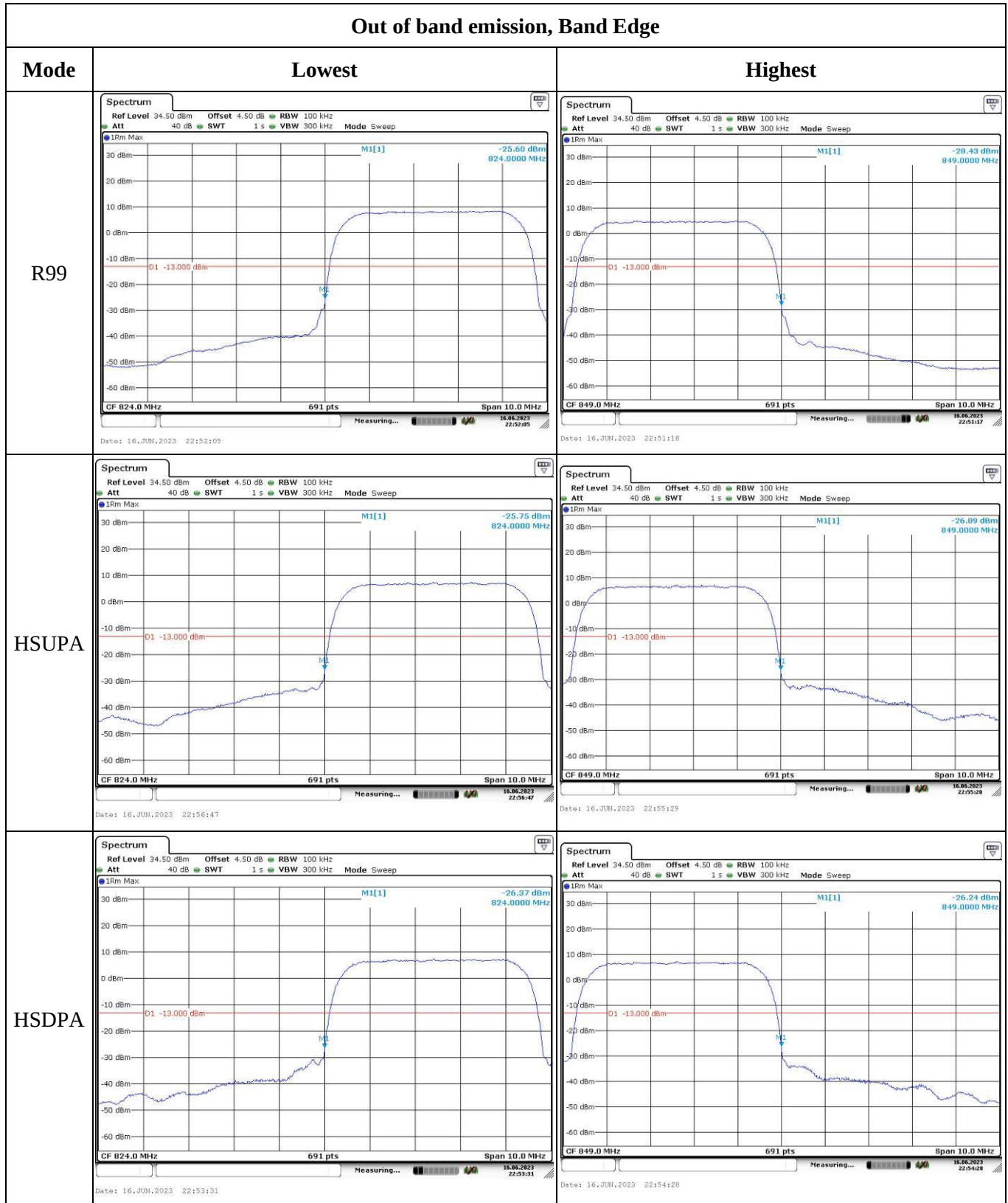


Out of band emission, Band Edge



4.5 Antenna Port Test Data and Results for LTE Band 2

Serial Number:	271I-3	Test Date:	2023/06/16~2023/06/22
Test Site:	RF	Test Mode:	Transmitting
Tester:	Zero Luo	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	23.7~27.5	Relative Humidity: (%)	38~59	ATM Pressure: (kPa)	99.8~100.9
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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	2022/7/15	2023/7/14
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
YINSAIGE	Coaxial Cable	SS402	SJ0100001	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	N/A	N/A
ZHAOXIN	DC Power Supply	RXN-6010D	21R6010D0912386	2022/7/15	2023/7/14

* 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	1850.7	1880	1909.3
3MHz	1851.5	1880	1908.5
5MHz	1852.5	1880	1907.5
10MHz	1855	1880	1905
15MHz	1857.5	1880	1902.5
20MHz	1860	1880	1900

Test Data:**FCC §2.1046; § 24.232****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	22.84	22.82	22.76	22.45	33
	RB1#3	22.83	22.83	22.77		
	RB1#5	22.76	22.85	22.74		
	RB3#0	22.99	22.9	22.93		
	RB3#3	22.87	22.94	22.83		
	RB6#0	21.74	21.92	21.85		
1.4MHz 16QAM	RB1#0	22.44	22.36	22.48	21.97	33
	RB1#3	22.43	22.38	22.45		
	RB1#5	22.51	22.39	22.41		
	RB3#0	21.89	21.86	21.99		
	RB3#3	21.92	21.82	21.92		
	RB6#0	21.1	21.25	21.05		
3MHz QPSK	RB1#0	22.82	22.8	22.81	22.4	33
	RB1#8	22.82	22.94	22.82		
	RB1#14	22.93	22.87	22.78		
	RB6#0	21.91	21.99	21.91		
	RB6#9	21.91	21.89	21.88		
	RB15#0	21.94	21.82	21.9		
3MHz 16QAM	RB1#0	22.56	21.7	22.26	22.08	33
	RB1#8	22.62	21.73	22.25		
	RB1#14	22.6	21.66	22.22		
	RB6#0	21	21.2	20.85		
	RB6#9	21.01	21.01	20.78		
	RB15#0	20.94	21.13	20.97		
5MHz QPSK	RB1#0	22.85	22.91	22.84	22.49	33
	RB1#13	22.94	22.83	22.82		
	RB1#24	23.03	22.95	22.79		
	RB15#0	21.86	21.93	21.98		
	RB15#10	21.91	21.85	21.88		
	RB25#0	21.89	21.92	21.88		
5MHz 16QAM	RB1#0	21.88	21.57	21.09	21.53	33
	RB1#13	22.07	21.59	21.14		
	RB1#24	22	21.67	21.14		
	RB15#0	20.82	21.21	21		
	RB15#10	20.85	21.04	20.92		
	RB25#0	20.98	20.99	21.02		
10MHz QPSK	RB1#0	22.93	22.88	22.75	22.45	33
	RB1#25	22.94	22.88	22.78		
	RB1#49	22.98	22.99	22.83		

	RB25#0	21.85	21.94	21.96		
	RB25#25	21.9	22.01	21.9		
	RB50#0	21.91	21.93	21.9		
10MHz 16QAM	RB1#0	22.04	21.41	22.02	21.56	33
	RB1#25	22.01	21.36	22.07		
	RB1#49	22.07	21.49	22.1		
	RB25#0	21.08	21.08	20.95		
	RB25#25	21.06	21.05	20.97		
	RB50#0	21.26	21.13	20.98		
15MHz QPSK	RB1#0	22.89	22.96	22.83	22.5	33
	RB1#38	22.97	23	22.78		
	RB1#74	22.96	23.04	22.83		
	RB36#0	21.83	21.9	21.86		
	RB36#39	21.86	21.96	21.98		
	RB75#0	21.98	21.89	21.82		
15MHz 16QAM	RB1#0	21.98	22.29	22.11	21.77	33
	RB1#38	22.14	22.27	22.1		
	RB1#74	22.05	22.31	22.15		
	RB36#0	21.21	20.95	20.99		
	RB36#39	21.04	21.01	21.07		
	RB75#0	21	21.17	21.04		
20MHz QPSK	RB1#0	22.93	22.94	22.95	22.47	33
	RB1#50	23.01	22.94	23		
	RB1#99	23	22.99	22.98		
	RB50#0	21.89	21.97	21.94		
	RB50#50	21.86	21.95	21.99		
	RB100#0	21.96	21.94	21.97		
20MHz 16QAM	RB1#0	21.93	22.61	21.99	22.15	33
	RB1#50	21.94	22.59	21.97		
	RB1#99	22.06	22.69	22.11		
	RB50#0	21.21	20.9	20.99		
	RB50#50	21.04	21.06	21.03		
	RB100#0	20.96	21.27	20.97		

Note: EIRP=Conducted Power(dBm) - Lc(dB) + Gr(dBi)

Result:

Pass

Peak-to-average Ratio(PAR)					
Test Bandwidth & Modulation	Resource Block & RB offset	Peak-to-average Ratio(dB)			Limit (dB)
		Lowest Channel	Middle Channel	Highest Channel	
20MHz QPSK	RB1#0	4.29	4.84	4.09	13
	RB100#0	3.97	3.94	3.86	13
20MHz 16QAM	RB1#0	5.59	5.59	5.22	13
	RB100#0	5.62	5.57	5.59	13
				Result:	Pass

FCC §2.1049, §24.238: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	1.266	1.266	1.272
1.4MHz 16QAM	1.108	1.09	1.114	1.26	1.254	1.278
3MHz QPSK	2.695	2.695	2.707	3.012	3.024	3
3MHz 16QAM	2.683	2.683	2.695	3.012	3.024	3.024
5MHz QPSK	4.511	4.511	4.531	5.02	5	5
5MHz 16QAM	4.531	4.551	4.531	5.02	5.04	5
10MHz QPSK	8.982	8.942	8.982	9.76	9.76	9.72
10MHz 16QAM	8.982	8.942	8.942	9.84	9.84	9.76
15MHz QPSK	13.473	13.533	13.473	15	15.12	14.94
15MHz 16QAM	13.533	13.533	13.473	15.12	15.06	14.88
20MHz QPSK	17.964	18.044	17.884	19.6	19.84	19.36
20MHz 16QAM	17.964	17.964	17.964	19.84	19.76	19.68
Note: The test plots please refer to the Plots of Occupied Bandwidth						

FCC §2.1051, § 24.238 (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, § 24.238 (a):Out of band emission, Band Edge

