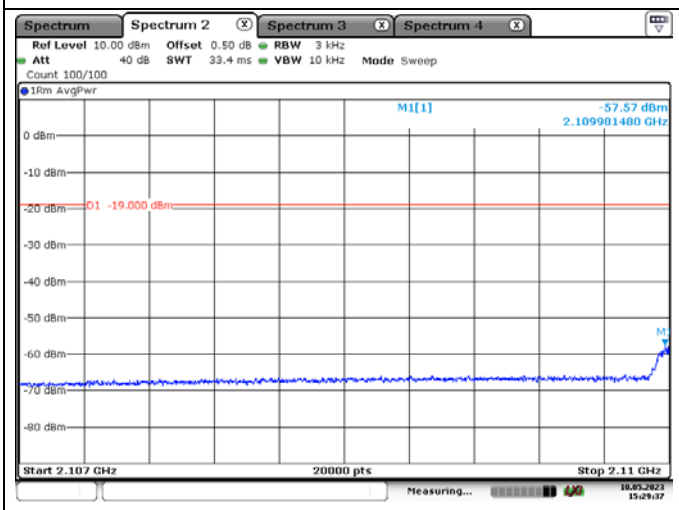
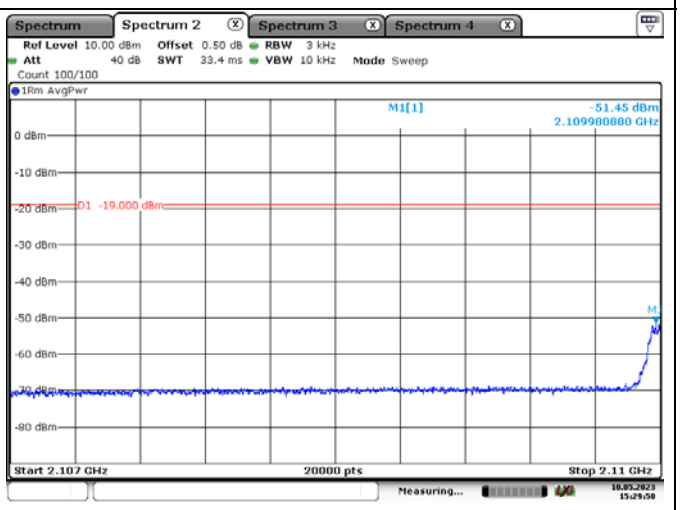
AWS-1 Band Downlink

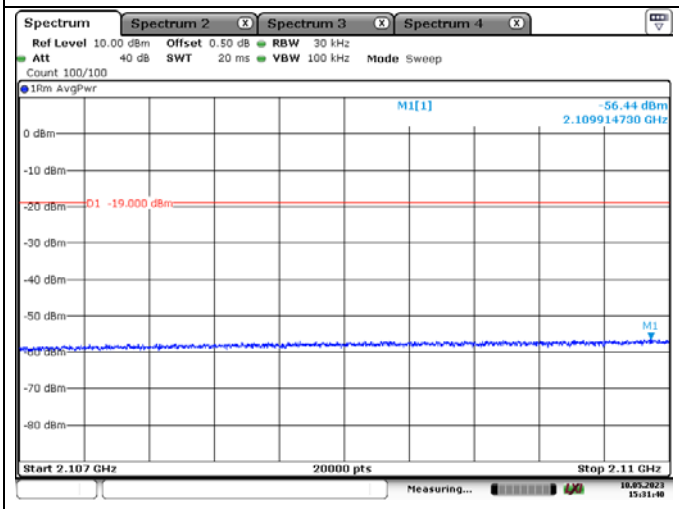
Left Side-GSM-Pre AGC



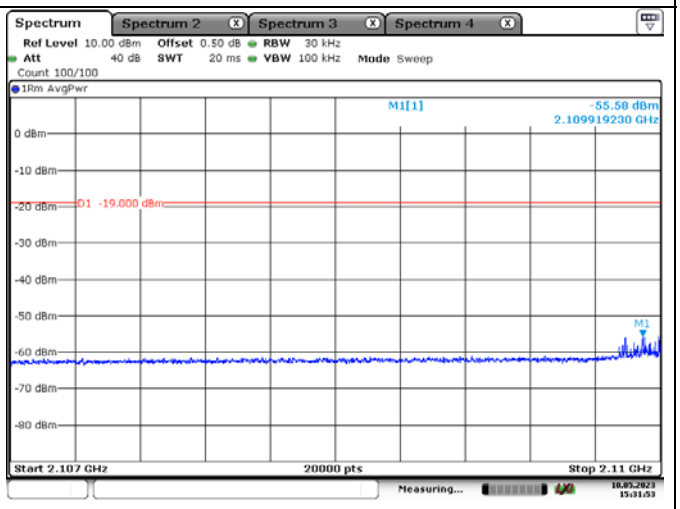
Left Side-GSM-Above AGC



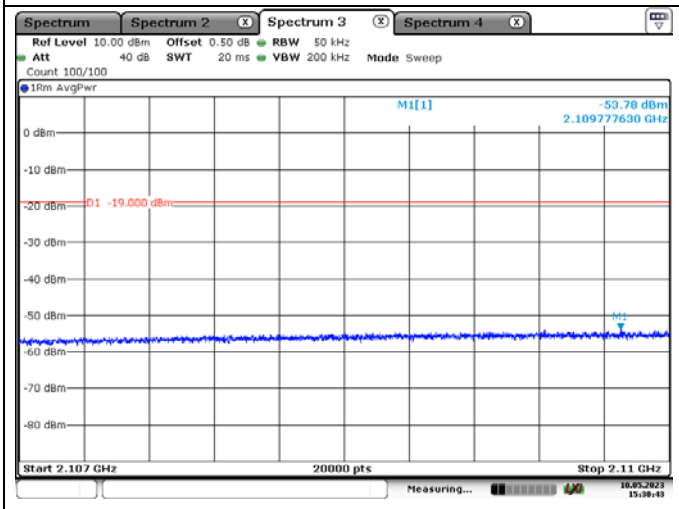
Left Side-CDMA-Pre AGC



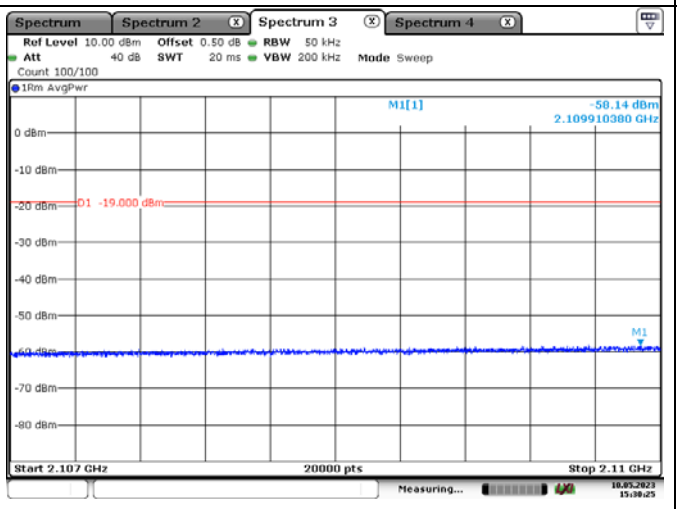
Left Side-CDMA-Above AGC



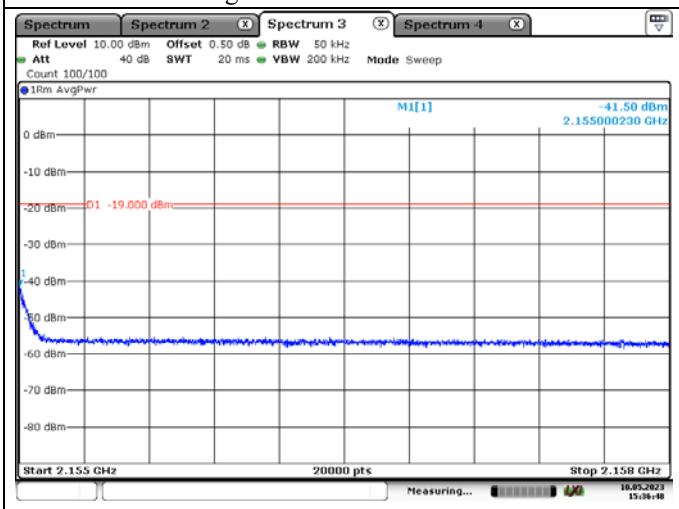
Left Side-WCDMA-Pre AGC



Left Side-WCDMA-Above AGC

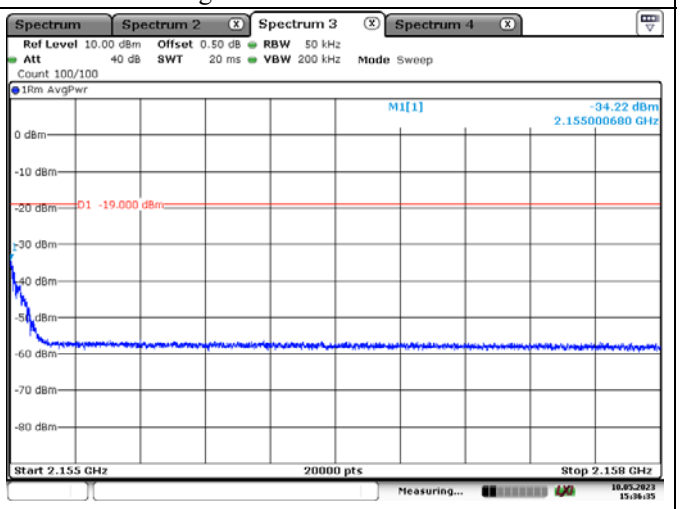


Right Side-GSM-Pre AGC



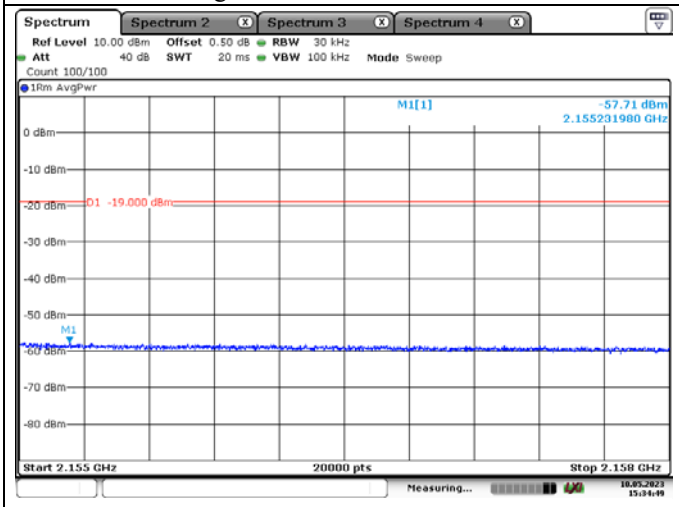
Date: 10.MAY.2023 15:36:48

Right Side-GSM-Above AGC



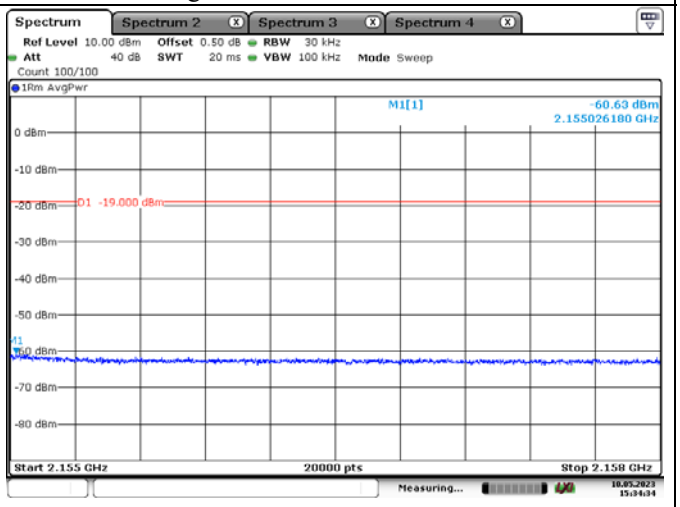
Date: 10.MAY.2023 15:36:35

Right Side-CDMA-Pre AGC



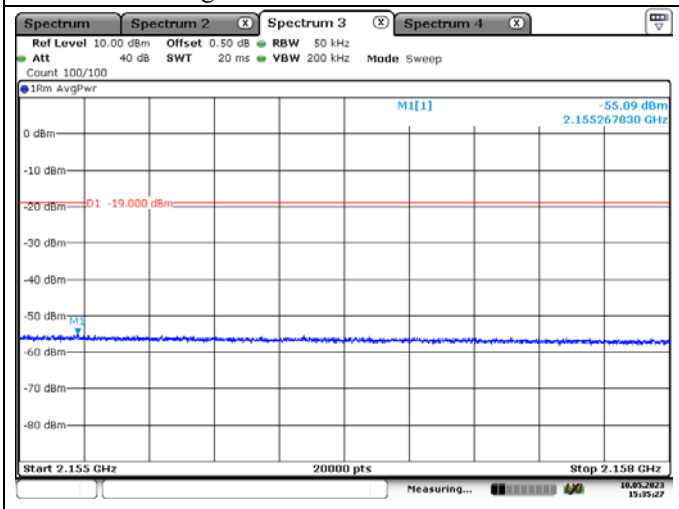
Date: 10.MAY.2023 15:34:49

Right Side-CDMA-Above AGC



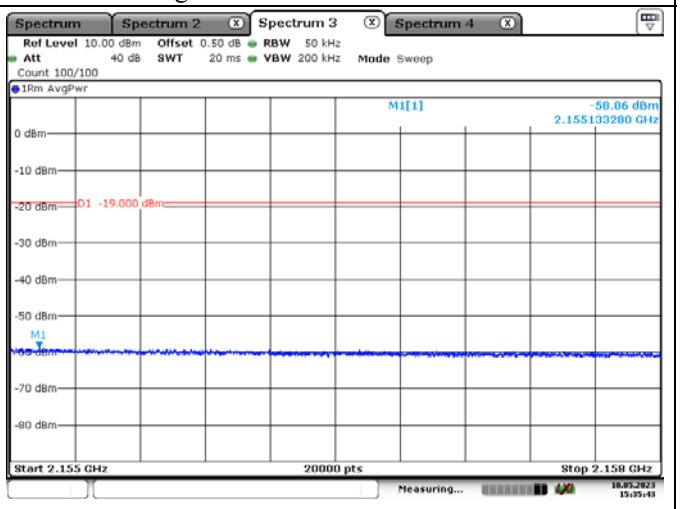
Date: 10.MAY.2023 15:34:34

Right Side-WCDMA-Pre AGC



Date: 10.MAY.2023 15:35:28

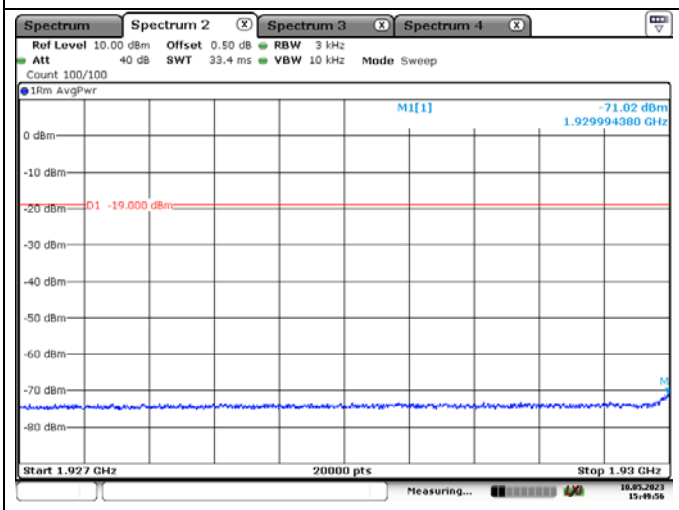
Right Side-WCDMA-Above AGC



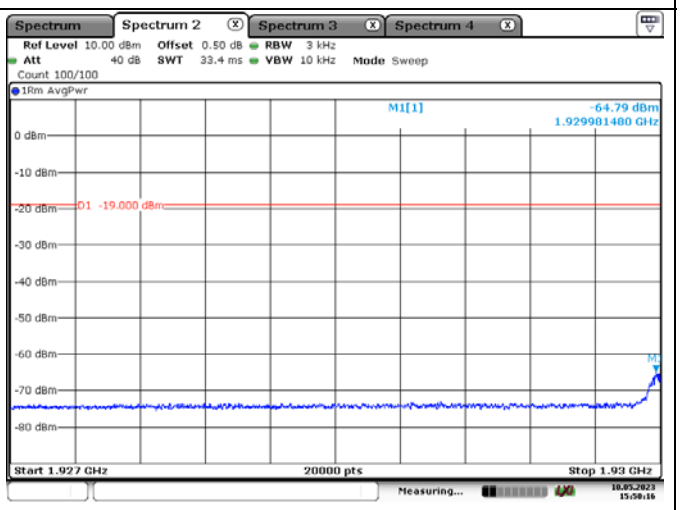
Date: 10.MAY.2023 15:35:44

PCS Band Downlink

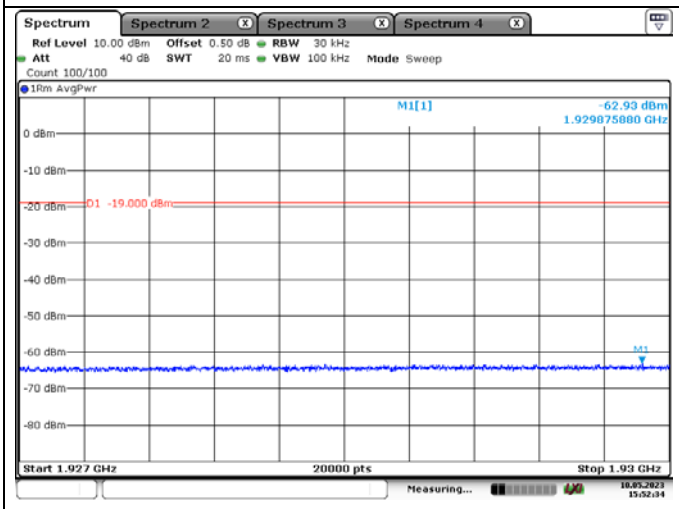
Left Side-GSM-Pre AGC



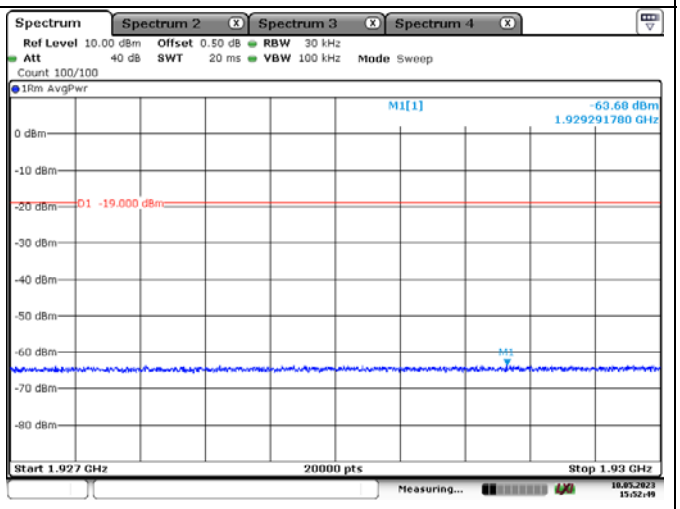
Left Side-GSM-Above AGC



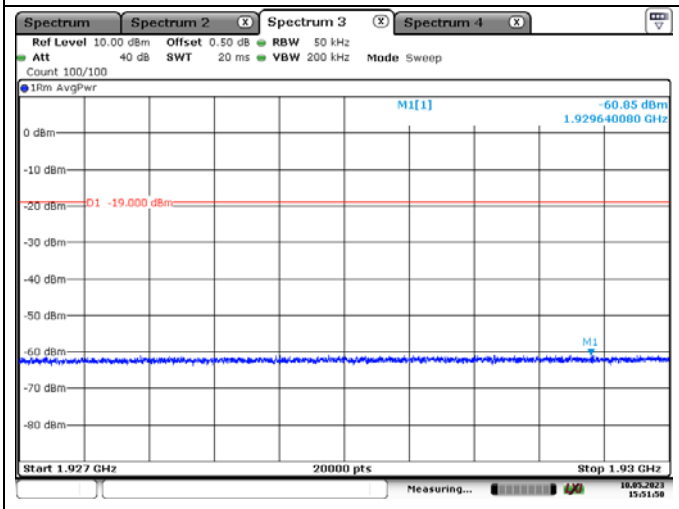
Left Side-CDMA-Pre AGC



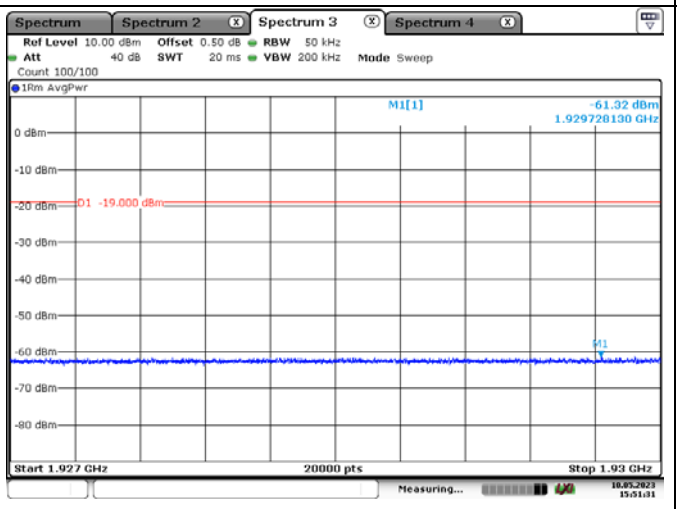
Left Side-CDMA-Above AGC



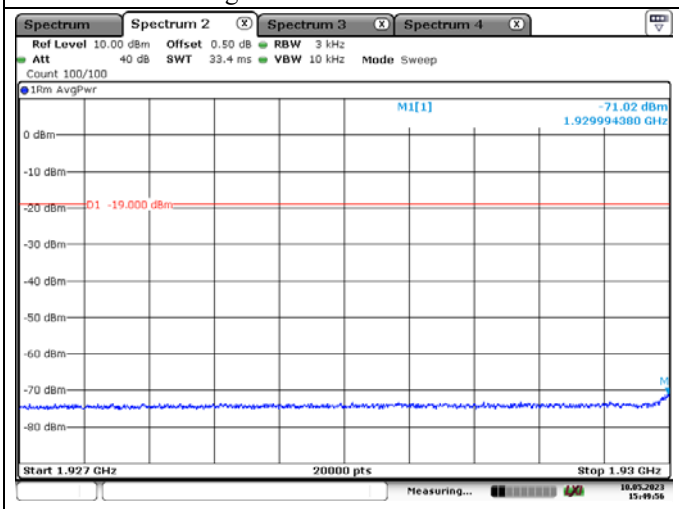
Left Side-WCDMA-Pre AGC



Left Side-WCDMA-Above AGC

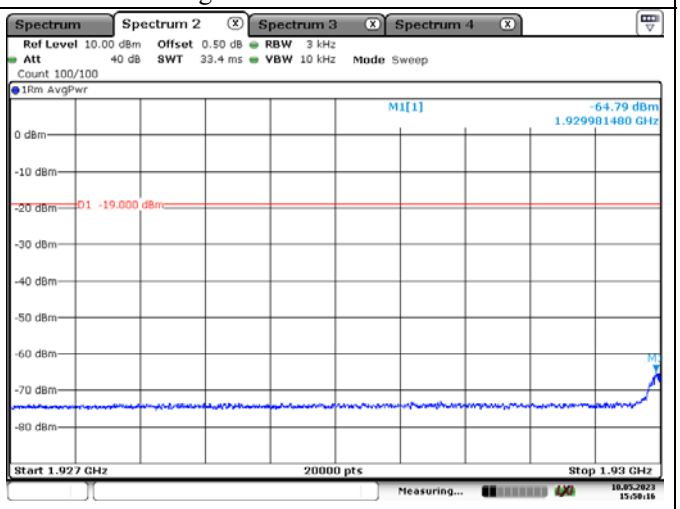


Right Side-GSM-Pre AGC



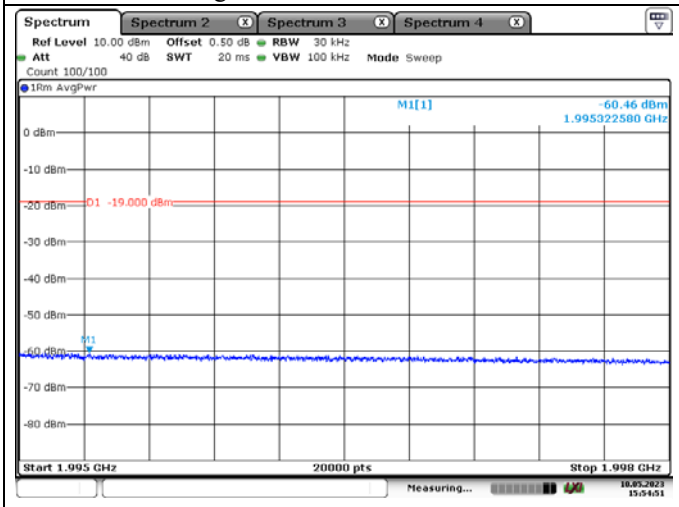
Date: 10.MAY.2023 15:49:57

Right Side-GSM-Above AGC



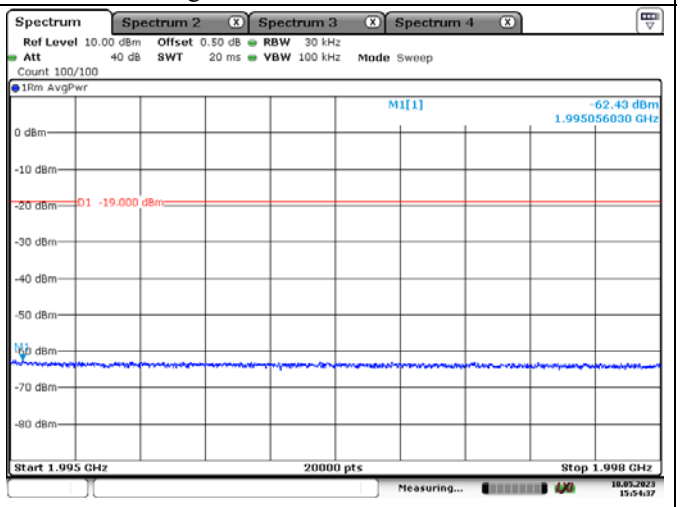
Date: 10.MAY.2023 15:50:16

Right Side-CDMA-Pre AGC



Date: 10.MAY.2023 15:54:52

Right Side-CDMA-Above AGC



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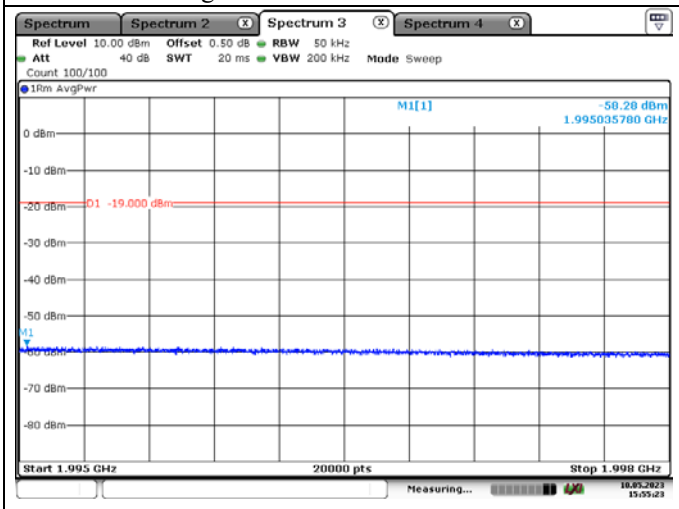
Right Side-WCDMA-Pre AGC



