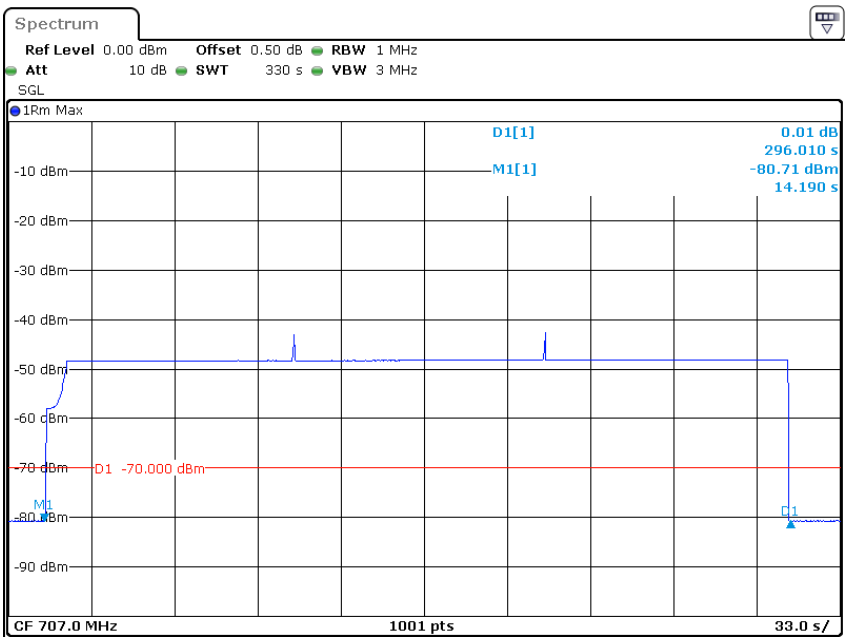
Date: 10.AUG.2022 10:37:57

AWS Band



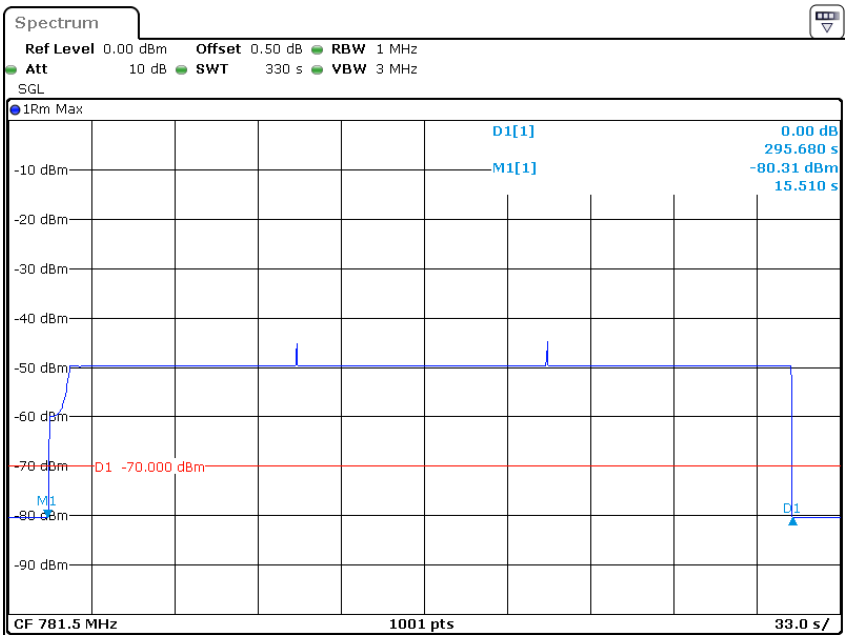
Date: 11.AUG.2022 16:54:50

Lower 700MHz



Date: 10.AUG.2022 09:56:58

Upper 700MHz



Date: 10.AUG.2022 10:17:36

§ 20.21(e)(8)(i)(C)(1) & § 20.21(e)(8)(i)(H) - VARIABLE BOOSTER GAIN

Applicable Standards

Rule paragraph(s): § 20.21(e)(8)(i)(C)(1) *Booster Gain Limits* (variable gain); § 20.21(e)(8)(i)(H) *Transmit Power Off Mode* (uplink gain).

Test Procedure

Maximum gain

This procedure shall be used to demonstrate compliance to the booster gain limits specified for wideband consumer signal boosters in § 20.21(e)(8)(i)(C) or § 20.21(e)(8)(i)(H). 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 on determining the applicable MSCL value.

a) Connect the EUT to the test equipment as shown in **Figure 5** with the uplink output connected to signal generator 1. Confirm 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% 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 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 RMS (power averaging) detector.
h) Ensure 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 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. See gain limit in charts in Annex D for uplink gain requirements. Additionally, document that the EUT provides equivalent uplink and downlink gain, and when operating in shutoff mode 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.

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.
d) Select MAX HOLD and increase the power level of signal generator 1 by 10 dB for mobile boosters and 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 3 seconds for fixed devices.
f) Repeat 7.9.2a) to 7.9.2e) for all operational uplink bands.

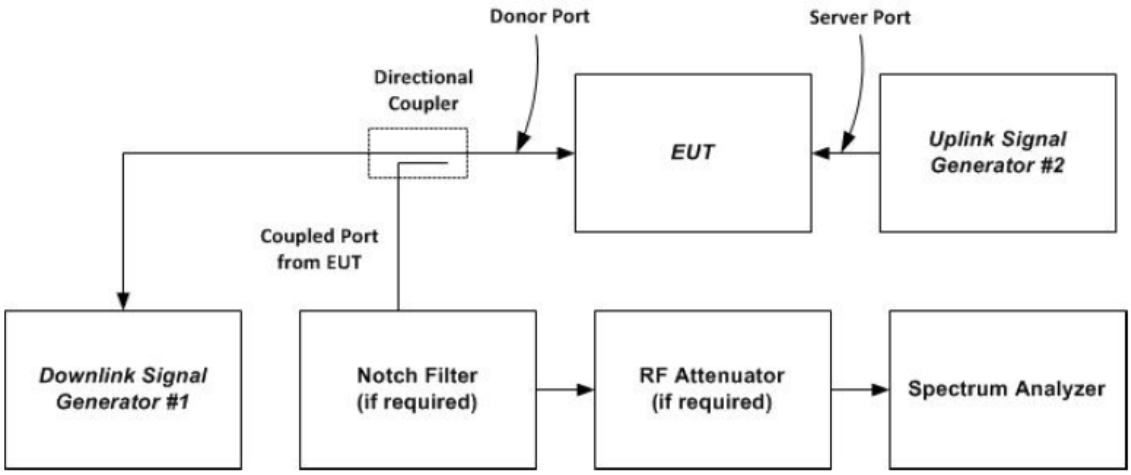


Figure 5 – Variable gain instrumentation test setup

Test Data

Environmental Conditions

Temperature:	24.6 ℃
Relative Humidity:	60 %
ATM Pressure:	101.0 kPa

The testing was performed by Andy Yu on 2022-08-25.

Test Result: Pass

Worst case: Configuration 1.

Please refer to following table.

MSCL calculation:

Operation Bands	Frequency	Distance	Path Loss	Indoor Antenna Gain	Indoor Cable Loss	Polarity Loss	MSCL
	MHz	m	dB	(dBi)	(dB)	(dB)	
Lower 700MHz	707.0	1	29.49	6.5	4.97	3.01	30.97
Upper700MHz	781.5	1	30.36	6.5	4.97	3.01	31.84
Cellur	836.5	1	30.95	6.5	5.17	3.01	32.63
PCS	1882.5	1	37.99	8.5	7.51	3.01	40.01
AWS	1732.5	1	37.27	8.5	7.51	3.01	39.29

Note:
Path loss=20logf+20logd-27.50
Polarity loss=20log(1/sin(45))=3.01
MSCL= Path loss + Indoor Cable Loss - Mobile Antenna Gain- Indoor Antenna Gain+ Polarity Loss
Mobile Antenna Gain=0
The lowest MSCL was calculated and used according to the manufacturer's specification

Variable booster gain:

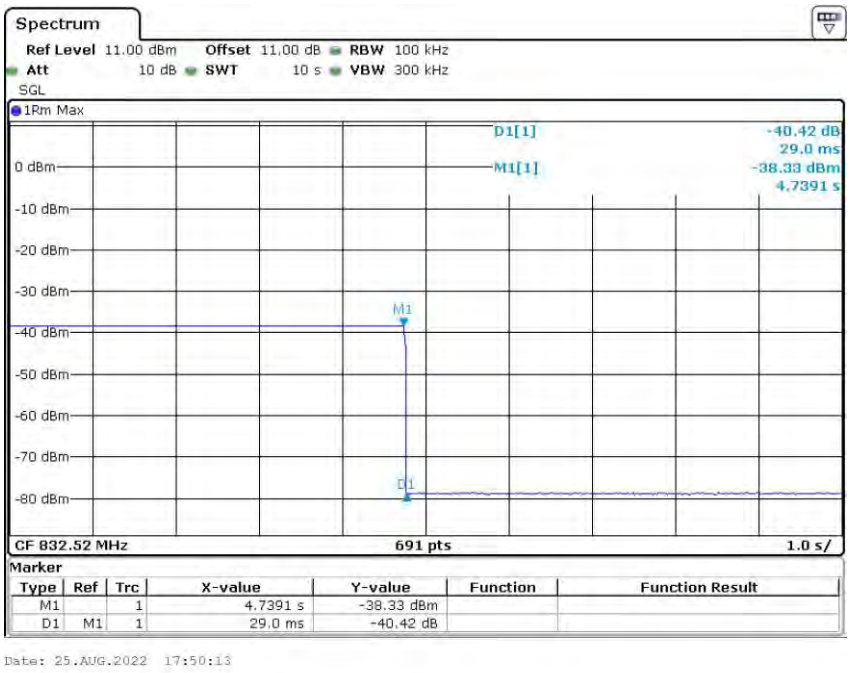
Operation Bands	RSSI	P_{in}	P_{out}	MSCL	Measured Value	Limit	Result
	dBm	dBm	dBm	dB	dB	dB	
Lower 700MHz	-60	-47.04	3.28	30.97	50.32	56.97	Compliance
	-59	-47.04	2.30	30.97	49.34	55.97	Compliance
	-58	-47.04	1.09	30.97	48.13	54.97	Compliance
	-57	-47.04	0.05	30.97	47.09	53.97	Compliance
	-56	-47.04	-1.45	30.97	45.59	52.97	Compliance
	-55	-47.04	-2.89	30.97	44.15	51.97	Compliance
Upper 700MHz	-60	-48.06	0.30	31.84	48.36	57.84	Compliance
	-59	-48.06	-0.11	31.84	47.95	56.84	Compliance
	-58	-48.06	-1.65	31.84	46.41	55.84	Compliance
	-57	-48.06	-3.15	31.84	44.91	54.84	Compliance
	-56	-48.06	-4.44	31.84	43.62	53.84	Compliance
	-55	-48.06	-5.54	31.84	42.52	52.84	Compliance
Cellur	-60	-47.03	2.08	32.63	49.11	58.63	Compliance
	-59	-47.03	1.49	32.63	48.52	57.63	Compliance
	-58	-47.03	0.62	32.63	47.65	56.63	Compliance
	-57	-47.03	-0.45	32.63	46.58	55.63	Compliance
	-56	-47.03	-1.10	32.63	45.93	54.63	Compliance
	-55	-47.03	-2.20	32.63	44.83	53.63	Compliance
PCS	-64	-55.09	7.23	40.01	62.32	70.01	Compliance
	-63	-55.09	6.64	40.01	61.73	69.01	Compliance
	-62	-55.09	5.16	40.01	60.25	68.01	Compliance
	-61	-55.09	4.15	40.01	59.24	67.01	Compliance
	-60	-55.09	3.36	40.01	58.45	66.01	Compliance
	-59	-55.09	2.71	40.01	57.80	65.01	Compliance
AWS	-66	-54.45	6.65	39.29	61.10	71.29	Compliance
	-65	-54.45	4.79	39.29	59.24	70.29	Compliance
	-64	-54.45	4.15	39.29	58.60	69.29	Compliance
	-63	-54.45	2.98	39.29	57.43	68.29	Compliance
	-62	-54.45	2.22	39.29	56.67	67.29	Compliance
	-61	-54.45	0.43	39.29	54.88	66.29	Compliance

Note: Variable booster gain Limit: −34 dB-RSSI + MSCL.

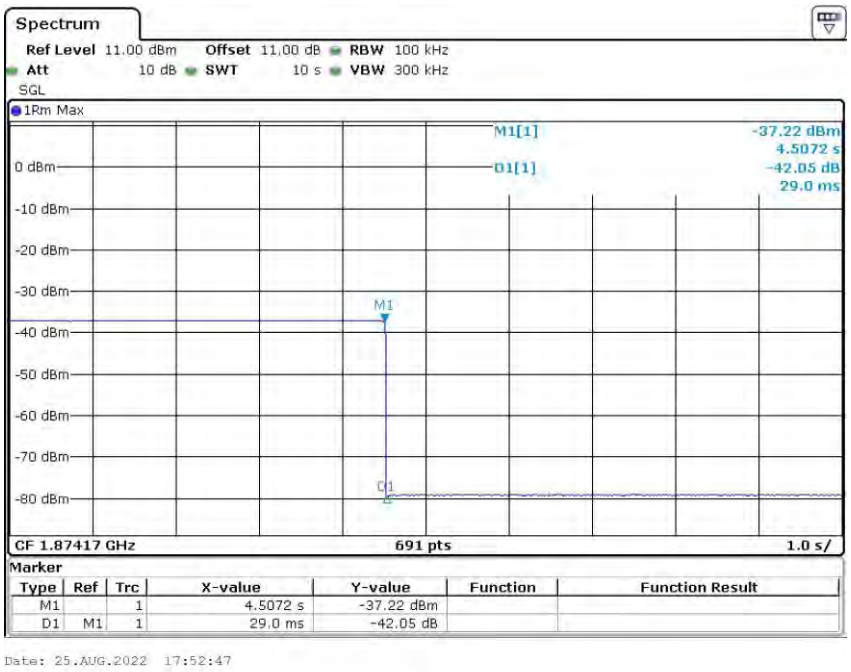
Variable gain timing:

Operation Bands	Measured value	Limit	Results
MHz	s	s	
Lower 700MHz	0.029	3	Compliance
Upper 700MHz	0.029		Compliance
Cellular	0.029		Compliance
PCS	0.029		Compliance
AWS	0.015		Compliance

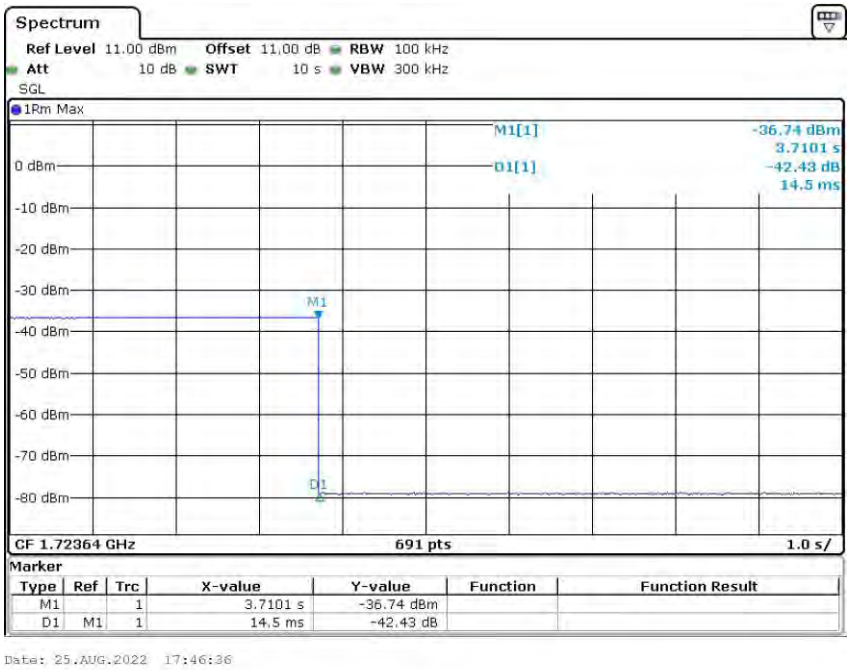
Cellular Band



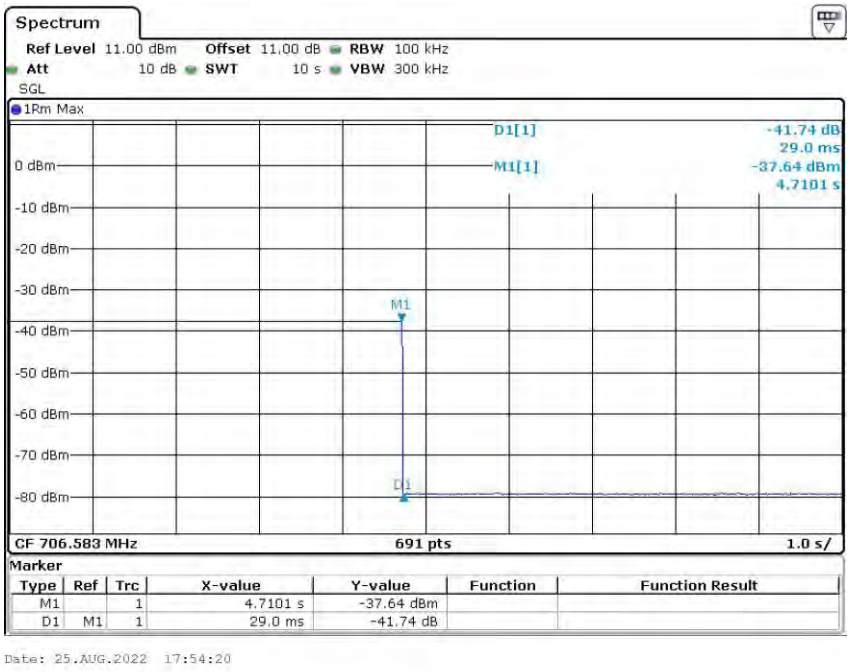
PCS Band



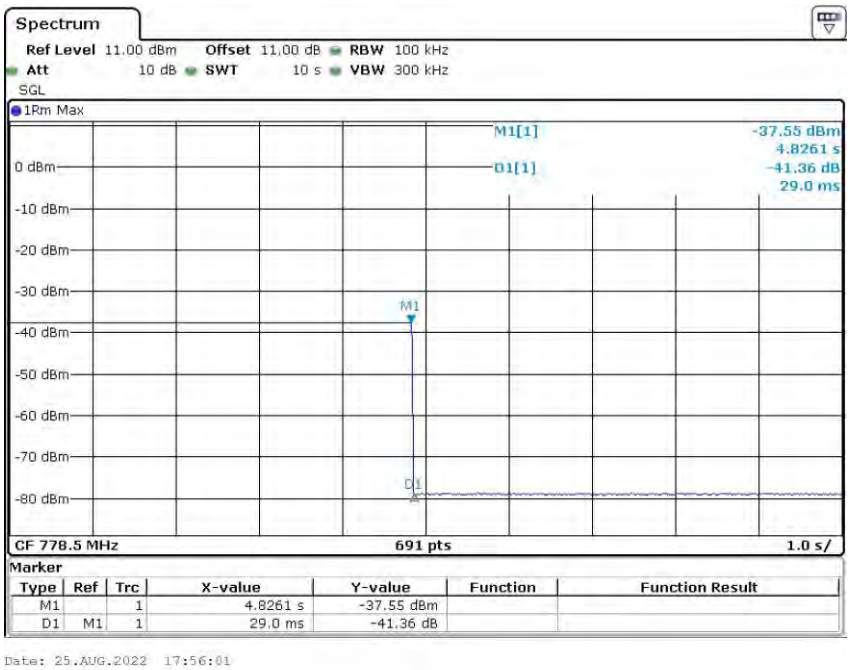
AWS Band



Lower 700MHz



Upper 700MHz



§ 2.1049 - OCCUPIED BANDWIDTH

Applicable Standards

According to§ 2.1049 Measurements required: Occupied bandwidth.

Test Procedure

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.
a) Connect the test equipment as shown in **Figure 6** to measure the characteristics of the test signals produced by the signal generator.
b) Set VBW to ≥ 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 occupied bandwidth as necessary for accurately viewing the signals.
d) Set the signal generator for power level to match the values obtained in 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 emissions bandwidth.
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 for all uplink and downlink operational bands. AWGN or LTE may be used in place of W-CDMA, 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 7.10c) to 7.10h) in this new configuration.

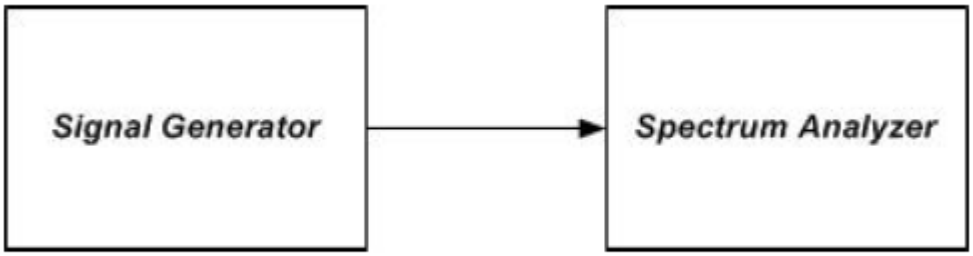


Figure 6 – Occupied bandwidth instrumentation test setup

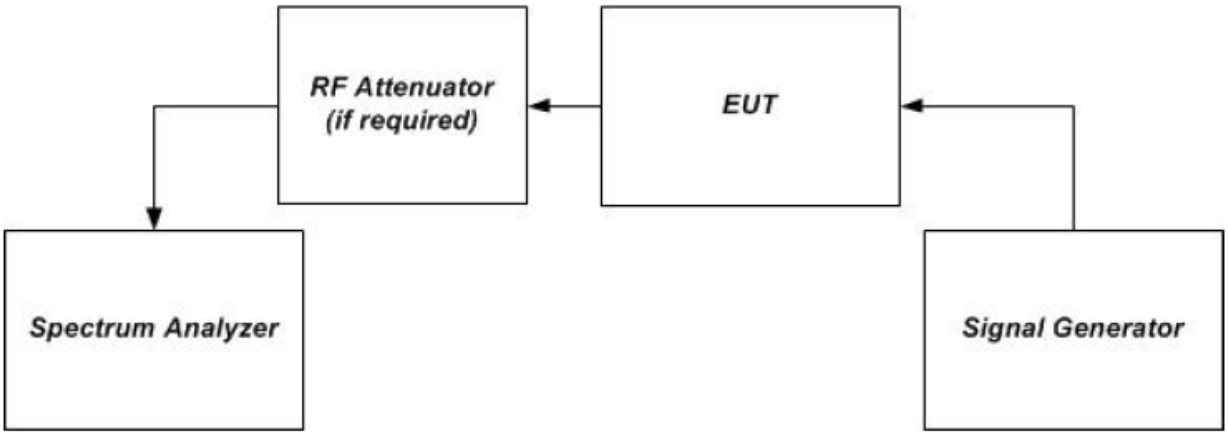


Figure 1 – Band verification test instrumentation setup

Test Data

Environmental Conditions

Temperature:	25.2 ℃
Relative Humidity:	57 %
ATM Pressure:	101.0 kPa

The testing was performed by Andy Yu on 2022-08-09.

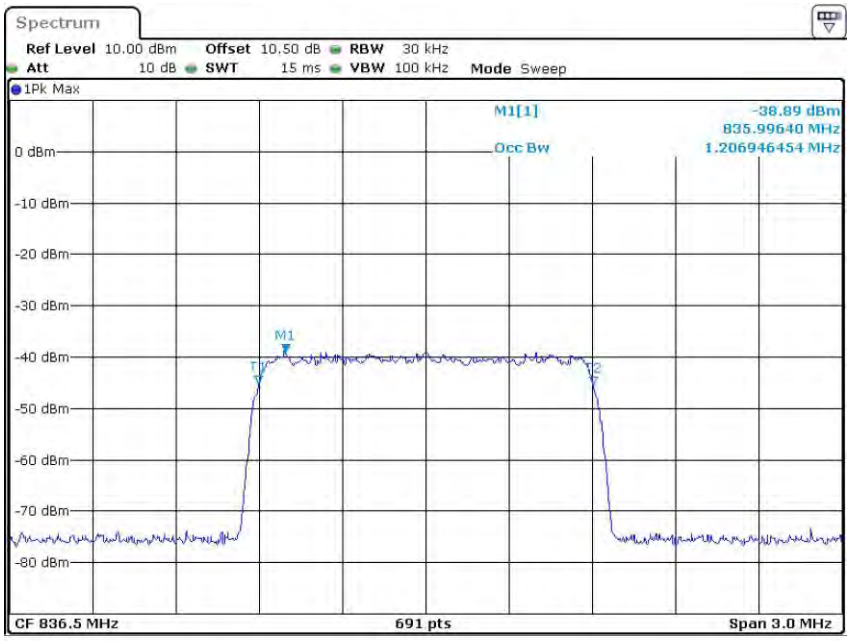
Test Result: Pass

Worst case: Configuration 1.

Please refer to following table.

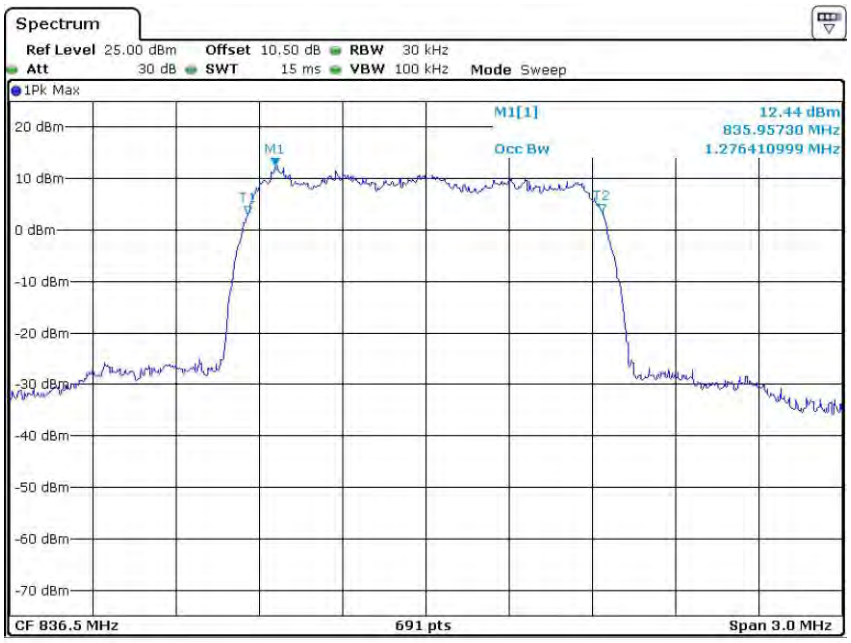
Mode	Operation Bands	Signal type	Occupied bandwidth(MHz)		Result
			In	Out	
Uplink	Lower 700MHz	GSM	0.245	0.245	Compliance
		CDMA	1.207	1.276	Compliance
		WCDMA	4.197	4.139	Compliance
	Upper 700MHz	GSM	0.245	0.249	Compliance
		CDMA	1.207	1.203	Compliance
		WCDMA	4.197	4.197	Compliance
	cellular	GSM	0.245	0.243	Compliance
		CDMA	1.207	1.276	Compliance
		WCDMA	4.197	4.168	Compliance
	PCS	GSM	0.245	0.243	Compliance
		CDMA	1.198	1.203	Compliance
		WCDMA	4.197	4.182	Compliance
	AWS	GSM	0.260	0.245	Compliance
		CDMA	1.224	1.216	Compliance
		WCDMA	4.197	4.313	Compliance
Downlink	Lower 700MHz	GSM	0.245	0.245	Compliance
		CDMA	1.207	1.203	Compliance
		WCDMA	4.197	4.139	Compliance
	Upper 700MHz	GSM	0.246	0.245	Compliance
		CDMA	1.207	1.203	Compliance
		WCDMA	4.197	4.168	Compliance
	cellular	GSM	0.246	0.245	Compliance
		CDMA	1.207	1.272	Compliance
		WCDMA	4.197	4.211	Compliance
	PCS	GSM	0.245	0.245	Compliance
		CDMA	1.203	1.203	Compliance
		WCDMA	4.197	4.182	Compliance
	AWS	GSM	0.247	0.246	Compliance
		CDMA	1.207	1.276	Compliance
		WCDMA	4.211	4.168	Compliance

Uplink, 836.5MHz-CDMA (Input)



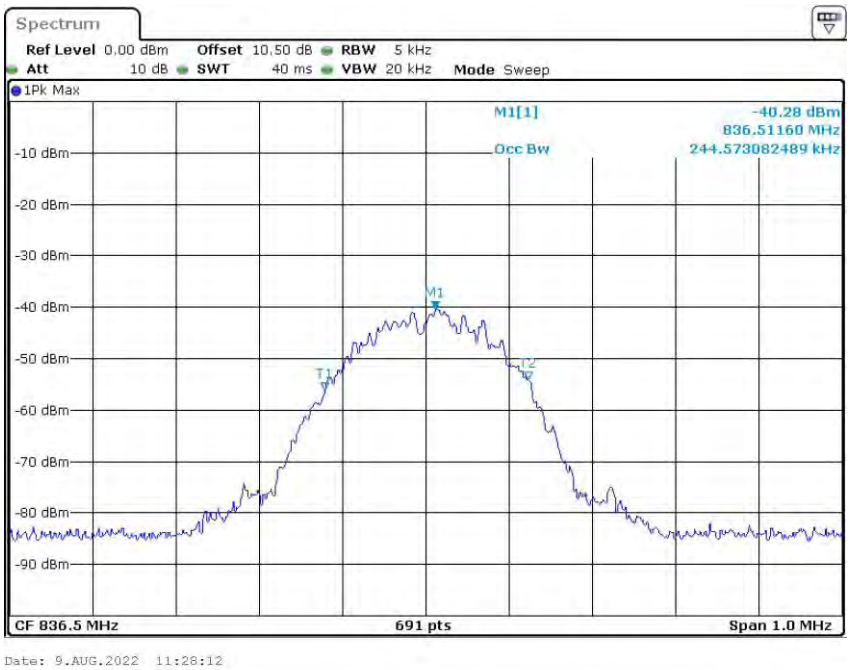
Date: 9.AUG.2022 11:25:42

Uplink, 836.5MHz-CDMA (Output)



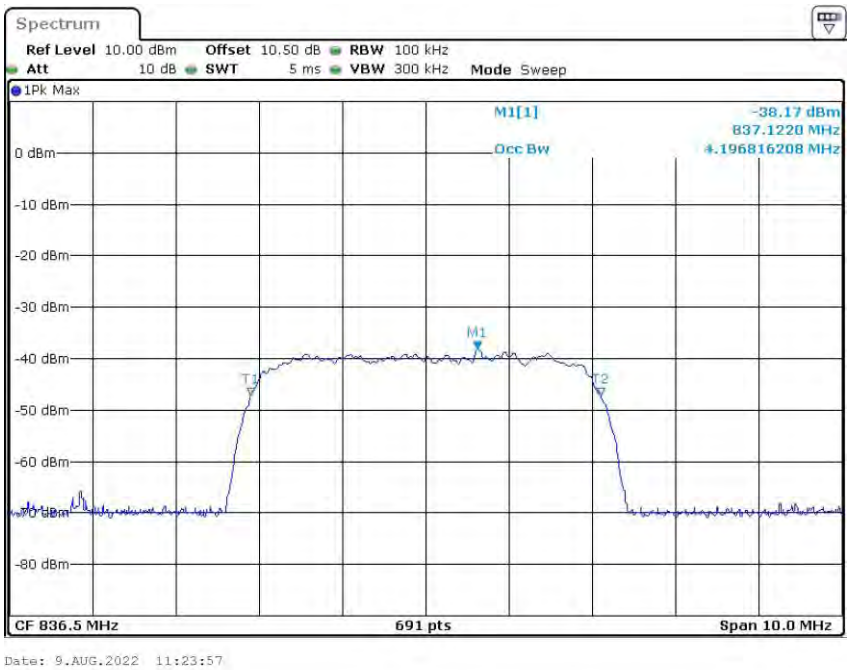
Date: 9.AUG.2022 10:02:20

Uplink, 836.5MHz–GSM (Input)

