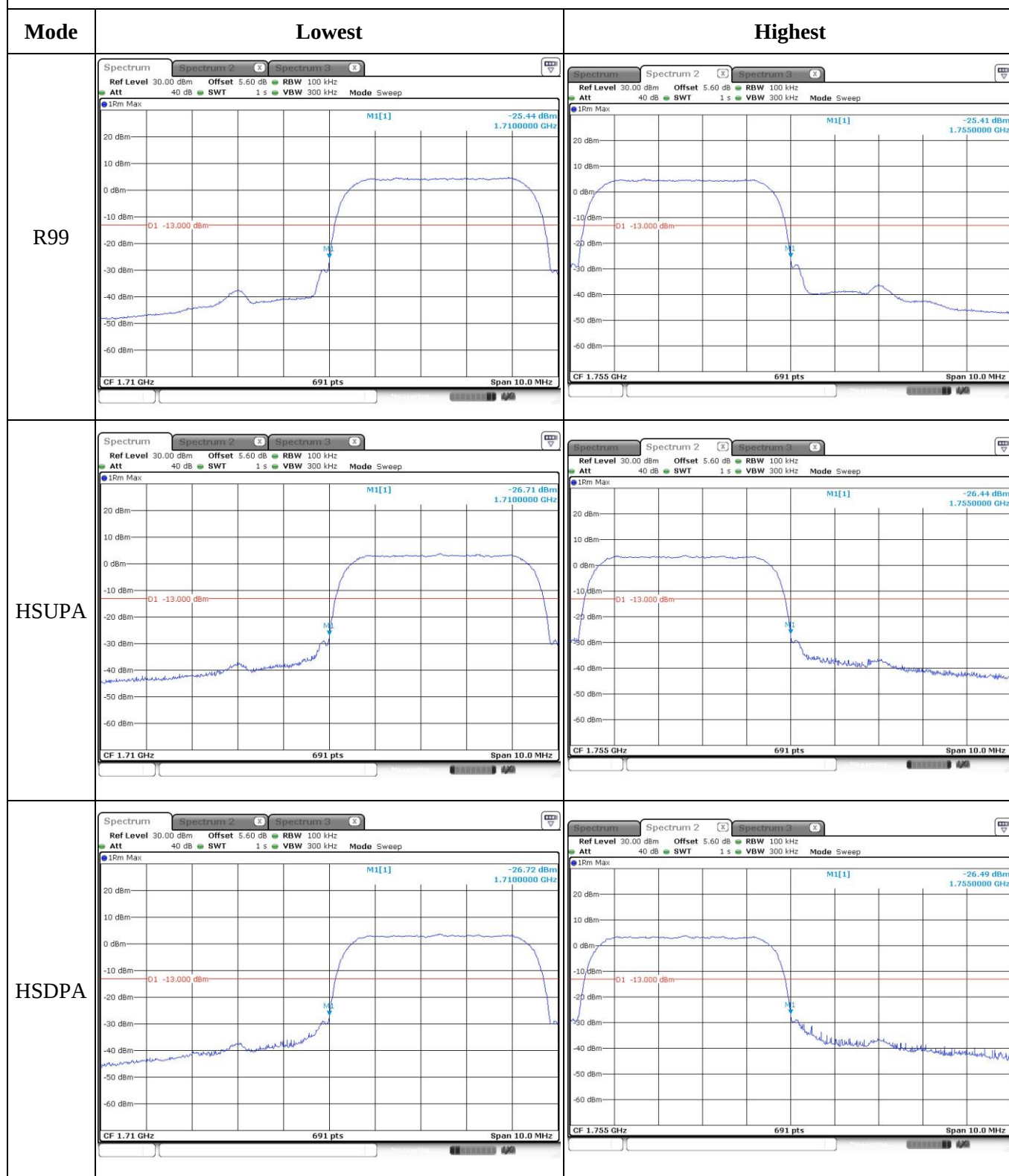


Out of band emission, Band Edge



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

Serial Number:	1ZWQ	Test Date:	2023/2/6~2023/2/11
Test Site:	RF	Test Mode:	Transmitting
Tester:	George Chen	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	21.3~24.8	Relative Humidity: (%)	41~56	ATM Pressure: (kPa)	100.8~102.1
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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	2022-07-15	2023-07-14
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	2022-04-06	2023-04-05
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2022-09-29	2023-09-28
UNI-T	Multimeter	UT39A+	C210582554	2022-07-15	2023-07-14
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 Subtest 1	22.52	22.39	23.04	19.16	38.45
HSDPA Subtest 1	22.38	22.64	22.82	18.94	38.45
HSDPA Subtest 2	22.24	22.41	22.83	18.95	38.45
HSDPA Subtest 3	22.09	22.31	22.53	18.65	38.45
HSDPA Subtest 4	21.95	21.83	21.99	18.11	38.45
HSUPA Subtest 1	22.66	22.91	23.25	19.37	38.45
HSUPA Subtest 2	22.49	22.81	22.86	18.98	38.45
HSUPA Subtest 3	22.28	22.62	22.61	18.74	38.45
HSUPA Subtest 4	22.12	22.19	22.49	18.61	38.45
HSUPA Subtest 5	21.93	22.24	22.17	18.36	38.45
DC-HSDPA Subtest 1	22.23	22.15	22.23	18.35	38.45
DC-HSDPA Subtest 2	22.03	22.46	22.29	18.58	38.45
DC-HSDPA Subtest 3	21.87	21.96	22.15	18.27	38.45
DC-HSDPA Subtest 4	21.64	21.91	21.75	18.03	38.45
HSPA+ Subtest 1	21.61	21.49	21.87	17.99	38.45
Note: $ERP = \text{Conducted Power(dBm)} - L_c(\text{dB}) + G_T(\text{dBd})$ $G_T(\text{dBd}) = G_T(\text{dBi}) - 2.15$					

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	3.07	3.01	13
HSDPA	4.55	4.58	4.55	13
HSUPA	5.3	5.45	5.74	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	4.168	4.182	4.168	4.718	4.747	4.732
HSDPA	4.211	4.211	4.197	5.065	5.152	5.123
HSUPA	4.211	4.197	4.197	5.051	5.239	5.109
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.
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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	3.8	-6.3	-0.0075	2.5
	-20	3.8	6.14	0.0073	2.5
	-10	3.8	9.32	0.0111	2.5
	0	3.8	-5.12	-0.0061	2.5
	10	3.8	-5.95	-0.0071	2.5
	20	3.8	-7.82	-0.0093	2.5
	30	3.8	-8.44	-0.0101	2.5
	40	3.8	-2.96	-0.0035	2.5
	50	3.8	-4.55	-0.0054	2.5
Frequency Stability vs. Voltage	20	3.45	-5.69	-0.0068	2.5
	20	4.4	-8.72	-0.0104	2.5
Result:				Pass	

Test Plots(Note: The 5.6dB is the Insertion loss of the RF cable, Power Splitter and DC Block, which was offset into the Spectrum Analyzer):

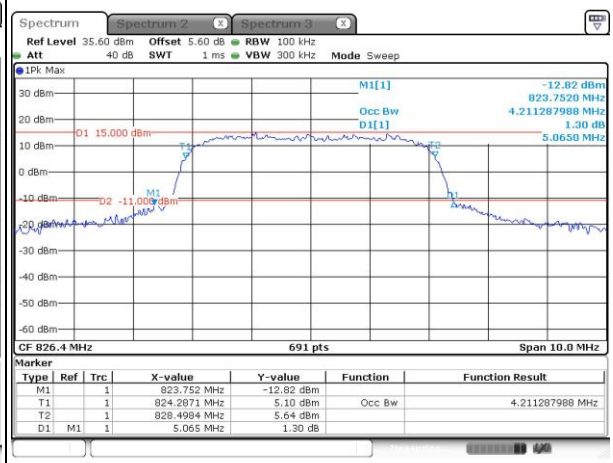
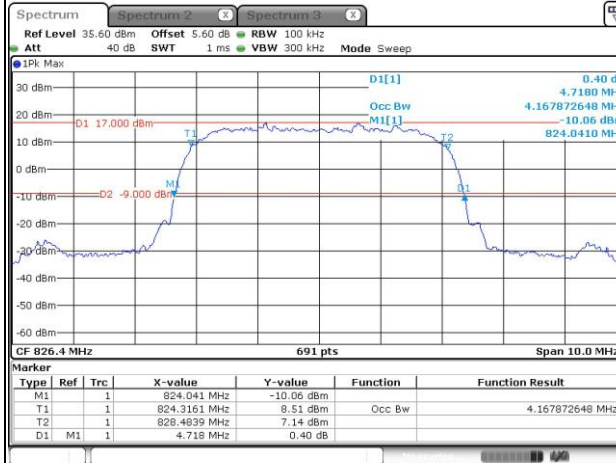
Occupied Bandwidth

Channel

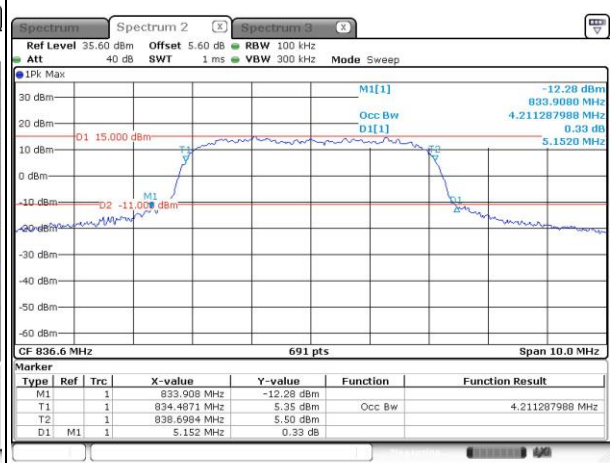
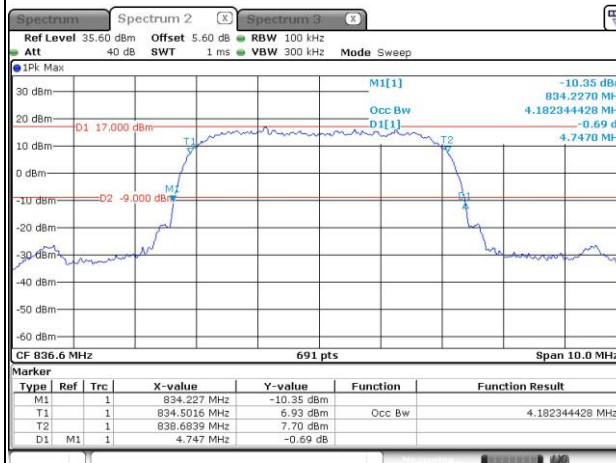
WCDMA R99

