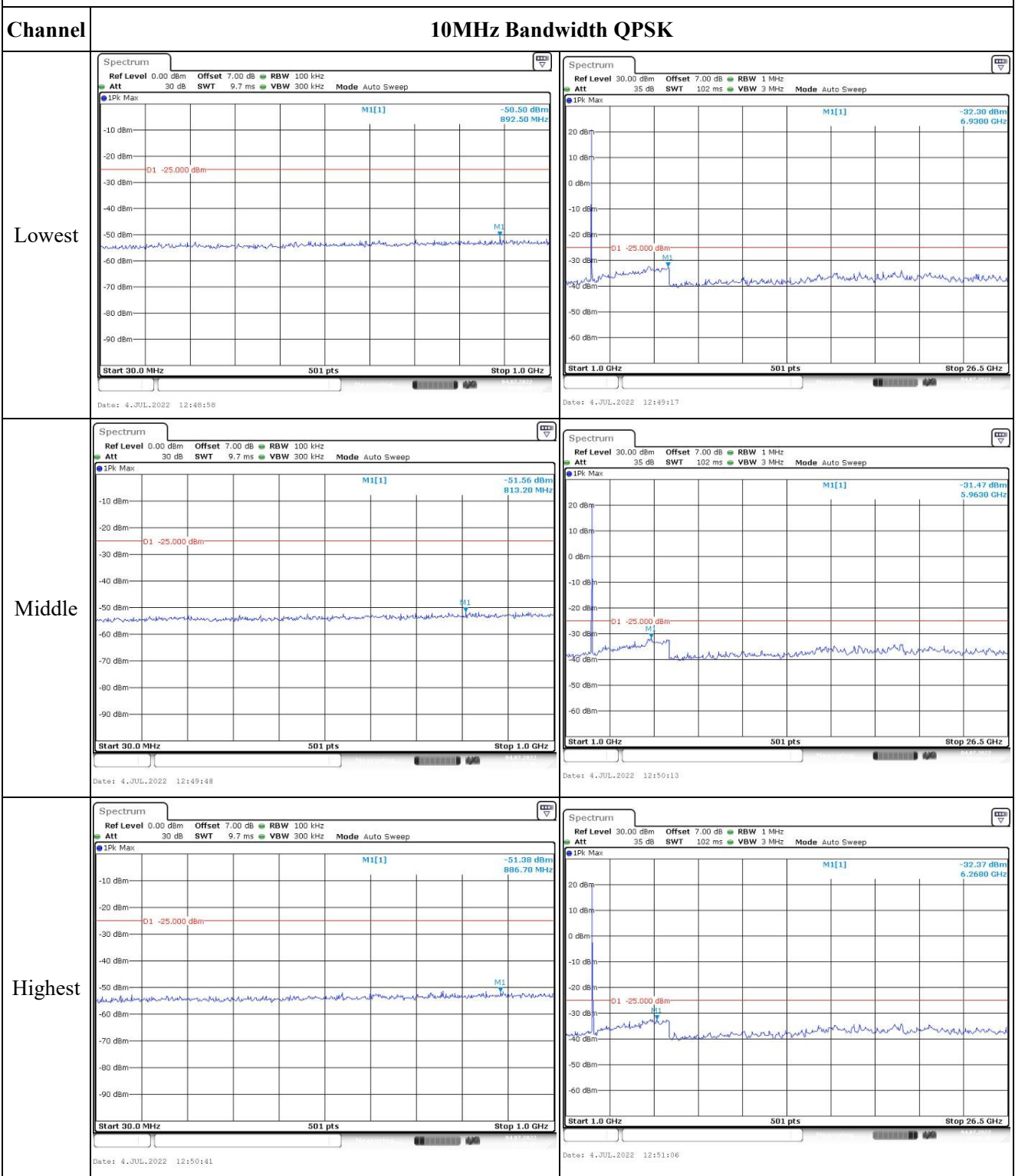


Spurious Emissions at Antenna Terminal

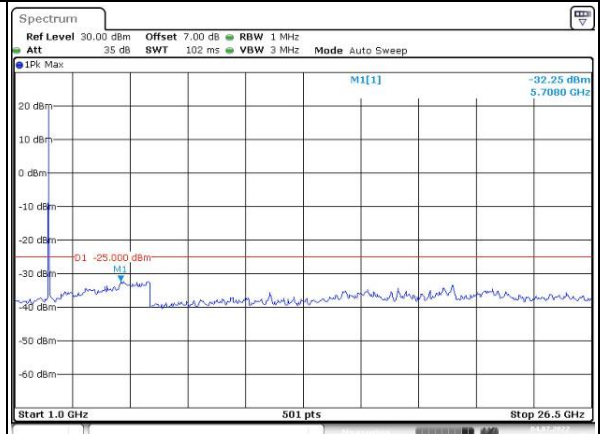
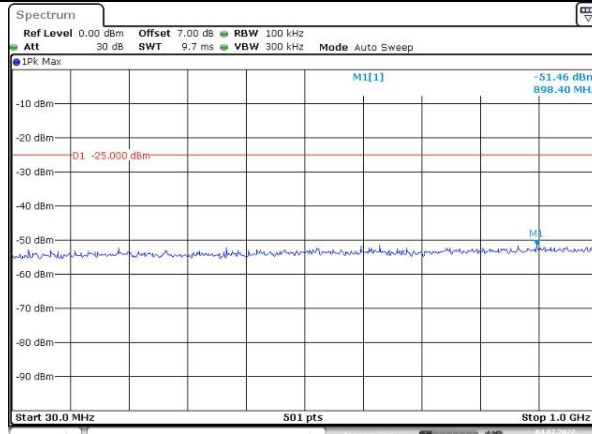


Spurious Emissions at Antenna Terminal

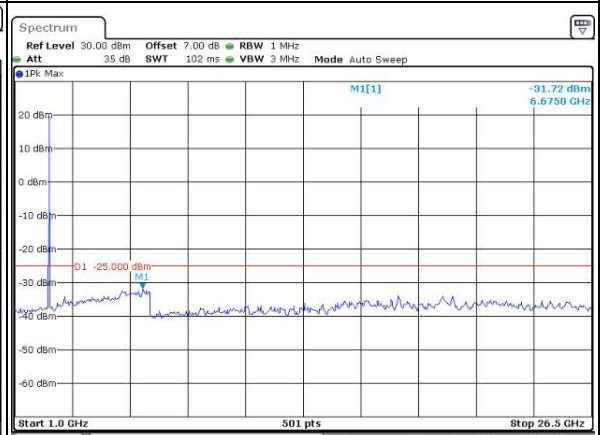
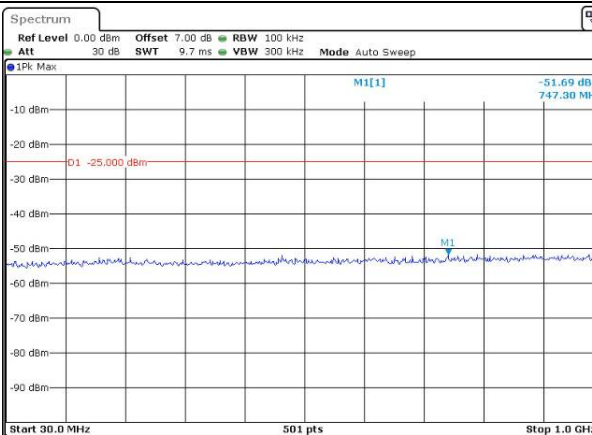
Channel

15MHz Bandwidth QPSK

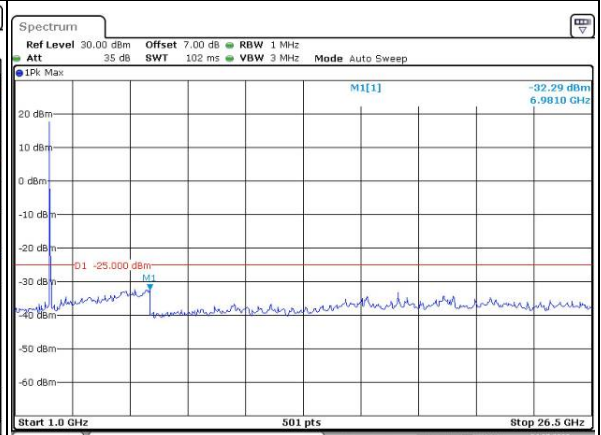
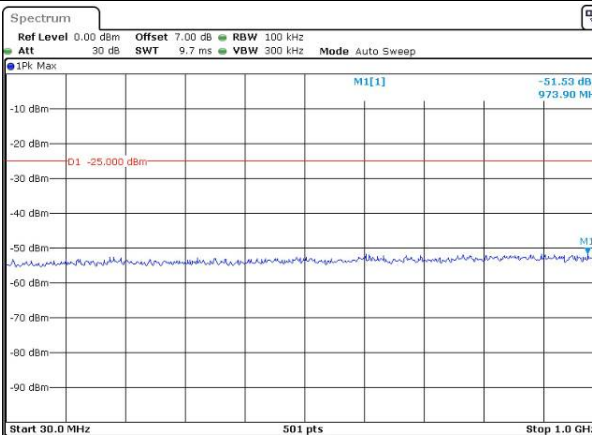
Lowest



