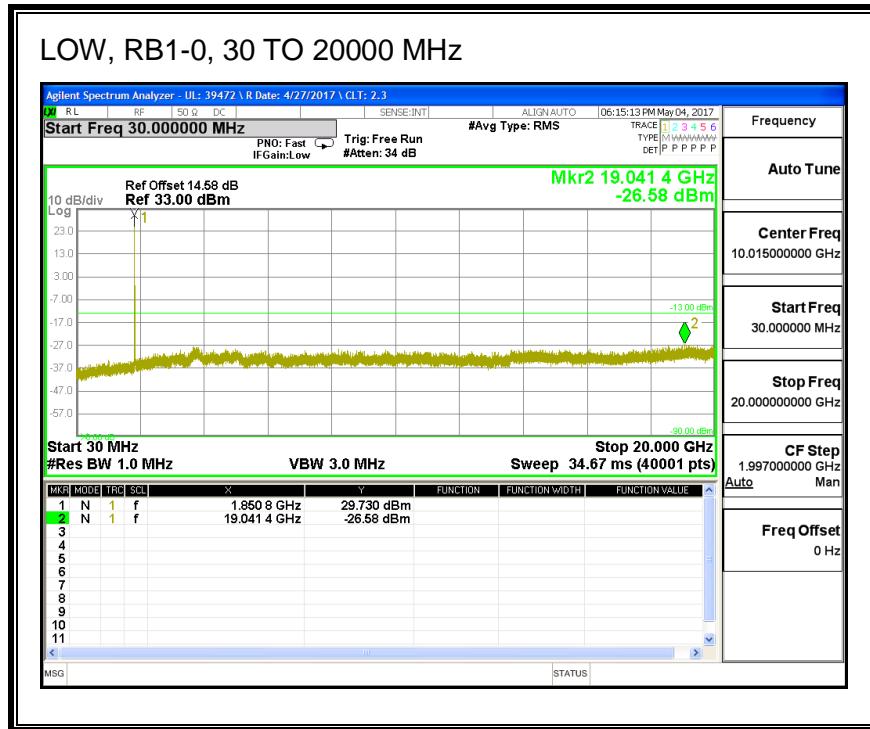
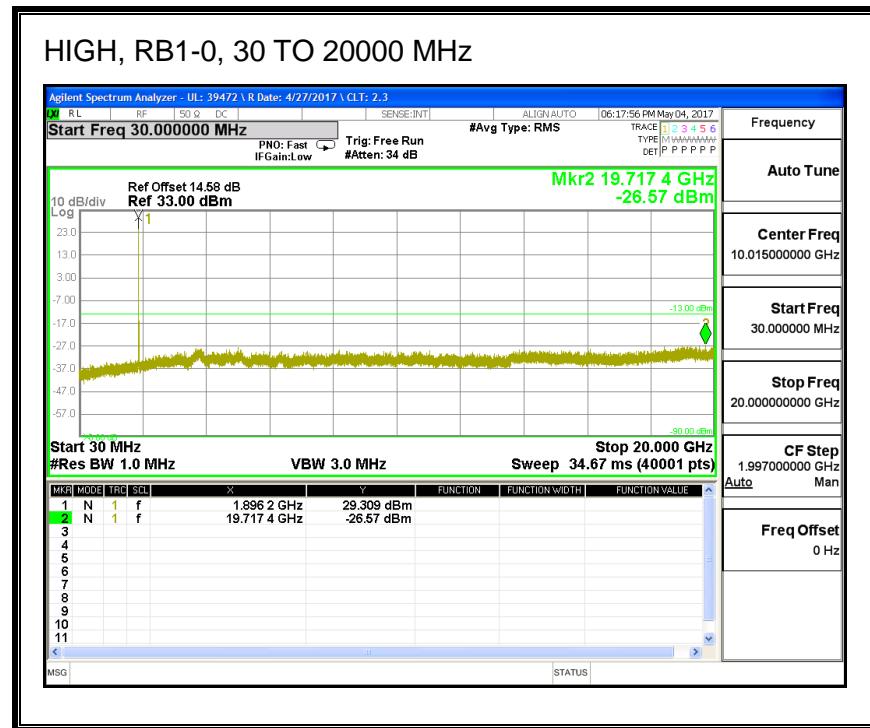
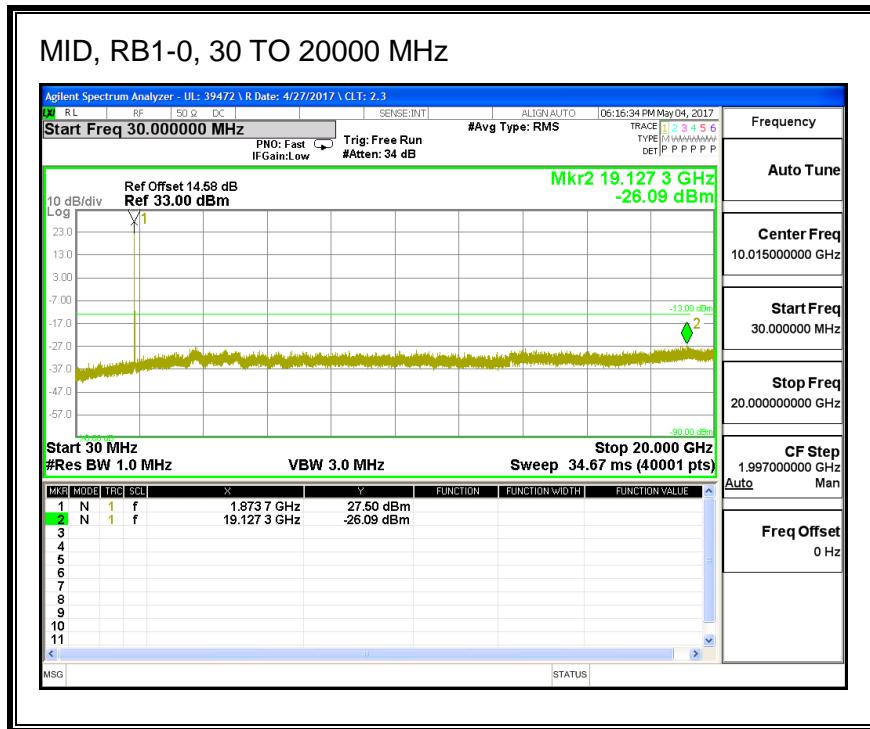


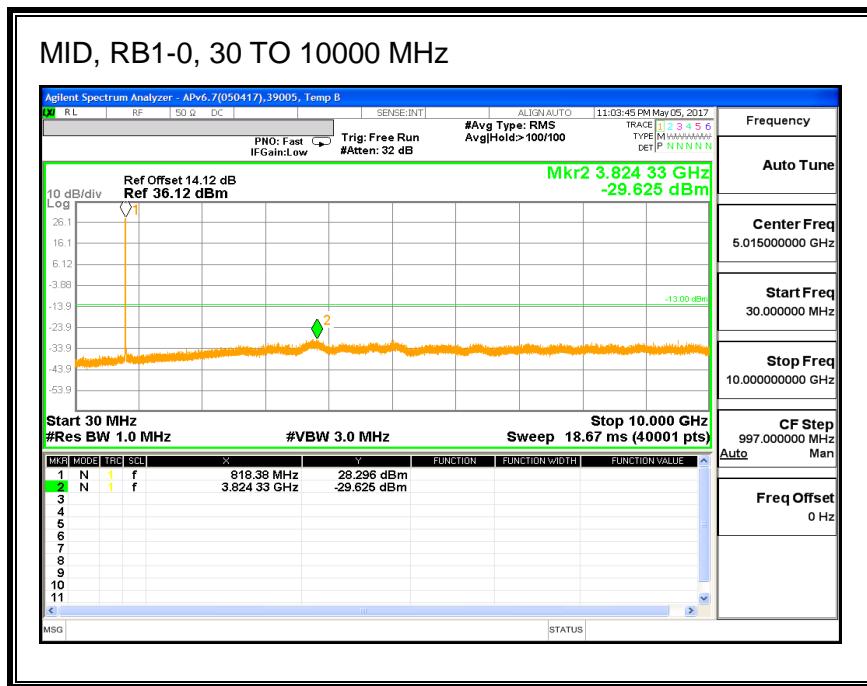
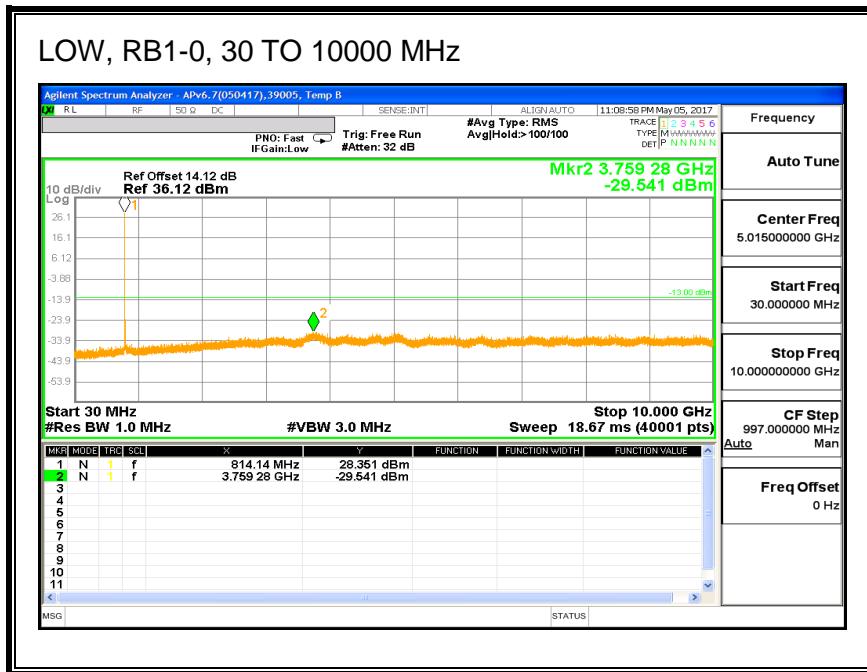
16QAM, (20.0 MHz BAND WIDTH)

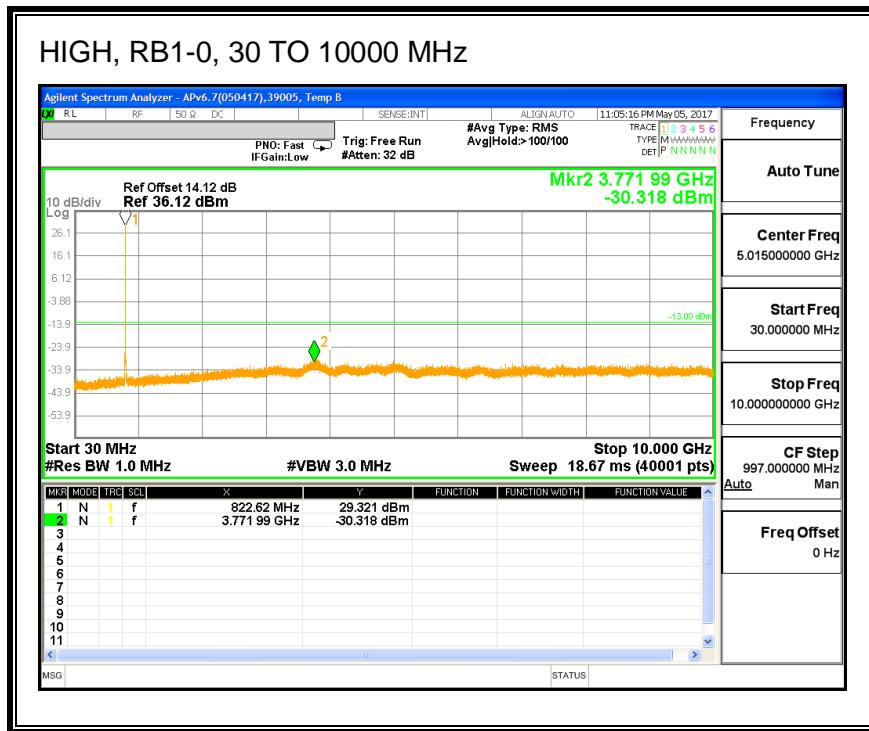




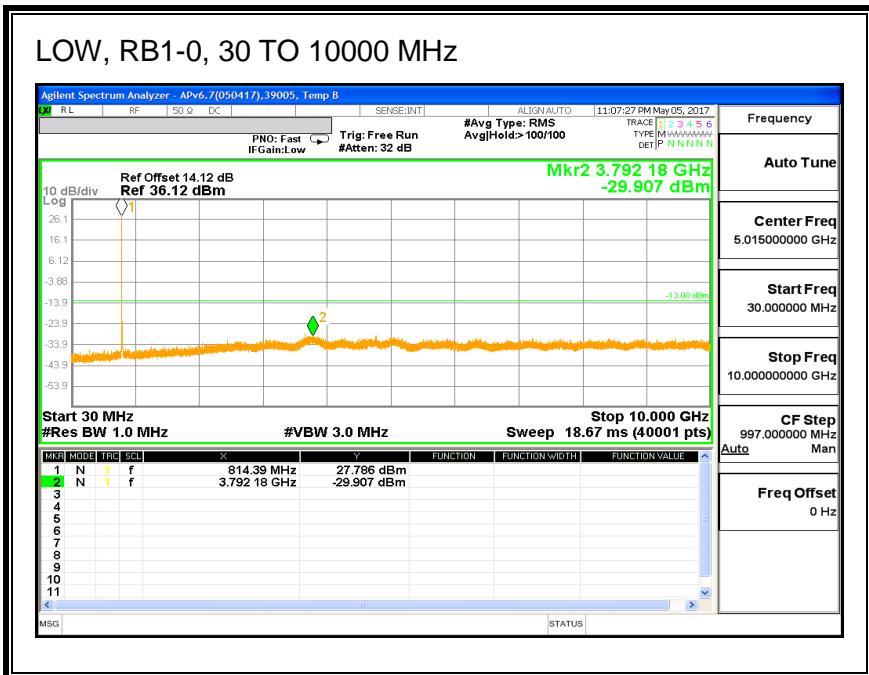
8.3.9. LTE BAND 26

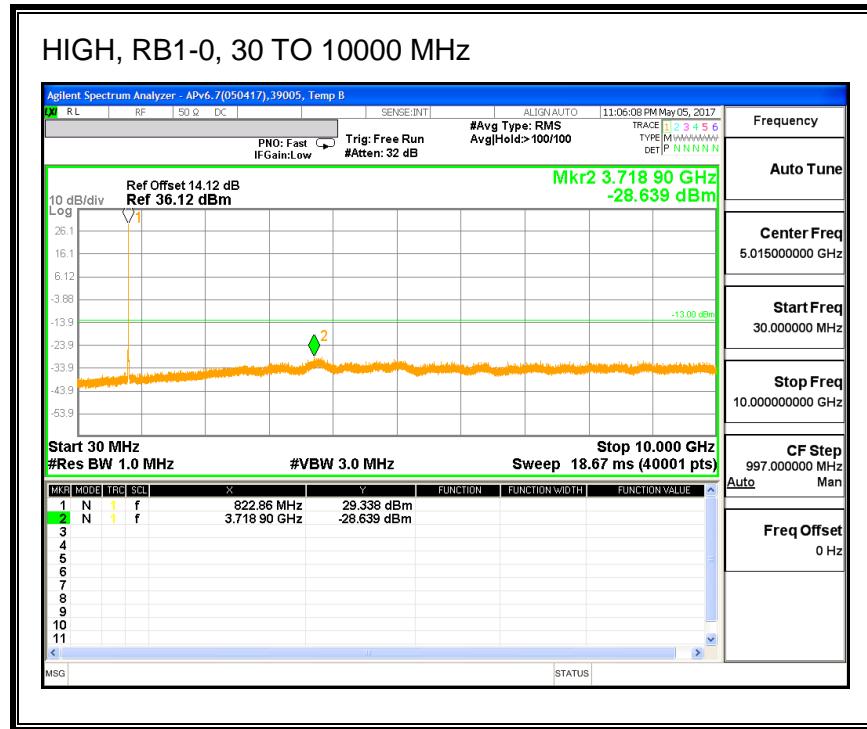
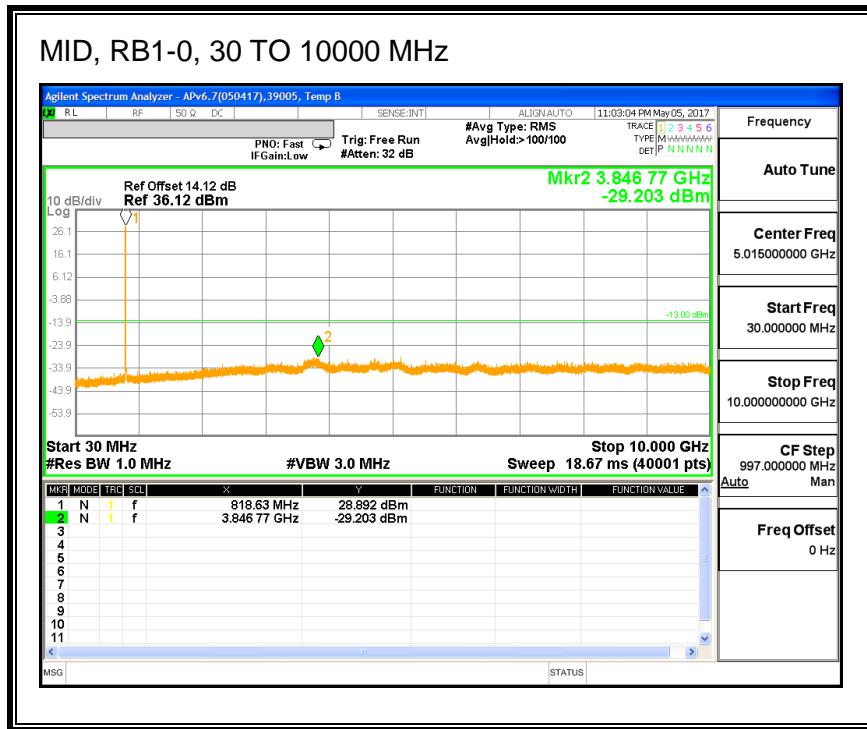
QPSK, (1.4 MHz BAND WIDTH)



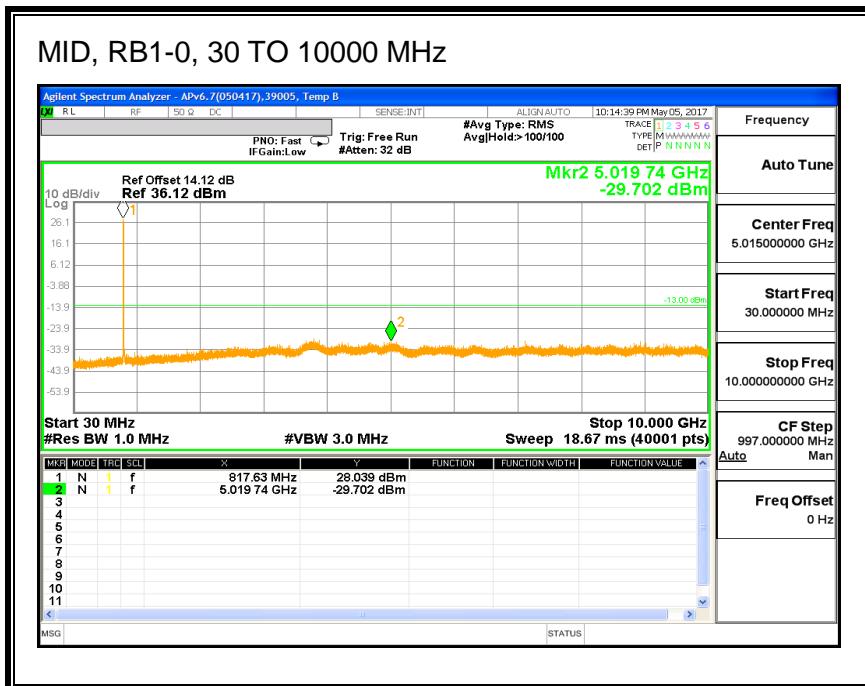
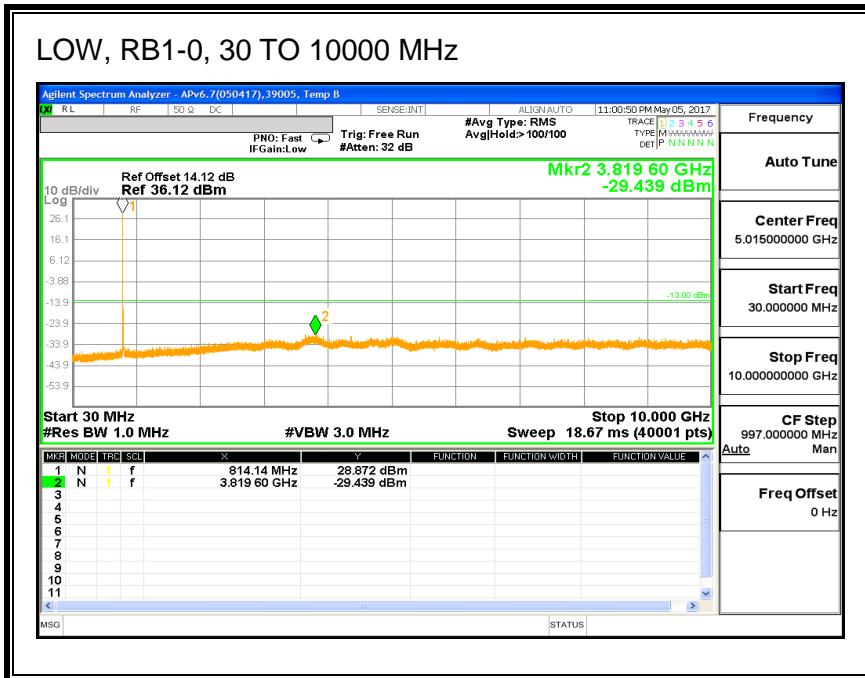


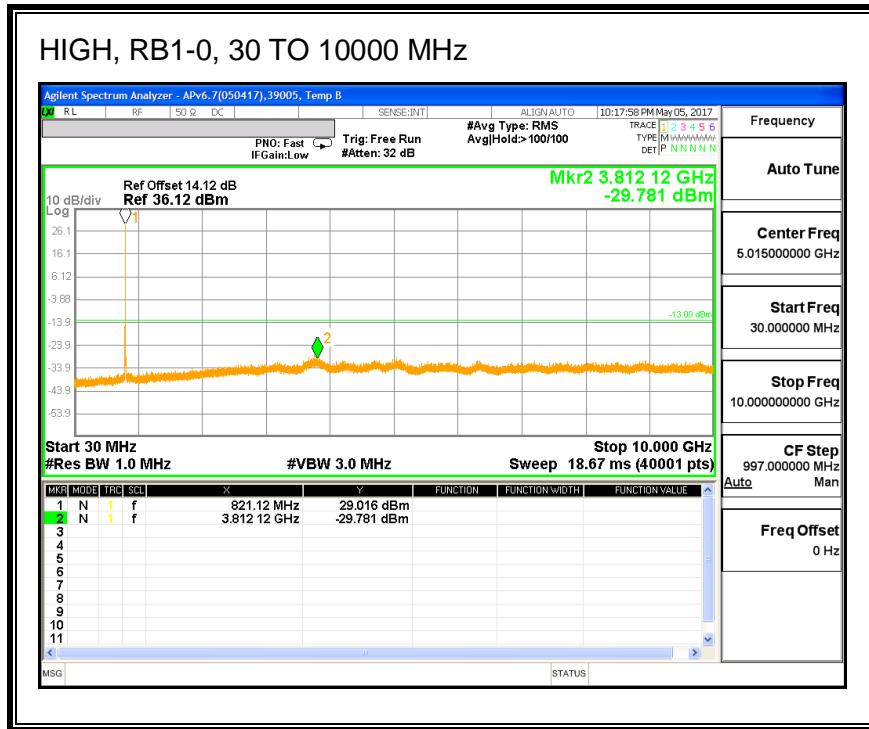
16QAM, (1.4 MHz BAND WIDTH)



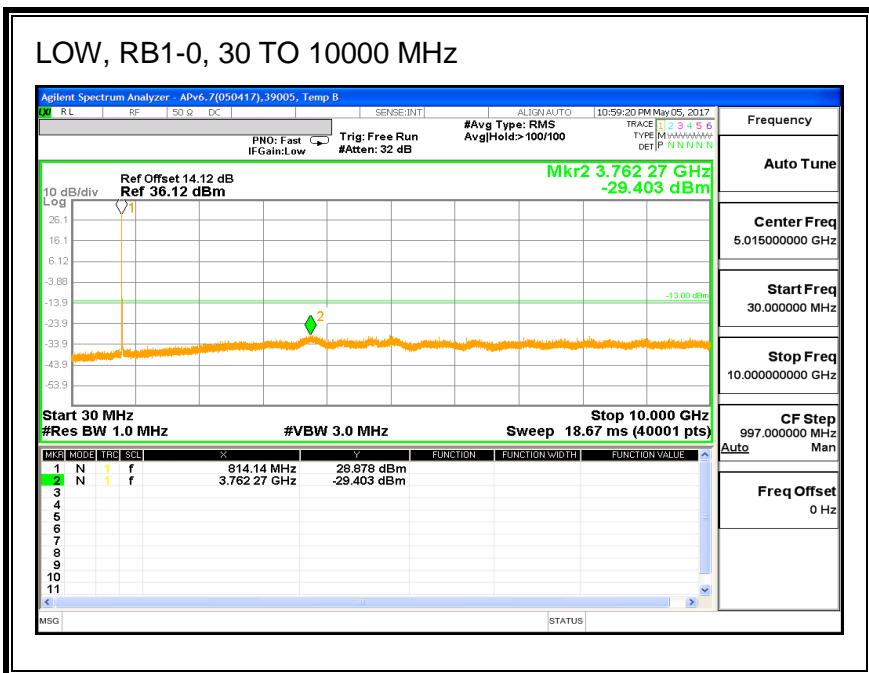


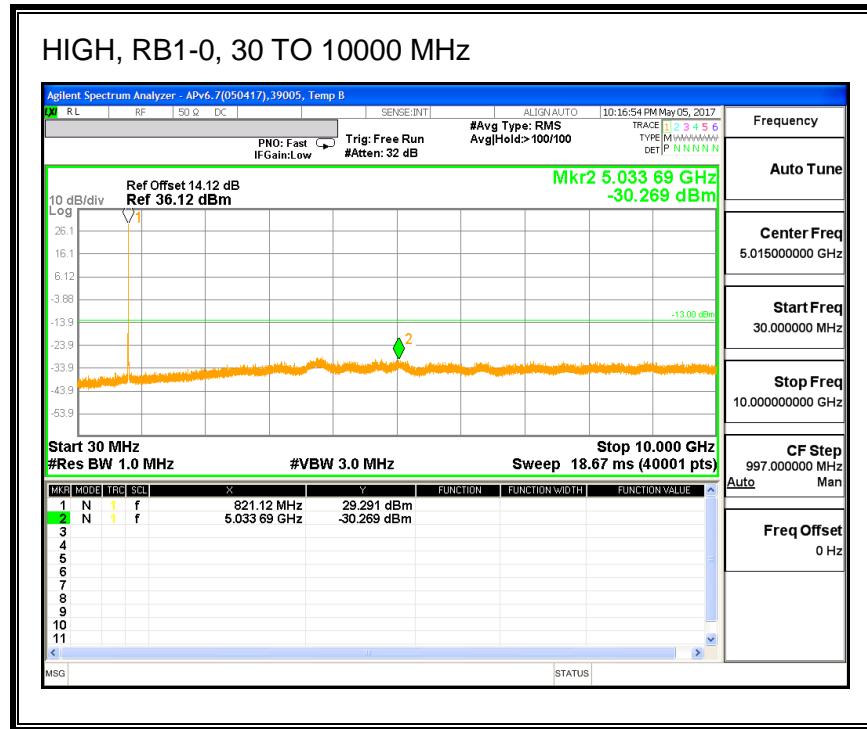
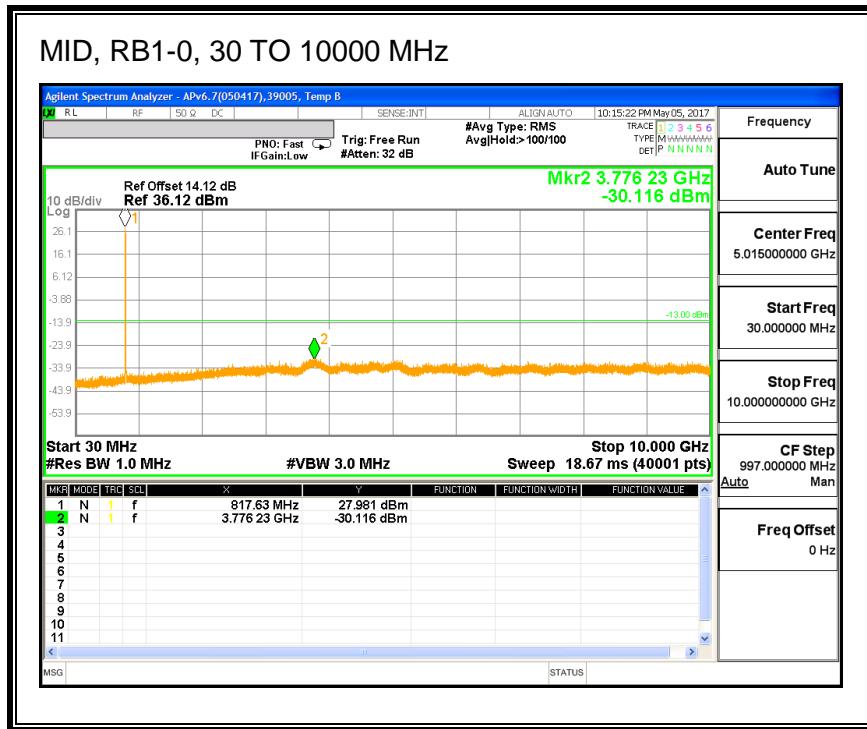
QPSK, (3.0 MHz BAND WIDTH)



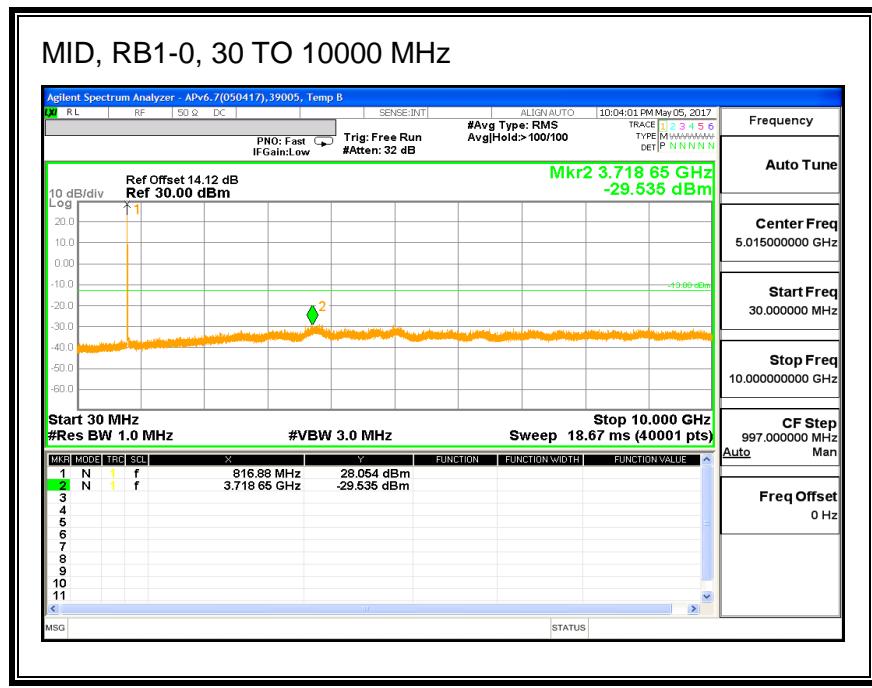
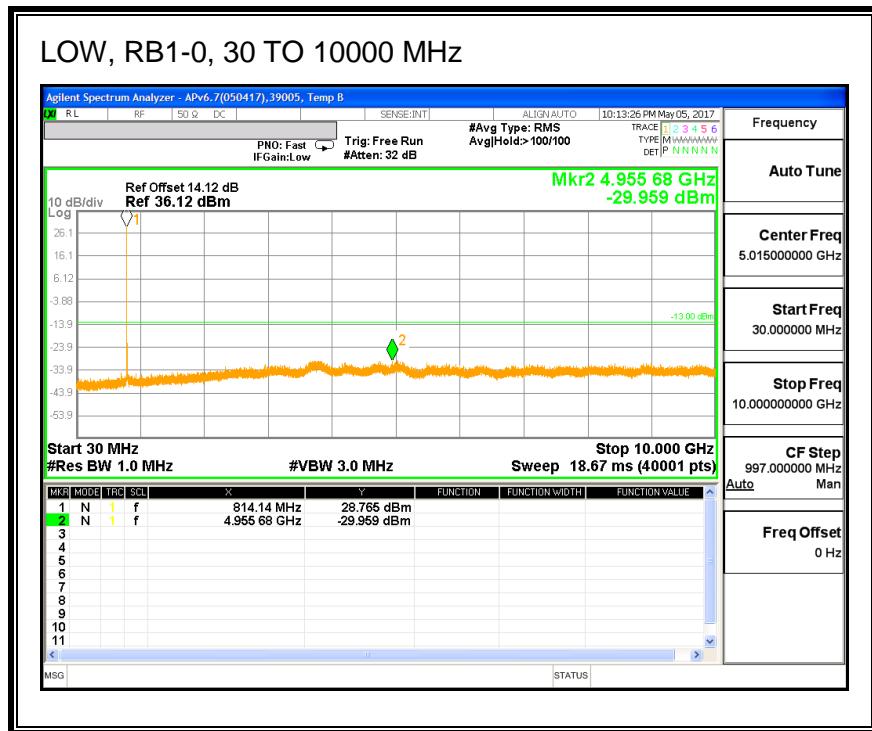


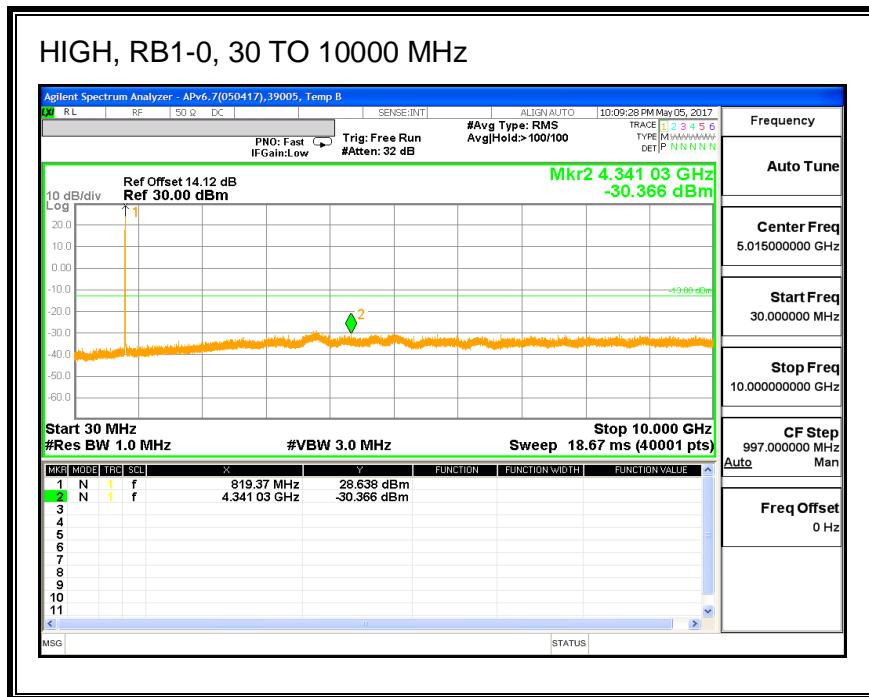
16QAM, (3.0 MHz BAND WIDTH)



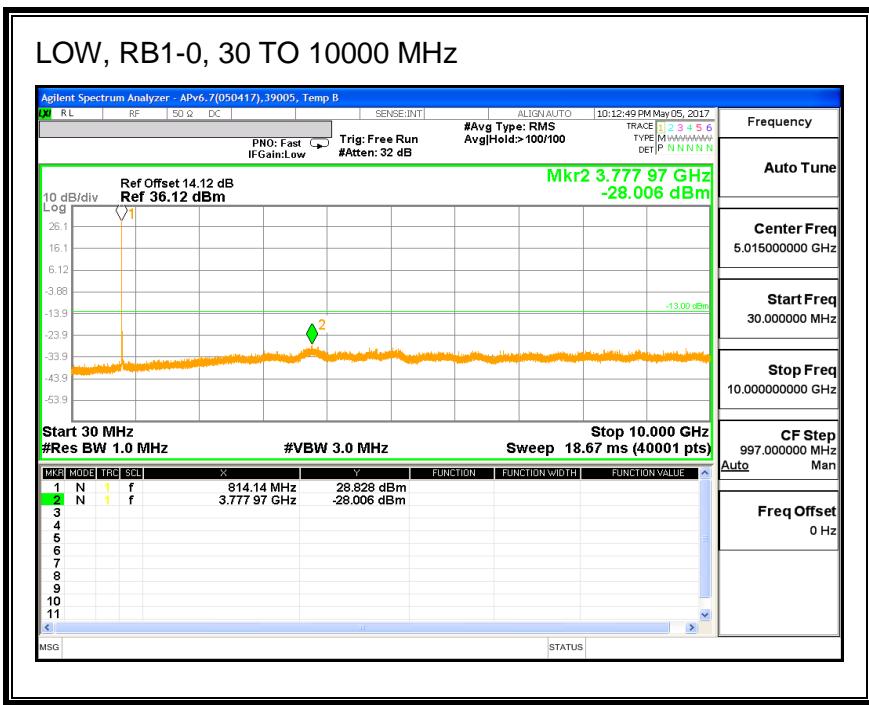


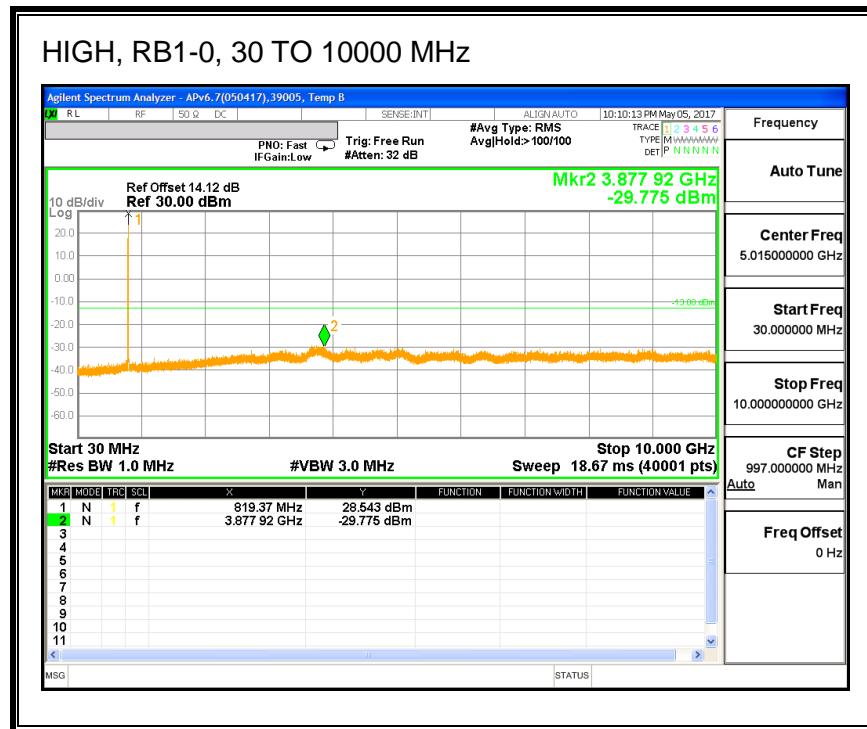
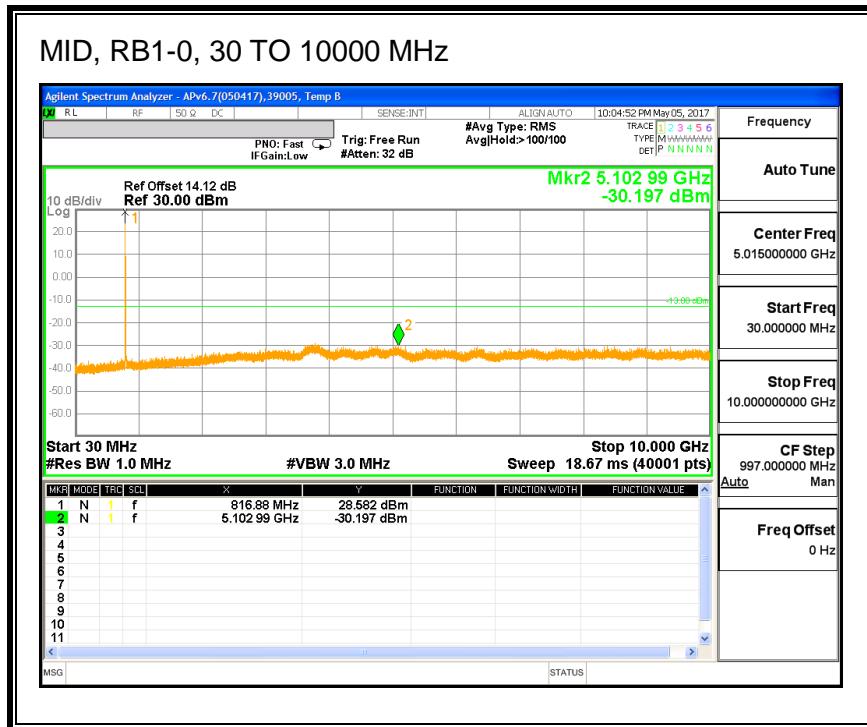
QPSK, (5.0 MHz BAND WIDTH)



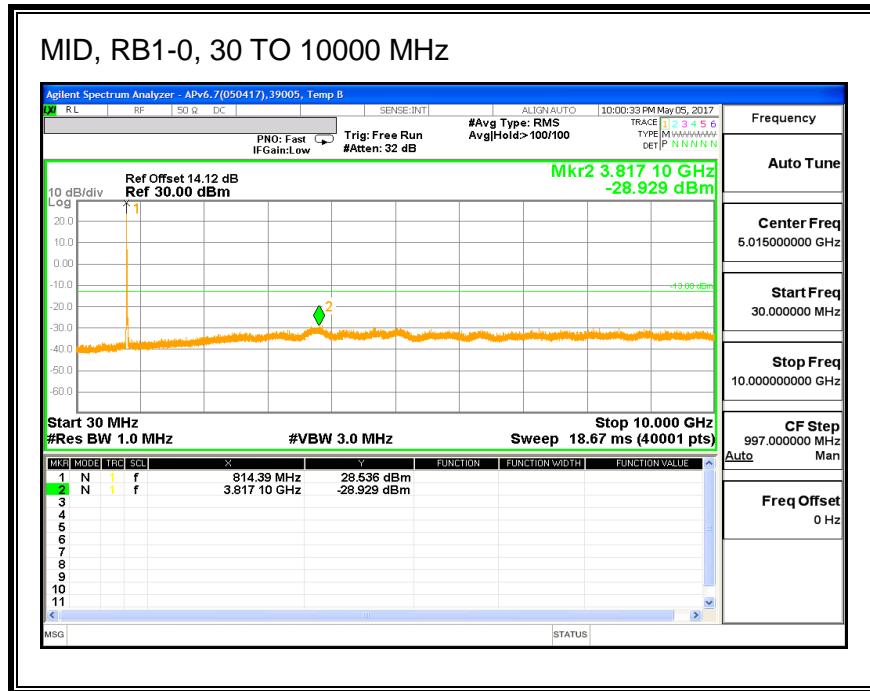


16QAM, (5.0 MHz BAND WIDTH)

