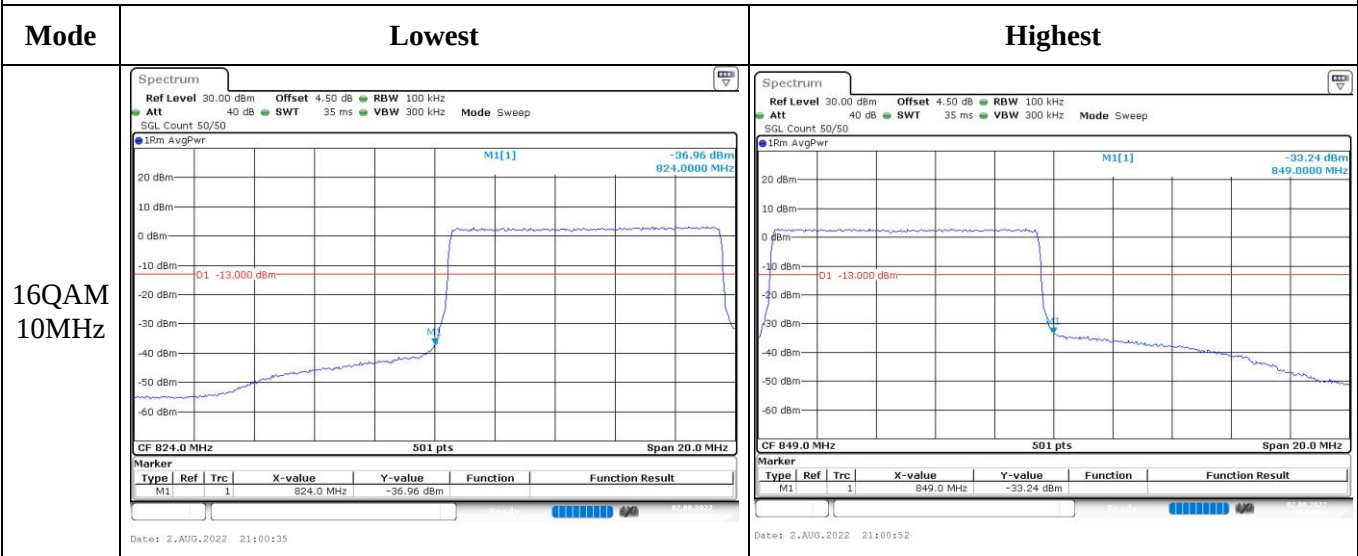


Out of band emission, Band Edge



4.9 Antenna Port Test Data and Results for LTE Band 7

Serial Number:	CR22070025-RF-S1	Test Date:	2022-08-01~2022-08-02
Test Site:	RF	Test Mode:	Transmitting
Tester:	George Chen	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	25.3~25.9	Relative Humidity: (%)	52~62	ATM Pressure: (kPa)	100.1~100.6
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2022-07-15	2023-07-14
zhuoxiang	Coaxial Cable	SMA-178	211002	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A
Weinschel	Coaxial Attenuators	53-20-34	LN751	Each time	N/A
Unknown	Coaxial tee connector	Unknown	2204006	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	149218	2022-07-15	2023-07-14
UNI-T	Multimeter	UT39A+	C210582554	2021-09-30	2022-09-29
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2022-04-06	2023-04-05
ZHAOXIN	DC Power Supply	RXN-6010D	21R6010D0912386	N/A	N/A

* Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

EUT Information@LTE Band 7▲:

Antenna Gain G_T (dBi):	2	Path Loss L_C (dB):	0.5
Operation Voltage(V_{DC}):			
Lowest:	3.3	Normal:	3.8
		Highest:	4.2

Test Frequency For Each Mode:

Operation Bandwidth	Lowest Frequency (MHz)	Middle Frequency (MHz)	Highest Frequency (MHz)
5MHz	2502.5	2535	2567.5
10MHz	2505	2535	2565
15MHz	2507.5	2535	2562.5
20MHz	2510	2535	2560

Test Data:**FCC §2.1046; § 27.50(h)(2)****RF Output Power:**

Test Bandwidth & Modulation	Resource Block & RB offset	Conducted Average Output Power(dBm)			Maximum EIRP (dBm)	EIRP Limit (dBm)
		Lowest Channel	Middle Channel	Highest Channel		
5MHz QPSK	RB1#0	21.82	21.72	21.61	23.45	33
	RB1#13	21.95	21.89	21.8		
	RB1#24	21.82	21.7	21.69		
	RB15#0	20.89	20.86	20.77		
	RB15#10	20.9	20.86	20.73		
	RB25#0	20.84	20.79	20.69		
5MHz 16QAM	RB1#0	21.02	20.76	20.48	22.7	33
	RB1#13	21.2	20.91	20.69		
	RB1#24	21.04	20.77	20.54		
	RB15#0	19.84	19.85	19.79		
	RB15#10	19.85	19.85	19.81		
	RB25#0	19.84	19.82	19.78		
10MHz QPSK	RB1#0	21.92	21.81	21.72	23.53	33
	RB1#25	22.01	22.03	21.97		
	RB1#49	21.91	21.79	21.77		
	RB25#0	20.87	20.84	20.79		
	RB25#25	20.94	20.85	20.76		
	RB50#0	20.86	20.81	20.77		
10MHz 16QAM	RB1#0	21.34	20.94	20.67	23.05	33
	RB1#25	21.55	21.05	20.91		
	RB1#49	21.4	20.9	20.74		
	RB25#0	19.92	19.87	19.86		
	RB25#25	20.01	19.87	19.88		
	RB50#0	19.93	19.83	19.78		
15MHz QPSK	RB1#0	21.84	21.72	21.66	23.41	33
	RB1#38	21.91	21.84	21.81		
	RB1#74	21.78	21.64	21.7		
	RB36#0	20.96	20.9	20.79		
	RB36#39	21.05	20.88	20.8		
	RB75#0	21	20.91	20.84		
15MHz 16QAM	RB1#0	21.11	21.28	20.75	22.84	33
	RB1#38	21.28	21.34	20.89		
	RB1#74	21.18	21.26	20.81		
	RB36#0	19.88	19.83	19.79		
	RB36#39	19.94	19.87	19.78		
	RB75#0	19.95	19.9	19.8		

20MHz QPSK	RB1#0	21.58	21.61	21.48	23.52	33
	RB1#50	21.98	22.02	21.91		
	RB1#99	21.58	21.56	21.55		
	RB50#0	20.84	20.84	20.77		
	RB50#50	20.92	20.82	20.69		
	RB100#0	20.83	20.8	20.74		
20MHz 16QAM	RB1#0	21.1	20.87	20.71	23.03	33
	RB1#50	21.53	21.24	21.01		
	RB1#99	21.14	20.85	20.71		
	RB50#0	19.82	19.8	19.79		
	RB50#50	19.91	19.75	19.67		
	RB100#0	19.89	19.81	19.75		
Note: EIRP=Conducted Power(dBm) - L _C (dB) + G _T (dBi)						
					Result:	Pass

Peak-to-average Ratio(PAR)					
Test Bandwidth & Modulation	Resource Block & RB offset	Peak-to-average Ratio(dB)			Limit (dB)
		Lowest Channel	Middle Channel	Highest Channel	
20MHz QPSK	RB1#0	4.23	4.64	4.26	13
	RB100#0	4.78	4.81	4.84	13
20MHz 16QAM	RB1#0	4.93	5.57	5.42	13
	RB100#0	5.68	5.62	5.77	13
Result:					Pass

FCC §2.1049, §27.53:Occupied Bandwidth						
Operation Mode	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)		
	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel
5MHz QPSK	4.511	4.491	4.531	4.98	4.94	4.94
5MHz 16QAM	4.531	4.531	4.491	4.96	4.96	4.96
10MHz QPSK	8.942	8.942	8.942	9.64	9.76	9.6
10MHz 16QAM	8.942	8.942	8.942	9.64	9.56	9.64
15MHz QPSK	13.533	13.473	13.533	14.82	14.76	14.82
15MHz 16QAM	13.473	13.473	13.533	14.7	14.82	14.82
20MHz QPSK	17.884	17.964	17.964	19.28	19.52	19.28
20MHz 16QAM	17.964	17.964	17.964	19.44	19.36	19.36
Note: The test plots please refer to the Plots of Occupied Bandwidth						

FCC §2.1051, §27.53:Spurious Emissions at Antenna Terminal	
Result:	Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.

FCC §2.1051, §27.53: Out of band emission, Band Edge

Result:	Pass, Please refer to the test plots of Out of band emission, Band Edge.
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FCC §2.1055, §27.54: Frequency Stability

Test Mode:	20M QPSK	Test Channel: Lowest for Lower Edge, Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	2500.415	2500.00	2569.6932	2570
	-20	3.8	2500.4137	2500.00	2569.6980	2570
	-10	3.8	2500.4135	2500.00	2569.6958	2570
	0	3.8	2500.4131	2500.00	2569.6954	2570
	10	3.8	2500.4137	2500.00	2569.6952	2570
	20	3.8	2500.4132	2500.00	2569.6953	2570
	30	3.8	2500.4137	2500.00	2569.6952	2570
	40	3.8	2500.4382	2500.00	2569.6951	2570
	50	3.8	2500.4382	2500.00	2569.6951	2570
Frequency Stability vs. Voltage	20	3.3	2500.4383	2500.00	2569.6952	2570
	20	4.2	2500.4385	2500.00	2569.6958	2570
Result:					Pass	

Test Mode:	20M 16QAM	Test Channel: Lowest for Lower Edge, Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	2500.4153	2500.00	2569.6934	2570
	-20	3.8	2500.4134	2500.00	2569.6981	2570
	-10	3.8	2500.4135	2500.00	2569.6944	2570
	0	3.8	2500.4131	2500.00	2569.6922	2570
	10	3.8	2500.4135	2500.00	2569.6924	2570
	20	3.8	2500.4136	2500.00	2569.6934	2570
	30	3.8	2500.4137	2500.00	2569.6941	2570
	40	3.8	2500.4383	2500.00	2569.6976	2570
	50	3.8	2500.4382	2500.00	2569.6945	2570
Frequency Stability vs. Voltage	20	3.3	2500.4383	2500.00	2569.6931	2570
	20	4.2	2500.4385	2500.00	2569.6923	2570
Result:					Pass	

Test Plots:

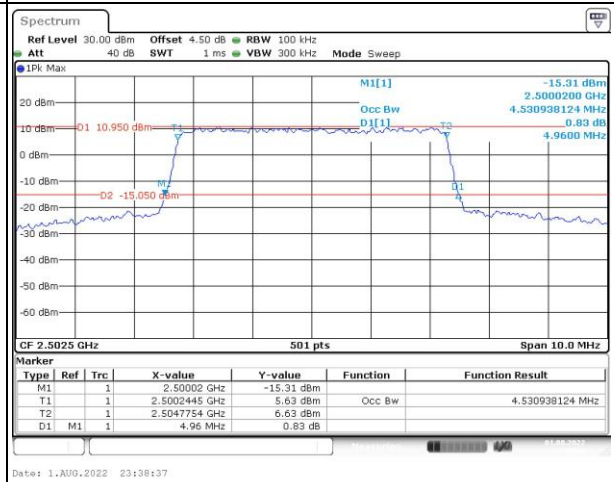
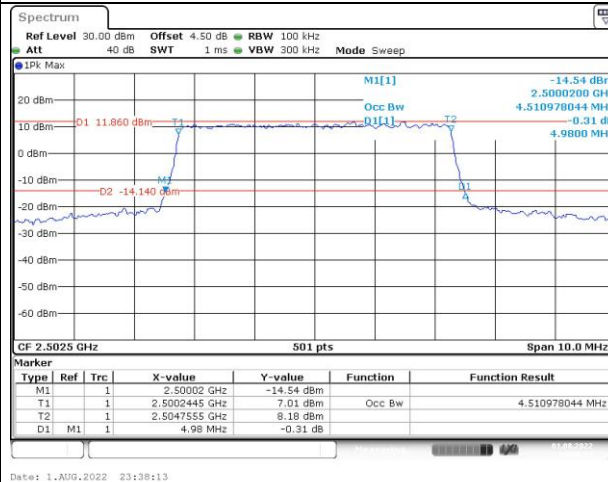
Occupied Bandwidth

