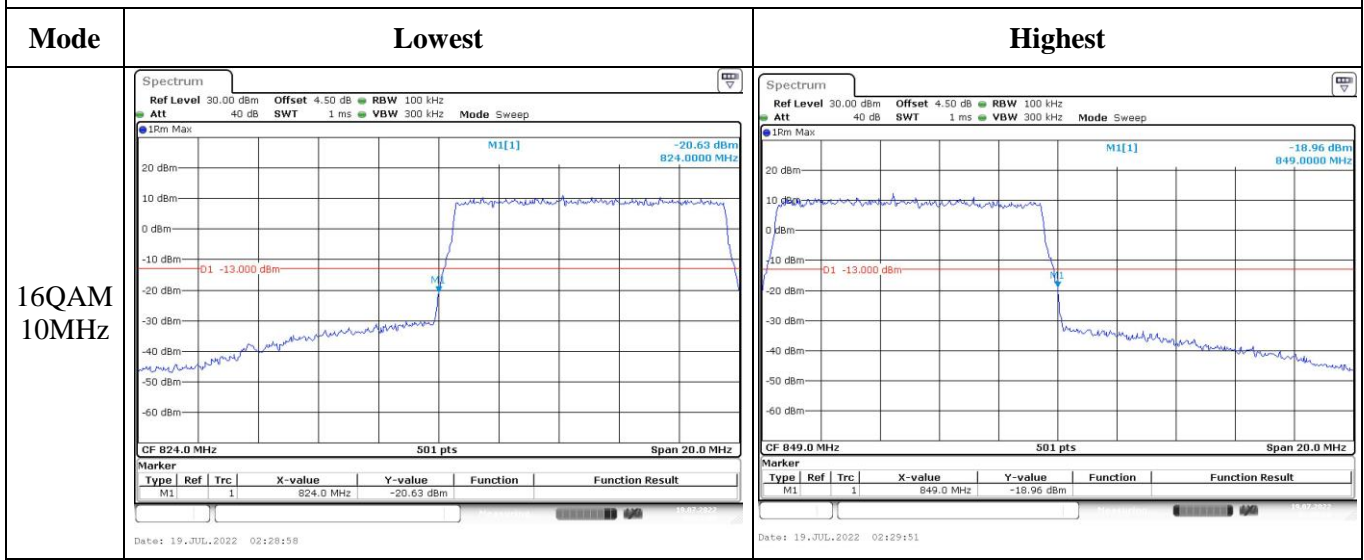


Out of band emission, Band Edge



4.9 Antenna Port Test Data and Results for LTE Band 12

Serial Number:	CR22060051-RF-S1	Test Date:	2022/07/19
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rinka Li	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	27.4	Relative Humidity: (%)	45	ATM Pressure: (kPa)	100.5
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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	2021-07-15	2022-07-14
R&S	Spectrum Analyzer	FSV40	101474	2022-07-15	2023-07-14
zhuoxiang	Coaxial Cable	SMA-178	211002	Each time	N/A
Weinschel	Coaxial Attenuators	53-20-34	LN751	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	149218	2021-07-22	2023-07-21
UNI-T	Multimeter	UT39A+	C210582554	2021-09-30	2022-09-29
E-Microwave	Two-way Splitter	ODP-1-6	OE0120176	Each time	N/A
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2022-04-06	2023-04-05

* 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 (dBi):	-1.98	Antenna Gain (dBd):	-4.13	Cable Loss (dB):	0
Operation Voltage(V _{dc}):					
Lowest:	3.5	Normal:	3.8	Highest:	4.35

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	22.38	21.83	22.39	18.42	34.77
	RB1#3	22.36	22.05	22.54		
	RB1#5	22.25	21.97	22.55		
	RB3#0	22.43	22.07	22.44		
	RB3#3	22.36	22.04	22.45		
	RB6#0	21.68	20.82	21.49		
1.4MHz 16QAM	RB1#0	22.31	20.45	21.98	18.2	34.77
	RB1#3	22.27	20.43	21.58		
	RB1#5	22.33	20.54	21.53		
	RB3#0	21.53	21.11	21.61		
	RB3#3	21.58	20.98	21.24		
	RB6#0	20.77	20.14	20.94		
3MHz QPSK	RB1#0	22.34	21.8	22.3	18.41	34.77
	RB1#8	22.39	22.02	22.38		
	RB1#14	22.14	22.05	22.54		
	RB6#0	21.68	20.84	21.74		
	RB6#9	21.26	20.78	21.41		
	RB15#0	21.56	20.89	21.79		
3MHz 16QAM	RB1#0	22.33	20.37	21.98	18.26	34.77
	RB1#8	22.39	20.41	22.03		
	RB1#14	21.69	20.43	21.6		
	RB6#0	20.79	20.55	20.77		
	RB6#9	20.13	20.18	20.89		
	RB15#0	20.79	19.97	20.84		
5MHz QPSK	RB1#0	22.3	21.85	22.34	18.34	34.77
	RB1#13	22.15	21.89	22.27		
	RB1#24	22.09	22.08	22.47		
	RB15#0	21.69	20.81	21.3		
	RB15#10	21.12	20.79	21.85		
	RB25#0	21.12	20.83	21.83		
5MHz 16QAM	RB1#0	21.77	20.35	20.46	17.64	34.77
	RB1#13	21.1	20.38	20.93		
	RB1#24	21.1	20.69	20.6		
	RB15#0	20.59	20.43	20.65		
	RB15#10	20	20	20.91		
	RB25#0	20.1	19.92	20.92		

10MHz QPSK	RB1#0	22.27	22.19	21.77	18.38	34.77
	RB1#25	22.03	22.13	22.03		
	RB1#49	21.93	22.51	22.43		
	RB25#0	21.11	20.8	20.74		
	RB25#25	20.82	21.23	21.82		
	RB50#0	21.16	20.79	21.2		
10MHz 16QAM	RB1#0	21.84	20.51	20.86	17.71	34.77
	RB1#25	21.15	20.41	21.21		
	RB1#49	21.07	20.82	21.41		
	RB25#0	20.12	20.47	19.93		
	RB25#25	20.4	20.63	20.8		
	RB50#0	20.58	20.02	20.6		
Note: ERP=Conducted Power(dBm) - Cable loss(dB) + Antenna Gain(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	4.61	5.16	5.77	13
	RB50#0	5.28	5.1	5.04	13
10MHz 16QAM	RB1#0	5.28	6.14	6.38	13
	RB50#0	6.29	6.12	5.91	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	1.102	1.26	1.254	1.254
1.4MHz 16QAM	1.09	1.102	1.108	1.248	1.254	1.266
3MHz QPSK	2.695	2.695	2.695	3	3.012	3
3MHz 16QAM	2.683	2.695	2.695	3	3.024	3.012
5MHz QPSK	4.511	4.491	4.511	5	4.98	5
5MHz 16QAM	4.551	4.531	4.531	5	5	5
10MHz QPSK	8.981	8.942	8.942	9.76	9.72	9.76
10MHz 16QAM	8.981	8.942	8.942	9.8	9.8	9.76
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.

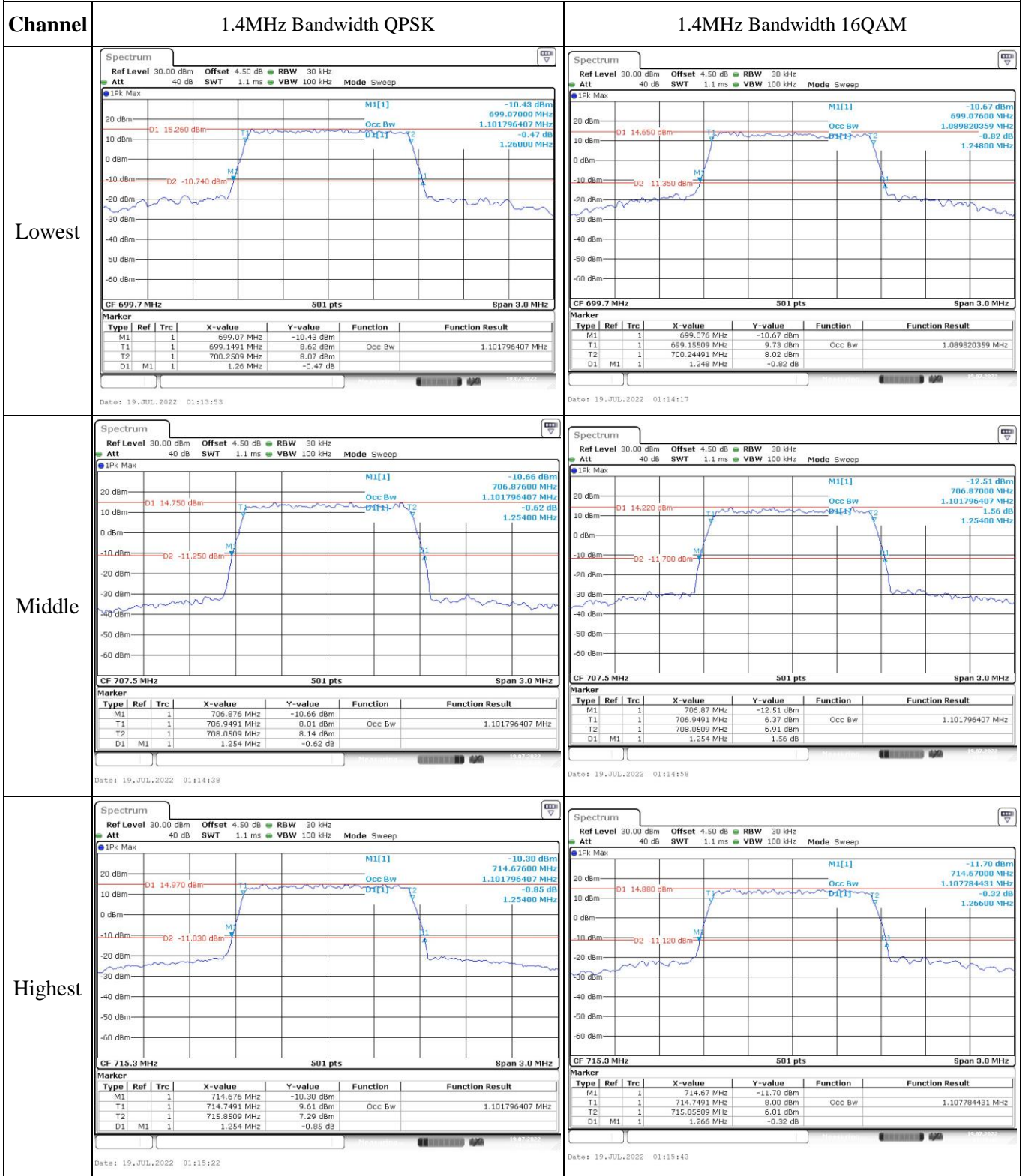
FCC §2.1051, §27.53:Out of band emission, Band Edge	
Result:	Pass, Please refer to the test plots of Out of band emission, Band Edge.

