4.6 Antenna Port Test Data and Results for LTE Band 2

Serial Number:	294A-2	Test Date:	2023/9/13
Test Site:	RF	Test Mode:	Transmitting
Tester:	Ken Tang	Test Result:	**Pass**

Environmental Conditions:					
Temperature: (℃)	25.6	Relative Humidity: (%)	57	ATM Pressure: (kPa)	101

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101943	2023/3/31	2024/3/30
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
zhuoxiang	Coaxial Cable	SMA-178	211002	Each time	N/A
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060301	Each time	N/A
Minl-Clrcuits	Power Splitter	ZFRSC-183-S+	S F448201619	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	143458	2023/3/31	2024/3/30
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 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	21.15	21.04	20.91	19.45	33
	RB1#3	21.15	21.15	20.78		
	RB1#5	21.09	21.05	20.8		
	RB3#0	21.15	20.99	20.94		
	RB3#3	21.07	21.04	20.85		
	RB6#0	20.21	20.17	19.98		
1.4MHz 16QAM	RB1#0	20.31	20.23	20.16	18.79	33
	RB1#3	20.49	20.27	20.17		
	RB1#5	20.31	20.12	20.02		
	RB3#0	20.33	20.24	19.97		
	RB3#3	20.33	20.28	20.01		
	RB6#0	19.29	19.13	19.06		
3MHz QPSK	RB1#0	21.23	21.17	21.03	19.53	33
	RB1#8	21.19	21.12	20.97		
	RB1#14	21.11	21.05	20.82		
	RB6#0	20.38	20.21	20.11		
	RB6#9	20.22	20.15	20.02		
	RB15#0	20.27	20.12	20.04		
3MHz 16QAM	RB1#0	20.38	20.3	20.61	18.93	33
	RB1#8	20.31	20.31	20.63		
	RB1#14	20.25	20.18	20.44		
	RB6#0	19.37	19.28	19.22		
	RB6#9	19.25	19.26	19.11		
	RB15#0	19.36	19.16	19.13		
5MHz QPSK	RB1#0	21.19	21.06	21.01	19.5	33
	RB1#13	21.2	21.08	21.02		
	RB1#24	21.14	21.02	20.97		
	RB15#0	20.32	20.19	20.12		
	RB15#10	20.21	20.22	20.01		
	RB25#0	20.28	20.13	20.09		
5MHz 16QAM	RB1#0	20.37	20.11	20.2	19.69	33
	RB1#13	20.4	20.08	20.14		
	RB1#24	20.3	20.11	20.08		
	RB15#0	19.41	19.23	21.39		
	RB15#10	19.34	19.25	20.38		
	RB25#0	20.13	19.21	20.47		

10MHz QPSK	RB1#0	22.42	22.32	22.36	**20.72**	33
	RB1#25	22.3	22.39	22.3		
	RB1#49	22.26	22.31	22.29		
	RB25#0	21.58	21.4	21.34		
	RB25#25	21.48	21.44	21.37		
	RB50#0	21.52	21.37	21.4		
10MHz 16QAM	RB1#0	21.72	21.47	21.47	20.02	33
	RB1#25	21.56	21.43	21.4		
	RB1#49	21.39	21.4	21.37		
	RB25#0	20.69	20.6	20.52		
	RB25#25	20.6	20.58	20.58		
	RB50#0	20.55	20.47	20.42		
15MHz QPSK	RB1#0	22.33	22.23	22.22	20.63	33
	RB1#38	22.23	22.19	22.16		
	RB1#74	22.22	22.21	22.19		
	RB36#0	21.43	21.31	21.23		
	RB36#39	21.36	21.33	21.31		
	RB75#0	21.39	21.3	21.34		
15MHz 16QAM	RB1#0	22.04	21.49	21.69	**20.34**	33
	RB1#38	21.92	21.5	21.64		
	RB1#74	21.93	21.52	21.65		
	RB36#0	20.52	20.35	20.33		
	RB36#39	20.43	20.41	20.38		
	RB75#0	20.49	20.28	20.32		
20MHz QPSK	RB1#0	22.4	22.22	22.19	20.71	33
	RB1#50	22.22	22.41	22.09		
	RB1#99	22.29	22.28	22.16		
	RB50#0	21.48	21.31	21.31		
	RB50#50	21.42	21.37	21.3		
	RB100#0	21.44	21.32	21.29		
20MHz 16QAM	RB1#0	21.63	21.56	21.82	20.14	33
	RB1#50	21.5	21.55	21.84		
	RB1#99	21.46	21.58	21.81		
	RB50#0	20.51	20.33	20.31		
	RB50#50	20.41	20.37	20.4		
	RB100#0	20.5	20.38	20.33		
Note: EIRP=Conducted Power(dBm) - L_C(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	6.17	6.98	9.43	13
	RB100#0	7.57	8.93	7.69	13
20MHz 16QAM	RB1#0	7.35	8	8.27	13
	RB100#0	9.76	8.87	8.65	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	1.084	1.078	1.09	1.206	1.212	1.21
1.4MHz 16QAM	1.084	1.078	1.078	1.218	1.200	1.212
3MHz QPSK	2.683	2.695	2.683	2.952	2.940	2.964
3MHz 16QAM	2.683	2.683	2.683	2.964	2.964	2.952
5MHz QPSK	4.511	4.511	4.511	5.020	5.000	5.000
5MHz 16QAM	4.511	4.531	4.511	4.980	5.000	5.000
10MHz QPSK	8.942	8.982	8.982	9.720	9.640	9.760
10MHz 16QAM	8.942	8.982	8.942	9.680	9.680	9.680
15MHz QPSK	13.473	13.473	13.473	14.760	14.640	14.760
15MHz 16QAM	13.533	13.533	13.533	14.760	14.700	14.700
20MHz QPSK	18.044	17.884	17.884	19.360	19.360	19.440
20MHz 16QAM	17.964	17.964	17.884	19.360	19.360	19.200
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.**

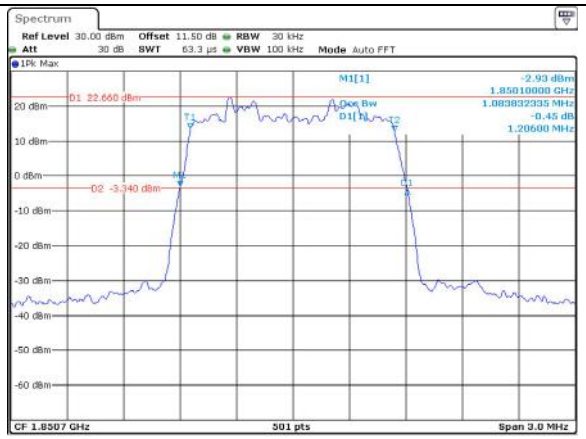
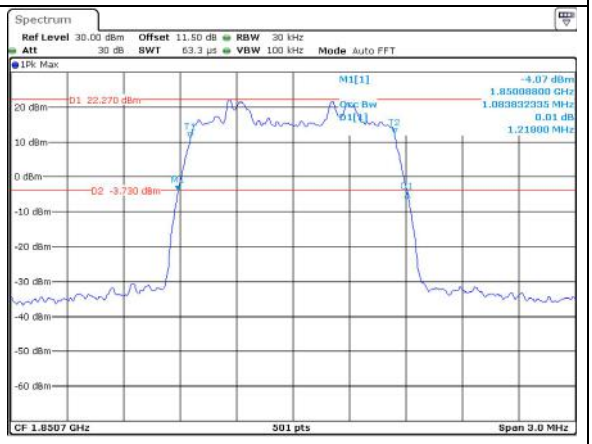
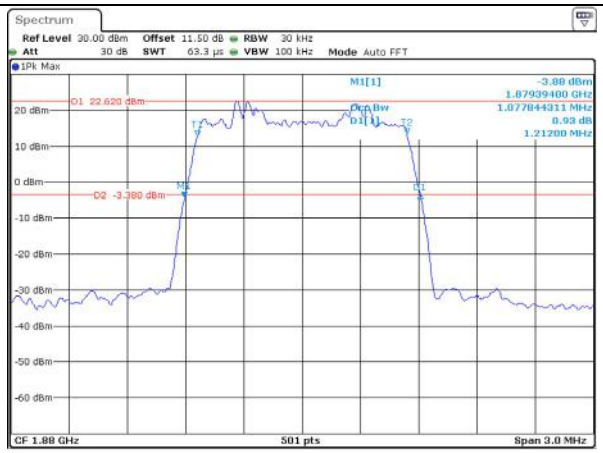
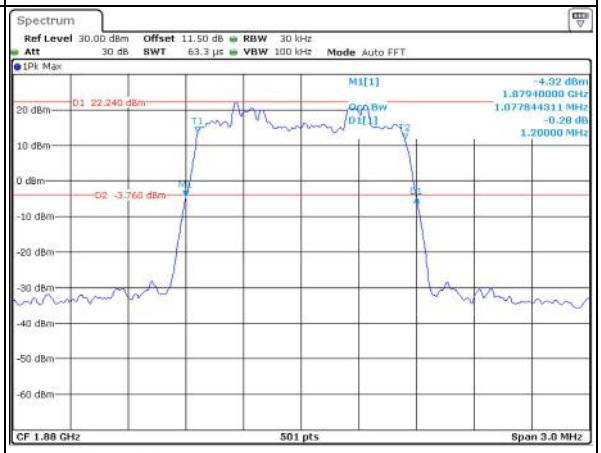
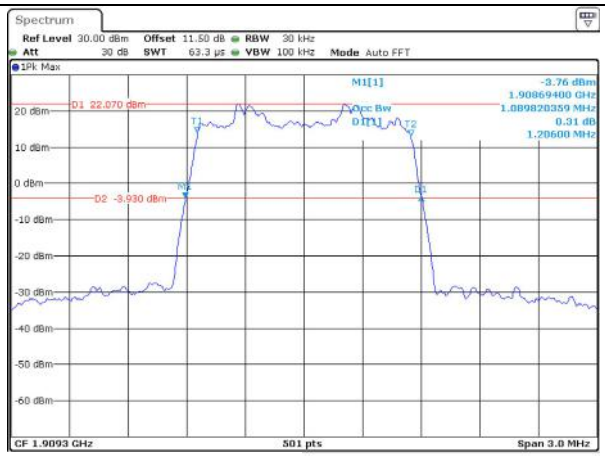
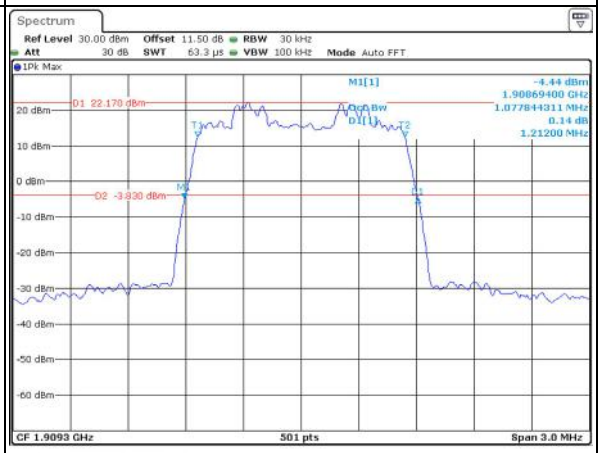
FCC §2.1051, § 24.238 (a):Out of band emission, Band Edge	
Result:	**Pass, Please refer to the test plots of Out of band emission, Band Edge.**

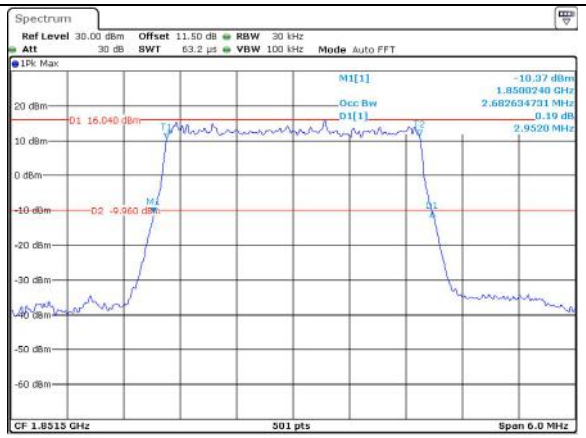
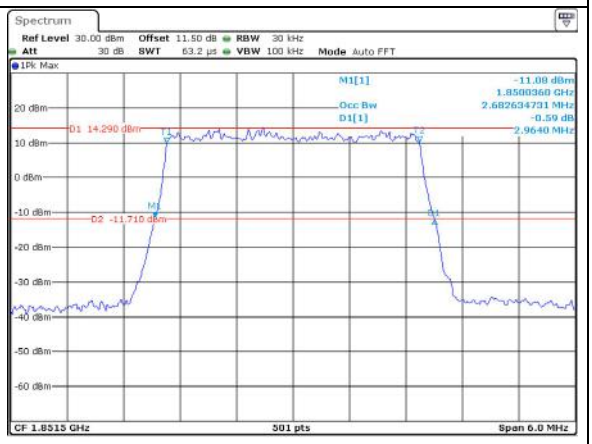
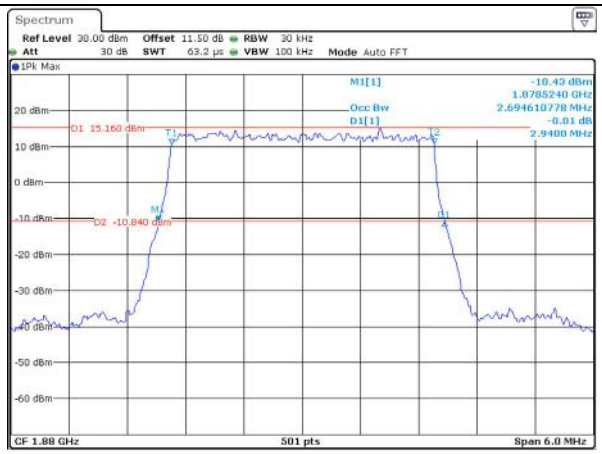
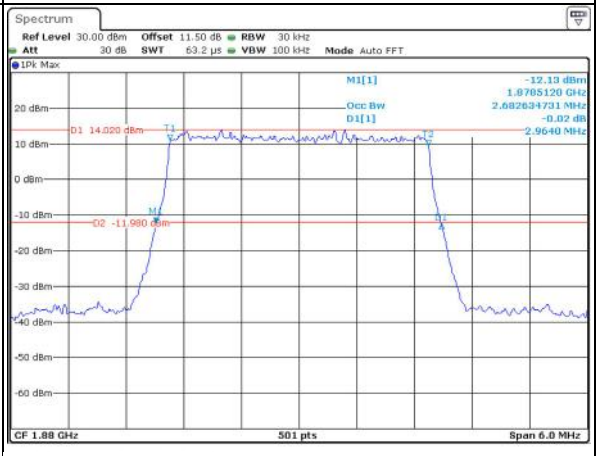
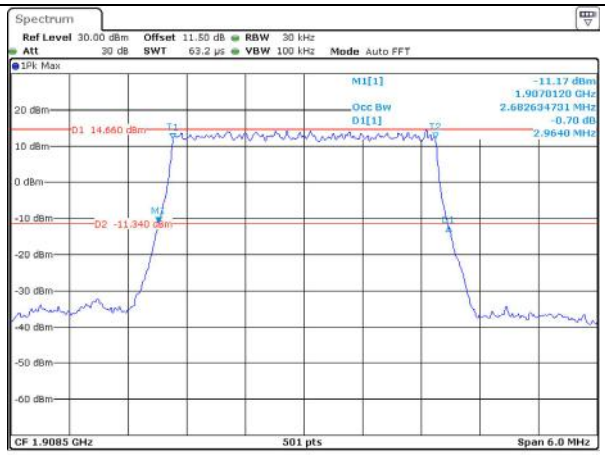
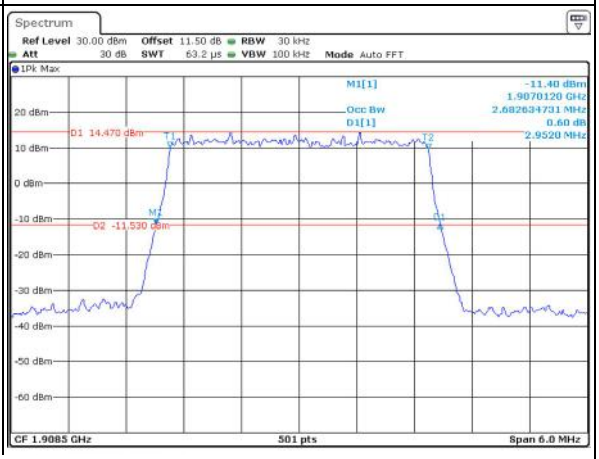
FCC §2.1055, §24.235: Frequency Stability

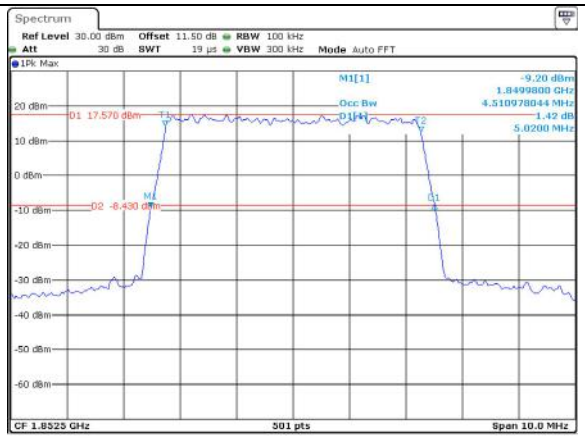
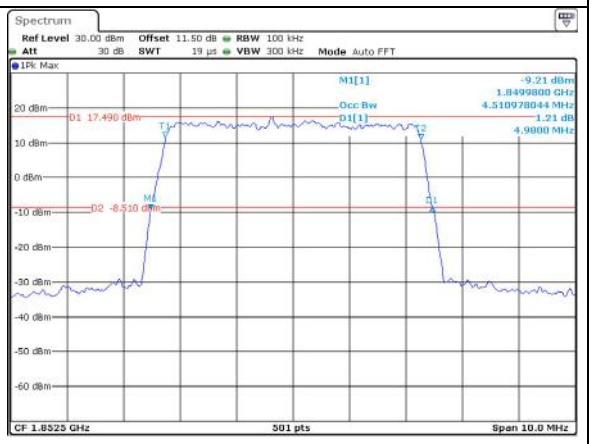
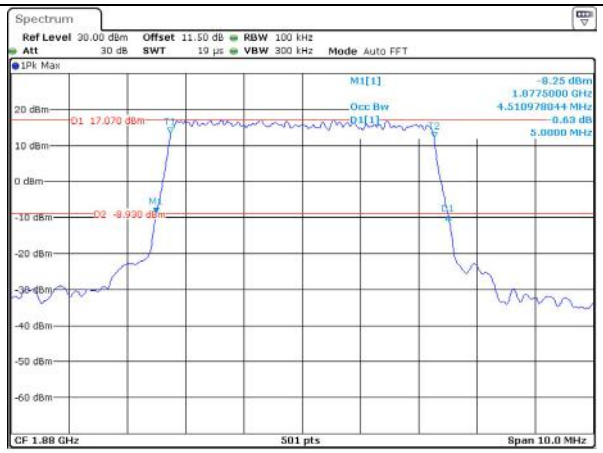
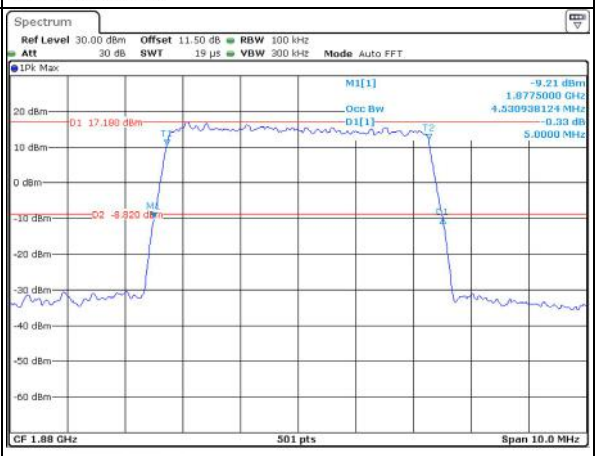
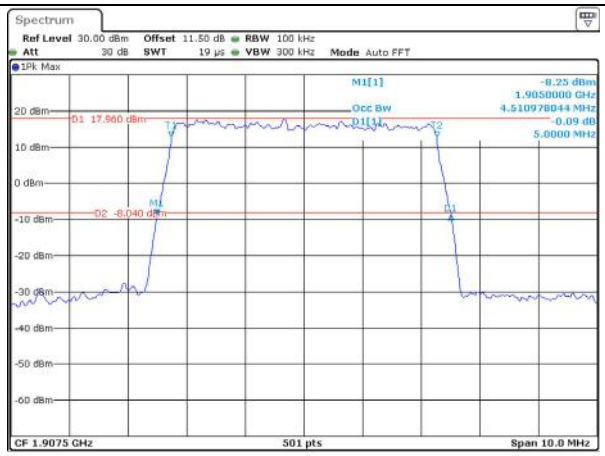
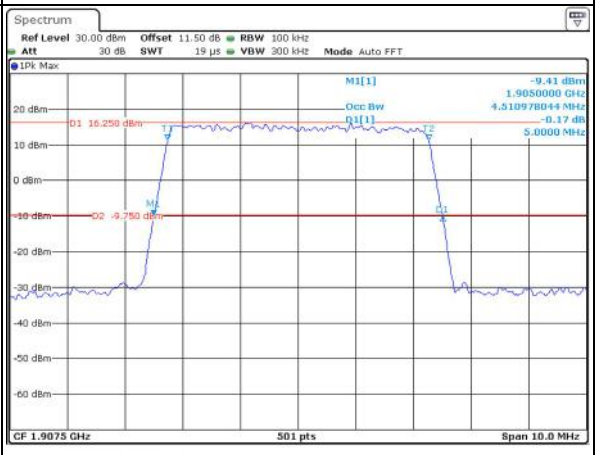
Test Mode:	20M QPSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (℃)	Voltage (V_{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.85	1850.010	1850.000	1909.999	1910.000
	-20	3.85	1850.029	1850.000	1909.978	1910.000
	-10	3.85	1850.007	1850.000	1909.999	1910.000
	0	3.85	1850.010	1850.000	1909.970	1910.000
	10	3.85	1850.015	1850.000	1909.981	1910.000
	20	3.85	1850.026	1850.000	1909.992	1910.000
	30	3.85	1850.002	1850.000	1909.999	1910.000
	40	3.85	1850.017	1850.000	1909.977	1910.000
	50	3.85	1850.003	1850.000	1909.975	1910.000
Frequency Stability vs. Voltage	20	3.66	1850.004	1850.000	1909.987	1910.000
	20	4.24	1850.006	1850.000	1909.330	1910.000
					Result:	**Pass**

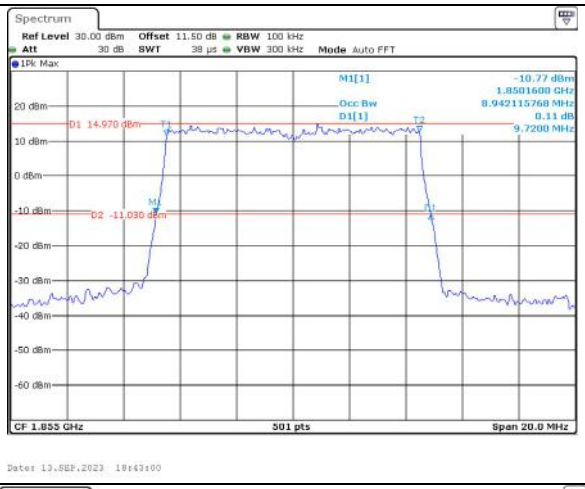
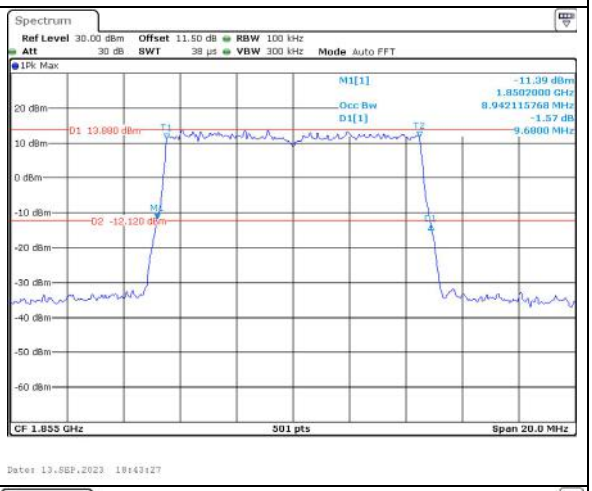
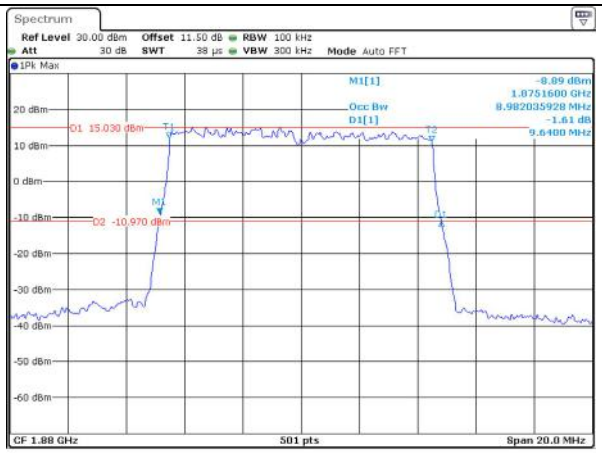
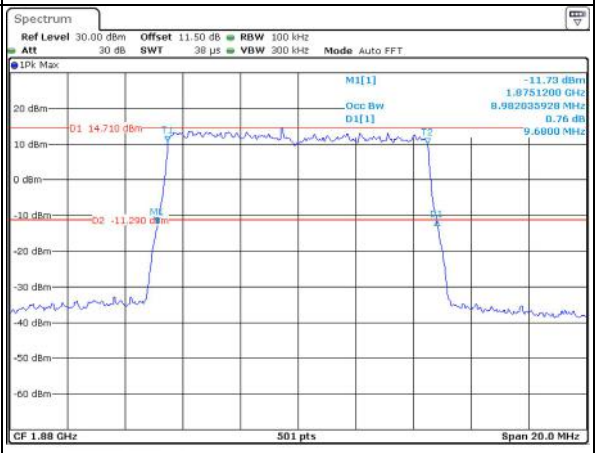
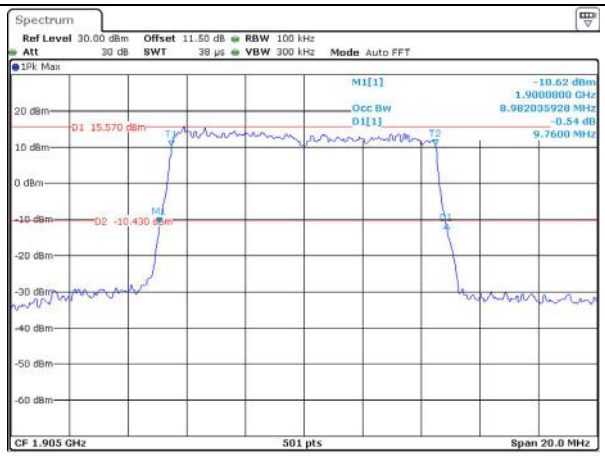
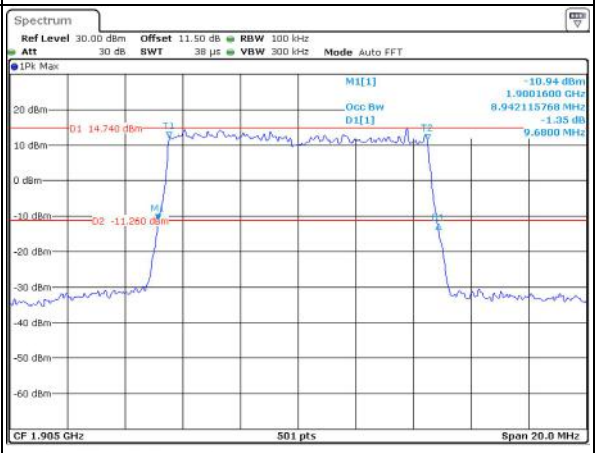
Test Mode:	20M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (℃)	Voltage (V_{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.85	1850.015	1850.000	1909.975	1910.000
	-20	3.85	1850.018	1850.000	1909.978	1910.000
	-10	3.85	1850.023	1850.000	1909.973	1910.000
	0	3.85	1850.021	1850.000	1909.982	1910.000
	10	3.85	1850.017	1850.000	1909.992	1910.000
	20	3.85	1850.017	1850.000	1909.973	1910.000
	30	3.85	1850.028	1850.000	1909.990	1910.000
	40	3.85	1850.010	1850.000	1909.978	1910.000
	50	3.85	1850.017	1850.000	1909.994	1910.000
Frequency Stability vs. Voltage	20	3.66	1850.010	1850.000	1909.993	1910.000
	20	4.24	1850.014	1850.000	1909.995	1910.000
					Result:	**Pass**

