

Out of band emission, Band Edge

Mode	Lowest	Highest
16QAM 10MHz		
16QAM 15MHz		
16QAM 20MHz		

**4.5 Antenna Port Test Data and Results for LTE Band 4:**

Serial Number:	CR22050036-RF-S1	Test Date:	2022-05-31~2022-07-12
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rinka Li	Test Result:	Pass

**Environmental Conditions:**

Temperature: (°C)	25.5~27.2	Relative Humidity: (%)	63~58	ATM Pressure: (kPa)	100.1~100.2
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**Test Equipment List and Details:**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2021-07-22	2022-07-21
zhuoxiang	Coaxial Cable	SMA-178	211002	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	2022-07-21
UNI-T	Multimeter	UT39A+	C210582554	2021-09-30	2022-09-29
Weinschel	Coaxial Attenuator	53-20-34	LN751	Each time	N/A
BACL	TEMP&HUMI Test Chamber	BTH-150	30026	2021-07-22	2022-07-21
UNI-T	Multimeter	UT39A+	C210582554	2021-07-22	2022-07-21
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 4▲:**

Antenna Gain (dBi):	3.87	Cable Loss (dB):	0
Operation Voltage(V <sub>DC</sub> ):			
Lowest:	10.8	Normal:	13.8
		Highest:	36

**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:**

<b>FCC§2.1046;§ 27.50(d)(4)</b>						
<b>RF Output Power:</b>						
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	22.31	21.95	21.85	26.18	30
	RB1#3	22.26	22.07	21.85		
	RB1#5	22.24	21.95	21.87		
	RB3#0	22.14	22.02	21.66		
	RB3#3	22.15	21.95	21.79		
	RB6#0	21.26	20.98	20.69		
1.4MHz 16QAM	RB1#0	21.38	20.82	20.79	25.29	30
	RB1#3	21.42	20.94	20.9		
	RB1#5	21.27	20.89	20.84		
	RB3#0	21.14	20.8	20.67		
	RB3#3	21.29	21.03	20.92		
	RB6#0	20.27	20.05	19.85		
3MHz QPSK	RB1#0	22.32	22.14	21.83	26.19	30
	RB1#8	22.29	22.04	21.89		
	RB1#14	22.3	22.15	21.94		
	RB6#0	21.29	21.13	20.69		
	RB6#9	21.36	21.19	20.85		
	RB15#0	21.38	21.16	20.81		
3MHz 16QAM	RB1#0	21.21	21.04	20.87	25.26	30
	RB1#8	21.24	21.03	20.73		
	RB1#14	21.39	21.14	20.9		
	RB6#0	20.35	20.1	19.75		
	RB6#9	20.36	20.16	19.77		
	RB15#0	20.44	20.17	19.82		
5MHz QPSK	RB1#0	22.24	22.08	21.89	26.16	30
	RB1#13	22.29	22.15	21.9		
	RB1#24	22.2	22.2	22.11		
	RB15#0	21.44	21.17	20.88		
	RB15#10	21.43	21.23	20.86		
	RB25#0	21.41	21.18	20.89		
5MHz 16QAM	RB1#0	21.38	21.22	19.41	25.29	30
	RB1#13	21.42	21.2	19.95		
	RB1#24	21.25	21.21	19.25		
	RB15#0	20.48	20.12	18.49		
	RB15#10	20.41	20.25	18.57		
	RB25#0	20.49	20.2	18.57		

10MHz QPSK	RB1#0	21.07	20.95	21.1	25.01	30
	RB1#25	21.09	21.03	21.04		
	RB1#49	21.05	21.06	21.14		
	RB25#0	20.11	19.98	19.87		
	RB25#25	19.86	19.99	19.76		
	RB50#0	20.16	19.9	19.87		
10MHz 16QAM	RB1#0	19.98	19.97	20.1	24.13	30
	RB1#25	20	19.97	20.17		
	RB1#49	19.99	19.92	20.26		
	RB25#0	19.26	19	19		
	RB25#25	19.05	19.13	18.91		
	RB50#0	19.21	19.06	19.09		
15MHz QPSK	RB1#0	21.52	21.1	21.44	25.39	30
	RB1#38	21.39	21.01	21.21		
	RB1#74	21.44	21.11	21.3		
	RB36#0	20.27	20.19	20.29		
	RB36#39	20.19	20.33	20.25		
	RB75#0	20.25	20.39	20.29		
15MHz 16QAM	RB1#0	20.19	20.4	20.43	24.3	30
	RB1#38	20.04	20.37	20.27		
	RB1#74	20.11	20.42	20.27		
	RB36#0	19.36	19.63	19.38		
	RB36#39	19.3	19.67	19.37		
	RB75#0	19.27	19.58	19.42		
20MHz QPSK	RB1#0	21.61	21.73	21.48	25.6	30
	RB1#50	21.67	21.64	21.51		
	RB1#99	21.6	21.67	21.36		
	RB50#0	20.74	20.58	20.54		
	RB50#50	20.7	20.71	20.33		
	RB100#0	20.73	20.54	20.49		
20MHz 16QAM	RB1#0	20.72	20.41	20.45	24.66	30
	RB1#50	20.79	20.27	20.47		
	RB1#99	20.71	20.45	20.41		
	RB50#0	19.74	19.67	19.68		
	RB50#50	19.79	19.71	19.45		
	RB100#0	19.75	19.63	19.55		

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

**Result:**

**Pass**

<b>Peak-to-average Ratio(PAR)</b>					
Test Bandwidth & Modulation	Resource Block & RB offset	Peak-to-average Ratio(dB)			Limit (dB)
		Lowest Channel	Middle Channel	Highest Channel	
20MHz QPSK	RB1#0	4.06	4.35	4.17	13
	RB100#0	4.78	4.99	4.58	13
20MHz 16QAM	RB1#0	5.25	5.51	5.16	13
	RB100#0	5.88	6	5.65	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
1.4MHz QPSK	1.114	1.102	1.102	1.326	1.32	1.302
1.4MHz 16QAM	1.108	1.108	1.102	1.32	1.302	1.314
3MHz QPSK	2.707	2.707	2.683	2.964	2.976	2.976
3MHz 16QAM	2.695	2.695	2.683	2.976	2.964	2.988
5MHz QPSK	4.531	4.511	4.511	5.02	5.06	5.04
5MHz 16QAM	4.511	4.511	4.511	5.04	5.04	5.02
10MHz QPSK	8.942	8.942	8.942	9.76	9.76	9.6
10MHz 16QAM	8.942	8.942	8.942	9.8	9.8	9.64
15MHz QPSK	13.473	13.533	13.413	14.88	14.88	14.76
15MHz 16QAM	13.473	13.473	13.413	14.82	14.94	14.7
20MHz QPSK	17.804	17.964	17.804	19.36	19.6	19.36
20MHz 16QAM	17.884	17.884	17.884	19.44	19.36	19.36

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>

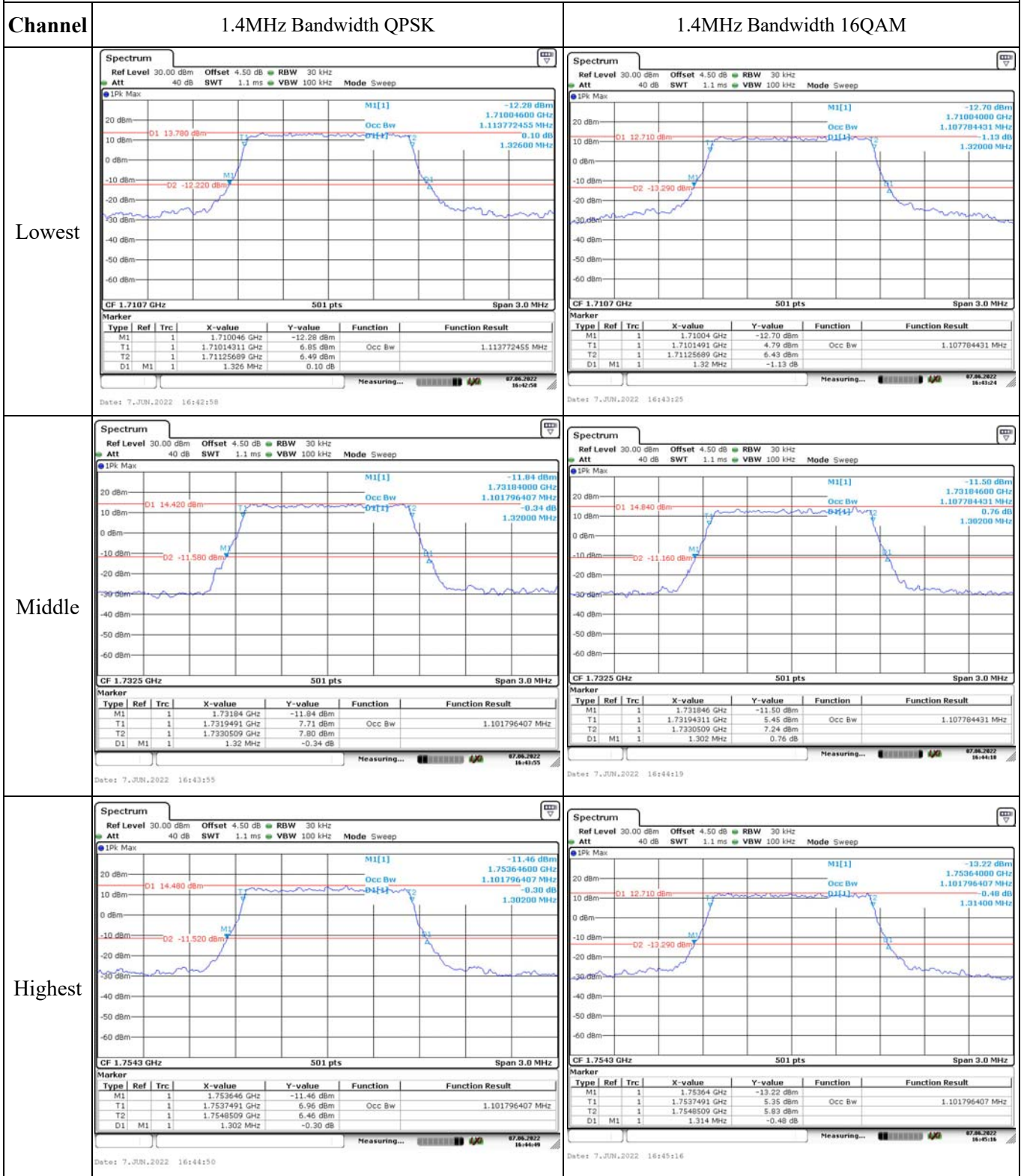
<b>FCC §2.1051, § 27.53:Out of band emission, Band Edge</b>	
<b>Result:</b>	<b>Pass, Please refer to the test plots of Out of band emission, Band Edge.</b>

<b>FCC §2.1055, §27.54: Frequency Stability</b>						
Test Mode:	20M 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	13.8	1710.290	1710.00	1754.717	1755
	-20	13.8	1710.293	1710.00	1754.723	1755
	-10	13.8	1710.292	1710.00	1754.724	1755
	0	13.8	1710.293	1710.00	1754.721	1755
	10	13.8	1710.291	1710.00	1754.724	1755
	20	13.8	1710.285	1710.00	1754.715	1755
	30	13.8	1710.289	1710.00	1754.716	1755
	40	13.8	1710.287	1710.00	1754.722	1755
Frequency Stability vs. Voltage	20	10.8	1710.287	1710.00	1754.723	1755
	20	36	1710.295	1710.00	1754.719	1755
					<b>Result:</b>	<b>Pass</b>

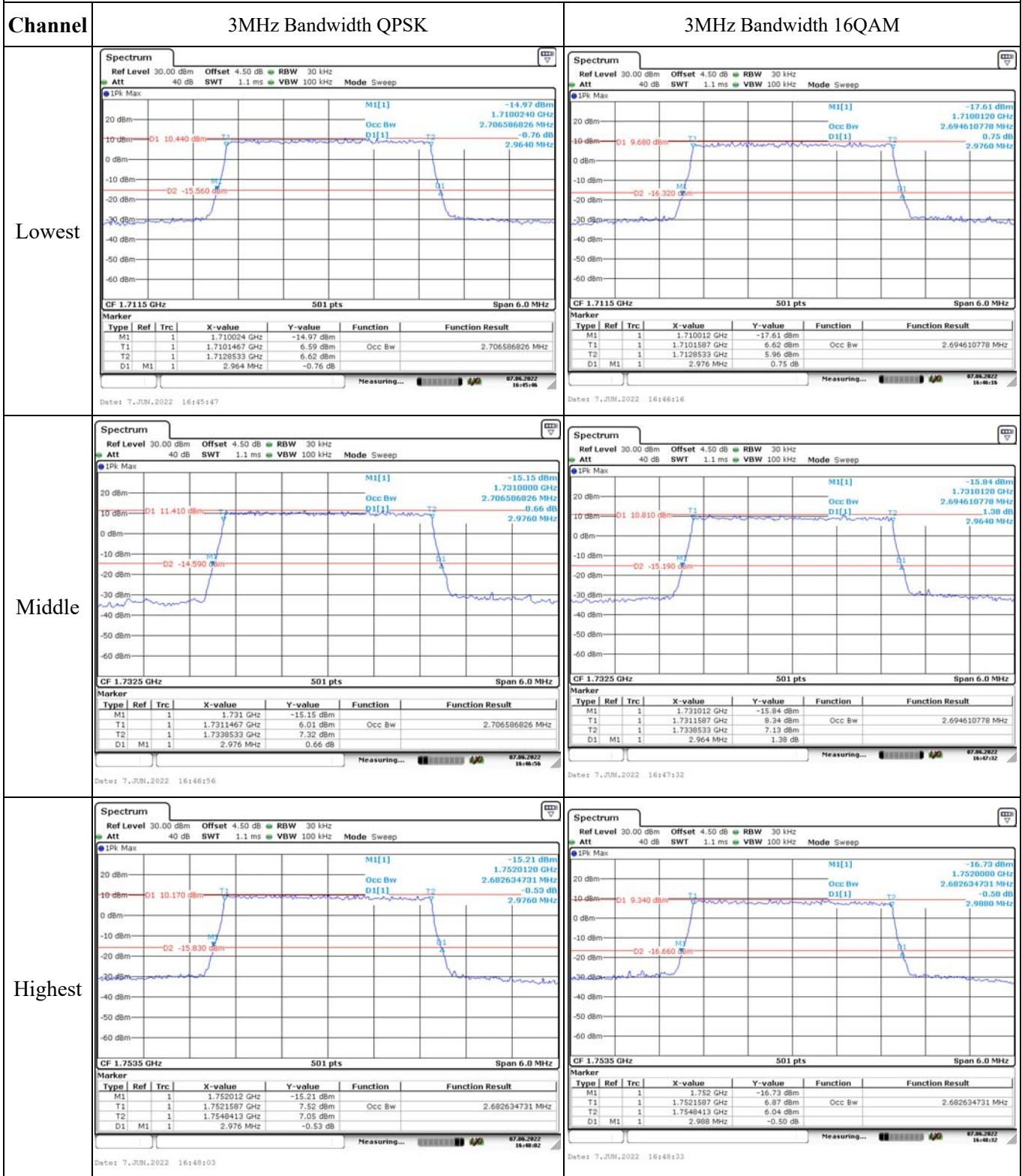
Test Mode:	20M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V <sub>DC</sub> )	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	13.8	1710.295	1710.00	1754.726	1755
	-20	13.8	1710.298	1710.00	1754.724	1755
	-10	13.8	1710.287	1710.00	1754.725	1755
	0	13.8	1710.292	1710.00	1754.727	1755
	10	13.8	1710.292	1710.00	1754.728	1755
	20	13.8	1710.285	1710.00	1754.715	1755
	30	13.8	1710.290	1710.00	1754.726	1755
	40	13.8	1710.296	1710.00	1754.723	1755
Frequency Stability vs. Voltage	20	10.8	1710.285	1710.00	1754.719	1755
	20	36	1710.288	1710.00	1754.720	1755
					<b>Result:</b>	<b>Pass</b>

Test Plots:

Occupied Bandwidth



Occupied Bandwidth





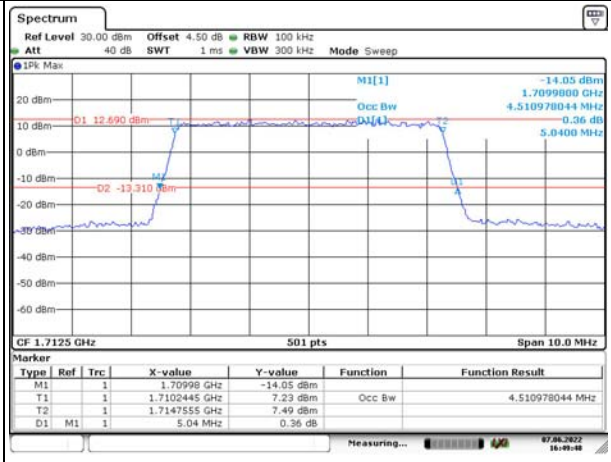
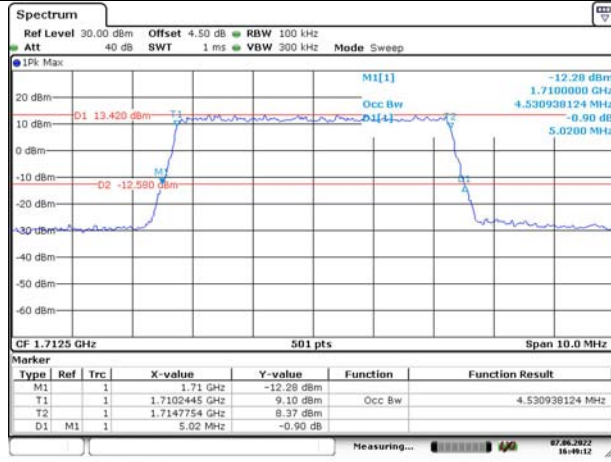
### Occupied Bandwidth

Channel

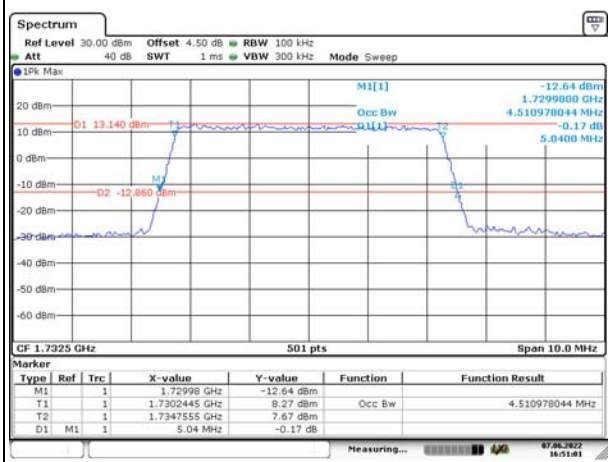
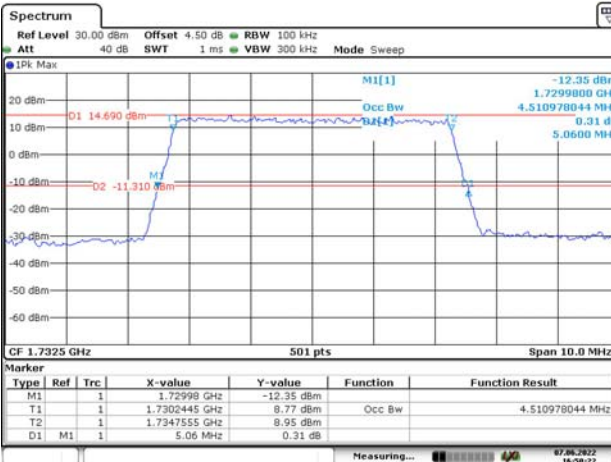
5MHz Bandwidth QPSK

5MHz Bandwidth 16QAM

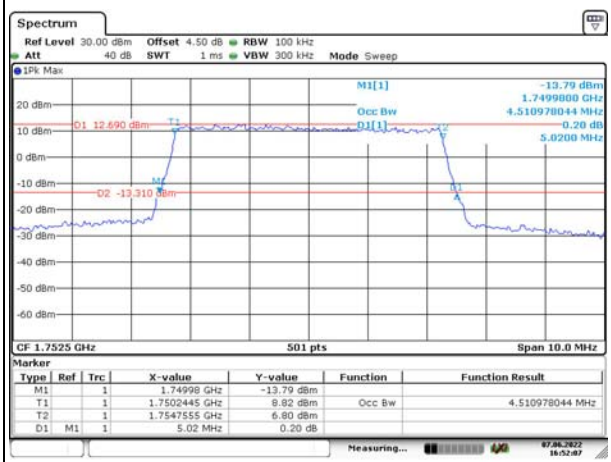
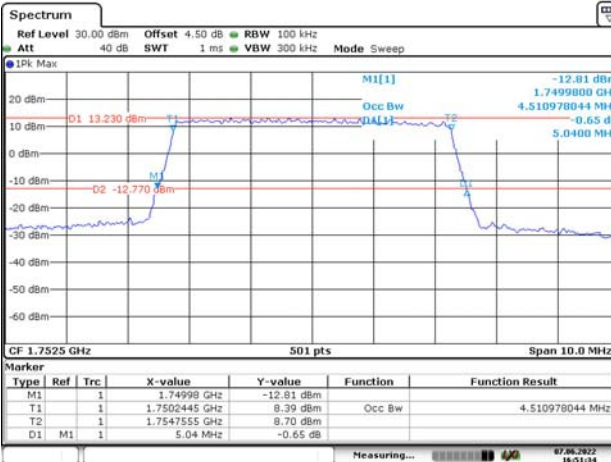
Lowest



Middle



Highest



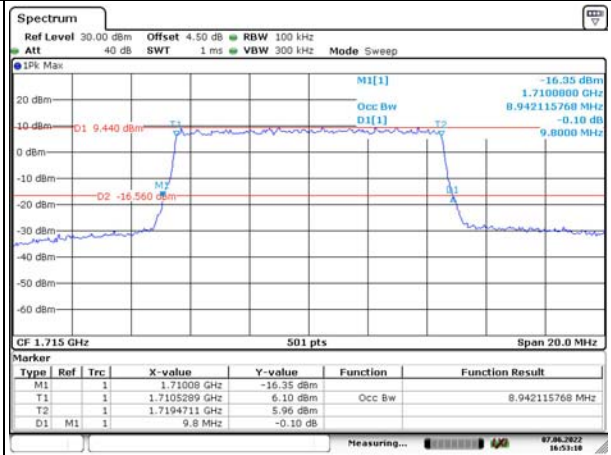
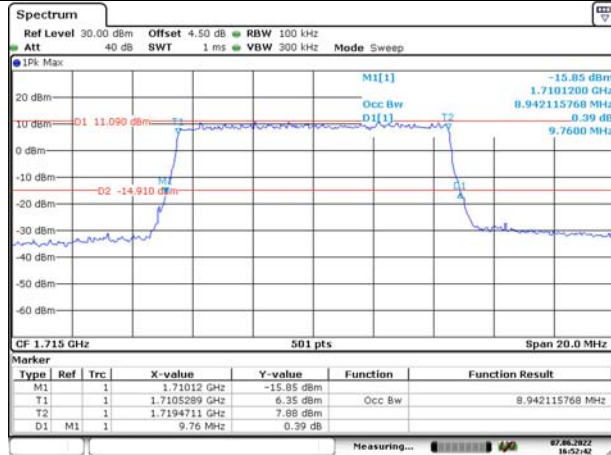
### Occupied Bandwidth

Channel

10MHz Bandwidth QPSK

10MHz Bandwidth 16QAM

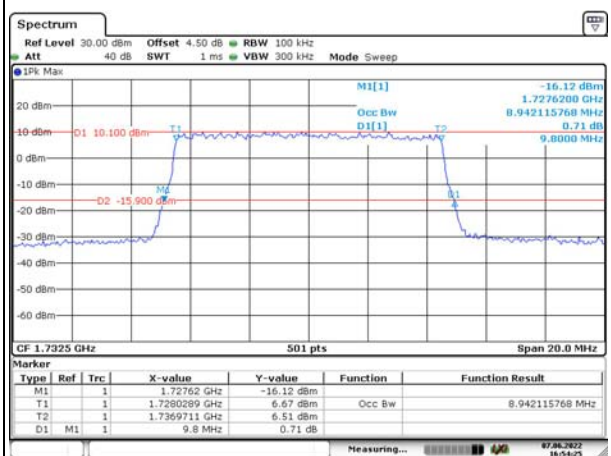
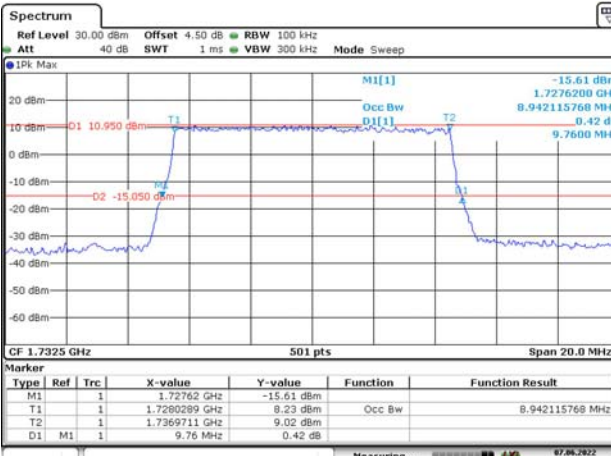
Lowest



Date: 7 JUN 2022 16:52:43

Date: 7 JUN 2022 16:53:11

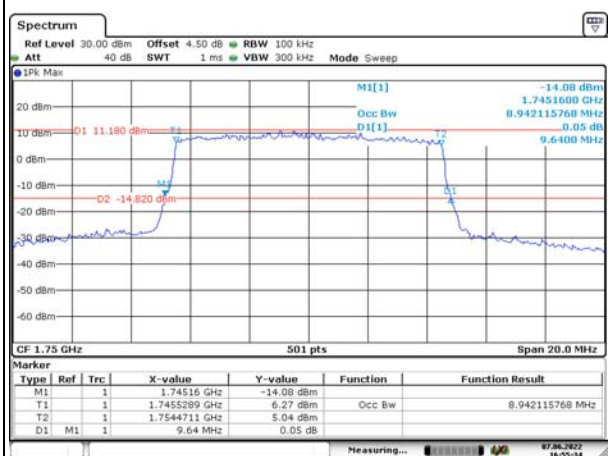
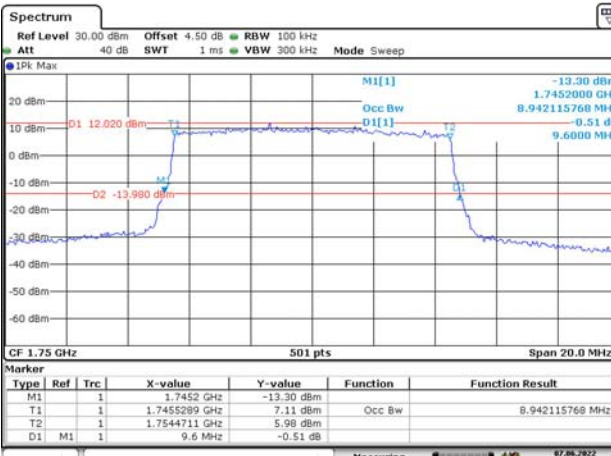
Middle



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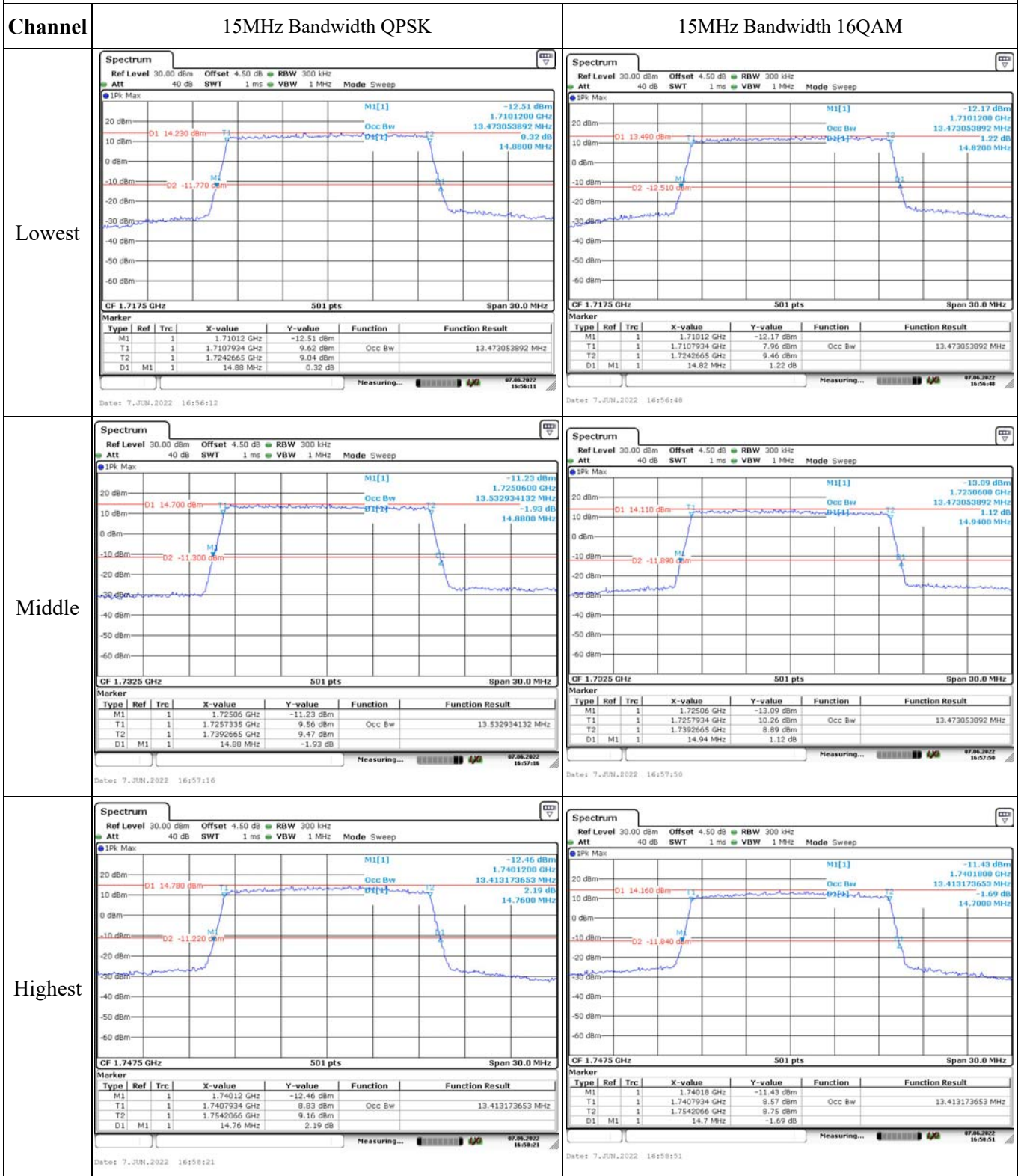
Highest