HSDPA

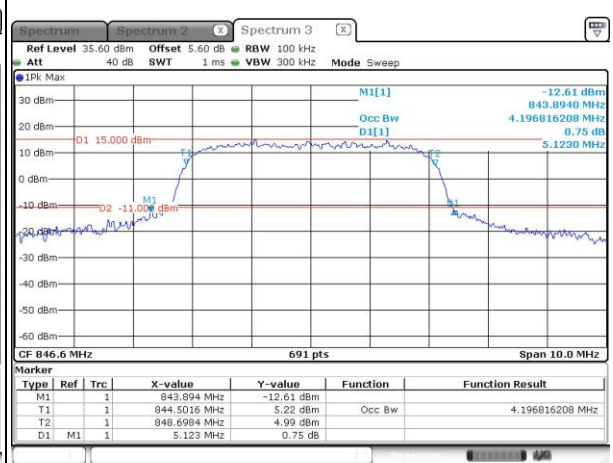
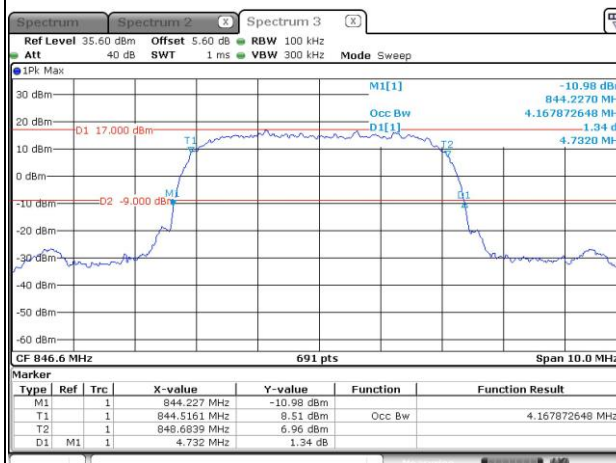
Lowest



Middle



Highest

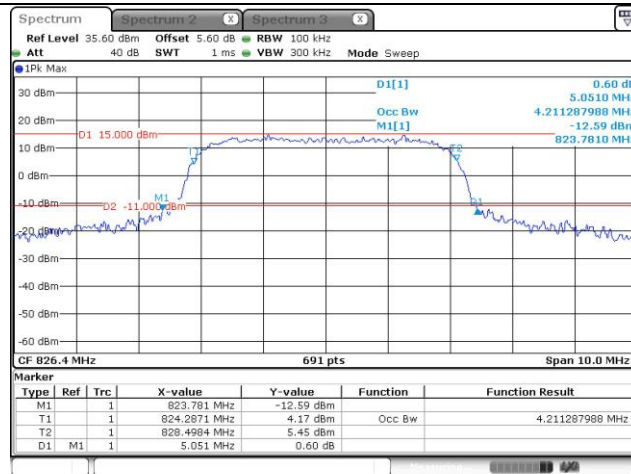


Occupied Bandwidth

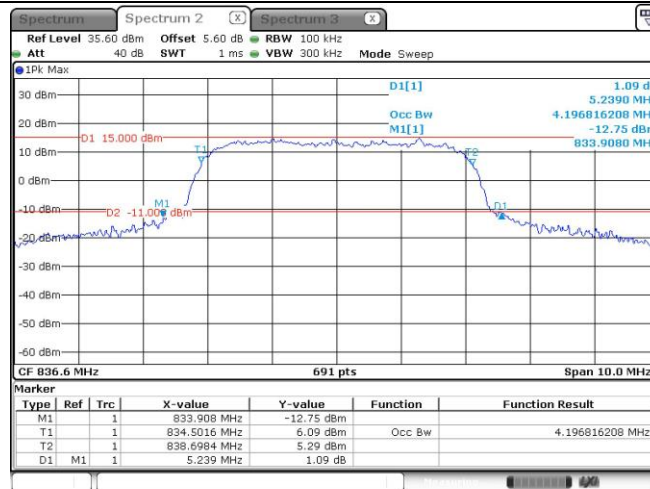
Channel

HSUPA

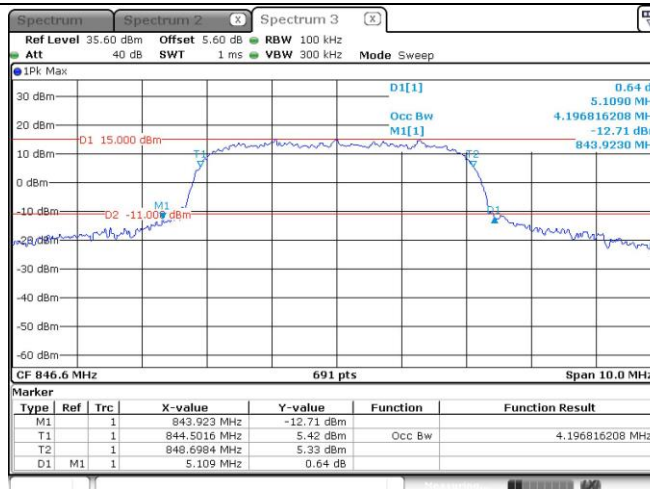
Lowest



Middle



Highest

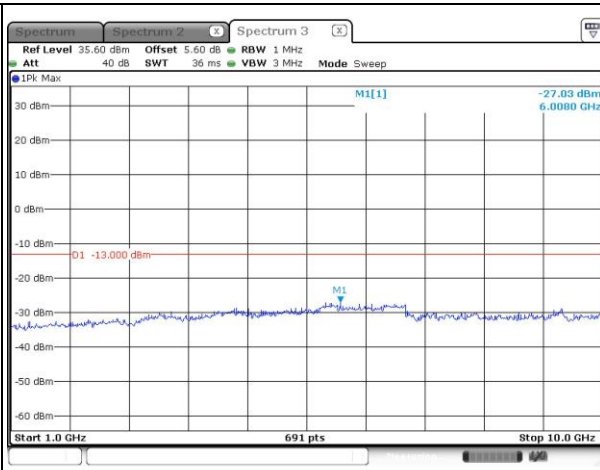
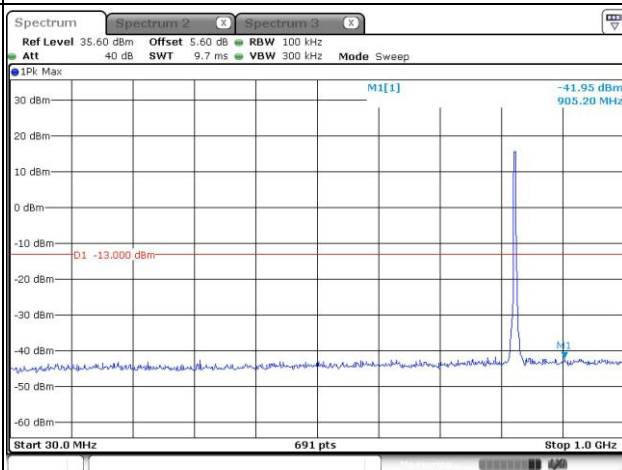


Spurious Emissions at Antenna Terminal

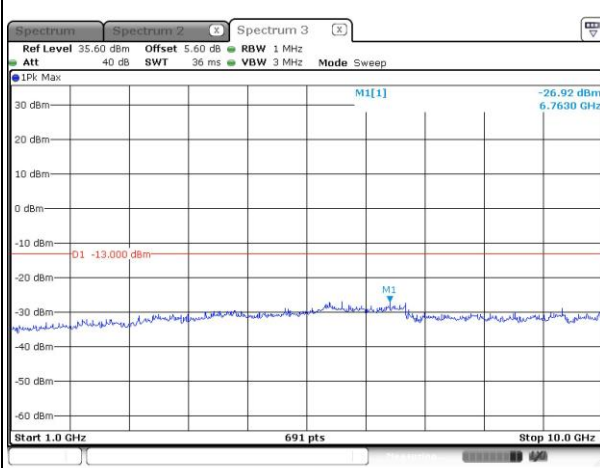
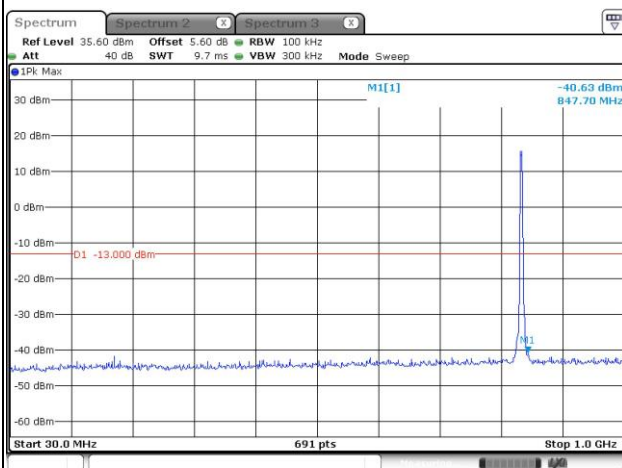
Channel

WCDMA R99

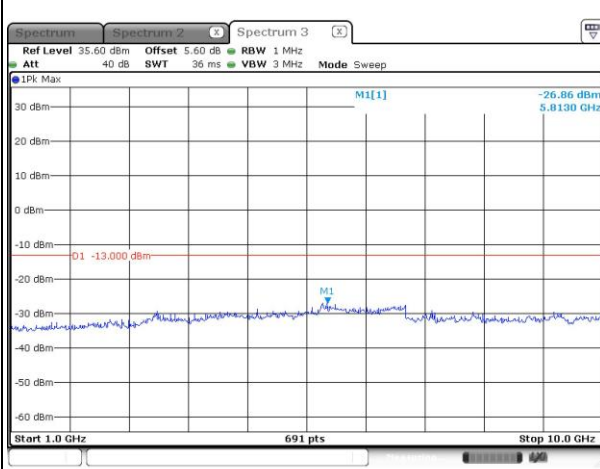
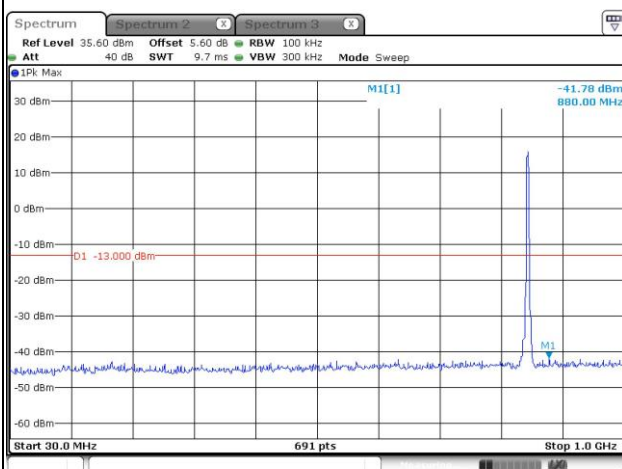
Lowest



