

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		
16QAM 15MHz		
16QAM 20MHz		

4.8 Antenna Port Test Data and Results for LTE Band 4

Serial Number:	291M-2	Test Date:	2023/08/05~2023/08/07
Test Site:	RF	Test Mode:	Transmitting
Tester:	One Luo	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	24.2~26.5	Relative Humidity: (%)	42~58	ATM Pressure: (kPa)	99.7~102.2
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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	2023/07/15	2024/07/14
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	2023/07/15	2024/07/14
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2022/09/29	2023/09/28
UNI-T	Multimeter	UT39A+	C210582554	2022/9/29	2023/9/28
ZHAOXIN	DC Power Supply	RXN-6010D	21R6010D0912386	N/A	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).

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	21.78	21.99	22.62	18.63	30
	RB1#3	21.91	22.33	22.83		
	RB1#5	21.78	22.29	22.67		
	RB3#0	21.98	22.26	22.41		
	RB3#3	21.98	22.1	22.44		
	RB6#0	20.83	21.14	21.26		
1.4MHz 16QAM	RB1#0	21.23	21.34	21.59	17.54	30
	RB1#3	21.5	21.13	21.74		
	RB1#5	21.35	20.71	20.96		
	RB3#0	20.99	21.2	20.92		
	RB3#3	21	21.31	20.97		
	RB6#0	19.78	20.22	20.16		
3MHz QPSK	RB1#0	21.91	22.23	22.34	18.49	30
	RB1#8	21.84	21.93	22.18		
	RB1#14	21.94	22.16	22.69		
	RB6#0	20.95	21.11	21.29		
	RB6#9	20.93	21.13	21.29		
	RB15#0	21	21.12	21.27		
3MHz 16QAM	RB1#0	21.2	21.6	21.53	17.4	30
	RB1#8	21.12	21.4	20.74		
	RB1#14	21.15	21.56	21.29		
	RB6#0	19.94	20.03	20.22		
	RB6#9	19.8	20.09	20.23		
	RB15#0	19.91	19.99	20.5		
5MHz QPSK	RB1#0	21.78	22.21	22.44	18.47	30
	RB1#13	21.95	22.32	22.38		
	RB1#24	21.98	22.11	22.67		
	RB15#0	20.94	21.12	21.31		
	RB15#10	21.02	21.15	21.3		
	RB25#0	20.89	21.1	21.48		
5MHz 16QAM	RB1#0	21.13	20.96	20.57	17.27	30
	RB1#13	21.47	20.85	21.02		
	RB1#24	21.27	21.04	21.14		
	RB15#0	19.84	20.15	20.36		
	RB15#10	19.82	20.19	20.31		
	RB25#0	20.02	20.17	20.63		

10MHz QPSK	RB1#0	21.86	22.09	22.29	18.26	30
	RB1#25	21.85	22.02	22.31		
	RB1#49	21.98	22.21	22.46		
	RB25#0	20.94	20.97	21.35		
	RB25#25	20.99	21.13	21.41		
	RB50#0	21	20.97	21.31		
10MHz 16QAM	RB1#0	20.61	21.3	21.68	18	30
	RB1#25	20.72	21.48	22.02		
	RB1#49	21.18	22.08	22.2		
	RB25#0	20.28	19.91	20.23		
	RB25#25	19.88	20.12	20.31		
	RB50#0	20.05	20.03	20.38		
15MHz QPSK	RB1#0	21.76	22.21	22.22	18.27	30
	RB1#38	22.15	22.12	22.27		
	RB1#74	22.27	22.31	22.47		
	RB36#0	21.01	21.06	21.28		
	RB36#39	21.08	21.15	21.36		
	RB75#0	21.07	21.1	21.31		
15MHz 16QAM	RB1#0	21.24	21.44	21.41	17.49	30
	RB1#38	21.14	21.48	21.46		
	RB1#74	21.1	21.61	21.69		
	RB36#0	19.96	20.07	20.16		
	RB36#39	19.92	20.18	20.33		
	RB75#0	19.91	20.14	20.37		
20MHz QPSK	RB1#0	22.06	21.92	22.26	18.57	30
	RB1#50	22.16	22.21	22.3		
	RB1#99	22.25	22.33	22.77		
	RB50#0	20.89	21.03	21.36		
	RB50#50	20.98	21.18	21.43		
	RB100#0	21.02	21.07	21.32		
20MHz 16QAM	RB1#0	21.48	21.1	21.55	18.76	30
	RB1#50	21.69	21.1	21.94		
	RB1#99	21.69	21.12	22.96		
	RB50#0	19.91	20.02	20.2		
	RB50#50	20.01	20.21	20.12		
	RB100#0	20.08	20.08	20.17		

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	4.81	4.64	3.97	13
	RB100#0	4.06	3.83	3.97	13
20MHz 16QAM	RB1#0	5.8	5.42	5.19	13
	RB100#0	5.88	5.65	5.77	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	1.108	1.108	1.102	1.314	1.284	1.302
1.4MHz 16QAM	1.096	1.102	1.102	1.296	1.308	1.314
3MHz QPSK	2.695	2.695	2.683	2.952	2.952	2.964
3MHz 16QAM	2.695	2.683	2.683	2.964	2.964	2.94
5MHz QPSK	4.511	4.491	4.531	5.04	5.02	5.04
5MHz 16QAM	4.531	4.531	4.511	5.06	5.04	5.02
10MHz QPSK	8.942	8.942	8.942	9.72	9.72	9.84
10MHz 16QAM	8.942	8.942	8.942	9.72	9.76	9.64
15MHz QPSK	13.473	13.413	13.473	14.94	14.7	14.88
15MHz 16QAM	13.473	13.473	13.533	14.76	14.82	14.88
20MHz QPSK	17.964	17.804	17.884	19.28	19.28	19.6
20MHz 16QAM	17.964	17.884	17.964	19.52	19.52	19.44

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

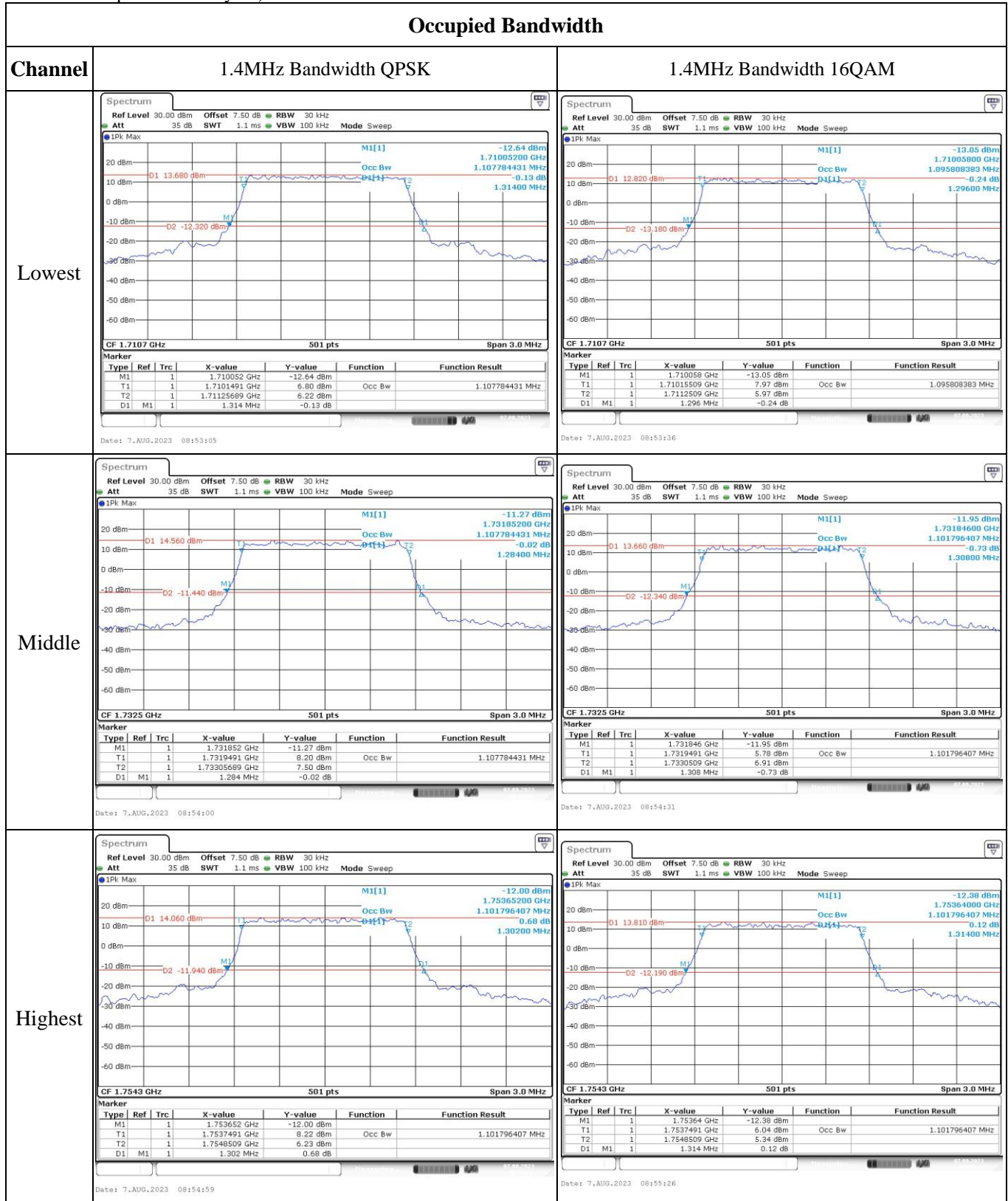
FCC §2.1051, §27.53:Spurious Emissions at Antenna Terminal	
Result:	Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.