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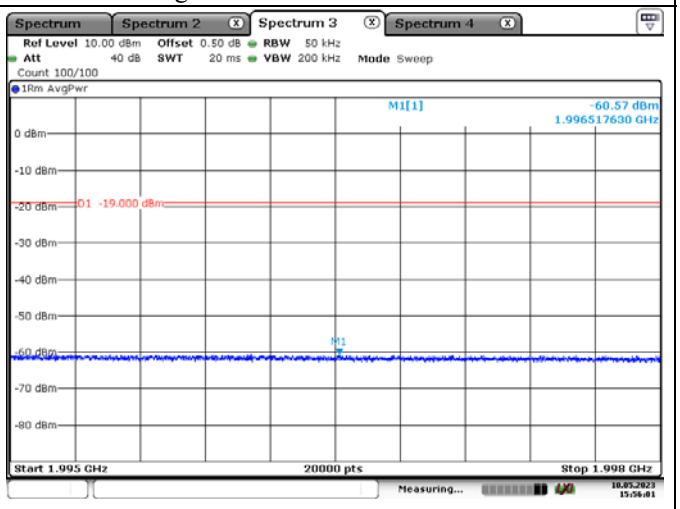
Right Side-WCDMA-Above AGC

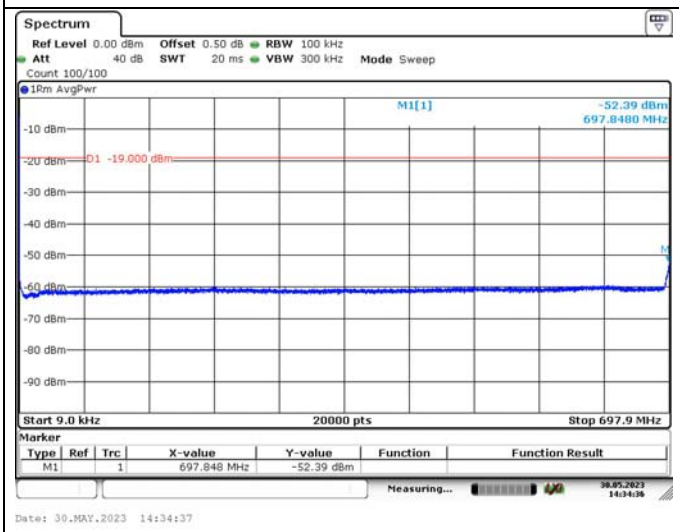


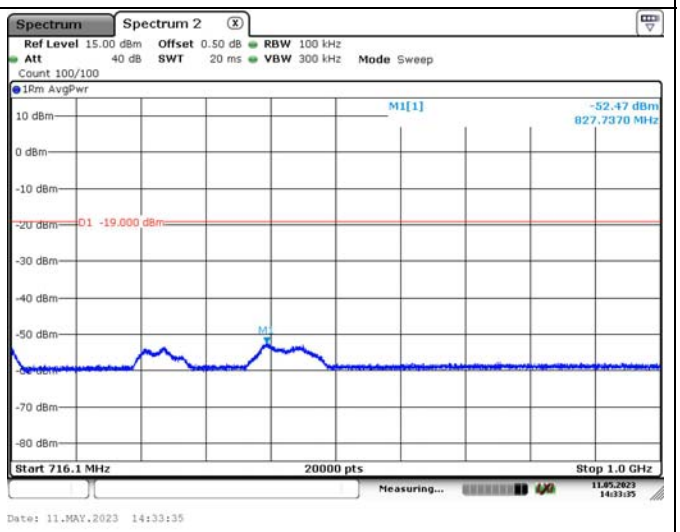
Date: 10.MAY.2023 15:56:01

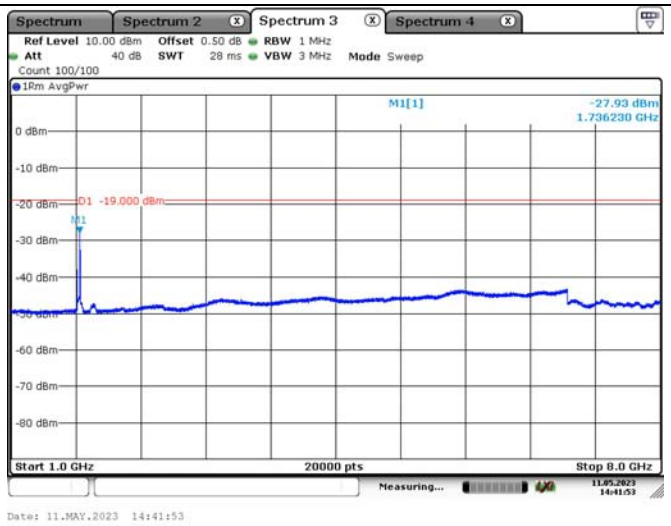
4.6 Spurious Emissions at Antenna Terminals:

Uplink

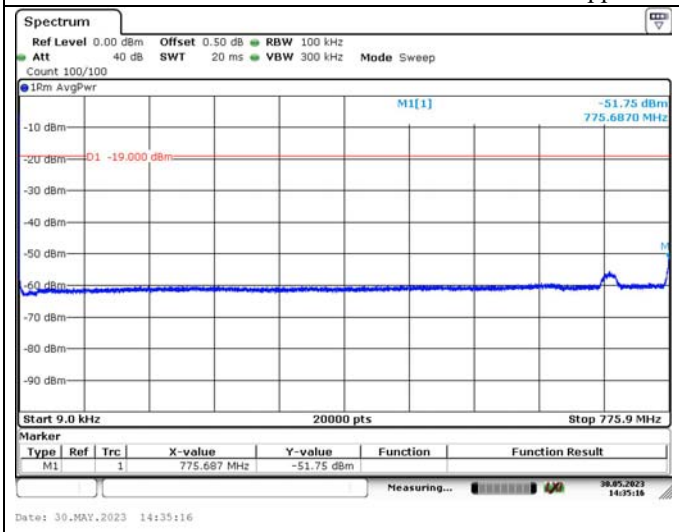
Lower 700MHz Band

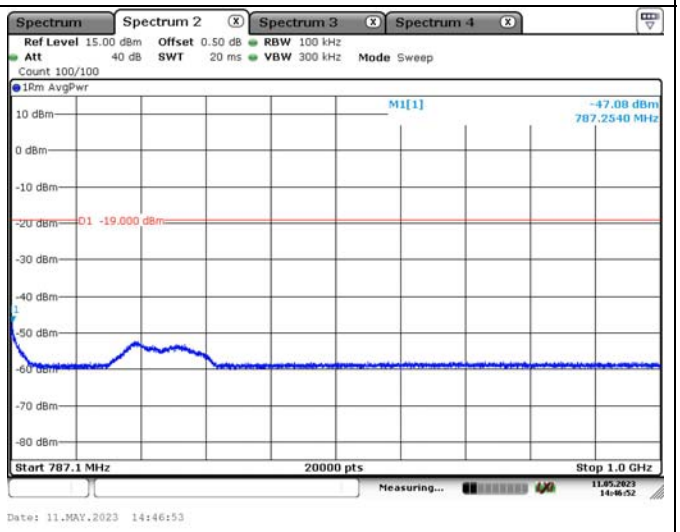


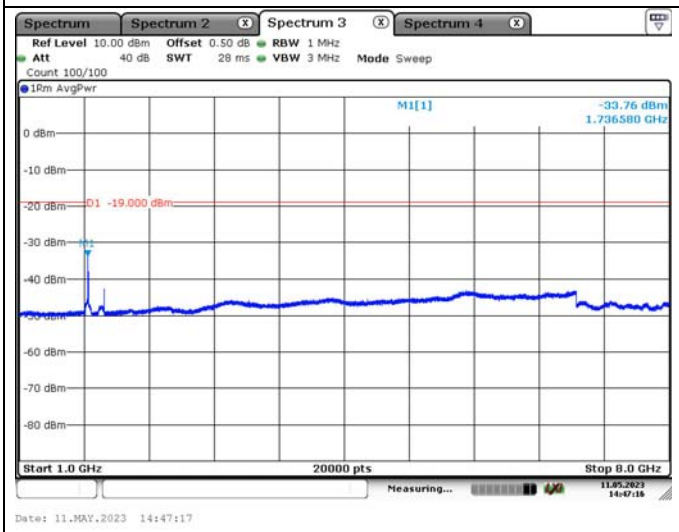


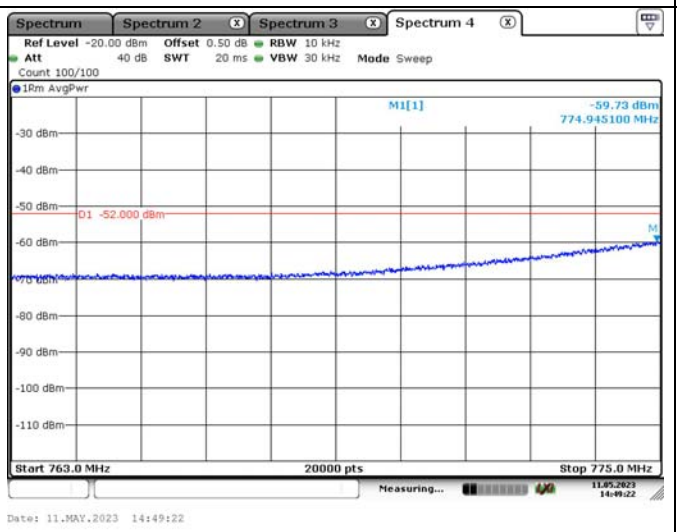


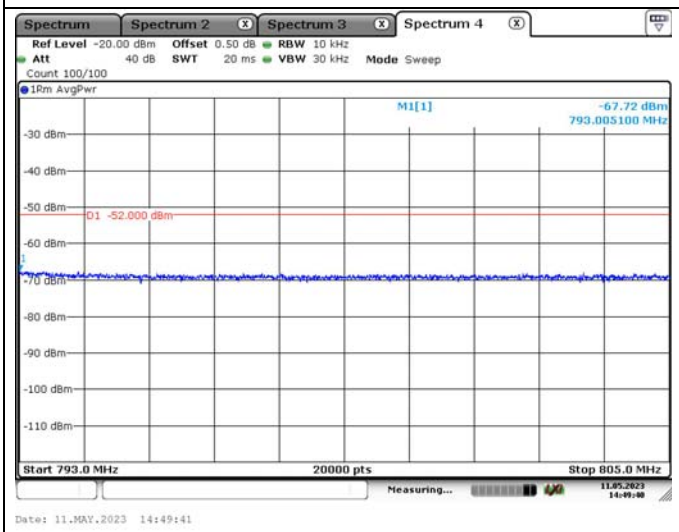
Upper 700MHz Band

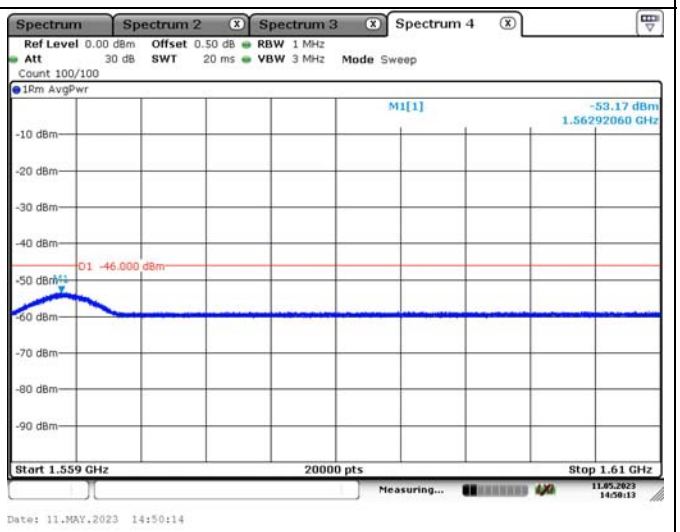




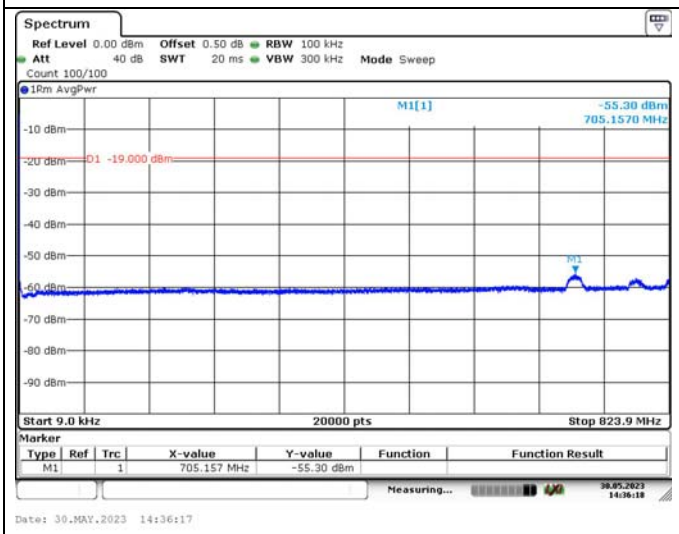


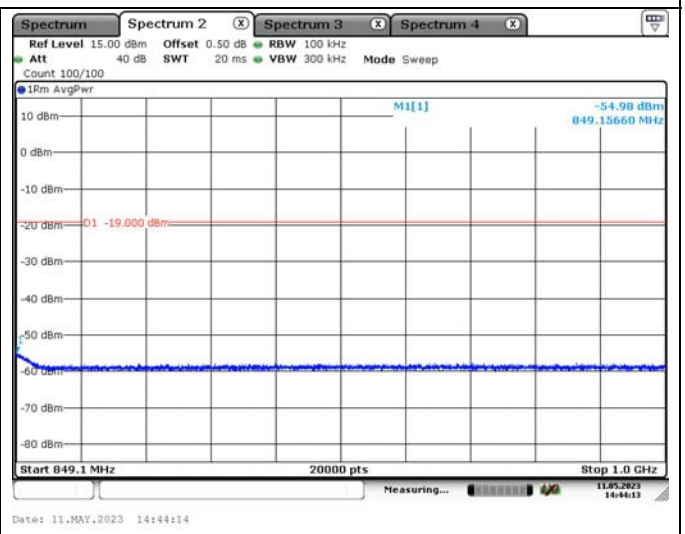


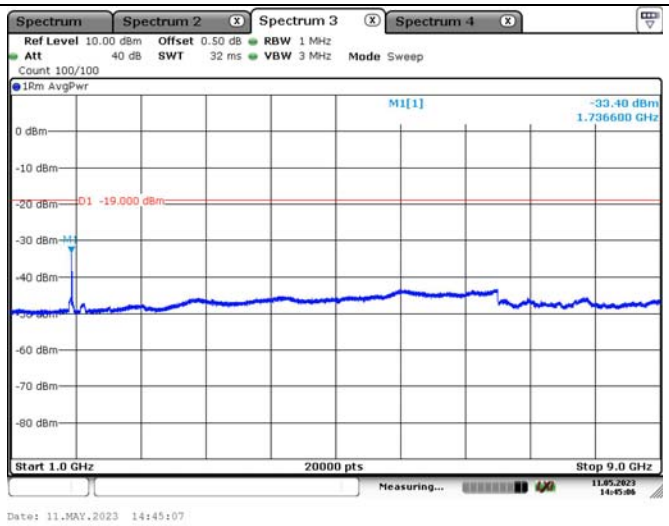




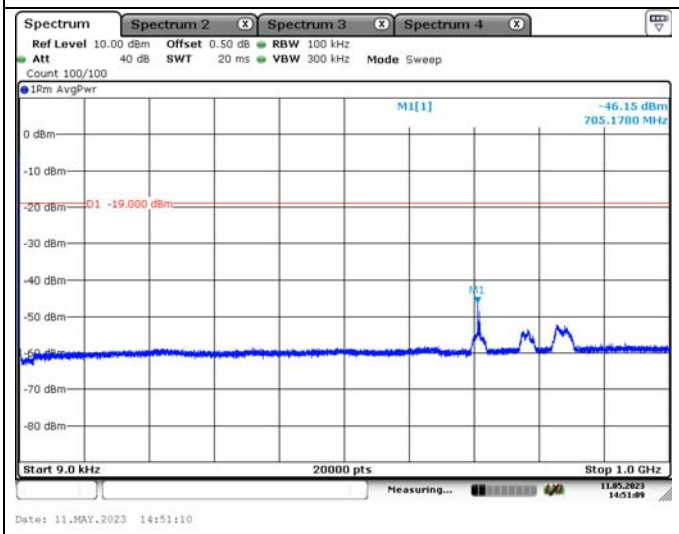
Cellular Band

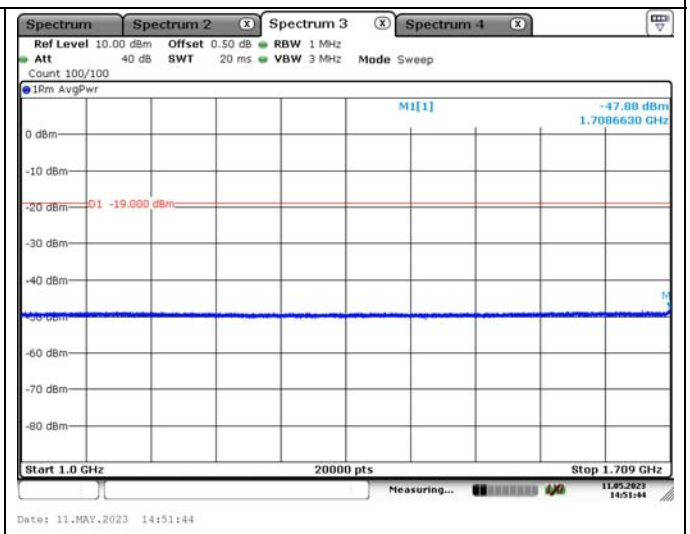


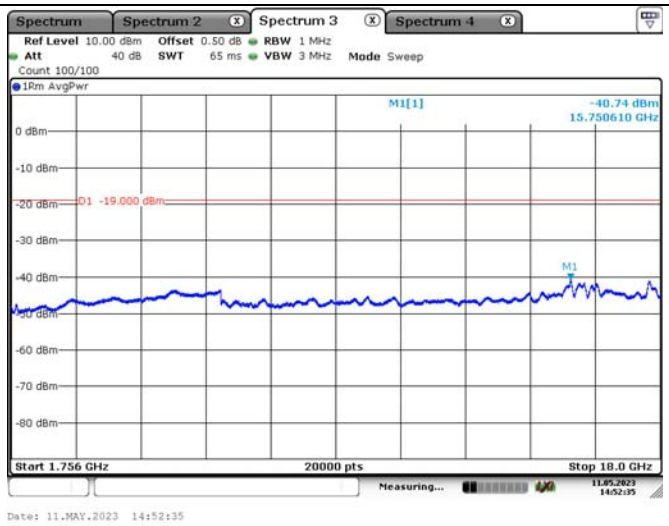




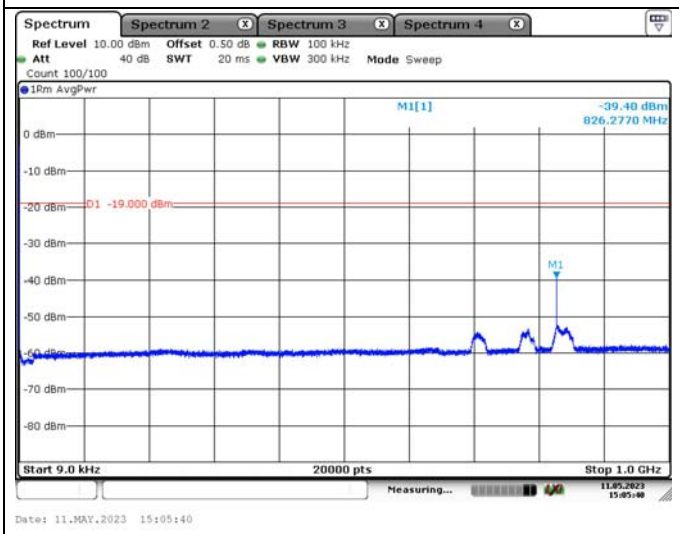
AWS-1 Band

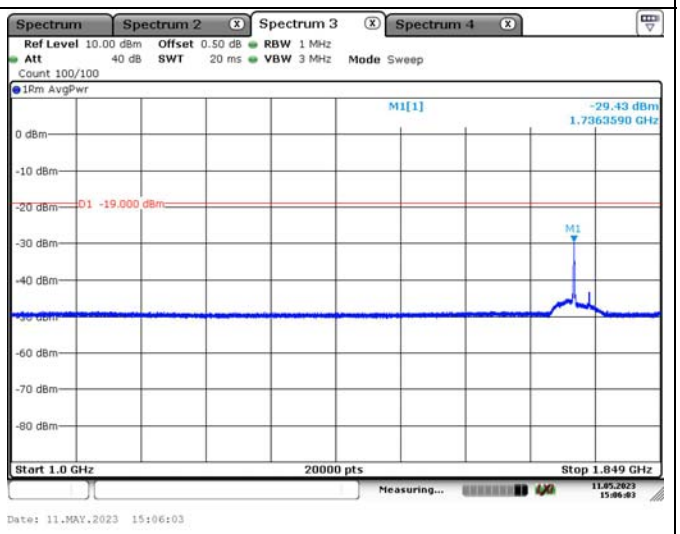

Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.00 dBm Offset 0.50 dB RBW 100 kHz
Att 40 dB SWT 20 ms VBW 300 kHz Mode Sweep
Count 100/100
1Rm AvgPwr
M1[1] -46.15 dBm
705.1780 MHz
D1 -19.000 dBm
Start 9.0 kHz 20000 pts Stop 1.0 GHz
Measuring...
Date: 11.MAY.2023 14:51:10

