



## **2.4 Peak to Average Ratio**

### **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%.

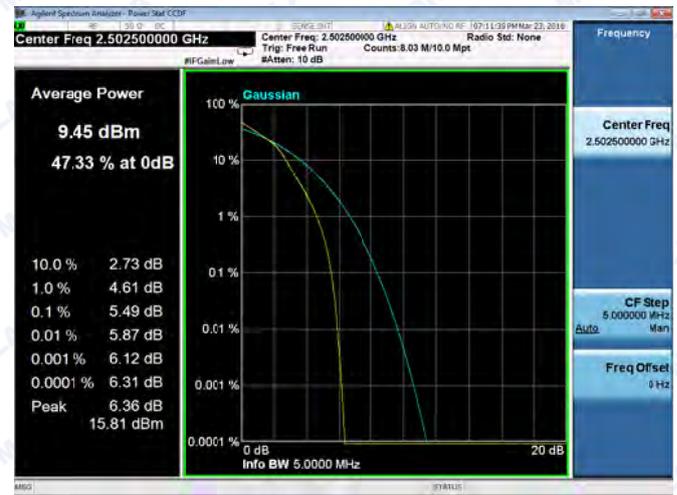
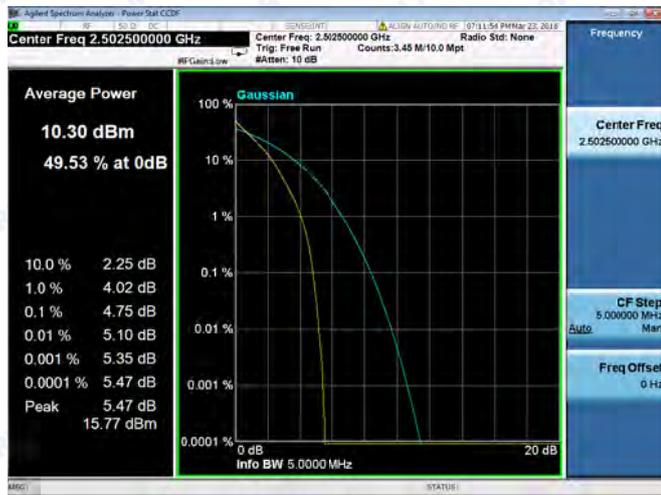


LTE Band 7 Low channel							
Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19957	1710.7	4.75	5.49	19965	1711.5	4.59	5.80

Spectrum Plot of Worst Value (Low channel)

5MHz/QPSK

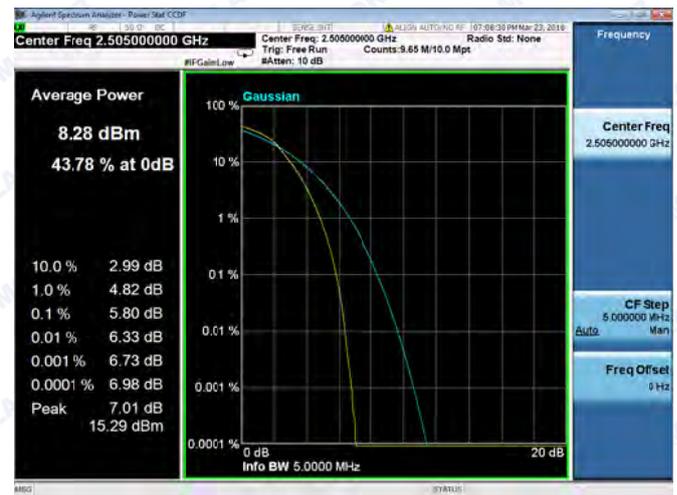
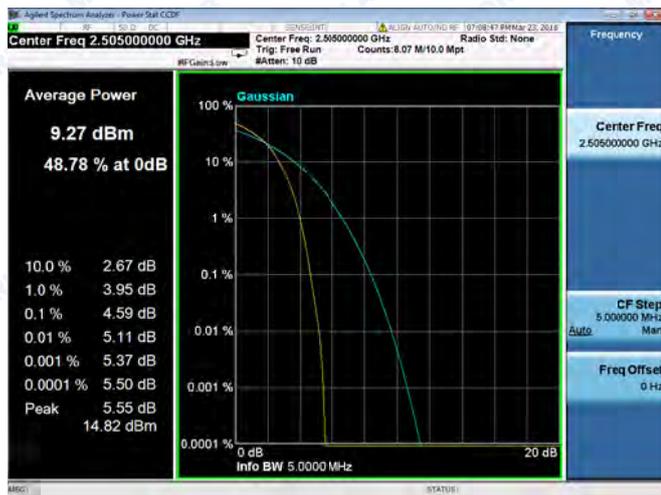
5MHz/16QAM



Spectrum Plot of Worst Value

10MHz/QPSK

10MHz/16QAM



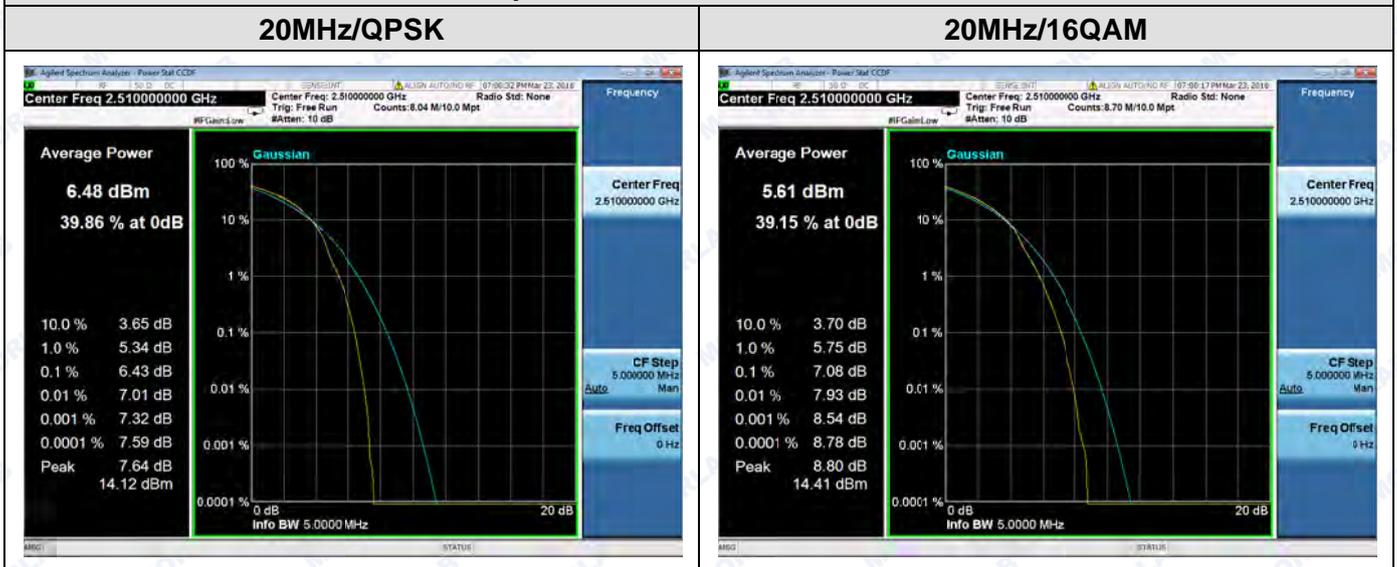


LTE Band 7 Low channel							
Channel Bandwidth: 15MHz				Channel Bandwidth: 20MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19975	1712.5	5.93	6.59	20000	1715.0	6.43	7.08

Spectrum Plot of Worst Value



Spectrum Plot of Worst Value



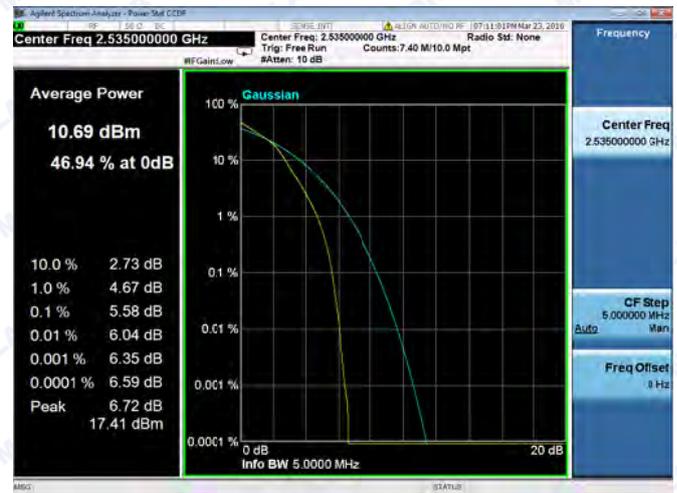
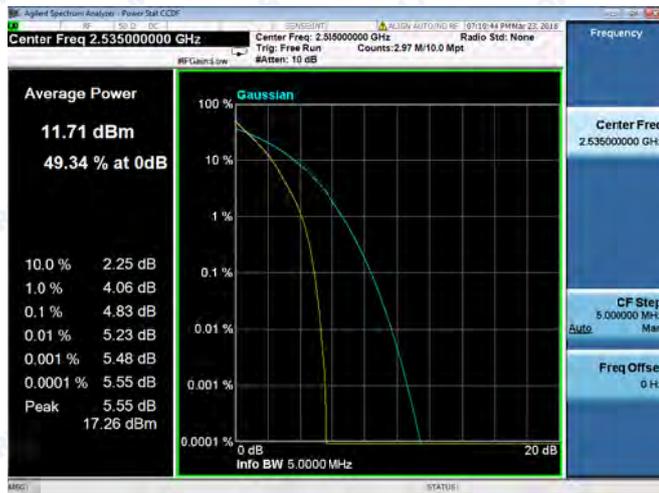


LTE Band 7 Middle channel							
Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20175	1732.5	4.83	5.58	20175	1732.5	4.59	5.80

Spectrum Plot of Worst Value

5MHz/QPSK

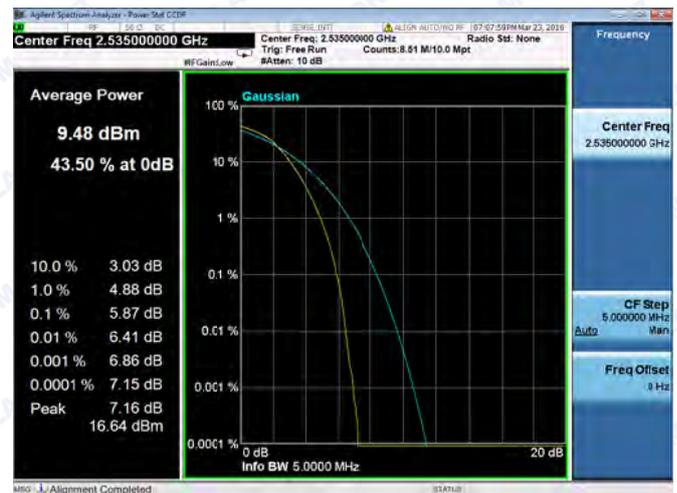
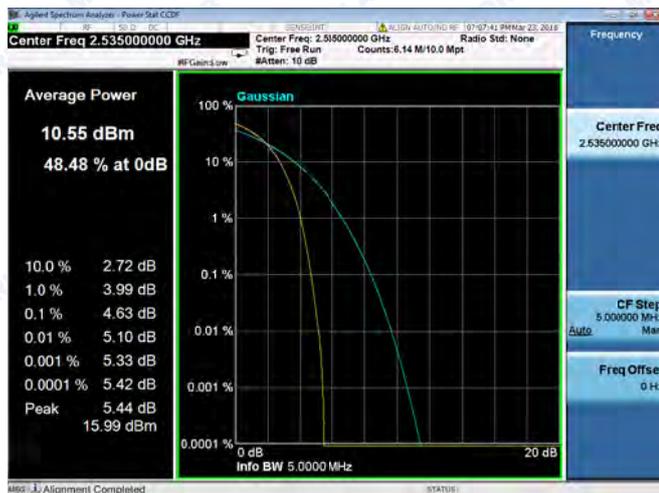
5MHz/16QAM



Spectrum Plot of Worst Value

10MHz/QPSK

10MHz/16QAM



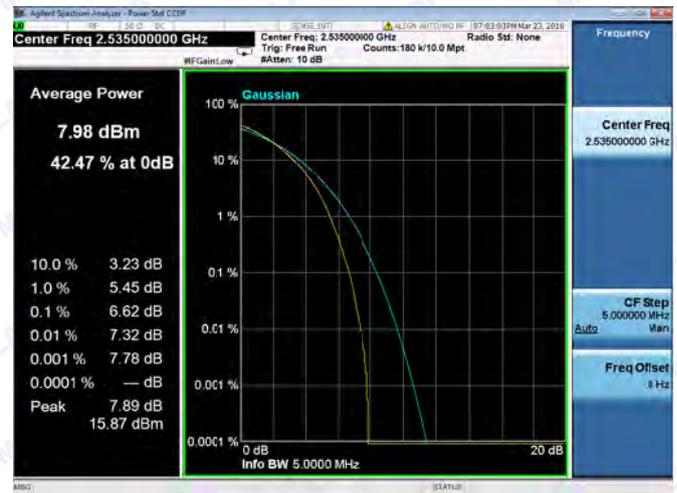
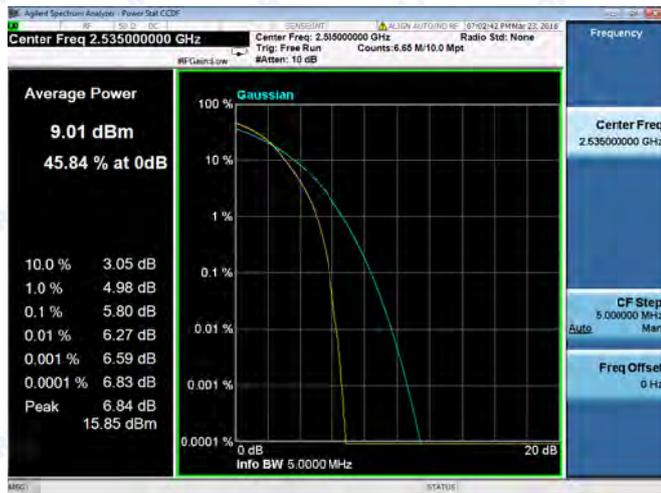


LTE Band 7 Middle channel							
Channel Bandwidth: 15MHz				Channel Bandwidth: 20MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20175	1732.5	5.80	6.62	20175	1732.5	6.46	7.07

Spectrum Plot of Worst Value

15MHz/QPSK

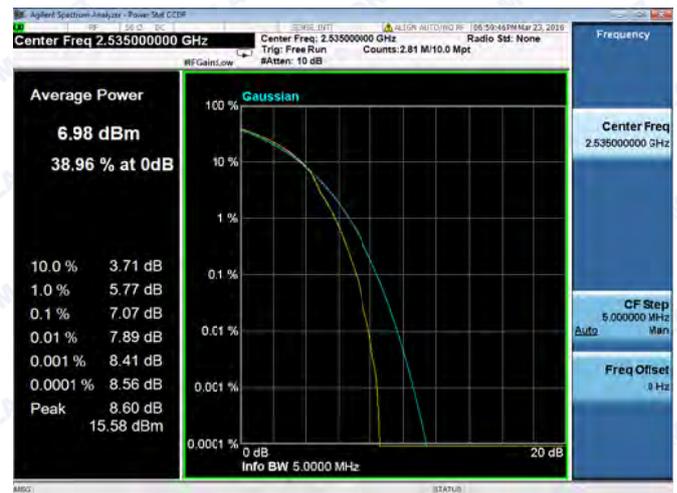
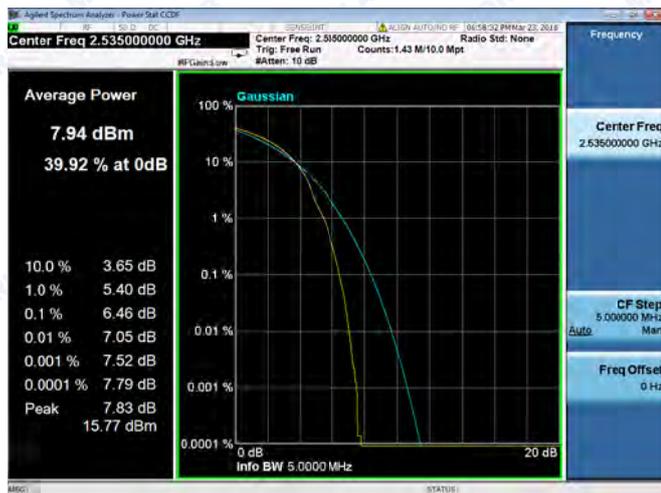
15MHz/16QAM