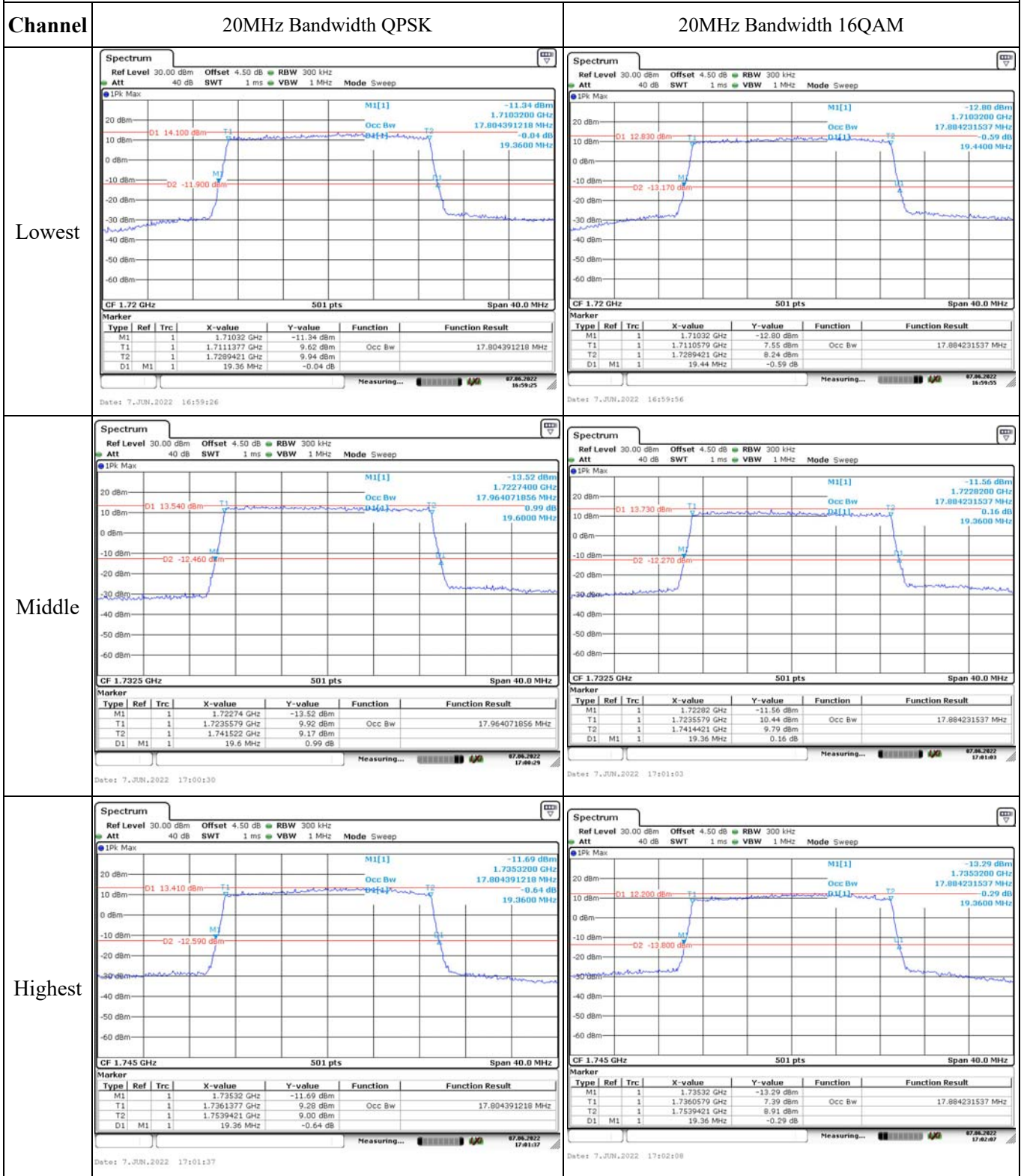
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### Occupied Bandwidth



### Occupied Bandwidth

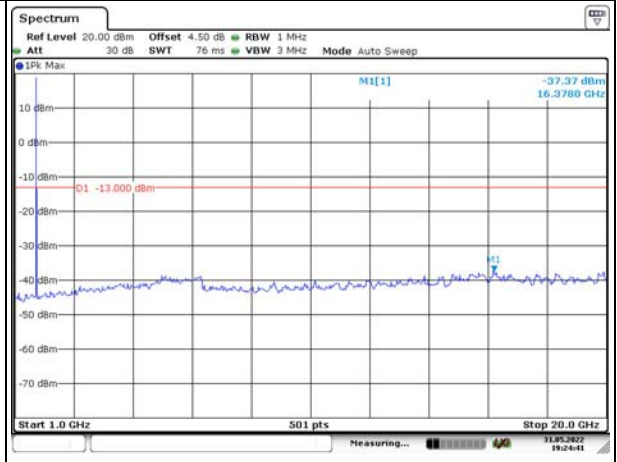
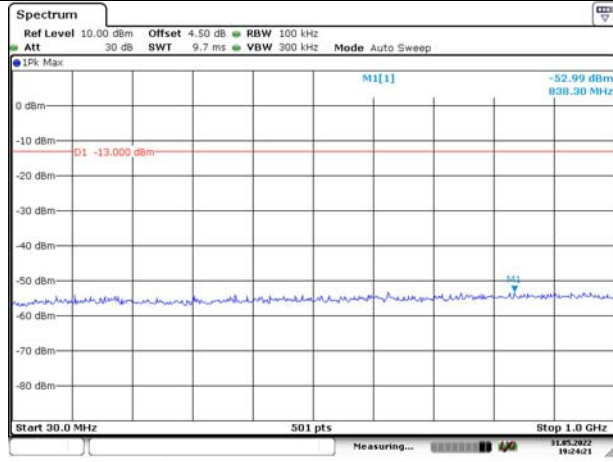


### Spurious Emissions at Antenna Terminal

Channel

1.4MHz Bandwidth QPSK

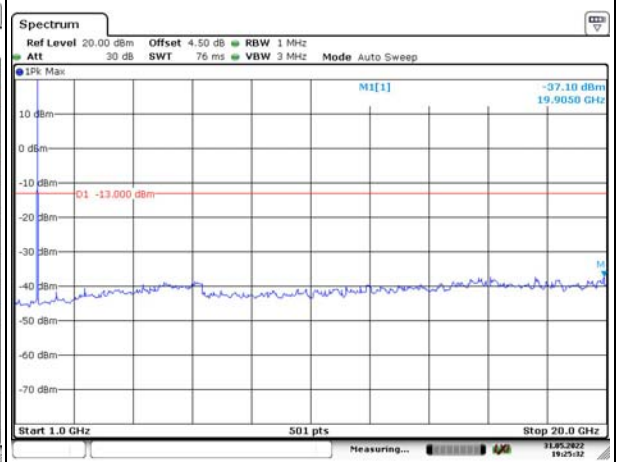
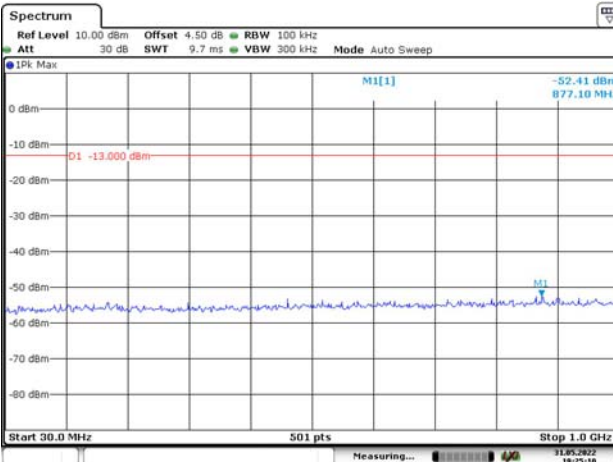
Lowest



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Date: 31.MAY.2022 19:24:41

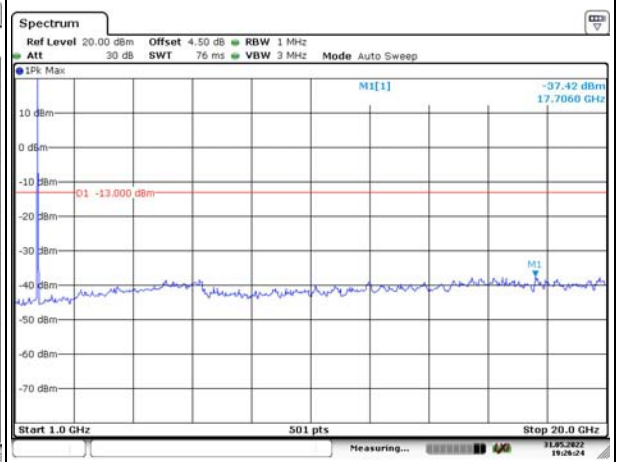
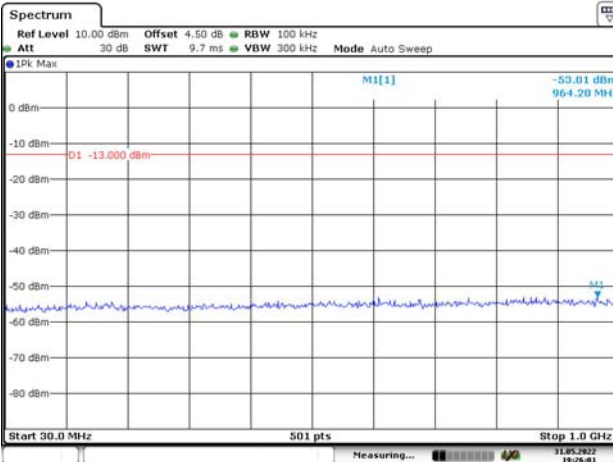
Middle



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Highest



Date: 31.MAY.2022 19:26:02

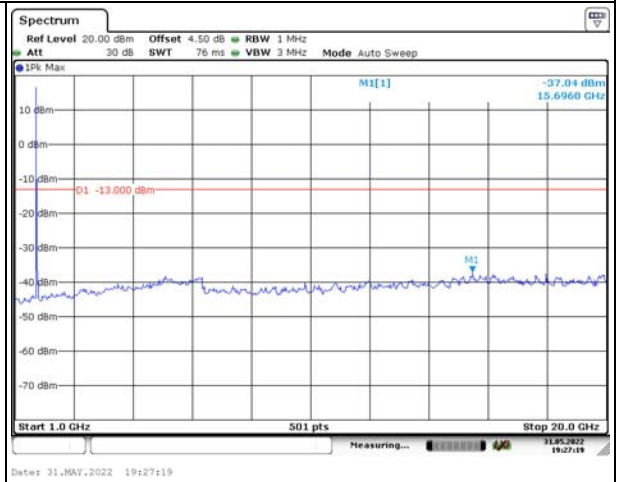
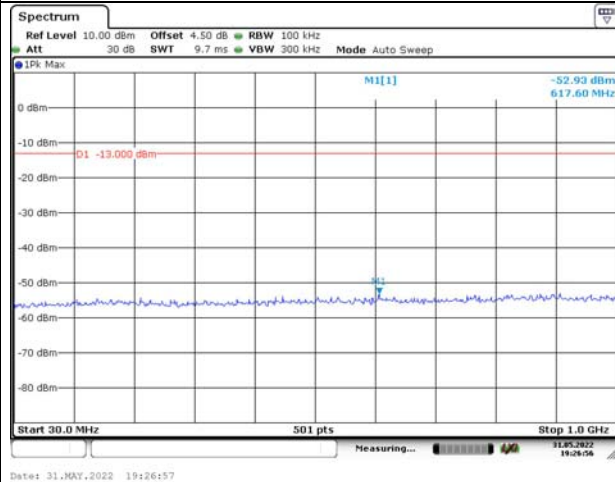
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### Spurious Emissions at Antenna Terminal

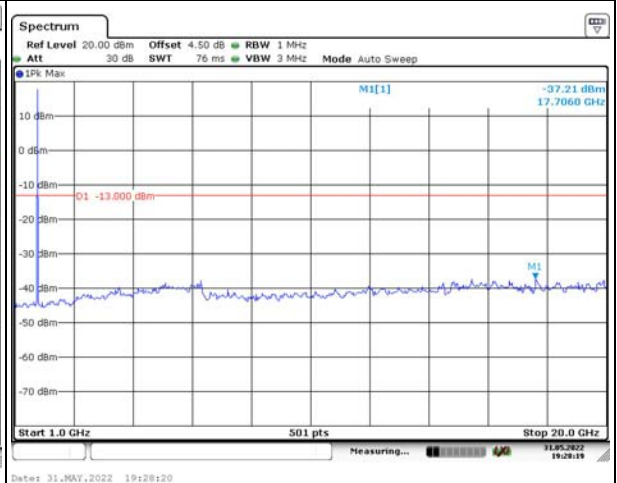
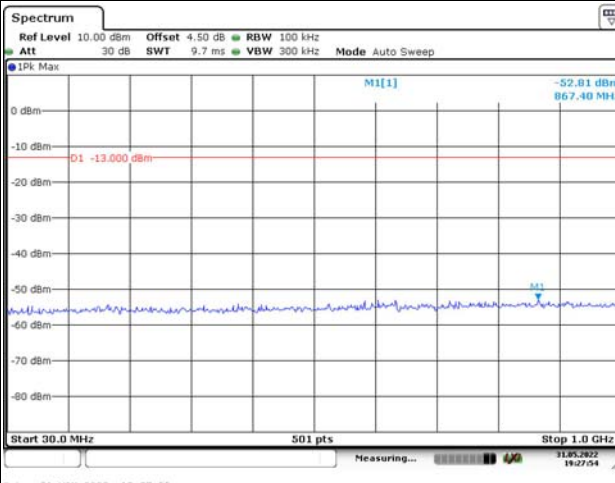
Channel

3MHz Bandwidth QPSK

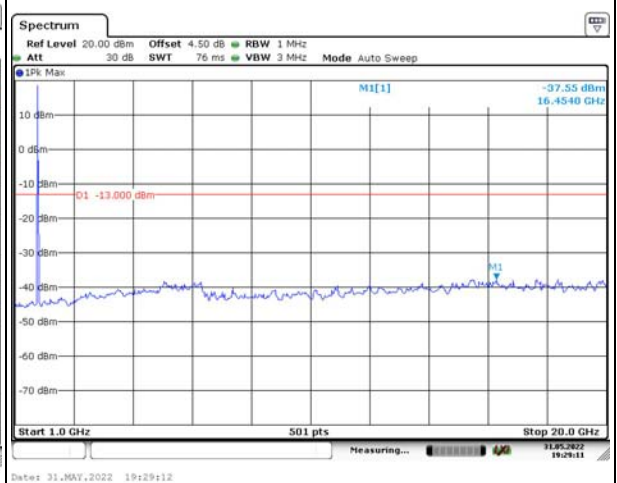
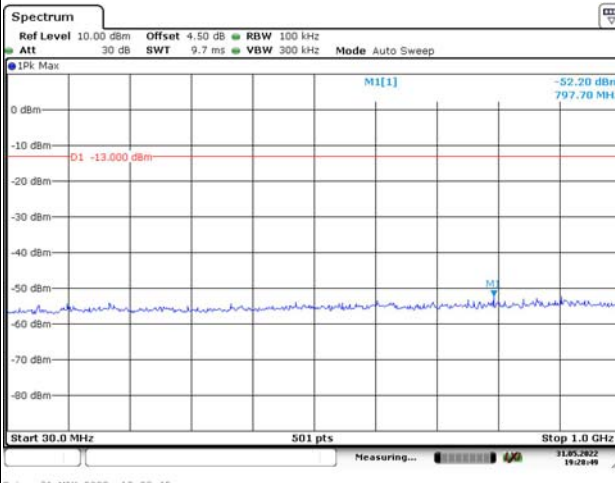
Lowest



Middle



Highest

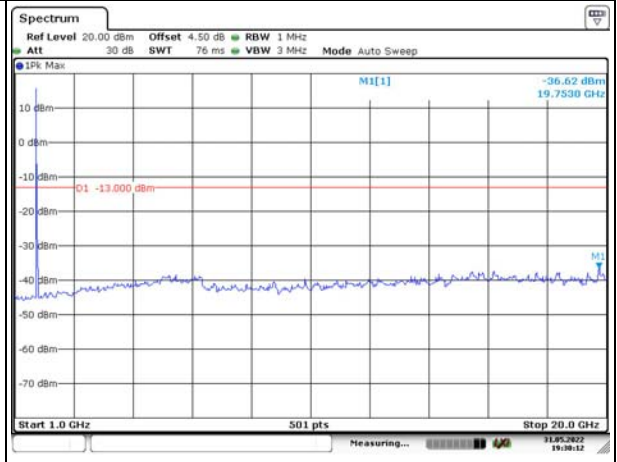
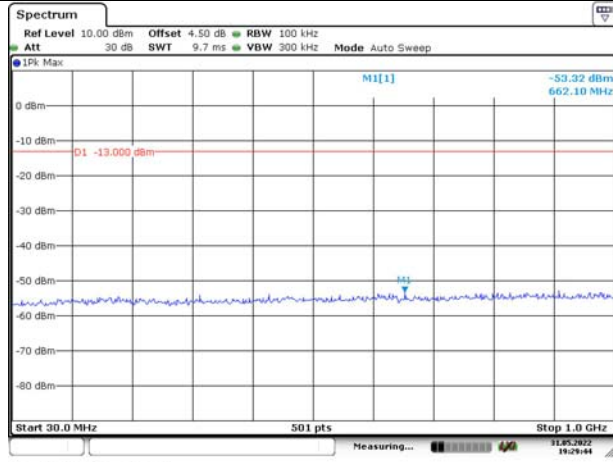


