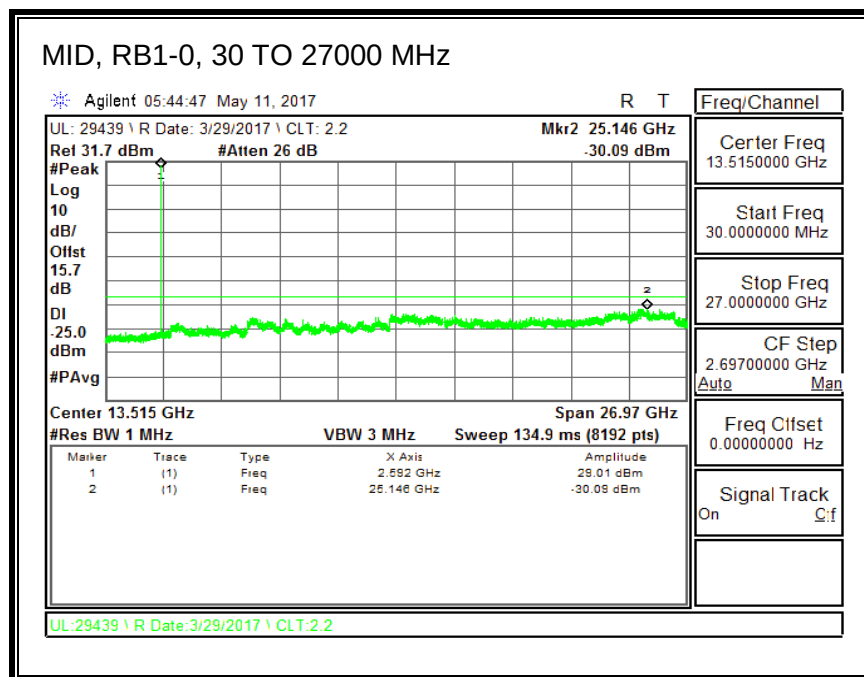
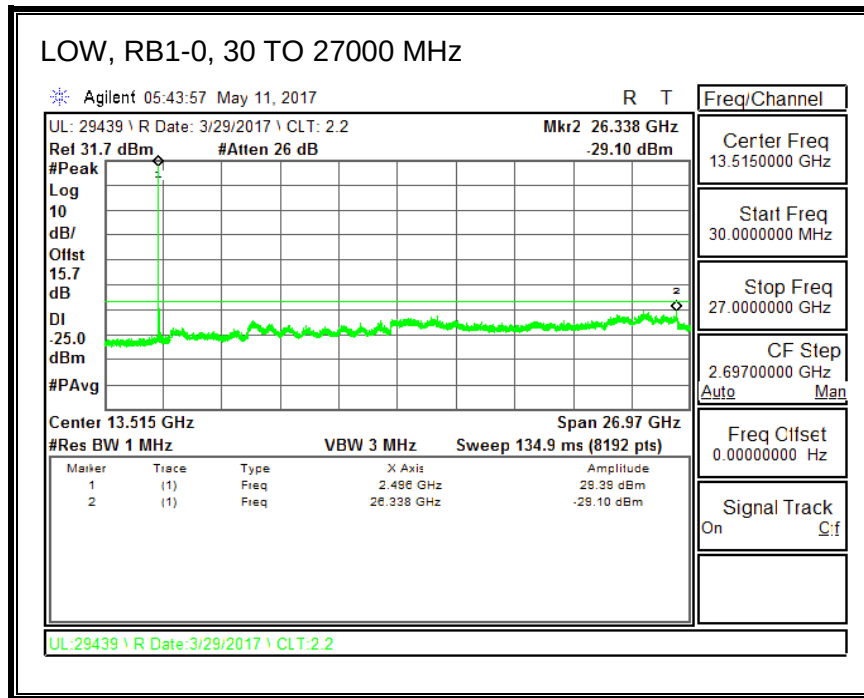
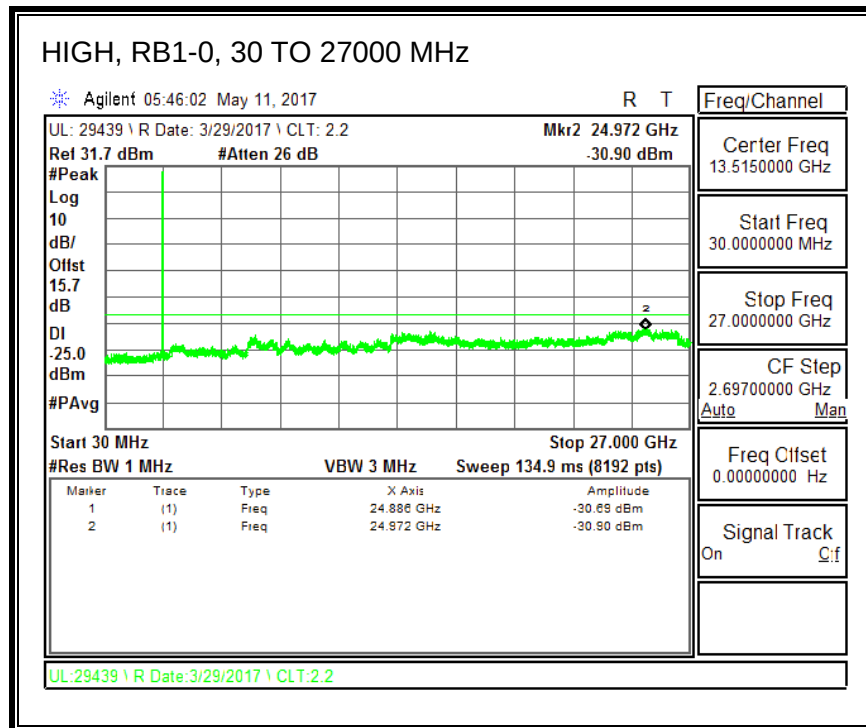


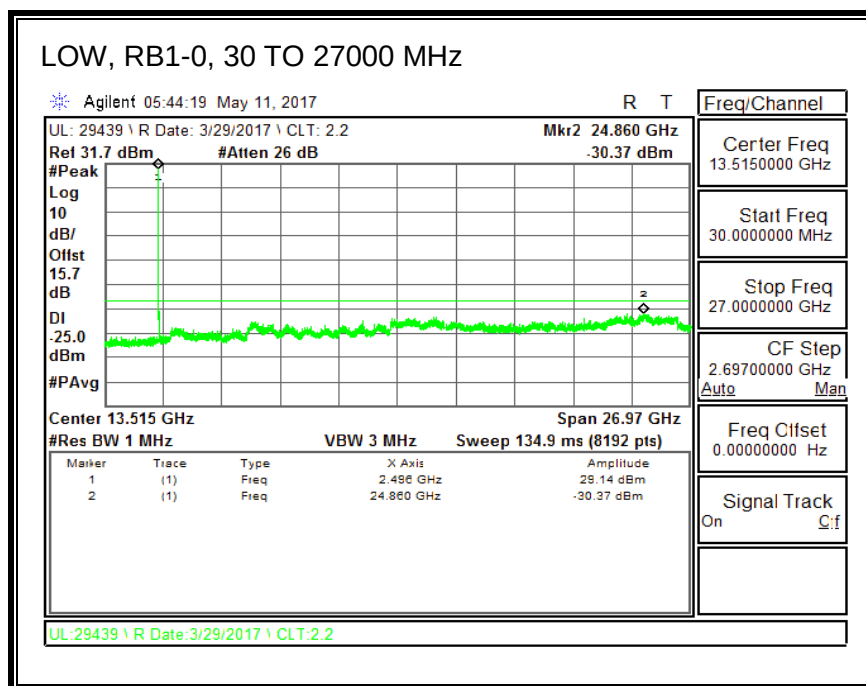
### 8.3.11. LTE BAND 41

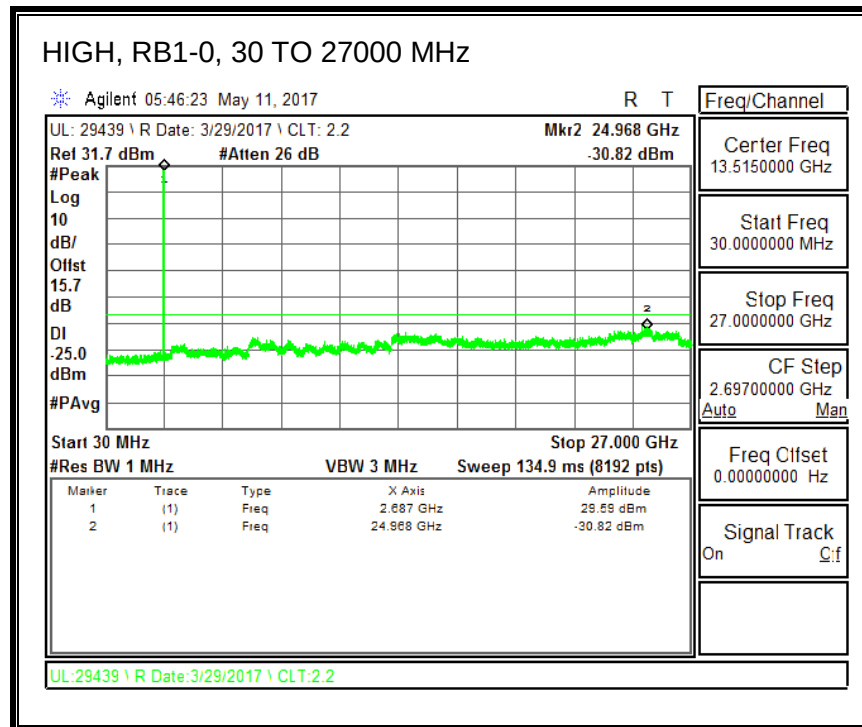
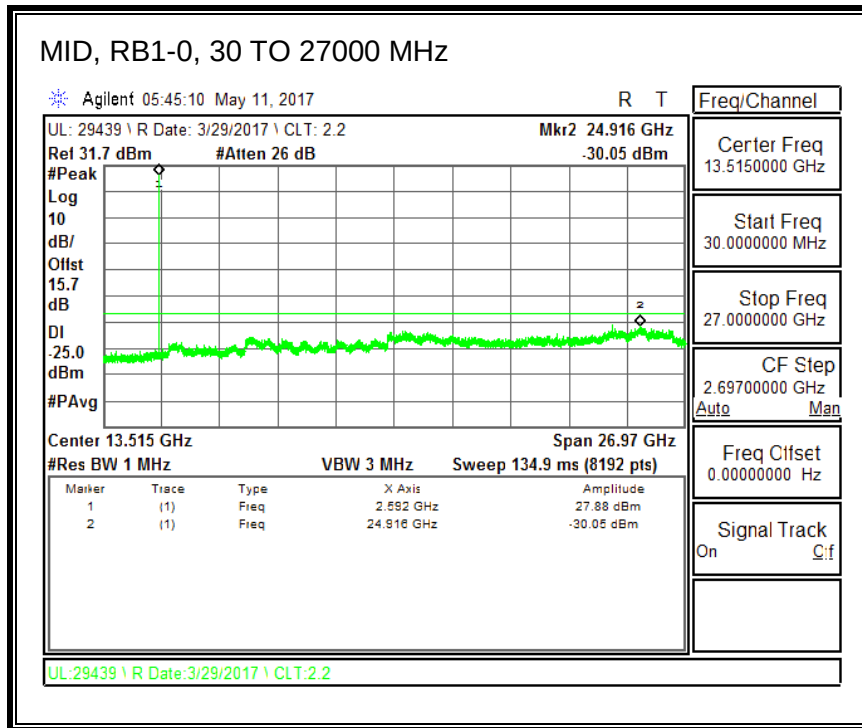
#### QPSK, (5.0 MHz BAND WIDTH)



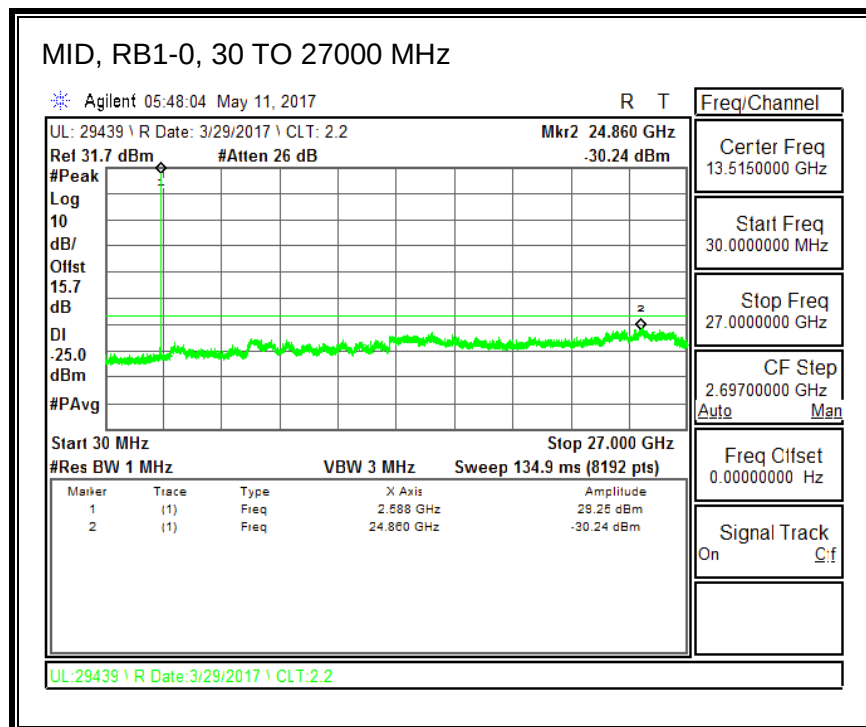
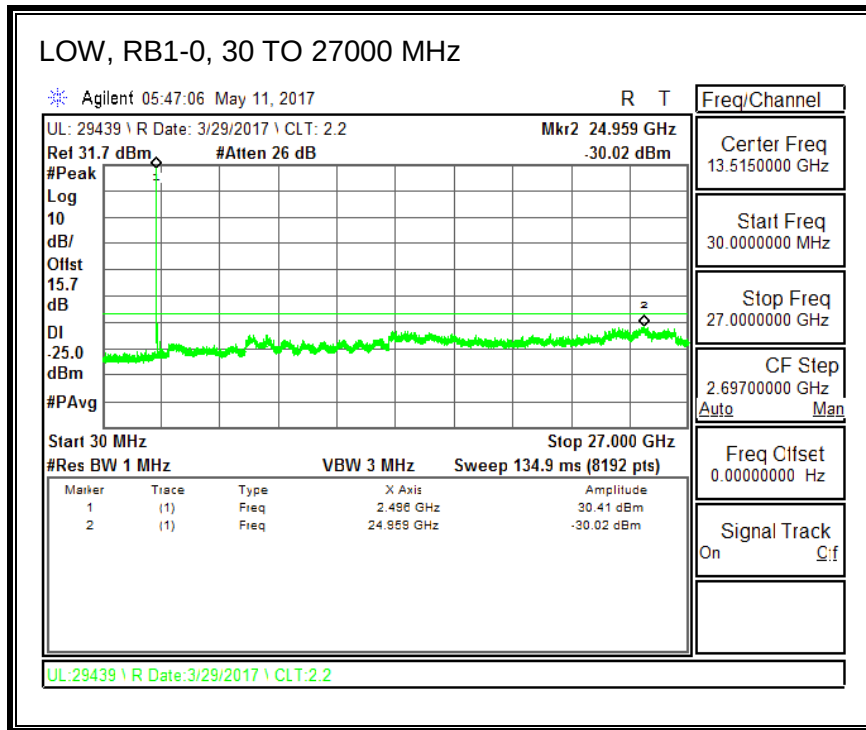


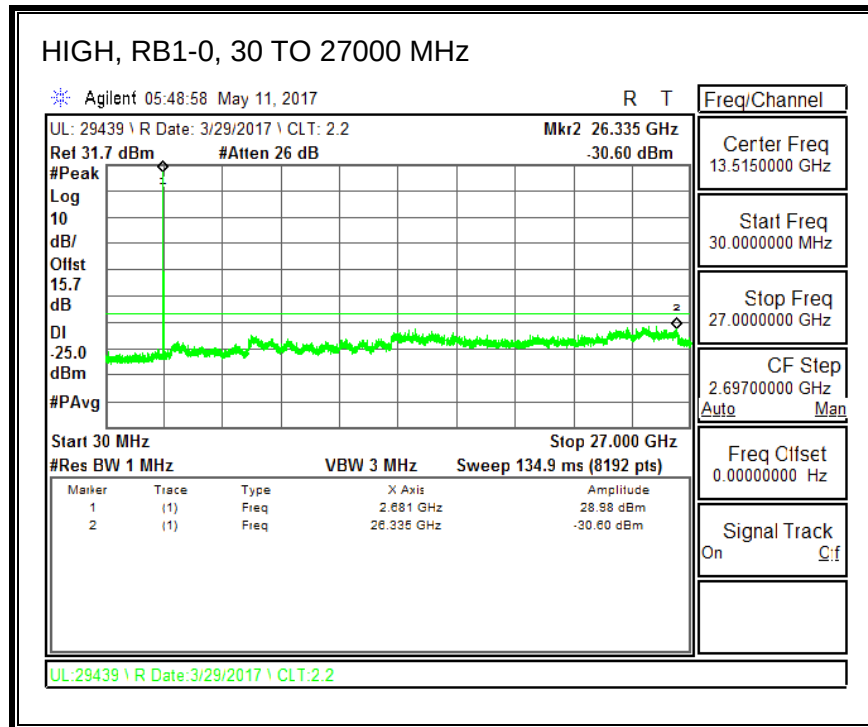
**16QAM, (5.0 MHz BAND WIDTH)**



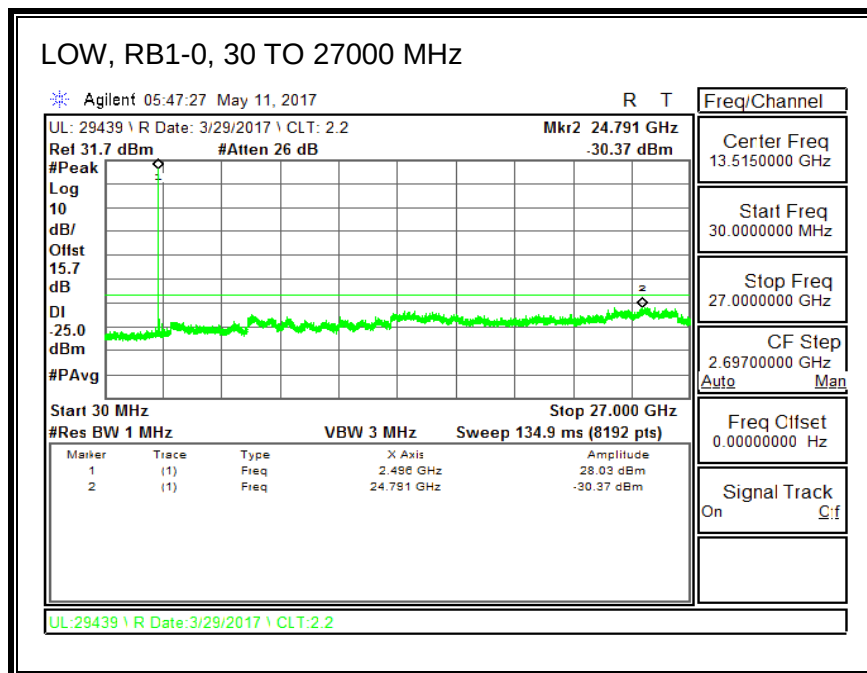


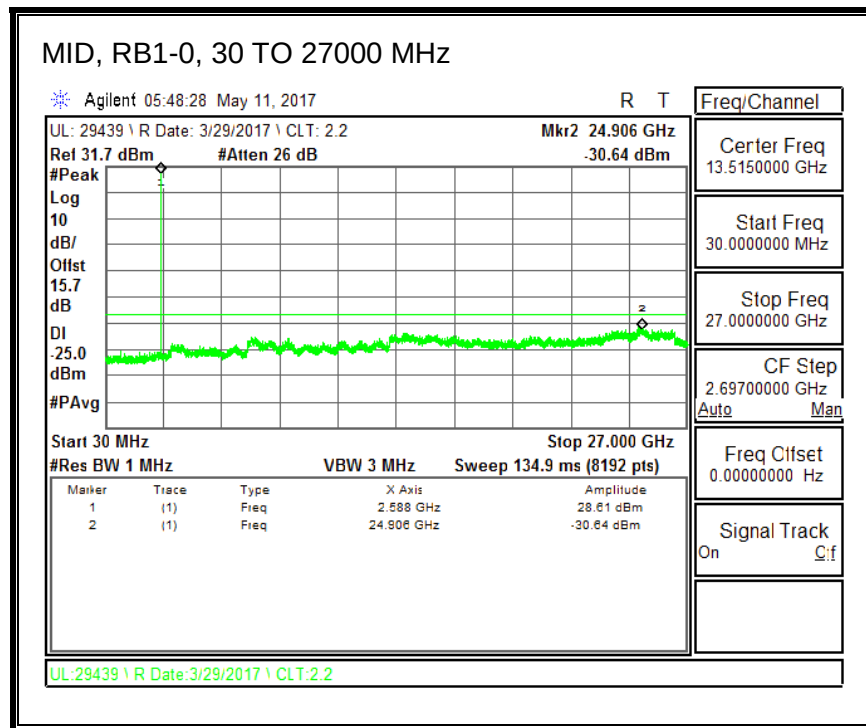
**QPSK, (10.0 MHz BAND WIDTH)**



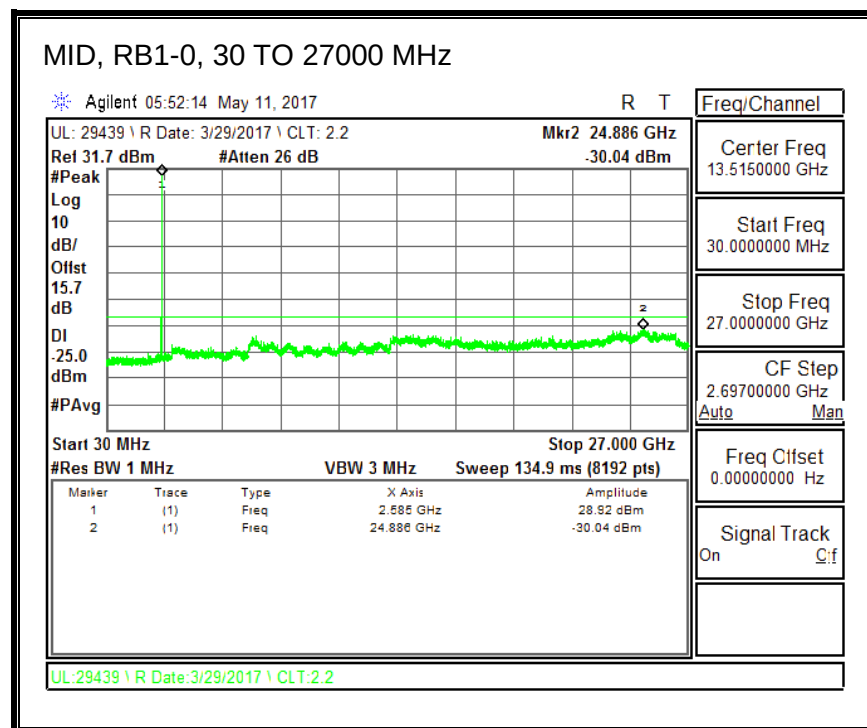
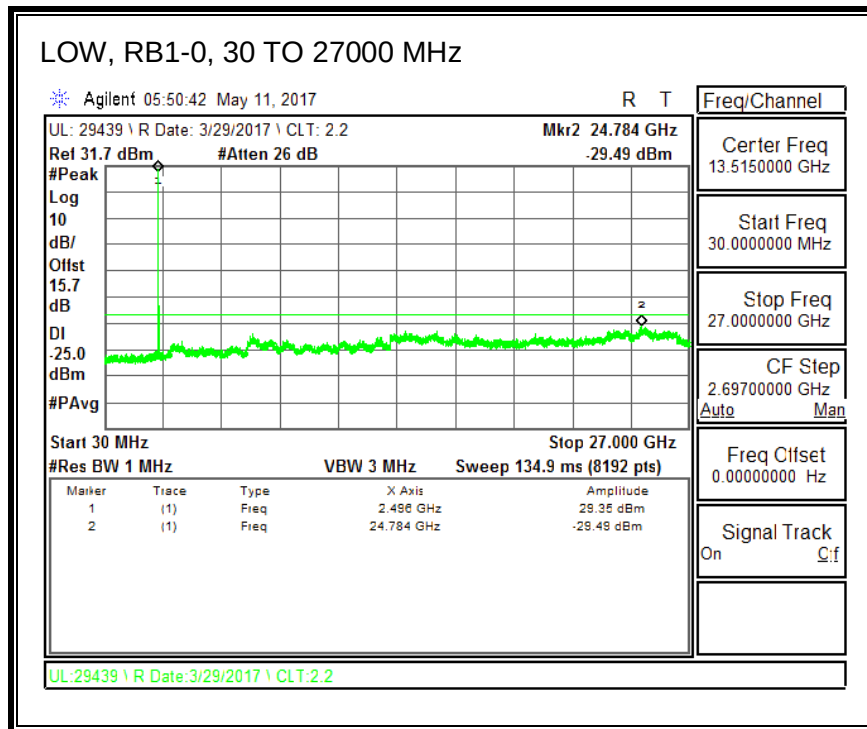


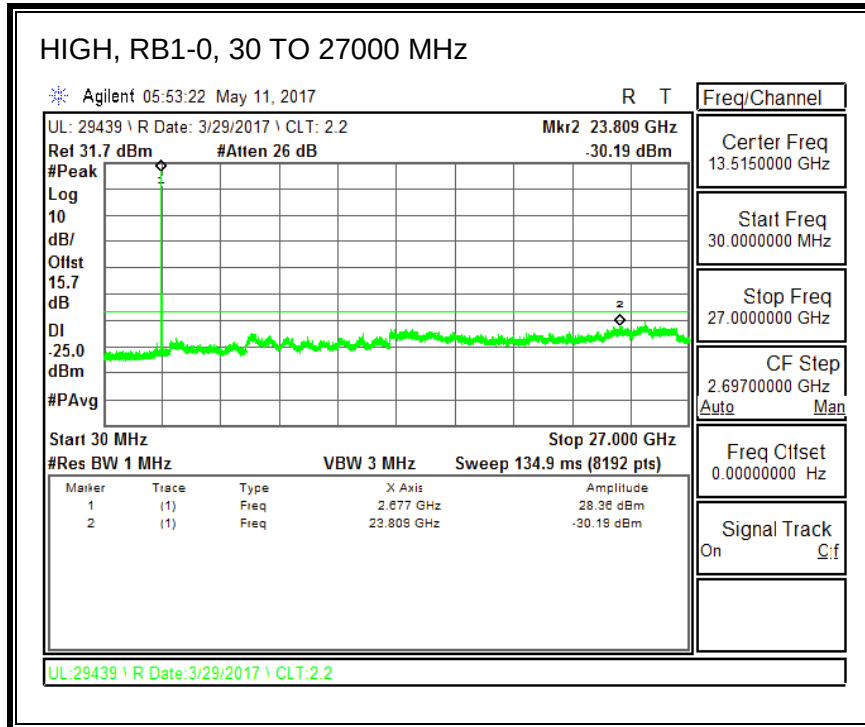
**16QAM, (10.0 MHz BAND WIDTH)**



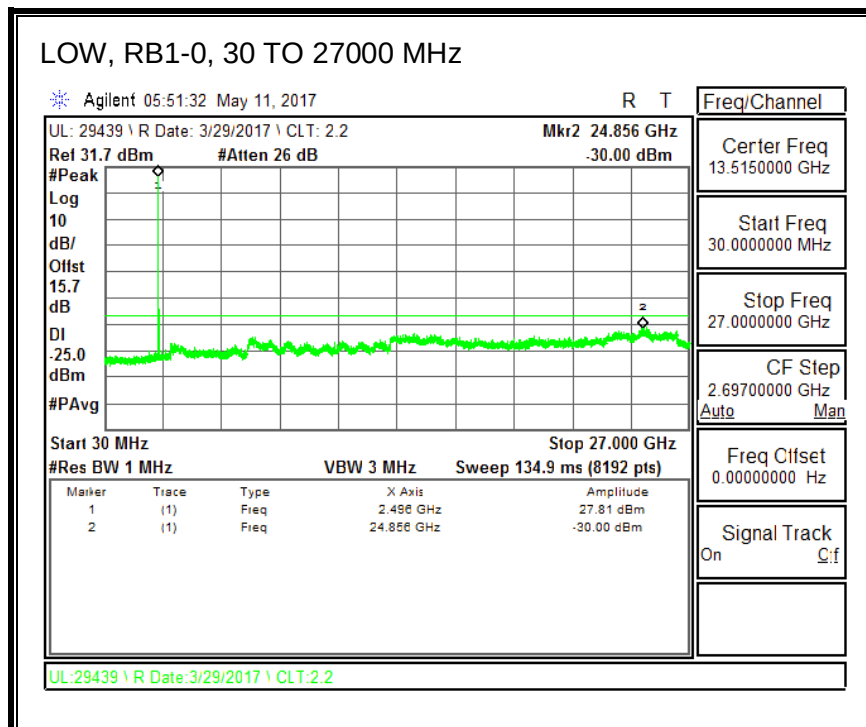


**QPSK, (15.0 MHz BAND WIDTH)**

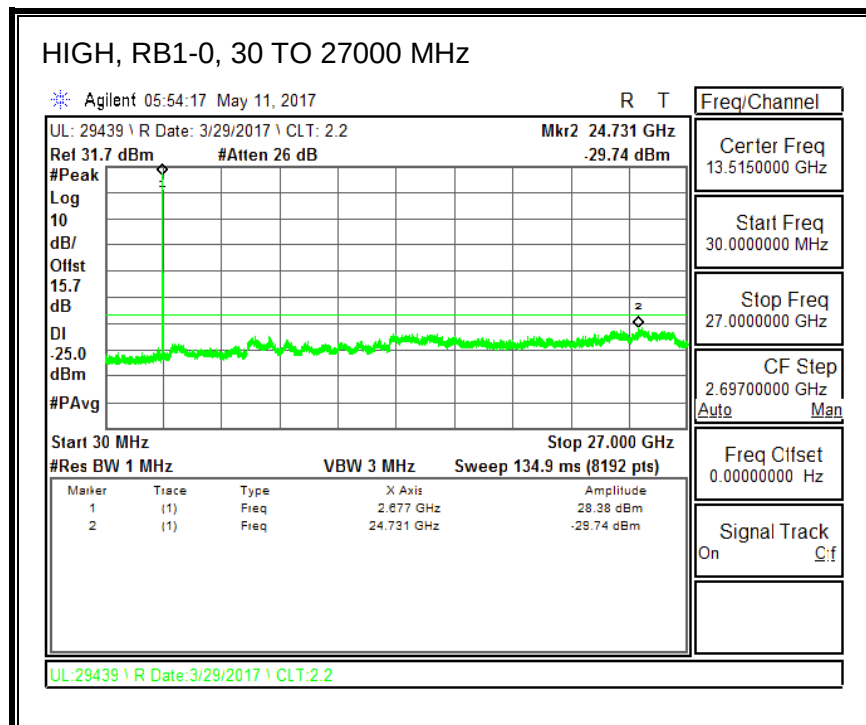
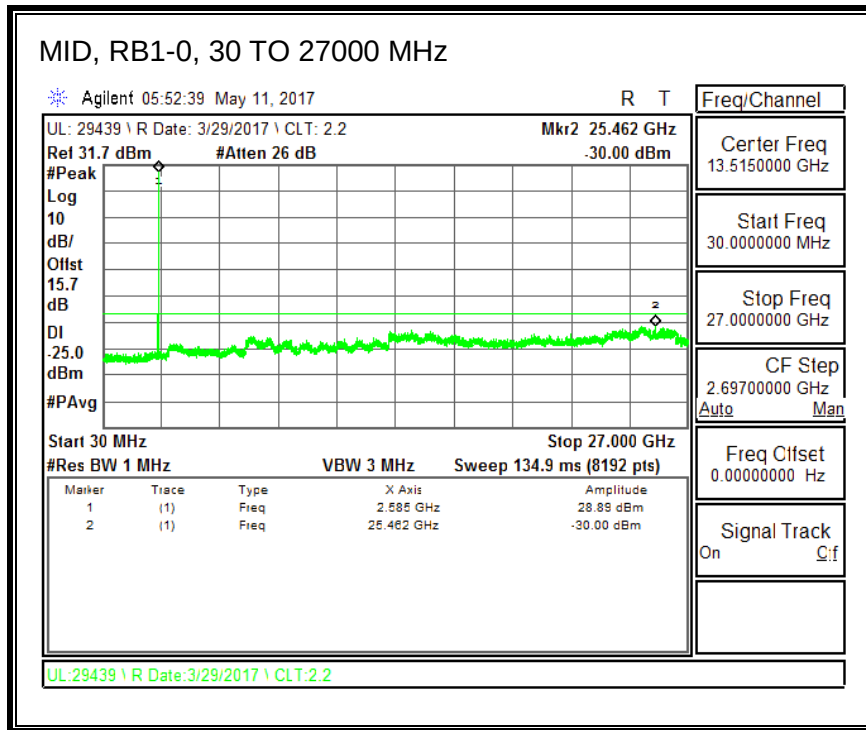




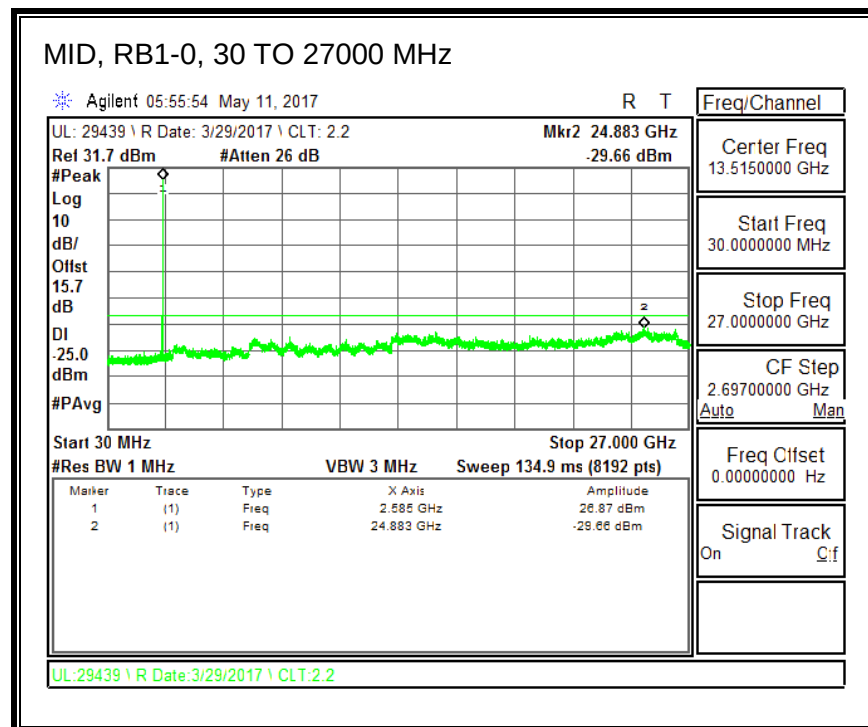
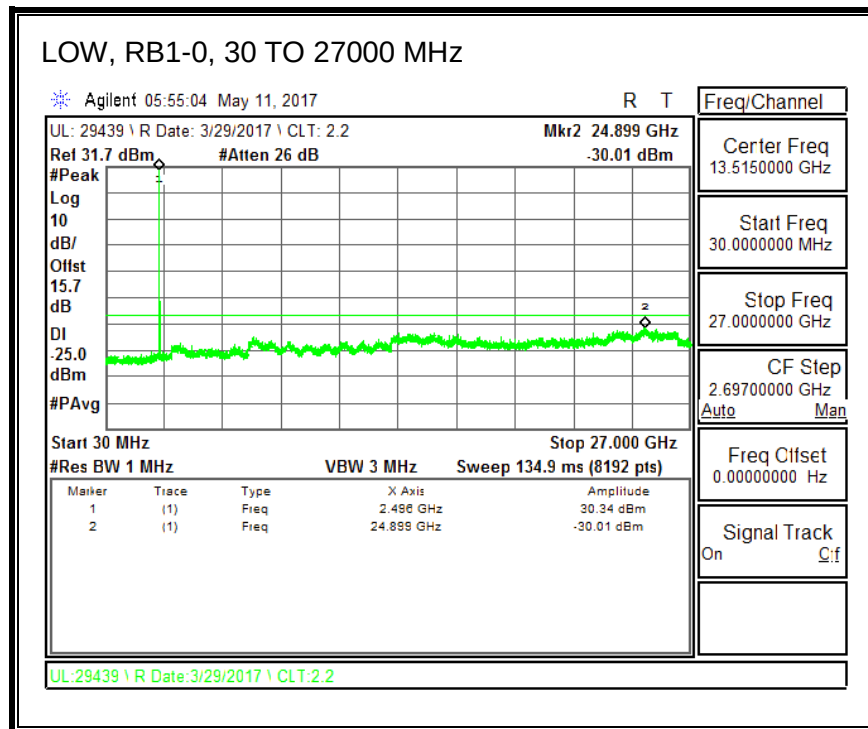
**16QAM, (15.0 MHz BAND WIDTH)**

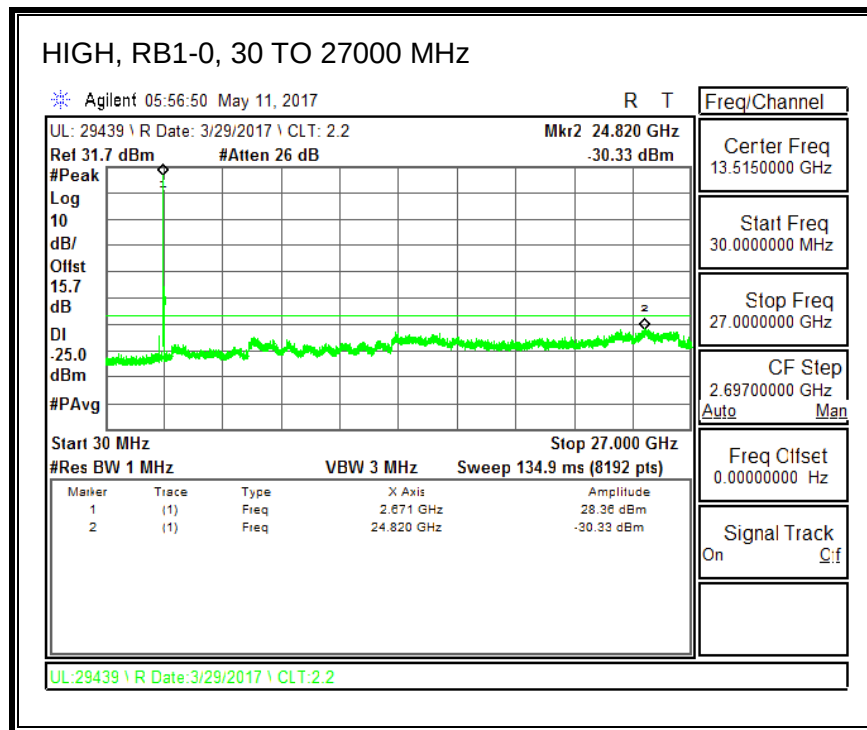




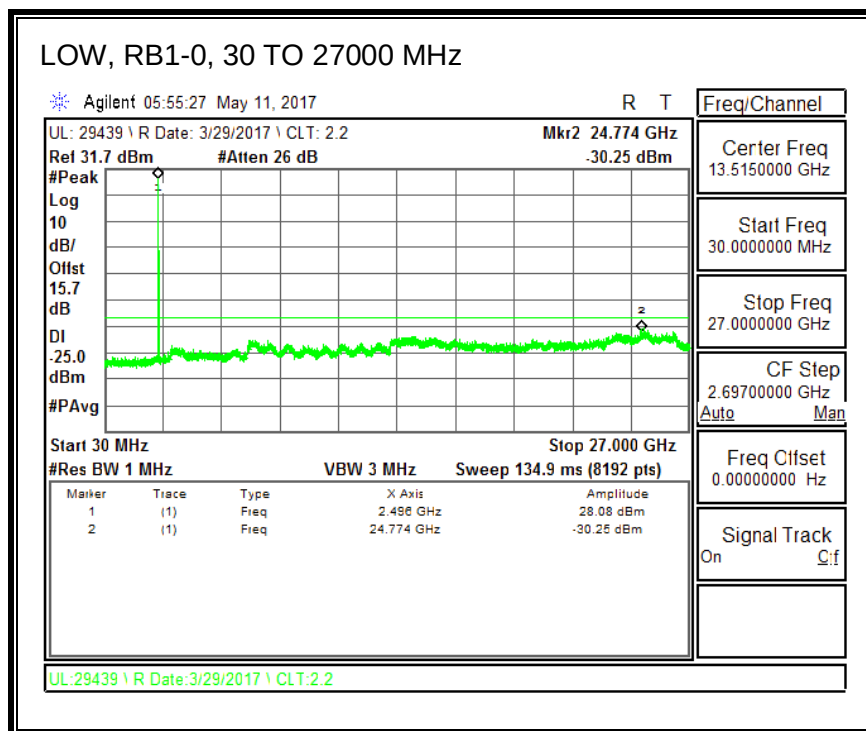


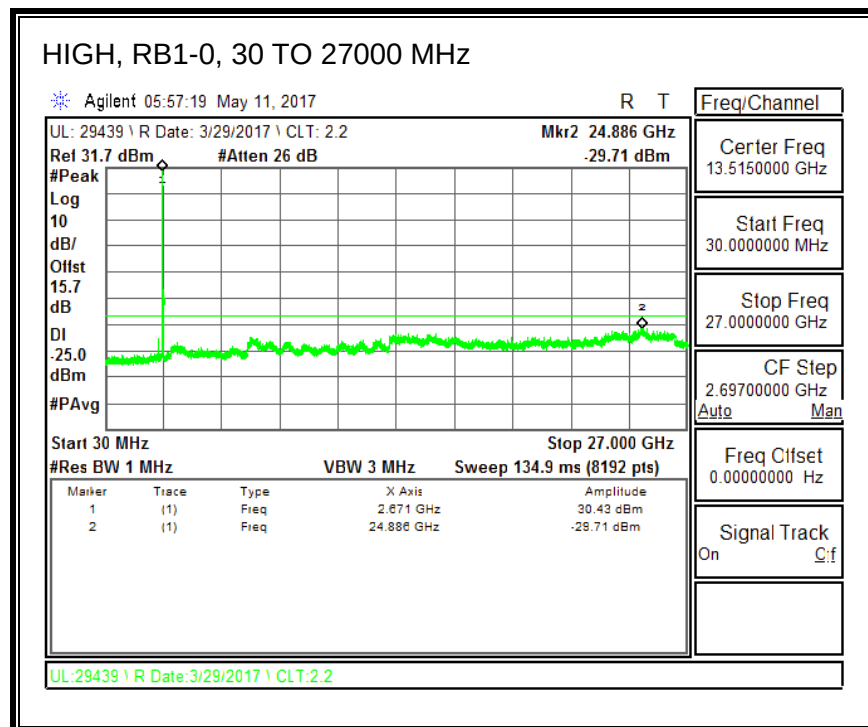
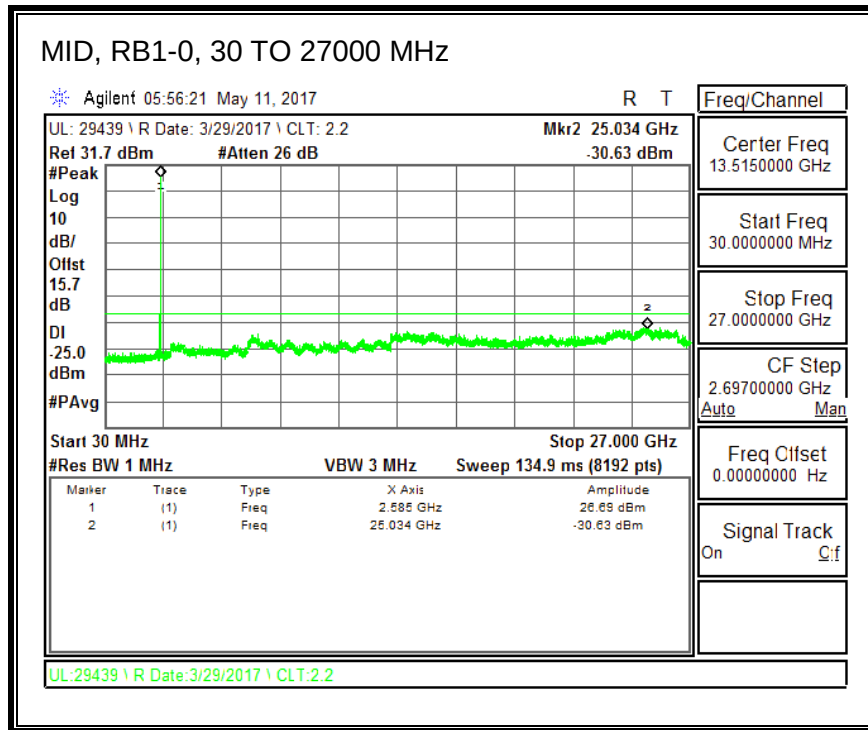
**QPSK, (20.0 MHz BAND WIDTH)**





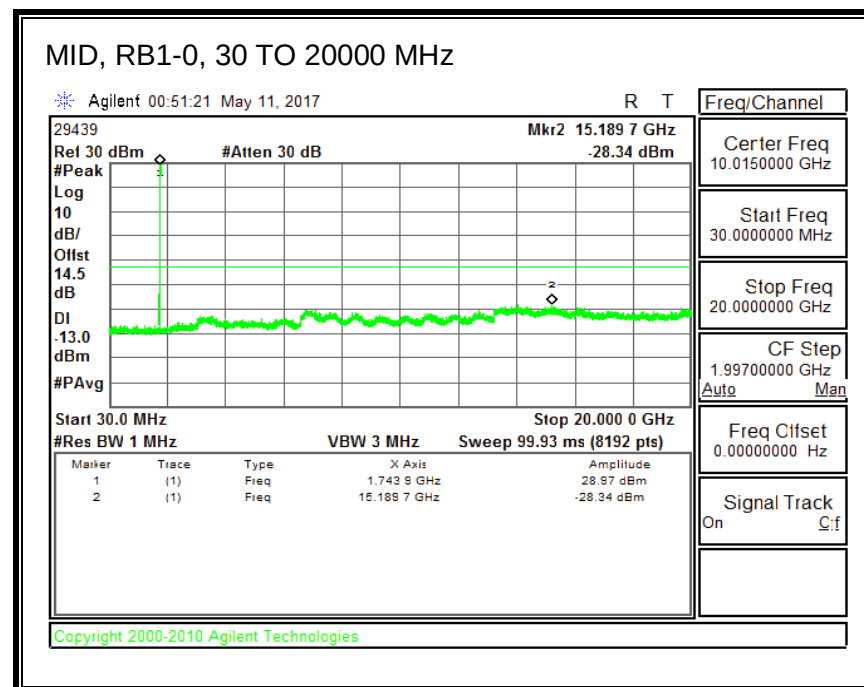
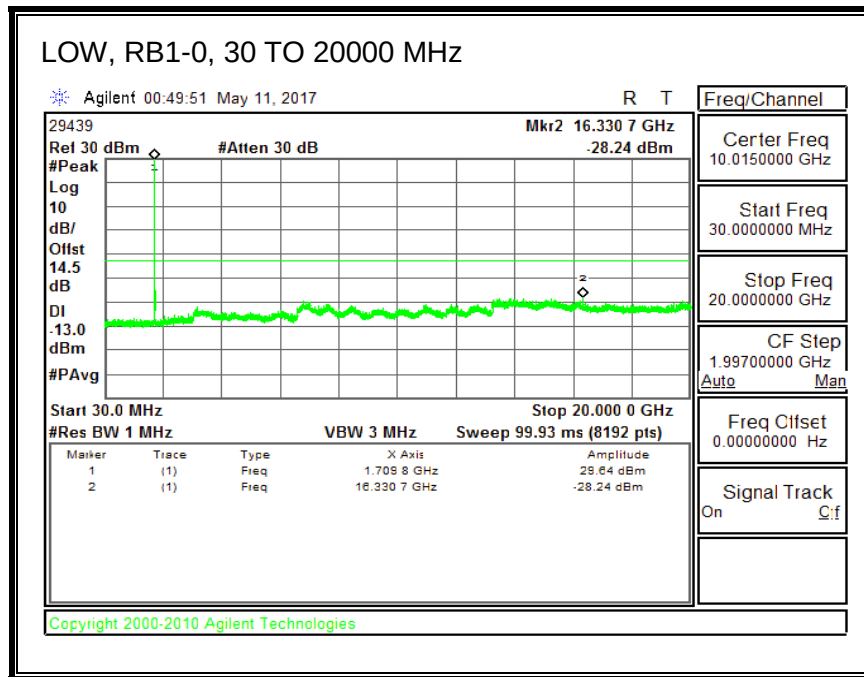
**16QAM, (20.0 MHz BAND WIDTH)**

