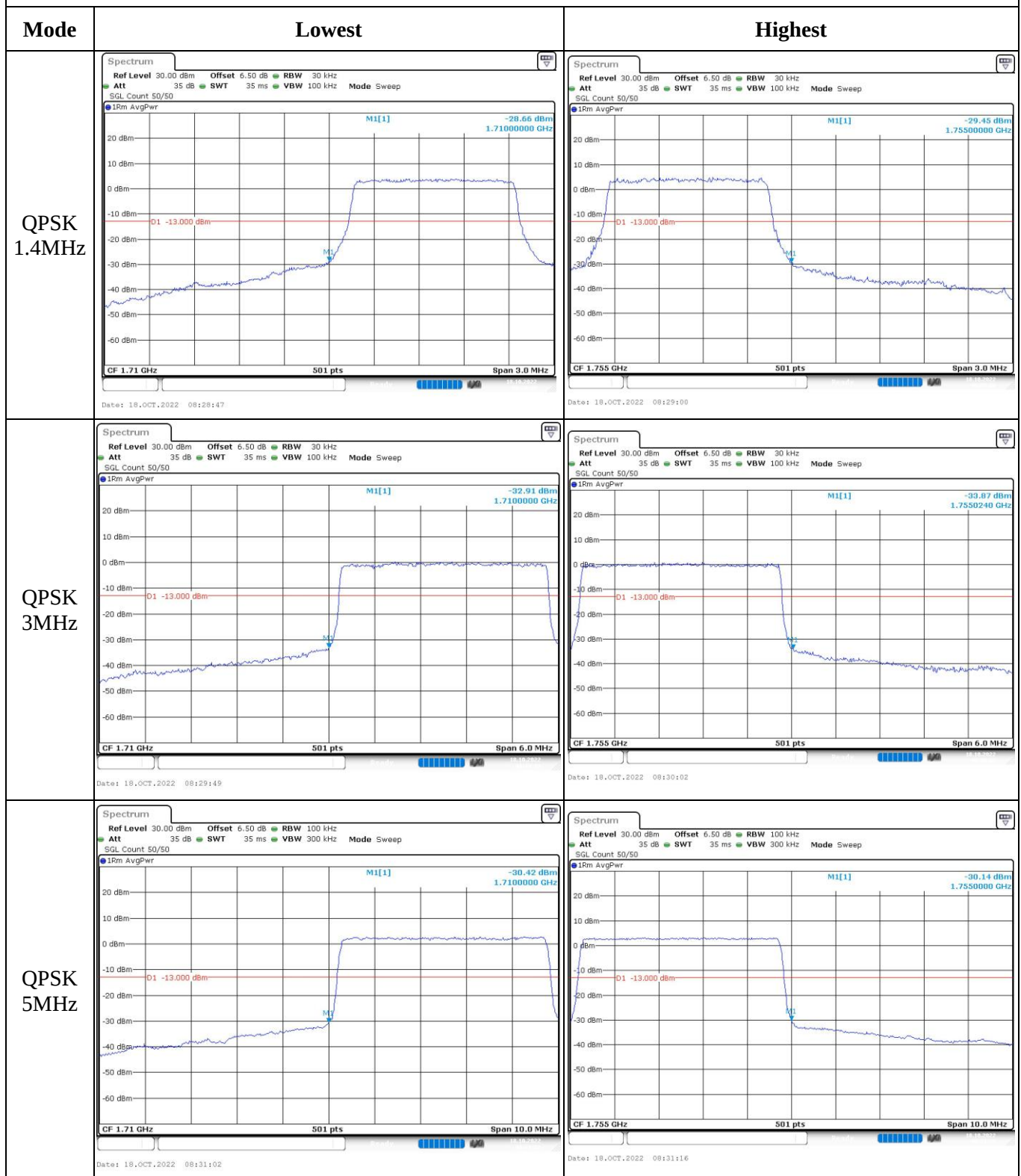
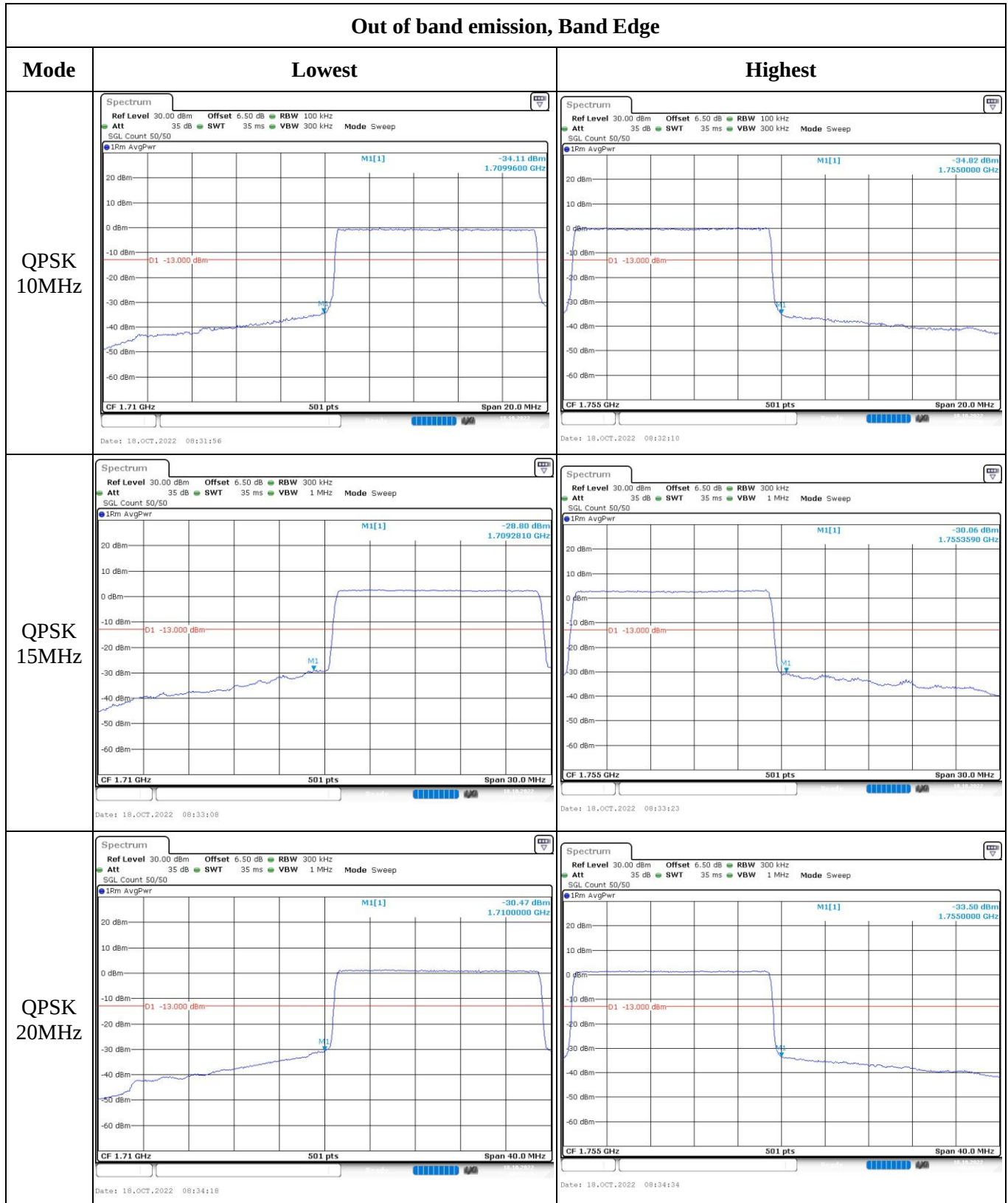


