

4.9 Antenna Port Test Data and Results for LTE Band 7

Serial Number:	CR22080020-RF-S1	Test Date:	2022/08/22~2022/08/30
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rinka Li	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	27.8	Relative Humidity: (%)	54	ATM Pressure: (kPa)	100.3
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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	211003	Each time	N/A
Mini-Circuits	DC Block	SS402	SJ0100003	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
ZHAOXIN	DC Power Supply	RXN-6010D	21R6010D0912386	N/A	N/A
Weinschel	Power splitter	1515	RA915	2022-08-07	2023-08-06

* 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 (dBi):	0.95	Cable Loss (dB):	0.4
Operation Voltage(V _{DC}):			
Lowest:	3.5	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	22.58	22.67	22.5	23.22	33
	RB1#13	22.52	22.58	22.51		
	RB1#24	22.49	22.64	22.18		
	RB15#0	21.55	21.6	21.6		
	RB15#10	21.55	21.48	21.54		
	RB25#0	21.46	21.51	21.5		
5MHz 16QAM	RB1#0	20.76	21.6	21.07	22.2	33
	RB1#13	20.8	21.57	21.17		
	RB1#24	20.78	21.65	21.11		
	RB15#0	20.71	20.57	20.71		
	RB15#10	20.72	20.6	20.62		
	RB25#0	20.8	20.63	20.61		
10MHz QPSK	RB1#0	22.6	22.65	22.53	23.23	33
	RB1#25	22.68	22.58	22.51		
	RB1#49	22.63	22.53	22.47		
	RB25#0	21.57	21.63	21.59		
	RB25#25	21.56	21.58	21.47		
	RB50#0	21.6	21.62	21.55		
10MHz 16QAM	RB1#0	21.66	21.08	21.81	22.36	33
	RB1#25	21.63	21.02	21.73		
	RB1#49	21.68	20.98	21.74		
	RB25#0	20.8	20.79	20.74		
	RB25#25	20.75	20.78	20.64		
	RB50#0	20.74	20.68	20.68		
15MHz QPSK	RB1#0	22.51	22.58	22.38	23.13	33
	RB1#38	22.54	22.53	22.44		
	RB1#74	22.55	22.54	22.4		
	RB36#0	21.6	21.56	21.61		
	RB36#39	21.61	21.57	21.56		
	RB75#0	21.54	21.53	21.61		
15MHz 16QAM	RB1#0	21.82	22.04	21.72	22.59	33
	RB1#38	21.75	21.94	21.81		
	RB1#74	21.83	22.01	21.73		
	RB36#0	20.73	20.7	20.72		
	RB36#39	20.74	20.71	20.81		
	RB75#0	20.74	20.7	20.74		
20MHz QPSK	RB1#0	22.64	22.47	22.5	23.26	33
	RB1#50	22.67	22.42	22.56		
	RB1#99	22.71	22.53	22.54		

20MHz 16QAM	RB50#0	21.55	21.66	21.58	22.92	33
	RB50#50	21.58	21.51	21.63		
	RB100#0	21.61	21.58	21.47		
	RB1#0	21.73	22.37	21.52		
	RB1#50	21.69	22.37	21.52		
	RB1#99	21.72	22.37	21.58		
	RB50#0	20.66	20.68	20.84		
	RB50#50	20.73	20.66	20.82		
	RB100#0	20.56	20.75	20.7		

Note:

EIRP=Conducted Power(dBm) - Cable loss(dB) + Antenna Gain(dBi)

Cable loss is the loss of RF cable form test point to the EUT transmission antenna

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	4.49	3.74	3.94	13
	RB100#0	4.87	4.52	4.61	13
20MHz 16QAM	RB1#0	5.22	4.78	5.16	13
	RB100#0	5.86	5.45	5.51	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	4.98	4.98
5MHz 16QAM	4.511	4.551	4.531	5.02	5.02	5.02
10MHz QPSK	8.982	8.942	8.942	9.8	9.8	9.8
10MHz 16QAM	8.982	8.942	8.942	9.8	9.84	8.942
15MHz QPSK	13.473	13.533	13.473	15.06	15.18	150
15MHz 16QAM	13.593	13.533	13.533	15.24	15.12	14.94
20MHz QPSK	17.964	18.044	17.964	19.68	19.84	19.52
20MHz 16QAM	17.964	17.964	17.964	19.92	19.76	19.68

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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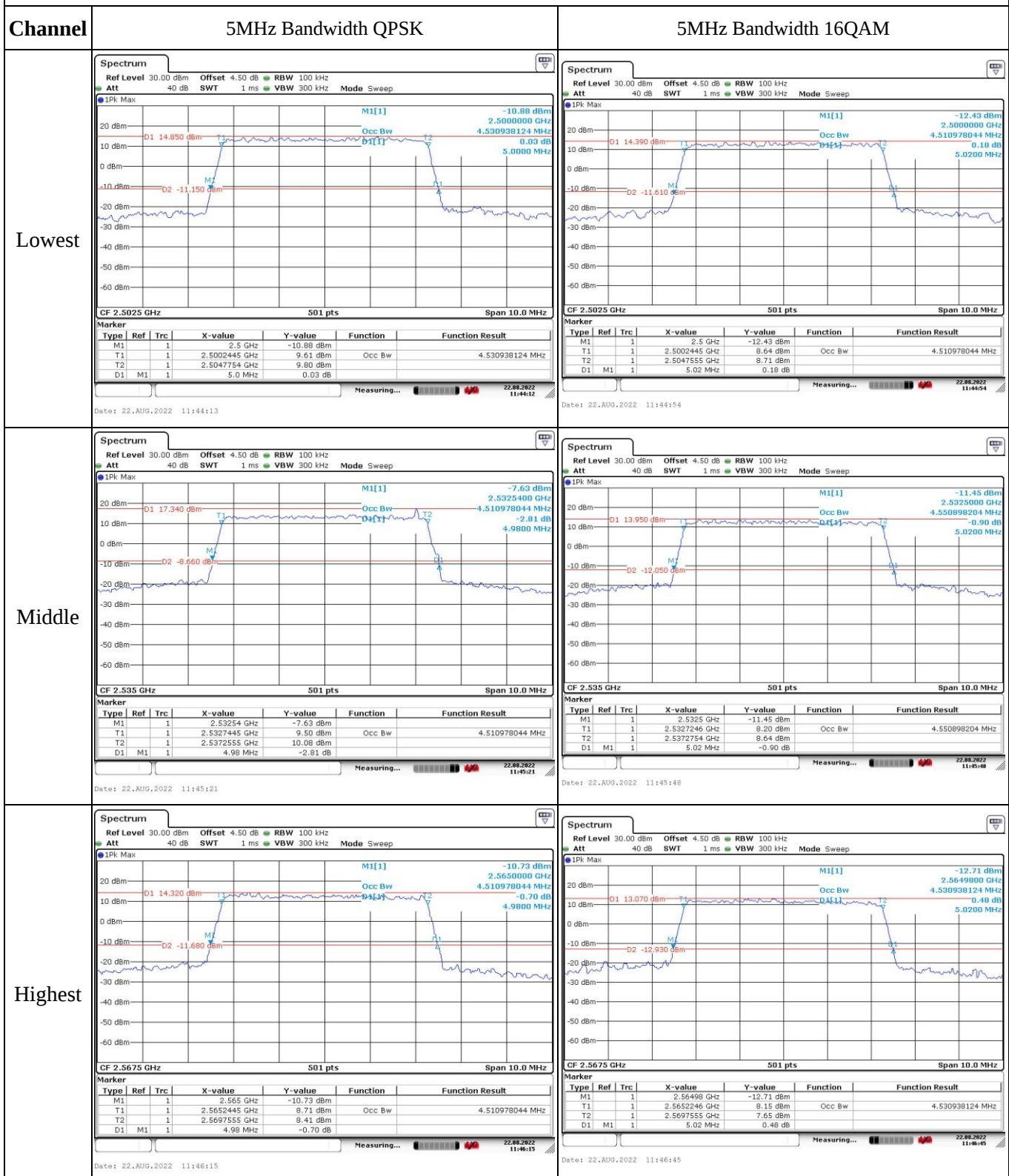
FCC §2.1055, §27.54: Frequency Stability

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	2500.205	2500.00	2569.856	2570
	-20	3.85	2500.169	2500.00	2569.849	2570
	-10	3.85	2500.132	2500.00	2569.811	2570
	0	3.85	2500.096	2500.00	2569.797	2570
	10	3.85	2500.089	2500.00	2569.775	2570
	20	3.85	2500.058	2500.00	2569.742	2570
	30	3.85	2500.039	2500.00	2569.735	2570
	40	3.85	2500.019	2500.00	2569.702	2570
	50	3.85	2500.001	2500.00	2569.762	2570
Frequency Stability vs. Voltage	20	3.5	2500.168	2500.00	2569.761	2570
	20	4.4	2500.155	2500.00	2569.724	2570
					Result:	Pass

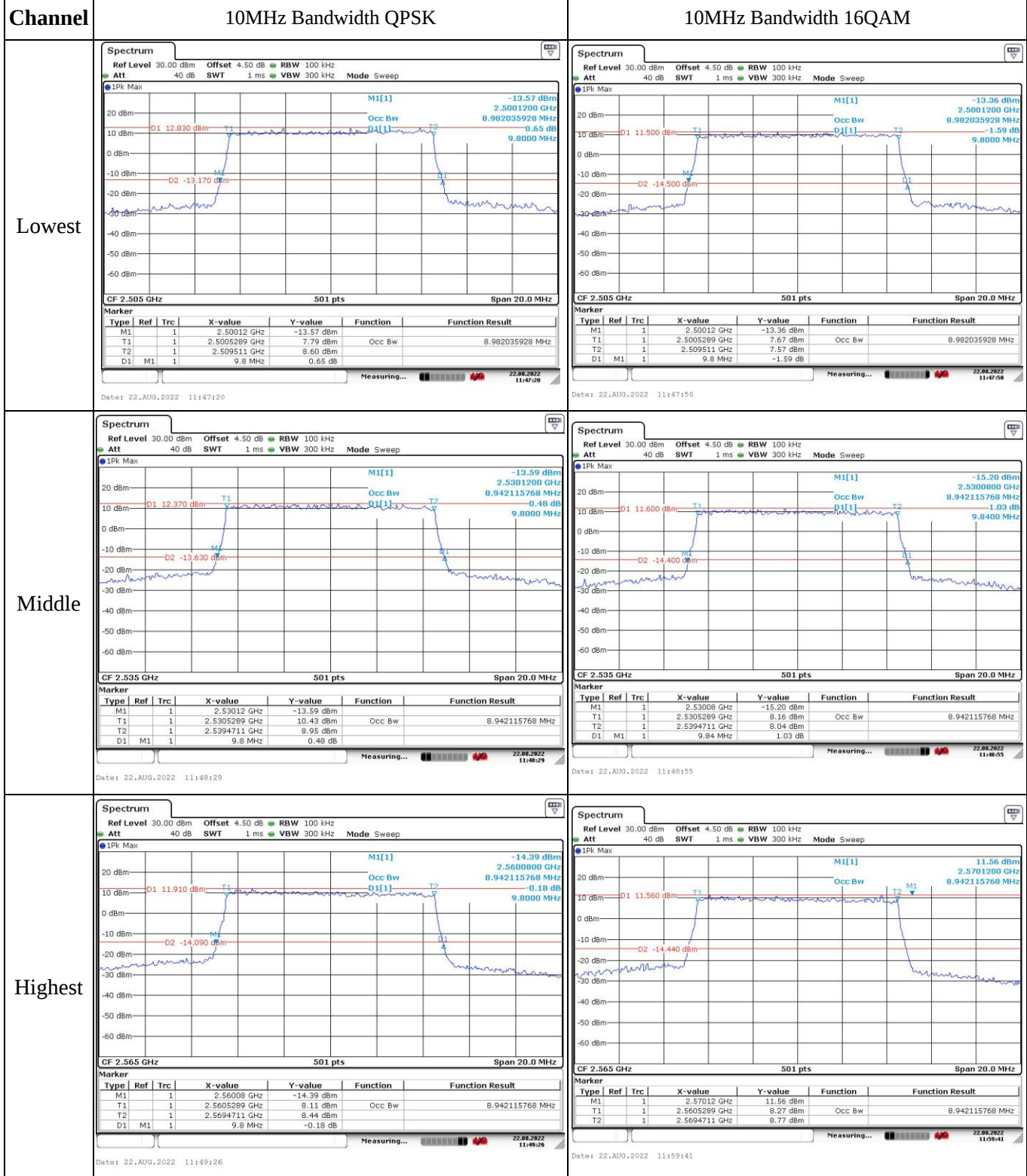
Test Mode:	20M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.85	2500.430	2500.00	2569.685	2570
	-20	3.85	2500.427	2500.00	2569.675	2570
	-10	3.85	2500.410	2500.00	2569.669	2570
	0	3.85	2500.410	2500.00	2569.649	2570
	10	3.85	2500.483	2500.00	2569.629	2570
	20	3.85	2500.458	2500.00	2569.622	2570
	30	3.85	2500.420	2500.00	2569.601	2570
	40	3.85	2500.406	2500.00	2569.693	2570
	50	3.85	2500.498	2500.00	2569.692	2570
Frequency Stability vs. Voltage	20	3.5	2500.460	2500.00	2569.675	2570
	20	4.4	2500.428	2500.00	2569.647	2570
					Result:	Pass