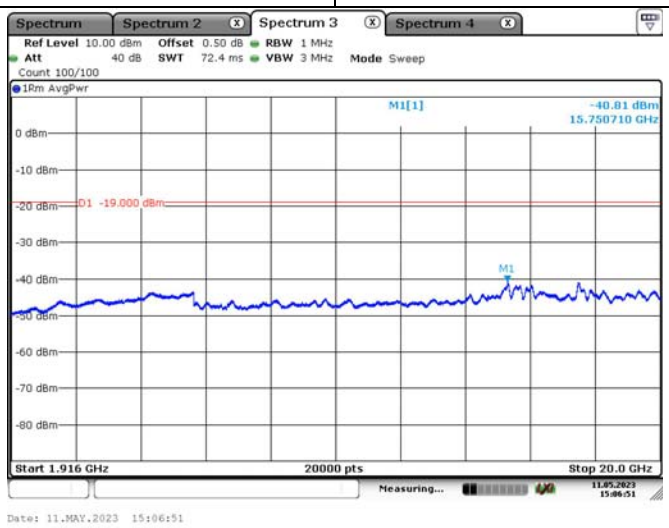

Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.00 dBm Offset 0.50 dB RBW 1 MHz
Att 40 dB SWT 20 ms VBW 3 MHz Mode Sweep
Count 100/100
1Rm AvgPwr
M1[1] -47.88 dBm
1.7086630 GHz
D1 -19.000 dBm
Start 1.0 GHz 20000 pts Stop 1.709 GHz
Measuring...
Date: 11.MAY.2023 14:51:44


Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.00 dBm Offset 0.50 dB RBW 1 MHz
Att 40 dB SWT 65 ms VBW 3 MHz Mode Sweep
Count 100/100
1Rm AvgPwr
M1[1] -40.74 dBm
15.750610 GHz
D1 -19.000 dBm
Start 1.756 GHz 20000 pts Stop 18.0 GHz
Measuring...
Date: 11.MAY.2023 14:52:35

PCS Band

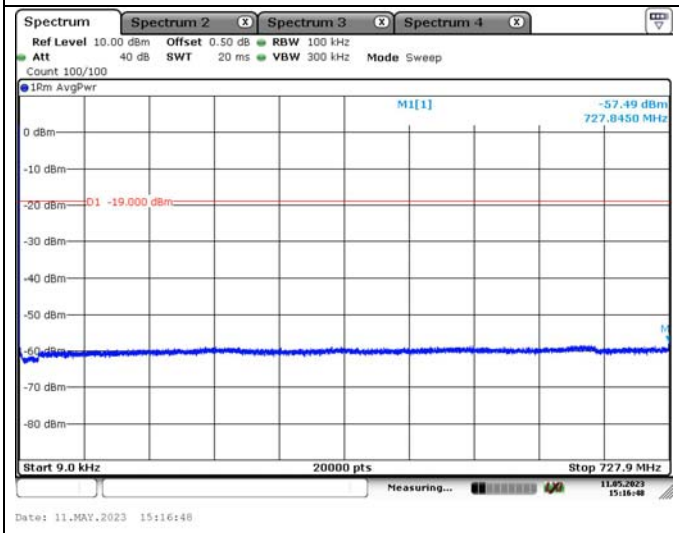

Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.00 dBm Offset 0.50 dB RBW 100 kHz
Att 40 dB SWT 20 ms VBW 300 kHz Mode Sweep
Count 100/100
1Rm AvgPwr
M1[1] -39.40 dBm
826.2770 MHz
D1 -19.000 dBm
M1
Start 9.0 kHz 20000 pts Stop 1.0 GHz
Measuring...
Date: 11.MAY.2023 15:05:40

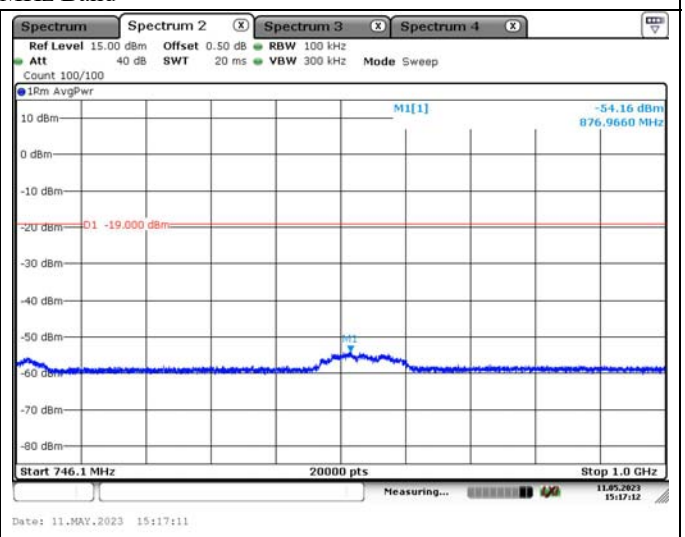

Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.00 dBm Offset 0.50 dB RBW 1 MHz
Att 40 dB SWT 20 ms VBW 3 MHz Mode Sweep
Count 100/100
1Rm AvgPwr
M1[1] -29.43 dBm
1.7363590 GHz
D1 -19.000 dBm
M1
Start 1.0 GHz 20000 pts Stop 1.849 GHz
Measuring...
Date: 11.MAY.2023 15:06:03

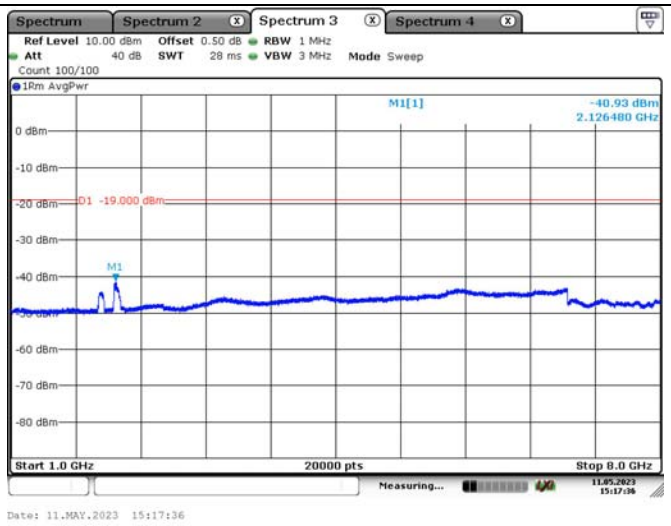

Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.00 dBm Offset 0.50 dB RBW 1 MHz
Att 40 dB SWT 72.4 ms VBW 3 MHz Mode Sweep
Count 100/100
1Rm AvgPwr
M1[1] -40.81 dBm
15.750710 GHz
D1 -19.000 dBm
M1
Start 1.916 GHz 20000 pts Stop 20.0 GHz
Measuring...
Date: 11.MAY.2023 15:06:51

Downlink

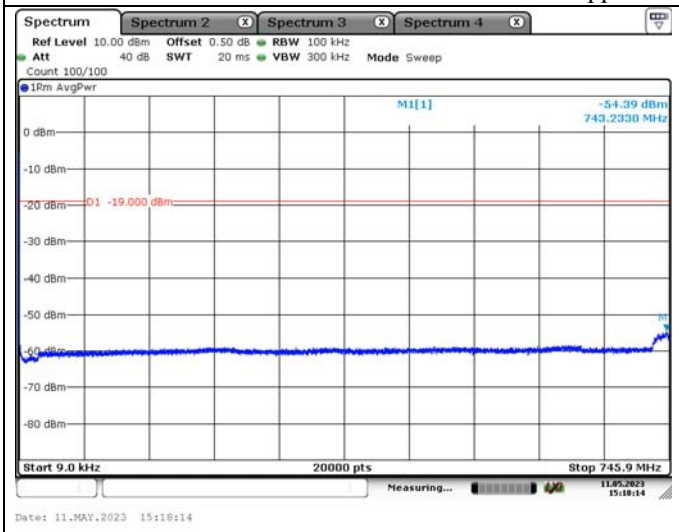
Lower 700MHz Band

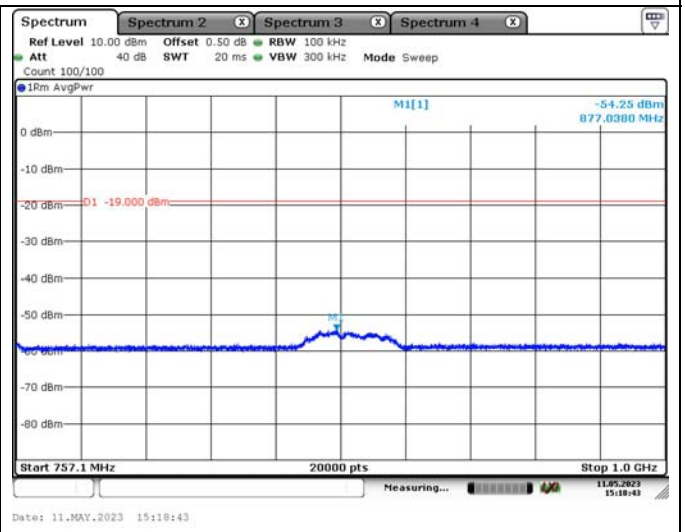


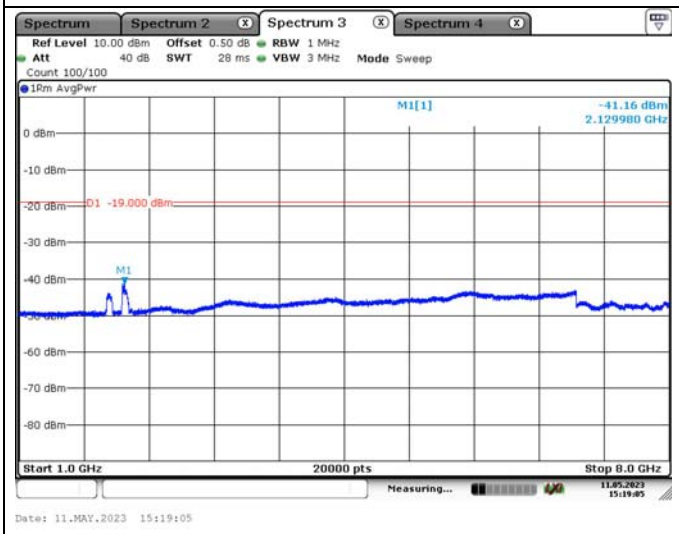


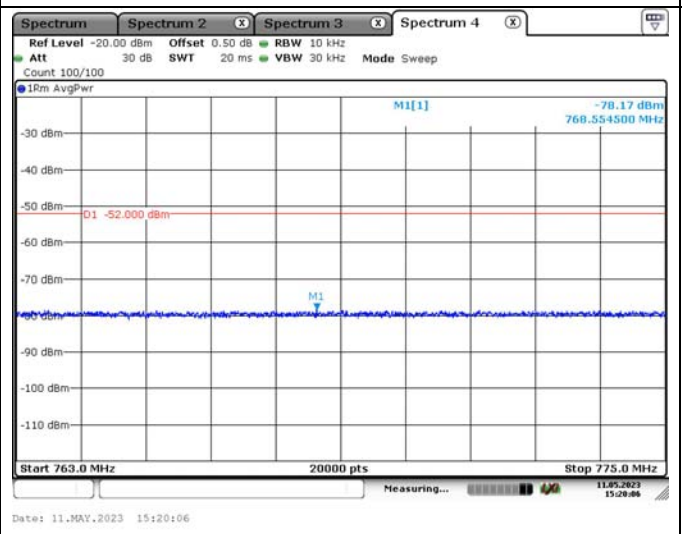


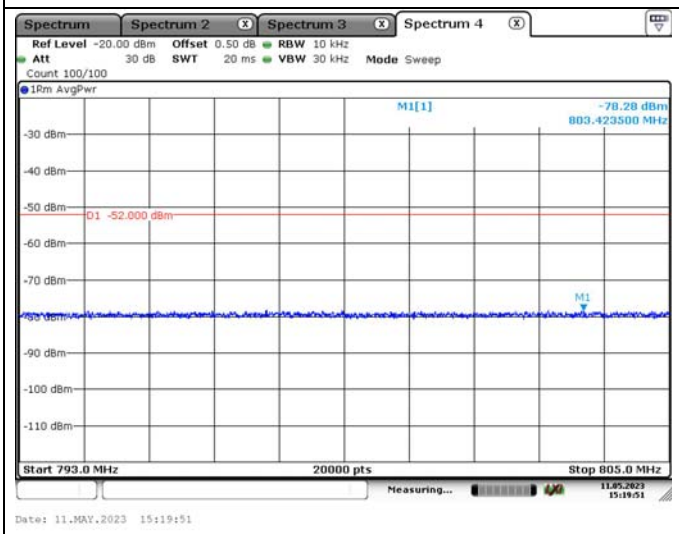
Upper 700MHz Band

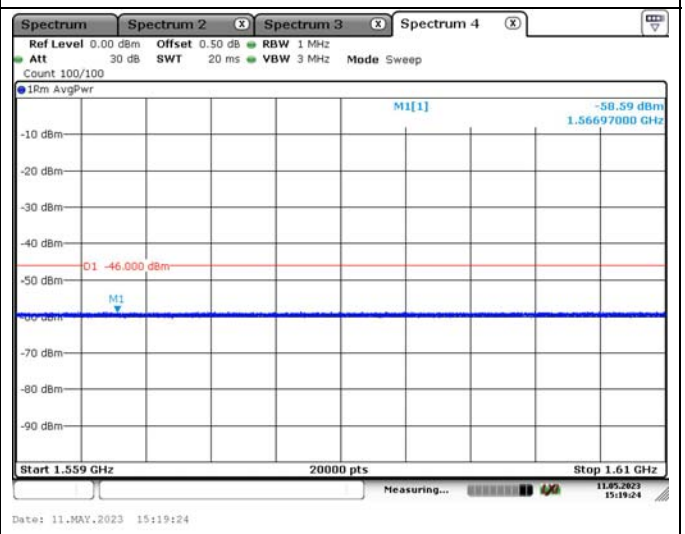




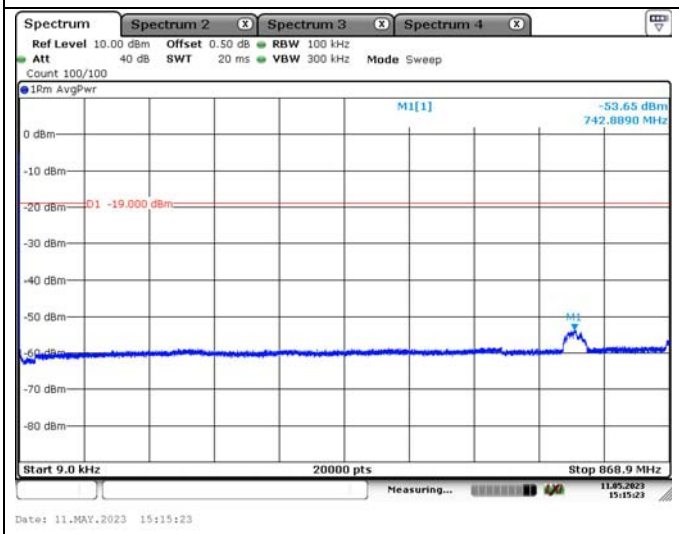


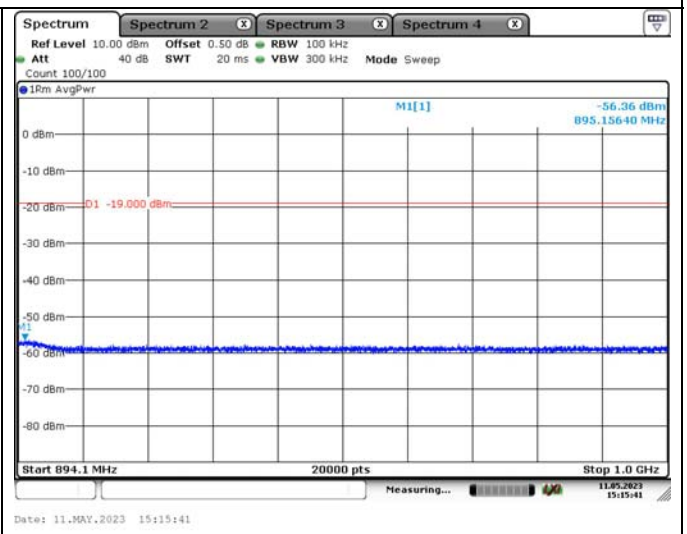


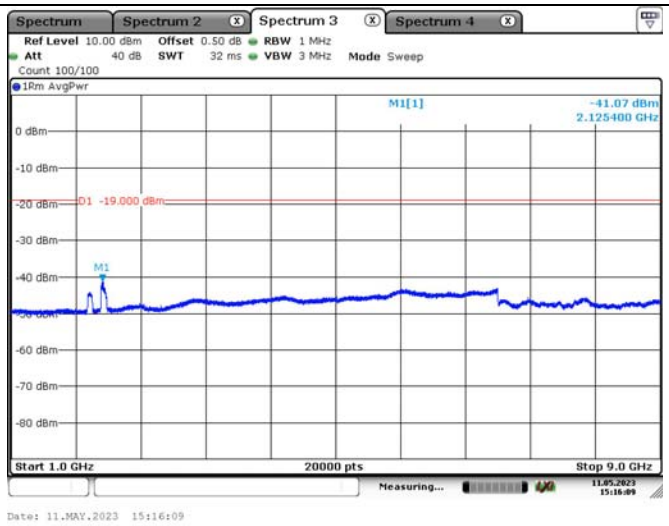




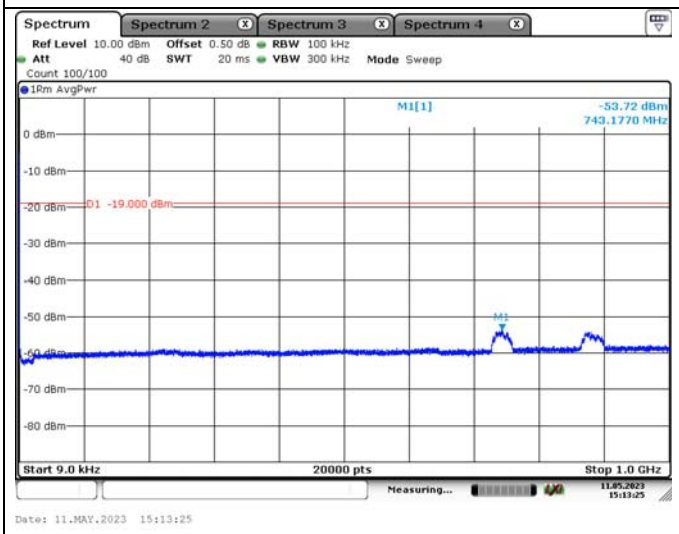
Cellular Band

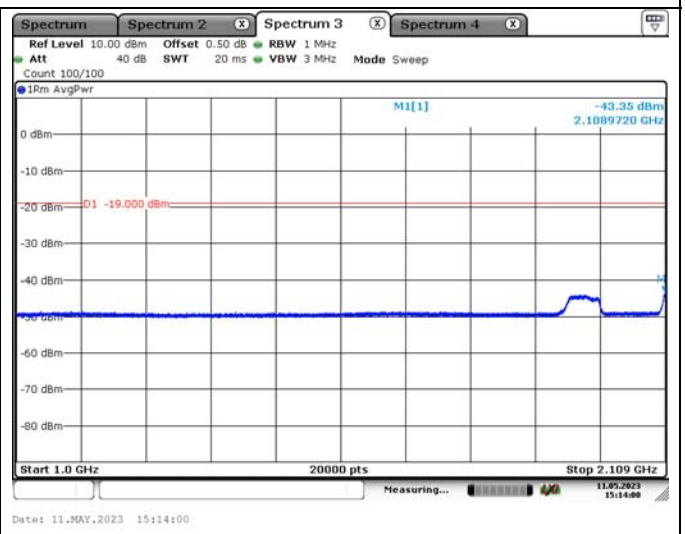


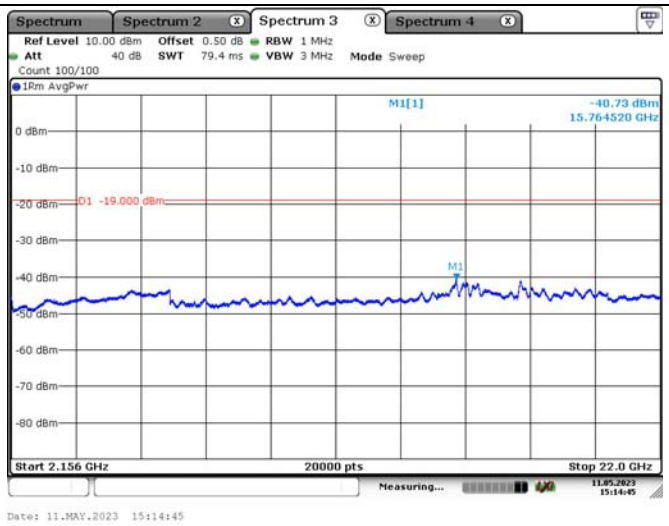




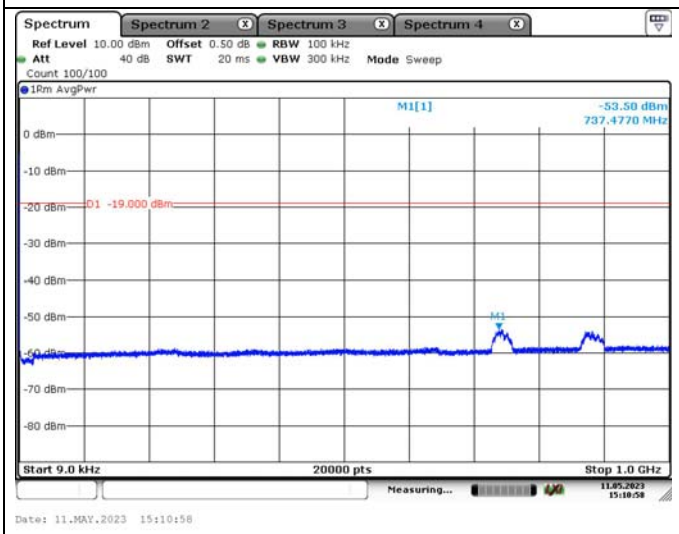
AWS-1 Band

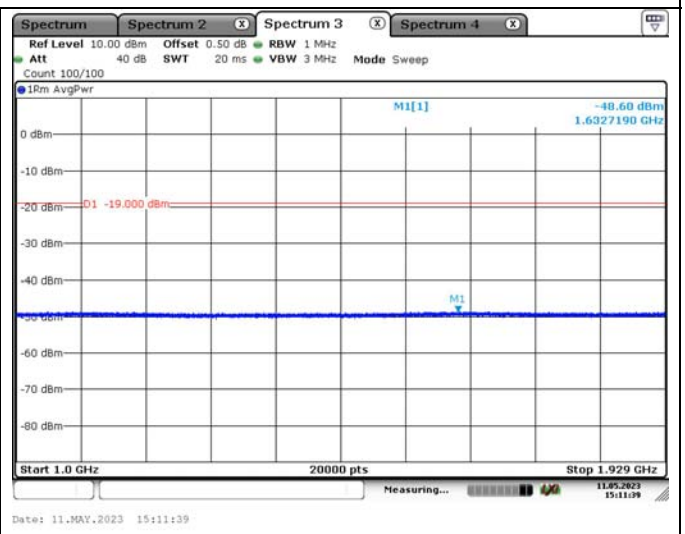

Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.00 dBm Offset 0.50 dB RBW 100 kHz
Att 40 dB SWT 20 ms VBW 300 kHz Mode Sweep
Count 100/100
1Rm AvgPwr
M1[1] -53.72 dBm
743.1770 MHz
D1 -19.000 dBm
Start 9.0 kHz 20000 pts Stop 1.0 GHz
Measuring...
Date: 11.MAY.2023 15:13:25