FCC §2.1055, §27.54: Frequency Stability						
Test Mode:	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	699.535	699.00	715.482	716.00
	-20	3.8	699.533	699.00	715.480	716.00
	-10	3.8	699.533	699.00	715.477	716.00
	0	3.8	699.530	699.00	715.476	716.00
	10	3.8	699.530	699.00	715.474	716.00
	20	3.8	699.529	699.00	715.471	716.00
	30	3.8	699.528	699.00	715.469	716.00
	40	3.8	699.527	699.00	715.468	716.00
Frequency Stability vs. Voltage	20	3.5	699.525	699.00	715.466	716.00
	20	4.35	699.523	699.00	715.465	716.00
					Result:	Pass

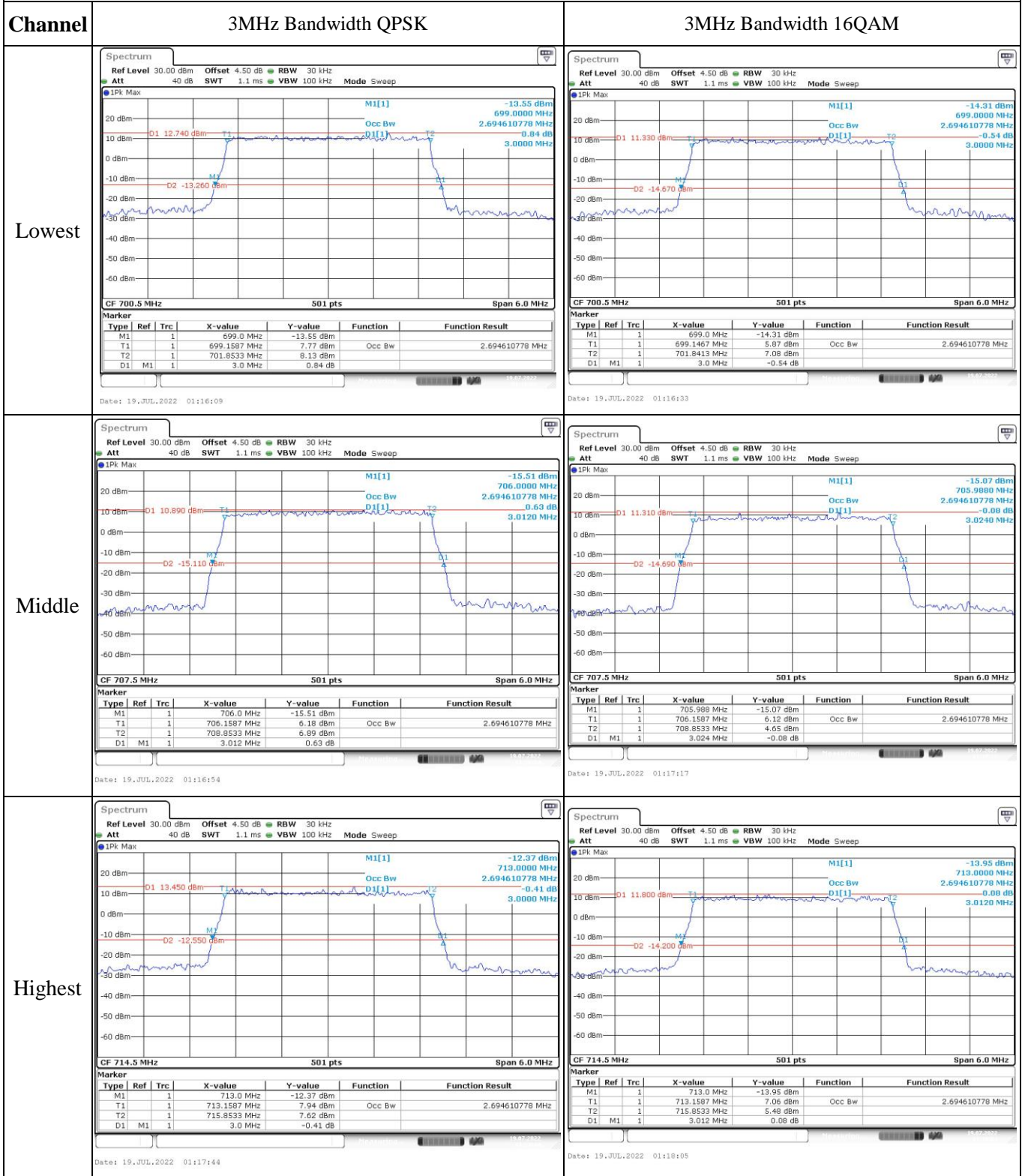
Test Mode:	10M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	699.540	699.00	715.484	716.00
	-20	3.8	699.539	699.00	715.482	716.00
	-10	3.8	699.536	699.00	715.479	716.00
	0	3.8	699.534	699.00	715.477	716.00
	10	3.8	699.532	699.00	715.473	716.00
	20	3.8	699.529	699.00	715.471	716.00
	30	3.8	699.529	699.00	715.470	716.00
	40	3.8	699.528	699.00	715.470	716.00
Frequency Stability vs. Voltage	20	3.5	699.527	699.00	715.467	716.00
	20	4.35	699.526	699.00	715.466	716.00
					Result:	Pass

Test Plots:

Occupied Bandwidth



Occupied Bandwidth



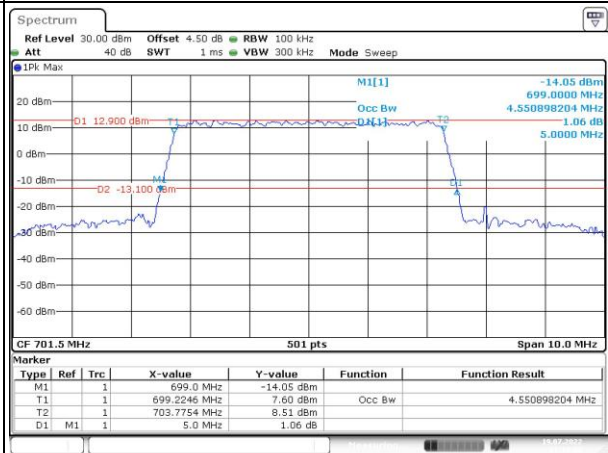
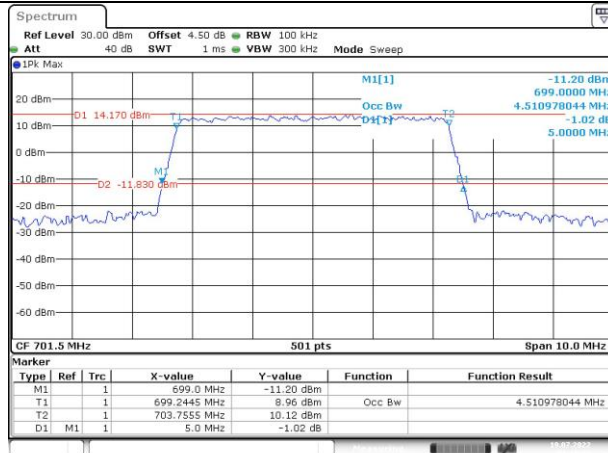
Occupied Bandwidth

Channel

5MHz Bandwidth QPSK

5MHz Bandwidth 16QAM

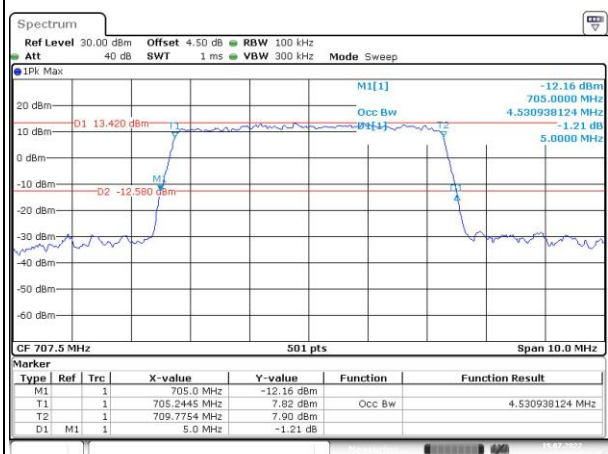
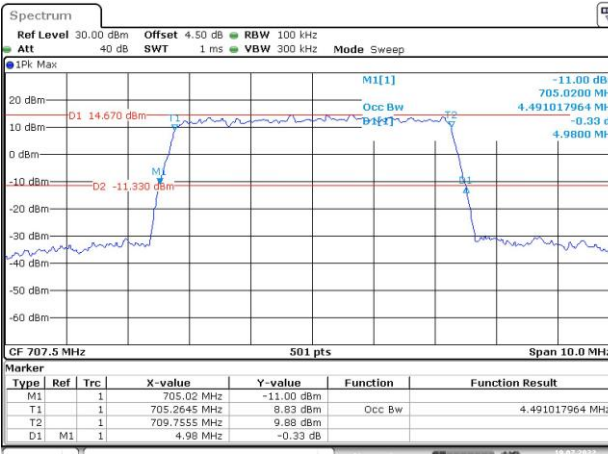
Lowest



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Date: 19_JUL_2022 01:19:08

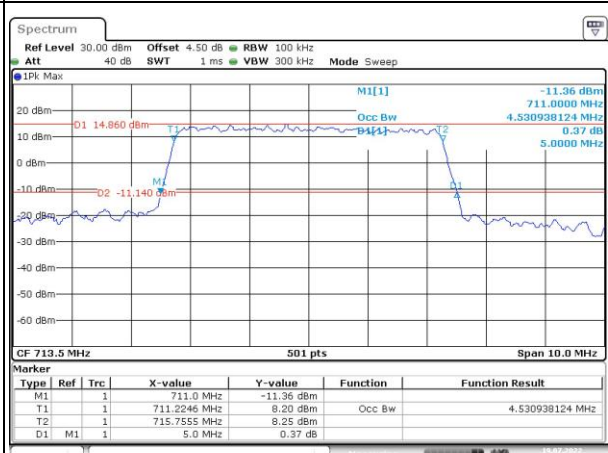
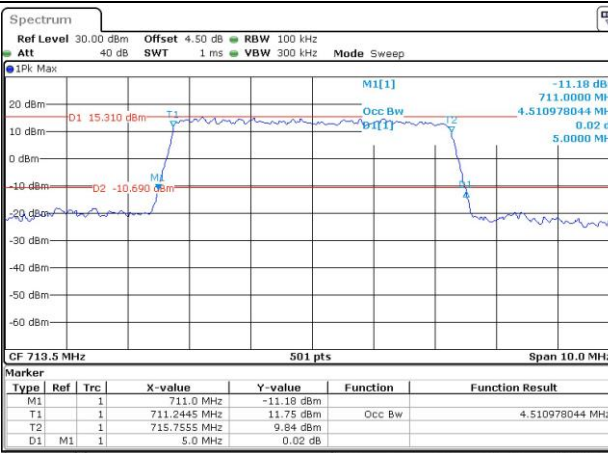
Middle