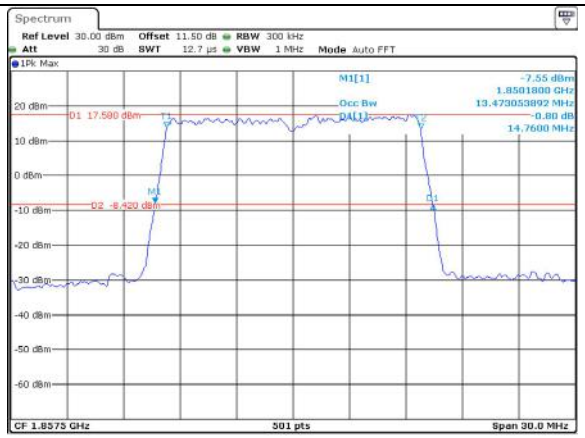
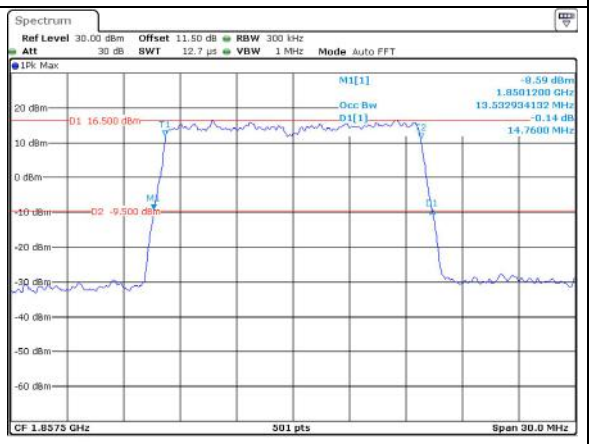
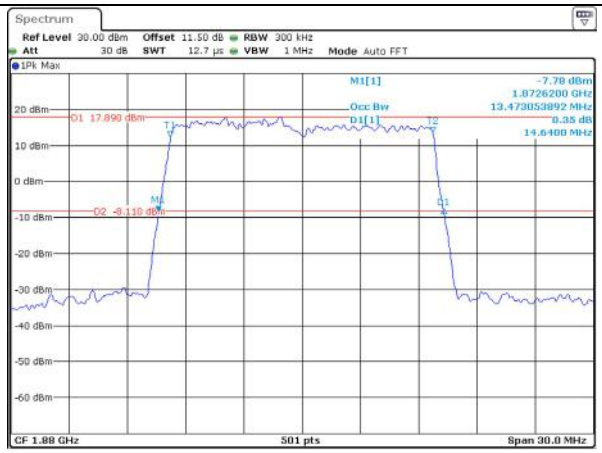
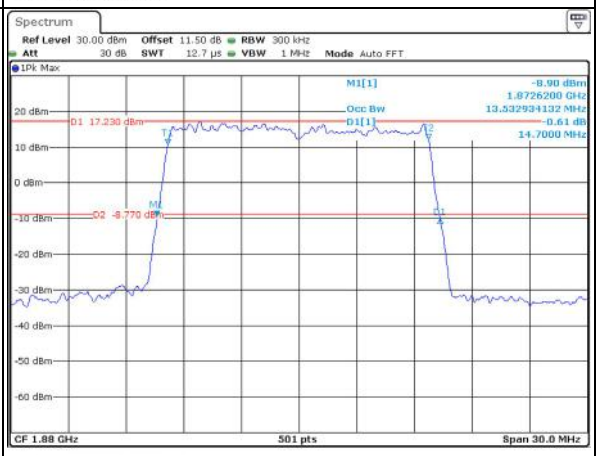
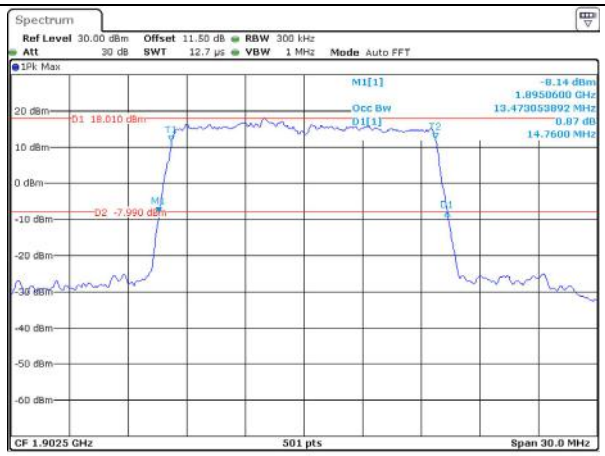
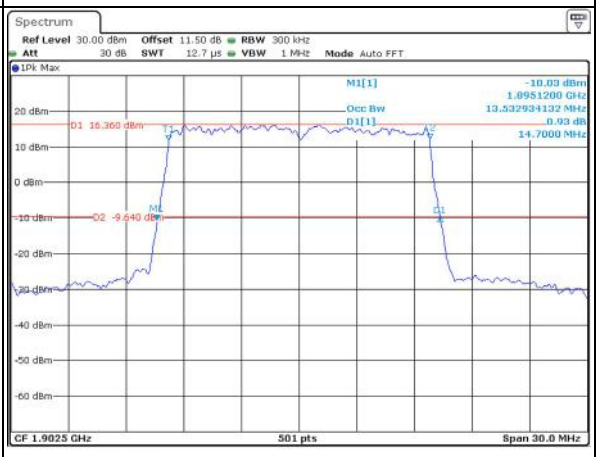
Test Plots(Note: The 11.5 dB is the Insertion loss of the RF cable and Power Splitter, which was offset into the Spectrum Analyzer):

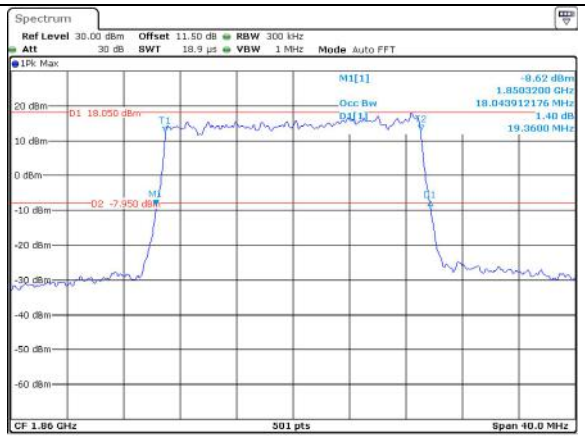
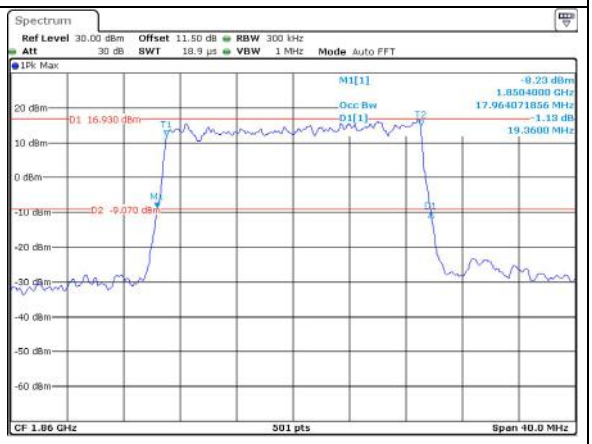
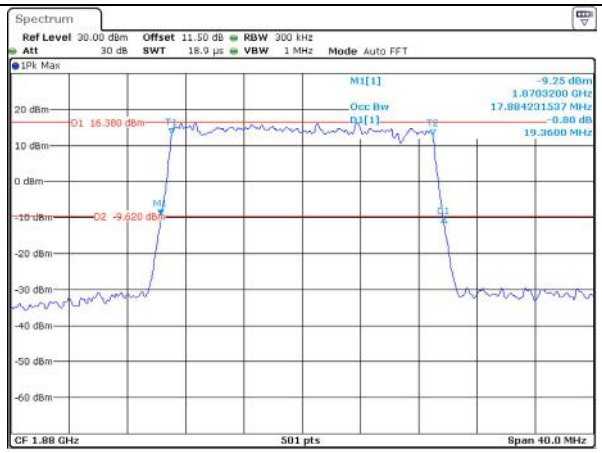
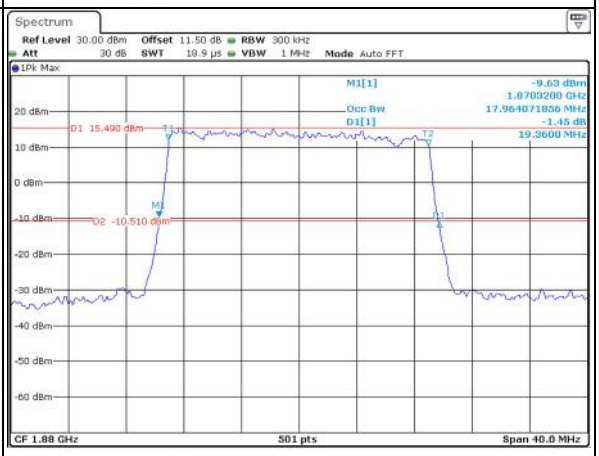
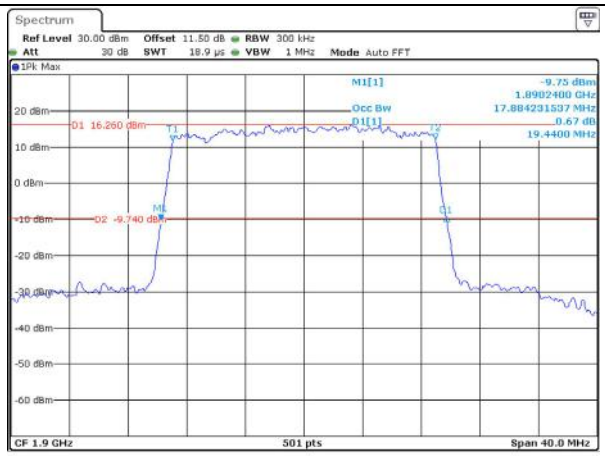
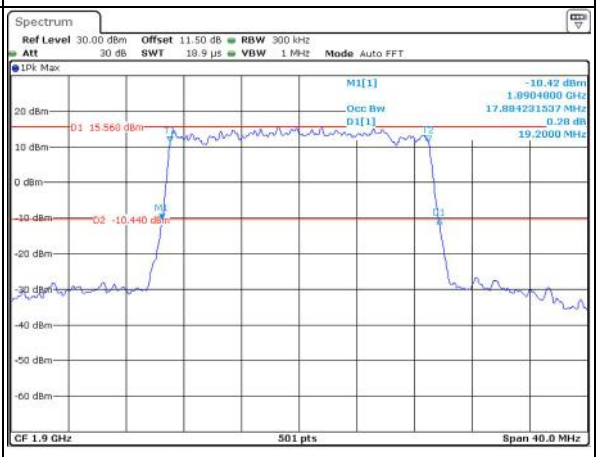
Occupied Bandwidth		
Channel	1.4MHz Bandwidth QPSK	1.4MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

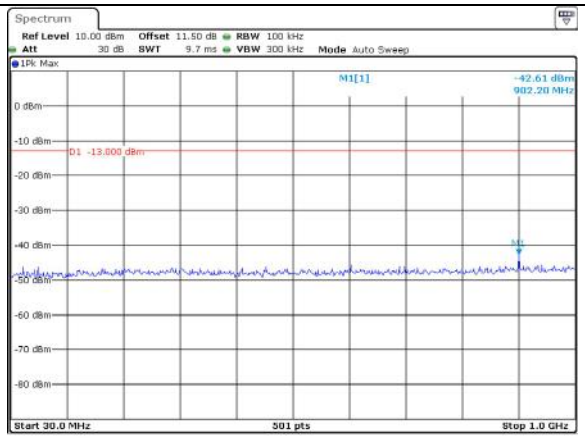
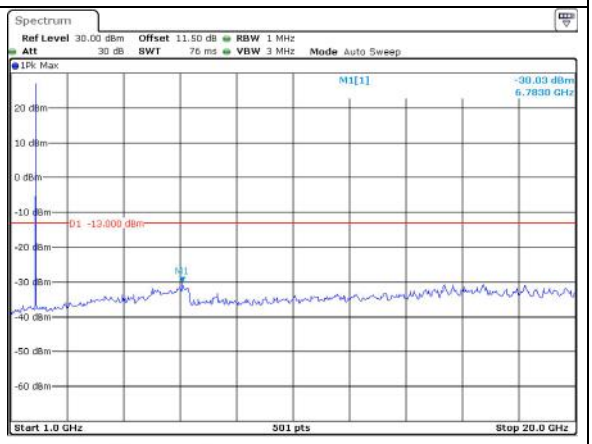
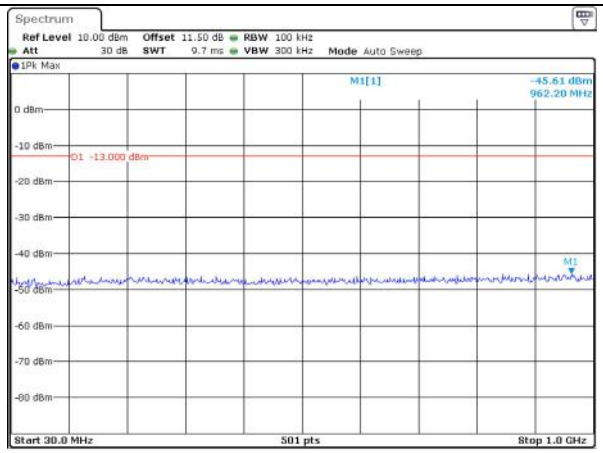
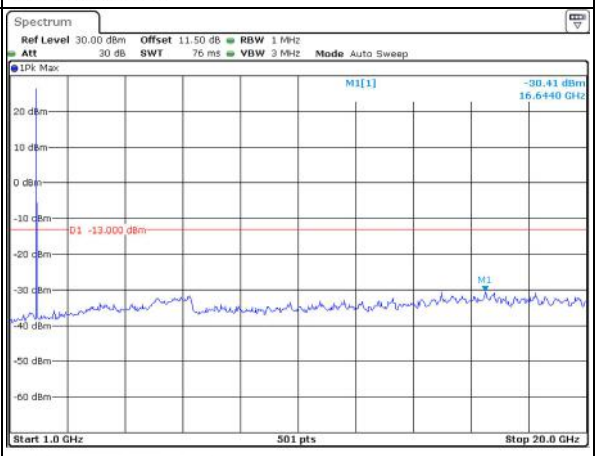
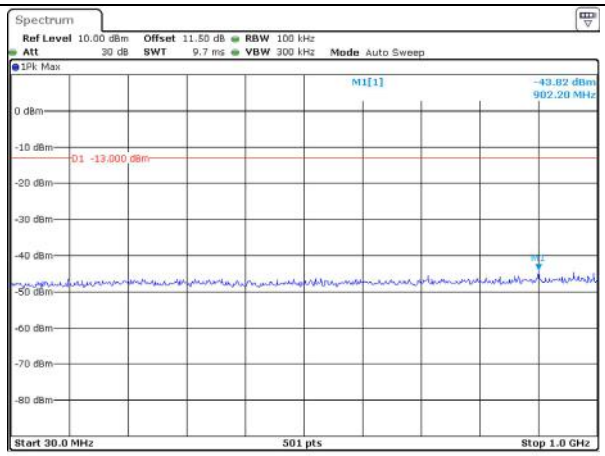
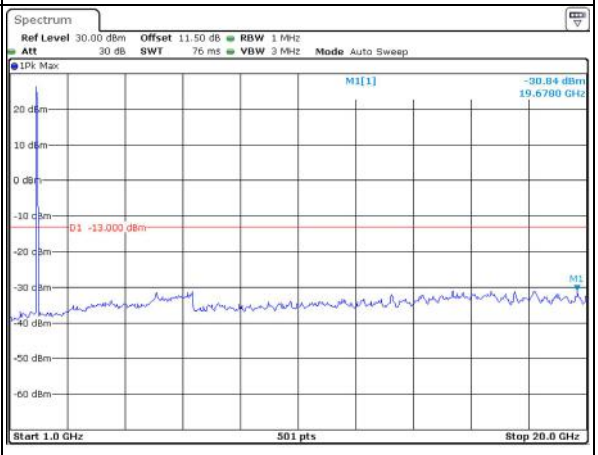
Occupied Bandwidth		
Channel	3MHz Bandwidth QPSK	3MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

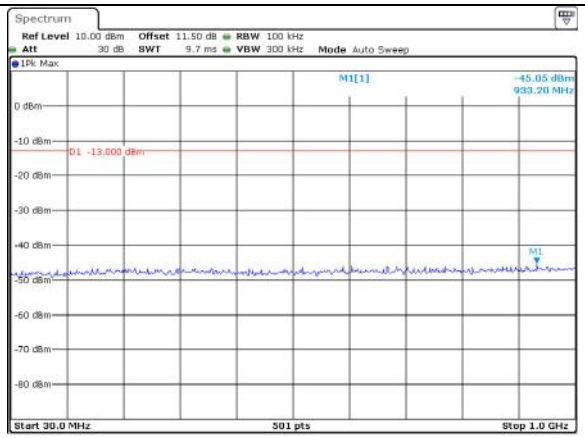
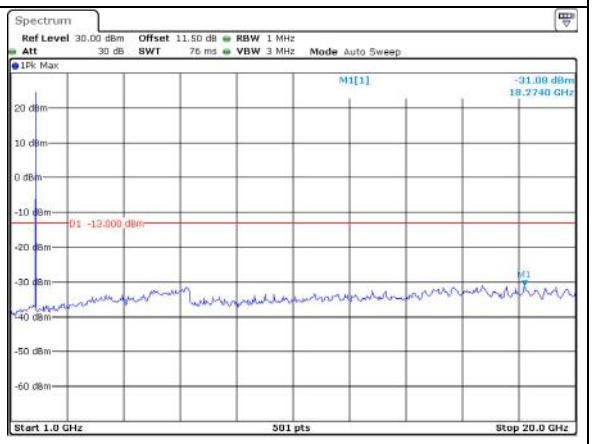
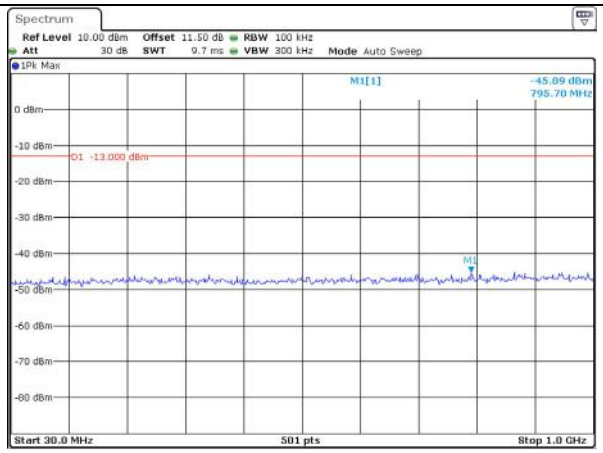
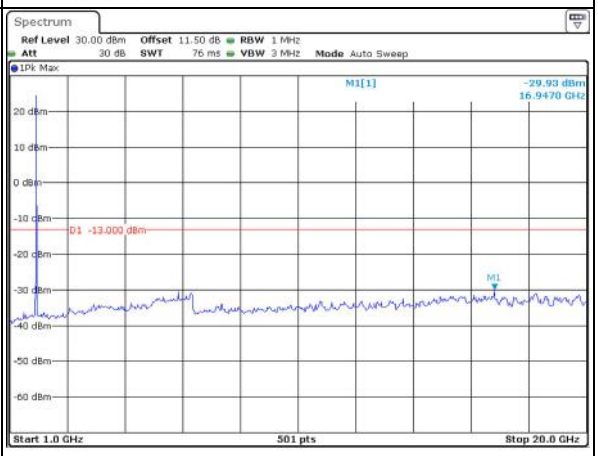
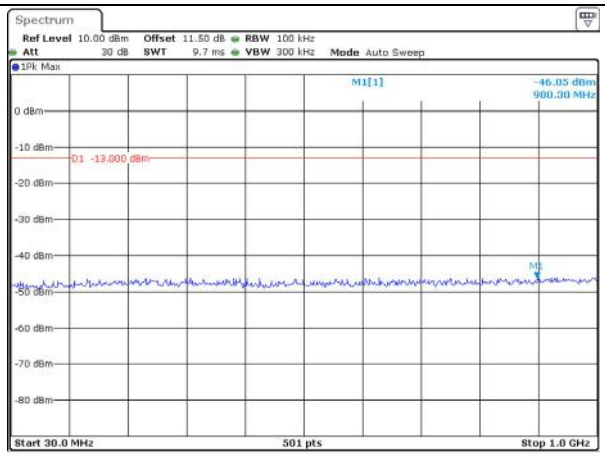
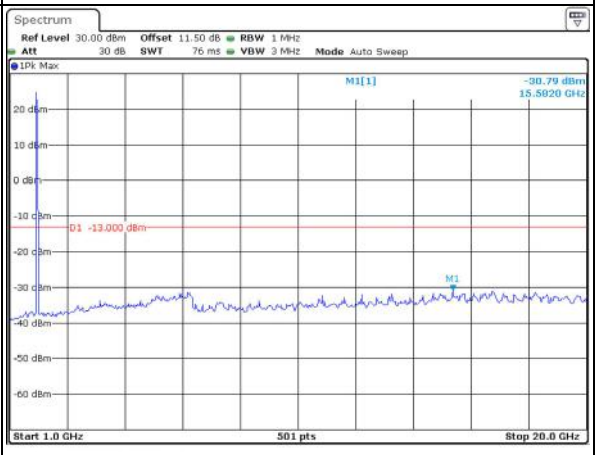
Occupied Bandwidth		
Channel	5MHz Bandwidth QPSK	5MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

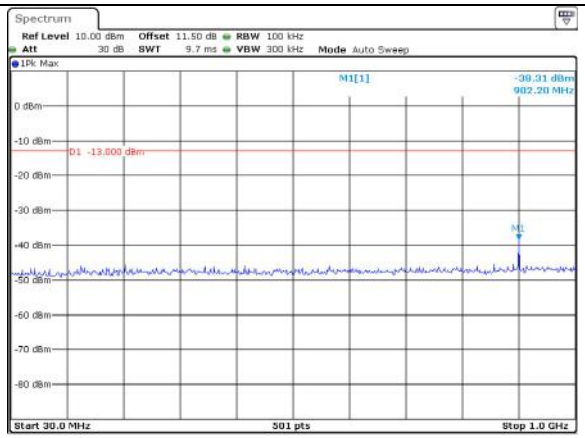
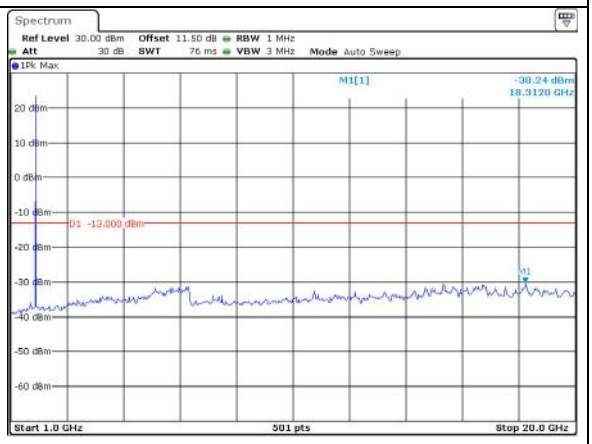
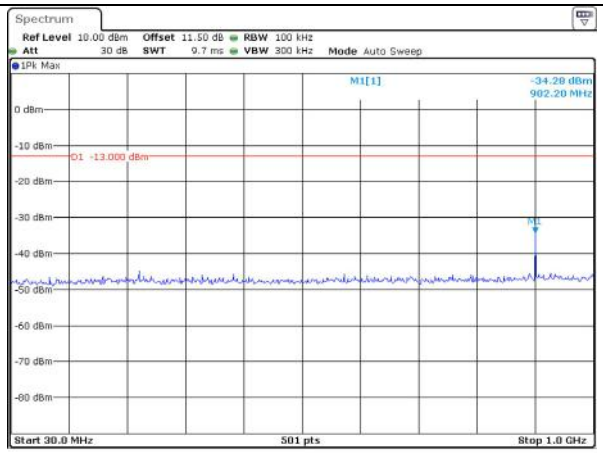
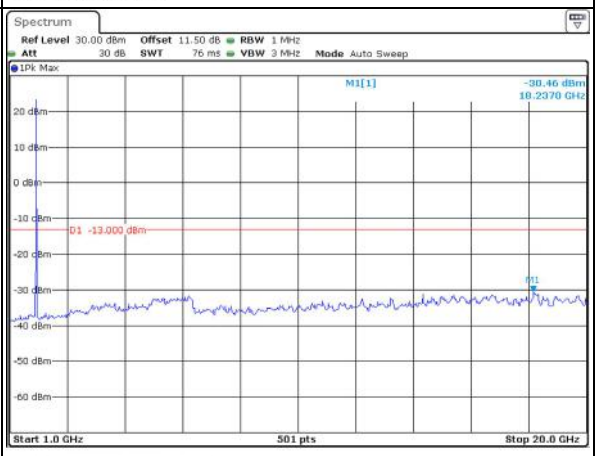
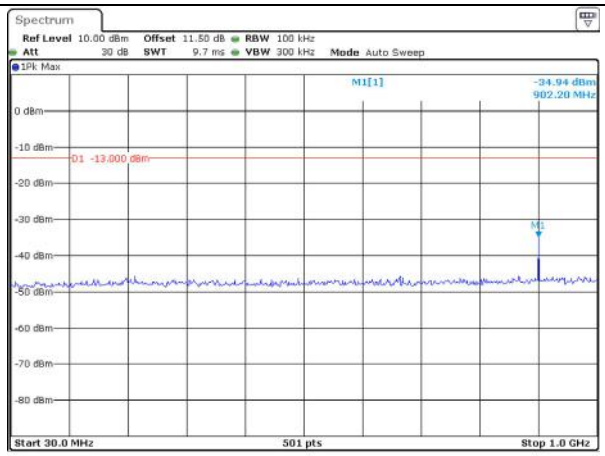
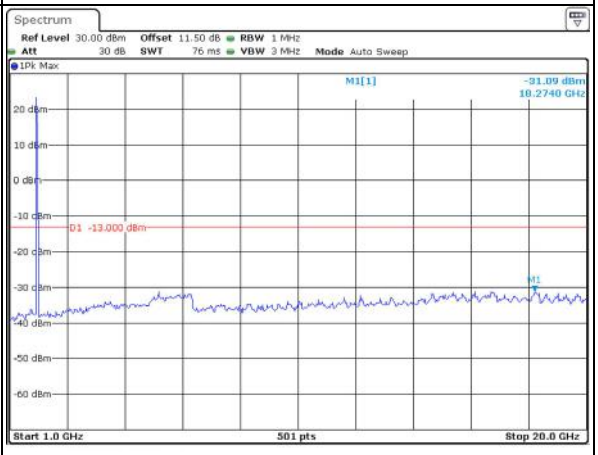
Occupied Bandwidth		
Channel	10MHz Bandwidth QPSK	10MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