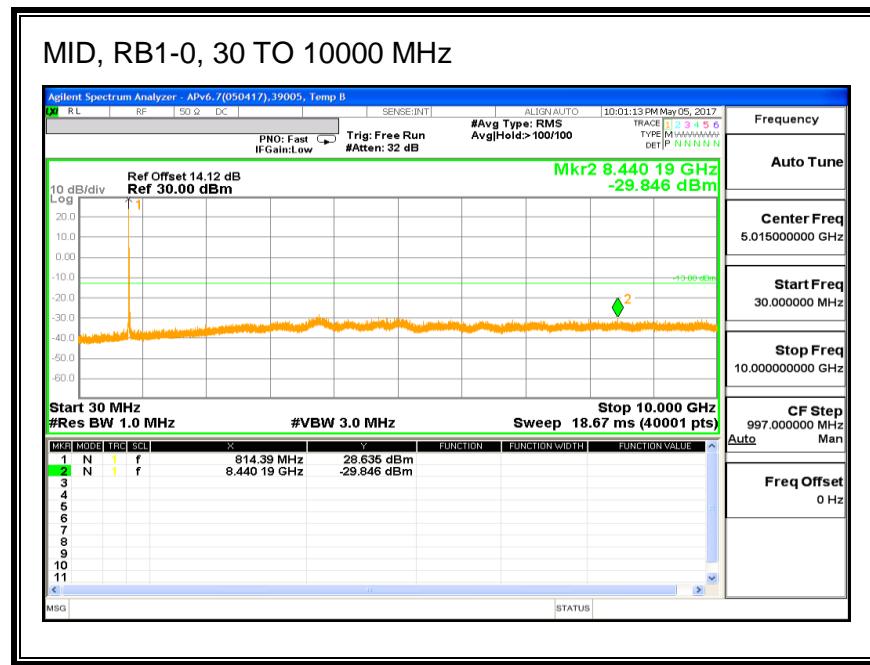




QPSK, (10.0 MHz BAND WIDTH)

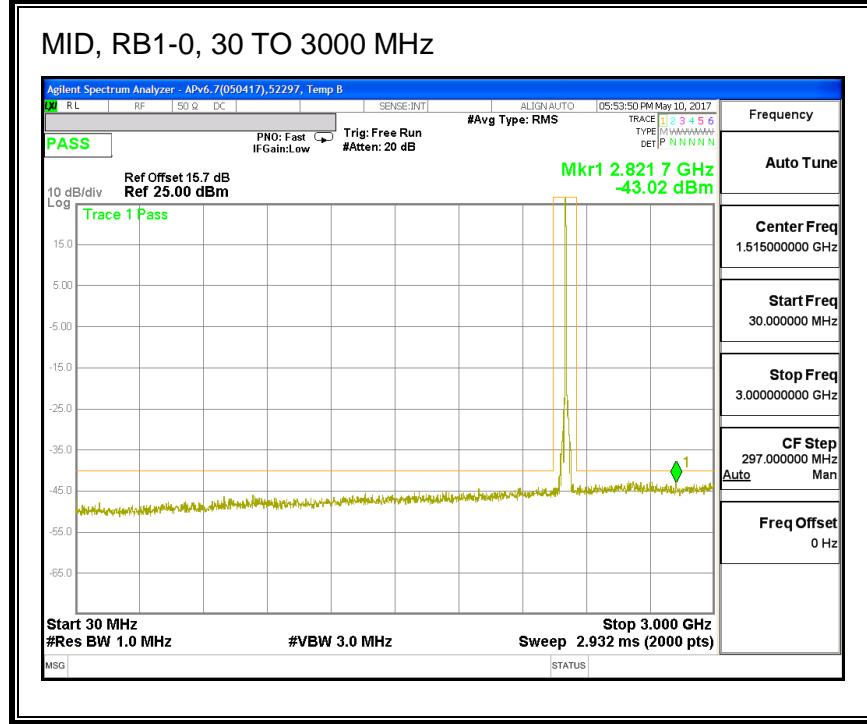
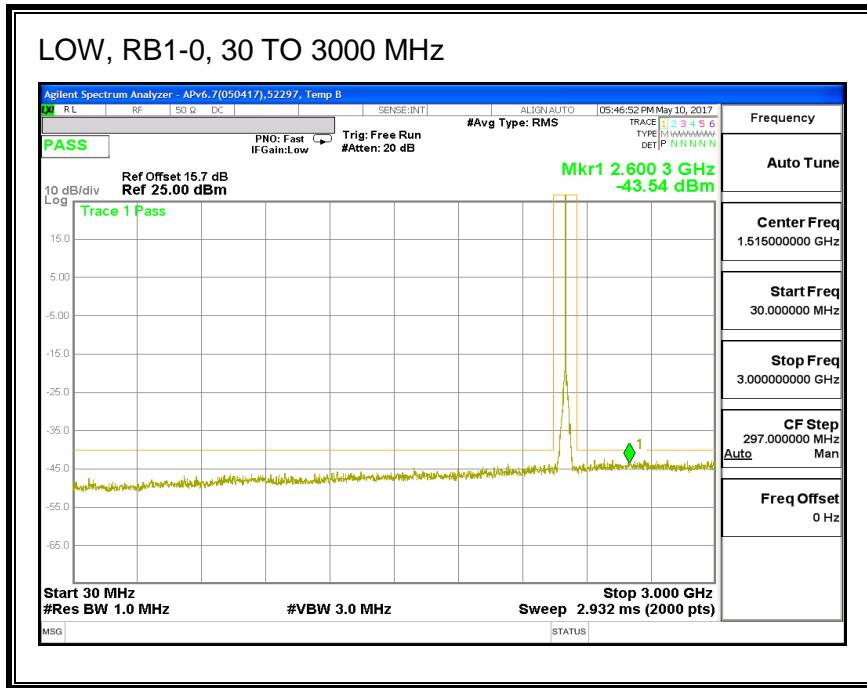


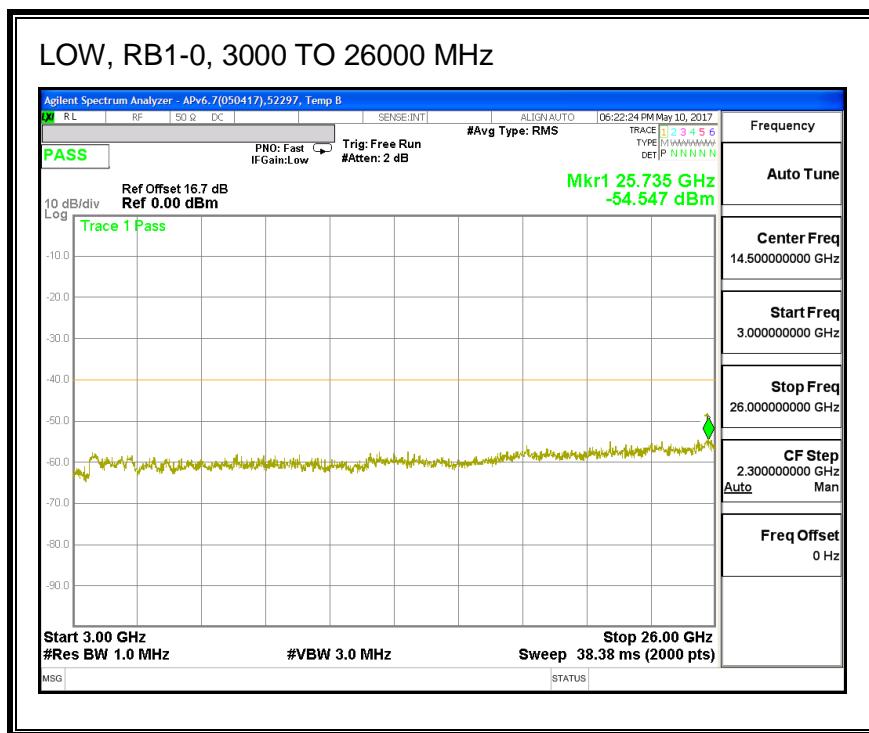
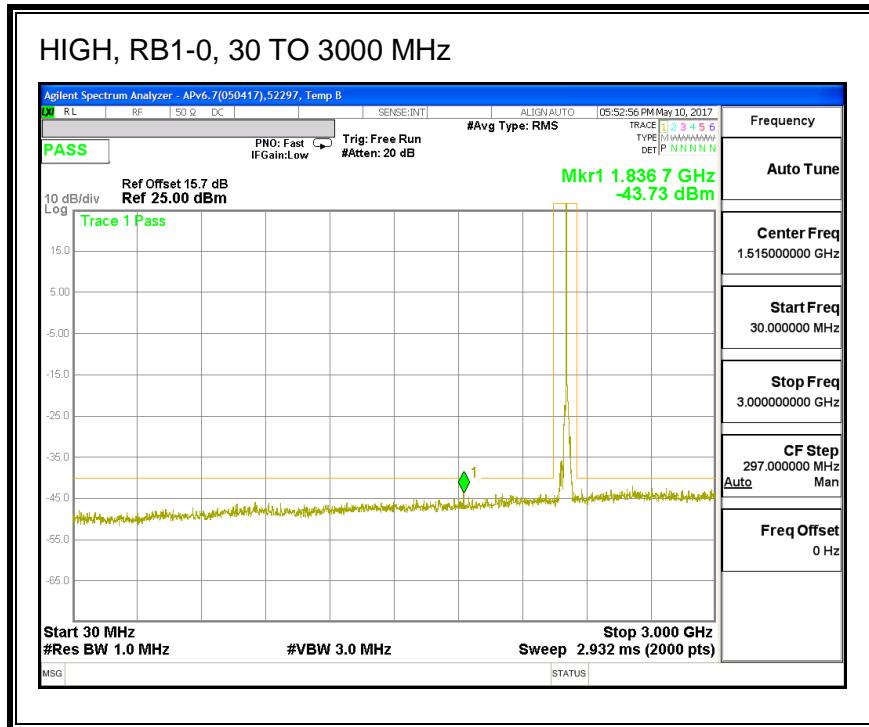
16QAM, (10.0 MHz BAND WIDTH)

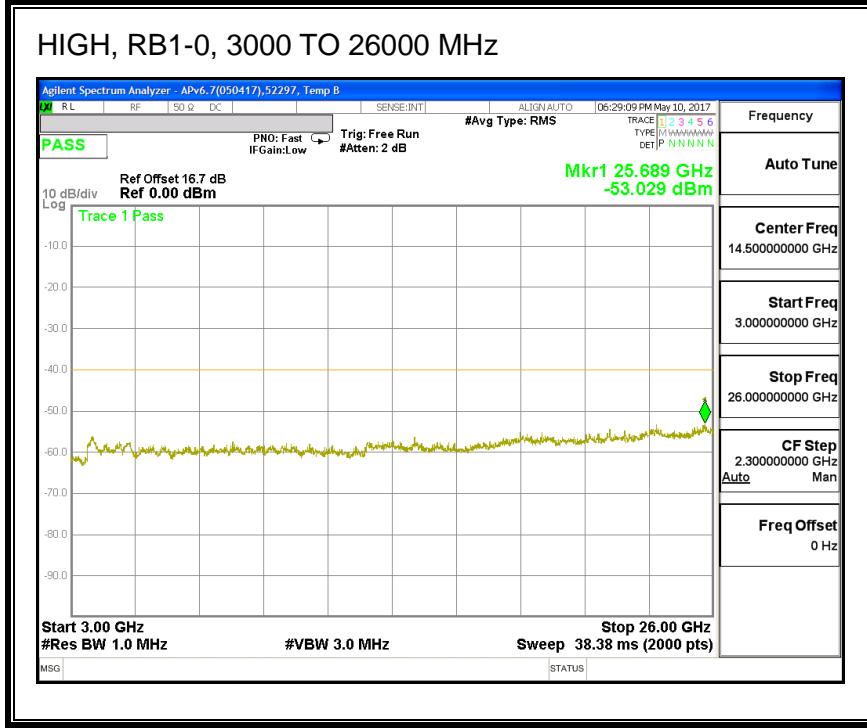
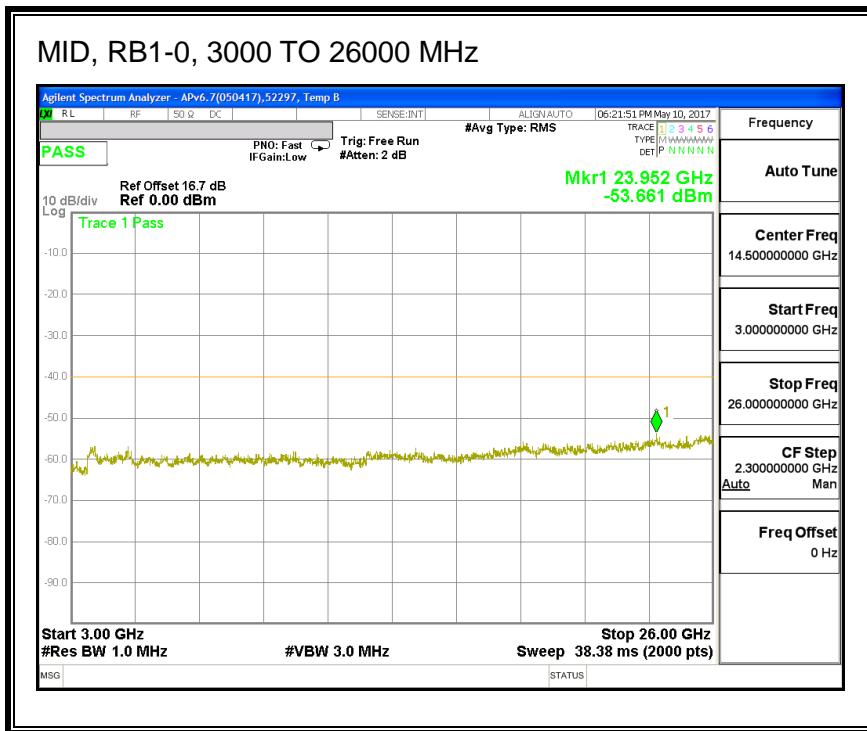


8.3.10. LTE BAND 30

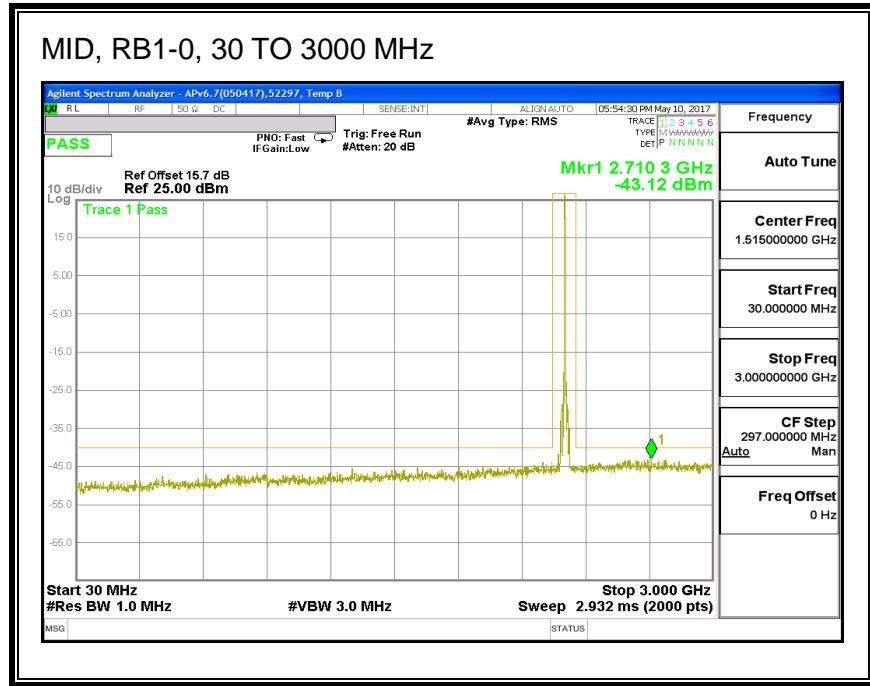
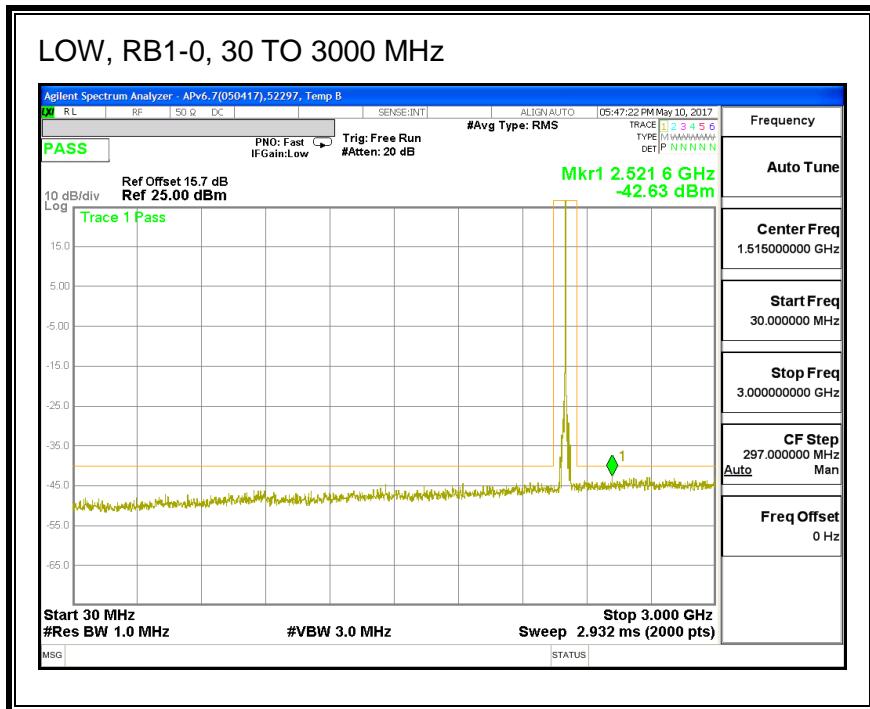
QPSK, (5.0 MHz BAND WIDTH)

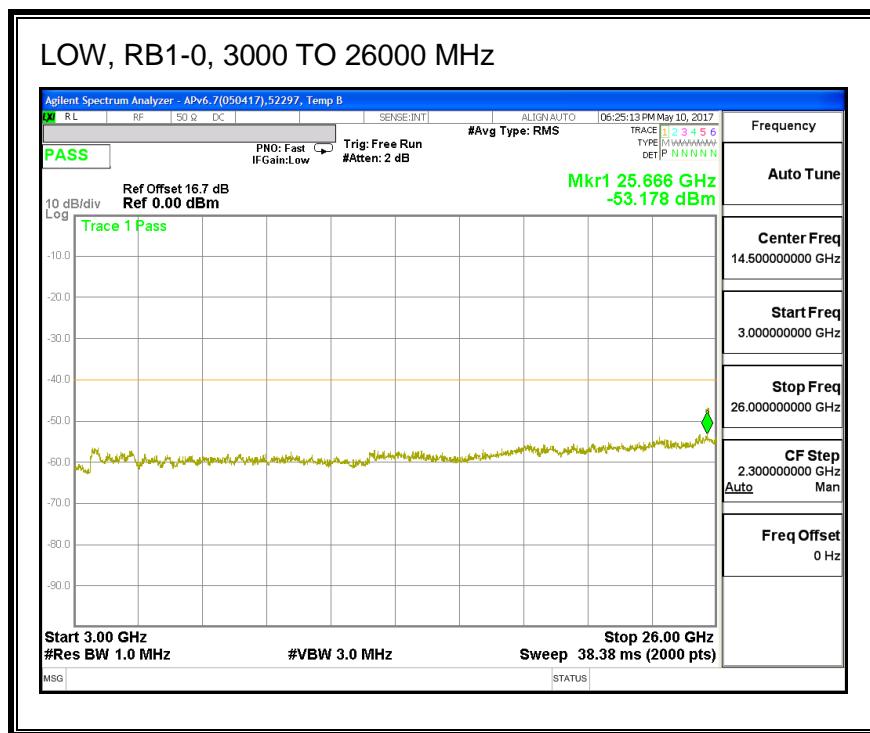
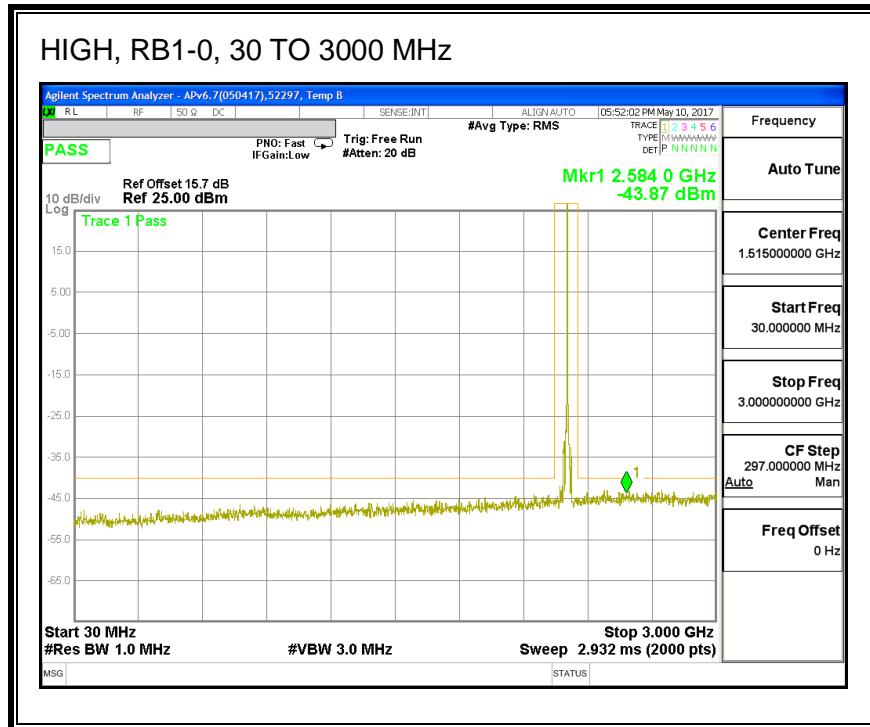




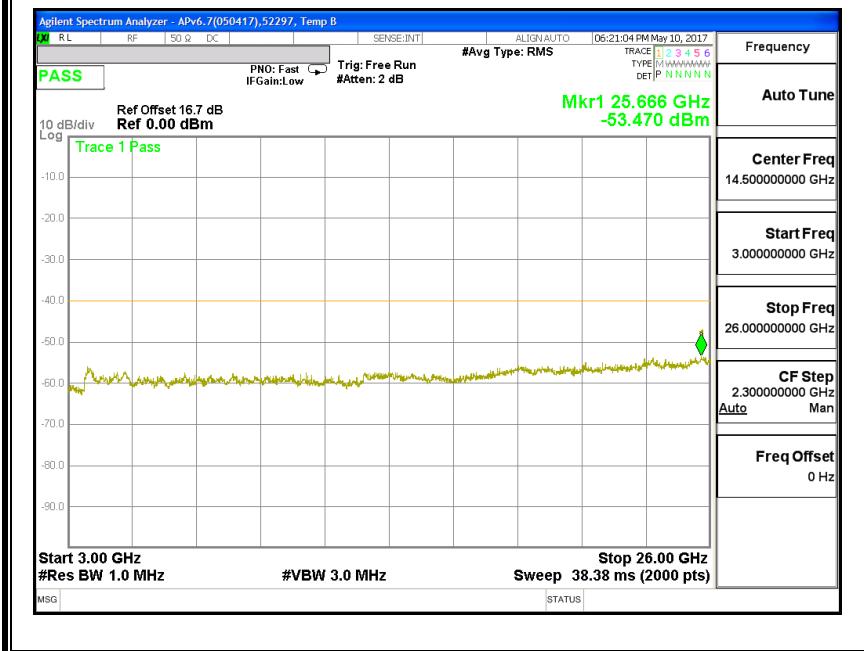


16QAM, (5.0 MHz BAND WIDTH)

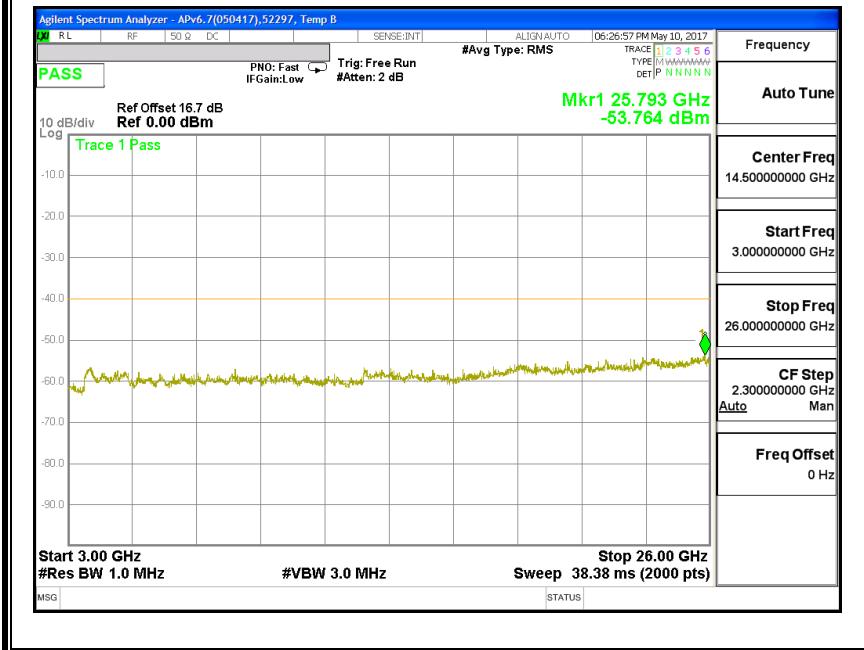




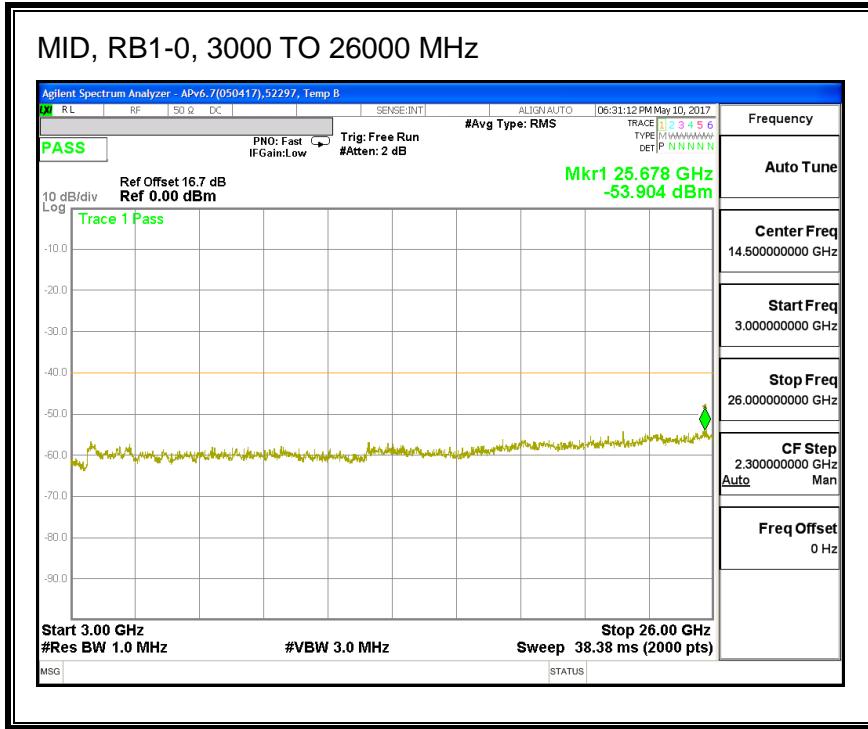
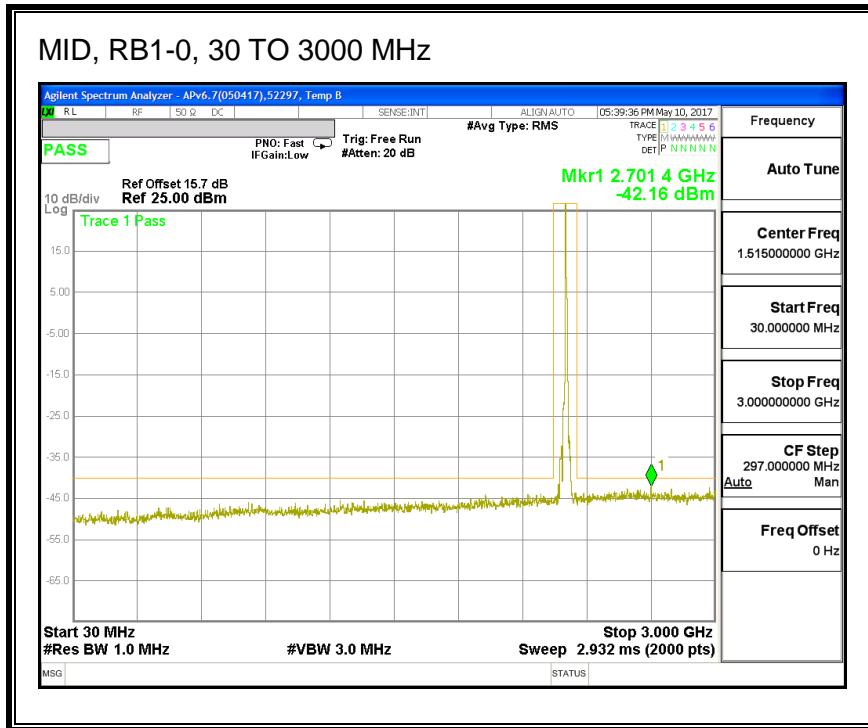
MID, RB1-0, 3000 TO 26000 MHz



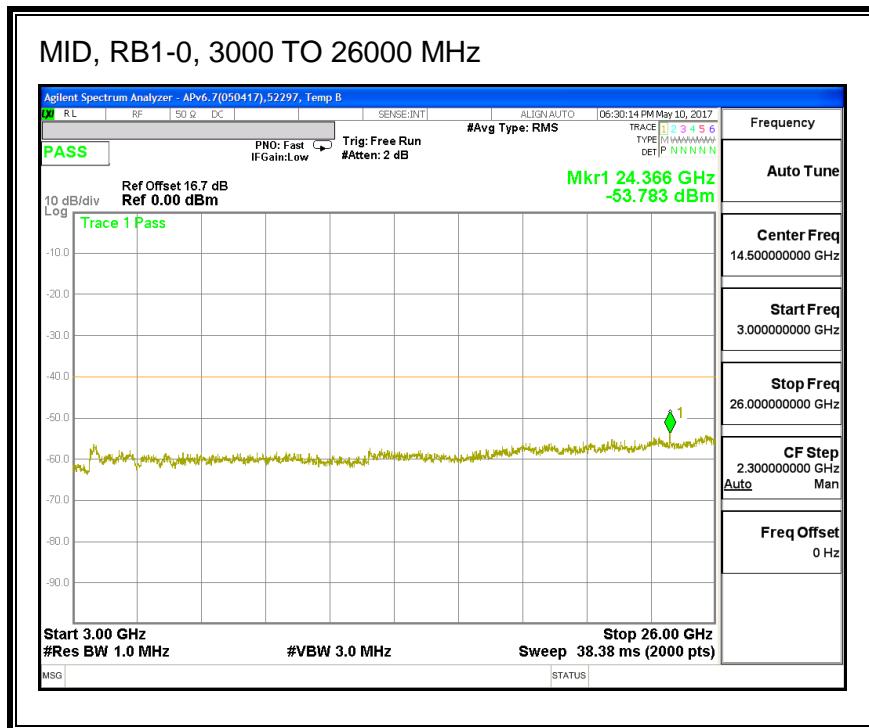
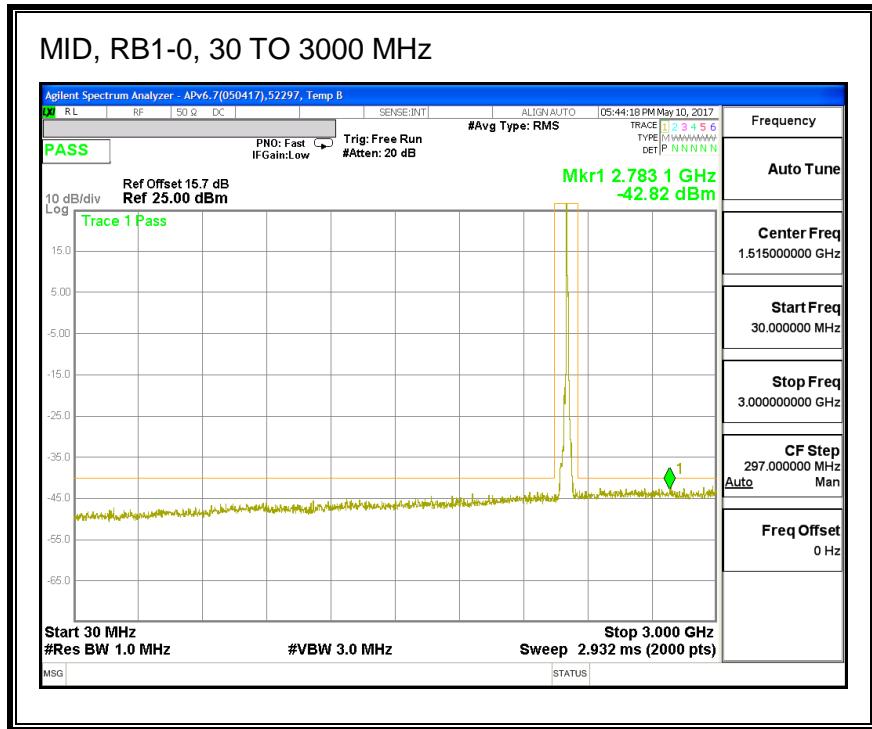
HIGH, RB1-0, 3000 TO 26000 MHz



QPSK, (10.0 MHz BAND WIDTH)

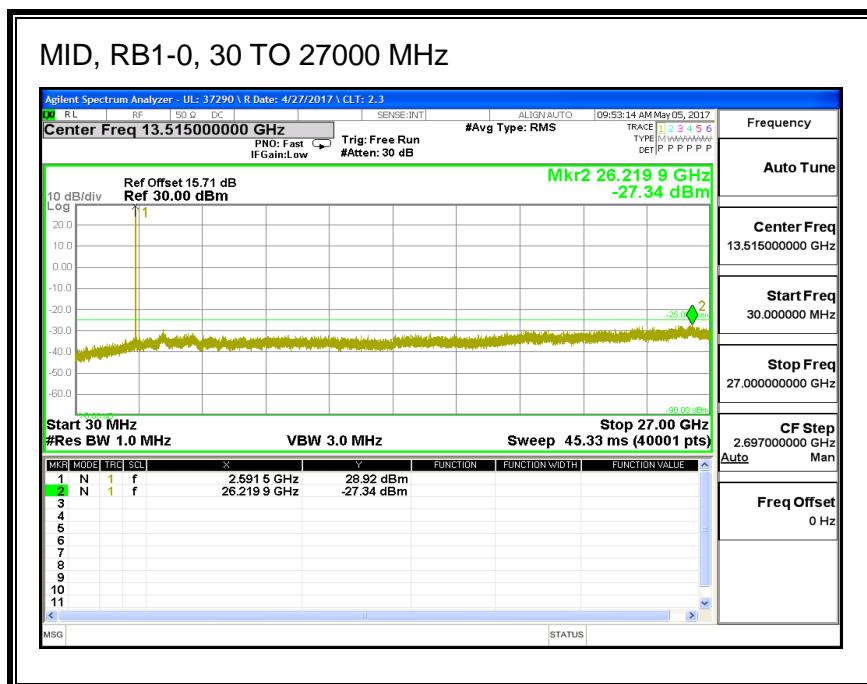
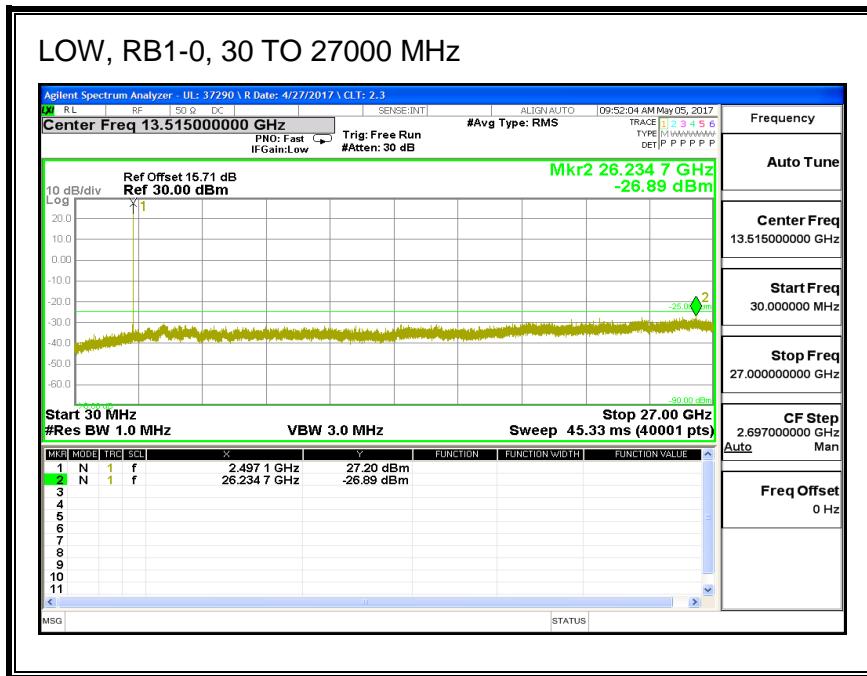


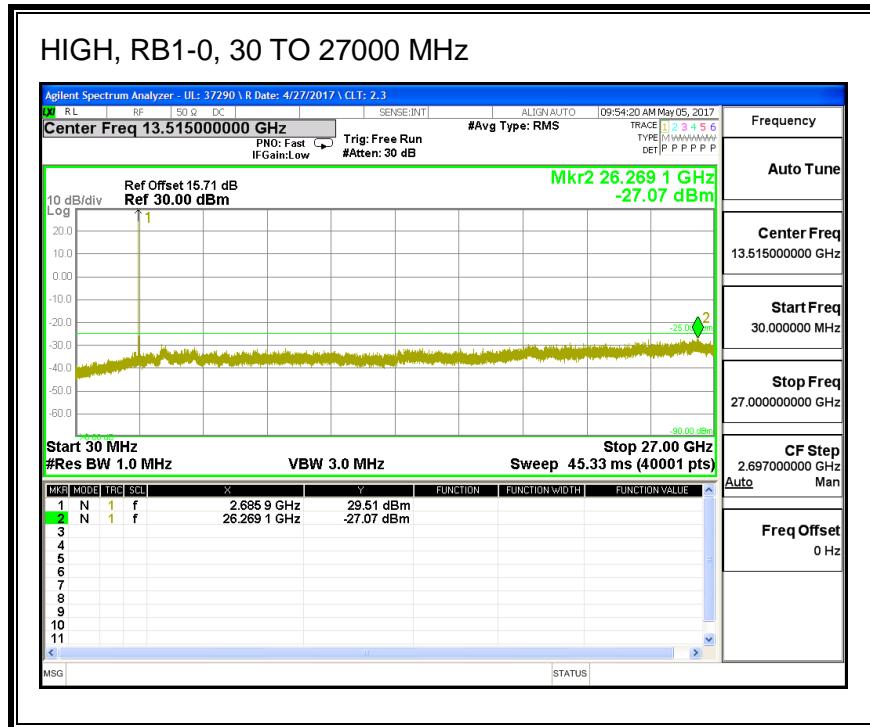
16QAM, (10.0 MHz BAND WIDTH)



