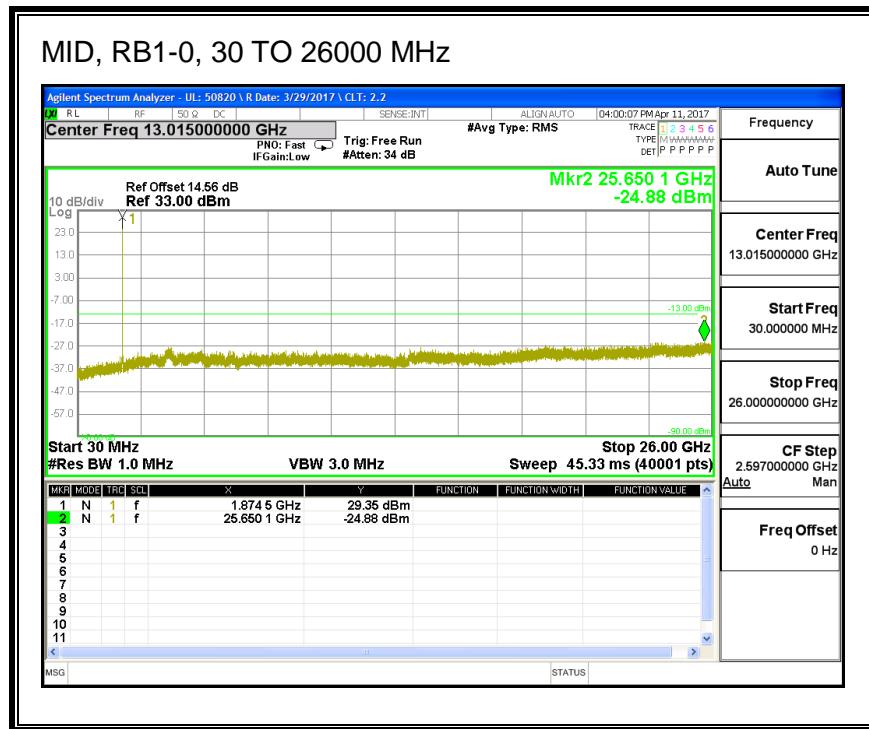
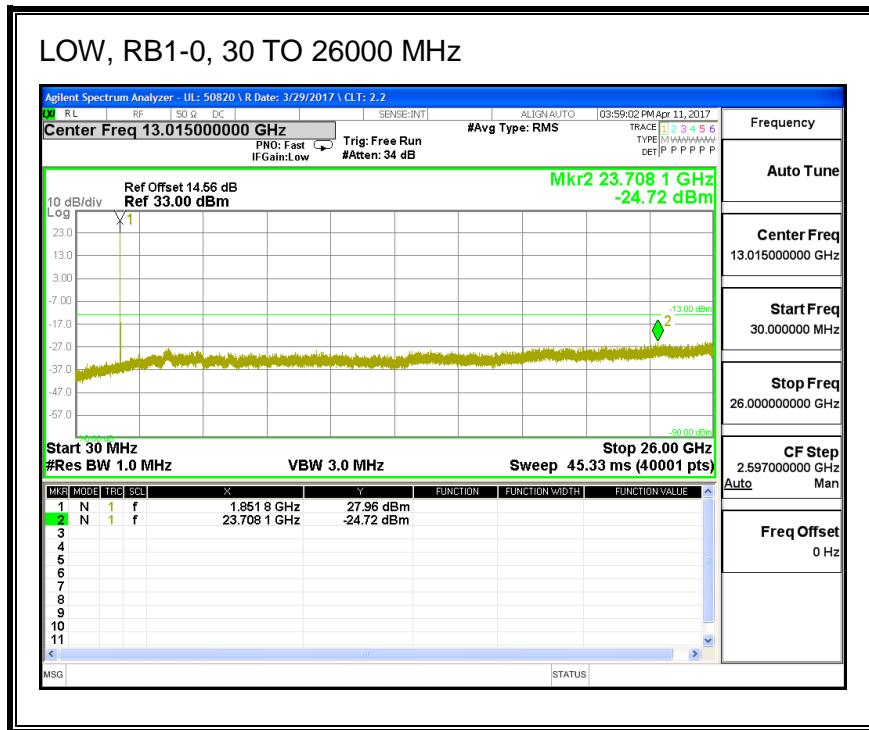
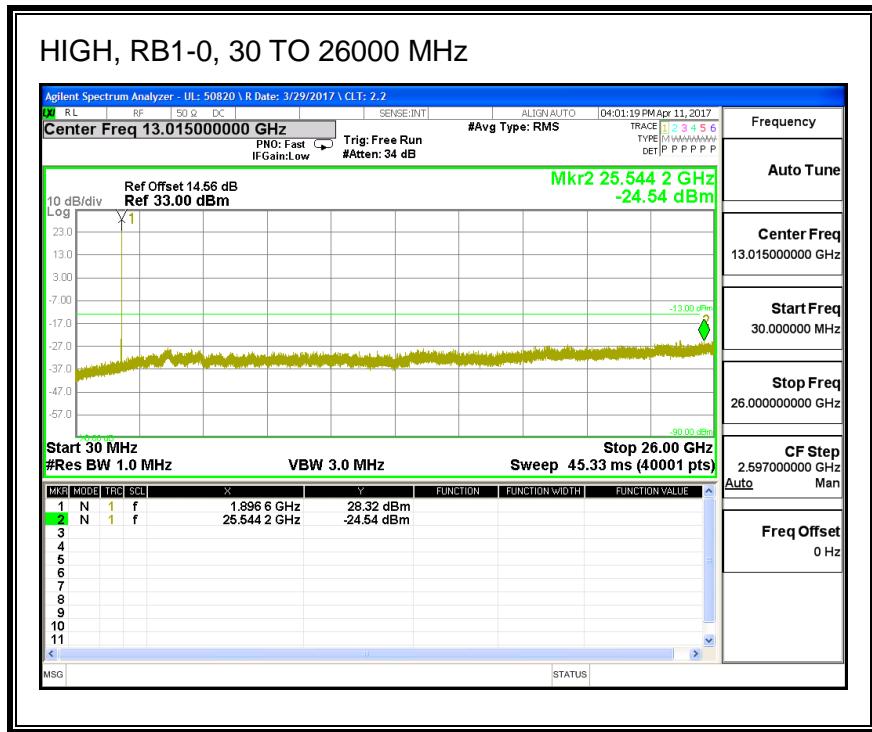
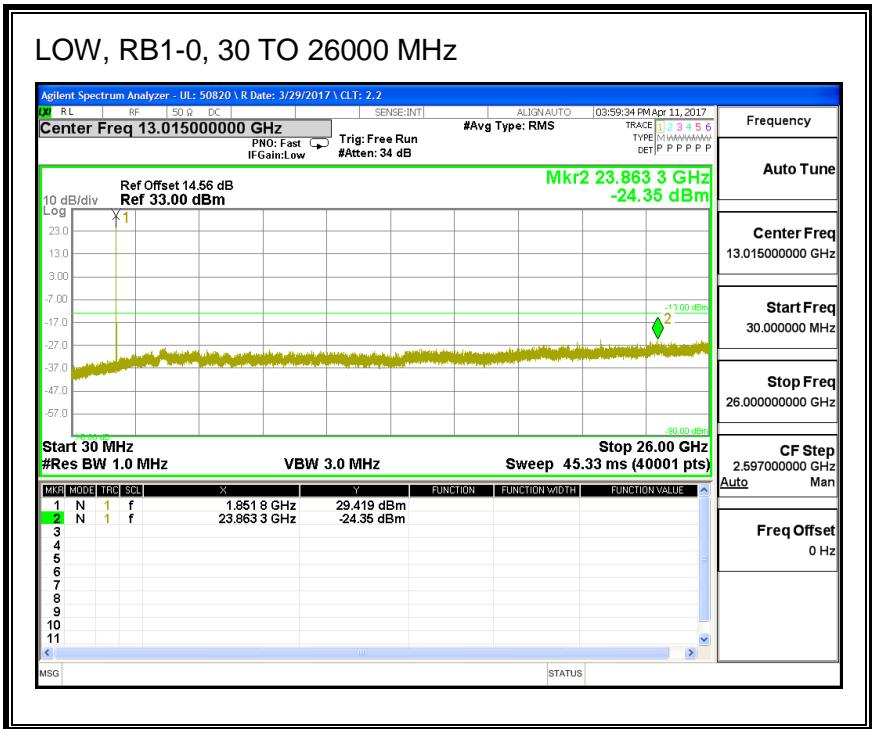


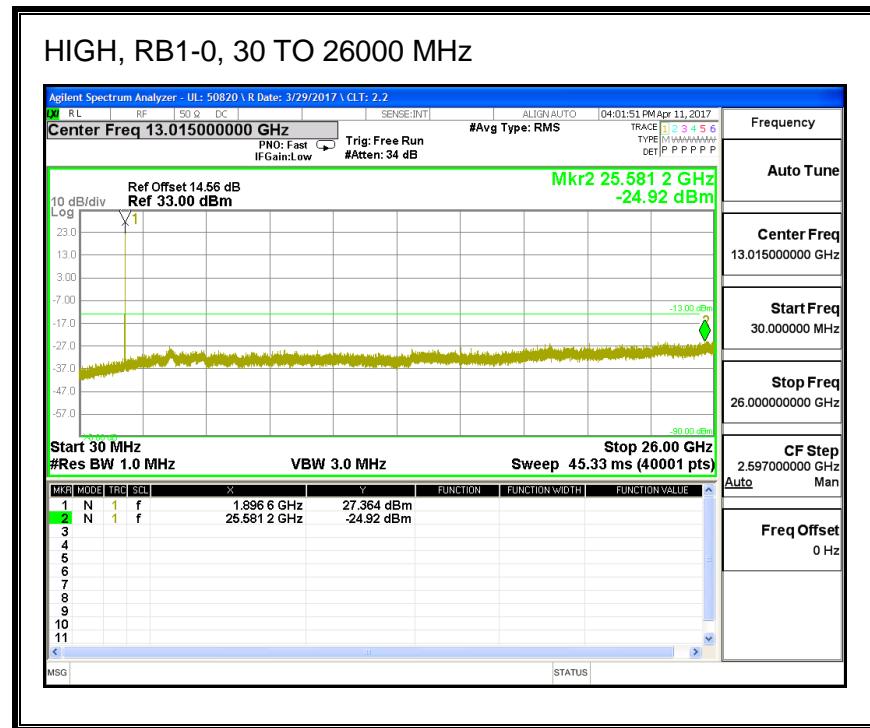
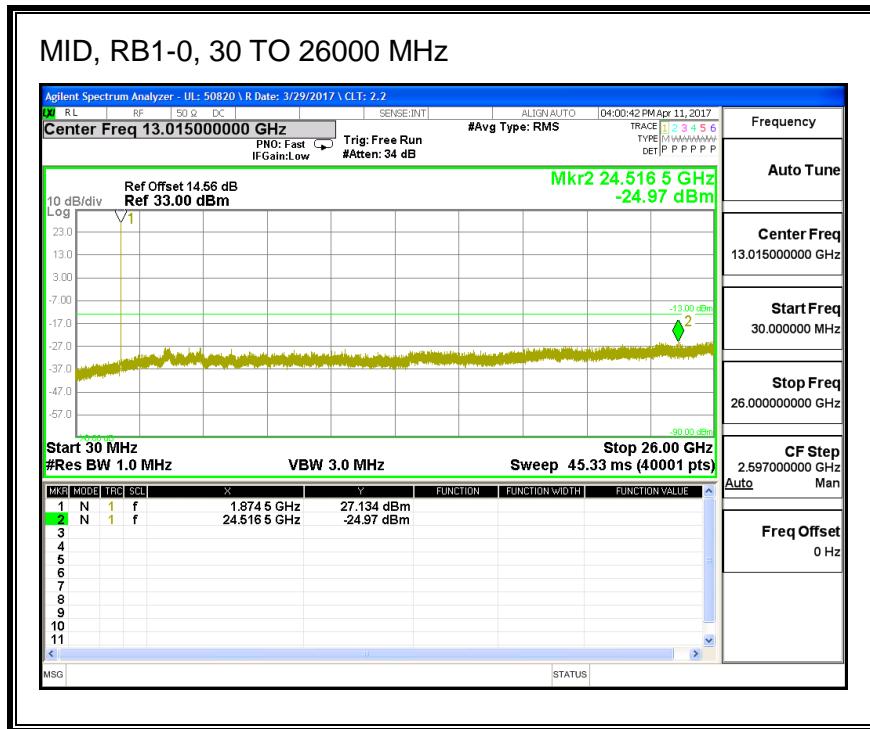
**QPSK, (20.0 MHz BAND WIDTH)**





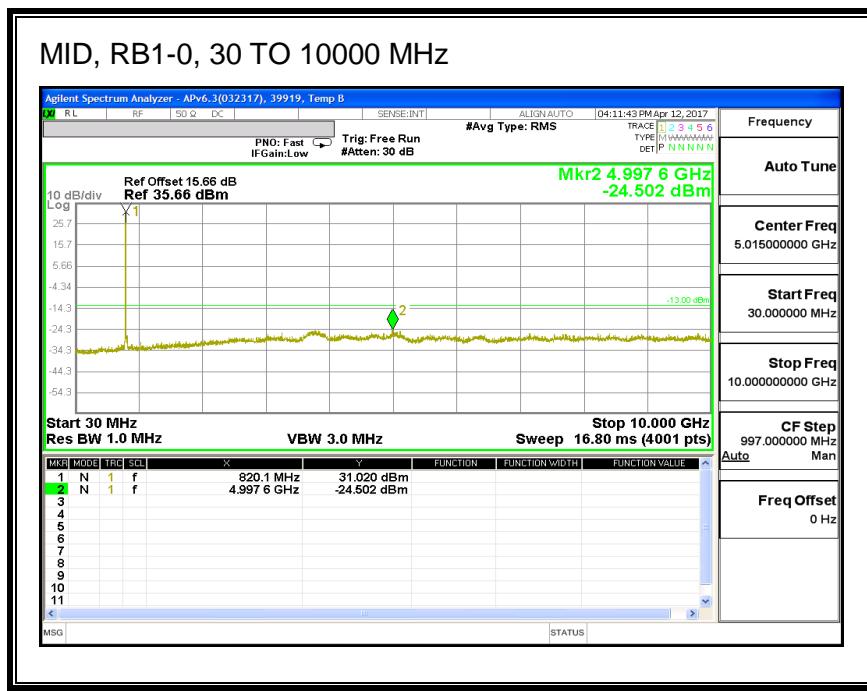
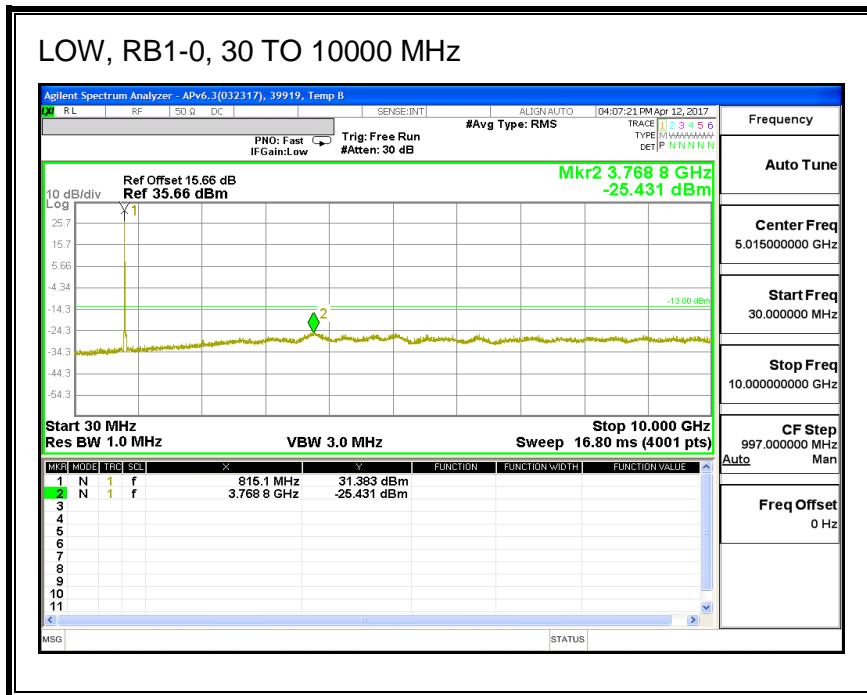
**16QAM, (20.0 MHz BAND WIDTH)**

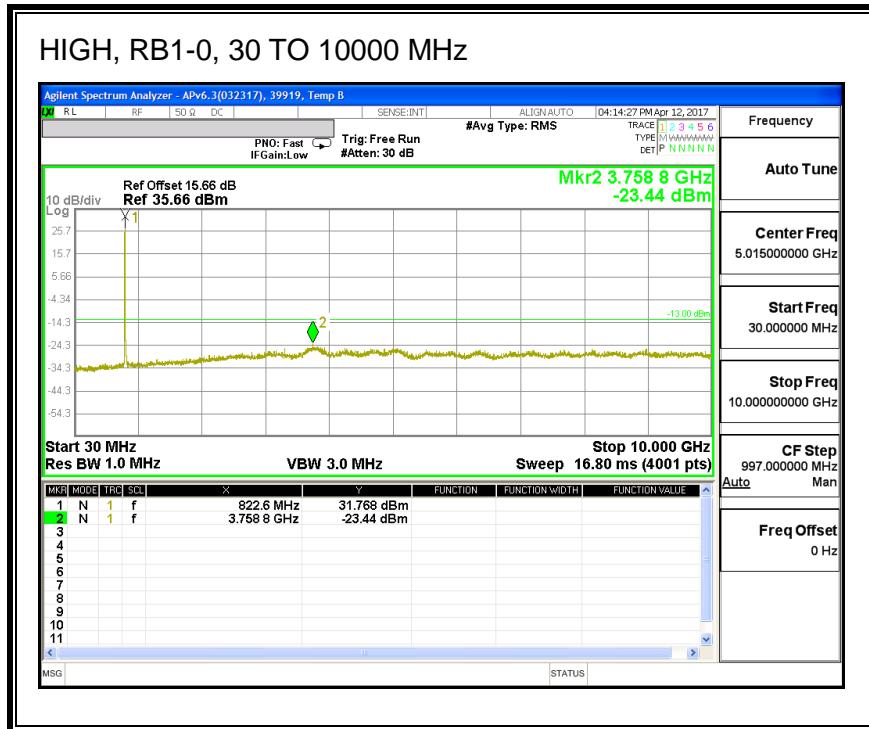




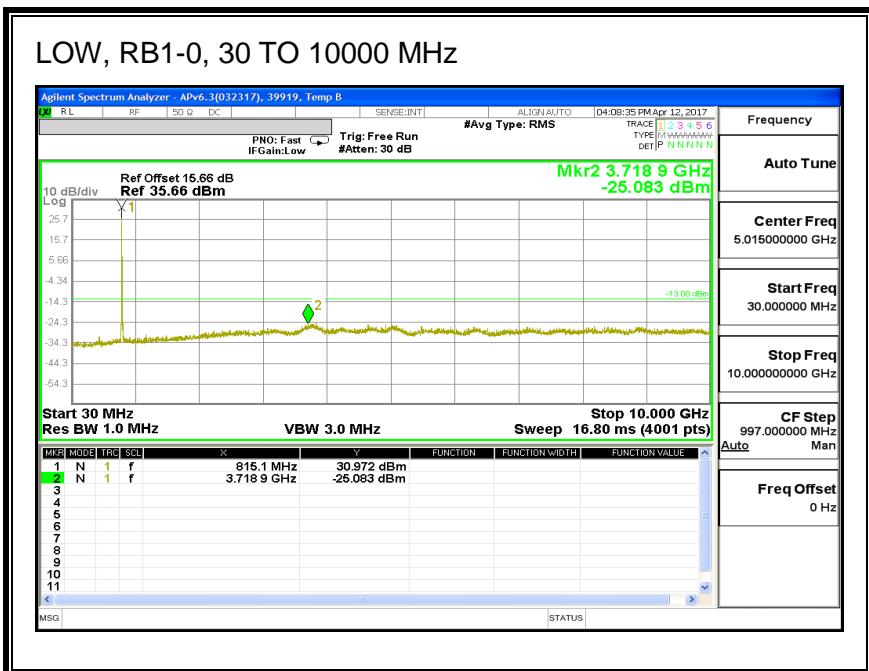
### 8.3.9. LTE BAND 26

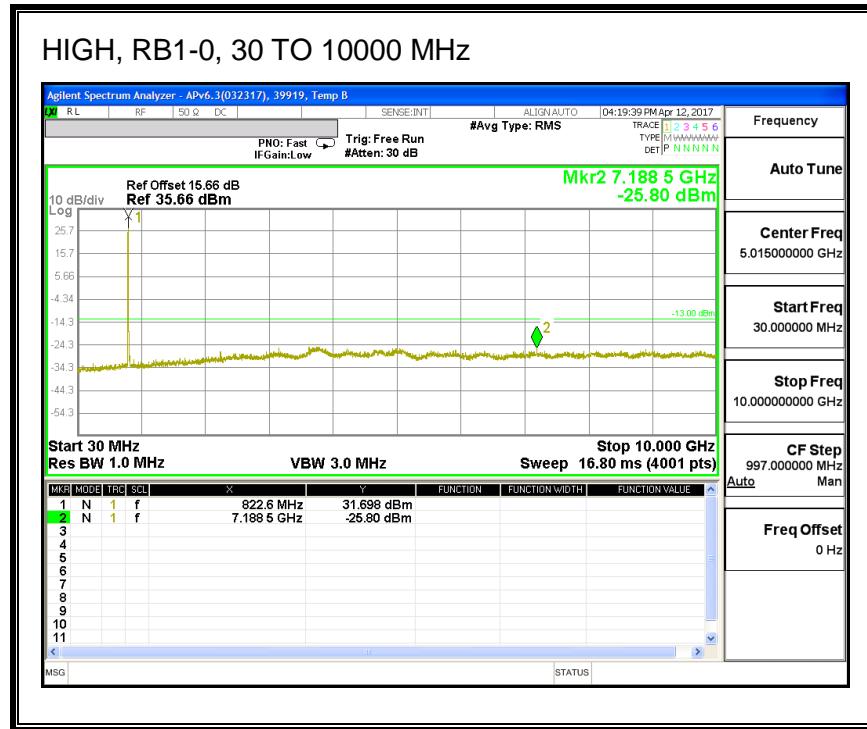
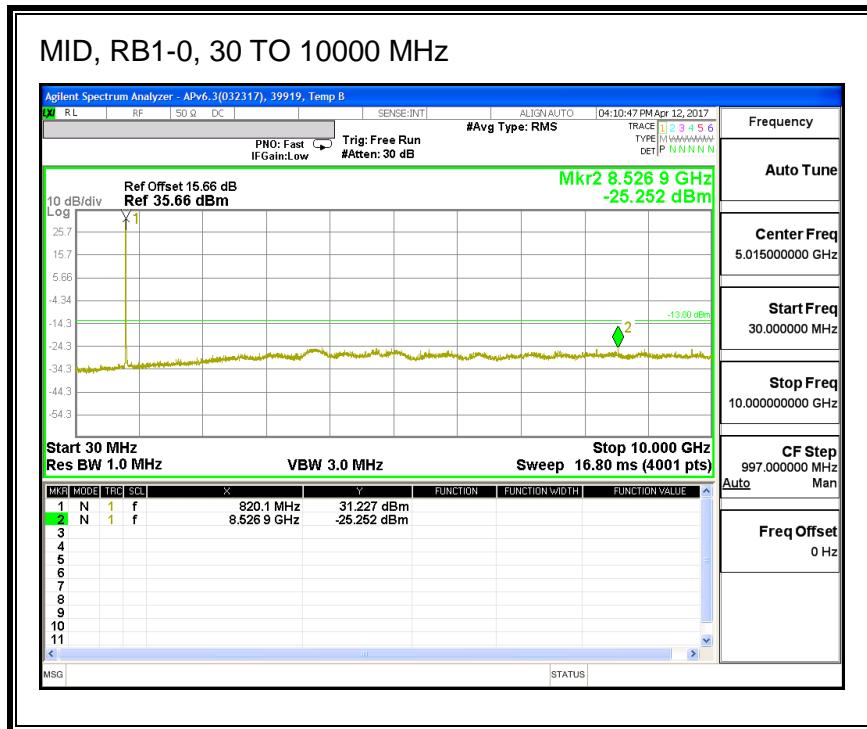
#### QPSK, (1.4 MHz BAND WIDTH)



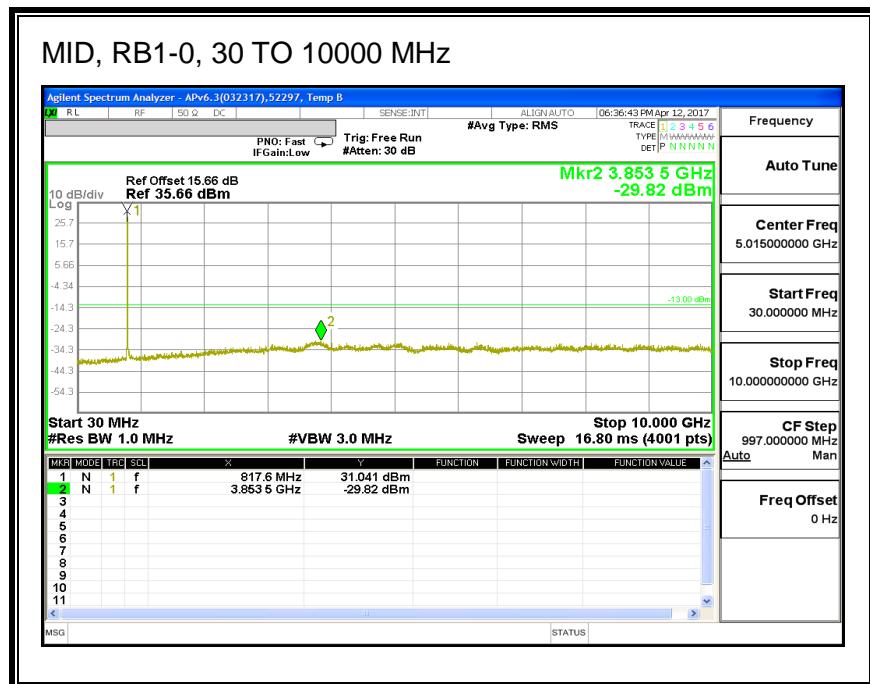
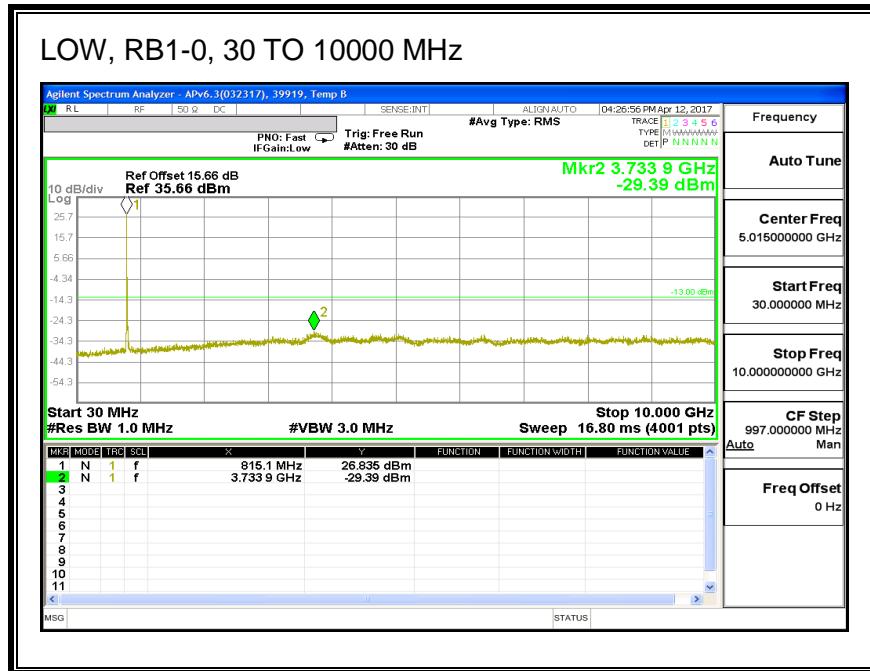


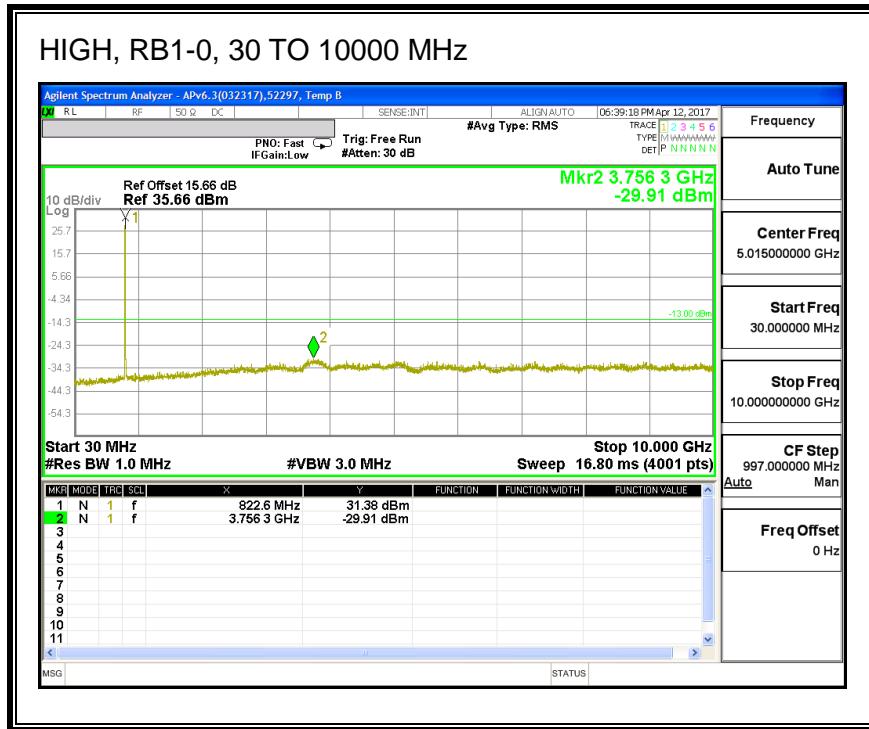
**16QAM, (1.4 MHz BAND WIDTH)**



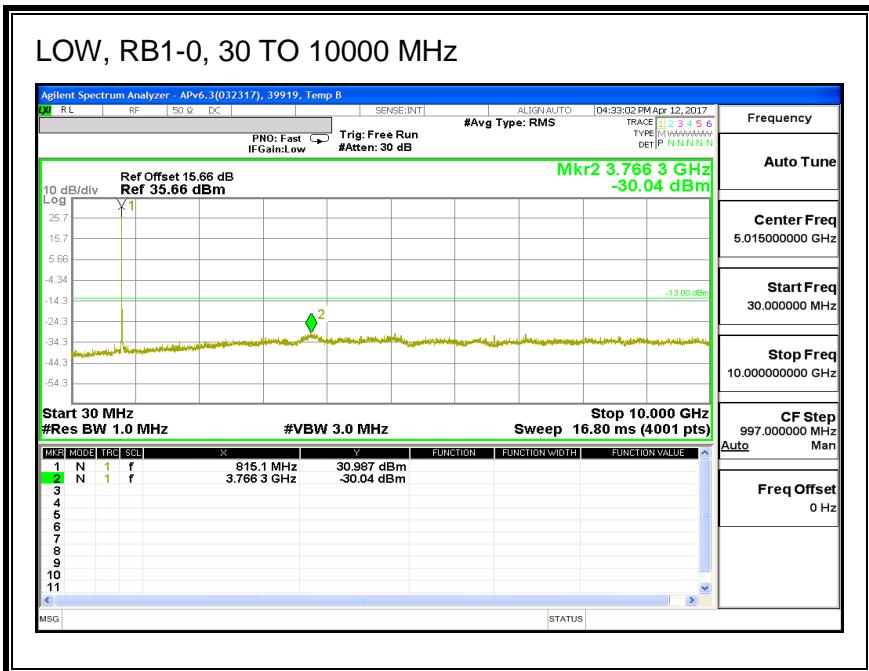


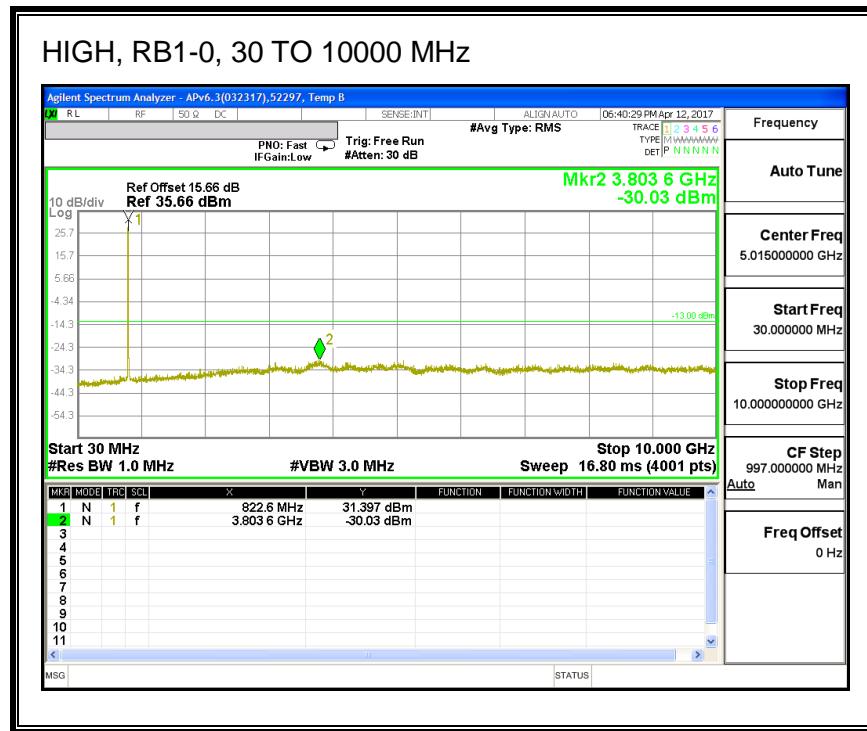
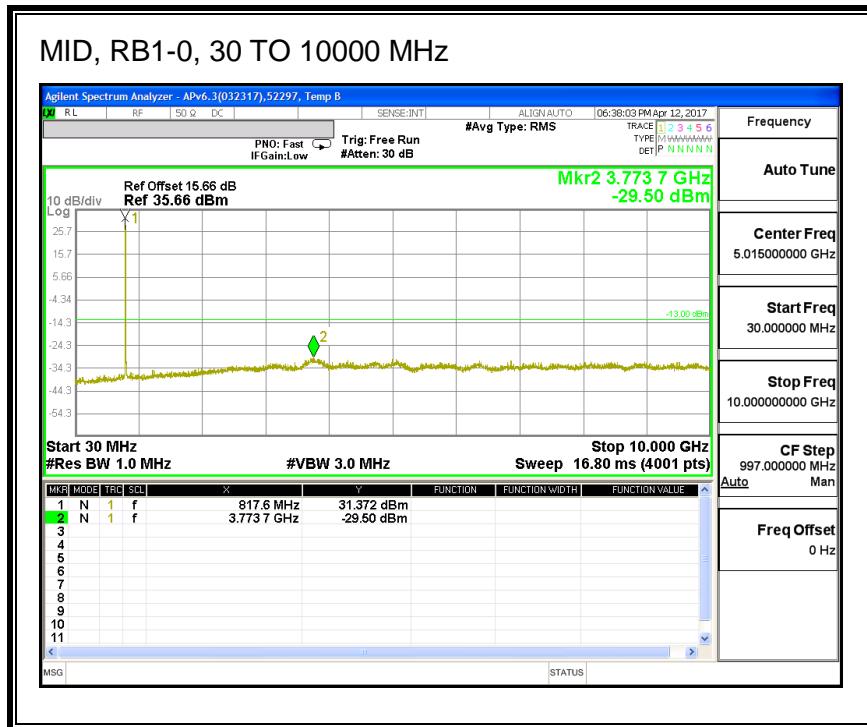
### QPSK, (3.0 MHz BAND WIDTH)



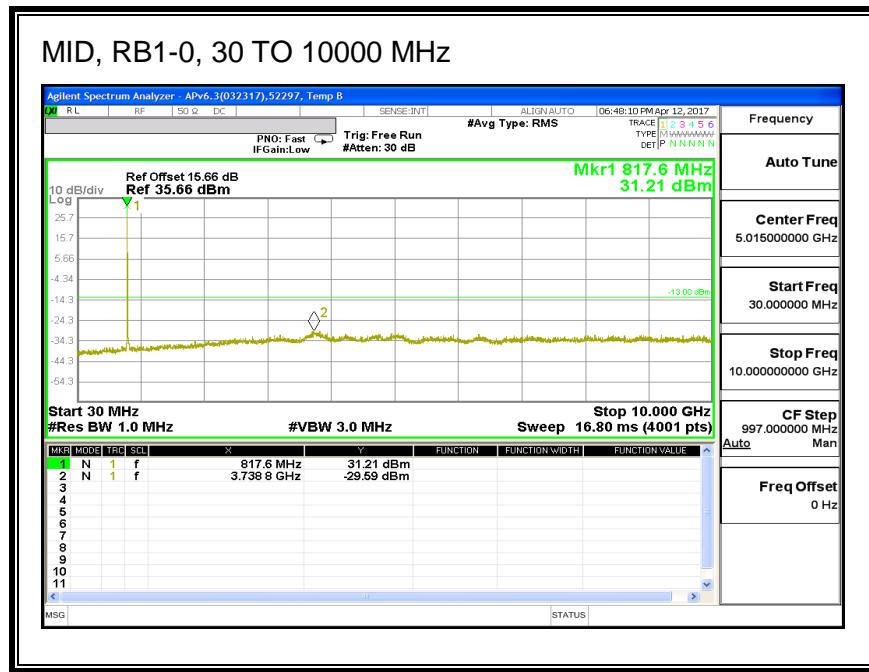
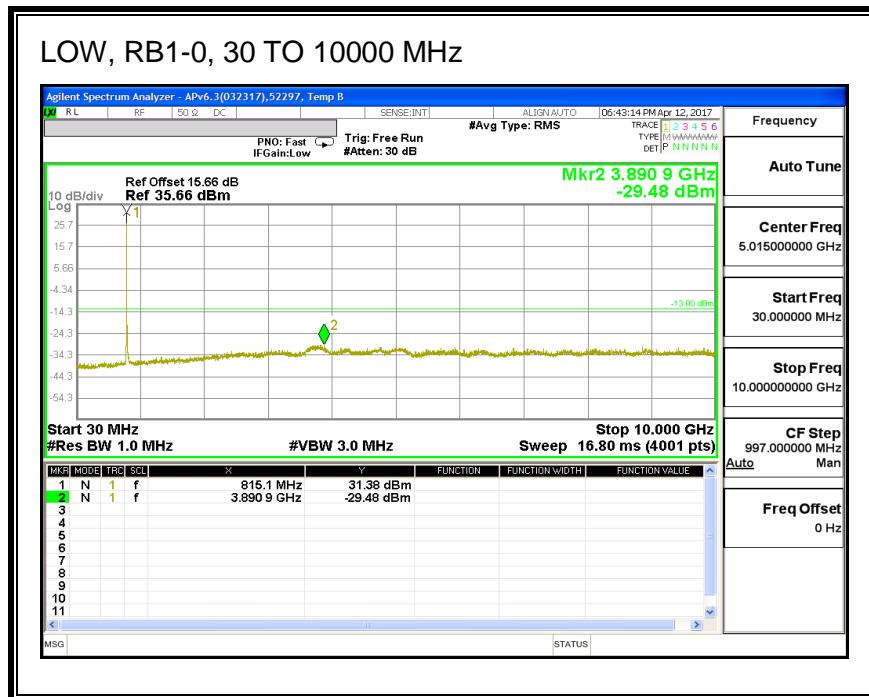


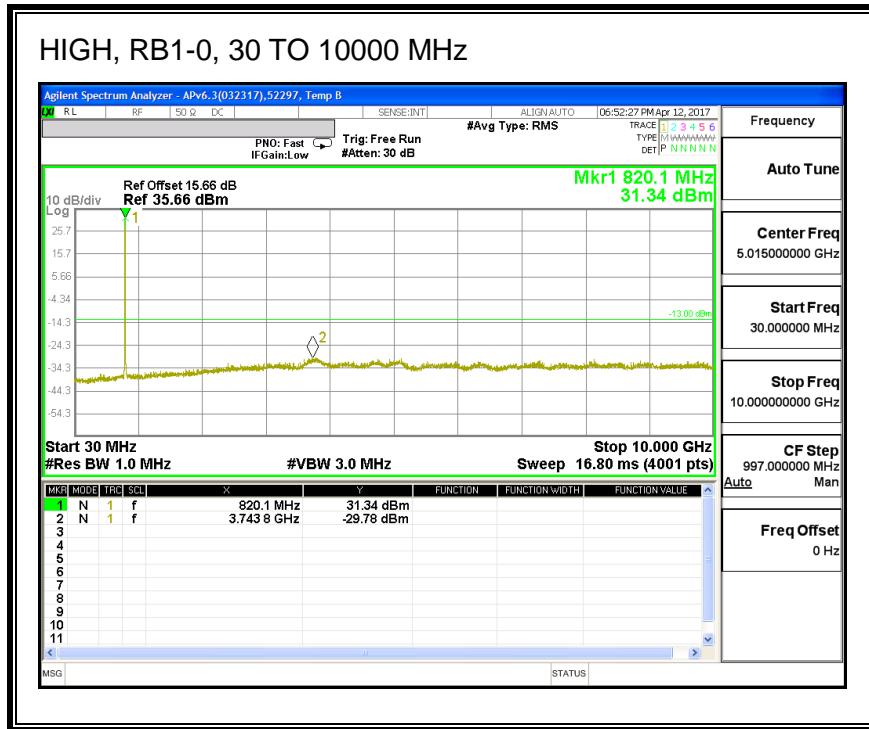
**16QAM, (3.0 MHz BAND WIDTH)**



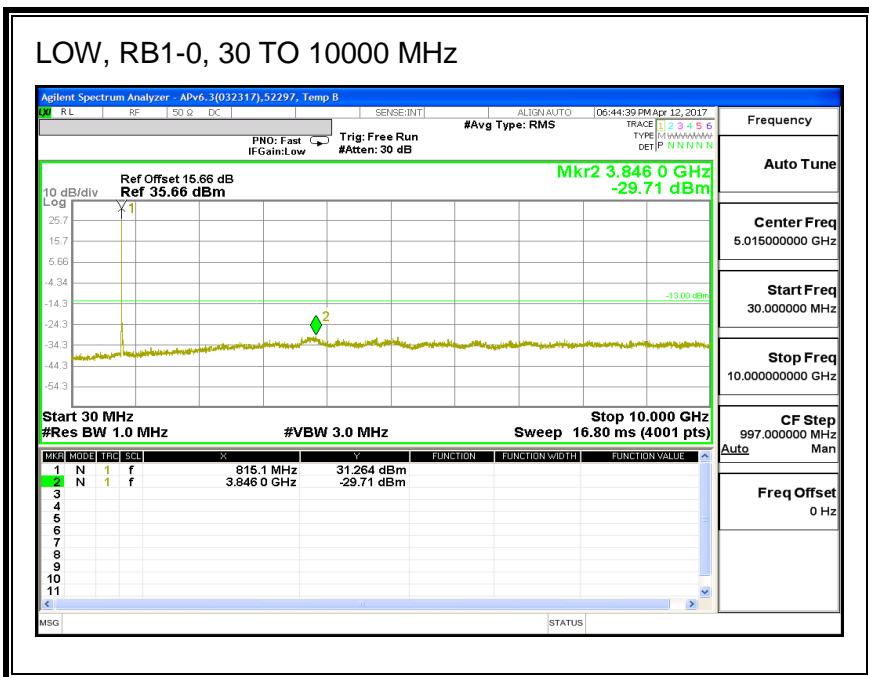


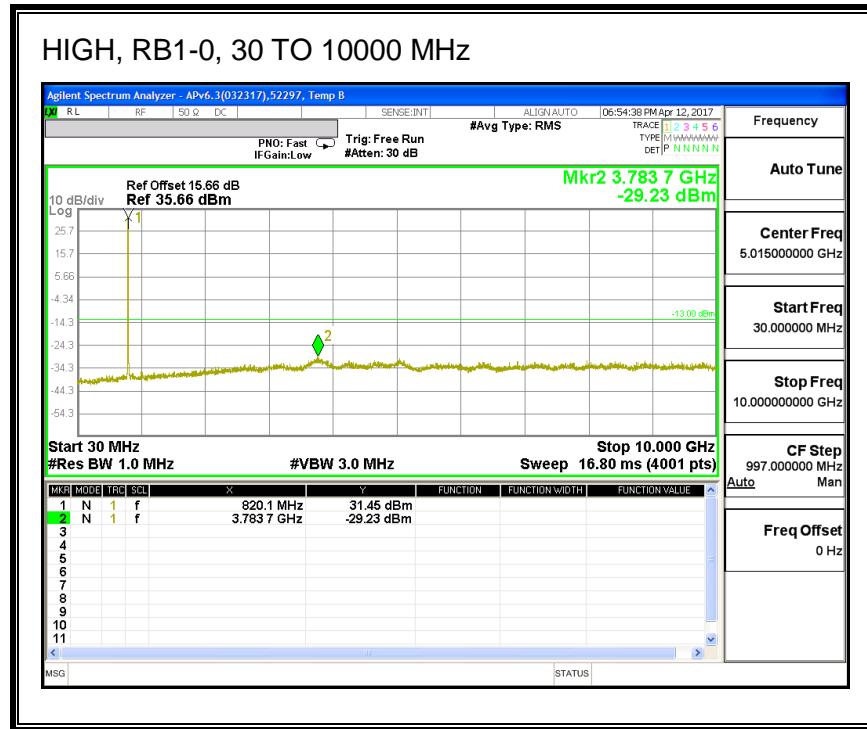
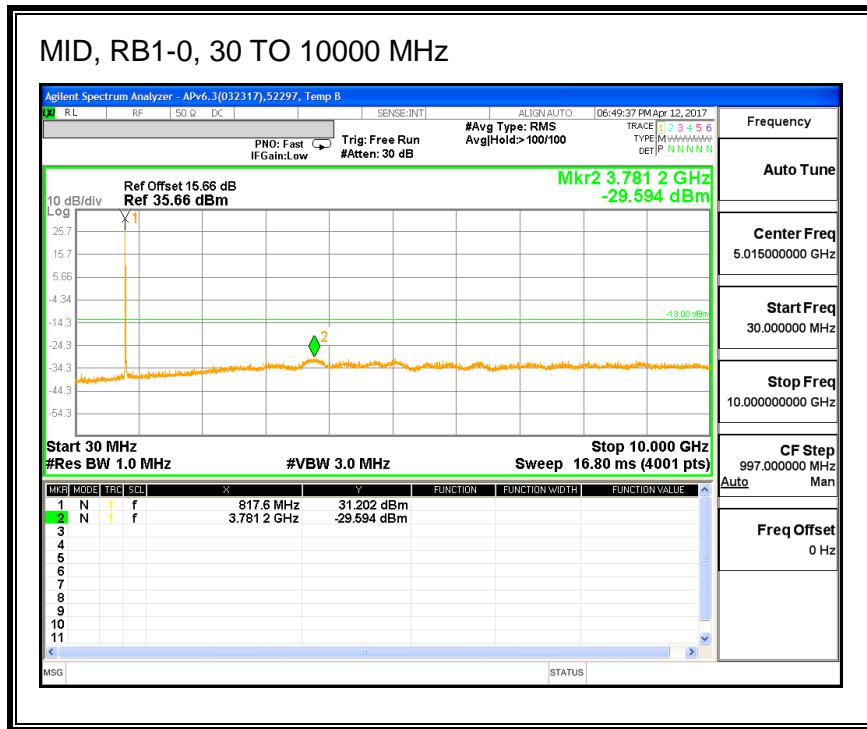
**QPSK, (5.0 MHz BAND WIDTH)**