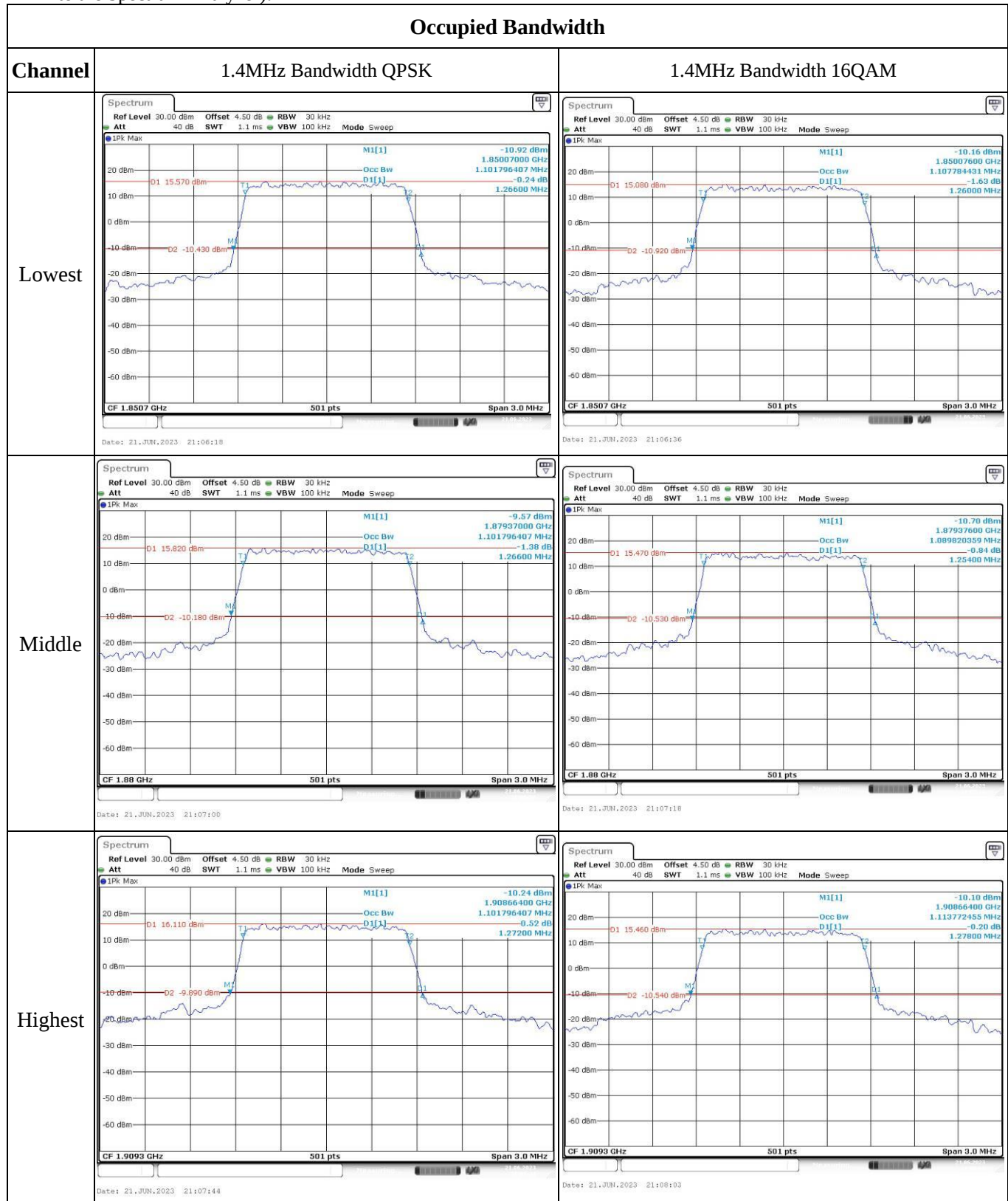
Result:	Pass, Please refer to the test plots of Out of band emission, Band Edge.
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FCC §2.1055, §24.235: Frequency Stability

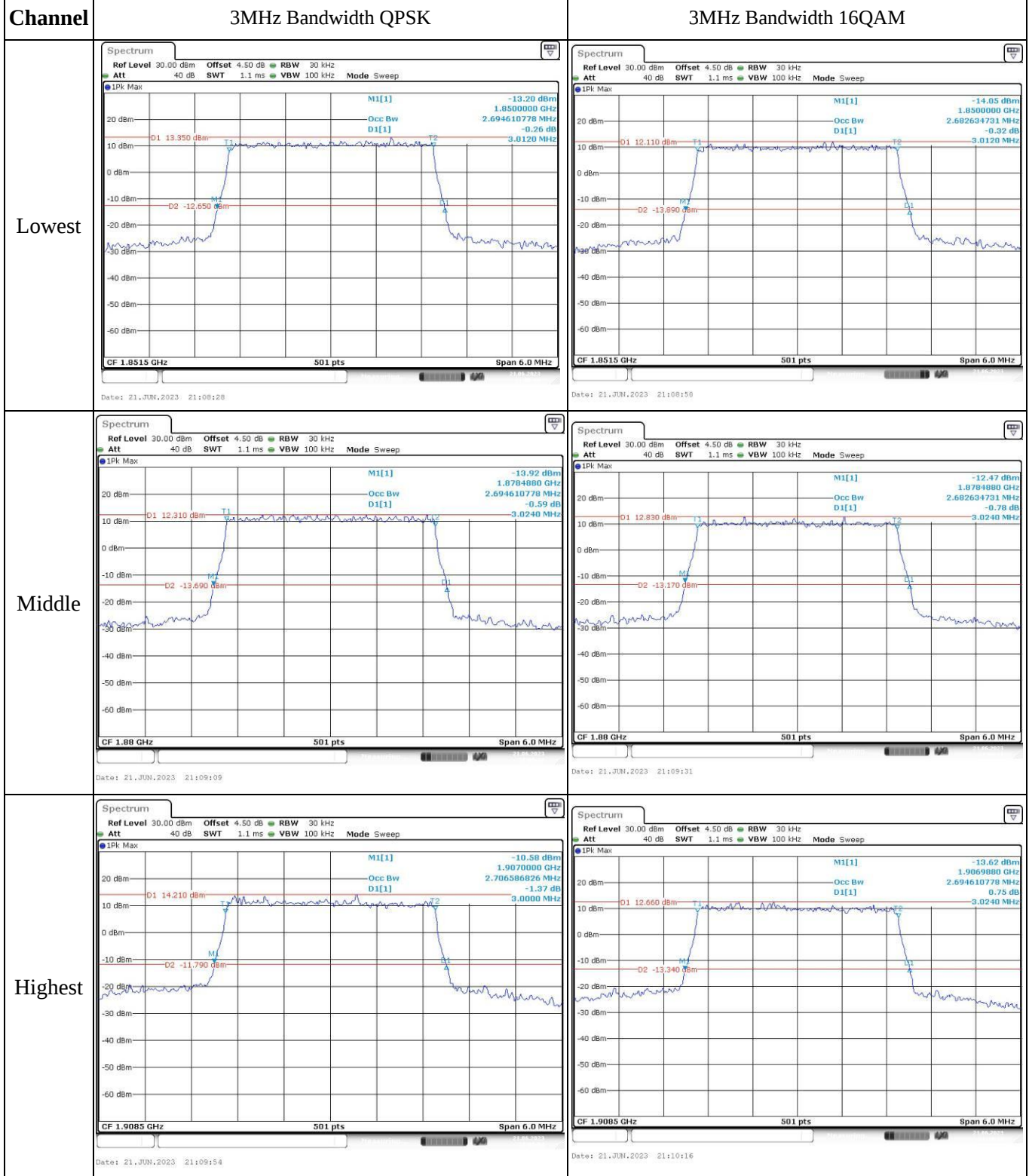
Test Mode:	20M QPSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.7	1851.156	1850.000	1908.912	1910.000
	-20	3.7	1851.172	1850.000	1908.875	1910.000
	-10	3.7	1851.169	1850.000	1908.835	1910.000
	0	3.7	1851.146	1850.000	1908.854	1910.000
	10	3.7	1851.126	1850.000	1908.864	1910.000
	20	3.7	1851.138	1850.000	1908.942	1910.000
	30	3.7	1851.105	1850.000	1908.902	1910.000
	40	3.7	1851.189	1850.000	1908.845	1910.000
	50	3.7	1851.187	1850.000	1908.825	1910.000
Frequency Stability vs. Voltage	20	3.3	1851.109	1850.000	1908.899	1910.000
	20	4.2	1851.160	1850.000	1908.860	1910.000
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	3.7	1851.135	1850.000	1908.856	1910.000
	-20	3.7	1851.146	1850.000	1908.832	1910.000
	-10	3.7	1851.175	1850.000	1908.810	1910.000
	0	3.7	1851.106	1850.000	1908.896	1910.000
	10	3.7	1851.169	1850.000	1908.842	1910.000
	20	3.7	1851.138	1850.000	1908.942	1910.000
	30	3.7	1851.111	1850.000	1908.885	1910.000
	40	3.7	1851.194	1850.000	1908.824	1910.000
	50	3.7	1851.055	1850.000	1908.923	1910.000
Frequency Stability vs. Voltage	20	3.3	1851.127	1850.000	1908.875	1910.000
	20	4.2	1851.155	1850.000	1908.822	1910.000
Result:					Pass	

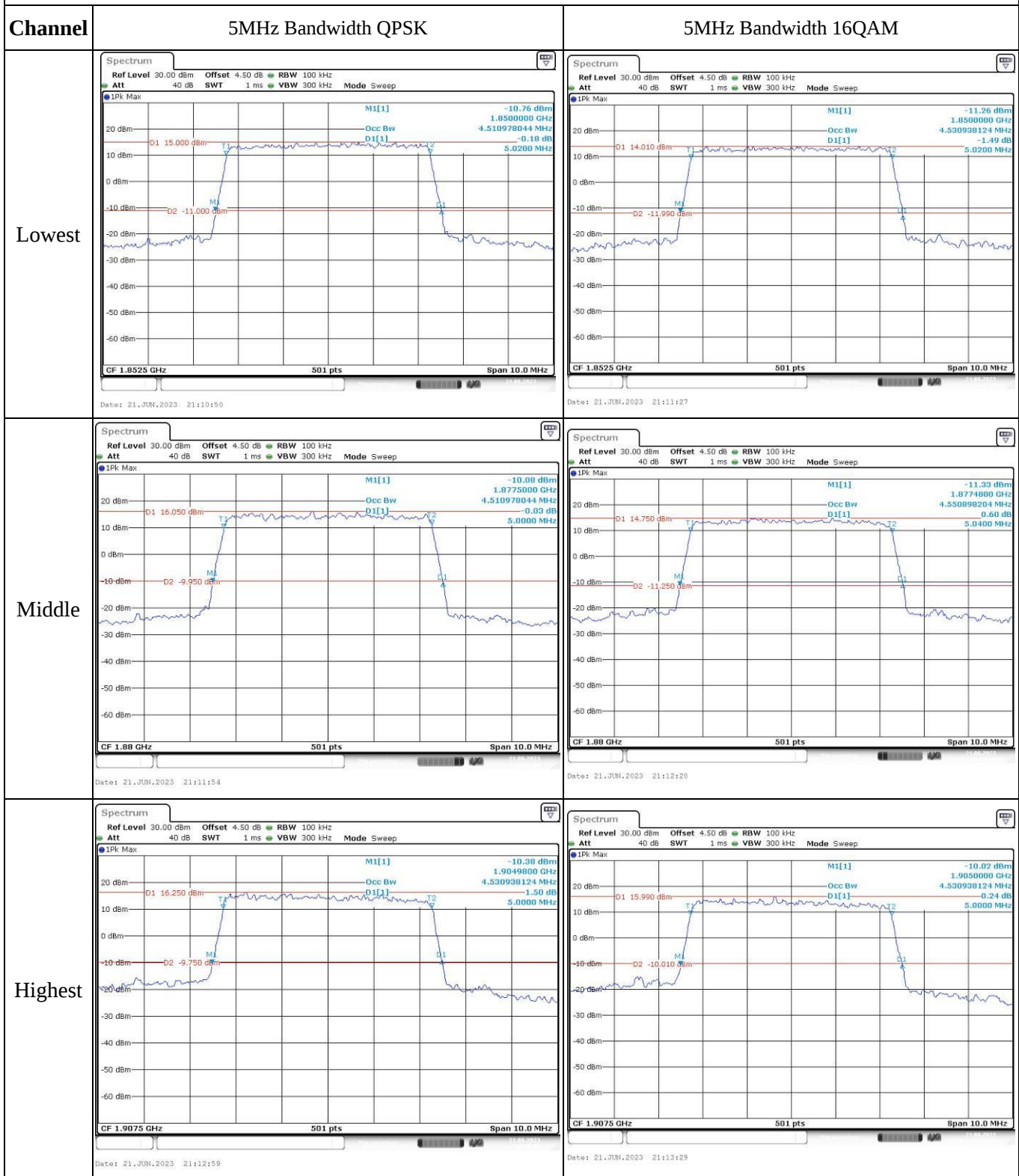
Test Plots(Note: The 4.5dB is the Insertion loss of the RF cable, Power Splitter and DC Block, which was offset into the Spectrum Analyzer):