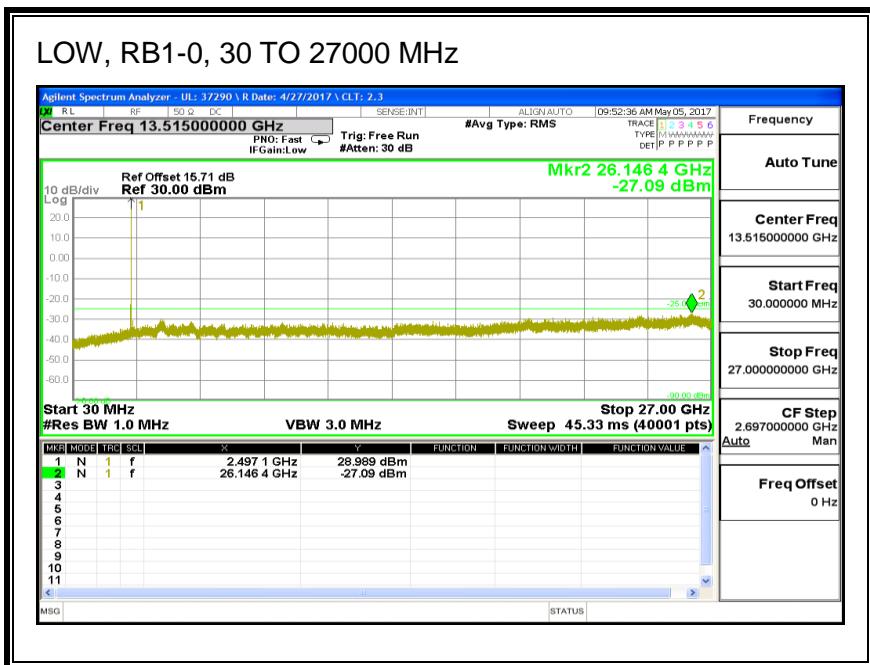
8.3.11. LTE BAND 41

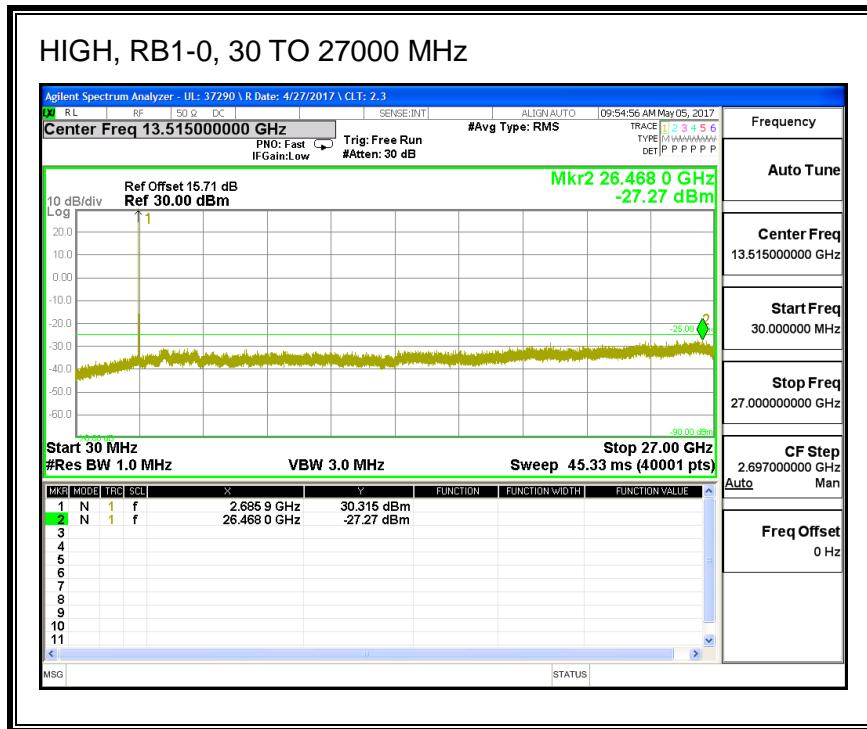
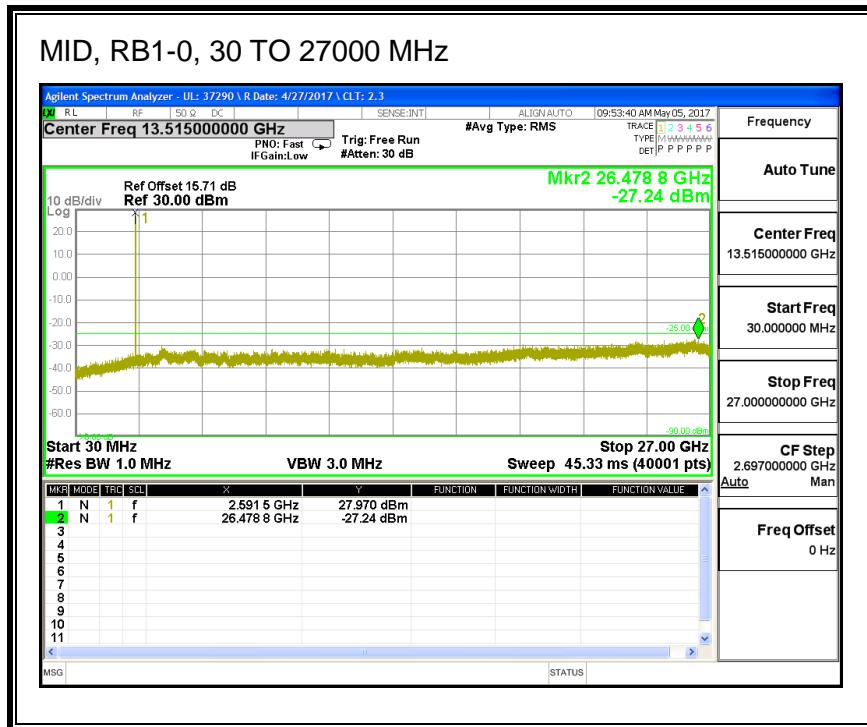
QPSK, (5.0 MHz BAND WIDTH)



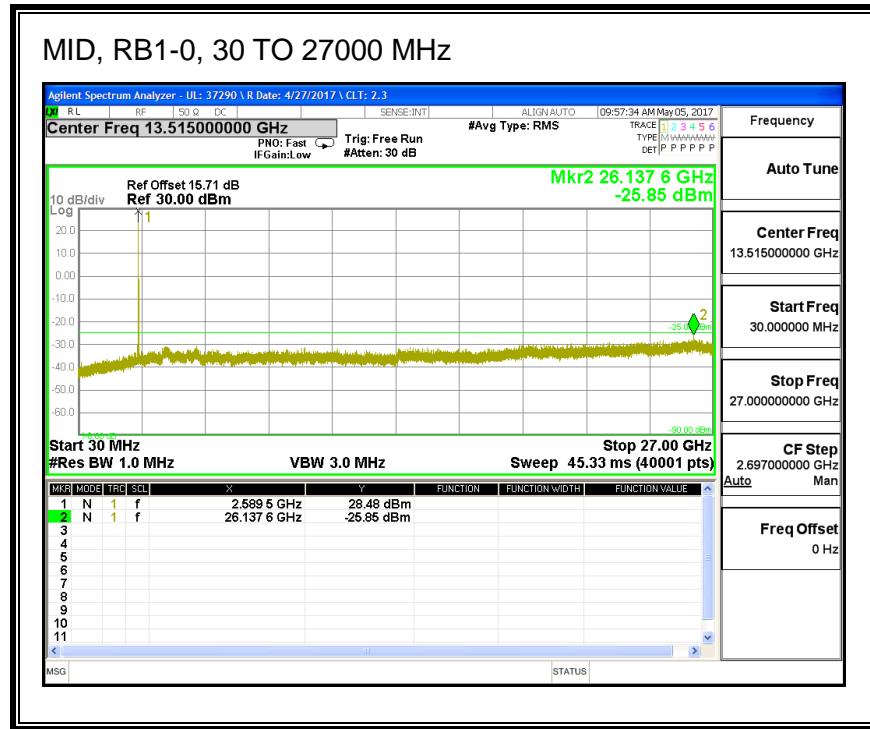
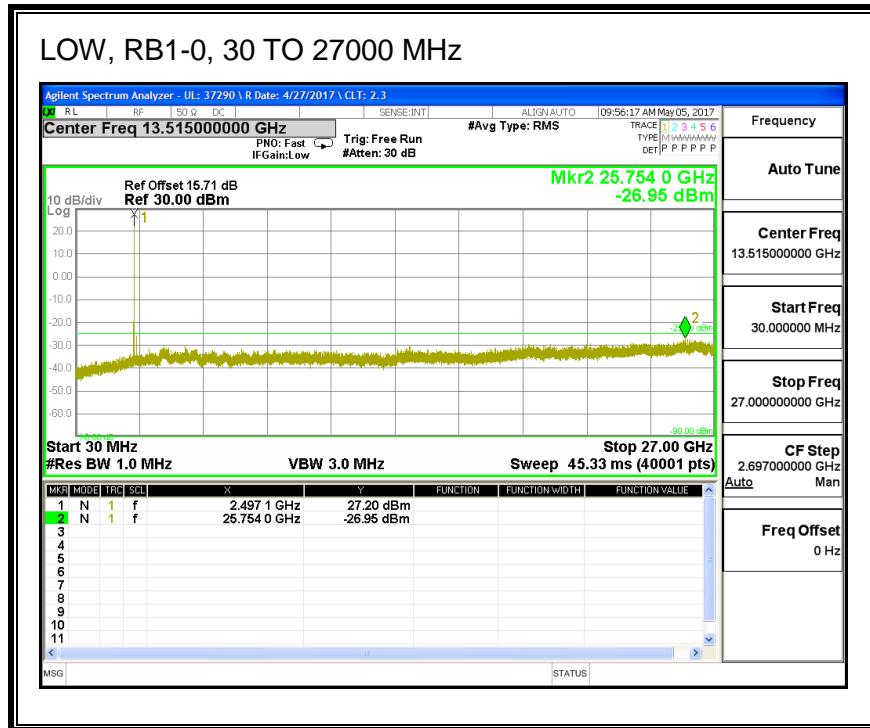


16QAM, (5.0 MHz BAND WIDTH)

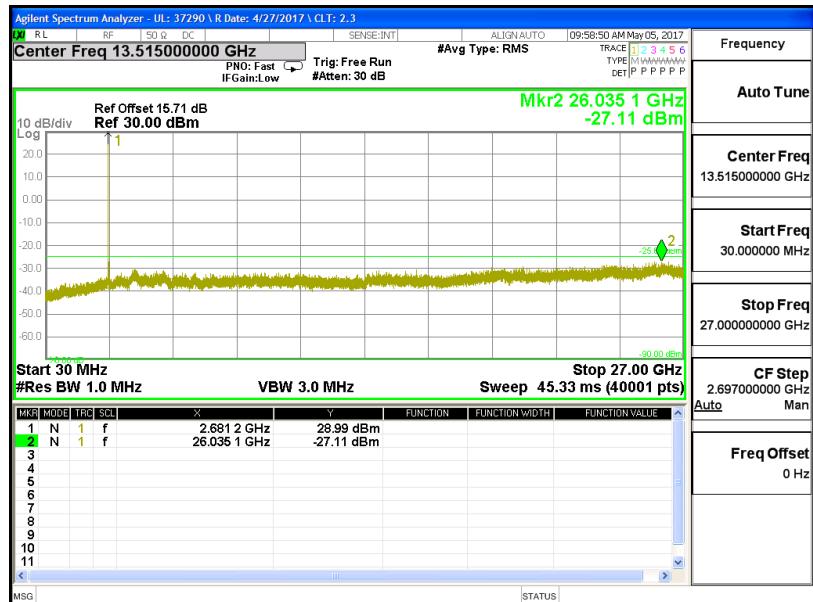




QPSK, (10.0 MHz BAND WIDTH)

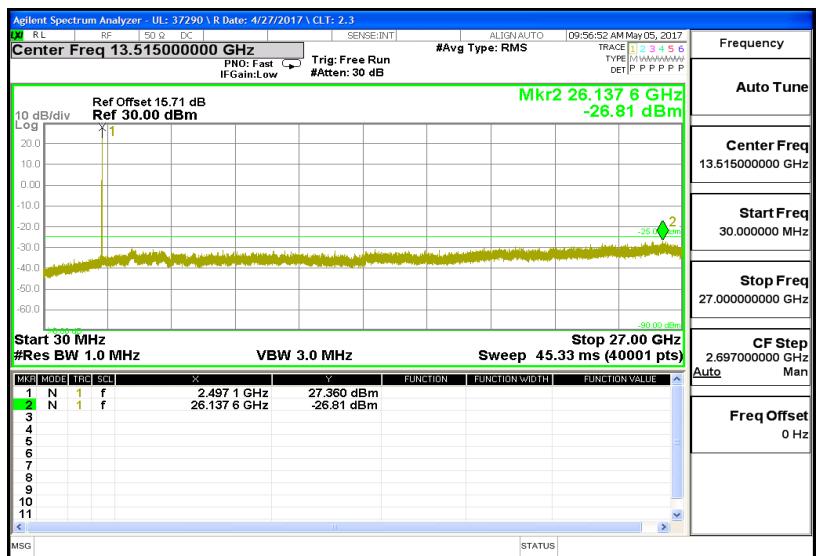


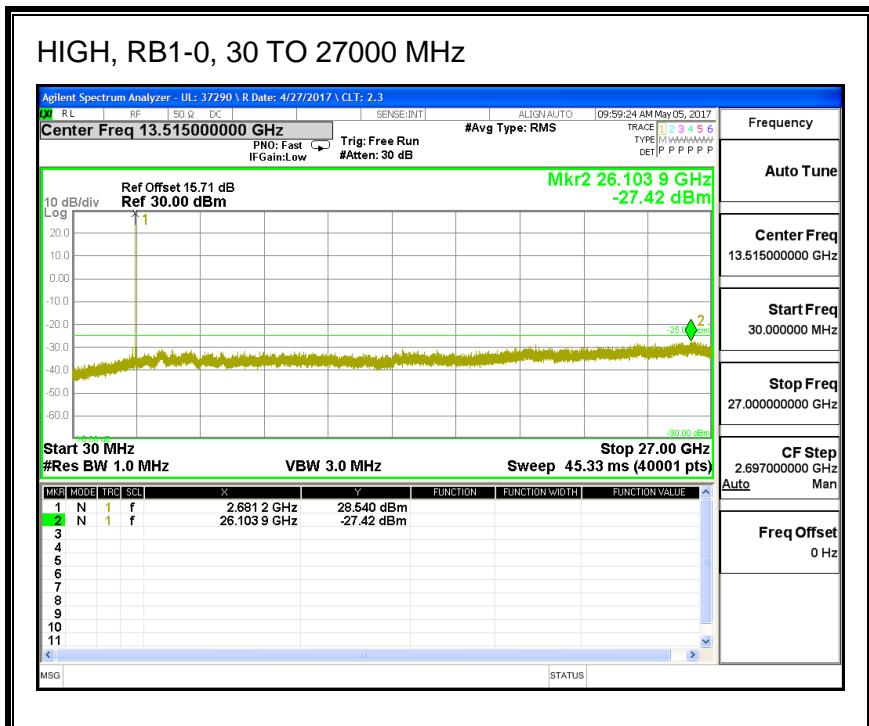
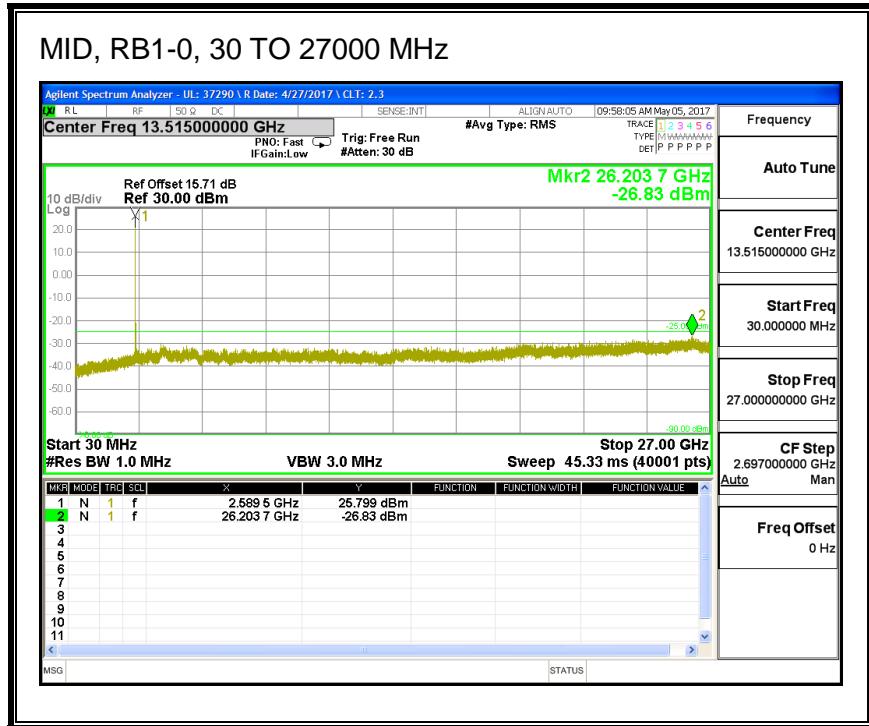
HIGH, RB1-0, 30 TO 27000 MHz



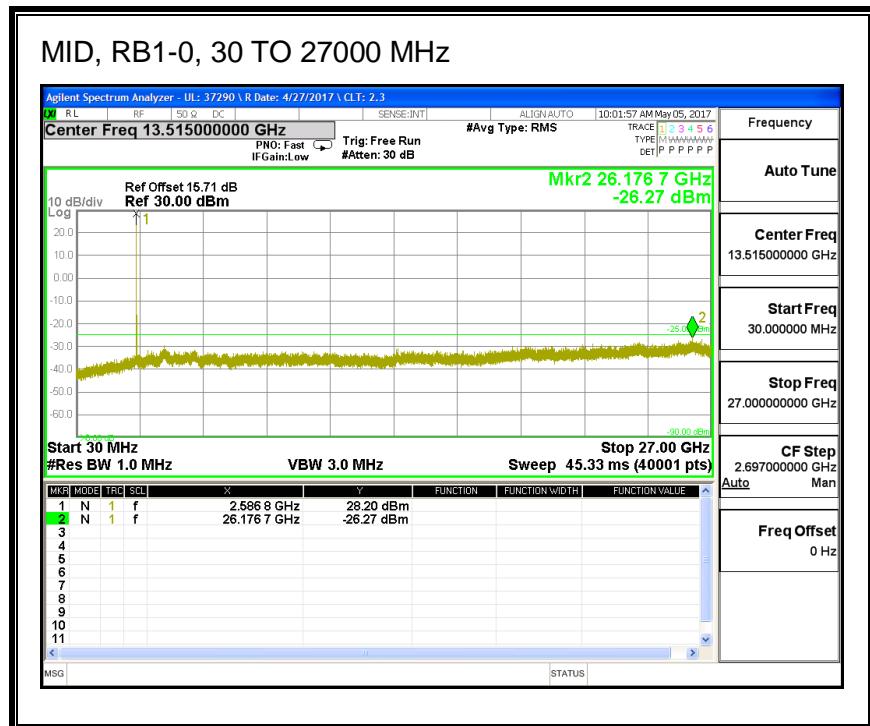
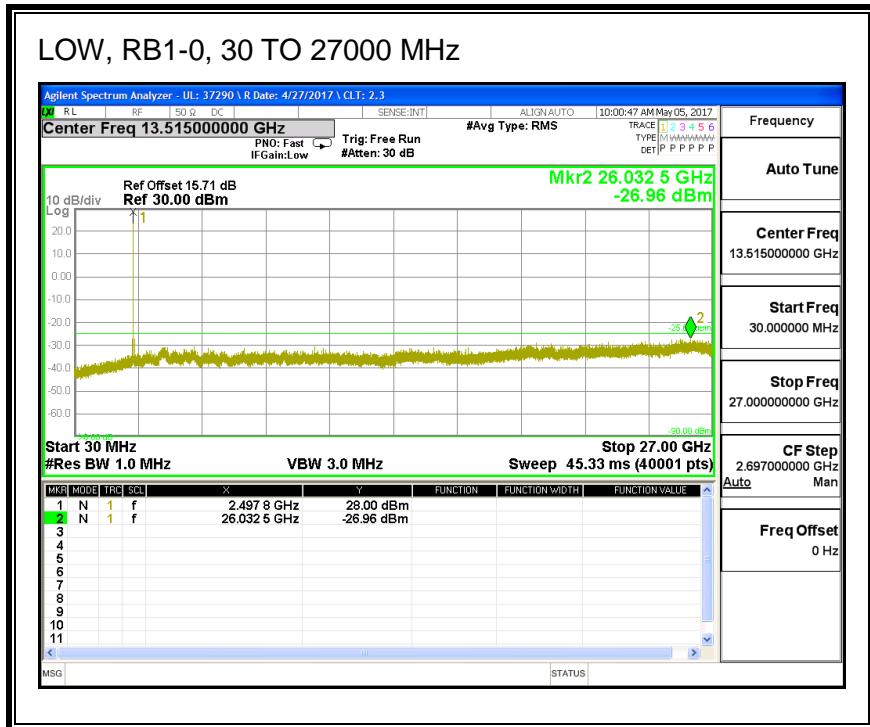
16QAM, (10.0 MHz BAND WIDTH)

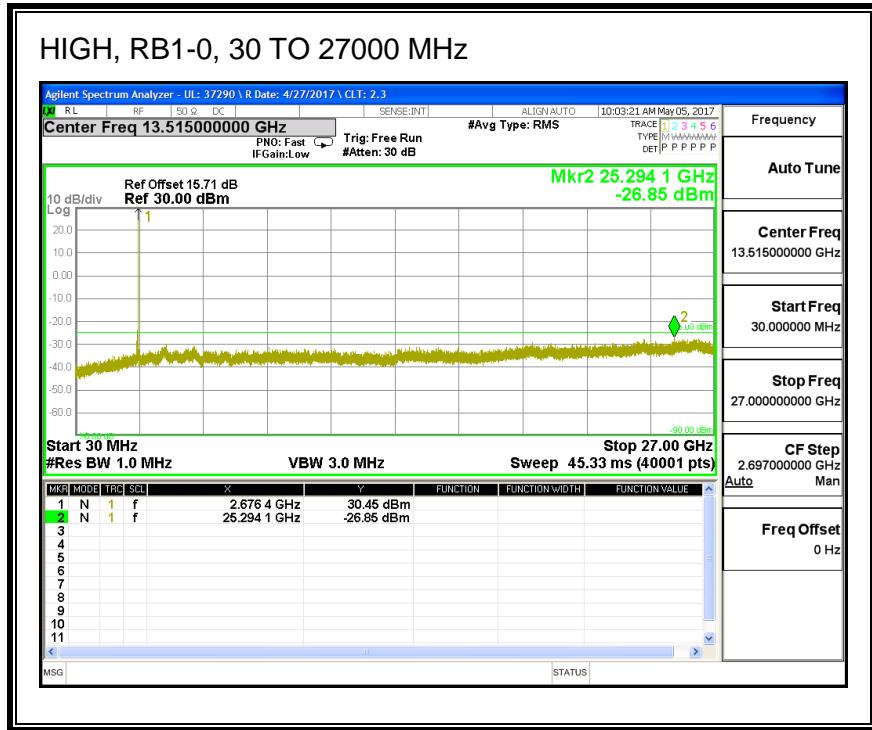
LOW, RB1-0, 30 TO 27000 MHz



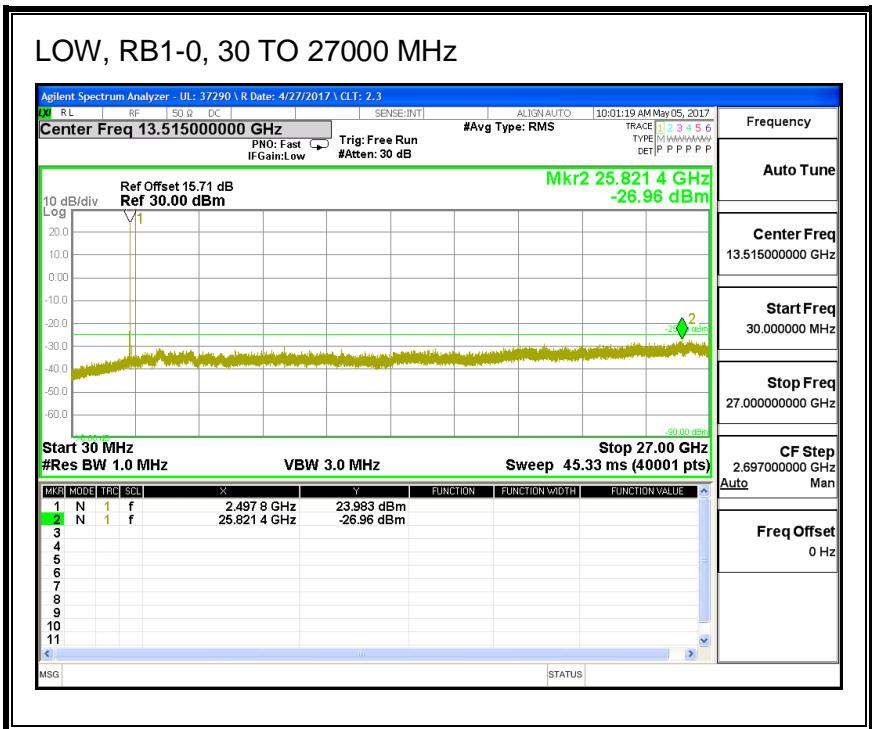


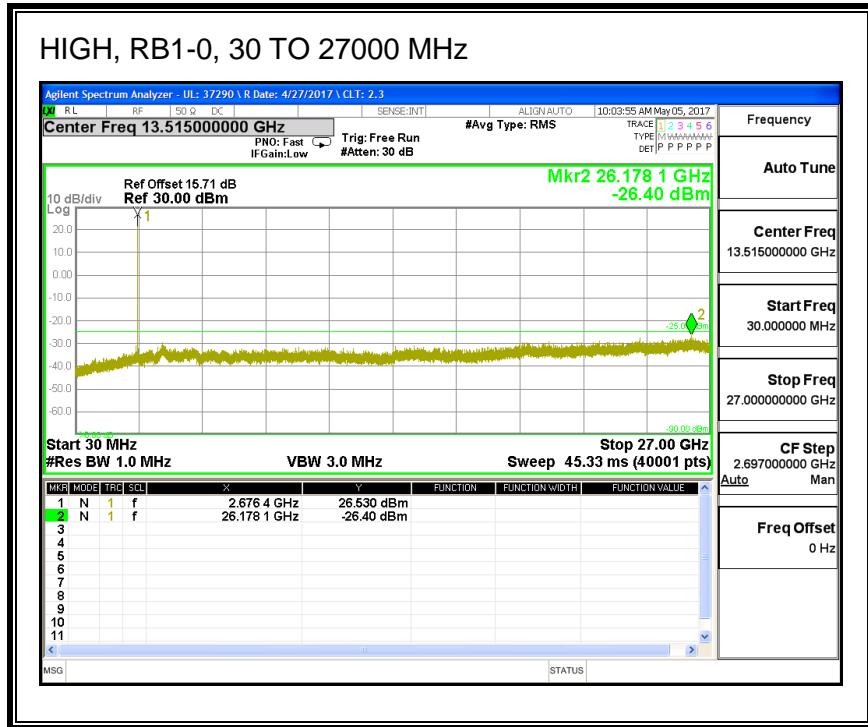
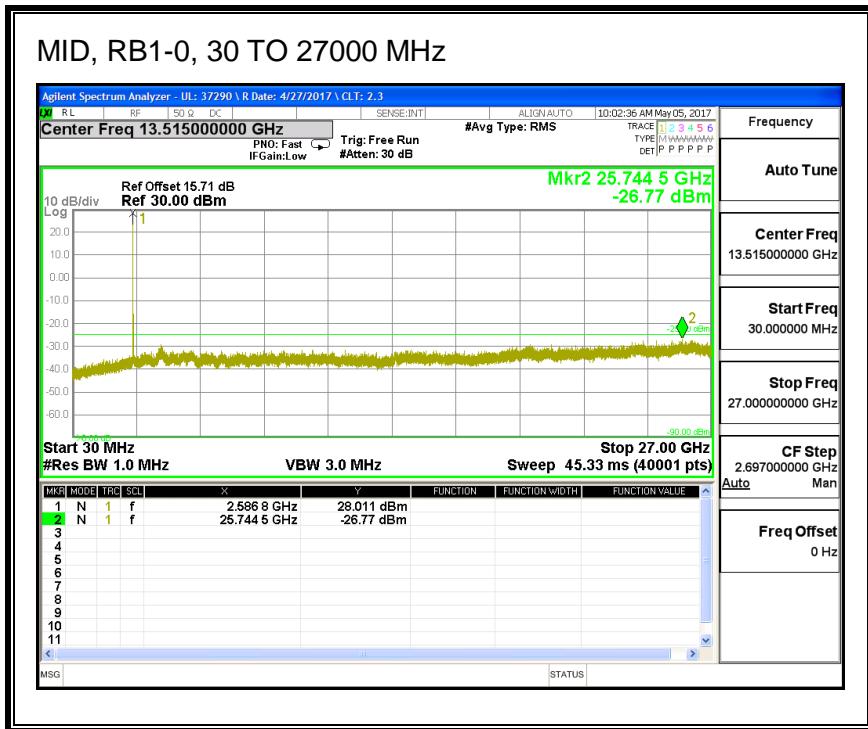
QPSK, (15.0 MHz BAND WIDTH)



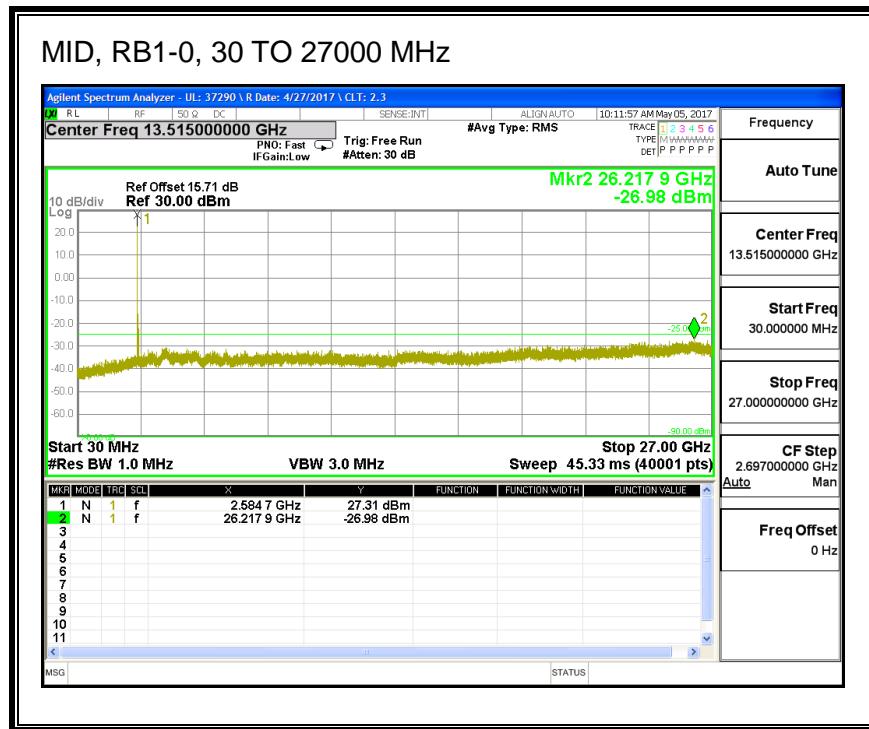
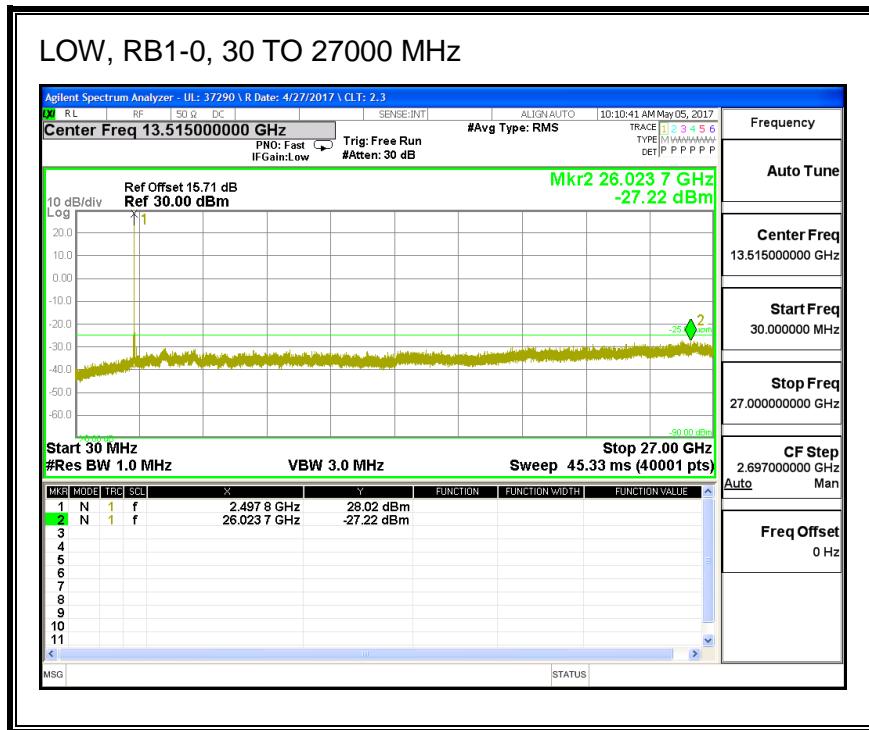


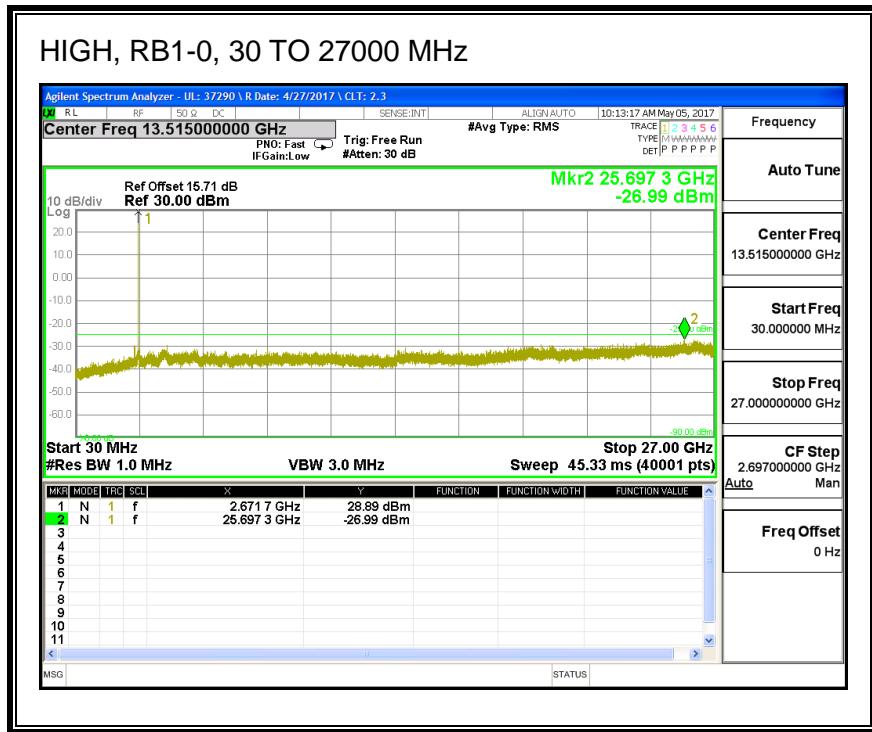
16QAM, (15.0 MHz BAND WIDTH)



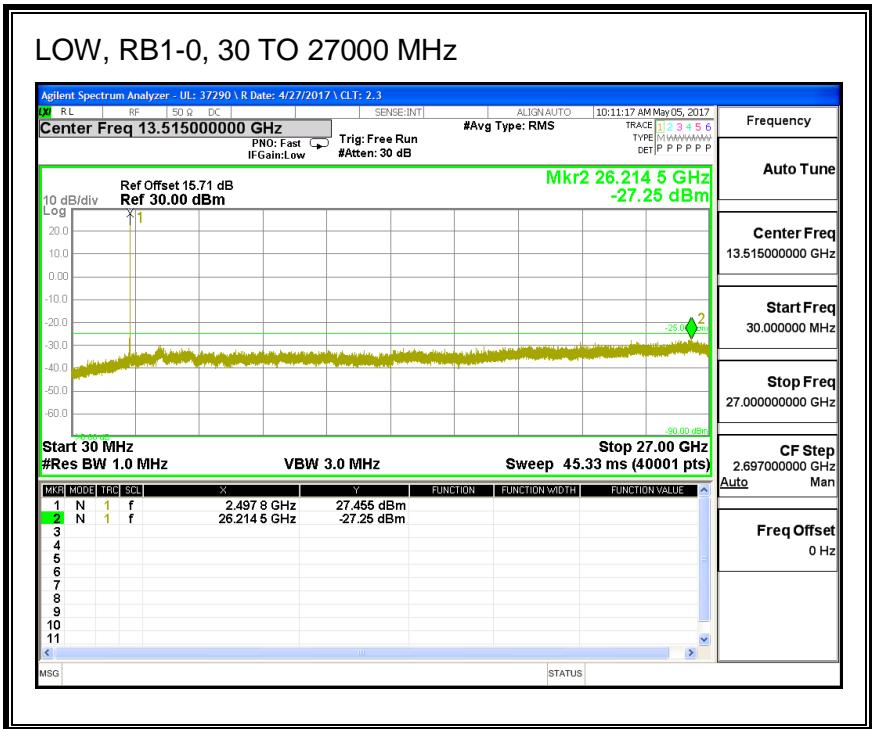


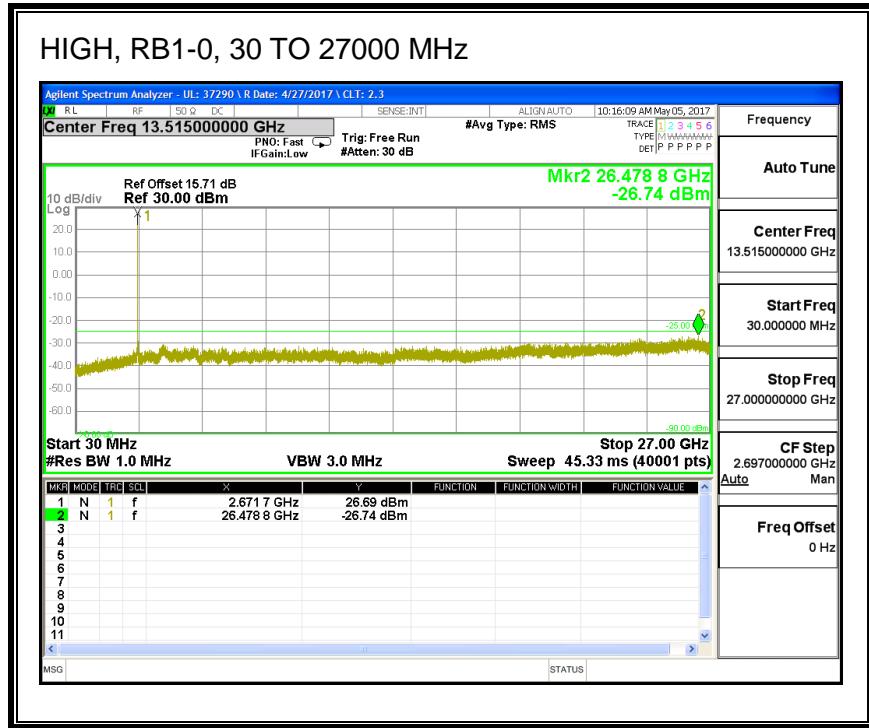
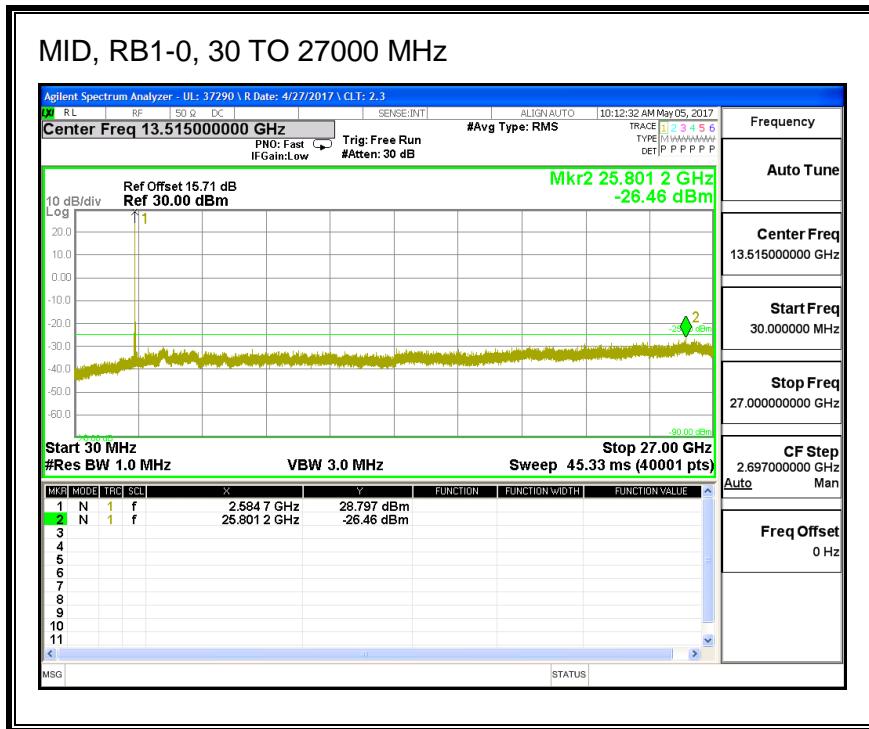
QPSK, (20.0 MHz BAND WIDTH)





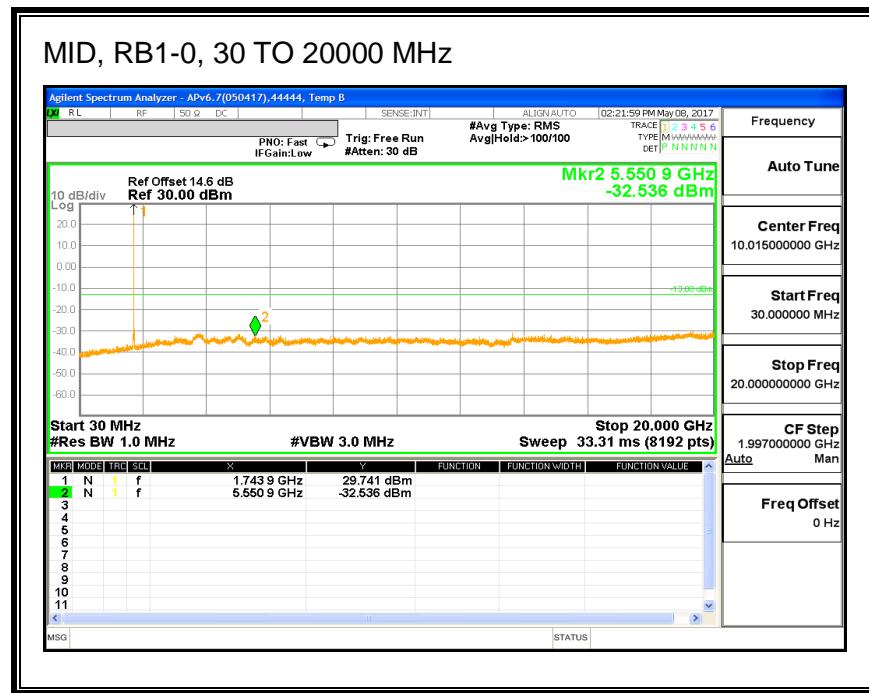
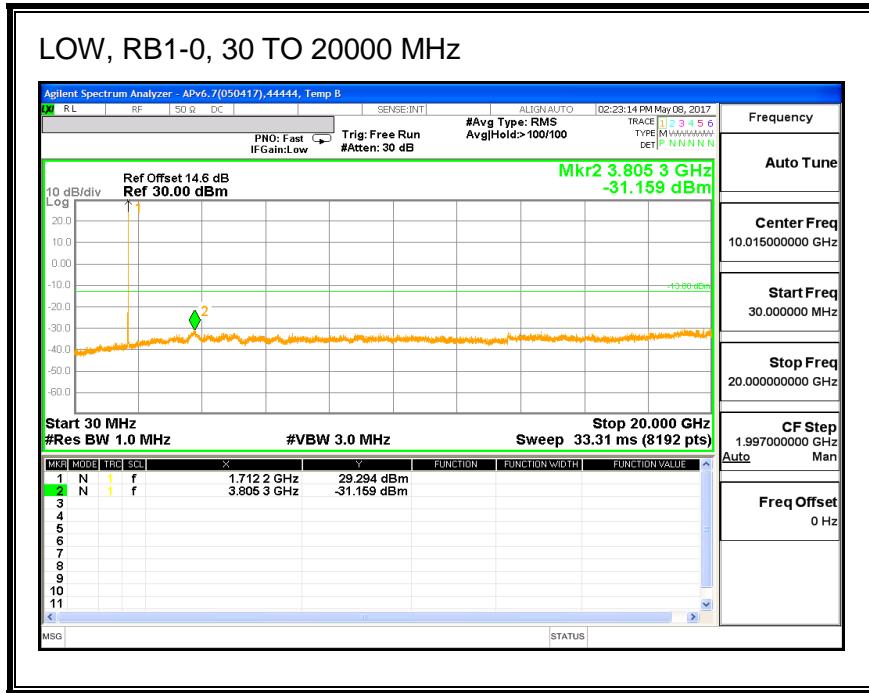
16QAM, (20.0 MHz BAND WIDTH)

