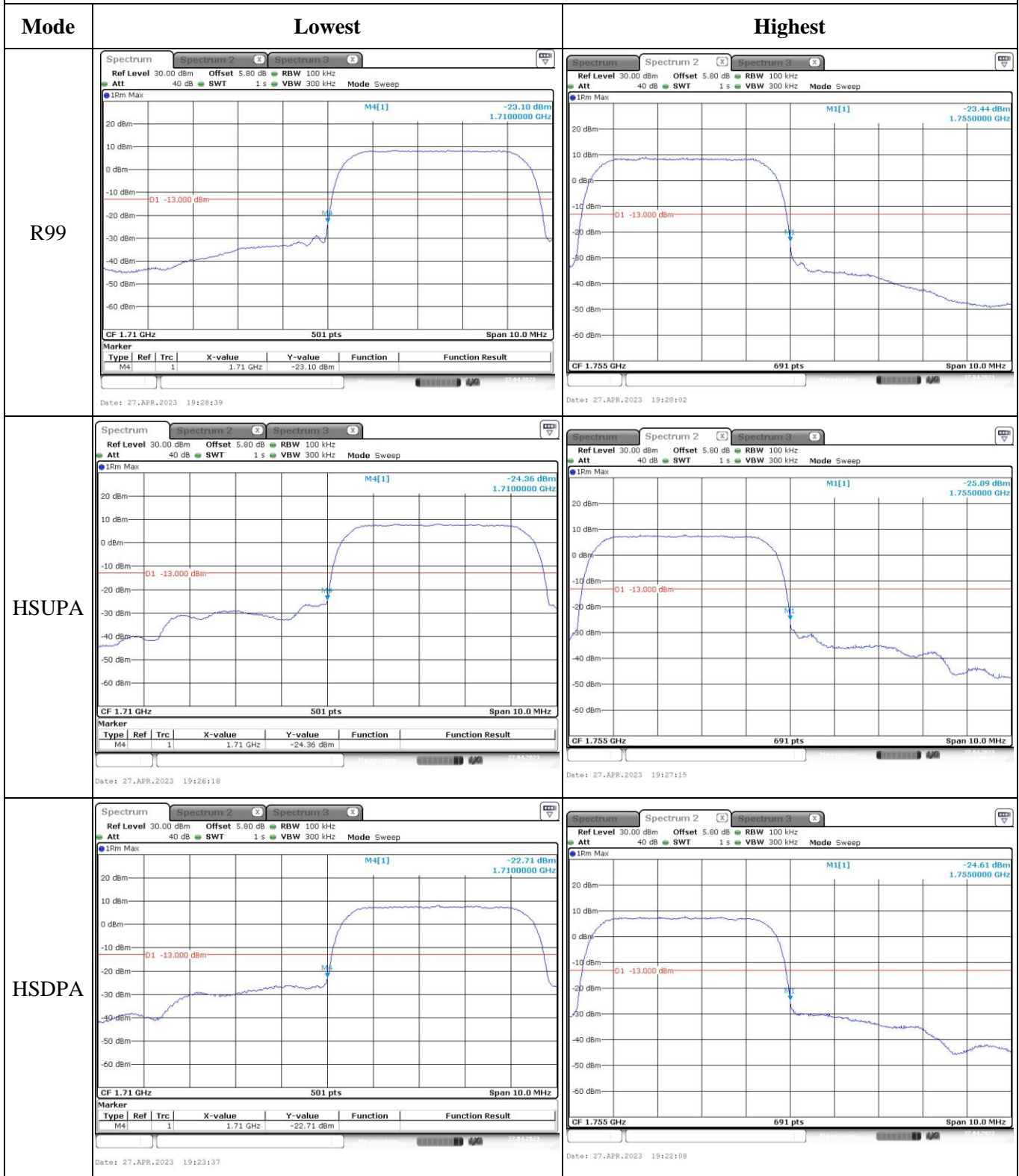


Out of band emission, Band Edge



4.5 Antenna Port Test Data and Results for WCDMA Band 5:

Serial Number:	22V0	Test Date:	2023/4/20~2023/4/21
Test Site:	RF	Test Mode:	Transmitting
Tester:	Jou Zhou	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	22.8~26.7	Relative Humidity: (%)	45~60	ATM Pressure: (kPa)	99.8~101.1
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2022/7/15	2023/7/14
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
YINSAIGE	Coaxial Cable	SS402	SJ0100004	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060301	Each time	N/A
Weinschel	Power splitter	1515	RA915	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	149218	2022/7/15	2023/7/14
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2023/3/31	2024/3/30
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:

Operation Modes	Lowest Frequency (MHz)	Middle Frequency (MHz)	Highest Frequency (MHz)
WCDMA	826.4	836.6	846.6

Test Data:**FCC §2.1046; § 22.913 (a)****RF Output Power:**

Test Mode	Conducted Average Output Power(dBm)			Maximum ERP (dBm)	ERP Limit (dBm)
	Lowest Channel	Middle Channel	Highest Channel		
WCDMA R99	20.21	20.11	20.24	16.06	38.45
HSDPA Subtest 1	20.16	20.22	20.73	16.55	38.45
HSDPA Subtest 2	20.13	20.14	20.48	16.3	38.45
HSDPA Subtest 3	20.11	20.55	20.64	16.46	38.45
HSDPA Subtest 4	19.99	20.19	20.23	16.05	38.45
HSUPA Subtest 1	19.86	20.12	20.25	16.07	38.45
HSUPA Subtest 2	19.73	20.02	19.98	15.84	38.45
HSUPA Subtest 3	19.7	19.98	19.94	15.8	38.45
HSUPA Subtest 4	19.68	19.65	19.85	15.67	38.45
HSUPA Subtest 5	19.65	19.99	19.73	15.81	38.45
DC-HSDPA Subtest 1	19.47	19.73	19.85	15.67	38.45
DC-HSDPA Subtest 2	19.27	19.42	19.7	15.52	38.45
DC-HSDPA Subtest 3	19.22	19.41	19.67	15.49	38.45
DC-HSDPA Subtest 4	19.16	19.52	19.49	15.34	38.45
HSPA+ Subtest 1	19.09	19.5	19.67	15.49	38.45

Note:

ERP= Conducted Power(dBm) - Lc(dB) + Gr(dBd)

Gr(dBd)=Gr(dBi)-2.15

Result: Pass**Peak-to-average Ratio(PAR)**

Test Mode	Peak-to-average Ratio(dB)			Limit (dB)
	Lowest Channel	Middle Channel	Highest Channel	
WCDMA R99	3.01	3.04	3.04	13
HSDPA	3.83	4.41	4.46	13
HSUPA	4.96	5.42	5.57	13

Result: Pass

FCC §2.1049, §22.917, §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
WCDMA R99	4.153	4.153	4.153	4.703	4.703	4.703
HSDPA	4.168	4.139	4.168	4.703	4.703	4.703
HSUPA	4.153	4.139	4.139	4.703	4.703	4.703

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

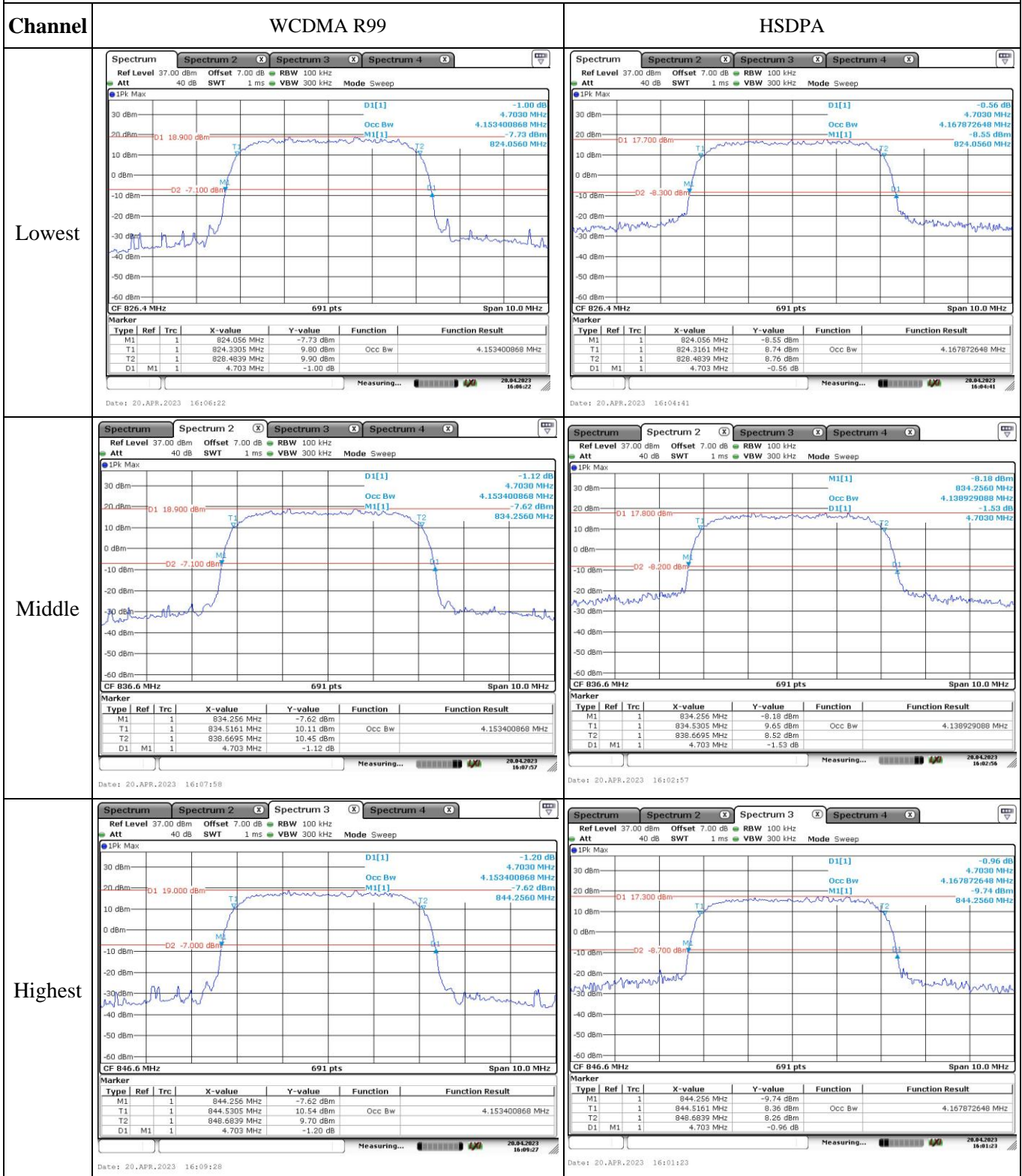
FCC §2.1051, §22.917(a): Spurious Emissions at Antenna Terminal	
Result:	Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.

