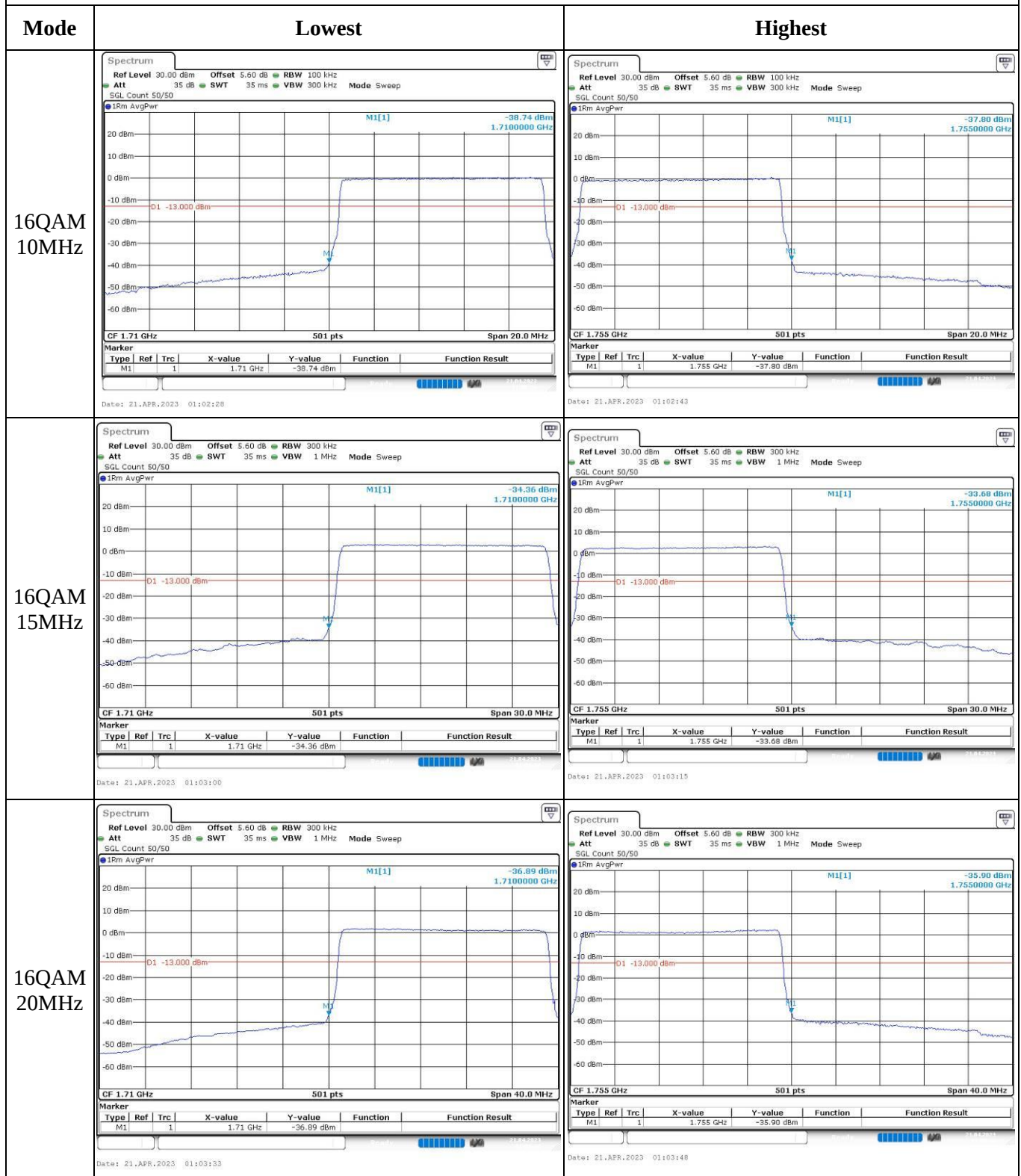


Out of band emission, Band Edge



4.8 Antenna Port Test Data and Results for LTE Band 5

Serial Number:	24YP_4	Test Date:	2023/04/20~2023/04/21
Test Site:	RF	Test Mode:	Transmitting
Tester:	George Chen	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	22.2~25.8	Relative Humidity: (%)	42~52	ATM Pressure: (kPa)	99.8~102.2
----------------------	-----------	---------------------------	-------	------------------------	------------

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101943	2022/7/25	2023/7/24
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
YINSAIGE	Coaxial Cable	SS413	SS413001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554403	Each time	N/A
Weinschel	Power Splitter	1515	RA914	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	149218	2022/7/15	2023/7/14
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2022/9/29	2023/9/28
UNI-T	Multimeter	UT39A+	C210582554	2022/7/15	2023/7/14
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).

Test Frequency For Each Mode:

Operation Bandwidth	Lowest Frequency (MHz)	Middle Frequency (MHz)	Highest Frequency (MHz)
1.4MHz	824.7	836.5	848.3
3MHz	825.5	836.5	847.5
5MHz	826.5	836.5	846.5
10MHz	829	836.5	844

Test Data:**FCC §2.1046; §22.913 (a)****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	23.05	22.98	23.06	20.16	38.45
	RB1#3	23.1	22.95	23.07		
	RB1#5	23.03	22.91	23.04		
	RB3#0	23.19	23.03	22.99		
	RB3#3	23.22	23.01	23.08		
	RB6#0	21.96	22.02	22.02		
1.4MHz 16QAM	RB1#0	22.47	22.59	21.57	19.53	38.45
	RB1#3	22.41	22.33	21.74		
	RB1#5	22.41	22.39	21.71		
	RB3#0	22.09	21.97	21.97		
	RB3#3	22.14	21.78	22.06		
	RB6#0	21.01	20.9	21.13		
3MHz QPSK	RB1#0	22.97	22.99	22.99	20.06	38.45
	RB1#8	23.12	22.98	22.93		
	RB1#14	23.11	23.03	23.01		
	RB6#0	22.09	22.01	22.02		
	RB6#9	21.99	22.08	21.88		
	RB15#0	21.99	21.98	22.04		
3MHz 16QAM	RB1#0	22.63	21.68	22.16	19.59	38.45
	RB1#8	22.62	21.47	22.08		
	RB1#14	22.65	21.67	22.12		
	RB6#0	20.95	20.96	20.97		
	RB6#9	20.85	20.93	20.9		
	RB15#0	21	20.91	20.9		
5MHz QPSK	RB1#0	23.04	22.89	22.91	20.09	38.45
	RB1#13	23.04	22.87	22.84		
	RB1#24	23.15	22.96	22.91		
	RB15#0	22.01	21.89	22.04		
	RB15#10	21.94	21.98	22.02		
	RB25#0	21.89	21.91	21.87		
5MHz 16QAM	RB1#0	22.07	21.94	21.24	19.02	38.45
	RB1#13	22	21.94	21.19		
	RB1#24	22.08	21.76	21.18		
	RB15#0	20.73	21.04	20.95		
	RB15#10	20.72	20.84	20.89		
	RB25#0	20.82	20.78	20.99		
10MHz QPSK	RB1#0	23.07	22.8	22.86	20.04	38.45
	RB1#25	23.1	22.96	22.99		

	RB1#49	23.01	23.02	22.9		
	RB25#0	21.94	21.86	21.99		
	RB25#25	22.06	22.1	21.97		
	RB50#0	22	21.9	21.87		
10MHz 16QAM	RB1#0	22.1	21.61	22.34	19.5	38.45
	RB1#25	22.13	21.76	22.32		
	RB1#49	22.56	21.67	22.35		
	RB25#0	20.86	21.04	20.89		
	RB25#25	20.84	21.13	20.89		
	RB50#0	20.94	20.97	20.76		
Note: ERP= Conducted Power(dBm) - Lc(dB) + G _T (dBd) G _T (dBd)=G _T (dBi)-2.15						
					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	4.03	4.23	4.35	13
	RB50#0	4.7	4.93	4.7	13
10MHz 16QAM	RB1#0	4.78	5.04	5.36	13
	RB50#0	5.57	5.8	5.57	13
				Result:	Pass

FCC §2.1049, §22.905: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	1.102	1.102	1.102	1.26	1.254	1.254
1.4MHz 16QAM	1.096	1.102	1.096	1.254	1.254	1.254
3MHz QPSK	2.695	2.683	2.695	3.012	3.024	3.024
3MHz 16QAM	2.683	2.683	2.683	3.012	3.024	3.012
5MHz QPSK	4.511	4.511	4.511	5.02	5	5
5MHz 16QAM	4.531	4.531	4.491	5.02	5	5
10MHz QPSK	8.942	8.942	8.942	9.72	9.8	9.8
10MHz 16QAM	8.942	8.942	8.942	9.8	9.88	9.4

Note: The test plots please refer to the Plots of Occupied Bandwidth

FCC §2.1051, §22.917(a):Spurious Emissions at Antenna Terminal

Result:	Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.
----------------	--

FCC §2.1051, §22.917(a):Out of band emission, Band Edge

Result:	Pass, Please refer to the test plots of Out of band emission, Band Edge.
----------------	---

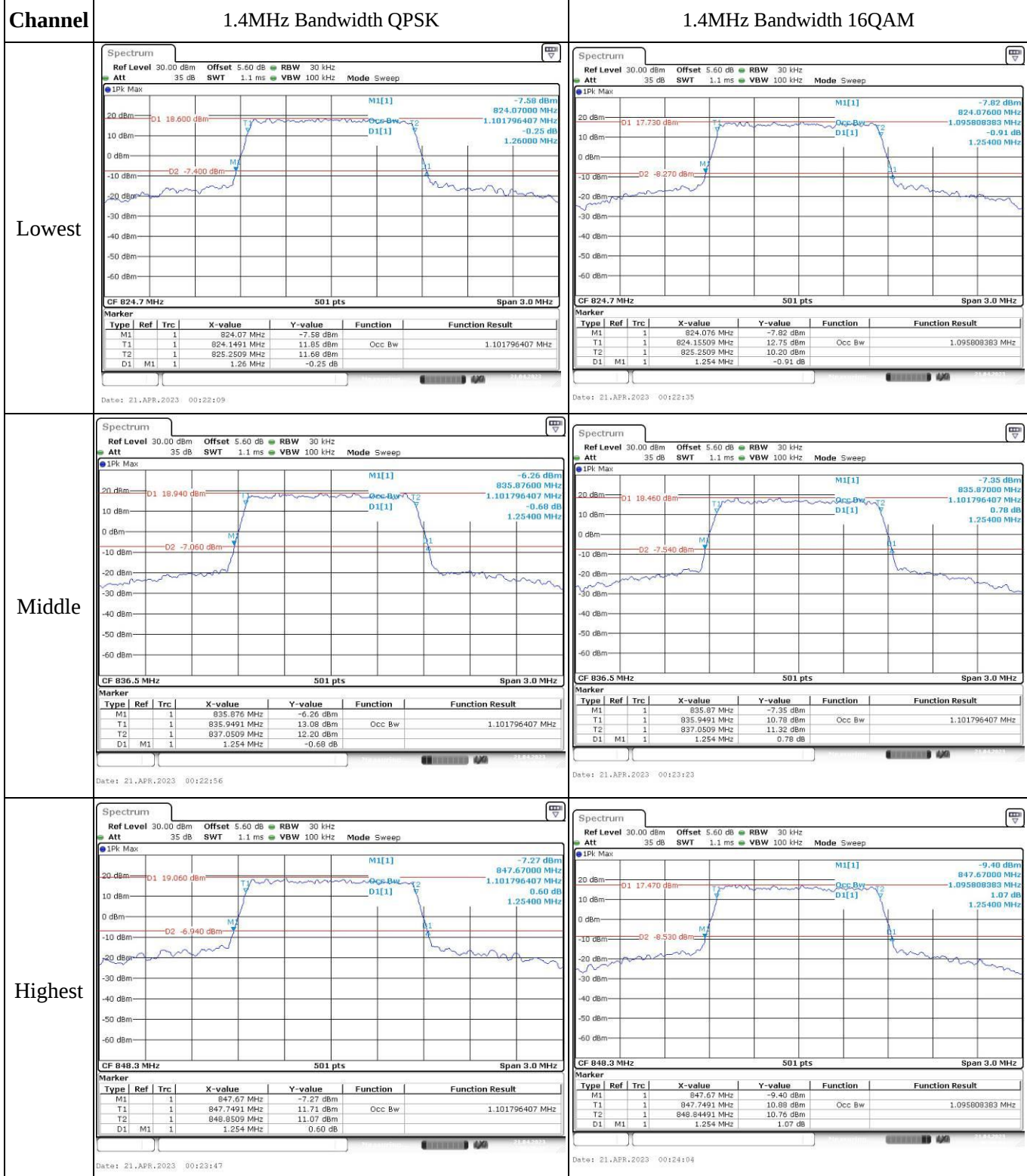
FCC §2.1055, §22.355: Frequency Stability