Channel

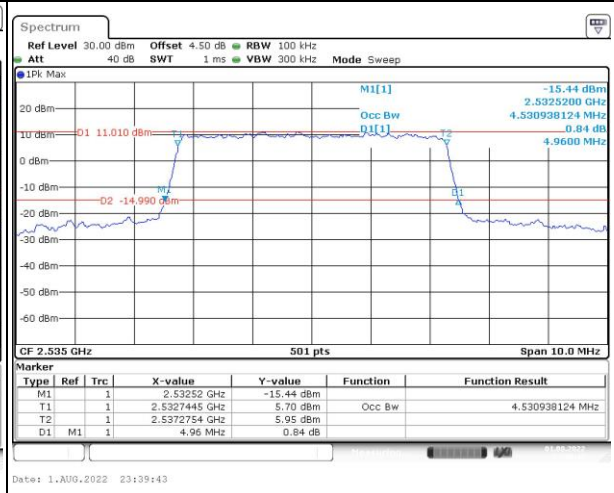
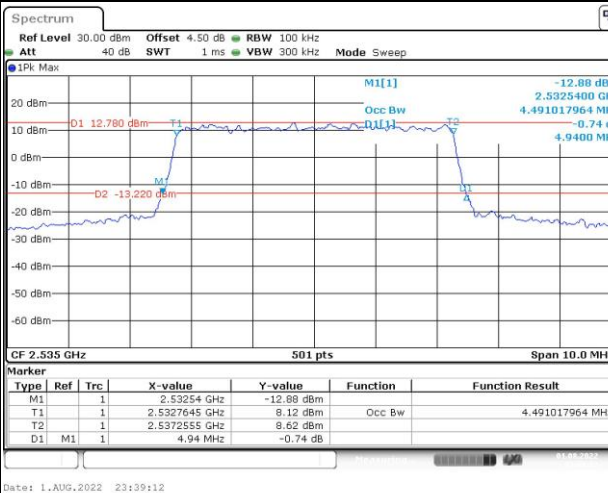
5MHz Bandwidth QPSK

5MHz Bandwidth 16QAM

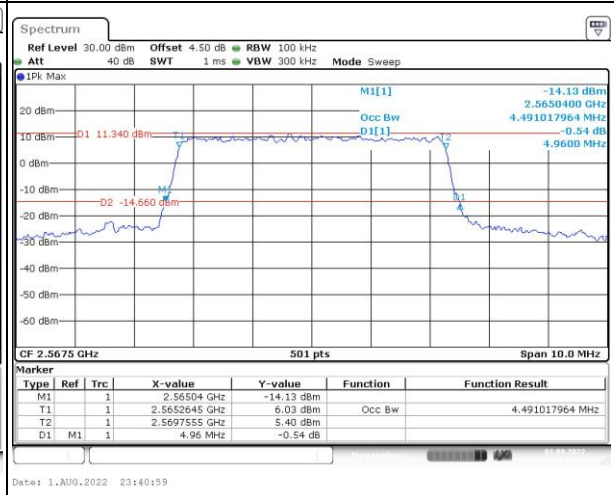
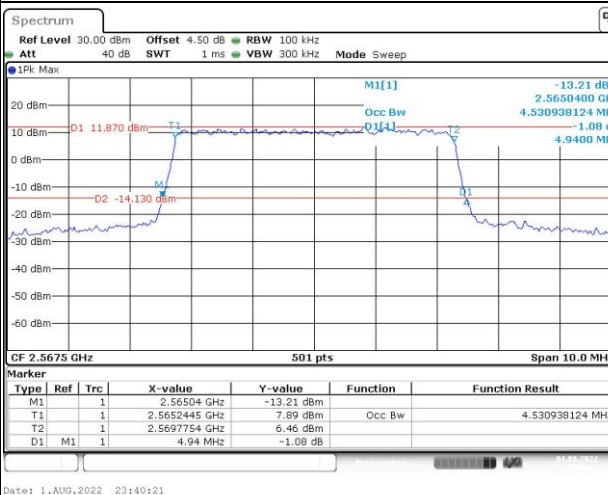
Lowest



Middle



Highest



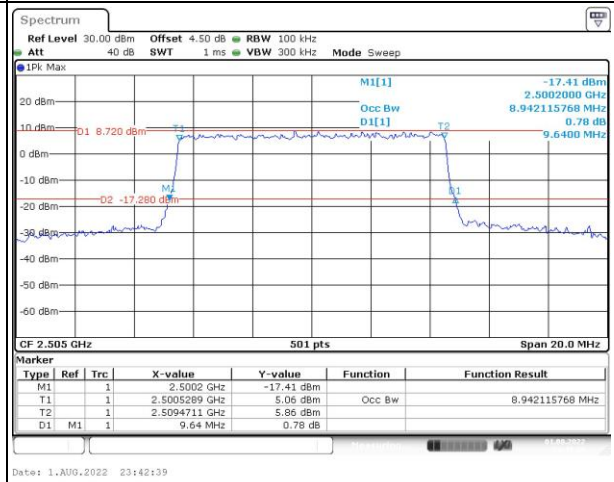
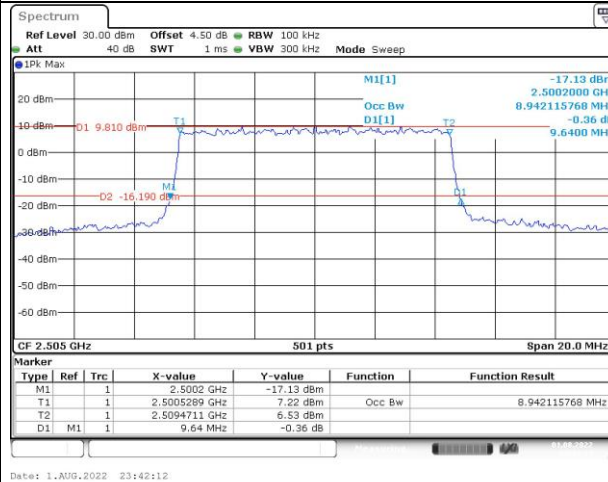
Occupied Bandwidth

Channel

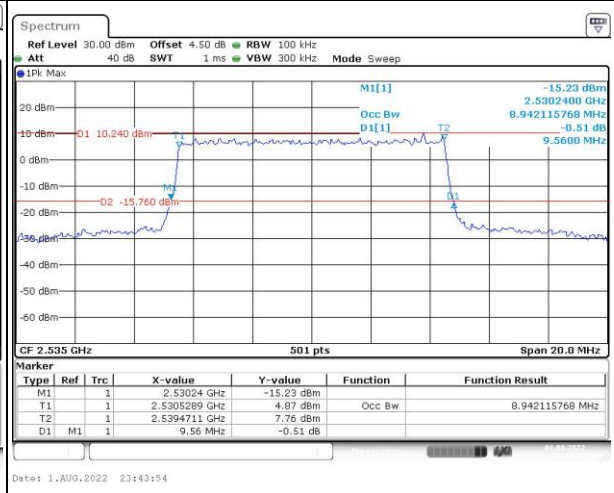
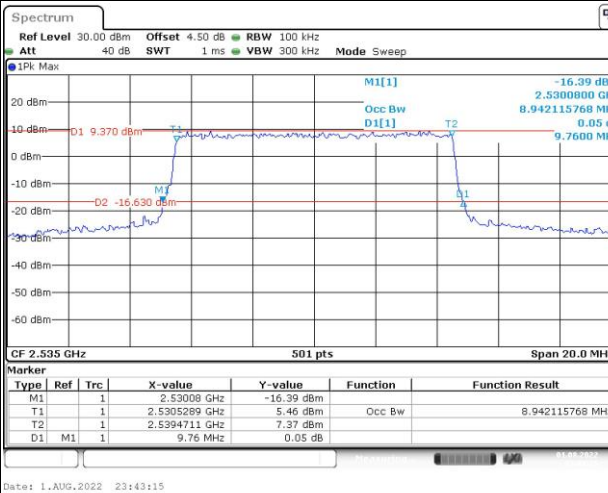
10MHz Bandwidth QPSK

10MHz Bandwidth 16QAM

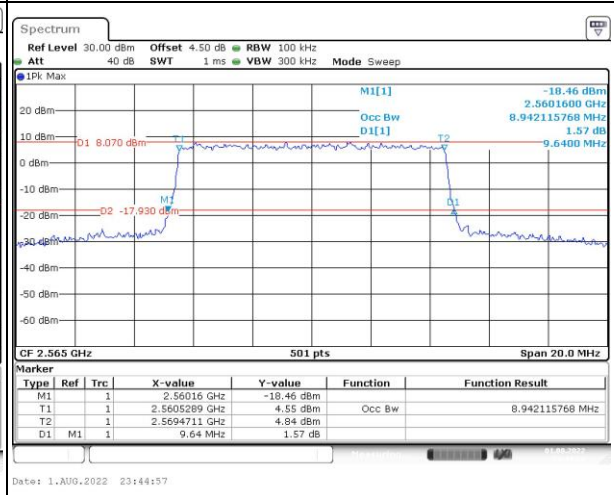
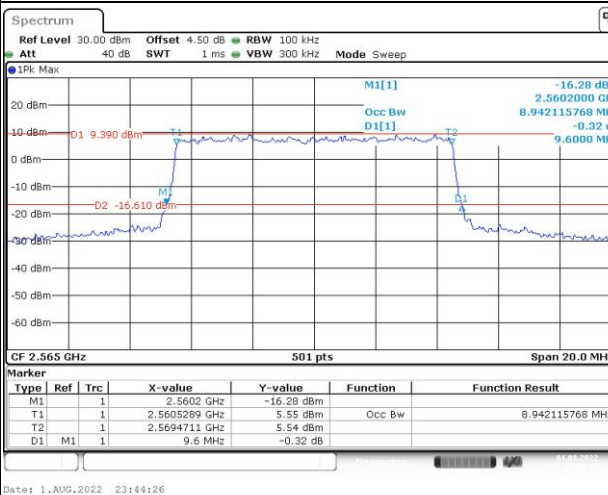
Lowest



Middle



Highest



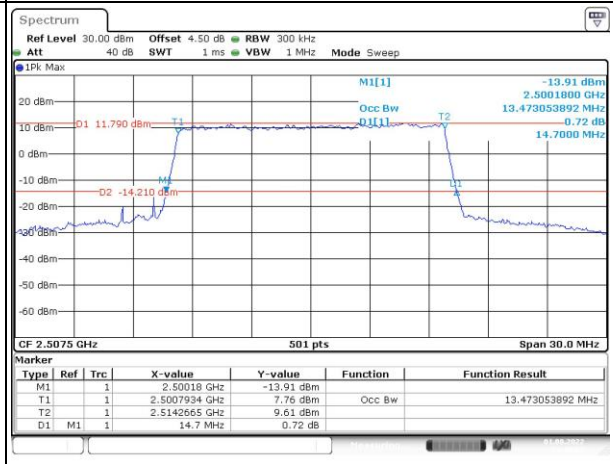
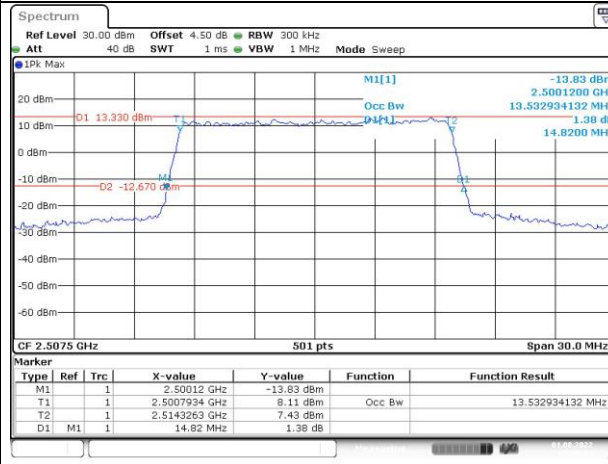
Occupied Bandwidth