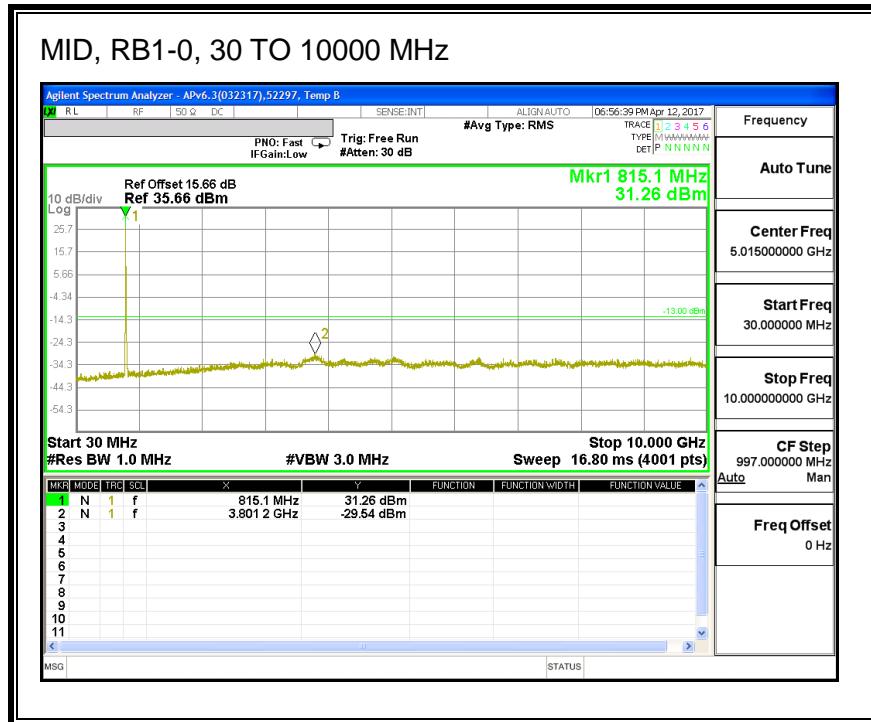


**16QAM, (5.0 MHz BAND WIDTH)**

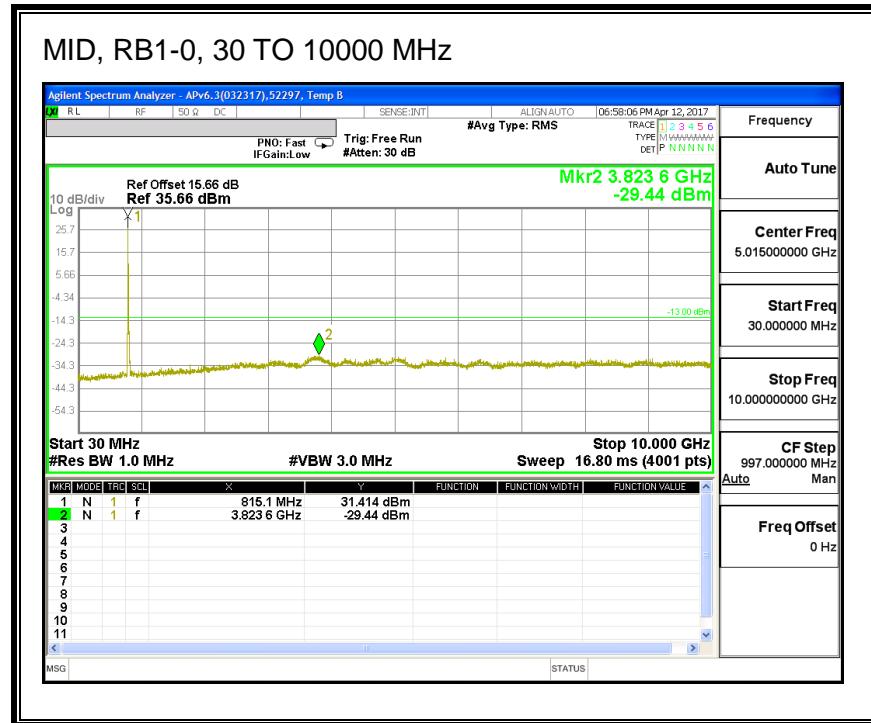




**QPSK, (10.0 MHz BAND WIDTH)**

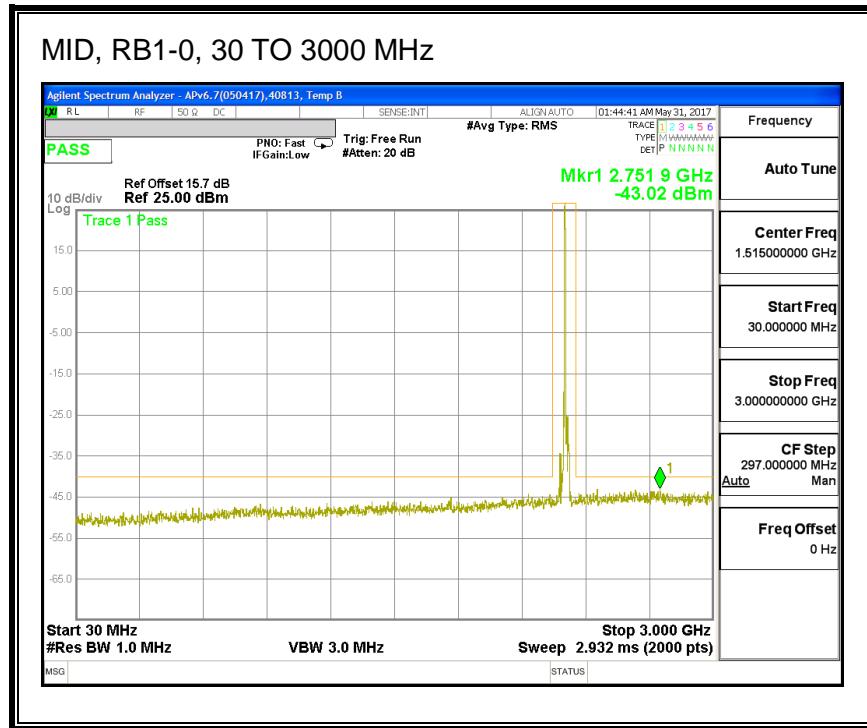
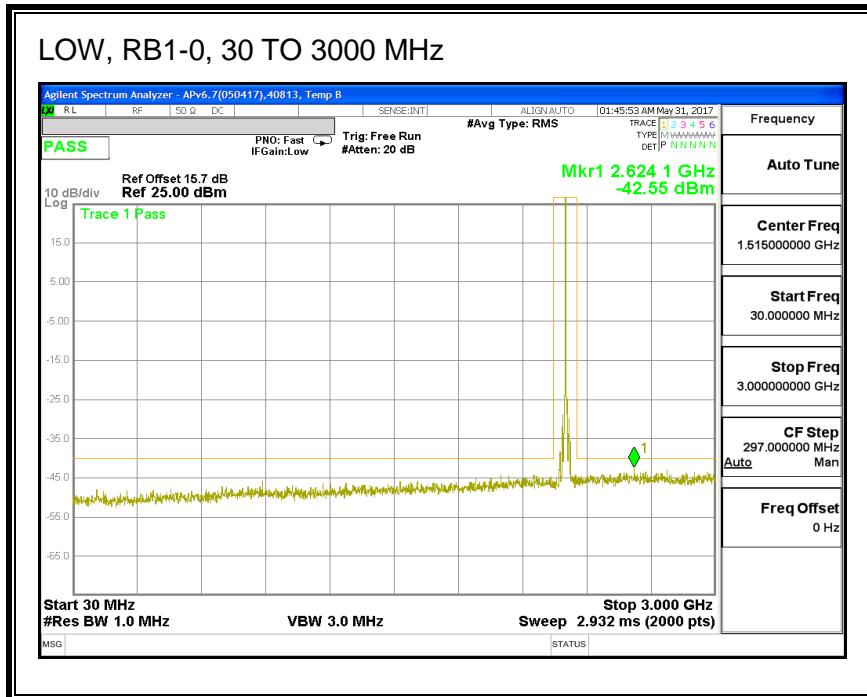


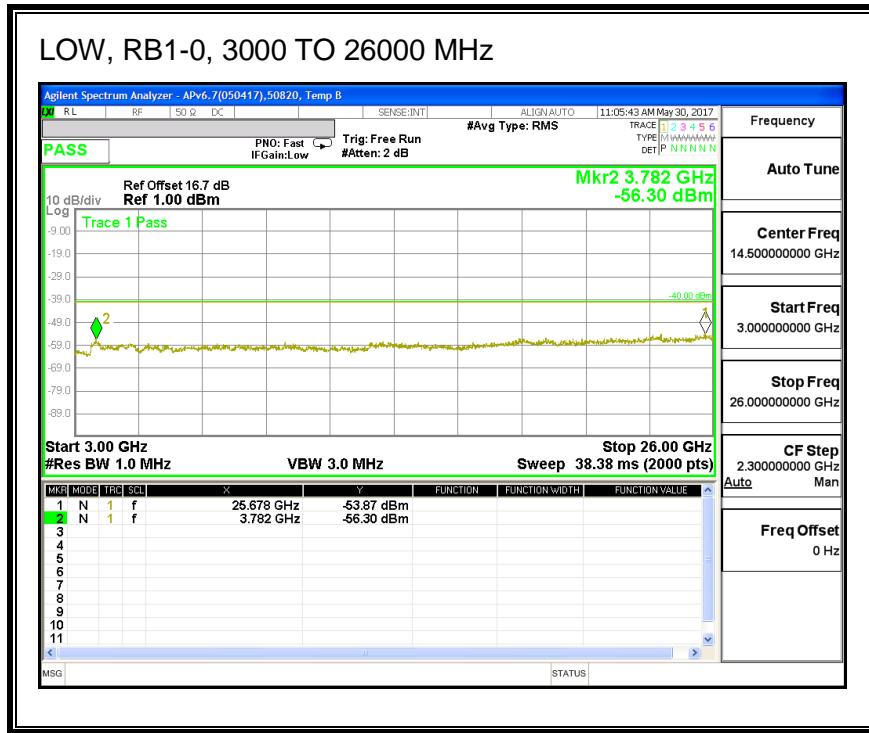
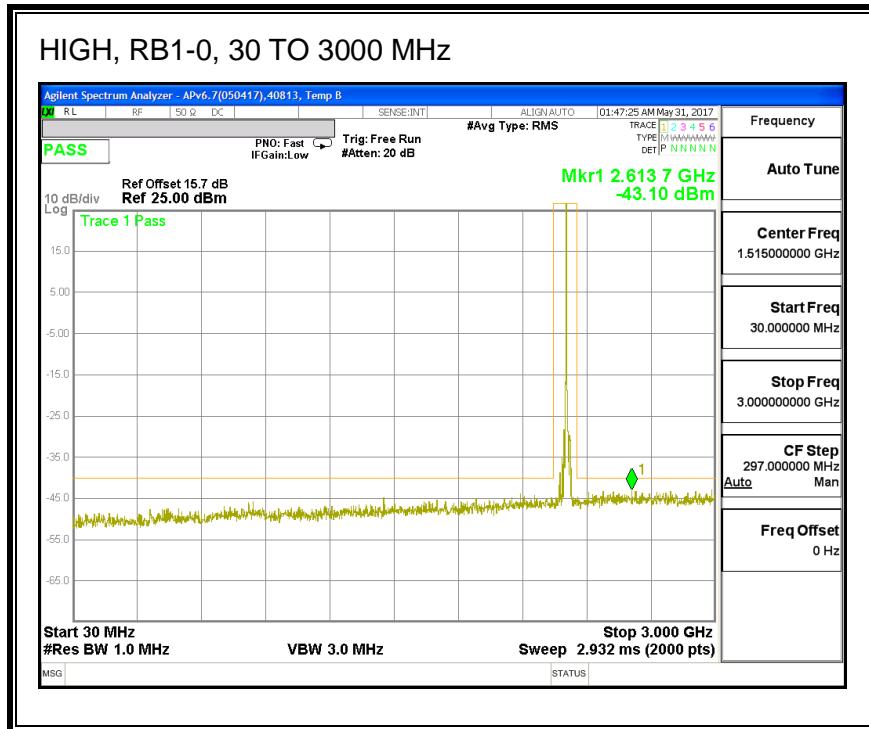
**16QAM, (10.0 MHz BAND WIDTH)**

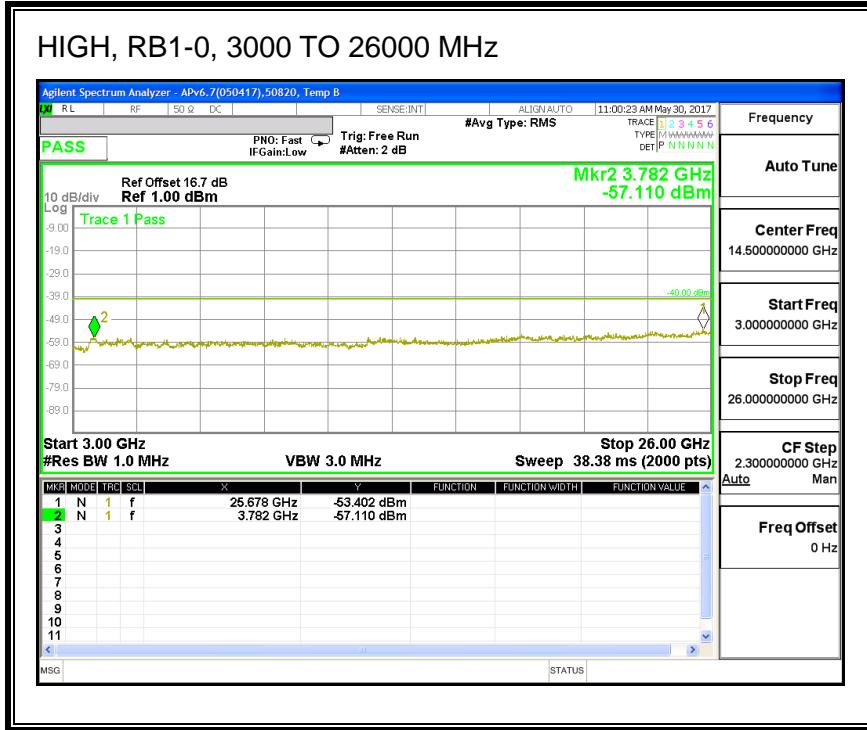
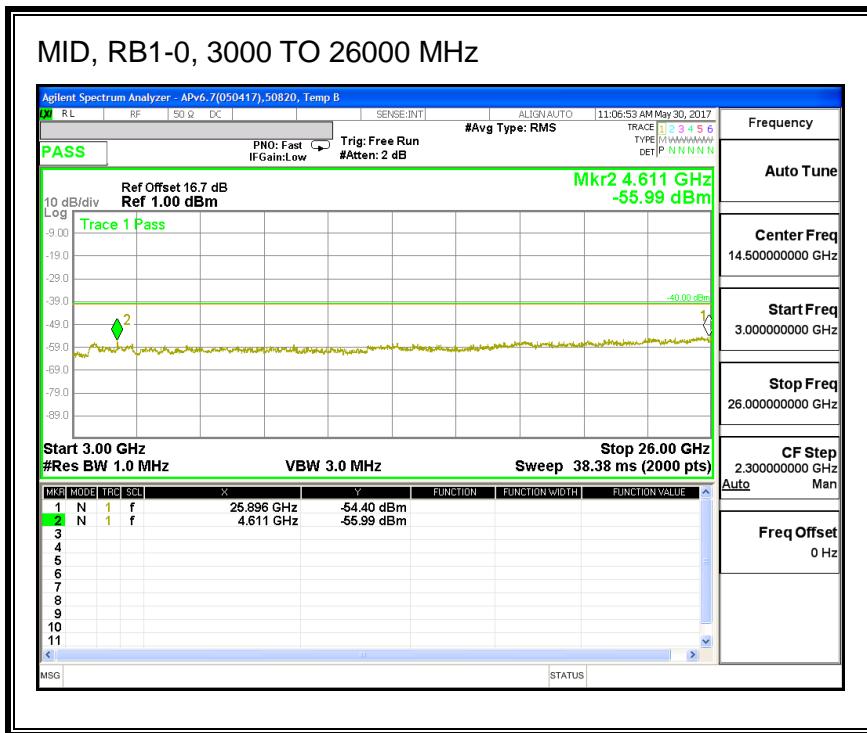


### 8.3.10. LTE BAND 30

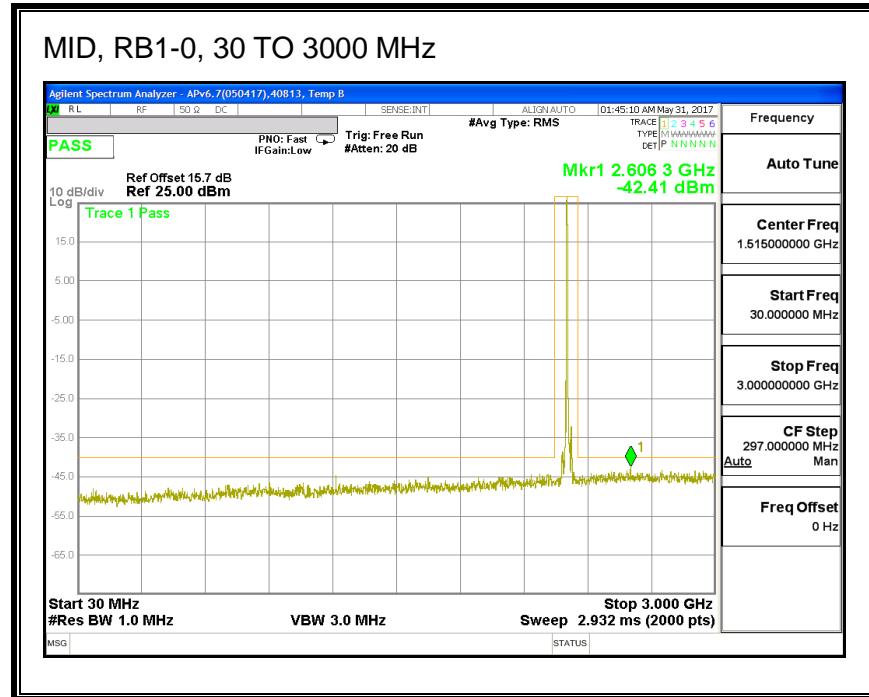
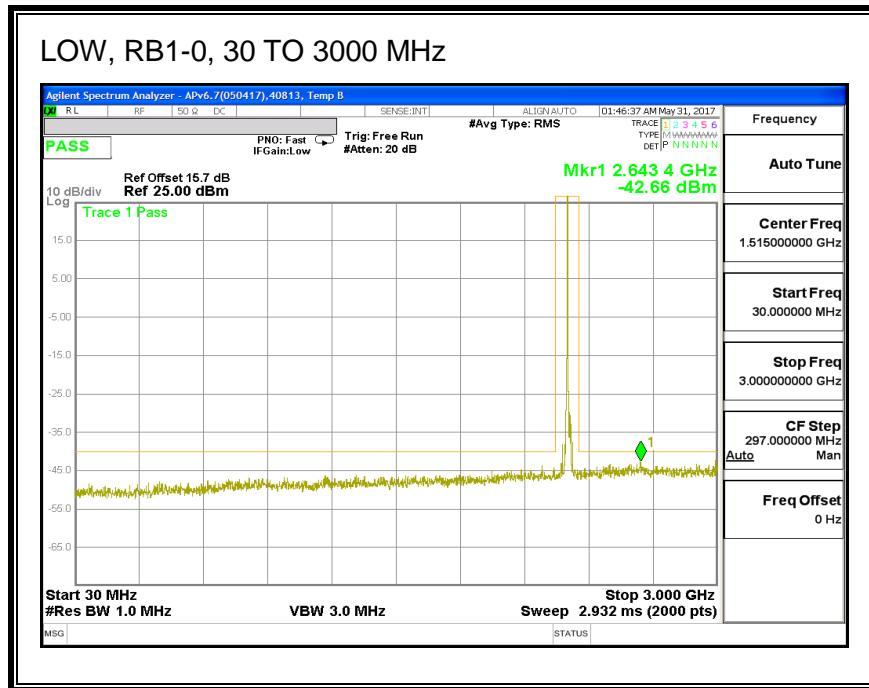
#### QPSK, (5.0 MHz BAND WIDTH)

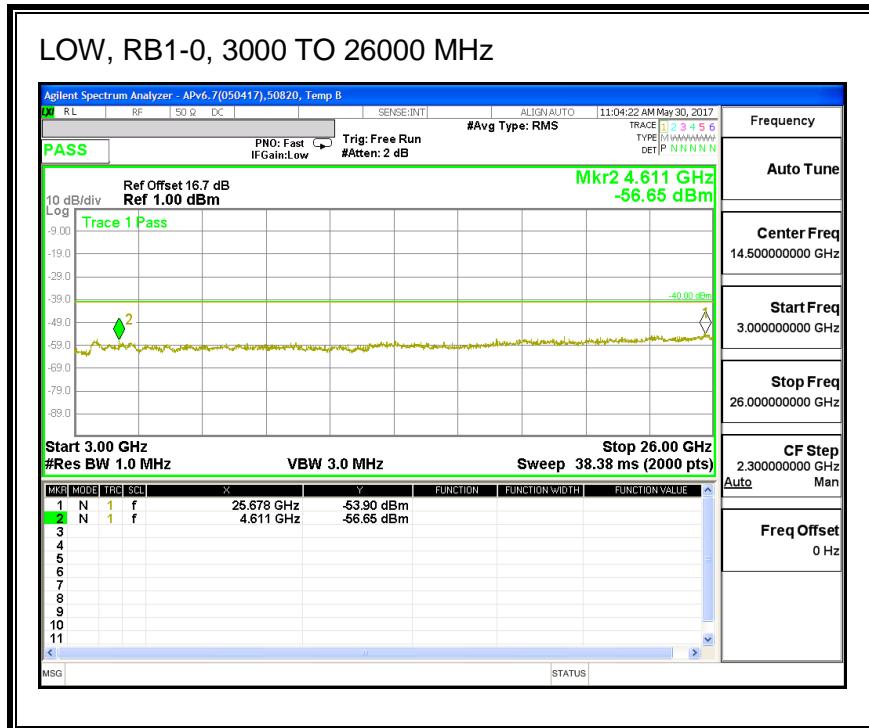
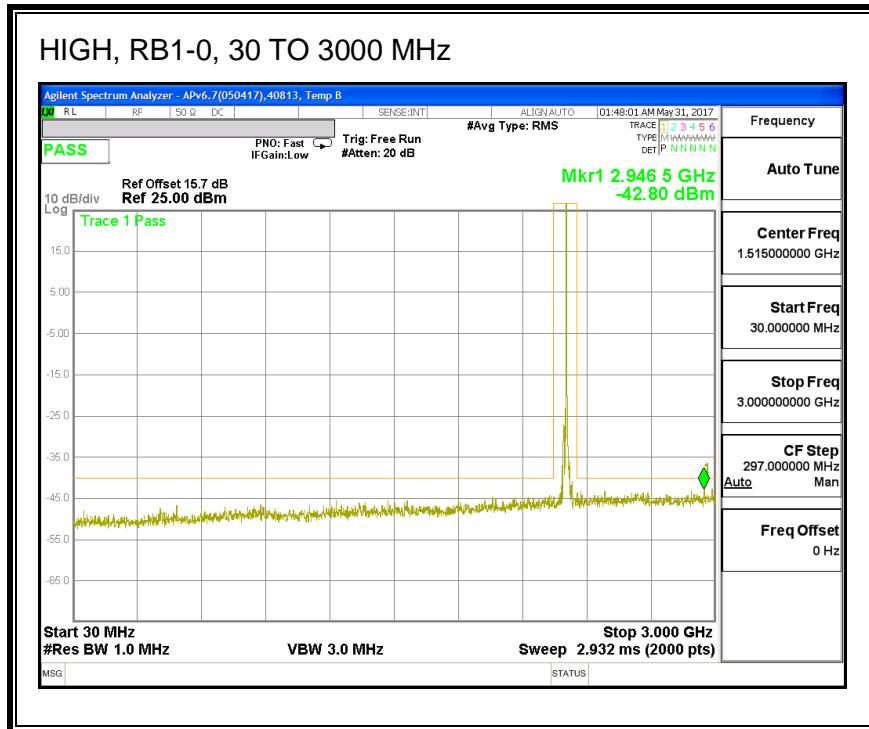


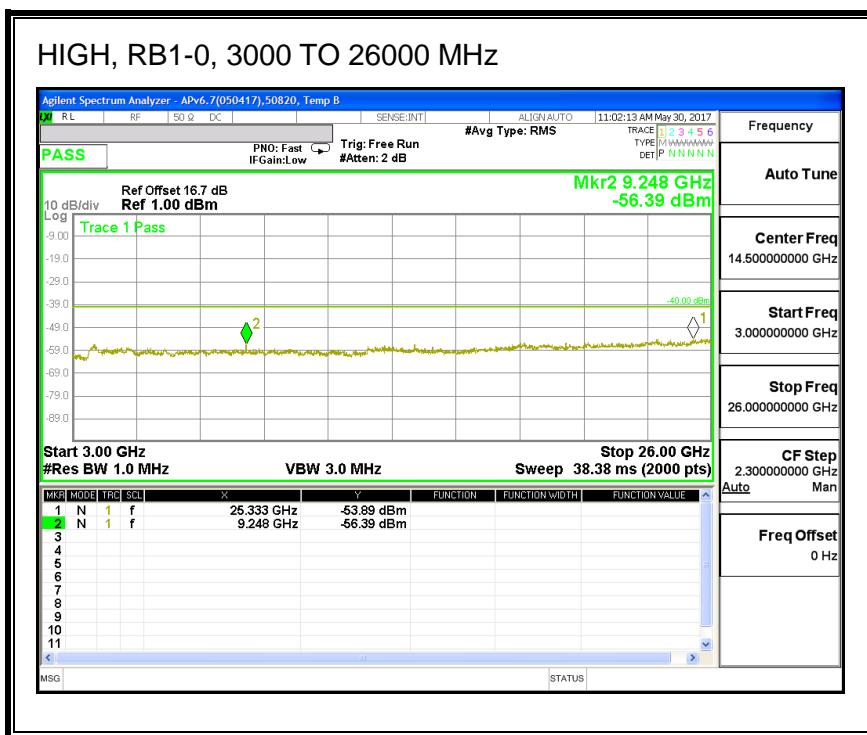
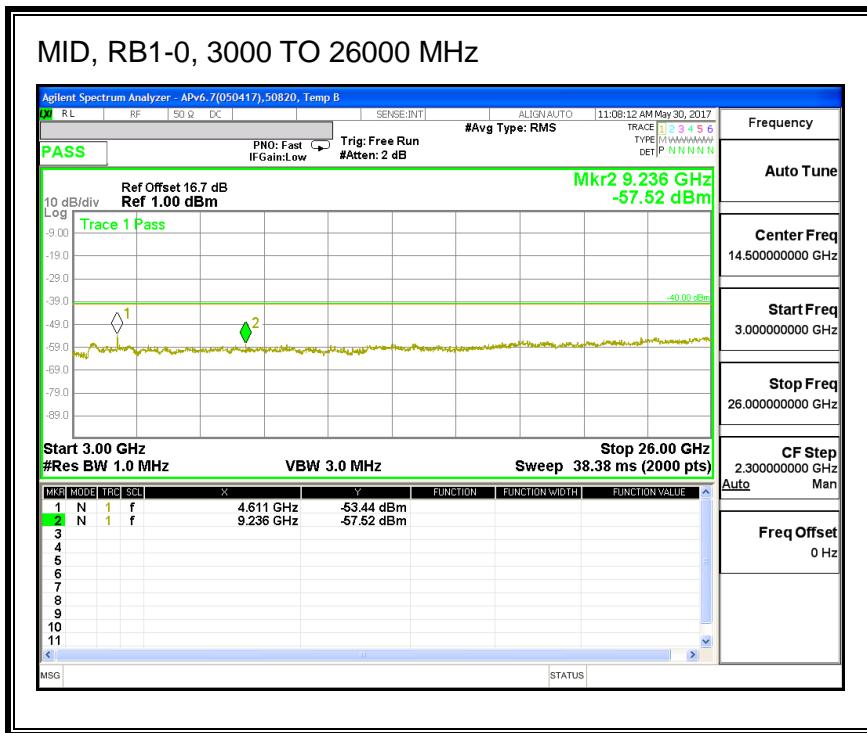




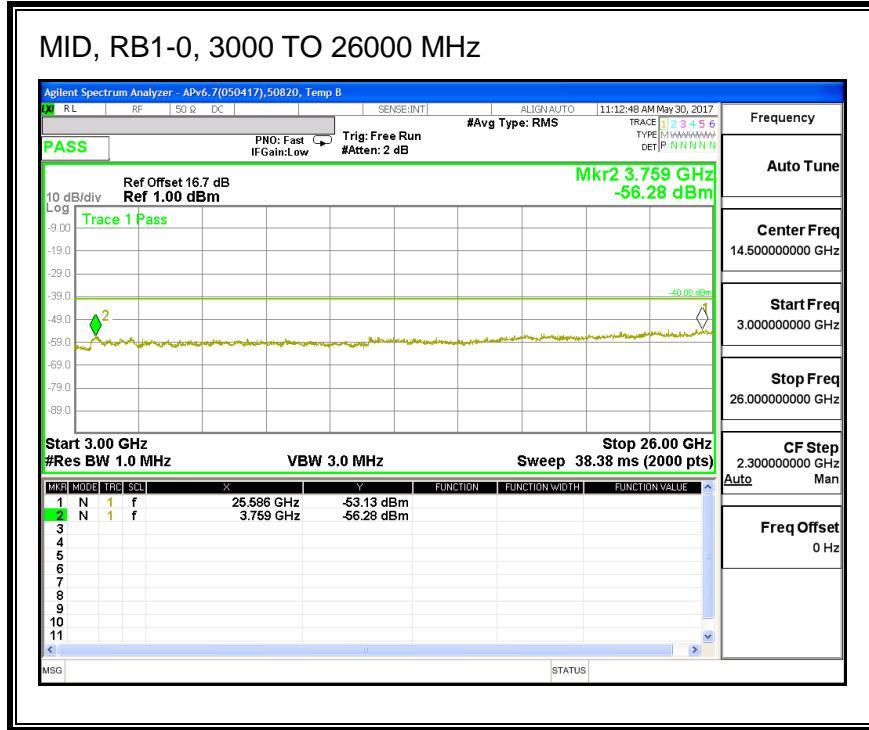
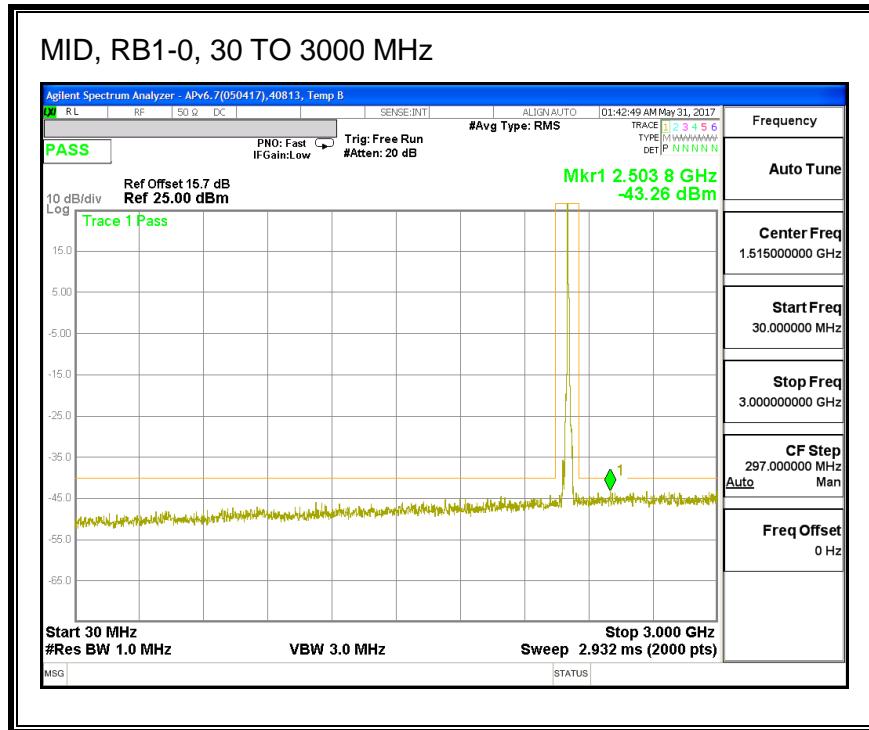
**16QAM, (5.0 MHz BAND WIDTH)**



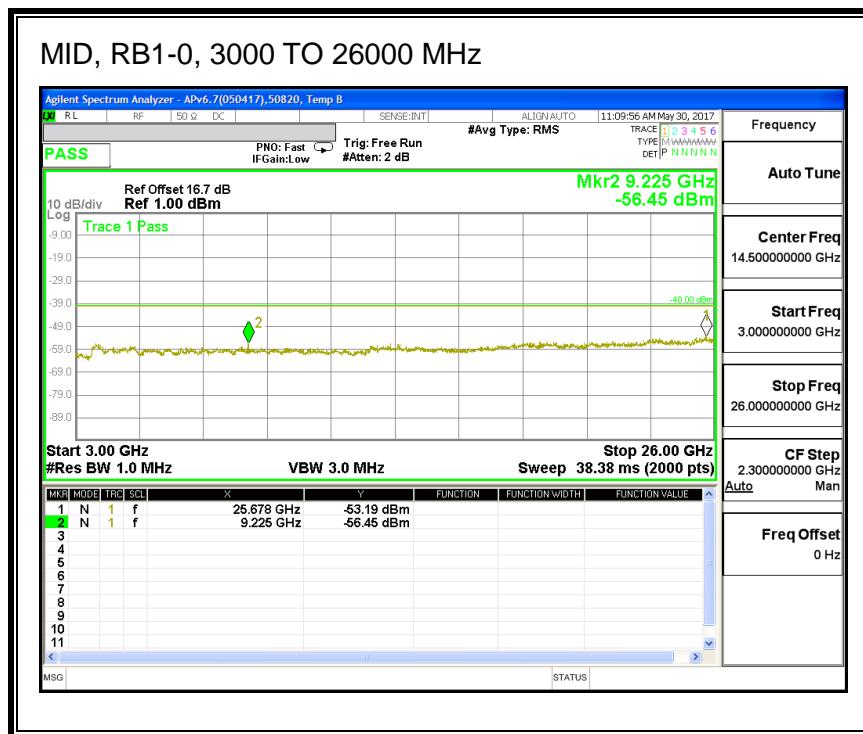
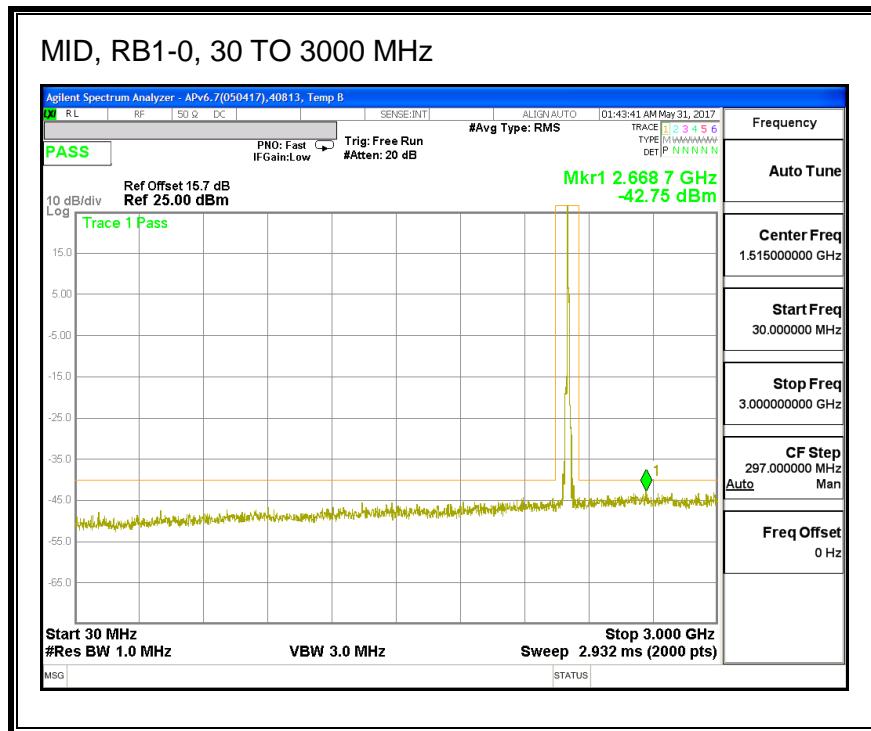




**QPSK, (10.0 MHz BAND WIDTH)**

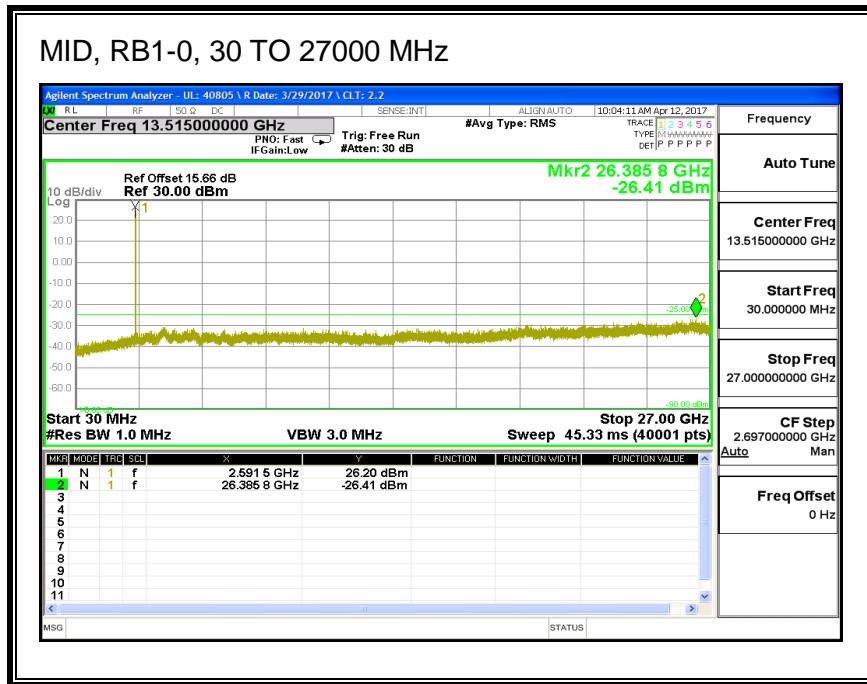
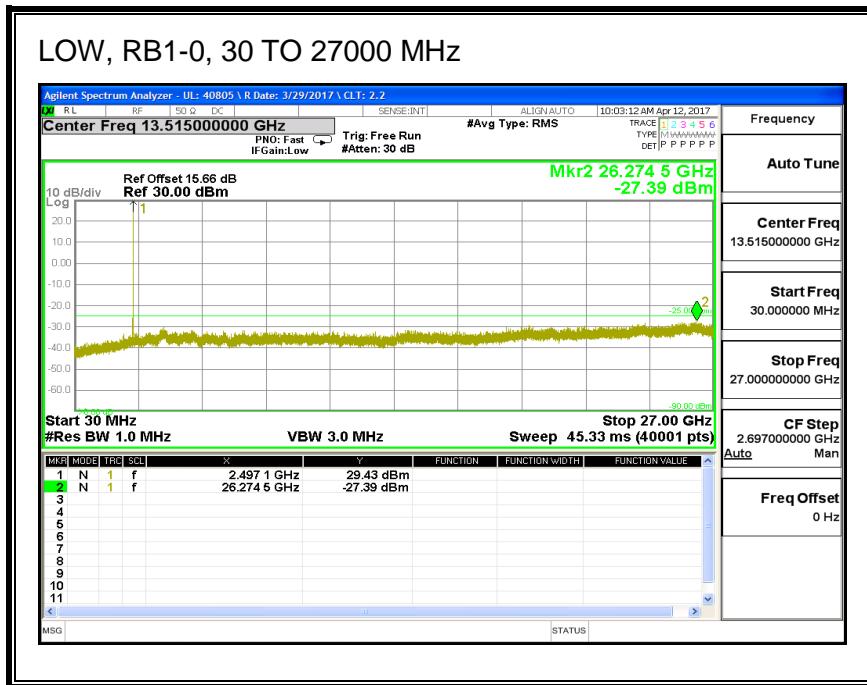


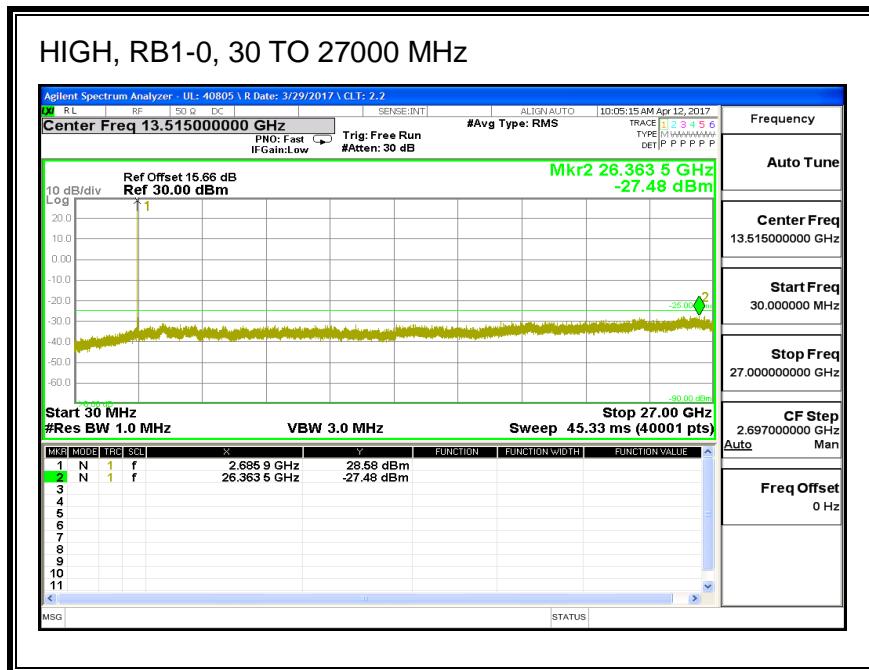
**16QAM, (10.0 MHz BAND WIDTH)**



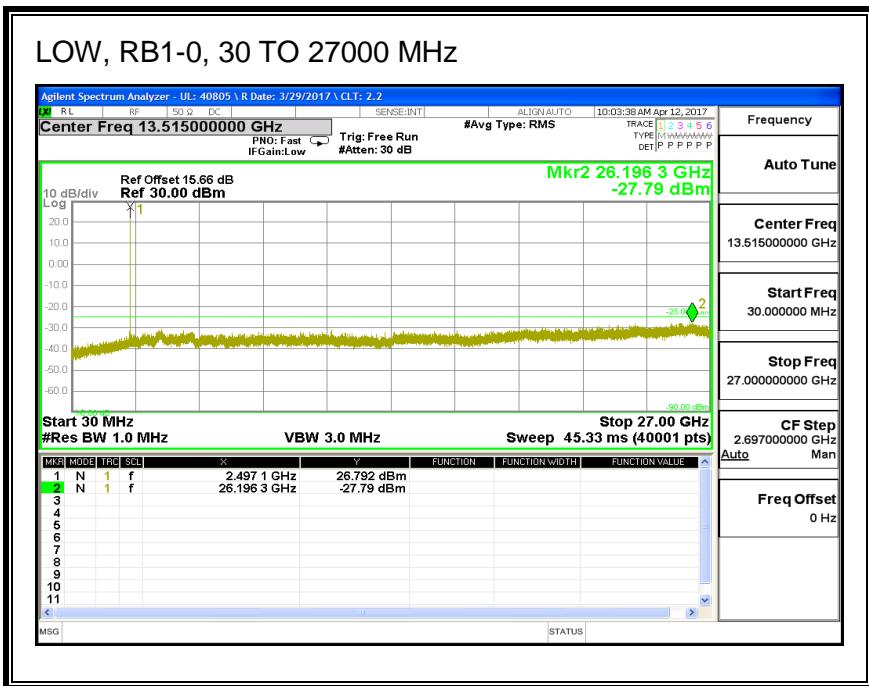
### 8.3.11. LTE BAND 41

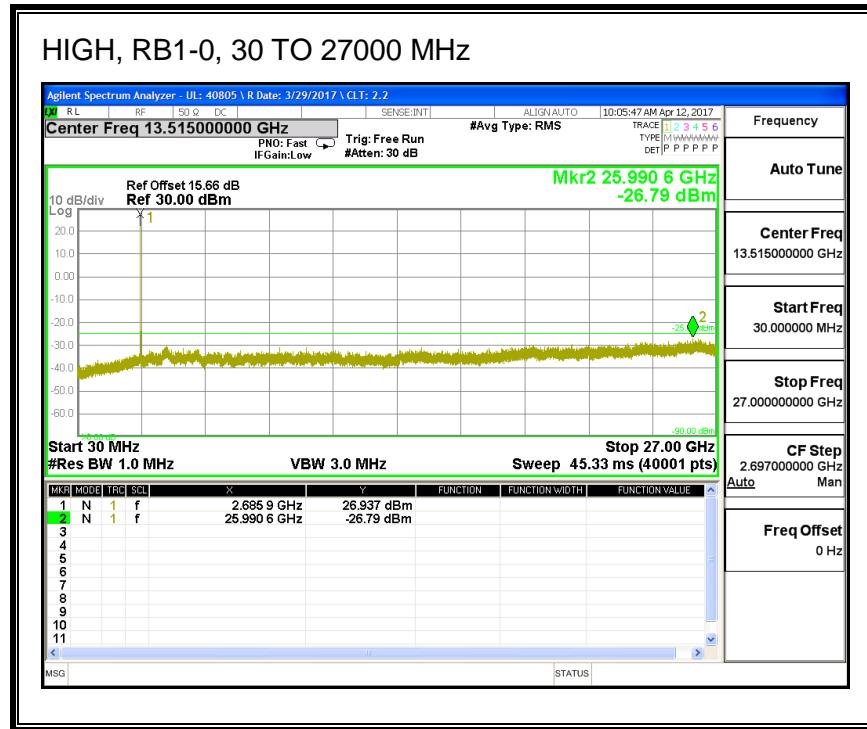
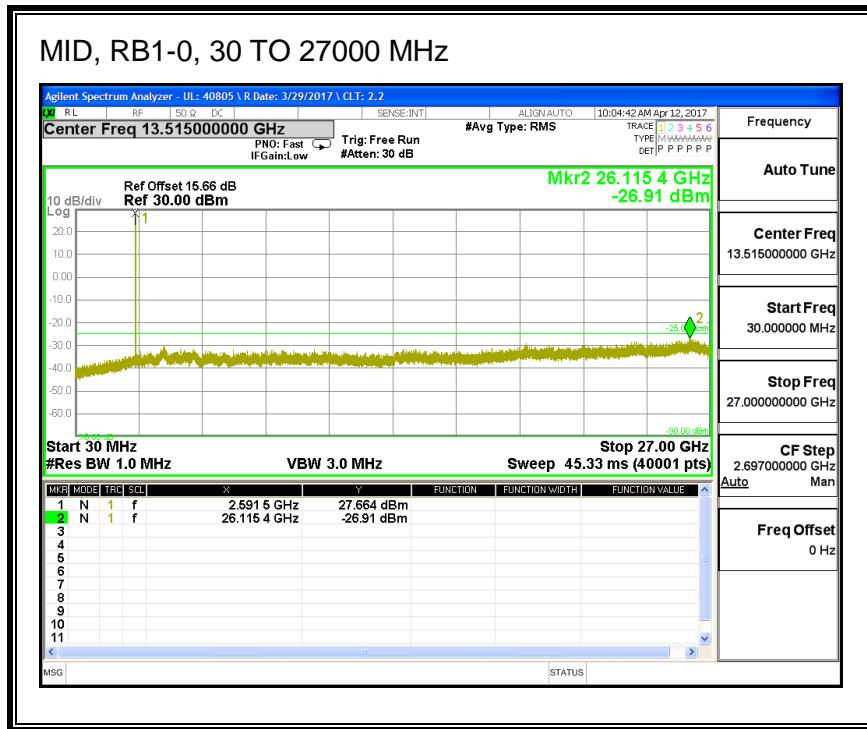
#### QPSK, (5.0 MHz BAND WIDTH)