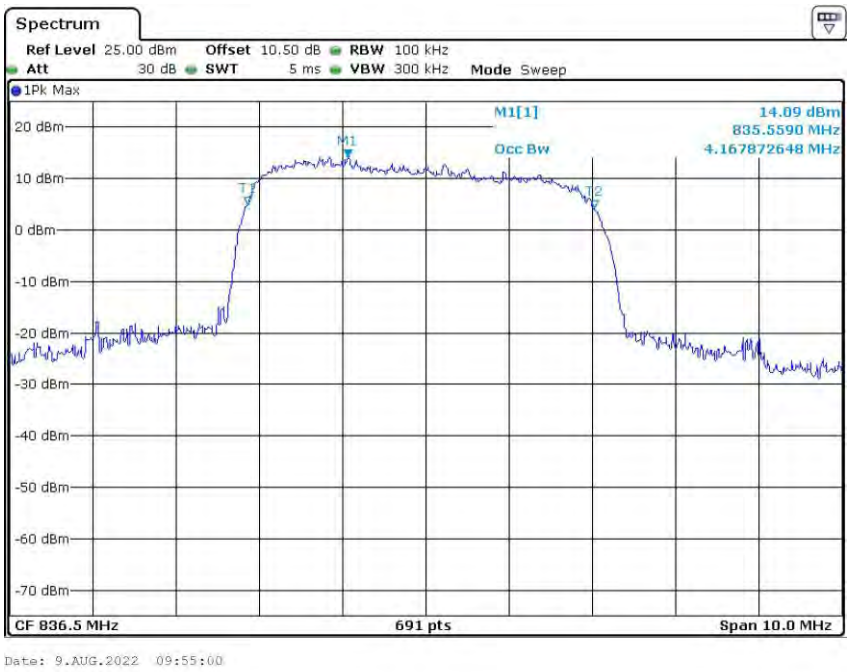


Uplink, 836.5MHz-GSM (Output)

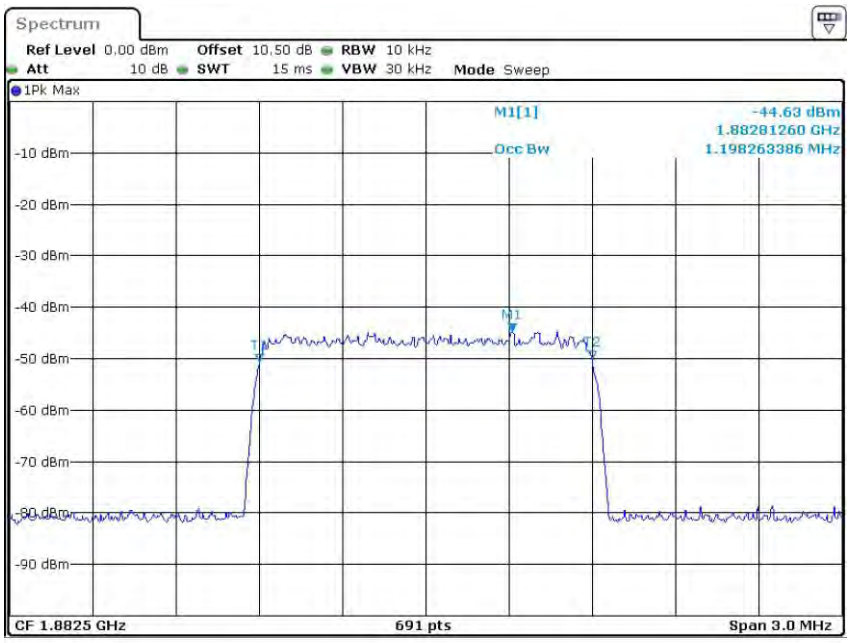
Uplink, 836.5MHz-WCDMA (Input)



Uplink, 836.5MHz-WCDMA (Output)

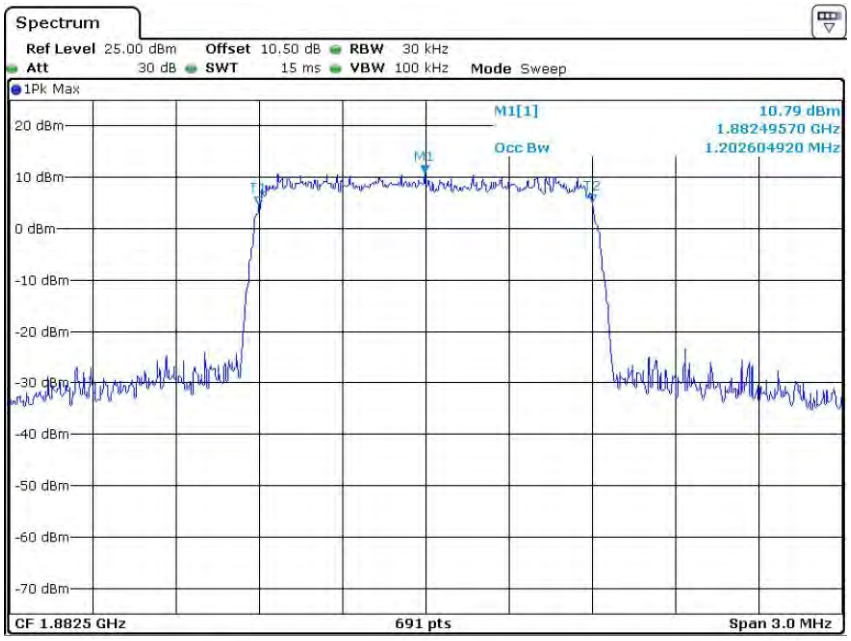


Uplink, 1882.5MHz-CDMA (Input)



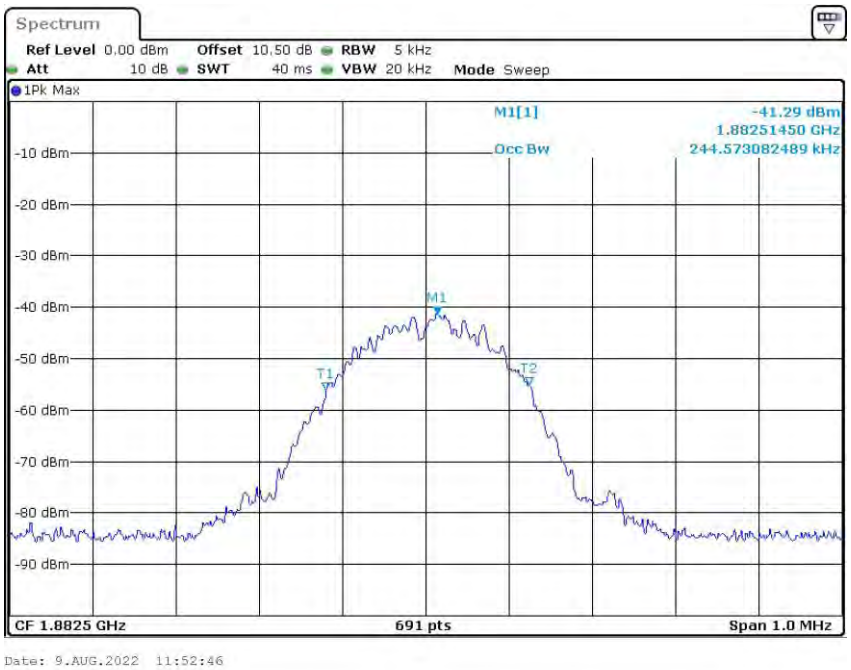
Date: 9.AUG.2022 11:54:11

Uplink, 1882.5MHz-CDMA (Output)



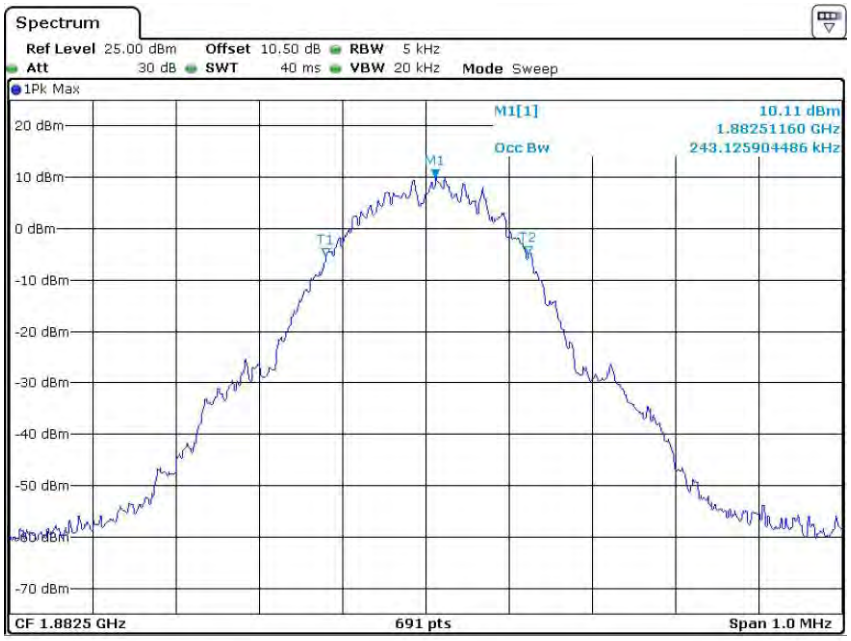
Date: 9.AUG.2022 10:21:19

Uplink, 1882.5MHz-GSM (Input)



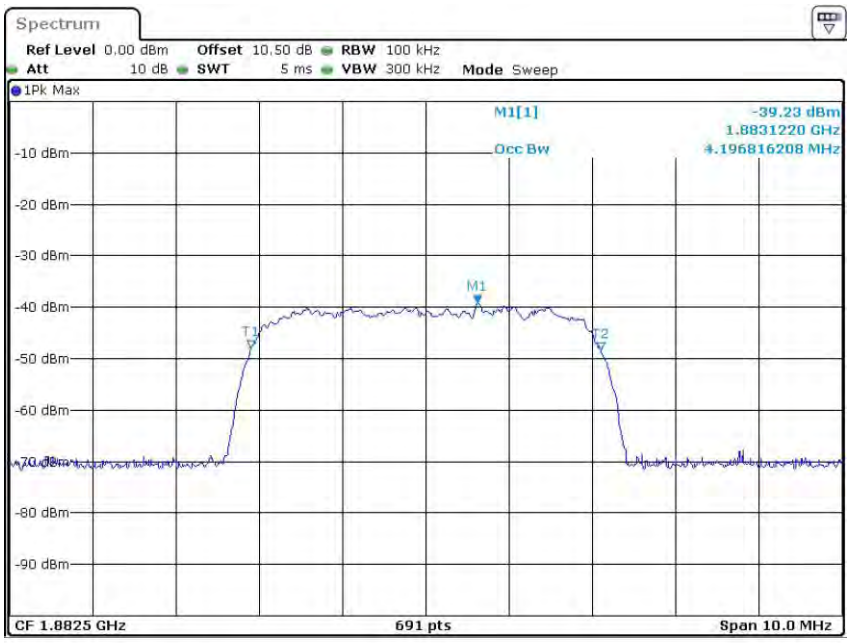
Date: 9.AUG.2022 11:52:46

Uplink, 1882.5MHz-GSM (Output)



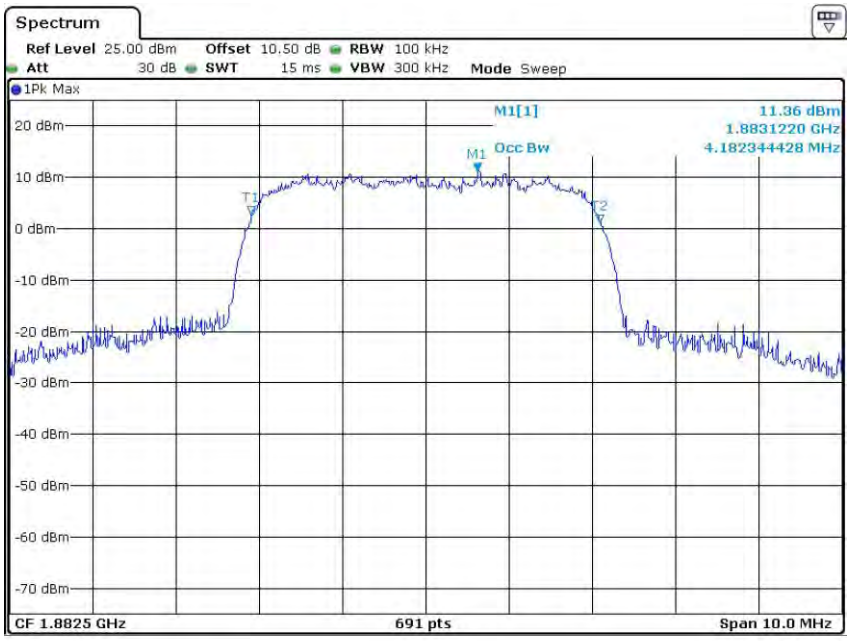
Date: 9.AUG.2022 10:25:21

Uplink, 1882.5MHz-WCDMA (Input)



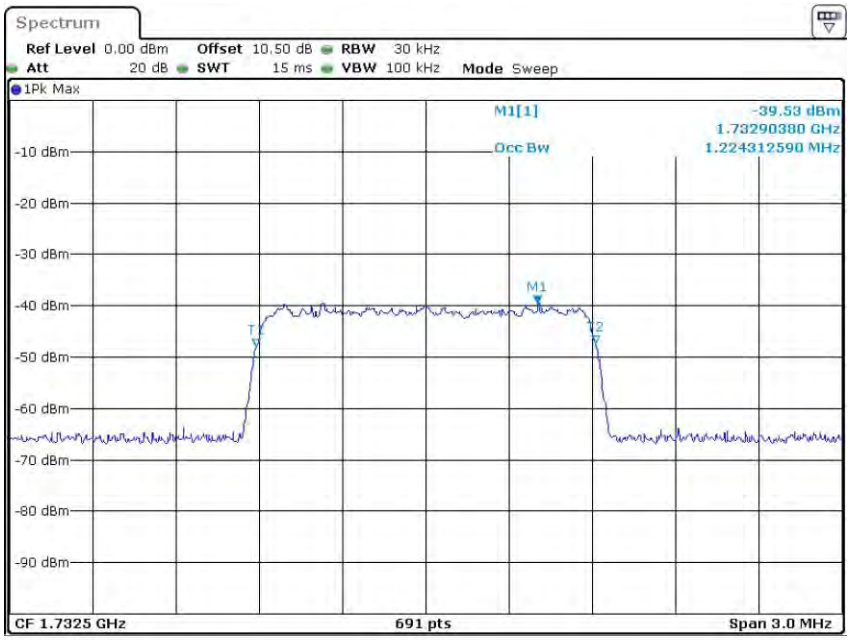
Date: 9.AUG.2022 11:55:35

Uplink, 1882.5MHz-WCDMA (Output)



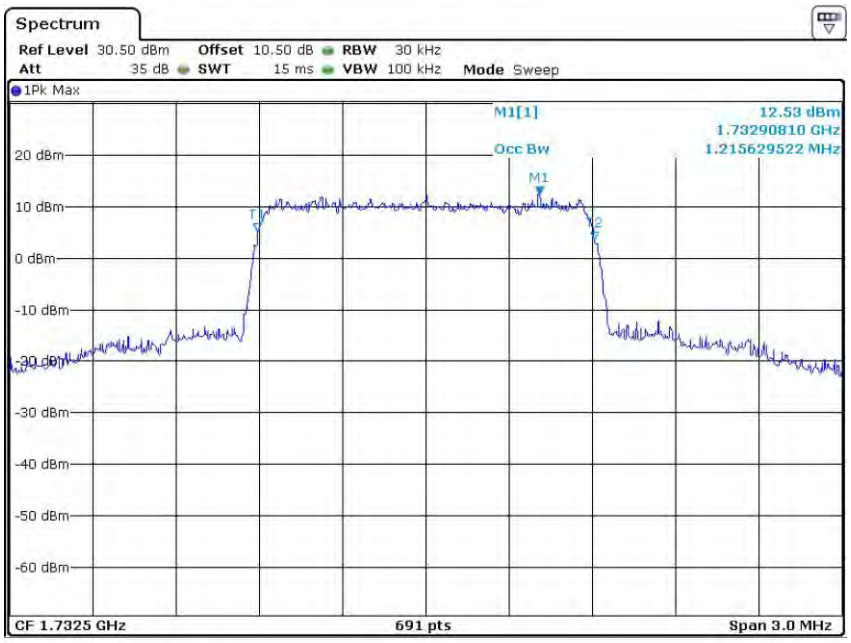
Date: 9.AUG.2022 10:26:52

Uplink, 1732.5MHz-CDMA (Input)



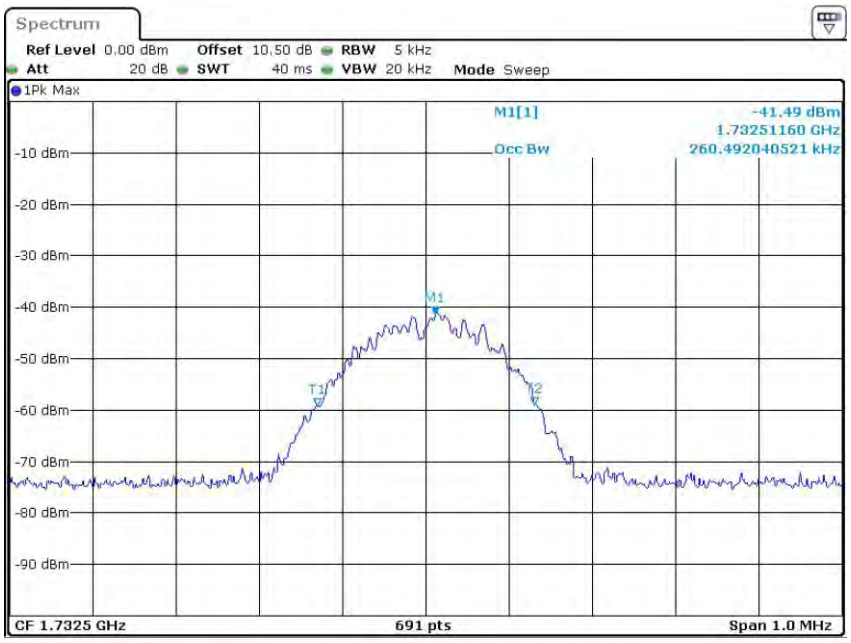
Date: 9.AUG.2022 11:18:16

Uplink, 1732.5MHz-CDMA (Output)



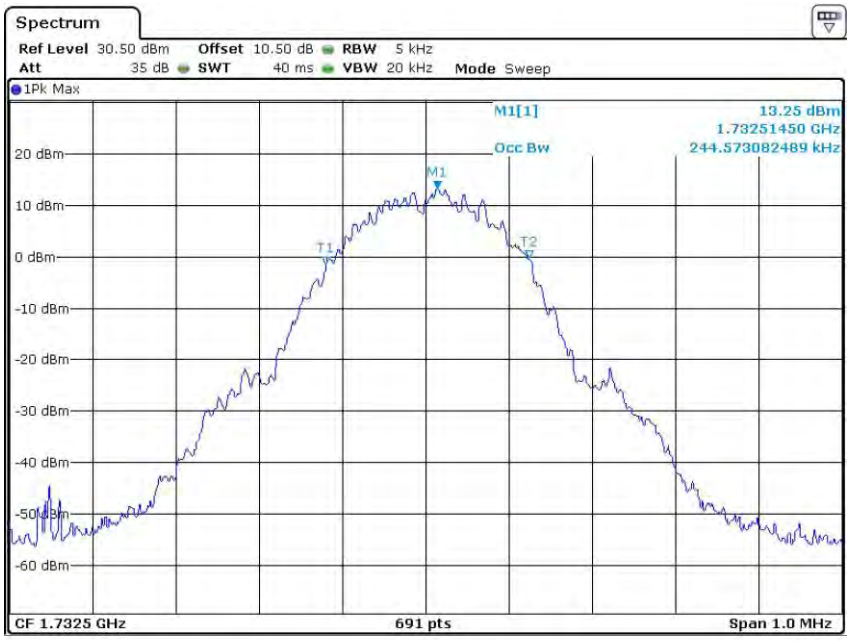
Date: 9.AUG.2022 09:25:09

Uplink, 1732.5MHz-GSM (Input)



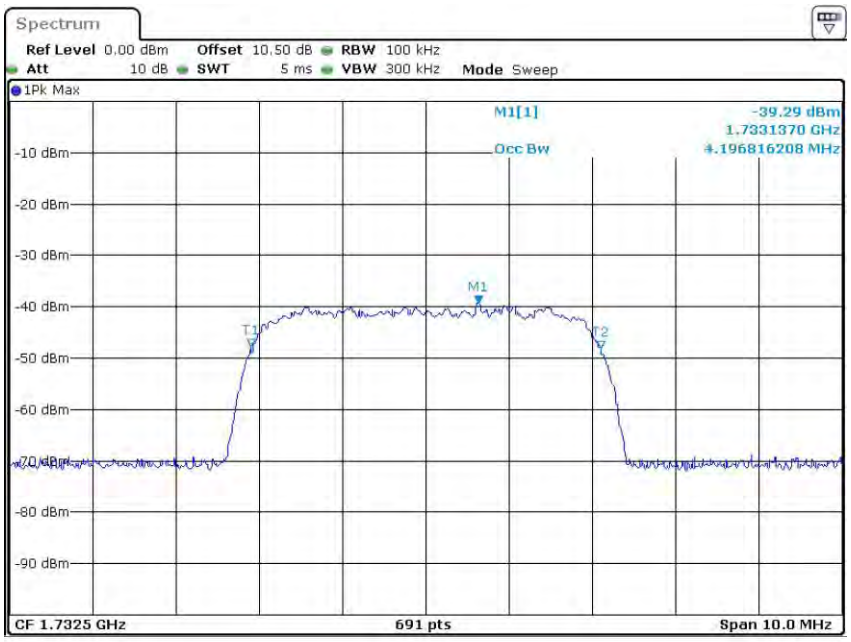
Date: 9.AUG.2022 11:15:44

Uplink, 1732.5MHz-GSM (Output)



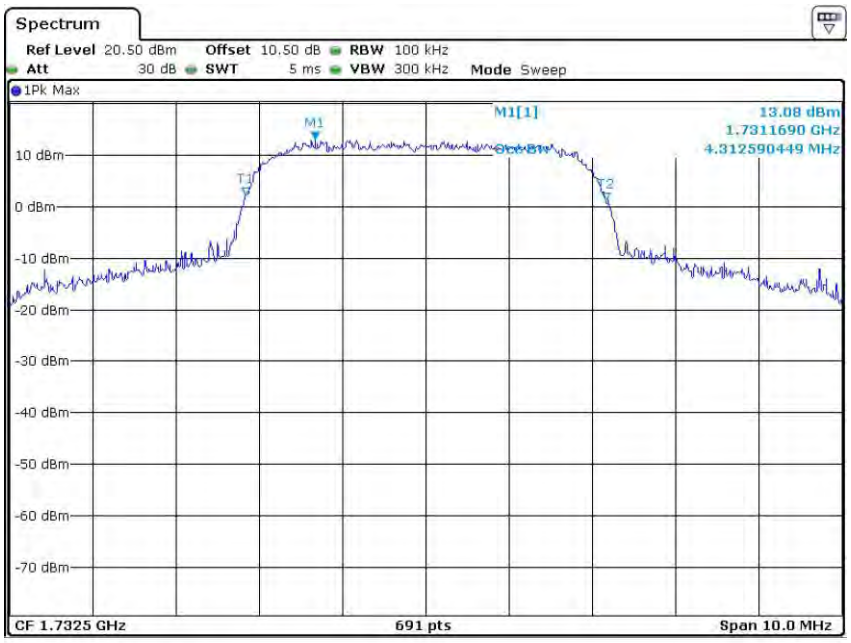
Date: 9.AUG.2022 09:22:06

Uplink, 1732.5MHz-WCDMA (Input)



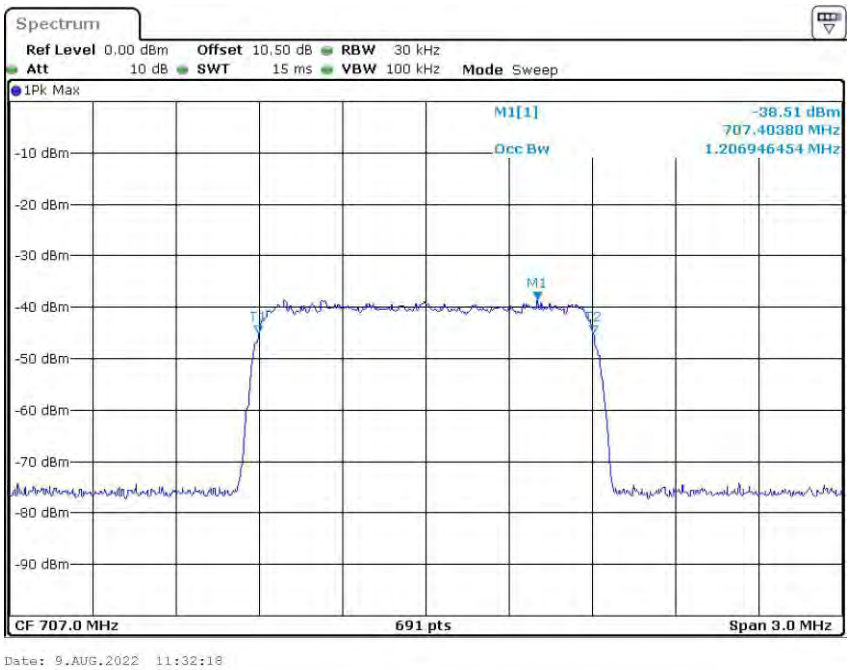
Date: 9.AUG.2022 11:37:25

Uplink, 1732.5MHz-WCDMA (Output)



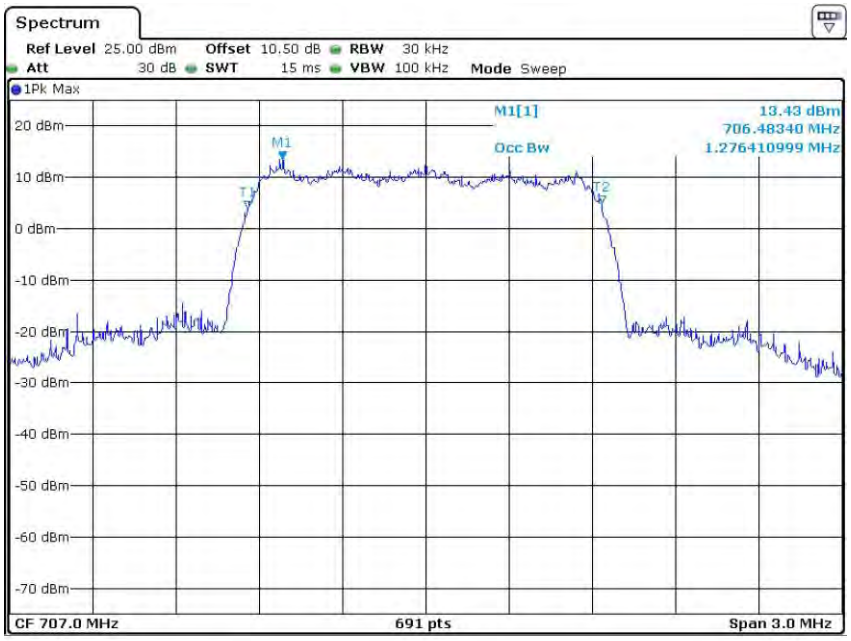
Date: 9.AUG.2022 09:51:19

Uplink, 707MHz-CDMA (Input)



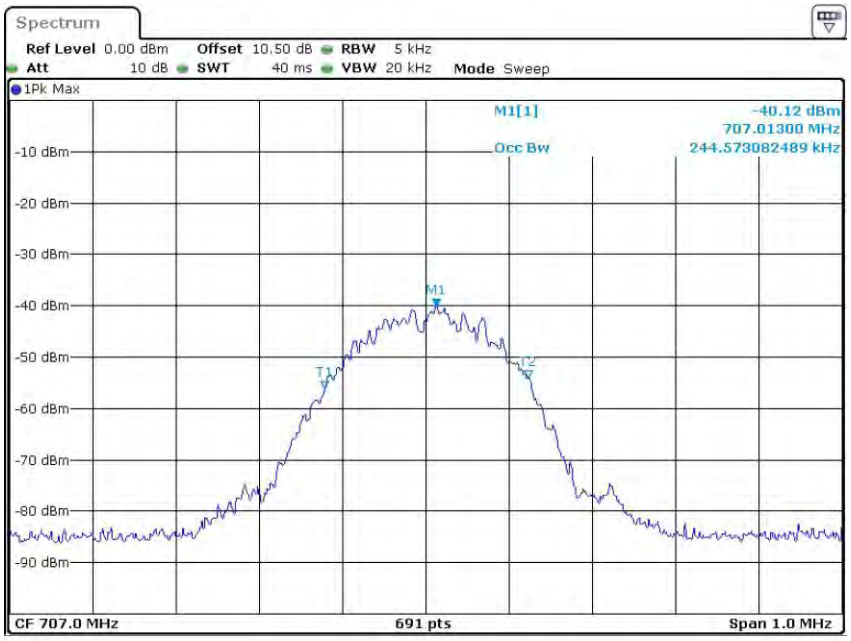
Date: 9.AUG.2022 11:32:18

Uplink, 707MHz-CDMA (Output)



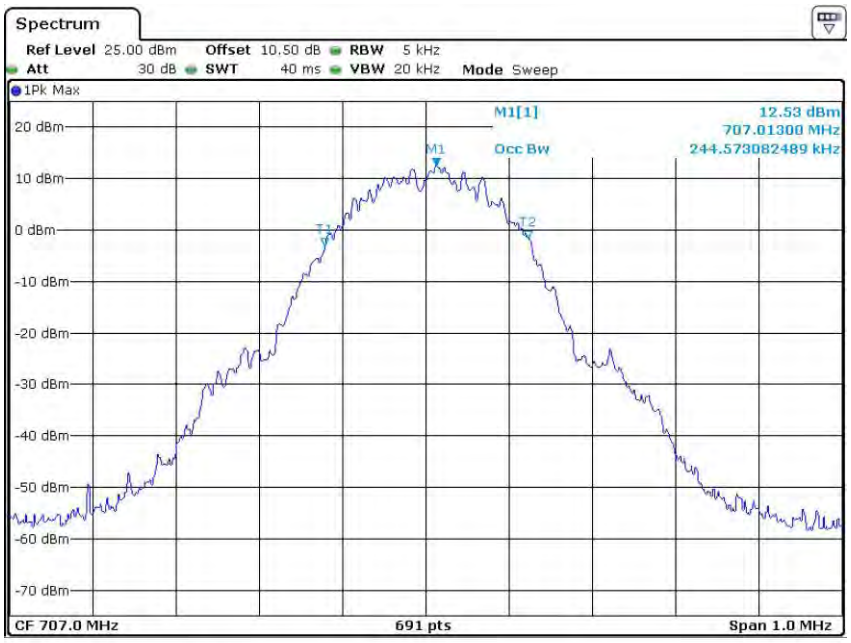
Date: 9.AUG.2022 10:05:01

Uplink, 707MHz-GSM (Input)



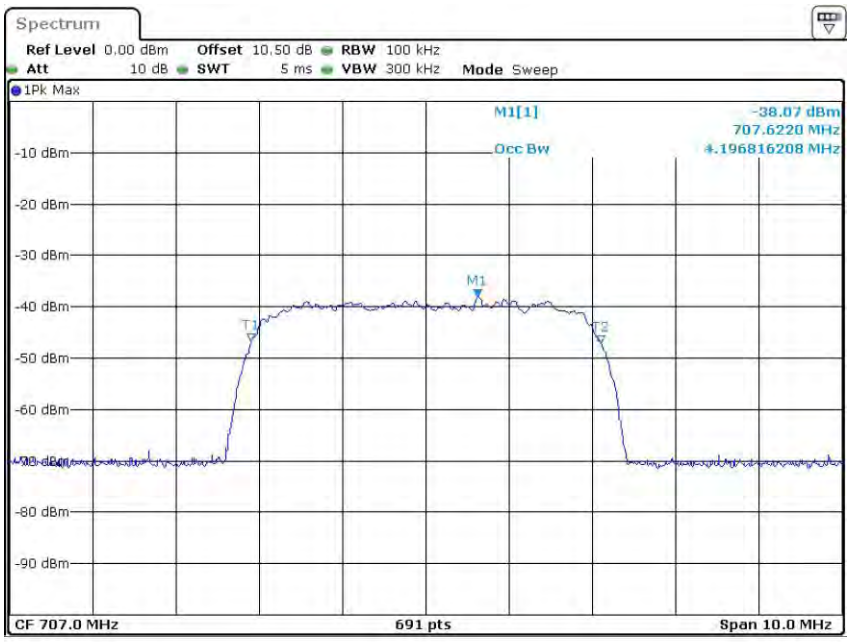
Date: 9.AUG.2022 11:30:27

Uplink, 707MHz-GSM (Output)



