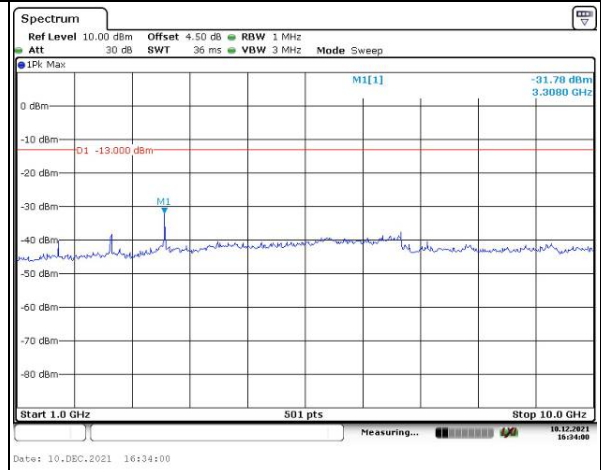
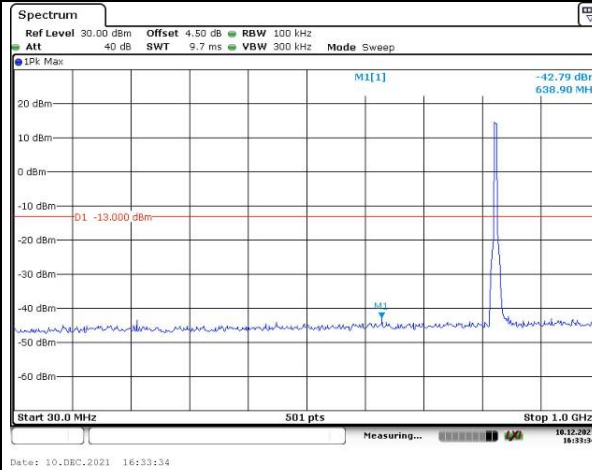


Spurious Emissions at Antenna Terminal

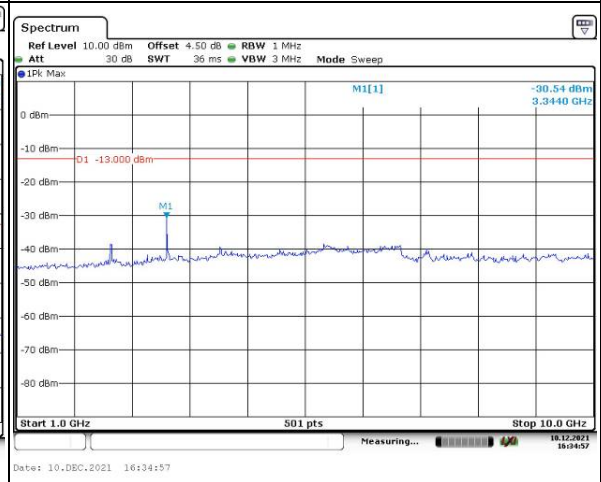
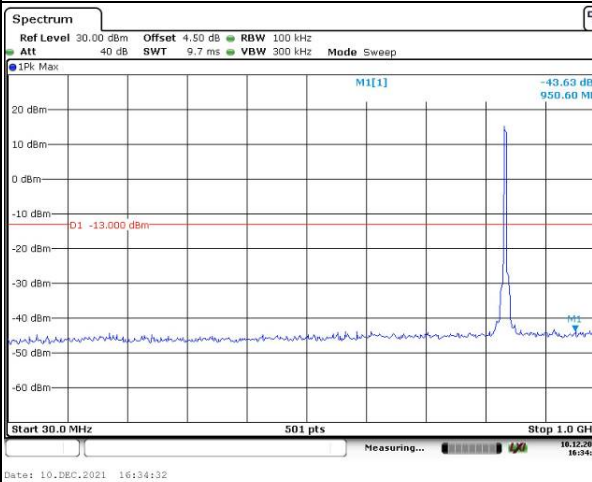
Channel

5MHz Bandwidth QPSK

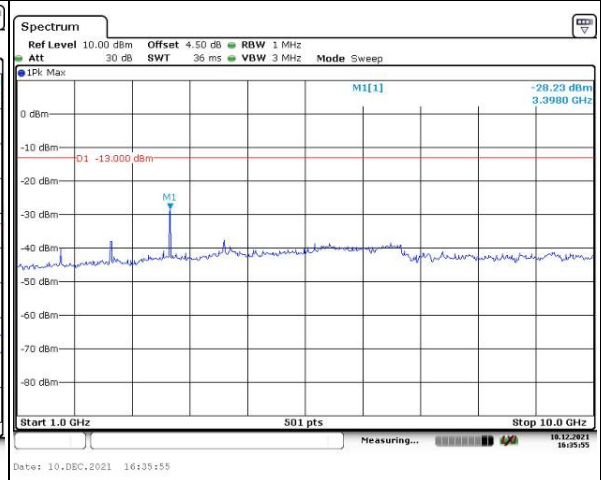
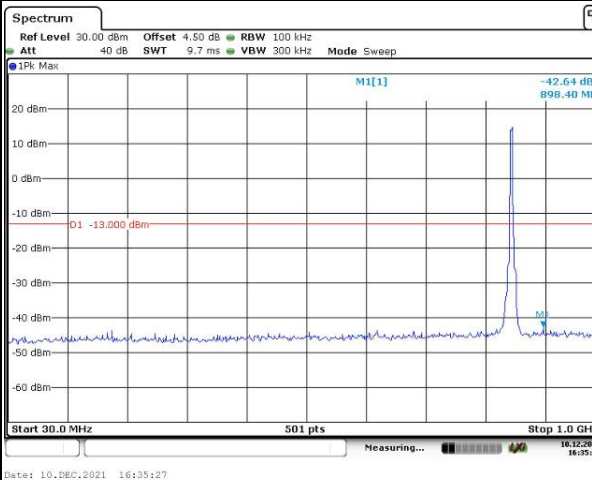
Lowest