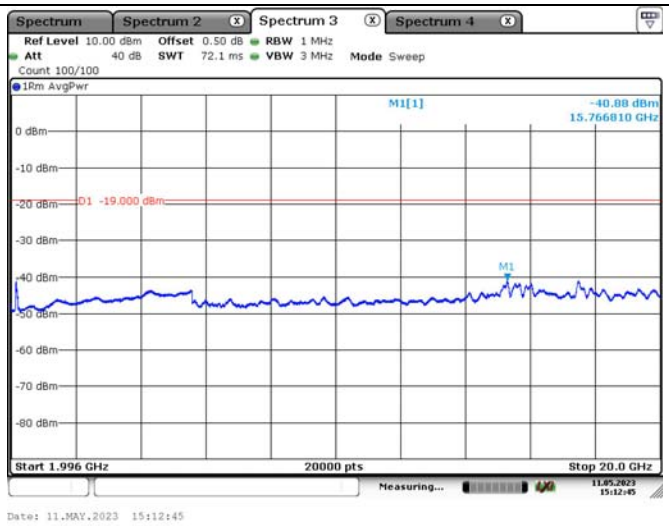

Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.00 dBm Offset 0.50 dB RBW 1 MHz
Att 40 dB SWT 20 ms VBW 3 MHz Mode Sweep
Count 100/100
1Rm AvgPwr
M1[1] -43.35 dBm
2.1089720 GHz
D1 -19.000 dBm
Start 1.0 GHz 20000 pts Stop 2.109 GHz
Measuring...
Date: 11.MAY.2023 15:14:00


Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.00 dBm Offset 0.50 dB RBW 1 MHz
Att 40 dB SWT 79.4 ms VBW 3 MHz Mode Sweep
Count 100/100
1Rm AvgPwr
M1[1] -40.73 dBm
15.764520 GHz
D1 -19.000 dBm
Start 2.156 GHz 20000 pts Stop 22.0 GHz
Measuring...
Date: 11.MAY.2023 15:14:45

PCS Band


Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.00 dBm Offset 0.50 dB RBW 100 kHz
Att 40 dB SWT 20 ms VBW 300 kHz Mode Sweep
Count 100/100
1Rm AvgPwr
M1[1] -53.50 dBm
737.4770 MHz
D1 -19.000 dBm
Start 9.0 kHz 20000 pts Stop 1.0 GHz
Measuring...
Date: 11.MAY.2023 15:10:58


Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.00 dBm Offset 0.50 dB RBW 1 MHz
Att 40 dB SWT 20 ms VBW 3 MHz Mode Sweep
Count 100/100
1Rm AvgPwr
M1[1] -48.60 dBm
1.6327190 GHz
D1 -19.000 dBm
Start 1.0 GHz 20000 pts Stop 1.929 GHz
Measuring...
Date: 11.MAY.2023 15:11:39

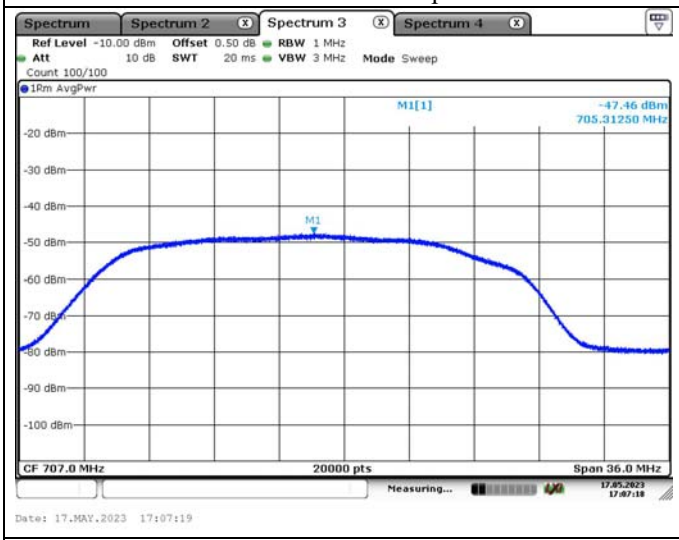

Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.00 dBm Offset 0.50 dB RBW 1 MHz
Att 40 dB SWT 72.1 ms VBW 3 MHz Mode Sweep
Count 100/100
1Rm AvgPwr
M1[1] -40.88 dBm
15.766810 GHz
D1 -19.000 dBm
Start 1.996 GHz 20000 pts Stop 20.0 GHz
Measuring...
Date: 11.MAY.2023 15:12:45

4.7 Noise Limits:

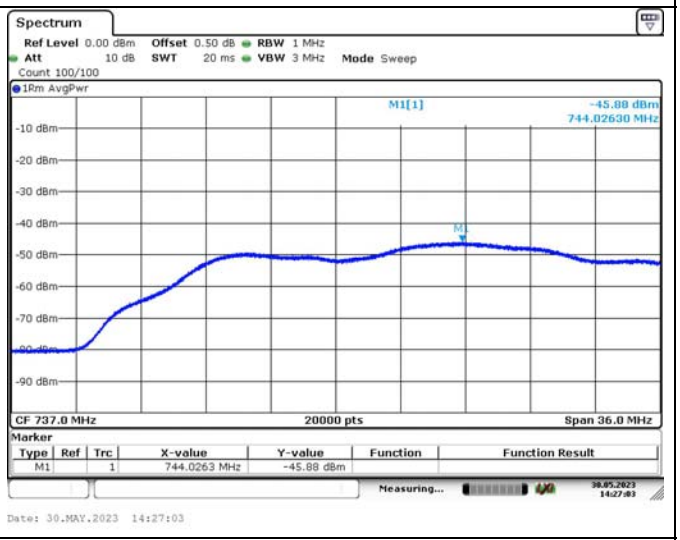
Operation Band	Uplink Noise (dBm/MHz)	Downlink Noise (dBm/MHz)	Limit (dBm/MHz)
Lower 700MHz	-47.46	-45.88	-45.51
Upper 700MHz	-50.23	-45.29	-44.64
Cellular	-48.72	-52.88	-44.05
AWS-1	-41.42	-47.78	-37.73
PCS	-44.43	-42.16	-37.01

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.

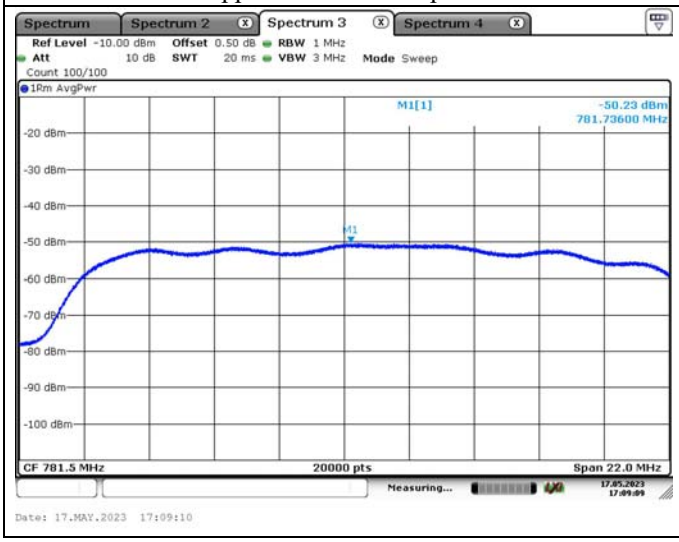
Lower 700M Band-Uplink



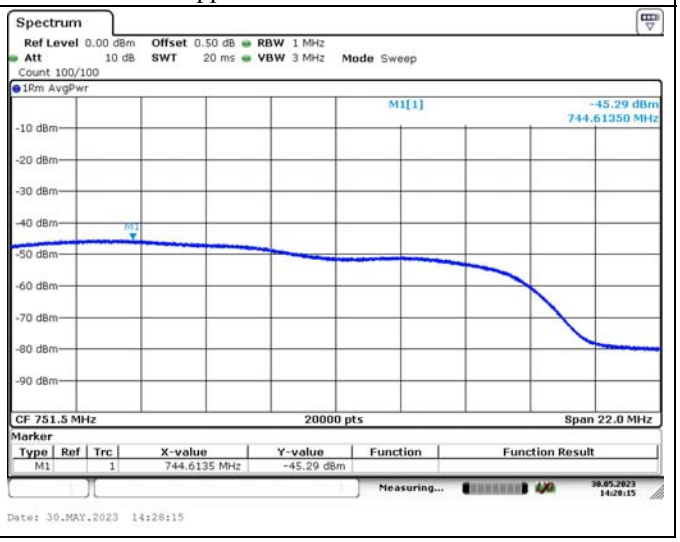
Lower 700M Band-Downlink



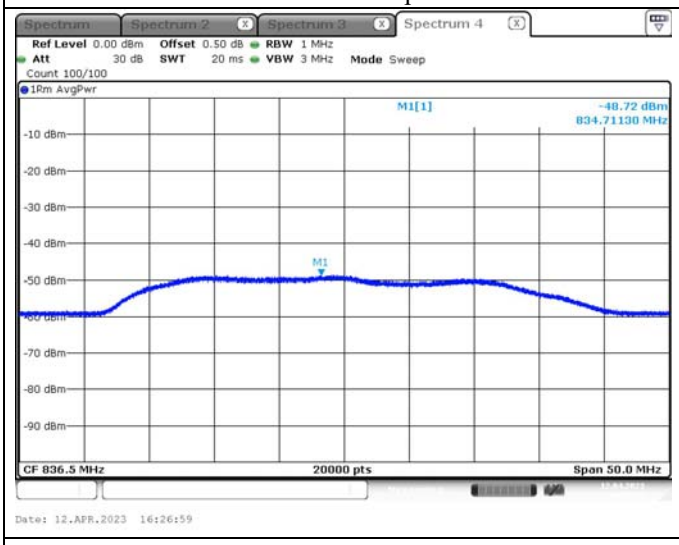
Upper 700M Band-Uplink



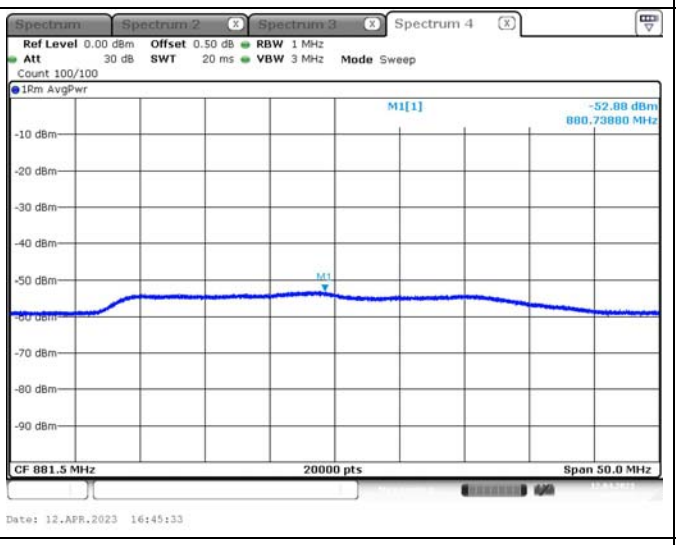
Upper 700M Band-Downlink



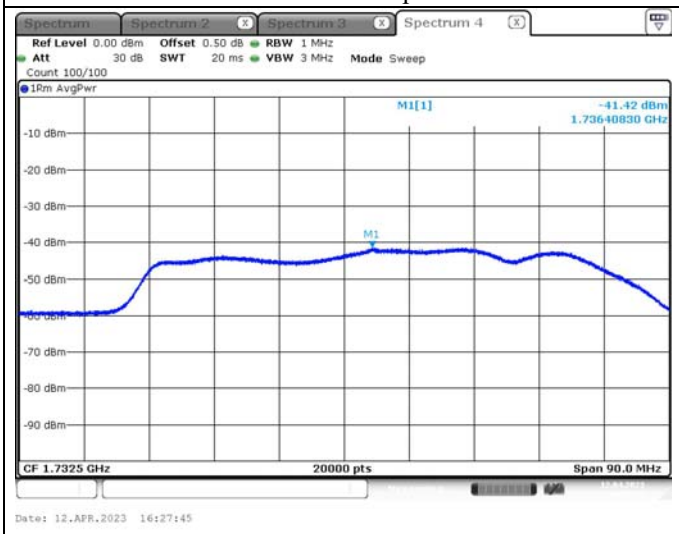
Cellular Band-Uplink



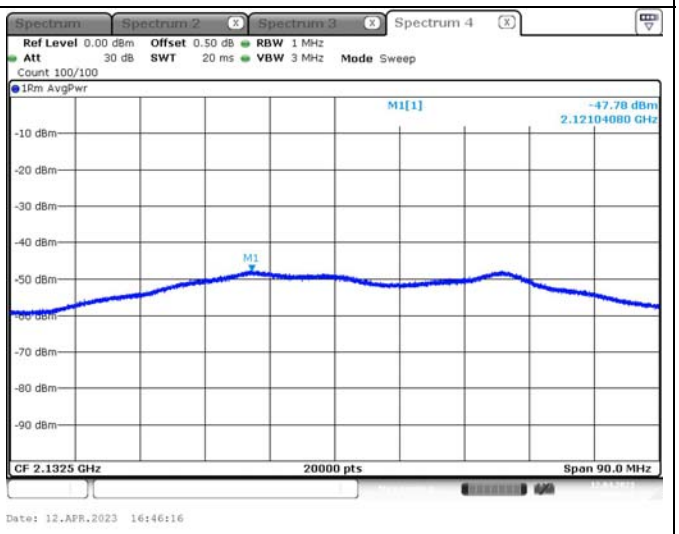
Cellular Band-Downlink



AWS-1 Band-Uplink

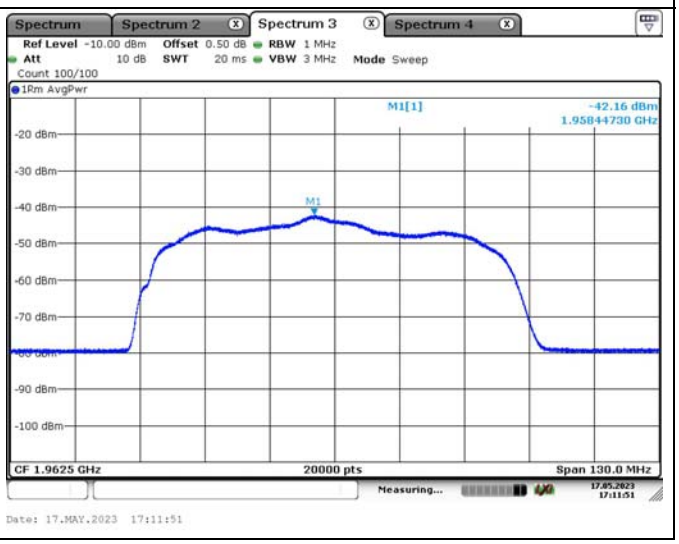


AWS-1 Band-Downlink



PCS Band-Uplink

PCS Band-Downlink



Variable Uplink Noise Limit:

Lower 700

RSSI	Noise	Limit
dBm	dBm	dBm
-90.00	-54.0	-45.51
-80.00	-54.1	-45.51
-70.00	-55.7	-45.51
-60.00	-55.4	-45.51
-57.49	-56.4	-45.51
-50.00	-58.4	-53.00
-40.00	-68.0	-63.00
-33.00	-72.8	-70.00
-30.00	-73.5	-70.00
-20.00	-73.5	-70.00

Upper 700

RSSI	Noise	Limit
dBm	dBm	dBm
-90.00	-49.0	-44.64
-80.00	-50.4	-44.64
-70.00	-51.6	-44.64
-60.00	-56.0	-44.64
-58.36	-57.1	-44.64
-50.00	-57.9	-53.00
-40.00	-65.7	-63.00
-33.00	-72.1	-70.00
-30.00	-73.3	-70.00
-20.00	-73.4	-70.00

Cellular

RSSI	Noise	Limit
dBm	dBm	dBm
-90.00	-49.8	-44.05
-80.00	-52.0	-44.05
-70.00	-52.1	-44.05
-60.00	-55.5	-44.05
-58.95	-57.6	-44.05
-50.00	-60.8	-53.00
-40.00	-65.7	-63.00
-33.00	-72.3	-70.00
-30.00	-73.2	-70.00
-20.00	-73.2	-70.00

AWS-1

RSSI	Noise	Limit
dBm	dBm	dBm
-90.00	-42.8	-37.73
-80.00	-45.9	-37.73
-70.00	-50.6	-37.73
-65.27	-54.1	-37.73
-60.00	-58.6	-43.00
-50.00	-60.9	-53.00
-40.00	-66.8	-63.00
-33.00	-73.4	-70.00
-30.00	-73.4	-70.00
-20.00	-73.4	-70.00

PCS

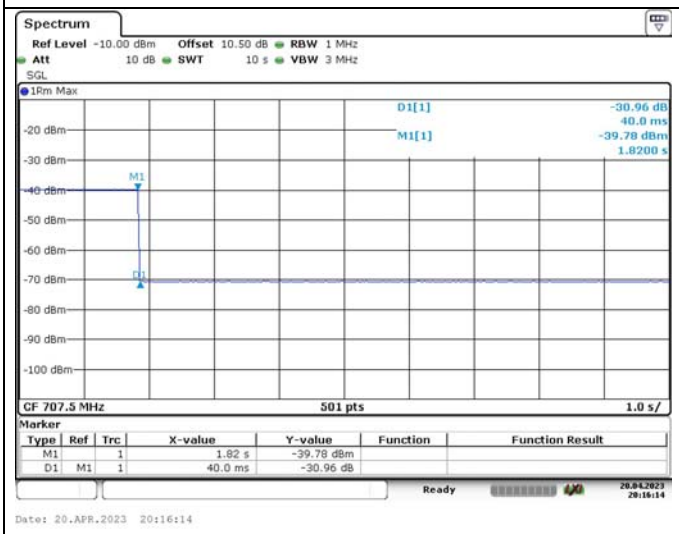
RSSI	Noise	Limit
dBm	dBm	dBm
-90.00	-43.7	-37.02
-80.00	-46.7	-37.02
-70.00	-51.6	-37.02
-65.98	-55.4	-37.02
-60.00	-57.1	-43.00
-50.00	-62.7	-53.00
-40.00	-65.8	-63.00
-33.00	-72.6	-70.00
-30.00	-73.4	-70.00
-20.00	-73.5	-70.00

Note:
According to KDB 935210 D03 Signal Booster Measurements v04r04 Annex D, the Variable uplink Noise limit is −103 dBm/MHz – RSSI in RSSI-Dependent Region, out of RSSI-Dependent Region, it is it is −102.5 dBm/MHz + 20 Log10 (Frequency), where Frequency is the uplink mid-band frequency of the supported spectrum bands in MHz..

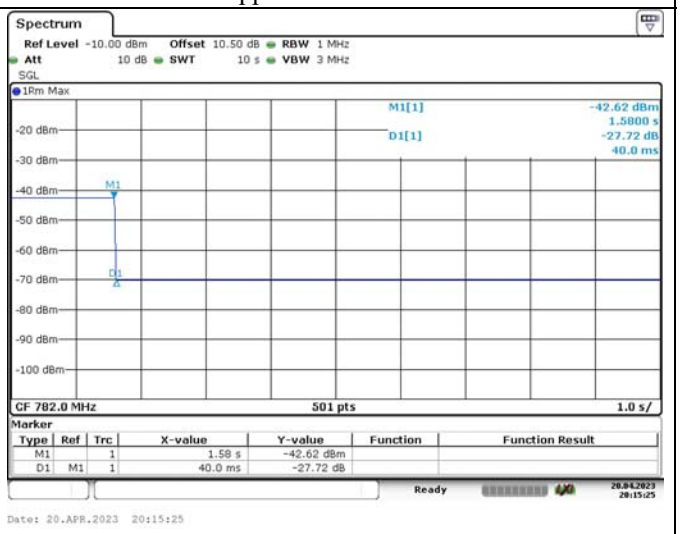
Variable Uplink Noise Timing:

Operating Band	Measured Value	Limit
	s	s
Lower 700MHz	0.04	3
Upper 700MHz	0.04	3
Cellular	0.04	3
AWS-1	0.06	3
PCS	0.04	3

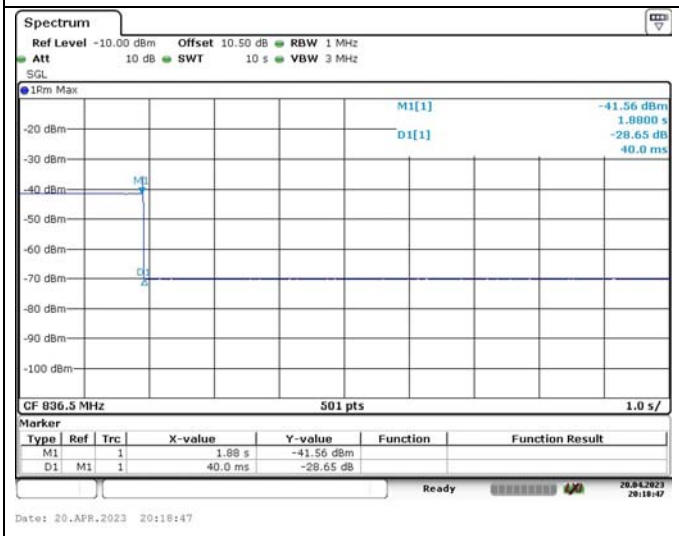
Lower 700MHz Band



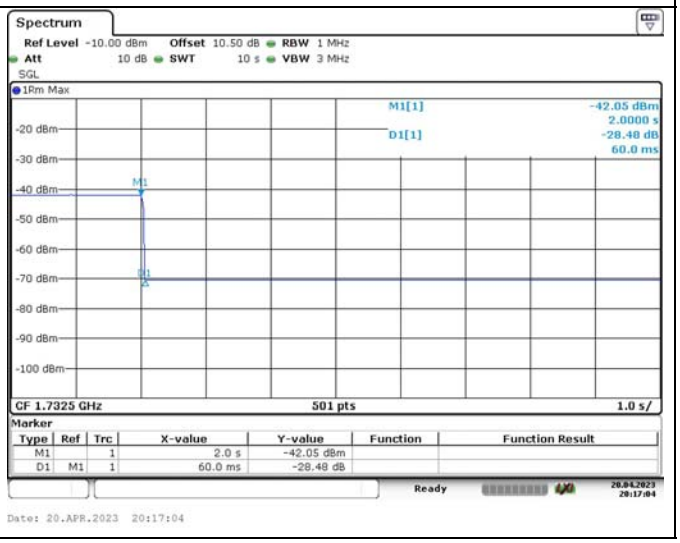
Upper 700MHz Band



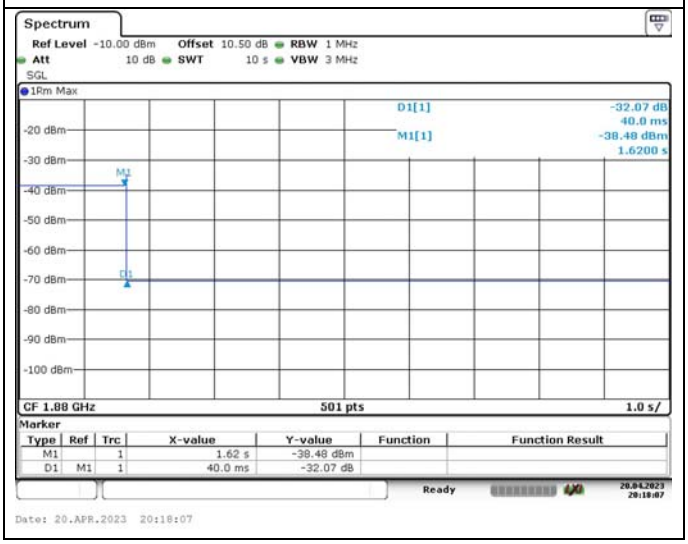
Cellular Band



AWS-1 Band



PCS Band

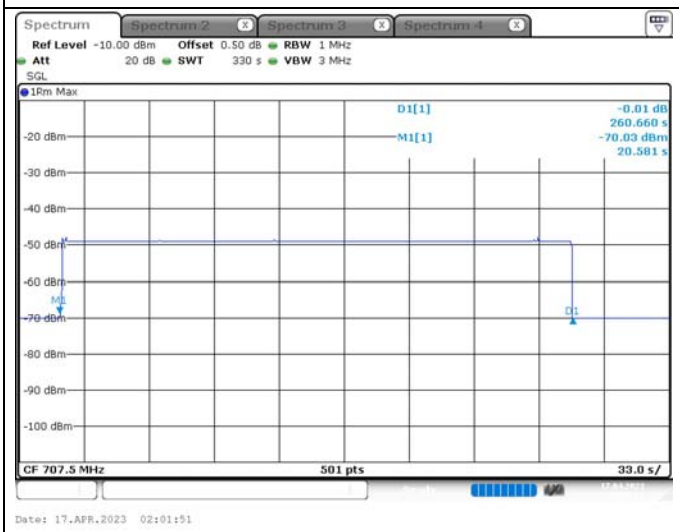


4.8 Uplink Inactivity:

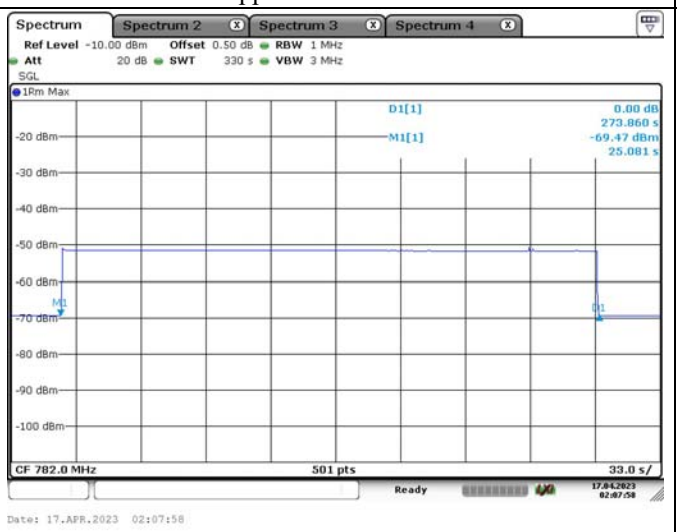
Operation Band	Measured value	Limit
	s	s
Lower 700MHz	260.66	300
Upper 700MHz	273.86	
Cellular	262.64	
AWS-1	264.96	
PCS	262.64	

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

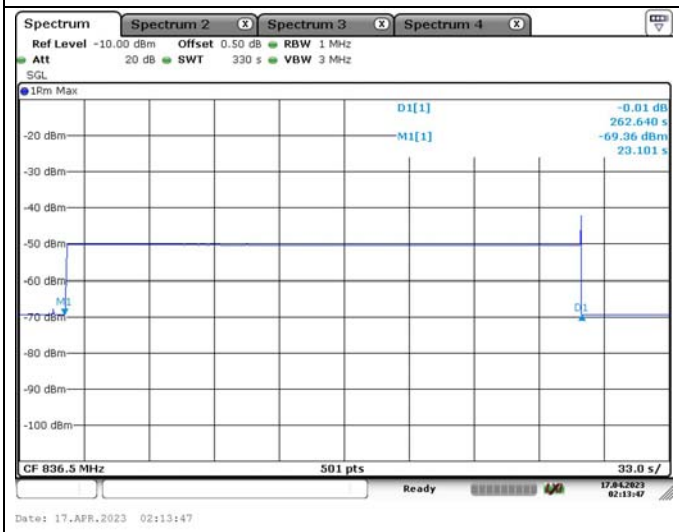
Lower 700MHz Band



Upper 700MHz Band



Cellular Band



AWS-1 Band

PCS Band

4.9 Variable Booster Gain:

MSCL Calculation:

Operation Bands	Frequency	Distance	Path Loss	Inside Antenna Gain	Inside Cable Loss	MSCL
	MHz	m	dB	(dBi)	(dB)	
Lower 700MHz	707	1.0	29.49	6.2	/	23.29
Upper 700MHz	781.5	1.0	30.36	6.2	/	24.16
Cellular	836.5	1.0	30.95	6.2	/	24.75
AWS-1	1732.5	1.0	37.27	7.8	/	29.47
PCS	1882.5	1.0	37.99	8.7	/	29.29

Note:
Path loss=20logf+20logd-27.5
f = frequency in MHz
d = separation distance in meters, please refer to the user manual
MSCL= Path loss - Mobile Antenna Gain(0dBi)+Indoor Cable Loss - Indoor Antenna Gain
The Inside Cable Loss was including in the inside Antenna Gain
The Minimum MSCL was calculated and used according to the manufacturer`s specification.