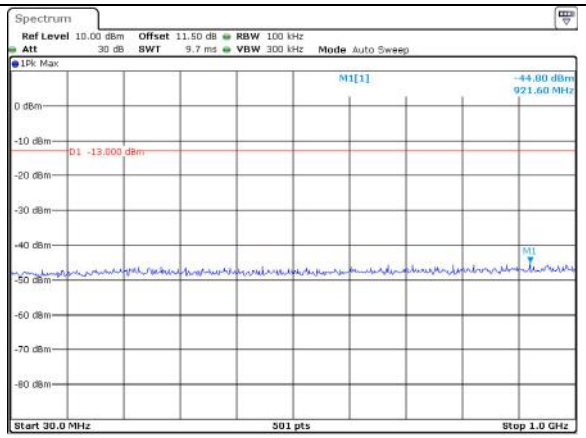
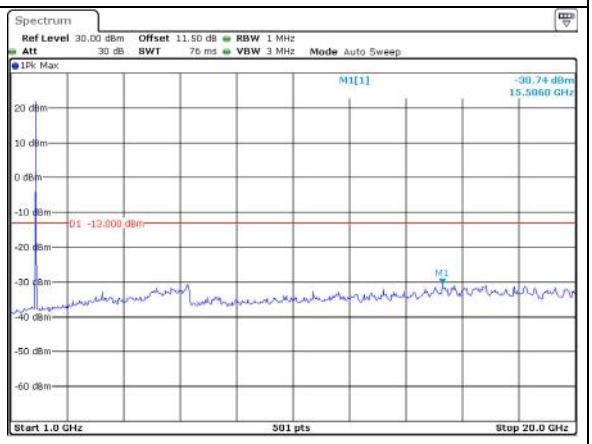
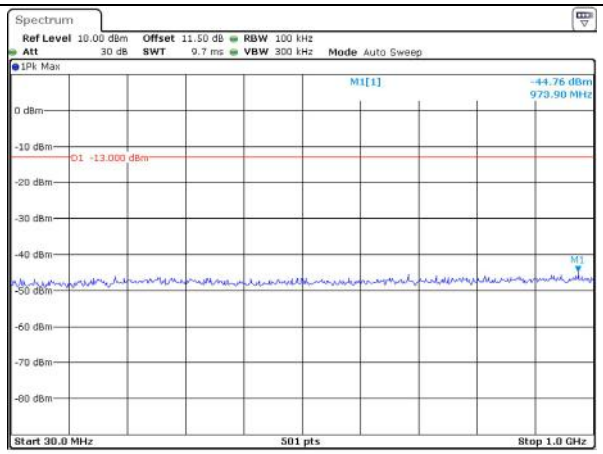
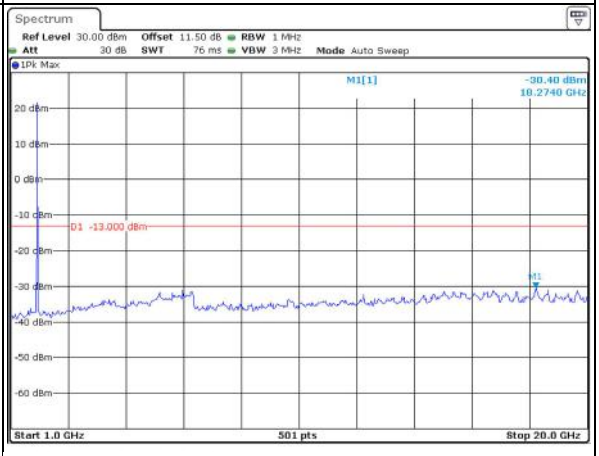
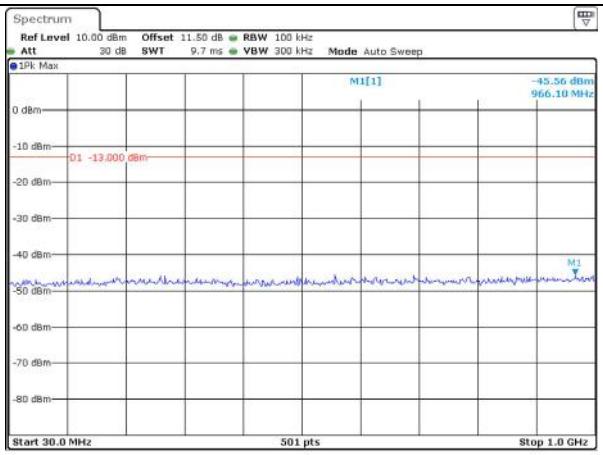
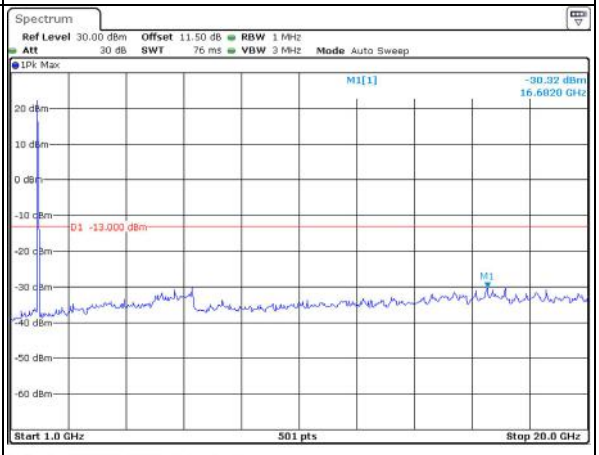
Occupied Bandwidth		
Channel	15MHz Bandwidth QPSK	15MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

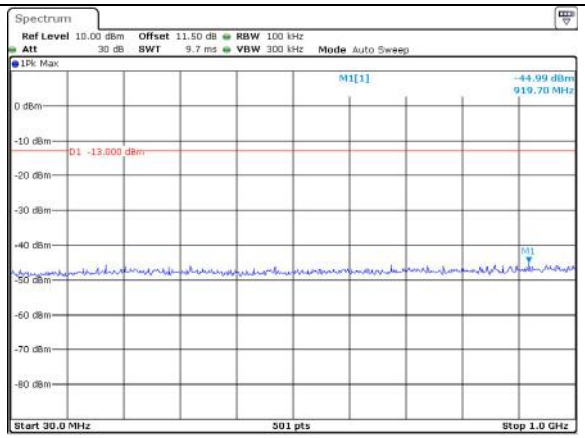
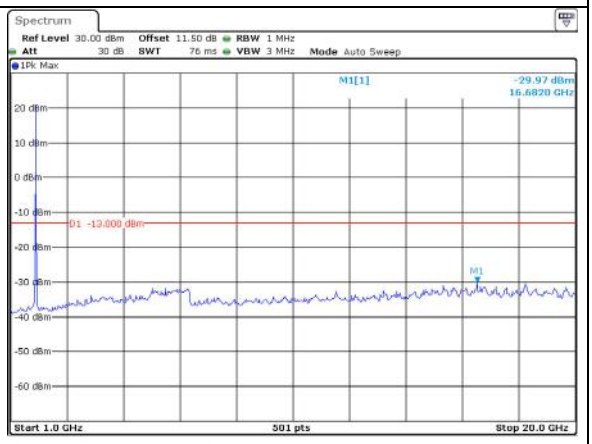
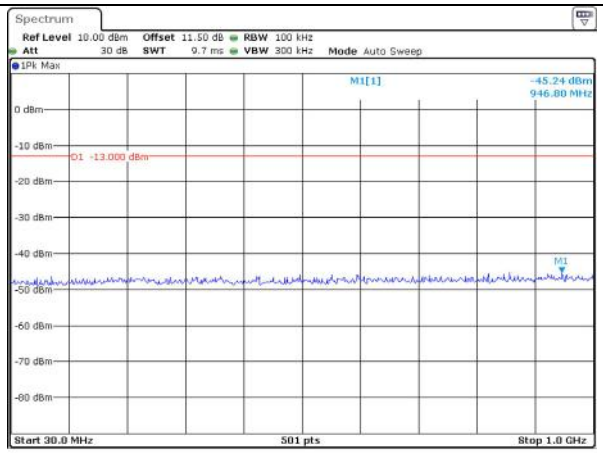
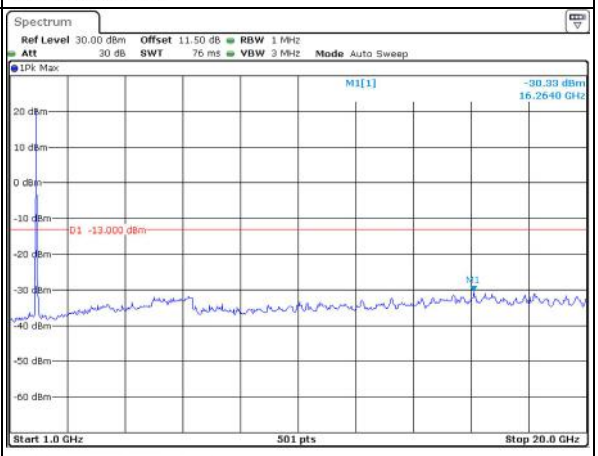
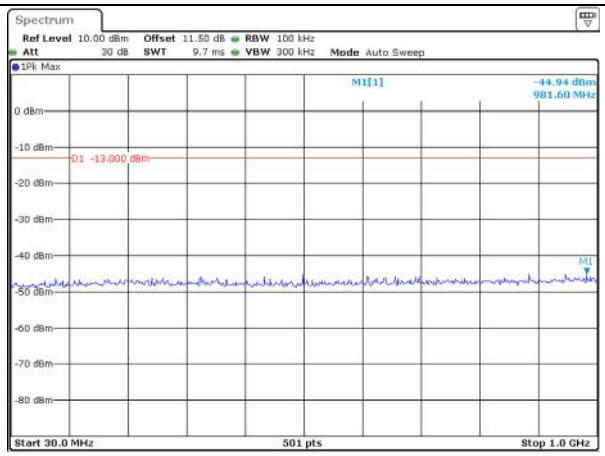
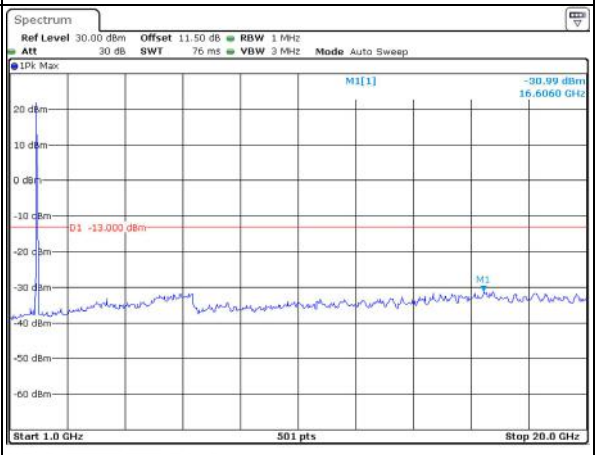
Occupied Bandwidth		
Channel	20MHz Bandwidth QPSK	20MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

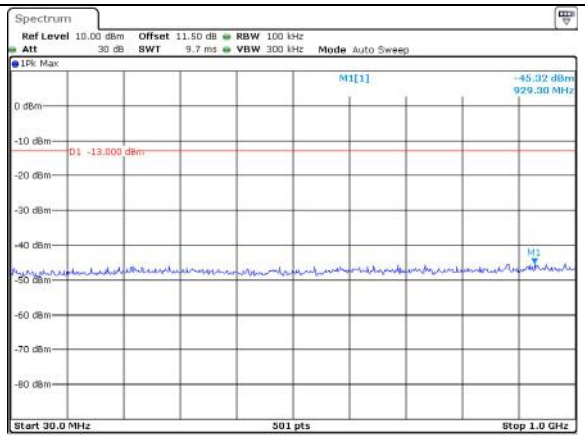
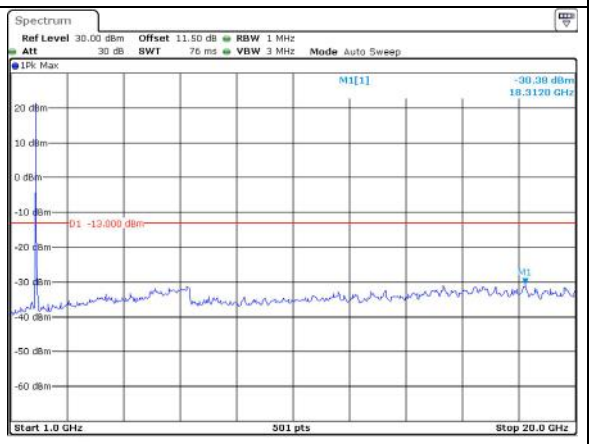
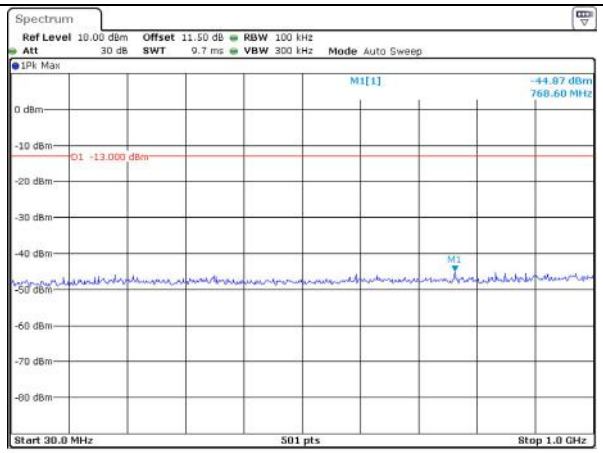
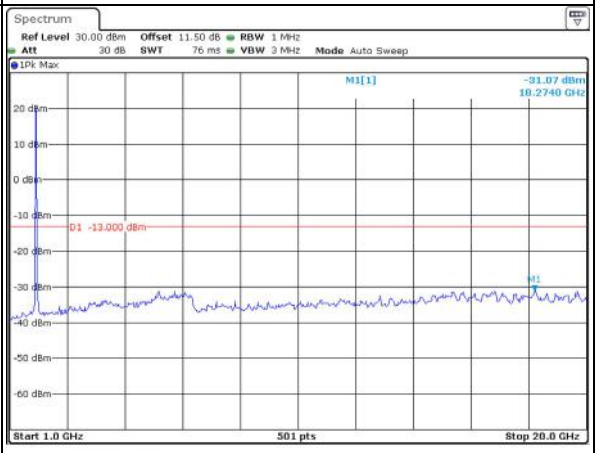
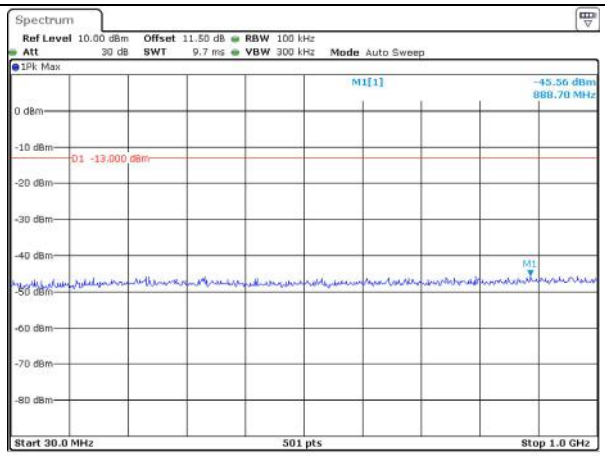
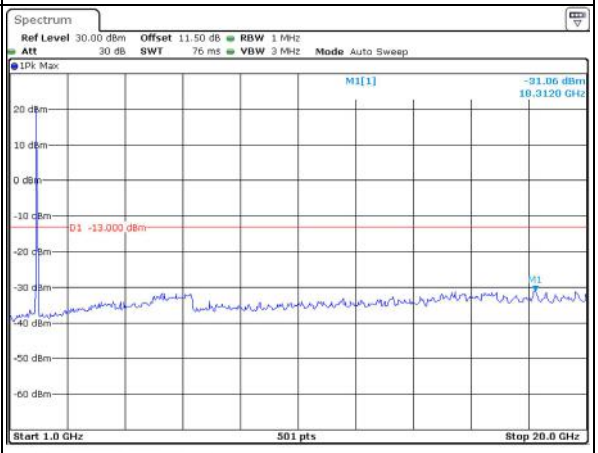
Spurious Emissions at Antenna Terminal		
Channel	**1.4MHz Bandwidth QPSK**	
Lowest		
Middle		
Highest		

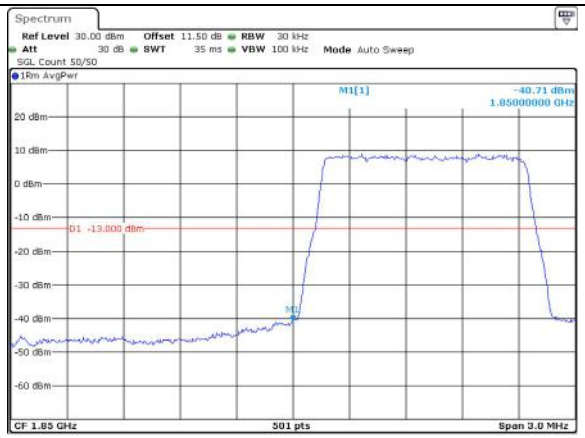
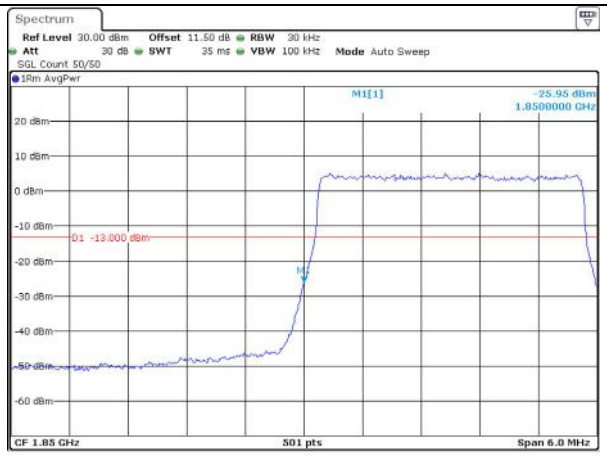
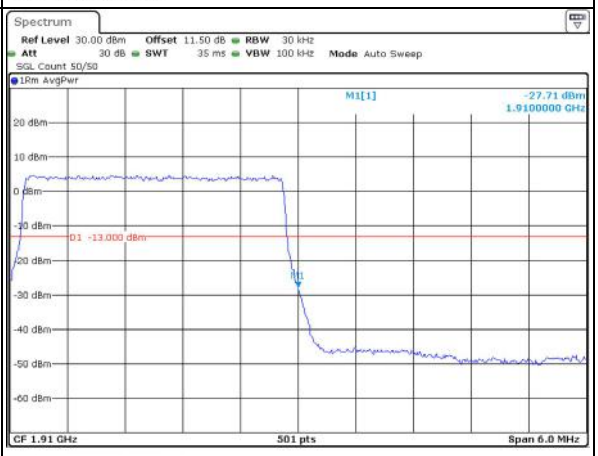
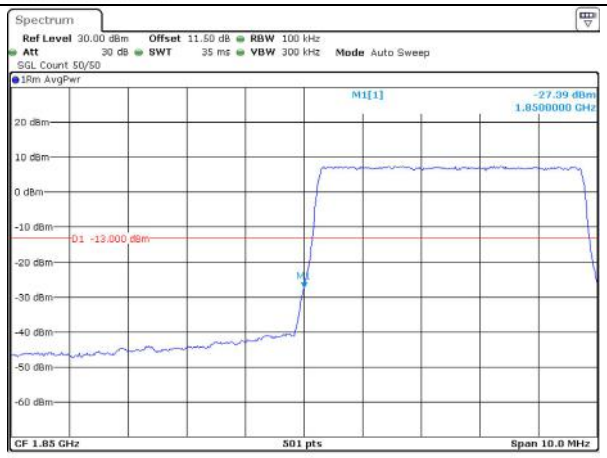
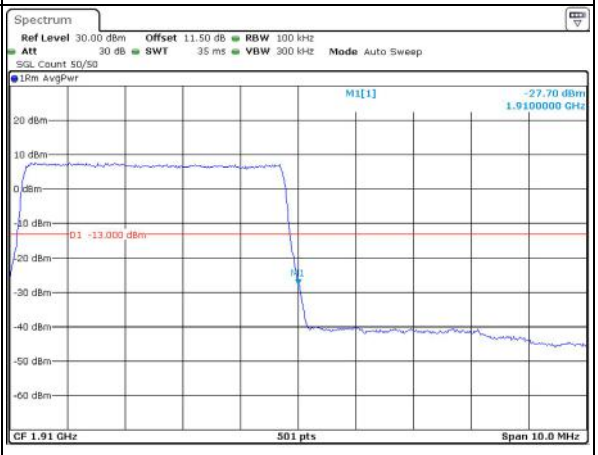
Spurious Emissions at Antenna Terminal		
Channel	**3MHz Bandwidth QPSK**	
Lowest		
Middle		
Highest		

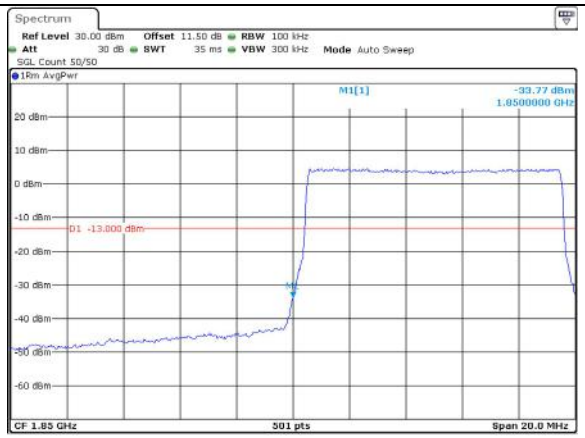
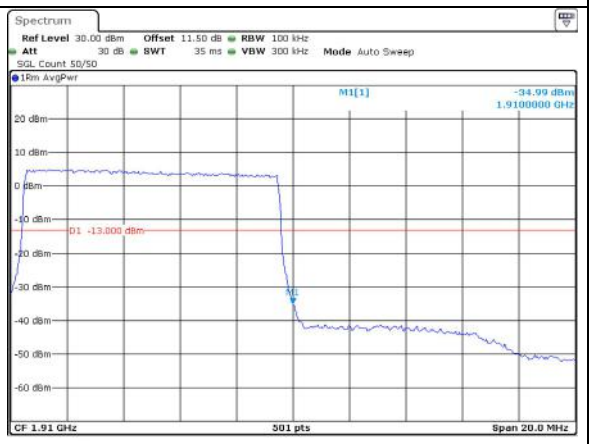
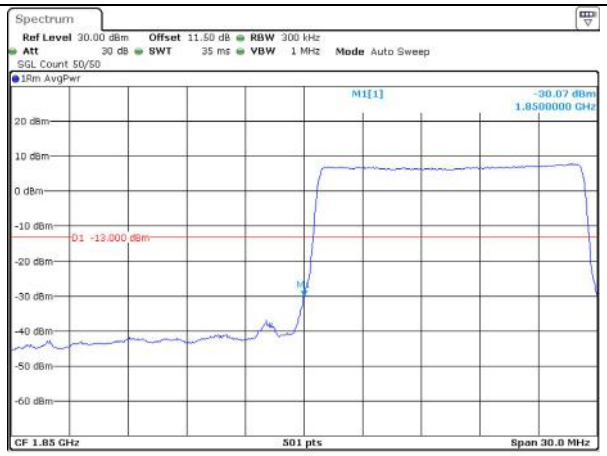
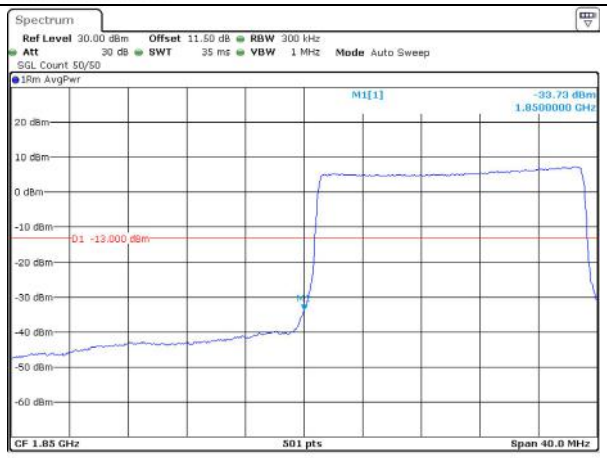
Spurious Emissions at Antenna Terminal		
Channel	**5MHz Bandwidth QPSK**	
Lowest		
Middle		
Highest		

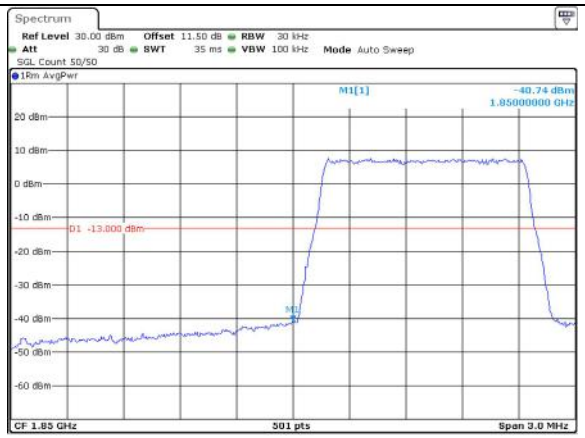
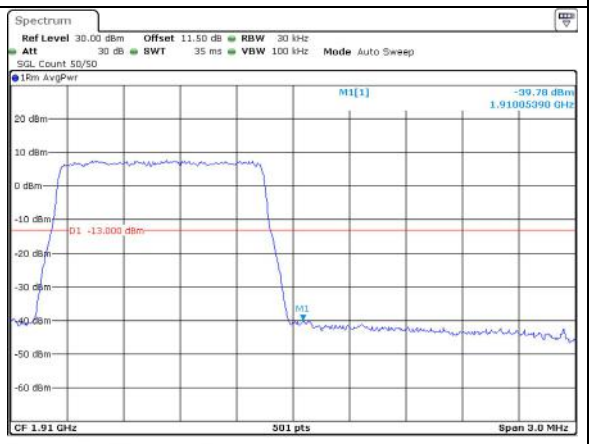
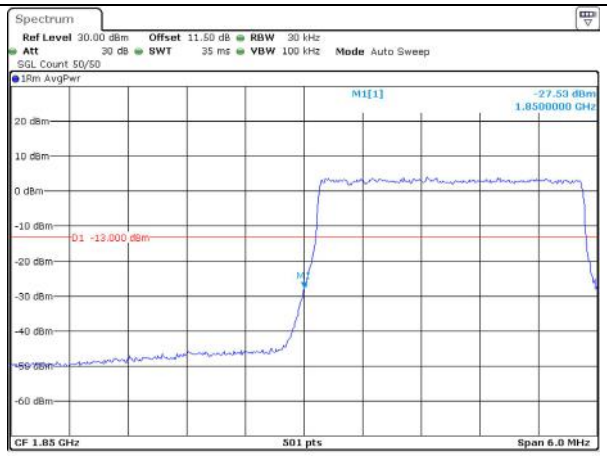
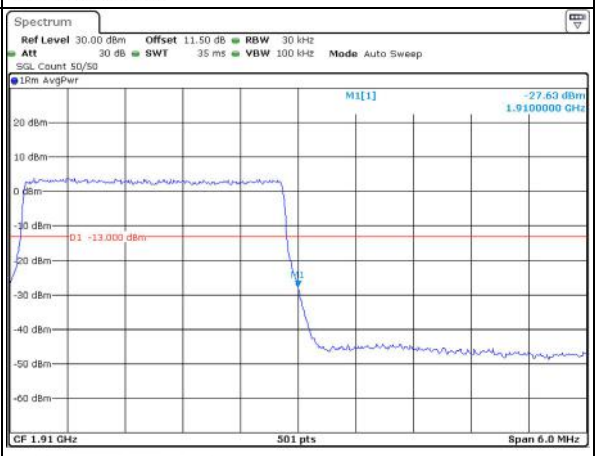
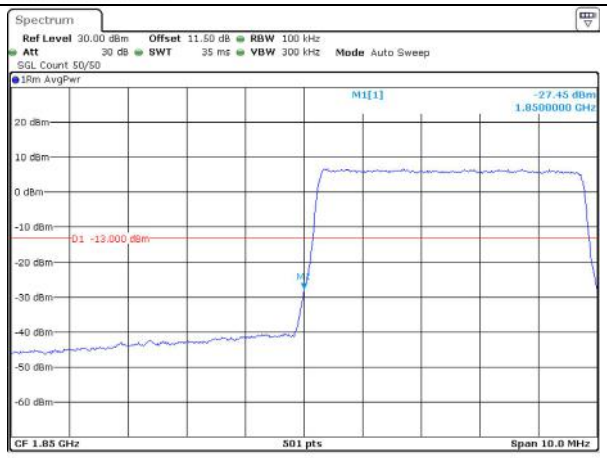
Spurious Emissions at Antenna Terminal		
Channel	**10MHz Bandwidth QPSK**	
Lowest		
Middle		
Highest		

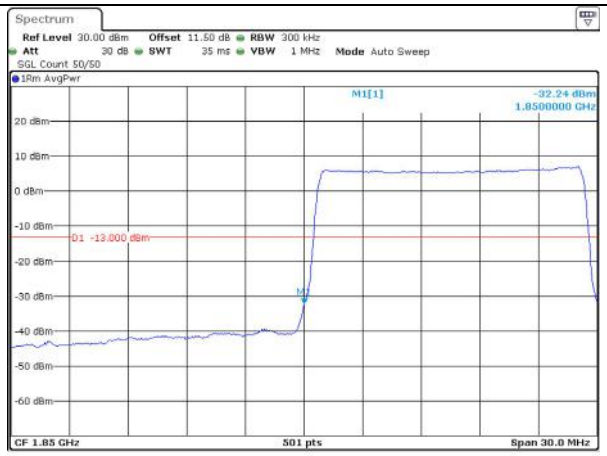
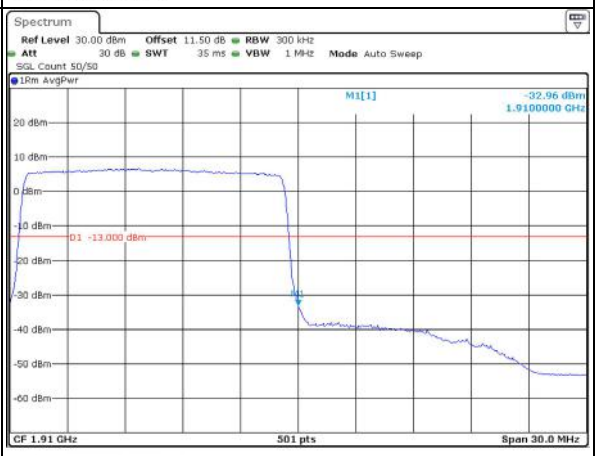
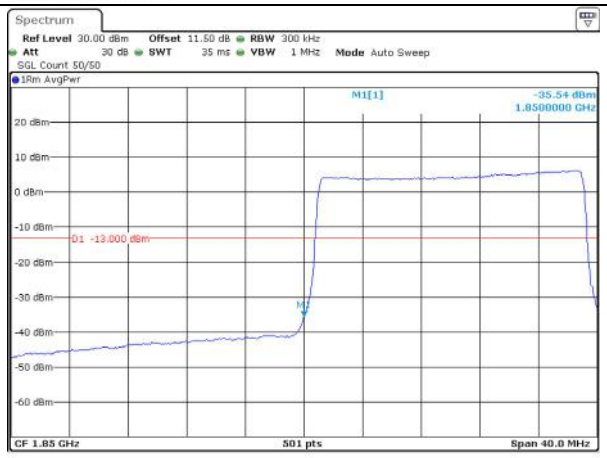
Spurious Emissions at Antenna Terminal		
Channel	**15MHz Bandwidth QPSK**	
Lowest		
Middle		
Highest		