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.

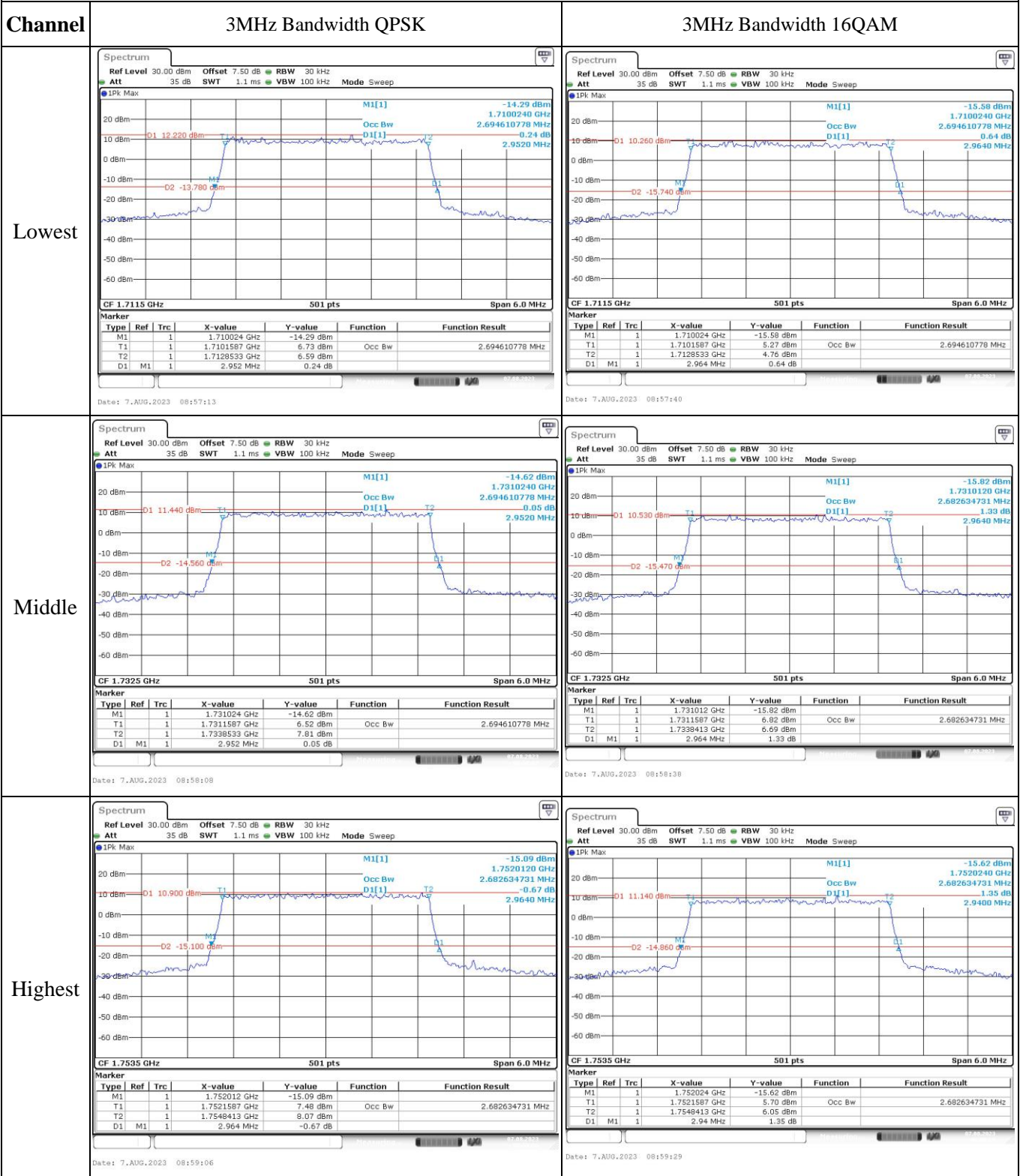
FCC §2.1055, §27.54: Frequency Stability						
Test Mode:	20M QPSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	1711.091	1710.00	1753.913	1755
	-20	3.8	1711.052	1710.00	1753.975	1755
	-10	3.8	1711.054	1710.00	1753.955	1755
	0	3.8	1711.035	1710.00	1753.973	1755
	10	3.8	1711.071	1710.00	1753.980	1755
	20	3.8	1711.058	1710.00	1753.942	1755
	30	3.8	1711.068	1710.00	1753.963	1755
	40	3.8	1711.066	1710.00	1753.978	1755
Frequency Stability vs. Voltage	20	3.55	1711.092	1710.00	1753.941	1755
	20	4.35	1711.079	1710.00	1753.970	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	3.8	1711.089	1710.00	1754.063	1755
	-20	3.8	1711.052	1710.00	1754.077	1755
	-10	3.8	1711.071	1710.00	1754.012	1755
	0	3.8	1711.097	1710.00	1754.087	1755
	10	3.8	1711.019	1710.00	1754.060	1755
	20	3.8	1711.058	1710.00	1754.022	1755
	30	3.8	1711.082	1710.00	1754.018	1755
	40	3.8	1711.003	1710.00	1754.053	1755
Frequency Stability vs. Voltage	20	3.55	1711.029	1710.00	1754.013	1755
	20	4.35	1711.069	1710.00	1754.027	1755
					Result:	Pass

Test Plots(Note: The 7.5dB is the Insertion loss of the RF cable, Power Splitter and DC Block, which was offset into the Spectrum Analyzer):



Occupied Bandwidth



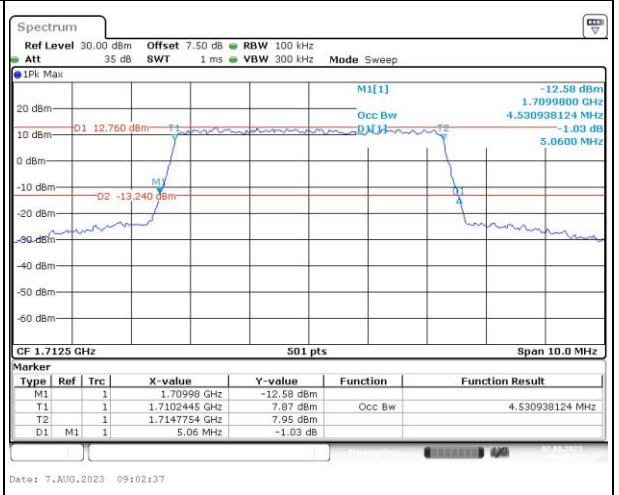
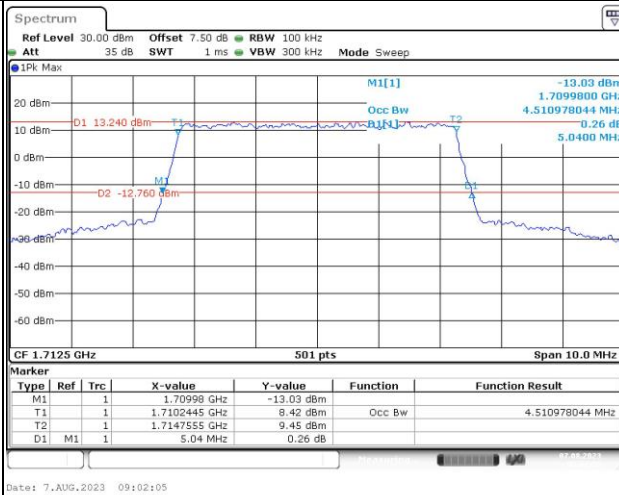
Occupied Bandwidth