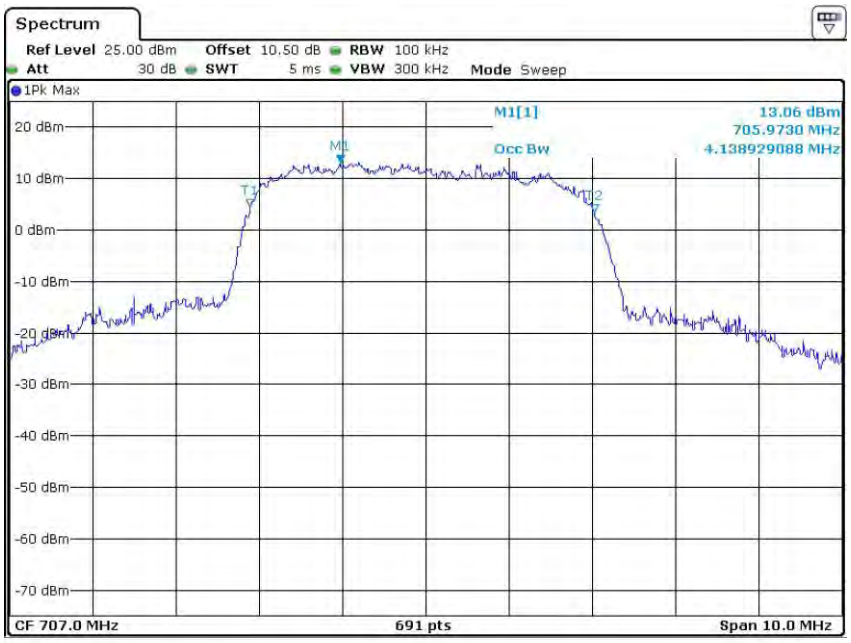
Date: 9.AUG.2022 10:07:46

Uplink, 707MHz-WCDMA (Input)



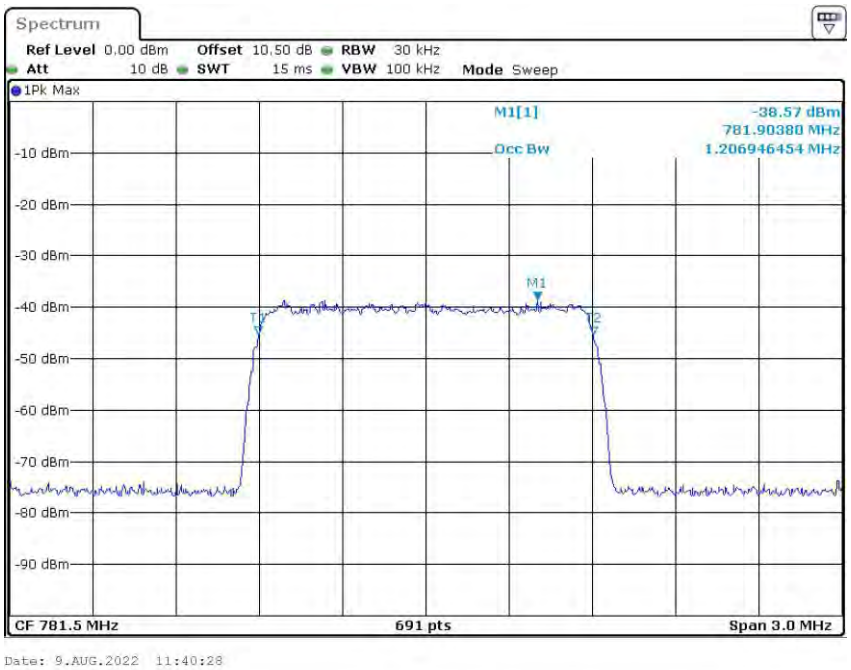
Date: 9.AUG.2022 11:34:15

Uplink, 707MHz-WCDMA (Output)



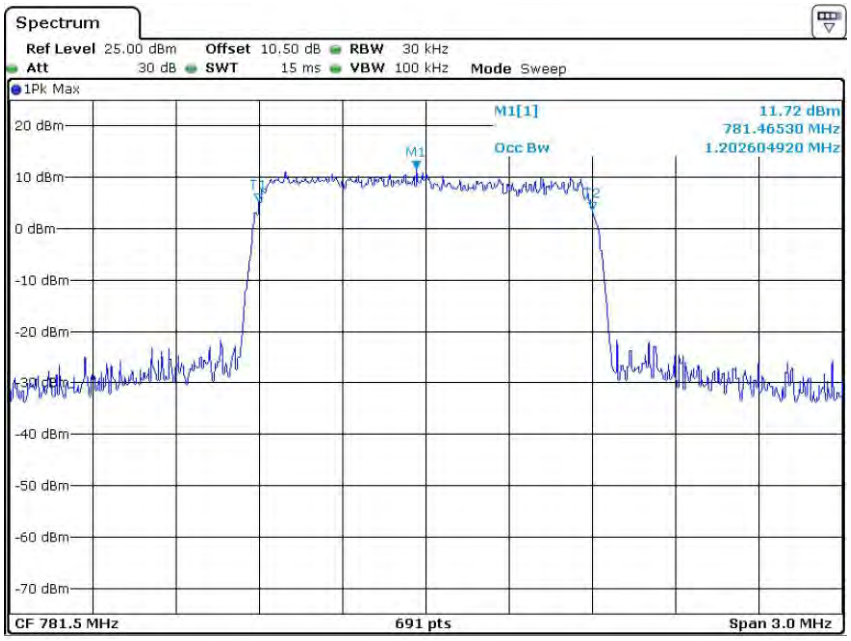
Date: 9.AUG.2022 10:11:20

Uplink, 781.5MHz-CDMA (Input)



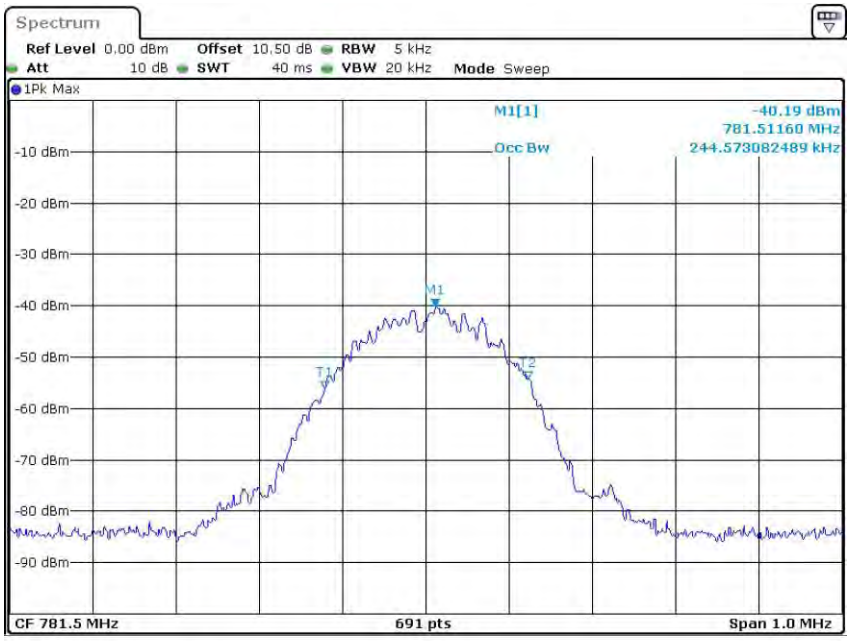
Date: 9.AUG.2022 11:40:28

Uplink, 781.5MHz-CDMA (Output)



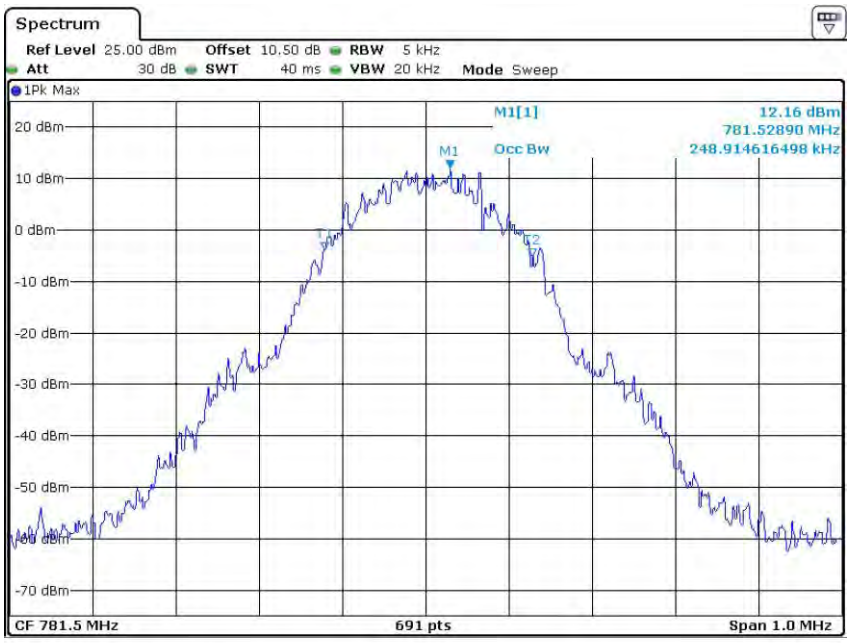
Date: 9.AUG.2022 10:19:01

Uplink, 781.5MHz-GSM (Input)



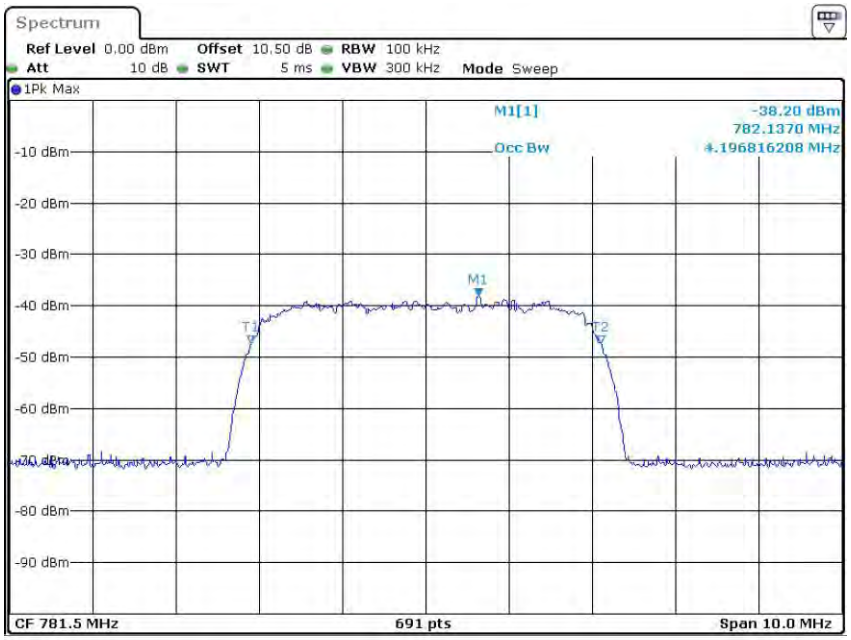
Date: 9.AUG.2022 11:49:46

Uplink, 781.5MHz-GSM (Output)



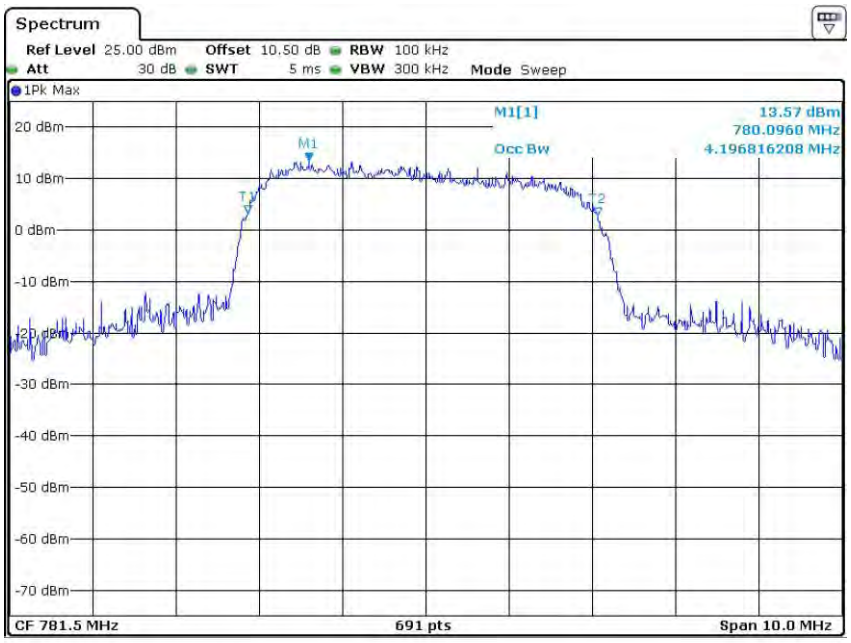
Date: 9.AUG.2022 10:16:25

Uplink, 781.5MHz-WCDMA (Input)



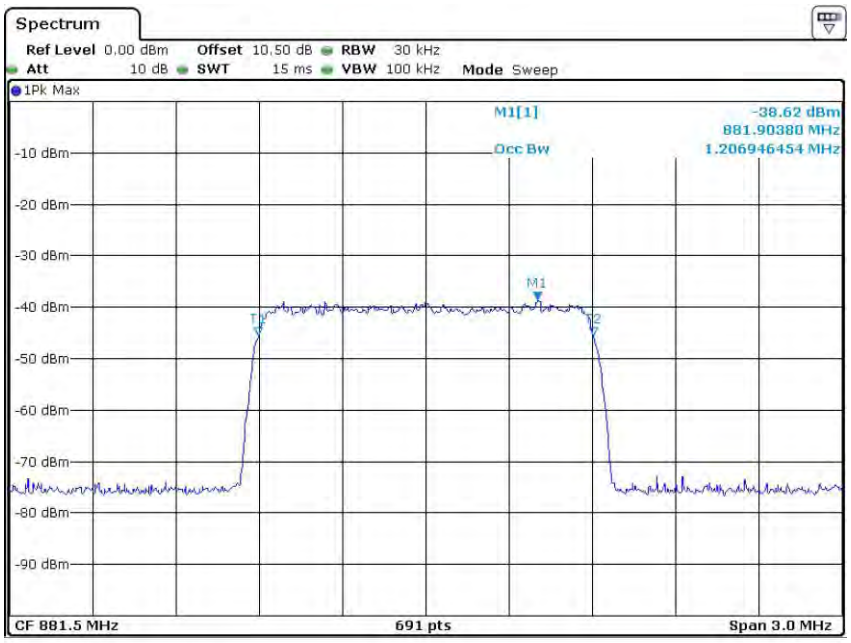
Date: 9.AUG.2022 11:39:13

Uplink, 781.5MHz-WCDMA (Output)



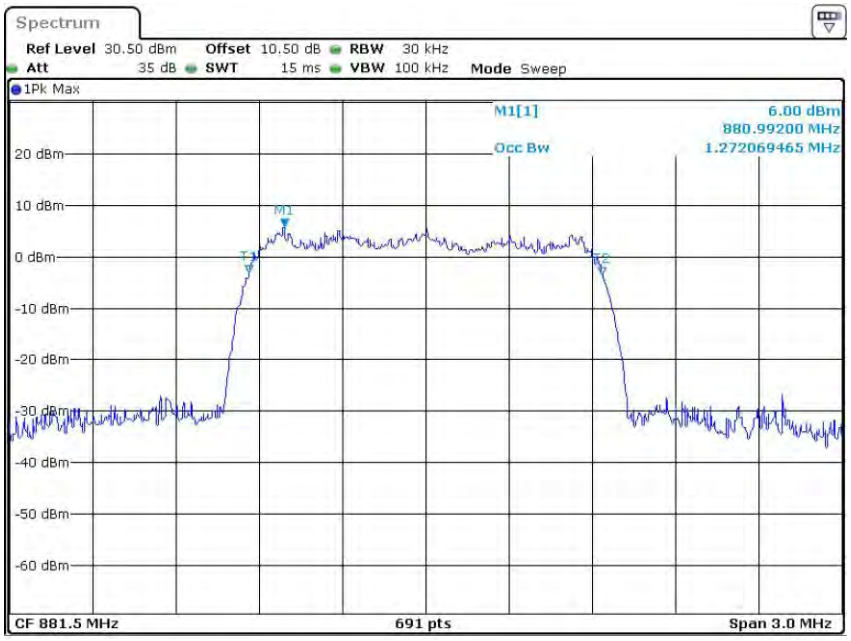
Date: 9.AUG.2022 10:14:06

Downlink, 881.5MHz-CDMA (Input)



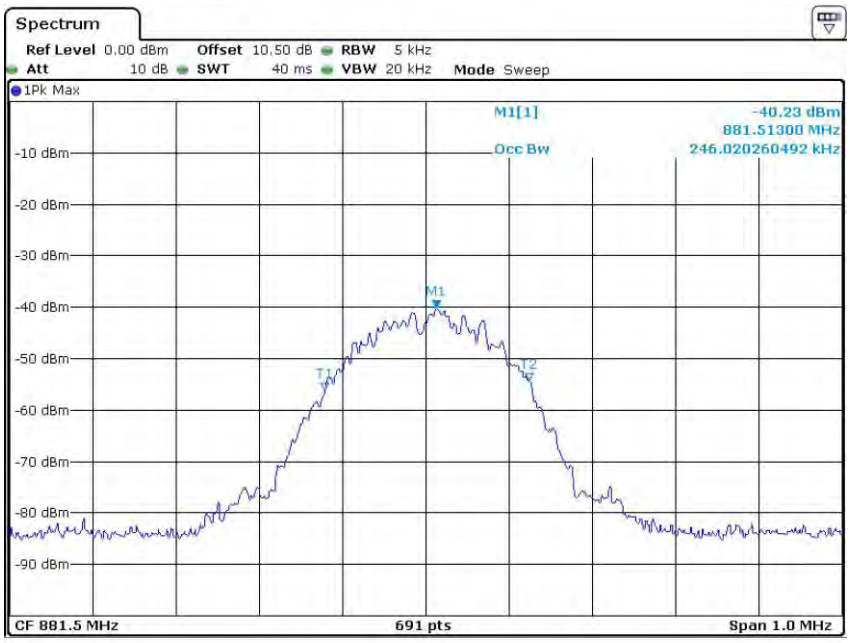
Date: 9.AUG.2022 13:15:25

Downlink, 881.5MHz-CDMA (Output)



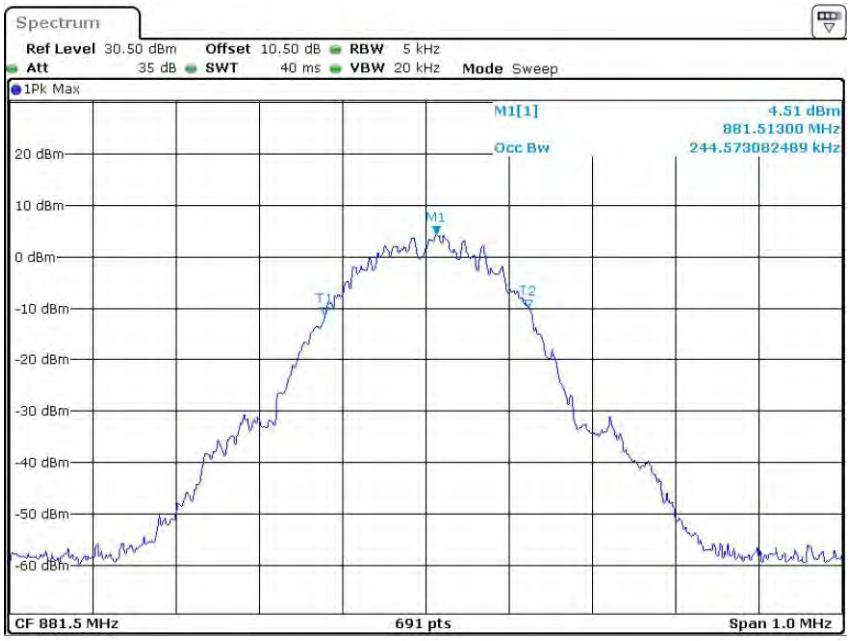
Date: 9.AUG.2022 14:13:54

Downlink, 881.5MHz-GSM (Input)



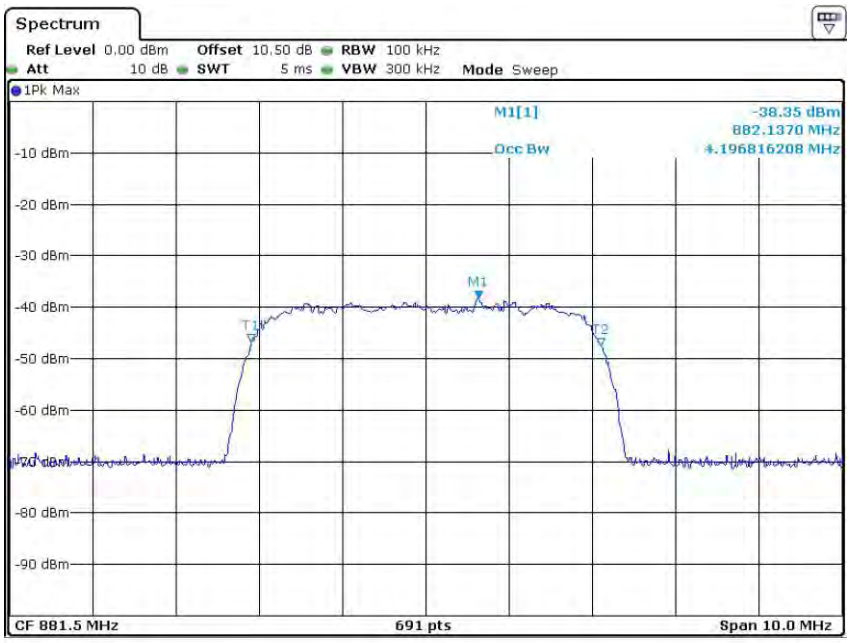
Date: 9.AUG.2022 13:16:59

Downlink, 881.5MHz-GSM (Output)



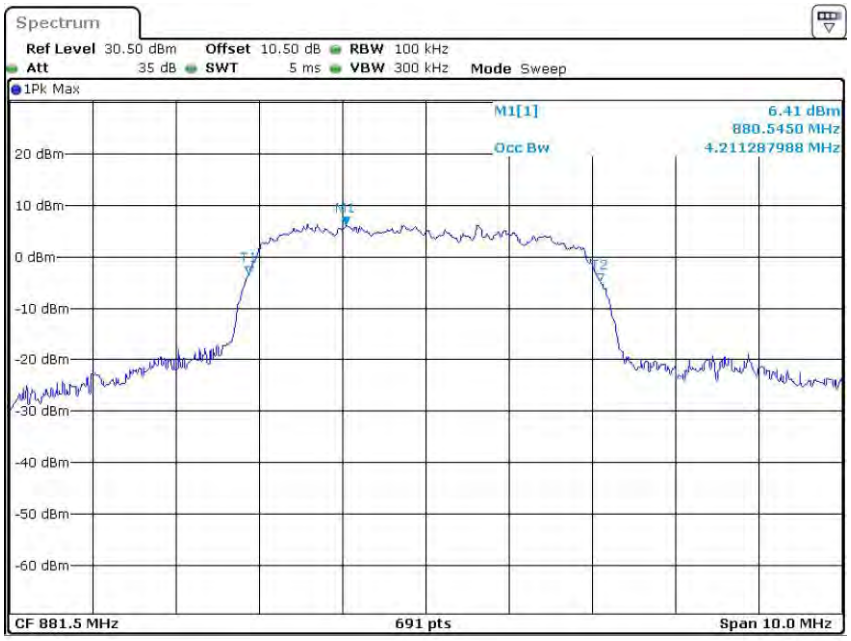
Date: 9.AUG.2022 14:16:02

Downlink, 881.5MHz-WCDMA (Input)



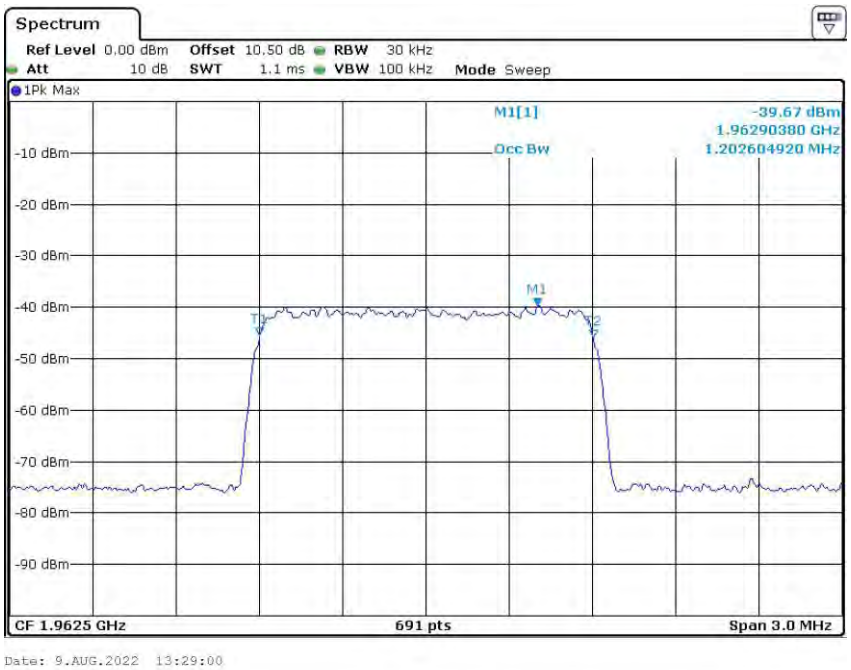
Date: 9.AUG.2022 13:13:43

Downlink, 881.5MHz-WCDMA (Output)



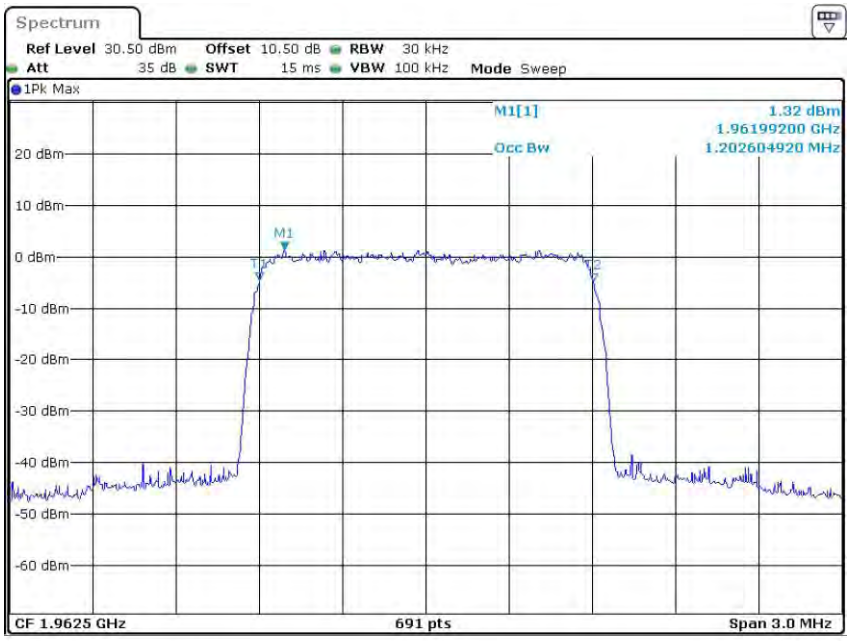
Date: 9.AUG.2022 14:19:03

Downlink, 1962.5MHz-CDMA (Input)



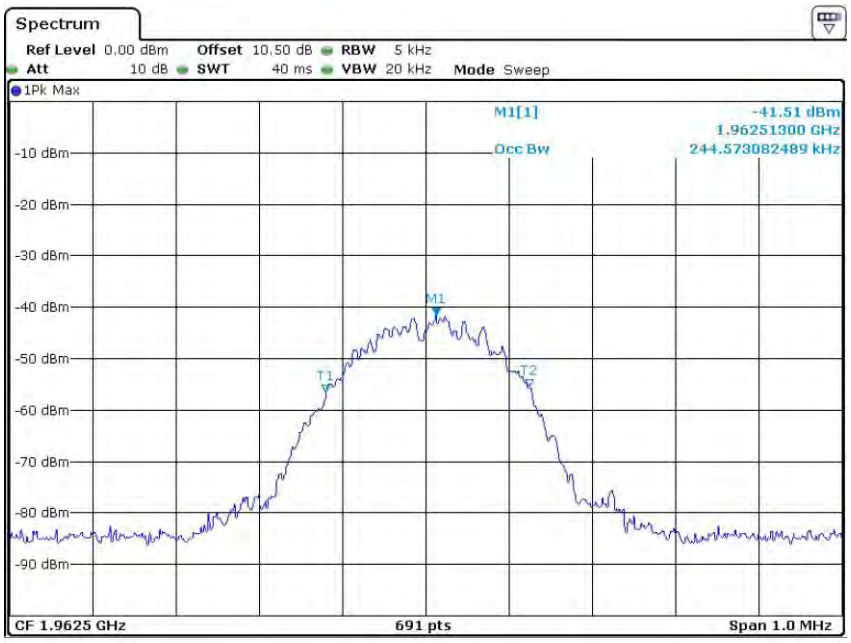
Date: 9.AUG.2022 13:29:00

Downlink, 1962.5MHz-CDMA (Output)



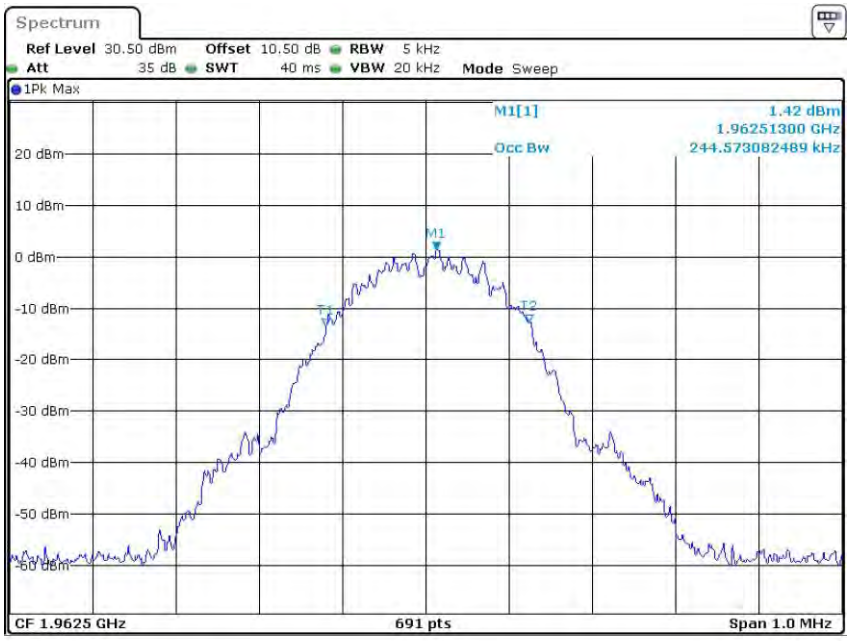
Date: 9.AUG.2022 14:46:50

Downlink, 1962.5MHz-GSM (Input)