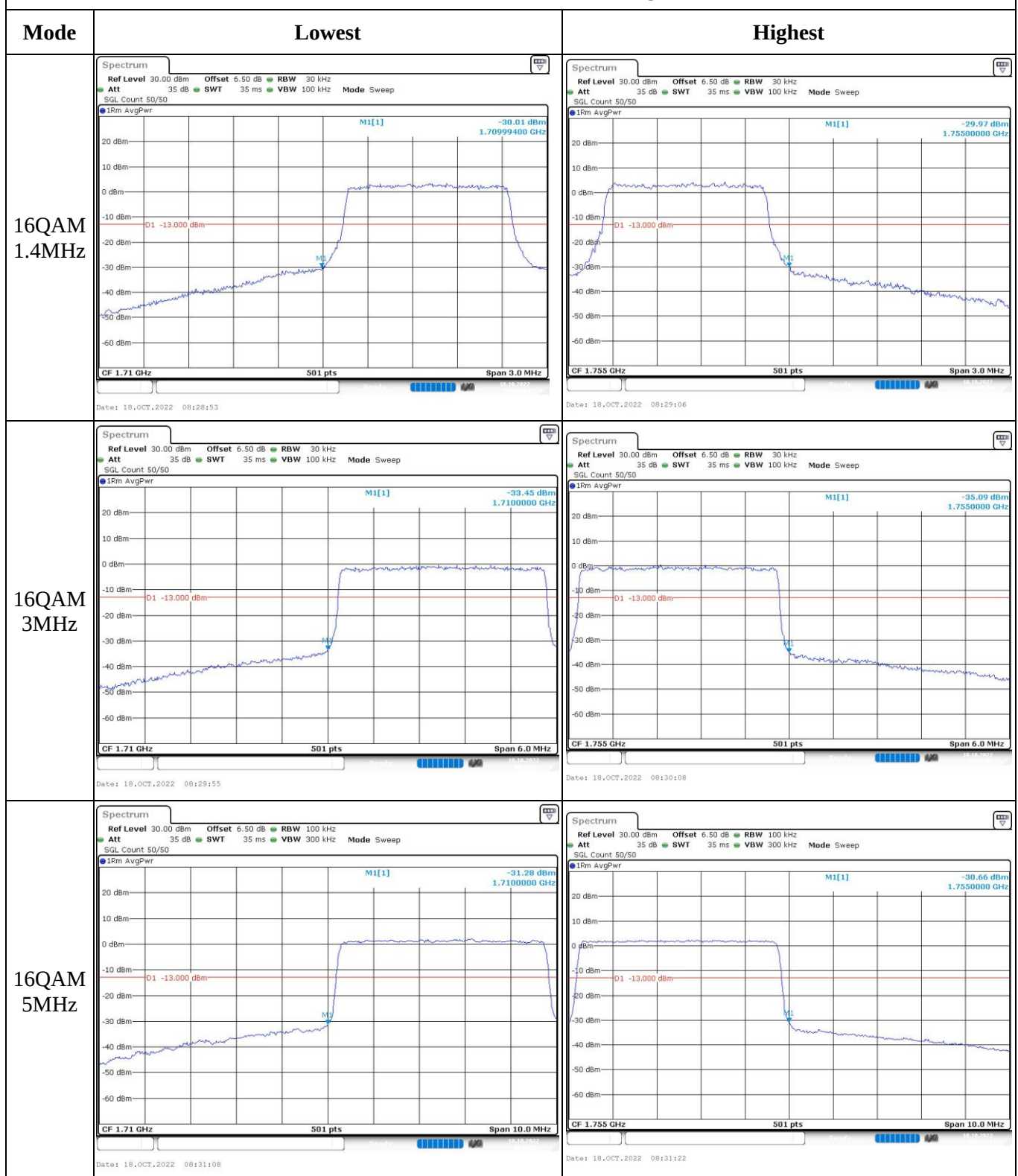
Out of band emission, Band Edge



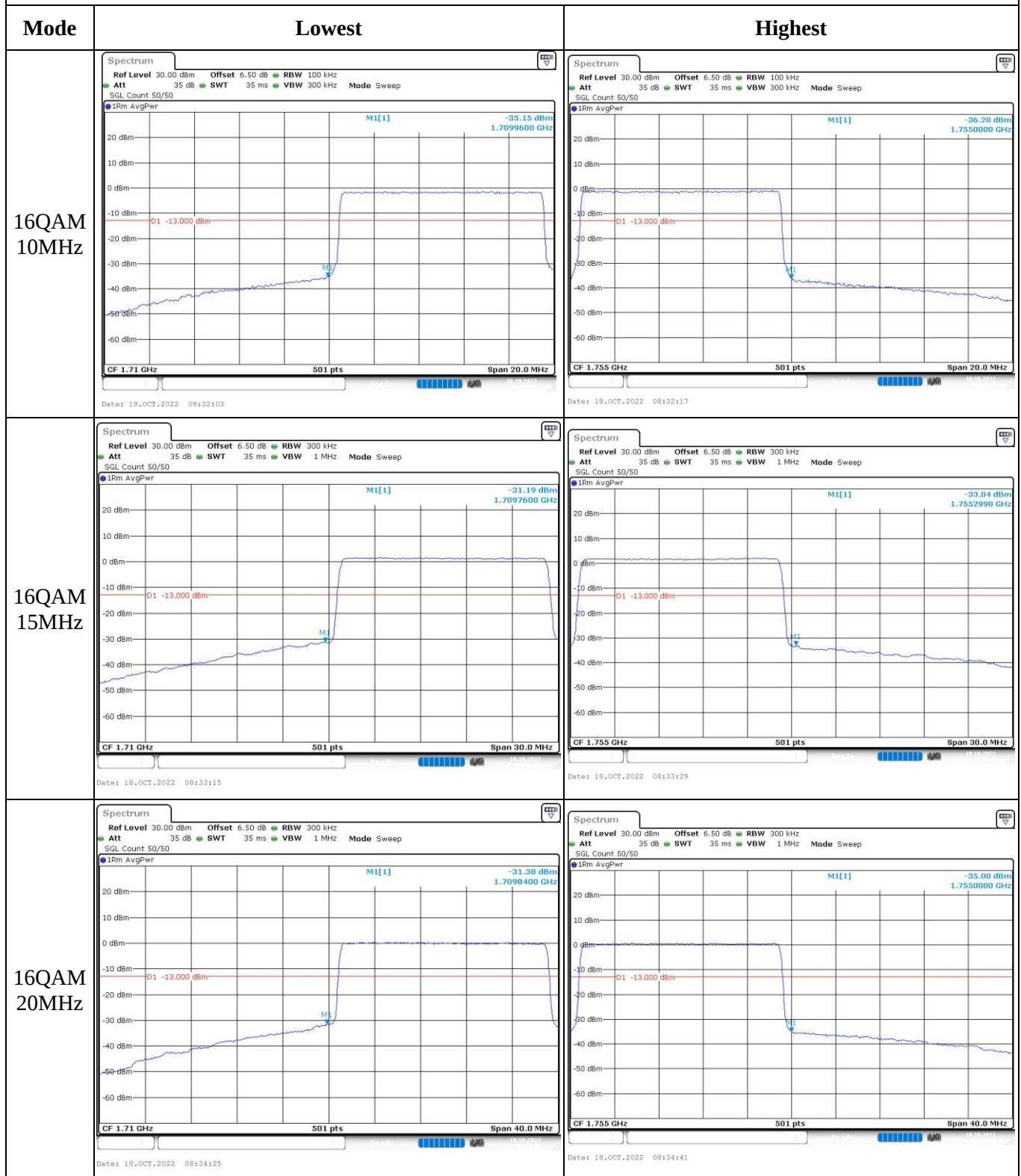
Out of band emission, Band Edge



Out of band emission, Band Edge



Out of band emission, Band Edge



4.8 Antenna Port Test Data and Results for LTE Band 5

Serial Number:	CR22090019-RF-S1	Test Date:	2022-9-20-2022- 10-18
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rinka Li	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	25.9	Relative Humidity: (%)	48.6	ATM Pressure: (kPa)	100.2
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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
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	149218	2022-07-15	2023-07-14
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2022-04-06	2023-04-05
UNI-T	Multimeter	UT39A+	C210582554	2021-09-30	2022-09-29
UNI-T	Multimeter	UT39A+	C210582554	2022-09-23	2023-09-23
ZHAOXIN	DC Power Supply	RXN-6010D	21R6010D0912386	N/A	N/A
Weinschel	Power Splitter	1515	RA914	Each time	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 5▲:

Antenna Gain G_T (dBi):	-1.77	Antenna Gain G_T (dBd):	-3.92	Path Loss L_C (dB):	0.2
Operation Voltage(V_{DC}):					
Lowest:	3.6	Normal:	3.85	Highest:	4.4

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	21.8	21.93	22.15	18.12	38.45
	RB1#3	21.86	21.97	22.22		
	RB1#5	21.82	21.97	22.18		
	RB3#0	21.94	21.94	22.14		
	RB3#3	21.85	21.89	22.24		
	RB6#0	20.76	20.93	21.03		
1.4MHz 16QAM	RB1#0	21.1	21.22	20.8	17.42	38.45
	RB1#3	21.15	21.38	20.93		
	RB1#5	21.13	21.54	20.91		
	RB3#0	20.63	20.94	21.11		
	RB3#3	20.66	20.91	21.17		
	RB6#0	19.73	19.99	20.31		
3MHz QPSK	RB1#0	21.87	21.73	22.05	17.93	38.45
	RB1#8	21.78	21.87	22.04		
	RB1#14	21.91	21.89	22		
	RB6#0	20.86	20.77	21.07		
	RB6#9	20.82	20.85	21.05		
	RB15#0	20.77	20.86	21.02		
3MHz 16QAM	RB1#0	21.49	20.52	21.29	17.38	38.45
	RB1#8	21.45	20.55	21.24		
	RB1#14	21.5	20.57	21.27		
	RB6#0	19.92	20.5	20.15		
	RB6#9	19.93	19.98	20.17		
	RB15#0	19.91	19.92	20.12		
5MHz QPSK	RB1#0	21.98	21.81	22.06	17.94	38.45
	RB1#13	21.97	21.88	22.02		
	RB1#24	22.01	21.98	22.06		
	RB15#0	20.82	20.84	21.08		
	RB15#10	20.7	20.96	21.14		
	RB25#0	20.79	20.97	21.04		
5MHz 16QAM	RB1#0	20.77	20.5	20.19	16.74	38.45
	RB1#13	20.82	20.57	20.17		
	RB1#24	20.86	20.71	20.26		
	RB15#0	19.71	20.33	20.11		
	RB15#10	19.64	19.93	20.11		
	RB25#0	19.75	19.78	20.16		
10MHz QPSK	RB1#0	21.76	21.94	21.91	18.05	38.45
	RB1#25	21.72	22.05	22.11		
	RB1#49	21.78	22.12	22.17		

10MHz 16QAM	RB25#0	20.88	20.76	20.96	17.04	38.45
	RB25#25	20.86	20.94	21.16		
	RB50#0	20.96	20.99	21.05		
	RB1#0	21.06	21.03	20.45		
	RB1#25	21.04	20.96	20.45		
	RB1#49	21.03	21.16	20.56		
	RB25#0	19.88	20.45	20.15		
	RB25#25	19.87	20.08	20.18		
	RB50#0	19.84	19.84	20.01		

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	3.62	4.61	3.8	13
	RB50#0	4.84	4.84	4.61	13
10MHz 16QAM	RB1#0	4.17	5.48	4.84	13
	RB50#0	5.71	5.86	5.59	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	1.108	1.102	1.114	1.26	1.26	1.272
1.4MHz 16QAM	1.114	1.096	1.102	1.266	1.248	1.266
3MHz QPSK	2.695	2.695	2.707	3.036	3.0	3.036
3MHz 16QAM	2.695	2.695	2.695	3.024	3.012	2.904
5MHz QPSK	4.511	4.511	4.551	5.02	5	5.04
5MHz 16QAM	4.551	4.551	4.531	5.02	5.04	5.02
10MHz QPSK	8.942	8.942	8.982	9.8	9.8	9.84
10MHz 16QAM	8.982	8.942	8.942	9.84	9.76	9.76

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.
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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.
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FCC §2.1055, §22.355: Frequency Stability					
Test Mode:	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	3.28	0.004	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 Mode:	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	5.16	0.006	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

Occupied Bandwidth

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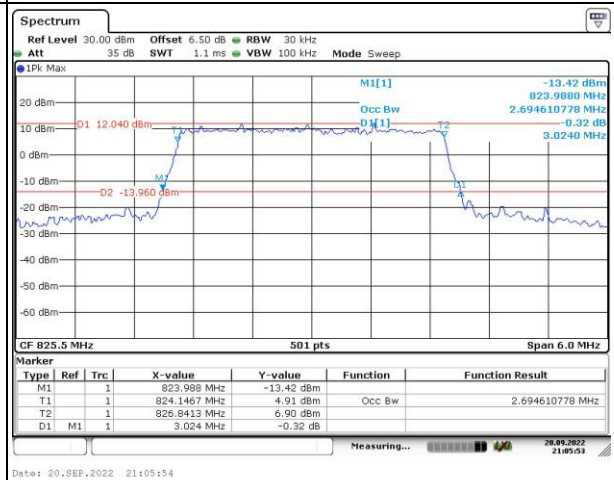
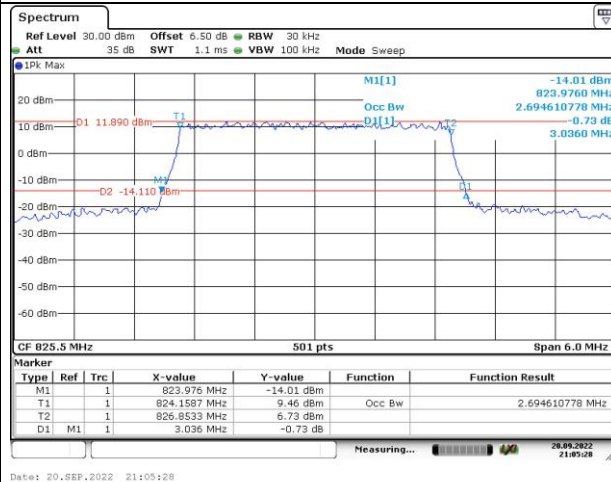
Occupied Bandwidth