Channel

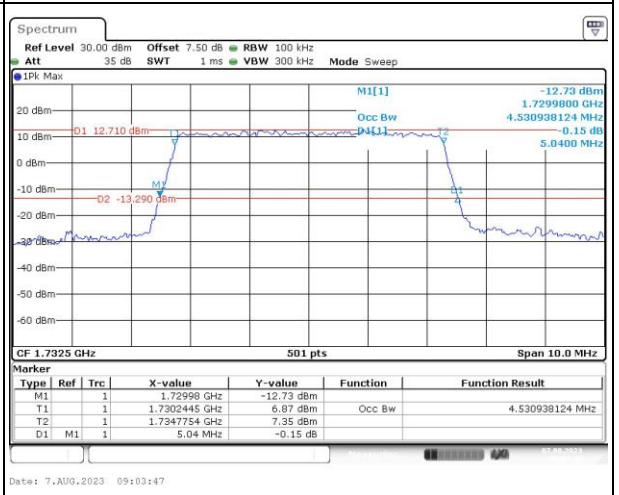
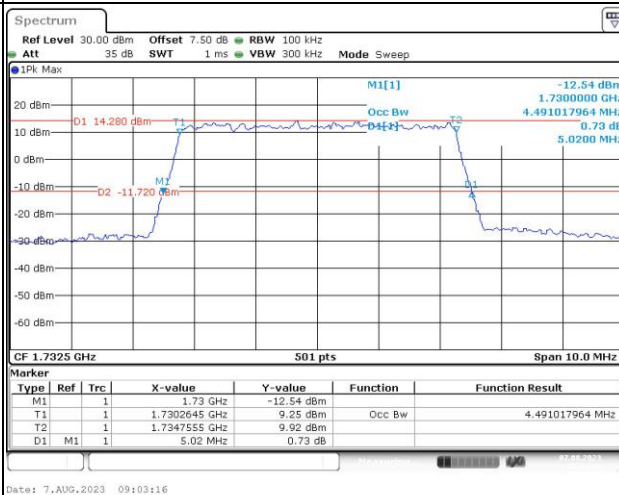
5MHz Bandwidth QPSK

5MHz Bandwidth 16QAM

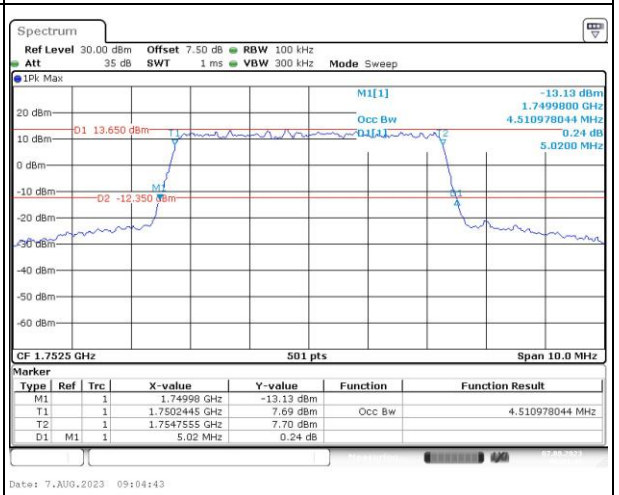
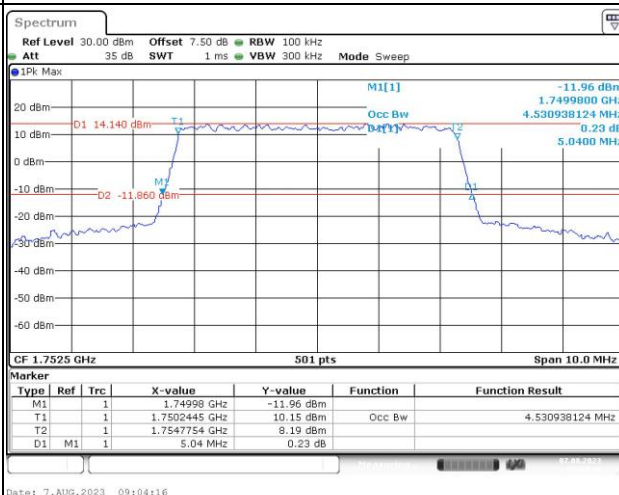
Lowest



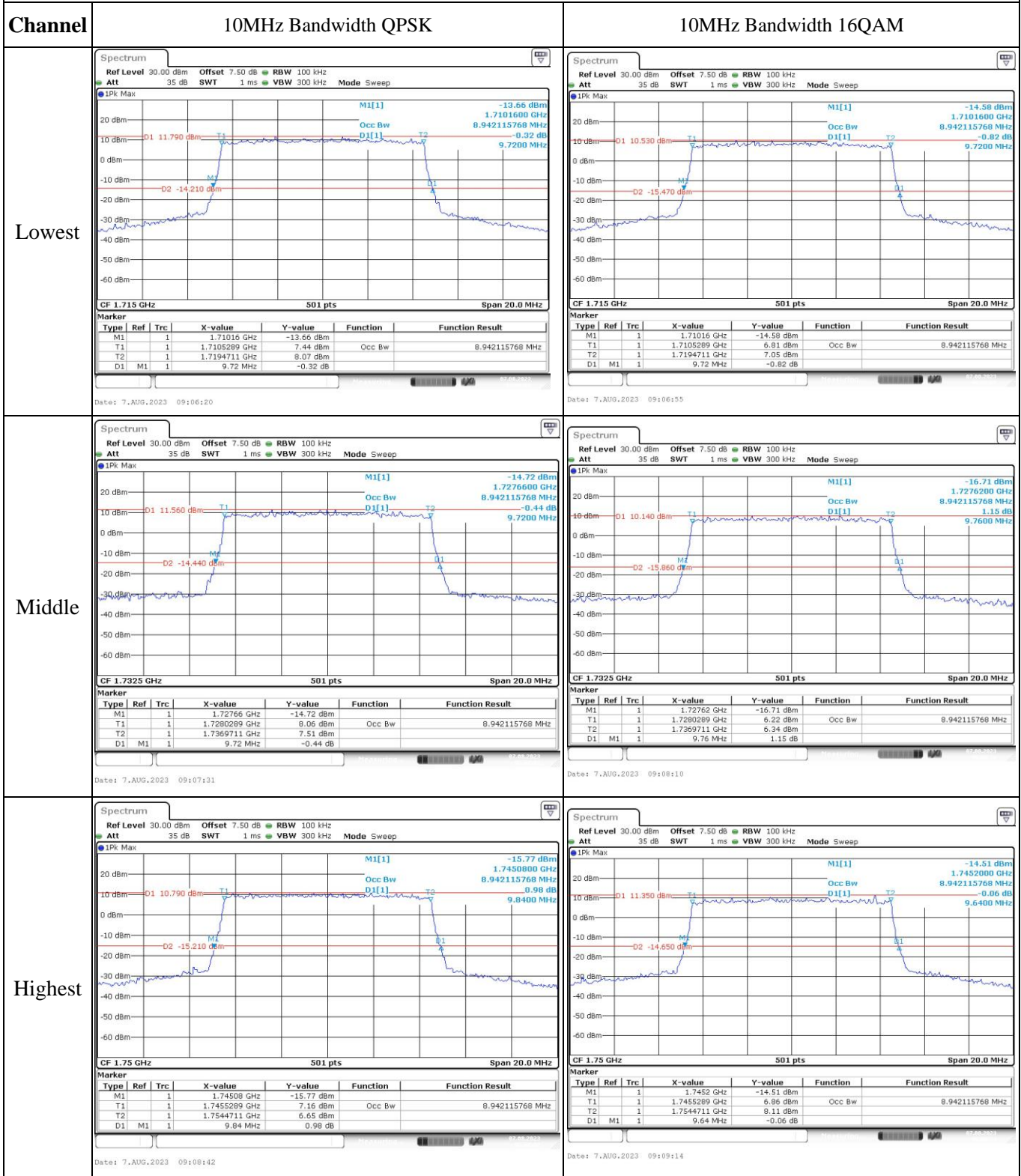
Middle



Highest



Occupied Bandwidth



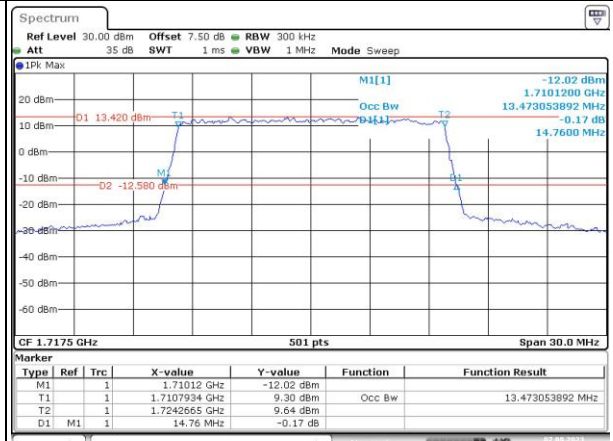
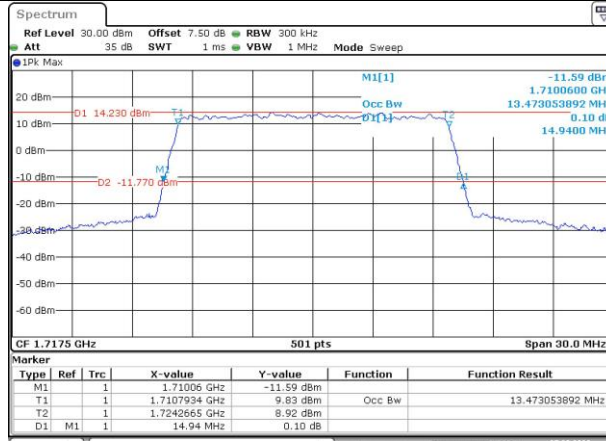
Occupied Bandwidth