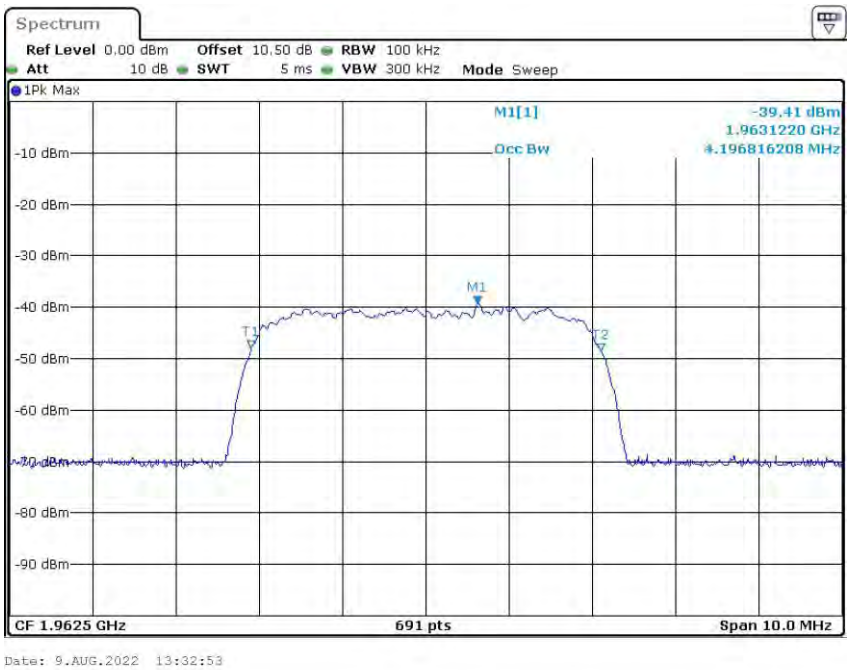
Date: 9.AUG.2022 13:26:05

Downlink, 1962.5MHz-GSM (Output)

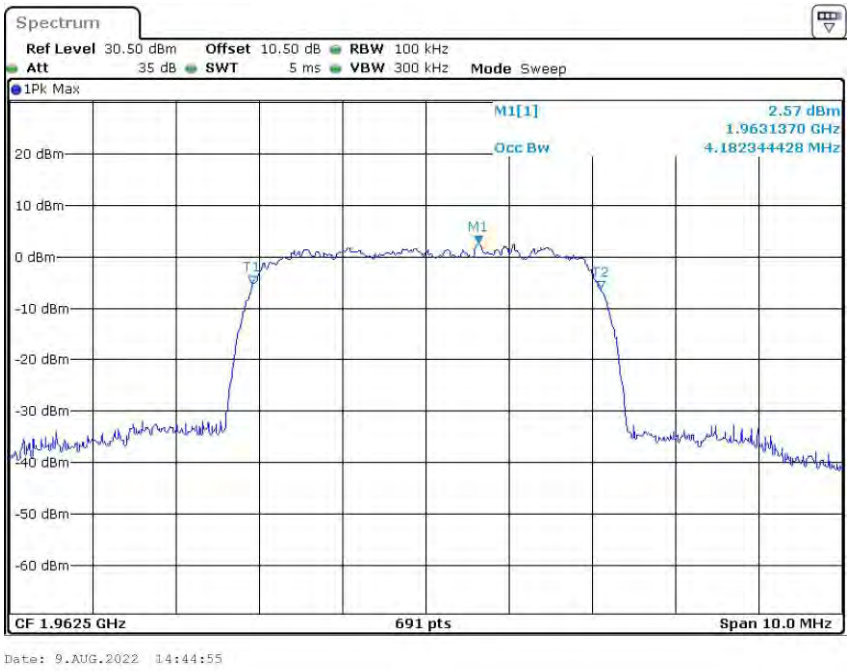


Date: 9.AUG.2022 14:48:23

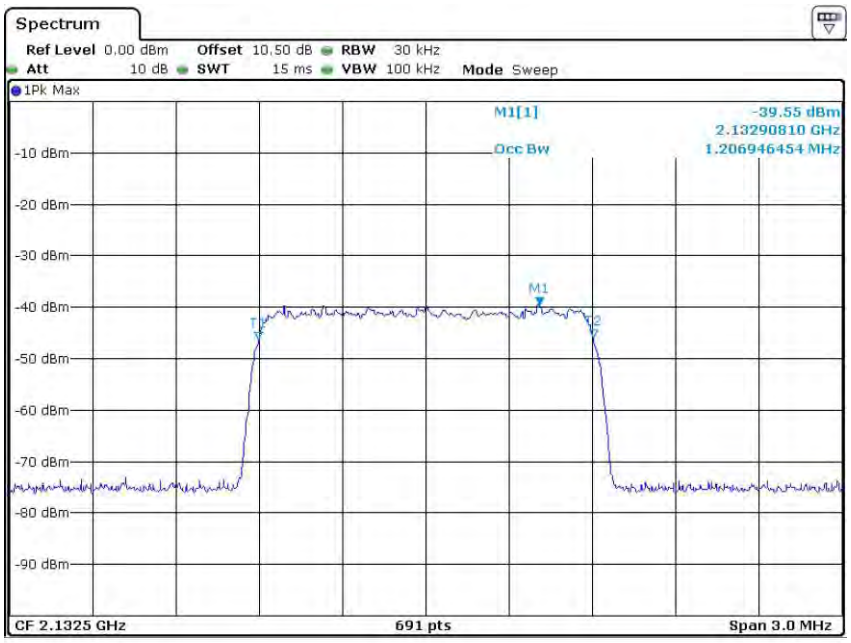
Downlink, 1962.5MHz-WCDMA (Input)



Downlink, 1962.5MHz-WCDMA (Output)

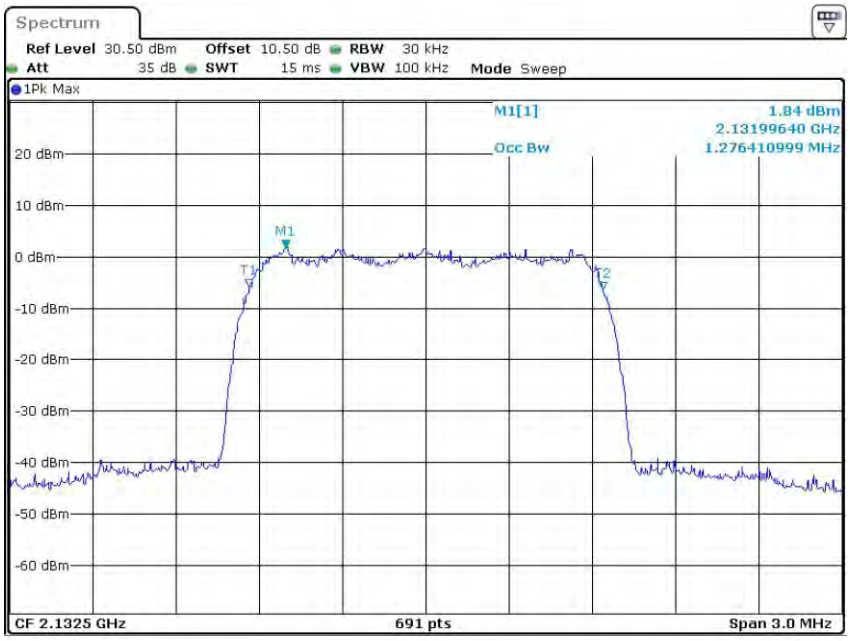


Downlink, 2132.5MHz-CDMA (Input)



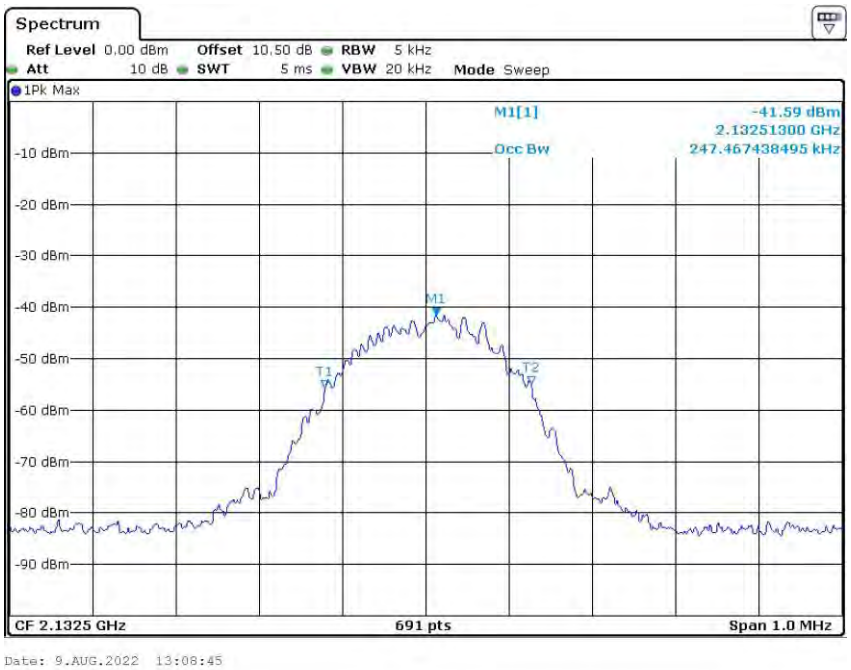
Date: 9.AUG.2022 13:10:59

Downlink, 2132.5MHz-CDMA (Output)



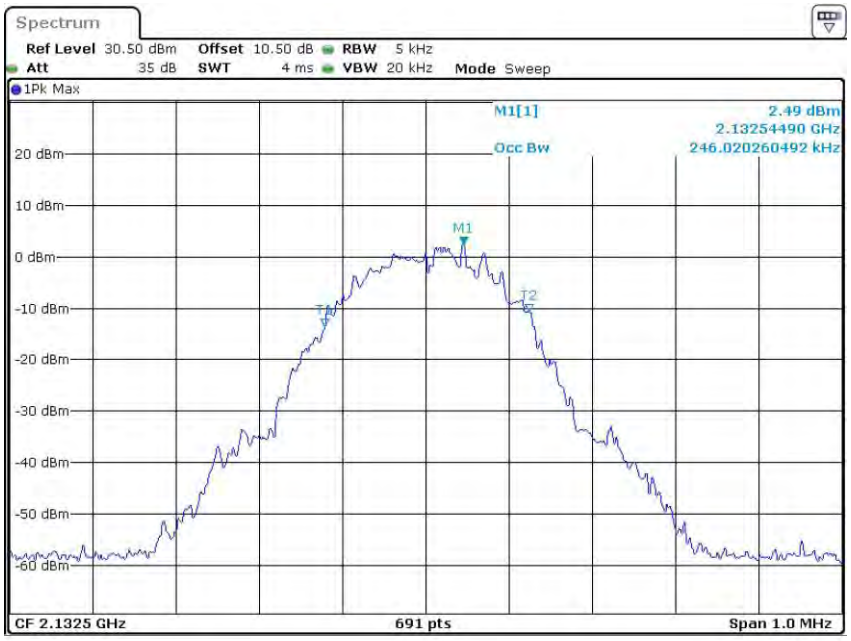
Date: 9.AUG.2022 14:10:32

Downlink, 2132.5MHz-GSM (Input)



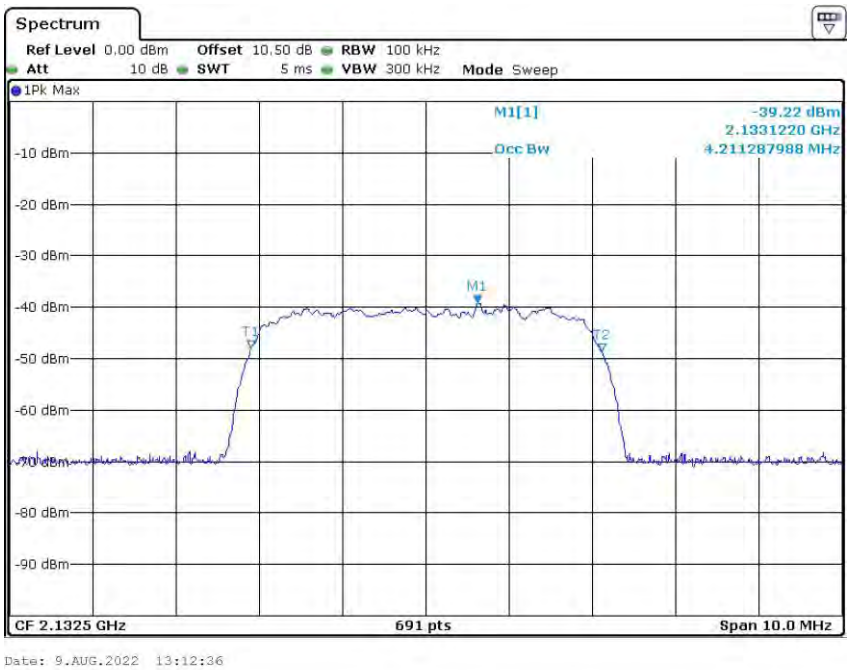
Date: 9.AUG.2022 13:08:45

Downlink, 2132.5MHz-GSM (Output)



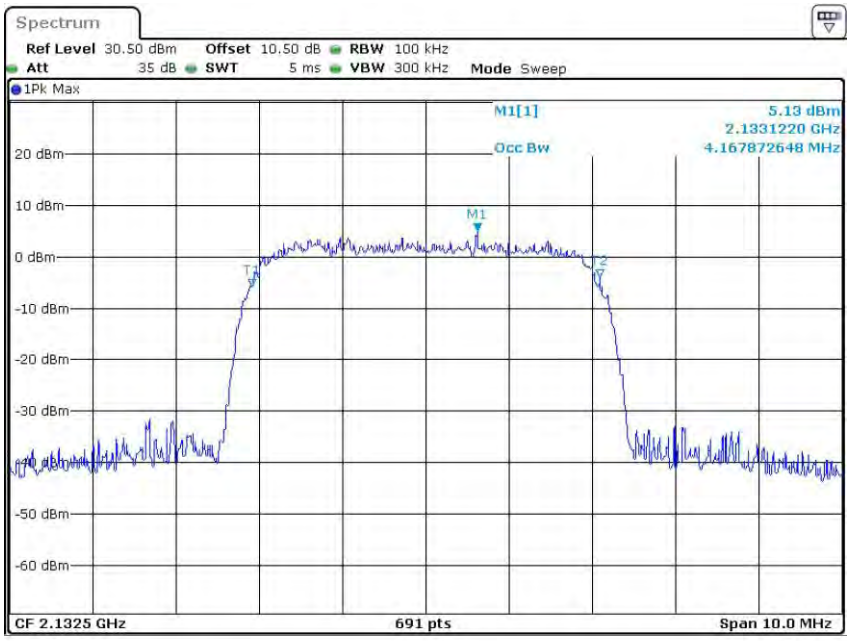
Date: 9.AUG.2022 13:59:46

Downlink, 2132.5MHz-WCDMA (Input)



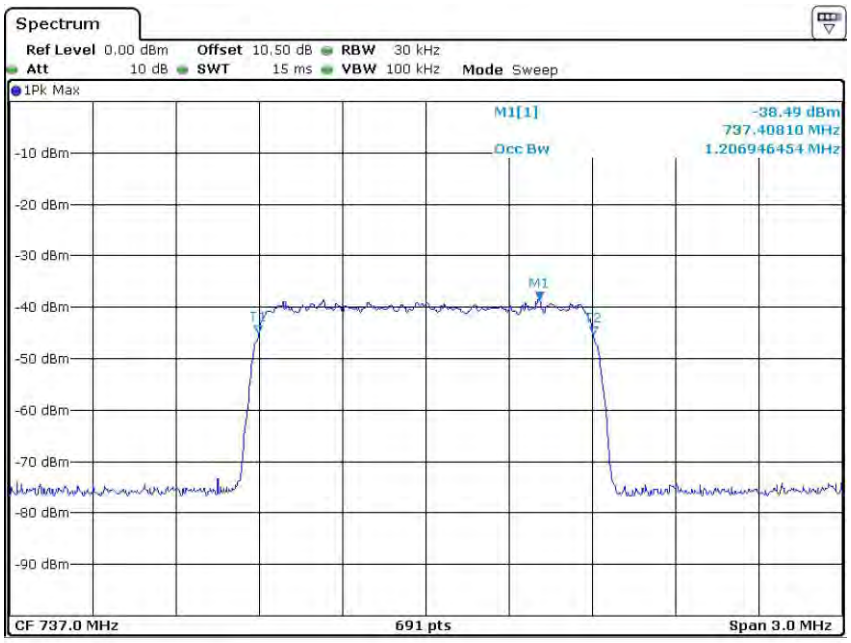
Date: 9.AUG.2022 13:12:36

Downlink, 2132.5MHz-WCDMA (Output)



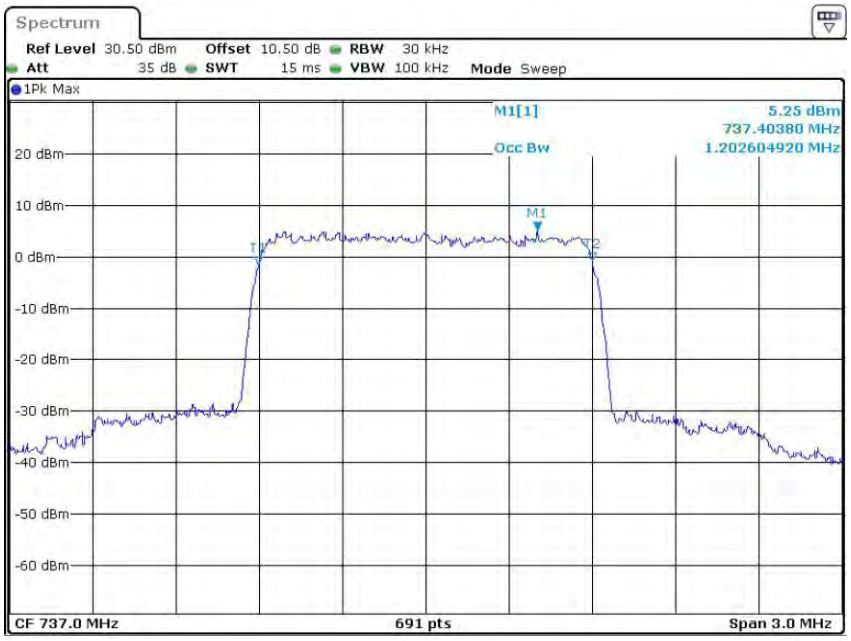
Date: 9.AUG.2022 13:58:28

Downlink, 737MHz-CDMA (Input)



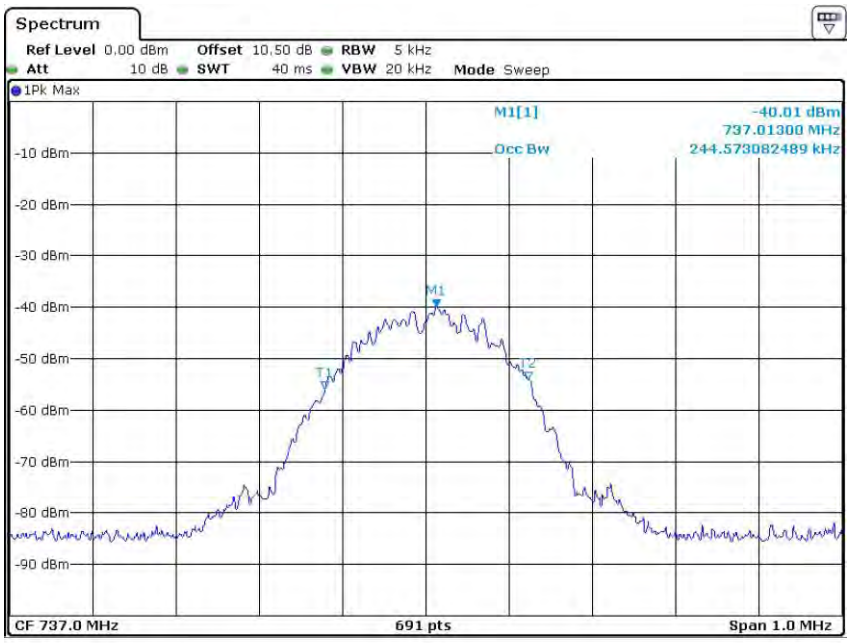
Date: 9.AUG.2022 13:19:57

Downlink, 737MHz-CDMA (Output)



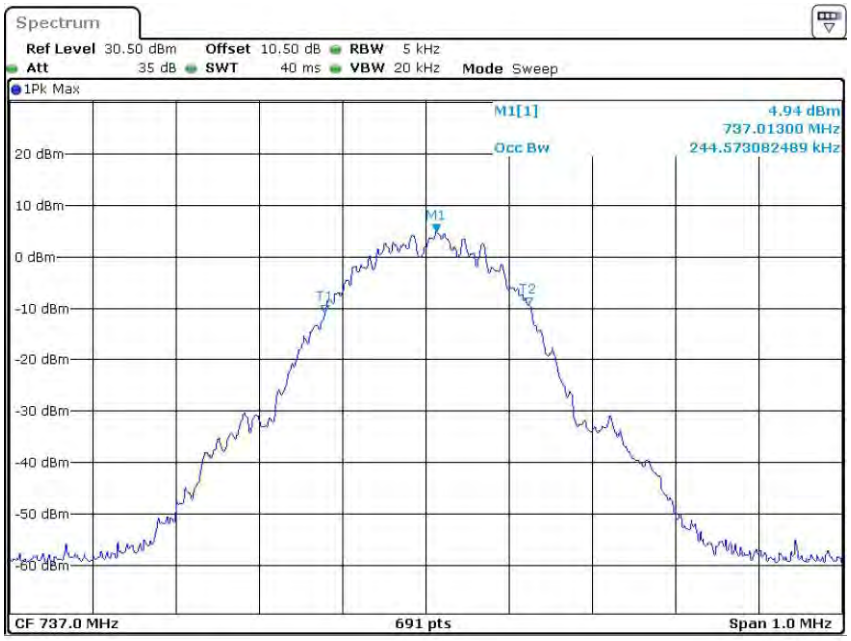
Date: 9.AUG.2022 14:24:47

Downlink, 737MHz-GSM (Input)



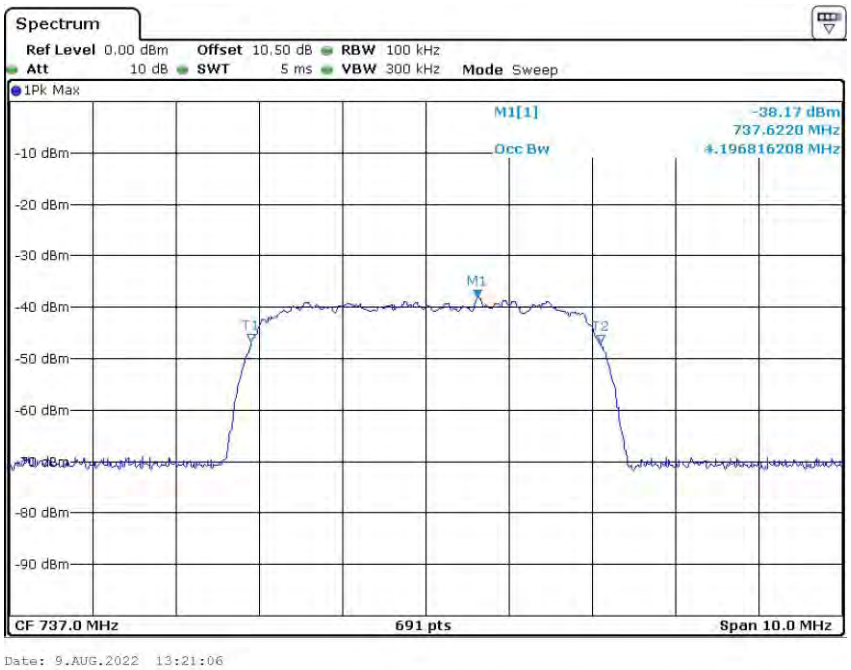
Date: 9.AUG.2022 13:18:17

Downlink, 737MHz-GSM (Output)

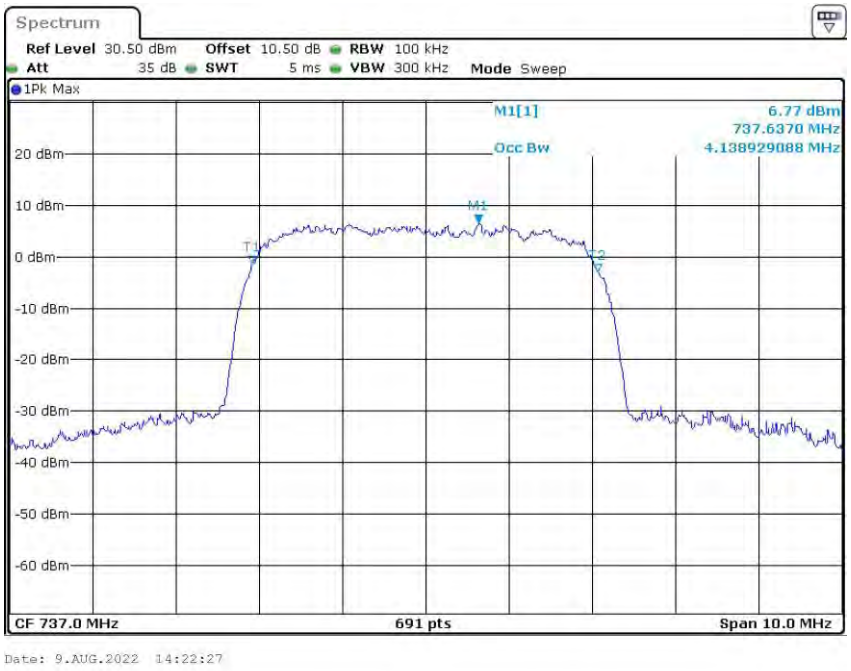


Date: 9.AUG.2022 14:26:43

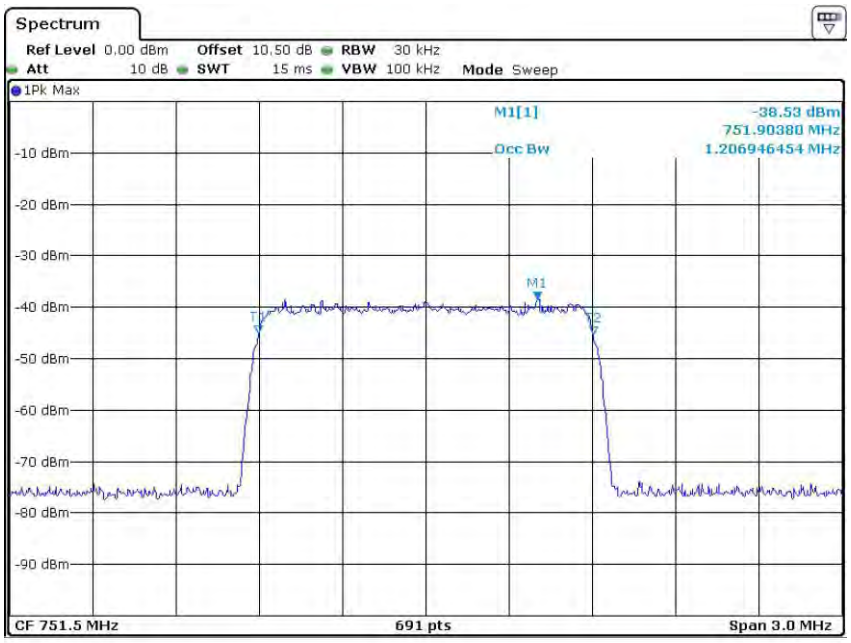
Downlink, 737MHz-WCDMA (Input)



Downlink, 737MHz-WCDMA (Output)

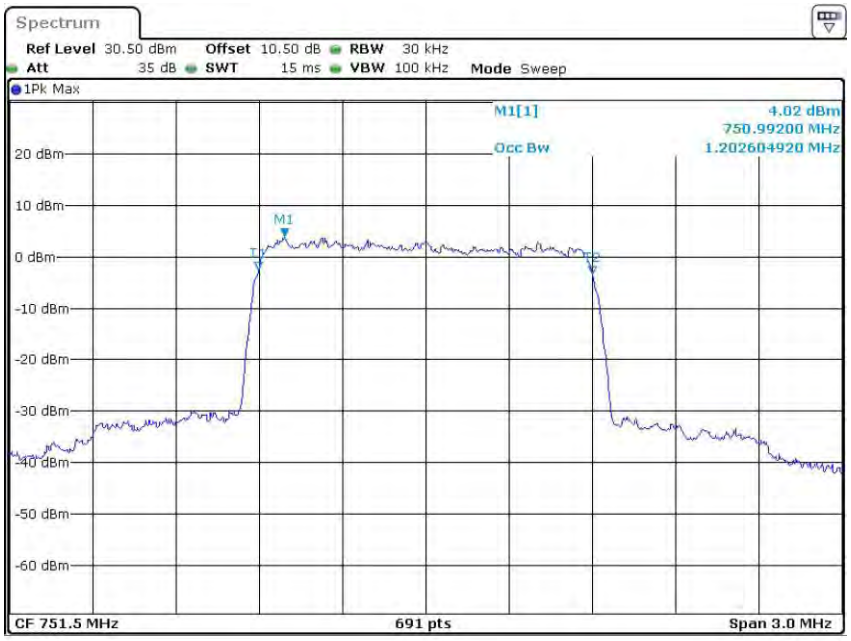


Downlink, 751.5MHz-CDMA (Input)



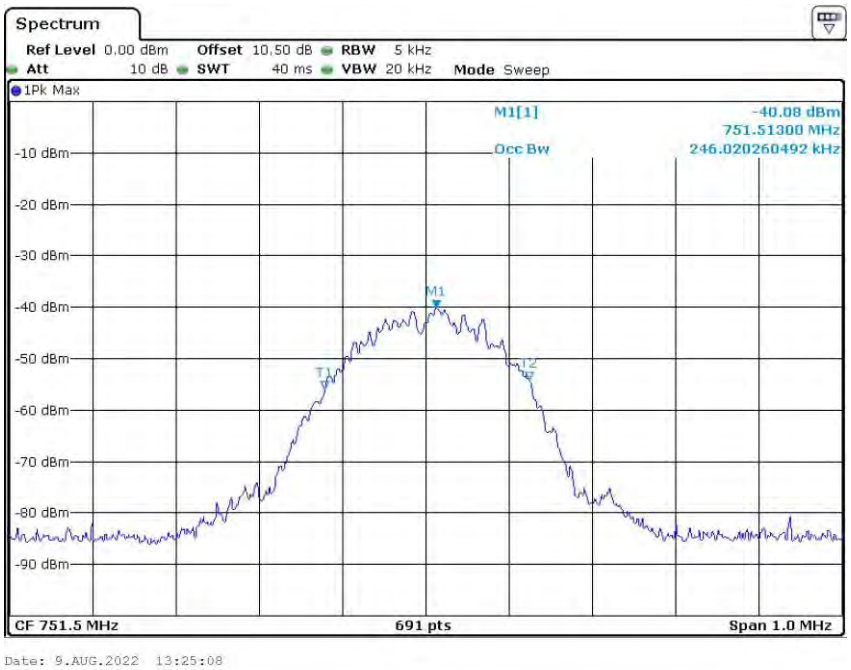
Date: 9.AUG.2022 13:24:04

Downlink, 751.5MHz-CDMA (Output)

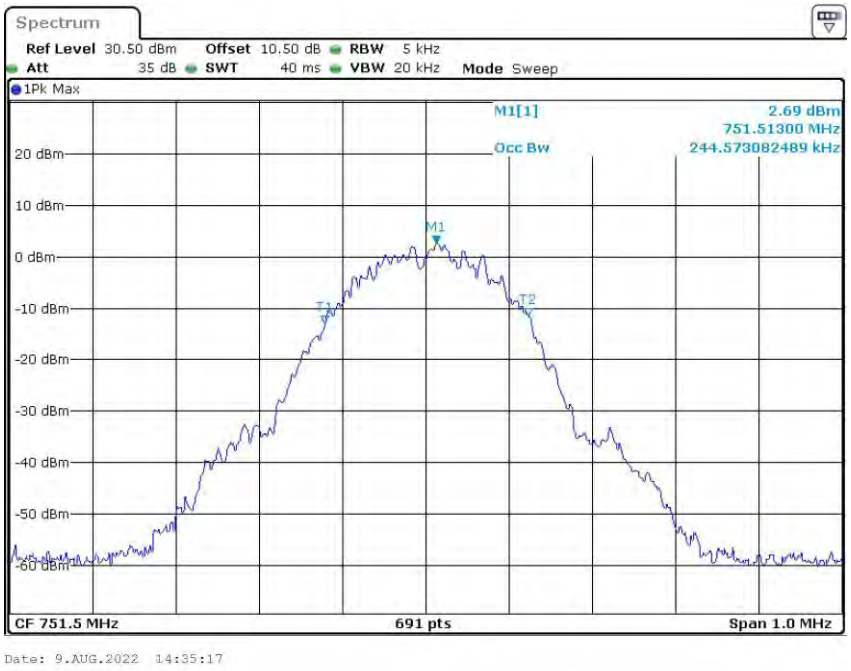


Date: 9.AUG.2022 14:37:22

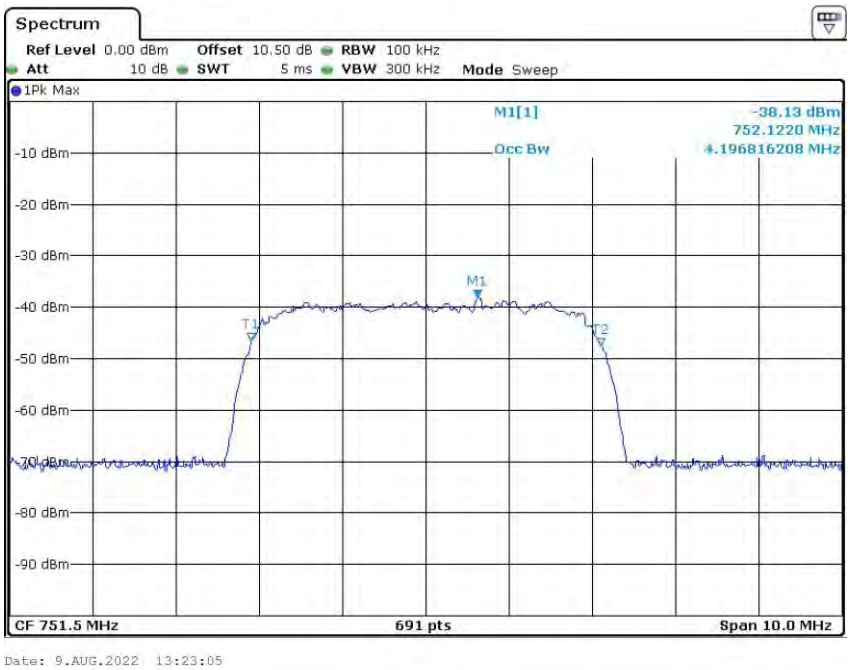
Downlink, 751.5MHz-GSM (Input)



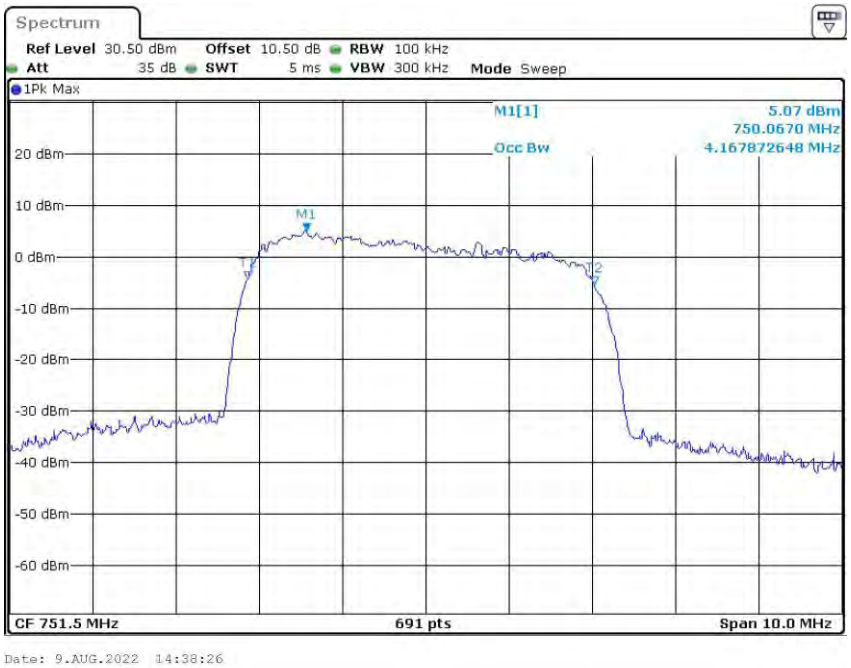
Downlink, 751.5MHz-GSM (Output)



Downlink, 751.5MHz-WCDMA (Input)



Downlink, 751.5MHz-WCDMA (Output)



§ 20.21(e)(8)(ii)(A) &§20.21(e)(4) - OSCILLATION DETECTION

Applicable Standards

Rule paragraph(s): § 20.21(e)(8)(ii)(A) Anti-Oscillation, §20.21(e)(4) Self-monitoring

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.