Date: 19_JUL_2022 01:19:42

Date: 19_JUL_2022 01:20:15

Highest



Date: 19_JUL_2022 01:20:39

Date: 19_JUL_2022 01:21:09

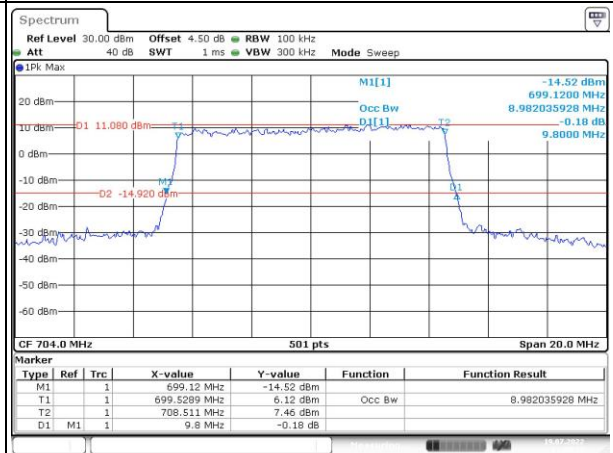
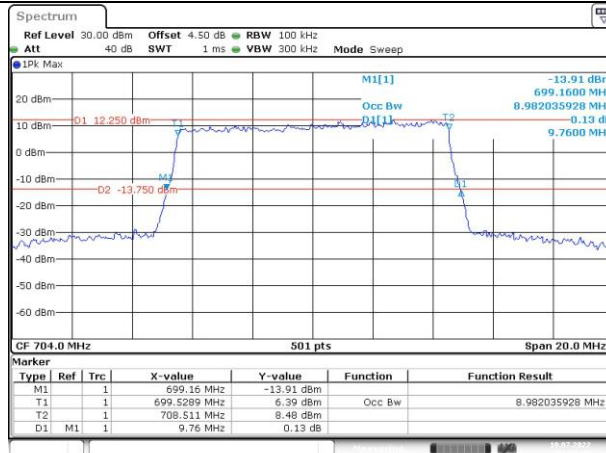
Occupied Bandwidth

Channel

10MHz Bandwidth QPSK

10MHz Bandwidth 16QAM

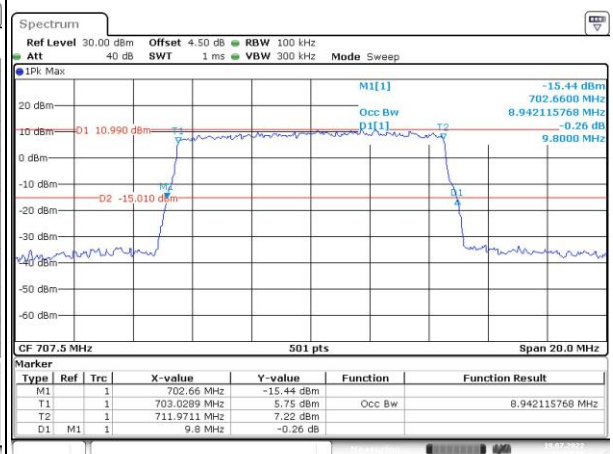
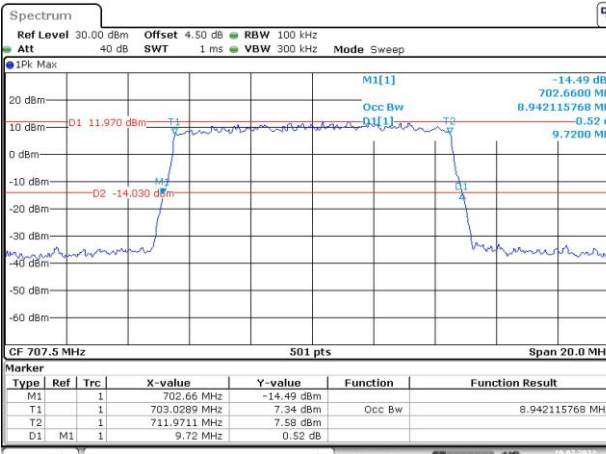
Lowest



Date: 19_JUL_2022 01:21:43

Date: 19_JUL_2022 01:22:13

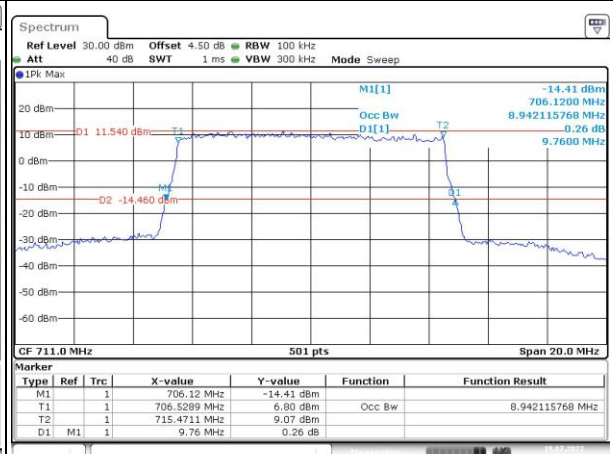
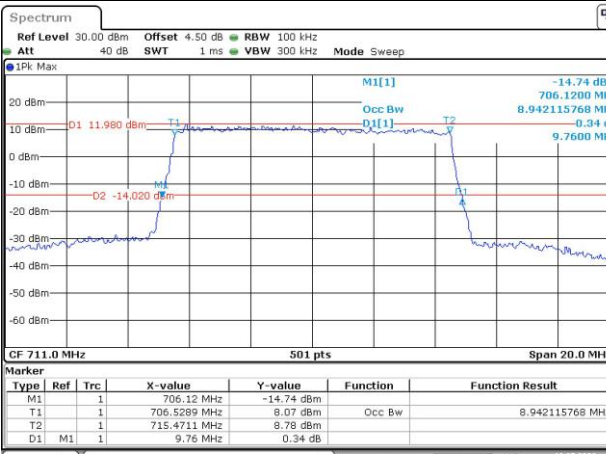
Middle



Date: 19_JUL_2022 01:22:48

Date: 19_JUL_2022 01:23:18

Highest



Date: 19_JUL_2022 01:23:49

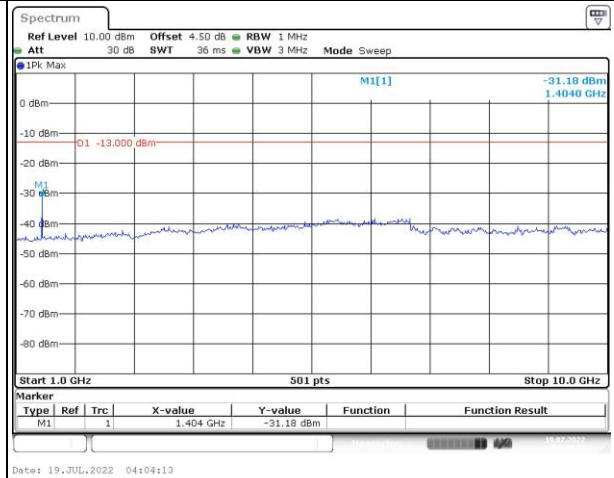
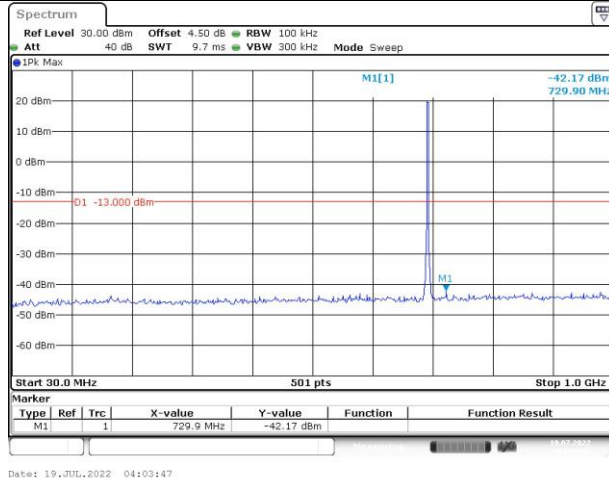
Date: 19_JUL_2022 01:24:23

Spurious Emissions at Antenna Terminal

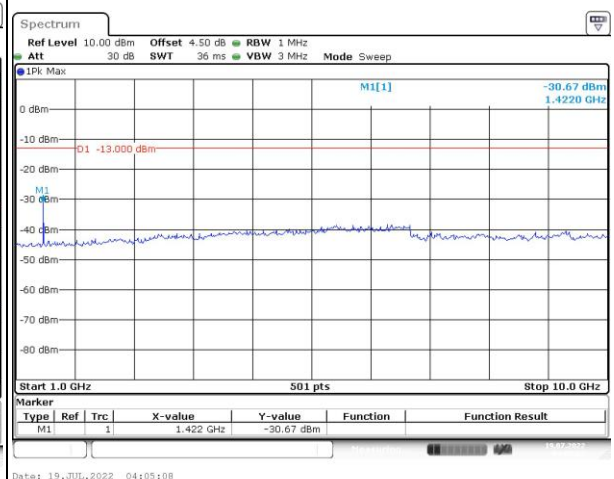
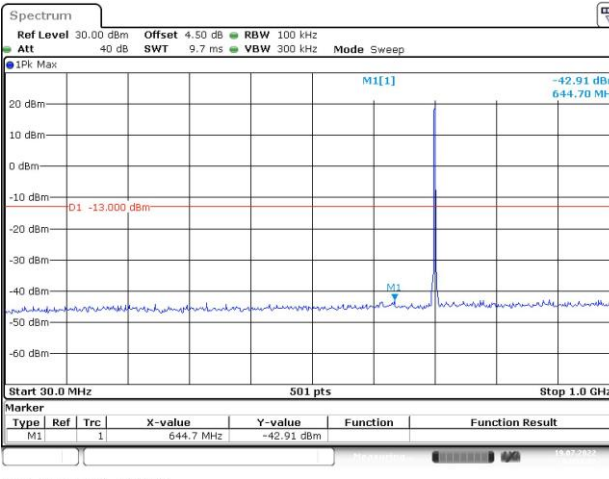
Channel

1.4MHz Bandwidth QPSK

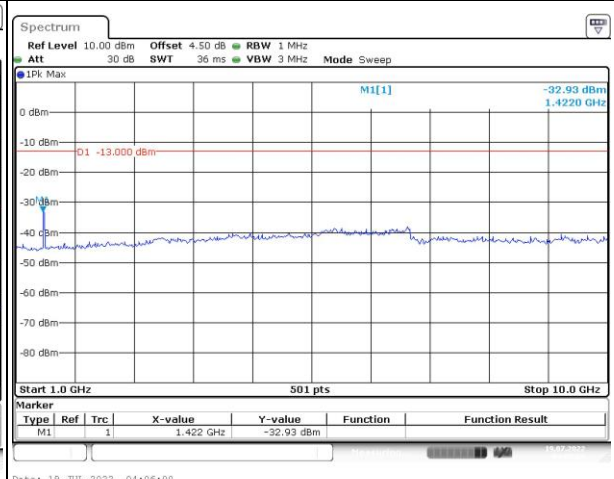
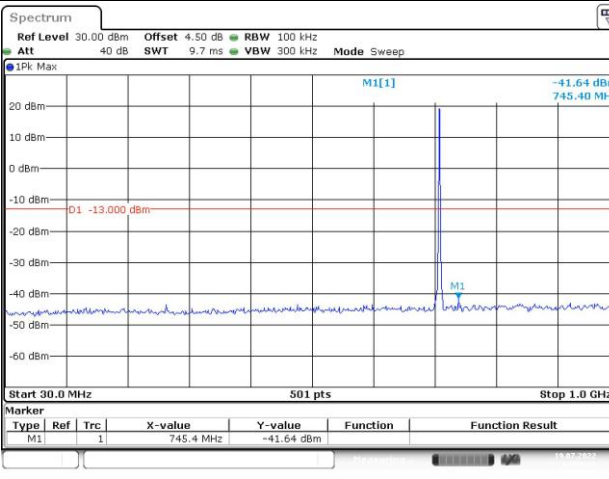
Lowest