Channel

15MHz Bandwidth QPSK

15MHz Bandwidth 16QAM

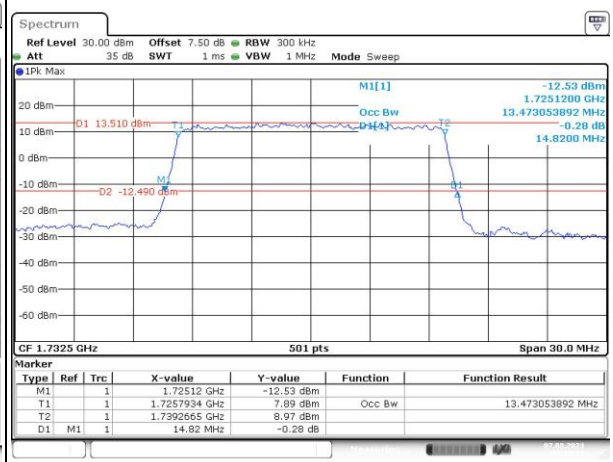
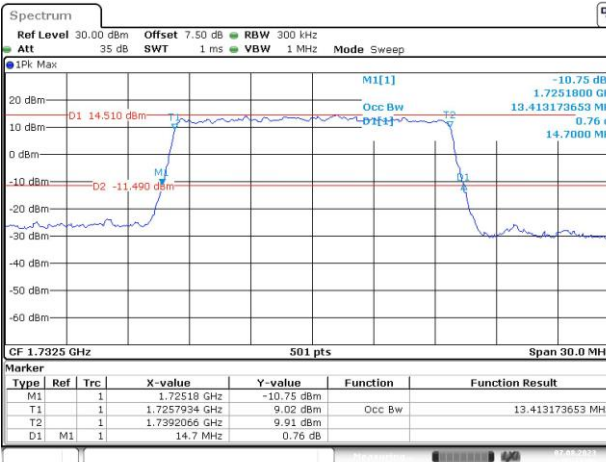
Lowest



Date: 7.AUG.2023 09:10:41

Date: 7.AUG.2023 09:11:08

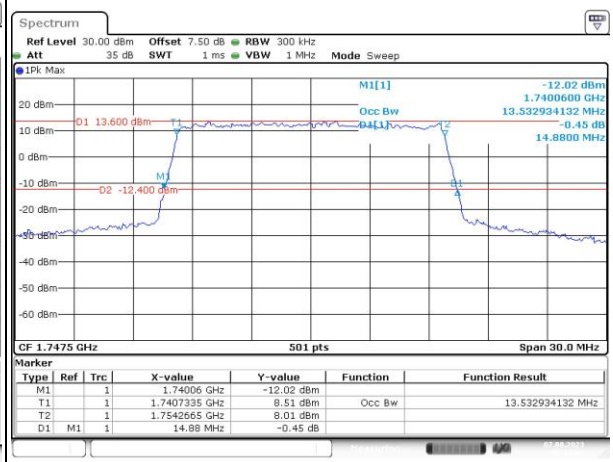
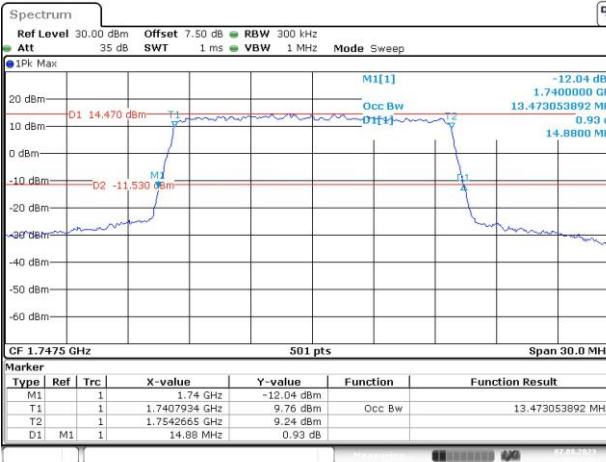
Middle



Date: 7.AUG.2023 09:11:40

Date: 7.AUG.2023 09:12:11

Highest



Date: 7.AUG.2023 09:12:42

Date: 7.AUG.2023 09:13:09

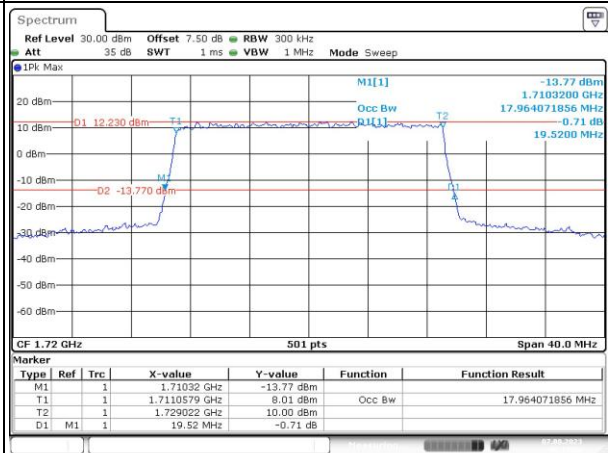
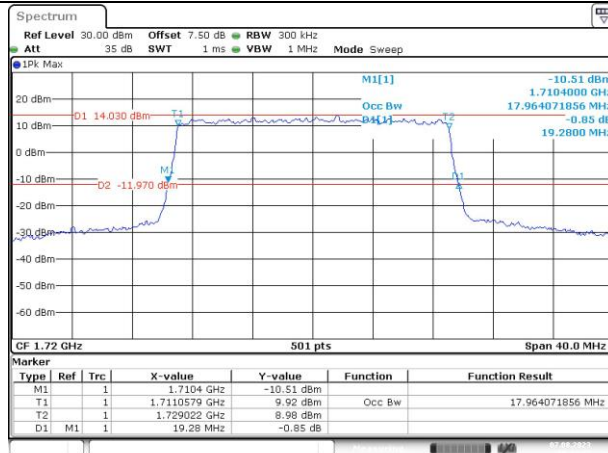
Occupied Bandwidth

Channel

20MHz Bandwidth QPSK

20MHz Bandwidth 16QAM

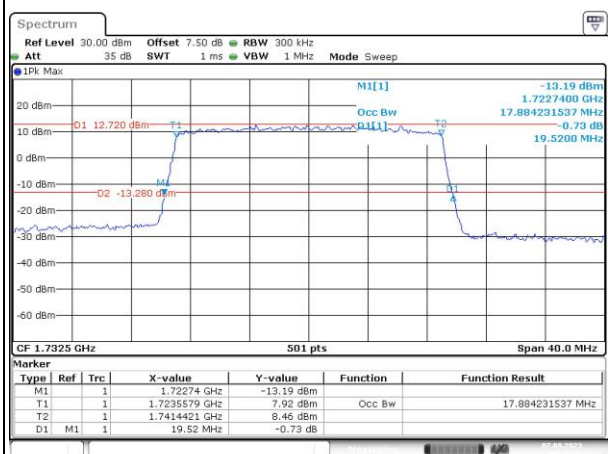
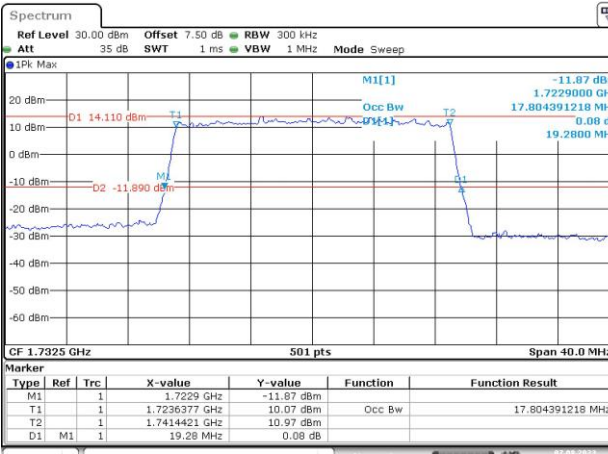
Lowest



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Date: 7.AUG.2023 09:15:36

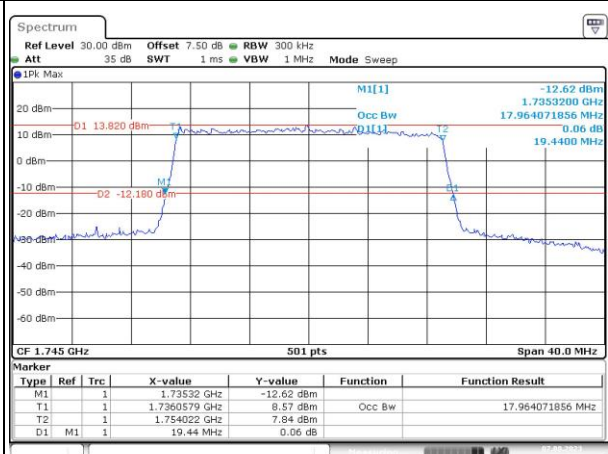
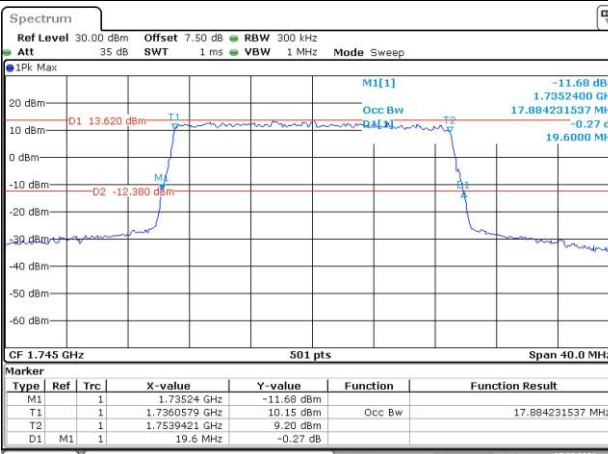
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Date: 7.AUG.2023 09:16:43