NOTE — Consumer boosters certified as direct connection mobile boosters having gain of less than or equal to 15 dB are exempt from compliance to testing procedures in 7.11.3 and 7.11.4.

Test Procedure

According to KDB 935210 D03 Signal Booster Measurements v04, §7.11.2 Oscillation restart tests and §7.11.3 Test procedure for measuring oscillation mitigation or shutdown

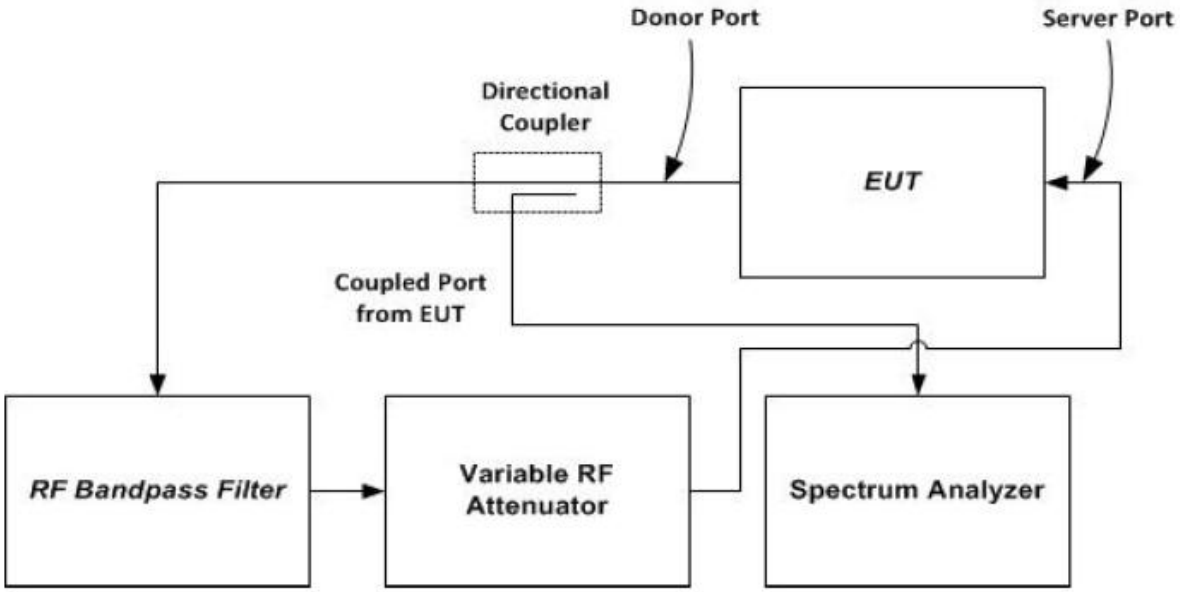


Figure 7 – Oscillation detection instrumentation test setup

Test Data

Environmental Conditions

Temperature:	24.6 ℃
Relative Humidity:	60 %
ATM Pressure:	101.0 kPa

The testing was performed by Andy Yu on 2022-08-16.

Test Result: Pass

Please refer to following table.

Oscillation Restart Time:

Mode	Operation Bands	Detection Time (s)		Power level	Between restart time (s)		Number of restart		Result
		Reading	Limit	dBm	Reading	Limit	Reading	Limit	
Uplink	Lower 700	0.196	0.3	16.65	61.74	60	3	5	Compliance
	Upper 700	0.085		15.39	62.17		3		Compliance
	Cellular	0.130		13.13	62.17		2		Compliance
	PCS	0.051		16.52	62.17		3		Compliance
	AWS	0.080		14.72	61.74		3		Compliance
Downlink	Lower 700	0.138	1	11.77	62.17		4		Compliance
	Upper 700	0.181		12.07	61.74		3		Compliance
	Cellular	0.145		10.33	62.17		3		Compliance
	PCS	0.101		8.55	62.17		3		Compliance
	AWS	0.058		4.54	61.74		3		Compliance

Oscillation Mitigation or Shutdown:

Mode	Operation Band	Max gain	Isolation	Difference	Limit	Result
		dB	dB	dB	dB	
Uplink	Lower 700MHz	62.90	+5	-8.46	12.00	Compliance
			+4	-9.54	12.00	Compliance
			+3	-10.93	12.00	Compliance
			+2	-11.36	12.00	Compliance
			+1	-12.53	12.00	Compliance
			+0	/	12.00	Compliance
			-1	/	12.00	Compliance
			-2	/	12.00	Compliance
			-3	/	12.00	Compliance
			-4	/	12.00	Compliance
			-5	/	12.00	Compliance
	Upper 700MHz	63.95	+5	-8.00	12.00	Compliance
			+4	-9.10	12.00	Compliance
			+3	-10.56	12.00	Compliance
			+2	-12.21	12.00	Compliance
			+1	/	12.00	Compliance
			+0	/	12.00	Compliance
			-1	/	12.00	Compliance
			-2	/	12.00	Compliance
			-3	/	12.00	Compliance
			-4	/	12.00	Compliance
			-5	/	12.00	Compliance
	Cellular	62.00	+5	-6.90	12.00	Compliance
			+4	-7.65	12.00	Compliance
			+3	-9.44	12.00	Compliance
			+2	-11.26	12.00	Compliance
			+1	-12.37	12.00	Compliance
			+0	/	12.00	Compliance
			-1	/	12.00	Compliance
			-2	/	12.00	Compliance
			-3	/	12.00	Compliance
			-4	/	12.00	Compliance
			-5	/	12.00	Compliance
	PCS	71.15	+5	-12.26	12.00	Compliance
			+4	/	12.00	Compliance
			+3	/	12.00	Compliance
			+2	/	12.00	Compliance
			+1	/	12.00	Compliance
			+0	/	12.00	Compliance
			-1	/	12.00	Compliance
			-2	/	12.00	Compliance
			-3	/	12.00	Compliance
			-4	/	12.00	Compliance
			-5	/	12.00	Compliance

Mode	Operation Band	Max gain	Isolation	Difference	Limit	Result
		dB	dB	dB	dB	
Uplink	AWS	70.14	+5	-7.11	12.00	Compliance
			+4	-8.30	12.00	Compliance
			+3	-9.94	12.00	Compliance
			+2	-10.97	12.00	Compliance
			+1	-12.02	12.00	Compliance
			+0	/	12.00	Compliance
			-1	/	12.00	Compliance
			-2	/	12.00	Compliance
			-3	/	12.00	Compliance
			-4	/	12.00	Compliance
			-5	/	12.00	Compliance
Downlink	Lower 700MHz	62.70	+5	-15.32	12.00	Compliance
			+4	/	12.00	Compliance
			+3	/	12.00	Compliance
			+2	/	12.00	Compliance
			+1	/	12.00	Compliance
			+0	/	12.00	Compliance
			-1	/	12.00	Compliance
			-2	/	12.00	Compliance
			-3	/	12.00	Compliance
			-4	/	12.00	Compliance
			-5	/	12.00	Compliance
	Upper 700MHz	64.33	+5	-8.63	12.00	Compliance
			+4	-10.52	12.00	Compliance
			+3	-13.26	12.00	Compliance
			+2	/	12.00	Compliance
			+1	/	12.00	Compliance
			+0	/	12.00	Compliance
			-1	/	12.00	Compliance
			-2	/	12.00	Compliance
			-3	/	12.00	Compliance
			-4	/	12.00	Compliance
			-5	/	12.00	Compliance
	Cellular	64.07	+5	-8.12	12.00	Compliance
			+4	-9.47	12.00	Compliance
			+3	-11.45	12.00	Compliance
			+2	-12.82	12.00	Compliance
			+1	/	12.00	Compliance
			+0	/	12.00	Compliance
			-1	/	12.00	Compliance
			-2	/	12.00	Compliance
			-3	/	12.00	Compliance
			-4	/	12.00	Compliance
			-5	/	12.00	Compliance

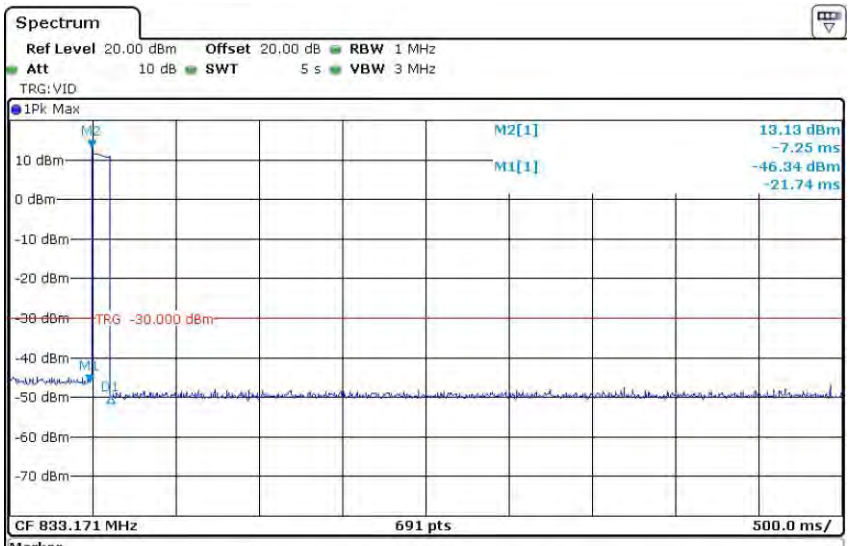
Mode	Operation Band	Max gain	Isolation	Difference	Limit	Result
		dB	dB	dB	dB	
Downlink	PCS	69.32	+5	-10.36	12.00	Compliance
			+4	-12.56	12.00	Compliance
			+3	/	12.00	Compliance
			+2	/	12.00	Compliance
			+1	/	12.00	Compliance
			+0	/	12.00	Compliance
			-1	/	12.00	Compliance
			-2	/	12.00	Compliance
			-3	/	12.00	Compliance
			-4	/	12.00	Compliance
			-5	/	12.00	Compliance
	AWS	71.17	+5	-7.57	12.00	Compliance
			+4	-8.11	12.00	Compliance
			+3	-9.35	12.00	Compliance
			+2	-10.22	12.00	Compliance
			+1	-11.34	12.00	Compliance
			+0	-12.25	12.00	Compliance
			-1	/	12.00	Compliance
			-2	/	12.00	Compliance
			-3	/	12.00	Compliance
			-4	/	12.00	Compliance
			-5	/	12.00	Compliance

Note: The mesured difference exceeds the limit for a period of less than 300 seconds before device mitigrate and shut down. The maximum recorded time prior to mitigate or shutdown was 96s

Oscillation Restart tests:

Uplink

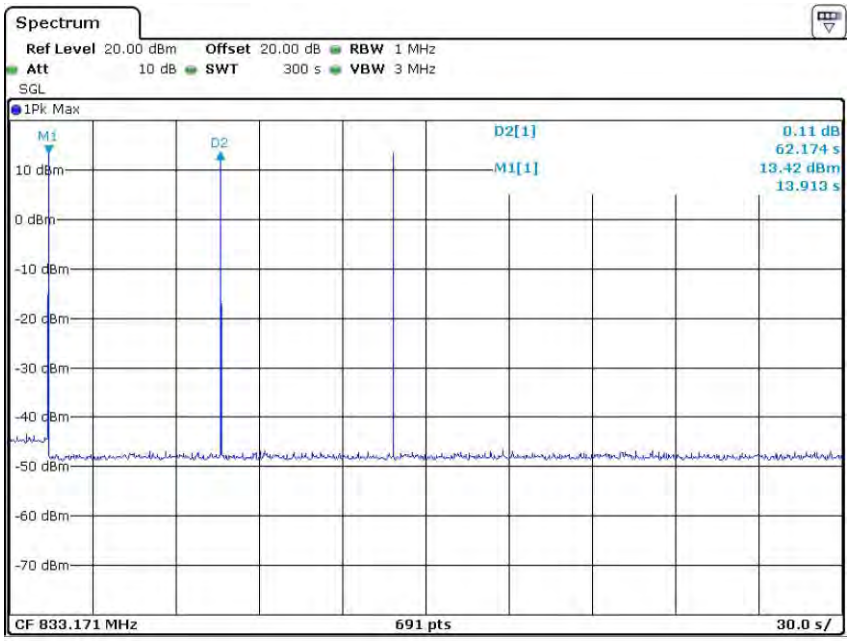
Cellular Band



Marker

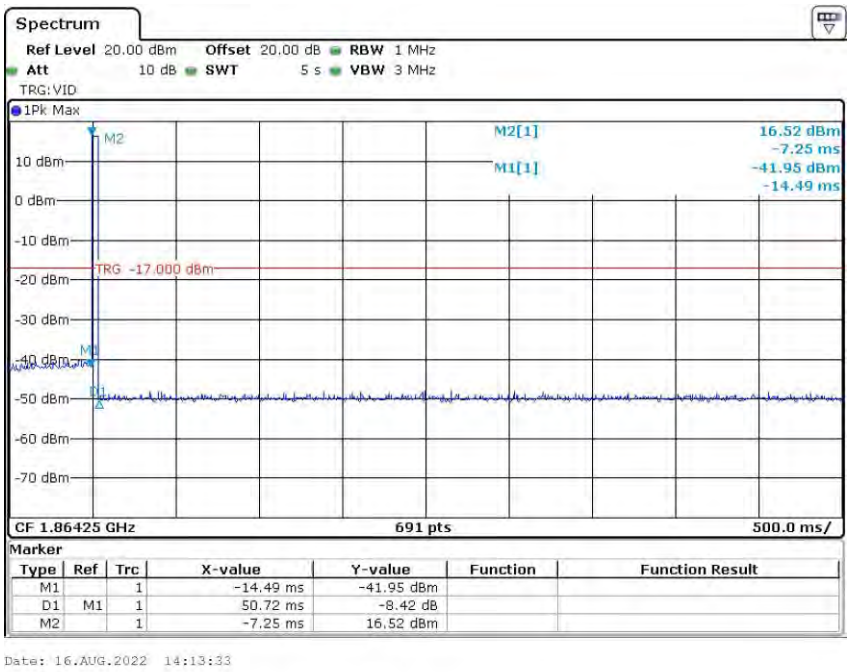
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	-21.74 ms	-46.34 dBm		
D1	M1	1	130.43 ms	-3.24 dB		
M2		1	-7.25 ms	13.13 dBm		

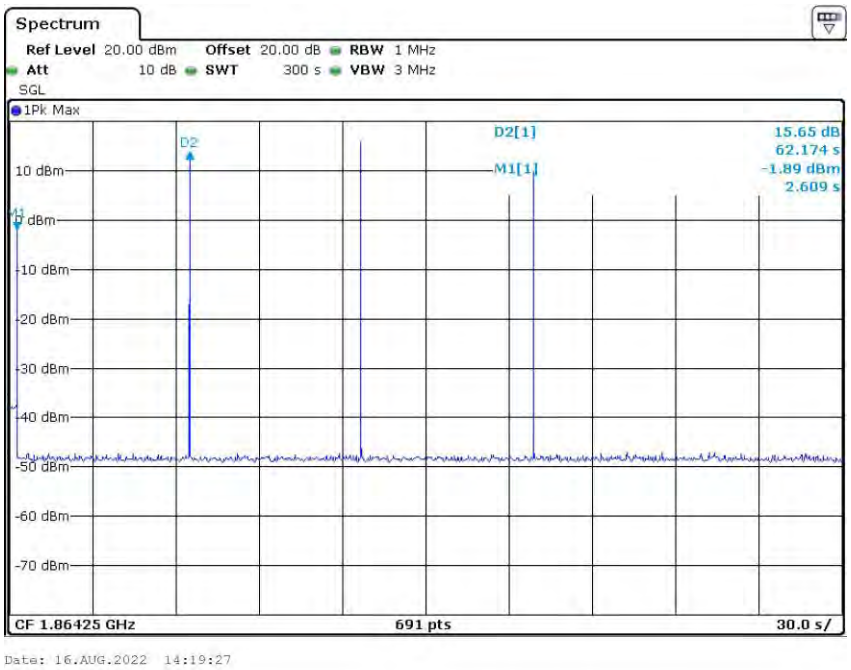
Date: 16.AUG.2022 13:27:42



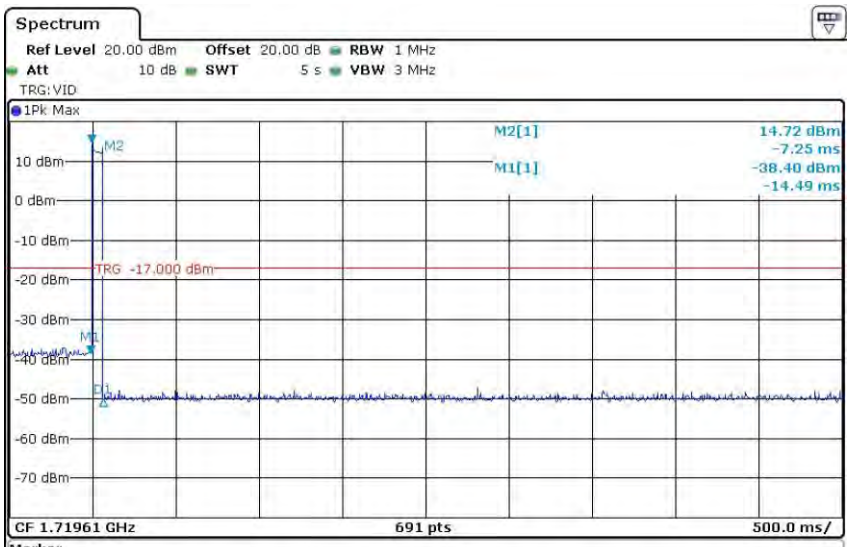
Date: 16.AUG.2022 13:40:59

PCS Band


Spectrum
Ref Level 20.00 dBm Offset 20.00 dB RBW 1 MHz
Att 10 dB SWT 5 s VBW 3 MHz
TRG:VID
1Pk Max
M2[1] 16.52 dBm
-7.25 ms
M1[1] -41.95 dBm
-14.49 ms
TRG -17.000 dBm
CF 1.86425 GHz 691 pts 500.0 ms/
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 -14.49 ms -41.95 dBm
D1 M1 1 50.72 ms -8.42 dB
M2 1 -7.25 ms 16.52 dBm
Date: 16.AUG.2022 14:13:33


Spectrum
Ref Level 20.00 dBm Offset 20.00 dB RBW 1 MHz
Att 10 dB SWT 300 s VBW 3 MHz
SGL
1Pk Max
D2[1] 15.65 dB
62.174 s
M1[1] -1.89 dBm
2.609 s
CF 1.86425 GHz 691 pts 30.0 s/
Date: 16.AUG.2022 14:19:27

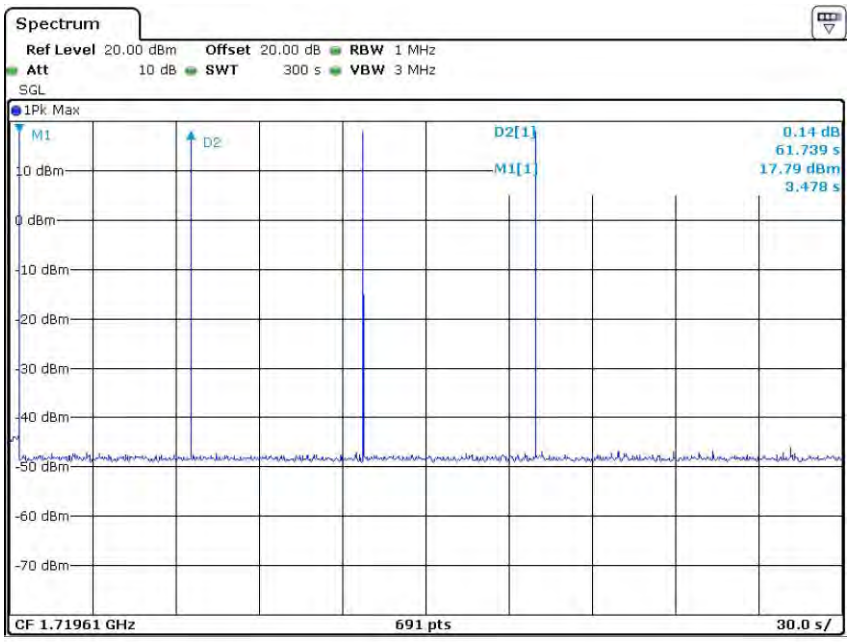
AWS Band



Marker

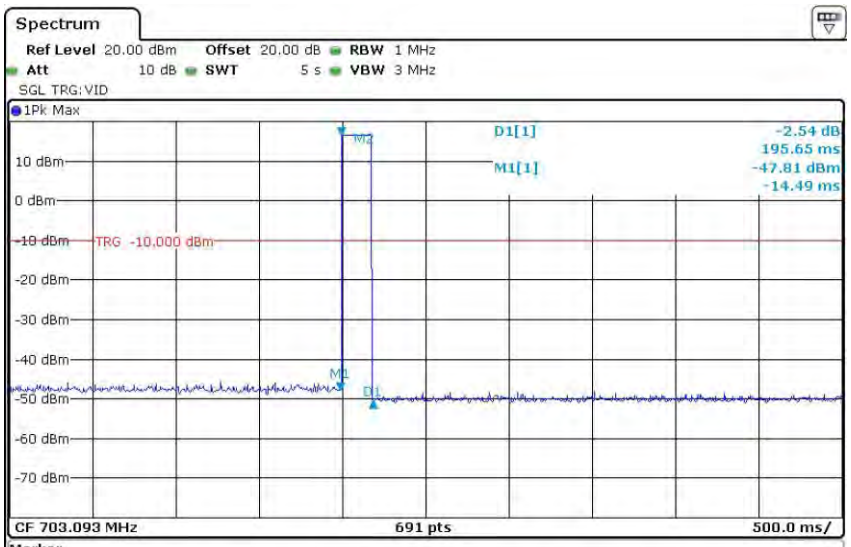
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	-14.49 ms	-38.40 dBm		
D1	M1	1	79.71 ms	-11.57 dB		
M2		1	-7.25 ms	14.72 dBm		

Date: 16.AUG.2022 13:45:26



Date: 16.AUG.2022 13:54:41

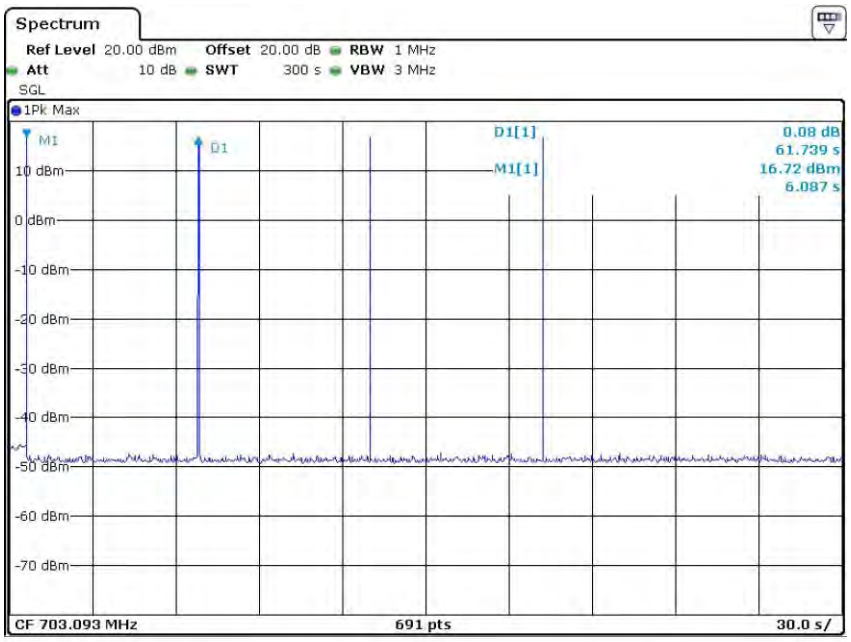
Lower 700MHz



Marker

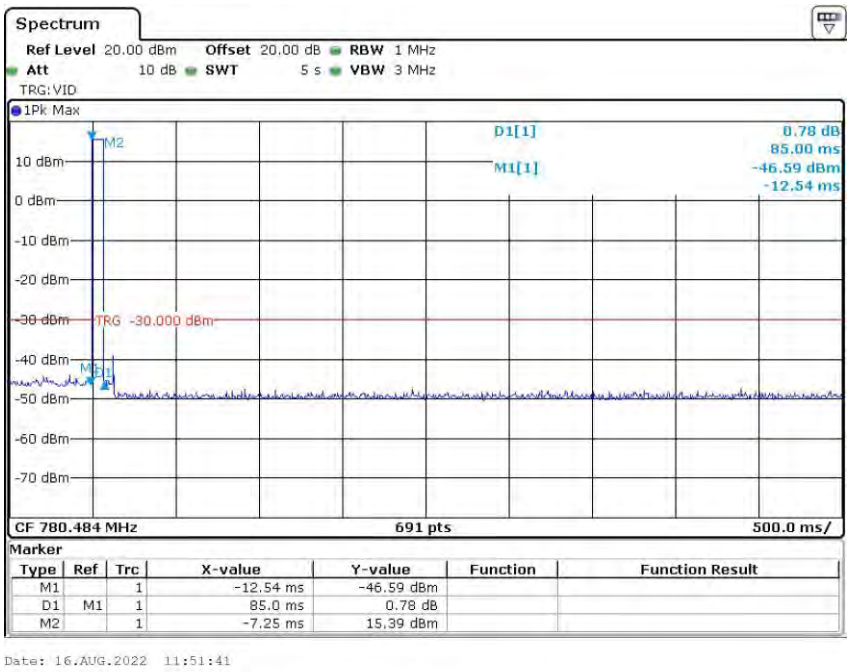
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	-14.49 ms	-47.81 dBm		
D1	M1	1	195.65 ms	-2.54 dB		
M2		1	-7.25 ms	16.65 dBm		