Variable Booster Gain:

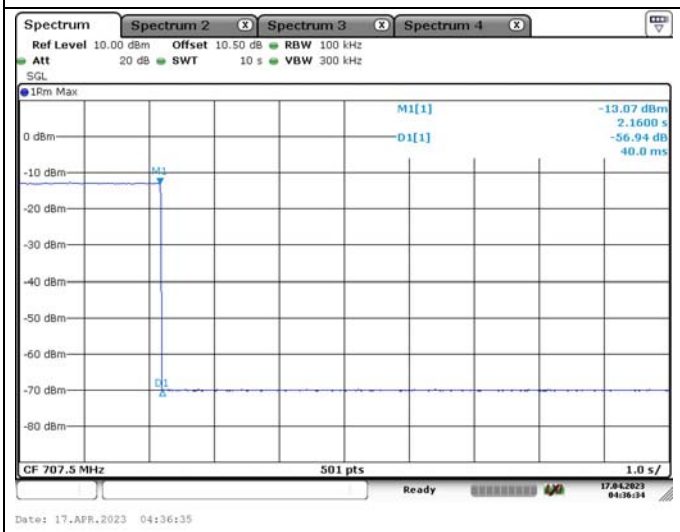
Operation Bands	RSSI	P_{in}	P_{out}	MSCL	Measured Value	Limit	Margin
	dBm	dBm	dBm	dB	dB	dB	dB
Lower 700MHz	-80	-43.8	9.7	23.29	53.5	69.29	15.79
	-70	-43.8	9.6	23.29	53.4	59.29	5.89
	-66	-43.8	9.4	23.29	53.2	55.29	2.09
	-60	-43.8	4.8	23.29	48.6	49.29	0.69
	-58	-43.8	3.2	23.29	47	47.29	0.29
	-56	-43.8	0.8	23.29	44.6	45.29	0.69
Upper 700MHz	-80	-41.8	9.8	24.16	51.6	70.16	18.56
	-70	-41.8	9.6	24.16	51.4	60.16	8.76
	-66	-41.8	9.5	24.16	51.3	56.16	4.86
	-60	-41.8	5.2	24.16	47	50.16	3.16
	-58	-41.8	4.2	24.16	46	48.16	2.16
	-56	-41.8	0.7	24.16	42.5	46.16	3.66
Cellular	-80	-40.7	9.5	24.75	50.2	70.75	20.55
	-70	-40.7	9.4	24.75	50.1	60.75	10.65
	-60	-40.7	8.7	24.75	49.4	50.75	1.35
	-58	-40.7	4.3	24.75	45	48.75	3.75
	-57	-40.7	2.1	24.75	42.8	47.75	4.95
	-56	-40.7	0.8	24.75	41.5	46.75	5.25
AWS-1	-80	-48.8	9.6	29.47	58.4	75.47	17.07
	-70	-48.8	8.8	29.47	57.6	65.47	7.87
	-66	-48.8	7.4	29.47	56.2	61.47	5.27
	-60	-48.8	5.4	29.47	54.2	55.47	1.27
	-59	-48.8	4.5	29.47	53.3	54.47	1.17
	-61	-48.8	2.4	29.47	51.2	56.47	5.27
PCS	-80	-34.9	12.1	29.29	47	75.29	28.29
	-70	-34.9	10.5	29.29	45.4	65.29	19.89
	-66	-34.9	7.5	29.29	42.4	61.29	18.89
	-60	-34.9	6.8	29.29	41.7	55.29	13.59
	-59	-34.9	4.6	29.29	39.5	54.29	14.79
	-58	-34.9	2.4	29.29	37.3	53.29	15.99

Note: According to KDB 935210 D03 Signal Booster Measurements v04r04 Annex D
Variable booster gain Limit: -34 dB - RSSI + MSCL.

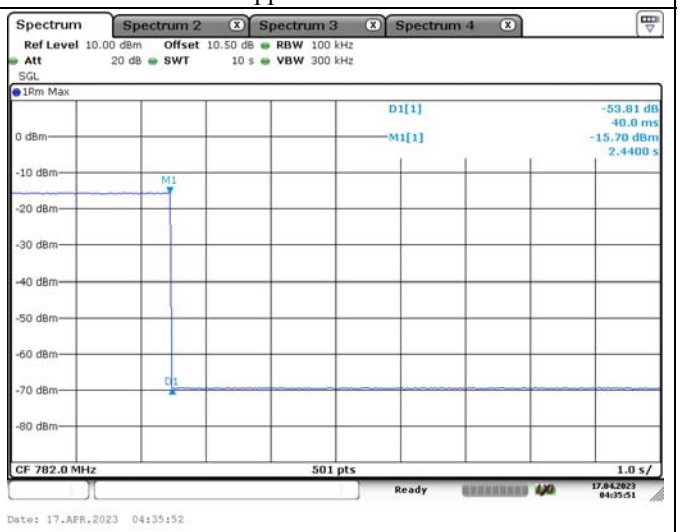
Variable Gain Timing:

Operation Band	Measured Value (s)	Limit (s)
Lower 700MHz	0.04	3
Upper 700MHz	0.04	3
Cellular	0.04	3
AWS-1	0.02	3
PCS	0.02	3
Note: The uplink noise decreases to the specified level within 3 seconds for fixed devices.		

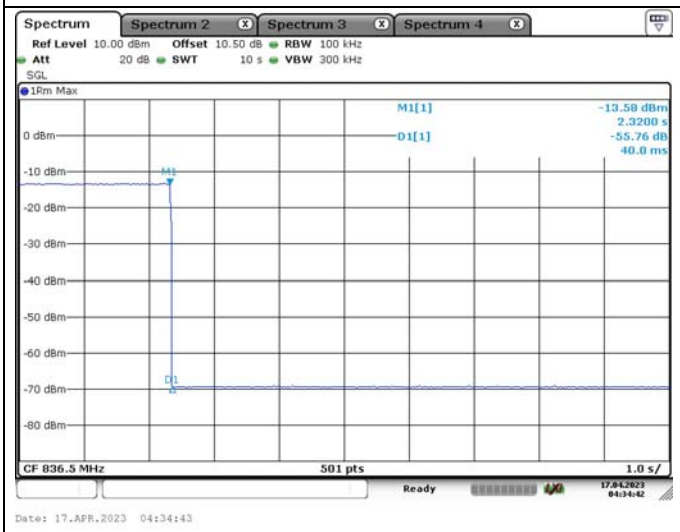
Lower 700M Band



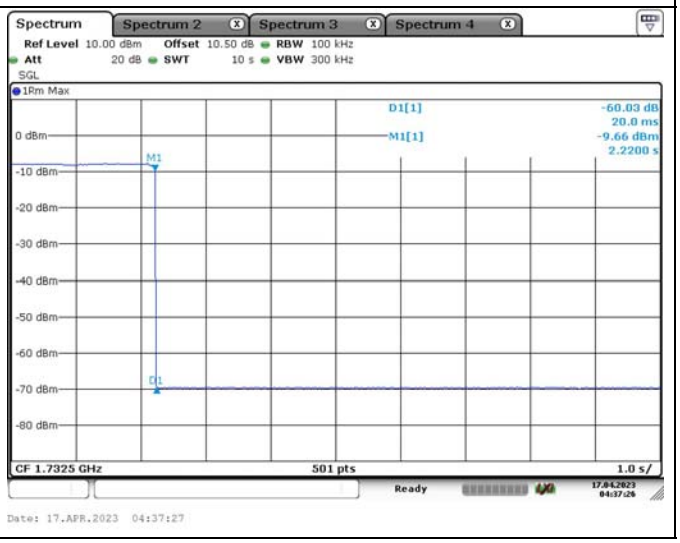
Upper 700M Band



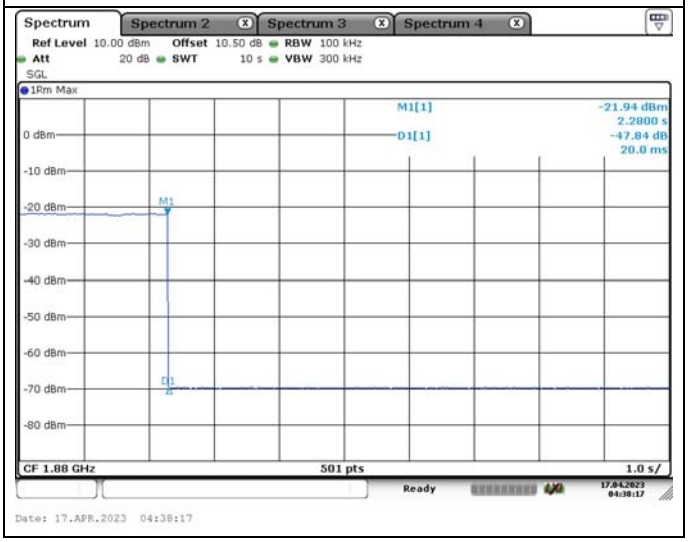
Cellular Band



AWS-1 Band



PCS Band

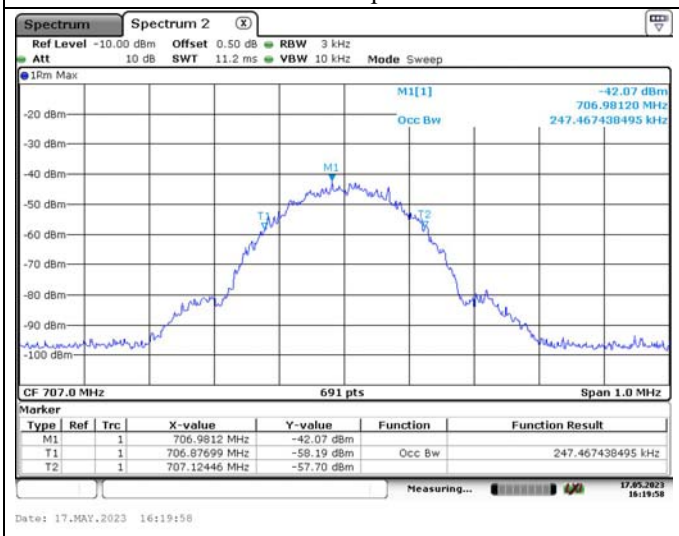


4.10 Occupied Bandwidth:

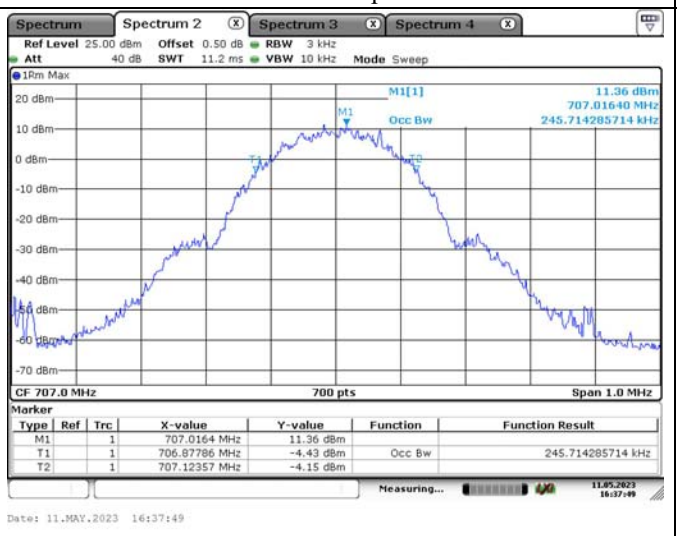
Mode	Operation Band	Signal Type	Input	Output
			MHz	MHz
Uplink	Lower 700MHz	GSM	0.247	0.246
		CDMA	1.185	1.196
		WCDMA	4.096	4.114
	Upper 700MHz	GSM	0.246	0.244
		CDMA	1.190	1.191
		WCDMA	4.139	4.086
	Cellular	GSM	0.245	0.246
		CDMA	1.190	1.191
		WCDMA	4.096	4.114
	AWS-1	GSM	0.245	0.246
		CDMA	1.185	1.217
		WCDMA	4.096	4.186
	PCS	GSM	0.246	0.247
		CDMA	1.190	1.200
		WCDMA	4.110	4.129
Downlink	Lower 700MHz	GSM	0.247	0.246
		CDMA	1.190	1.187
		WCDMA	4.139	4.129
	Upper 700MHz	GSM	0.246	0.246
		CDMA	1.190	1.183
		WCDMA	4.124	4.100
	Cellular	GSM	0.247	0.246
		CDMA	1.194	1.179
		WCDMA	4.139	4.086
	AWS-1	GSM	0.247	0.247
		CDMA	1.190	1.191
		WCDMA	4.139	4.100
	PCS	GSM	0.247	0.246
		CDMA	1.190	1.187
		WCDMA	4.124	4.114