Test Plots:

Occupied Bandwidth



Occupied Bandwidth



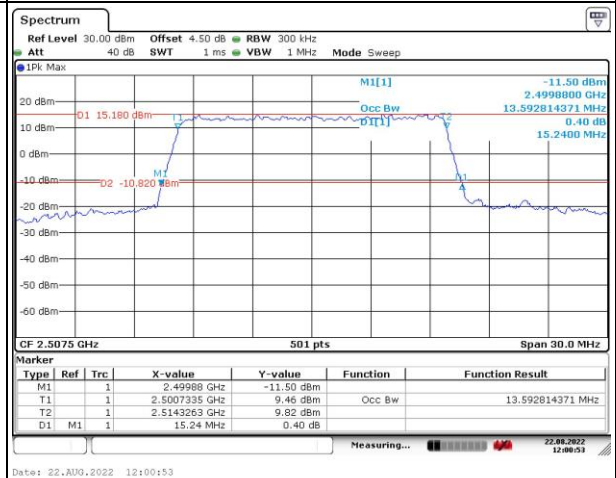
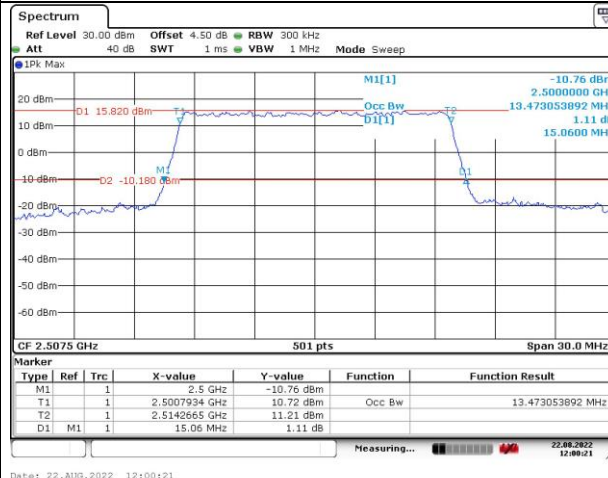
Occupied Bandwidth

Channel

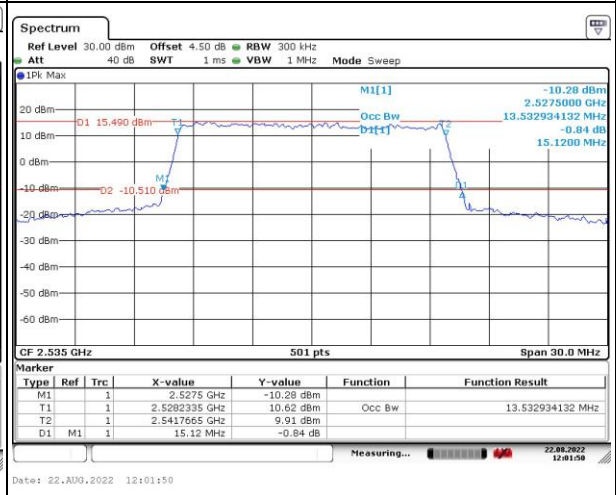
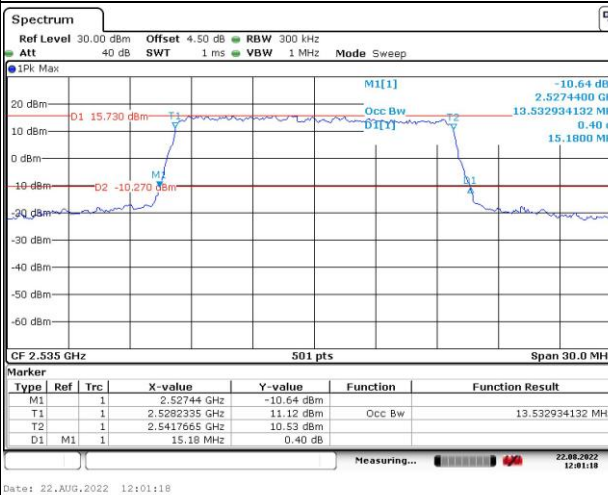
15MHz Bandwidth QPSK

15MHz Bandwidth 16QAM

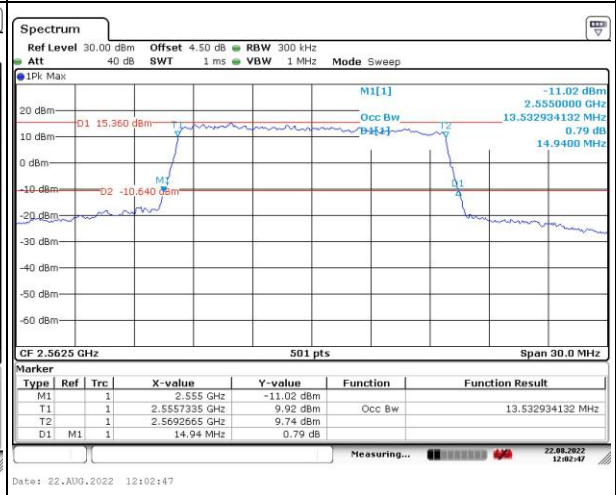
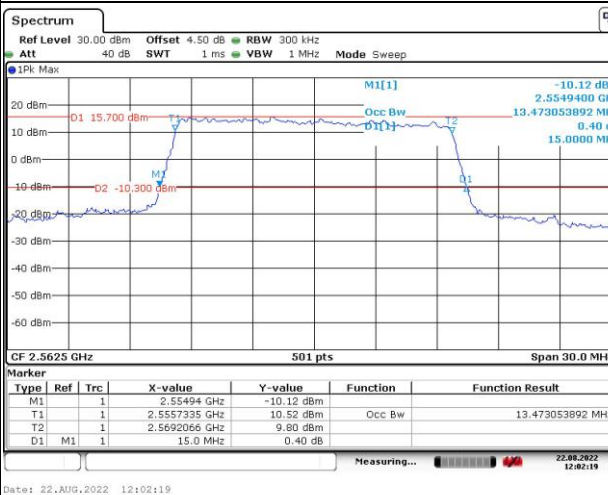
Lowest



Middle



Highest



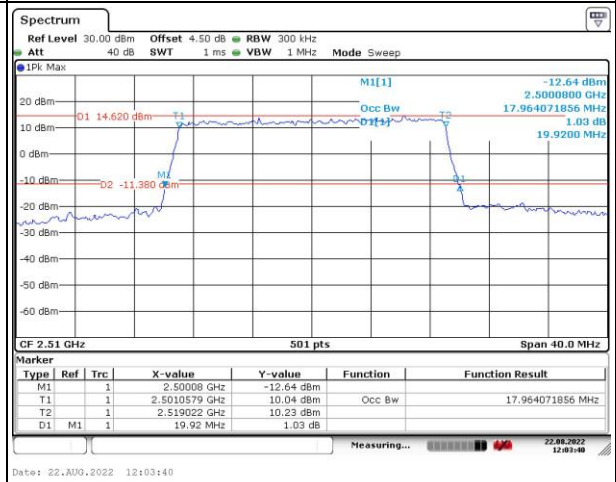
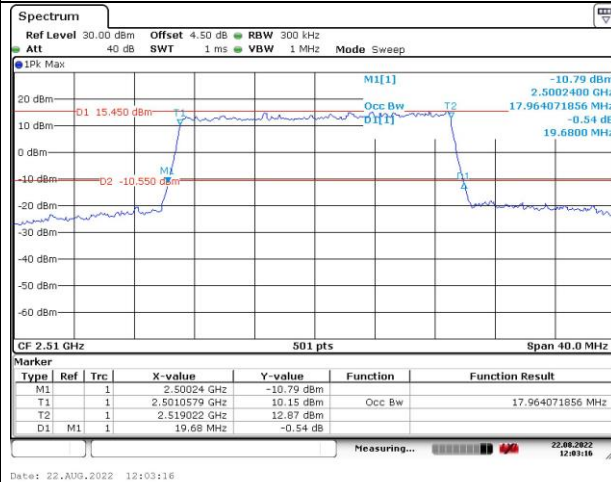
Occupied Bandwidth

Channel

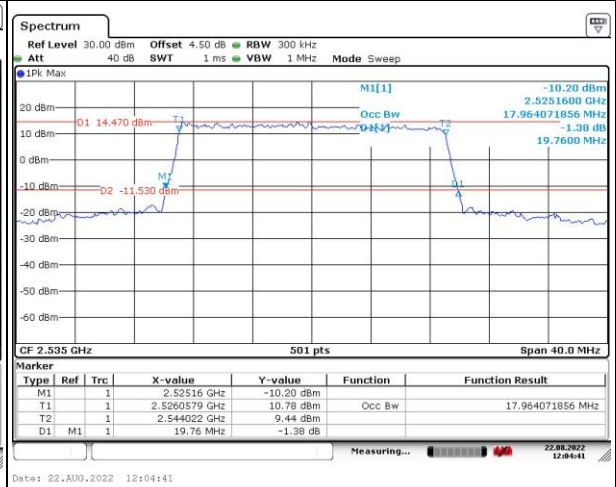
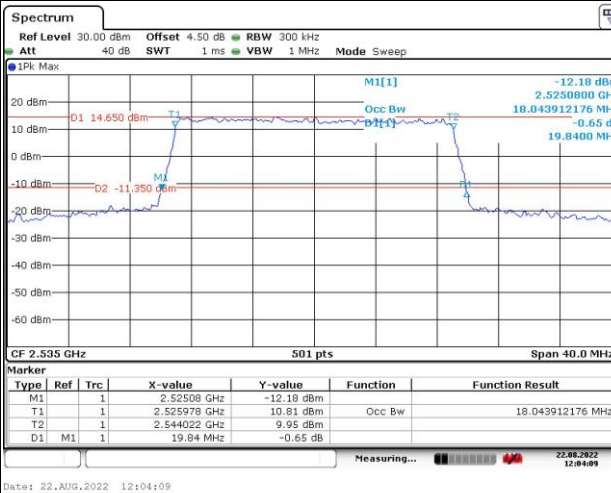
20MHz Bandwidth QPSK

