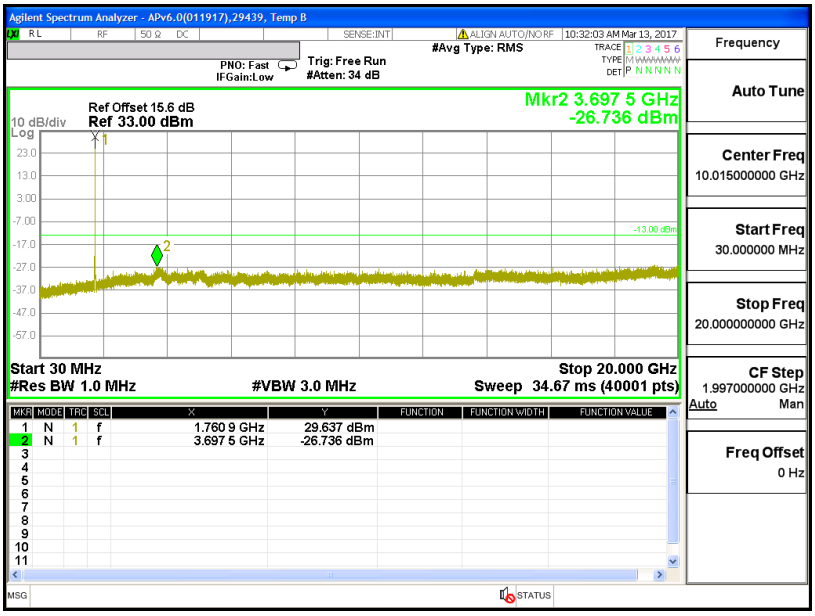
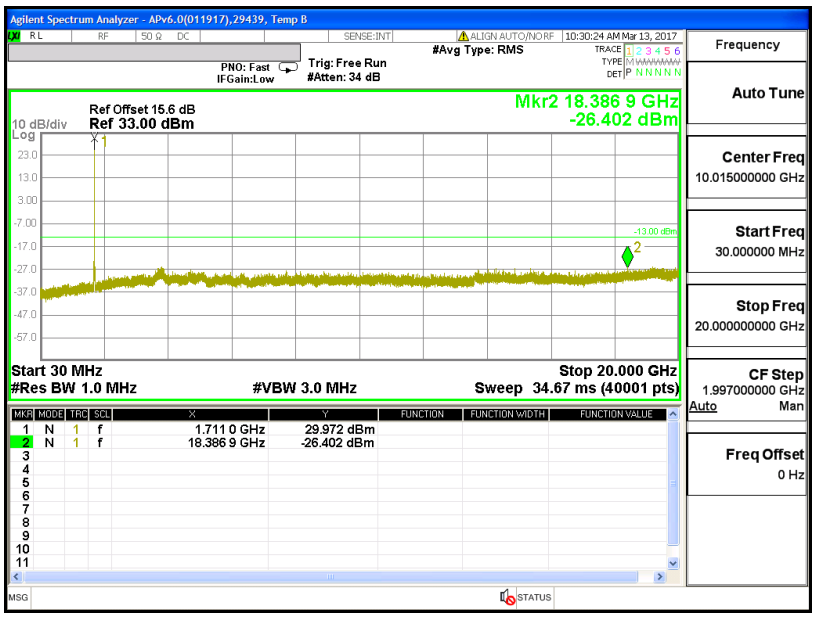
HIGH, RB1-0, 30 TO 20000 MHz



16QAM, (20.0 MHz BAND WIDTH)

LOW, RB1-0, 30 TO 20000 MHz



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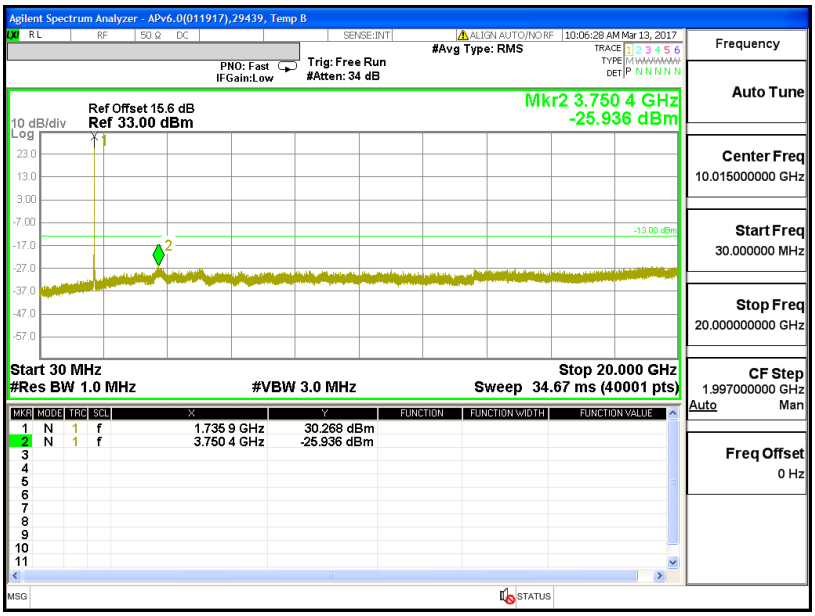
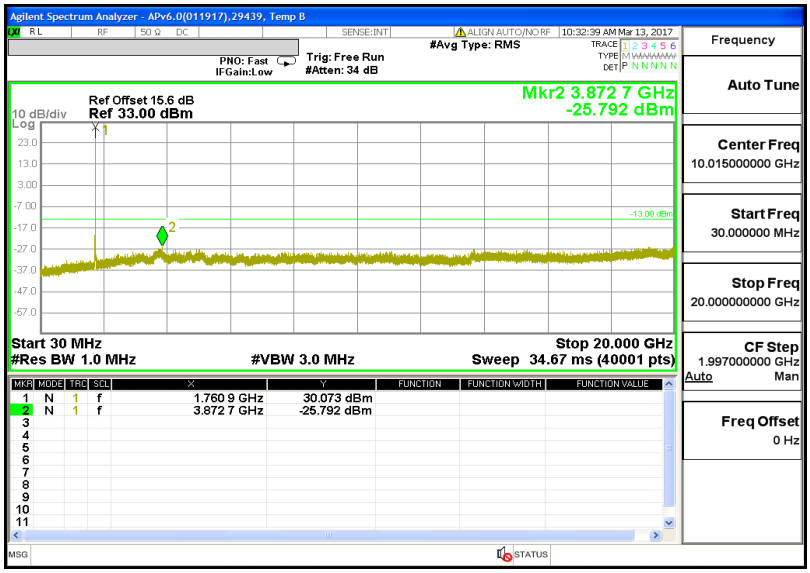
MID, RB1-0, 30 TO 20000 MHz



HIGH, RB1-0, 30 TO 20000 MHz



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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

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TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = −30° to +50°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 20ºC 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 +50ºC 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.

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8.4.1. LTE BAND 2

ID:	50822	Date:	4/4/17

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	1851.0006	1909.0018		
Extreme (50C)		1851.0007	1909.0018	10.2	0.005
Extreme (40C)		1851.0007	1909.0018	9.9	0.005
Extreme (30C)		1851.0007	1909.0018	9.4	0.005
Extreme (10C)		1851.0007	1909.0018	9.8	0.005
Extreme (0C)		1851.0007	1909.0018	9.6	0.005
Extreme (-10C)		1851.0007	1909.0018	9.0	0.005
Extreme (-20C)		1851.0007	1909.0018	9.2	0.005
Extreme (-30C)		1851.0007	1909.0018	9.0	0.005
20C	15%	1851.0007	1909.0018	10.1	0.005
	-15%	1851.0007	1909.0018	9.8	0.005
	End Point	1851.0007	1909.0018	10.5	0.006

8.4.2. LTE BAND 4

ID:	50822	Date:	4/4/17

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	1710.0821	1754.9070		
Extreme (50C)		1710.0821	1754.9070	7.1	0.004
Extreme (40C)		1710.0821	1754.9070	5.7	0.003
Extreme (30C)		1710.0821	1754.9070	6.4	0.004
Extreme (10C)		1710.0821	1754.9070	6.1	0.004
Extreme (0C)		1710.0821	1754.9070	6.5	0.004
Extreme (-10C)		1710.0821	1754.9070	5.9	0.003
Extreme (-20C)		1710.0821	1754.9070	6.0	0.003
Extreme (-30C)		1710.0821	1754.9070	6.5	0.004
20C	15%	1710.0821	1754.9070	8.3	0.005
	-15%	1710.0821	1754.9070	7.5	0.004
	End Point	1710.0821	1754.9070	8.4	0.005

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8.4.3. LTE BAND 5

ID:	50822	Date:	4/4/17

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	824.3656	848.5189		
Extreme (50C)		824.3656	848.5189	7.0	0.008
Extreme (40C)		824.3656	848.5189	6.9	0.008
Extreme (30C)		824.3656	848.5189	7.3	0.009
Extreme (10C)		824.3656	848.5189	7.0	0.008
Extreme (0C)		824.3656	848.5189	6.9	0.008
Extreme (-10C)		824.3656	848.5189	7.0	0.008
Extreme (-20C)		824.3656	848.5189	7.2	0.009
Extreme (-30C)		824.3656	848.5189	6.7	0.008
20C	15%	824.3656	848.5189	7.5	0.009
	-15%	824.3656	848.5189	8.0	0.010
	End Point	824.3656	848.5189	7.6	0.009

8.4.4. LTE BAND 7

ID:	50822	Date:	4/5/17

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	2501.0052	2568.9923		
Extreme (50C)		2501.0052	2568.9923	7.3	0.003
Extreme (40C)		2501.0052	2568.9923	7.2	0.003
Extreme (30C)		2501.0052	2568.9923	7.6	0.003
Extreme (10C)		2501.0052	2568.9923	7.3	0.003
Extreme (0C)		2501.0052	2568.9923	7.5	0.003
Extreme (-10C)		2501.0052	2568.9923	7.2	0.003
Extreme (-20C)		2501.0052	2568.9923	7.3	0.003
Extreme (-30C)		2501.0052	2568.9923	7.2	0.003
20C	15%	2501.0052	2568.9923	7.5	0.003
	-15%	2501.0052	2568.9923	7.0	0.003
	End Point	2501.0052	2568.9923	7.2	0.003

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8.4.5. LTE BAND 12

ID:	38602	Date:	4/6/17

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	699.3973	715.5454		
Extreme (50C)		699.3973	715.5454	6.1	0.01
Extreme (40C)		699.3973	715.5454	6.7	0.01
Extreme (30C)		699.3973	715.5454	6.6	0.01
Extreme (10C)		699.3973	715.5454	6.3	0.01
Extreme (0C)		699.3973	715.5454	6.5	0.01
Extreme (-10C)		699.3973	715.5454	6.2	0.01
Extreme (-20C)		699.3973	715.5454	6.4	0.01
Extreme (-30C)		699.3973	715.5454	6.6	0.01
20C	15%	699.3973	715.5454	7.3	0.01
	-15%	699.3973	715.5454	8.0	0.01
	End Point	699.3973	715.5454	7.5	0.01

8.4.6. LTE BAND 13

ID:	38602	Date:	4/6/17

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	777.5317	786.4707		
Extreme (50C)		777.5317	786.4707	5.2	0.007
Extreme (40C)		777.5317	786.4707	5.4	0.007
Extreme (30C)		777.5317	786.4707	5.0	0.006
Extreme (10C)		777.5317	786.4707	5.4	0.007
Extreme (0C)		777.5317	786.4707	4.9	0.006
Extreme (-10C)		777.5317	786.4707	5.4	0.007
Extreme (-20C)		777.5317	786.4707	5.1	0.007
Extreme (-30C)		777.5317	786.4707	4.8	0.006
20C	15%	777.5317	786.4707	5.8	0.007
	-15%	777.5317	786.4707	6.1	0.008
	End Point	777.5317	786.4707	6.3	0.008

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8.4.7. LTE BAND 17

ID:	38602	Date:	4/6/17

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	704.5248	715.4703		
Extreme (50C)		704.5248	715.4703	5.1	0.007
Extreme (40C)		704.5248	715.4703	5.3	0.007
Extreme (30C)		704.5248	715.4703	5.1	0.007
Extreme (10C)		704.5248	715.4703	5.4	0.008
Extreme (0C)		704.5248	715.4703	5.6	0.008
Extreme (-10C)		704.5248	715.4703	5.5	0.008
Extreme (-20C)		704.5248	715.4703	5.6	0.008
Extreme (-30C)		704.5248	715.4703	5.4	0.008
20C	15%	704.5248	715.4703	6.1	0.009
	-15%	704.5248	715.4703	5.7	0.008
	End Point	704.5248	715.4703	6.0	0.008

8.4.8. LTE BAND 25

ID:	38602	Date:	4/5/17

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	1851.0686	1913.9217		
Extreme (50C)		1851.0686	1913.9217	4.0	0.002
Extreme (40C)		1851.0686	1913.9217	4.4	0.002
Extreme (30C)		1851.0686	1913.9217	4.2	0.002
Extreme (10C)		1851.0686	1913.9217	4.6	0.002
Extreme (0C)		1851.0686	1913.9217	2.7	0.001
Extreme (-10C)		1851.0686	1913.9217	3.8	0.002
Extreme (-20C)		1851.0686	1913.9217	3.0	0.002
Extreme (-30C)		1851.0686	1913.9217	3.6	0.002
20C	15%	1851.0686	1913.9217	3.7	0.002
	-15%	1851.0686	1913.9217	4.1	0.002
	End Point	1851.0686	1913.9217	4.9	0.003

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8.4.9. LTE BAND 26

ID:	50822	Date:	4/4/17

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	814.3000	823.7030		
Extreme (50C)		814.3000	823.7030	2.2	0.003
Extreme (40C)		814.3000	823.7030	9.1	0.011
Extreme (30C)		814.3000	823.7030	6.5	0.008
Extreme (10C)		814.3000	823.7030	8.0	0.010
Extreme (0C)		814.3000	823.7030	3.4	0.004
Extreme (-10C)		814.3000	823.7030	3.7	0.005
Extreme (-20C)		814.3000	823.7030	2.5	0.003
Extreme (-30C)		814.3000	823.7030	3.8	0.005
20C	15%	814.3000	823.7030	7.1	0.009
	-15%	814.3000	823.7030	6.5	0.008
	End Point	814.3000	823.7030	7.3	0.009

8.4.10. LTE BAND 30

ID:	38602	Date:	4/4/17

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	2305.5026	2314.5024		
Extreme (50C)		2305.5026	2314.5024	7.1	0.003
Extreme (40C)		2305.5026	2314.5024	7.0	0.003
Extreme (30C)		2305.5026	2314.5024	7.3	0.003
Extreme (10C)		2305.5026	2314.5024	7.2	0.003
Extreme (0C)		2305.5026	2314.5024	7.4	0.003
Extreme (-10C)		2305.5026	2314.5024	6.8	0.003
Extreme (-20C)		2305.5026	2314.5024	6.4	0.003
Extreme (-30C)		2305.5026	2314.5024	6.9	0.003
20C	15%	2305.5026	2314.5024	7.3	0.003
	-15%	2305.5026	2314.5024	7.7	0.003
	End Point	2305.5026	2314.5024	8.2	0.004

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8.4.11. LTE BAND 41

ID:	50822	Date:	4/6/17

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	2496.9114	2689.0734		
Extreme (50C)		2496.9114	2689.0734	12.8	0.005
Extreme (40C)		2496.9114	2689.0734	12.7	0.005
Extreme (30C)		2496.9114	2689.0734	13.0	0.005
Extreme (10C)		2496.9114	2689.0734	11.7	0.005
Extreme (0C)		2496.9114	2689.0734	11.9	0.005
Extreme (-10C)		2496.9114	2689.0734	11.8	0.005
Extreme (-20C)		2496.9114	2689.0734	12.1	0.005
Extreme (-30C)		2496.9114	2689.0734	12.3	0.005
20C	15%	2496.9114	2689.0734	14.7	0.006
	-15%	2496.9114	2689.0734	14.5	0.006
	End Point	2496.9114	2689.0734	14.2	0.005

8.4.12. LTE BAND 66

ID:	50822	Date:	4/8/17

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	1711.0089	1778.9911		
Extreme (50C)		1711.0089	1778.9911	1.6	0.001
Extreme (40C)		1711.0089	1778.9911	3.6	0.002
Extreme (30C)		1711.0089	1778.9911	2.8	0.002
Extreme (10C)		1711.0089	1778.9911	3.0	0.002
Extreme (0C)		1711.0089	1778.9911	1.0	0.001
Extreme (-10C)		1711.0089	1778.9911	-1.9	-0.001
Extreme (-20C)		1711.0089	1778.9911	1.3	0.001
Extreme (-30C)		1711.0089	1778.9911	1.9	0.001
20C	15%	1711.0089	1778.9911	1.9	0.001
	-15%	1711.0089	1778.9911	1.6	0.001
	End Point	1711.0089	1778.9911	1.7	0.001

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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.

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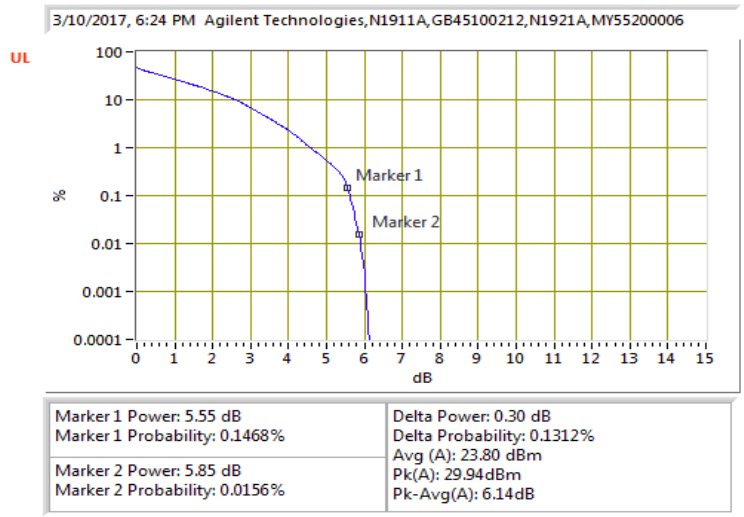
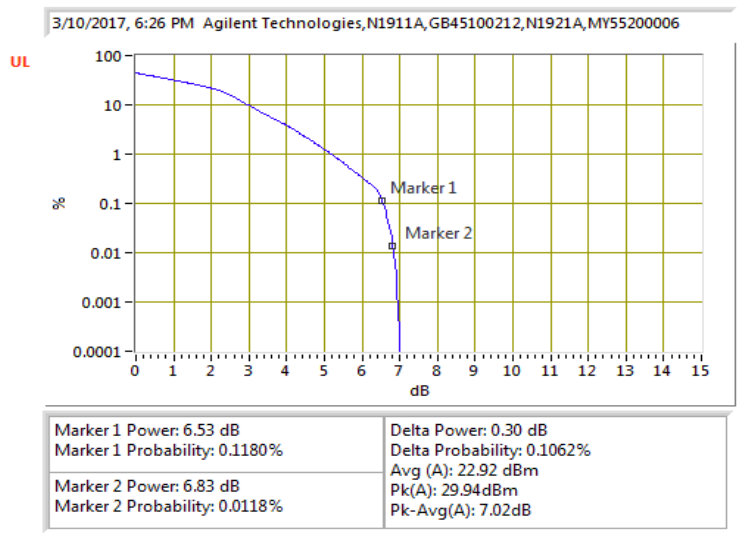
8.5.1. LTE BAND 2

QPSK, (1.4 MHz BAND WIDTH)



16QAM, (1.4 MHz BAND WIDTH)



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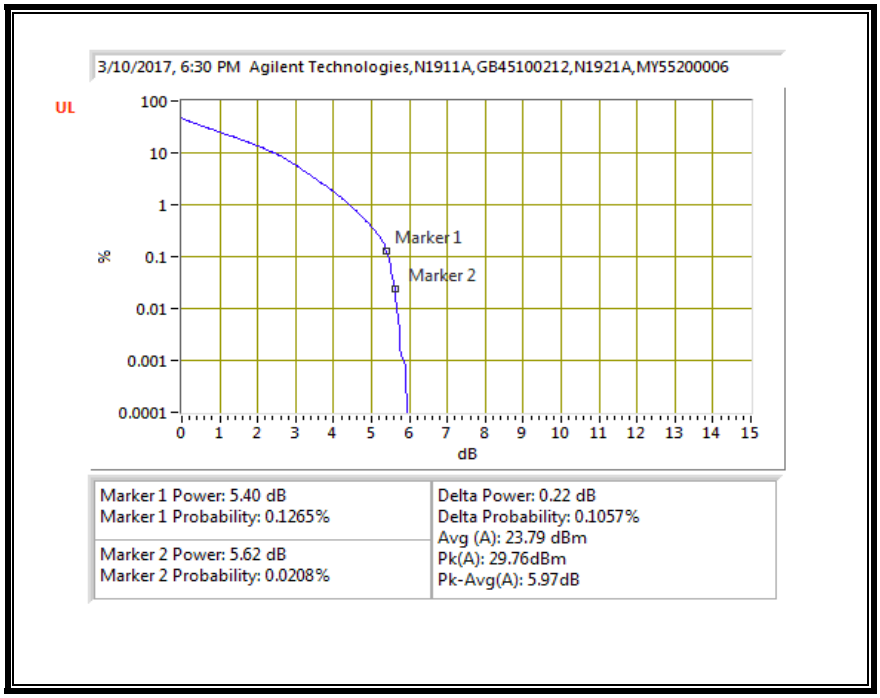
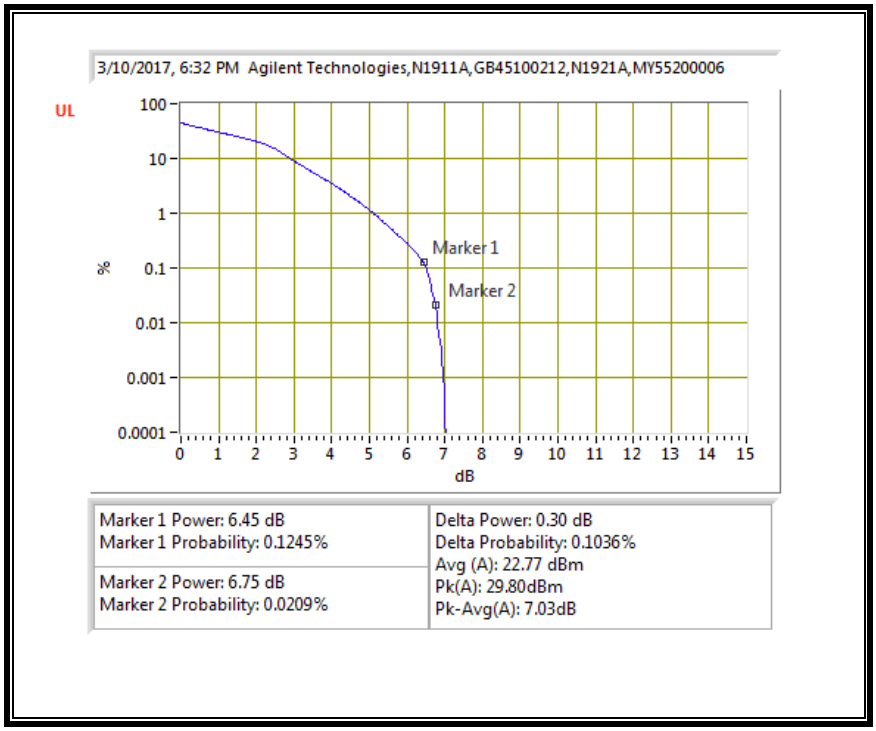
QPSK, (3.0 MHz BAND WIDTH)



16QAM, (3.0 MHz BAND WIDTH)



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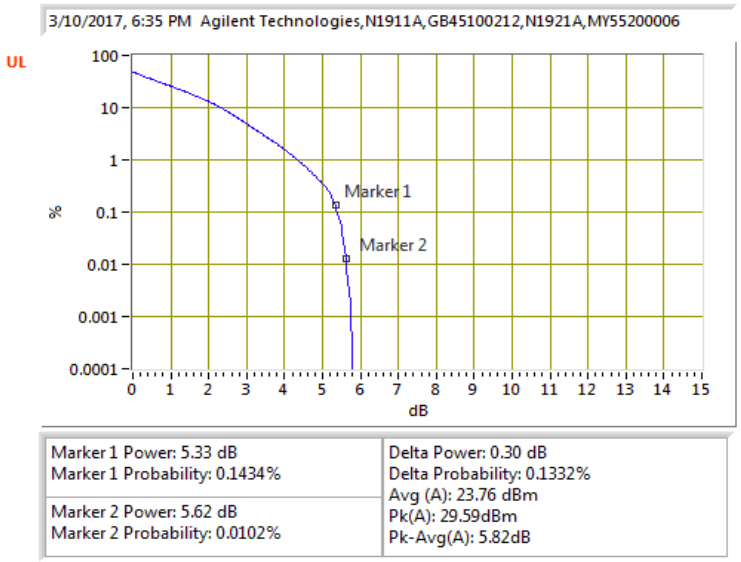
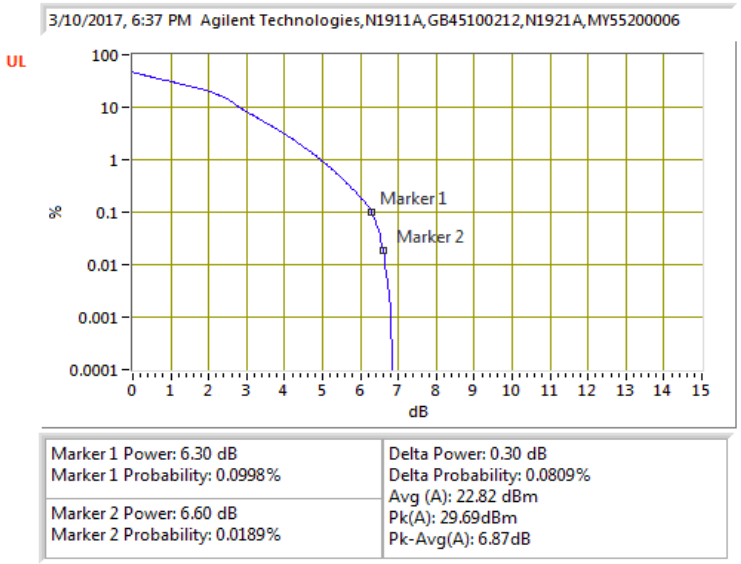
QPSK, (5.0 MHz BAND WIDTH)



16QAM, (5.0 MHz BAND WIDTH)



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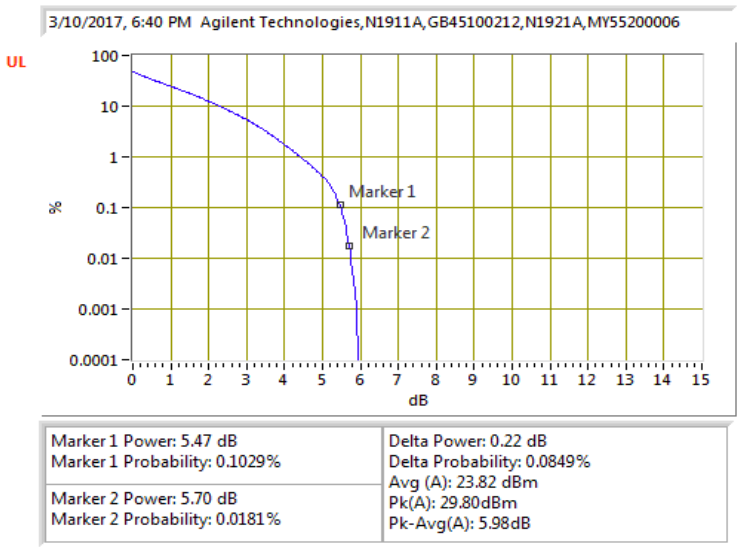
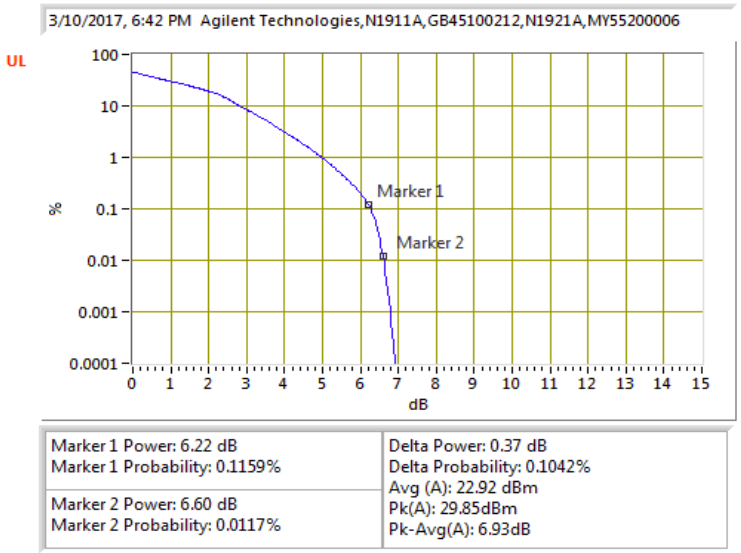
QPSK, (10.0 MHz BAND WIDTH)