Uplink:
Lower 700M Band

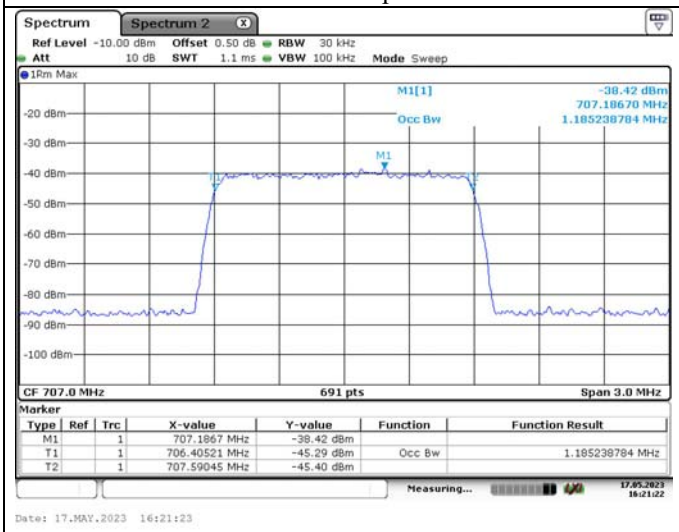
GSM-Input



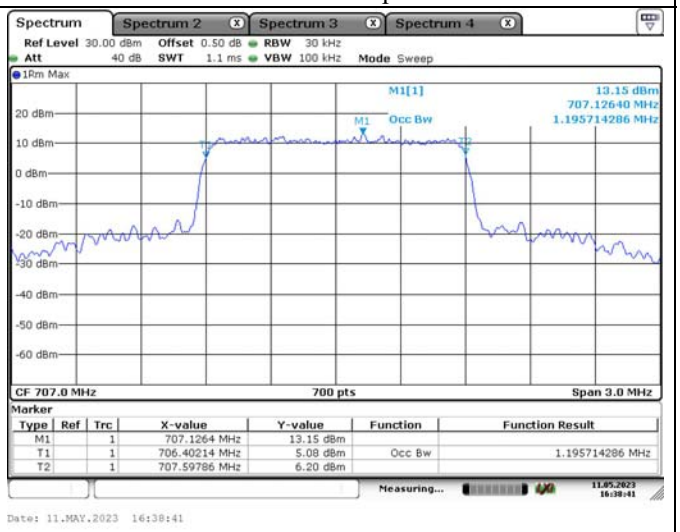
GSM-Output



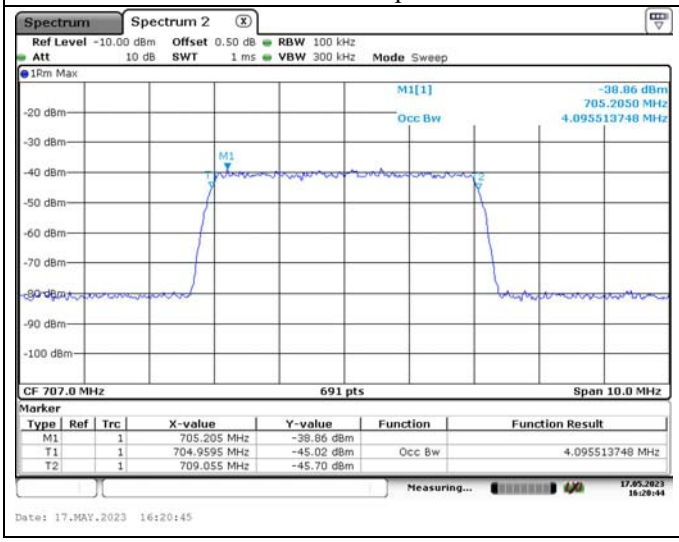
CDMA-Input



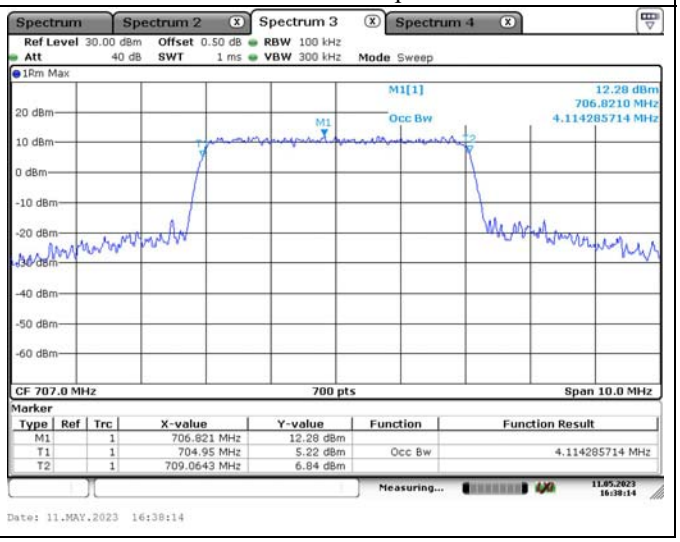
CDMA-Output



WCDMA-Input

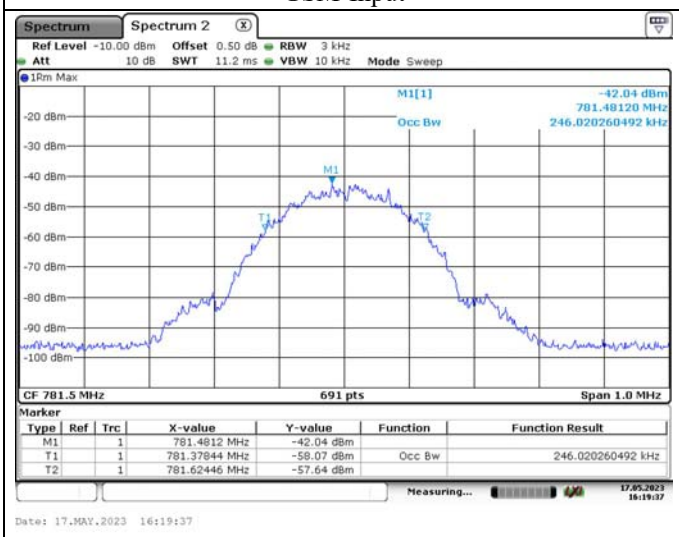


WCDMA-Output

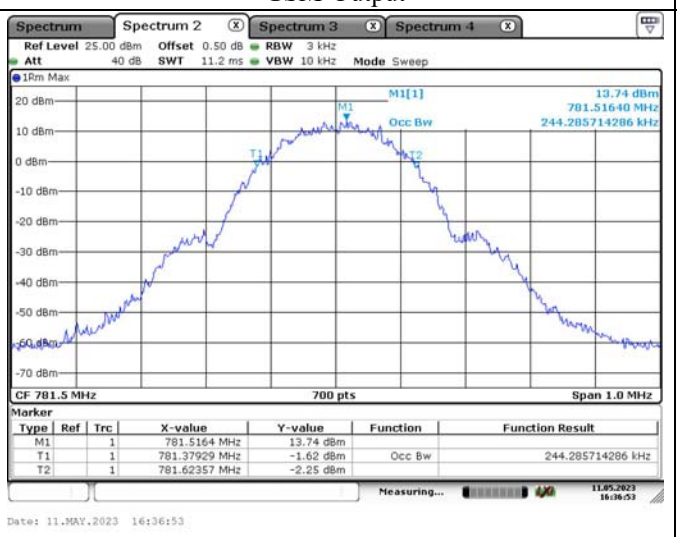


Upper 700M Band

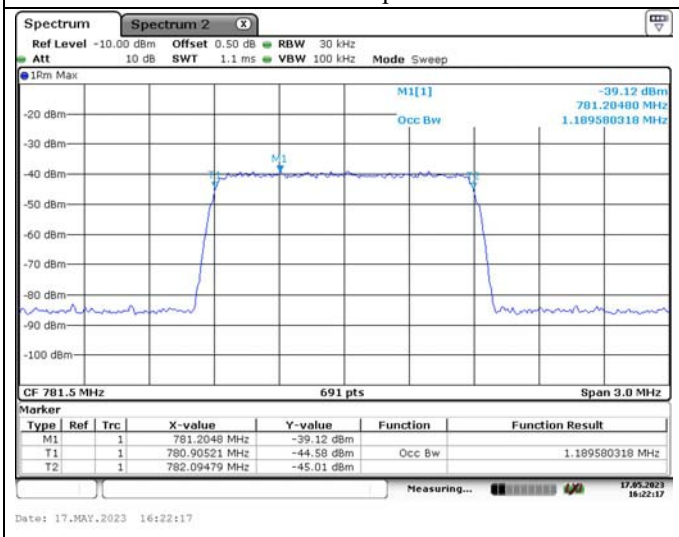
GSM-Input



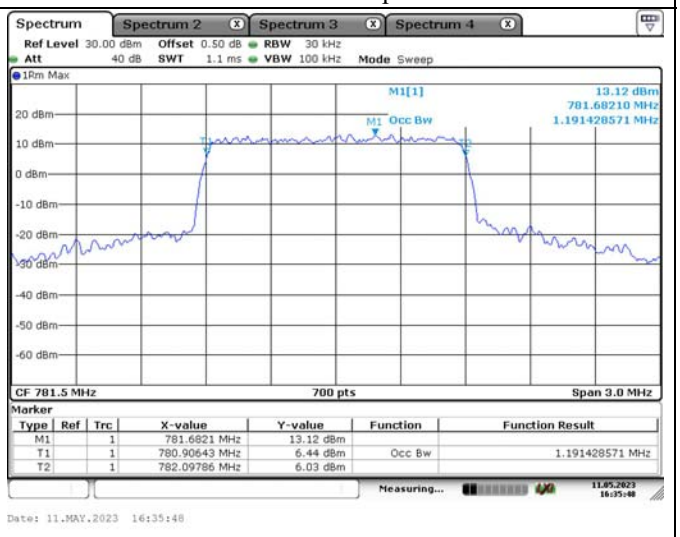
GSM-Output



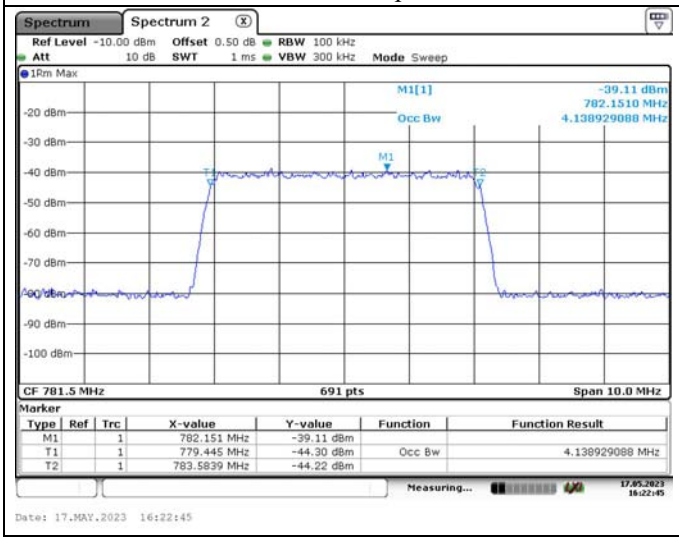
CDMA-Input



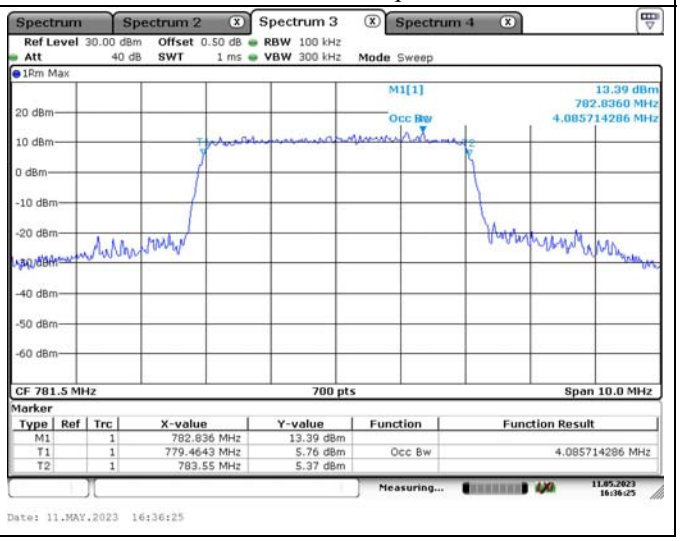
CDMA-Output



WCDMA-Input

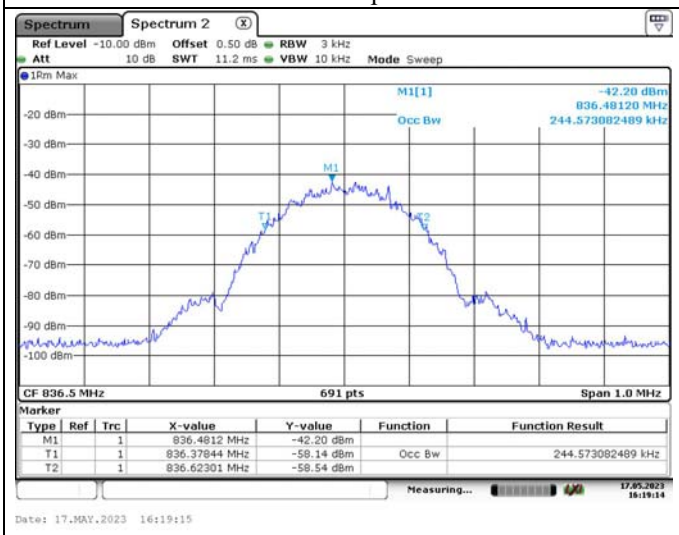


WCDMA-Output

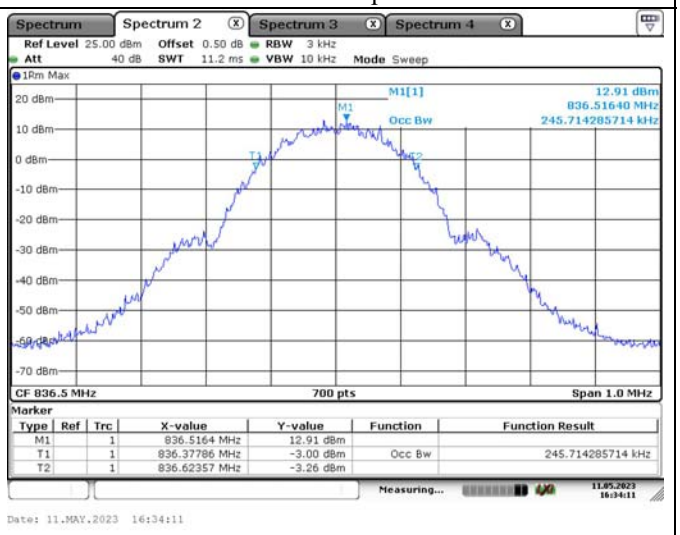


Cellular Band

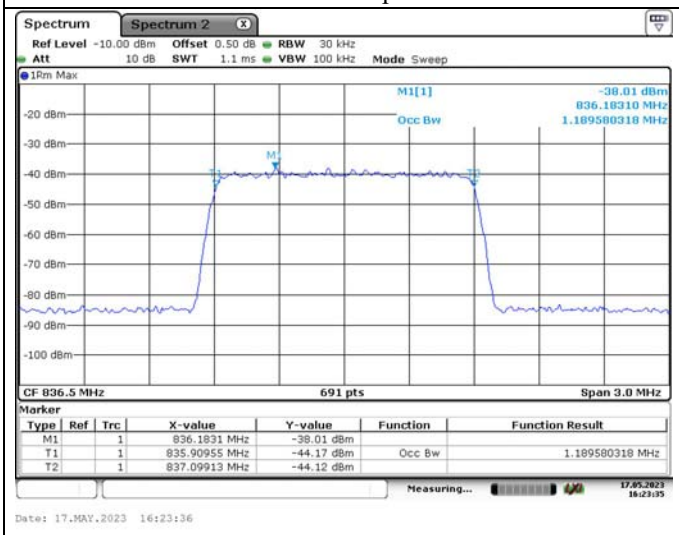
GSM-Input



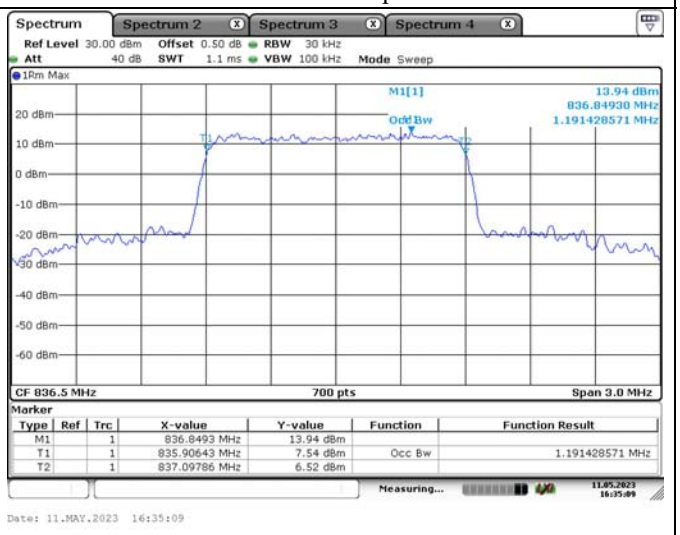
GSM-Output



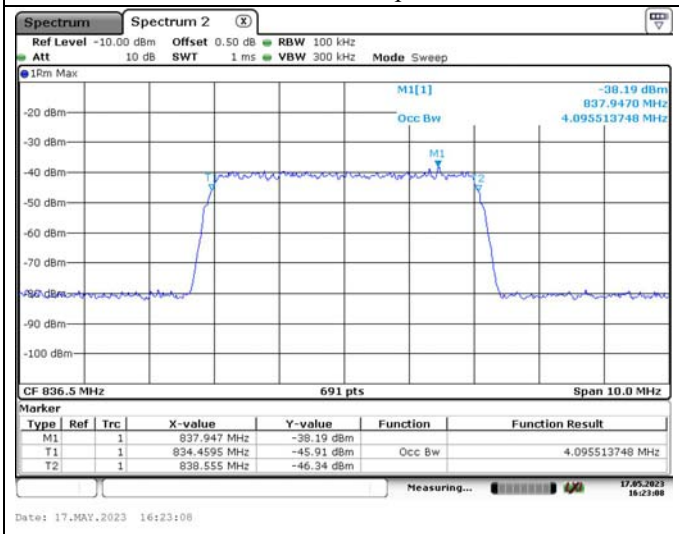
CDMA-Input



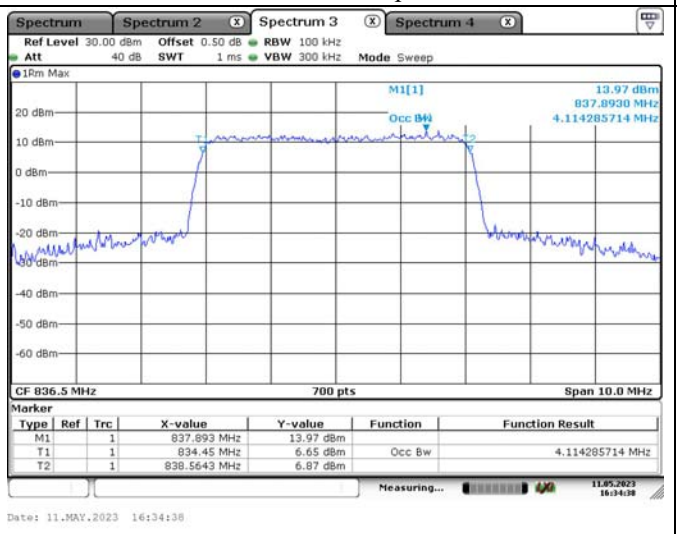
CDMA-Output



WCDMA-Input

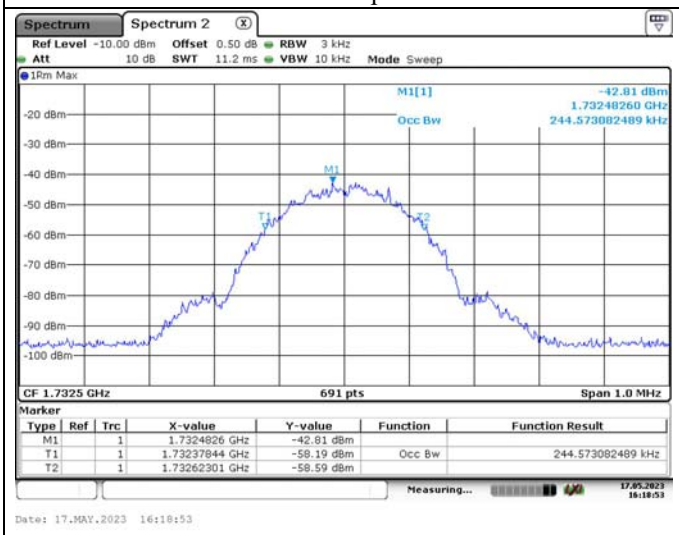


WCDMA-Output

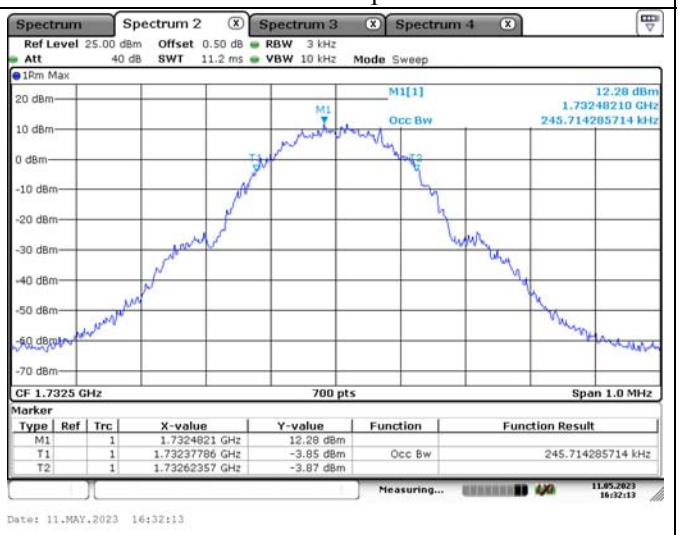


AWS-1 Band

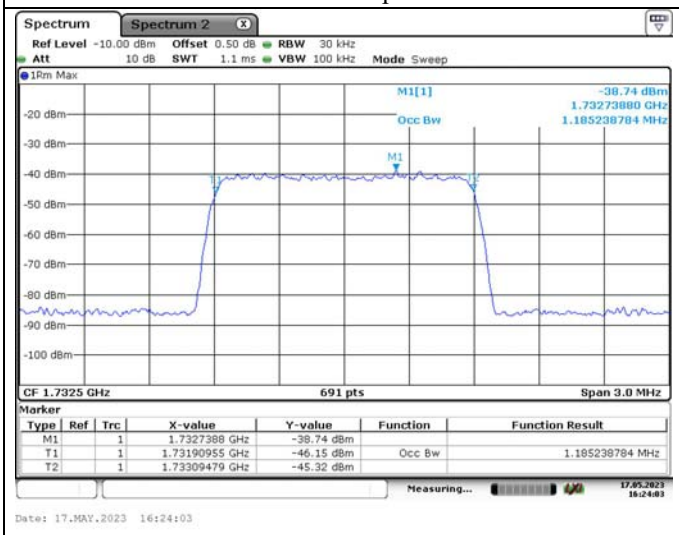
GSM-Input



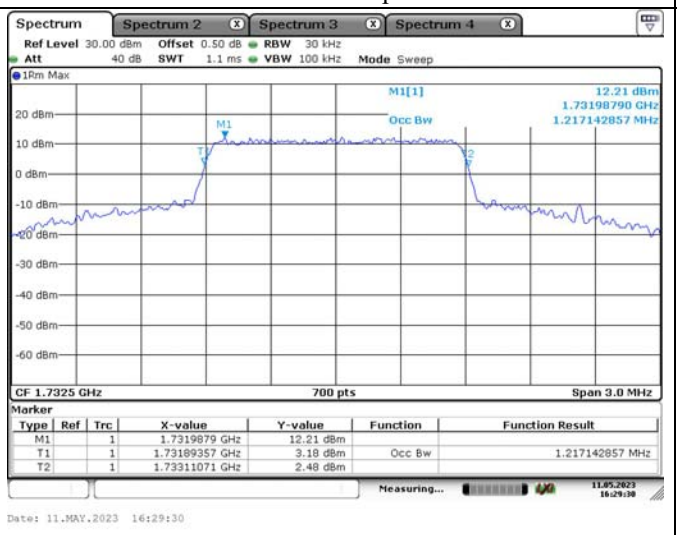
GSM-Output



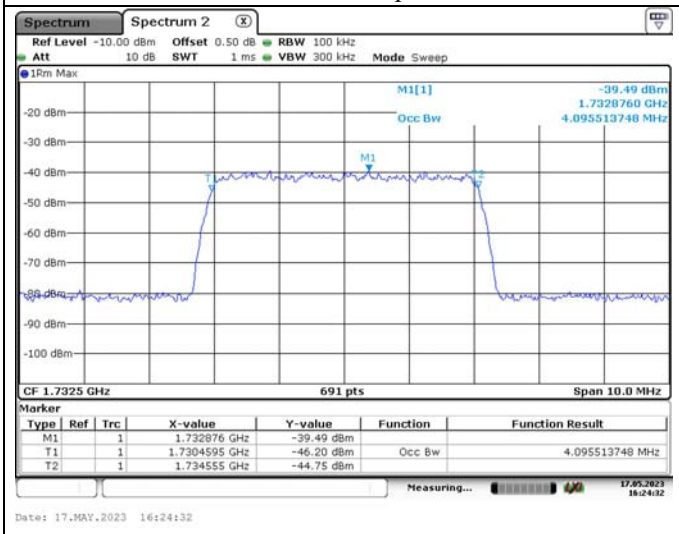
CDMA-Input



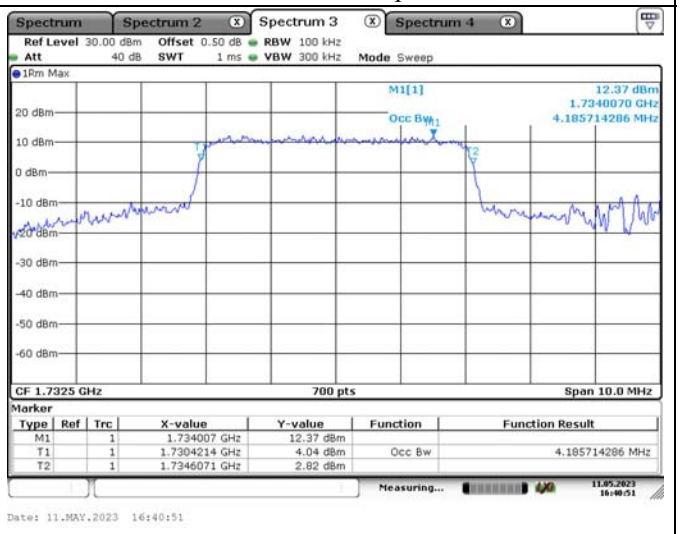
CDMA-Output



WCDMA-Input

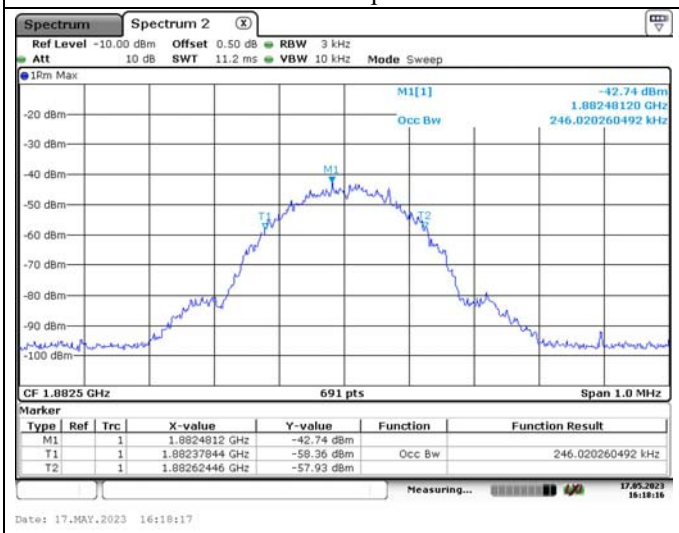


WCDMA-Output

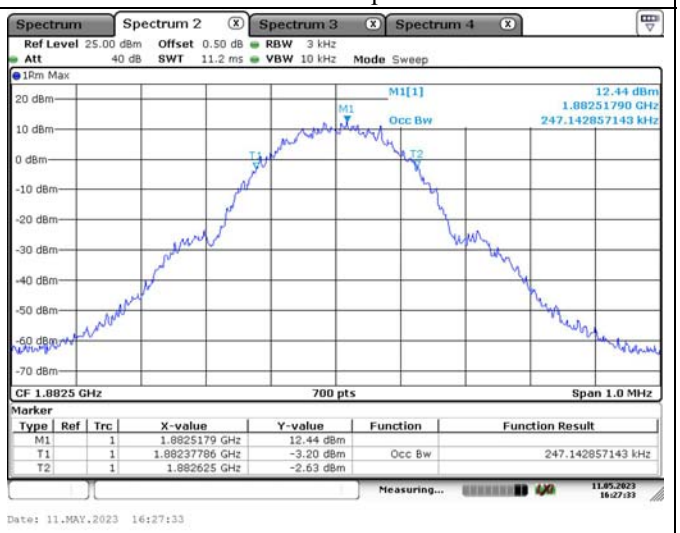


PCS Band

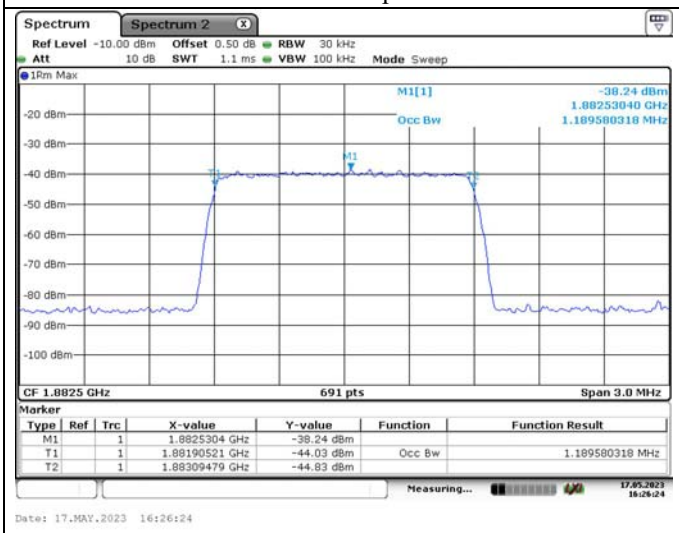
GSM-Input



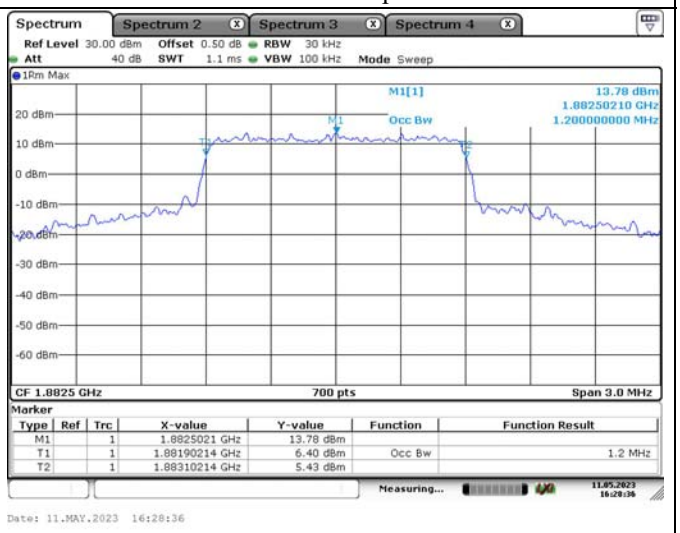
GSM-Output



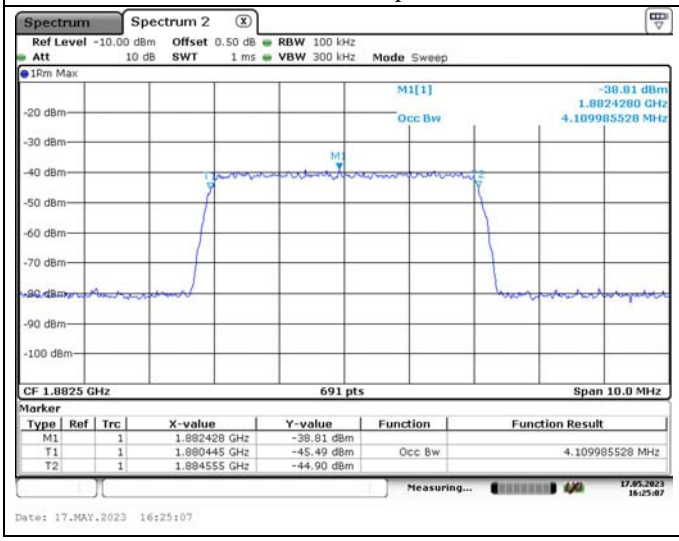
CDMA-Input



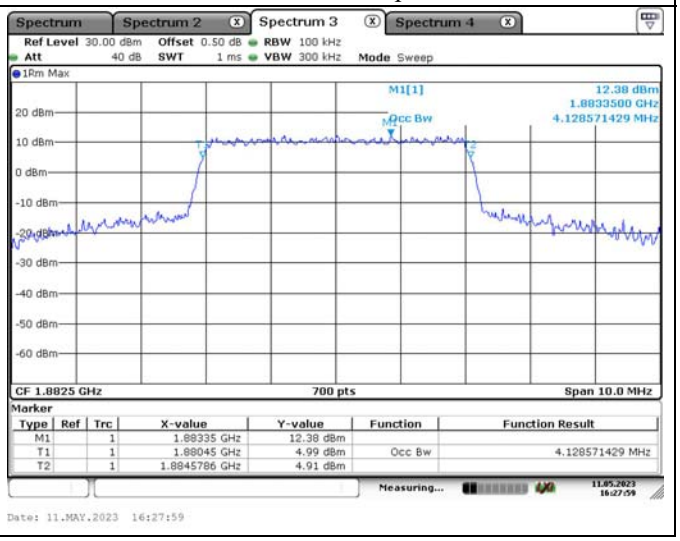
CDMA-Output



WCDMA-Input

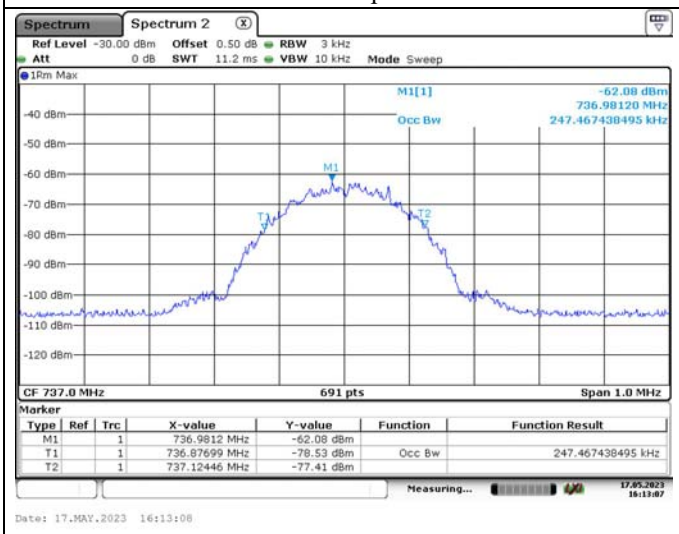


WCDMA-Output

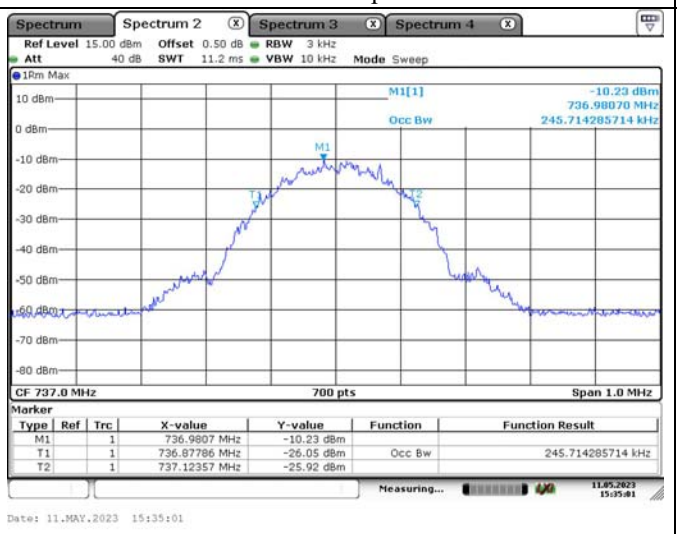


Downlink:
Lower 700M Band

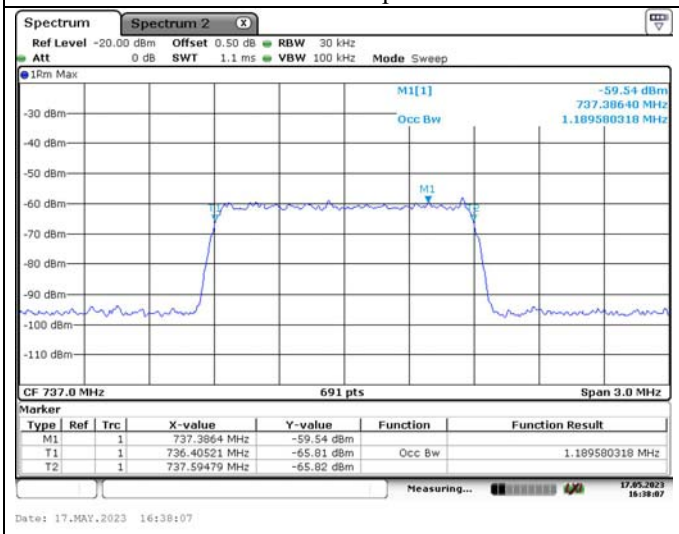
GSM-Input



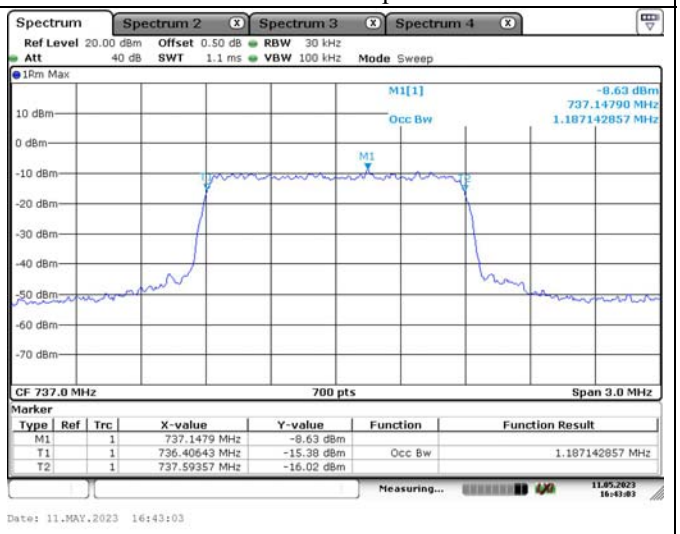
GSM-Output



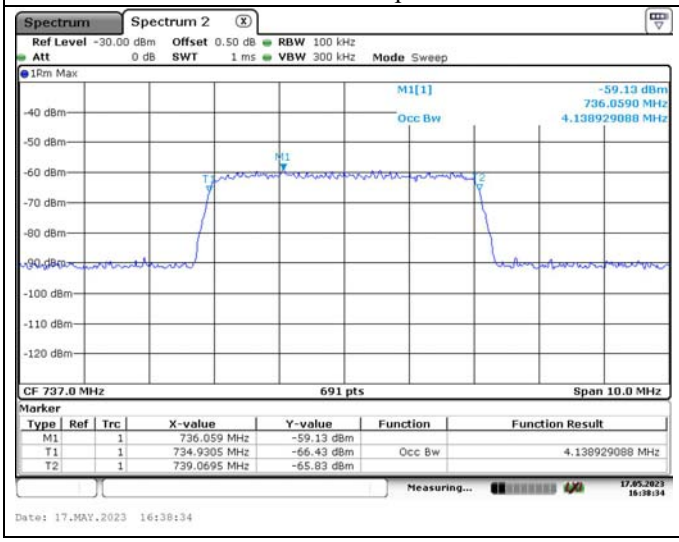
CDMA-Input



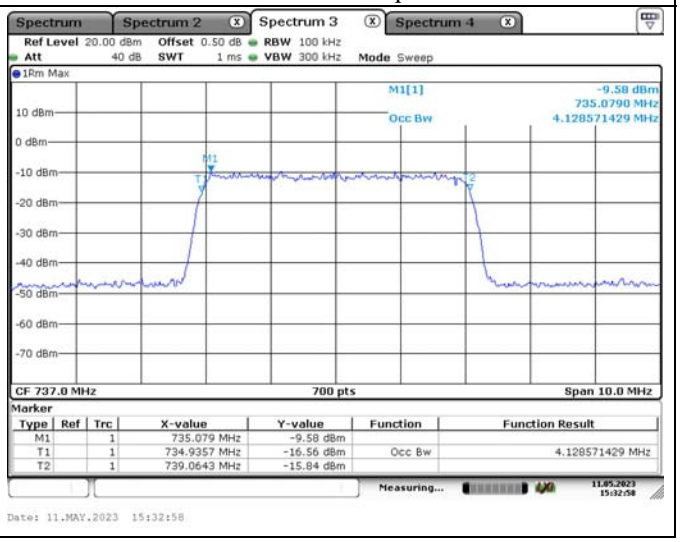
CDMA-Output



WCDMA-Input

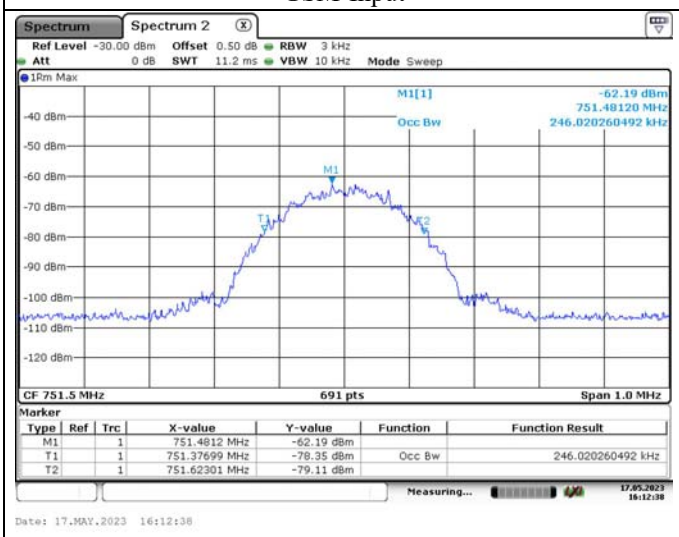