20MHz Bandwidth 16QAM

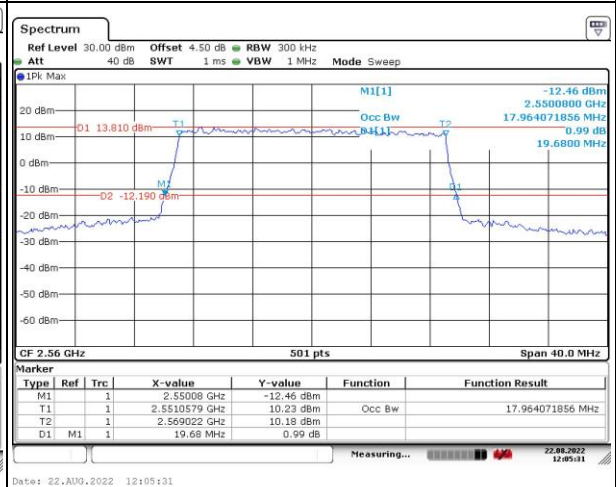
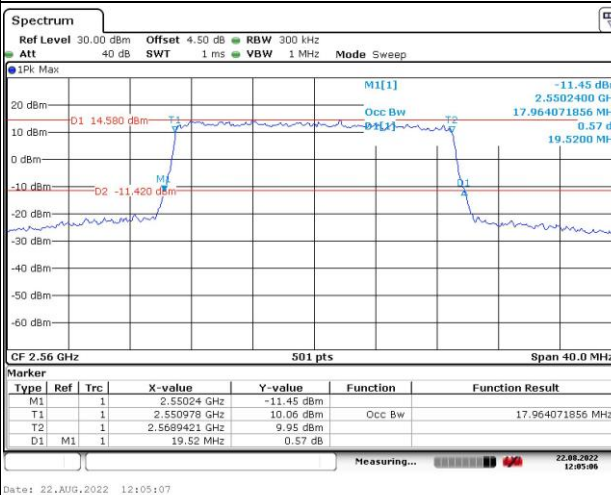
Lowest



Middle



Highest

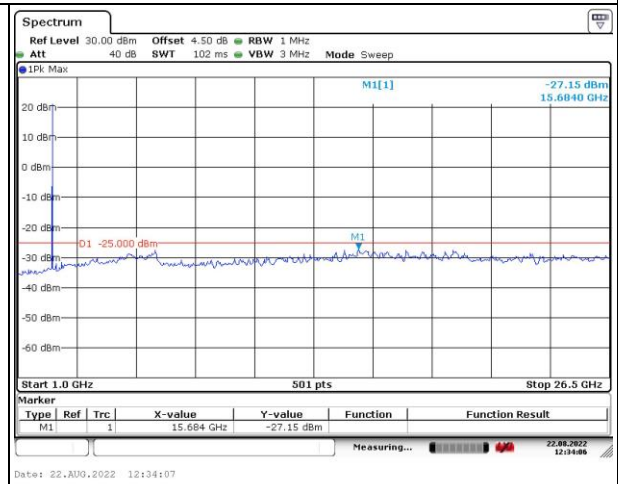
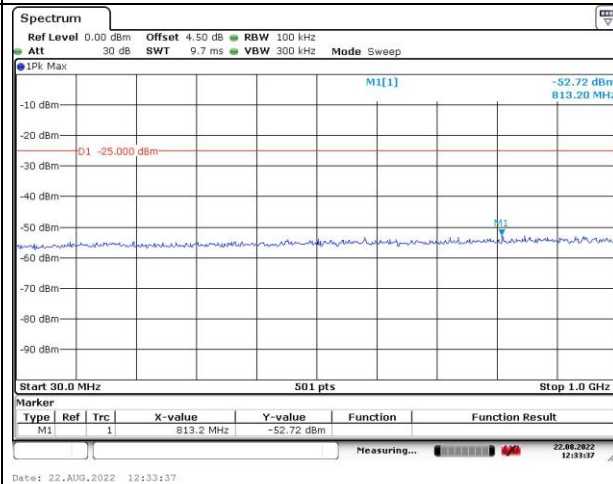


Spurious Emissions at Antenna Terminal

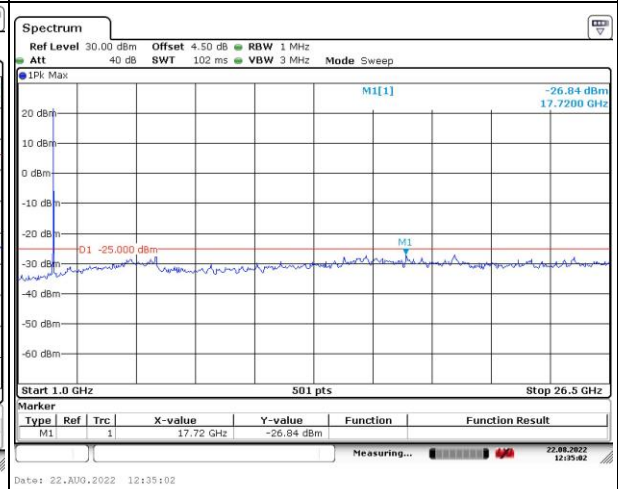
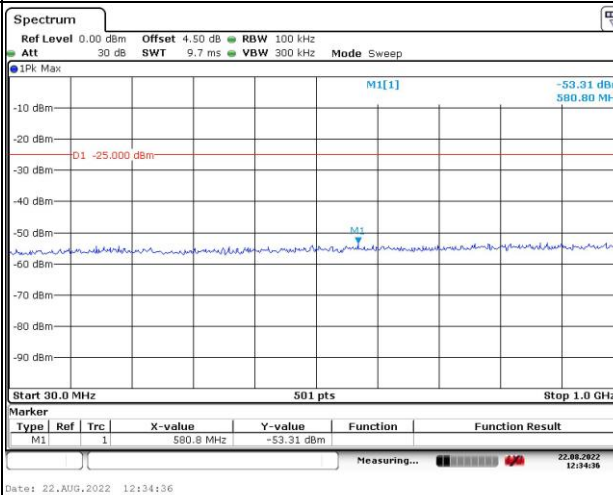
Channel

5MHz Bandwidth QPSK

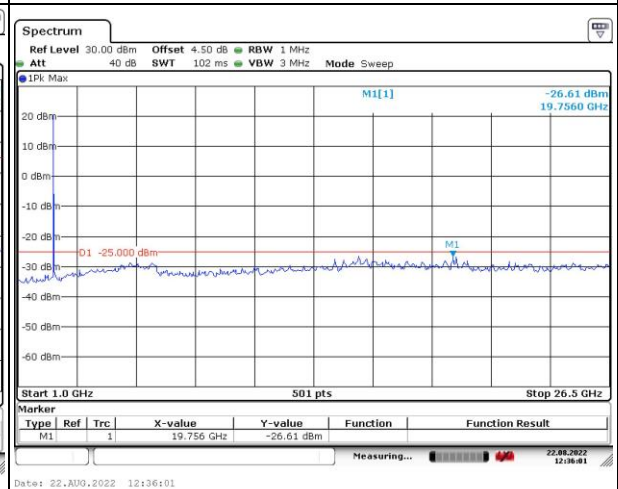
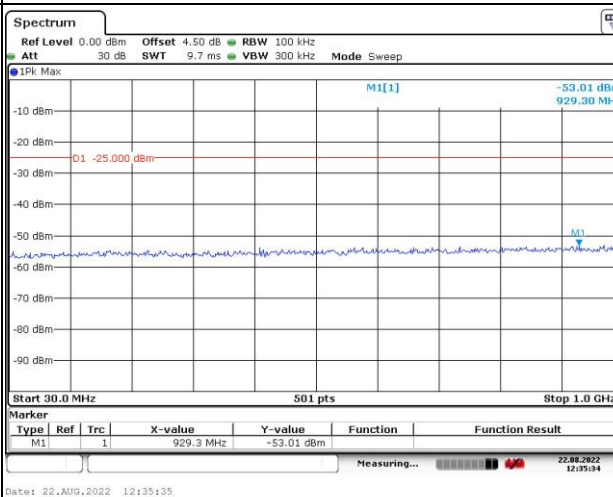
Lowest



Middle



Highest

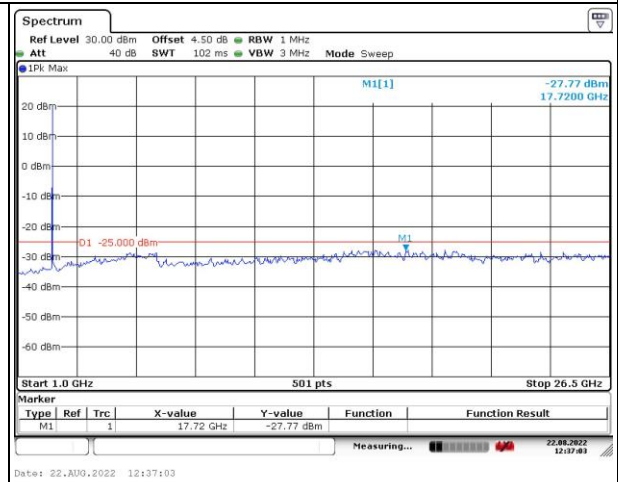
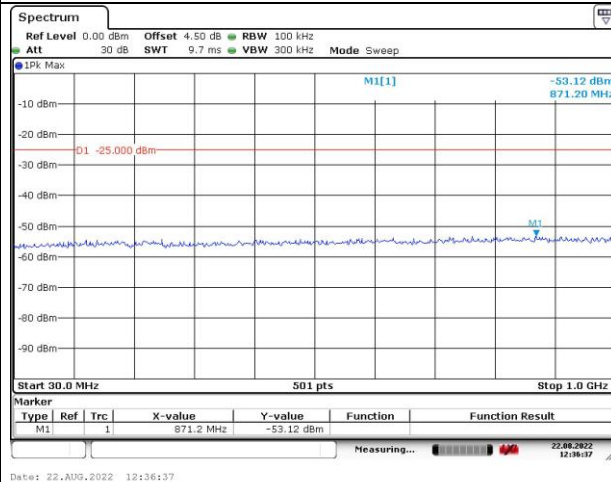