16QAM, (10.0 MHz BAND WIDTH)



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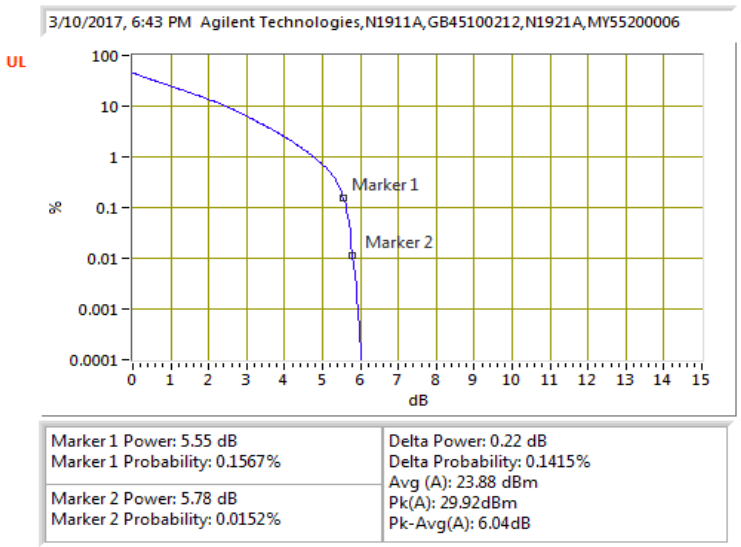
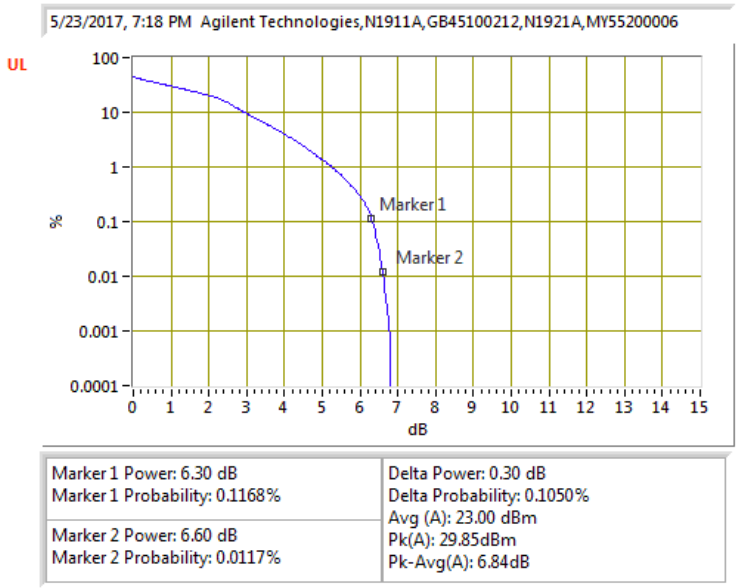
QPSK, (15.0 MHz BAND WIDTH)



16QAM, (15.0 MHz BAND WIDTH)



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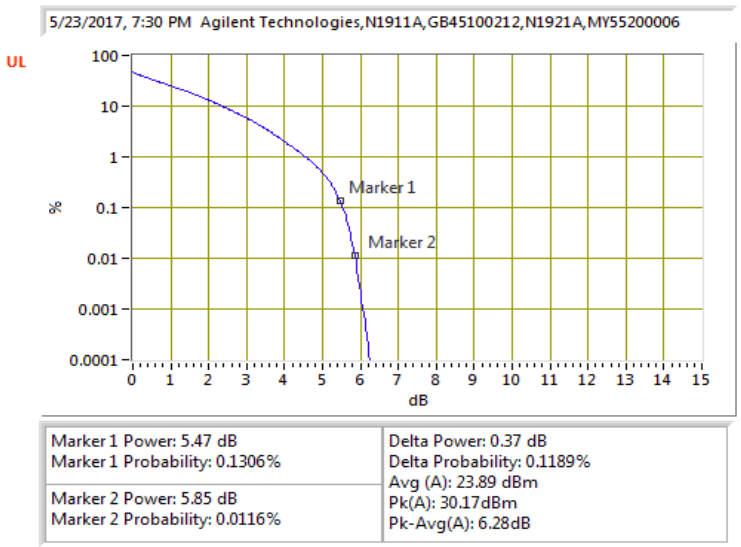
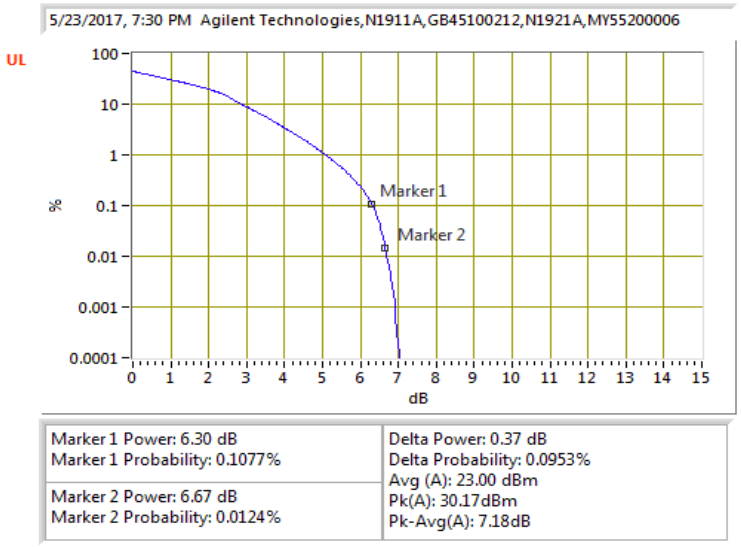
QPSK, (20.0 MHz BAND WIDTH)



16QAM, (20.0 MHz BAND WIDTH)



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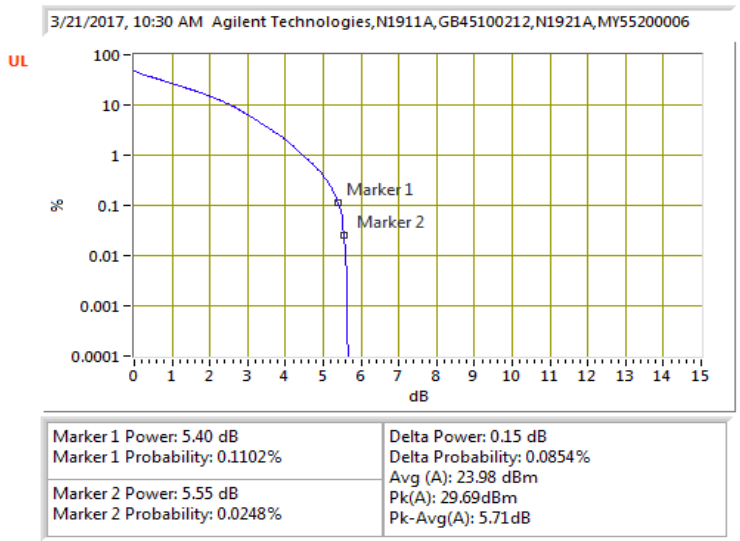
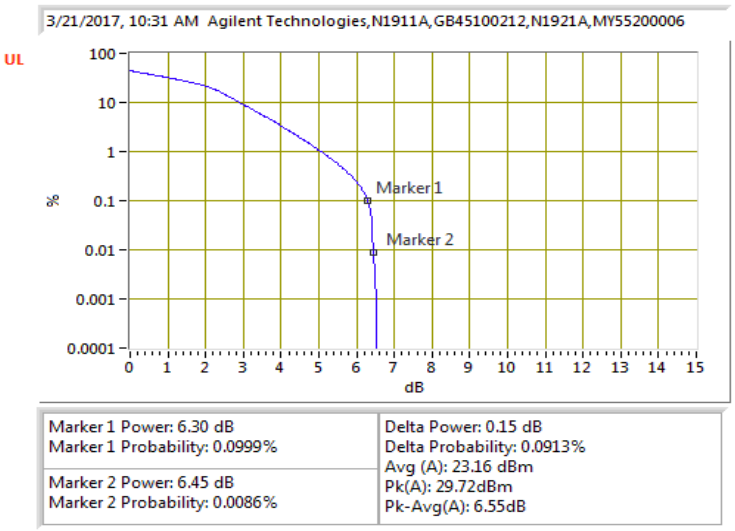
8.5.2. LTE BAND 4

QPSK, (1.4 MHz BAND WIDTH)



16QAM, (1.4 MHz BAND WIDTH)



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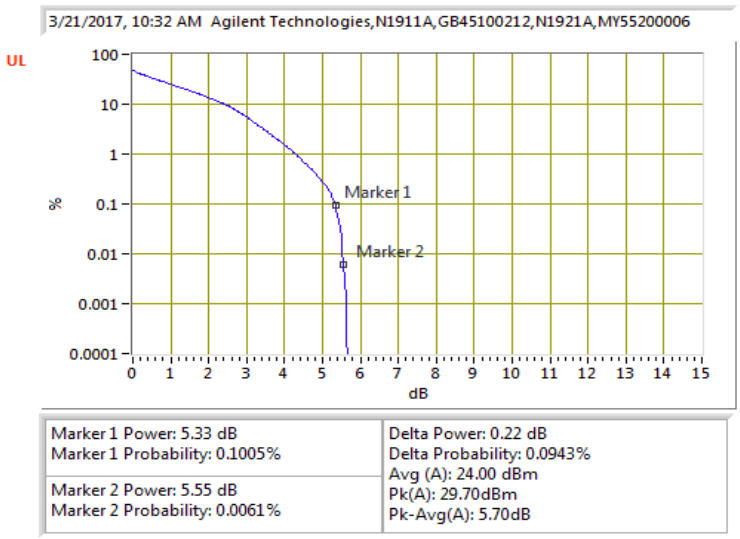
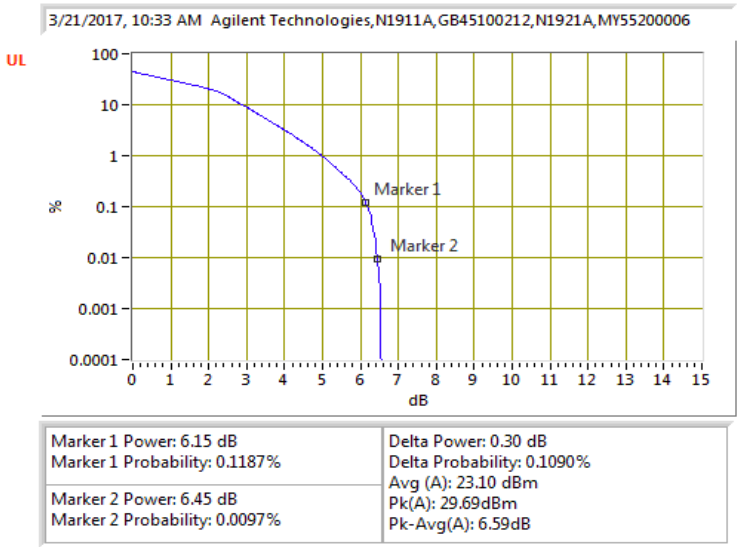
QPSK, (3.0 MHz BAND WIDTH)



16QAM, (3.0 MHz BAND WIDTH)



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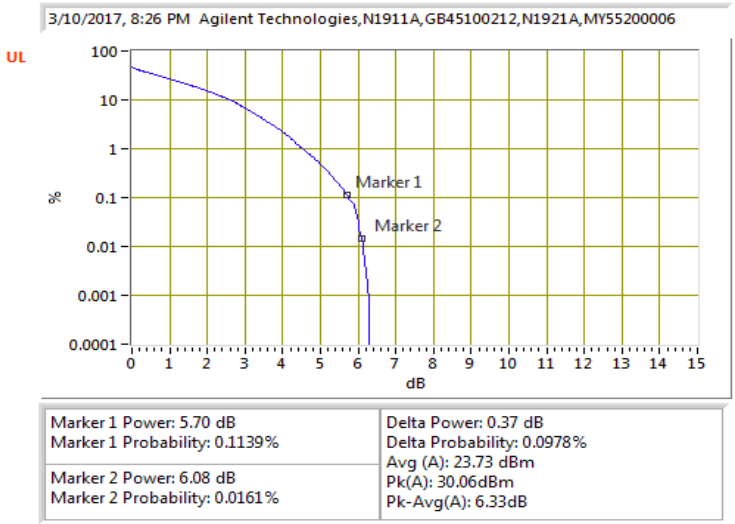
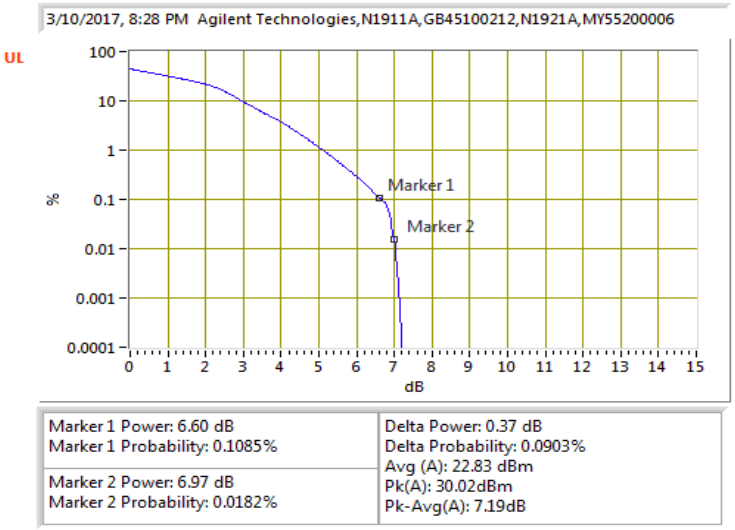
8.5.3. LTE BAND 5

QPSK, (1.4 MHz BAND WIDTH)



16QAM, (1.4 MHz BAND WIDTH)



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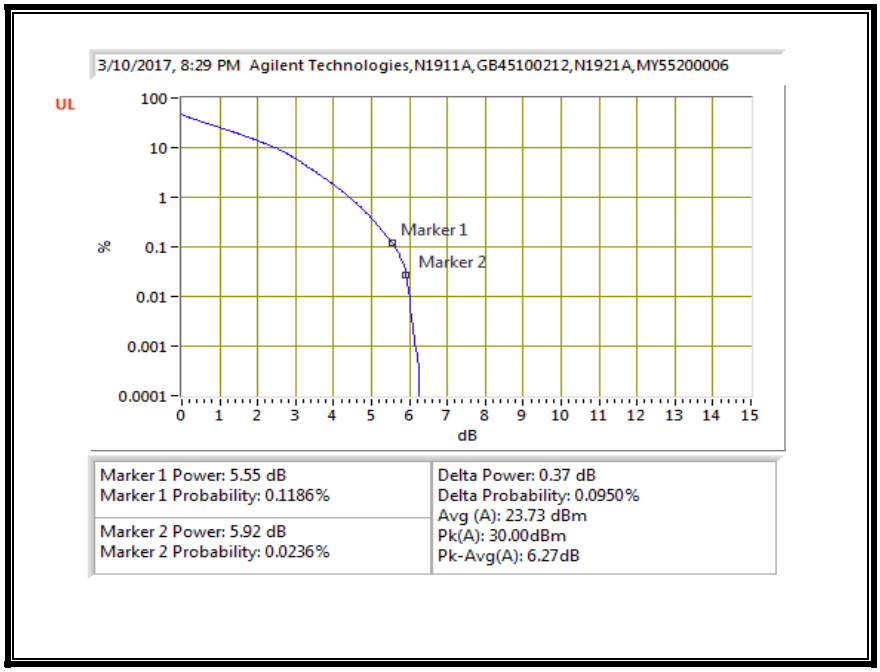
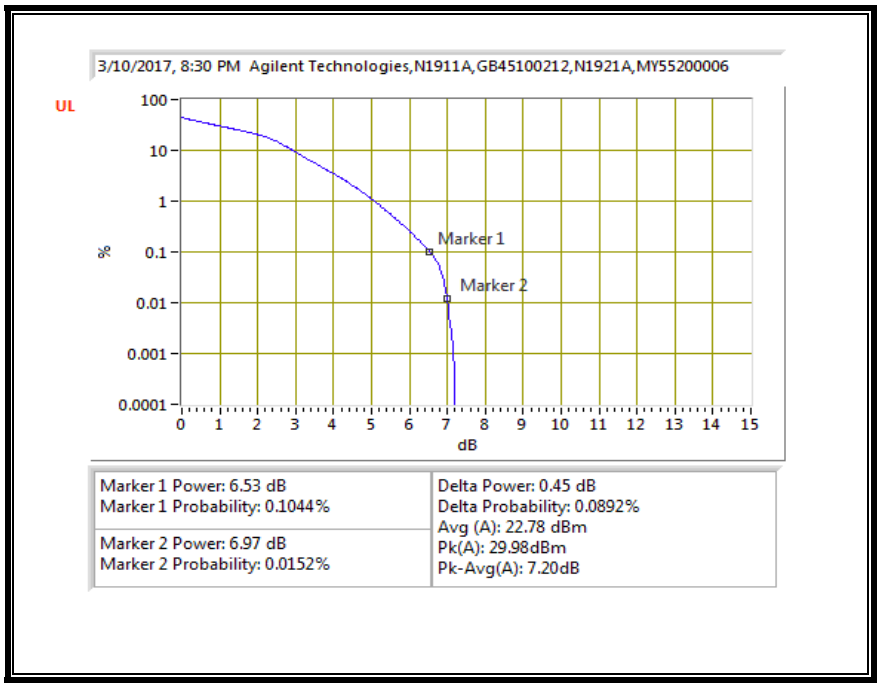
QPSK, (3.0 MHz BAND WIDTH)



16QAM, (3.0 MHz BAND WIDTH)



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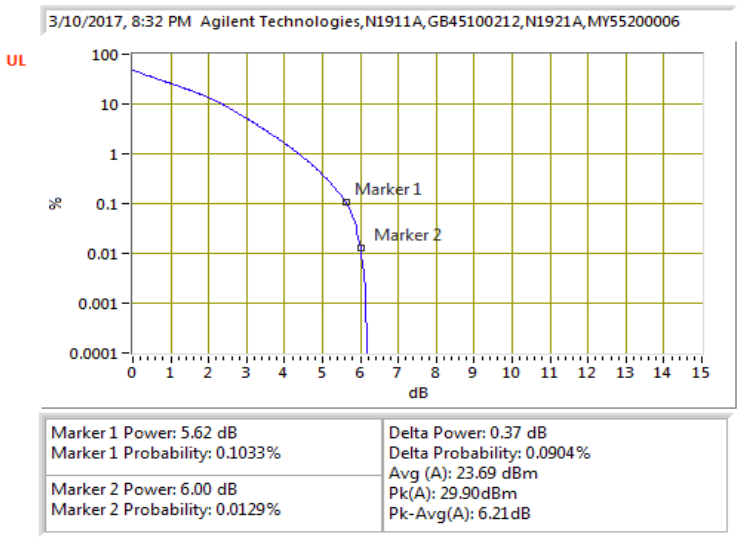
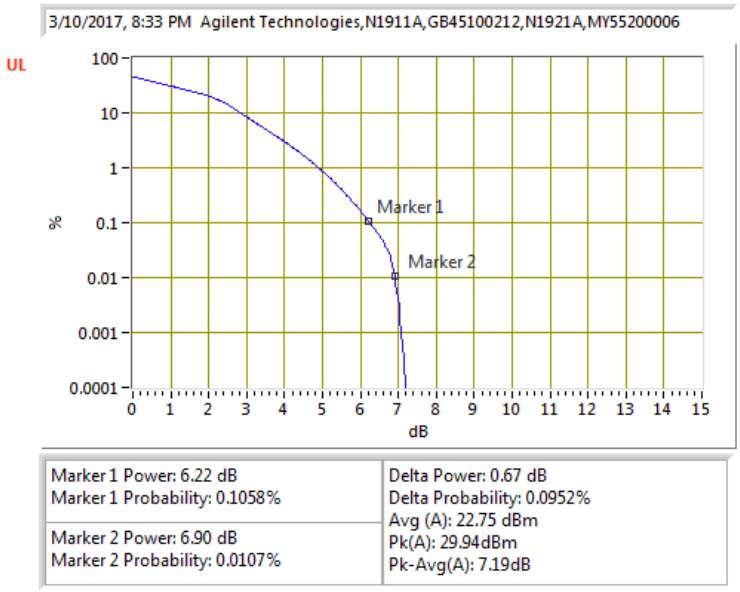
QPSK, (5.0 MHz BAND WIDTH)



16QAM, (5.0 MHz BAND WIDTH)



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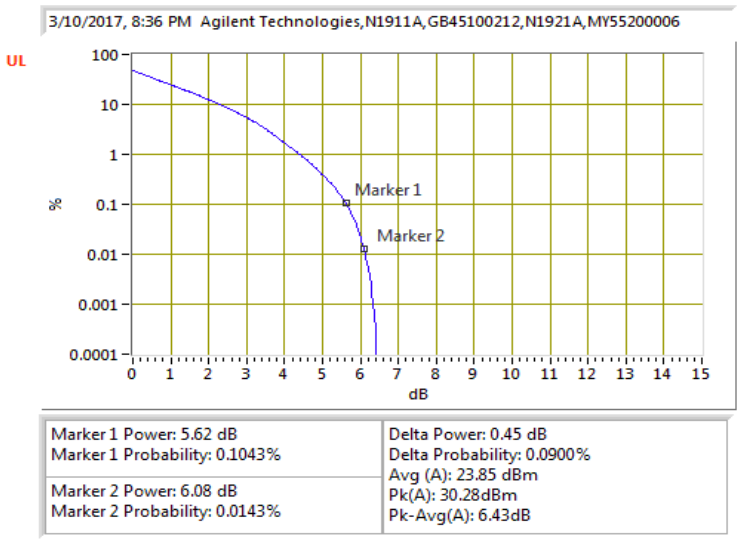
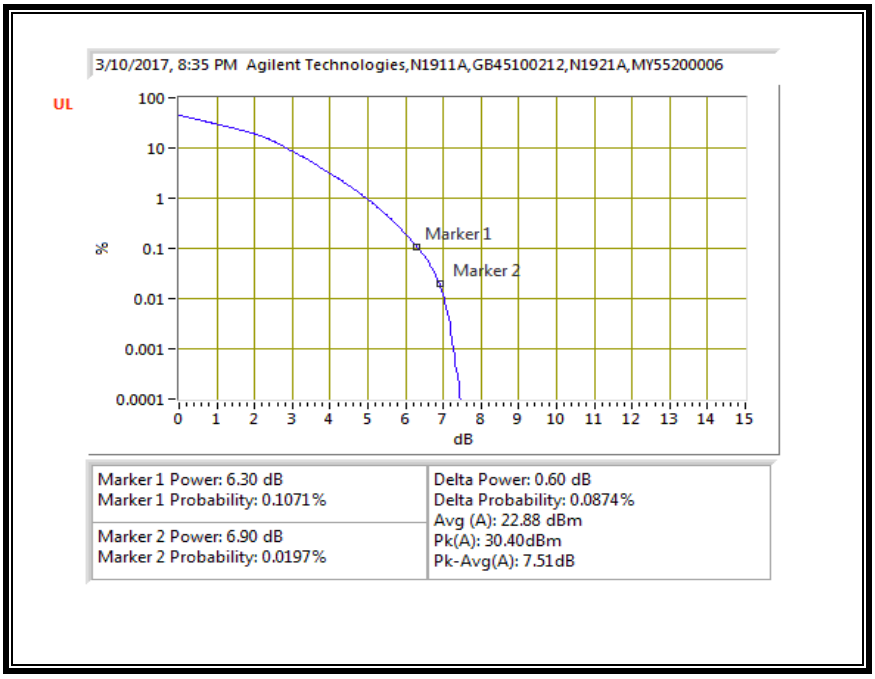
QPSK, (10.0 MHz BAND WIDTH)



16QAM, (10.0 MHz BAND WIDTH)



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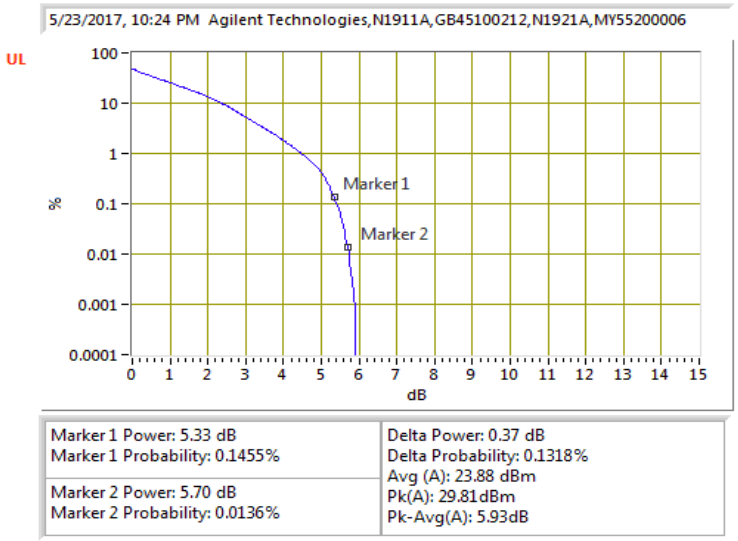
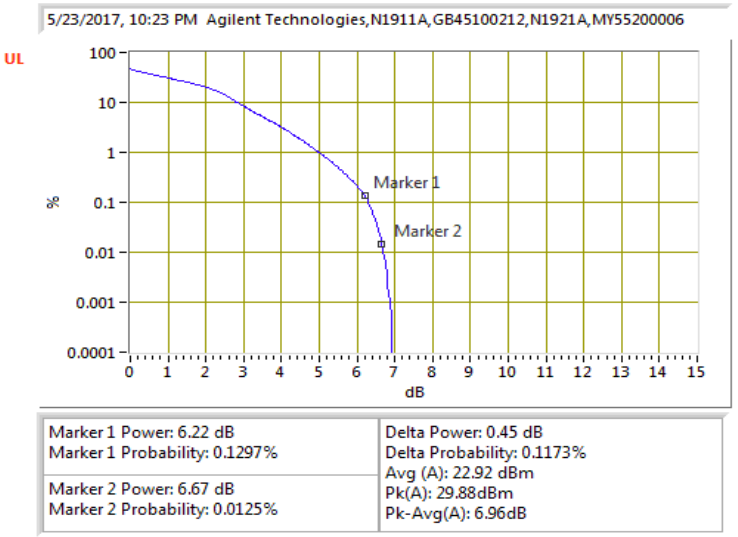
8.5.4. LTE BAND 7

QPSK, (5.0 MHz BAND WIDTH)



16QAM, (5.0 MHz BAND WIDTH)



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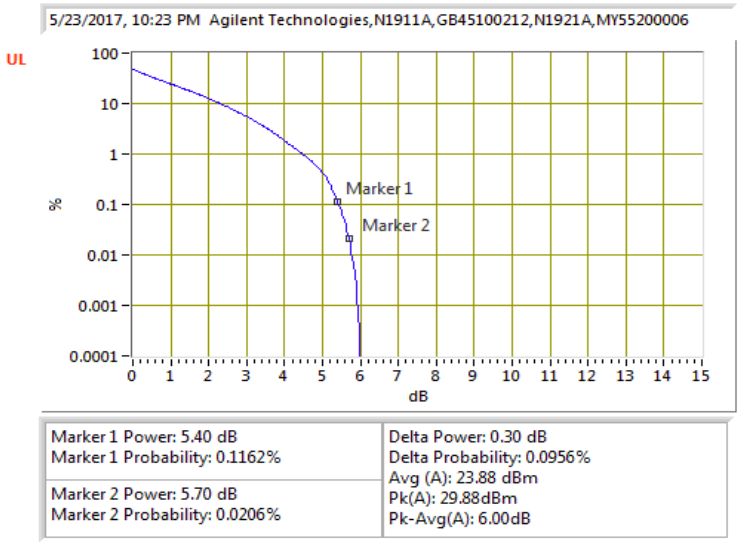
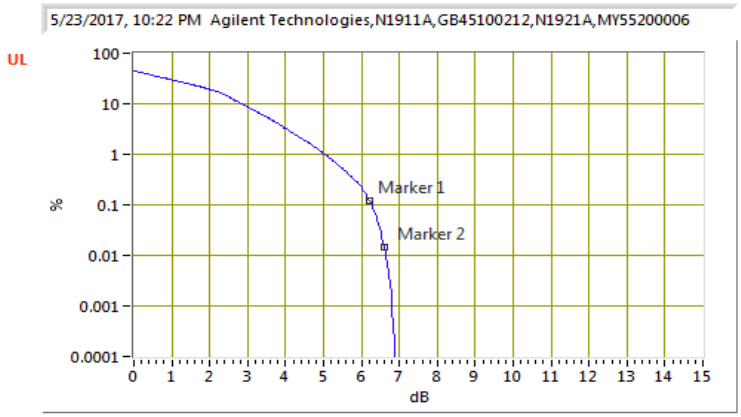
QPSK, (10.0 MHz BAND WIDTH)



16QAM, (10.0 MHz BAND WIDTH)