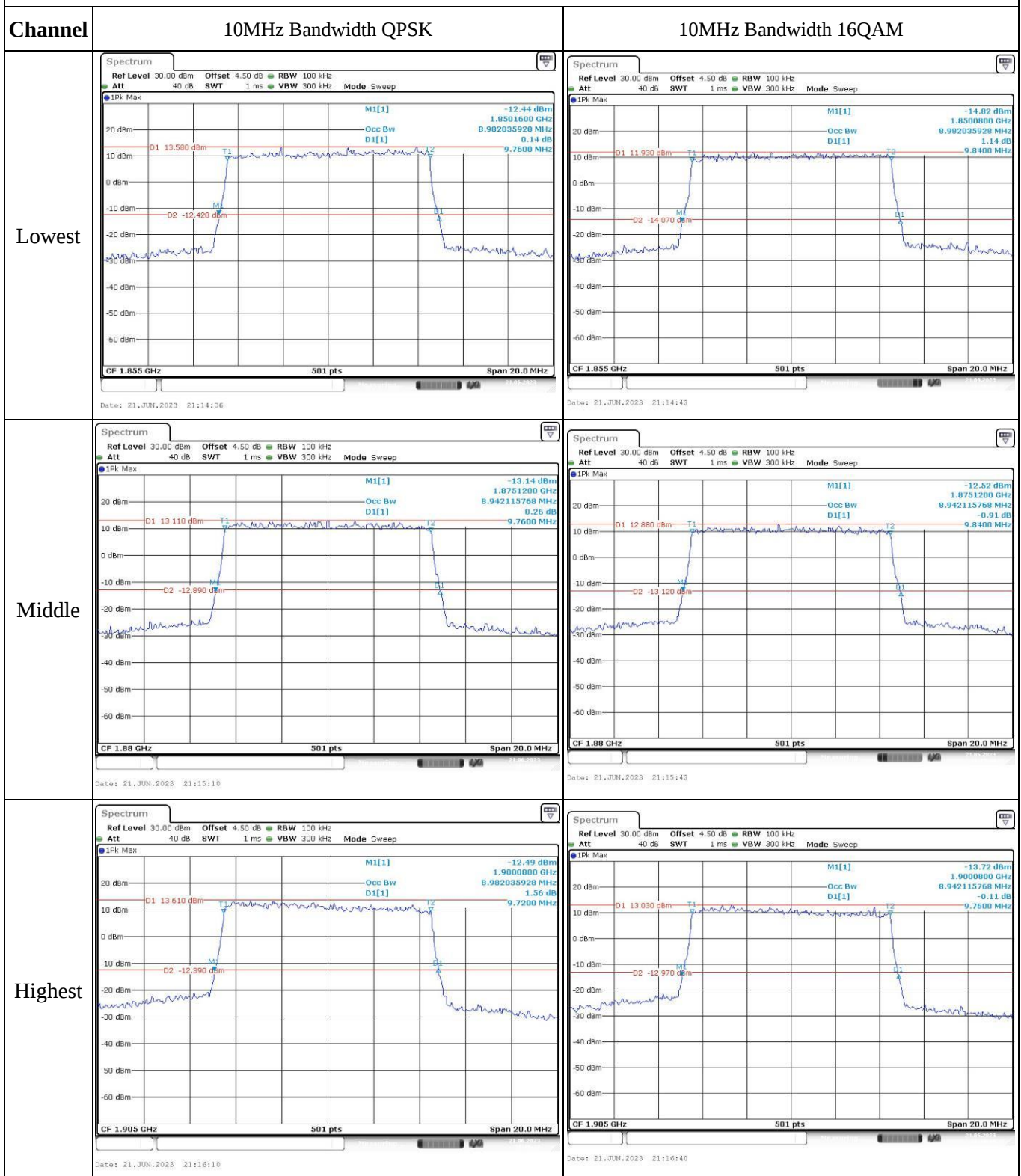
Occupied Bandwidth



Occupied Bandwidth



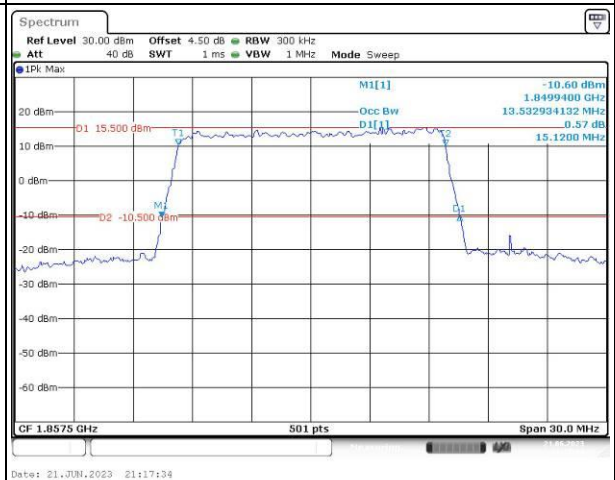
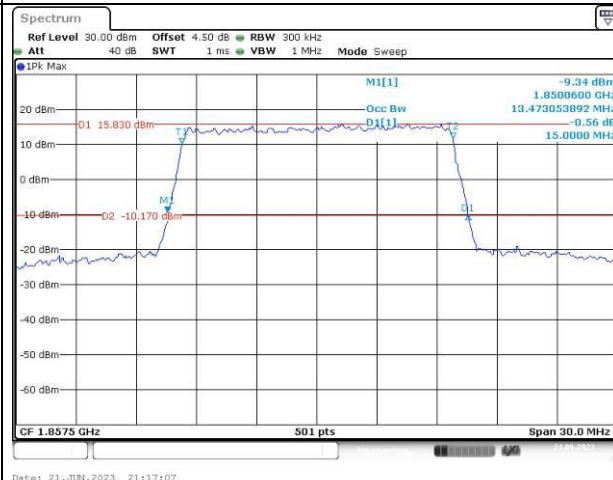
Occupied Bandwidth



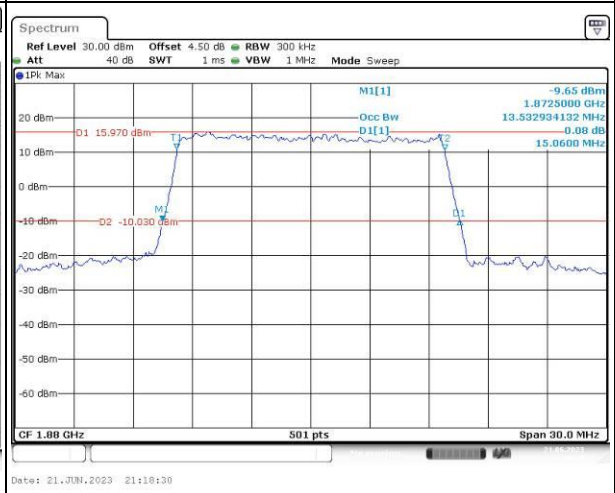
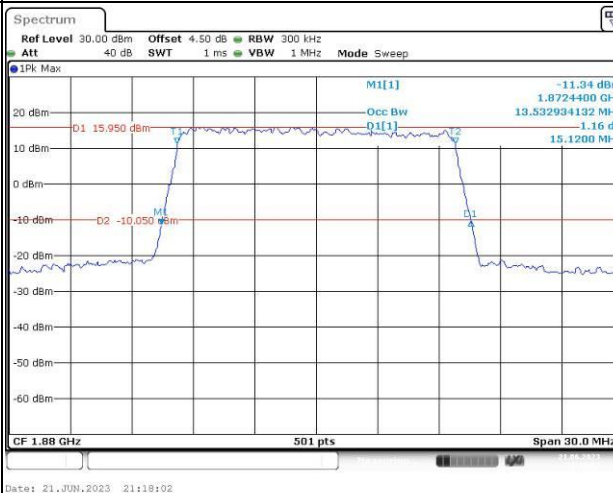
Channel

15MHz Bandwidth 16QAM

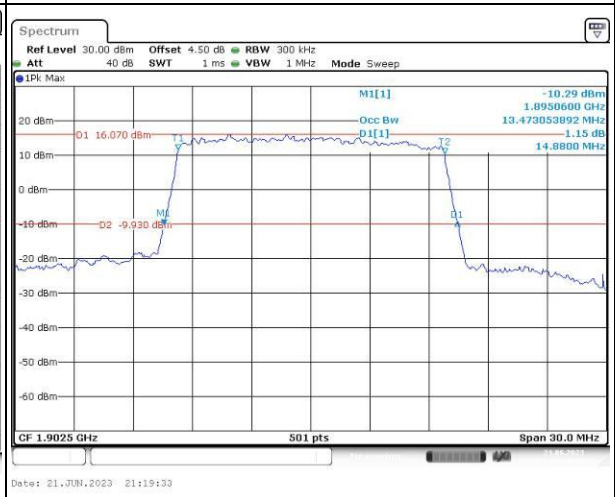
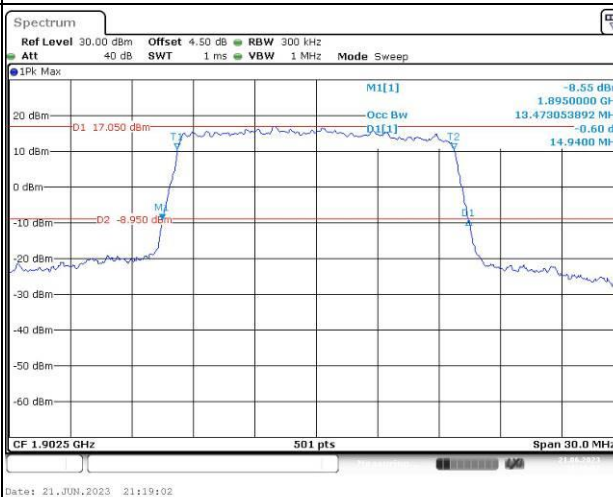
Lowest