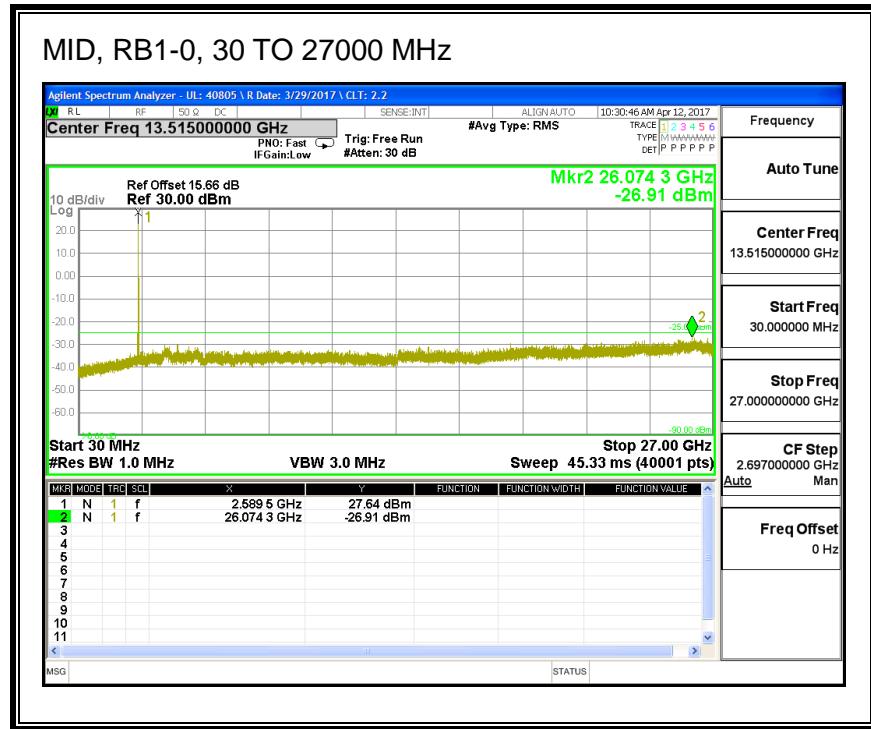
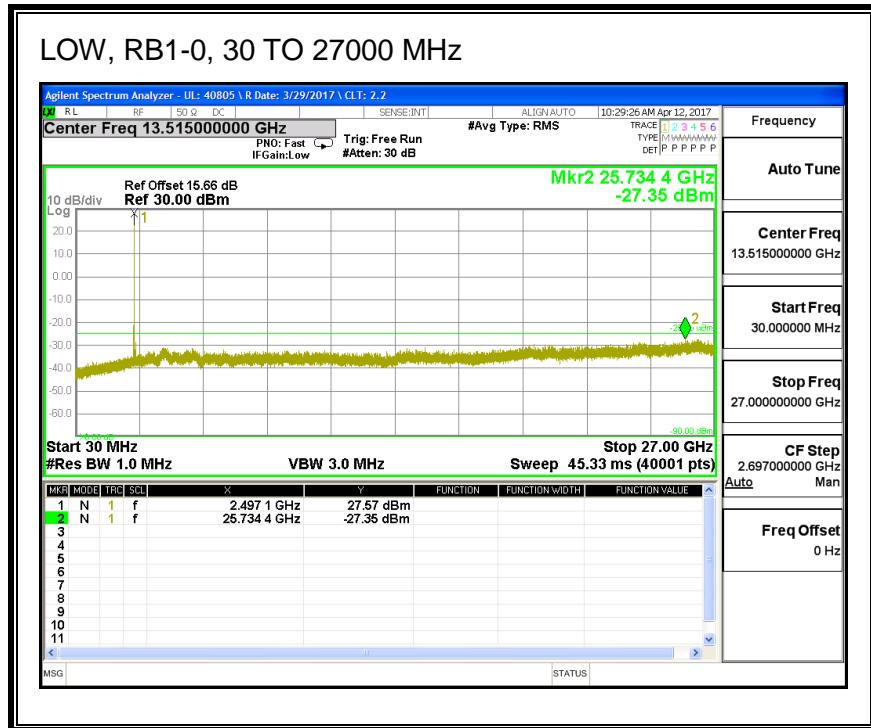


### 16QAM, (5.0 MHz BAND WIDTH)

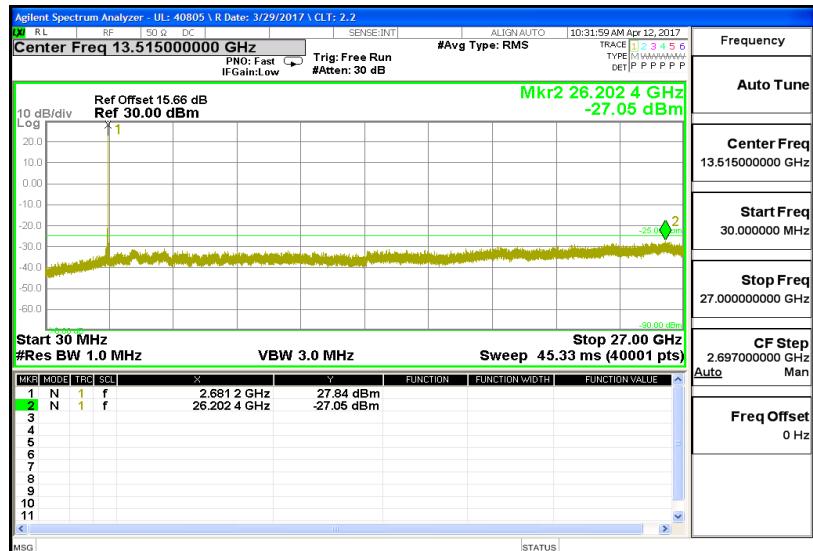




**QPSK, (10.0 MHz BAND WIDTH)**

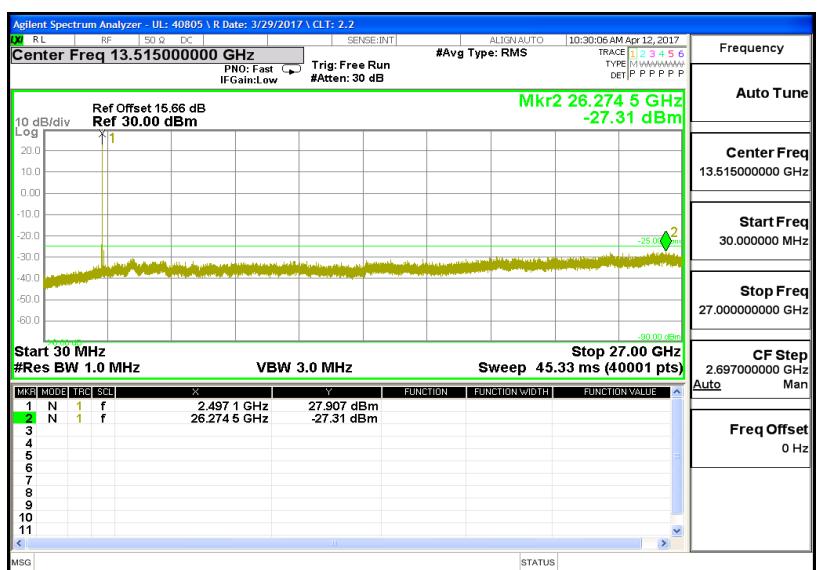


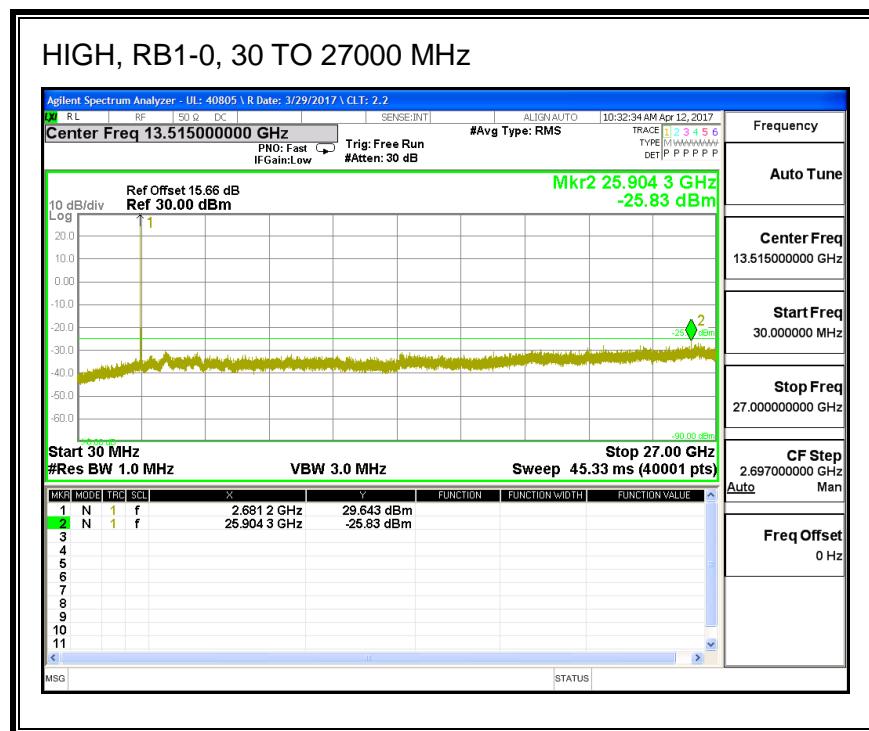
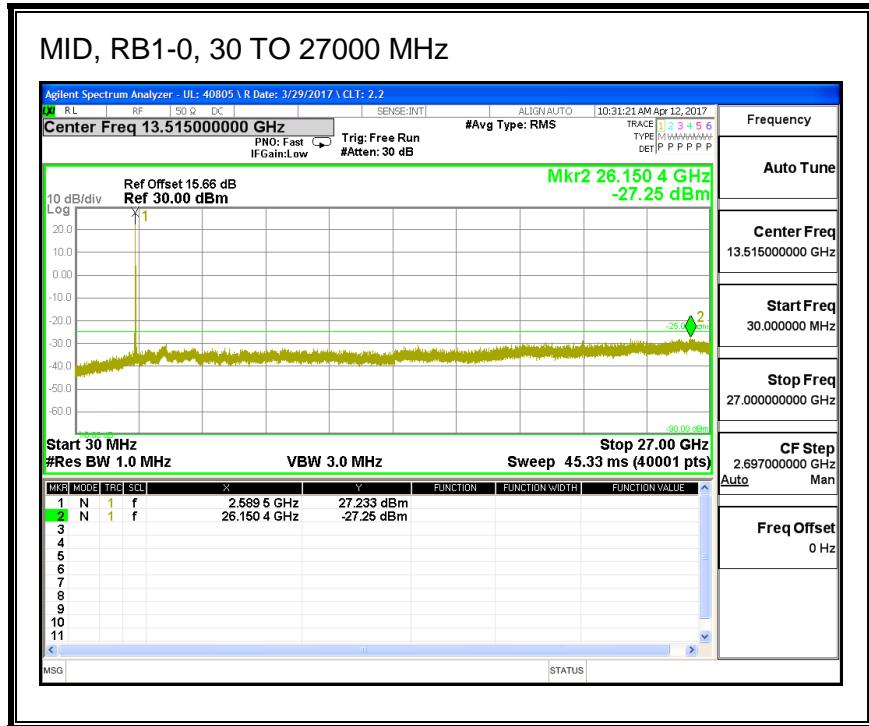
HIGH, RB1-0, 30 TO 27000 MHz



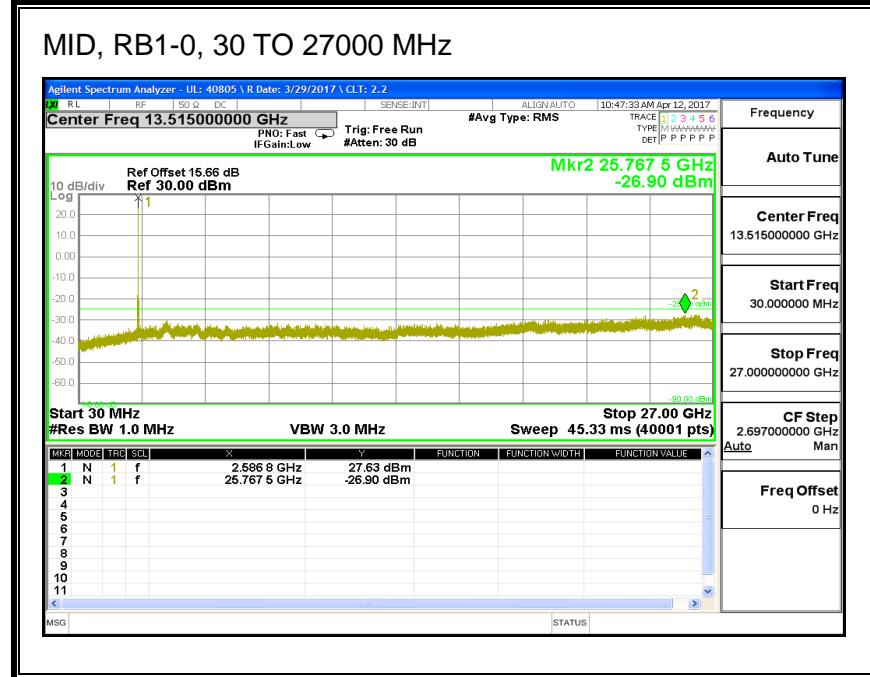
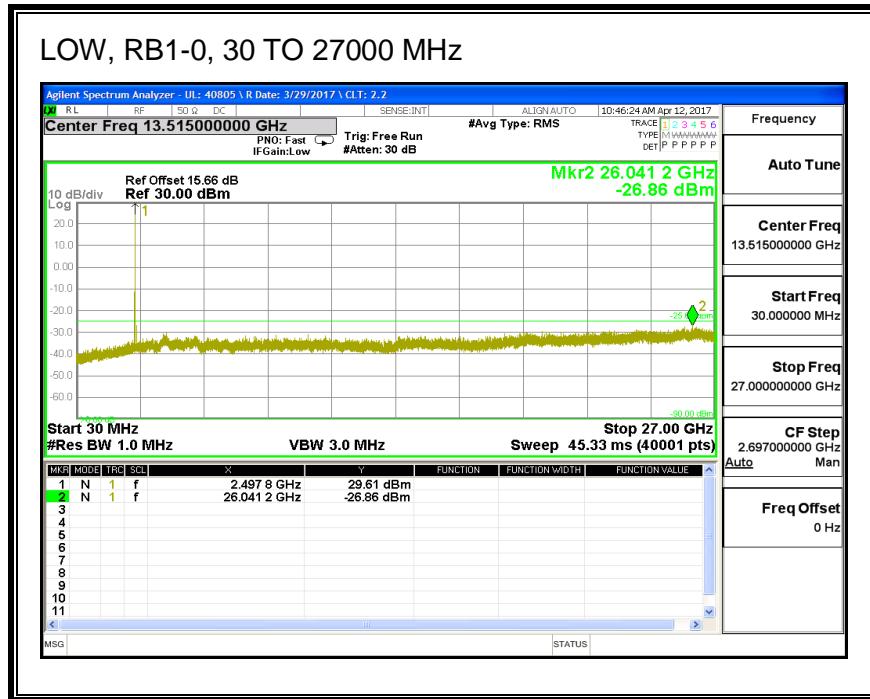
16QAM, (10.0 MHz BAND WIDTH)

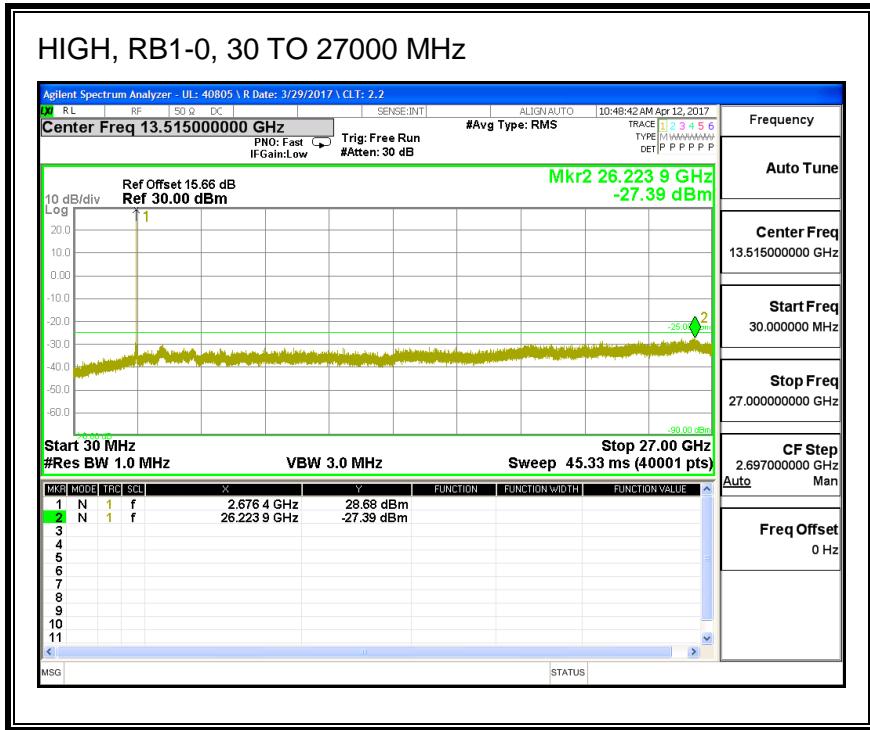
LOW, RB1-0, 30 TO 27000 MHz



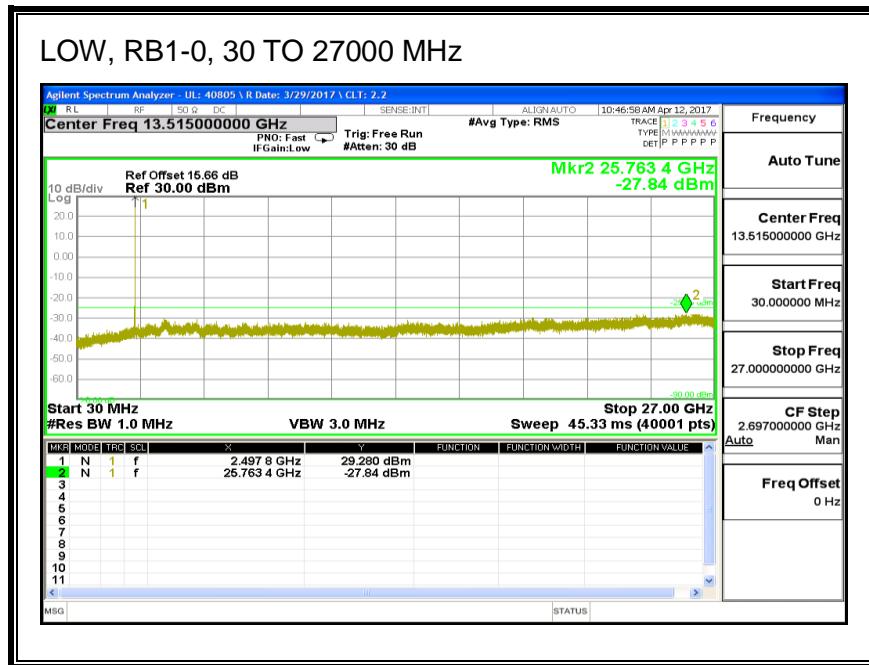


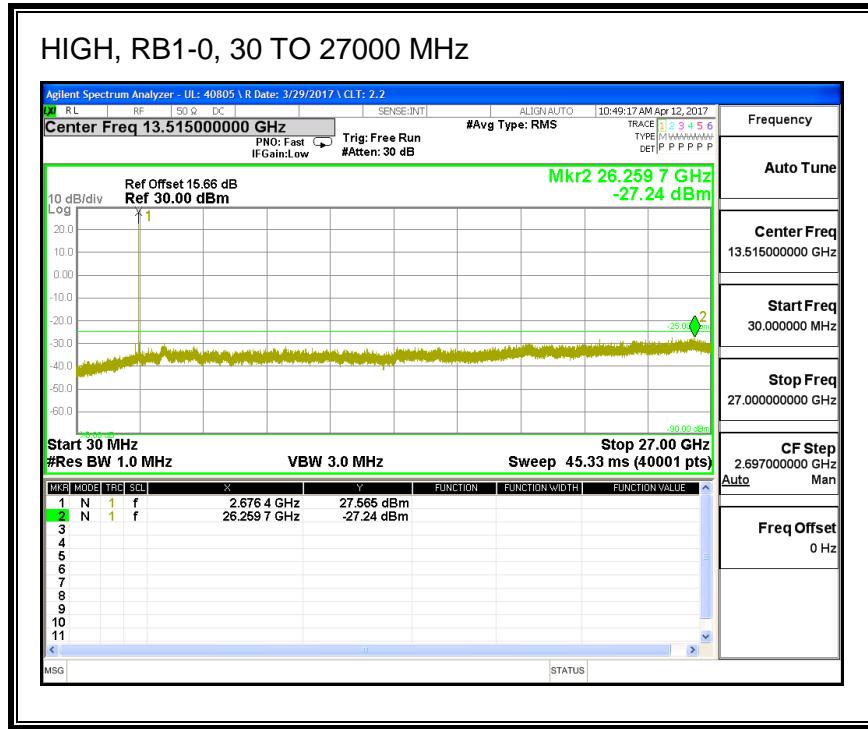
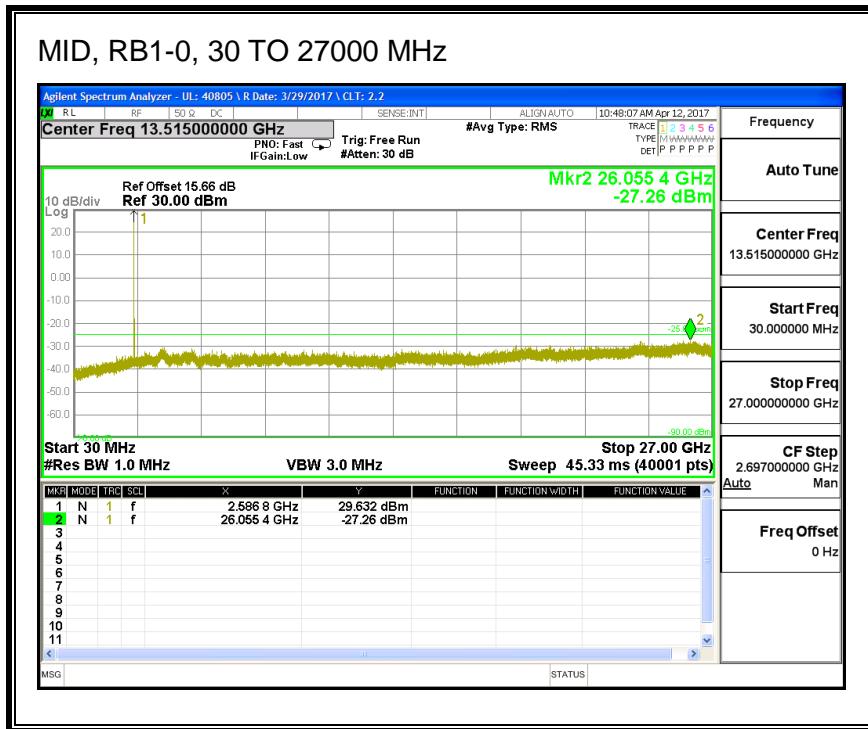
**QPSK, (15.0 MHz BAND WIDTH)**



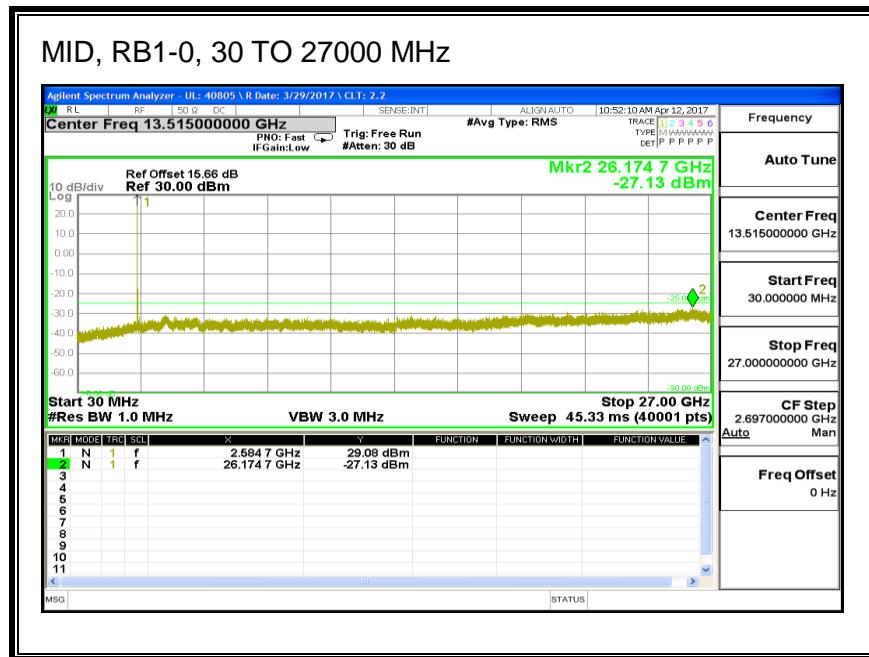
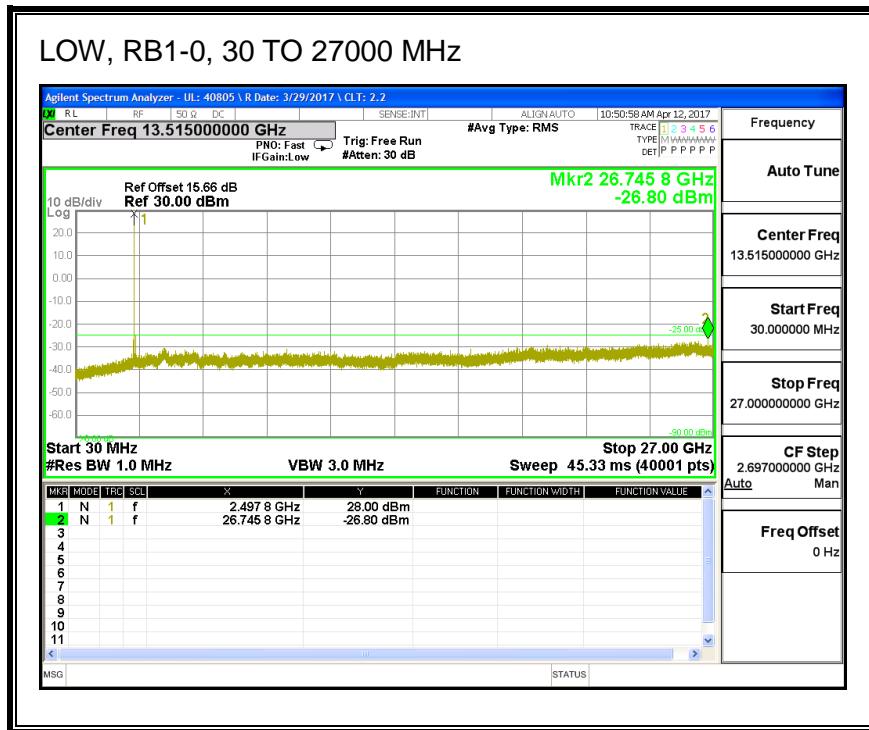


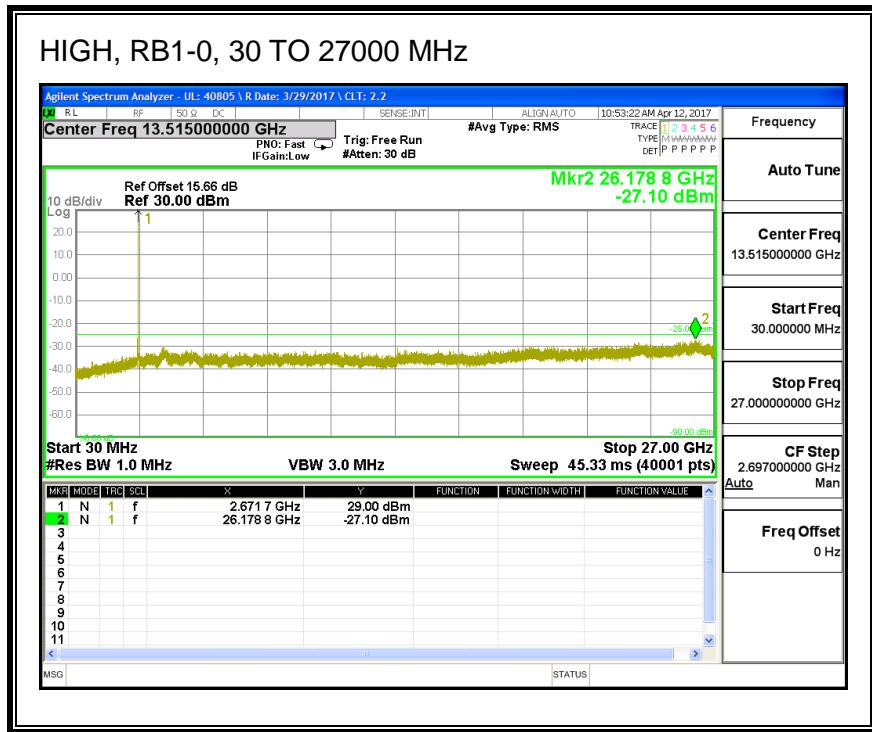
**16QAM, (15.0 MHz BAND WIDTH)**



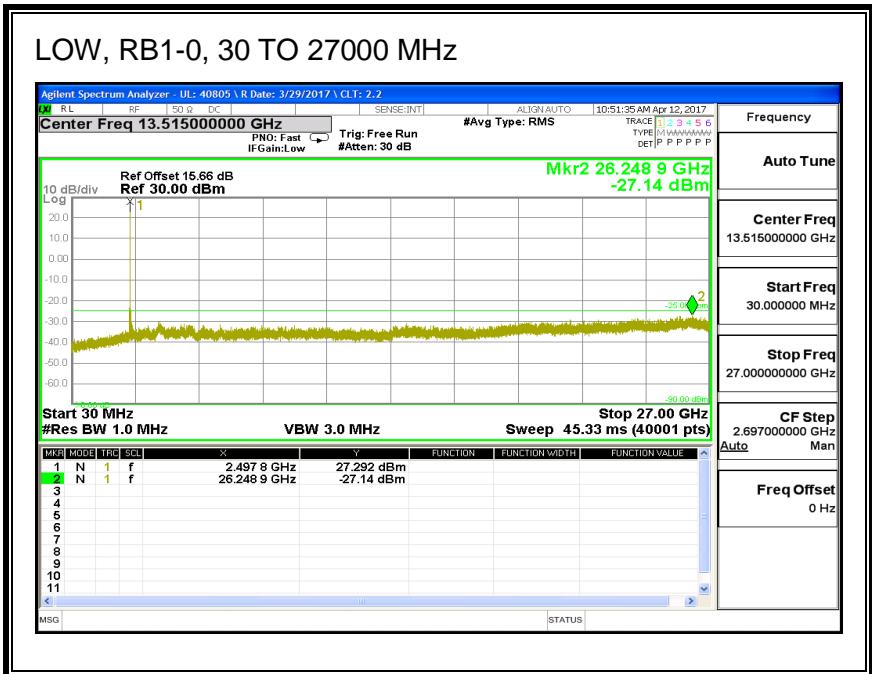


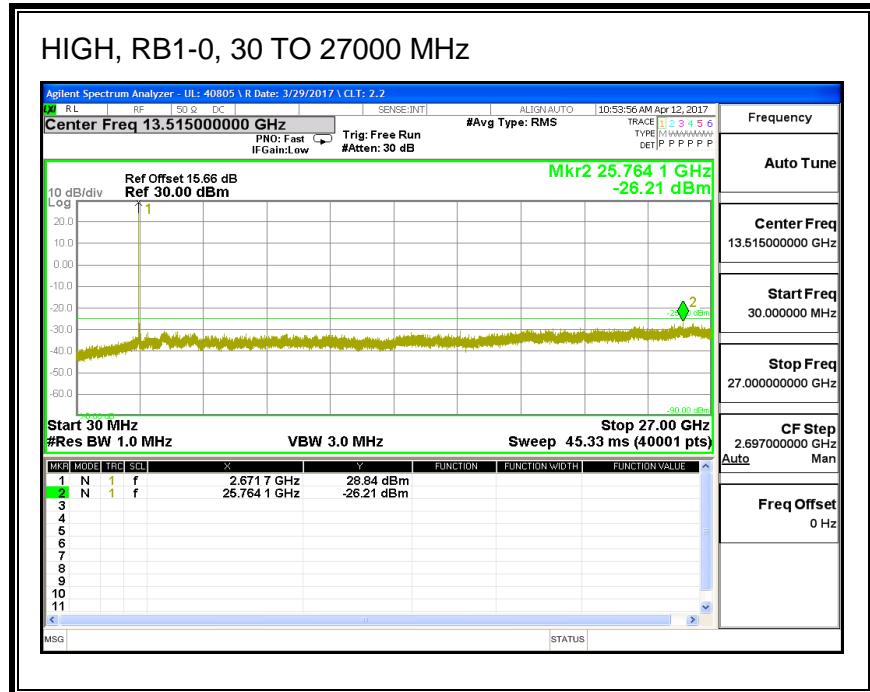
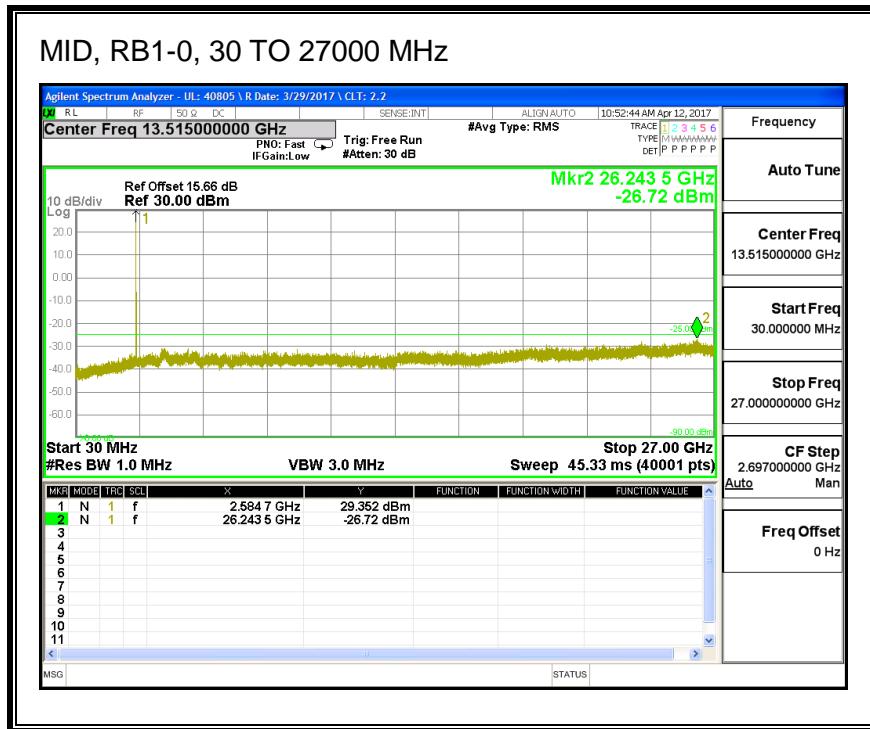
**QPSK, (20.0 MHz BAND WIDTH)**





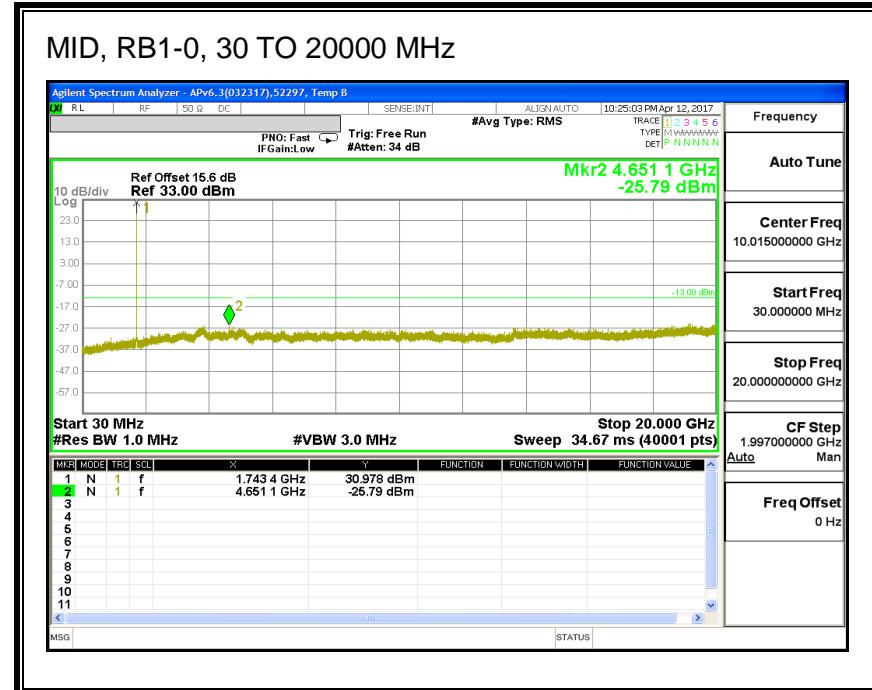
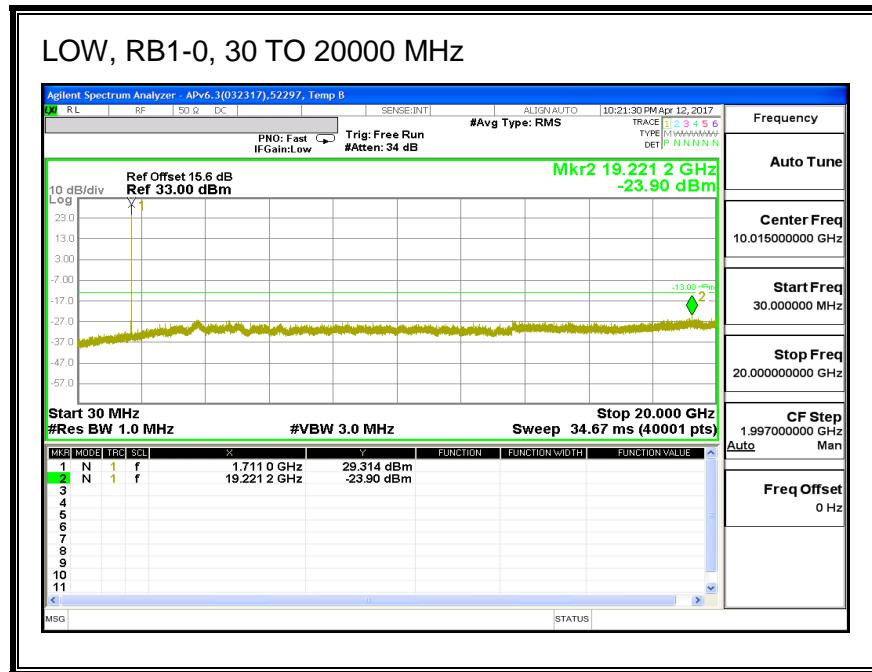
**16QAM, (20.0 MHz BAND WIDTH)**

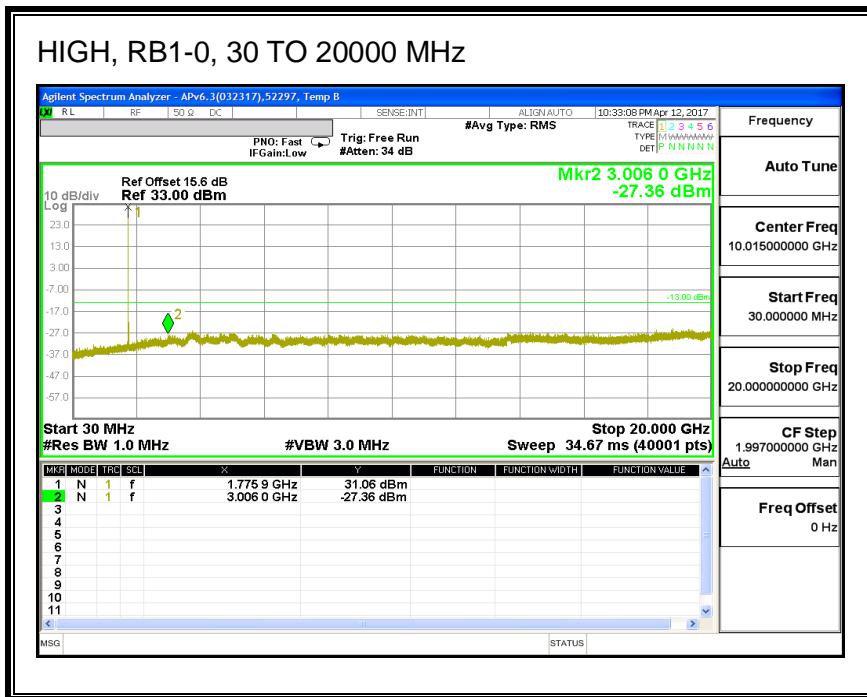




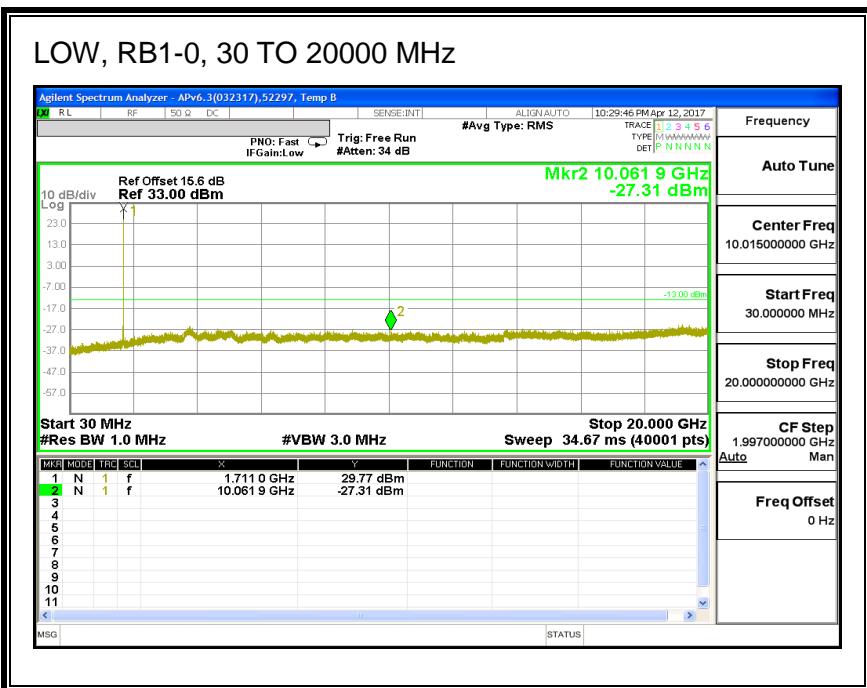
### 8.3.12. LTE BAND 66

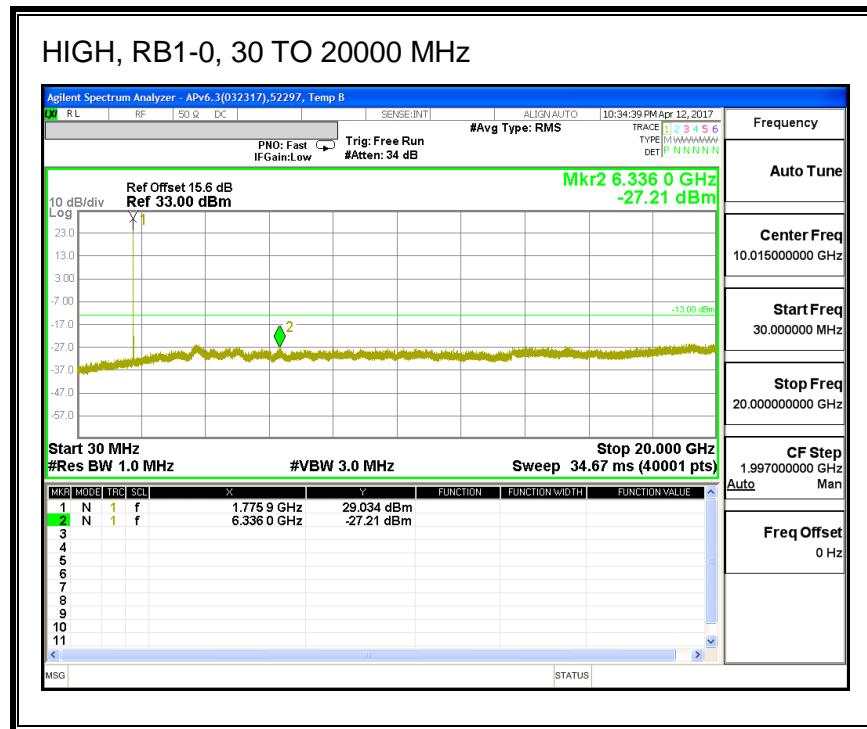
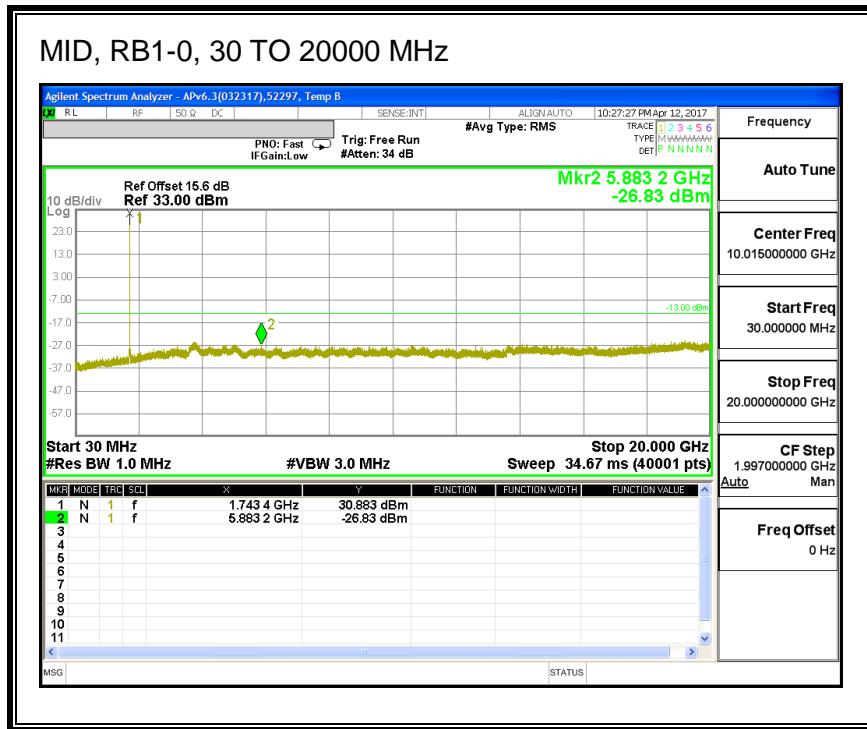
#### QPSK, (5.0 MHz BAND WIDTH)