Spurious Emissions at Antenna Terminal

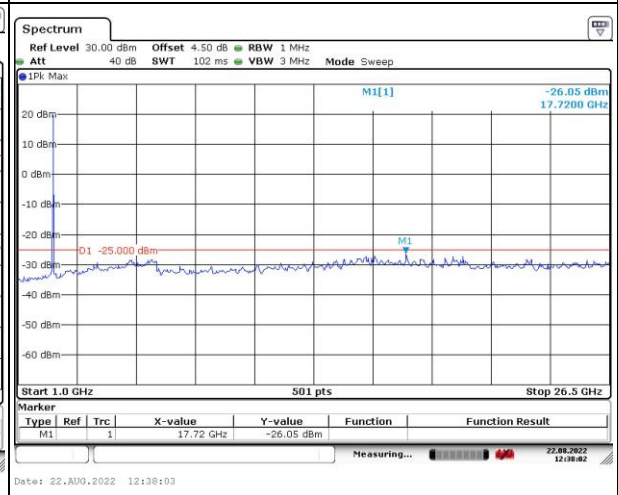
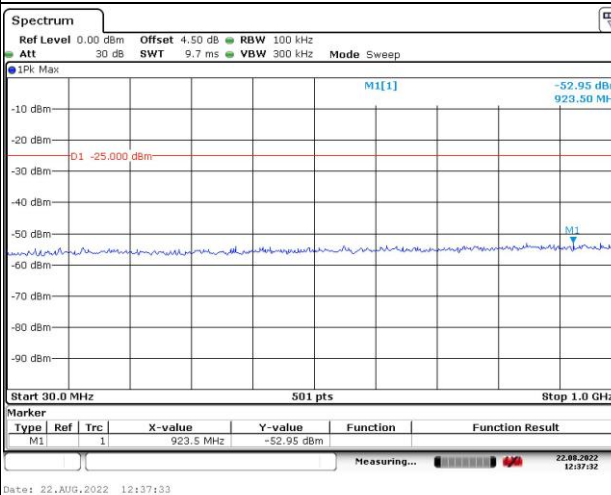
Channel

10MHz Bandwidth QPSK

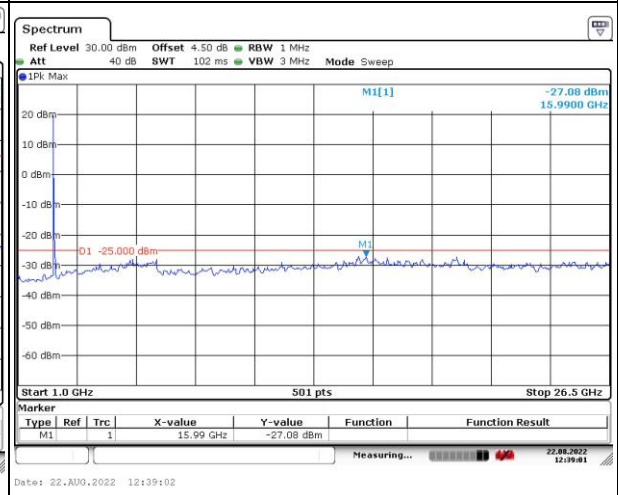
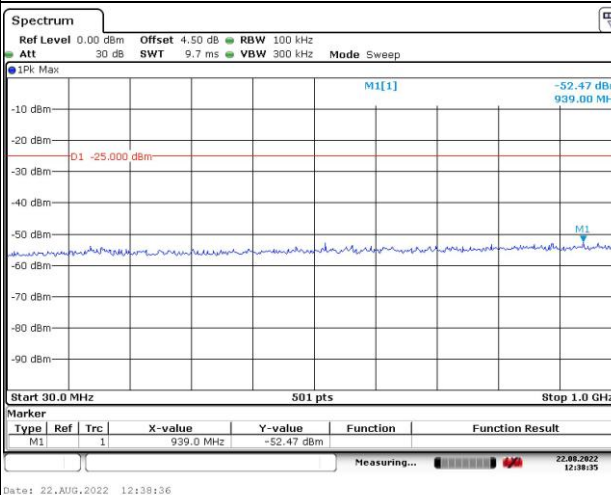
Lowest



Middle



Highest

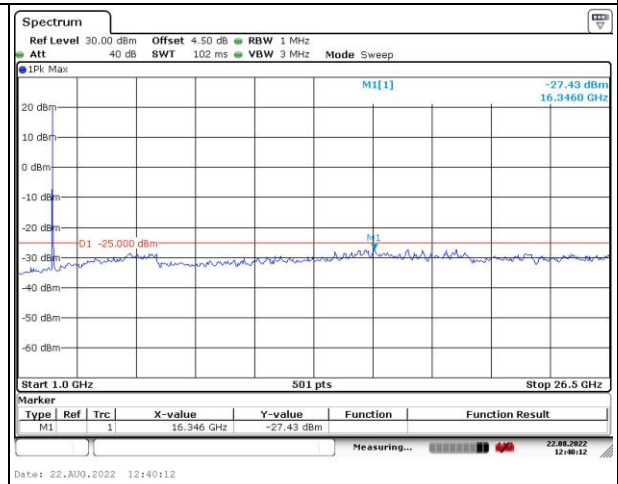
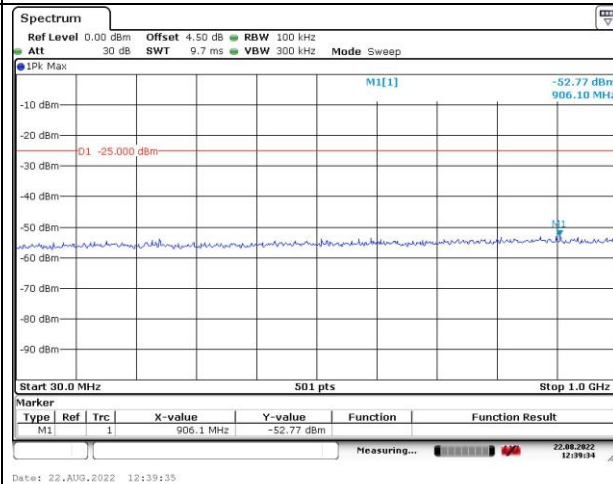


Spurious Emissions at Antenna Terminal

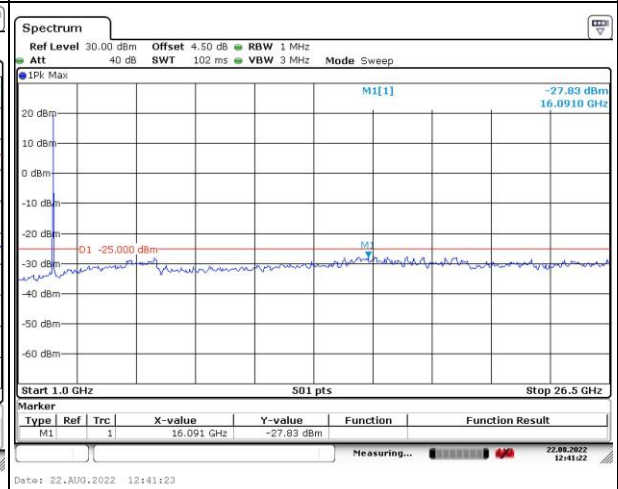
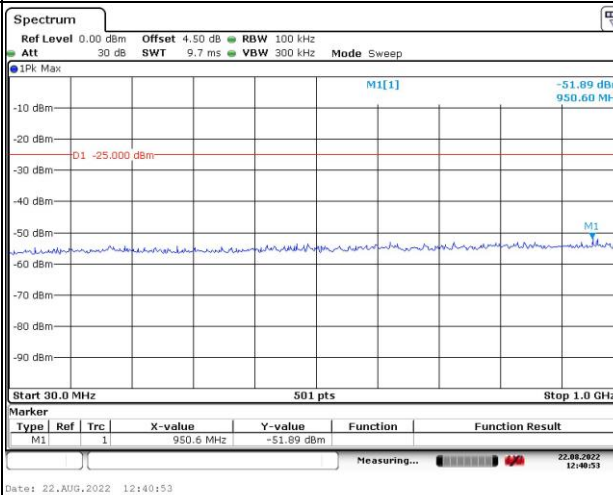
Channel

15MHz Bandwidth QPSK

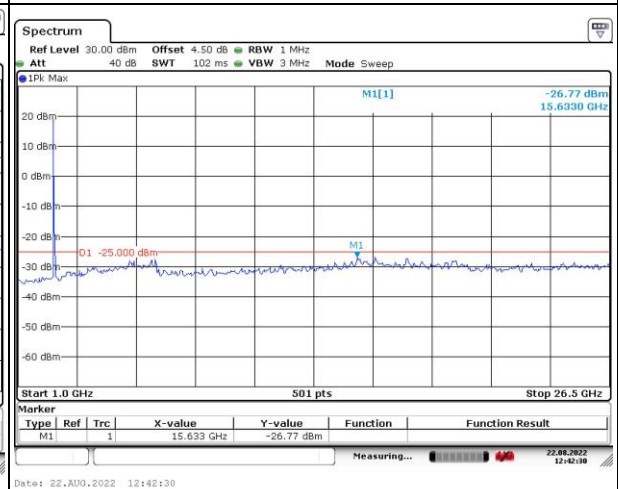
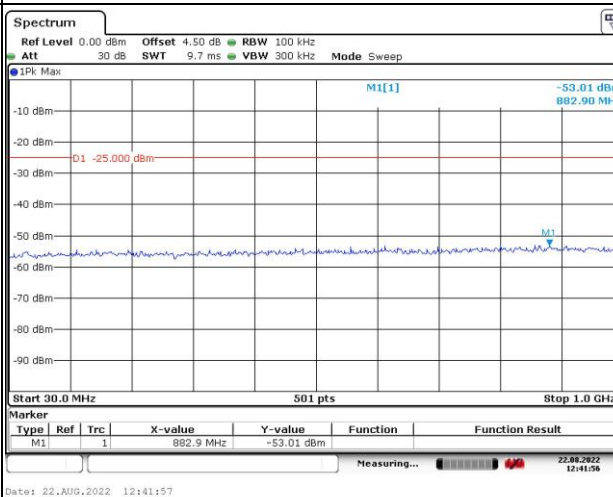
Lowest



Middle



Highest

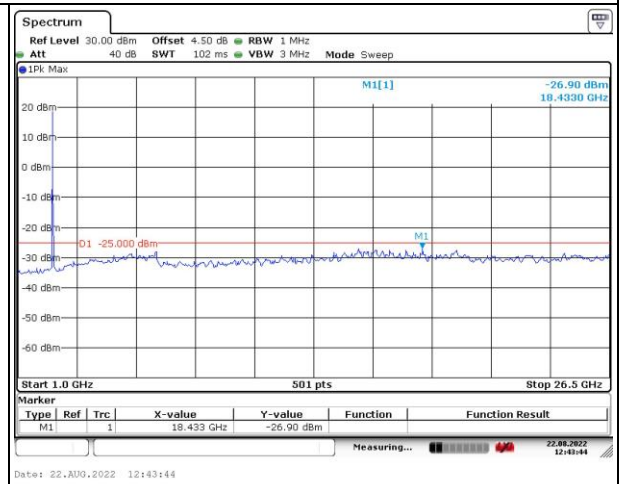
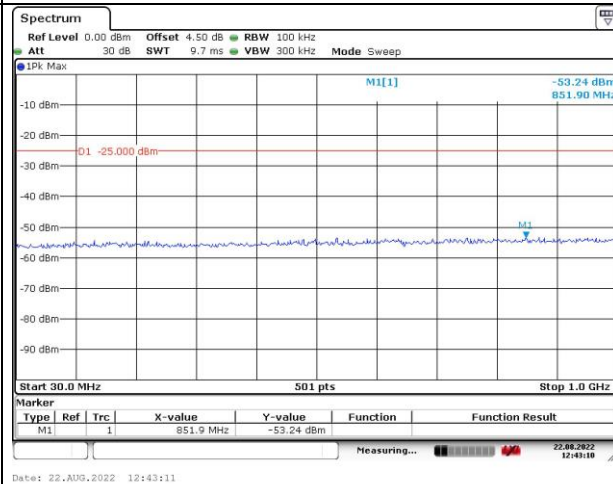