Spurious Emissions at Antenna Terminal		
Channel	**20MHz 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		
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		

4.7 Antenna Port Test Data and Results for LTE Band 4

Serial Number:	294A-2	Test Date:	2023/9/13
Test Site:	RF	Test Mode:	Transmitting
Tester:	Ken Tang	Test Result:	**Pass**

Environmental Conditions:					
Temperature: (℃)	25.6	Relative Humidity: (%)	57	ATM Pressure: (kPa)	101

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101943	2023/3/31	2024/3/30
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
zhuoxiang	Coaxial Cable	SMA-178	211002	Each time	N/A
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060301	Each time	N/A
Minl-Clrcuits	Power Splitter	ZFRSC-183-S+	S F448201619	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	143458	2023/3/31	2024/3/30
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 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	22.66	22.31	22.22	**21.26**	30
	RB1#3	22.65	22.3	22.25		
	RB1#5	22.59	22.28	22.25		
	RB3#0	22.64	22.34	22.18		
	RB3#3	22.59	22.27	22.17		
	RB6#0	21.68	21.38	21.28		
1.4MHz 16QAM	RB1#0	21.82	21.35	21.24	20.52	30
	RB1#3	21.92	21.47	21.29		
	RB1#5	21.79	21.39	21.24		
	RB3#0	21.75	21.34	21.49		
	RB3#3	21.75	21.32	21.48		
	RB6#0	20.31	20.64	20.3		
3MHz QPSK	RB1#0	22.47	22.39	22.27	21.07	30
	RB1#8	22.45	22.43	22.33		
	RB1#14	22.38	22.41	22.3		
	RB6#0	21.51	21.41	21.25		
	RB6#9	21.49	21.39	21.33		
	RB15#0	21.47	21.37	21.21		
3MHz 16QAM	RB1#0	21.47	21.57	21.32	20.18	30
	RB1#8	21.54	21.58	21.44		
	RB1#14	21.45	21.47	21.35		
	RB6#0	20.57	20.46	20.36		
	RB6#9	20.53	20.47	20.46		
	RB15#0	20.51	20.42	20.16		
5MHz QPSK	RB1#0	22.49	22.38	22.31	21.13	30
	RB1#13	22.53	22.4	22.33		
	RB1#24	22.49	22.36	22.32		
	RB15#0	21.49	21.37	21.35		
	RB15#10	21.5	21.37	21.3		
	RB25#0	21.51	21.42	21.36		
5MHz 16QAM	RB1#0	21.98	21.6	21.53	**20.64**	30
	RB1#13	22.04	21.63	21.59		
	RB1#24	21.93	21.58	21.55		
	RB15#0	20.6	20.33	20.42		
	RB15#10	20.61	20.37	20.42		
	RB25#0	20.48	20.41	20.43		
10MHz QPSK	RB1#0	22.42	22.27	22.3	21.02	30

	RB1#25	22.41	22.35	22.32		
	RB1#49	22.36	22.37	22.26		
	RB25#0	21.38	21.34	21.32		
	RB25#25	21.45	21.43	21.35		
	RB50#0	21.45	21.42	21.26		
10MHz 16QAM	RB1#0	21.42	21.47	21.35	20.17	30
	RB1#25	21.45	21.57	21.38		
	RB1#49	21.38	21.54	21.44		
	RB25#0	20.52	20.37	20.27		
	RB25#25	20.53	20.43	20.28		
	RB50#0	20.42	20.44	20.27		
15MHz QPSK	RB1#0	22.27	22.03	22.13	20.87	30
	RB1#38	22.2	22.17	22.12		
	RB1#74	22.12	22.16	22.14		
	RB36#0	21.37	21.16	21.18		
	RB36#39	21.28	21.25	21.23		
	RB75#0	21.33	21.29	21.22		
15MHz 16QAM	RB1#0	21.53	21.62	21.43	20.28	30
	RB1#38	21.43	21.68	21.38		
	RB1#74	21.38	21.67	21.39		
	RB36#0	20.38	20.16	20.2		
	RB36#39	20.32	20.28	20.28		
	RB75#0	20.35	20.21	20.25		
20MHz QPSK	RB1#0	22.26	22.18	22.14	20.86	30
	RB1#50	22.17	22.19	22.09		
	RB1#99	22.15	22.24	22.14		
	RB50#0	21.23	21.19	21.24		
	RB50#50	21.25	21.29	21.27		
	RB100#0	21.31	21.33	21.2		
20MHz 16QAM	RB1#0	21.54	21.46	21.65	20.30	30
	RB1#50	21.45	21.41	21.63		
	RB1#99	21.39	21.55	21.7		
	RB50#0	20.31	20.17	20.29		
	RB50#50	20.22	20.29	20.28		
	RB100#0	20.36	20.3	20.21		
Note: EIRP=Conducted Power(dBm) - L_C(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	8.10	8.66	6.01	13
	RB100#0	6.68	8.92	6.59	13
20MHz 16QAM	RB1#0	8.32	8.75	9.47	13
	RB100#0	9.96	7.78	7.37	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	1.078	1.096	1.084	1.206	1.212	1.212
1.4MHz 16QAM	1.072	1.078	1.09	1.200	1.212	1.22
3MHz QPSK	2.683	2.695	2.683	2.952	2.940	2.964
3MHz 16QAM	2.683	2.683	2.683	2.976	2.964	2.952
5MHz QPSK	4.511	4.511	4.511	4.980	5.020	5.000
5MHz 16QAM	4.511	4.531	4.511	4.980	5.020	5.020
10MHz QPSK	8.982	8.942	8.982	9.720	9.640	9.720
10MHz 16QAM	8.942	8.982	8.982	9.600	9.720	9.720
15MHz QPSK	13.533	13.473	13.473	14.820	14.640	14.820
15MHz 16QAM	13.533	13.533	13.473	14.700	14.760	14.700
20MHz QPSK	17.964	17.884	17.964	19.440	19.440	19.440
20MHz 16QAM	17.964	17.884	17.884	19.440	19.520	19.440
Note: The test plots please refer to the Plots of Occupied Bandwidth						

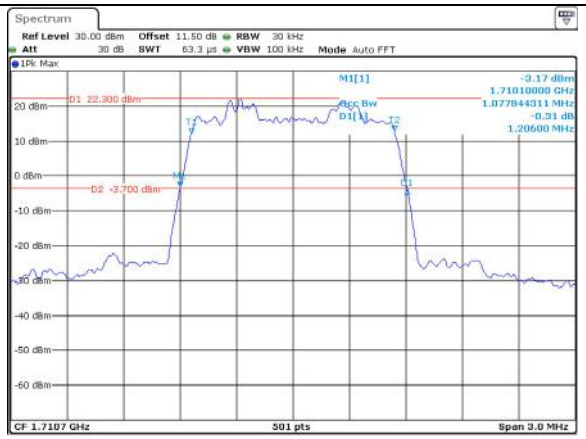
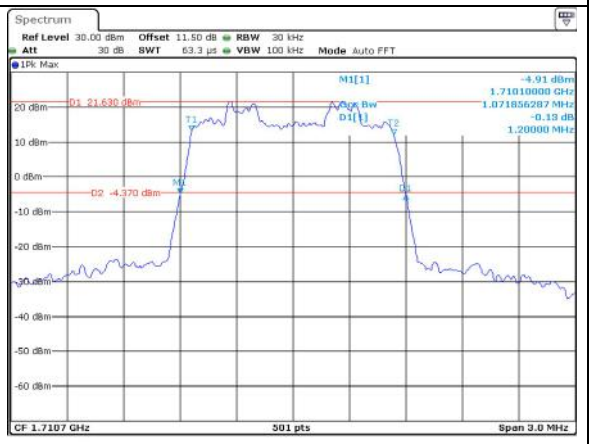
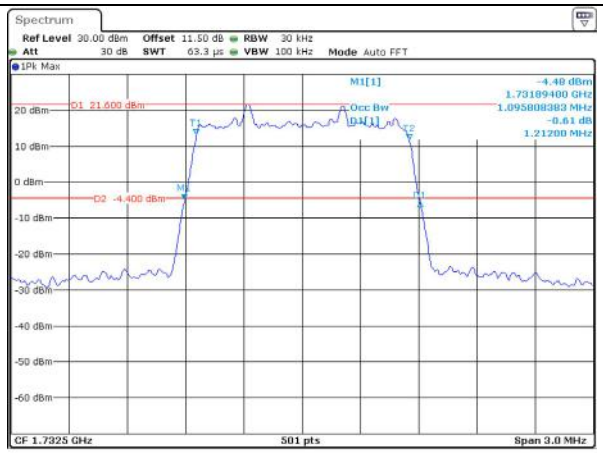
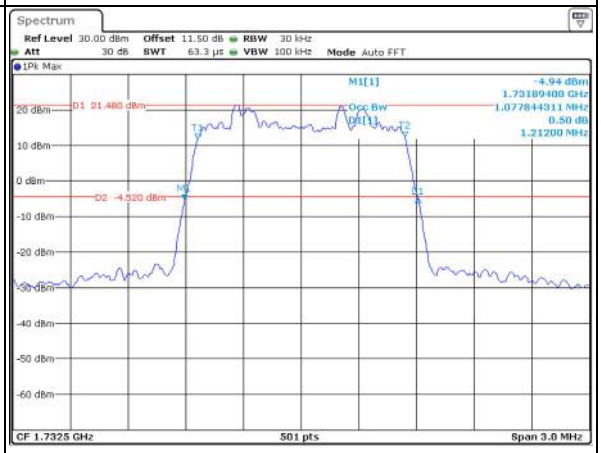
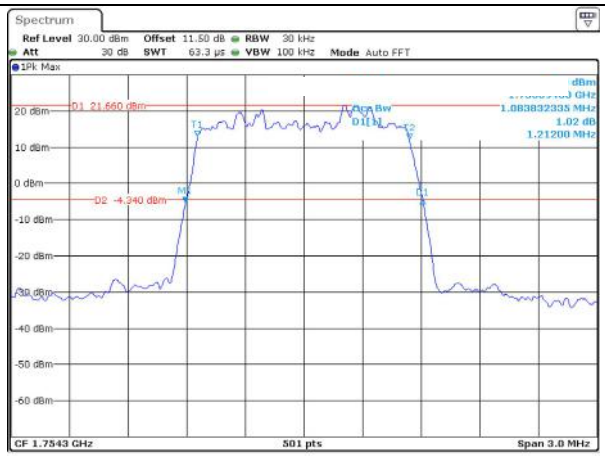
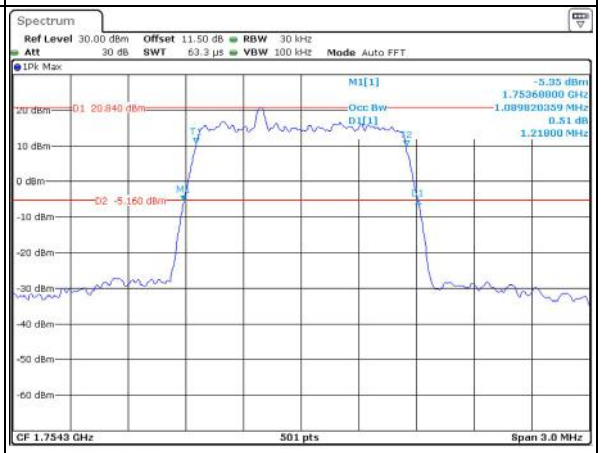
FCC §2.1051, § 27.53:Spurious Emissions at Antenna Terminal	
Result:	**Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.**

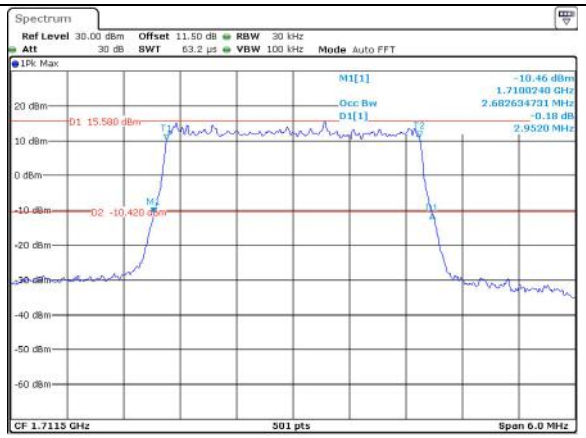
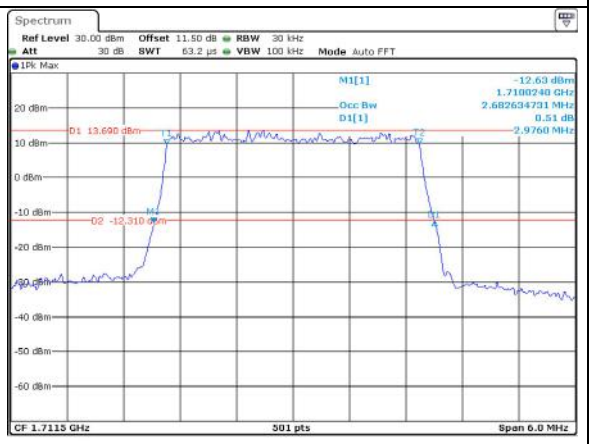
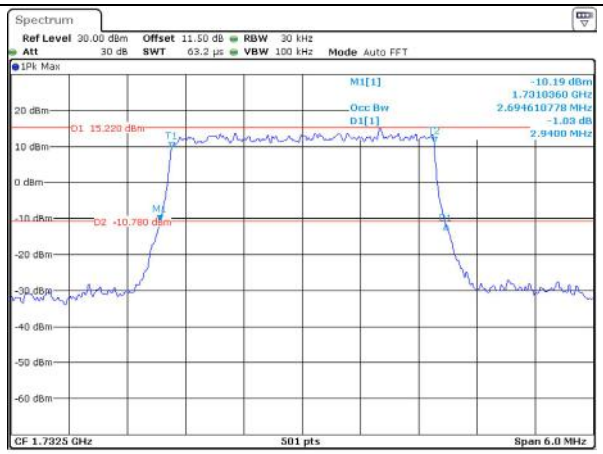
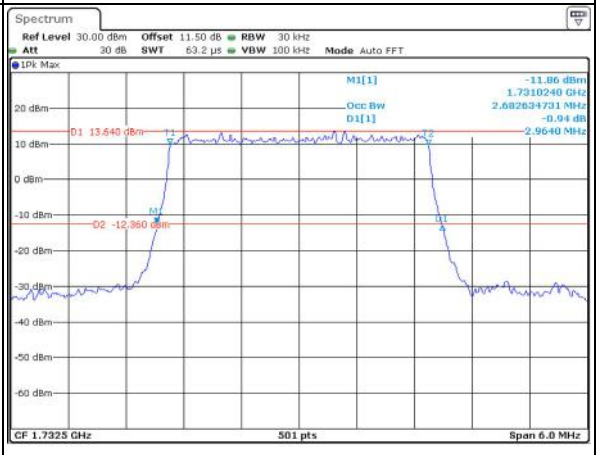
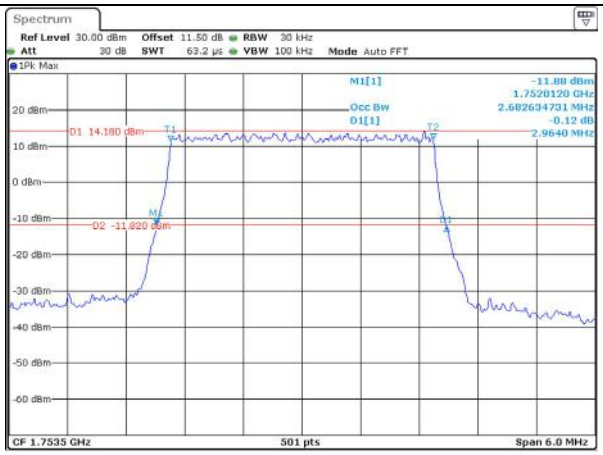
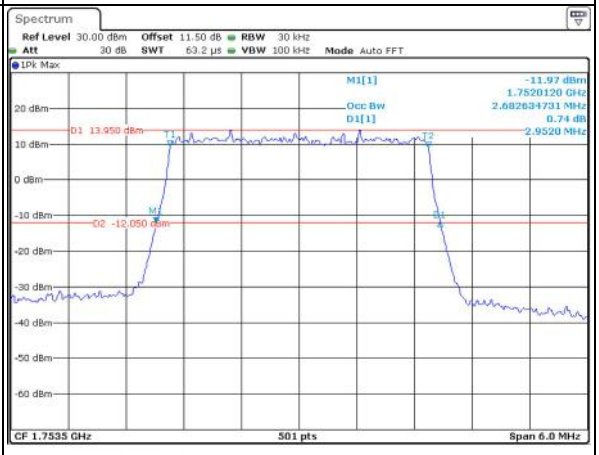
FCC §2.1051, § 27.53:Out of band emission, Band Edge	
Result:	**Pass, Please refer to the test plots of Out of band emission, Band Edge.**

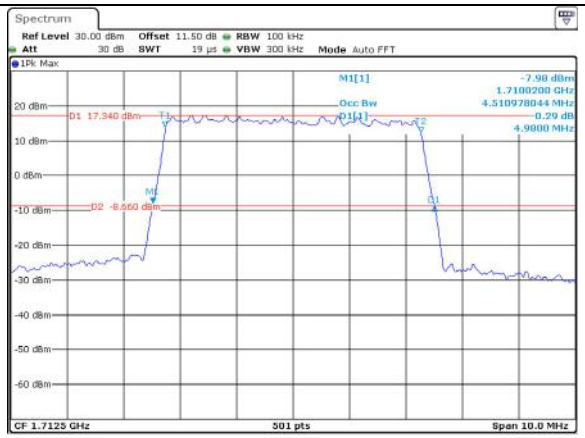
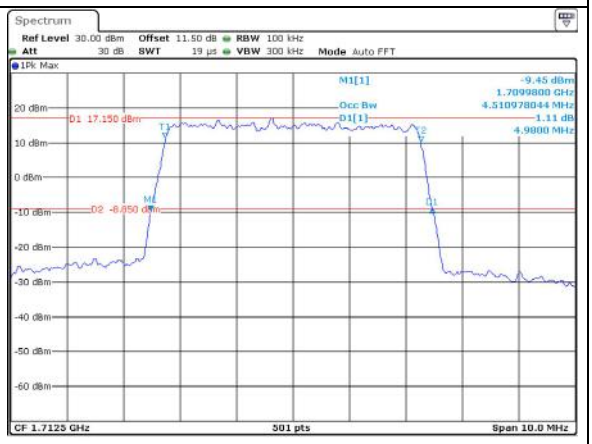
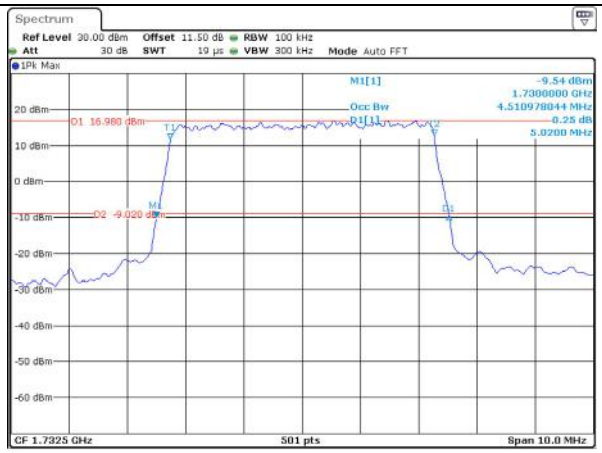
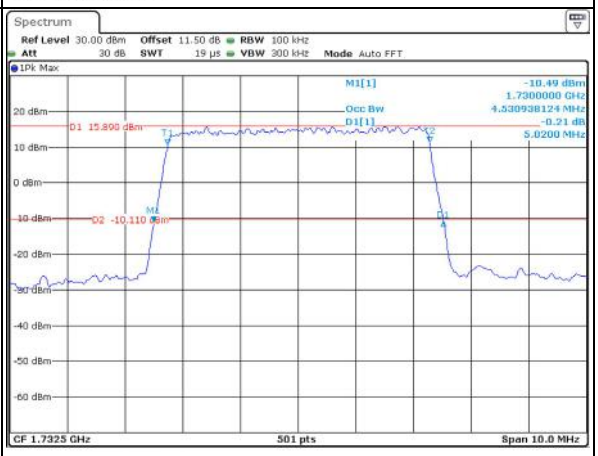
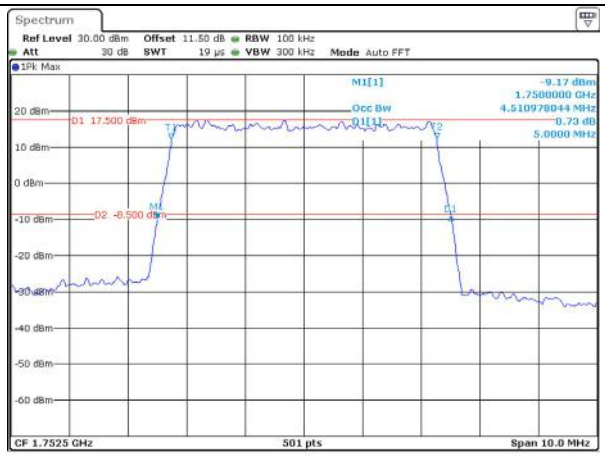
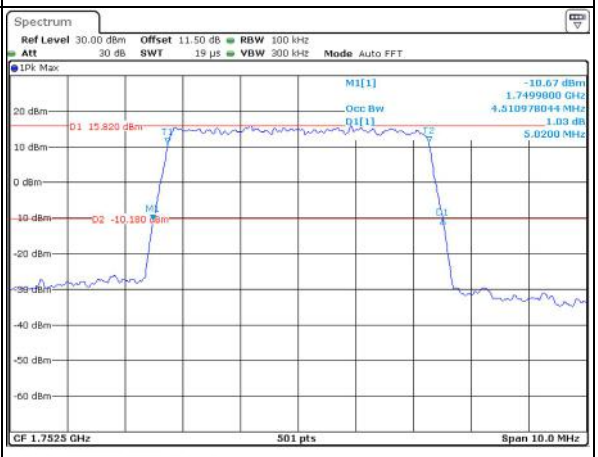
FCC §2.1055, §27.54: Frequency Stability						
Test Mode:	20M QPSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (℃)	Voltage (V_{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.85	1710.019	1710.00	1754.971	1755
	-20	3.85	1710.004	1710.00	1754.987	1755
	-10	3.85	1710.009	1710.00	1754.992	1755
	0	3.85	1710.005	1710.00	1754.995	1755
	10	3.85	1710.008	1710.00	1754.992	1755
	20	3.85	1710.024	1710.00	1754.983	1755
	30	3.85	1710.029	1710.00	1754.988	1755
	40	3.85	1710.005	1710.00	1754.984	1755
	50	3.85	1710.015	1710.00	1754.995	1755
Frequency Stability vs. Voltage	20	3.66	1710.014	1710.00	1754.973	1755
	20	4.24	1710.015	1710.00	1754.993	1755
					Result:	**Pass**

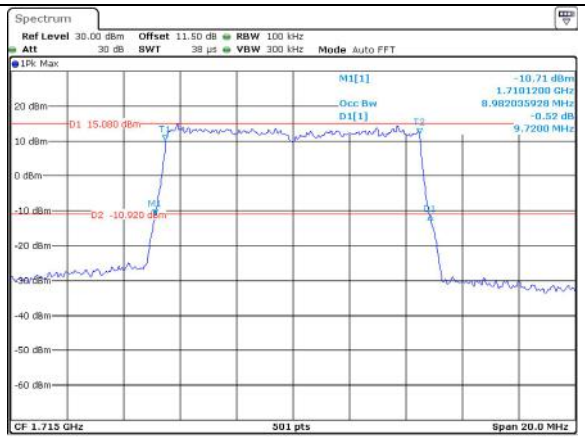
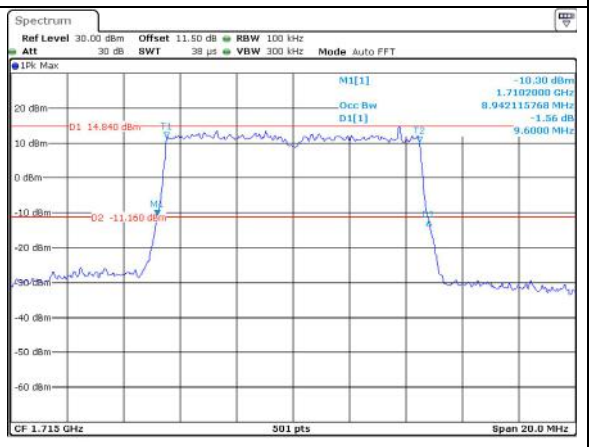
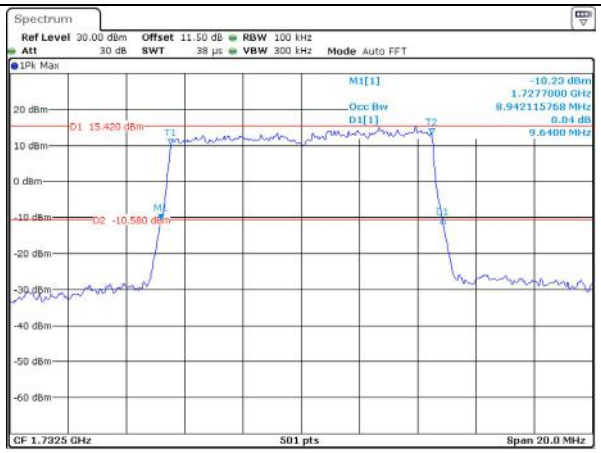
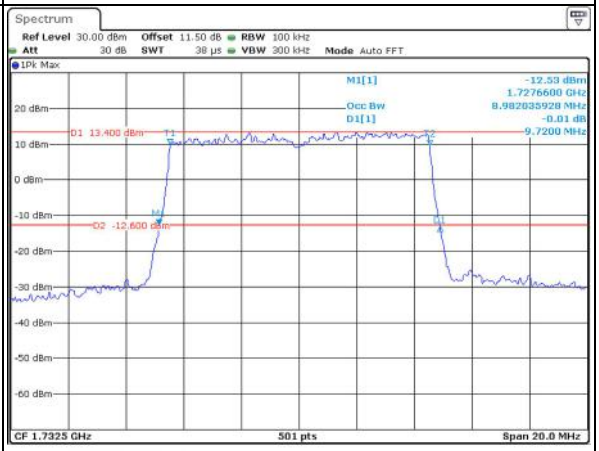
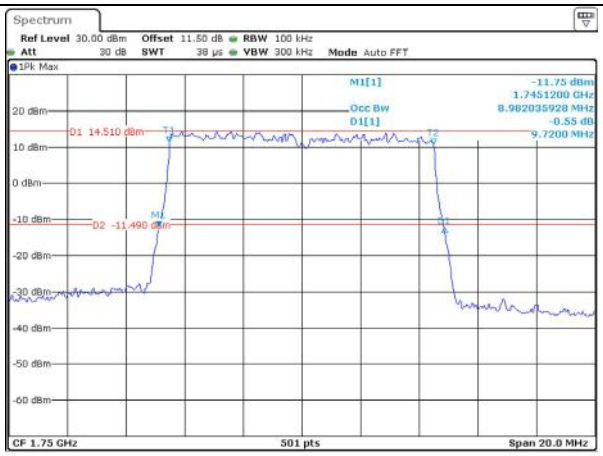
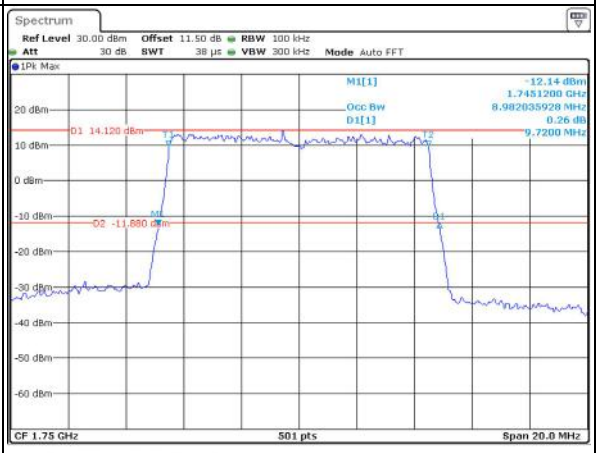
Test Mode:	20M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (℃)	Voltage (V_{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.85	1710.016	1710.00	1754.989	1755
	-20	3.85	1710.023	1710.00	1754.980	1755
	-10	3.85	1710.030	1710.00	1754.994	1755
	0	3.85	1710.003	1710.00	1754.991	1755
	10	3.85	1710.023	1710.00	1754.993	1755
	20	3.85	1710.014	1710.00	1754.997	1755
	30	3.85	1710.023	1710.00	1754.980	1755
	40	3.85	1710.013	1710.00	1754.992	1755
	50	3.85	1710.030	1710.00	1754.979	1755
Frequency Stability vs. Voltage	20	3.66	1710.028	1710.00	1754.983	1755
	20	4.24	1710.008	1710.00	1754.985	1755
					Result:	**Pass**