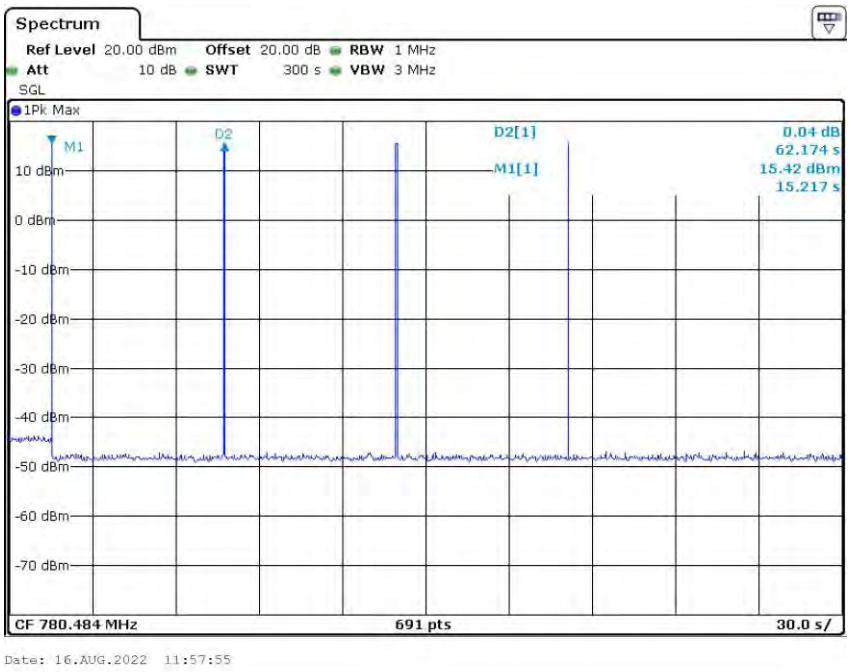
Date: 16.AUG.2022 10:44:49



Date: 16.AUG.2022 10:52:05

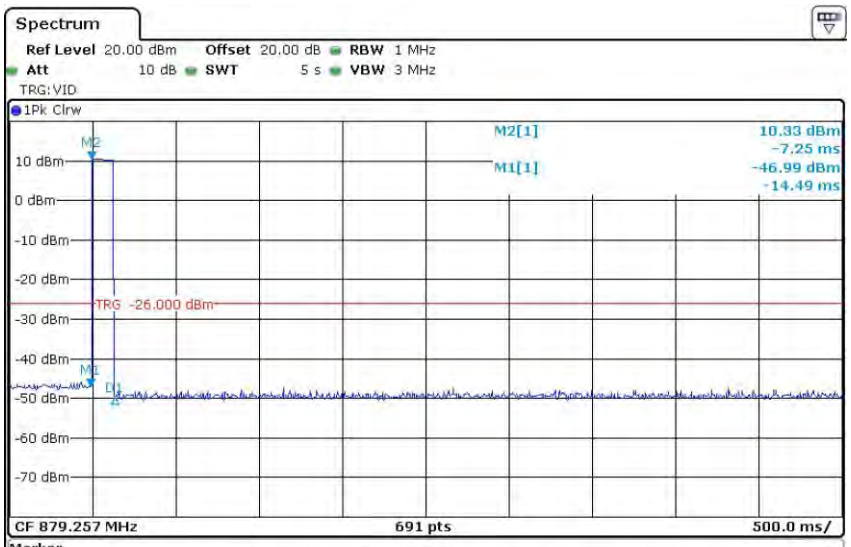
Upper 700MHz





Downlink

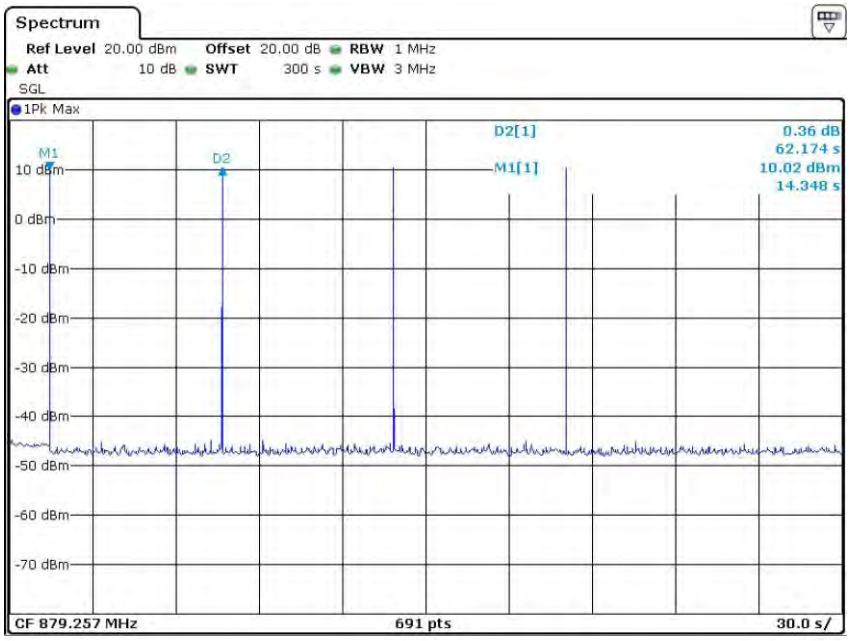
Cellular Band



Marker

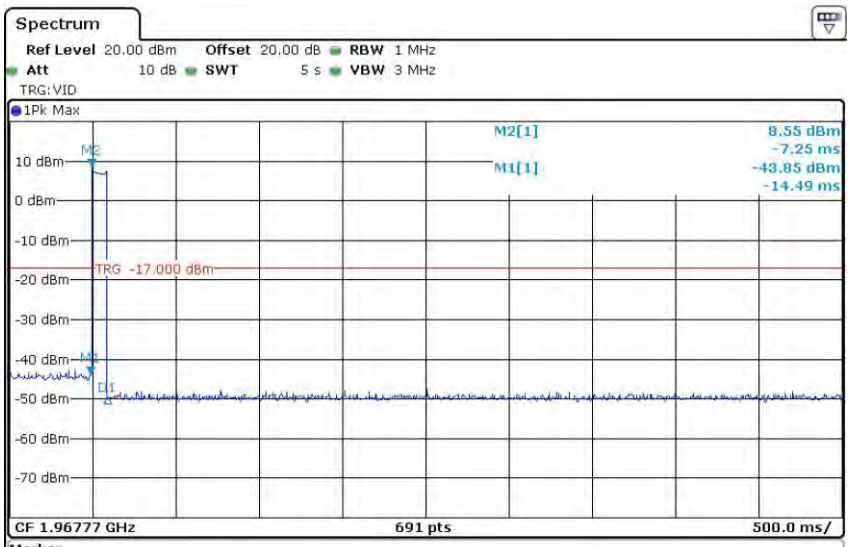
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	-14.49 ms	-46.99 dBm		
D1	M1	1	144.93 ms	-2.64 dB		
M2		1	-7.25 ms	10.33 dBm		

Date: 16.AUG.2022 15:03:47



Date: 16.AUG.2022 15:10:17

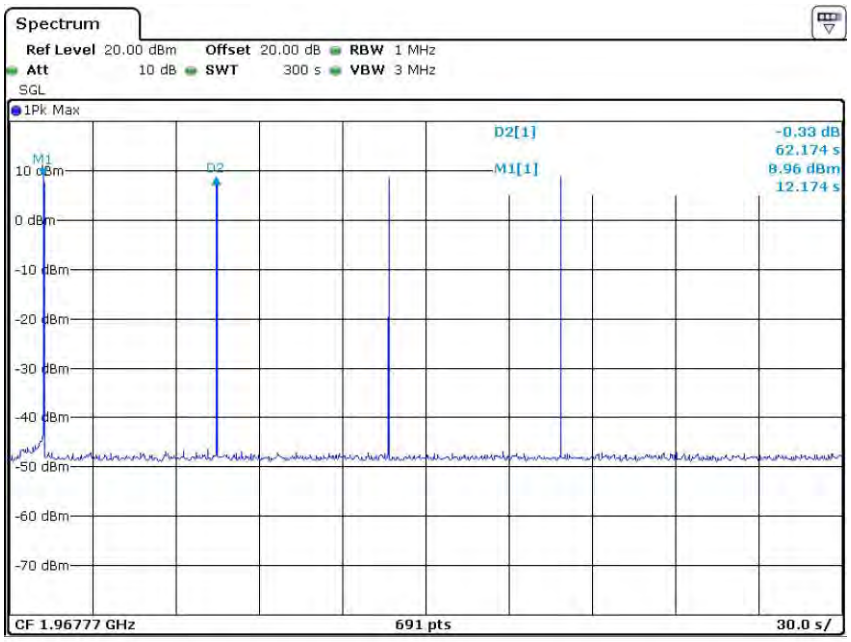
PCS Band



Marker

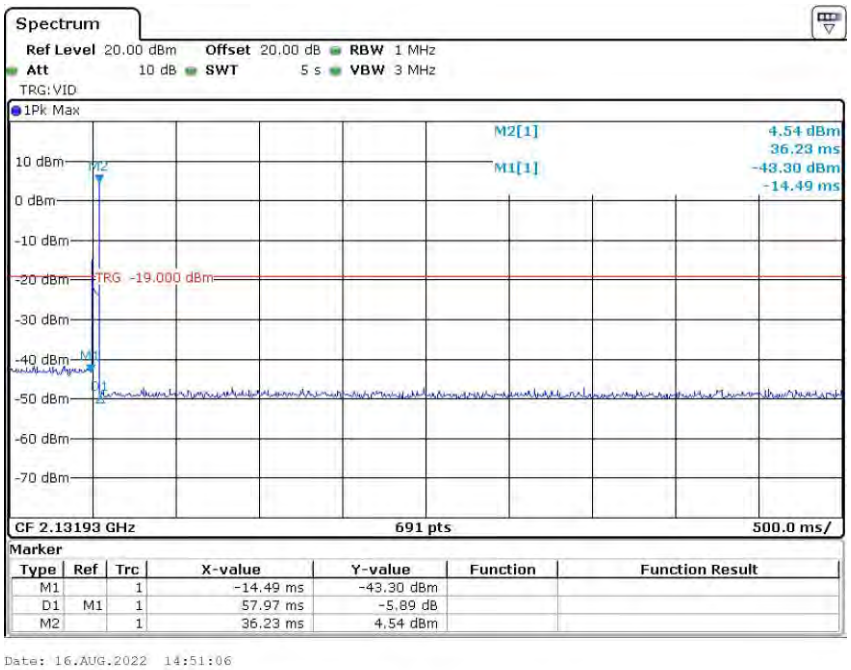
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	-14.49 ms	-43.85 dBm		
D1	M1	1	101.45 ms	-5.51 dB		
M2		1	-7.25 ms	8.55 dBm		

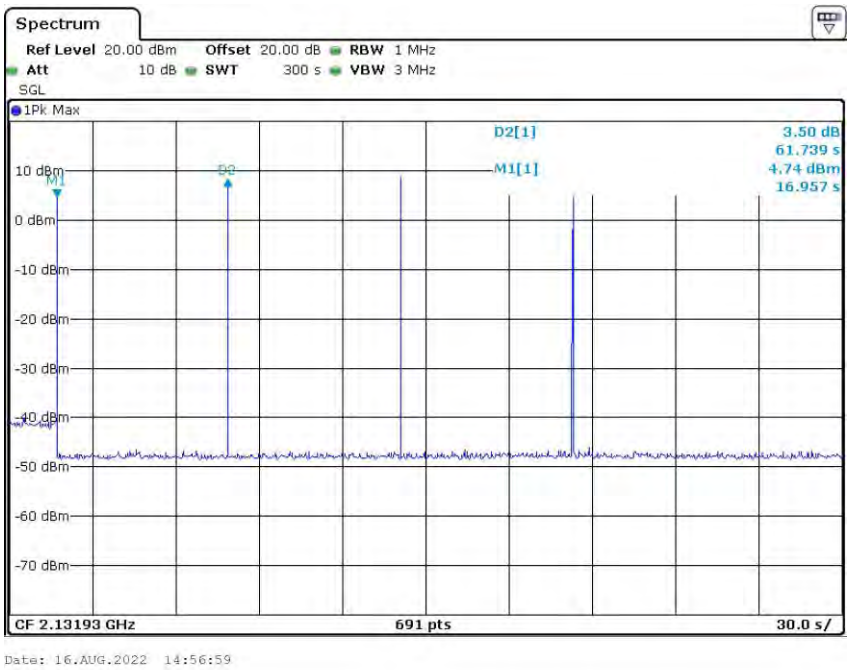
Date: 16.AUG.2022 14:24:42



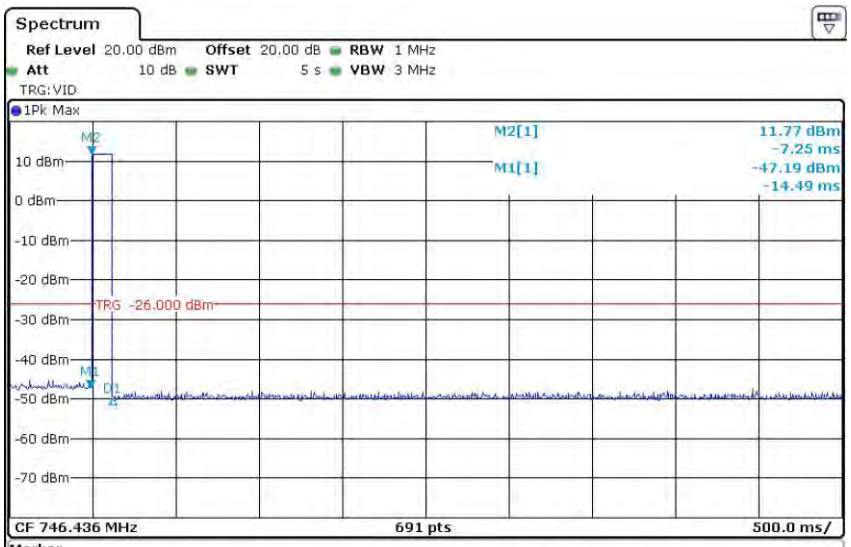
Date: 16.AUG.2022 14:31:13

AWS Band


Spectrum
Ref Level 20.00 dBm Offset 20.00 dB RBW 1 MHz
Att 10 dB SWT 5 s VBW 3 MHz
TRG:VID
1Pk Max
M2[1] 4.54 dBm 36.23 ms
M1[1] -43.30 dBm -14.49 ms
10 dBm
0 dBm
-10 dBm
-20 dBm
TRG -19.000 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.13193 GHz 691 pts 500.0 ms/
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 -14.49 ms -43.30 dBm
D1 M1 1 57.97 ms -5.89 dB
M2 1 36.23 ms 4.54 dBm
Date: 16.AUG.2022 14:51:06


Spectrum
Ref Level 20.00 dBm Offset 20.00 dB RBW 1 MHz
Att 10 dB SWT 300 s VBW 3 MHz
SGL
1Pk Max
D2[1] 3.50 dB 61.739 s
M1[1] 4.74 dBm 16.957 s
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.13193 GHz 691 pts 30.0 s/
Date: 16.AUG.2022 14:56:59

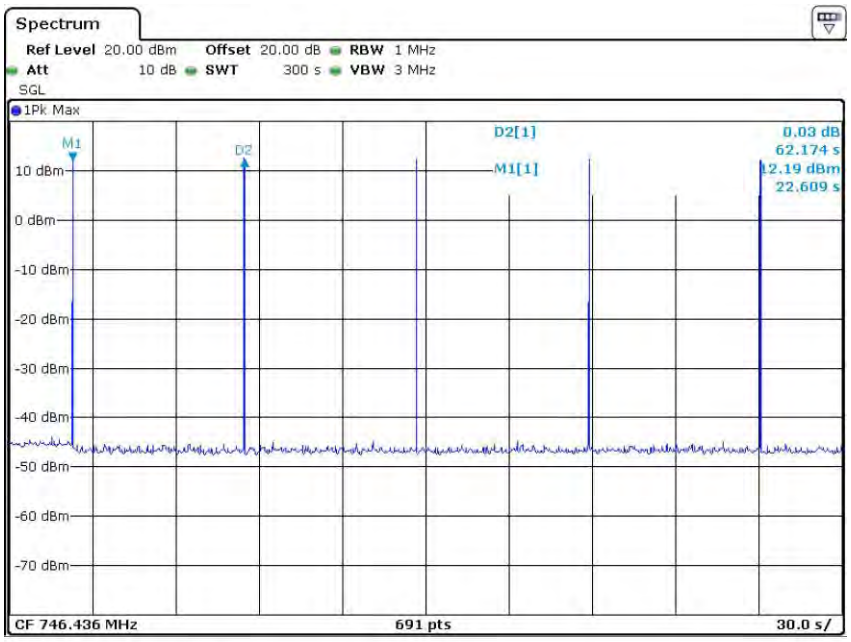
Lower 700MHz



Marker

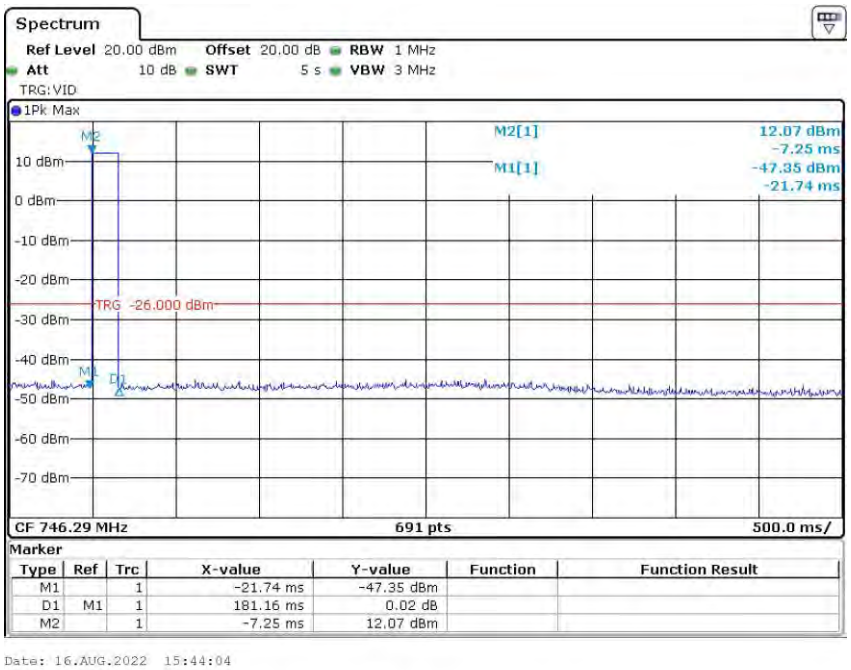
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	-14.49 ms	-47.19 dBm		
D1	M1	1	137.68 ms	-2.49 dB		
M2		1	-7.25 ms	11.77 dBm		

Date: 16.AUG.2022 15:58:29



Date: 16.AUG.2022 16:05:06

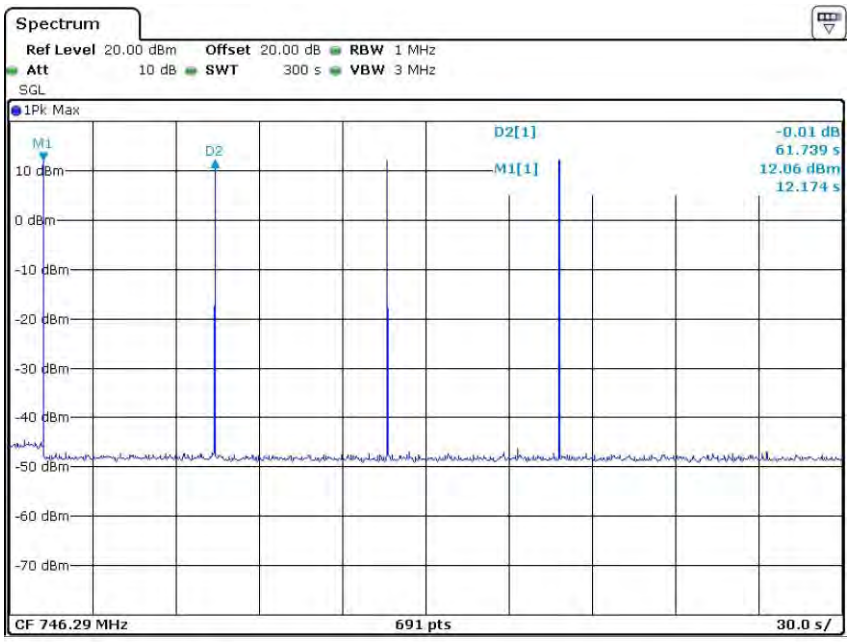
Upper 700MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	-21.74 ms	-47.35 dBm		
D1	M1	1	181.16 ms	0.02 dB		
M2		1	-7.25 ms	12.07 dBm		

Date: 16.AUG.2022 15:44:04



Date: 16.AUG.2022 15:51:47

§2.1051- SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standards

FCC §2.1051 *Measurements required: Spurious emissions at antenna terminals.*

§20.21(e)(8)(i)(E): Booster out of band emissions (OOBE) shall be at least 6 dB below the FCC's mobile emission limits for the supported bands of operation. Compliance to OOBE limits will utilize high peak-to-average CMRS signal types.

§22.917 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

§24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

§27.53: the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

Test Procedure

The following procedures shall be used to demonstrate compliance to the applicable conducted spurious emissions limits as per § 2.1051.

Note: *For frequencies below 1 GHz, an RBW of 1 MHz may be used in a preliminary measurement. If non-compliant emissions are detected, a final measurement shall be made with a 100 kHz RBW. Additionally, a peak detector may also be used for the preliminary measurement. If non-compliant emissions are detected then a final measurement of these emissions shall be made with the power averaging (RMS) detector.*

a) Connect the EUT to the test equipment as shown in **Figure 1**. Begin with the uplink output connected to the spectrum analyzer.
b) Configure the signal generator for AWGN with a 99% occupied bandwidth of 4.1 MHz with a center frequency corresponding to the center of the CMRS band under test.
c) Set the signal generator amplitude to the level determined in the power measurement procedure in 7.2.
d) Turn on the signal generator RF output and measure the spurious emission power levels with an appropriate measurement instrument as follows.
1) 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.
2) Set VBW = 3 × RBW.
3) Select the power averaging (RMS) detector. (See above note regarding the use of a peak detector for preliminary measurements.)
4) Sweep time = auto-couple.
5) Set the analyzer start frequency to the lowest radio frequency signal generated in the equipment, without going below 9 kHz, and the stop frequency to the lower band/block edge frequency minus 100 kHz or 1 MHz, as specified in the applicable rule part. Note that the number of measurement points in each sweep

must be ≥ (2 × span/RBW) which may require that the measurement range defined by the 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.
6) Use the peak marker function to identify the highest amplitude level over each measured frequency range. Record the frequency and amplitude and capture a plot for inclusion in the test report.
7) 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 × the highest frequency of the fundamental emission. Note that the number of measurement points in each sweep must be ≥ (2 × span/RBW) which may require that the measurement range defined by the start and stop frequencies above be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.
8) Use the peak marker function to identify the highest amplitude level over each of the measured frequency ranges. Record the frequency and amplitude and capture a plot for inclusion in the test report.
e) Repeat 7.6b) through 7.6d) for each supported frequency band of operation.

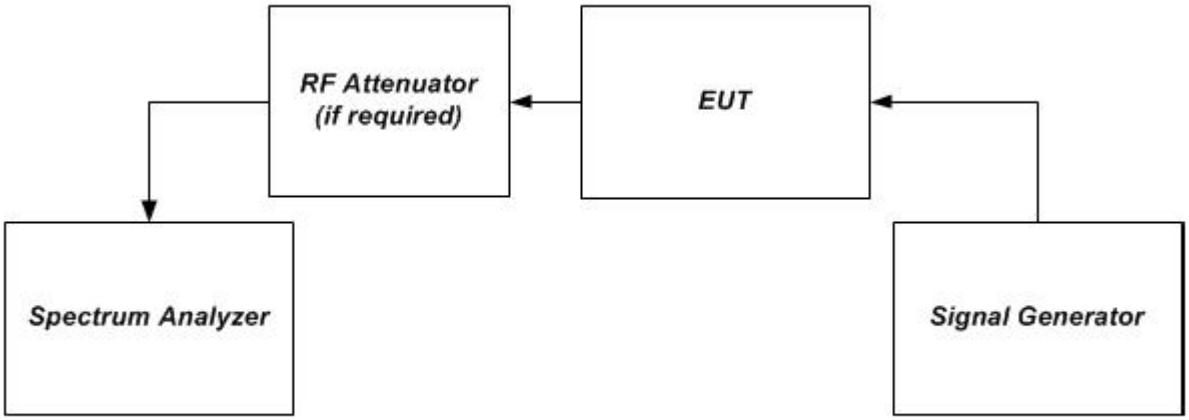


Figure 1 – Band verification test instrumentation setup

Test Data

Environmental Conditions

Temperature:	25.3 ℃
Relative Humidity:	57 %
ATM Pressure:	101.0 kPa

The testing was performed by Andy Yu on 2022-08-10.

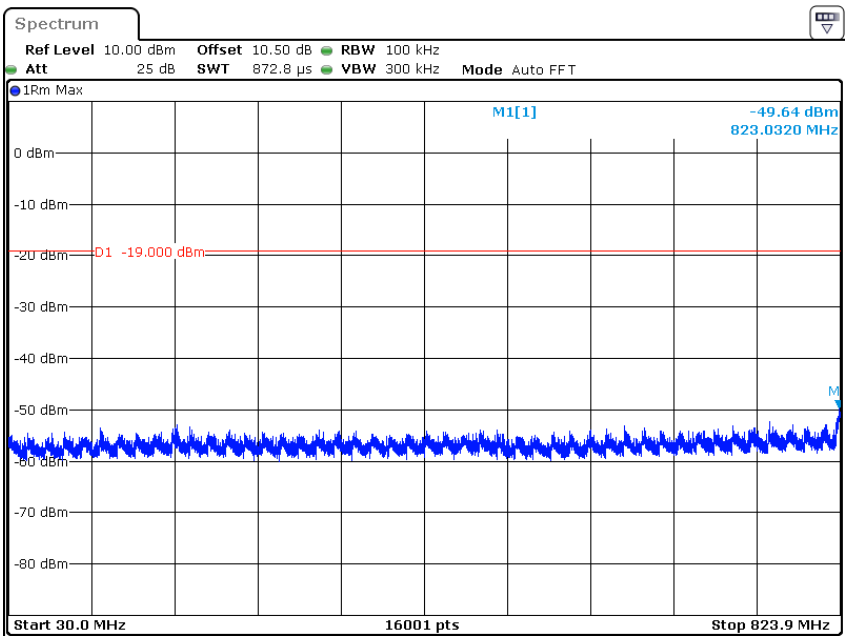
Test Mode: Transmitting (Worst case: Configuration 1)

Test Result: Pass

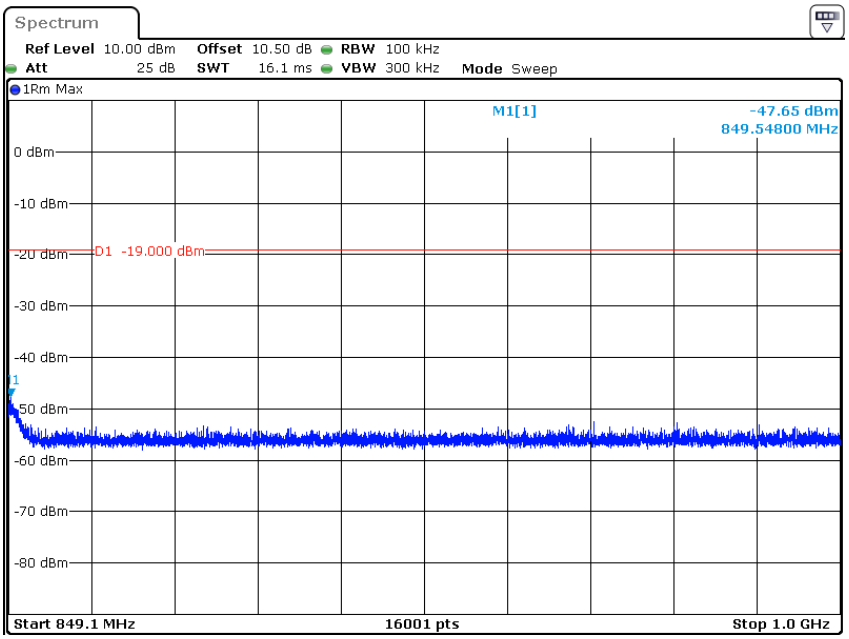
Please refer to the following plots.