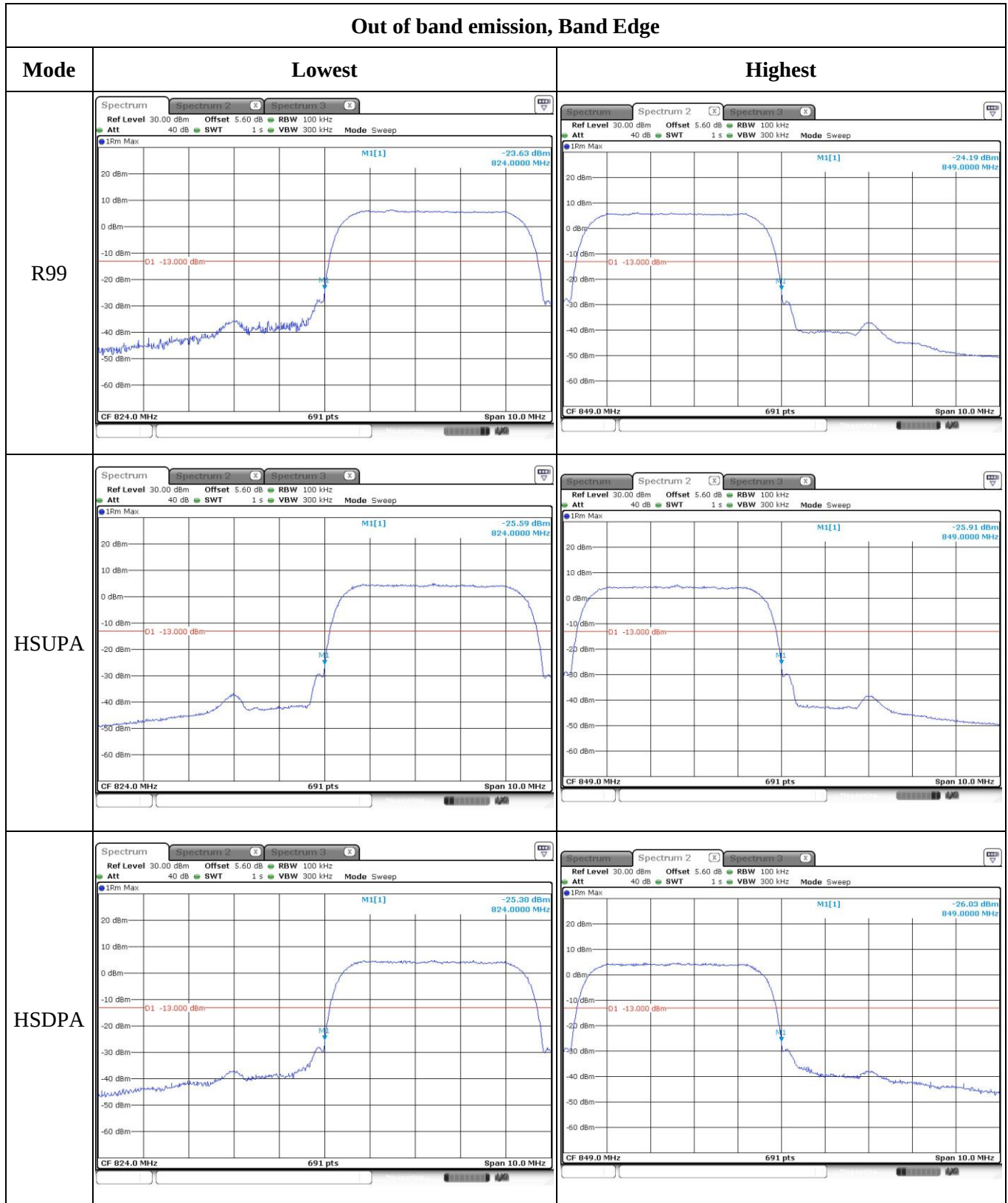
Middle



Highest



Out of band emission, Band Edge



4.6 Antenna Port Test Data and Results for LTE Band 2

Serial Number:	1ZWQ	Test Date:	2023/2/6~2023/2/11
Test Site:	RF	Test Mode:	Transmitting
Tester:	George Chen	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	21.3~24.8	Relative Humidity: (%)	41~56	ATM Pressure: (kPa)	100.8~102.1
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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	2022-07-15	2023-07-14
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	2022-04-06	2023-04-05
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2022-09-29	2023-09-28
UNI-T	Multimeter	UT39A+	C210582554	2022-07-15	2023-07-14
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	22.38	22.43	22.47	19.97	33
	RB1#3	22.55	22.51	22.63		
	RB1#5	22.36	22.43	22.47		
	RB3#0	22.47	22.51	22.52		
	RB3#3	22.46	22.51	22.54		
	RB6#0	21.46	21.51	21.54		
1.4MHz 16QAM	RB1#0	21.38	21.53	21.43	19.02	33
	RB1#3	21.49	21.68	21.62		
	RB1#5	21.33	21.54	21.47		
	RB3#0	21.62	21.46	21.63		
	RB3#3	21.61	21.49	21.6		
	RB6#0	20.48	20.54	20.44		
3MHz QPSK	RB1#0	22.51	22.52	22.56	19.94	33
	RB1#8	22.48	22.54	22.6		
	RB1#14	22.45	22.51	22.57		
	RB6#0	21.43	21.51	21.53		
	RB6#9	21.46	21.48	21.47		
	RB15#0	21.5	21.52	21.54		
3MHz 16QAM	RB1#0	21.95	21.65	21.53	19.31	33
	RB1#8	21.97	21.62	21.54		
	RB1#14	21.95	21.62	21.51		
	RB6#0	20.59	20.53	20.49		
	RB6#9	20.57	20.56	20.48		
	RB15#0	20.59	20.49	20.62		
5MHz QPSK	RB1#0	22.37	22.44	22.42	19.95	33
	RB1#13	22.54	22.58	22.61		
	RB1#24	22.39	22.43	22.44		
	RB15#0	21.42	21.52	21.62		
	RB15#10	21.58	21.53	21.61		
	RB25#0	21.48	21.53	21.57		
5MHz 16QAM	RB1#0	21.28	21.67	21.48	19.12	33
	RB1#13	21.38	21.78	21.64		
	RB1#24	21.28	21.68	21.45		
	RB15#0	20.51	20.5	20.69		
	RB15#10	20.65	20.54	20.65		
	RB25#0	20.58	20.53	20.63		
10MHz QPSK	RB1#0	22.47	22.47	22.48	20.03	33
	RB1#25	22.67	22.69	22.67		
	RB1#49	22.52	22.5	22.54		

	RB25#0	21.36	21.46	21.6		
	RB25#25	21.6	21.48	21.62		
	RB50#0	21.48	21.48	21.59		
10MHz 16QAM	RB1#0	21.41	21.99	21.58	19.53	33
	RB1#25	21.61	22.19	21.83		
	RB1#49	21.47	21.97	21.65		
	RB25#0	20.46	20.52	20.61		
	RB25#25	20.7	20.53	20.65		
	RB50#0	20.55	20.49	20.64		
15MHz QPSK	RB1#0	22.35	22.37	22.4	19.9	33
	RB1#38	22.47	22.53	22.56		
	RB1#74	22.43	22.44	22.51		
	RB36#0	21.46	21.53	21.55		
	RB36#39	21.6	21.53	21.59		
	RB75#0	21.58	21.55	21.59		
15MHz 16QAM	RB1#0	21.87	21.47	21.75	19.4	33
	RB1#38	22.06	21.65	21.96		
	RB1#74	21.96	21.52	21.81		
	RB36#0	20.49	20.53	20.56		
	RB36#39	20.63	20.61	20.63		
	RB75#0	20.55	20.56	20.58		
20MHz QPSK	RB1#0	22.24	22.21	22.23	20.09	33
	RB1#50	22.73	22.62	22.75		
	RB1#99	22.31	22.21	22.35		
	RB50#0	21.39	21.45	21.52		
	RB50#50	21.53	21.54	21.56		
	RB100#0	21.49	21.47	21.55		
20MHz 16QAM	RB1#0	21.39	21.7	21.45	19.51	33
	RB1#50	21.87	22.17	21.98		
	RB1#99	21.47	21.72	21.49		
	RB50#0	20.4	20.44	20.54		
	RB50#50	20.58	20.55	20.55		
	RB100#0	20.53	20.49	20.58		

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	5.33	5.13	13
	RB100#0	4.2	4.09	4.17	13
20MHz 16QAM	RB1#0	5.39	6.06	6.17	13
	RB100#0	5.83	5.71	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	1.096	1.108	1.302	1.308	1.296
1.4MHz 16QAM	1.102	1.096	1.102	1.326	1.296	1.296
3MHz QPSK	2.695	2.683	2.683	2.88	2.892	2.88
3MHz 16QAM	2.683	2.683	2.683	2.88	2.88	2.892
5MHz QPSK	4.531	4.531	4.531	5.18	5.18	5.18
5MHz 16QAM	4.531	4.551	4.511	5.2	5.24	5.16
10MHz QPSK	8.982	8.942	8.982	9.84	10	10
10MHz 16QAM	8.942	8.942	8.942	9.88	9.92	9.92
15MHz QPSK	13.473	13.413	13.593	15.12	14.46	16.56
15MHz 16QAM	13.533	13.533	13.533	15.12	15.18	15.36
20MHz QPSK	17.884	17.964	17.964	19.68	19.92	19.68
20MHz 16QAM	17.964	17.964	17.964	19.84	19.76	19.6

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.
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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.
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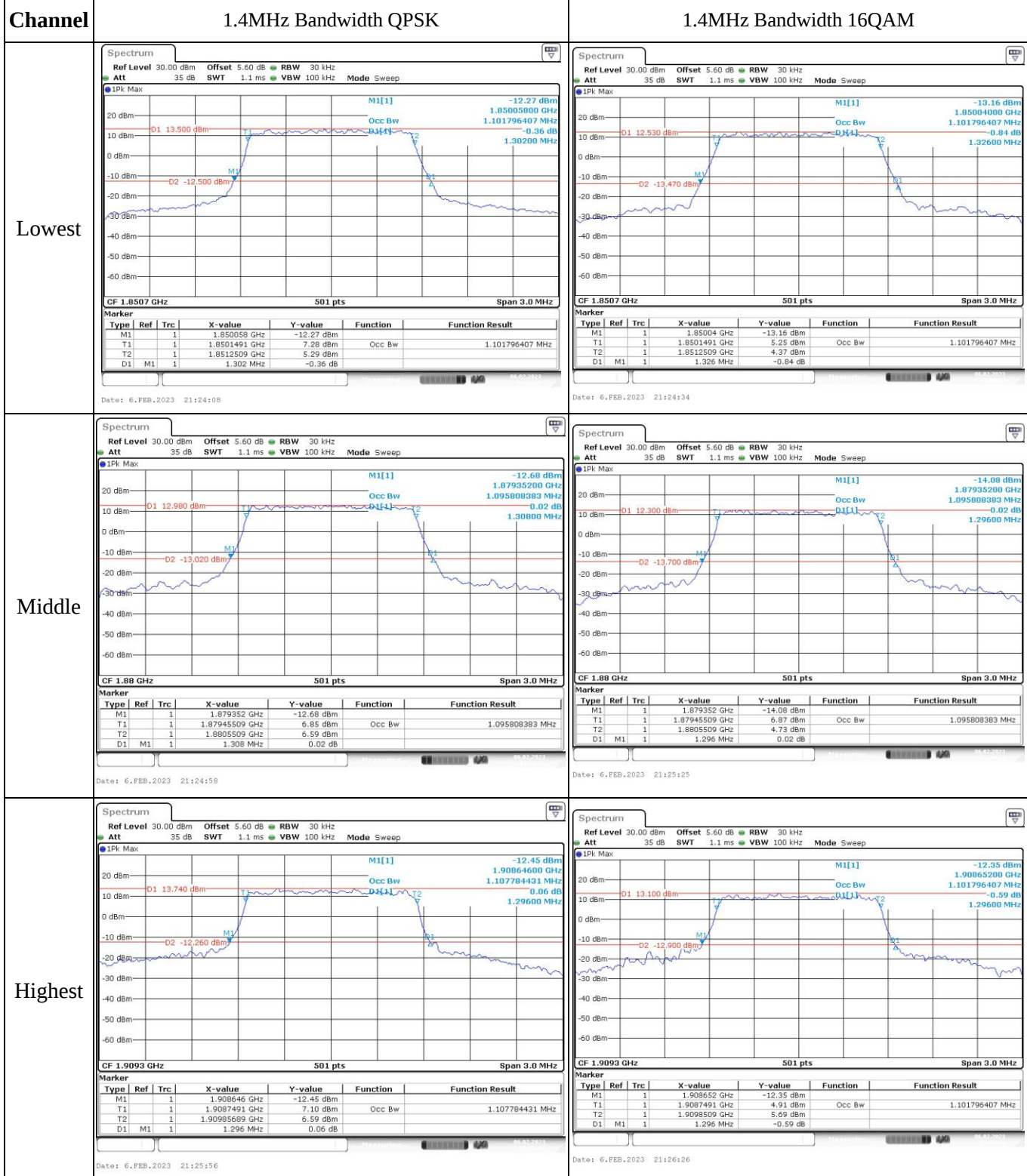
FCC §2.1055, §24.235: Frequency Stability