Test Modulation:	10 MHz QPSK		Test Channel:	836.5	MHz
Test Item	Temperature (°C)	Voltage (V _{DC})	Frequency Error		Limit
			(Hz)	(ppm)	(ppm)
Frequency Stability vs. Temperature	-30	3.85	19.7	0.024	2.5
	-20	3.85	-9.97	-0.012	2.5
	-10	3.85	-6.13	-0.007	2.5
	0	3.85	6.17	0.007	2.5
	10	3.85	7.92	0.009	2.5
	20	3.85	6.46	0.008	2.5
	30	3.85	-6.52	-0.008	2.5
	40	3.85	7.18	0.009	2.5
	50	3.85	-9.7	-0.012	2.5
Frequency Stability vs. Voltage	20	3.6	-8.17	-0.010	2.5
	20	4.4	-7.05	-0.008	2.5
Result:				Pass	

Test Modulation:	10 MHz 16QAM		Test Channel:	836.5	MHz
Test Item	Temperature(°C)	Voltage(V _{DC})	Frequency Error		Limit
			(Hz)	(ppm)	(ppm)
Frequency Stability vs. Temperature	-30	3.85	-18.17	-0.022	2.5
	-20	3.85	-6.68	-0.008	2.5
	-10	3.85	9.77	0.012	2.5
	0	3.85	-7.62	-0.009	2.5
	10	3.85	-9.91	-0.012	2.5
	20	3.85	-9.82	-0.012	2.5
	30	3.85	-6.68	-0.008	2.5
	40	3.85	-8.86	-0.011	2.5
	50	3.85	5.67	0.007	2.5
Frequency Stability vs. Voltage	20	3.6	6.05	0.007	2.5
	20	4.4	7.52	0.009	2.5
Result:				Pass	

Test Plots(Note: The 5.6dB is the Insertion loss of the RF cable, Power Splitter and DC Block, which was offset into the Spectrum Analyzer):

Occupied Bandwidth



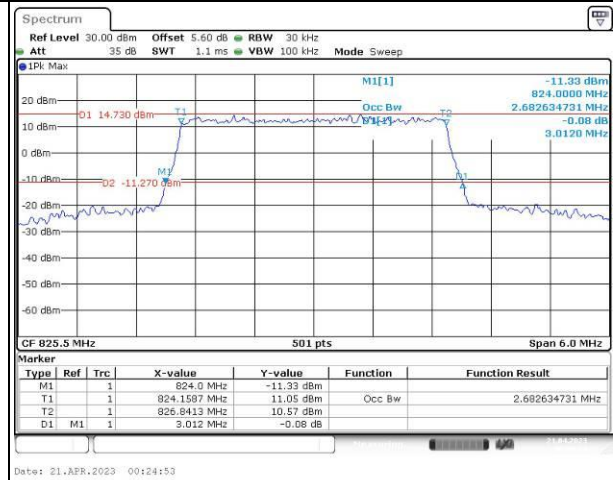
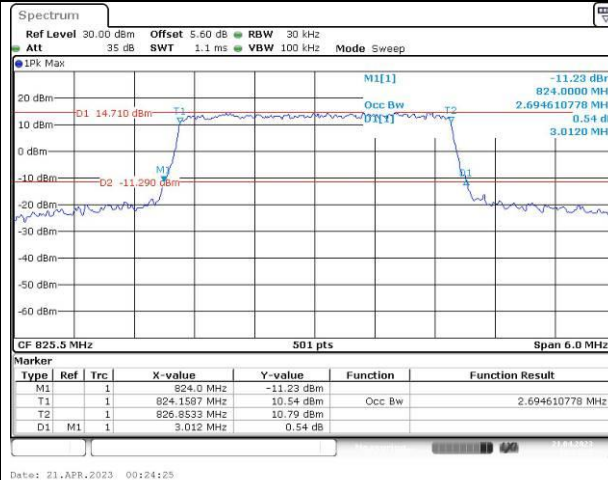
Occupied Bandwidth

Channel

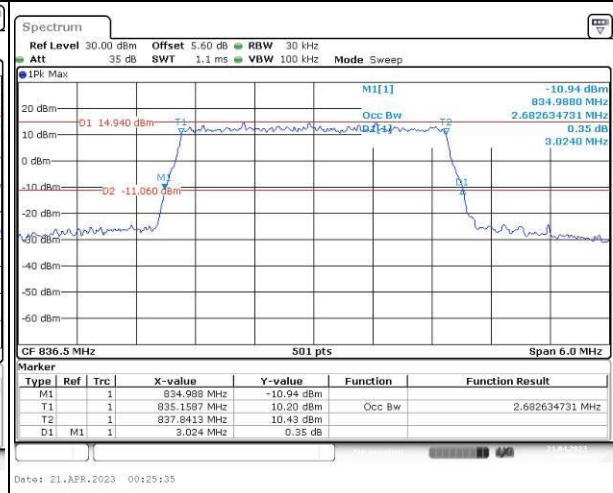
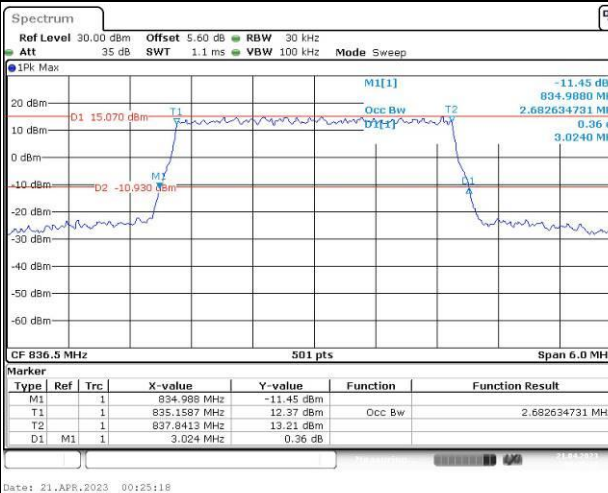
3MHz Bandwidth QPSK

3MHz Bandwidth 16QAM

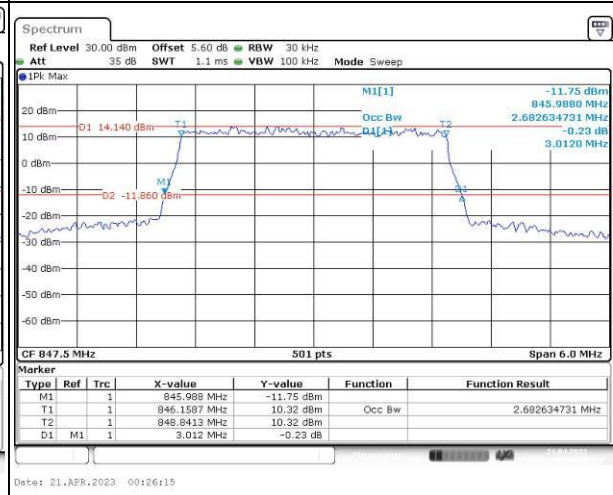
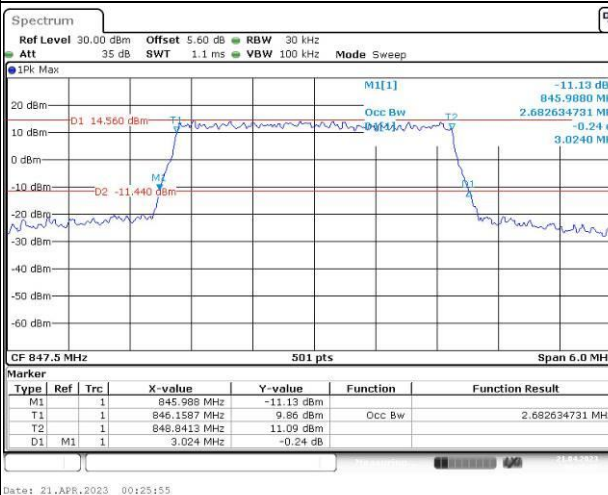
Lowest



Middle



Highest



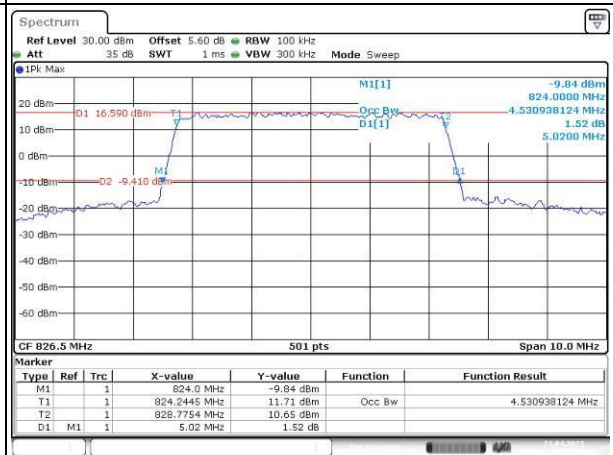
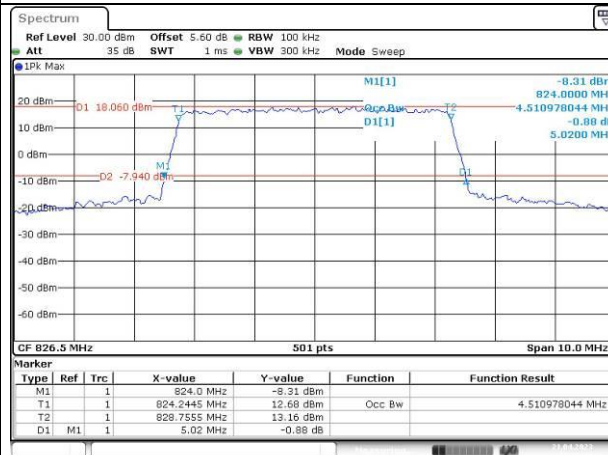
Occupied Bandwidth