Channel

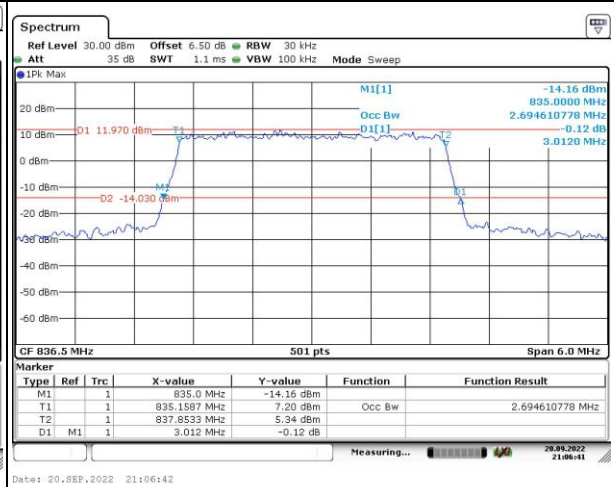
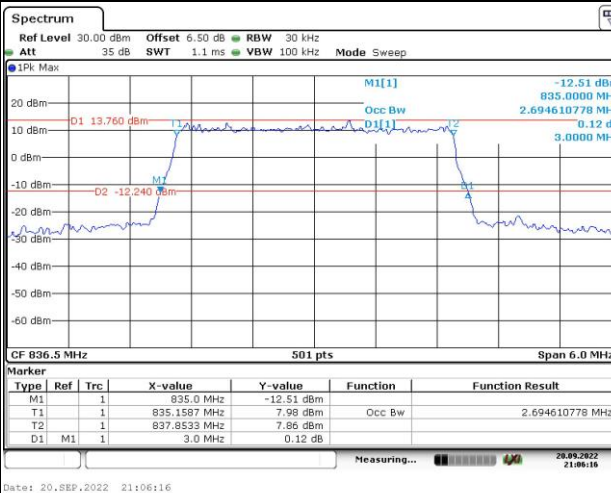
3MHz Bandwidth QPSK

3MHz Bandwidth 16QAM

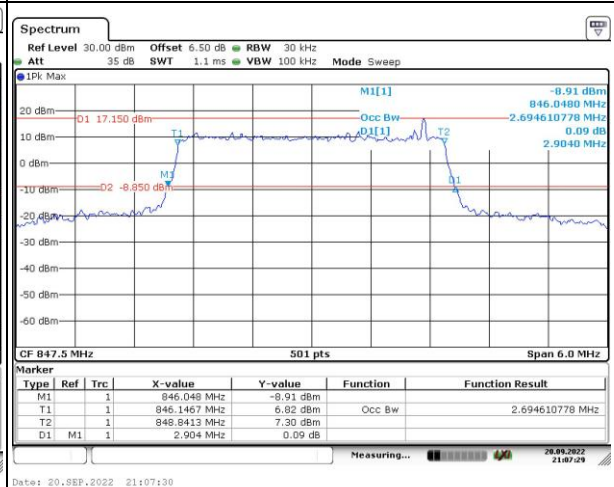
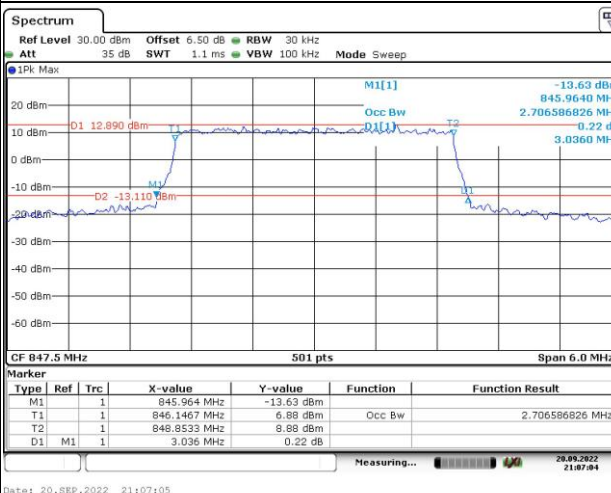
Lowest



Middle



Highest



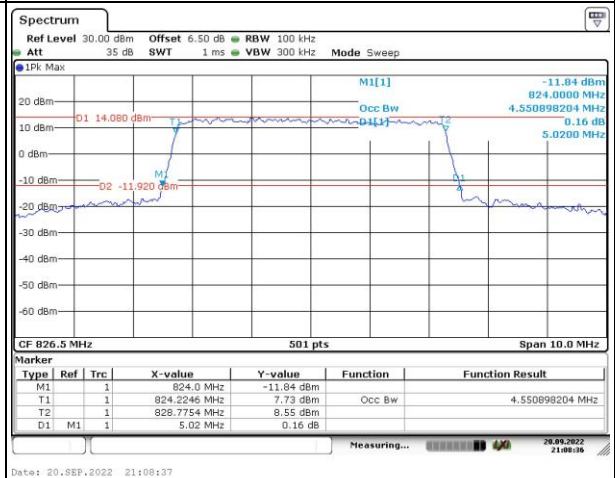
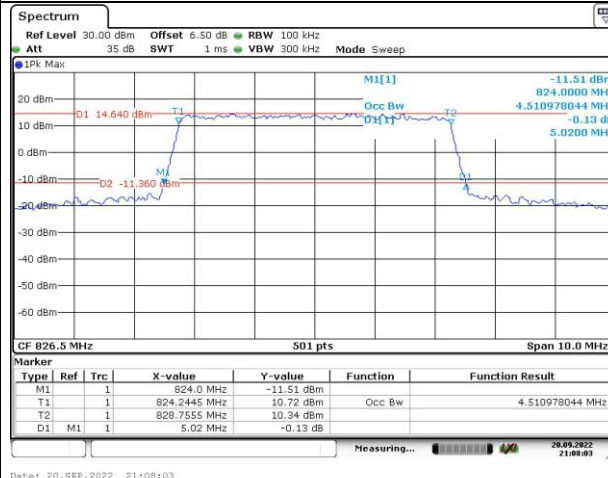
Occupied Bandwidth

Channel

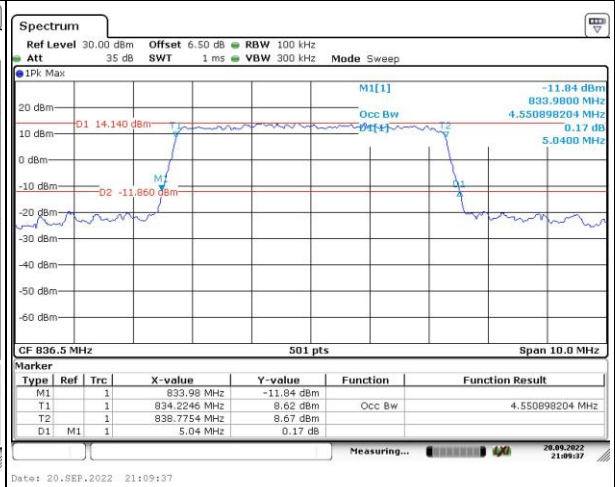
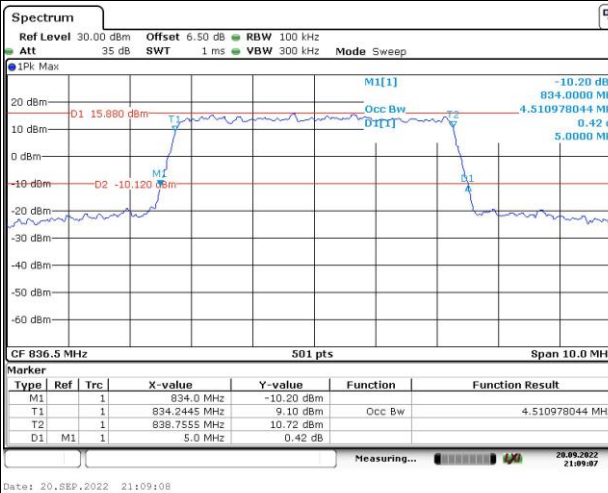
5MHz Bandwidth QPSK

5MHz Bandwidth 16QAM

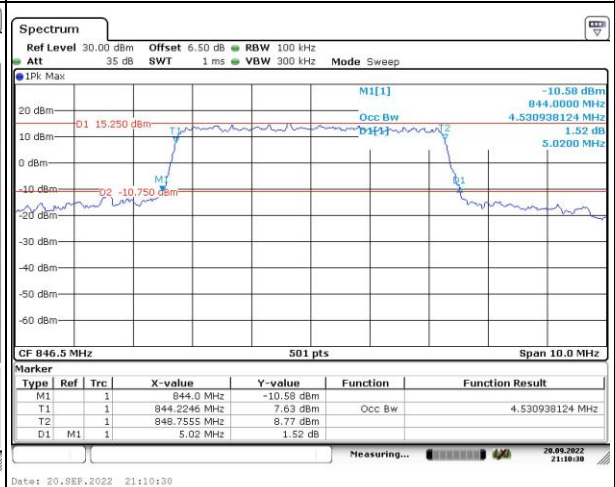
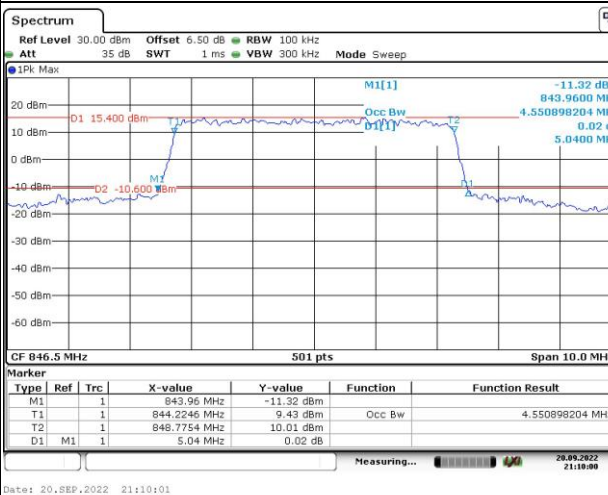
Lowest



Middle



Highest



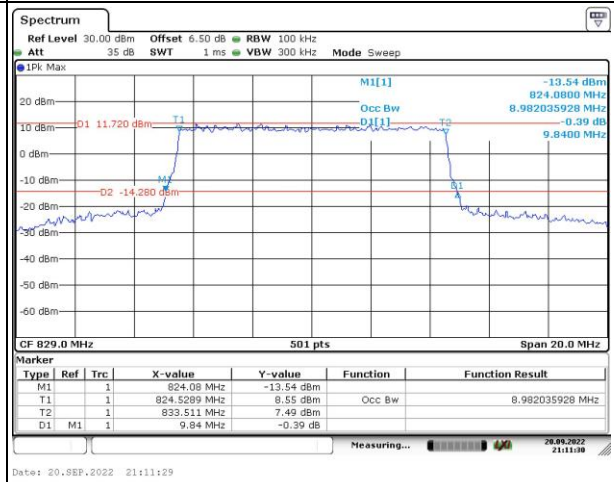
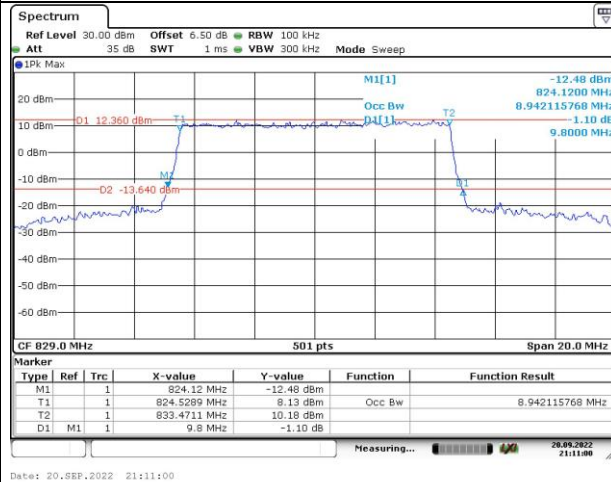
Occupied Bandwidth