Uplink

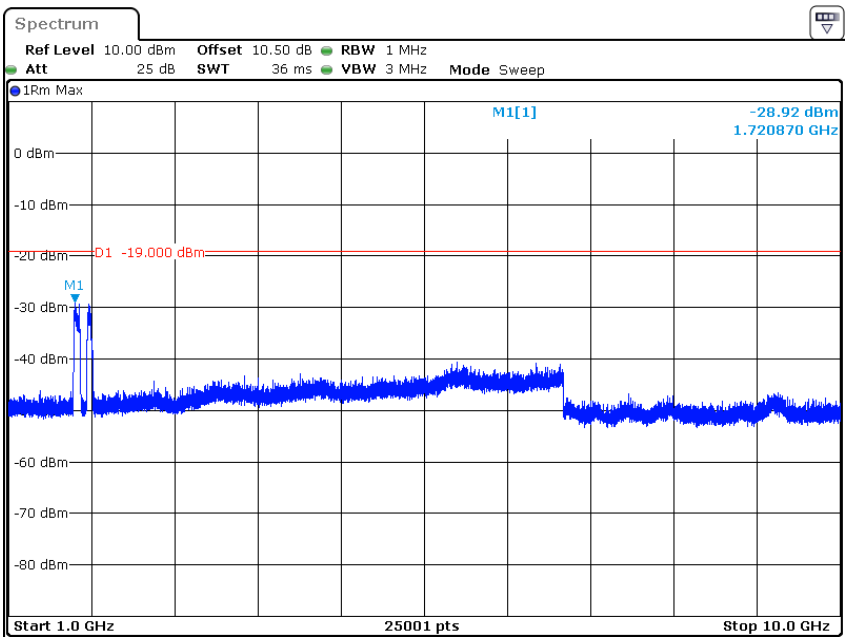
Cellular Band



Date: 10.AUG.2022 11:24:07

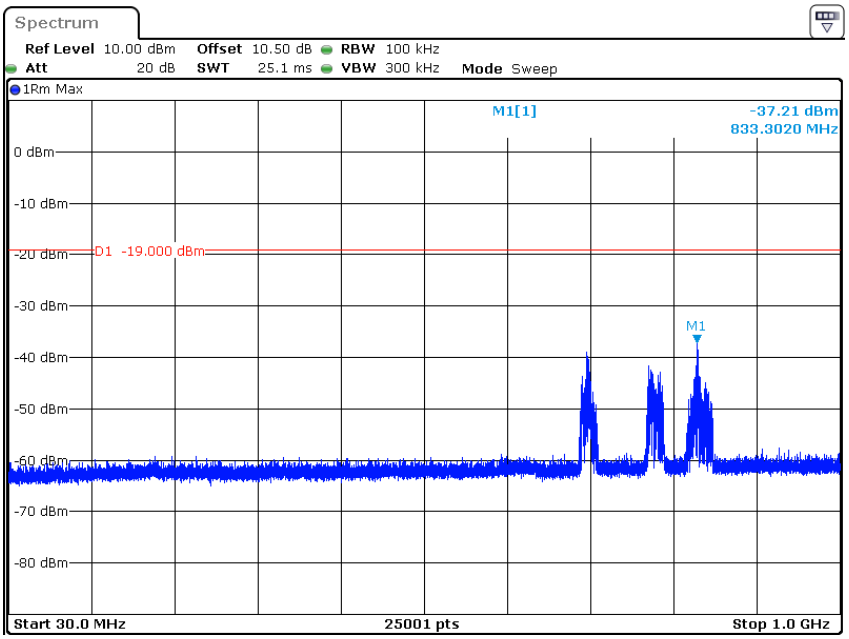


Date: 10.AUG.2022 11:27:21

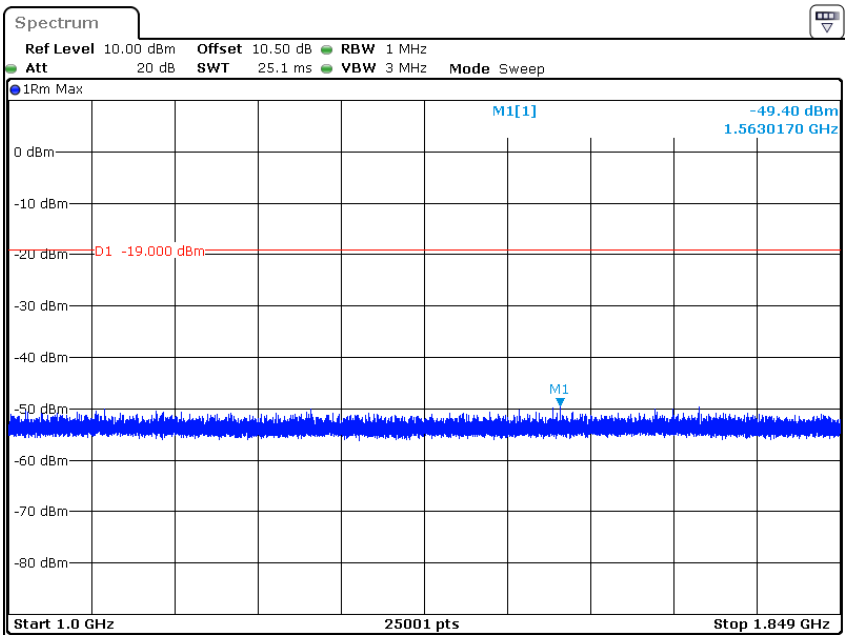


Date: 10.AUG.2022 11:30:00

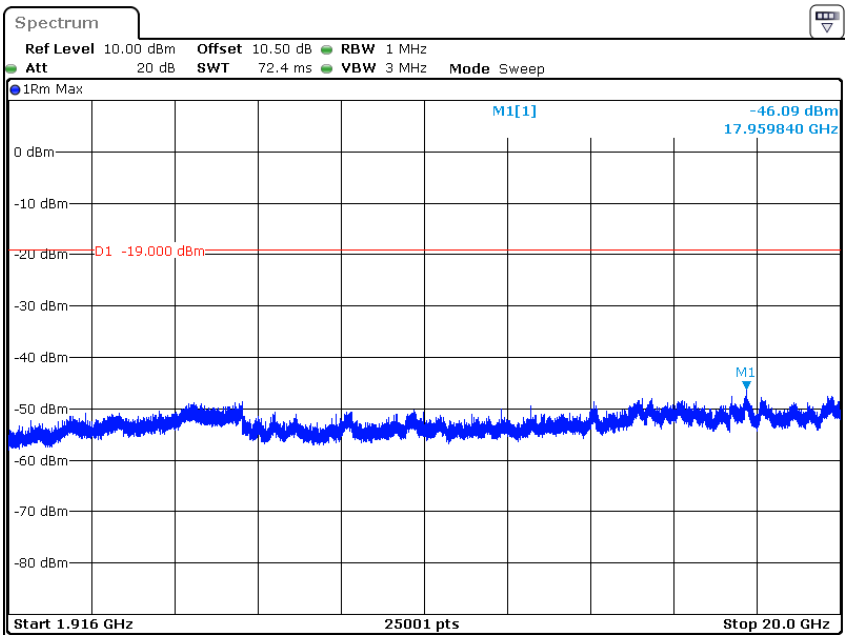
PCS Band



Date: 10.AUG.2022 11:44:18

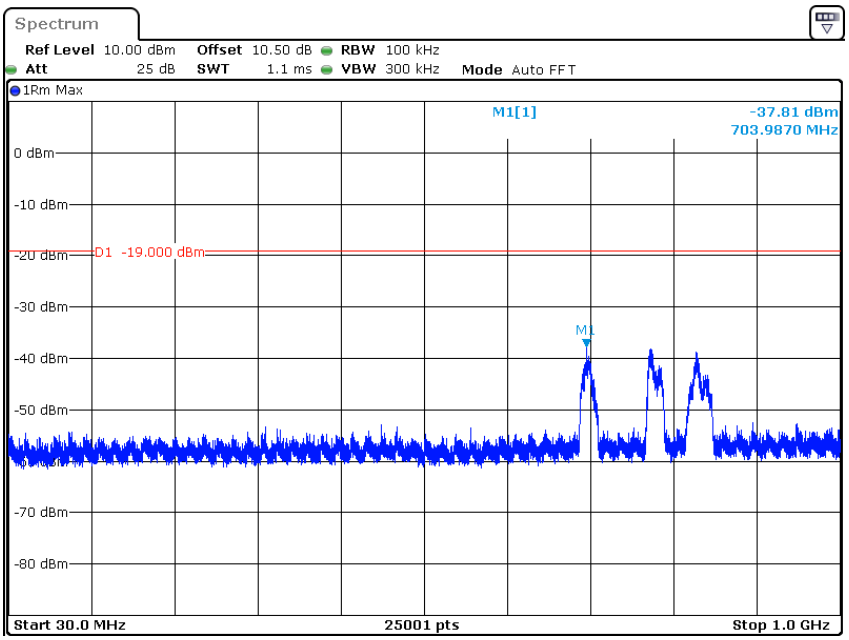


Date: 10.AUG.2022 11:46:00

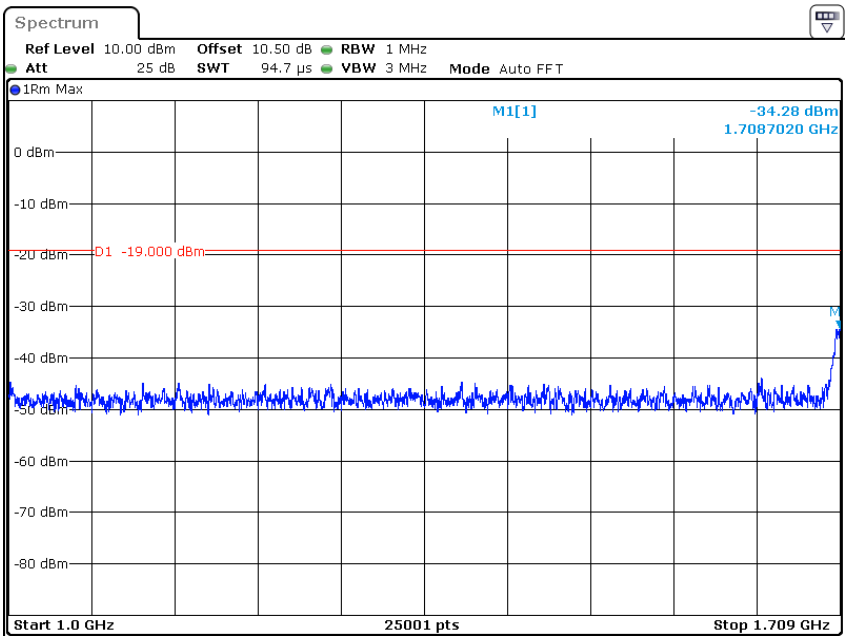


Date: 10.AUG.2022 11:47:29

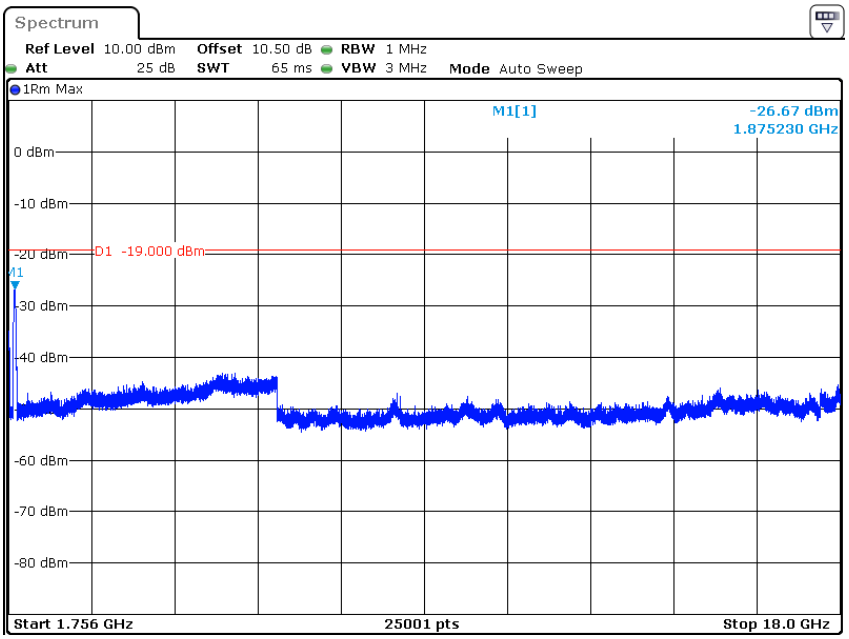
AWS Band



Date: 10.AUG.2022 11:04:08

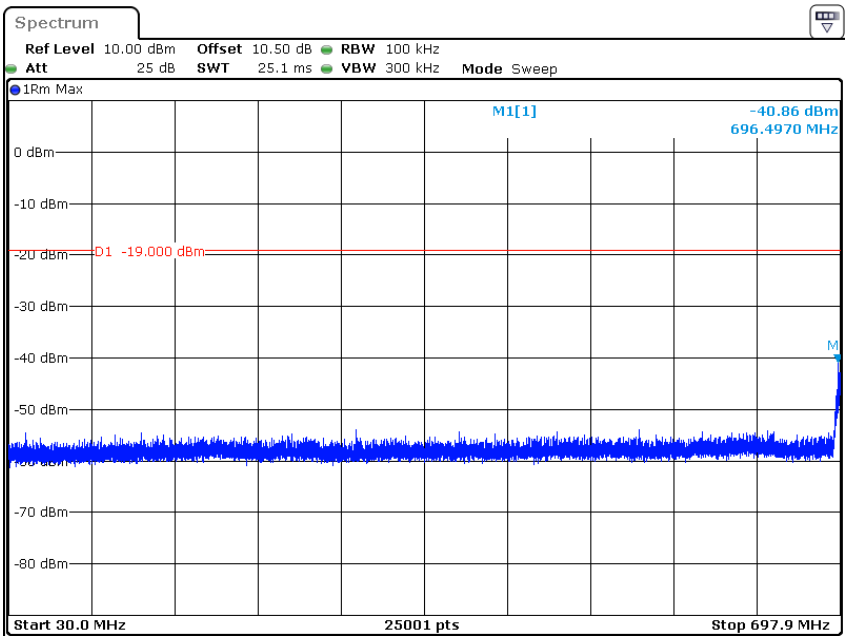


Date: 10.AUG.2022 11:07:16

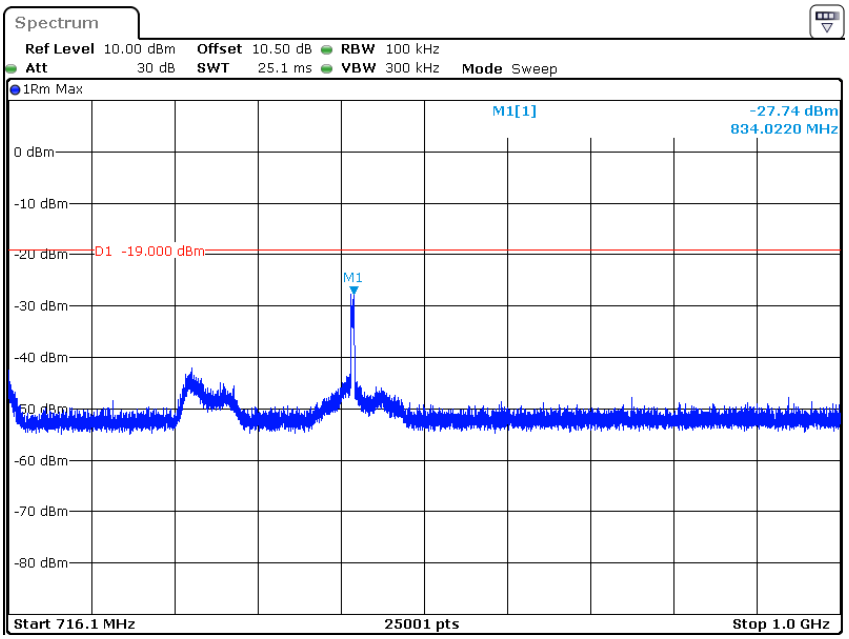


Date: 10.AUG.2022 11:09:52

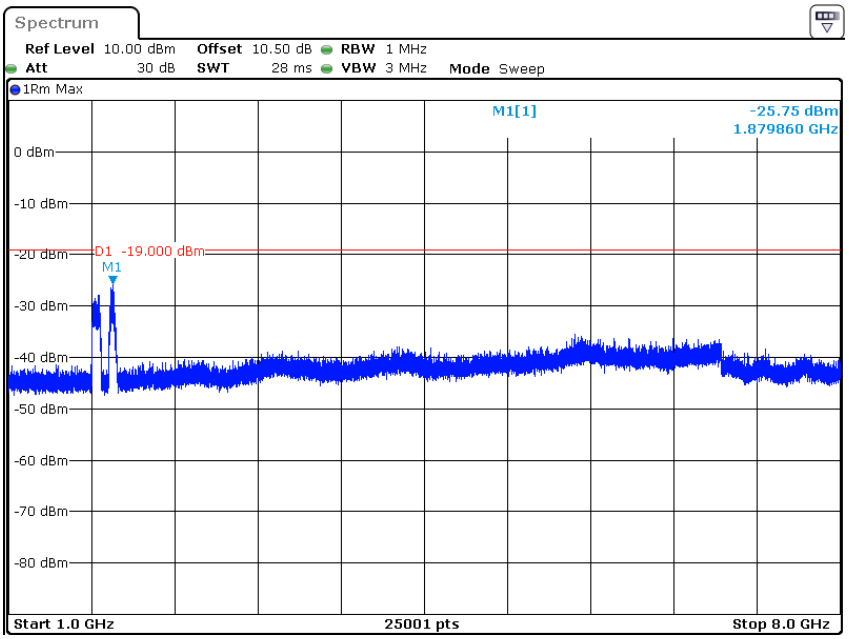
Lower 700MHz



Date: 10.AUG.2022 11:31:53

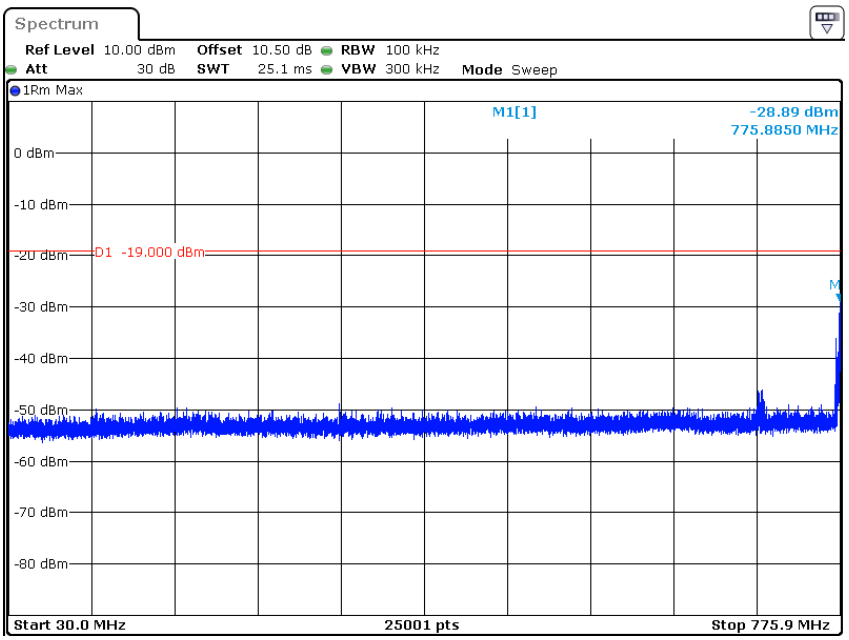


Date: 10.AUG.2022 11:34:35

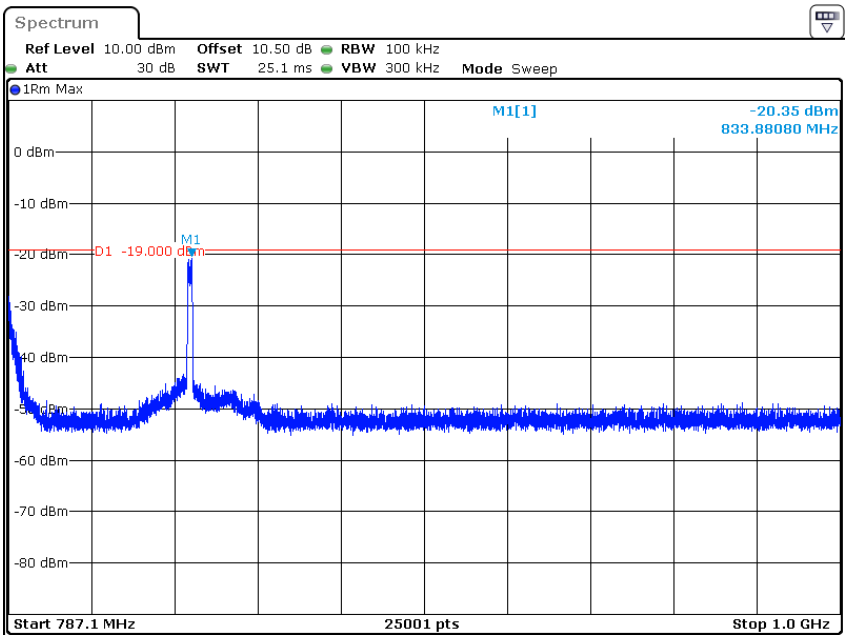


Date: 10.AUG.2022 11:35:30

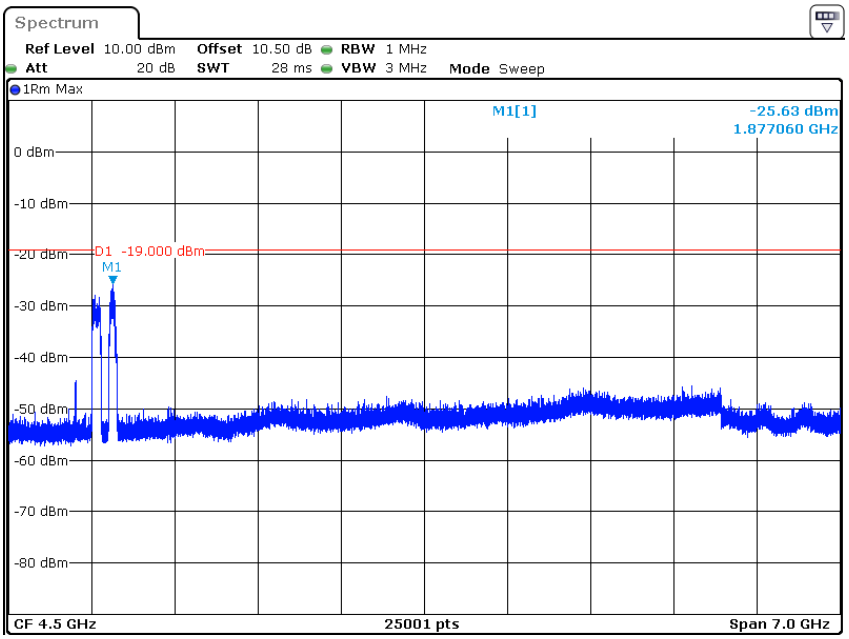
Upper 700MHz



Date: 10.AUG.2022 11:37:06



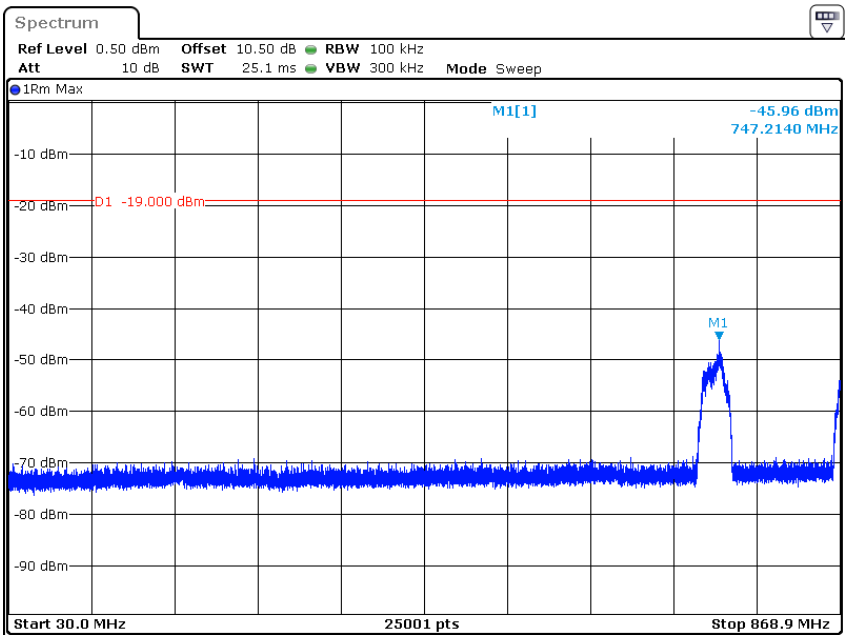
Date: 10.AUG.2022 11:39:28



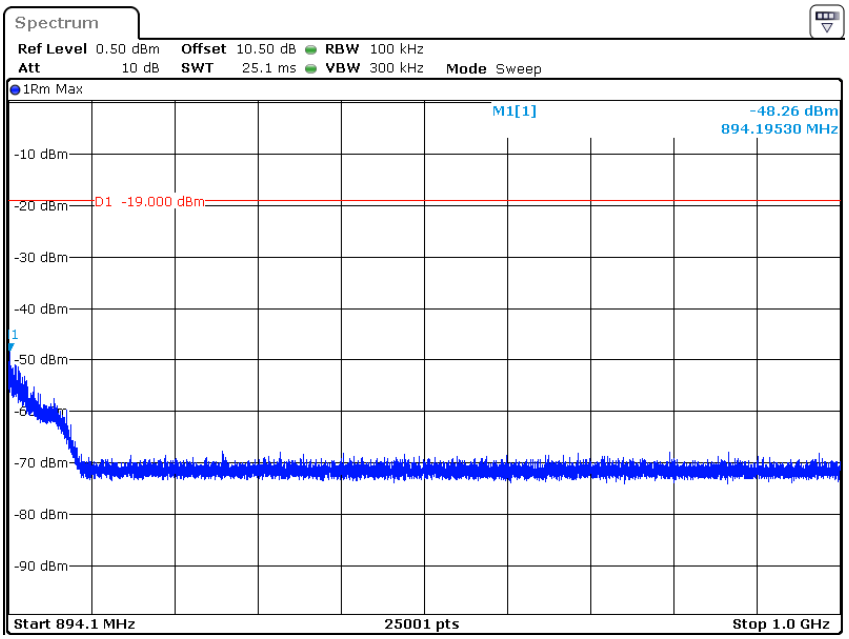
Date: 10.AUG.2022 11:40:42

Downlink

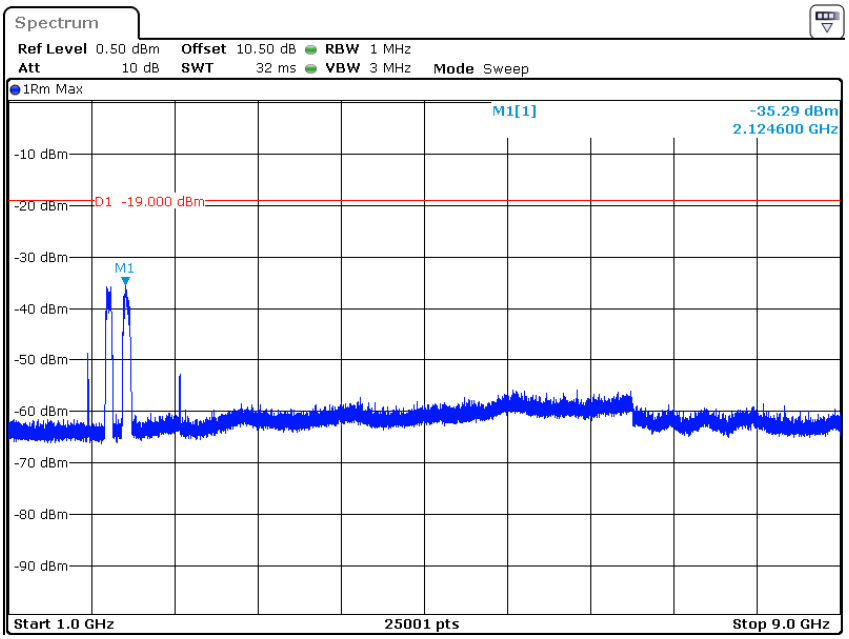
Cellular Band



Date: 10.AUG.2022 17:10:51

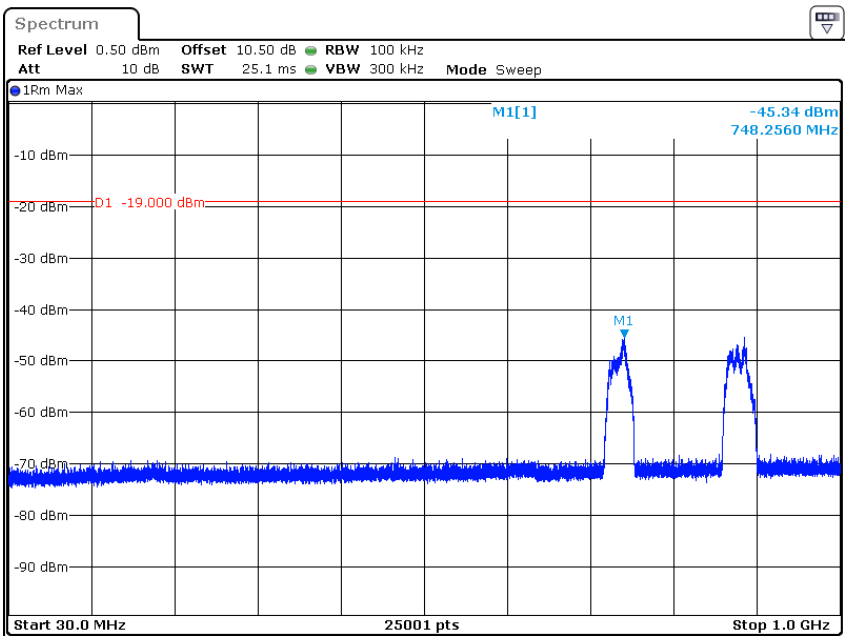


Date: 10.AUG.2022 17:12:16

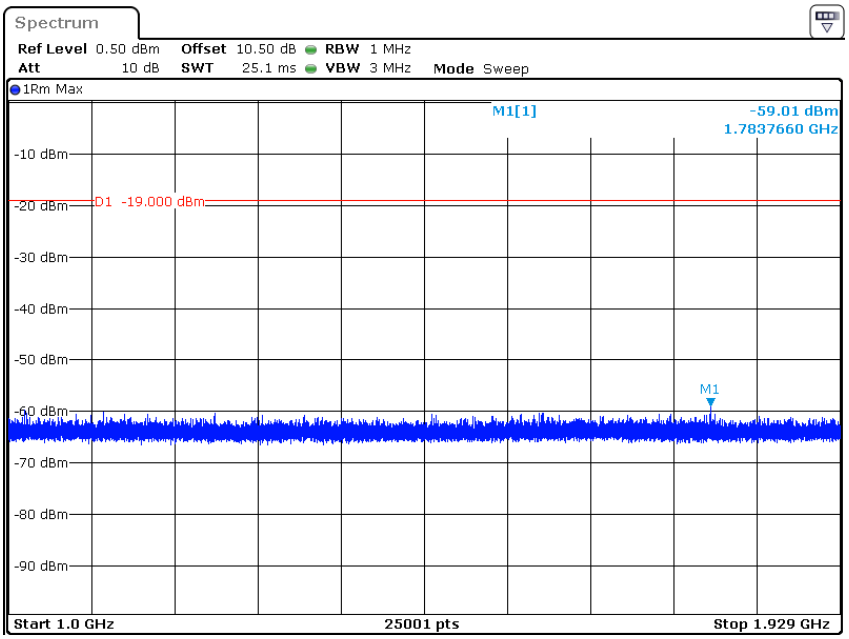


Date: 10.AUG.2022 17:13:29

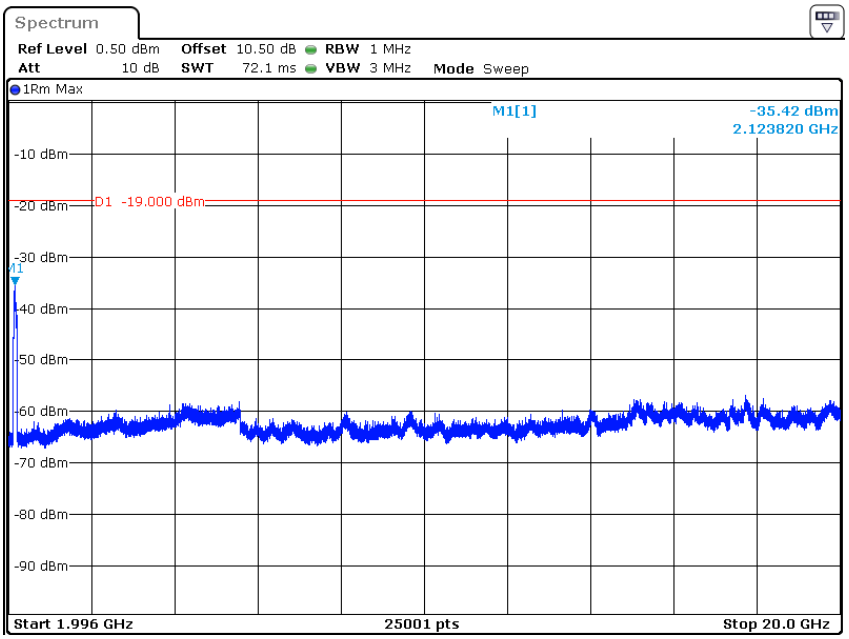
PCS Band



Date: 10.AUG.2022 17:27:19

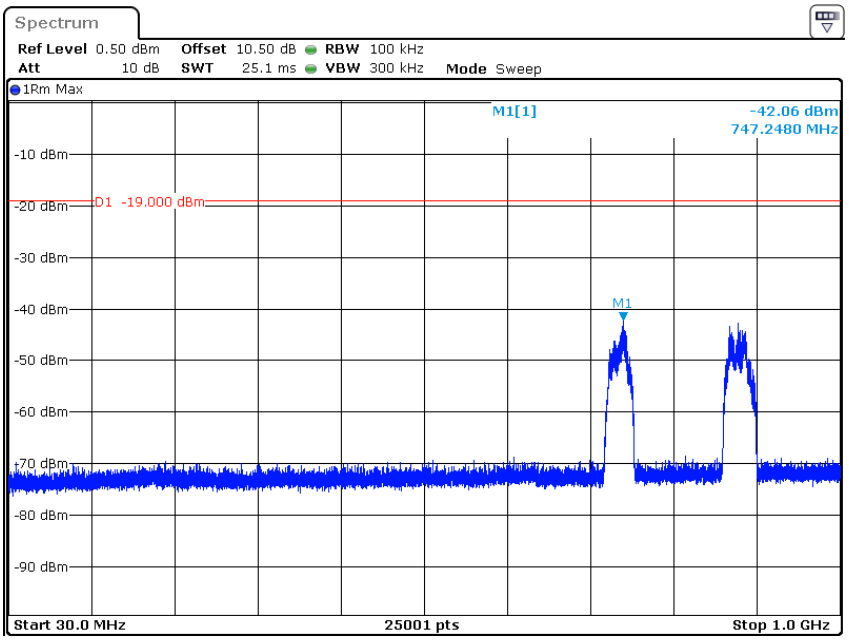


Date: 10.AUG.2022 17:28:26

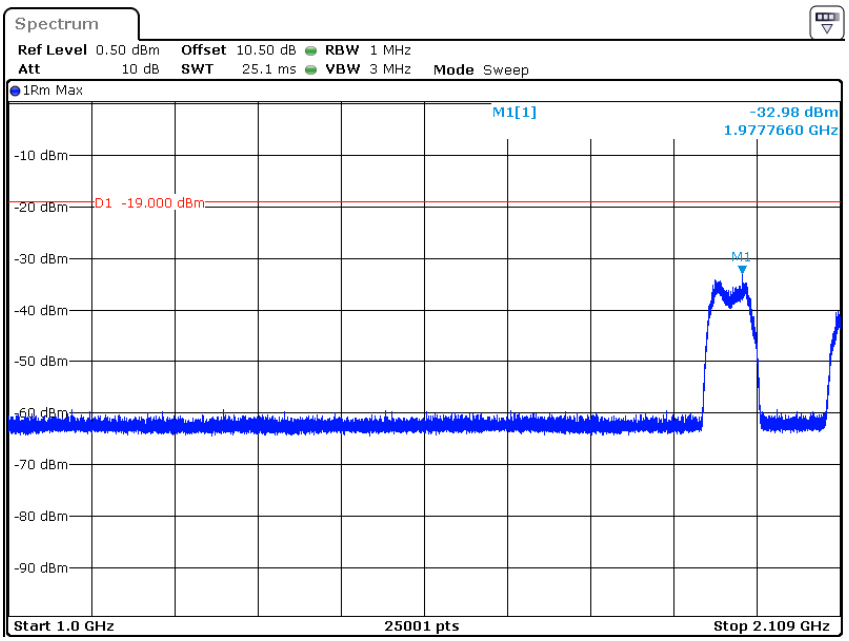


Date: 10.AUG.2022 17:29:48

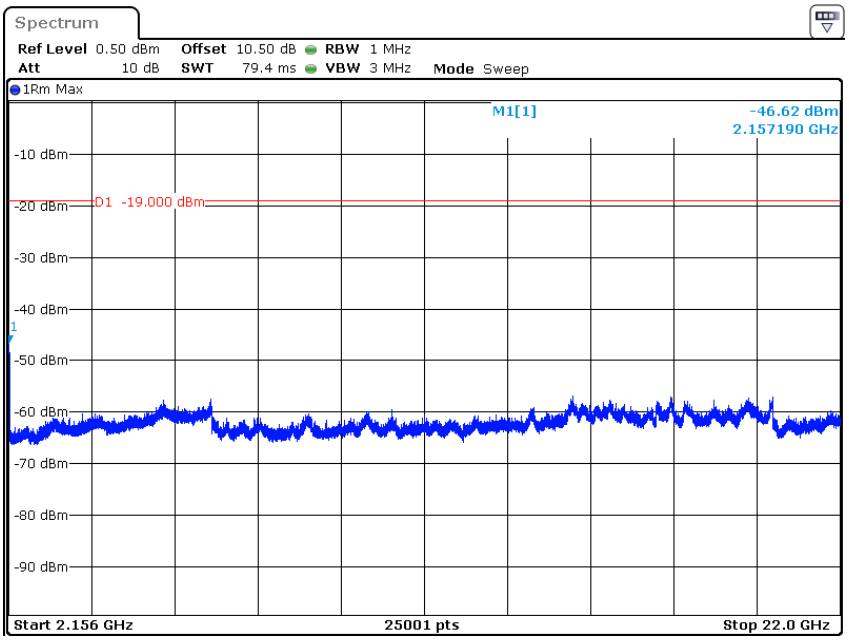
AWS Band



Date: 10.AUG.2022 17:04:22

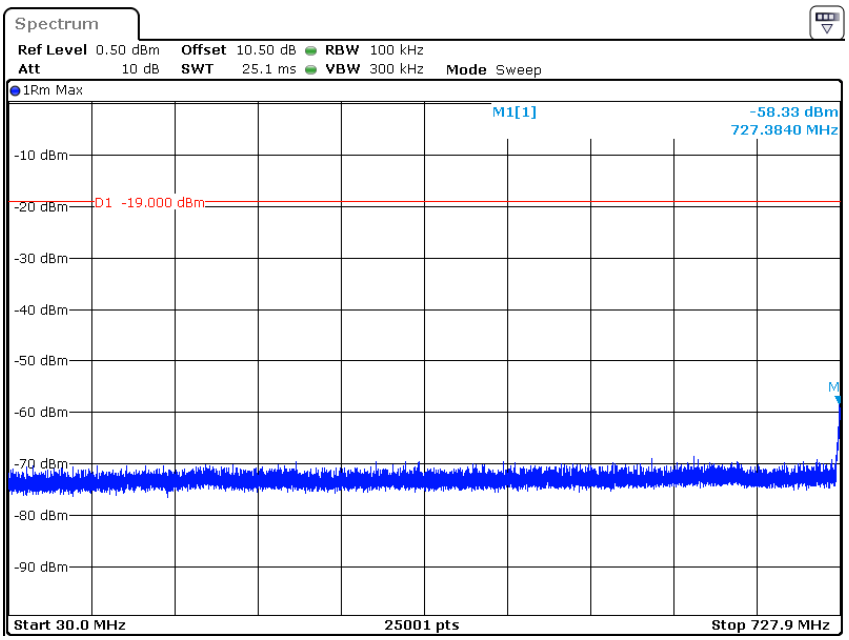


Date: 10.AUG.2022 16:57:14

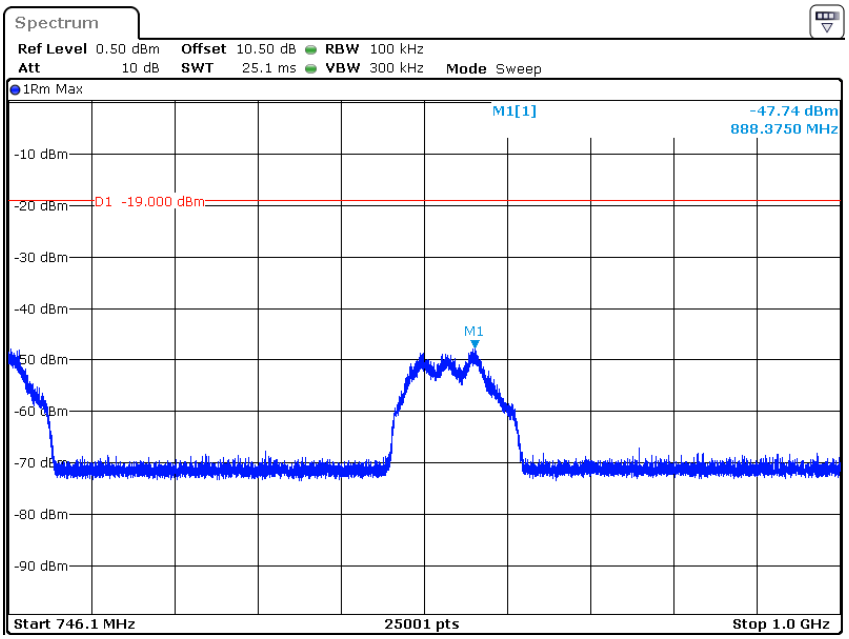


Date: 10.AUG.2022 17:02:14

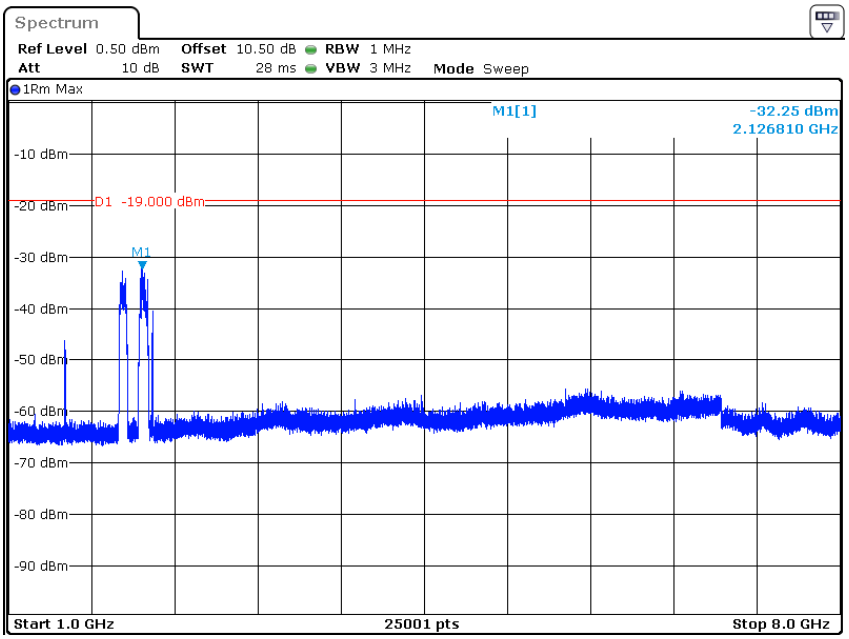
Lower 700MHz



Date: 10.AUG.2022 17:15:32

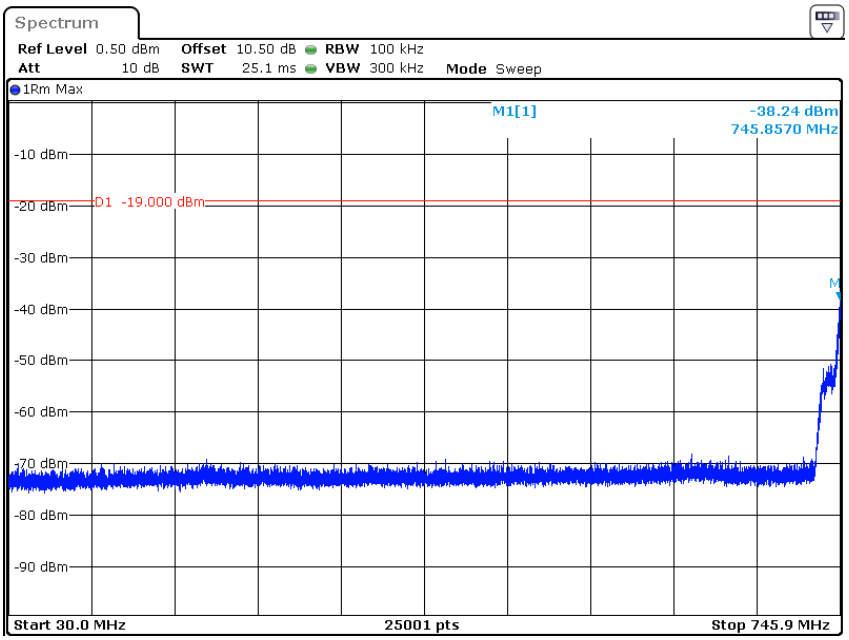


Date: 10.AUG.2022 17:17:18

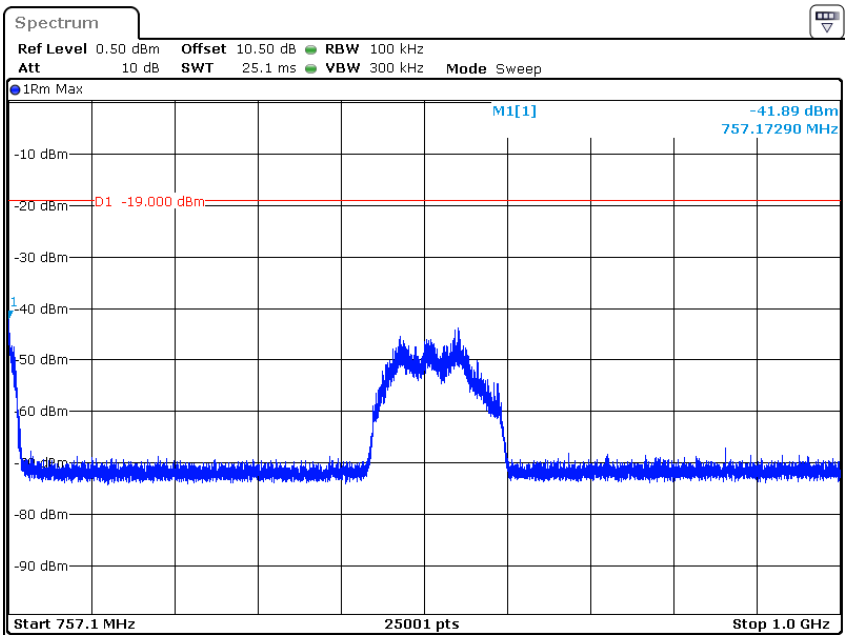


Date: 10.AUG.2022 17:18:33

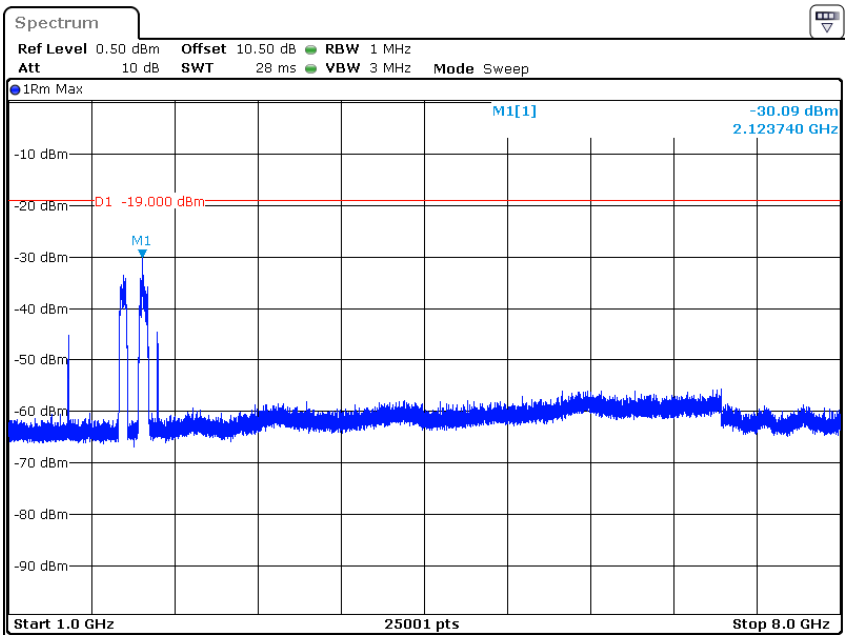
Upper 700MHz



Date: 10.AUG.2022 17:20:04



Date: 10.AUG.2022 17:23:23

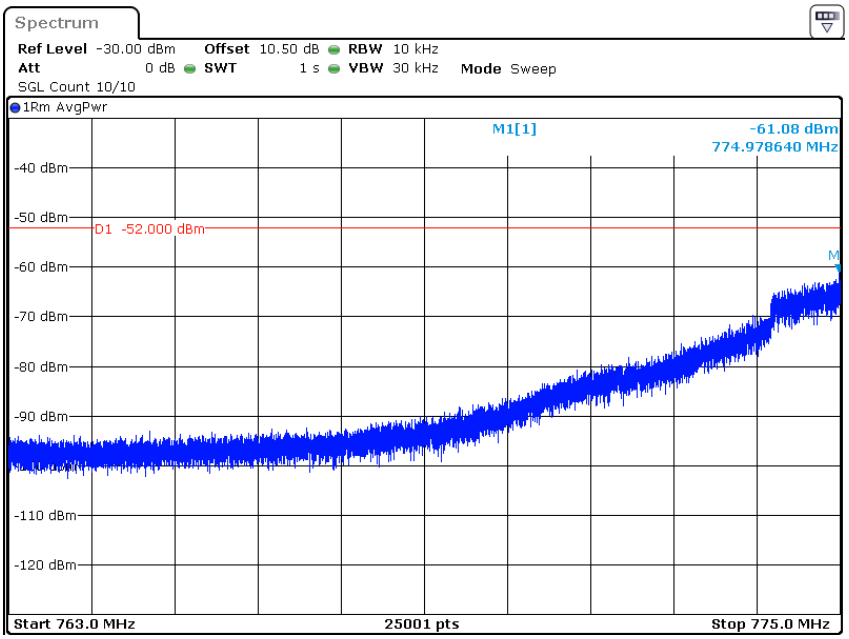


Date: 10.AUG.2022 17:25:03

Additional requirement for upper 700MHz band

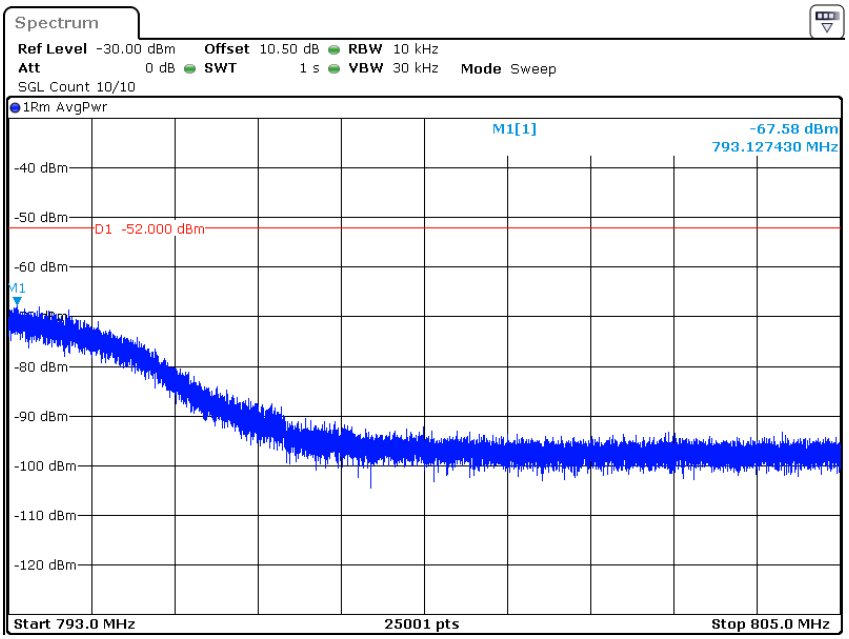
Uplink

763 MHz~775 MHz



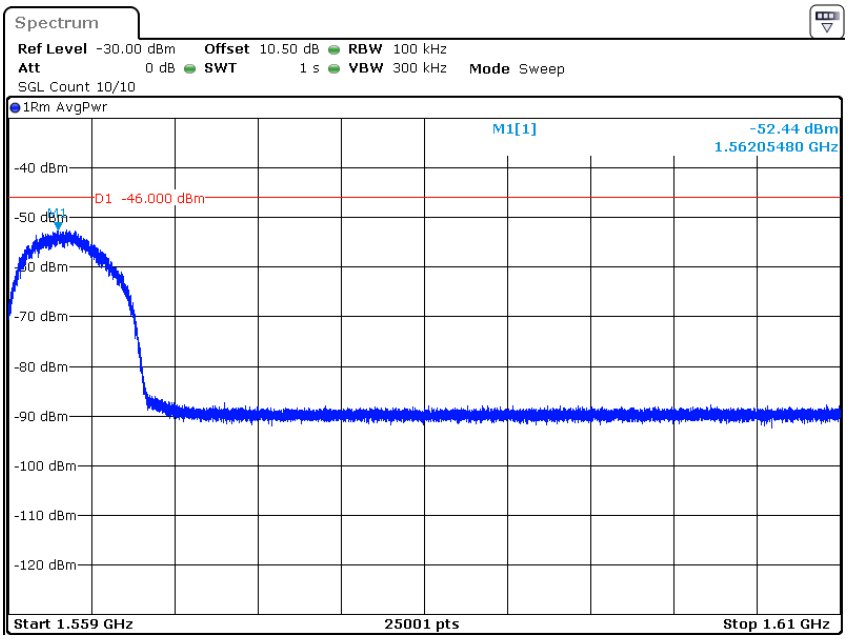
Date: 10.AUG.2022 18:12:59

793 MHz~805 MHz



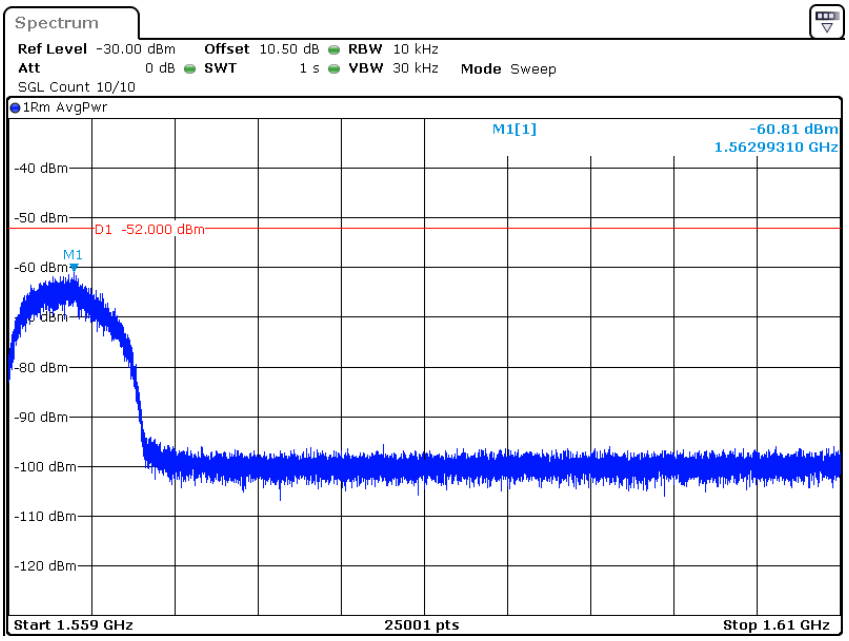
Date: 10.AUG.2022 18:11:42

1559 MHz~1610 MHz (wide band)



Date: 10.AUG.2022 18:09:19

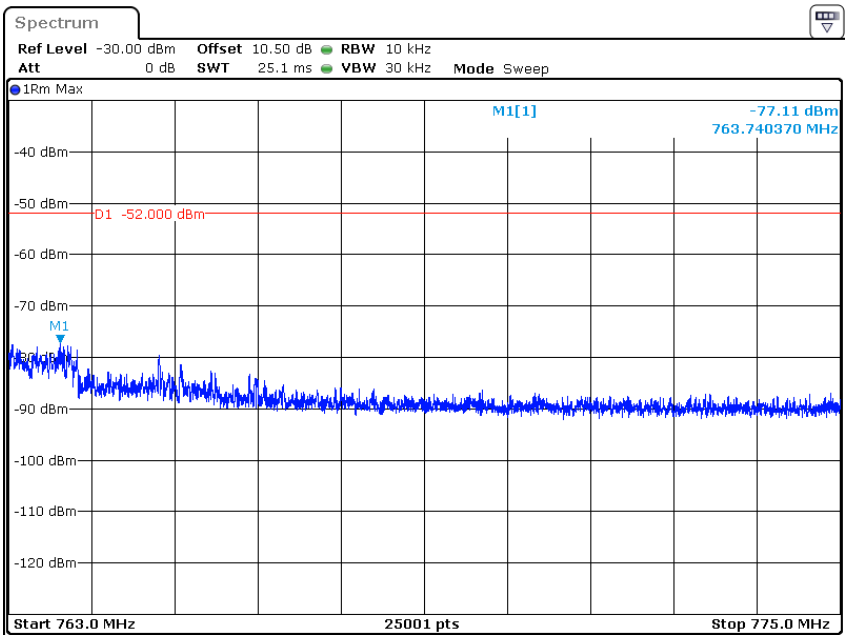
1559 MHz~1610 MHz (narrow band)



Date: 10.AUG.2022 18:07:43

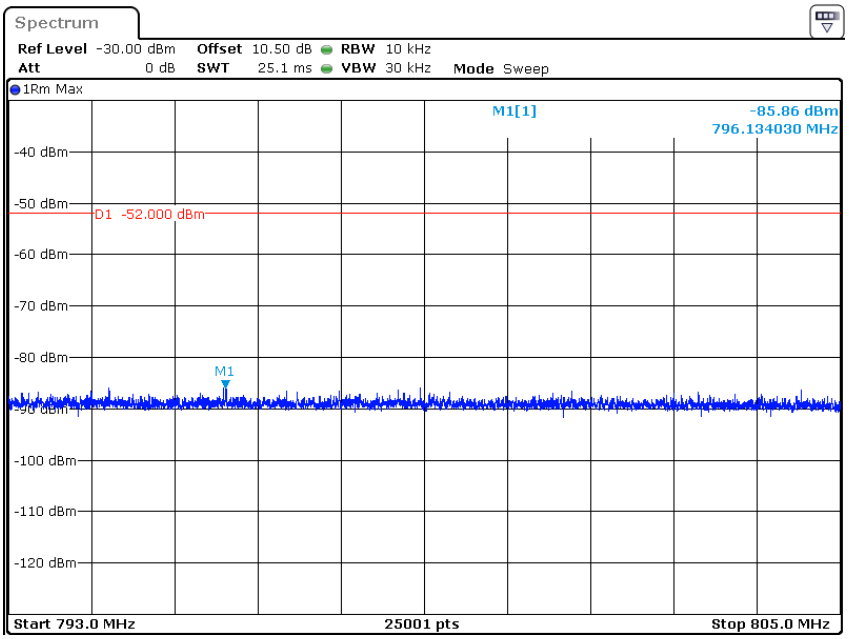
Downlink

763 MHz~775 MHz



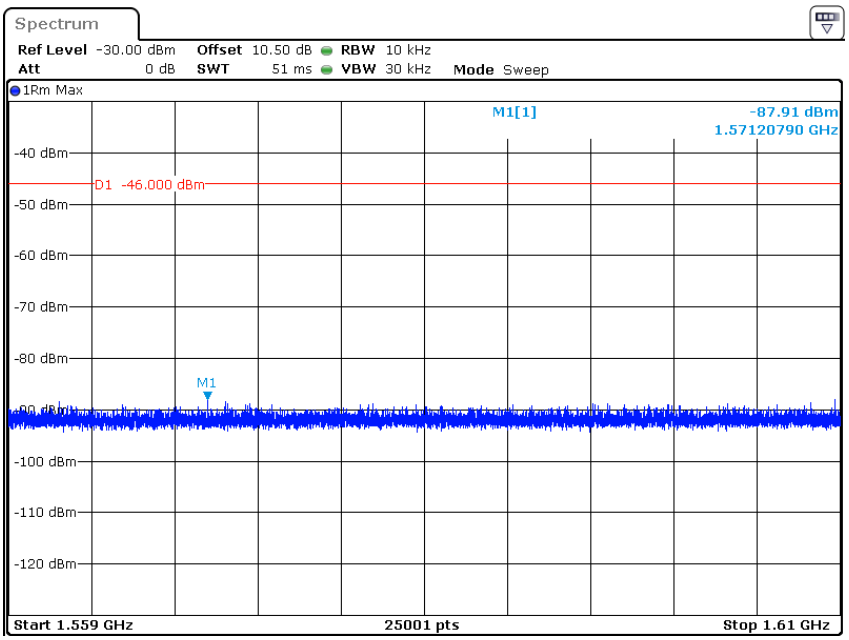
Date: 10.AUG.2022 17:41:40

793 MHz~805 MHz



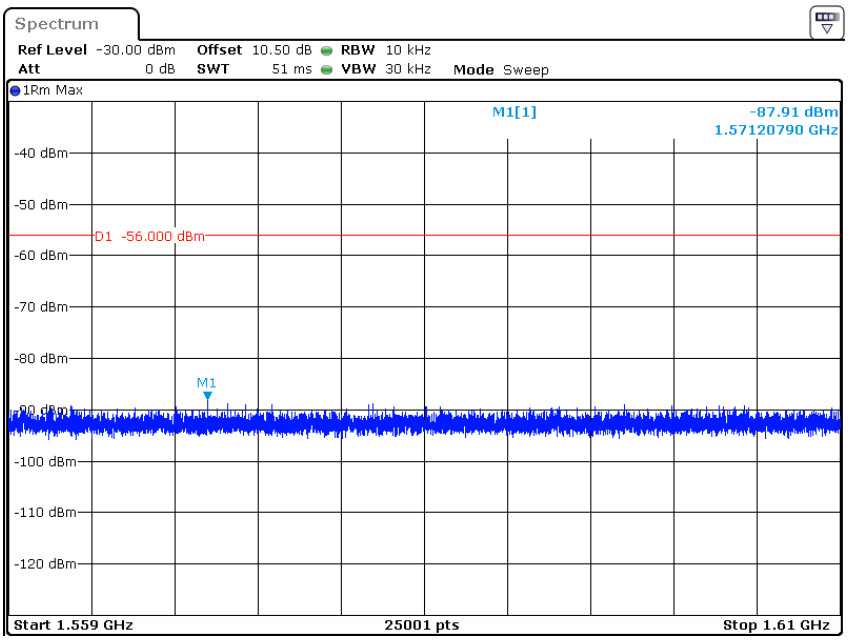
Date: 10.AUG.2022 17:45:15

1559 MHz~1610 MHz (wide band)



Date: 10.AUG.2022 17:47:39

1559 MHz~1610 MHz (narrow band)



Date: 10.AUG.2022 17:47:07

§ 2.1053 - RADIATED SPURIOUS EMISSIONS

Applicable Standards

§ 2.1053 *Measurements required: Field strength of spurious radiation.*

Test Procedure

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 appropriate to the band of operation (see Annex A).

a) Place the EUT on an OATS or semi-anechoic chamber turntable 3 m from the receiving antenna. 12