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

FCC §2.1055, §22.355: Frequency Stability					
Test Modulation:	WCDMA R99		Test Channel:	836.6	MHz
Test Item	Temperature (°C)	Voltage (V _{DC})	Frequency Error		Limit
			(Hz)	(ppm)	(ppm)
Frequency Stability vs. Temperature	-30	3.85	17	0.020	2.5
	-20	3.85	-32	-0.038	2.5
	-10	3.85	52	0.062	2.5
	0	3.85	28	0.033	2.5
	10	3.85	9	0.011	2.5
	20	3.85	37	0.044	2.5
	30	3.85	51	0.061	2.5
	40	3.85	-16	-0.019	2.5
Frequency Stability vs. Voltage	50	3.85	50	0.060	2.5
	20	3.5	41	0.049	2.5
	20	4.4	35	0.042	2.5
				Result:	Pass

Test Plots(Note: The 7.0dB is the Insertion loss of the RF cable, Power Splitter and DC Block, which was offset into the Spectrum Analyzer):

Occupied Bandwidth

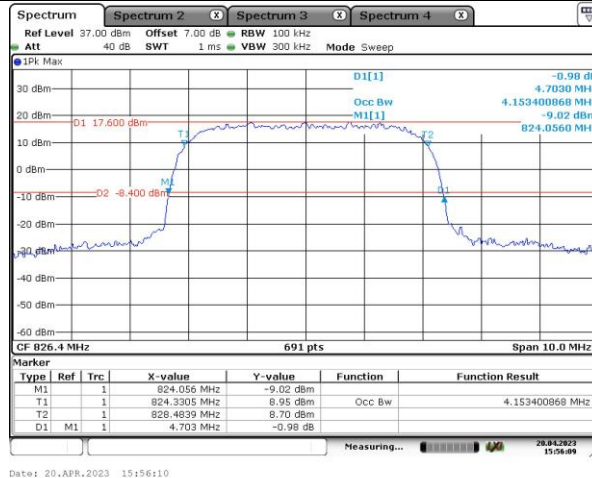


Occupied Bandwidth

Channel

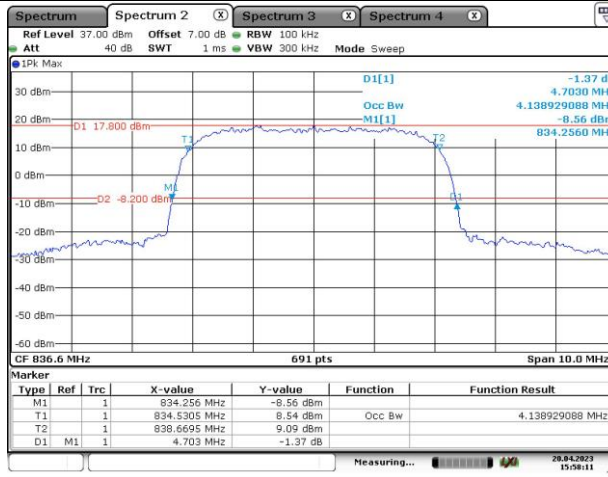
HSUPA

Lowest



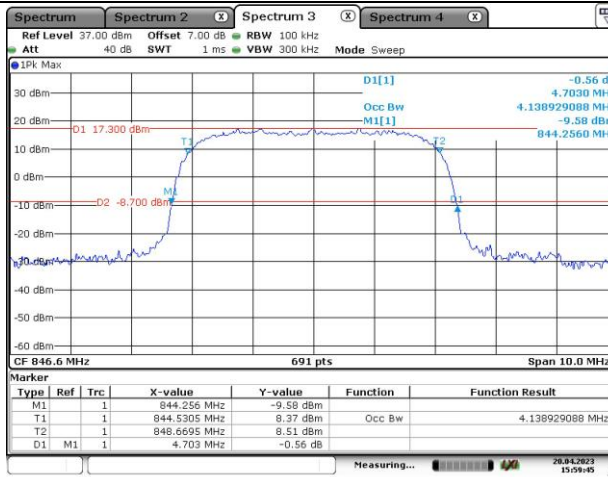
Date: 20.APR.2023 15:56:10

Middle



Date: 20.APR.2023 15:58:11

Highest



Date: 20.APR.2023 15:59:46

Spurious Emissions at Antenna Terminal

Channel	WCDMA R99	
Lowest	<p>Ref Level 37.00 dBm Offset 7.00 dB RBW 100 kHz Att 40 dB SWT 9.7 ms VBW 300 kHz Mode Sweep IPK Max M1[1] -28.25 dBm 821.00 MHz D1 -13.000 dBm Start 30.0 MHz 691 pts Stop 1.0 GHz Date: 20.APR.2023 16:27:15</p>	<p>Ref Level 37.00 dBm Offset 7.00 dB RBW 1 MHz Att 40 dB SWT 36 ms VBW 3 MHz Mode Sweep IPK Max D1[1] -7.84 dB M1[1] -25.59 dBm 5.9040 GHz D1 -13.000 dBm Start 1.0 GHz 691 pts Stop 10.0 GHz Date: 20.APR.2023 16:27:31</p>
	<p>Ref Level 37.00 dBm Offset 7.00 dB RBW 100 kHz Att 40 dB SWT 9.7 ms VBW 300 kHz Mode Sweep IPK Max M1[1] -27.61 dBm 840.70 MHz D1 -13.000 dBm Start 30.0 MHz 691 pts Stop 1.0 GHz Date: 20.APR.2023 16:26:08</p>	<p>Ref Level 37.00 dBm Offset 7.00 dB RBW 1 MHz Att 40 dB SWT 36 ms VBW 3 MHz Mode Sweep IPK Max D1[1] -7.44 dB M1[1] -25.42 dBm 6.9980 GHz D1 -13.000 dBm Start 1.0 GHz 691 pts Stop 10.0 GHz Date: 20.APR.2023 16:26:31</p>
Highest	<p>Ref Level 37.00 dBm Offset 7.00 dB RBW 100 kHz Att 40 dB SWT 9.7 ms VBW 300 kHz Mode Sweep IPK Max M1[1] -25.90 dBm 843.50 MHz D1 -13.000 dBm Start 30.0 MHz 691 pts Stop 1.0 GHz Date: 20.APR.2023 16:23:45</p>	<p>Ref Level 37.00 dBm Offset 7.00 dB RBW 1 MHz Att 40 dB SWT 36 ms VBW 3 MHz Mode Sweep IPK Max D1[1] -7.14 dB M1[1] -24.85 dBm 6.7630 GHz D1 -13.000 dBm Start 1.0 GHz 691 pts Stop 10.0 GHz Date: 20.APR.2023 16:22:58</p>

Out of band emission, Band Edge

Mode	Lowest	Highest
R99		
HSUPA		
HSDPA		

4.6 Antenna Port Test Data and Results for LTE Band 2

Serial Number:	22V0	Test Date:	2023/3/16~2023/3/17
Test Site:	RF	Test Mode:	Transmitting
Tester:	Jou Zhou	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	22.8~26.7	Relative Humidity: (%)	45~60	ATM Pressure: (kPa)	99.8~101.1
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2022/7/15	2023/7/14
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
YINSAIGE	Coaxial Cable	SS401	SJ0100001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060301	Each time	N/A
Weinschel	Power splitter	1515	RA915	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	149218	2022/7/15	2023/7/14
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2022/3/31	2023/3/30
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	1850.7	1880	1909.3
3MHz	1851.5	1880	1908.5
5MHz	1852.5	1880	1907.5
10MHz	1855	1880	1905
15MHz	1857.5	1880	1902.5
20MHz	1860	1880	1900

Test Data:**FCC §2.1046; §24.232****RF Output Power:**

Test Bandwidth & Modulation	Resource Block & RB offset	Conducted Average Output Power(dBm)			Maximum EIRP(dBm)	EIRP Limit(dBm)
		Lowest Channel	Middle Channel	Highest Channel		
1.4MHz QPSK	RB1#0	17.15	17.93	16.86	19.02	33
	RB1#3	17.96	17.83	16.43		
	RB1#5	16.93	16.05	16.68		
	RB3#0	17.28	16.5	17.65		
	RB3#3	17.8	17.55	17.99		
	RB6#0	16.36	17.08	16.26		
1.4MHz 16QAM	RB1#0	18	16.62	17.77	19.03	33
	RB1#3	16.51	17.33	17.23		
	RB1#5	16.22	17.51	16.12		
	RB3#0	17.23	17.16	17.94		
	RB3#3	17.62	16.48	17.74		
	RB6#0	16.99	17.9	16.7		
3MHz QPSK	RB1#0	17.61	16.85	17.27	19.01	33
	RB1#8	16.77	17.46	17.89		
	RB1#14	17.33	17.14	16.66		
	RB6#0	16.68	17.7	16.54		
	RB6#9	17.38	17.98	16.86		
	RB15#0	16.57	17.58	16.51		
3MHz 16QAM	RB1#0	16.44	16.43	17.85	18.88	33
	RB1#8	17.22	17.48	17.69		
	RB1#14	16.58	17.27	17.21		
	RB6#0	16.95	16.37	16.95		
	RB6#9	16.44	16.22	16.31		
	RB15#0	17.5	17	16.48		
5MHz QPSK	RB1#0	17.41	16.23	17.43	18.96	33
	RB1#13	17.21	17.46	16.6		
	RB1#24	17.93	16.06	17.61		
	RB15#0	16.42	16.5	17.64		
	RB15#10	17.21	17.68	17.39		
	RB25#0	16.96	16.5	17.72		
5MHz 16QAM	RB1#0	17.03	16.94	17.07	18.91	33
	RB1#13	16.88	17.88	16.57		
	RB1#24	17.85	16.2	16.29		
	RB15#0	17.13	17.67	16.36		
	RB15#10	17.44	17.53	17.5		
	RB25#0	16.22	16.89	16.54		
10MHz QPSK	RB1#0	16.32	16.6	16.5	18.89	33
	RB1#25	16.12	16.38	17.28		

	RB1#49	17.84	16.01	17.69		
	RB25#0	17.53	16.69	17		
	RB25#25	17.86	16.45	16.37		
	RB50#0	17.5	16.14	17.81		
10MHz 16QAM	RB1#0	16.46	17.35	16.89	18.94	33
	RB1#25	16.66	16.36	17.71		
	RB1#49	17.34	16.69	16.12		
	RB25#0	17.16	17.29	17.86		
	RB25#25	16.82	16.83	17.33		
15MHz QPSK	RB1#0	16.82	17.1	17.3	18.89	33
	RB1#38	17.13	16.36	17.8		
	RB1#74	16.27	16.77	17.35		
	RB36#0	17.86	16.78	17.56		
	RB36#39	16.03	17.45	16.06		
15MHz 16QAM	RB1#0	16.56	17.45	17.25	19.02	33
	RB1#38	16.18	16.2	16.55		
	RB1#74	17.85	17.54	17.28		
	RB36#0	16.52	16.67	16.64		
	RB36#39	17.96	17.97	17.31		
20MHz QPSK	RB1#0	16.29	17.25	16.36	18.95	33
	RB1#50	16.18	17.4	16.34		
	RB1#99	16.28	17.86	16.93		
	RB50#0	17.72	17.26	17.84		
	RB50#50	16.6	17.35	17.22		
20MHz 16QAM	RB100#0	17.89	17.92	17.43	19	33
	RB1#0	16.38	16.23	16.17		
	RB1#50	17.79	17.84	17.7		
	RB1#99	16.46	17.13	16.55		
	RB50#0	17.19	17.31	16.52		
	RB50#50	16.8	16.24	17.38		
	RB100#0	16.69	17.97	17.15		
Note: EIRP=Conducted Power(dBm) - Lc(dB) + G _T (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	4.96	5.33	5.54	13
	RB100#0	4.14	4.17	4.2	13
20MHz 16QAM	RB1#0	5.62	6.17	6.46	13
	RB100#0	5.77	5.86	5.77	13
Result:					Pass