Channel

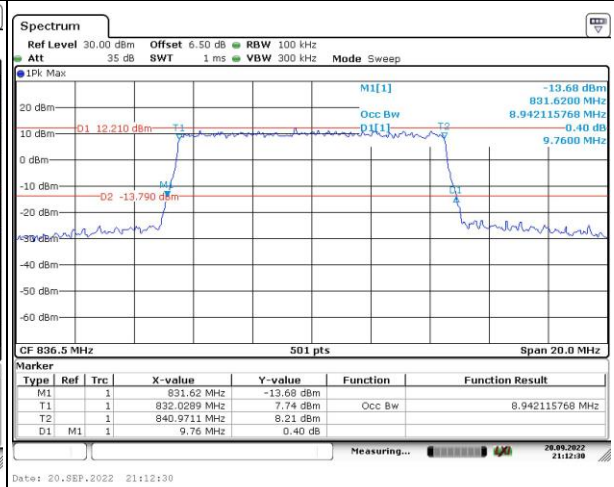
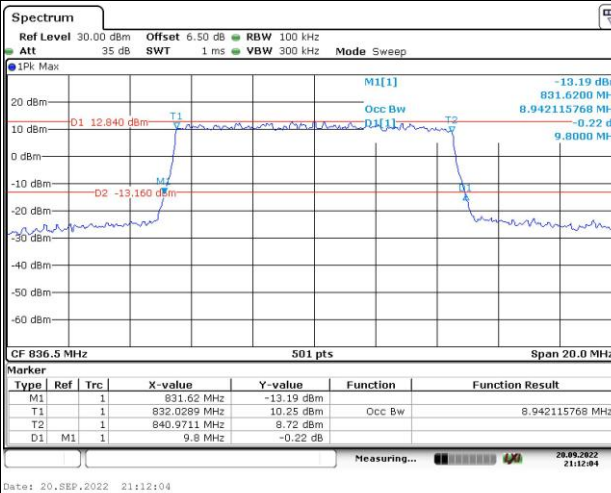
10MHz Bandwidth QPSK

10MHz Bandwidth 16QAM

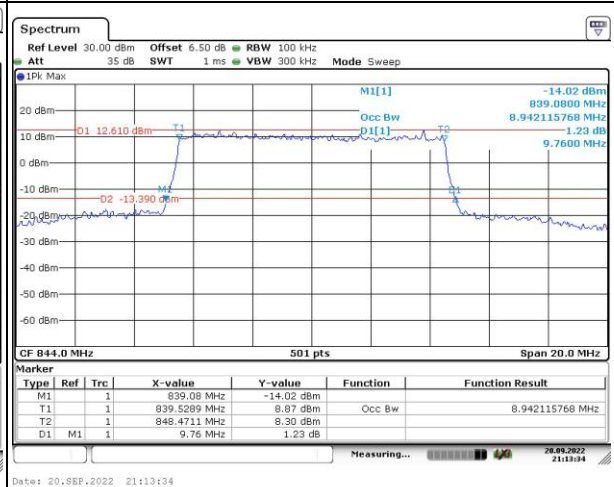
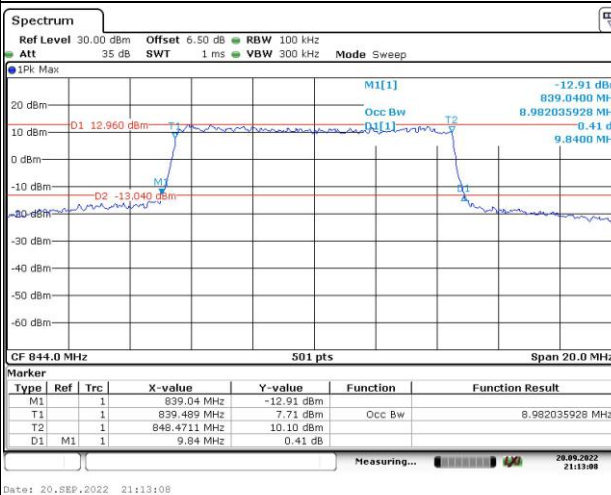
Lowest



Middle



Highest

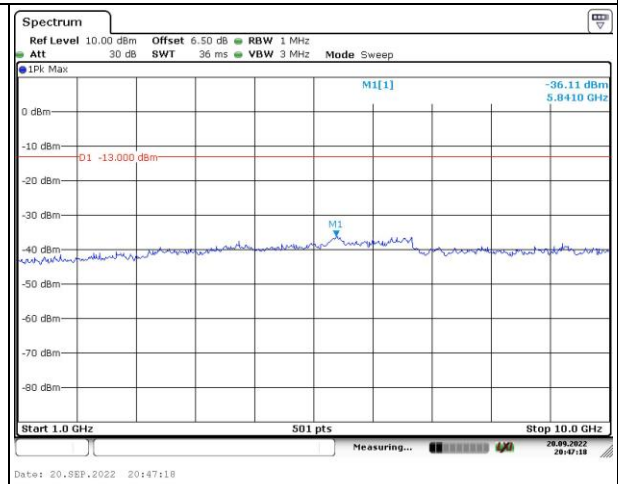
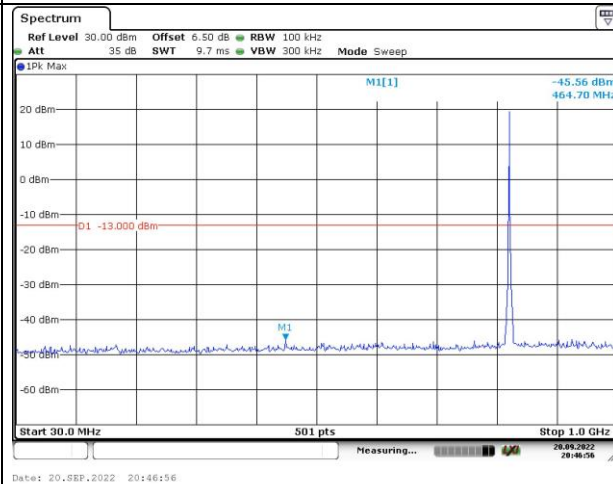


Spurious Emissions at Antenna Terminal

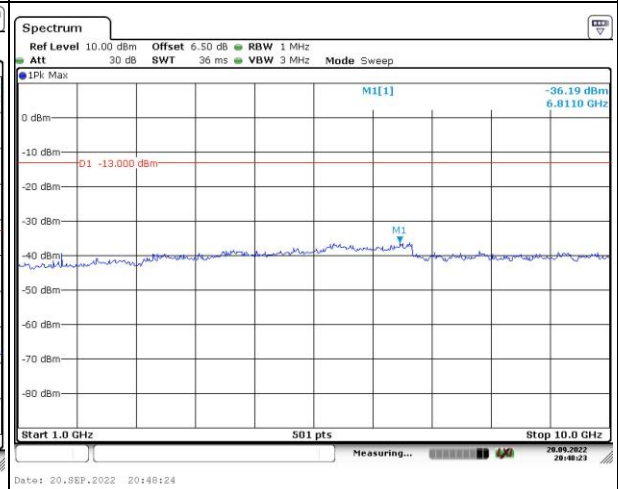
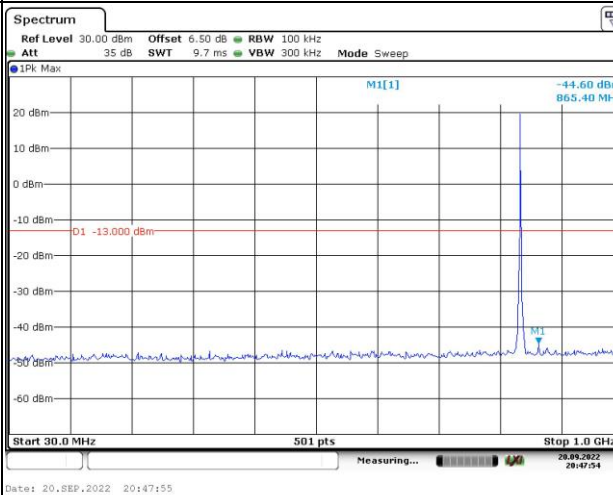
Channel

1.4MHz Bandwidth QPSK

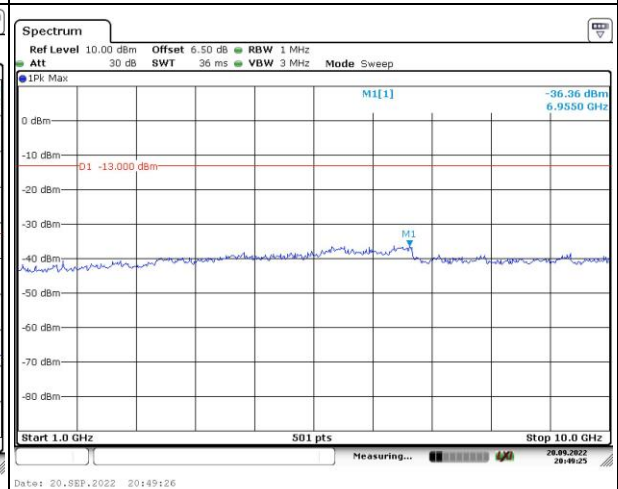
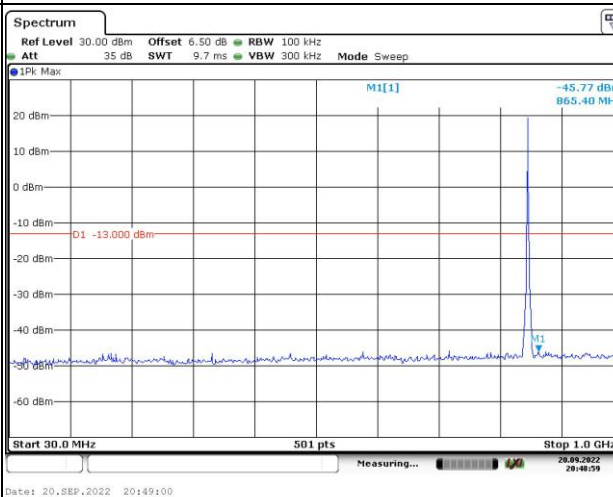
Lowest