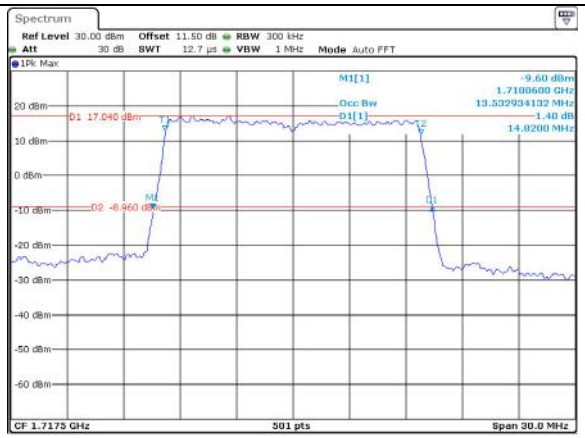
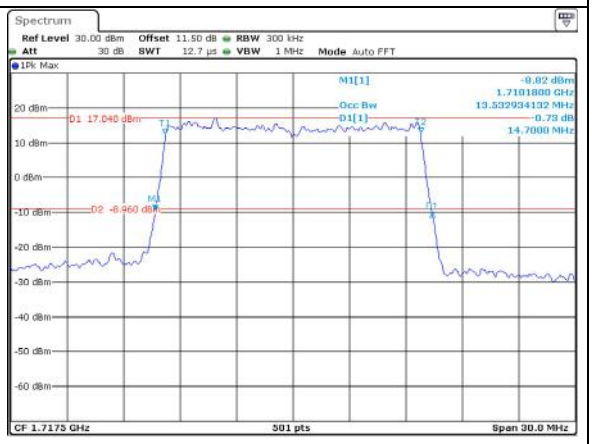
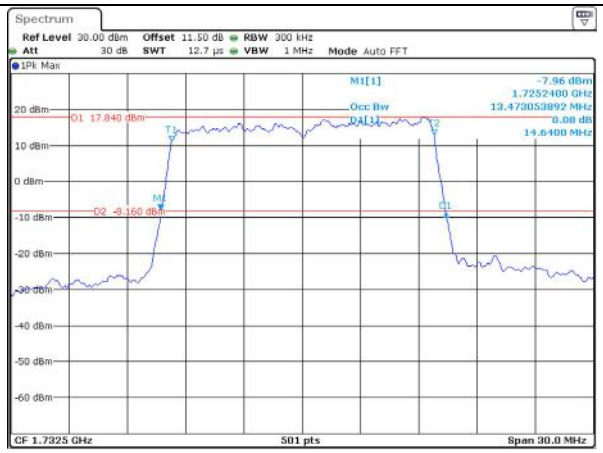
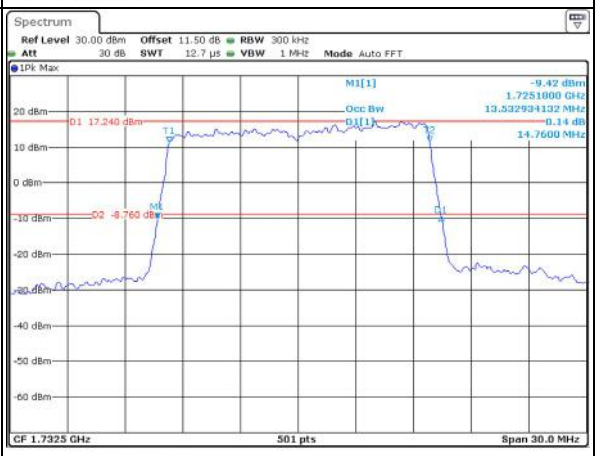
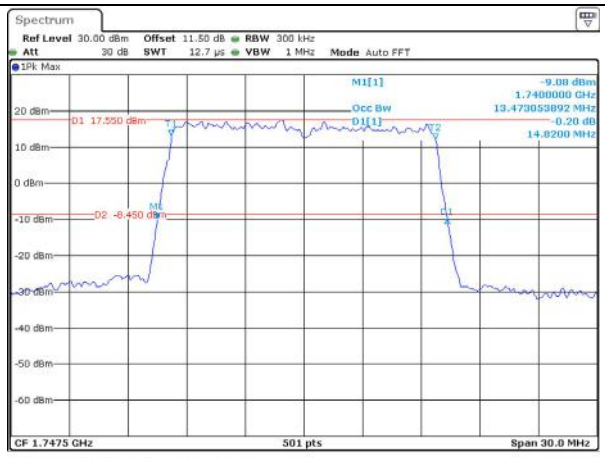
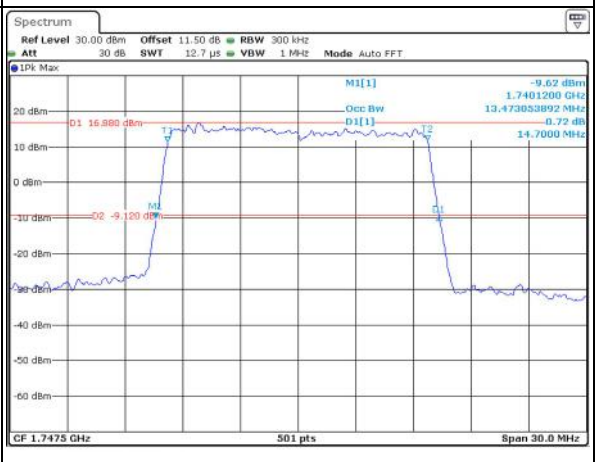
Test Plots(Note: The 11.5 dB is the Insertion loss of the RF cable and Power Splitter, which was offset into the Spectrum Analyzer):

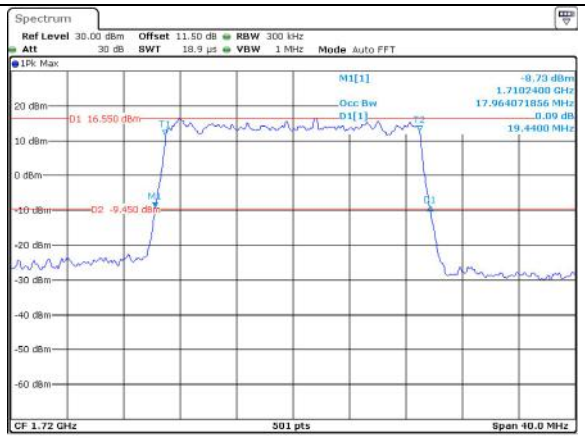
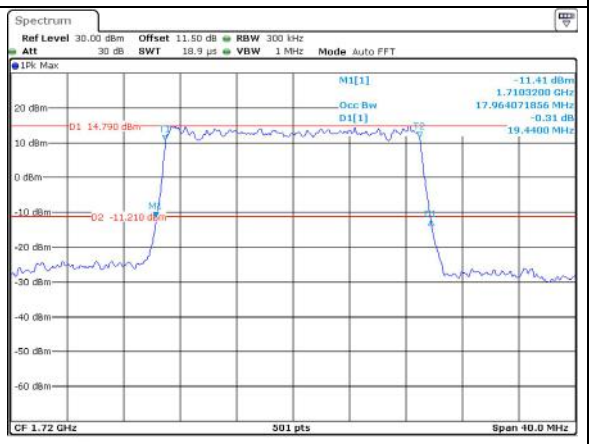
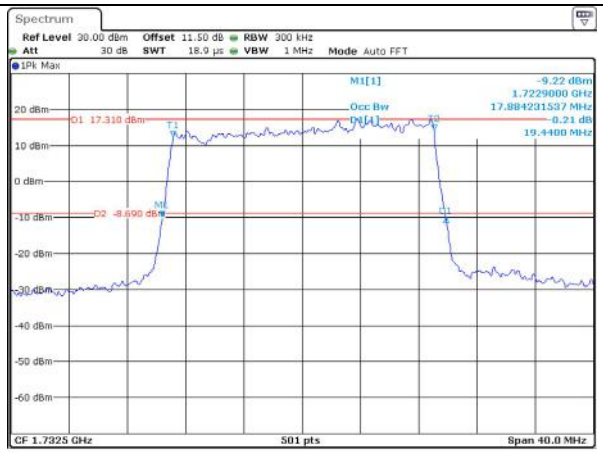
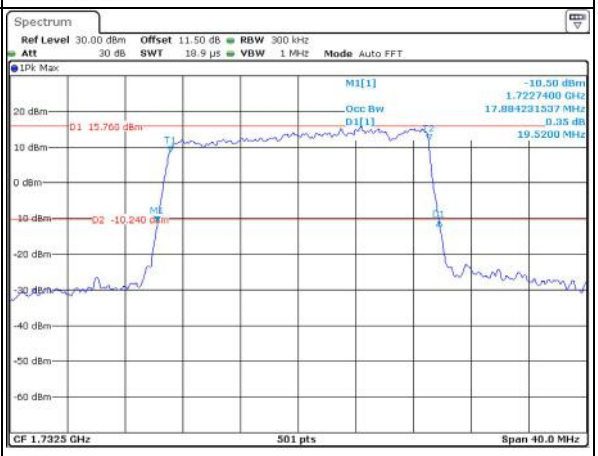
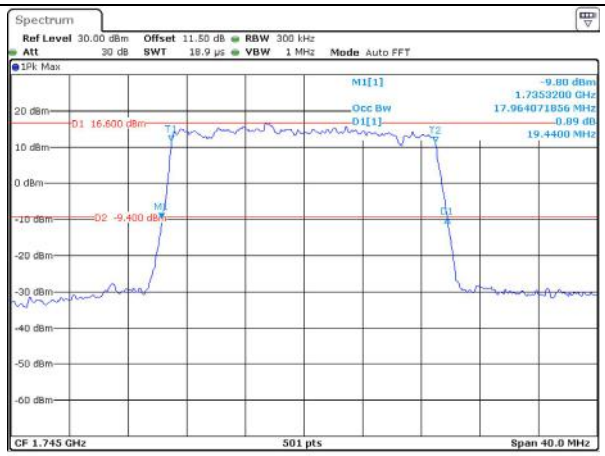
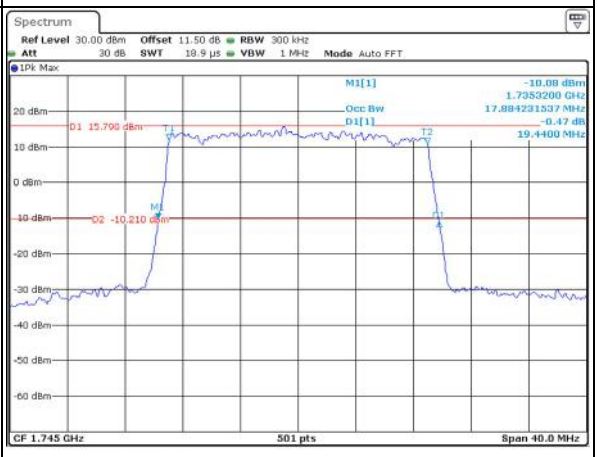
Occupied Bandwidth		
Channel	1.4MHz Bandwidth QPSK	1.4MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

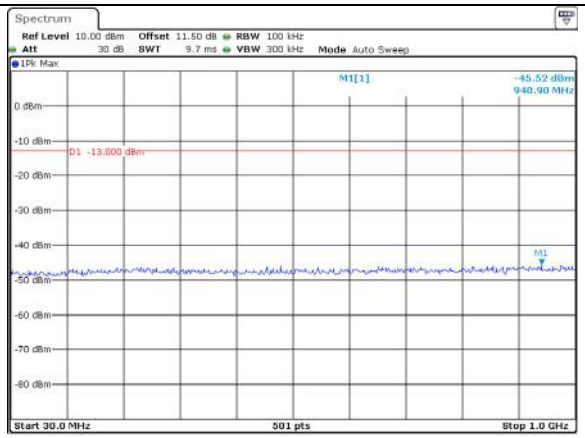
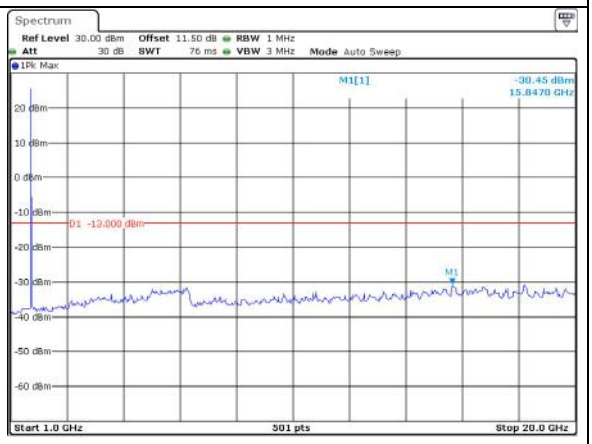
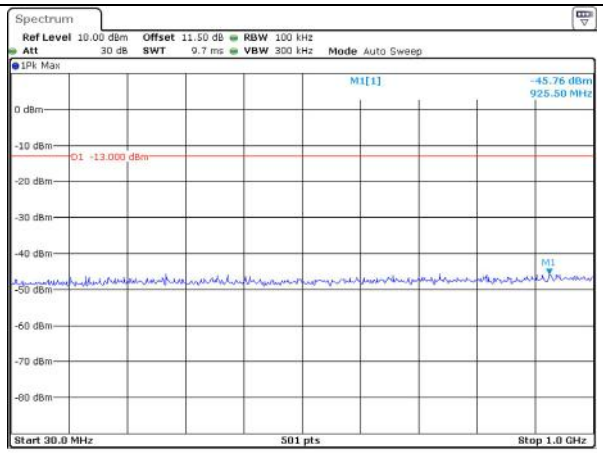
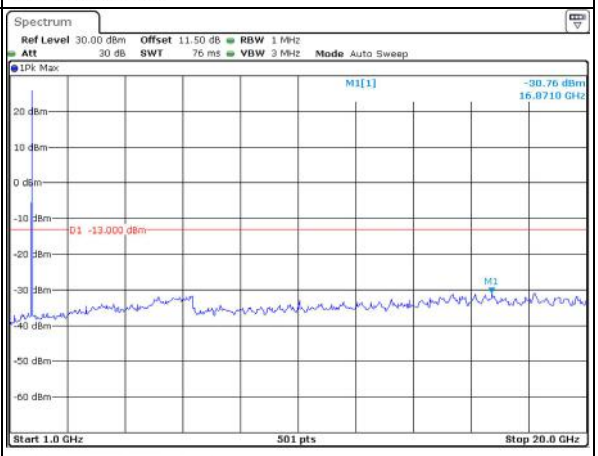
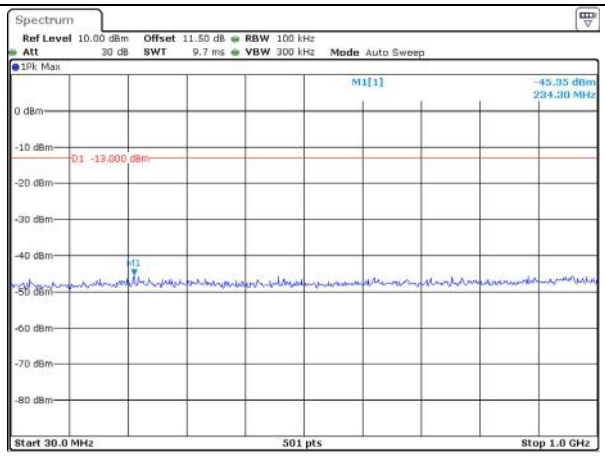
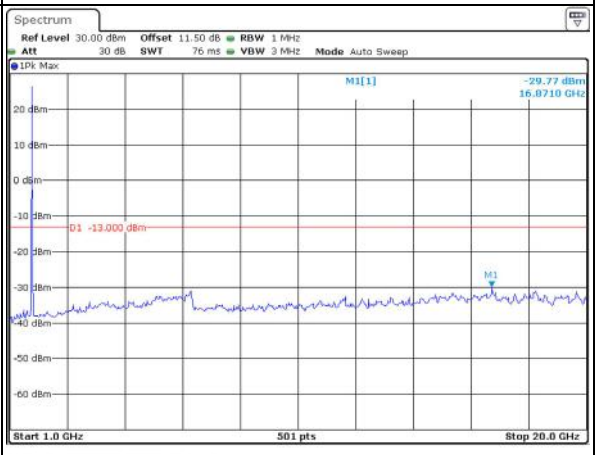
Occupied Bandwidth		
Channel	3MHz Bandwidth QPSK	3MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

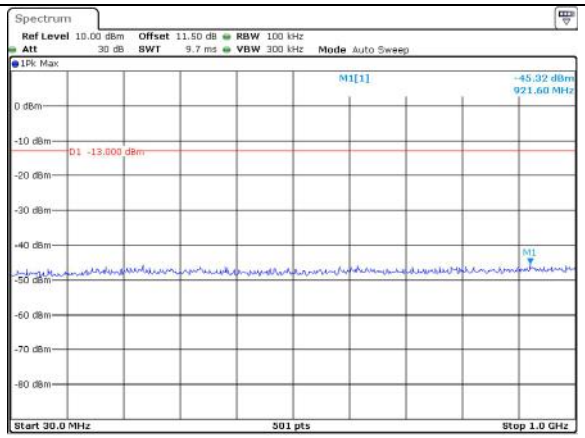
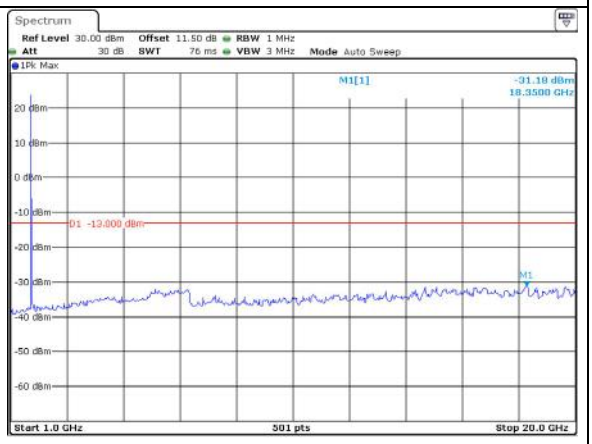
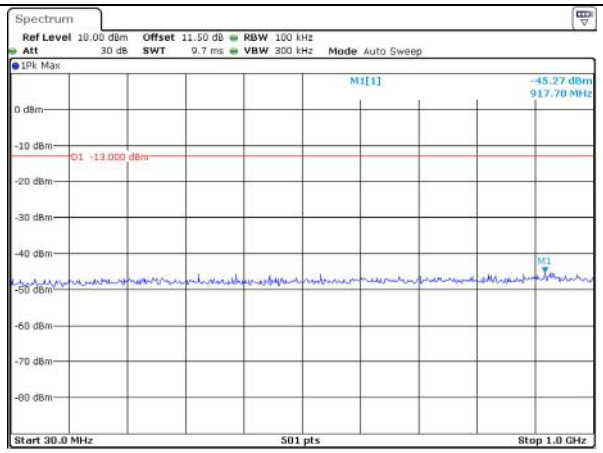
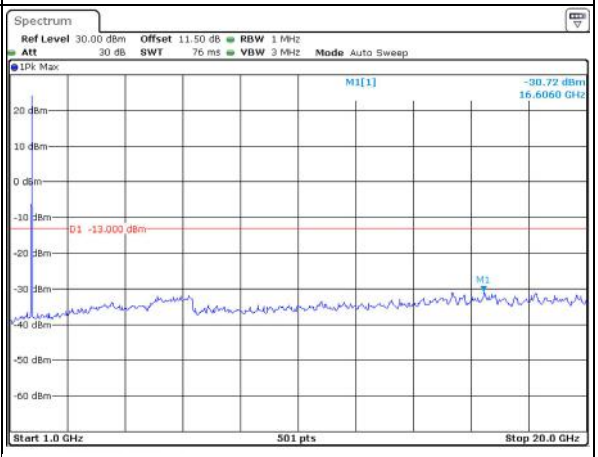
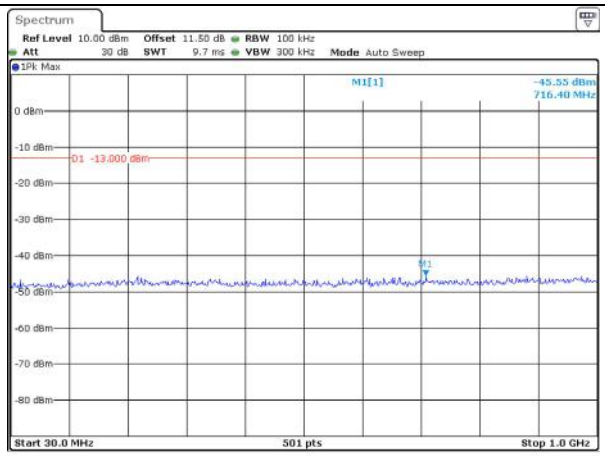
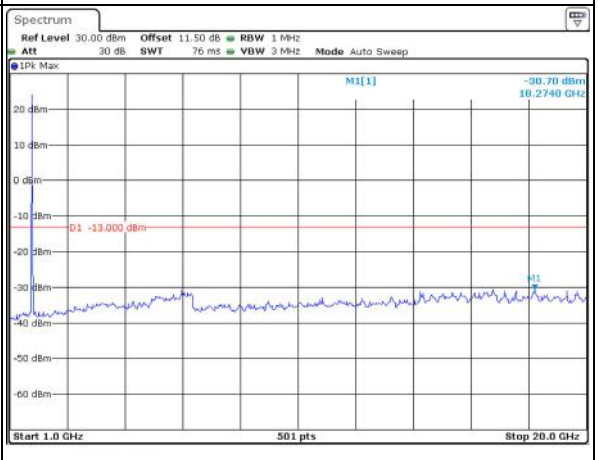
Occupied Bandwidth		
Channel	5MHz Bandwidth QPSK	5MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

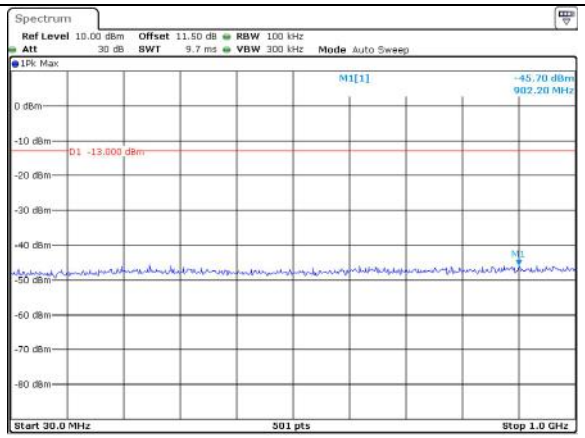
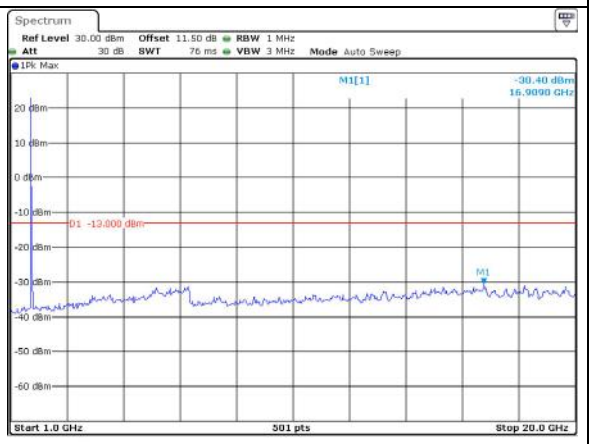
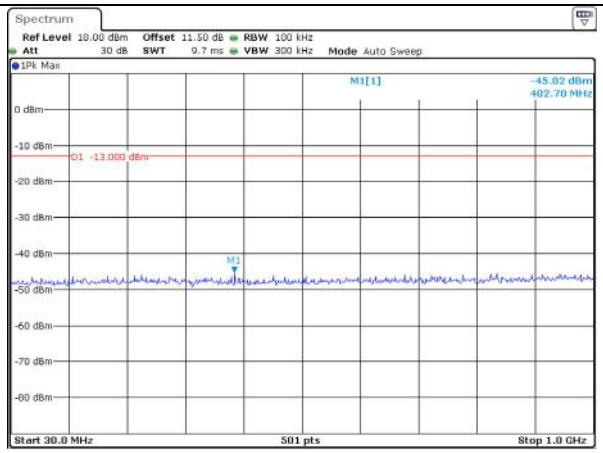
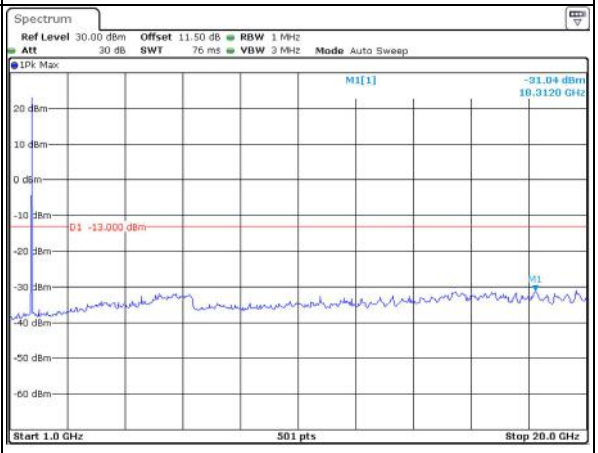
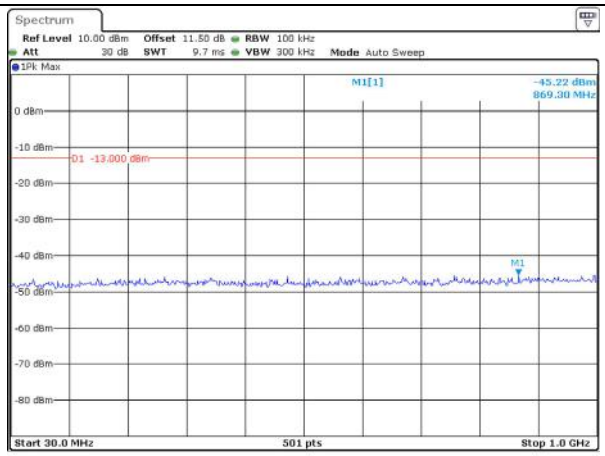
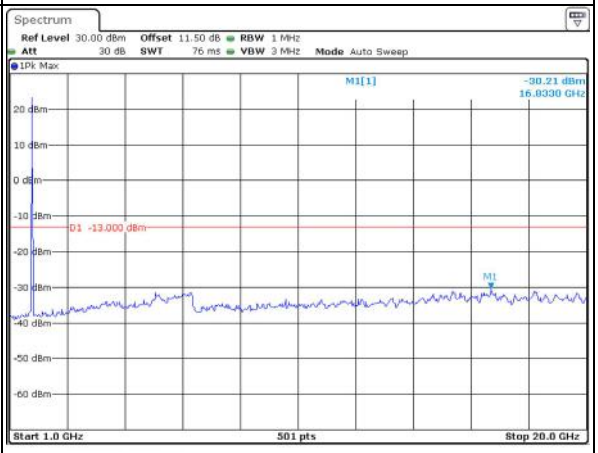
Occupied Bandwidth		
Channel	10MHz Bandwidth QPSK	10MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