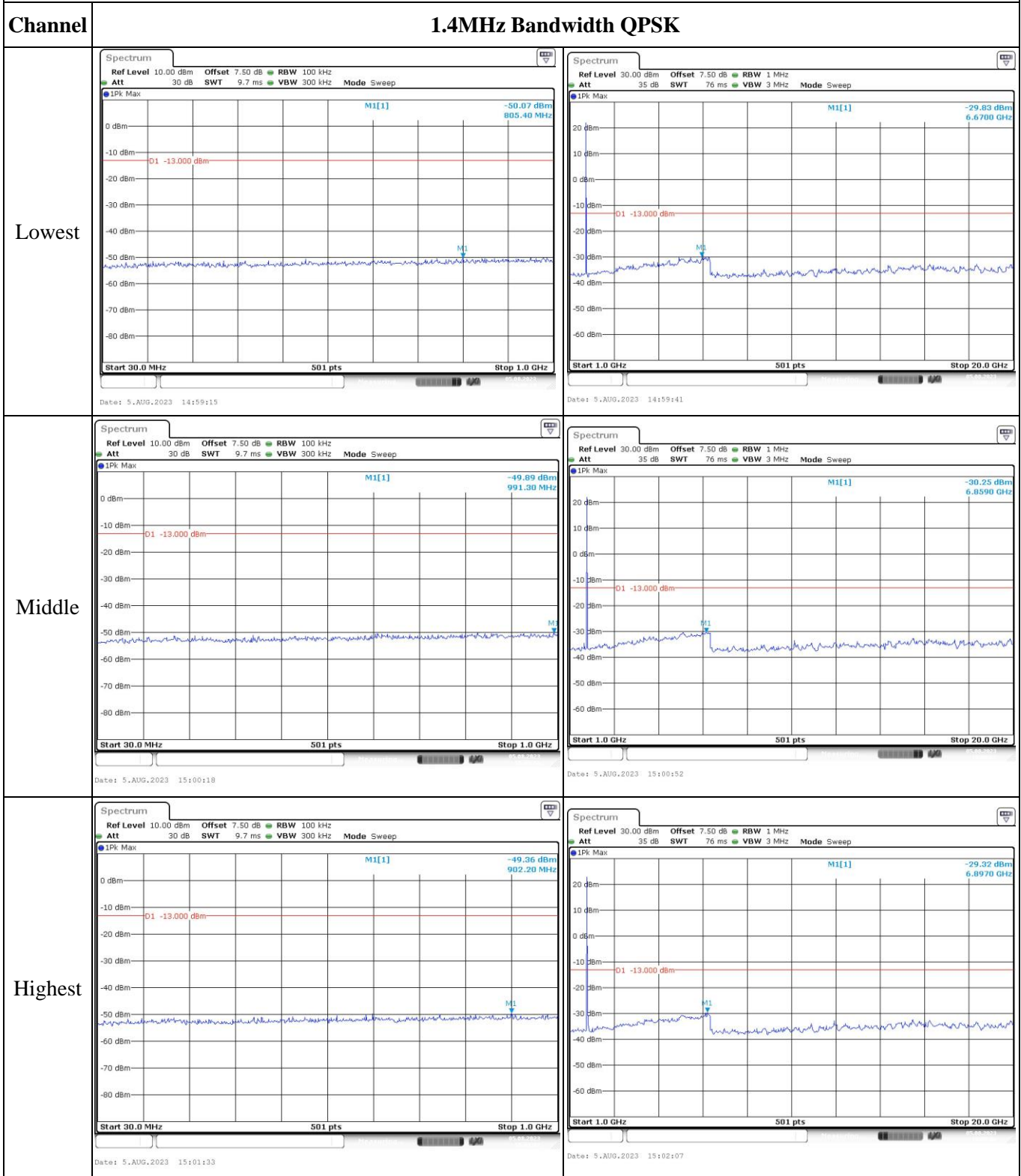
Highest



Date: 7.AUG.2023 09:17:19

Date: 7.AUG.2023 09:17:57

Spurious Emissions at Antenna Terminal

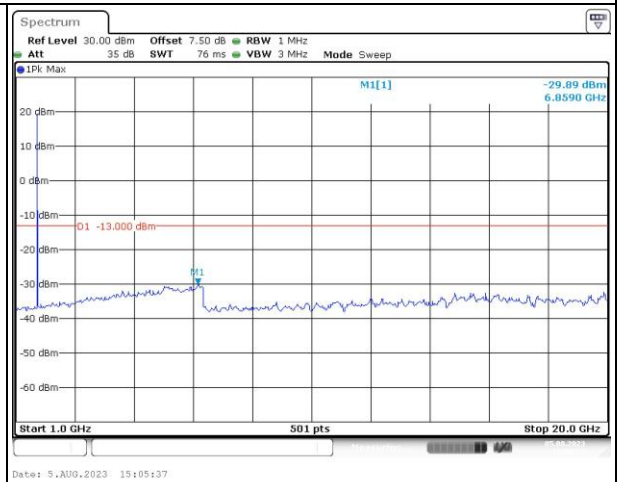
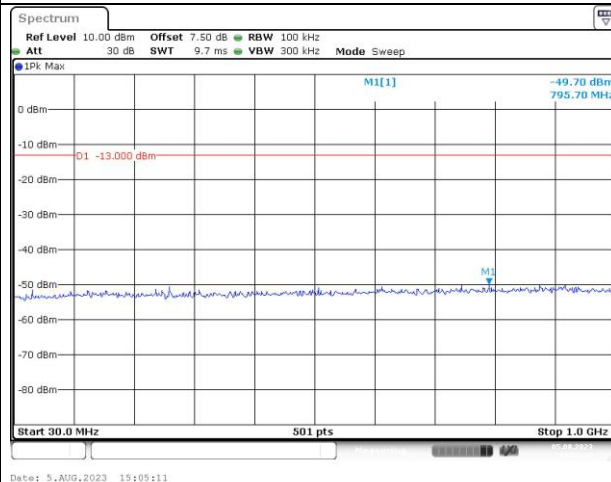


Spurious Emissions at Antenna Terminal

Channel

3MHz Bandwidth QPSK

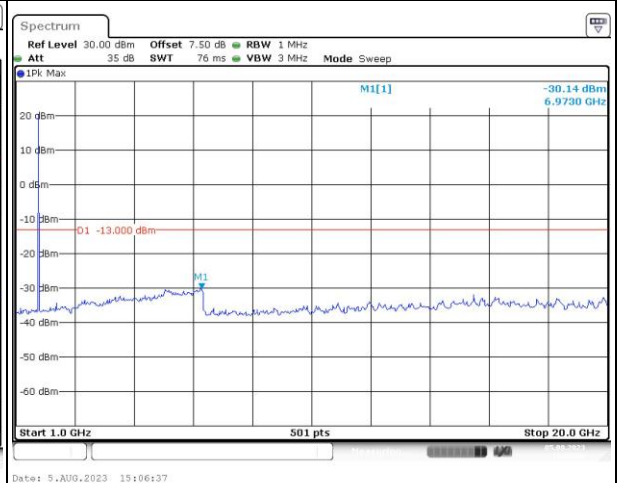
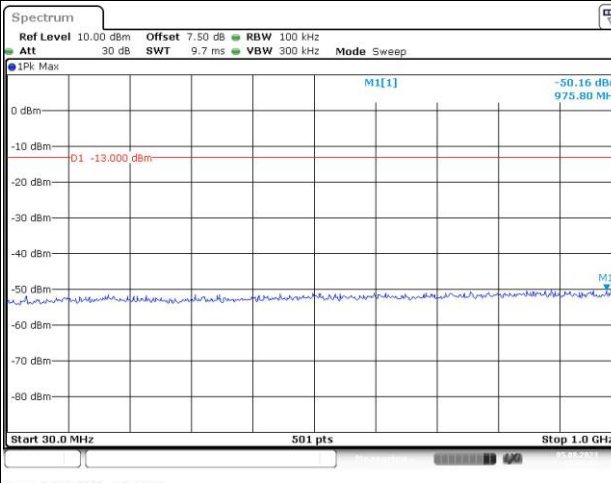
Lowest