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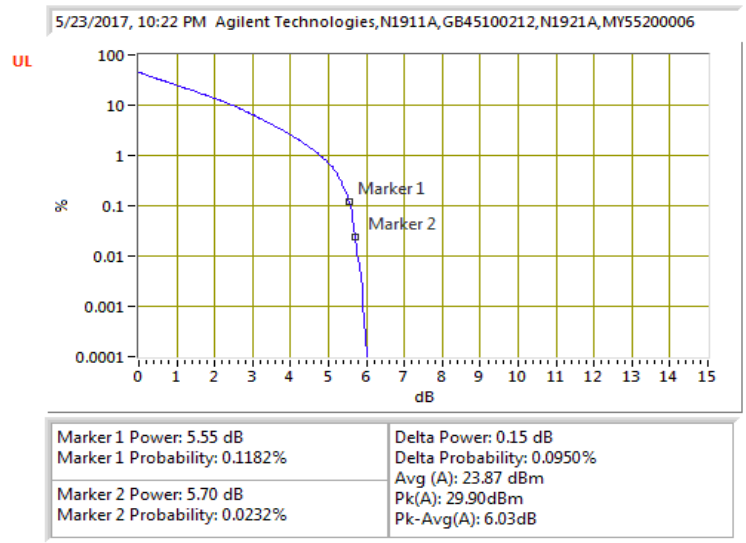
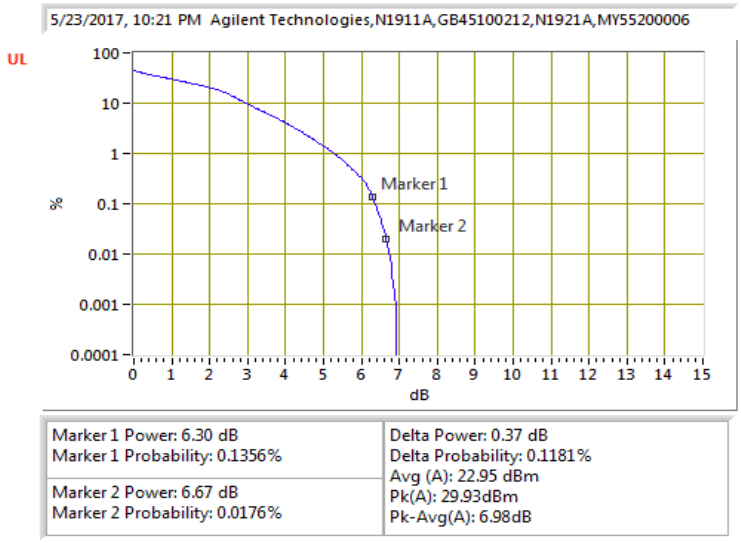
QPSK, (15.0 MHz BAND WIDTH)



16QAM, (15.0 MHz BAND WIDTH)



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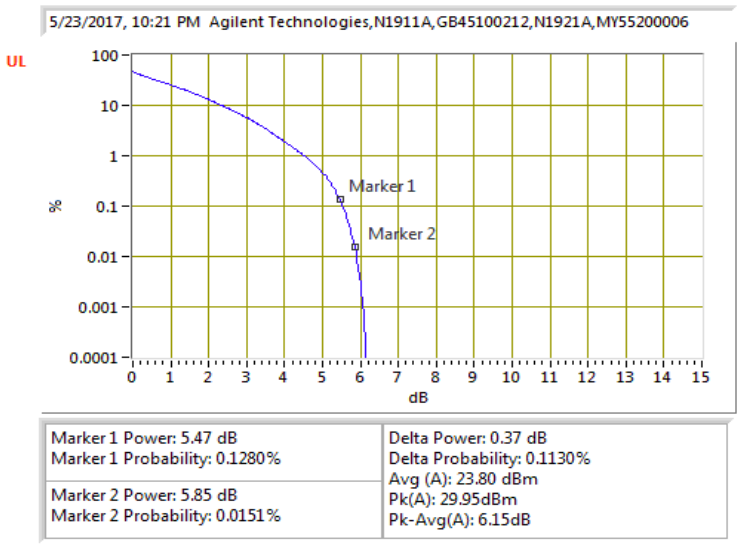
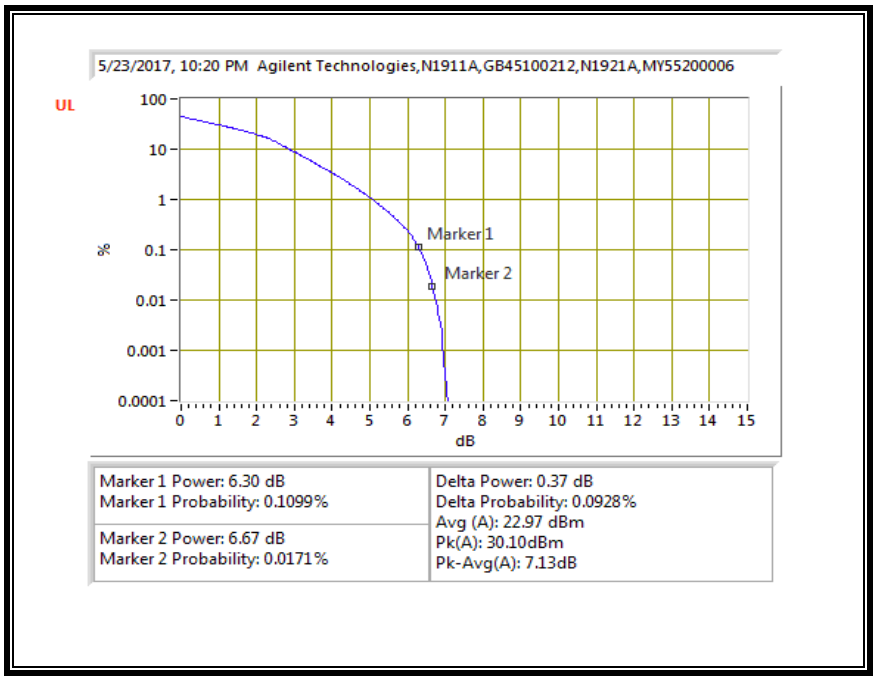
QPSK, (20.0 MHz BAND WIDTH)



16QAM, (20.0 MHz BAND WIDTH)



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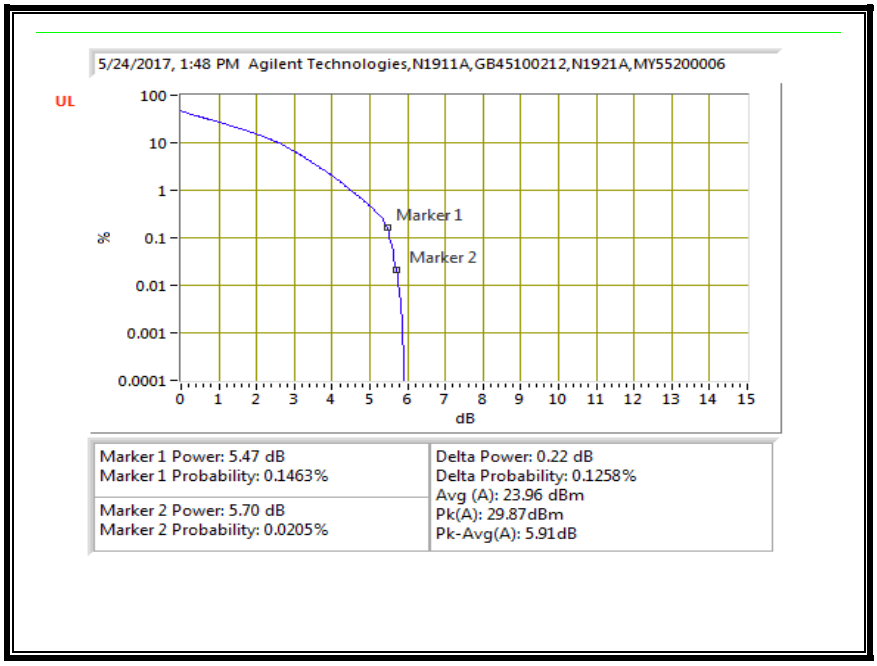
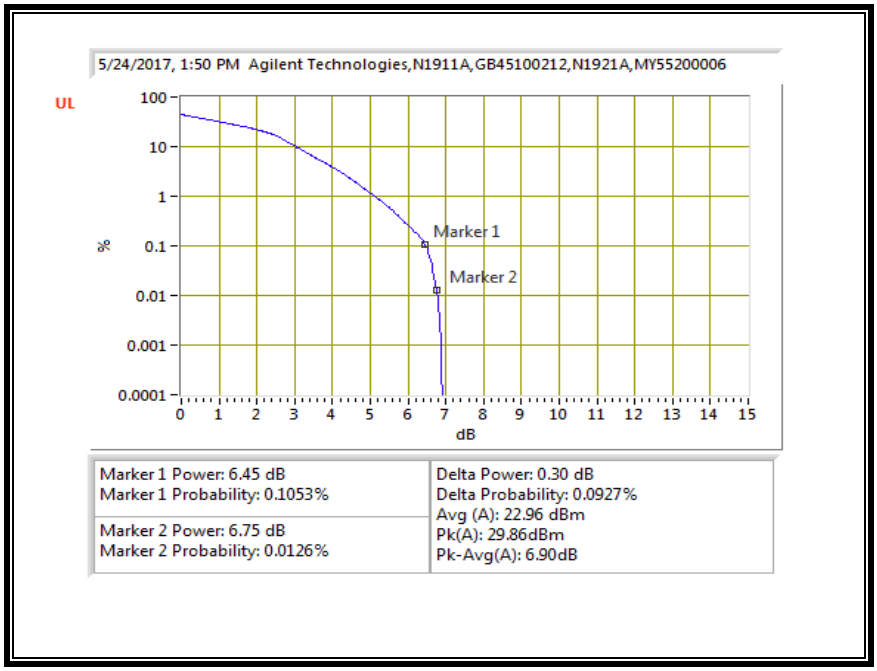
8.5.5. LTE BAND 12

QPSK, (1.4 MHz BAND WIDTH)



16QAM, (1.4 MHz BAND WIDTH)



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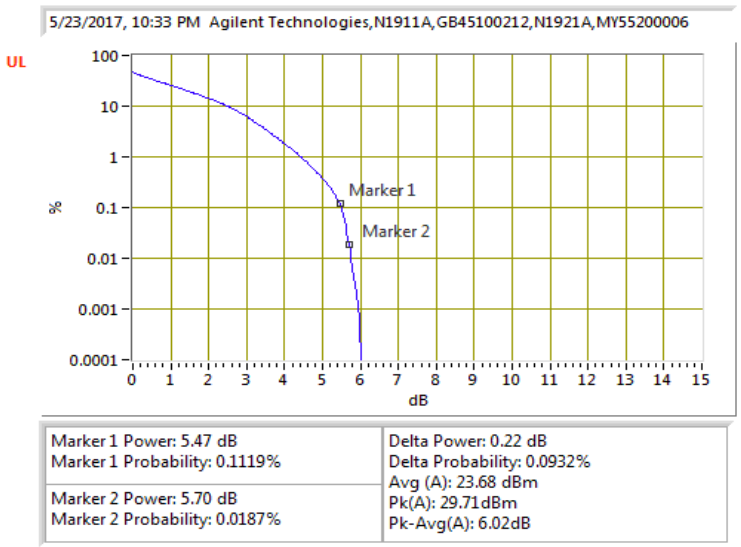
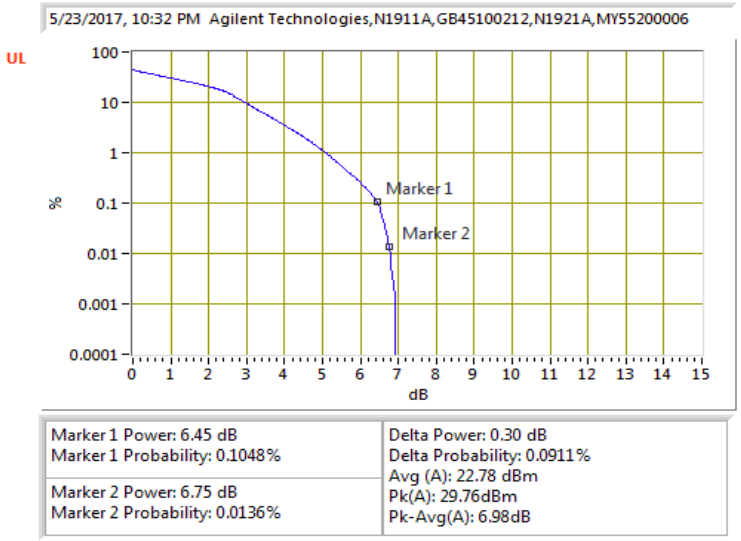
QPSK, (3.0 MHz BAND WIDTH)



16QAM, (3.0 MHz BAND WIDTH)



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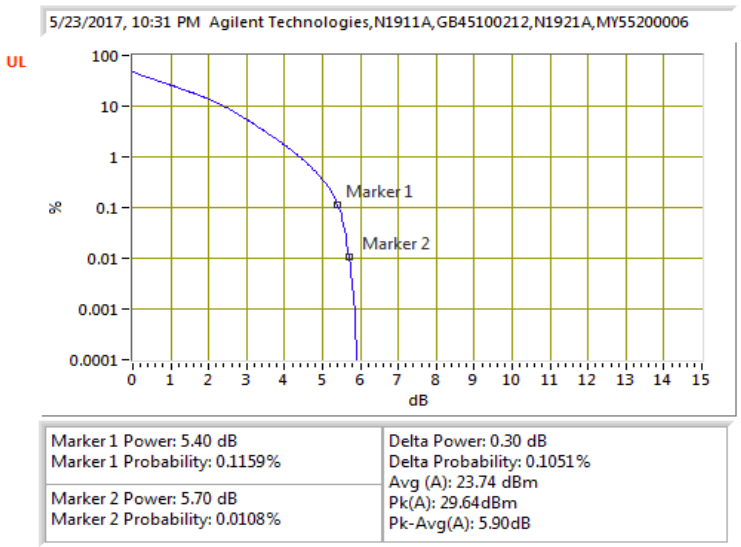
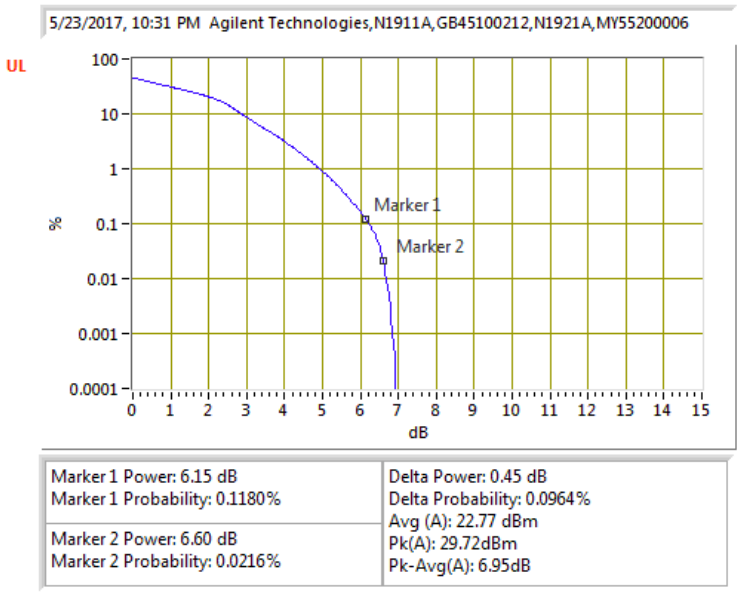
QPSK, (5.0 MHz BAND WIDTH)



16QAM, (5.0 MHz BAND WIDTH)



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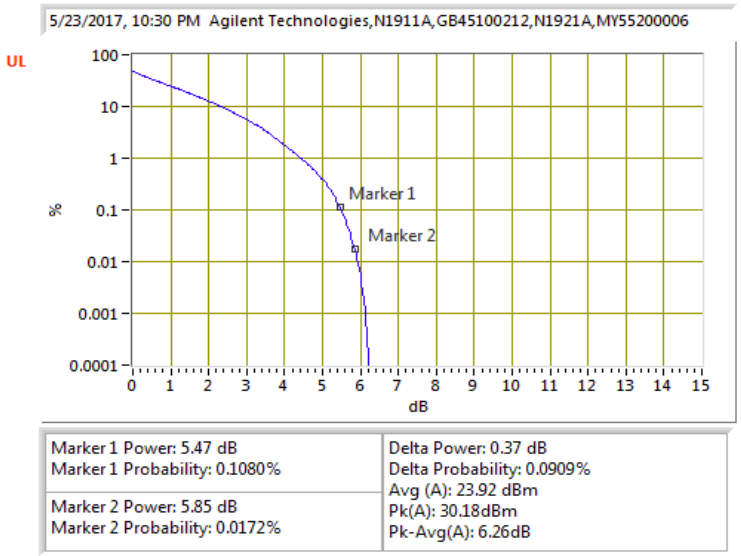
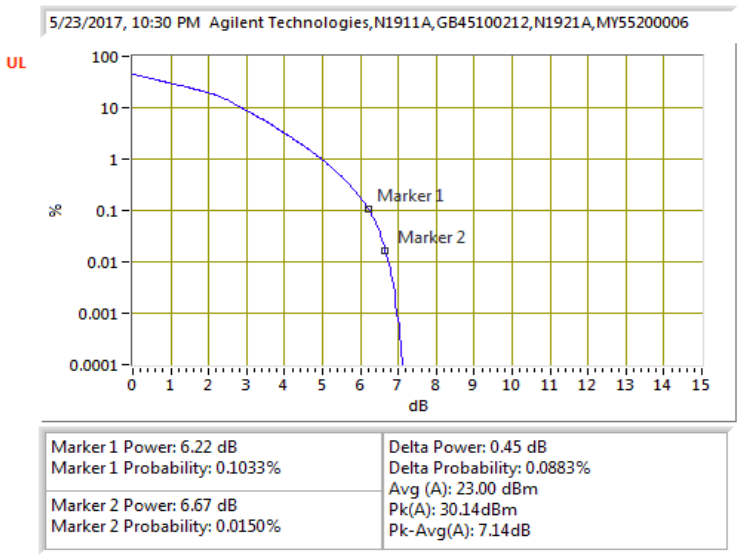
QPSK, (10.0 MHz BAND WIDTH)



16QAM, (10.0 MHz BAND WIDTH)



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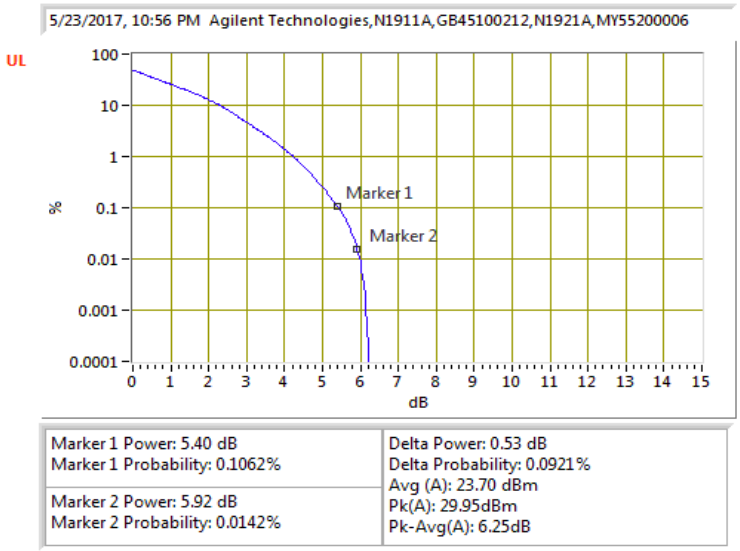
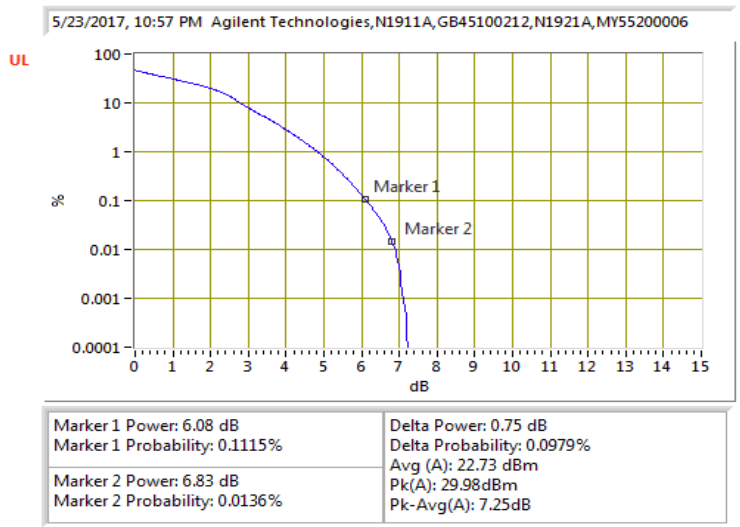
8.5.6. LTE BAND 13

QPSK, (5.0 MHz BAND WIDTH)



16QAM, (5.0 MHz BAND WIDTH)



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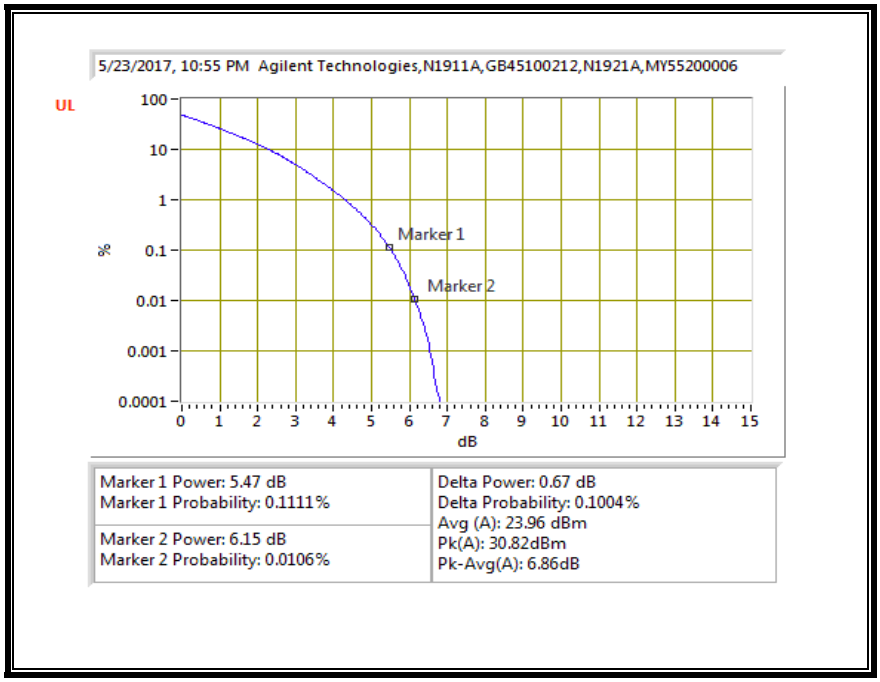
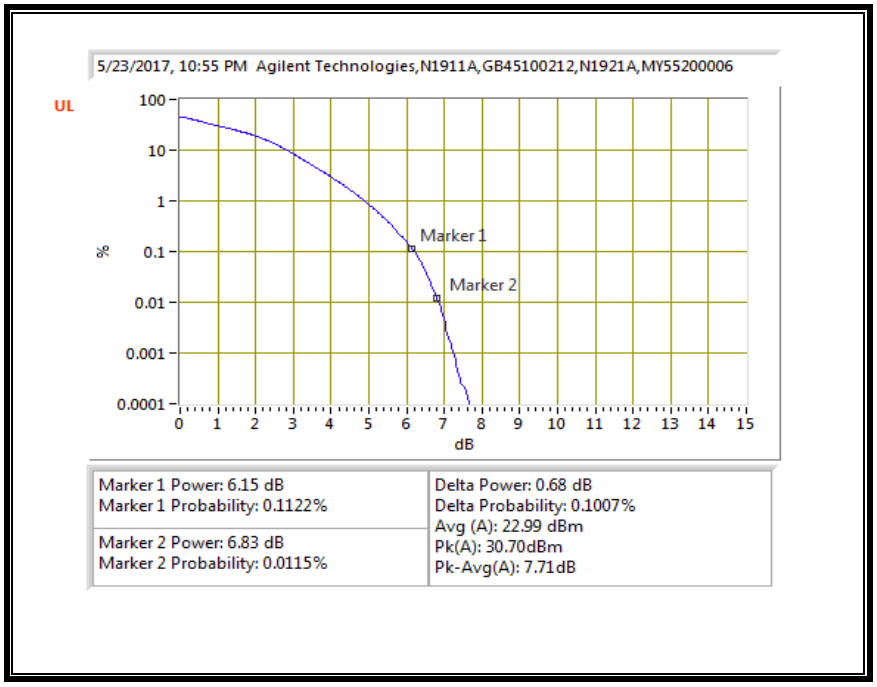
QPSK, (10.0 MHz BAND WIDTH)



16QAM, (10.0 MHz BAND WIDTH)



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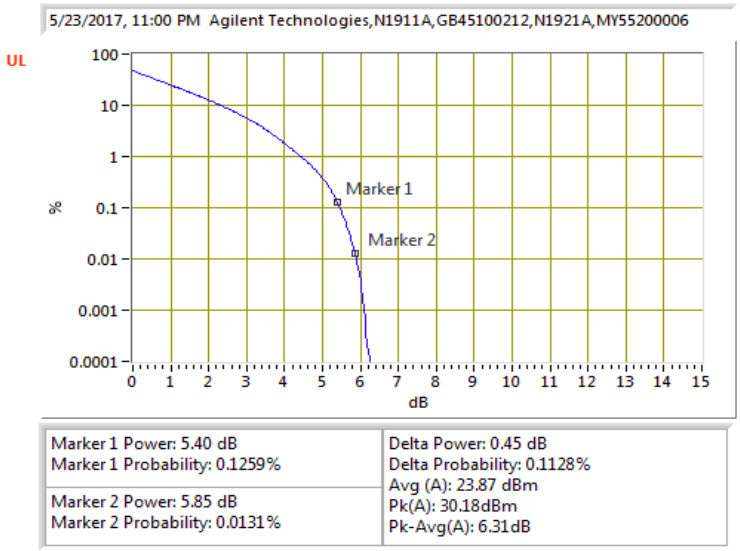
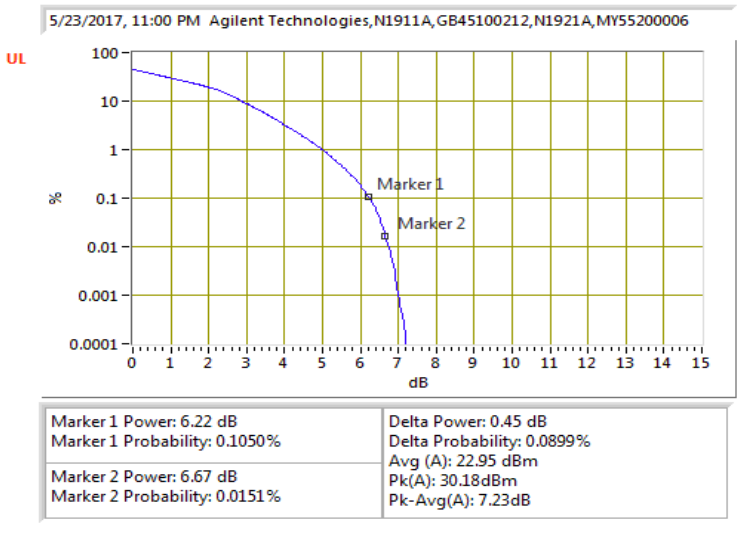
8.5.7. LTE BAND 17

QPSK, (5.0 MHz BAND WIDTH)



16QAM, (5.0 MHz BAND WIDTH)