FCC §2.1049, §24.238:Occupied Bandwidth						
Operation Mode	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)		
	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel
1.4MHz QPSK	1.102	1.108	1.102	1.284	1.314	1.284
1.4MHz 16QAM	1.108	1.096	1.108	1.29	1.296	1.296
3MHz QPSK	2.695	2.695	2.707	3.024	3.024	3.012
3MHz 16QAM	2.695	2.695	2.695	3.06	3.072	3.024
5MHz QPSK	4.511	4.531	4.531	5.2	5.38	5.24
5MHz 16QAM	4.551	4.551	4.511	5.26	5.38	5.24
10MHz QPSK	8.942	8.942	8.942	9.84	9.96	9.84
10MHz 16QAM	8.982	8.942	8.942	9.88	10.04	9.68
15MHz QPSK	13.473	13.533	13.533	15.48	15.9	15.48
15MHz 16QAM	13.593	13.533	13.473	15.42	15.06	15.18
20MHz QPSK	18.044	18.044	17.964	20	20.08	19.84
20MHz 16QAM	17.964	17.964	17.964	19.92	20.08	20.08

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

FCC §2.1051, § 24.238 (a):Spurious Emissions at Antenna Terminal	
Result:	Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.

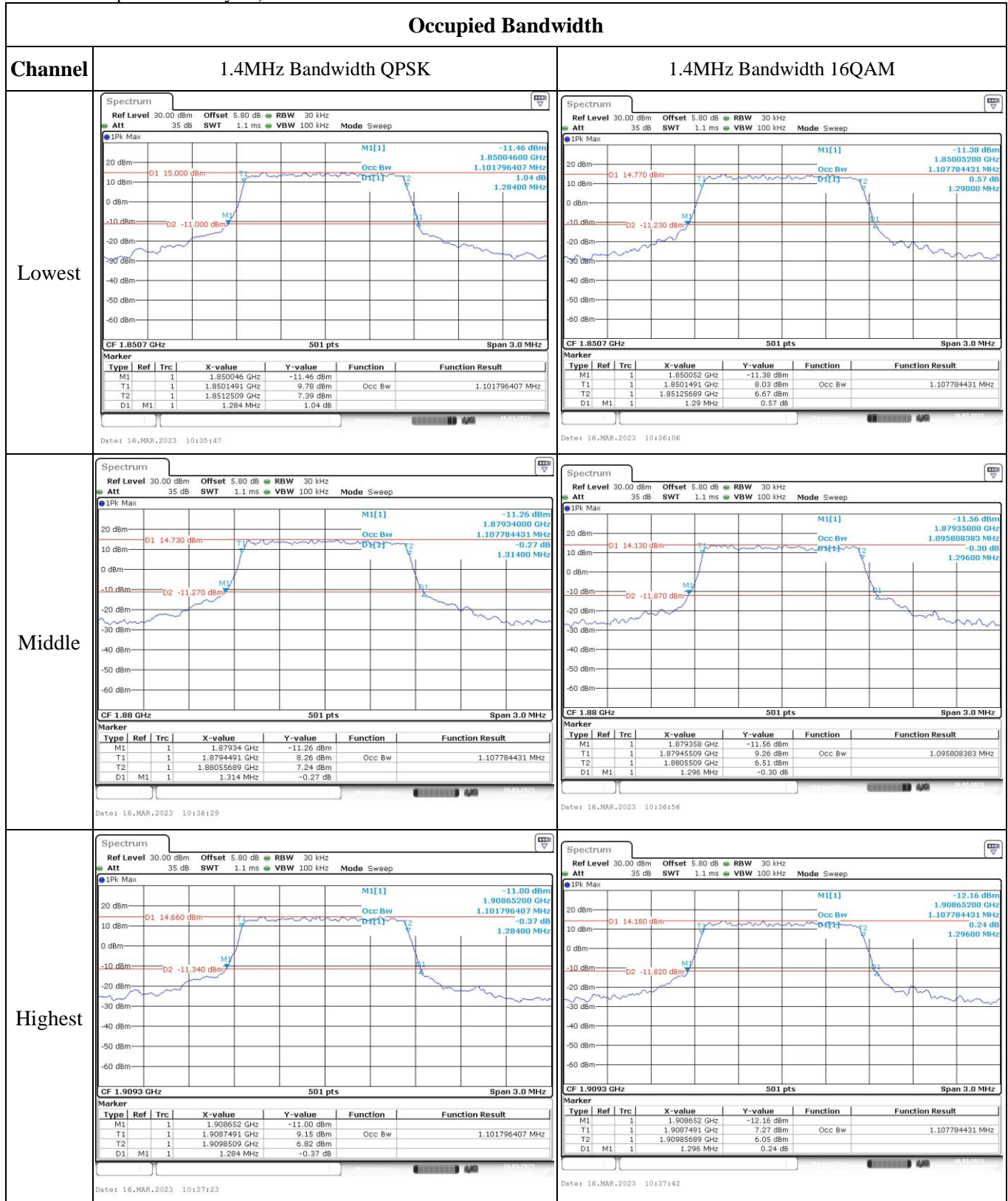
FCC §2.1051, § 24.238 (a):Out of band emission, Band Edge	
Result:	Pass, Please refer to the test plots of Out of band emission, Band Edge.

FCC §2.1055, §24.235: Frequency Stability

Test Mode:	20M QPSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.85	1851.079	1850.000	1909.043	1910.000
	-20	3.85	1851.014	1850.000	1909.019	1910.000
	-10	3.85	1851.094	1850.000	1909.057	1910.000
	0	3.85	1851.061	1850.000	1909.074	1910.000
	10	3.85	1851.104	1850.000	1909.000	1910.000
	20	3.85	1851.058	1850.000	1909.022	1910.000
	30	3.85	1851.024	1850.000	1909.096	1910.000
	40	3.85	1851.104	1850.000	1909.087	1910.000
Frequency Stability vs. Voltage	20	3.5	1851.094	1850.000	1909.040	1910.000
	20	4.4	1851.084	1850.000	1909.054	1910.000
					Result:	Pass

Test Mode:	20M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.85	1851.029	1850.000	1909.090	1910.000
	-20	3.85	1851.036	1850.000	1909.078	1910.000
	-10	3.85	1851.097	1850.000	1909.097	1910.000
	0	3.85	1851.050	1850.000	1909.014	1910.000
	10	3.85	1851.097	1850.000	1909.038	1910.000
	20	3.85	1851.058	1850.000	1909.022	1910.000
	30	3.85	1851.012	1850.000	1909.091	1910.000
	40	3.85	1851.044	1850.000	1909.069	1910.000
Frequency Stability vs. Voltage	20	3.5	1851.079	1850.000	1909.012	1910.000
	20	4.4	1851.054	1850.000	1909.076	1910.000
					Result:	Pass

Test Plots(Note: The 5.8dB is the Insertion loss of the RF cable, Power Splitter and DC Block, which was offset into the Spectrum Analyzer):



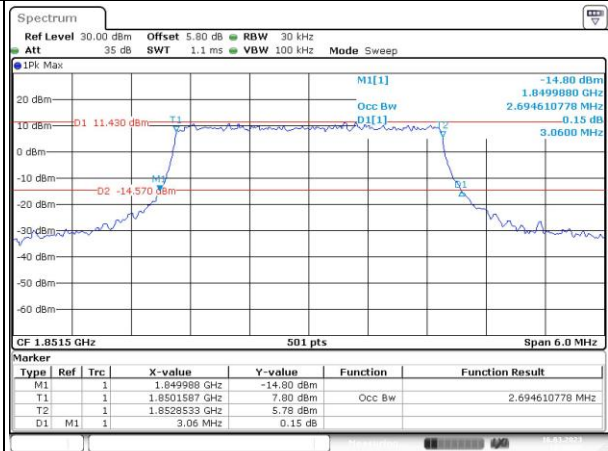
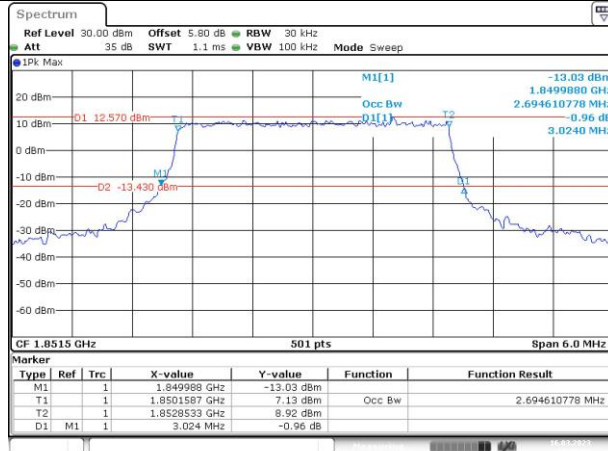
Occupied Bandwidth

Channel

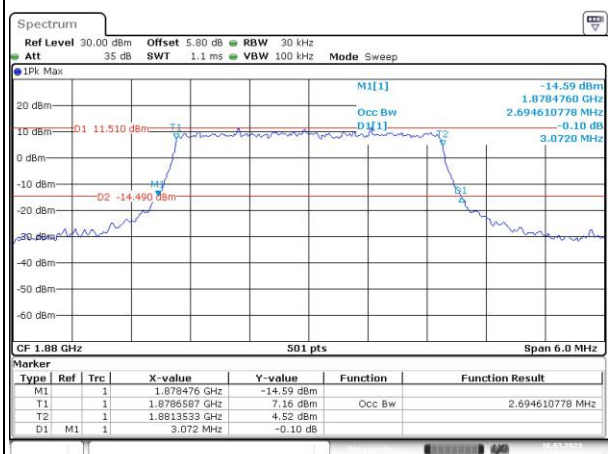
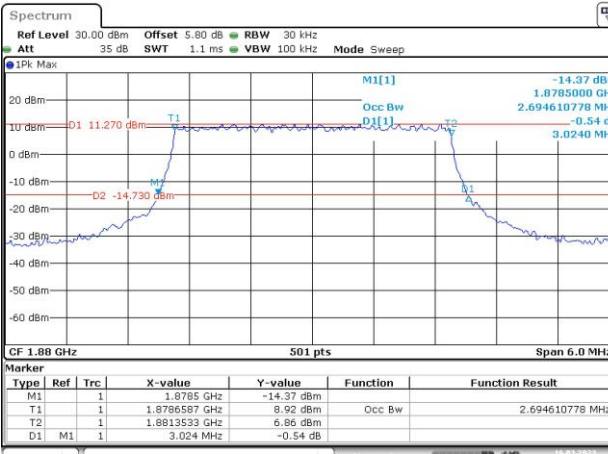
3MHz Bandwidth QPSK