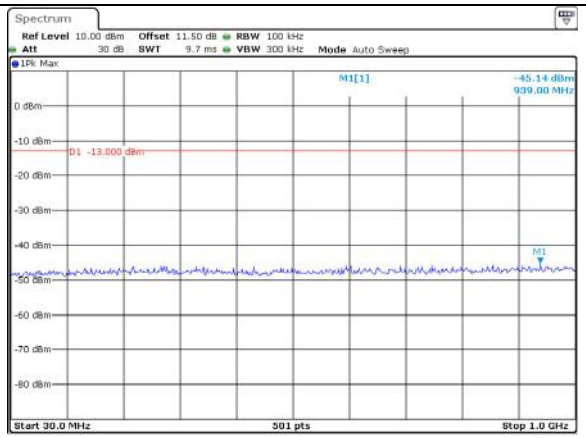
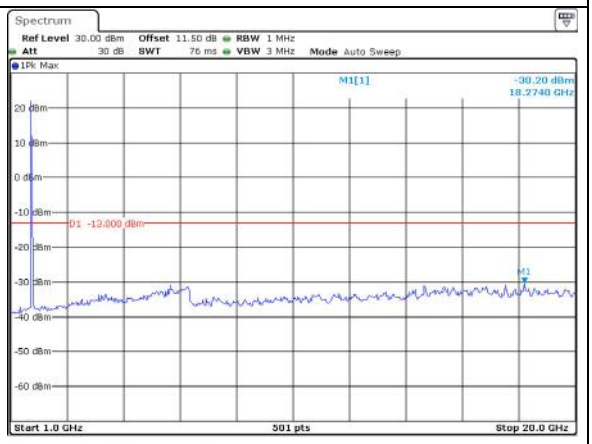
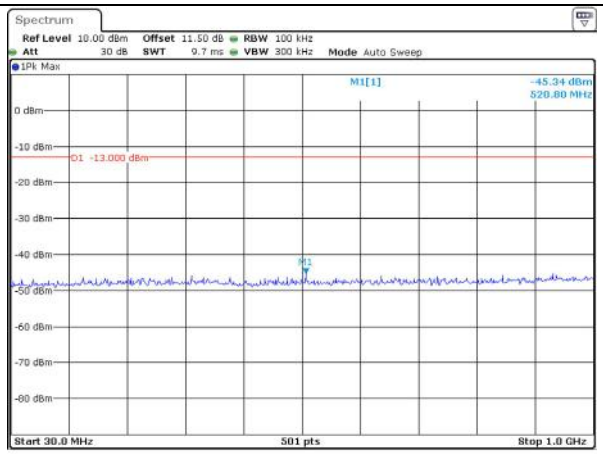
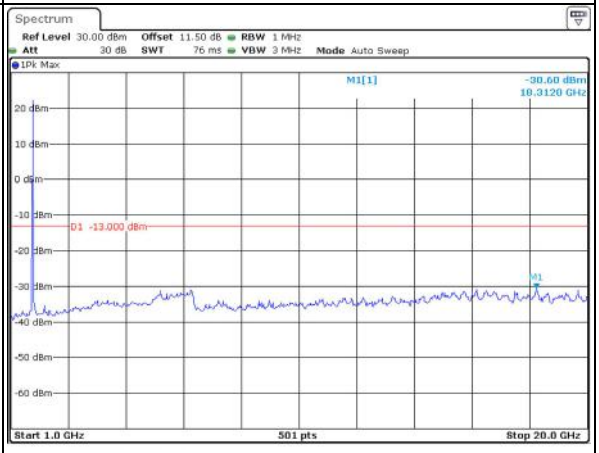
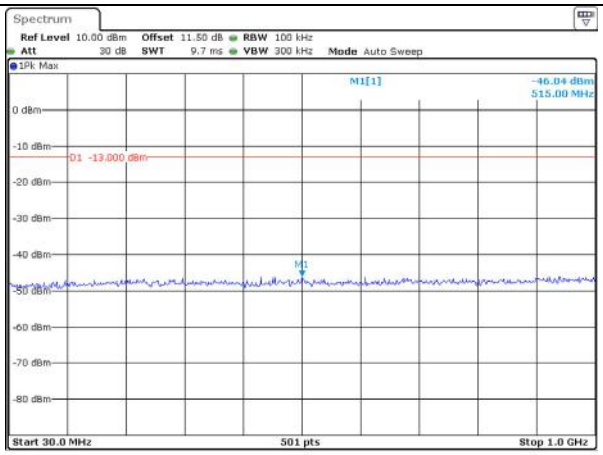
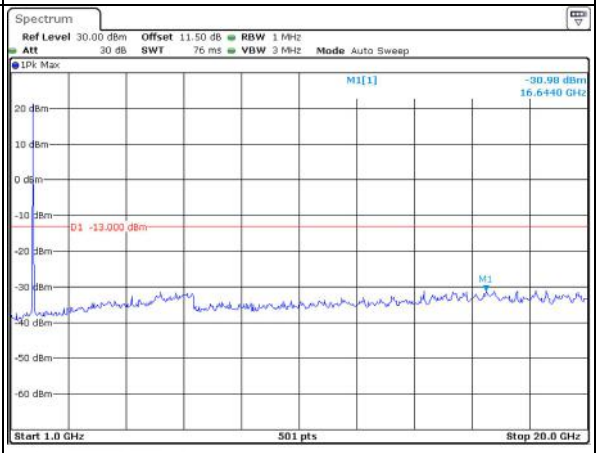
Occupied Bandwidth		
Channel	15MHz Bandwidth QPSK	15MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

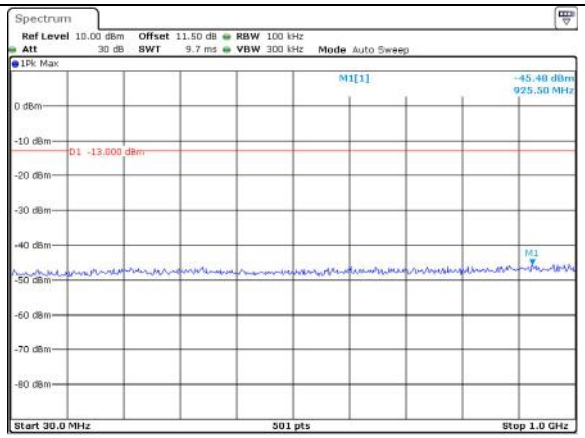
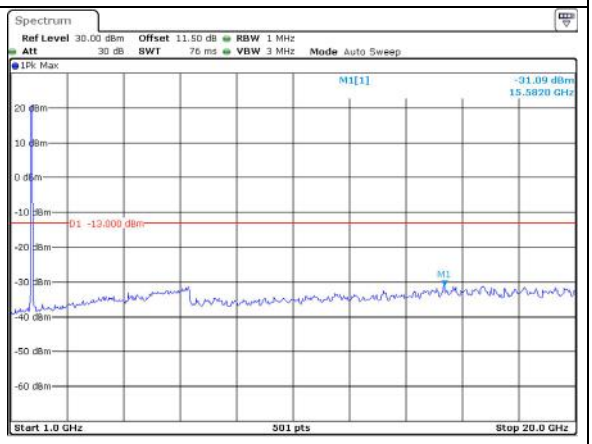
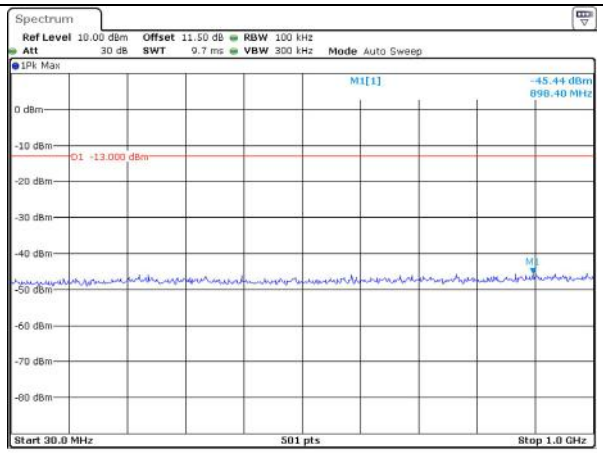
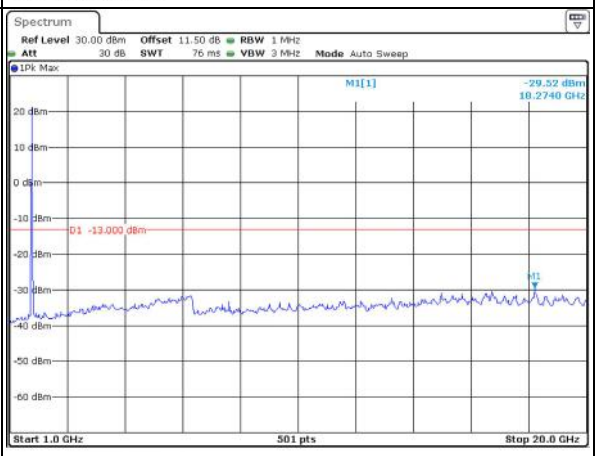
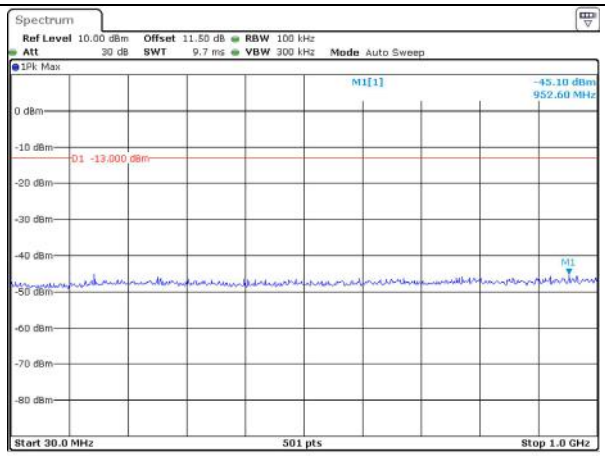
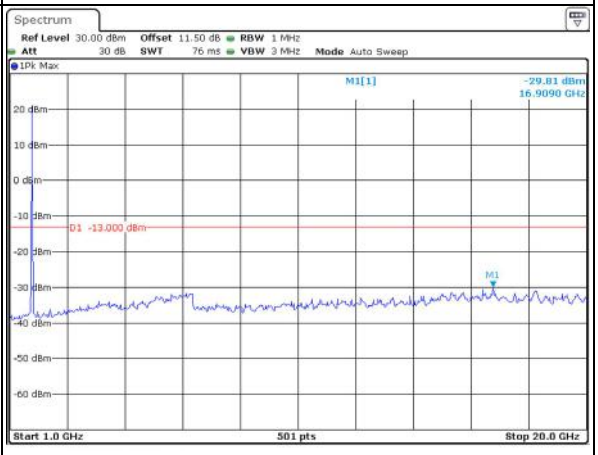
Occupied Bandwidth		
Channel	20MHz Bandwidth QPSK	20MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

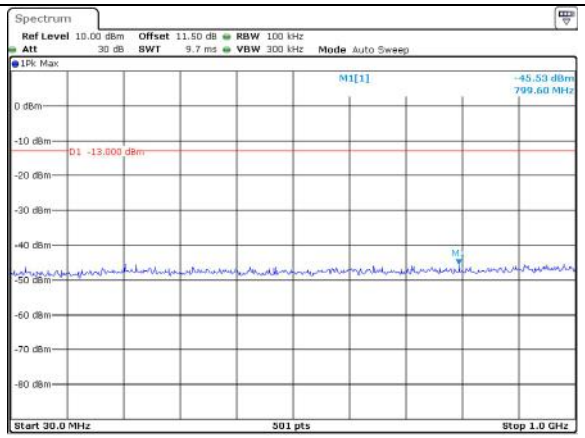
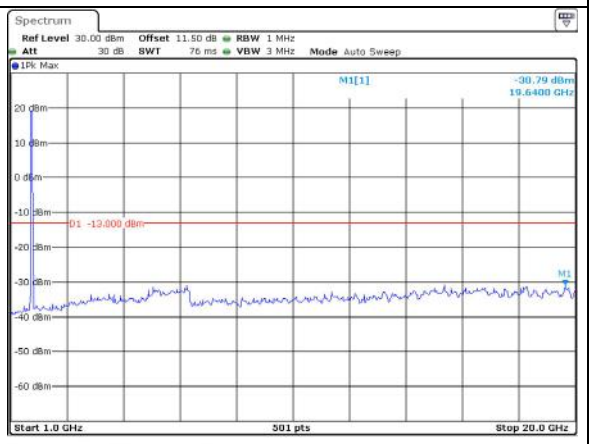
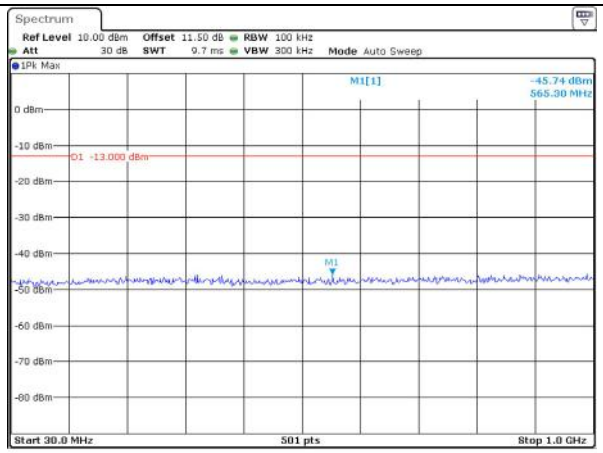
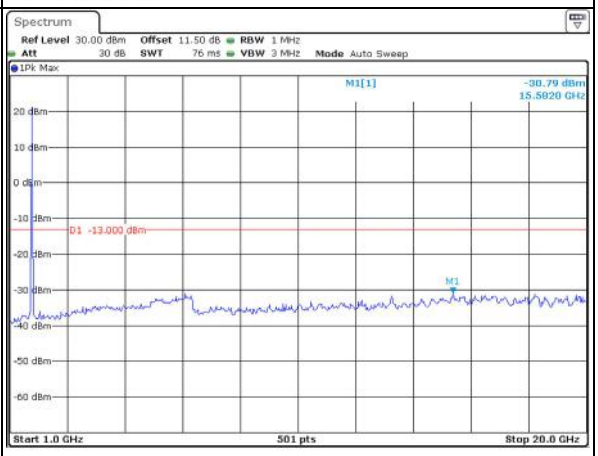
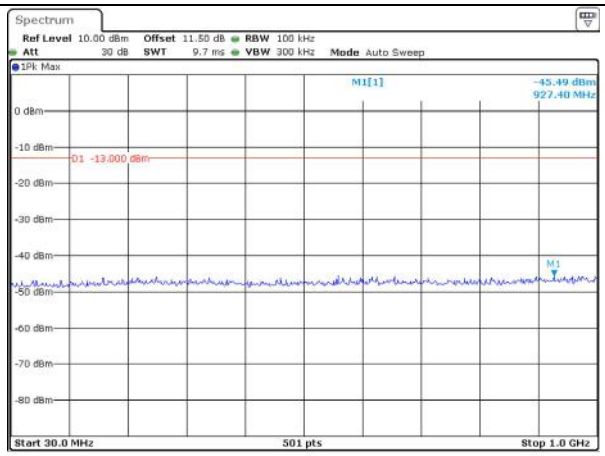
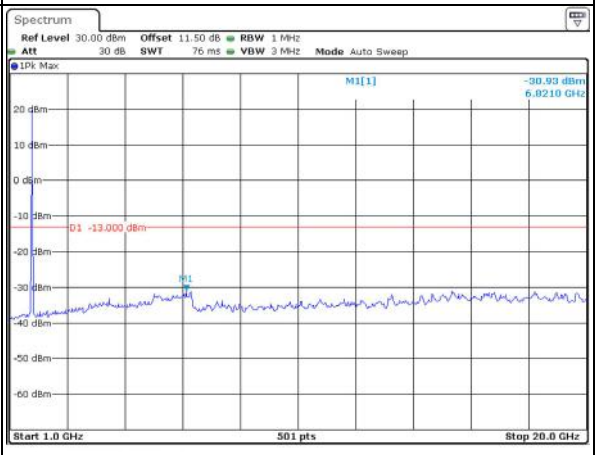
Spurious Emissions at Antenna Terminal		
Channel	**1.4MHz Bandwidth QPSK**	
Lowest		
Middle		
Highest		

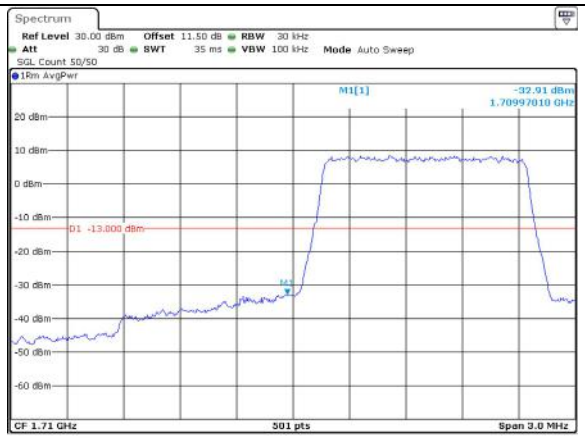
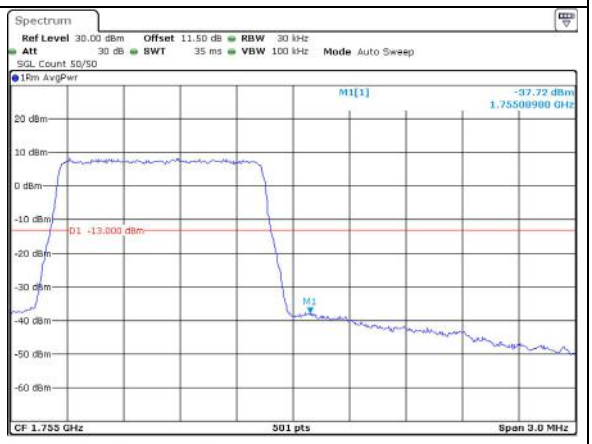
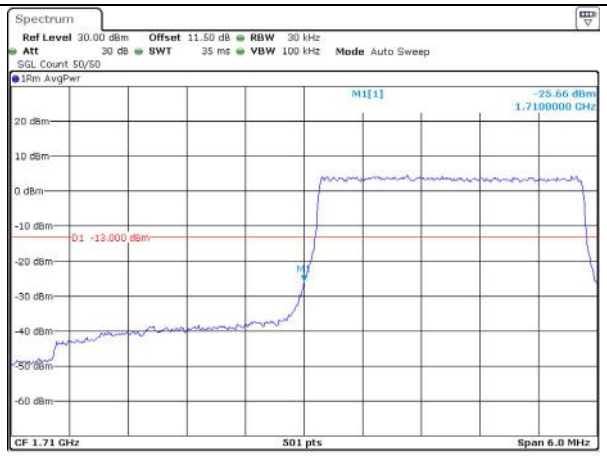
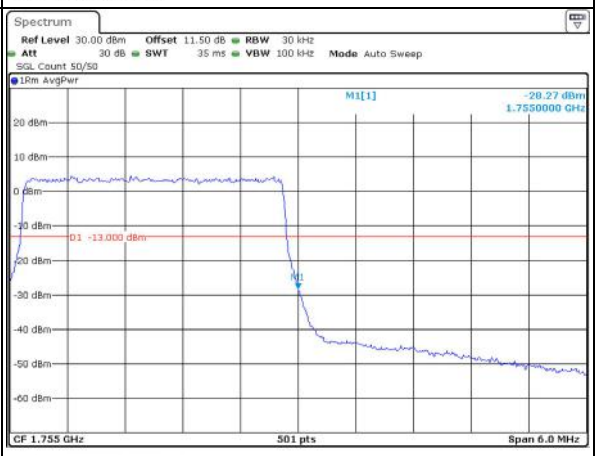
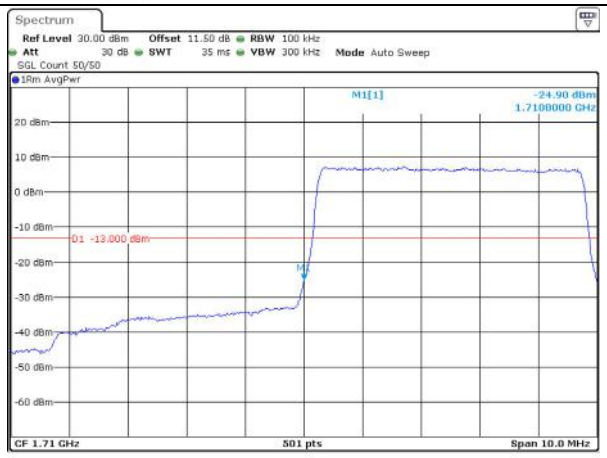
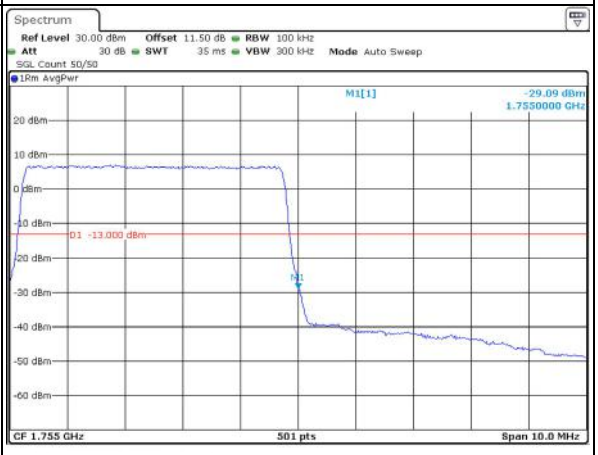
Spurious Emissions at Antenna Terminal		
Channel	**3MHz Bandwidth QPSK**	
Lowest		
Middle		
Highest		

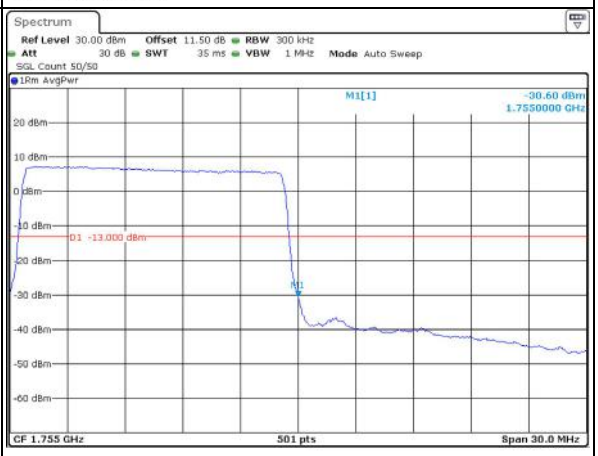
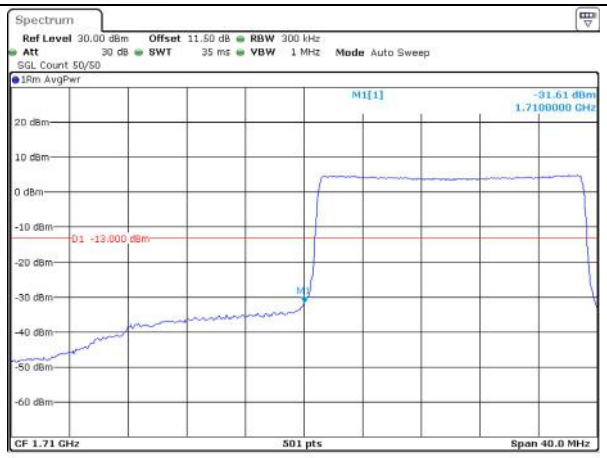
Spurious Emissions at Antenna Terminal		
Channel	**5MHz Bandwidth QPSK**	
Lowest		
Middle		
Highest		

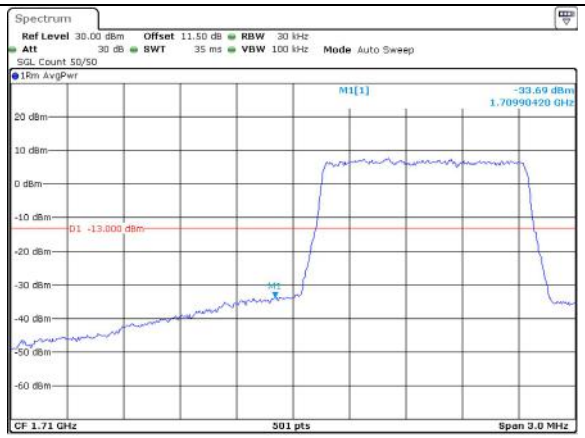
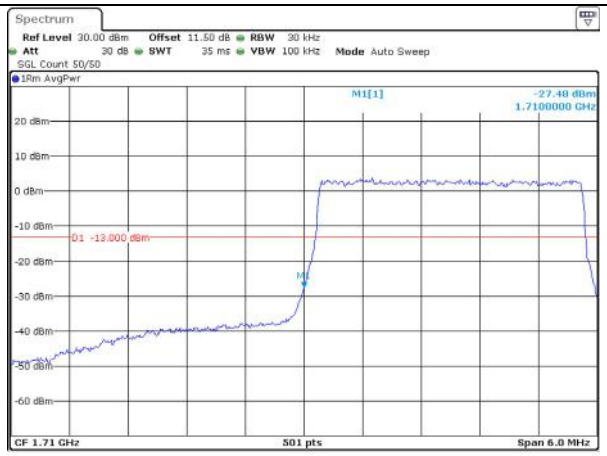
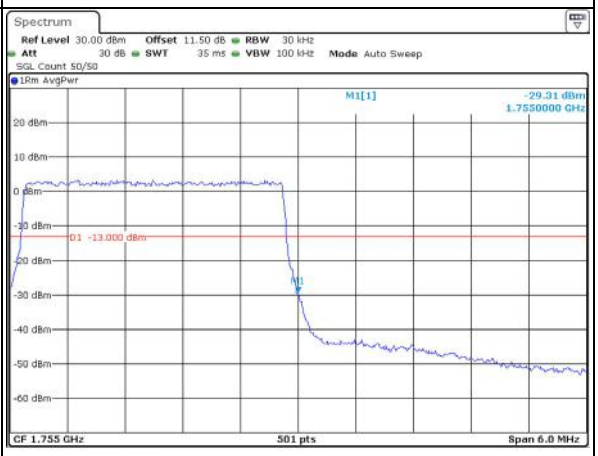
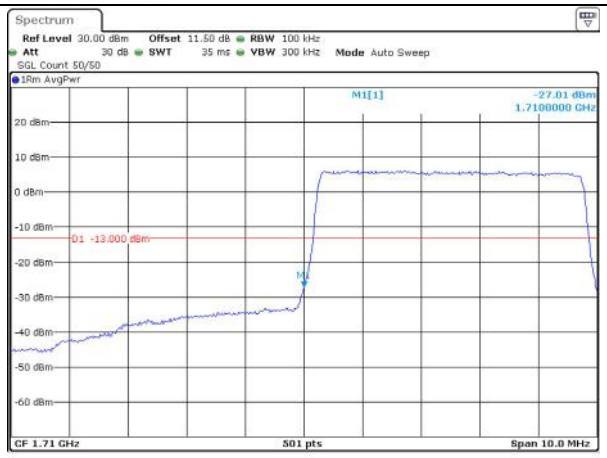
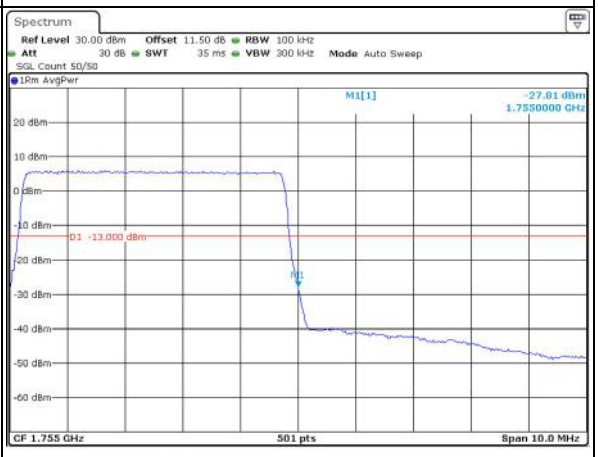
Spurious Emissions at Antenna Terminal		
Channel	**10MHz Bandwidth QPSK**	
Lowest		
Middle		
Highest		

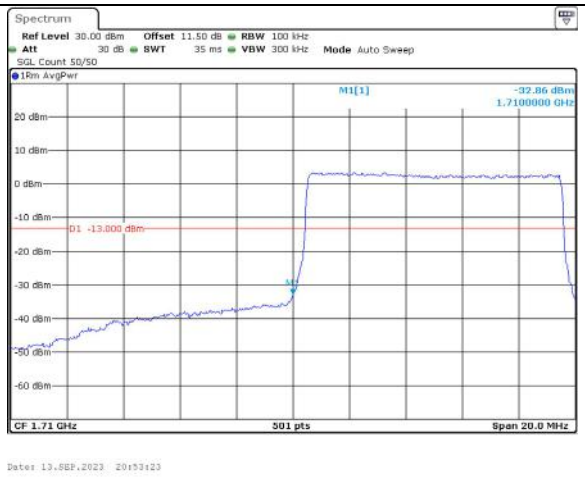
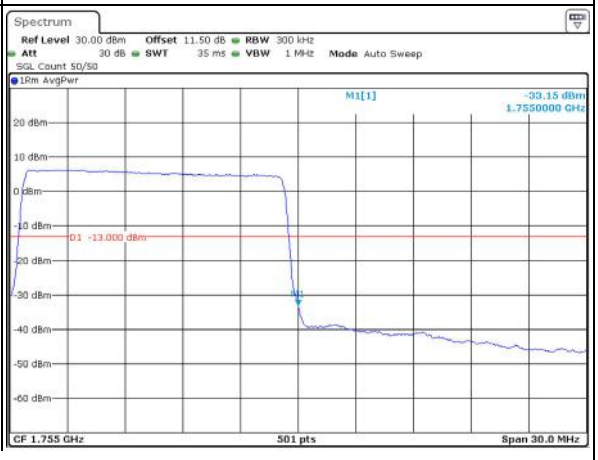
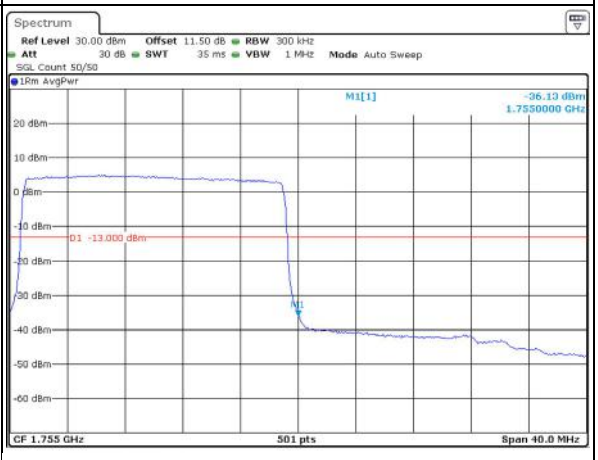
Spurious Emissions at Antenna Terminal		
Channel	**15MHz Bandwidth QPSK**	
Lowest		
Middle		
Highest		