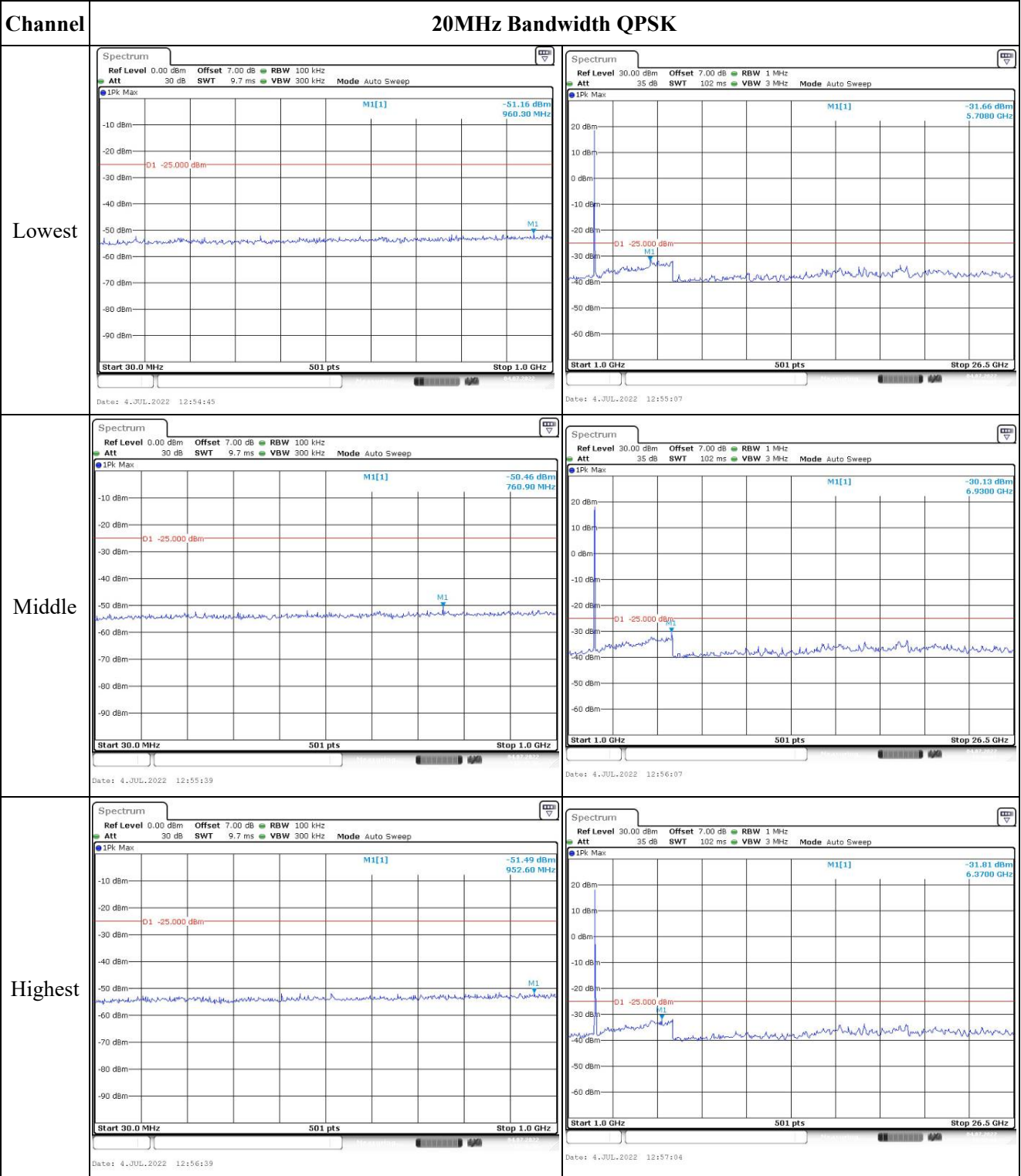
Middle



Highest



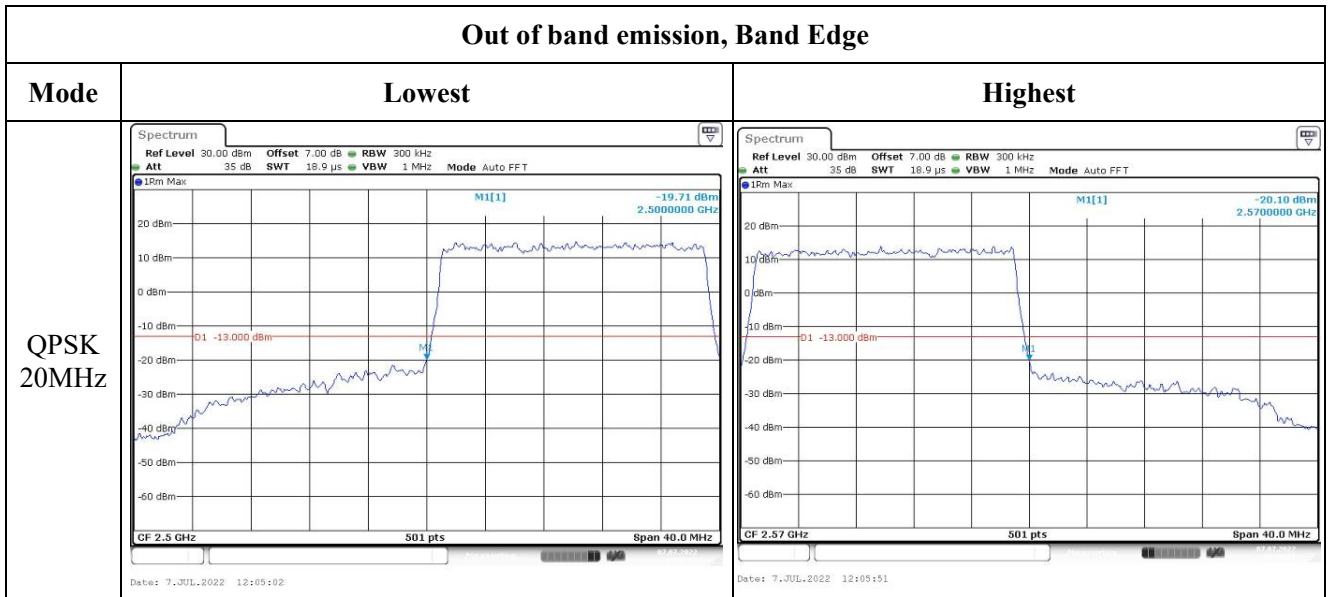
### Spurious Emissions at Antenna Terminal



Out of band emission, Band Edge

Mode	Lowest	Highest
QPSK 5MHz		
QPSK 10MHz		
QPSK 15MHz		

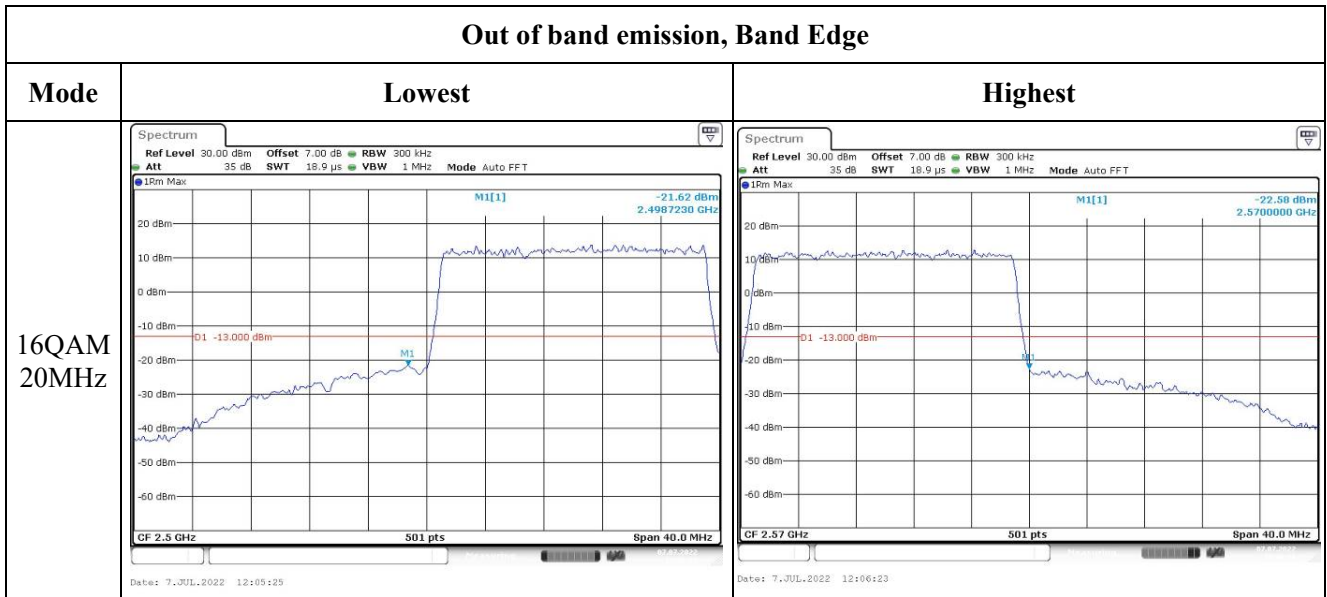
Out of band emission, Band Edge



Out of band emission, Band Edge

Mode	Lowest	Highest
16QAM 5MHz		
16QAM 10MHz		
16QAM 15MHz		

Out of band emission, Band Edge





**4.9 Antenna Port Test Data and Results for LTE Band 12**

Serial Number:	CR220050079-RF-S1	Test Date:	2022/7/2~2022/7/11
Test Site:	RF	Test Mode:	Transmitting
Tester:	Ted Min	Test Result:	Pass

**Environmental Conditions:**

Temperature: (°C)	24.3~24.8	Relative Humidity: (%)	49~52	ATM Pressure: (kPa)	100~100.2
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**Test Equipment List and Details:**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101943	2021-10-10	2022-10-09
R&S	Wideband Radio Communication Tester	CMW500	149218	2021-07-21	2022-07-20
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
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
E-Microwave	Two-way Splitter	ODP-1-6	OE0120176	Each time	N/A
HuiXunDa	DC Block	SMA-JK 18G	DCB181108042	Each time	N/A
Weinschel	Coaxial Attenuators	53-20-34	LN751	Each time	N/A
YINSAIGE	Coaxial Cable	SS402	SJ0100003	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):	-1.49	Antenna Gain (dBd):	-3.64	Path Loss L <sub>C</sub> (dB):	0
Operation Voltage(V <sub>DC</sub> ):					
Lowest:	3.42	Normal:	3.8	Highest:	4.18