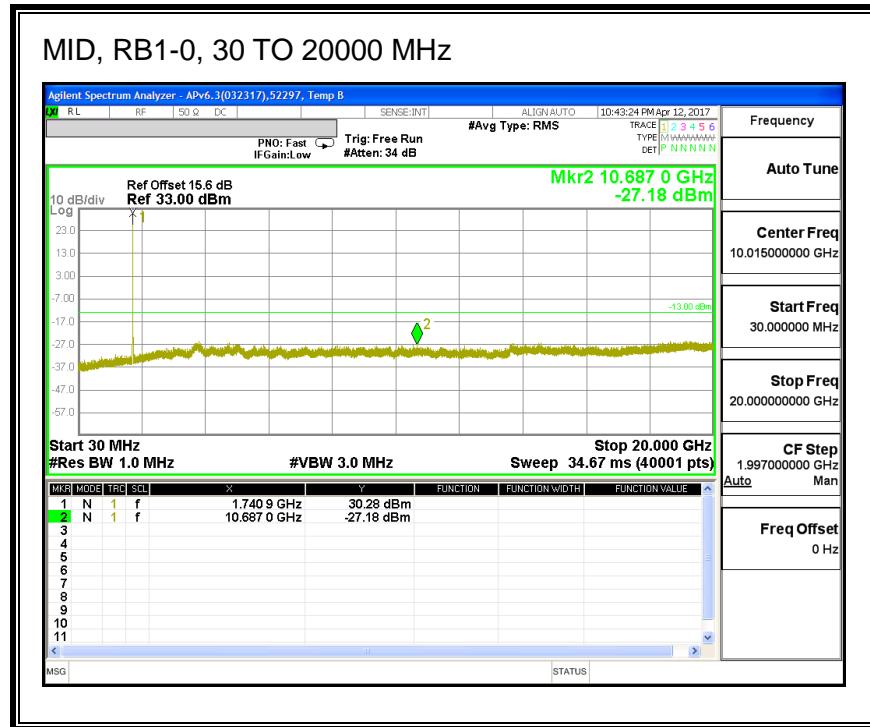
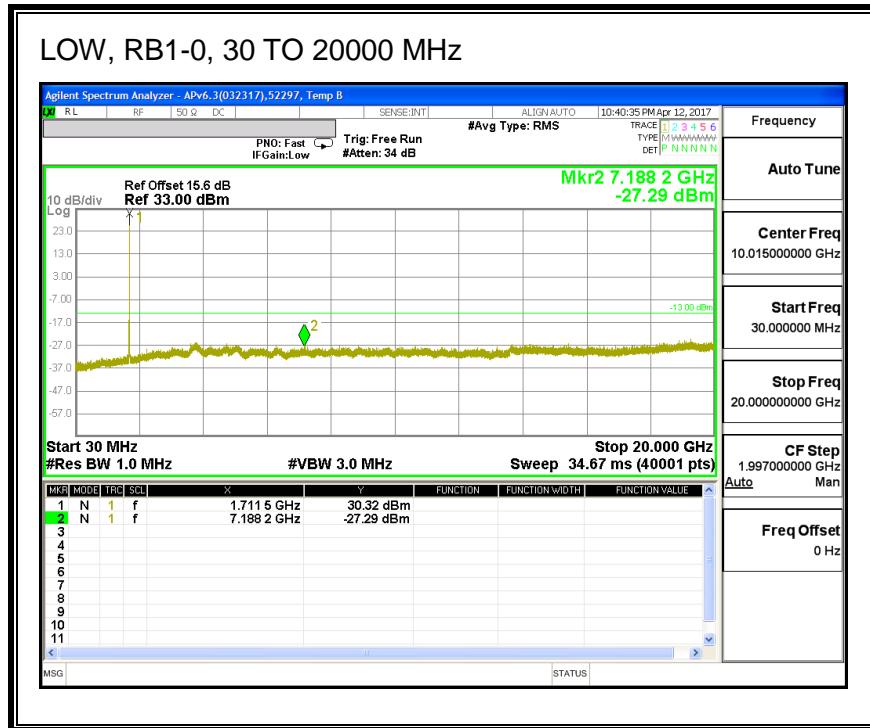


### 16QAM, (5.0 MHz BAND WIDTH)

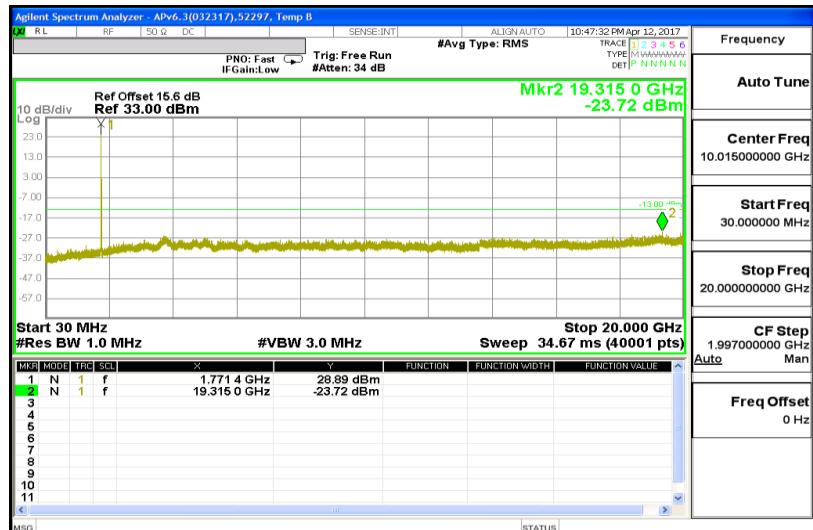




**QPSK, (10.0 MHz BAND WIDTH)**

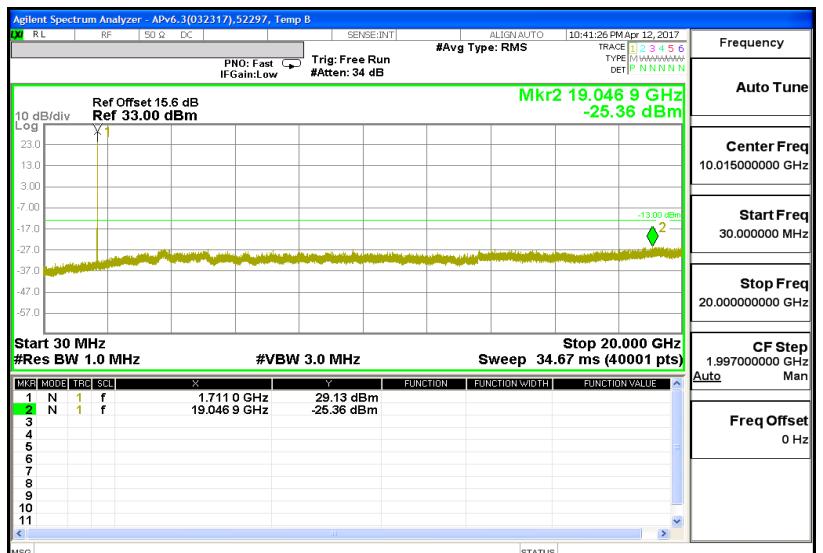


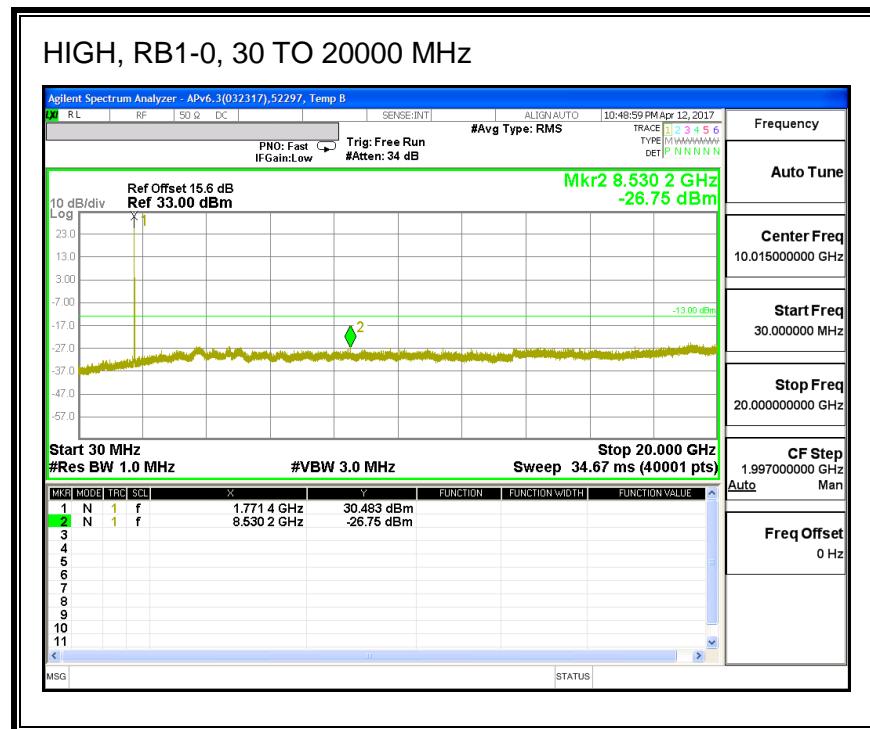
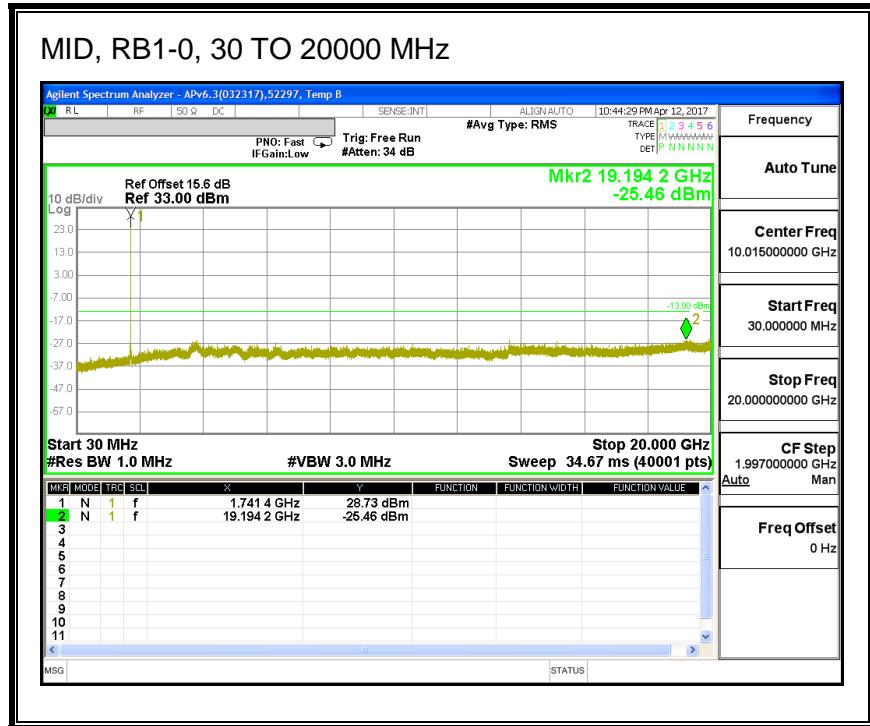
HIGH, RB1-0, 30 TO 20000 MHz



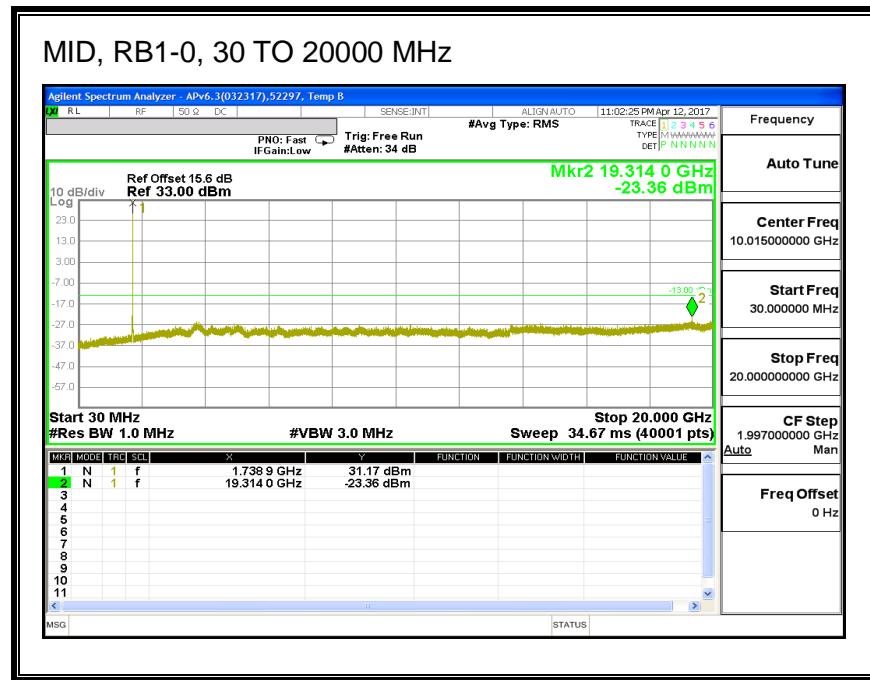
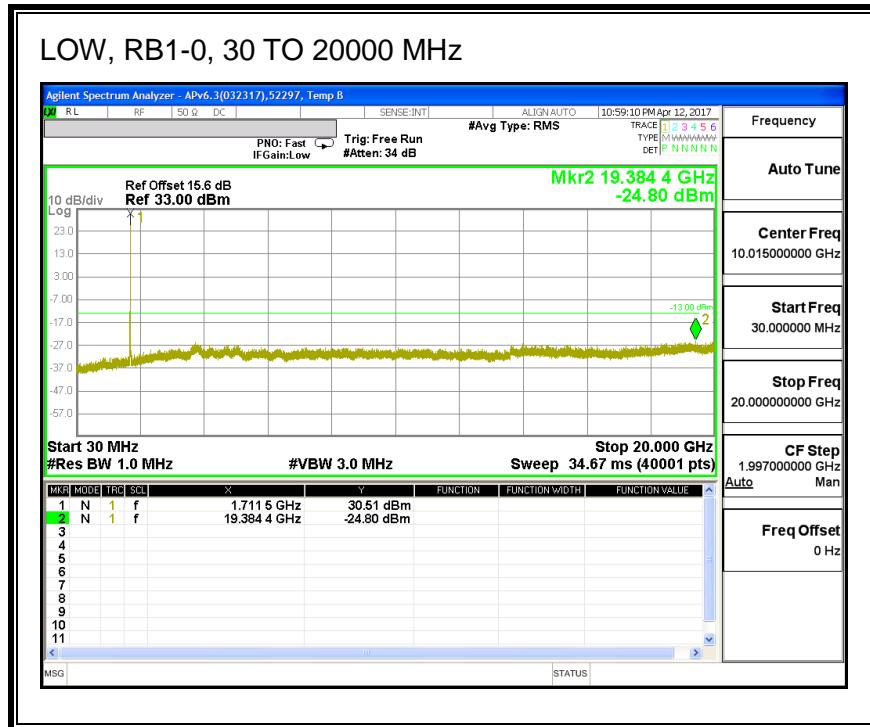
16QAM, (10.0 MHz BAND WIDTH)

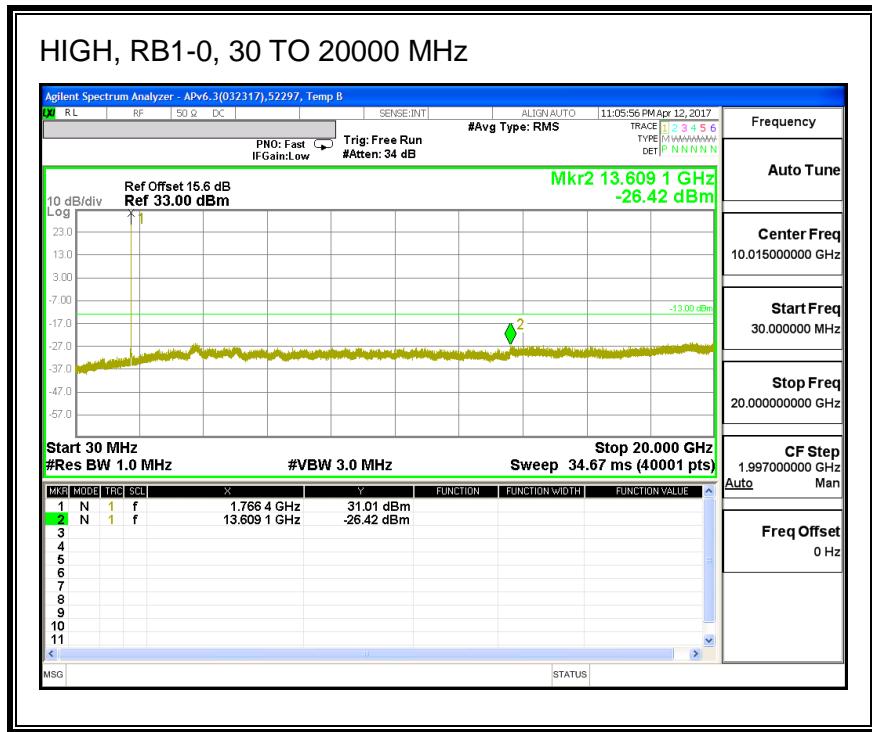
LOW, RB1-0, 30 TO 20000 MHz



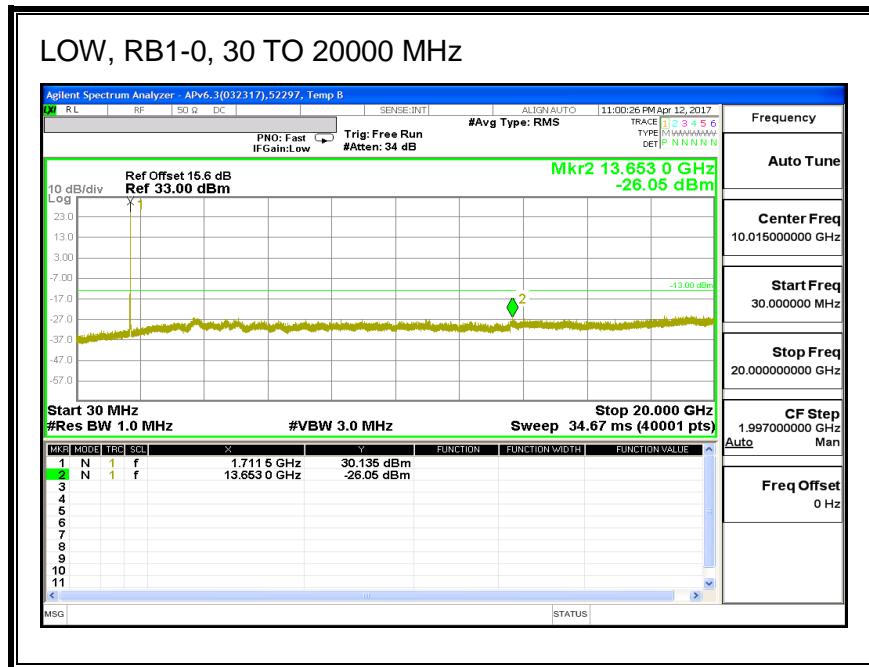


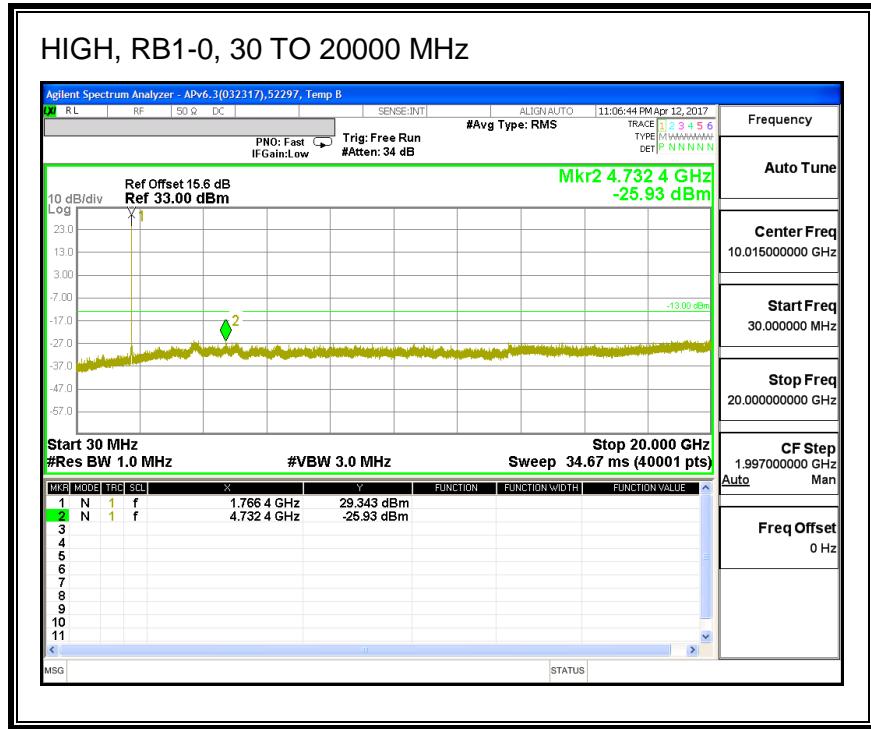
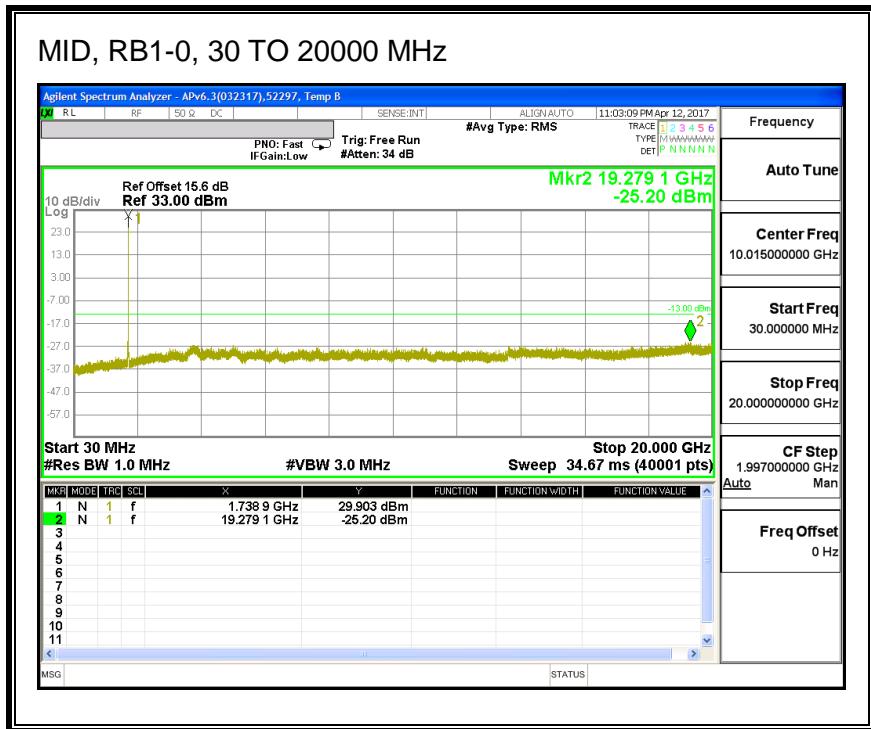
**QPSK, (15.0 MHz BAND WIDTH)**



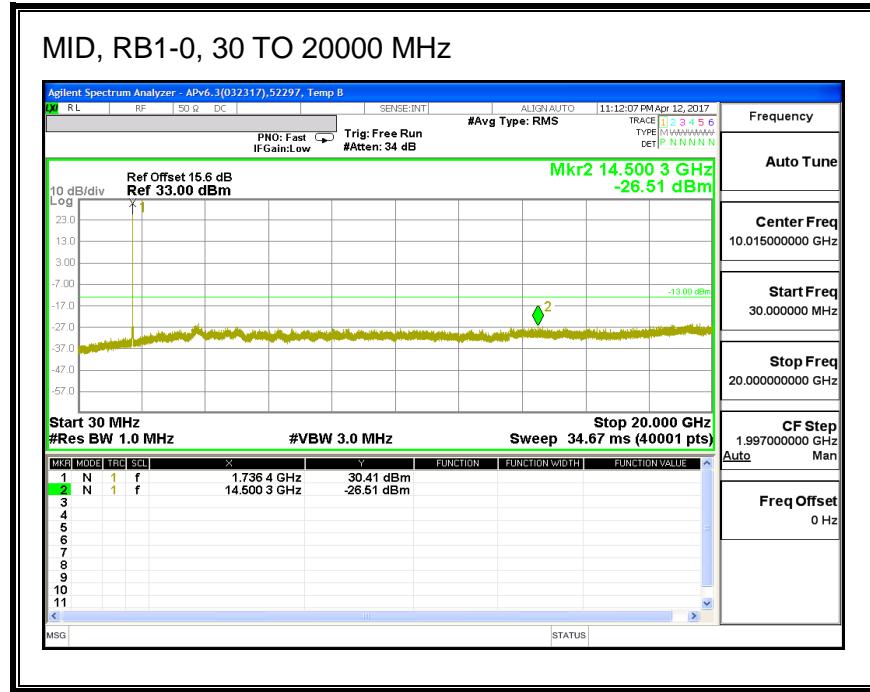
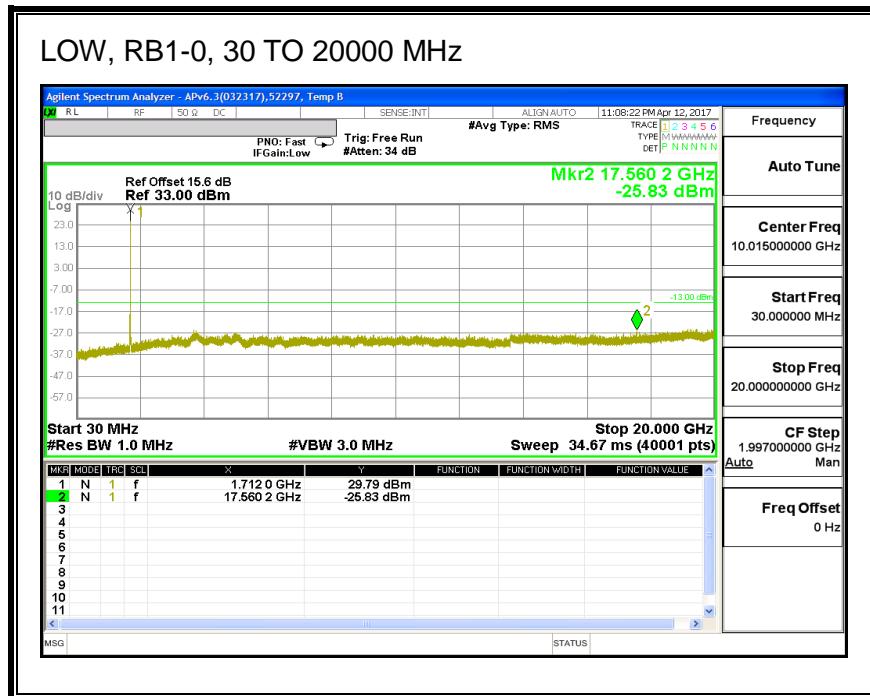


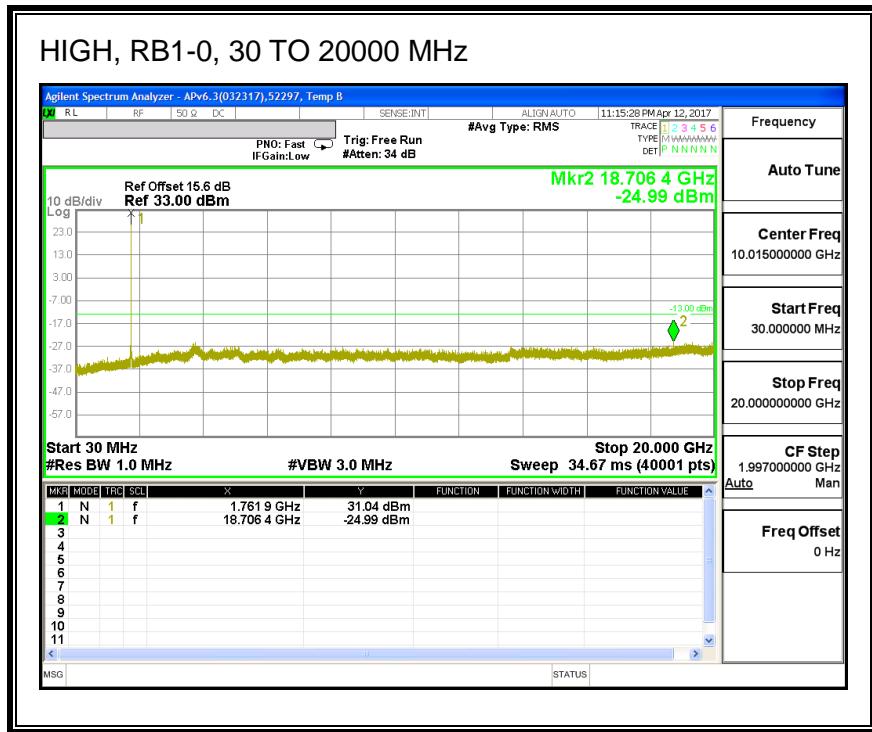
**16QAM, (15.0 MHz BAND WIDTH)**



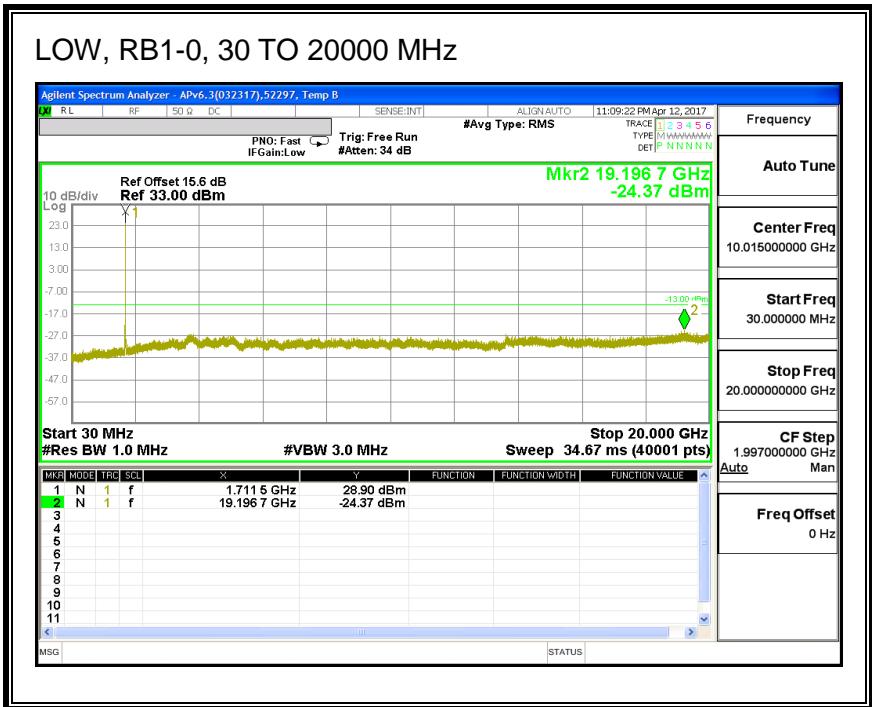


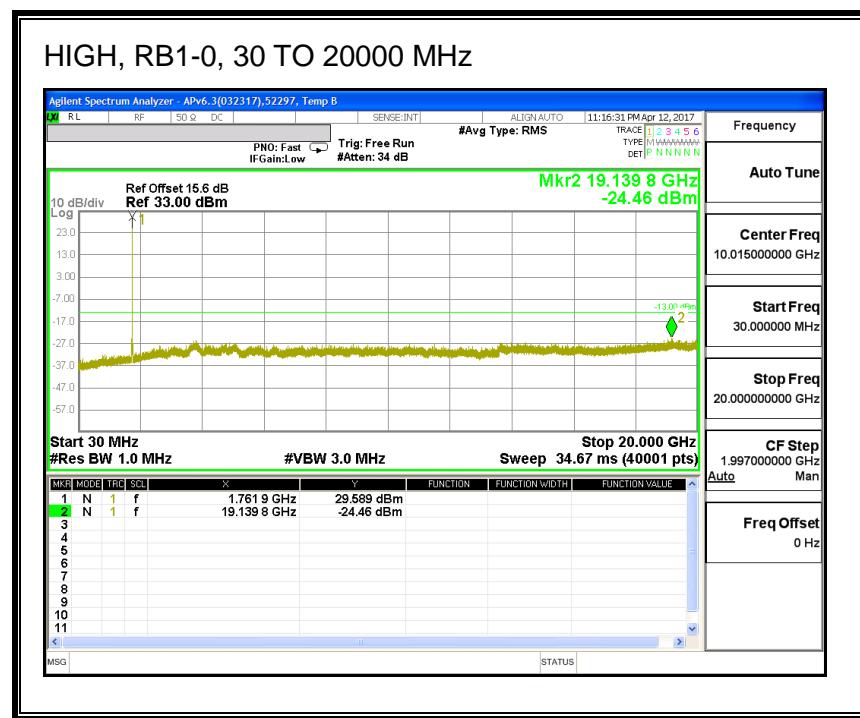
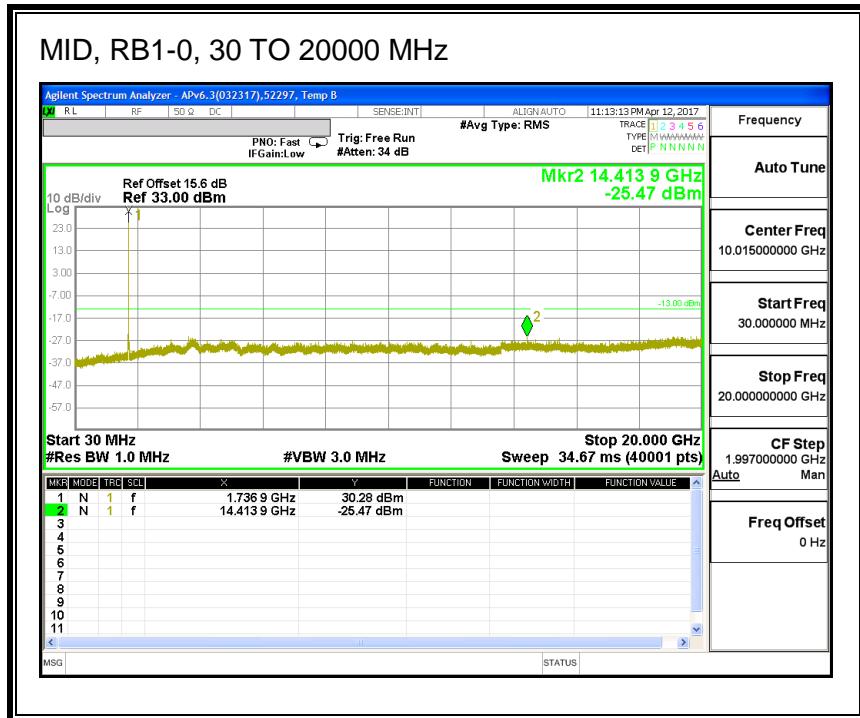
**QPSK, (20.0 MHz BAND WIDTH)**





**16QAM, (20.0 MHz BAND WIDTH)**





## 8.4. FREQUENCY STABILITY

### RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54 and §90.213

### LIMITS

FCC: §22.355

The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations.

FCC: §24.235 & §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

FCC: §90.213

The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations

### TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. =  $-30^{\circ}$  to  $+50^{\circ}\text{C}$
- Voltage = (85% - 115%)

Low voltage, 3.23VDC, Normal, 3.8VDC and High voltage, 4.37VDC.  
End Voltage, 3.2VDC.

### **Frequency Stability vs Temperature:**

The EUT is place inside a temperature chamber. The temperature is set to  $20^{\circ}\text{C}$  and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until  $+50^{\circ}\text{C}$  is reached.

### **Frequency Stability vs Voltage:**

The peak frequency error is recorded (worst-case).

### MODES TESTED

- LTE Band 2
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 30
- LTE Band 41
- LTE Band 66

Note: Band 4, 17, 25, 26 and 38 covered by 66, 12 , 2, 5 and 41 respectively

### RESULTS

See the following pages.

### 8.4.1. LTE BAND 2

ID:	38602	Date:	4/18/17
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#### QPSK, (20MHz BANDWIDTH)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	1851.0640	1908.9422		
Extreme (50C)		1851.0640	1908.9422	16.9	0.009
Extreme (40C)		1851.0640	1908.9422	17.6	0.009
Extreme (30C)		1851.0640	1908.9422	17.3	0.009
Extreme (10C)		1851.0640	1908.9422	14.6	0.008
Extreme (0C)		1851.0640	1908.9422	12.7	0.007
Extreme (-10C)		1851.0640	1908.9422	10.3	0.005
Extreme (-20C)		1851.0640	1908.9422	13.5	0.007
Extreme (-30C)		1851.0640	1908.9422	12.3	0.007
20C	15%	1851.0640	1908.9422	10.3	0.005
	-15%	1851.0640	1908.9422	10.2	0.005
	End Point	1851.0640	1908.9422	10.1	0.005

### 8.4.2. LTE BAND 4

ID:	29446	Date:	4/21/17
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#### QPSK, (3.0MHz BANDWIDTH)

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	1710.1298	1754.8965		
Extreme (50C)		1710.1297	1754.8965	-28.8	-0.017
Extreme (40C)		1710.1297	1754.8965	-25.5	-0.015
Extreme (30C)		1710.1297	1754.8965	-29.4	-0.017
Extreme (10C)		1710.1297	1754.8965	-29.2	-0.017
Extreme (0C)		1710.1297	1754.8965	-29.5	-0.017
Extreme (-10C)		1710.1297	1754.8965	-30.5	-0.018
Extreme (-20C)		1710.1297	1754.8965	-29.8	-0.017
Extreme (-30C)		1710.1297	1754.8965	-26.4	-0.015
20C	15%	1710.1297	1754.8965	-29.1	-0.017
	-15%	1710.1297	1754.8965	-24.4	-0.014
	End Point	1710.1297	1754.8965	-24.8	-0.014

### 8.4.3. LTE BAND 5

ID:	29446	Date:	4/21/17
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#### QPSK, (10MHz BANDWIDTH)

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	824.5062	848.4759	Delta (Hz)	Frequency Stability (ppm)
Extreme (50C)		824.5063	848.4759		0.017
Extreme (40C)		824.5063	848.4759		0.015
Extreme (30C)		824.5063	848.4759		0.015
Extreme (10C)		824.5063	848.4759		0.012
Extreme (0C)		824.5063	848.4759		0.014
Extreme (-10C)		824.5063	848.4759		0.014
Extreme (-20C)		824.5063	848.4759		0.014
Extreme (-30C)		824.5063	848.4759		0.014
20C	15%	824.5063	848.4759	12.4	0.015
	-15%	824.5063	848.4759	12.9	0.015
	End Point	824.5063	848.4759	12.6	0.015

### 8.4.4. LTE BAND 7

ID:	29446	Date:	4/21/17
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#### QPSK, (20MHz BANDWIDTH)

Limit		2500	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	2501.0165	2568.9870	Delta (Hz)	Frequency Stability (ppm)
Extreme (50C)		2501.0165	2568.9870		0.006
Extreme (40C)		2501.0165	2568.9870		0.007
Extreme (30C)		2501.0165	2568.9870		0.006
Extreme (10C)		2501.0165	2568.9870		0.007
Extreme (0C)		2501.0165	2568.9870		0.008
Extreme (-10C)		2501.0165	2568.9870		0.007
Extreme (-20C)		2501.0165	2568.9870		0.007
Extreme (-30C)		2501.0165	2568.9870		0.007
20C	15%	2501.0165	2568.9870	17.7	0.007
	-15%	2501.0165	2568.9870	17.4	0.007
	End Point	2501.0165	2568.9870	18.1	0.007

#### 8.4.5. LTE BAND 12

ID:	29446	Date:	4/21/17
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##### QPSK, (10MHz BANDWIDTH)

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	699.5286	715.4724	9.2	0.01
Extreme (50C)		699.5286	715.4724		
Extreme (40C)		699.5286	715.4724		
Extreme (30C)		699.5286	715.4724		
Extreme (10C)		699.5286	715.4724		
Extreme (0C)		699.5286	715.4724		
Extreme (-10C)		699.5286	715.4724		
Extreme (-20C)		699.5286	715.4724		
Extreme (-30C)		699.5286	715.4724		
20C	15%	699.5286	715.4724	8.8	0.01
	-15%	699.5286	715.4724	9.5	0.01
	End Point	699.5286	715.4724	9.9	0.01

#### 8.4.6. LTE BAND 13

ID:	29446	Date:	4/21/17
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##### QPSK, (10MHz BANDWIDTH)

Limit		777	787	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	777.5199	786.4752	-11.9	-0.015
Extreme (50C)		777.5199	786.4752		
Extreme (40C)		777.5199	786.4752		
Extreme (30C)		777.5199	786.4752		
Extreme (10C)		777.5199	786.4752		
Extreme (0C)		777.5199	786.4752		
Extreme (-10C)		777.5199	786.4752		
Extreme (-20C)		777.5199	786.4752		
Extreme (-30C)		777.5199	786.4752		
20C	15%	777.5199	786.4752	-7.9	-0.010
	-15%	777.5199	786.4752	-8.4	-0.011
	End Point	777.5199	786.4752	-8.0	-0.010

#### 8.4.7. LTE BAND 17

ID:	29446	Date:	4/21/17
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##### QPSK, (10MHz BANDWIDTH)

Limit		704	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	704.5258	715.4812	9.2	0.013
Extreme (50C)		704.5258	715.4812		
Extreme (40C)		704.5258	715.4812		
Extreme (30C)		704.5258	715.4812		
Extreme (10C)		704.5258	715.4812		
Extreme (0C)		704.5258	715.4812		
Extreme (-10C)		704.5258	715.4812		
Extreme (-20C)		704.5258	715.4812		
Extreme (-30C)		704.5258	715.4812		
20C	15%	704.5258	715.4812	8.8	0.012
	-15%	704.5258	715.4812	9.5	0.013
	End Point	704.5258	715.4812	9.9	0.014

#### 8.4.8. LTE BAND 25

ID:	29446	Date:	4/21/17
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##### QPSK, (20MHz BANDWIDTH)

Limit		1850	1915	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	1851.0026	1914.0236	-27.7	-0.015
Extreme (50C)		1851.0026	1914.0236		
Extreme (40C)		1851.0026	1914.0236		
Extreme (30C)		1851.0026	1914.0236		
Extreme (10C)		1851.0026	1914.0236		
Extreme (0C)		1851.0026	1914.0236		
Extreme (-10C)		1851.0026	1914.0236		
Extreme (-20C)		1851.0026	1914.0236		
Extreme (-30C)		1851.0026	1914.0236		
20C	15%	1851.0026	1914.0236	-28.3	-0.015
	-15%	1851.0026	1914.0236	-28.5	-0.015
	End Point	1851.0026	1914.0236	-25.6	-0.014

#### 8.4.9. LTE BAND 26

ID:	29446	Date:	4/21/17
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##### QPSK, (10MHz BANDWIDTH)

Limit		814	824	Delta (Hz)	Frequency Stability (ppm)		
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)				
Temperature	Voltage						
Normal (20C)	Normal	814.4494	823.5171	11.8	0.014		
Extreme (50C)		814.4494	823.5171				
Extreme (40C)		814.4494	823.5171				
Extreme (30C)		814.4494	823.5171				
Extreme (10C)		814.4494	823.5171				
Extreme (0C)		814.4494	823.5171				
Extreme (-10C)		814.4494	823.5171				
Extreme (-20C)		814.4494	823.5171				
Extreme (-30C)		814.4494	823.5171				
20C		15%	814.4494	823.5171	11.5	0.014	
20C		-15%	814.4494	823.5171	11.3	0.014	
20C		End Point	814.4494	823.5171	11.0	0.013	

#### 8.4.10. LTE BAND 30

ID:	29446	Date:	4/21/17
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##### QPSK, (10MHz BANDWIDTH)

Limit		2305	2315	Delta (Hz)	Frequency Stability (ppm)		
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)				
Temperature	Voltage						
Normal (20C)	Normal	2305.4902	2314.5355	15.7	0.007		
Extreme (50C)		2305.4902	2314.5355				
Extreme (40C)		2305.4902	2314.5355				
Extreme (30C)		2305.4902	2314.5355				
Extreme (10C)		2305.4902	2314.5355				
Extreme (0C)		2305.4902	2314.5355				
Extreme (-10C)		2305.4902	2314.5355				
Extreme (-20C)		2305.4902	2314.5355				
Extreme (-30C)		2305.4902	2314.5355				
20C		15%	2305.4902	2314.5355	15.3	0.007	
20C		-15%	2305.4902	2314.5355	16.6	0.007	
20C		End Point	2305.4902	2314.5355	13.9	0.006	

#### 8.4.11. LTE BAND 41

ID:	29446	Date:	4/24/17
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##### QPSK, (20MHz BANDWIDTH)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)		
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)				
Temperature	Voltage						
Normal (20C)	Normal	2496.9427	2689.0697	19.0	0.007		
Extreme (50C)		2496.9428	2689.0697				
Extreme (40C)		2496.9428	2689.0697				
Extreme (30C)		2496.9428	2689.0697				
Extreme (10C)		2496.9428	2689.0697				
Extreme (0C)		2496.9428	2689.0697				
Extreme (-10C)		2496.9428	2689.0697				
Extreme (-20C)		2496.9428	2689.0697				
Extreme (-30C)		2496.9428	2689.0697				
20C		15%	2496.9428	2689.0697	20.6	0.008	
20C		-15%	2496.9428	2689.0697	20.7	0.008	
20C		End Point	2496.9428	2689.0697	21.1	0.008	

#### 8.4.12. LTE BAND 66

ID:	29446	Date:	4/21/17
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##### QPSK, (20MHz BANDWIDTH)

Limit		1710	1780	Delta (Hz)	Frequency Stability (ppm)		
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)				
Temperature	Voltage						
Normal (20C)	Normal	1710.9503	1779.0258	-28.8	-0.016		
Extreme (50C)		1710.9503	1779.0257				
Extreme (40C)		1710.9503	1779.0257				
Extreme (30C)		1710.9503	1779.0257				
Extreme (10C)		1710.9503	1779.0257				
Extreme (0C)		1710.9503	1779.0257				
Extreme (-10C)		1710.9503	1779.0257				
Extreme (-20C)		1710.9503	1779.0257				
Extreme (-30C)		1710.9503	1779.0257				
20C		15%	1710.9503	1779.0257	-29.1	-0.017	
20C		-15%	1710.9503	1779.0257	-24.4	-0.014	
20C		End Point	1710.9503	1779.0257	-24.8	-0.014	

## 8.5. PEAK-TO-AVERAGE RATIO

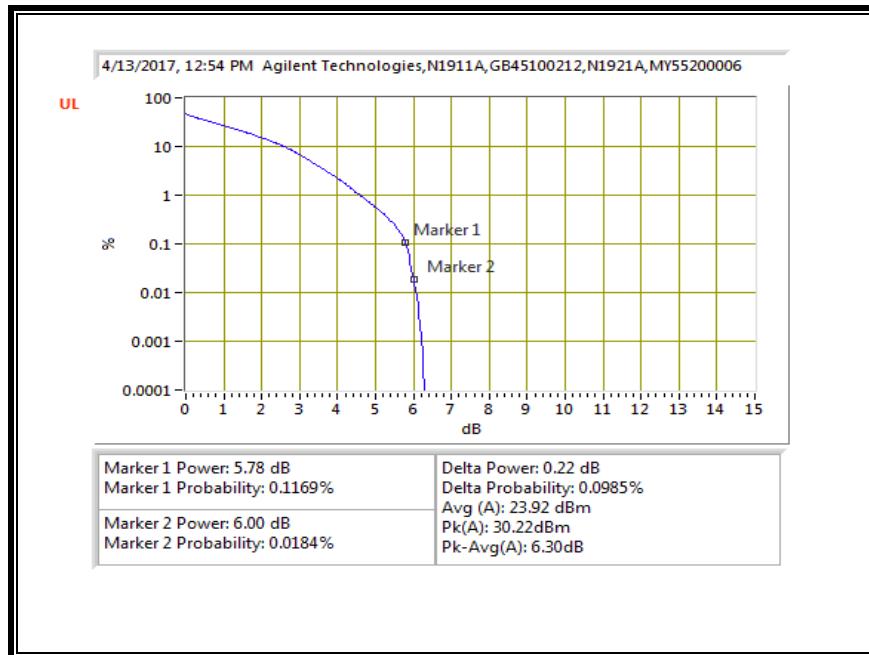
In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

### RESULT

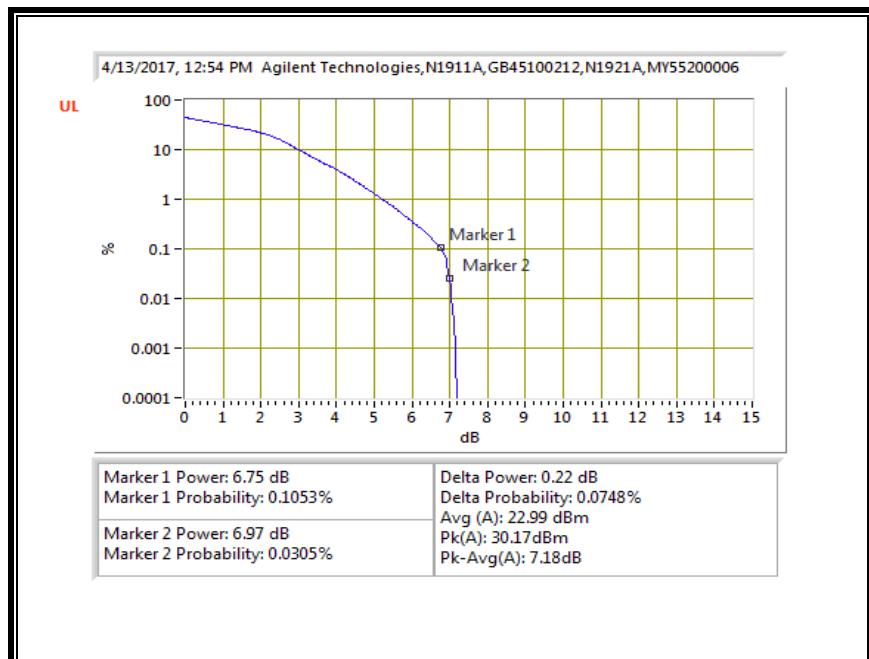
Test was performed on LAT 1 antenna; full resource block (FRB) for each bandwidth was used to measure as the worst case. The results from all CCDF measurements are passed with 13dB peak-to-average ratio criteria.