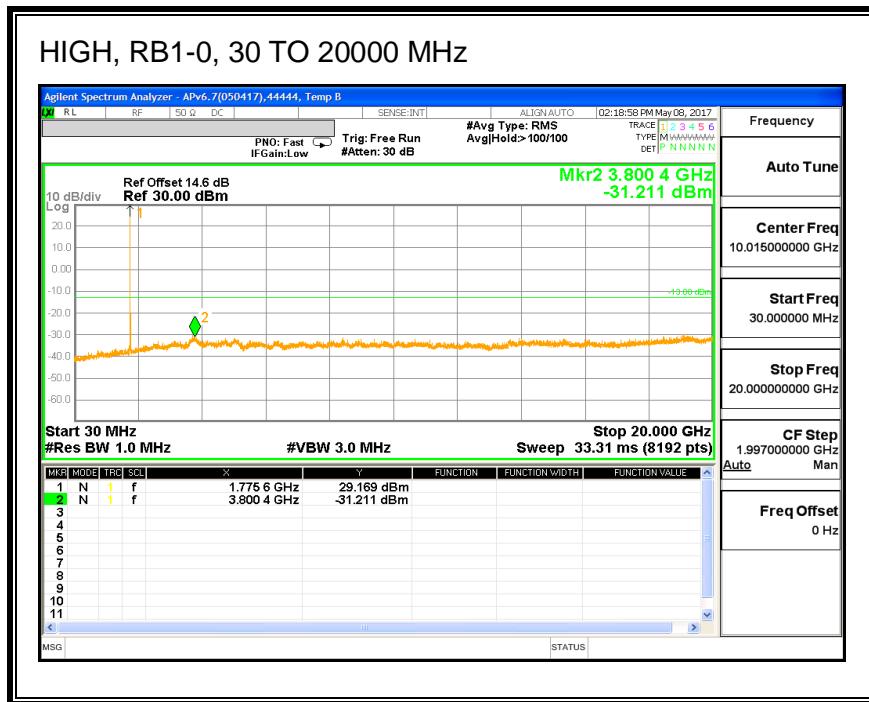




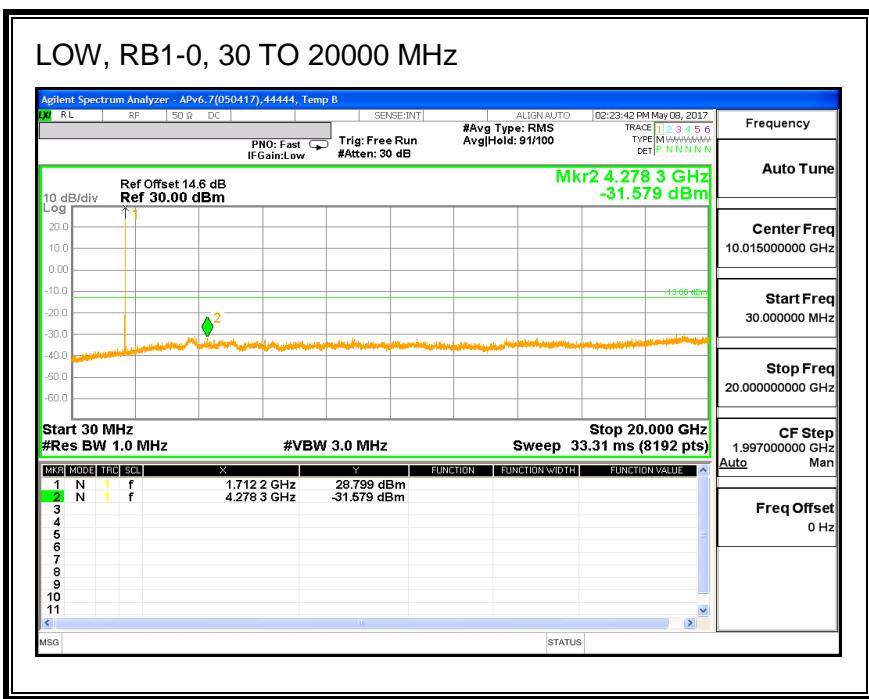
8.3.12. LTE BAND 66

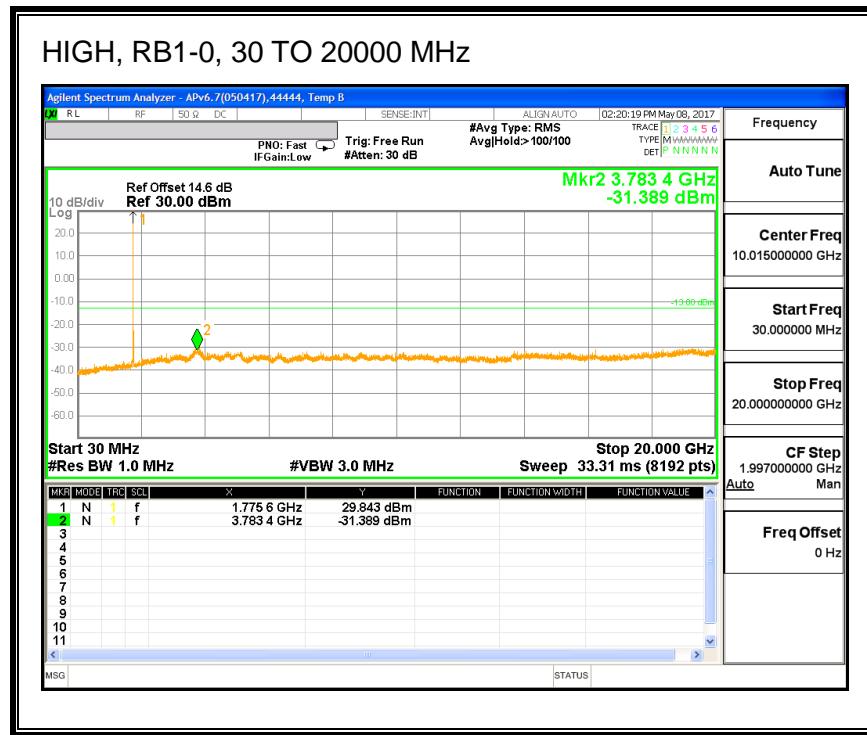
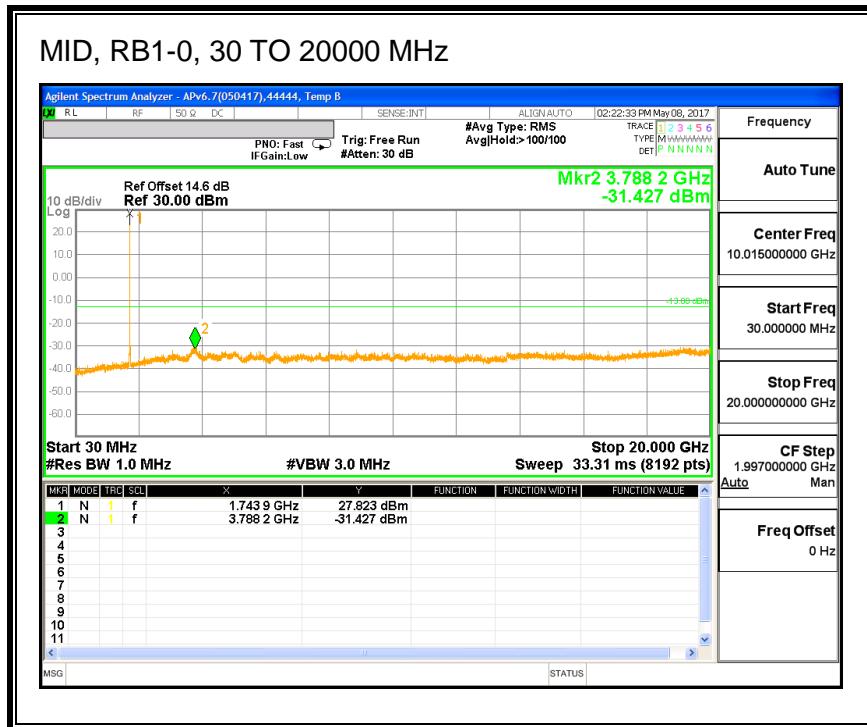
QPSK, (5.0 MHz BAND WIDTH)



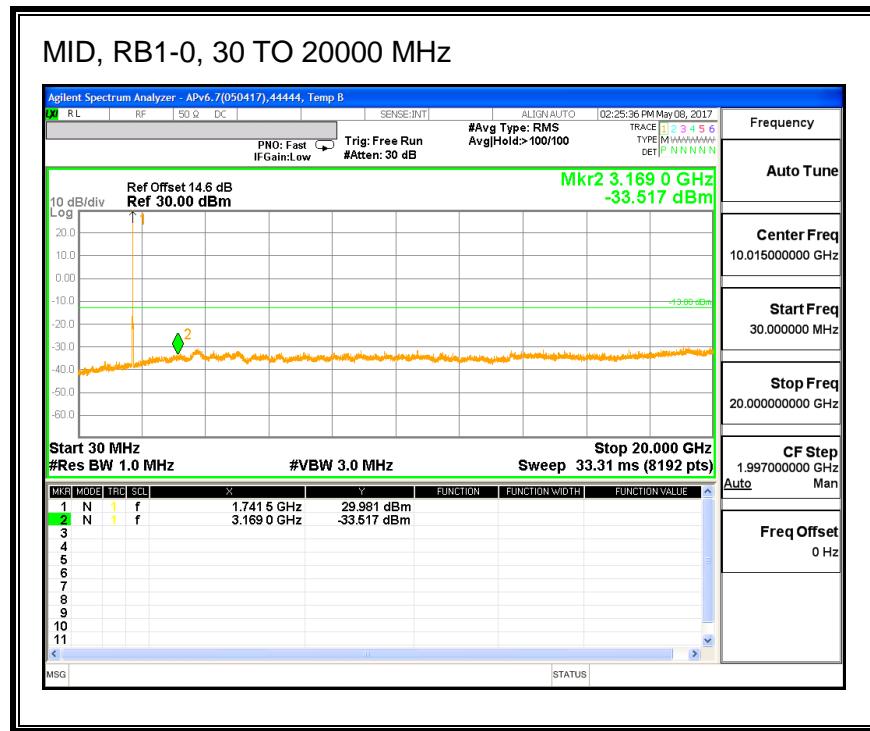
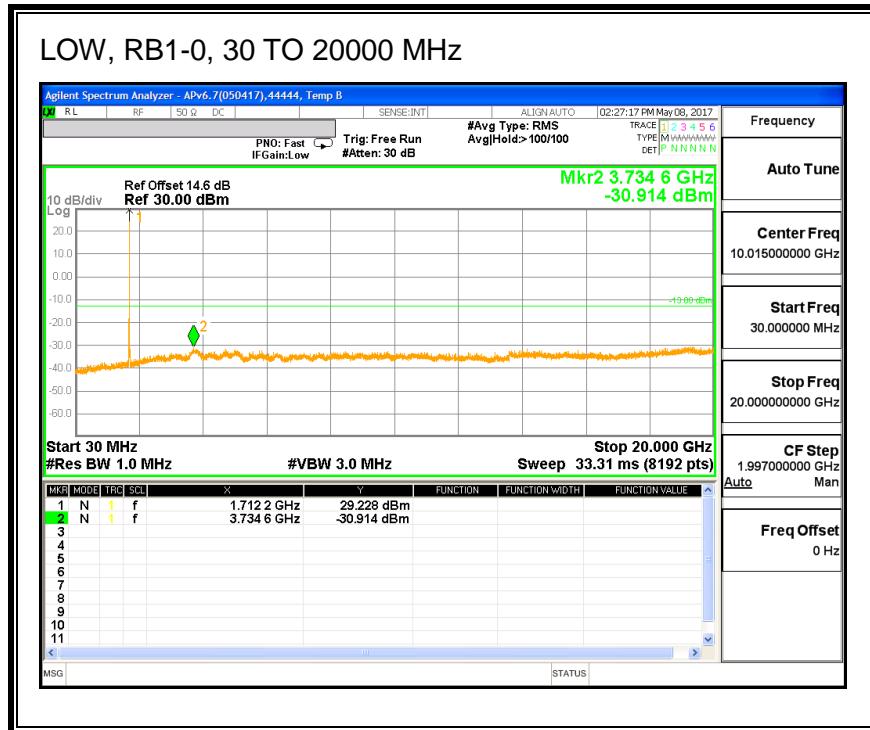


16QAM, (5.0 MHz BAND WIDTH)

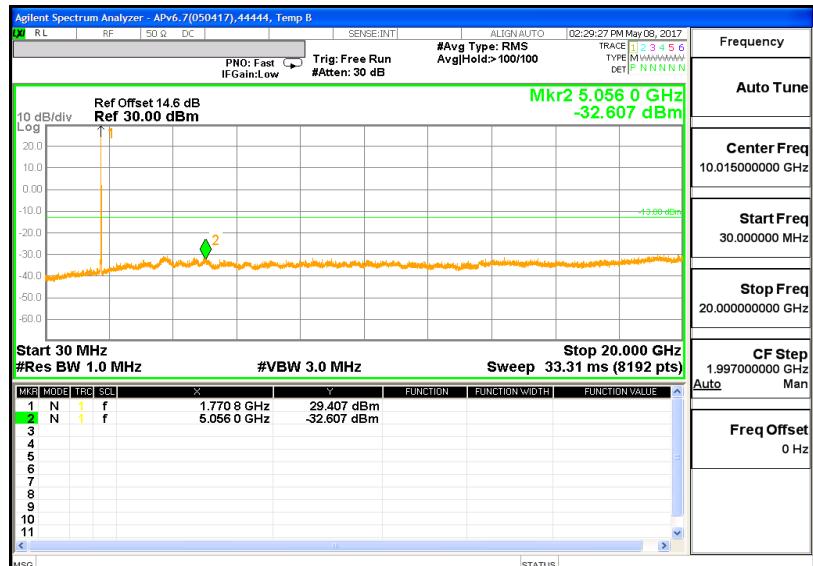




QPSK, (10.0 MHz BAND WIDTH)



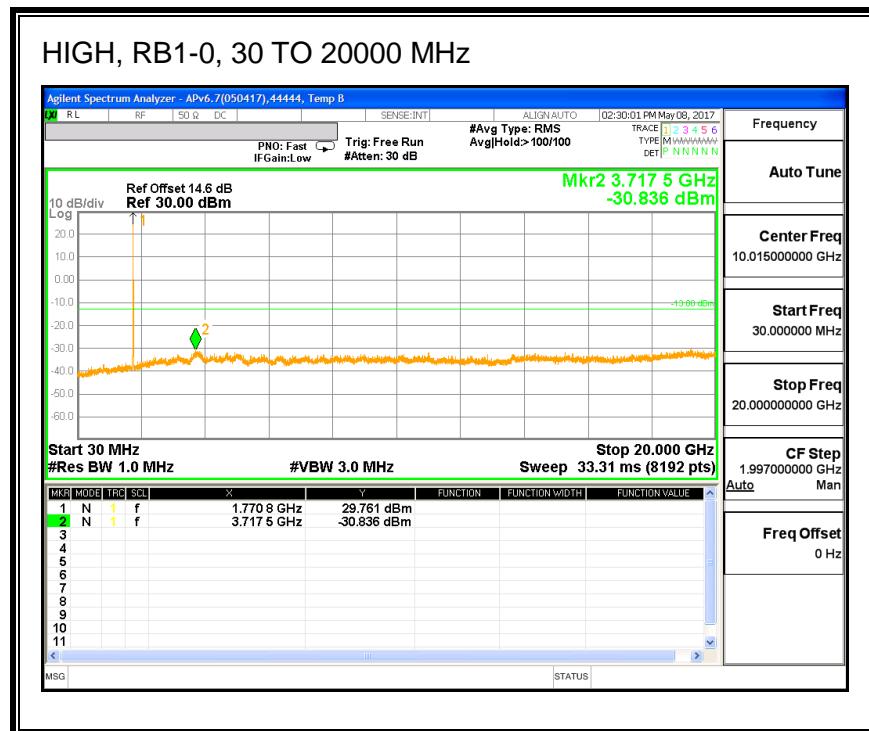
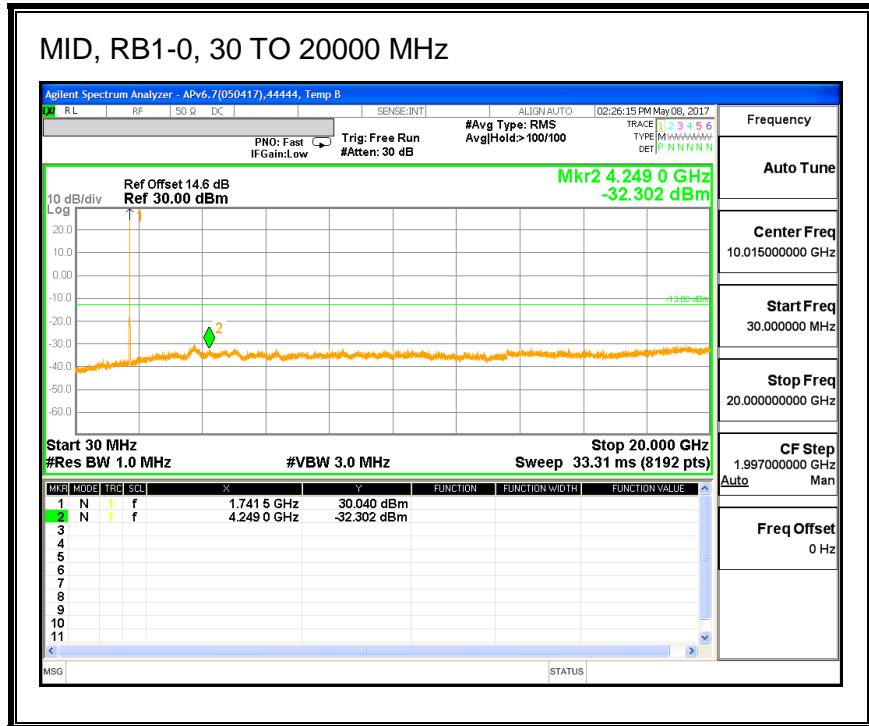
HIGH, RB1-0, 30 TO 20000 MHz



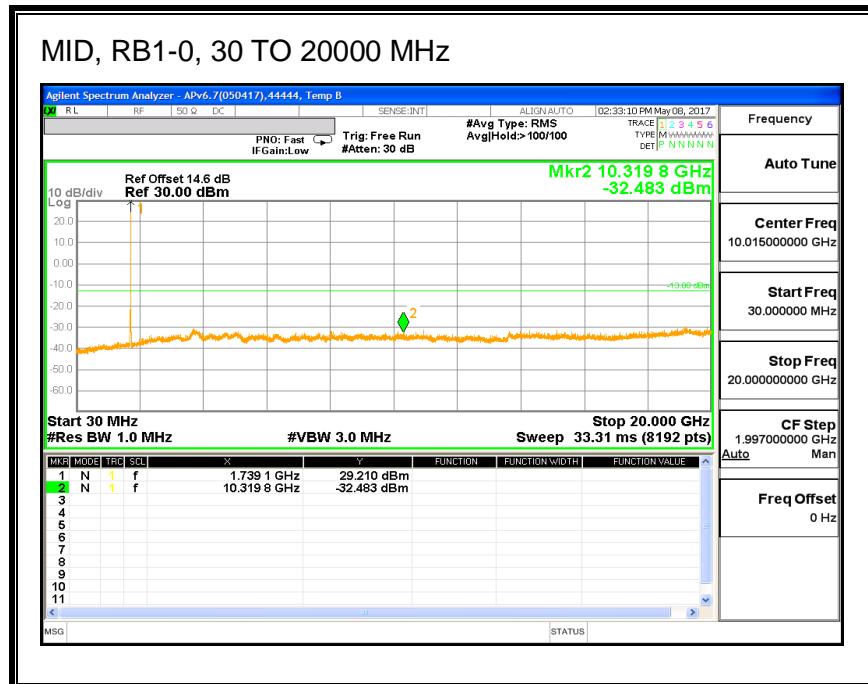
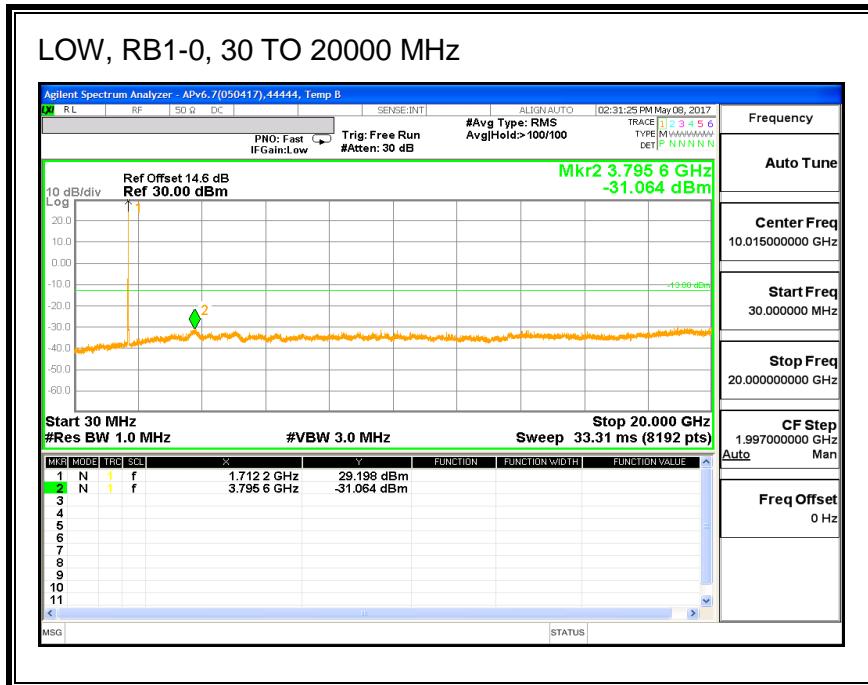
16QAM, (10.0 MHz BAND WIDTH)

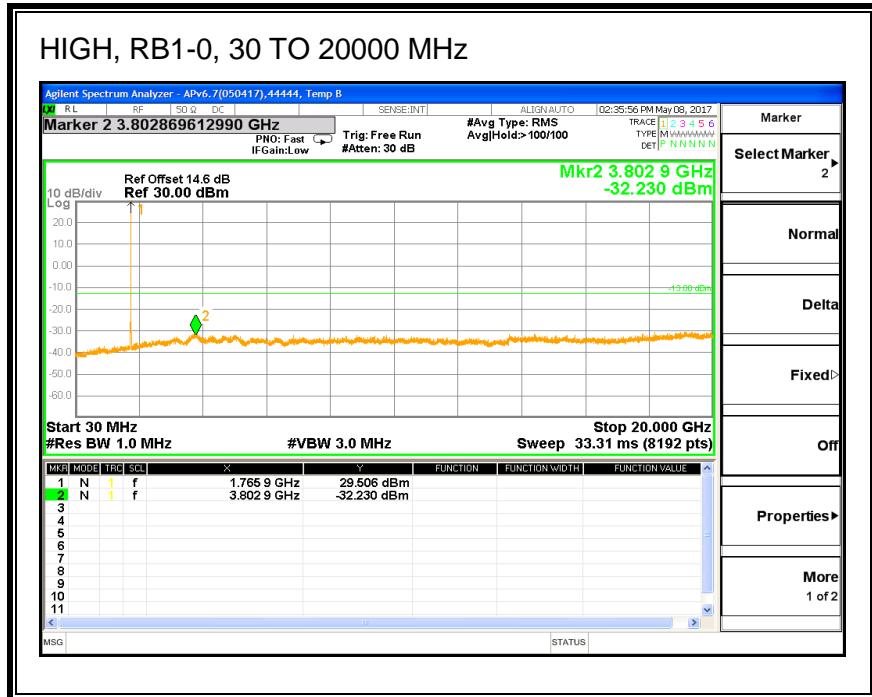
LOW, RB1-0, 30 TO 20000 MHz



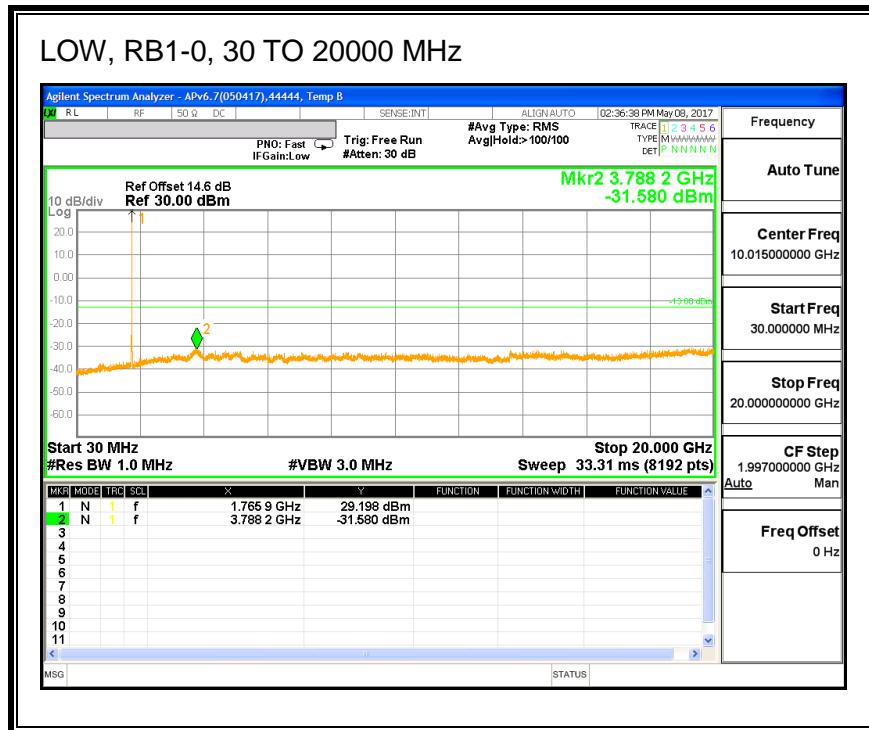


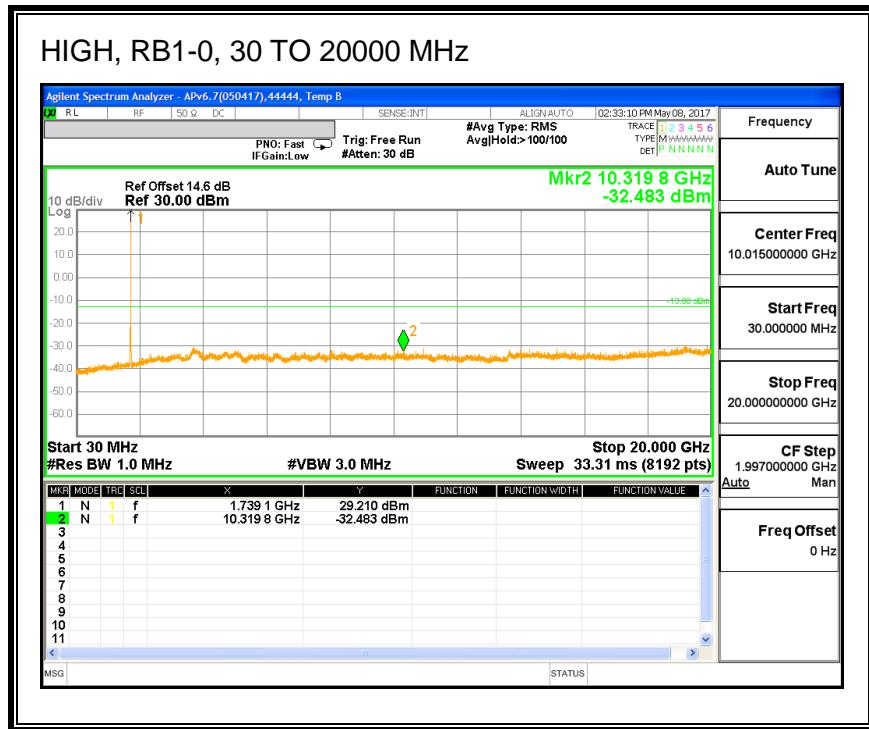
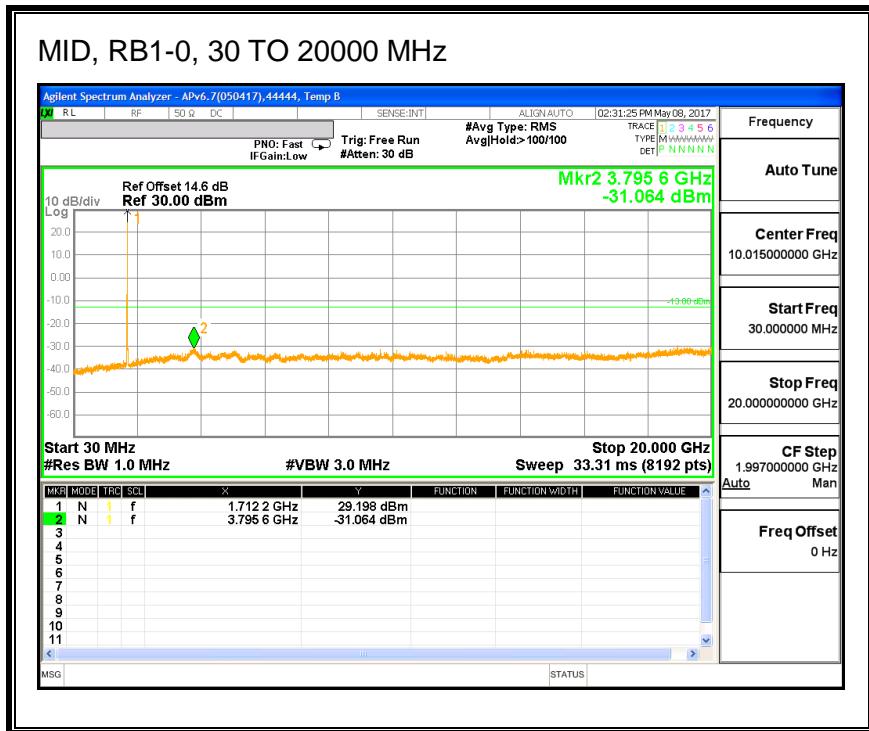
QPSK, (15.0 MHz BAND WIDTH)



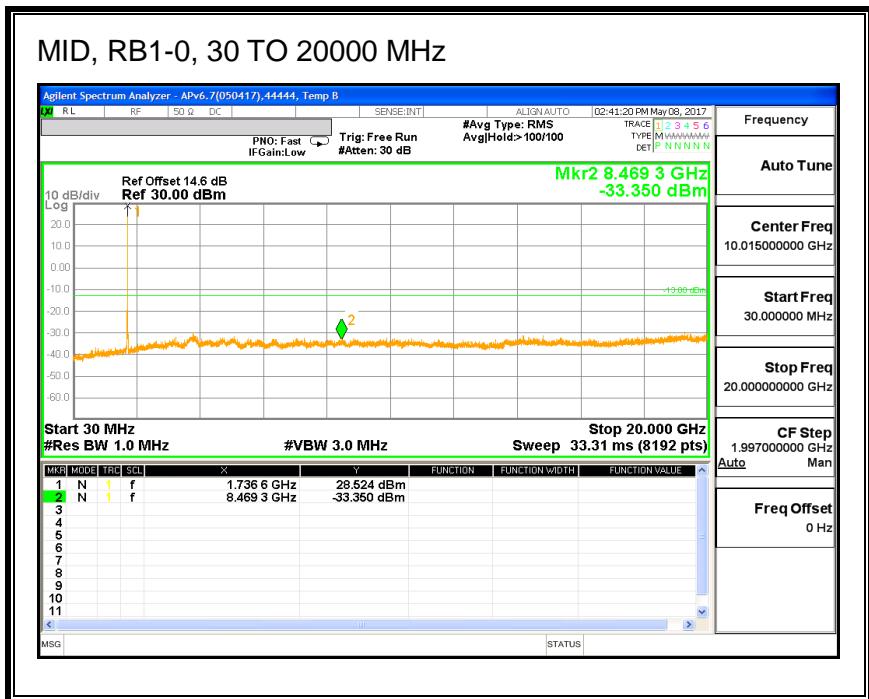
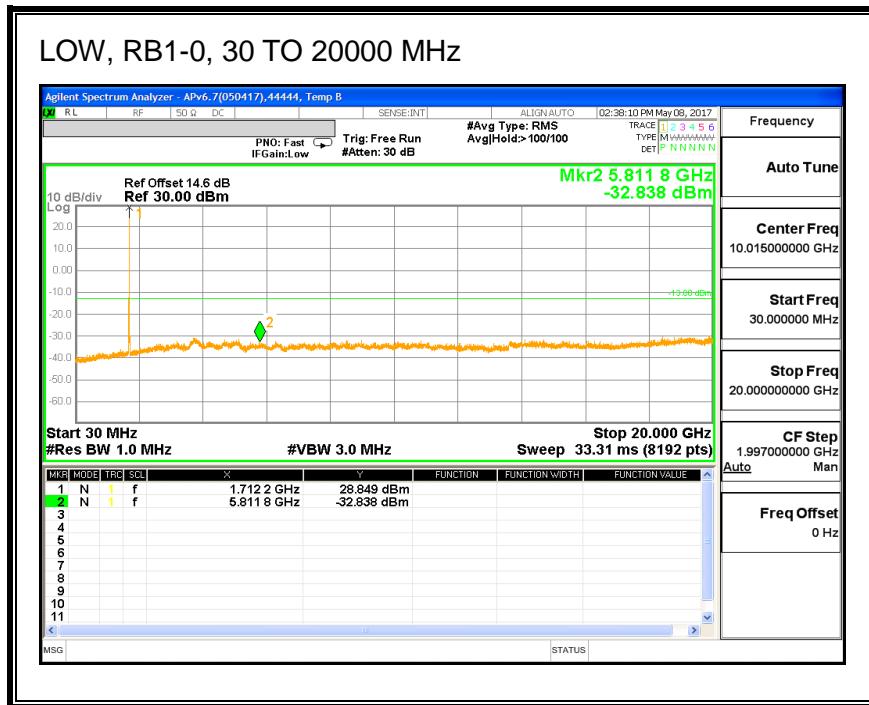


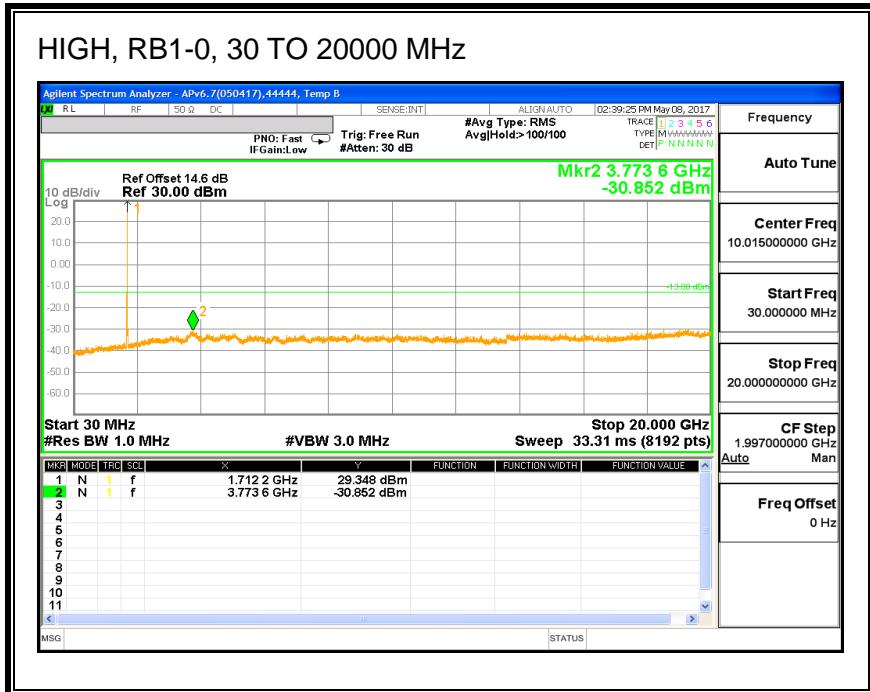
16QAM, (15.0 MHz BAND WIDTH)



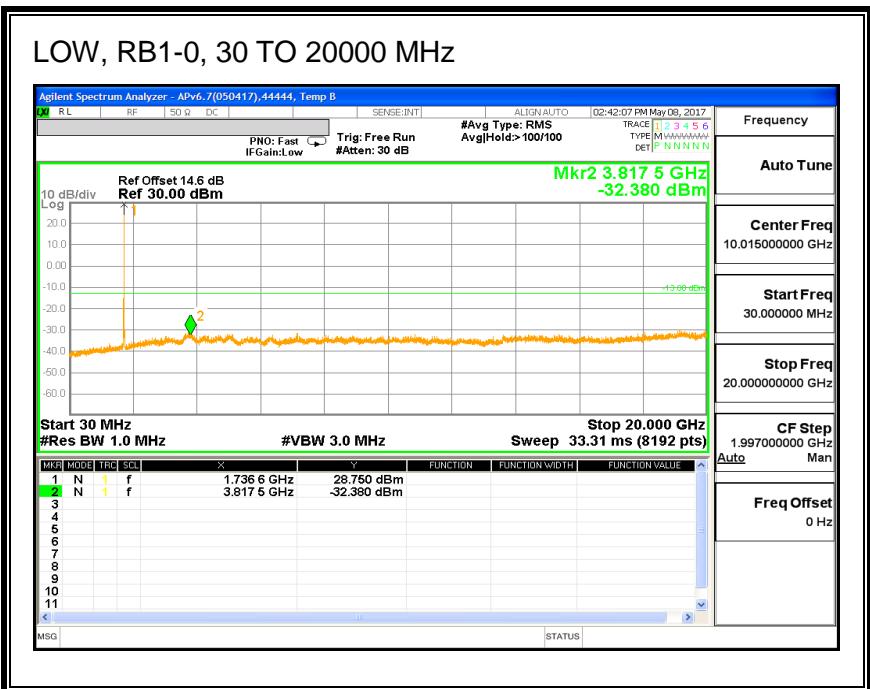


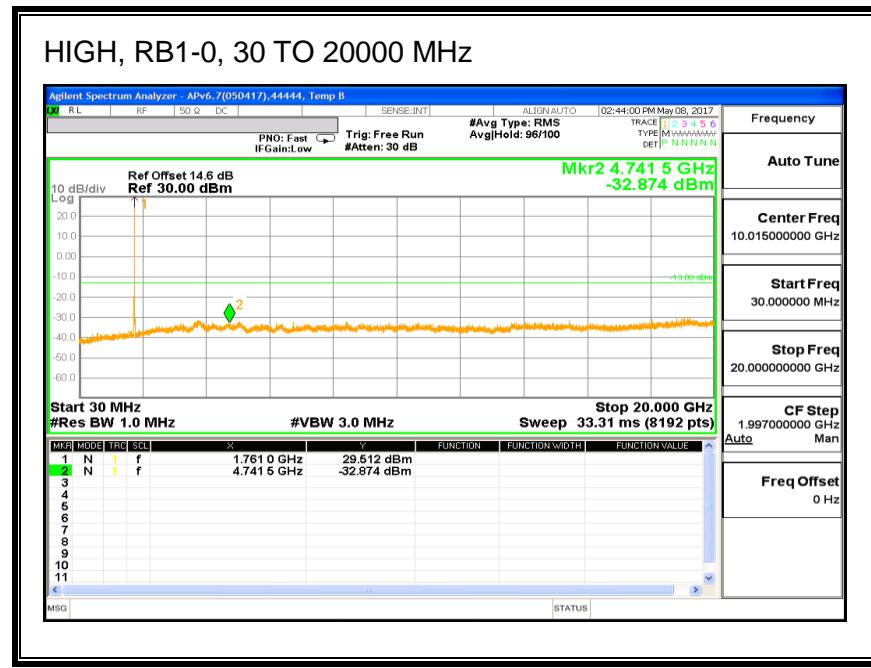
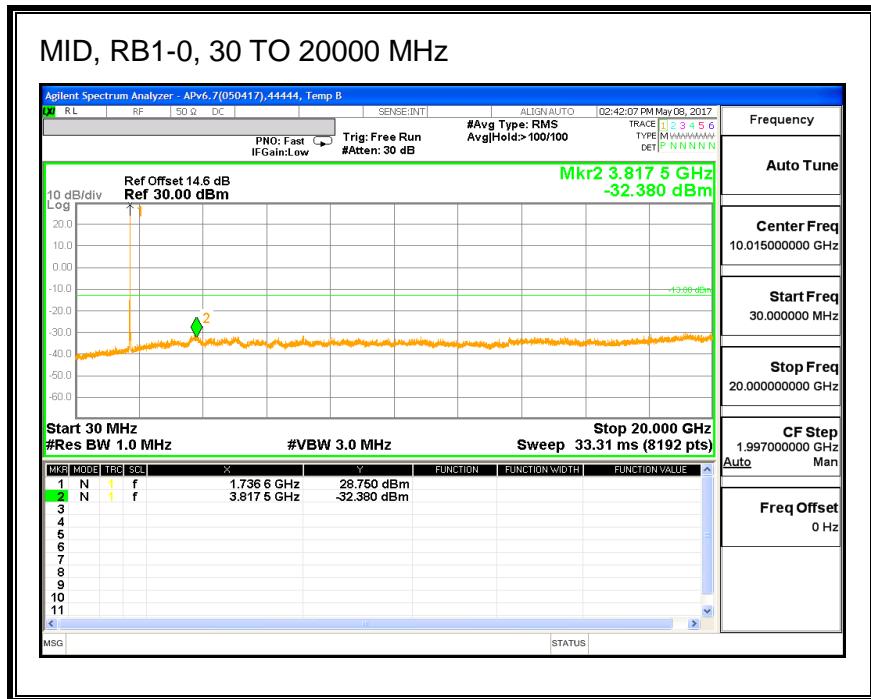
QPSK, (20.0 MHz BAND WIDTH)





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 ± 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 ± 2.5 ppm for mobile stations

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = -30° 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°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 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

See the following pages.