Channel

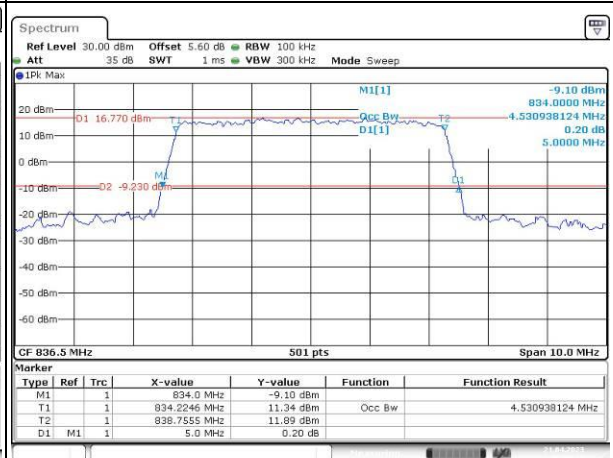
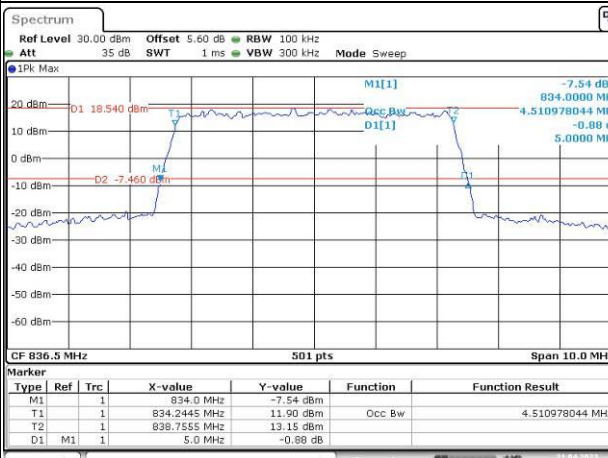
5MHz Bandwidth QPSK

5MHz Bandwidth 16QAM

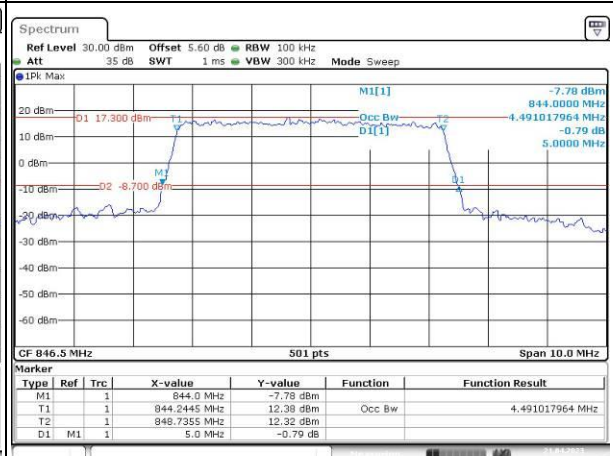
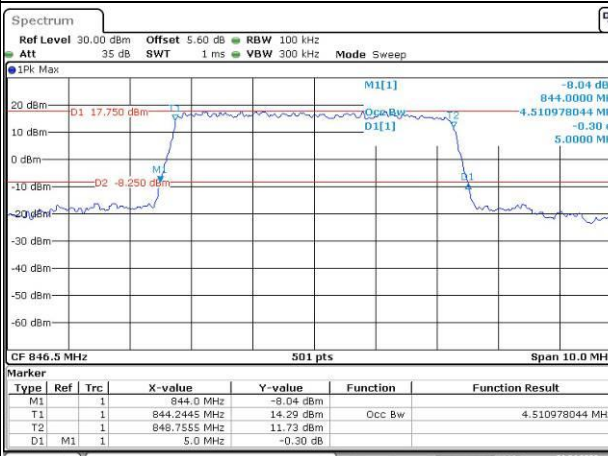
Lowest



Middle



Highest



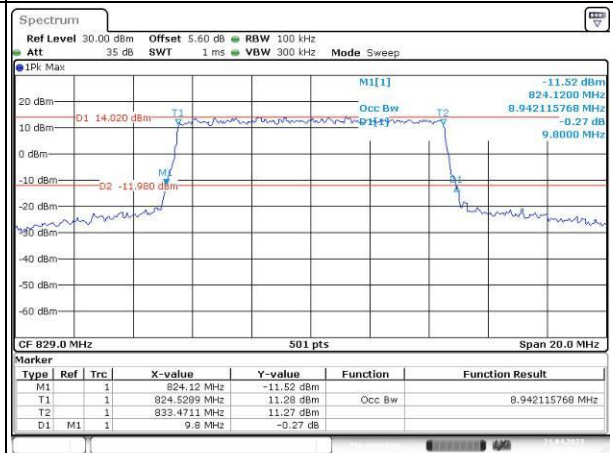
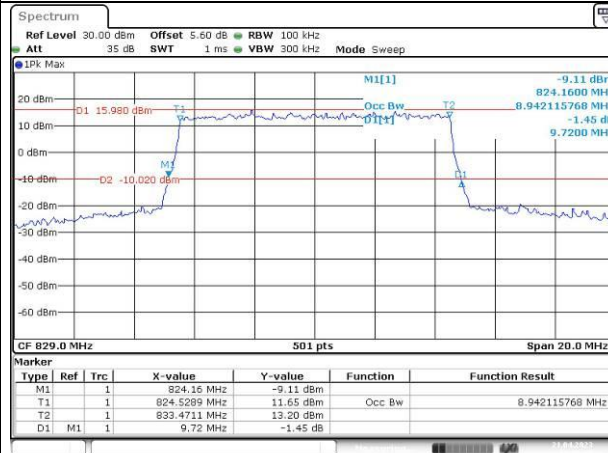
Occupied Bandwidth

Channel

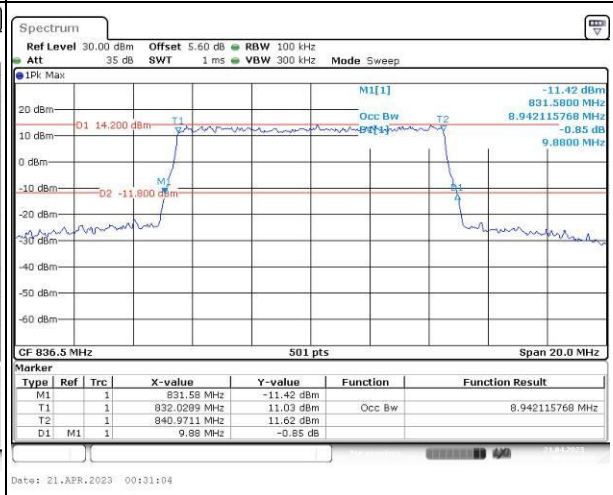
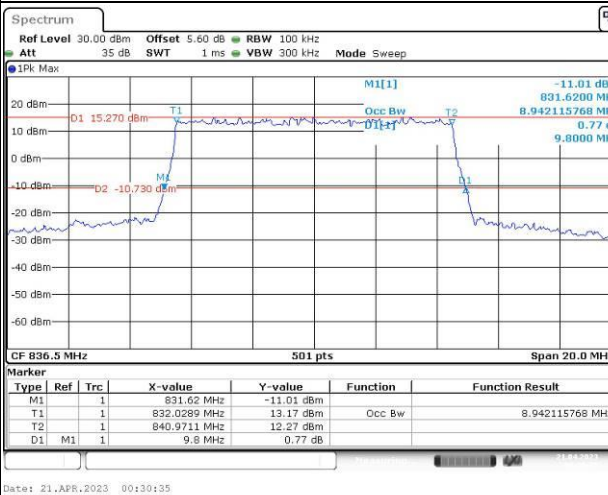
10MHz Bandwidth QPSK

10MHz Bandwidth 16QAM

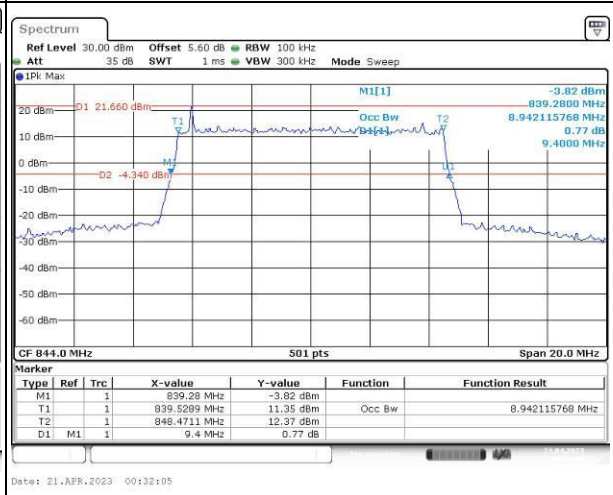
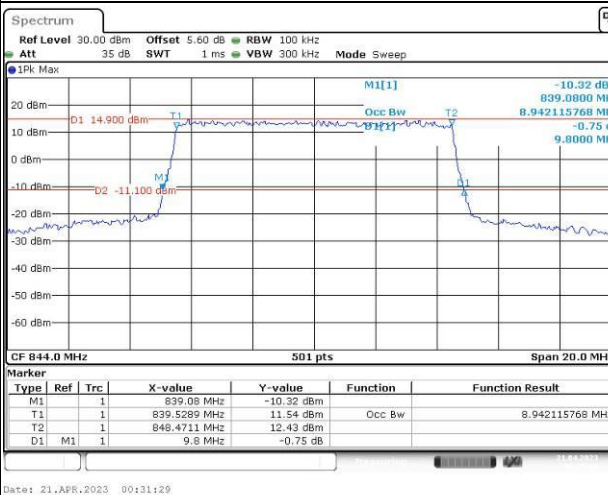
Lowest