Middle



Highest

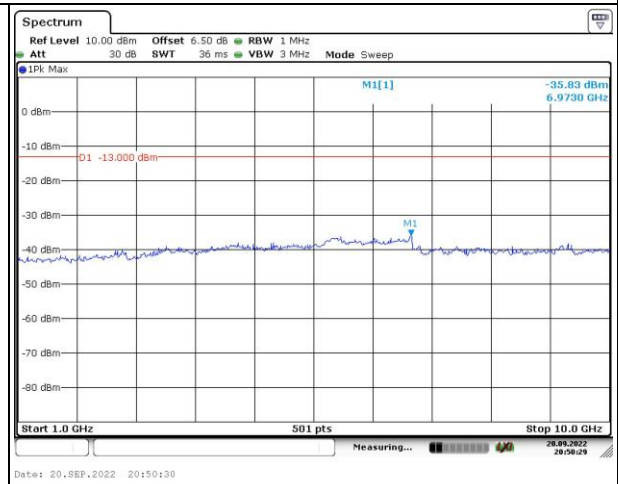
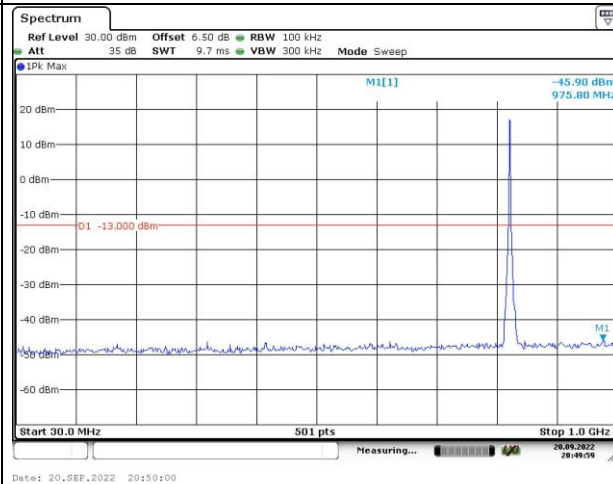


Spurious Emissions at Antenna Terminal

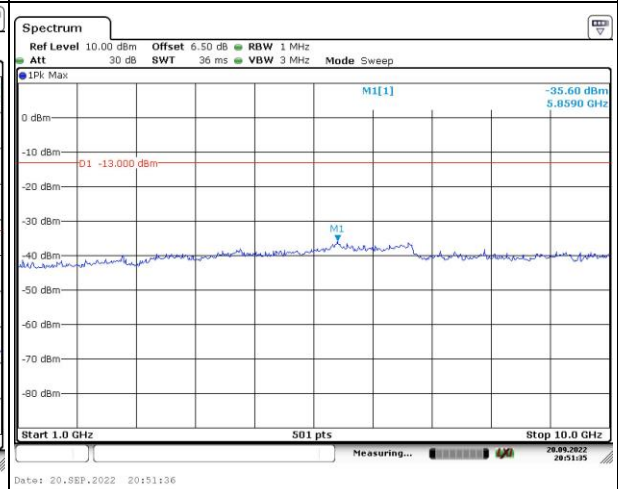
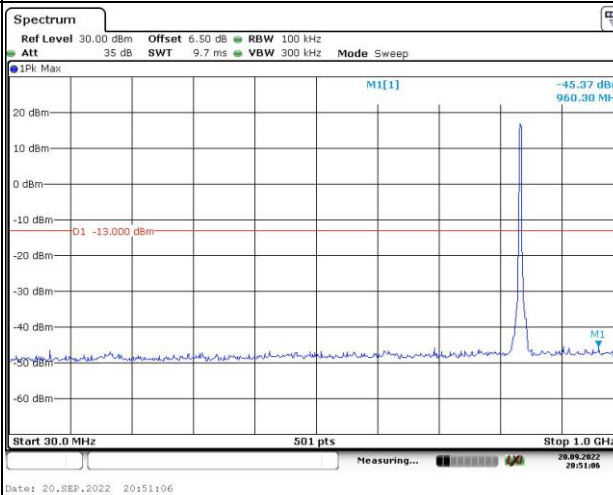
Channel

3MHz Bandwidth QPSK

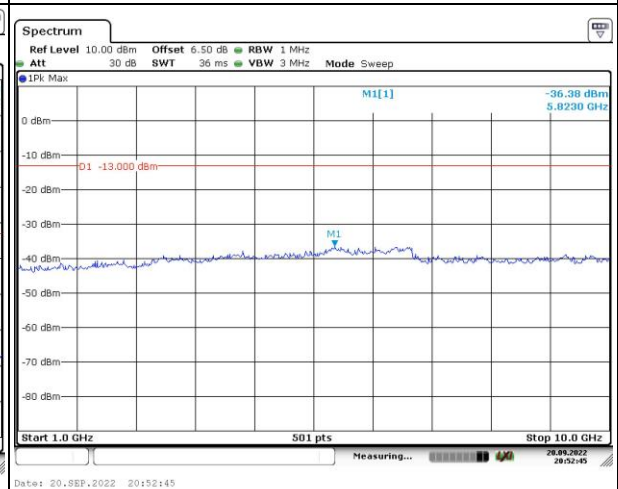
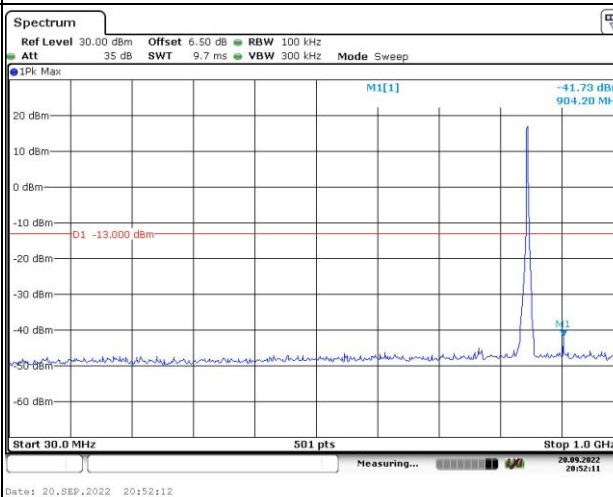
Lowest



Middle



Highest

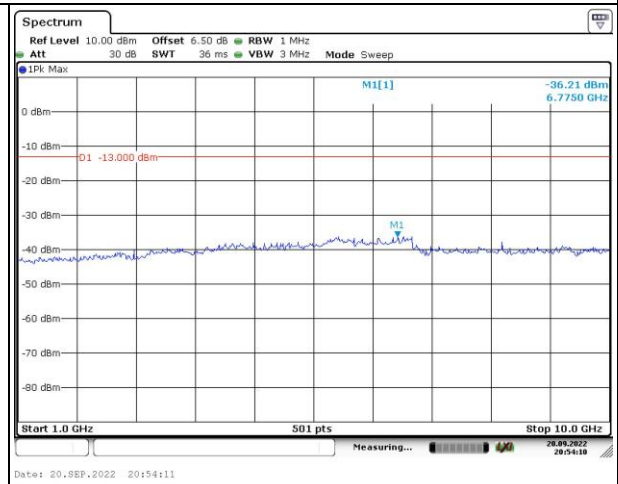
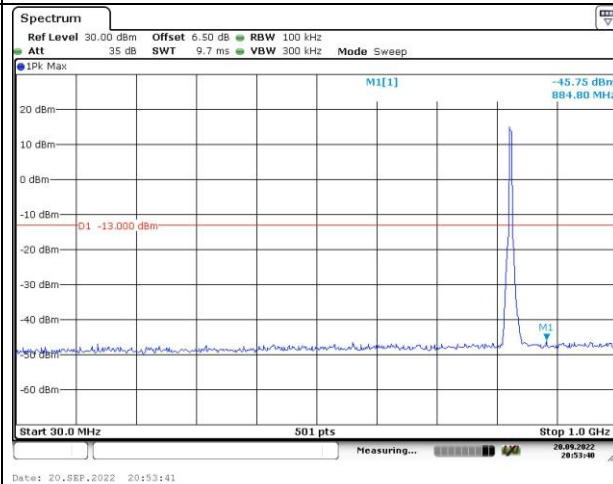


Spurious Emissions at Antenna Terminal

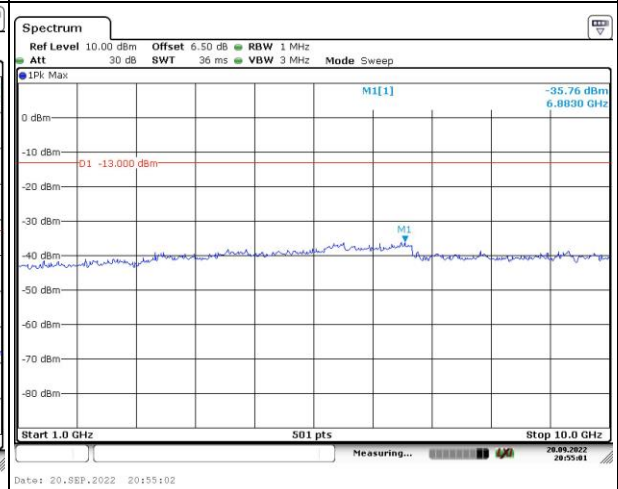
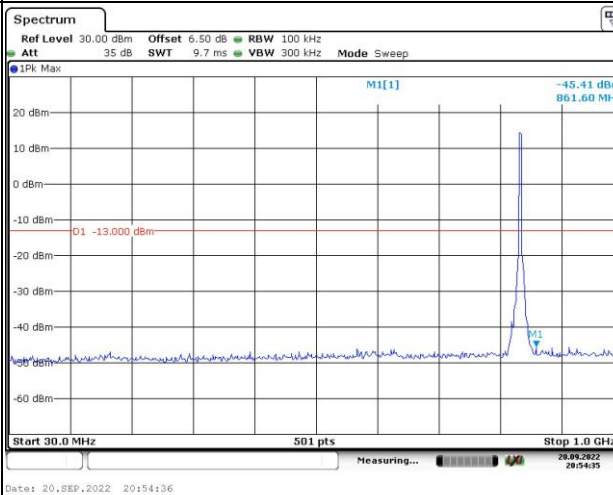
Channel