**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	22.1	22.12	22	18.5	34.77
	RB1#3	22.14	22.12	21.95		
	RB1#5	22.1	22.05	22.05		
	RB3#0	21.99	22.12	21.9		
	RB3#3	21.86	21.97	21.99		
	RB6#0	21.62	21.82	21.7		
1.4MHz 16QAM	RB1#0	21.85	21.95	21.76	18.32	34.77
	RB1#3	21.91	21.93	21.77		
	RB1#5	21.93	21.96	21.84		
	RB3#0	21.75	21.95	21.78		
	RB3#3	21.72	21.94	21.92		
	RB6#0	21.48	21.58	21.47		
3MHz QPSK	RB1#0	22.13	21.9	21.92	18.57	34.77
	RB1#8	22.2	21.98	21.98		
	RB1#14	22.21	22.01	21.97		
	RB6#0	22.19	21.98	21.87		
	RB6#9	22.2	22	21.9		
	RB15#0	21.97	21.63	21.59		
3MHz 16QAM	RB1#0	22.07	21.84	21.79	18.49	34.77
	RB1#8	22.02	21.83	21.74		
	RB1#14	22.09	21.87	21.86		
	RB6#0	22.13	21.85	21.89		
	RB6#9	22.01	21.98	21.99		
	RB15#0	21.92	21.59	21.58		
5MHz QPSK	RB1#0	21.88	21.99	21.97	18.39	34.77
	RB1#13	21.96	21.97	22.02		
	RB1#24	22.01	22	22.03		
	RB15#0	21.88	21.9	21.84		
	RB15#10	21.86	21.93	21.91		
	RB25#0	21.48	21.5	21.59		
5MHz 16QAM	RB1#0	21.73	21.75	21.72	18.2	34.77
	RB1#13	21.7	21.76	21.71		
	RB1#24	21.71	21.84	21.67		
	RB15#0	21.65	21.66	21.63		
	RB15#10	21.73	21.79	21.79		
	RB25#0	21.35	21.37	21.41		

10MHz QPSK	RB1#0	21.92	21.74	21.95	18.58	34.77
	RB1#25	22.03	21.78	21.94		
	RB1#49	22.22	21.97	21.99		
	RB25#0	22.08	21.88	21.93		
	RB25#25	22.1	21.74	21.83		
	RB50#0	21.78	21.29	21.49		
10MHz 16QAM	RB1#0	21.69	21.54	21.62	18.34	34.77
	RB1#25	21.98	21.62	21.6		
	RB1#49	21.97	21.72	21.69		
	RB25#0	21.87	21.55	21.59		
	RB25#25	21.97	21.64	21.73		
	RB50#0	21.59	21.22	21.34		
Note: ERP=Conducted Power(dBm) - Cable loss(dB) + Antenna Gain(dBd)						
					<b>Result:</b>	<b>Pass</b>

Peak-to-average Ratio(PAR)					
Test Bandwidth & Modulation	Resource Block & RB offset	Peak-to-average Ratio(dB)			Limit (dB)
		Lowest Channel	Middle Channel	Highest Channel	
10MHz QPSK	RB1#0	3.23	3.14	3.22	13
	RB50#0	5.18	5.21	5.23	13
10MHz 16QAM	RB1#0	4.18	4.18	4.09	13
	RB50#0	6.33	6.13	6.18	13
<b>Result:</b>					<b>Pass</b>

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	1.108	1.102	1.296	1.35	1.29
1.4MHz 16QAM	1.096	1.108	1.096	1.314	1.488	1.296
3MHz QPSK	2.683	2.695	2.695	2.856	2.904	3.012
3MHz 16QAM	2.683	2.683	2.683	2.892	2.964	3.096
5MHz QPSK	4.551	4.511	4.611	5.22	5.2	6.8
5MHz 16QAM	4.511	4.511	4.611	5.2	5.18	5.9
10MHz QPSK	8.982	8.942	8.982	10.16	9.8	10
10MHz 16QAM	8.982	8.942	8.982	9.72	9.84	9.92
Note: The test plots please refer to the Plots of Occupied Bandwidth						

**FCC §2.1051, §27.53:Spurious Emissions at Antenna Terminal**

<b>Result:</b>	<b>Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.</b>
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**FCC §2.1051, §27.53:Out of band emission, Band Edge**

<b>Result:</b>	<b>Pass, Please refer to the test plots of Out of band emission, Band Edge.</b>
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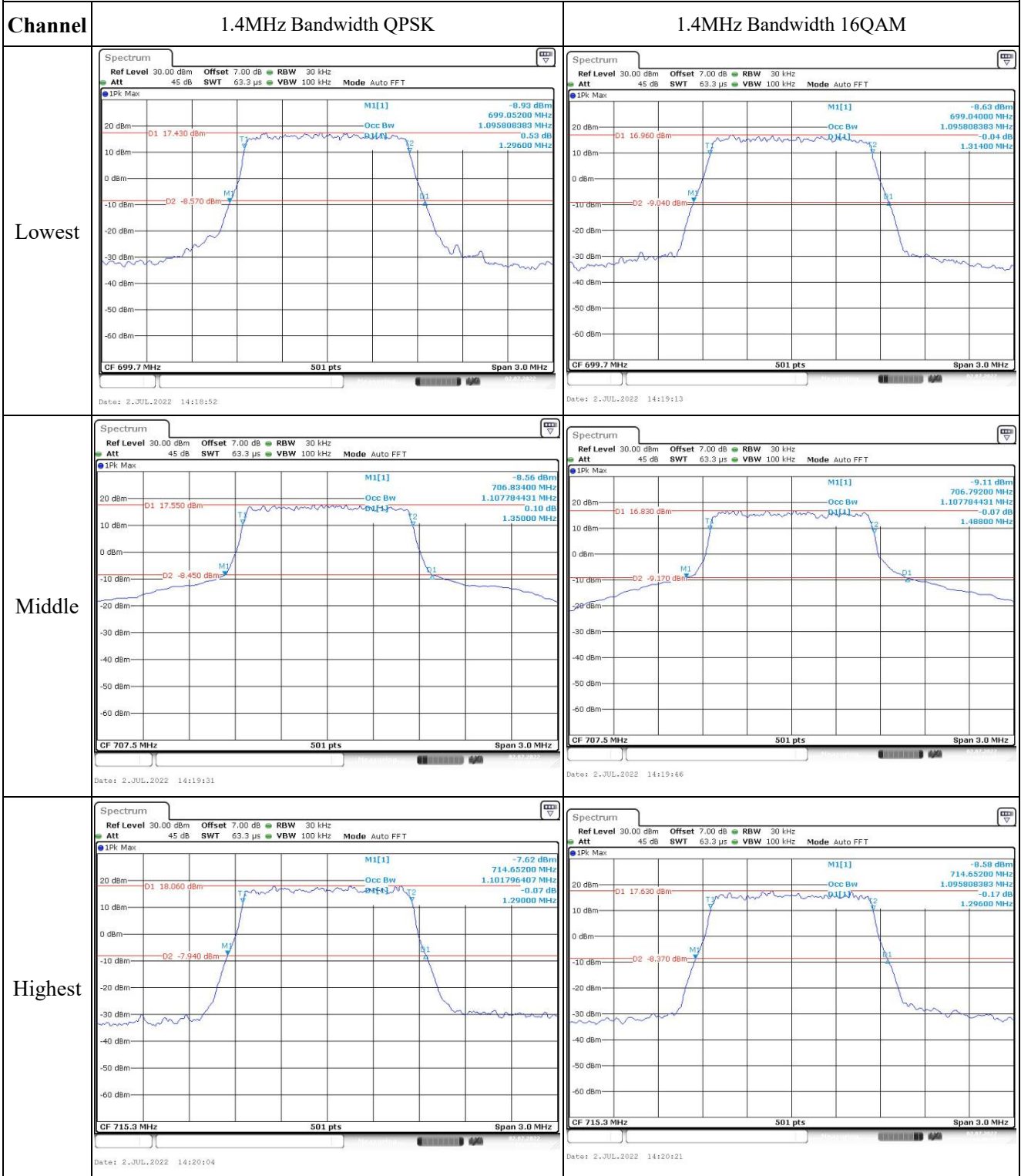
**FCC §2.1055, §27.54: Frequency Stability**

Test Mode:	10M QPSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V <sub>DC</sub> )	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	699.373	699.00	715.670	716.00
	-20	3.8	699.336	699.00	715.648	716.00
	-10	3.8	699.265	699.00	715.735	716.00
	0	3.8	699.450	699.00	715.630	716.00
	10	3.8	699.299	699.00	715.806	716.00
	20	3.8	699.282	699.00	715.749	716.00
	30	3.8	699.329	699.00	715.754	716.00
	40	3.8	699.295	699.00	715.727	716.00
Frequency Stability vs. Voltage	20	3.42	699.419	699.00	715.803	716.00
	20	4.18	699.370	699.00	715.745	716.00
					<b>Result:</b>	<b>Pass</b>