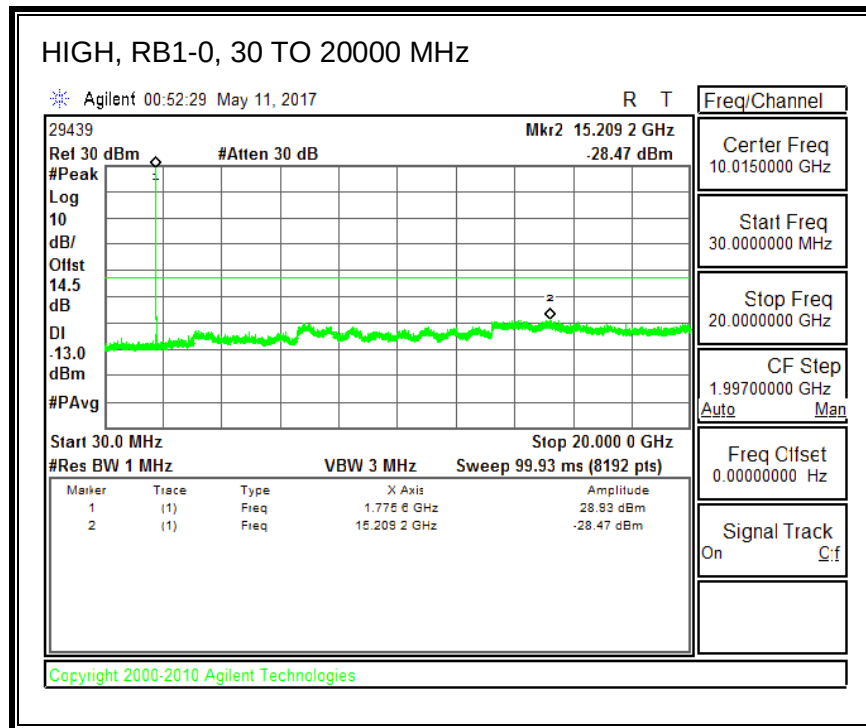




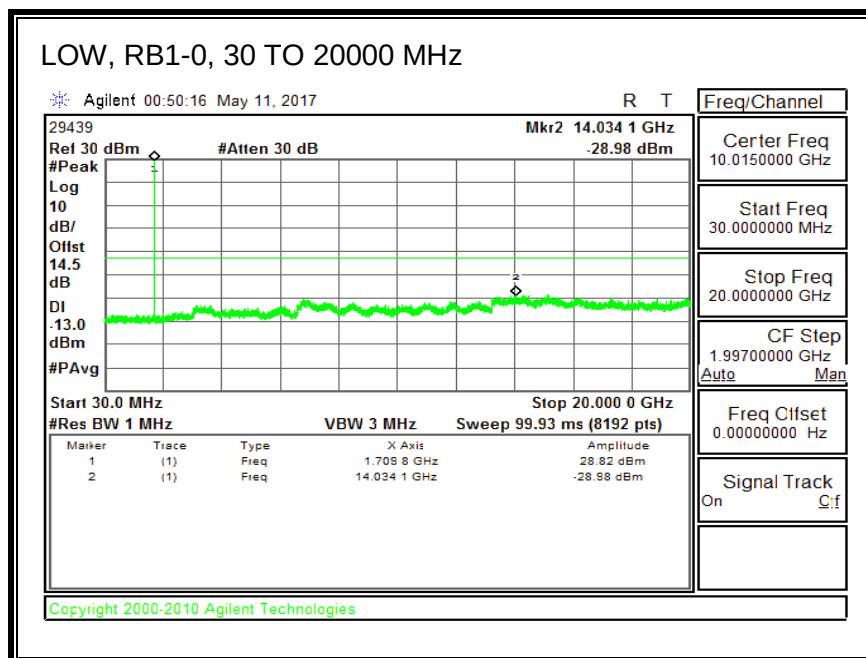
### 8.3.12. LTE BAND 66

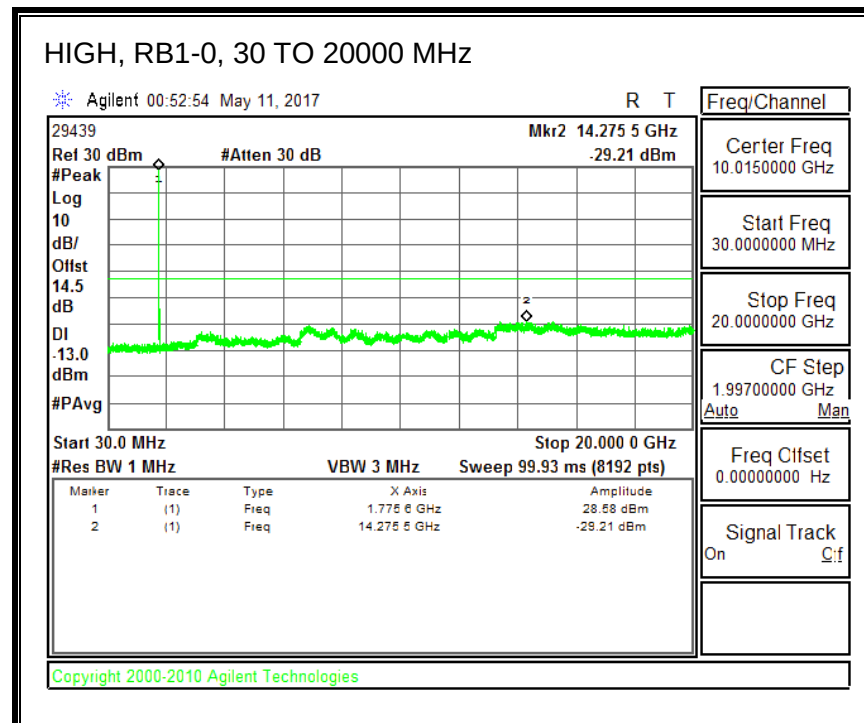
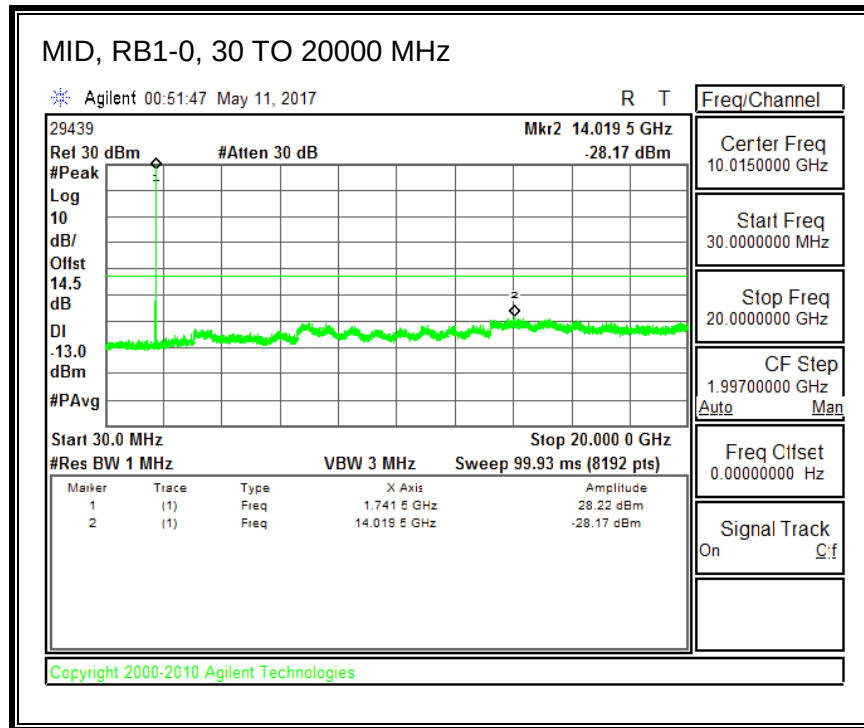
#### QPSK, (5.0 MHz BAND WIDTH)



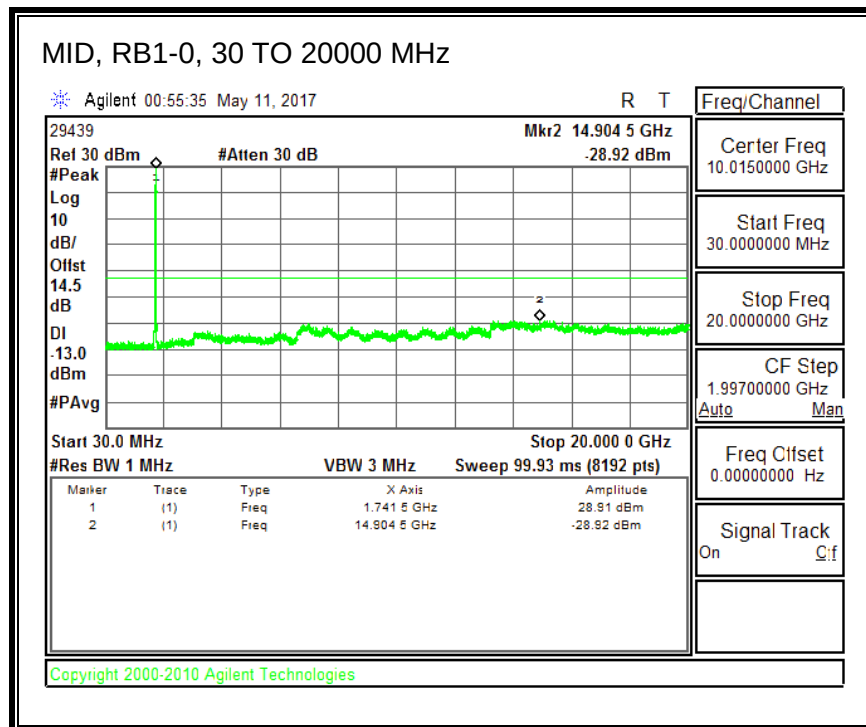
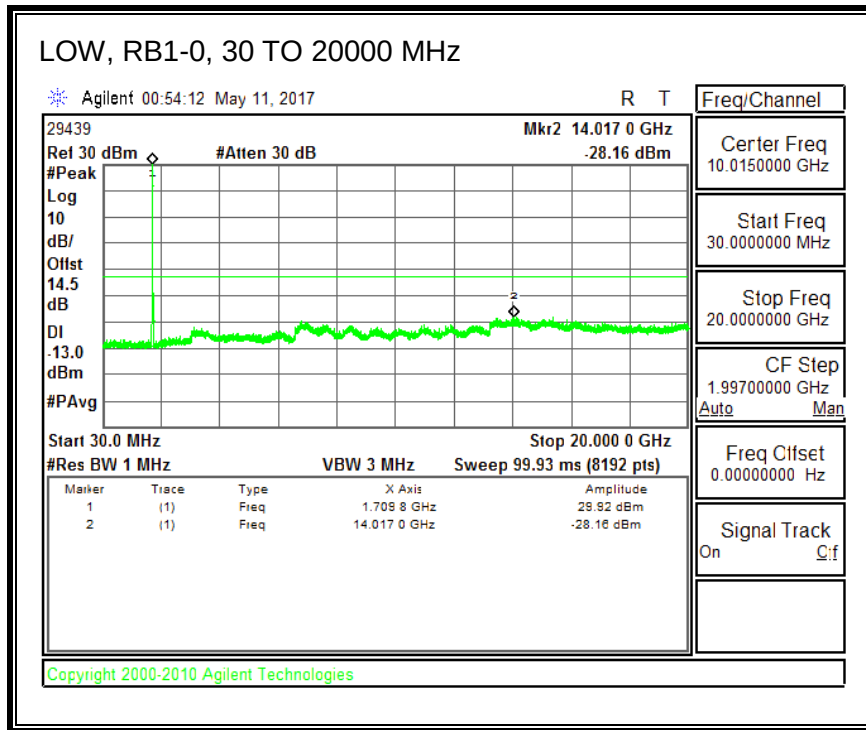


**16QAM, (5.0 MHz BAND WIDTH)**

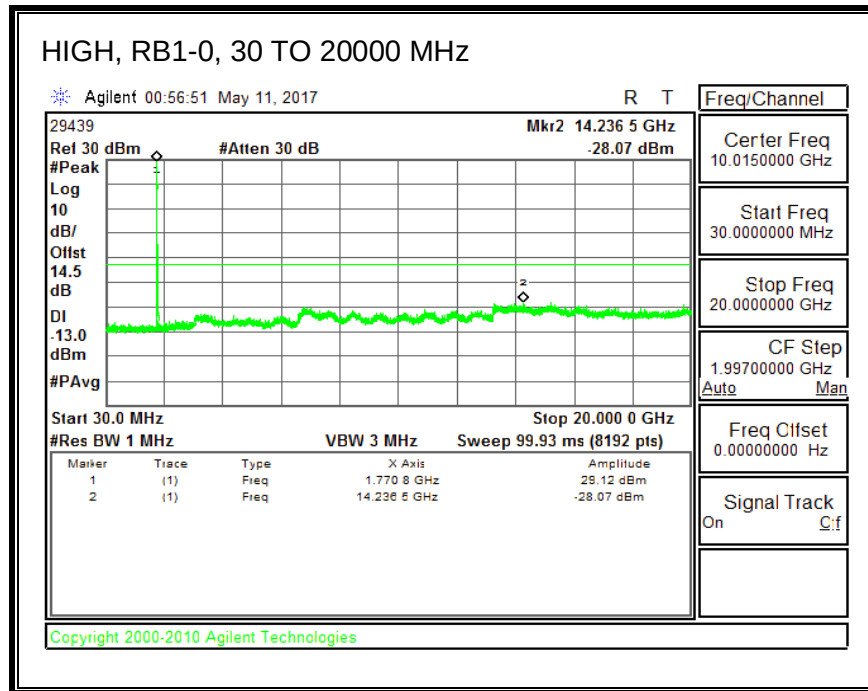




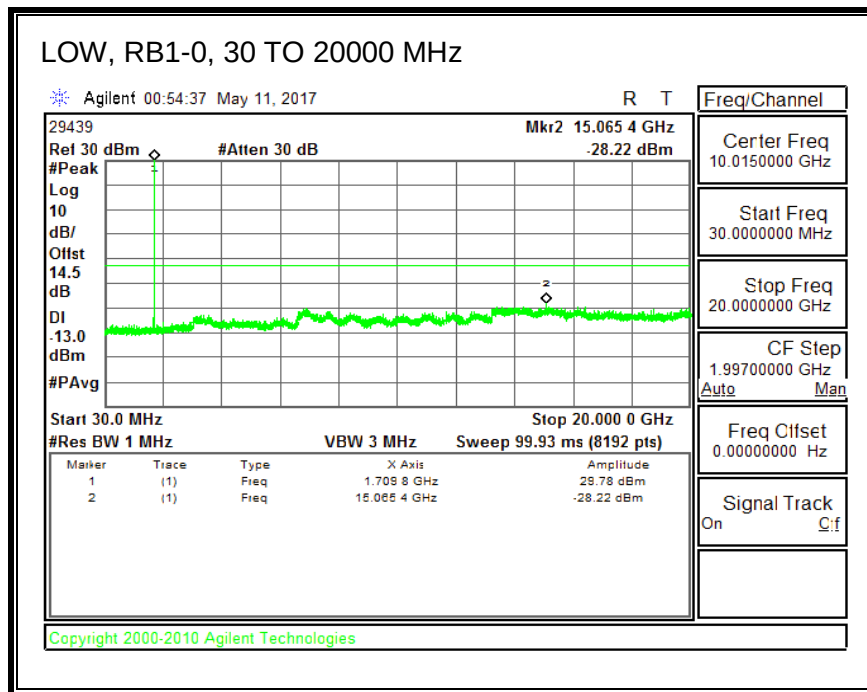
**QPSK, (10.0 MHz BAND WIDTH)**

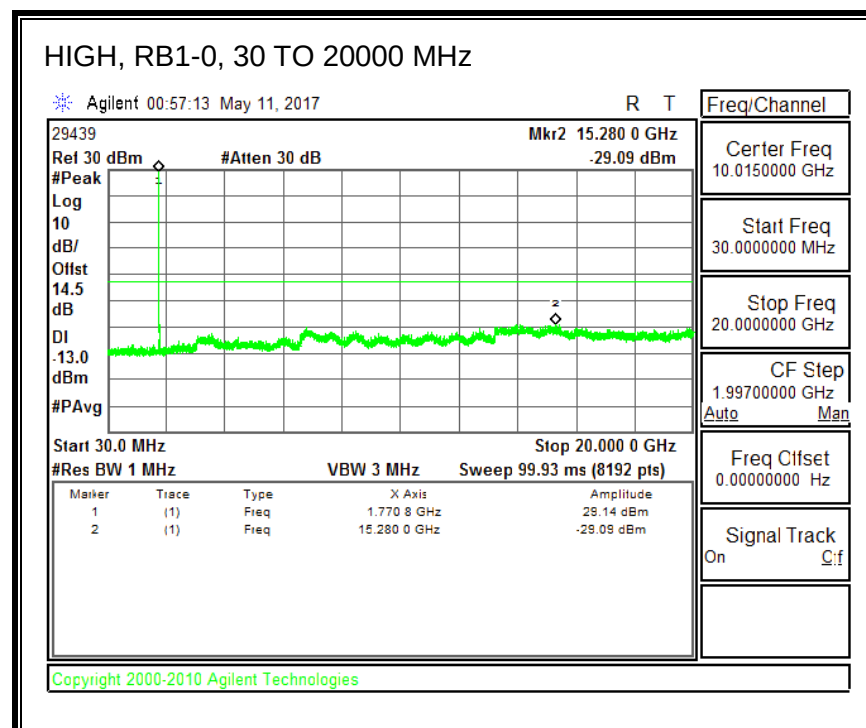
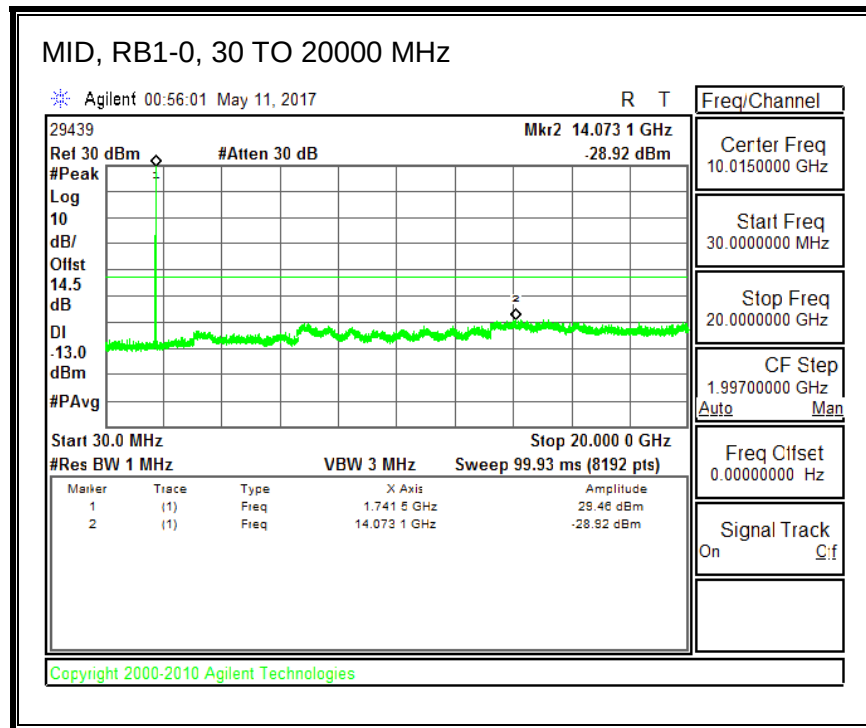




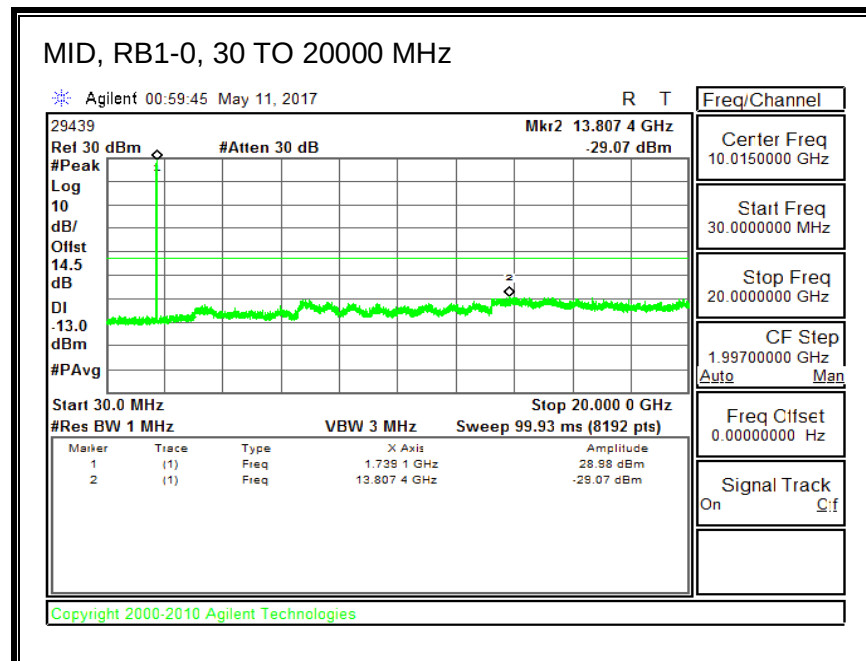
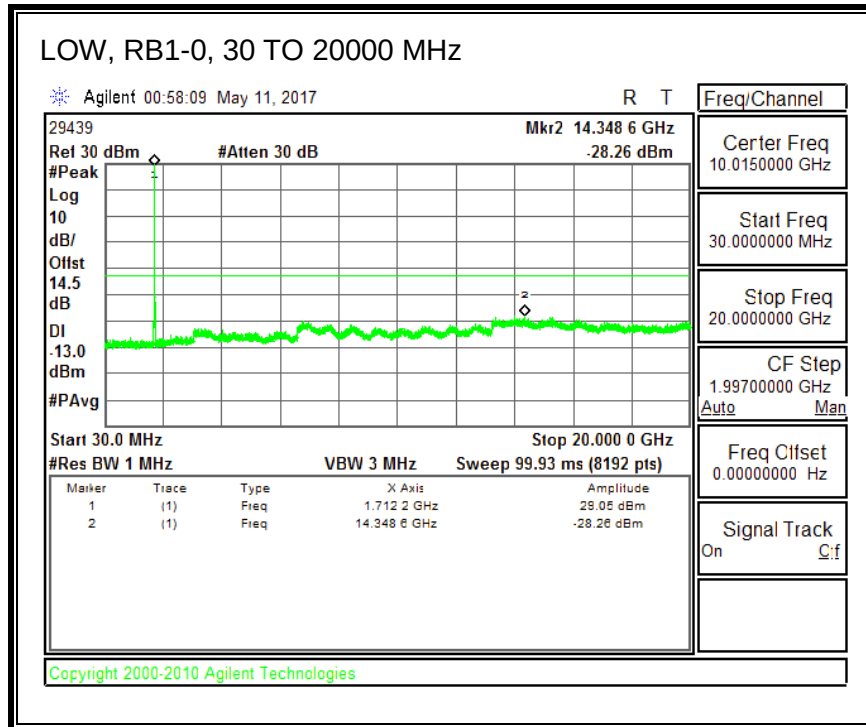


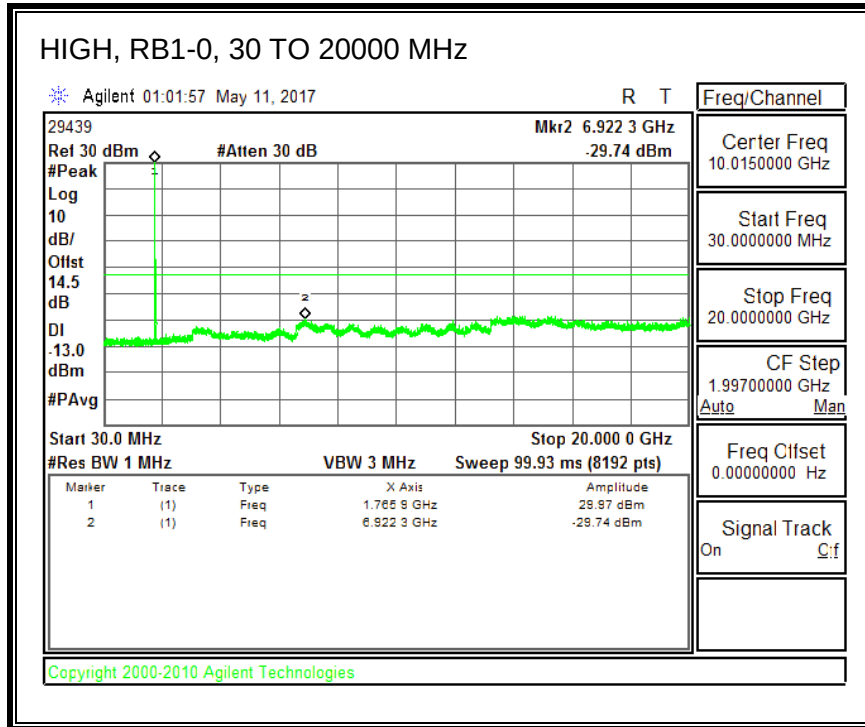
**16QAM, (10.0 MHz BAND WIDTH)**



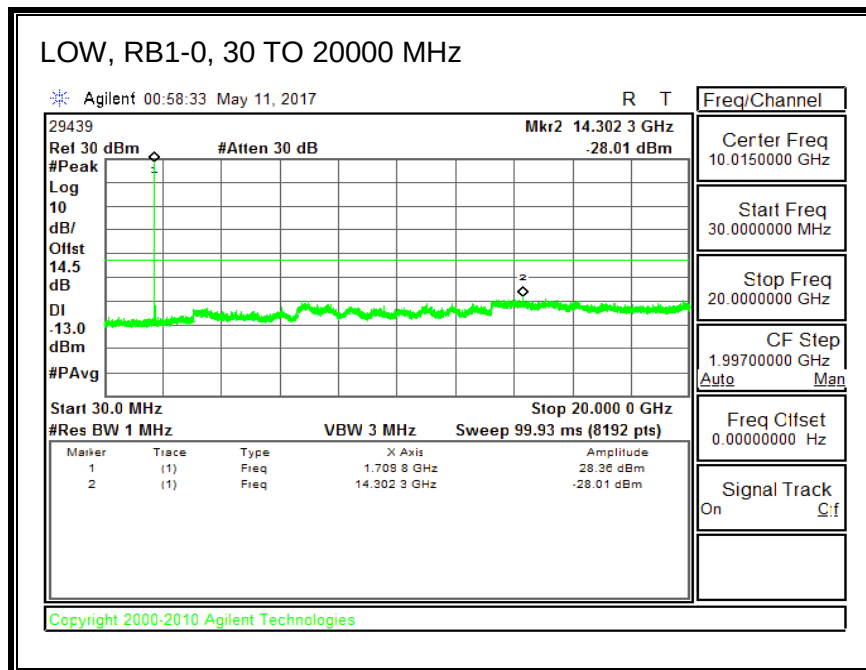


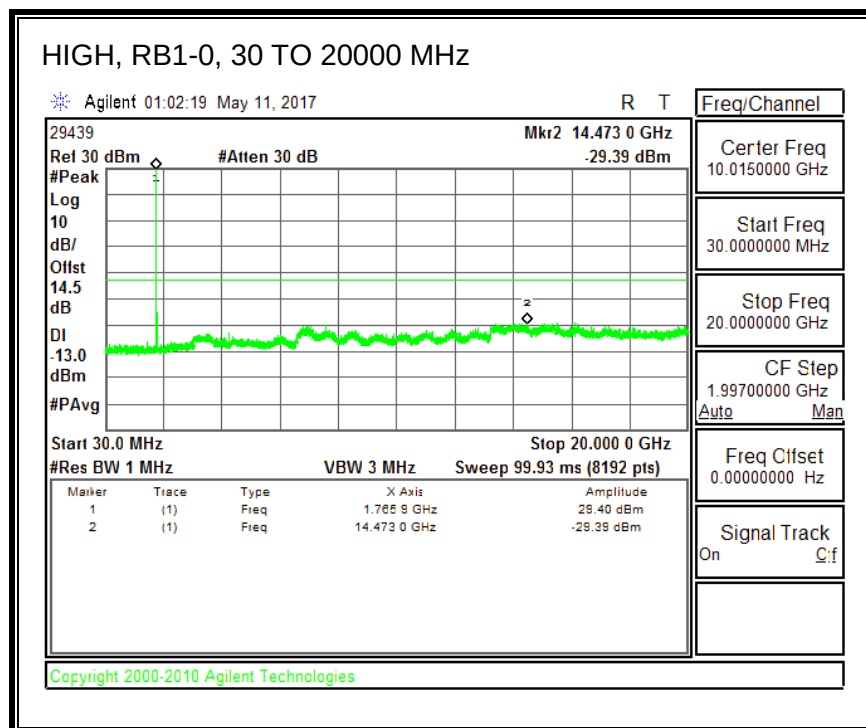
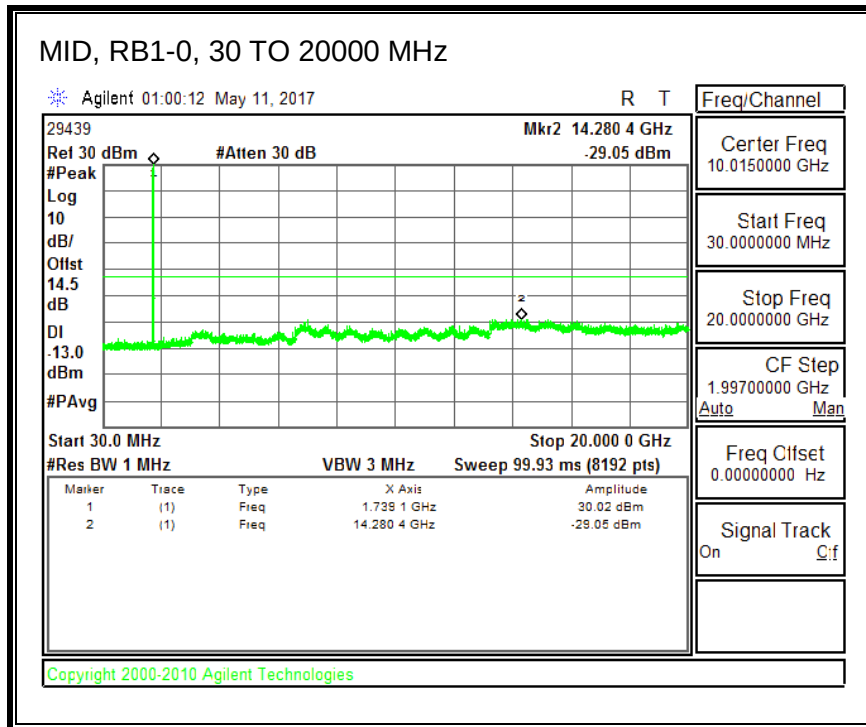
**QPSK, (15.0 MHz BAND WIDTH)**



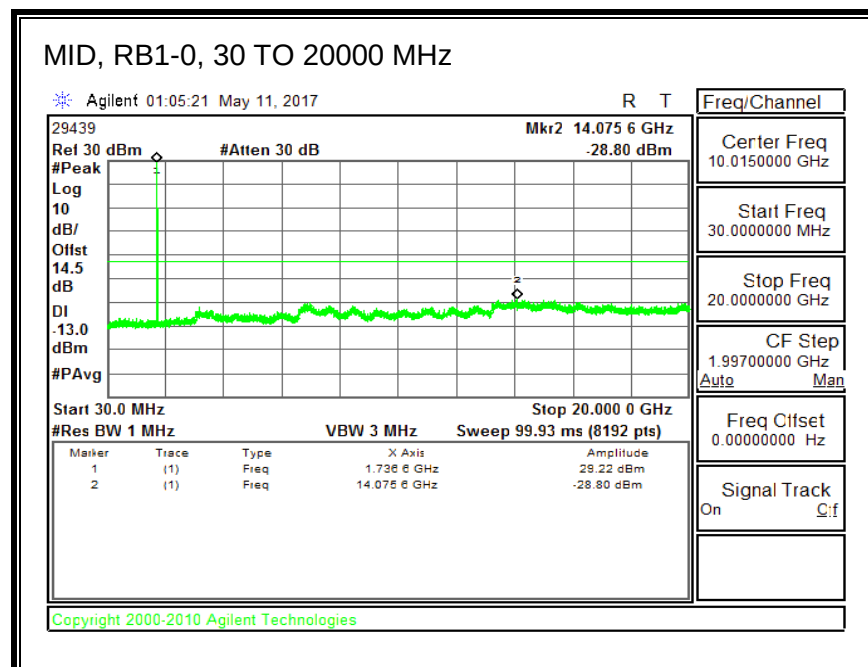
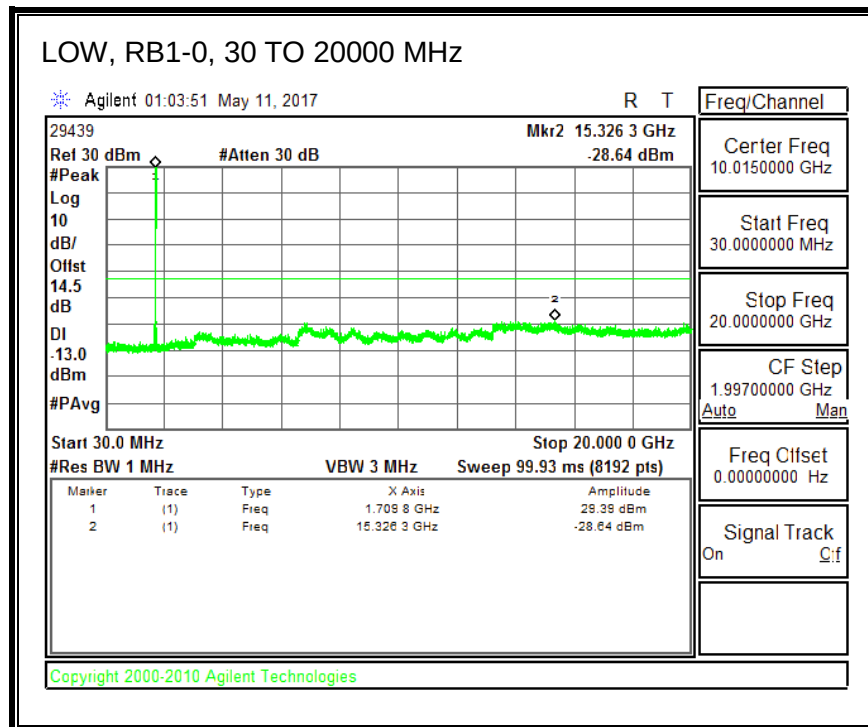


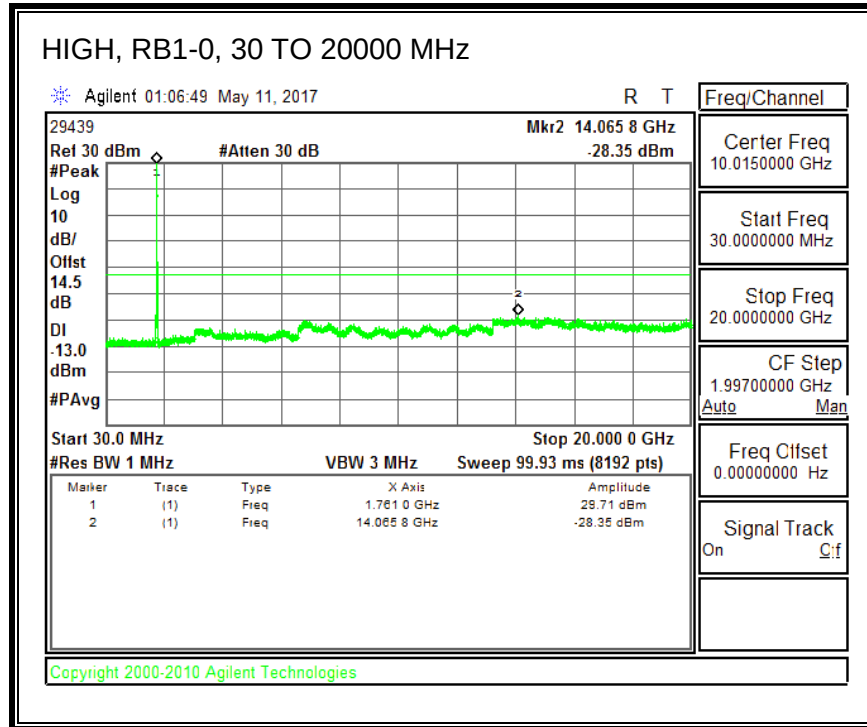
**16QAM, (15.0 MHz BAND WIDTH)**



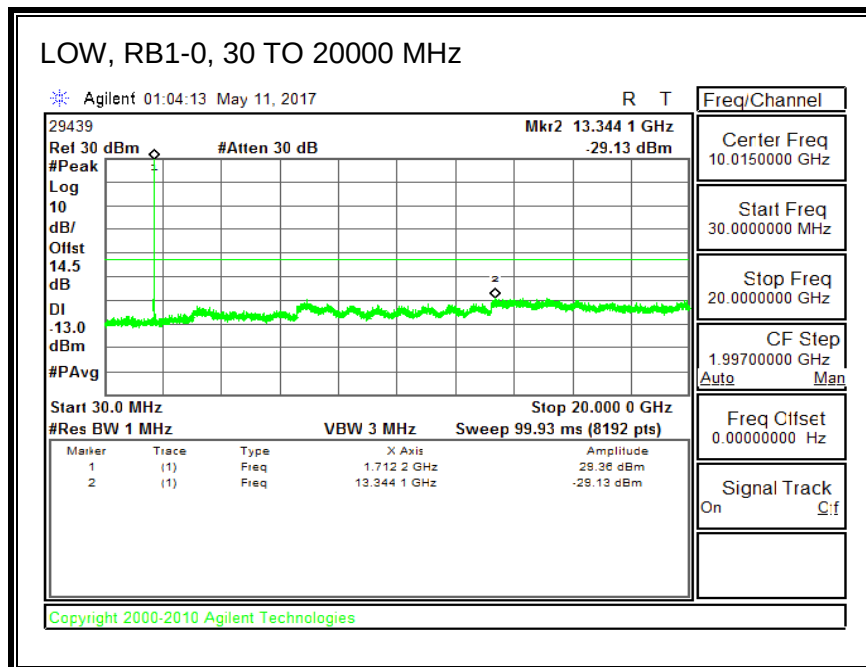


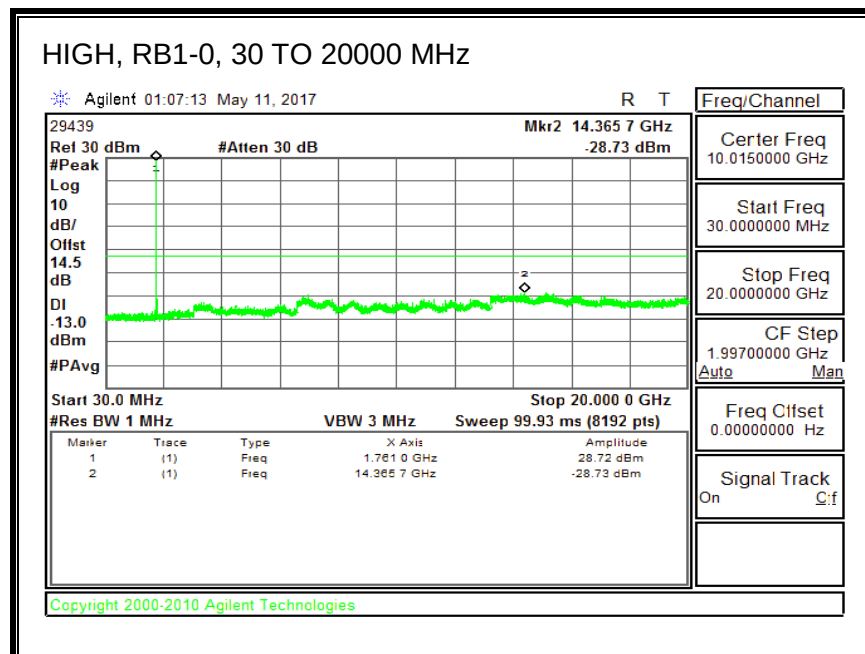
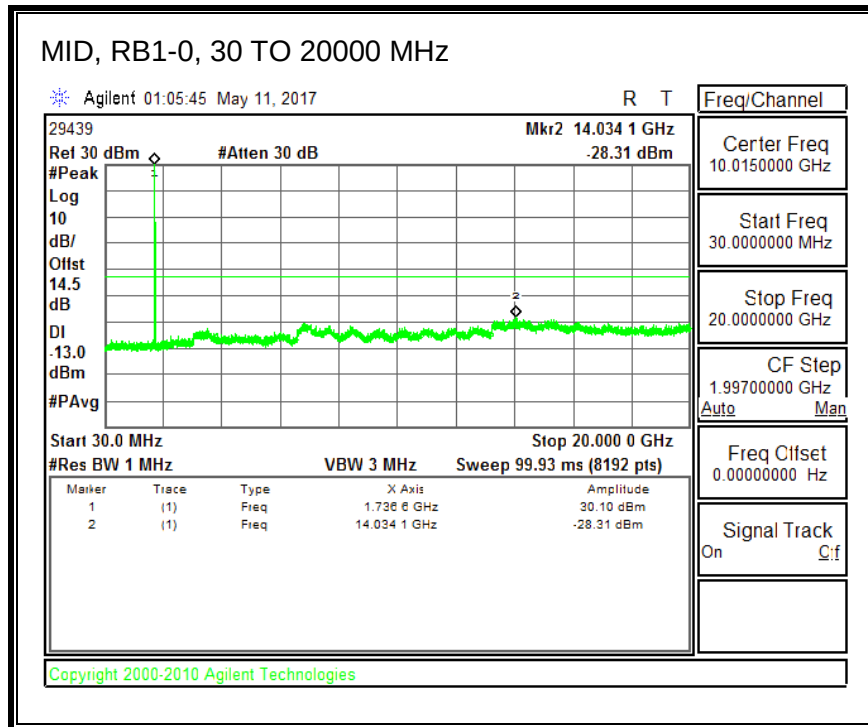
**QPSK, (20.0 MHz BAND WIDTH)**





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







## **8.4. FREQUENCY STABILITY**

### **RULE PART(S)**

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

### **LIMITS**

FCC: §22.355

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

FCC: §24.235 & §27.54

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

FCC: §90.213

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

### **TEST PROCEDURE**

Use CMW 500 with Frequency Error measurement capability.

- Temp. =  $-30^{\circ}$  to  $+50^{\circ}\text{C}$
- Voltage = (85% - 115%)  
Low voltage, 3.23VDC, Normal, 3.8VDC and High voltage, 4.37VDC.  
End Voltage, 3.2VDC.

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

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

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

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

### **MODES TESTED**

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

### **RESULTS**

See the following pages.