Channel

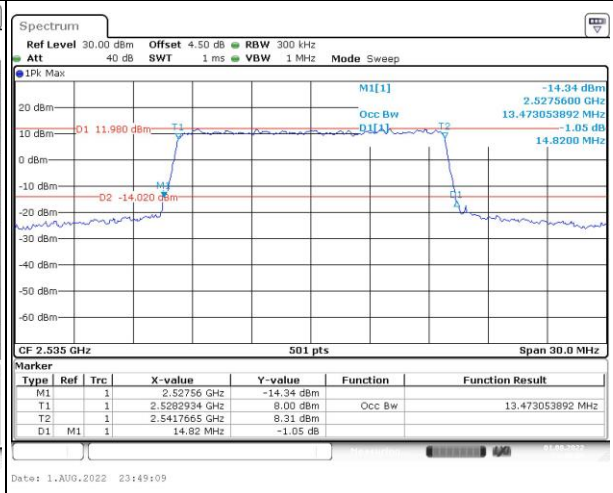
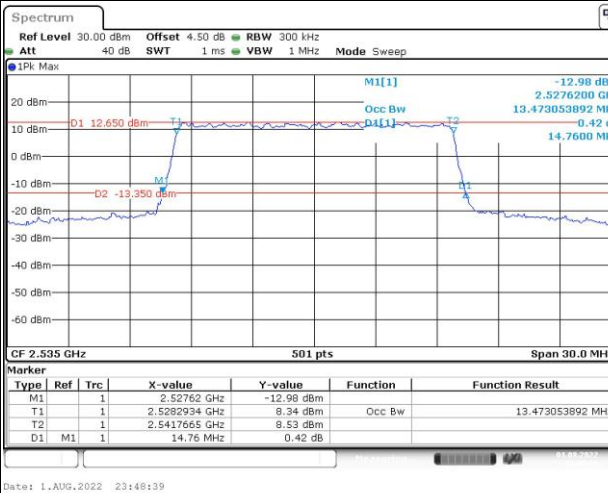
15MHz Bandwidth QPSK

15MHz Bandwidth 16QAM

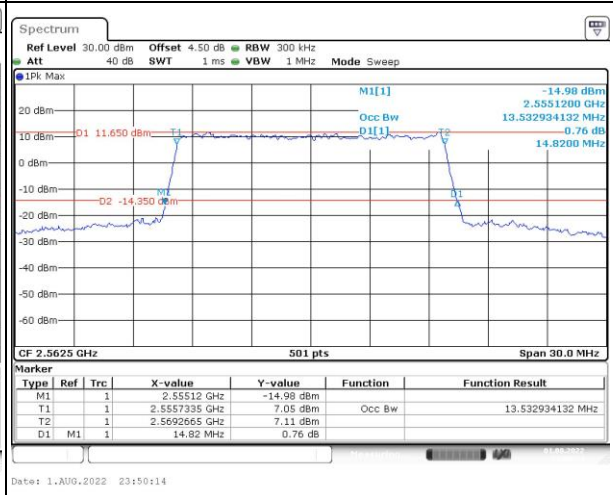
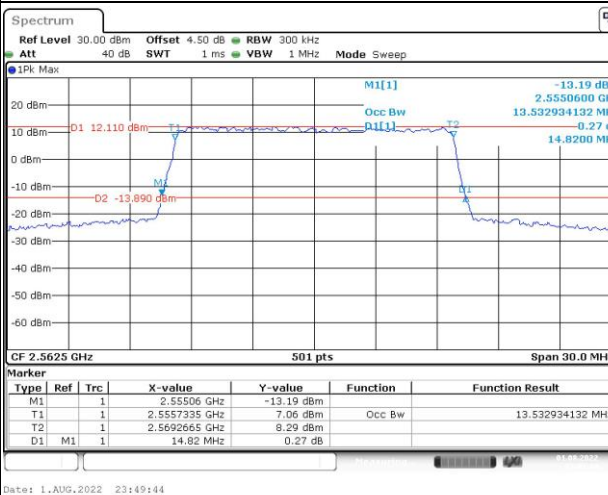
Lowest



Middle



Highest



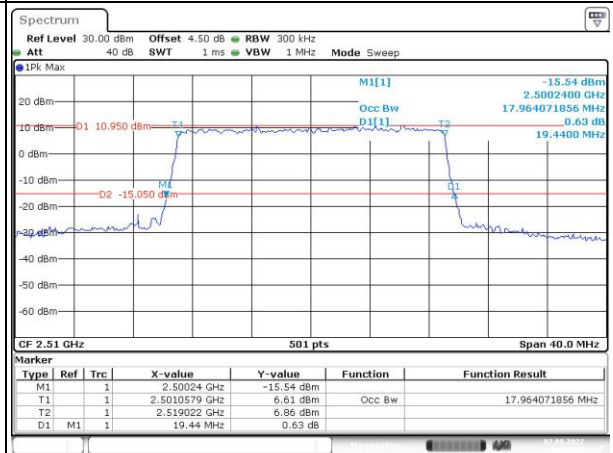
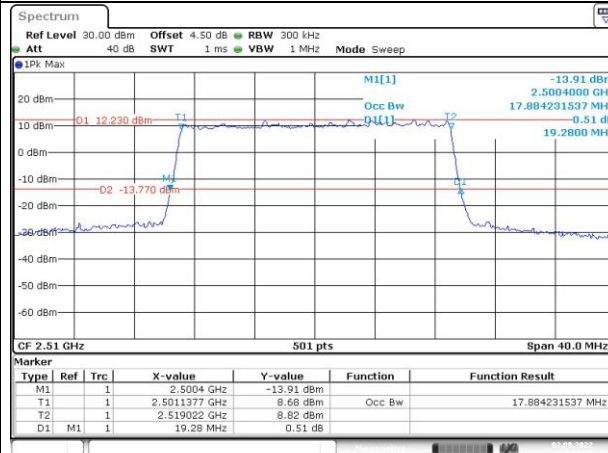
Occupied Bandwidth

Channel

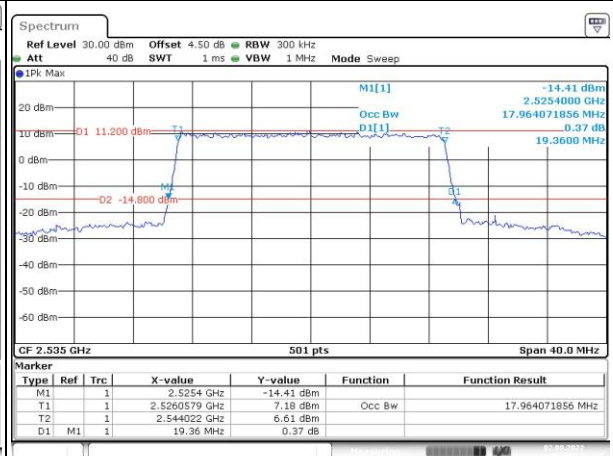
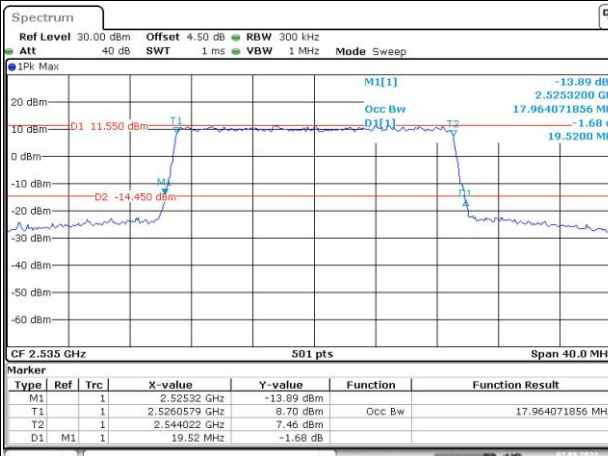
20MHz Bandwidth QPSK

20MHz Bandwidth 16QAM

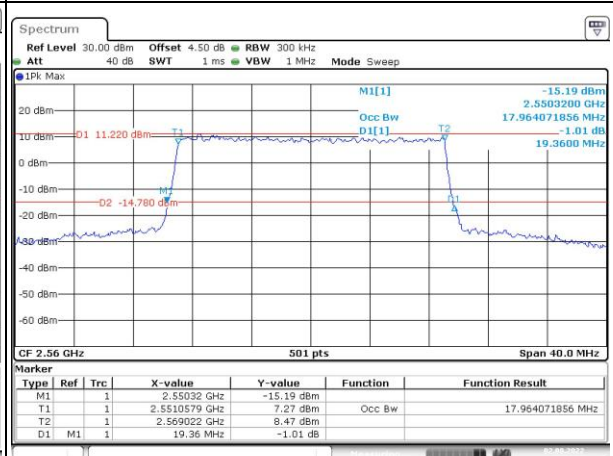
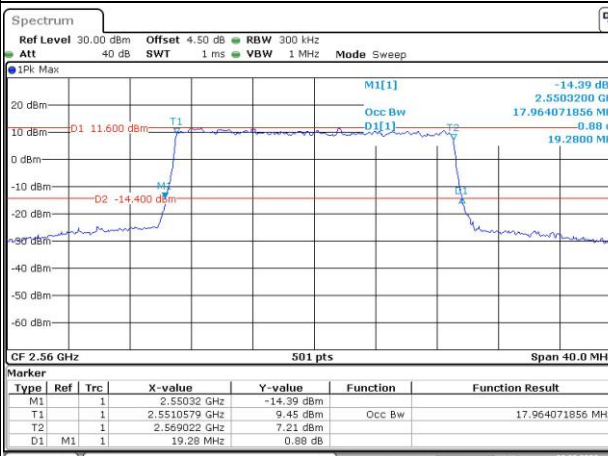
Lowest



Middle



Highest

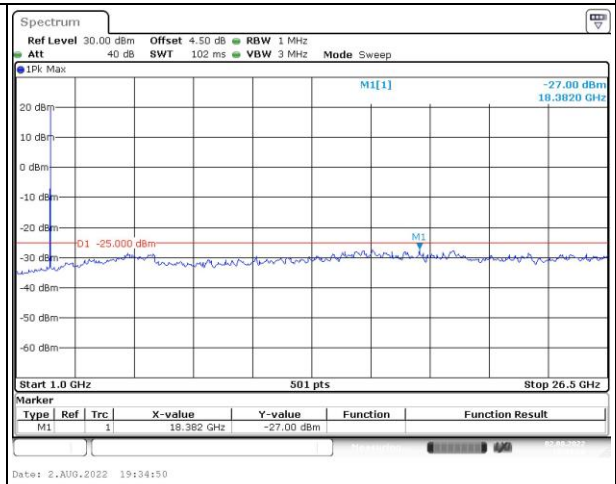
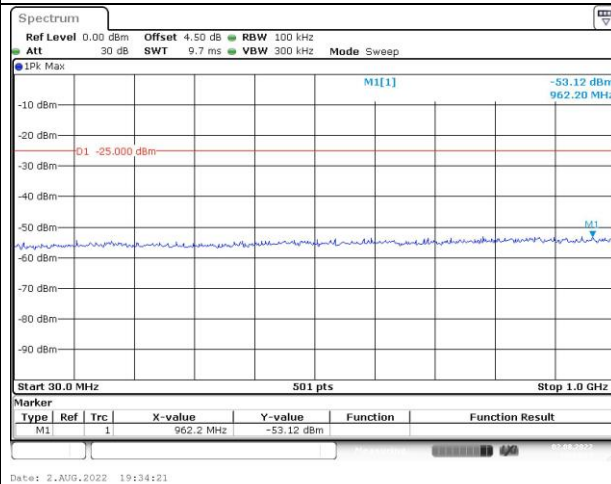