8.4.1. LTE BAND 2

ID:	29446	Date:	5/10/17
-----	-------	-------	---------

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	1851.1345	1908.9348	46.1	0.025
Extreme (50C)		1851.1346	1908.9348		
Extreme (40C)		1851.1346	1908.9348		
Extreme (30C)		1851.1346	1908.9348		
Extreme (10C)		1851.1346	1908.9348		
Extreme (0C)		1851.1346	1908.9348		
Extreme (-10C)		1851.1346	1908.9348		
Extreme (-20C)		1851.1346	1908.9348		
Extreme (-30C)		1851.1346	1908.9348		
20C	15%	1851.1346	1908.9348	23.3	0.012
	-15%	1851.1346	1908.9348	22.9	0.012
	End Point	1851.1346	1908.9348	22.2	0.012

8.4.2. LTE BAND 4

ID:	29446	Date:	5/10/17
-----	-------	-------	---------

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	1710.1509	1754.8509	34.2	0.020
Extreme (50C)		1710.1510	1754.8509		
Extreme (40C)		1710.1510	1754.8509		
Extreme (30C)		1710.1510	1754.8509		
Extreme (10C)		1710.1510	1754.8510		
Extreme (0C)		1710.1510	1754.8510		
Extreme (-10C)		1710.1510	1754.8510		
Extreme (-20C)		1710.1510	1754.8509		
Extreme (-30C)		1710.1510	1754.8509		
20C	15%	1710.1510	1754.8509	24.4	0.014
	-15%	1710.1510	1754.8509	22.3	0.013
	End Point	1710.1510	1754.8509	21.8	0.013

8.4.3. LTE BAND 5

ID:	29446	Date:	5/10/17
-----	-------	-------	---------

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	824.5292	848.8430		
Extreme (50C)		824.5292	848.8431	15.0	0.018
Extreme (40C)		824.5292	848.8431	14.3	0.017
Extreme (30C)		824.5292	848.8431	16.1	0.019
Extreme (10C)		824.5292	848.8431	15.9	0.019
Extreme (0C)		824.5292	848.8431	14.2	0.017
Extreme (-10C)		824.5292	848.8431	17.5	0.021
Extreme (-20C)		824.5292	848.8431	19.2	0.023
Extreme (-30C)		824.5292	848.8431	17.6	0.021
20C	15%	824.5292	848.8431	16.9	0.020
	-15%	824.5292	848.8431	16.3	0.019
	End Point	824.5292	848.8431	15.8	0.019

8.4.4. LTE BAND 7

ID:	29446	Date:	5/10/17
-----	-------	-------	---------

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	2501.0920	2568.9704		
Extreme (50C)		2501.0920	2568.9704	28.2	0.011
Extreme (40C)		2501.0920	2568.9704	24.7	0.010
Extreme (30C)		2501.0920	2568.9704	28.9	0.011
Extreme (10C)		2501.0920	2568.9704	28.2	0.011
Extreme (0C)		2501.0920	2568.9704	29.9	0.012
Extreme (-10C)		2501.0920	2568.9704	31.8	0.013
Extreme (-20C)		2501.0920	2568.9704	29.5	0.012
Extreme (-30C)		2501.0920	2568.9704	25.9	0.010
20C	15%	2501.0920	2568.9704	17.9	0.007
	-15%	2501.0920	2568.9704	17.5	0.007
	End Point	2501.0920	2568.9704	16.8	0.007

8.4.5. LTE BAND 12

ID:	29446	Date:	5/10/17
-----	-------	-------	---------

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	699.5421	715.4801	14.9	0.02
Extreme (50C)		699.5421	715.4801		
Extreme (40C)		699.5421	715.4801		
Extreme (30C)		699.5421	715.4801		
Extreme (10C)		699.5421	715.4801		
Extreme (0C)		699.5421	715.4801		
Extreme (-10C)		699.5421	715.4801		
Extreme (-20C)		699.5421	715.4801		
Extreme (-30C)		699.5421	715.4802		
20C	15%	699.5421	715.4801	10.3	0.01
	-15%	699.5421	715.4801	11.5	0.02
	End Point	699.5421	715.4801	12.0	0.02

8.4.6. LTE BAND 13

ID:	29446	Date:	5/10/17
-----	-------	-------	---------

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	777.5301	786.4859	12.1	0.015
Extreme (50C)		777.5301	786.4859		
Extreme (40C)		777.5301	786.4859		
Extreme (30C)		777.5301	786.4859		
Extreme (10C)		777.5301	786.4859		
Extreme (0C)		777.5301	786.4859		
Extreme (-10C)		777.5301	786.4859		
Extreme (-20C)		777.5301	786.4859		
Extreme (-30C)		777.5301	786.4859		
20C	15%	777.5301	786.4859	6.7	0.009
	-15%	777.5301	786.4859	6.5	0.008
	End Point	777.5301	786.4859	6.5	0.008

8.4.7. LTE BAND 17

ID:	29446	Date:	5/10/17
-----	-------	-------	---------

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	705.5506	714.4681	8.9	0.012
Extreme (50C)		705.5506	714.4681		
Extreme (40C)		705.5506	714.4681		
Extreme (30C)		705.5506	714.4681		
Extreme (10C)		705.5506	714.4681		
Extreme (0C)		705.5506	714.4681		
Extreme (-10C)		705.5506	714.4681		
Extreme (-20C)		705.5506	714.4681		
Extreme (-30C)		705.5506	714.4681		
20C		15%	705.5506	714.4681	6.2
		-15%	705.5506	714.4681	6.1
		End Point	705.5506	714.4681	6.2

8.4.8. LTE BAND 25

ID:	29446	Date:	5/10/17
-----	-------	-------	---------

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	1851.1215	1913.9452	29.6	0.016
Extreme (50C)		1851.1215	1913.9452		
Extreme (40C)		1851.1215	1913.9452		
Extreme (30C)		1851.1215	1913.9452		
Extreme (10C)		1851.1215	1913.9452		
Extreme (0C)		1851.1215	1913.9452		
Extreme (-10C)		1851.1215	1913.9452		
Extreme (-20C)		1851.1215	1913.9452		
Extreme (-30C)		1851.1215	1913.9452		
20C		15%	1851.1215	1913.9452	10.2
		-15%	1851.1215	1913.9452	10.6
		End Point	1851.1215	1913.9452	10.7

8.4.9. LTE BAND 26

ID:	29446	Date:	5/10/17
-----	-------	-------	---------

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	814.5279	823.4827		
Extreme (50C)		814.5279	823.4827	15.7	0.019
Extreme (40C)		814.5279	823.4827	16.4	0.020
Extreme (30C)		814.5279	823.4827	14.9	0.018
Extreme (10C)		814.5279	823.4827	15.2	0.019
Extreme (0C)		814.5279	823.4827	14.1	0.017
Extreme (-10C)		814.5279	823.4827	14.0	0.017
Extreme (-20C)		814.5279	823.4827	18.5	0.023
Extreme (-30C)		814.5279	823.4827	16.6	0.020
20C	15%	814.5279	823.4827	15.0	0.018
	-15%	814.5279	823.4827	14.1	0.017
	End Point	814.5279	823.4827	15.1	0.018

8.4.10. LTE BAND 30

ID:	29446	Date:	5/10/17
-----	-------	-------	---------

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	2305.5273	2314.4838		
Extreme (50C)		2305.5273	2314.4838	29.4	0.013
Extreme (40C)		2305.5273	2314.4838	28.1	0.012
Extreme (30C)		2305.5273	2314.4838	28.9	0.013
Extreme (10C)		2305.5274	2314.4838	37.0	0.016
Extreme (0C)		2305.5274	2314.4838	37.5	0.016
Extreme (-10C)		2305.5274	2314.4838	39.6	0.017
Extreme (-20C)		2305.5273	2314.4838	28.8	0.012
Extreme (-30C)		2305.5274	2314.4838	32.6	0.014
20C	15%	2305.5273	2314.4838	17.5	0.008
	-15%	2305.5273	2314.4838	15.6	0.007
	End Point	2305.5273	2314.4838	16.1	0.007

8.4.11. LTE BAND 41

ID:	38602	Date:	5/11/17
-----	-------	-------	---------

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	2497.1454	2689.1687	26.0	0.010
Extreme (50C)		2497.1454	2689.1687		
Extreme (40C)		2497.1454	2689.1687		
Extreme (30C)		2497.1454	2689.1687		
Extreme (10C)		2497.1454	2689.1687		
Extreme (0C)		2497.1454	2689.1687		
Extreme (-10C)		2497.1454	2689.1687		
Extreme (-20C)		2497.1454	2689.1687		
Extreme (-30C)		2497.1454	2689.1687		
20C	15%	2497.1454	2689.1687	21.1	0.008
	-15%	2497.1454	2689.1687	20.9	0.008
	End Point	2497.1454	2689.1687	19.4	0.007

8.4.12. LTE BAND 66

ID:	29446	Date:	5/10/17
-----	-------	-------	---------

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	1711.1008	778.9315	36.6	0.021
Extreme (50C)		1711.1008	778.9315		
Extreme (40C)		1711.1008	778.9315		
Extreme (30C)		1711.1008	778.9315		
Extreme (10C)		1711.1008	778.9315		
Extreme (0C)		1711.1008	778.9315		
Extreme (-10C)		1711.1008	778.9315		
Extreme (-20C)		1711.1008	778.9315		
Extreme (-30C)		1711.1008	778.9315		
20C	15%	1711.1007	778.9314	-28.3	-0.016
	-15%	1711.1007	778.9314	-27.8	-0.016
	End Point	1711.1007	778.9315	-26.9	-0.015

8.5. PEAK-TO-AVERAGE RATIO

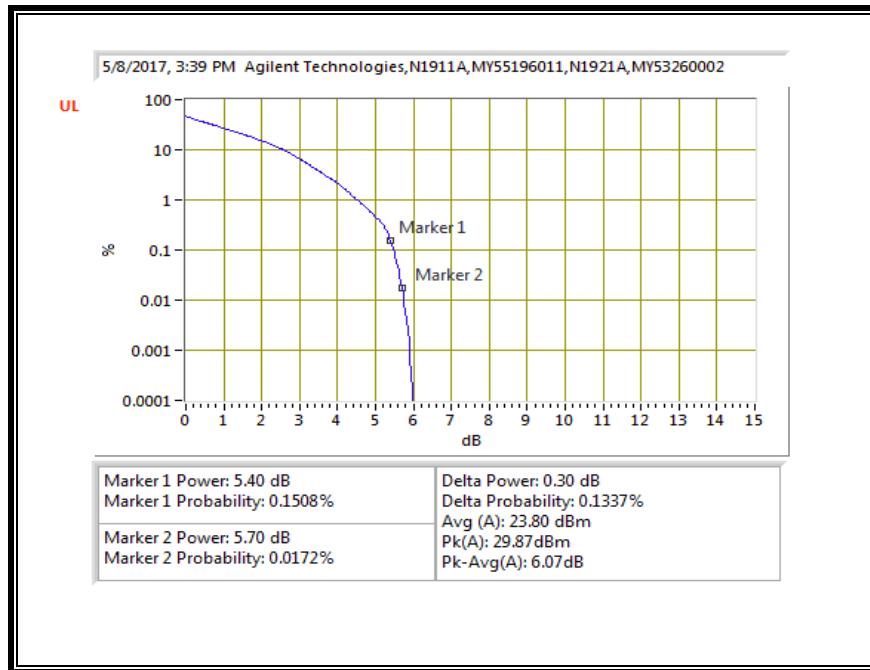
In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

RESULT

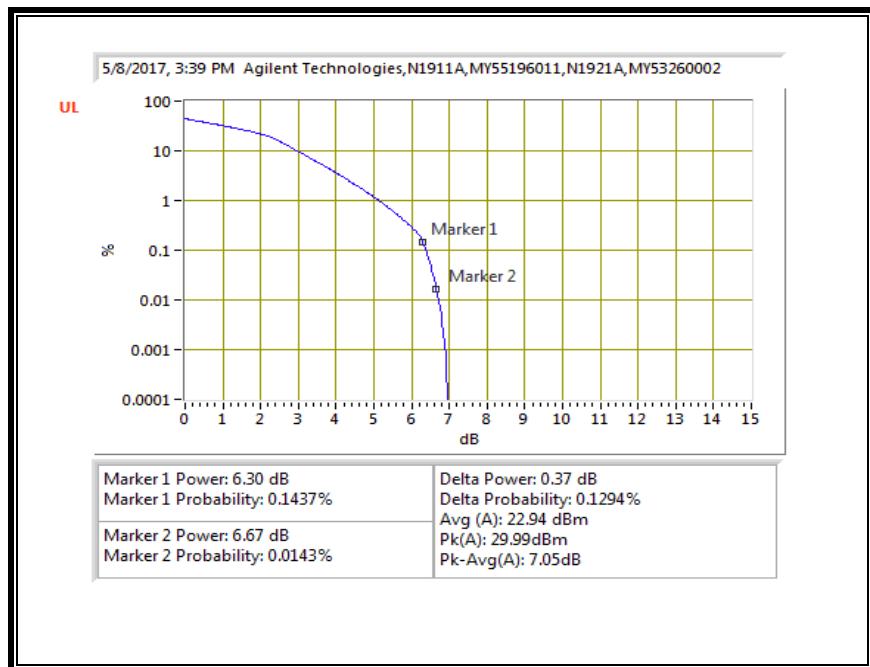
Test was performed on LAT 1 antenna; full resource block (FRB) for each bandwidth combination was used to measure as the worst case. The results from all CCDF measurements are passed with 13dB peak-to-average ratio criteria.

8.5.1. LTE BAND 2

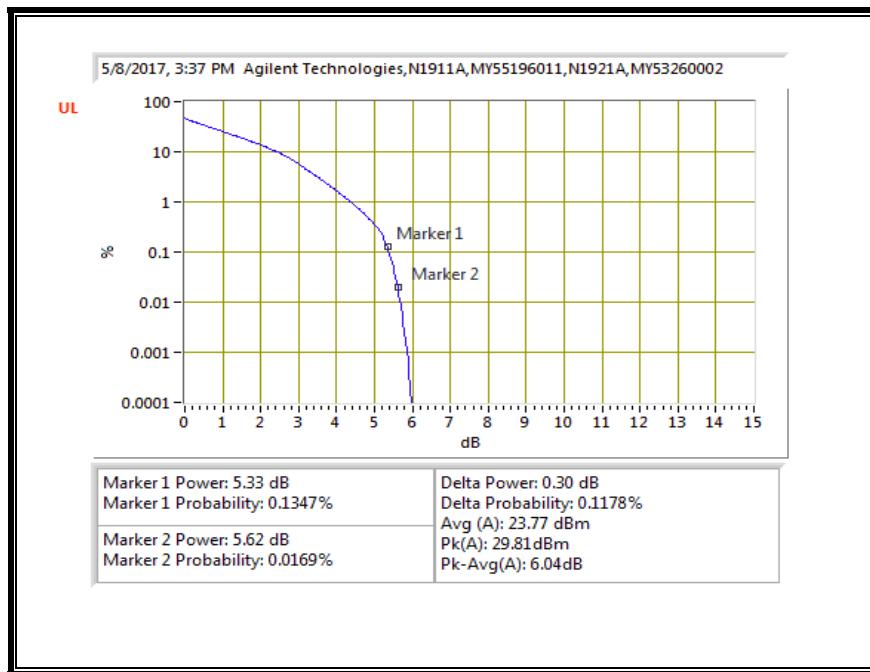
QPSK, (1.4 MHz BAND WIDTH)



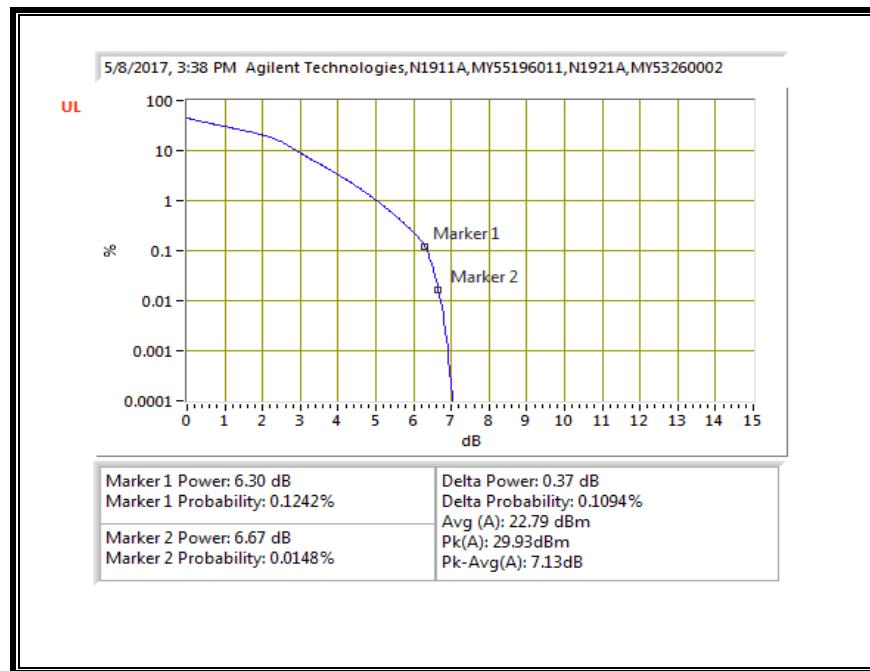
16QAM, (1.4 MHz BAND WIDTH)



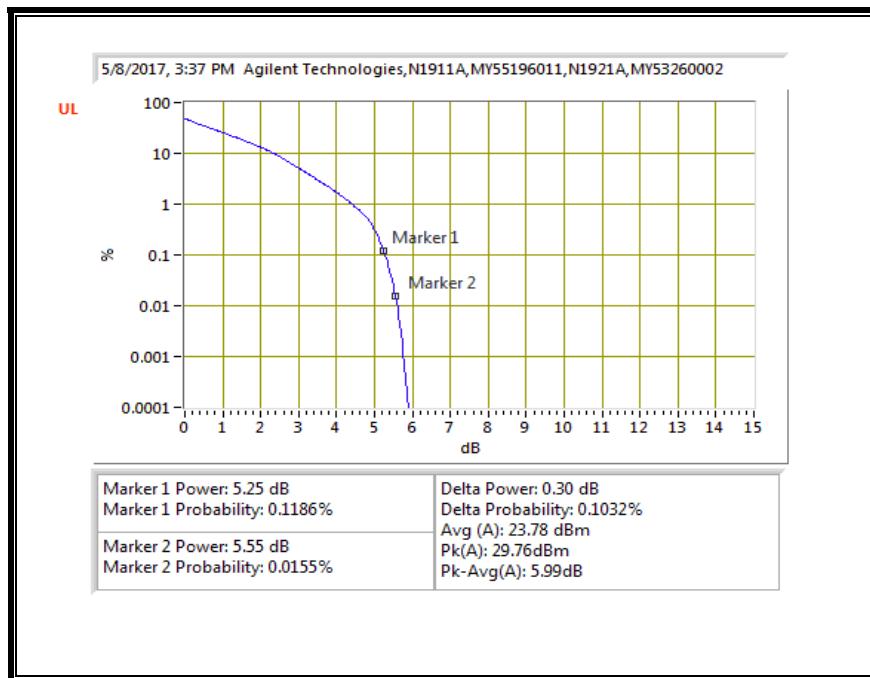
QPSK, (3.0 MHz BAND WIDTH)



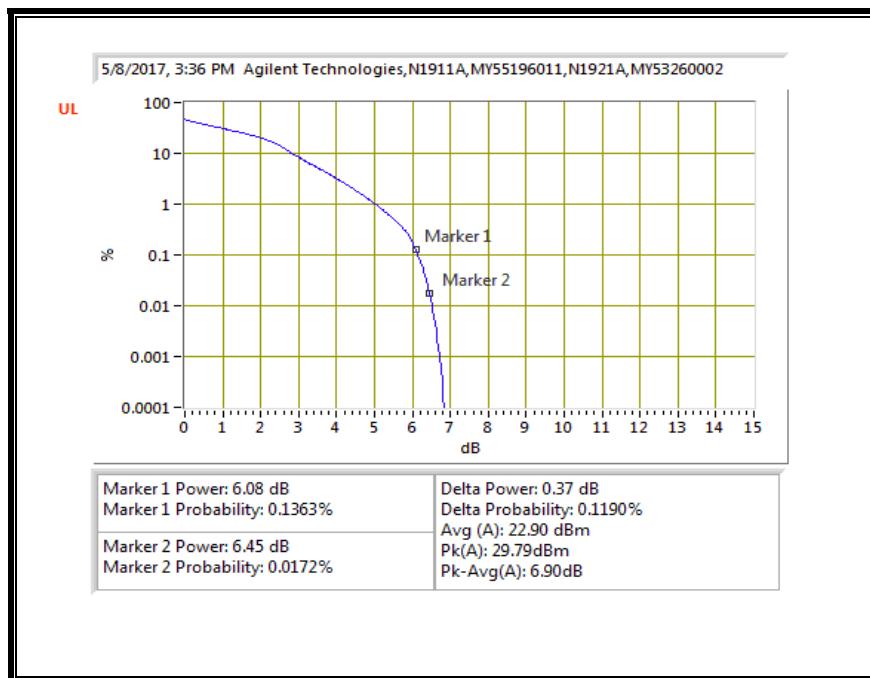
16QAM, (3.0 MHz BAND WIDTH)



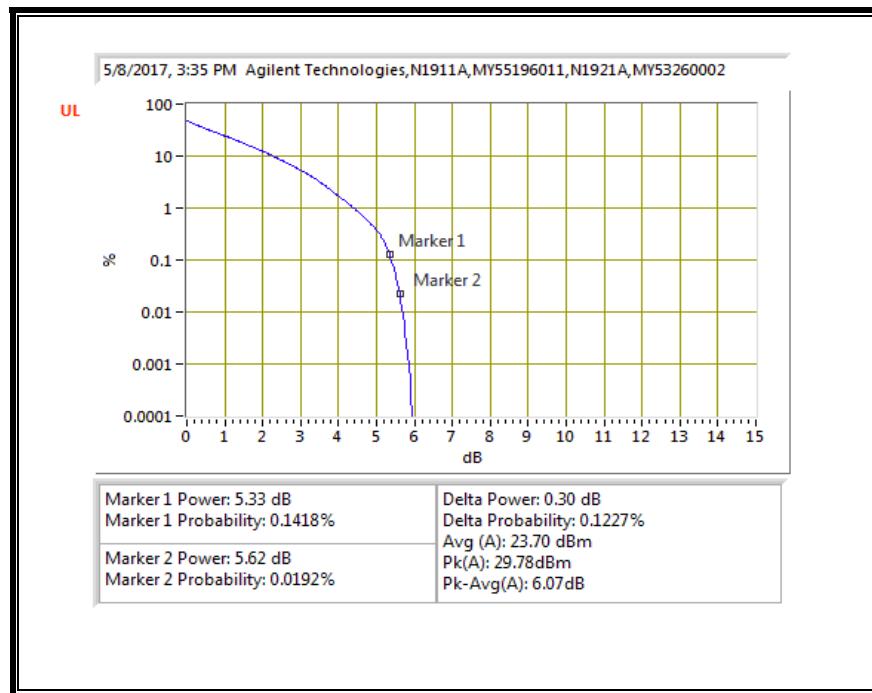
QPSK, (5.0 MHz BAND WIDTH)



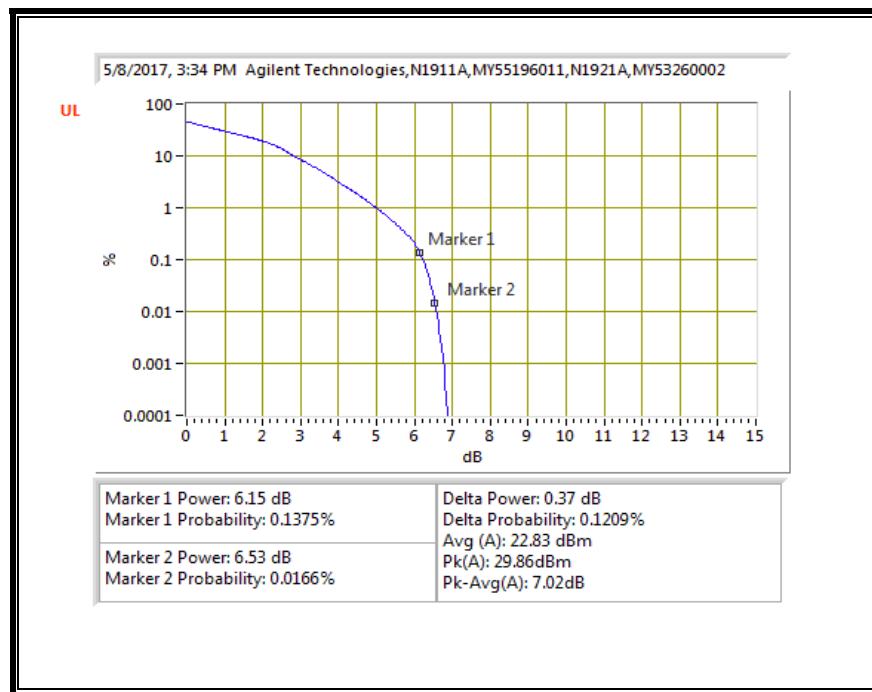
16QAM, (5.0 MHz BAND WIDTH)



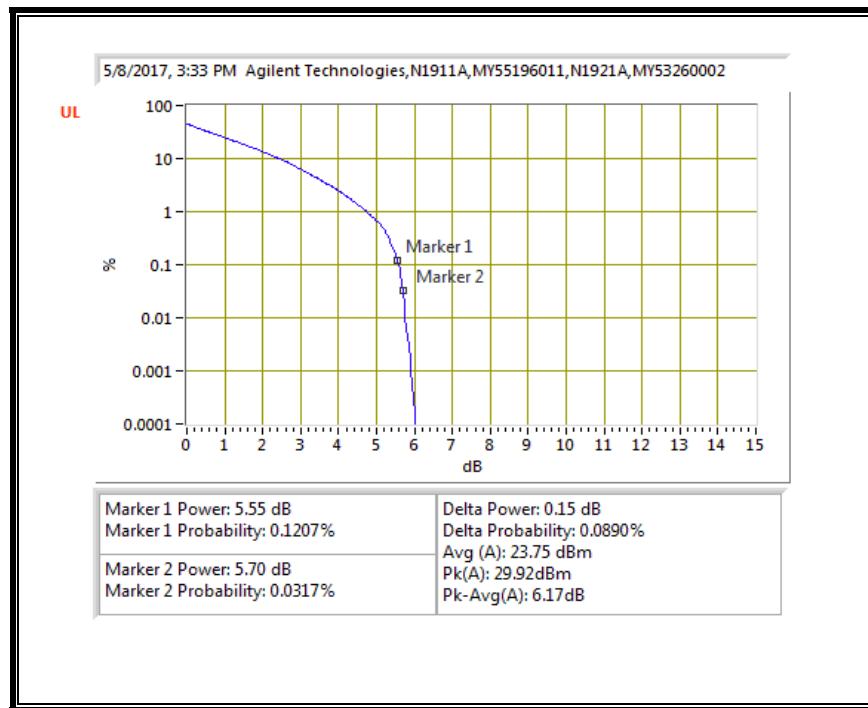
QPSK, (10.0 MHz BAND WIDTH)



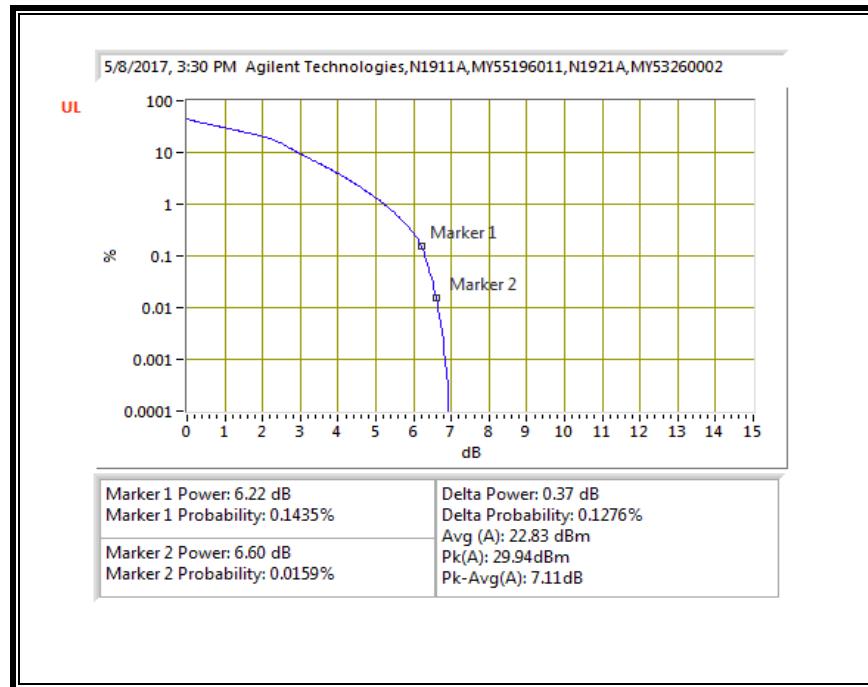
16QAM, (10.0 MHz BAND WIDTH)



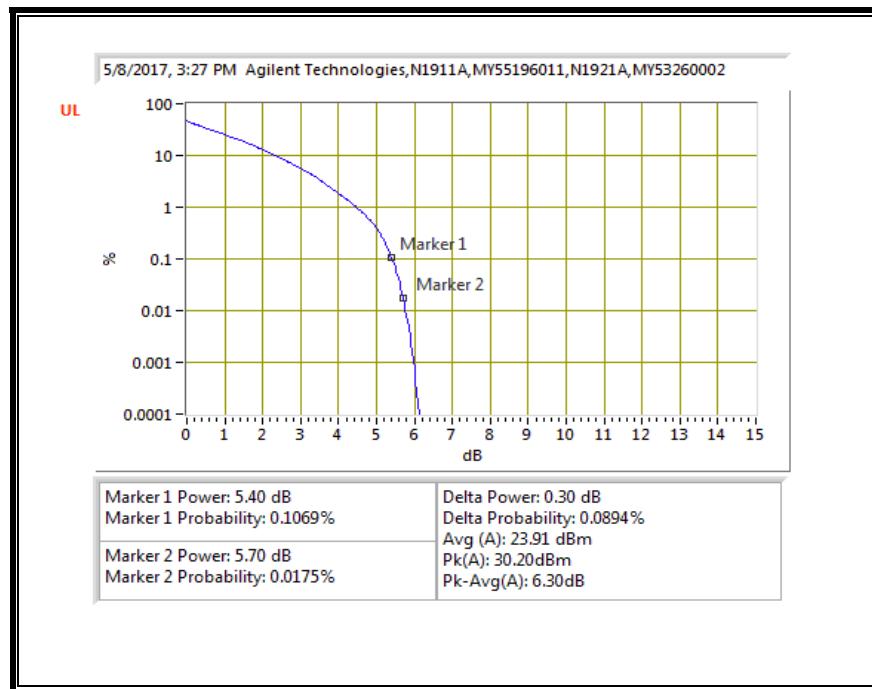
QPSK, (15.0 MHz BAND WIDTH)



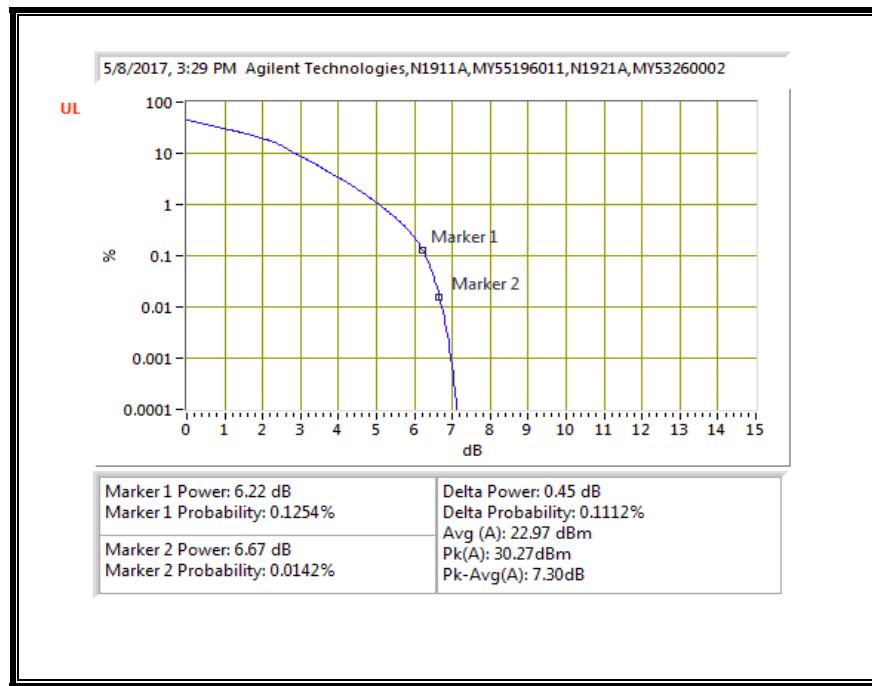
16QAM, (15.0 MHz BAND WIDTH)



QPSK, (20.0 MHz BAND WIDTH)

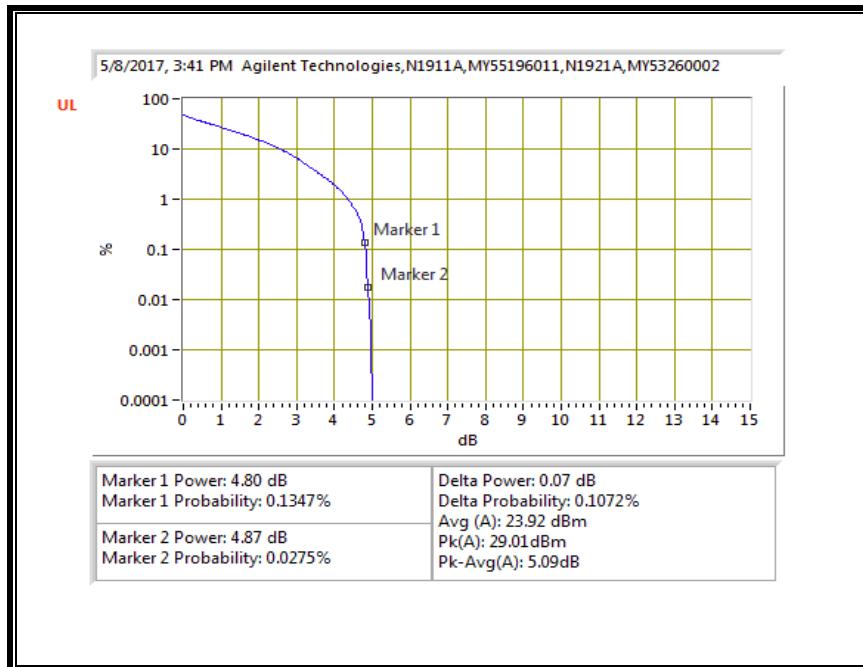


16QAM, (20.0 MHz BAND WIDTH)

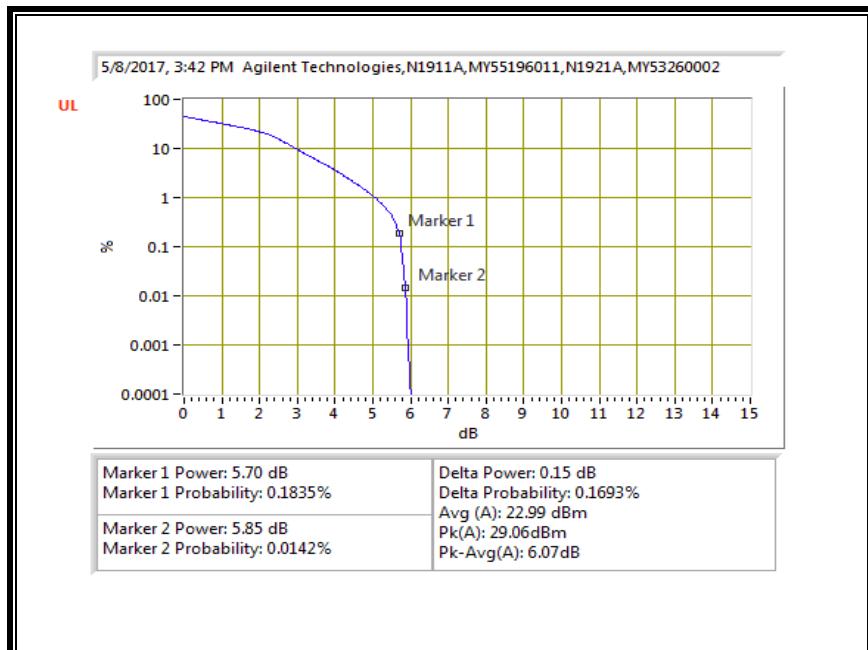


8.5.2. LTE BAND 4

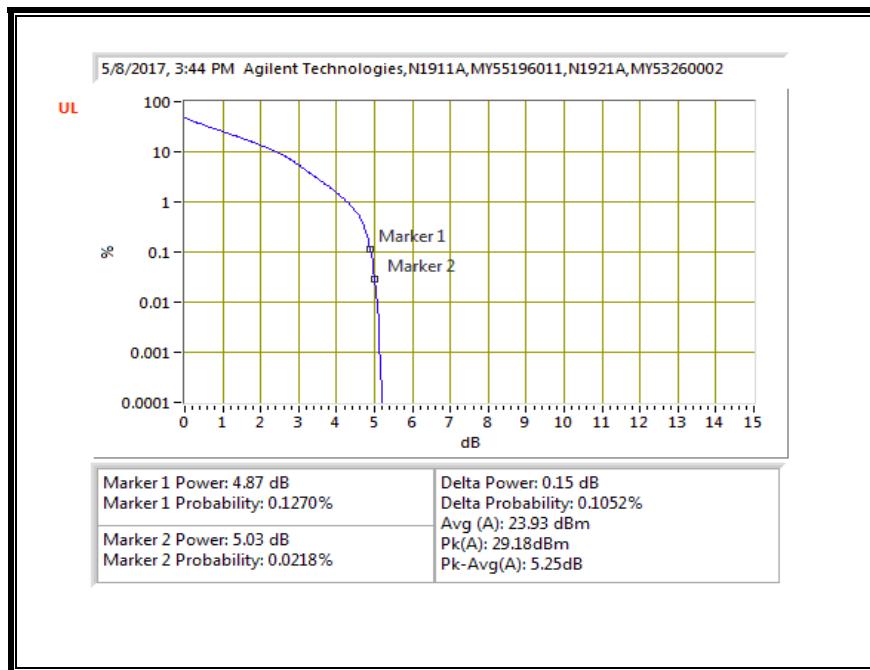
QPSK, (1.4 MHz BAND WIDTH)



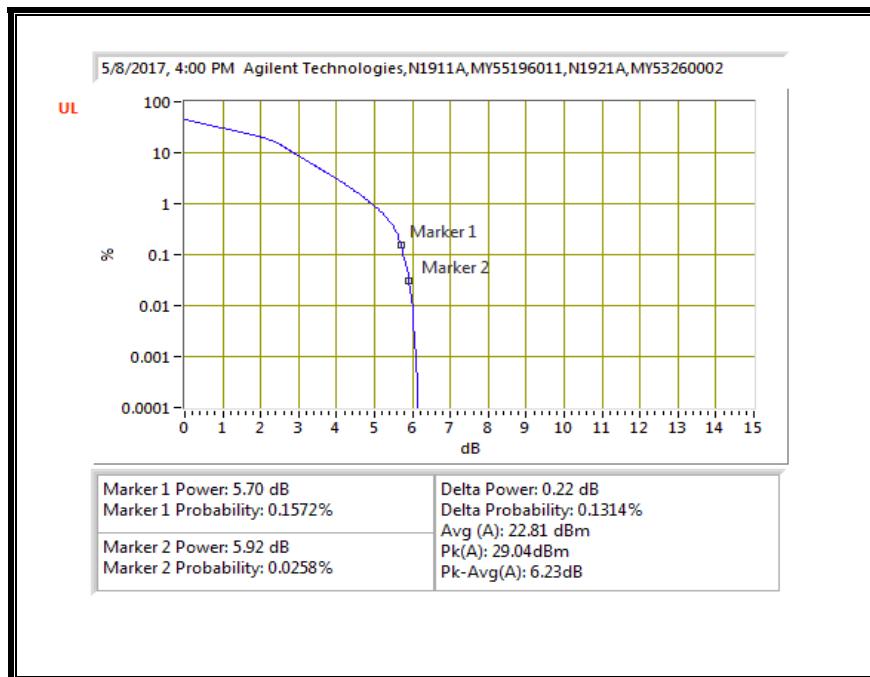
16QAM, (1.4 MHz BAND WIDTH)



QPSK, (3.0 MHz BAND WIDTH)

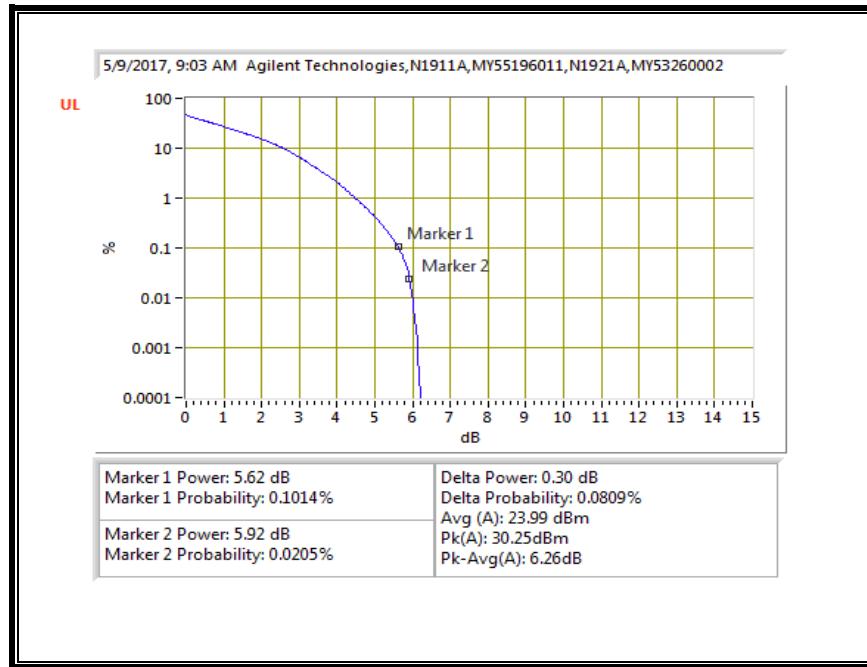


16QAM, (3.0 MHz BAND WIDTH)

