2.3. Frequency Stability

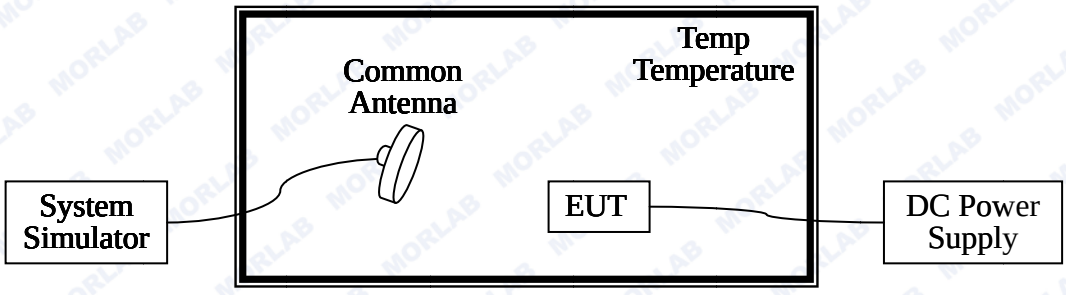
2.3.1. Requirement

According to FCC section 2.1055 and FCC section 27.54, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

(a) The temperature is varied from -30°C to +50°C at intervals of not more than 10°C.
(b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

2.3.2. Test Description

1. Test Setup:



The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power. A call is established between the EUT and the SS via a Common Antenna.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Rohde& Schwarz	CMW500	1201.0002k50/124534/wk	2014.02.26	2015.02.25
DC Power Supply	Good Will	GPS-3030DD	EF920938	2014.02.26	2015.02.25
Temperature Chamber	YinHe Experimental Equip.	HL4003T	(n.a.)	2014.02.26	2015.02.25

2.3.3. Test Verdict

The nominal, highest and lowest extreme voltages are separately 3.8VDC, 4.2VDC and 3.5VDC, which are specified by the applicant; the normal temperature here used is 20°C. The frequency deviation limit is ±2.5ppm.

The testing was performed using one RB and Bandwidth setting for each band.

LTE Band 7 – QPSK - Channel 21100 – Frequency 2535MHz – RB 25/0 Limit: 2535MHz*2.5ppm=6337.5Hz				
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Result
100	3.8	-30	5.41	PASS
100		-20	-5.04	
100		-10	-5.18	
100		0	-4.58	
100		+10	-4.51	
100		+20	5.75	
100		+30	-5.71	
100		+40	4.70	
100		+50	-6.78	
111	4.2	+20	-6.17	
92	3.5	+20	-6.02	
LTE Band 4 – QPSK - Channel 20175 – Frequency 1732.5MHz – RB 6/0 Limit: 1732.5MHz*2.5ppm=4331.25Hz				
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Result
100	3.8	-30	11.16	PASS
100		-20	12.16	
100		-10	11.54	
100		0	12.04	
100		+10	12.06	
100		+20	9.38	
100		+30	-11.88	
100		+40	11.83	
100		+50	13.62	
111	4.2	+20	12.12	
92	3.5	+20	13.52	

2.4. Peak to Average Radio

2.4.1. Requirement

According to FCC section 27.50(d) (5), the peak to average ratio (PAR) of the transmission may not exceed 13dB.

2.4.2. Test Description

See section 2.1.2 of this report.

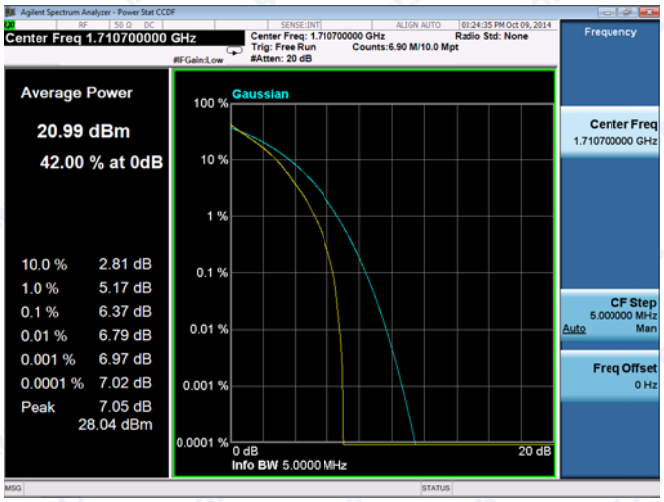
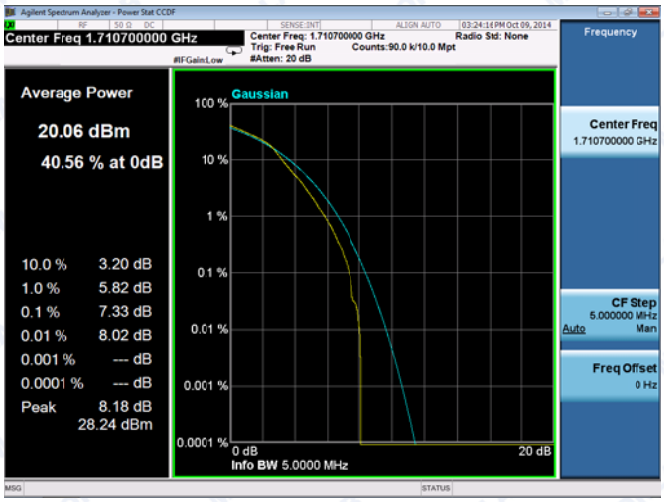
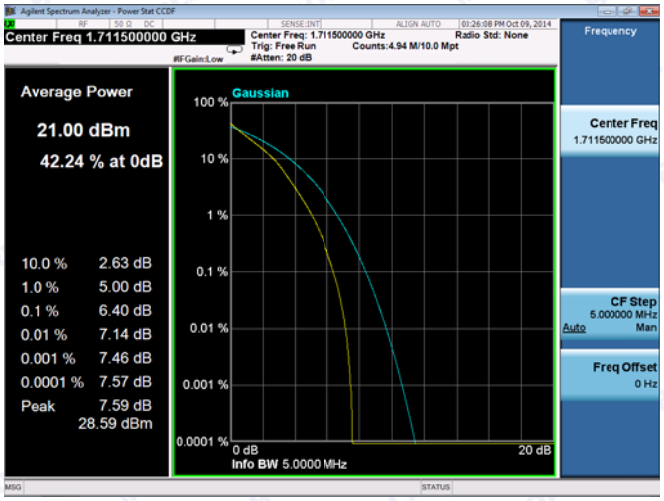
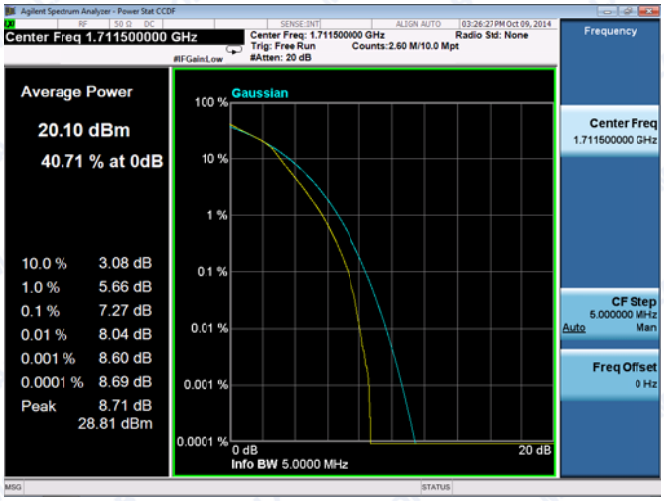
2.4.3. Test Result

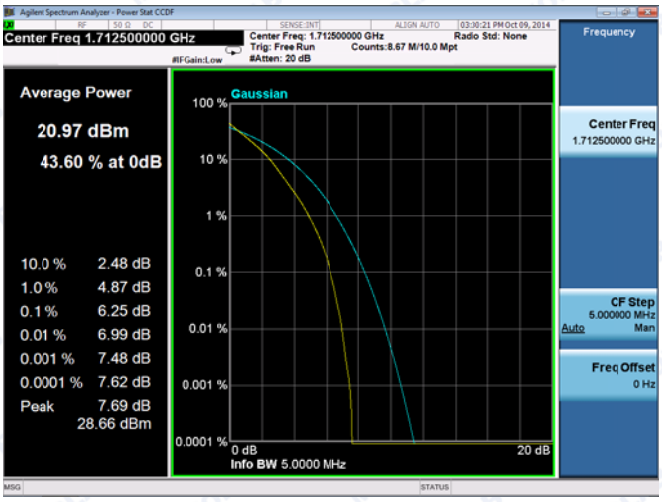
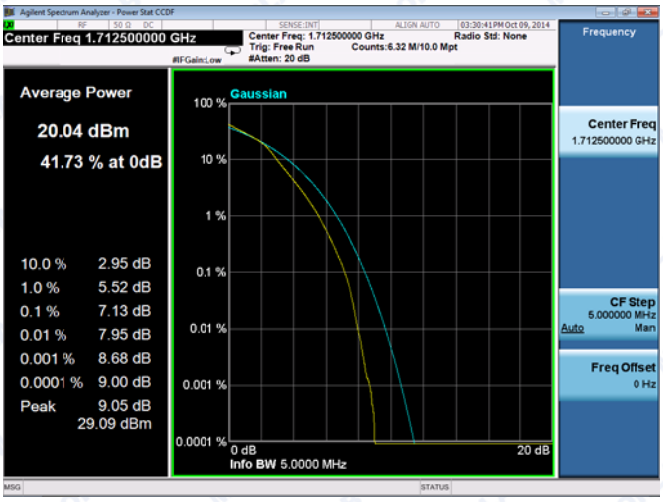
Record the maximum PAPR level associated with a probability of 0.1%.

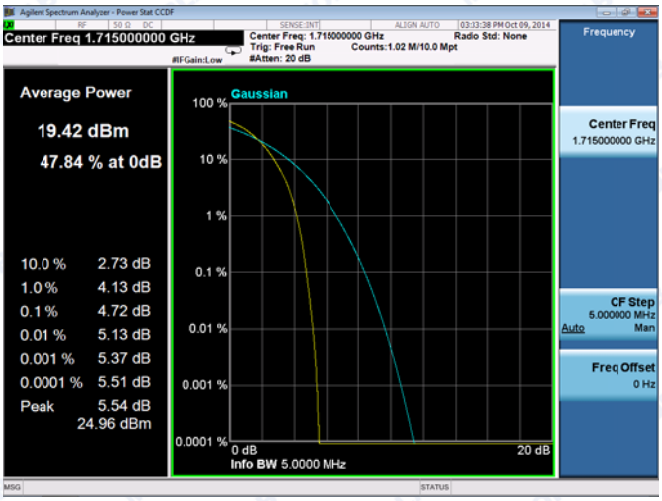
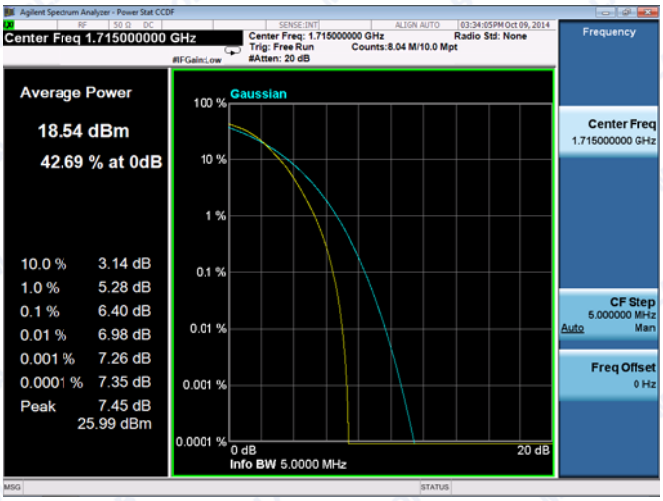
LTE Band 4:

Low channel:

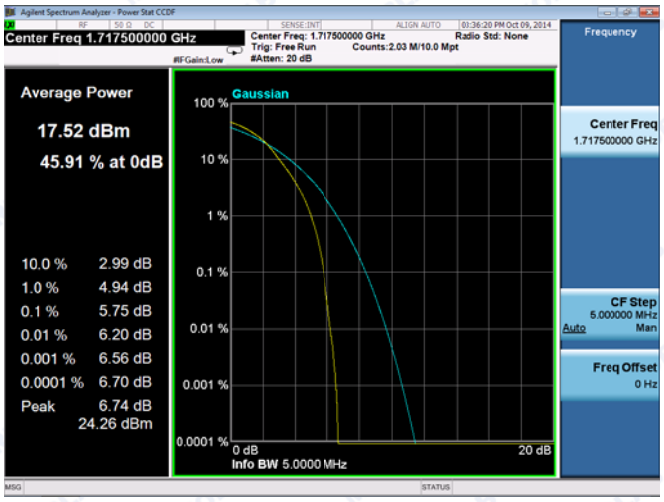
Channel Bandwidth: 1.4MHz				Channel Bandwidth: 3MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19957	1710.7	6.37	7.33	19965	1771.5	6.40	7.27
Channel Bandwidth: 5MHz				**Channel Bandwidth: 10MHz**			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM		QPSK	QPSK	16QAM
19975	1712.5	6.25	7.13	20000	1715.0	4.72	6.40
Channel Bandwidth: 15MHz				**Channel Bandwidth: 20MHz**			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM		QPSK	QPSK	16QAM
20025	1717.5	5.75	6.98	20050	1720.0	6.45	7.32