Spurious Emissions at Antenna Terminal

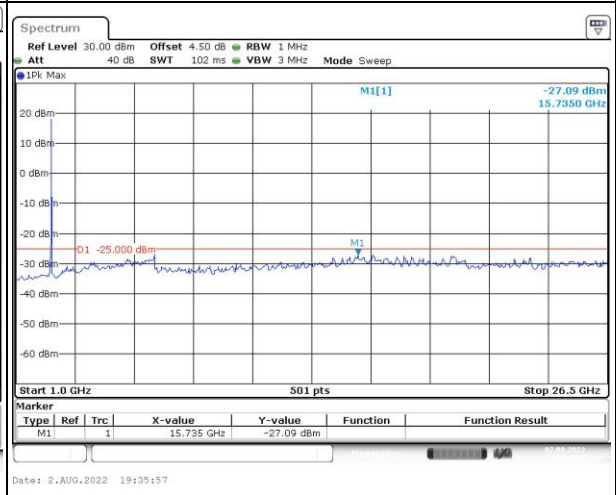
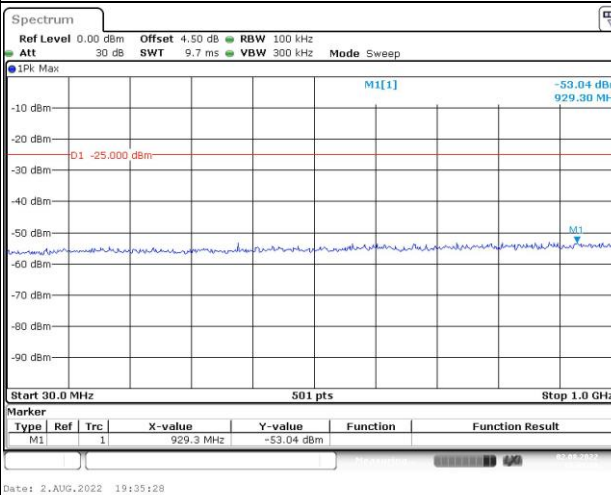
Channel

5MHz Bandwidth QPSK

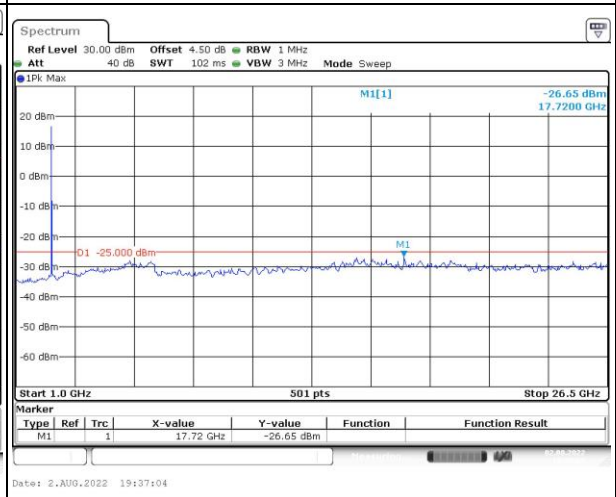
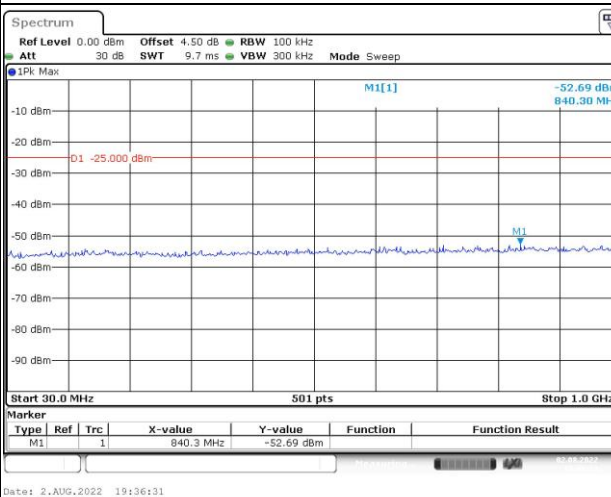
Lowest



Middle



Highest

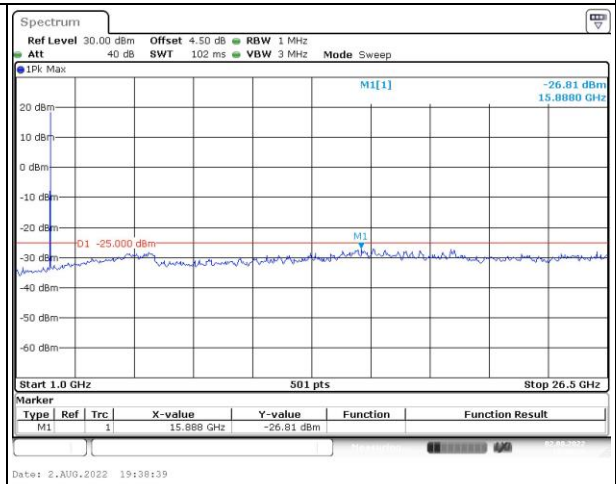
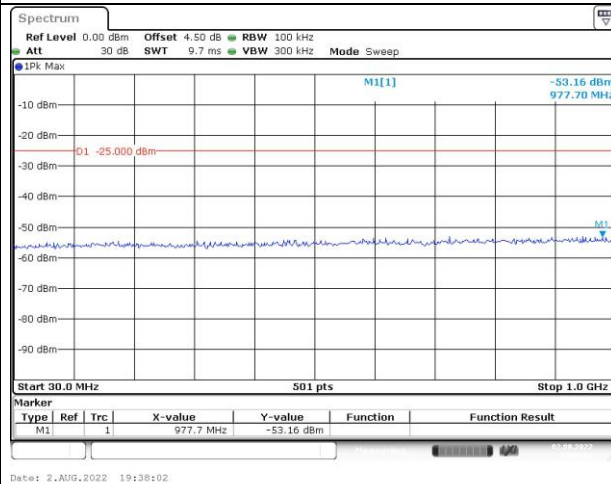


Spurious Emissions at Antenna Terminal

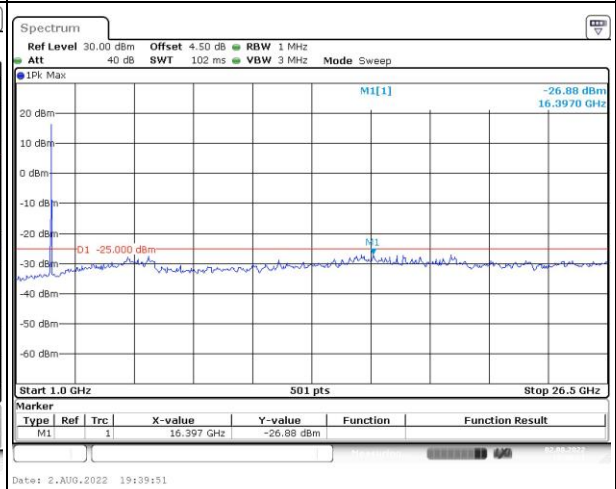
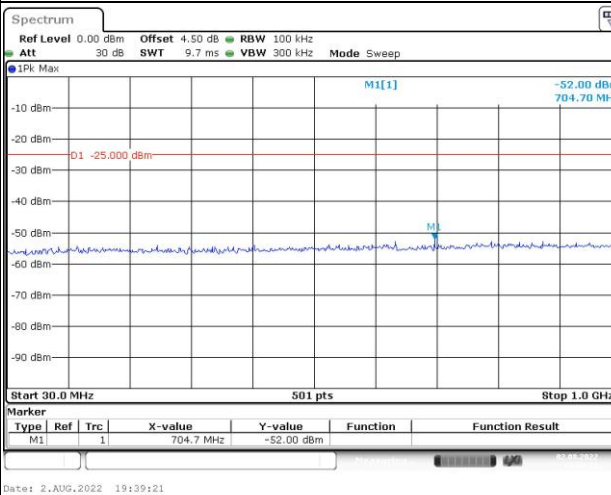
Channel

10MHz Bandwidth QPSK

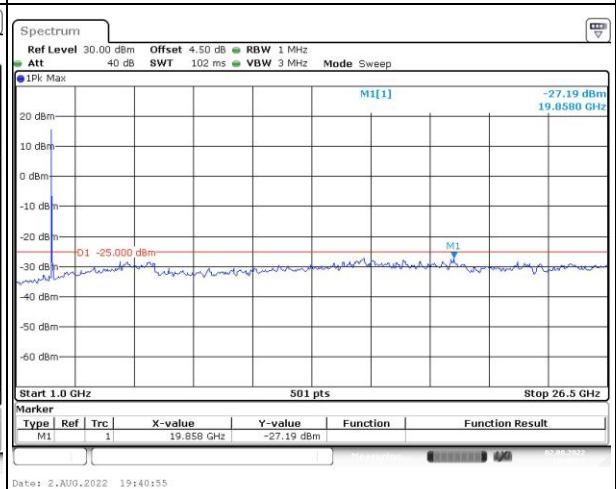
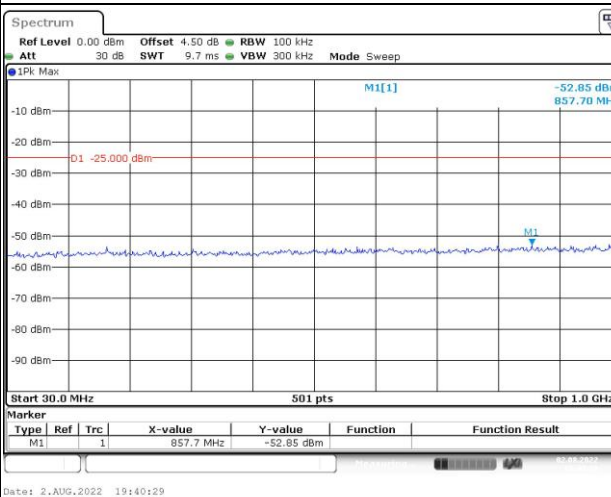
Lowest



Middle



Highest

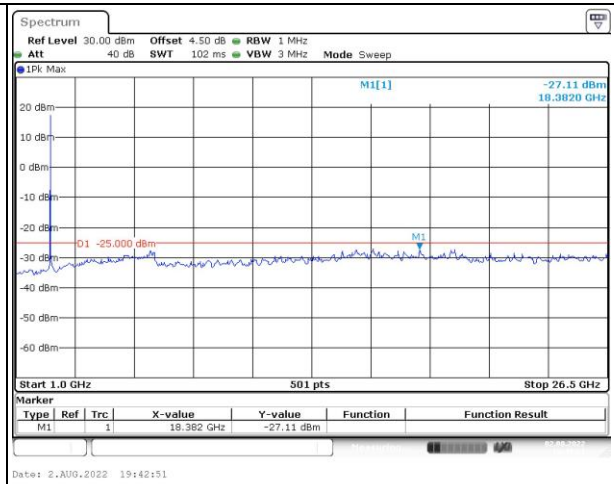
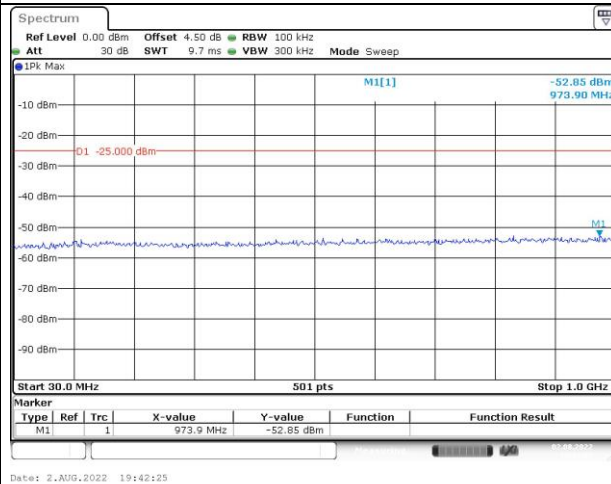