Date: 5.AUG.2023 15:05:11

Date: 5.AUG.2023 15:05:37

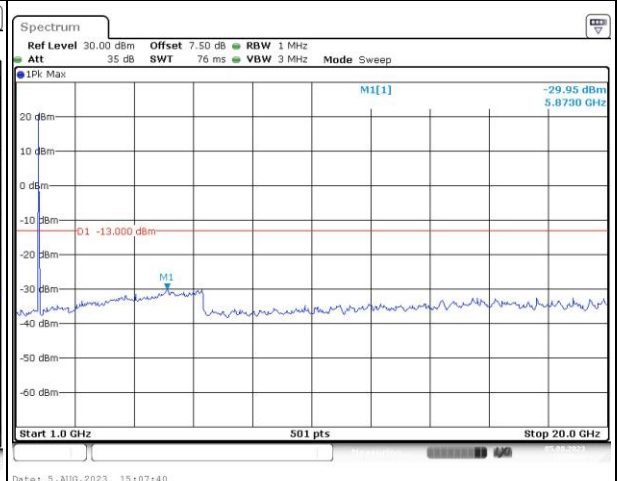
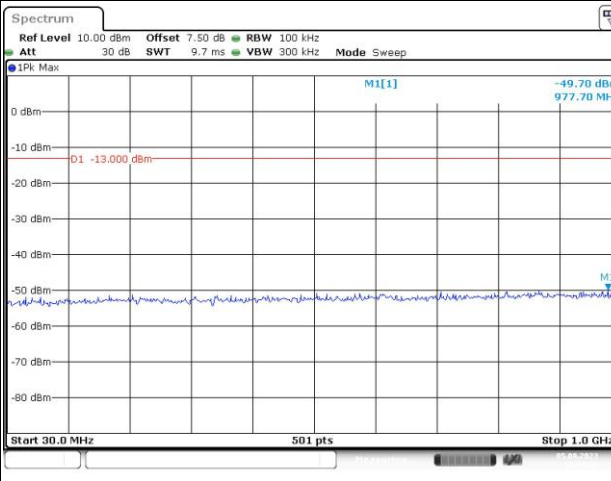
Middle



Date: 5.AUG.2023 15:06:11

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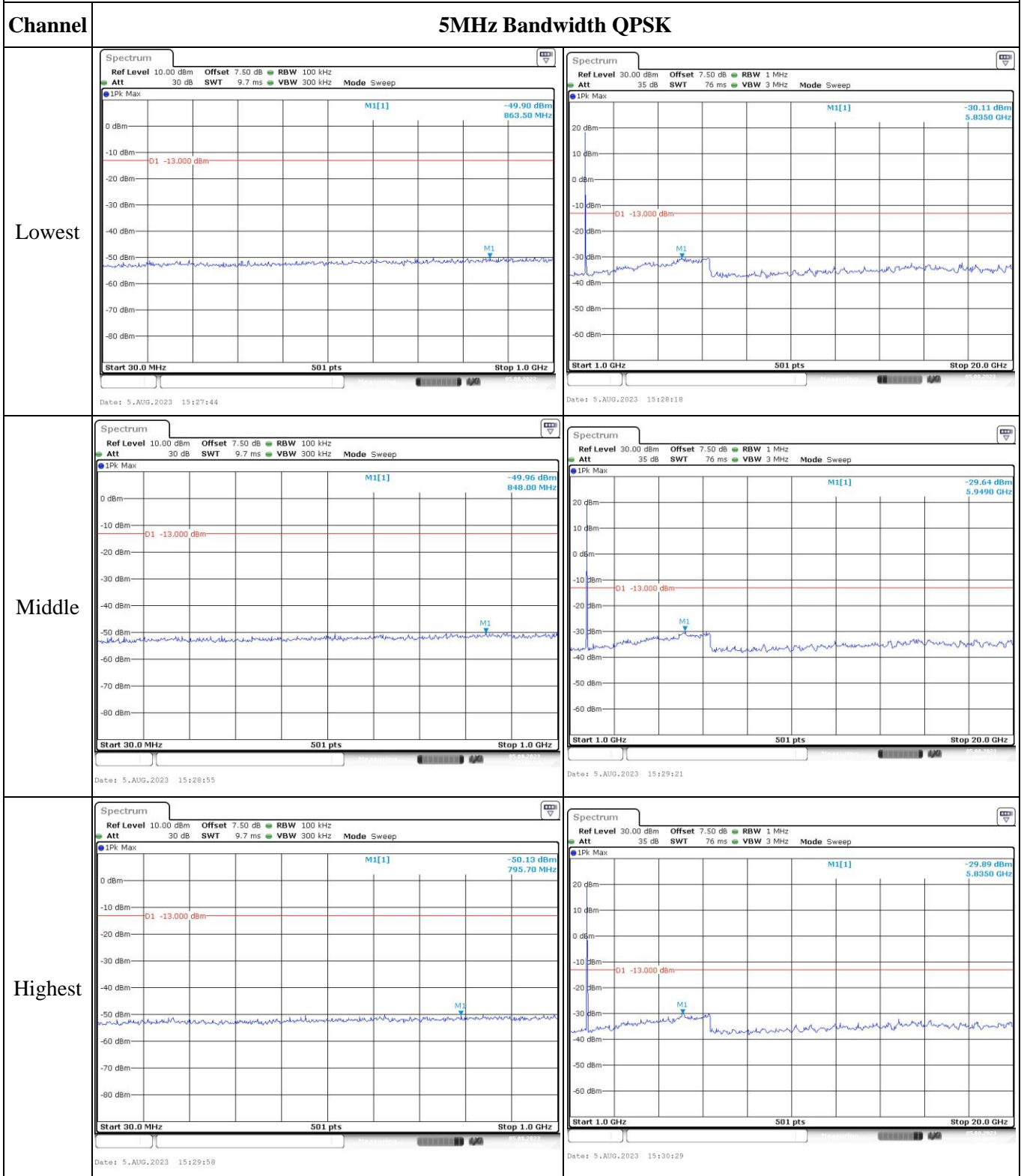
Highest



Date: 5.AUG.2023 15:07:06

Date: 5.AUG.2023 15:07:40

Spurious Emissions at Antenna Terminal

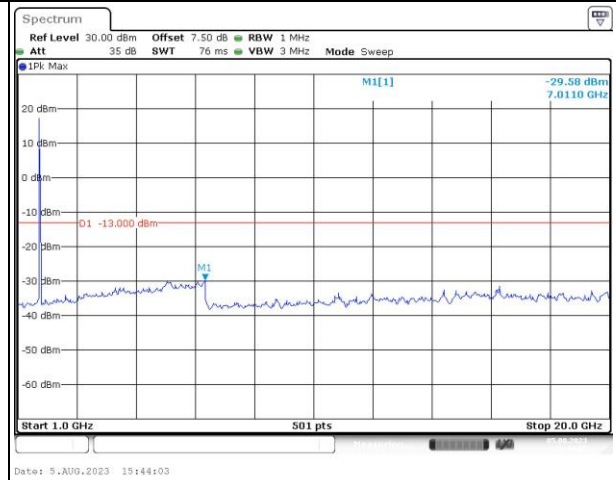
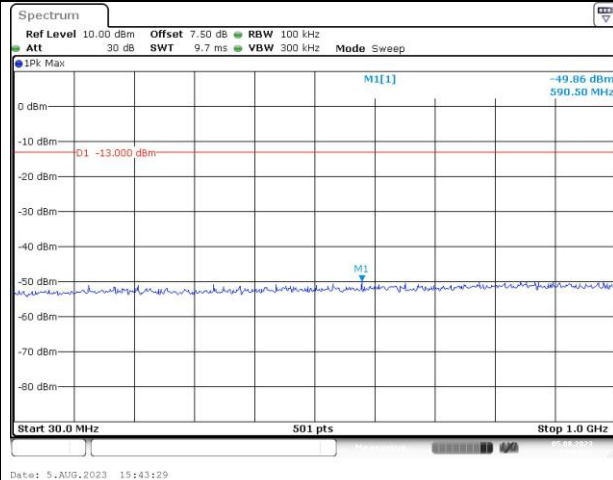


Spurious Emissions at Antenna Terminal

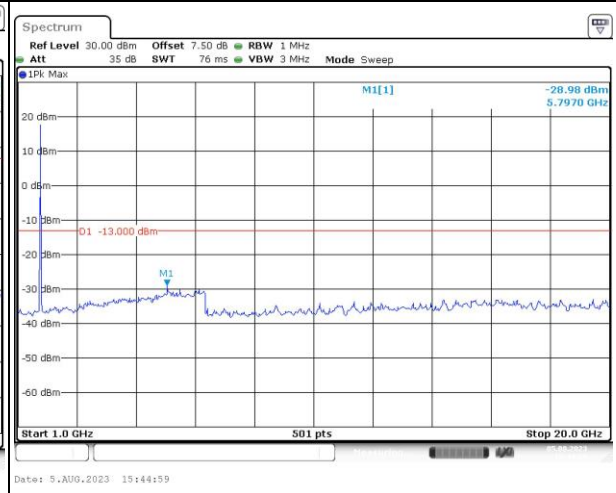
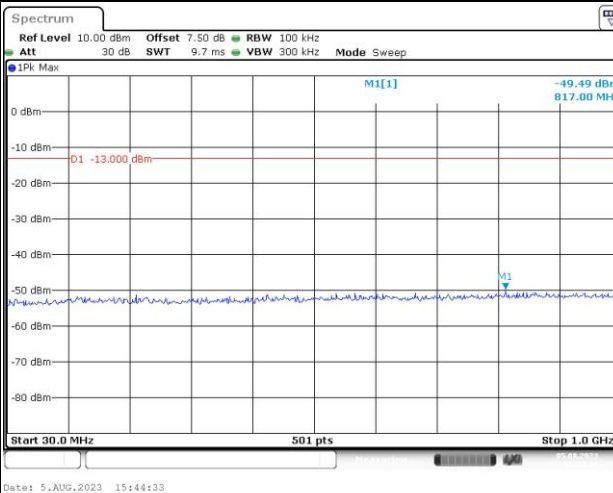
Channel