### Spurious Emissions at Antenna Terminal

Channel

5MHz Bandwidth QPSK

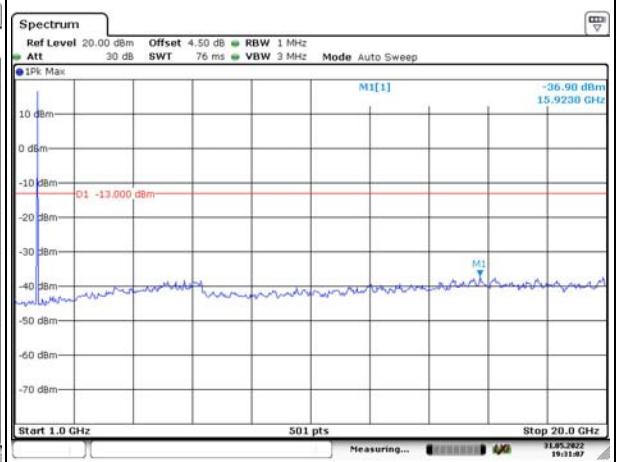
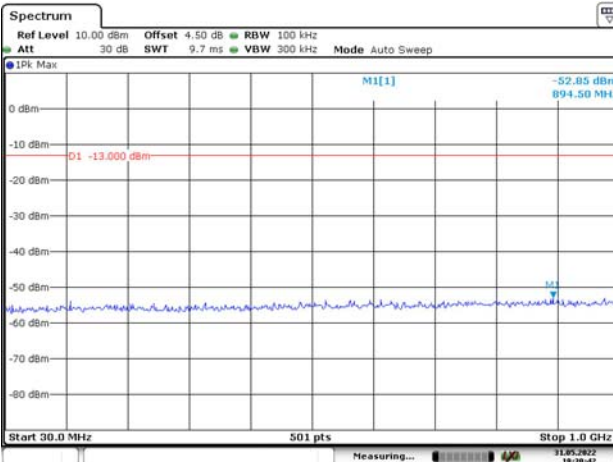
Lowest



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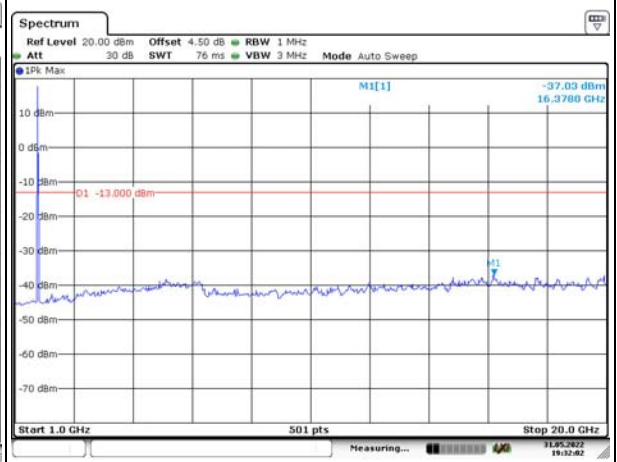
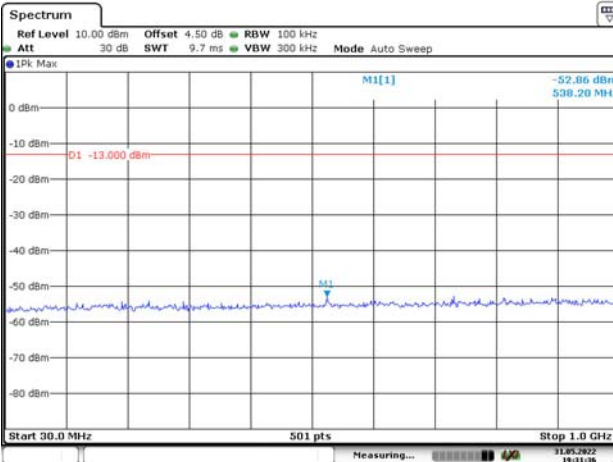
Middle



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Highest



Date: 31.MAY.2022 19:31:37

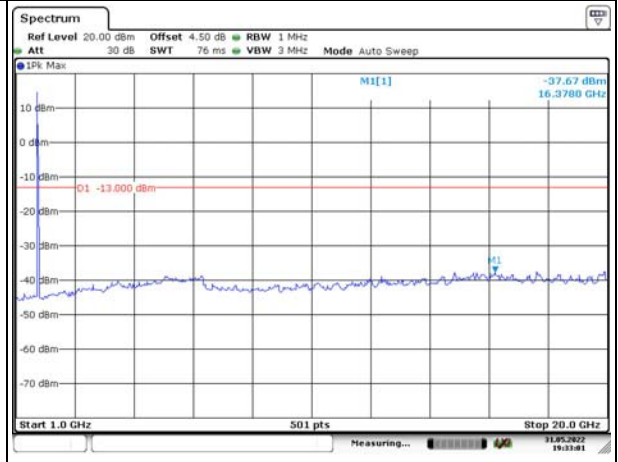
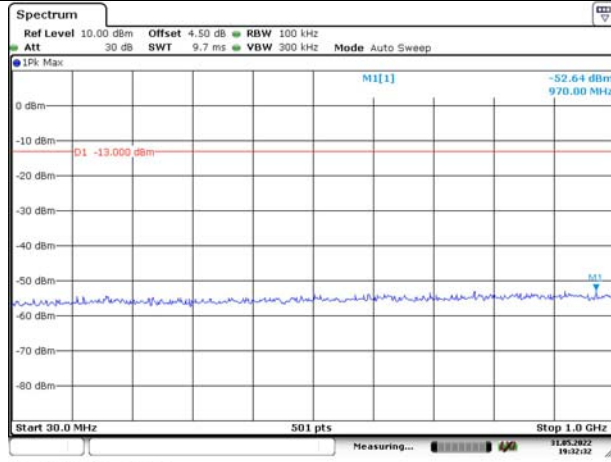
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### Spurious Emissions at Antenna Terminal

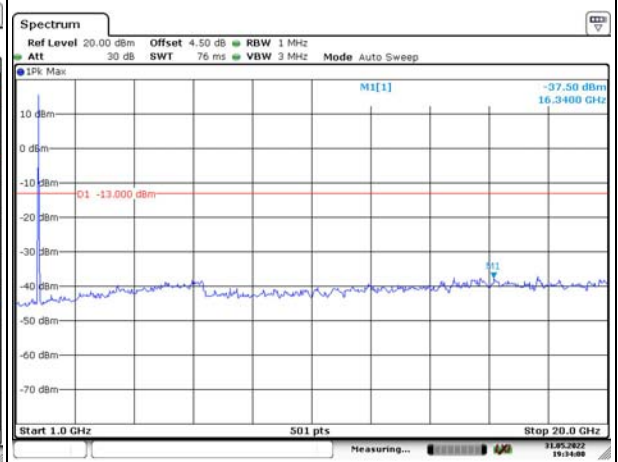
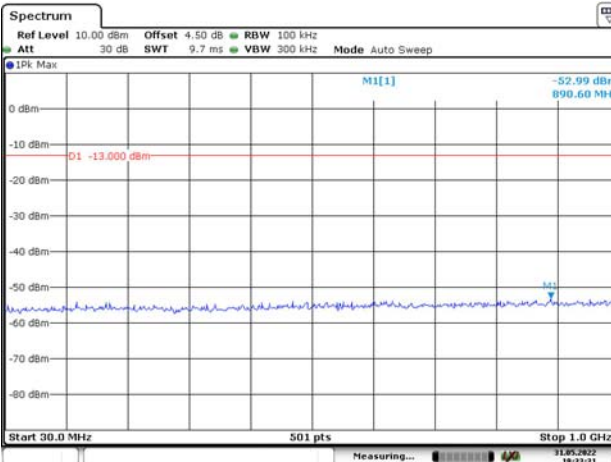
Channel

10MHz Bandwidth QPSK

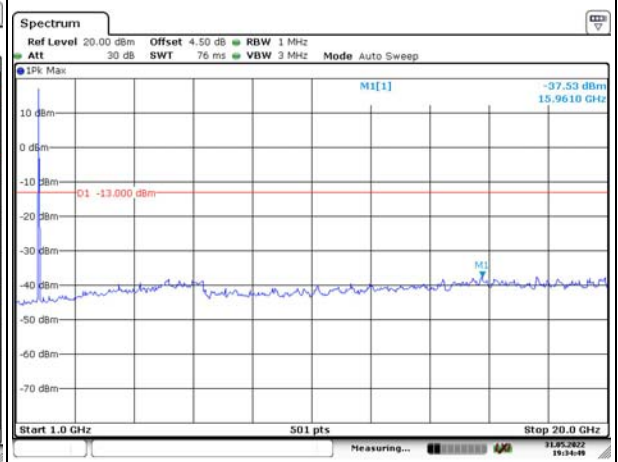
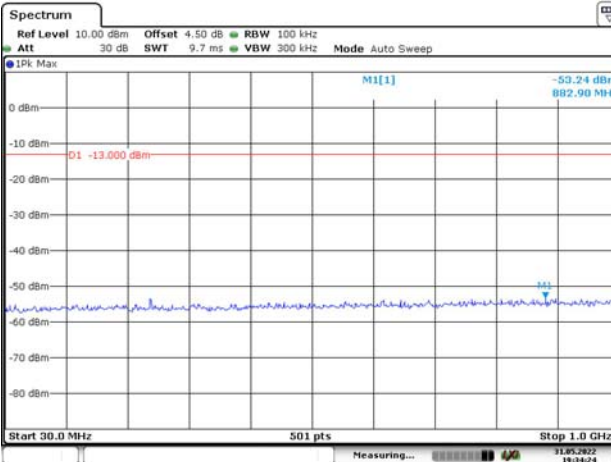
Lowest