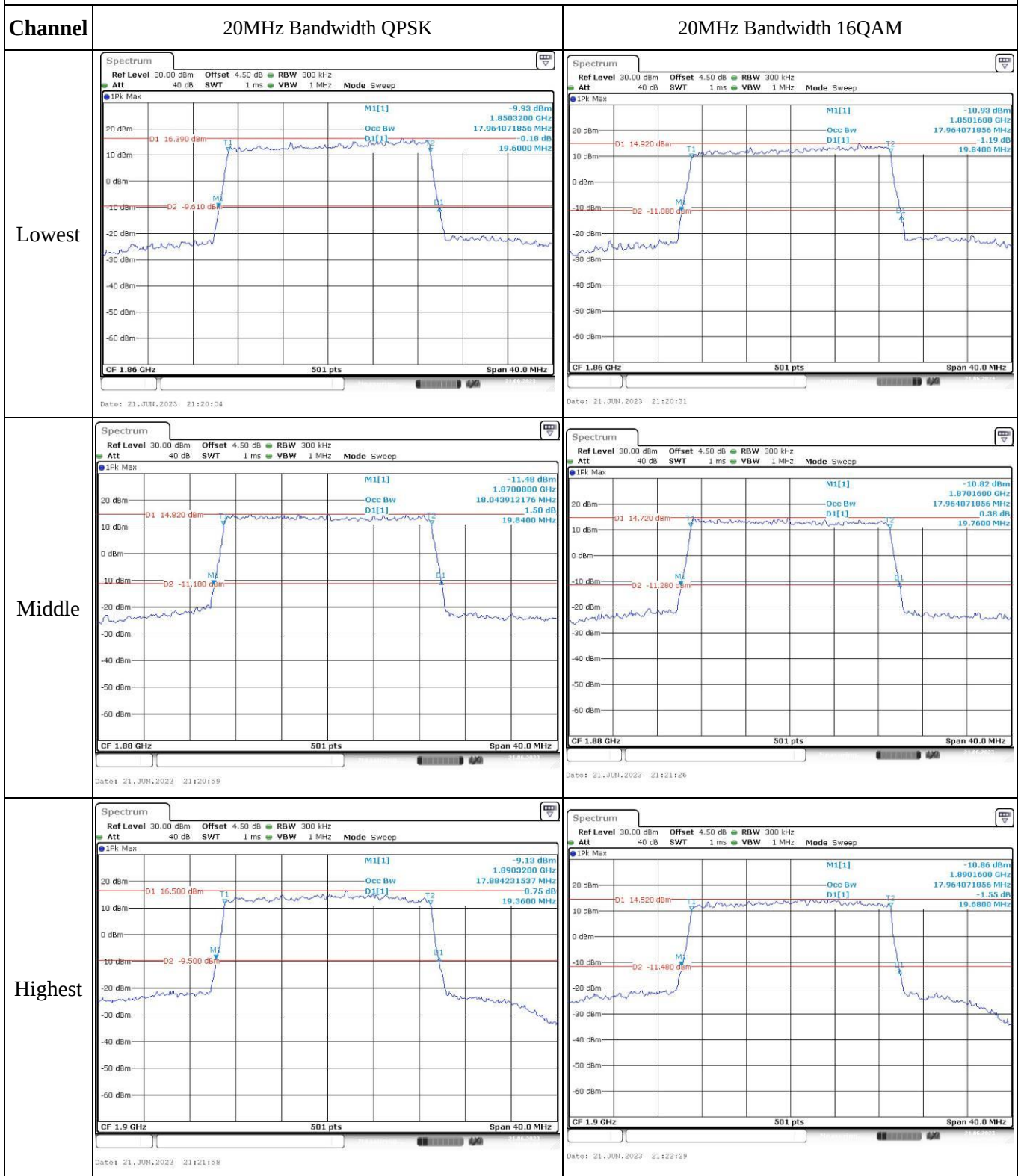
Middle



Highest



Occupied Bandwidth

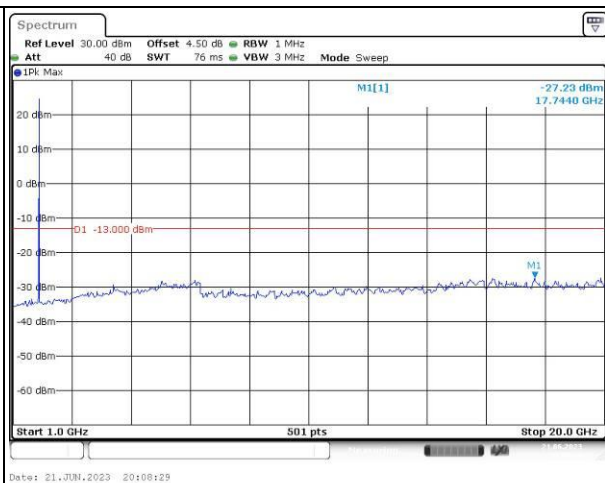
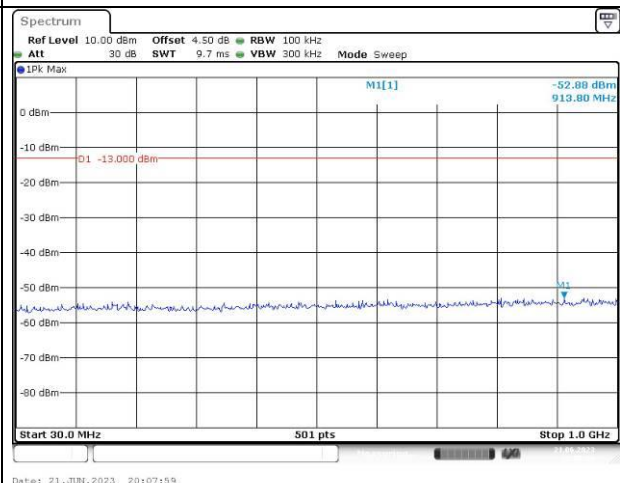


Spurious Emissions at Antenna Terminal

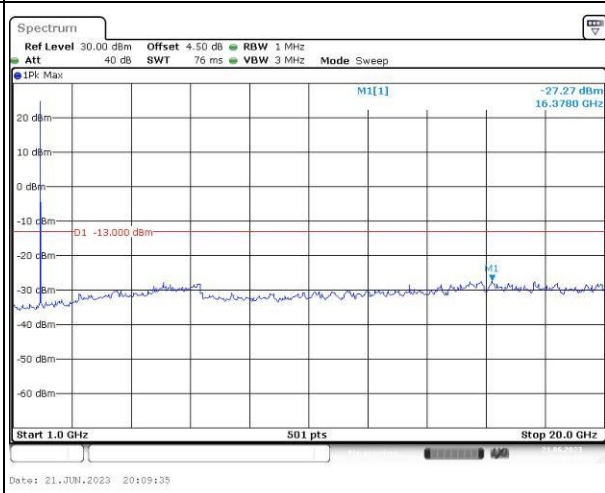
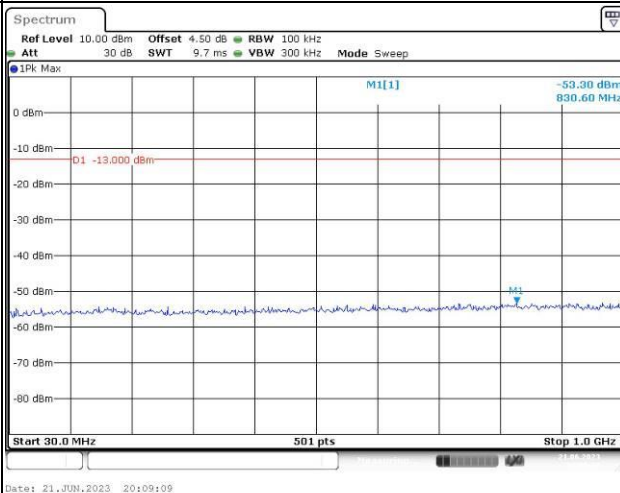
Channel

1.4MHz Bandwidth QPSK

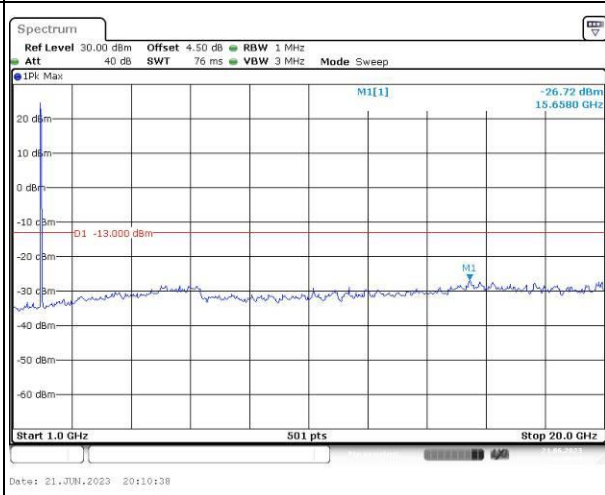
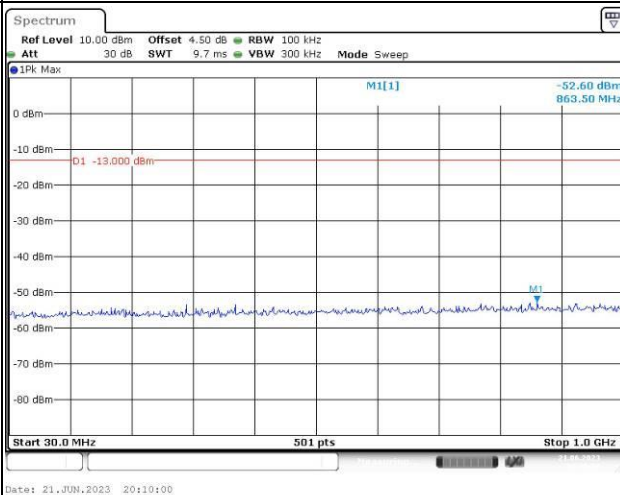
Lowest



Middle



Highest

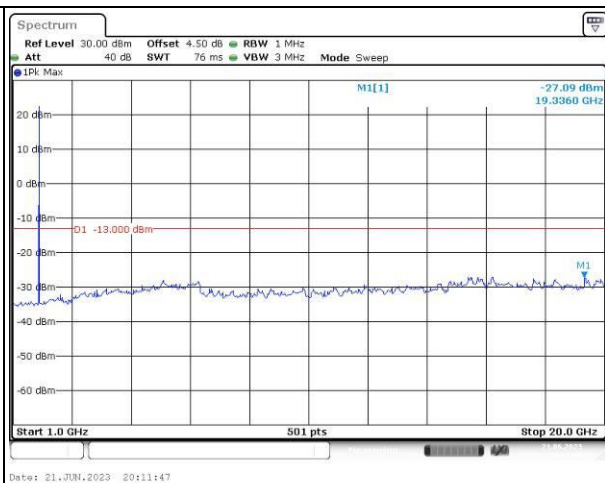
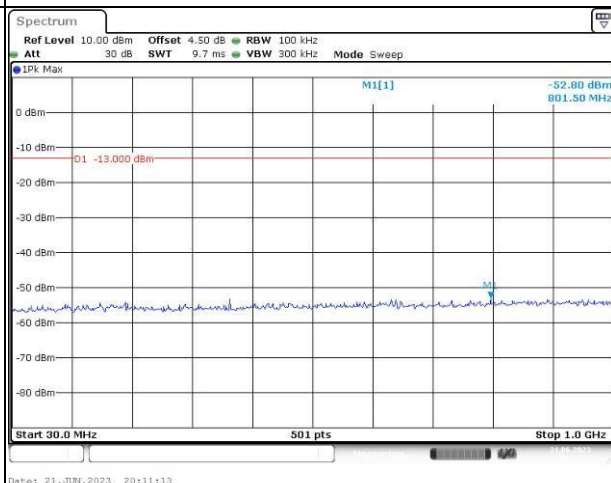


Spurious Emissions at Antenna Terminal

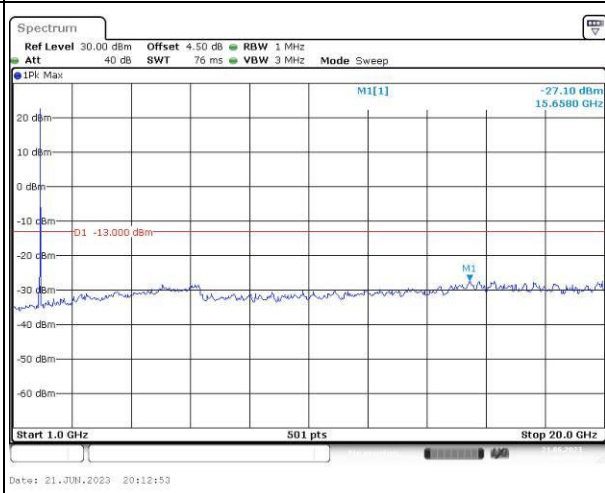
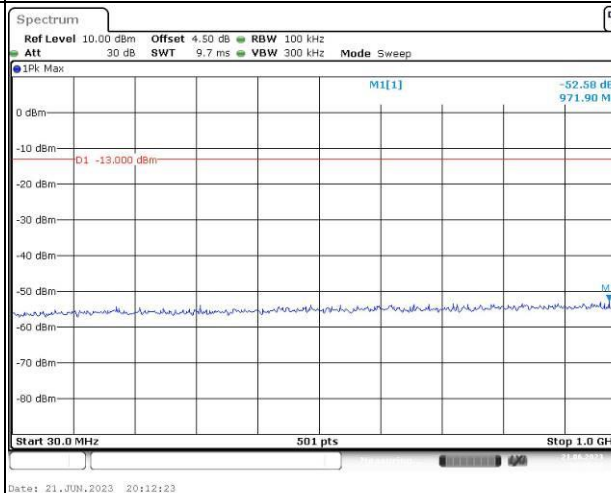
Channel

3MHz Bandwidth QPSK

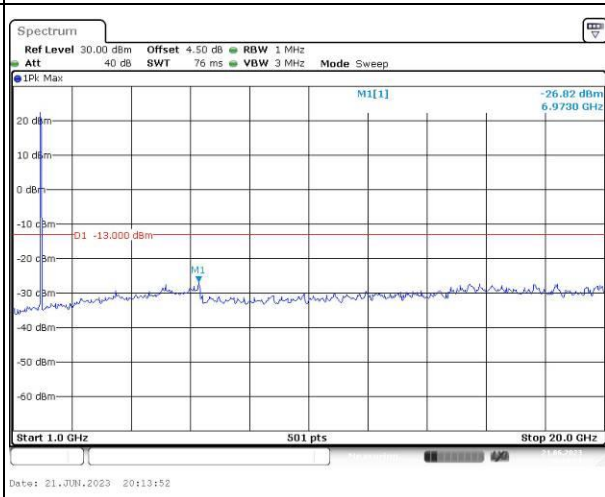
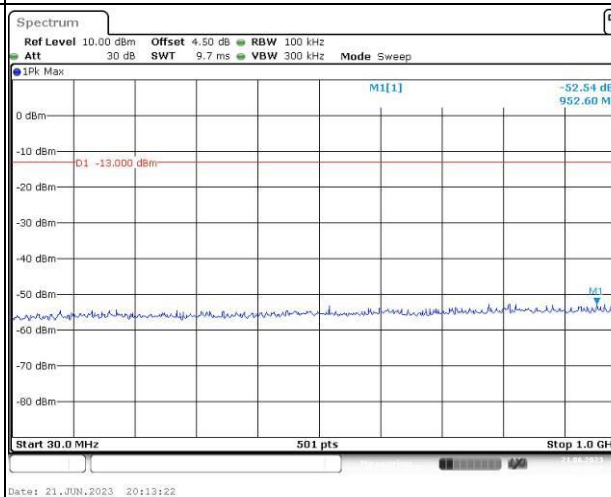
Lowest