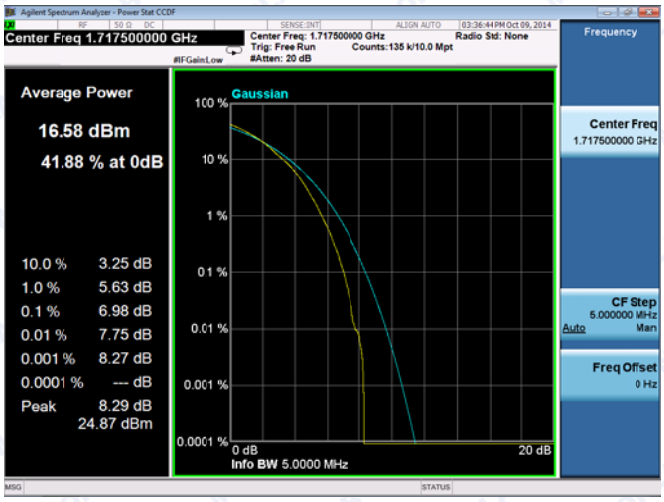
Spectrum Plot of Worst Value (Low channel)	
1.4MHz/QPSK	1.4MHz/16QAM
	
Spectrum Plot of Worst Value	
3MHz/QPSK	3MHz/16QAM
	

Spectrum Plot of Worst Value	
5MHz/QPSK	5MHz/16QAM
	

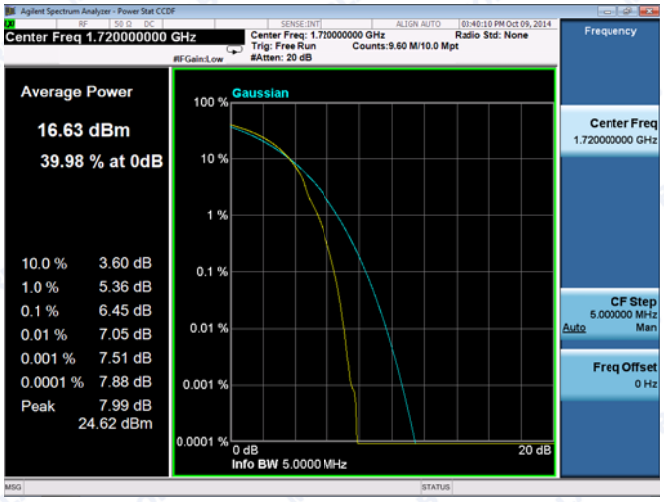
Spectrum Plot of Worst Value	
10MHz/QPSK	10MHz/16QAM
	

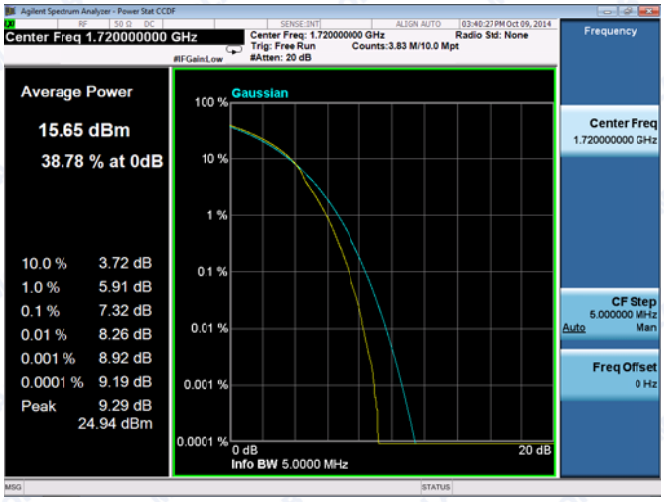
Spectrum Plot of Worst Value	
15MHz/QPSK	15MHz/16QAM





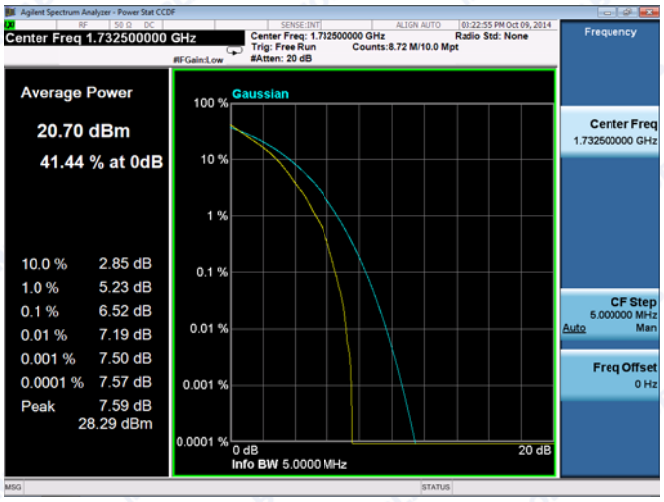
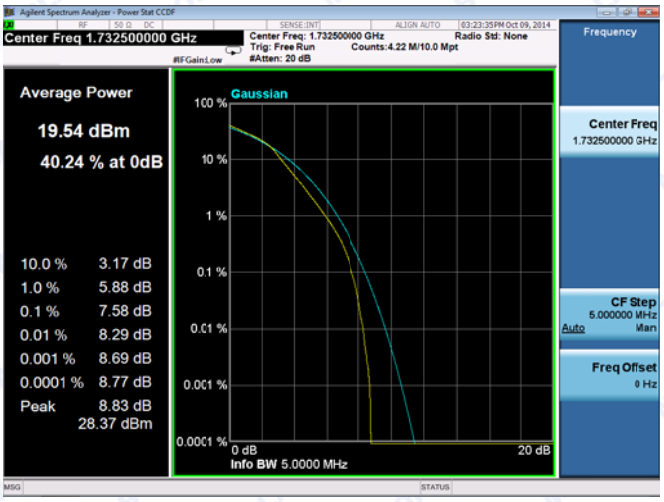
Spectrum Plot of Worst Value	
20MHz/QPSK	20MHz/16QAM

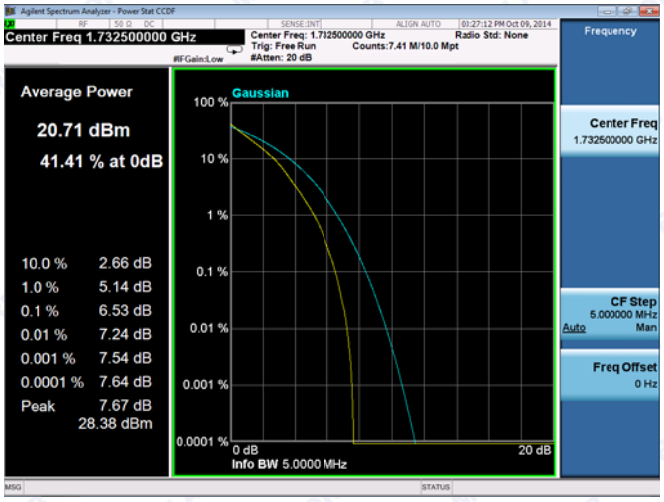
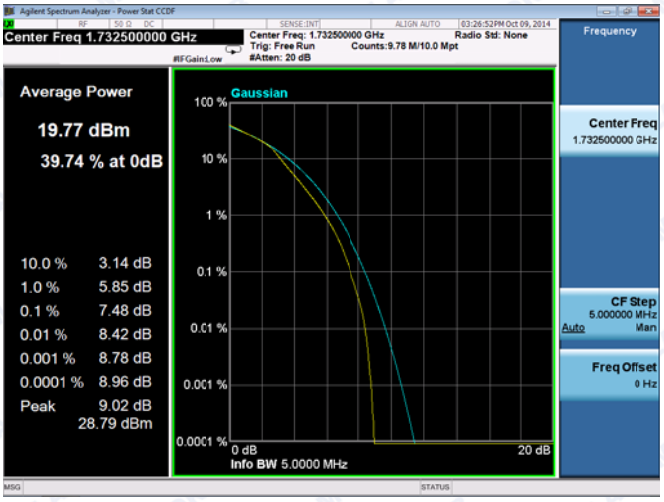




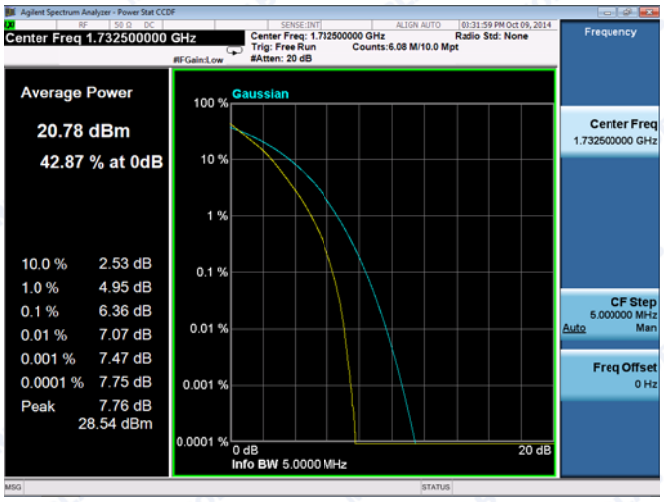
Middle channel:

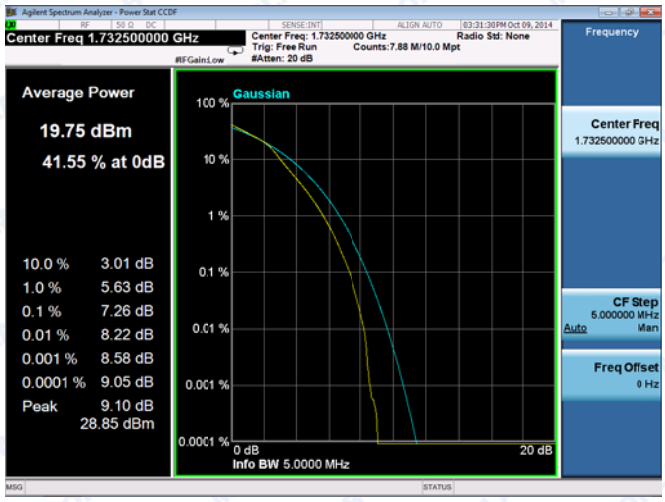
Channel Bandwidth: 1.4MHz				Channel Bandwidth: 3MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20175	1732.5	6.52	7.58	20175	1732.5	6.53	7.48
Channel Bandwidth: 5MHz				**Channel Bandwidth: 10MHz**			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM		QPSK	QPSK	16QAM
20175	1732.5	6.36	7.26	20175	1732.5	4.70	6.58
Channel Bandwidth: 15MHz				**Channel Bandwidth: 20MHz**			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM		QPSK	QPSK	16QAM
20175	1732.5	5.71	7.05	20175	1732.5	6.44	7.39

Spectrum Plot of Worst Value	
1.4MHz/QPSK	1.4MHz/16QAM
	

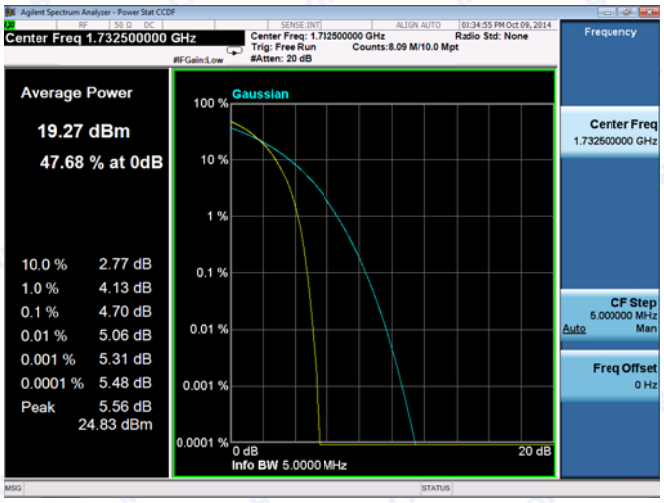
Spectrum Plot of Worst Value	
3MHz/QPSK	3MHz/16QAM
	

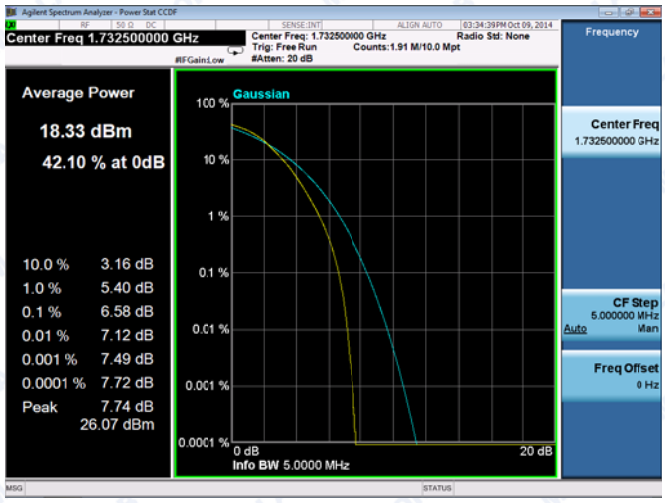
Spectrum Plot of Worst Value	
5MHz/QPSK	5MHz/16QAM