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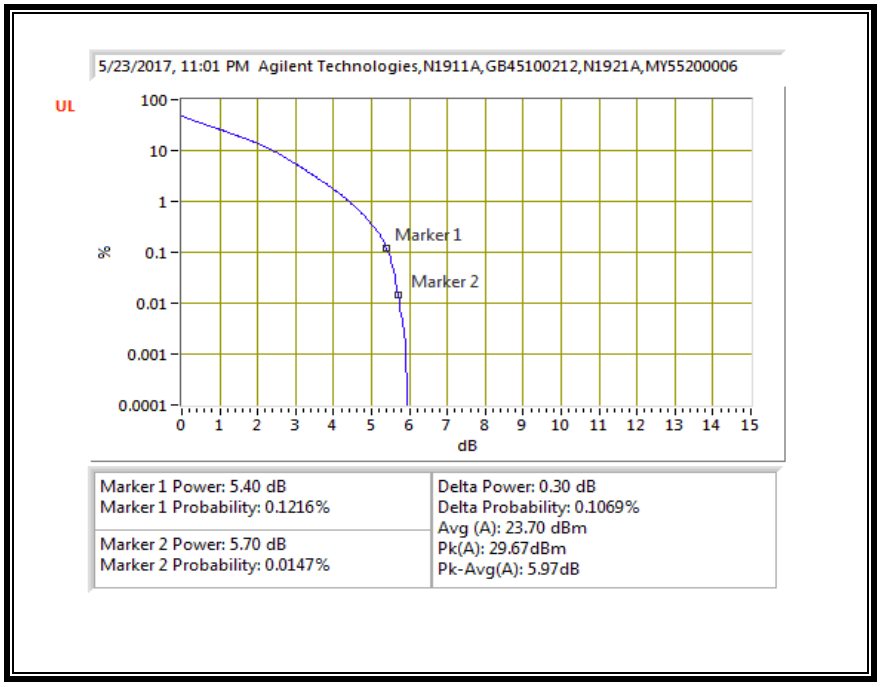
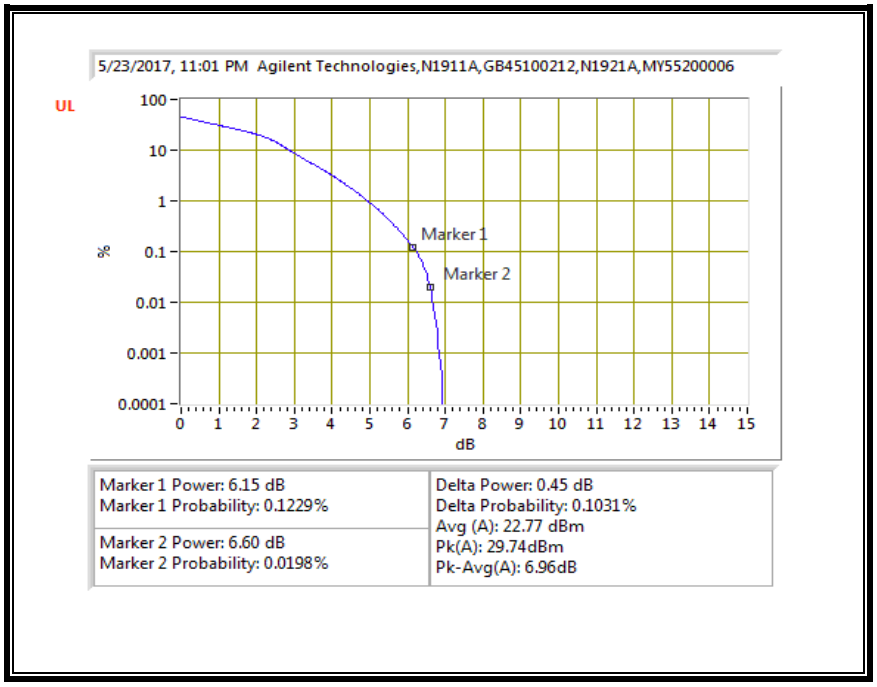
QPSK, (10.0 MHz BAND WIDTH)



16QAM, (10.0 MHz BAND WIDTH)



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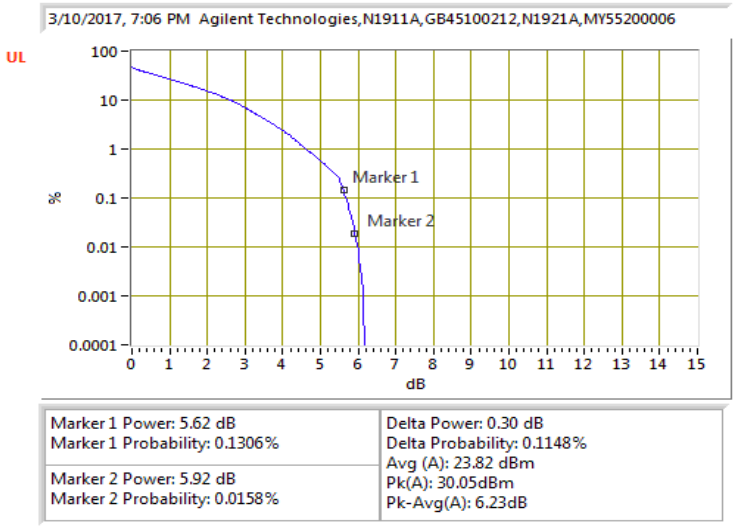
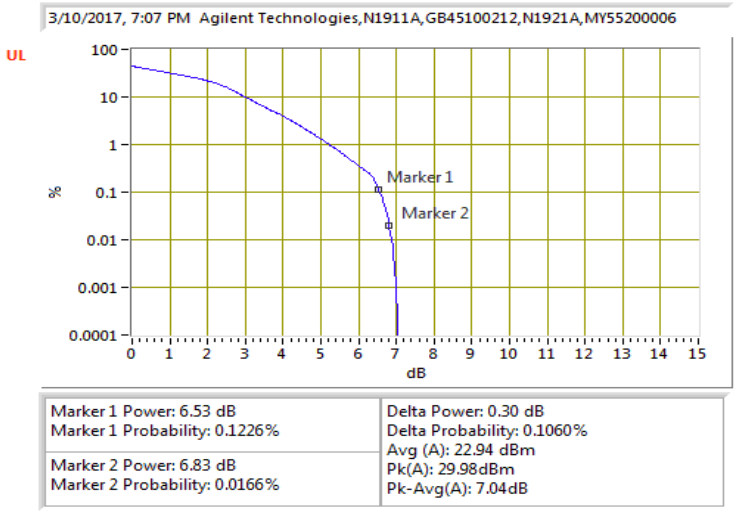
8.5.8. LTE BAND 25

QPSK, (1.4 MHz BAND WIDTH)



16QAM, (1.4 MHz BAND WIDTH)



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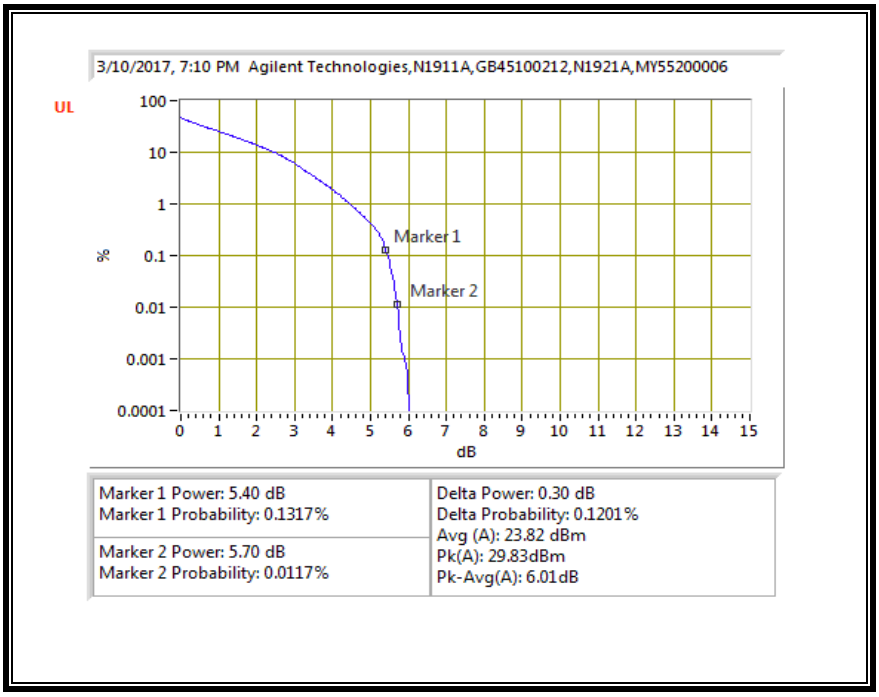
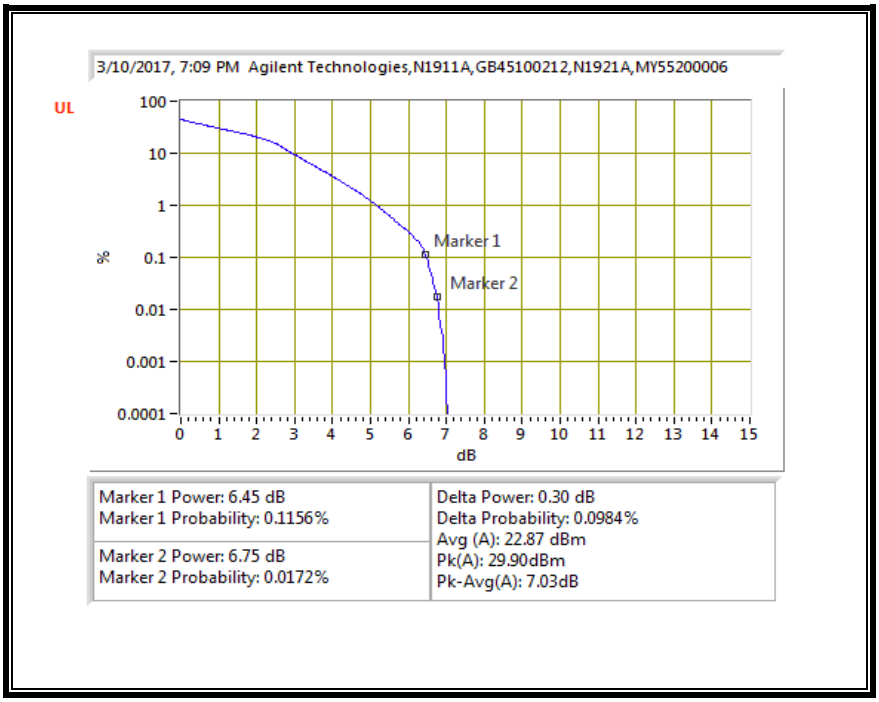
QPSK, (3.0 MHz BAND WIDTH)



16QAM, (3.0 MHz BAND WIDTH)



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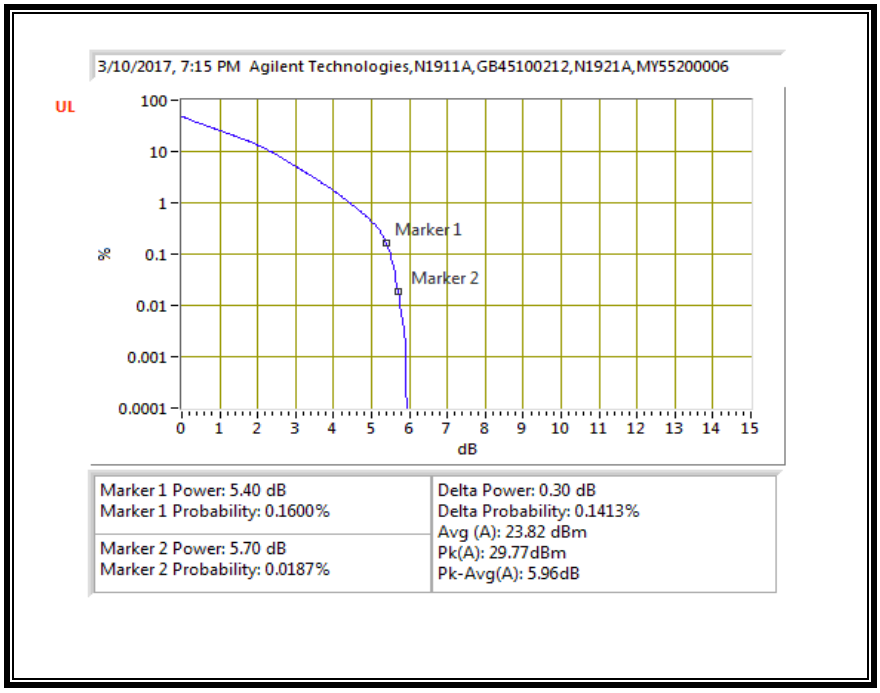
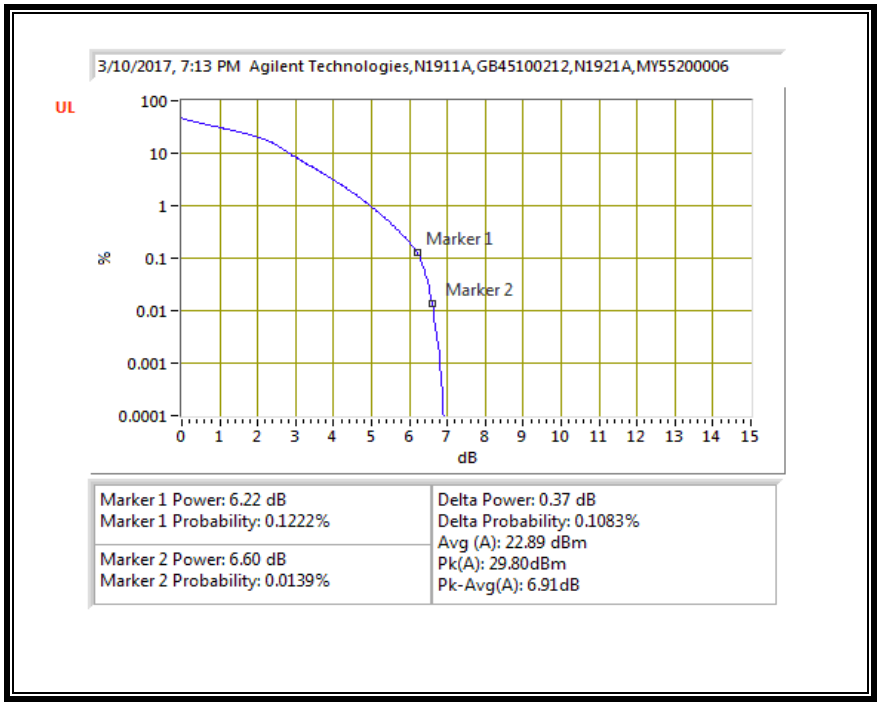
QPSK, (5.0 MHz BAND WIDTH)



16QAM, (5.0 MHz BAND WIDTH)



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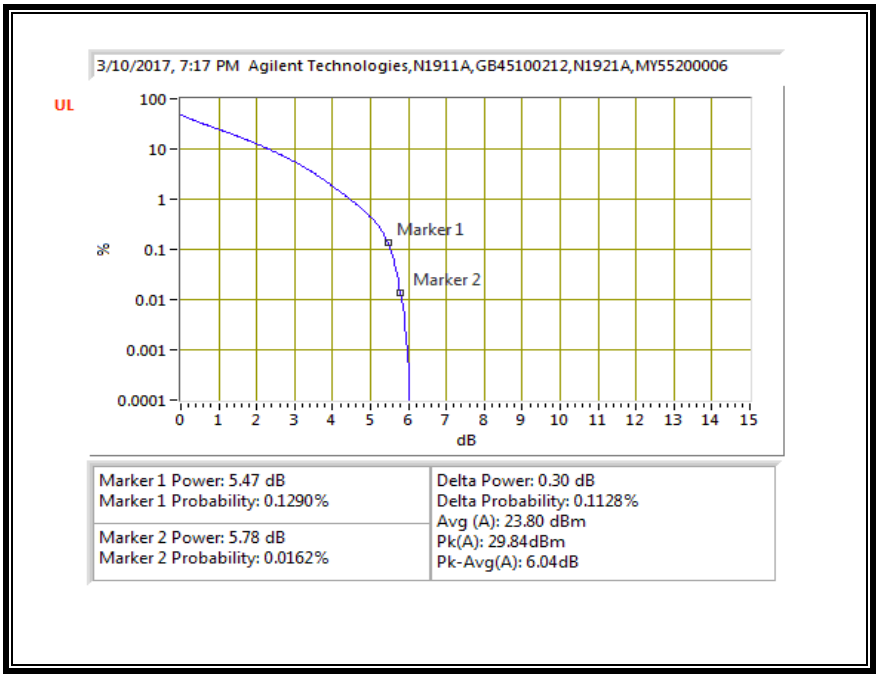
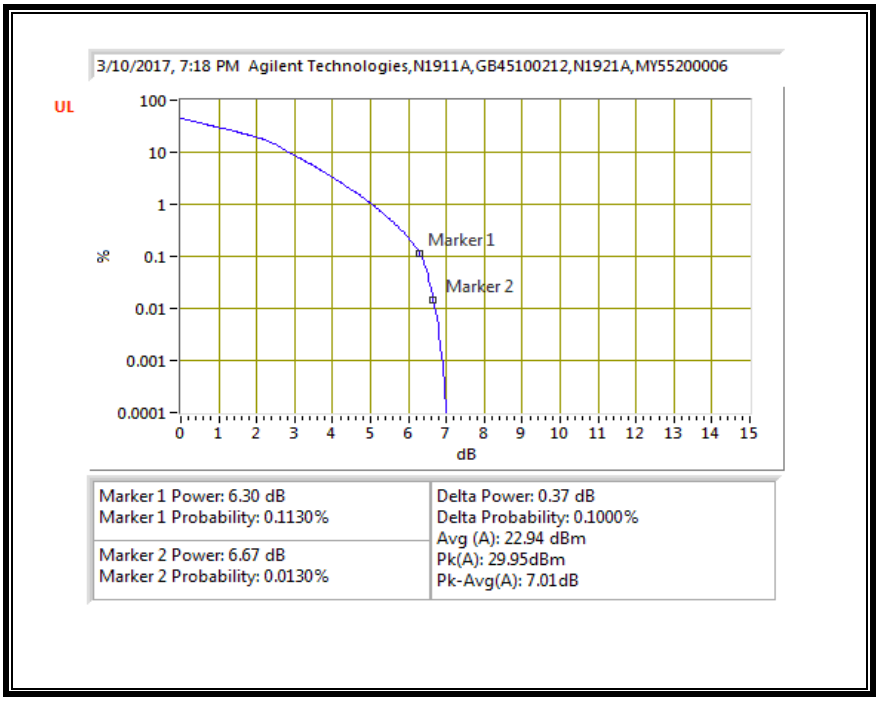
QPSK, (10.0 MHz BAND WIDTH)



16QAM, (10.0 MHz BAND WIDTH)



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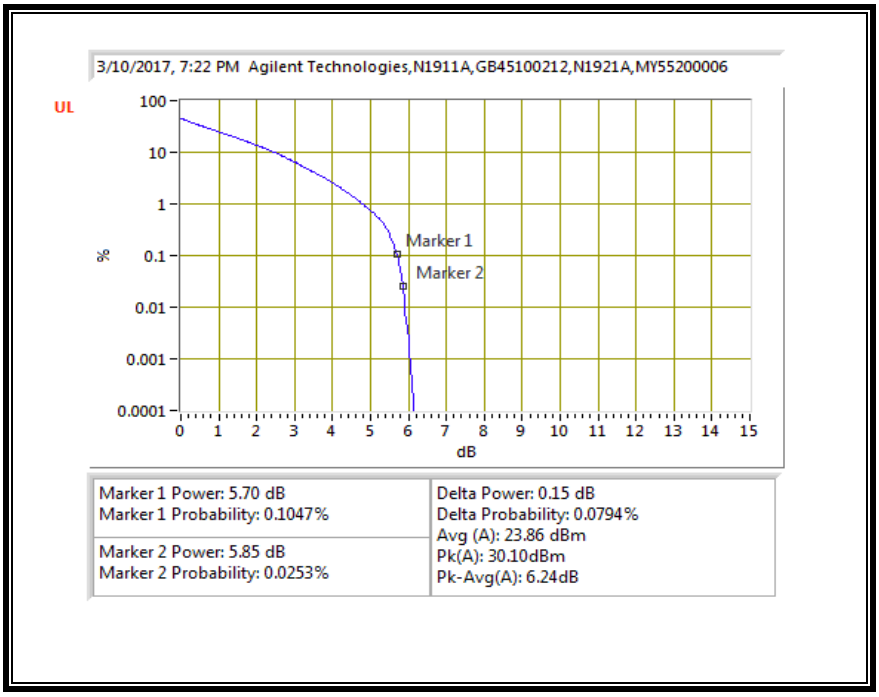
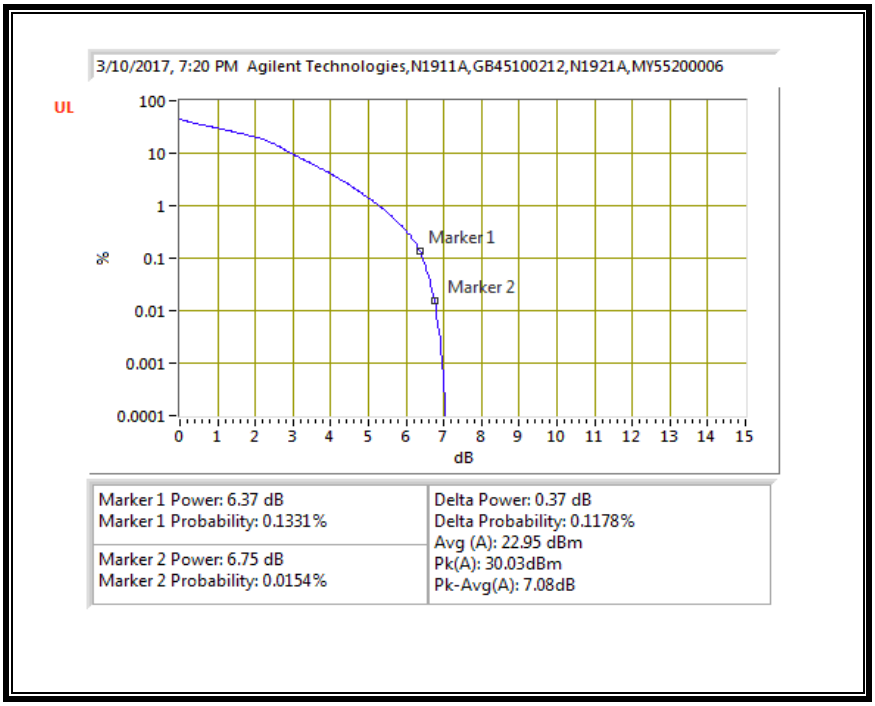
QPSK, (15.0 MHz BAND WIDTH)



16QAM, (15.0 MHz BAND WIDTH)



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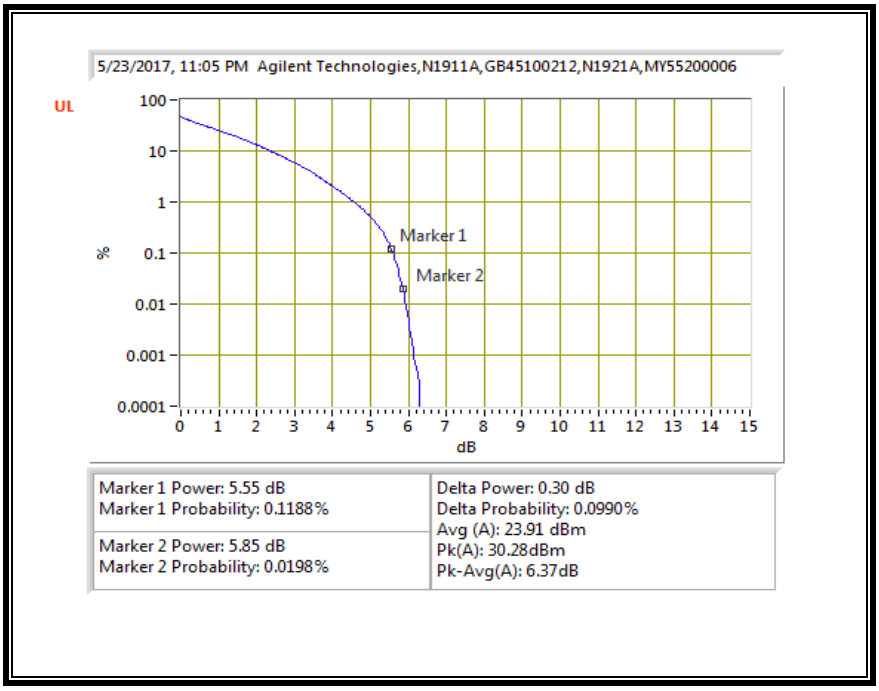
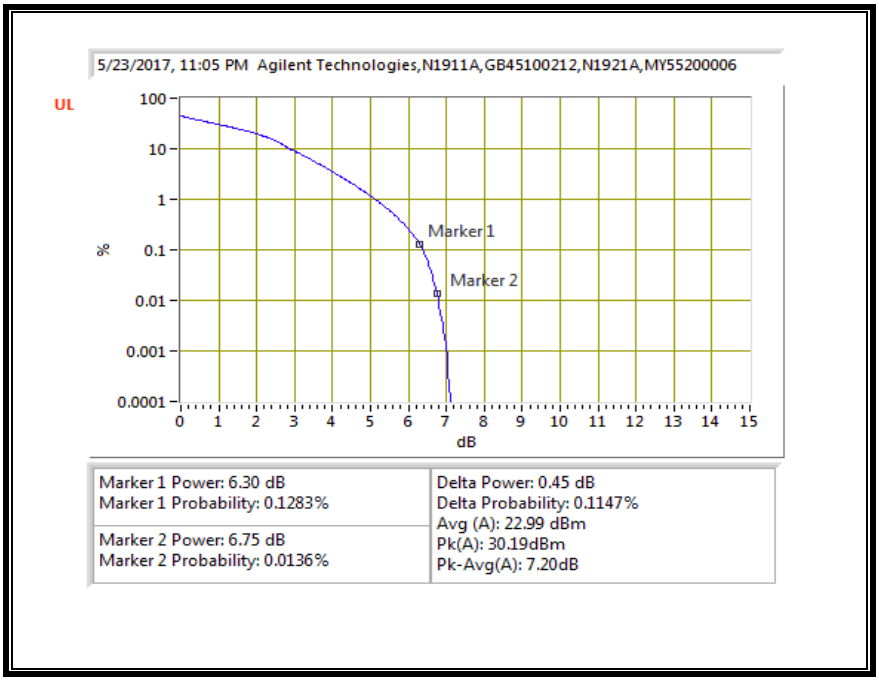
QPSK, (20.0 MHz BAND WIDTH)



16QAM, (20.0 MHz BAND WIDTH)



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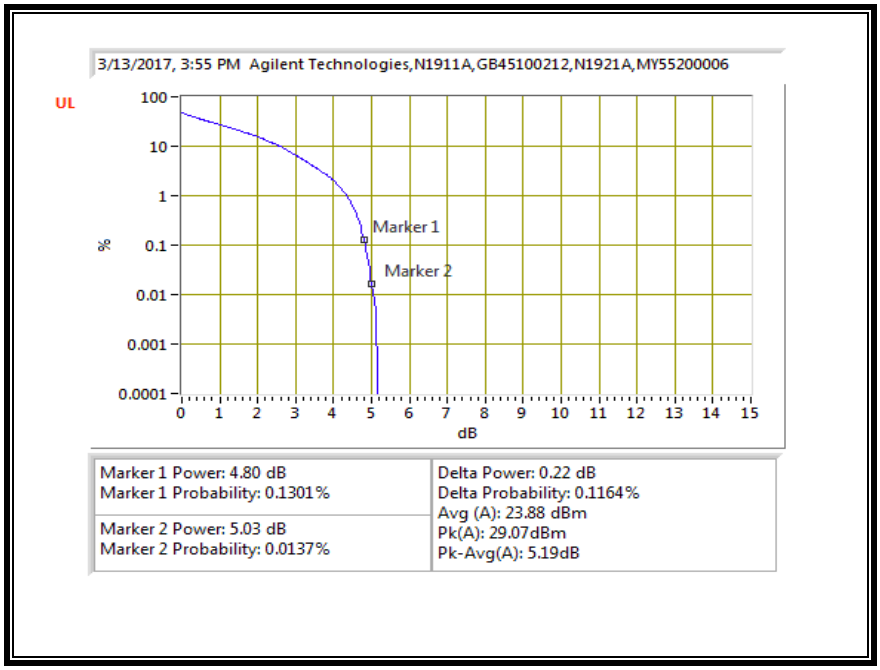
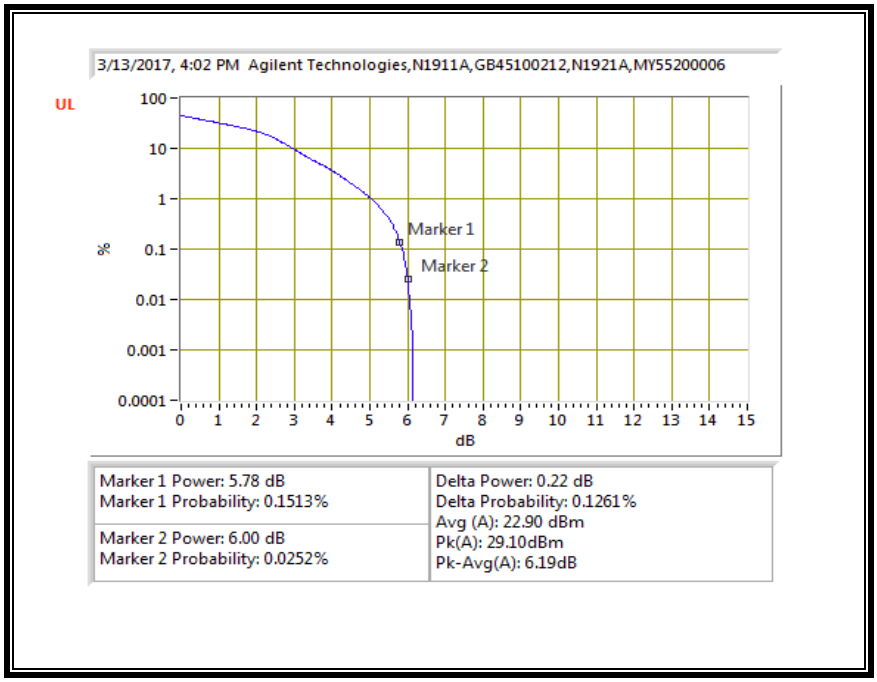
8.5.9. LTE BAND 26