Test Mode:	20 MHz 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	1850.164	1850.000	1909.801	1910.000
	-20	3.8	1850.094	1850.000	1909.893	1910.000
	-10	3.8	1850.153	1850.000	1909.855	1910.000
	0	3.8	1850.131	1850.000	1909.877	1910.000
	10	3.8	1850.107	1850.000	1909.857	1910.000
	20	3.8	1850.138	1850.000	1909.822	1910.000
	30	3.8	1850.168	1850.000	1909.813	1910.000
	40	3.8	1850.076	1850.000	1909.843	1910.000
	50	3.8	1850.089	1850.000	1909.875	1910.000
Frequency Stability vs. Voltage	20	3.45	1850.125	1850.000	1909.832	1910.000
	20	4.4	1850.114	1850.000	1909.819	1910.000
					Result:	Pass

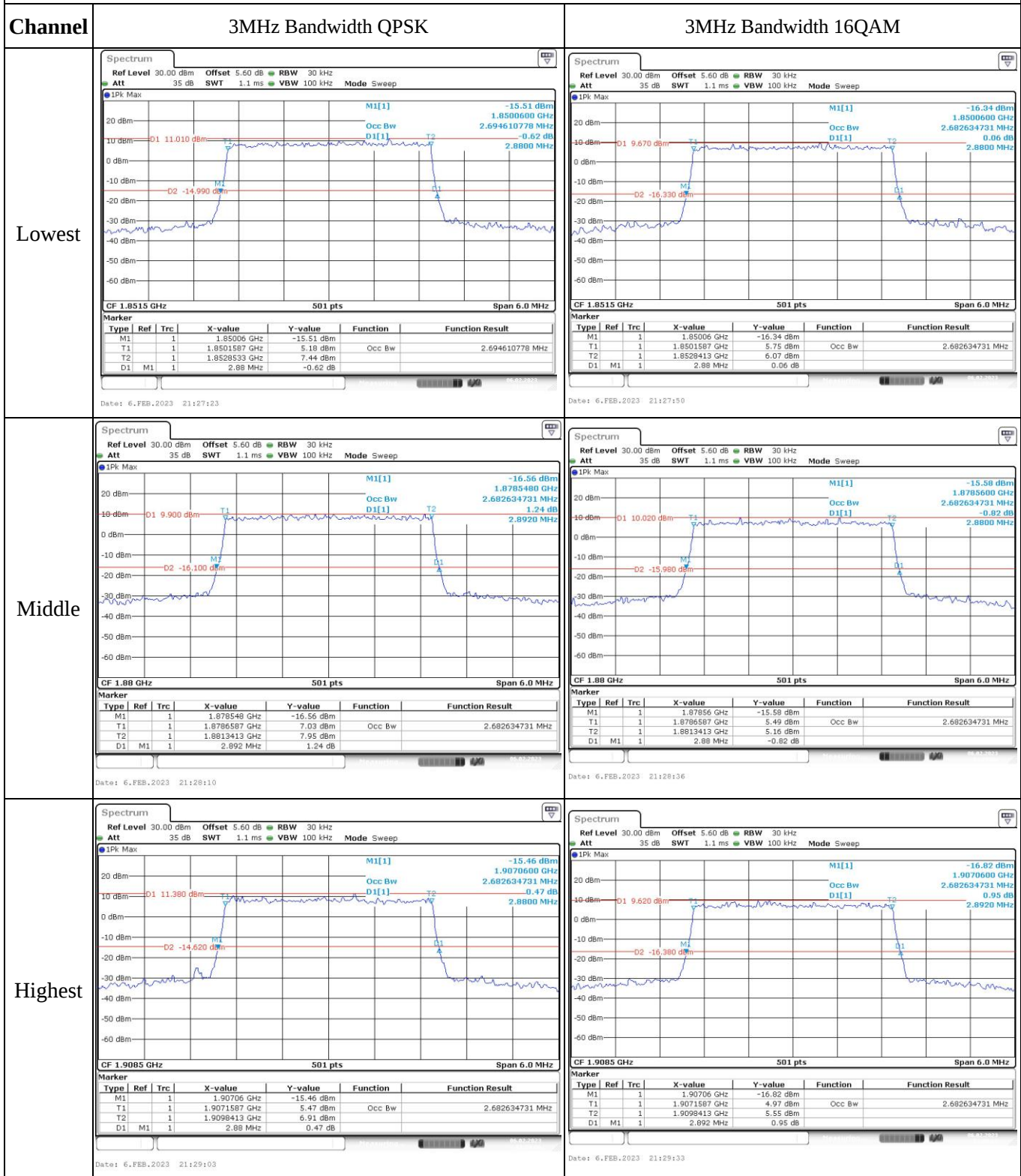
Test Mode:	20 MHz 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V _{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	1850.025	1850.000	1909.857	1910.000
	-20	3.8	1850.026	1850.000	1909.895	1910.000
	-10	3.8	1850.007	1850.000	1909.876	1910.000
	0	3.8	1850.087	1850.000	1909.894	1910.000
	10	3.8	1850.096	1850.000	1909.821	1910.000
	20	3.8	1850.058	1850.000	1909.822	1910.000
	30	3.8	1850.054	1850.000	1909.899	1910.000
	40	3.8	1850.069	1850.000	1909.864	1910.000
	50	3.8	1850.057	1850.000	1909.823	1910.000
Frequency Stability vs. Voltage	20	3.45	1850.021	1850.000	1909.855	1910.000
	20	4.4	1850.063	1850.000	1909.845	1910.000
					Result:	Pass

Test Plots(Note: The 5.6dB is the Insertion loss of the RF cable, Power Splitter and DC Block, which was offset into the Spectrum Analyzer):

Occupied Bandwidth



Occupied Bandwidth



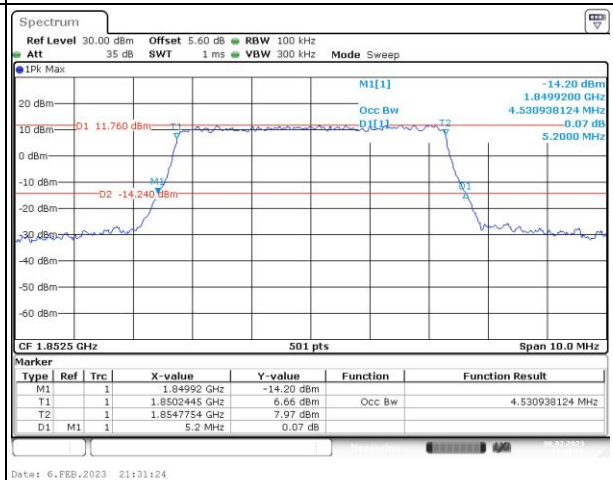
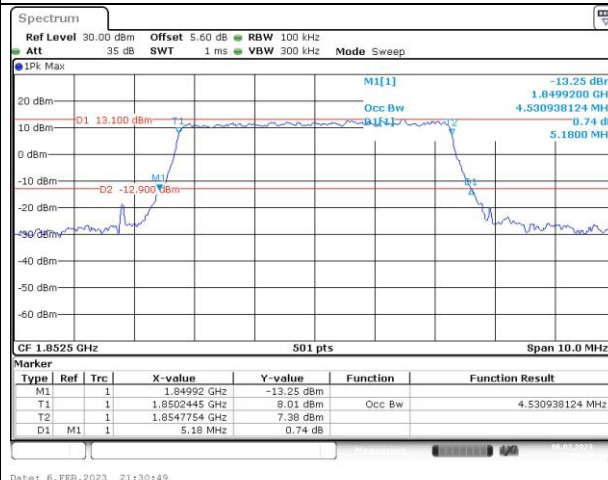
Occupied Bandwidth

Channel

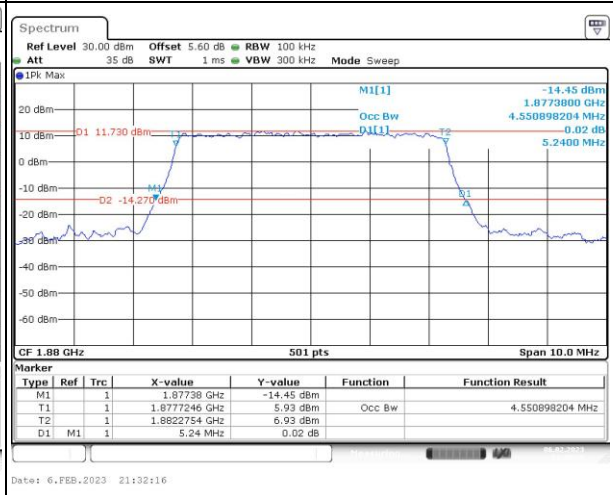
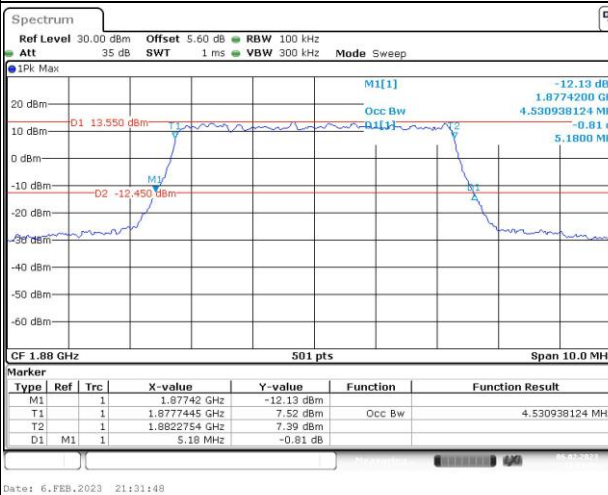
5MHz Bandwidth QPSK

5MHz Bandwidth 16QAM

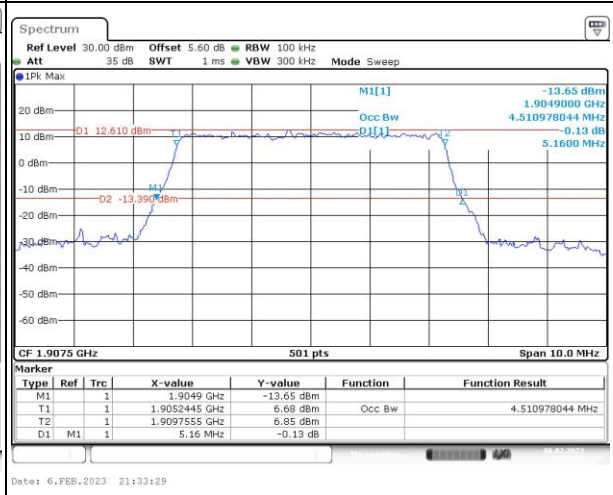
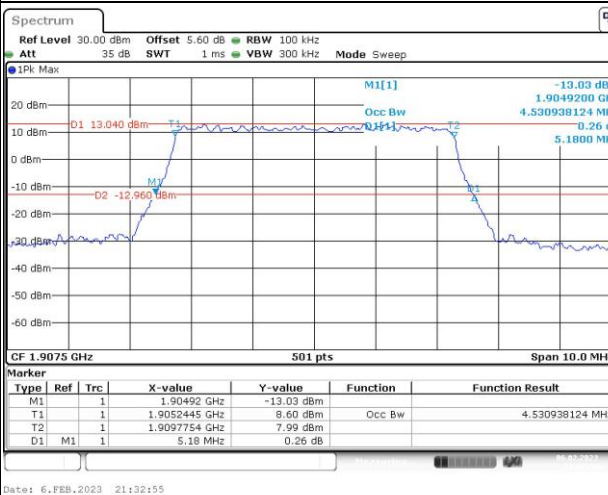
Lowest