Spectrum Plot of Worst Value

20MHz/QPSK

20MHz/16QAM



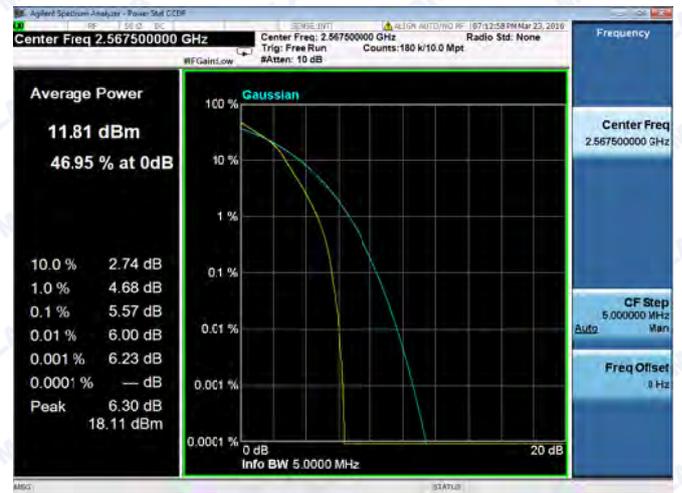


LTE Band 7 High channel							
Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20375	1752.5	4.76	5.57	20350	1750.0	4.63	5.96

Spectrum Plot of Worst Value

5MHz/QPSK

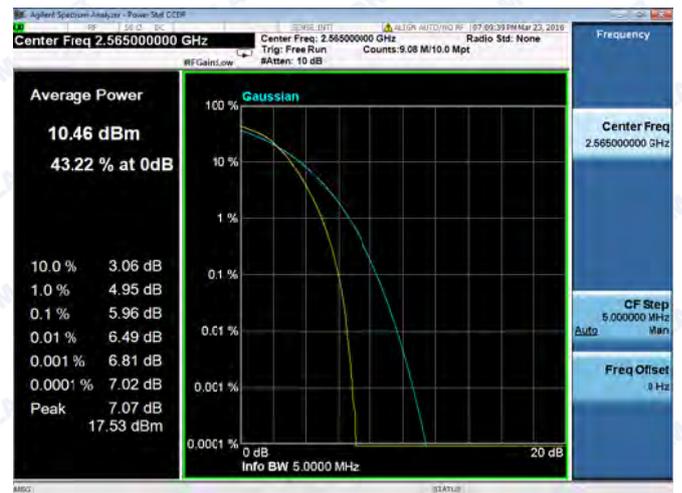
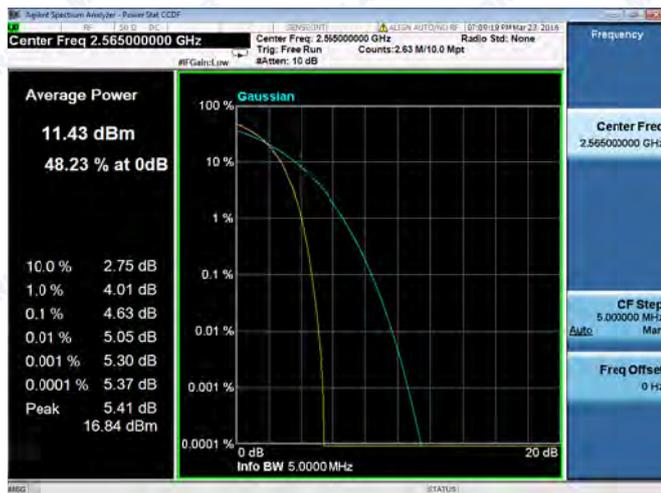
5MHz/16QAM



Spectrum Plot of Worst Value

10MHz/QPSK

10MHz/16QAM



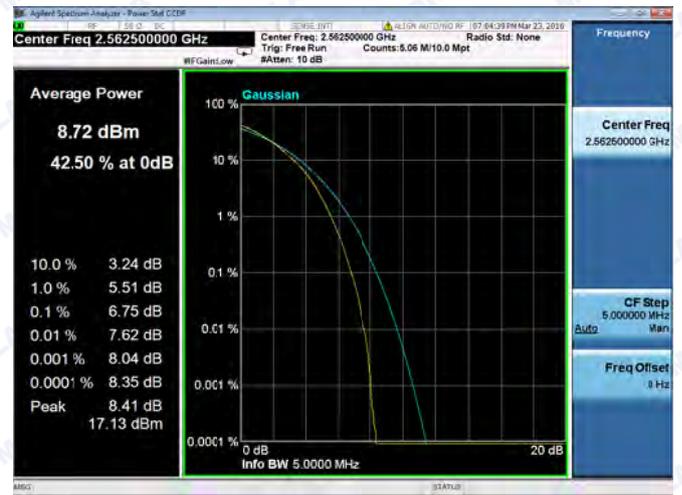
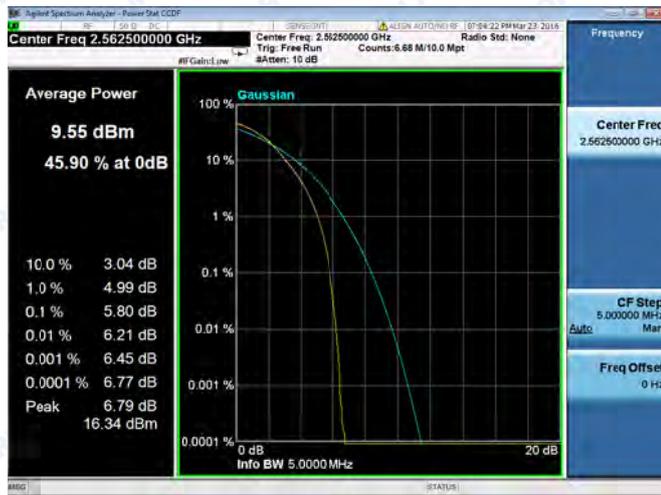


LTE Band 7 High channel							
Channel Bandwidth: 15MHz				Channel Bandwidth: 20MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20325	1747.5	5.80	6.75	20300	1745.0	6.46	7.08

Spectrum Plot of Worst Value

15MHz/QPSK

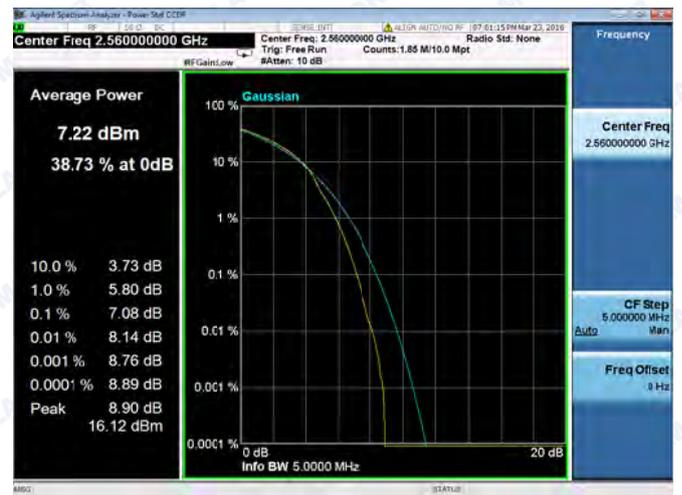
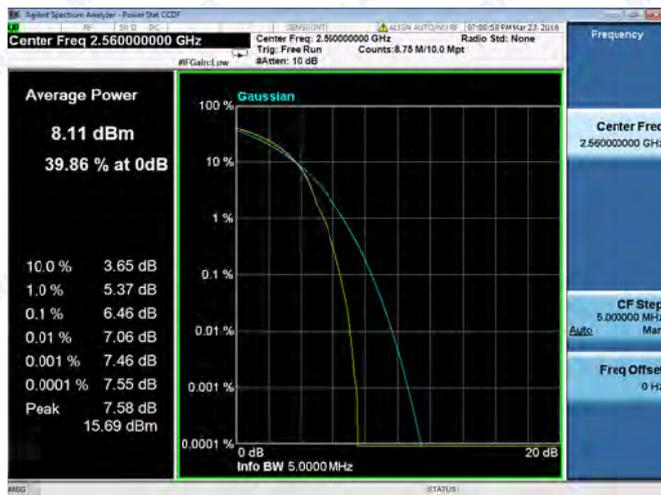
15MHz/16QAM



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.

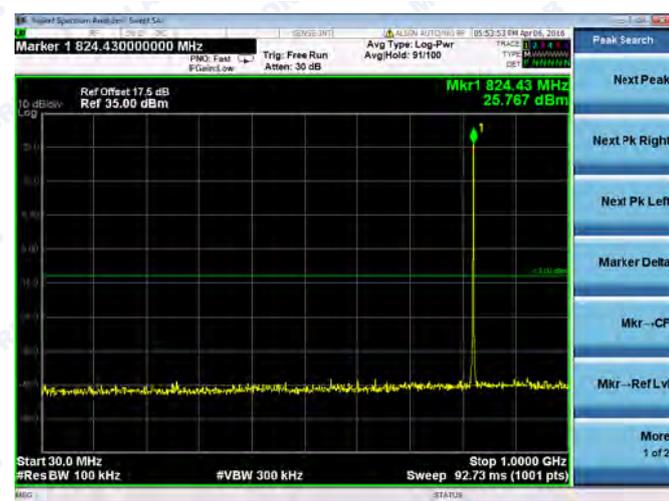


LTE Band 5 1.4MHz BW Low Channel

QPSK



16QAM



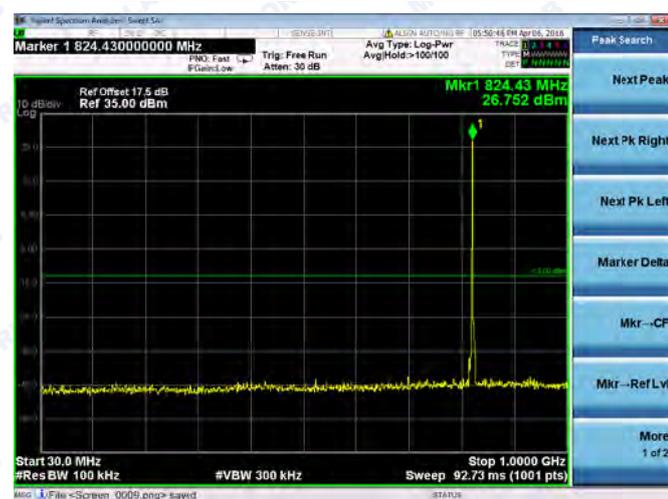


LTE Band 5 3MHz BW Low Channel

QPSK



16QAM



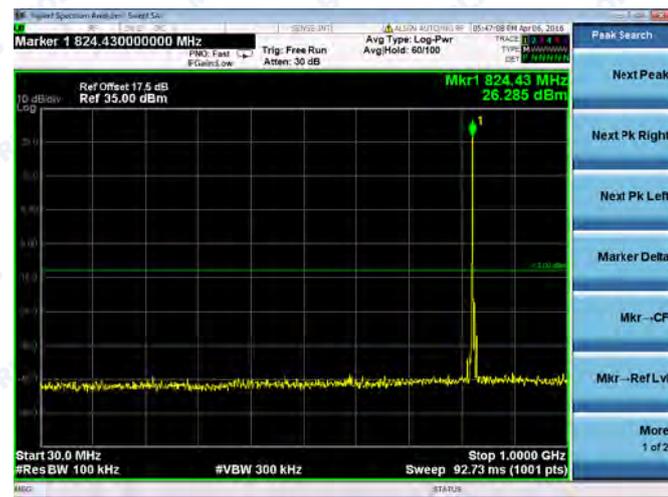


LTE Band 5 5MHz BW Low Channel

QPSK



16QAM



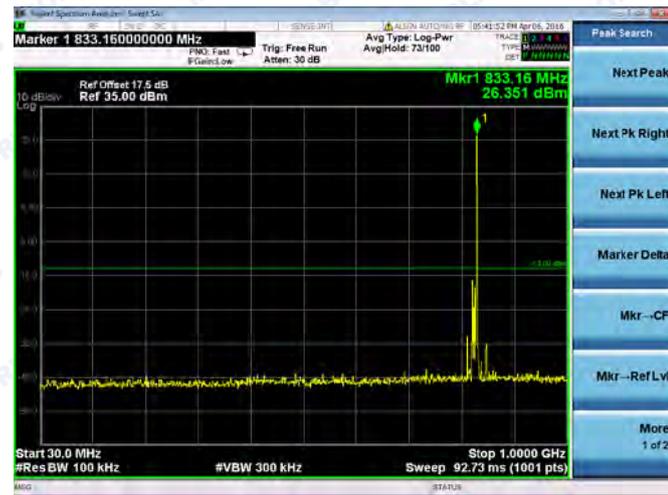


LTE Band 5 10MHz BW Low Channel

QPSK



16QAM

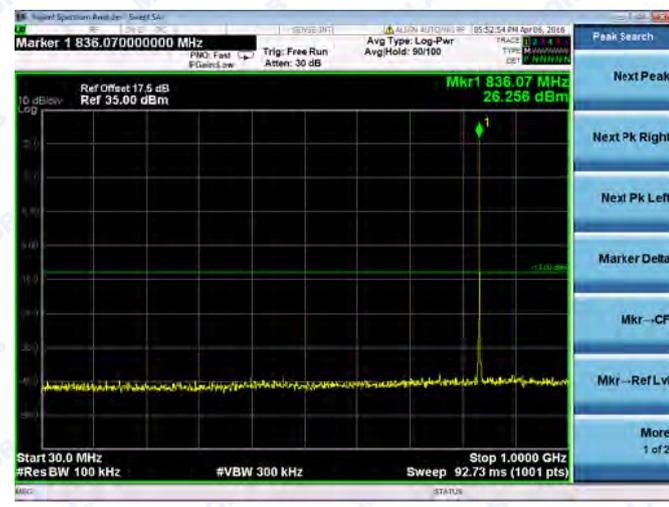




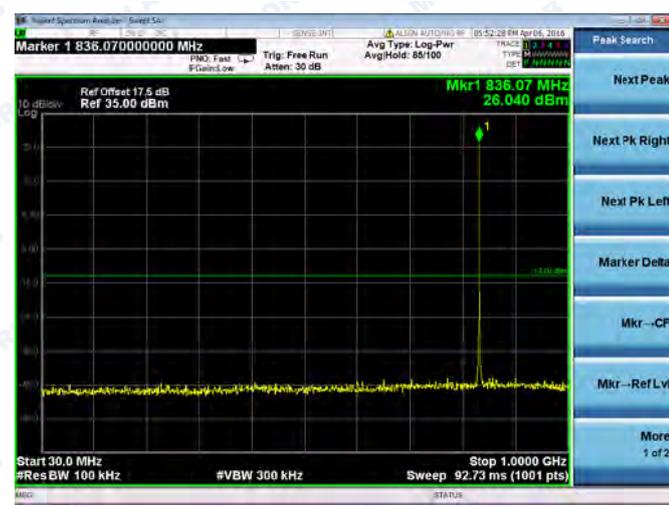
Middle channel:

LTE Band 5 1.4MHz BW Mid Channel

QPSK



16QAM





LTE Band 5 3MHz BW Mid Channel

QPSK



16QAM





LTE Band 5 5MHz BW Mid Channel

QPSK



16QAM



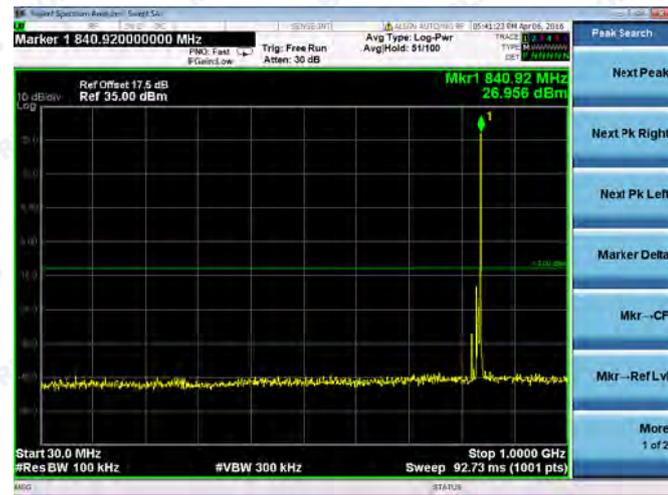


LTE Band 5 10MHz BW Mid Channel

QPSK



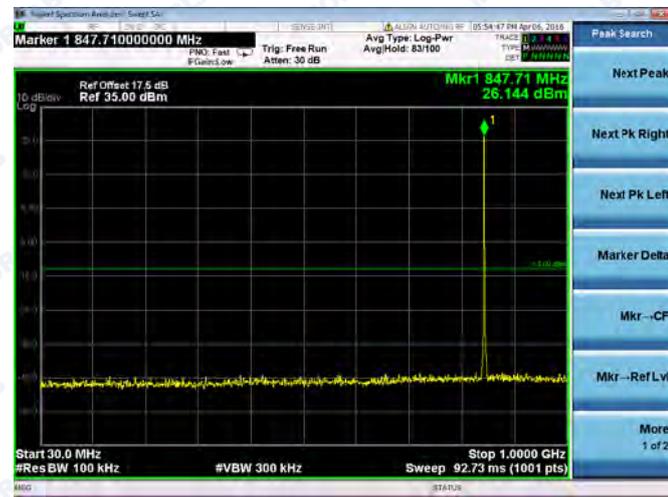
16QAM



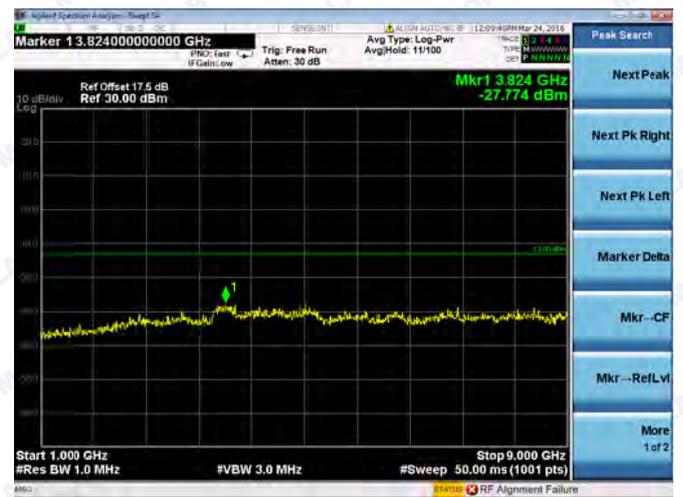
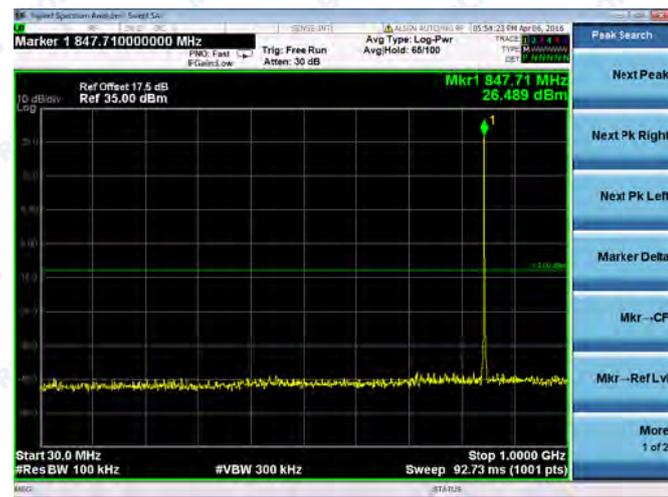


LTE Band 5 1.4MHz BW High Channel

QPSK



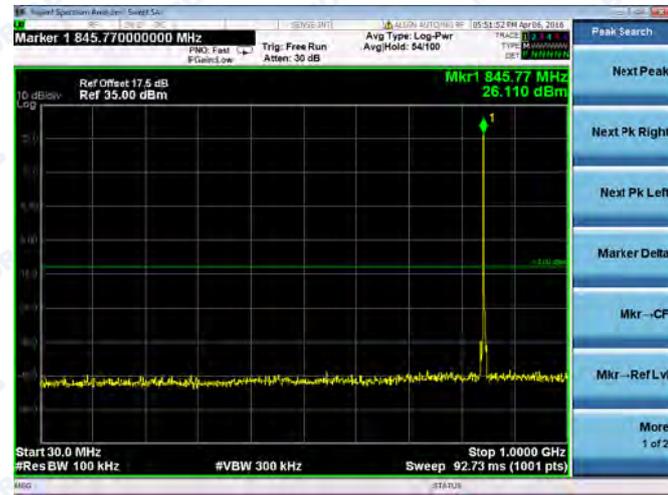
16QAM



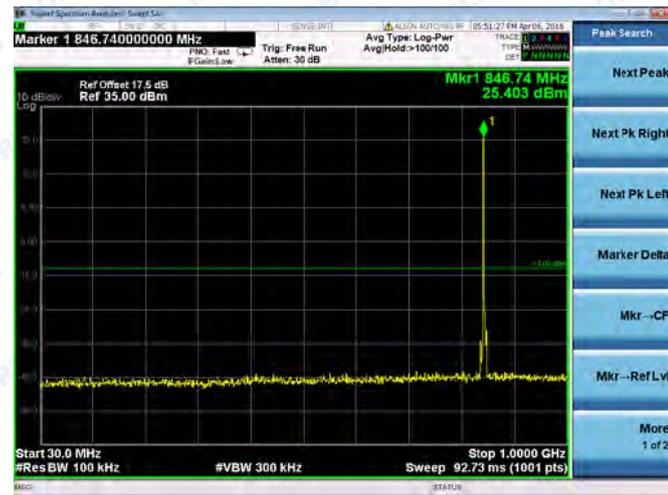


LTE Band 5 3MHz BW High Channel

QPSK



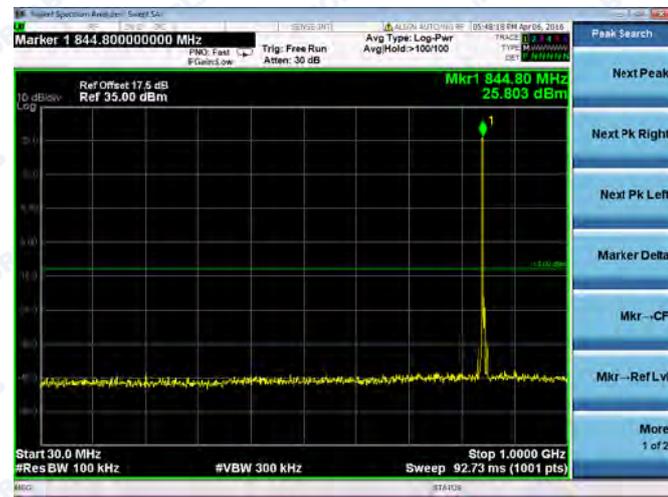
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LTE Band 5 5MHz BW High Channel

QPSK



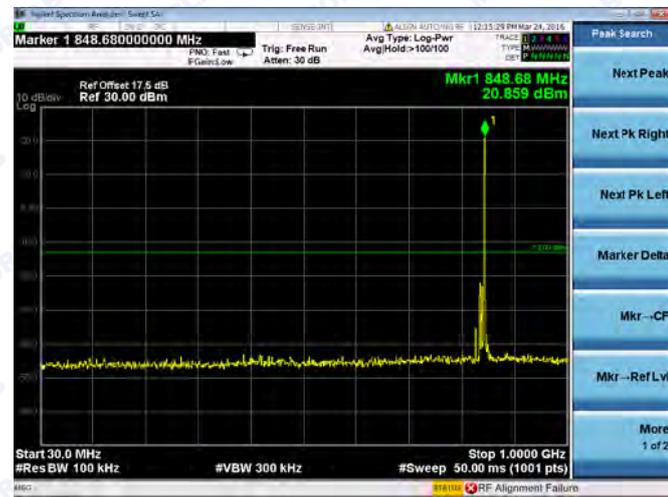
16QAM



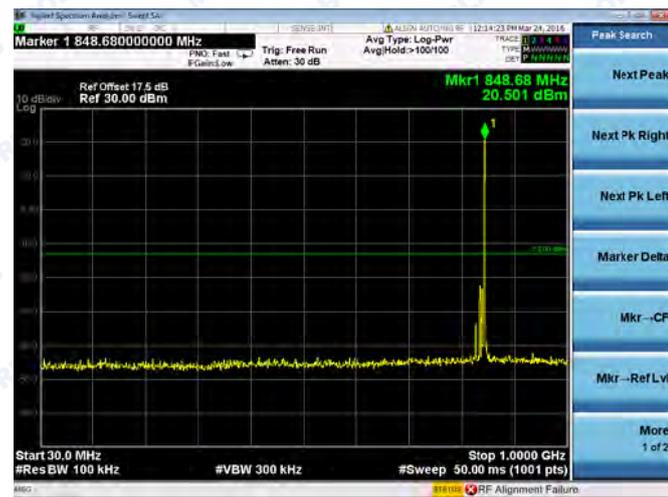


LTE Band 5 10MHz BW High Channel

QPSK



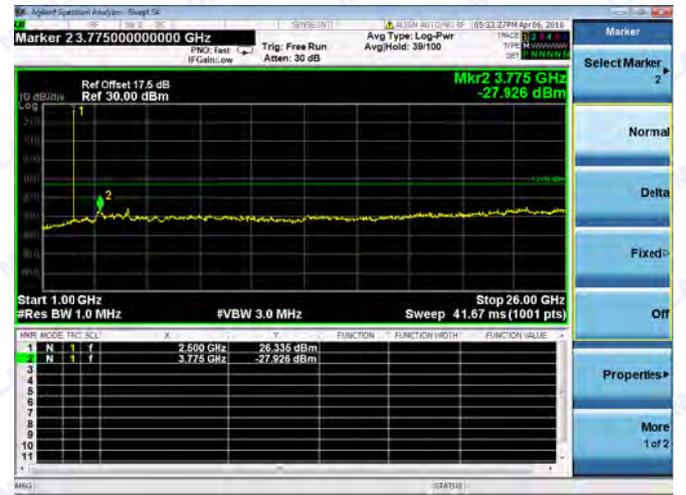
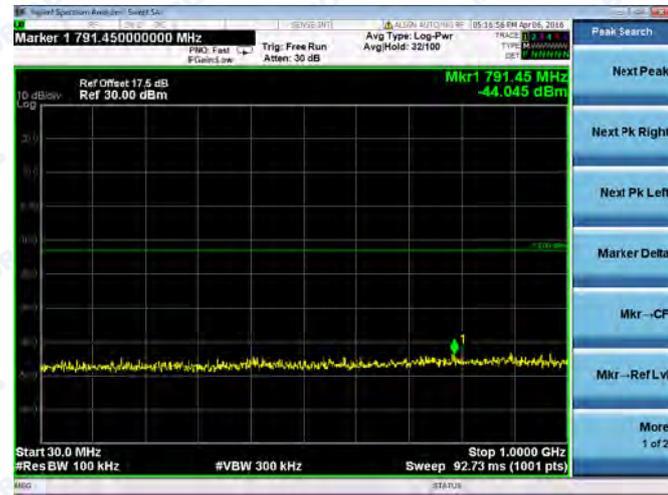
16QAM



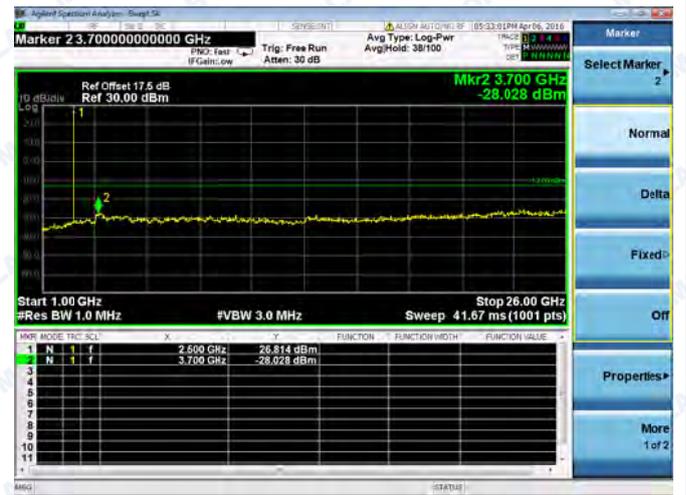
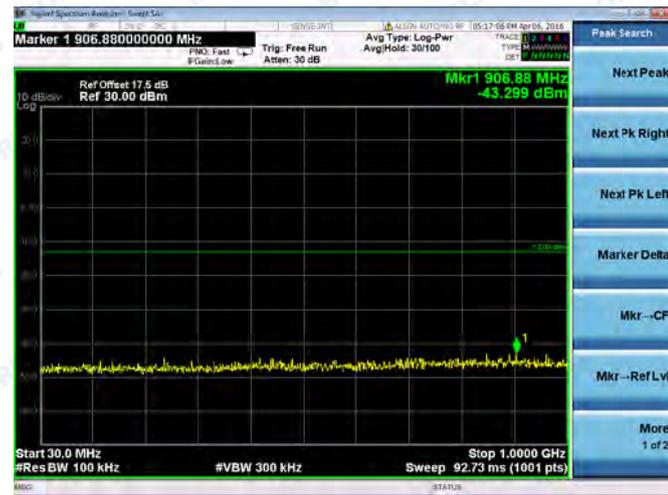


LTE Band 7 5MHz BW Low Channel

QPSK



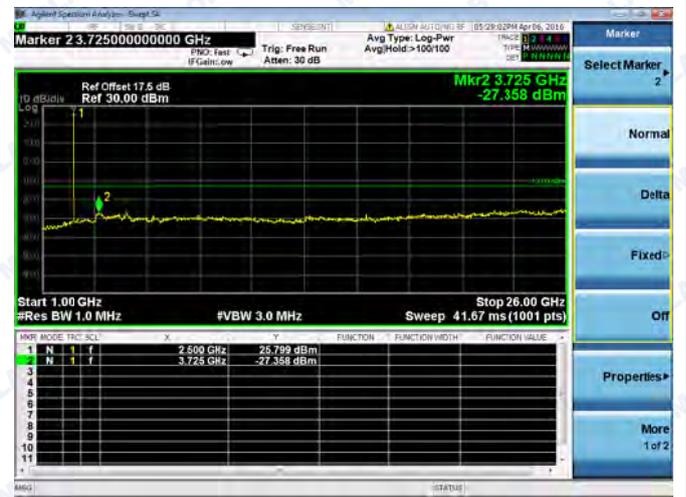
16QAM



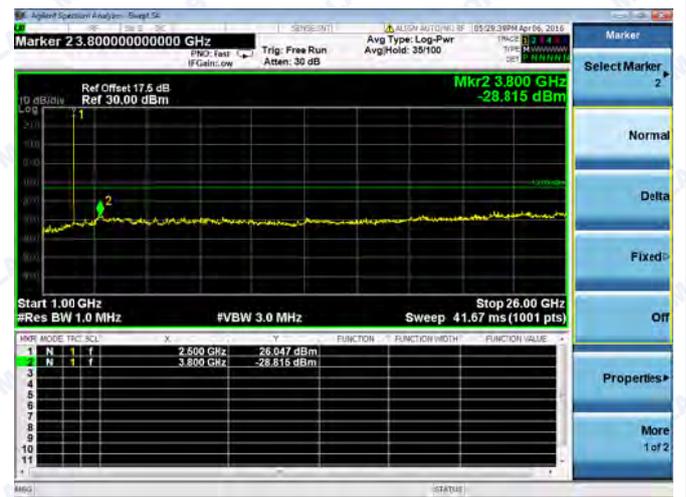
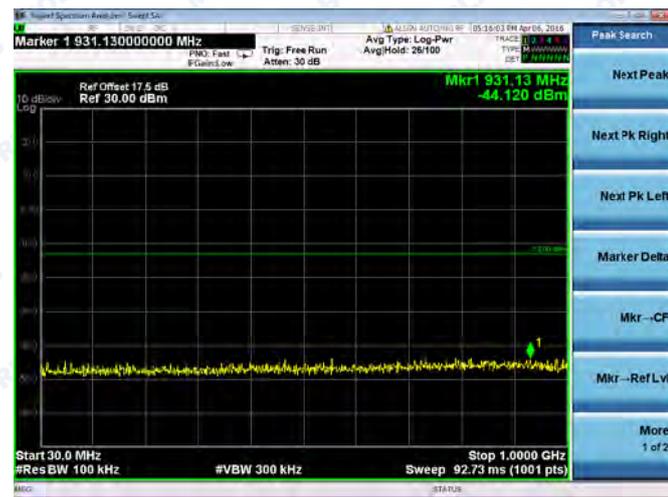