Spurious Emissions at Antenna Terminal		
Channel	**20MHz 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		
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 5

Serial Number:	294A-2	Test Date:	2023/9/13-2023/9/14
Test Site:	RF	Test Mode:	Transmitting
Tester:	Ken Tang	Test Result:	**Pass**

Environmental Conditions:					
Temperature: (℃)	25.6~26.7	Relative Humidity: (%)	53~57	ATM Pressure: (kPa)	100.6~101

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101943	2023/3/31	2024/3/30
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
zhuoxiang	Coaxial Cable	SMA-178	211002	Each time	N/A
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060301	Each time	N/A
Minl-Clrcuits	Power Splitter	ZFRSC-183-S+	S F448201619	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	143458	2023/3/31	2024/3/30
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 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:

FCC§2.1046;§ 22.913 (a)						
RF Output Power:						
Test Bandwidth & Modulation	Resource Block & RB offset	Conducted Average Output Power(dBm)			Maximum ERP (dBm)	ERP Limit (dBm)
		Lowest Channel	Middle Channel	Highest Channel		
1.4MHz QPSK	RB1#0	23.82	23.75	23.71	**18.14**	38.45
	RB1#3	23.85	24.09	23.76		
	RB1#5	23.86	23.81	23.67		
	RB3#0	23.78	23.77	23.73		
	RB3#3	23.84	23.76	23.67		
	RB6#0	22.85	22.87	22.71		
1.4MHz 16QAM	RB1#0	22.96	22.87	22.84	17.18	38.45
	RB1#3	22.96	23.13	23.04		
	RB1#5	22.99	22.85	22.96		
	RB3#0	22.93	22.95	22.74		
	RB3#3	22.94	23.04	22.71		
	RB6#0	21.93	21.91	21.85		
3MHz QPSK	RB1#0	23.96	23.92	23.80	18.02	38.45
	RB1#8	23.97	23.91	23.80		
	RB1#14	23.93	23.88	23.75		
	RB6#0	22.90	22.86	22.80		
	RB6#9	22.92	22.92	22.87		
	RB15#0	22.98	22.88	22.71		
3MHz 16QAM	RB1#0	23.09	22.96	23.49	17.62	38.45
	RB1#8	23.14	22.90	23.57		
	RB1#14	23.03	22.93	23.38		
	RB6#0	21.94	21.77	21.90		
	RB6#9	22.04	21.94	21.99		
	RB15#0	21.88	21.97	21.84		
5MHz QPSK	RB1#0	23.99	23.94	23.82	18.04	38.45
	RB1#13	23.97	23.90	23.89		
	RB1#24	23.99	23.88	23.79		
	RB15#0	23.02	22.90	22.80		
	RB15#10	22.97	22.99	22.88		
	RB25#0	22.96	22.94	22.83		
5MHz 16QAM	RB1#0	23.16	22.90	23.11	17.22	38.45
	RB1#13	23.13	23.03	23.17		
	RB1#24	23.17	22.92	23.12		
	RB15#0	22.06	21.94	21.81		
	RB15#10	22.02	22.00	21.87		
	RB25#0	22.03	22.03	21.82		
10MHz QPSK	RB1#0	23.92	23.90	23.86	17.97	38.45

	RB1#25	23.87	23.86	23.81		
	RB1#49	23.86	23.84	23.76		
	RB25#0	22.96	22.92	22.90		
	RB25#25	22.95	22.96	22.88		
	RB50#0	23.03	22.92	22.90		
10MHz 16QAM	RB1#0	22.90	23.66	23.09	**17.71**	38.45
	RB1#25	22.97	23.59	22.97		
	RB1#49	22.93	23.52	22.98		
	RB25#0	22.01	21.96	21.92		
	RB25#25	22.04	22.01	21.92		
	RB50#0	22.02	21.89	21.93		
Note: ERP= Conducted Power(dBm) - L_C(dB) + G_T(dBd) G_T(dBd)=G_T(dBi)-2.15						
					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	
10MHz QPSK	RB1#0	6.21	8.40	7.20	13
	RB50#0	7.03	9.12	9.93	13
10MHz 16QAM	RB1#0	9.52	6.92	6.85	13
	RB50#0	9.72	6.15	8.52	13
				Result:	**Pass**

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	1.212	1.248	1.22	1.212	1.248	1.22
1.4MHz 16QAM	1.22	1.224	1.21	1.22	1.224	1.21
3MHz QPSK	2.952	2.976	2.952	2.952	2.976	2.952
3MHz 16QAM	2.964	2.940	2.964	2.964	2.940	2.964
5MHz QPSK	5.000	4.960	5.020	5.000	4.960	5.020
5MHz 16QAM	5.000	5.060	4.980	5.000	5.060	4.980
10MHz QPSK	9.640	9.680	9.720	9.640	9.680	9.720
10MHz 16QAM	9.640	9.720	9.640	9.640	9.720	9.640
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.**

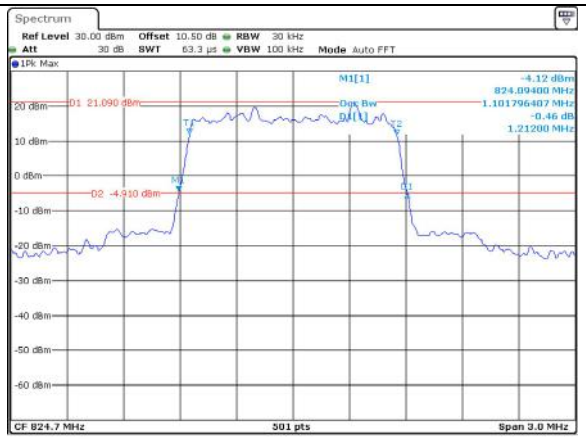
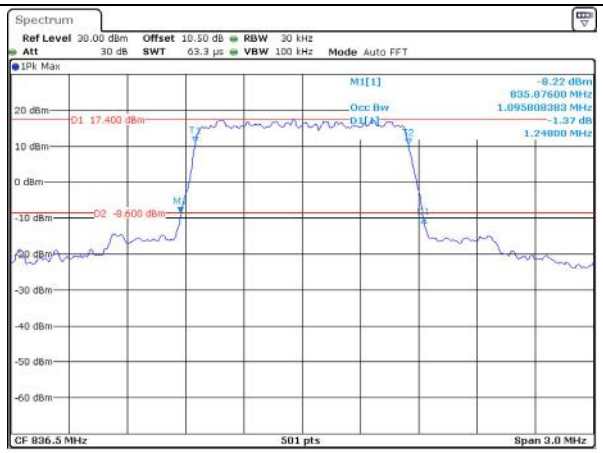
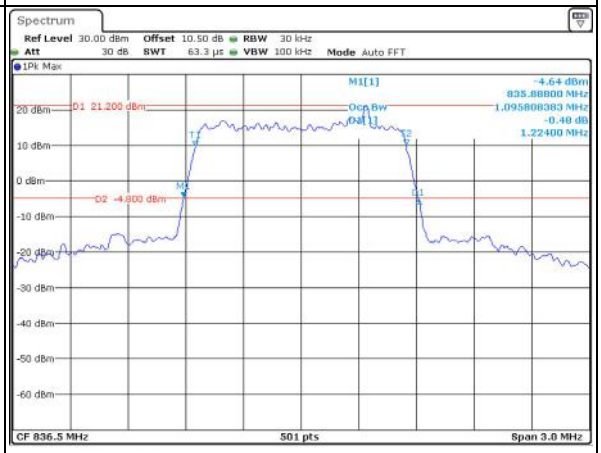
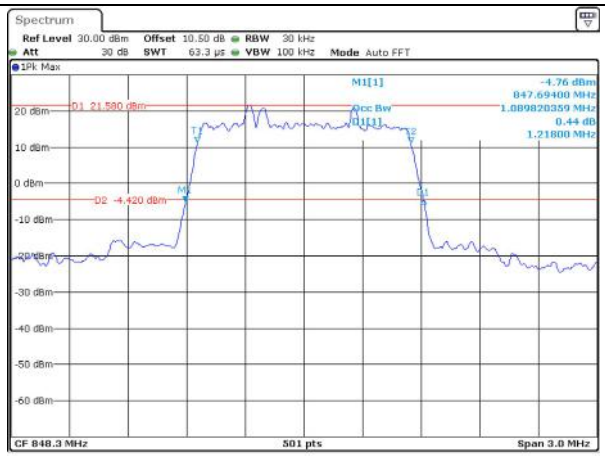
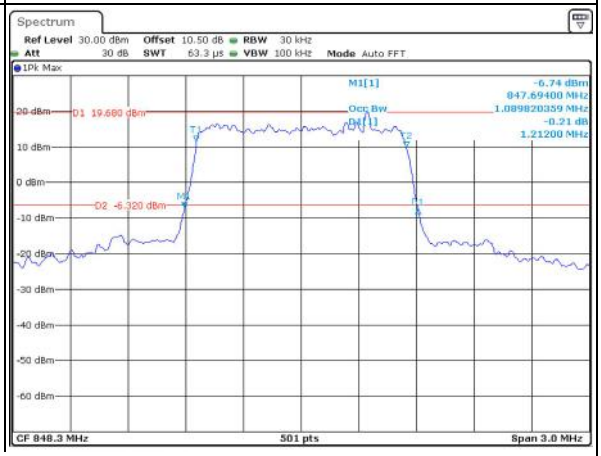
FCC §2.1051, §22.917(a):Out of band emission, Band Edge	
Result:	**Pass, Please refer to the test plots of Out of band emission, Band Edge.**

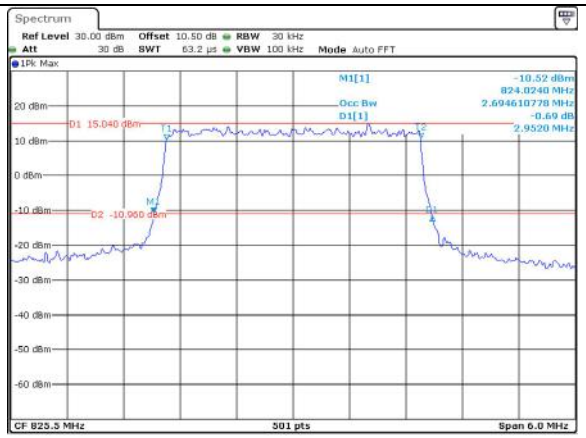
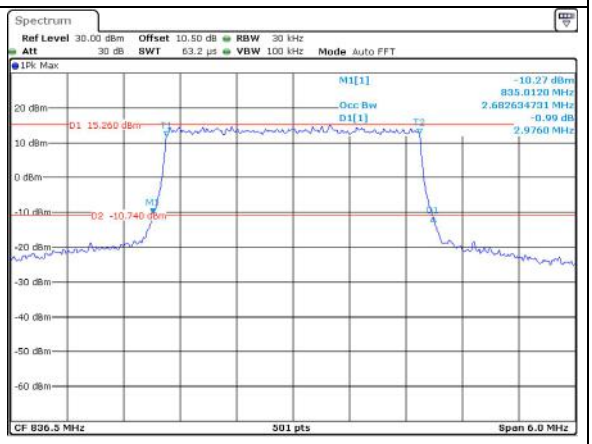
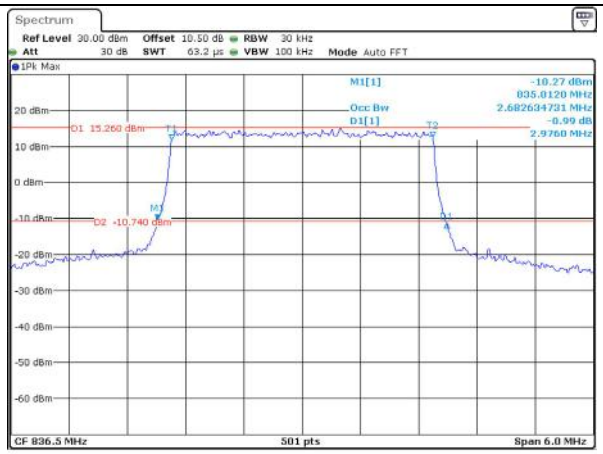
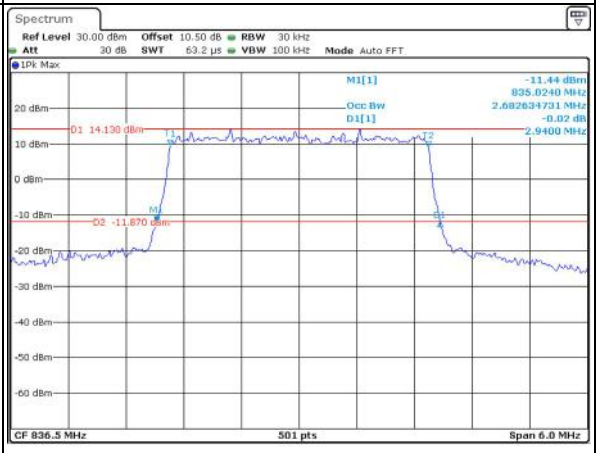
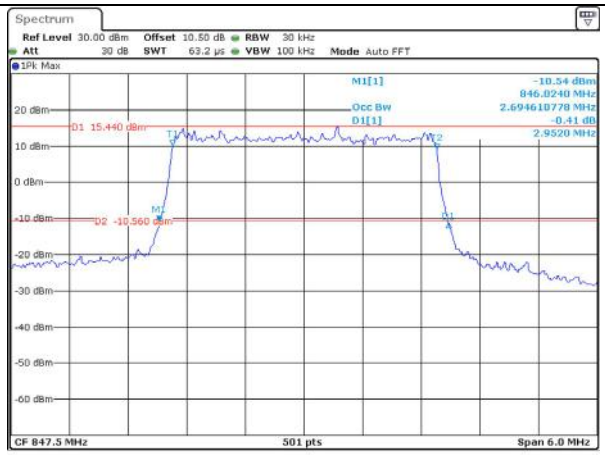
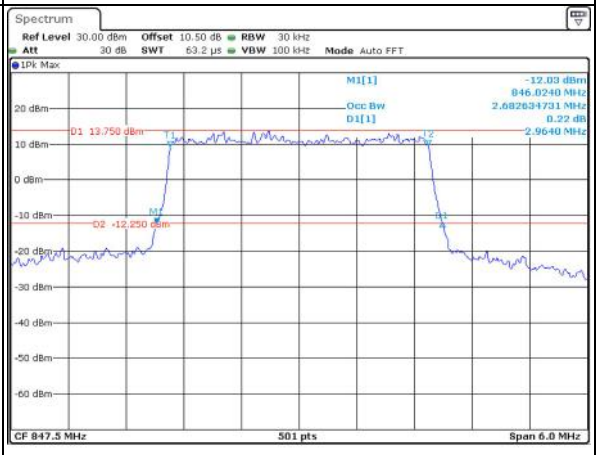
FCC §2.1055, §22.355: Frequency Stability

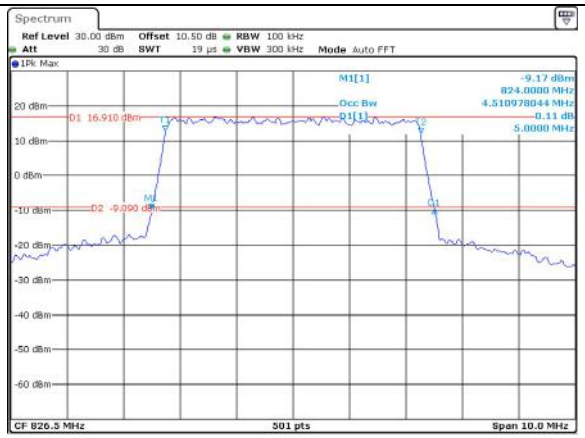
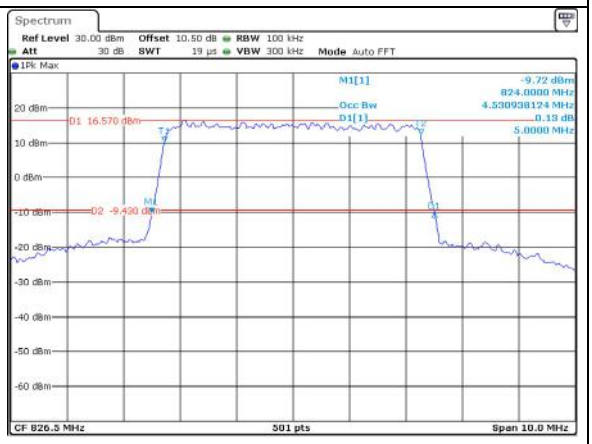
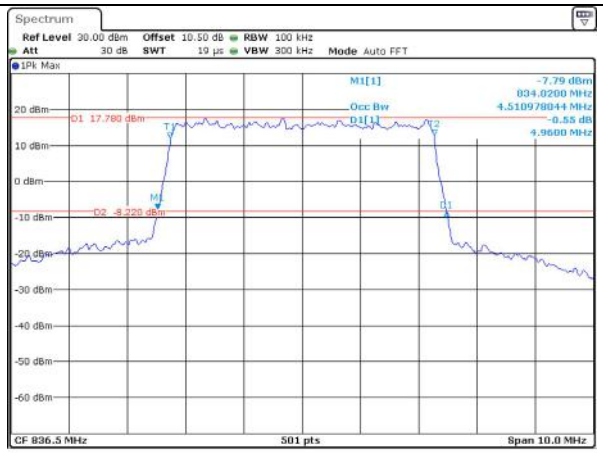
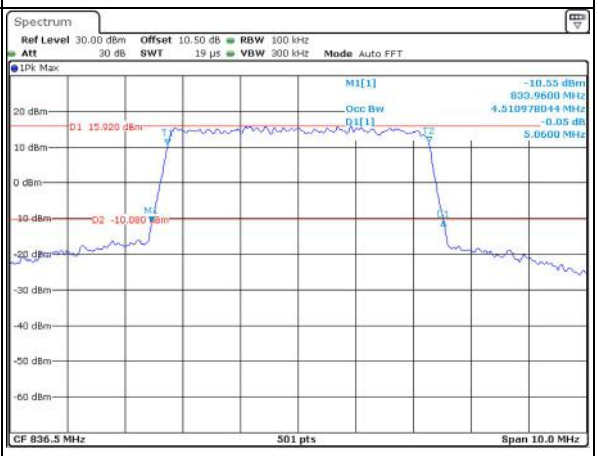
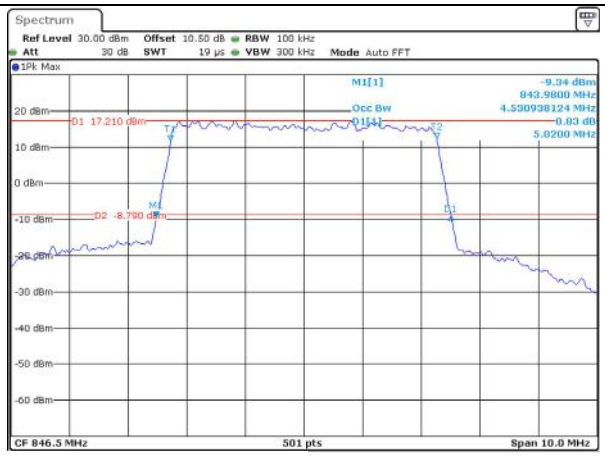
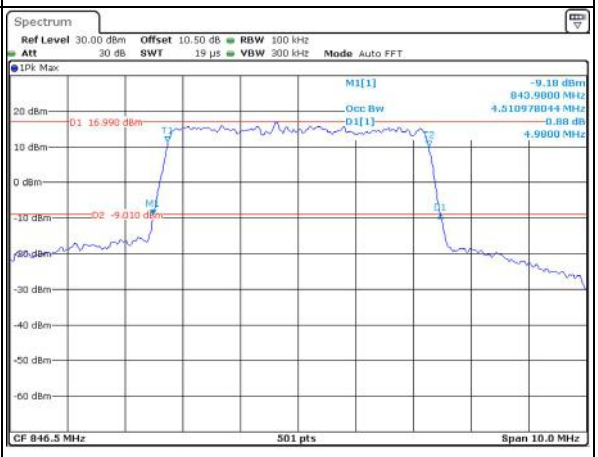
Test Modulation:	10 MHz QPSK		Test Channel:	836.5	MHz
Test Item	Temperature (℃)	Voltage (V_{DC})	Frequency Error		Limit
			(Hz)	(ppm)	(ppm)
Frequency Stability vs. Temperature	-30	3.85	115.833	0.138	2.5
	-20	3.85	116.092	0.139	2.5
	-10	3.85	114.567	0.137	2.5
	0	3.85	110.608	0.132	2.5
	10	3.85	113.261	0.135	2.5
	20	3.85	113.367	0.136	2.5
	30	3.85	113.638	0.136	2.5
	40	3.85	103.178	0.123	2.5
	50	3.85	119.921	0.143	2.5
Frequency Stability vs. Voltage	20	3.66	116.238	0.139	2.5
	20	4.24	112.681	0.135	2.5
				Result:	**Pass**

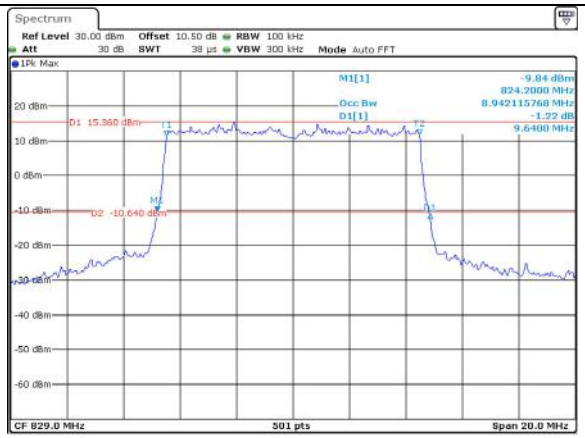
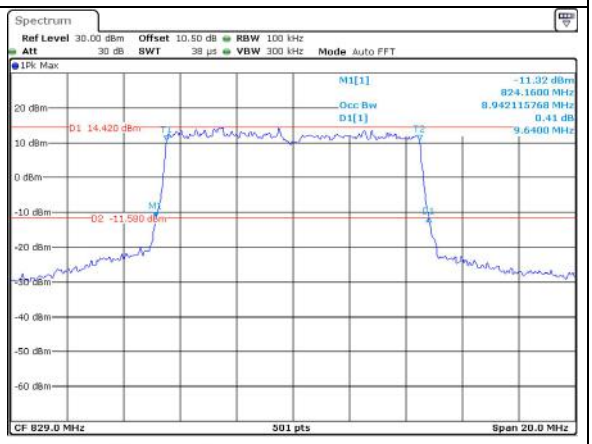
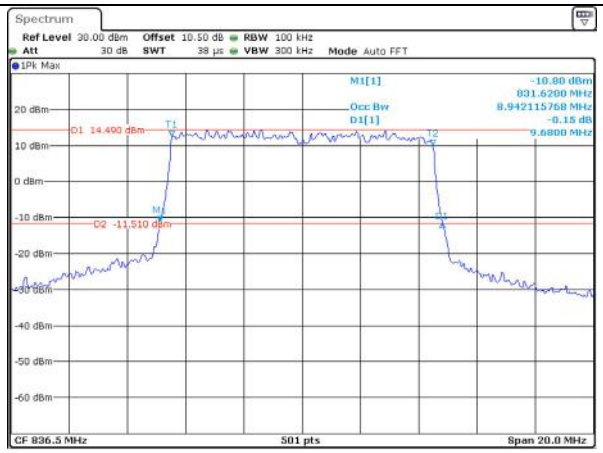
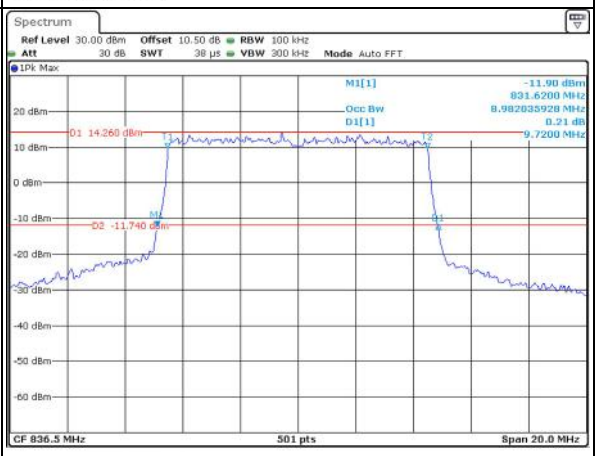
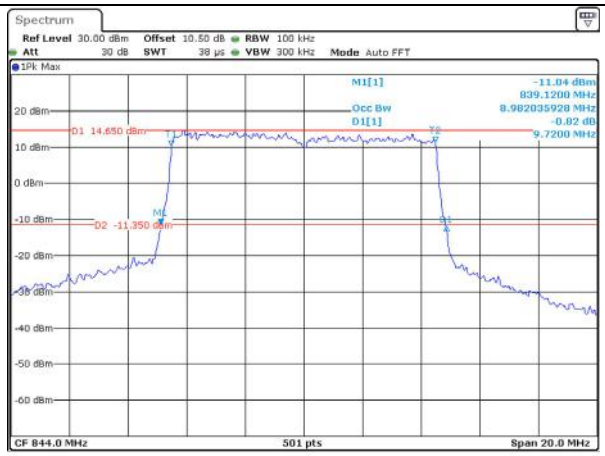
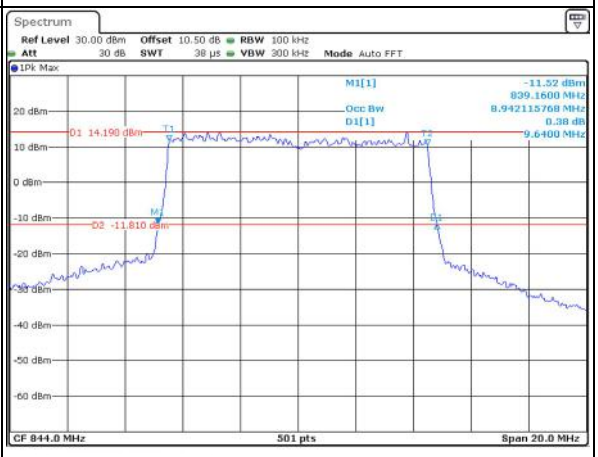
Test Modulation:	10 MHz 16QAM		Test Channel:	836.5	MHz
Test Item	Temperature (℃)	Voltage (V_{DC})	Frequency Error		Limit
			(Hz)	(ppm)	(ppm)
Frequency Stability vs. Temperature	-30	3.85	110.391	0.132	2.5
	-20	3.85	107.483	0.128	2.5
	-10	3.85	118.074	0.141	2.5
	0	3.85	102.456	0.122	2.5
	10	3.85	108.886	0.130	2.5
	20	3.85	109.729	0.131	2.5
	30	3.85	111.327	0.133	2.5
	40	3.85	108.051	0.129	2.5
	50	3.85	110.360	0.132	2.5
Frequency Stability vs. Voltage	20	3.66	114.692	0.137	2.5
	20	4.24	107.978	0.129	2.5
				Result:	**Pass**