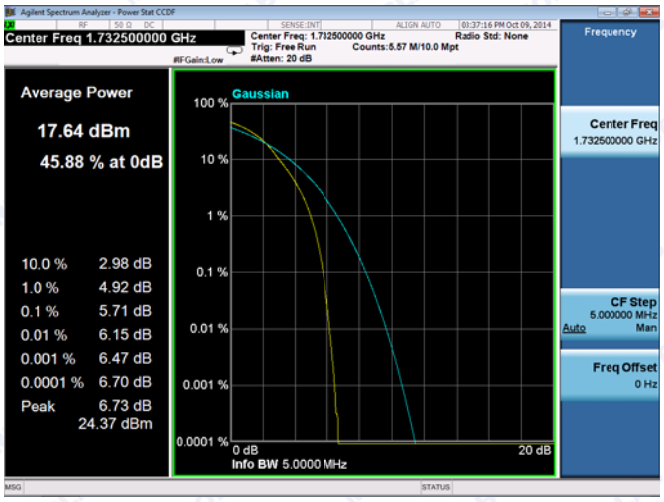
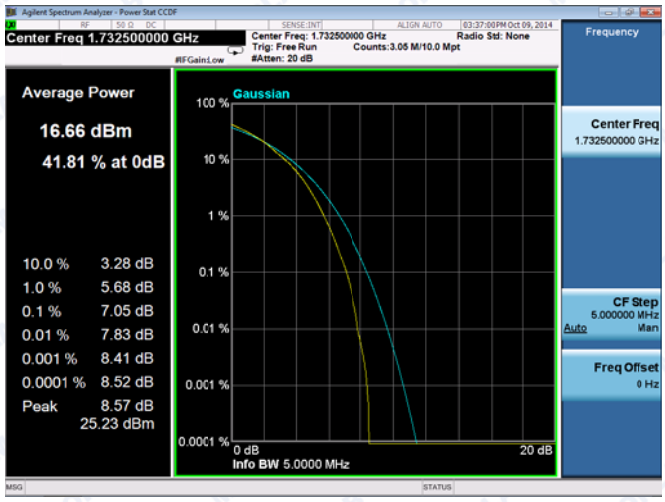


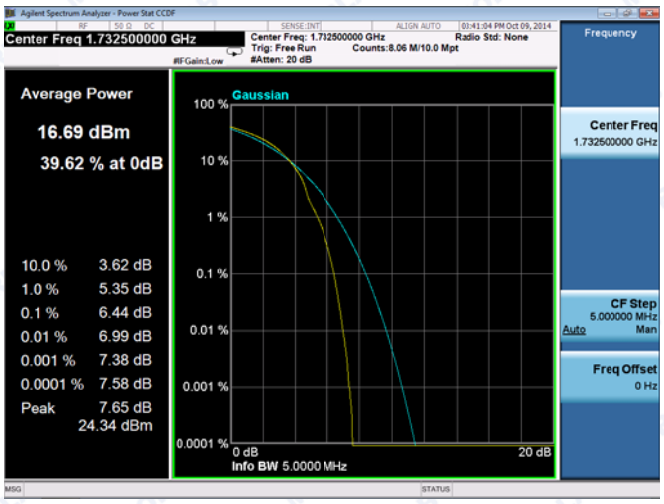
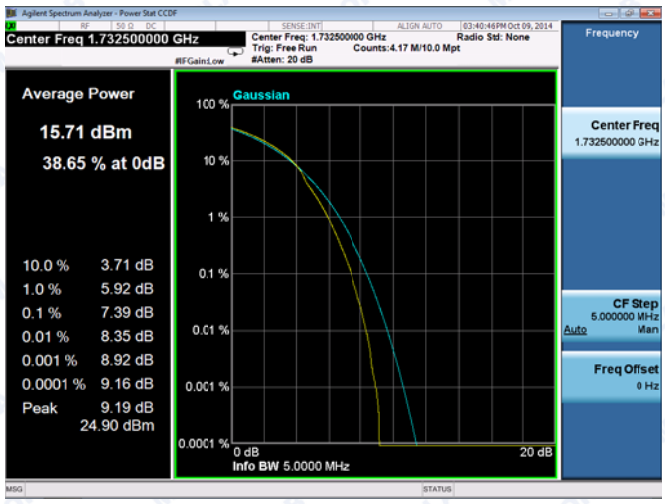


Spectrum Plot of Worst Value	
10MHz/QPSK	10MHz/16QAM



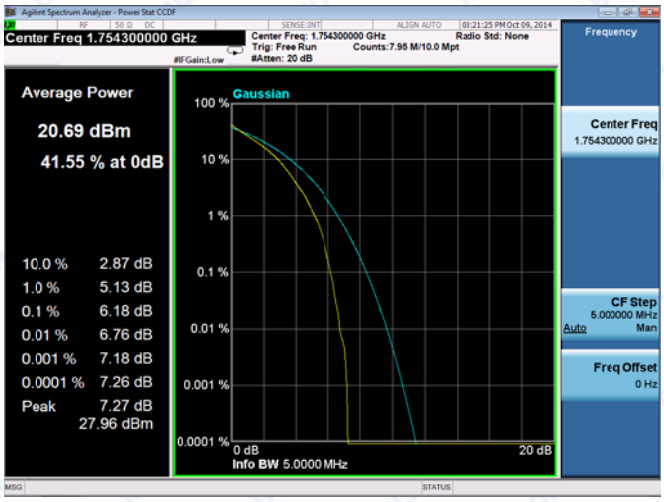
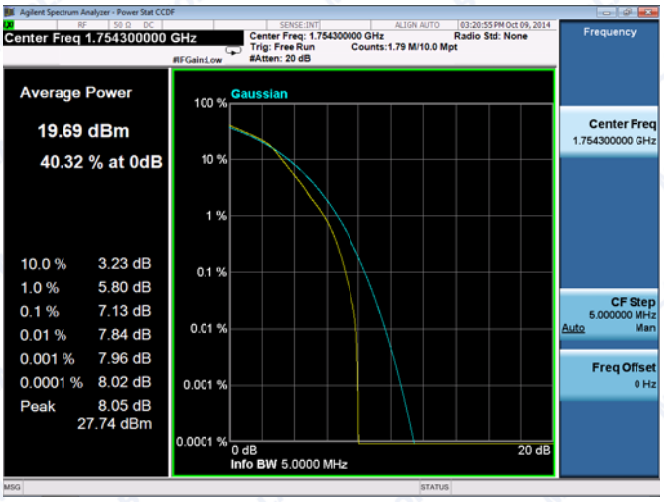


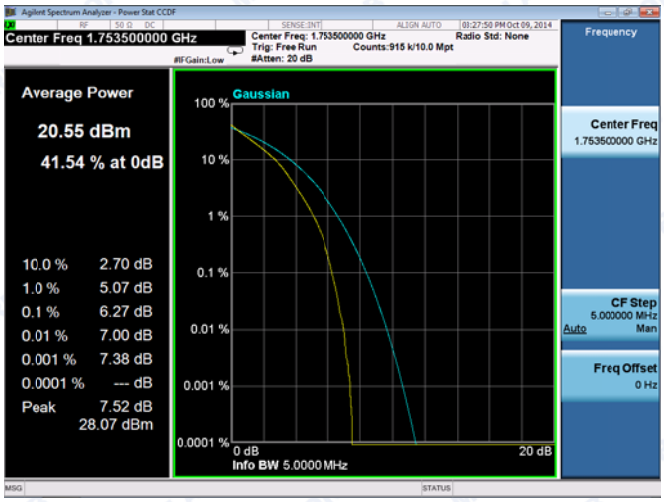
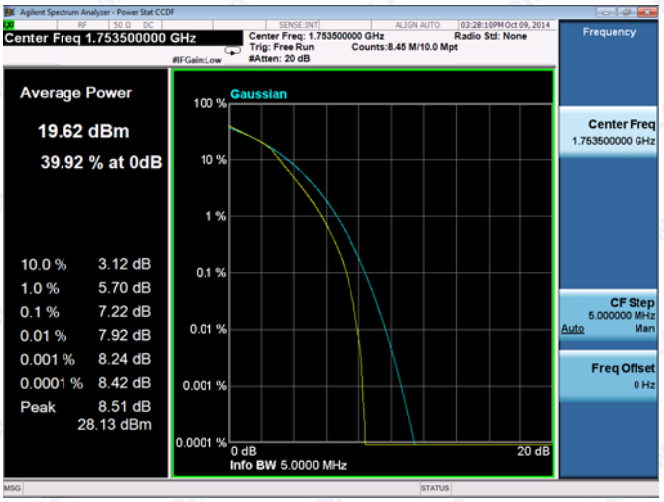
Spectrum Plot of Worst Value	
15MHz/QPSK	15MHz/16QAM
	

Spectrum Plot of Worst Value	
20MHz/QPSK	20MHz/16QAM
	

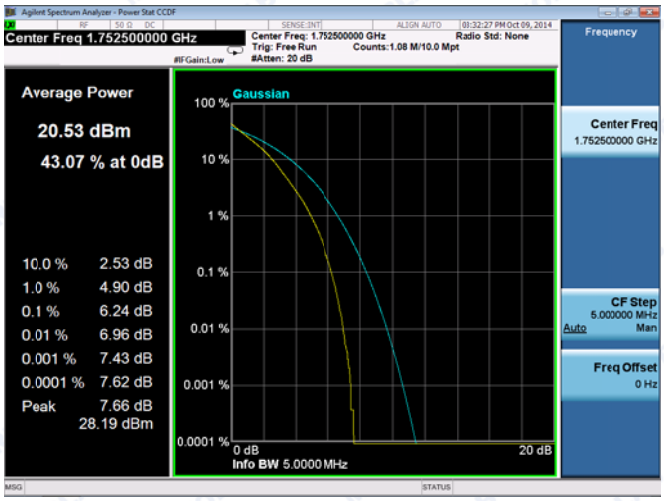
High channel:

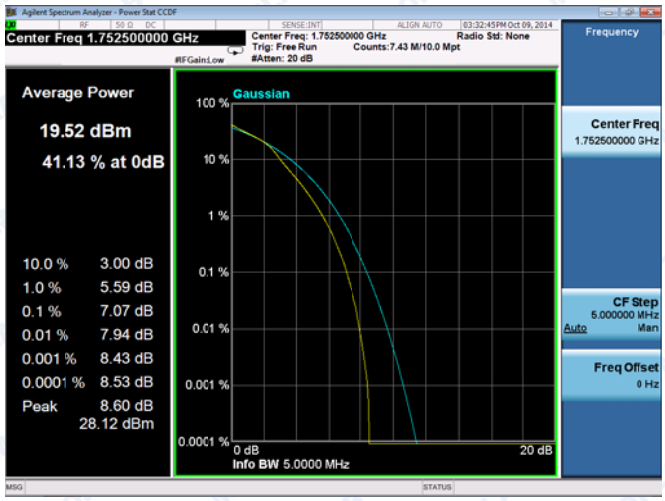
Channel Bandwidth: 1.4MHz				Channel Bandwidth: 3MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20392	1754.2	6.18	7.13	20384	1753.4	6.27	7.22
Channel Bandwidth: 5MHz				**Channel Bandwidth: 10MHz**			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM		QPSK	QPSK	16QAM
20375	1752.5	6.24	7.07	20350	1750.0	4.77	6.52
Channel Bandwidth: 15MHz				**Channel Bandwidth: 20MHz**			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM		QPSK	QPSK	16QAM
20325	1747.5	5.73	6.91	20300	1745.0	6.40	7.26

Spectrum Plot of Worst Value	
1.4MHz/QPSK	1.4MHz/16QAM
	

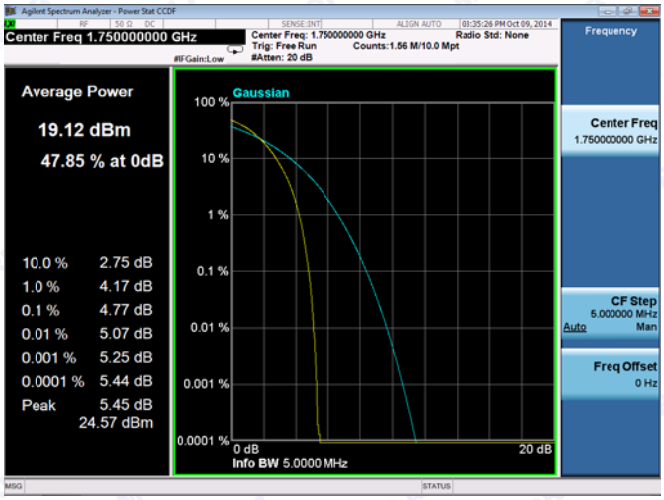
Spectrum Plot of Worst Value	
3MHz/QPSK	3MHz/16QAM
	

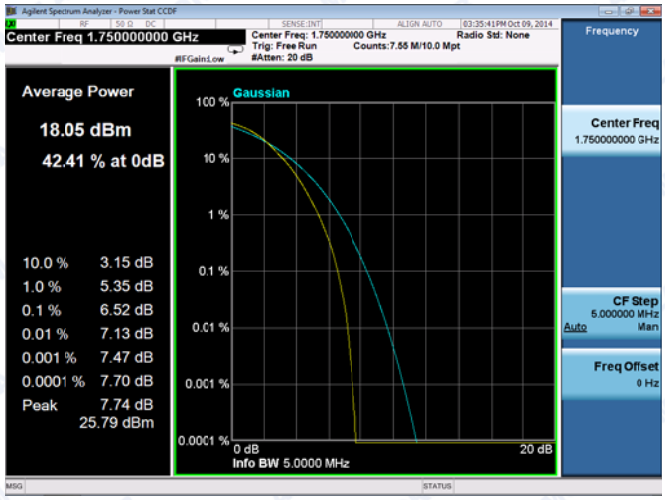
Spectrum Plot of Worst Value	
5MHz/QPSK	5MHz/16QAM