LTE Band 7 10MHz BW Low Channel

QPSK



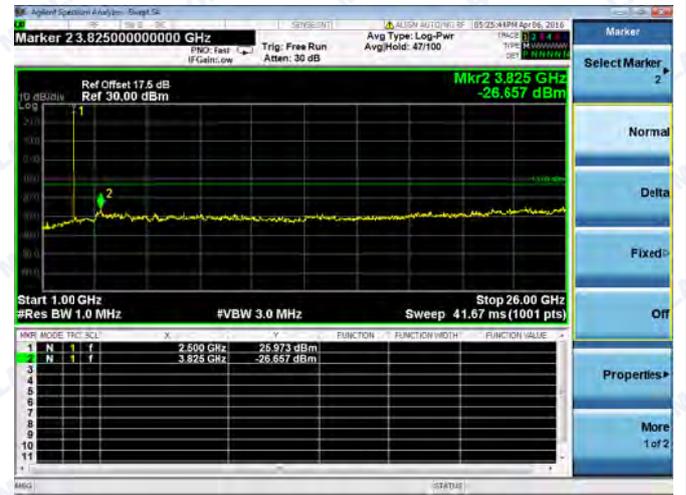
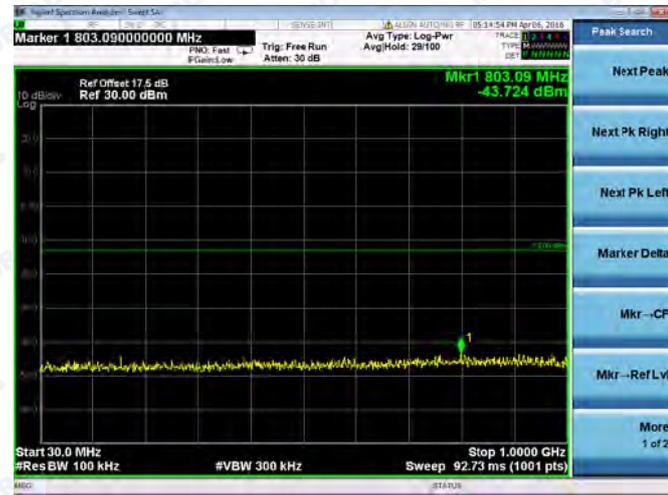
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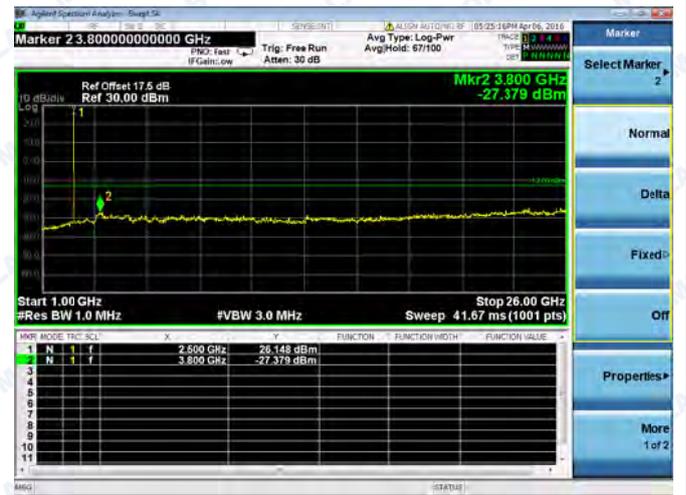
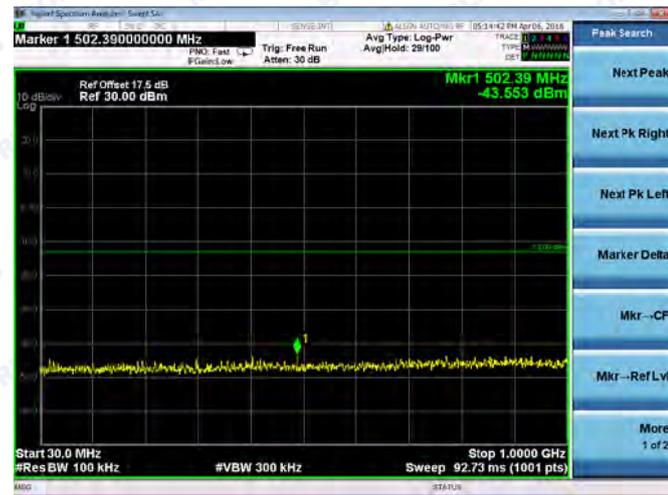


LTE Band 7 15MHz BW Low Channel

QPSK



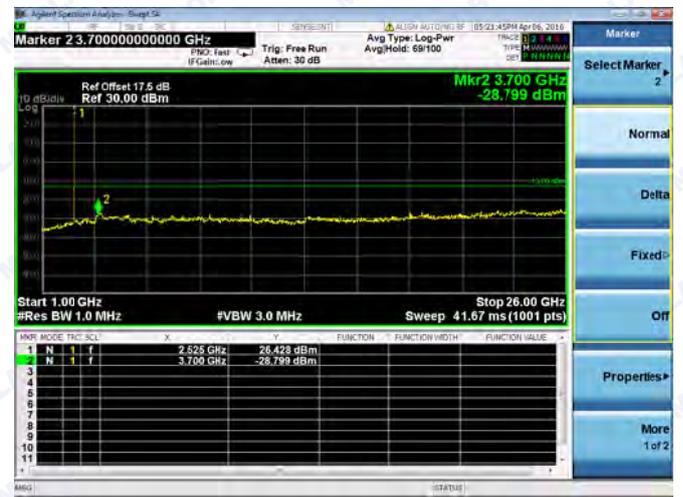
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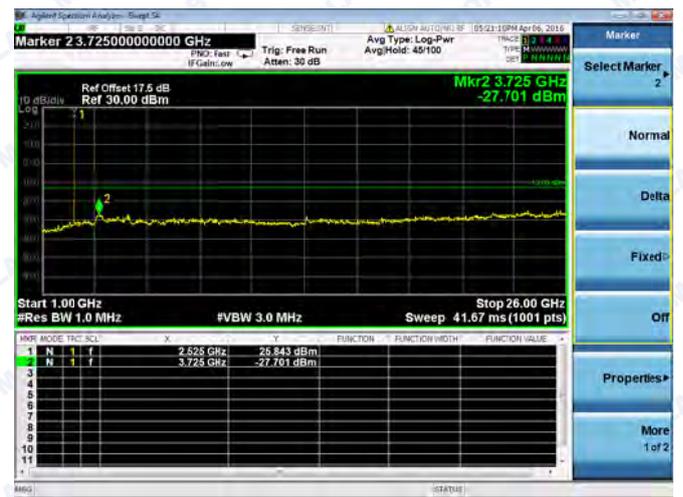
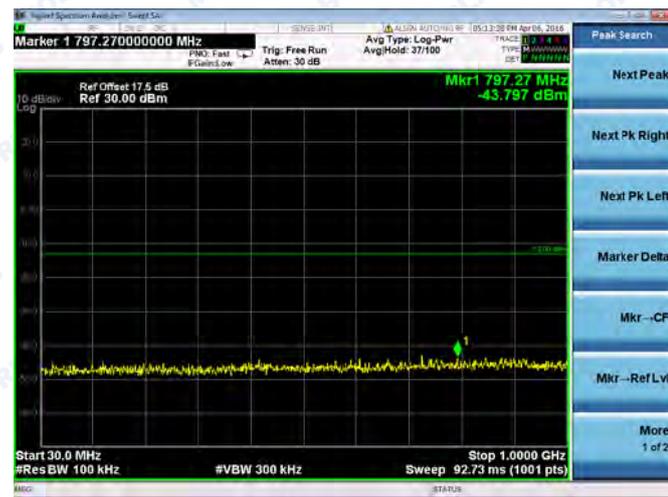


LTE Band 7 20MHz BW Low Channel

QPSK



16QAM





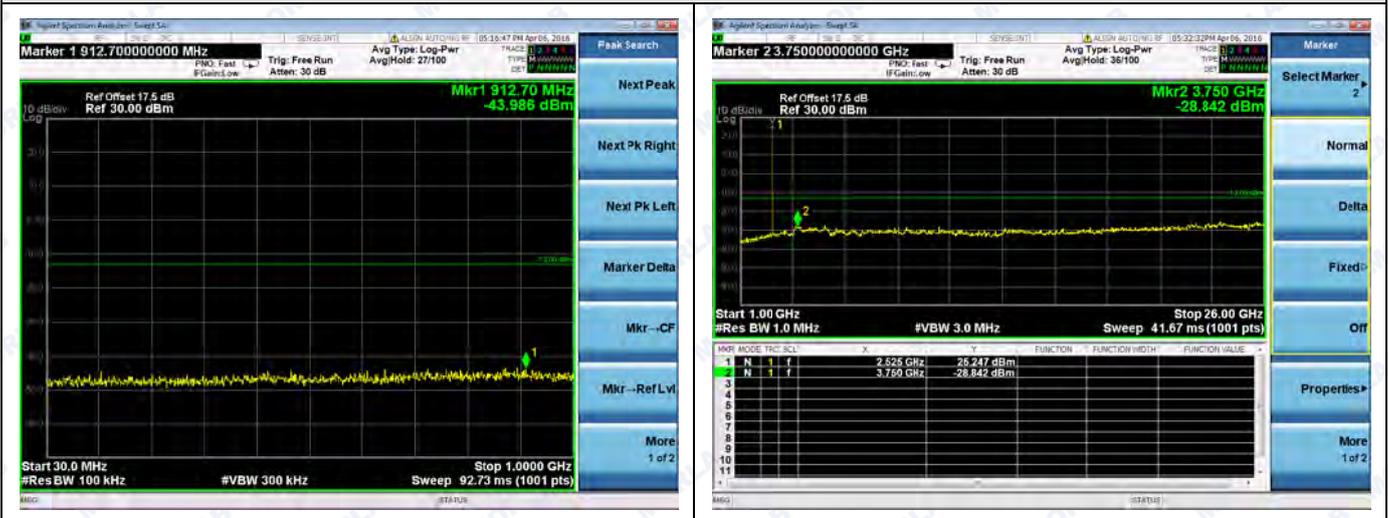
Middle channel:

LTE Band 7 5MHz BW Mid Channel

QPSK



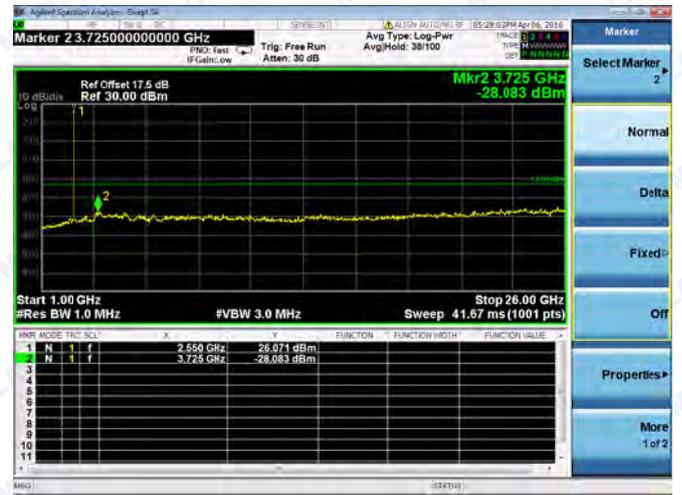
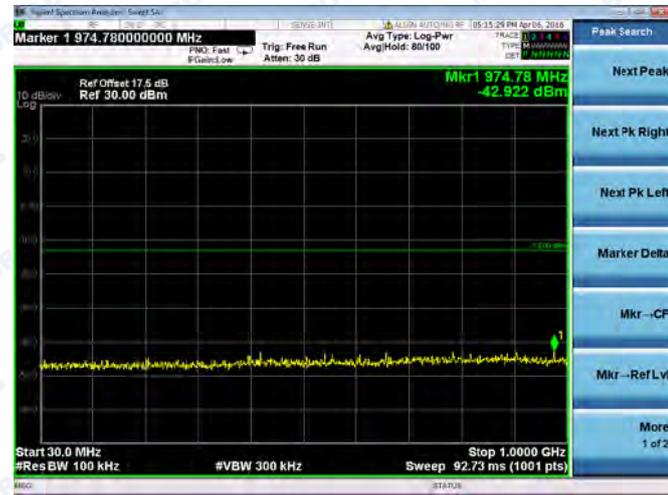
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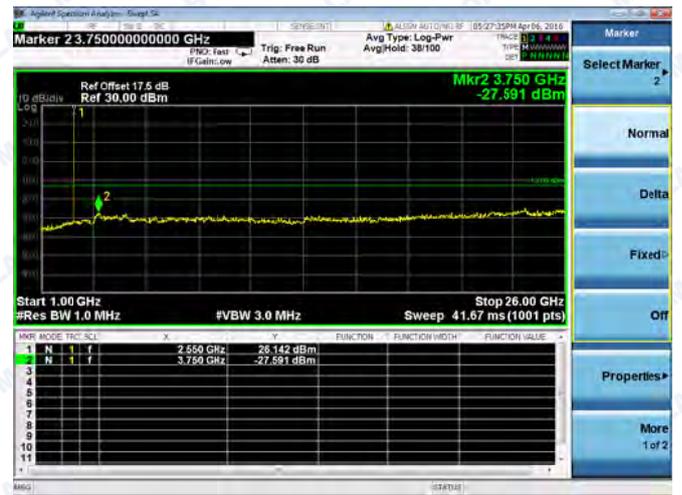


LTE Band 7 10MHz BW Mid Channel

QPSK



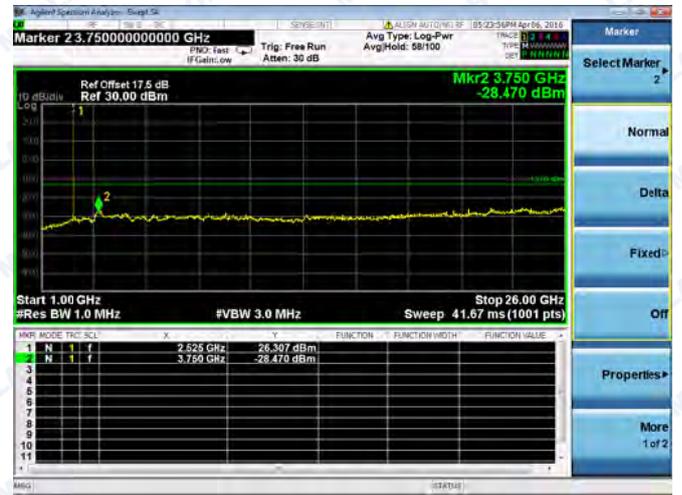
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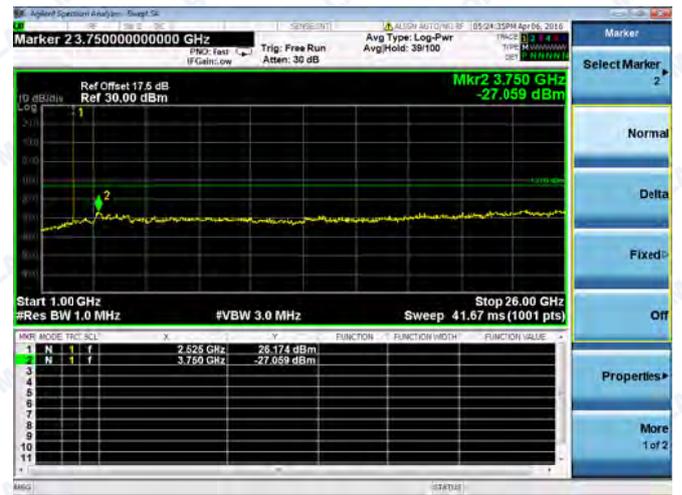
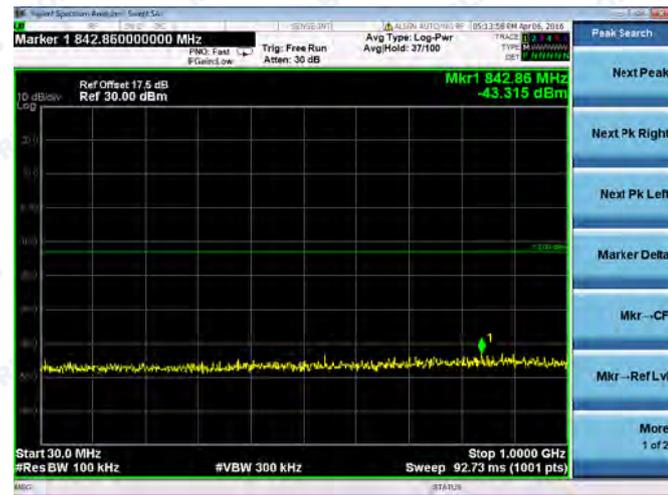