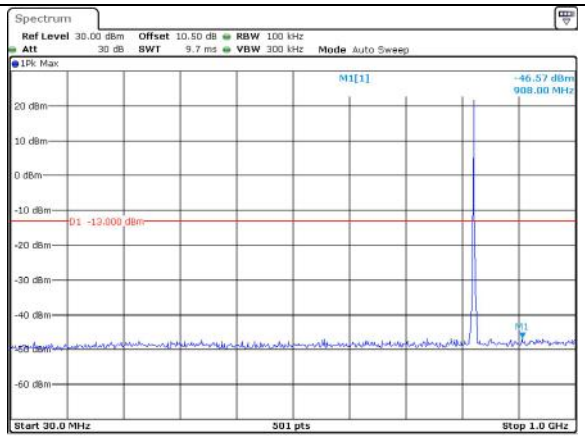
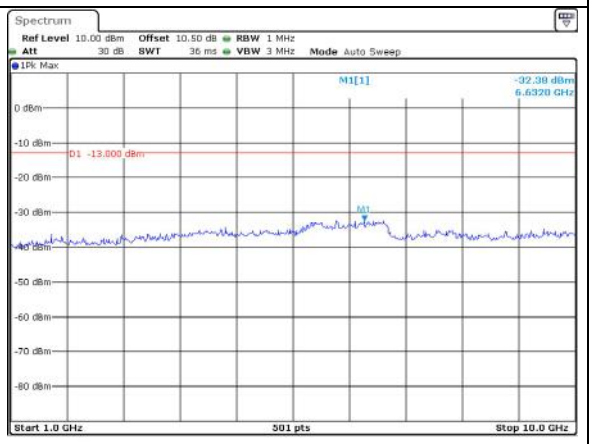
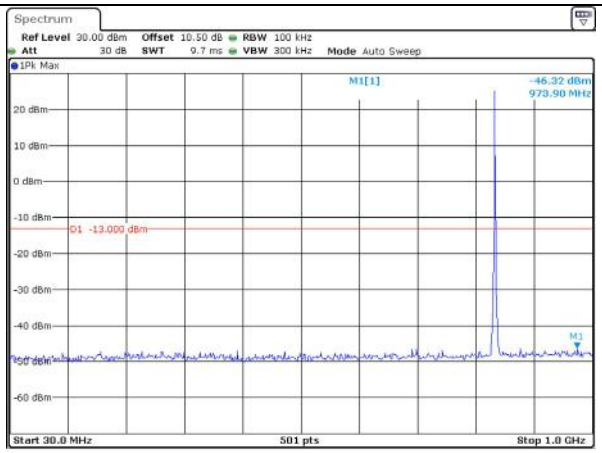
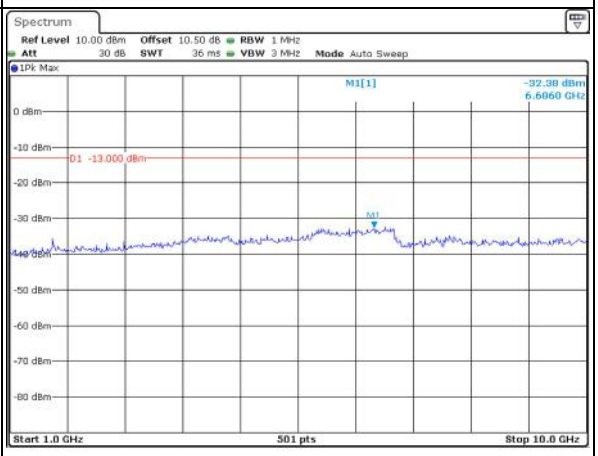
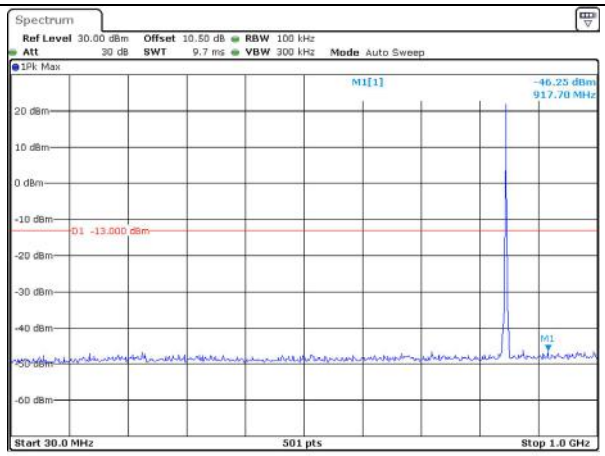
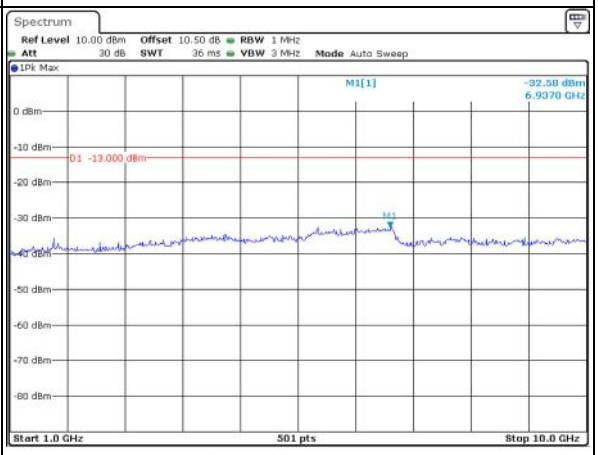
Test Plots(Note: The 10.5 dB is the Insertion loss of the RF cable and Power Splitter, which was offset into the Spectrum Analyzer):

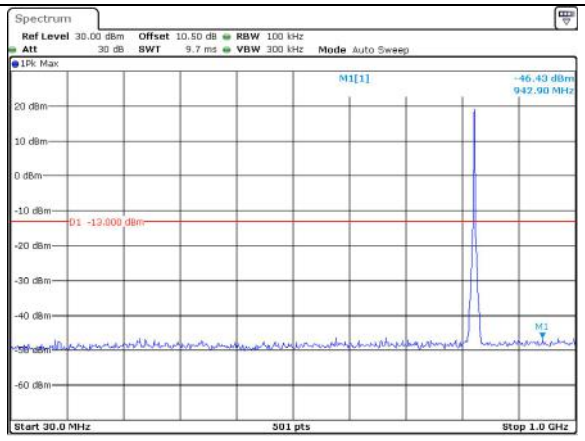
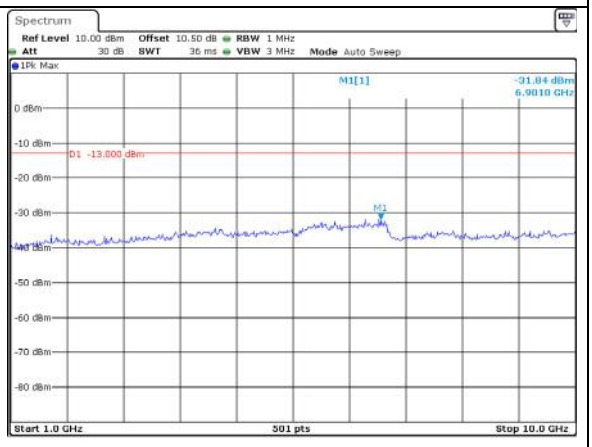
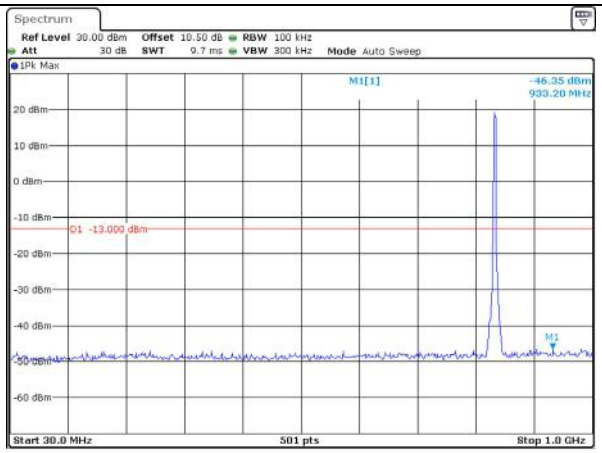
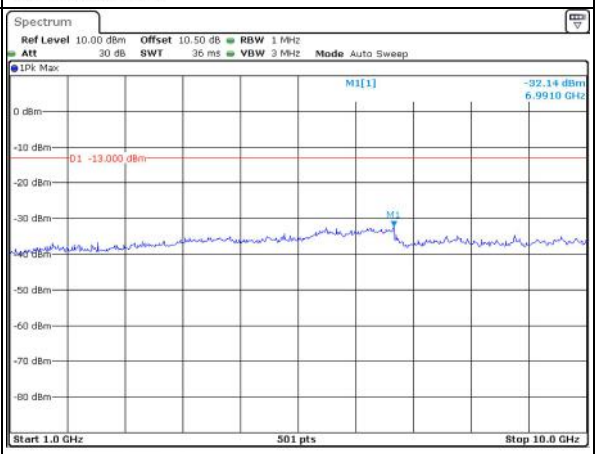
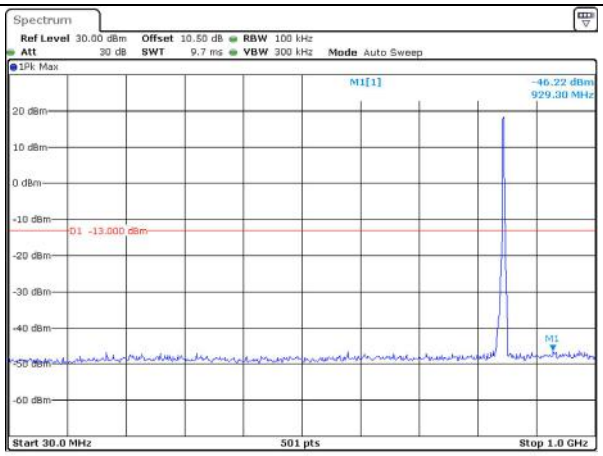
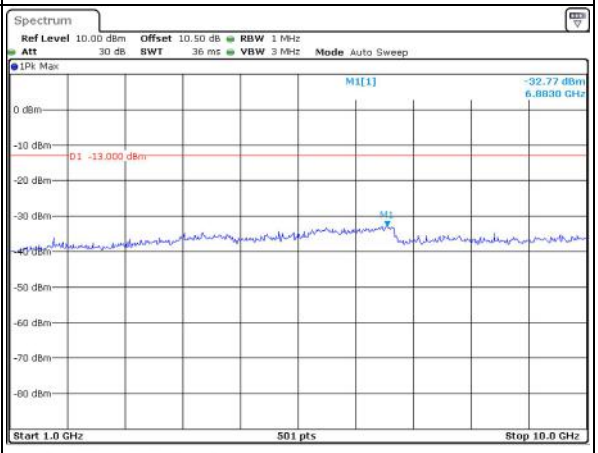
Occupied Bandwidth		
Channel	1.4MHz Bandwidth QPSK	1.4MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

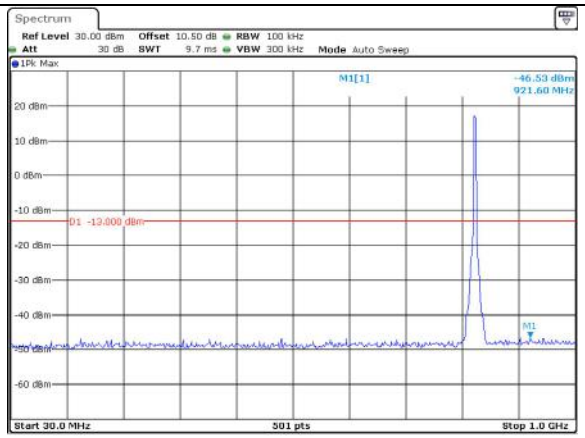
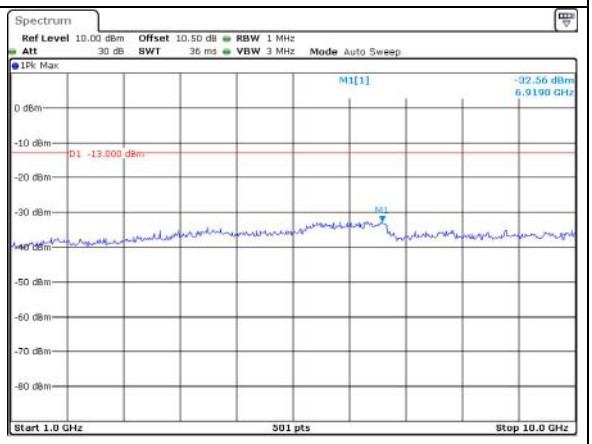
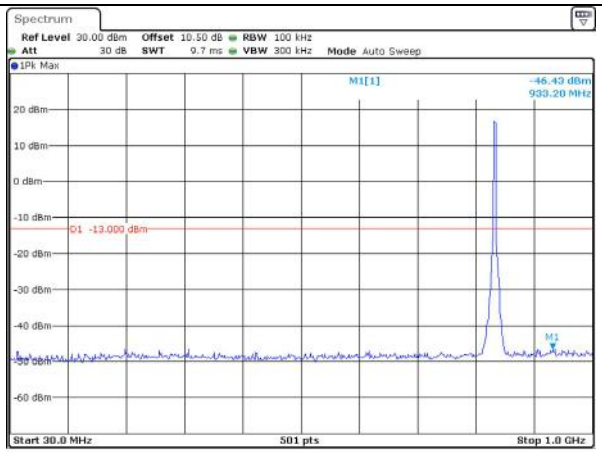
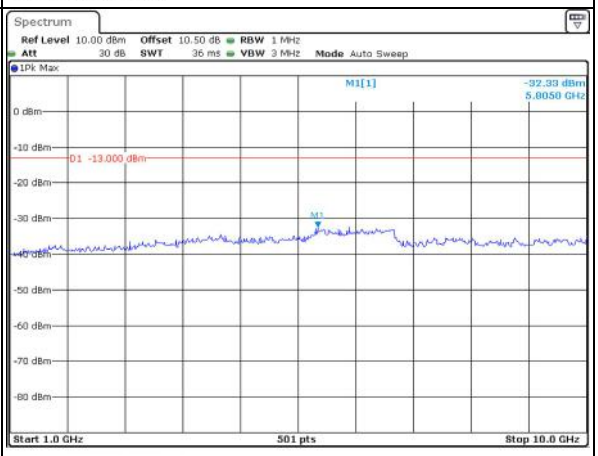
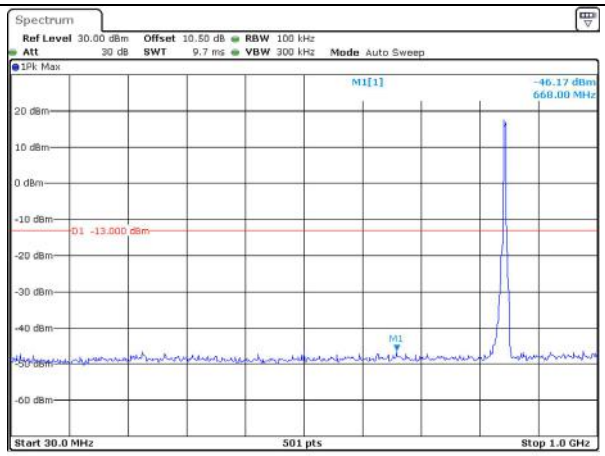
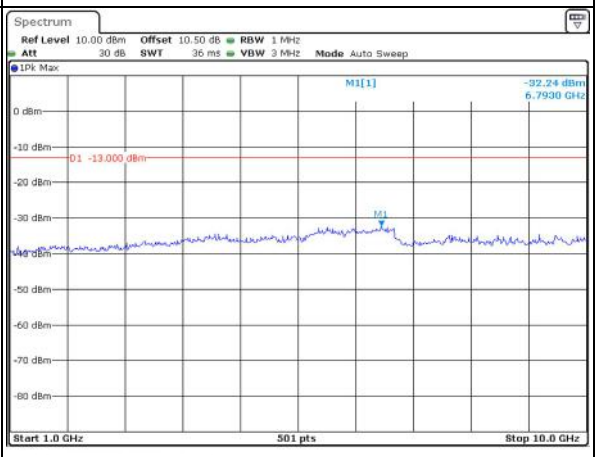
Occupied Bandwidth		
Channel	3MHz Bandwidth QPSK	3MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

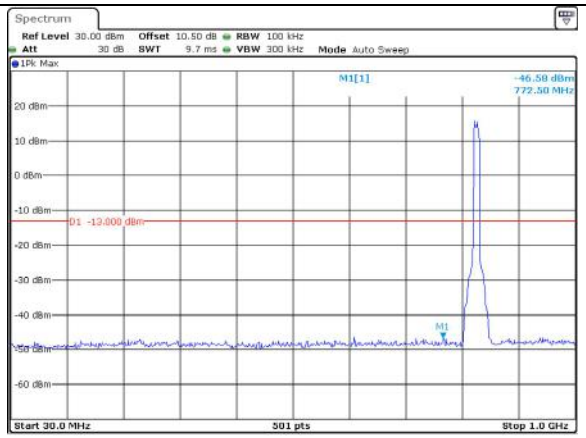
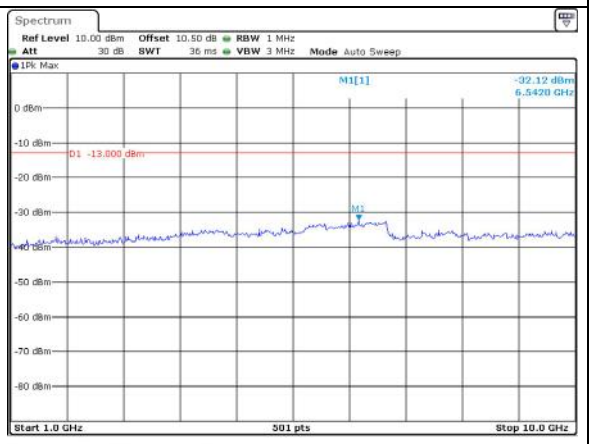
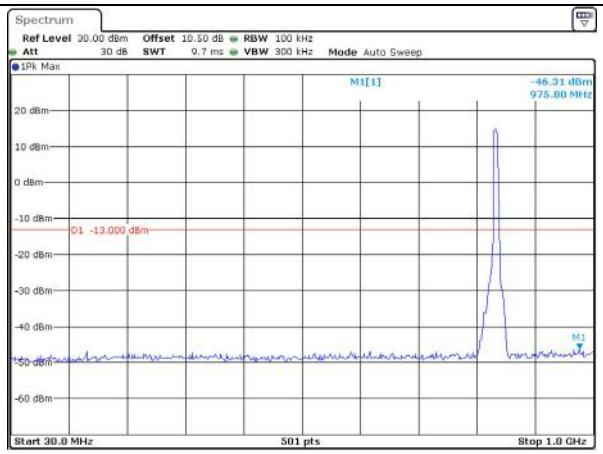
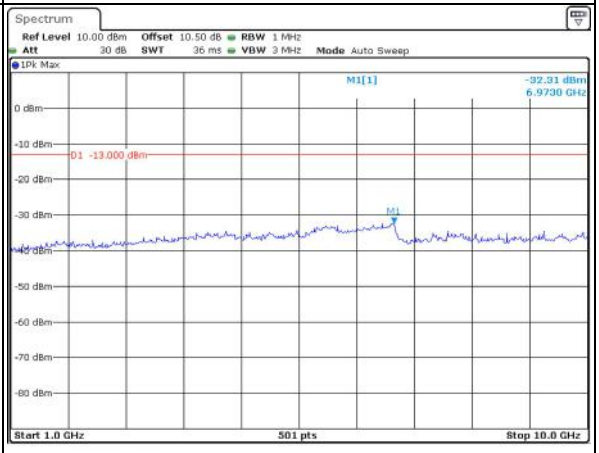
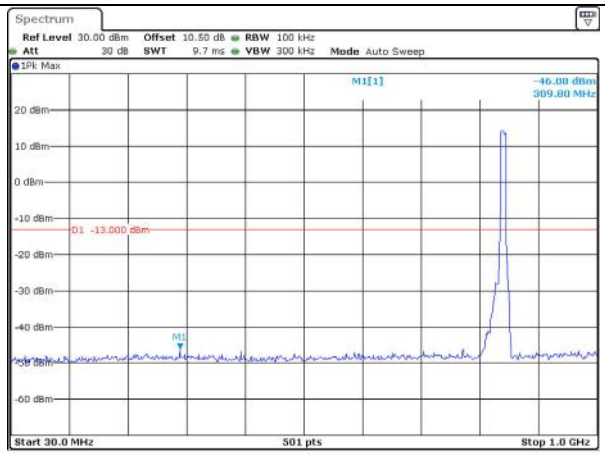
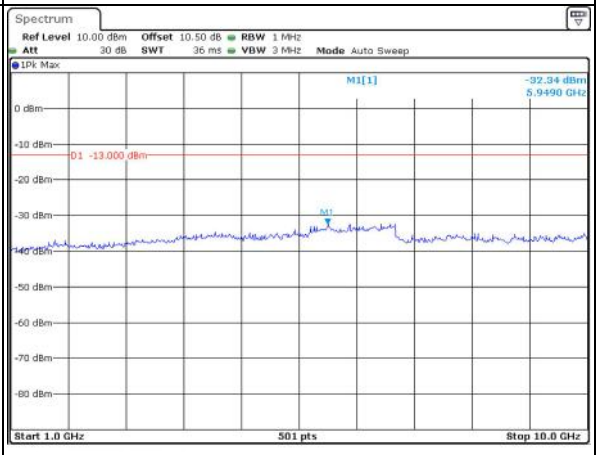
Occupied Bandwidth		
Channel	5MHz Bandwidth QPSK	5MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

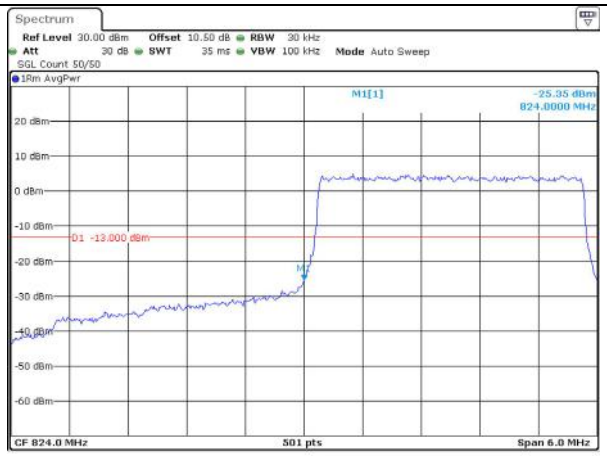
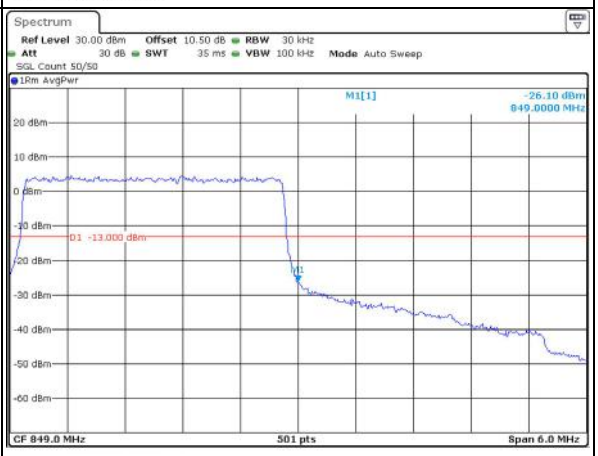
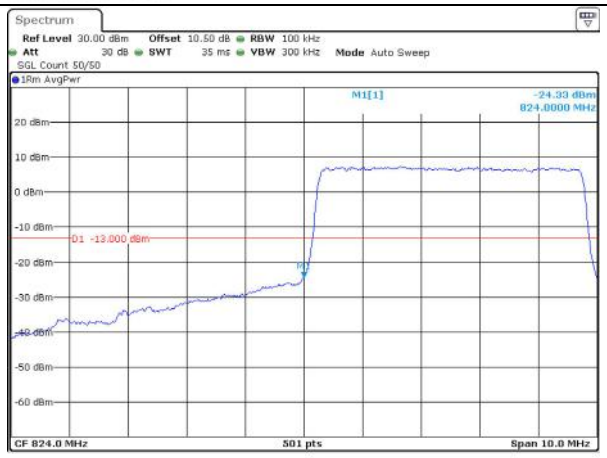
Occupied Bandwidth		
Channel	10MHz Bandwidth QPSK	10MHz Bandwidth 16QAM
Lowest		
Middle		
Highest		

Spurious Emissions at Antenna Terminal		
Channel	**1.4MHz Bandwidth QPSK**	
Lowest		
Middle		
Highest		

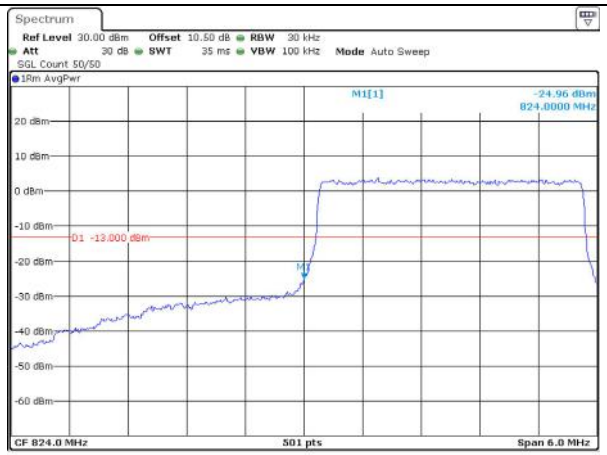
Spurious Emissions at Antenna Terminal		
Channel	**3MHz Bandwidth QPSK**	
Lowest		
Middle		
Highest		

Spurious Emissions at Antenna Terminal		
Channel	**5MHz Bandwidth QPSK**	
Lowest		
Middle		
Highest		

Spurious Emissions at Antenna Terminal		
Channel	**10MHz Bandwidth QPSK**	
Lowest		
Middle		
Highest		

Out of band emission, Band Edge		
Mode	**Lowest**	**Highest**
QPSK 1.4MHz		
QPSK 3MHz		
QPSK 5MHz		

Out of band emission, Band Edge		
Mode	**Lowest**	**Highest**
QPSK 10MHz		

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		

4.9 Antenna Port Test Data and Results for LTE Band 7

Serial Number:	294A-2	Test Date:	2023/9/13-2023/9/27
Test Site:	RF	Test Mode:	Transmitting
Tester:	Ken Tang	Test Result:	**Pass**

Environmental Conditions:					
Temperature: (℃)	25.6~28.4	Relative Humidity: (%)	57~58	ATM Pressure: (kPa)	100.2~101

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101943	2023/3/31	2024/3/30
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
zhuoxiang	Coaxial Cable	SMA-178	211002	Each time	N/A
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060301	Each time	N/A
Minl-Clrcuits	Power Splitter	ZFRSC-183-S+	S F448201619	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	143458	2023/3/31	2024/3/30
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 For Each Mode:

Operation Bandwidth	Lowest Frequency (MHz)	Middle Frequency (MHz)	Highest Frequency (MHz)
5MHz	2502.5	2535	2567.5
10MHz	2505	2535	2565
15MHz	2507.5	2535	2562.5
20MHz	2510	2535	2560

Test Data:

FCC§2.1046;§ 27.50(h)(2)

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		
5MHz QPSK	RB1#0	22.02	22.16	22.36	21.38	33
	RB1#13	22.12	22.26	22.43		
	RB1#24	22.11	22.23	22.41		
	RB15#0	21.14	21.17	21.40		
	RB15#10	21.20	21.32	21.49		
	RB25#0	21.16	21.27	21.48		
5MHz 16QAM	RB1#0	21.30	21.45	21.59	20.68	33
	RB1#13	21.40	21.58	21.73		
	RB1#24	21.37	21.59	21.64		
	RB15#0	20.16	20.14	20.43		
	RB15#10	20.23	20.30	20.48		
	RB25#0	20.16	20.33	20.49		
10MHz QPSK	RB1#0	22.07	22.12	22.36	**21.43**	33
	RB1#25	22.11	22.19	22.41		
	RB1#49	22.15	22.24	22.48		
	RB25#0	21.14	21.19	21.41		
	RB25#25	21.16	21.28	21.49		
	RB50#0	21.20	21.28	21.44		
10MHz 16QAM	RB1#0	21.20	21.43	21.75	**20.80**	33
	RB1#25	21.30	21.55	21.77		
	RB1#49	21.32	21.53	21.85		
	RB25#0	20.23	20.25	20.47		
	RB25#25	20.23	20.32	20.58		
	RB50#0	20.19	20.26	20.44		
15MHz QPSK	RB1#0	21.89	21.87	22.12	21.16	33
	RB1#38	21.97	21.93	22.17		
	RB1#74	22.01	21.98	22.21		
	RB36#0	20.93	21.04	21.26		
	RB36#39	21.04	21.15	21.35		
	RB75#0	21.05	21.15	21.26		
15MHz 16QAM	RB1#0	21.10	21.49	21.49	20.56	33
	RB1#38	21.25	21.55	21.57		
	RB1#74	21.27	21.61	21.59		
	RB36#0	19.93	20.04	20.33		
	RB36#39	20.05	20.15	20.39		
	RB75#0	20.08	20.15	20.29		
20MHz QPSK	RB1#0	21.82	21.91	22.08	21.19	33

	RB1#50	21.90	21.94	22.17		
	RB1#99	22.03	22.02	22.24		
	RB50#0	20.95	21.06	21.25		
	RB50#50	21.06	21.15	21.33		
	RB100#0	21.09	21.17	21.29		
20MHz 16QAM	RB1#0	21.13	21.40	21.44	20.47	33
	RB1#50	21.14	21.43	21.46		
	RB1#99	21.24	21.52	21.52		
	RB50#0	19.95	20.10	20.25		
	RB50#50	20.06	20.21	20.37		
	RB100#0	20.08	20.15	20.29		
Note: EIRP=Conducted Power(dBm) - L_C(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	9.96	7.95	9.60	13
	RB100#0	6.01	8.67	9.07	13
20MHz 16QAM	RB1#0	8.28	6.80	9.58	13
	RB100#0	6.31	9.92	8.00	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
5MHz QPSK	4.511	4.511	4.511	5.000	5.000	5.000
5MHz 16QAM	4.531	4.511	4.511	5.020	4.980	5.000
10MHz QPSK	8.942	8.942	8.942	9.720	9.720	9.680
10MHz 16QAM	8.942	8.942	8.942	9.720	9.680	9.680
15MHz QPSK	13.473	13.533	13.533	14.760	14.760	14.820
15MHz 16QAM	13.533	13.533	13.473	14.700	14.700	14.760
20MHz QPSK	17.964	17.964	18.044	19.280	19.360	19.440
20MHz 16QAM	17.964	17.964	17.964	19.520	19.680	19.360
Note: The test plots please refer to the Plots of Occupied Bandwidth						