QPSK, (1.4 MHz BAND WIDTH)



16QAM, (1.4 MHz BAND WIDTH)



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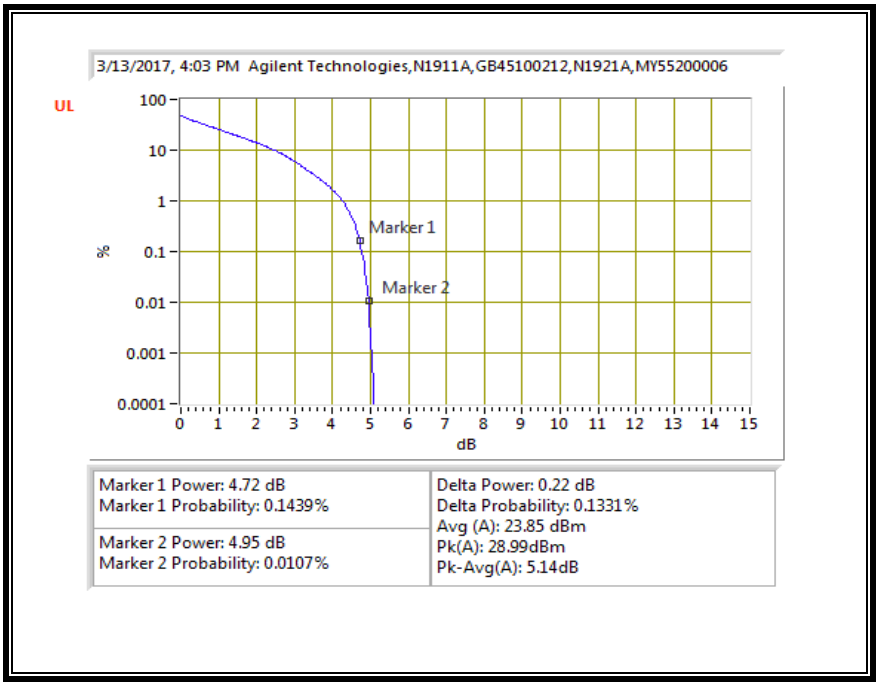
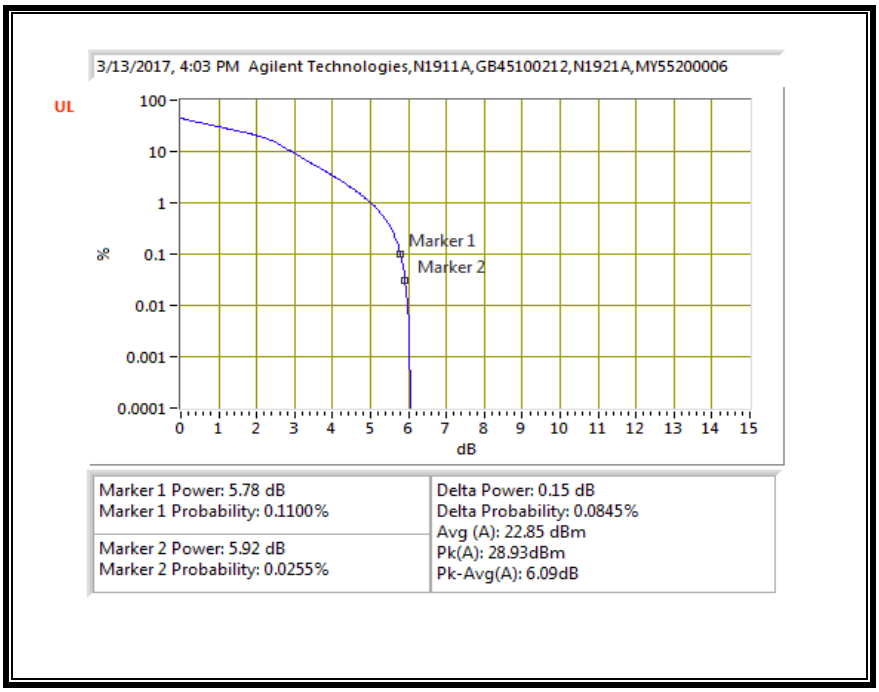
QPSK, (3.0 MHz BAND WIDTH)



16QAM, (3.0 MHz BAND WIDTH)



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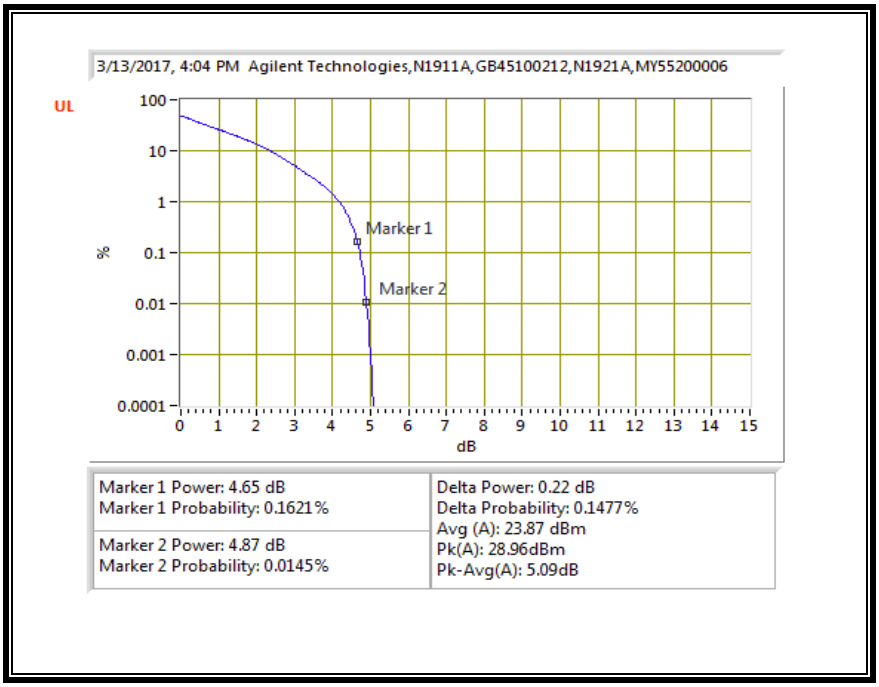
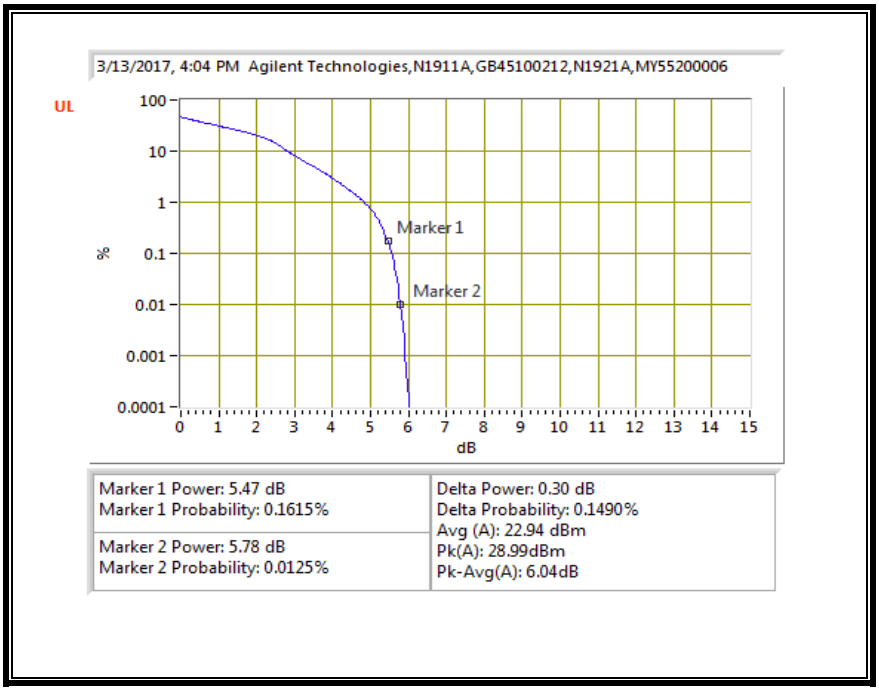
QPSK, (5.0 MHz BAND WIDTH)



16QAM, (5.0 MHz BAND WIDTH)



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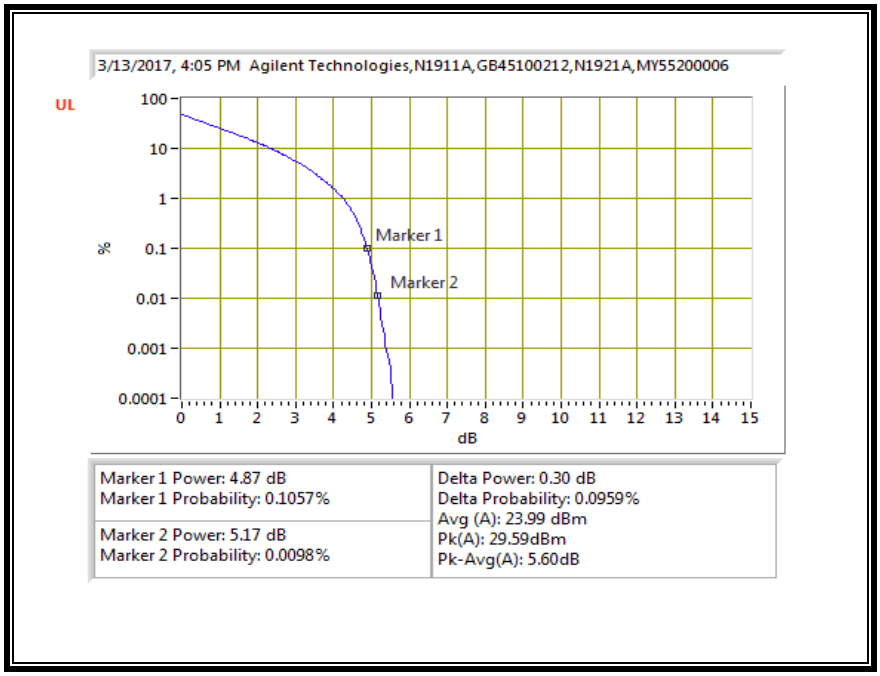
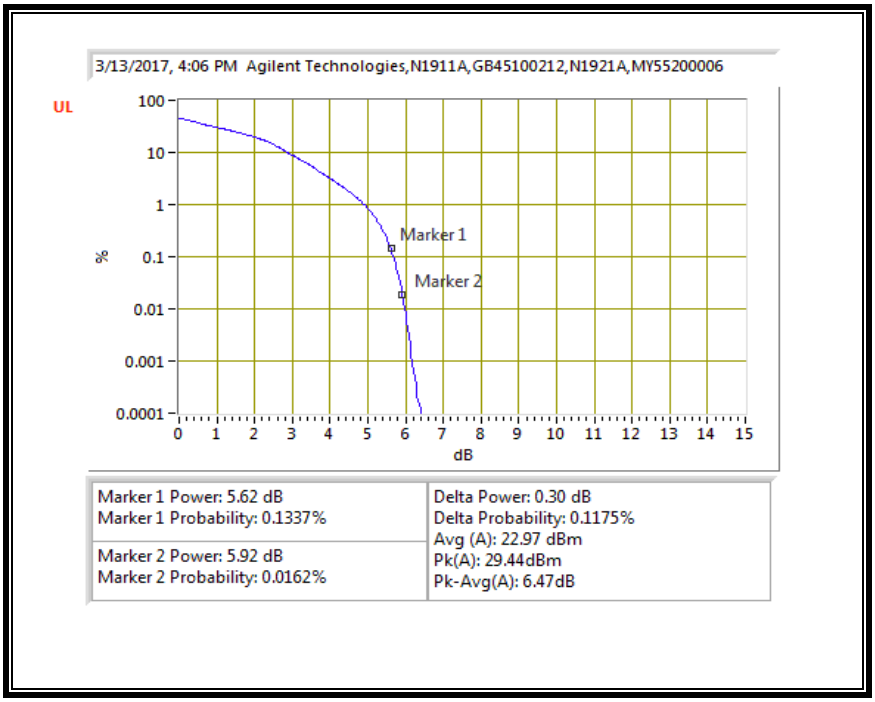
QPSK, (10.0 MHz BAND WIDTH)



16QAM, (10.0 MHz BAND WIDTH)



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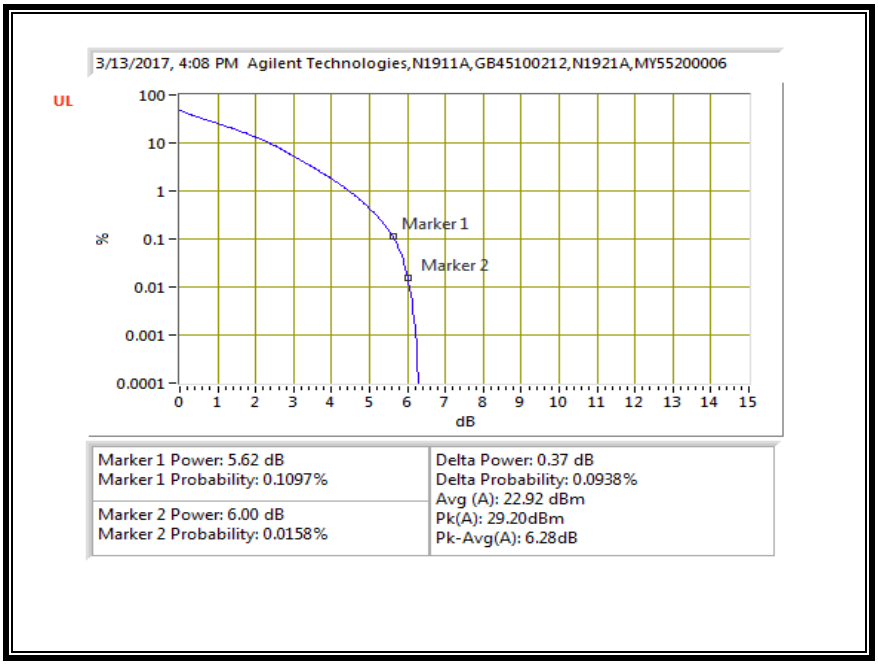
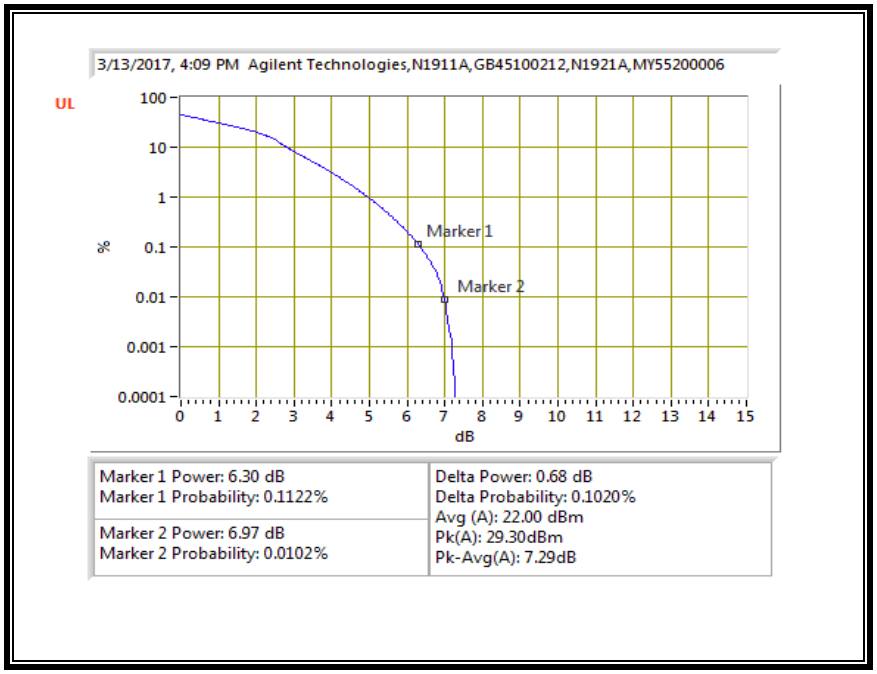
8.5.10. LTE BAND 30

QPSK, (5.0 MHz BAND WIDTH)



16QAM, (5.0 MHz BAND WIDTH)



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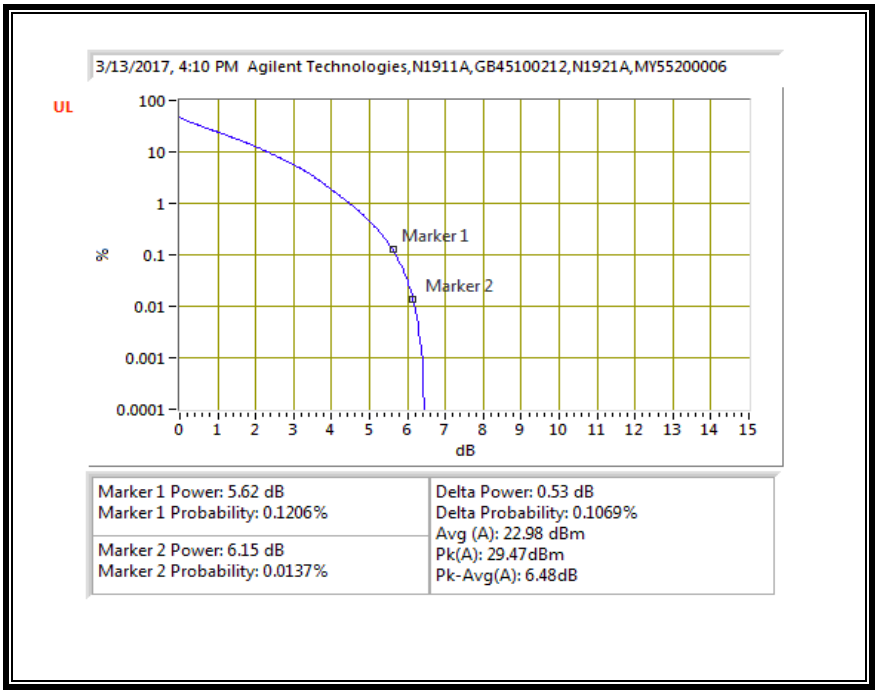
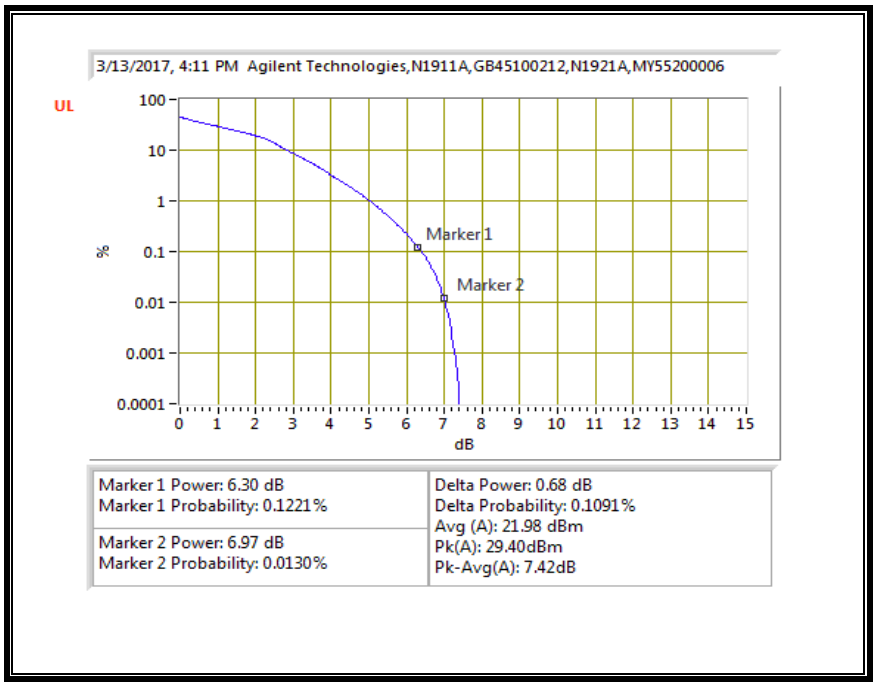
QPSK, (10.0 MHz BAND WIDTH)



16QAM, (10.0 MHz BAND WIDTH)



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8.5.11. LTE BAND 41

ID:	52297	Date:	5/23/17

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	29.32	16.88	5.43
					16QAM	29.30	15.99	6.30
	10MHz		50	0	QPSK	29.49	16.95	5.53
					16QAM	29.49	16	6.48
	15MHz		75	0	QPSK	29.66	16.82	5.83
					16QAM	29.73	15.93	6.79
	20MHz		100	0	QPSK	29.76	16.78	5.97
					16QAM	29.79	15.8	6.98
Duty Cycle Correction Factor (dB)=			7.01					
Peak to Average Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor								

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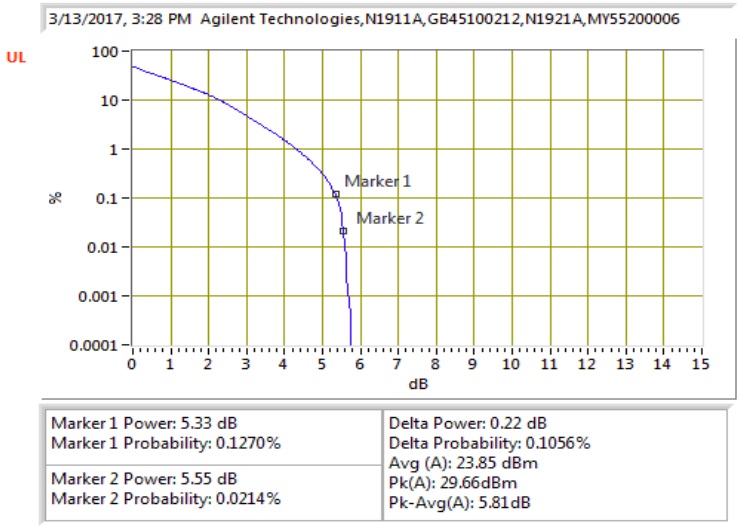
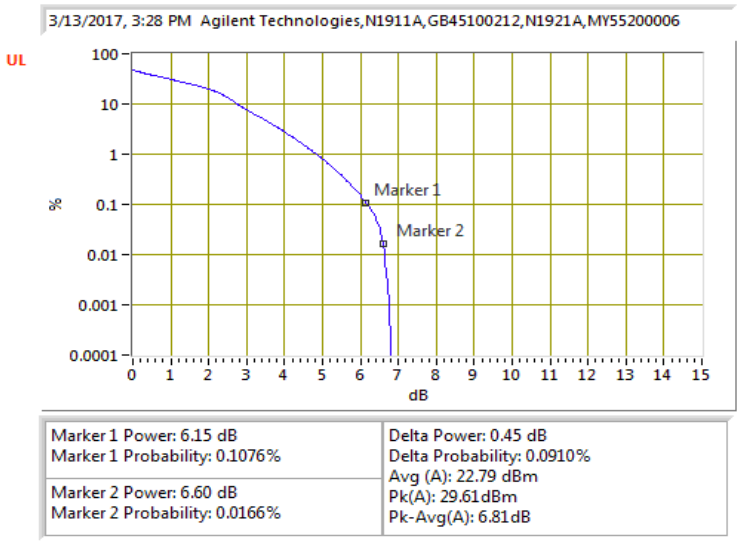
8.5.12. LTE BAND 66

QPSK, (5.0 MHz BAND WIDTH)



16QAM, (5.0 MHz BAND WIDTH)



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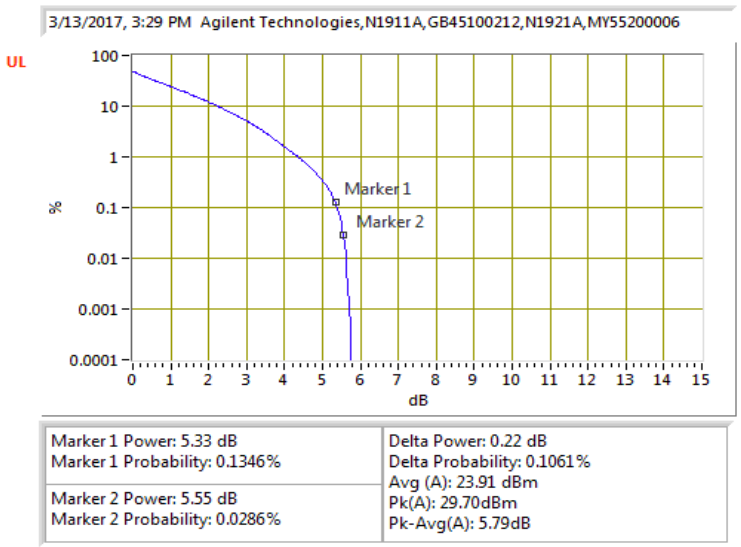
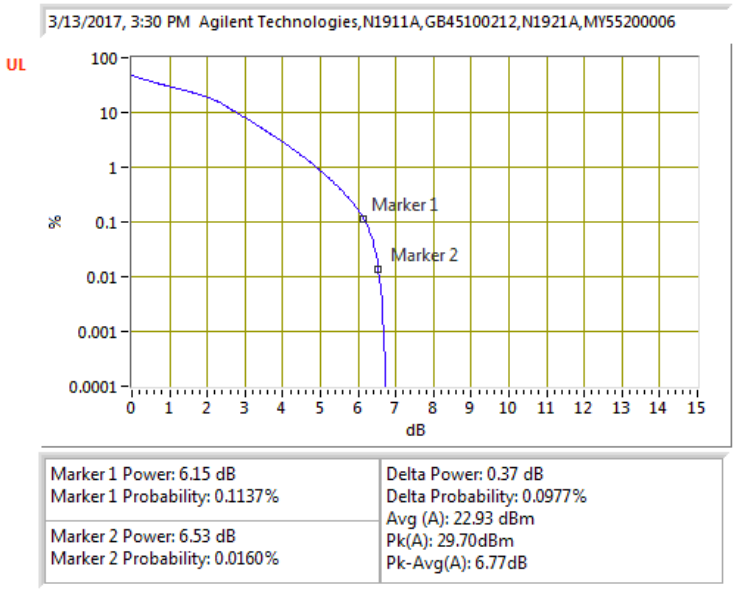
QPSK, (10.0 MHz BAND WIDTH)



16QAM, (10.0 MHz BAND WIDTH)



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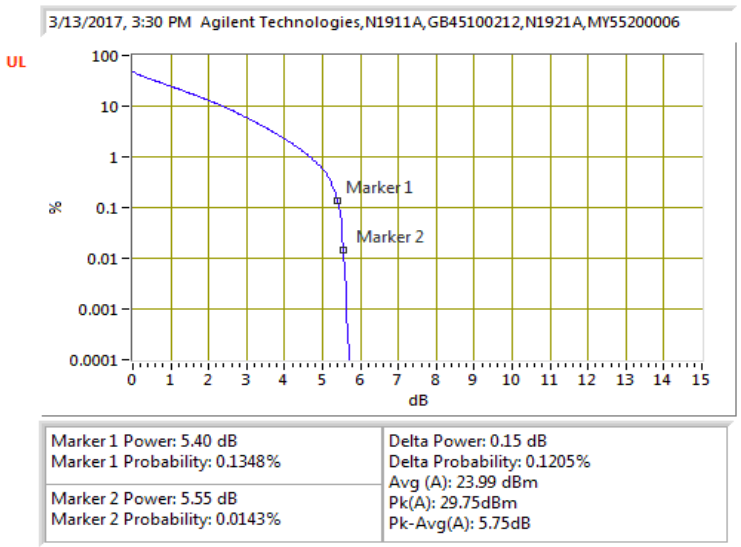
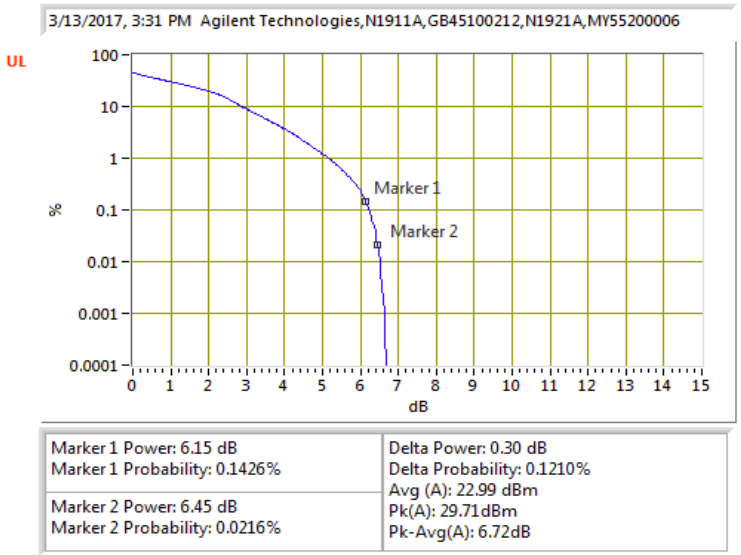
QPSK, (15.0 MHz BAND WIDTH)



16QAM, (15.0 MHz BAND WIDTH)



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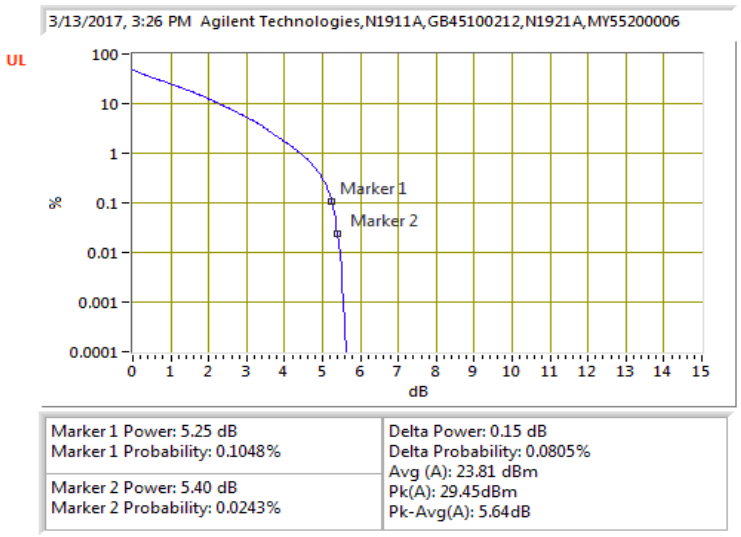
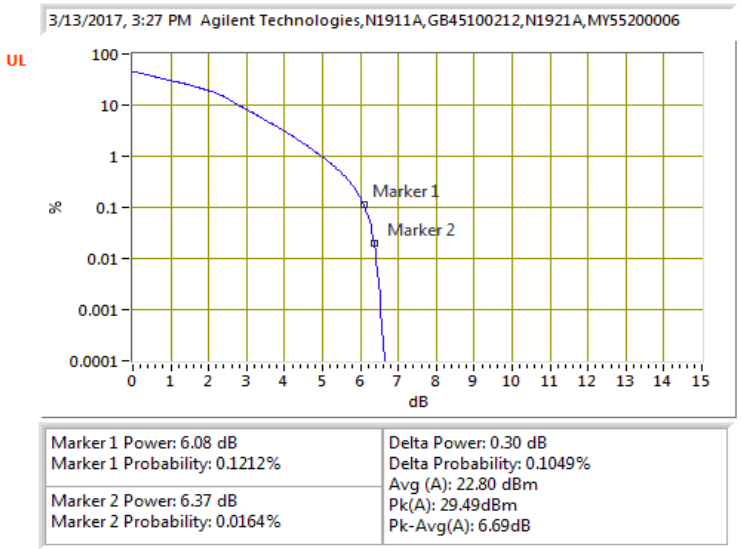
QPSK, (20.0 MHz BAND WIDTH)



16QAM, (20.0 MHz BAND WIDTH)



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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 log10(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 Log10 (f/6.1) decibels or 50 + 10 Log10 (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 + 10Log10 (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.