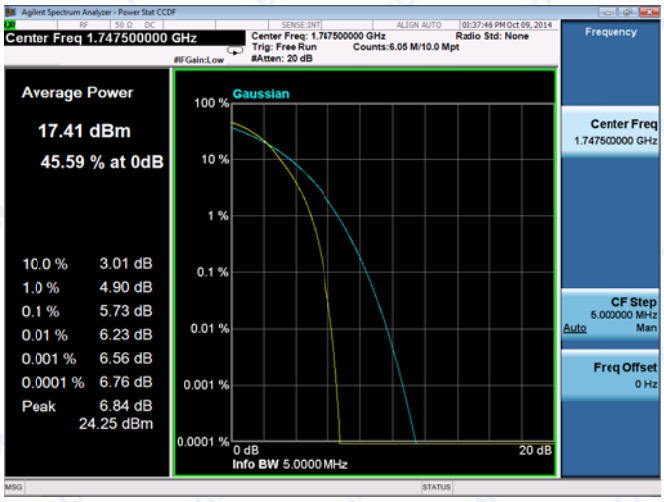
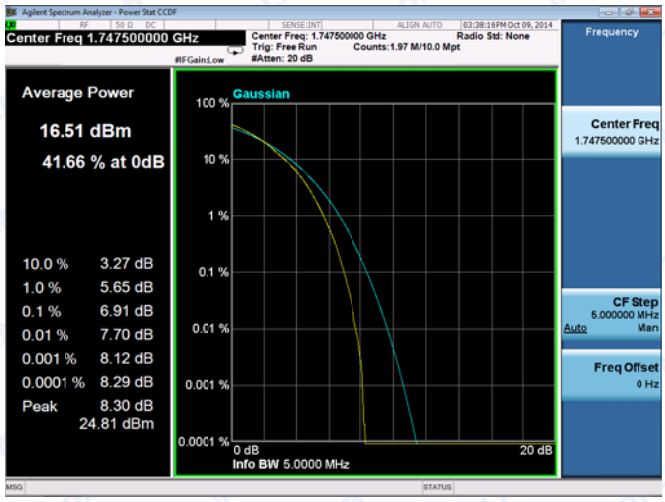


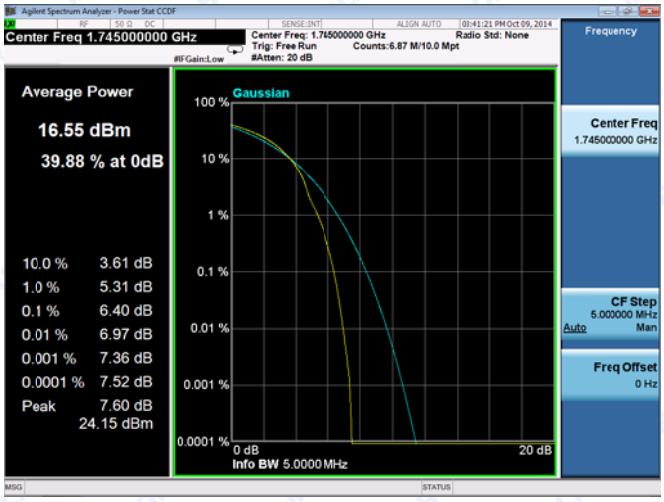
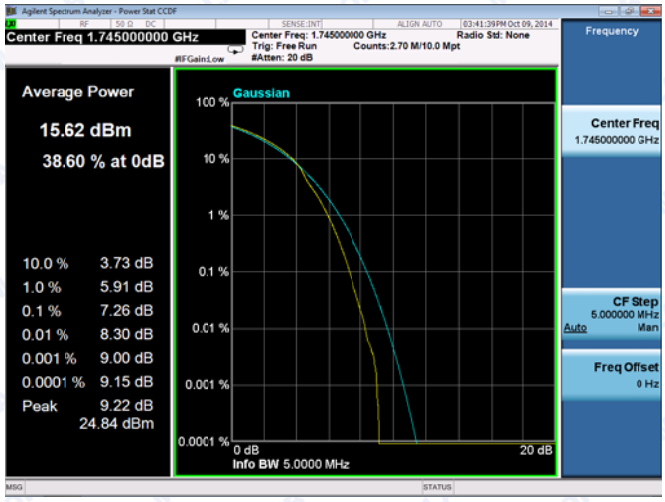


Spectrum Plot of Worst Value	
10MHz/QPSK	10MHz/16QAM





Spectrum Plot of Worst Value	
15MHz/QPSK	15MHz/16QAM
	

Spectrum Plot of Worst Value	
20MHz/QPSK	20MHz/16QAM
	

2.5. Conducted Spurious Emissions

2.5.1. Test Requirement

According to FCC section 2.1051 and 27.53(g), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10*log(P)dB. This calculated to be -13dBm.

2.5.2. Test Procedure

See section 2.1.2 of this report.

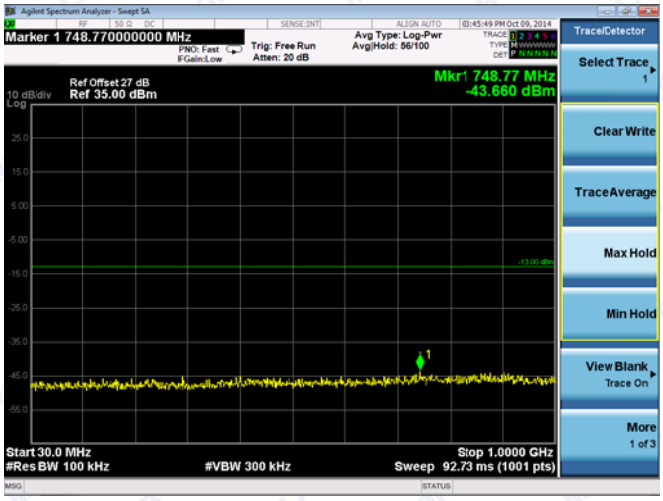
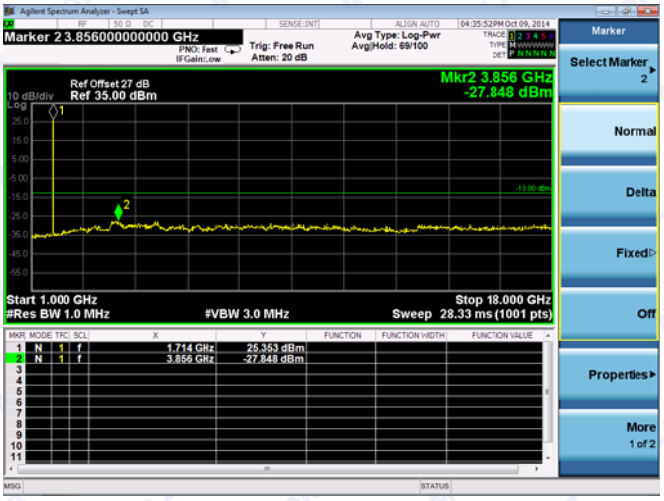
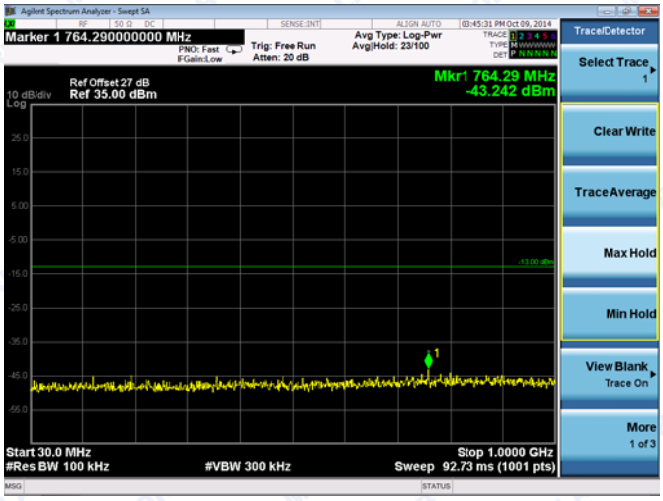
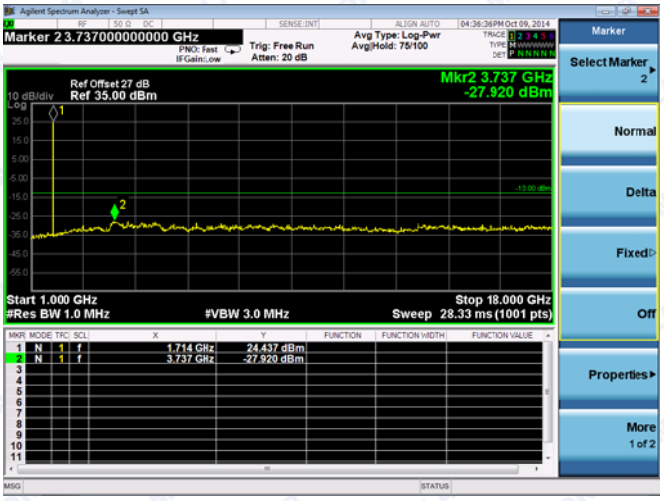
Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

2.5.3. Test Result

Compliant. See attached pots.

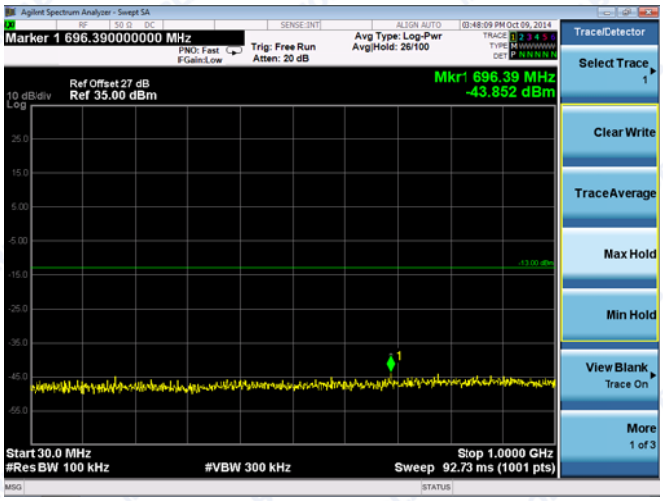
LTE Band 4

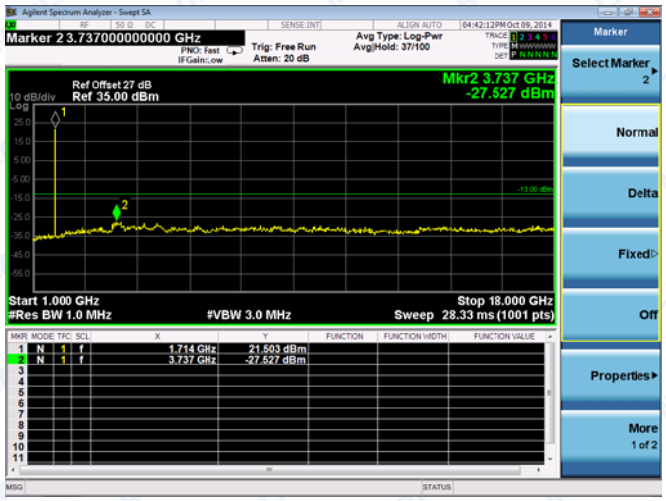
Low channel:

LTE Band 4 1.4MHz BW, Low Channel	
QPSK	
	
16QAM	
	

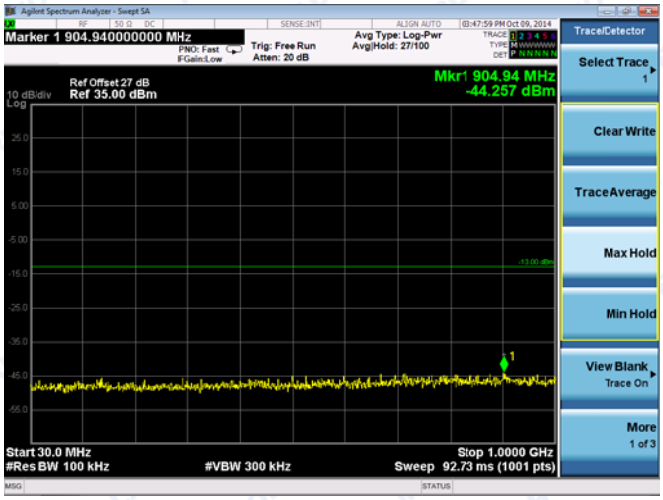
LTE Band 4 3MHz BW, Low Channel

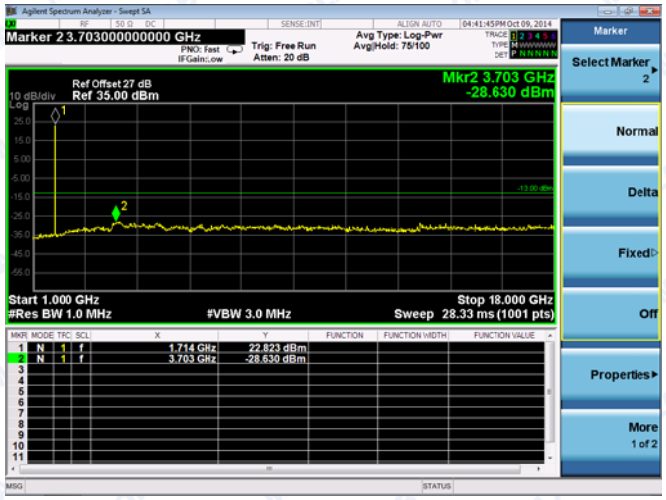
QPSK





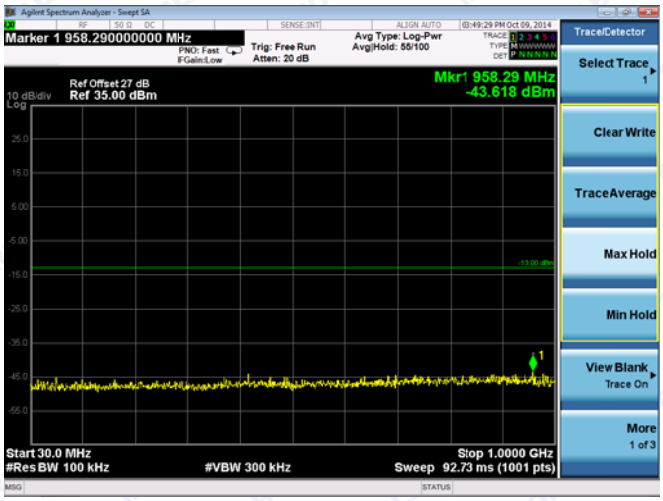
16QAM

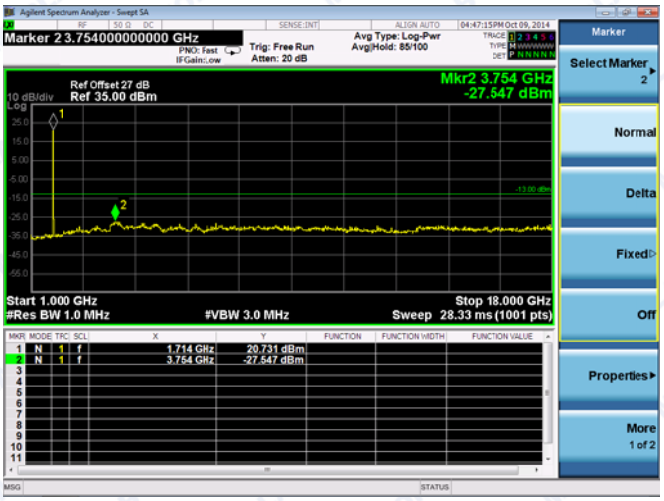




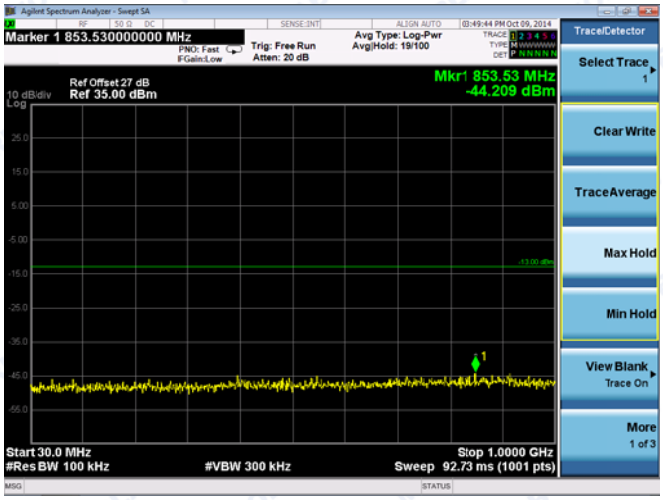
LTE Band 4 5MHz BW, Low Channel

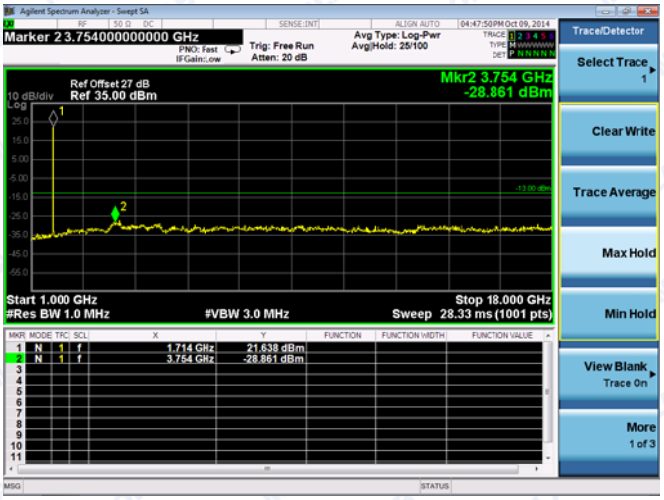
QPSK





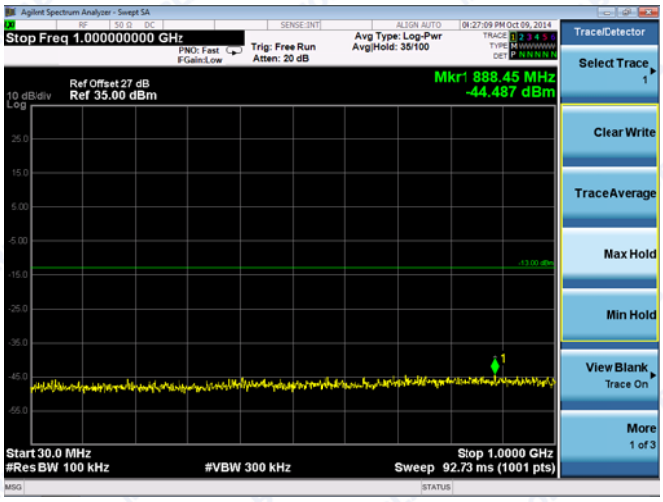
16QAM

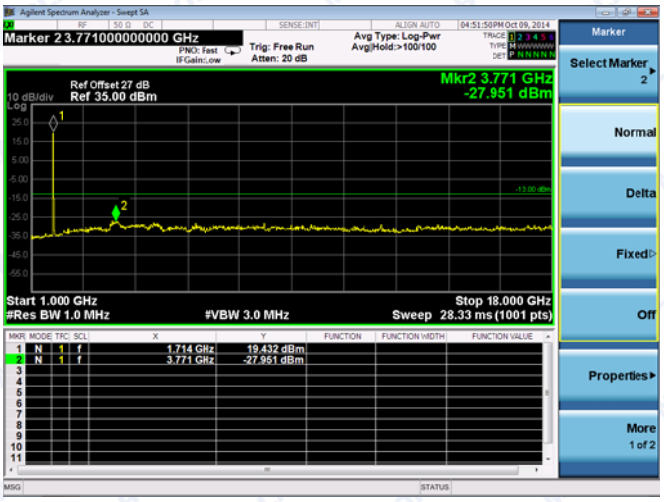




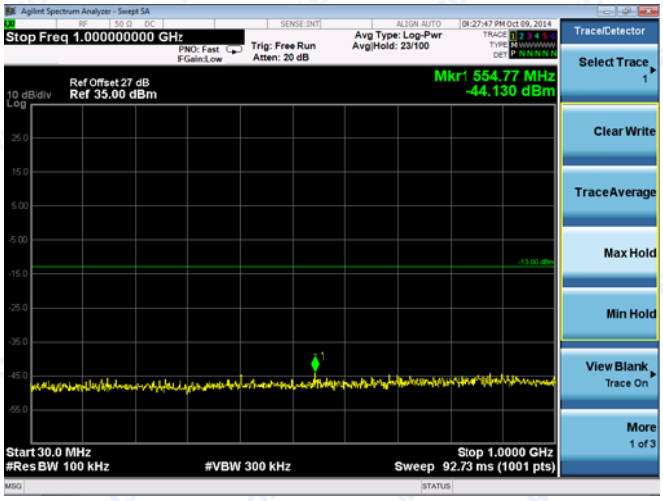
LTE Band 4 10MHz BW, Low Channel

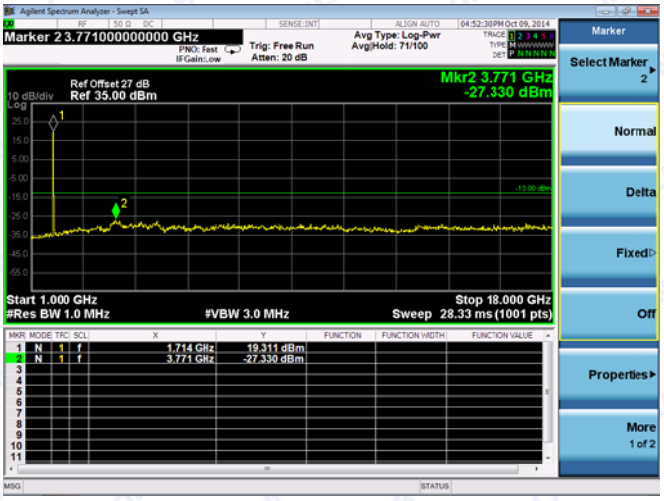
QPSK





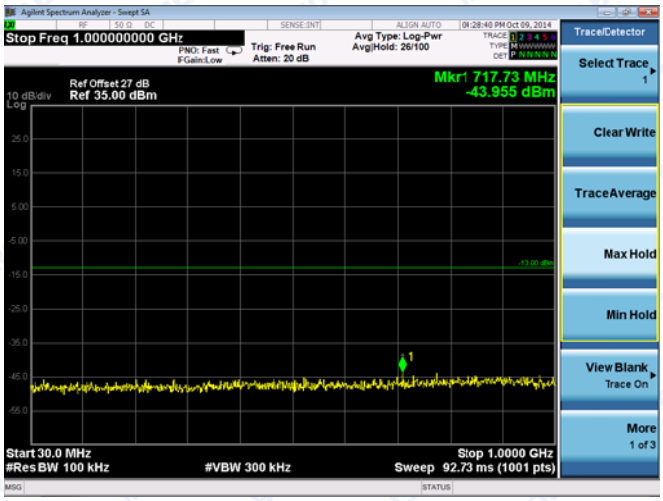
16QAM