### 8.4.1. LTE BAND 2

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 38602 | <b>Date:</b> | 5/12/17 |
|------------|-------|--------------|---------|

#### QPSK, (20MHz BANDWIDTH)

| Limit          |           | 1850                       | 1910                        | Delta<br>(Hz) | Frequency<br>Stability<br>(ppm) |
|----------------|-----------|----------------------------|-----------------------------|---------------|---------------------------------|
| Condition      |           | F low @<br>-13dBm<br>(MHz) | F high @<br>-13dBm<br>(MHz) |               |                                 |
| Temperature    | Voltage   |                            |                             |               |                                 |
| Normal (20C)   | Normal    | 1851.0623                  | 1908.9505                   |               |                                 |
| Extreme (50C)  |           | 1851.0623                  | 1908.9505                   | 17.5          | 0.009                           |
| Extreme (40C)  |           | 1851.0623                  | 1908.9505                   | 18.2          | 0.010                           |
| Extreme (30C)  |           | 1851.0623                  | 1908.9505                   | 17.4          | 0.009                           |
| Extreme (10C)  |           | 1851.0623                  | 1908.9505                   | 15.3          | 0.008                           |
| Extreme (0C)   |           | 1851.0623                  | 1908.9505                   | 18.0          | 0.010                           |
| Extreme (-10C) |           | 1851.0623                  | 1908.9505                   | 17.2          | 0.009                           |
| Extreme (-20C) |           | 1851.0623                  | 1908.9505                   | 19.2          | 0.010                           |
| Extreme (-30C) |           | 1851.0623                  | 1908.9505                   | 20.1          | 0.011                           |
|                |           |                            |                             |               |                                 |
| 20C            | 15%       | 1851.0623                  | 1908.9505                   | 15.1          | 0.008                           |
|                | -15%      | 1851.0623                  | 1908.9505                   | 16.2          | 0.009                           |
|                | End Point | 1851.0623                  | 1908.9505                   | 16.4          | 0.009                           |

### 8.4.2. LTE BAND 4

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 38602 | <b>Date:</b> | 5/12/17 |
|------------|-------|--------------|---------|

#### QPSK, (3.0MHz BANDWIDTH)

| Limit          |           | 1710                       | 1755                        | Delta<br>(Hz) | Frequency<br>Stability<br>(ppm) |
|----------------|-----------|----------------------------|-----------------------------|---------------|---------------------------------|
| Condition      |           | F low @<br>-13dBm<br>(MHz) | F high @<br>-13dBm<br>(MHz) |               |                                 |
| Temperature    | Voltage   |                            |                             |               |                                 |
| Normal (20C)   | Normal    | 1710.1255                  | 1754.8948                   |               |                                 |
| Extreme (50C)  |           | 1710.1256                  | 1754.8948                   | 18.4          | 0.011                           |
| Extreme (40C)  |           | 1710.1256                  | 1754.8948                   | 20.3          | 0.012                           |
| Extreme (30C)  |           | 1710.1256                  | 1754.8948                   | 19.6          | 0.011                           |
| Extreme (10C)  |           | 1710.1256                  | 1754.8948                   | 21.7          | 0.013                           |
| Extreme (0C)   |           | 1710.1256                  | 1754.8948                   | 20.9          | 0.012                           |
| Extreme (-10C) |           | 1710.1256                  | 1754.8948                   | 19.6          | 0.011                           |
| Extreme (-20C) |           | 1710.1256                  | 1754.8948                   | 21.8          | 0.013                           |
| Extreme (-30C) |           | 1710.1256                  | 1754.8948                   | 20.3          | 0.012                           |
|                |           |                            |                             |               |                                 |
| 20C            | 15%       | 1710.1255                  | 1754.8948                   | 13.7          | 0.008                           |
|                | -15%      | 1710.1255                  | 1754.8948                   | 13.8          | 0.008                           |
|                | End Point | 1710.1255                  | 1754.8948                   | 13.6          | 0.008                           |

### 8.4.3. LTE BAND 5

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 38602 | <b>Date:</b> | 5/12/17 |
|------------|-------|--------------|---------|

#### QPSK, (10MHz BANDWIDTH)

| Limit          |           | 824                        | 849                         | Delta<br>(Hz) | Frequency<br>Stability<br>(ppm) |
|----------------|-----------|----------------------------|-----------------------------|---------------|---------------------------------|
| Condition      |           | F low @<br>-13dBm<br>(MHz) | F high @<br>-13dBm<br>(MHz) |               |                                 |
| Temperature    | Voltage   |                            |                             |               |                                 |
| Normal (20C)   | Normal    | 824.5381                   | 848.4782                    |               |                                 |
| Extreme (50C)  |           | 824.5381                   | 848.4782                    | -13.9         | -0.017                          |
| Extreme (40C)  |           | 824.5381                   | 848.4782                    | -13.3         | -0.016                          |
| Extreme (30C)  |           | 824.5381                   | 848.4782                    | -12.2         | -0.015                          |
| Extreme (10C)  |           | 824.5381                   | 848.4782                    | -12.5         | -0.015                          |
| Extreme (0C)   |           | 824.5381                   | 848.4782                    | -10.2         | -0.012                          |
| Extreme (-10C) |           | 824.5381                   | 848.4782                    | -9.8          | -0.012                          |
| Extreme (-20C) |           | 824.5381                   | 848.4782                    | -11.0         | -0.013                          |
| Extreme (-30C) |           | 824.5381                   | 848.4782                    | -11.8         | -0.014                          |
|                |           |                            |                             |               |                                 |
| 20C            | 15%       | 824.5381                   | 848.4782                    | -16.3         | -0.019                          |
|                | -15%      | 824.5381                   | 848.4782                    | -13.8         | -0.016                          |
|                | End Point | 824.5381                   | 848.4782                    | -15.2         | -0.018                          |

### 8.4.4. LTE BAND 7

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 38602 | <b>Date:</b> | 5/12/17 |
|------------|-------|--------------|---------|

#### 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    | 2501.0839            | 2568.9483             |            |                           |
| Extreme (50C)  |           | 2501.0839            | 2568.9483             | -30.7      | -0.012                    |
| Extreme (40C)  |           | 2501.0839            | 2568.9483             | -29.3      | -0.012                    |
| Extreme (30C)  |           | 2501.0839            | 2568.9483             | -29.8      | -0.012                    |
| Extreme (10C)  |           | 2501.0839            | 2568.9483             | -41.4      | -0.016                    |
| Extreme (0C)   |           | 2501.0839            | 2568.9483             | -45.3      | -0.018                    |
| Extreme (-10C) |           | 2501.0838            | 2568.9482             | -51.1      | -0.020                    |
| Extreme (-20C) |           | 2501.0838            | 2568.9482             | -53.7      | -0.021                    |
| Extreme (-30C) |           | 2501.0838            | 2568.9482             | -56.1      | -0.022                    |
|                |           |                      |                       |            |                           |
| 20C            | 15%       | 2501.0839            | 2568.9483             | -21.5      | -0.008                    |
|                | -15%      | 2501.0839            | 2568.9483             | -21.4      | -0.008                    |
|                | End Point | 2501.0839            | 2568.9483             | -24.9      | -0.010                    |

#### 8.4.5. LTE BAND 12

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 38602 | <b>Date:</b> | 5/12/17 |
|------------|-------|--------------|---------|

##### 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    | 699.5422             | 715.4798              |            |                           |
| Extreme (50C)  |           | 699.5422             | 715.4798              | -9.6       | -0.01                     |
| Extreme (40C)  |           | 699.5422             | 715.4798              | -9.8       | -0.01                     |
| Extreme (30C)  |           | 699.5422             | 715.4798              | -8.7       | -0.01                     |
| Extreme (10C)  |           | 699.5422             | 715.4798              | -9.1       | -0.01                     |
| Extreme (0C)   |           | 699.5422             | 715.4798              | -10.8      | -0.02                     |
| Extreme (-10C) |           | 699.5422             | 715.4798              | -8.7       | -0.01                     |
| Extreme (-20C) |           | 699.5422             | 715.4798              | -11.2      | -0.02                     |
| Extreme (-30C) |           | 699.5422             | 715.4798              | -13.3      | -0.02                     |
|                |           |                      |                       |            |                           |
| 20C            | 15%       | 699.5422             | 715.4798              | -16.8      | -0.02                     |
|                | -15%      | 699.5422             | 715.4798              | -16.9      | -0.02                     |
|                | End Point | 699.5422             | 715.4798              | -16.8      | -0.02                     |

#### 8.4.6. LTE BAND 13

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 38602 | <b>Date:</b> | 5/12/17 |
|------------|-------|--------------|---------|

##### 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    | 777.5306             | 786.4797              |            |                           |
| Extreme (50C)  |           | 777.5306             | 786.4797              | -14.3      | -0.018                    |
| Extreme (40C)  |           | 777.5306             | 786.4797              | -13.6      | -0.017                    |
| Extreme (30C)  |           | 777.5306             | 786.4797              | -13.0      | -0.017                    |
| Extreme (10C)  |           | 777.5306             | 786.4797              | -14.8      | -0.019                    |
| Extreme (0C)   |           | 777.5306             | 786.4797              | -15.1      | -0.019                    |
| Extreme (-10C) |           | 777.5306             | 786.4797              | -14.5      | -0.019                    |
| Extreme (-20C) |           | 777.5306             | 786.4797              | -15.7      | -0.020                    |
| Extreme (-30C) |           | 777.5306             | 786.4797              | -16.4      | -0.021                    |
|                |           |                      |                       |            |                           |
| 20C            | 15%       | 777.5306             | 786.4797              | -15.2      | -0.019                    |
|                | -15%      | 777.5306             | 786.4797              | -13.2      | -0.017                    |
|                | End Point | 777.5306             | 786.4797              | -13.3      | -0.017                    |

#### 8.4.7. LTE BAND 17

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 29446 | <b>Date:</b> | 5/12/17 |
|------------|-------|--------------|---------|

##### 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    | 704.5351             | 715.4785              |            |                           |
| Extreme (50C)  |           | 704.5351             | 715.4785              | 7.5        | 0.011                     |
| Extreme (40C)  |           | 704.5351             | 715.4785              | 7.5        | 0.011                     |
| Extreme (30C)  |           | 704.5351             | 715.4785              | 8.3        | 0.012                     |
| Extreme (10C)  |           | 704.5351             | 715.4785              | 10.2       | 0.014                     |
| Extreme (0C)   |           | 704.5351             | 715.4785              | 12.2       | 0.017                     |
| Extreme (-10C) |           | 704.5351             | 715.4785              | 10.1       | 0.014                     |
| Extreme (-20C) |           | 704.5351             | 715.4785              | 9.5        | 0.013                     |
| Extreme (-30C) |           | 704.5351             | 715.4785              | 10.6       | 0.015                     |
|                |           |                      |                       |            |                           |
| 20C            | 15%       | 704.5351             | 715.4785              | 14.5       | 0.020                     |
|                | -15%      | 704.5351             | 715.4785              | 15.1       | 0.021                     |
|                | End Point | 704.5351             | 715.4785              | 16.0       | 0.023                     |

#### 8.4.8. LTE BAND 25

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 29446 | <b>Date:</b> | 5/12/17 |
|------------|-------|--------------|---------|

##### QPSK, (20MHz BANDWIDTH)

| Limit          |           | 1850                       | 1915                        | Delta<br>(Hz) | Frequency<br>Stability<br>(ppm) |
|----------------|-----------|----------------------------|-----------------------------|---------------|---------------------------------|
| Condition      |           | F low @<br>-13dBm<br>(MHz) | F high @<br>-13dBm<br>(MHz) |               |                                 |
| Temperature    | Voltage   |                            |                             |               |                                 |
| Normal (20C)   | Normal    | 1851.1054                  | 1913.9451                   |               |                                 |
| Extreme (50C)  |           | 1851.1053                  | 1913.9450                   | -54.7         | -0.029                          |
| Extreme (40C)  |           | 1851.1054                  | 1913.9451                   | -48.8         | -0.026                          |
| Extreme (30C)  |           | 1851.1054                  | 1913.9451                   | -45.8         | -0.024                          |
| Extreme (10C)  |           | 1851.1054                  | 1913.9451                   | -49.0         | -0.026                          |
| Extreme (0C)   |           | 1851.1055                  | 1913.9452                   | 57.7          | 0.031                           |
| Extreme (-10C) |           | 1851.1055                  | 1913.9452                   | 61.7          | 0.033                           |
| Extreme (-20C) |           | 1851.1055                  | 1913.9452                   | 64.7          | 0.034                           |
| Extreme (-30C) |           | 1851.1054                  | 1913.9451                   | 48.3          | 0.026                           |
|                |           |                            |                             |               |                                 |
| 20C            | 15%       | 1851.1054                  | 1913.9451                   | -11.0         | -0.006                          |
|                | -15%      | 1851.1054                  | 1913.9451                   | -11.2         | -0.006                          |
|                | End Point | 1851.1054                  | 1913.9451                   | -11.7         | -0.006                          |

#### 8.4.9. LTE BAND 26

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 29446 | <b>Date:</b> | 5/12/17 |
|------------|-------|--------------|---------|

##### 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    | 814.5450             | 823.4757              |            |                           |
| Extreme (50C)  |           | 814.5450             | 823.4757              | 8.0        | 0.010                     |
| Extreme (40C)  |           | 814.5450             | 823.4757              | 7.7        | 0.009                     |
| Extreme (30C)  |           | 814.5450             | 823.4757              | 7.8        | 0.010                     |
| Extreme (10C)  |           | 814.5450             | 823.4757              | 7.3        | 0.009                     |
| Extreme (0C)   |           | 814.5450             | 823.4757              | 9.1        | 0.011                     |
| Extreme (-10C) |           | 814.5450             | 823.4757              | 5.9        | 0.007                     |
| Extreme (-20C) |           | 814.5450             | 823.4757              | 6.7        | 0.008                     |
| Extreme (-30C) |           | 814.5450             | 823.4757              | 7.1        | 0.009                     |
|                |           |                      |                       |            |                           |
| 20C            | 15%       | 814.5450             | 823.4757              | 11.6       | 0.014                     |
|                | -15%      | 814.5450             | 823.4757              | 11.1       | 0.014                     |
|                | End Point | 814.5450             | 823.4757              | 11.6       | 0.014                     |

#### 8.4.10. LTE BAND 30

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 29446 | <b>Date:</b> | 5/12/17 |
|------------|-------|--------------|---------|

##### 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    | 2305.5422            | 2314.4754             |            |                           |
| Extreme (50C)  |           | 2305.5421            | 2314.4753             | -60.3      | -0.026                    |
| Extreme (40C)  |           | 2305.5421            | 2314.4753             | -58.8      | -0.025                    |
| Extreme (30C)  |           | 2305.5421            | 2314.4753             | -75.2      | -0.033                    |
| Extreme (10C)  |           | 2305.5421            | 2314.4753             | -63.9      | -0.028                    |
| Extreme (0C)   |           | 2305.5421            | 2314.4753             | -60.3      | -0.026                    |
| Extreme (-10C) |           | 2305.5422            | 2314.4754             | -47.4      | -0.021                    |
| Extreme (-20C) |           | 2305.5422            | 2314.4754             | -45.9      | -0.020                    |
| Extreme (-30C) |           | 2305.5421            | 2314.4753             | -66.1      | -0.029                    |
|                |           |                      |                       |            |                           |
| 20C            | 15%       | 2305.5422            | 2314.4754             | -28.9      | -0.013                    |
|                | -15%      | 2305.5422            | 2314.4754             | -28.3      | -0.012                    |
|                | End Point | 2305.5422            | 2314.4754             | -28.3      | -0.012                    |

#### 8.4.11. LTE BAND 41

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 29446 | <b>Date:</b> | 5/12/17 |
|------------|-------|--------------|---------|

#### QPSK, (20MHz BANDWIDTH)

| Limit          |           | 2496                       | 2690                        | Delta<br>(Hz) | Frequency<br>Stability<br>(ppm) |
|----------------|-----------|----------------------------|-----------------------------|---------------|---------------------------------|
| Condition      |           | F low @<br>-13dBm<br>(MHz) | F high @<br>-13dBm<br>(MHz) |               |                                 |
| Temperature    | Voltage   |                            |                             |               |                                 |
| Normal (20C)   | Normal    | 2497.0609                  | 2689.0250                   |               |                                 |
| Extreme (50C)  |           | 2497.0609                  | 2689.0250                   | -42.7         | -0.016                          |
| Extreme (40C)  |           | 2497.0609                  | 2689.0250                   | -41.8         | -0.016                          |
| Extreme (30C)  |           | 2497.0609                  | 2689.0250                   | -44.8         | -0.017                          |
| Extreme (10C)  |           | 2497.0609                  | 2689.0250                   | -48.2         | -0.019                          |
| Extreme (0C)   |           | 2497.0608                  | 2689.0249                   | -58.9         | -0.023                          |
| Extreme (-10C) |           | 2497.0609                  | 2689.0250                   | -49.1         | -0.019                          |
| Extreme (-20C) |           | 2497.0608                  | 2689.0249                   | -56.0         | -0.022                          |
| Extreme (-30C) |           | 2497.0609                  | 2689.0250                   | -45.1         | -0.017                          |
|                |           |                            |                             |               |                                 |
| 20C            | 15%       | 2497.0609                  | 2689.0250                   | -15.4         | -0.006                          |
|                | -15%      | 2497.0609                  | 2689.0250                   | -19.3         | -0.007                          |
|                | End Point | 2497.0609                  | 2689.0250                   | -21.7         | -0.008                          |

#### 8.4.12. LTE BAND 66

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 29446 | <b>Date:</b> | 5/12/17 |
|------------|-------|--------------|---------|

#### QPSK, (20MHz BANDWIDTH)

| Limit          |           | 1710                       | 1780                        | Delta<br>(Hz) | Frequency<br>Stability<br>(ppm) |
|----------------|-----------|----------------------------|-----------------------------|---------------|---------------------------------|
| Condition      |           | F low @<br>-13dBm<br>(MHz) | F high @<br>-13dBm<br>(MHz) |               |                                 |
| Temperature    | Voltage   |                            |                             |               |                                 |
| Normal (20C)   | Normal    | 1711.1064                  | 1778.9052                   |               |                                 |
| Extreme (50C)  |           | 1711.1064                  | 1778.9052                   | 25.6          | 0.015                           |
| Extreme (40C)  |           | 1711.1064                  | 1778.9052                   | 24.1          | 0.014                           |
| Extreme (30C)  |           | 1711.1064                  | 1778.9052                   | 42.5          | 0.024                           |
| Extreme (10C)  |           | 1711.1064                  | 1778.9052                   | 35.6          | 0.020                           |
| Extreme (0C)   |           | 1711.1064                  | 1778.9052                   | 31.5          | 0.018                           |
| Extreme (-10C) |           | 1711.1064                  | 1778.9052                   | 27.7          | 0.016                           |
| Extreme (-20C) |           | 1711.1064                  | 1778.9052                   | 29.6          | 0.017                           |
| Extreme (-30C) |           | 1711.1064                  | 1778.9052                   | 33.2          | 0.019                           |
|                |           |                            |                             |               |                                 |
| 20C            | 15%       | 1711.1064                  | 1778.9052                   | 9.0           | 0.005                           |
|                | -15%      | 1711.1064                  | 1778.9052                   | 9.6           | 0.006                           |
|                | End Point | 1711.1064                  | 1778.9052                   | 8.9           | 0.005                           |



## 8.5. PEAK-TO-AVERAGE RATIO

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

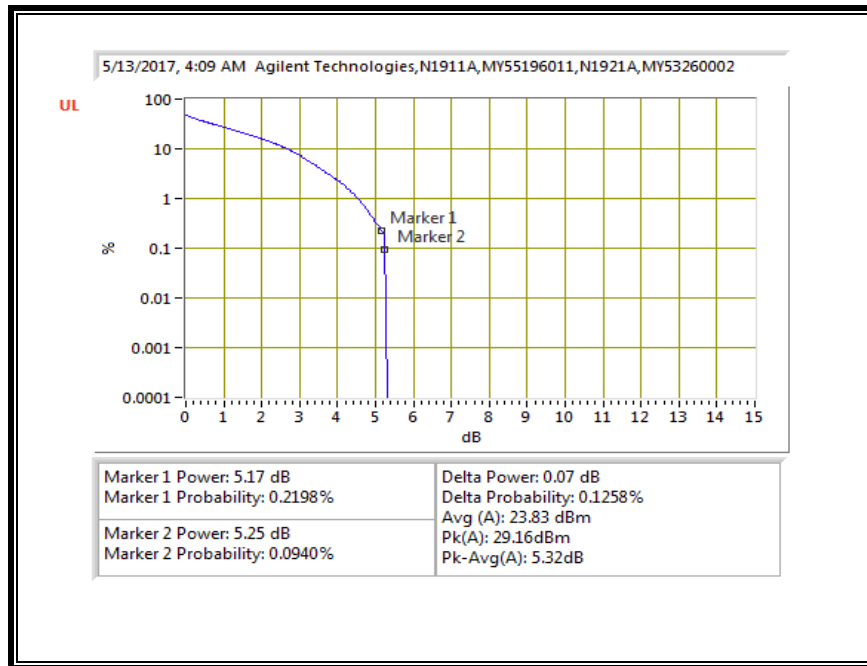
### RESULT

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

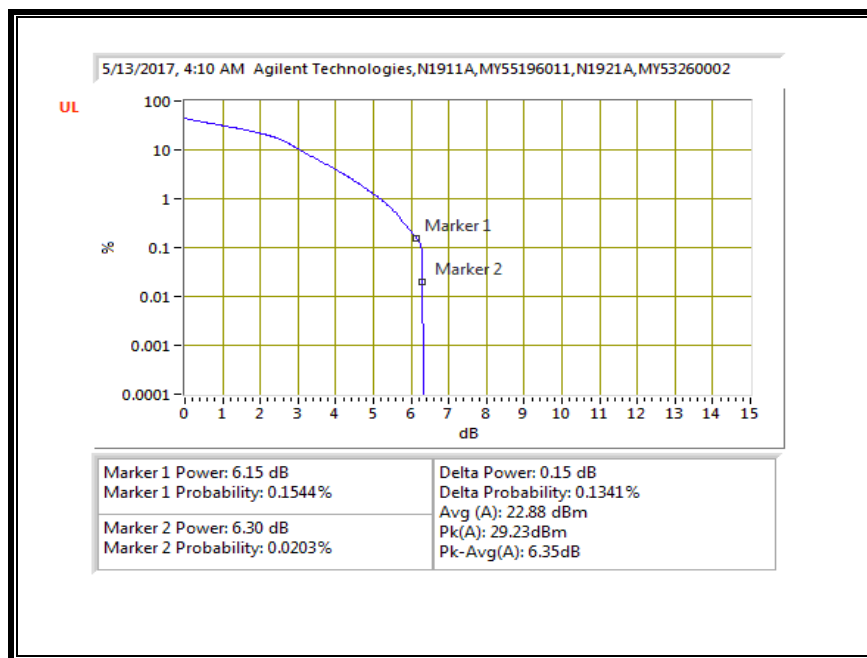
|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 52297 | <b>Date:</b> | 5/15/17 |
|------------|-------|--------------|---------|

## 8.5.1. LTE BAND 2

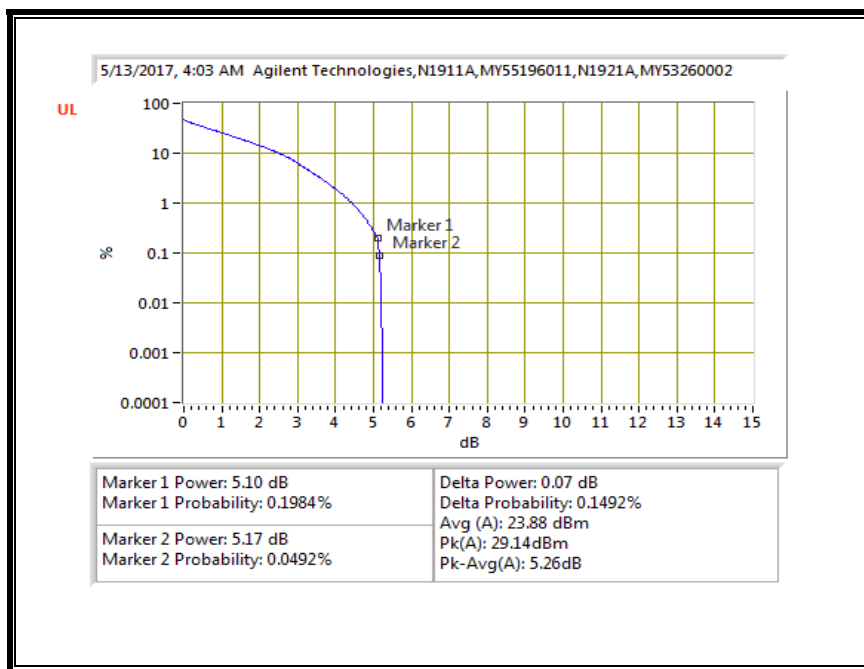
### QPSK, (1.4 MHz BAND WIDTH)



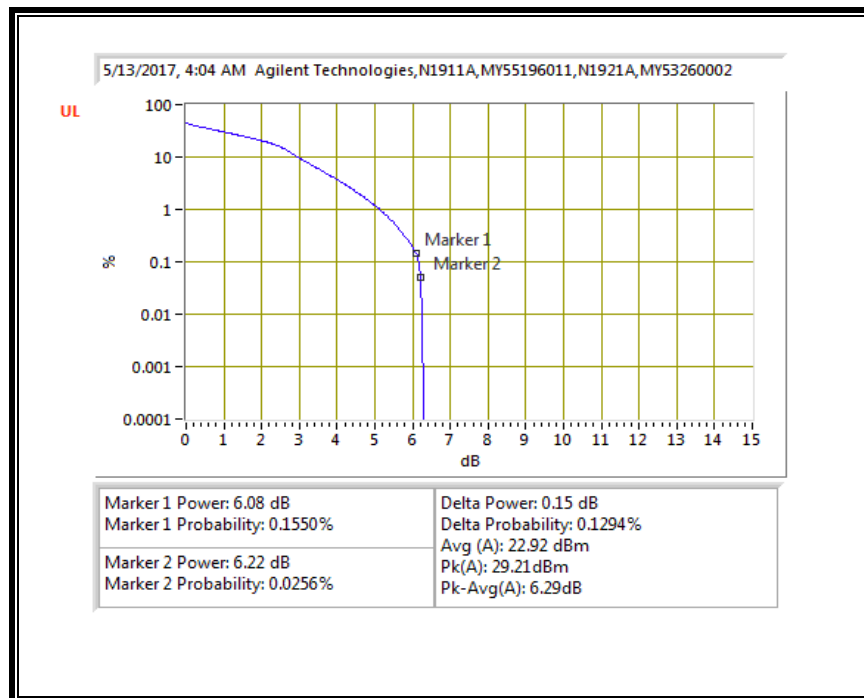
### 16QAM, (1.4 MHz BAND WIDTH)



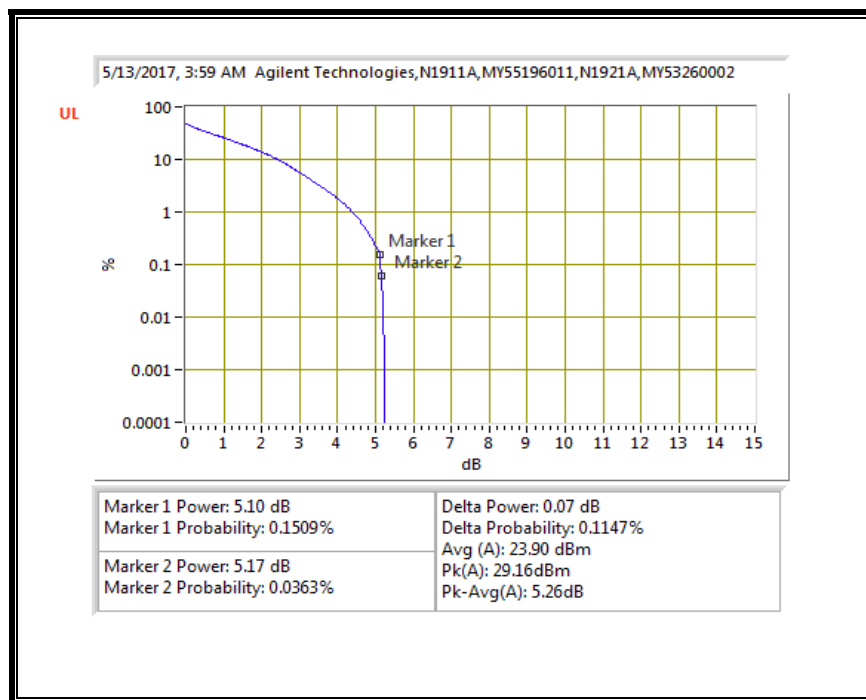
**QPSK, (3.0 MHz BAND WIDTH)**



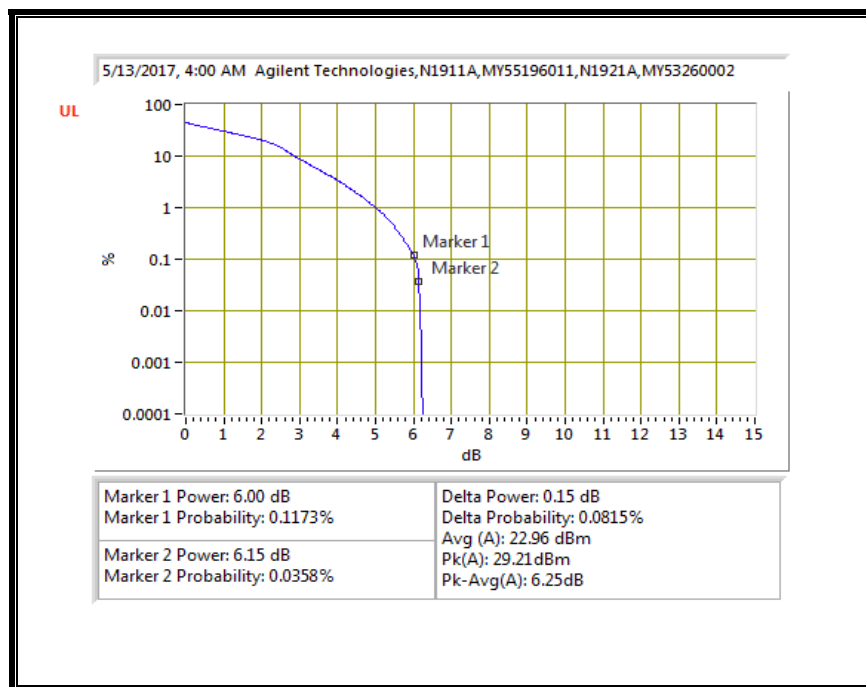
**16QAM, (3.0 MHz BAND WIDTH)**



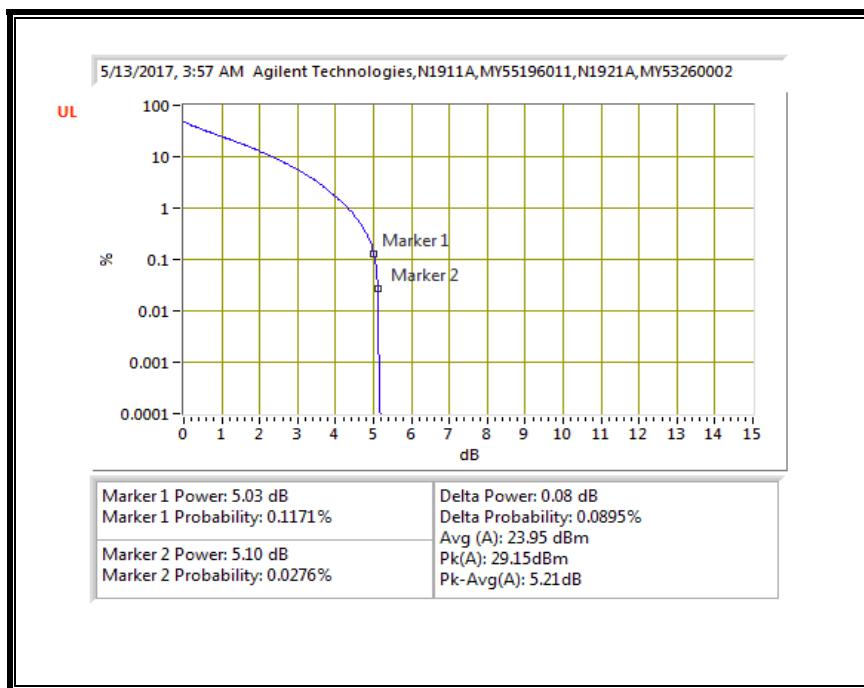
**QPSK, (5.0 MHz BAND WIDTH)**



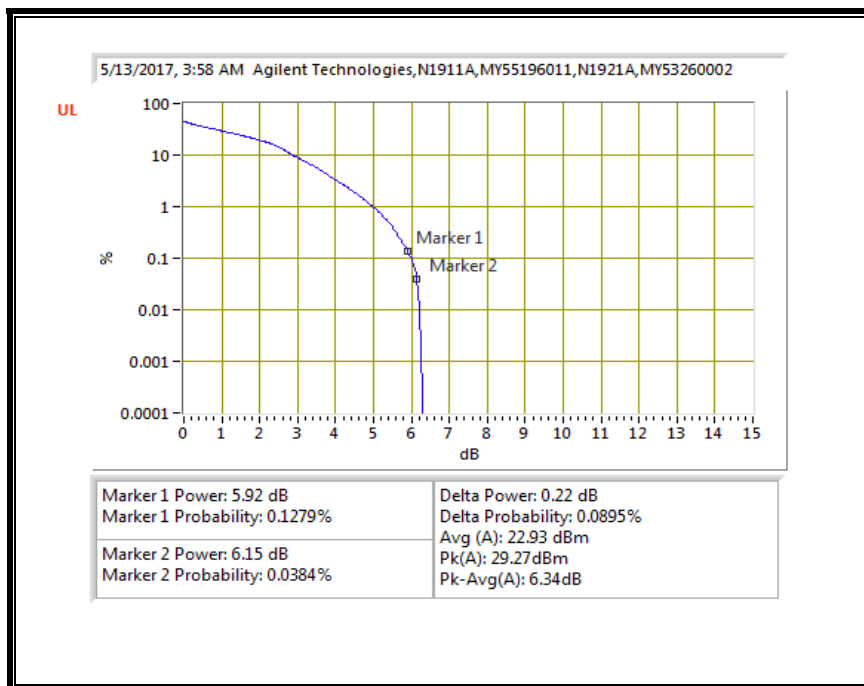
**16QAM, (5.0 MHz BAND WIDTH)**



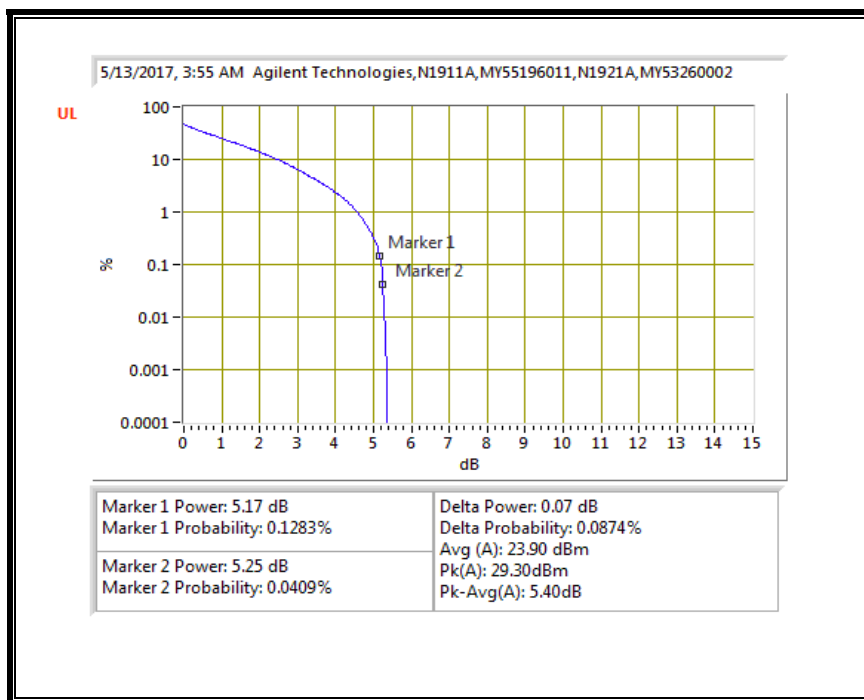
**QPSK, (10.0 MHz BAND WIDTH)**



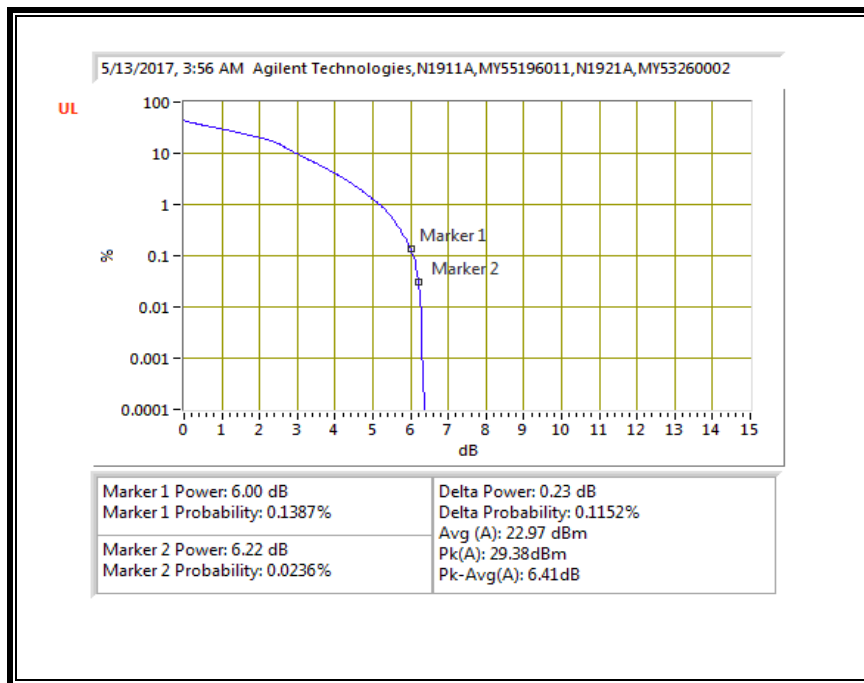
**16QAM, (10.0 MHz BAND WIDTH)**



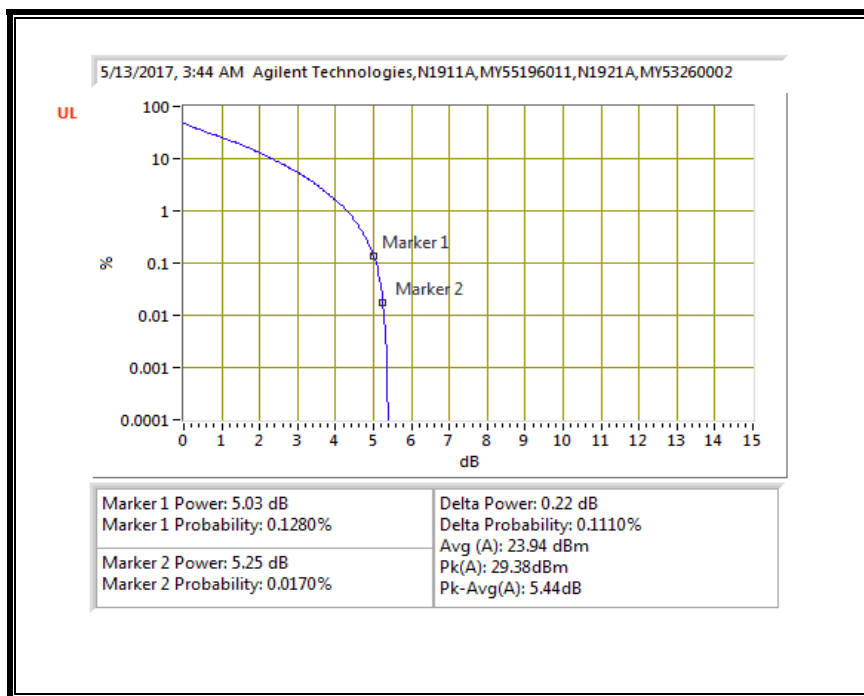
**QPSK, (15.0 MHz BAND WIDTH)**



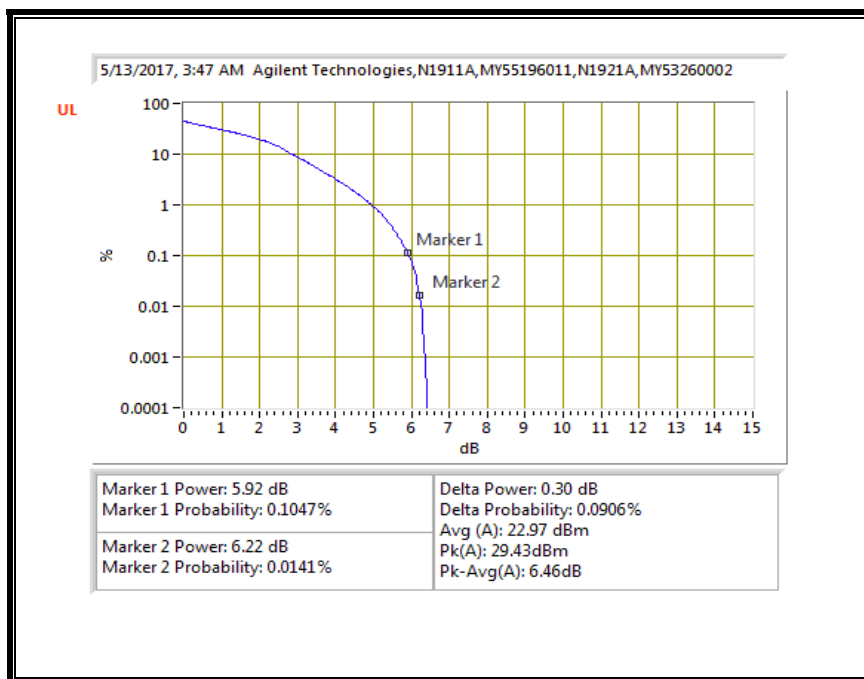
**16QAM, (15.0 MHz BAND WIDTH)**



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

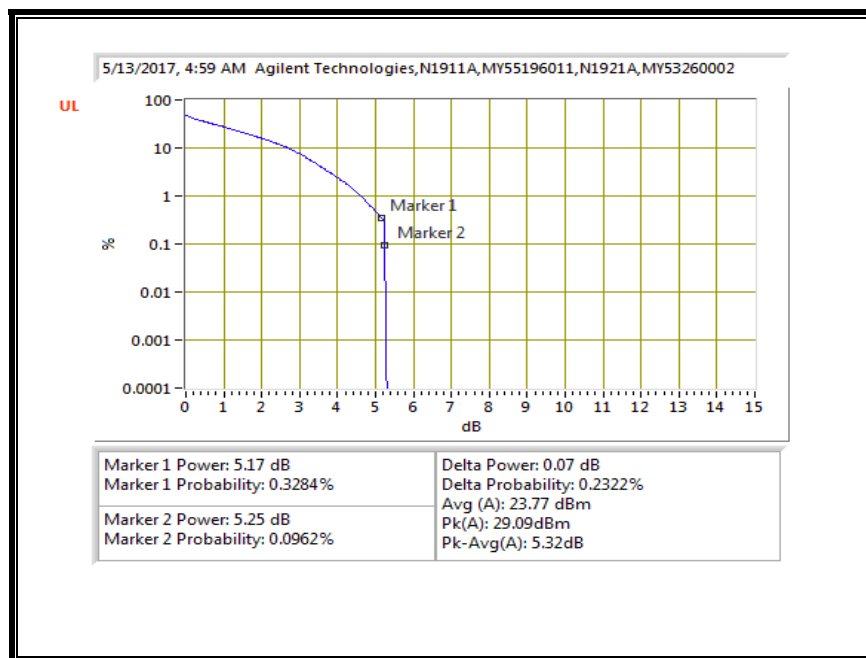


**16QAM, (20.0 MHz BAND WIDTH)**

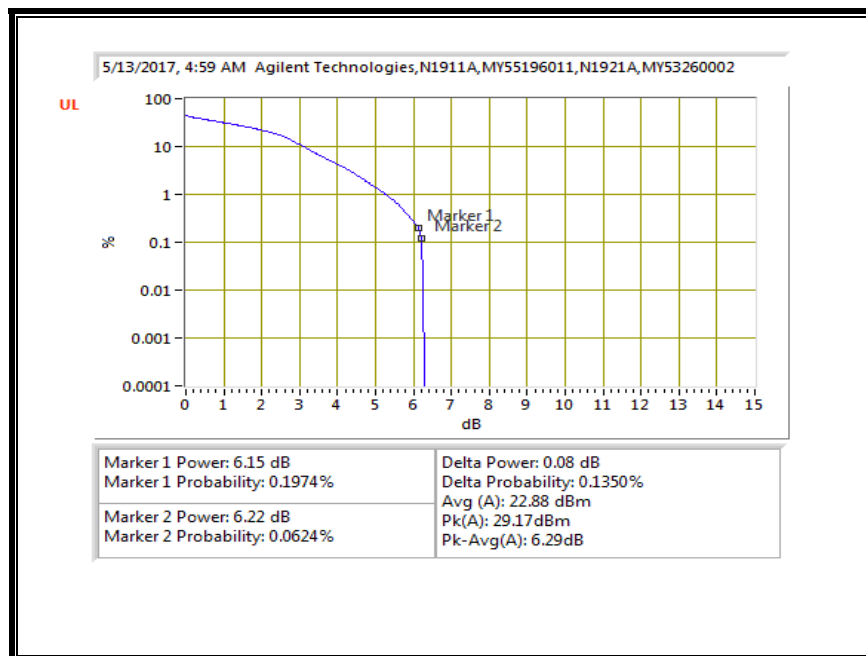


## 8.5.2. LTE BAND 4

### QPSK, (1.4 MHz BAND WIDTH)

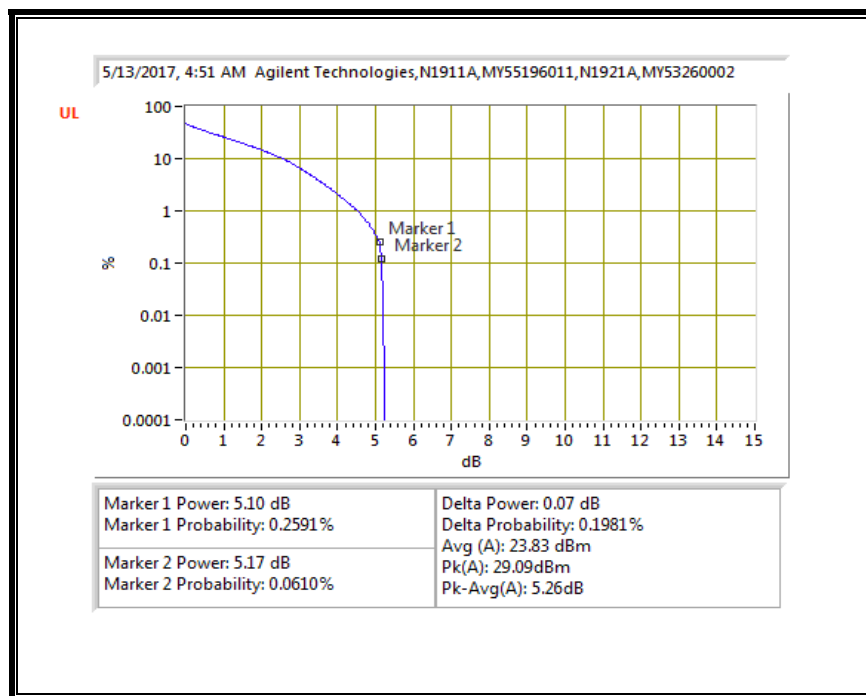


### 16QAM, (1.4 MHz BAND WIDTH)

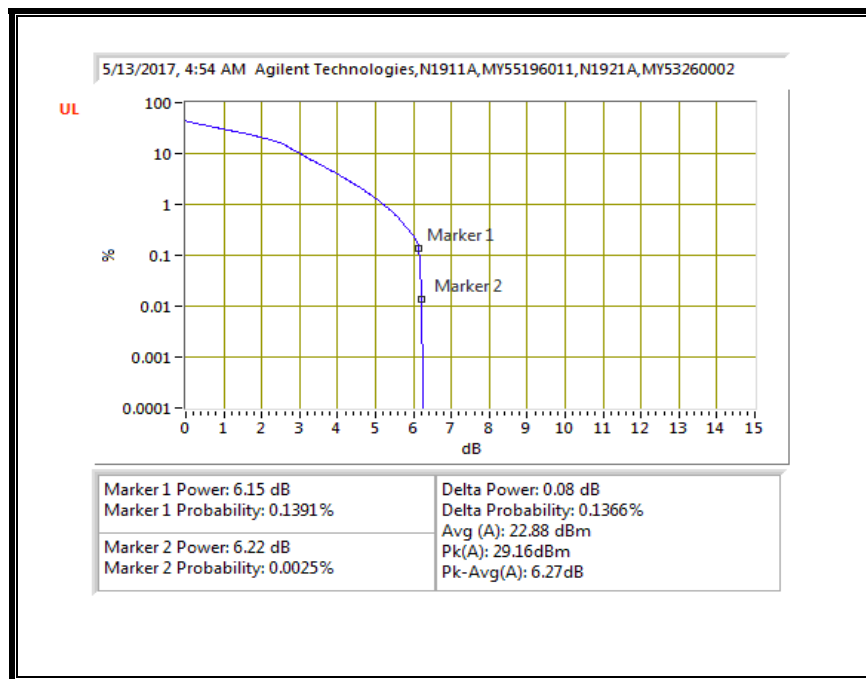




**QPSK, (3.0 MHz BAND WIDTH)**

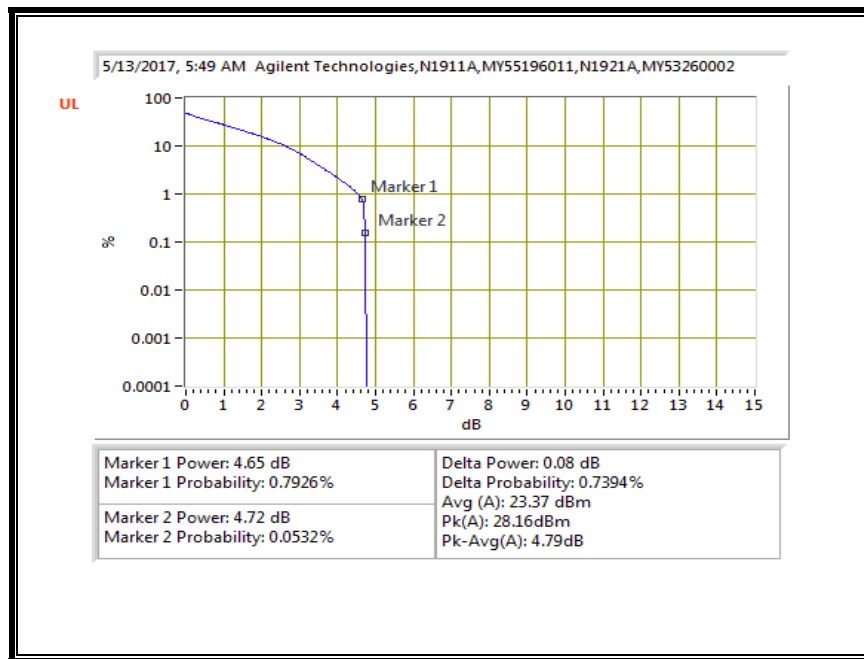


**16QAM, (3.0 MHz BAND WIDTH)**

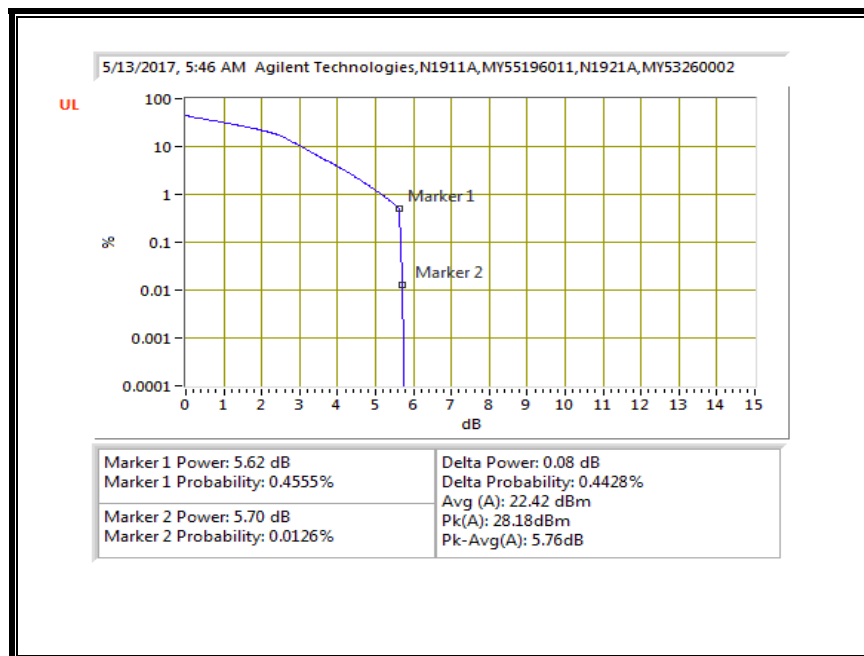


### 8.5.3. LTE BAND 5

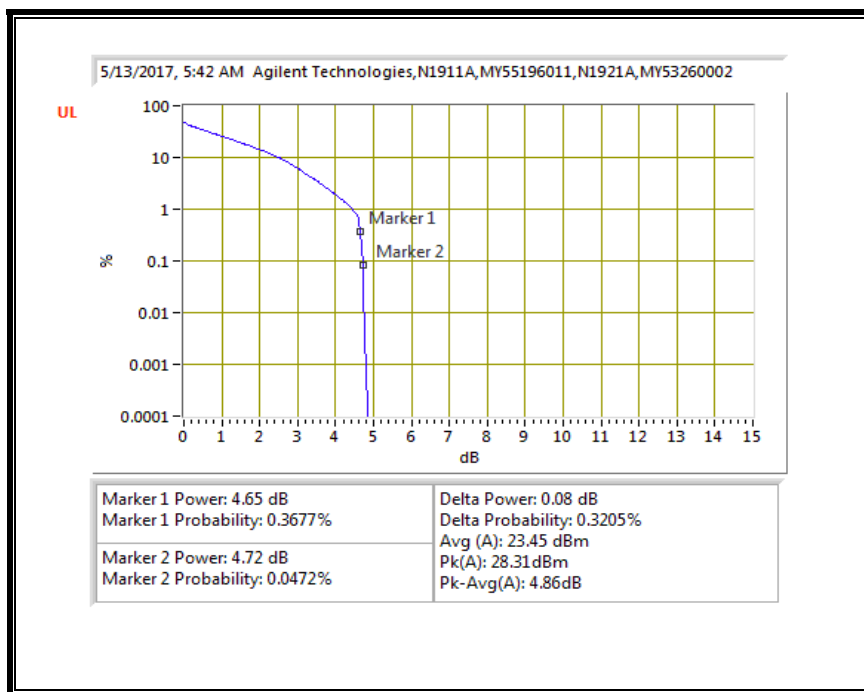
#### QPSK, (1.4 MHz BAND WIDTH)