Middle



Highest

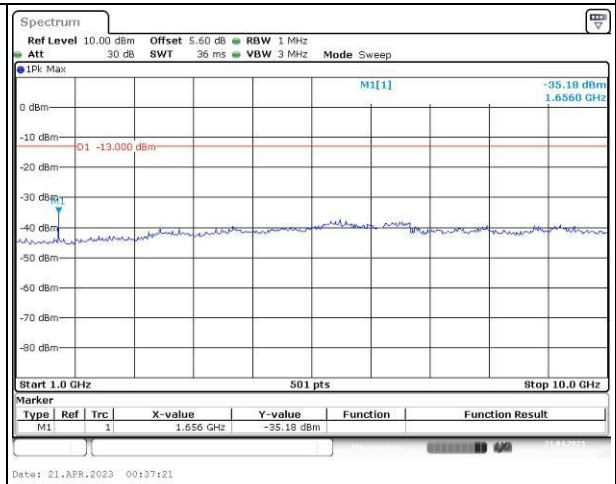
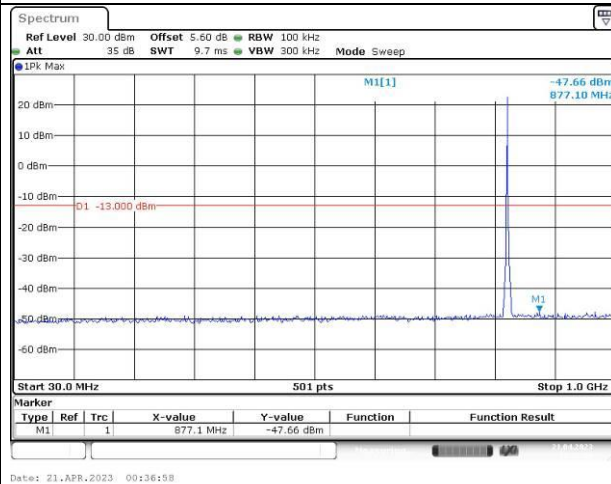


Spurious Emissions at Antenna Terminal

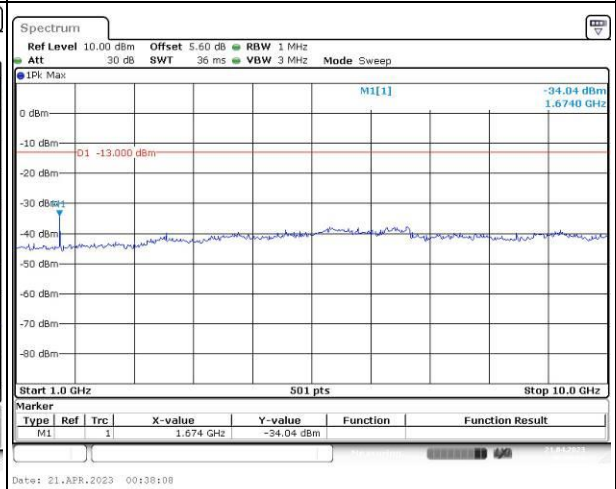
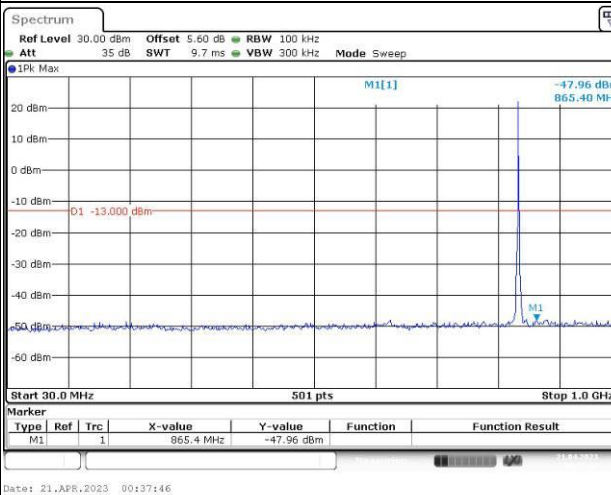
Channel

1.4MHz Bandwidth QPSK

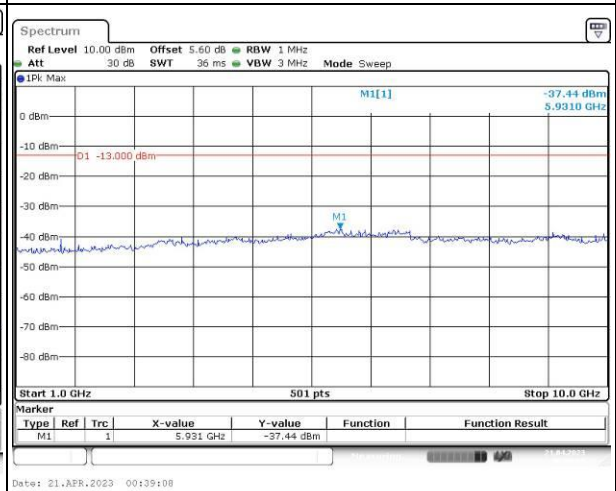
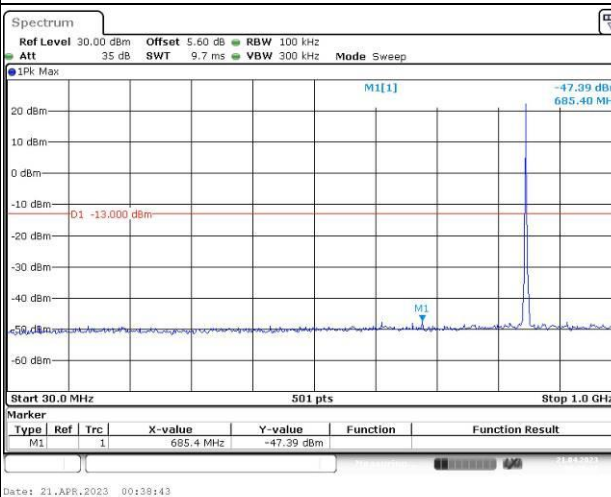
Lowest



Middle



Highest

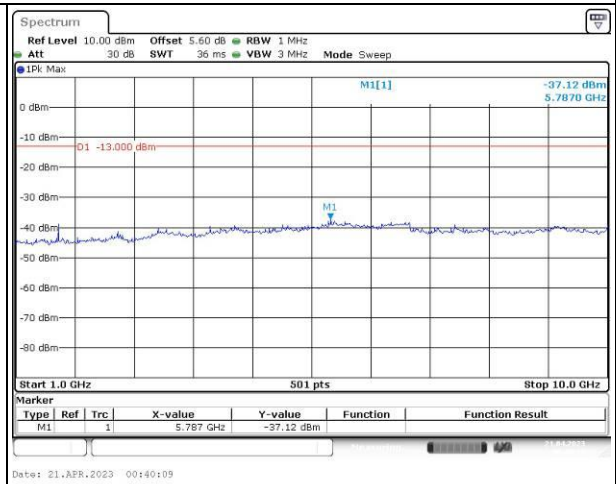
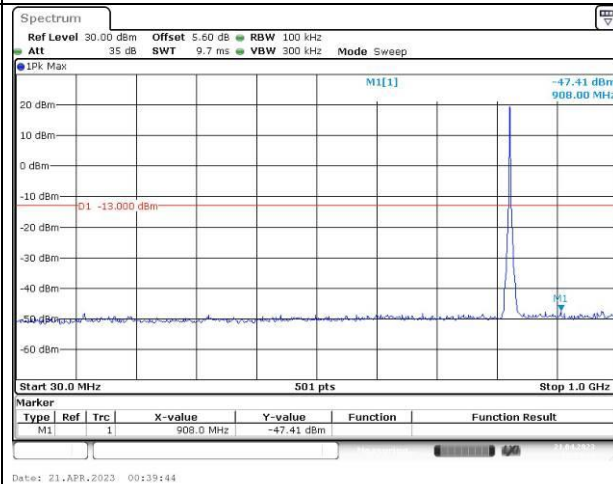


Spurious Emissions at Antenna Terminal

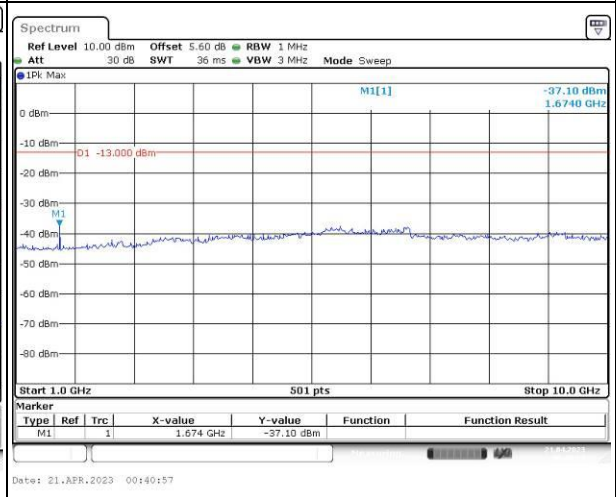
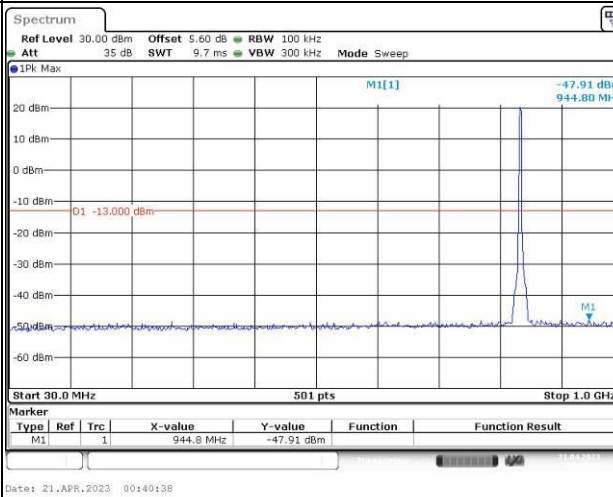
Channel

3MHz Bandwidth QPSK

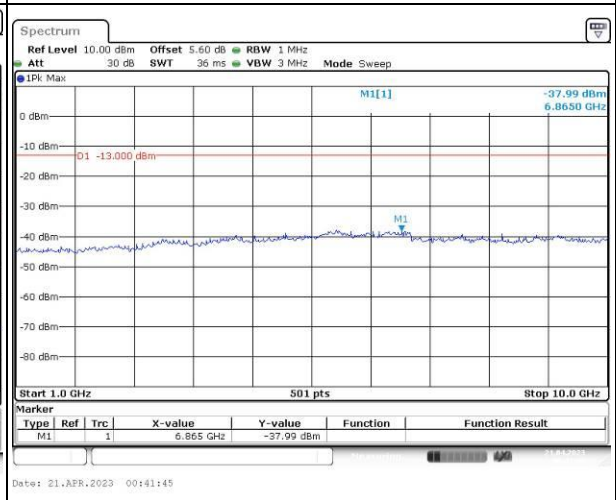
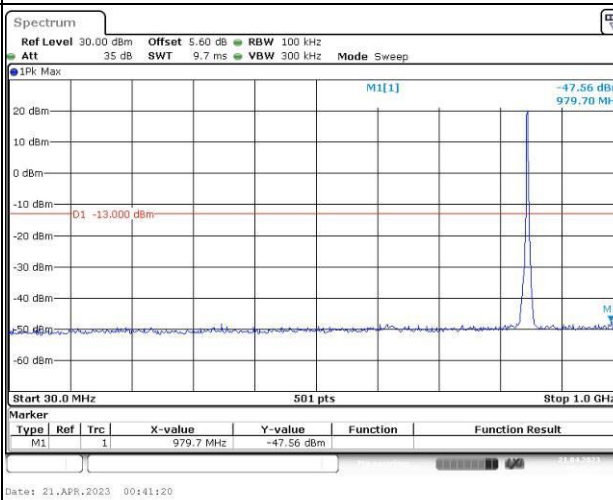
Lowest