3MHz Bandwidth 16QAM

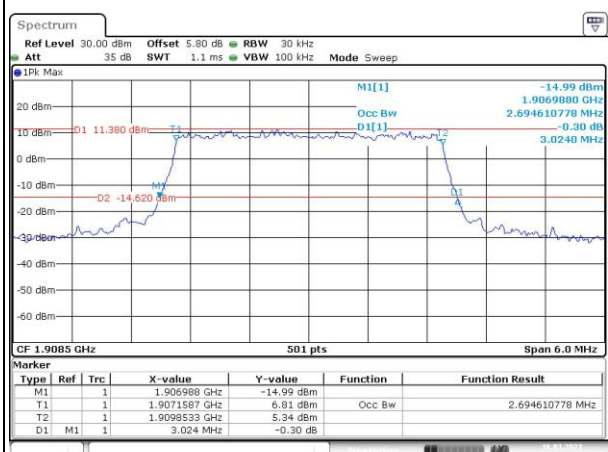
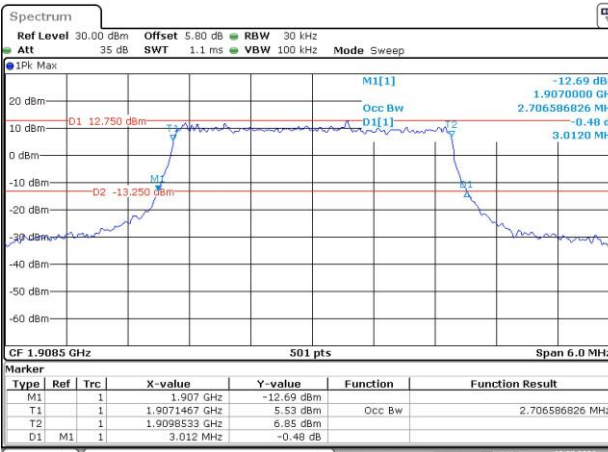
Lowest



Middle



Highest



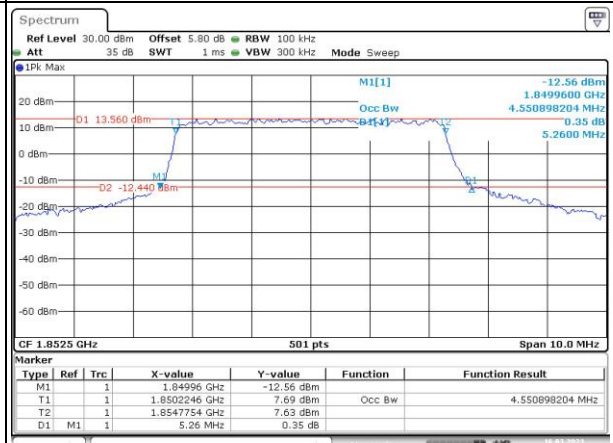
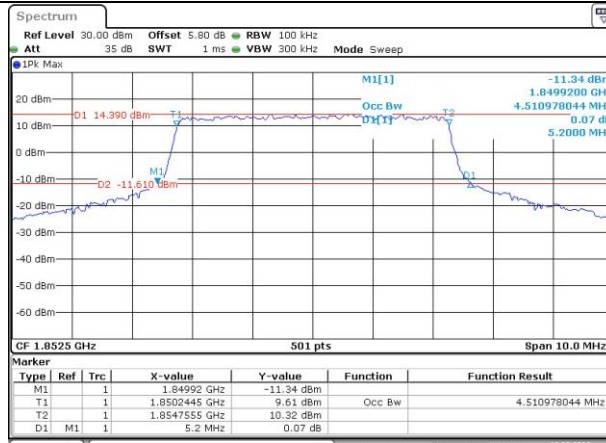
Occupied Bandwidth

Channel

5MHz Bandwidth QPSK

5MHz Bandwidth 16QAM

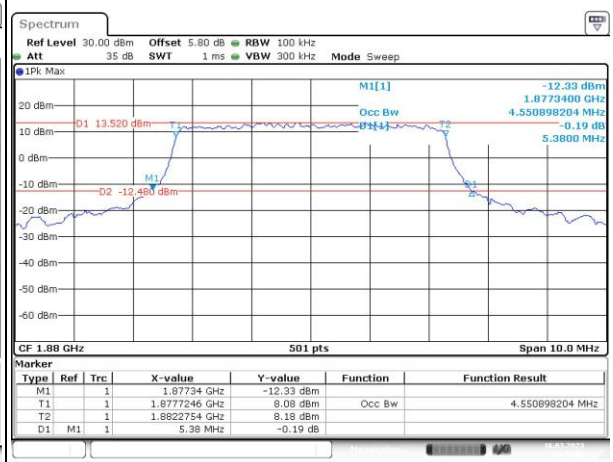
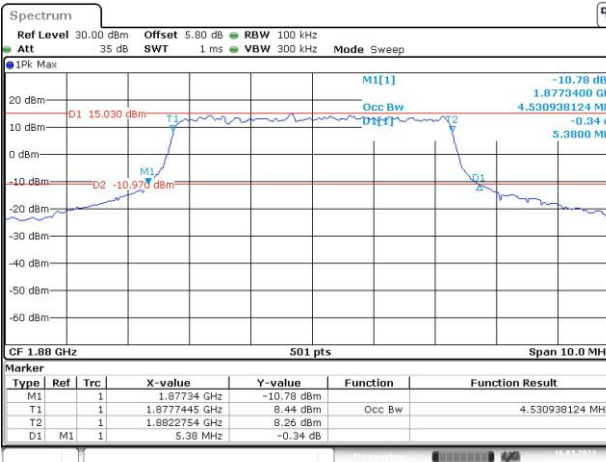
Lowest



Date: 16.MAR.2023 10:40:43

Date: 16.MAR.2023 10:41:11

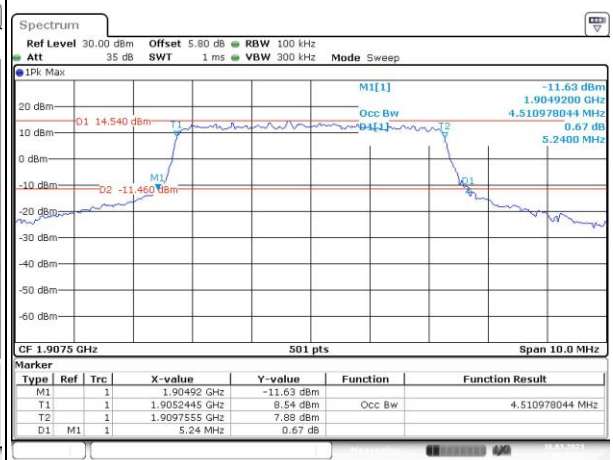
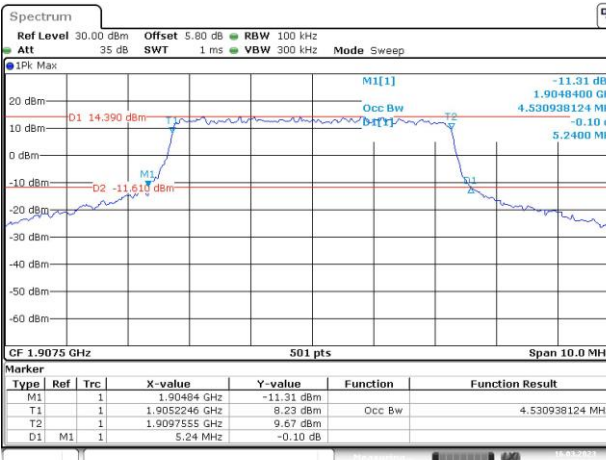
Middle



Date: 16.MAR.2023 10:41:39

Date: 16.MAR.2023 10:42:02

Highest



Date: 16.MAR.2023 10:42:38

Date: 16.MAR.2023 10:43:16

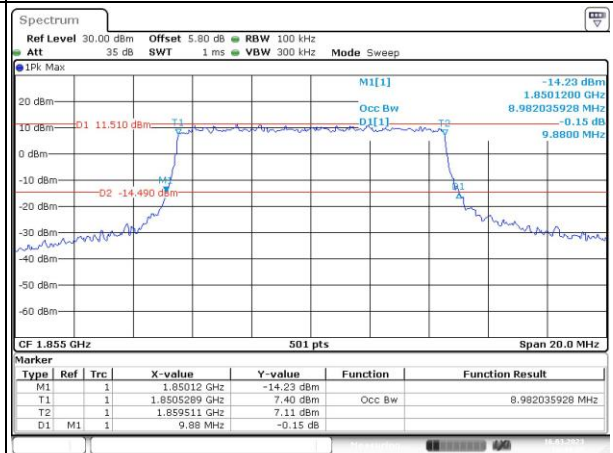
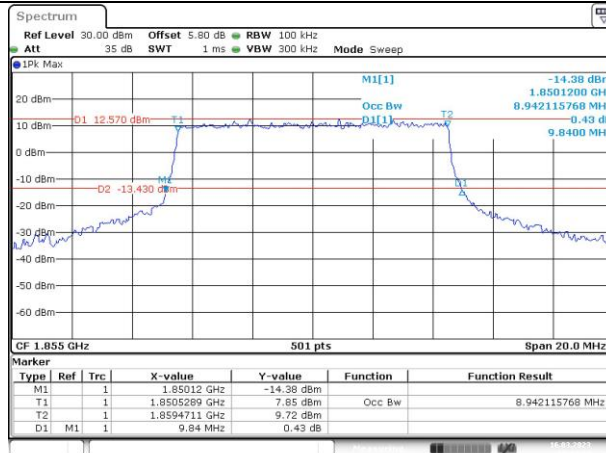
Occupied Bandwidth