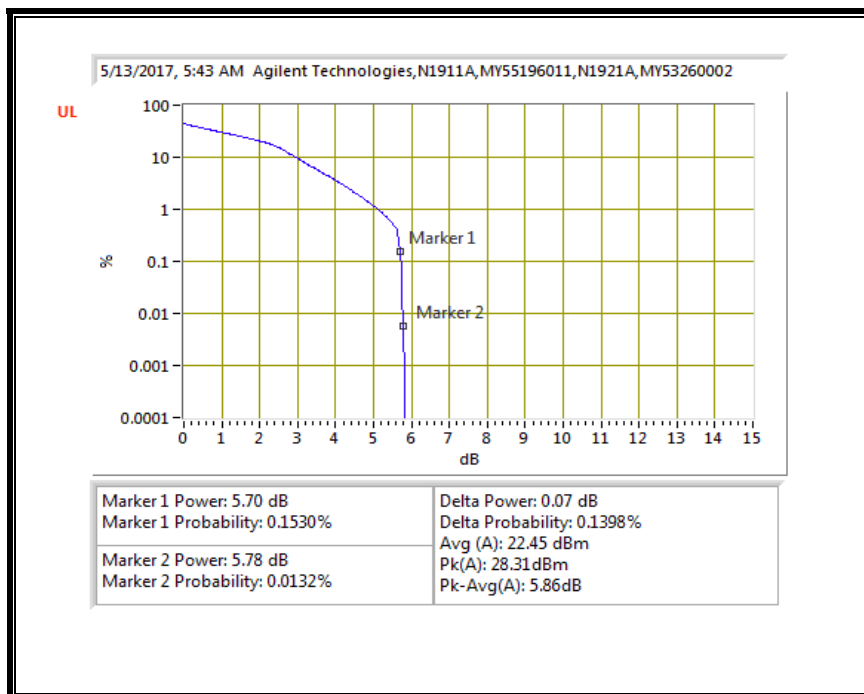
#### 16QAM, (1.4 MHz BAND WIDTH)



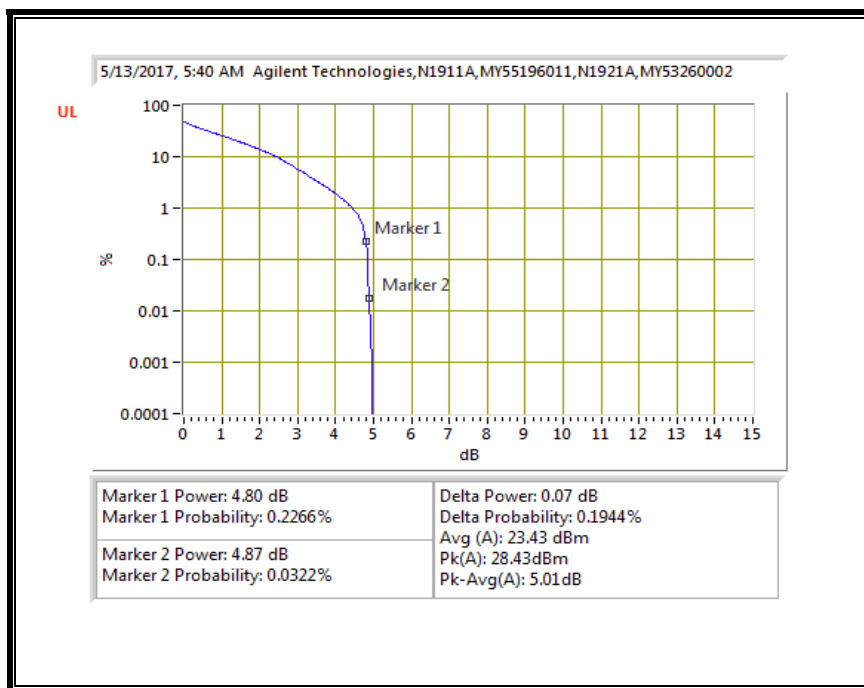
**QPSK, (3.0 MHz BAND WIDTH)**



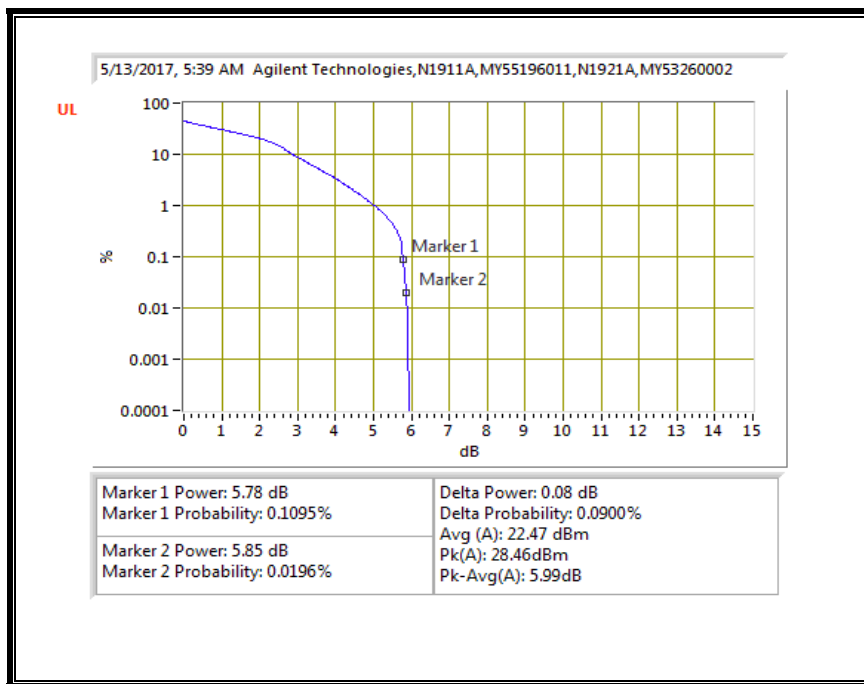
**16QAM, (3.0 MHz BAND WIDTH)**



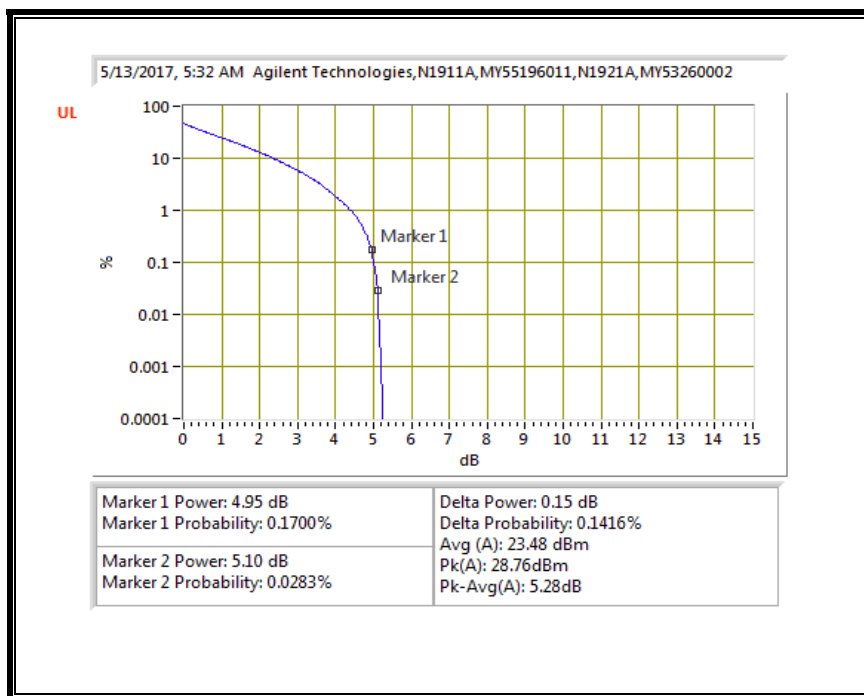
**QPSK, (5.0 MHz BAND WIDTH)**



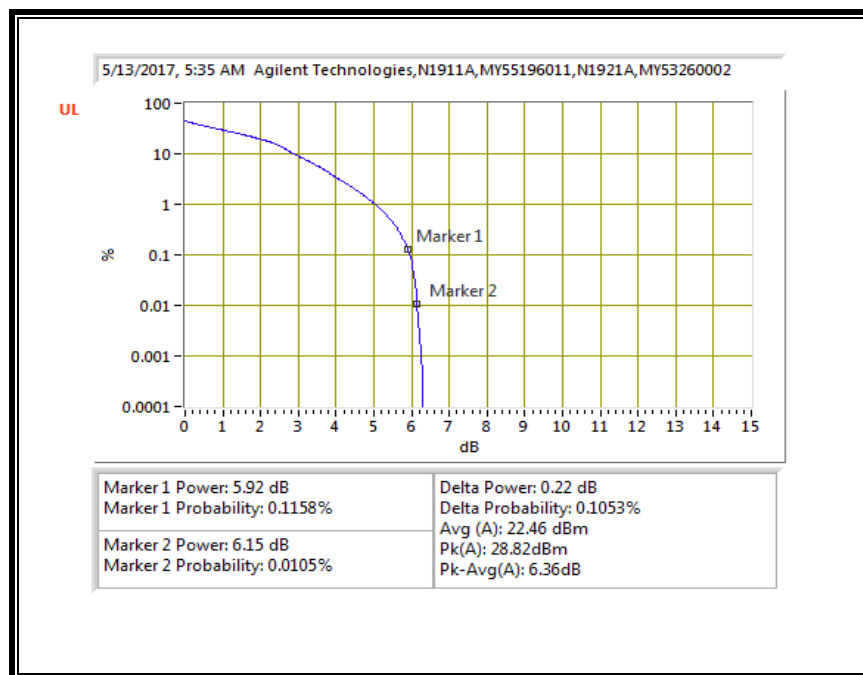
**16QAM, (5.0 MHz BAND WIDTH)**



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

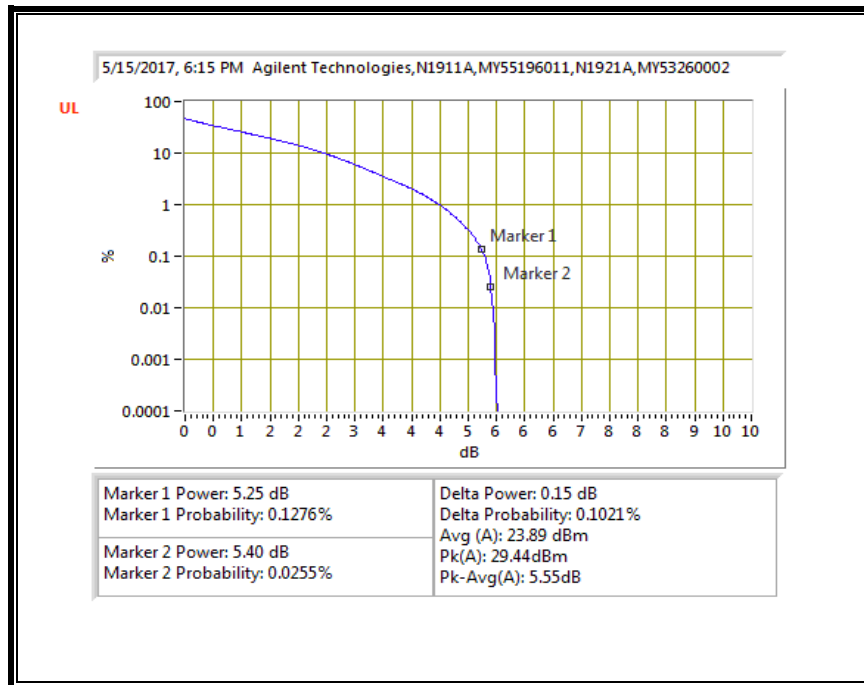


**16QAM, (10.0 MHz BAND WIDTH)**

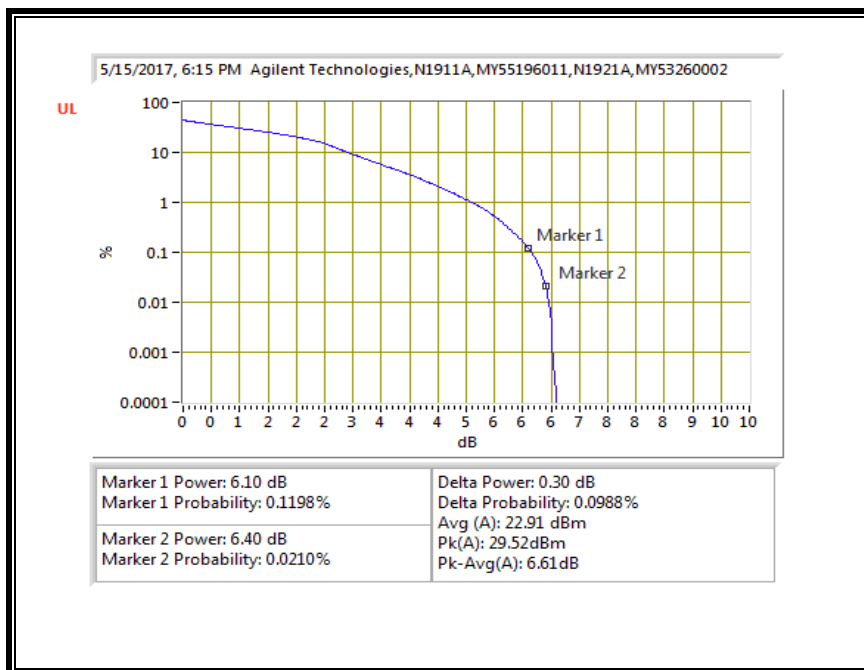


#### 8.5.4. LTE BAND 7

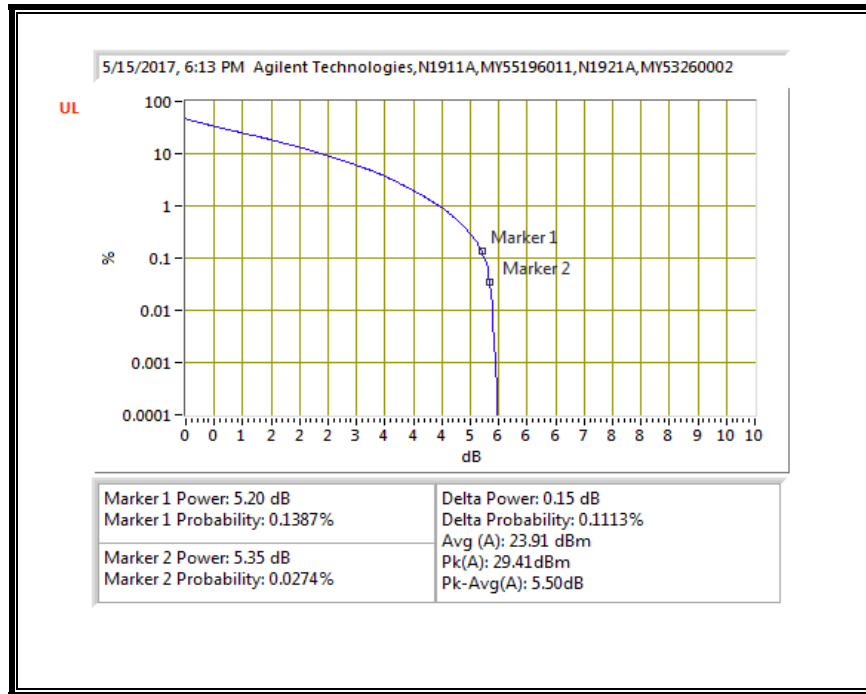
##### QPSK, (5.0 MHz BAND WIDTH)



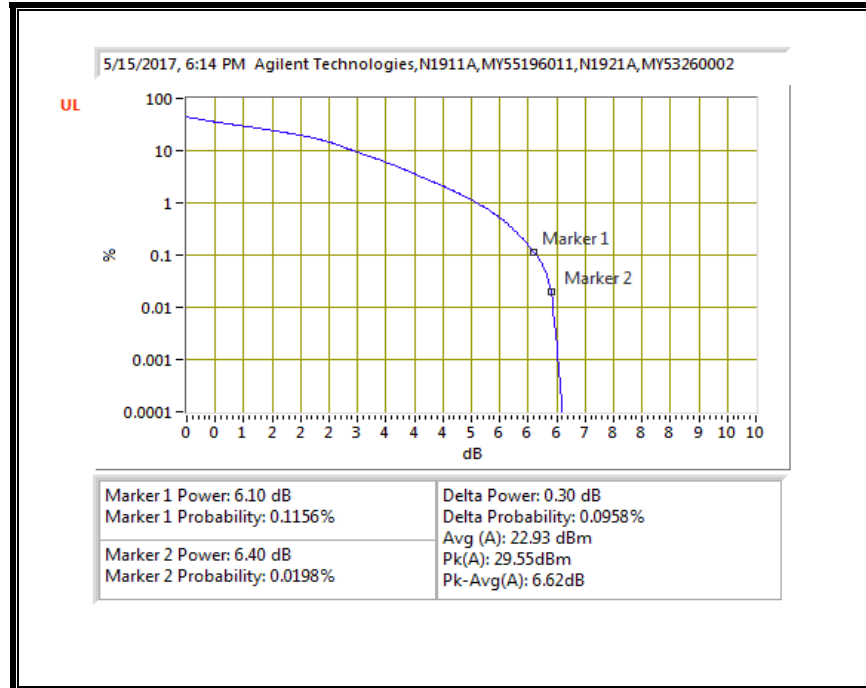
##### 16QAM, (5.0 MHz BAND WIDTH)



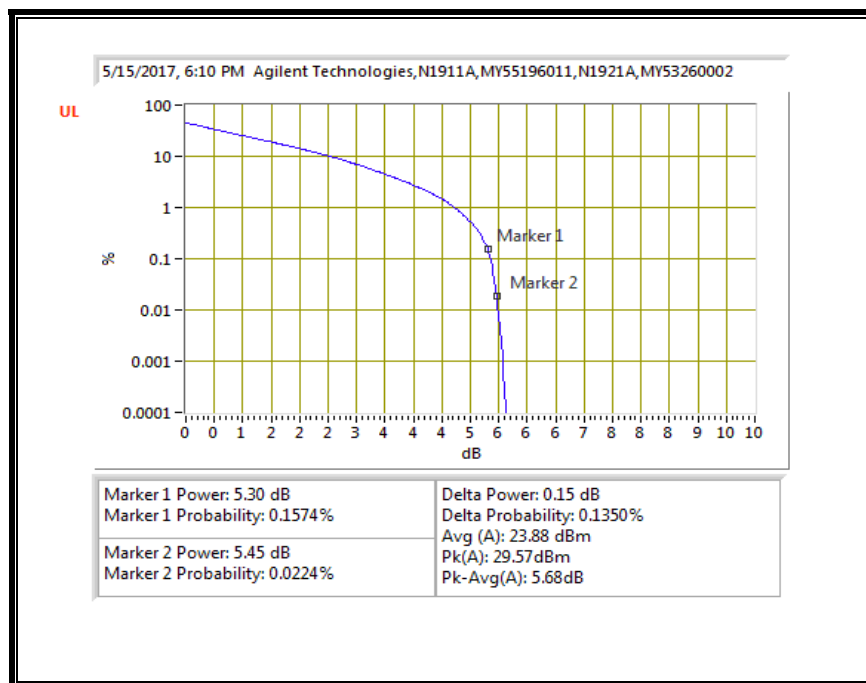
**QPSK, (10.0 MHz BAND WIDTH)**



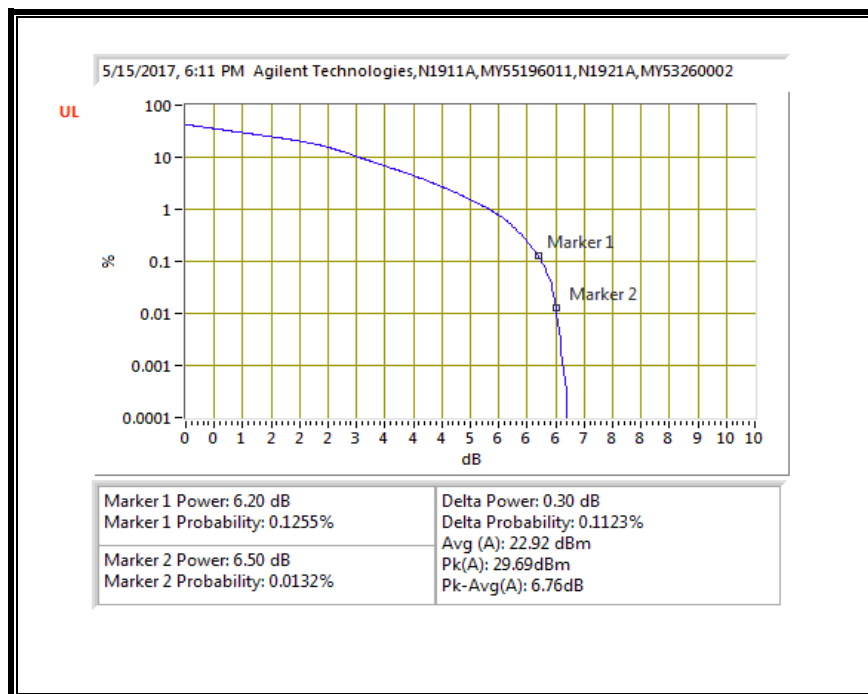
**16QAM, (10.0 MHz BAND WIDTH)**



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

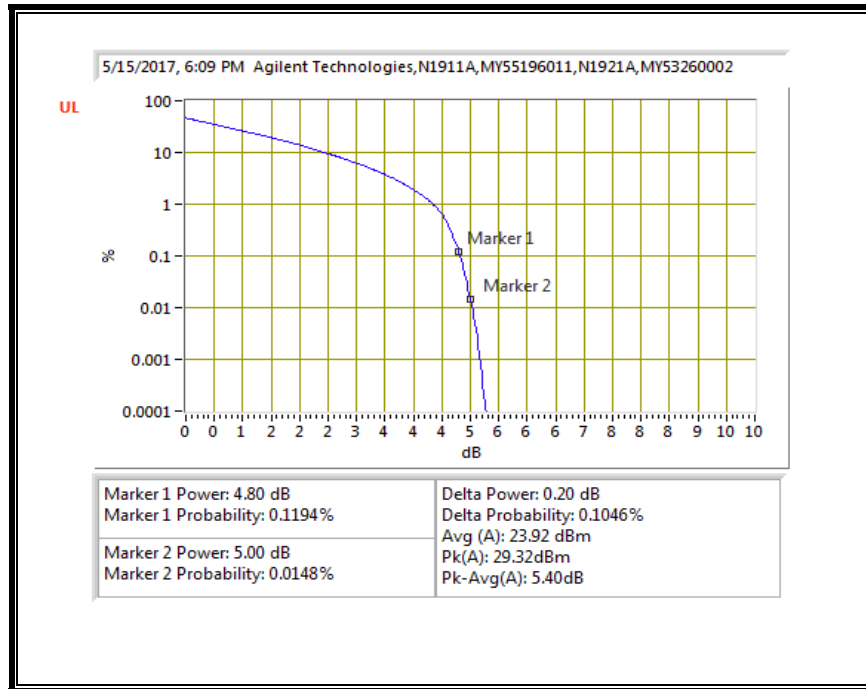


**16QAM, (15.0 MHz BAND WIDTH)**

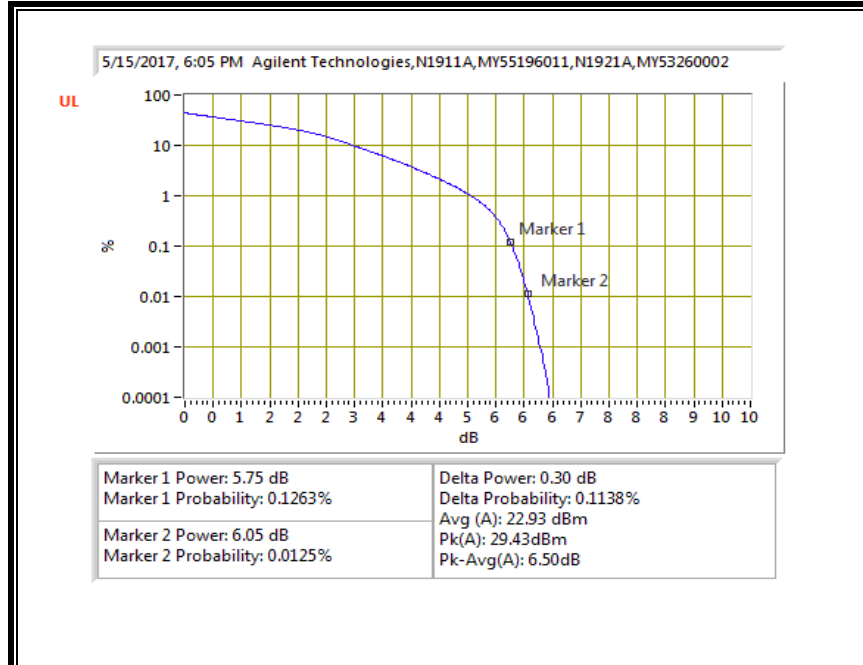




**QPSK, (20.0 MHz BAND WIDTH)**

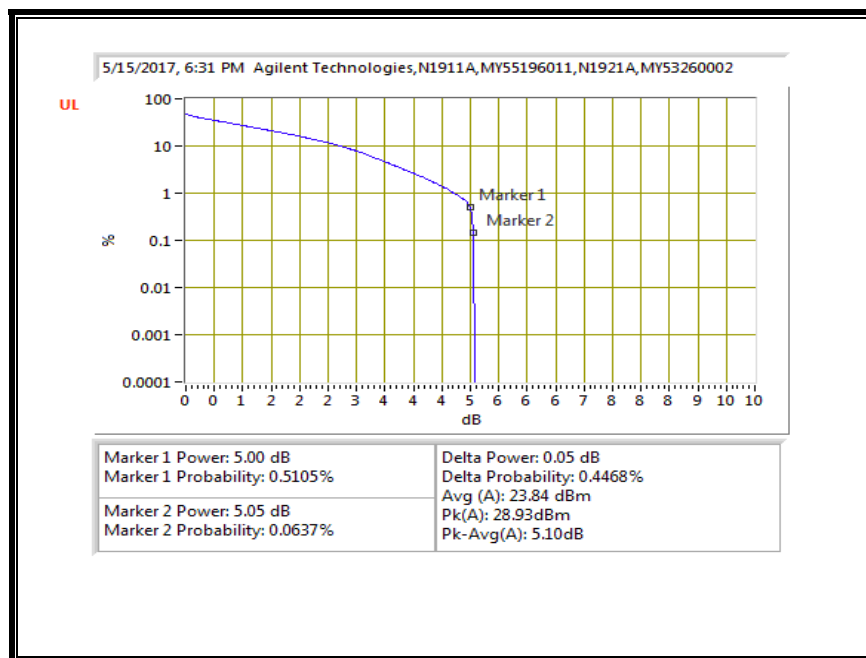


**16QAM, (20.0 MHz BAND WIDTH)**

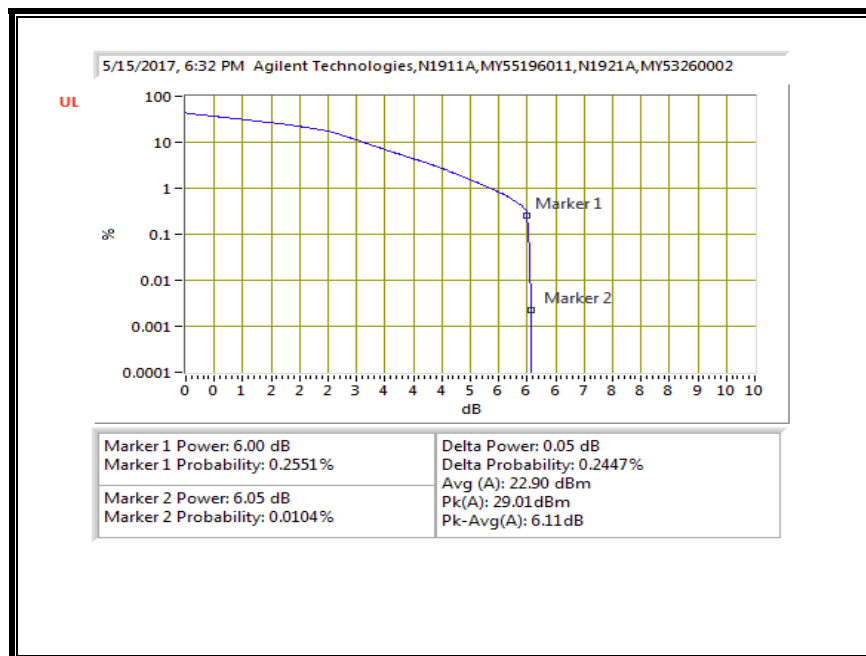


## 8.5.5. LTE BAND 12

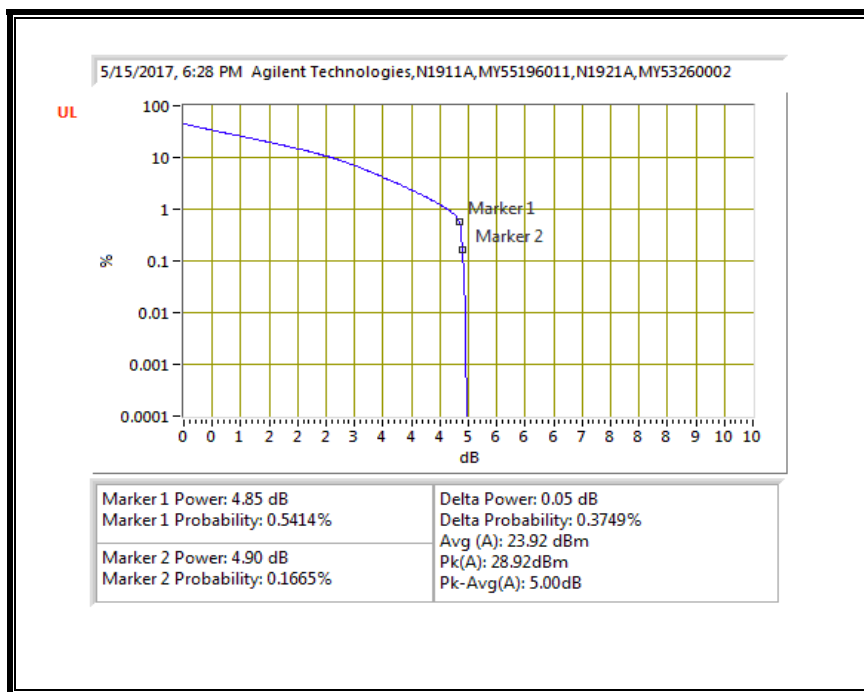
### QPSK, (1.4 MHz BAND WIDTH)



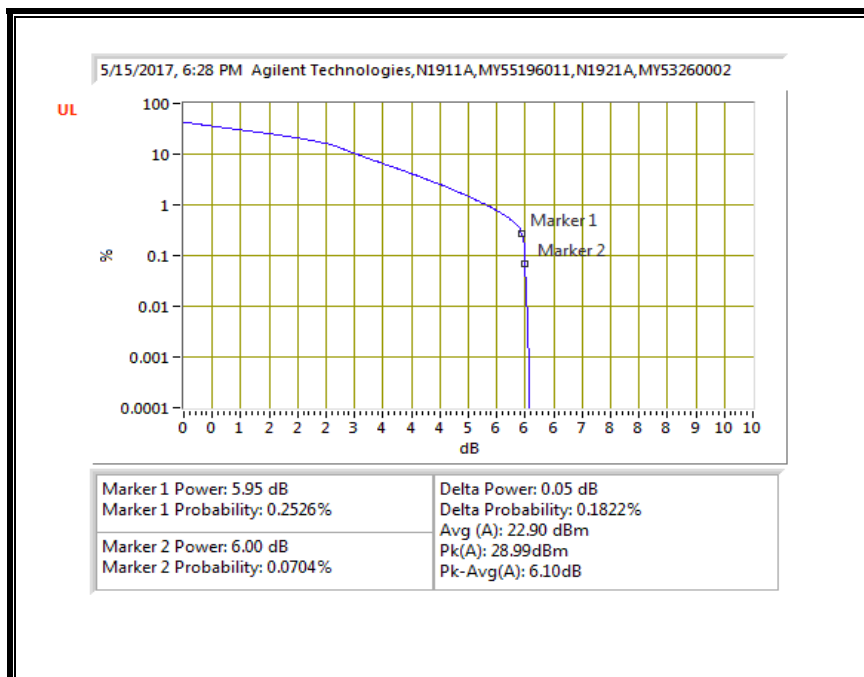
### 16QAM, (1.4 MHz BAND WIDTH)



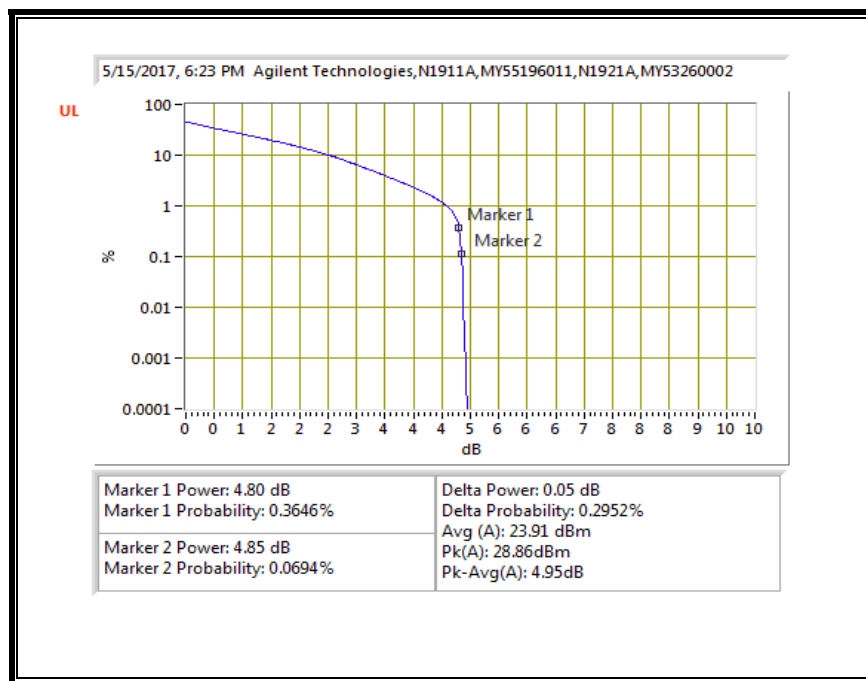
**QPSK, (3.0 MHz BAND WIDTH)**



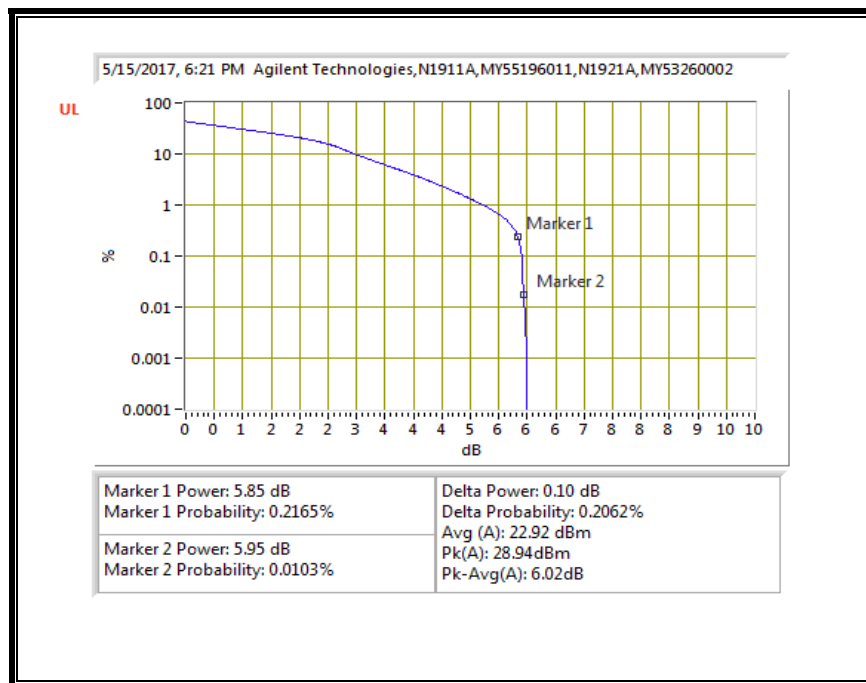
**16QAM, (3.0 MHz BAND WIDTH)**



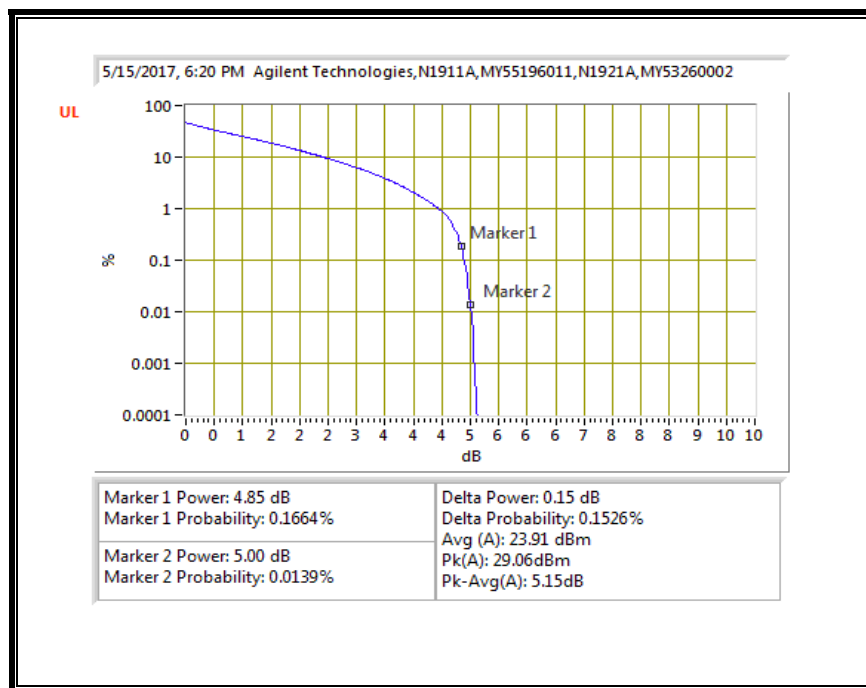
**QPSK, (5.0 MHz BAND WIDTH)**



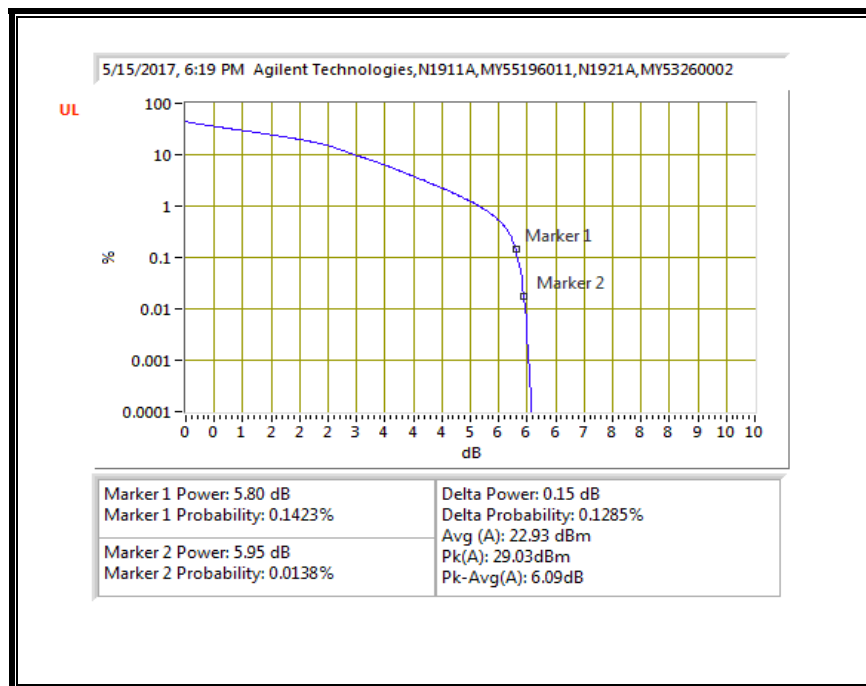
**16QAM, (5.0 MHz BAND WIDTH)**



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

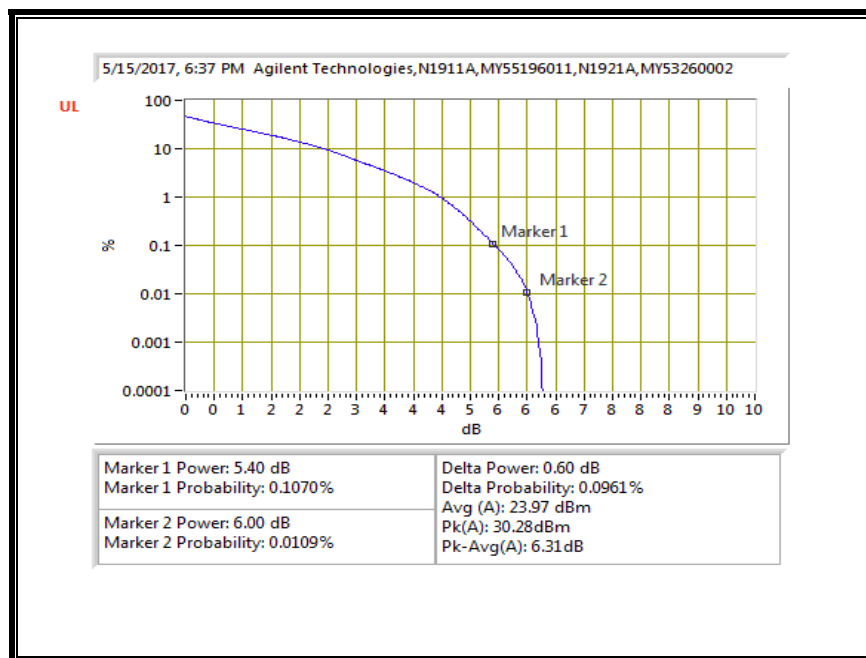


**16QAM, (10.0 MHz BAND WIDTH)**

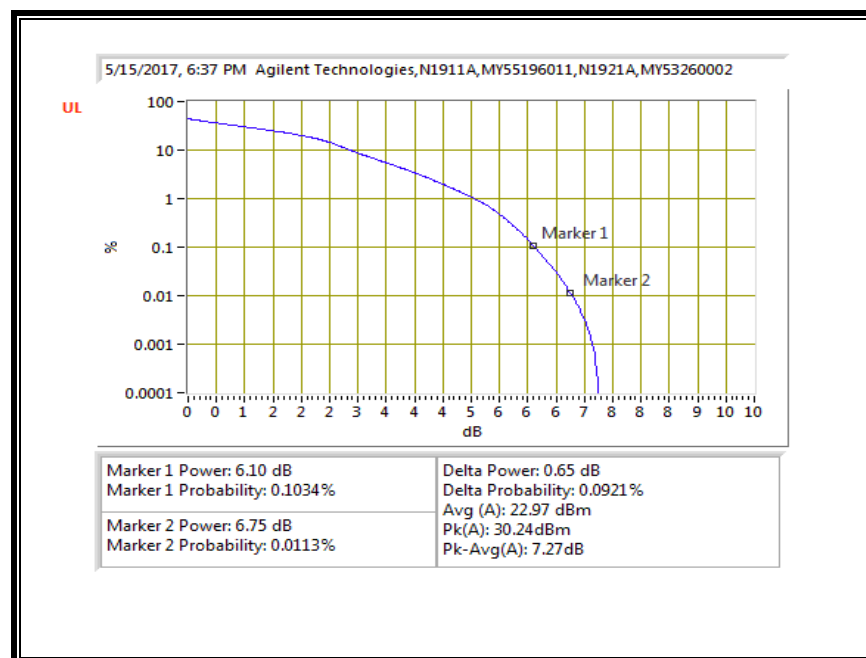


## 8.5.6. LTE BAND 13

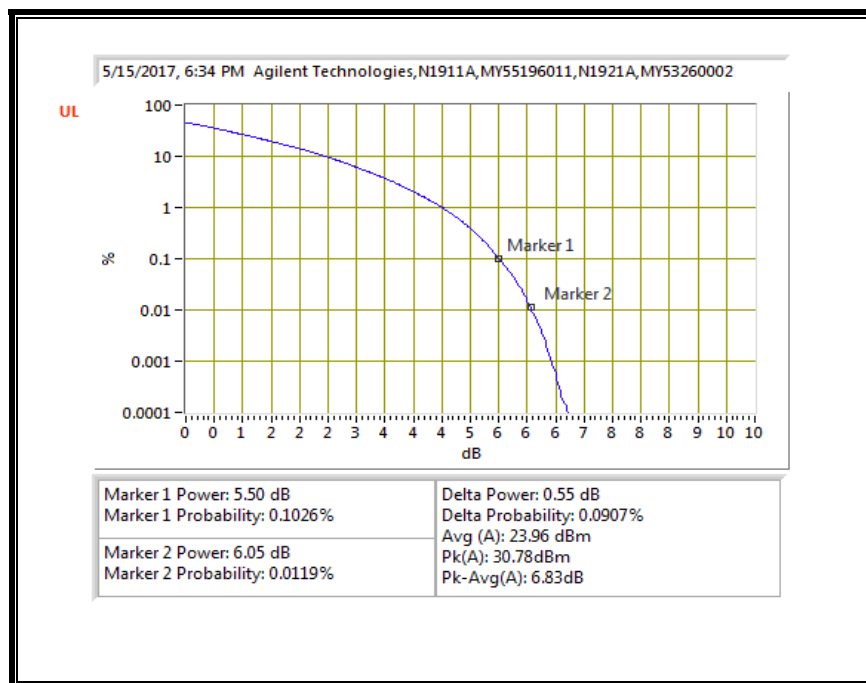
### QPSK, (5.0 MHz BAND WIDTH)