Middle

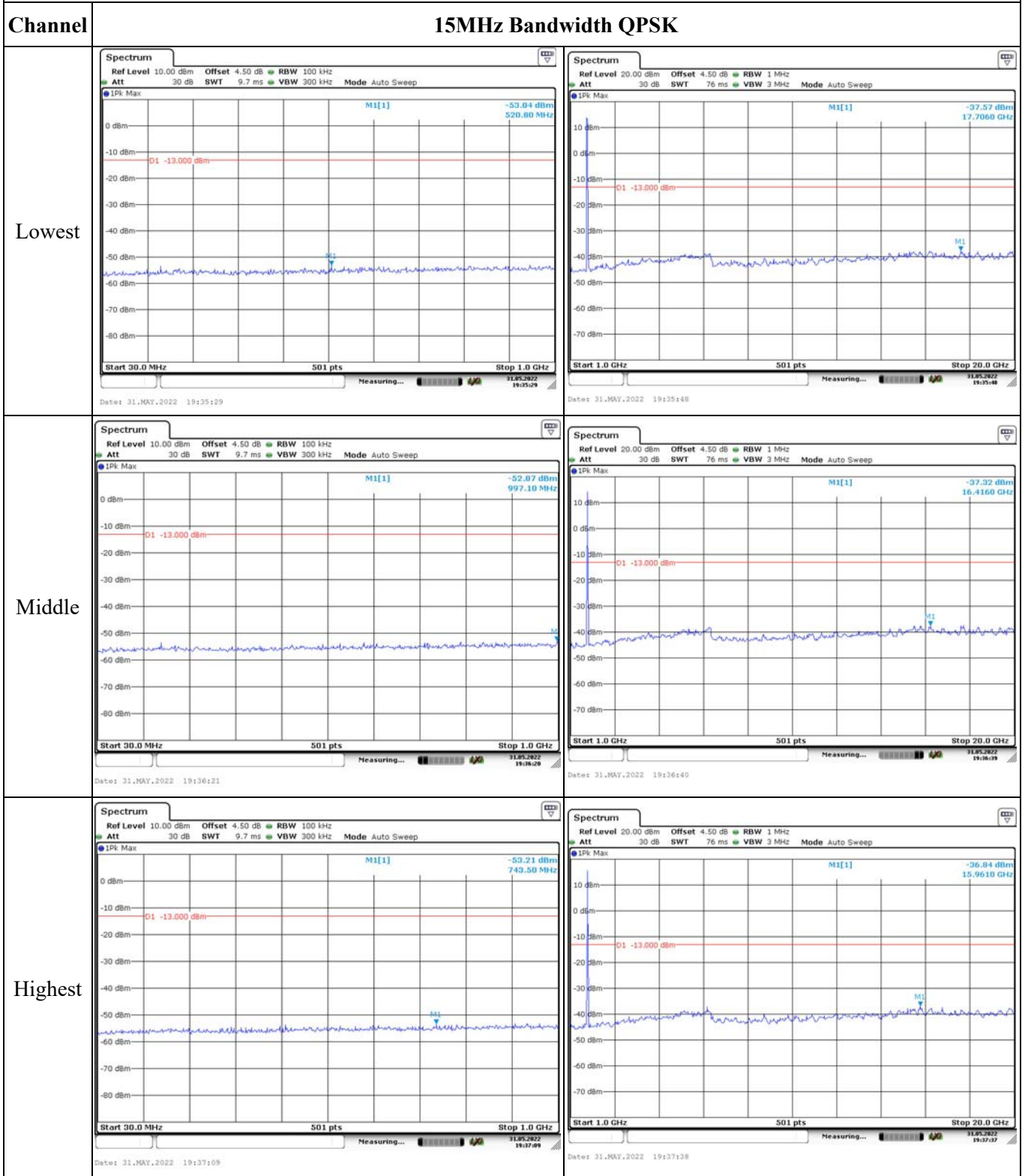


Highest

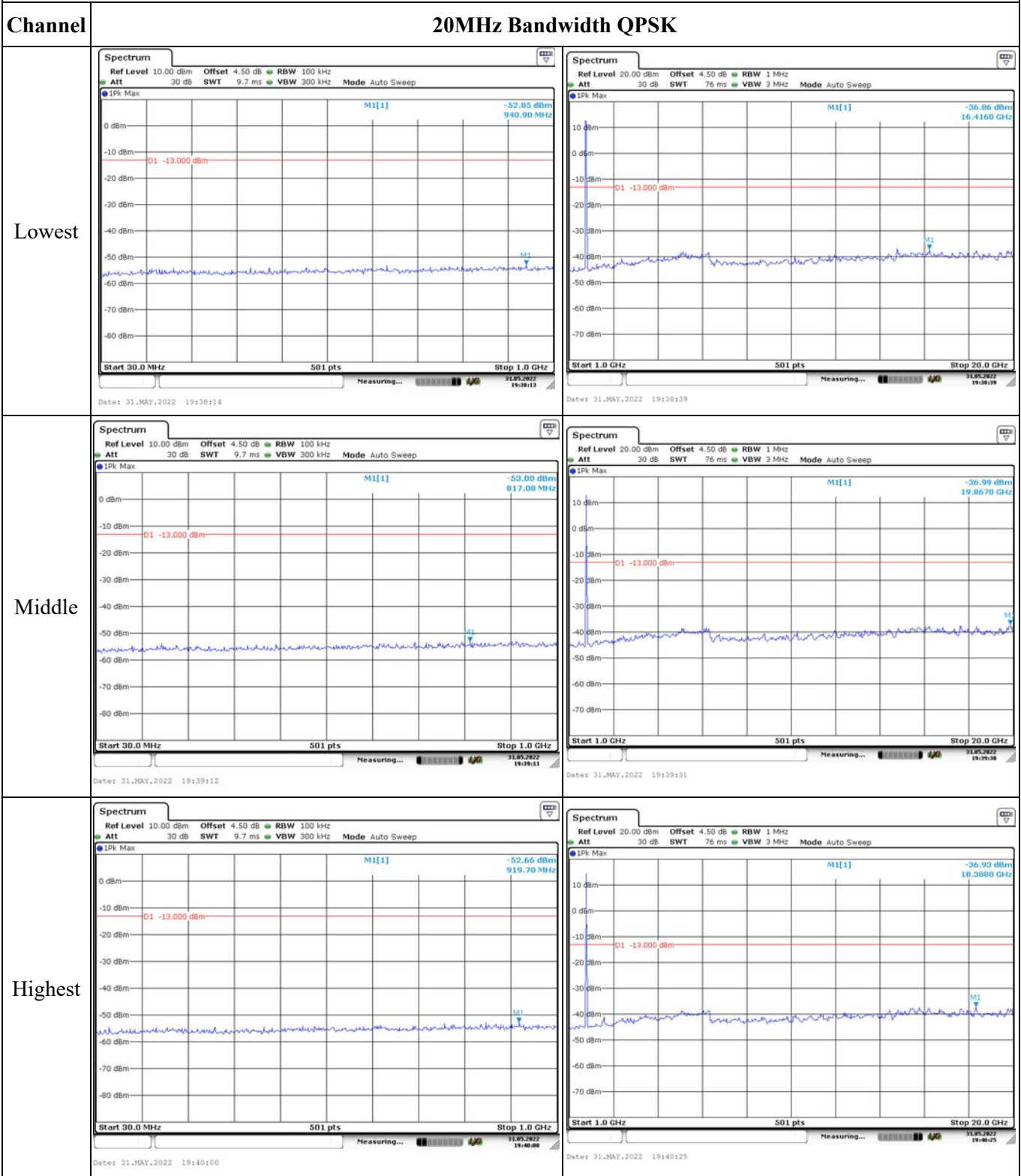




### Spurious Emissions at Antenna Terminal



### Spurious Emissions at Antenna Terminal



Out of band emission, Band Edge

Mode	Lowest	Highest
QPSK 1.4MHz	<p>Ref Level 30.00 dBm Offset 4.50 dB RBW 30 kHz Att 40 dB SWT 1.1 ms VBW 100 kHz Mode Sweep</p> <p>M1[1] -17.84 dBm 1.7100000 GHz</p> <p>D1 -13.000 dBm</p> <p>CF 1.71 GHz 501 pts Span 3.0 MHz</p> <p>Date: 7 JUN 2022 19:29:29</p>	<p>Ref Level 30.00 dBm Offset 4.50 dB RBW 30 kHz Att 40 dB SWT 1.1 ms VBW 100 kHz Mode Sweep</p> <p>M1[1] -17.14 dBm 1.7550000 GHz</p> <p>D1 -13.000 dBm</p> <p>CF 1.755 GHz 501 pts Span 3.0 MHz</p> <p>Date: 7 JUN 2022 19:30:28</p>
QPSK 3MHz	<p>Ref Level 30.00 dBm Offset 4.50 dB RBW 30 kHz Att 40 dB SWT 1.1 ms VBW 100 kHz Mode Sweep</p> <p>M1[1] -18.71 dBm 1.7100000 GHz</p> <p>D1 -13.000 dBm</p> <p>CF 1.71 GHz 501 pts Span 6.0 MHz</p> <p>Date: 7 JUN 2022 19:31:33</p>	<p>Ref Level 30.00 dBm Offset 4.50 dB RBW 30 kHz Att 40 dB SWT 1.1 ms VBW 100 kHz Mode Sweep</p> <p>M1[1] -18.12 dBm 1.7550000 GHz</p> <p>D1 -13.000 dBm</p> <p>CF 1.755 GHz 501 pts Span 6.0 MHz</p> <p>Date: 7 JUN 2022 19:32:36</p>
QPSK 5MHz	<p>Ref Level 30.00 dBm Offset 4.50 dB RBW 100 kHz Att 40 dB SWT 100 ms VBW 300 kHz Mode Sweep</p> <p>M1[1] -25.29 dBm 1.7100000 GHz</p> <p>D1 -13.000 dBm</p> <p>CF 1.71 GHz 501 pts Span 10.0 MHz</p> <p>Date: 12 JUL 2022 17:56:55</p>	<p>Ref Level 30.00 dBm Offset 4.50 dB RBW 100 kHz Att 40 dB SWT 100 ms VBW 300 kHz Mode Sweep</p> <p>M1[1] -31.71 dBm 1.7550000 GHz</p> <p>D1 -13.000 dBm</p> <p>CF 1.755 GHz 501 pts Span 10.0 MHz</p> <p>Date: 12 JUL 2022 17:55:44</p>

Out of band emission, Band Edge

Mode	Lowest	Highest
QPSK 10MHz		
QPSK 15MHz		
QPSK 20MHz		

Out of band emission, Band Edge

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

Out of band emission, Band Edge

Mode	Lowest	Highest
16QAM 10MHz	<p>Ref Level 30.00 dBm Offset 4.50 dB RBW 100 kHz Att 40 dB SWT 1 ms VBW 300 kHz Mode Sweep MI[1] -22.74 dBm 1.7099600 GHz D1 -13.000 dBm CF 1.71 GHz 501 pts Span 20.0 MHz Date: 7 JUN 2022 19:36:05</p>	<p>Ref Level 30.00 dBm Offset 4.50 dB RBW 100 kHz Att 40 dB SWT 1 ms VBW 300 kHz Mode Sweep MI[1] -23.22 dBm 1.7550000 GHz D1 -13.000 dBm CF 1.755 GHz 501 pts Span 20.0 MHz Date: 7 JUN 2022 19:37:09</p>
16QAM 15MHz	<p>Ref Level 30.00 dBm Offset 4.50 dB RBW 300 kHz Att 40 dB SWT 1 ms VBW 1 MHz Mode Sweep MI[1] -18.72 dBm 1.7100000 GHz D1 -13.000 dBm CF 1.71 GHz 501 pts Span 30.0 MHz Date: 7 JUN 2022 19:38:19</p>	<p>Ref Level 30.00 dBm Offset 4.50 dB RBW 300 kHz Att 40 dB SWT 1 ms VBW 1 MHz Mode Sweep MI[1] -18.17 dBm 1.7550000 GHz D1 -13.000 dBm CF 1.755 GHz 501 pts Span 30.0 MHz Date: 7 JUN 2022 19:39:19</p>
16QAM 20MHz	<p>Ref Level 30.00 dBm Offset 4.50 dB RBW 300 kHz Att 40 dB SWT 1 ms VBW 1 MHz Mode Sweep MI[1] -24.63 dBm 1.7100000 GHz D1 -13.000 dBm CF 1.71 GHz 501 pts Span 40.0 MHz Date: 7 JUN 2022 19:40:35</p>	<p>Ref Level 30.00 dBm Offset 4.50 dB RBW 300 kHz Att 40 dB SWT 1 ms VBW 1 MHz Mode Sweep MI[1] -22.87 dBm 1.7550000 GHz D1 -13.000 dBm CF 1.755 GHz 501 pts Span 40.0 MHz Date: 7 JUN 2022 19:41:41</p>

**4.6 Antenna Port Test Data and Results for LTE Band 5:**

Serial Number:	CR22050036-RF-S1	Test Date:	2022-05-31~2022-07-12
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rinka Li	Test Result:	Pass

**Environmental Conditions:**

Temperature: (°C)	25.5~27.2	Relative Humidity: (%)	63~58	ATM Pressure: (kPa)	100.1~100.2
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**Test Equipment List and Details:**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2021-07-22	2022-07-21
zhuoxiang	Coaxial Cable	SMA-178	211002	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	2022-07-21
UNI-T	Multimeter	UT39A+	C210582554	2021-09-30	2022-09-29
Weinschel	Coaxial Attenuator	53-20-34	LN751	Each time	N/A
BACL	TEMP&HUMI Test Chamber	BTH-150	30026	2021-07-22	2022-07-21
UNI-T	Multimeter	UT39A+	C210582554	2021-07-22	2022-07-21
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 5▲:**

Antenna Gain (dBi):	0.88	Antenna Gain (dBd):	-1.27	Cable Loss (dB):	0
Operation Voltage(V <sub>DC</sub> ):					
Lowest:	10.8	Normal:	13.8	Highest:	36

**Test Frequency For Each Mode:**

Operation Bandwidth	Lowest Frequency (MHz)	Middle Frequency (MHz)	Highest Frequency (MHz)
1.4MHz	824.7	836.5	848.3
3MHz	825.5	836.5	847.5
5MHz	826.5	836.5	846.5
10MHz	829	836.5	844

**Test Data:**

<b>FCC§2.1046;§ 22.913 (a)</b>						
<b>RF Output Power:</b>						
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	22.15	21.98	22.27	21.06	38.45
	RB1#3	22.21	22.1	22.33		
	RB1#5	22.17	21.99	22.28		
	RB3#0	22.01	22.03	22.14		
	RB3#3	22	21.98	22.14		
	RB6#0	21.07	21.13	21.16		
1.4MHz 16QAM	RB1#0	21.2	20.85	21.1	20.16	38.45
	RB1#3	21.31	21.05	21.43		
	RB1#5	21.15	21.08	21.17		
	RB3#0	21.07	21	21.18		
	RB3#3	21.11	21.14	21.27		
	RB6#0	20.19	20.05	20.14		
3MHz QPSK	RB1#0	22.24	22.21	22.21	21.02	38.45
	RB1#8	22	22.1	22.29		
	RB1#14	22.13	22.12	22.27		
	RB6#0	21.17	21.25	21.25		
	RB6#9	21.01	21.19	21.29		
	RB15#0	21.03	21.26	21.24		
3MHz 16QAM	RB1#0	21.33	21.06	21.21	20.06	38.45
	RB1#8	21.11	20.9	20.95		
	RB1#14	21.23	20.85	21.14		
	RB6#0	20.14	20.14	20.19		
	RB6#9	20.04	20.21	20.25		
	RB15#0	20.08	20.28	20.2		
5MHz QPSK	RB1#0	22.21	22.07	22.08	21.02	38.45
	RB1#13	22.09	22.21	22.29		
	RB1#24	22.19	22.12	22.23		
	RB15#0	21.16	21.35	21.28		
	RB15#10	21.18	21.29	21.36		
	RB25#0	21.21	21.35	21.27		
5MHz 16QAM	RB1#0	21.34	21.24	21.2	20.12	38.45
	RB1#13	21.2	21.31	21.39		
	RB1#24	21.29	21.33	21.33		
	RB15#0	20.11	20.34	20.25		
	RB15#10	20.17	20.31	20.3		
	RB25#0	20.24	20.36	20.26		



10MHz QPSK	RB1#0	22.23	22.24	22.41	21.24	38.45
	RB1#25	22.49	22.39	22.4		
	RB1#49	22.39	22.22	22.51		
	RB25#0	21.29	21.44	21.46		
	RB25#25	21.38	21.44	21.44		
	RB50#0	21.36	21.46	21.44		
10MHz 16QAM	RB1#0	21.19	21.23	21.53	20.26	38.45
	RB1#25	21.43	21.28	21.49		
	RB1#49	21.3	21.12	21.42		
	RB25#0	20.29	20.42	20.39		
	RB25#25	20.36	20.37	20.38		
	RB50#0	20.35	20.44	20.38		
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	4.29	4.61	4.43	13
	RB50#0	5.07	4.96	4.81	13
10MHz 16QAM	RB1#0	5.42	5.71	5.39	13
	RB50#0	6.03	6.03	5.77	13
<b>Result:</b>					<b>Pass</b>

FCC §2.1049, §22.905: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	1.32	1.314	1.32
1.4MHz 16QAM	1.102	1.102	1.108	1.308	1.32	1.32
3MHz QPSK	2.695	2.683	2.695	2.952	2.94	2.952
3MHz 16QAM	2.695	2.683	2.695	2.952	2.964	2.964
5MHz QPSK	4.511	4.511	4.511	5.04	5.04	5.04
5MHz 16QAM	4.531	4.531	4.511	5	4.98	5.04
10MHz QPSK	8.942	8.942	8.942	9.76	9.72	9.72
10MHz 16QAM	8.942	8.982	8.942	9.68	9.76	9.72
Note: The test plots please refer to the Plots of Occupied Bandwidth						

<b>FCC §2.1051, §22.917(a):Spurious Emissions at Antenna Terminal</b>	
<b>Result:</b>	<b>Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.</b>

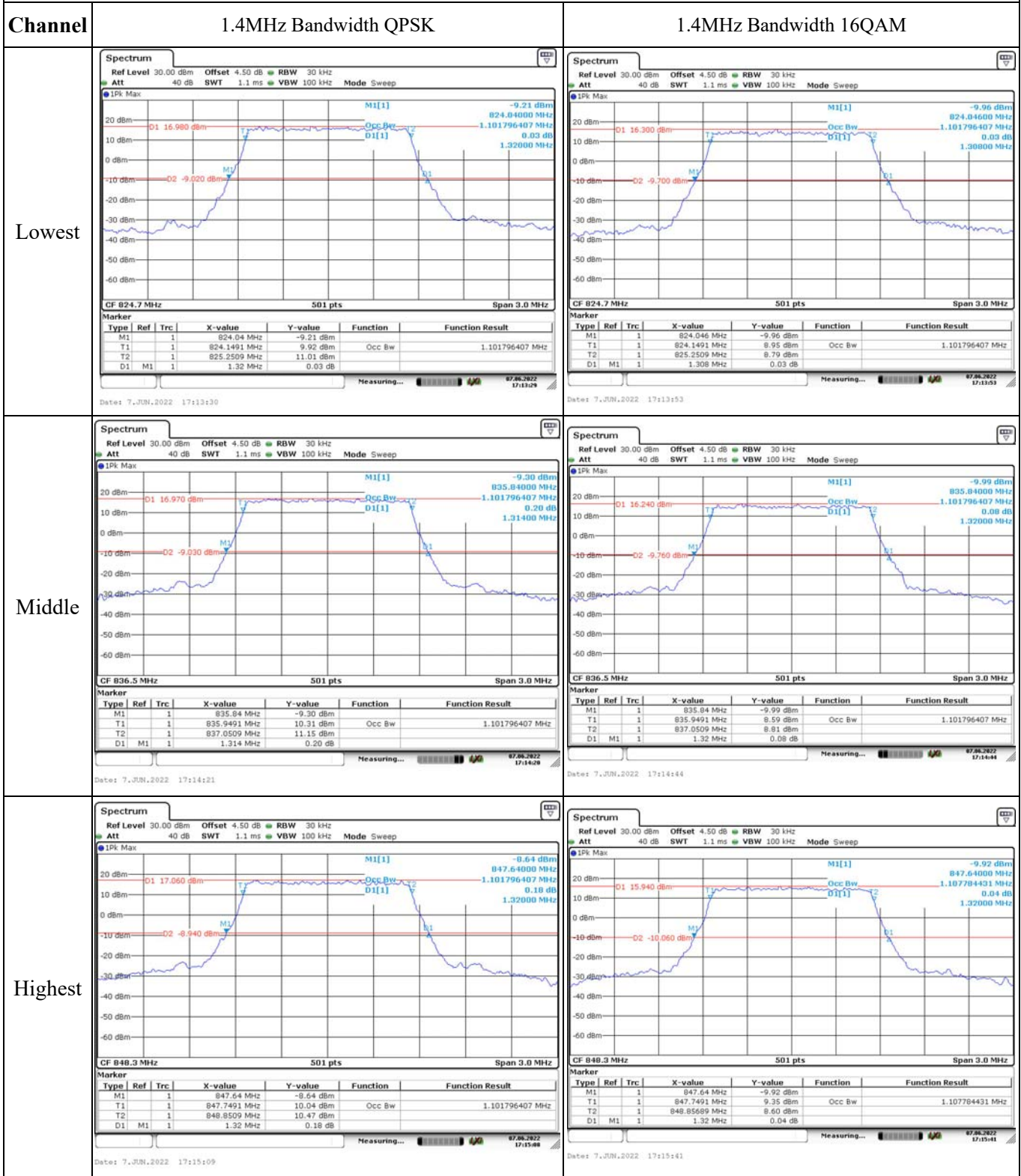
<b>FCC §2.1051, §22.917(a):Out of band emission, Band Edge</b>	
<b>Result:</b>	<b>Pass, Please refer to the test plots of Out of band emission, Band Edge.</b>

<b>FCC §2.1055, §22.355: Frequency Stability</b>					
Test Mode:	10 MHz QPSK		Test Channel:	836.5	MHz
Test Item	Temperature (°C)	Voltage (V <sub>DC</sub> )	Frequency Error		Limit
			(Hz)	(ppm)	(ppm)
Frequency Stability vs. Temperature	-30	13.8	-1.39	-0.002	2.5
	-20	13.8	-6.7	-0.008	2.5
	-10	13.8	5.15	0.006	2.5
	0	13.8	-8.68	-0.010	2.5
	10	13.8	6.06	0.007	2.5
	20	13.8	-5.91	-0.007	2.5
	30	13.8	9.31	0.011	2.5
	40	13.8	-5.99	-0.007	2.5
Frequency Stability vs. Voltage	20	10.8	9.05	0.011	2.5
	20	36	8.25	0.010	2.5
<b>Result:</b>					<b>Pass</b>