Middle



Highest

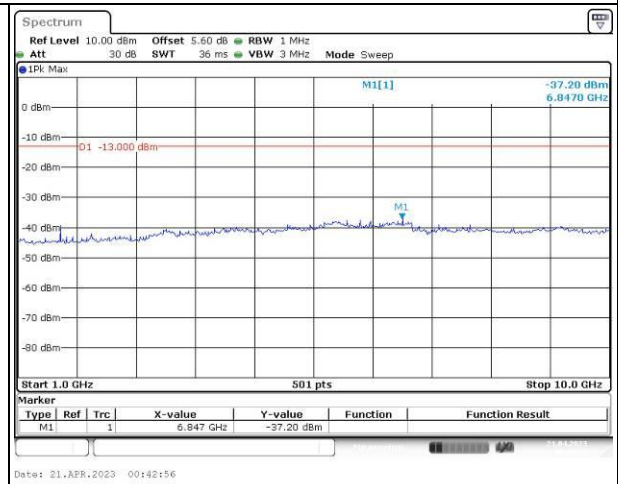
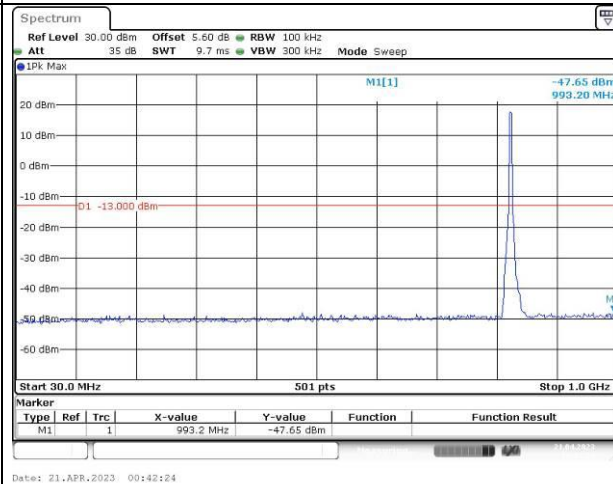


Spurious Emissions at Antenna Terminal

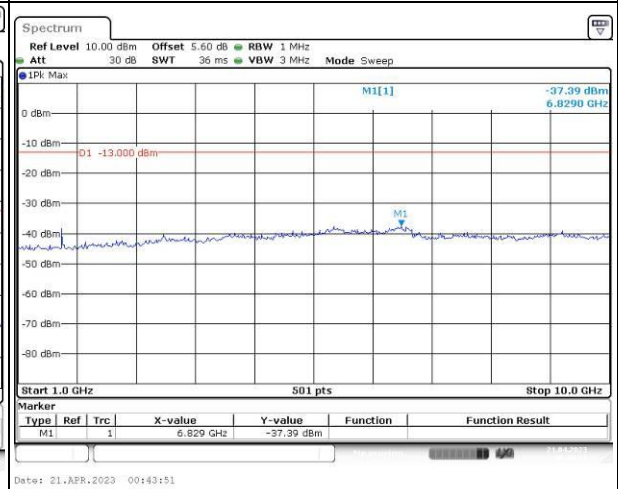
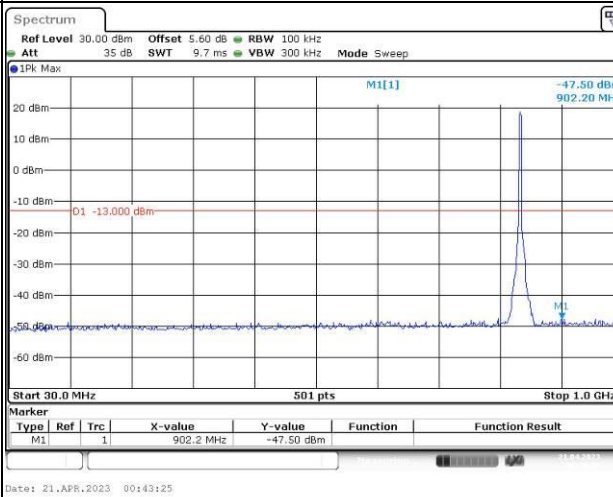
Channel

5MHz Bandwidth QPSK

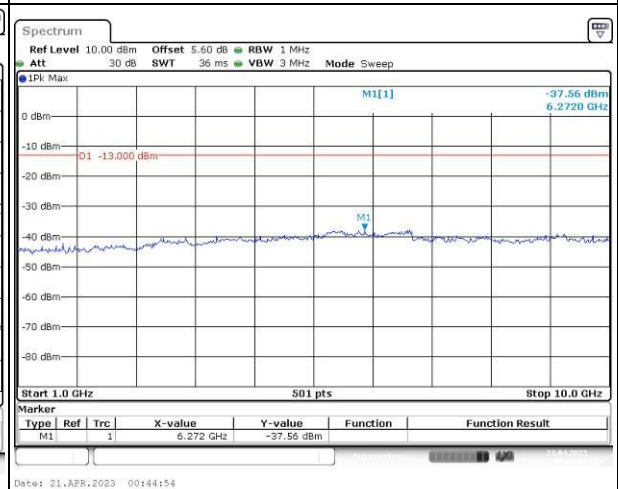
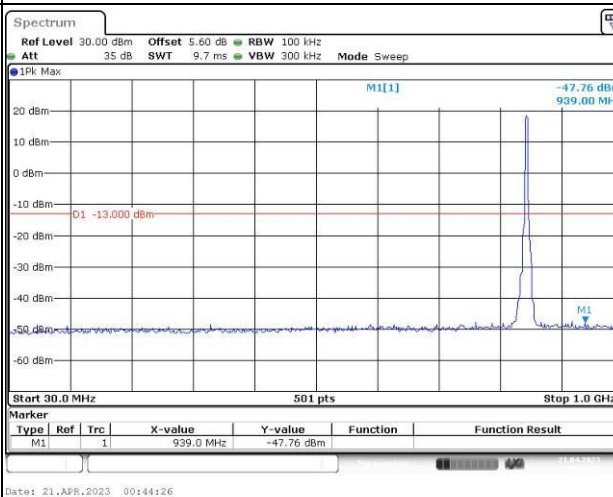
Lowest



Middle



Highest

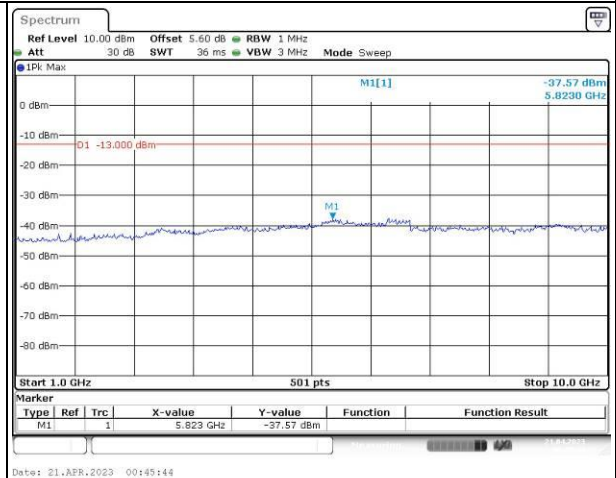
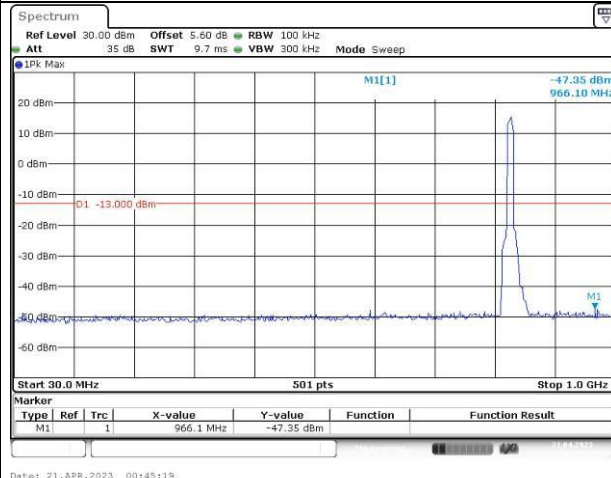


Spurious Emissions at Antenna Terminal

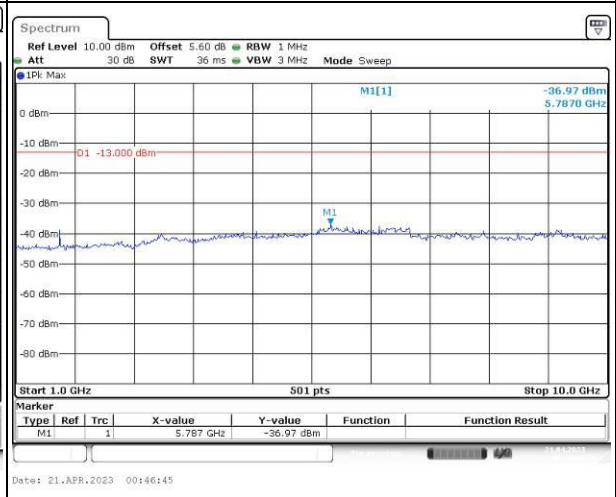
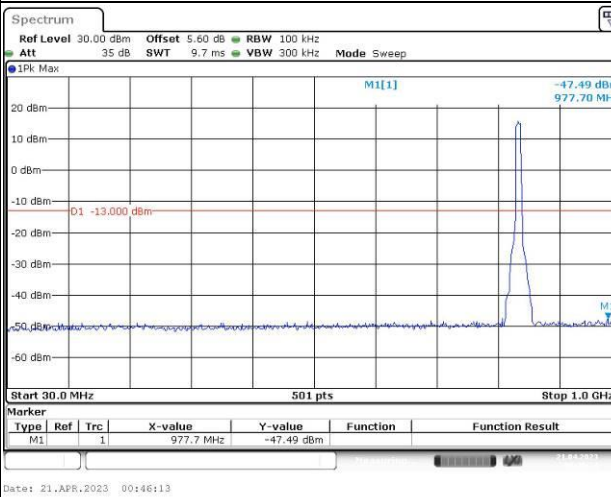
Channel

10MHz Bandwidth QPSK

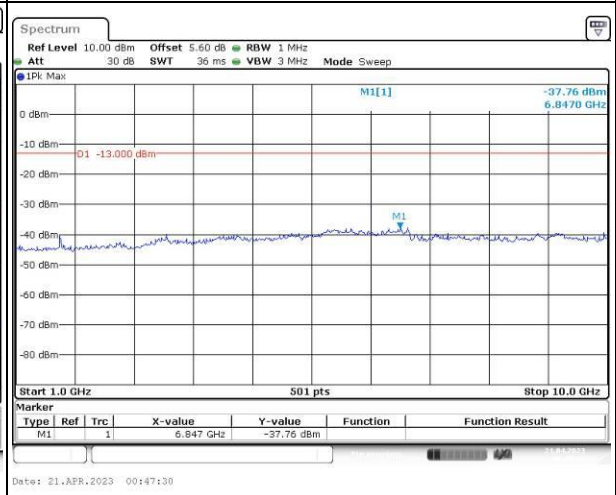
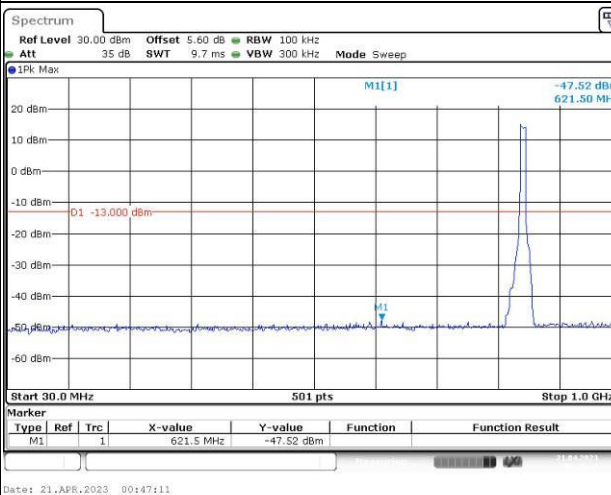
Lowest