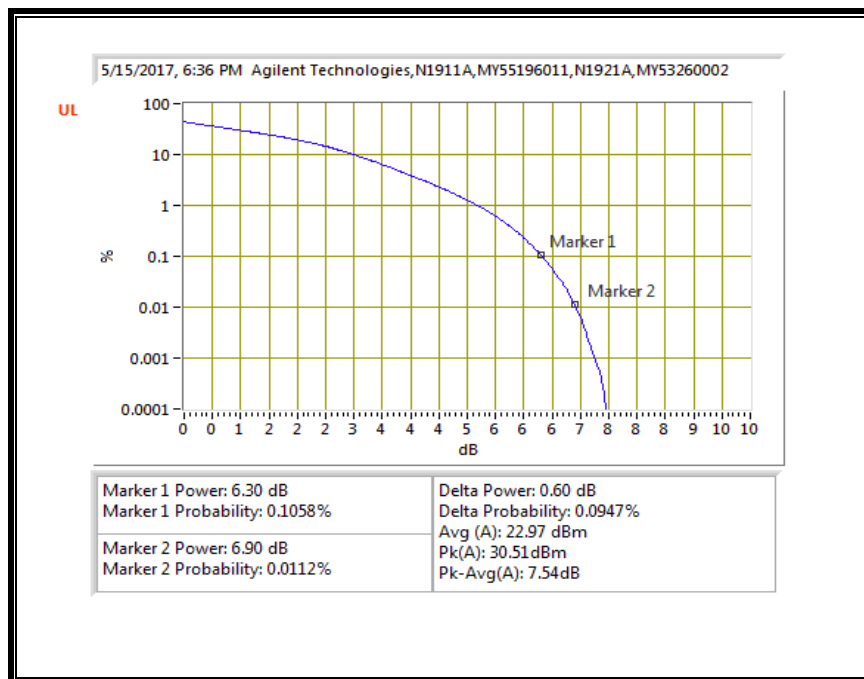
### 16QAM, (5.0 MHz BAND WIDTH)



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

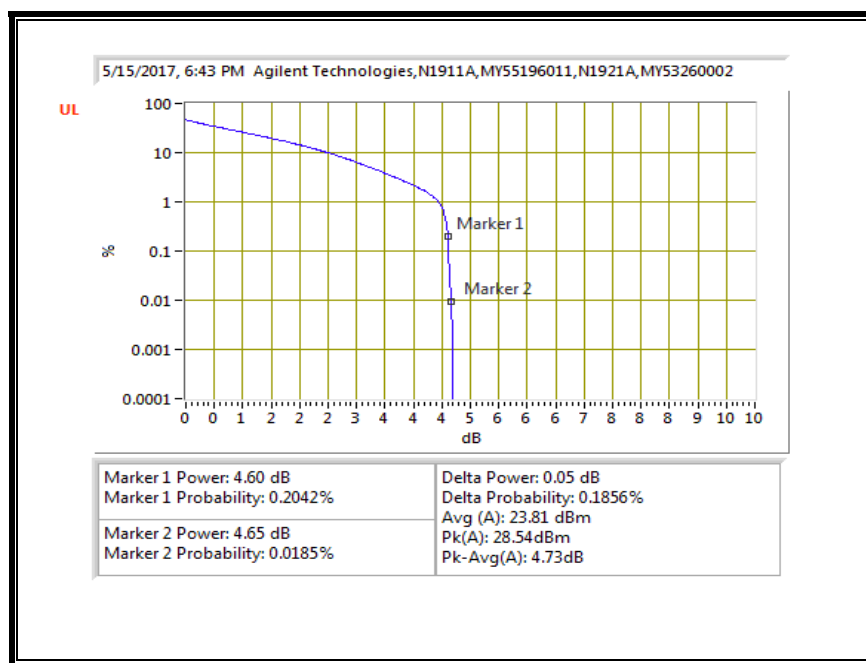


**16QAM, (10.0 MHz BAND WIDTH)**

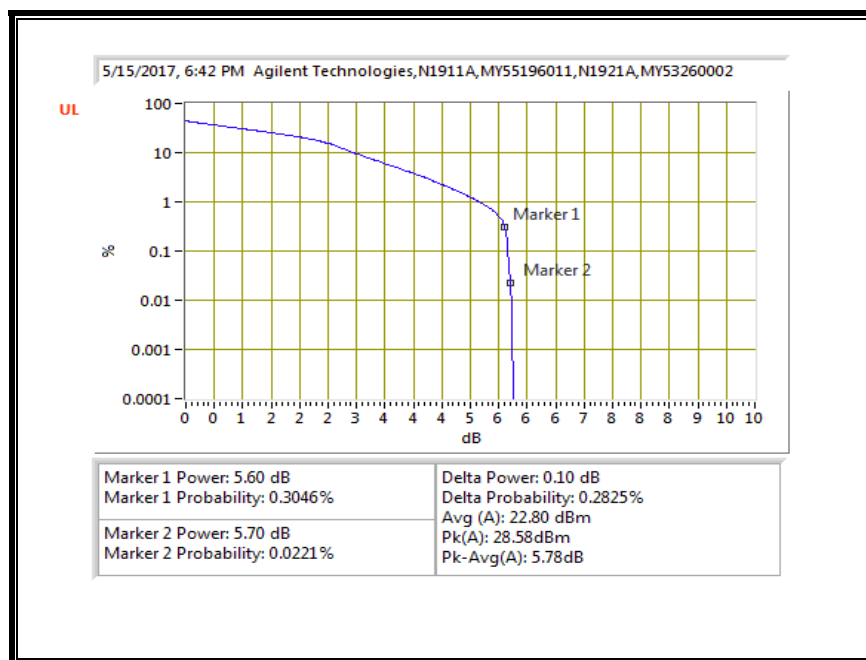


## 8.5.7. LTE BAND 17

### QPSK, (5.0 MHz BAND WIDTH)

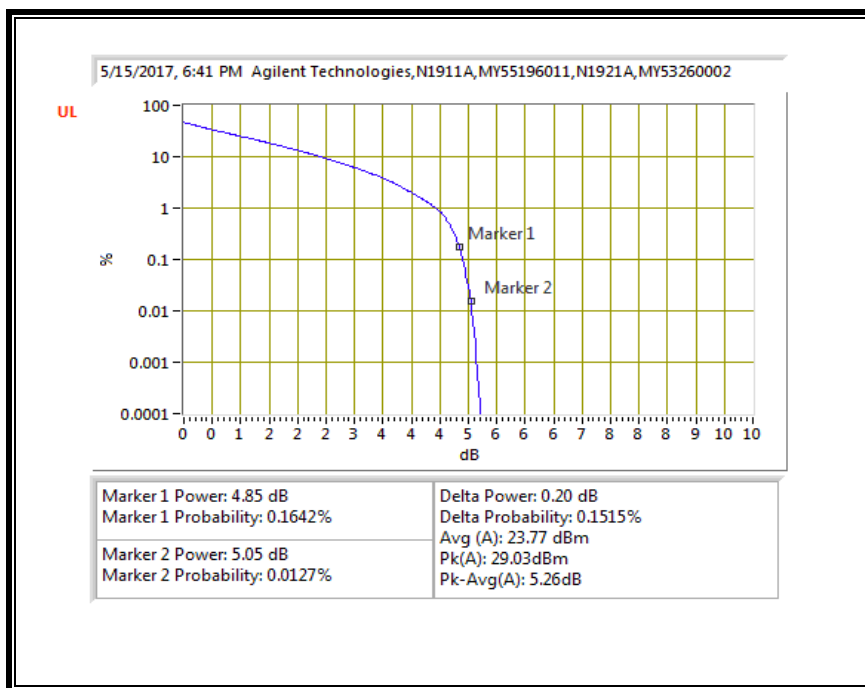


### 16QAM, (5.0 MHz BAND WIDTH)

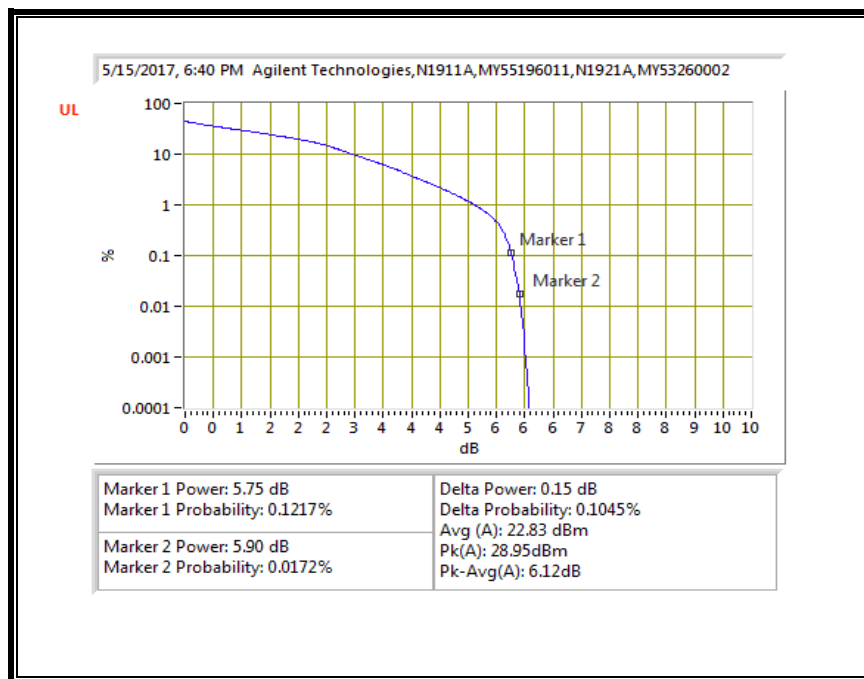




**QPSK, (10.0 MHz BAND WIDTH)**

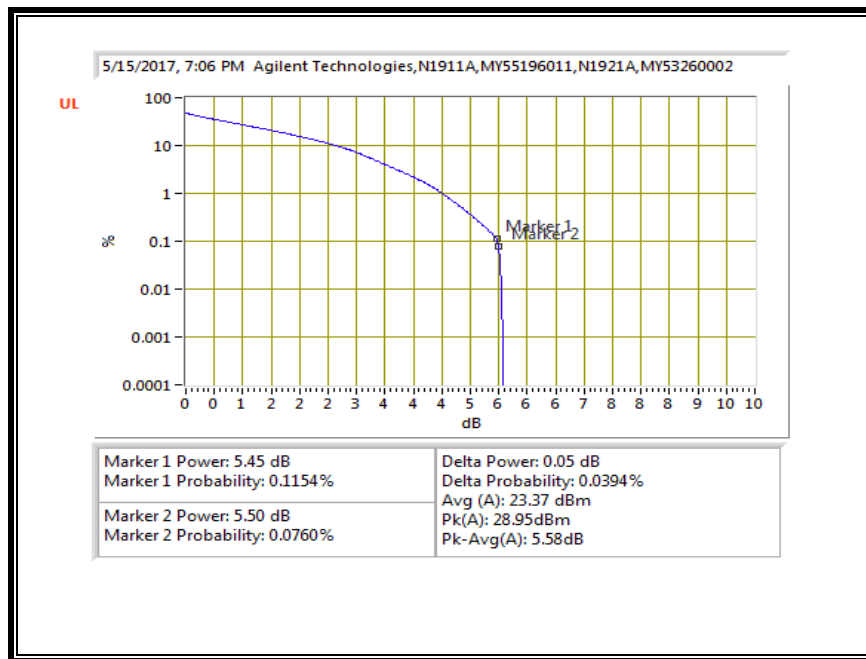


**16QAM, (10.0 MHz BAND WIDTH)**

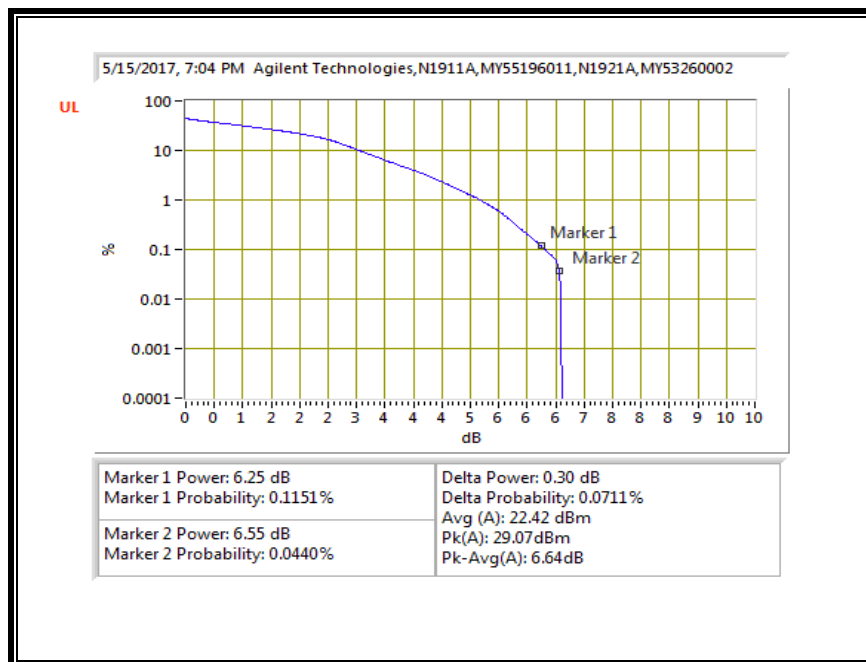


## 8.5.8. LTE BAND 25

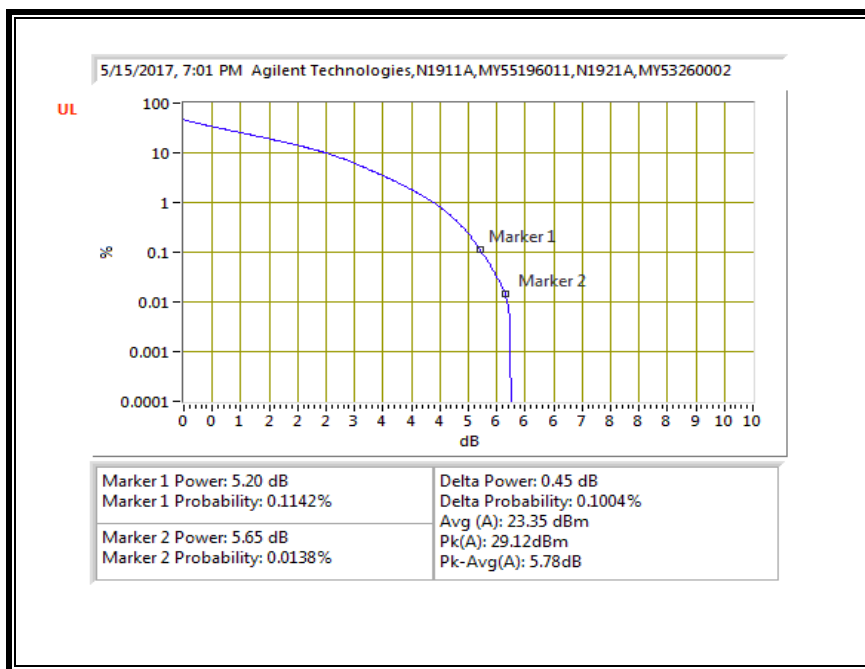
### QPSK, (1.4 MHz BAND WIDTH)



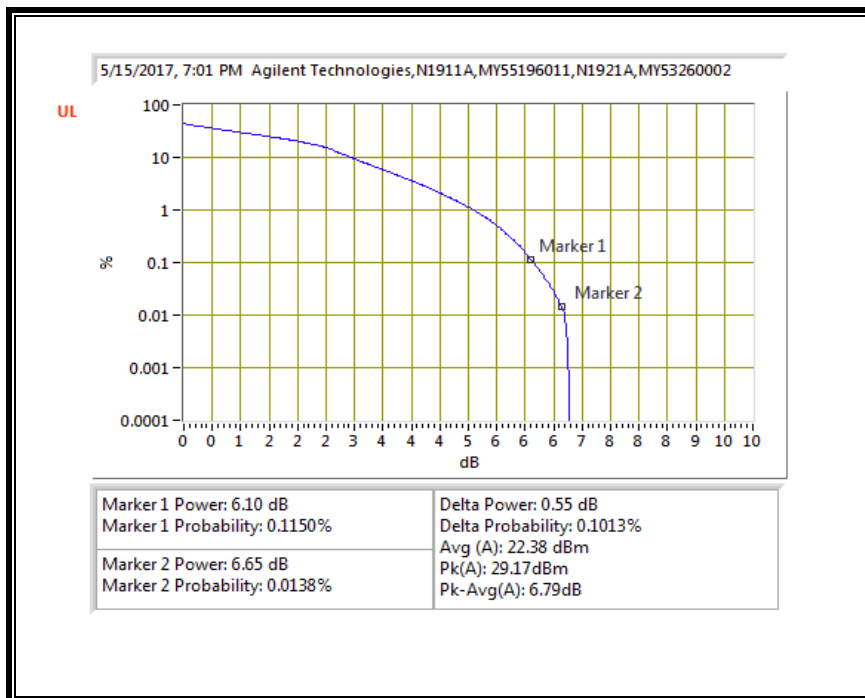
### 16QAM, (1.4 MHz BAND WIDTH)



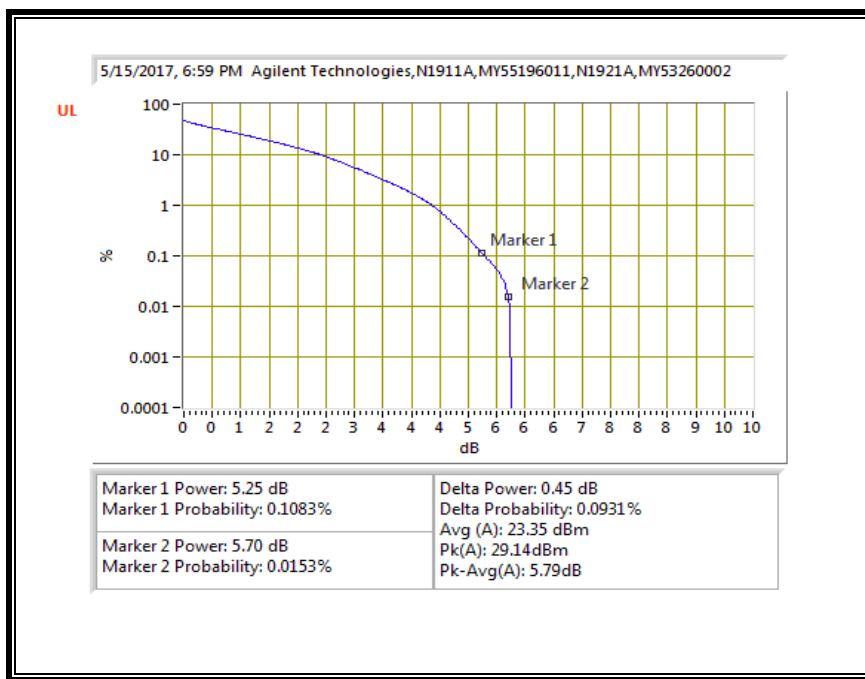
**QPSK, (3.0 MHz BAND WIDTH)**



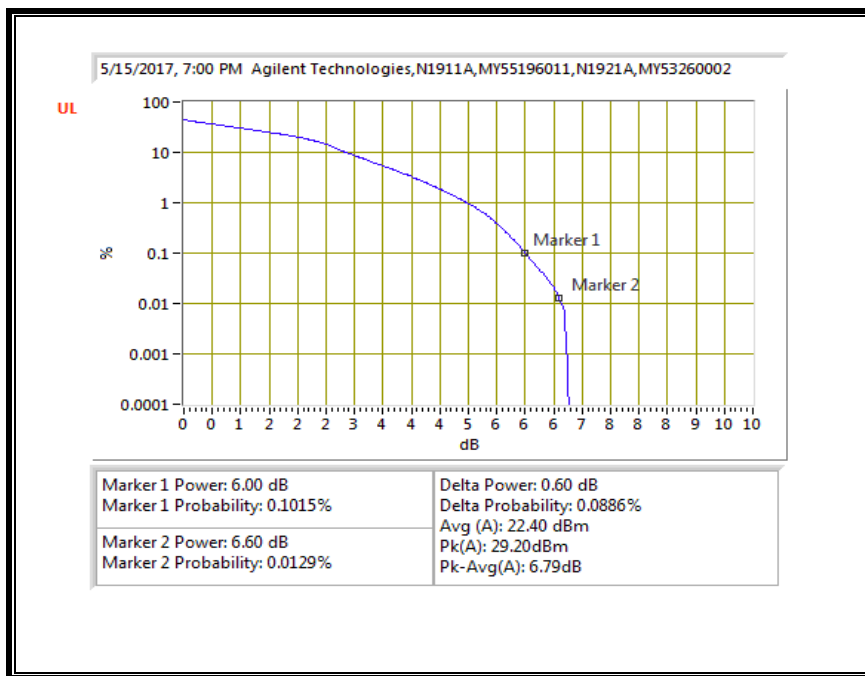
**16QAM, (3.0 MHz BAND WIDTH)**



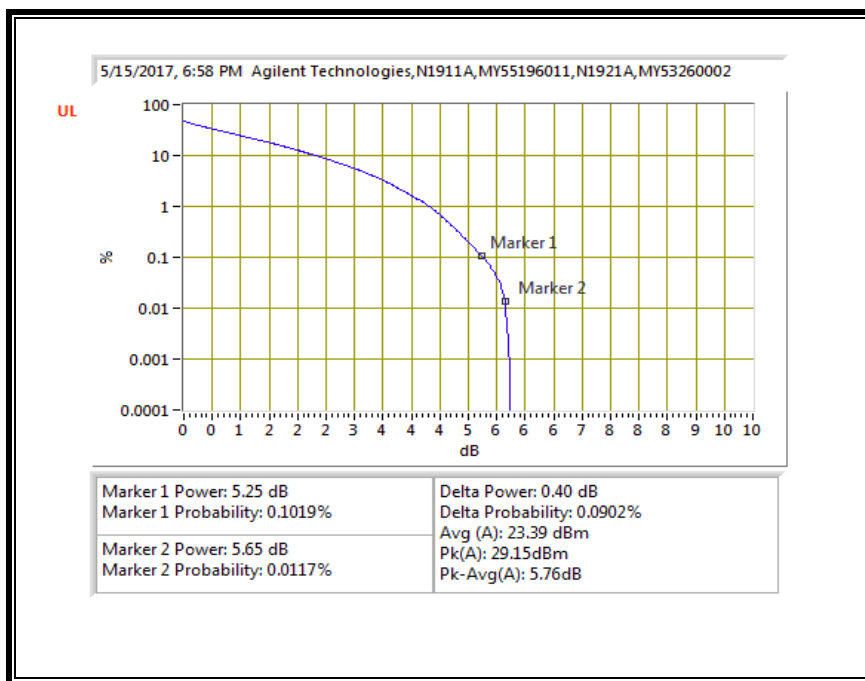
**QPSK, (5.0 MHz BAND WIDTH)**



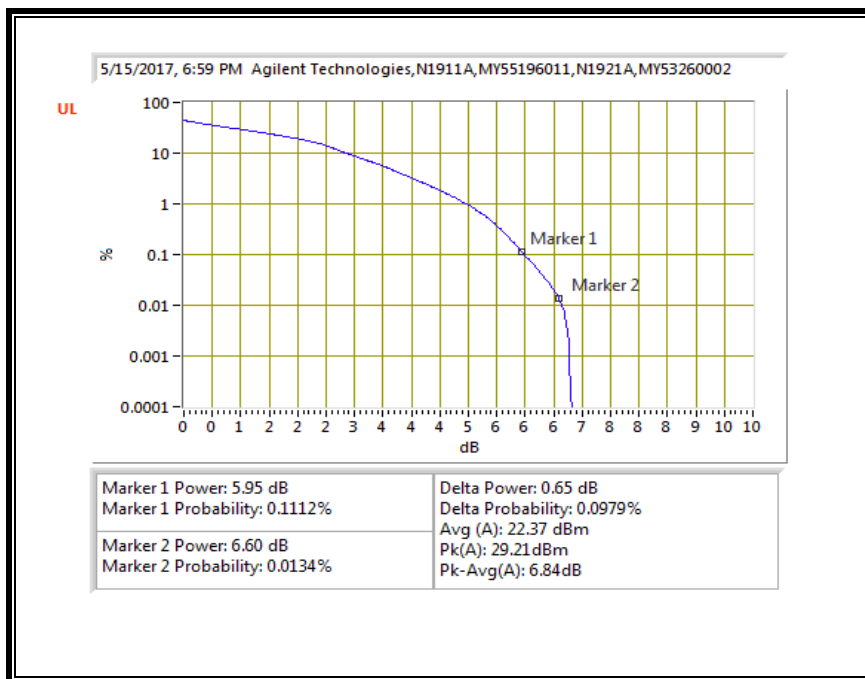
**16QAM, (5.0 MHz BAND WIDTH)**



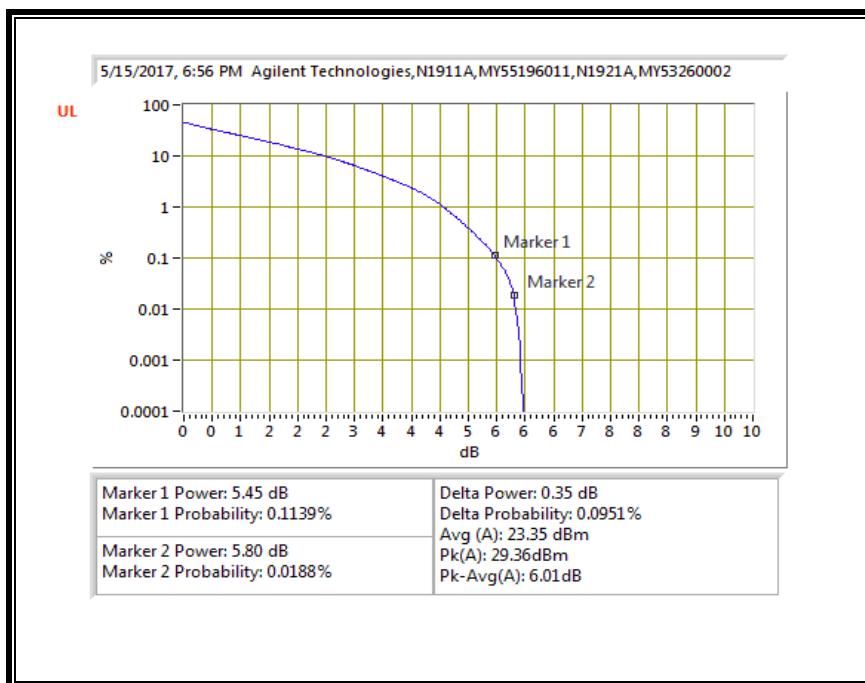
**QPSK, (10.0 MHz BAND WIDTH)**



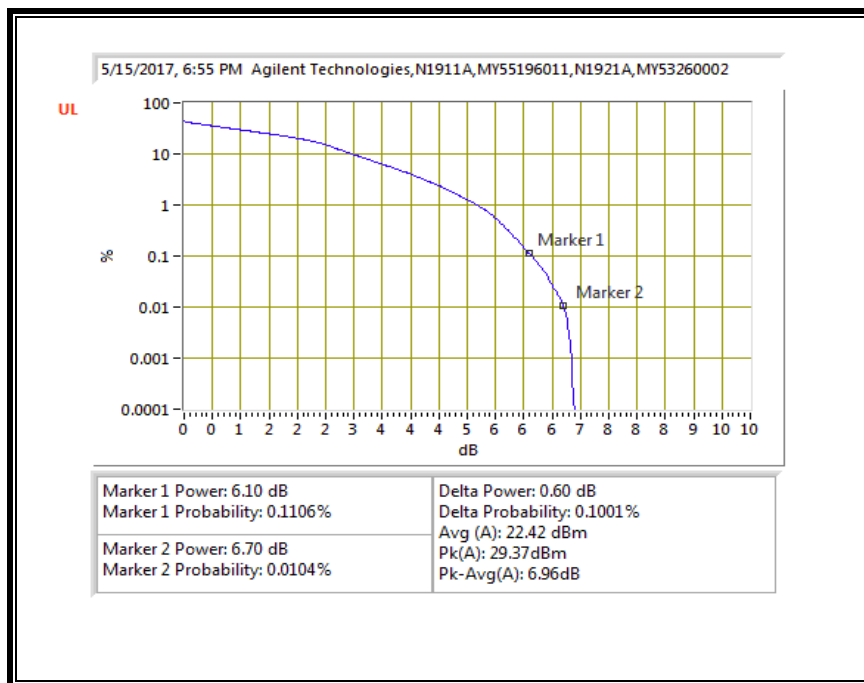
**16QAM, (10.0 MHz BAND WIDTH)**



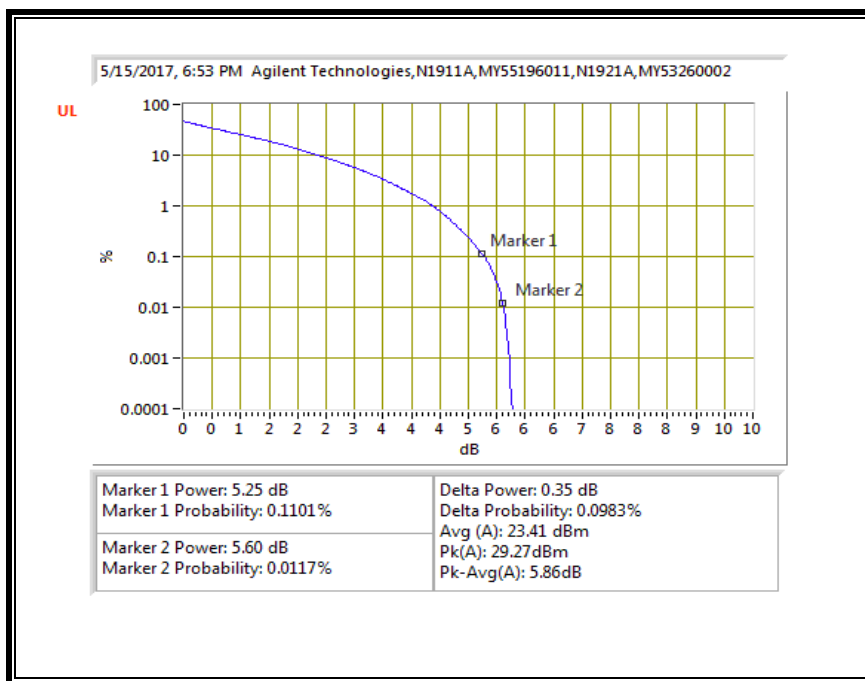
**QPSK, (15.0 MHz BAND WIDTH)**



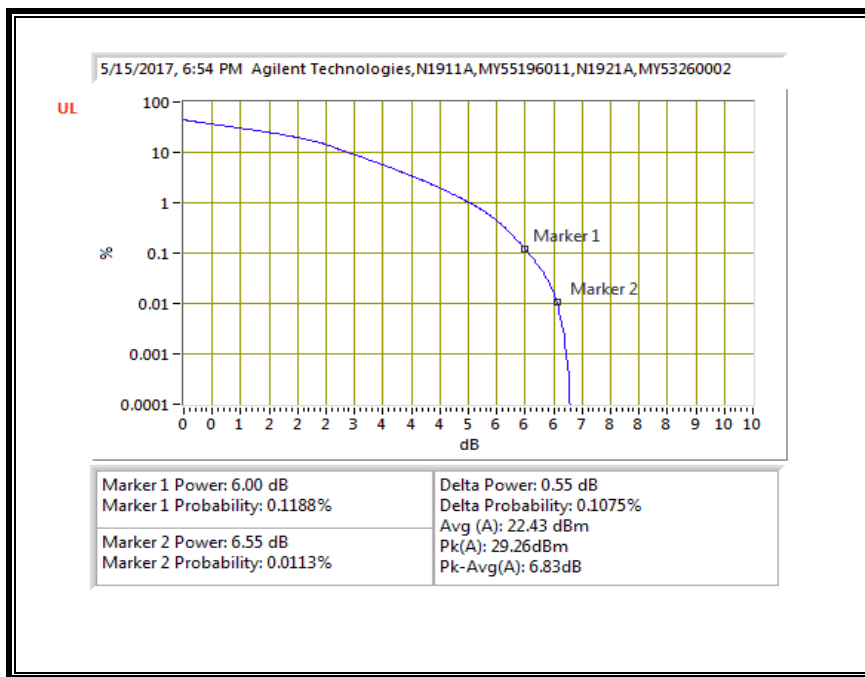
**16QAM, (15.0 MHz BAND WIDTH)**



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

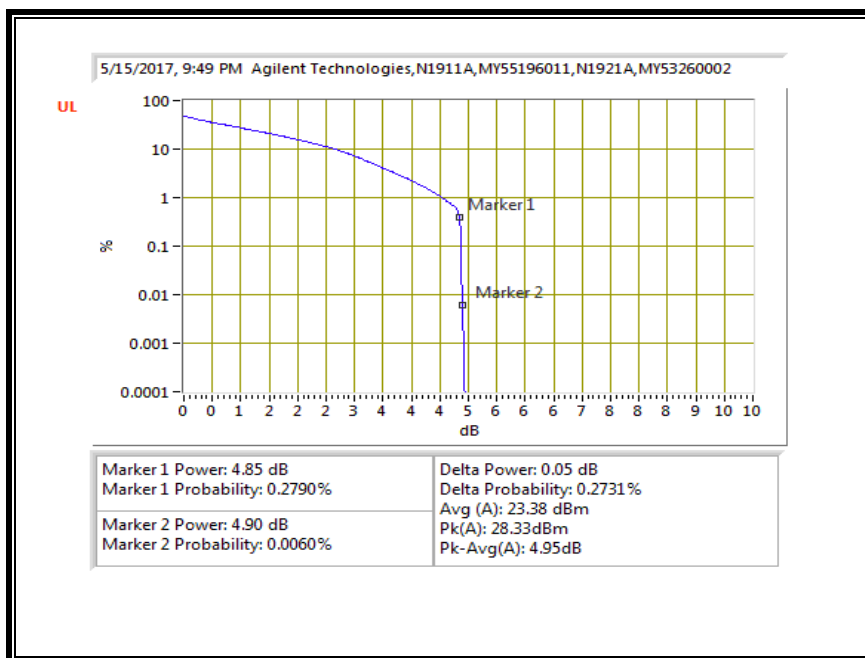


**16QAM, (20.0 MHz BAND WIDTH)**

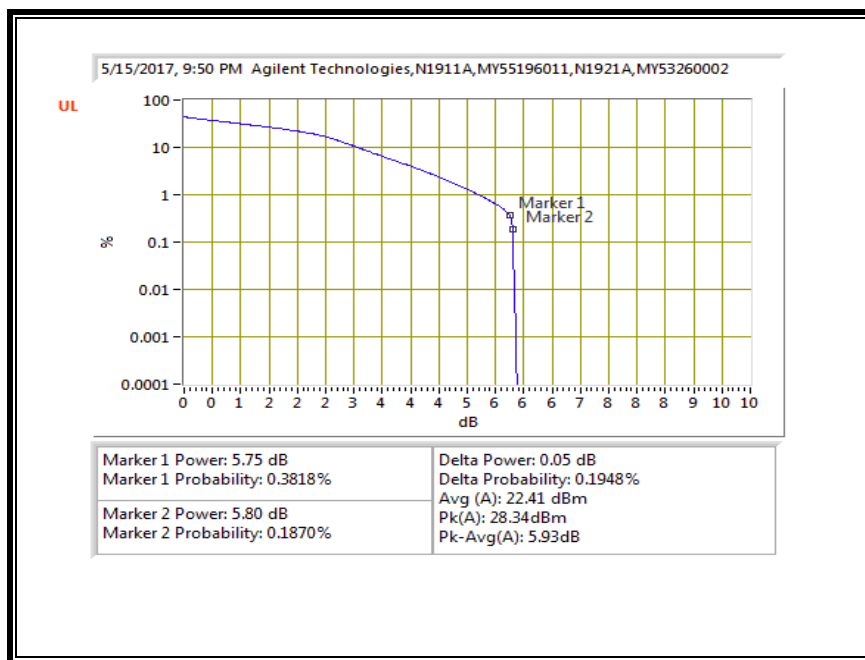


## 8.5.9. LTE BAND 26

### QPSK, (1.4 MHz BAND WIDTH)

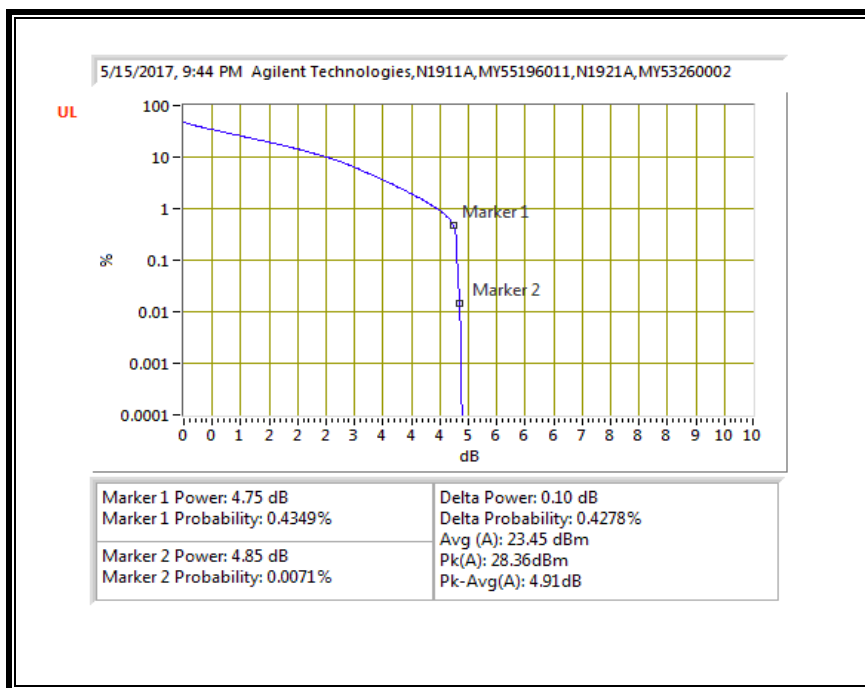


### 16QAM, (1.4 MHz BAND WIDTH)

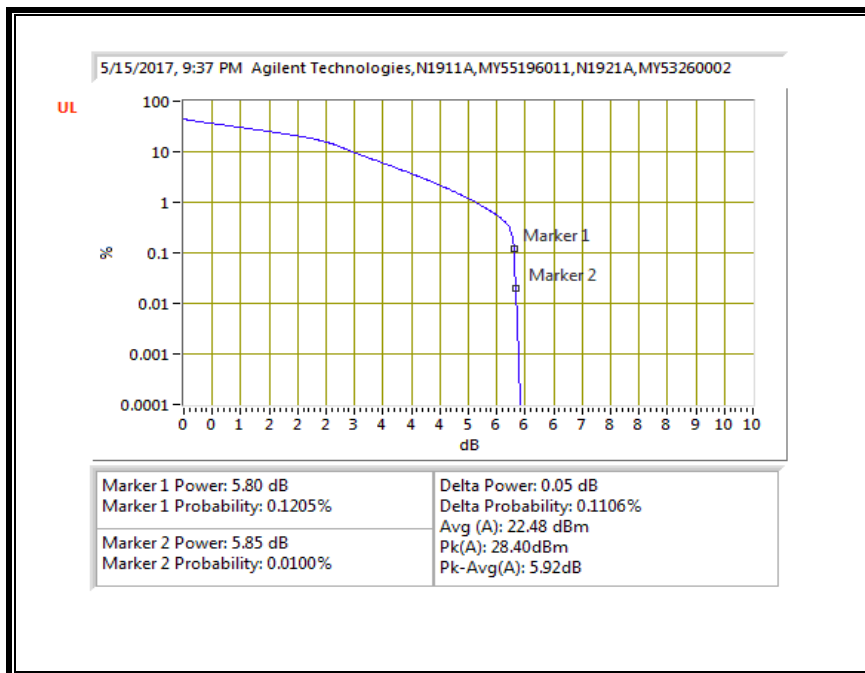




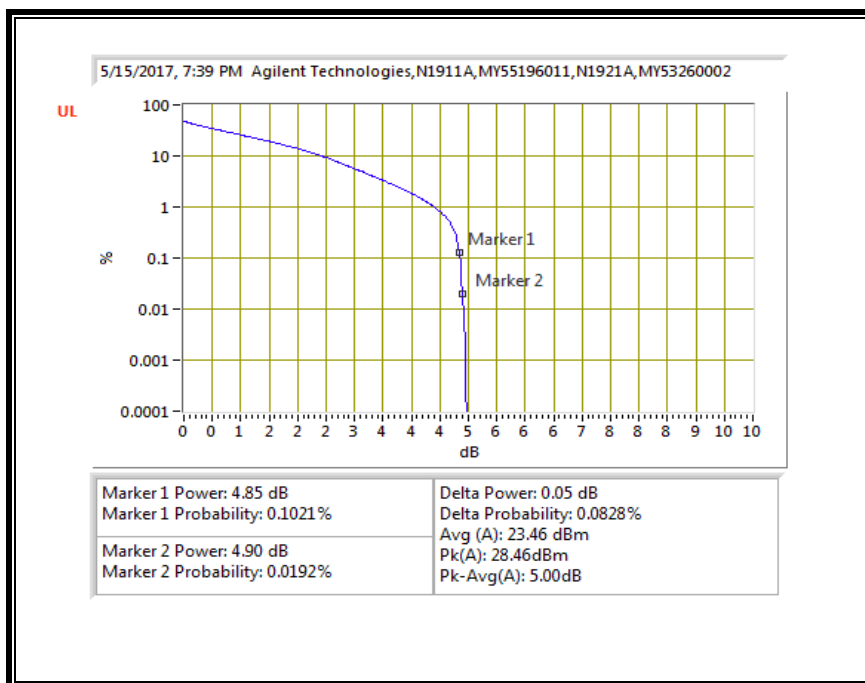
**QPSK, (3.0 MHz BAND WIDTH)**



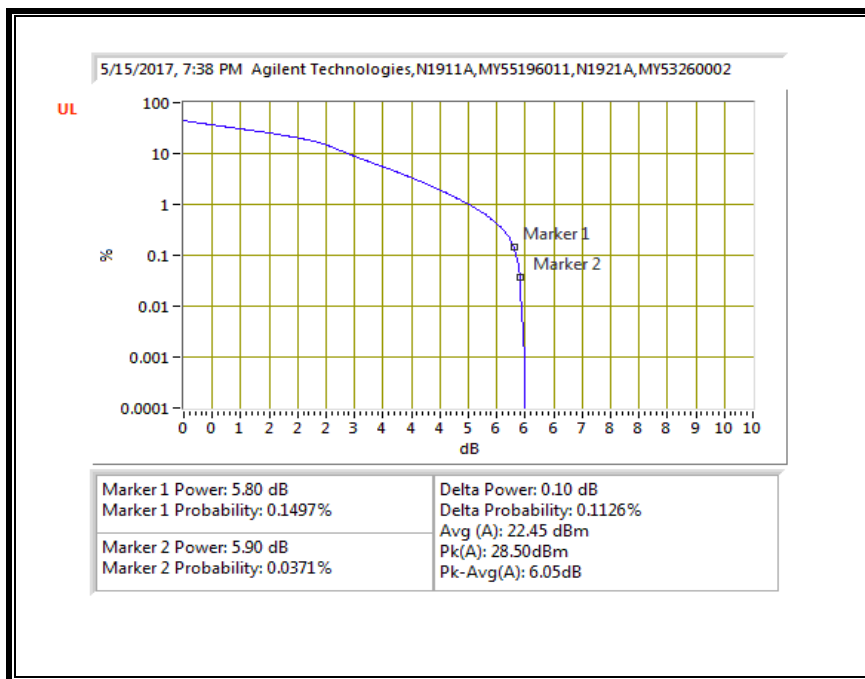
**16QAM, (3.0 MHz BAND WIDTH)**



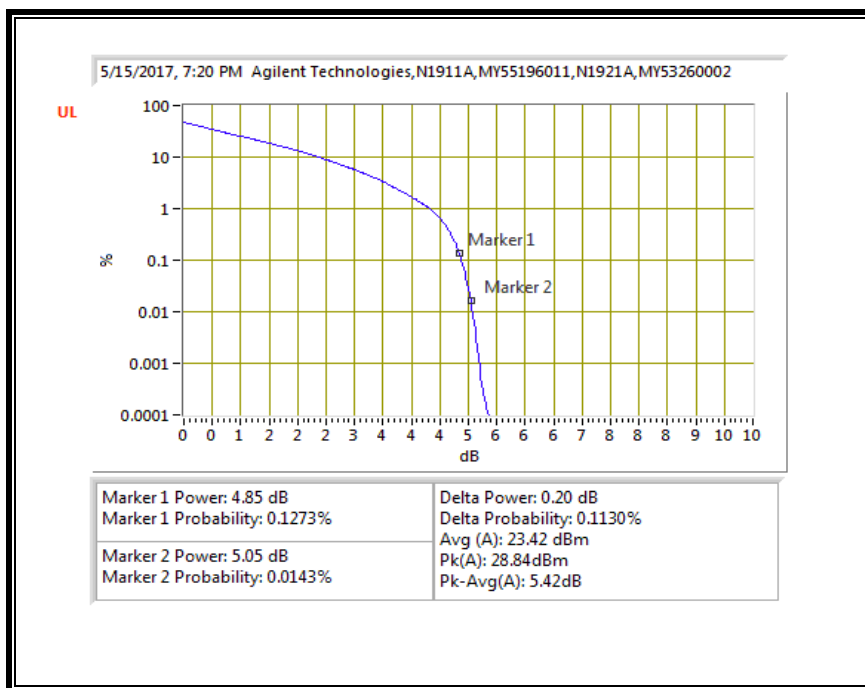
**QPSK, (5.0 MHz BAND WIDTH)**



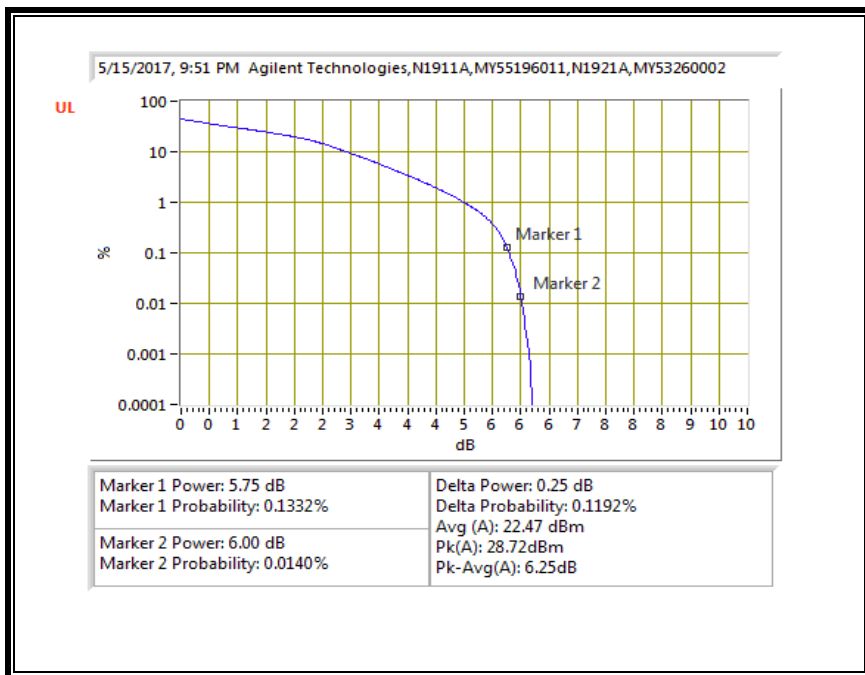
**16QAM, (5.0 MHz BAND WIDTH)**



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

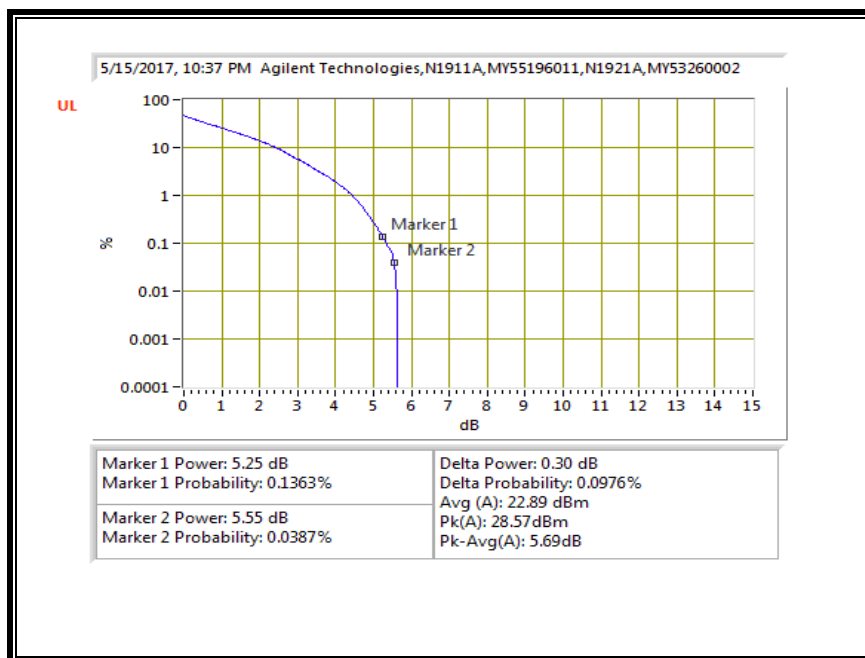


**16QAM, (10.0 MHz BAND WIDTH)**

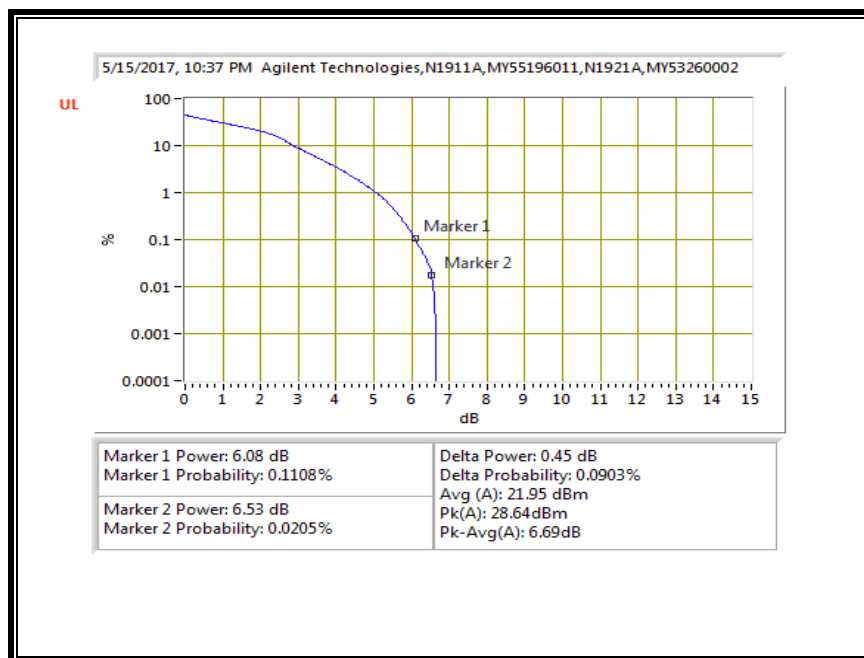


## 8.5.10. LTE BAND 30

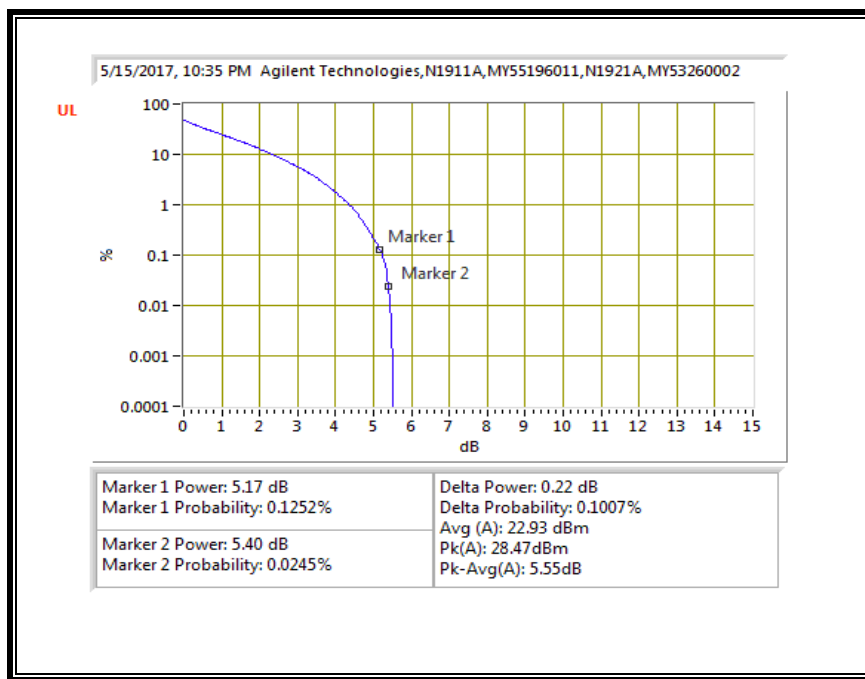
### QPSK, (5.0 MHz BAND WIDTH)