Spurious Emissions at Antenna Terminal

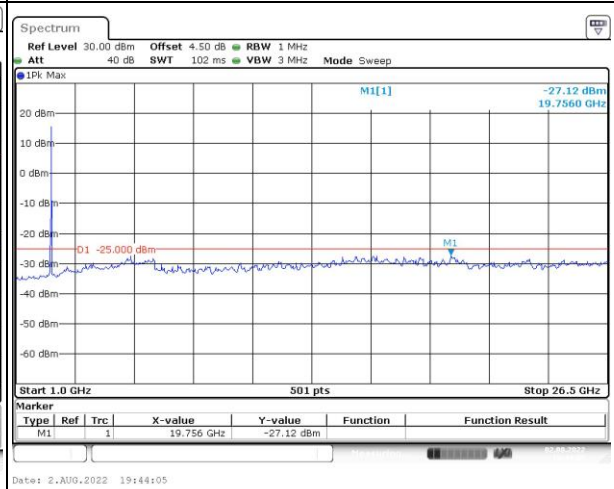
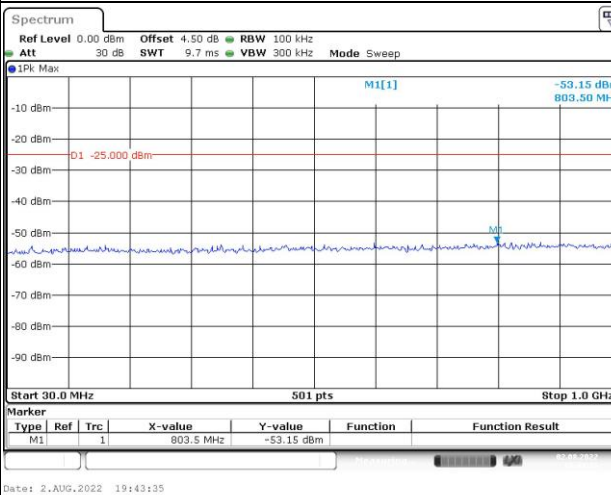
Channel

15MHz Bandwidth QPSK

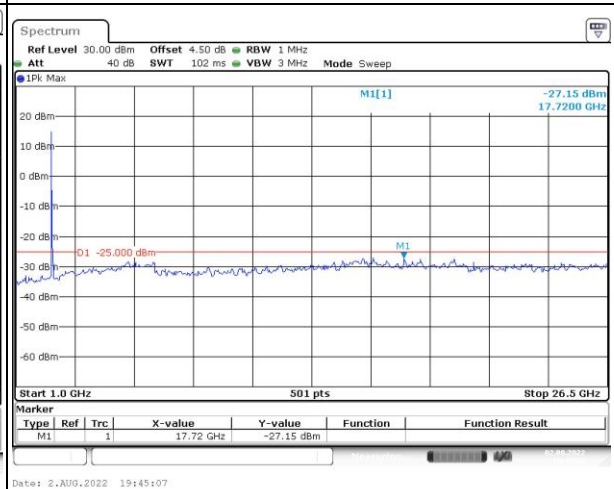
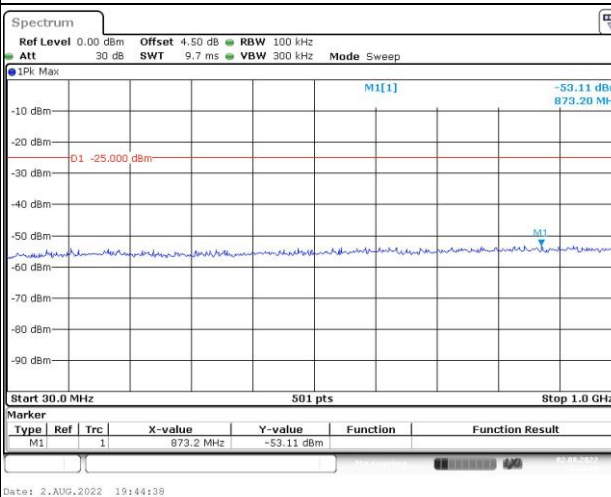
Lowest



Middle



Highest

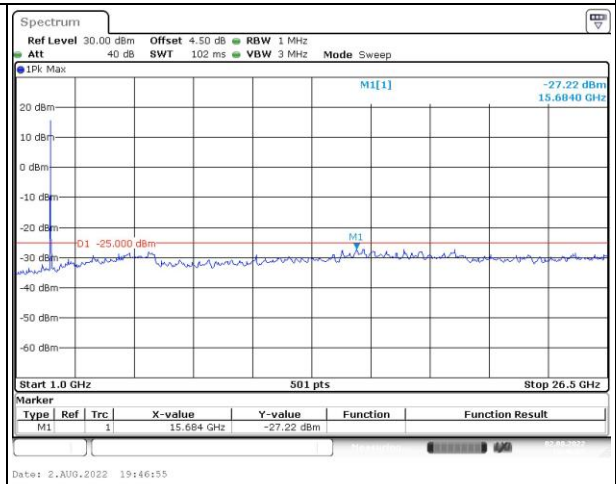
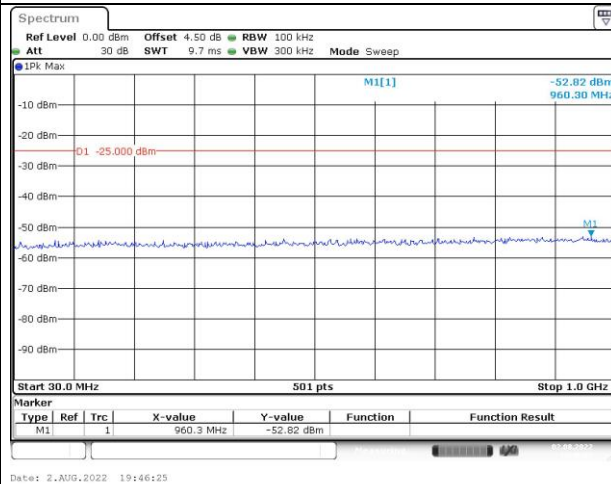


Spurious Emissions at Antenna Terminal

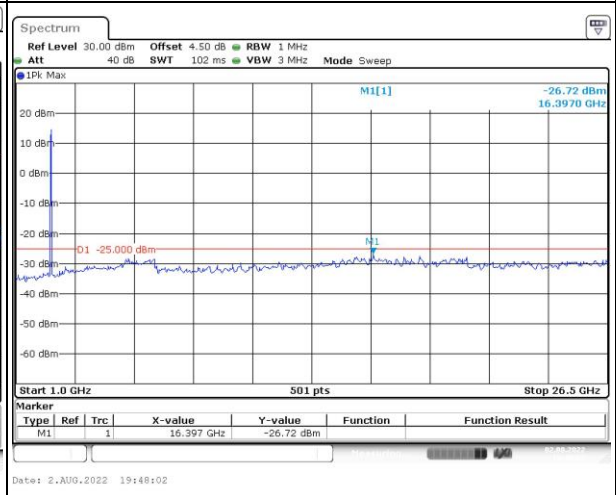
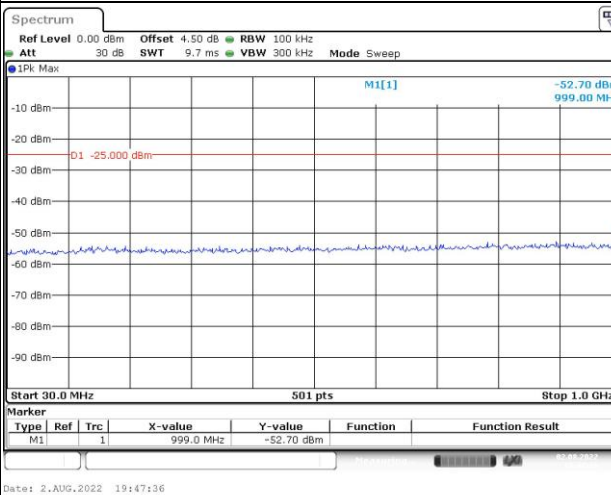
Channel

20MHz Bandwidth QPSK

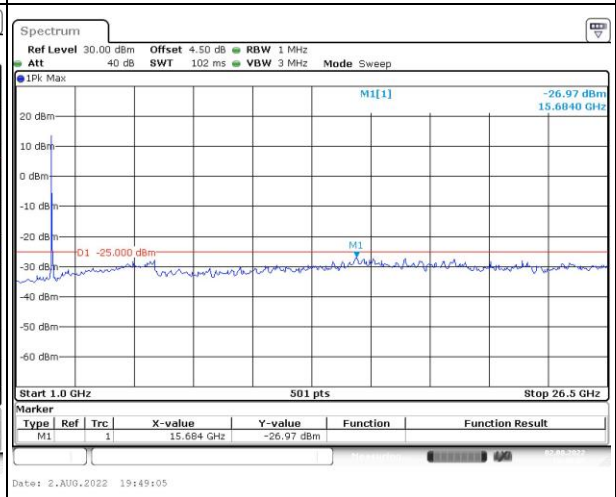
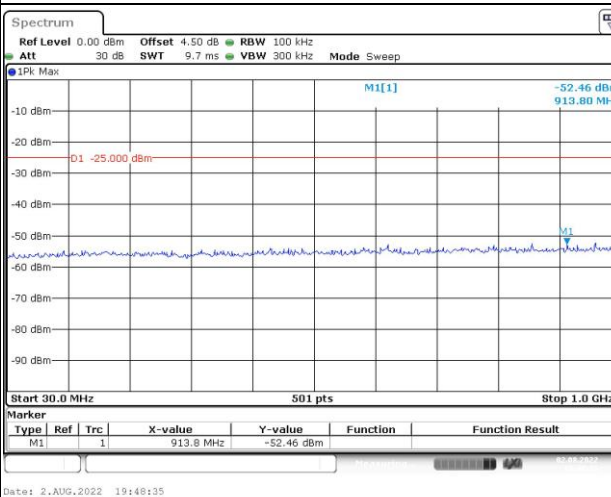
Lowest