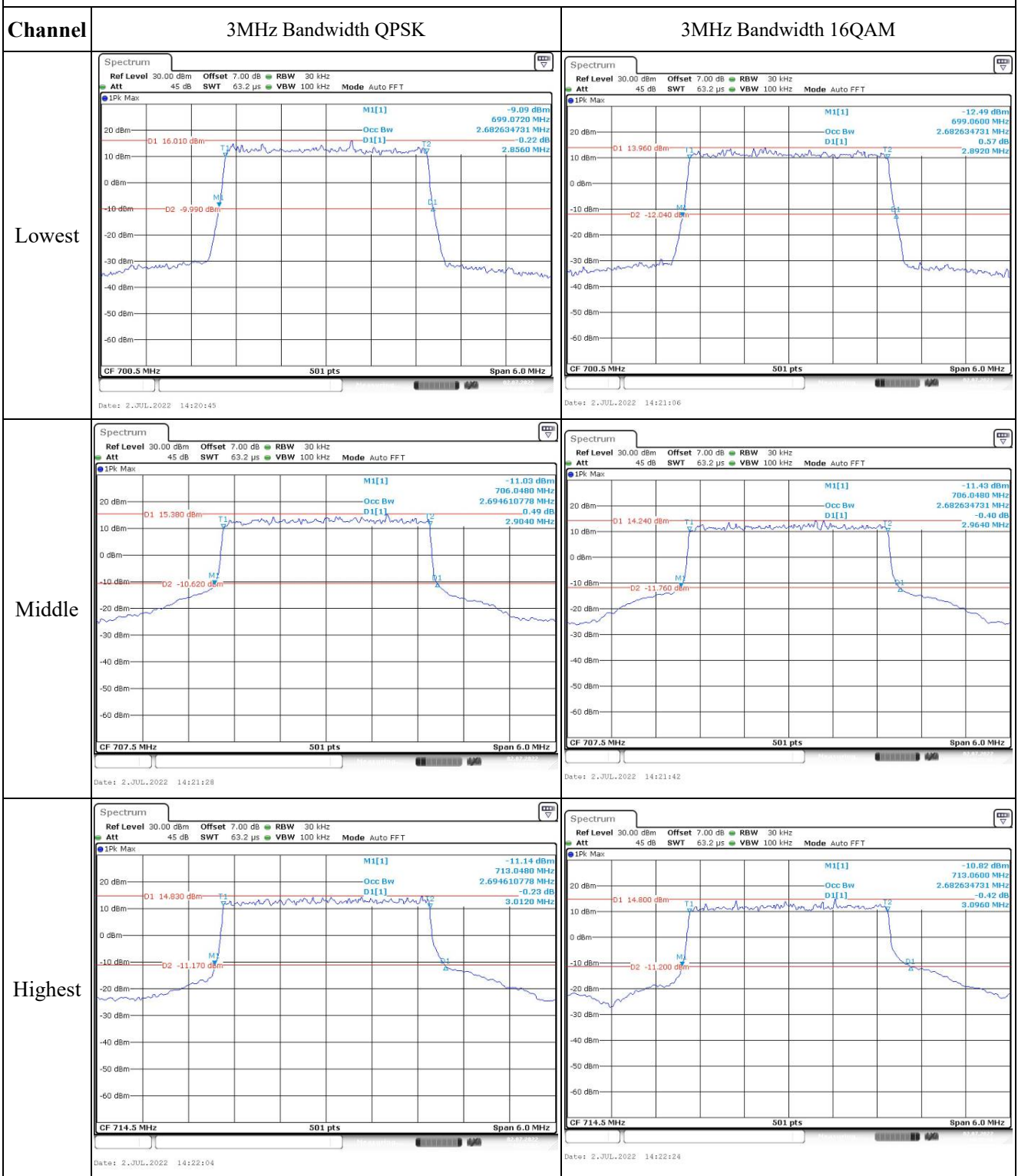
Test Mode:	10M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V <sub>DC</sub> )	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	699.463	699.00	715.649	716.00
	-20	3.8	699.350	699.00	715.657	716.00
	-10	3.8	699.384	699.00	715.700	716.00
	0	3.8	699.313	699.00	715.687	716.00
	10	3.8	699.359	699.00	715.693	716.00
	20	3.8	699.300	699.00	715.742	716.00
	30	3.8	699.343	699.00	715.639	716.00
	40	3.8	699.409	699.00	715.707	716.00
Frequency Stability vs. Voltage	20	3.42	699.342	699.00	715.753	716.00
	20	4.18	699.292	699.00	715.648	716.00
					<b>Result:</b>	<b>Pass</b>

Test Plots:

Occupied Bandwidth



Occupied Bandwidth

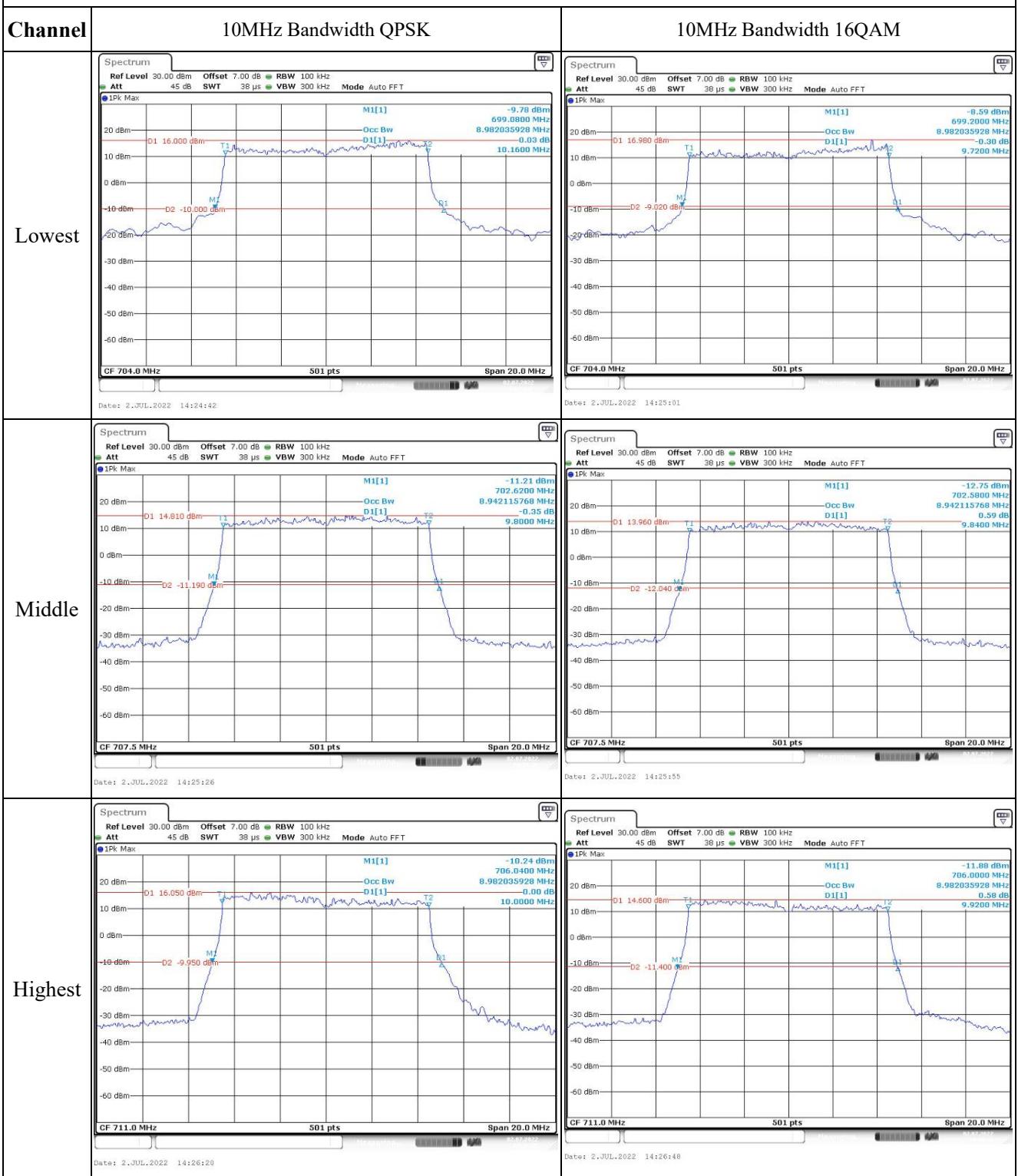


Occupied Bandwidth

Channel	5MHz Bandwidth QPSK	5MHz Bandwidth 16QAM
Lowest	<p>Ref Level 30.00 dBm Offset 7.00 dB RBW 100 kHz Att 45 dB SWT 19 μs VBW 300 kHz Mode Auto FFT</p> <p>1Pk Max</p> <p>M1[1] -8.32 dBm 698.8800 MHz Occ Bw 4.55089294 MHz -0.06 dB 5.2200 MHz</p> <p>O1 17.300 dBm M2 -8.700 dBm</p> <p>CF 701.5 MHz 501 pts Span 10.0 MHz</p> <p>Date: 2.JUL.2022 14:22:48</p>	<p>Ref Level 30.00 dBm Offset 7.00 dB RBW 100 kHz Att 45 dB SWT 19 μs VBW 300 kHz Mode Auto FFT</p> <p>1Pk Max</p> <p>M1[1] -9.28 dBm 698.8800 MHz Occ Bw 4.510978044 MHz -0.01 dB 5.2000 MHz</p> <p>O1 17.060 dBm M2 -8.940 dBm</p> <p>CF 701.5 MHz 501 pts Span 10.0 MHz</p> <p>Date: 2.JUL.2022 14:23:06</p>
Middle	<p>Ref Level 30.00 dBm Offset 7.00 dB RBW 100 kHz Att 45 dB SWT 19 μs VBW 300 kHz Mode Auto FFT</p> <p>1Pk Max</p> <p>M1[1] -8.69 dBm 704.9200 MHz Occ Bw 4.510978044 MHz 0.21 dB 5.2000 MHz</p> <p>O1 17.470 dBm M2 -8.930 dBm</p> <p>CF 707.5 MHz 501 pts Span 10.0 MHz</p> <p>Date: 2.JUL.2022 14:23:21</p>	<p>Ref Level 30.00 dBm Offset 7.00 dB RBW 100 kHz Att 45 dB SWT 19 μs VBW 300 kHz Mode Auto FFT</p> <p>1Pk Max</p> <p>M1[1] -10.16 dBm 704.9200 MHz Occ Bw 4.510978044 MHz -0.42 dB 5.1800 MHz</p> <p>O1 16.140 dBm M2 -9.860 dBm</p> <p>CF 707.5 MHz 501 pts Span 10.0 MHz</p> <p>Date: 2.JUL.2022 14:23:35</p>
Highest	<p>Ref Level 30.00 dBm Offset 7.00 dB RBW 100 kHz Att 45 dB SWT 19 μs VBW 300 kHz Mode Auto FFT</p> <p>1Pk Max</p> <p>M1[1] -8.19 dBm 709.9000 MHz Occ Bw 4.610778443 MHz -0.03 dB 6.8000 MHz</p> <p>O1 17.840 dBm M2 -8.160 dBm</p> <p>CF 713.5 MHz 501 pts Span 10.0 MHz</p> <p>Date: 2.JUL.2022 14:23:50</p>	<p>Ref Level 30.00 dBm Offset 7.00 dB RBW 100 kHz Att 45 dB SWT 19 μs VBW 300 kHz Mode Auto FFT</p> <p>1Pk Max</p> <p>M1[1] -9.76 dBm 710.6400 MHz Occ Bw 4.610778443 MHz -0.10 dB 5.9000 MHz</p> <p>O1 16.190 dBm M2 -9.870 dBm</p> <p>CF 713.5 MHz 501 pts Span 10.0 MHz</p> <p>Date: 2.JUL.2022 14:24:11</p>