10MHz Bandwidth QPSK

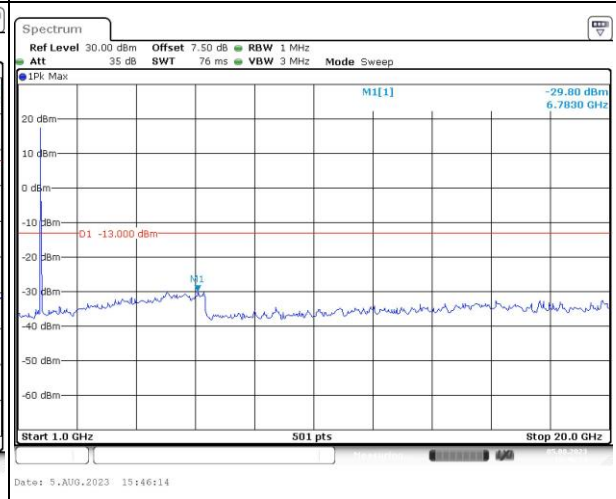
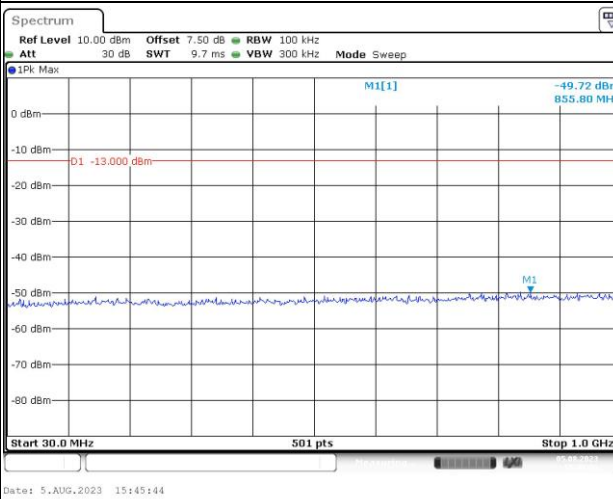
Lowest



Middle



Highest

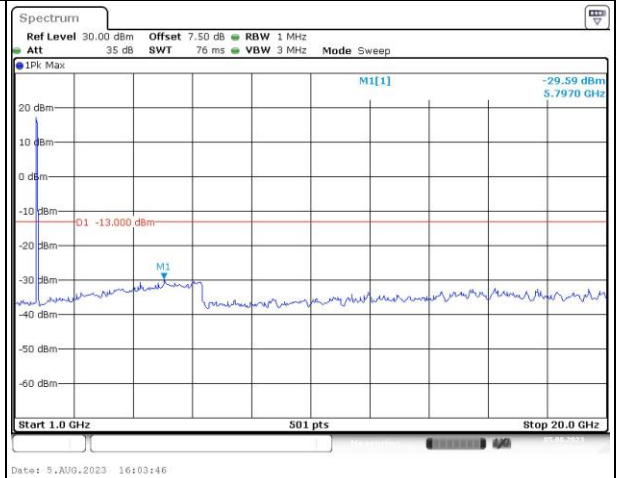
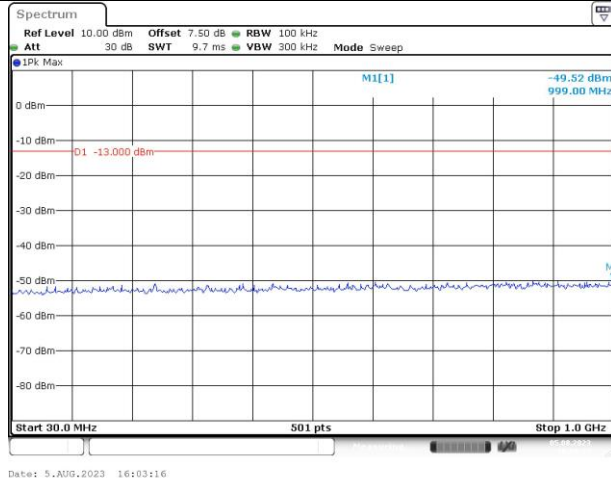


Spurious Emissions at Antenna Terminal

Channel

15MHz Bandwidth QPSK

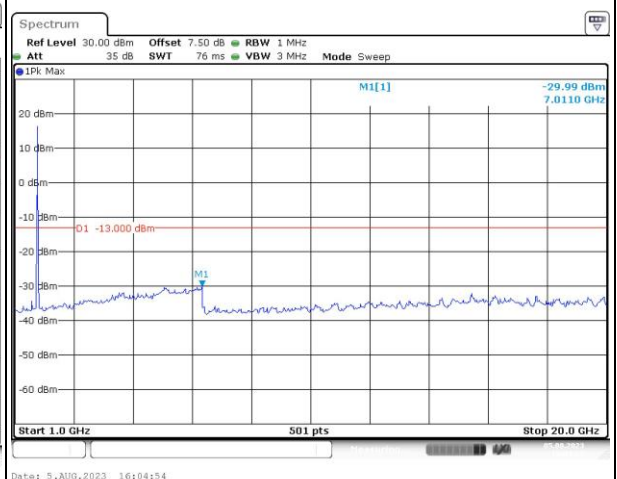
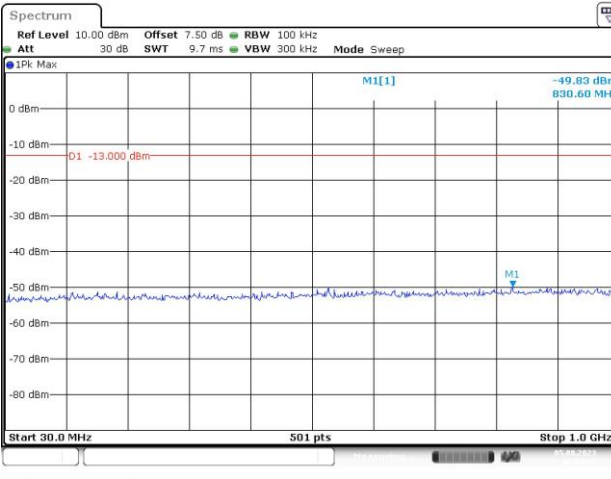
Lowest



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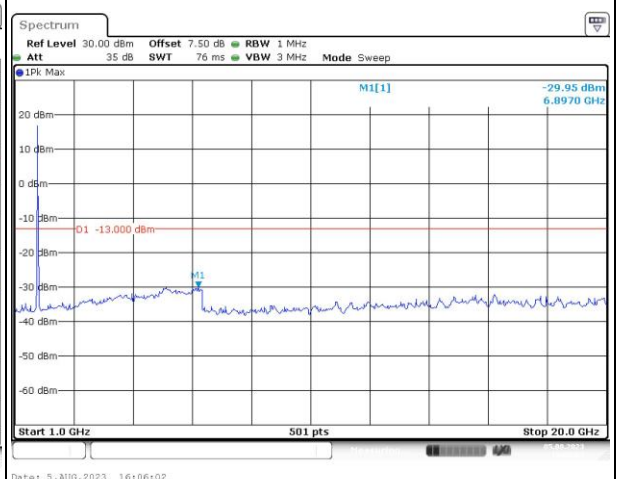
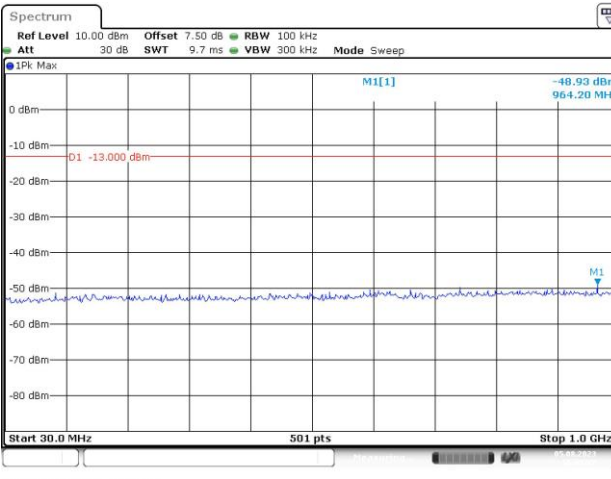
Middle