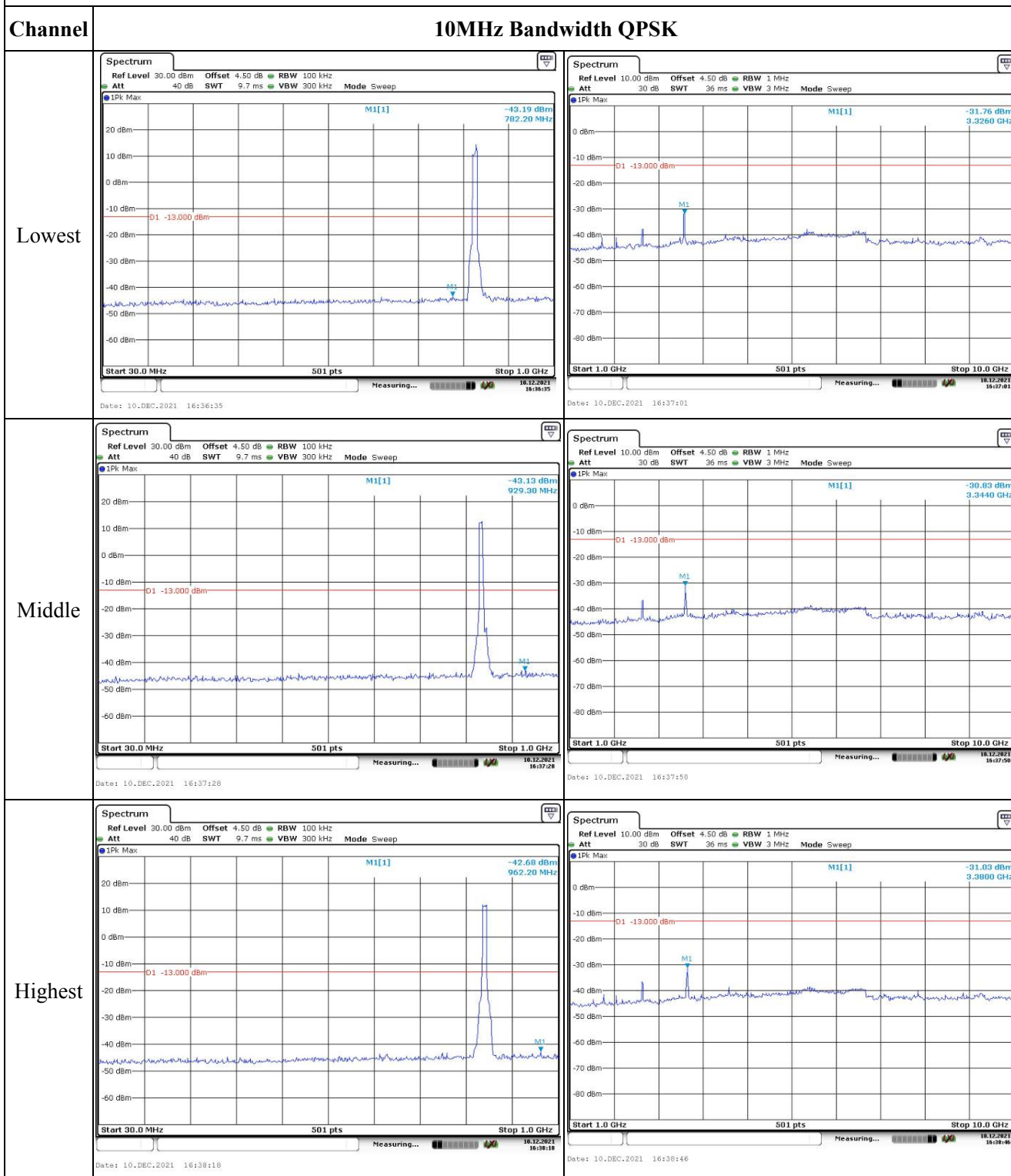
Middle



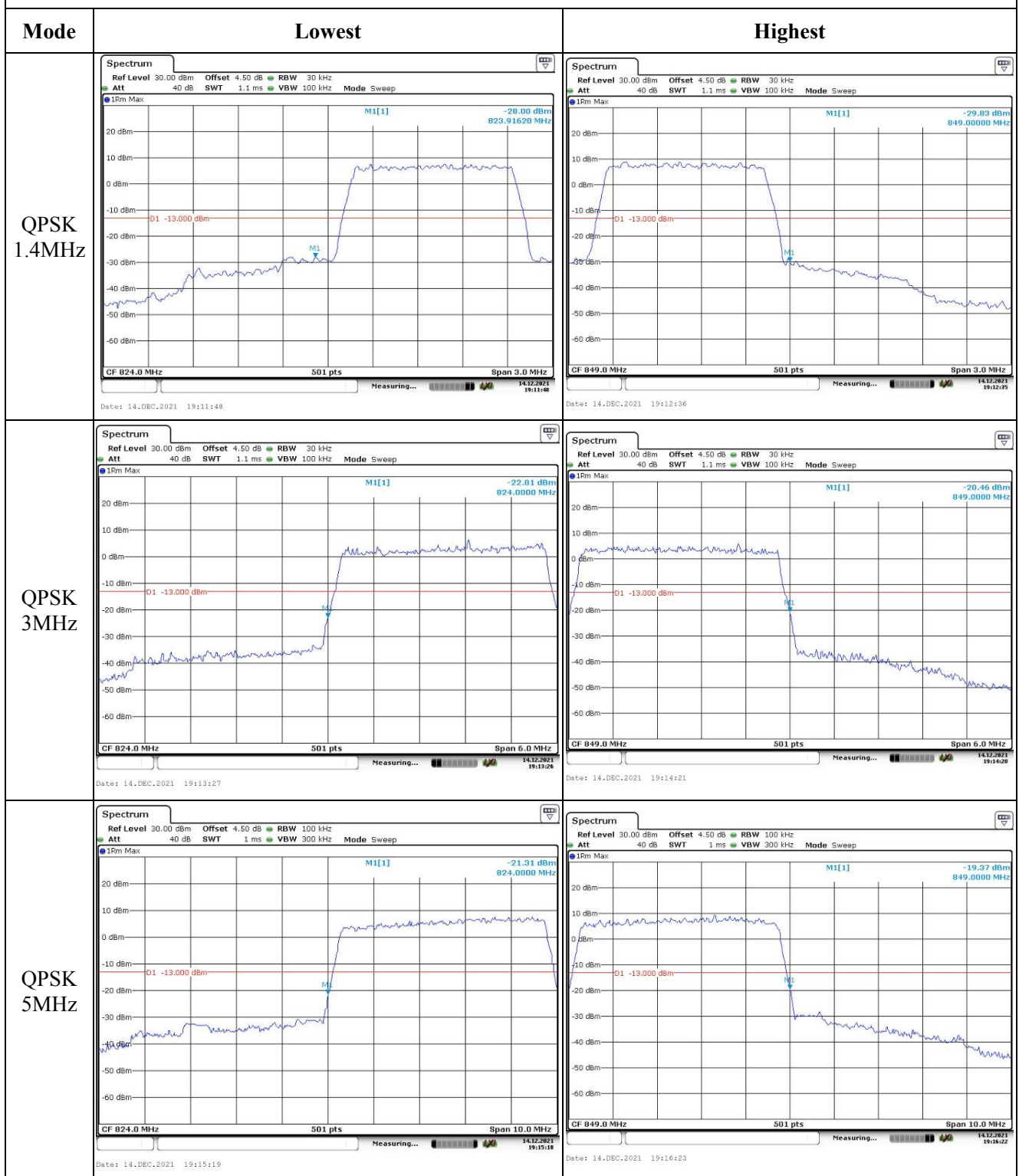
Highest



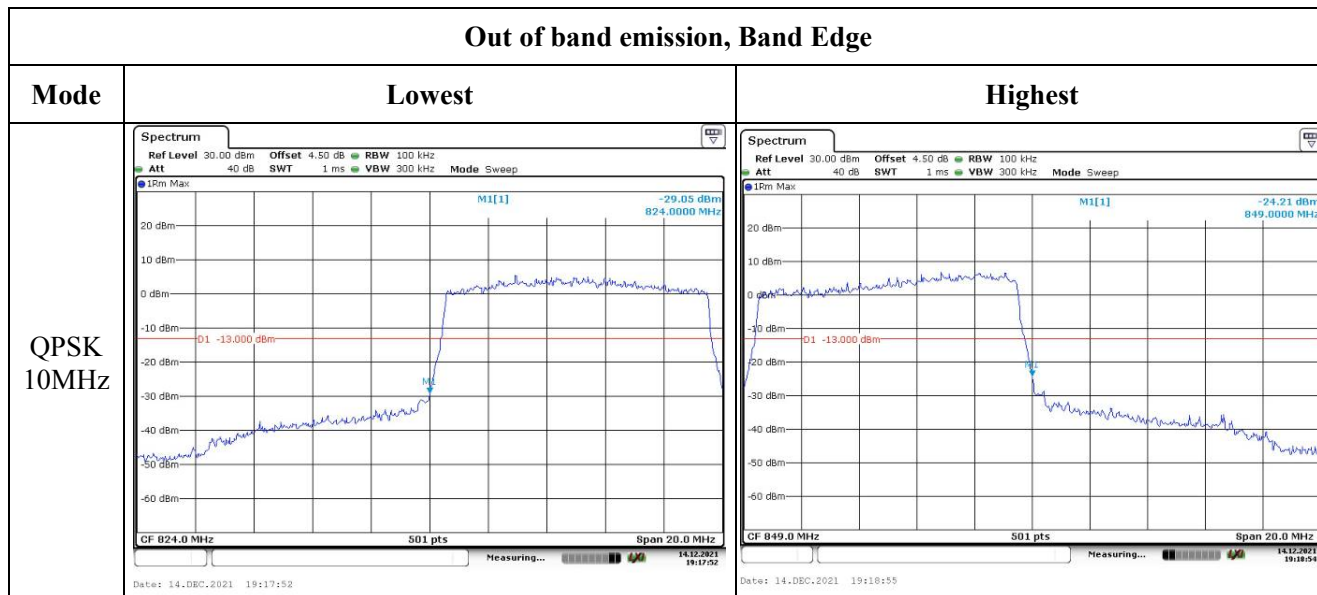
Spurious Emissions at Antenna Terminal



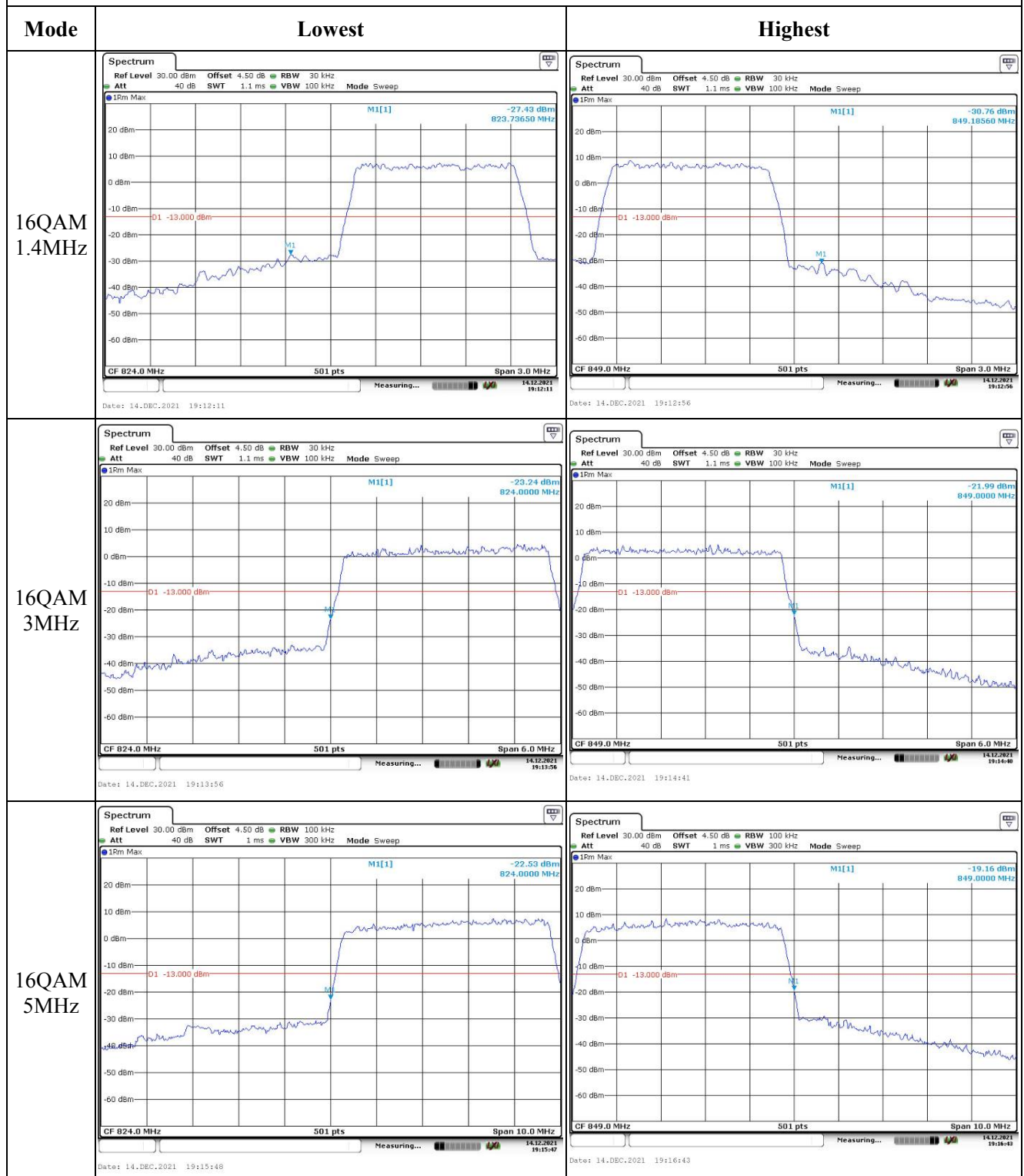
Out of band emission, Band Edge



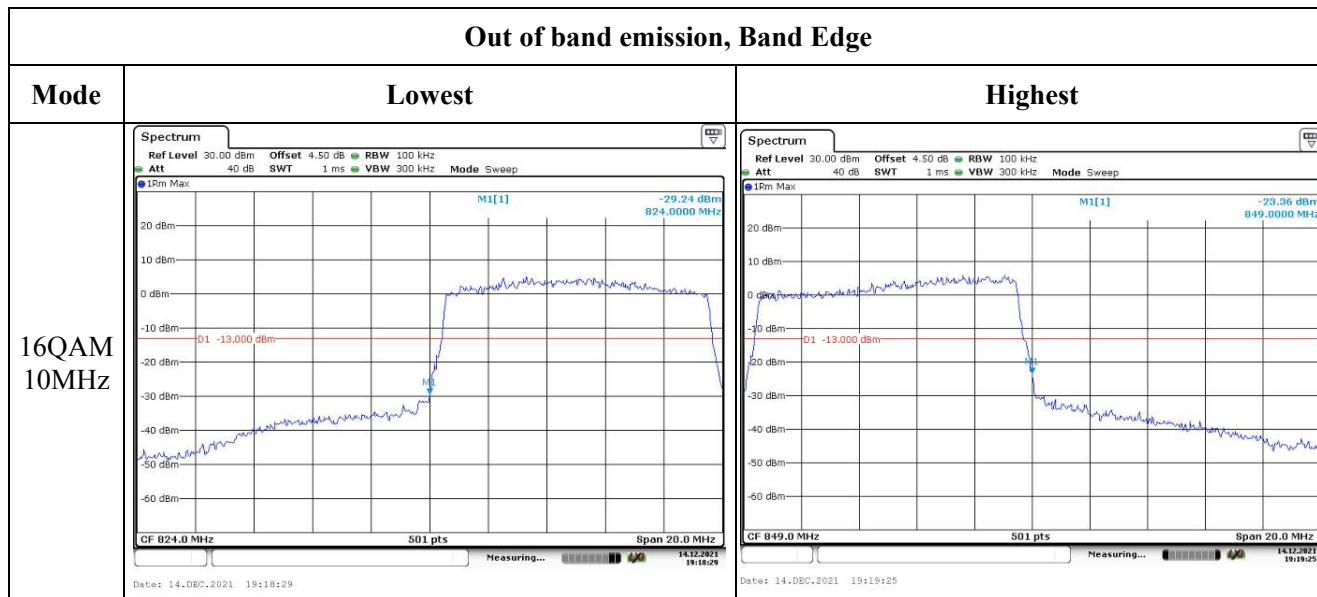
Out of band emission, Band Edge



Out of band emission, Band Edge



Out of band emission, Band Edge



4.9 Antenna Port Test Data and Results for LTE Band 12

Serial Number:	CR21110023-RF-S1	Test Date:	2021-11-29~2022-01-06
Test Site:	RF	Test Mode:	Transmitting
Tester:	Wolf Mo	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	22.1~25.9	Relative Humidity: (%)	60~66	ATM Pressure: (kPa)	101.2~101.4
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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	2021/7/22	2022/7/21
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554403	Each time	N/A
Weinschel	Coaxial Attenuators	53-20-34	LN751	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	149218	2021/7/22	2022/7/21
BACL	TEMP&HUMI Test Chamber	BTH-150	30026	2021/7/22	2022/7/22
UNI-T	Multimeter	UT39A+	C210582554	2021/9/30	2022/9/30
E-Microwave	Two-way Splitter	ODP-1-6	OE0120176	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 12▲:

Antenna Gain (dBi):	0.17	Antenna Gain (dBd):	-1.98	Cable Loss (dB):	0
Operation Voltage(V _{DC}):					
Lowest:	3.5	Normal:	3.7	Highest:	4.2

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	23.01	22.92	23.09	21.14	34.77
	RB1#3	22.94	23.08	22.94		
	RB1#5	22.93	23.00	22.90		
	RB3#0	23.00	23.04	23.09		
	RB3#3	22.94	23.12	22.96		
	RB6#0	22.07	22.47	21.90		
1.4MHz 16QAM	RB1#0	22.54	22.49	21.80	21.06	34.77
	RB1#3	22.51	23.04	21.59		
	RB1#5	22.56	23.04	21.64		
	RB3#0	22.34	22.22	22.24		
	RB3#3	22.27	22.32	22.06		
	RB6#0	21.42	21.36	21.25		
3MHz QPSK	RB1#0	22.99	22.85	23.16	21.18	34.77
	RB1#8	22.99	23.06	23.10		
	RB1#14	23.07	23.00	22.95		
	RB6#0	22.10	22.01	22.25		
	RB6#9	22.08	22.41	22.00		
	RB15#0	22.07	22.40	22.20		
3MHz 16QAM	RB1#0	22.45	22.53	21.85	21.12	34.77
	RB1#8	22.40	23.10	21.76		
	RB1#14	22.36	23.10	21.72		
	RB6#0	21.28	21.47	21.61		
	RB6#9	21.40	21.47	21.34		
	RB15#0	21.26	21.40	21.34		
5MHz QPSK	RB1#0	22.91	22.84	22.83	21.18	34.77
	RB1#13	23.08	23.01	22.97		
	RB1#24	23.16	23.09	22.74		
	RB15#0	22.06	21.99	21.88		
	RB15#10	22.09	22.39	22.24		
	RB25#0	22.09	22.46	22.21		
5MHz 16QAM	RB1#0	21.11	21.73	21.41	20.38	34.77
	RB1#13	21.17	22.36	21.83		
	RB1#24	21.25	21.98	21.63		
	RB15#0	21.27	21.29	21.10		

	RB15#10	21.49	21.24	21.51		
	RB25#0	21.50	21.34	21.38		
10MHz QPSK	RB1#0	22.85	23.00	23.06	21.25	34.77
	RB1#25	23.07	22.93	23.23		
	RB1#49	23.12	23.05	23.18		
	RB25#0	22.11	22.04	22.35		
	RB25#25	22.13	21.97	22.27		
	RB50#0	22.19	22.47	22.10		
10MHz 16QAM	RB1#0	22.14	22.29	21.33	20.6	34.77
	RB1#25	22.16	22.58	21.61		
	RB1#49	22.49	22.12	21.64		
	RB25#0	21.41	21.48	21.47		
	RB25#25	21.44	21.33	21.51		
	RB50#0	21.08	21.49	21.21		

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	5.77	6.00	5.54	13
	RB50#0	5.86	5.62	5.62	13
10MHz 16QAM	RB1#0	7.28	6.87	6.58	13
	RB50#0	6.75	6.61	6.58	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	1.096	1.102	1.102	1.260	1.260	1.260
1.4MHz 16QAM	1.108	1.096	1.102	1.260	1.254	1.260
3MHz QPSK	2.695	2.695	2.683	3.000	3.000	3.012
3MHz 16QAM	2.695	2.683	2.695	3.012	3.024	3.024
5MHz QPSK	4.511	4.511	4.511	5.000	5.000	5.020
5MHz 16QAM	4.511	4.551	4.511	4.980	5.040	5.020
10MHz QPSK	8.981	8.981	8.942	9.760	9.760	9.760
10MHz 16QAM	8.981	8.981	8.942	9.800	9.800	9.760