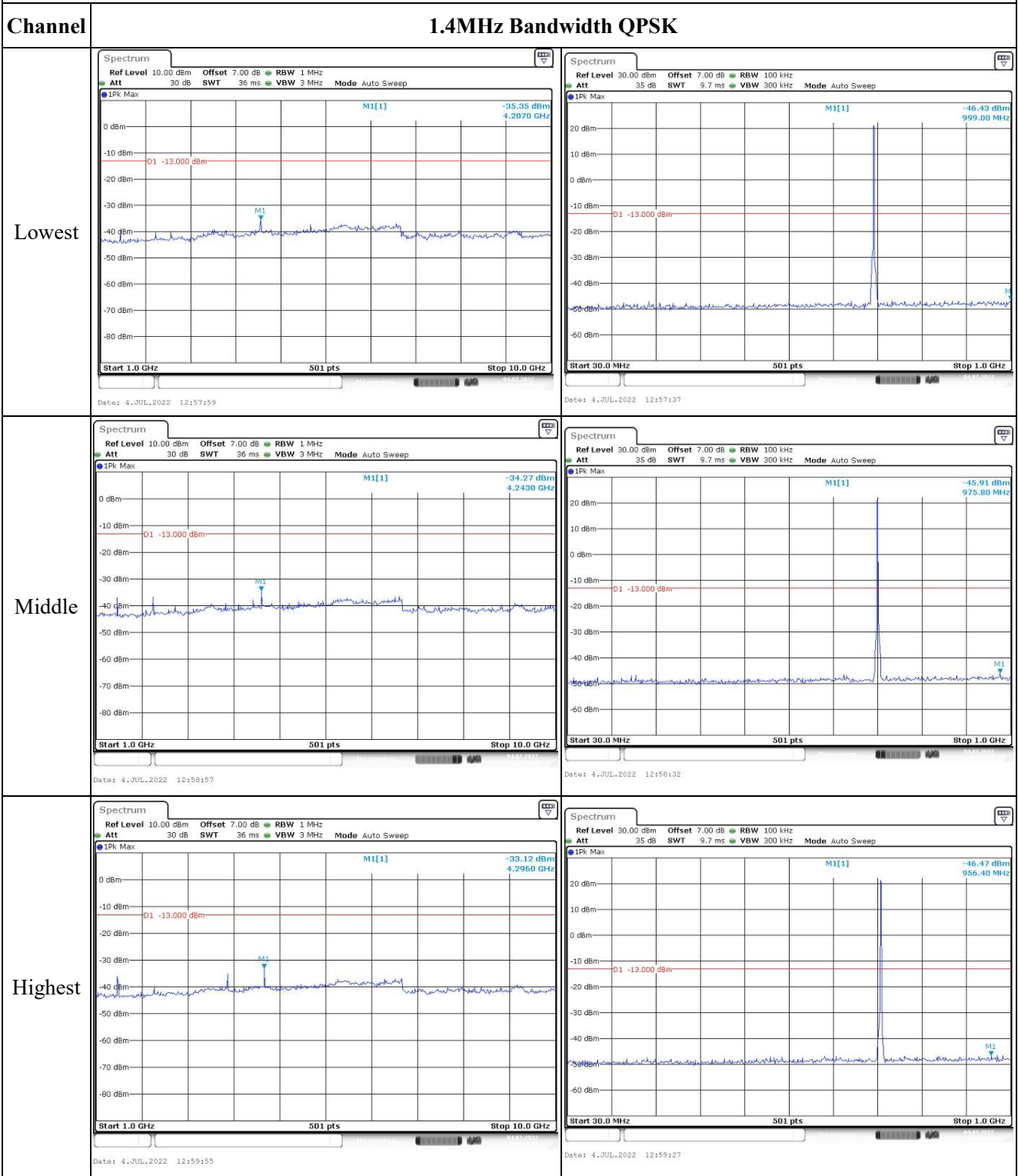


Occupied Bandwidth





Spurious Emissions at Antenna Terminal

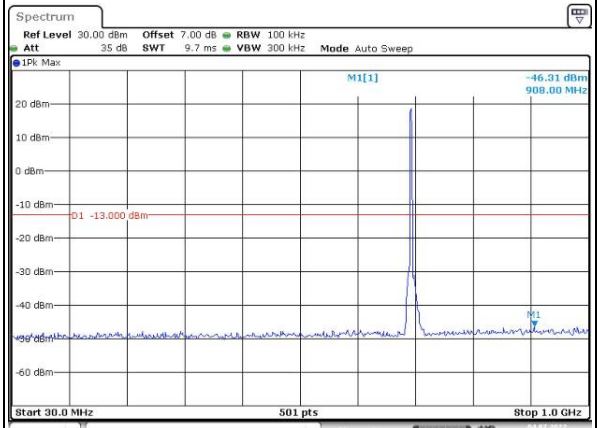
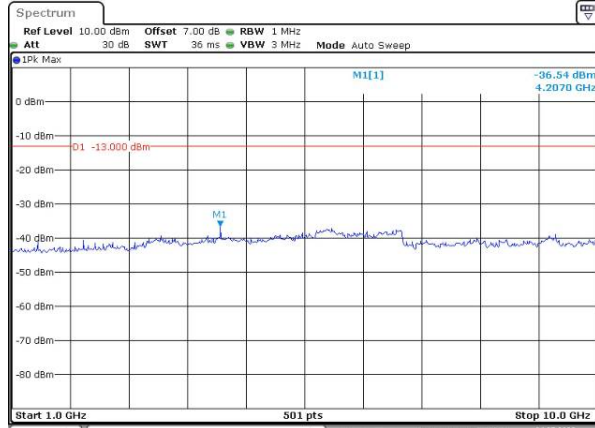


Spurious Emissions at Antenna Terminal

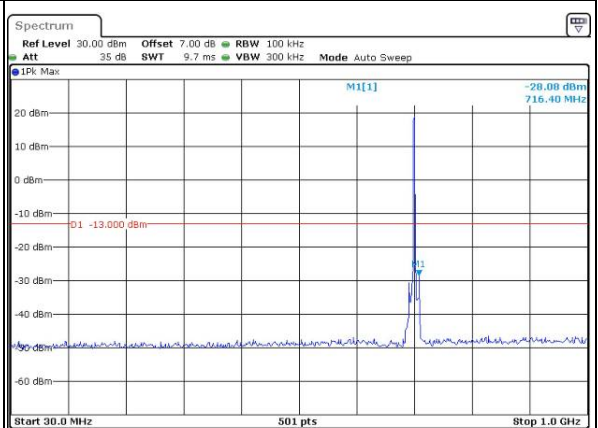
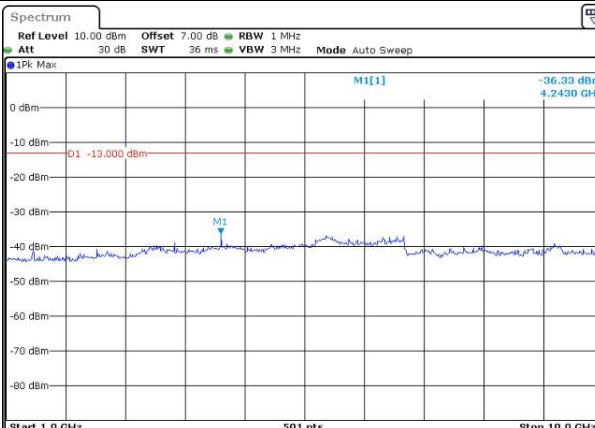
Channel

3MHz Bandwidth QPSK

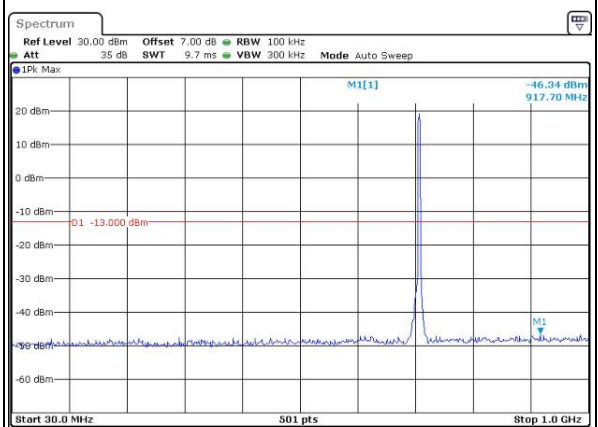
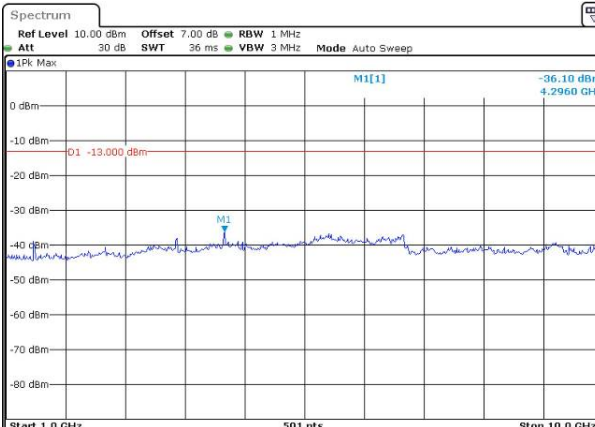
Lowest