b) Connect the EUT to the test equipment as shown in **Figure 10** beginning with the uplink output.
c) Set the signal generator to produce a CW signal with the frequency set to the center of the operational band under test and the power level set at P_{IN} as determined from 7.2.
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 Clause 8 of ANSI C63.4-2014.
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 7.12c) through 7.12e) for all operational bands.

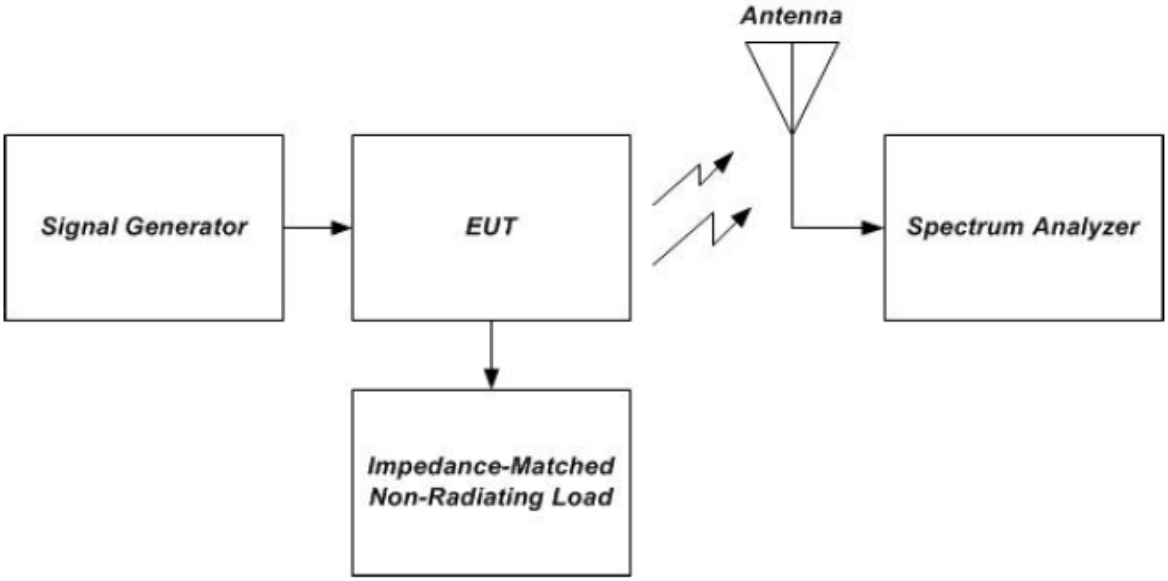


Figure 10 – Radiated spurious emissions test instrumentation setup

Test Data

Environmental Conditions

Temperature:	26.3 °C
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Jeff Jiang on 2022-08-02

Test Result: Pass

Please refer to following table.

Test Mode: Transmitting (Worst case: Configuration 1)

Uplink

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
Cellular Band, Test Frequency 836.5MHz								
950.51	-77.90	152	2.1	H	10.0	-67.90	-19	48.90
950.51	-81.48	41	1.5	V	11.7	-69.78	-19	50.78
1673	-56.5	107	1.9	H	3.8	-52.7	-19	33.7
1673	-54.7	144	1.4	V	3.1	-51.6	-19	32.6
PCS Band, Test Frequency 1882.5MHz								
951.97	-78.59	97	1.2	H	10.0	-68.59	-19	49.59
951.97	-82.77	195	1.0	V	11.7	-71.07	-19	52.07
3765	-58.2	89	1.1	H	8.8	-49.4	-19	30.4
3765	-56.8	117	2.4	V	8.0	-48.8	-19	29.8
AWS Band, Test Frequency 1732.5MHz								
951.71	-77.32	321	1.7	H	10.0	-67.32	-19	48.32
951.71	-81.97	181	1.4	V	11.7	-70.27	-19	51.27
3465	-51.4	140	2.2	H	7.0	-44.4	-19	25.4
3465	-51.9	315	2.1	V	6.2	-45.7	-19	26.7
Lower 700MHz, Test Frequency 707MHz								
956.64	-78.17	243	2.0	H	10.0	-68.17	-19	49.17
956.64	-83.51	276	2.4	V	11.7	-71.81	-19	52.81
1414	-61.2	311	1.5	H	5.7	-55.5	-19	36.5
1414	-61.6	13	2.4	V	5.4	-56.2	-19	37.2
Upper 700MHz, Test Frequency 781.5MHz								
954.28	-77.70	227	1.8	H	10.0	-67.70	-19	48.70
954.28	-81.35	155	1.8	V	11.7	-69.65	-19	50.65
1563	-64.7	123	1.2	H	4.2	-60.5	-46	14.5
1563	-63.0	220	2.3	V	3.3	-59.7	-46	13.7

Downlink

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
Cellular Band, Test Frequency 881.5MHz								
950.60	-77.43	211	2.4	H	10.0	-67.43	-19	48.43
950.60	-82.47	279	1.4	V	11.7	-70.77	-19	51.77
1763	-59.5	40	1.9	H	4.4	-55.1	-19	36.1
1763	-58.7	191	1.8	V	3.2	-55.5	-19	36.5
PCS Band, Test Frequency 1962.5MHz								
956.83	-77.77	96	1.5	H	10.0	-67.77	-19	48.77
956.83	-83.58	132	1.8	V	11.7	-71.88	-19	52.88
3925	-56.4	329	2.0	H	8.9	-47.5	-19	28.5
3925	-56.7	227	1.2	V	8.3	-48.4	-19	29.4
AWS Band, Test Frequency 2132.5MHz								
952.92	-78.38	103	1.3	H	10.0	-68.38	-19	49.38
952.92	-83.07	101	1.4	V	11.7	-71.37	-19	52.37
4265	-60.0	316	1.4	H	9.7	-50.3	-19	31.3
4265	-59.3	243	1.7	V	8.9	-50.6	-19	31.6
Lower 700MHz, Test Frequency 737MHz								
956.82	-77.98	46	1.5	H	10.0	-67.98	-19	48.98
956.82	-81.83	102	1.9	V	11.7	-70.13	-19	51.13
1474	-62.0	150	2.5	H	4.5	-57.5	-19	38.5
1474	-64.3	26	1.8	V	6.0	-58.3	-19	39.3
Upper 700MHz, Test Frequency 751.5MHz								
953.79	-77.62	107	1.3	H	10.0	-67.62	-19	48.62
953.79	-82.81	33	2.0	V	11.7	-71.11	-19	52.11
1503	-64.3	324	2.1	H	5.0	-59.3	-19	40.3
1503	-64.4	352	1.5	V	4.3	-60.1	-19	41.1

Note:
Absolute Level = Reading Level + Substituted Factor
Substituted Factor contains: SG Level - Cable loss+ Antenna Gain
Margin = Limit - Absolute Level

******* END OF REPORT *******