LTE Band 7 15MHz BW Mid Channel

QPSK



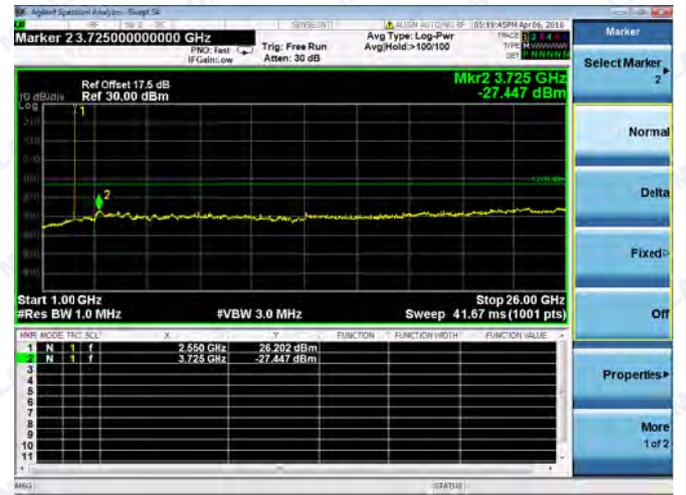
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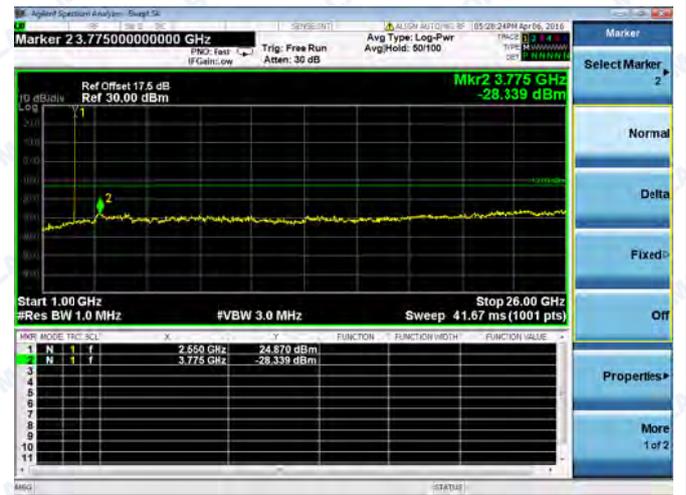


LTE Band 7 20MHz BW Mid Channel

QPSK



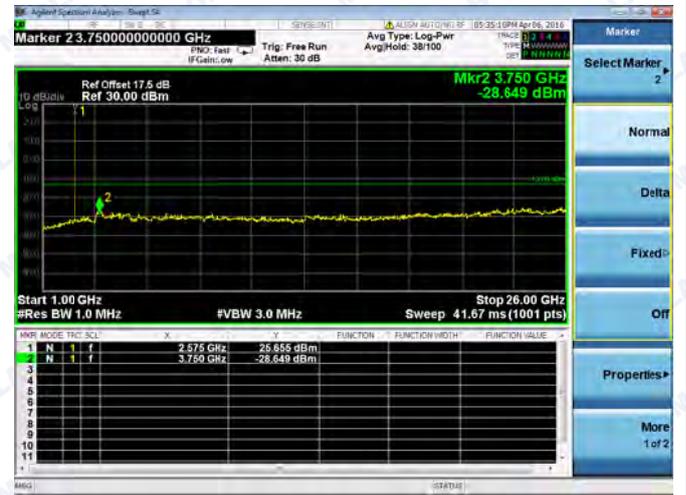
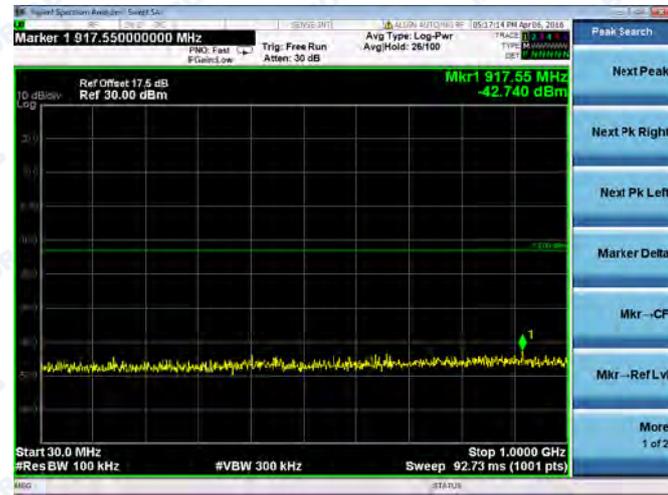
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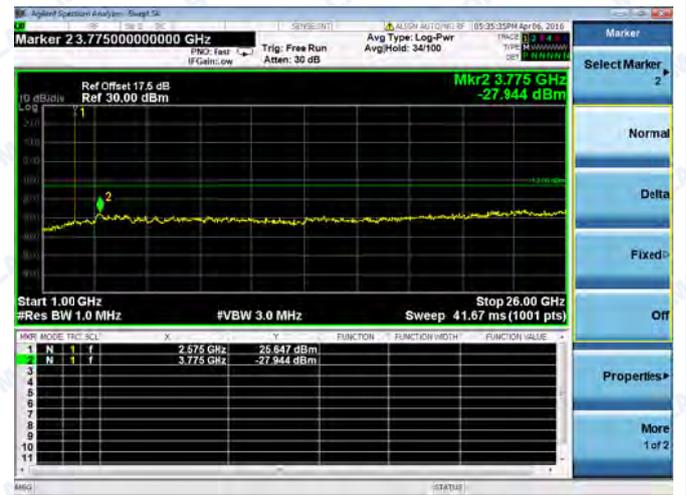


LTE Band 7 5MHz BW High Channel

QPSK



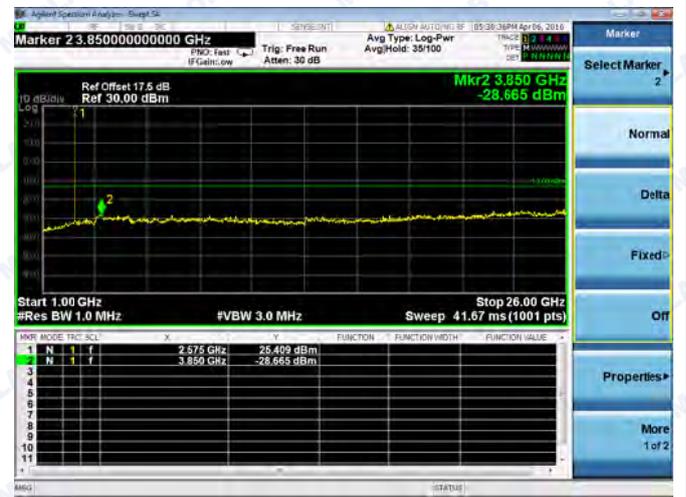
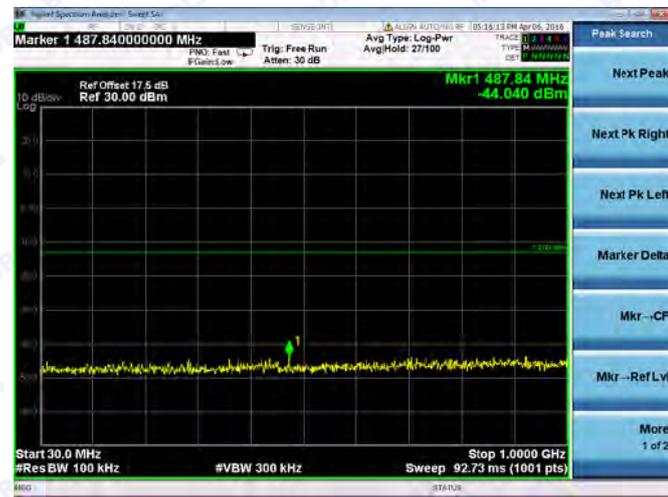
16QAM



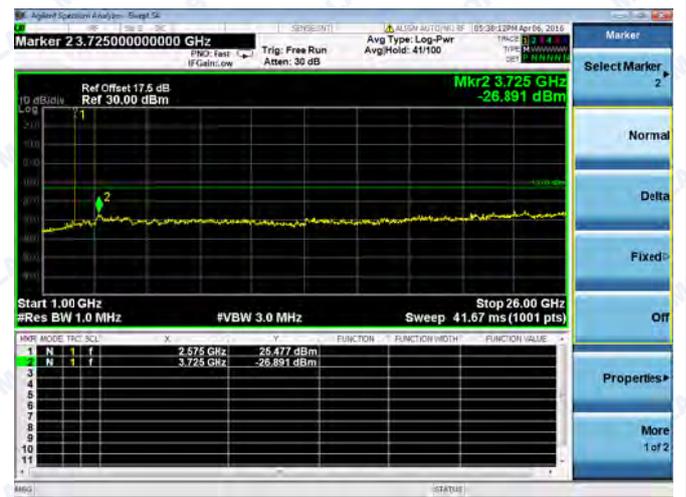
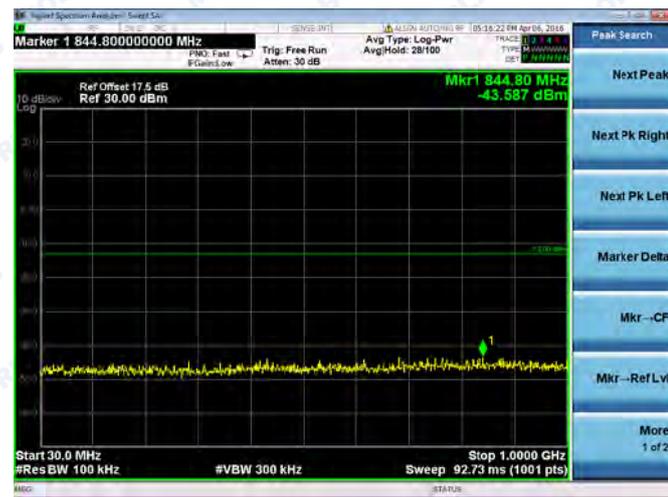


LTE Band 7 10MHz BW High Channel

QPSK



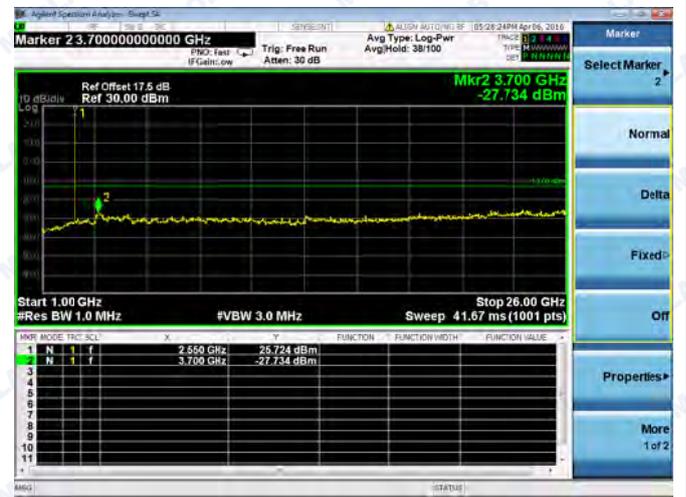
16QAM



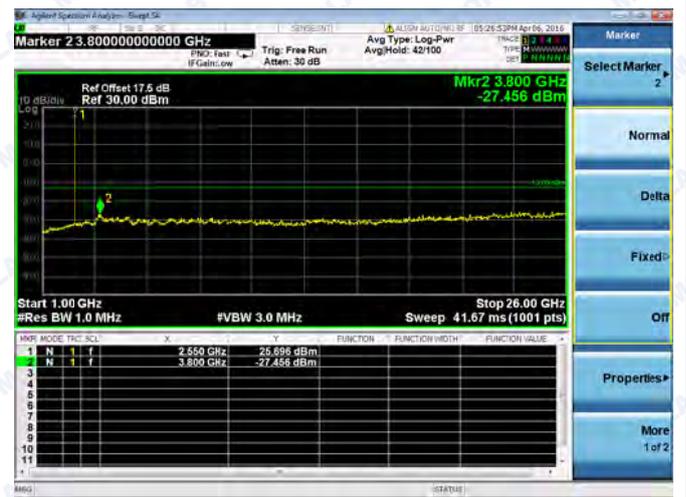
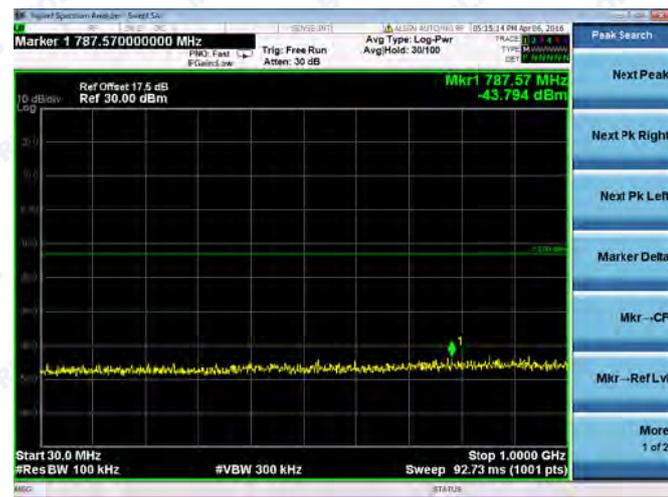


LTE Band 7 15MHz BW High Channel

QPSK



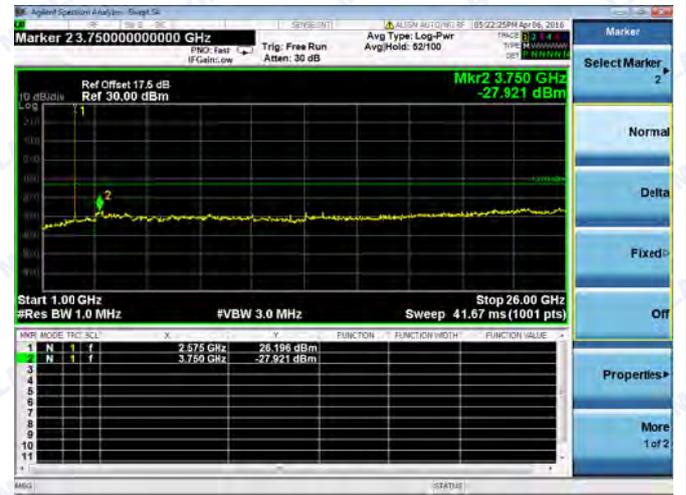
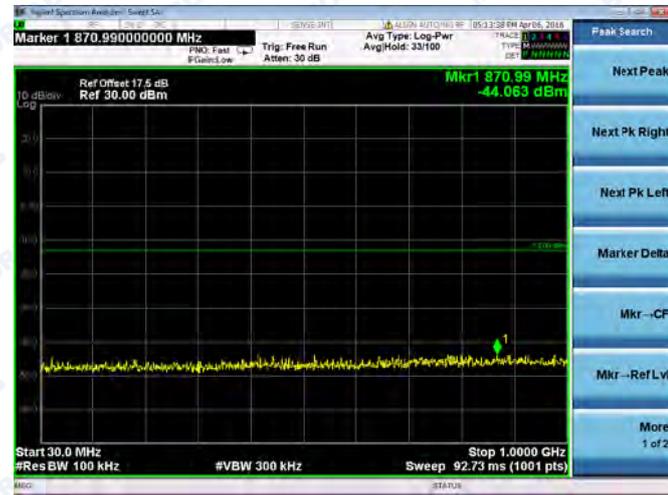
16QAM