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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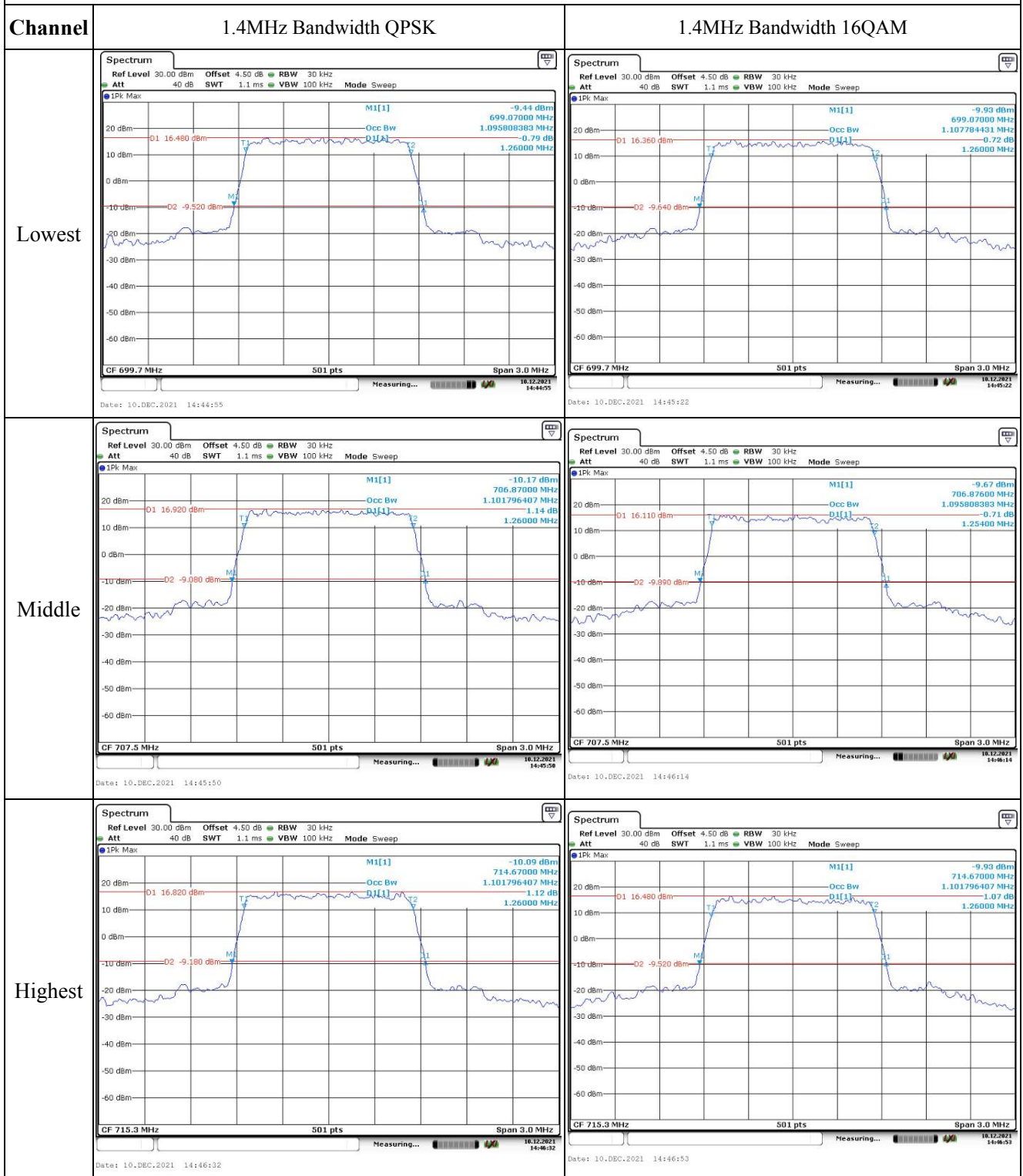
FCC §2.1055, §27.54: Frequency Stability

Test Mode:	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	3.7	699.529	699.00	715.471	716.00
	-20	3.7	699.525	699.00	715.472	716.00
	-10	3.7	699.526	699.00	715.471	716.00
	0	3.7	699.522	699.00	715.470	716.00
	10	3.7	699.520	699.00	715.471	716.00
	20	3.7	699.529	699.00	715.471	716.00
	30	3.7	699.525	699.00	715.474	716.00
	40	3.7	699.529	699.00	715.471	716.00
	50	3.7	699.524	699.00	715.471	716.00
Frequency Stability vs. Voltage	20	3.5	699.529	699.00	715.470	716.00
	20	4.2	699.520	699.00	715.471	716.00
Result:					Pass	

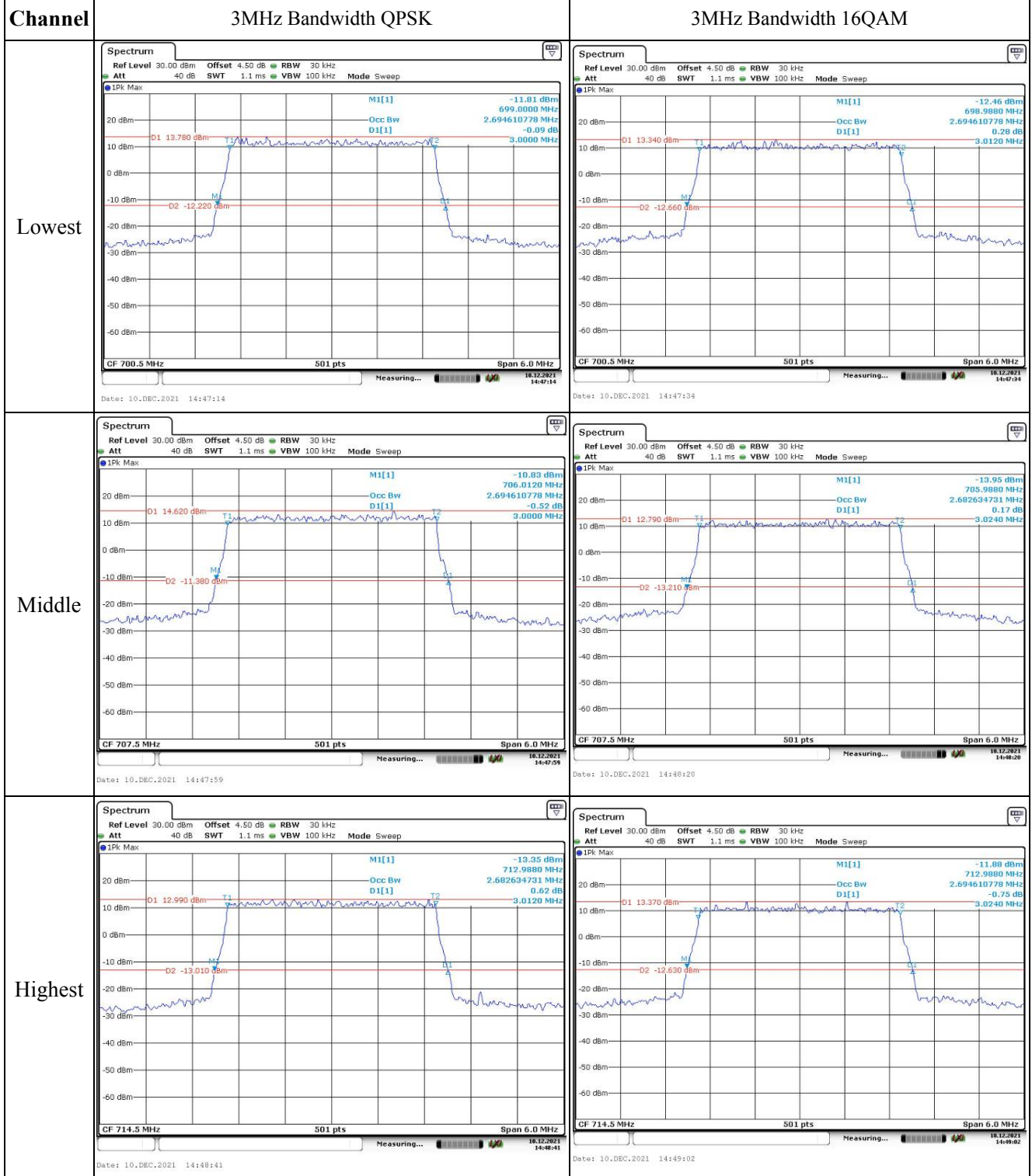
Test Mode:	10M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.7	699.529	699.00	715.471	716.00
	-20	3.7	699.524	699.00	715.471	716.00
	-10	3.7	699.525	699.00	715.470	716.00
	0	3.7	699.529	699.00	715.471	716.00
	10	3.7	699.527	699.00	715.472	716.00
	20	3.7	699.529	699.00	715.471	716.00
	30	3.7	699.529	699.00	715.471	716.00
	40	3.7	699.526	699.00	715.473	716.00
	50	3.7	699.525	699.00	715.471	716.00
Frequency Stability vs. Voltage	20	3.5	699.529	699.00	715.474	716.00
	20	4.2	699.520	699.00	715.471	716.00
Result:					Pass	

Test Plots:

Occupied Bandwidth



Occupied Bandwidth



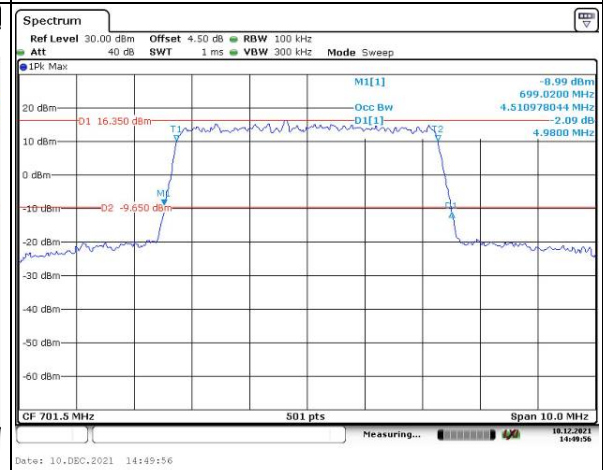
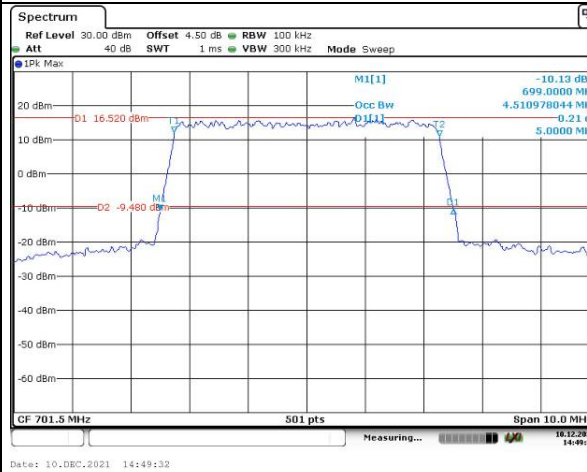
Occupied Bandwidth

Channel

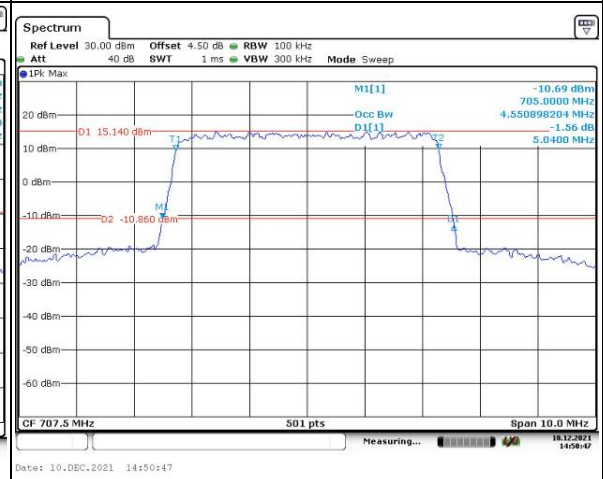
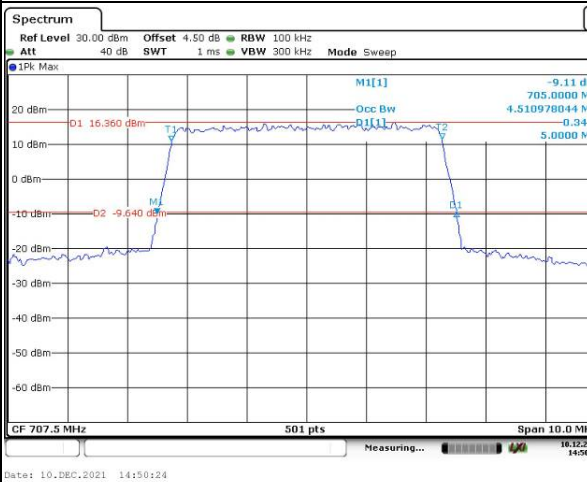
5MHz Bandwidth QPSK