Middle



Highest

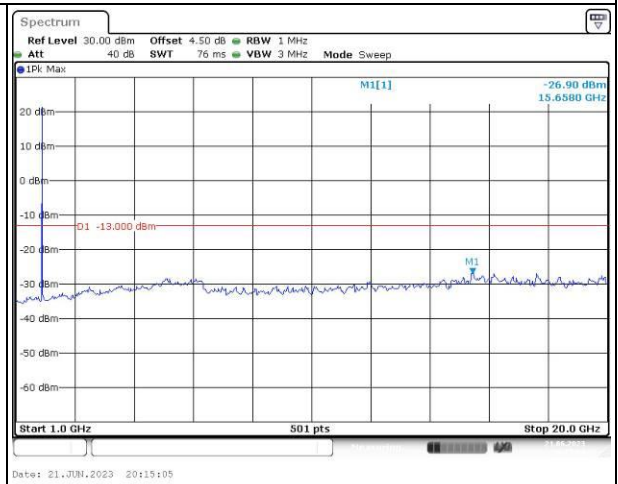
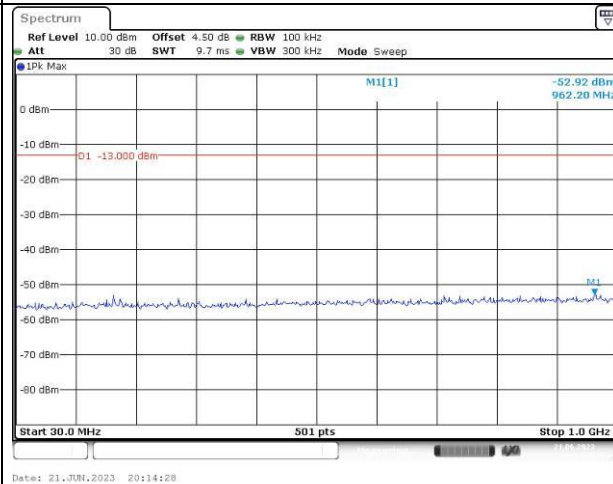


Spurious Emissions at Antenna Terminal

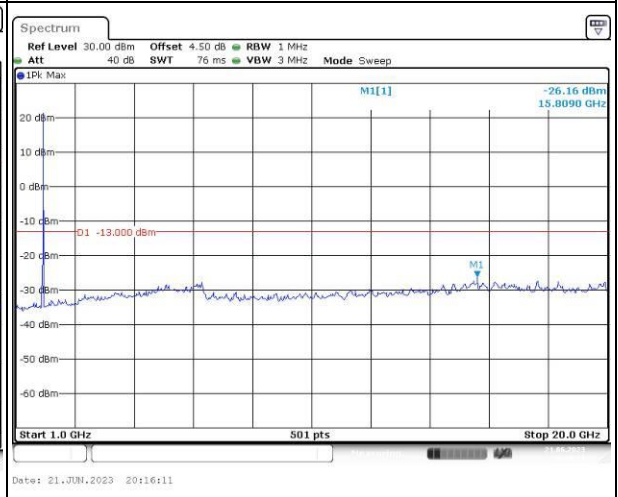
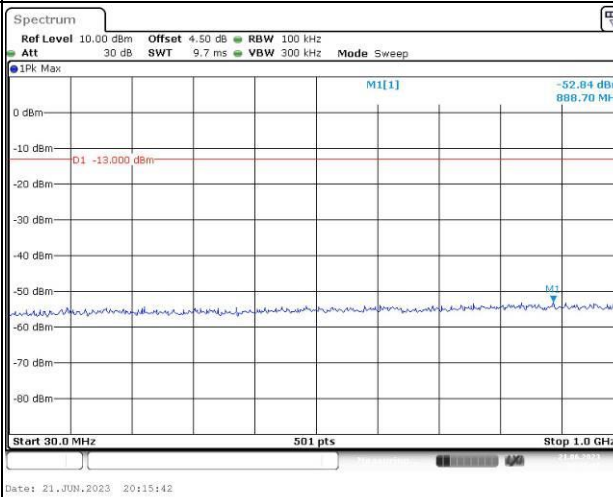
Channel

5MHz Bandwidth QPSK

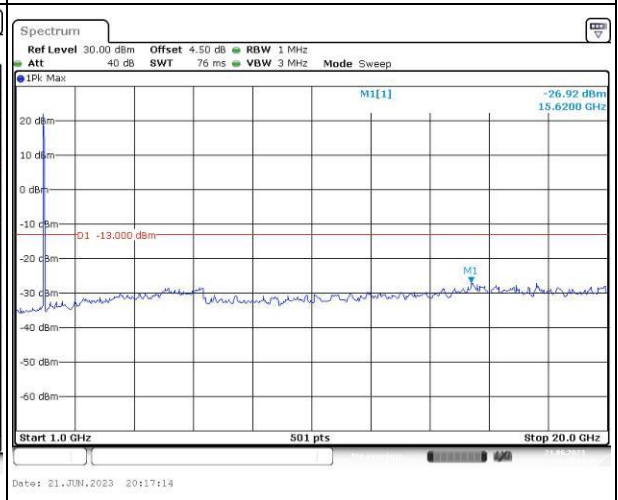
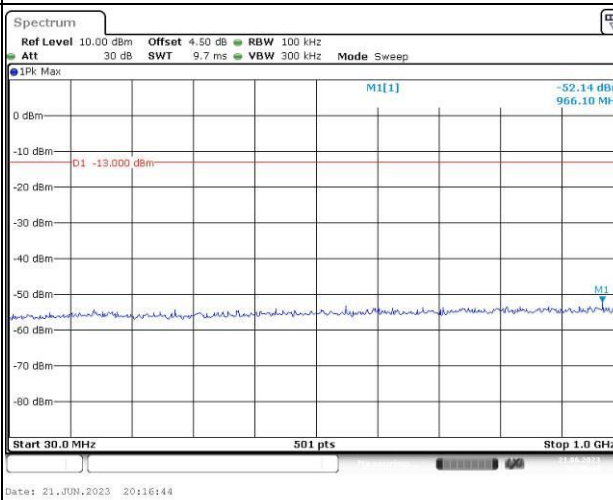
Lowest



Middle



Highest

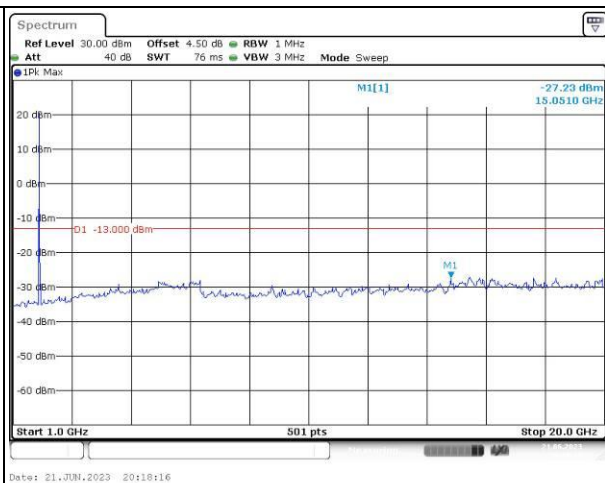
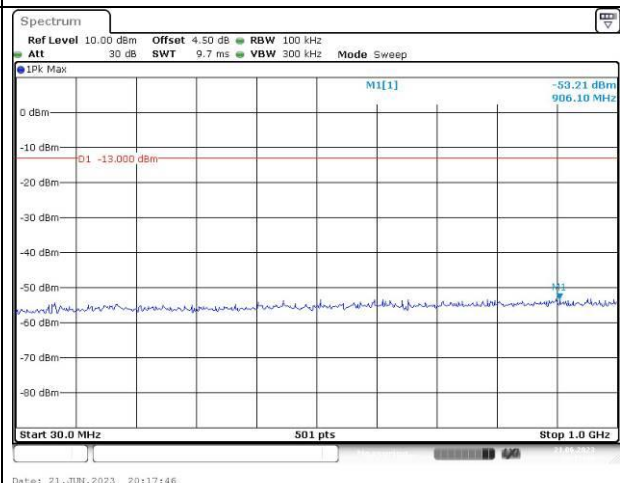


Spurious Emissions at Antenna Terminal

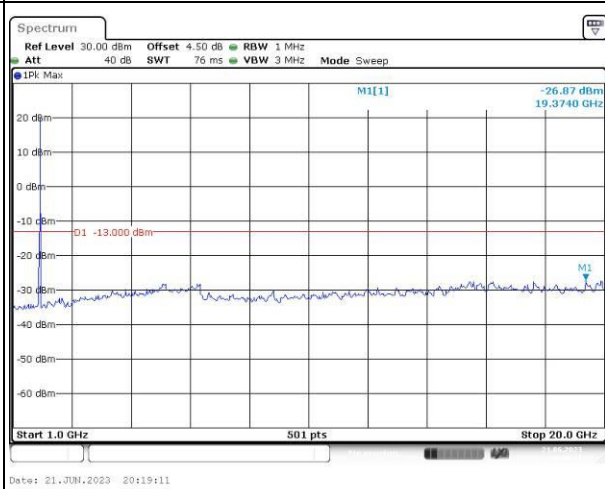
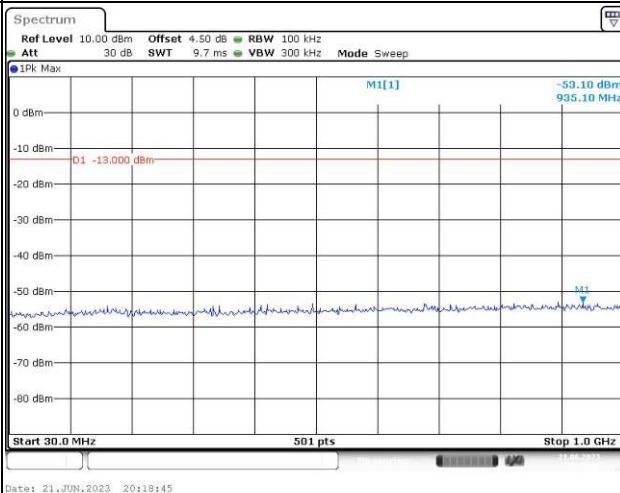
Channel