Spurious Emissions at Antenna Terminal

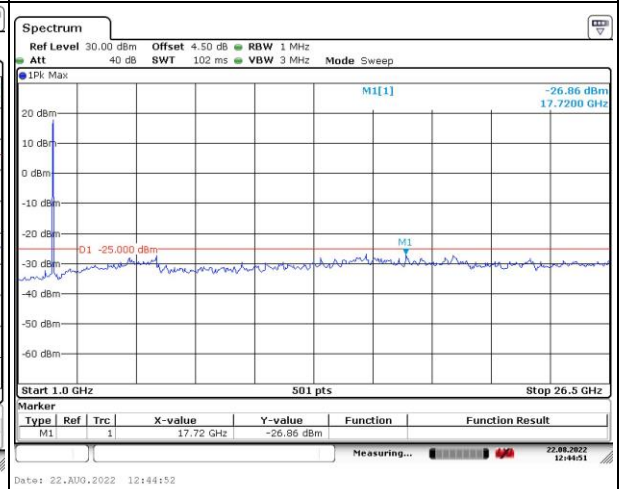
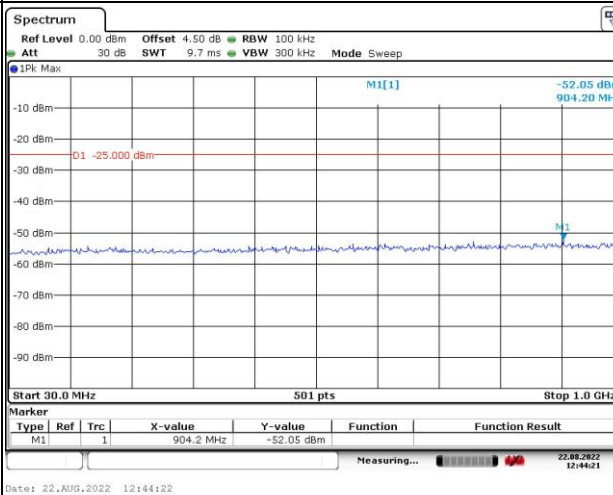
Channel

20MHz Bandwidth QPSK

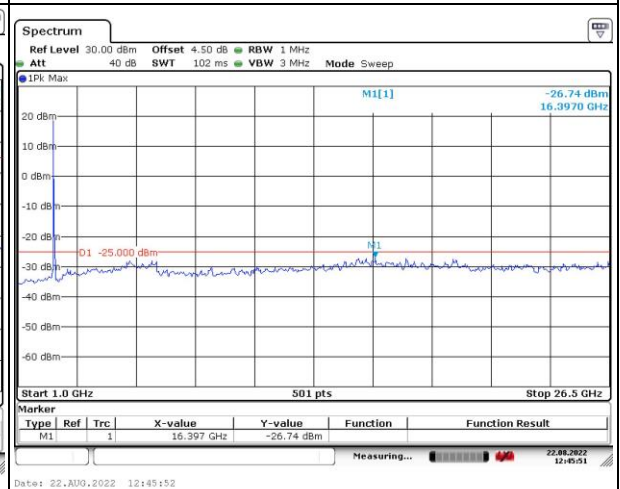
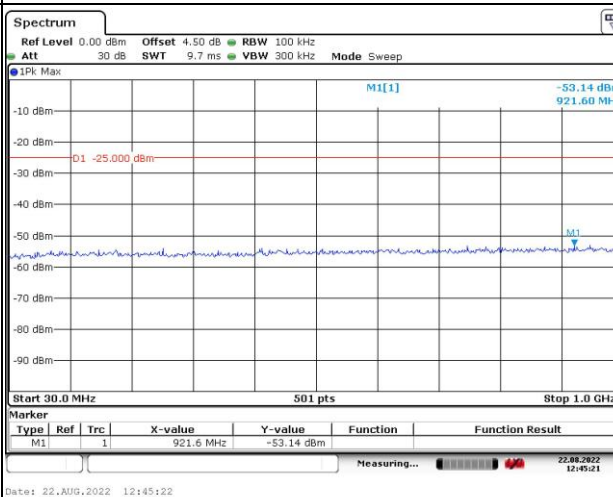
Lowest