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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 Log10 (p), dB; and

b. for mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB at the channel edges and 55 + 10 Log10 (p) at 5.5 MHz away and beyond the channel edges where p in (a) and (b) is the transmitter power measured in watts.

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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

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9.1.1. LTE BAND 2

QPSK LTE BAND 2 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/21/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 2, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1860MHz)										
3.73	-66.1	H	3.0	-16.1	38.6	1.0	-53.7	-13.0	-40.7	
5.59	-66.3	H	3.0	-12.2	38.6	1.0	-49.7	-13.0	-36.7	
7.44	-68.4	H	3.0	-10.7	37.8	1.0	-47.5	-13.0	-34.5	
3.73	-66.1	V	3.0	-16.2	38.6	1.0	-53.8	-13.0	-40.8	
5.58	-66.3	V	3.0	-12.5	38.6	1.0	-50.1	-13.0	-37.1	
7.44	-67.8	V	3.0	-10.3	37.8	1.0	-47.1	-13.0	-34.1	
Mid Channel (1880MHz)										
3.76	-66.2	H	3.0	-16.1	38.6	1.0	-53.7	-13.0	-40.7	
5.65	-67.3	H	3.0	-13.0	38.5	1.0	-50.6	-13.0	-37.6	
7.51	-68.4	H	3.0	-10.6	37.7	1.0	-47.4	-13.0	-34.4	
3.76	-66.3	V	3.0	-16.2	38.6	1.0	-53.9	-13.0	-40.9	
5.63	-66.9	V	3.0	-13.0	38.5	1.0	-50.5	-13.0	-37.5	
7.51	-68.3	V	3.0	-10.7	37.7	1.0	-47.5	-13.0	-34.5	
High Channel (1900MHz)										
3.79	-66.3	H	3.0	-16.1	38.6	1.0	-53.8	-13.0	-40.8	
5.71	-67.5	H	3.0	-13.1	38.5	1.0	-50.6	-13.0	-37.6	
7.60	-68.6	H	3.0	-10.6	37.7	1.0	-47.3	-13.0	-34.3	
3.79	-65.5	V	3.0	-15.4	38.6	1.0	-53.0	-13.0	-40.0	
5.71	-66.2	V	3.0	-12.1	38.5	1.0	-49.6	-13.0	-36.6	
7.61	-68.9	V	3.0	-11.2	37.7	1.0	-47.8	-13.0	-34.8	

Rev. 05.21.15

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16QAM LTE BAND 2 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/21/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 2, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1860MHz)										
3.71	-66.5	H	3.0	-16.6	38.6	1.0	-54.2	-13.0	-41.2	
5.58	-66.6	H	3.0	-12.5	38.6	1.0	-50.0	-13.0	-37.0	
7.43	-68.7	H	3.0	-11.0	37.8	1.0	-47.8	-13.0	-34.8	
3.71	-67.0	V	3.0	-17.1	38.6	1.0	-54.7	-13.0	-41.7	
5.59	-66.9	V	3.0	-13.0	38.6	1.0	-50.6	-13.0	-37.6	
7.44	-68.0	V	3.0	-10.5	37.8	1.0	-47.3	-13.0	-34.3	
Mid Channel (1880MHz)										
3.77	-66.7	H	3.0	-16.6	38.6	1.0	-54.2	-13.0	-41.2	
5.65	-66.9	H	3.0	-12.6	38.5	1.0	-50.1	-13.0	-37.1	
7.51	-67.8	H	3.0	-10.0	37.8	1.0	-46.7	-13.0	-33.7	
3.76	-67.7	V	3.0	-17.6	38.6	1.0	-55.3	-13.0	-42.3	
5.64	-67.8	V	3.0	-13.9	38.5	1.0	-51.4	-13.0	-38.4	
7.51	-68.7	V	3.0	-11.1	37.8	1.0	-47.9	-13.0	-34.9	
High Channel (1900MHz)										
3.79	-65.6	H	3.0	-15.4	38.6	1.0	-53.0	-13.0	-40.0	
5.71	-66.6	H	3.0	-12.2	38.5	1.0	-49.7	-13.0	-36.7	
7.61	-69.7	H	3.0	-11.8	37.7	1.0	-48.5	-13.0	-35.5	
3.80	-66.7	V	3.0	-16.5	38.6	1.0	-54.1	-13.0	-41.1	
5.71	-67.7	V	3.0	-13.6	38.5	1.0	-51.1	-13.0	-38.1	
7.60	-69.5	V	3.0	-11.8	37.7	1.0	-48.5	-13.0	-35.5	

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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: 05/24/17
Test Engineer: 39004
Configuration: EUT Only
Mode: LTE Band 4, 3MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1711.5MHz)										
3.44	-66.9	H	3.0	-17.6	38.5	1.0	-55.1	-13.0	-42.1	
5.16	-67.5	H	3.0	-14.3	38.7	1.0	-51.9	-13.0	-38.9	
6.88	-68.4	H	3.0	-11.5	38.1	1.0	-48.6	-13.0	-35.6	
3.44	-66.5	V	3.0	-17.4	38.5	1.0	-54.9	-13.0	-41.9	
5.16	-67.3	V	3.0	-14.4	38.7	1.0	-52.1	-13.0	-39.1	
6.88	-68.3	V	3.0	-11.6	38.1	1.0	-48.7	-13.0	-35.7	
Mid Channel (1732.5MHz)										
3.46	-68.7	H	3.0	-19.4	38.5	1.0	-56.9	-13.0	-43.9	
5.20	-68.4	H	3.0	-15.1	38.7	1.0	-52.8	-13.0	-39.8	
6.93	-67.1	H	3.0	-10.1	38.1	1.0	-47.2	-13.0	-34.2	
3.47	-65.5	V	3.0	-16.3	38.5	1.0	-53.8	-13.0	-40.8	
5.19	-65.6	V	3.0	-12.7	38.7	1.0	-50.4	-13.0	-37.4	
6.94	-68.5	V	3.0	-11.7	38.1	1.0	-48.8	-13.0	-35.8	
High Channel (1753.5MHz)										
3.49	-67.0	H	3.0	-17.6	38.5	1.0	-55.1	-13.0	-42.1	
5.24	-67.4	H	3.0	-14.0	38.7	1.0	-51.7	-13.0	-38.7	
6.98	-68.7	H	3.0	-11.6	38.1	1.0	-48.6	-13.0	-35.6	
3.49	-67.1	V	3.0	-17.8	38.5	1.0	-55.4	-13.0	-42.4	
5.24	-67.8	V	3.0	-14.8	38.7	1.0	-52.4	-13.0	-39.4	
6.98	-68.6	V	3.0	-11.7	38.1	1.0	-48.7	-13.0	-35.7	

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16QAM LTE BAND 4 (3.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/24/17
Test Engineer: 39004
Configuration: EUT Only
Mode: LTE Band 4, 3MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1711.5MHz)										
3.44	-67.9	H	3.0	-18.6	38.5	1.0	-56.1	-13.0	-43.1	
5.16	-66.8	H	3.0	-13.6	38.7	1.0	-51.3	-13.0	-38.3	
6.88	-69.3	H	3.0	-12.4	38.1	1.0	-49.5	-13.0	-36.5	
3.44	-66.6	V	3.0	-17.5	38.5	1.0	-55.0	-13.0	-42.0	
5.16	-66.5	V	3.0	-13.7	38.7	1.0	-51.4	-13.0	-38.4	
6.88	-66.9	V	3.0	-10.2	38.1	1.0	-47.3	-13.0	-34.3	
Mid Channel (1732.5MHz)										
3.47	-67.2	H	3.0	-17.9	38.5	1.0	-55.4	-13.0	-42.4	
5.20	-67.7	H	3.0	-14.4	38.7	1.0	-52.1	-13.0	-39.1	
6.93	-69.7	H	3.0	-12.6	38.1	1.0	-49.8	-13.0	-36.8	
3.48	-67.3	V	3.0	-18.1	38.5	1.0	-55.6	-13.0	-42.6	
5.19	-67.8	V	3.0	-14.8	38.7	1.0	-52.5	-13.0	-39.5	
6.93	-69.5	V	3.0	-12.7	38.1	1.0	-49.8	-13.0	-36.8	
High Channel (1753.5MHz)										
3.49	-67.6	H	3.0	-18.1	38.5	1.0	-55.7	-13.0	-42.7	
5.24	-66.8	H	3.0	-13.4	38.7	1.0	-51.1	-13.0	-38.1	
6.98	-69.3	H	3.0	-12.1	38.1	1.0	-49.2	-13.0	-36.2	
3.49	-67.4	V	3.0	-18.1	38.5	1.0	-55.6	-13.0	-42.6	
5.24	-67.3	V	3.0	-14.3	38.7	1.0	-52.0	-13.0	-39.0	
6.98	-69.2	V	3.0	-12.3	38.1	1.0	-49.4	-13.0	-36.4	

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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: 02/22/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 5, 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (829MHz)										
1.65	-64.2	H	3.0	-21.7	37.8	1.0	-58.6	-13.0	-45.6	
2.49	-64.5	H	3.0	-19.4	38.5	1.0	-57.0	-13.0	-44.0	
3.32	-64.7	H	3.0	-15.7	38.5	1.0	-53.2	-13.0	-40.2	
1.65	-64.9	V	3.0	-22.8	37.8	1.0	-59.6	-13.0	-46.6	
2.48	-65.1	V	3.0	-19.9	38.5	1.0	-57.4	-13.0	-44.4	
3.32	-66.9	V	3.0	-18.2	38.5	1.0	-55.7	-13.0	-42.7	
Mid Channel (836.5MHz)										
1.68	-64.6	H	3.0	-22.1	37.9	1.0	-58.9	-13.0	-45.9	
2.50	-65.7	H	3.0	-20.6	38.6	1.0	-58.1	-13.0	-45.1	
3.35	-63.8	H	3.0	-14.7	38.5	1.0	-52.2	-13.0	-39.2	
1.68	-63.6	V	3.0	-21.3	37.9	1.0	-58.2	-13.0	-45.2	
2.51	-65.8	V	3.0	-20.4	38.6	1.0	-58.0	-13.0	-45.0	
3.35	-64.3	V	3.0	-15.5	38.5	1.0	-53.0	-13.0	-40.0	
High Channel (844MHz)										
1.69	-64.8	H	3.0	-22.2	37.9	1.0	-59.1	-13.0	-46.1	
2.53	-66.3	H	3.0	-21.0	38.6	1.0	-58.6	-13.0	-45.6	
3.37	-66.2	H	3.0	-17.1	38.5	1.0	-54.6	-13.0	-41.6	
1.69	-64.2	V	3.0	-21.9	37.9	1.0	-58.7	-13.0	-45.7	
2.53	-66.6	V	3.0	-21.1	38.6	1.0	-58.7	-13.0	-45.7	
3.37	-65.6	V	3.0	-16.7	38.5	1.0	-54.2	-13.0	-41.2	

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16QAM LTE BAND 5 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/22/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 5, 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (829MHz)										
1.65	-63.6	H	3.0	-21.2	37.8	1.0	-58.0	-13.0	-45.0	
2.49	-65.1	H	3.0	-20.0	38.5	1.0	-57.5	-13.0	-44.5	
3.32	-66.0	H	3.0	-17.0	38.5	1.0	-54.4	-13.0	-41.4	
1.65	-64.4	V	3.0	-22.2	37.8	1.0	-59.1	-13.0	-46.1	
2.48	-66.2	V	3.0	-21.0	38.5	1.0	-58.5	-13.0	-45.5	
3.32	-66.1	V	3.0	-17.4	38.5	1.0	-54.9	-13.0	-41.9	
Mid Channel (836.5MHz)										
1.68	-64.3	H	3.0	-21.8	37.9	1.0	-58.6	-13.0	-45.6	
2.50	-66.0	H	3.0	-20.8	38.6	1.0	-58.4	-13.0	-45.4	
3.35	-63.9	H	3.0	-14.9	38.5	1.0	-52.3	-13.0	-39.3	
1.68	-64.2	V	3.0	-22.0	37.9	1.0	-58.8	-13.0	-45.8	
2.51	-65.7	V	3.0	-20.3	38.6	1.0	-57.9	-13.0	-44.9	
3.35	-63.9	V	3.0	-15.0	38.5	1.0	-52.5	-13.0	-39.5	
High Channel (844MHz)										
1.69	-64.7	H	3.0	-22.2	37.9	1.0	-59.0	-13.0	-46.0	
2.53	-66.7	H	3.0	-21.4	38.6	1.0	-58.9	-13.0	-45.9	
3.37	-65.9	H	3.0	-16.8	38.5	1.0	-54.3	-13.0	-41.3	
1.69	-64.6	V	3.0	-22.3	37.9	1.0	-59.2	-13.0	-46.2	
2.53	-66.1	V	3.0	-20.6	38.6	1.0	-58.2	-13.0	-45.2	
3.37	-66.5	V	3.0	-17.6	38.5	1.0	-55.1	-13.0	-42.1	

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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: 02/22/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 7, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	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	-62.5	H	3.0	-9.5	38.7	1.0	-47.2	-25.0	-22.2	
7.53	-65.0	H	3.0	-7.2	37.7	1.0	-43.9	-25.0	-18.9	
10.04	-66.7	H	3.0	-5.8	36.2	1.0	-41.0	-25.0	-16.0	
5.02	-62.3	V	3.0	-9.7	38.7	1.0	-47.4	-25.0	-22.4	
7.53	-65.3	V	3.0	-7.7	37.7	1.0	-44.4	-25.0	-19.4	
10.04	-67.0	V	3.0	-6.2	36.2	1.0	-41.3	-25.0	-16.3	
Mid Channel (2535MHz)										
5.07	-62.2	H	3.0	-9.2	38.7	1.0	-46.9	-25.0	-21.9	
7.61	-64.6	H	3.0	-6.7	37.7	1.0	-43.4	-25.0	-18.4	
10.14	-67.4	H	3.0	-6.5	36.2	1.0	-41.7	-25.0	-16.7	
5.07	-57.0	V	3.0	-4.3	38.7	1.0	-42.0	-25.0	-17.0	
7.61	-64.1	V	3.0	-6.4	37.7	1.0	-43.1	-25.0	-18.1	
10.14	-67.5	V	3.0	-6.6	36.2	1.0	-41.8	-25.0	-16.8	
High Channel (2560MHz)										
5.12	-61.2	H	3.0	-8.1	38.7	1.0	-45.8	-25.0	-20.8	
7.68	-64.8	H	3.0	-6.8	37.6	1.0	-43.4	-25.0	-18.4	
10.24	-66.0	H	3.0	-5.0	36.3	1.0	-40.3	-25.0	-15.3	
5.12	-62.9	V	3.0	-10.1	38.7	1.0	-47.8	-25.0	-22.8	
7.68	-64.5	V	3.0	-6.6	37.6	1.0	-43.3	-25.0	-18.3	
10.24	-66.4	V	3.0	-5.4	36.3	1.0	-40.6	-25.0	-15.6	

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16QAM LTE BAND 7 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/22/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 7, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	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	-61.0	H	3.0	-8.1	38.7	1.0	-45.8	-25.0	-20.8	
7.53	-65.3	H	3.0	-7.5	37.7	1.0	-44.2	-25.0	-19.2	
10.04	-66.8	H	3.0	-6.0	36.2	1.0	-41.1	-25.0	-16.1	
5.02	-60.8	V	3.0	-8.1	38.7	1.0	-45.8	-25.0	-20.8	
7.53	-65.1	V	3.0	-7.5	37.7	1.0	-44.2	-25.0	-19.2	
10.04	-66.8	V	3.0	-6.0	36.2	1.0	-41.1	-25.0	-16.1	
Mid Channel (2535MHz)										
5.07	-61.0	H	3.0	-8.0	38.7	1.0	-45.7	-25.0	-20.7	
7.61	-63.1	H	3.0	-5.2	37.7	1.0	-41.9	-25.0	-16.9	
10.14	-66.9	H	3.0	-6.0	36.2	1.0	-41.2	-25.0	-16.2	
5.07	-61.0	V	3.0	-8.3	38.7	1.0	-46.0	-25.0	-21.0	
7.61	-64.6	V	3.0	-6.9	37.7	1.0	-43.6	-25.0	-18.6	
10.14	-66.7	V	3.0	-5.8	36.2	1.0	-41.0	-25.0	-16.0	
High Channel (2560MHz)										
5.12	-62.7	H	3.0	-9.6	38.7	1.0	-47.3	-25.0	-22.3	
7.68	-65.6	H	3.0	-7.6	37.6	1.0	-44.2	-25.0	-19.2	
10.24	-66.6	H	3.0	-5.6	36.3	1.0	-40.8	-25.0	-15.8	
5.12	-61.2	V	3.0	-8.4	38.7	1.0	-46.1	-25.0	-21.1	
7.68	-65.1	V	3.0	-7.3	37.6	1.0	-43.9	-25.0	-18.9	
10.24	-66.7	V	3.0	-5.7	36.3	1.0	-41.0	-25.0	-16.0	

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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: 02/22/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 12, 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (704MHz)										
1.41	-61.7	H	3.0	-20.1	38.1	1.0	-57.1	-13.0	-44.1	
2.11	-65.4	H	3.0	-21.9	38.0	1.0	-58.9	-13.0	-45.9	
2.82	-64.2	H	3.0	-17.0	38.4	1.0	-54.5	-13.0	-41.5	
1.41	-61.5	V	3.0	-20.6	38.1	1.0	-57.6	-13.0	-44.6	
2.11	-64.3	V	3.0	-20.1	38.0	1.0	-57.1	-13.0	-44.1	
2.82	-64.0	V	3.0	-17.1	38.4	1.0	-54.5	-13.0	-41.5	
Mid Channel (707.5MHz)										
1.41	-61.6	H	3.0	-19.9	38.0	1.0	-56.9	-13.0	-43.9	
2.12	-65.7	H	3.0	-22.1	38.0	1.0	-59.1	-13.0	-46.1	
2.83	-64.1	H	3.0	-16.9	38.4	1.0	-54.4	-13.0	-41.4	
1.41	-62.2	V	3.0	-21.2	38.1	1.0	-58.3	-13.0	-45.3	
2.12	-65.6	V	3.0	-21.4	38.0	1.0	-58.4	-13.0	-45.4	
2.82	-64.1	V	3.0	-17.2	38.4	1.0	-54.6	-13.0	-41.6	
High Channel (711MHz)										
1.43	-62.5	H	3.0	-20.7	38.0	1.0	-57.7	-13.0	-44.7	
2.13	-66.1	H	3.0	-22.5	38.0	1.0	-59.5	-13.0	-46.5	
2.84	-64.7	H	3.0	-17.4	38.4	1.0	-54.9	-13.0	-41.9	
1.42	-62.8	V	3.0	-21.8	38.0	1.0	-58.9	-13.0	-45.9	
2.14	-65.9	V	3.0	-21.7	38.0	1.0	-58.7	-13.0	-45.7	
2.85	-63.9	V	3.0	-16.9	38.4	1.0	-54.3	-13.0	-41.3	

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16QAM LTE BAND 12 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/22/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 12, 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (704MHz)										
1.40	-62.6	H	3.0	-21.0	38.1	1.0	-58.0	-13.0	-45.0	
2.11	-64.6	H	3.0	-21.0	38.0	1.0	-58.0	-13.0	-45.0	
2.82	-64.7	H	3.0	-17.6	38.4	1.0	-55.1	-13.0	-42.1	
1.41	-62.2	V	3.0	-21.2	38.1	1.0	-58.3	-13.0	-45.3	
2.11	-64.6	V	3.0	-20.5	38.0	1.0	-57.5	-13.0	-44.5	
2.82	-64.5	V	3.0	-17.5	38.4	1.0	-55.0	-13.0	-42.0	
Mid Channel (707.5MHz)										
1.41	-62.4	H	3.0	-20.8	38.1	1.0	-57.9	-13.0	-44.9	
2.12	-65.9	H	3.0	-22.3	38.0	1.0	-59.3	-13.0	-46.3	
2.83	-64.2	H	3.0	-17.0	38.4	1.0	-54.4	-13.0	-41.4	
1.41	-62.7	V	3.0	-21.8	38.1	1.0	-58.9	-13.0	-45.9	
2.12	-65.8	V	3.0	-21.7	38.0	1.0	-58.7	-13.0	-45.7	
2.83	-63.9	V	3.0	-16.9	38.4	1.0	-54.4	-13.0	-41.4	
High Channel (711MHz)										
1.42	-62.1	H	3.0	-20.4	38.0	1.0	-57.5	-13.0	-44.5	
2.13	-65.5	H	3.0	-21.9	38.0	1.0	-58.9	-13.0	-45.9	
2.84	-64.1	H	3.0	-16.9	38.4	1.0	-54.3	-13.0	-41.3	
1.42	-62.3	V	3.0	-21.3	38.0	1.0	-58.4	-13.0	-45.4	
2.13	-65.5	V	3.0	-21.3	38.0	1.0	-58.3	-13.0	-45.3	
2.84	-64.0	V	3.0	-16.9	38.4	1.0	-54.4	-13.0	-41.4	

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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: 02/21/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 13, 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	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)										
1.57	-62.9	H	3.0	-20.6	37.8	1.0	-57.4	-40.0	-17.4	
2.35	-66.8	H	3.0	-22.3	38.1	1.0	-59.5	-13.0	-46.5	
3.12	-67.6	H	3.0	-19.1	38.4	1.0	-56.5	-13.0	-43.5	
1.56	-63.3	V	3.0	-21.6	37.8	1.0	-58.4	-40.0	-18.4	
2.35	-66.9	V	3.0	-22.3	38.2	1.0	-59.4	-13.0	-46.4	
3.14	-67.4	V	3.0	-19.2	38.4	1.0	-56.6	-13.0	-43.6	

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16QAM LTE BAND 13 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/21/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 13, 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	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)										
1.57	-63.6	H	3.0	-21.3	37.8	1.0	-58.1	-40.0	-18.1	
2.36	-67.6	H	3.0	-23.1	38.2	1.0	-60.3	-13.0	-47.3	
3.14	-67.5	H	3.0	-18.9	38.4	1.0	-56.4	-13.0	-43.4	
1.56	-63.2	V	3.0	-21.5	37.8	1.0	-58.3	-40.0	-18.3	
2.35	-67.0	V	3.0	-22.3	38.1	1.0	-59.5	-13.0	-46.5	
3.12	-67.1	V	3.0	-19.0	38.4	1.0	-56.4	-13.0	-43.4	

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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: 10641
Configuration: EUT Only
Mode: LTE Band 17, 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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	-64.4	H	3.0	-22.7	38.0	1.0	-59.8	-13.0	-46.8	
2.127	-65.1	H	3.0	-21.5	38.0	1.0	-58.5	-13.0	-45.5	
2.836	-65.1	H	3.0	-17.9	38.4	1.0	-55.3	-13.0	-42.3	
1.418	-64.1	V	3.0	-23.1	38.0	1.0	-60.2	-13.0	-47.2	
2.127	-65.5	V	3.0	-21.4	38.0	1.0	-58.4	-13.0	-45.4	
2.836	-65.9	V	3.0	-18.9	38.4	1.0	-56.4	-13.0	-43.4	
Mid Channel (710MHz)										
1.420	-64.2	H	3.0	-22.5	38.0	1.0	-59.6	-13.0	-46.6	
2.130	-65.9	H	3.0	-22.3	38.0	1.0	-59.3	-13.0	-46.3	
2.840	-65.6	H	3.0	-18.3	38.4	1.0	-55.8	-13.0	-42.8	
1.420	-64.8	V	3.0	-23.8	38.0	1.0	-60.8	-13.0	-47.8	
2.130	-65.9	V	3.0	-21.8	38.0	1.0	-58.8	-13.0	-45.8	
2.840	-67.9	V	3.0	-20.9	38.4	1.0	-58.4	-13.0	-45.4	
High Channel (711MHz)										
1.422	-63.1	H	3.0	-21.4	38.0	1.0	-58.4	-13.0	-45.4	
2.133	-63.5	H	3.0	-19.8	38.0	1.0	-56.8	-13.0	-43.8	
2.844	-65.3	H	3.0	-18.0	38.4	1.0	-55.4	-13.0	-42.4	
1.422	-64.8	V	3.0	-23.8	38.0	1.0	-60.8	-13.0	-47.8	
2.133	-65.3	V	3.0	-21.2	38.0	1.0	-58.2	-13.0	-45.2	
2.844	-64.4	V	3.0	-17.4	38.4	1.0	-54.8	-13.0	-41.8	

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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: 10641
Configuration: EUT Only
Mode: LTE Band 17, 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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	-64.2	H	3.0	-22.5	38.0	1.0	-59.5	-13.0	-46.5	
2.127	-64.7	H	3.0	-21.1	38.0	1.0	-58.1	-13.0	-45.1	
2.836	-65.7	H	3.0	-18.5	38.4	1.0	-56.0	-13.0	-43.0	
1.418	-64.2	V	3.0	-23.2	38.0	1.0	-60.3	-13.0	-47.3	
2.127	-64.4	V	3.0	-20.2	38.0	1.0	-57.2	-13.0	-44.2	
2.836	-65.8	V	3.0	-18.8	38.4	1.0	-56.3	-13.0	-43.3	
Mid Channel (710MHz)										
1.420	-64.7	H	3.0	-23.0	38.0	1.0	-60.1	-13.0	-47.1	
2.130	-66.3	H	3.0	-22.7	38.0	1.0	-59.7	-13.0	-46.7	
2.840	-66.8	H	3.0	-19.6	38.4	1.0	-57.1	-13.0	-44.1	
1.420	-64.2	V	3.0	-23.2	38.0	1.0	-60.2	-13.0	-47.2	
2.130	-66.2	V	3.0	-22.1	38.0	1.0	-59.1	-13.0	-46.1	
2.840	-67.7	V	3.0	-20.7	38.4	1.0	-58.2	-13.0	-45.2	
High Channel (711MHz)										
1.422	-63.4	H	3.0	-21.7	38.0	1.0	-58.7	-13.0	-45.7	
2.133	-64.3	H	3.0	-20.7	38.0	1.0	-57.7	-13.0	-44.7	
2.844	-65.4	H	3.0	-18.2	38.4	1.0	-55.6	-13.0	-42.6	
1.422	-64.0	V	3.0	-23.0	38.0	1.0	-60.0	-13.0	-47.0	
2.133	-64.6	V	3.0	-20.5	38.0	1.0	-57.5	-13.0	-44.5	
2.844	-65.3	V	3.0	-18.3	38.4	1.0	-55.7	-13.0	-42.7	