Channel

10MHz Bandwidth QPSK

10MHz Bandwidth 16QAM

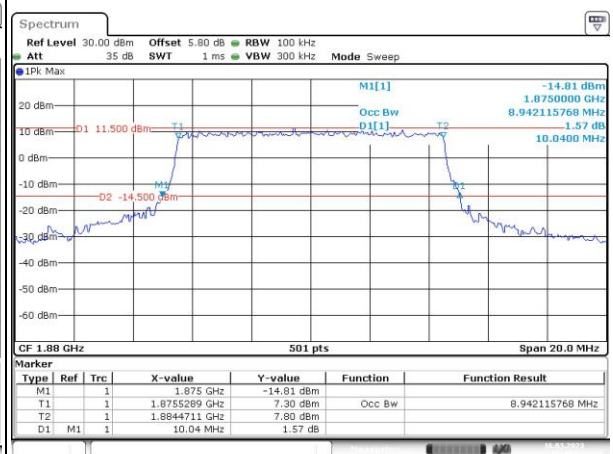
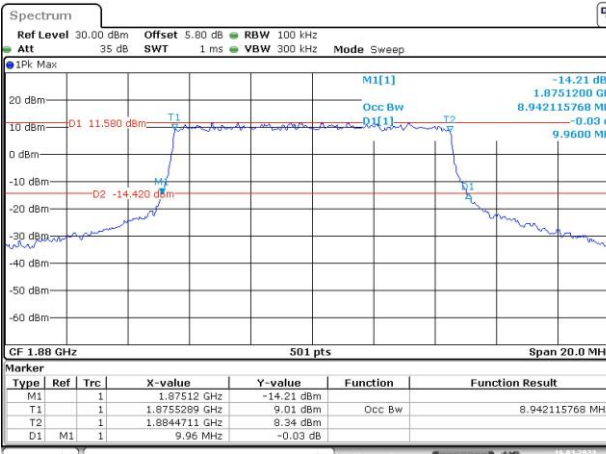
Lowest



Date: 16.MAR.2023 10:44:03

Date: 16.MAR.2023 10:44:35

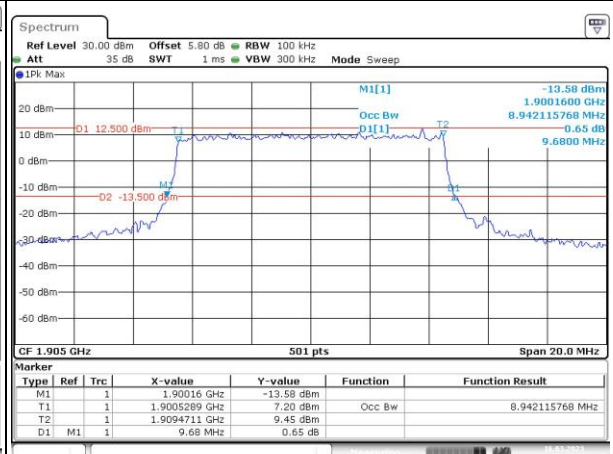
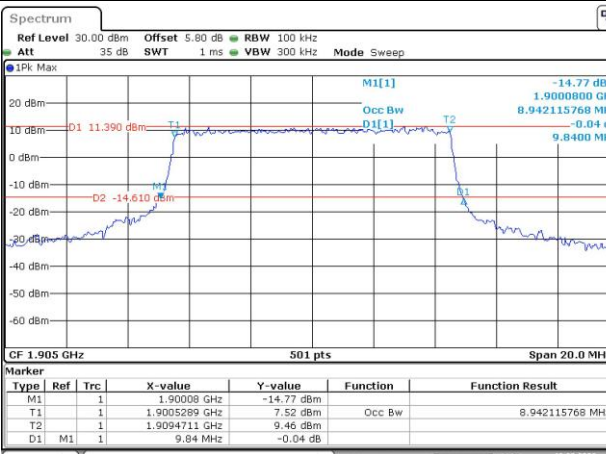
Middle



Date: 16.MAR.2023 10:45:21

Date: 16.MAR.2023 10:45:56

Highest



Date: 16.MAR.2023 10:46:36

Date: 16.MAR.2023 10:47:14

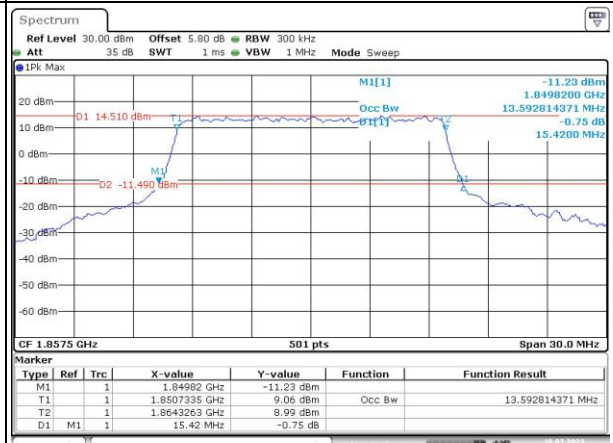
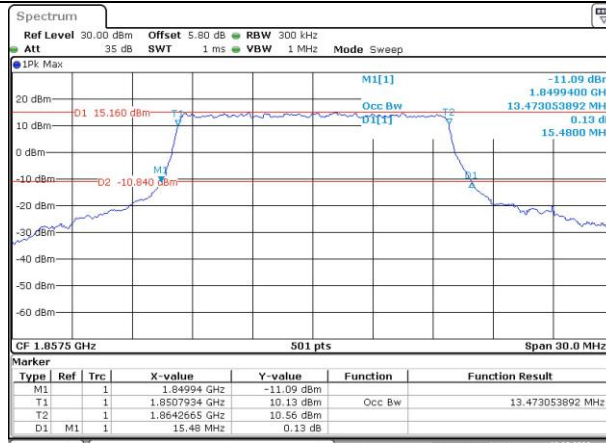
Occupied Bandwidth

Channel

15MHz Bandwidth QPSK

15MHz Bandwidth 16QAM

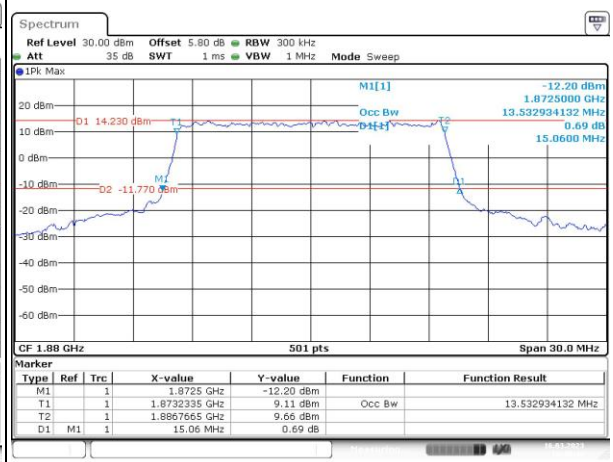
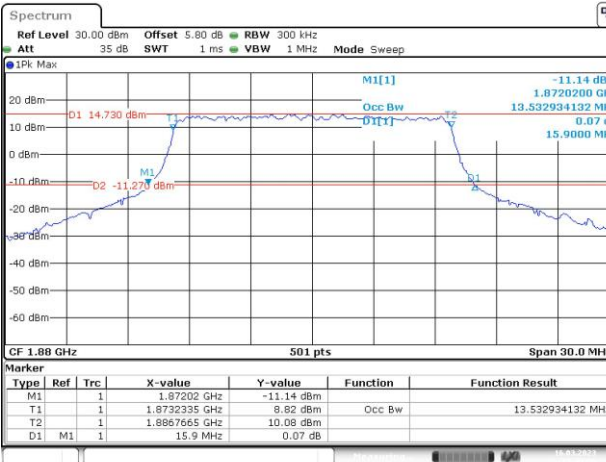
Lowest



Date: 16.MAR.2023 10:47:53

Date: 16.MAR.2023 10:48:27

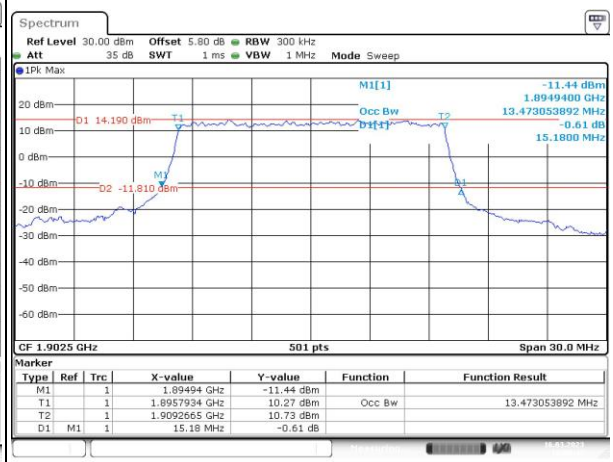
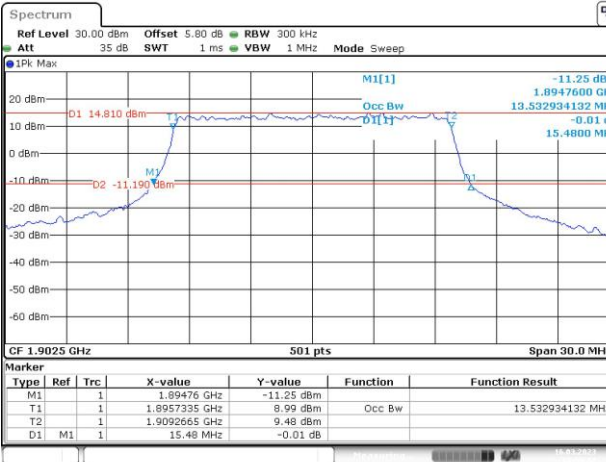
Middle



Date: 16.MAR.2023 10:49:06

Date: 16.MAR.2023 10:49:40

Highest



Date: 16.MAR.2023 10:50:11

Date: 16.MAR.2023 10:50:42

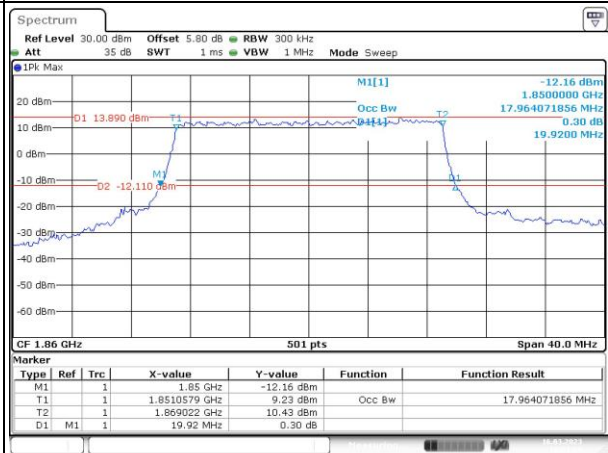
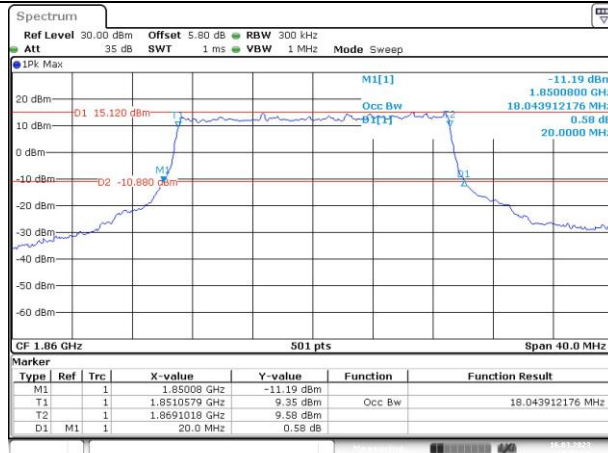
Occupied Bandwidth