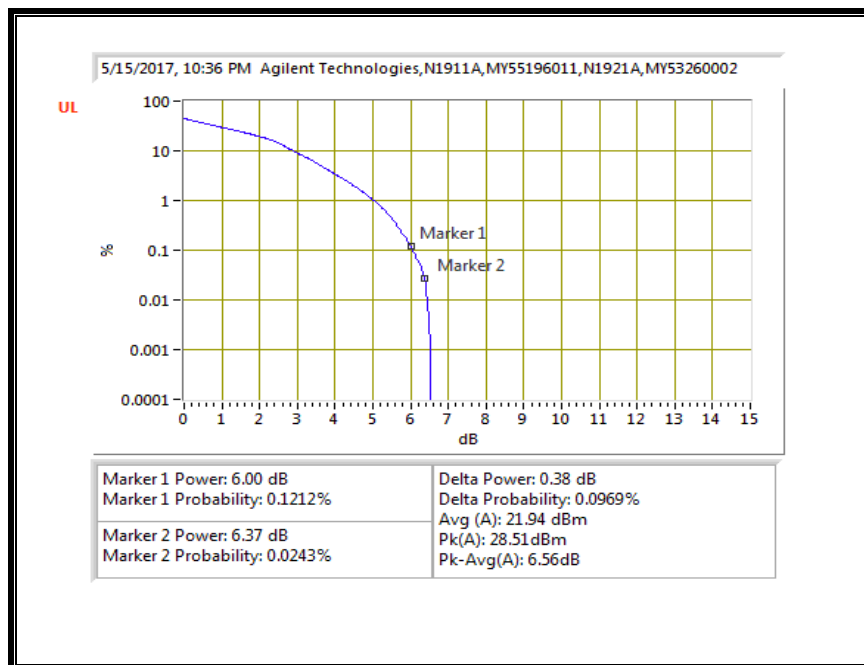
### 16QAM, (5.0 MHz BAND WIDTH)



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



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



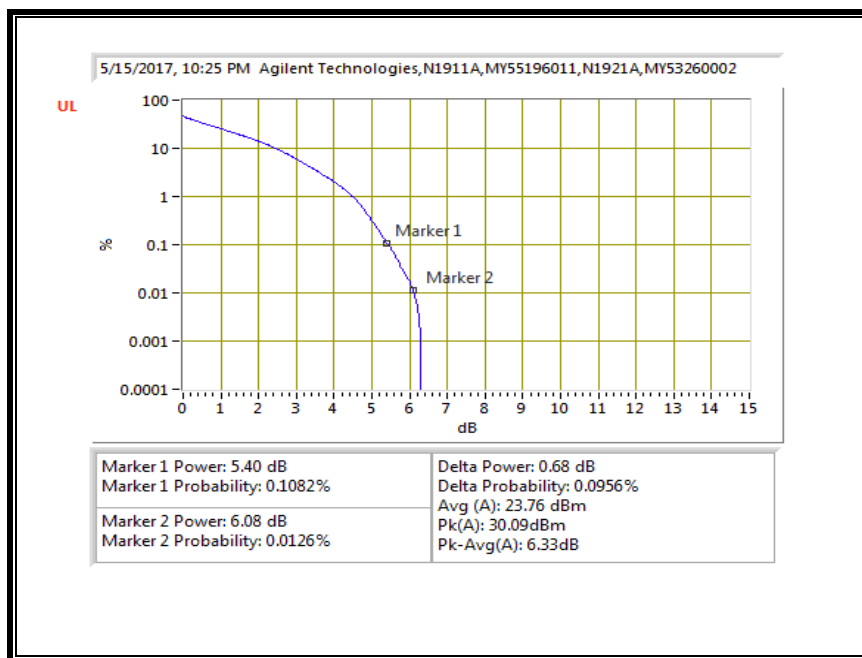
### 8.5.11. LTE BAND 41

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 52297 | <b>Date:</b> | 5/15/17 |
|------------|-------|--------------|---------|

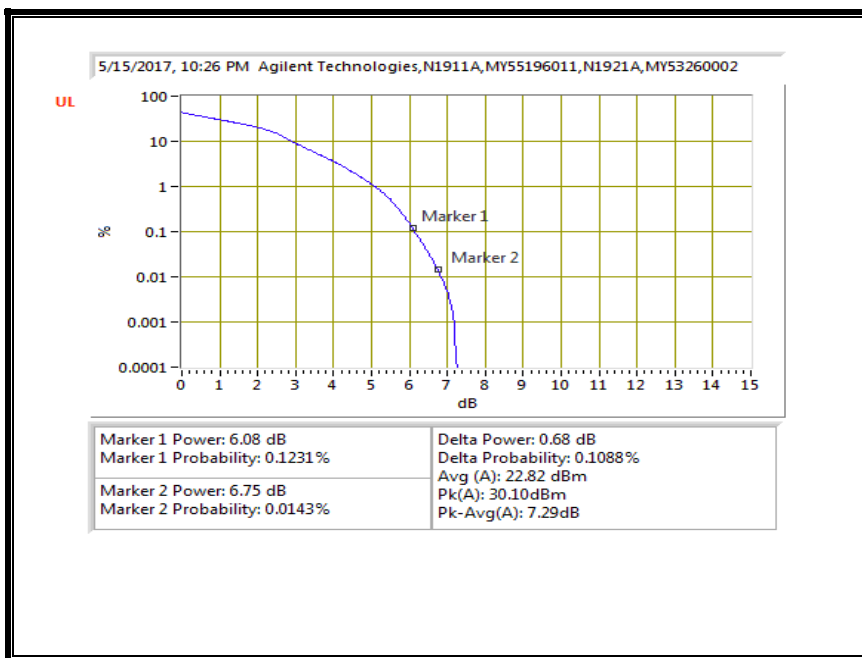
| Mode                                                                                 | Channel Band- | Frequency (MHz) | RB Size | RB OffSet | Modulation | Conducted Power (dBm) |         | Peak-to-Average Ratio |
|--------------------------------------------------------------------------------------|---------------|-----------------|---------|-----------|------------|-----------------------|---------|-----------------------|
|                                                                                      |               |                 |         |           |            | Peak                  | Average |                       |
| LTE Band 41                                                                          | 5MHz          | 2593.0          | 25      | 0         | QPSK       | 29.81                 | 16.91   | 5.91                  |
|                                                                                      |               |                 |         |           | 16QAM      | 29.84                 | 15.92   | 6.93                  |
|                                                                                      | 10MHz         |                 | 50      | 0         | QPSK       | 29.81                 | 16.93   | 5.89                  |
|                                                                                      |               |                 |         |           | 16QAM      | 29.79                 | 15.96   | 6.84                  |
|                                                                                      | 15MHz         |                 | 75      | 0         | QPSK       | 29.76                 | 16.88   | 5.89                  |
|                                                                                      |               |                 |         |           | 16QAM      | 29.79                 | 15.89   | 6.91                  |
|                                                                                      | 20MHz         |                 | 100     | 0         | QPSK       | 29.66                 | 16.93   | 5.74                  |
|                                                                                      |               |                 |         |           | 16QAM      | 29.70                 | 15.92   | 6.79                  |
| Duty Cycle Correction Factor (dB)=                                                   |               |                 | 6.99    |           |            |                       |         |                       |
| Peak to Average Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor |               |                 |         |           |            |                       |         |                       |

## 8.5.12. LTE BAND 66

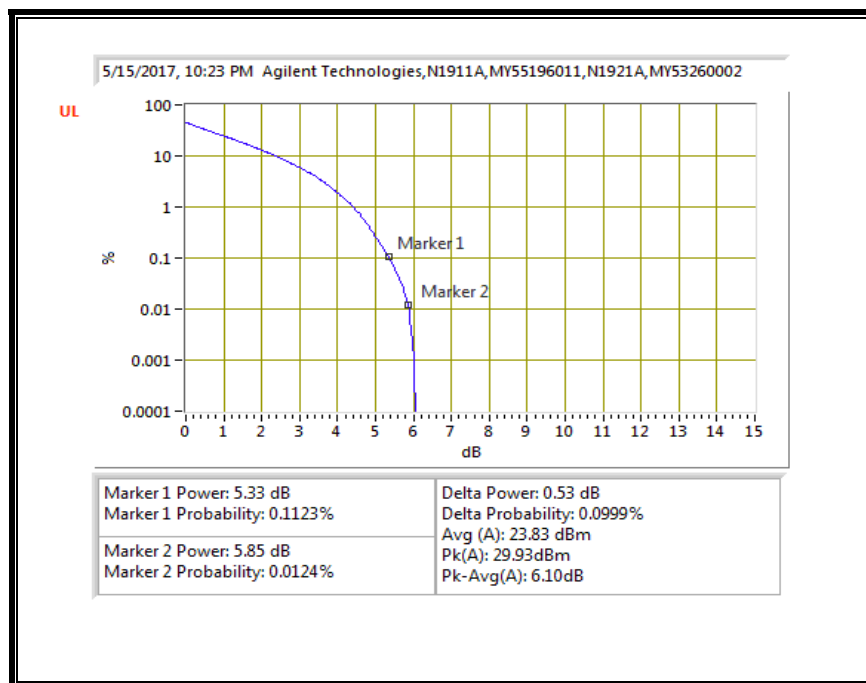
### QPSK, (5.0 MHz BAND WIDTH)



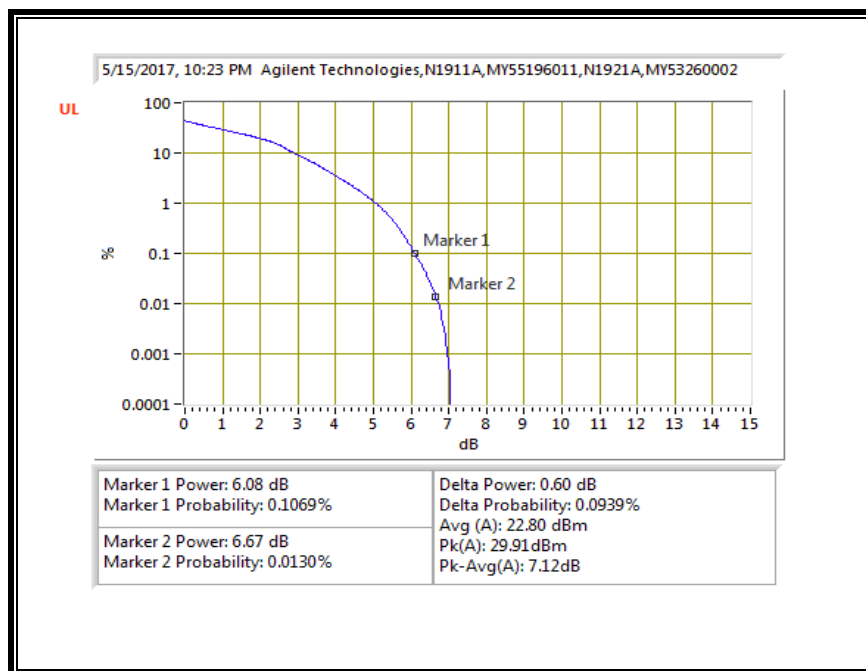
### 16QAM, (5.0 MHz BAND WIDTH)



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

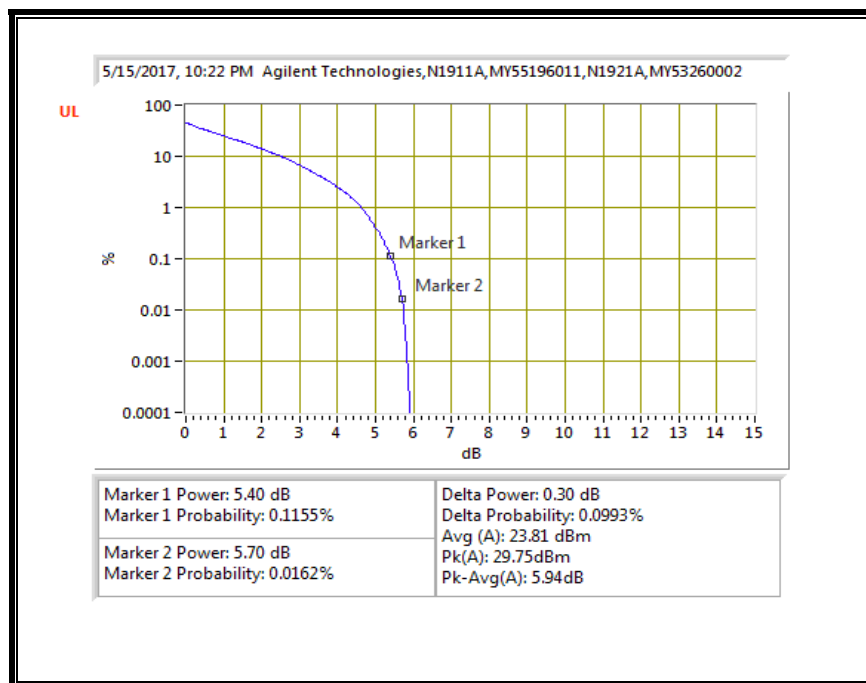


**16QAM, (10.0 MHz BAND WIDTH)**

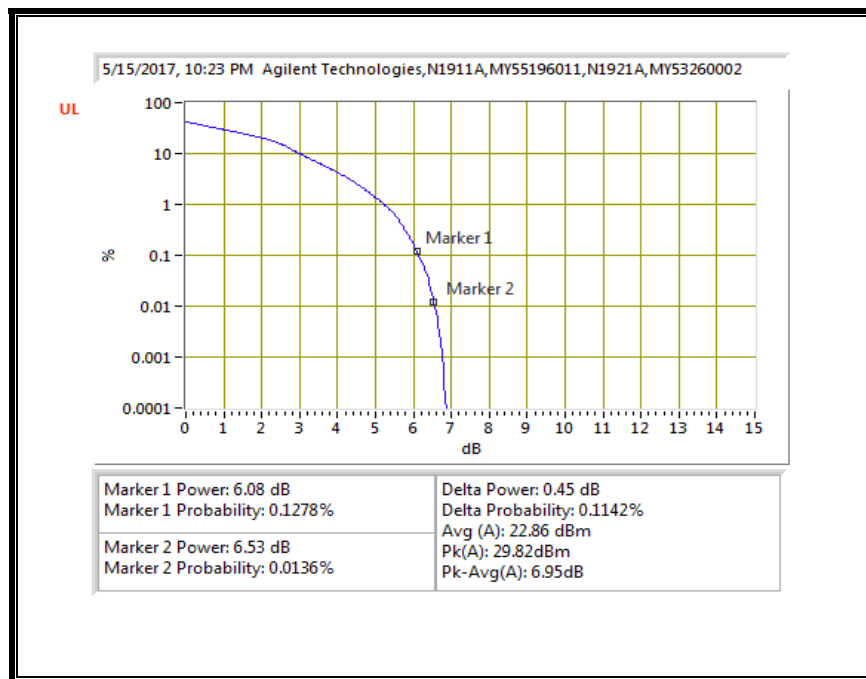




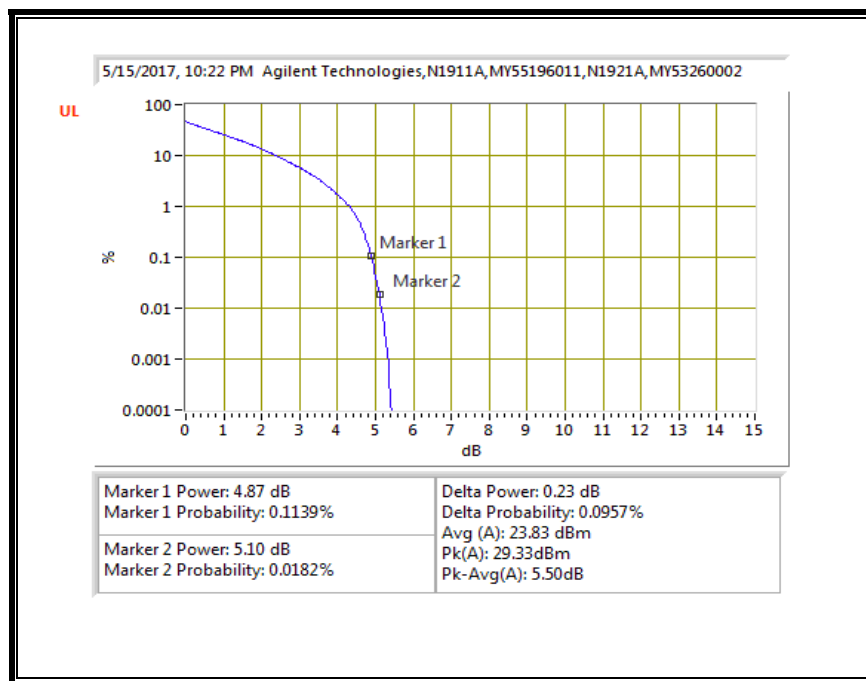
**QPSK, (15.0 MHz BAND WIDTH)**



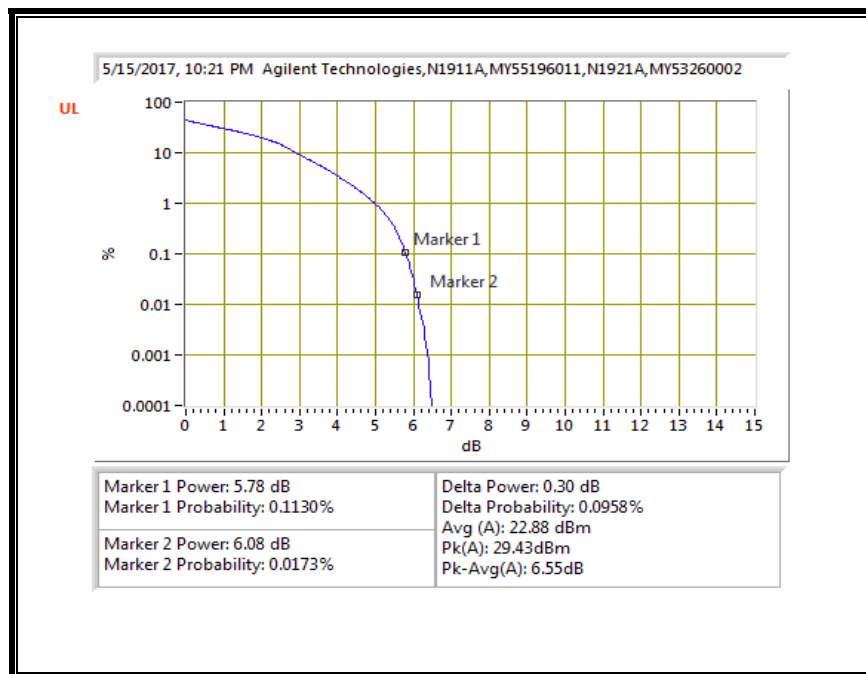
**16QAM, (15.0 MHz BAND WIDTH)**



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



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



## 9. RADIATED TEST RESULTS

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

#### RULE PART(S)

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

#### LIMIT

FCC: §22.917 (e) and §24.238 (a): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

FCC: §27.53 (g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB.

FCC: §27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB.

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

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

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

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

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

### **TEST PROCEDURE**

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

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

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

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

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

**MODES TESTED**

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

**RESULTS**

## 9.1.1. LTE BAND 2

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

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 05/17/17  
**Test Engineer:** 37290  
**Configuration:** EUT Only  
**Mode:** LTE Band 2, 20MHz QPSK

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

**Chamber**  
 3m Chamber F

**Pre-amplifier**  
 3m Chamber F

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency<br>(GHz)            | SA reading<br>(dBm) | Ant. Pol.<br>(H/V) | Distance | EIRP @ TX<br>Ant End<br>(dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|---------------------|--------------------|----------|-------------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1860MHz)</b>  |                     |                    |          |                               |        |            |       |       |       |       |
| 3.72                          | -70.5               | H                  | 3.0      | -20.6                         | 34.4   | 1.0        | -54.1 | -13.0 | -41.1 |       |
| 5.58                          | -71.0               | H                  | 3.0      | -17.5                         | 34.1   | 1.0        | -50.7 | -13.0 | -37.7 |       |
| 7.44                          | -72.2               | H                  | 3.0      | -15.9                         | 33.6   | 1.0        | -48.4 | -13.0 | -35.4 |       |
| 3.72                          | -70.3               | V                  | 3.0      | -20.3                         | 34.4   | 1.0        | -53.8 | -13.0 | -40.8 |       |
| 5.58                          | -69.7               | V                  | 3.0      | -16.1                         | 34.1   | 1.0        | -49.2 | -13.0 | -36.2 |       |
| 7.44                          | -72.8               | V                  | 3.0      | -16.6                         | 33.6   | 1.0        | -49.2 | -13.0 | -36.2 |       |
| <b>Mid Channel (1880MHz)</b>  |                     |                    |          |                               |        |            |       |       |       |       |
| 3.76                          | -68.4               | H                  | 3.0      | -18.4                         | 34.4   | 1.0        | -51.8 | -13.0 | -38.8 |       |
| 5.64                          | -70.4               | H                  | 3.0      | -16.8                         | 34.1   | 1.0        | -49.9 | -13.0 | -36.9 |       |
| 7.52                          | -71.5               | H                  | 3.0      | -15.0                         | 33.5   | 1.0        | -47.5 | -13.0 | -34.5 |       |
| 3.76                          | -68.5               | V                  | 3.0      | -18.4                         | 34.4   | 1.0        | -51.8 | -13.0 | -38.8 |       |
| 5.64                          | -72.1               | V                  | 3.0      | -18.3                         | 34.1   | 1.0        | -51.4 | -13.0 | -38.4 |       |
| 7.52                          | -72.0               | V                  | 3.0      | -15.7                         | 33.5   | 1.0        | -48.2 | -13.0 | -35.2 |       |
| <b>High Channel (1900MHz)</b> |                     |                    |          |                               |        |            |       |       |       |       |
| 3.80                          | -69.6               | H                  | 3.0      | -19.4                         | 34.4   | 1.0        | -52.8 | -13.0 | -39.8 |       |
| 5.70                          | -71.2               | H                  | 3.0      | -17.5                         | 34.1   | 1.0        | -50.6 | -13.0 | -37.6 |       |
| 7.60                          | -74.1               | H                  | 3.0      | -17.5                         | 33.5   | 1.0        | -49.9 | -13.0 | -36.9 |       |
| 3.80                          | -69.6               | V                  | 3.0      | -19.4                         | 34.4   | 1.0        | -52.7 | -13.0 | -39.7 |       |
| 5.70                          | -71.1               | V                  | 3.0      | -17.3                         | 34.1   | 1.0        | -50.4 | -13.0 | -37.4 |       |
| 7.60                          | -73.4               | V                  | 3.0      | -17.0                         | 33.5   | 1.0        | -49.5 | -13.0 | -36.5 |       |

Rev. 05.21.15

**16QAM LTE BAND 2 (20.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 05/17/17  
**Test Engineer:** 37290  
**Configuration:** EUT Only  
**Mode:** LTE Band 2, 20MHz 16QAM

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

**Chamber**  
 3m Chamber F

**Pre-amplifier**  
 3m Chamber F

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1860MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.72                          | -69.2            | H               | 3.0      | -19.3                   | 34.4   | 1.0        | -52.8 | -13.0 | -39.8 |       |
| 5.58                          | -70.0            | H               | 3.0      | -16.6                   | 34.1   | 1.0        | -49.7 | -13.0 | -36.7 |       |
| 7.44                          | -71.9            | H               | 3.0      | -15.6                   | 33.6   | 1.0        | -48.2 | -13.0 | -35.2 |       |
| 3.72                          | -69.2            | V               | 3.0      | -19.3                   | 34.4   | 1.0        | -52.7 | -13.0 | -39.7 |       |
| 5.58                          | -70.0            | V               | 3.0      | -16.4                   | 34.1   | 1.0        | -49.5 | -13.0 | -36.5 |       |
| 7.44                          | -71.9            | V               | 3.0      | -15.8                   | 33.6   | 1.0        | -48.3 | -13.0 | -35.3 |       |
| <b>Mid Channel (1880MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.76                          | -70.2            | H               | 3.0      | -20.2                   | 34.4   | 1.0        | -53.6 | -13.0 | -40.6 |       |
| 5.64                          | -70.8            | H               | 3.0      | -17.2                   | 34.1   | 1.0        | -50.3 | -13.0 | -37.3 |       |
| 7.52                          | -72.5            | H               | 3.0      | -16.0                   | 33.5   | 1.0        | -48.5 | -13.0 | -35.5 |       |
| 3.76                          | -70.0            | V               | 3.0      | -19.9                   | 34.4   | 1.0        | -53.3 | -13.0 | -40.3 |       |
| 5.64                          | -70.8            | V               | 3.0      | -17.1                   | 34.1   | 1.0        | -50.2 | -13.0 | -37.2 |       |
| 7.52                          | -72.5            | V               | 3.0      | -16.2                   | 33.5   | 1.0        | -48.7 | -13.0 | -35.7 |       |
| <b>High Channel (1900MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 3.80                          | -70.5            | H               | 3.0      | -20.4                   | 34.4   | 1.0        | -53.8 | -13.0 | -40.8 |       |
| 5.70                          | -70.9            | H               | 3.0      | -17.3                   | 34.1   | 1.0        | -50.4 | -13.0 | -37.4 |       |
| 7.60                          | -73.0            | H               | 3.0      | -16.4                   | 33.5   | 1.0        | -48.9 | -13.0 | -35.9 |       |
| 3.80                          | -70.1            | V               | 3.0      | -19.9                   | 34.4   | 1.0        | -53.3 | -13.0 | -40.3 |       |
| 5.70                          | -71.1            | V               | 3.0      | -17.3                   | 34.1   | 1.0        | -50.4 | -13.0 | -37.4 |       |
| 7.60                          | -73.4            | V               | 3.0      | -17.0                   | 33.5   | 1.0        | -49.4 | -13.0 | -36.4 |       |

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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 #:** 11792476  
**Date:** 05/17/17  
**Test Engineer:** 37290  
**Configuration:** EUT Only  
**Mode:** LTE Band 4, 3MHz QPSK

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

**Chamber**  

3m Chamber F

**Pre-amplifier**  

3m Chamber F

**Filter**  

Filter

**Limit**  

EIRP

| Frequency (GHz)                 | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|---------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1711.5MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.42                            | -70.6            | H               | 3.0      | -21.9                   | 34.6   | 1.0        | -55.5 | -13.0 | -42.5 |       |
| 5.13                            | -72.3            | H               | 3.0      | -19.6                   | 34.2   | 1.0        | -52.7 | -13.0 | -39.7 |       |
| 6.85                            | -71.9            | H               | 3.0      | -16.4                   | 33.9   | 1.0        | -49.3 | -13.0 | -36.3 |       |
| 3.42                            | -69.7            | V               | 3.0      | -20.8                   | 34.6   | 1.0        | -54.4 | -13.0 | -41.4 |       |
| 5.13                            | -71.8            | V               | 3.0      | -18.8                   | 34.2   | 1.0        | -51.9 | -13.0 | -38.9 |       |
| 6.85                            | -71.4            | V               | 3.0      | -16.0                   | 33.9   | 1.0        | -48.9 | -13.0 | -35.9 |       |
| <b>Mid Channel (1732.5MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.47                            | -69.8            | H               | 3.0      | -20.9                   | 34.6   | 1.0        | -54.5 | -13.0 | -41.5 |       |
| 5.20                            | -71.4            | H               | 3.0      | -18.5                   | 34.2   | 1.0        | -51.7 | -13.0 | -38.7 |       |
| 6.93                            | -71.5            | H               | 3.0      | -15.8                   | 33.9   | 1.0        | -48.8 | -13.0 | -35.8 |       |
| 3.47                            | -71.2            | V               | 3.0      | -22.2                   | 34.6   | 1.0        | -55.7 | -13.0 | -42.7 |       |
| 5.20                            | -71.6            | V               | 3.0      | -18.4                   | 34.2   | 1.0        | -51.6 | -13.0 | -38.6 |       |
| 6.93                            | -71.3            | V               | 3.0      | -15.8                   | 33.9   | 1.0        | -48.8 | -13.0 | -35.8 |       |
| <b>High Channel (1753.5MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 3.51                            | -69.8            | H               | 3.0      | -20.7                   | 34.5   | 1.0        | -54.3 | -13.0 | -41.3 |       |
| 5.26                            | -69.3            | H               | 3.0      | -16.3                   | 34.2   | 1.0        | -49.5 | -13.0 | -36.5 |       |
| 7.01                            | -71.3            | H               | 3.0      | -15.5                   | 33.9   | 1.0        | -48.4 | -13.0 | -35.4 |       |
| 3.51                            | -68.5            | V               | 3.0      | -19.2                   | 34.5   | 1.0        | -52.8 | -13.0 | -39.8 |       |
| 5.26                            | -70.4            | V               | 3.0      | -17.2                   | 34.2   | 1.0        | -50.3 | -13.0 | -37.3 |       |
| 7.01                            | -73.3            | V               | 3.0      | -17.7                   | 33.9   | 1.0        | -50.6 | -13.0 | -37.6 |       |

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

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

Company:  
Project #: 11792476  
Date: 05/17/17  
Test Engineer: 37290  
Configuration: EUT Only  
Mode: LTE Band 4, 3MHz 16QAM

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

**Chamber**

3m Chamber F

**Pre-amplifier**

3m Chamber F

**Filter**

Filter

**Limit**

EIRP

| Frequency<br>(GHz)              | SA reading<br>(dBm) | Ant. Pol.<br>(H/V) | Distance | EIRP @ TX<br>Ant End<br>(dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|---------------------------------|---------------------|--------------------|----------|-------------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1711.5MHz)</b>  |                     |                    |          |                               |        |            |       |       |       |       |
| 3.42                            | -69.8               | H                  | 3.0      | -21.1                         | 34.6   | 1.0        | -54.7 | -13.0 | -41.7 |       |
| 5.13                            | -71.6               | H                  | 3.0      | -18.8                         | 34.2   | 1.0        | -52.0 | -13.0 | -39.0 |       |
| 6.85                            | -71.6               | H                  | 3.0      | -16.1                         | 33.9   | 1.0        | -49.0 | -13.0 | -36.0 |       |
| 3.42                            | -69.8               | V                  | 3.0      | -20.9                         | 34.6   | 1.0        | -54.5 | -13.0 | -41.5 |       |
| 5.13                            | -71.2               | V                  | 3.0      | -18.2                         | 34.2   | 1.0        | -51.4 | -13.0 | -38.4 |       |
| 6.85                            | -71.6               | V                  | 3.0      | -16.2                         | 33.9   | 1.0        | -49.2 | -13.0 | -36.2 |       |
| <b>Mid Channel (1732.5MHz)</b>  |                     |                    |          |                               |        |            |       |       |       |       |
| 3.47                            | -73.4               | H                  | 3.0      | -24.5                         | 34.6   | 1.0        | -58.1 | -13.0 | -45.1 |       |
| 5.20                            | -71.1               | H                  | 3.0      | -18.2                         | 34.2   | 1.0        | -51.4 | -13.0 | -38.4 |       |
| 6.93                            | -71.9               | H                  | 3.0      | -16.2                         | 33.9   | 1.0        | -49.2 | -13.0 | -36.2 |       |
| 3.47                            | -70.6               | V                  | 3.0      | -21.5                         | 34.6   | 1.0        | -55.1 | -13.0 | -42.1 |       |
| 5.20                            | -71.1               | V                  | 3.0      | -17.9                         | 34.2   | 1.0        | -51.1 | -13.0 | -38.1 |       |
| 6.93                            | -71.9               | V                  | 3.0      | -16.4                         | 33.9   | 1.0        | -49.4 | -13.0 | -36.4 |       |
| <b>High Channel (1753.5MHz)</b> |                     |                    |          |                               |        |            |       |       |       |       |
| 3.51                            | -68.5               | H                  | 3.0      | -19.4                         | 34.5   | 1.0        | -53.0 | -13.0 | -40.0 |       |
| 5.26                            | -70.3               | H                  | 3.0      | -17.4                         | 34.2   | 1.0        | -50.5 | -13.0 | -37.5 |       |
| 7.01                            | -71.0               | H                  | 3.0      | -15.2                         | 33.9   | 1.0        | -48.1 | -13.0 | -35.1 |       |
| 3.51                            | -71.3               | V                  | 3.0      | -22.1                         | 34.5   | 1.0        | -55.6 | -13.0 | -42.6 |       |
| 5.26                            | -70.1               | V                  | 3.0      | -16.8                         | 34.2   | 1.0        | -50.0 | -13.0 | -37.0 |       |
| 7.01                            | -71.6               | V                  | 3.0      | -16.1                         | 33.9   | 1.0        | -49.0 | -13.0 | -36.0 |       |

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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 #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 38602  
**Configuration:** EUT Only  
**Mode:** LTE Band 5, 10MHz QPSK

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

**Chamber**  

3m Chamber H

**Pre-amplifier**  

3m Chamber H

**Filter**  

Filter

**Limit**  

EIRP

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (829MHz)</b>   |                  |                 |          |                         |        |            |       |       |       |       |
| 1.66                          | -58.2            | H               | 3.0      | -17.7                   | 37.7   | 1.0        | -54.5 | -13.0 | -41.5 |       |
| 2.49                          | -57.4            | H               | 3.0      | -13.4                   | 37.1   | 1.0        | -49.4 | -13.0 | -36.4 |       |
| 3.32                          | -58.1            | H               | 3.0      | -10.3                   | 37.8   | 1.0        | -47.1 | -13.0 | -34.1 |       |
| 1.66                          | -58.6            | V               | 3.0      | -17.9                   | 37.7   | 1.0        | -54.7 | -13.0 | -41.7 |       |
| 2.49                          | -58.2            | V               | 3.0      | -14.1                   | 37.1   | 1.0        | -50.1 | -13.0 | -37.1 |       |
| 3.32                          | -57.5            | V               | 3.0      | -10.7                   | 37.8   | 1.0        | -47.5 | -13.0 | -34.5 |       |
| <b>Mid Channel (836.5MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 1.67                          | -59.4            | H               | 3.0      | -18.8                   | 37.8   | 1.0        | -55.6 | -13.0 | -42.6 |       |
| 2.51                          | -58.0            | H               | 3.0      | -13.9                   | 37.1   | 1.0        | -49.9 | -13.0 | -36.9 |       |
| 3.35                          | -57.1            | H               | 3.0      | -9.3                    | 37.8   | 1.0        | -46.1 | -13.0 | -33.1 |       |
| 1.67                          | -58.9            | V               | 3.0      | -18.1                   | 37.8   | 1.0        | -54.9 | -13.0 | -41.9 |       |
| 2.51                          | -57.8            | V               | 3.0      | -13.6                   | 37.1   | 1.0        | -49.7 | -13.0 | -36.7 |       |
| 3.35                          | -58.1            | V               | 3.0      | -11.2                   | 37.8   | 1.0        | -48.0 | -13.0 | -35.0 |       |
| <b>High Channel (844MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.69                          | -58.6            | H               | 3.0      | -17.9                   | 37.8   | 1.0        | -54.7 | -13.0 | -41.7 |       |
| 2.53                          | -57.7            | H               | 3.0      | -13.4                   | 37.1   | 1.0        | -49.5 | -13.0 | -36.5 |       |
| 3.38                          | -57.0            | H               | 3.0      | -9.2                    | 37.8   | 1.0        | -46.0 | -13.0 | -33.0 |       |
| 1.69                          | -59.3            | V               | 3.0      | -18.4                   | 37.8   | 1.0        | -55.2 | -13.0 | -42.2 |       |
| 2.53                          | -57.8            | V               | 3.0      | -13.5                   | 37.1   | 1.0        | -49.6 | -13.0 | -36.6 |       |
| 3.38                          | -57.0            | V               | 3.0      | -10.0                   | 37.8   | 1.0        | -46.8 | -13.0 | -33.8 |       |

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

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 38602  
**Configuration:** EUT Only  
**Mode:** LTE Band 5, 10MHz 16QAM

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (829MHz)</b>   |                  |                 |          |                         |        |            |       |       |       |       |
| 1.66                          | -59.3            | H               | 3.0      | -17.8                   | 37.7   | 1.0        | -54.6 | -13.0 | -41.6 |       |
| 2.49                          | -58.5            | H               | 3.0      | -15.3                   | 37.1   | 1.0        | -51.4 | -13.0 | -38.4 |       |
| 3.32                          | -57.9            | H               | 3.0      | -11.9                   | 37.8   | 1.0        | -48.8 | -13.0 | -35.8 |       |
| 1.66                          | -59.1            | V               | 3.0      | -17.3                   | 37.7   | 1.0        | -54.1 | -13.0 | -41.1 |       |
| 2.49                          | -58.5            | V               | 3.0      | -14.4                   | 37.1   | 1.0        | -50.4 | -13.0 | -37.4 |       |
| 3.32                          | -57.0            | V               | 3.0      | -11.0                   | 37.8   | 1.0        | -47.9 | -13.0 | -34.9 |       |
| <b>Mid Channel (836.5MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 1.67                          | -59.7            | H               | 3.0      | -18.2                   | 37.8   | 1.0        | -55.0 | -13.0 | -42.0 |       |
| 2.51                          | -58.2            | H               | 3.0      | -15.0                   | 37.1   | 1.0        | -51.1 | -13.0 | -38.1 |       |
| 3.35                          | -57.6            | H               | 3.0      | -11.6                   | 37.8   | 1.0        | -48.4 | -13.0 | -35.4 |       |
| 1.67                          | -59.4            | V               | 3.0      | -17.6                   | 37.8   | 1.0        | -54.4 | -13.0 | -41.4 |       |
| 2.51                          | -57.8            | V               | 3.0      | -13.6                   | 37.1   | 1.0        | -49.7 | -13.0 | -36.7 |       |
| 3.35                          | -57.1            | V               | 3.0      | -11.1                   | 37.8   | 1.0        | -47.9 | -13.0 | -34.9 |       |
| <b>High Channel (844MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.69                          | -59.4            | H               | 3.0      | -17.9                   | 37.8   | 1.0        | -54.6 | -13.0 | -41.6 |       |
| 2.53                          | -57.2            | H               | 3.0      | -13.9                   | 37.1   | 1.0        | -50.0 | -13.0 | -37.0 |       |
| 3.38                          | -57.8            | H               | 3.0      | -11.7                   | 37.8   | 1.0        | -48.5 | -13.0 | -35.5 |       |
| 1.69                          | -59.3            | V               | 3.0      | -17.5                   | 37.8   | 1.0        | -54.3 | -13.0 | -41.3 |       |
| 2.53                          | -58.8            | V               | 3.0      | -14.5                   | 37.1   | 1.0        | -50.7 | -13.0 | -37.7 |       |
| 3.38                          | -57.7            | V               | 3.0      | -11.6                   | 37.8   | 1.0        | -48.3 | -13.0 | -35.3 |       |

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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 #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 38602  
**Configuration:** EUT Only  
**Mode:** LTE Band 7, 20MHz QPSK

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 LTE B7

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (2510MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 5.02                          | -57.2            | H               | 3.0      | -7.2                    | 36.9   | 1.0        | -43.0 | -25.0 | -18.0 |       |
| 7.53                          | -58.4            | H               | 3.0      | -4.5                    | 35.9   | 1.0        | -39.5 | -25.0 | -14.5 |       |
| 10.04                         | -58.6            | H               | 3.0      | -2.1                    | 33.7   | 1.0        | -34.7 | -25.0 | -9.7  |       |
| 5.02                          | -56.5            | V               | 3.0      | -6.3                    | 36.9   | 1.0        | -42.2 | -25.0 | -17.2 |       |
| 7.53                          | -58.3            | V               | 3.0      | -4.7                    | 35.9   | 1.0        | -39.6 | -25.0 | -14.6 |       |
| 10.04                         | -58.3            | V               | 3.0      | -2.1                    | 33.7   | 1.0        | -34.8 | -25.0 | -9.8  |       |
| <b>Mid Channel (2535MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 5.07                          | -56.8            | H               | 3.0      | -6.7                    | 36.9   | 1.0        | -42.5 | -25.0 | -17.5 |       |
| 7.61                          | -57.2            | H               | 3.0      | -3.3                    | 35.8   | 1.0        | -38.1 | -25.0 | -13.1 |       |
| 10.14                         | -58.1            | H               | 3.0      | -1.5                    | 33.7   | 1.0        | -34.2 | -25.0 | -9.2  |       |
| 5.07                          | -56.6            | V               | 3.0      | -6.3                    | 36.9   | 1.0        | -42.1 | -25.0 | -17.1 |       |
| 7.61                          | -58.7            | V               | 3.0      | -5.0                    | 35.8   | 1.0        | -39.8 | -25.0 | -14.8 |       |
| 10.14                         | -57.3            | V               | 3.0      | -1.1                    | 33.7   | 1.0        | -33.8 | -25.0 | -8.8  |       |
| <b>High Channel (2560MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 5.12                          | -56.5            | H               | 3.0      | -6.3                    | 36.8   | 1.0        | -42.1 | -25.0 | -17.1 |       |
| 7.68                          | -57.5            | H               | 3.0      | -3.5                    | 35.8   | 1.0        | -38.3 | -25.0 | -13.3 |       |
| 10.24                         | -58.7            | H               | 3.0      | -2.0                    | 33.7   | 1.0        | -34.7 | -25.0 | -9.7  |       |
| 5.12                          | -56.8            | V               | 3.0      | -6.4                    | 36.8   | 1.0        | -42.2 | -25.0 | -17.2 |       |
| 7.68                          | -57.9            | V               | 3.0      | -4.1                    | 35.8   | 1.0        | -38.9 | -25.0 | -13.9 |       |
| 10.24                         | -58.7            | V               | 3.0      | -2.4                    | 33.7   | 1.0        | -35.1 | -25.0 | -10.1 |       |

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**16QAM LTE BAND 7 (20.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 38602  
**Configuration:** EUT Only  
**Mode:** LTE Band 7, 20MHz 16QAM

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 LTE B7

| Frequency<br>(GHz)            | SA reading<br>(dBm) | Ant. Pol.<br>(H/V) | Distance | EIRP @ TX<br>Ant End<br>(dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|---------------------|--------------------|----------|-------------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (2510MHz)</b>  |                     |                    |          |                               |        |            |       |       |       |       |
| 5.02                          | -56.5               | H                  | 3.0      | -6.5                          | 36.9   | 1.0        | -42.3 | -25.0 | -17.3 |       |
| 7.53                          | -59.3               | H                  | 3.0      | -5.4                          | 35.9   | 1.0        | -40.4 | -25.0 | -15.4 |       |
| 10.04                         | -59.2               | H                  | 3.0      | -2.7                          | 33.7   | 1.0        | -35.3 | -25.0 | -10.3 |       |
| 5.02                          | -57.2               | V                  | 3.0      | -7.0                          | 36.9   | 1.0        | -42.9 | -25.0 | -17.9 |       |
| 7.53                          | -57.9               | V                  | 3.0      | -4.3                          | 35.9   | 1.0        | -39.2 | -25.0 | -14.2 |       |
| 10.04                         | -58.6               | V                  | 3.0      | -2.4                          | 33.7   | 1.0        | -35.1 | -25.0 | -10.1 |       |
| <b>Mid Channel (2535MHz)</b>  |                     |                    |          |                               |        |            |       |       |       |       |
| 5.07                          | -56.7               | H                  | 3.0      | -6.6                          | 36.9   | 1.0        | -42.4 | -25.0 | -17.4 |       |
| 7.61                          | -57.9               | H                  | 3.0      | -4.0                          | 35.8   | 1.0        | -38.8 | -25.0 | -13.8 |       |
| 10.14                         | -58.4               | H                  | 3.0      | -1.8                          | 33.7   | 1.0        | -34.5 | -25.0 | -9.5  |       |
| 5.07                          | -56.5               | V                  | 3.0      | -6.2                          | 36.9   | 1.0        | -42.0 | -25.0 | -17.0 |       |
| 7.61                          | -58.1               | V                  | 3.0      | -4.4                          | 35.8   | 1.0        | -39.2 | -25.0 | -14.2 |       |
| 10.14                         | -58.6               | V                  | 3.0      | -2.4                          | 33.7   | 1.0        | -35.1 | -25.0 | -10.1 |       |
| <b>High Channel (2560MHz)</b> |                     |                    |          |                               |        |            |       |       |       |       |
| 5.12                          | -56.7               | H                  | 3.0      | -6.5                          | 36.8   | 1.0        | -42.3 | -25.0 | -17.3 |       |
| 7.68                          | -58.2               | H                  | 3.0      | -4.2                          | 35.8   | 1.0        | -39.0 | -25.0 | -14.0 |       |
| 10.24                         | -58.1               | H                  | 3.0      | -1.4                          | 33.7   | 1.0        | -34.1 | -25.0 | -9.1  |       |
| 5.12                          | -56.5               | V                  | 3.0      | -6.1                          | 36.8   | 1.0        | -41.9 | -25.0 | -16.9 |       |
| 7.68                          | -57.5               | V                  | 3.0      | -3.7                          | 35.8   | 1.0        | -38.5 | -25.0 | -13.5 |       |
| 10.24                         | -57.9               | V                  | 3.0      | -1.6                          | 33.7   | 1.0        | -34.3 | -25.0 | -9.3  |       |