Middle



Highest

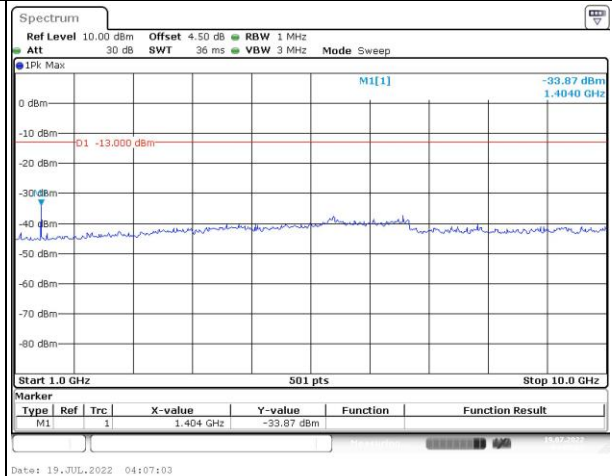
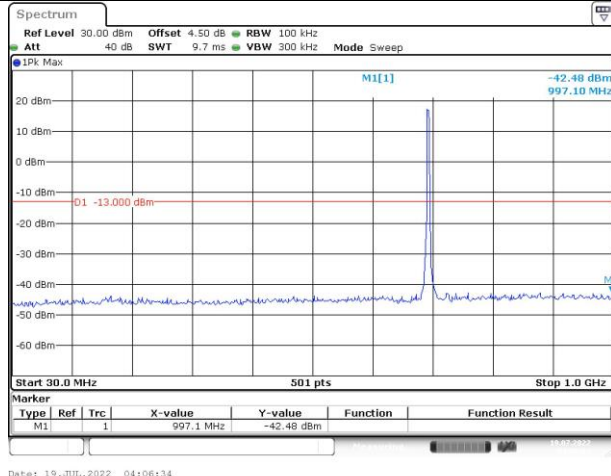


Spurious Emissions at Antenna Terminal

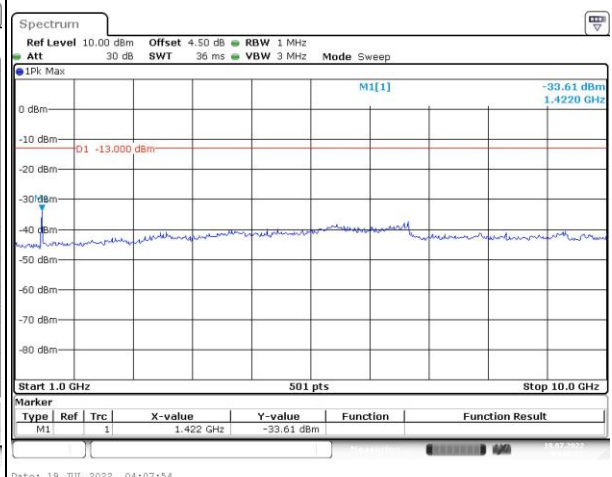
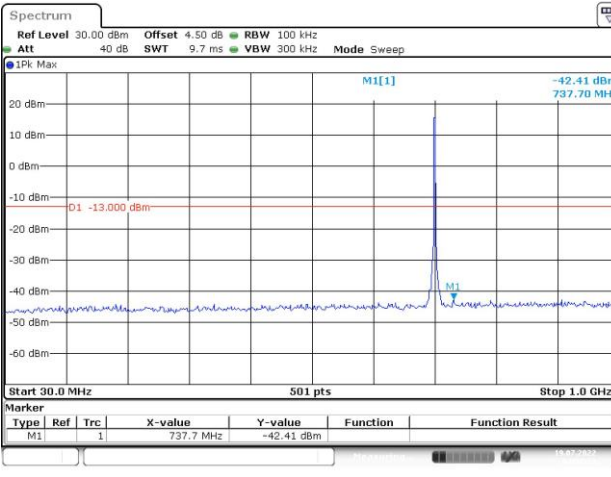
Channel

3MHz Bandwidth QPSK

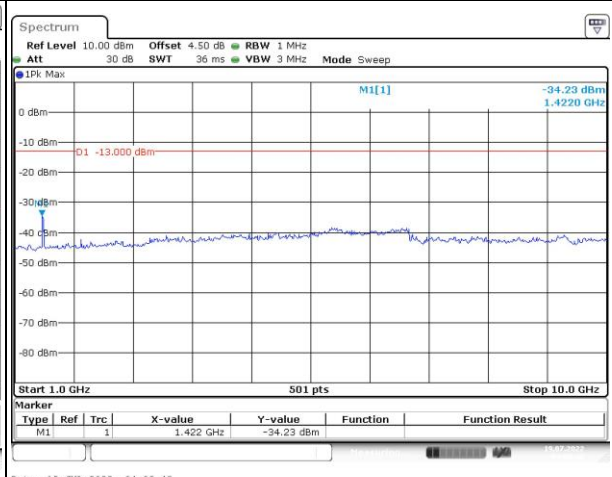
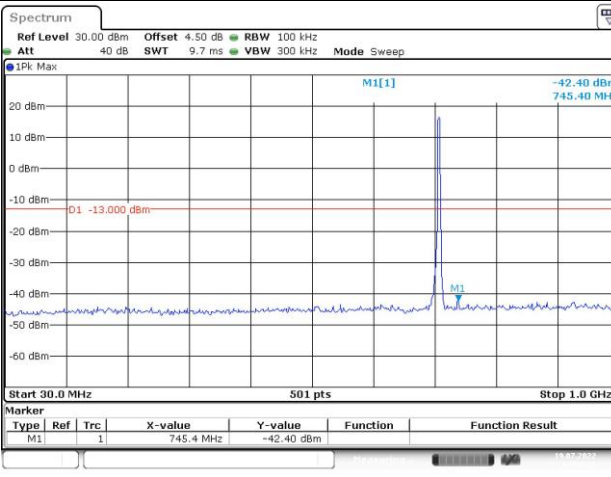
Lowest



Middle



Highest

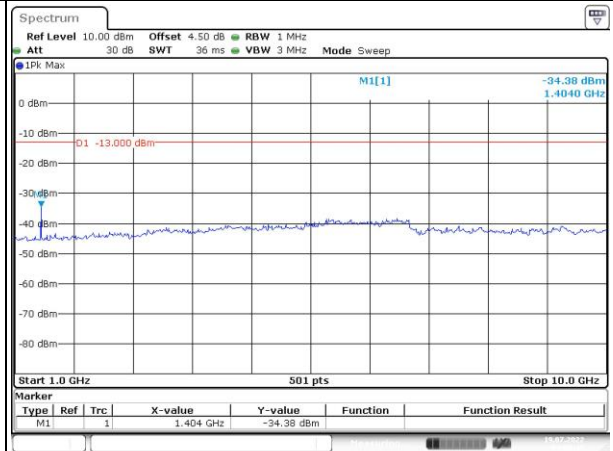
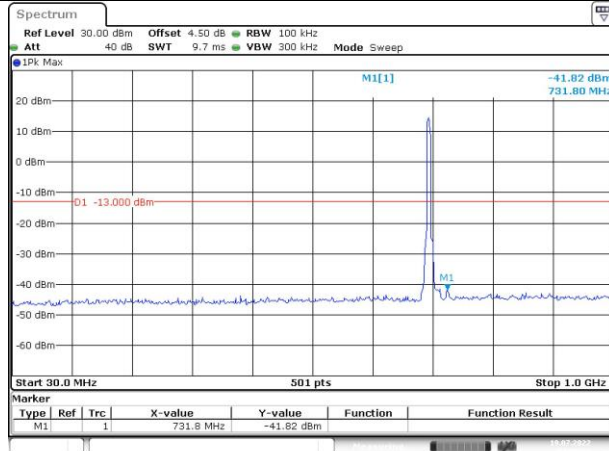


Spurious Emissions at Antenna Terminal

Channel

5MHz Bandwidth QPSK

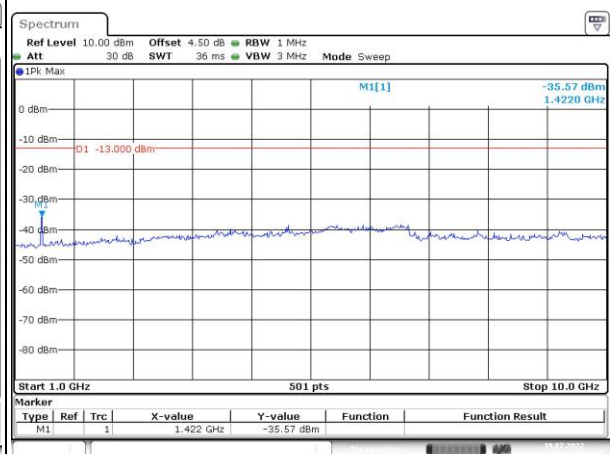
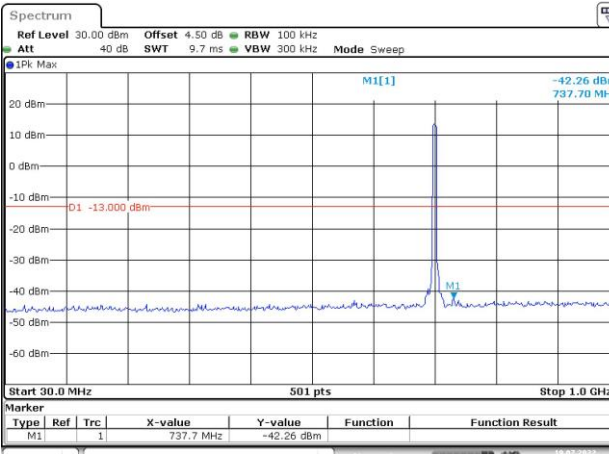
Lowest