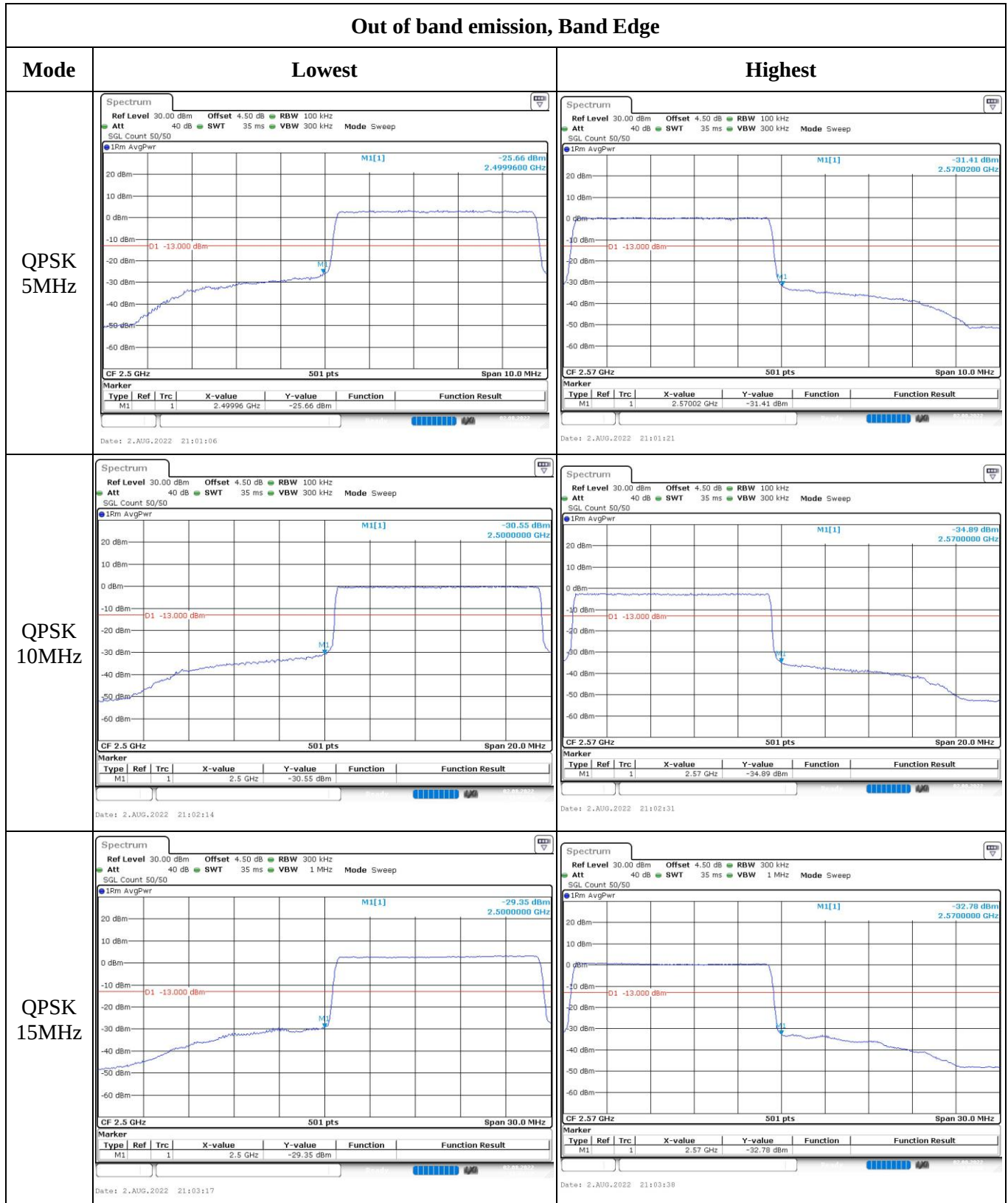
Middle



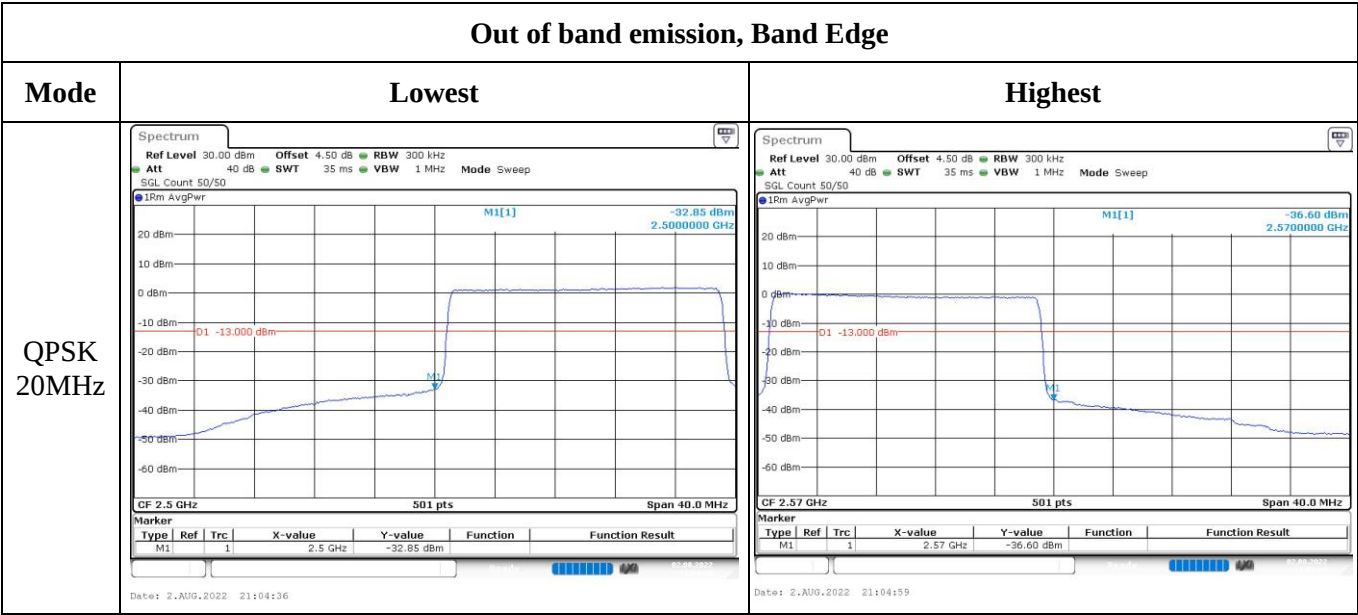
Highest



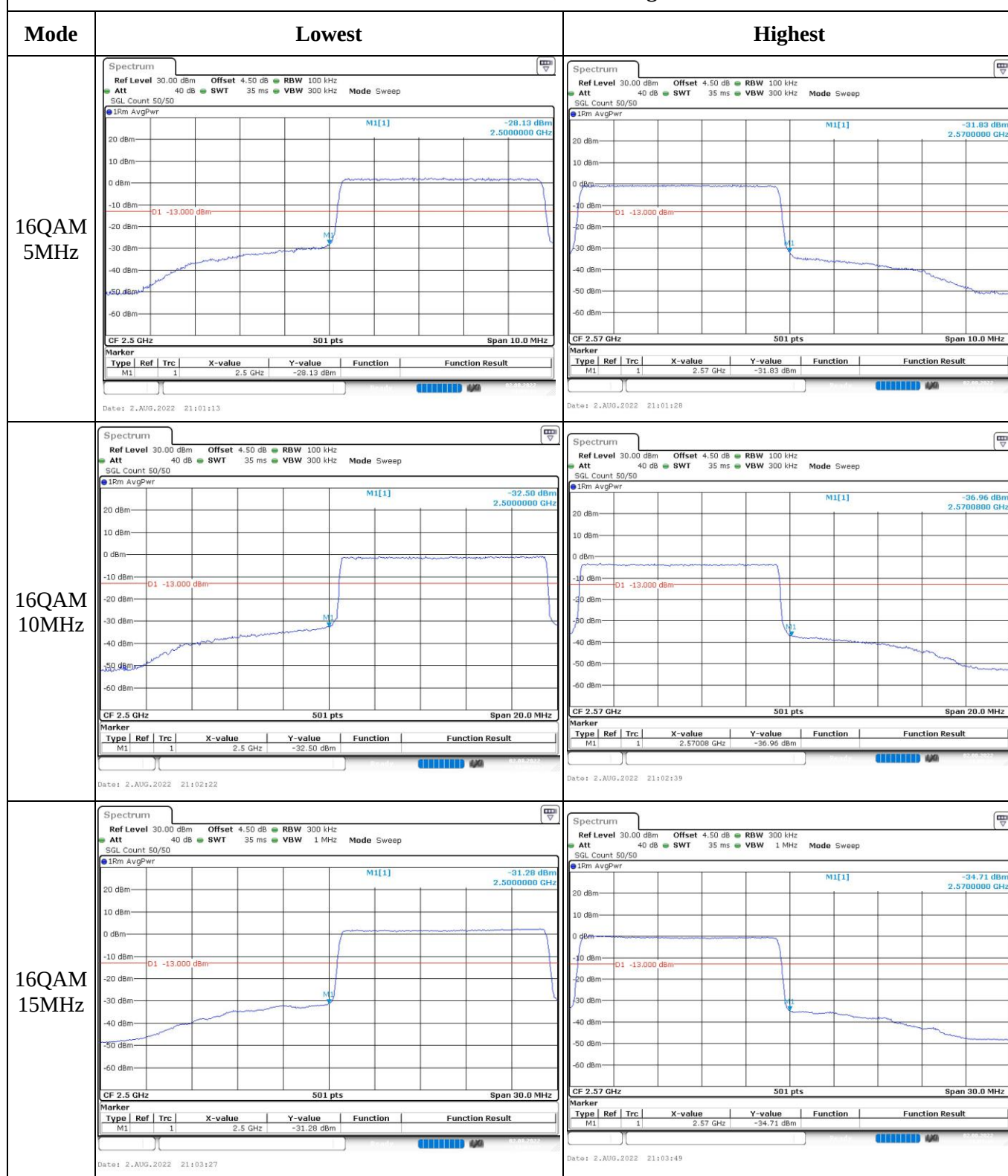
Out of band emission, Band Edge



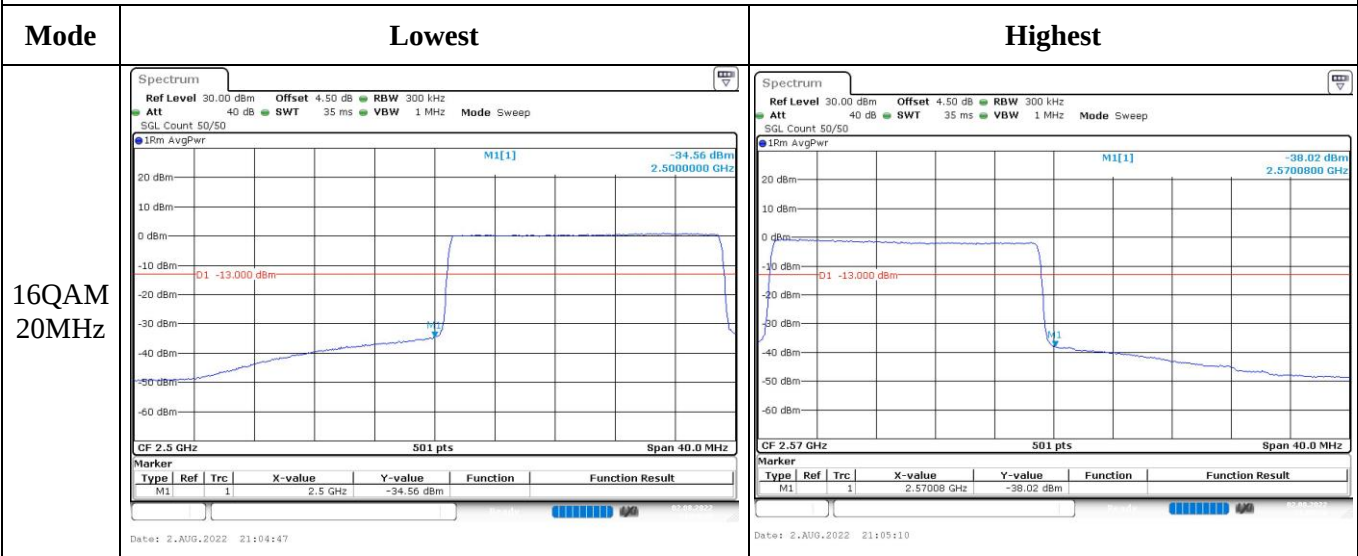
Out of band emission, Band Edge



Out of band emission, Band Edge



Out of band emission, Band Edge



4.10 Antenna Port Test Data and Results for LTE Band 12

Serial Number:	CR22070025-RF-S1	Test Date:	2022-08-02
Test Site:	RF	Test Mode:	Transmitting
Tester:	George Chen	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	25.3~25.9	Relative Humidity: (%)	52~62	ATM Pressure: (kPa)	100.1~100.6
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2022-07-15	2023-07-14
zhuoxiang	Coaxial Cable	SMA-178	211002	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A
Weinschel	Coaxial Attenuators	53-20-34	LN751	Each time	N/A
Unknown	Coaxial tee connector	Unknown	2204006	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	149218	2022-07-15	2023-07-14
UNI-T	Multimeter	UT39A+	C210582554	2021-09-30	2022-09-29
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2022-04-06	2023-04-05
ZHAOXIN	DC Power Supply	RXN-6010D	21R6010D0912386	N/A	N/A

* Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

EUT Information@ LTE Band 12▲:

Antenna Gain G_T (dBi):	-3	Antenna Gain G_T (dBd):	-5.15	Path Loss L_C (dB):	0.1
Operation Voltage(V_{DC}):					
Lowest:	3.5	Normal:	3.8	Highest:	4.2

Test Frequency For Each Mode:

Operation Bandwidth	Lowest Frequency (MHz)	Middle Frequency (MHz)	Highest Frequency (MHz)
1.4MHz	699.7	707.5	715.3
3MHz	700.5	707.5	714.5
5MHz	701.5	707.5	713.5
10MHz	704	707.5	711