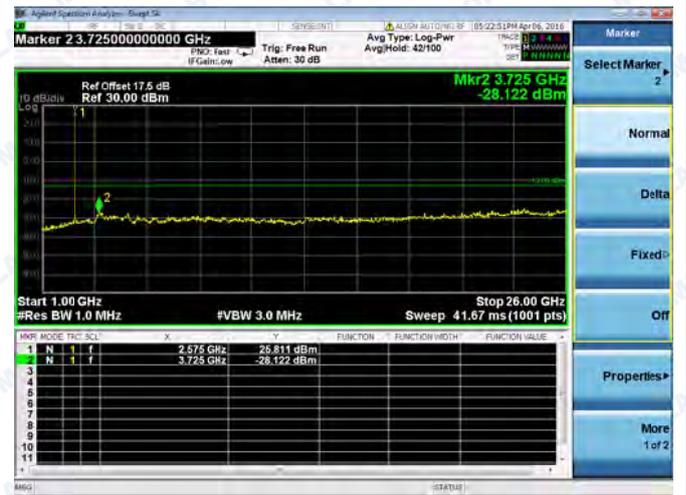
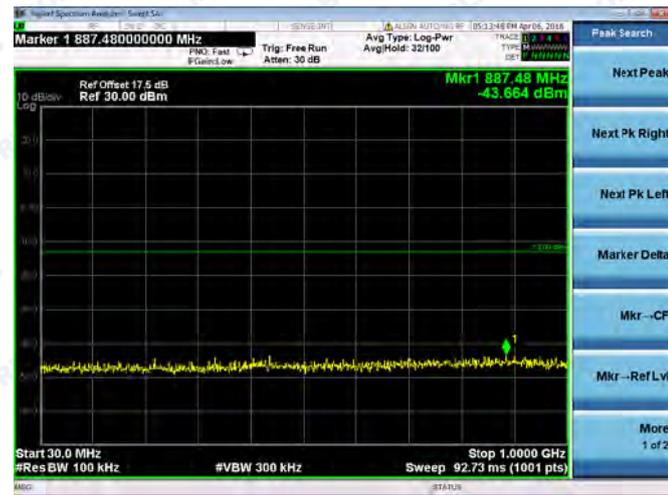


LTE Band 7 20MHz BW High Channel

QPSK



16QAM

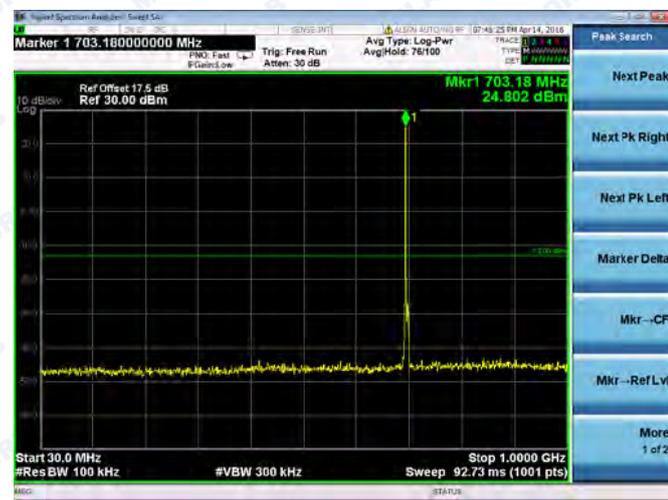




Band28 (704MHz-710MHz)

LTE Band 28 3MHz BW Low Channel

QPSK



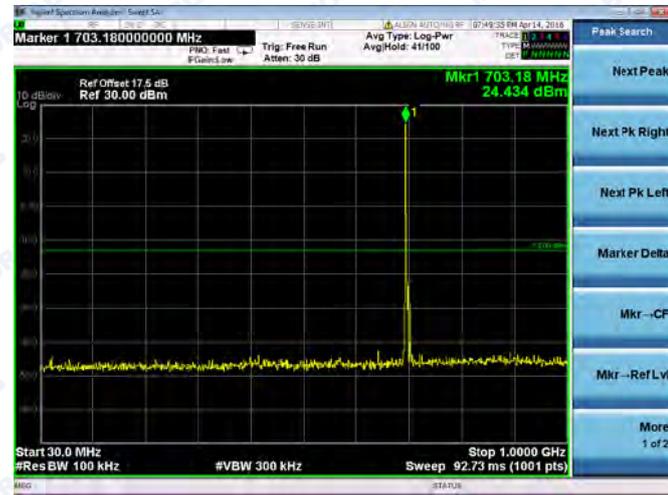
16QAM



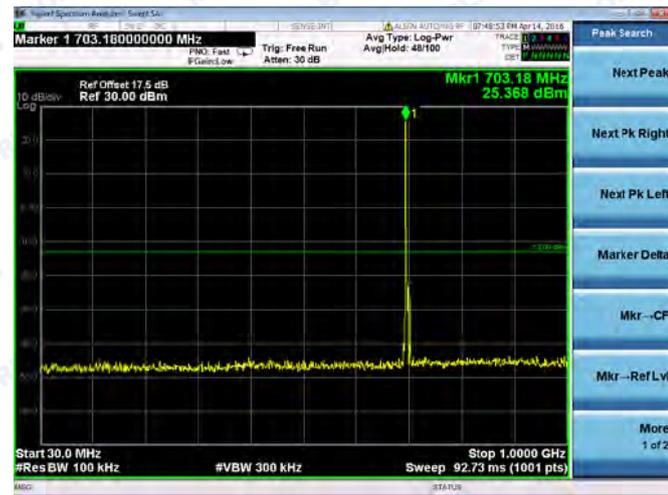


LTE Band 28 5MHz BW Low Channel

QPSK



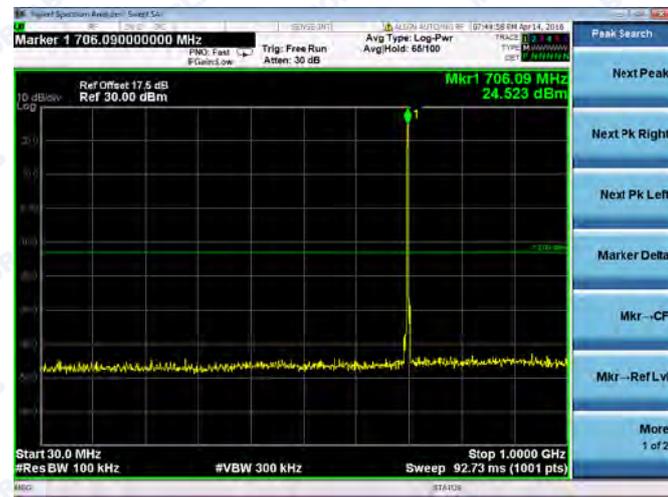
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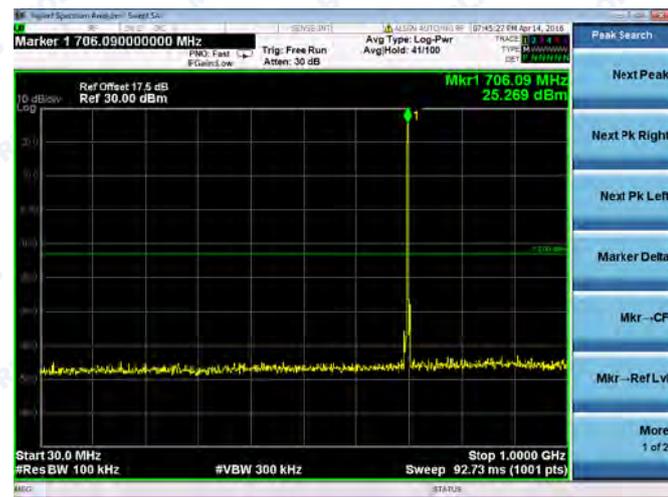


LTE Band 28 3MHz BW Middle Channel

QPSK



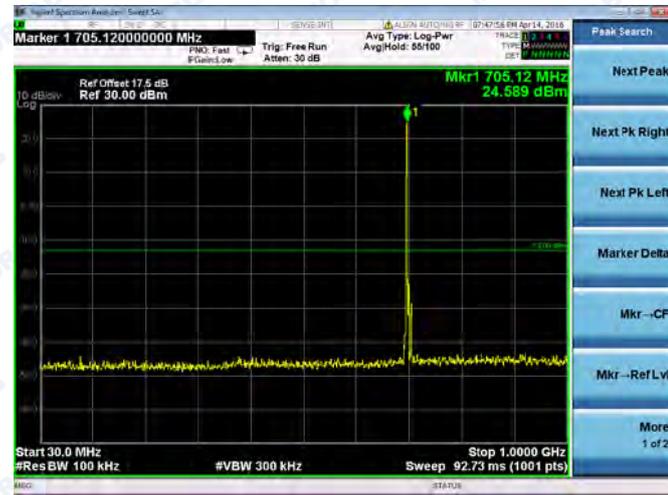
16QAM



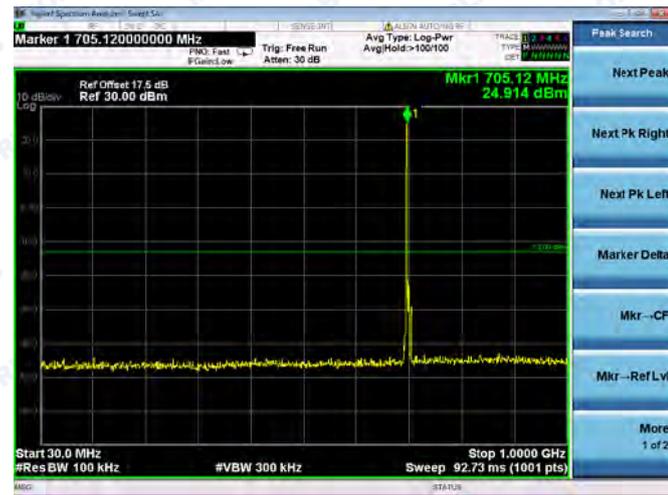


LTE Band 28 5MHz BW Middle Channel

QPSK



16QAM



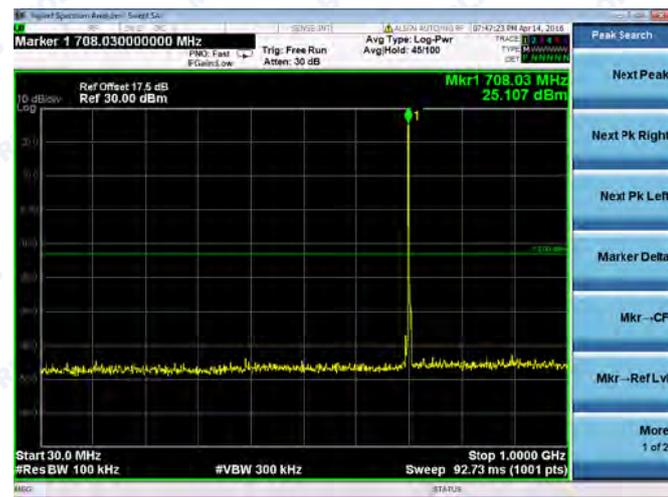


LTE Band 28 3MHz BW High Channel

QPSK



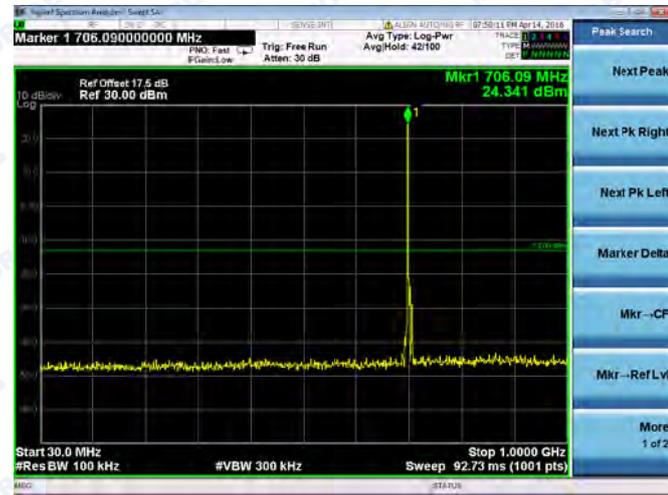
16QAM



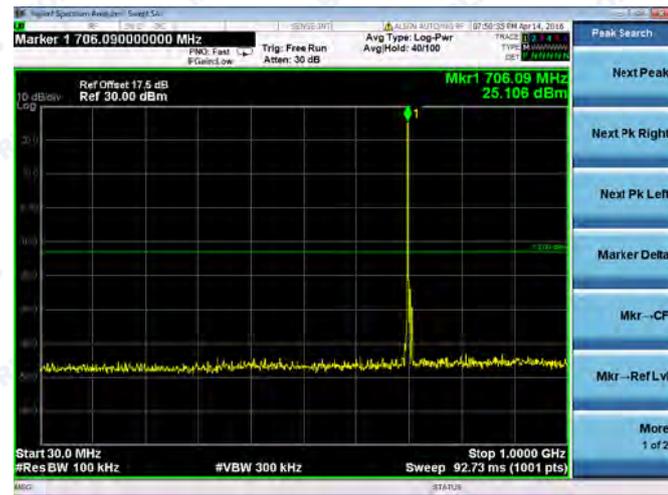


LTE Band 28 5MHz BW High Channel

QPSK



16QAM

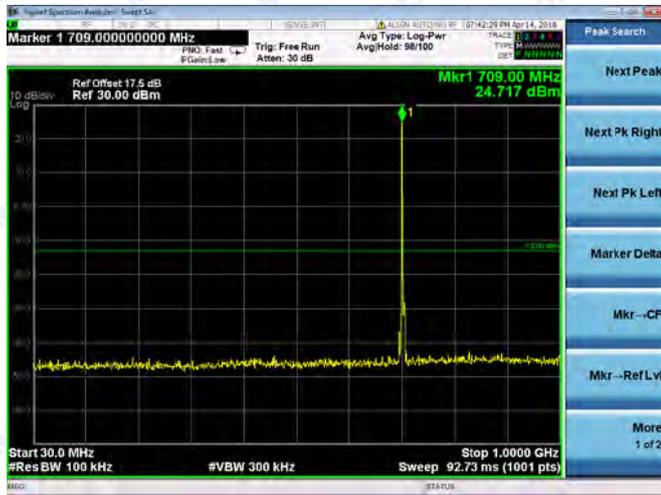




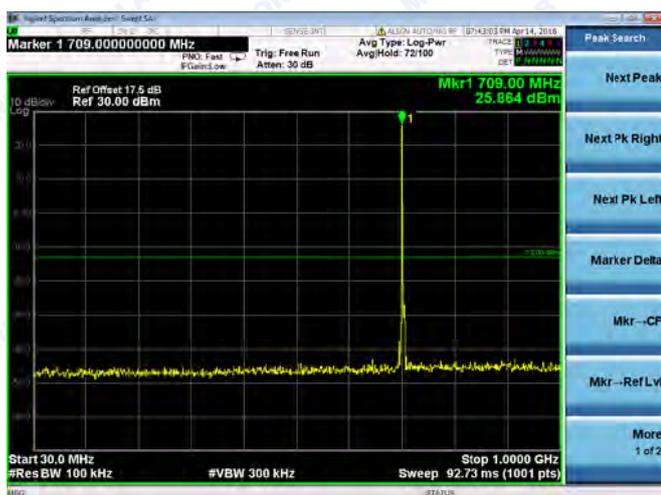
Band28 (710MHz-716MHz)

LTE Band 28 3MHz BW Low Channel

QPSK



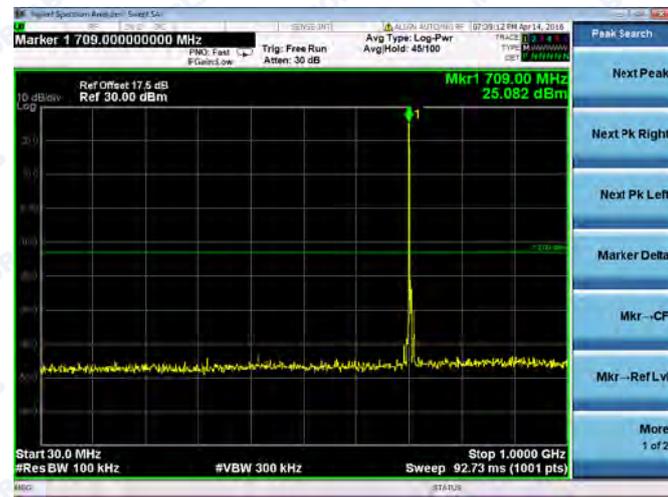
16QAM



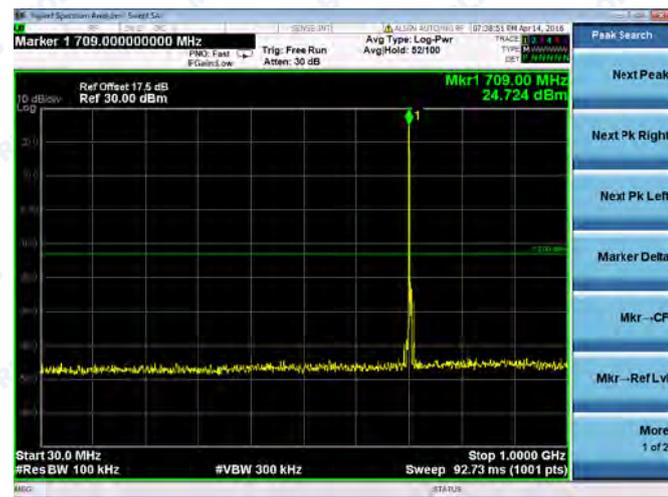


LTE Band 28 5MHz BW Low Channel

QPSK



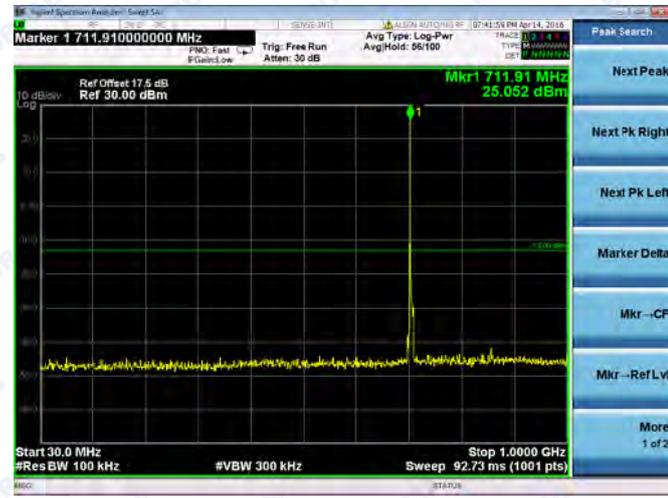
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LTE Band 28 3MHz BW Middle Channel