Middle



Highest



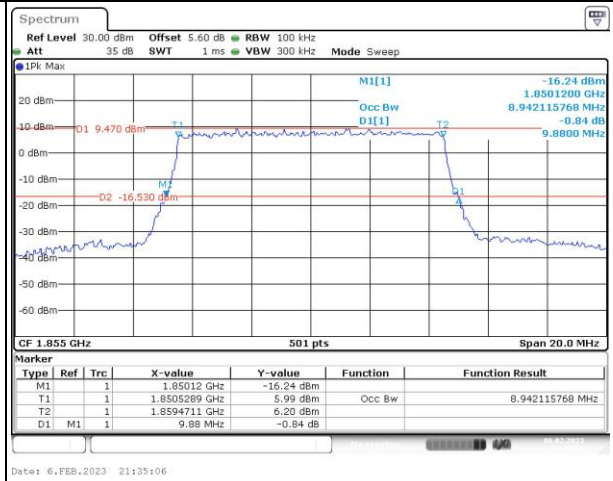
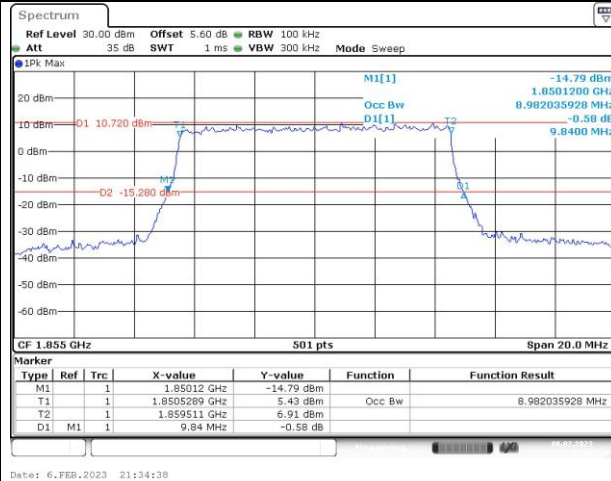
Occupied Bandwidth

Channel

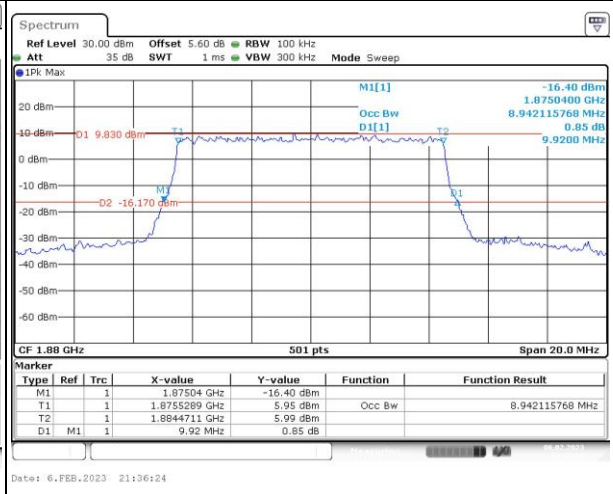
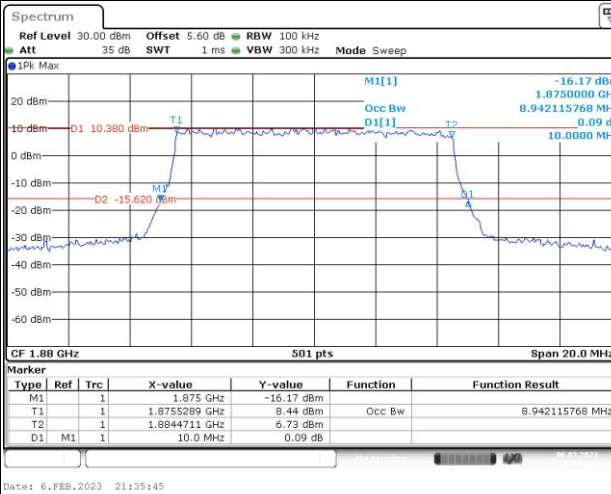
10MHz Bandwidth QPSK

10MHz Bandwidth 16QAM

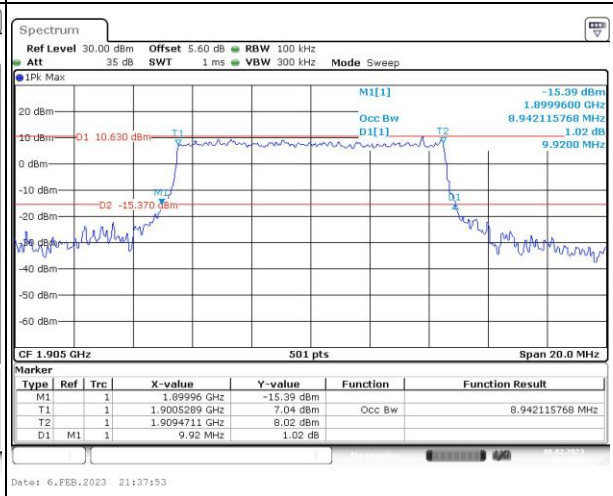
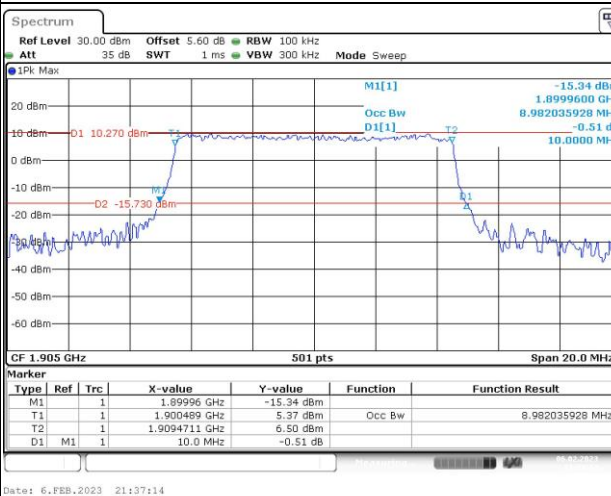
Lowest



Middle



Highest



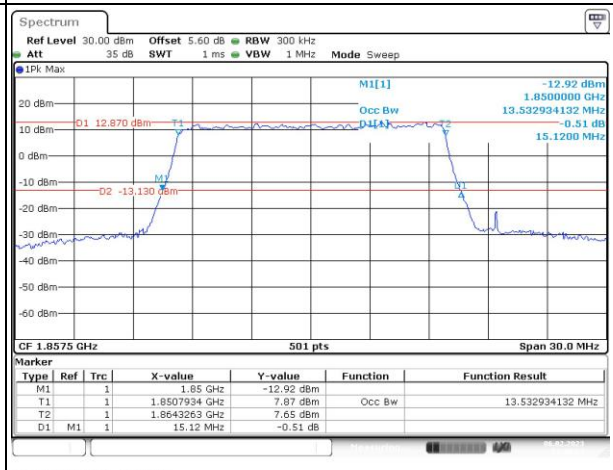
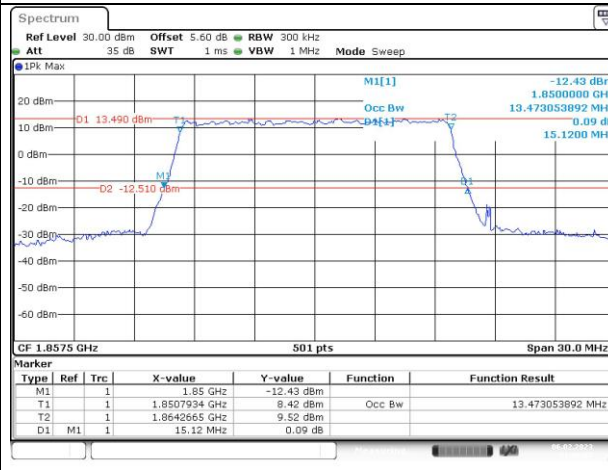
Occupied Bandwidth

Channel

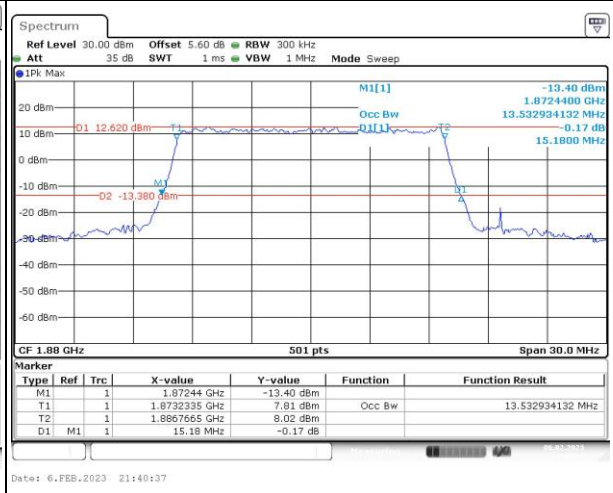
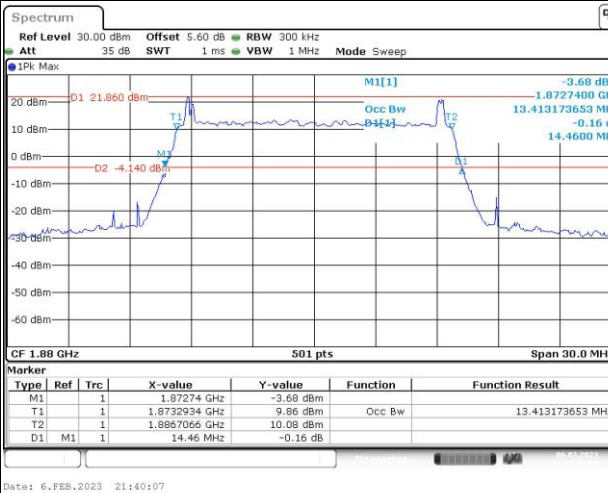
15MHz Bandwidth QPSK

15MHz Bandwidth 16QAM

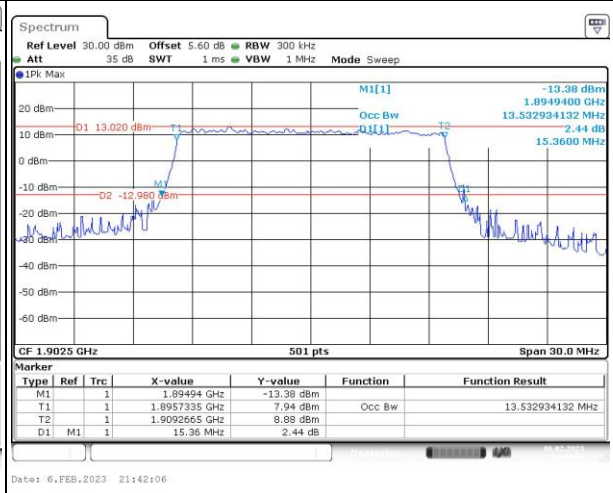
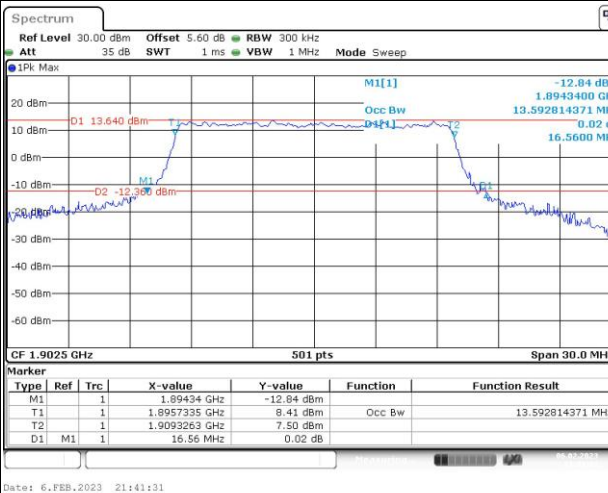
Lowest