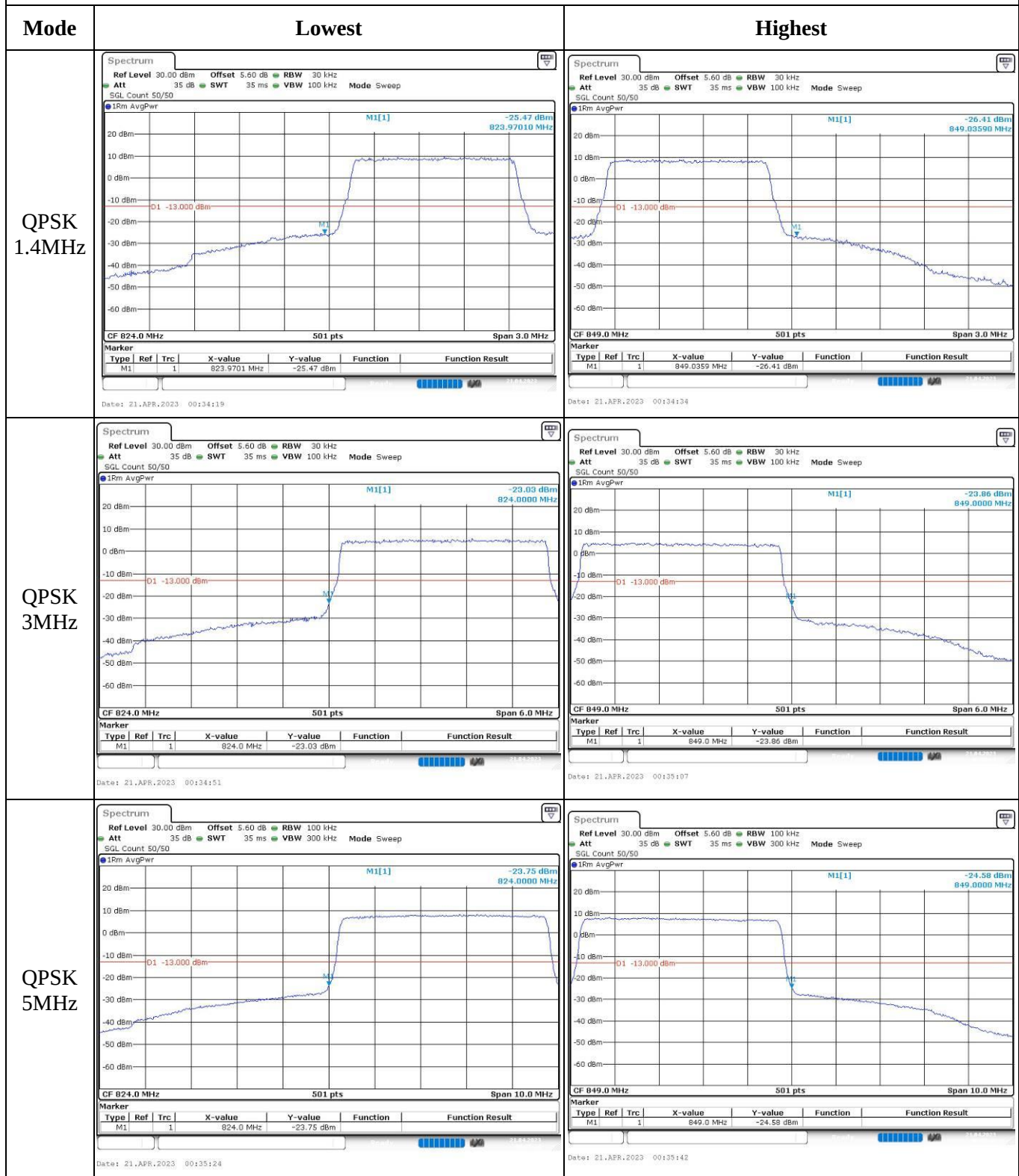
Middle



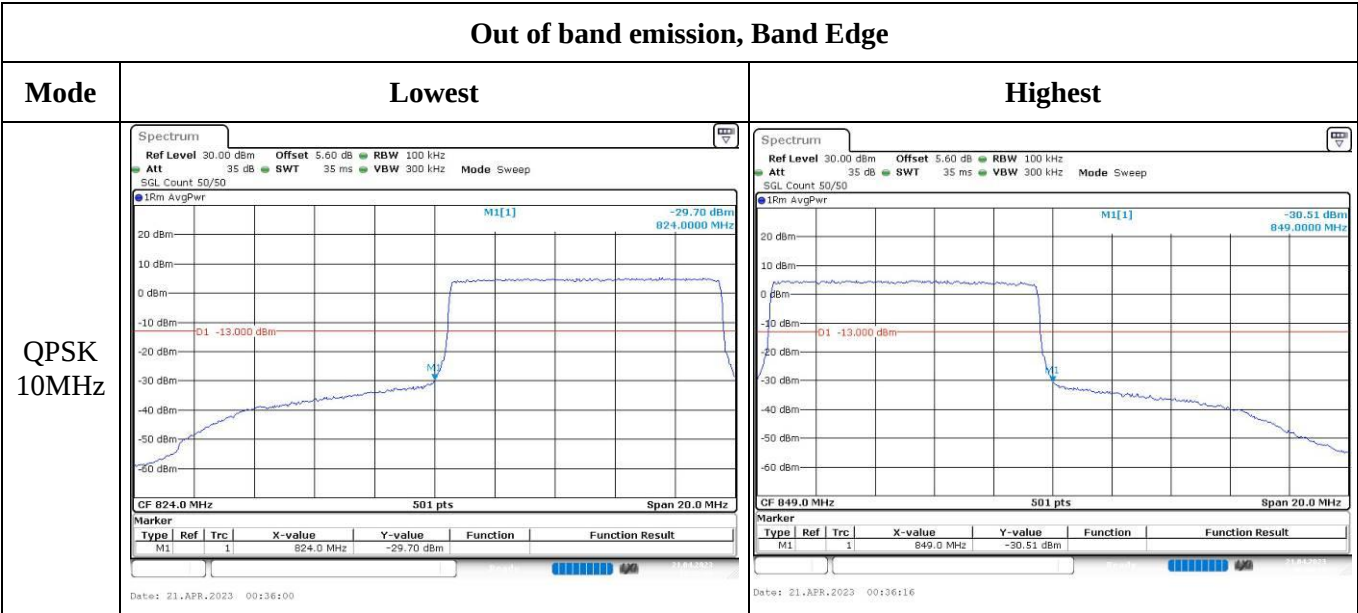
Highest



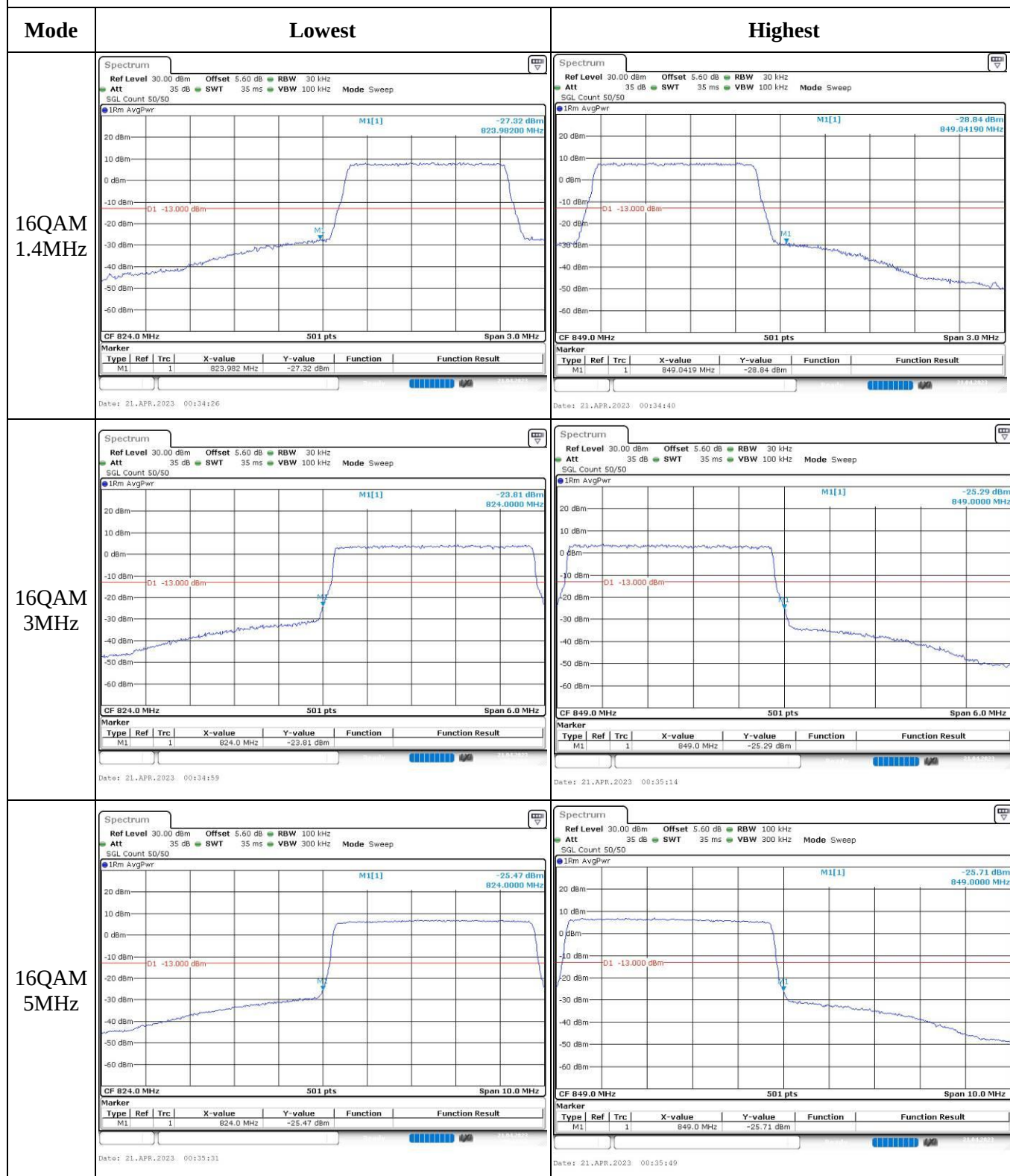
Out of band emission, Band Edge



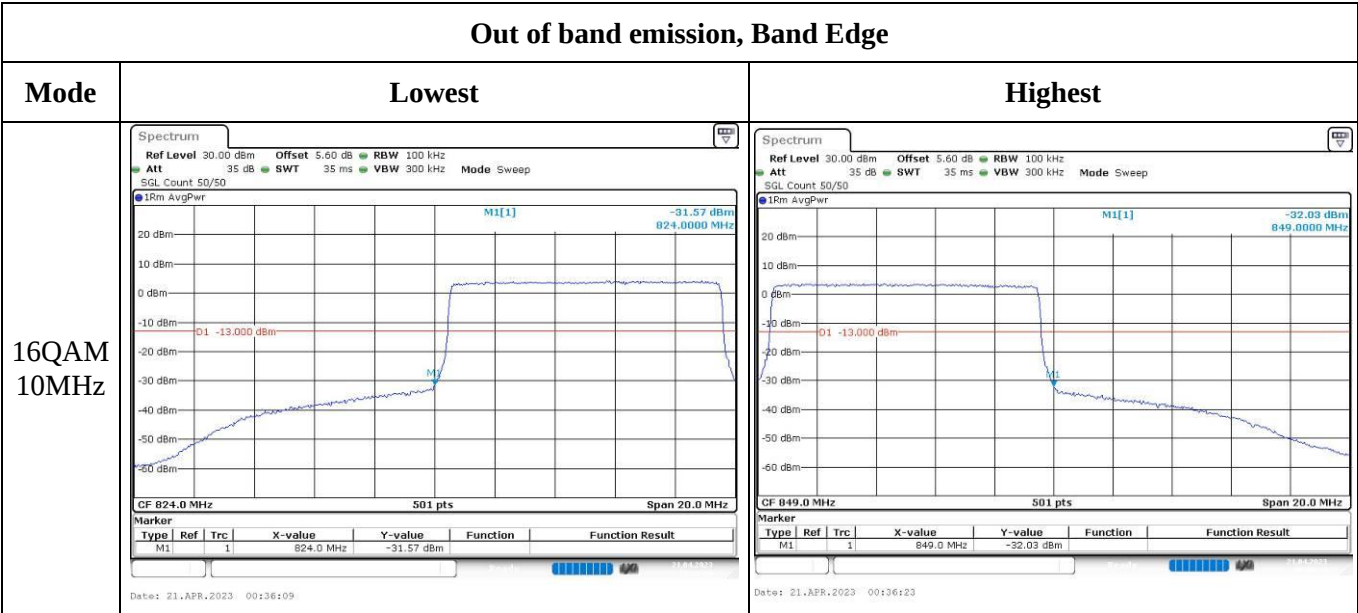
Out of band emission, Band Edge



Out of band emission, Band Edge



Out of band emission, Band Edge



4.9 Antenna Port Test Data and Results for LTE Band 7

Serial Number:	24YP_4	Test Date:	2023/04/21~2023/04/22
Test Site:	RF	Test Mode:	Transmitting
Tester:	George Chen	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	22.2~25.8	Relative Humidity: (%)	42~52	ATM Pressure: (kPa)	99.8~102.2
----------------------	-----------	---------------------------	-------	------------------------	------------

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101943	2022/7/25	2023/7/24
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
YINSAIGE	Coaxial Cable	SS413	SS413001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554403	Each time	N/A
Weinschel	Power Splitter	1515	RA914	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	149218	2022/7/15	2023/7/14
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2022/9/29	2023/9/28
UNI-T	Multimeter	UT39A+	C210582554	2022/7/15	2023/7/14
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).*

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	21.79	21.47	21.7	22.92	33
	RB1#13	21.73	21.47	21.74		
	RB1#24	21.8	21.45	21.66		
	RB15#0	20.68	20.61	20.76		
	RB15#10	20.65	20.48	20.76		
	RB25#0	20.76	20.52	20.71		
5MHz 16QAM	RB1#0	20.79	20.62	20.03	21.92	33
	RB1#13	20.74	20.59	20.12		
	RB1#24	20.8	20.58	20.12		
	RB15#0	19.81	19.5	19.86		
	RB15#10	19.8	19.56	19.87		
	RB25#0	19.79	19.71	19.99		
10MHz QPSK	RB1#0	21.72	21.47	21.53	22.84	33
	RB1#25	21.66	21.43	21.59		
	RB1#49	21.61	21.53	21.67		