QPSK



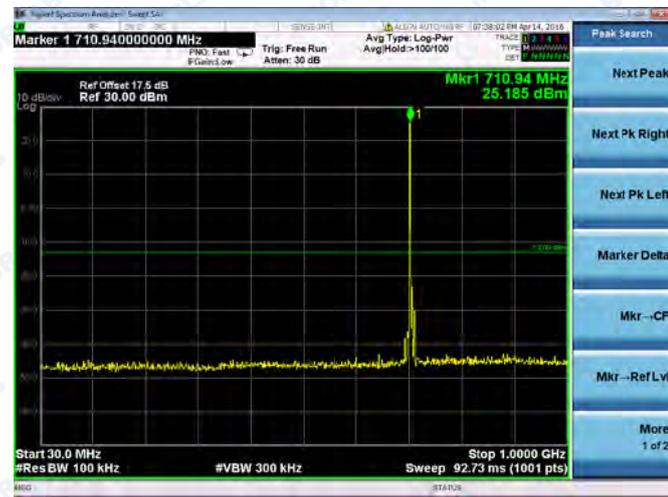
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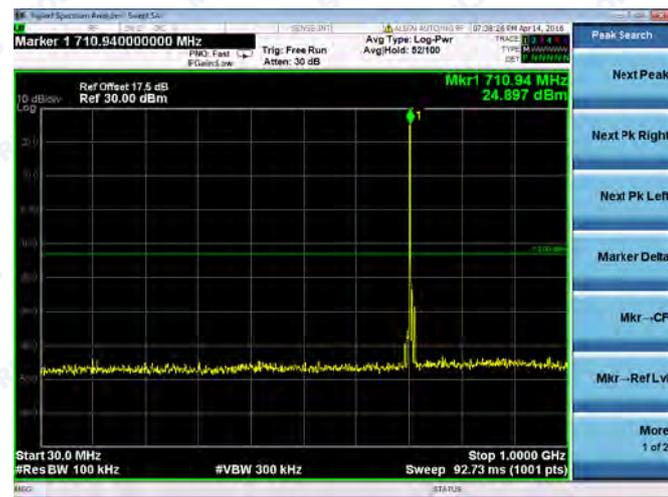


LTE Band 28 5MHz BW Middle Channel

QPSK



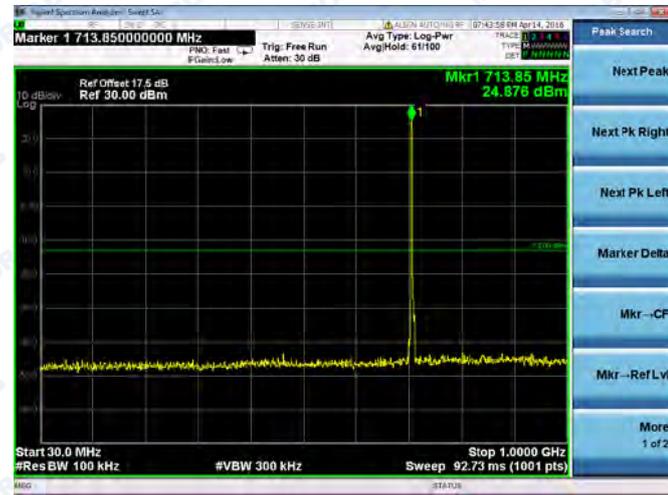
16QAM





LTE Band 28 3MHz BW High Channel

QPSK



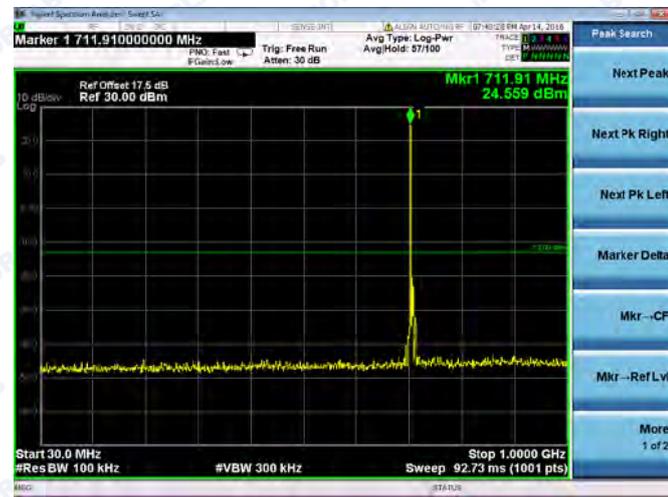
16QAM



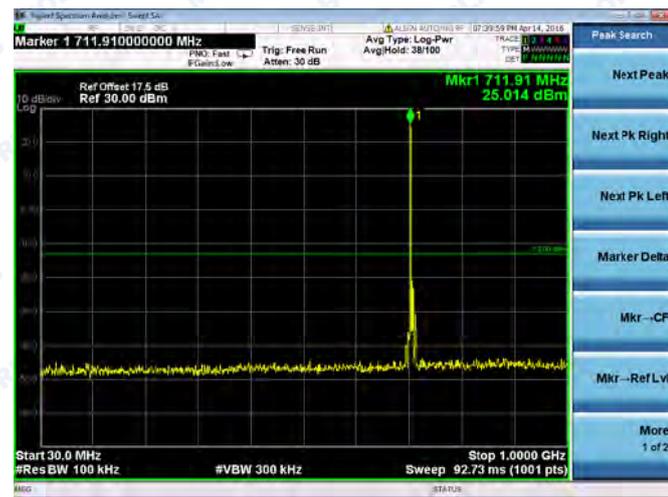


LTE Band 28 5MHz BW High Channel

QPSK



16QAM

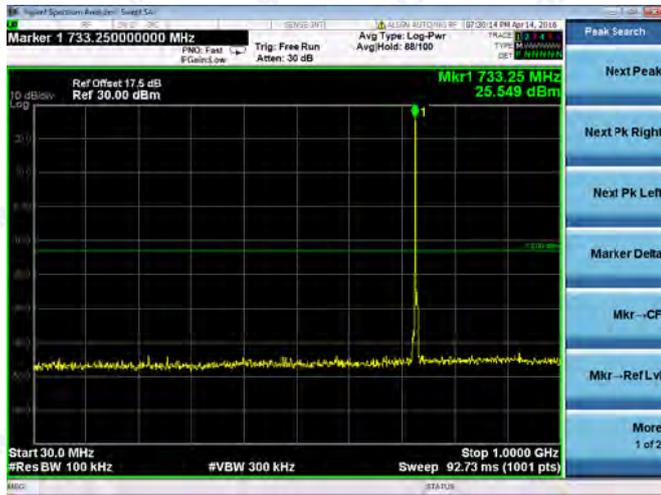




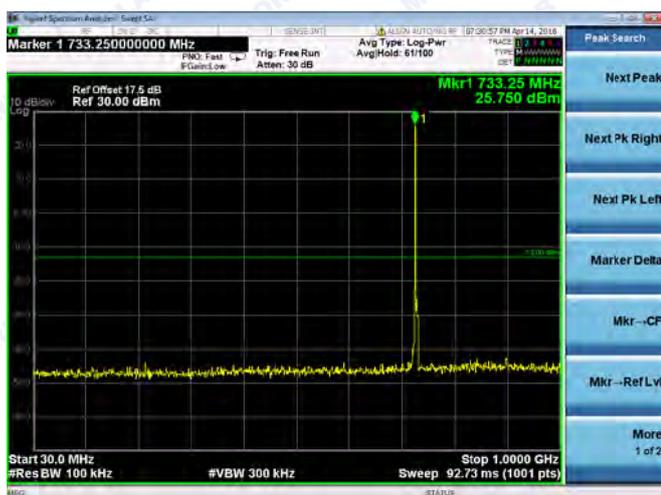
Band28 (734MHz-740MHz)