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Date: 5.AUG.2023 16:04:54

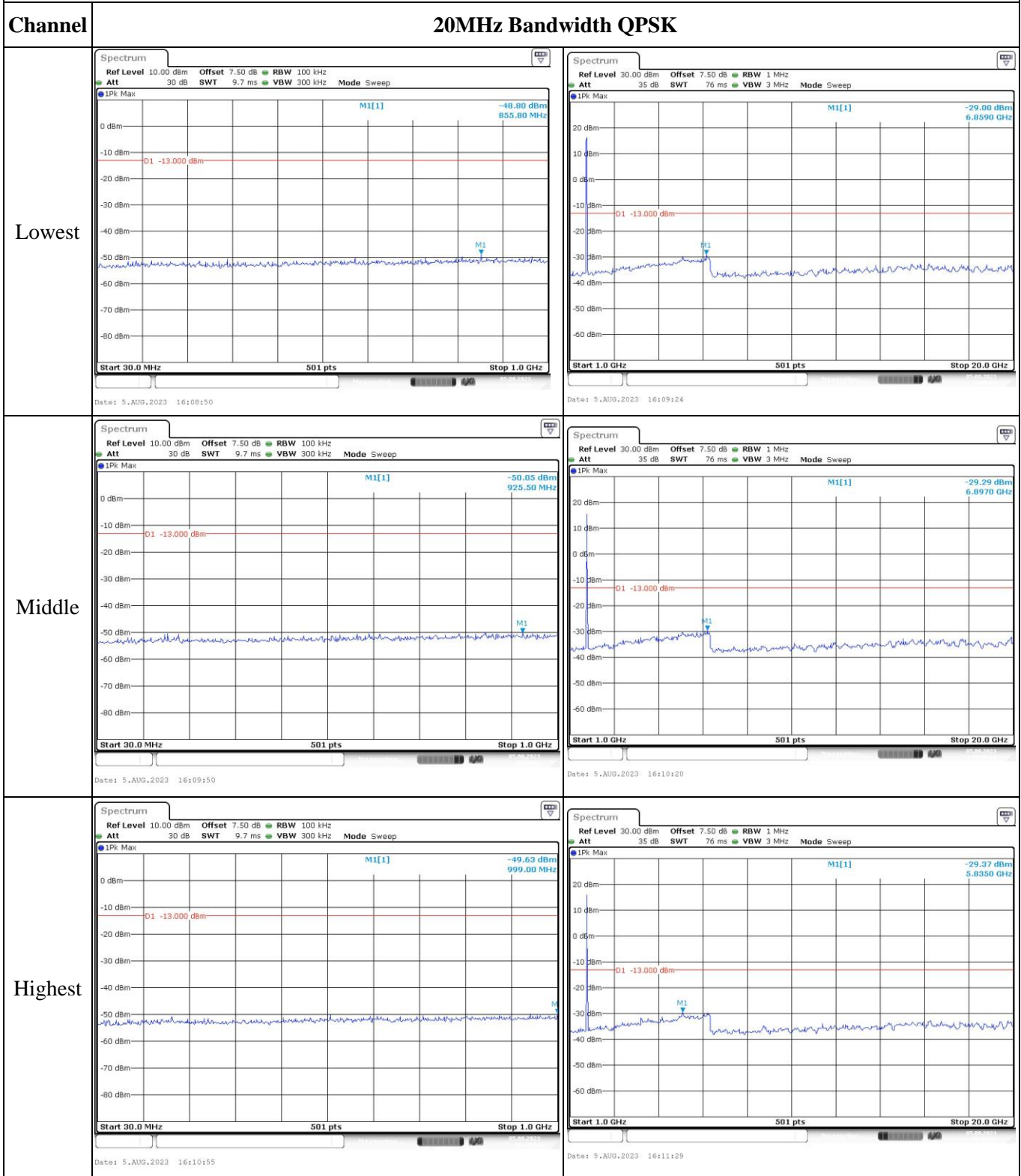
Highest



Date: 5.AUG.2023 16:05:28

Date: 5.AUG.2023 16:06:02

Spurious Emissions at Antenna Terminal



Out of band emission, Band Edge

Mode	Lowest	Highest
QPSK 1.4MHz	<p>Ref Level 30.00 dBm Offset 7.50 dB RBW 30 kHz Att 35 dB SWT 35 ms VBW 100 kHz Mode Sweep SGL Count 50/50 IRm AvgPwr MI[1] -30.41 dBm 1.7100000 GHz D1 -13.000 dBm CF 1.71 GHz 501 pts Span 3.0 MHz Date: 5.AUG.2023 11:23:56</p>	<p>Ref Level 30.00 dBm Offset 7.50 dB RBW 30 kHz Att 35 dB SWT 35 ms VBW 100 kHz Mode Sweep SGL Count 50/50 IRm AvgPwr MI[1] -20.59 dBm 1.7550060 GHz D1 -13.000 dBm CF 1.755 GHz 501 pts Span 3.0 MHz Date: 5.AUG.2023 11:24:09</p>
QPSK 3MHz	<p>Ref Level 30.00 dBm Offset 7.50 dB RBW 30 kHz Att 35 dB SWT 35 ms VBW 100 kHz Mode Sweep SGL Count 50/50 IRm AvgPwr MI[1] -31.81 dBm 1.7099880 GHz D1 -13.000 dBm CF 1.71 GHz 501 pts Span 6.0 MHz Date: 5.AUG.2023 11:59:54</p>	<p>Ref Level 30.00 dBm Offset 7.50 dB RBW 30 kHz Att 35 dB SWT 35 ms VBW 100 kHz Mode Sweep SGL Count 50/50 IRm AvgPwr MI[1] -30.55 dBm 1.7550000 GHz D1 -13.000 dBm CF 1.755 GHz 501 pts Span 6.0 MHz Date: 5.AUG.2023 12:00:08</p>
QPSK 5MHz	<p>Ref Level 30.00 dBm Offset 7.50 dB RBW 100 kHz Att 35 dB SWT 35 ms VBW 300 kHz Mode Sweep SGL Count 50/50 IRm AvgPwr MI[1] -29.60 dBm 1.7100000 GHz D1 -13.000 dBm CF 1.71 GHz 501 pts Span 10.0 MHz Date: 5.AUG.2023 12:11:54</p>	<p>Ref Level 30.00 dBm Offset 7.50 dB RBW 100 kHz Att 35 dB SWT 35 ms VBW 300 kHz Mode Sweep SGL Count 50/50 IRm AvgPwr MI[1] -20.44 dBm 1.7550000 GHz D1 -13.000 dBm CF 1.755 GHz 501 pts Span 10.0 MHz Date: 5.AUG.2023 12:12:08</p>

Out of band emission, Band Edge

Mode	Lowest	Highest
QPSK 10MHz	<p>Ref Level 30.00 dBm Offset 7.50 dB RBW 100 kHz Att 35 dB SWT 35 ms VBW 300 kHz Mode Sweep SGL Count 50/50 IRm AvgPwr MI[1] -35.11 dBm 1.7100000 GHz D1 -13.000 dBm CF 1.71 GHz 501 pts Span 20.0 MHz Date: 5.AUG.2023 12:17:24</p>	<p>Ref Level 30.00 dBm Offset 7.50 dB RBW 100 kHz Att 35 dB SWT 35 ms VBW 300 kHz Mode Sweep SGL Count 50/50 IRm AvgPwr MI[1] -34.49 dBm 1.7550000 GHz D1 -13.000 dBm CF 1.755 GHz 501 pts Span 20.0 MHz Date: 5.AUG.2023 12:17:39</p>
QPSK 15MHz	<p>Ref Level 30.00 dBm Offset 7.50 dB RBW 300 kHz Att 35 dB SWT 35 ms VBW 1 MHz Mode Sweep SGL Count 50/50 IRm AvgPwr MI[1] -34.22 dBm 1.7100000 GHz D1 -13.000 dBm CF 1.71 GHz 501 pts Span 30.0 MHz Date: 5.AUG.2023 12:28:09</p>	<p>Ref Level 30.00 dBm Offset 7.50 dB RBW 300 kHz Att 35 dB SWT 35 ms VBW 1 MHz Mode Sweep SGL Count 50/50 IRm AvgPwr MI[1] -33.64 dBm 1.7550000 GHz D1 -13.000 dBm CF 1.755 GHz 501 pts Span 30.0 MHz Date: 5.AUG.2023 12:28:24</p>
QPSK 20MHz	<p>Ref Level 30.00 dBm Offset 7.50 dB RBW 300 kHz Att 35 dB SWT 35 ms VBW 1 MHz Mode Sweep SGL Count 50/50 IRm AvgPwr MI[1] -35.19 dBm 1.7100000 GHz D1 -13.000 dBm CF 1.71 GHz 501 pts Span 40.0 MHz Date: 5.AUG.2023 12:30:52</p>	<p>Ref Level 30.00 dBm Offset 7.50 dB RBW 300 kHz Att 35 dB SWT 35 ms VBW 1 MHz Mode Sweep SGL Count 50/50 IRm AvgPwr MI[1] -36.36 dBm 1.7550000 GHz D1 -13.000 dBm CF 1.755 GHz 501 pts Span 40.0 MHz Date: 5.AUG.2023 12:31:08</p>