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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 #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 38602  
**Configuration:** EUT Only  
**Mode:** LTE Band 12, 10MHz QPSK

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (704MHz)</b>   |                  |                 |          |                         |        |            |       |       |       |       |
| 1.41                          | -59.9            | H               | 3.0      | -21.0                   | 37.4   | 1.0        | -57.3 | -13.0 | -44.3 |       |
| 2.11                          | -52.7            | H               | 3.0      | -9.6                    | 37.7   | 1.0        | -46.3 | -13.0 | -33.3 |       |
| 2.82                          | -58.5            | H               | 3.0      | -12.1                   | 37.8   | 1.0        | -48.9 | -13.0 | -35.9 |       |
| 1.41                          | -60.0            | V               | 3.0      | -20.7                   | 37.4   | 1.0        | -57.1 | -13.0 | -44.1 |       |
| 2.11                          | -59.2            | V               | 3.0      | -16.2                   | 37.7   | 1.0        | -52.8 | -13.0 | -39.8 |       |
| 2.82                          | -58.5            | V               | 3.0      | -13.1                   | 37.8   | 1.0        | -49.9 | -13.0 | -36.9 |       |
| <b>Mid Channel (707.5MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 1.42                          | -60.2            | H               | 3.0      | -21.2                   | 37.4   | 1.0        | -57.6 | -13.0 | -44.6 |       |
| 2.12                          | -58.2            | H               | 3.0      | -15.1                   | 37.7   | 1.0        | -51.7 | -13.0 | -38.7 |       |
| 2.83                          | -59.0            | H               | 3.0      | -12.5                   | 37.8   | 1.0        | -49.4 | -13.0 | -36.4 |       |
| 1.42                          | -60.2            | V               | 3.0      | -20.9                   | 37.4   | 1.0        | -57.3 | -13.0 | -44.3 |       |
| 2.12                          | -58.3            | V               | 3.0      | -15.2                   | 37.7   | 1.0        | -51.9 | -13.0 | -38.9 |       |
| 2.83                          | -58.3            | V               | 3.0      | -12.8                   | 37.8   | 1.0        | -49.6 | -13.0 | -36.6 |       |
| <b>High Channel (711MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.42                          | -60.0            | H               | 3.0      | -21.0                   | 37.4   | 1.0        | -57.4 | -13.0 | -44.4 |       |
| 2.13                          | -59.3            | H               | 3.0      | -16.1                   | 37.6   | 1.0        | -52.8 | -13.0 | -39.8 |       |
| 2.84                          | -58.5            | H               | 3.0      | -11.9                   | 37.8   | 1.0        | -48.8 | -13.0 | -35.8 |       |
| 1.42                          | -60.3            | V               | 3.0      | -21.0                   | 37.4   | 1.0        | -57.4 | -13.0 | -44.4 |       |
| 2.13                          | -57.8            | V               | 3.0      | -14.7                   | 37.6   | 1.0        | -51.3 | -13.0 | -38.3 |       |
| 2.84                          | -58.0            | V               | 3.0      | -12.5                   | 37.8   | 1.0        | -49.3 | -13.0 | -36.3 |       |

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

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 38602  
**Configuration:** EUT Only  
**Mode:** LTE Band 12, 10MHz 16QAM

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (704MHz)</b>   |                  |                 |          |                         |        |            |       |       |       |       |
| 1.41                          | -60.4            | H               | 3.0      | -21.5                   | 37.4   | 1.0        | -57.8 | -13.0 | -44.8 |       |
| 2.11                          | -56.7            | H               | 3.0      | -13.6                   | 37.7   | 1.0        | -50.3 | -13.0 | -37.3 |       |
| 2.82                          | -57.7            | H               | 3.0      | -11.3                   | 37.8   | 1.0        | -48.1 | -13.0 | -35.1 |       |
| 1.41                          | -60.3            | V               | 3.0      | -21.0                   | 37.4   | 1.0        | -57.4 | -13.0 | -44.4 |       |
| 2.11                          | -56.5            | V               | 3.0      | -13.5                   | 37.7   | 1.0        | -50.1 | -13.0 | -37.1 |       |
| 2.82                          | -58.4            | V               | 3.0      | -13.0                   | 37.8   | 1.0        | -49.8 | -13.0 | -36.8 |       |
| <b>Mid Channel (707.5MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 1.42                          | -60.2            | H               | 3.0      | -21.2                   | 37.4   | 1.0        | -57.6 | -13.0 | -44.6 |       |
| 2.12                          | -58.1            | H               | 3.0      | -15.0                   | 37.7   | 1.0        | -51.6 | -13.0 | -38.6 |       |
| 2.83                          | -58.0            | H               | 3.0      | -11.5                   | 37.8   | 1.0        | -48.4 | -13.0 | -35.4 |       |
| 1.42                          | -59.2            | V               | 3.0      | -19.9                   | 37.4   | 1.0        | -56.3 | -13.0 | -43.3 |       |
| 2.12                          | -58.5            | V               | 3.0      | -15.4                   | 37.7   | 1.0        | -52.1 | -13.0 | -39.1 |       |
| 2.83                          | -58.1            | V               | 3.0      | -12.6                   | 37.8   | 1.0        | -49.4 | -13.0 | -36.4 |       |
| <b>High Channel (711MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.42                          | -59.9            | H               | 3.0      | -20.9                   | 37.4   | 1.0        | -57.3 | -13.0 | -44.3 |       |
| 2.13                          | -59.0            | H               | 3.0      | -15.8                   | 37.6   | 1.0        | -52.5 | -13.0 | -39.5 |       |
| 2.84                          | -58.3            | H               | 3.0      | -11.7                   | 37.8   | 1.0        | -48.6 | -13.0 | -35.6 |       |
| 1.42                          | -59.2            | V               | 3.0      | -19.9                   | 37.4   | 1.0        | -56.3 | -13.0 | -43.3 |       |
| 2.13                          | -59.4            | V               | 3.0      | -16.3                   | 37.6   | 1.0        | -52.9 | -13.0 | -39.9 |       |
| 2.84                          | -58.8            | V               | 3.0      | -13.3                   | 37.8   | 1.0        | -50.1 | -13.0 | -37.1 |       |

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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 #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 38602  
**Configuration:** EUT Only  
**Mode:** LTE Band 13, 10MHz QPSK

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

Chamber

3m Chamber H

Pre-amplifier

3m Chamber H

Filter

Filter

Limit

LTE B13

| Frequency (GHz)             | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-----------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Mid Channel (782MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 1.56                        | -59.8            | H               | 3.0      | -20.0                   | 37.7   | 1.0        | -56.7 | -40.0 | -16.7 |       |
| 2.35                        | -58.8            | H               | 3.0      | -15.1                   | 37.1   | 1.0        | -51.2 | -13.0 | -38.2 |       |
| 3.13                        | -57.7            | H               | 3.0      | -10.0                   | 38.0   | 1.0        | -47.0 | -13.0 | -34.0 |       |
| 1.56                        | -58.8            | V               | 3.0      | -18.6                   | 37.7   | 1.0        | -55.3 | -40.0 | -15.3 |       |
| 2.35                        | -58.7            | V               | 3.0      | -14.9                   | 37.1   | 1.0        | -51.0 | -13.0 | -38.0 |       |
| 3.13                        | -57.2            | V               | 3.0      | -10.8                   | 38.0   | 1.0        | -47.8 | -13.0 | -34.8 |       |

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**16QAM LTE BAND 13 (10.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 38602  
**Configuration:** EUT Only  
**Mode:** LTE Band 13, 10MHz 16QAM

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

**Chamber**

3m Chamber H

**Pre-amplifier**

3m Chamber H

**Filter**

Filter

**Limit**

LTE B13

| Frequency (GHz)             | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX<br>Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-----------------------------|------------------|-----------------|----------|----------------------------|--------|------------|-------|-------|-------|-------|
| <b>Mid Channel (782MHz)</b> |                  |                 |          |                            |        |            |       |       |       |       |
| 1.56                        | -60.1            | H               | 3.0      | -20.3                      | 37.7   | 1.0        | -57.0 | -40.0 | -17.0 |       |
| 2.35                        | -59.3            | H               | 3.0      | -15.6                      | 37.1   | 1.0        | -51.7 | -13.0 | -38.7 |       |
| 3.13                        | -58.0            | H               | 3.0      | -10.3                      | 38.0   | 1.0        | -47.3 | -13.0 | -34.3 |       |
| 1.56                        | -59.2            | V               | 3.0      | -19.0                      | 37.7   | 1.0        | -55.7 | -40.0 | -15.7 |       |
| 2.35                        | -58.5            | V               | 3.0      | -14.7                      | 37.1   | 1.0        | -50.8 | -13.0 | -37.8 |       |
| 3.13                        | -58.1            | V               | 3.0      | -11.7                      | 38.0   | 1.0        | -48.7 | -13.0 | -35.7 |       |

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## 9.1.7. LTE BAND 17

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

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:**  
**Date:** 07/21/17  
**Test Engineer:** 50822  
**Configuration:** EUT Only  
**Mode:** LTE Band 17, 10MHz QPSK

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

**Chamber**  
 3m Chamber E

**Pre-amplifier**  
 3m Chamber E

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency (GHz)              | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (709MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.418                        | -63.3            | H               | 3.0      | -21.6                   | 38.0   | 1.0        | -58.6 | -13.0 | -45.6 |       |
| 2.127                        | -63.5            | H               | 3.0      | -19.9                   | 38.0   | 1.0        | -56.9 | -13.0 | -43.9 |       |
| 2.836                        | -64.5            | H               | 3.0      | -17.3                   | 38.4   | 1.0        | -54.7 | -13.0 | -41.7 |       |
| 1.418                        | -62.4            | V               | 3.0      | -21.4                   | 38.0   | 1.0        | -58.4 | -13.0 | -45.4 |       |
| 2.127                        | -63.9            | V               | 3.0      | -19.7                   | 38.0   | 1.0        | -56.7 | -13.0 | -43.7 |       |
| 2.836                        | -64.0            | V               | 3.0      | -17.0                   | 38.4   | 1.0        | -54.4 | -13.0 | -41.4 |       |
| <b>Mid Channel (710MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.420                        | -62.6            | H               | 3.0      | -20.9                   | 38.0   | 1.0        | -57.9 | -13.0 | -44.9 |       |
| 2.130                        | -64.2            | H               | 3.0      | -20.6                   | 38.0   | 1.0        | -57.5 | -13.0 | -44.5 |       |
| 2.840                        | -64.3            | H               | 3.0      | -17.1                   | 38.4   | 1.0        | -54.5 | -13.0 | -41.5 |       |
| 1.420                        | -64.1            | V               | 3.0      | -23.1                   | 38.0   | 1.0        | -60.1 | -13.0 | -47.1 |       |
| 2.130                        | -64.6            | V               | 3.0      | -20.4                   | 38.0   | 1.0        | -57.4 | -13.0 | -44.4 |       |
| 2.840                        | -64.7            | V               | 3.0      | -17.7                   | 38.4   | 1.0        | -55.2 | -13.0 | -42.2 |       |
| <b>High Channel (711MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 1.422                        | -63.6            | H               | 3.0      | -21.8                   | 38.0   | 1.0        | -58.9 | -13.0 | -45.9 |       |
| 2.133                        | -64.3            | H               | 3.0      | -20.7                   | 38.0   | 1.0        | -57.7 | -13.0 | -44.7 |       |
| 2.844                        | -64.7            | H               | 3.0      | -17.5                   | 38.4   | 1.0        | -54.9 | -13.0 | -41.9 |       |
| 1.422                        | -63.1            | V               | 3.0      | -22.1                   | 38.0   | 1.0        | -59.2 | -13.0 | -46.2 |       |
| 2.133                        | -64.5            | V               | 3.0      | -20.3                   | 38.0   | 1.0        | -57.3 | -13.0 | -44.3 |       |
| 2.844                        | -64.7            | V               | 3.0      | -17.7                   | 38.4   | 1.0        | -55.1 | -13.0 | -42.1 |       |

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

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:**  
**Date:** 07/21/17  
**Test Engineer:** 50822  
**Configuration:** EUT Only  
**Mode:** LTE Band 17, 10MHz 16QAM

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

**Chamber**  
 3m Chamber E

**Pre-amplifier**  
 3m Chamber E

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency (GHz)              | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (709MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.418                        | -62.7            | H               | 3.0      | -21.0                   | 38.0   | 1.0        | -58.0 | -13.0 | -45.0 |       |
| 2.127                        | -64.0            | H               | 3.0      | -20.3                   | 38.0   | 1.0        | -57.3 | -13.0 | -44.3 |       |
| 2.836                        | -64.7            | H               | 3.0      | -17.4                   | 38.4   | 1.0        | -54.9 | -13.0 | -41.9 |       |
| 1.418                        | -63.1            | V               | 3.0      | -22.1                   | 38.0   | 1.0        | -59.1 | -13.0 | -46.1 |       |
| 2.127                        | -64.1            | V               | 3.0      | -19.9                   | 38.0   | 1.0        | -56.9 | -13.0 | -43.9 |       |
| 2.836                        | -64.3            | V               | 3.0      | -17.3                   | 38.4   | 1.0        | -54.7 | -13.0 | -41.7 |       |
| <b>Mid Channel (710MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.420                        | -62.5            | H               | 3.0      | -20.8                   | 38.0   | 1.0        | -57.9 | -13.0 | -44.9 |       |
| 2.130                        | -63.6            | H               | 3.0      | -19.9                   | 38.0   | 1.0        | -56.9 | -13.0 | -43.9 |       |
| 2.840                        | -64.7            | H               | 3.0      | -17.5                   | 38.4   | 1.0        | -54.9 | -13.0 | -41.9 |       |
| 1.420                        | -64.0            | V               | 3.0      | -23.0                   | 38.0   | 1.0        | -60.0 | -13.0 | -47.0 |       |
| 2.130                        | -63.9            | V               | 3.0      | -19.8                   | 38.0   | 1.0        | -56.8 | -13.0 | -43.8 |       |
| 2.840                        | -64.7            | V               | 3.0      | -17.7                   | 38.4   | 1.0        | -55.1 | -13.0 | -42.1 |       |
| <b>High Channel (711MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 1.422                        | -62.7            | H               | 3.0      | -21.0                   | 38.0   | 1.0        | -58.0 | -13.0 | -45.0 |       |
| 2.133                        | -64.0            | H               | 3.0      | -20.4                   | 38.0   | 1.0        | -57.4 | -13.0 | -44.4 |       |
| 2.844                        | -64.9            | H               | 3.0      | -17.6                   | 38.4   | 1.0        | -55.1 | -13.0 | -42.1 |       |
| 1.422                        | -63.4            | V               | 3.0      | -22.3                   | 38.0   | 1.0        | -59.4 | -13.0 | -46.4 |       |
| 2.133                        | -64.1            | V               | 3.0      | -19.9                   | 38.0   | 1.0        | -56.9 | -13.0 | -43.9 |       |
| 2.844                        | -64.8            | V               | 3.0      | -17.7                   | 38.4   | 1.0        | -55.2 | -13.0 | -42.2 |       |

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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 #:** 11792476  
**Date:** 05/17/17  
**Test Engineer:** 37290  
**Configuration:** EUT Only  
**Mode:** LTE Band 25, 20MHz QPSK

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

**Chamber**  
 3m Chamber F

**Pre-amplifier**  
 3m Chamber F

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency (GHz)                | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|--------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1860MHz)</b>   |                  |                 |          |                         |        |            |       |       |       |       |
| 3.72                           | -68.7            | H               | 3.0      | -18.8                   | 34.4   | 1.0        | -52.3 | -13.0 | -39.3 |       |
| 5.58                           | -70.5            | H               | 3.0      | -17.0                   | 34.1   | 1.0        | -50.2 | -13.0 | -37.2 |       |
| 7.44                           | -72.4            | H               | 3.0      | -16.1                   | 33.6   | 1.0        | -48.7 | -13.0 | -35.7 |       |
| 3.72                           | -69.9            | V               | 3.0      | -20.0                   | 34.4   | 1.0        | -53.4 | -13.0 | -40.4 |       |
| 5.58                           | -72.2            | V               | 3.0      | -18.5                   | 34.1   | 1.0        | -51.6 | -13.0 | -38.6 |       |
| 7.44                           | -73.9            | V               | 3.0      | -17.8                   | 33.6   | 1.0        | -50.3 | -13.0 | -37.3 |       |
| <b>Mid Channel (1882.5MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 3.77                           | -70.1            | H               | 3.0      | -20.1                   | 34.4   | 1.0        | -53.5 | -13.0 | -40.5 |       |
| 5.65                           | -71.3            | H               | 3.0      | -17.7                   | 34.1   | 1.0        | -50.8 | -13.0 | -37.8 |       |
| 7.53                           | -73.4            | H               | 3.0      | -16.9                   | 33.5   | 1.0        | -49.4 | -13.0 | -36.4 |       |
| 3.77                           | -70.1            | V               | 3.0      | -20.0                   | 34.4   | 1.0        | -53.4 | -13.0 | -40.4 |       |
| 5.65                           | -71.1            | V               | 3.0      | -17.3                   | 34.1   | 1.0        | -50.4 | -13.0 | -37.4 |       |
| 7.53                           | -73.3            | V               | 3.0      | -16.9                   | 33.5   | 1.0        | -49.5 | -13.0 | -36.5 |       |
| <b>High Channel (1905MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.81                           | -71.3            | H               | 3.0      | -21.1                   | 34.4   | 1.0        | -54.5 | -13.0 | -41.5 |       |
| 5.72                           | -72.0            | H               | 3.0      | -18.3                   | 34.1   | 1.0        | -51.4 | -13.0 | -38.4 |       |
| 7.62                           | -73.7            | H               | 3.0      | -17.1                   | 33.4   | 1.0        | -49.6 | -13.0 | -36.6 |       |
| 3.81                           | -71.2            | V               | 3.0      | -21.0                   | 34.4   | 1.0        | -54.4 | -13.0 | -41.4 |       |
| 5.72                           | -71.5            | V               | 3.0      | -17.6                   | 34.1   | 1.0        | -50.7 | -13.0 | -37.7 |       |
| 7.62                           | -73.7            | V               | 3.0      | -17.3                   | 33.4   | 1.0        | -49.7 | -13.0 | -36.7 |       |

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**16QAM LTE BAND 25 (20.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 05/17/17  
**Test Engineer:** 37290  
**Configuration:** EUT Only  
**Mode:** LTE Band 25, 20MHz 16QAM

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

**Chamber**

3m Chamber F

**Pre-amplifier**

3m Chamber F

**Filter**

Filter

**Limit**

EIRP

| Frequency (GHz)                | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|--------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1860MHz)</b>   |                  |                 |          |                         |        |            |       |       |       |       |
| 3.72                           | -70.2            | H               | 3.0      | -20.3                   | 34.4   | 1.0        | -53.8 | -13.0 | -40.8 |       |
| 5.58                           | -70.7            | H               | 3.0      | -17.2                   | 34.1   | 1.0        | -50.4 | -13.0 | -37.4 |       |
| 7.44                           | -73.1            | H               | 3.0      | -16.7                   | 33.6   | 1.0        | -49.3 | -13.0 | -36.3 |       |
| 3.72                           | -69.9            | V               | 3.0      | -19.9                   | 34.4   | 1.0        | -53.4 | -13.0 | -40.4 |       |
| 5.58                           | -71.6            | V               | 3.0      | -17.9                   | 34.1   | 1.0        | -51.0 | -13.0 | -38.0 |       |
| 7.44                           | -73.1            | V               | 3.0      | -16.9                   | 33.6   | 1.0        | -49.5 | -13.0 | -36.5 |       |
| <b>Mid Channel (1882.5MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 3.77                           | -68.8            | H               | 3.0      | -18.8                   | 34.4   | 1.0        | -52.2 | -13.0 | -39.2 |       |
| 5.65                           | -72.0            | H               | 3.0      | -18.4                   | 34.1   | 1.0        | -51.5 | -13.0 | -38.5 |       |
| 7.53                           | -72.9            | H               | 3.0      | -16.4                   | 33.5   | 1.0        | -48.9 | -13.0 | -35.9 |       |
| 3.77                           | -69.2            | V               | 3.0      | -19.1                   | 34.4   | 1.0        | -52.5 | -13.0 | -39.5 |       |
| 5.65                           | -71.0            | V               | 3.0      | -17.2                   | 34.1   | 1.0        | -50.3 | -13.0 | -37.3 |       |
| 7.53                           | -73.2            | V               | 3.0      | -16.9                   | 33.5   | 1.0        | -49.4 | -13.0 | -36.4 |       |
| <b>High Channel (1905MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.81                           | -68.9            | H               | 3.0      | -18.7                   | 34.4   | 1.0        | -52.1 | -13.0 | -39.1 |       |
| 5.72                           | -71.1            | H               | 3.0      | -17.4                   | 34.1   | 1.0        | -50.5 | -13.0 | -37.5 |       |
| 7.62                           | -73.6            | H               | 3.0      | -17.0                   | 33.4   | 1.0        | -49.5 | -13.0 | -36.5 |       |
| 3.81                           | -70.1            | V               | 3.0      | -19.9                   | 34.4   | 1.0        | -53.2 | -13.0 | -40.2 |       |
| 5.72                           | -73.3            | V               | 3.0      | -19.5                   | 34.1   | 1.0        | -52.6 | -13.0 | -39.6 |       |
| 7.62                           | -74.4            | V               | 3.0      | -18.0                   | 33.4   | 1.0        | -50.4 | -13.0 | -37.4 |       |

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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 #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 38602  
**Configuration:** EUT Only  
**Mode:** LTE Band 26 (90S), 10MHz QPSK

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

Chamber

3m Chamber H

Pre-amplifier

3m Chamber H

Filter

Filter

Limit

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                 | -59.1            | H               | 3.0      | -18.8                   | 37.7   | 1.0        | -55.5 | -13.0 | -42.5 |       |
| 2.46                 | -58.2            | H               | 3.0      | -14.2                   | 37.0   | 1.0        | -50.3 | -13.0 | -37.3 |       |
| 3.28                 | -57.3            | H               | 3.0      | -9.5                    | 37.9   | 1.0        | -46.4 | -13.0 | -33.4 |       |
| 1.64                 | -59.8            | V               | 3.0      | -19.2                   | 37.7   | 1.0        | -56.0 | -13.0 | -43.0 |       |
| 2.46                 | -57.9            | V               | 3.0      | -13.8                   | 37.0   | 1.0        | -49.8 | -13.0 | -36.8 |       |
| 3.28                 | -57.8            | V               | 3.0      | -11.0                   | 37.9   | 1.0        | -47.9 | -13.0 | -34.9 |       |

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**16QAM LTE BAND 26 (10.0MHZ BANDWIDTH)**

| High Frequency Substitution Measurement<br>UL Fremont Radiated Chamber                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |                    |          |                               |        |            |       |       |       |       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------|----------|-------------------------------|--------|------------|-------|-------|-------|-------|
| <div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> <p><b>Company:</b></p> <p><b>Project #:</b> 11792476</p> <p><b>Date:</b> 06/05/17</p> <p><b>Test Engineer:</b> 38602</p> <p><b>Configuration:</b> EUT Only</p> <p><b>Mode:</b> LTE Band 26 (90S), 10MHz 16QAM</p> </div> <div style="width: 55%;"> <p><u><b>Test Equipment:</b></u></p> <p>Substitution: Horn T59 Substitution, and 8ft SMA Cable</p> </div> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |                    |          |                               |        |            |       |       |       |       |
| <div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> <div style="border: 1px solid black; padding: 5px; background-color: #e0f7fa;">Chamber</div> <div style="border: 1px solid black; padding: 5px; background-color: #e0f7fa;">Pre-amplifier</div> <div style="border: 1px solid black; padding: 5px; background-color: #e0f7fa;">Filter</div> <div style="border: 1px solid black; padding: 5px; background-color: #e0f7fa;">Limit</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; background-color: #e0f7fa;">3m Chamber H ▾</div> <div style="border: 1px solid black; padding: 5px; background-color: #e0f7fa;">3m Chamber H ▾</div> <div style="border: 1px solid black; padding: 5px; background-color: #e0f7fa;">Filter ▾</div> <div style="border: 1px solid black; padding: 5px; background-color: #e0f7fa;">EIRP ▾</div> </div> |                     |                    |          |                               |        |            |       |       |       |       |
| Frequency<br>(GHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SA reading<br>(dBm) | Ant. Pol.<br>(H/V) | Distance | EIRP @ TX<br>Ant End<br>(dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
| Mid Channel (819MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |                    |          |                               |        |            |       |       |       |       |
| 1.64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -59.6               | H                  | 3.0      | -19.3                         | 37.7   | 1.0        | -56.0 | -13.0 | -43.0 |       |
| 2.46                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -57.9               | H                  | 3.0      | -13.9                         | 37.0   | 1.0        | -50.0 | -13.0 | -37.0 |       |
| 3.28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -58.0               | H                  | 3.0      | -10.2                         | 37.9   | 1.0        | -47.1 | -13.0 | -34.1 |       |
| 1.64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -59.3               | V                  | 3.0      | -18.7                         | 37.7   | 1.0        | -55.5 | -13.0 | -42.5 |       |
| 2.46                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -58.8               | V                  | 3.0      | -14.7                         | 37.0   | 1.0        | -50.7 | -13.0 | -37.7 |       |
| 3.28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -57.2               | V                  | 3.0      | -10.4                         | 37.9   | 1.0        | -47.3 | -13.0 | -34.3 |       |
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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 #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 12456  
**Configuration:** EUT Only  
**Mode:** LTE Band 30, 10MHz QPSK

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

**Chamber**  

3m Chamber H

**Pre-amplifier**  

3m Chamber H

**Filter**  

Filter

**Limit**  

LTE B30

| Frequency<br>(GHz)           | SA reading<br>(dBm) | Ant. Pol.<br>(H/V) | Distance | EIRP @ TX<br>Ant End<br>(dBm) | Preamplifier | Attenuator | EIRP  | Limit | Delta | Notes |
|------------------------------|---------------------|--------------------|----------|-------------------------------|--------------|------------|-------|-------|-------|-------|
| <b>Mid Channel (2310MHz)</b> |                     |                    |          |                               |              |            |       |       |       |       |
| 4.62                         | -61.2               | H                  | 3.0      | -7.4                          | 37.9         | 1.0        | -44.3 | -40.0 | -4.3  |       |
| 6.93                         | -66.8               | H                  | 3.0      | -8.1                          | 36.5         | 1.0        | -43.6 | -40.0 | -3.6  |       |
| 9.24                         | -68.8               | H                  | 3.0      | -7.3                          | 34.9         | 1.0        | -41.1 | -40.0 | -1.1  |       |
| 4.62                         | -62.3               | V                  | 3.0      | -8.5                          | 37.9         | 1.0        | -45.4 | -40.0 | -5.4  |       |
| 6.93                         | -66.6               | V                  | 3.0      | -7.1                          | 36.5         | 1.0        | -42.5 | -40.0 | -2.5  |       |
| 9.24                         | -69.1               | V                  | 3.0      | -7.3                          | 34.9         | 1.0        | -41.2 | -40.0 | -1.2  |       |

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**16QAM LTE BAND 30 (10.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 12456  
**Configuration:** EUT Only  
**Mode:** LTE Band 30, 10MHz 16QAM

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 LTE B30

| Frequency (GHz)              | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Mid Channel (2310MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 4.62                         | -63.6            | H               | 3.0      | -9.8                    | 37.9   | 1.0        | -46.7 | -40.0 | -6.7  |       |
| 6.93                         | -66.8            | H               | 3.0      | -8.2                    | 36.5   | 1.0        | -43.7 | -40.0 | -3.7  |       |
| 9.24                         | -70.1            | H               | 3.0      | -8.6                    | 34.9   | 1.0        | -42.5 | -40.0 | -2.5  |       |
| 4.62                         | -62.6            | V               | 3.0      | -8.9                    | 37.9   | 1.0        | -45.8 | -40.0 | -5.8  |       |
| 6.93                         | -66.3            | V               | 3.0      | -6.8                    | 36.5   | 1.0        | -42.2 | -40.0 | -2.2  |       |
| 9.24                         | -70.5            | V               | 3.0      | -8.7                    | 34.9   | 1.0        | -42.6 | -40.0 | -2.6  |       |

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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 #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 12456  
**Configuration:** EUT Only  
**Mode:** LTE Band 41, 20MHz QPSK

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

Chamber

3m Chamber H

Pre-amplifier

3m Chamber H

Filter

Filter

Limit

LTE B41

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (2506MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 5.01                          | -64.8            | H               | 3.0      | -14.8                   | 36.9   | 1.0        | -50.7 | -25.0 | -25.7 |       |
| 7.52                          | -67.8            | H               | 3.0      | -14.0                   | 35.9   | 1.0        | -48.9 | -25.0 | -23.9 |       |
| 10.02                         | -71.0            | H               | 3.0      | -14.5                   | 33.7   | 1.0        | -47.1 | -25.0 | -22.1 |       |
| 5.01                          | -63.9            | V               | 3.0      | -13.7                   | 36.9   | 1.0        | -49.5 | -25.0 | -24.5 |       |
| 7.52                          | -68.9            | V               | 3.0      | -15.2                   | 35.9   | 1.0        | -50.2 | -25.0 | -25.2 |       |
| 10.02                         | -69.8            | V               | 3.0      | -13.6                   | 33.7   | 1.0        | -46.2 | -25.0 | -21.2 |       |
| <b>Mid Channel (2593MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 5.19                          | -62.4            | H               | 3.0      | -12.0                   | 36.8   | 1.0        | -47.9 | -25.0 | -22.9 |       |
| 7.78                          | -66.9            | H               | 3.0      | -12.8                   | 35.7   | 1.0        | -47.4 | -25.0 | -22.4 |       |
| 10.37                         | -67.9            | H               | 3.0      | -11.2                   | 33.7   | 1.0        | -43.9 | -25.0 | -18.9 |       |
| 5.19                          | -63.6            | V               | 3.0      | -13.1                   | 36.8   | 1.0        | -48.9 | -25.0 | -23.9 |       |
| 7.78                          | -66.7            | V               | 3.0      | -12.8                   | 35.7   | 1.0        | -47.5 | -25.0 | -22.5 |       |
| 10.37                         | -68.4            | V               | 3.0      | -12.0                   | 33.7   | 1.0        | -44.7 | -25.0 | -19.7 |       |
| <b>High Channel (2680MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 5.36                          | -65.7            | H               | 3.0      | -15.1                   | 36.8   | 1.0        | -50.9 | -25.0 | -25.9 |       |
| 8.04                          | -68.5            | H               | 3.0      | -14.1                   | 35.4   | 1.0        | -48.6 | -25.0 | -23.6 |       |
| 10.72                         | -70.2            | H               | 3.0      | -13.3                   | 33.7   | 1.0        | -46.0 | -25.0 | -21.0 |       |
| 5.36                          | -66.9            | V               | 3.0      | -16.1                   | 36.8   | 1.0        | -51.9 | -25.0 | -26.9 |       |
| 8.04                          | -69.0            | V               | 3.0      | -14.8                   | 35.4   | 1.0        | -49.3 | -25.0 | -24.3 |       |
| 10.72                         | -70.4            | V               | 3.0      | -13.9                   | 33.7   | 1.0        | -46.7 | -25.0 | -21.7 |       |

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**16QAM LTE BAND 41 (20.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**

**Project #:** 11792476

**Date:** 06/05/17

**Test Engineer:** 12456

**Configuration:** EUT Only

**Mode:** LTE Band 41, 20MHz 16QAM

**Test Equipment:**

Substitution: Horn T59 Substitution, and 8ft SMA Cable

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 LTE B41

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (2506MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 5.01                          | -64.8            | H               | 3.0      | -14.8                   | 36.9   | 1.0        | -50.6 | -25.0 | -25.6 |       |
| 7.52                          | -67.6            | H               | 3.0      | -13.8                   | 35.9   | 1.0        | -48.7 | -25.0 | -23.7 |       |
| 10.02                         | -70.2            | H               | 3.0      | -13.6                   | 33.7   | 1.0        | -46.3 | -25.0 | -21.3 |       |
| 5.01                          | -63.5            | V               | 3.0      | -13.3                   | 36.9   | 1.0        | -49.2 | -25.0 | -24.2 |       |
| 7.52                          | -68.3            | V               | 3.0      | -14.7                   | 35.9   | 1.0        | -49.6 | -25.0 | -24.6 |       |
| 10.02                         | -70.2            | V               | 3.0      | -14.0                   | 33.7   | 1.0        | -46.7 | -25.0 | -21.7 |       |
| <b>Mid Channel (2593MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 5.19                          | -63.1            | H               | 3.0      | -12.7                   | 36.8   | 1.0        | -48.5 | -25.0 | -23.5 |       |
| 7.78                          | -67.4            | H               | 3.0      | -13.3                   | 35.7   | 1.0        | -48.0 | -25.0 | -23.0 |       |
| 10.37                         | -69.6            | H               | 3.0      | -12.9                   | 33.7   | 1.0        | -45.6 | -25.0 | -20.6 |       |
| 5.19                          | -62.8            | V               | 3.0      | -12.3                   | 36.8   | 1.0        | -48.2 | -25.0 | -23.2 |       |
| 7.78                          | -67.2            | V               | 3.0      | -13.4                   | 35.7   | 1.0        | -48.0 | -25.0 | -23.0 |       |
| 10.37                         | -68.9            | V               | 3.0      | -12.6                   | 33.7   | 1.0        | -45.3 | -25.0 | -20.3 |       |
| <b>High Channel (2680MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 5.36                          | -66.4            | H               | 3.0      | -15.7                   | 36.8   | 1.0        | -51.5 | -25.0 | -26.5 |       |
| 8.04                          | -67.9            | H               | 3.0      | -13.5                   | 35.4   | 1.0        | -47.9 | -25.0 | -22.9 |       |
| 10.72                         | -70.5            | H               | 3.0      | -13.6                   | 33.7   | 1.0        | -46.4 | -25.0 | -21.4 |       |
| 5.36                          | -65.9            | V               | 3.0      | -15.1                   | 36.8   | 1.0        | -50.9 | -25.0 | -25.9 |       |
| 8.04                          | -69.0            | V               | 3.0      | -14.9                   | 35.4   | 1.0        | -49.3 | -25.0 | -24.3 |       |
| 10.72                         | -70.6            | V               | 3.0      | -14.2                   | 33.7   | 1.0        | -46.9 | -25.0 | -21.9 |       |

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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 #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 38602  
**Configuration:** EUT Only  
**Mode:** LTE Band 66, 20MHz QPSK

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

Chamber

3m Chamber H

Pre-amplifier

3m Chamber H

Filter

Filter

Limit

EIRP

| Frequency (GHz)                 | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|---------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1720.0MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.44                            | -58.8            | H               | 3.0      | -11.0                   | 37.7   | 1.0        | -47.7 | -13.0 | -34.7 |       |
| 5.16                            | -57.6            | H               | 3.0      | -7.3                    | 36.8   | 1.0        | -43.1 | -13.0 | -30.1 |       |
| 6.88                            | -58.0            | H               | 3.0      | -4.9                    | 36.4   | 1.0        | -40.3 | -13.0 | -27.3 |       |
| 3.44                            | -57.8            | V               | 3.0      | -10.7                   | 37.7   | 1.0        | -47.4 | -13.0 | -34.4 |       |
| 5.16                            | -55.7            | V               | 3.0      | -5.2                    | 36.8   | 1.0        | -41.1 | -13.0 | -28.1 |       |
| 6.88                            | -57.1            | V               | 3.0      | -4.2                    | 36.4   | 1.0        | -39.6 | -13.0 | -26.6 |       |
| <b>Mid Channel (1745.0MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.49                            | -58.1            | H               | 3.0      | -10.3                   | 37.6   | 1.0        | -46.9 | -13.0 | -33.9 |       |
| 5.23                            | -57.6            | H               | 3.0      | -7.2                    | 36.8   | 1.0        | -43.0 | -13.0 | -30.0 |       |
| 6.98                            | -58.4            | H               | 3.0      | -5.2                    | 36.4   | 1.0        | -40.6 | -13.0 | -27.6 |       |
| 3.49                            | -58.1            | V               | 3.0      | -10.9                   | 37.6   | 1.0        | -47.6 | -13.0 | -34.6 |       |
| 5.23                            | -57.2            | V               | 3.0      | -6.6                    | 36.8   | 1.0        | -42.4 | -13.0 | -29.4 |       |
| 6.98                            | -57.8            | V               | 3.0      | -4.8                    | 36.4   | 1.0        | -40.2 | -13.0 | -27.2 |       |
| <b>High Channel (1770.0MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 3.54                            | -58.6            | H               | 3.0      | -10.8                   | 37.6   | 1.0        | -47.4 | -13.0 | -34.4 |       |
| 5.31                            | -59.0            | H               | 3.0      | -8.5                    | 36.8   | 1.0        | -44.3 | -13.0 | -31.3 |       |
| 7.08                            | -58.4            | H               | 3.0      | -5.1                    | 36.3   | 1.0        | -40.4 | -13.0 | -27.4 |       |
| 3.54                            | -58.0            | V               | 3.0      | -10.8                   | 37.6   | 1.0        | -47.3 | -13.0 | -34.3 |       |
| 5.31                            | -57.8            | V               | 3.0      | -7.1                    | 36.8   | 1.0        | -42.9 | -13.0 | -29.9 |       |
| 7.08                            | -57.1            | V               | 3.0      | -4.0                    | 36.3   | 1.0        | -39.3 | -13.0 | -26.3 |       |

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**16QAM LTE BAND 66 (20.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 38602  
**Configuration:** EUT Only  
**Mode:** LTE Band 66, 20MHz 16QAM

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency (GHz)                 | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamplifier | Attenuator | EIRP  | Limit | Delta | Notes |
|---------------------------------|------------------|-----------------|----------|-------------------------|--------------|------------|-------|-------|-------|-------|
| <b>Low Channel (1720.0MHz)</b>  |                  |                 |          |                         |              |            |       |       |       |       |
| 3.44                            | -58.6            | H               | 3.0      | -10.8                   | 37.7         | 1.0        | -47.5 | -13.0 | -34.5 |       |
| 5.16                            | -57.9            | H               | 3.0      | -7.6                    | 36.8         | 1.0        | -43.4 | -13.0 | -30.4 |       |
| 6.88                            | -58.2            | H               | 3.0      | -5.1                    | 36.4         | 1.0        | -40.5 | -13.0 | -27.5 |       |
| 3.44                            | -58.0            | V               | 3.0      | -10.9                   | 37.7         | 1.0        | -47.6 | -13.0 | -34.6 |       |
| 5.16                            | -56.2            | V               | 3.0      | -5.7                    | 36.8         | 1.0        | -41.6 | -13.0 | -28.6 |       |
| 6.88                            | -57.4            | V               | 3.0      | -4.5                    | 36.4         | 1.0        | -39.9 | -13.0 | -26.9 |       |
| <b>Mid Channel (1745.0MHz)</b>  |                  |                 |          |                         |              |            |       |       |       |       |
| 3.49                            | -58.2            | H               | 3.0      | -10.4                   | 37.6         | 1.0        | -47.0 | -13.0 | -34.0 |       |
| 5.23                            | -57.7            | H               | 3.0      | -7.3                    | 36.8         | 1.0        | -43.1 | -13.0 | -30.1 |       |
| 6.98                            | -58.6            | H               | 3.0      | -5.4                    | 36.4         | 1.0        | -40.8 | -13.0 | -27.8 |       |
| 3.49                            | -58.3            | V               | 3.0      | -11.1                   | 37.6         | 1.0        | -47.8 | -13.0 | -34.8 |       |
| 5.23                            | -57.7            | V               | 3.0      | -7.1                    | 36.8         | 1.0        | -42.9 | -13.0 | -29.9 |       |
| 6.98                            | -58.0            | V               | 3.0      | -5.0                    | 36.4         | 1.0        | -40.4 | -13.0 | -27.4 |       |
| <b>High Channel (1770.0MHz)</b> |                  |                 |          |                         |              |            |       |       |       |       |
| 3.54                            | -58.6            | H               | 3.0      | -10.8                   | 37.6         | 1.0        | -47.4 | -13.0 | -34.4 |       |
| 5.31                            | -58.9            | H               | 3.0      | -8.4                    | 36.8         | 1.0        | -44.2 | -13.0 | -31.2 |       |
| 7.08                            | -58.5            | H               | 3.0      | -5.2                    | 36.3         | 1.0        | -40.5 | -13.0 | -27.5 |       |
| 3.54                            | -58.2            | V               | 3.0      | -11.0                   | 37.6         | 1.0        | -47.5 | -13.0 | -34.5 |       |
| 5.31                            | -58.1            | V               | 3.0      | -7.4                    | 36.8         | 1.0        | -43.2 | -13.0 | -30.2 |       |
| 7.08                            | -58.5            | V               | 3.0      | -5.4                    | 36.3         | 1.0        | -40.7 | -13.0 | -27.7 |       |

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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 #:** 11792476  
**Date:** 06/04/17  
**Test Engineer:** 30606  
**Configuration:** EUT Only  
**Mode:** LTE Band 2, 20MHz QPSK

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency<br>(GHz)            | SA reading<br>(dBm) | Ant. Pol.<br>(H/V) | Distance | EIRP @ TX<br>Ant End<br>(dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|---------------------|--------------------|----------|-------------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1860MHz)</b>  |                     |                    |          |                               |        |            |       |       |       |       |
| 3.72                          | -68.9               | H                  | 3.0      | -21.0                         | 37.4   | 1.0        | -57.4 | -13.0 | -44.4 |       |
| 5.58                          | -71.4               | H                  | 3.0      | -20.4                         | 36.7   | 1.0        | -56.1 | -13.0 | -43.1 |       |
| 7.44                          | -73.7               | H                  | 3.0      | -19.9                         | 36.0   | 1.0        | -54.9 | -13.0 | -41.9 |       |
| 3.72                          | -68.7               | V                  | 3.0      | -21.0                         | 37.4   | 1.0        | -57.4 | -13.0 | -44.4 |       |
| 5.58                          | -71.8               | V                  | 3.0      | -20.7                         | 36.7   | 1.0        | -56.5 | -13.0 | -43.5 |       |
| 7.44                          | -73.7               | V                  | 3.0      | -20.2                         | 36.0   | 1.0        | -55.2 | -13.0 | -42.2 |       |
| <b>Mid Channel (1880MHz)</b>  |                     |                    |          |                               |        |            |       |       |       |       |
| 3.76                          | -68.5               | H                  | 3.0      | -20.5                         | 37.4   | 1.0        | -56.9 | -13.0 | -43.9 |       |
| 5.64                          | -70.9               | H                  | 3.0      | -19.8                         | 36.7   | 1.0        | -55.6 | -13.0 | -42.6 |       |
| 7.52                          | -73.6               | H                  | 3.0      | -19.7                         | 35.9   | 1.0        | -54.7 | -13.0 | -41.7 |       |
| 3.76                          | -68.9               | V                  | 3.0      | -21.1                         | 37.4   | 1.0        | -57.5 | -13.0 | -44.5 |       |
| 5.64                          | -71.7               | V                  | 3.0      | -20.5                         | 36.7   | 1.0        | -56.2 | -13.0 | -43.2 |       |
| 7.52                          | -73.5               | V                  | 3.0      | -19.9                         | 35.9   | 1.0        | -54.8 | -13.0 | -41.8 |       |
| <b>High Channel (1900MHz)</b> |                     |                    |          |                               |        |            |       |       |       |       |
| 3.80                          | -68.6               | H                  | 3.0      | -20.6                         | 37.3   | 1.0        | -56.9 | -13.0 | -43.9 |       |
| 5.70                          | -70.9               | H                  | 3.0      | -19.7                         | 36.7   | 1.0        | -55.4 | -13.0 | -42.4 |       |
| 7.60                          | -72.3               | H                  | 3.0      | -18.3                         | 35.8   | 1.0        | -53.2 | -13.0 | -40.2 |       |
| 3.80                          | -68.6               | V                  | 3.0      | -20.7                         | 37.3   | 1.0        | -57.0 | -13.0 | -44.0 |       |
| 5.70                          | -70.9               | V                  | 3.0      | -19.7                         | 36.7   | 1.0        | -55.4 | -13.0 | -42.4 |       |
| 7.60                          | -72.6               | V                  | 3.0      | -18.9                         | 35.8   | 1.0        | -53.8 | -13.0 | -40.8 |       |

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**16QAM LTE BAND 2 (20.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 06/04/17  
**Test Engineer:** 30606  
**Configuration:** EUT Only  
**Mode:** LTE Band 2, 20MHz 16QAM

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

**Chamber**  
3m Chamber H

**Pre-amplifier**  
3m Chamber H

**Filter**  
Filter

**Limit**  
EIRP

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1860MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.72                          | -69.5            | H               | 3.0      | -21.6                   | 37.4   | 1.0        | -58.0 | -13.0 | -45.0 |       |
| 5.58                          | -72.3            | H               | 3.0      | -21.3                   | 36.7   | 1.0        | -57.0 | -13.0 | -44.0 |       |
| 7.44                          | -73.4            | H               | 3.0      | -19.7                   | 36.0   | 1.0        | -54.6 | -13.0 | -41.6 |       |
| 3.72                          | -69.0            | V               | 3.0      | -21.3                   | 37.4   | 1.0        | -57.7 | -13.0 | -44.7 |       |
| 5.58                          | -72.1            | V               | 3.0      | -21.0                   | 36.7   | 1.0        | -56.8 | -13.0 | -43.8 |       |
| 7.44                          | -73.9            | V               | 3.0      | -20.4                   | 36.0   | 1.0        | -55.4 | -13.0 | -42.4 |       |
| <b>Mid Channel (1880MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.76                          | -69.2            | H               | 3.0      | -21.2                   | 37.4   | 1.0        | -57.6 | -13.0 | -44.6 |       |
| 5.64                          | -71.8            | H               | 3.0      | -20.7                   | 36.7   | 1.0        | -56.5 | -13.0 | -43.5 |       |
| 7.52                          | -73.9            | H               | 3.0      | -20.1                   | 35.9   | 1.0        | -55.0 | -13.0 | -42.0 |       |
| 3.76                          | -68.8            | V               | 3.0      | -21.0                   | 37.4   | 1.0        | -57.4 | -13.0 | -44.4 |       |
| 5.64                          | -71.5            | V               | 3.0      | -20.3                   | 36.7   | 1.0        | -56.1 | -13.0 | -43.1 |       |
| 7.52                          | -73.9            | V               | 3.0      | -20.2                   | 35.9   | 1.0        | -55.2 | -13.0 | -42.2 |       |
| <b>High Channel (1900MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 3.80                          | -69.3            | H               | 3.0      | -21.3                   | 37.3   | 1.0        | -57.6 | -13.0 | -44.6 |       |
| 5.70                          | -72.2            | H               | 3.0      | -21.0                   | 36.7   | 1.0        | -56.7 | -13.0 | -43.7 |       |
| 7.60                          | -73.2            | H               | 3.0      | -19.2                   | 35.8   | 1.0        | -54.1 | -13.0 | -41.1 |       |
| 3.80                          | -68.6            | V               | 3.0      | -20.8                   | 37.3   | 1.0        | -57.1 | -13.0 | -44.1 |       |
| 5.70                          | -71.8            | V               | 3.0      | -20.5                   | 36.7   | 1.0        | -56.2 | -13.0 | -43.2 |       |
| 7.60                          | -73.5            | V               | 3.0      | -19.8                   | 35.8   | 1.0        | -54.6 | -13.0 | -41.6 |       |

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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 #:** 11792476  
**Date:** 06/04/17  
**Test Engineer:** 30606  
**Configuration:** EUT Only  
**Mode:** LTE Band 4, 3MHz QPSK