10MHz Bandwidth QPSK

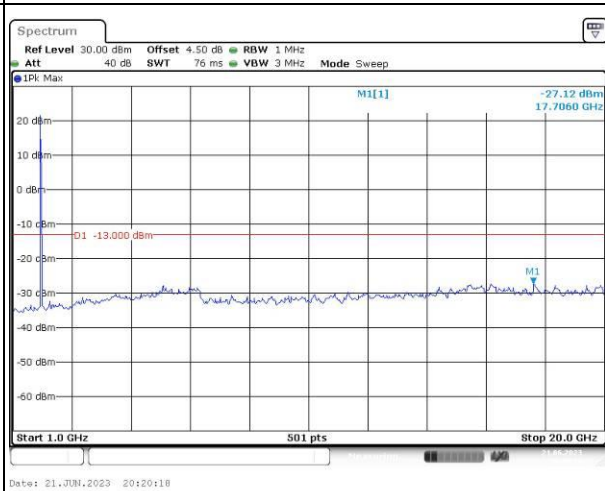
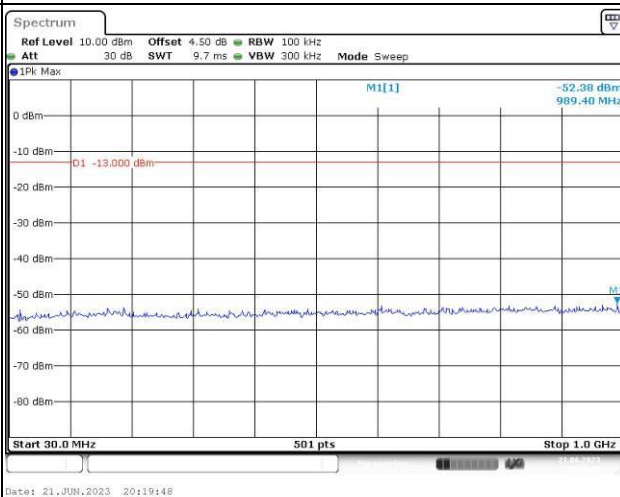
Lowest



Middle



Highest

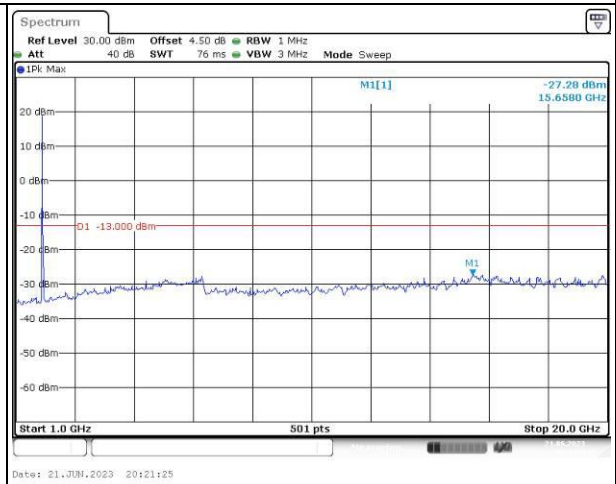
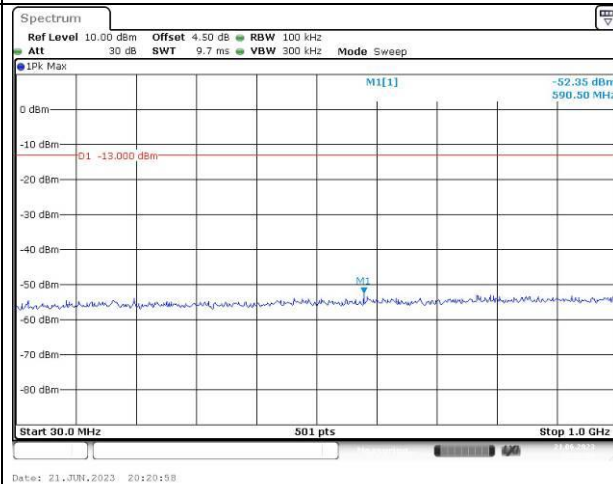


Spurious Emissions at Antenna Terminal

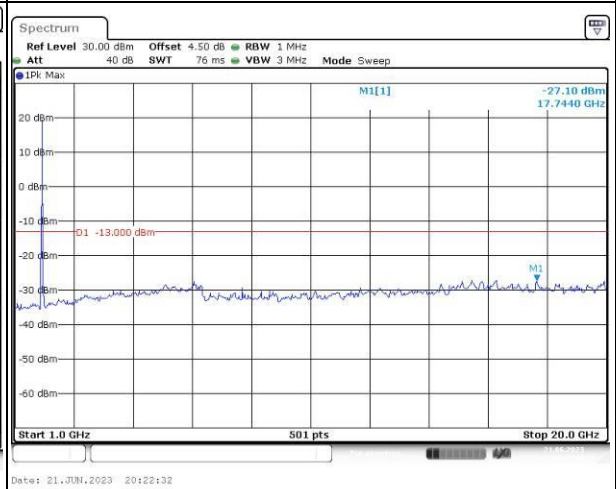
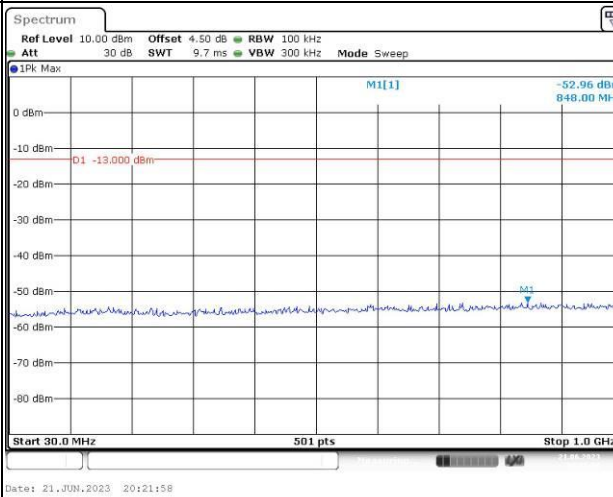
Channel

15MHz Bandwidth QPSK

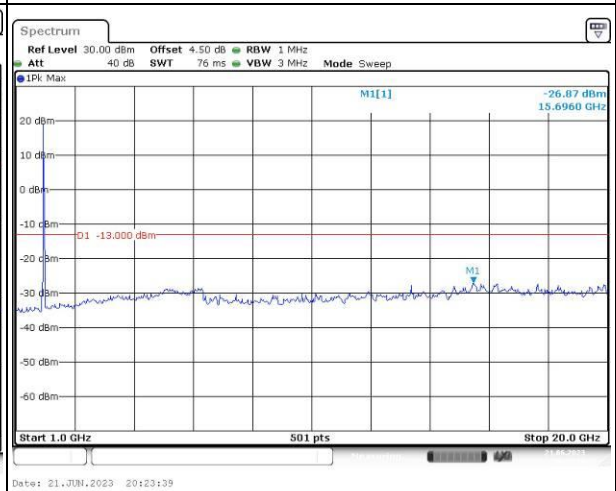
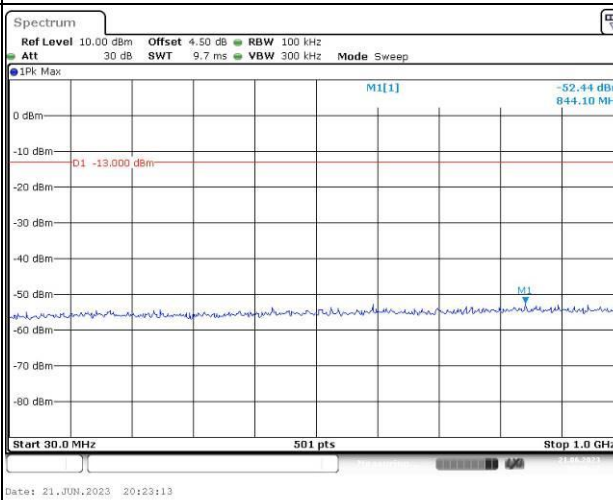
Lowest



Middle



Highest

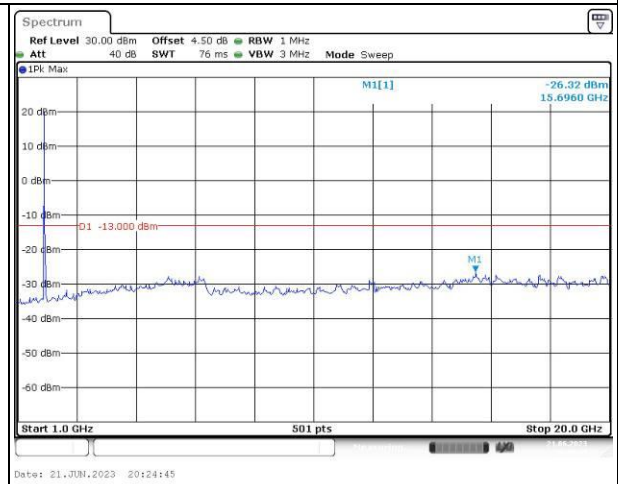
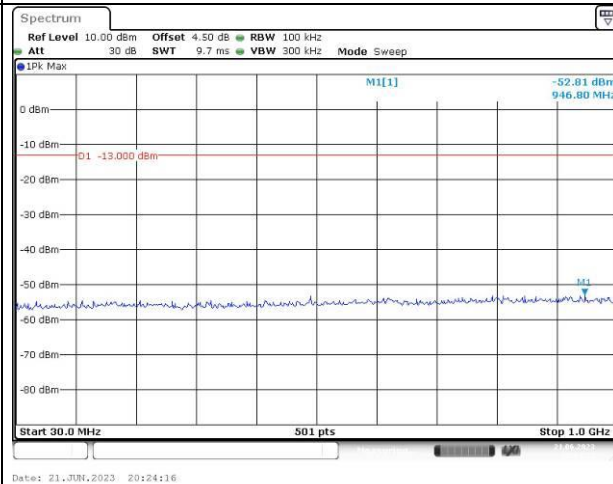


Spurious Emissions at Antenna Terminal

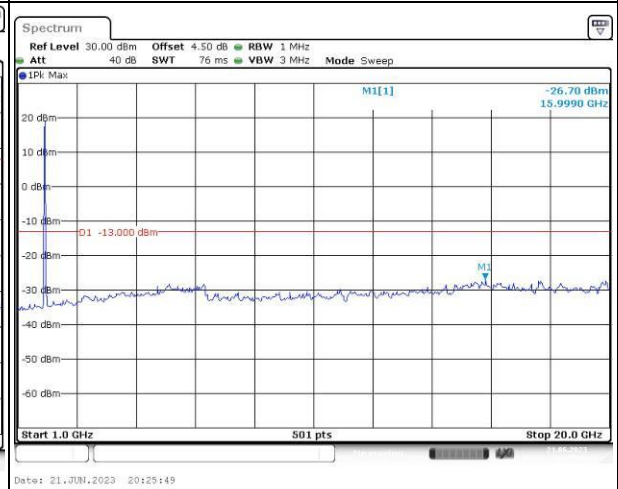
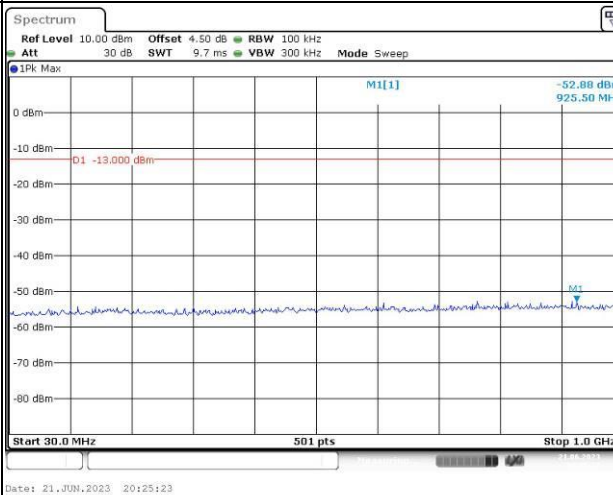
Channel