WCDMA-Output

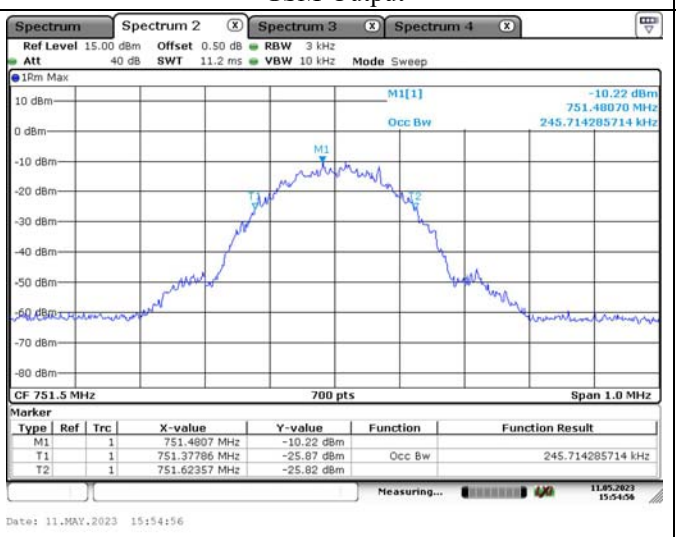


Upper 700M Band

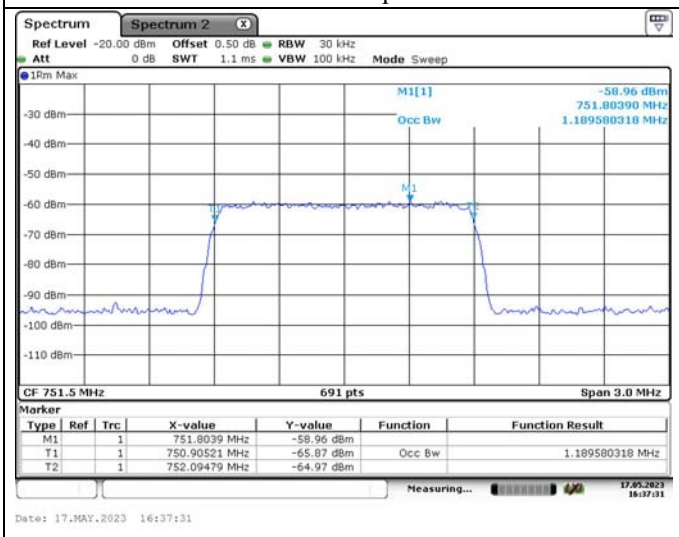
GSM-Input



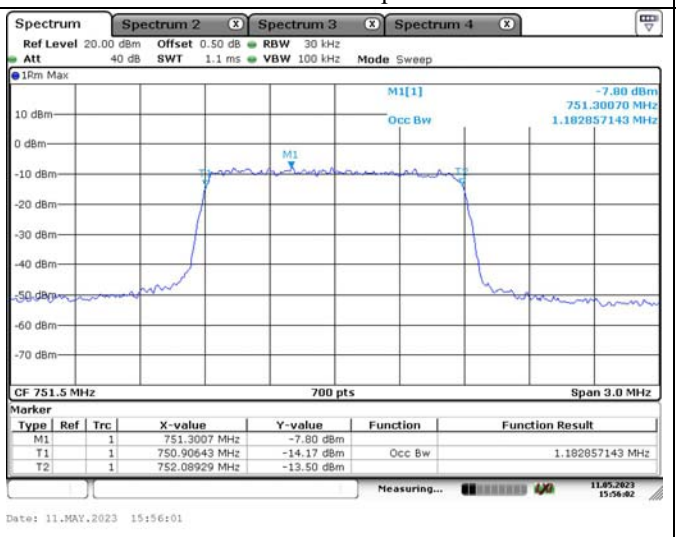
GSM-Output



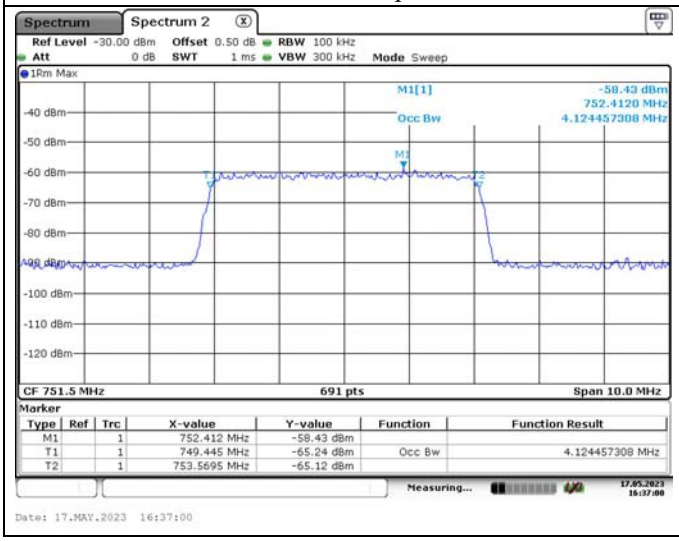
CDMA-Input



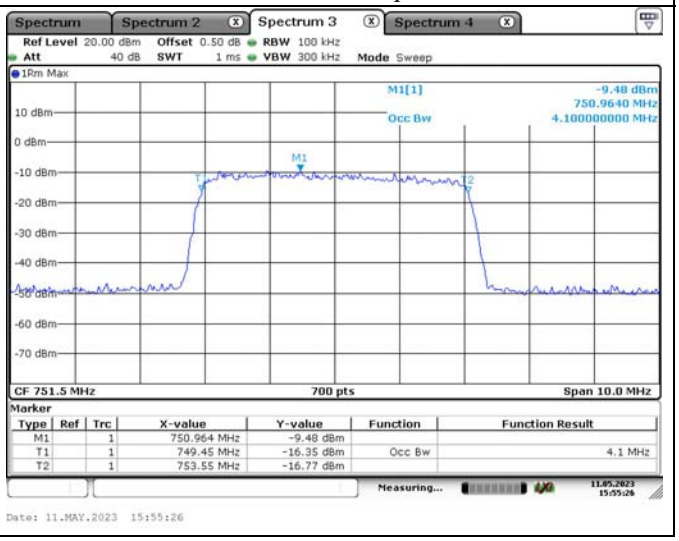
CDMA-Output



WCDMA-Input

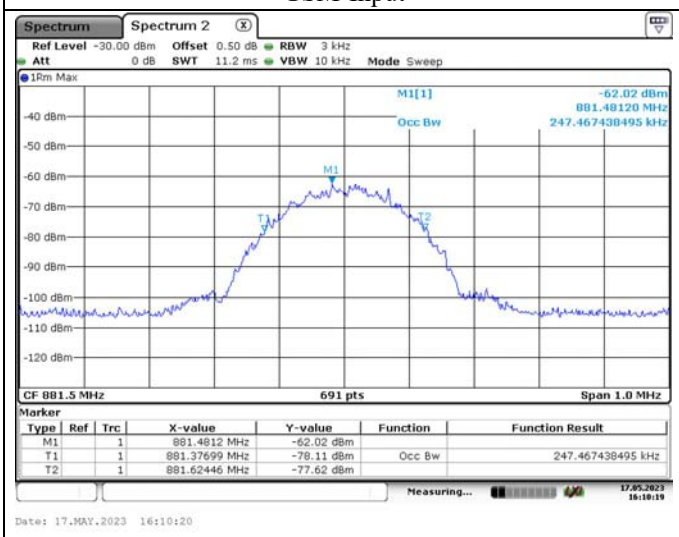


WCDMA-Output

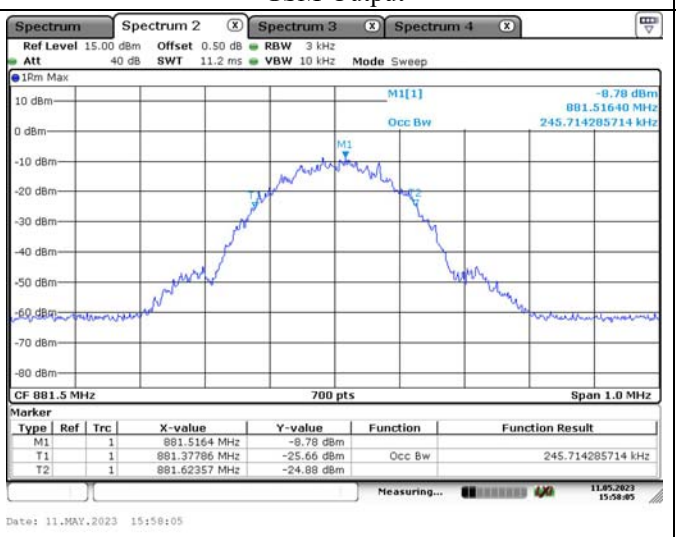


Cellular Band

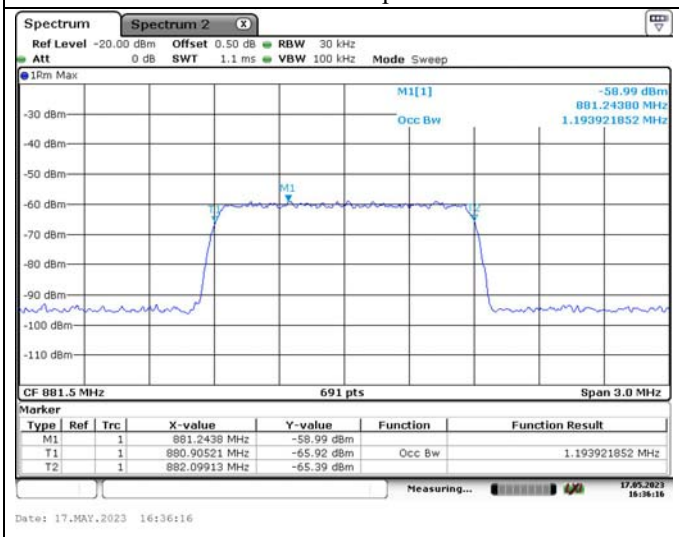
GSM-Input



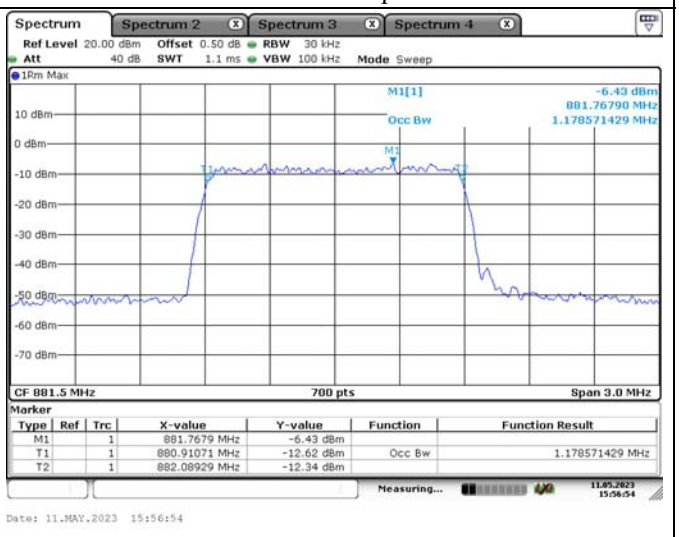
GSM-Output



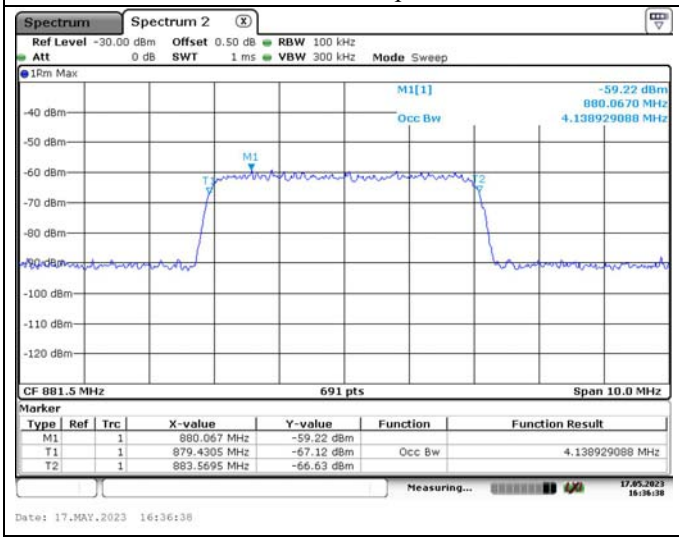
CDMA-Input



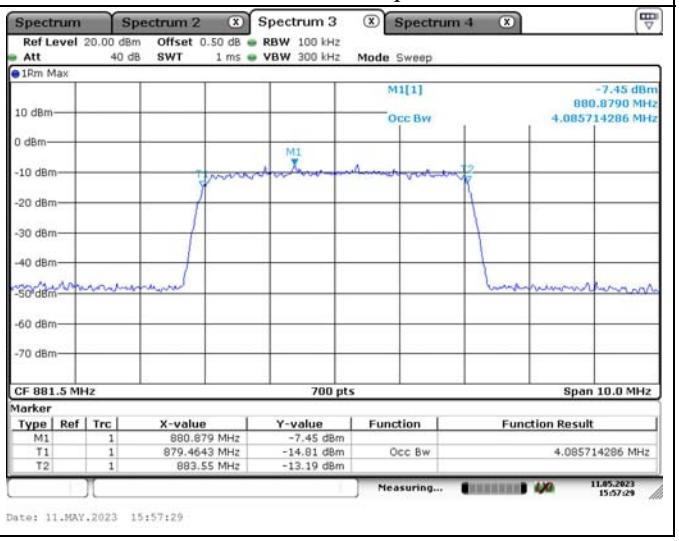
CDMA-Output



WCDMA-Input

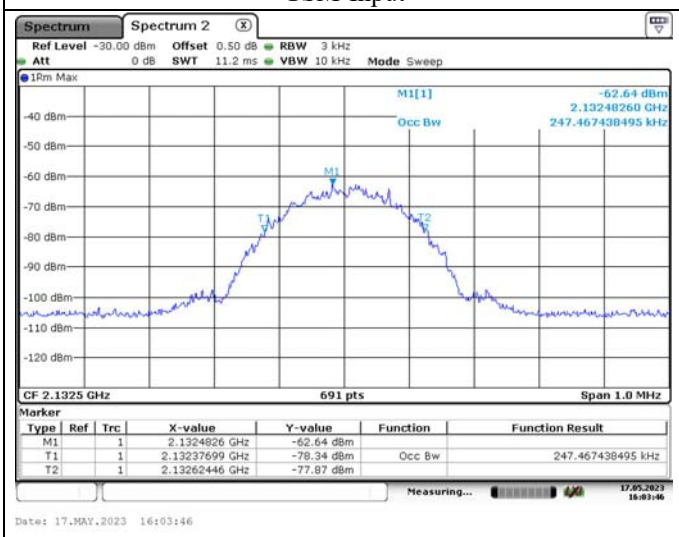


WCDMA-Output

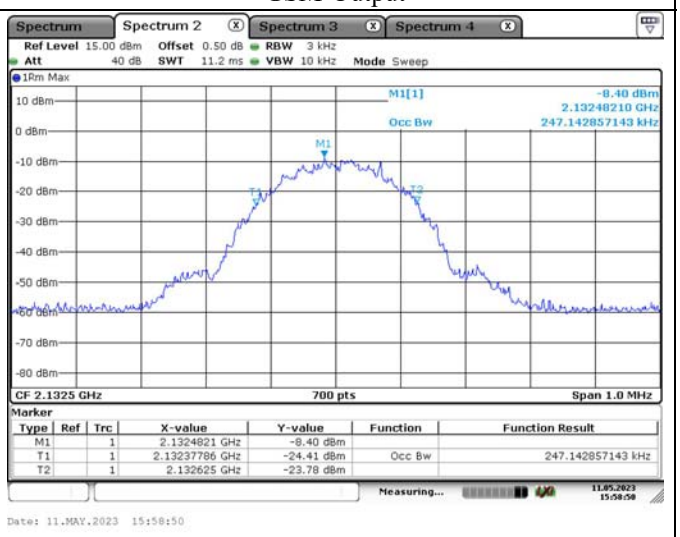


AWS-1 Band

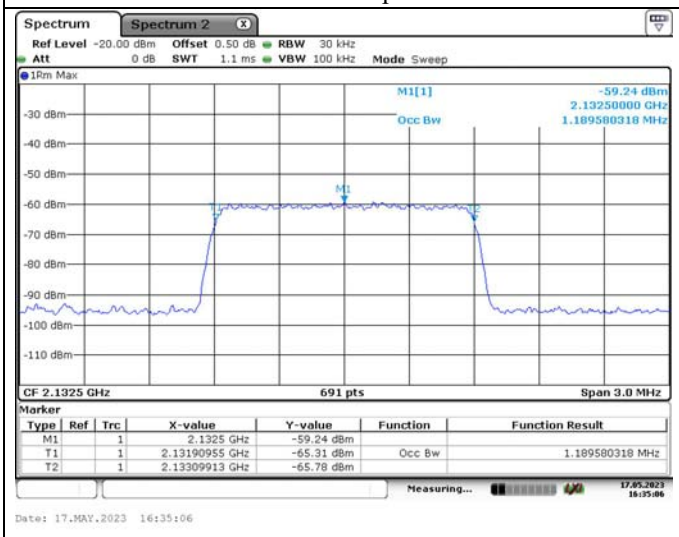
GSM-Input



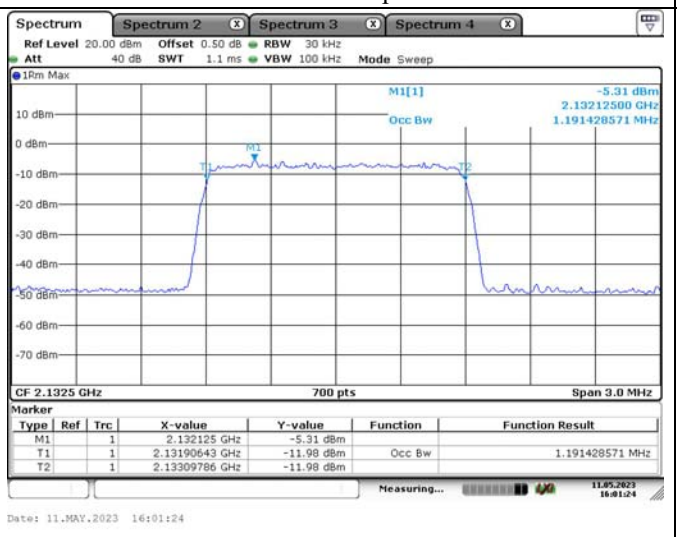
GSM-Output



CDMA-Input



CDMA-Output



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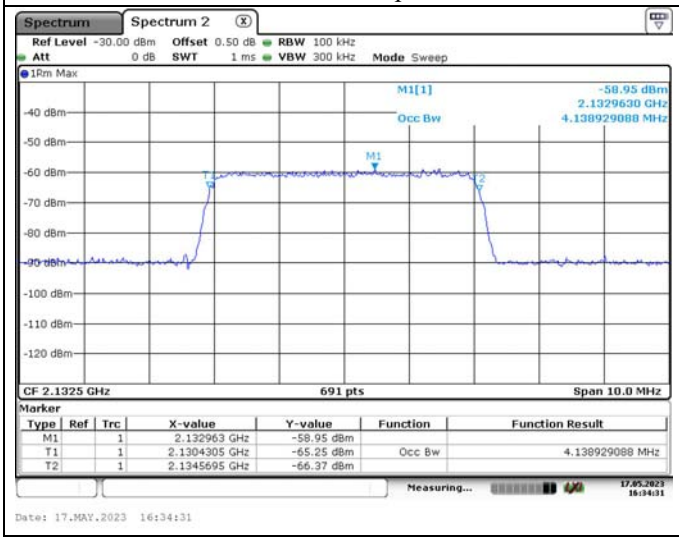

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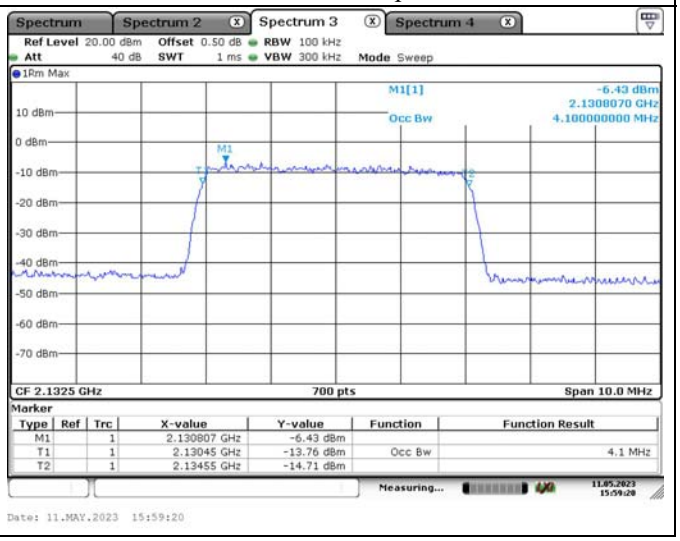
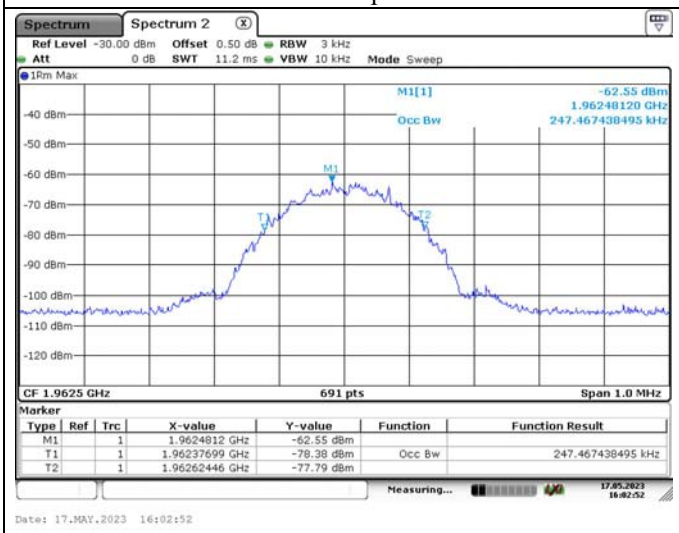
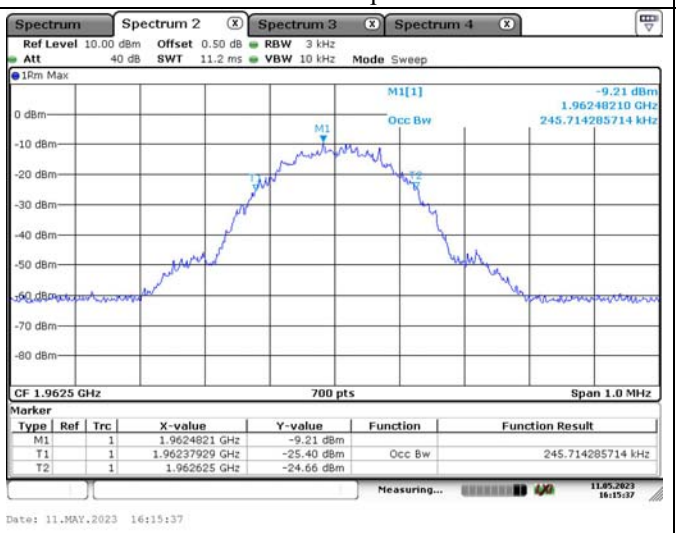


PCS Band

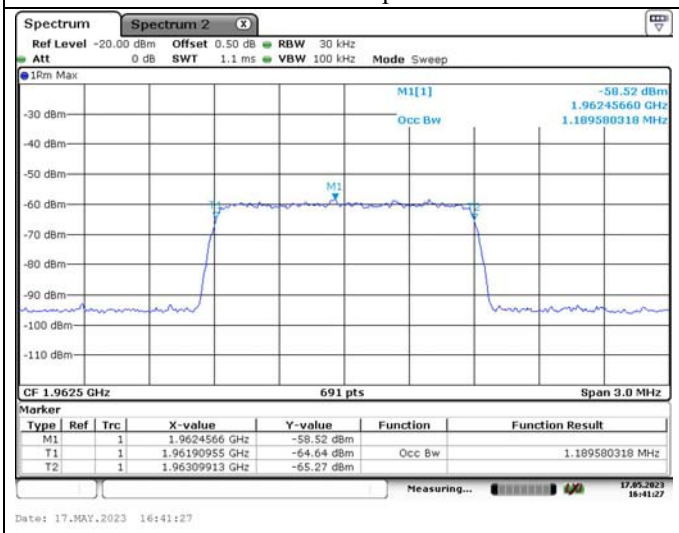
GSM-Input



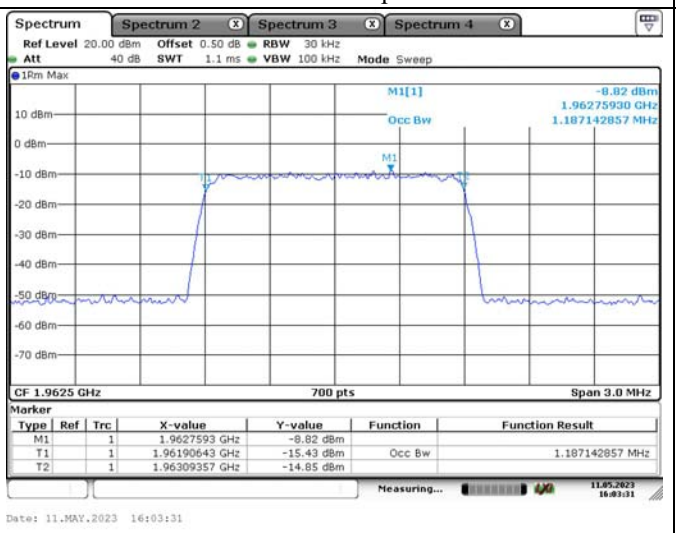
GSM-Output



CDMA-Input



CDMA-Output



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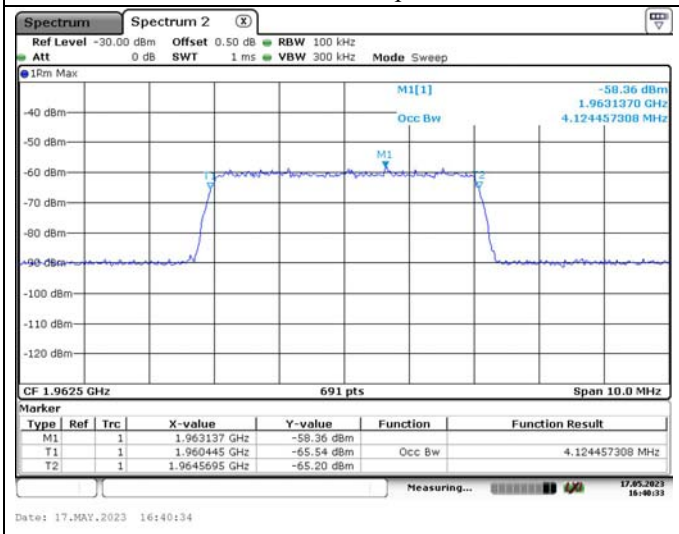

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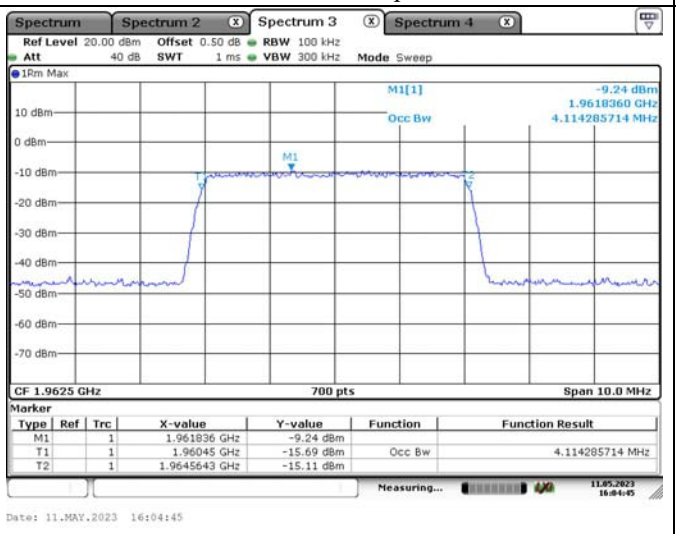


4.11 Oscillation Detection:

Oscillation Restart Time:

Mode	Operation Bands	Detection Time (s)		Power level	Between restart time (s)		Number of restart	
		Reading	Limit	dBm	Reading	Limit	Reading	Limit
Uplink	Lower 700MHz	0.297	<0.3	23.67	60.03	≥60	2	≤5
	Upper 700MHz	0.296		20.47	60.23		2	
	Cellular	0.293		25.14	60.53		2	
	AWS-1	0.275		21.71	66.40		2	
	PCS	0.295		25.94	60.33		2	
Downlink	Lower 700MHz	0.036	<1	14.49	60.50		2	
	Upper 700MHz	0.036		9.49	62.00		2	
	Cellular	0.710		9.99	62.20		2	
	AWS-1	0.116		13.74	65.20		2	