Test Data:**FCC §2.1046; § 27.50(c) (10)****RF Output Power:**

Test Bandwidth & Modulation	Resource Block & RB offset	Conducted Average Output Power(dBm)			Maximum ERP (dBm)	ERP Limit (dBm)
		Lowest Channel	Middle Channel	Highest Channel		
1.4MHz QPSK	RB1#0	23.6	23.69	23.64	18.68	34.77
	RB1#3	23.84	23.93	23.85		
	RB1#5	23.59	23.65	23.7		
	RB3#0	23.7	23.69	23.75		
	RB3#3	23.79	23.67	23.71		
	RB6#0	22.73	22.77	22.79		
1.4MHz 16QAM	RB1#0	22.64	22.58	22.74	17.74	34.77
	RB1#3	22.87	22.78	22.99		
	RB1#5	22.71	22.54	22.82		
	RB3#0	22.81	22.76	22.68		
	RB3#3	22.84	22.79	22.67		
	RB6#0	21.72	21.71	21.81		
3MHz QPSK	RB1#0	23.64	23.7	23.68	18.48	34.77
	RB1#8	23.72	23.66	23.73		
	RB1#14	23.72	23.64	23.72		
	RB6#0	22.6	22.7	22.7		
	RB6#9	22.68	22.66	22.67		
	RB15#0	22.69	22.65	22.68		
3MHz 16QAM	RB1#0	22.69	23.11	22.73	17.86	34.77
	RB1#8	22.7	23.08	22.81		
	RB1#14	22.68	23.07	22.81		
	RB6#0	21.61	21.73	21.71		
	RB6#9	21.65	21.73	21.75		
	RB15#0	21.74	21.71	21.64		
5MHz QPSK	RB1#0	23.53	23.6	23.57	18.49	34.77
	RB1#13	23.68	23.73	23.74		
	RB1#24	23.61	23.59	23.66		
	RB15#0	22.62	22.72	22.69		
	RB15#10	22.72	22.62	22.64		
	RB25#0	22.65	22.63	22.64		
5MHz 16QAM	RB1#0	22.62	22.37	22.82	17.73	34.77
	RB1#13	22.75	22.52	22.98		
	RB1#24	22.66	22.46	22.91		
	RB15#0	21.66	21.72	21.69		
	RB15#10	21.77	21.63	21.67		
	RB25#0	21.68	21.69	21.63		

10MHz QPSK	RB1#0	23.52	23.63	23.6	18.6	34.77
	RB1#25	23.85	23.85	23.78		
	RB1#49	23.65	23.68	23.72		
	RB25#0	22.53	22.66	22.66		
	RB25#25	22.62	22.71	22.66		
	RB50#0	22.6	22.66	22.65		
10MHz 16QAM	RB1#0	22.63	22.57	23.02	18.08	34.77
	RB1#25	22.88	22.75	23.33		
	RB1#49	22.75	22.63	23.2		
	RB25#0	21.55	21.73	21.74		
	RB25#25	21.62	21.8	21.73		
	RB50#0	21.6	21.67	21.66		
Note: ERP=Conducted Power(dBm) - L _C (dB) + G _T (dBd)						
					Result:	Pass

Peak-to-average Ratio(PAR)					
Test Bandwidth & Modulation	Resource Block & RB offset	Peak-to-average Ratio(dB)			Limit (dB)
		Lowest Channel	Middle Channel	Highest Channel	
10MHz QPSK	RB1#0	4.99	3.88	4.29	13
	RB50#0	4.87	4.96	4.78	13
10MHz 16QAM	RB1#0	5.77	4.99	4.93	13
	RB50#0	5.74	5.8	5.83	13
Result:					Pass

FCC §2.1049, §27.53:Occupied Bandwidth						
Operation Mode	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)		
	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel
1.4MHz QPSK	1.114	1.102	1.102	1.488	1.314	1.308
1.4MHz 16QAM	1.108	1.096	1.102	1.428	1.284	1.29
3MHz QPSK	2.671	2.695	2.683	2.868	2.856	2.892
3MHz 16QAM	2.671	2.683	2.671	2.88	2.88	2.88
5MHz QPSK	4.531	4.511	4.511	5.18	5.18	5.16
5MHz 16QAM	4.491	4.551	4.531	5.14	5.22	5.18
10MHz QPSK	8.942	8.982	8.942	9.88	9.92	9.84
10MHz 16QAM	8.942	8.982	8.942	9.8	10	9.92
Note: The test plots please refer to the Plots of Occupied Bandwidth						

FCC §2.1051, §27.53:Spurious Emissions at Antenna Terminal	
Result:	Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.

FCC §2.1051, §27.53: Out of band emission, Band Edge

Result:	Pass, Please refer to the test plots of Out of band emission, Band Edge.
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FCC §2.1055, §27.54: Frequency Stability

Test Mode:	10M QPSK	Test Channel: Lowest for Lower Edge, Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	699.529	699.00	715.471	716.00
	-20	3.8	699.035	699.00	715.148	716.00
	-10	3.8	699.529	699.00	715.471	716.00
	0	3.8	699.529	699.00	715.471	716.00
	10	3.8	699.529	699.00	715.471	716.00
	20	3.8	699.529	699.00	715.471	716.00
	30	3.8	699.529	699.00	715.471	716.00
	40	3.8	699.529	699.00	715.471	716.00
	50	3.8	699.529	699.00	715.471	716.00
Frequency Stability vs. Voltage	20	3.3	699.529	699.00	715.471	716.00
	20	4.2	699.529	699.00	715.471	716.00
Result:					Pass	

Test Mode:	10M 16QAM	Test Channel: Lowest for Lower Edge, Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	699.529	699.00	715.471	716.00
	-20	3.8	699.529	699.00	715.471	716.00
	-10	3.8	699.019	699.00	715.216	716.00
	0	3.8	699.529	699.00	715.471	716.00
	10	3.8	699.529	699.00	715.471	716.00
	20	3.8	699.529	699.00	715.471	716.00
	30	3.8	699.529	699.00	715.471	716.00
	40	3.8	699.529	699.00	715.471	716.00
	50	3.8	699.529	699.00	715.471	716.00
Frequency Stability vs. Voltage	20	3.3	699.529	699.00	715.471	716.00
	20	4.2	699.529	699.00	715.471	716.00
Result:					Pass	

Test Plots:

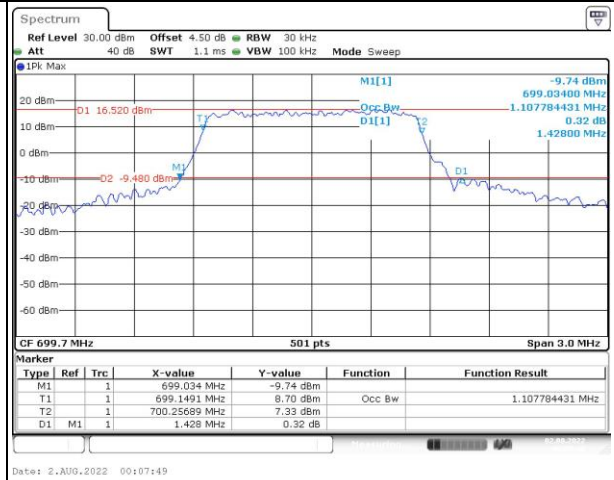
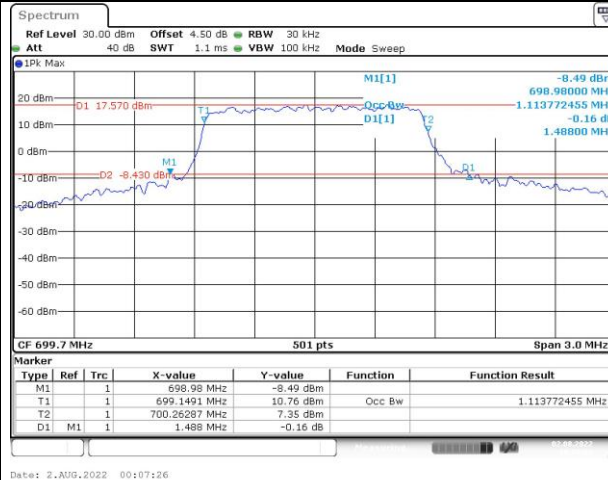
Occupied Bandwidth

Channel

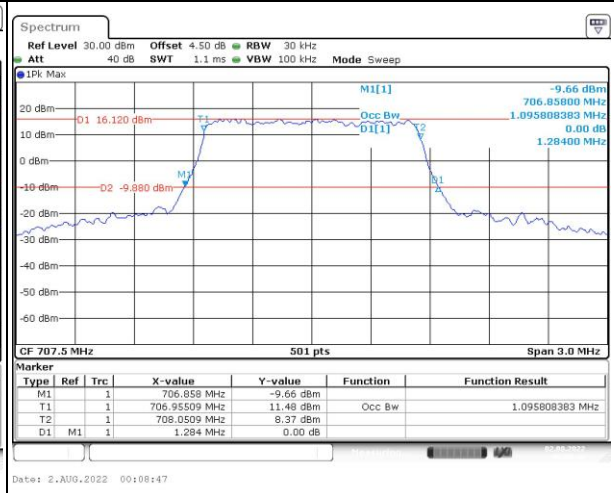
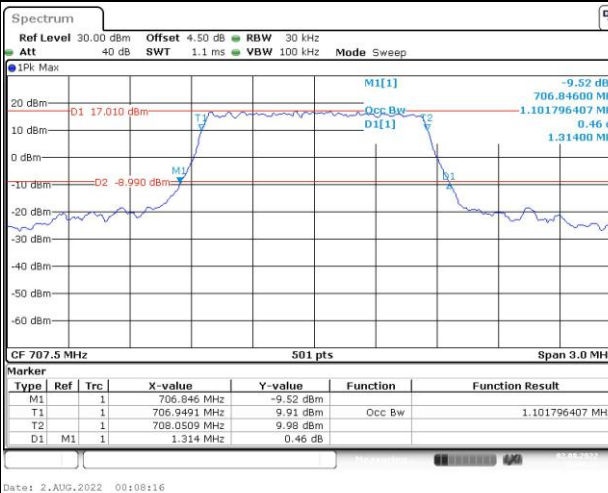
1.4MHz Bandwidth QPSK

1.4MHz Bandwidth 16QAM

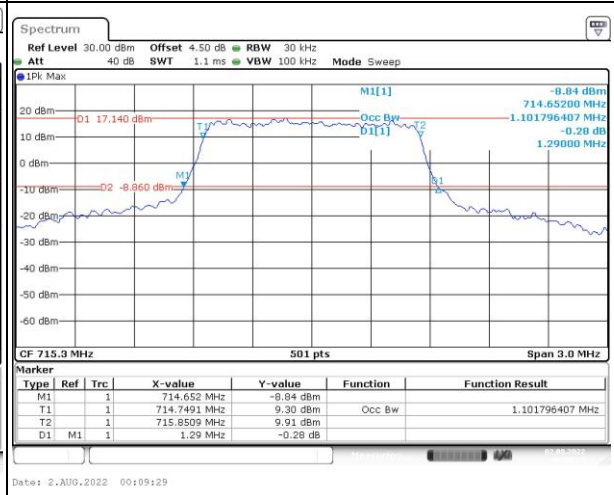
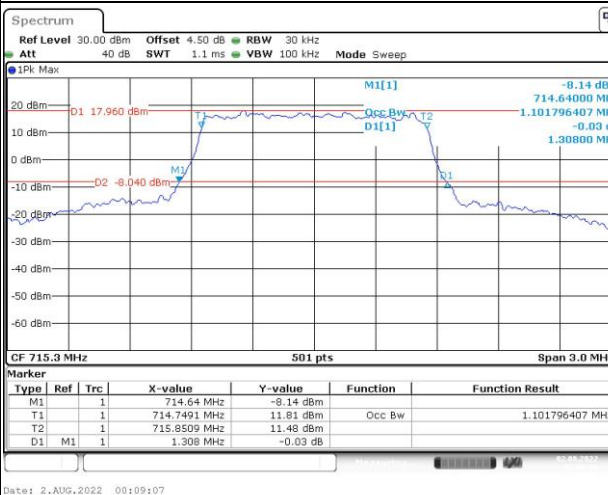
Lowest