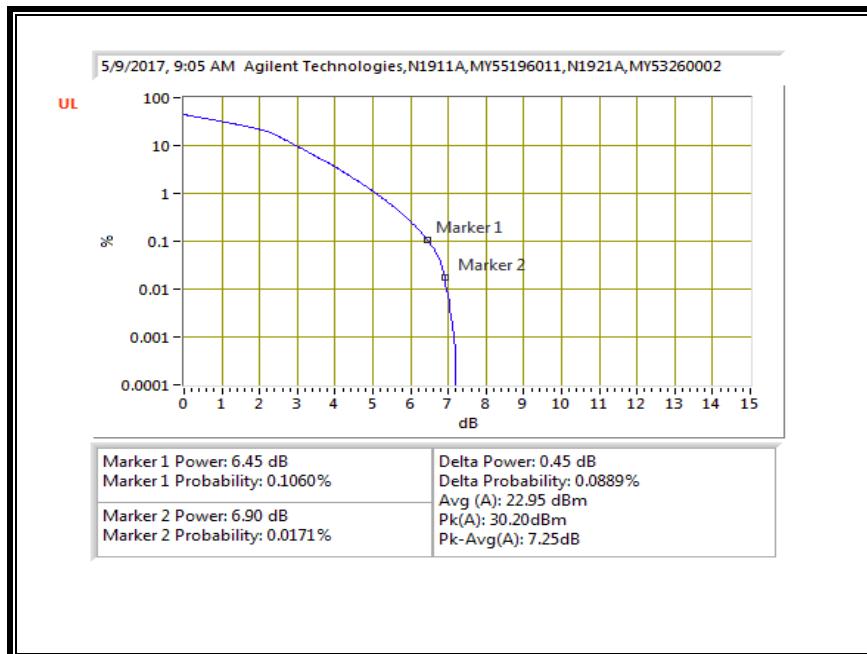


8.5.3. LTE BAND 5

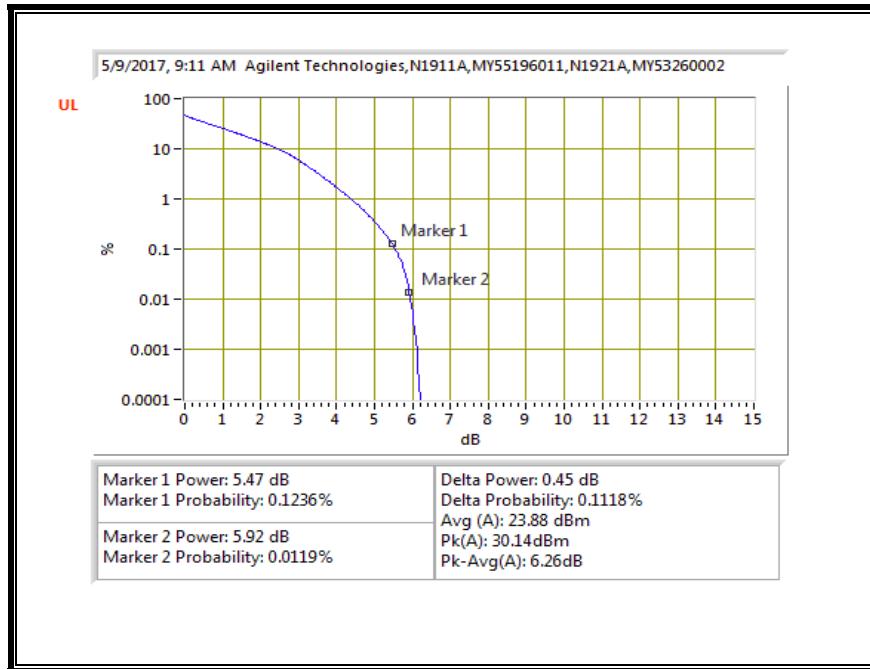
QPSK, (1.4 MHz BAND WIDTH)



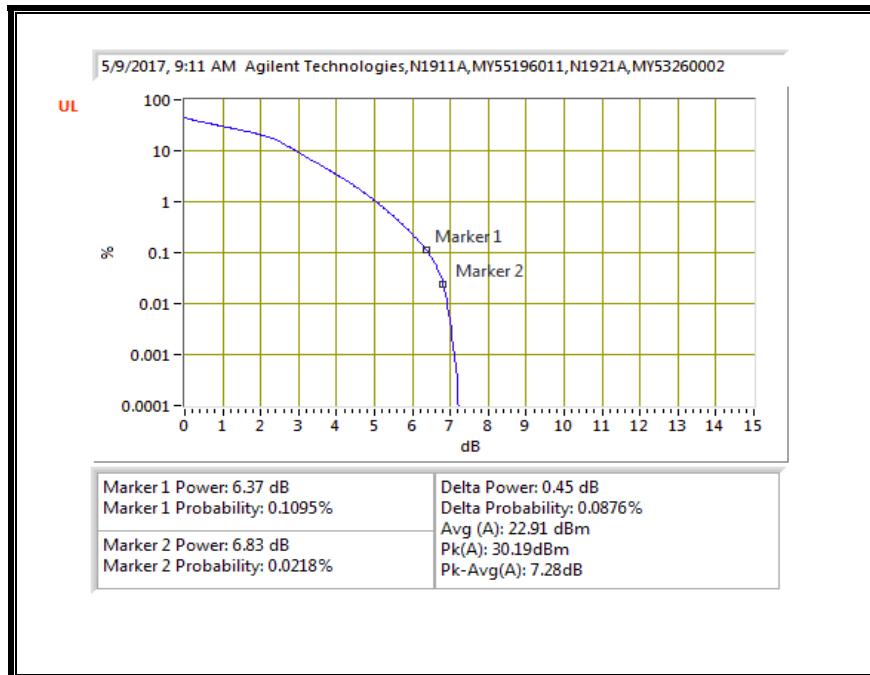
16QAM, (1.4 MHz BAND WIDTH)



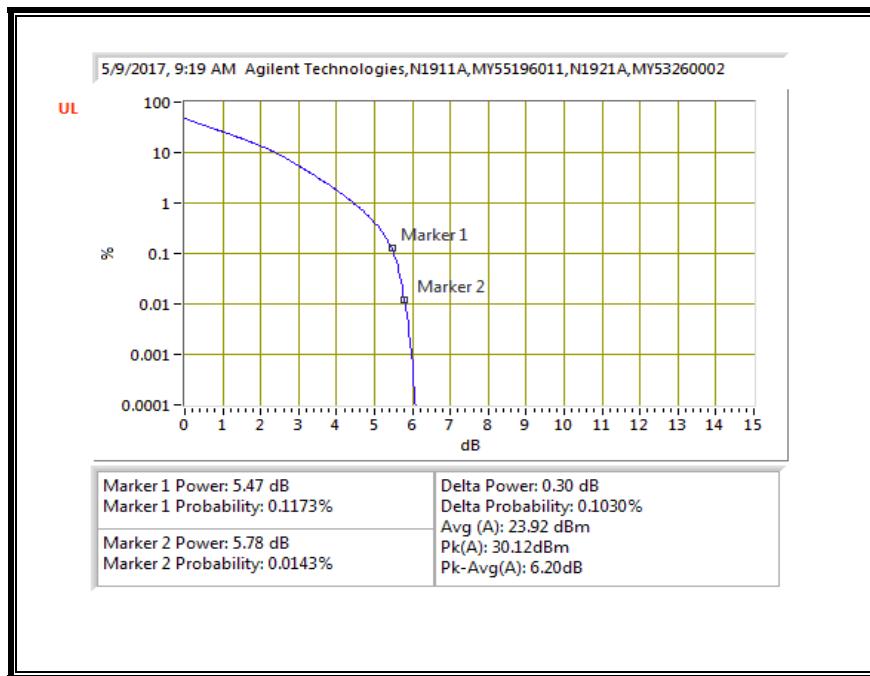
QPSK, (3.0 MHz BAND WIDTH)



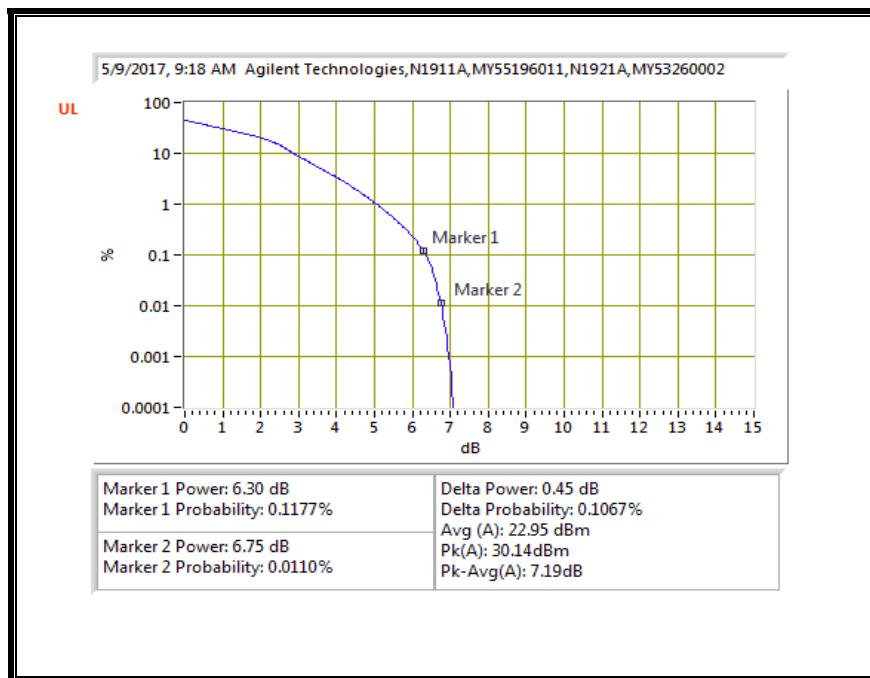
16QAM, (3.0 MHz BAND WIDTH)



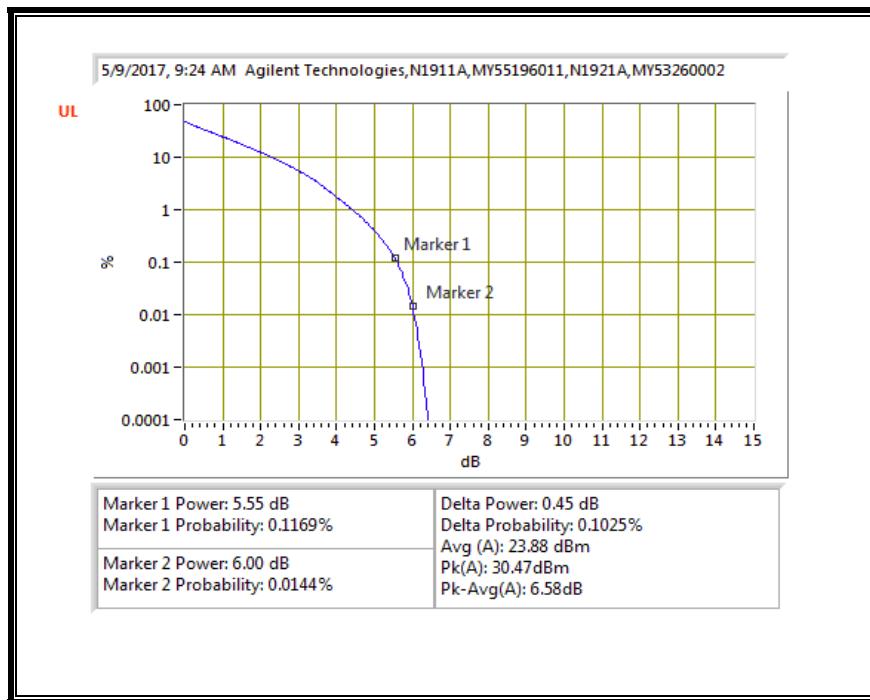
QPSK, (5.0 MHz BAND WIDTH)



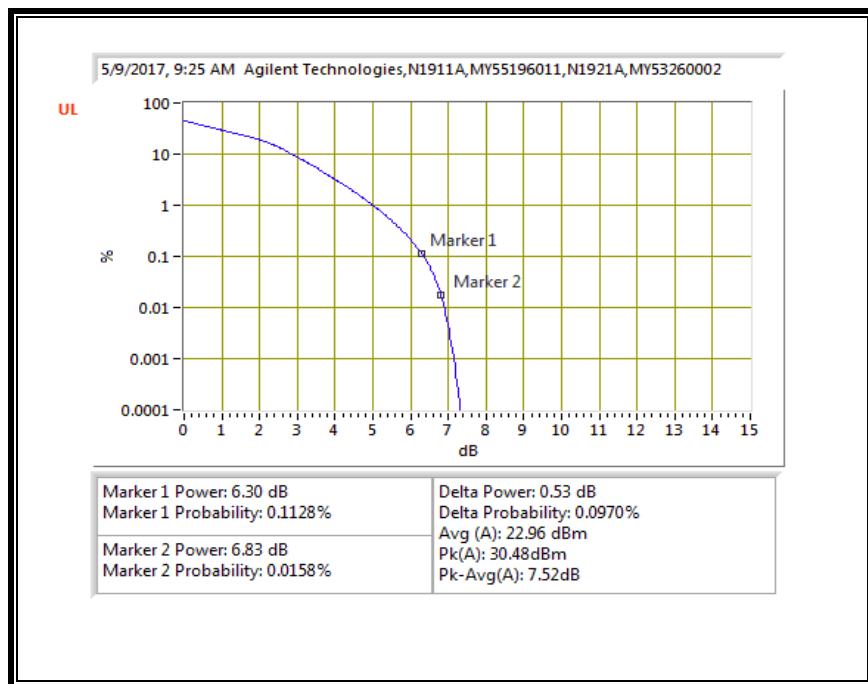
16QAM, (5.0 MHz BAND WIDTH)



QPSK, (10.0 MHz BAND WIDTH)

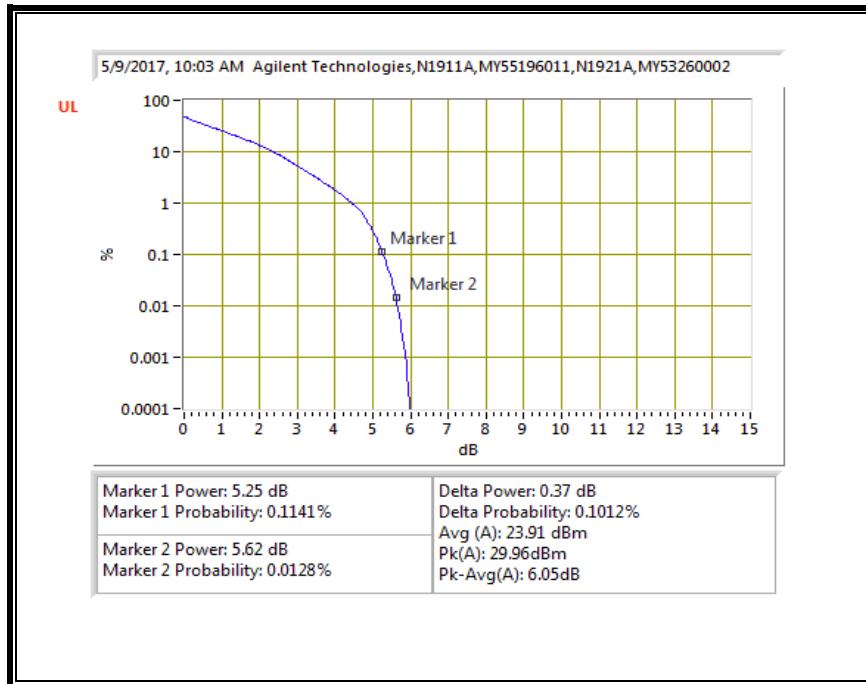


16QAM, (10.0 MHz BAND WIDTH)

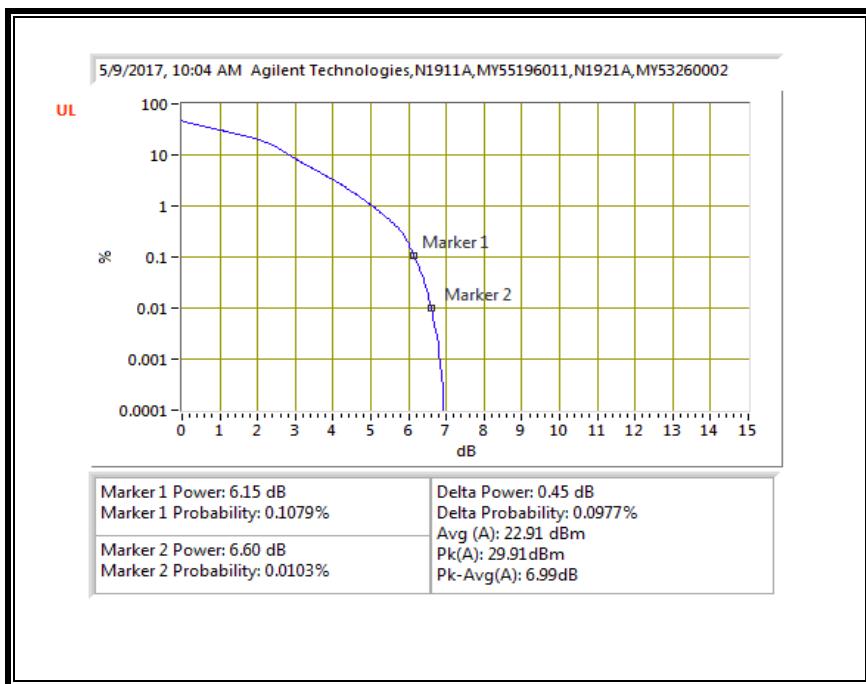


8.5.4. LTE BAND 7

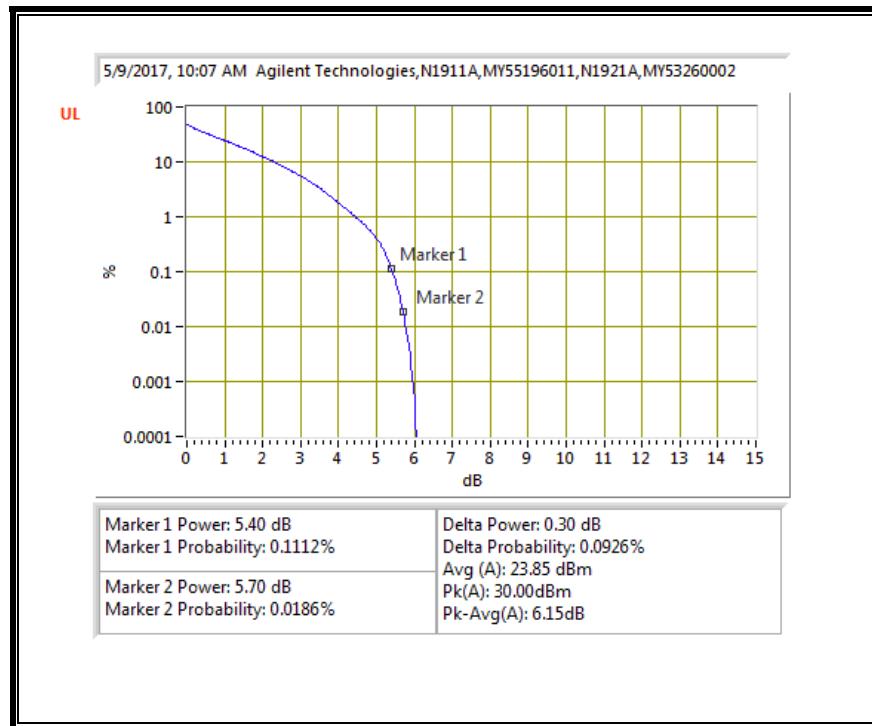
QPSK, (5.0 MHz BAND WIDTH)



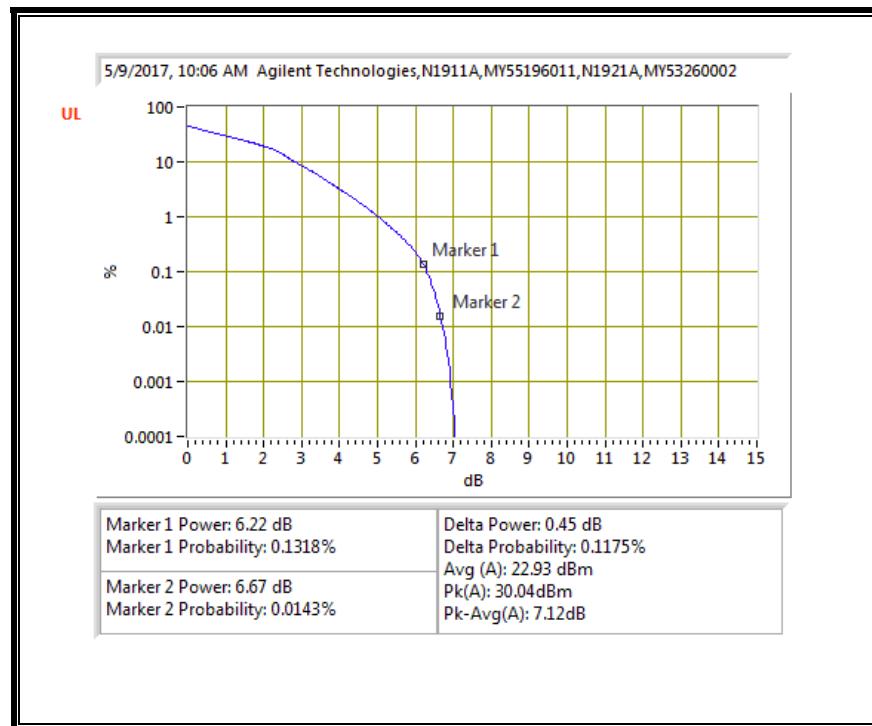
16QAM, (5.0 MHz BAND WIDTH)



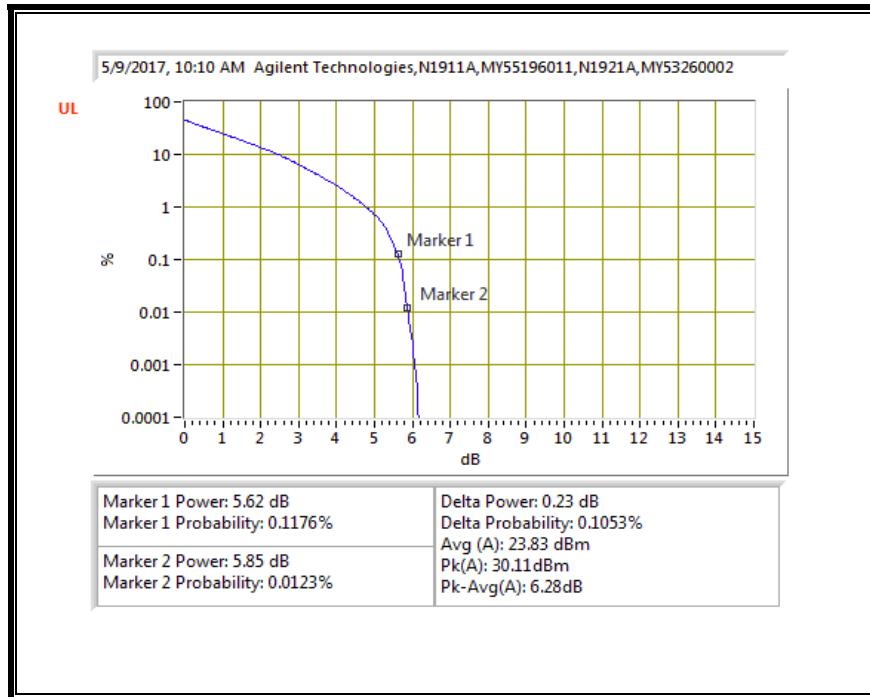
QPSK, (10.0 MHz BAND WIDTH)



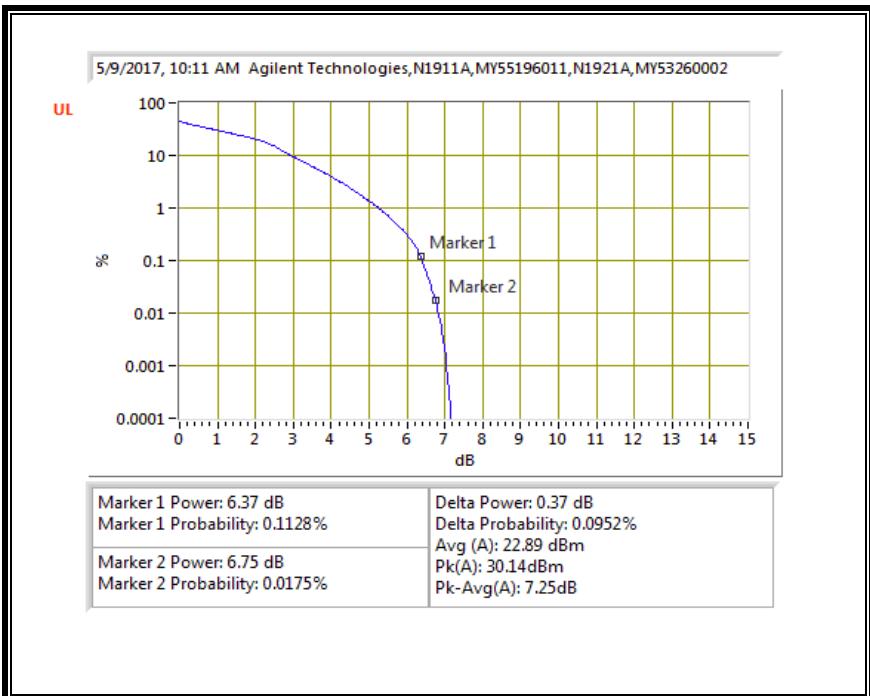
16QAM, (10.0 MHz BAND WIDTH)



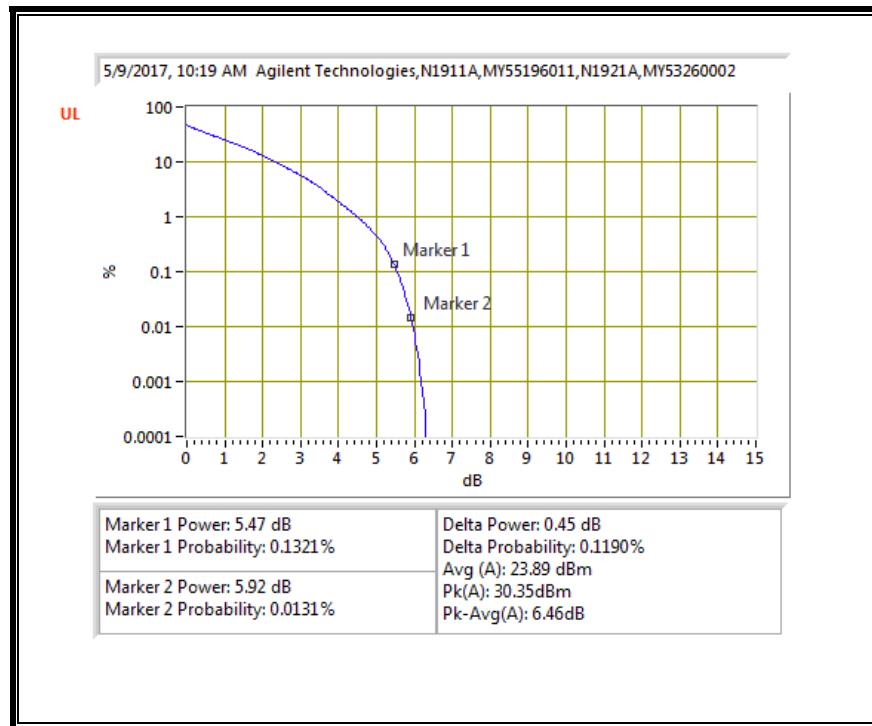
QPSK, (15.0 MHz BAND WIDTH)



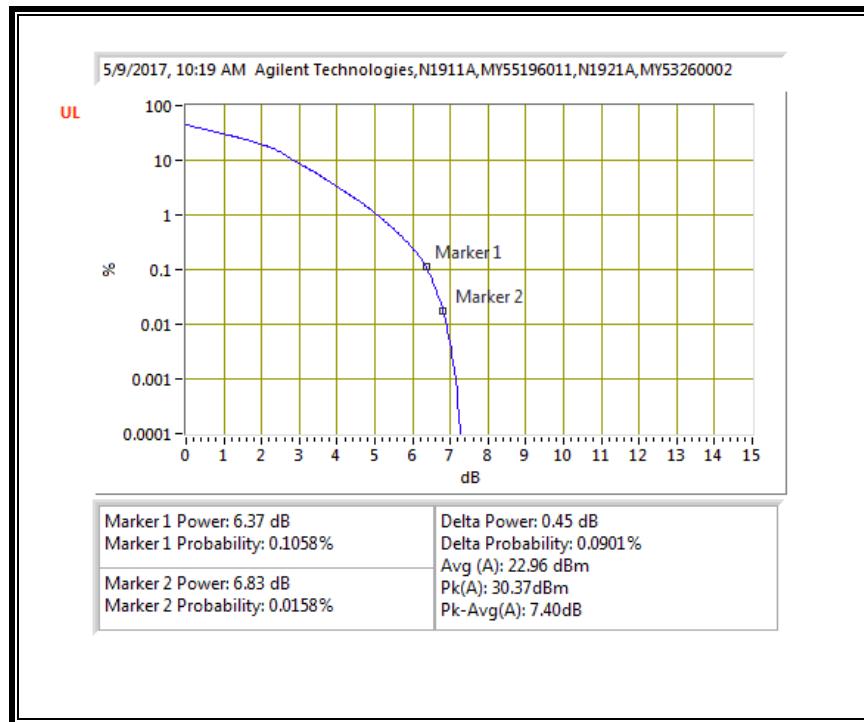
16QAM, (15.0 MHz BAND WIDTH)



QPSK, (20.0 MHz BAND WIDTH)

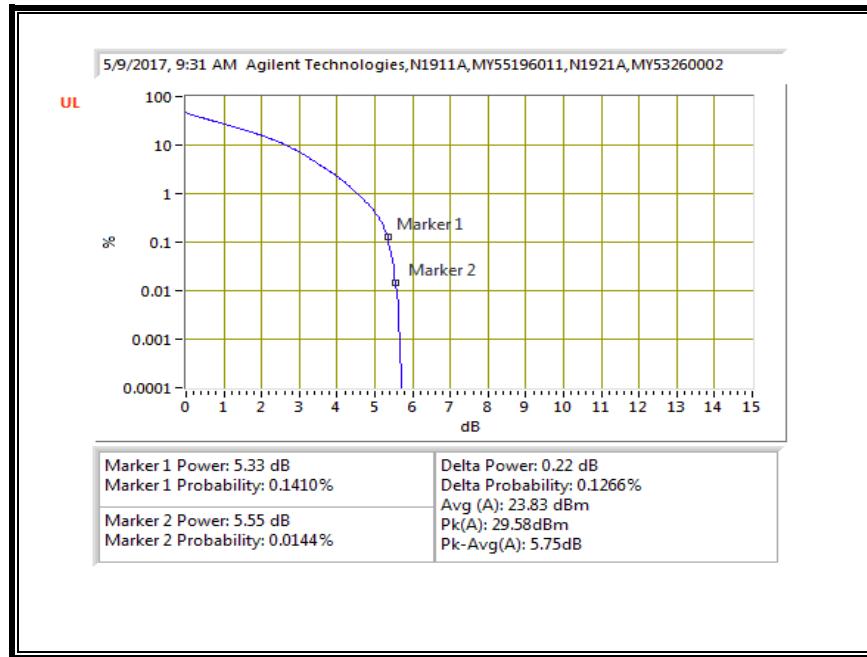


16QAM, (20.0 MHz BAND WIDTH)

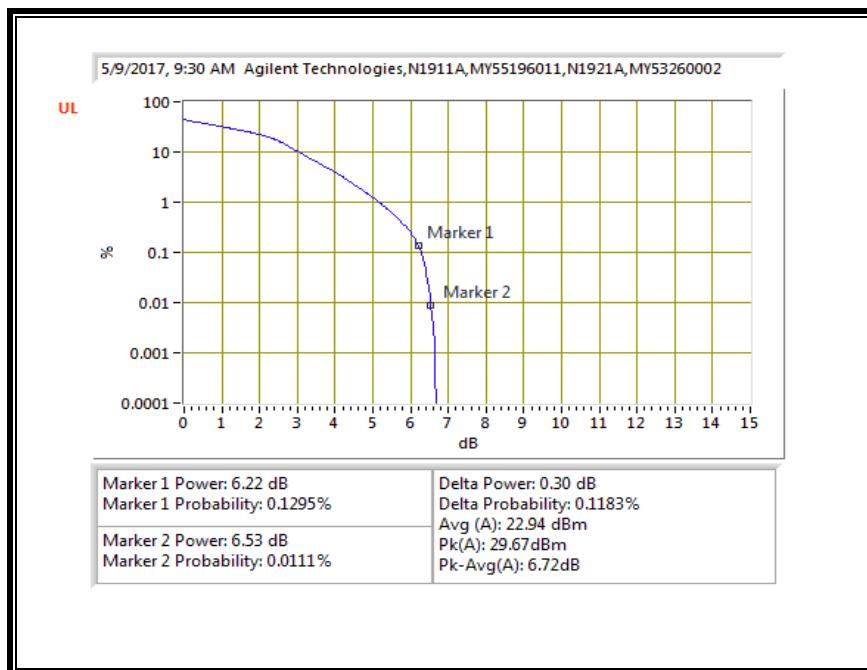


8.5.5. LTE BAND 12

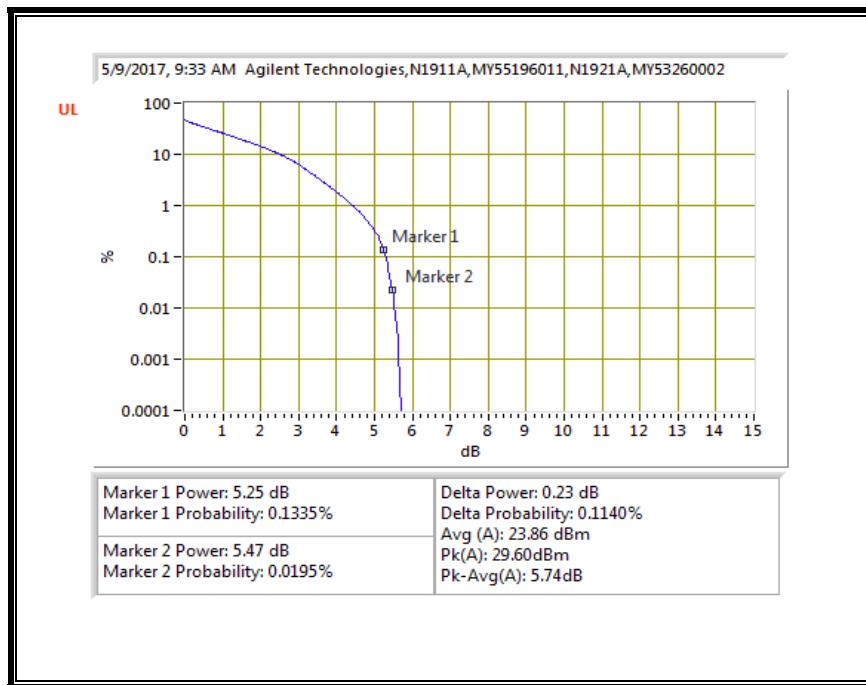
QPSK, (1.4 MHz BAND WIDTH)



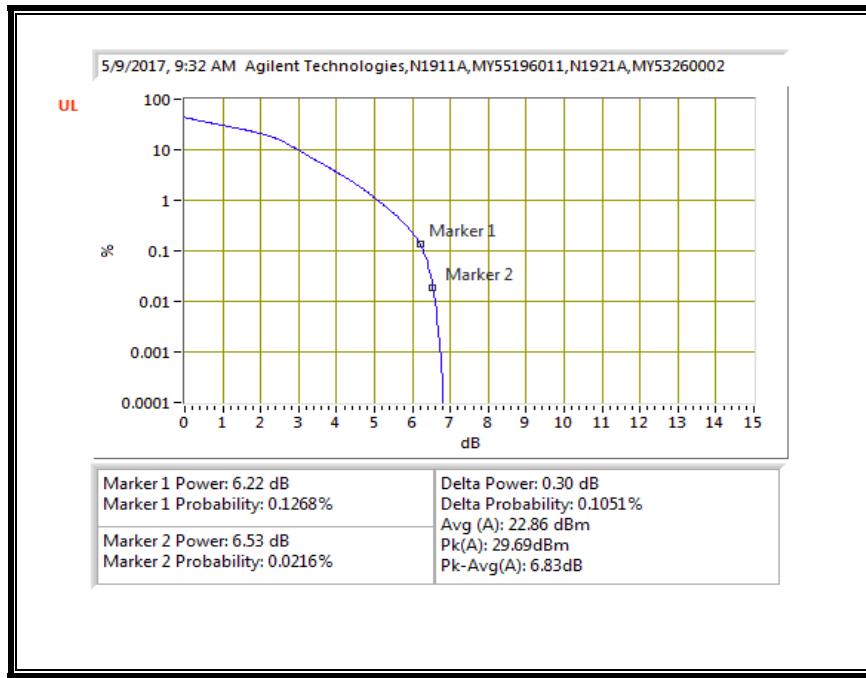
16QAM, (1.4 MHz BAND WIDTH)



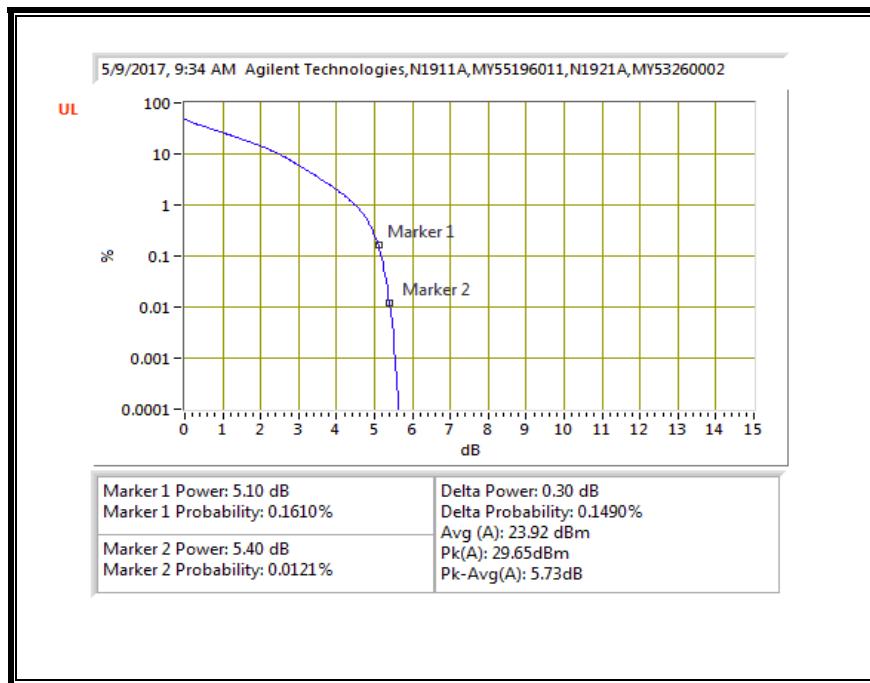
QPSK, (3.0 MHz BAND WIDTH)



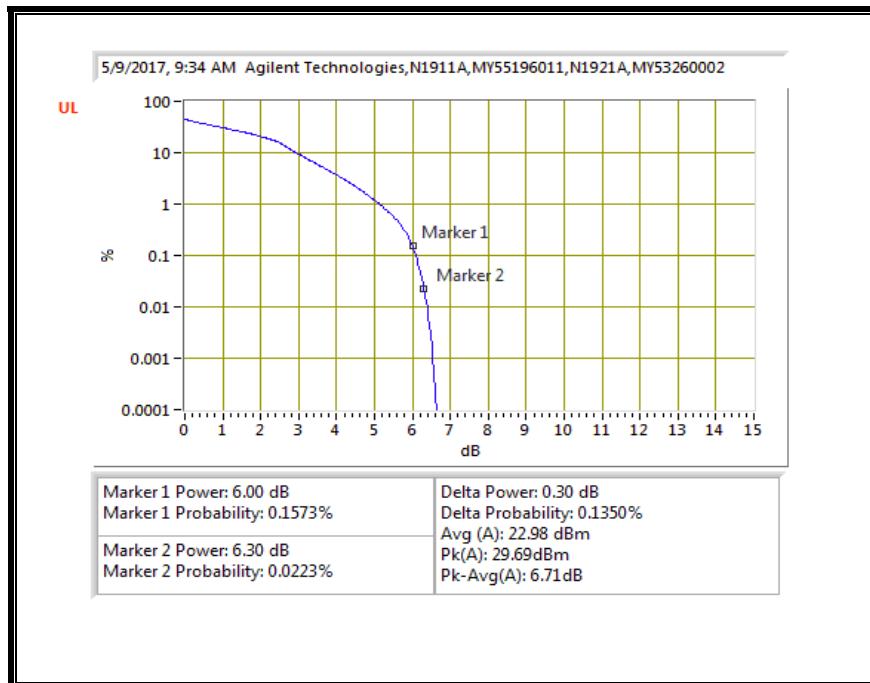
16QAM, (3.0 MHz BAND WIDTH)



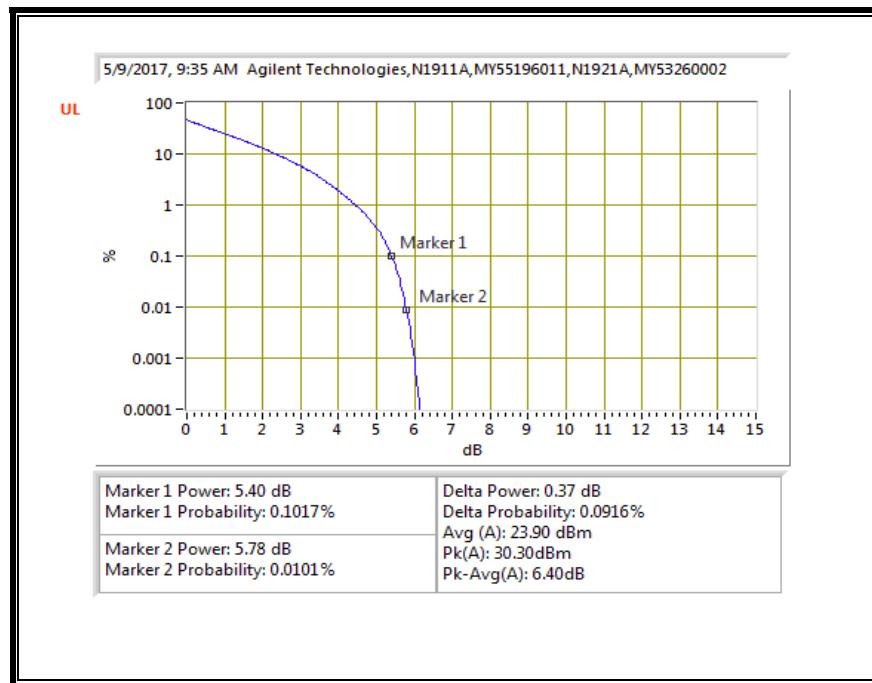
QPSK, (5.0 MHz BAND WIDTH)



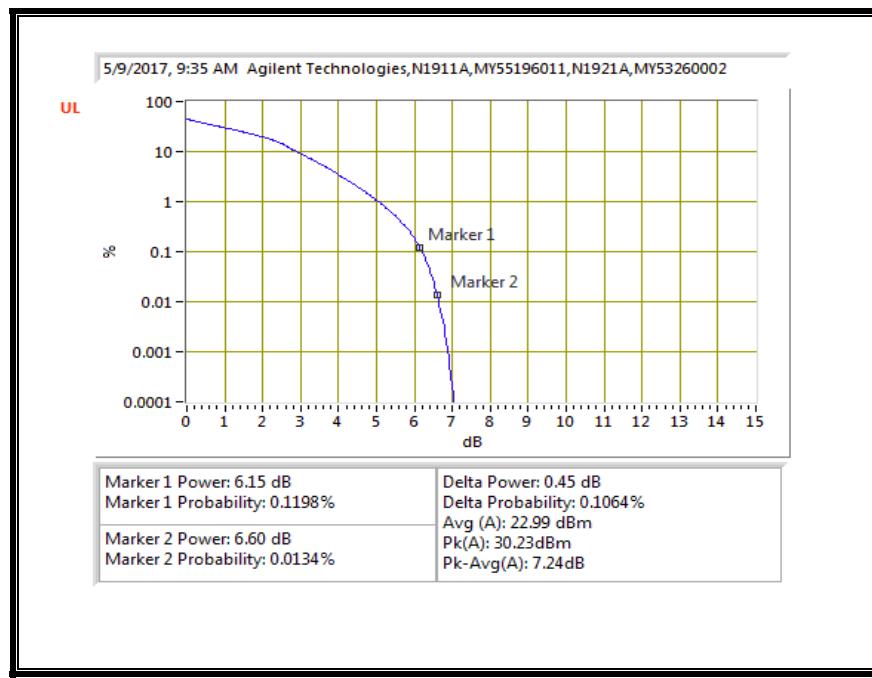
16QAM, (5.0 MHz BAND WIDTH)