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9.1.8. LTE BAND 25

QPSK LTE BAND 25 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/21/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 25, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1860MHz)										
3.72	-67.1	H	3.0	-17.1	38.6	1.0	-54.7	-13.0	-41.7	
5.58	-68.1	H	3.0	-14.0	38.6	1.0	-51.5	-13.0	-38.5	
7.44	-70.1	H	3.0	-12.4	37.8	1.0	-49.2	-13.0	-36.2	
3.72	-68.5	V	3.0	-18.6	38.6	1.0	-56.2	-13.0	-43.2	
5.58	-68.7	V	3.0	-14.9	38.6	1.0	-52.5	-13.0	-39.5	
7.44	-70.5	V	3.0	-13.0	37.8	1.0	-49.8	-13.0	-36.8	
Mid Channel (1882.5MHz)										
3.77	-68.7	H	3.0	-18.5	38.6	1.0	-56.2	-13.0	-43.2	
5.65	-69.5	H	3.0	-15.2	38.5	1.0	-52.8	-13.0	-39.8	
7.53	-70.7	H	3.0	-12.9	37.7	1.0	-49.6	-13.0	-36.6	
3.77	-67.5	V	3.0	-17.5	38.6	1.0	-55.1	-13.0	-42.1	
5.65	-67.7	V	3.0	-13.8	38.5	1.0	-51.3	-13.0	-38.3	
7.53	-70.4	V	3.0	-12.8	37.7	1.0	-49.5	-13.0	-36.5	
High Channel (1905MHz)										
3.81	-66.4	H	3.0	-16.2	38.6	1.0	-53.8	-13.0	-40.8	
5.72	-67.9	H	3.0	-13.5	38.5	1.0	-51.0	-13.0	-38.0	
7.62	-69.3	H	3.0	-11.4	37.7	1.0	-48.0	-13.0	-35.0	
3.81	-68.4	V	3.0	-18.2	38.6	1.0	-55.8	-13.0	-42.8	
5.72	-69.3	V	3.0	-15.2	38.5	1.0	-52.7	-13.0	-39.7	
7.62	-70.4	V	3.0	-12.7	37.7	1.0	-49.3	-13.0	-36.3	

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16QAM LTE BAND 25 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/21/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 25, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1860MHz)										
3.72	-68.9	H	3.0	-18.9	38.6	1.0	-56.5	-13.0	-43.5	
5.58	-68.6	H	3.0	-14.5	38.6	1.0	-52.0	-13.0	-39.0	
7.44	-70.0	H	3.0	-12.3	37.8	1.0	-49.1	-13.0	-36.1	
3.72	-67.6	V	3.0	-17.6	38.6	1.0	-55.2	-13.0	-42.2	
5.58	-67.9	V	3.0	-14.1	38.6	1.0	-51.7	-13.0	-38.7	
7.44	-69.2	V	3.0	-11.6	37.8	1.0	-48.4	-13.0	-35.4	
Mid Channel (1882.5MHz)										
3.77	-67.8	H	3.0	-17.7	38.6	1.0	-55.3	-13.0	-42.3	
5.65	-68.3	H	3.0	-14.0	38.5	1.0	-51.6	-13.0	-38.6	
7.53	-70.8	H	3.0	-13.0	37.7	1.0	-49.7	-13.0	-36.7	
3.77	-67.8	V	3.0	-17.7	38.6	1.0	-55.4	-13.0	-42.4	
5.65	-69.0	V	3.0	-15.1	38.5	1.0	-52.6	-13.0	-39.6	
7.53	-71.0	V	3.0	-13.4	37.7	1.0	-50.1	-13.0	-37.1	
High Channel (1905MHz)										
3.81	-66.5	H	3.0	-16.2	38.6	1.0	-53.9	-13.0	-40.9	
5.72	-67.4	H	3.0	-12.9	38.5	1.0	-50.5	-13.0	-37.5	
7.62	-68.6	H	3.0	-10.7	37.7	1.0	-47.3	-13.0	-34.3	
3.81	-68.5	V	3.0	-18.3	38.6	1.0	-55.9	-13.0	-42.9	
5.72	-69.8	V	3.0	-15.7	38.5	1.0	-53.2	-13.0	-40.2	
7.62	-70.6	V	3.0	-12.8	37.7	1.0	-49.5	-13.0	-36.5	

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9.1.9. LTE BAND 26

QPSK LTE BAND 26 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/22/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 26 (90S), 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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
Mid Channel (819MHz)										
1.64	-63.1	H	3.0	-20.6	37.8	1.0	-57.5	-13.0	-44.5	
2.45	-63.5	H	3.0	-18.6	38.4	1.0	-56.0	-13.0	-43.0	
3.27	-67.7	H	3.0	-18.8	38.5	1.0	-56.3	-13.0	-43.3	
1.63	-62.7	V	3.0	-20.6	37.8	1.0	-57.5	-13.0	-44.5	
2.45	-62.9	V	3.0	-17.9	38.4	1.0	-55.3	-13.0	-42.3	
3.28	-67.8	V	3.0	-19.2	38.5	1.0	-56.6	-13.0	-43.6	

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16QAM LTE BAND 26 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/22/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 26 (90S), 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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
Mid Channel (819MHz)										
1.64	-63.2	H	3.0	-20.7	37.8	1.0	-57.6	-13.0	-44.6	
2.45	-63.2	H	3.0	-18.3	38.4	1.0	-55.7	-13.0	-42.7	
3.26	-67.6	H	3.0	-18.8	38.5	1.0	-56.3	-13.0	-43.3	
1.63	-63.2	V	3.0	-21.2	37.8	1.0	-58.0	-13.0	-45.0	
2.45	-63.5	V	3.0	-18.4	38.4	1.0	-55.8	-13.0	-42.8	
3.28	-67.7	V	3.0	-19.0	38.5	1.0	-56.5	-13.0	-43.5	

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9.1.10. LTE BAND 30

QPSK LTE BAND 30 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/22/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 30, 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	LTE B30

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Mid Channel (2310MHz)										
4.62	-67.7	H	3.0	-13.9	37.9	1.0	-50.8	-40.0	-10.8	
6.93	-69.8	H	3.0	-11.2	36.5	1.0	-46.6	-40.0	-6.6	
9.24	-70.8	H	3.0	-9.2	34.9	1.0	-43.1	-40.0	-3.1	
4.62	-67.5	V	3.0	-13.8	37.9	1.0	-50.7	-40.0	-10.7	
6.93	-69.7	V	3.0	-10.2	36.5	1.0	-45.7	-40.0	-5.7	
9.24	-70.9	V	3.0	-9.1	34.9	1.0	-42.9	-40.0	-2.9	

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16QAM LTE BAND 30 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/22/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 30, 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	LTE B30

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Mid Channel (2310MHz)										
4.62	-66.7	H	3.0	-12.9	37.9	1.0	-49.8	-40.0	-9.8	
6.93	-69.2	H	3.0	-10.6	36.5	1.0	-46.0	-40.0	-6.0	
9.24	-70.8	H	3.0	-9.3	34.9	1.0	-43.1	-40.0	-3.1	
4.62	-67.0	V	3.0	-13.3	37.9	1.0	-50.2	-40.0	-10.2	
6.93	-68.3	V	3.0	-8.8	36.5	1.0	-44.3	-40.0	-4.3	
9.24	-70.2	V	3.0	-8.4	34.9	1.0	-42.3	-40.0	-2.3	

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9.1.11. LTE BAND 41

QPSK LTE BAND 41 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/22/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 41, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	LTE B41

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2506MHz)										
5.01	-67.3	H	3.0	-14.4	38.7	1.0	-52.1	-25.0	-27.1	
7.52	-69.2	H	3.0	-11.4	37.7	1.0	-48.1	-25.0	-23.1	
10.02	-71.5	H	3.0	-10.7	36.1	1.0	-45.8	-25.0	-20.8	
5.01	-67.1	V	3.0	-14.5	38.7	1.0	-52.2	-25.0	-27.2	
7.52	-69.8	V	3.0	-12.2	37.7	1.0	-48.9	-25.0	-23.9	
10.02	-71.0	V	3.0	-10.2	36.1	1.0	-45.3	-25.0	-20.3	
Mid Channel (2593MHz)										
5.19	-66.7	H	3.0	-13.4	38.7	1.0	-51.1	-25.0	-26.1	
7.78	-70.5	H	3.0	-12.4	37.6	1.0	-48.9	-25.0	-23.9	
10.37	-71.8	H	3.0	-10.7	36.4	1.0	-46.0	-25.0	-21.0	
5.19	-68.2	V	3.0	-15.2	38.7	1.0	-52.9	-25.0	-27.9	
7.78	-70.2	V	3.0	-12.3	37.6	1.0	-48.8	-25.0	-23.8	
10.37	-74.0	V	3.0	-12.8	36.4	1.0	-48.2	-25.0	-23.2	
High Channel (2680MHz)										
5.36	-68.2	H	3.0	-14.6	38.6	1.0	-52.2	-25.0	-27.2	
8.04	-70.9	H	3.0	-12.5	37.4	1.0	-48.9	-25.0	-23.9	
10.72	-71.6	H	3.0	-10.2	36.6	1.0	-45.8	-25.0	-20.8	
5.36	-68.7	V	3.0	-15.4	38.6	1.0	-53.0	-25.0	-28.0	
8.04	-70.0	V	3.0	-11.7	37.4	1.0	-48.1	-25.0	-23.1	
10.72	-72.1	V	3.0	-10.5	36.6	1.0	-46.1	-25.0	-21.1	

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16QAM LTE BAND 41 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/22/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 41, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	LTE B41

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2506MHz)										
5.01	-67.2	H	3.0	-14.3	38.7	1.0	-52.0	-25.0	-27.0	
7.52	-68.8	H	3.0	-11.0	37.7	1.0	-47.7	-25.0	-22.7	
10.02	-71.2	H	3.0	-10.4	36.1	1.0	-45.5	-25.0	-20.5	
5.01	-68.1	V	3.0	-15.5	38.7	1.0	-53.2	-25.0	-28.2	
7.52	-69.8	V	3.0	-12.2	37.7	1.0	-48.9	-25.0	-23.9	
10.02	-72.1	V	3.0	-11.3	36.1	1.0	-46.4	-25.0	-21.4	
Mid Channel (2593MHz)										
5.19	-68.6	H	3.0	-15.3	38.7	1.0	-53.0	-25.0	-28.0	
7.78	-70.3	H	3.0	-12.2	37.6	1.0	-48.8	-25.0	-23.8	
10.37	-72.1	H	3.0	-11.0	36.4	1.0	-46.4	-25.0	-21.4	
5.19	-67.4	V	3.0	-14.5	38.7	1.0	-52.2	-25.0	-27.2	
7.78	-70.2	V	3.0	-12.3	37.6	1.0	-48.8	-25.0	-23.8	
10.37	-71.9	V	3.0	-10.7	36.4	1.0	-46.1	-25.0	-21.1	
High Channel (2680MHz)										
5.36	-68.5	H	3.0	-14.9	38.6	1.0	-52.5	-25.0	-27.5	
8.04	-69.7	H	3.0	-11.3	37.4	1.0	-47.7	-25.0	-22.7	
10.72	-72.5	H	3.0	-11.1	36.6	1.0	-46.7	-25.0	-21.7	
5.36	-68.9	V	3.0	-15.6	38.6	1.0	-53.2	-25.0	-28.2	
8.04	-71.2	V	3.0	-12.9	37.4	1.0	-49.3	-25.0	-24.3	
10.72	-72.0	V	3.0	-10.4	36.6	1.0	-46.0	-25.0	-21.0	

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47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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9.1.12. LTE BAND 66

QPSK LTE BAND 66 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 03/17/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 66, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1720.0MHz)										
3.44	-66.7	H	3.0	-17.4	38.5	1.0	-54.9	-13.0	-41.9	
5.16	-65.1	H	3.0	-11.9	38.7	1.0	-49.6	-13.0	-36.6	
6.88	-66.5	H	3.0	-9.6	38.1	1.0	-46.7	-13.0	-33.7	
3.44	-66.4	V	3.0	-17.3	38.5	1.0	-54.8	-13.0	-41.8	
5.16	-65.0	V	3.0	-12.1	38.7	1.0	-49.8	-13.0	-36.8	
6.88	-65.4	V	3.0	-8.7	38.1	1.0	-45.8	-13.0	-32.8	
Mid Channel (1745.0MHz)										
3.49	-67.4	H	3.0	-18.0	38.5	1.0	-55.6	-13.0	-42.6	
5.24	-67.6	H	3.0	-14.2	38.7	1.0	-51.9	-13.0	-38.9	
6.98	-64.8	H	3.0	-7.7	38.1	1.0	-44.7	-13.0	-31.7	
3.49	-67.1	V	3.0	-17.9	38.5	1.0	-55.4	-13.0	-42.4	
5.24	-66.0	V	3.0	-12.9	38.7	1.0	-50.6	-13.0	-37.6	
6.98	-65.0	V	3.0	-8.1	38.1	1.0	-45.2	-13.0	-32.2	
High Channel (1770.0MHz)										
3.54	-66.8	H	3.0	-17.2	38.6	1.0	-54.8	-13.0	-41.8	
5.31	-67.2	H	3.0	-13.7	38.6	1.0	-51.3	-13.0	-38.3	
7.08	-68.3	H	3.0	-11.0	38.0	1.0	-48.0	-13.0	-35.0	
3.54	-66.8	V	3.0	-17.4	38.6	1.0	-55.0	-13.0	-42.0	
5.31	-66.7	V	3.0	-13.5	38.6	1.0	-51.2	-13.0	-38.2	
7.08	-68.0	V	3.0	-11.0	38.0	1.0	-48.0	-13.0	-35.0	

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16QAM LTE BAND 66 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 03/17/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 66, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1720.0MHz)										
3.44	-67.8	H	3.0	-18.5	38.5	1.0	-56.0	-13.0	-43.0	
5.16	-65.8	H	3.0	-12.6	38.7	1.0	-50.3	-13.0	-37.3	
6.88	-67.2	H	3.0	-10.3	38.1	1.0	-47.4	-13.0	-34.4	
3.44	-67.2	V	3.0	-18.1	38.5	1.0	-55.6	-13.0	-42.6	
5.16	-64.6	V	3.0	-11.7	38.7	1.0	-49.4	-13.0	-36.4	
6.88	-67.3	V	3.0	-10.6	38.1	1.0	-47.7	-13.0	-34.7	
Mid Channel (1745.0MHz)										
3.49	-65.7	H	3.0	-16.3	38.5	1.0	-53.8	-13.0	-40.8	
5.24	-66.6	H	3.0	-13.2	38.7	1.0	-50.9	-13.0	-37.9	
6.98	-67.4	H	3.0	-10.3	38.1	1.0	-47.3	-13.0	-34.3	
3.49	-67.5	V	3.0	-18.2	38.5	1.0	-55.8	-13.0	-42.8	
5.24	-66.7	V	3.0	-13.7	38.7	1.0	-51.3	-13.0	-38.3	
6.98	-66.0	V	3.0	-9.1	38.1	1.0	-46.2	-13.0	-33.2	
High Channel (1770.0MHz)										
3.54	-66.2	H	3.0	-16.6	38.6	1.0	-54.2	-13.0	-41.2	
5.31	-66.8	H	3.0	-13.3	38.6	1.0	-50.9	-13.0	-37.9	
7.08	-66.7	H	3.0	-9.4	38.0	1.0	-46.4	-13.0	-33.4	
3.54	-65.9	V	3.0	-16.5	38.6	1.0	-54.1	-13.0	-41.1	
5.31	-66.7	V	3.0	-13.5	38.6	1.0	-51.2	-13.0	-38.2	
7.08	-66.8	V	3.0	-9.8	38.0	1.0	-46.8	-13.0	-33.8	

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9.2. FIELD STRENGTH OF SPURIOUS RADIATION, UAT 1

9.2.1. LTE BAND 2

QPSK LTE BAND 2 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/23/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 2, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1860MHz)										
3.73	-67.2	H	3.0	-17.2	38.6	1.0	-54.8	-13.0	-41.8	
5.59	-67.6	H	3.0	-13.5	38.6	1.0	-51.0	-13.0	-38.0	
7.44	-69.8	H	3.0	-12.1	37.8	1.0	-48.9	-13.0	-35.9	
3.73	-66.2	V	3.0	-16.2	38.6	1.0	-53.9	-13.0	-40.9	
5.58	-67.5	V	3.0	-13.7	38.6	1.0	-51.3	-13.0	-38.3	
7.44	-69.2	V	3.0	-11.7	37.8	1.0	-48.5	-13.0	-35.5	
Mid Channel (1880MHz)										
3.76	-66.7	H	3.0	-16.6	38.6	1.0	-54.2	-13.0	-41.2	
5.65	-67.9	H	3.0	-13.6	38.5	1.0	-51.2	-13.0	-38.2	
7.51	-68.7	H	3.0	-10.9	37.7	1.0	-47.6	-13.0	-34.6	
3.76	-67.5	V	3.0	-17.4	38.6	1.0	-55.1	-13.0	-42.1	
5.63	-68.6	V	3.0	-14.7	38.5	1.0	-52.2	-13.0	-39.2	
7.51	-69.9	V	3.0	-12.3	37.7	1.0	-49.1	-13.0	-36.1	
High Channel (1900MHz)										
3.79	-66.0	H	3.0	-15.8	38.6	1.0	-53.5	-13.0	-40.5	
5.71	-68.3	H	3.0	-13.9	38.5	1.0	-51.4	-13.0	-38.4	
7.60	-69.6	H	3.0	-11.7	37.7	1.0	-48.4	-13.0	-35.4	
3.79	-67.5	V	3.0	-17.4	38.6	1.0	-55.0	-13.0	-42.0	
5.71	-66.7	V	3.0	-12.6	38.5	1.0	-50.1	-13.0	-37.1	
7.61	-68.9	V	3.0	-11.2	37.7	1.0	-47.9	-13.0	-34.9	

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16QAM LTE BAND 2 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/23/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 2, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1860MHz)										
3.71	-67.4	H	3.0	-17.4	38.6	1.0	-55.0	-13.0	-42.0	
5.58	-68.3	H	3.0	-14.2	38.6	1.0	-51.7	-13.0	-38.7	
7.43	-68.2	H	3.0	-10.5	37.8	1.0	-47.3	-13.0	-34.3	
3.71	-67.2	V	3.0	-17.3	38.6	1.0	-54.9	-13.0	-41.9	
5.59	-68.1	V	3.0	-14.3	38.6	1.0	-51.8	-13.0	-38.8	
7.44	-69.1	V	3.0	-11.6	37.8	1.0	-48.4	-13.0	-35.4	
Mid Channel (1880MHz)										
3.77	-67.0	H	3.0	-16.9	38.6	1.0	-54.5	-13.0	-41.5	
5.65	-68.4	H	3.0	-14.1	38.5	1.0	-51.7	-13.0	-38.7	
7.51	-69.5	H	3.0	-11.7	37.8	1.0	-48.5	-13.0	-35.5	
3.76	-67.1	V	3.0	-17.0	38.6	1.0	-54.7	-13.0	-41.7	
5.64	-67.4	V	3.0	-13.5	38.5	1.0	-51.0	-13.0	-38.0	
7.51	-70.0	V	3.0	-12.4	37.8	1.0	-49.1	-13.0	-36.1	
High Channel (1900MHz)										
3.79	-66.8	H	3.0	-16.6	38.6	1.0	-54.2	-13.0	-41.2	
5.71	-67.5	H	3.0	-13.1	38.5	1.0	-50.6	-13.0	-37.6	
7.61	-69.5	H	3.0	-11.6	37.7	1.0	-48.3	-13.0	-35.3	
3.80	-66.1	V	3.0	-15.9	38.6	1.0	-53.6	-13.0	-40.6	
5.71	-67.7	V	3.0	-13.6	38.5	1.0	-51.1	-13.0	-38.1	
7.60	-68.7	V	3.0	-11.0	37.7	1.0	-47.7	-13.0	-34.7	

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9.2.2. LTE BAND 4

QPSK LTE BAND 4 (3.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/24/17
Test Engineer: 39004
Configuration: EUT Only
Mode: LTE Band 4, 3MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1711.5MHz)										
3.44	-66.3	H	3.0	-17.0	38.5	1.0	-54.5	-13.0	-41.5	
5.16	-67.6	H	3.0	-14.4	38.7	1.0	-52.1	-13.0	-39.1	
6.88	-67.7	H	3.0	-10.8	38.1	1.0	-47.9	-13.0	-34.9	
3.44	-66.7	V	3.0	-17.6	38.5	1.0	-55.1	-13.0	-42.1	
5.16	-67.4	V	3.0	-14.5	38.7	1.0	-52.2	-13.0	-39.2	
6.88	-67.7	V	3.0	-11.0	38.1	1.0	-48.1	-13.0	-35.1	
Mid Channel (1732.5MHz)										
3.47	-66.5	H	3.0	-17.2	38.5	1.0	-54.7	-13.0	-41.7	
5.20	-67.1	H	3.0	-13.9	38.7	1.0	-51.6	-13.0	-38.6	
6.93	-67.8	H	3.0	-10.7	38.1	1.0	-47.8	-13.0	-34.8	
3.47	-66.6	V	3.0	-17.4	38.5	1.0	-55.0	-13.0	-42.0	
5.20	-67.3	V	3.0	-14.4	38.7	1.0	-52.0	-13.0	-39.0	
6.93	-67.8	V	3.0	-11.0	38.1	1.0	-48.1	-13.0	-35.1	
High Channel (1753.5MHz)										
3.49	-66.4	H	3.0	-17.0	38.5	1.0	-54.5	-13.0	-41.5	
5.24	-67.4	H	3.0	-14.0	38.7	1.0	-51.7	-13.0	-38.7	
6.98	-67.8	H	3.0	-10.7	38.1	1.0	-47.8	-13.0	-34.8	
3.49	-66.5	V	3.0	-17.3	38.5	1.0	-54.8	-13.0	-41.8	
5.24	-67.8	V	3.0	-14.7	38.7	1.0	-52.4	-13.0	-39.4	
6.98	-67.9	V	3.0	-11.0	38.1	1.0	-48.1	-13.0	-35.1	

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16QAM LTE BAND 4 (3.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/24/17
Test Engineer: 39004
Configuration: EUT Only
Mode: LTE Band 4, 3MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1711.5MHz)										
3.44	-66.1	H	3.0	-16.8	38.5	1.0	-54.3	-13.0	-41.3	
5.16	-67.4	H	3.0	-14.2	38.7	1.0	-51.9	-13.0	-38.9	
6.88	-67.8	H	3.0	-10.9	38.1	1.0	-48.0	-13.0	-35.0	
3.44	-66.5	V	3.0	-17.4	38.5	1.0	-55.0	-13.0	-42.0	
5.16	-67.7	V	3.0	-14.8	38.7	1.0	-52.5	-13.0	-39.5	
6.88	-67.7	V	3.0	-11.0	38.1	1.0	-48.2	-13.0	-35.2	
Mid Channel (1732.5MHz)										
3.47	-66.3	H	3.0	-16.9	38.5	1.0	-54.5	-13.0	-41.5	
5.20	-67.3	H	3.0	-14.0	38.7	1.0	-51.7	-13.0	-38.7	
6.93	-67.7	H	3.0	-10.6	38.1	1.0	-47.7	-13.0	-34.7	
3.47	-66.4	V	3.0	-17.2	38.5	1.0	-54.8	-13.0	-41.8	
5.20	-67.5	V	3.0	-14.6	38.7	1.0	-52.3	-13.0	-39.3	
6.93	-67.9	V	3.0	-11.1	38.1	1.0	-48.2	-13.0	-35.2	
High Channel (1753.5MHz)										
3.49	-66.3	H	3.0	-16.9	38.5	1.0	-54.5	-13.0	-41.5	
5.24	-67.6	H	3.0	-14.2	38.7	1.0	-51.9	-13.0	-38.9	
6.98	-67.8	H	3.0	-10.6	38.1	1.0	-47.7	-13.0	-34.7	
3.49	-66.6	V	3.0	-17.4	38.5	1.0	-54.9	-13.0	-41.9	
5.24	-67.9	V	3.0	-14.8	38.7	1.0	-52.5	-13.0	-39.5	
6.98	-67.9	V	3.0	-11.0	38.1	1.0	-48.1	-13.0	-35.1	

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9.2.3. LTE BAND 5

QPSK LTE BAND 5 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/28/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 5, 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	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)										
1.65	-62.8	H	3.0	-22.4	37.7	1.0	-59.1	-13.0	-46.1	
2.49	-65.0	H	3.0	-21.0	37.1	1.0	-57.0	-13.0	-44.0	
3.32	-63.0	H	3.0	-15.2	37.8	1.0	-52.0	-13.0	-39.0	
1.65	-64.0	V	3.0	-23.4	37.7	1.0	-60.1	-13.0	-47.1	
2.49	-64.9	V	3.0	-20.7	37.1	1.0	-56.8	-13.0	-43.8	
3.32	-63.4	V	3.0	-16.6	37.8	1.0	-53.4	-13.0	-40.4	
Mid Channel (836.5MHz)										
1.68	-64.2	H	3.0	-23.6	37.8	1.0	-60.4	-13.0	-47.4	
2.50	-63.4	H	3.0	-19.4	37.1	1.0	-55.4	-13.0	-42.4	
3.35	-63.9	H	3.0	-16.1	37.8	1.0	-52.9	-13.0	-39.9	
1.68	-63.9	V	3.0	-23.1	37.8	1.0	-59.9	-13.0	-46.9	
2.50	-64.4	V	3.0	-20.2	37.1	1.0	-56.3	-13.0	-43.3	
3.35	-64.7	V	3.0	-17.8	37.8	1.0	-54.6	-13.0	-41.6	
High Channel (844MHz)										
1.69	-62.3	H	3.0	-21.6	37.8	1.0	-58.3	-13.0	-45.3	
2.53	-63.0	H	3.0	-18.7	37.1	1.0	-54.8	-13.0	-41.8	
3.37	-65.0	H	3.0	-17.2	37.8	1.0	-53.9	-13.0	-40.9	
1.69	-63.7	V	3.0	-22.8	37.8	1.0	-59.6	-13.0	-46.6	
2.53	-62.5	V	3.0	-18.2	37.1	1.0	-54.3	-13.0	-41.3	
3.37	-65.5	V	3.0	-18.6	37.8	1.0	-55.4	-13.0	-42.4	

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16QAM LTE BAND 5 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/28/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 5, 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	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)										
1.65	-64.6	H	3.0	-24.2	37.7	1.0	-61.0	-13.0	-48.0	
2.49	-65.5	H	3.0	-21.4	37.1	1.0	-57.5	-13.0	-44.5	
3.32	-63.7	H	3.0	-15.9	37.8	1.0	-52.7	-13.0	-39.7	
1.65	-64.4	V	3.0	-23.7	37.7	1.0	-60.5	-13.0	-47.5	
2.49	-63.9	V	3.0	-19.7	37.1	1.0	-55.8	-13.0	-42.8	
3.32	-62.9	V	3.0	-16.1	37.8	1.0	-52.9	-13.0	-39.9	
Mid Channel (836.5MHz)										
1.68	-63.7	H	3.0	-23.1	37.8	1.0	-59.9	-13.0	-46.9	
2.50	-64.0	H	3.0	-19.9	37.1	1.0	-56.0	-13.0	-43.0	
3.35	-64.4	H	3.0	-16.6	37.8	1.0	-53.4	-13.0	-40.4	
1.68	-64.6	V	3.0	-23.8	37.8	1.0	-60.6	-13.0	-47.6	
2.50	-65.2	V	3.0	-21.0	37.1	1.0	-57.1	-13.0	-44.1	
3.35	-63.8	V	3.0	-16.9	37.8	1.0	-53.7	-13.0	-40.7	
High Channel (844MHz)										
1.69	-64.1	H	3.0	-23.4	37.8	1.0	-60.2	-13.0	-47.2	
2.53	-63.1	H	3.0	-18.8	37.1	1.0	-54.9	-13.0	-41.9	
3.37	-65.3	H	3.0	-17.5	37.8	1.0	-54.2	-13.0	-41.2	
1.69	-63.4	V	3.0	-22.5	37.8	1.0	-59.3	-13.0	-46.3	
2.53	-63.6	V	3.0	-19.3	37.1	1.0	-55.4	-13.0	-42.4	
3.37	-65.9	V	3.0	-18.9	37.8	1.0	-55.7	-13.0	-42.7	