Channel

20MHz Bandwidth QPSK

20MHz Bandwidth 16QAM

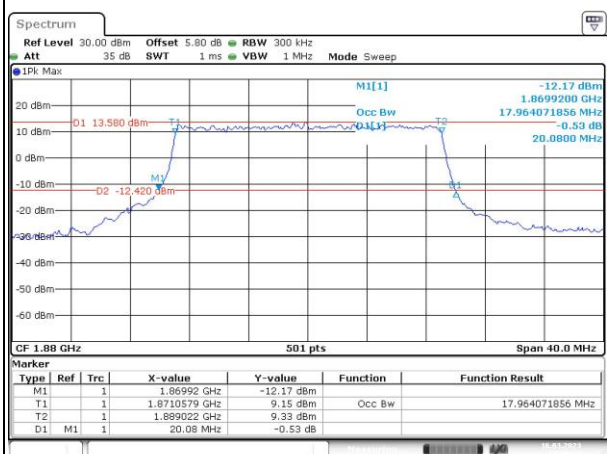
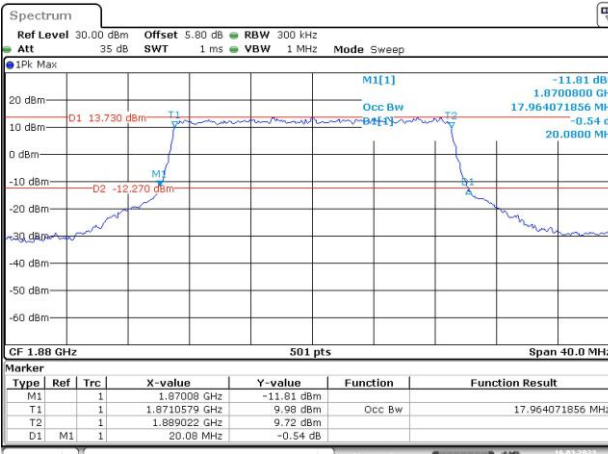
Lowest



Date: 16.MAR.2023 10:51:28

Date: 16.MAR.2023 10:51:59

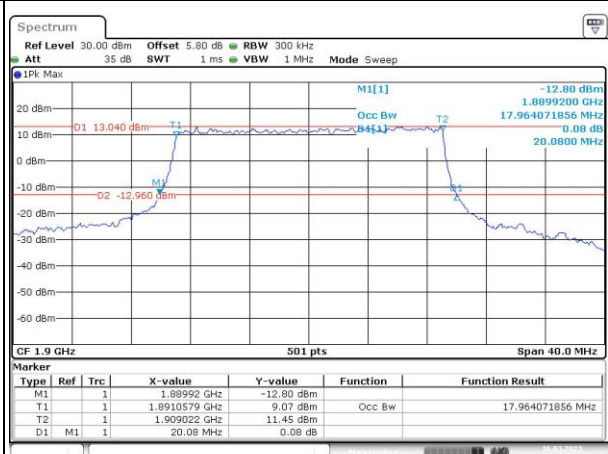
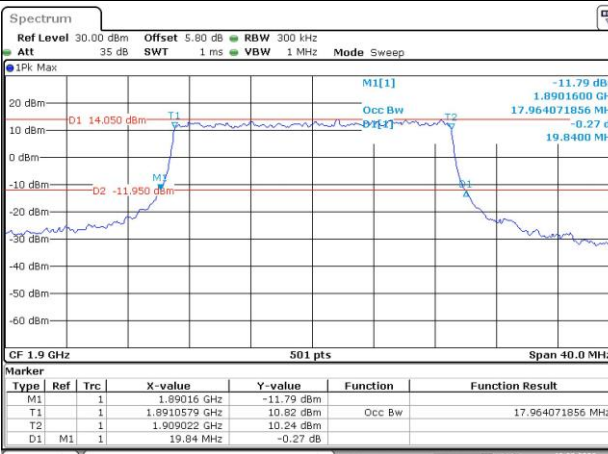
Middle



Date: 16.MAR.2023 10:52:31

Date: 16.MAR.2023 10:53:02

Highest



Date: 16.MAR.2023 10:53:33

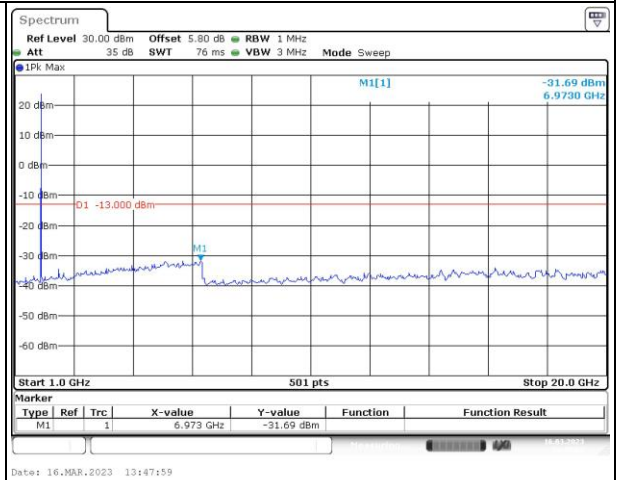
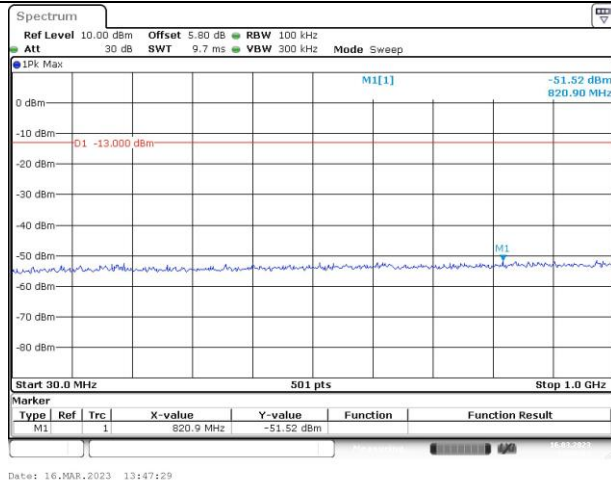
Date: 16.MAR.2023 10:54:08

Spurious Emissions at Antenna Terminal

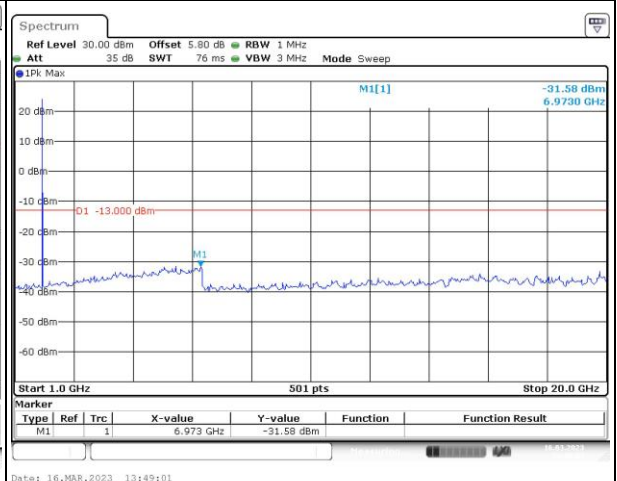
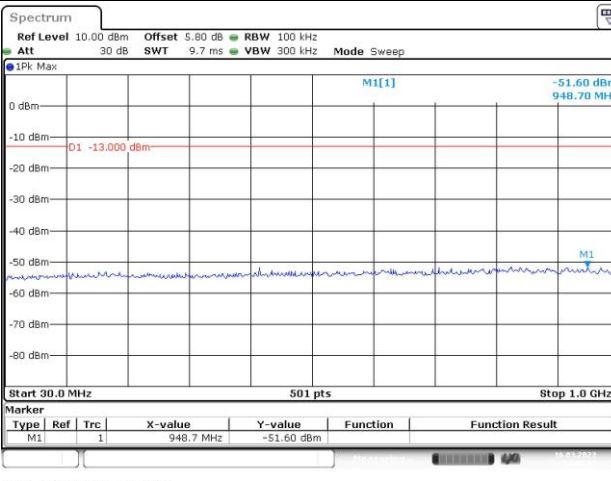
Channel

1.4MHz Bandwidth QPSK

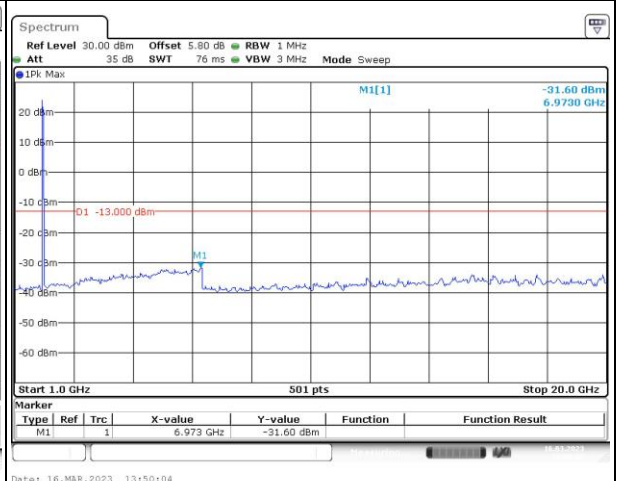
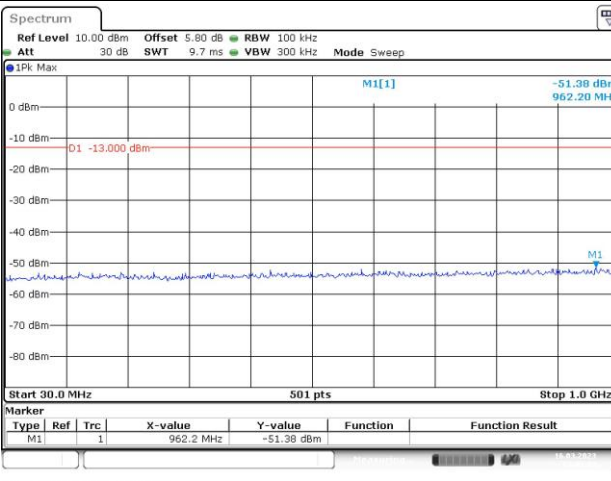
Lowest