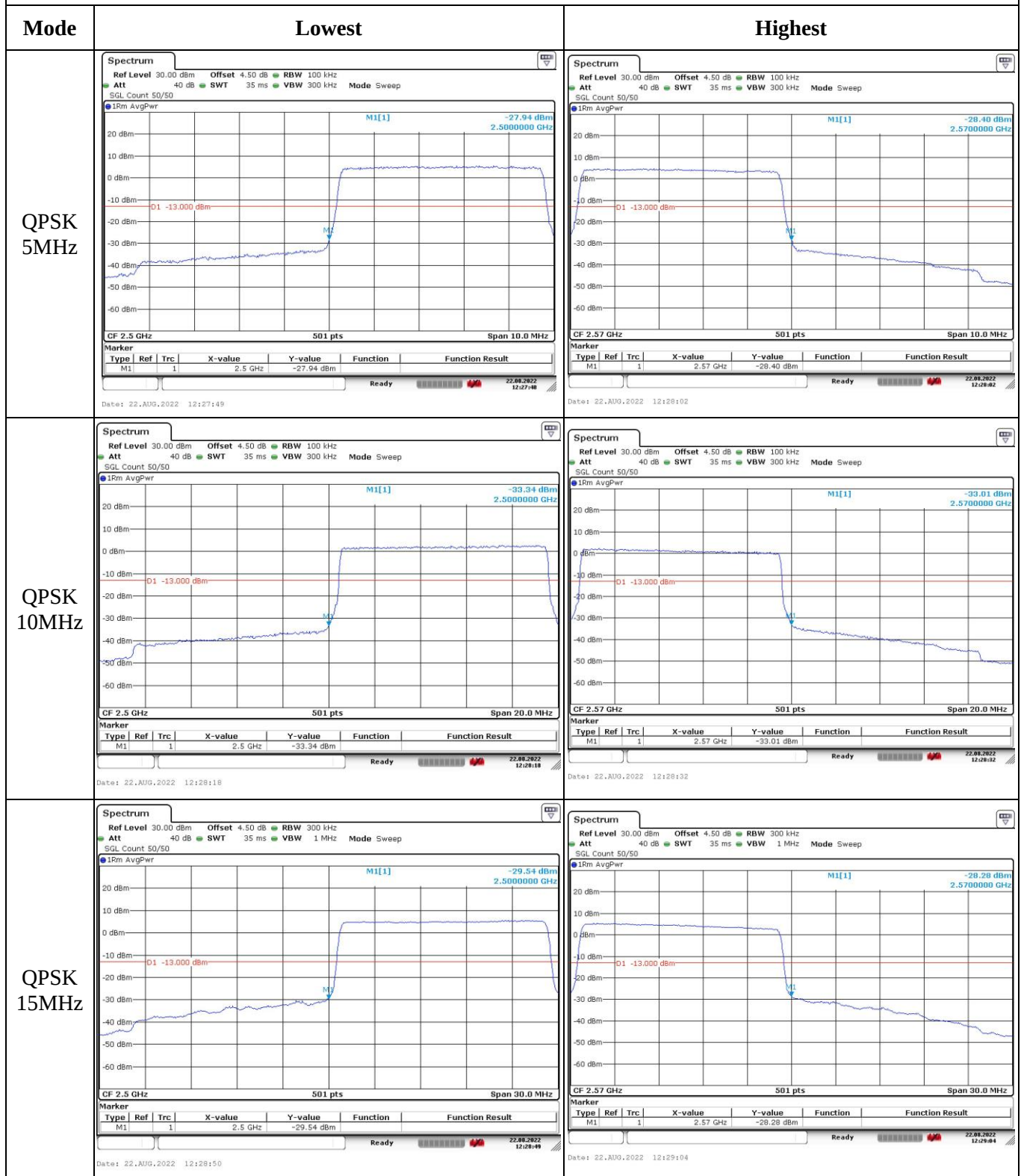
Middle



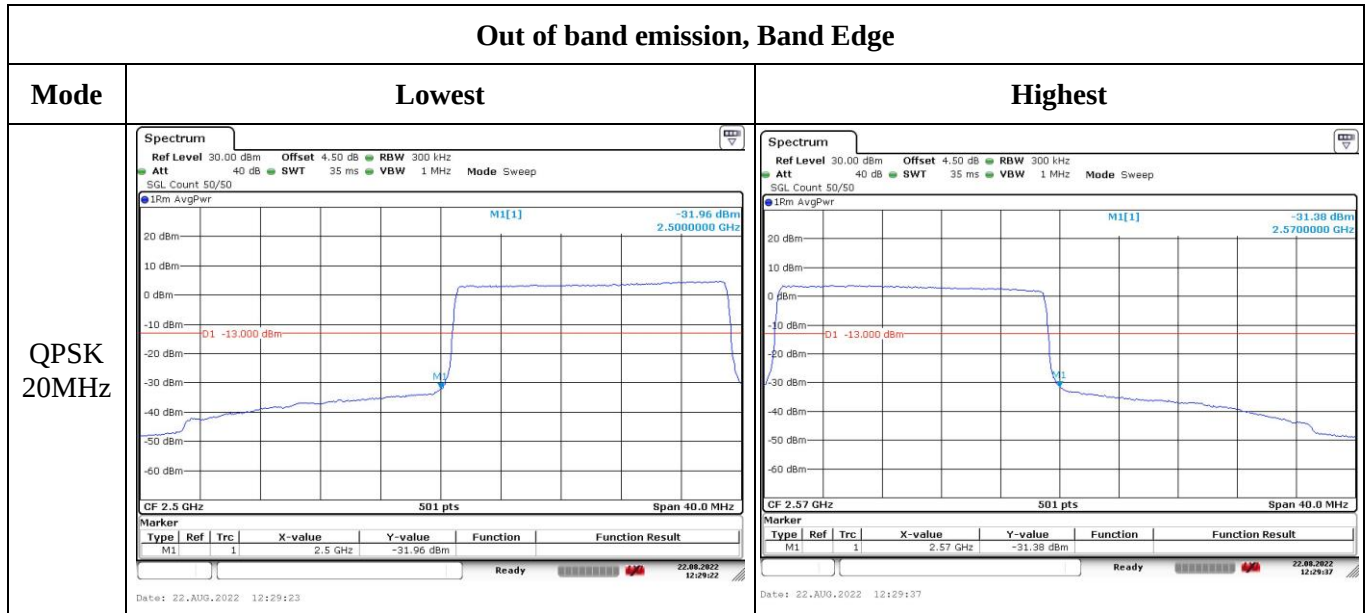
Highest



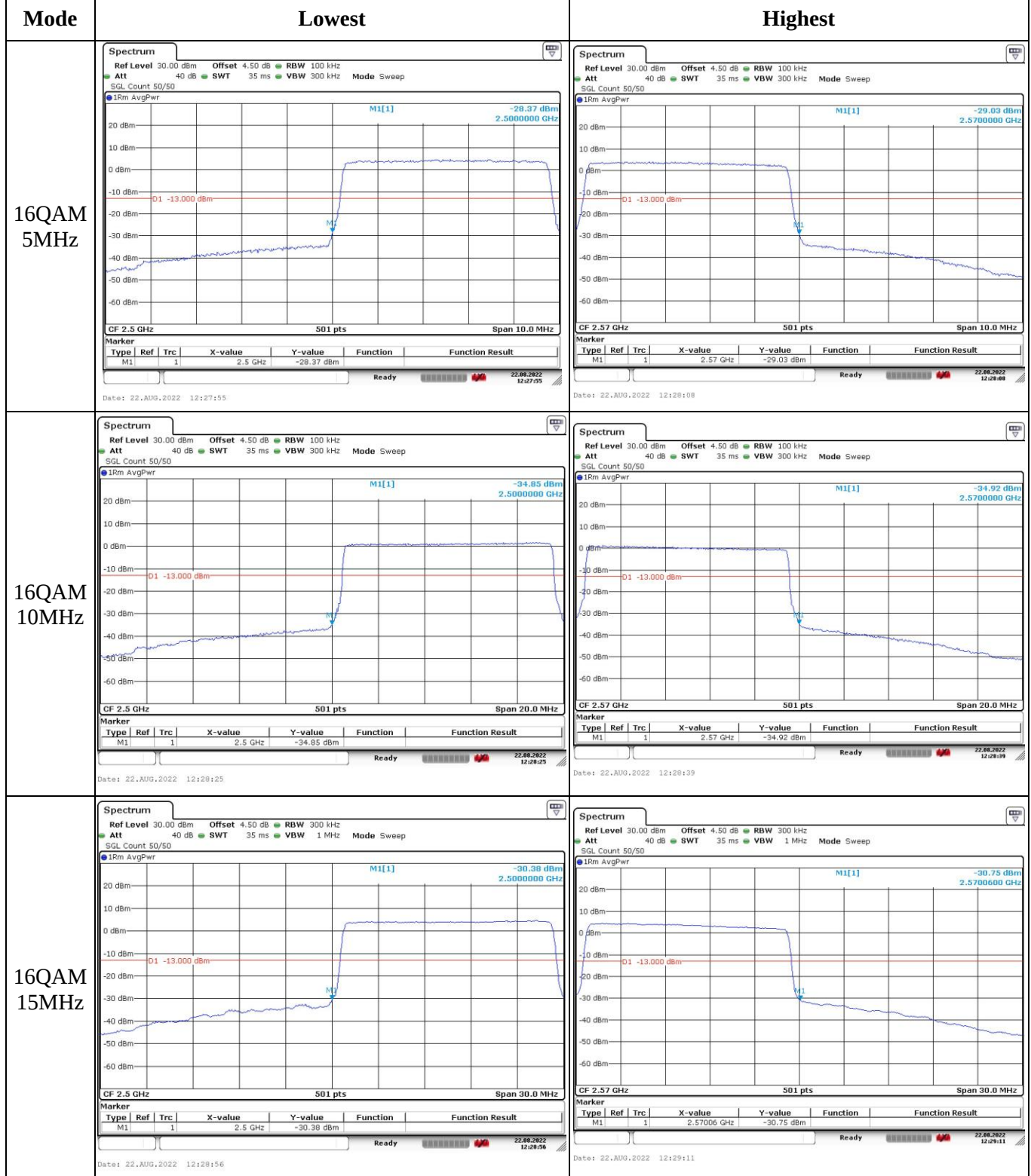
Out of band emission, Band Edge



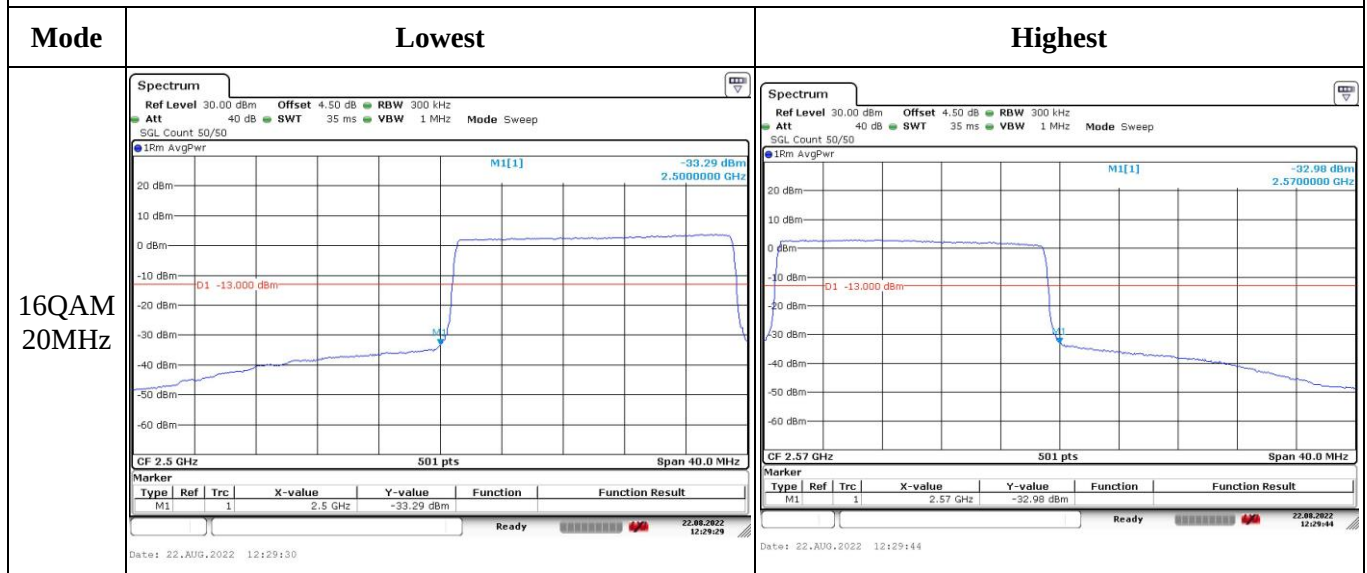
Out of band emission, Band Edge



Out of band emission, Band Edge



Out of band emission, Band Edge



4.10 Antenna Port Test Data and Results for LTE Band 66

Serial Number:	CR22080020-RF-S1	Test Date:	2022/08/22~2022/08/30
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rinka Li	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	27.8	Relative Humidity: (%)	54	ATM Pressure: (kPa)	100.3
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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	211003	Each time	N/A
Mini-Circuits	DC Block	SS402	SJ0100003	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
ZHAOXIN	DC Power Supply	RXN-6010D	21R6010D0912386	N/A	N/A
Weinschel	Power splitter	1515	RA915	2022-08-07	2023-08-06

* 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 66▲:

Antenna Gain (dBi):	1.19	Cable Loss (dB):	0.3
Operation Voltage(V _{DC}):			
Lowest:	3.5	Normal:	3.85
		Highest:	4.4

Test Frequency For Each Mode:

Operation Bandwidth	Lowest Frequency (MHz)	Middle Frequency (MHz)	Highest Frequency (MHz)
1.4MHz	1710.7	1745	1779.3
3MHz	1711.5	1745	1778.5
5MHz	1712.5	1745	1777.5
10MHz	1715	1745	1775
15MHz	1717.5	1745	1772.5
20MHz	1720	1745	1770

Test Data:**FCC §2.1046; §27.50(d)(4)****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		
1.4MHz QPSK	RB1#0	22.65	22.62	22.44	23.56	30
	RB1#3	22.62	22.61	22.41		
	RB1#5	22.64	22.67	22.4		
	RB3#0	22.53	22.54	22.56		
	RB3#3	22.54	22.52	22.49		
	RB6#0	21.52	21.55	21.56		
1.4MHz 16QAM	RB1#0	22.27	21.47	22.31	23.26	30
	RB1#3	22.37	21.31	22.29		
	RB1#5	22.08	21.33	22.31		
	RB3#0	21.84	21.4	21.66		
	RB3#3	21.87	21.36	21.67		
	RB6#0	20.87	20.84	20.74		
3MHz QPSK	RB1#0	22.53	22.8	22.5	23.69	30
	RB1#8	22.58	22.74	22.5		
	RB1#14	22.6	22.78	22.46		
	RB6#0	21.62	21.62	21.63		
	RB6#9	21.69	21.57	21.57		
	RB15#0	21.59	21.63	21.47		
3MHz 16QAM	RB1#0	22.34	21.57	21.95	23.26	30
	RB1#8	22.35	21.58	21.94		
	RB1#14	22.37	21.61	22		
	RB6#0	20.8	20.94	20.53		
	RB6#9	20.75	20.94	20.49		
	RB15#0	20.67	20.73	20.69		
5MHz QPSK	RB1#0	22.6	22.58	22.55	23.63	30
	RB1#13	22.69	22.5	22.53		
	RB1#24	22.74	22.49	22.49		
	RB15#0	21.6	21.68	21.55		
	RB15#10	21.65	21.61	21.49		
	RB25#0	21.61	21.6	21.47		
5MHz 16QAM	RB1#0	21.73	21.22	20.67	22.73	30
	RB1#13	21.8	21.32	20.66		
	RB1#24	21.84	21.36	20.64		
	RB15#0	20.58	20.71	20.72		
	RB15#10	20.55	20.8	20.63		
	RB25#0	20.63	20.57	20.73		
10MHz QPSK	RB1#0	22.65	22.64	22.4	23.6	30
	RB1#25	22.67	22.61	22.42		

	RB1#49	22.71	22.68	22.44		
	RB25#0	21.51	21.52	21.61		
	RB25#25	21.56	21.64	21.53		
	RB50#0	21.58	21.48	21.56		
10MHz 16QAM	RB1#0	21.67	22.01	21.85	22.91	30
	RB1#25	21.77	22.02	21.84		
	RB1#49	21.8	22.02	21.81		
	RB25#0	20.8	20.72	20.8		
	RB25#25	20.78	20.69	20.74		
	RB50#0	20.7	20.69	20.77		
15MHz QPSK	RB1#0	22.65	22.64	22.4	23.6	30
	RB1#38	22.67	22.61	22.42		
	RB1#74	22.71	22.68	22.44		
	RB36#0	21.51	21.52	21.61		
	RB36#39	21.56	21.64	21.53		
	RB75#0	21.58	21.48	21.56		
15MHz 16QAM	RB1#0	21.67	22.01	21.85	22.91	30
	RB1#38	21.77	22.02	21.84		
	RB1#74	21.8	22.02	21.81		
	RB36#0	20.8	20.72	20.8		
	RB36#39	20.78	20.69	20.74		
	RB75#0	20.7	20.69	20.77		
20MHz QPSK	RB1#0	22.66	22.63	22.6	23.55	30
	RB1#50	22.61	22.66	22.55		
	RB1#99	22.66	22.65	22.56		
	RB50#0	21.52	21.64	21.58		
	RB50#50	21.57	21.57	21.49		
	RB100#0	21.5	21.54	21.66		
20MHz 16QAM	RB1#0	21.63	22.35	21.75	23.24	30
	RB1#50	21.58	22.35	21.77		
	RB1#99	21.65	22.27	21.68		
	RB50#0	20.72	20.63	20.68		
	RB50#50	20.68	20.66	20.71		
	RB100#0	20.59	20.71	20.65		
Note: EIRP=Conducted Power(dBm) - Cable loss(dB) + Antenna Gain(dBi) Cable loss is the loss of RF cable form test point to the EUT transmission antenna					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	5.36	4.29	4.78	13
	RB100#0	5.42	5.16	4.93	13
20MHz 16QAM	RB1#0	6.38	5.45	5.8	13
	RB100#0	6.46	6.12	5.8	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	1.102	1.102	1.096	1.26	1.26	1.254
1.4MHz 16QAM	1.096	1.102	1.108	1.254	1.254	1.266
3MHz QPSK	2.695	2.695	2.695	3.012	3.012	2.988
3MHz 16QAM	2.695	2.695	2.695	3.012	3.024	3.012
5MHz QPSK	4.511	4.511	4.511	5.02	5	5
5MHz 16QAM	4.531	4.531	4.511	5.02	5	5
10MHz QPSK	8.942	8.942	8.942	9.8	9.8	9.76
10MHz 16QAM	8.982	8.942	8.942	9.84	9.88	9.72
15MHz QPSK	13.533	13.533	13.533	15	15.12	15
15MHz 16QAM	13.533	13.533	13.473	15.12	15.06	14.94
20MHz QPSK	17.964	18.044	17.964	19.44	19.84	19.52
20MHz 16QAM	17.964	17.964	17.964	19.76	19.76	19.68
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.