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9.2.4. LTE BAND 7

QPSK LTE BAND 7 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/23/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 7, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	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	-61.6	H	3.0	-8.7	38.7	1.0	-46.4	-25.0	-21.4	
7.53	-69.4	H	3.0	-11.6	37.7	1.0	-48.3	-25.0	-23.3	
10.04	-71.2	H	3.0	-10.4	36.2	1.0	-45.5	-25.0	-20.5	
5.02	-58.2	V	3.0	-5.6	38.7	1.0	-43.3	-25.0	-18.3	
7.53	-68.1	V	3.0	-10.5	37.7	1.0	-47.2	-25.0	-22.2	
10.04	-71.7	V	3.0	-10.9	36.2	1.0	-46.0	-25.0	-21.0	
Mid Channel (2535MHz)										
5.07	-62.8	H	3.0	-9.8	38.7	1.0	-47.5	-25.0	-22.5	
7.61	-67.7	H	3.0	-9.8	37.7	1.0	-46.5	-25.0	-21.5	
10.14	-71.0	H	3.0	-10.1	36.2	1.0	-45.3	-25.0	-20.3	
5.07	-62.7	V	3.0	-10.0	38.7	1.0	-47.7	-25.0	-22.7	
7.61	-70.5	V	3.0	-12.8	37.7	1.0	-49.5	-25.0	-24.5	
10.14	-72.0	V	3.0	-11.1	36.2	1.0	-46.3	-25.0	-21.3	
High Channel (2560MHz)										
5.12	-66.0	H	3.0	-12.9	38.7	1.0	-50.6	-25.0	-25.6	
7.68	-69.1	H	3.0	-11.1	37.6	1.0	-47.7	-25.0	-22.7	
10.24	-72.2	H	3.0	-11.2	36.3	1.0	-46.5	-25.0	-21.5	
5.12	-60.7	V	3.0	-7.9	38.7	1.0	-45.6	-25.0	-20.6	
7.68	-69.7	V	3.0	-11.9	37.6	1.0	-48.5	-25.0	-23.5	
10.24	-70.8	V	3.0	-9.8	36.3	1.0	-45.0	-25.0	-20.0	

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16QAM LTE BAND 7 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/23/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 7, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	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	-63.7	H	3.0	-10.8	38.7	1.0	-48.5	-25.0	-23.5	
7.53	-70.8	H	3.0	-13.0	37.7	1.0	-49.7	-25.0	-24.7	
10.04	-71.2	H	3.0	-10.4	36.2	1.0	-45.5	-25.0	-20.5	
5.02	-59.3	V	3.0	-6.7	38.7	1.0	-44.4	-25.0	-19.4	
7.53	-69.1	V	3.0	-11.5	37.7	1.0	-48.2	-25.0	-23.2	
10.04	-70.9	V	3.0	-10.1	36.2	1.0	-45.2	-25.0	-20.2	
Mid Channel (2535MHz)										
5.07	-59.9	H	3.0	-6.9	38.7	1.0	-44.6	-25.0	-19.6	
7.61	-69.4	H	3.0	-11.5	37.7	1.0	-48.2	-25.0	-23.2	
10.14	-70.9	H	3.0	-10.0	36.2	1.0	-45.2	-25.0	-20.2	
5.07	-59.9	V	3.0	-7.2	38.7	1.0	-44.9	-25.0	-19.9	
7.61	-69.0	V	3.0	-11.3	37.7	1.0	-48.0	-25.0	-23.0	
10.14	-71.1	V	3.0	-10.2	36.2	1.0	-45.4	-25.0	-20.4	
High Channel (2560MHz)										
5.12	-65.6	H	3.0	-12.5	38.7	1.0	-50.2	-25.0	-25.2	
7.68	-70.4	H	3.0	-12.4	37.6	1.0	-49.0	-25.0	-24.0	
10.24	-70.2	H	3.0	-9.2	36.3	1.0	-44.5	-25.0	-19.5	
5.12	-64.2	V	3.0	-11.4	38.7	1.0	-49.1	-25.0	-24.1	
7.68	-70.3	V	3.0	-12.4	37.6	1.0	-49.1	-25.0	-24.1	
10.24	-72.1	V	3.0	-11.1	36.3	1.0	-46.4	-25.0	-21.4	

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9.2.5. LTE BAND 12

QPSK LTE BAND 12 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/28/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 12, 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	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	-64.0	H	3.0	-25.1	37.4	1.0	-61.4	-13.0	-48.4	
2.11	-62.2	H	3.0	-19.1	37.7	1.0	-55.8	-13.0	-42.8	
2.82	-63.1	H	3.0	-16.7	37.8	1.0	-53.5	-13.0	-40.5	
1.41	-64.6	V	3.0	-25.3	37.4	1.0	-61.7	-13.0	-48.7	
2.11	-62.6	V	3.0	-19.5	37.7	1.0	-56.2	-13.0	-43.2	
2.82	-63.7	V	3.0	-18.3	37.8	1.0	-55.1	-13.0	-42.1	
Mid Channel (707.5MHz)										
1.41	-63.1	H	3.0	-24.2	37.4	1.0	-60.6	-13.0	-47.6	
2.12	-62.6	H	3.0	-19.5	37.7	1.0	-56.2	-13.0	-43.2	
2.83	-62.2	H	3.0	-15.8	37.8	1.0	-52.6	-13.0	-39.6	
1.40	-65.6	V	3.0	-26.3	37.4	1.0	-62.7	-13.0	-49.7	
2.12	-62.4	V	3.0	-19.3	37.7	1.0	-55.9	-13.0	-42.9	
2.82	-63.6	V	3.0	-18.2	37.8	1.0	-54.9	-13.0	-41.9	
High Channel (711MHz)										
1.43	-64.5	H	3.0	-25.5	37.4	1.0	-61.9	-13.0	-48.9	
2.13	-62.5	H	3.0	-19.4	37.6	1.0	-56.0	-13.0	-43.0	
2.84	-61.8	H	3.0	-15.3	37.8	1.0	-52.1	-13.0	-39.1	
1.43	-64.0	V	3.0	-24.6	37.4	1.0	-61.0	-13.0	-48.0	
2.13	-62.3	V	3.0	-19.2	37.6	1.0	-55.8	-13.0	-42.8	
2.84	-62.1	V	3.0	-16.6	37.8	1.0	-53.5	-13.0	-40.5	

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16QAM LTE BAND 12 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/28/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 12, 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	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	-64.0	H	3.0	-25.0	37.4	1.0	-61.4	-13.0	-48.4	
2.11	-62.2	H	3.0	-19.0	37.7	1.0	-55.7	-13.0	-42.7	
2.82	-62.8	H	3.0	-16.4	37.8	1.0	-53.2	-13.0	-40.2	
1.41	-64.0	V	3.0	-24.7	37.4	1.0	-61.1	-13.0	-48.1	
2.11	-63.0	V	3.0	-20.0	37.7	1.0	-56.7	-13.0	-43.7	
2.82	-63.7	V	3.0	-18.2	37.8	1.0	-55.0	-13.0	-42.0	
Mid Channel (707.5MHz)										
1.41	-65.4	H	3.0	-26.5	37.4	1.0	-62.9	-13.0	-49.9	
2.12	-63.2	H	3.0	-20.1	37.7	1.0	-56.8	-13.0	-43.8	
2.83	-63.7	H	3.0	-17.2	37.8	1.0	-54.0	-13.0	-41.0	
1.41	-65.5	V	3.0	-26.2	37.4	1.0	-62.6	-13.0	-49.6	
2.13	-63.1	V	3.0	-20.0	37.6	1.0	-56.6	-13.0	-43.6	
2.83	-62.9	V	3.0	-17.4	37.8	1.0	-54.2	-13.0	-41.2	
High Channel (711MHz)										
1.42	-65.6	H	3.0	-26.6	37.4	1.0	-63.0	-13.0	-50.0	
2.13	-63.2	H	3.0	-20.0	37.6	1.0	-56.7	-13.0	-43.7	
2.84	-62.3	H	3.0	-15.8	37.8	1.0	-52.6	-13.0	-39.6	
1.43	-64.6	V	3.0	-25.2	37.4	1.0	-61.6	-13.0	-48.6	
2.13	-62.1	V	3.0	-19.0	37.6	1.0	-55.7	-13.0	-42.7	
2.84	-62.4	V	3.0	-16.9	37.8	1.0	-53.7	-13.0	-40.7	

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9.2.6. LTE BAND 13

QPSK LTE BAND 13 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/28/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 13, 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	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	-64.5	H	3.0	-24.7	37.7	1.0	-61.4	-40.0	-21.4	
2.35	-64.1	H	3.0	-20.4	37.1	1.0	-56.5	-13.0	-43.5	
3.12	-64.4	H	3.0	-16.6	38.1	1.0	-53.7	-13.0	-40.7	
1.56	-63.9	V	3.0	-23.8	37.7	1.0	-60.5	-40.0	-20.5	
2.35	-63.4	V	3.0	-19.5	37.1	1.0	-55.6	-13.0	-42.6	
3.14	-61.9	V	3.0	-15.4	38.0	1.0	-52.5	-13.0	-39.5	

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16QAM LTE BAND 13 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/28/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 13, 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	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	-63.9	H	3.0	-24.1	37.7	1.0	-60.8	-40.0	-20.8	
2.35	-64.8	H	3.0	-21.1	37.1	1.0	-57.2	-13.0	-44.2	
3.12	-63.7	H	3.0	-15.9	38.1	1.0	-53.0	-13.0	-40.0	
1.56	-62.6	V	3.0	-22.4	37.7	1.0	-59.1	-40.0	-19.1	
2.35	-64.6	V	3.0	-20.8	37.1	1.0	-56.9	-13.0	-43.9	
3.14	-62.4	V	3.0	-15.9	38.0	1.0	-53.0	-13.0	-40.0	

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9.2.7. 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: 10641
Configuration: EUT Only
Mode: LTE Band 17, 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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	-62.8	H	3.0	-21.1	38.0	1.0	-58.1	-13.0	-45.1	
2.127	-65.0	H	3.0	-21.4	38.0	1.0	-58.4	-13.0	-45.4	
2.836	-65.6	H	3.0	-18.3	38.4	1.0	-55.8	-13.0	-42.8	
1.418	-63.5	V	3.0	-22.5	38.0	1.0	-59.5	-13.0	-46.5	
2.127	-65.8	V	3.0	-21.7	38.0	1.0	-58.7	-13.0	-45.7	
2.836	-65.5	V	3.0	-18.6	38.4	1.0	-56.0	-13.0	-43.0	
Mid Channel (710MHz)										
1.420	-64.5	H	3.0	-22.8	38.0	1.0	-59.9	-13.0	-46.9	
2.130	-63.1	H	3.0	-19.5	38.0	1.0	-56.5	-13.0	-43.5	
2.840	-60.8	H	3.0	-13.6	38.4	1.0	-51.0	-13.0	-38.0	
1.420	-63.5	V	3.0	-22.5	38.0	1.0	-59.5	-13.0	-46.5	
2.130	-62.2	V	3.0	-18.1	38.0	1.0	-55.0	-13.0	-42.0	
2.840	-61.6	V	3.0	-14.6	38.4	1.0	-52.1	-13.0	-39.1	
High Channel (711MHz)										
1.422	-63.6	H	3.0	-21.9	38.0	1.0	-58.9	-13.0	-45.9	
2.133	-64.5	H	3.0	-20.9	38.0	1.0	-57.9	-13.0	-44.9	
2.844	-65.3	H	3.0	-18.0	38.4	1.0	-55.5	-13.0	-42.5	
1.422	-65.0	V	3.0	-24.0	38.0	1.0	-61.0	-13.0	-48.0	
2.133	-63.7	V	3.0	-19.6	38.0	1.0	-56.6	-13.0	-43.6	
2.844	-65.3	V	3.0	-18.3	38.4	1.0	-55.7	-13.0	-42.7	

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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: 10641
Configuration: EUT Only
Mode: LTE Band 17, 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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	-64.6	H	3.0	-22.9	38.0	1.0	-60.0	-13.0	-47.0	
2.127	-64.6	H	3.0	-21.0	38.0	1.0	-58.0	-13.0	-45.0	
2.836	-65.7	H	3.0	-18.5	38.4	1.0	-55.9	-13.0	-42.9	
1.418	-65.1	V	3.0	-24.1	38.0	1.0	-61.1	-13.0	-48.1	
2.127	-64.9	V	3.0	-20.8	38.0	1.0	-57.8	-13.0	-44.8	
2.836	-65.5	V	3.0	-18.5	38.4	1.0	-55.9	-13.0	-42.9	
Mid Channel (710MHz)										
1.420	-63.9	H	3.0	-22.2	38.0	1.0	-59.2	-13.0	-46.2	
2.130	-64.8	H	3.0	-21.1	38.0	1.0	-58.1	-13.0	-45.1	
2.840	-63.7	H	3.0	-16.4	38.4	1.0	-53.9	-13.0	-40.9	
1.420	-62.6	V	3.0	-21.6	38.0	1.0	-58.6	-13.0	-45.6	
2.130	-64.6	V	3.0	-20.5	38.0	1.0	-57.5	-13.0	-44.5	
2.840	-62.4	V	3.0	-15.4	38.4	1.0	-52.8	-13.0	-39.8	
High Channel (711MHz)										
1.422	-64.4	H	3.0	-22.6	38.0	1.0	-59.7	-13.0	-46.7	
2.133	-64.5	H	3.0	-20.8	38.0	1.0	-57.8	-13.0	-44.8	
2.844	-64.8	H	3.0	-17.6	38.4	1.0	-55.0	-13.0	-42.0	
1.422	-64.6	V	3.0	-23.6	38.0	1.0	-60.6	-13.0	-47.6	
2.133	-64.5	V	3.0	-20.3	38.0	1.0	-57.3	-13.0	-44.3	
2.844	-64.9	V	3.0	-17.9	38.4	1.0	-55.3	-13.0	-42.3	

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9.2.8. LTE BAND 25

QPSK LTE BAND 25 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/23/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 25, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1860MHz)										
3.72	-67.4	H	3.0	-17.4	38.6	1.0	-55.0	-13.0	-42.0	
5.58	-68.4	H	3.0	-14.3	38.6	1.0	-51.8	-13.0	-38.8	
7.44	-70.6	H	3.0	-12.9	37.8	1.0	-49.7	-13.0	-36.7	
3.72	-68.1	V	3.0	-18.2	38.6	1.0	-55.8	-13.0	-42.8	
5.58	-68.4	V	3.0	-14.6	38.6	1.0	-52.2	-13.0	-39.2	
7.44	-70.6	V	3.0	-13.1	37.8	1.0	-49.8	-13.0	-36.8	
Mid Channel (1882.5MHz)										
3.77	-67.6	H	3.0	-17.5	38.6	1.0	-55.2	-13.0	-42.2	
5.65	-67.5	H	3.0	-13.3	38.5	1.0	-50.8	-13.0	-37.8	
7.53	-70.0	H	3.0	-12.2	37.7	1.0	-48.9	-13.0	-35.9	
3.77	-66.9	V	3.0	-16.8	38.6	1.0	-54.4	-13.0	-41.4	
5.65	-67.5	V	3.0	-13.6	38.5	1.0	-51.1	-13.0	-38.1	
7.53	-70.9	V	3.0	-13.3	37.7	1.0	-50.0	-13.0	-37.0	
High Channel (1905MHz)										
3.81	-67.4	H	3.0	-17.2	38.6	1.0	-54.8	-13.0	-41.8	
5.72	-67.9	H	3.0	-13.5	38.5	1.0	-51.0	-13.0	-38.0	
7.62	-69.5	H	3.0	-11.6	37.7	1.0	-48.2	-13.0	-35.2	
3.81	-68.8	V	3.0	-18.6	38.6	1.0	-56.2	-13.0	-43.2	
5.72	-69.6	V	3.0	-15.5	38.5	1.0	-53.0	-13.0	-40.0	
7.62	-70.7	V	3.0	-13.0	37.7	1.0	-49.6	-13.0	-36.6	

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16QAM LTE BAND 25 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/23/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 25, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1860MHz)										
3.72	-66.9	H	3.0	-16.9	38.6	1.0	-54.5	-13.0	-41.5	
5.58	-67.8	H	3.0	-13.7	38.6	1.0	-51.2	-13.0	-38.2	
7.44	-68.9	H	3.0	-11.2	37.8	1.0	-48.0	-13.0	-35.0	
3.72	-66.8	V	3.0	-16.8	38.6	1.0	-54.5	-13.0	-41.5	
5.58	-68.0	V	3.0	-14.2	38.6	1.0	-51.8	-13.0	-38.8	
7.44	-69.5	V	3.0	-12.0	37.8	1.0	-48.8	-13.0	-35.8	
Mid Channel (1882.5MHz)										
3.77	-67.1	H	3.0	-17.0	38.6	1.0	-54.6	-13.0	-41.6	
5.65	-67.8	H	3.0	-13.5	38.5	1.0	-51.1	-13.0	-38.1	
7.53	-69.7	H	3.0	-11.9	37.7	1.0	-48.6	-13.0	-35.6	
3.77	-67.4	V	3.0	-17.3	38.6	1.0	-55.0	-13.0	-42.0	
5.65	-69.8	V	3.0	-15.9	38.5	1.0	-53.4	-13.0	-40.4	
7.53	-70.0	V	3.0	-12.4	37.7	1.0	-49.1	-13.0	-36.1	
High Channel (1905MHz)										
3.81	-66.5	H	3.0	-16.2	38.6	1.0	-53.9	-13.0	-40.9	
5.72	-67.4	H	3.0	-13.0	38.5	1.0	-50.5	-13.0	-37.5	
7.62	-67.9	H	3.0	-10.0	37.7	1.0	-46.6	-13.0	-33.6	
3.81	-67.6	V	3.0	-17.4	38.6	1.0	-55.0	-13.0	-42.0	
5.72	-68.8	V	3.0	-14.7	38.5	1.0	-52.2	-13.0	-39.2	
7.62	-69.6	V	3.0	-11.8	37.7	1.0	-48.5	-13.0	-35.5	

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9.2.9. LTE BAND 26

QPSK LTE BAND 26 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 03/01/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 26 (90S), 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Mid Channel (819MHz)										
1.64	-63.9	H	3.0	-23.6	37.7	1.0	-60.4	-13.0	-47.4	
2.45	-62.6	H	3.0	-18.7	37.0	1.0	-54.7	-13.0	-41.7	
3.27	-65.1	H	3.0	-17.4	37.9	1.0	-54.2	-13.0	-41.2	
1.64	-63.8	V	3.0	-23.3	37.7	1.0	-60.0	-13.0	-47.0	
2.45	-63.3	V	3.0	-19.2	37.0	1.0	-55.2	-13.0	-42.2	
3.27	-64.6	V	3.0	-17.9	37.9	1.0	-54.8	-13.0	-41.8	

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16QAM LTE BAND 26 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 03/01/17
Test Engineer: 52297
Configuration: EUT only
Mode: LTE Band 26 (90S), 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Mid Channel (819MHz)										
1.64	-64.9	H	3.0	-24.6	37.7	1.0	-61.4	-13.0	-48.4	
2.45	-63.8	H	3.0	-19.8	37.0	1.0	-55.8	-13.0	-42.8	
3.27	-64.5	H	3.0	-16.7	37.9	1.0	-53.6	-13.0	-40.6	
1.64	-66.0	V	3.0	-25.5	37.7	1.0	-62.2	-13.0	-49.2	
2.45	-64.9	V	3.0	-20.8	37.0	1.0	-56.8	-13.0	-43.8	
3.27	-63.9	V	3.0	-17.2	37.9	1.0	-54.1	-13.0	-41.1	

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9.2.10. LTE BAND 30

QPSK LTE BAND 30 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/23/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 30, 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	LTE B30

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Mid Channel (2310MHz)										
4.62	-67.5	H	3.0	-13.7	37.9	1.0	-50.6	-40.0	-10.6	
6.93	-70.0	H	3.0	-11.4	36.5	1.0	-46.8	-40.0	-6.8	
9.24	-71.0	H	3.0	-9.5	34.9	1.0	-43.3	-40.0	-3.3	
4.62	-67.8	V	3.0	-14.1	37.9	1.0	-51.0	-40.0	-11.0	
6.93	-69.5	V	3.0	-10.0	36.5	1.0	-45.5	-40.0	-5.5	
9.24	-70.6	V	3.0	-8.8	34.9	1.0	-42.7	-40.0	-2.7	

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16QAM LTE BAND 30 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/23/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 30, 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	LTE B30

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Mid Channel (2310MHz)										
4.62	-67.4	H	3.0	-13.6	37.9	1.0	-50.5	-40.0	-10.5	
6.93	-69.8	H	3.0	-11.2	36.5	1.0	-46.6	-40.0	-6.6	
9.24	-70.5	H	3.0	-9.0	34.9	1.0	-42.8	-40.0	-2.8	
4.62	-67.8	V	3.0	-14.1	37.9	1.0	-51.0	-40.0	-11.0	
6.93	-68.8	V	3.0	-9.3	36.5	1.0	-44.8	-40.0	-4.8	
9.24	-70.5	V	3.0	-8.7	34.9	1.0	-42.6	-40.0	-2.6	

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9.2.11. LTE BAND 41

QPSK LTE BAND 41 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/23/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 41, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	LTE B41

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2506MHz)										
5.01	-65.7	H	3.0	-12.8	38.7	1.0	-50.5	-25.0	-25.5	
7.52	-69.4	H	3.0	-11.6	37.7	1.0	-48.3	-25.0	-23.3	
10.02	-71.9	H	3.0	-11.1	36.1	1.0	-46.2	-25.0	-21.2	
5.01	-62.7	V	3.0	-10.1	38.7	1.0	-47.8	-25.0	-22.8	
7.52	-69.2	V	3.0	-11.6	37.7	1.0	-48.3	-25.0	-23.3	
10.02	-70.4	V	3.0	-9.6	36.1	1.0	-44.7	-25.0	-19.7	
Mid Channel (2593MHz)										
5.19	-68.1	H	3.0	-14.8	38.7	1.0	-52.5	-25.0	-27.5	
7.78	-69.5	H	3.0	-11.4	37.6	1.0	-47.9	-25.0	-22.9	
10.37	-72.0	H	3.0	-10.9	36.4	1.0	-46.2	-25.0	-21.2	
5.19	-67.0	V	3.0	-14.1	38.7	1.0	-51.8	-25.0	-26.8	
7.78	-68.9	V	3.0	-11.0	37.6	1.0	-47.5	-25.0	-22.5	
10.37	-72.4	V	3.0	-11.2	36.4	1.0	-46.6	-25.0	-21.6	
High Channel (2680MHz)										
5.36	-65.4	H	3.0	-11.8	38.6	1.0	-49.4	-25.0	-24.4	
8.04	-70.1	H	3.0	-11.7	37.4	1.0	-48.1	-25.0	-23.1	
10.72	-71.5	H	3.0	-10.1	36.6	1.0	-45.7	-25.0	-20.7	
5.36	-66.3	V	3.0	-13.0	38.6	1.0	-50.6	-25.0	-25.6	
8.04	-70.3	V	3.0	-12.0	37.4	1.0	-48.4	-25.0	-23.4	
10.72	-72.2	V	3.0	-10.6	36.6	1.0	-46.2	-25.0	-21.2	

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16QAM LTE BAND 41 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 02/23/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 41, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	LTE B41

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2506MHz)										
5.01	-67.0	H	3.0	-14.1	38.7	1.0	-51.8	-25.0	-26.8	
7.52	-70.3	H	3.0	-12.5	37.7	1.0	-49.2	-25.0	-24.2	
10.02	-71.2	H	3.0	-10.4	36.1	1.0	-45.5	-25.0	-20.5	
5.01	-59.9	V	3.0	-7.3	38.7	1.0	-44.9	-25.0	-19.9	
7.52	-69.6	V	3.0	-12.0	37.7	1.0	-48.7	-25.0	-23.7	
10.02	-71.5	V	3.0	-10.7	36.1	1.0	-45.8	-25.0	-20.8	
Mid Channel (2593MHz)										
5.19	-68.0	H	3.0	-14.7	38.7	1.0	-52.4	-25.0	-27.4	
7.78	-69.0	H	3.0	-10.9	37.6	1.0	-47.4	-25.0	-22.4	
10.37	-71.1	H	3.0	-10.0	36.4	1.0	-45.3	-25.0	-20.3	
5.19	-67.6	V	3.0	-14.7	38.7	1.0	-52.4	-25.0	-27.4	
7.78	-70.0	V	3.0	-12.1	37.6	1.0	-48.6	-25.0	-23.6	
10.37	-70.5	V	3.0	-9.3	36.4	1.0	-44.7	-25.0	-19.7	
High Channel (2680MHz)										
5.36	-67.8	H	3.0	-14.2	38.6	1.0	-51.8	-25.0	-26.8	
8.04	-70.8	H	3.0	-12.4	37.4	1.0	-48.8	-25.0	-23.8	
10.72	-71.2	H	3.0	-9.8	36.6	1.0	-45.4	-25.0	-20.4	
5.36	-66.9	V	3.0	-13.6	38.6	1.0	-51.2	-25.0	-26.2	
8.04	-70.1	V	3.0	-11.9	37.4	1.0	-48.3	-25.0	-23.3	
10.72	-71.4	V	3.0	-9.9	36.6	1.0	-45.5	-25.0	-20.5	

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UL VERIFICATION SERVICES INC. FORM NO: CCSUP4031B
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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9.2.12. LTE BAND 66

QPSK LTE BAND 66 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 03/17/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 66, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1720.0MHz)										
3.44	-66.7	H	3.0	-17.4	38.5	1.0	-54.9	-13.0	-41.9	
5.16	-66.2	H	3.0	-13.0	38.7	1.0	-50.7	-13.0	-37.7	
6.88	-67.0	H	3.0	-10.1	38.1	1.0	-47.2	-13.0	-34.2	
3.44	-66.0	V	3.0	-16.9	38.5	1.0	-54.4	-13.0	-41.4	
5.16	-66.2	V	3.0	-13.3	38.7	1.0	-51.0	-13.0	-38.0	
6.88	-66.9	V	3.0	-10.2	38.1	1.0	-47.3	-13.0	-34.3	
Mid Channel (1745.0MHz)										
3.49	-65.5	H	3.0	-16.1	38.5	1.0	-53.6	-13.0	-40.6	
5.24	-66.7	H	3.0	-13.3	38.7	1.0	-51.0	-13.0	-38.0	
6.98	-66.7	H	3.0	-9.6	38.1	1.0	-46.6	-13.0	-33.6	
3.49	-67.3	V	3.0	-18.1	38.5	1.0	-55.6	-13.0	-42.6	
5.24	-67.1	V	3.0	-14.1	38.7	1.0	-51.7	-13.0	-38.7	
6.98	-67.6	V	3.0	-10.7	38.1	1.0	-47.8	-13.0	-34.8	
High Channel (1770.0MHz)										
3.54	-64.2	H	3.0	-14.6	38.6	1.0	-52.2	-13.0	-39.2	
5.31	-64.3	H	3.0	-10.8	38.6	1.0	-48.4	-13.0	-35.4	
7.08	-64.7	H	3.0	-7.4	38.0	1.0	-44.4	-13.0	-31.4	
3.54	-66.5	V	3.0	-17.1	38.6	1.0	-54.7	-13.0	-41.7	
5.31	-66.9	V	3.0	-13.7	38.6	1.0	-51.4	-13.0	-38.4	
7.08	-68.7	V	3.0	-11.7	38.0	1.0	-48.7	-13.0	-35.7	

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16QAM LTE BAND 66 (20.0MHZ BANDWIDTH)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 03/17/17
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 66, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	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 (1720.0MHz)										
3.44	-66.5	H	3.0	-17.2	38.5	1.0	-54.7	-13.0	-41.7	
5.16	-65.4	H	3.0	-12.2	38.7	1.0	-49.9	-13.0	-36.9	
6.88	-65.7	H	3.0	-8.8	38.1	1.0	-45.9	-13.0	-32.9	
3.44	-66.5	V	3.0	-17.4	38.5	1.0	-54.9	-13.0	-41.9	
5.16	-65.8	V	3.0	-12.9	38.7	1.0	-50.6	-13.0	-37.6	
6.88	-66.0	V	3.0	-9.3	38.1	1.0	-46.4	-13.0	-33.4	
Mid Channel (1745.0MHz)										
3.49	-65.7	H	3.0	-16.3	38.5	1.0	-53.8	-13.0	-40.8	
5.24	-65.4	H	3.0	-12.0	38.7	1.0	-49.7	-13.0	-36.7	
6.98	-64.9	H	3.0	-7.8	38.1	1.0	-44.8	-13.0	-31.8	
3.49	-65.3	V	3.0	-16.0	38.5	1.0	-53.6	-13.0	-40.6	
5.24	-66.8	V	3.0	-13.8	38.7	1.0	-51.4	-13.0	-38.4	
6.98	-66.4	V	3.0	-9.5	38.1	1.0	-46.6	-13.0	-33.6	
High Channel (1770.0MHz)										
3.54	-66.2	H	3.0	-16.6	38.6	1.0	-54.2	-13.0	-41.2	
5.31	-65.8	H	3.0	-12.3	38.6	1.0	-49.9	-13.0	-36.9	
7.08	-66.2	H	3.0	-8.9	38.0	1.0	-45.9	-13.0	-32.9	
3.54	-66.8	V	3.0	-17.4	38.6	1.0	-55.0	-13.0	-42.0	
5.31	-65.0	V	3.0	-11.8	38.6	1.0	-49.5	-13.0	-36.5	
7.08	-66.2	V	3.0	-9.2	38.0	1.0	-46.2	-13.0	-33.2	

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