	PCS	0.116		14.29	60.40		2	

Oscillation Mitigation or Shutdown:

Mode	Operation Band	Max gain	Isolation	Difference	Limit
		dB	dB	dB	dB
Uplink	Lower 700MHz	58.8	+5	10.09	12
			+4	/	12
			+3	/	12
			+2	/	12
			+1	/	12
			+0	/	12
			-1	/	12
			-2	/	12
			-3	/	12
			-4	/	12
			-5	/	12
	Upper 700MHz	56.08	+5	9.38	12
			+4	/	12
			+3	/	12
			+2	/	12
			+1	/	12
			+0	/	12
			-1	/	12
			-2	/	12
			-3	/	12
			-4	/	12
			-5	/	12
	Cellular	55.69	+5	8.34	12
			+4	/	12
			+3	/	12
			+2	/	12
			+1	/	12
			+0	/	12
			-1	/	12
			-2	/	12
			-3	/	12
			-4	/	12
			-5	/	12

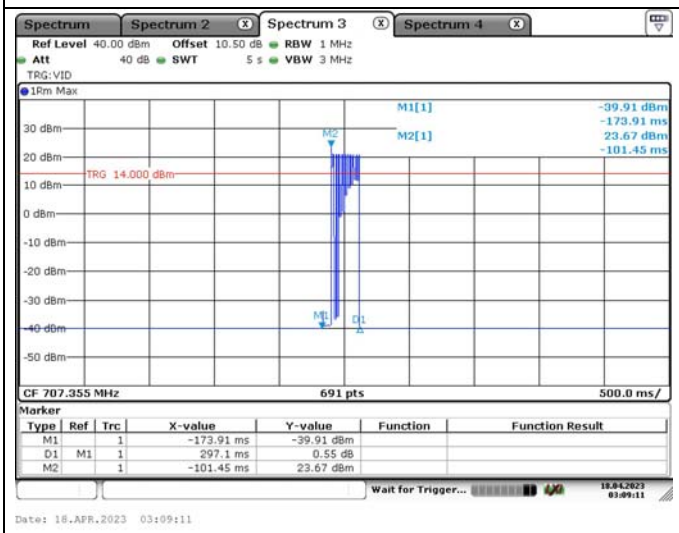
Mode	Operation Band	Max gain	Isolation	Difference	Limit
		dB	dB	dB	dB
Uplink	AWS-1	63.49	+5	8.81	12
			+4	/	12
			+3	/	12
			+2	/	12
			+1	/	12
			+0	/	12
			-1	/	12
			-2	/	12
			-3	/	12
			-4	/	12
			-5	/	12
	PCS	51.96	+5	8.18	12
			+4	/	12
			+3	/	12
			+2	/	12
			+1	/	12
			+0	/	12
			-1	/	12
			-2	/	12
			-3	/	12
			-4	/	12
			-5	/	12
Downlink	Lower 700MHz	58.75	+5	8.94	12
			+4	/	12
			+3	/	12
			+2	/	12
			+1	/	12
			+0	/	12
			-1	/	12
			-2	/	12
			-3	/	12
			-4	/	12
			-5	/	12
	Upper 700MHz	54.93	+5	10.1	12
			+4	/	12
			+3	/	12
			+2	/	12
			+1	/	12
			+0	/	12
			-1	/	12
			-2	/	12
			-3	/	12
			-4	/	12
			-5	/	12
	Cellular	57.24	+5	9.39	12
			+4	/	12
			+3	/	12
			+2	/	12
			+1	/	12
			+0	/	12
			-1	/	12
			-2	/	12
			-3	/	12
			-4	/	12
			-5	/	12

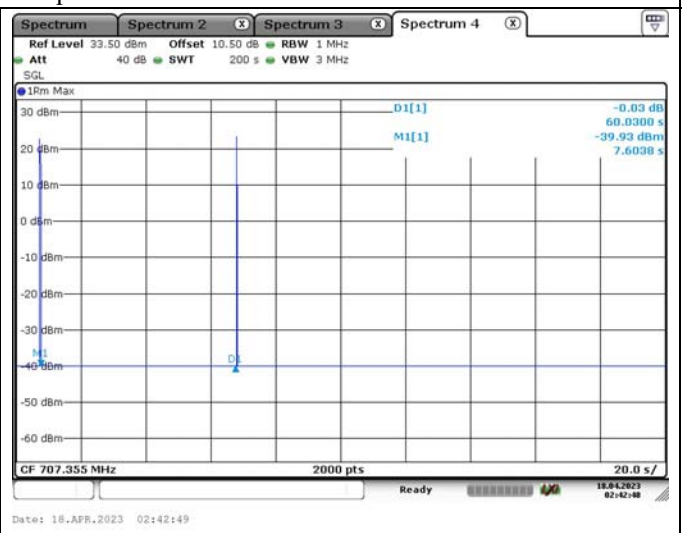
Mode	Operation Band	Max gain	Isolation	Difference	Limit
		dB	dB	dB	dB
Downlink	AWS-1	64.2	+5	10.16	12
			+4	/	12
			+3	/	12
			+2	/	12
			+1	/	12
			+0	/	12
			-1	/	12
			-2	/	12
			-3	/	12
			-4	/	12
			-5	/	12
	PCS	54.76	+5	9.72	12
			+4	/	12
			+3	/	12
			+2	/	12
			+1	/	12
			+0	/	12
			-1	/	12
			-2	/	12
			-3	/	12
			-4	/	12
			-5	/	12

Note: "/" means that booster is shut down.

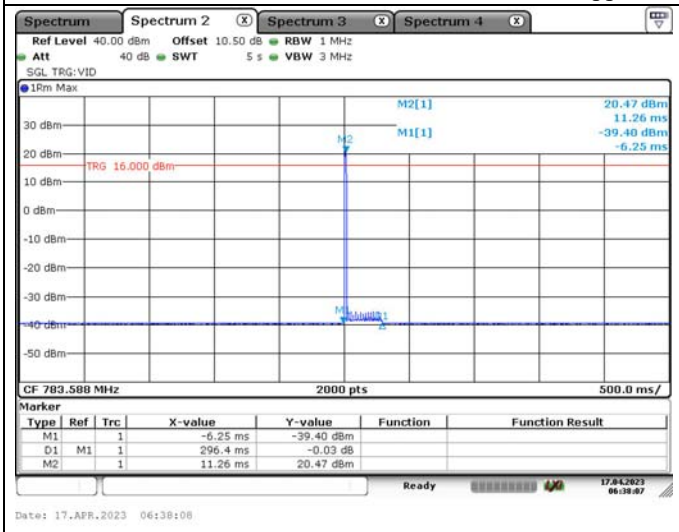
Oscillation Restart Time:

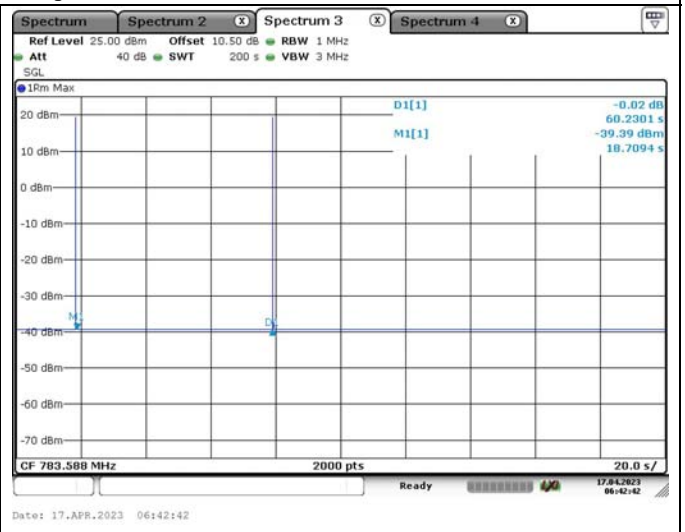
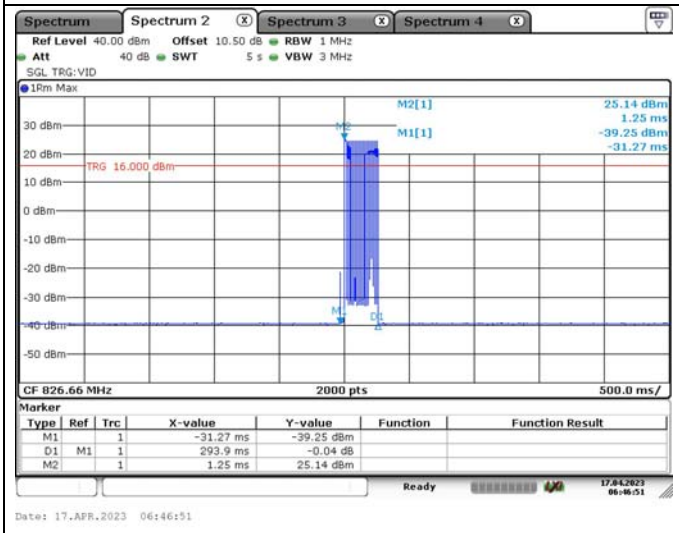
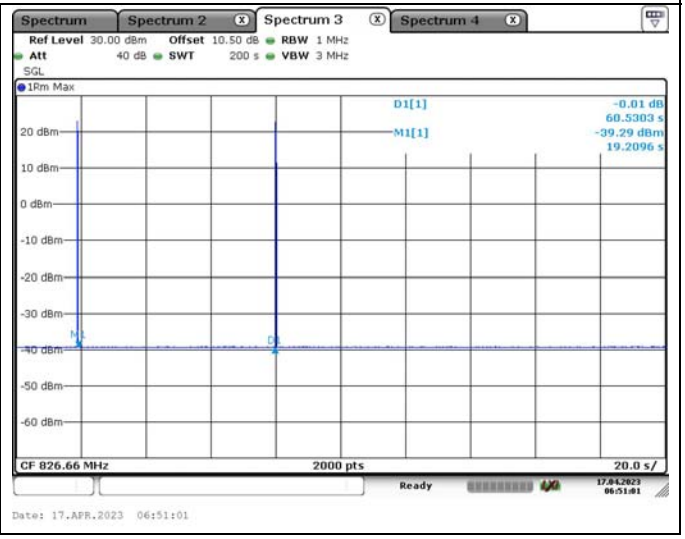
Lower 700M-Uplink





Upper 700M-Uplink





Cellular-Uplink