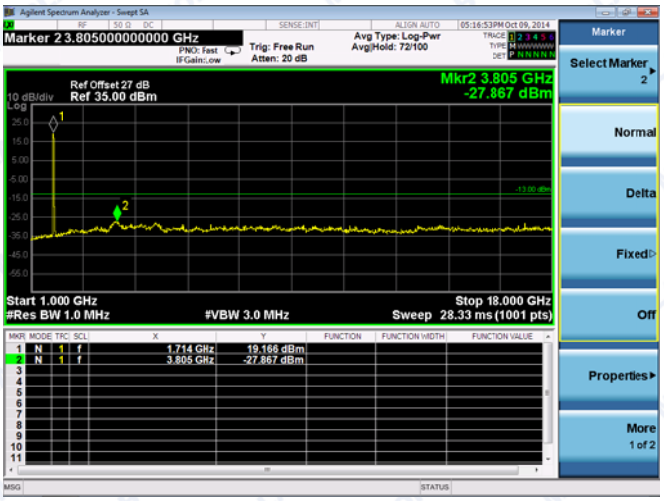




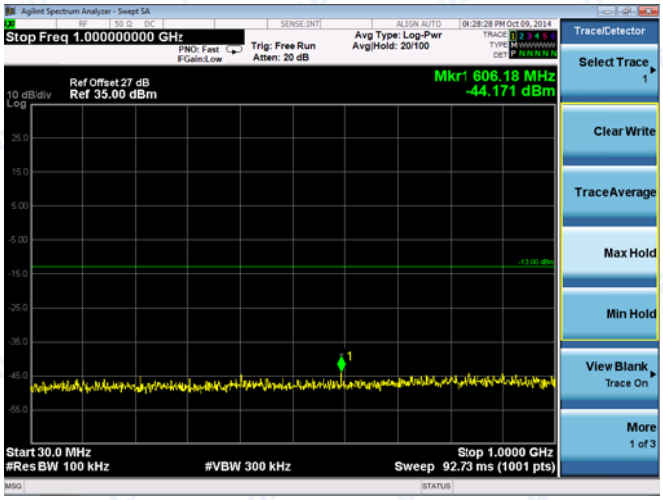
LTE Band 4 15MHz BW, Low Channel

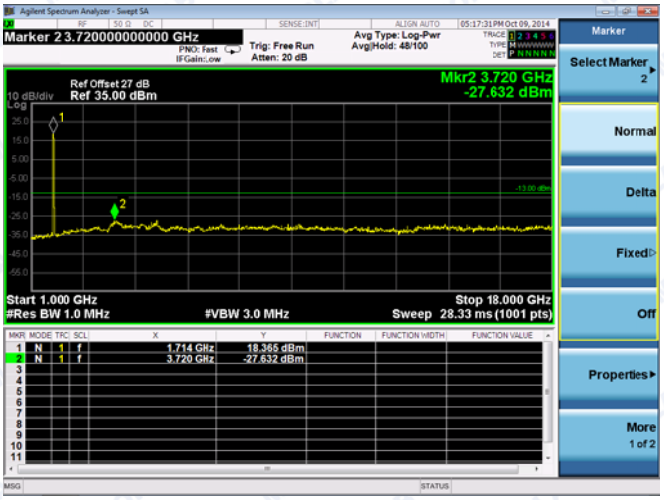
QPSK





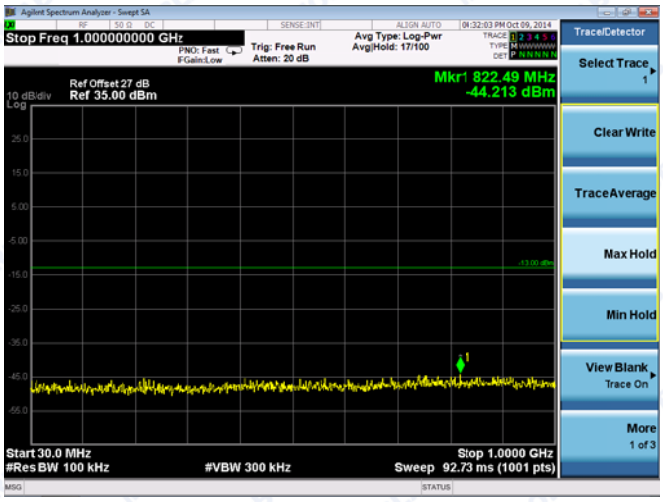
16QAM

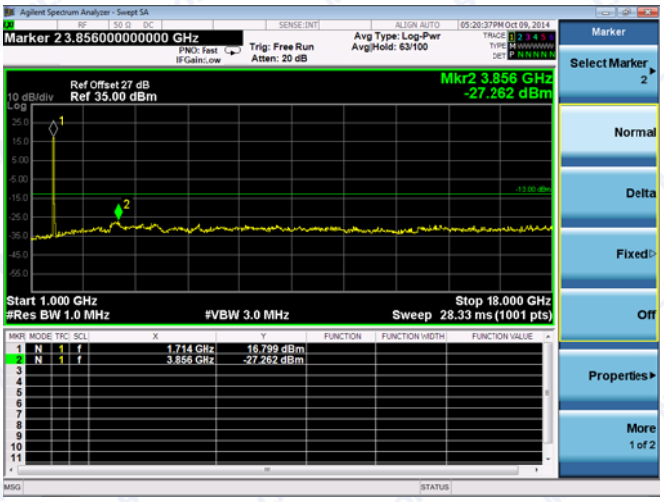




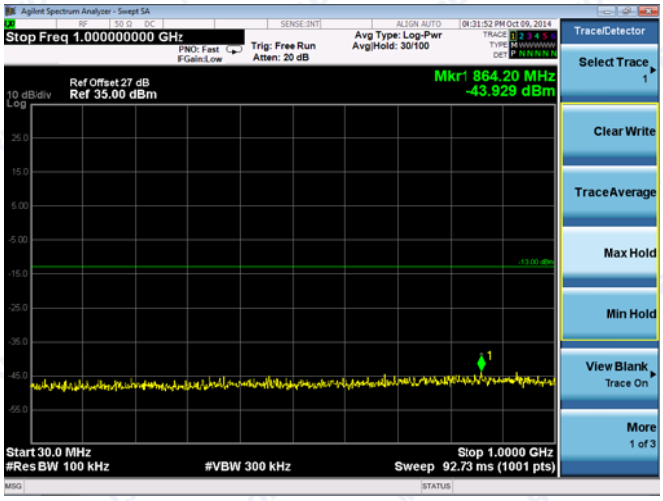
LTE Band 4 20MHz BW, Low Channel

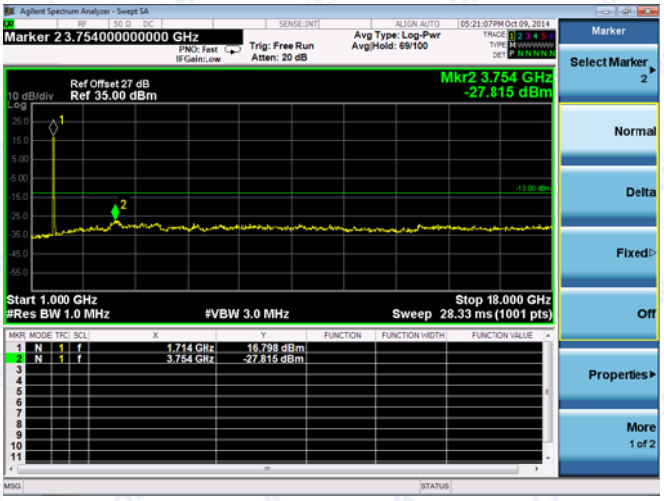
QPSK



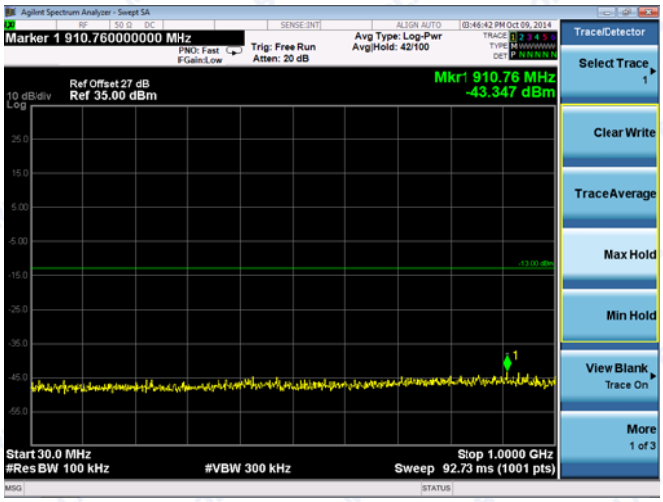
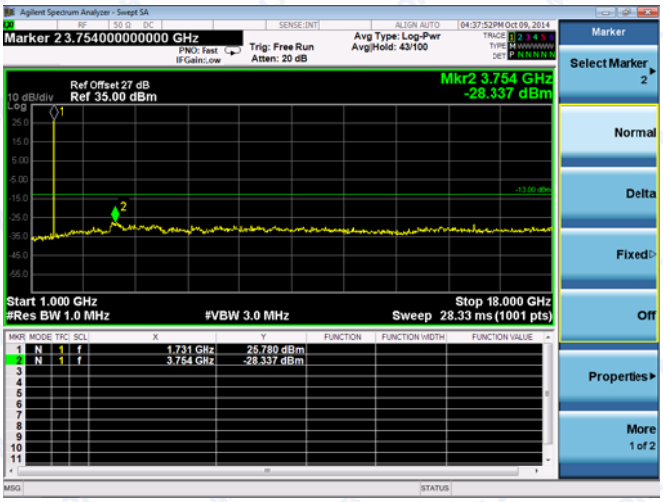
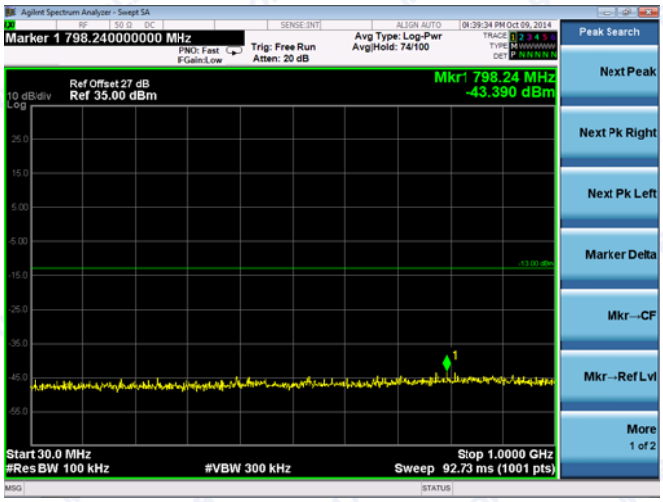
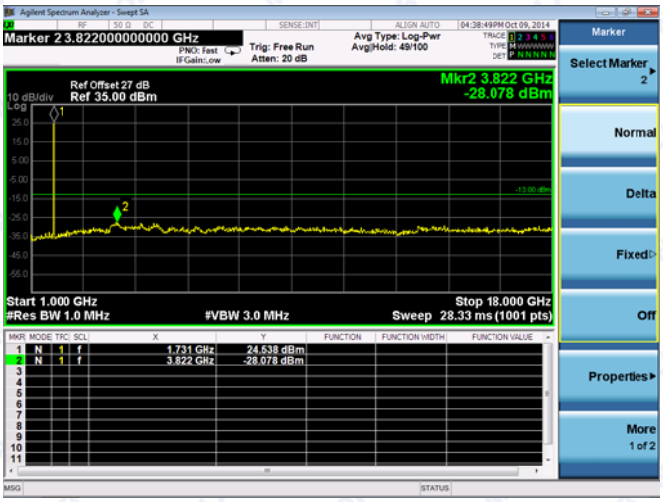


16QAM



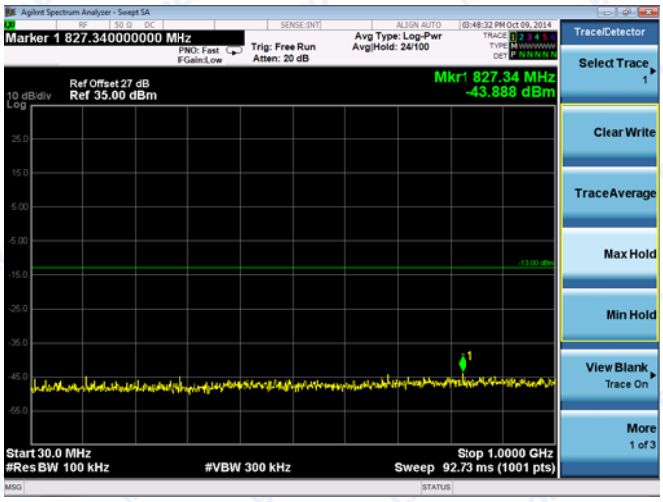


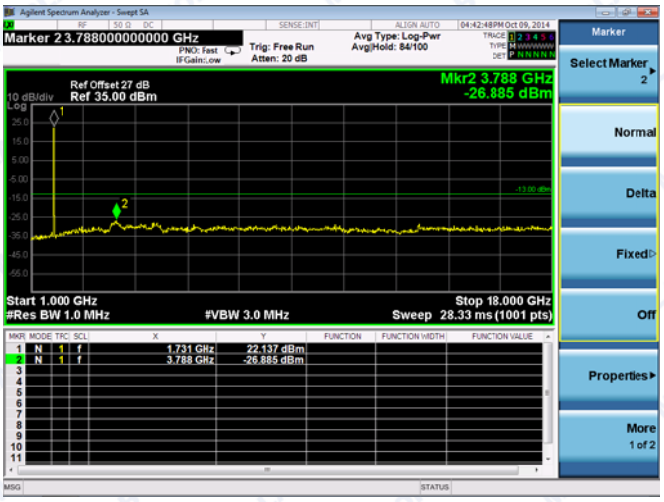
Middle channel:

LTE Band 4 1.4MHz BW, Mid Channel	
QPSK	
	
16QAM	
	

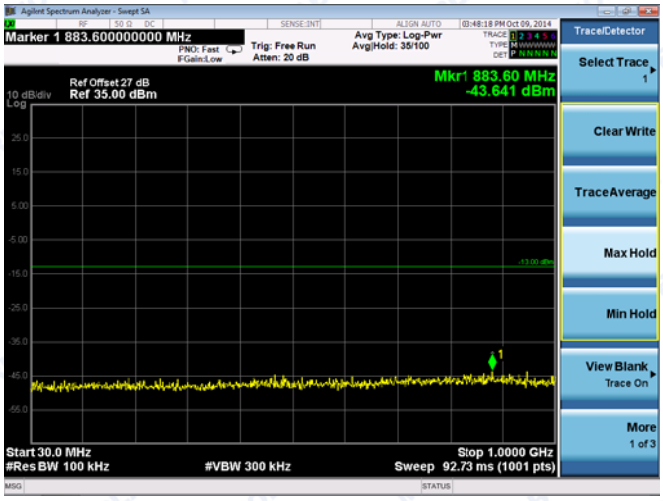
LTE Band 4 3MHz BW, Mid Channel

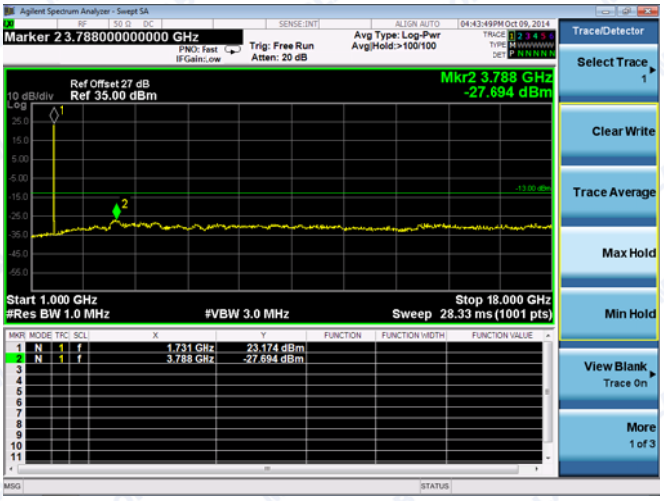
QPSK





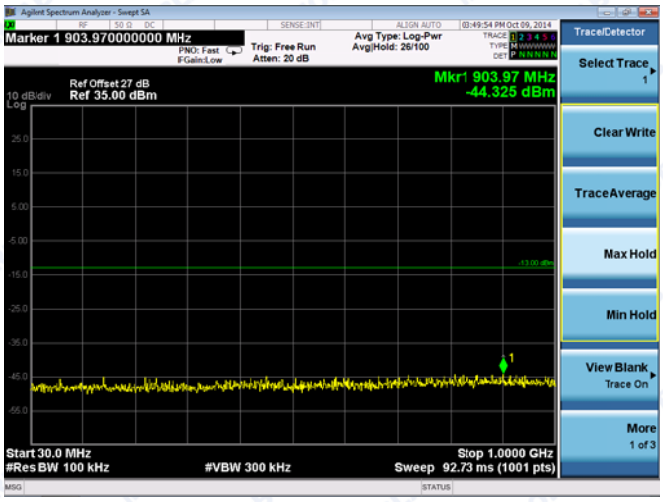
16QAM

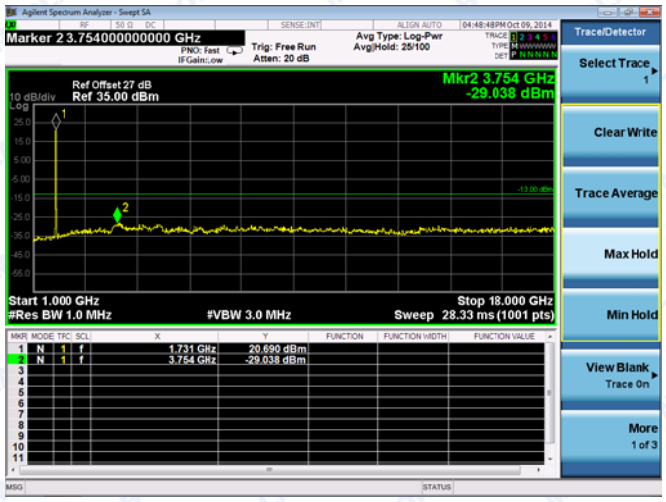




LTE Band 4 5MHz BW, Mid Channel

QPSK





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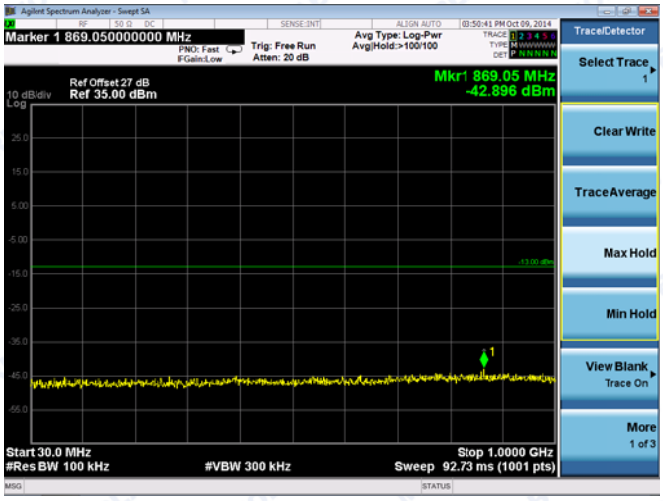
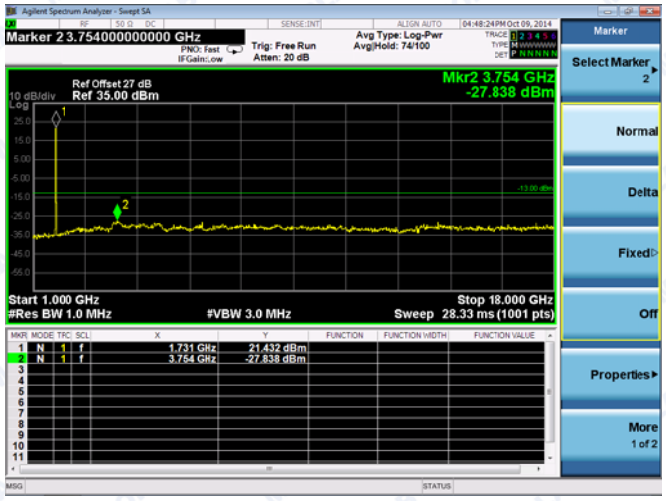
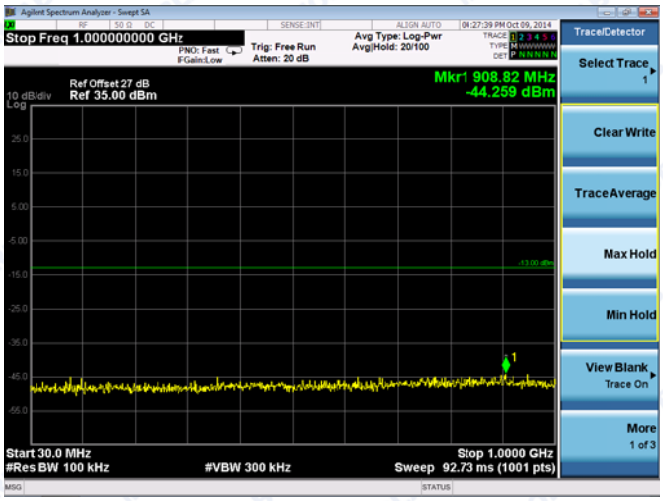
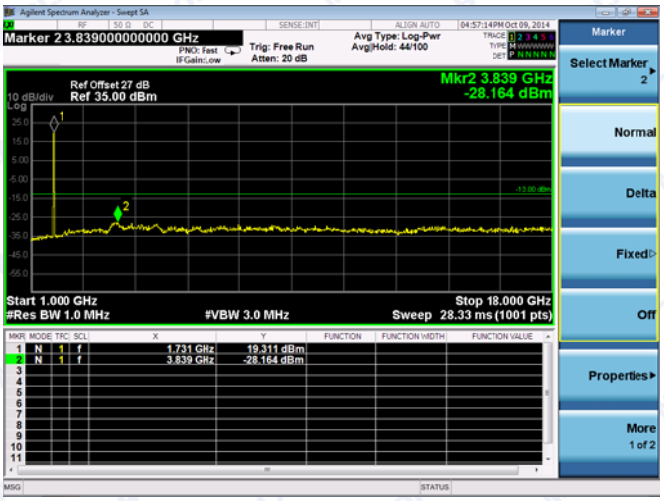