Middle



Highest

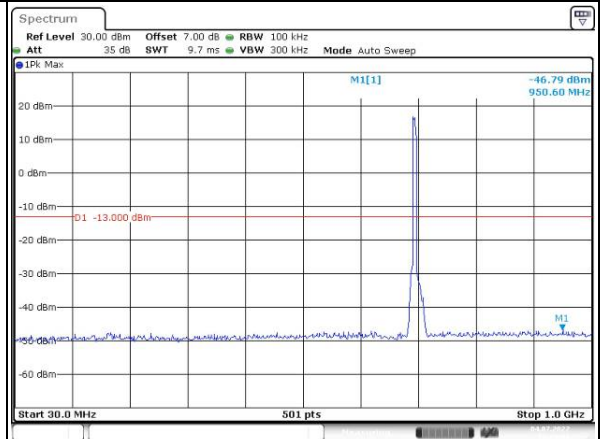
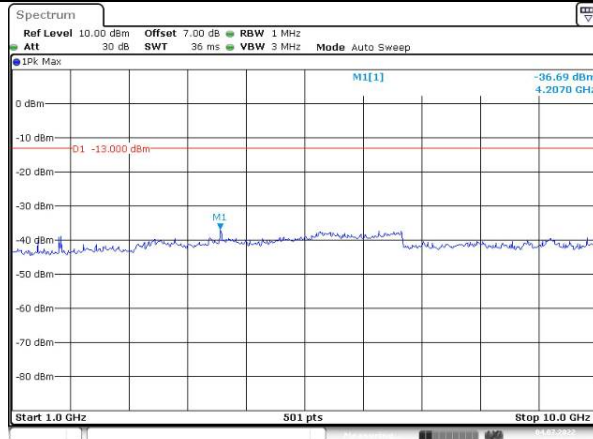


### Spurious Emissions at Antenna Terminal

Channel

5MHz Bandwidth QPSK

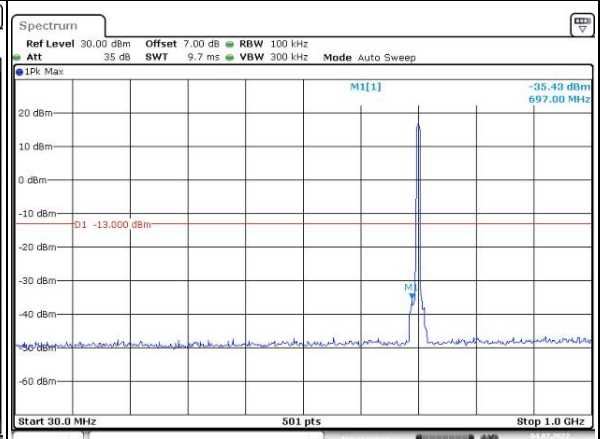
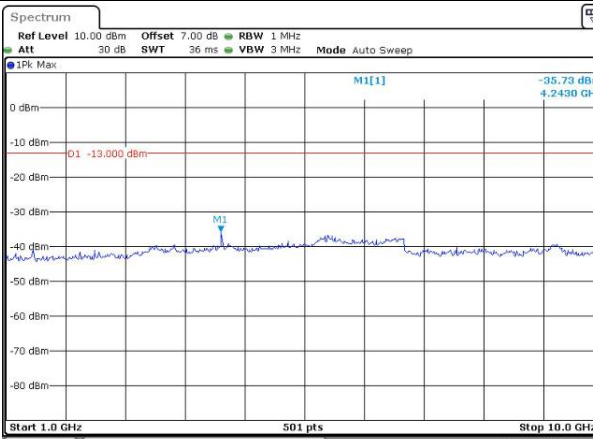
Lowest



Date: 4.JUL.2022 13:03:27

Date: 4.JUL.2022 13:03:04

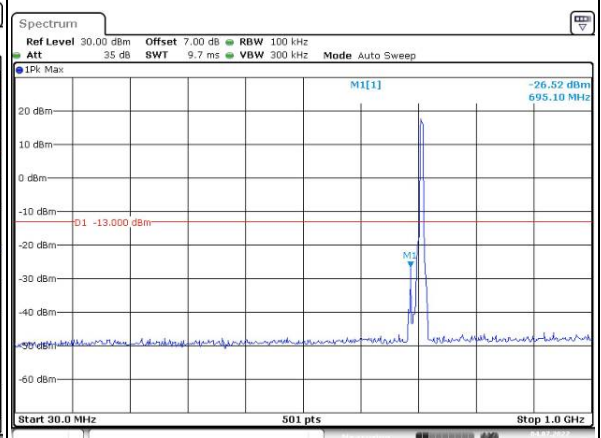
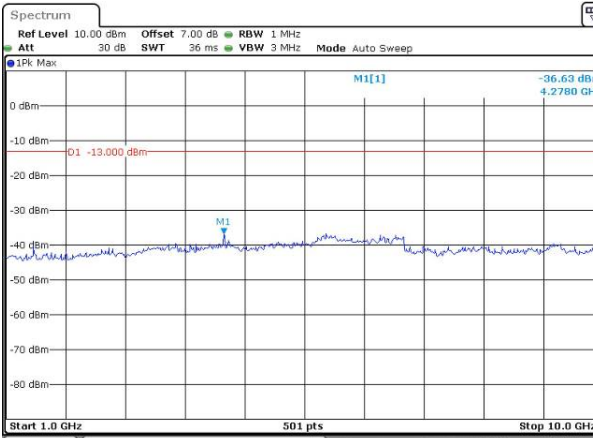
Middle