20MHz Bandwidth QPSK

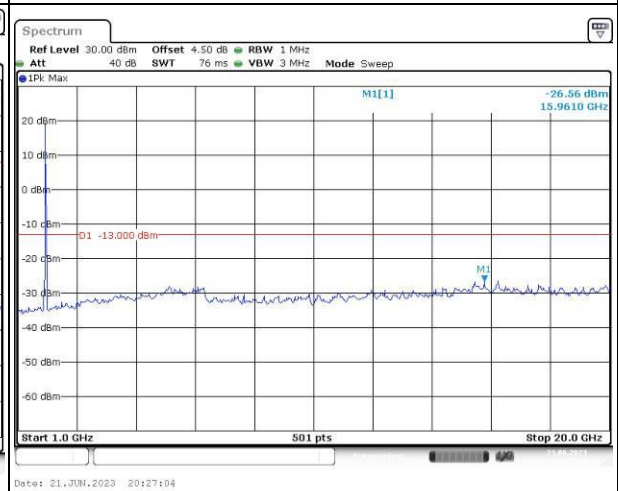
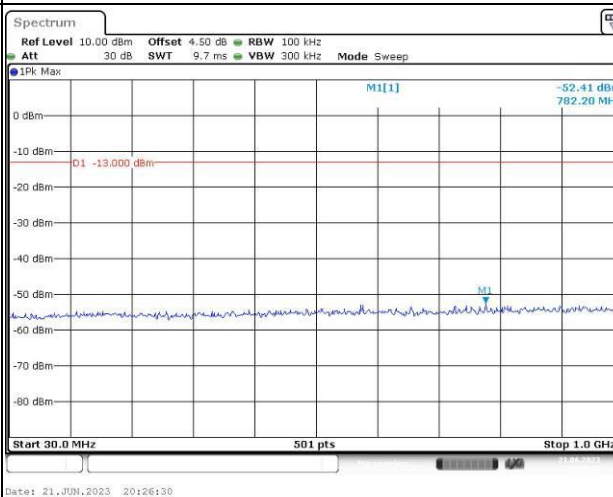
Lowest