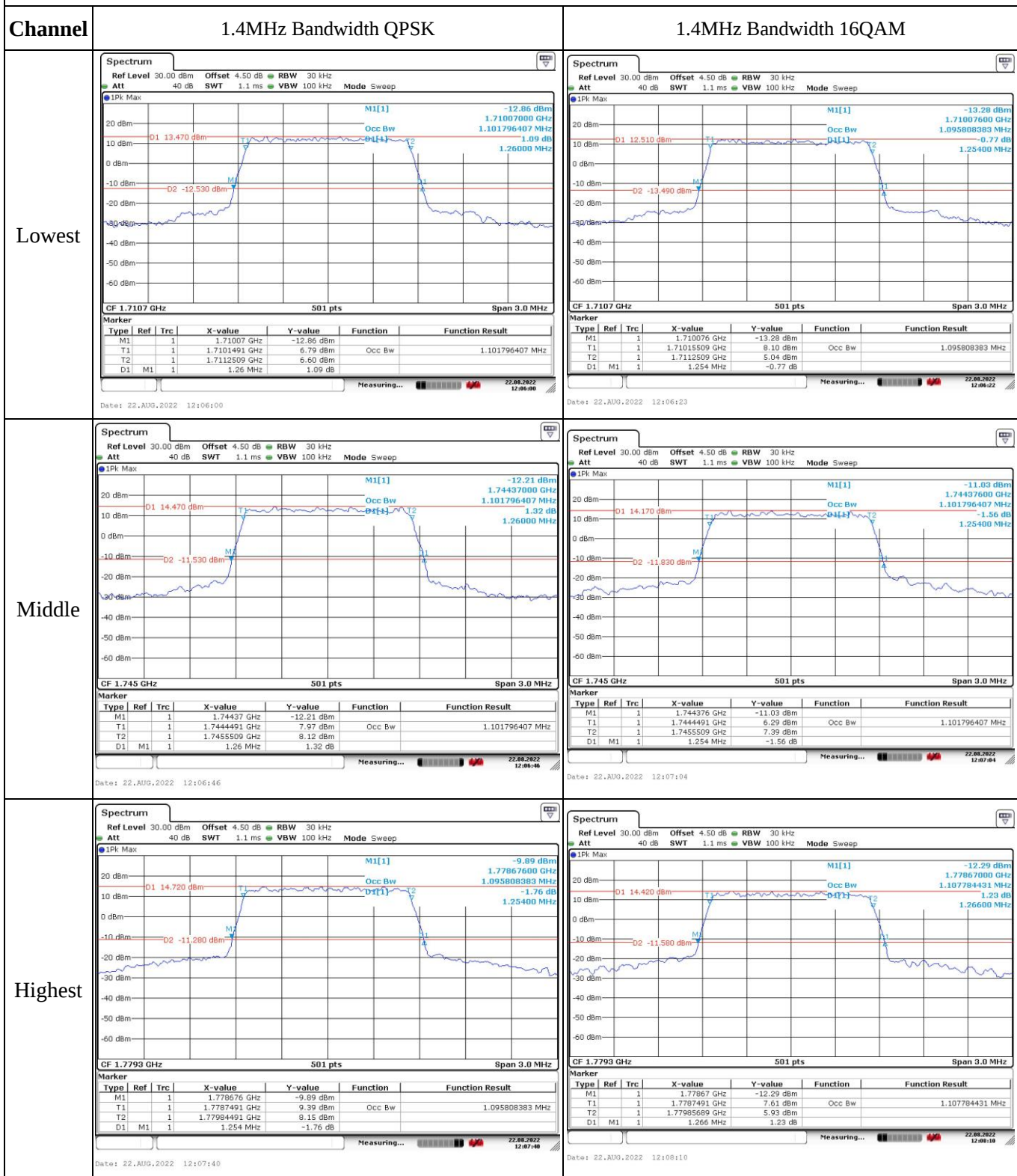
FCC §2.1055, §27.54: Frequency Stability

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	1710.773	1710.00	1779.372	1780
	-20	3.85	1710.748	1710.00	1779.324	1780
	-10	3.85	1710.730	1710.00	1779.320	1780
	0	3.85	1710.797	1710.00	1779.391	1780
	10	3.85	1710.759	1710.00	1779.354	1780
	20	3.85	1710.738	1710.00	1779.322	1780
	30	3.85	1710.709	1710.00	1779.309	1780
	40	3.85	1710.799	1710.00	1779.380	1780
	50	3.85	1710.779	1710.00	1779.371	1780
Frequency Stability vs. Voltage	20	3.5	1710.772	1710.00	1779.369	1780
	20	4.4	1710.766	1710.00	1779.331	1780
					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	1710.758	1710.00	1779.331	1780
	-20	3.85	1710.757	1710.00	1779.301	1780
	-10	3.85	1710.731	1710.00	1779.376	1780
	0	3.85	1710.798	1710.00	1779.368	1780
	10	3.85	1710.794	1710.00	1779.332	1780
	20	3.85	1710.758	1710.00	1779.322	1780
	30	3.85	1710.751	1710.00	1779.398	1780
	40	3.85	1710.711	1710.00	1779.392	1780
	50	3.85	1710.703	1710.00	1779.362	1780
Frequency Stability vs. Voltage	20	3.5	1710.703	1710.00	1779.351	1780
	20	4.4	1710.788	1710.00	1779.322	1780
					Result:	Pass

Test Plots:

Occupied Bandwidth



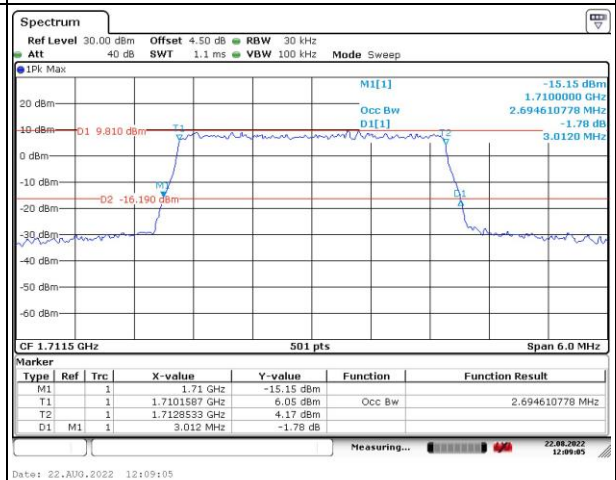
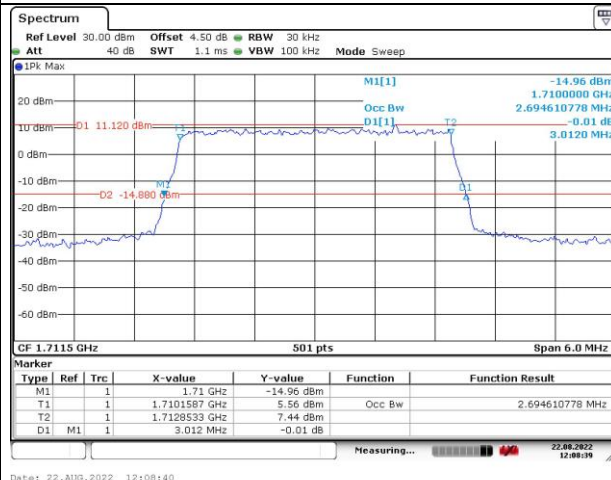
Occupied Bandwidth

Channel

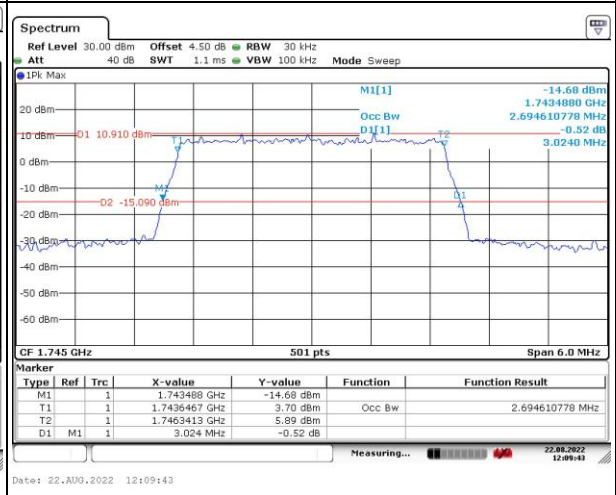
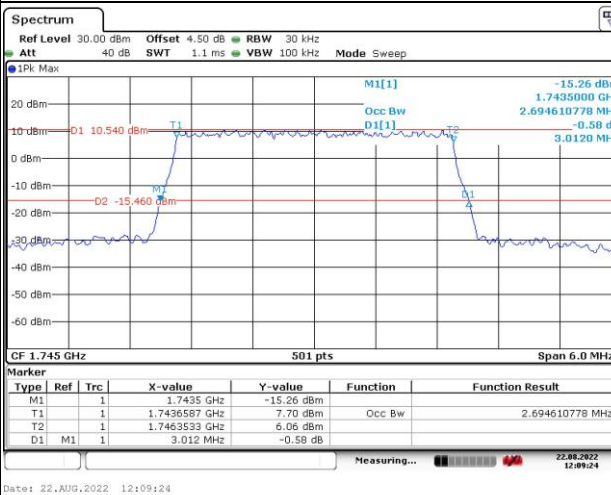
3MHz Bandwidth QPSK