5MHz Bandwidth QPSK

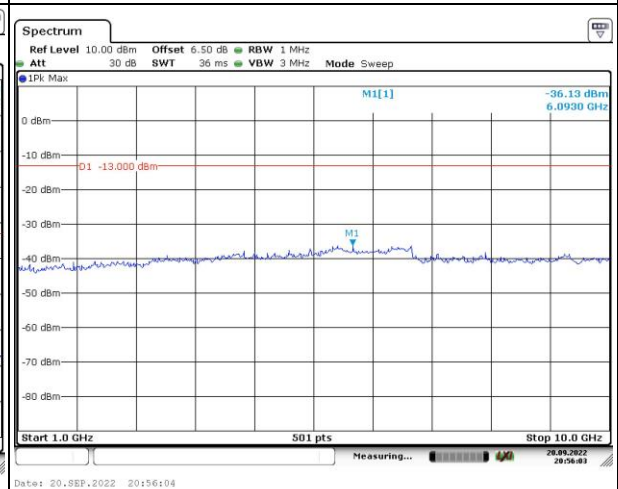
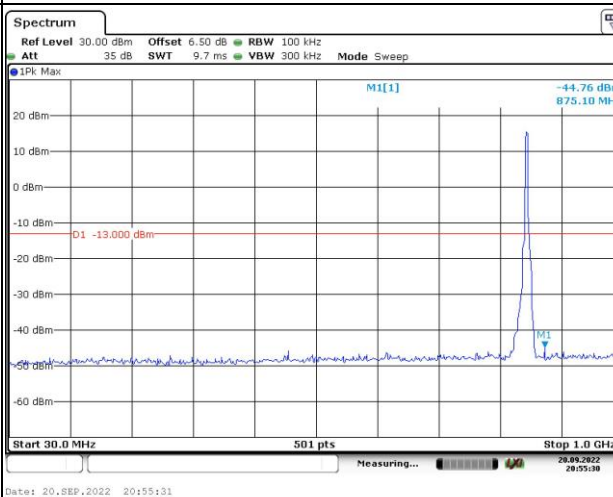
Lowest



Middle



Highest

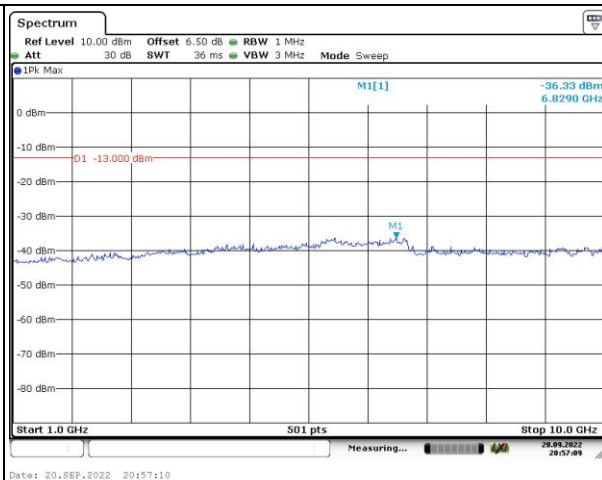
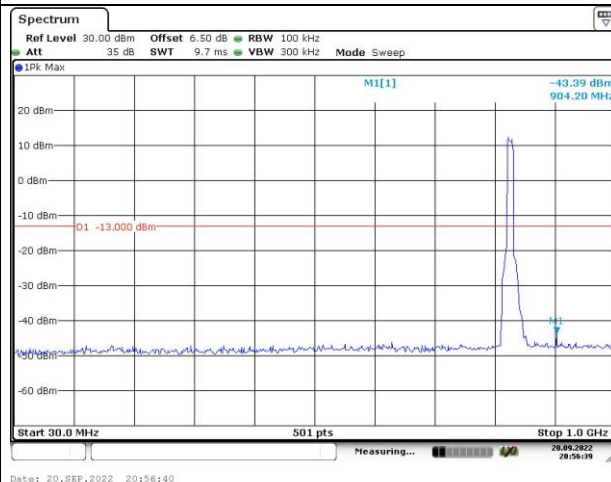


Spurious Emissions at Antenna Terminal

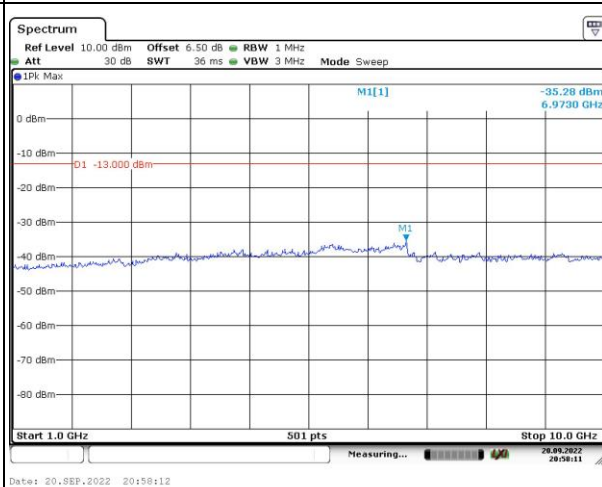
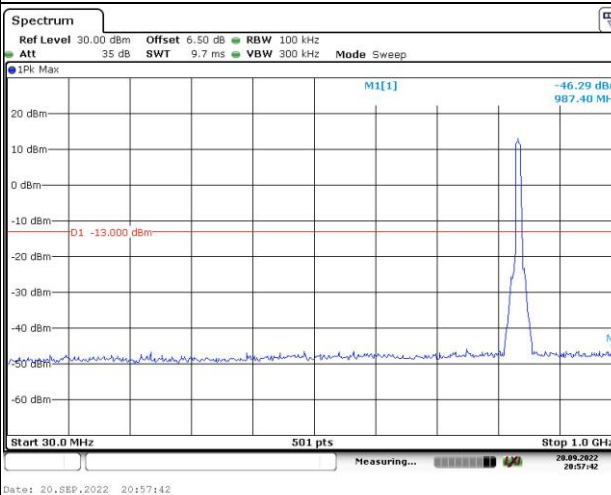
Channel

10MHz Bandwidth QPSK

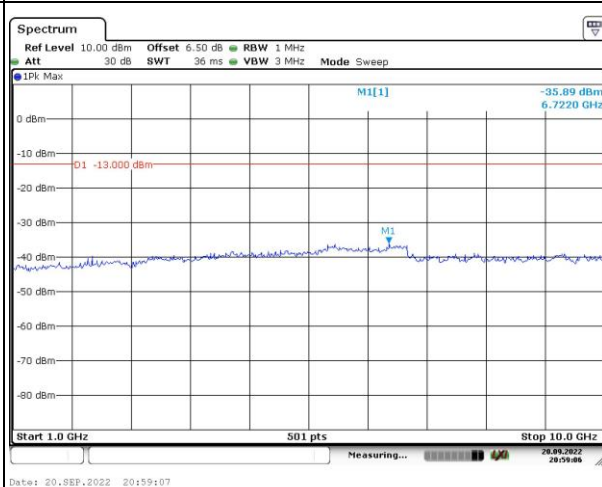
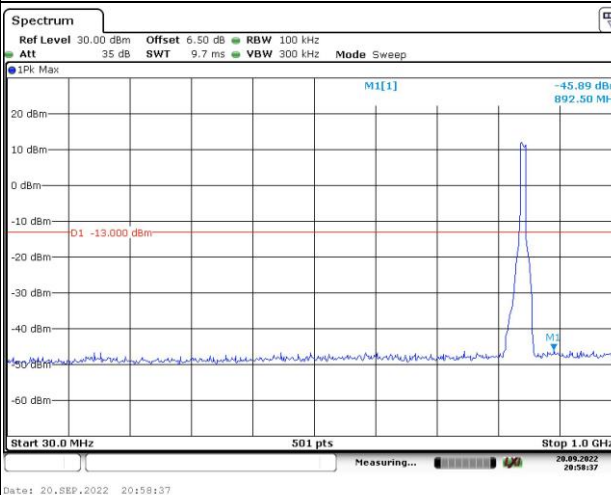
Lowest



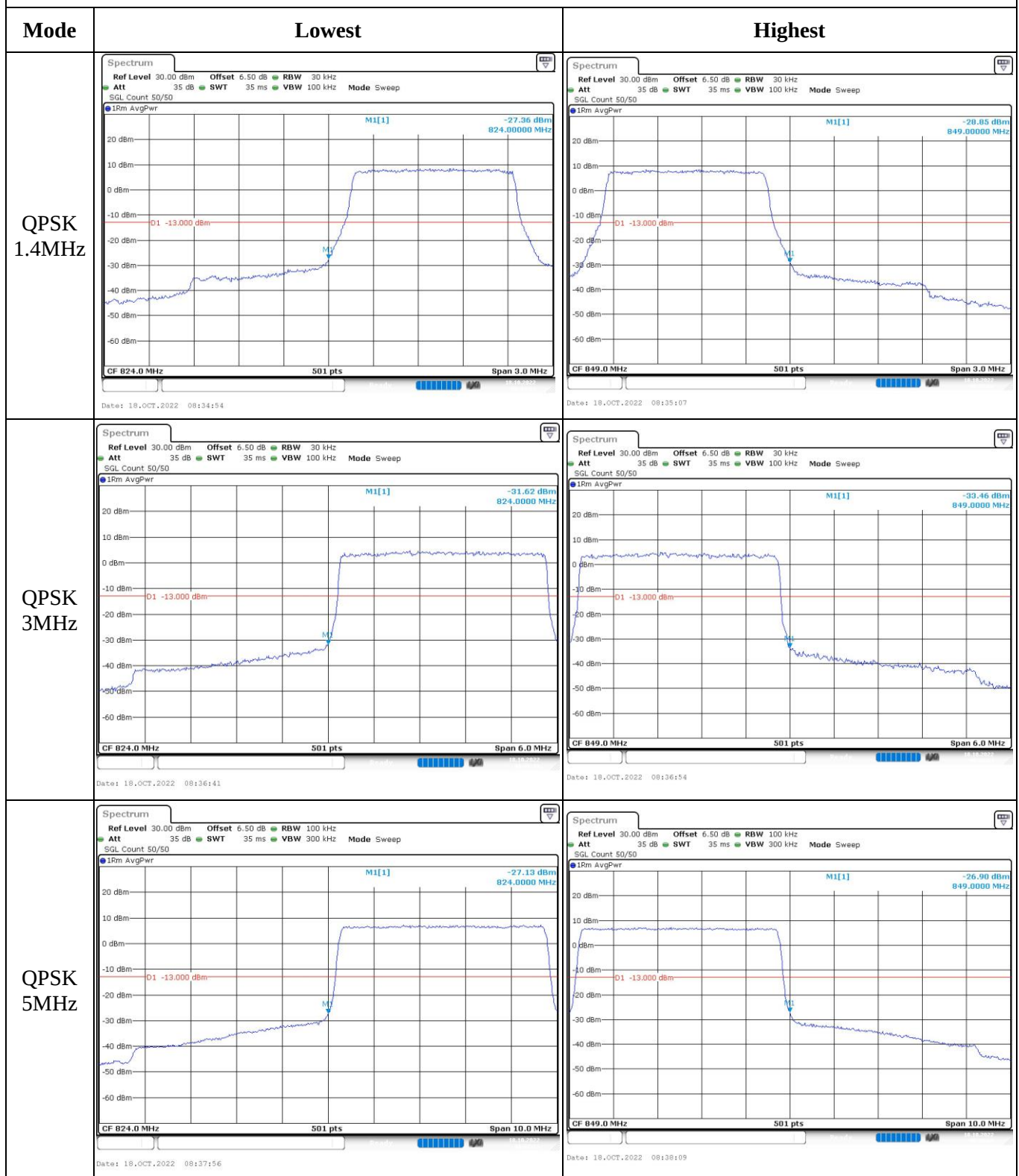
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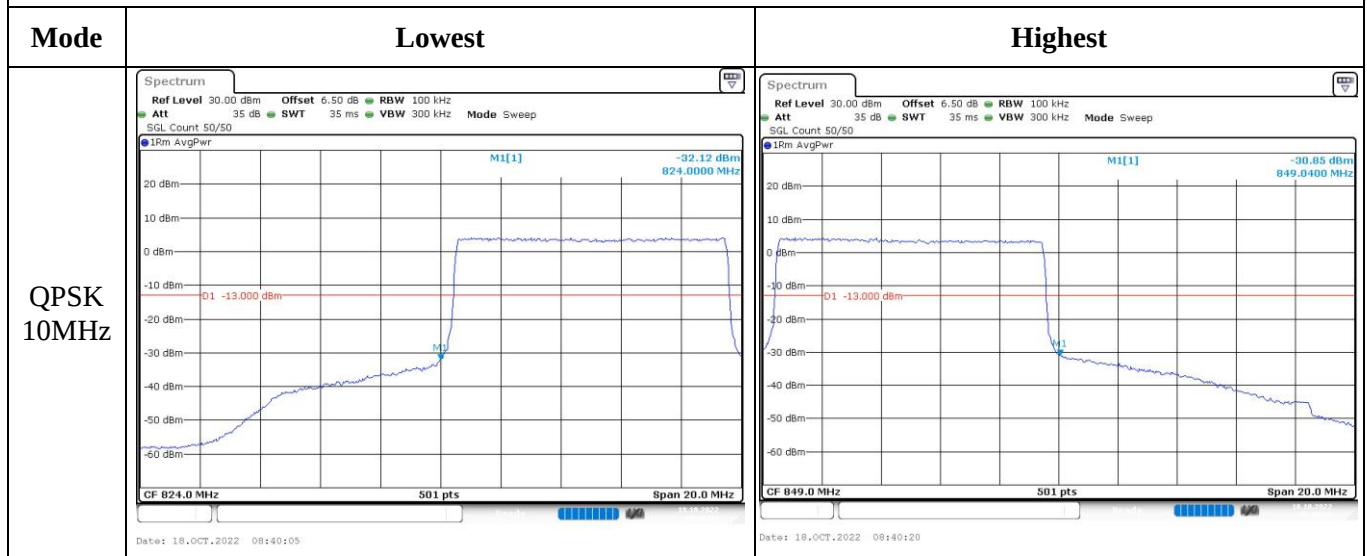
Highest