5MHz Bandwidth 16QAM

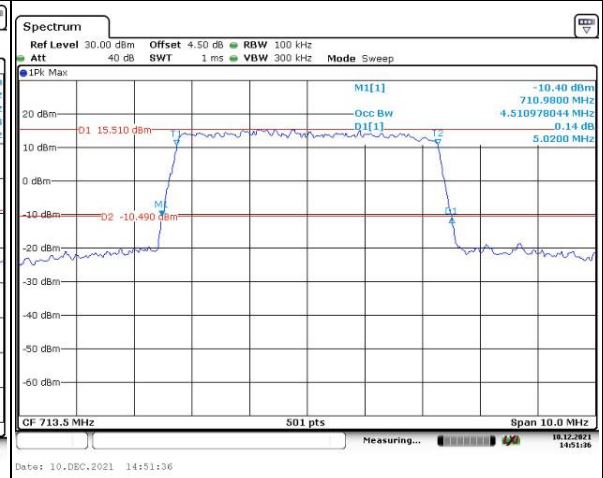
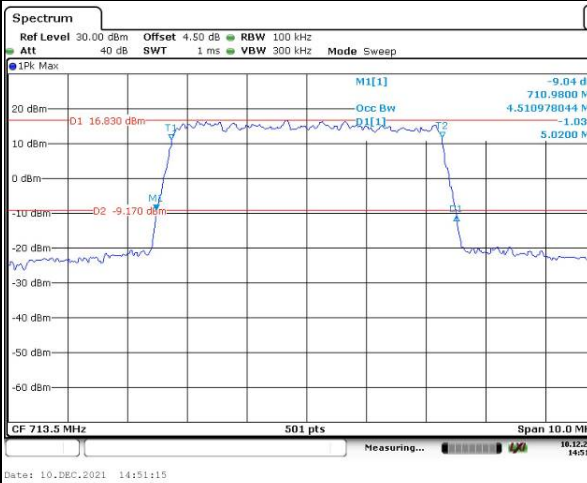
Lowest



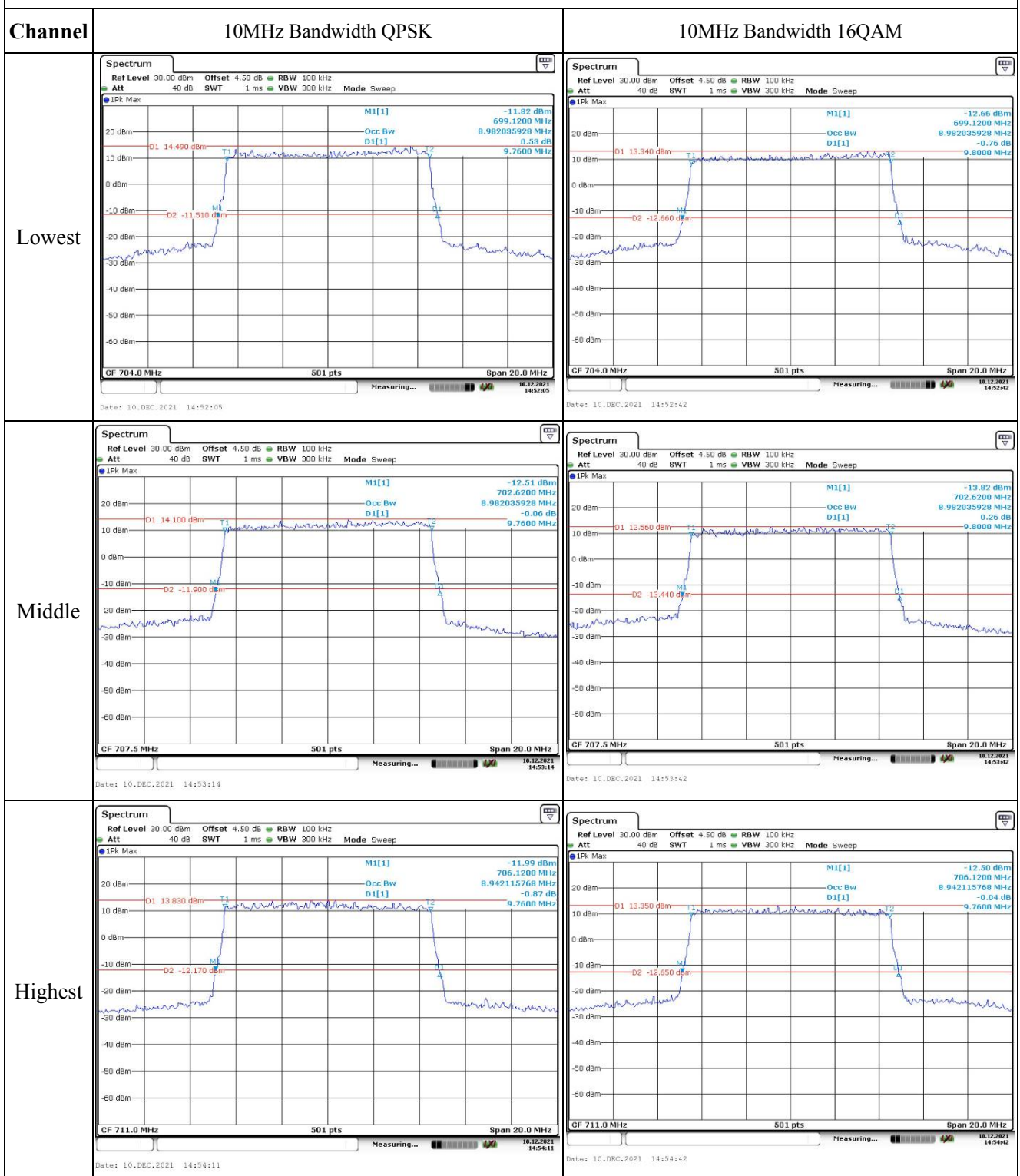
Middle



Highest



Occupied Bandwidth

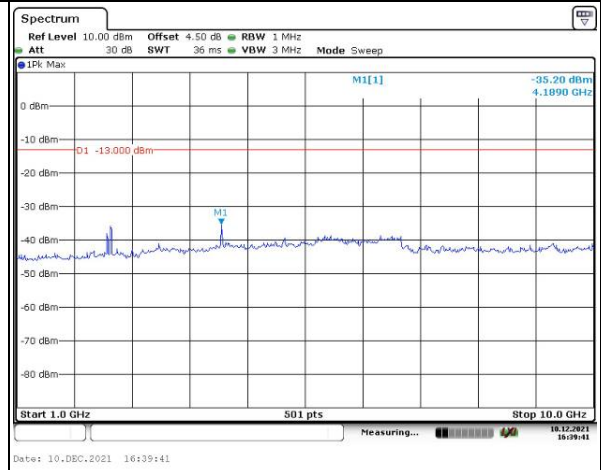
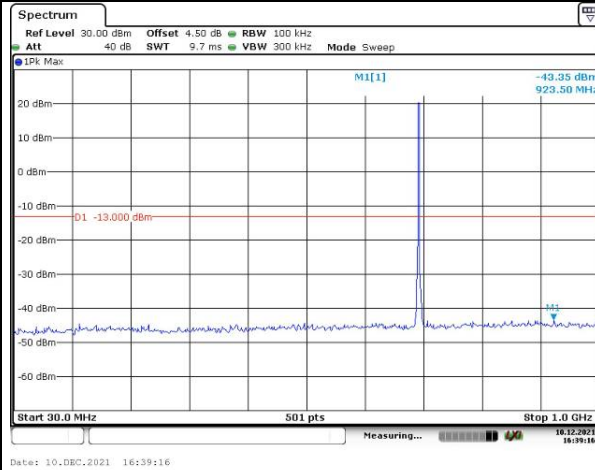


Spurious Emissions at Antenna Terminal

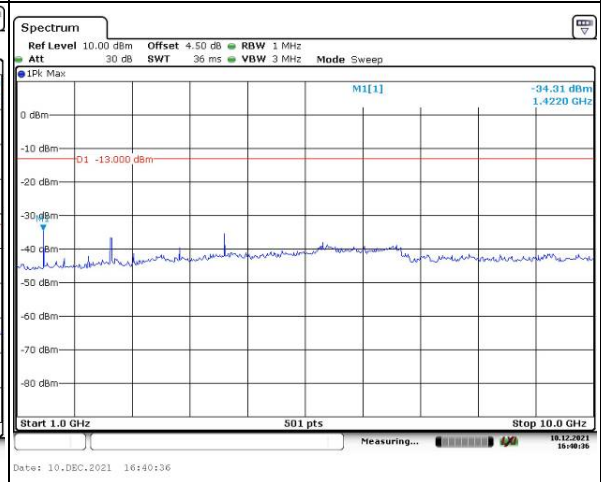
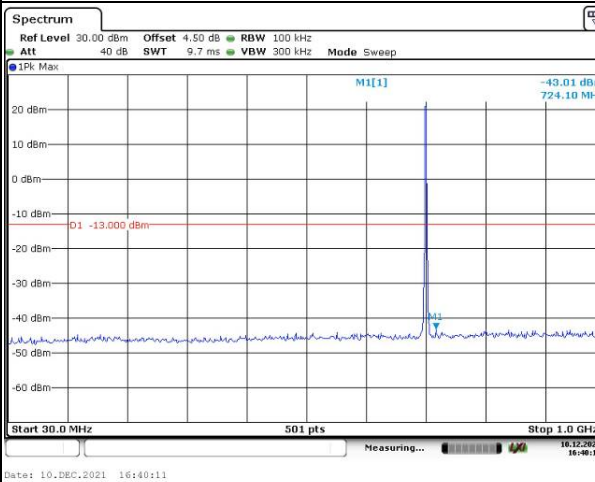
Channel

1.4MHz Bandwidth QPSK

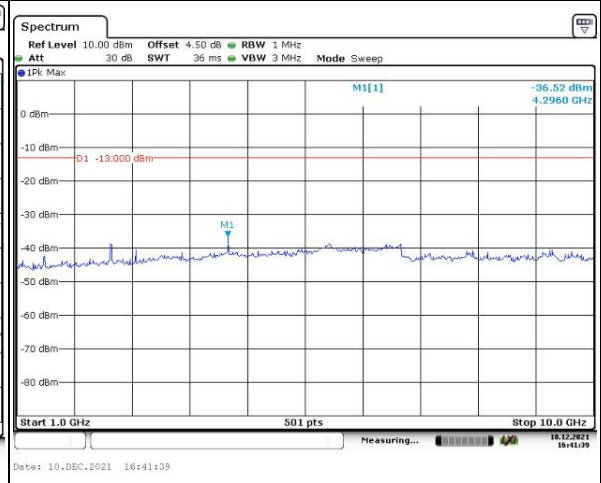
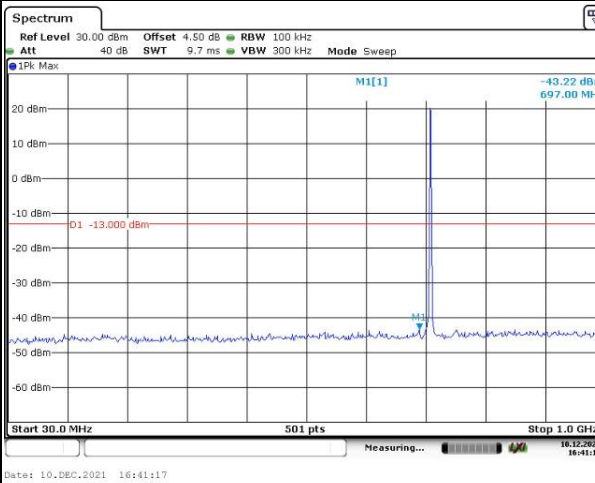
Lowest



Middle



Highest

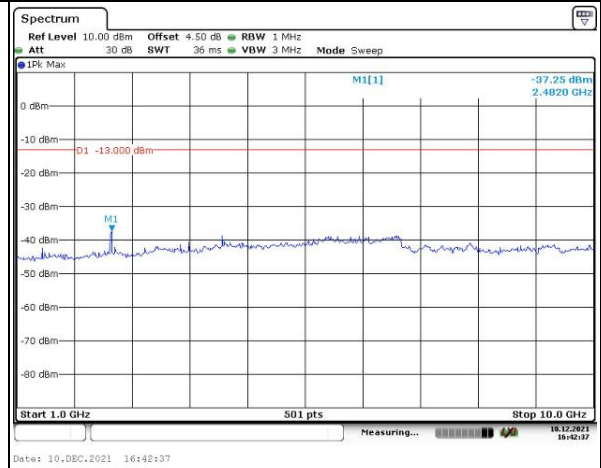
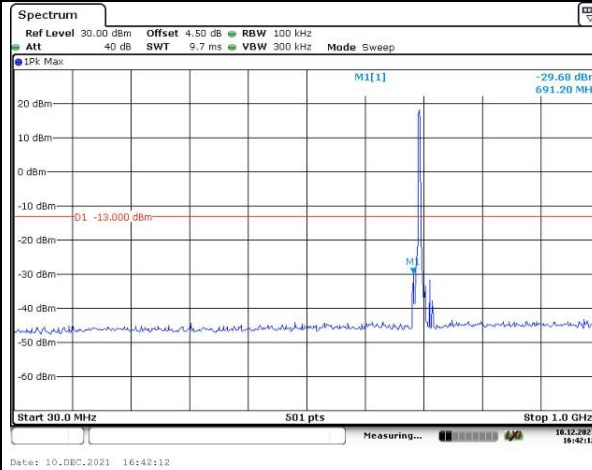