Middle



Highest

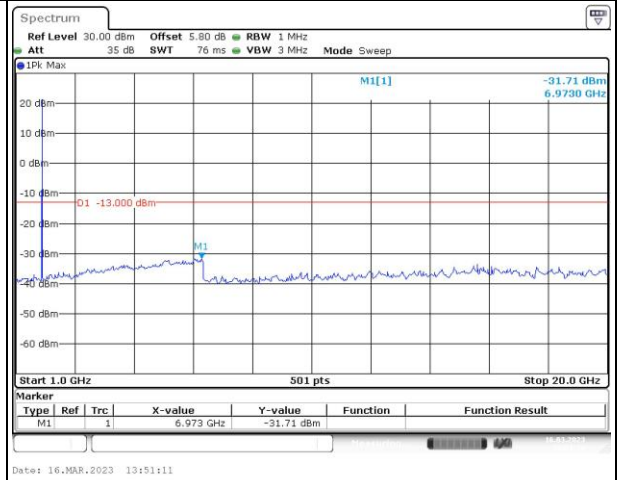
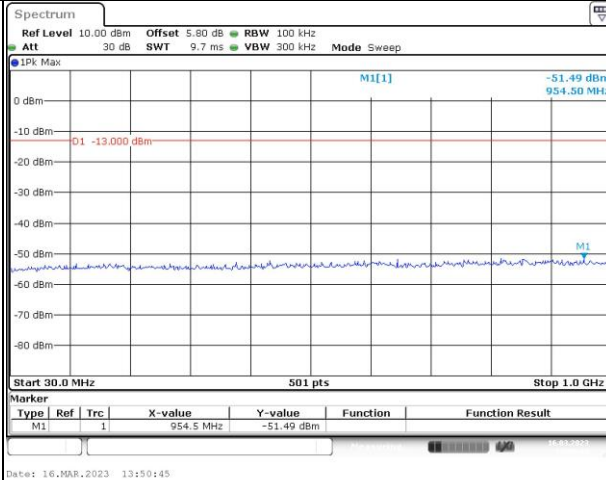


Spurious Emissions at Antenna Terminal

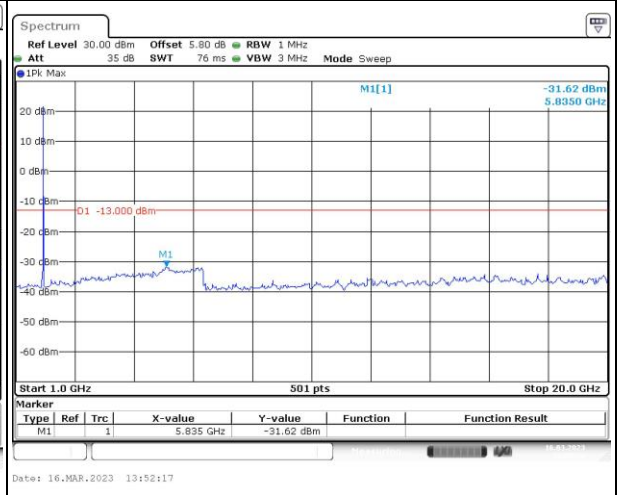
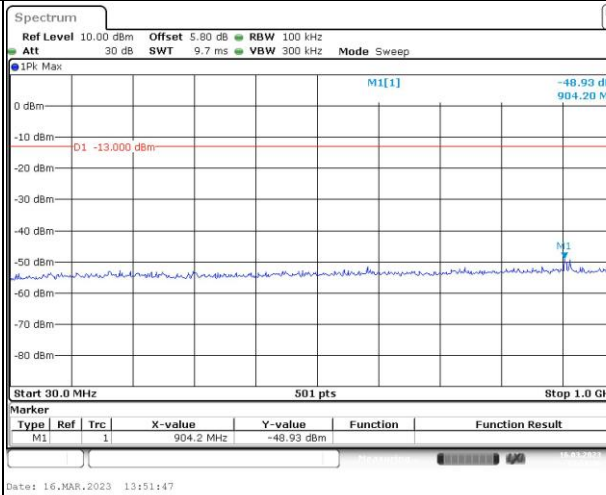
Channel

3MHz Bandwidth QPSK

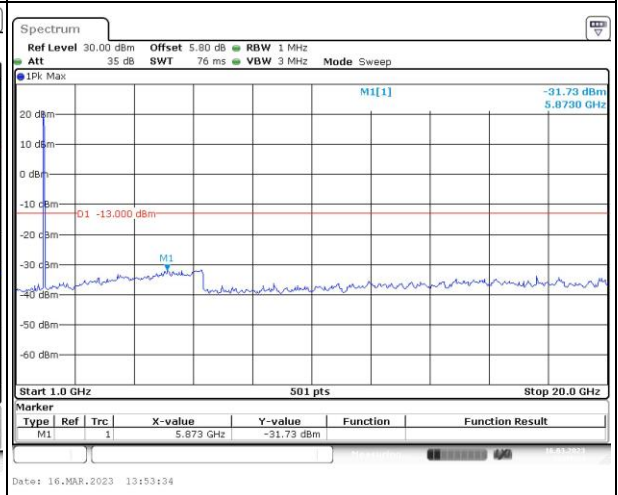
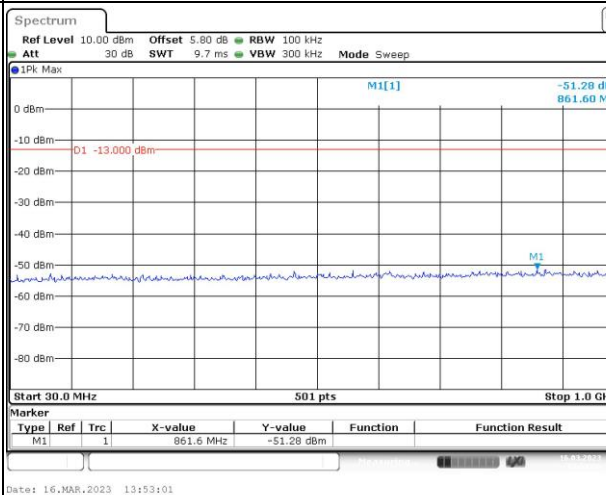
Lowest



Middle



Highest

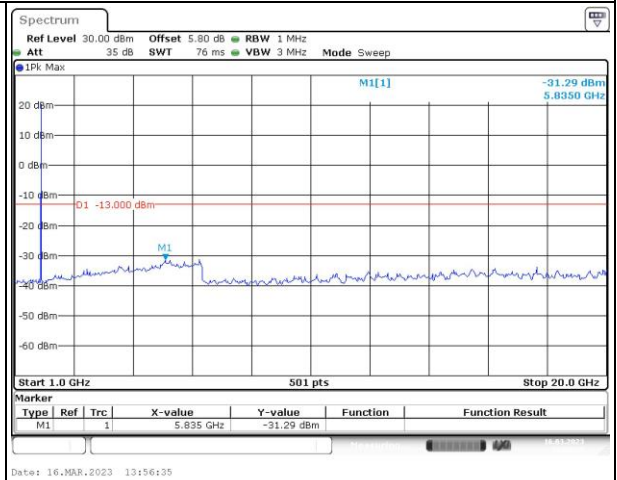
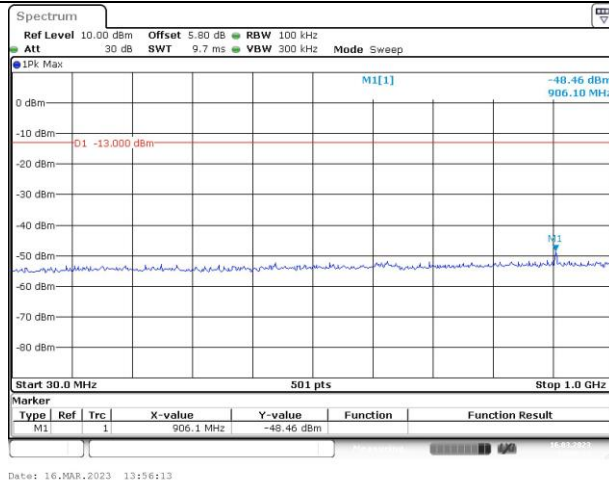


Spurious Emissions at Antenna Terminal

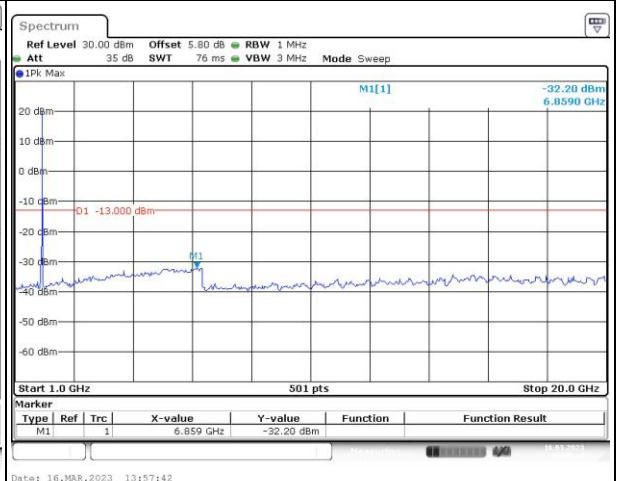
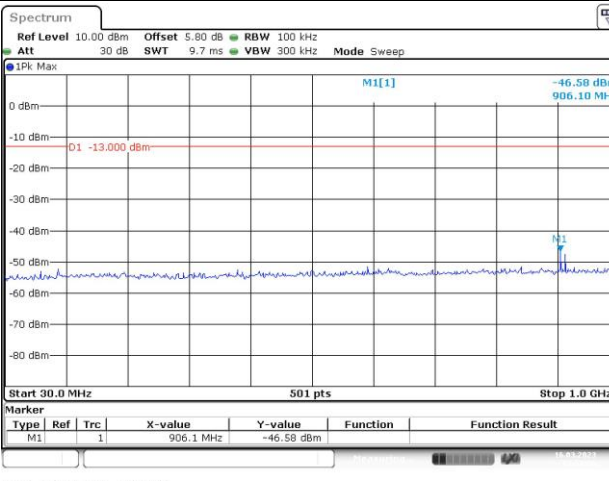
Channel

5MHz Bandwidth QPSK

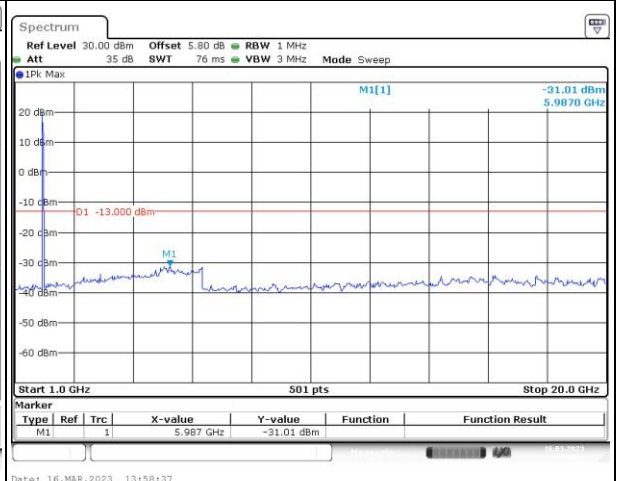
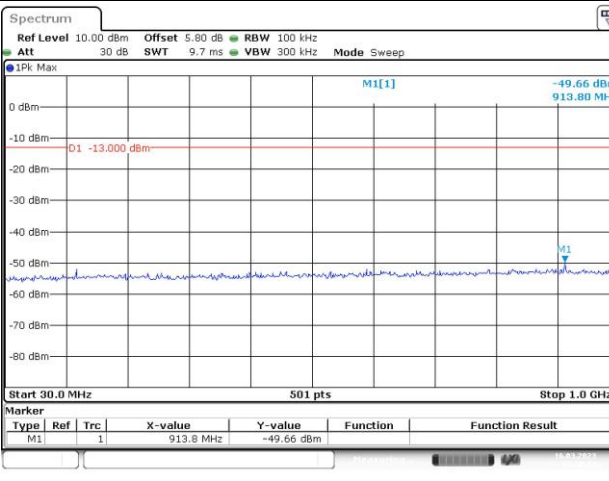
Lowest