Date: 19_JUL_2022 04:09:23

Date: 19_JUL_2022 04:09:45

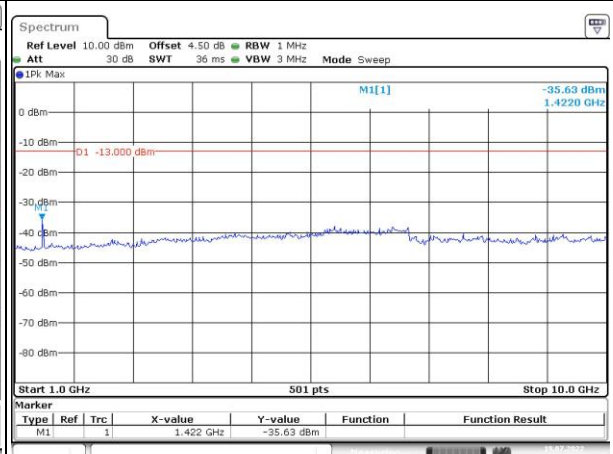
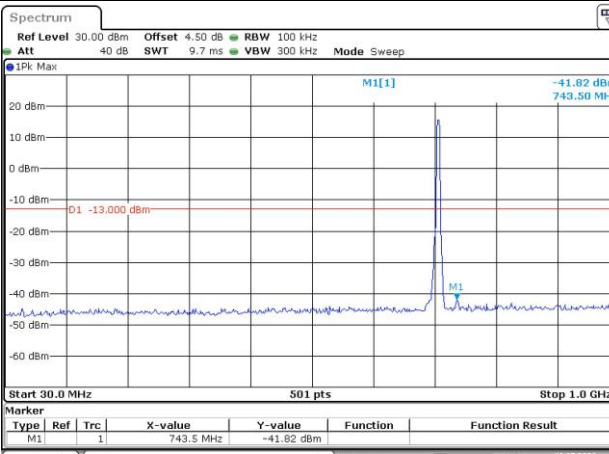
Middle



Date: 19_JUL_2022 04:10:20

Date: 19_JUL_2022 04:10:43

Highest



Date: 19_JUL_2022 04:11:05

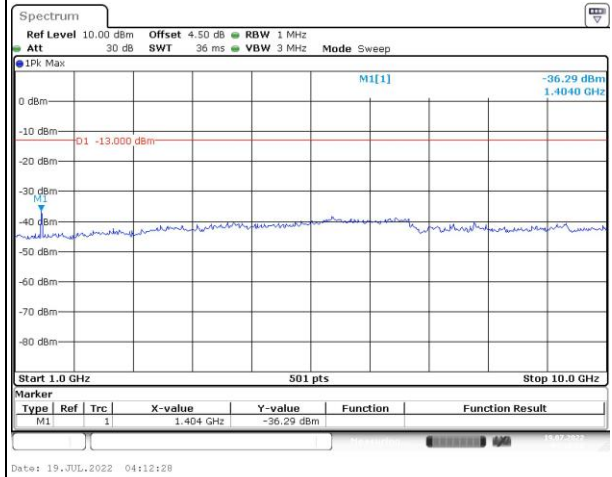
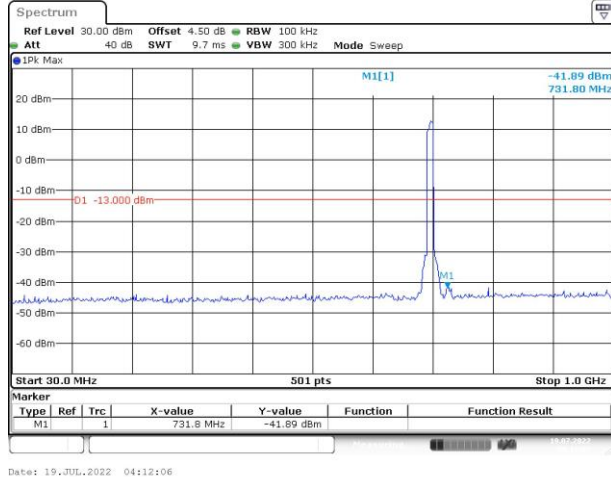
Date: 19_JUL_2022 04:11:28

Spurious Emissions at Antenna Terminal

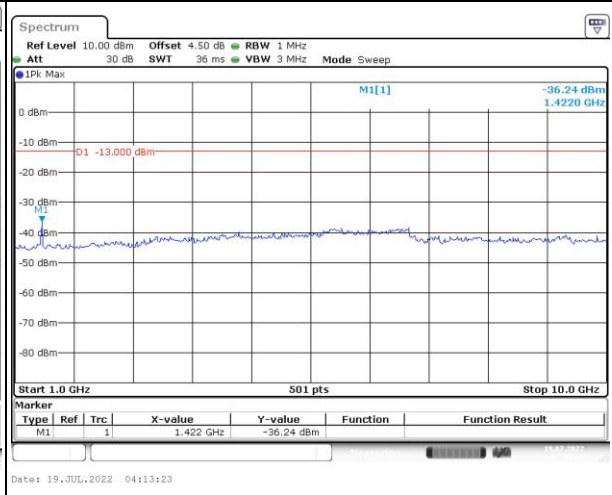
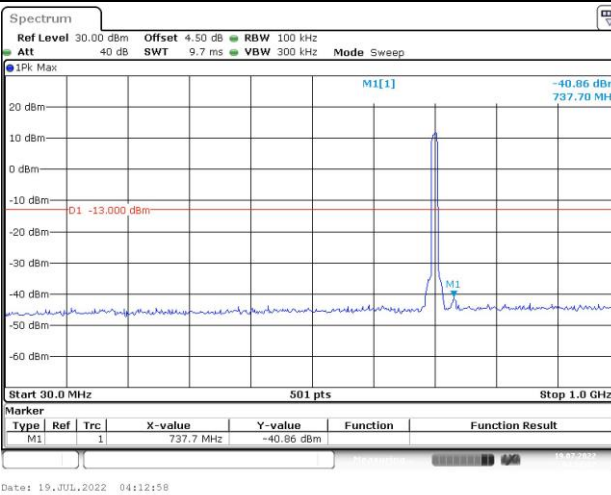
Channel

10MHz Bandwidth QPSK

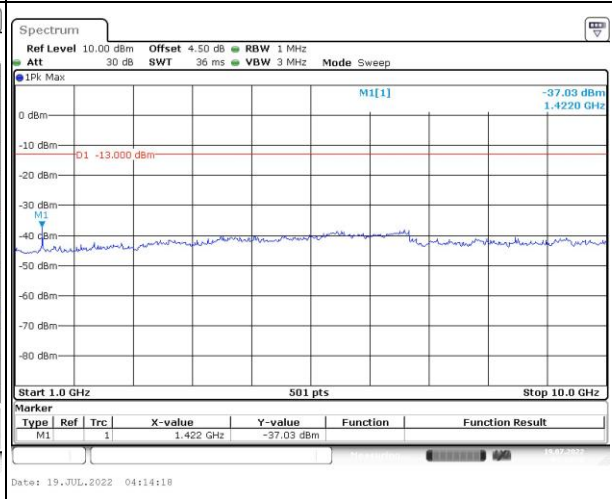
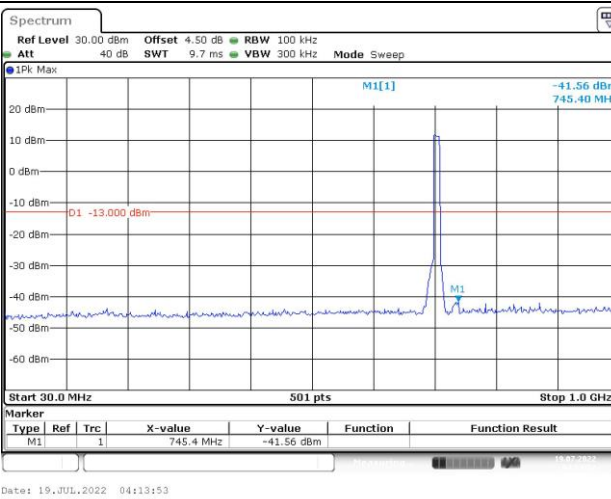
Lowest