Middle



Highest



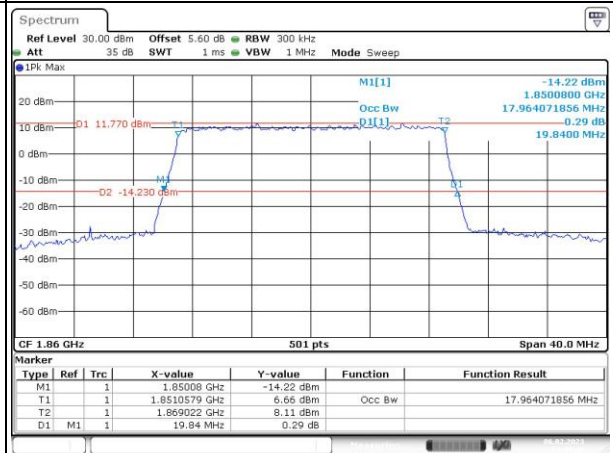
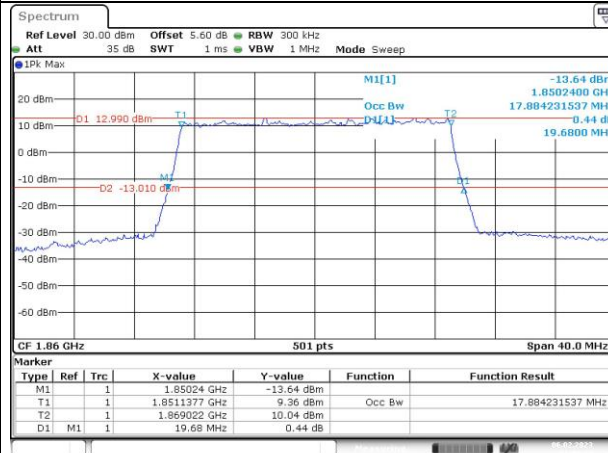
Occupied Bandwidth

Channel

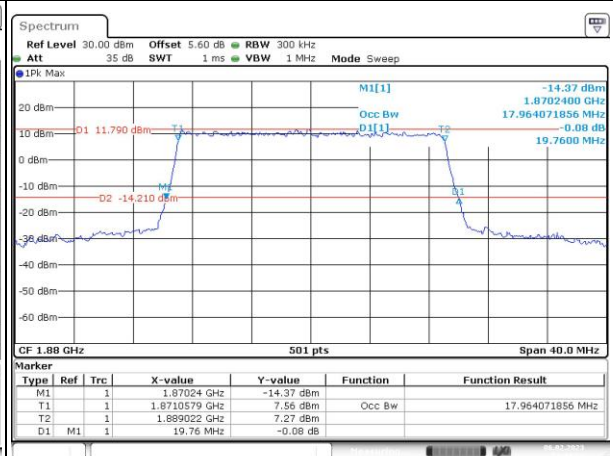
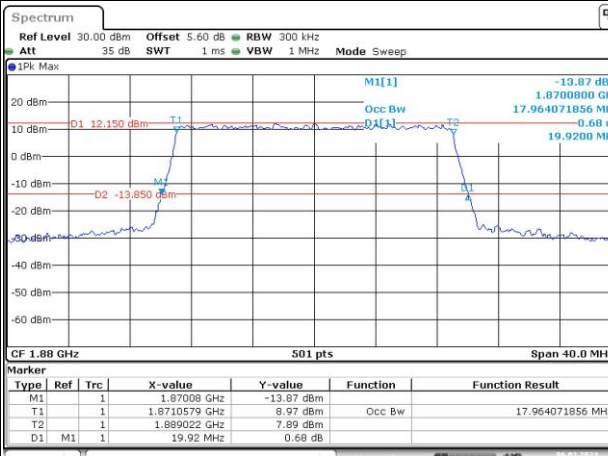
20MHz Bandwidth QPSK

20MHz Bandwidth 16QAM

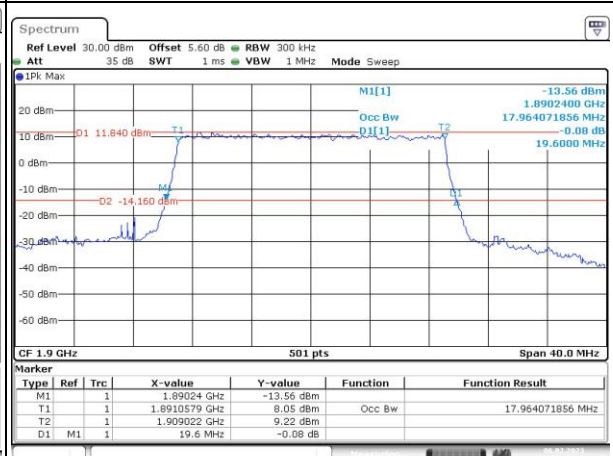
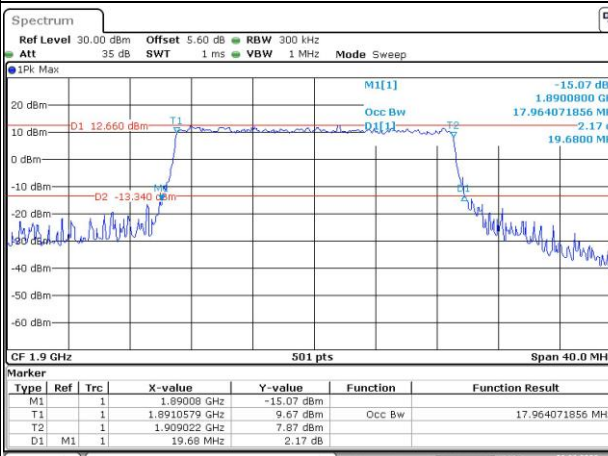
Lowest



Middle



Highest

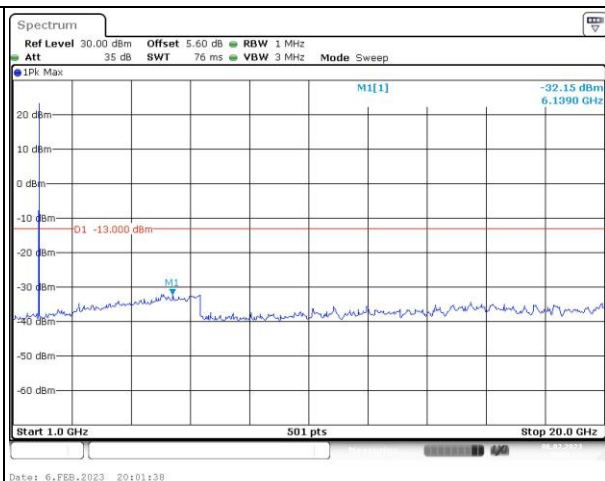
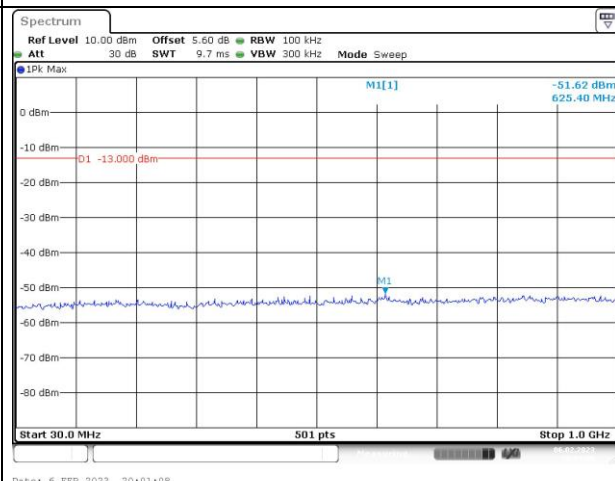


Spurious Emissions at Antenna Terminal

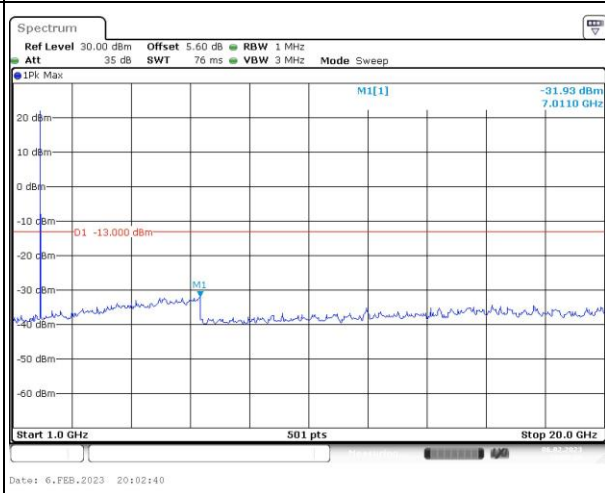
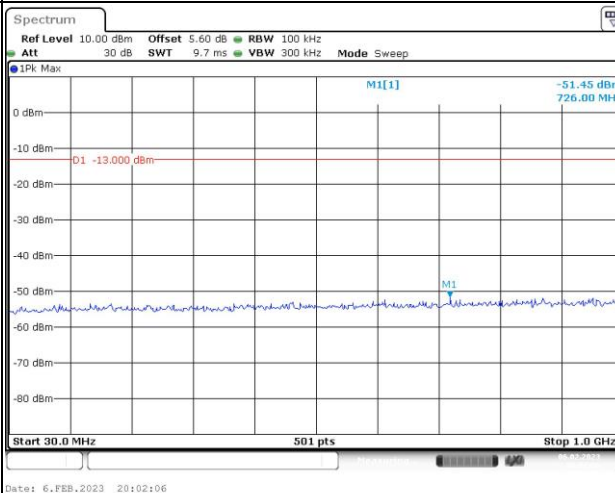
Channel

1.4MHz Bandwidth QPSK

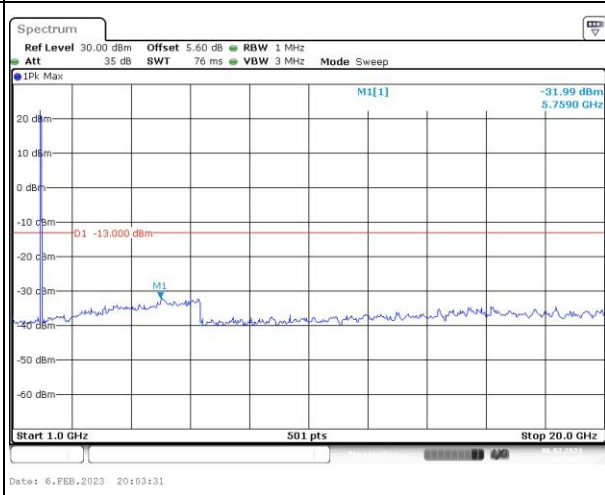
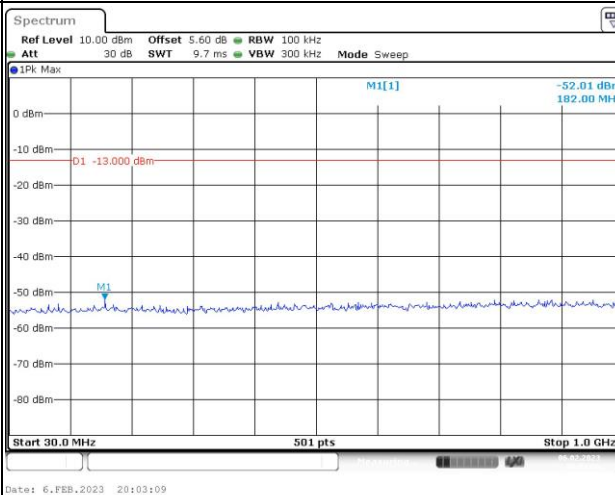
Lowest