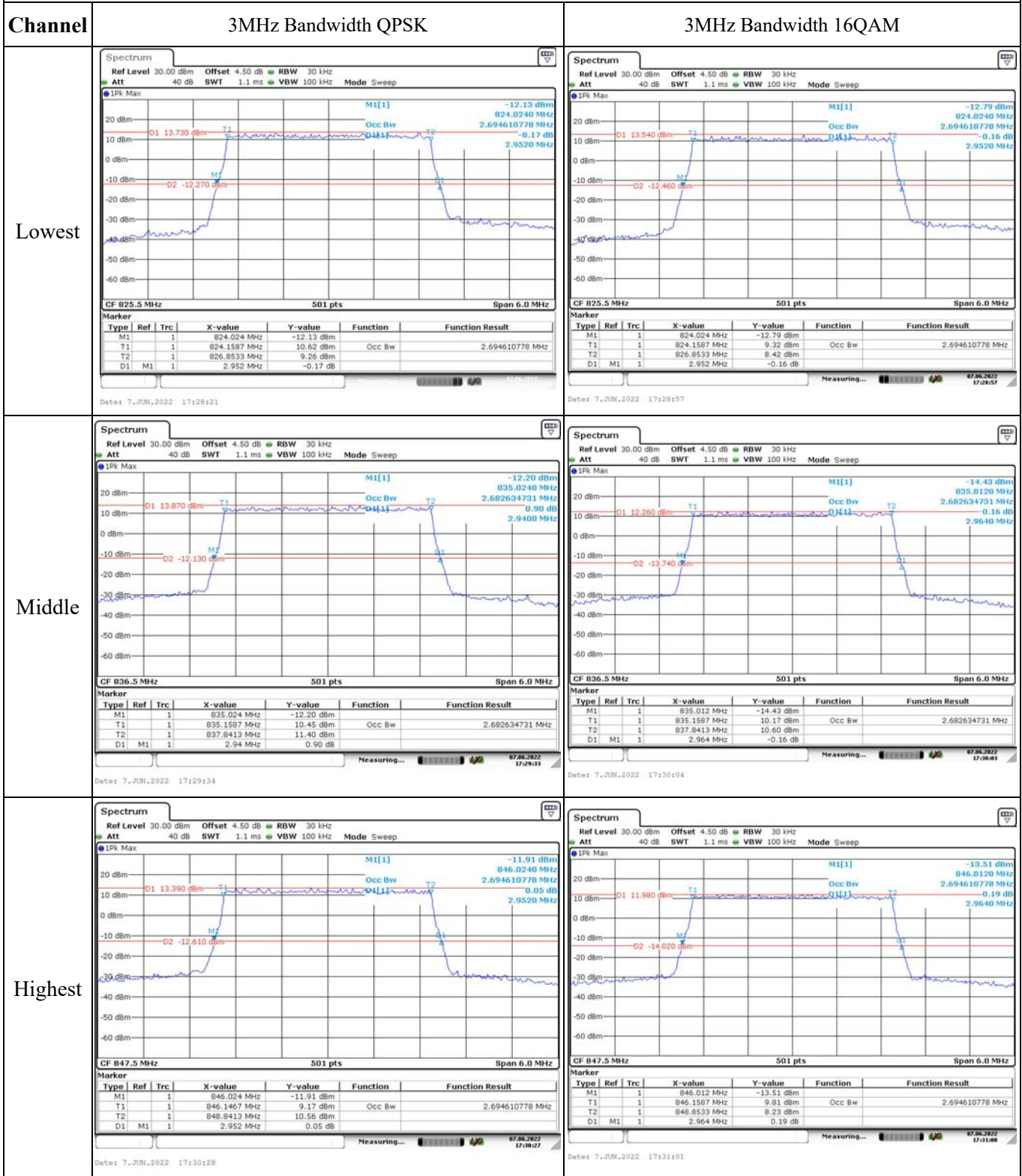
Test Mode:	10 MHz 16QAM		Test Channel:	836.5	MHz
Test Item	Temperature (°C)	Voltage (V <sub>DC</sub> )	Frequency Error		Limit
			(Hz)	(ppm)	(ppm)
Frequency Stability vs. Temperature	-30	13.8	-0.51	-0.001	2.5
	-20	13.8	-8.23	-0.010	2.5
	-10	13.8	-8.02	-0.010	2.5
	0	13.8	5.07	0.006	2.5
	10	13.8	9.35	0.011	2.5
	20	13.8	-9.58	-0.011	2.5
	30	13.8	-8.48	-0.010	2.5
	40	13.8	7.59	0.009	2.5
Frequency Stability vs. Voltage	20	10.8	9.4	0.011	2.5
	20	36	5.86	0.007	2.5
<b>Result:</b>					<b>Pass</b>

Test Plots:

Occupied Bandwidth



### Occupied Bandwidth



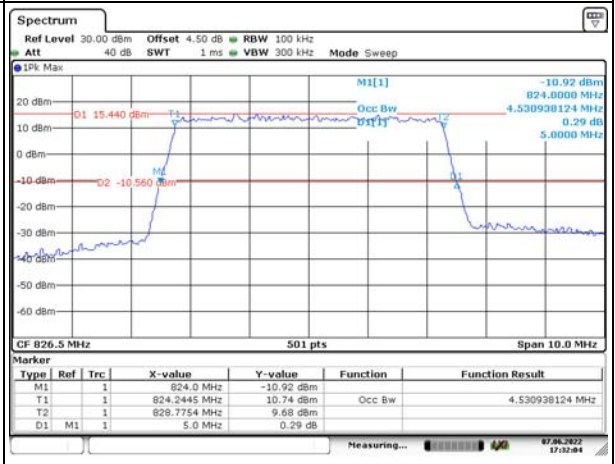
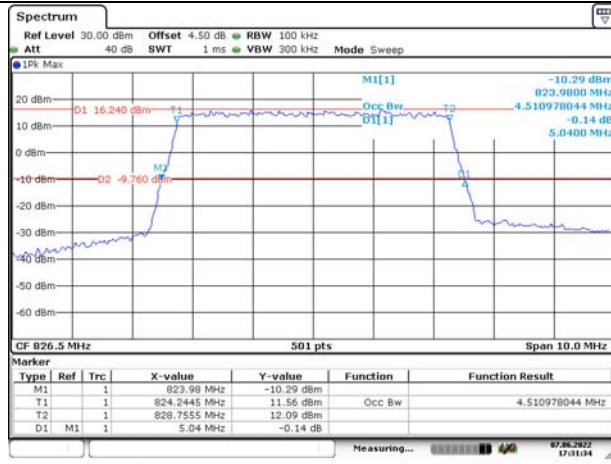
### Occupied Bandwidth

Channel

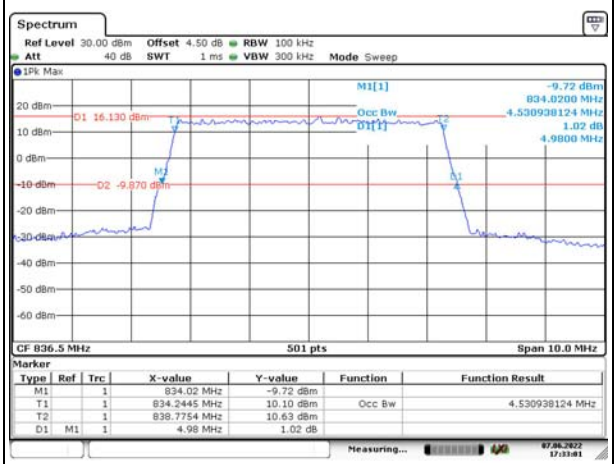
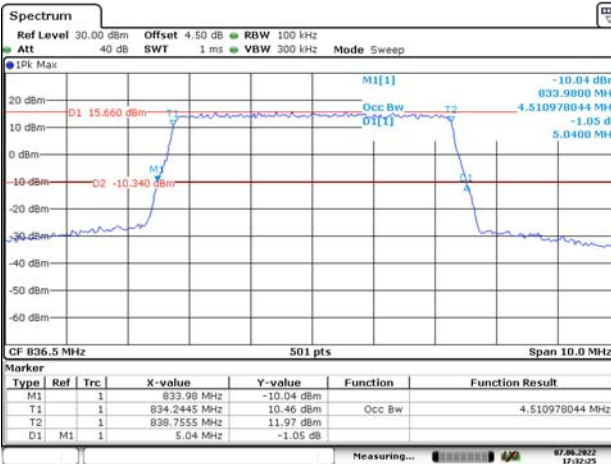
5MHz Bandwidth QPSK

5MHz Bandwidth 16QAM

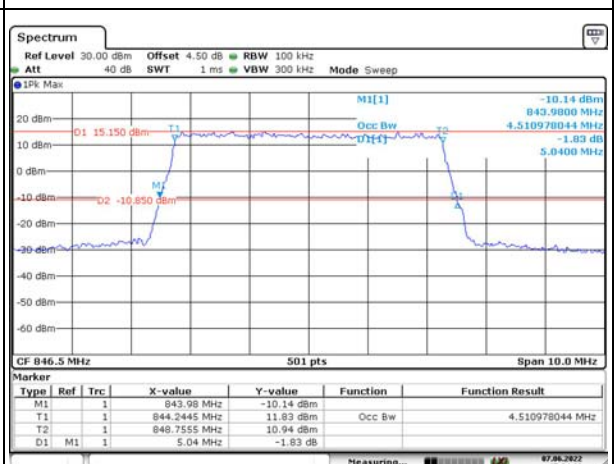
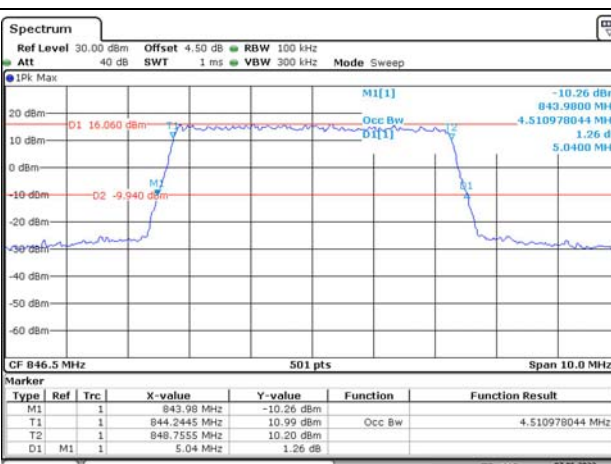
Lowest



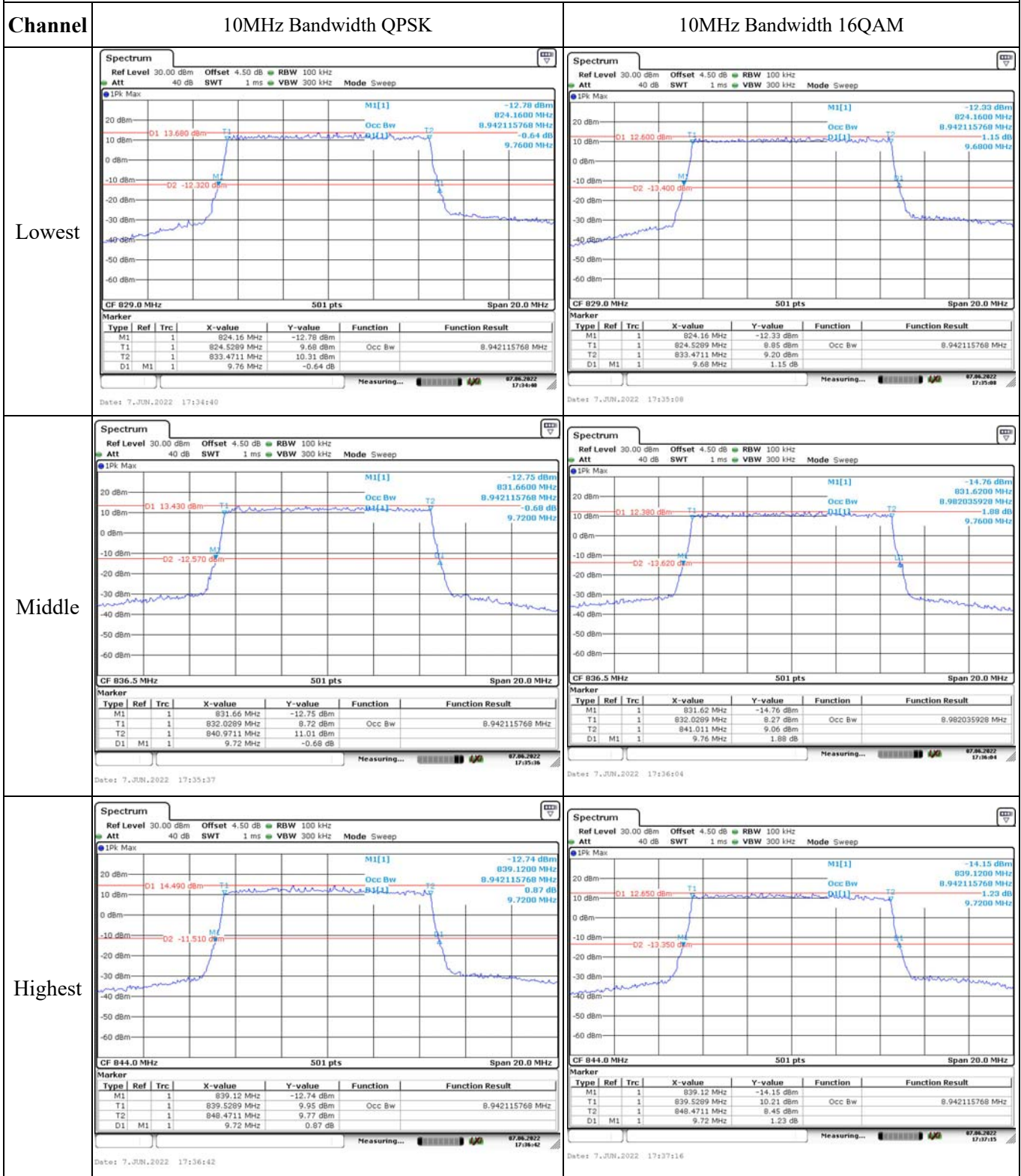
Middle



Highest



### Occupied Bandwidth

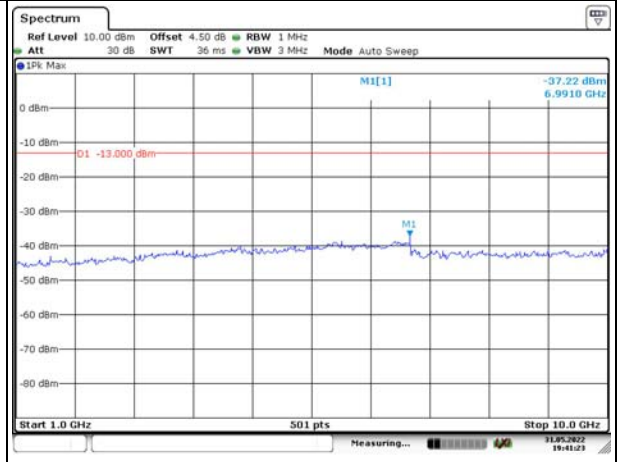
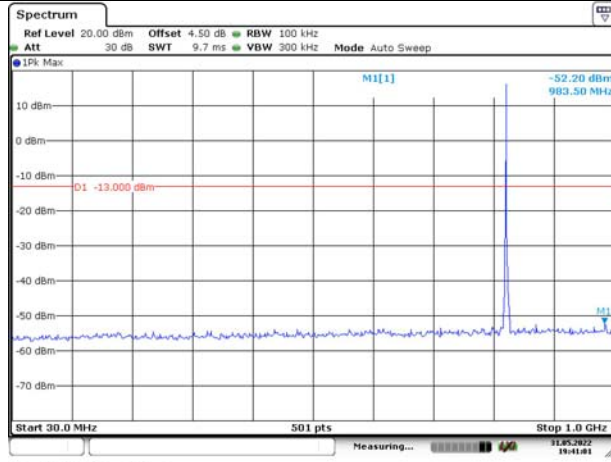