Spurious Emissions at Antenna Terminal

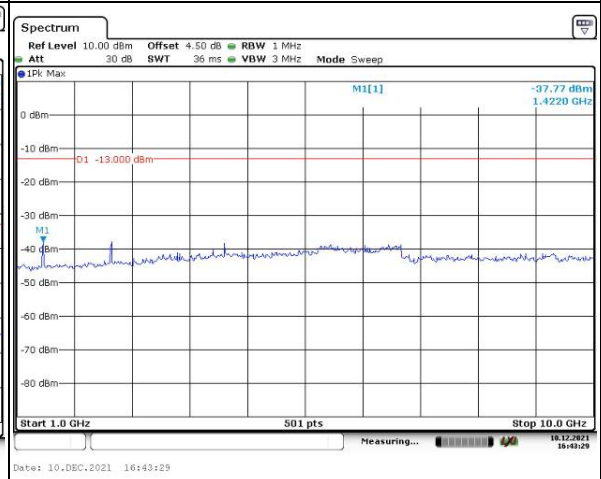
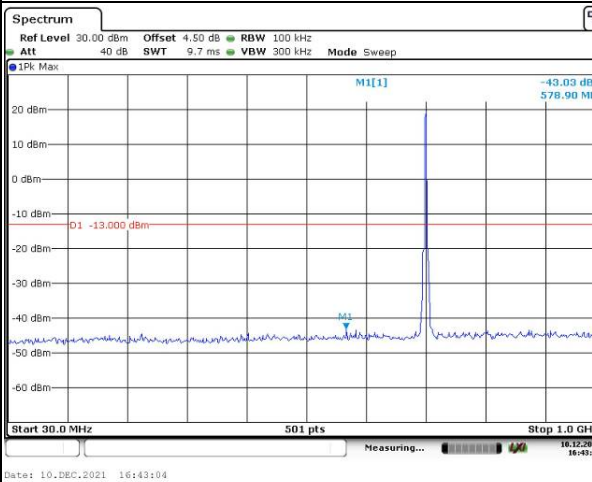
Channel

3MHz Bandwidth QPSK

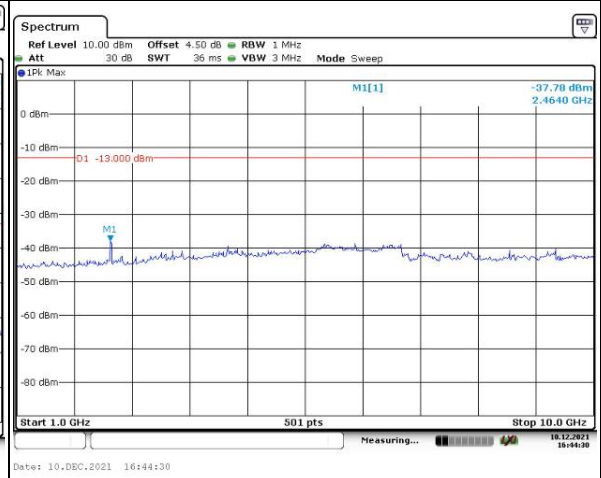
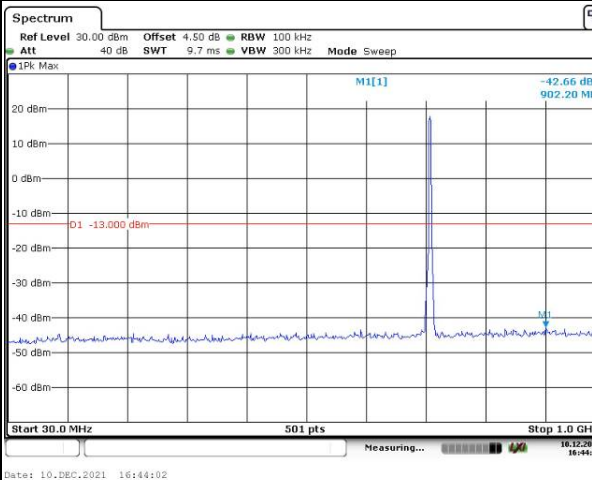
Lowest



Middle



Highest

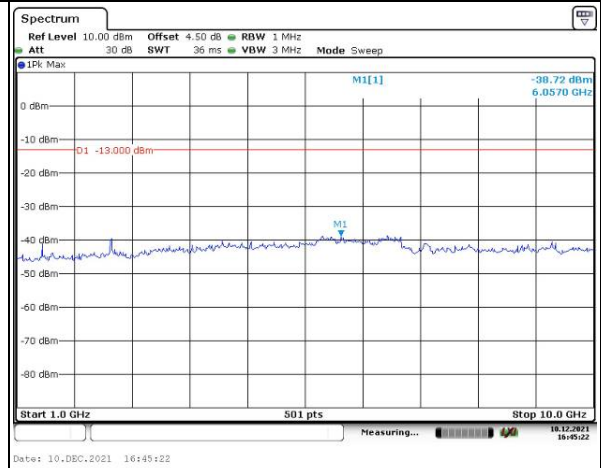
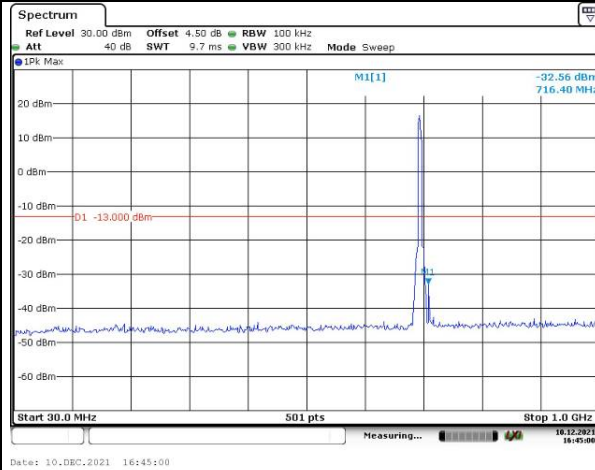


Spurious Emissions at Antenna Terminal

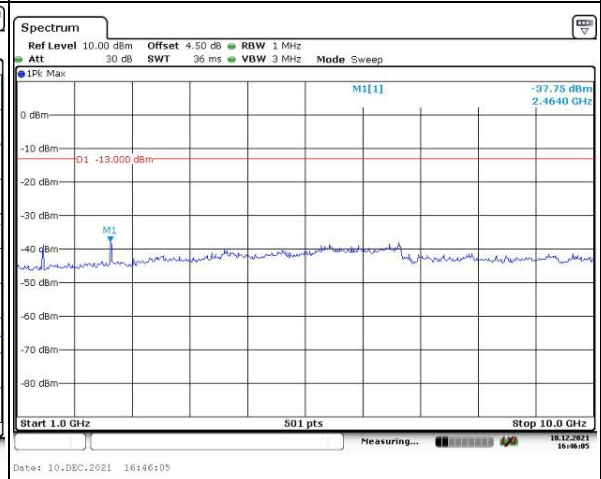
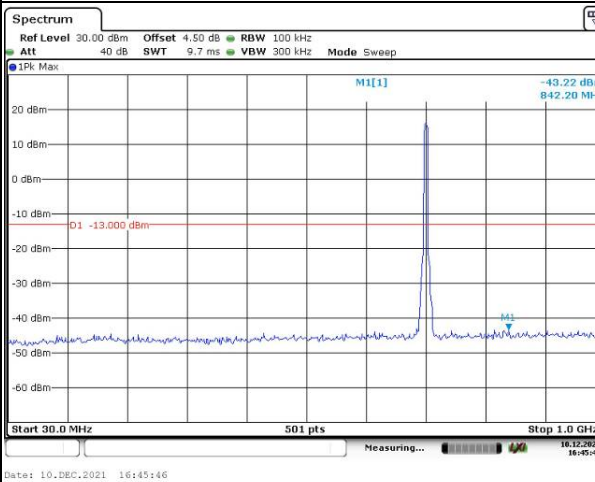
Channel

5MHz Bandwidth QPSK

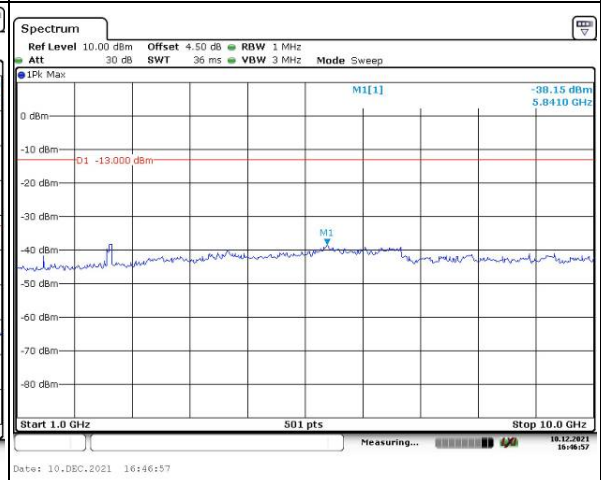
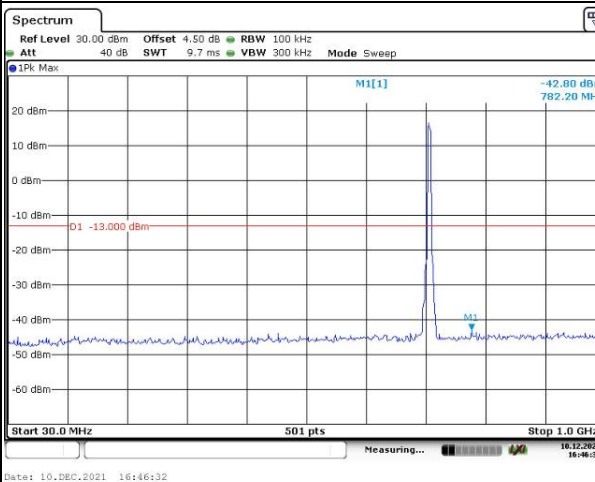
Lowest



Middle



Highest

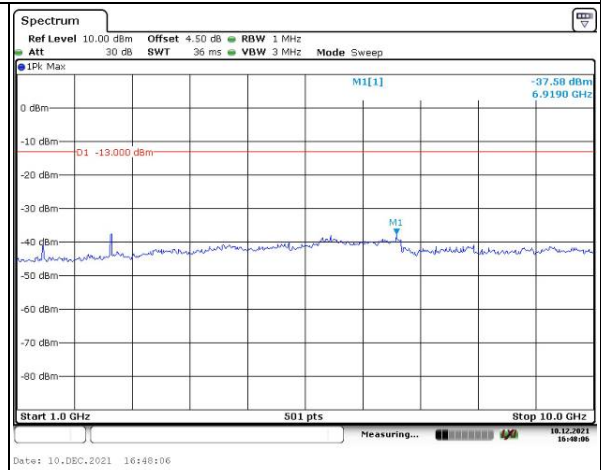
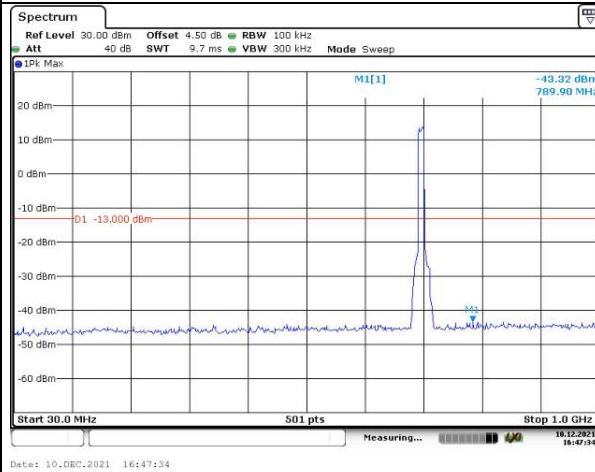


Spurious Emissions at Antenna Terminal

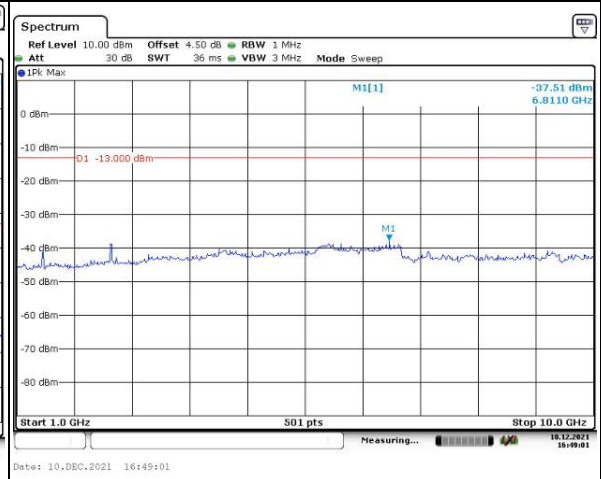
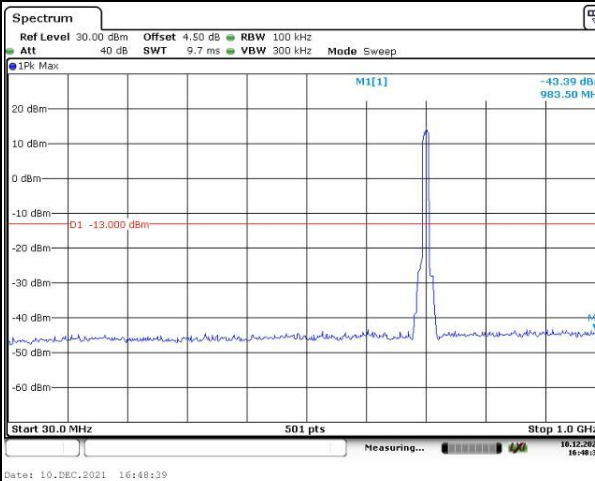
Channel