### 8.5.1. LTE BAND 2

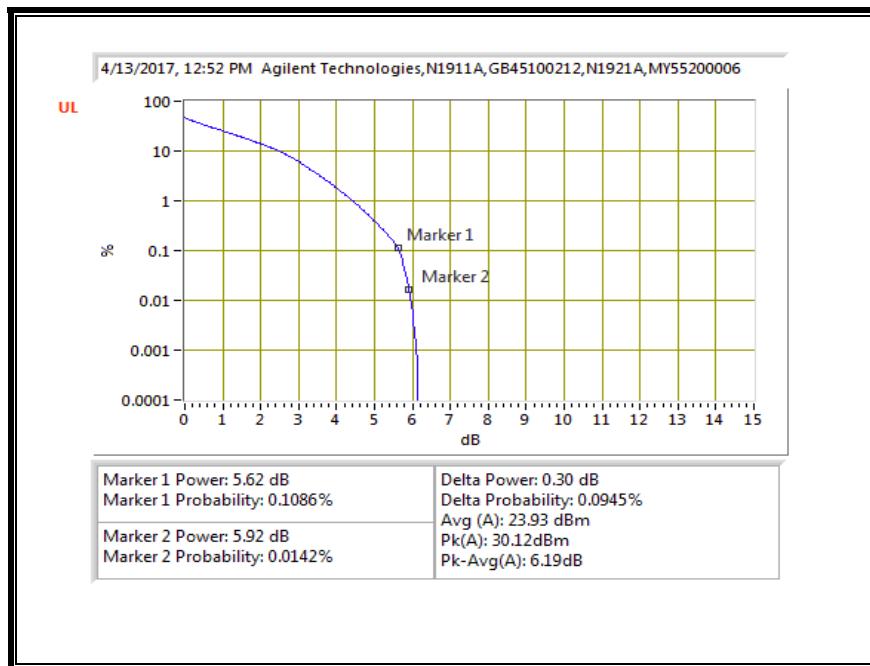
#### QPSK, (1.4 MHz BAND WIDTH)



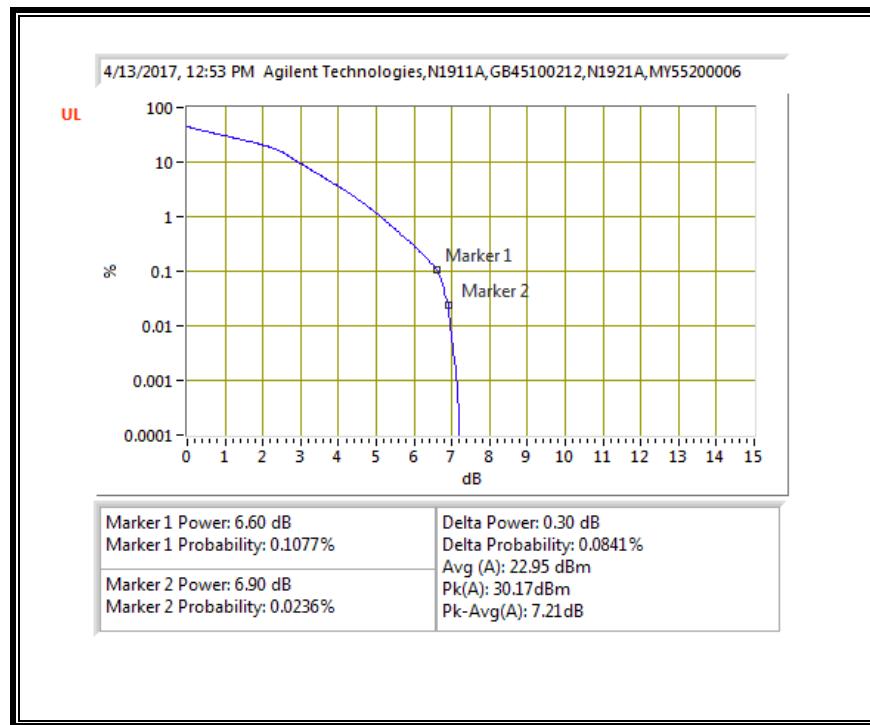
#### 16QAM, (1.4 MHz BAND WIDTH)



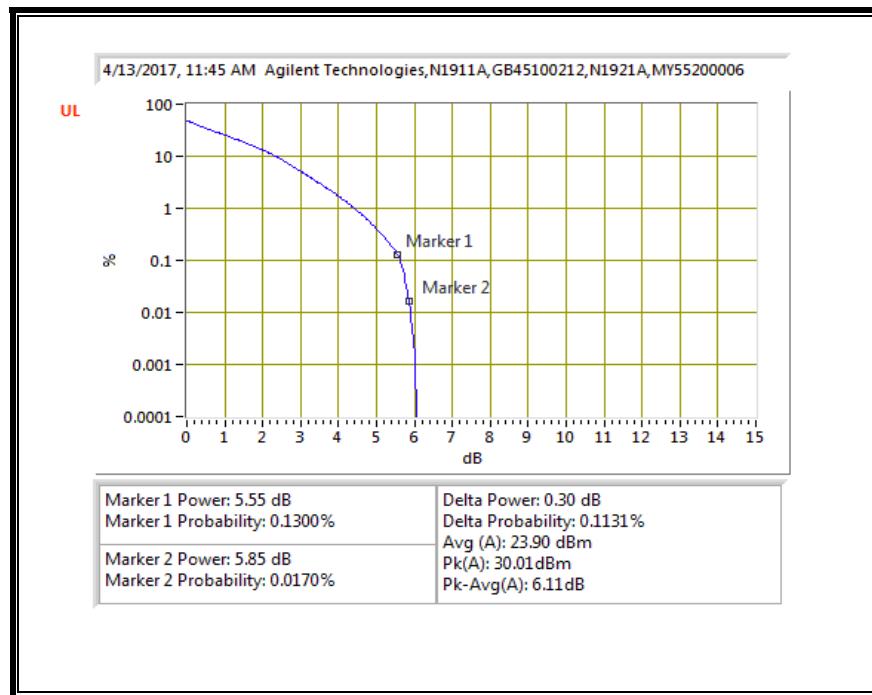
**QPSK, (3.0 MHz BAND WIDTH)**



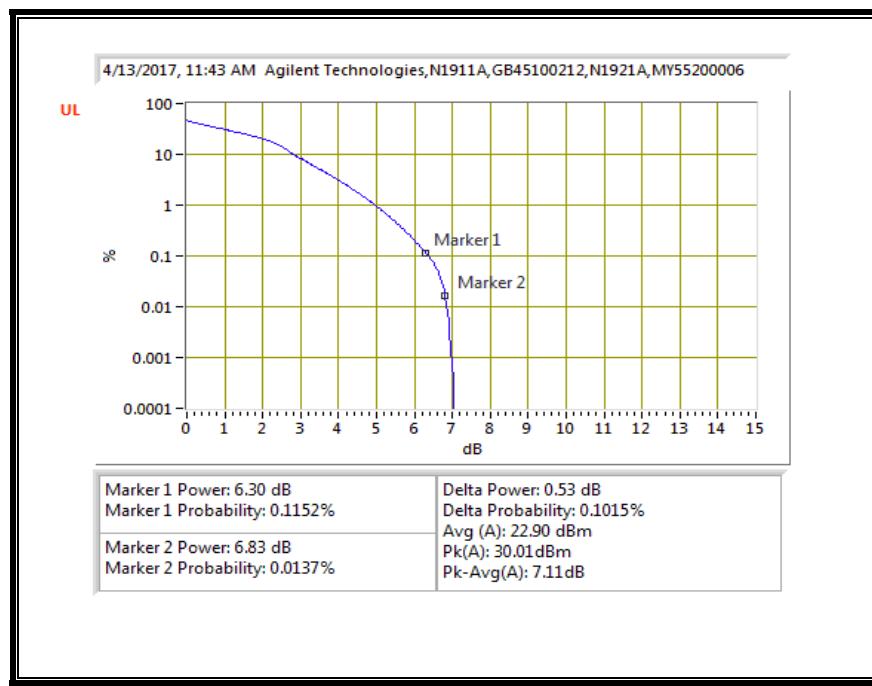
**16QAM, (3.0 MHz BAND WIDTH)**



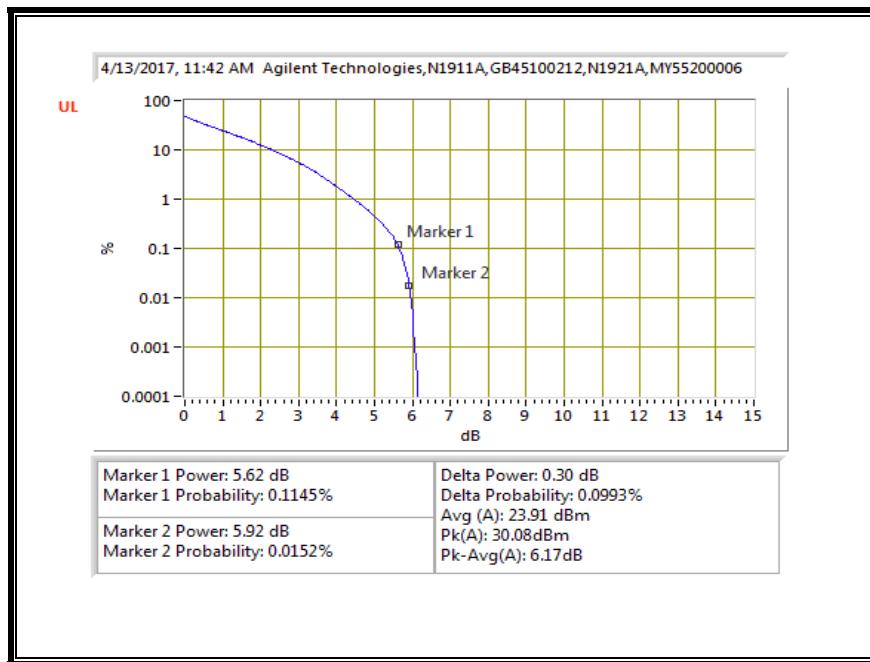
**QPSK, (5.0 MHz BAND WIDTH)**



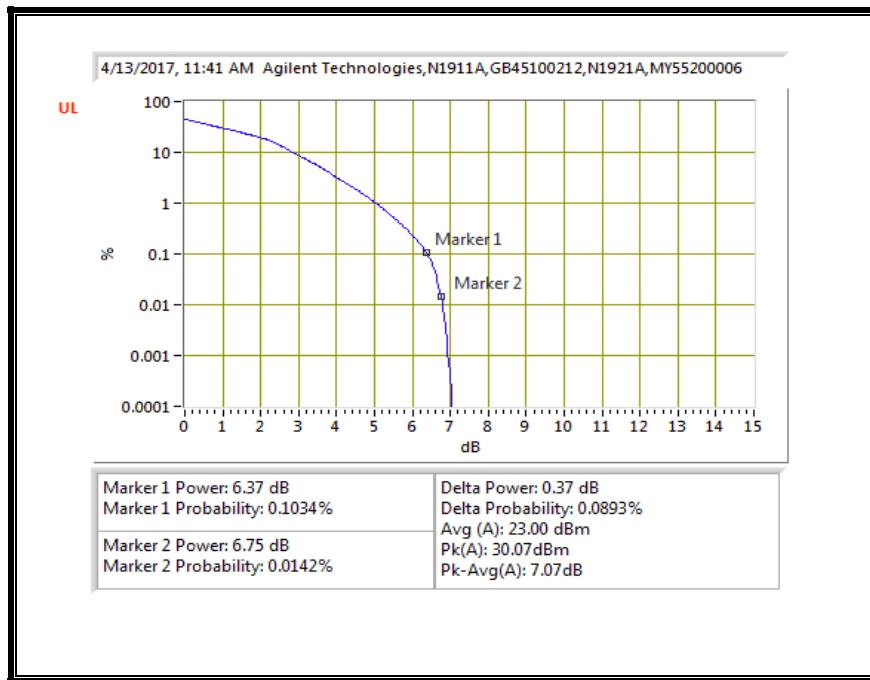
**16QAM, (5.0 MHz BAND WIDTH)**



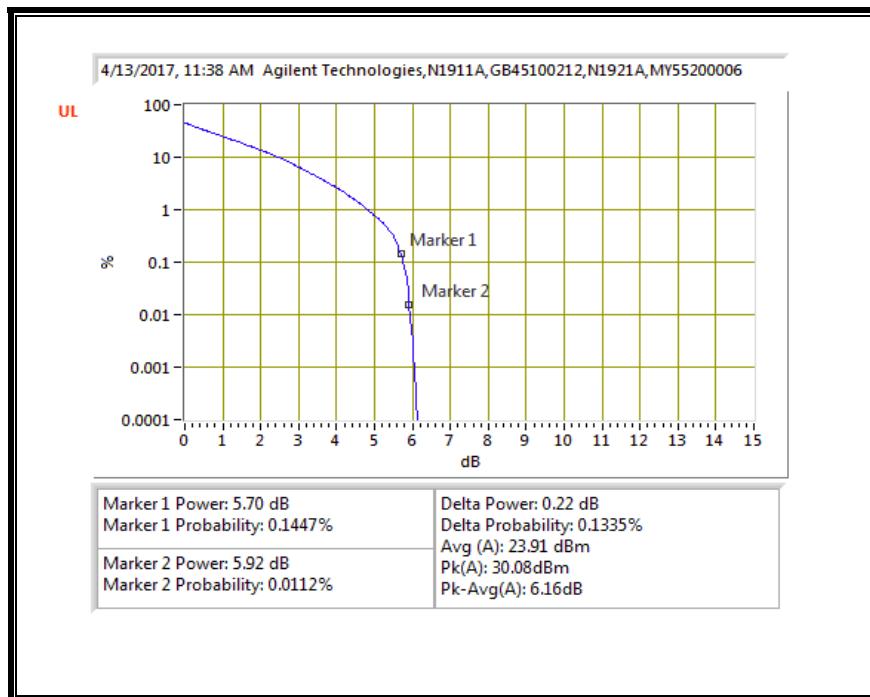
**QPSK, (10.0 MHz BAND WIDTH)**



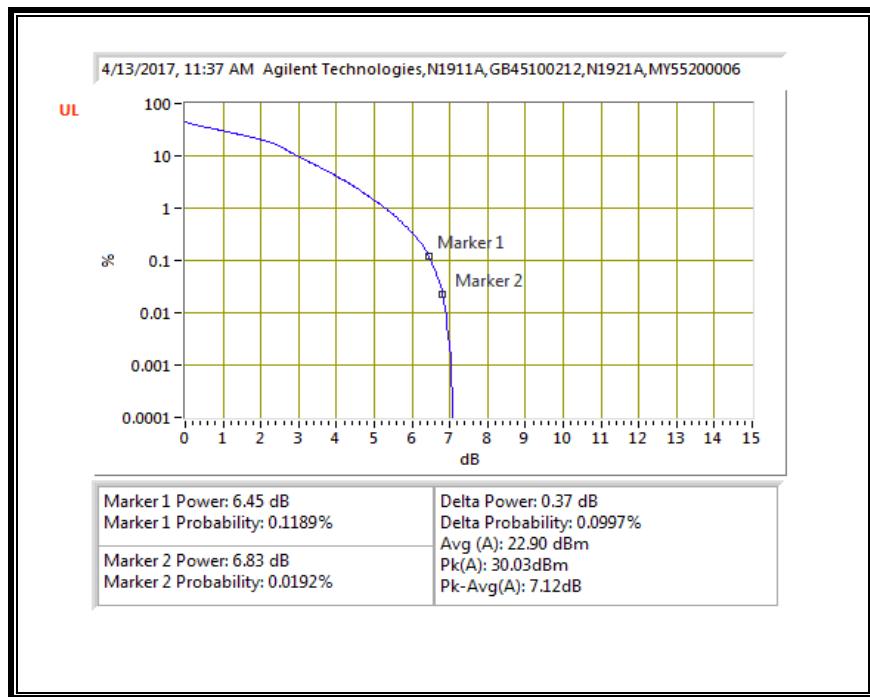
**16QAM, (10.0 MHz BAND WIDTH)**



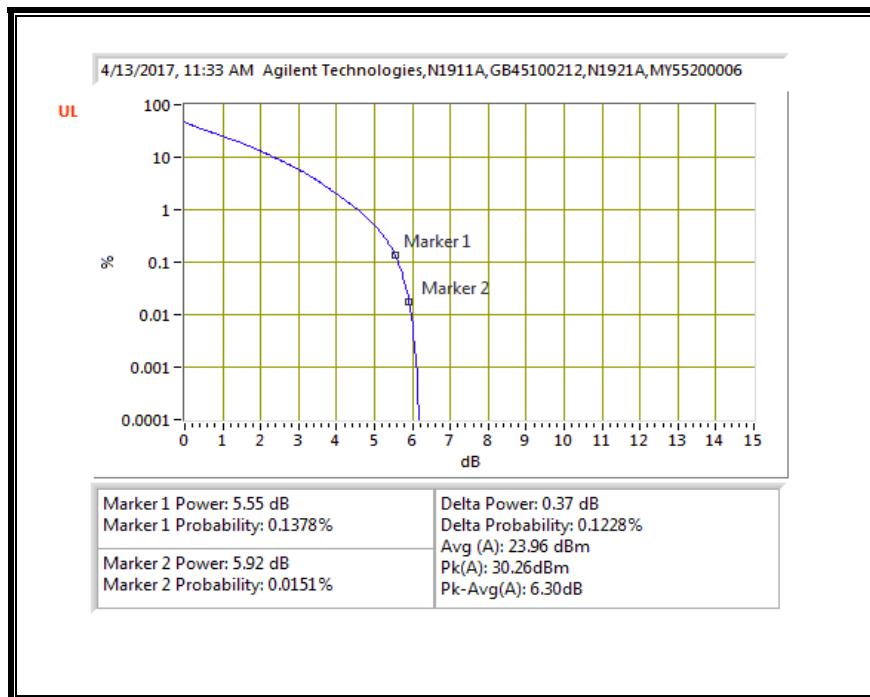
**QPSK, (15.0 MHz BAND WIDTH)**



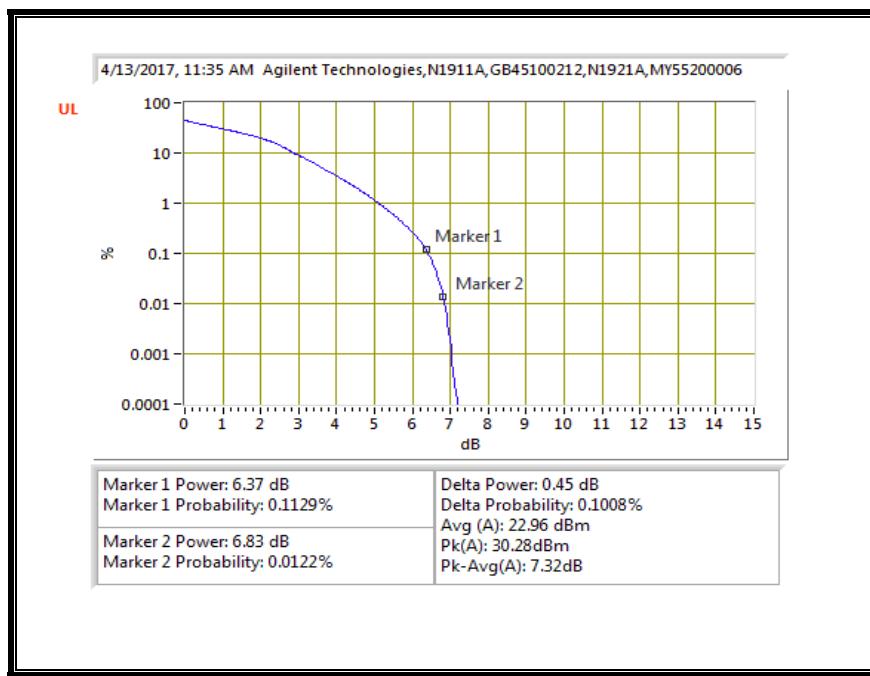
**16QAM, (15.0 MHz BAND WIDTH)**



**QPSK, (20.0 MHz BAND WIDTH)**

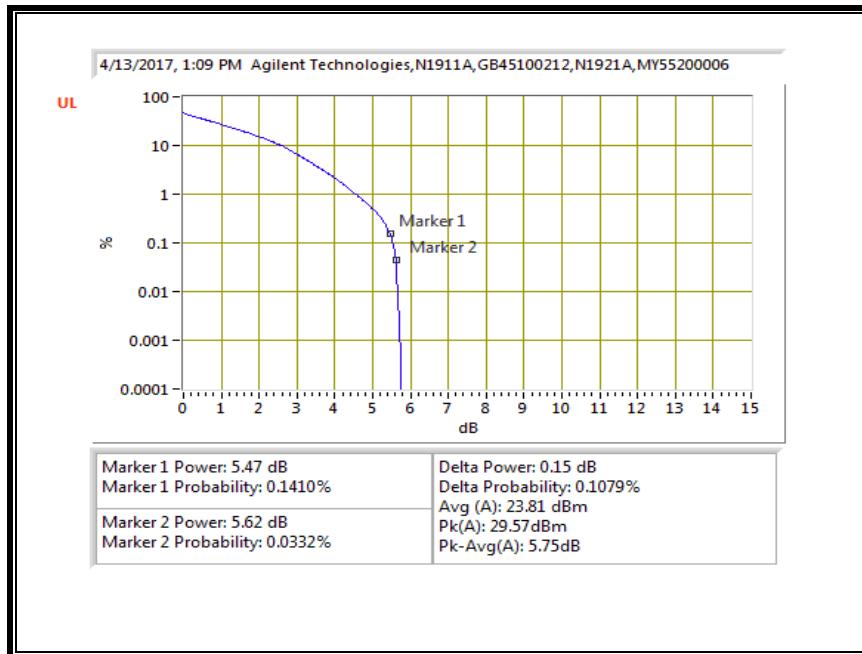


**16QAM, (20.0 MHz BAND WIDTH)**

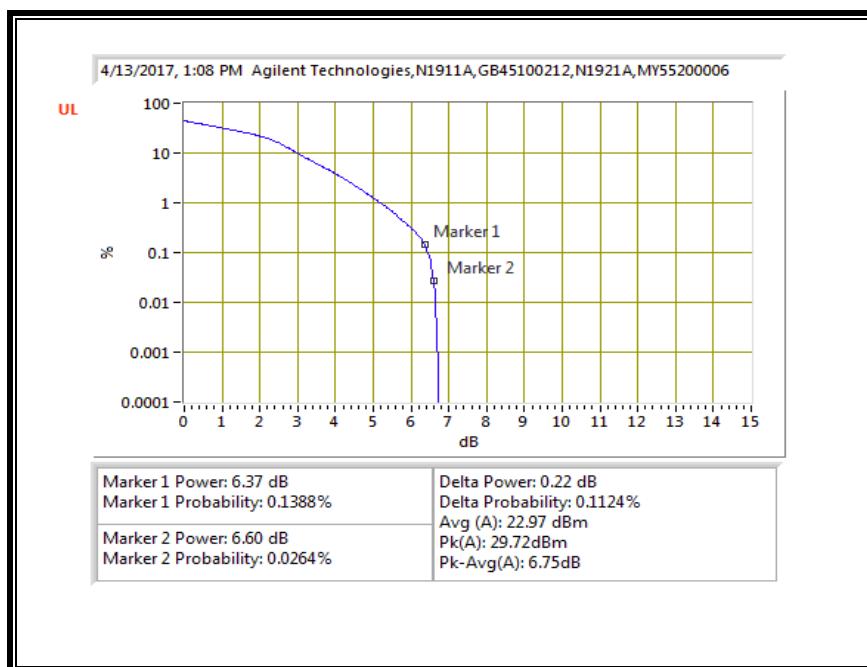


### 8.5.2. LTE BAND 4

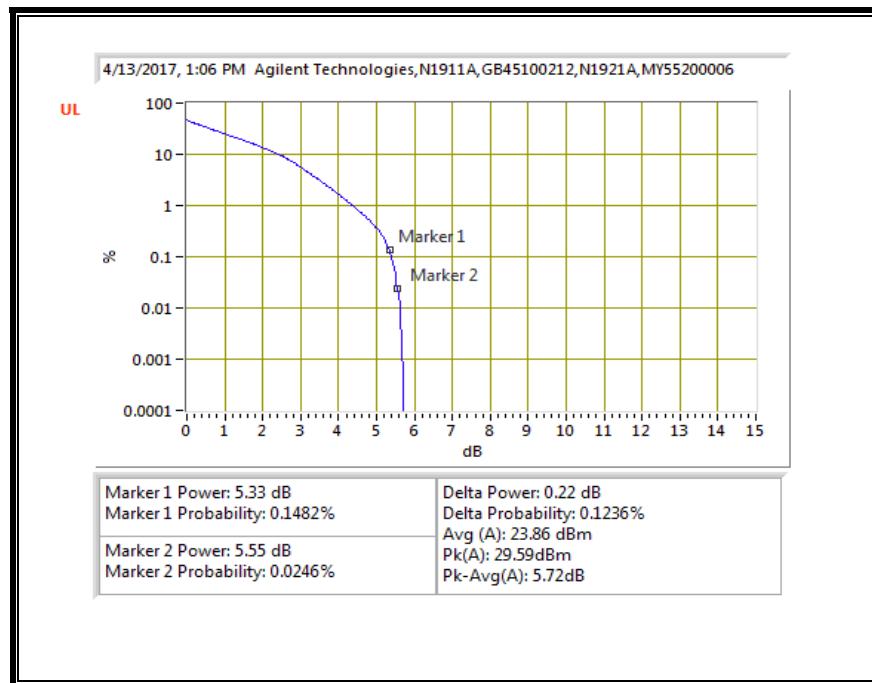
#### QPSK, (1.4 MHz BAND WIDTH)



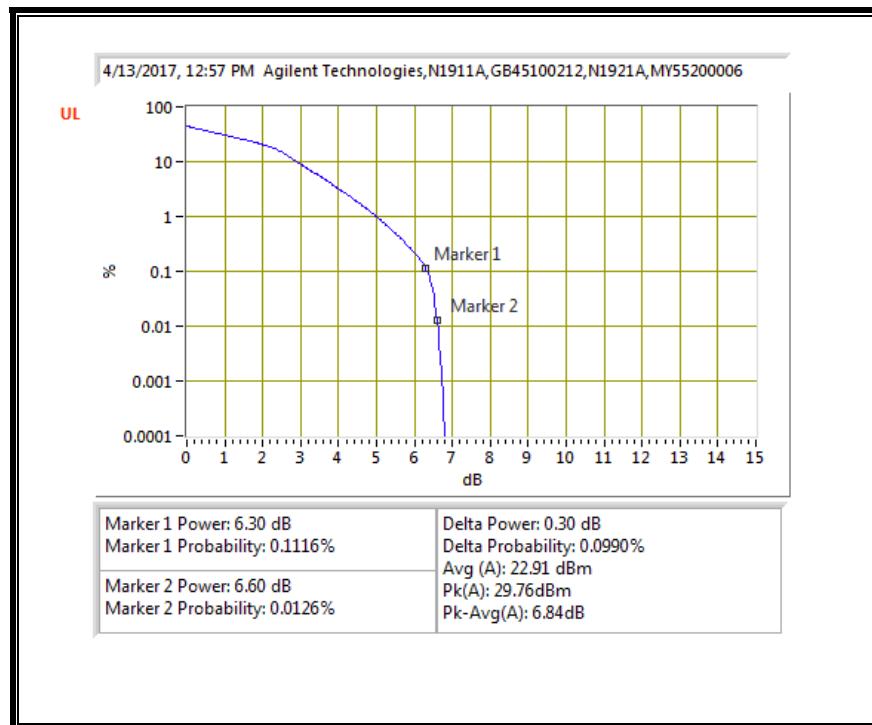
#### 16QAM, (1.4 MHz BAND WIDTH)



### QPSK, (3.0 MHz BAND WIDTH)

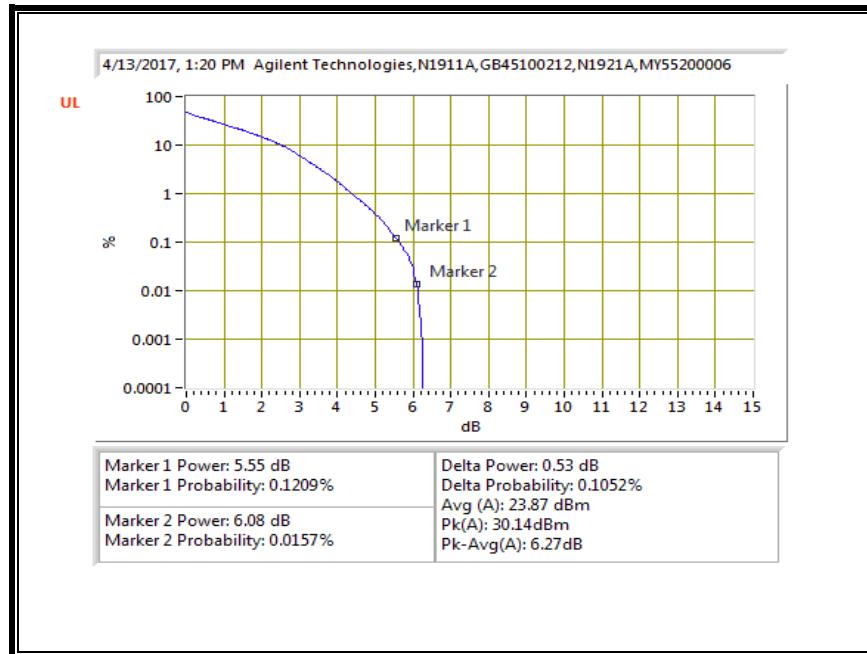


### 16QAM, (3.0 MHz BAND WIDTH)

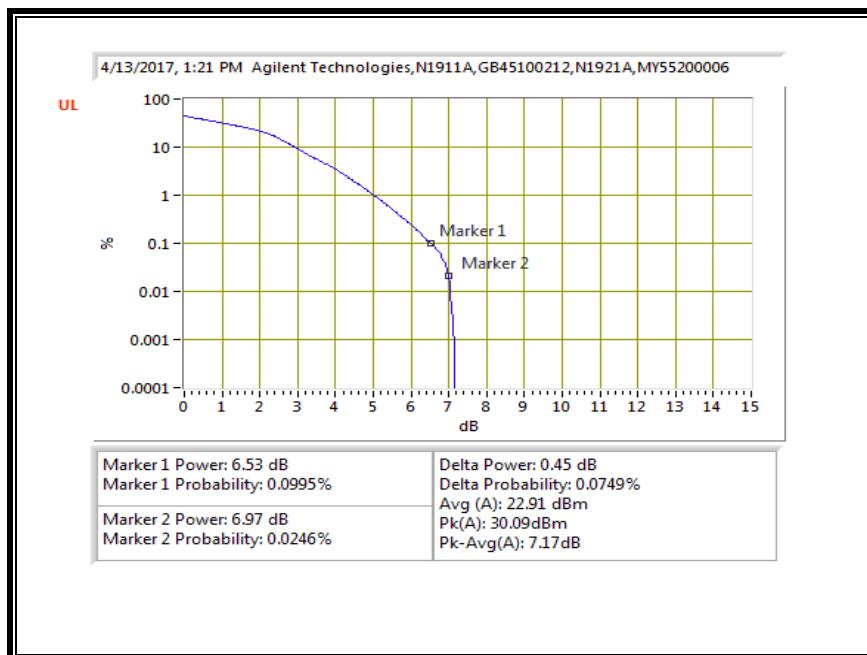


### 8.5.3. LTE BAND 5

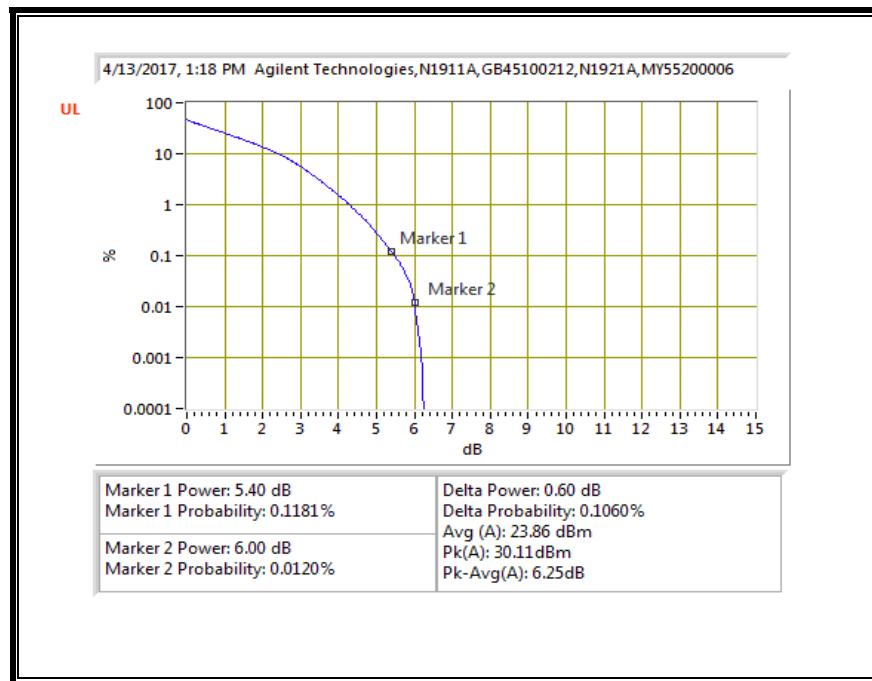
#### QPSK, (1.4 MHz BAND WIDTH)



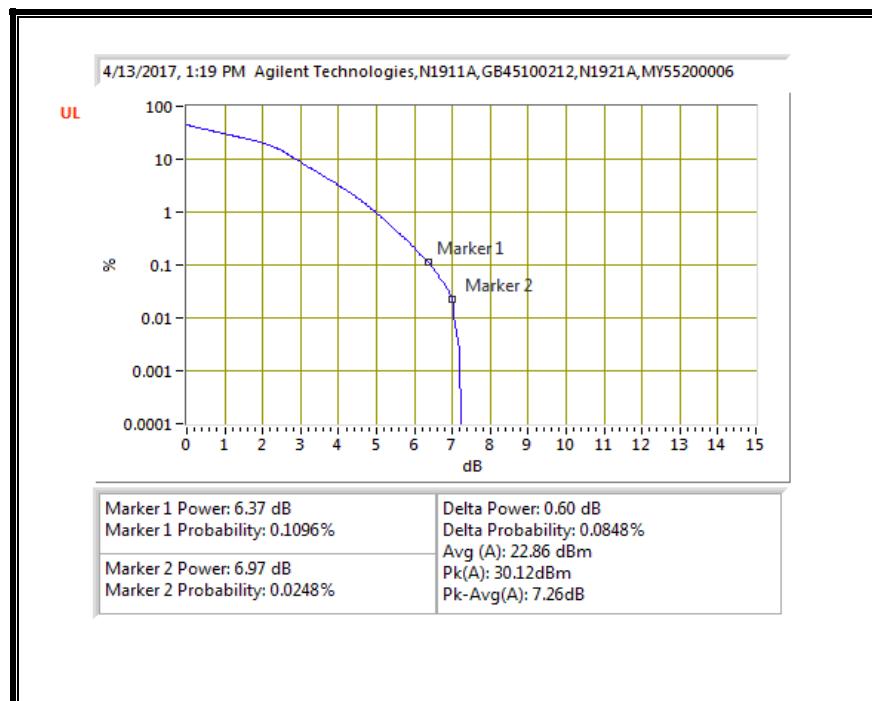
#### 16QAM, (1.4 MHz BAND WIDTH)



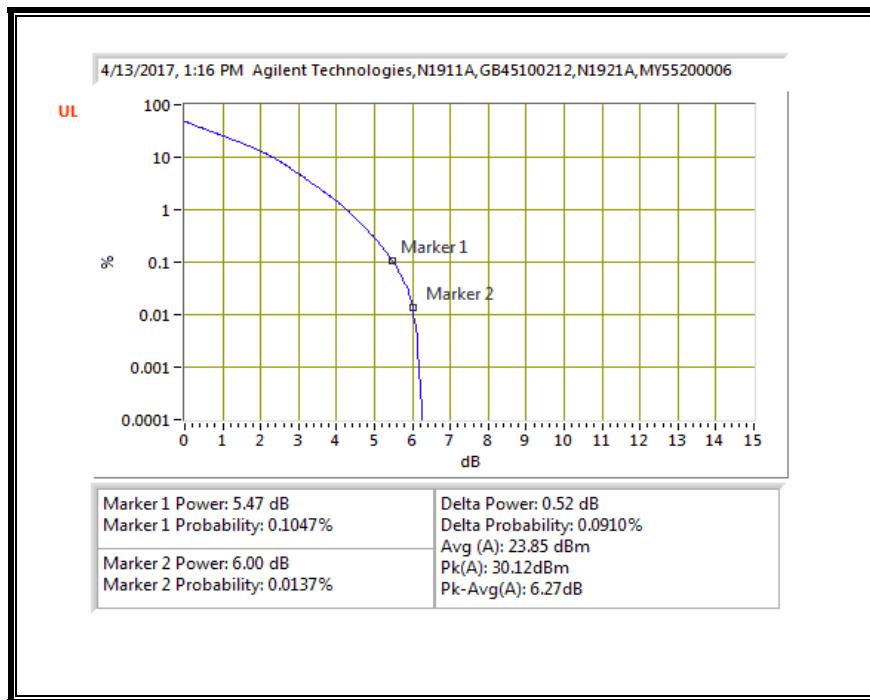
### QPSK, (3.0 MHz BAND WIDTH)



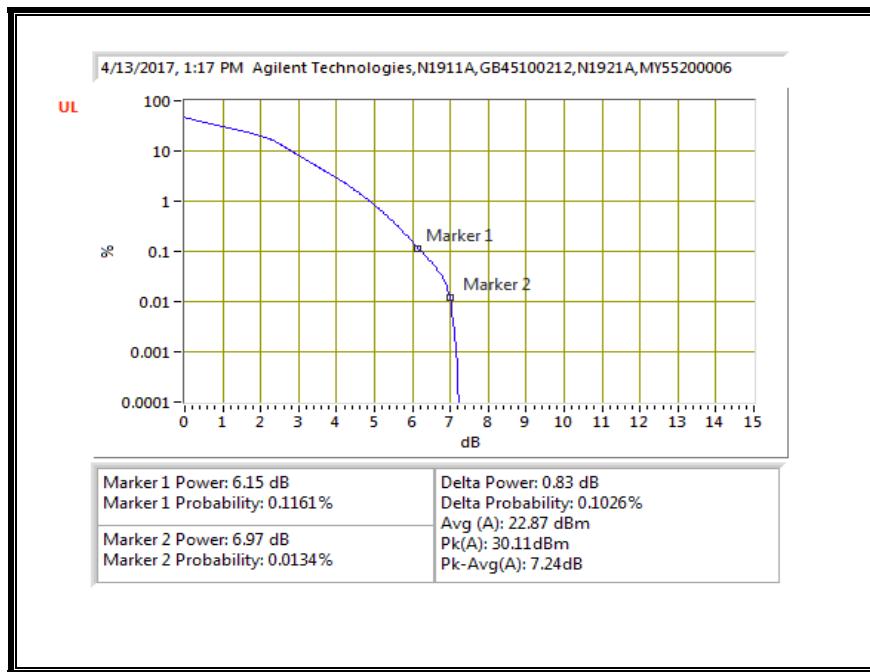
### 16QAM, (3.0 MHz BAND WIDTH)