### Spurious Emissions at Antenna Terminal

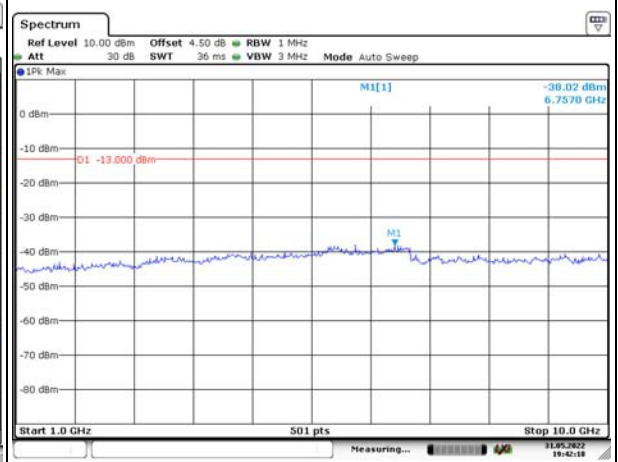
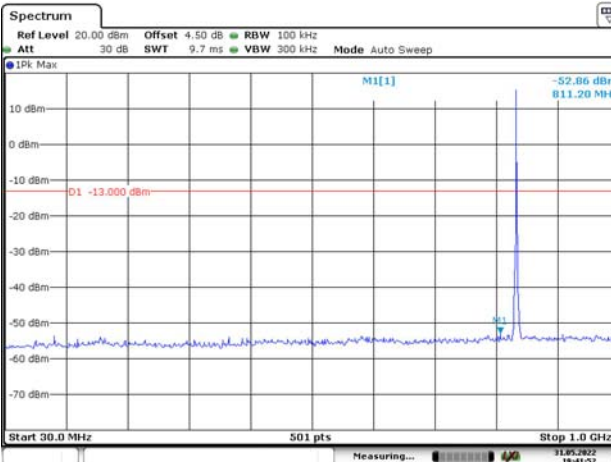
Channel

1.4MHz Bandwidth QPSK

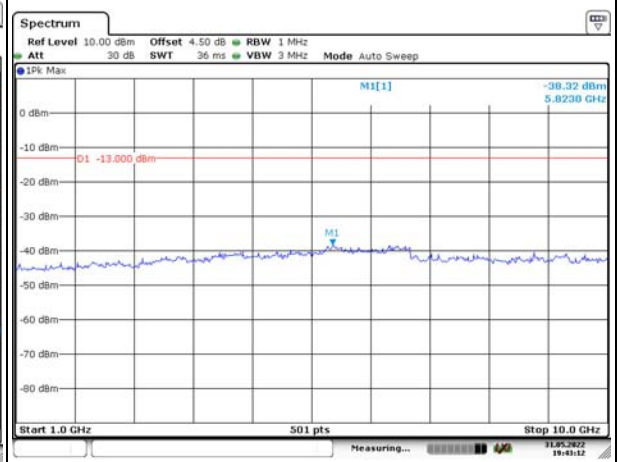
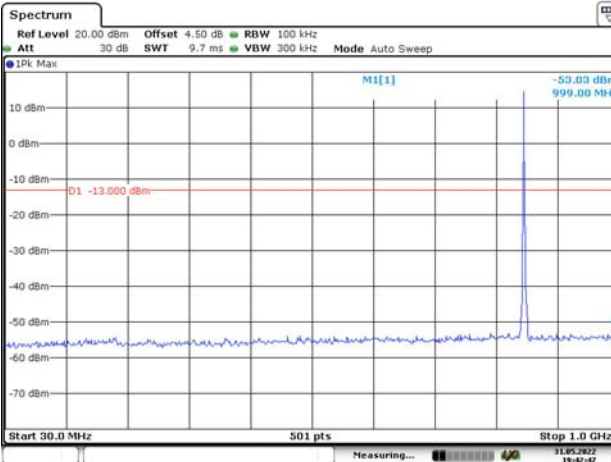
Lowest



Middle



Highest

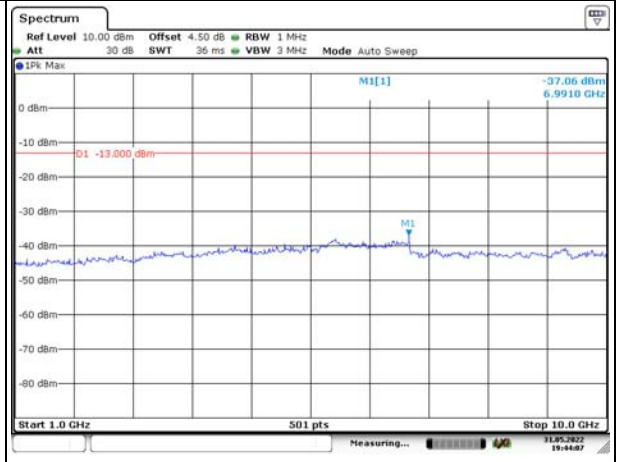
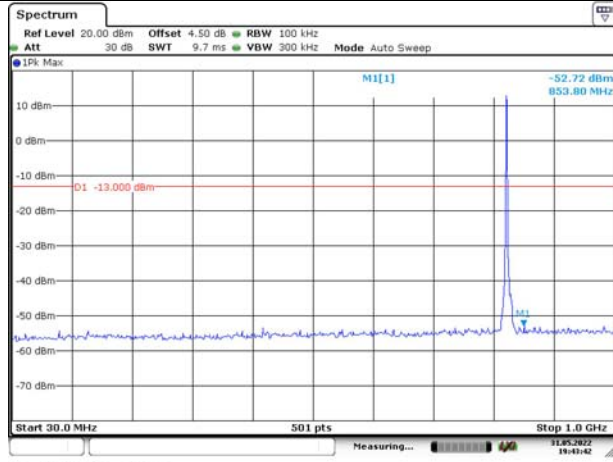


### Spurious Emissions at Antenna Terminal

Channel

3MHz Bandwidth QPSK

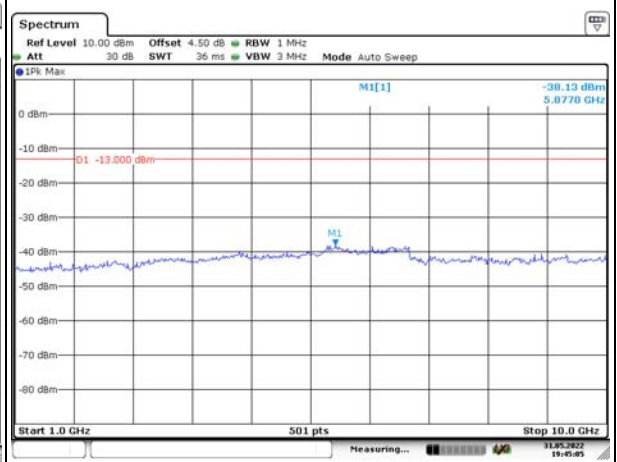
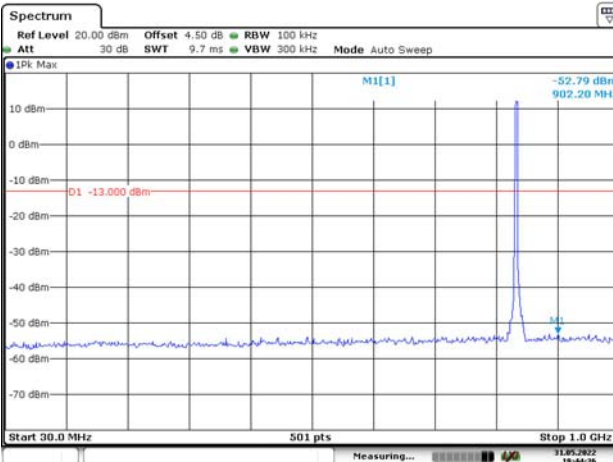
Lowest



Date: 31.MAY.2022 19:43:43

Date: 31.MAY.2022 19:44:08

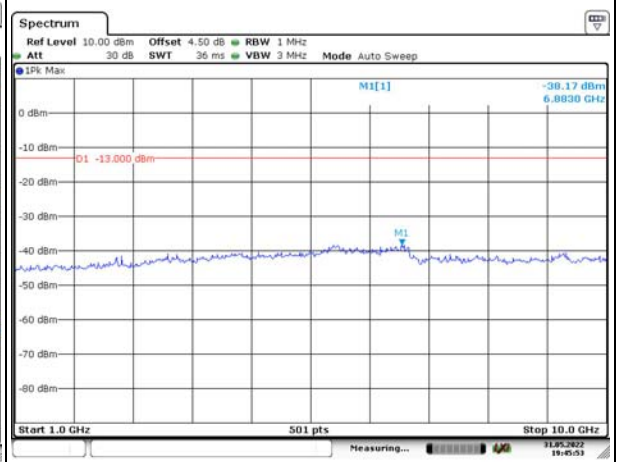
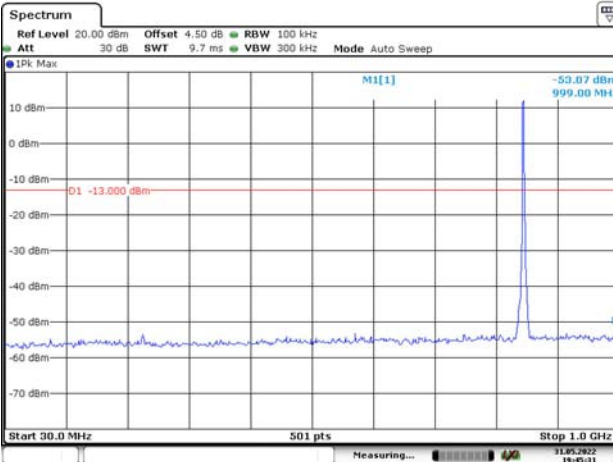
Middle



Date: 31.MAY.2022 19:44:37

Date: 31.MAY.2022 19:45:05

Highest



Date: 31.MAY.2022 19:45:32

Date: 31.MAY.2022 19:45:54

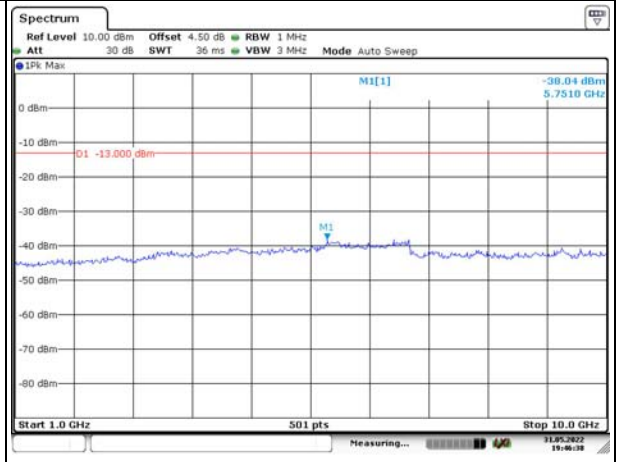
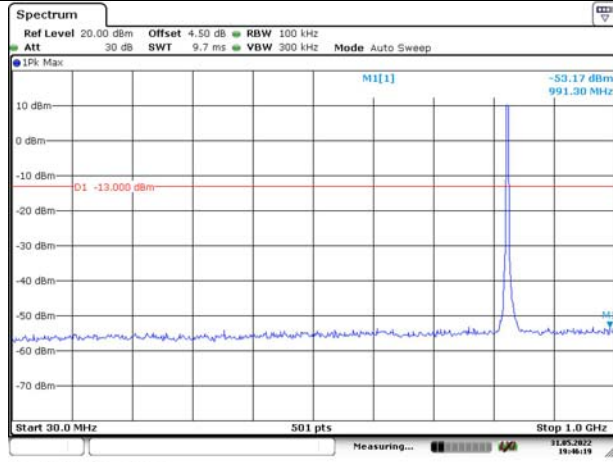


### Spurious Emissions at Antenna Terminal

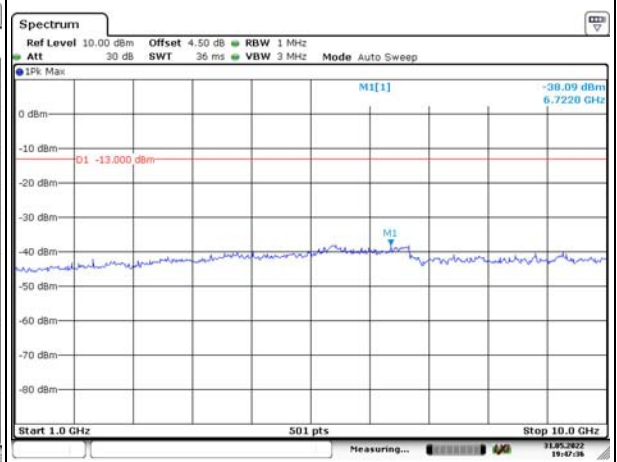
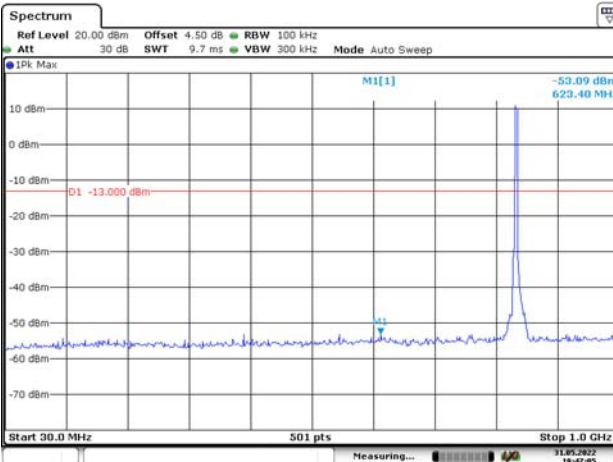
Channel

5MHz Bandwidth QPSK

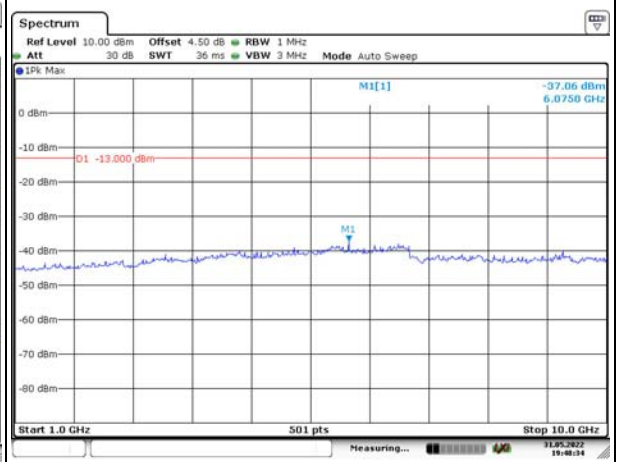
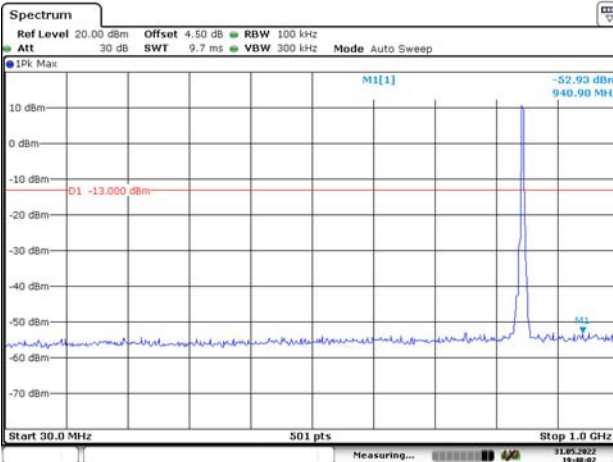
Lowest



Middle



Highest

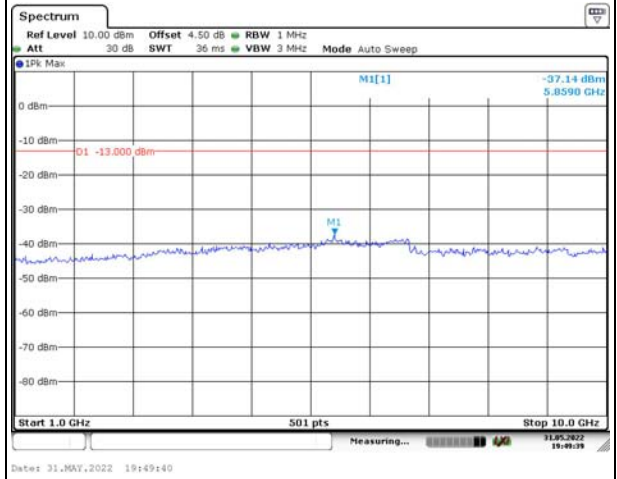
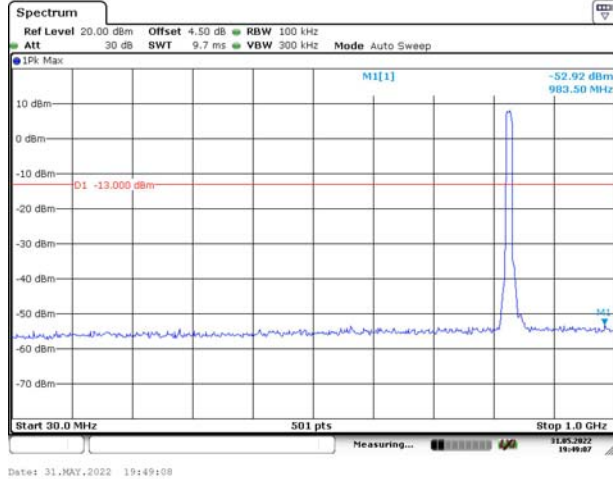