Date: 4.JUL.2022 13:04:21

Date: 4.JUL.2022 13:03:56

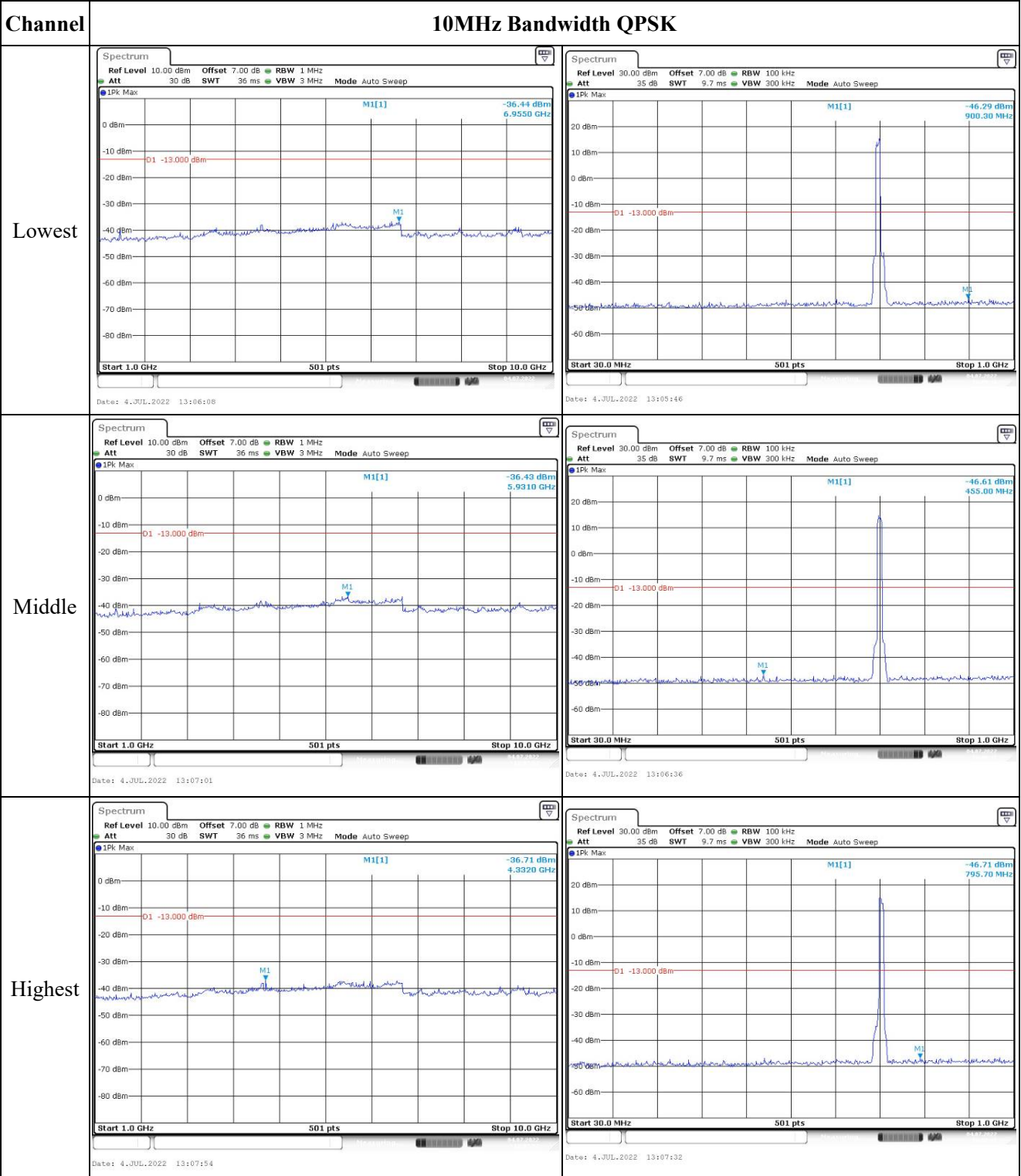
Highest



Date: 4.JUL.2022 13:05:13

Date: 4.JUL.2022 13:04:51

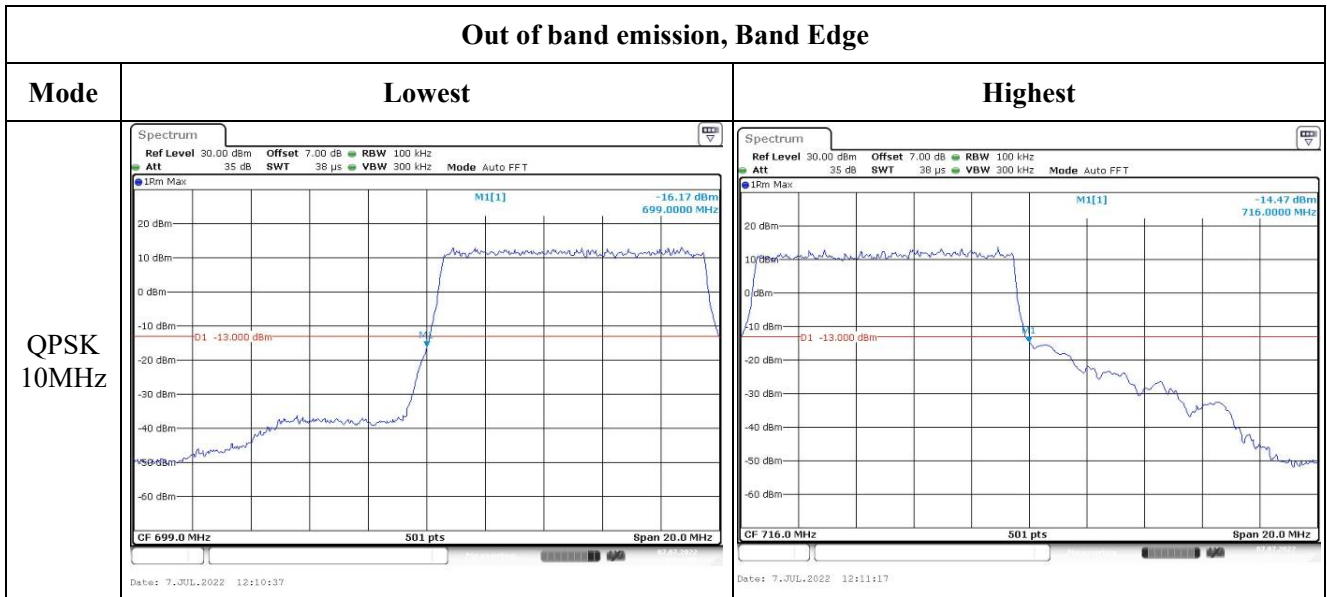
Spurious Emissions at Antenna Terminal



Out of band emission, Band Edge

Mode	Lowest	Highest
QPSK 1.4MHz		
QPSK 3MHz		
QPSK 5MHz		

Out of band emission, Band Edge



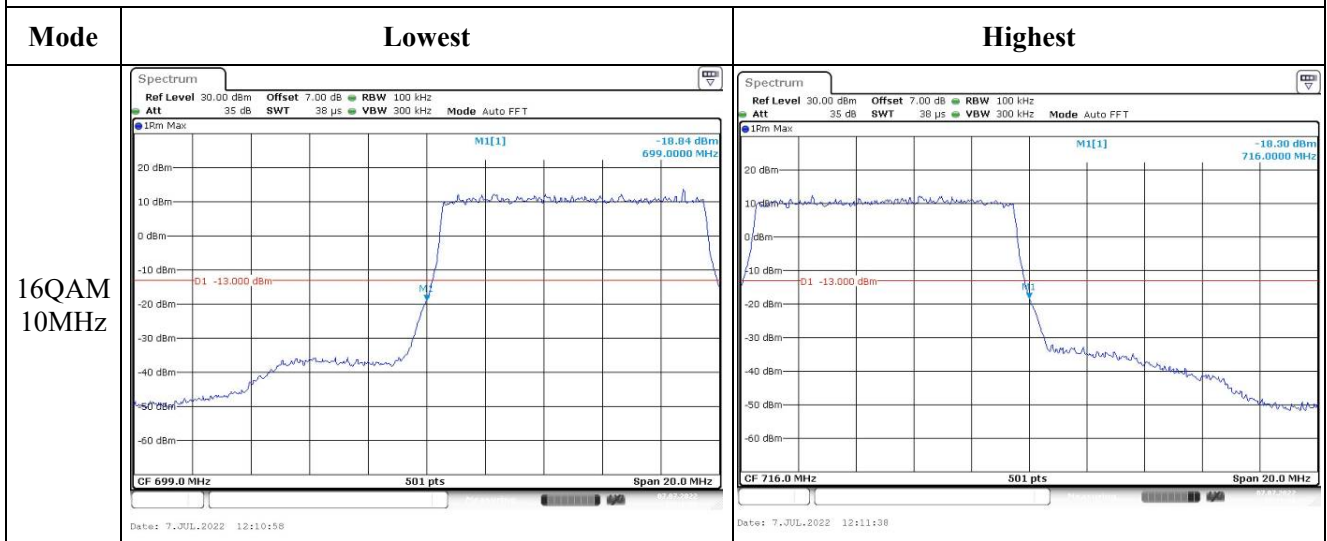


Out of band emission, Band Edge

Mode	Lowest	Highest
16QAM 1.4MHz		
16QAM 3MHz		
16QAM 5MHz		



Out of band emission, Band Edge



**4.10 Antenna Port Test Data and Results for LTE Band 17**

Serial Number:	CR220050079-RF-S1	Test Date:	2022/7/2~2022/7/11
Test Site:	RF	Test Mode:	Transmitting
Tester:	Ted Min	Test Result:	Pass

**Environmental Conditions:**

Temperature: (°C)	24.3~24.8	Relative Humidity: (%)	49~52	ATM Pressure: (kPa)	100.0~100.2
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**Test Equipment List and Details:**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101943	2021-10-10	2022-10-09
R&S	Wideband Radio Communication Tester	CMW500	149218	2021-07-21	2022-07-20
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
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
E-Microwave	Two-way Splitter	ODP-1-6	OE0120176	Each time	N/A
HuiXunDa	DC Block	SMA-JK 18G	DCB181108042	Each time	N/A
Weinschel	Coaxial Attenuators	53-20-34	LN751	Each time	N/A
YINSAIGE	Coaxial Cable	SS402	SJ0100003	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 17▲:**

Antenna Gain (dBi):	-1.49	Antenna Gain (dBd):	-3.64	Path Loss $L_c$ (dB):	0
Operation Voltage(V <sub>DC</sub> ):					
Lowest:	3.42	Normal:	3.8	Highest:	4.18

**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	21.92	21.75	21.93	18.39	34.77
	RB1#13	21.98	21.77	21.97		
	RB1#24	22.03	21.9	21.98		
	RB15#0	21.97	21.77	21.86		
	RB15#10	21.93	21.83	21.88		
	RB25#0	21.73	21.39	21.47		
5MHz 16QAM	RB1#0	21.64	21.46	21.72	18.26	34.77
	RB1#13	21.74	21.57	21.82		
	RB1#24	21.84	21.76	21.9		
	RB15#0	21.82	21.68	21.8		
	RB15#10	21.78	21.79	21.85		
	RB25#0	21.48	21.32	21.51		
10MHz QPSK	RB1#0	22.14	22.05	22.14	18.73	34.77
	RB1#25	22.22	22.14	22.11		
	RB1#49	22.29	22.18	22.24		
	RB25#0	22.13	22.12	22.23		
	RB25#25	22.25	22.08	22.37		
	RB50#0	21.88	21.77	22		
10MHz 16QAM	RB1#0	21.79	21.67	21.81	18.29	34.77
	RB1#25	21.86	21.74	21.89		
	RB1#49	21.91	21.84	21.93		
	RB25#0	21.68	21.59	21.68		
	RB25#25	21.71	21.63	21.76		
	RB50#0	21.56	21.39	21.61		
Note: ERP=Conducted Power(dBm) - Cable loss(dB) + Antenna Gain(dBd)					<b>Result:</b>	<b>Pass</b>

**Peak-to-average Ratio(PAR)**

Test Bandwidth & Modulation	Resource Block & RB offset	Peak-to-average Ratio(dB)			Limit (dB)
		Lowest Channel	Middle Channel	Highest Channel	
10MHz QPSK	RB1#0	3.06	3.13	3.19	13
	RB50#0	5.23	5.24	5.36	13
10MHz 16QAM	RB1#0	4.09	4.36	4.18	13
	RB50#0	6.41	6.33	6.45	13
<b>Result:</b>					<b>Pass</b>

<b>FCC §2.1049, §27.53:Occupied Bandwidth</b>						
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	4.551	5.18	5.2	6.44
5MHz 16QAM	4.491	4.531	4.651	5.16	5.18	5.74
10MHz QPSK	8.942	8.942	8.982	9.96	9.72	9.92
10MHz 16QAM	8.942	8.942	8.982	9.84	9.8	9.88