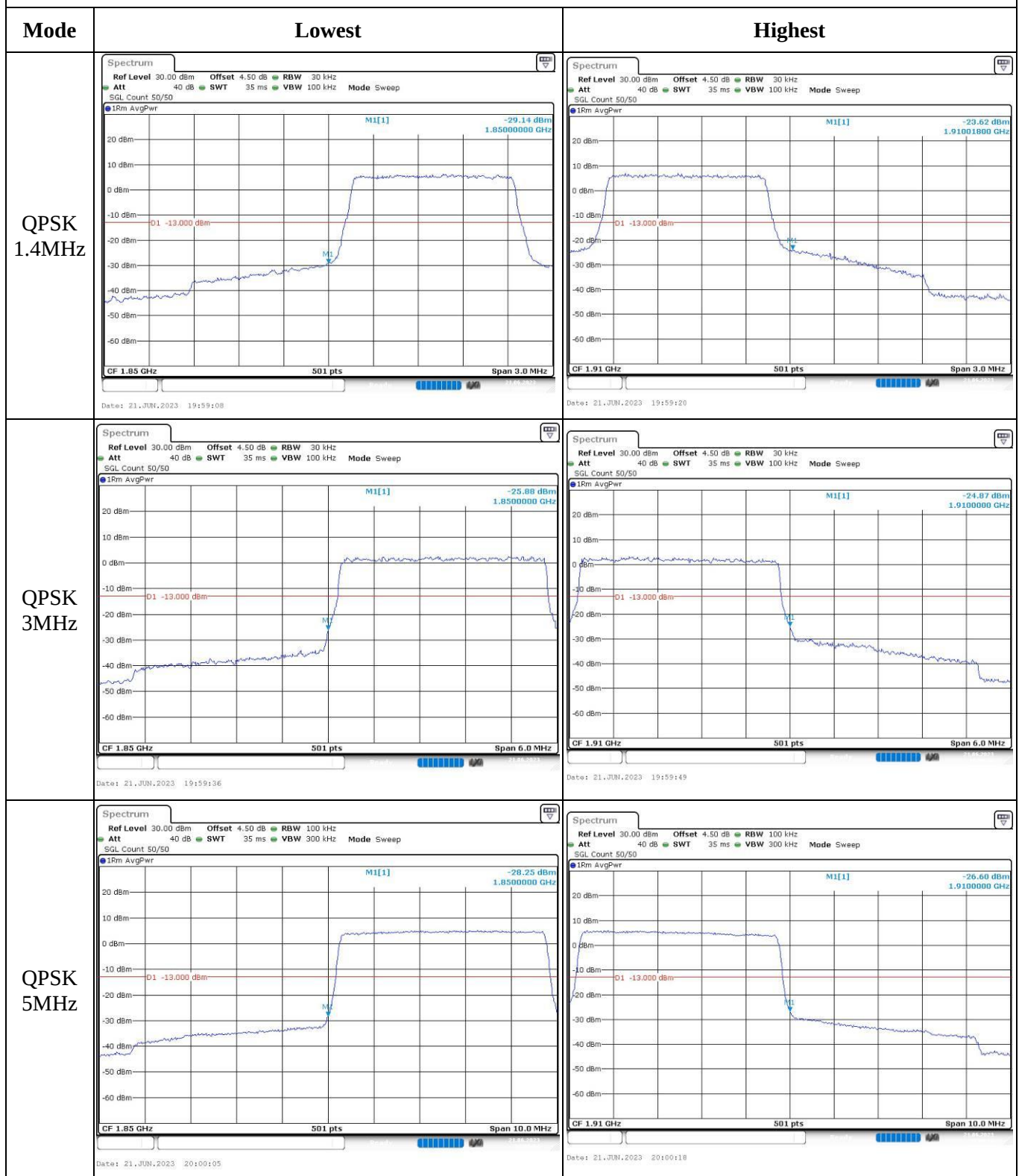
Middle



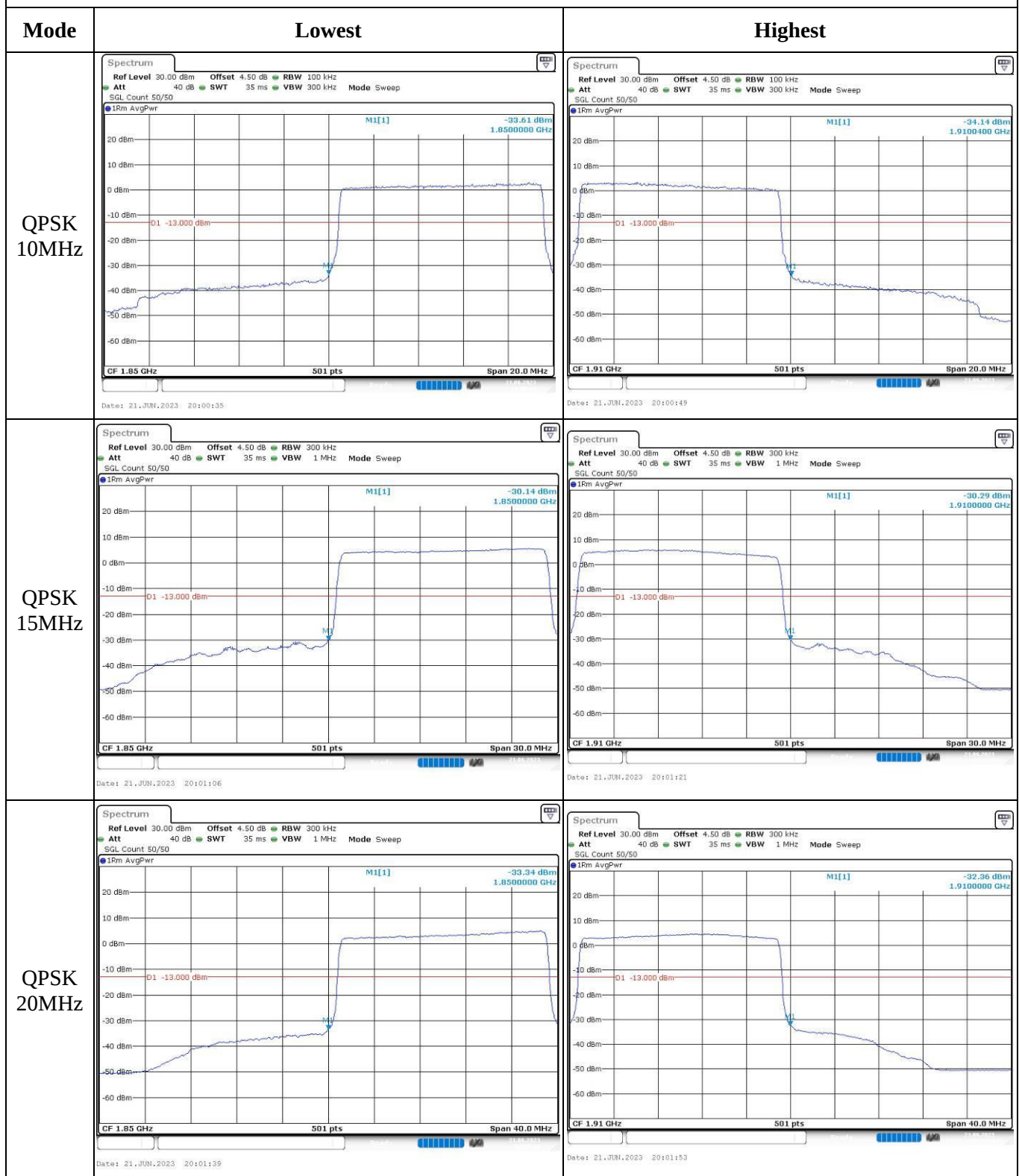
Highest



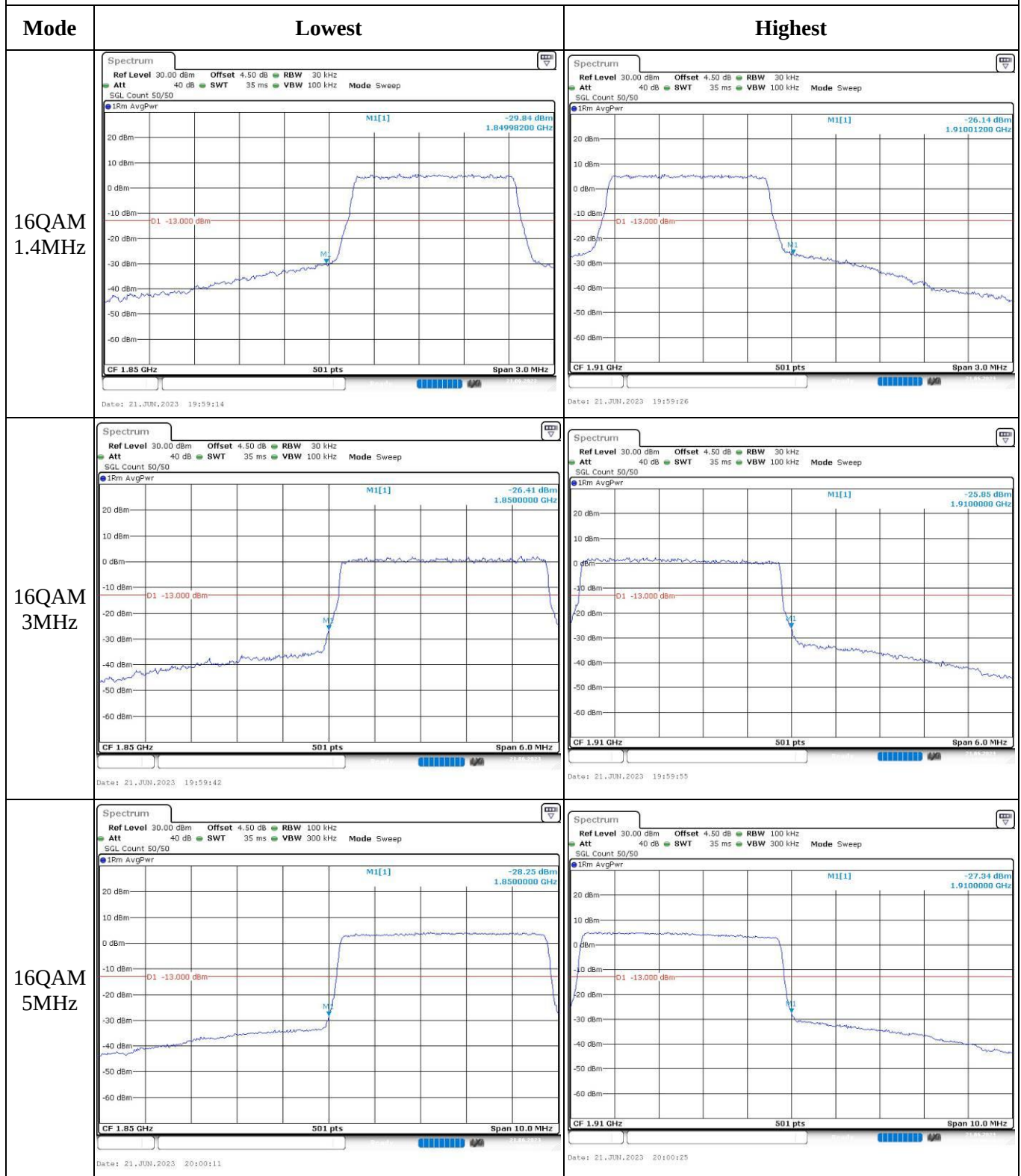
Out of band emission, Band Edge



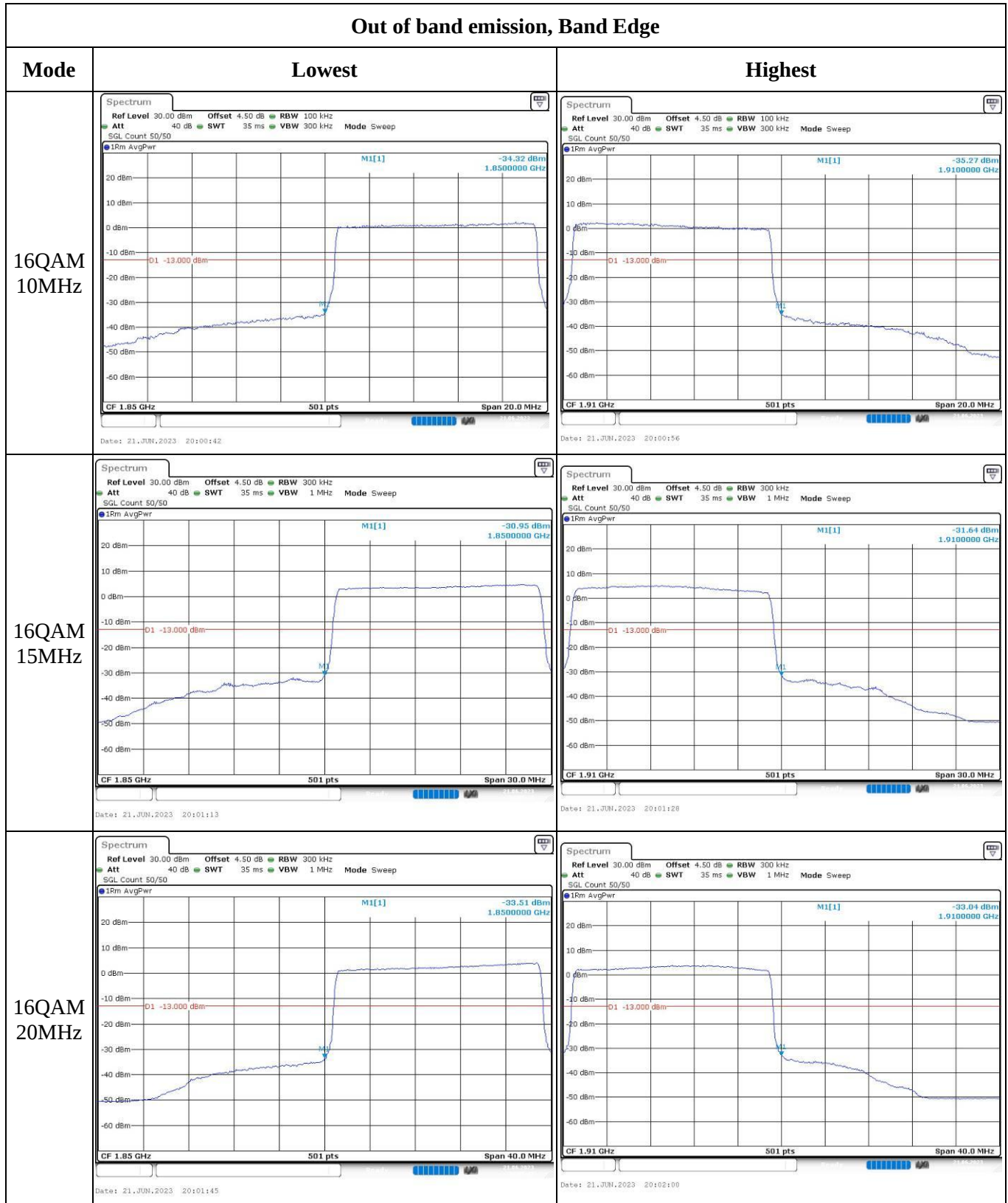
Out of band emission, Band Edge



Out of band emission, Band Edge



Out of band emission, Band Edge



4.6 Antenna Port Test Data and Results for LTE Band 4

Serial Number:	271I-3	Test Date:	2023/06/16~2023/06/22
Test Site:	RF	Test Mode:	Transmitting
Tester:	Zero Luo	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	23.7~27.5	Relative Humidity: (%)	38~59	ATM Pressure: (kPa)	99.8~100.9
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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	2022/7/15	2023/7/14
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
YINSAIGE	Coaxial Cable	SS402	SJ0100001	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	N/A	N/A
ZHAOXIN	DC Power Supply	RXN-6010D	21R6010D0912386	2022/7/15	2023/7/14

** 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	1710.7	1732.5	1754.3
3MHz	1711.5	1732.5	1753.5
5MHz	1712.5	1732.5	1752.5
10MHz	1715	1732.5	1750
15MHz	1717.5	1732.5	1747.5
20MHz	1720	1732.5	1745

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	22.97	22.8	23.12	22.59	30
	RB1#3	22.91	22.9	23.05		
	RB1#5	22.94	22.85	23.1		
	RB3#0	22.93	22.95	22.99		
	RB3#3	22.89	22.95	22.96		
	RB6#0	21.96	21.94	21.84		
1.4MHz 16QAM	RB1#0	22.58	22.7	21.79	22.19	30
	RB1#3	22.63	22.66	21.78		
	RB1#5	22.6	22.72	21.89		
	RB3#0	21.75	21.99	21.93		
	RB3#3	21.75	22.08	21.94		
	RB6#0	21.1	21.28	21.25		
3MHz QPSK	RB1#0	22.94	22.81	22.87	22.46	30
	RB1#8	22.93	22.82	22.84		
	RB1#14	22.99	22.87	22.83		
	RB6#0	21.96	22.04	21.83		
	RB6#9	21.91	21.94	21.95		
	RB15#0	21.97	21.98	21.93		
3MHz 16QAM	RB1#0	22.73	21.66	21.94	22.2	30
	RB1#8	22.67	21.69	22		
	RB1#14	22.72	21.73	21.97		
	RB6#0	21.08	21.15	20.95		
	RB6#9	21.05	21.22	20.95		
	RB15#0	20.95	21.08	21		
5MHz QPSK	RB1#0	22.86	22.83	22.99	22.46	30
	RB1#13	22.85	22.91	22.99		
	RB1#24	22.99	22.89	22.89		
	RB15#0	21.96	21.89	22.01		
	RB15#10	21.92	21.92	22		
	RB25#0	21.9	22.02	21.92		
5MHz 16QAM	RB1#0	22.06	21.62	21.16	21.58	30
	RB1#13	22.02	21.67	21.15		
	RB1#24	22.11	21.63	21.14		
	RB15#0	20.86	21.08	21.08		
	RB15#10	20.84	21.03	21.03		
	RB25#0	21.01	20.97	21.06		
10MHz QPSK	RB1#0	23.02	22.92	22.93	22.51	30
	RB1#25	23.04	22.96	22.94		
	RB1#49	23.02	23.03	22.95		

	RB25#0	21.82	21.99	21.98		
	RB25#25	21.86	22.06	21.85		
	RB50#0	21.87	21.91	21.96		
10MHz 16QAM	RB1#0	22.08	21.4	22.21	21.73	30
	RB1#25	22.13	21.41	22.26		
	RB1#49	22.1	21.43	22.25		
	RB25#0	21.06	21.15	20.97		
	RB25#25	21.07	21.59	20.95		
	RB50#0	21.06	21.01	21.17		
15MHz QPSK	RB1#0	22.99	22.8	22.95	22.55	30
	RB1#38	23.04	22.81	22.94		
	RB1#74	23.08	22.94	22.98		
	RB36#0	21.9	21.86	21.87		
	RB36#39	21.87	22.01	21.88		
	RB75#0	21.99	21.94	21.94		
15MHz 16QAM	RB1#0	21.99	22.26	22.22	21.75	30
	RB1#38	22.13	22.26	22.18		
	RB1#74	22.16	22.28	22.27		
	RB36#0	21.04	21.03	21.14		
	RB36#39	21.08	21.09	21.18		
	RB75#0	20.98	21.12	21.06		
20MHz QPSK	RB1#0	22.41	22.48	22.4	22.38	30
	RB1#50	22.89	22.91	22.79		
	RB1#99	22.47	22.48	22.37		
	RB50#0	21.66	21.67	21.72		
	RB50#50	21.74	21.69	21.62		
	RB100#0	21.74	21.73	21.68		
20MHz 16QAM	RB1#0	21.64	21.67	21.93	21.86	30
	RB1#50	22.24	22.18	22.39		
	RB1#99	21.81	21.69	21.89		
	RB50#0	20.71	20.74	20.76		
	RB50#50	20.78	20.76	20.66		
	RB100#0	20.82	20.78	20.78		

Note: EIRP=Conducted Power(dBm) - Lc(dB) + Gr(dBi)

Result:**Pass**

Peak-to-average Ratio(PAR)					
Test Bandwidth & Modulation	Resource Block & RB offset	Peak-to-average Ratio(dB)			Limit (dB)
		Lowest Channel	Middle Channel	Highest Channel	
20MHz QPSK	RB1#0	4.93	5.13	5.59	13
	RB100#0	4.46	4.32	4.52	13
20MHz 16QAM	RB1#0	6.09	6.2	6.06	13
	RB100#0	5.94	5.97	6.09	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	1.254	1.254	1.254
1.4MHz 16QAM	1.09	1.108	1.09	1.254	1.26	1.254
3MHz QPSK	2.695	2.695	2.695	3.012	3.012	2.988
3MHz 16QAM	2.695	2.695	2.695	3.012	3.012	3.012
5MHz QPSK	4.511	4.491	4.531	5	5	5
5MHz 16QAM	4.551	4.531	4.511	5.02	5.02	4.98
10MHz QPSK	8.942	8.982	8.942	9.76	9.8	9.76
10MHz 16QAM	8.982	8.942	8.942	9.84	9.84	9.76
15MHz QPSK	13.473	13.533	13.533	15.06	15.06	15.06
15MHz 16QAM	13.593	13.533	13.533	15.18	15	15
20MHz QPSK	18.044	18.044	18.044	19.6	19.76	19.68
20MHz 16QAM	18.044	17.884	18.044	19.76	19.6	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	3.7	1711.094	1710.00	1753.900	1755
	-20	3.7	1711.020	1710.00	1753.975	1755
	-10	3.7	1711.062	1710.00	1753.933	1755
	0	3.7	1711.073	1710.00	1753.922	1755
	10	3.7	1711.026	1710.00	1753.974	1755
	20	3.7	1711.058	1710.00	1753.978	1755
	30	3.7	1711.022	1710.00	1753.974	1755
	40	3.7	1711.061	1710.00	1753.933	1755
	50	3.7	1711.083	1710.00	1753.918	1755
Frequency Stability vs. Voltage	20	3.3	1711.028	1710.00	1753.970	1755
	20	4.2	1711.091	1710.00	1753.905	1755
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	3.7	1711.055	1710.00	1754.087	1755
	-20	3.7	1711.026	1710.00	1754.083	1755
	-10	3.7	1711.092	1710.00	1754.006	1755
	0	3.7	1711.086	1710.00	1754.011	1755
	10	3.7	1711.087	1710.00	1754.027	1755
	20	3.7	1711.058	1710.00	1754.022	1755
	30	3.7	1711.045	1710.00	1754.096	1755
	40	3.7	1711.011	1710.00	1754.082	1755
	50	3.7	1711.047	1710.00	1754.055	1755
Frequency Stability vs. Voltage	20	3.3	1711.024	1710.00	1754.075	1755
	20	4.2	1711.074	1710.00	1754.022	1755
Result:					Pass	