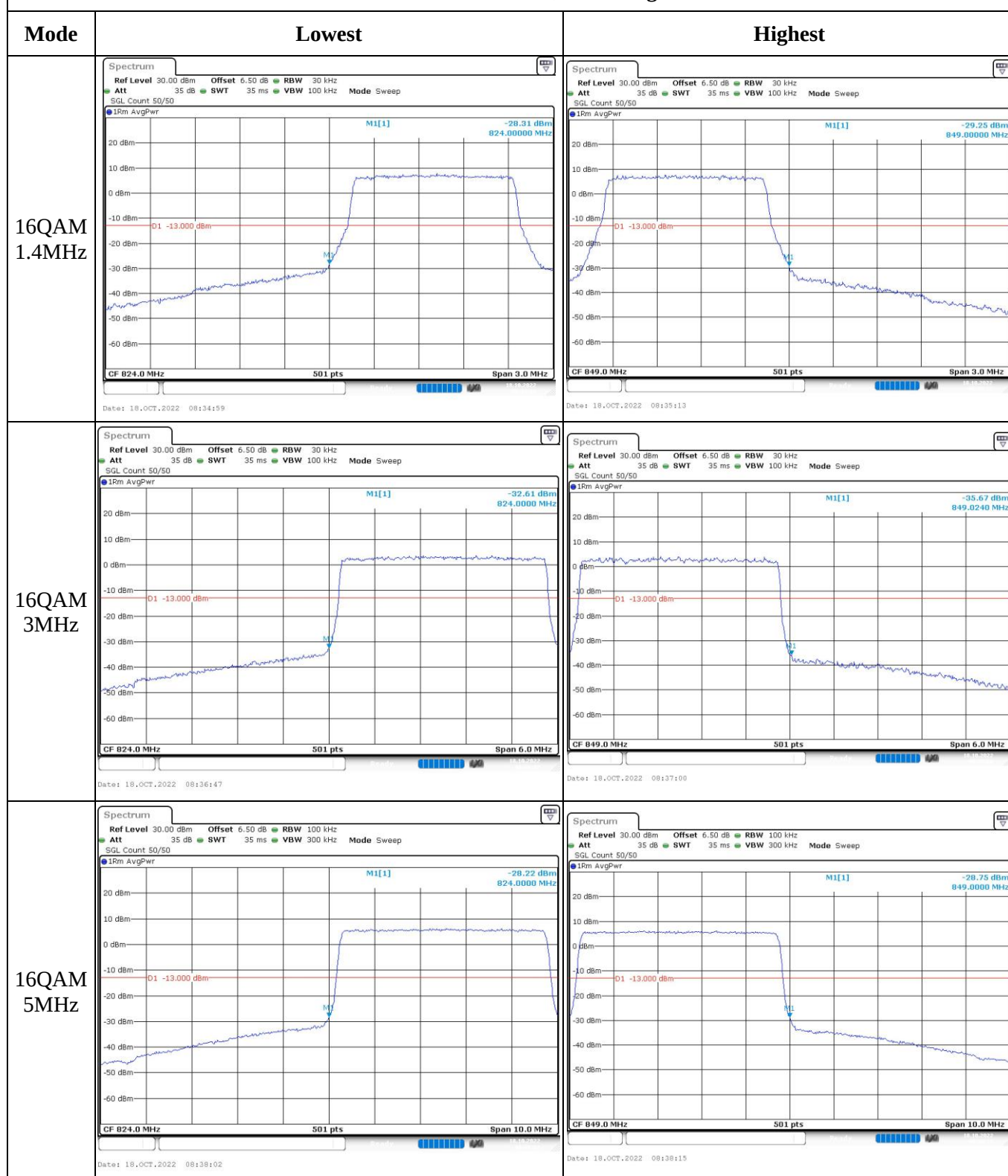
Out of band emission, Band Edge



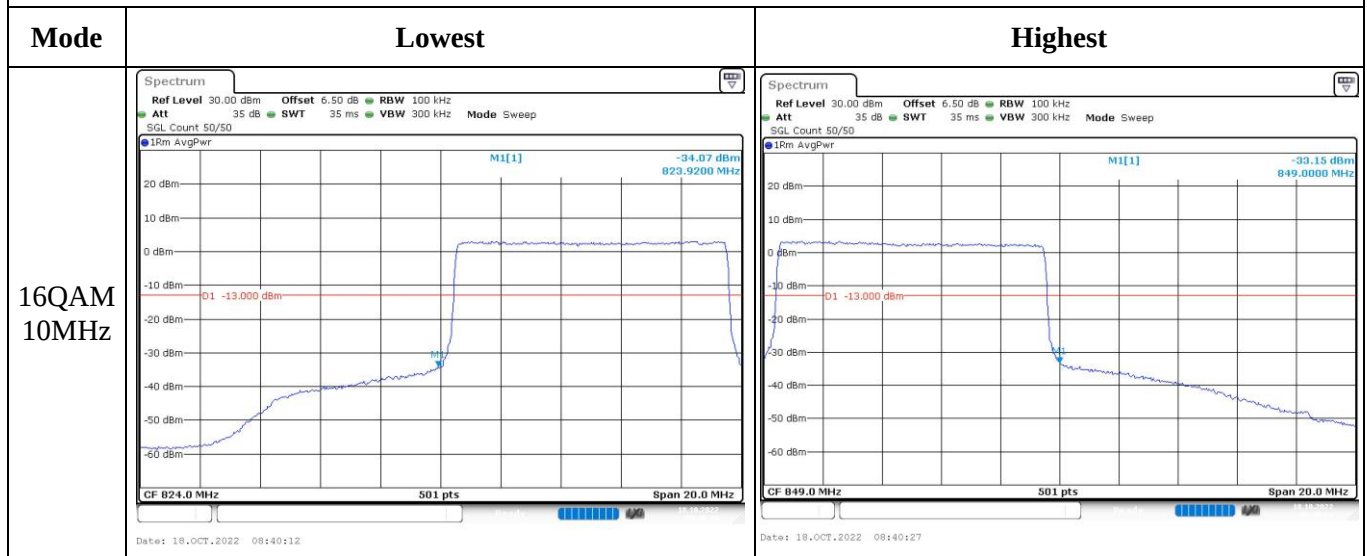
Out of band emission, Band Edge



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:	CR22090019-RF-S1	Test Date:	2022-9-20-2022- 10-18
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rinka Li	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	25.9	Relative Humidity: (%)	48.6	ATM Pressure: (kPa)	100.2
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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
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	149218	2022-07-15	2023-07-14
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2022-04-06	2023-04-05
UNI-T	Multimeter	UT39A+	C210582554	2021-09-30	2022-09-29
UNI-T	Multimeter	UT39A+	C210582554	2022-09-23	2023-09-23
ZHAOXIN	DC Power Supply	RXN-6010D	21R6010D0912386	N/A	N/A
Weinschel	Power Splitter	1515	RA914	Each time	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):	-0.68	Path Loss L_C (dB):	0.4
Operation Voltage(V_{DC}):			
Lowest:	3.6	Normal:	3.85
		Highest:	4.4

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	21.24	21.4	21.18	20.38	33
	RB1#13	21.32	21.42	21.1		
	RB1#24	21.41	21.46	21.13		
	RB15#0	20.43	20.38	20.21		
	RB15#10	20.39	20.4	20.22		
	RB25#0	20.39	20.37	20.27		
5MHz 16QAM	RB1#0	19.59	20.36	19.86	19.43	33
	RB1#13	19.63	20.51	19.86		
	RB1#24	19.74	20.4	19.83		
	RB15#0	19.51	19.47	19.4		
	RB15#10	19.51	19.5	19.38		
	RB25#0	19.61	19.52	19.16		
10MHz QPSK	RB1#0	21.34	21.43	21.26	20.35	33
	RB1#25	21.39	21.35	21.14		
	RB1#49	21.42	21.38	21.12		
	RB25#0	20.36	20.47	20.33		
	RB25#25	20.39	20.36	20.14		
	RB50#0	20.34	20.4	20.34		
10MHz 16QAM	RB1#0	20.46	19.96	20.6	19.52	33
	RB1#25	20.52	19.99	20.43		
	RB1#49	20.49	19.83	20.46		
	RB25#0	19.58	19.69	19.39		
	RB25#25	19.62	19.71	19.34		
	RB50#0	19.56	19.6	19.5		
15MHz QPSK	RB1#0	22.14	21.34	21.26	21.18	33
	RB1#38	22.22	21.34	21.11		
	RB1#74	22.26	21.35	21.06		
	RB36#0	21.12	20.46	20.37		
	RB36#39	21.19	20.49	20.18		
	RB75#0	21.25	20.47	20.31		
15MHz 16QAM	RB1#0	21.65	20.8	20.64	20.57	33
	RB1#38	21.65	20.8	20.68		
	RB1#74	20.28	20.81	20.65		
	RB36#0	19.44	19.64	19.5		
	RB36#39	19.49	19.62	19.44		
	RB75#0	19.5	19.66	19.37		
20MHz QPSK	RB1#0	21.47	21.37	21.45	20.57	33
	RB1#50	21.53	21.32	21.33		
	RB1#99	21.65	21.35	21.25		