Note: The test plots please refer to the Plots of Occupied Bandwidth

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

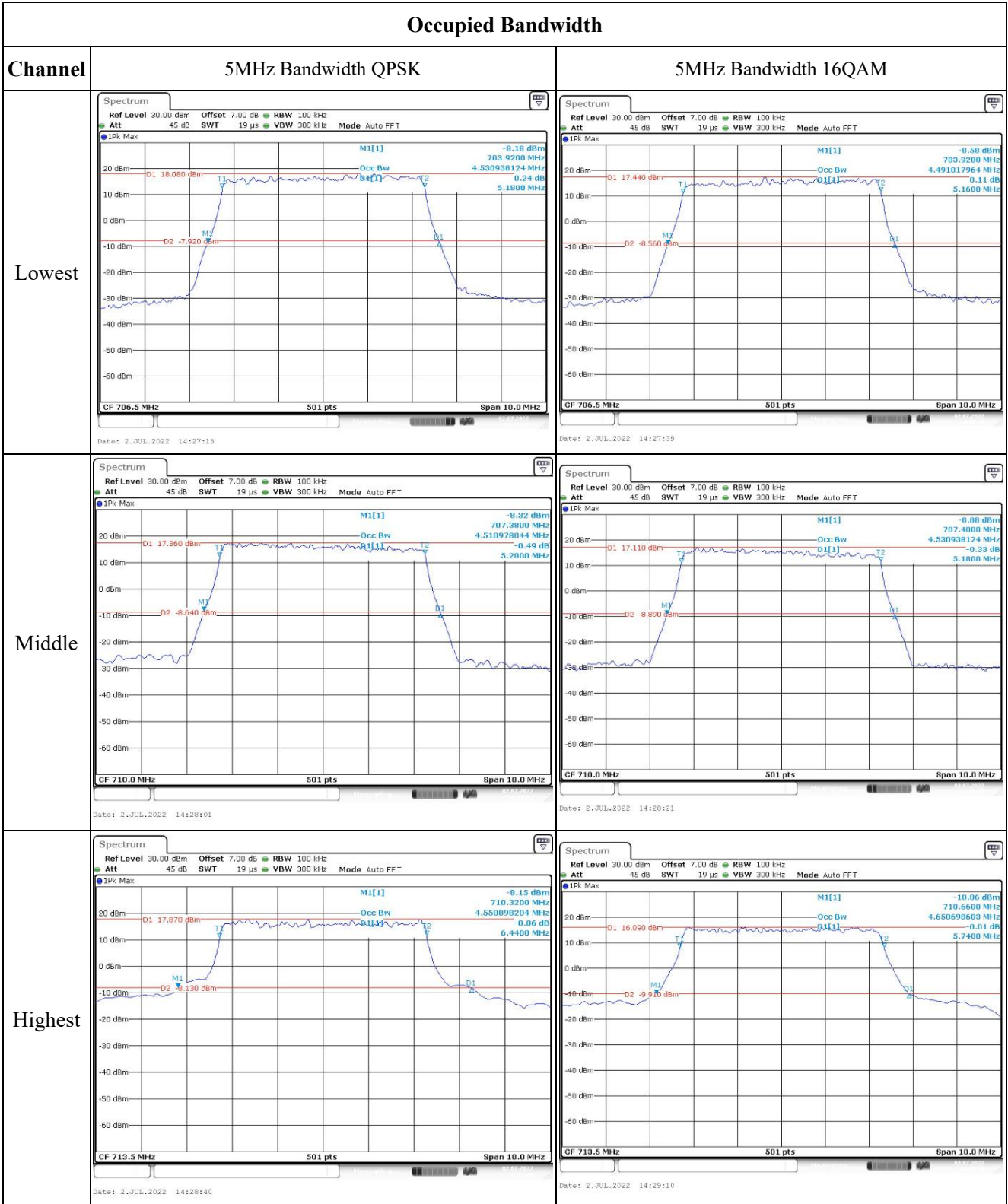
<b>FCC §2.1051, §27.53:Out of band emission, Band Edge</b>	
<b>Result:</b>	<b>Pass, Please refer to the test plots of Out of band emission, Band Edge.</b>

<b>FCC §2.1055, §27.54: Frequency Stability</b>						
Test Mode:	10M QPSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V <sub>DC</sub> )	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	704.163	704.00	715.801	716.00
	-20	3.8	704.354	704.00	715.837	716.00
	-10	3.8	704.295	704.00	715.698	716.00
	0	3.8	704.346	704.00	715.773	716.00
	10	3.8	704.198	704.00	715.810	716.00
	20	3.8	704.181	704.00	715.711	716.00
	30	3.8	704.223	704.00	715.779	716.00
	40	3.8	704.256	704.00	715.716	716.00
Frequency Stability vs. Voltage	20	3.42	704.187	704.00	715.803	716.00
	20	4.18	704.348	704.00	715.743	716.00
					<b>Result:</b>	<b>Pass</b>

Test Mode:	10M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V <sub>DC</sub> )	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	704.190	704.00	715.836	716.00
	-20	3.8	704.338	704.00	715.881	716.00
	-10	3.8	704.199	704.00	715.757	716.00
	0	3.8	704.220	704.00	715.754	716.00
	10	3.8	704.173	704.00	715.789	716.00
	20	3.8	704.270	704.00	715.837	716.00
	30	3.8	704.304	704.00	715.896	716.00
	40	3.8	704.312	704.00	715.768	716.00
	50	3.8	704.260	704.00	715.871	716.00
Frequency Stability vs. Voltage	20	3.42	704.256	704.00	715.774	716.00
	20	4.18	704.237	704.00	715.854	716.00
					<b>Result:</b>	<b>Pass</b>

Test Plots:

Occupied Bandwidth



Occupied Bandwidth

Channel	10MHz Bandwidth QPSK	10MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

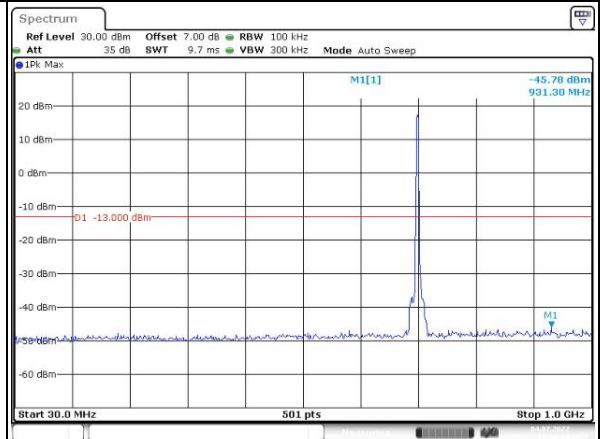
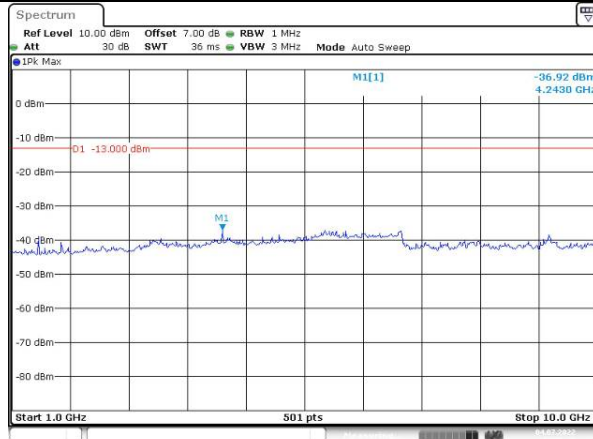


### Spurious Emissions at Antenna Terminal

Channel

5MHz Bandwidth QPSK

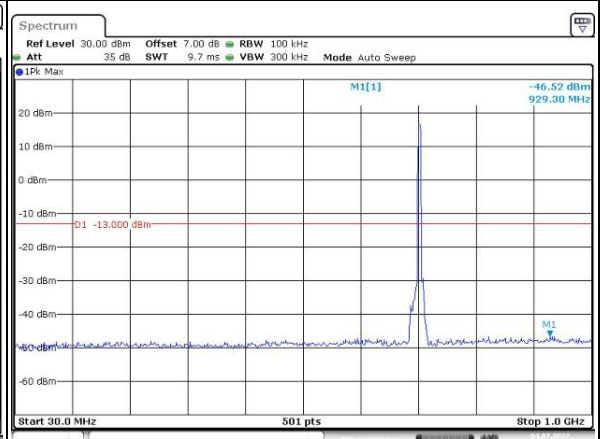
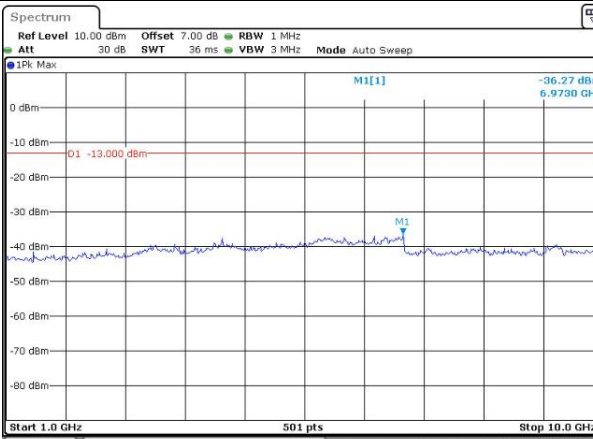
Lowest



Date: 4.JUL.2022 13:08:45

Date: 4.JUL.2022 13:08:26

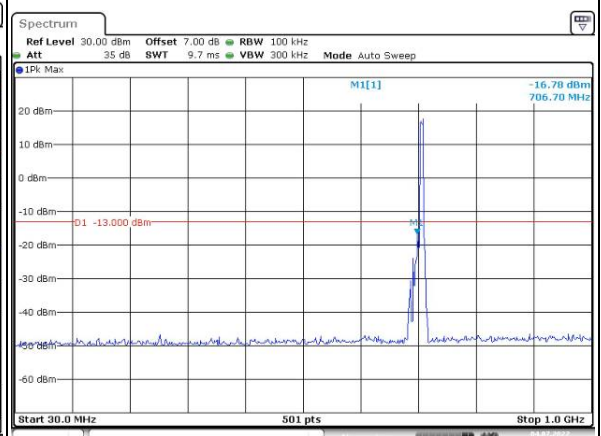
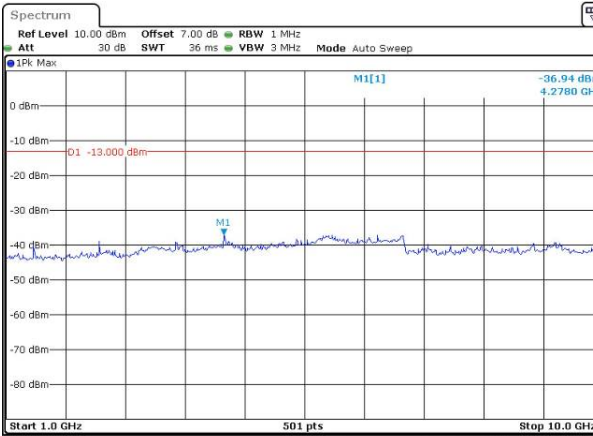
Middle



Date: 4.JUL.2022 13:09:43

Date: 4.JUL.2022 13:09:15

Highest



Date: 4.JUL.2022 13:10:38

Date: 4.JUL.2022 13:10:16

Spurious Emissions at Antenna Terminal