LTE Band 28 3MHz BW Low Channel

QPSK



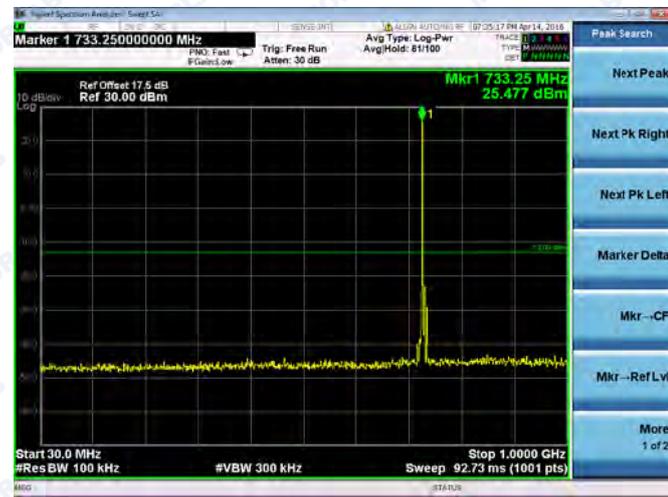
16QAM



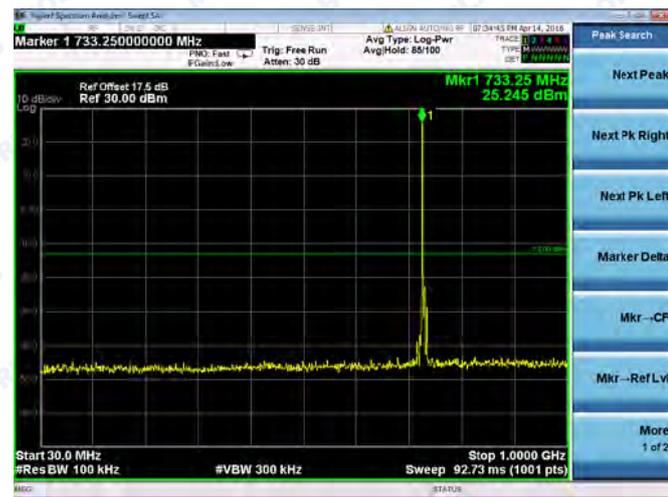


LTE Band 28 5MHz BW Low Channel

QPSK



16QAM





LTE Band 28 3MHz BW Middle Channel

QPSK



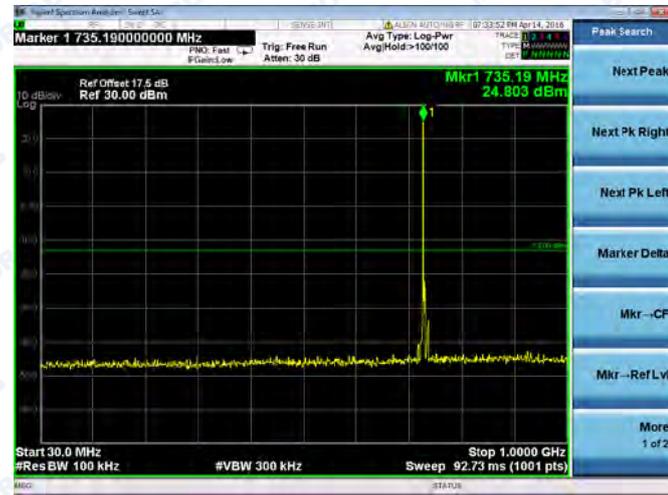
16QAM





LTE Band 28 5MHz BW Middle Channel

QPSK



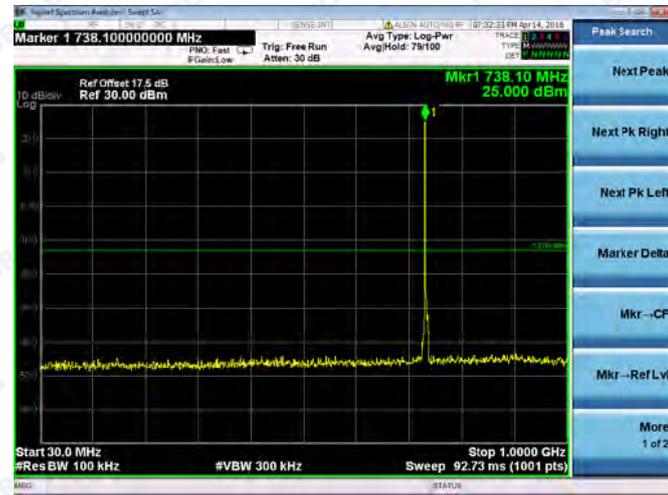
16QAM



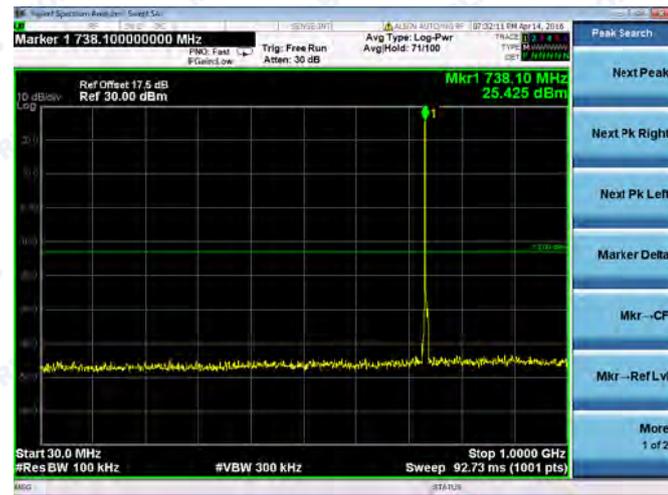


LTE Band 28 3MHz BW High Channel

QPSK



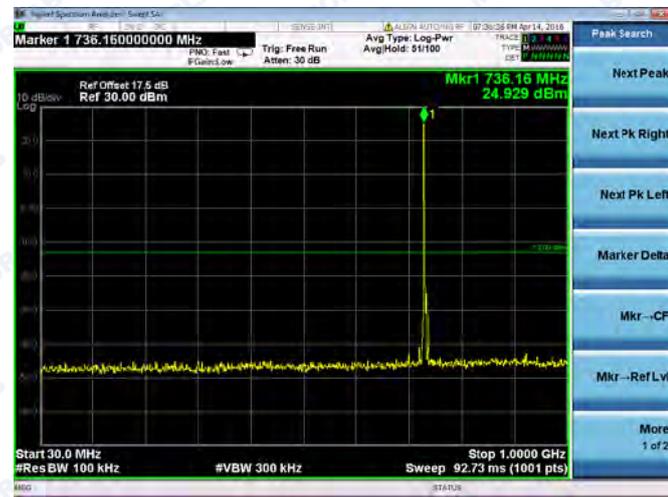
16QAM



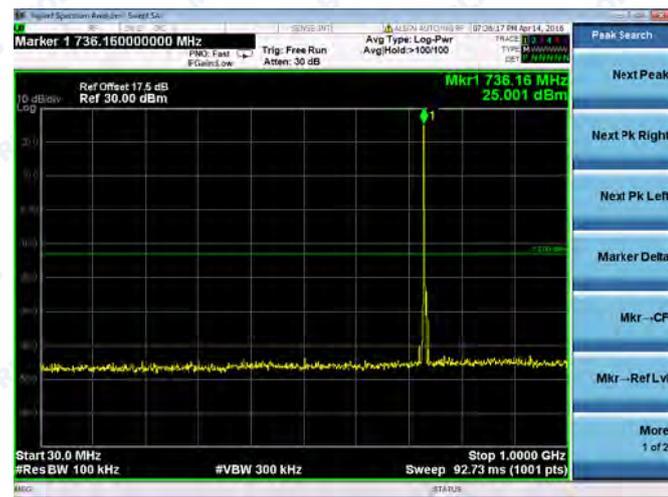


LTE Band 28 5MHz BW High Channel

QPSK



16QAM

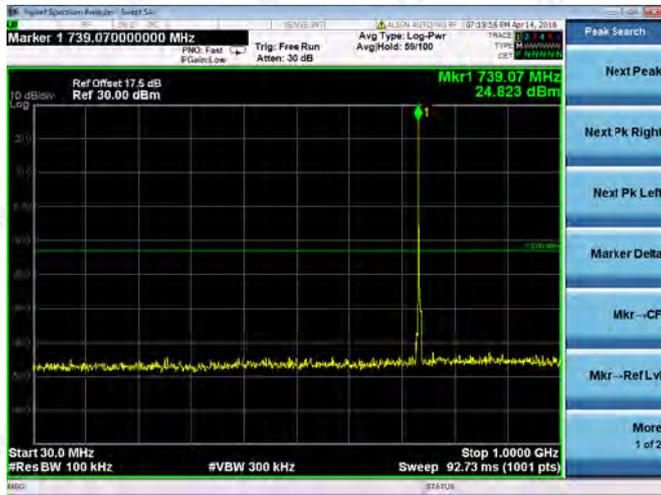




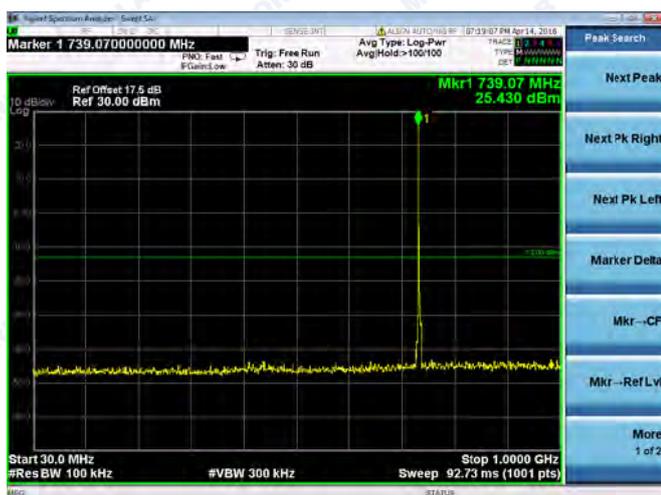
Band28 (740MHz-746MHz)

LTE Band 28 3MHz BW Low Channel

QPSK



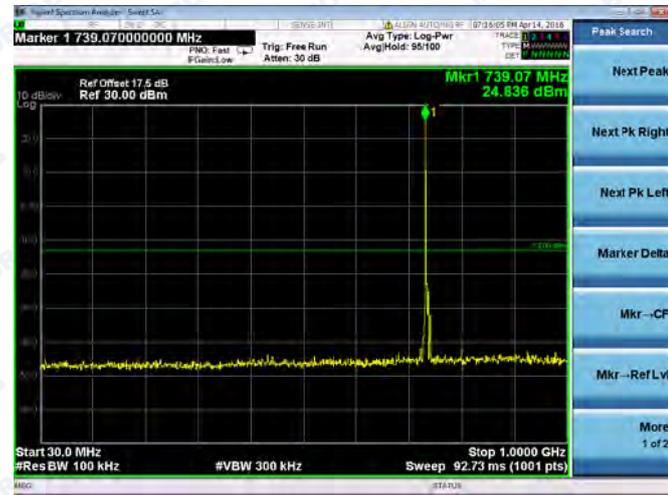
16QAM



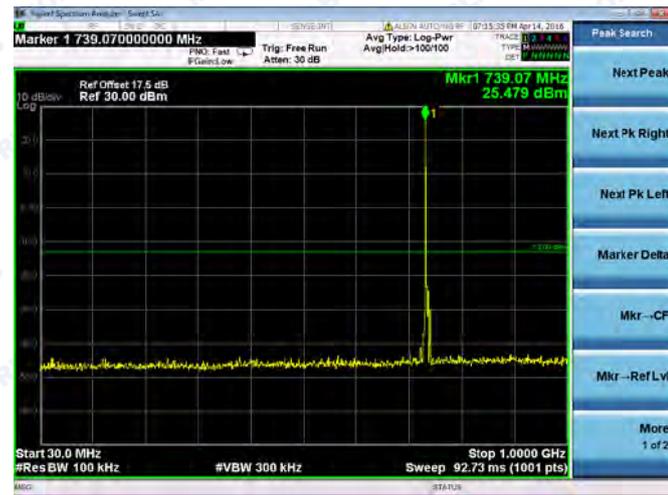


LTE Band 28 5MHz BW Low Channel

QPSK



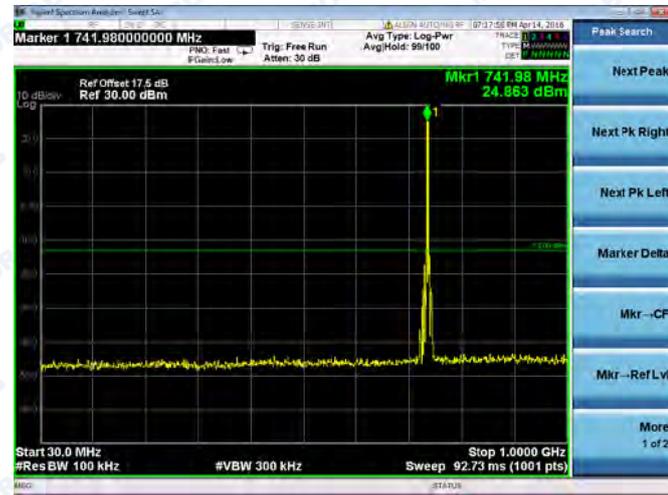
16QAM





LTE Band 28 3MHz BW Middle Channel

QPSK



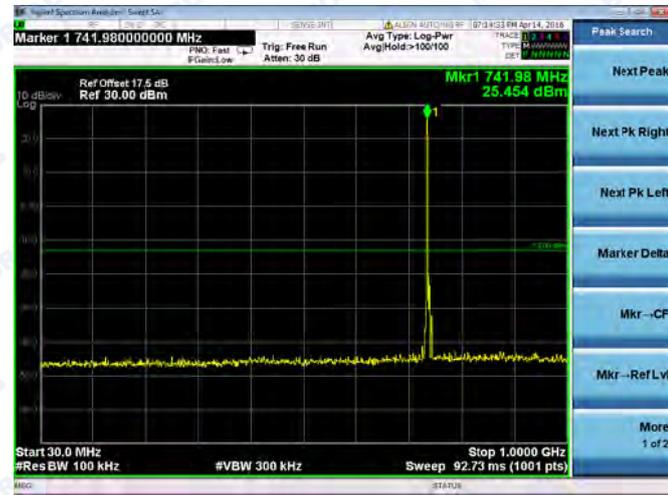
16QAM



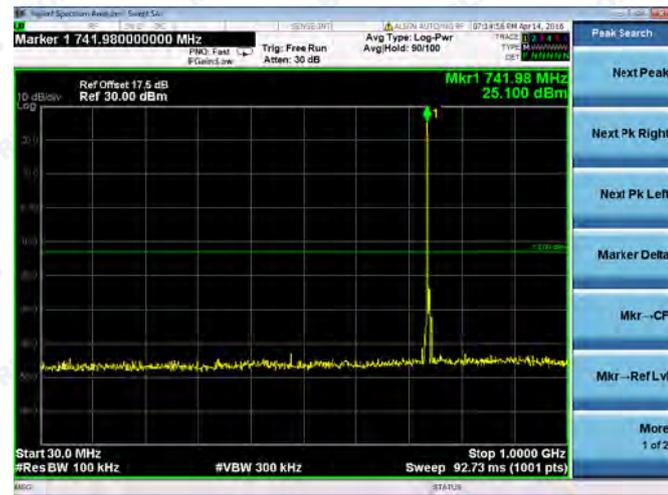


LTE Band 28 5MHz BW Middle Channel

QPSK



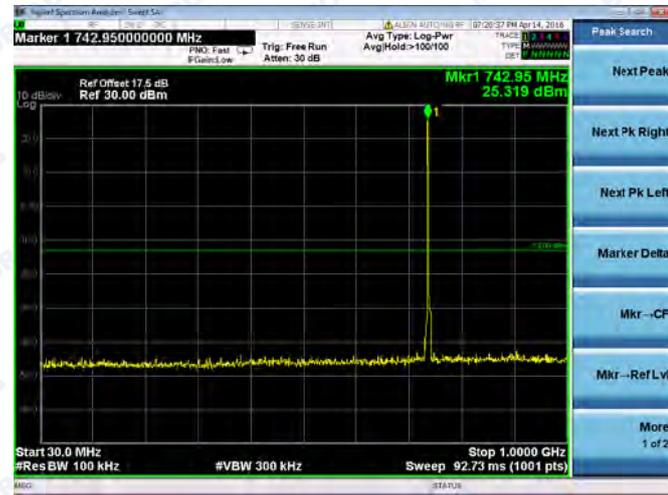
16QAM





LTE Band 28 3MHz BW High Channel

QPSK



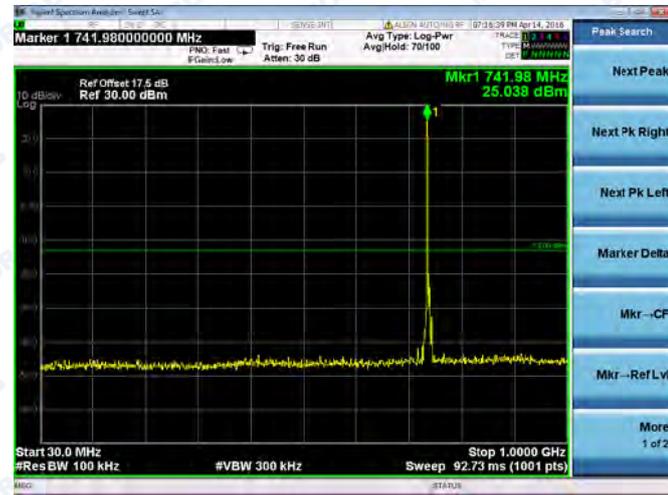
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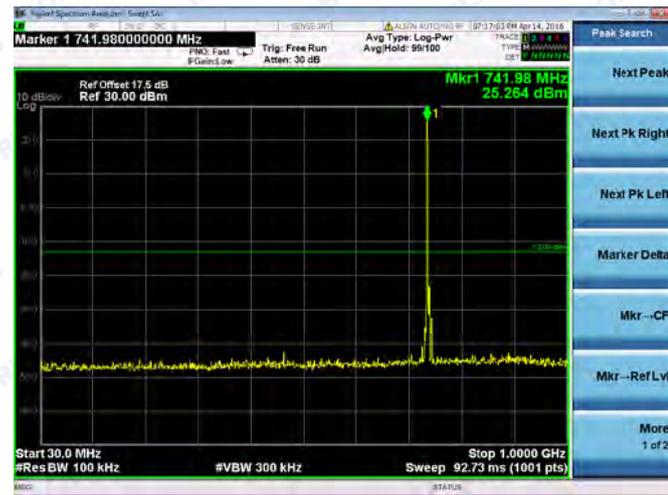


LTE Band 28 5MHz BW High Channel

QPSK



16QAM





## 2.6 Band Edge

### 2.6.1 Requirement

According to FCC section 27.53(g) (h), (g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(h) For operations in the 1710–1755 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB.

According to FCC section 27.53(m) (4), (m) (4) For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees

### 2.6.2 Test Description

See section 2.1.2 of this report.

### 2.6.3 Test Result

The center frequency of spectrum is the band edge frequency and span is 2MHz, Record the max trace into the test report.

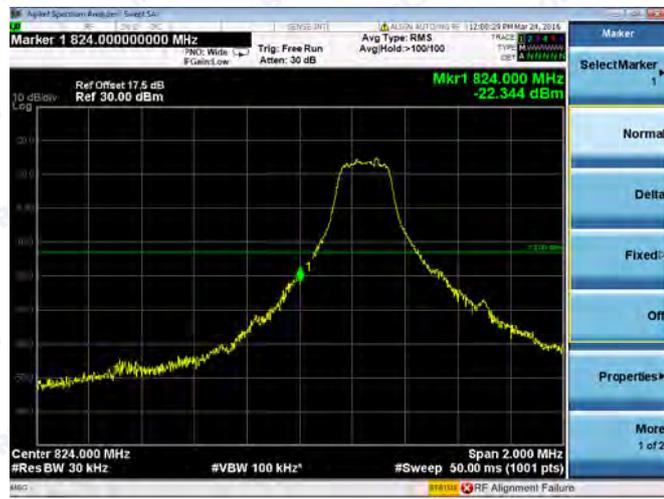
PASS. See the attached plots.



LTE Band 5

Channel Bandwidth: 1.4MHz

Channel	20407	RB Size 1	RB Offset 0	Channel	20407	RB Size 6	RB Offset 0
---------	-------	-----------	-------------	---------	-------	-----------	-------------



Channel Bandwidth: 1.4MHz

Channel	20642	RB Size 1	RB Offset 5	Channel	20642	RB Size 6	RB Offset 0
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LTE Band 5

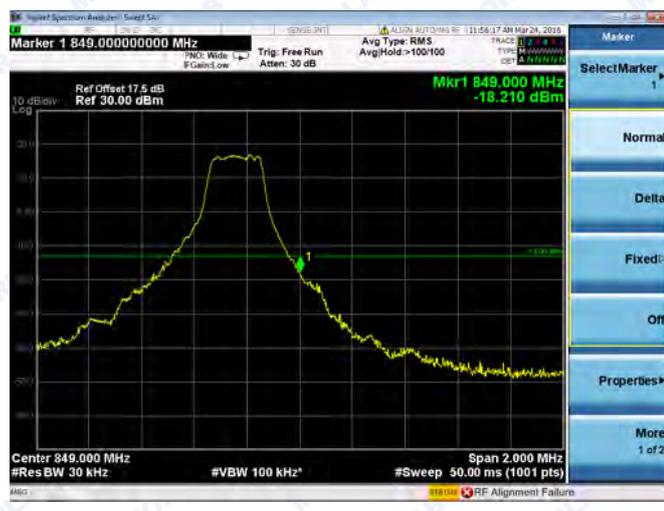
Channel Bandwidth: 3MHz

Channel	20415	RB Size 1	RB Offset 0	Channel	20415	RB Size 15	RB Offset 0
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Channel Bandwidth: 3MHz

Channel	20634	RB Size 1	RB Offset 14	Channel	20634	RB Size 15	RB Offset 0
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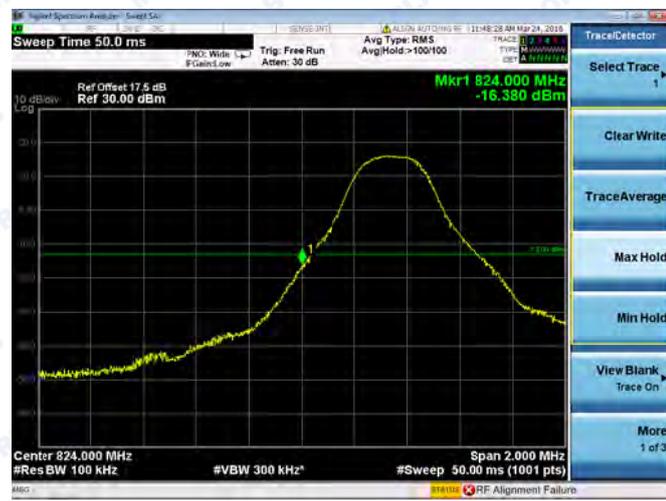




LTE Band 5

Channel Bandwidth: 5MHz

Channel	20425	RB Size 1	RB Offset 0	Channel	20425	RB Size 25	RB Offset 0
---------	-------	-----------	-------------	---------	-------	------------	-------------



Channel Bandwidth: 5MHz

Channel	20625	RB Size 1	RB Offset 24	Channel	20625	RB Size 25	RB Offset 0
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