QPSK, (10.0 MHz BAND WIDTH)

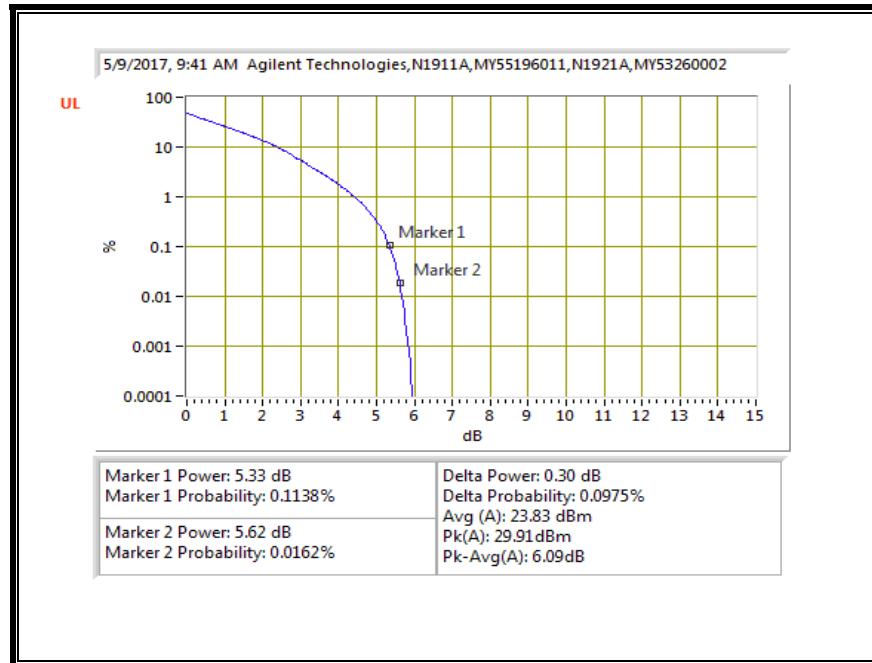


16QAM, (10.0 MHz BAND WIDTH)

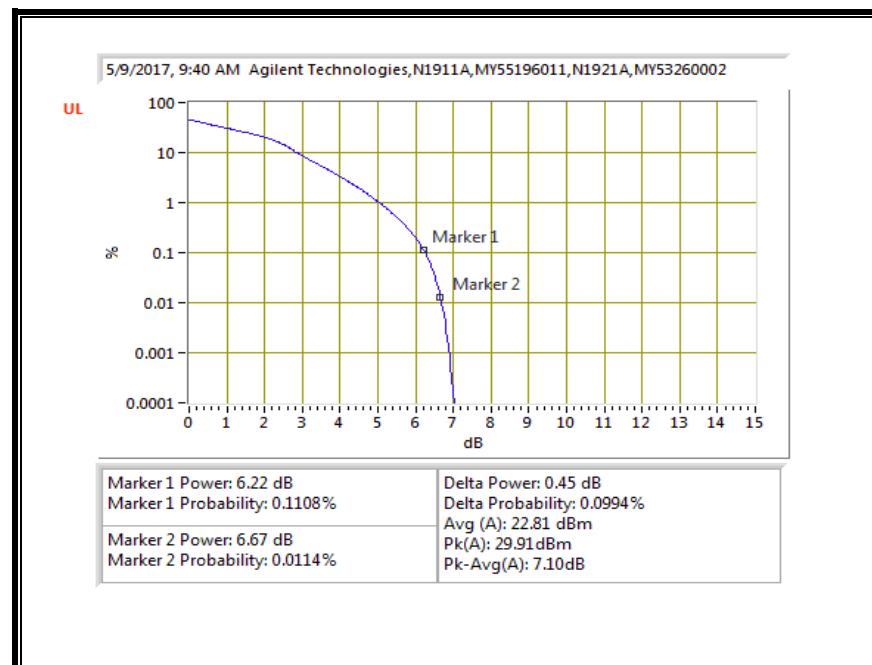


8.5.6. LTE BAND 13

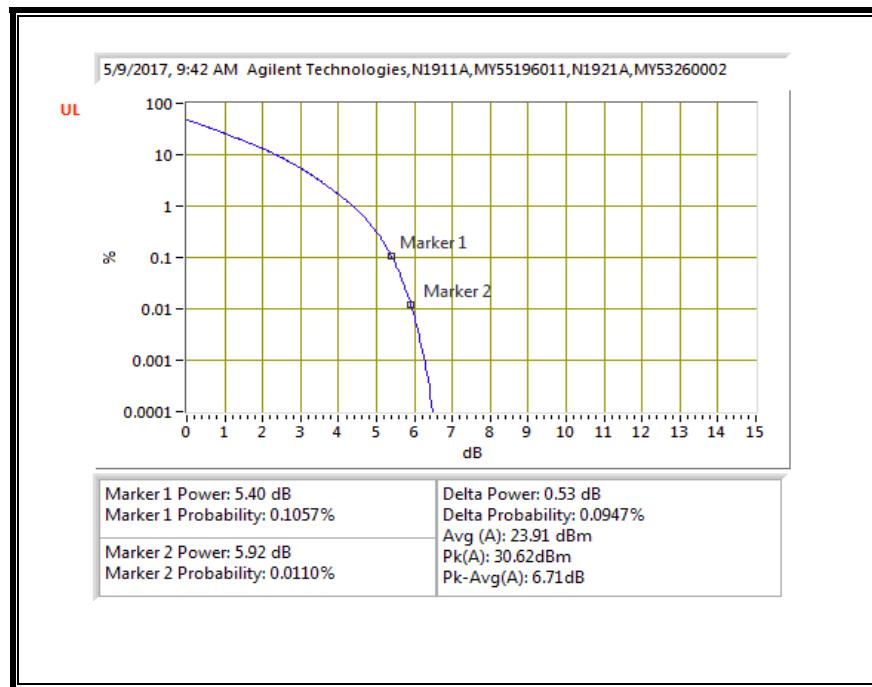
QPSK, (5.0 MHz BAND WIDTH)



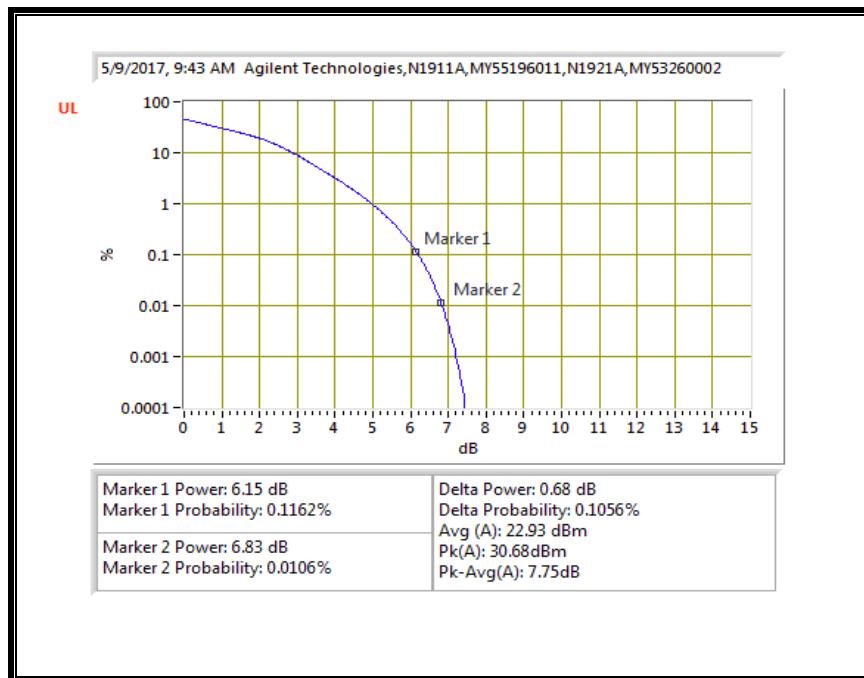
16QAM, (5.0 MHz BAND WIDTH)



QPSK, (10.0 MHz BAND WIDTH)

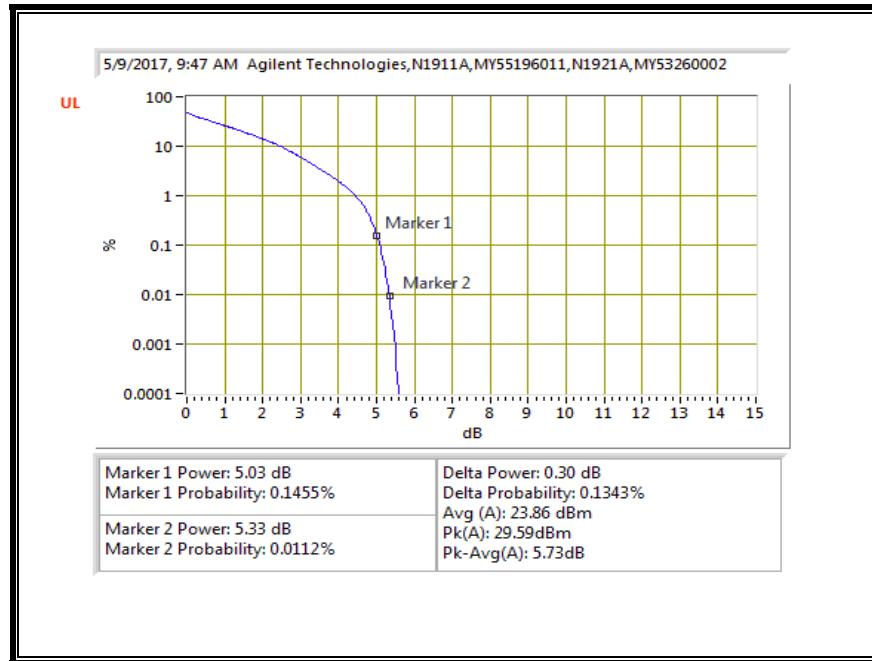


16QAM, (10.0 MHz BAND WIDTH)

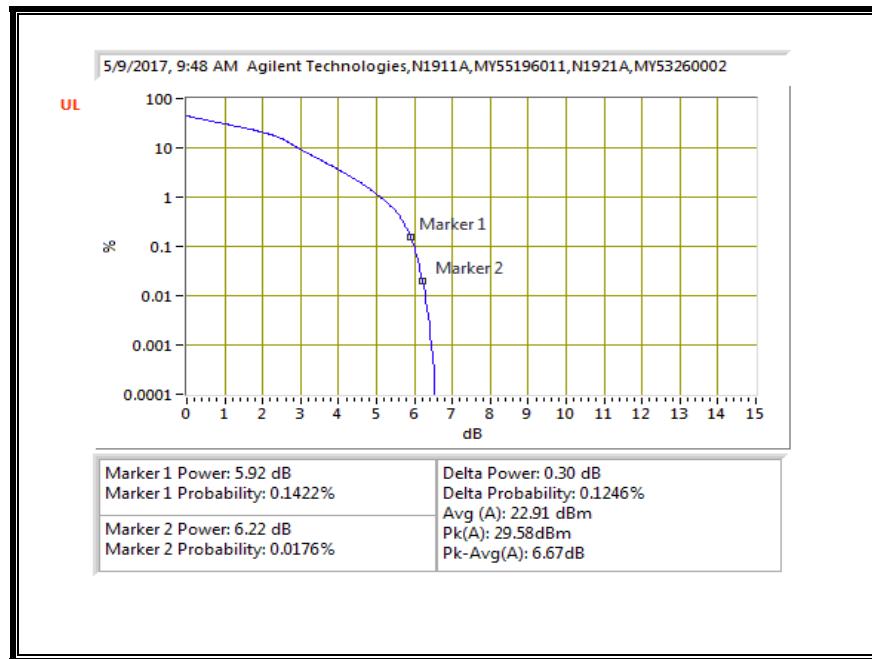


8.5.7. LTE BAND 17

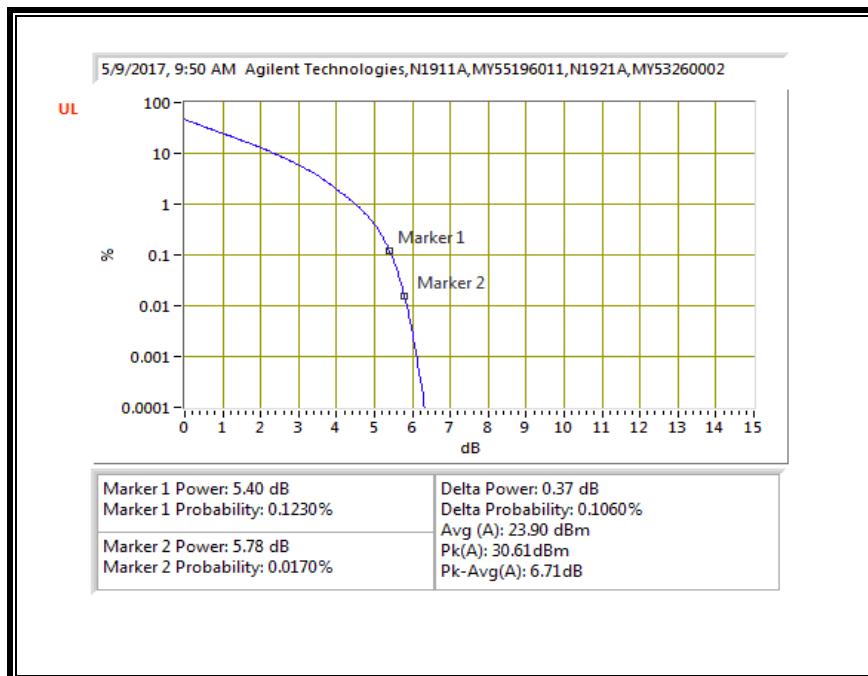
QPSK, (5.0 MHz BAND WIDTH)



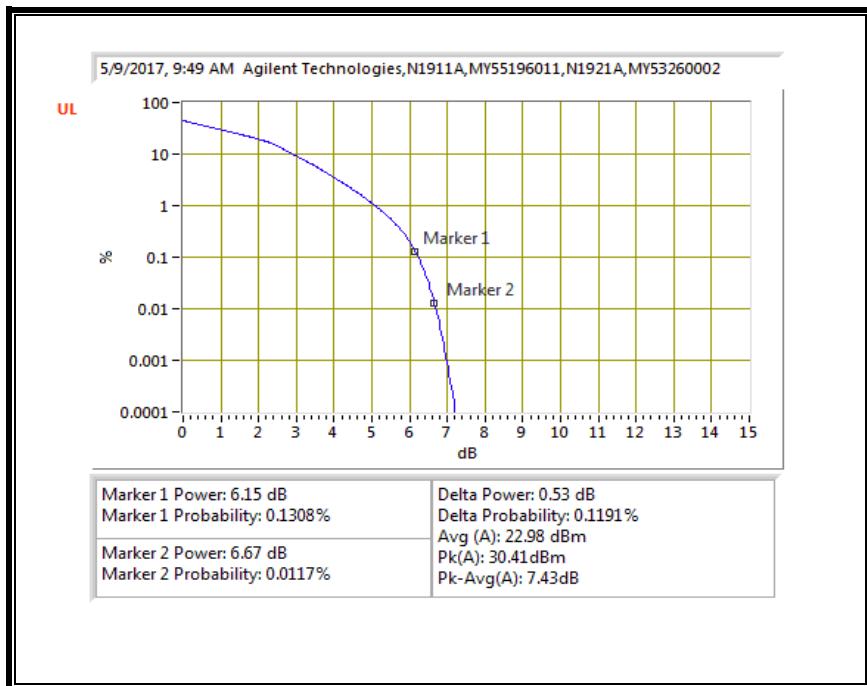
16QAM, (5.0 MHz BAND WIDTH)



QPSK, (10.0 MHz BAND WIDTH)

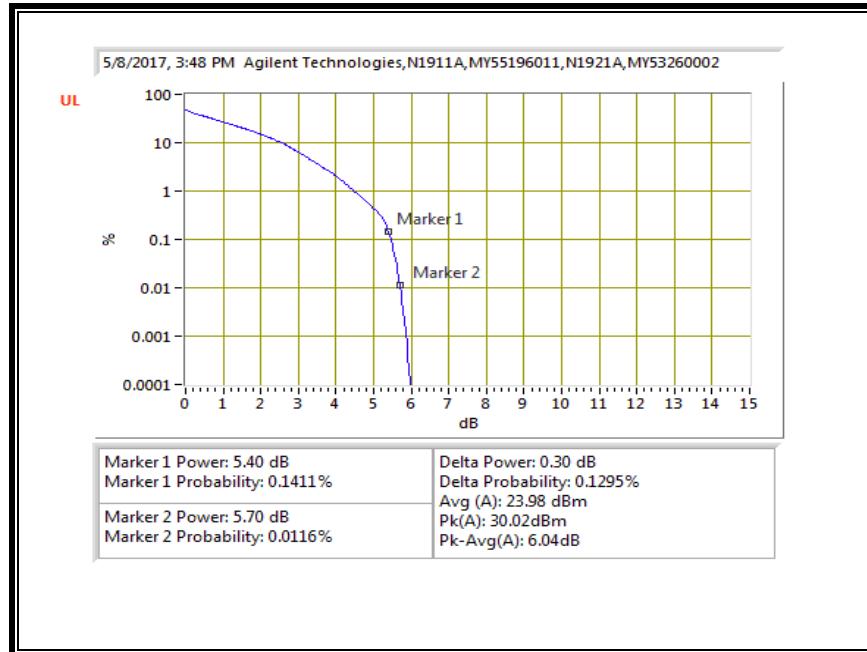


16QAM, (10.0 MHz BAND WIDTH)

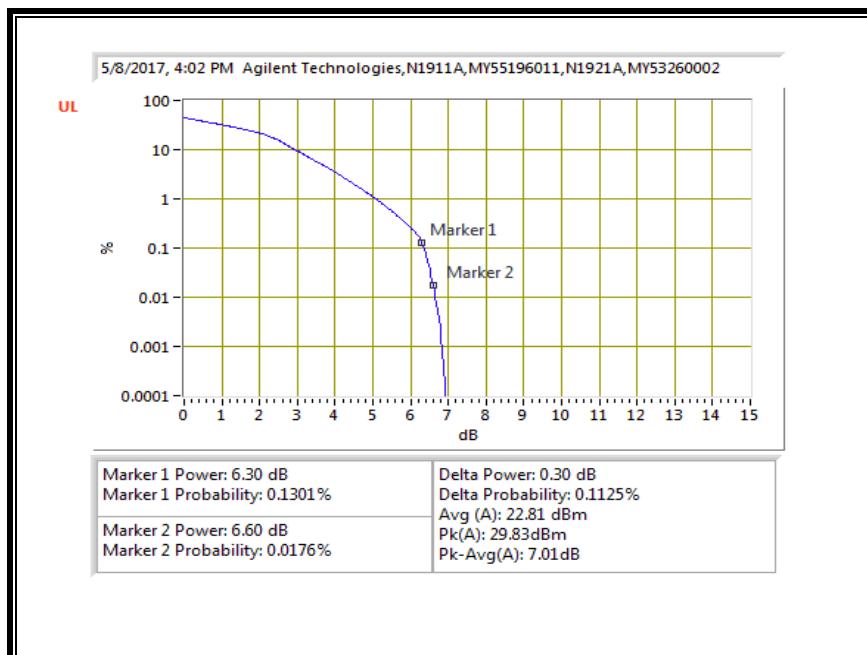


8.5.8. LTE BAND 25

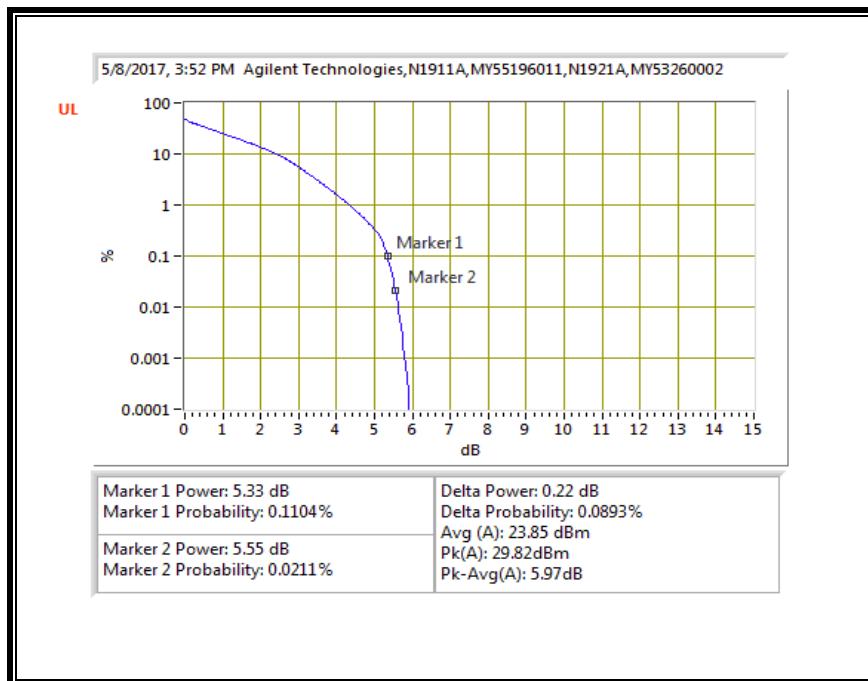
QPSK, (1.4 MHz BAND WIDTH)



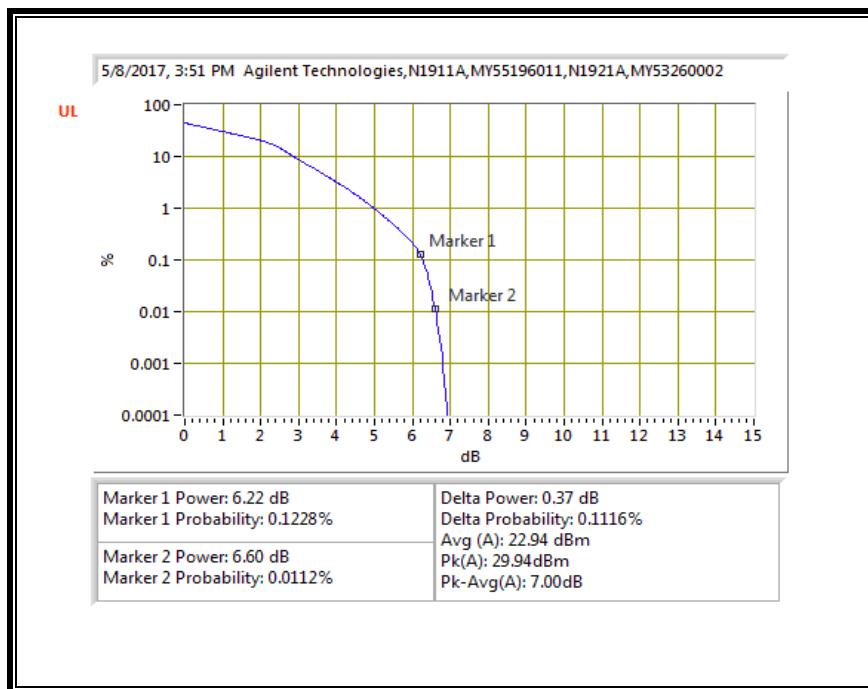
16QAM, (1.4 MHz BAND WIDTH)



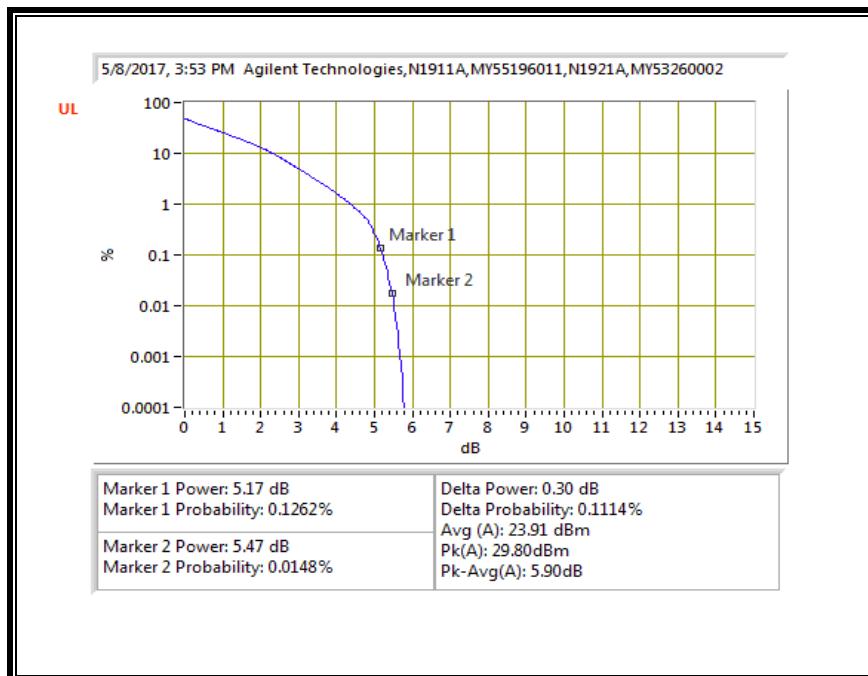
QPSK, (3.0 MHz BAND WIDTH)



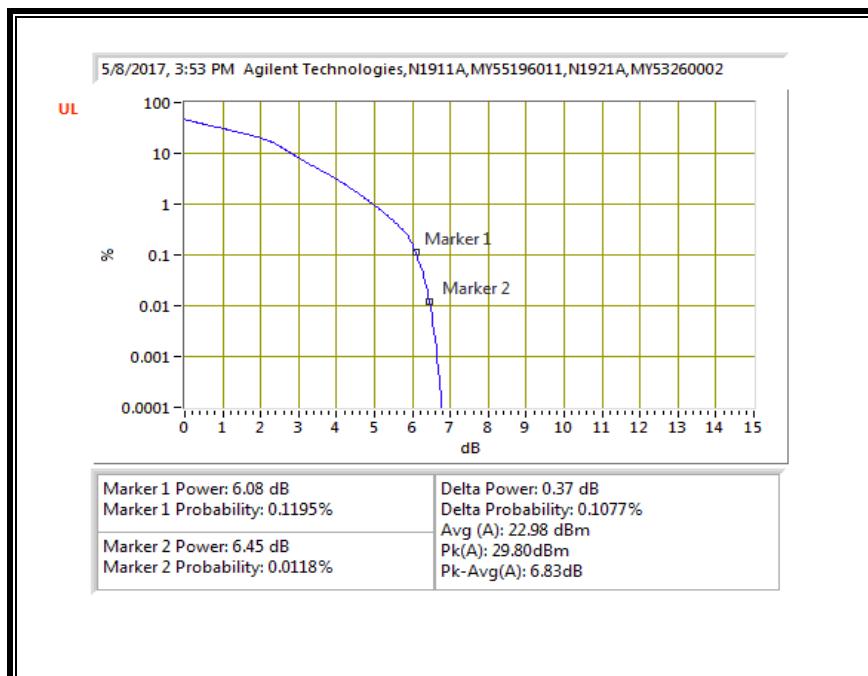
16QAM, (3.0 MHz BAND WIDTH)



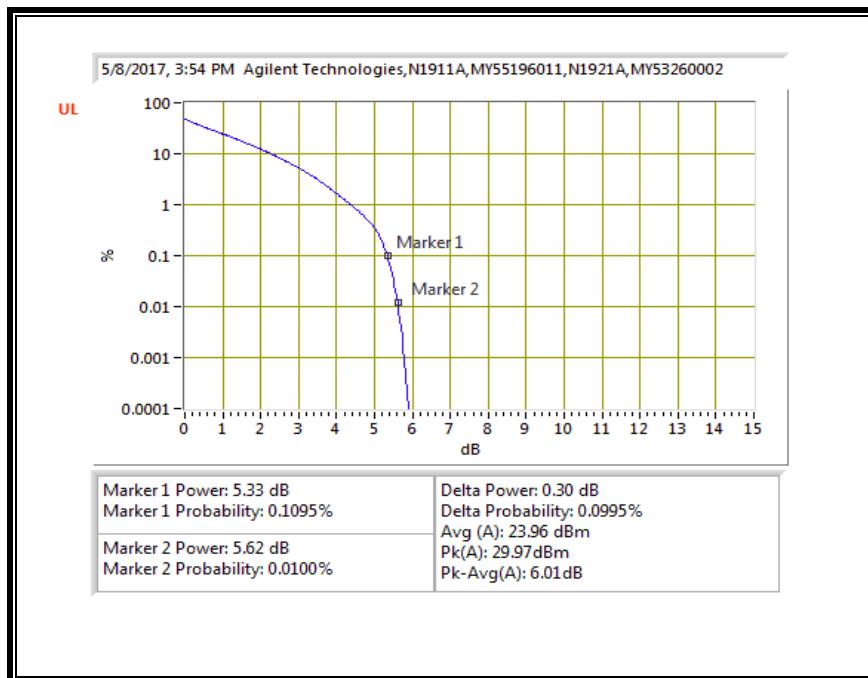
QPSK, (5.0 MHz BAND WIDTH)



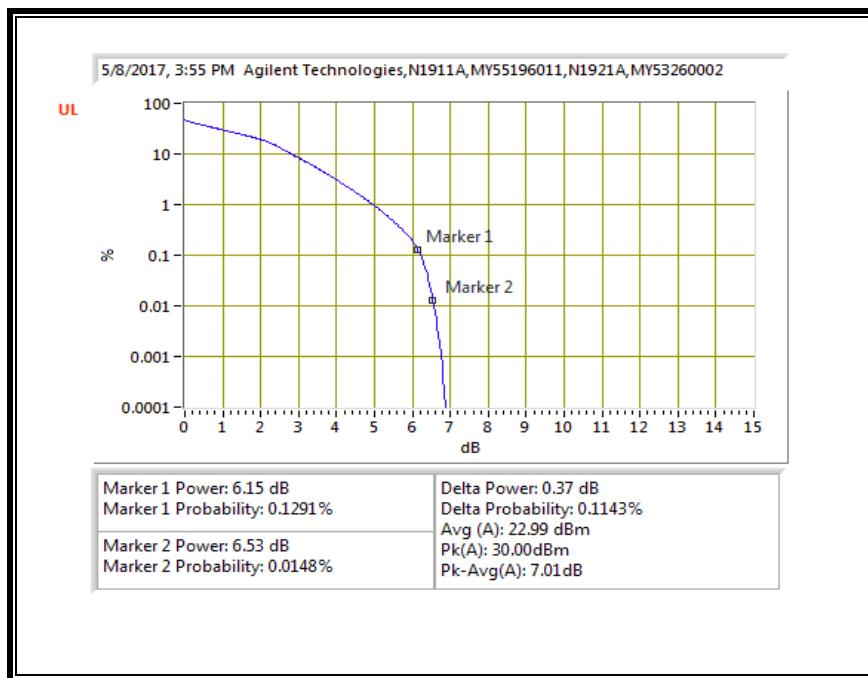
16QAM, (5.0 MHz BAND WIDTH)



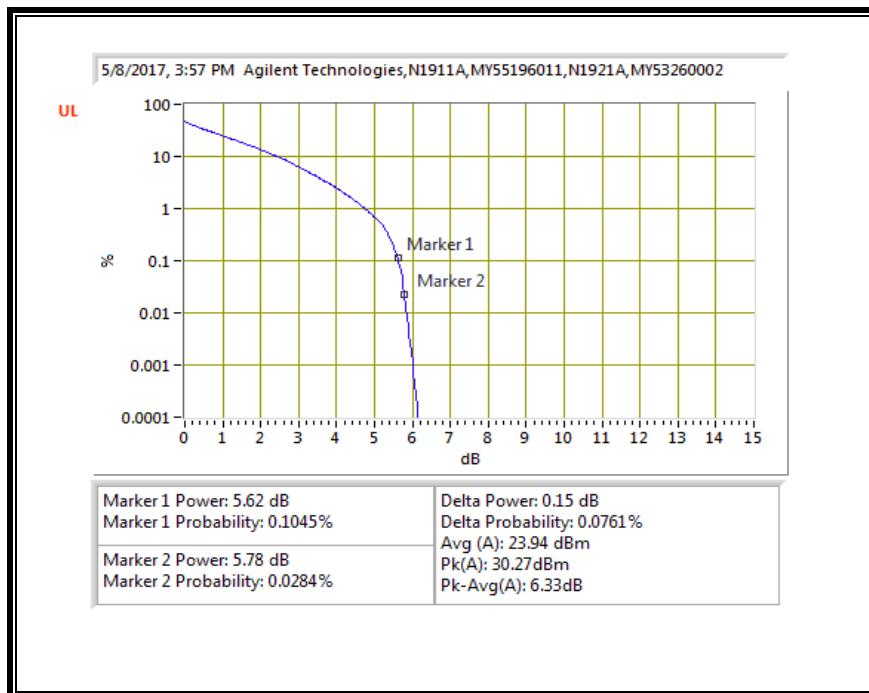
QPSK, (10.0 MHz BAND WIDTH)



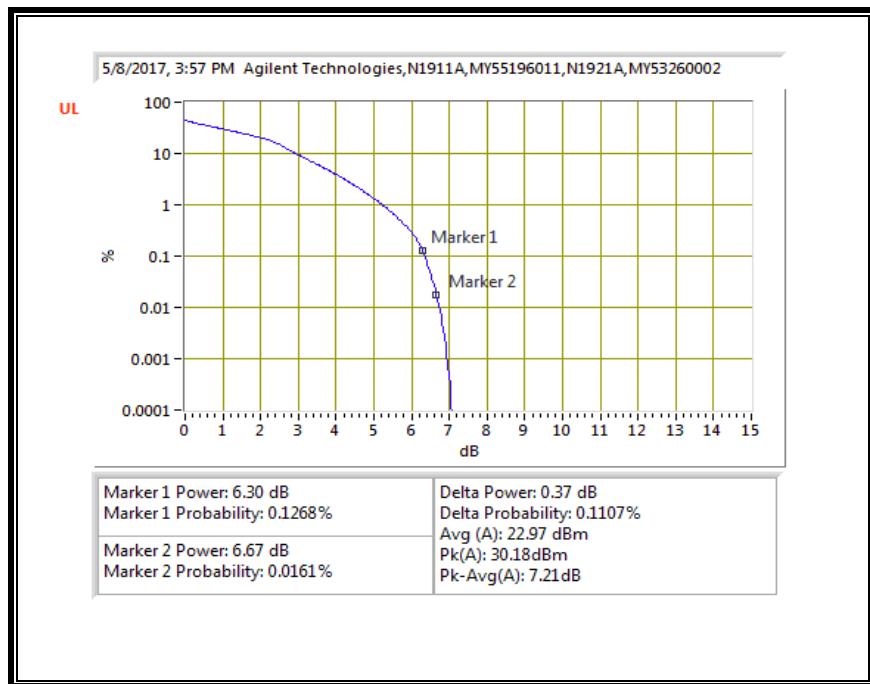
16QAM, (10.0 MHz BAND WIDTH)



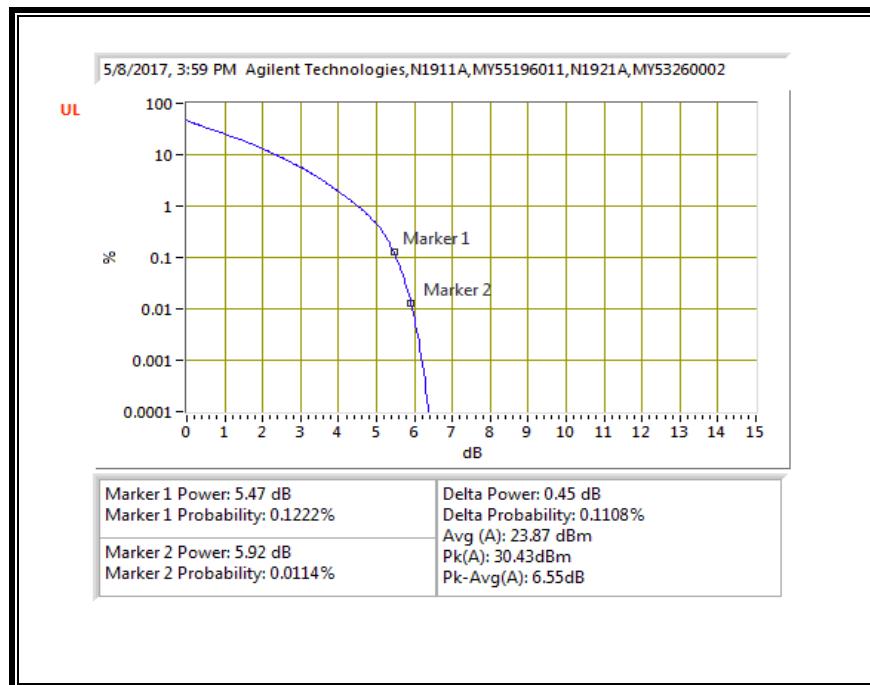
QPSK, (15.0 MHz BAND WIDTH)



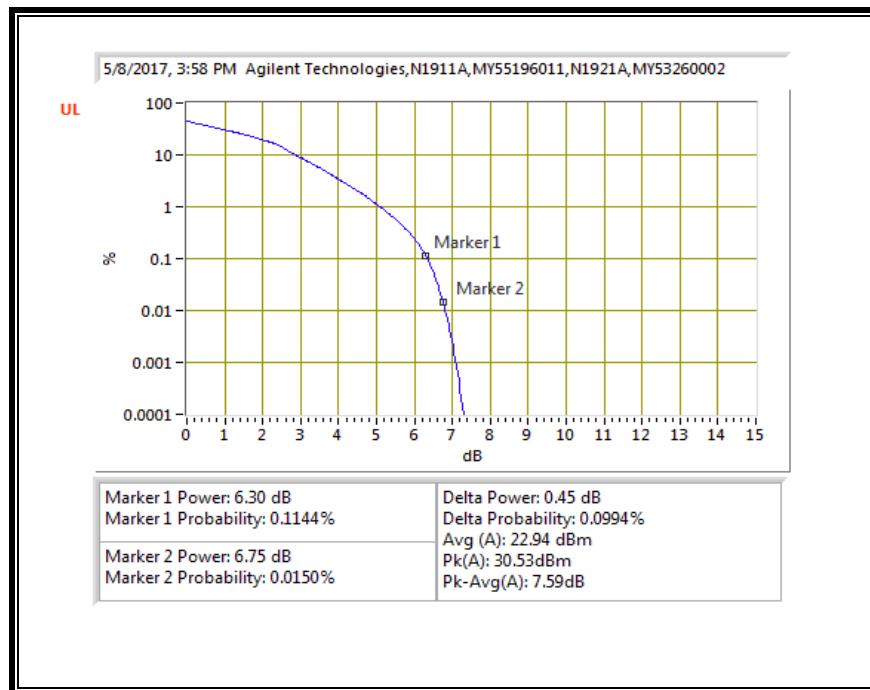
16QAM, (15.0 MHz BAND WIDTH)



QPSK, (20.0 MHz BAND WIDTH)

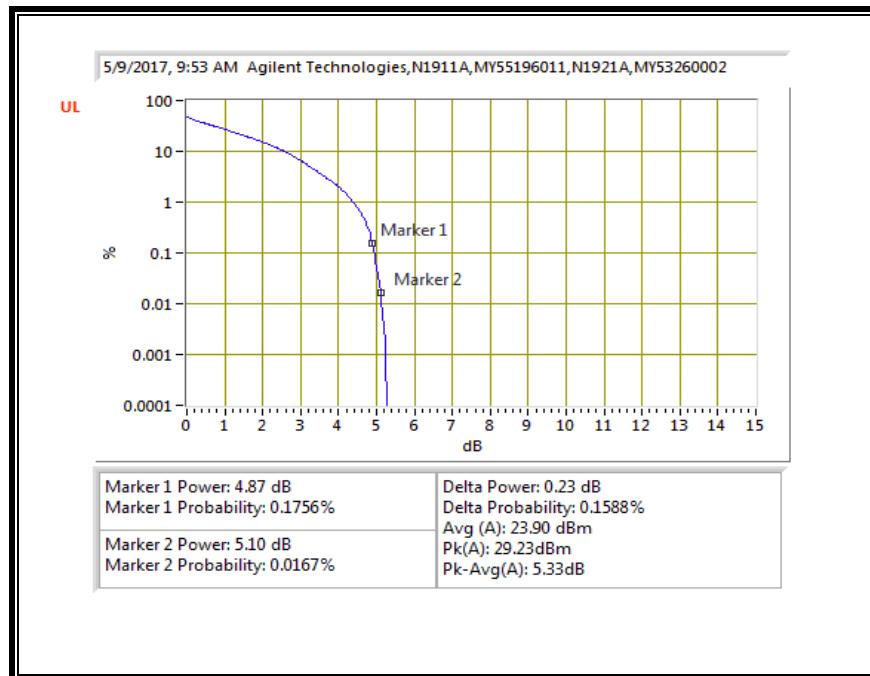


16QAM, (20.0 MHz BAND WIDTH)