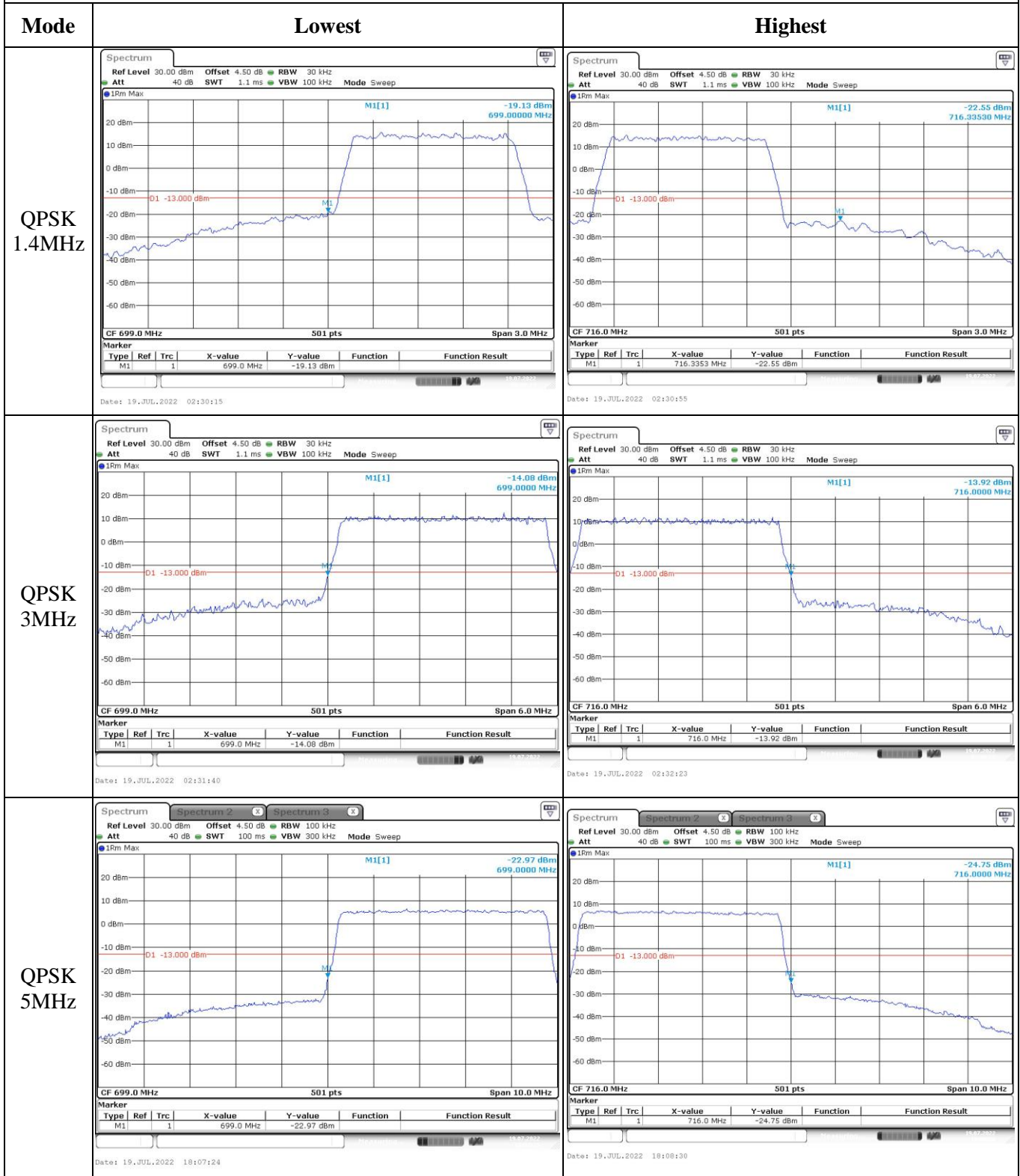
Middle



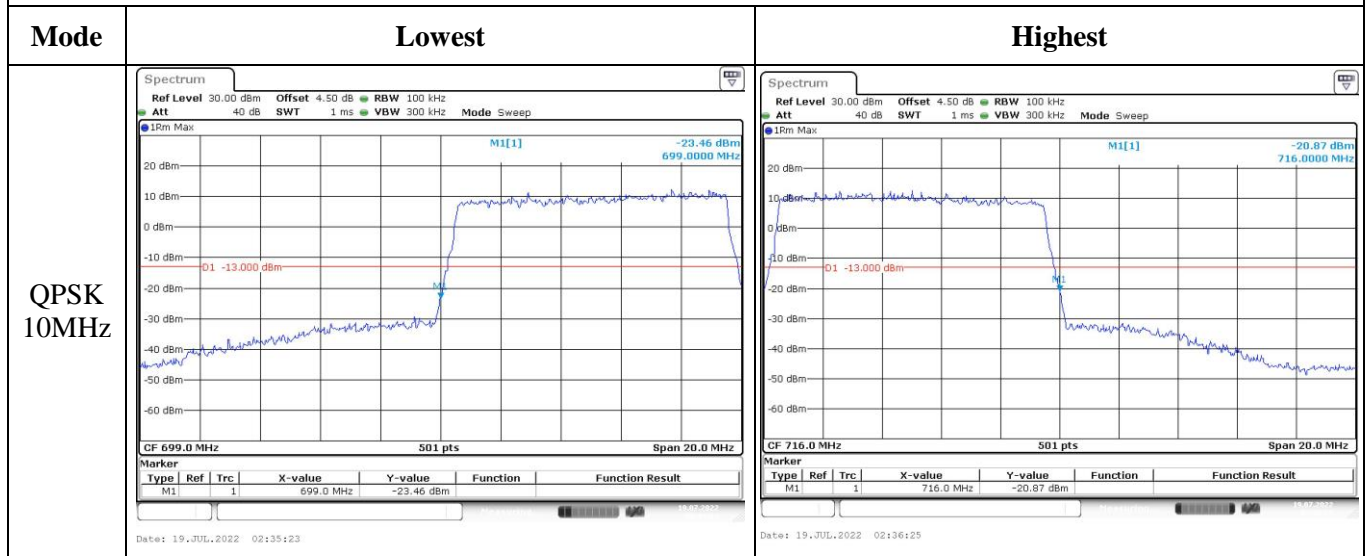
Highest



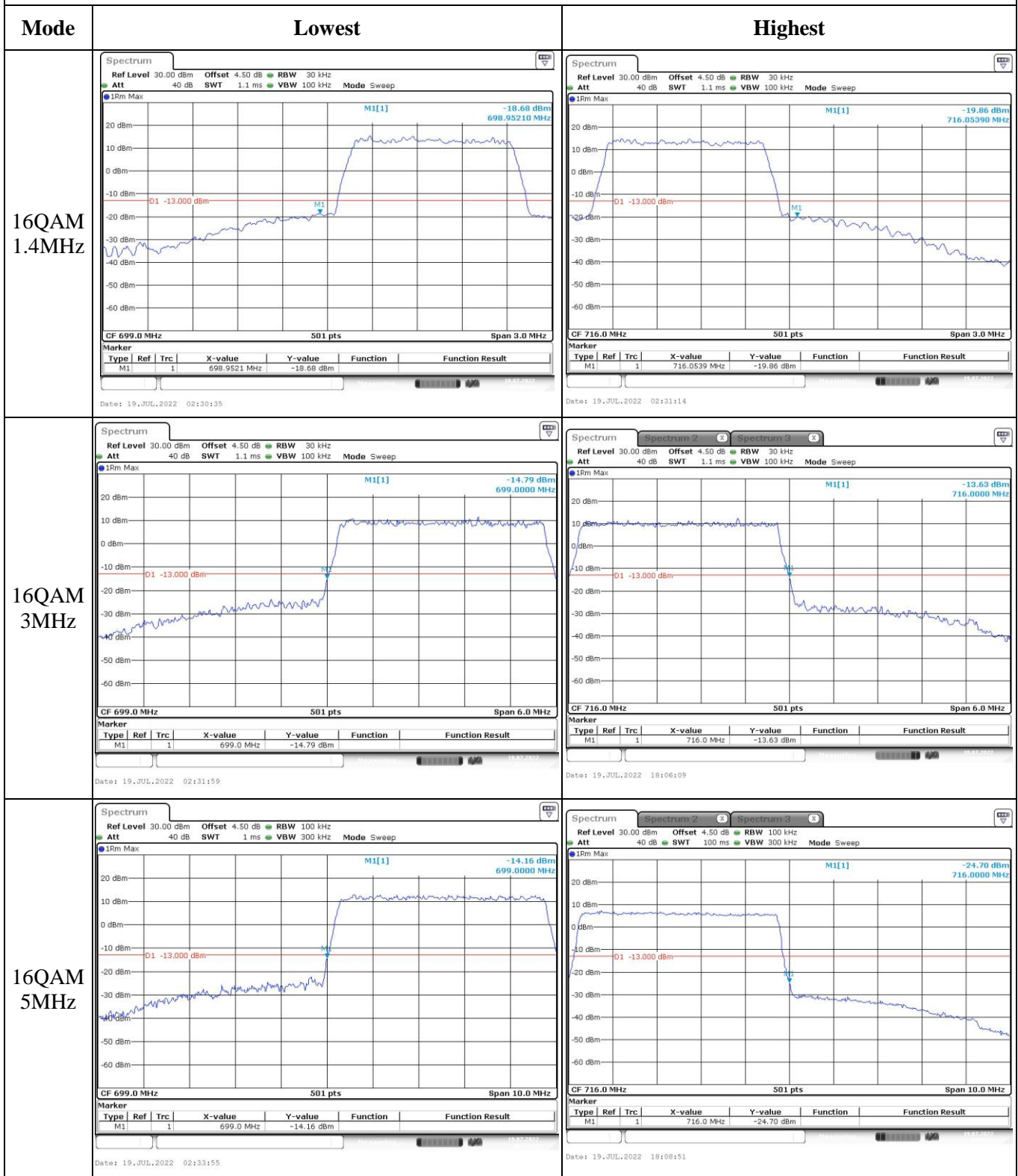
Out of band emission, Band Edge



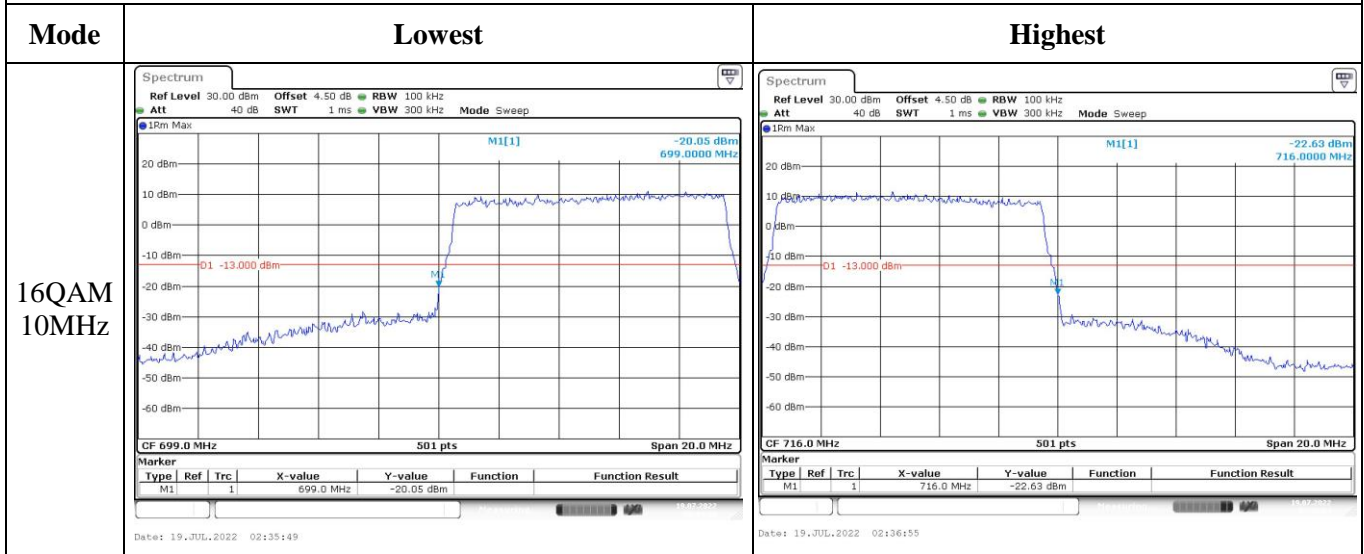
Out of band emission, Band Edge



Out of band emission, Band Edge



Out of band emission, Band Edge



4.10 Antenna Port Test Data and Results for LTE Band 17

Serial Number:	CR22060051-RF-S1	Test Date:	2022/07/19
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rinka Li	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	27.4	Relative Humidity: (%)	45	ATM Pressure: (kPa)	100.5
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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	2021-07-15	2022-07-14
R&S	Spectrum Analyzer	FSV40	101474	2022-07-15	2023-07-14
zhuoxiang	Coaxial Cable	SMA-178	211002	Each time	N/A
Weinschel	Coaxial Attenuators	53-20-34	LN751	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	149218	2021-07-22	2023-07-21
UNI-T	Multimeter	UT39A+	C210582554	2021-09-30	2022-09-29
E-Microwave	Two-way Splitter	ODP-1-6	OE0120176	Each time	N/A
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2022-04-06	2023-04-05

* 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 17▲:

Antenna Gain (dBi):	-1.98	Antenna Gain (dBd):	-4.13	Cable Loss (dB):	0
Operation Voltage(V _{DC}):					
Lowest:	3.5	Normal:	3.8	Highest:	4.35

Test Frequency For Each Mode:

Operation Bandwidth	Lowest Frequency (MHz)	Middle Frequency (MHz)	Highest Frequency (MHz)
5MHz	706.5	710	713.5
10MHz	709	710	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		
5MHz QPSK	RB1#0	22.04	21.87	22.3	18.3	34.77
	RB1#13	21.81	22.1	22.39		
	RB1#24	21.92	22.21	22.43		
	RB15#0	20.8	21.25	21.32		
	RB15#10	20.83	21.32	21.86		
	RB25#0	20.85	21.24	21.73		
5MHz 16QAM	RB1#0	20.97	20.36	20.44	16.84	34.77
	RB1#13	20.76	20.64	20.94		
	RB1#24	20.82	20.88	20.59		
	RB15#0	20.28	20.61	20.67		
	RB15#10	19.82	20.53	20.89		
	RB25#0	20.4	20.38	20.94		
10MHz QPSK	RB1#0	22.12	22.05	21.72	18.29	34.77
	RB1#25	21.92	22.32	22.06		
	RB1#49	22.31	22.42	22.37		
	RB25#0	20.78	20.77	20.8		
	RB25#25	21.22	21.19	21.75		
	RB50#0	20.74	21.22	21.3		
10MHz 16QAM	RB1#0	21.12	20.46	20.8	17.89	34.77
	RB1#25	21.07	20.58	21.17		
	RB1#49	22.02	21.3	21.47		
	RB25#0	20.38	19.97	19.9		
	RB25#25	20.66	20.72	20.77		
	RB50#0	20.04	20.51	20.58		
Note: ERP=Conducted Power(dBm) - Cable loss(dB) + Antenna Gain(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	5.8	5.45	5.77	13
	RB50#0	5.07	4.99	5.13	13
10MHz 16QAM	RB1#0	6.67	5.74	7.13	13
	RB50#0	6.2	6.03	5.94	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	4.98	4.96	4.98
5MHz 16QAM	4.531	4.531	4.531	5	5	5
10MHz QPSK	8.942	8.942	8.942	9.68	9.72	9.72
10MHz 16QAM	8.942	8.942	8.942	9.76	9.72	9.76

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.