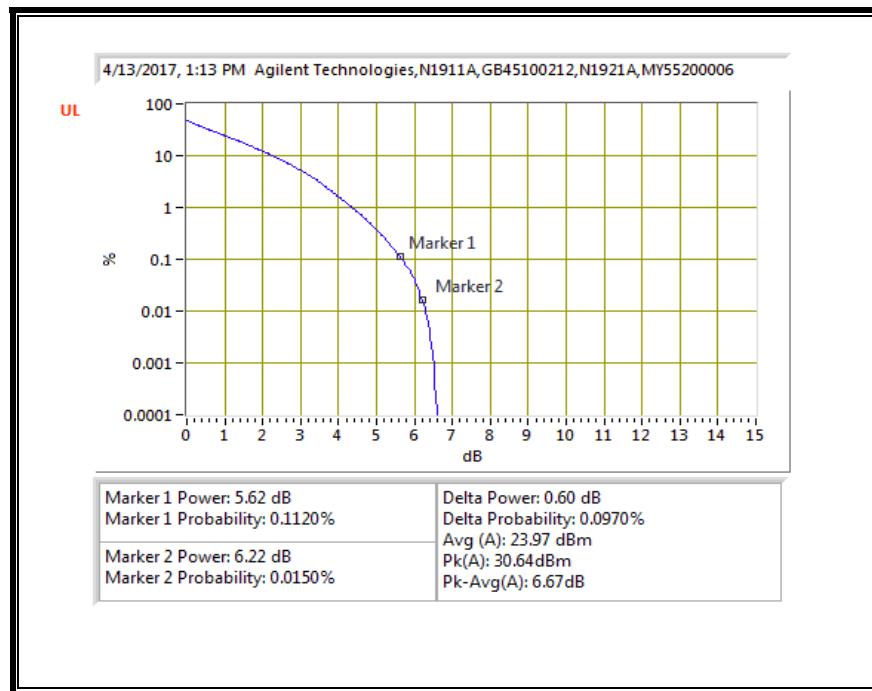
**QPSK, (5.0 MHz BAND WIDTH)**



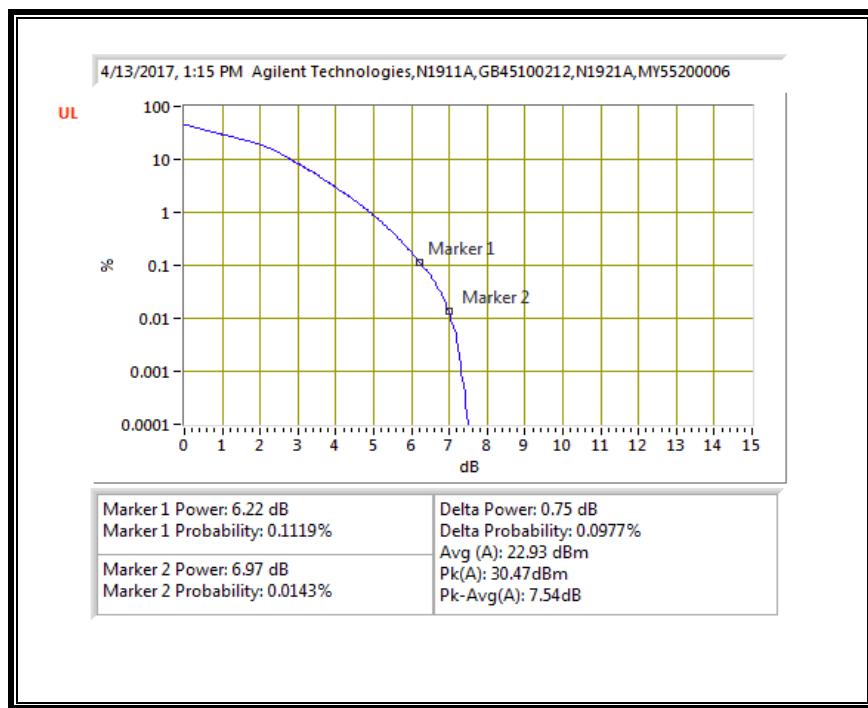
**16QAM, (5.0 MHz BAND WIDTH)**



**QPSK, (10.0 MHz BAND WIDTH)**

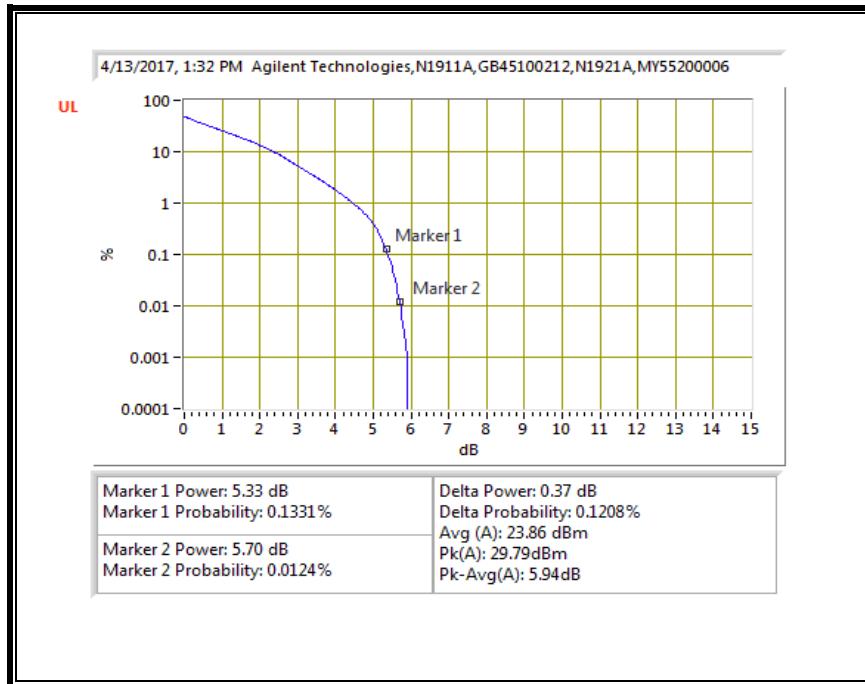


**16QAM, (10.0 MHz BAND WIDTH)**

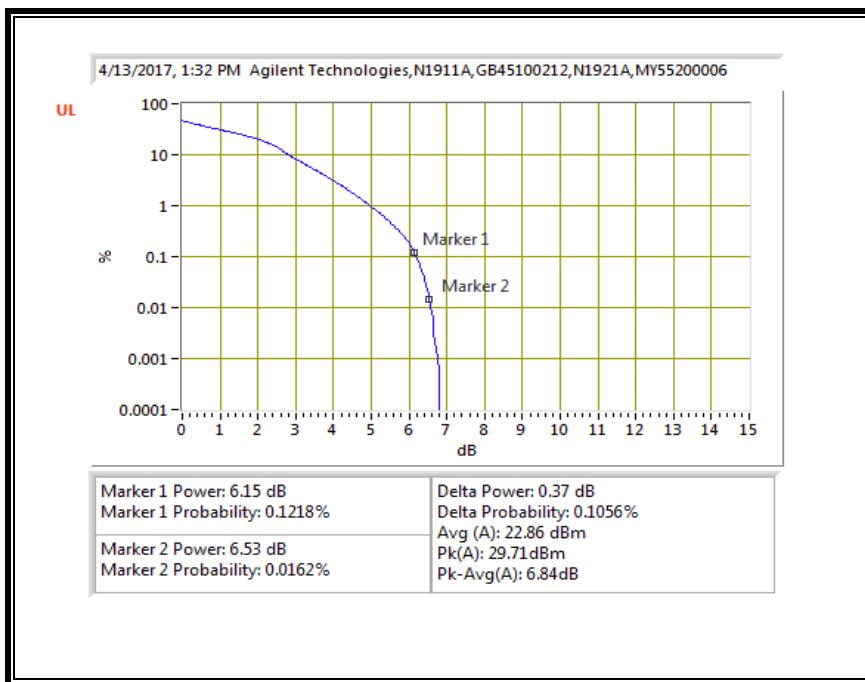


### 8.5.4. LTE BAND 7

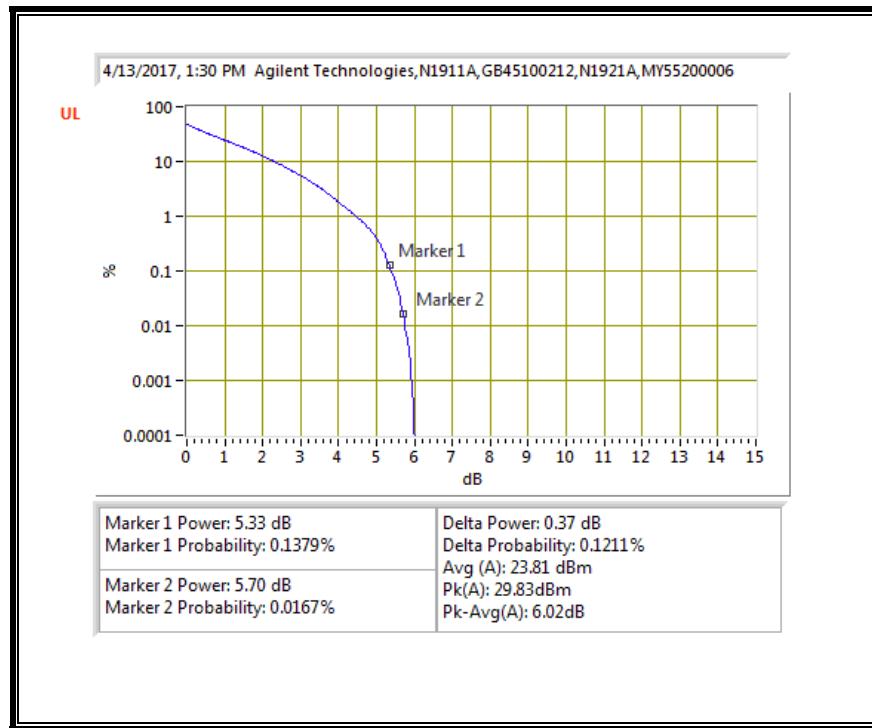
#### QPSK, (5.0 MHz BAND WIDTH)



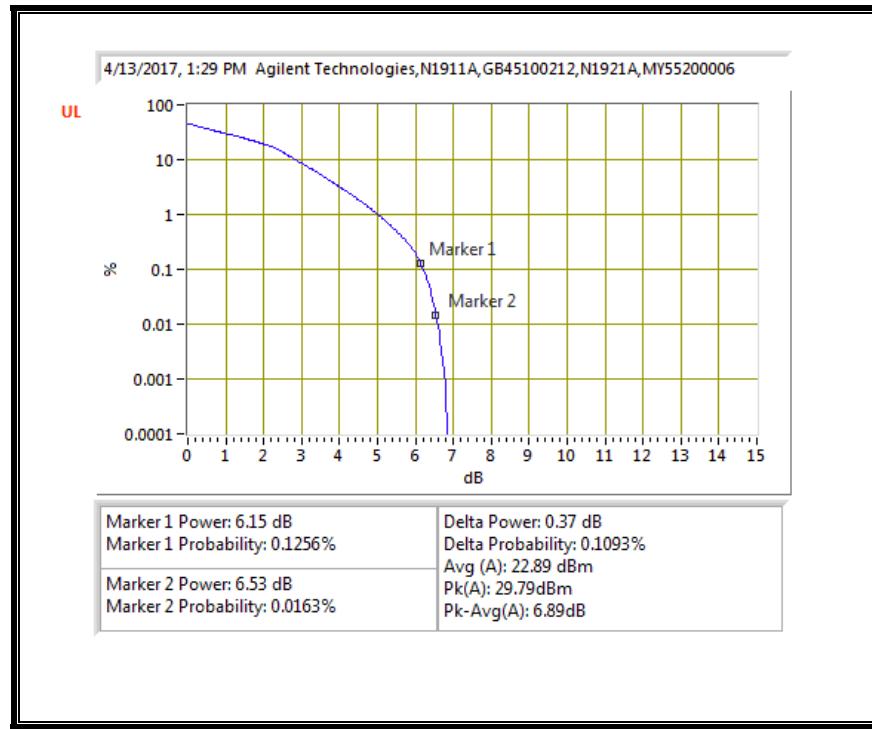
#### 16QAM, (5.0 MHz BAND WIDTH)



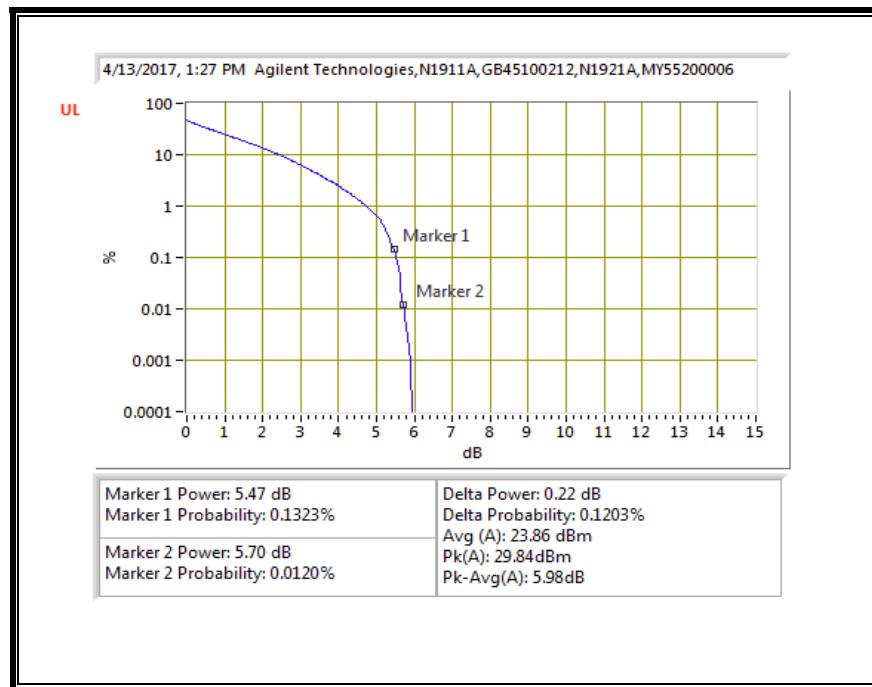
**QPSK, (10.0 MHz BAND WIDTH)**



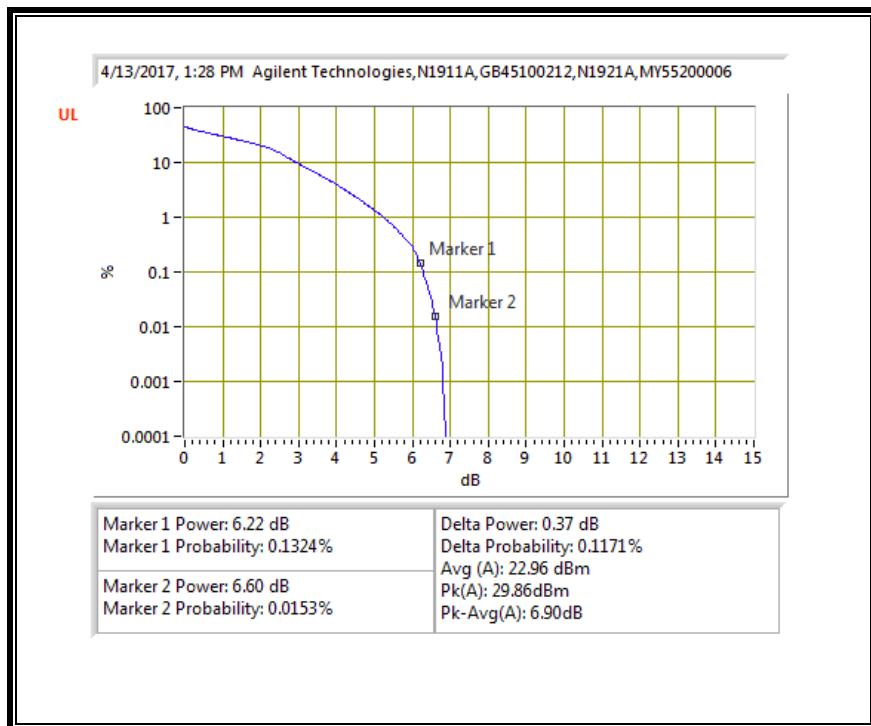
**16QAM, (10.0 MHz BAND WIDTH)**



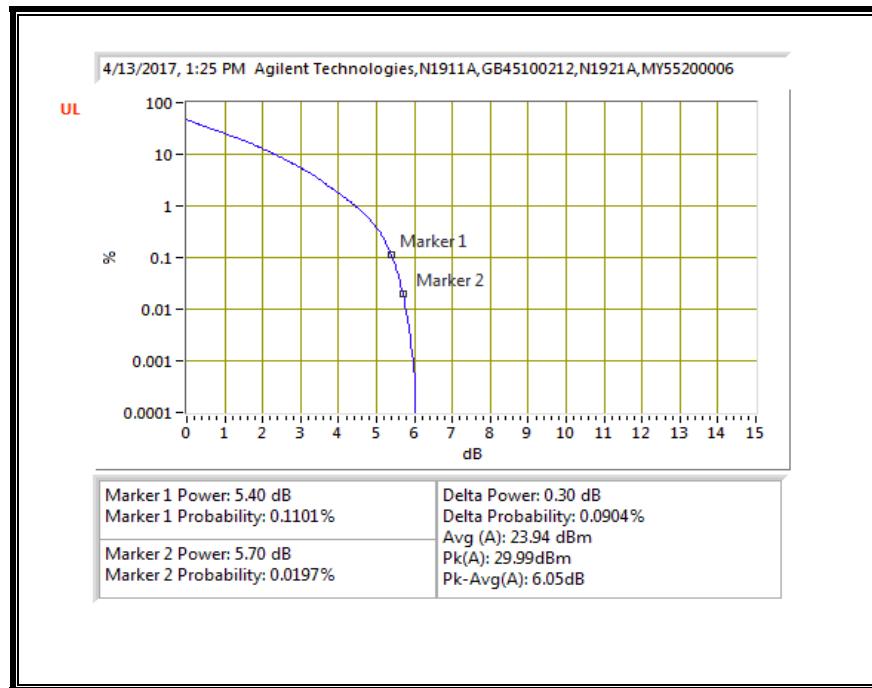
**QPSK, (15.0 MHz BAND WIDTH)**



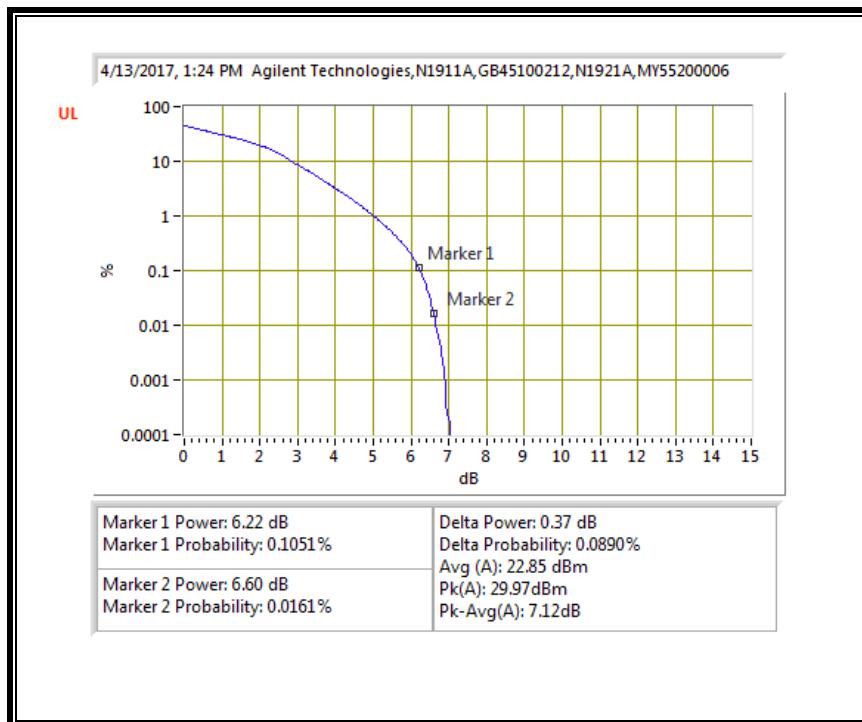
**16QAM, (15.0 MHz BAND WIDTH)**



**QPSK, (20.0 MHz BAND WIDTH)**

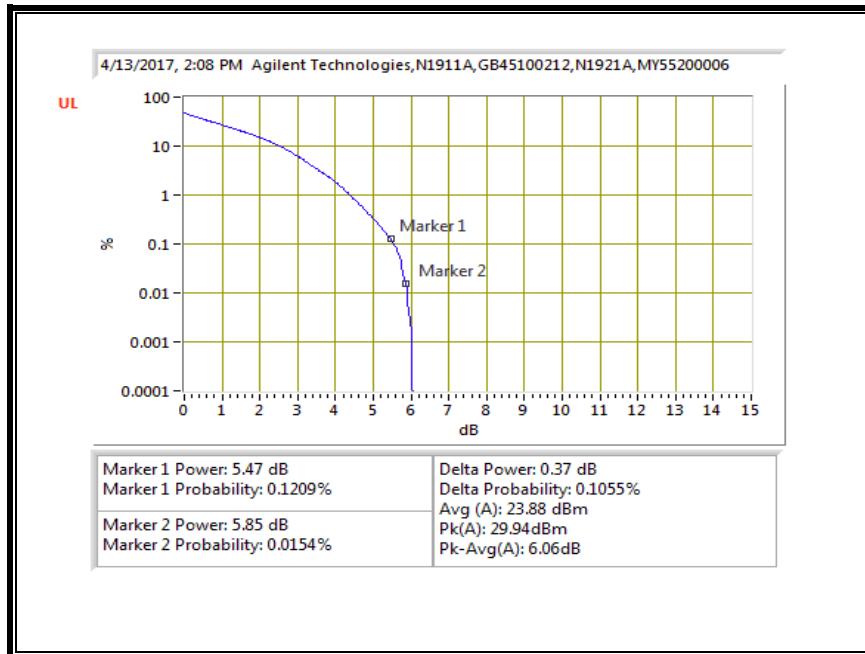


**16QAM, (20.0 MHz BAND WIDTH)**

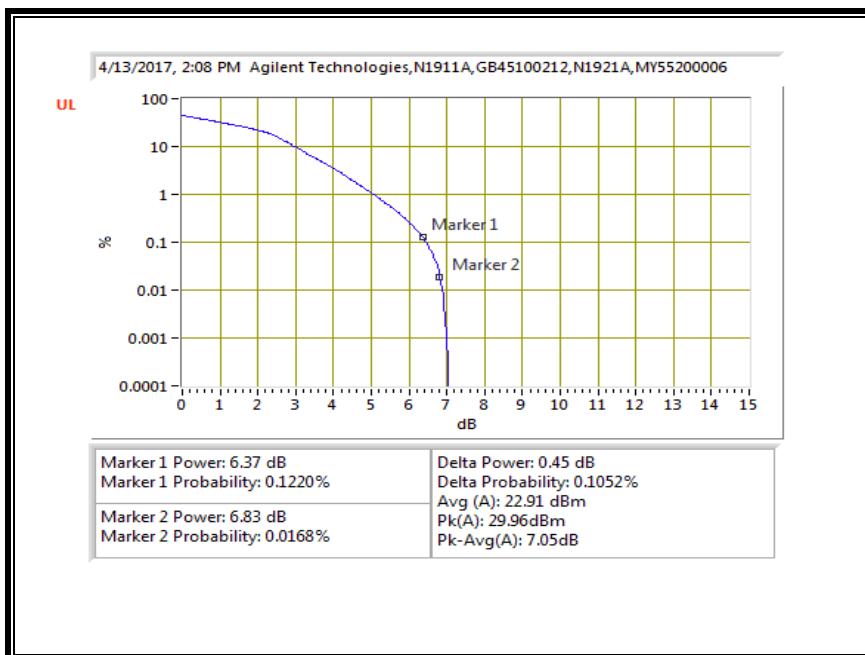


### 8.5.5. LTE BAND 12

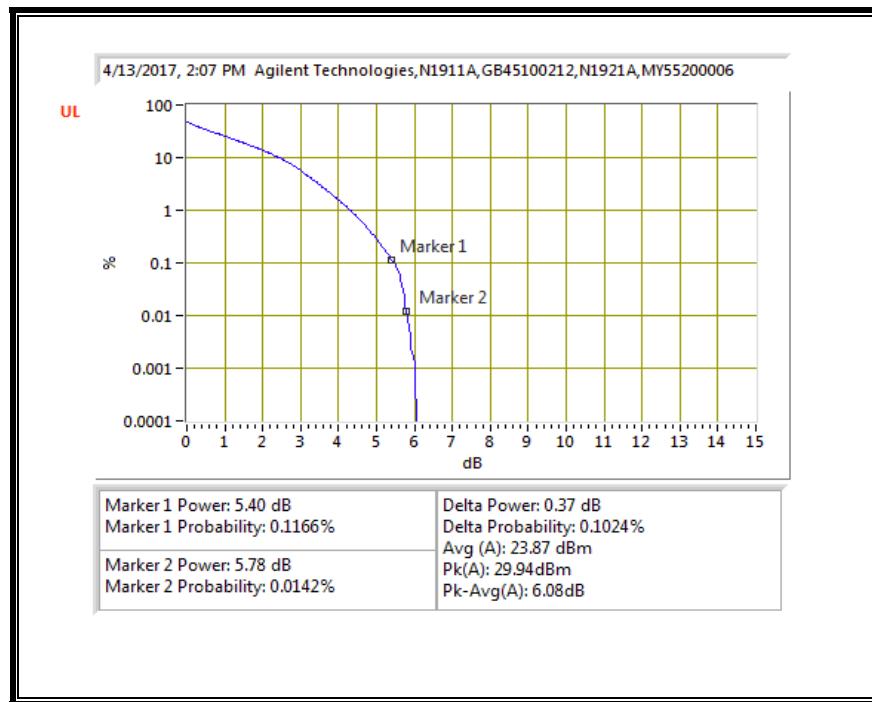
#### QPSK, (1.4 MHz BAND WIDTH)



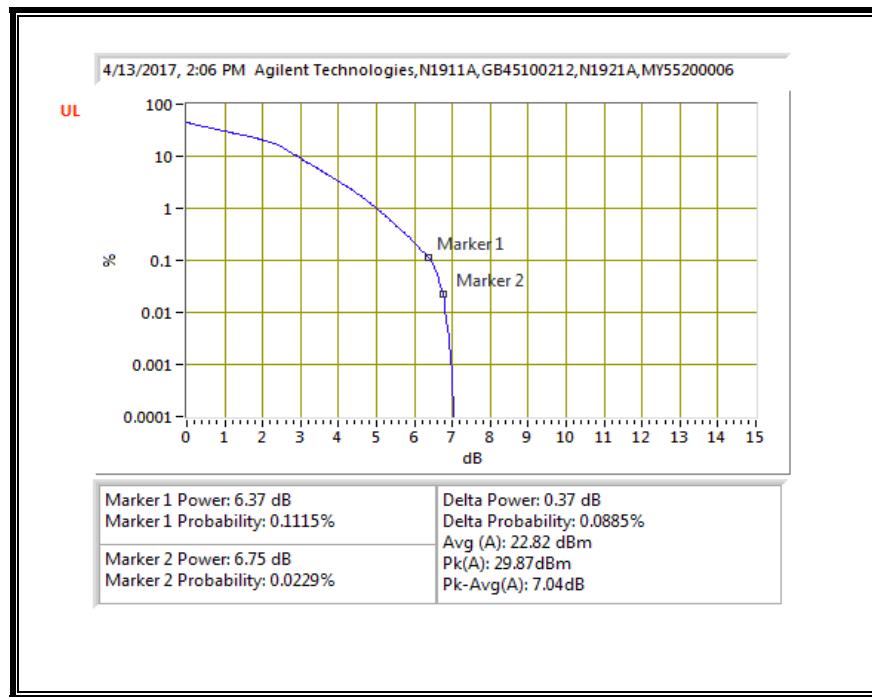
#### 16QAM, (1.4 MHz BAND WIDTH)



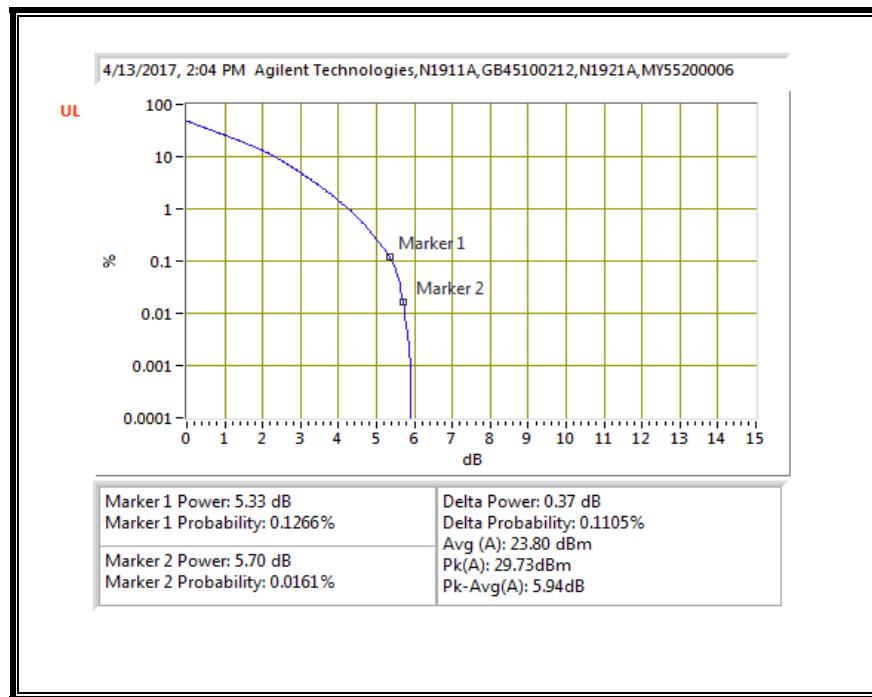
**QPSK, (3.0 MHz BAND WIDTH)**



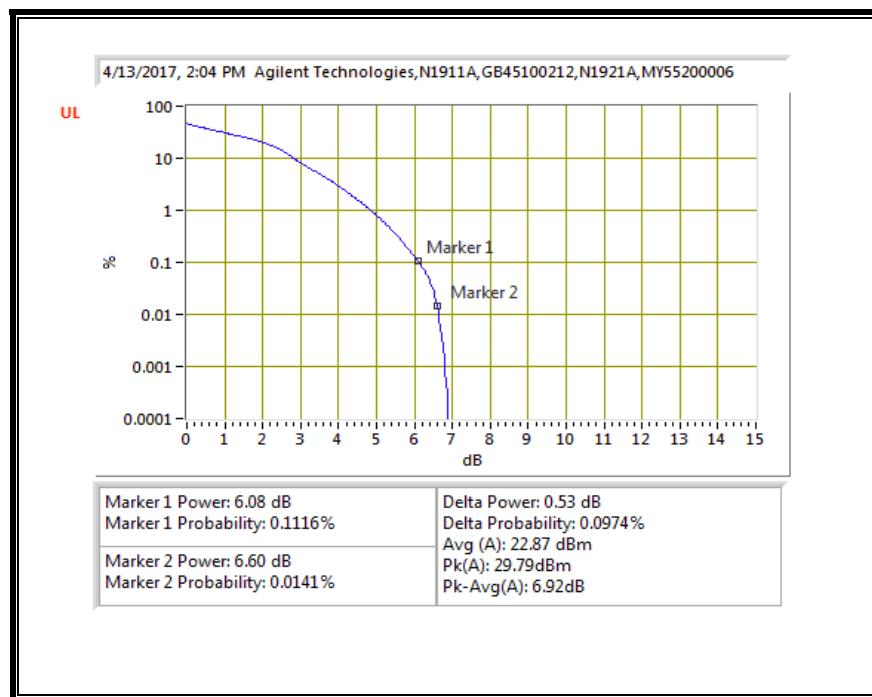
**16QAM, (3.0 MHz BAND WIDTH)**



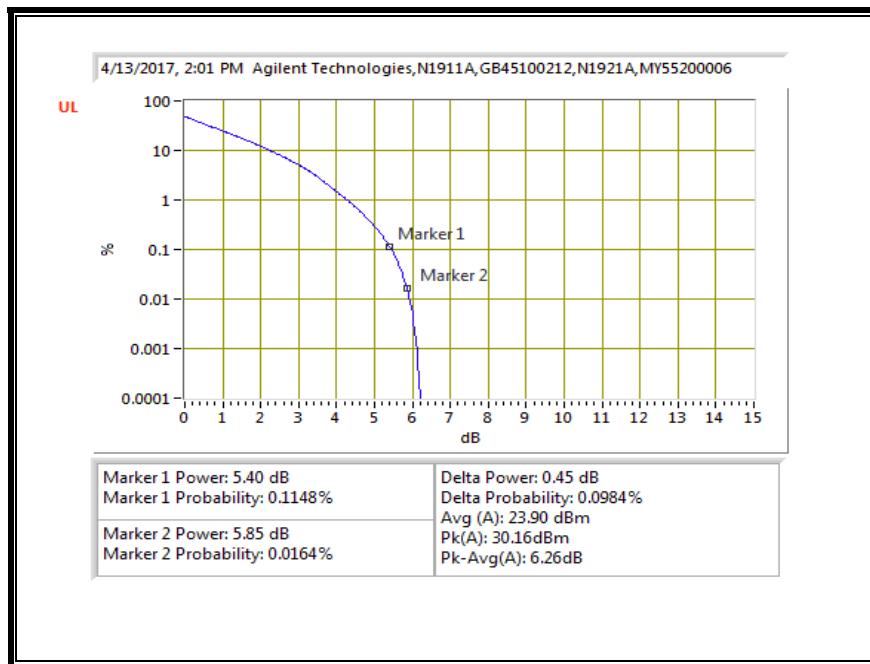
**QPSK, (5.0 MHz BAND WIDTH)**



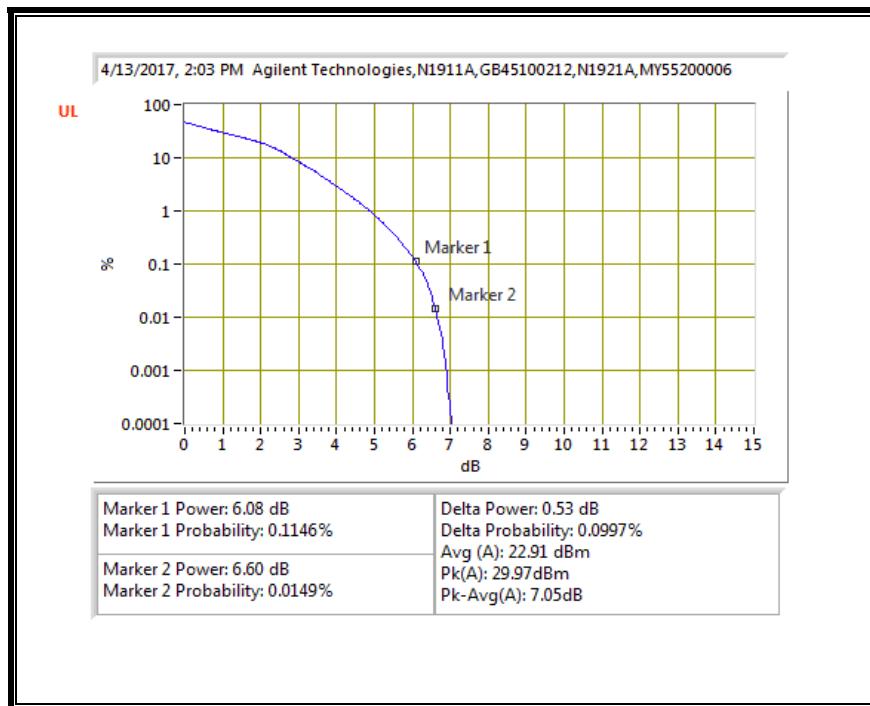
**16QAM, (5.0 MHz BAND WIDTH)**



**QPSK, (10.0 MHz BAND WIDTH)**

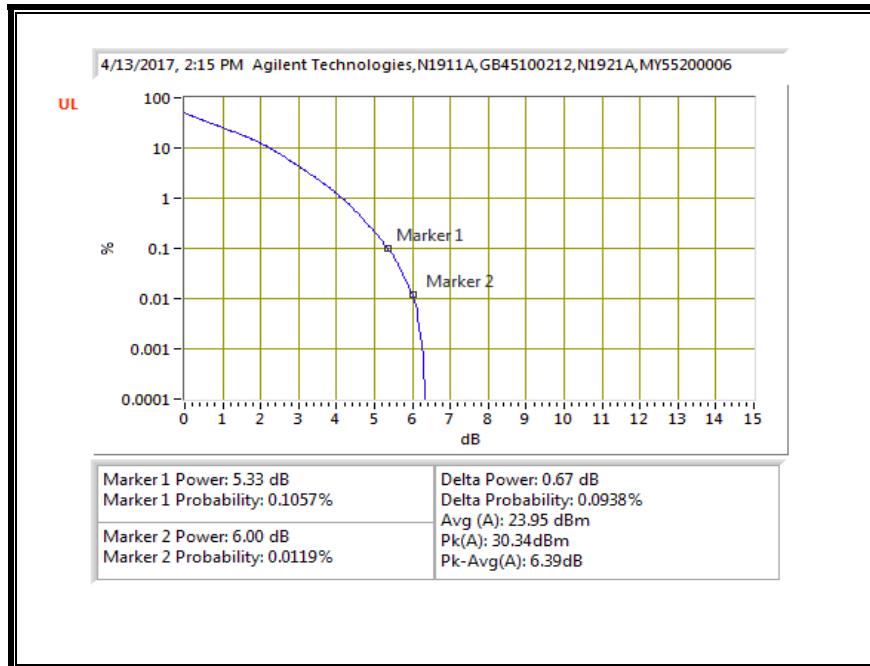


**16QAM, (10.0 MHz BAND WIDTH)**

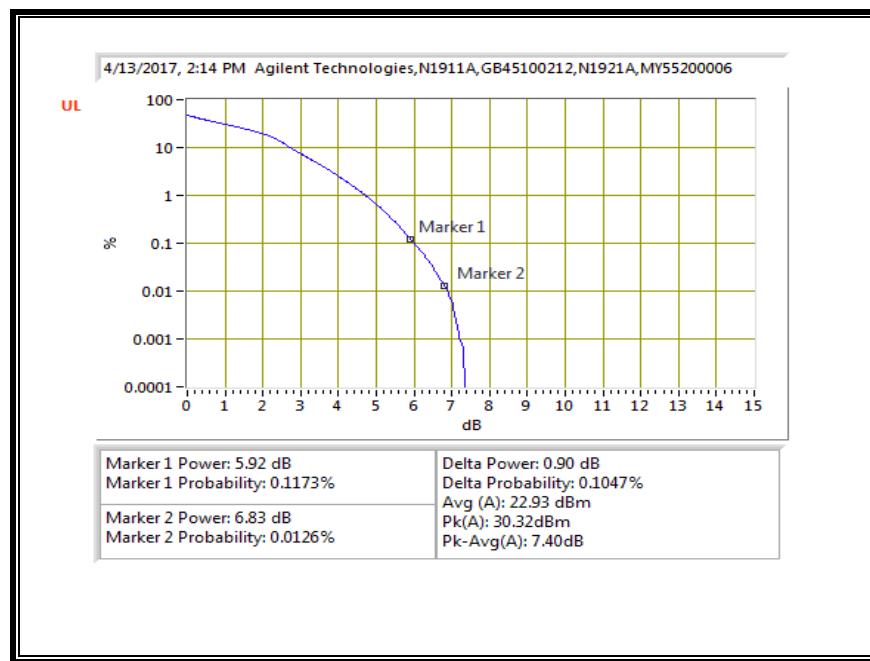


### 8.5.6. LTE BAND 13

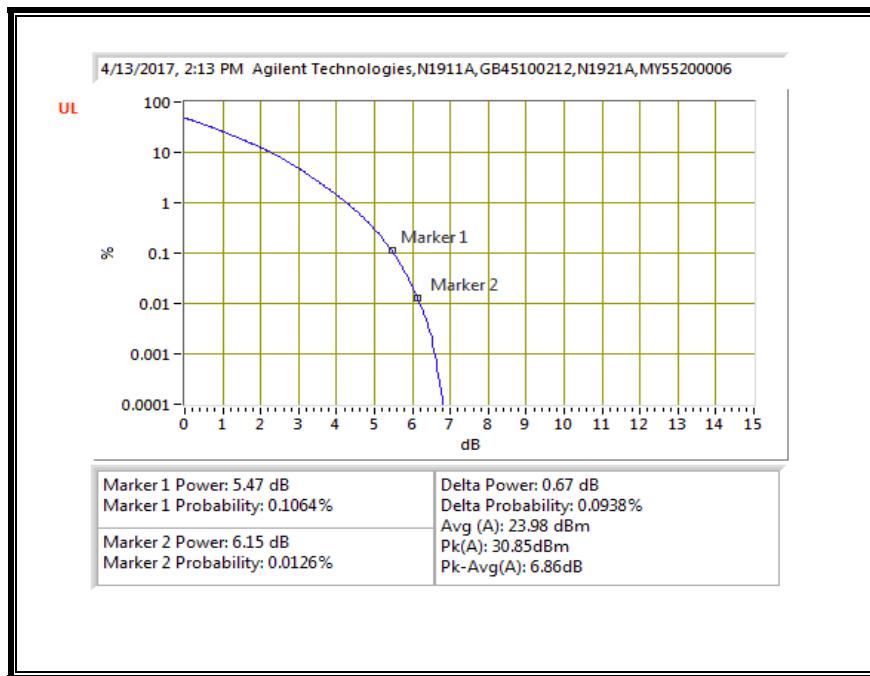
#### QPSK, (5.0 MHz BAND WIDTH)



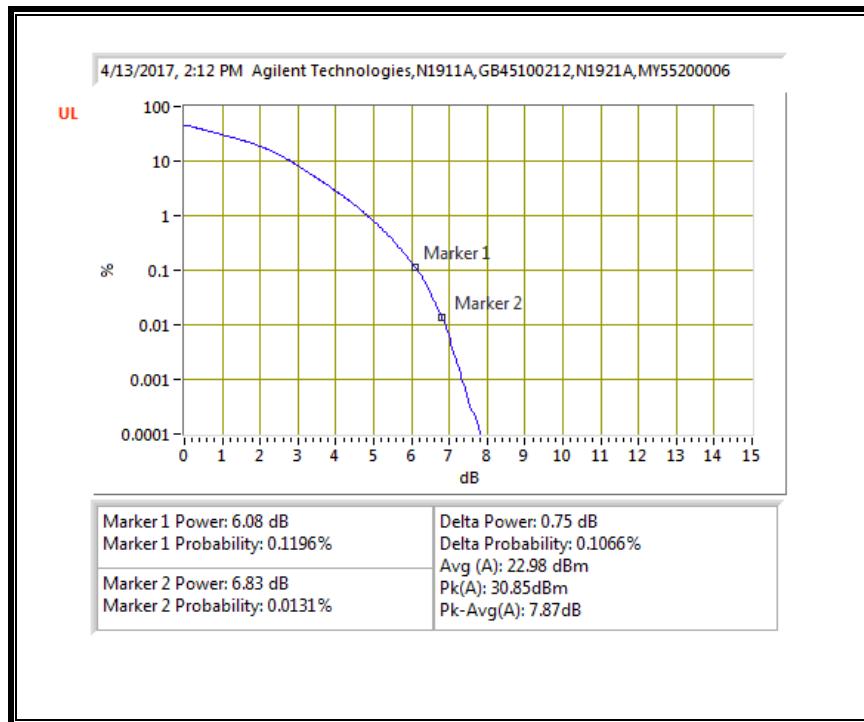
#### 16QAM, (5.0 MHz BAND WIDTH)



**QPSK, (10.0 MHz BAND WIDTH)**

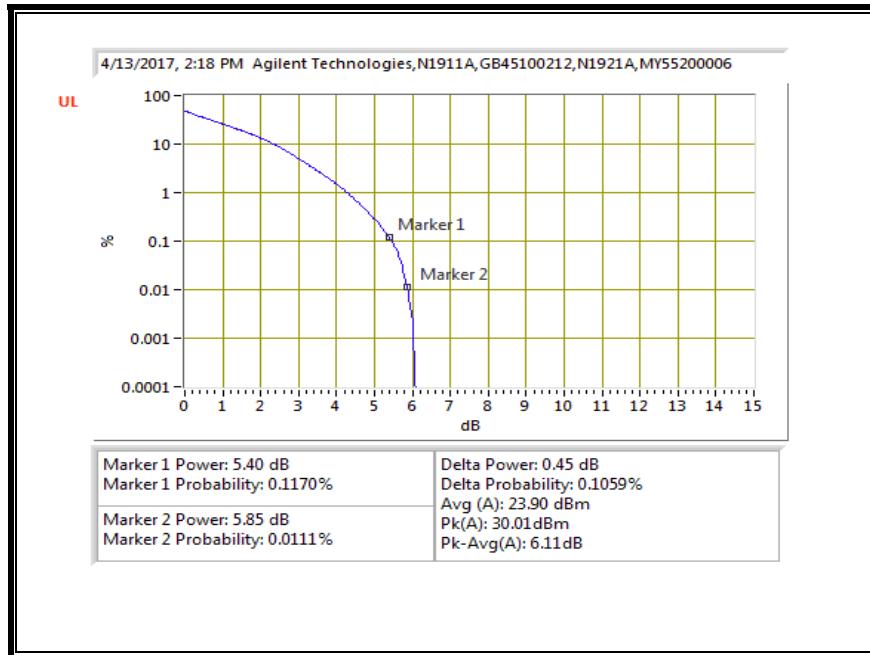


**16QAM, (10.0 MHz BAND WIDTH)**

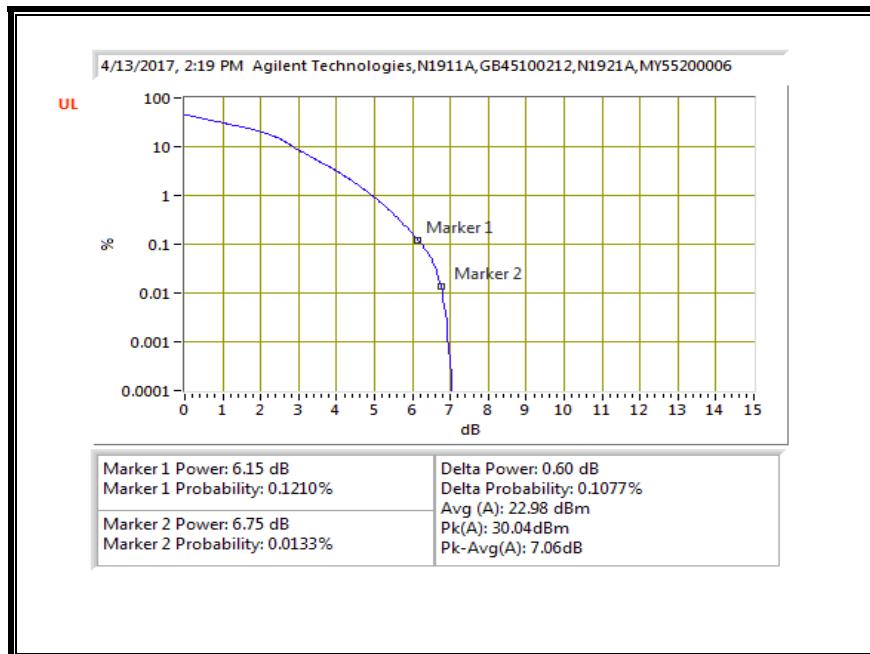


### 8.5.7. LTE BAND 17

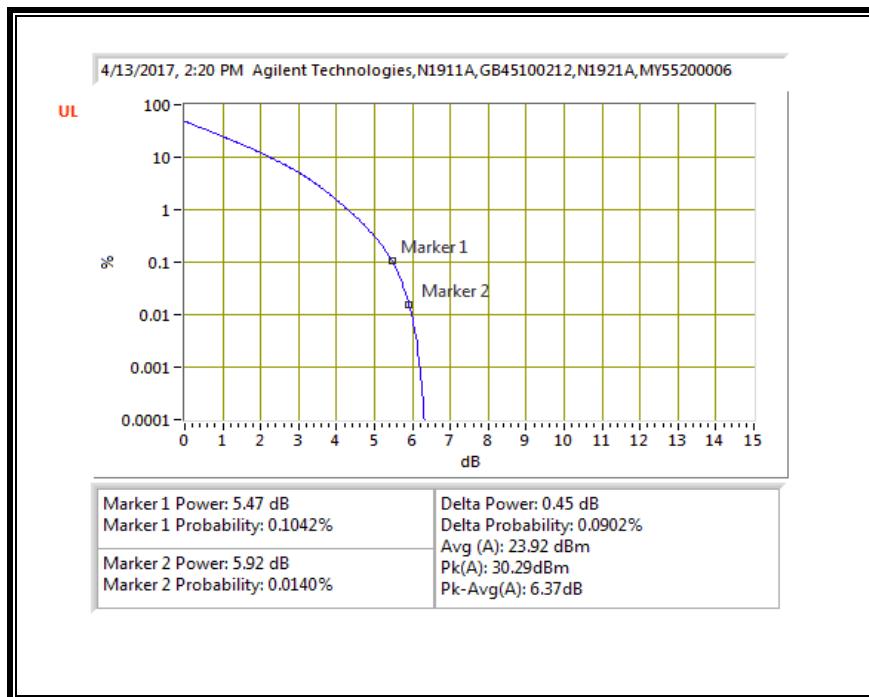
#### QPSK, (5.0 MHz BAND WIDTH)



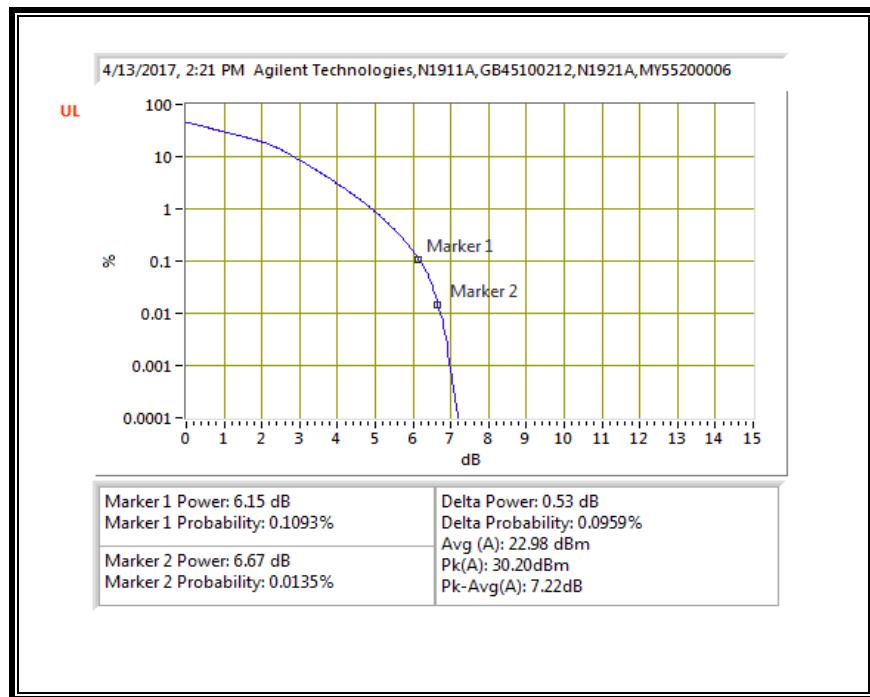
#### 16QAM, (5.0 MHz BAND WIDTH)