Middle



Highest

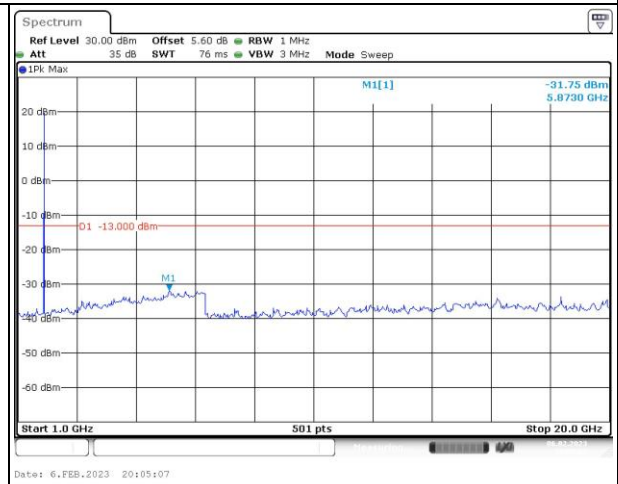
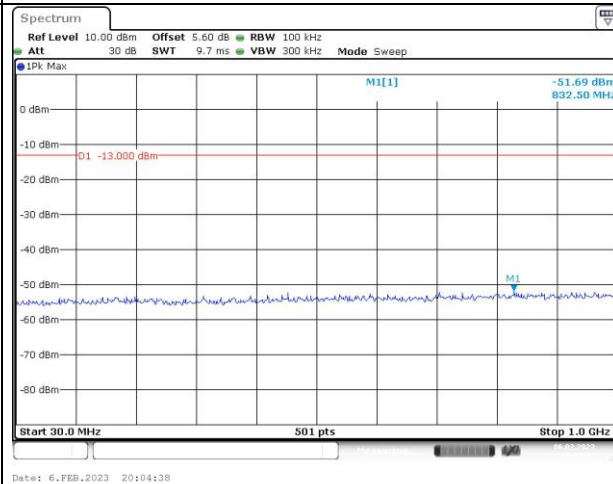


Spurious Emissions at Antenna Terminal

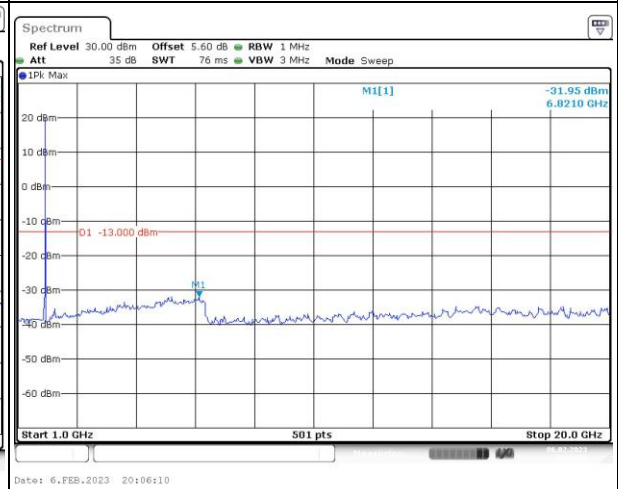
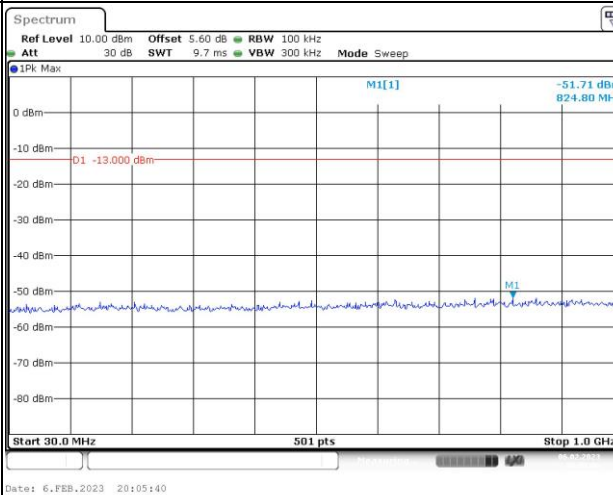
Channel

3MHz Bandwidth QPSK

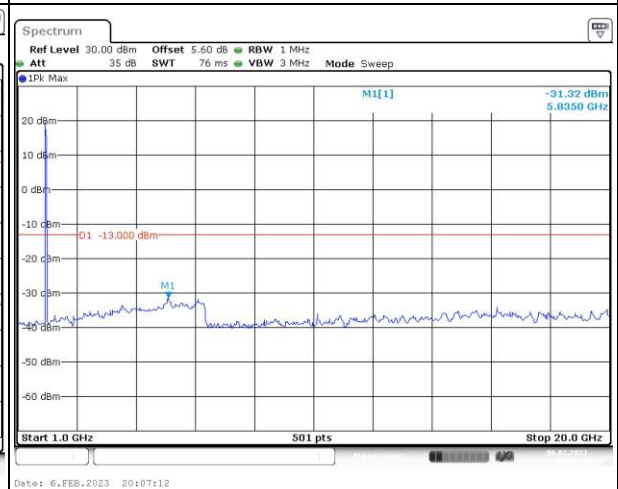
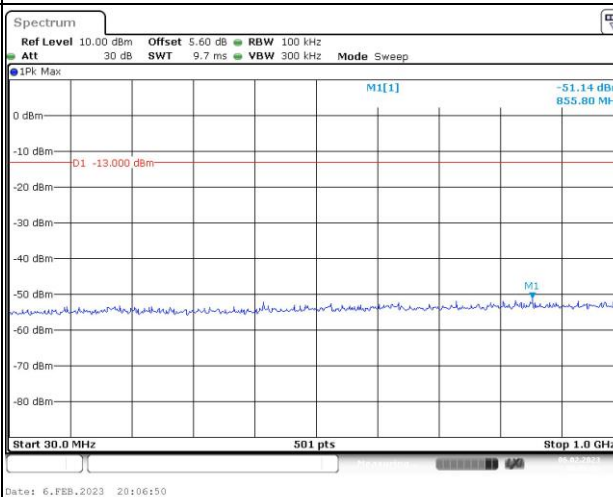
Lowest



Middle



Highest

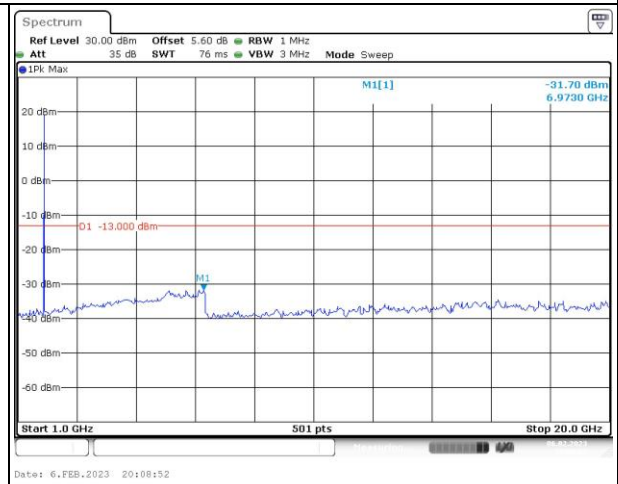
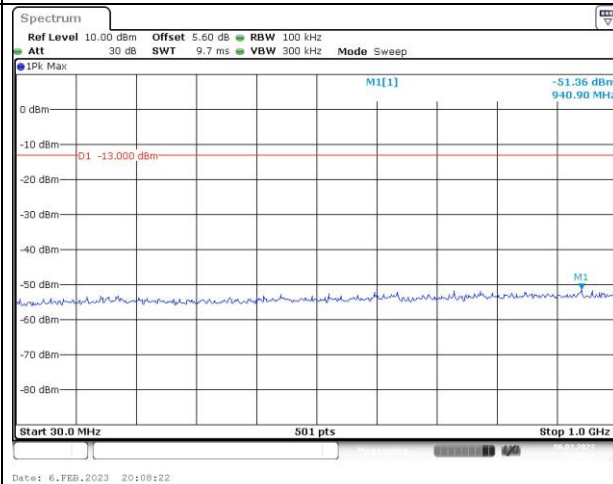


Spurious Emissions at Antenna Terminal

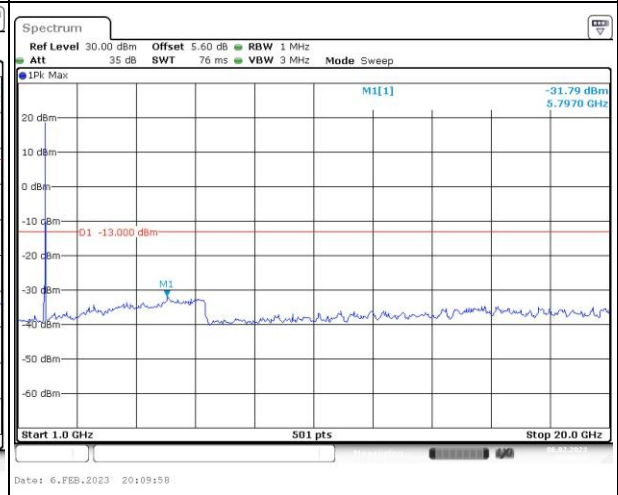
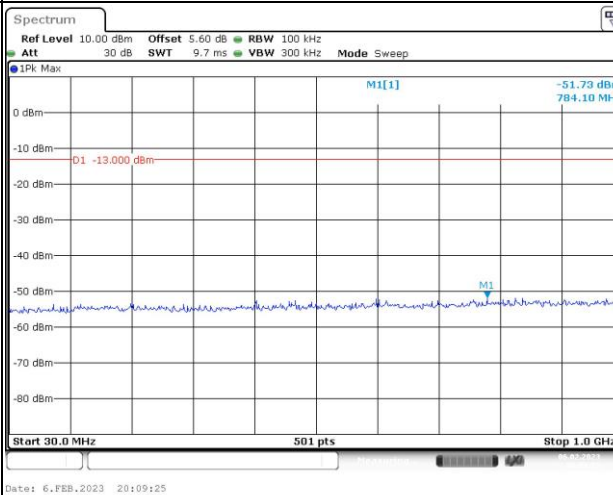
Channel