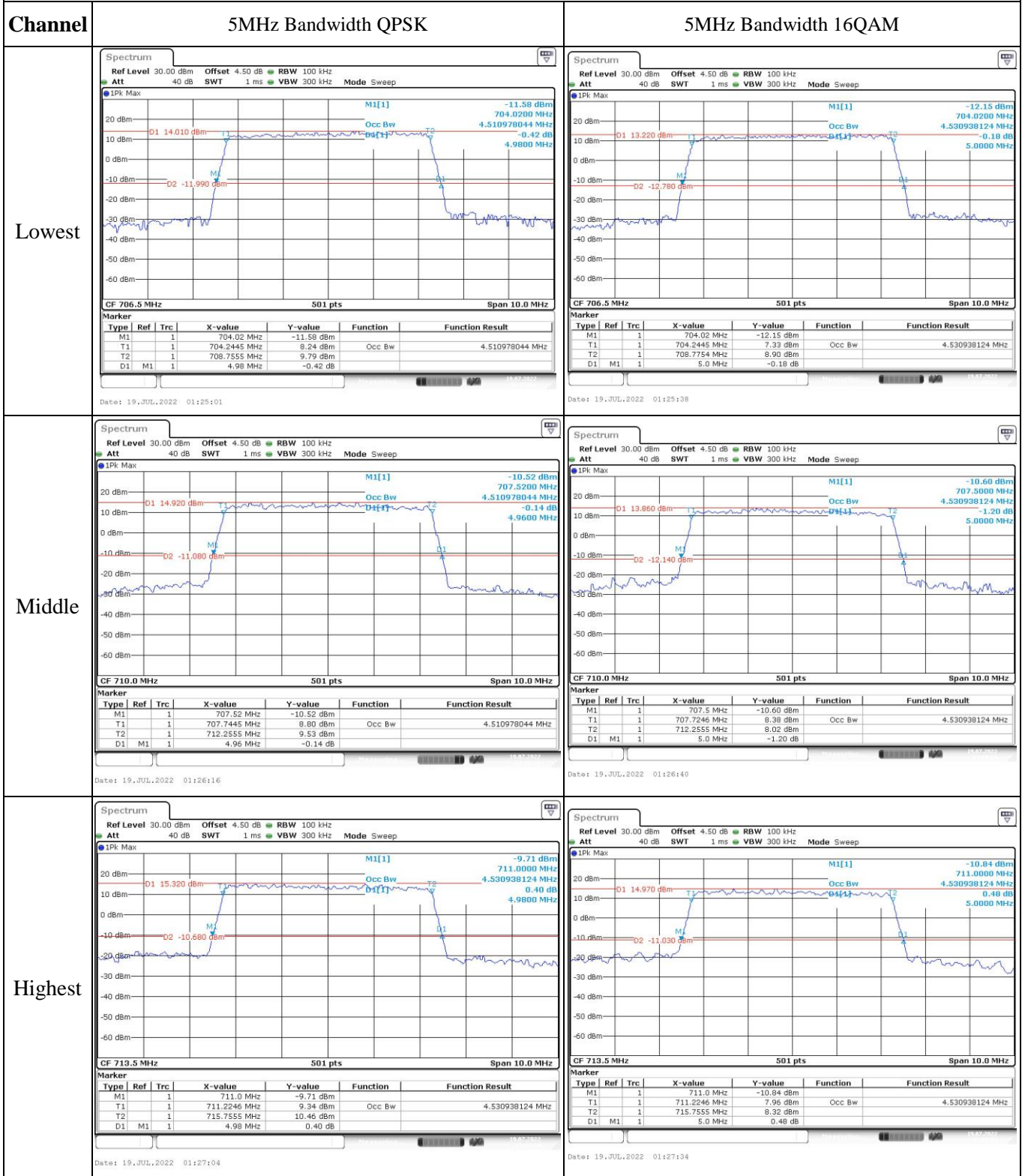
FCC §2.1051, §27.53:Out of band emission, Band Edge	
Result:	Pass, Please refer to the test plots of Out of band emission, Band Edge.

FCC §2.1055, §27.54: Frequency Stability						
Test Mode:	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	704.537	704.00	715.484	716.00
	-20	3.8	704.535	704.00	715.481	716.00
	-10	3.8	704.534	704.00	715.480	716.00
	0	3.8	704.532	704.00	715.478	716.00
	10	3.8	704.532	704.00	715.474	716.00
	20	3.8	704.529	704.00	715.471	716.00
	30	3.8	704.528	704.00	715.470	716.00
	40	3.8	704.527	704.00	715.470	716.00
Frequency Stability vs. Voltage	20	3.5	704.525	704.00	715.470	716.00
	20	4.35	704.524	704.00	715.469	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	704.536	704.00	715.479	716.00
	-20	3.8	704.536	704.00	715.477	716.00
	-10	3.8	704.536	704.00	715.477	716.00
	0	3.8	704.534	704.00	715.474	716.00
	10	3.8	704.531	704.00	715.474	716.00
	20	3.8	704.529	704.00	715.471	716.00
	30	3.8	704.529	704.00	715.469	716.00
	40	3.8	704.528	704.00	715.467	716.00
Frequency Stability vs. Voltage	50	3.8	704.527	704.00	715.466	716.00
	20	3.5	704.525	704.00	715.465	716.00
	20	4.35	704.523	704.00	715.463	716.00
					Result:	Pass

Test Plots:

Occupied Bandwidth



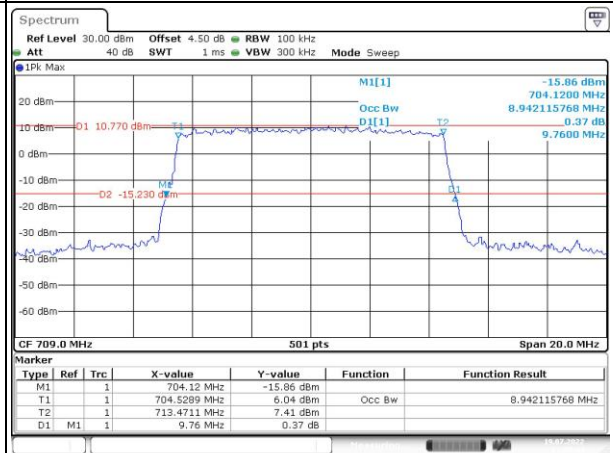
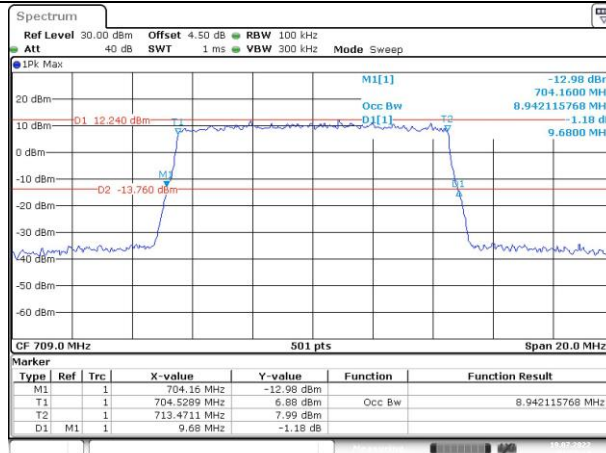
Occupied Bandwidth

Channel

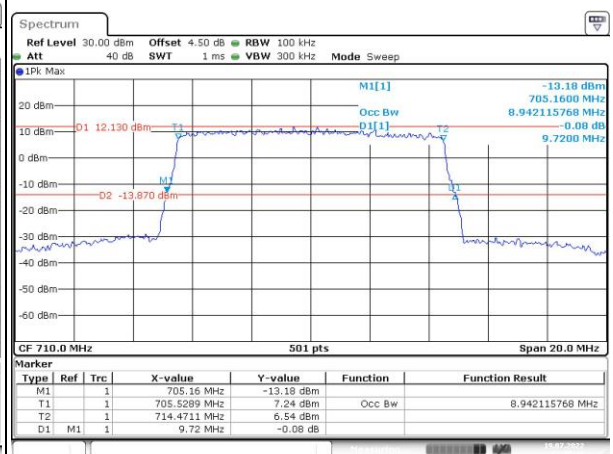
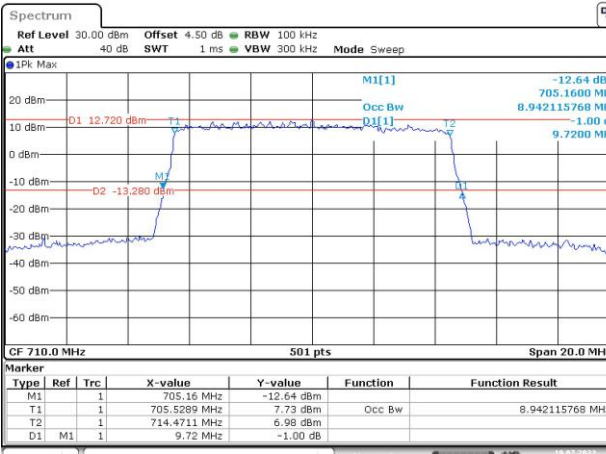
10MHz Bandwidth QPSK