20MHz 16QAM	RB50#0	20.32	20.54	20.45	20.28	33
	RB50#50	20.47	20.4	20.32		
	RB100#0	20.45	20.4	20.32		
	RB1#0	20.56	21.36	20.26		
	RB1#50	20.62	21.26	20.38		
	RB1#99	20.73	21.27	20.33		
	RB50#0	19.55	19.64	19.56		
	RB50#50	19.61	19.6	19.55		
	RB100#0	19.57	19.65	19.45		

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	3.74	4.38	4.14	13
	RB100#0	4.7	4.87	4.78	13
20MHz 16QAM	RB1#0	4.9	5.86	5.04	13
	RB100#0	5.68	5.77	5.68	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	4.531	4.511	4.511	5.00	5.02	5.00
5MHz 16QAM	4.511	4.531	4.551	5.00	5.02	5.02
10MHz QPSK	8.982	8.942	8.942	9.80	9.80	9.80
10MHz 16QAM	8.982	8.982	8.942	9.72	9.84	9.88
15MHz QPSK	13.473	13.533	13.533	15.00	15.18	15.06
15MHz 16QAM	13.533	13.533	13.533	15.12	15.12	15.00
20MHz QPSK	17.964	17.964	18.044	19.44	19.6	19.84
20MHz 16QAM	18.044	18.044	17.964	19.76	19.92	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.
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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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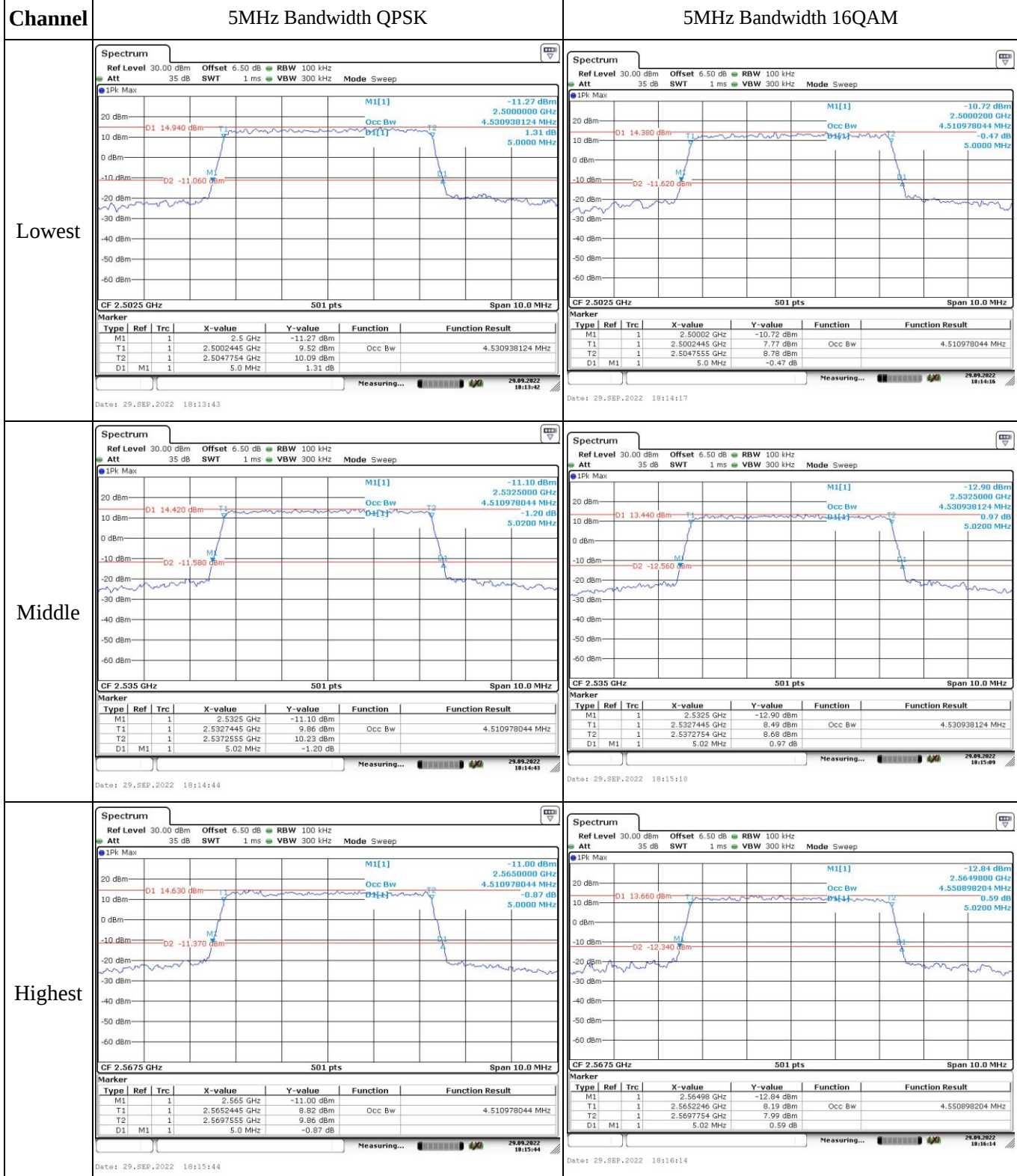
FCC §2.1055, §27.54: Frequency Stability

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	3.85	2500.4582	2500.00	2569.6559	2570
	-20	3.85	2500.4536	2500.00	2569.6402	2570
	-10	3.85	2500.4434	2500.00	2569.6277	2570
	0	3.85	2500.4369	2500.00	2569.6240	2570
	10	3.85	2500.4214	2500.00	2569.6164	2570
	20	3.85	2500.4058	2500.00	2569.6022	2570
	30	3.85	2500.4993	2500.00	2569.6954	2570
	40	3.85	2500.4991	2500.00	2569.6813	2570
	50	3.85	2500.4922	2500.00	2569.6798	2570
Frequency Stability vs. Voltage	20	3.6	2500.4776	2500.00	2569.6773	2570
	20	4.4	2500.4723	2500.00	2569.6769	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	2500.4626	2500.00	2569.6410	2570
	-20	3.85	2500.4453	2500.00	2569.6388	2570
	-10	3.85	2500.4338	2500.00	2569.6338	2570
	0	3.85	2500.4257	2500.00	2569.6242	2570
	10	3.85	2500.4125	2500.00	2569.6201	2570
	20	3.85	2500.4058	2500.00	2569.6022	2570
	30	3.85	2500.4711	2500.00	2569.6459	2570
	40	3.85	2500.4703	2500.00	2569.6876	2570
	50	3.85	2500.4446	2500.00	2569.6849	2570
Frequency Stability vs. Voltage	20	3.6	2500.4115	2500.00	2569.6497	2570
	20	4.4	2500.4042	2500.00	2569.6124	2570
					Result:	Pass

Test Plots(Note:6.5dB is the Insertion loss of the RF cable, coaxial tee connector and DC Block, which was offset into the Spectrum Analyzer):

Occupied Bandwidth



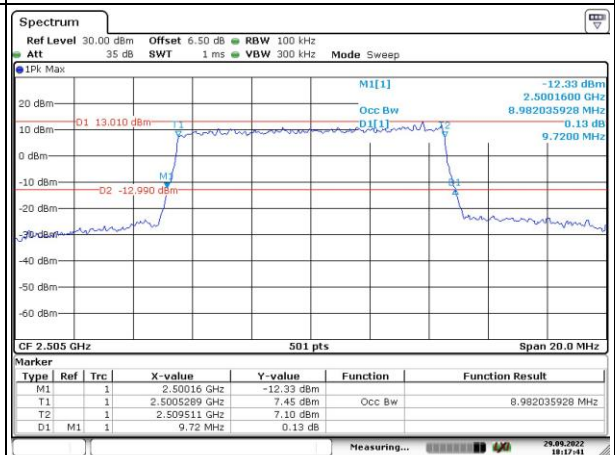
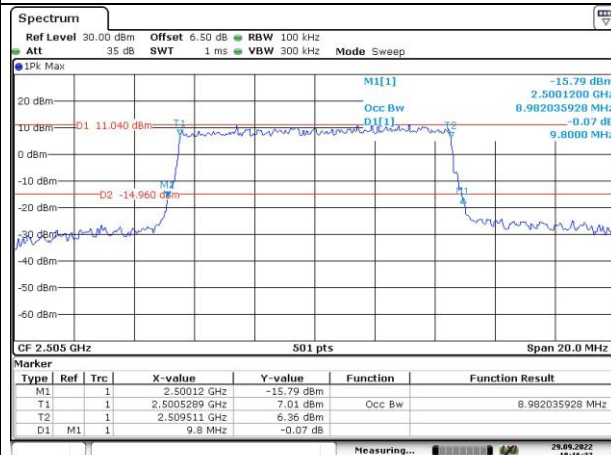
Occupied Bandwidth

Channel

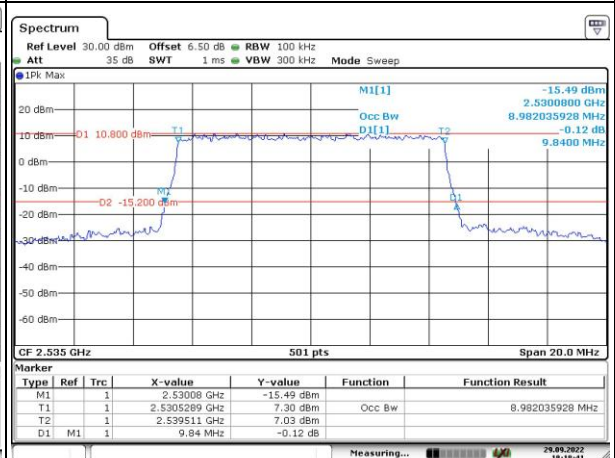
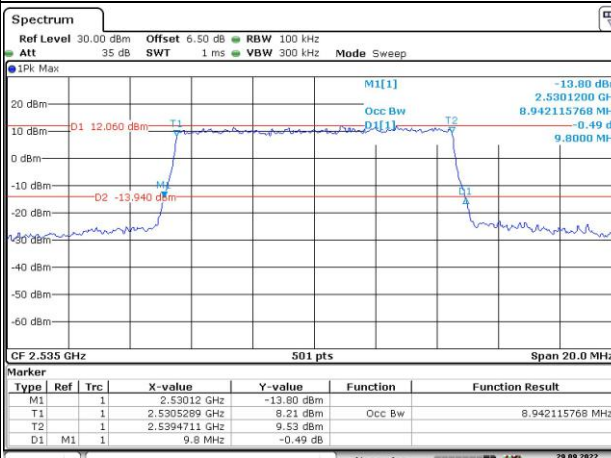
10MHz Bandwidth QPSK

10MHz Bandwidth 16QAM

Lowest



Middle



Highest