10MHz Bandwidth QPSK

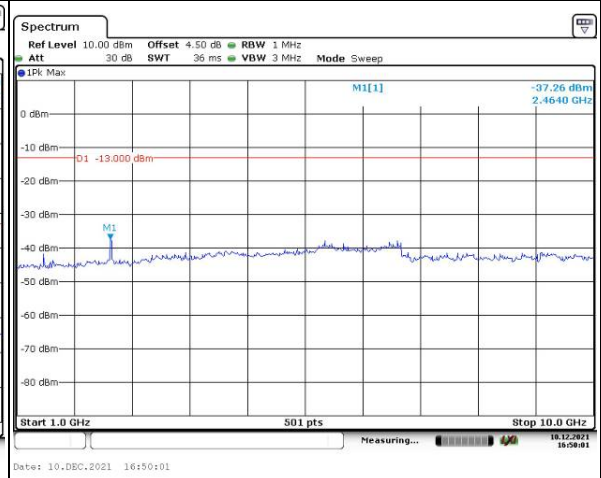
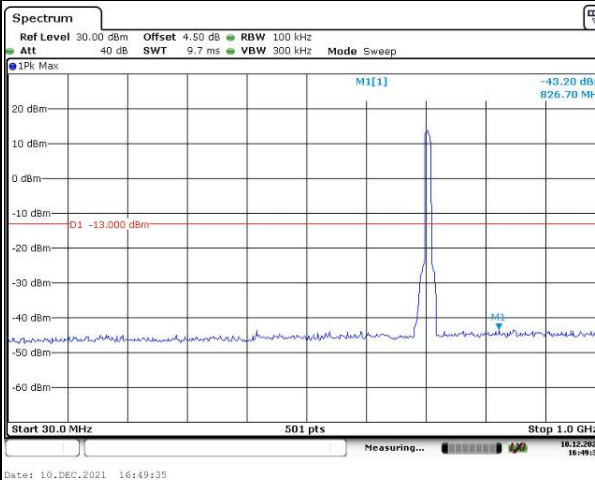
Lowest