10MHz Bandwidth 16QAM

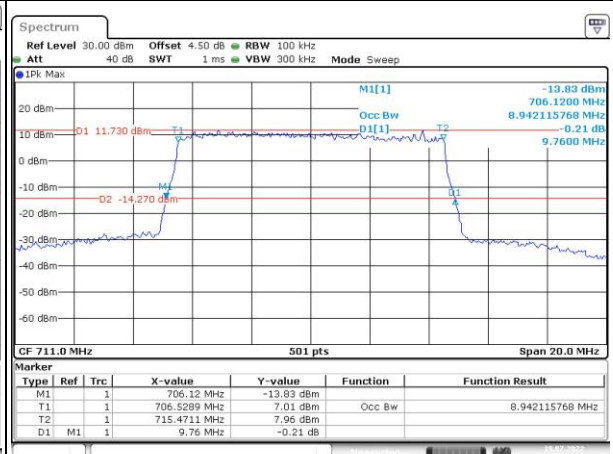
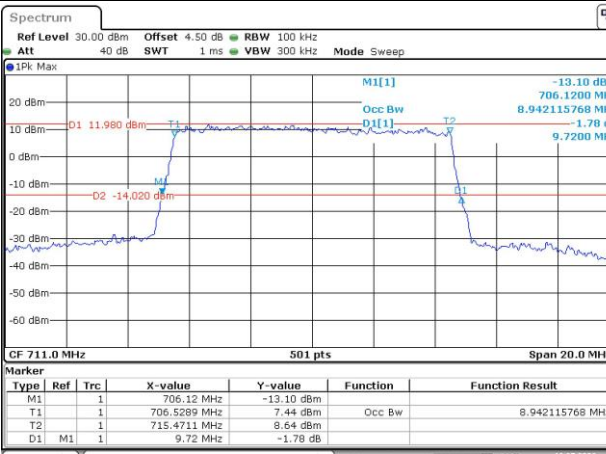
Lowest



Middle



Highest

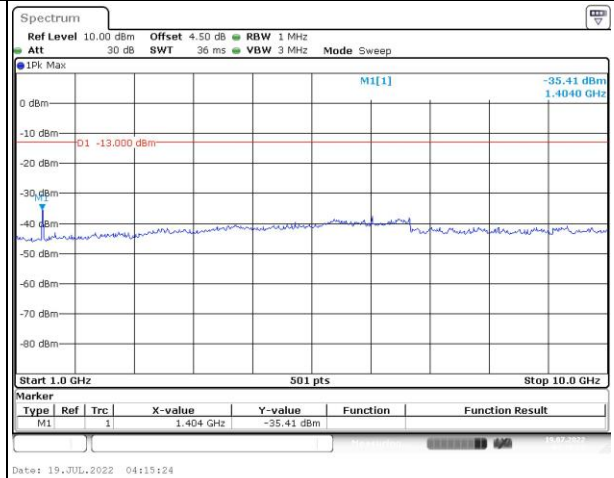
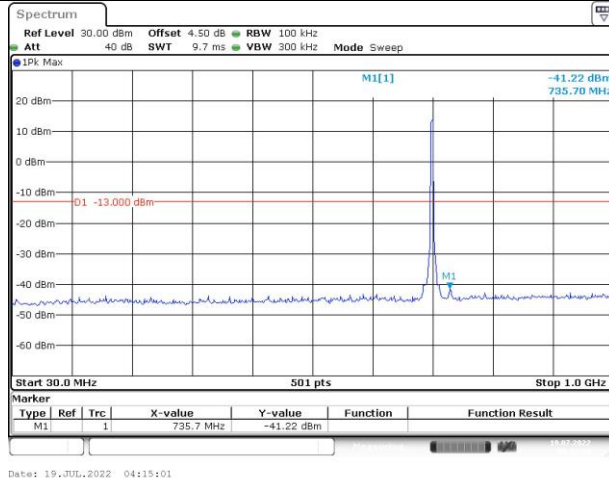


Spurious Emissions at Antenna Terminal

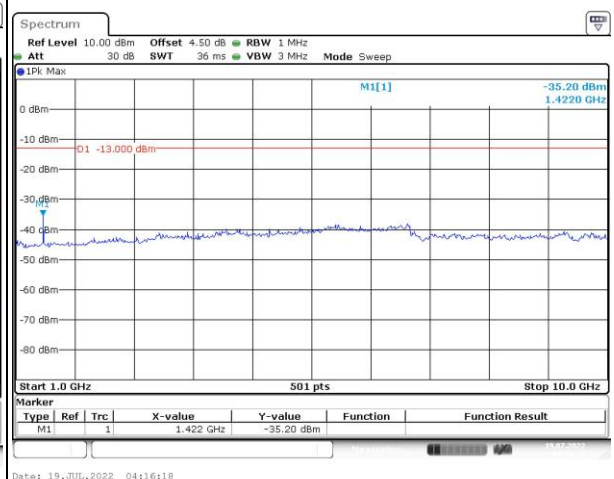
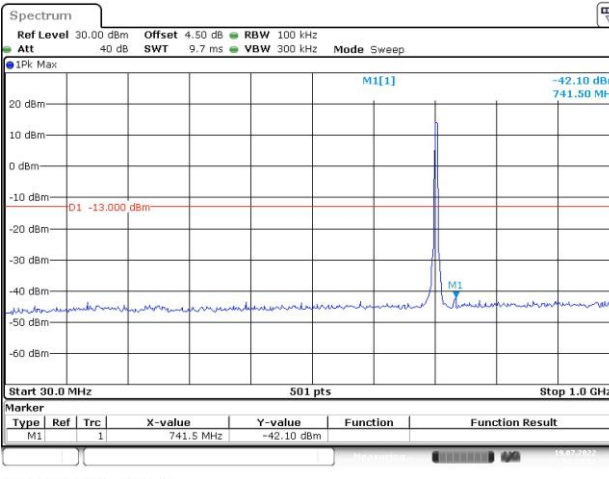
Channel

5MHz Bandwidth QPSK

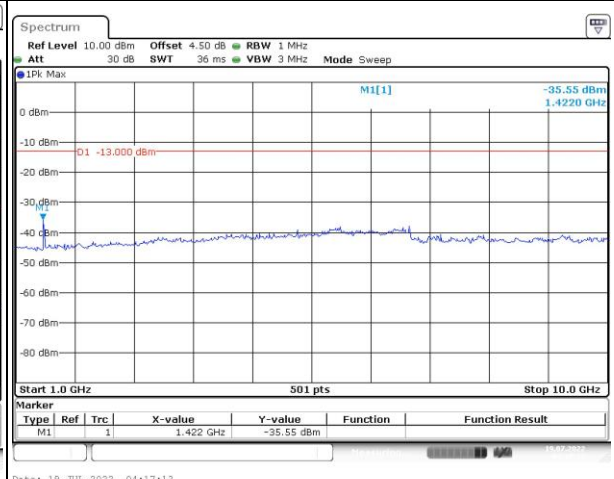
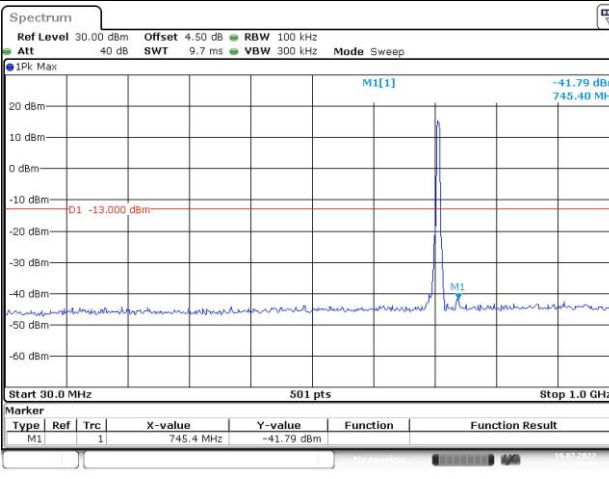
Lowest



Middle



Highest

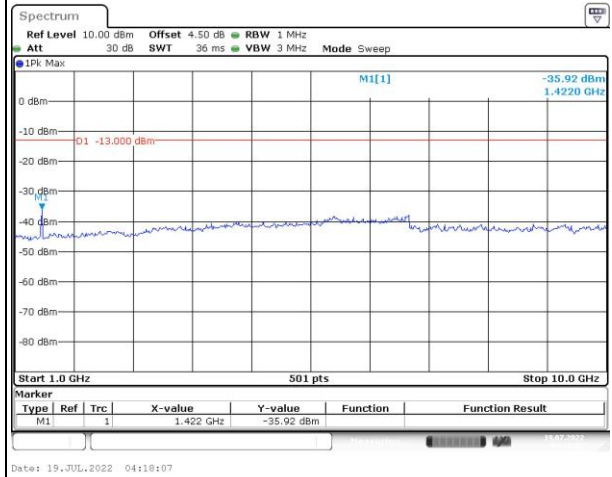
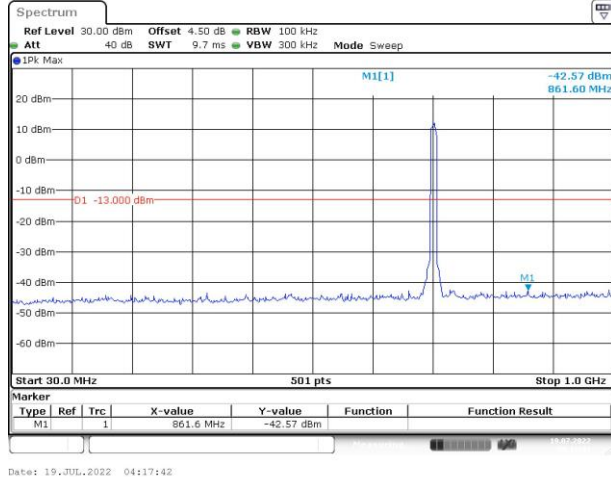


Spurious Emissions at Antenna Terminal

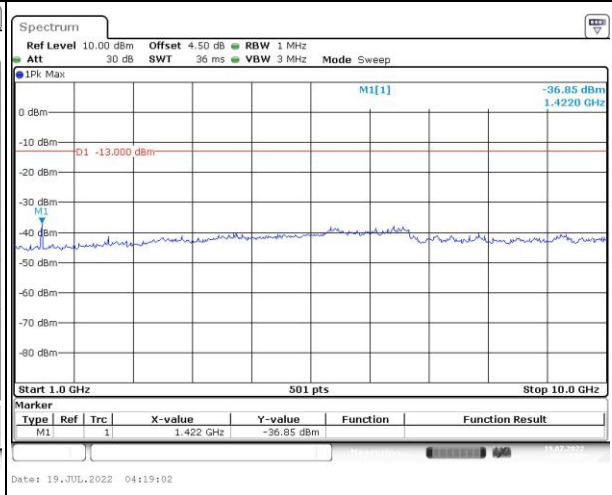
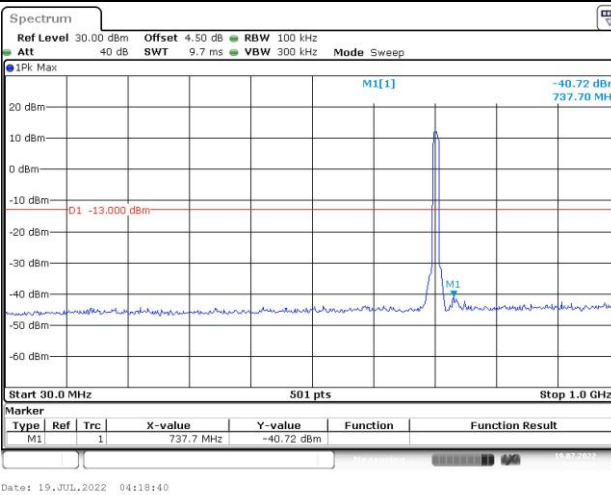
Channel

10MHz Bandwidth QPSK

Lowest



Middle



Highest