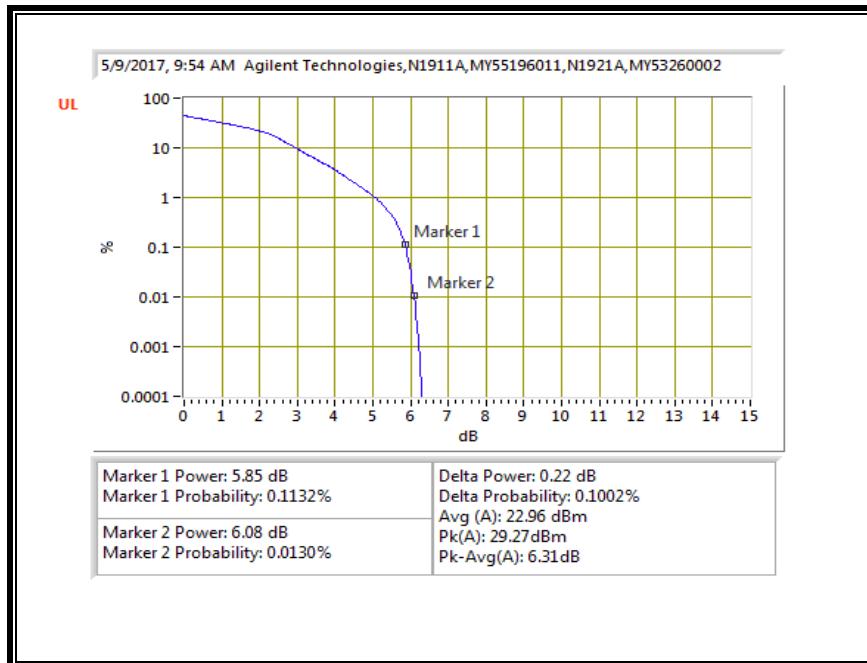


8.5.9. LTE BAND 26

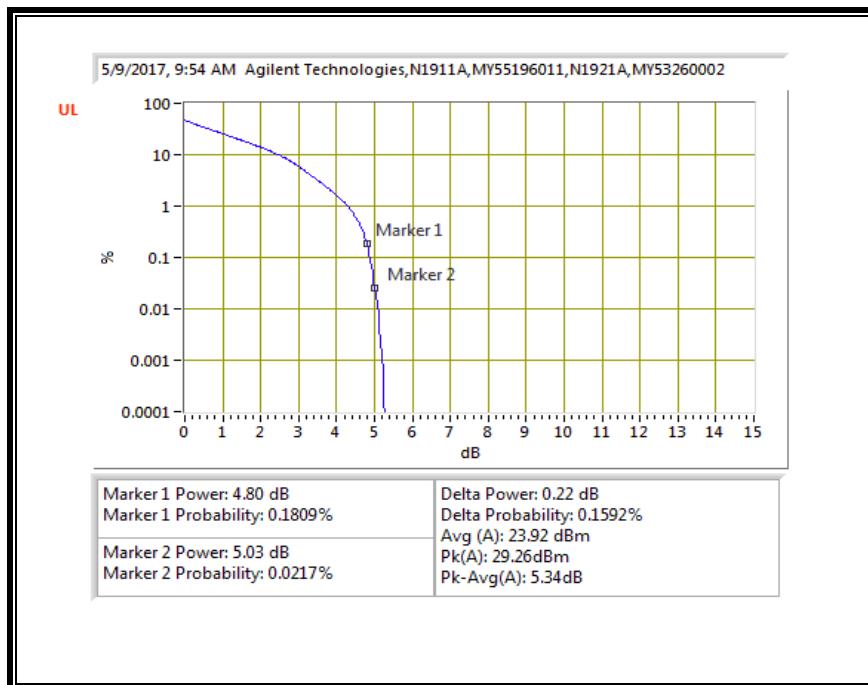
QPSK, (1.4 MHz BAND WIDTH)



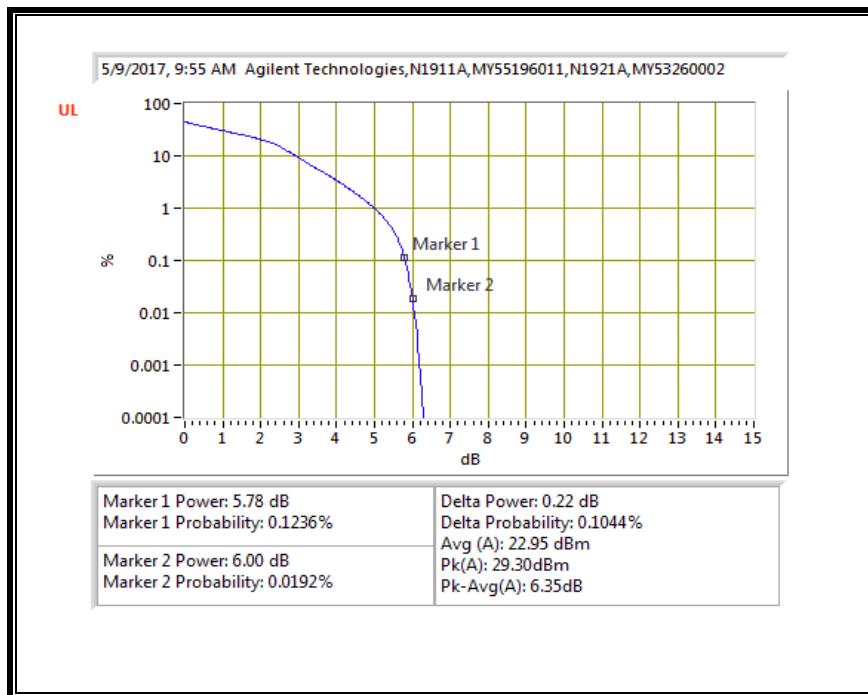
16QAM, (1.4 MHz BAND WIDTH)



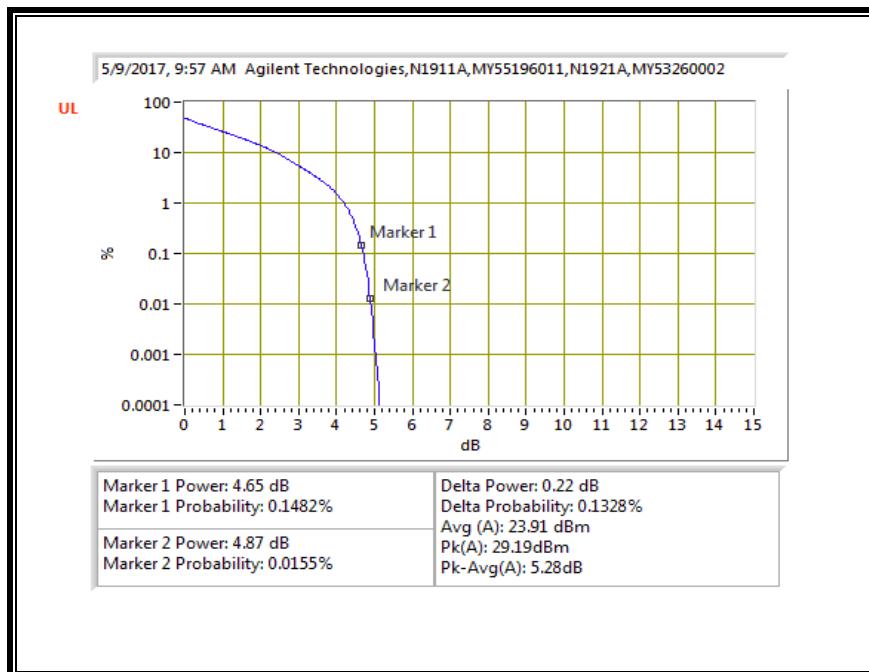
QPSK, (3.0 MHz BAND WIDTH)



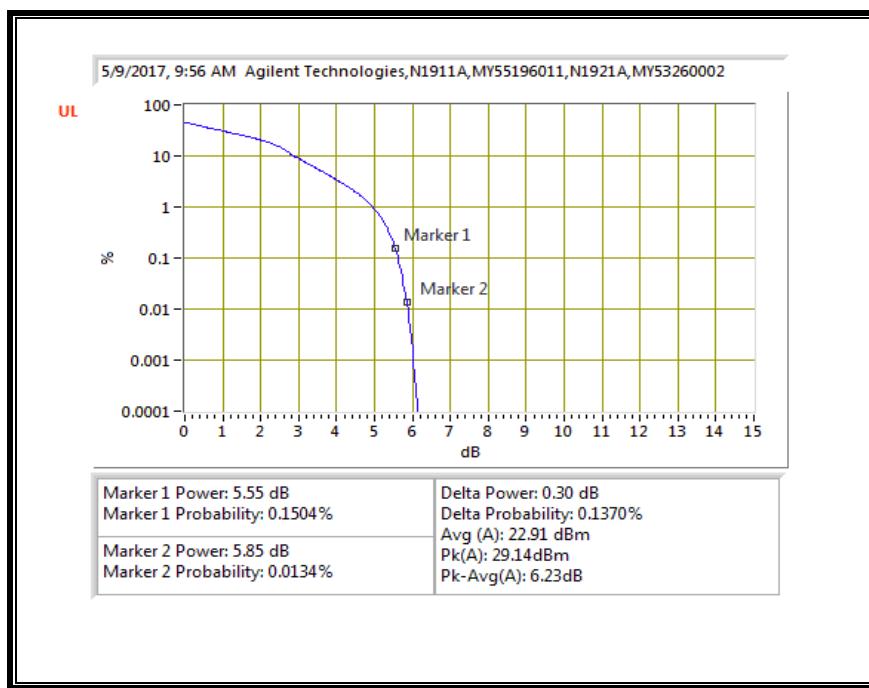
16QAM, (3.0 MHz BAND WIDTH)



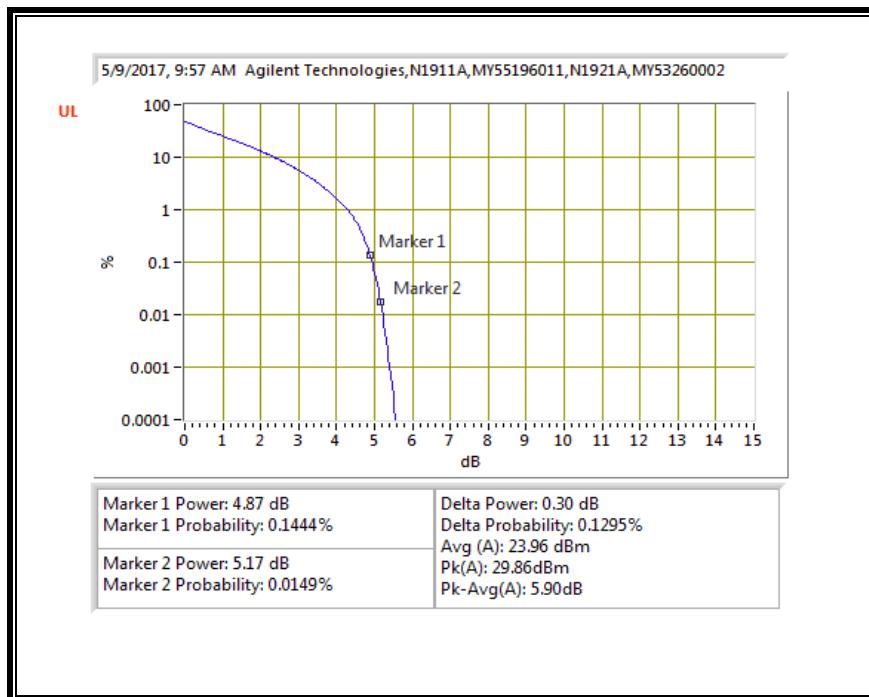
QPSK, (5.0 MHz BAND WIDTH)



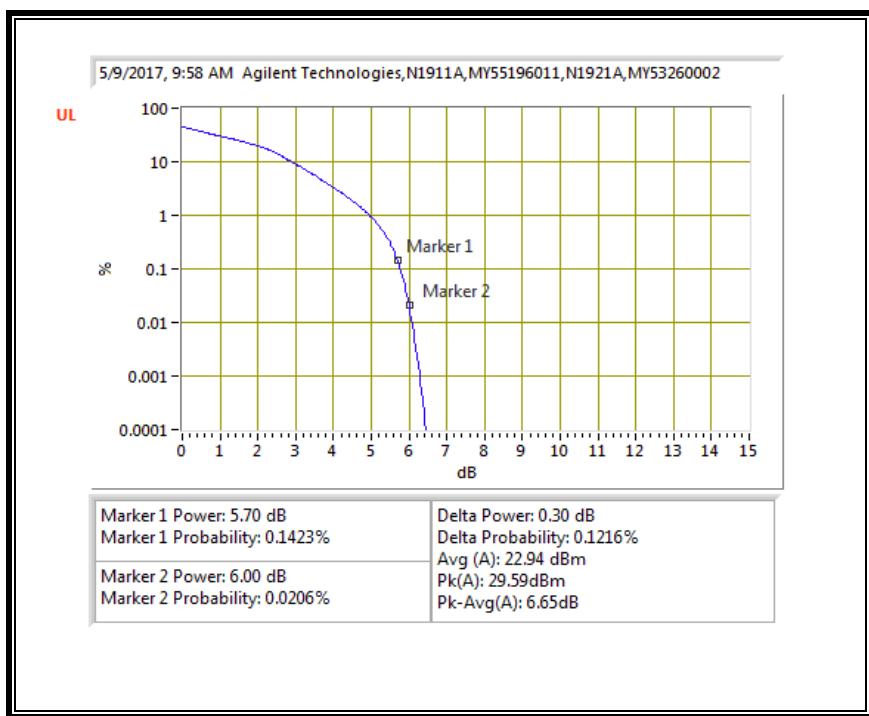
16QAM, (5.0 MHz BAND WIDTH)



QPSK, (10.0 MHz BAND WIDTH)

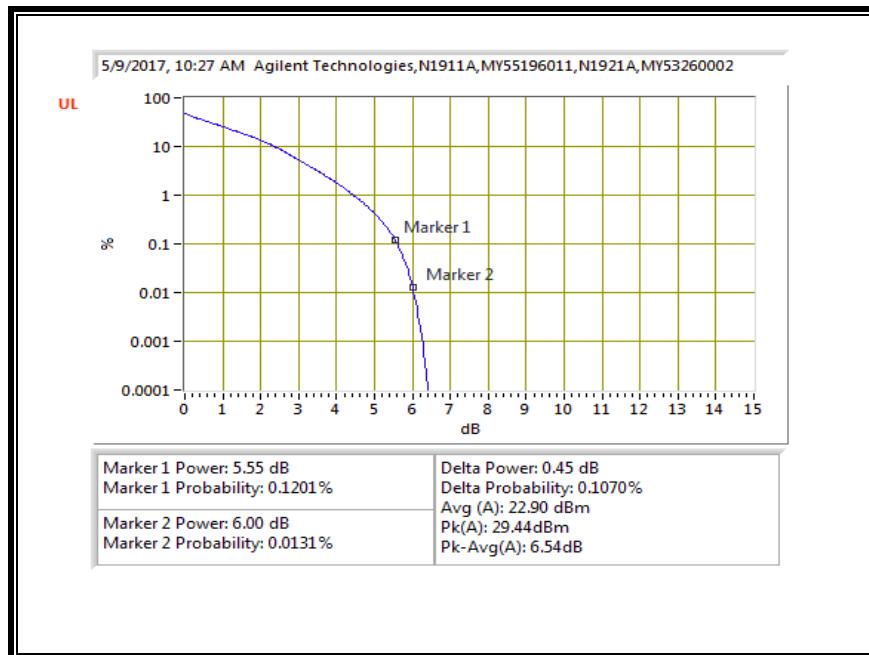


16QAM, (10.0 MHz BAND WIDTH)

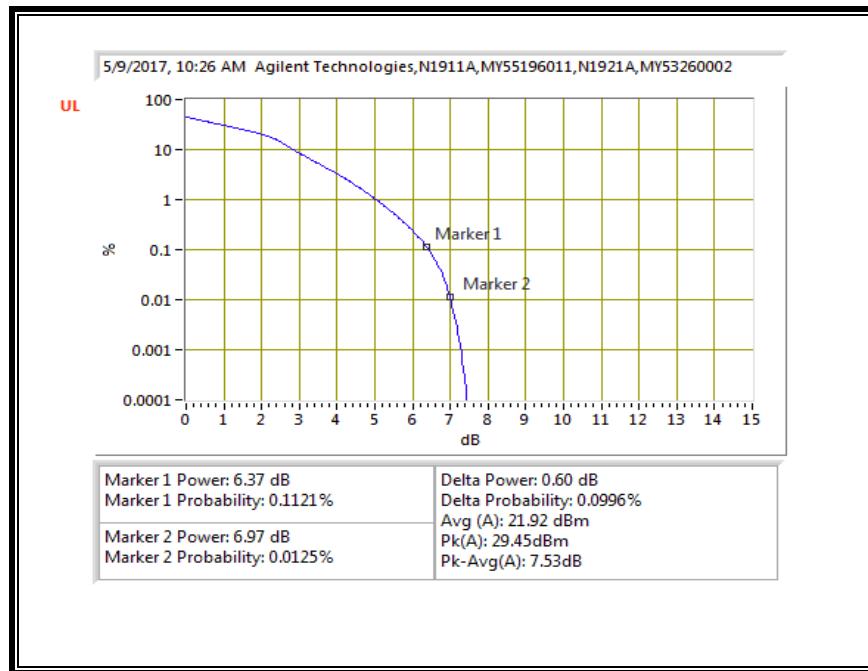


8.5.10. LTE BAND 30

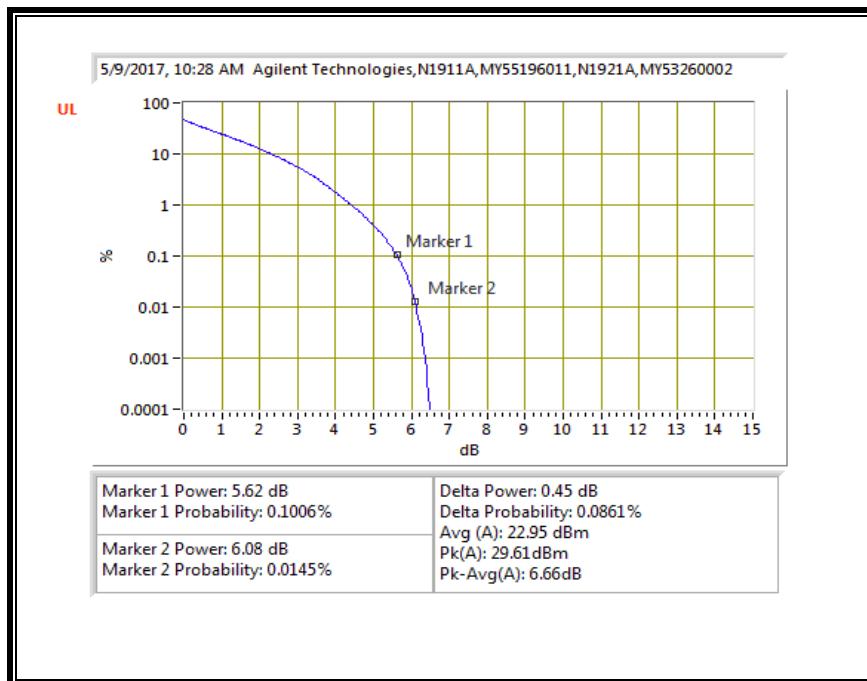
QPSK, (5.0 MHz BAND WIDTH)



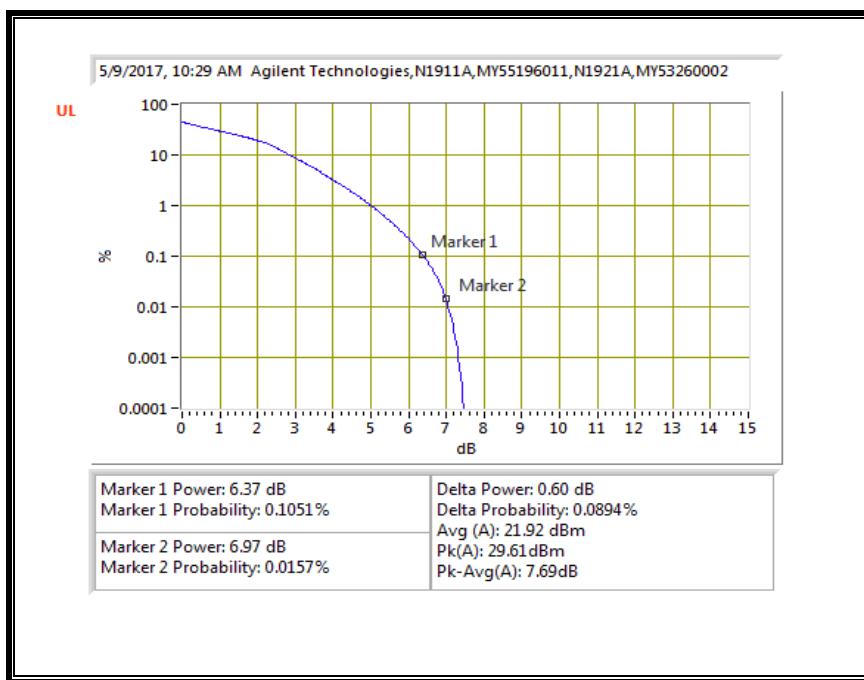
16QAM, (5.0 MHz BAND WIDTH)



QPSK, (10.0 MHz BAND WIDTH)



16QAM, (10.0 MHz BAND WIDTH)



8.5.11. LTE BAND 41

ID:	50820	Date:	5/9/17
-----	-------	-------	--------

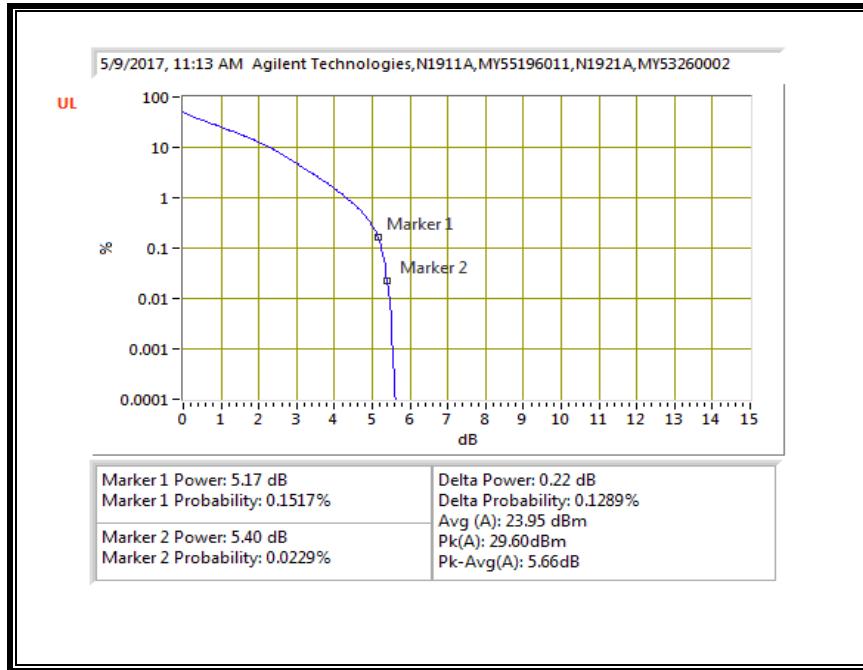
Mode	Channel Band-	Frequency (MHz)	RB Size	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Ratio	
						Peak	Average		
LTE Band 41	5MHz	2593.0	25	0	QPSK	29.43	16.96	5.48	
					16QAM	29.35	15.93	6.43	
	10MHz		50	0	QPSK	29.49	16.88	5.62	
					16QAM	29.41	15.88	6.54	
	15MHz		75	0	QPSK	29.57	16.78	5.80	
					16QAM	29.63	15.88	6.76	
	20MHz		100	0	QPSK	29.70	16.83	5.88	
					16QAM	29.78	15.93	6.86	

Duty Cycle Correction Factor (dB)= 6.99

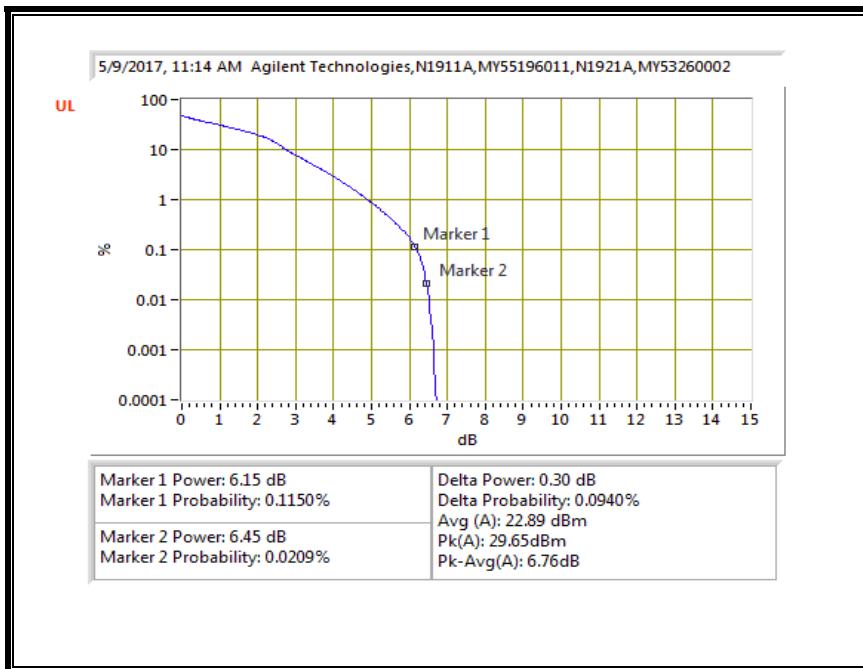
Peak to Average Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor

8.5.12. LTE BAND 66

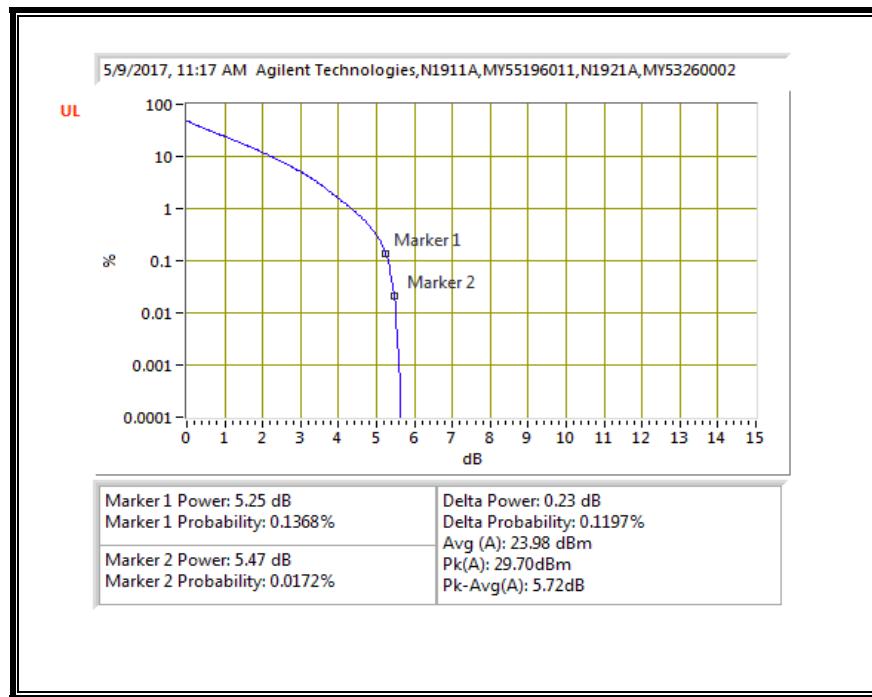
QPSK, (5.0 MHz BAND WIDTH)



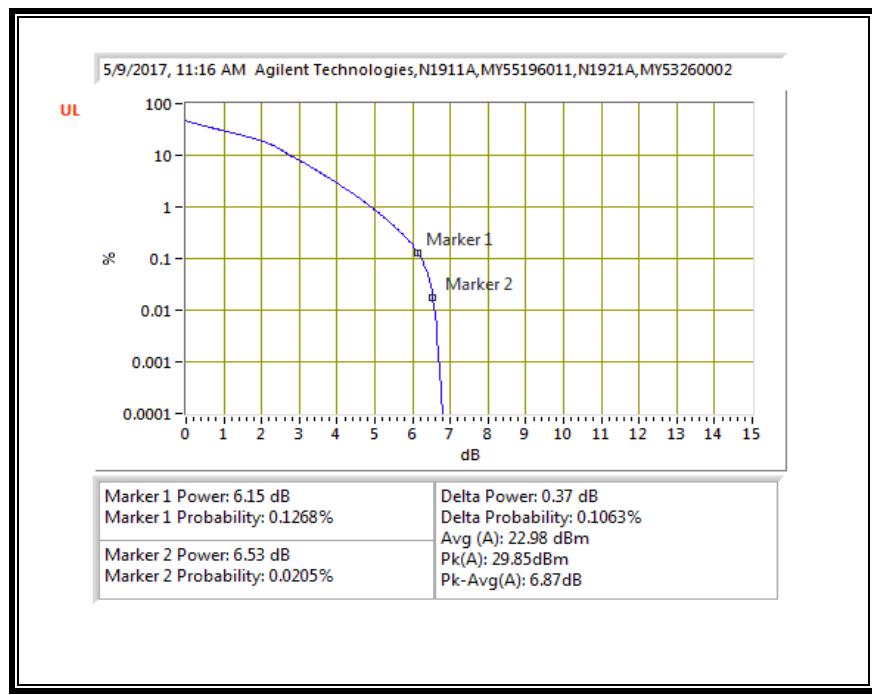
16QAM, (5.0 MHz BAND WIDTH)



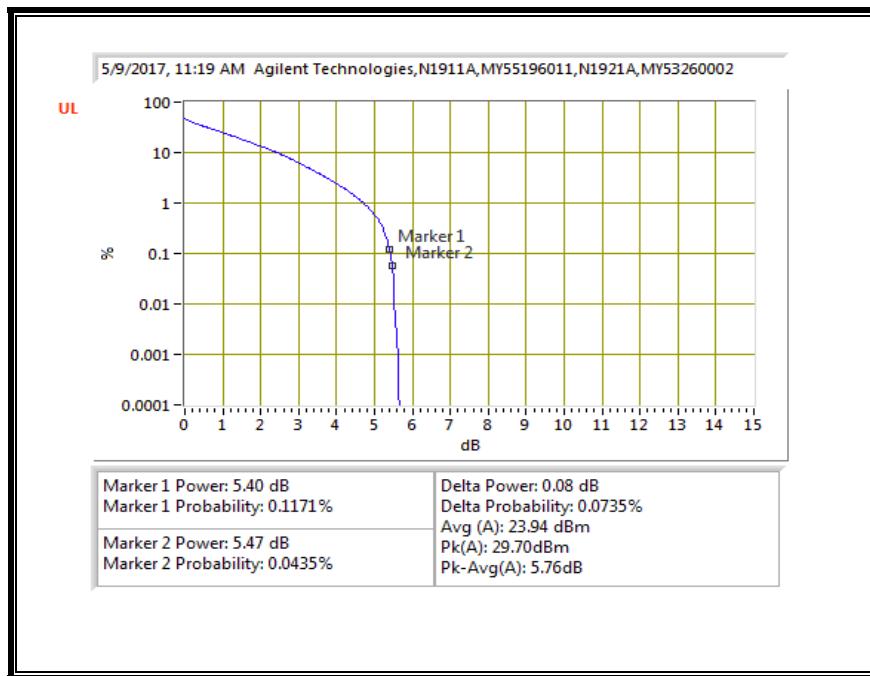
QPSK, (10.0 MHz BAND WIDTH)



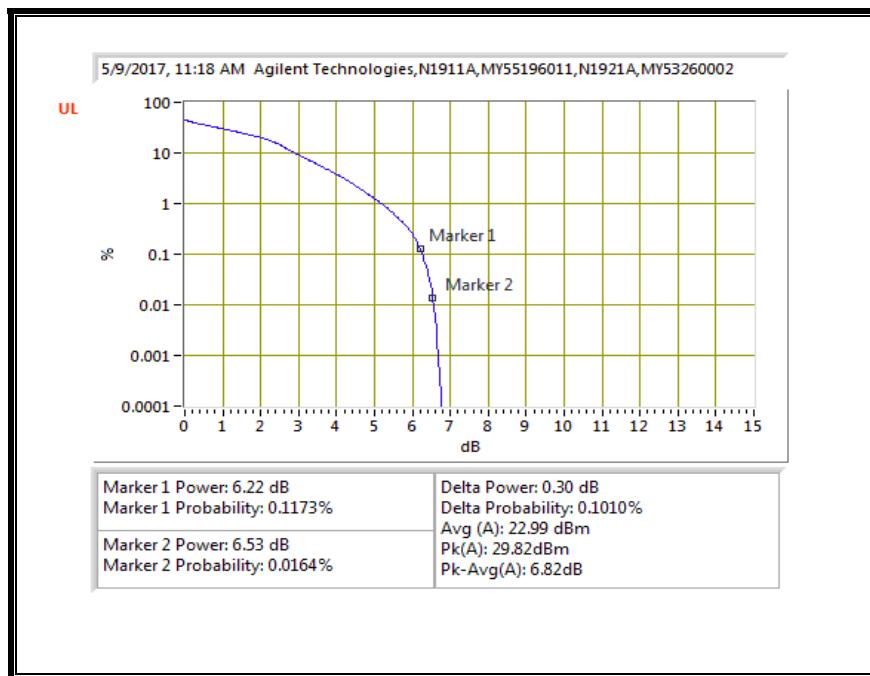
16QAM, (10.0 MHz BAND WIDTH)



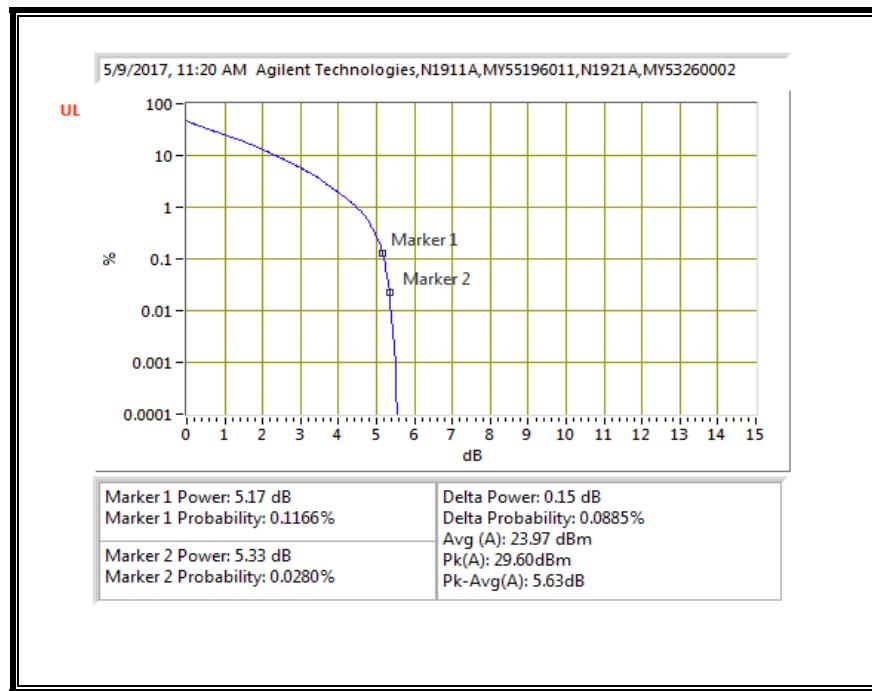
QPSK, (15.0 MHz BAND WIDTH)



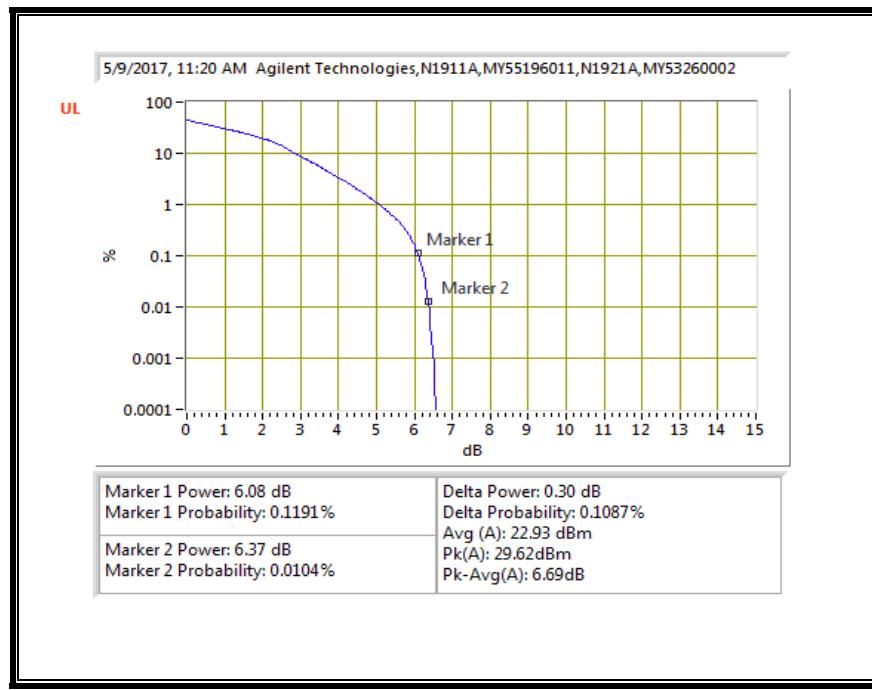
16QAM, (15.0 MHz BAND WIDTH)



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 #:	11792137									
Date:	05/16/17									
Test Engineer:	37290									
Configuration:	EUT Only									
Mode:	LTE Band 2, 20MHz QPSK									
Test Equipment:										
Substitution: Horn T59 Substitution, and 8ft SMA Cable										
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber F		3m Chamber F		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 (1860MHz)										
3.72	-69.4	H	3.0	-19.6	34.4	1.0	53.0	-13.0	-40.0	
5.58	-70.3	H	3.0	-16.8	34.1	1.0	49.9	-13.0	-36.9	
7.44	-71.5	H	3.0	-15.1	33.6	1.0	47.7	-13.0	-34.7	
3.72	-69.2	V	3.0	-19.3	34.4	1.0	52.7	-13.0	-39.7	
5.58	-70.0	V	3.0	-16.3	34.1	1.0	49.4	-13.0	-36.4	
7.44	-71.5	V	3.0	-15.3	33.6	1.0	47.9	-13.0	-34.9	
Mid Channel (1880MHz)										
3.76	-68.6	H	3.0	-18.7	34.4	1.0	52.1	-13.0	-39.1	
5.64	-70.2	H	3.0	-16.6	34.1	1.0	49.8	-13.0	-36.8	
7.52	-71.8	H	3.0	-15.3	33.5	1.0	47.8	-13.0	-34.8	
3.76	-69.4	V	3.0	-19.3	34.4	1.0	52.7	-13.0	-39.7	
5.64	-69.9	V	3.0	-16.2	34.1	1.0	49.3	-13.0	-36.3	
7.52	-71.1	V	3.0	-14.8	33.5	1.0	47.4	-13.0	-34.4	
High Channel (1900MHz)										
3.80	-69.1	H	3.0	-18.9	34.4	1.0	52.3	-13.0	-39.3	
5.70	-70.2	H	3.0	-16.5	34.1	1.0	49.6	-13.0	-36.6	
7.60	-71.6	H	3.0	-15.0	33.5	1.0	47.4	-13.0	-34.4	
3.80	-68.6	V	3.0	-18.4	34.4	1.0	51.8	-13.0	-38.8	
5.70	-70.8	V	3.0	-17.0	34.1	1.0	50.1	-13.0	-37.1	
7.60	-72.8	V	3.0	-16.4	33.5	1.0	48.9	-13.0	-35.9	

Rev. 05.21.15

16QAM LTE BAND 2 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company:										
Project #:	11792137									
Date:	05/16/17									
Test Engineer:	37290									
Configuration:	EUT Only									
Mode:	LTE Band 2, 20MHz 16QAM									
<u>Test Equipment:</u> Substitution: Horn T59 Substitution, and 8ft SMA Cable										
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber F		3m Chamber F		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 (1860MHz)										
3.72	-69.2	H	3.0	-19.4	34.4	1.0	-52.8	-13.0	-39.8	
5.58	-70.4	H	3.0	-16.9	34.1	1.0	-50.0	-13.0	-37.0	
7.44	-72.2	H	3.0	-15.8	33.6	1.0	-48.4	-13.0	-35.4	
3.72	-69.2	V	3.0	-19.3	34.4	1.0	-52.7	-13.0	-39.7	
5.58	-70.3	V	3.0	-16.6	34.1	1.0	-49.7	-13.0	-36.7	
7.44	-72.1	V	3.0	-15.9	33.6	1.0	-48.5	-13.0	-35.5	
Mid Channel (1880MHz)										
3.76	-68.9	H	3.0	-18.9	34.4	1.0	-52.3	-13.0	-39.3	
5.64	-70.9	H	3.0	-17.3	34.1	1.0	-50.4	-13.0	-37.4	
7.52	-70.3	H	3.0	-13.8	33.5	1.0	-46.3	-13.0	-33.3	
3.76	-69.5	V	3.0	-19.4	34.4	1.0	-52.9	-13.0	-39.9	
5.64	-70.2	V	3.0	-16.5	34.1	1.0	-49.6	-13.0	-36.6	
7.52	-72.2	V	3.0	-15.9	33.5	1.0	-48.4	-13.0	-35.4	
High Channel (1900MHz)										
3.80	-69.5	H	3.0	-19.4	34.4	1.0	-52.8	-13.0	-39.8	
5.70	-70.7	H	3.0	-17.0	34.1	1.0	-50.1	-13.0	-37.1	
7.60	-72.5	H	3.0	-15.9	33.5	1.0	-48.4	-13.0	-35.4	
3.80	-68.4	V	3.0	-18.2	34.4	1.0	-51.6	-13.0	-38.6	
5.70	-70.3	V	3.0	-16.5	34.1	1.0	-49.6	-13.0	-36.6	
7.60	-72.4	V	3.0	-16.0	33.5	1.0	-48.4	-13.0	-35.4	
Rev. 05.21.15										

9.1.2. LTE BAND 4

QPSK LTE BAND 4 (3.0MHZ BANDWIDTH)

High Frequency Substitution Measurement UL Fremont Radiated Chamber										
Company: Project #: 11792137 Date: 05/26/17 Test Engineer: 10641 Configuration: EUT Only Mode: LTE Band 4, 3MHz QPSK										
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
Low Channel (1720MHz)										
3.44	-66.2	H	3.0	-16.9	38.5	1.0	-54.4	-13.0	-41.4	
5.16	-64.1	H	3.0	-10.9	38.7	1.0	-48.6	-13.0	-35.6	
6.88	-65.7	H	3.0	-8.8	38.1	1.0	-45.9	-13.0	-32.9	
3.44	-66.8	V	3.0	-17.7	38.5	1.0	-55.2	-13.0	-42.2	
5.16	-65.0	V	3.0	-12.1	38.7	1.0	-49.8	-13.0	-36.8	
6.88	-64.2	V	3.0	-7.5	38.1	1.0	-44.7	-13.0	-31.7	
Mid Channel (1732.5MHz)										
3.47	-67.8	H	3.0	-18.4	38.5	1.0	-55.9	-13.0	-42.9	
5.20	-64.7	H	3.0	-11.4	38.7	1.0	-49.1	-13.0	-36.1	
6.93	-66.5	H	3.0	-9.5	38.1	1.0	-46.6	-13.0	-33.6	
3.47	-66.5	V	3.0	-17.3	38.5	1.0	-54.8	-13.0	-41.8	
5.20	-65.2	V	3.0	-12.3	38.7	1.0	-49.9	-13.0	-36.9	
6.93	-65.0	V	3.0	-8.3	38.1	1.0	-45.4	-13.0	-32.4	
High Channel (1745MHz)										
3.49	-65.8	H	3.0	-16.4	38.5	1.0	-53.9	-13.0	-40.9	
5.24	-65.6	H	3.0	-12.3	38.7	1.0	-49.9	-13.0	-36.9	
6.98	-66.3	H	3.0	-9.2	38.1	1.0	-46.3	-13.0	-33.3	
3.49	-66.3	V	3.0	-17.0	38.5	1.0	-54.5	-13.0	-41.5	
5.24	-65.8	V	3.0	-12.8	38.7	1.0	-50.5	-13.0	-37.5	
6.98	-66.1	V	3.0	-9.2	38.1	1.0	-46.2	-13.0	-33.2	

Rev. 05.21.15