Middle



Highest

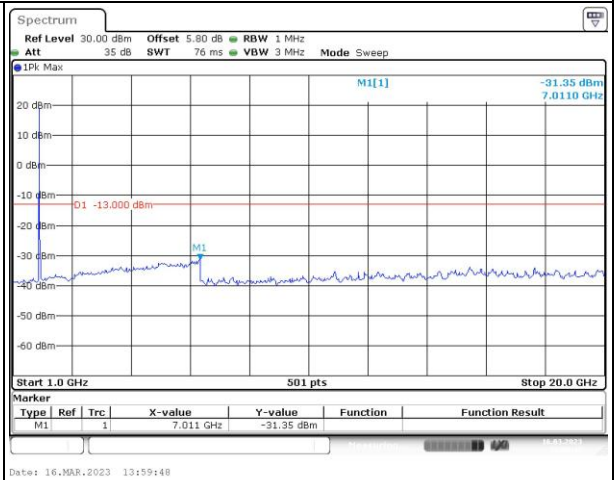
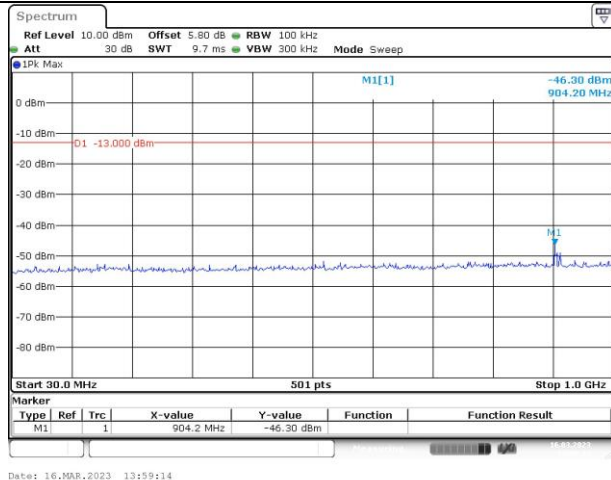


Spurious Emissions at Antenna Terminal

Channel

10MHz Bandwidth QPSK

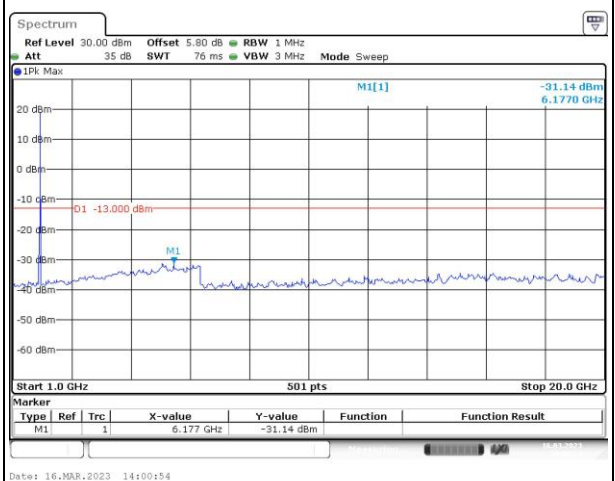
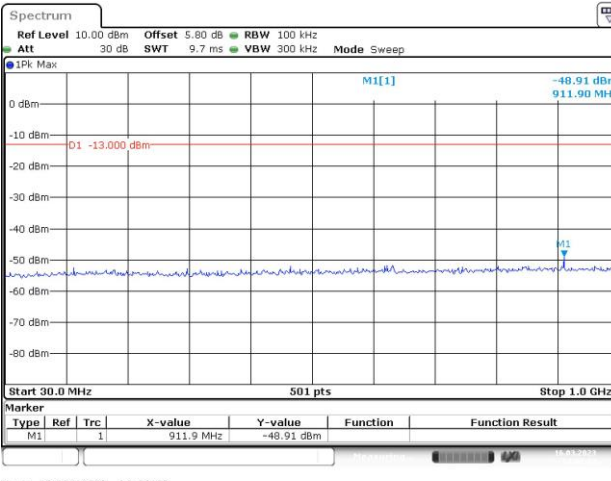
Lowest



Date: 16.MAR.2023 13:59:14

Date: 16.MAR.2023 13:59:48

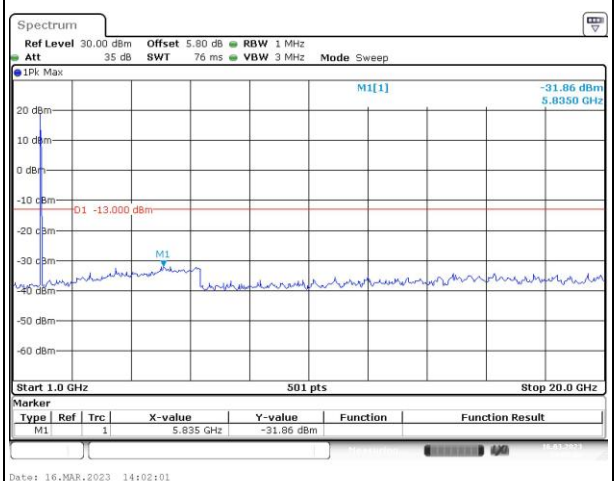
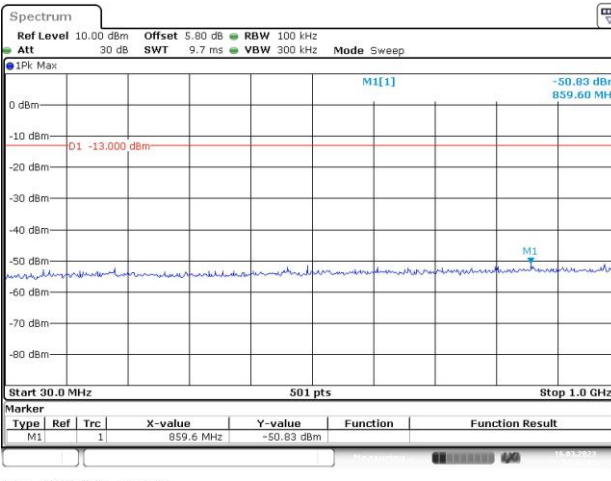
Middle



Date: 16.MAR.2023 14:00:25

Date: 16.MAR.2023 14:00:54

Highest



Date: 16.MAR.2023 14:01:35

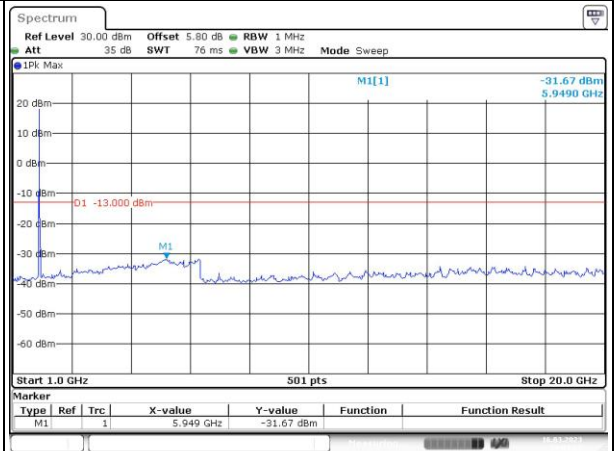
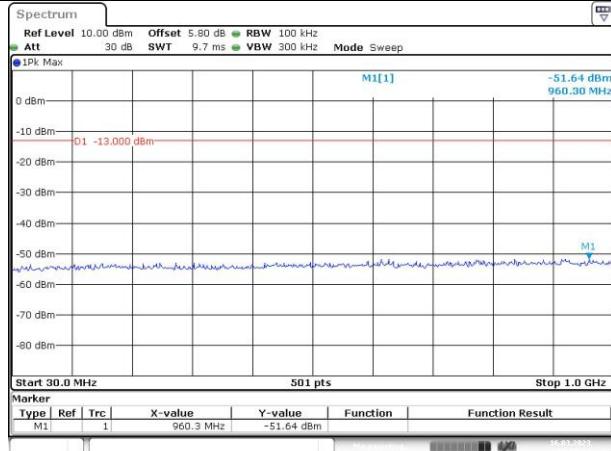
Date: 16.MAR.2023 14:02:01

Spurious Emissions at Antenna Terminal

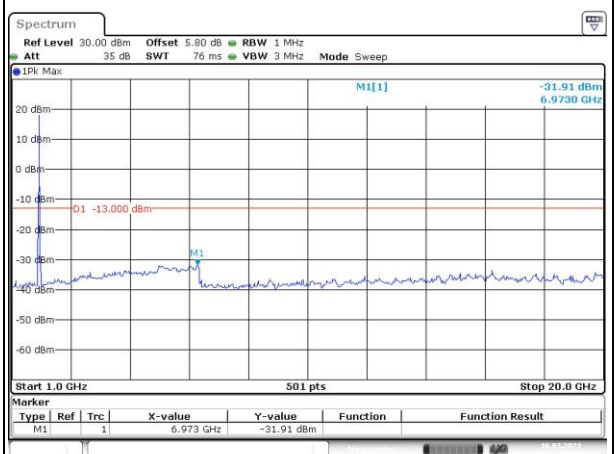
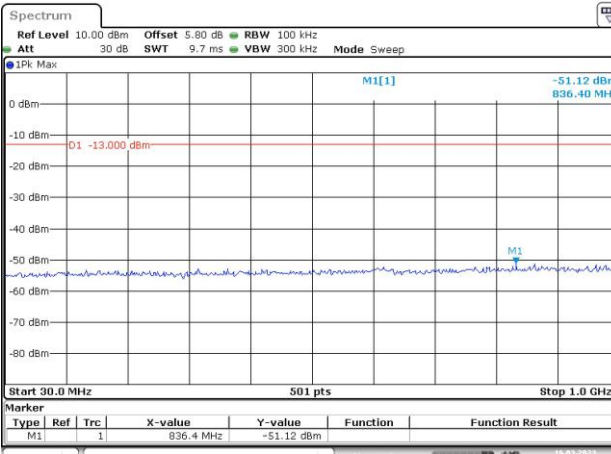
Channel

15MHz Bandwidth QPSK

Lowest



Middle



Highest