3MHz Bandwidth 16QAM

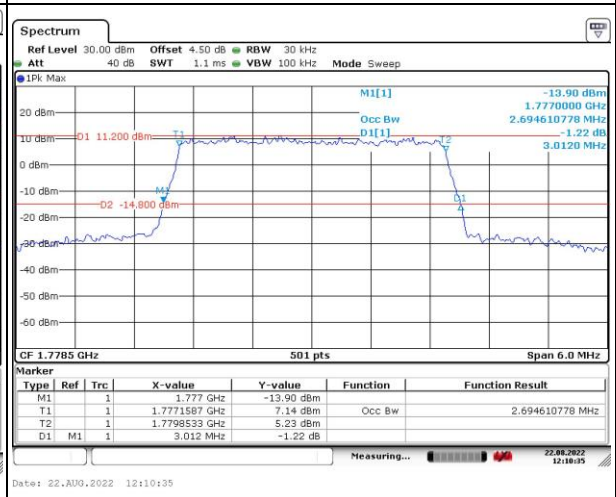
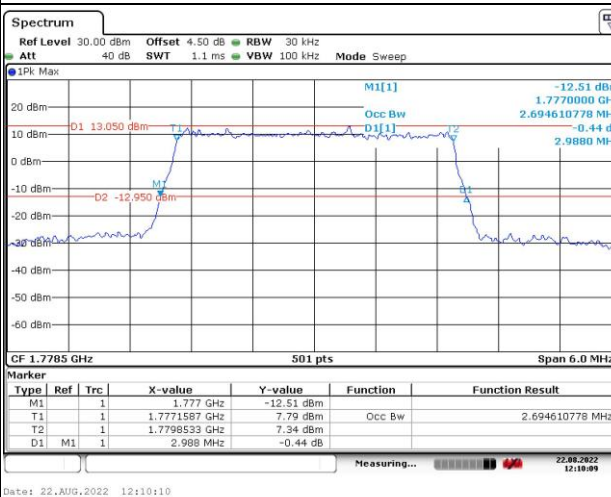
Lowest



Middle



Highest



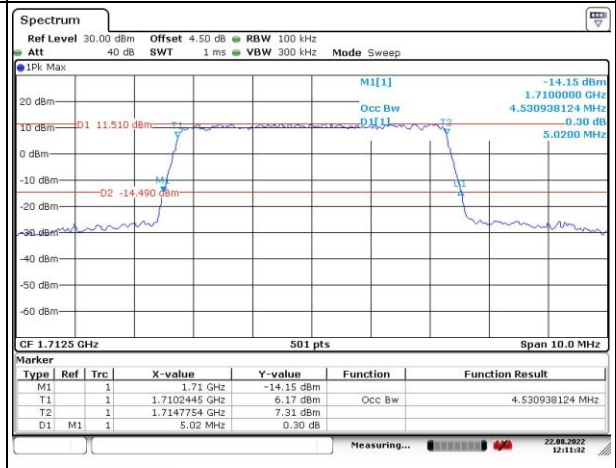
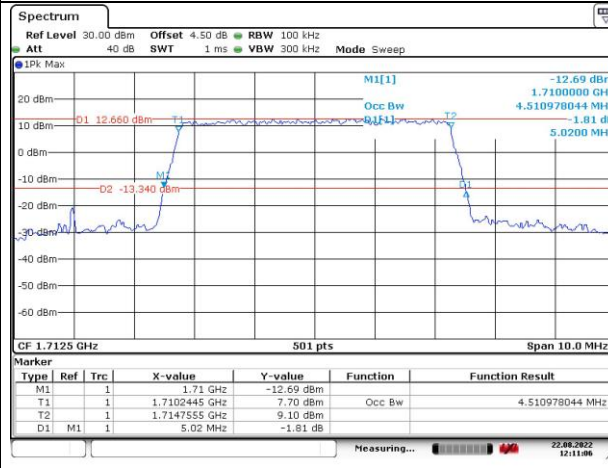
Occupied Bandwidth

Channel

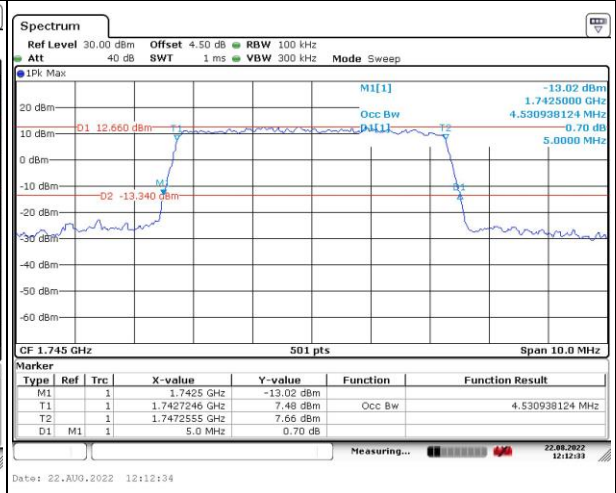
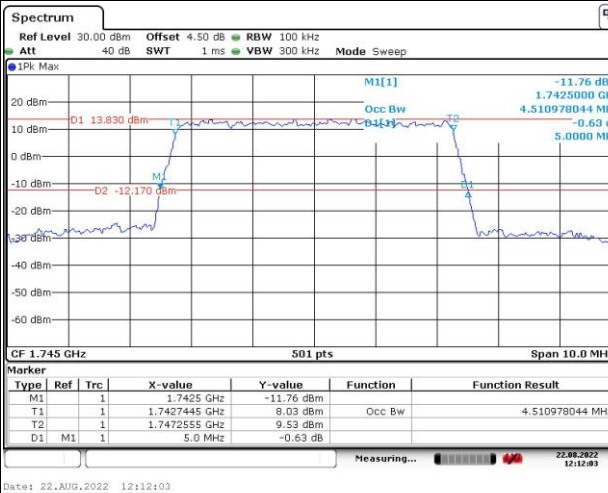
5MHz Bandwidth QPSK

5MHz Bandwidth 16QAM

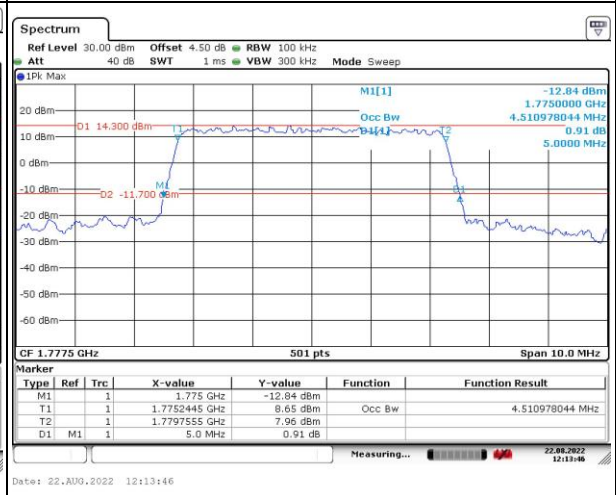
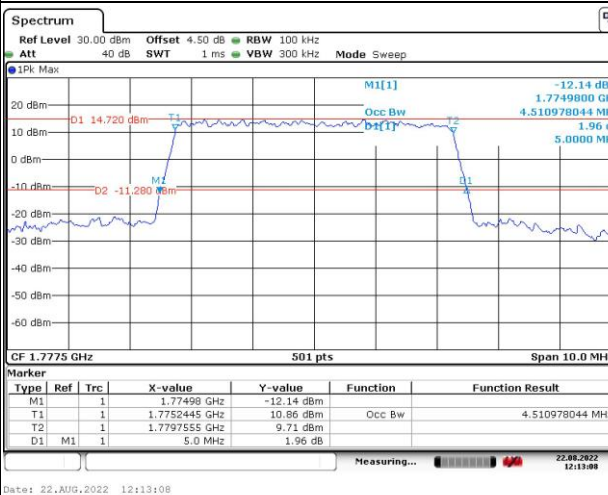
Lowest



Middle



Highest



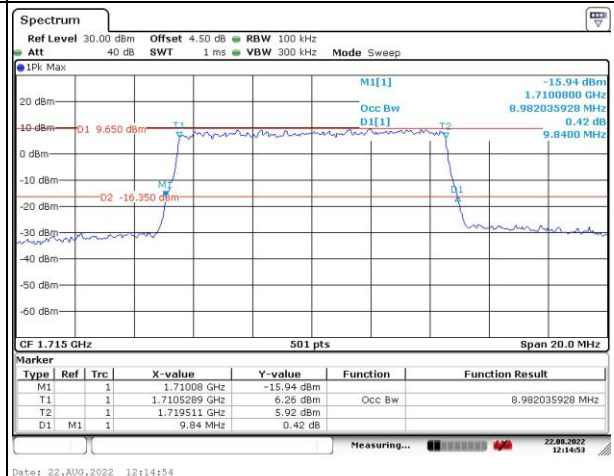
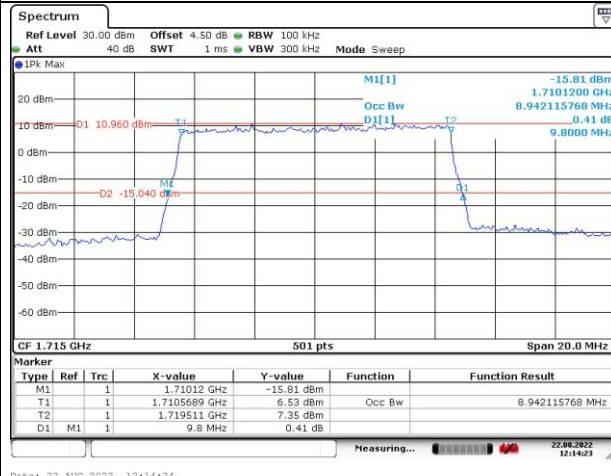
Occupied Bandwidth

Channel

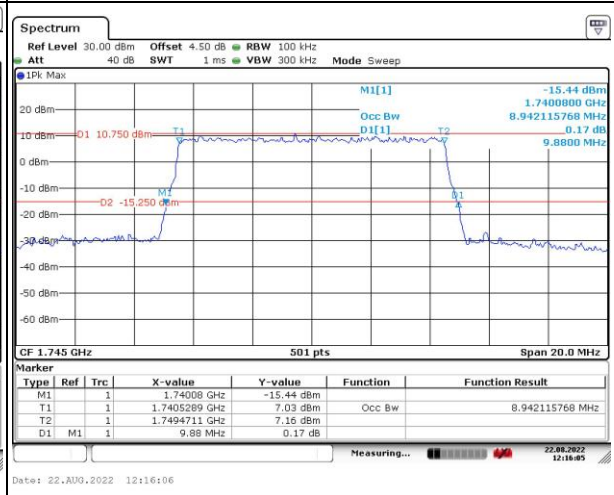
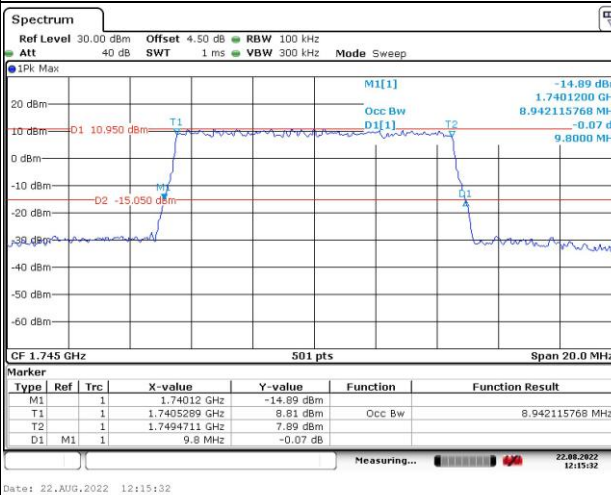
10MHz Bandwidth QPSK

10MHz Bandwidth 16QAM

Lowest



Middle



Highest