**QPSK, (10.0 MHz BAND WIDTH)**

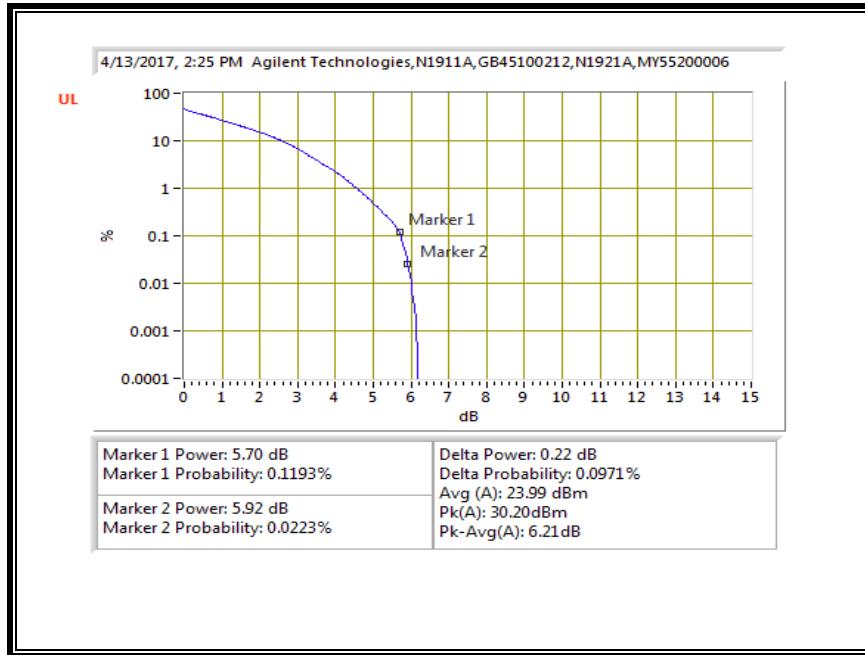


**16QAM, (10.0 MHz BAND WIDTH)**

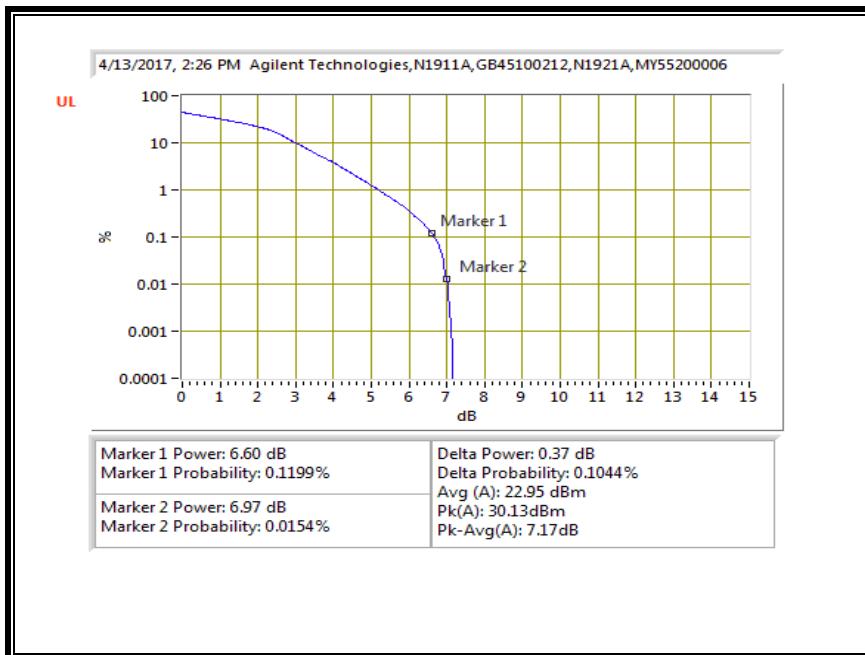


### 8.5.8. LTE BAND 25

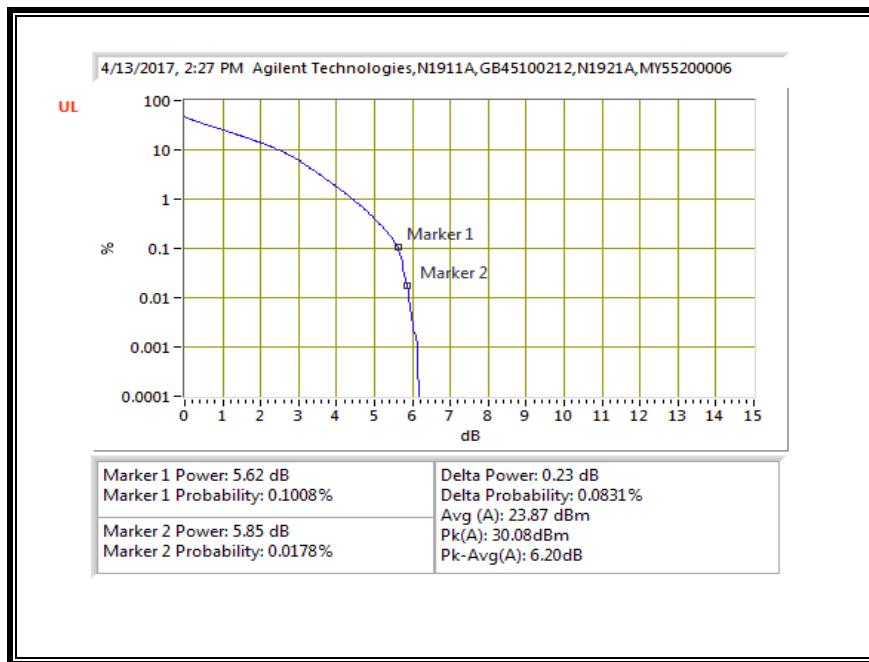
#### QPSK, (1.4 MHz BAND WIDTH)



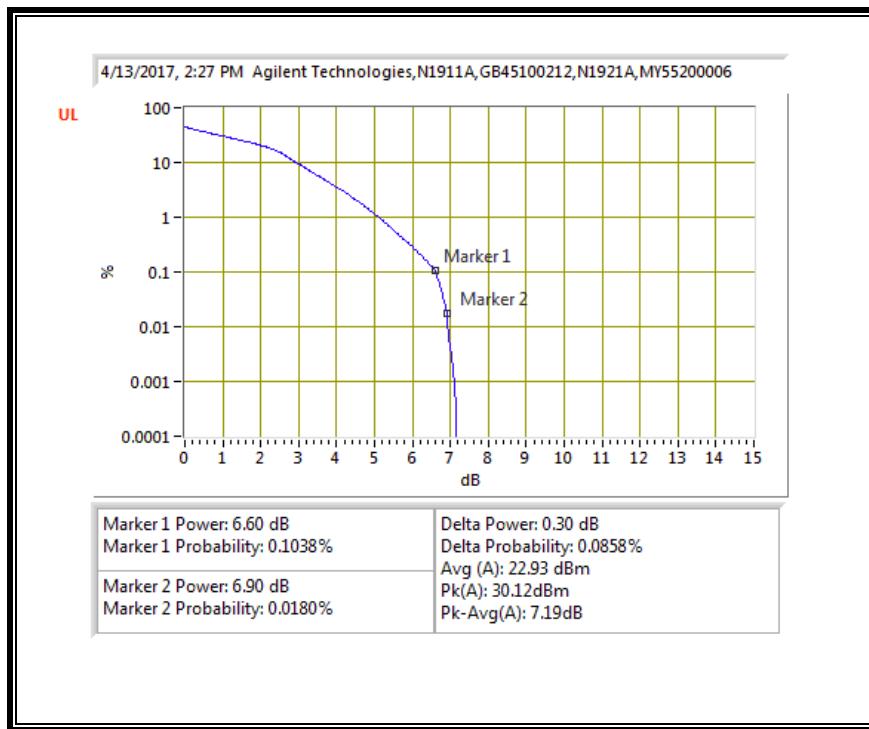
#### 16QAM, (1.4 MHz BAND WIDTH)



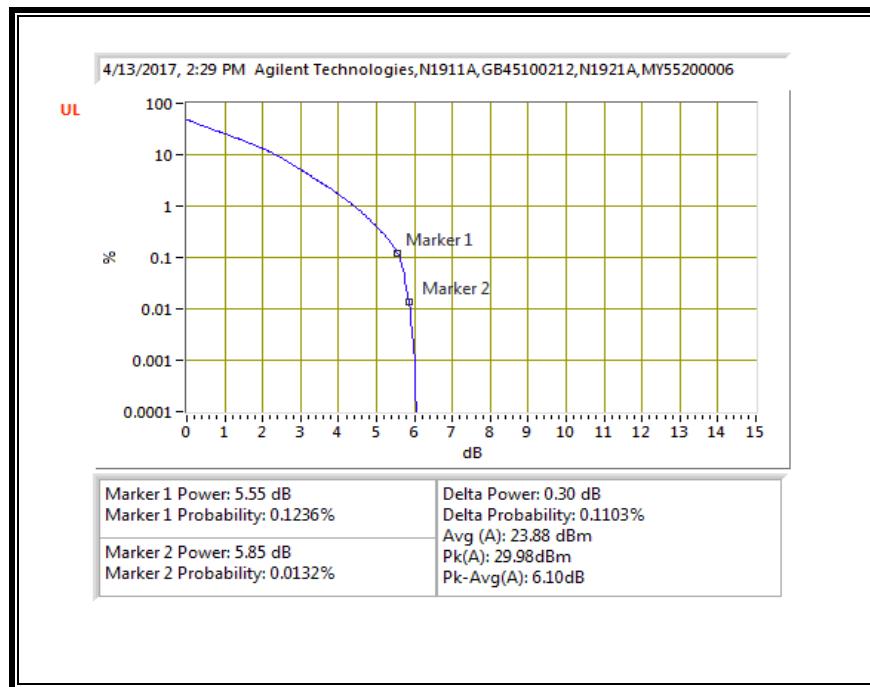
**QPSK, (3.0 MHz BAND WIDTH)**



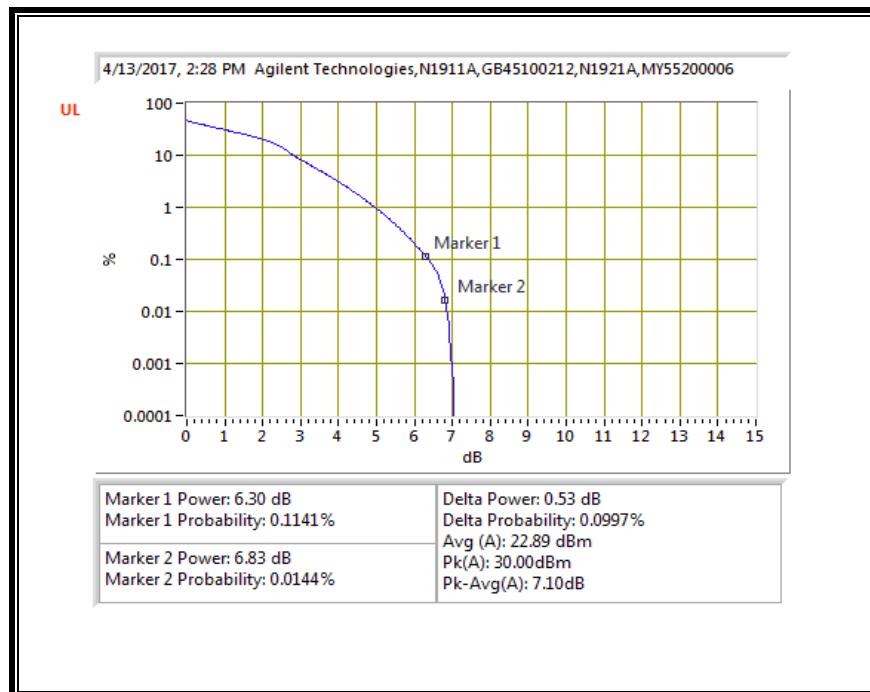
**16QAM, (3.0 MHz BAND WIDTH)**



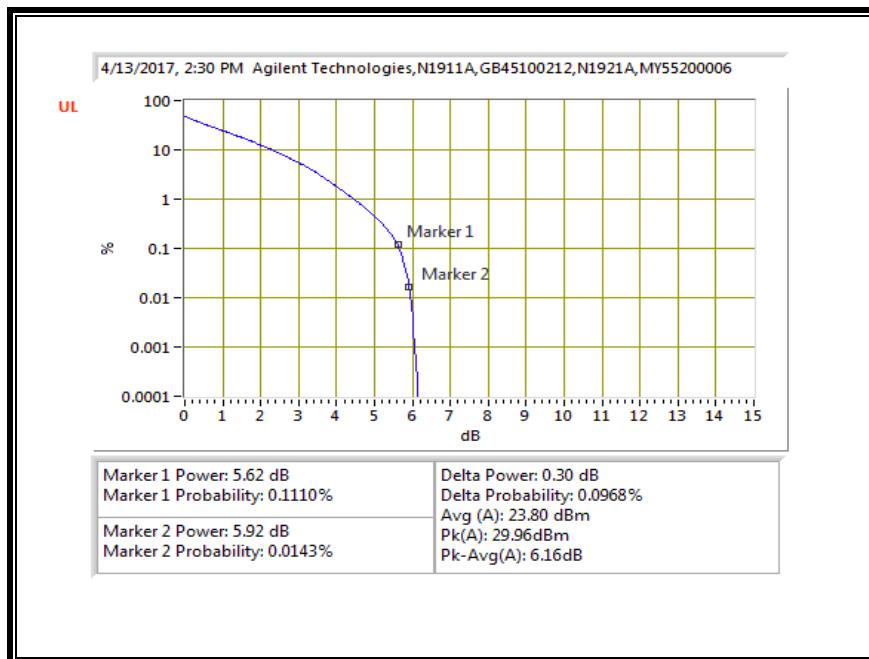
**QPSK, (5.0 MHz BAND WIDTH)**



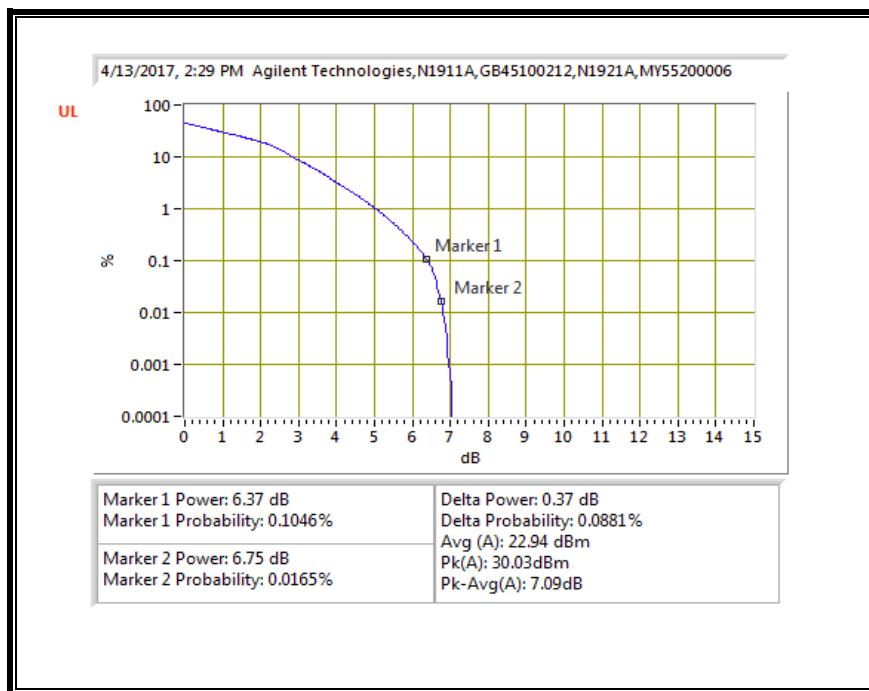
**16QAM, (5.0 MHz BAND WIDTH)**



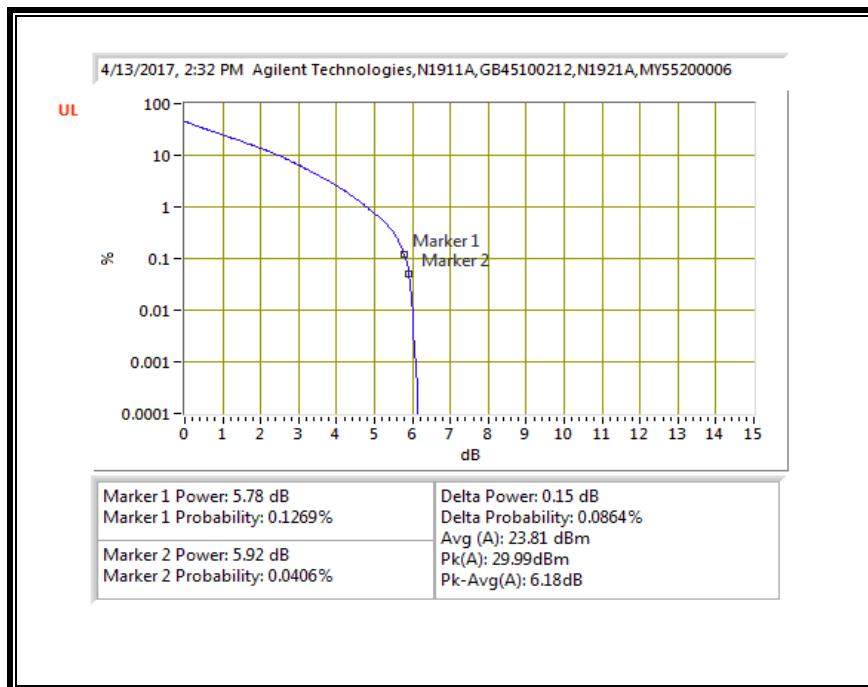
**QPSK, (10.0 MHz BAND WIDTH)**



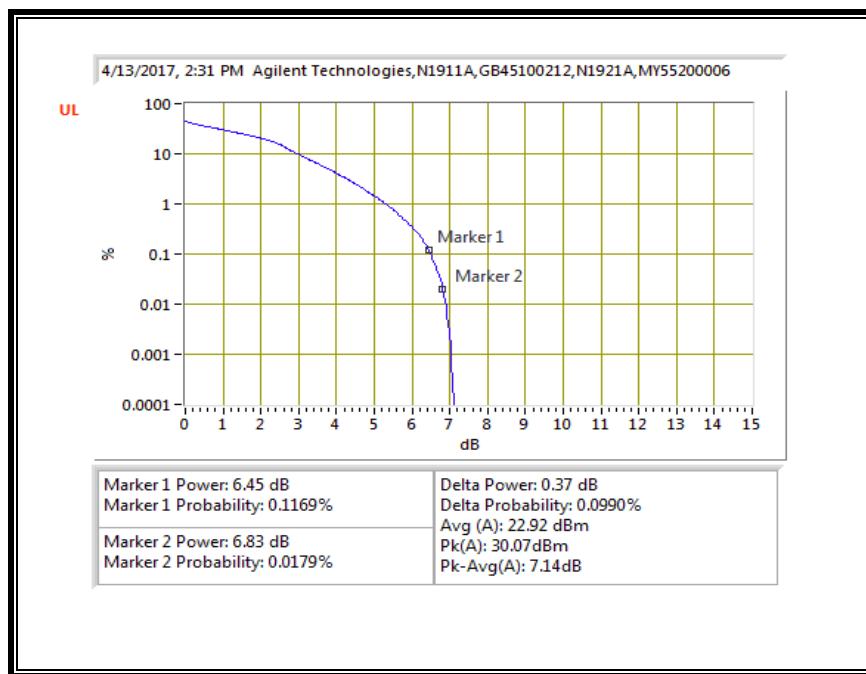
**16QAM, (10.0 MHz BAND WIDTH)**



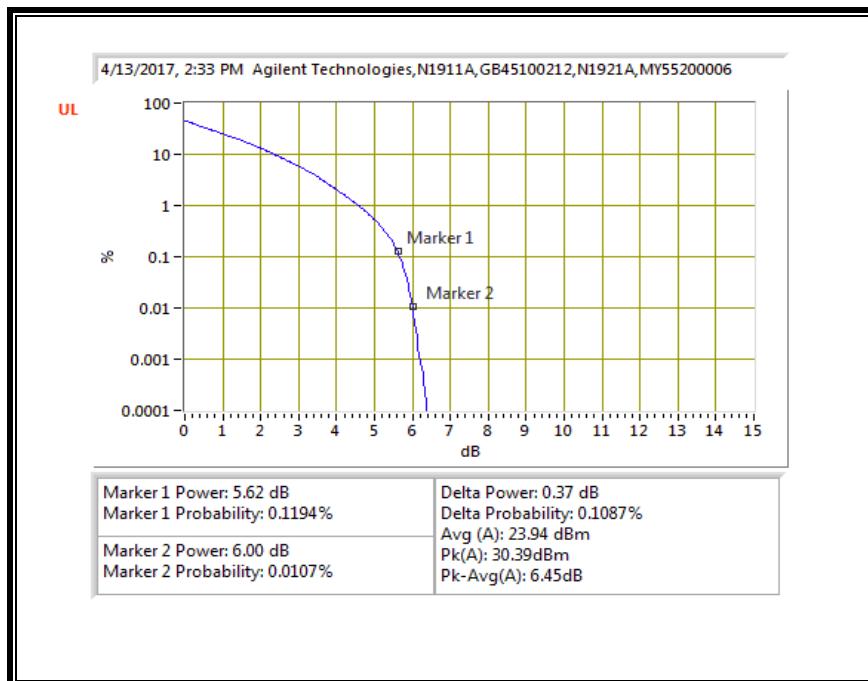
**QPSK, (15.0 MHz BAND WIDTH)**



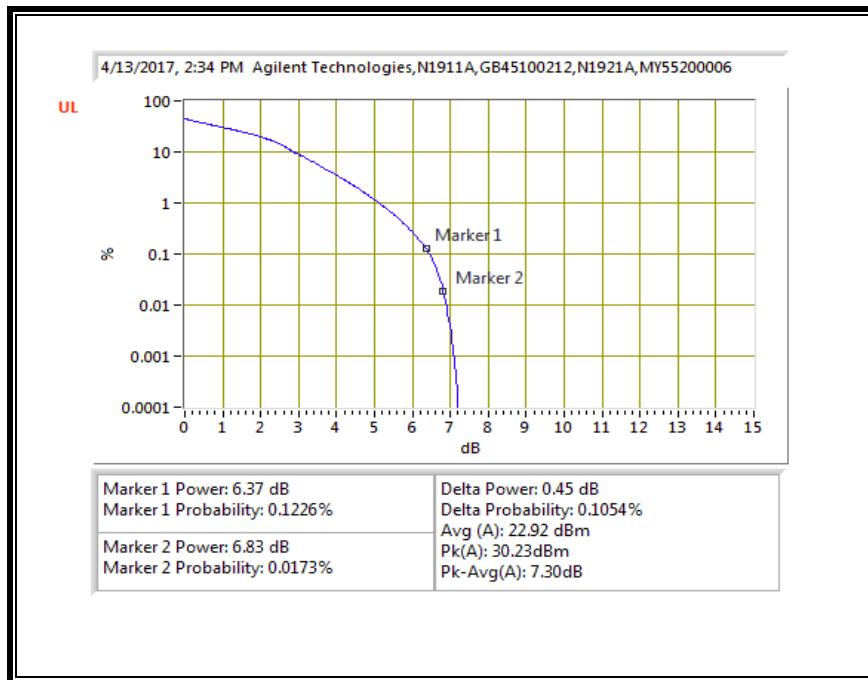
**16QAM, (15.0 MHz BAND WIDTH)**



**QPSK, (20.0 MHz BAND WIDTH)**

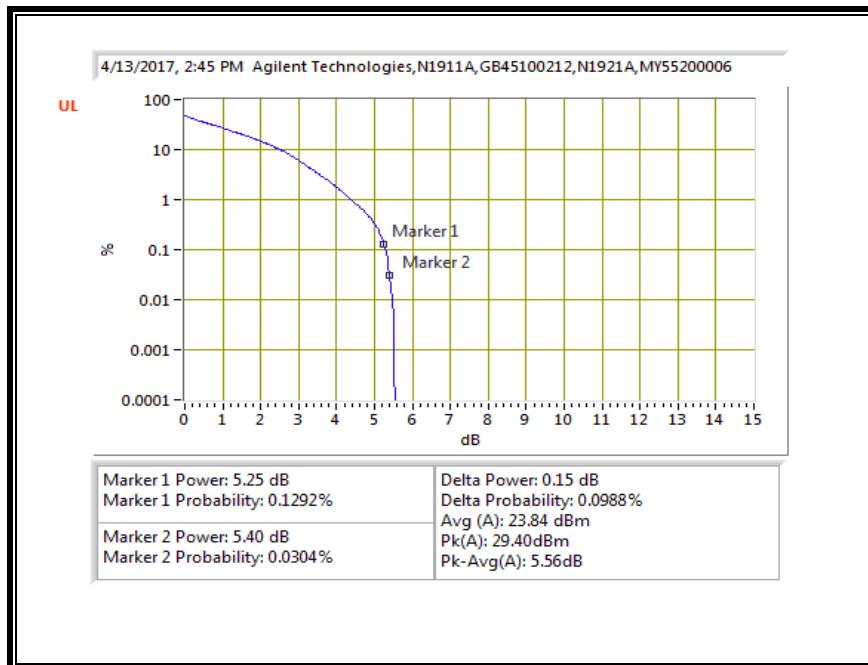


**16QAM, (20.0 MHz BAND WIDTH)**

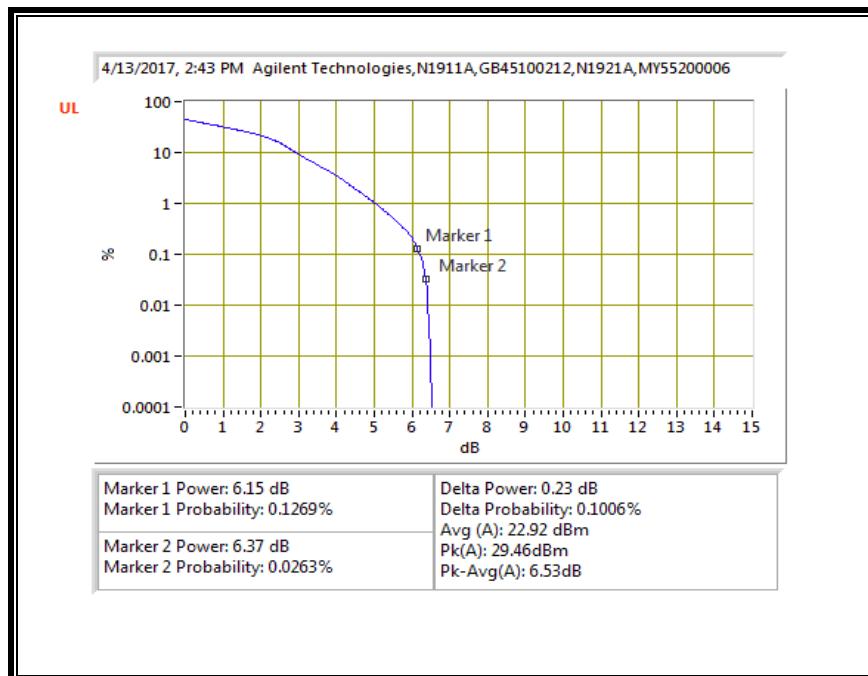


### 8.5.9. LTE BAND 26

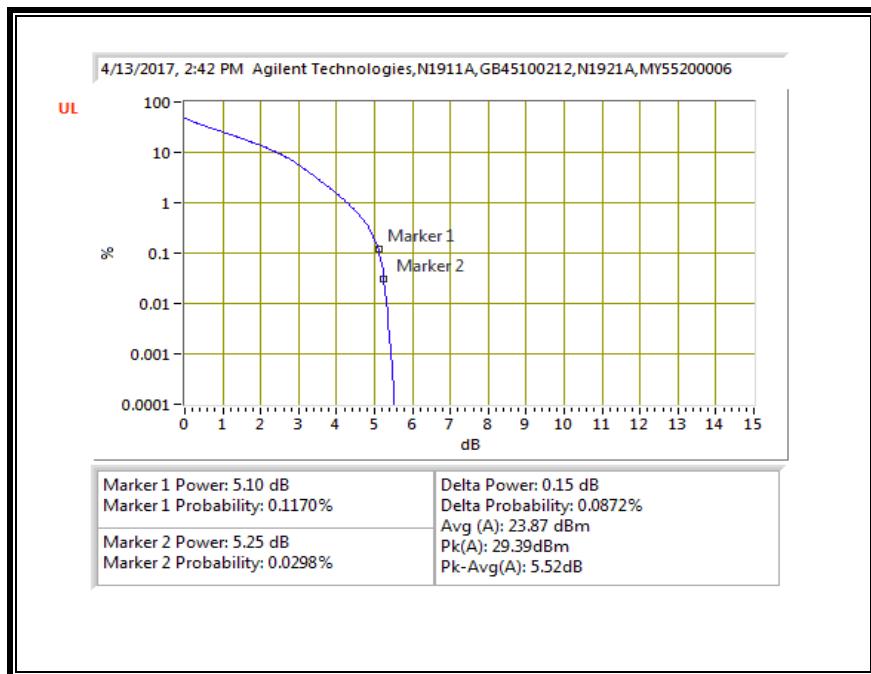
#### QPSK, (1.4 MHz BAND WIDTH)



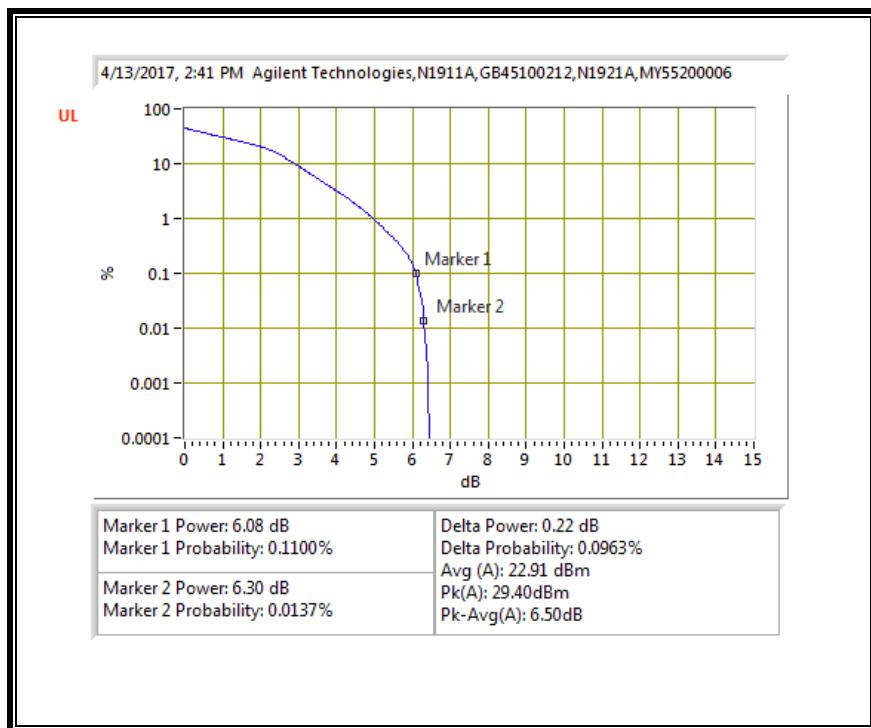
#### 16QAM, (1.4 MHz BAND WIDTH)



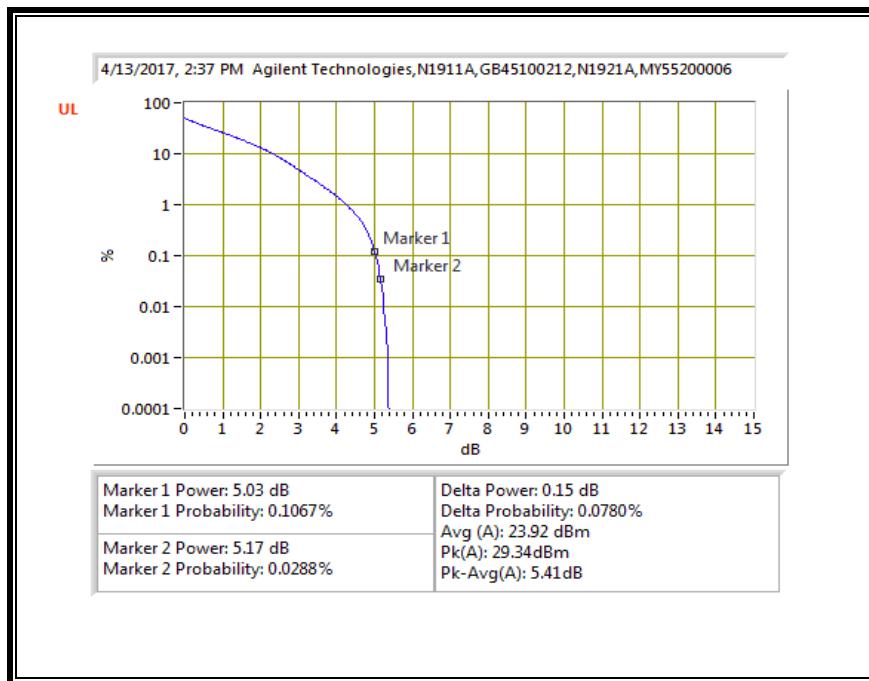
**QPSK, (3.0 MHz BAND WIDTH)**



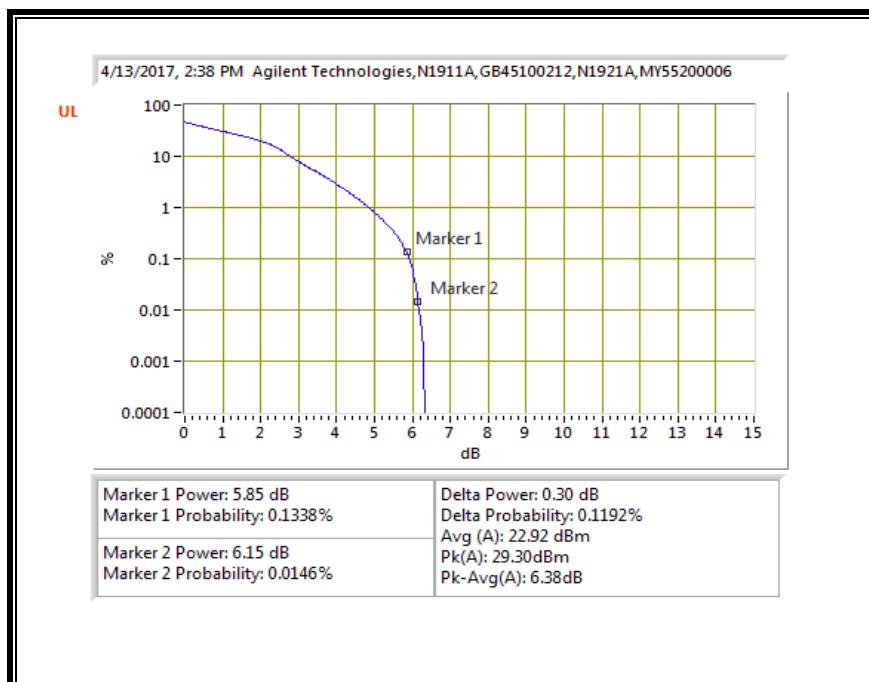
**16QAM, (3.0 MHz BAND WIDTH)**



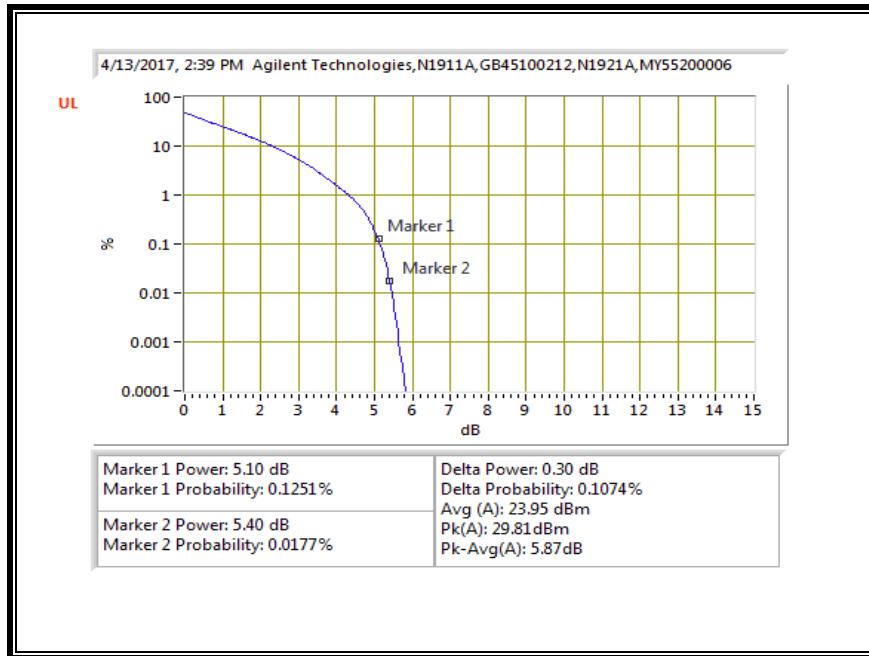
**QPSK, (5.0 MHz BAND WIDTH)**



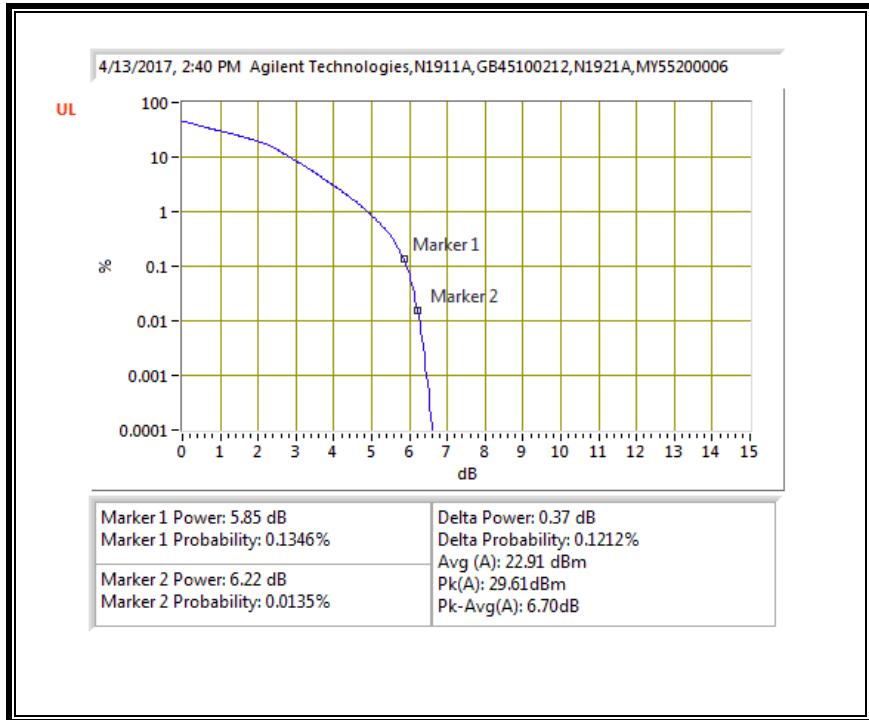
**16QAM, (5.0 MHz BAND WIDTH)**



**QPSK, (10.0 MHz BAND WIDTH)**

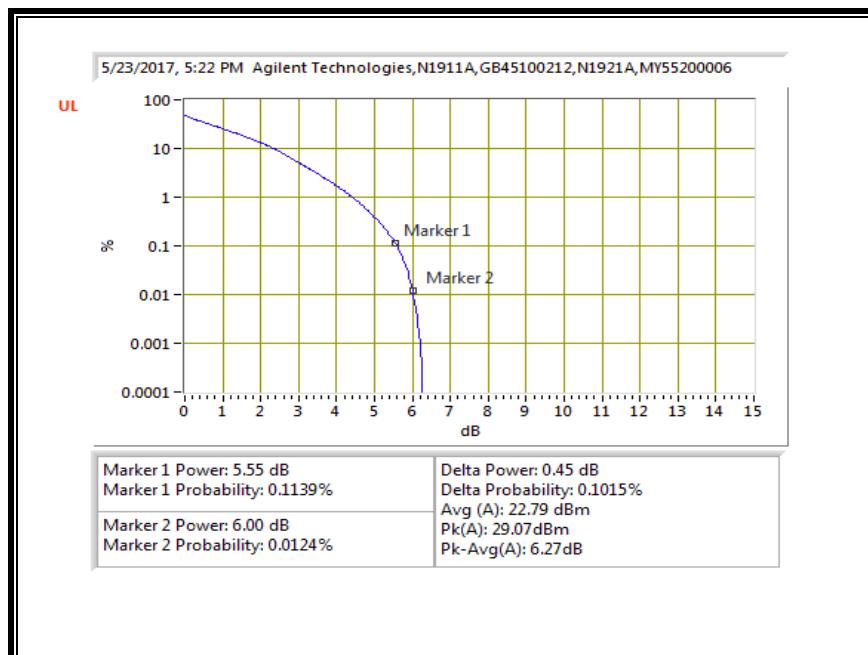


**16QAM, (10.0 MHz BAND WIDTH)**

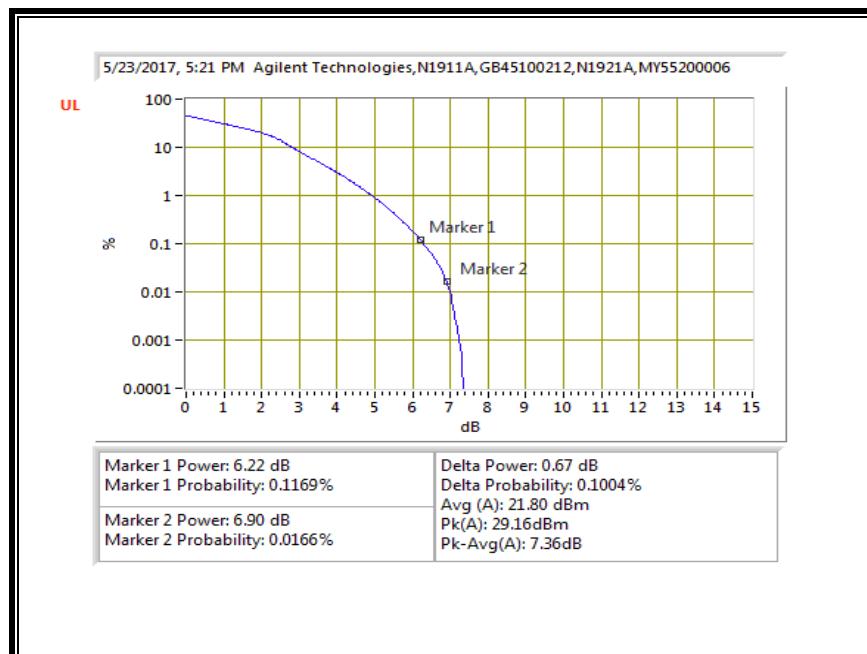


### 8.5.10. LTE BAND 30

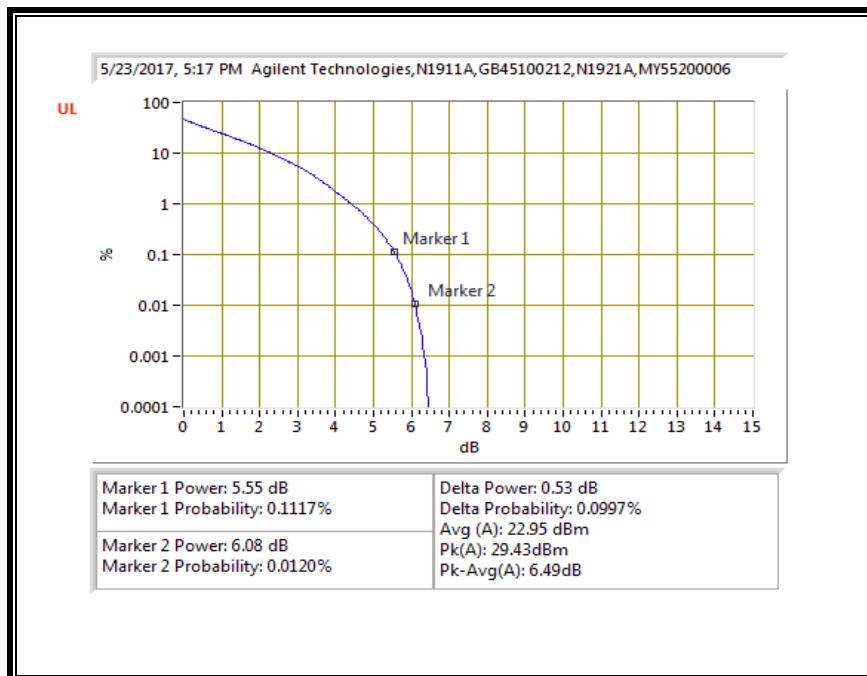
#### QPSK, (5.0 MHz BAND WIDTH)



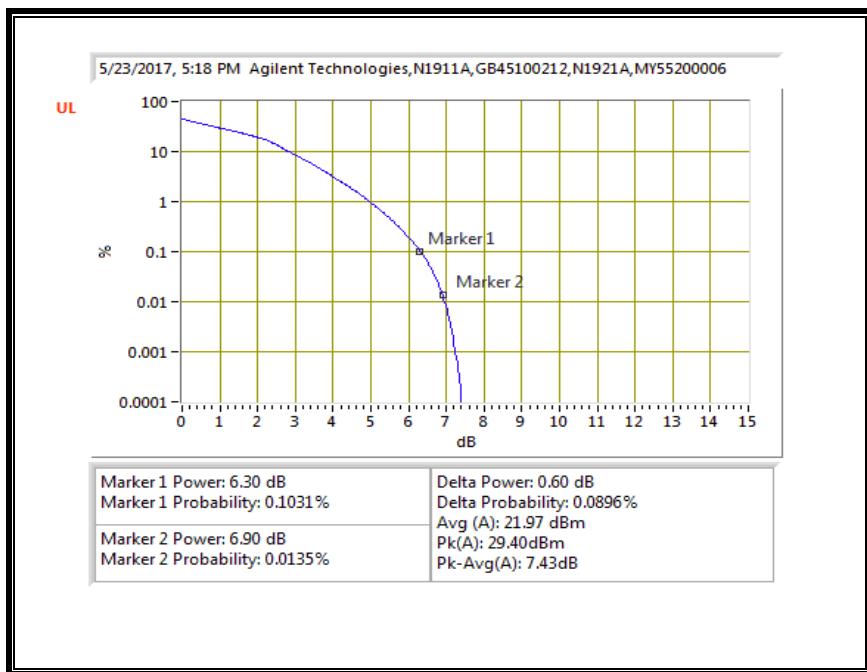
#### 16QAM, (5.0 MHz BAND WIDTH)