	RB25#0	20.68	20.51	20.68		
	RB25#25	20.72	20.61	20.76		
	RB50#0	20.66	20.47	20.72		
10MHz 16QAM	RB1#0	21.42	20.34	20.93	22.57	33
	RB1#25	21.37	20.41	20.97		
	RB1#49	21.45	20.37	21		
	RB25#0	19.84	19.8	19.84		
	RB25#25	19.87	19.82	19.91		
	RB50#0	19.89	19.7	19.97		
15MHz QPSK	RB1#0	21.65	21.45	21.5	22.8	33
	RB1#38	21.68	21.52	21.56		
	RB1#74	21.65	21.57	21.57		
	RB36#0	20.62	20.44	20.62		
	RB36#39	20.66	20.49	20.77		
	RB75#0	20.61	20.43	20.75		
15MHz 16QAM	RB1#0	20.98	20.9	20.98	22.3	33
	RB1#38	21.02	20.69	21.08		
	RB1#74	20.86	20.68	21.18		
	RB36#0	19.89	19.63	19.74		
	RB36#39	19.82	19.66	19.85		
	RB75#0	19.79	19.63	19.84		
20MHz QPSK	RB1#0	21.82	21.4	21.61	22.95	33
	RB1#50	21.83	21.47	21.67		

	RB1#99	21.72	21.58	21.83		
	RB50#0	20.64	20.49	20.58		
	RB50#50	20.58	20.53	20.77		
	RB100#0	20.75	20.49	20.75		
20MHz 16QAM	RB1#0	20.83	21.01	20.56	22.13	33
	RB1#50	20.83	20.98	20.69		
	RB1#99	20.83	20.98	20.8		
	RB50#0	19.86	19.62	19.84		
	RB50#50	19.8	19.63	19.98		
	RB100#0	19.79	19.7	19.8		

Note: EIRP=Conducted Power(dBm) - Lc(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	3.45	3.88	4	13
	RB100#0	4.46	4.41	4.49	13
20MHz 16QAM	RB1#0	4.58	4.78	4.9	13
	RB100#0	5.36	5.28	5.33	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	4.511	4.531	5.02	5	5.02
5MHz 16QAM	4.511	4.551	4.511	4.84	5	5
10MHz QPSK	8.942	8.942	8.982	9.76	9.8	9.84
10MHz 16QAM	8.982	8.942	8.982	9.84	9.84	9.76
15MHz QPSK	13.473	13.473	13.593	15.12	14.46	15.12
15MHz 16QAM	13.593	13.533	13.593	15.18	14.4	15.12
20MHz QPSK	17.964	18.044	17.964	19.68	19.92	18.96
20MHz 16QAM	17.964	17.964	17.964	18.96	19.84	19.76

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

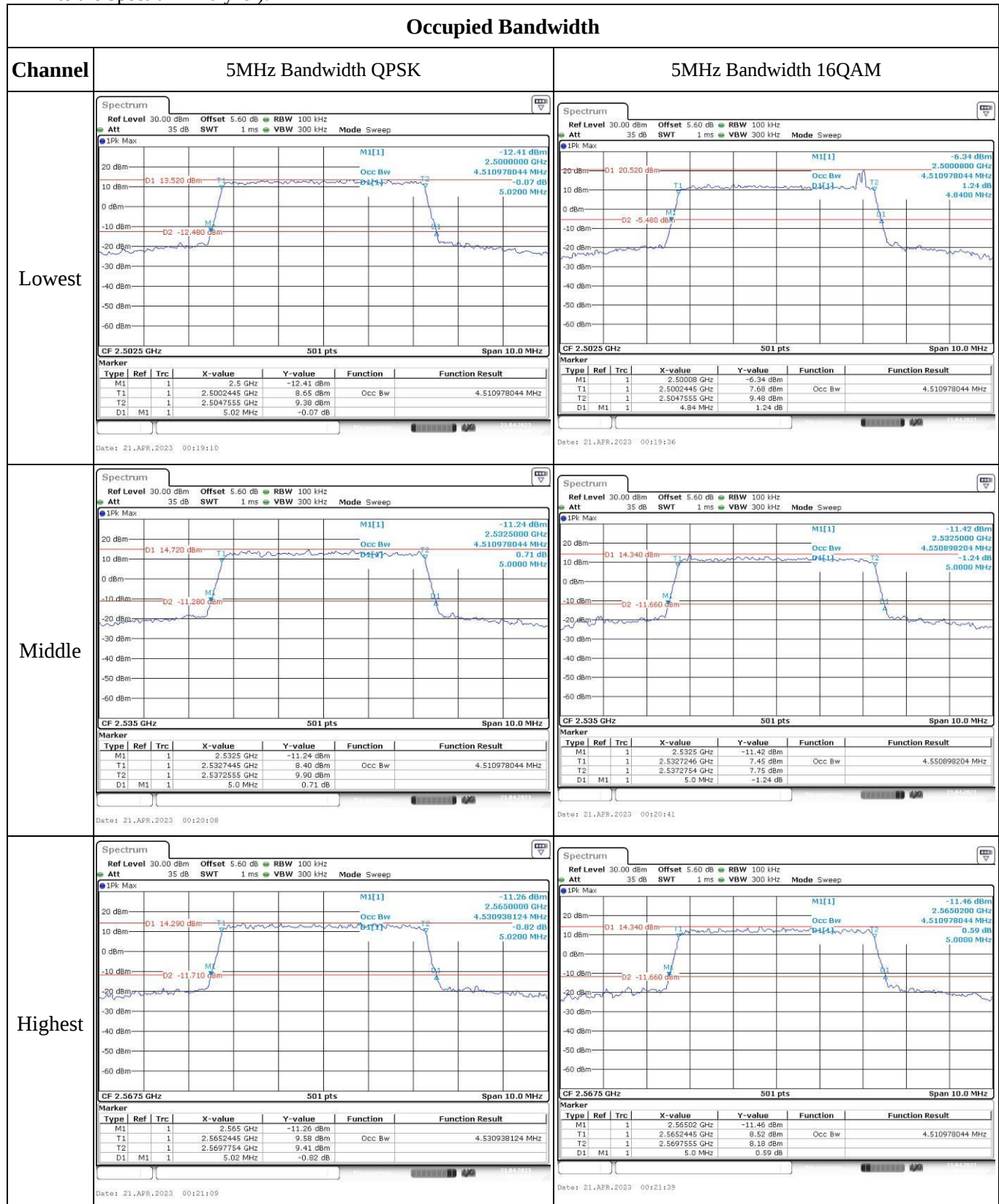
Result:	Pass, Please refer to the test plots of Out of band emission, Band Edge.
----------------	---