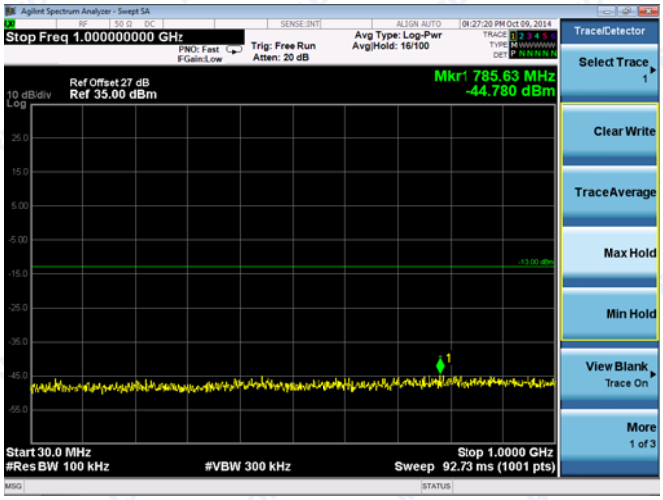
LTE Band 4 10MHz BW, Mid Channel

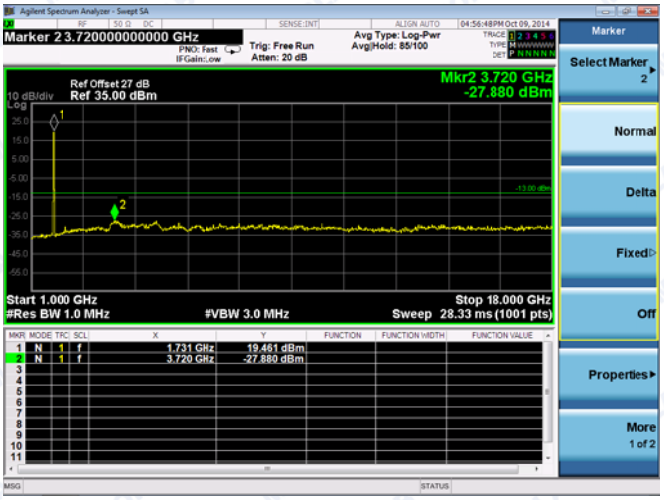
QPSK





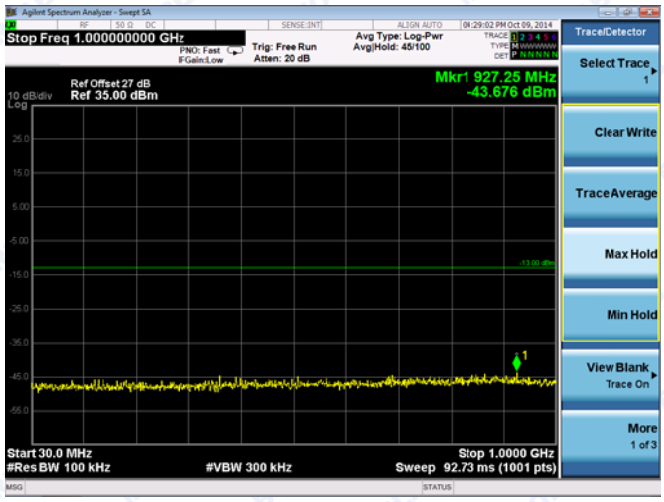
16QAM

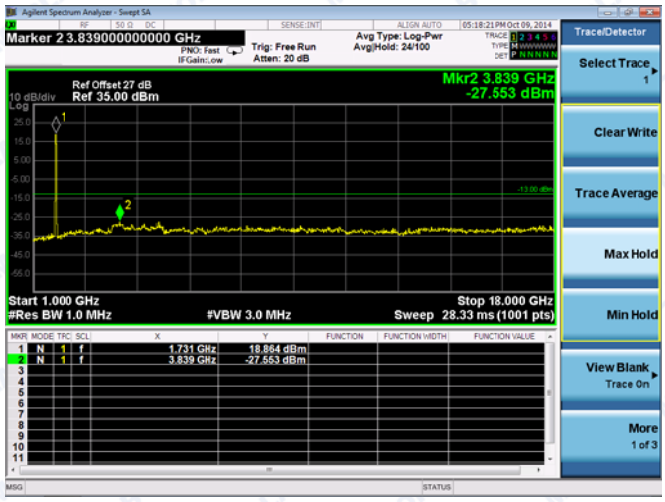




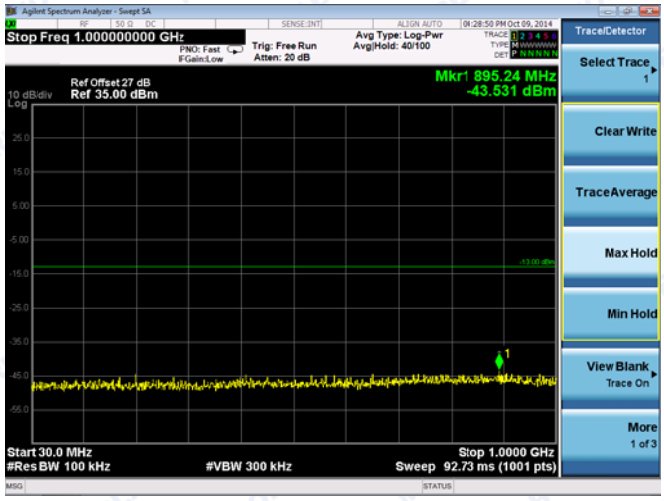
LTE Band 4 15MHz BW, Mid Channel

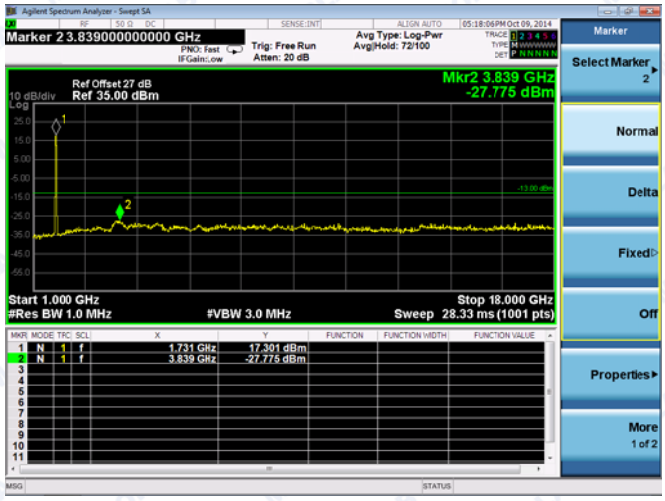
QPSK





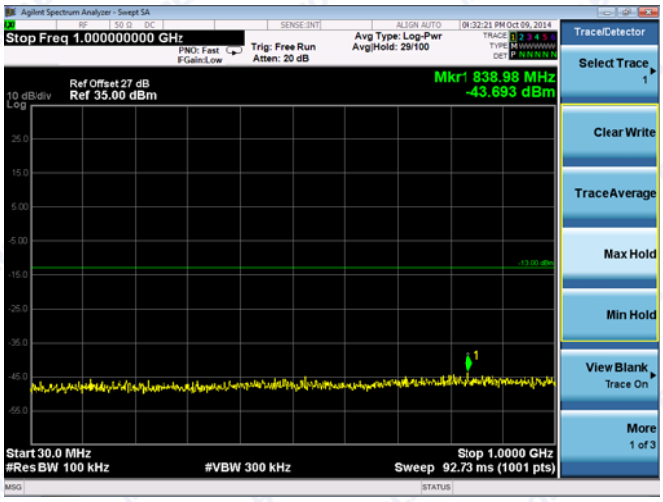
16QAM

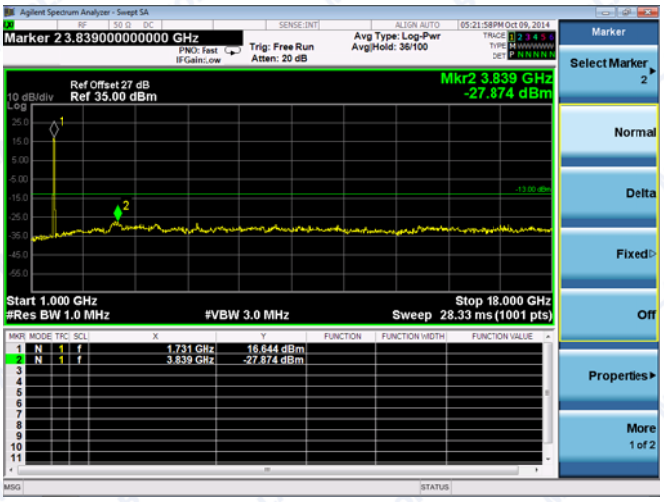




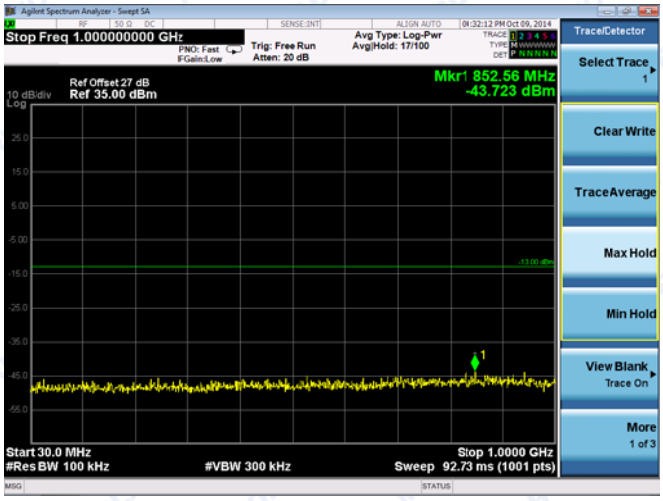
LTE Band 4 20MHz BW, Mid Channel

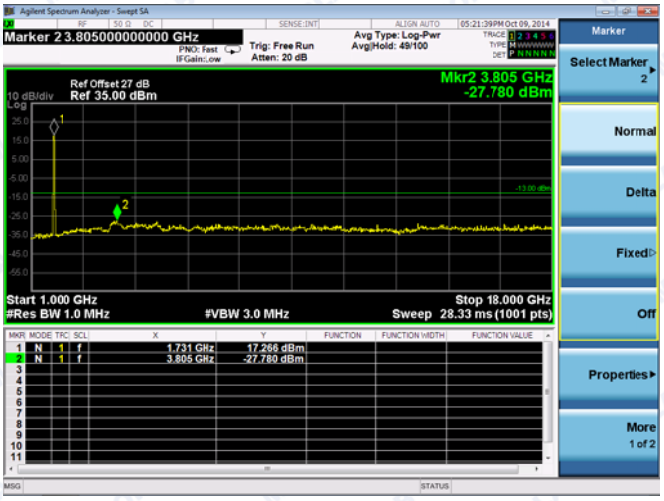
QPSK



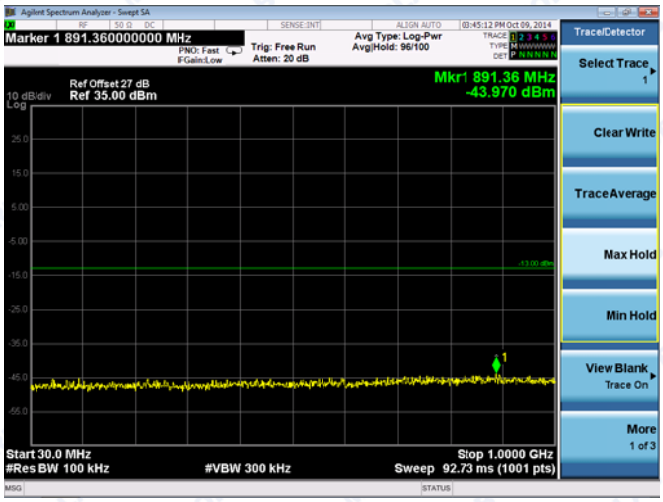
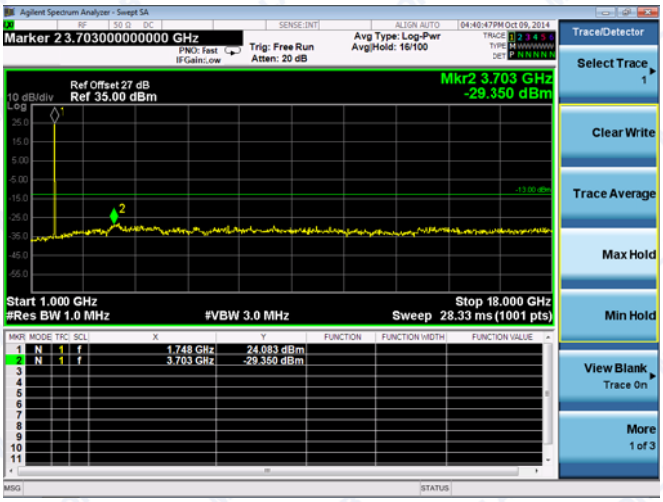
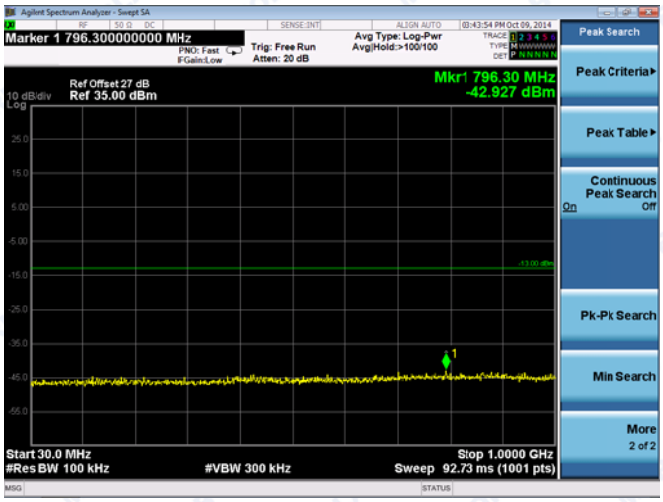
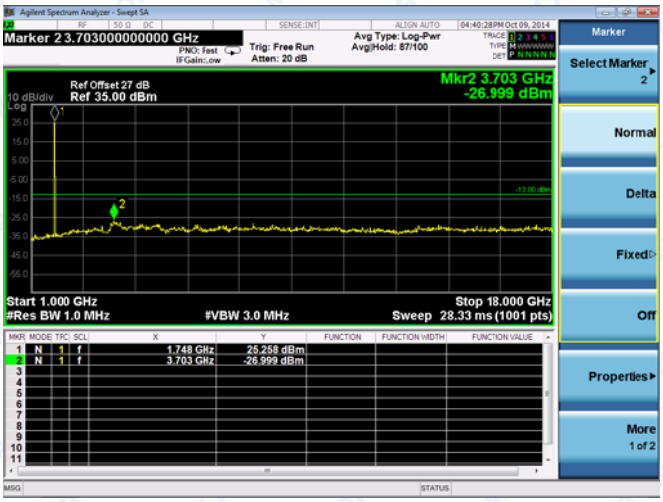


16QAM



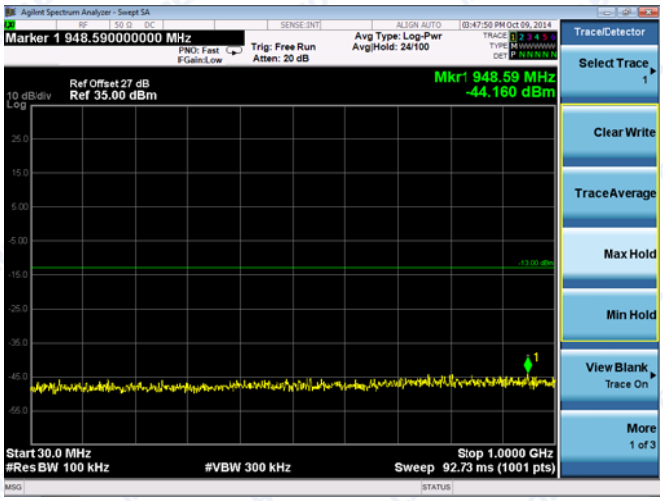


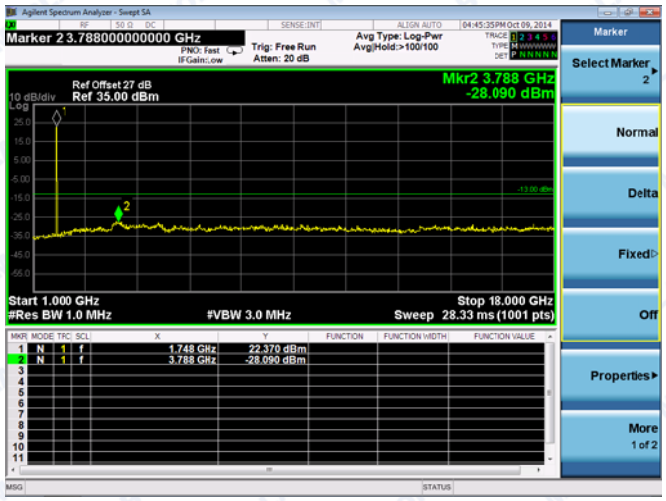
High channel:

LTE Band 4 1.4MHz BW, High Channel	
QPSK	
	
16QAM	
	

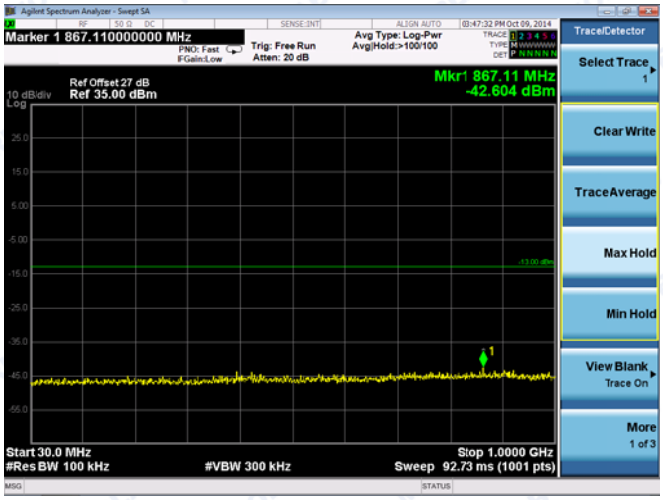
LTE Band 4 3MHz BW, High Channel

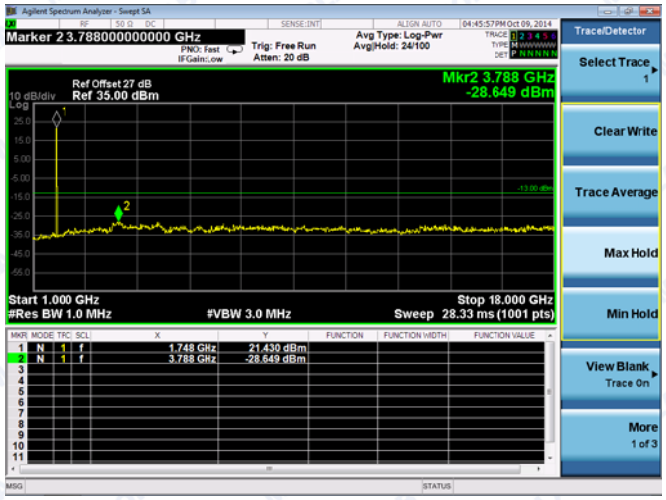
QPSK





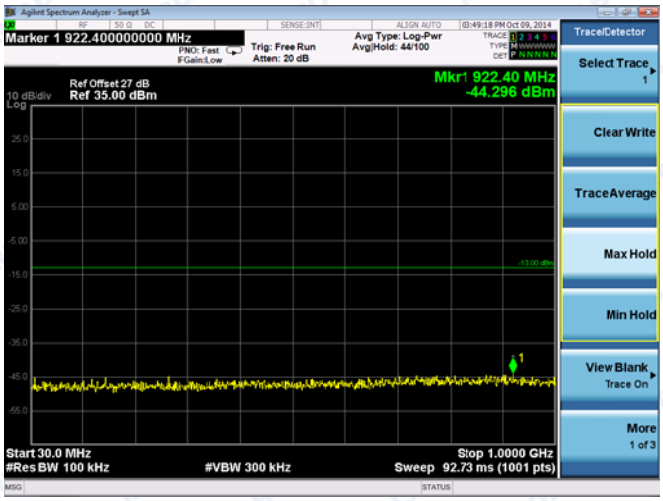
16QAM

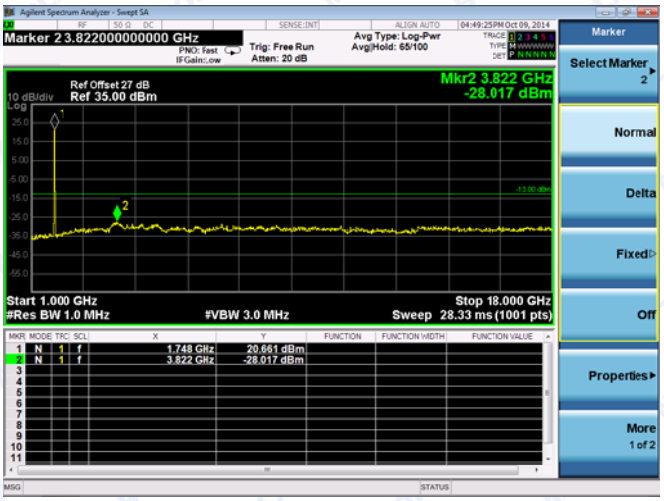




LTE Band 4 5MHz BW, High Channel

QPSK





16QAM