Middle



Highest



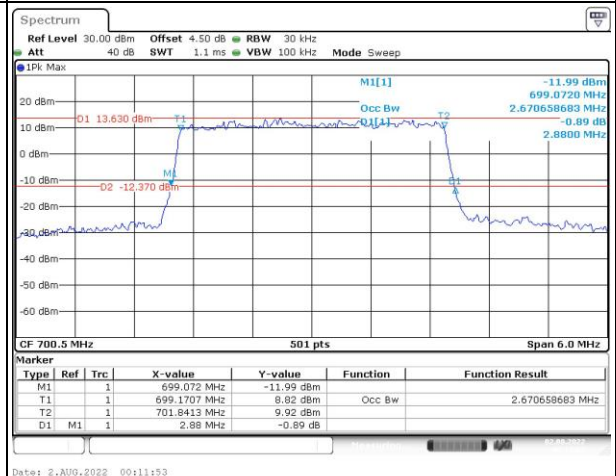
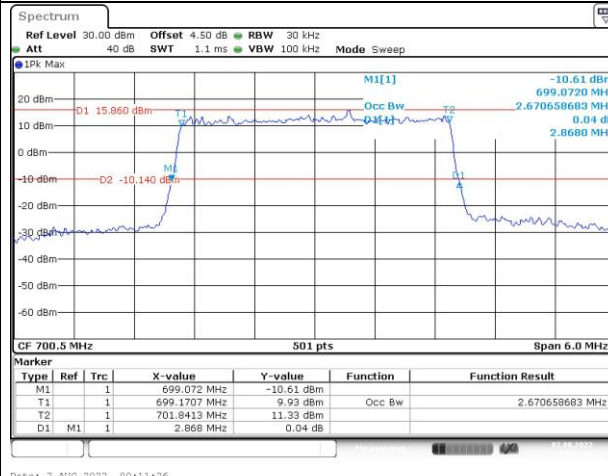
Occupied Bandwidth

Channel

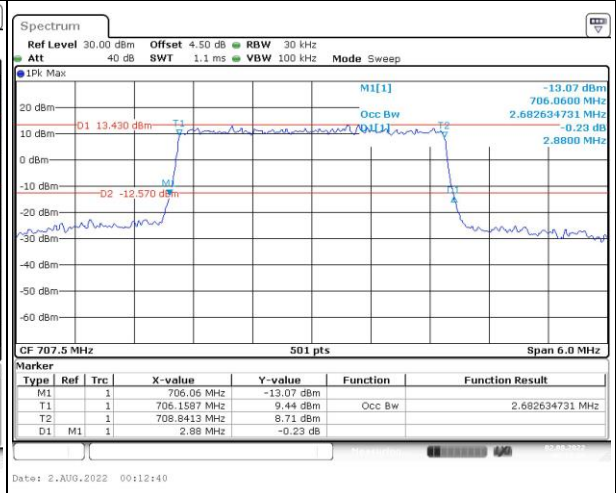
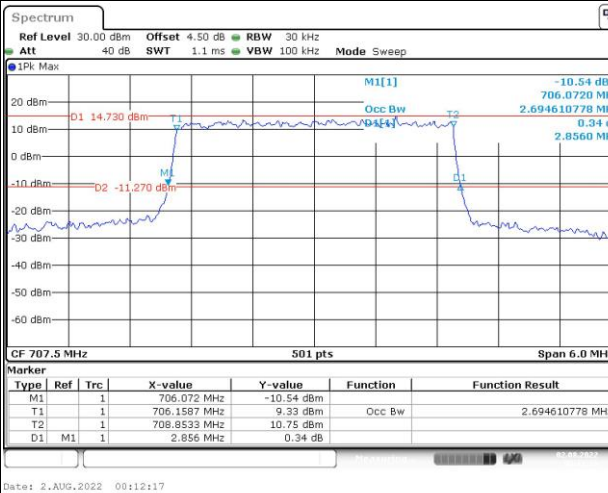
3MHz Bandwidth QPSK

3MHz Bandwidth 16QAM

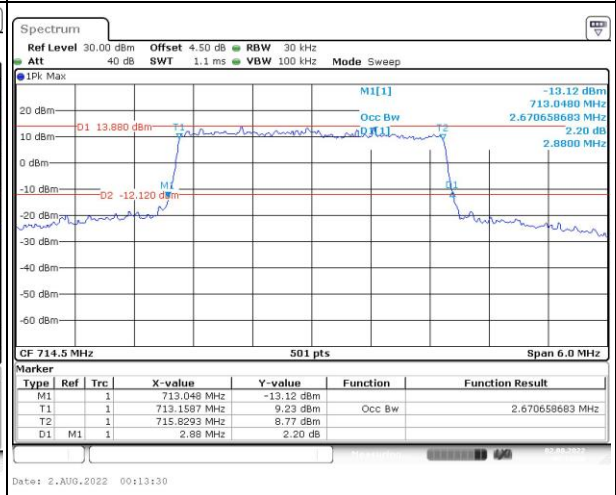
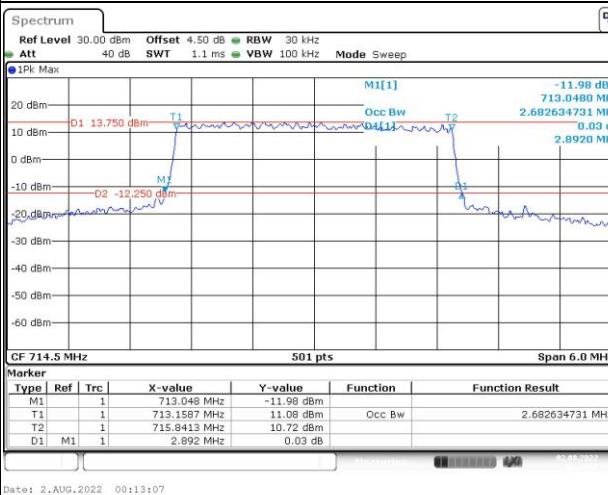
Lowest



Middle



Highest



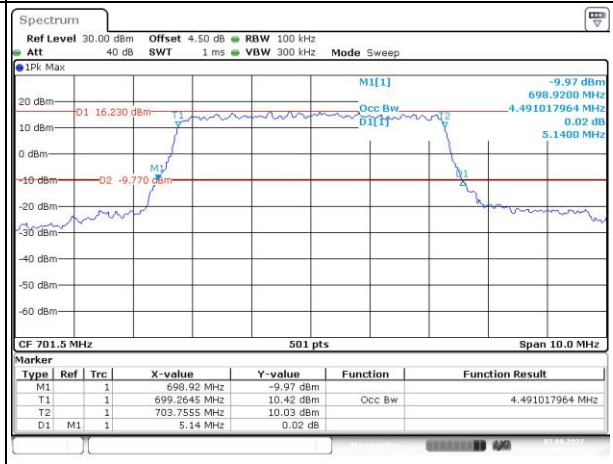
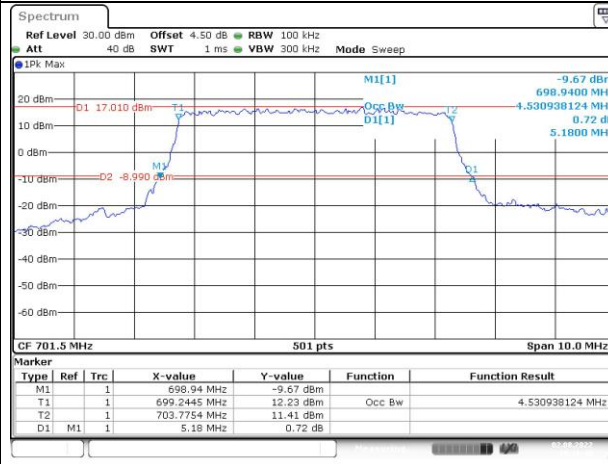
Occupied Bandwidth

Channel

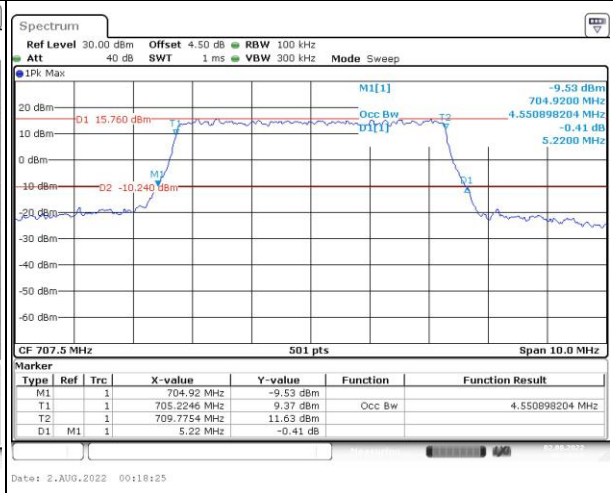
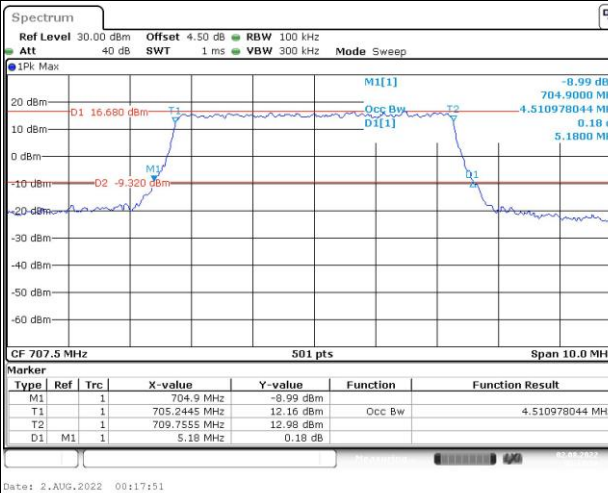
5MHz Bandwidth QPSK

5MHz Bandwidth 16QAM

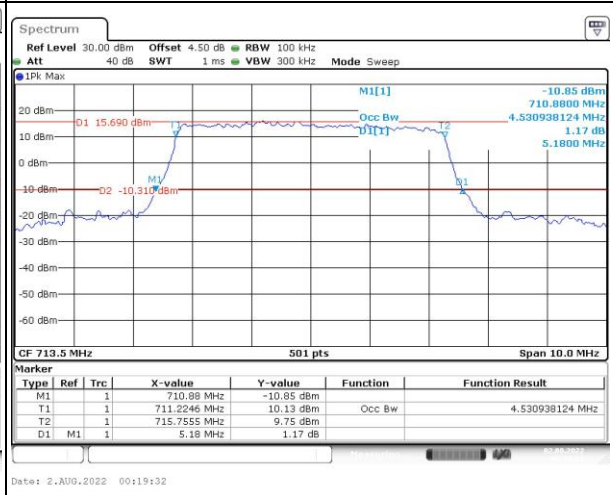
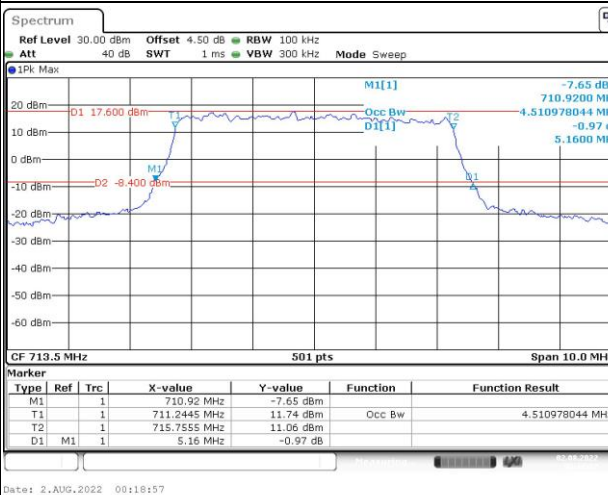
Lowest



Middle



Highest



Channel

10MHz Bandwidth 16QAM

Date: 2.AUG.2022 00:22:54

Date: 2.AUG.2022 00:23:26

Date: 2.AUG.2022 00:24:02

Date: 2.AUG.2022 00:24:37

Date: 2.AUG.2022 00:36:51

Date: 2.AUG.2022 00:37:23