**QPSK, (10.0 MHz BAND WIDTH)**



**16QAM, (10.0 MHz BAND WIDTH)**



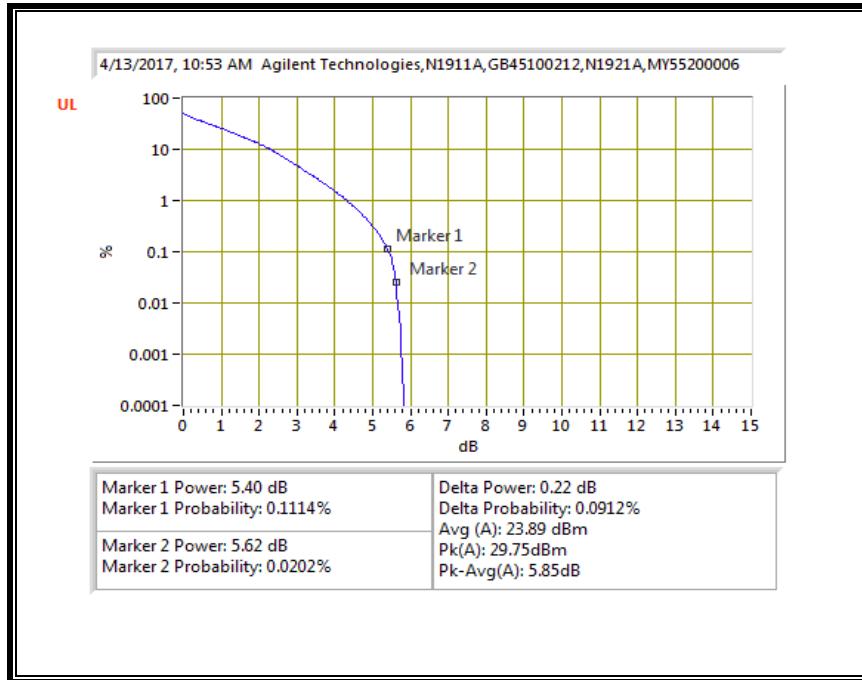
### 8.5.11. LTE BAND 41

ID:	52297	Date:	4/13/17
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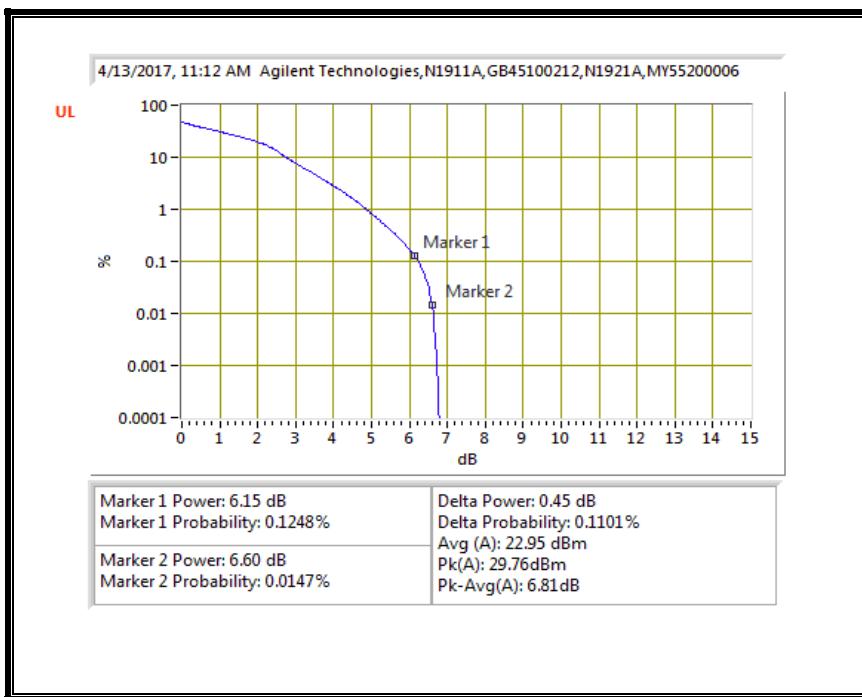
Mode	Channel Band-	Frequency (MHz)	RB Size	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Ratio					
						Peak	Average						
LTE Band 41	5MHz	2593.0	25	0	QPSK	30.31	16.97	6.35					
					16QAM	30.24	15.95	7.30					
	10MHz		50	0	QPSK	30.30	16.85	6.46					
					16QAM	30.31	15.93	7.39					
	15MHz		75	0	QPSK	30.63	16.87	6.77					
					16QAM	30.66	15.96	7.71					
	20MHz		100	0	QPSK	30.81	16.81	7.01					
					16QAM	30.83	15.83	8.01					
Duty Cycle Correction Factor (dB)= 6.99													
Peak to Average Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor													

## 8.5.12. LTE BAND 66

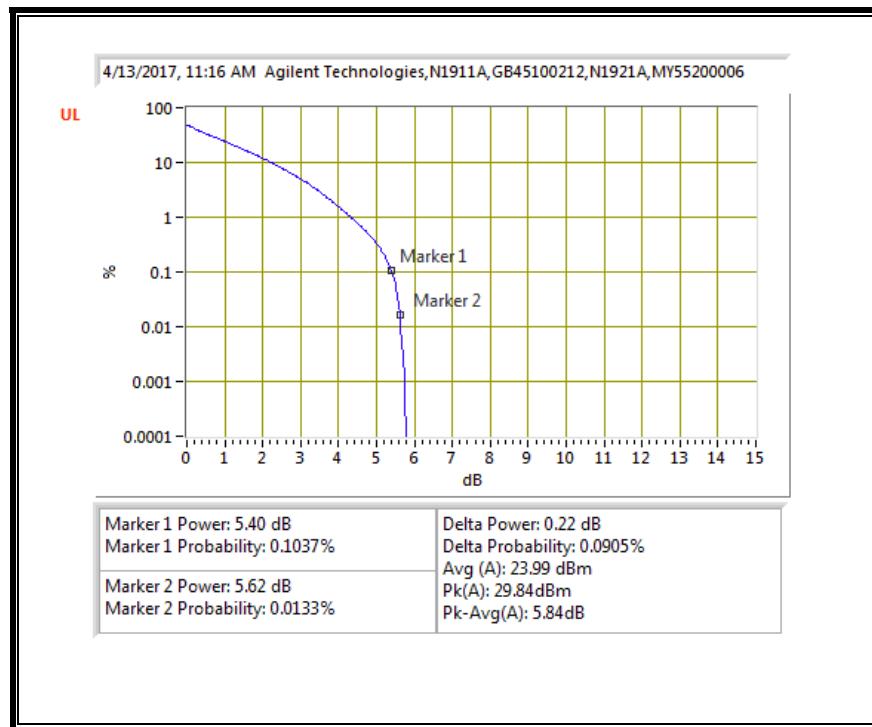
### QPSK, (5.0 MHz BAND WIDTH)



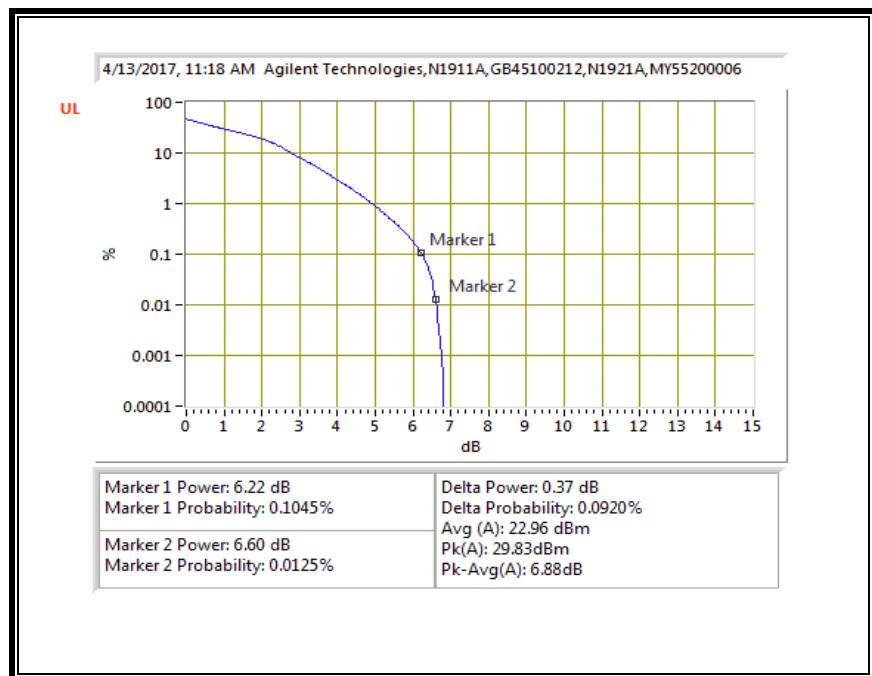
### 16QAM, (5.0 MHz BAND WIDTH)



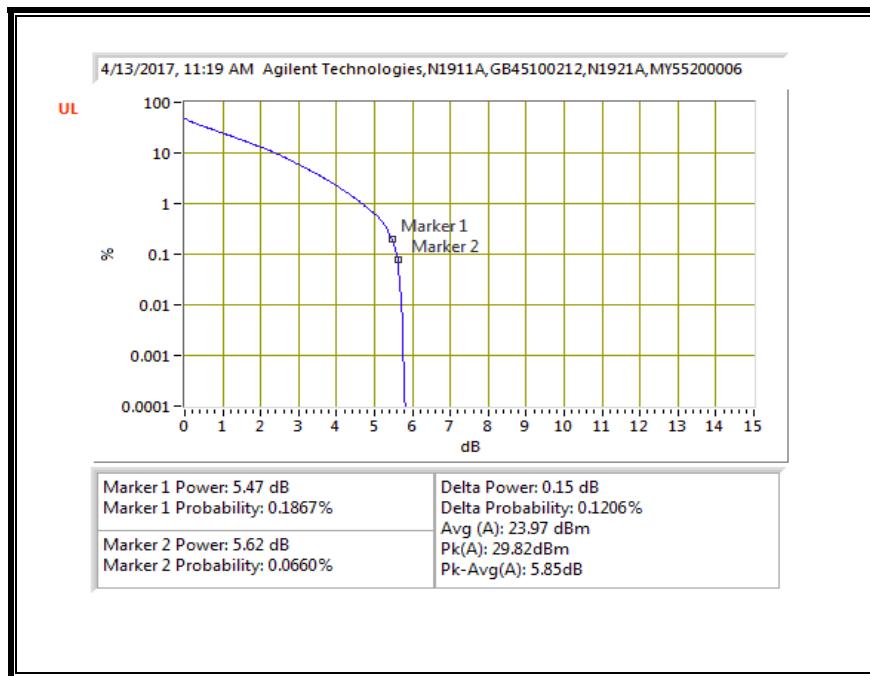
**QPSK, (10.0 MHz BAND WIDTH)**



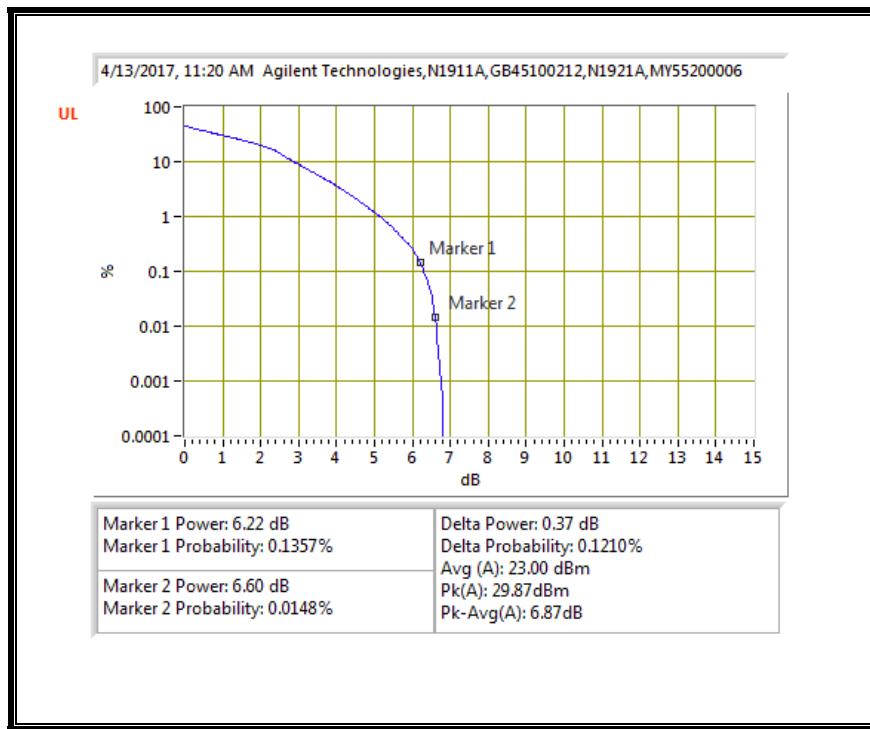
**16QAM, (10.0 MHz BAND WIDTH)**



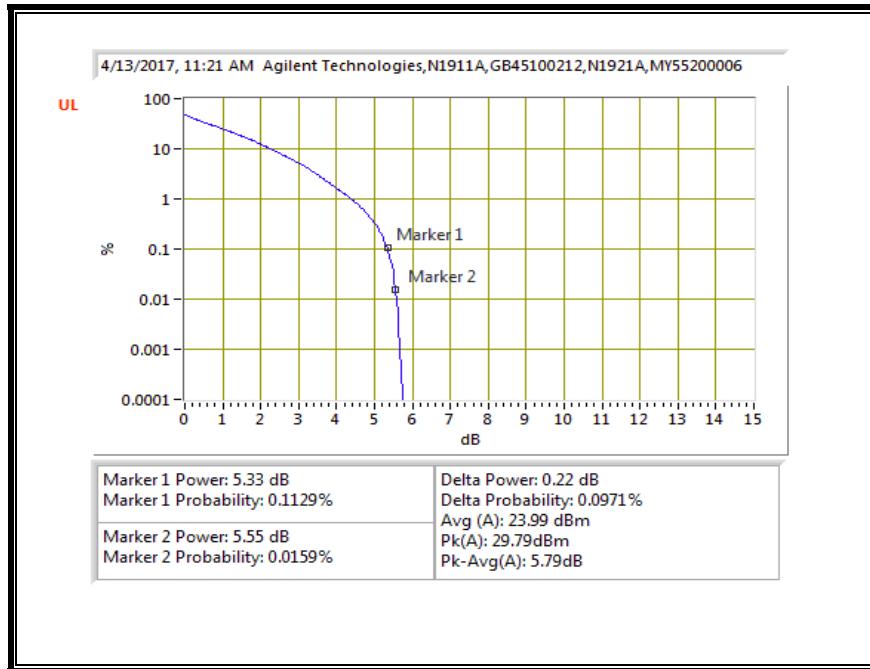
**QPSK, (15.0 MHz BAND WIDTH)**



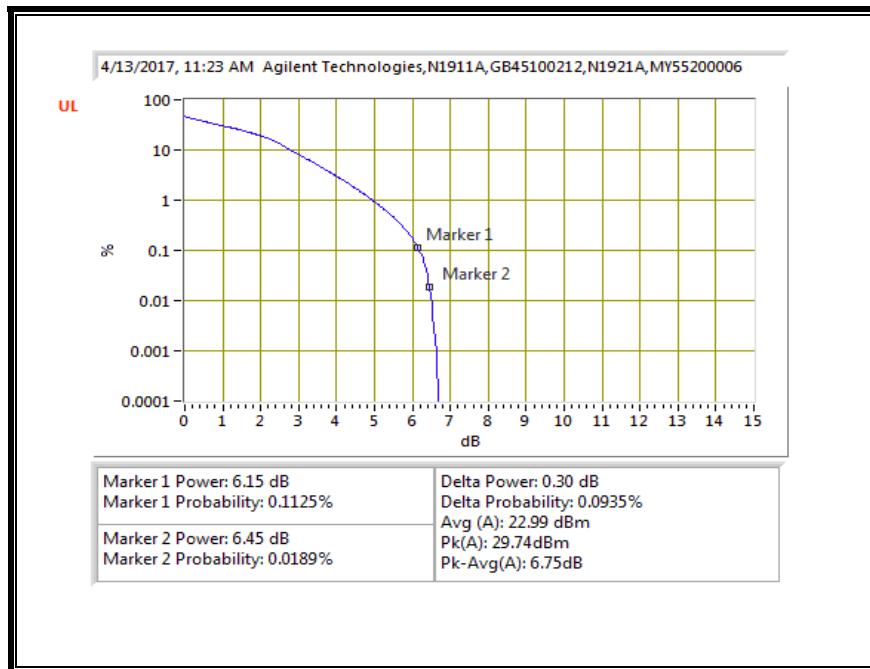
**16QAM, (15.0 MHz BAND WIDTH)**



**QPSK, (20.0 MHz BAND WIDTH)**



**16QAM, (20.0 MHz BAND WIDTH)**



## 9. RADIATED TEST RESULTS

### 9.1. FIELD STRENGTH OF SPURIOUS RADIATION, LAT 1

#### RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53, §90.691

#### LIMIT

FCC: §22.917 (e) and §24.238 (a): Out of band emissions. 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.

FCC: §27.53 (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.

FCC: §27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 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.

FCC: §90.691 Emission mask requirements for EA-based systems.

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $116 \log_{10}(f/6.1)$  decibels or  $50 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

### **TEST PROCEDURE**

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth in the 1 MHz band immediately outside and adjacent to the channel edge of the equipment. Beyond the 1 MHz band immediately outside the channel edge of the equipment, a resolution bandwidth of 1 MHz shall be employed. A narrower resolution bandwidth is allowed to be used provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1% of the occupied bandwidth as applicable.

The power of any unwanted emissions measured from the channel edge of the equipment shall be attenuated below the transmitter power,  $P$  (dBW), as follows:

- a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than  $43 + 10 \log_{10} (p)$ , dB; and
- b. for mobile subscriber equipment, the attenuation shall not be less than  $43 + 10 \log_{10} (p)$ , dB at the channel edges and  $55 + 10 \log_{10} (p)$  at 5.5 MHz away and beyond the channel edges where  $p$  in (a) and (b) is the transmitter power measured in watts.

#### **MODES TESTED**

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 17
- LTE Band 25
- LTE Band 26
- LTE Band 30
- LTE Band 41
- LTE Band 66

#### **RESULTS**

### 9.1.1. LTE BAND 2

#### QPSK LTE BAND 2 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:										
Date:		04/10/17								
Test Engineer:		30606								
Configuration:		EUT Only								
Mode:		LTE Band 2, 20MHz QPSK								
<u>Test Equipment:</u>		Substitution: Horn T59 Substitution, and 8ft SMA Cable								
Chamber			Pre-amplifier			Filter			Limit	
3m Chamber D			3m Chamber D			Filter			EIRP	
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
<b>Low Channel (1860MHz)</b>										
3.72	-66.2	H	3.0	-18.2	33.5	1.0	50.7	-13.0	-37.7	
5.58	-66.9	H	3.0	-15.6	32.4	1.0	47.0	-13.0	-34.0	
7.44	-67.1	H	3.0	-12.7	30.4	1.0	42.0	-13.0	-29.0	
3.72	-64.9	V	3.0	-16.9	33.5	1.0	49.4	-13.0	-36.4	
5.58	-67.9	V	3.0	-16.8	32.4	1.0	48.3	-13.0	-35.3	
7.44	-66.5	V	3.0	-11.9	30.4	1.0	41.2	-13.0	-28.2	
<b>Mid Channel (1880MHz)</b>										
3.76	-66.4	H	3.0	-18.3	33.5	1.0	50.8	-13.0	-37.8	
5.64	-68.3	H	3.0	-16.8	32.4	1.0	48.2	-13.0	-35.2	
7.52	-68.2	H	3.0	-13.7	30.3	1.0	43.0	-13.0	-30.0	
3.76	-66.3	V	3.0	-18.2	33.5	1.0	50.8	-13.0	-37.8	
5.64	-68.0	V	3.0	-16.8	32.4	1.0	48.1	-13.0	-35.1	
7.52	-68.1	V	3.0	-13.4	30.3	1.0	42.7	-13.0	-29.7	
<b>High Channel (1900MHz)</b>										
3.80	-65.5	H	3.0	-17.3	33.6	1.0	49.9	-13.0	-36.9	
5.70	-67.6	H	3.0	-16.1	32.3	1.0	47.4	-13.0	-34.4	
7.60	-68.2	H	3.0	-13.6	30.2	1.0	42.7	-13.0	-29.7	
3.80	-65.2	V	3.0	-17.0	33.6	1.0	49.6	-13.0	-36.6	
5.70	-66.8	V	3.0	-15.5	32.3	1.0	46.8	-13.0	-33.8	
7.60	-66.7	V	3.0	-12.0	30.2	1.0	41.1	-13.0	-28.1	
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**16QAM LTE BAND 2 (20.0MHZ BANDWIDTH)**

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:										
Date:										
Test Engineer:										
Configuration:										
Mode:										
<b>Test Equipment:</b>										
Substitution: Horn T59 Substitution, and 8ft SMA Cable										
		Chamber	Pre-amplifier	Filter	Limit					
		3m Chamber D	3m Chamber D	Filter	EIRP					
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
<b>Low Channel (1860MHz)</b>										
3.72	-64.6	H	3.0	-16.6	33.5	1.0	-49.2	-13.0	-36.2	
5.58	-67.6	H	3.0	-16.3	32.4	1.0	-47.7	-13.0	-34.7	
7.44	-68.3	H	3.0	-13.9	30.4	1.0	-43.2	-13.0	-30.2	
3.72	-64.6	V	3.0	-16.6	33.5	1.0	-49.2	-13.0	-36.2	
5.58	-66.4	V	3.0	-15.3	32.4	1.0	-46.7	-13.0	-33.7	
7.44	-67.7	V	3.0	-13.1	30.4	1.0	-42.5	-13.0	-29.5	
<b>Mid Channel (1880MHz)</b>										
3.76	-64.5	H	3.0	-16.3	33.5	1.0	-48.9	-13.0	-35.9	
5.64	-67.5	H	3.0	-16.1	32.4	1.0	-47.4	-13.0	-34.4	
7.52	-68.0	H	3.0	-13.5	30.3	1.0	-42.8	-13.0	-29.8	
3.76	-65.1	V	3.0	-17.0	33.5	1.0	-49.6	-13.0	-36.6	
5.64	-65.5	V	3.0	-14.3	32.4	1.0	-45.7	-13.0	-32.7	
7.52	-68.3	V	3.0	-13.6	30.3	1.0	-42.9	-13.0	-29.9	
<b>High Channel (1900MHz)</b>										
3.80	-64.3	H	3.0	-16.1	33.6	1.0	-48.7	-13.0	-35.7	
5.70	-66.1	H	3.0	-14.5	32.3	1.0	-45.8	-13.0	-32.8	
7.60	-68.2	H	3.0	-13.6	30.2	1.0	-42.7	-13.0	-29.7	
3.80	-65.2	V	3.0	-17.0	33.6	1.0	-49.6	-13.0	-36.6	
5.70	-68.2	V	3.0	-16.8	32.3	1.0	-48.1	-13.0	-35.1	
7.60	-67.9	V	3.0	-13.1	30.2	1.0	-42.3	-13.0	-29.3	
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### 9.1.2. LTE BAND 4

#### QPSK LTE BAND 4 (3.0MHZ BANDWIDTH)

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:										
Date:		05/11/17								
Test Engineer:		10641								
Configuration:		EUT Only								
Mode:		LTE Band 4, 3MHz QPSK								
<u>Test Equipment:</u>										
Substitution: Horn T59 Substitution, and 8ft SMA Cable										
		Chamber	Pre-amplifier	Filter	Limit					
		3m Chamber E	3m Chamber E	Filter	EIRP					
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
<b>Low Channel (1720MHz)</b>										
3.44	-62.1	H	3.0	-12.8	38.5	1.0	-50.3	-13.0	-37.3	
5.16	-59.2	H	3.0	-6.0	38.7	1.0	-43.7	-13.0	-30.7	
6.88	-60.3	H	3.0	-3.4	38.1	1.0	-40.5	-13.0	-27.5	
3.44	-61.4	V	3.0	-12.3	38.5	1.0	-49.8	-13.0	-36.8	
5.16	-58.2	V	3.0	-5.3	38.7	1.0	-43.0	-13.0	-30.0	
6.88	-60.6	V	3.0	-3.9	38.1	1.0	-41.0	-13.0	-28.0	
<b>Mid Channel (1732.5MHz)</b>										
3.47	-61.2	H	3.0	-11.9	38.5	1.0	-49.4	-13.0	-36.4	
5.20	-59.8	H	3.0	-6.5	38.7	1.0	-44.2	-13.0	-31.2	
6.93	-59.5	H	3.0	-2.5	38.1	1.0	-39.6	-13.0	-26.6	
3.47	-59.1	V	3.0	-9.9	38.5	1.0	-47.5	-13.0	-34.5	
5.20	-60.2	V	3.0	-7.2	38.7	1.0	-44.9	-13.0	-31.9	
6.93	-60.9	V	3.0	-4.1	38.1	1.0	-41.2	-13.0	-28.2	
<b>High Channel (1745MHz)</b>										
3.49	-62.1	H	3.0	-12.7	38.5	1.0	-50.2	-13.0	-37.2	
5.24	-60.5	H	3.0	-7.1	38.7	1.0	-44.8	-13.0	-31.8	
6.98	-61.1	H	3.0	-3.9	38.1	1.0	-41.0	-13.0	-28.0	
3.49	-62.3	V	3.0	-13.0	38.5	1.0	-50.6	-13.0	-37.6	
5.24	-61.3	V	3.0	-8.3	38.7	1.0	-46.0	-13.0	-33.0	
6.98	-60.6	V	3.0	-3.7	38.1	1.0	-40.8	-13.0	-27.8	

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**16QAM LTE BAND 4 (3.0MHZ BANDWIDTH)**

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:										
Date:		05/11/17								
Test Engineer:		10641								
Configuration:		EUT Only								
Mode:		LTE Band 4, 3MHz 16QAM								
<u>Test Equipment:</u>										
Substitution: Horn T59 Substitution, and 8ft SMA Cable										
Chamber			Pre-amplifier			Filter		Limit		
3m Chamber E			3m Chamber E			Filter		EIRP		
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1720MHz)										
3.44	-62.6	H	3.0	-13.3	38.5	1.0	-50.9	-13.0	-37.9	
5.16	-59.0	H	3.0	-5.8	38.7	1.0	-43.5	-13.0	-30.5	
6.88	-60.5	H	3.0	-3.5	38.1	1.0	-40.7	-13.0	-27.7	
3.44	-62.4	V	3.0	-13.3	38.5	1.0	-50.8	-13.0	-37.8	
5.16	-59.3	V	3.0	-6.5	38.7	1.0	-44.1	-13.0	-31.1	
6.88	-60.1	V	3.0	-3.4	38.1	1.0	-40.5	-13.0	-27.5	
Mid Channel (1732.5MHz)										
3.47	-60.9	H	3.0	-11.5	38.5	1.0	-49.0	-13.0	-36.0	
5.20	-60.4	H	3.0	-7.1	38.7	1.0	-44.8	-13.0	-31.8	
6.93	-60.9	H	3.0	-3.9	38.1	1.0	-41.0	-13.0	-28.0	
3.47	-61.3	V	3.0	-12.2	38.5	1.0	-49.7	-13.0	-36.7	
5.20	-59.4	V	3.0	-6.5	38.7	1.0	-44.2	-13.0	-31.2	
6.93	-60.3	V	3.0	-3.5	38.1	1.0	-40.6	-13.0	-27.6	
High Channel (1745MHz)										
3.49	-62.1	H	3.0	-12.6	38.5	1.0	-50.2	-13.0	-37.2	
5.24	-59.9	H	3.0	-6.6	38.7	1.0	-44.2	-13.0	-31.2	
6.98	-60.5	H	3.0	-3.3	38.1	1.0	-40.4	-13.0	-27.4	
3.49	-61.6	V	3.0	-12.3	38.5	1.0	-49.8	-13.0	-36.8	
5.24	-61.5	V	3.0	-8.4	38.7	1.0	-46.1	-13.0	-33.1	
6.98	-60.0	V	3.0	-3.1	38.1	1.0	-40.2	-13.0	-27.2	
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### 9.1.3. LTE BAND 5

#### QPSK LTE BAND 5 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:										
Date:	04/12/17									
Test Engineer:	44353									
Configuration:	EUT Only									
Mode:	LTE Band 5, 10MHz QPSK									
Test Equipment:										
Substitution: Horn T59 Substitution, and 8ft SMA Cable										
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber D		3m Chamber D		Filter		EIRP				
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (829MHz)										
1.66	68.2	H	3.0	-26.4	35.0	1.0	-60.4	-13.0	-47.4	
2.49	-66.3	H	3.0	-22.1	33.8	1.0	-54.9	-13.0	-41.9	
3.32	-67.3	H	3.0	-20.5	33.2	1.0	-52.7	-13.0	-39.7	
1.66	69.1	V	3.0	-27.0	35.0	1.0	-61.1	-13.0	-48.1	
2.49	-66.8	V	3.0	-22.4	33.8	1.0	-55.2	-13.0	-42.2	
3.32	-68.1	V	3.0	-21.1	33.2	1.0	-53.4	-13.0	-40.4	
Mid Channel (836.5MHz)										
1.67	-65.9	H	3.0	-24.1	35.0	1.0	-58.1	-13.0	-45.1	
2.51	-67.0	H	3.0	-22.7	33.7	1.0	-55.4	-13.0	-42.4	
3.35	-67.6	H	3.0	-20.7	33.3	1.0	-53.0	-13.0	-40.0	
1.67	-66.9	V	3.0	-24.8	35.0	1.0	-58.9	-13.0	-45.9	
2.51	-65.9	V	3.0	-21.5	33.7	1.0	-54.2	-13.0	-41.2	
3.35	-67.1	V	3.0	-20.1	33.3	1.0	-52.3	-13.0	-39.3	
High Channel (844MHz)										
1.69	-67.0	H	3.0	-25.1	35.0	1.0	-59.1	-13.0	-46.1	
2.53	-66.1	H	3.0	-21.7	33.7	1.0	-54.4	-13.0	-41.4	
3.38	-65.8	H	3.0	-18.8	33.3	1.0	-51.1	-13.0	-38.1	
1.69	-66.4	V	3.0	-24.3	35.0	1.0	-58.3	-13.0	-45.3	
2.53	-66.7	V	3.0	-22.2	33.7	1.0	-54.9	-13.0	-41.9	
3.38	-66.7	V	3.0	-19.6	33.3	1.0	-51.9	-13.0	-38.9	

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**16QAM LTE BAND 5 (10.0MHZ BANDWIDTH)**

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:										
Date:	04/12/17									
Test Engineer:	44353									
Configuration:	EUT Only									
Mode:	LTE Band 5, 10MHz 16QAM									
<u>Test Equipment:</u> Substitution: Horn T59 Substitution, and 8ft SMA Cable										
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber D		3m Chamber D		Filter		EIRP				
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
<u>Low Channel (829MHz)</u>										
1.66	-66.5	H	3.0	-25.1	35.0	1.0	-59.1	-13.0	-46.1	
2.49	-66.4	H	3.0	-23.3	33.8	1.0	-56.1	-13.0	-43.1	
3.32	-66.0	H	3.0	-20.0	33.2	1.0	-52.2	-13.0	-39.2	
1.66	-67.1	V	3.0	-25.4	35.0	1.0	-59.4	-13.0	-46.4	
2.49	-67.1	V	3.0	-22.9	33.8	1.0	-55.8	-13.0	-42.8	
3.32	-65.4	V	3.0	-19.4	33.2	1.0	-51.6	-13.0	-38.6	
<u>Mid Channel (836.5MHz)</u>										
1.67	-66.4	H	3.0	-24.9	35.0	1.0	-58.9	-13.0	-45.9	
2.51	-66.2	H	3.0	-23.0	33.7	1.0	-55.7	-13.0	-42.7	
3.35	-66.5	H	3.0	-20.5	33.3	1.0	-52.7	-13.0	-39.7	
1.67	-67.1	V	3.0	-25.4	35.0	1.0	-59.4	-13.0	-46.4	
2.51	-66.0	V	3.0	-21.7	33.7	1.0	-54.5	-13.0	-41.5	
3.35	-66.5	V	3.0	-20.5	33.3	1.0	-52.7	-13.0	-39.7	
<u>High Channel (844MHz)</u>										
1.69	-66.3	H	3.0	-24.7	35.0	1.0	-58.8	-13.0	-45.8	
2.53	-66.6	H	3.0	-23.3	33.7	1.0	-56.0	-13.0	-43.0	
3.38	-66.6	H	3.0	-20.5	33.3	1.0	-52.8	-13.0	-39.8	
1.69	-66.7	V	3.0	-24.9	35.0	1.0	-58.9	-13.0	-45.9	
2.53	-65.7	V	3.0	-21.4	33.7	1.0	-54.1	-13.0	-41.1	
3.38	-65.5	V	3.0	-19.3	33.3	1.0	-51.6	-13.0	-38.6	
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### 9.1.4. LTE BAND 7

#### QPSK LTE BAND 7 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:										
Date:	04/11/17									
Test Engineer:	44353									
Configuration:	EUT Only									
Mode:	LTE Band 7, 20MHz QPSK									
Test Equipment:										
Substitution: Horn T69 Substitution, and 8ft SMA Cable										
Chamber			Pre-amplifier			Filter			Limit	
3m Chamber D	3m Chamber D	Filter	3m Chamber D	Filter	Filter	Filter	Filter	LTE B7	Limit	
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2510MHz)										
5.02	-65.5	H	3.0	-15.1	33.0	1.0	-47.1	-25.0	-22.1	
7.53	-67.6	H	3.0	-13.1	30.2	1.0	-42.3	-25.0	-17.3	
10.04	-67.6	H	3.0	-10.0	27.3	1.0	-36.3	-25.0	-11.3	
5.02	-63.4	V	3.0	-13.3	33.0	1.0	-45.3	-25.0	-20.3	
7.53	-67.4	V	3.0	-12.8	30.2	1.0	-42.0	-25.0	-17.0	
10.04	-67.1	V	3.0	-10.1	27.3	1.0	-36.3	-25.0	-11.3	
Mid Channel (2535MHz)										
5.07	-64.5	H	3.0	-14.0	33.0	1.0	-46.0	-25.0	-21.0	
7.61	-66.6	H	3.0	-12.0	30.2	1.0	-41.2	-25.0	-16.2	
10.14	-66.6	H	3.0	-9.0	27.3	1.0	-35.3	-25.0	-10.3	
5.07	-65.8	V	3.0	-15.7	33.0	1.0	-47.6	-25.0	-22.6	
7.61	-66.2	V	3.0	-11.4	30.2	1.0	-40.6	-25.0	-15.6	
10.14	-66.7	V	3.0	-9.6	27.3	1.0	-35.9	-25.0	-10.9	
High Channel (2560MHz)										
5.12	-64.5	H	3.0	-13.9	32.9	1.0	-45.8	-25.0	-20.8	
7.68	-66.2	H	3.0	-11.5	30.1	1.0	-40.6	-25.0	-15.6	
10.24	-66.4	H	3.0	-8.8	27.4	1.0	-35.2	-25.0	-10.2	
5.12	-65.5	V	3.0	-15.3	32.9	1.0	-47.2	-25.0	-22.2	
7.68	-66.7	V	3.0	-11.9	30.1	1.0	-41.0	-25.0	-16.0	
10.24	-67.3	V	3.0	-10.2	27.4	1.0	-36.5	-25.0	-11.5	
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**16QAM LTE BAND 7 (20.0MHZ BANDWIDTH)**

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:										
Date:	04/11/17									
Test Engineer:		44353								
Configuration:		EUT Only								
Mode:		LTE Band 7, 20MHz 16QAM								
Test Equipment:		Substitution: Horn T59 Substitution, and 8ft SMA Cable								
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber D		3m Chamber D		Filter		LTE B7				
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2510MHz)										
5.02	-64.3	H	3.0	-13.9	33.0	1.0	-45.9	-25.0	-20.9	
7.53	-65.4	H	3.0	-10.9	30.2	1.0	-40.1	-25.0	-15.1	
10.04	-65.9	H	3.0	-8.3	27.3	1.0	-34.6	-25.0	-9.6	
5.02	-65.2	V	3.0	-15.2	33.0	1.0	-47.2	-25.0	-22.2	
7.53	-67.2	V	3.0	-12.5	30.2	1.0	-41.8	-25.0	-16.8	
10.04	-67.1	V	3.0	-10.1	27.3	1.0	-36.4	-25.0	-11.4	
Mid Channel (2535MHz)										
5.07	-65.4	H	3.0	-14.9	33.0	1.0	-46.9	-25.0	-21.9	
7.61	-65.6	H	3.0	-11.0	30.2	1.0	-40.2	-25.0	-15.2	
10.14	-68.0	H	3.0	-10.4	27.3	1.0	-36.7	-25.0	-11.7	
5.07	-64.4	V	3.0	-14.3	33.0	1.0	-46.2	-25.0	-21.2	
7.61	-66.8	V	3.0	-12.1	30.2	1.0	-41.2	-25.0	-16.2	
10.14	-66.8	V	3.0	-9.7	27.3	1.0	-36.0	-25.0	-11.0	
High Channel (2560MHz)										
5.12	-64.9	H	3.0	-14.4	32.9	1.0	-46.3	-25.0	-21.3	
7.68	-66.6	H	3.0	-11.9	30.1	1.0	-41.0	-25.0	-16.0	
10.24	-67.1	H	3.0	-9.5	27.4	1.0	-35.9	-25.0	-10.9	
5.12	-64.5	V	3.0	-14.3	32.9	1.0	-46.2	-25.0	-21.2	
7.68	-66.3	V	3.0	-11.5	30.1	1.0	-40.6	-25.0	-15.6	
10.24	-67.3	V	3.0	-10.2	27.4	1.0	-36.5	-25.0	-11.5	

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### 9.1.5. LTE BAND 12

#### QPSK LTE BAND 12 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:										
Date:	04/12/17									
Test Engineer:	39472									
Configuration:	EUT Only									
Mode:	LTE Band 12, 10MHz QPSK									
<u>Test Equipment:</u> Substitution: Horn T59 Substitution, and 8ft SMA Cable										
Chamber			Pre-amplifier		Filter		Limit			
3m Chamber D			3m Chamber D			Filter			EIRP	
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (704MHz)										
1.41	-66.6	H	3.0	-25.7	34.8	1.0	59.6	-13.0	-46.6	
2.11	-68.2	H	3.0	-25.1	34.9	1.0	59.0	-13.0	-46.0	
2.82	-69.2	H	3.0	-23.9	33.3	1.0	56.2	-13.0	-43.2	
1.41	-67.6	V	3.0	-26.5	34.8	1.0	60.3	-13.0	-47.3	
2.11	-68.8	V	3.0	-25.7	34.9	1.0	59.5	-13.0	-46.5	
2.82	-68.2	V	3.0	-22.7	33.3	1.0	55.0	-13.0	-42.0	
Mid Channel (707.5MHz)										
1.42	-67.4	H	3.0	-26.5	34.8	1.0	60.3	-13.0	-47.3	
2.12	-68.0	H	3.0	-24.9	34.9	1.0	58.7	-13.0	-45.7	
2.83	-68.4	H	3.0	-23.1	33.3	1.0	55.4	-13.0	-42.4	
1.42	-68.0	V	3.0	-26.9	34.8	1.0	60.7	-13.0	-47.7	
2.12	-68.6	V	3.0	-25.4	34.9	1.0	59.3	-13.0	-46.3	
2.83	-69.4	V	3.0	-23.8	33.3	1.0	56.1	-13.0	-43.1	
High Channel (711MHz)										
1.42	-66.7	H	3.0	-25.7	34.9	1.0	59.6	-13.0	-46.6	
2.13	-66.1	H	3.0	-23.0	34.8	1.0	56.8	-13.0	-43.8	
2.84	-67.8	H	3.0	-22.4	33.2	1.0	54.6	-13.0	-41.6	
1.42	-67.1	V	3.0	-25.9	34.9	1.0	59.7	-13.0	-46.7	
2.13	-67.1	V	3.0	-23.9	34.8	1.0	57.8	-13.0	-44.8	
2.84	-68.1	V	3.0	-22.6	33.2	1.0	54.8	-13.0	-41.8	

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**16QAM LTE BAND 12 (10.0MHZ BANDWIDTH)**

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:										
Date:	04/12/17									
Test Engineer:	39472									
Configuration:	EUT Only									
Mode:	LTE Band 12, 10MHz 16QAM									
<u>Test Equipment:</u> Substitution: Horn T59 Substitution, and 8ft SMA Cable										
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber D		3m Chamber D		Filter		EIRP				
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
<b>Low Channel (704MHz)</b>										
1.41	-67.6	H	3.0	-26.7	34.8	1.0	60.5	-13.0	47.5	
2.11	-68.8	H	3.0	-25.6	34.9	1.0	59.5	-13.0	46.5	
2.82	-67.7	H	3.0	-22.4	33.3	1.0	54.7	-13.0	41.7	
1.41	-66.9	V	3.0	-25.7	34.8	1.0	59.5	-13.0	46.5	
2.11	-69.0	V	3.0	-25.9	34.9	1.0	59.8	-13.0	46.8	
2.82	-68.5	V	3.0	-23.0	33.3	1.0	55.3	-13.0	42.3	
<b>Mid Channel (707.5MHz)</b>										
1.42	-66.9	H	3.0	-26.0	34.8	1.0	59.8	-13.0	46.8	
2.12	-66.3	H	3.0	-23.2	34.9	1.0	57.0	-13.0	44.0	
2.83	-66.3	H	3.0	-21.0	33.3	1.0	53.2	-13.0	40.2	
1.42	-68.0	V	3.0	-26.8	34.8	1.0	60.6	-13.0	47.6	
2.12	-68.3	V	3.0	-25.1	34.9	1.0	59.0	-13.0	46.0	
2.83	-69.6	V	3.0	-24.1	33.3	1.0	56.3	-13.0	43.3	
<b>High Channel (711MHz)</b>										
1.42	-66.2	H	3.0	-25.3	34.9	1.0	59.1	-13.0	46.1	
2.13	-66.8	H	3.0	-23.6	34.8	1.0	57.4	-13.0	44.4	
2.84	-67.6	H	3.0	-22.2	33.2	1.0	54.5	-13.0	41.5	
1.42	-67.4	V	3.0	-26.2	34.9	1.0	60.1	-13.0	47.1	
2.13	-66.9	V	3.0	-23.7	34.8	1.0	57.6	-13.0	44.6	
2.84	-68.9	V	3.0	-23.3	33.2	1.0	55.6	-13.0	42.6	
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### 9.1.6. LTE BAND 13

#### QPSK LTE BAND 13 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:										
Date:	04/12/17									
Test Engineer:	39472									
Configuration:	EUT Only									
Mode:	LTE Band 13, 10MHz QPSK									
<u>Test Equipment:</u> Substitution: Horn T59 Substitution, and 8ft SMA Cable										
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber D		3m Chamber D		Filter		LTE B13				
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Mid Channel (782MHz)										
1.56	-66.8	H	3.0	-25.3	35.0	1.0	-59.3	-40.0	-19.3	
2.35	-67.0	H	3.0	-23.4	34.5	1.0	-56.9	-13.0	-43.9	
3.13	-68.8	H	3.0	-22.5	33.1	1.0	-54.6	-13.0	-41.6	
1.56	-68.7	V	3.0	-26.9	35.0	1.0	-60.9	-40.0	-20.9	
2.35	-68.7	V	3.0	-24.8	34.5	1.0	-58.3	-13.0	-45.3	
3.13	-69.8	V	3.0	-23.4	33.1	1.0	-55.5	-13.0	-42.5	
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**16QAM LTE BAND 13 (10.0MHZ BANDWIDTH)**

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:										
Date:		04/12/17								
Test Engineer:		39472								
Configuration:		EUT Only								
Mode:		LTE Band 13, 10MHz 16QAM								
<u>Test Equipment:</u>										
Substitution: Horn T59 Substitution, and 8ft SMA Cable										
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber D		3m Chamber D		Filter		LTE B13				
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Mid Channel (782MHz)										
1.56	-66.7	H	3.0	-25.2	35.0	1.0	-59.2	-40.0	-19.2	
2.35	-68.2	H	3.0	-24.6	34.5	1.0	-58.1	-43.0	-45.1	
3.13	-68.4	H	3.0	-22.1	33.1	1.0	-54.2	-43.0	-41.2	
1.56	-67.6	V	3.0	-25.8	35.0	1.0	-59.8	-40.0	-19.8	
2.35	-68.9	V	3.0	-25.0	34.5	1.0	-58.5	-43.0	-45.5	
3.13	-69.5	V	3.0	-23.1	33.1	1.0	-55.2	-43.0	-42.2	
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### 9.1.7. LTE BAND 17

#### QPSK LTE BAND 17 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:										
Date:		07/21/17								
Test Engineer:		50822								
Configuration:		EUT Only								
Mode:		LTE Band 17, 10MHz QPSK								
<u>Test Equipment:</u>										
Substitution: Horn T59 Substitution, and 8ft SMA Cable										
		Chamber	Pre-amplifier	Filter	Limit					
		3m Chamber E	3m Chamber E	Filter	EIRP					
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (709MHz)										
1.418	-64.0	H	3.0	-22.3	38.0	1.0	-59.4	-13.0	-46.4	
2.127	-64.1	H	3.0	-20.4	38.0	1.0	-57.4	-13.0	-44.4	
2.836	-64.7	H	3.0	-17.5	38.4	1.0	-55.0	-13.0	-42.0	
1.418	-63.8	V	3.0	-22.8	38.0	1.0	-59.9	-13.0	-46.9	
2.127	-64.5	V	3.0	-20.3	38.0	1.0	-57.3	-13.0	-44.3	
2.836	-64.7	V	3.0	-17.7	38.4	1.0	-55.1	-13.0	-42.1	
Mid Channel (710MHz)										
1.420	-63.3	H	3.0	-21.6	38.0	1.0	-58.6	-13.0	-45.6	
2.130	-64.0	H	3.0	-20.4	38.0	1.0	-57.4	-13.0	-44.4	
2.840	-65.1	H	3.0	-17.8	38.4	1.0	-55.3	-13.0	-42.3	
1.420	-63.4	V	3.0	-22.4	38.0	1.0	-59.4	-13.0	-46.4	
2.130	-64.0	V	3.0	-19.8	38.0	1.0	-56.8	-13.0	-43.8	
2.840	-64.9	V	3.0	-17.9	38.4	1.0	-55.3	-13.0	-42.3	
High Channel (711MHz)										
1.422	-64.0	H	3.0	-22.2	38.0	1.0	-59.3	-13.0	-46.3	
2.133	-64.3	H	3.0	-20.6	38.0	1.0	-57.6	-13.0	-44.6	
2.844	-64.7	H	3.0	-17.5	38.4	1.0	-54.9	-13.0	-41.9	
1.422	-63.6	V	3.0	-22.6	38.0	1.0	-59.6	-13.0	-46.6	
2.133	-64.2	V	3.0	-20.0	38.0	1.0	-57.0	-13.0	-44.0	
2.844	-64.6	V	3.0	-17.6	38.4	1.0	-55.0	-13.0	-42.0	

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**16QAM LTE BAND 17 (10.0MHZ BANDWIDTH)**

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:										
Date:		07/21/17								
Test Engineer:		50822								
Configuration:		EUT Only								
Mode:		LTE Band 17, 10MHz 16QAM								
Test Equipment:		Substitution: Horn T59 Substitution, and 8ft SMA Cable								
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber E		3m Chamber E		Filter		EIRP				
Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
<b>Low Channel (709MHz)</b>										
1.418	-63.7	H	3.0	-22.0	38.0	1.0	-59.0	-13.0	-46.0	
2.127	-64.6	H	3.0	-21.0	38.0	1.0	-58.0	-13.0	-45.0	
2.836	-62.2	H	3.0	-15.0	38.4	1.0	-52.4	-13.0	-39.4	
1.418	-63.8	V	3.0	-22.8	38.0	1.0	-59.8	-13.0	-46.8	
2.127	-64.5	V	3.0	-20.3	38.0	1.0	-57.3	-13.0	-44.3	
2.836	-64.7	V	3.0	-17.7	38.4	1.0	-55.1	-13.0	-42.1	
<b>Mid Channel (710MHz)</b>										
1.420	-63.2	H	3.0	-21.4	38.0	1.0	-58.5	-13.0	-45.5	
2.130	-63.8	H	3.0	-20.2	38.0	1.0	-57.2	-13.0	-44.2	
2.840	-64.1	H	3.0	-16.9	38.4	1.0	-54.4	-13.0	-41.4	
1.420	-62.8	V	3.0	-21.8	38.0	1.0	-58.9	-13.0	-45.9	
2.130	-64.4	V	3.0	-20.3	38.0	1.0	-57.3	-13.0	-44.3	
2.840	-64.5	V	3.0	-17.5	38.4	1.0	-54.9	-13.0	-41.9	
<b>High Channel (711MHz)</b>										
1.422	-63.9	H	3.0	-22.2	38.0	1.0	-59.2	-13.0	-46.2	
2.133	-64.8	H	3.0	-21.2	38.0	1.0	-58.2	-13.0	-45.2	
2.844	-64.8	H	3.0	-17.6	38.4	1.0	-55.0	-13.0	-42.0	
1.422	-63.9	V	3.0	-22.9	38.0	1.0	-59.9	-13.0	-46.9	
2.133	-64.7	V	3.0	-20.5	38.0	1.0	-57.5	-13.0	-44.5	
2.844	-64.6	V	3.0	-17.5	38.4	1.0	-55.0	-13.0	-42.0	
Rev. 05.21.15										