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	3.85	2501.011	2500.00	2569.064	2570
	-20	3.85	2501.093	2500.00	2569.088	2570
	-10	3.85	2501.066	2500.00	2569.003	2570
	0	3.85	2501.014	2500.00	2569.095	2570
	10	3.85	2501.048	2500.00	2569.041	2570
	20	3.85	2501.058	2500.00	2569.022	2570
	30	3.85	2501.030	2500.00	2569.013	2570
	40	3.85	2501.085	2500.00	2569.008	2570
	50	3.85	2501.068	2500.00	2569.022	2570
Frequency Stability vs. Voltage	20	3.6	2501.042	2500.00	2569.015	2570
	20	4.4	2501.025	2500.00	2569.080	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	3.85	2501.097	2500.00	2569.040	2570
	-20	3.85	2501.047	2500.00	2569.012	2570
	-10	3.85	2501.077	2500.00	2569.058	2570
	0	3.85	2501.091	2500.00	2569.082	2570
	10	3.85	2501.069	2500.00	2569.023	2570
	20	3.85	2501.058	2500.00	2569.022	2570
	30	3.85	2501.031	2500.00	2569.068	2570
	40	3.85	2501.008	2500.00	2569.092	2570
	50	3.85	2501.061	2500.00	2569.014	2570
Frequency Stability vs. Voltage	20	3.6	2501.004	2500.00	2569.006	2570
	20	4.4	2501.072	2500.00	2569.041	2570
Result:					Pass	

Test Plots(Note: The 5.6dB is the Insertion loss of the RF cable, Power Splitter and DC Block, which was offset into the Spectrum Analyzer):



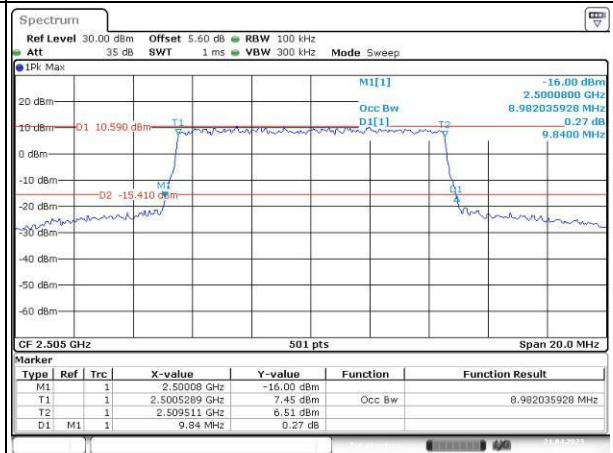
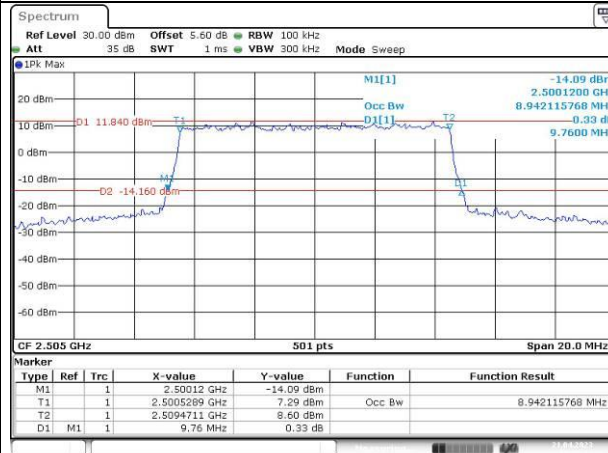
Occupied Bandwidth

Channel

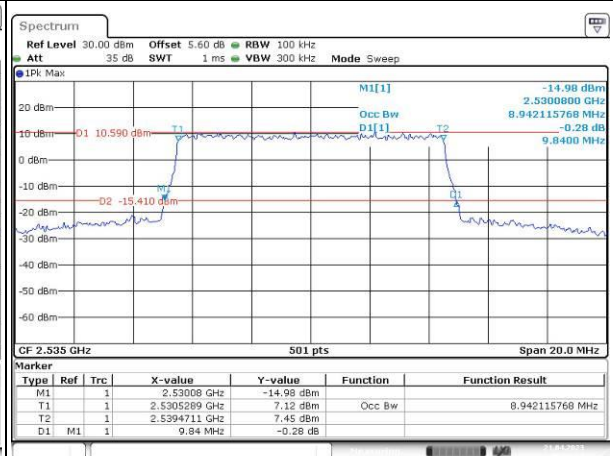
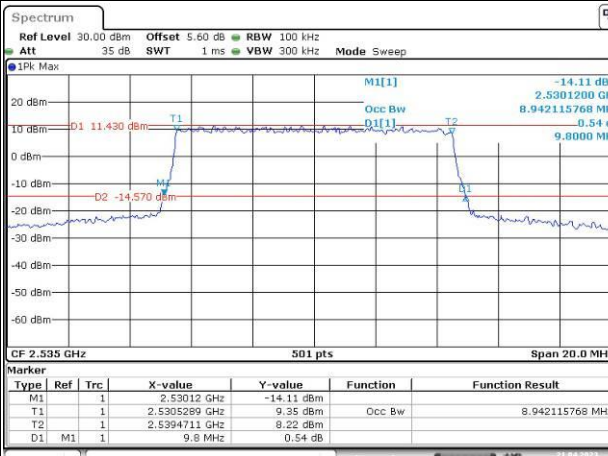
10MHz Bandwidth QPSK

10MHz Bandwidth 16QAM

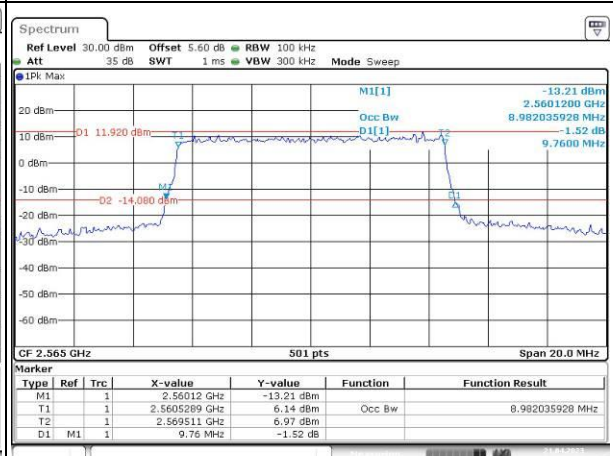
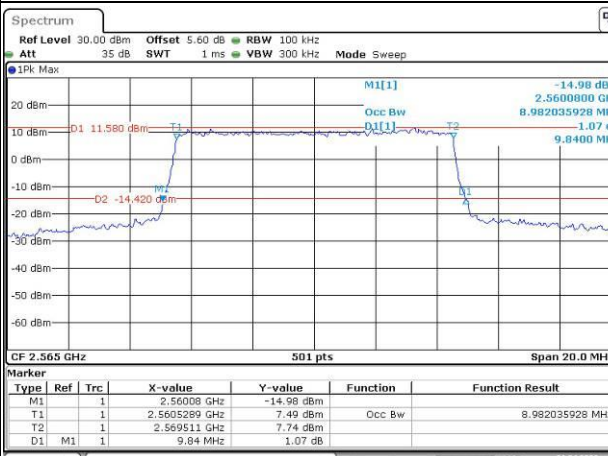
Lowest



Middle



Highest



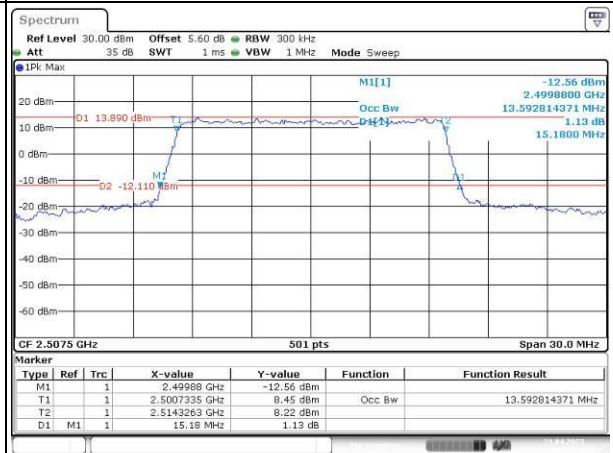
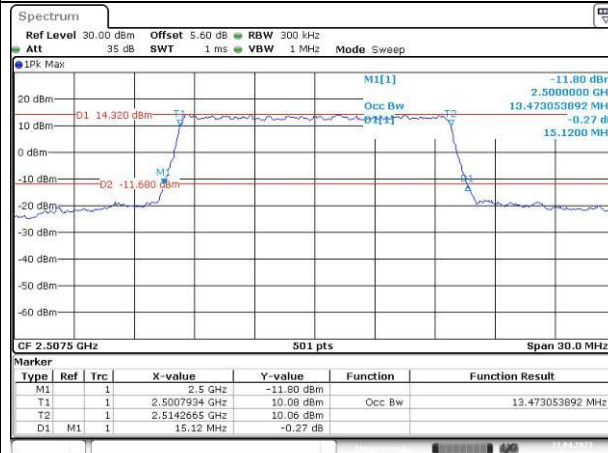
Occupied Bandwidth

Channel

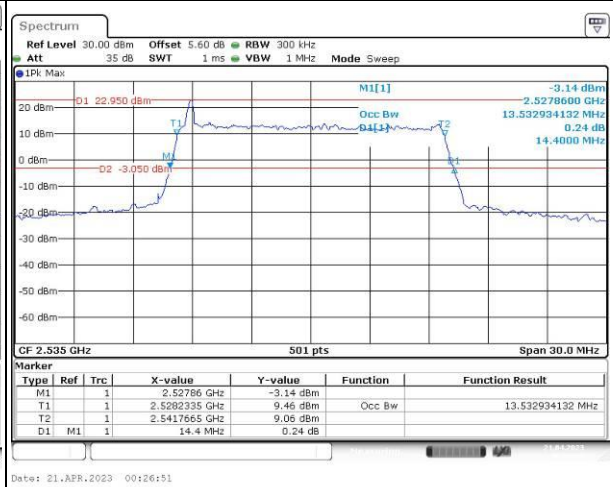
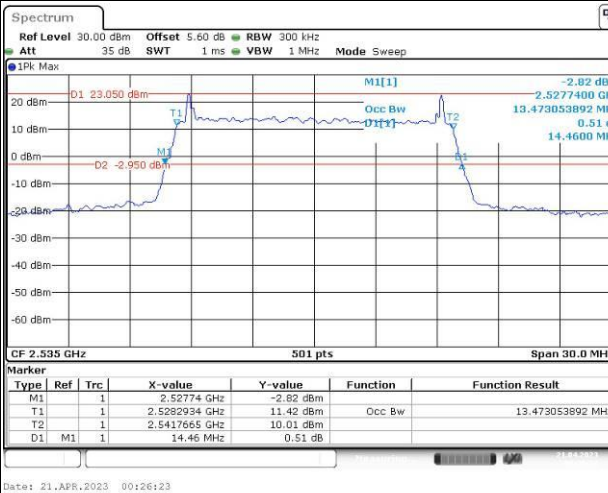
15MHz Bandwidth QPSK

15MHz Bandwidth 16QAM

Lowest



Middle



Highest