### Spurious Emissions at Antenna Terminal

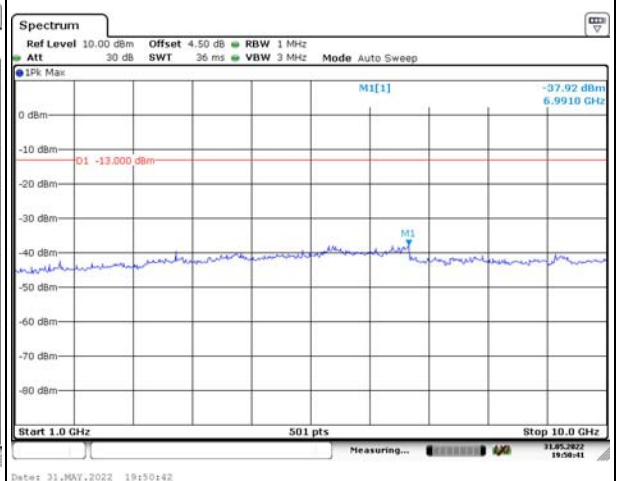
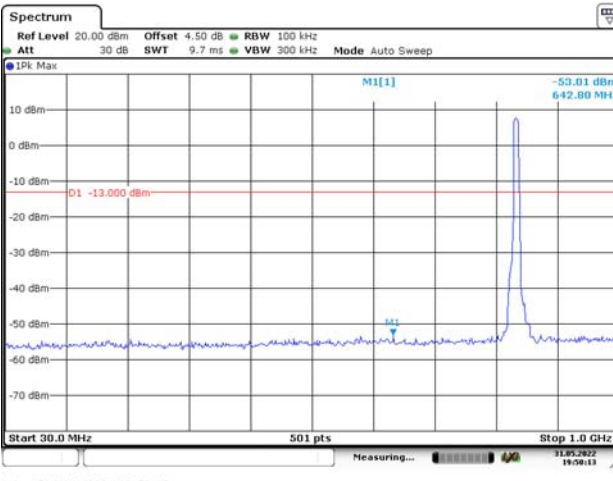
Channel

10MHz Bandwidth QPSK

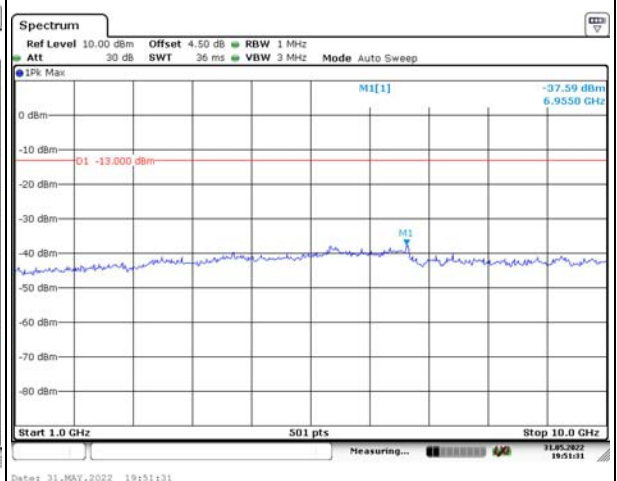
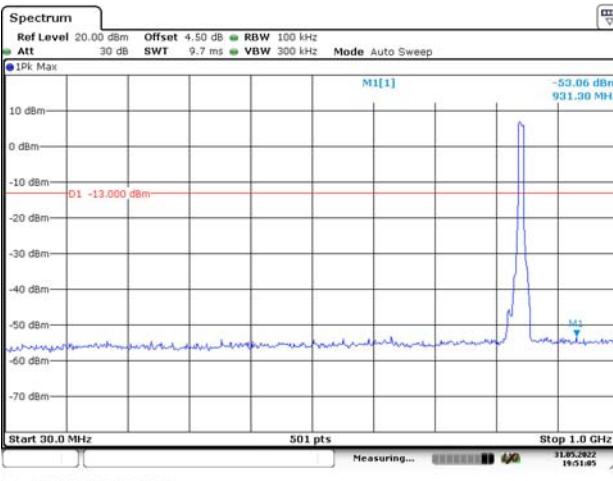
Lowest



Middle



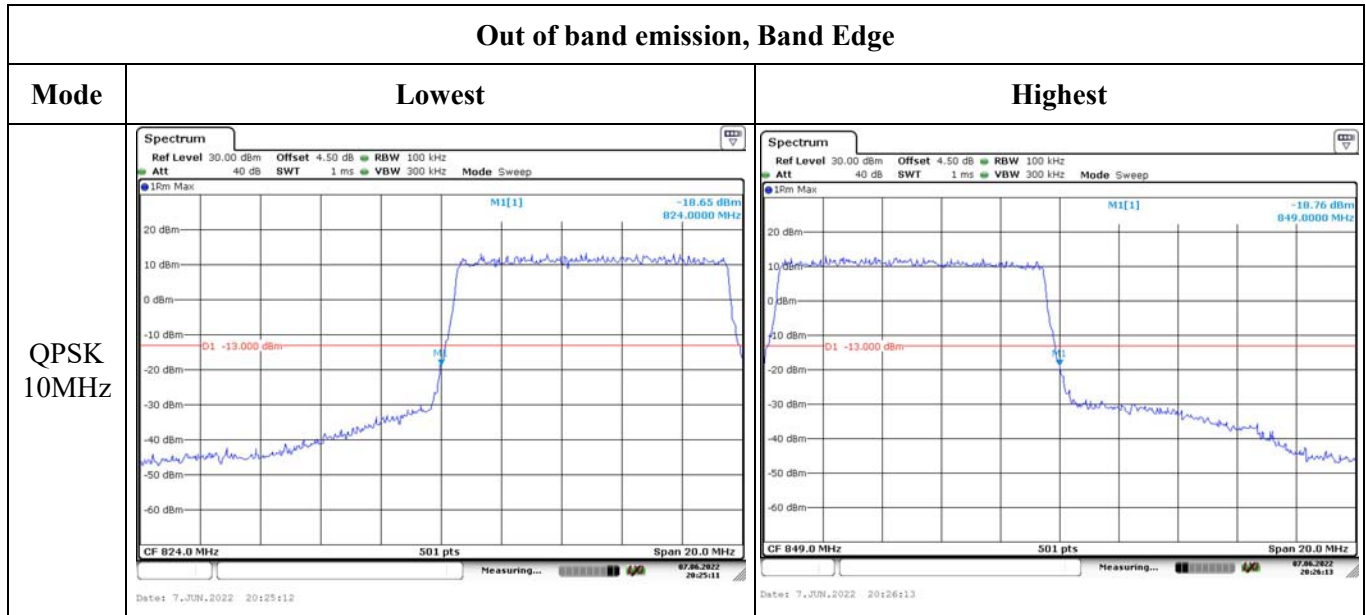
Highest



Out of band emission, Band Edge

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

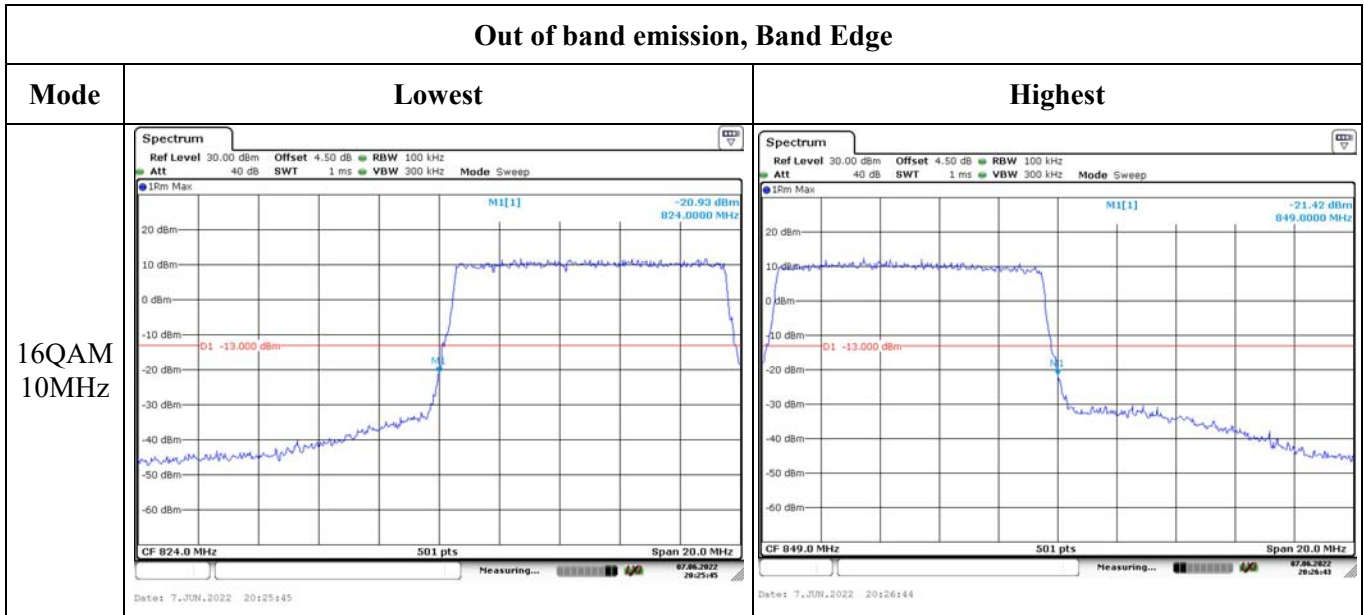
Out of band emission, Band Edge



Out of band emission, Band Edge

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

Out of band emission, Band Edge



**4.7 Antenna Port Test Data and Results for LTE Band 12:**

Serial Number:	CR22050036-RF-S1	Test Date:	2022-05-31~2022-07-12
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rinka Li	Test Result:	Pass

**Environmental Conditions:**

Temperature: (°C)	25.5~27.2	Relative Humidity: (%)	63~58	ATM Pressure: (kPa)	100.1~100.2
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**Test Equipment List and Details:**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2021-07-22	2022-07-21
zhuoxiang	Coaxial Cable	SMA-178	211002	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	2022-07-21
UNI-T	Multimeter	UT39A+	C210582554	2021-09-30	2022-09-29
Weinschel	Coaxial Attenuator	53-20-34	LN751	Each time	N/A
BACL	TEMP&HUMI Test Chamber	BTH-150	30026	2021-07-22	2022-07-21
UNI-T	Multimeter	UT39A+	C210582554	2021-07-22	2022-07-21
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):	-0.7	Antenna Gain (dBd):	-2.85	Cable Loss (dB):	0
Operation Voltage(V <sub>DC</sub> ):					
Lowest:	10.8	Normal:	13.8	Highest:	36

**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:**

<b>FCC§2.1046;§ 27.50(c) (10)</b>						
<b>RF Output Power:</b>						
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	22.92	22.84	22.95	20.32	34.77
	RB1#3	23.17	22.84	23.1		
	RB1#5	22.97	22.78	23.03		
	RB3#0	22.89	22.84	22.81		
	RB3#3	22.85	22.89	22.91		
	RB6#0	21.8	21.95	21.95		
1.4MHz 16QAM	RB1#0	21.97	21.75	22.03	19.22	34.77
	RB1#3	21.91	21.96	22.07		
	RB1#5	21.79	21.99	21.97		
	RB3#0	21.81	21.88	21.92		
	RB3#3	21.87	21.82	22		
	RB6#0	20.75	21	20.92		
3MHz QPSK	RB1#0	22.92	22.89	22.95	20.38	34.77
	RB1#8	22.85	22.84	22.93		
	RB1#14	22.86	22.84	23.23		
	RB6#0	21.84	21.94	22.07		
	RB6#9	21.8	22	21.96		
	RB15#0	21.83	21.92	21.96		
3MHz 16QAM	RB1#0	21.76	21.86	22.02	19.43	34.77
	RB1#8	21.77	22.06	22.05		
	RB1#14	21.71	21.82	22.28		
	RB6#0	20.91	20.85	20.92		
	RB6#9	20.9	21.04	21.05		
	RB15#0	20.86	21.01	21.03		
5MHz QPSK	RB1#0	22.86	22.89	22.76	20.18	34.77
	RB1#13	22.78	22.93	22.92		
	RB1#24	22.86	22.85	23.03		
	RB15#0	21.91	21.89	21.94		
	RB15#10	21.84	21.92	21.97		
	RB25#0	21.87	21.93	21.92		
5MHz 16QAM	RB1#0	21.83	21.83	21.96	19.23	34.77
	RB1#13	21.83	22.05	22		
	RB1#24	21.84	21.75	22.08		
	RB15#0	20.83	20.88	20.95		
	RB15#10	20.81	20.96	20.98		
	RB25#0	20.8	20.91	20.85		



10MHz QPSK	RB1#0	22.85	22.78	23.05	20.24	34.77
	RB1#25	23.09	23.06	22.97		
	RB1#49	22.98	22.84	23.02		
	RB25#0	21.85	21.96	21.92		
	RB25#25	22.04	21.91	22.02		
	RB50#0	21.89	21.96	22.02		
10MHz 16QAM	RB1#0	21.65	21.84	21.94	19.23	34.77
	RB1#25	22	22.08	22.05		
	RB1#49	21.89	21.82	22.04		
	RB25#0	20.82	20.91	20.93		
	RB25#25	20.98	20.94	20.95		
	RB50#0	20.91	20.88	20.98		
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	4.38	4.52	4.55	13
	RB50#0	5.25	4.96	4.67	13
10MHz 16QAM	RB1#0	5.16	5.54	5.65	13
	RB50#0	6.06	5.94	5.83	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	1.108	1.096	1.102	1.332	1.338	1.32
1.4MHz 16QAM	1.102	1.102	1.102	1.302	1.308	1.32
3MHz QPSK	2.683	2.695	2.707	2.964	2.952	2.964
3MHz 16QAM	2.695	2.695	2.695	2.94	2.964	2.976
5MHz QPSK	4.531	4.531	4.511	4.98	5.08	5.04
5MHz 16QAM	4.511	4.511	4.531	5	4.96	5.04
10MHz QPSK	8.982	8.942	8.942	9.84	9.64	9.64
10MHz 16QAM	8.942	8.902	8.902	9.76	9.76	9.64
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	13.8	699.524	699.00	715.470	716.00
	-20	13.8	699.528	699.00	715.470	716.00
	-10	13.8	699.525	699.00	715.461	716.00
	0	13.8	699.515	699.00	715.464	716.00
	10	13.8	699.518	699.00	715.468	716.00
	20	13.8	699.514	699.00	715.457	716.00
	30	13.8	699.519	699.00	715.457	716.00
	40	13.8	699.525	699.00	715.462	716.00
Frequency Stability vs. Voltage	20	10.8	699.528	699.00	715.462	716.00
	20	36	699.528	699.00	715.459	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	13.8	699.526	699.00	715.461	716.00
	-20	13.8	699.521	699.00	715.462	716.00
	-10	13.8	699.520	699.00	715.459	716.00
	0	13.8	699.527	699.00	715.466	716.00
	10	13.8	699.526	699.00	715.469	716.00
	20	13.8	699.514	699.00	715.457	716.00
	30	13.8	699.528	699.00	715.458	716.00
	40	13.8	699.527	699.00	715.459	716.00
Frequency Stability vs. Voltage	20	10.8	699.517	699.00	715.460	716.00
	20	36	699.517	699.00	715.463	716.00
<b>Result:</b>					<b>Pass</b>	

Test Plots:

Occupied Bandwidth