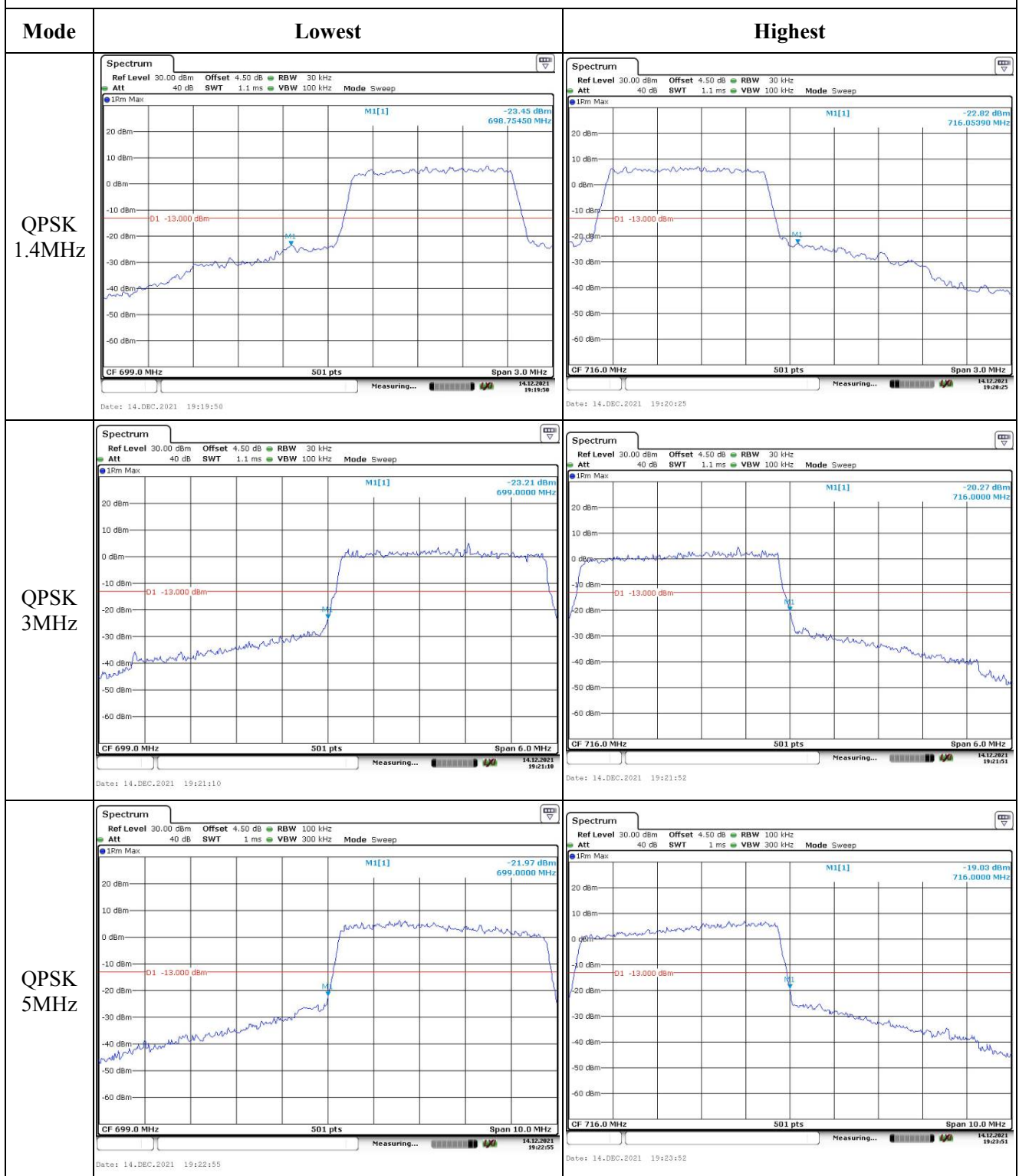
Middle



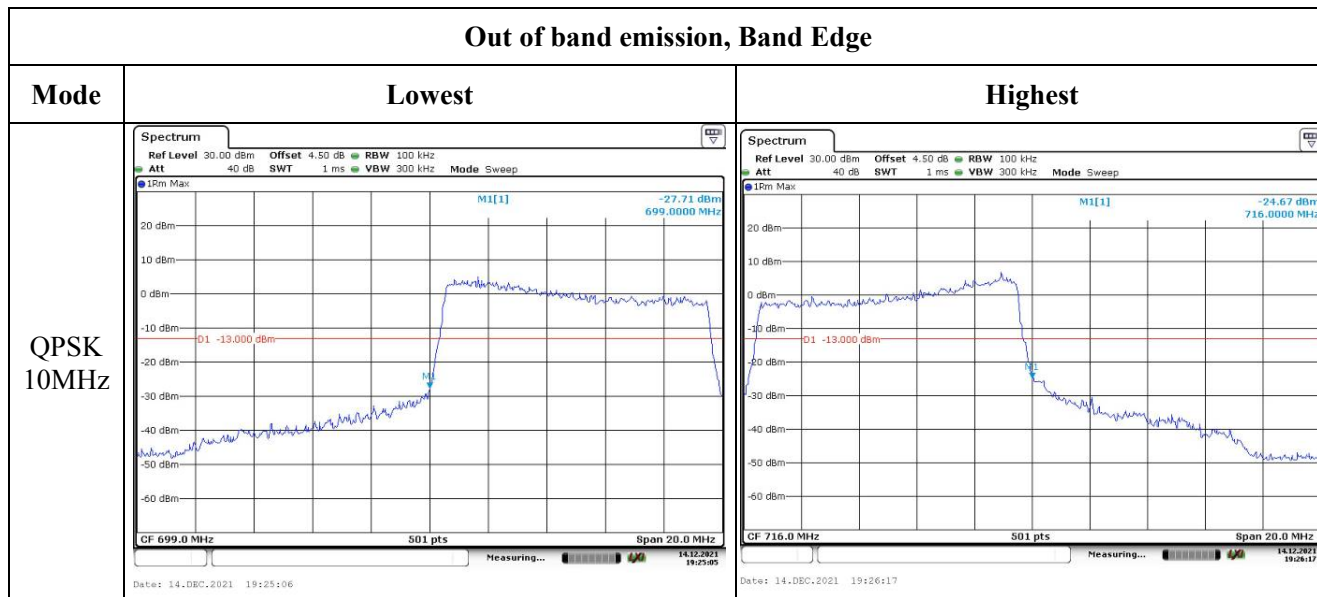
Highest



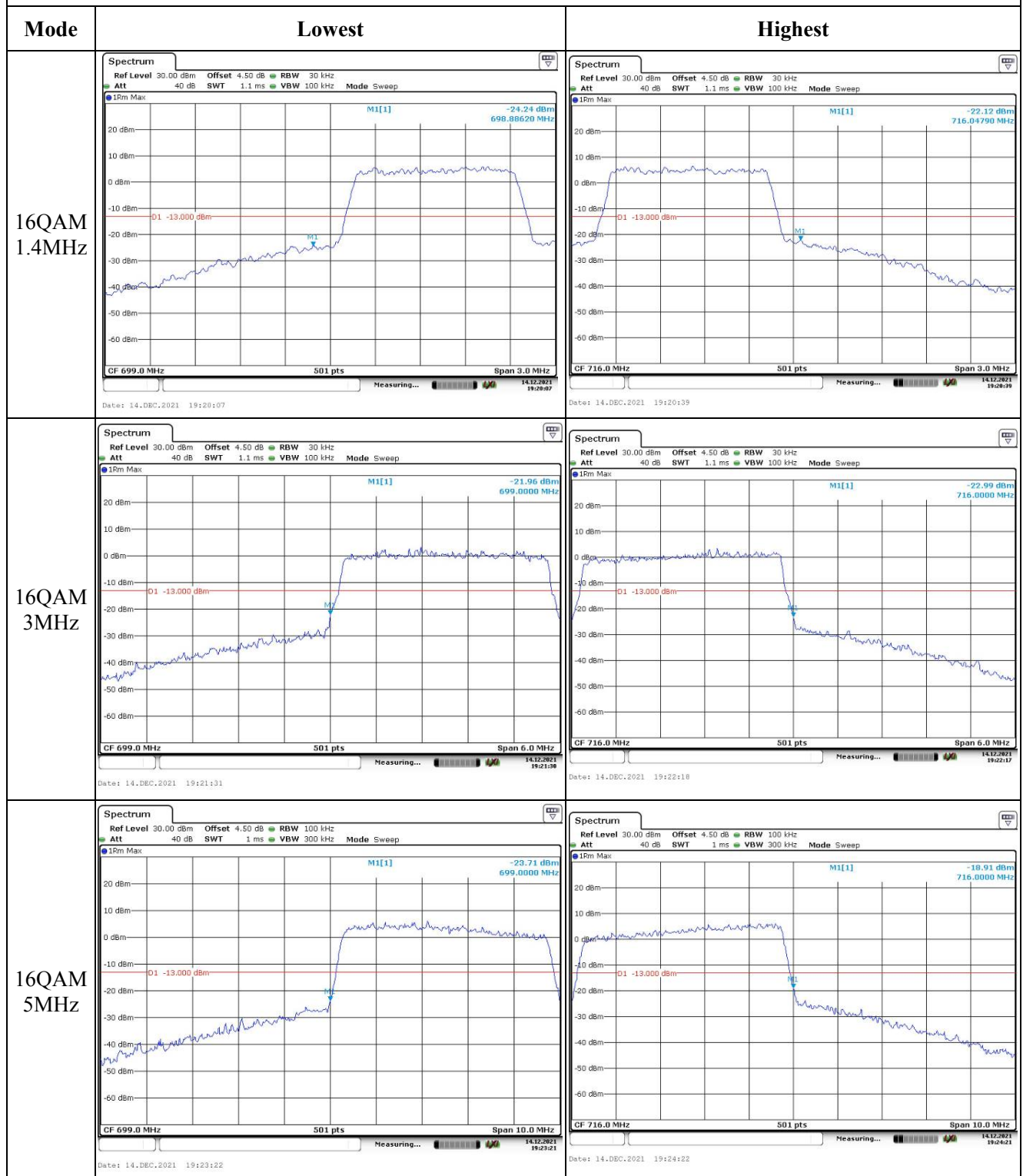
Out of band emission, Band Edge



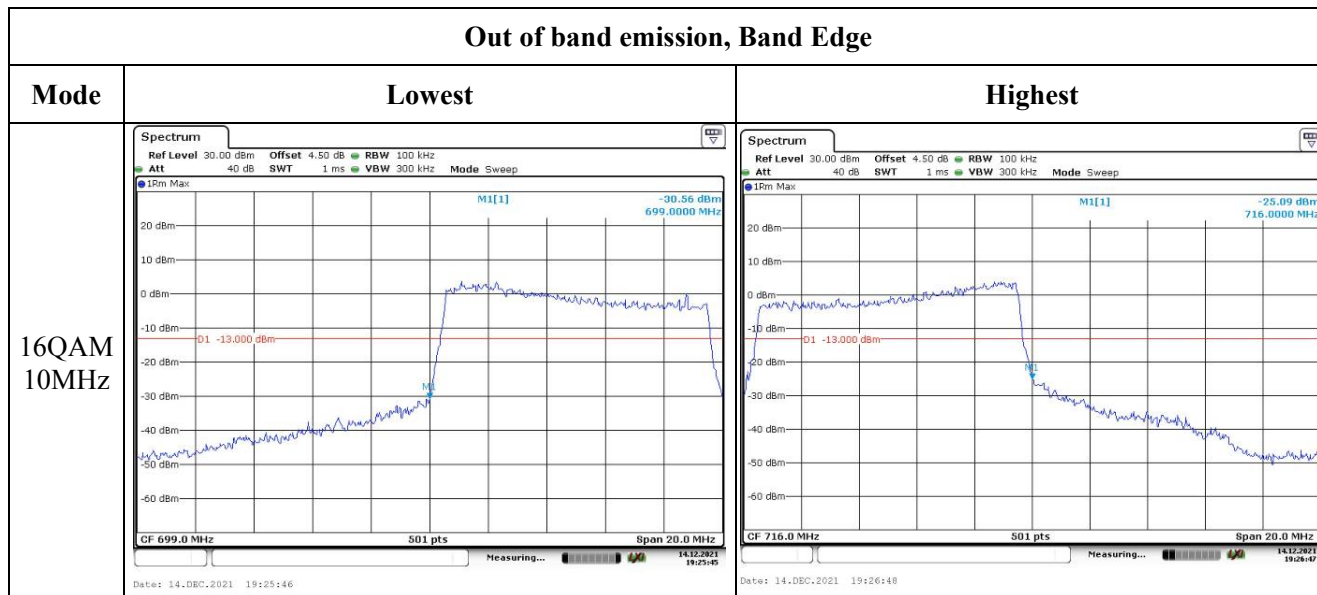
Out of band emission, Band Edge



Out of band emission, Band Edge



Out of band emission, Band Edge



4.10 Antenna Port Test Data and Results for LTE Band 13

Serial Number:	CR21110023-RF-S1	Test Date:	2021-11-29~2022-03-02
Test Site:	RF	Test Mode:	Transmitting
Tester:	Wolf Mo	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	22.1~25.9	Relative Humidity: (%)	60~66	ATM Pressure: (kPa)	101.2~101.4
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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	2021/7/22	2022/7/21
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554403	Each time	N/A
Weinschel	Coaxial Attenuators	53-20-34	LN751	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	149218	2021/7/22	2022/7/21
BACL	TEMP&HUMI Test Chamber	BTH-150	30026	2021/7/22	2022/7/22
UNI-T	Multimeter	UT39A+	C210582554	2021/9/30	2022/9/30
E-Microwave	Two-way Splitter	ODP-1-6	OE0120176	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 13▲:

Antenna Gain (dBi):	-0.2	Antenna Gain (dBd):	-2.35	Cable Loss (dB):	0
Operation Voltage(V _{DC}):					
Lowest:	3.5	Normal:	3.7	Highest:	4.2

Test Frequency For Each Mode:

Operation Bandwidth	Lowest Frequency (MHz)	Middle Frequency (MHz)	Highest Frequency (MHz)
5MHz	779.5	/	784.5
10MHz	/	782	/

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	21.09	/	21.00	18.74	34.77
	RB1#13	20.89	/	20.90		
	RB1#24	20.96	/	20.99		
	RB15#0	20.00	/	20.18		
	RB15#10	19.98	/	20.22		
	RB25#0	20.06	/	20.32		
5MHz 16QAM	RB1#0	19.34	/	19.71	17.55	34.77
	RB1#13	19.22	/	19.84		
	RB1#24	19.42	/	19.90		
	RB15#0	19.13	/	19.31		
	RB15#10	18.98	/	19.30		
	RB25#0	19.07	/	19.18		
10MHz QPSK	RB1#0	/	21.10	/	18.75	34.77
	RB1#25	/	21.06	/		
	RB1#49	/	21.05	/		
	RB25#0	/	20.01	/		
	RB25#25	/	20.28	/		
	RB50#0	/	20.08	/		
10MHz 16QAM	RB1#0	/	20.17	/	18.01	34.77
	RB1#25	/	20.16	/		
	RB1#49	/	20.36	/		
	RB25#0	/	19.06	/		
	RB25#25	/	19.34	/		
	RB50#0	/	19.16	/		

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	/	5.07	/	13
	RB50#0	/	5.42	/	13
10MHz 16QAM	RB1#0	/	5.94	/	13
	RB50#0	/	6.29	/	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	4.960	/	5.000
5MHz 16QAM	4.511	/	4.551	4.960	/	5.020
10MHz QPSK	/	8.942	/	/	9.760	/
10MHz 16QAM	/	8.942	/	/	9.760	/
Note: The test plots please refer to the Plots of Occupied Bandwidth						

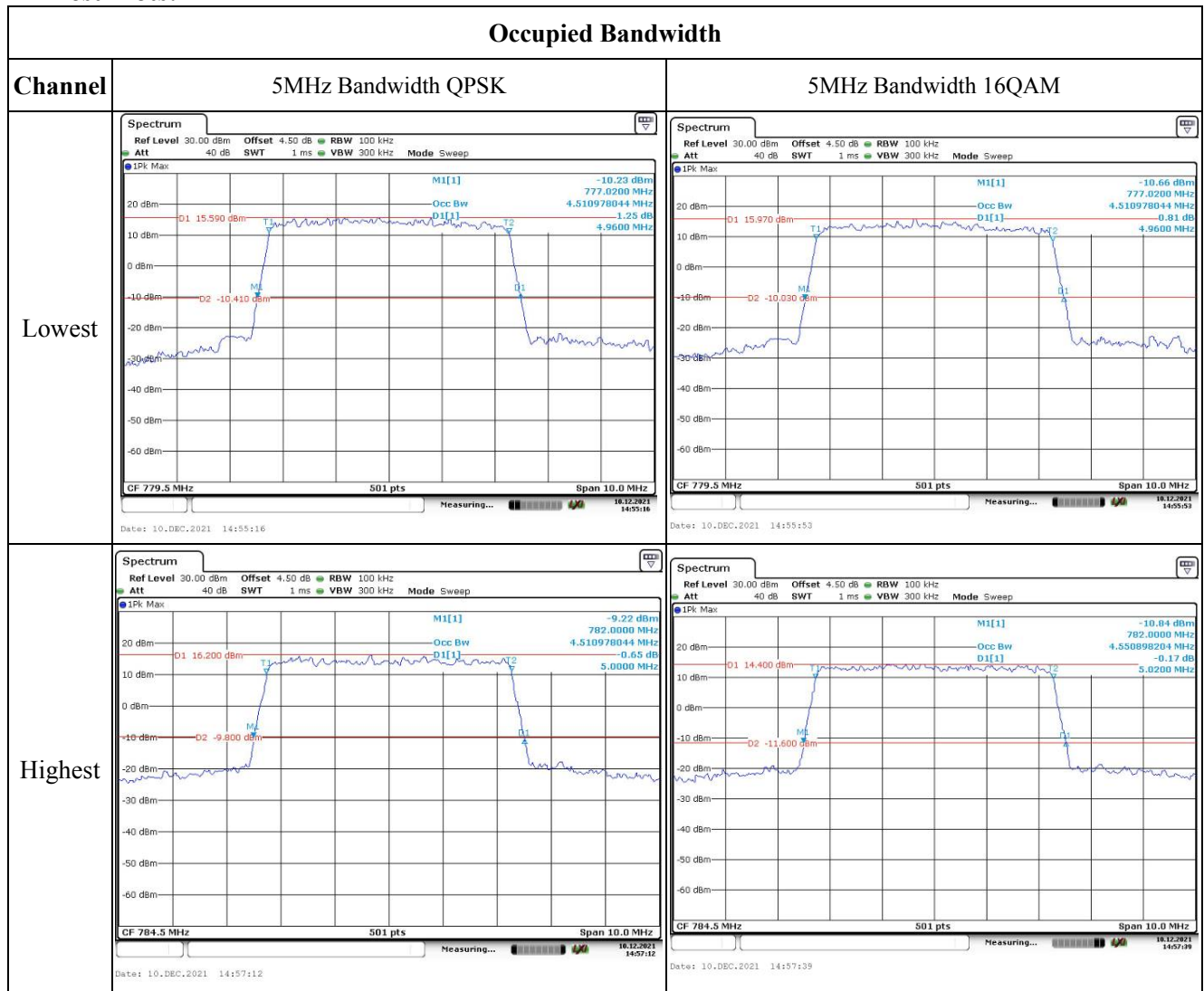
FCC §2.1051, §27.53:Spurious Emissions at Antenna Terminal	
Result:	Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.

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.

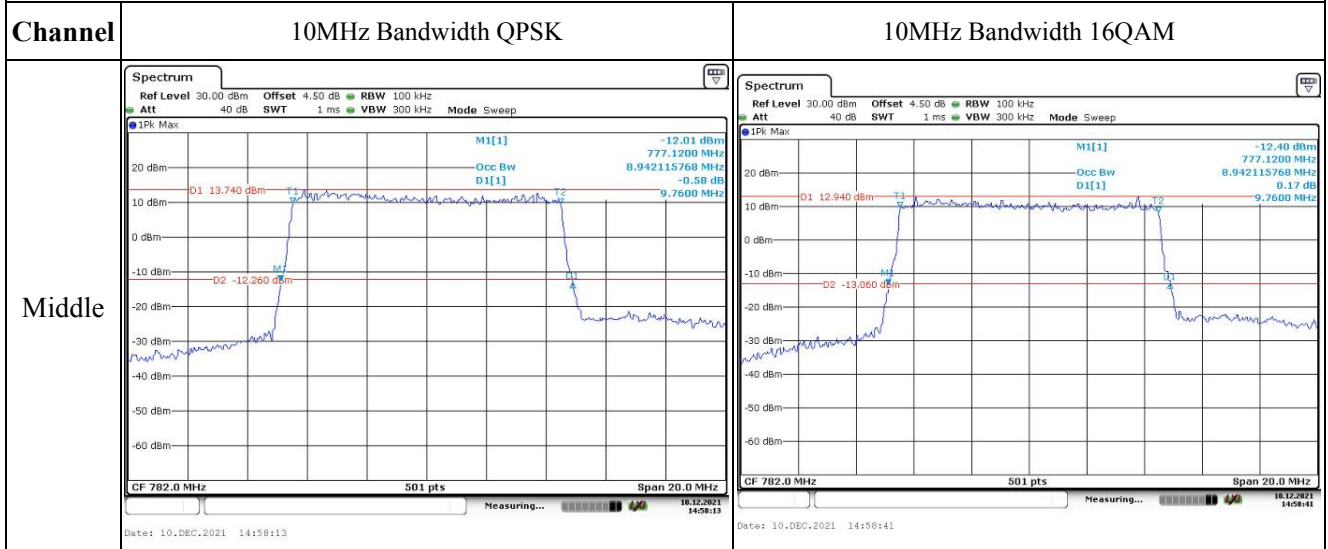
FCC §2.1055, §27.54: Frequency Stability						
Test Mode:	10M QPSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.7	777.529	777.00	786.471	787.00
	-20	3.7	777.524	777.00	786.470	787.00
	-10	3.7	777.529	777.00	786.471	787.00
	0	3.7	777.527	777.00	786.473	787.00
	10	3.7	777.526	777.00	786.474	787.00
	20	3.7	777.529	777.00	786.471	787.00
	30	3.7	777.524	777.00	786.471	787.00
	40	3.7	777.529	777.00	786.474	787.00
	50	3.7	777.522	777.00	786.473	787.00
Frequency Stability vs. Voltage	20	3.5	777.529	777.00	786.471	787.00
	20	4.2	777.524	777.00	786.470	787.00
					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	3.7	777.529	777.00	786.471	787.00
	-20	3.7	777.524	777.00	786.470	787.00
	-10	3.7	777.529	777.00	786.471	787.00
	0	3.7	777.527	777.00	786.473	787.00
	10	3.7	777.526	777.00	786.471	787.00
	20	3.7	777.529	777.00	786.471	787.00
	30	3.7	777.524	777.00	786.471	787.00
	40	3.7	777.529	777.00	786.474	787.00
	50	3.7	777.521	777.00	786.473	787.00
Frequency Stability vs. Voltage	20	3.5	777.529	777.00	786.471	787.00
	20	4.2	777.524	777.00	786.470	787.00
					Result:	Pass

Test Plots:



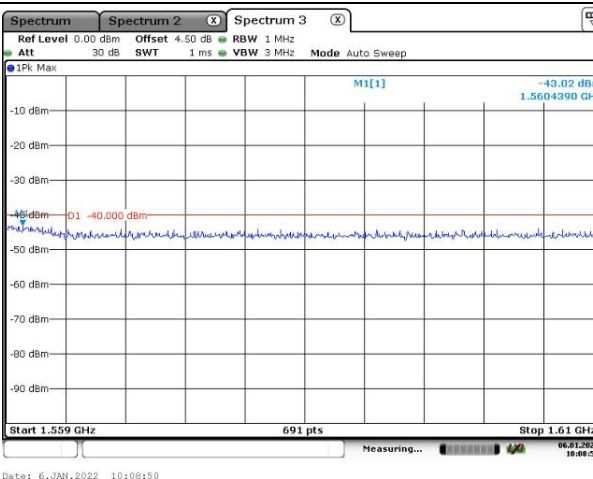
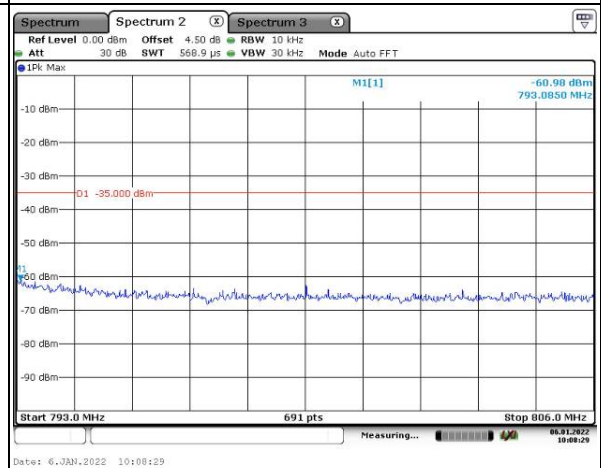
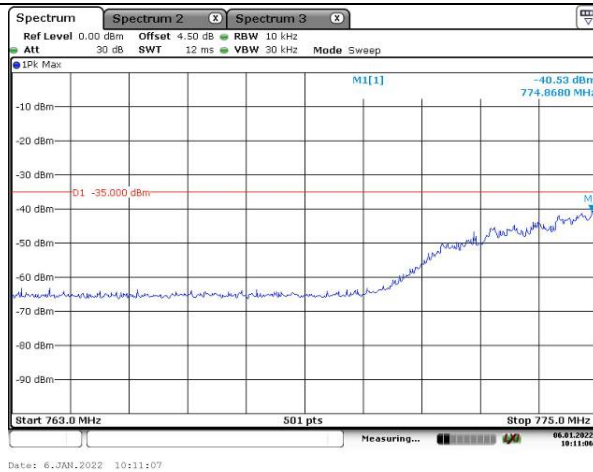
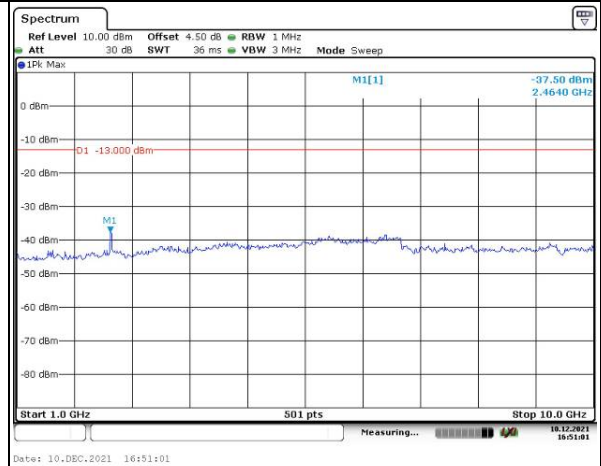
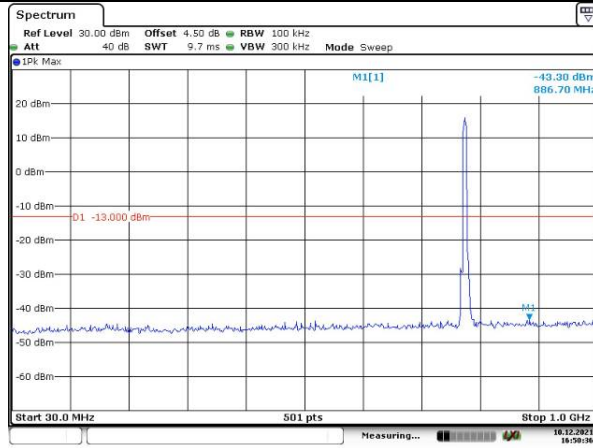
Occupied Bandwidth



Spurious Emissions at Antenna Terminal

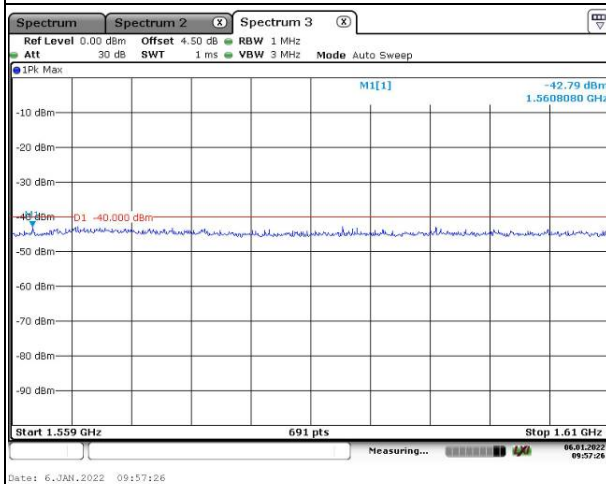
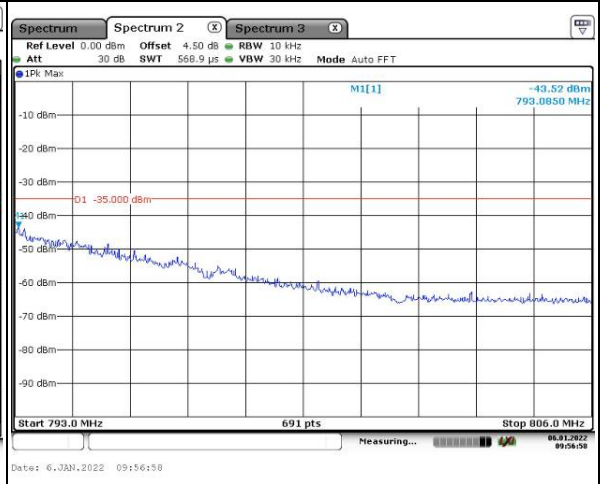
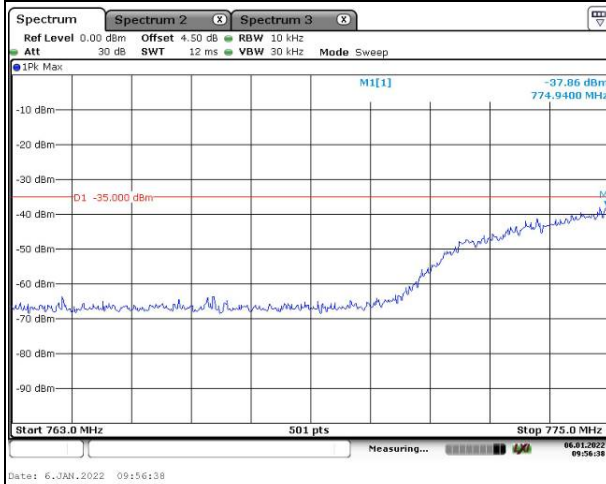
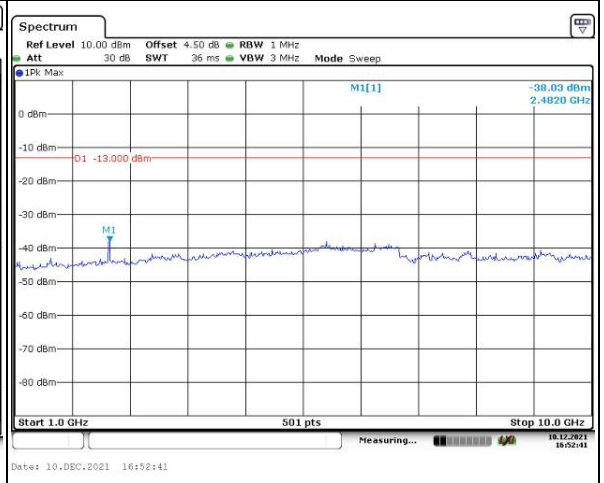
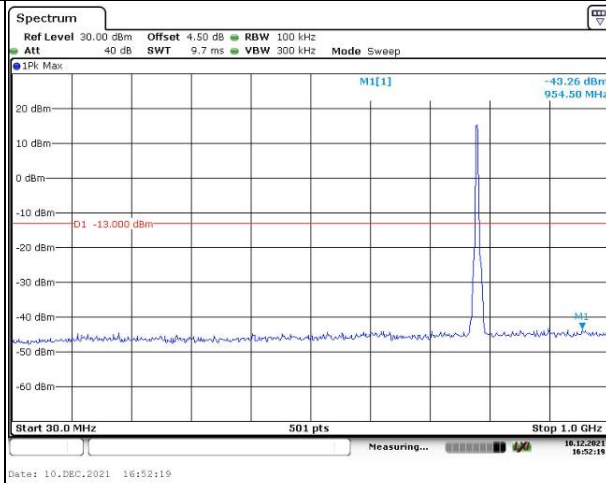
Channel

5MHz Bandwidth QPSK



Lowest

Spurious Emissions at Antenna Terminal

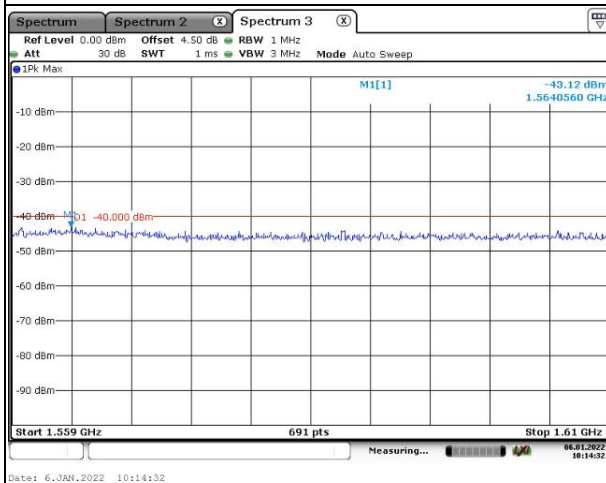
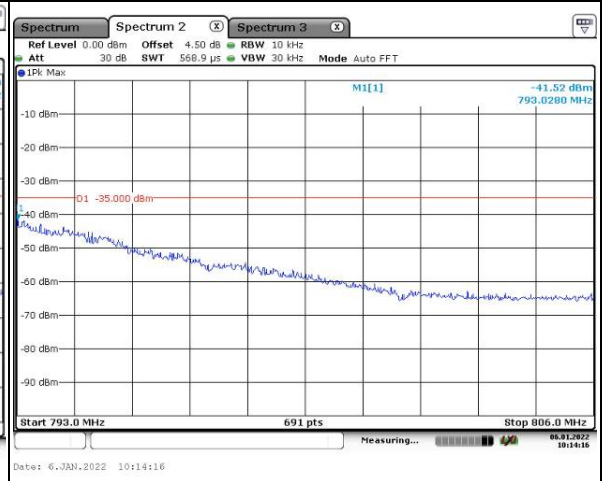
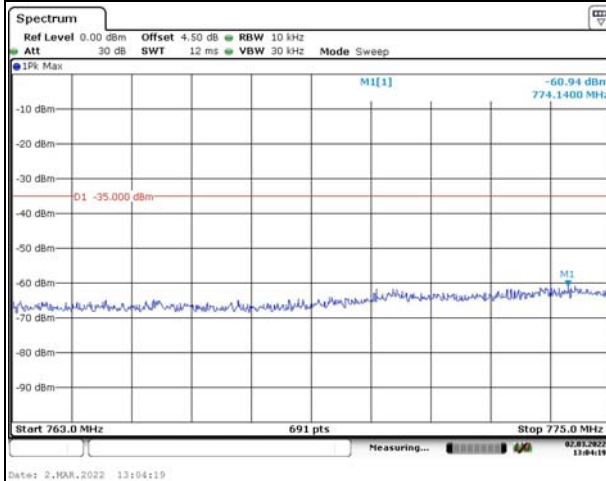
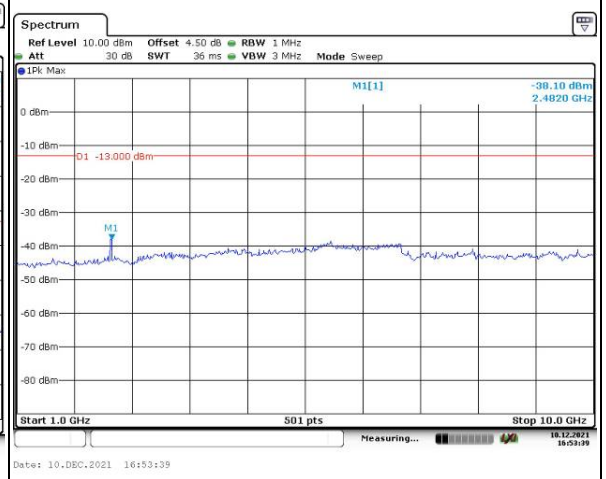
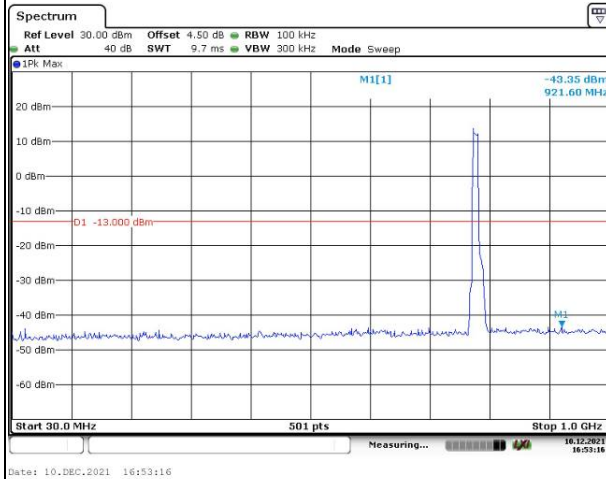


Highest

Spurious Emissions at Antenna Terminal

Channel

10MHz Bandwidth QPSK



Middle