5MHz Bandwidth QPSK

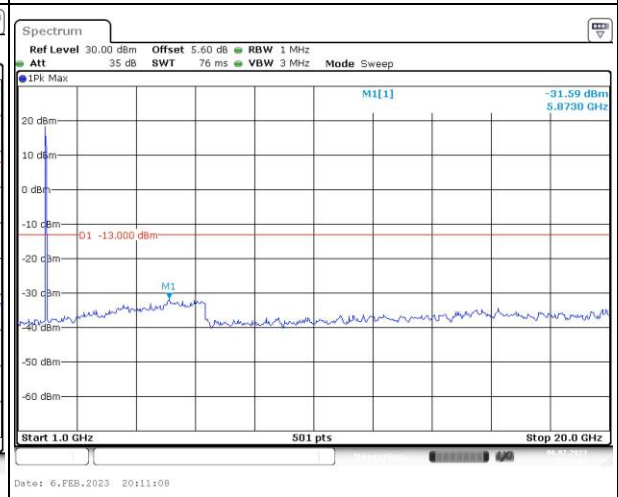
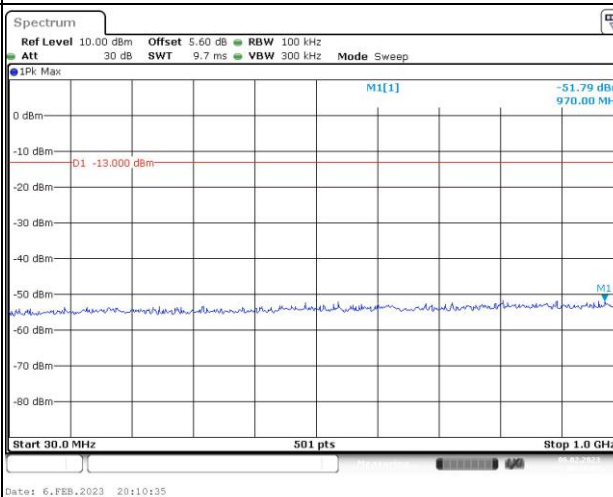
Lowest



Middle



Highest

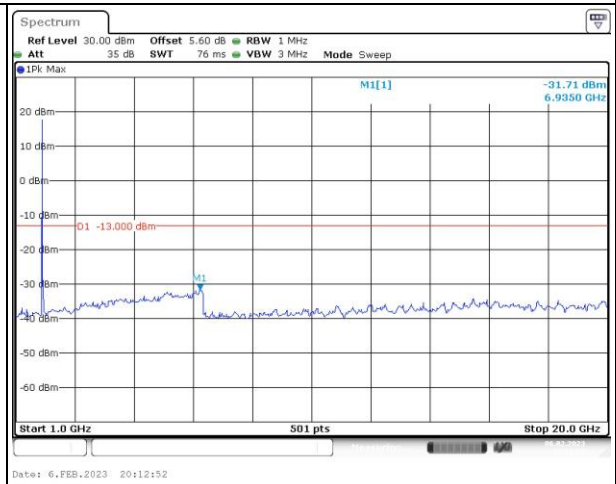
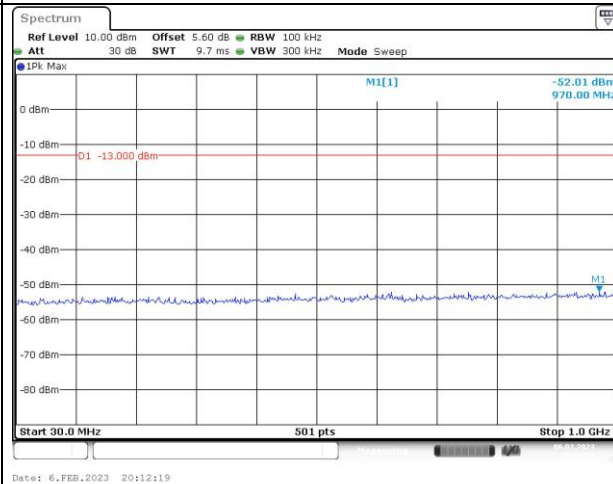


Spurious Emissions at Antenna Terminal

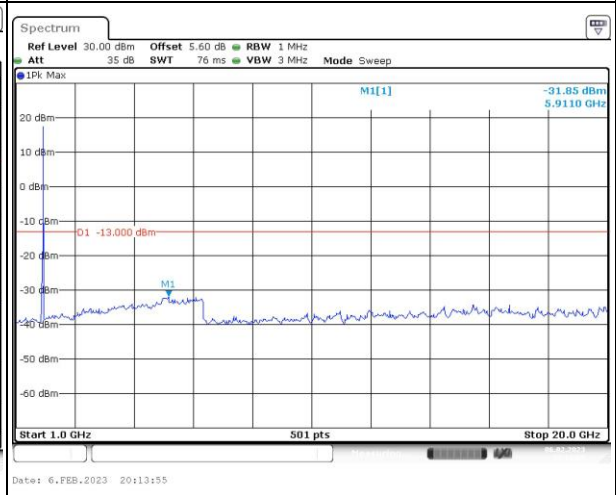
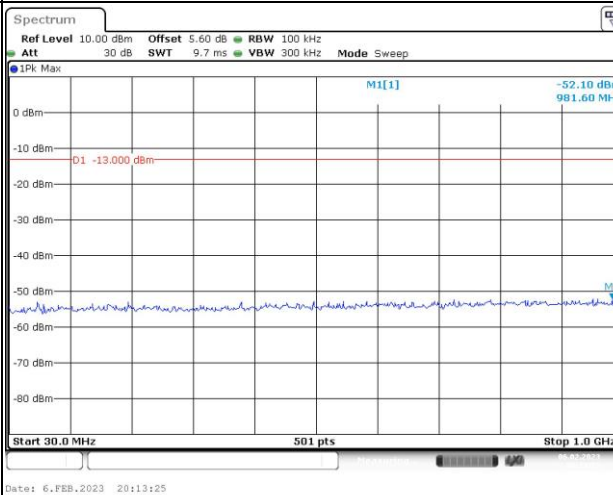
Channel

10MHz Bandwidth QPSK

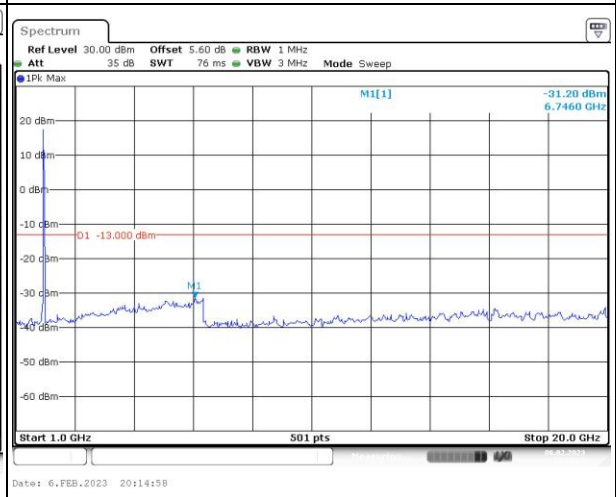
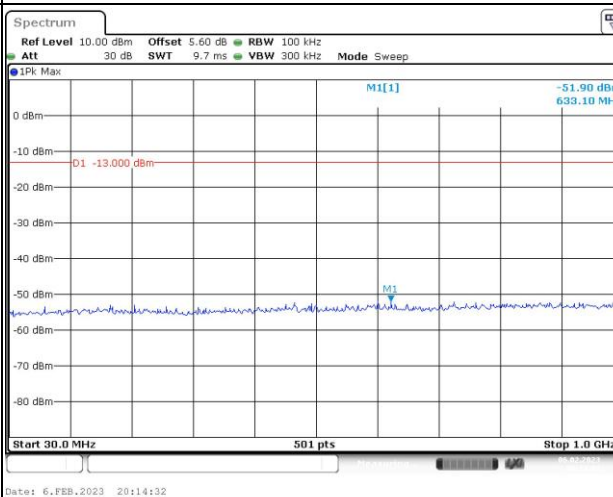
Lowest



Middle



Highest

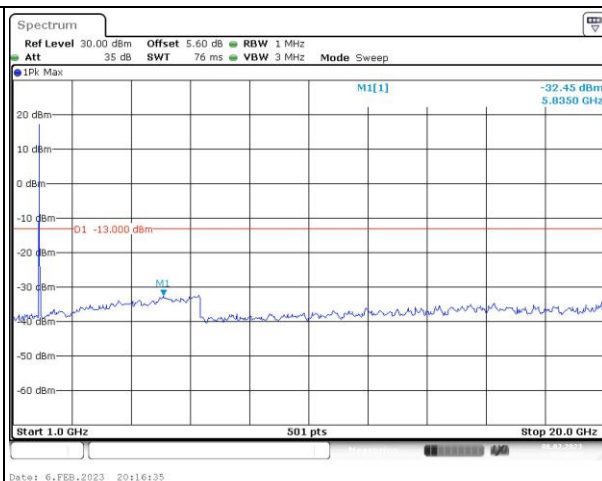
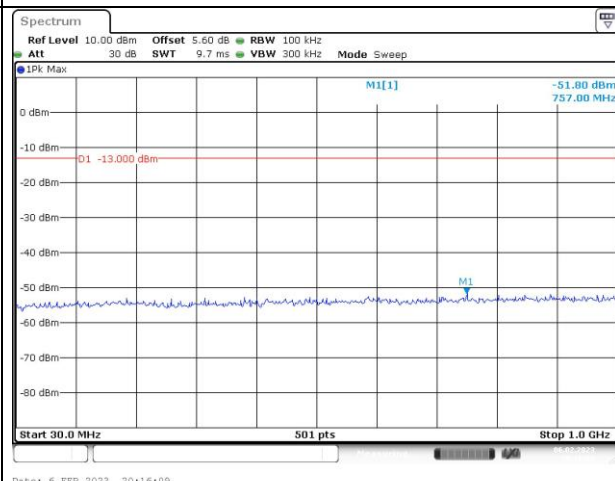


Spurious Emissions at Antenna Terminal

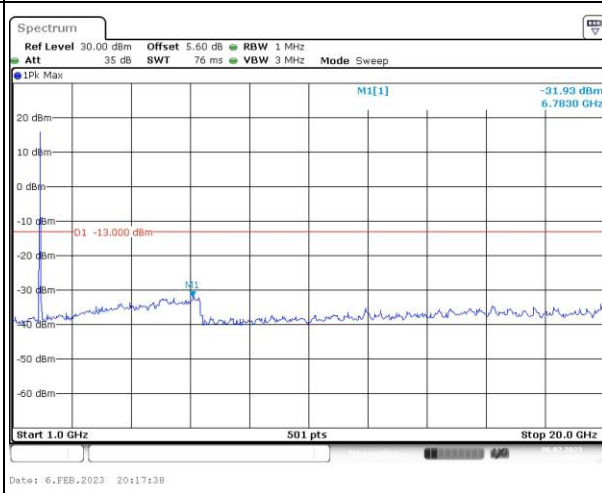
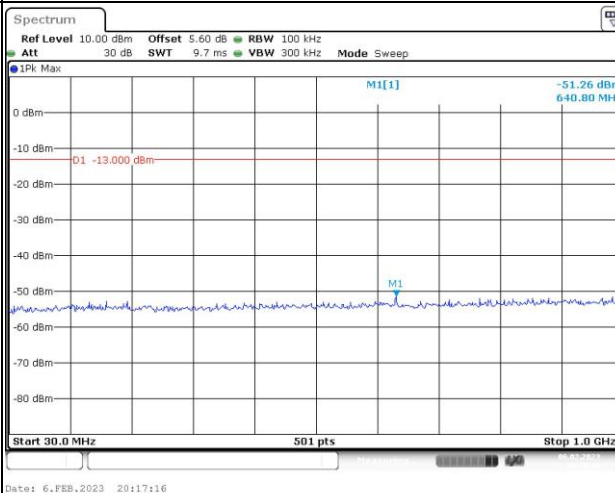
Channel

15MHz Bandwidth QPSK

Lowest



Middle



Highest