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency<br>(GHz)              | SA reading<br>(dBm) | Ant. Pol.<br>(H/V) | Distance | EIRP @ TX<br>Ant End<br>(dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|---------------------------------|---------------------|--------------------|----------|-------------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1711.5MHz)</b>  |                     |                    |          |                               |        |            |       |       |       |       |
| 3.42                            | -70.1               | H                  | 3.0      | -22.3                         | 37.7   | 1.0        | -59.0 | -13.0 | -46.0 |       |
| 5.13                            | -71.1               | H                  | 3.0      | -20.9                         | 36.8   | 1.0        | -56.8 | -13.0 | -43.8 |       |
| 6.85                            | -73.1               | H                  | 3.0      | -20.0                         | 36.4   | 1.0        | -55.4 | -13.0 | -42.4 |       |
| 3.42                            | -69.9               | V                  | 3.0      | -22.8                         | 37.7   | 1.0        | -59.5 | -13.0 | -46.5 |       |
| 5.13                            | -71.0               | V                  | 3.0      | -20.6                         | 36.8   | 1.0        | -56.4 | -13.0 | -43.4 |       |
| 6.85                            | -73.2               | V                  | 3.0      | -20.3                         | 36.4   | 1.0        | -55.8 | -13.0 | -42.8 |       |
| <b>Mid Channel (1732.5MHz)</b>  |                     |                    |          |                               |        |            |       |       |       |       |
| 3.47                            | -70.3               | H                  | 3.0      | -22.4                         | 37.7   | 1.0        | -59.1 | -13.0 | -46.1 |       |
| 5.20                            | -71.7               | H                  | 3.0      | -21.3                         | 36.8   | 1.0        | -57.1 | -13.0 | -44.1 |       |
| 6.93                            | -73.3               | H                  | 3.0      | -20.1                         | 36.4   | 1.0        | -55.5 | -13.0 | -42.5 |       |
| 3.47                            | -70.0               | V                  | 3.0      | -22.8                         | 37.7   | 1.0        | -59.5 | -13.0 | -46.5 |       |
| 5.20                            | -71.7               | V                  | 3.0      | -21.2                         | 36.8   | 1.0        | -57.0 | -13.0 | -44.0 |       |
| 6.93                            | -73.4               | V                  | 3.0      | -20.4                         | 36.4   | 1.0        | -55.8 | -13.0 | -42.8 |       |
| <b>High Channel (1753.5MHz)</b> |                     |                    |          |                               |        |            |       |       |       |       |
| 3.51                            | -70.6               | H                  | 3.0      | -22.8                         | 37.6   | 1.0        | -59.4 | -13.0 | -46.4 |       |
| 5.26                            | -72.4               | H                  | 3.0      | -21.9                         | 36.8   | 1.0        | -57.7 | -13.0 | -44.7 |       |
| 7.01                            | -73.2               | H                  | 3.0      | -19.9                         | 36.4   | 1.0        | -55.3 | -13.0 | -42.3 |       |
| 3.51                            | -70.3               | V                  | 3.0      | -23.1                         | 37.6   | 1.0        | -59.7 | -13.0 | -46.7 |       |
| 5.26                            | -72.3               | V                  | 3.0      | -21.7                         | 36.8   | 1.0        | -57.5 | -13.0 | -44.5 |       |
| 7.01                            | -73.3               | V                  | 3.0      | -20.2                         | 36.4   | 1.0        | -55.6 | -13.0 | -42.6 |       |

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

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 06/04/17  
**Test Engineer:** 30606  
**Configuration:** EUT Only  
**Mode:** LTE Band 4, 3MHz 16QAM

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency (GHz)                 | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|---------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1711.5MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.42                            | -70.6            | H               | 3.0      | -22.8                   | 37.7   | 1.0        | -59.5 | -13.0 | -46.5 |       |
| 5.13                            | -70.8            | H               | 3.0      | -20.6                   | 36.8   | 1.0        | -56.4 | -13.0 | -43.4 |       |
| 6.85                            | -72.4            | H               | 3.0      | -19.3                   | 36.4   | 1.0        | -54.8 | -13.0 | -41.8 |       |
| 3.42                            | -70.8            | V               | 3.0      | -23.7                   | 37.7   | 1.0        | -60.4 | -13.0 | -47.4 |       |
| 5.13                            | -71.3            | V               | 3.0      | -20.9                   | 36.8   | 1.0        | -56.8 | -13.0 | -43.8 |       |
| 6.85                            | -73.5            | V               | 3.0      | -20.7                   | 36.4   | 1.0        | -56.1 | -13.0 | -43.1 |       |
| <b>Mid Channel (1732.5MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.47                            | -70.4            | H               | 3.0      | -22.6                   | 37.7   | 1.0        | -59.2 | -13.0 | -46.2 |       |
| 5.20                            | -71.1            | H               | 3.0      | -20.7                   | 36.8   | 1.0        | -56.6 | -13.0 | -43.6 |       |
| 6.93                            | -73.6            | H               | 3.0      | -20.4                   | 36.4   | 1.0        | -55.8 | -13.0 | -42.8 |       |
| 3.47                            | -70.1            | V               | 3.0      | -23.0                   | 37.7   | 1.0        | -59.6 | -13.0 | -46.6 |       |
| 5.20                            | -71.3            | V               | 3.0      | -20.8                   | 36.8   | 1.0        | -56.6 | -13.0 | -43.6 |       |
| 6.93                            | -73.1            | V               | 3.0      | -20.2                   | 36.4   | 1.0        | -55.6 | -13.0 | -42.6 |       |
| <b>High Channel (1753.5MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 3.51                            | -70.2            | H               | 3.0      | -22.3                   | 37.6   | 1.0        | -58.9 | -13.0 | -45.9 |       |
| 5.26                            | -72.4            | H               | 3.0      | -21.9                   | 36.8   | 1.0        | -57.7 | -13.0 | -44.7 |       |
| 7.01                            | -72.8            | H               | 3.0      | -19.5                   | 36.4   | 1.0        | -54.9 | -13.0 | -41.9 |       |
| 3.51                            | -70.3            | V               | 3.0      | -23.0                   | 37.6   | 1.0        | -59.7 | -13.0 | -46.7 |       |
| 5.26                            | -72.5            | V               | 3.0      | -21.8                   | 36.8   | 1.0        | -57.7 | -13.0 | -44.7 |       |
| 7.01                            | -73.2            | V               | 3.0      | -20.1                   | 36.4   | 1.0        | -55.5 | -13.0 | -42.5 |       |

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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 #:** 11792476  
**Date:** 05/17/17  
**Test Engineer:** 37290  
**Configuration:** EUT Only  
**Mode:** LTE Band 5, 10MHz QPSK

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

**Chamber**  

3m Chamber H

**Pre-amplifier**  

3m Chamber H

**Filter**  

Filter

**Limit**  

EIRP

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (829MHz)</b>   |                  |                 |          |                         |        |            |       |       |       |       |
| 1.66                          | -61.6            | H               | 3.0      | -21.1                   | 37.7   | 1.0        | -57.9 | -13.0 | -44.9 |       |
| 2.49                          | -57.0            | H               | 3.0      | -12.9                   | 37.1   | 1.0        | -49.0 | -13.0 | -36.0 |       |
| 3.32                          | -60.9            | H               | 3.0      | -13.1                   | 37.8   | 1.0        | -50.0 | -13.0 | -37.0 |       |
| 1.66                          | -62.5            | V               | 3.0      | -21.8                   | 37.7   | 1.0        | -58.5 | -13.0 | -45.5 |       |
| 2.49                          | -56.8            | V               | 3.0      | -12.6                   | 37.1   | 1.0        | -48.7 | -13.0 | -35.7 |       |
| 3.32                          | -61.3            | V               | 3.0      | -14.4                   | 37.8   | 1.0        | -51.3 | -13.0 | -38.3 |       |
| <b>Mid Channel (836.5MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 1.67                          | -62.8            | H               | 3.0      | -22.3                   | 37.8   | 1.0        | -59.0 | -13.0 | -46.0 |       |
| 2.51                          | -56.8            | H               | 3.0      | -12.6                   | 37.1   | 1.0        | -48.7 | -13.0 | -35.7 |       |
| 3.35                          | -63.3            | H               | 3.0      | -15.5                   | 37.8   | 1.0        | -52.3 | -13.0 | -39.3 |       |
| 1.67                          | -61.6            | V               | 3.0      | -20.8                   | 37.8   | 1.0        | -57.5 | -13.0 | -44.5 |       |
| 2.51                          | -61.8            | V               | 3.0      | -17.6                   | 37.1   | 1.0        | -53.7 | -13.0 | -40.7 |       |
| 3.35                          | -62.8            | V               | 3.0      | -15.9                   | 37.8   | 1.0        | -52.7 | -13.0 | -39.7 |       |
| <b>High Channel (844MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.69                          | -62.9            | H               | 3.0      | -22.3                   | 37.8   | 1.0        | -59.0 | -13.0 | -46.0 |       |
| 2.53                          | -62.0            | H               | 3.0      | -17.7                   | 37.1   | 1.0        | -53.8 | -13.0 | -40.8 |       |
| 3.38                          | -62.9            | H               | 3.0      | -15.0                   | 37.8   | 1.0        | -51.8 | -13.0 | -38.8 |       |
| 1.69                          | -62.7            | V               | 3.0      | -21.8                   | 37.8   | 1.0        | -58.6 | -13.0 | -45.6 |       |
| 2.53                          | -61.0            | V               | 3.0      | -16.7                   | 37.1   | 1.0        | -52.8 | -13.0 | -39.8 |       |
| 3.38                          | -62.1            | V               | 3.0      | -15.1                   | 37.8   | 1.0        | -51.9 | -13.0 | -38.9 |       |

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

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 05/17/17  
**Test Engineer:** 37290  
**Configuration:** EUT Only  
**Mode:** LTE Band 5, 10MHz 16QAM

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (829MHz)</b>   |                  |                 |          |                         |        |            |       |       |       |       |
| 1.66                          | -61.9            | H               | 3.0      | -20.4                   | 37.7   | 1.0        | -57.1 | -13.0 | -44.1 |       |
| 2.49                          | -51.7            | H               | 3.0      | -8.6                    | 37.1   | 1.0        | -44.6 | -13.0 | -31.6 |       |
| 3.32                          | -61.9            | H               | 3.0      | -15.9                   | 37.8   | 1.0        | -52.7 | -13.0 | -39.7 |       |
| 1.66                          | -61.8            | V               | 3.0      | -20.1                   | 37.7   | 1.0        | -56.8 | -13.0 | -43.8 |       |
| 2.49                          | -57.1            | V               | 3.0      | -13.0                   | 37.1   | 1.0        | -49.0 | -13.0 | -36.0 |       |
| 3.32                          | -62.2            | V               | 3.0      | -16.3                   | 37.8   | 1.0        | -53.1 | -13.0 | -40.1 |       |
| <b>Mid Channel (836.5MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 1.67                          | -60.8            | H               | 3.0      | -19.3                   | 37.8   | 1.0        | -56.1 | -13.0 | -43.1 |       |
| 2.51                          | -61.0            | H               | 3.0      | -17.8                   | 37.1   | 1.0        | -53.8 | -13.0 | -40.8 |       |
| 3.35                          | -61.3            | H               | 3.0      | -15.3                   | 37.8   | 1.0        | -52.1 | -13.0 | -39.1 |       |
| 1.67                          | -60.9            | V               | 3.0      | -19.1                   | 37.8   | 1.0        | -55.9 | -13.0 | -42.9 |       |
| 2.51                          | -61.0            | V               | 3.0      | -16.7                   | 37.1   | 1.0        | -52.8 | -13.0 | -39.8 |       |
| 3.35                          | -61.6            | V               | 3.0      | -15.6                   | 37.8   | 1.0        | -52.4 | -13.0 | -39.4 |       |
| <b>High Channel (844MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.69                          | -62.0            | H               | 3.0      | -20.5                   | 37.8   | 1.0        | -57.2 | -13.0 | -44.2 |       |
| 2.53                          | -55.9            | H               | 3.0      | -12.5                   | 37.1   | 1.0        | -48.7 | -13.0 | -35.7 |       |
| 3.38                          | -62.6            | H               | 3.0      | -16.6                   | 37.8   | 1.0        | -53.3 | -13.0 | -40.3 |       |
| 1.69                          | -60.6            | V               | 3.0      | -18.8                   | 37.8   | 1.0        | -55.6 | -13.0 | -42.6 |       |
| 2.53                          | -61.5            | V               | 3.0      | -17.2                   | 37.1   | 1.0        | -53.3 | -13.0 | -40.3 |       |
| 3.38                          | -63.0            | V               | 3.0      | -16.9                   | 37.8   | 1.0        | -53.7 | -13.0 | -40.7 |       |

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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 #:** 11792476  
**Date:** 06/06/17  
**Test Engineer:** 45200  
**Configuration:** EUT Only  
**Mode:** LTE Band 7, 20MHz QPSK

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 LTE B7

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (2510MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 5.02                          | -63.0            | H               | 3.0      | -13.0                   | 36.9   | 1.0        | -48.9 | -25.0 | -23.9 |       |
| 7.53                          | -66.1            | H               | 3.0      | -12.2                   | 35.9   | 1.0        | -47.1 | -25.0 | -22.1 |       |
| 10.04                         | -67.1            | H               | 3.0      | -10.6                   | 33.7   | 1.0        | -43.2 | -25.0 | -18.2 |       |
| 5.02                          | -63.4            | V               | 3.0      | -13.2                   | 36.9   | 1.0        | -49.0 | -25.0 | -24.0 |       |
| 7.53                          | -66.1            | V               | 3.0      | -12.4                   | 35.9   | 1.0        | -47.3 | -25.0 | -22.3 |       |
| 10.04                         | -67.3            | V               | 3.0      | -11.1                   | 33.7   | 1.0        | -43.8 | -25.0 | -18.8 |       |
| <b>Mid Channel (2535MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 5.07                          | -61.8            | H               | 3.0      | -11.7                   | 36.9   | 1.0        | -47.5 | -25.0 | -22.5 |       |
| 7.61                          | -65.2            | H               | 3.0      | -11.2                   | 35.8   | 1.0        | -46.1 | -25.0 | -21.1 |       |
| 10.14                         | -66.4            | H               | 3.0      | -9.8                    | 33.7   | 1.0        | -42.5 | -25.0 | -17.5 |       |
| 5.07                          | -62.7            | V               | 3.0      | -12.4                   | 36.9   | 1.0        | -48.3 | -25.0 | -23.3 |       |
| 7.61                          | -65.4            | V               | 3.0      | -11.7                   | 35.8   | 1.0        | -46.6 | -25.0 | -21.6 |       |
| 10.14                         | -64.8            | V               | 3.0      | -8.6                    | 33.7   | 1.0        | -41.3 | -25.0 | -16.3 |       |
| <b>High Channel (2560MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 5.12                          | -62.6            | H               | 3.0      | -12.3                   | 36.8   | 1.0        | -48.2 | -25.0 | -23.2 |       |
| 7.68                          | -65.6            | H               | 3.0      | -11.5                   | 35.8   | 1.0        | -46.3 | -25.0 | -21.3 |       |
| 10.24                         | -65.9            | H               | 3.0      | -9.3                    | 33.7   | 1.0        | -42.0 | -25.0 | -17.0 |       |
| 5.12                          | -63.1            | V               | 3.0      | -12.7                   | 36.8   | 1.0        | -48.5 | -25.0 | -23.5 |       |
| 7.68                          | -65.5            | V               | 3.0      | -11.7                   | 35.8   | 1.0        | -46.5 | -25.0 | -21.5 |       |
| 10.24                         | -66.9            | V               | 3.0      | -10.6                   | 33.7   | 1.0        | -43.3 | -25.0 | -18.3 |       |

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**16QAM LTE BAND 7 (20.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**

**Project #:** 11792476

**Date:** 06/06/17

**Test Engineer:** 45200

**Configuration:** EUT Only

**Mode:** LTE Band 7, 20MHz 16QAM

**Test Equipment:**

Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber

3m Chamber H

Pre-amplifier

3m Chamber H

Filter

Filter

Limit

LTE B7

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (2510MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 5.02                          | -63.2            | H               | 3.0      | -13.2                   | 36.9   | 1.0        | -49.1 | -25.0 | -24.1 |       |
| 7.53                          | -66.3            | H               | 3.0      | -12.4                   | 35.9   | 1.0        | -47.3 | -25.0 | -22.3 |       |
| 10.04                         | -67.4            | H               | 3.0      | -10.8                   | 33.7   | 1.0        | -43.5 | -25.0 | -18.5 |       |
| 5.02                          | -62.3            | V               | 3.0      | -12.1                   | 36.9   | 1.0        | -48.0 | -25.0 | -23.0 |       |
| 7.53                          | -65.3            | V               | 3.0      | -11.7                   | 35.9   | 1.0        | -46.6 | -25.0 | -21.6 |       |
| 10.04                         | -66.3            | V               | 3.0      | -10.1                   | 33.7   | 1.0        | -42.8 | -25.0 | -17.8 |       |
| <b>Mid Channel (2535MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 5.07                          | -63.4            | H               | 3.0      | -13.3                   | 36.9   | 1.0        | -49.1 | -25.0 | -24.1 |       |
| 7.61                          | -65.2            | H               | 3.0      | -11.3                   | 35.8   | 1.0        | -46.1 | -25.0 | -21.1 |       |
| 10.14                         | -66.8            | H               | 3.0      | -10.2                   | 33.7   | 1.0        | -42.9 | -25.0 | -17.9 |       |
| 5.07                          | -61.4            | V               | 3.0      | -11.1                   | 36.9   | 1.0        | -46.9 | -25.0 | -21.9 |       |
| 7.61                          | -64.6            | V               | 3.0      | -10.9                   | 35.8   | 1.0        | -45.7 | -25.0 | -20.7 |       |
| 10.14                         | -66.3            | V               | 3.0      | -10.0                   | 33.7   | 1.0        | -42.7 | -25.0 | -17.7 |       |
| <b>High Channel (2560MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 5.12                          | -62.0            | H               | 3.0      | -11.7                   | 36.8   | 1.0        | -47.6 | -25.0 | -22.6 |       |
| 7.68                          | -65.8            | H               | 3.0      | -11.8                   | 35.8   | 1.0        | -46.6 | -25.0 | -21.6 |       |
| 10.24                         | -67.2            | H               | 3.0      | -10.5                   | 33.7   | 1.0        | -43.2 | -25.0 | -18.2 |       |
| 5.12                          | -63.1            | V               | 3.0      | -12.7                   | 36.8   | 1.0        | -48.6 | -25.0 | -23.6 |       |
| 7.68                          | -65.4            | V               | 3.0      | -11.6                   | 35.8   | 1.0        | -46.4 | -25.0 | -21.4 |       |
| 10.24                         | -66.5            | V               | 3.0      | -10.2                   | 33.7   | 1.0        | -42.9 | -25.0 | -17.9 |       |

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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 #:** 11792476  
**Date:** 05/17/17  
**Test Engineer:** 37290  
**Configuration:** EUT Only  
**Mode:** LTE Band 12, 10MHz QPSK

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

Chamber

3m Chamber H

Pre-amplifier

3m Chamber H

Filter

Filter

Limit

EIRP

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (704MHz)</b>   |                  |                 |          |                         |        |            |       |       |       |       |
| 1.41                          | -62.8            | H               | 3.0      | -23.9                   | 37.4   | 1.0        | -60.3 | -13.0 | -47.3 |       |
| 2.11                          | -62.0            | H               | 3.0      | -18.9                   | 37.7   | 1.0        | -55.6 | -13.0 | -42.6 |       |
| 2.82                          | -61.6            | H               | 3.0      | -15.2                   | 37.8   | 1.0        | -52.0 | -13.0 | -39.0 |       |
| 1.41                          | -62.4            | V               | 3.0      | -23.2                   | 37.4   | 1.0        | -59.5 | -13.0 | -46.5 |       |
| 2.11                          | -61.9            | V               | 3.0      | -18.8                   | 37.7   | 1.0        | -55.5 | -13.0 | -42.5 |       |
| 2.82                          | -62.2            | V               | 3.0      | -16.8                   | 37.8   | 1.0        | -53.5 | -13.0 | -40.5 |       |
| <b>Mid Channel (707.5MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 1.42                          | -62.6            | H               | 3.0      | -23.6                   | 37.4   | 1.0        | -60.0 | -13.0 | -47.0 |       |
| 2.12                          | -62.3            | H               | 3.0      | -19.2                   | 37.7   | 1.0        | -55.8 | -13.0 | -42.8 |       |
| 2.83                          | -62.6            | H               | 3.0      | -16.2                   | 37.8   | 1.0        | -53.0 | -13.0 | -40.0 |       |
| 1.42                          | -62.9            | V               | 3.0      | -23.6                   | 37.4   | 1.0        | -60.0 | -13.0 | -47.0 |       |
| 2.12                          | -62.4            | V               | 3.0      | -19.3                   | 37.7   | 1.0        | -56.0 | -13.0 | -43.0 |       |
| 2.83                          | -62.3            | V               | 3.0      | -16.8                   | 37.8   | 1.0        | -53.6 | -13.0 | -40.6 |       |
| <b>High Channel (711MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.42                          | -62.9            | H               | 3.0      | -23.9                   | 37.4   | 1.0        | -60.3 | -13.0 | -47.3 |       |
| 2.13                          | -61.3            | H               | 3.0      | -18.1                   | 37.6   | 1.0        | -54.7 | -13.0 | -41.7 |       |
| 2.84                          | -60.2            | H               | 3.0      | -13.7                   | 37.8   | 1.0        | -50.5 | -13.0 | -37.5 |       |
| 1.42                          | -62.5            | V               | 3.0      | -23.1                   | 37.4   | 1.0        | -59.6 | -13.0 | -46.6 |       |
| 2.13                          | -61.8            | V               | 3.0      | -18.7                   | 37.6   | 1.0        | -55.3 | -13.0 | -42.3 |       |
| 2.84                          | -61.5            | V               | 3.0      | -15.9                   | 37.8   | 1.0        | -52.8 | -13.0 | -39.8 |       |

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

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 05/17/17  
**Test Engineer:** 37290  
**Configuration:** EUT Only  
**Mode:** LTE Band 12, 10MHz 16QAM

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (704MHz)</b>   |                  |                 |          |                         |        |            |       |       |       |       |
| 1.41                          | -62.6            | H               | 3.0      | -23.7                   | 37.4   | 1.0        | -60.1 | -13.0 | -47.1 |       |
| 2.11                          | -62.6            | H               | 3.0      | -19.5                   | 37.7   | 1.0        | -56.2 | -13.0 | -43.2 |       |
| 2.82                          | -61.4            | H               | 3.0      | -15.1                   | 37.8   | 1.0        | -51.8 | -13.0 | -38.8 |       |
| 1.41                          | -63.3            | V               | 3.0      | -24.1                   | 37.4   | 1.0        | -60.4 | -13.0 | -47.4 |       |
| 2.11                          | -62.0            | V               | 3.0      | -18.9                   | 37.7   | 1.0        | -55.6 | -13.0 | -42.6 |       |
| 2.82                          | -61.6            | V               | 3.0      | -16.1                   | 37.8   | 1.0        | -52.9 | -13.0 | -39.9 |       |
| <b>Mid Channel (707.5MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 1.42                          | -62.6            | H               | 3.0      | -23.7                   | 37.4   | 1.0        | -60.1 | -13.0 | -47.1 |       |
| 2.12                          | -62.1            | H               | 3.0      | -18.9                   | 37.7   | 1.0        | -55.6 | -13.0 | -42.6 |       |
| 2.83                          | -62.5            | H               | 3.0      | -16.1                   | 37.8   | 1.0        | -52.9 | -13.0 | -39.9 |       |
| 1.42                          | -62.5            | V               | 3.0      | -23.2                   | 37.4   | 1.0        | -59.6 | -13.0 | -46.6 |       |
| 2.12                          | -62.0            | V               | 3.0      | -18.9                   | 37.7   | 1.0        | -55.6 | -13.0 | -42.6 |       |
| 2.83                          | -62.3            | V               | 3.0      | -16.9                   | 37.8   | 1.0        | -53.7 | -13.0 | -40.7 |       |
| <b>High Channel (711MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.42                          | -62.5            | H               | 3.0      | -23.5                   | 37.4   | 1.0        | -59.9 | -13.0 | -46.9 |       |
| 2.13                          | -61.7            | H               | 3.0      | -18.5                   | 37.6   | 1.0        | -55.2 | -13.0 | -42.2 |       |
| 2.84                          | -61.2            | H               | 3.0      | -14.6                   | 37.8   | 1.0        | -51.5 | -13.0 | -38.5 |       |
| 1.42                          | -62.4            | V               | 3.0      | -23.1                   | 37.4   | 1.0        | -59.5 | -13.0 | -46.5 |       |
| 2.13                          | -62.0            | V               | 3.0      | -18.9                   | 37.6   | 1.0        | -55.5 | -13.0 | -42.5 |       |
| 2.84                          | -62.6            | V               | 3.0      | -17.1                   | 37.8   | 1.0        | -53.9 | -13.0 | -40.9 |       |

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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 #:** 11792476  
**Date:** 06/06/17  
**Test Engineer:** 45200  
**Configuration:** EUT Only  
**Mode:** LTE Band 13, 10MHz QPSK

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

Chamber

3m Chamber H

Pre-amplifier

3m Chamber H

Filter

Filter

Limit

LTE B13

| Frequency (GHz)             | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-----------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Mid Channel (782MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 1.56                        | -62.6            | H               | 3.0      | -22.9                   | 37.7   | 1.0        | -59.5 | -40.0 | -19.5 |       |
| 2.35                        | -61.1            | H               | 3.0      | -17.4                   | 37.1   | 1.0        | -53.5 | -13.0 | -40.5 |       |
| 3.13                        | -62.6            | H               | 3.0      | -14.9                   | 38.0   | 1.0        | -52.0 | -13.0 | -39.0 |       |
| 1.56                        | -61.9            | V               | 3.0      | -21.8                   | 37.7   | 1.0        | -58.4 | -40.0 | -18.4 |       |
| 2.35                        | -62.0            | V               | 3.0      | -18.1                   | 37.1   | 1.0        | -54.2 | -13.0 | -41.2 |       |
| 3.13                        | -62.8            | V               | 3.0      | -16.4                   | 38.0   | 1.0        | -53.5 | -13.0 | -40.5 |       |
|                             |                  |                 |          |                         |        |            |       |       |       |       |
|                             |                  |                 |          |                         |        |            |       |       |       |       |
|                             |                  |                 |          |                         |        |            |       |       |       |       |

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**16QAM LTE BAND 13 (10.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 06/06/17  
**Test Engineer:** 45200  
**Configuration:** EUT Only  
**Mode:** LTE Band 13, 10MHz 16QAM

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

Chamber

3m Chamber H

Pre-amplifier

3m Chamber H

Filter

Filter

Limit

LTE B13

| Frequency (GHz)      | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX<br>Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|----------------------|------------------|-----------------|----------|----------------------------|--------|------------|-------|-------|-------|-------|
| Mid Channel (782MHz) |                  |                 |          |                            |        |            |       |       |       |       |
| 1.56                 | -61.7            | H               | 3.0      | -21.9                      | 37.7   | 1.0        | -58.5 | -40.0 | -18.5 |       |
| 2.35                 | -60.2            | H               | 3.0      | -16.6                      | 37.1   | 1.0        | -52.7 | -13.0 | -39.7 |       |
| 3.13                 | -63.0            | H               | 3.0      | -15.3                      | 38.0   | 1.0        | -52.3 | -13.0 | -39.3 |       |
| 1.56                 | -62.0            | V               | 3.0      | -21.8                      | 37.7   | 1.0        | -58.5 | -40.0 | -18.5 |       |
| 2.35                 | -62.3            | V               | 3.0      | -18.5                      | 37.1   | 1.0        | -54.6 | -13.0 | -41.6 |       |
| 3.13                 | -62.2            | V               | 3.0      | -15.8                      | 38.0   | 1.0        | -52.8 | -13.0 | -39.8 |       |

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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:** 50822  
**Configuration:** EUT Only  
**Mode:** LTE Band 17, 10MHz QPSK

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

Chamber

3m Chamber E

Pre-amplifier

3m Chamber E

Filter

Filter

Limit

EIRP

| Frequency (GHz)              | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (709MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.418                        | -63.3            | H               | 3.0      | -21.6                   | 38.0   | 1.0        | -58.6 | -13.0 | -45.6 |       |
| 2.127                        | -64.7            | H               | 3.0      | -21.1                   | 38.0   | 1.0        | -58.1 | -13.0 | -45.1 |       |
| 2.836                        | -64.4            | H               | 3.0      | -17.2                   | 38.4   | 1.0        | -54.6 | -13.0 | -41.6 |       |
| 1.418                        | -63.4            | V               | 3.0      | -22.4                   | 38.0   | 1.0        | -59.5 | -13.0 | -46.5 |       |
| 2.127                        | -64.3            | V               | 3.0      | -20.1                   | 38.0   | 1.0        | -57.1 | -13.0 | -44.1 |       |
| 2.836                        | -63.9            | V               | 3.0      | -17.0                   | 38.4   | 1.0        | -54.4 | -13.0 | -41.4 |       |
| <b>Mid Channel (710MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.420                        | -63.8            | H               | 3.0      | -22.1                   | 38.0   | 1.0        | -59.1 | -13.0 | -46.1 |       |
| 2.130                        | -64.3            | H               | 3.0      | -20.7                   | 38.0   | 1.0        | -57.7 | -13.0 | -44.7 |       |
| 2.840                        | -64.7            | H               | 3.0      | -17.5                   | 38.4   | 1.0        | -54.9 | -13.0 | -41.9 |       |
| 1.420                        | -62.9            | V               | 3.0      | -21.8                   | 38.0   | 1.0        | -58.9 | -13.0 | -45.9 |       |
| 2.130                        | -64.0            | V               | 3.0      | -19.8                   | 38.0   | 1.0        | -56.8 | -13.0 | -43.8 |       |
| 2.840                        | -64.3            | V               | 3.0      | -17.3                   | 38.4   | 1.0        | -54.7 | -13.0 | -41.7 |       |
| <b>High Channel (711MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 1.422                        | -63.2            | H               | 3.0      | -21.5                   | 38.0   | 1.0        | -58.5 | -13.0 | -45.5 |       |
| 2.133                        | -64.3            | H               | 3.0      | -20.6                   | 38.0   | 1.0        | -57.6 | -13.0 | -44.6 |       |
| 2.844                        | -64.4            | H               | 3.0      | -17.2                   | 38.4   | 1.0        | -54.6 | -13.0 | -41.6 |       |
| 1.422                        | -63.4            | V               | 3.0      | -22.4                   | 38.0   | 1.0        | -59.4 | -13.0 | -46.4 |       |
| 2.133                        | -63.7            | V               | 3.0      | -19.5                   | 38.0   | 1.0        | -56.5 | -13.0 | -43.5 |       |
| 2.844                        | -64.6            | V               | 3.0      | -17.6                   | 38.4   | 1.0        | -55.0 | -13.0 | -42.0 |       |

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

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:**  
**Date:** 07/21/17  
**Test Engineer:** 50822  
**Configuration:** EUT Only  
**Mode:** LTE Band 17, 10MHz 16QAM

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

**Chamber**  
 3m Chamber E

**Pre-amplifier**  
 3m Chamber E

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency (GHz)              | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (709MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.418                        | -63.0            | H               | 3.0      | -21.3                   | 38.0   | 1.0        | -58.3 | -13.0 | -45.3 |       |
| 2.127                        | -64.1            | H               | 3.0      | -20.4                   | 38.0   | 1.0        | -57.4 | -13.0 | -44.4 |       |
| 2.836                        | -64.7            | H               | 3.0      | -17.5                   | 38.4   | 1.0        | -54.9 | -13.0 | -41.9 |       |
| 1.418                        | -63.2            | V               | 3.0      | -22.2                   | 38.0   | 1.0        | -59.2 | -13.0 | -46.2 |       |
| 2.127                        | -65.0            | V               | 3.0      | -20.8                   | 38.0   | 1.0        | -57.8 | -13.0 | -44.8 |       |
| 2.836                        | -64.5            | V               | 3.0      | -17.5                   | 38.4   | 1.0        | -55.0 | -13.0 | -42.0 |       |
| <b>Mid Channel (710MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 1.420                        | -63.7            | H               | 3.0      | -22.0                   | 38.0   | 1.0        | -59.0 | -13.0 | -46.0 |       |
| 2.130                        | -64.5            | H               | 3.0      | -20.9                   | 38.0   | 1.0        | -57.9 | -13.0 | -44.9 |       |
| 2.840                        | -64.7            | H               | 3.0      | -17.5                   | 38.4   | 1.0        | -54.9 | -13.0 | -41.9 |       |
| 1.420                        | -63.6            | V               | 3.0      | -22.5                   | 38.0   | 1.0        | -59.6 | -13.0 | -46.6 |       |
| 2.130                        | -64.1            | V               | 3.0      | -20.0                   | 38.0   | 1.0        | -57.0 | -13.0 | -44.0 |       |
| 2.840                        | -64.5            | V               | 3.0      | -17.5                   | 38.4   | 1.0        | -54.9 | -13.0 | -41.9 |       |
| <b>High Channel (711MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 1.422                        | -63.2            | H               | 3.0      | -21.4                   | 38.0   | 1.0        | -58.5 | -13.0 | -45.5 |       |
| 2.133                        | -64.4            | H               | 3.0      | -20.7                   | 38.0   | 1.0        | -57.7 | -13.0 | -44.7 |       |
| 2.844                        | -64.8            | H               | 3.0      | -17.5                   | 38.4   | 1.0        | -54.9 | -13.0 | -41.9 |       |
| 1.422                        | -63.8            | V               | 3.0      | -22.7                   | 38.0   | 1.0        | -59.8 | -13.0 | -46.8 |       |
| 2.133                        | -64.3            | V               | 3.0      | -20.1                   | 38.0   | 1.0        | -57.1 | -13.0 | -44.1 |       |
| 2.844                        | -65.3            | V               | 3.0      | -18.3                   | 38.4   | 1.0        | -55.7 | -13.0 | -42.7 |       |

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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 #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 30606  
**Configuration:** EUT Only  
**Mode:** LTE Band 25, 20MHz QPSK

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency (GHz)                | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|--------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1860MHz)</b>   |                  |                 |          |                         |        |            |       |       |       |       |
| 3.72                           | -68.8            | H               | 3.0      | -20.9                   | 37.4   | 1.0        | -57.3 | -13.0 | -44.3 |       |
| 5.58                           | -72.2            | H               | 3.0      | -21.2                   | 36.7   | 1.0        | -56.9 | -13.0 | -43.9 |       |
| 7.44                           | -73.3            | H               | 3.0      | -19.6                   | 36.0   | 1.0        | -54.6 | -13.0 | -41.6 |       |
| 3.72                           | -68.4            | V               | 3.0      | -20.7                   | 37.4   | 1.0        | -57.1 | -13.0 | -44.1 |       |
| 5.58                           | -72.3            | V               | 3.0      | -21.3                   | 36.7   | 1.0        | -57.0 | -13.0 | -44.0 |       |
| 7.44                           | -74.0            | V               | 3.0      | -20.5                   | 36.0   | 1.0        | -55.5 | -13.0 | -42.5 |       |
| <b>Mid Channel (1882.5MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 3.77                           | -69.5            | H               | 3.0      | -21.5                   | 37.3   | 1.0        | -57.9 | -13.0 | -44.9 |       |
| 5.65                           | -72.1            | H               | 3.0      | -21.0                   | 36.7   | 1.0        | -56.7 | -13.0 | -43.7 |       |
| 7.53                           | -74.3            | H               | 3.0      | -20.5                   | 35.9   | 1.0        | -55.4 | -13.0 | -42.4 |       |
| 3.77                           | -69.1            | V               | 3.0      | -21.3                   | 37.3   | 1.0        | -57.6 | -13.0 | -44.6 |       |
| 5.65                           | -71.5            | V               | 3.0      | -20.3                   | 36.7   | 1.0        | -56.0 | -13.0 | -43.0 |       |
| 7.53                           | -73.7            | V               | 3.0      | -20.1                   | 35.9   | 1.0        | -55.0 | -13.0 | -42.0 |       |
| <b>High Channel (1905MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.81                           | -69.3            | H               | 3.0      | -21.3                   | 37.3   | 1.0        | -57.6 | -13.0 | -44.6 |       |
| 5.72                           | -72.6            | H               | 3.0      | -21.4                   | 36.7   | 1.0        | -57.1 | -13.0 | -44.1 |       |
| 7.62                           | -73.6            | H               | 3.0      | -19.7                   | 35.8   | 1.0        | -54.5 | -13.0 | -41.5 |       |
| 3.81                           | -68.7            | V               | 3.0      | -20.8                   | 37.3   | 1.0        | -57.1 | -13.0 | -44.1 |       |
| 5.72                           | -72.5            | V               | 3.0      | -21.3                   | 36.7   | 1.0        | -57.0 | -13.0 | -44.0 |       |
| 7.62                           | -73.3            | V               | 3.0      | -19.5                   | 35.8   | 1.0        | -54.4 | -13.0 | -41.4 |       |

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**16QAM LTE BAND 25 (20.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 30606  
**Configuration:** EUT Only  
**Mode:** LTE Band 25, 20MHz 16QAM

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 EIRP

| Frequency (GHz)                | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|--------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1860MHz)</b>   |                  |                 |          |                         |        |            |       |       |       |       |
| 3.72                           | -69.8            | H               | 3.0      | -21.8                   | 37.4   | 1.0        | -58.2 | -13.0 | -45.2 |       |
| 5.58                           | -72.4            | H               | 3.0      | -21.4                   | 36.7   | 1.0        | -57.1 | -13.0 | -44.1 |       |
| 7.44                           | -74.3            | H               | 3.0      | -20.5                   | 36.0   | 1.0        | -55.5 | -13.0 | -42.5 |       |
| 3.72                           | -69.1            | V               | 3.0      | -21.4                   | 37.4   | 1.0        | -57.8 | -13.0 | -44.8 |       |
| 5.58                           | -71.9            | V               | 3.0      | -20.8                   | 36.7   | 1.0        | -56.5 | -13.0 | -43.5 |       |
| 7.44                           | -73.9            | V               | 3.0      | -20.3                   | 36.0   | 1.0        | -55.3 | -13.0 | -42.3 |       |
| <b>Mid Channel (1882.5MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 3.77                           | -69.4            | H               | 3.0      | -21.4                   | 37.3   | 1.0        | -57.8 | -13.0 | -44.8 |       |
| 5.65                           | -72.2            | H               | 3.0      | -21.1                   | 36.7   | 1.0        | -56.8 | -13.0 | -43.8 |       |
| 7.53                           | -74.1            | H               | 3.0      | -20.2                   | 35.9   | 1.0        | -55.1 | -13.0 | -42.1 |       |
| 3.77                           | -68.9            | V               | 3.0      | -21.1                   | 37.3   | 1.0        | -57.5 | -13.0 | -44.5 |       |
| 5.65                           | -71.8            | V               | 3.0      | -20.6                   | 36.7   | 1.0        | -56.3 | -13.0 | -43.3 |       |
| 7.53                           | -73.3            | V               | 3.0      | -19.7                   | 35.9   | 1.0        | -54.6 | -13.0 | -41.6 |       |
| <b>High Channel (1905MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.81                           | -69.1            | H               | 3.0      | -21.2                   | 37.3   | 1.0        | -57.5 | -13.0 | -44.5 |       |
| 5.72                           | -72.2            | H               | 3.0      | -20.9                   | 36.7   | 1.0        | -56.7 | -13.0 | -43.7 |       |
| 7.62                           | -73.2            | H               | 3.0      | -19.2                   | 35.8   | 1.0        | -54.1 | -13.0 | -41.1 |       |
| 3.81                           | -69.7            | V               | 3.0      | -21.8                   | 37.3   | 1.0        | -58.1 | -13.0 | -45.1 |       |
| 5.72                           | -72.6            | V               | 3.0      | -21.4                   | 36.7   | 1.0        | -57.1 | -13.0 | -44.1 |       |
| 7.62                           | -73.7            | V               | 3.0      | -20.0                   | 35.8   | 1.0        | -54.8 | -13.0 | -41.8 |       |

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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 #:** 11792476  
**Date:** 06/06/17  
**Test Engineer:** 45200  
**Configuration:** EUT Only  
**Mode:** LTE Band 26 (90S), 10MHz QPSK

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

Chamber

3m Chamber H

Pre-amplifier

3m Chamber H

Filter

Filter

Limit

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                 | -61.9            | H               | 3.0      | -21.6                   | 37.7   | 1.0        | -58.4 | -13.0 | -45.4 |       |
| 2.46                 | -61.7            | H               | 3.0      | -17.7                   | 37.0   | 1.0        | -53.8 | -13.0 | -40.8 |       |
| 3.28                 | -62.2            | H               | 3.0      | -14.4                   | 37.9   | 1.0        | -51.3 | -13.0 | -38.3 |       |
| 1.64                 | -61.9            | V               | 3.0      | -21.4                   | 37.7   | 1.0        | -58.1 | -13.0 | -45.1 |       |
| 2.46                 | -60.6            | V               | 3.0      | -16.5                   | 37.0   | 1.0        | -52.6 | -13.0 | -39.6 |       |
| 3.28                 | -63.1            | V               | 3.0      | -16.3                   | 37.9   | 1.0        | -53.2 | -13.0 | -40.2 |       |

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**16QAM LTE BAND 26 (10.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 06/06/17  
**Test Engineer:** 45200  
**Configuration:** EUT Only  
**Mode:** LTE Band 26 (90S), 10MHz 16QAM

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

**Chamber**

3m Chamber H

**Pre-amplifier**

3m Chamber H

**Filter**

Filter

**Limit**

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                 | -62.6            | H               | 3.0      | -22.2                   | 37.7   | 1.0        | -59.0 | -13.0 | -46.0 |       |
| 2.46                 | -60.9            | H               | 3.0      | -17.0                   | 37.0   | 1.0        | -53.0 | -13.0 | -40.0 |       |
| 3.28                 | -62.6            | H               | 3.0      | -14.8                   | 37.9   | 1.0        | -51.7 | -13.0 | -38.7 |       |
| 1.64                 | -62.5            | V               | 3.0      | -21.9                   | 37.7   | 1.0        | -58.7 | -13.0 | -45.7 |       |
| 2.46                 | -61.6            | V               | 3.0      | -17.5                   | 37.0   | 1.0        | -53.6 | -13.0 | -40.6 |       |
| 3.28                 | -62.9            | V               | 3.0      | -16.1                   | 37.9   | 1.0        | -53.0 | -13.0 | -40.0 |       |

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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 #:** 11792476  
**Date:** 06/06/17  
**Test Engineer:** 45200  
**Configuration:** EUT Only  
**Mode:** LTE Band 30, 10MHz QPSK

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

Chamber

3m Chamber H

Pre-amplifier

3m Chamber H

Filter

Filter

Limit

LTE B30

| Frequency (GHz)              | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Mid Channel (2310MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 4.62                         | -73.2            | H               | 3.0      | -19.4                   | 37.9   | 1.0        | -56.4 | -40.0 | -16.4 |       |
| 6.93                         | -75.8            | H               | 3.0      | -17.2                   | 36.5   | 1.0        | -52.6 | -40.0 | -12.6 |       |
| 9.24                         | -76.8            | H               | 3.0      | -15.3                   | 34.9   | 1.0        | -49.2 | -40.0 | -9.2  |       |
| 4.62                         | -72.1            | V               | 3.0      | -18.4                   | 37.9   | 1.0        | -55.3 | -40.0 | -15.3 |       |
| 6.93                         | -75.4            | V               | 3.0      | -16.0                   | 36.5   | 1.0        | -51.4 | -40.0 | -11.4 |       |
| 9.24                         | -76.0            | V               | 3.0      | -14.2                   | 34.9   | 1.0        | -48.1 | -40.0 | -8.1  |       |

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**16QAM LTE BAND 30 (10.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 06/06/17  
**Test Engineer:** 45200  
**Configuration:** EUT Only  
**Mode:** LTE Band 30, 10MHz 16QAM

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

**Chamber**  
 3m Chamber A

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 LTE B30

| Frequency<br>(GHz)           | SA reading<br>(dBm) | Ant. Pol.<br>(H/V) | Distance | EIRP @ TX<br>Ant End<br>(dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|------------------------------|---------------------|--------------------|----------|-------------------------------|--------|------------|-------|-------|-------|-------|
| <b>Mid Channel (2310MHz)</b> |                     |                    |          |                               |        |            |       |       |       |       |
| 4.62                         | -73.2               | H                  | 3.0      | -19.4                         | 37.9   | 1.0        | -56.4 | -40.0 | -16.4 |       |
| 6.93                         | -75.0               | H                  | 3.0      | -16.4                         | 36.5   | 1.0        | -51.8 | -40.0 | -11.8 |       |
| 9.24                         | -77.0               | H                  | 3.0      | -15.5                         | 34.9   | 1.0        | -49.3 | -40.0 | -9.3  |       |
| 4.62                         | -72.5               | V                  | 3.0      | -18.7                         | 37.9   | 1.0        | -55.6 | -40.0 | -15.6 |       |
| 6.93                         | -75.1               | V                  | 3.0      | -15.6                         | 36.5   | 1.0        | -51.0 | -40.0 | -11.0 |       |
| 9.24                         | -76.4               | V                  | 3.0      | -14.6                         | 34.9   | 1.0        | -48.5 | -40.0 | -8.5  |       |

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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 #:** 11792476  
**Date:** 06/06/17  
**Test Engineer:** 45200  
**Configuration:** EUT Only  
**Mode:** LTE Band 41, 20MHz QPSK

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 LTE B41

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (2506MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 5.01                          | -62.6            | H               | 3.0      | -12.5                   | 36.9   | 1.0        | -48.4 | -25.0 | -23.4 |       |
| 7.52                          | -66.1            | H               | 3.0      | -12.3                   | 35.9   | 1.0        | -47.2 | -25.0 | -22.2 |       |
| 10.02                         | -67.2            | H               | 3.0      | -10.6                   | 33.7   | 1.0        | -43.3 | -25.0 | -18.3 |       |
| 5.01                          | -62.9            | V               | 3.0      | -12.7                   | 36.9   | 1.0        | -48.6 | -25.0 | -23.6 |       |
| 7.52                          | -66.1            | V               | 3.0      | -12.5                   | 35.9   | 1.0        | -47.4 | -25.0 | -22.4 |       |
| 10.02                         | -67.2            | V               | 3.0      | -11.0                   | 33.7   | 1.0        | -43.7 | -25.0 | -18.7 |       |
| <b>Mid Channel (2593MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 5.19                          | -63.7            | H               | 3.0      | -13.3                   | 36.8   | 1.0        | -49.2 | -25.0 | -24.2 |       |
| 7.78                          | -66.3            | H               | 3.0      | -12.1                   | 35.7   | 1.0        | -46.8 | -25.0 | -21.8 |       |
| 10.37                         | -66.7            | H               | 3.0      | -10.0                   | 33.7   | 1.0        | -42.7 | -25.0 | -17.7 |       |
| 5.19                          | -63.1            | V               | 3.0      | -12.5                   | 36.8   | 1.0        | -48.4 | -25.0 | -23.4 |       |
| 7.78                          | -65.0            | V               | 3.0      | -11.1                   | 35.7   | 1.0        | -45.8 | -25.0 | -20.8 |       |
| 10.37                         | -66.4            | V               | 3.0      | -10.1                   | 33.7   | 1.0        | -42.8 | -25.0 | -17.8 |       |
| <b>High Channel (2680MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 5.36                          | -64.5            | H               | 3.0      | -13.9                   | 36.8   | 1.0        | -49.7 | -25.0 | -24.7 |       |
| 8.04                          | -65.9            | H               | 3.0      | -11.5                   | 35.4   | 1.0        | -46.0 | -25.0 | -21.0 |       |
| 10.72                         | -67.0            | H               | 3.0      | -10.1                   | 33.7   | 1.0        | -42.8 | -25.0 | -17.8 |       |
| 5.36                          | -63.6            | V               | 3.0      | -12.8                   | 36.8   | 1.0        | -48.6 | -25.0 | -23.6 |       |
| 8.04                          | -66.3            | V               | 3.0      | -12.2                   | 35.4   | 1.0        | -46.6 | -25.0 | -21.6 |       |
| 10.72                         | -66.4            | V               | 3.0      | -10.0                   | 33.7   | 1.0        | -42.7 | -25.0 | -17.7 |       |

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**16QAM LTE BAND 41 (20.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 06/06/17  
**Test Engineer:** 45200  
**Configuration:** EUT Only  
**Mode:** LTE Band 41, 20MHz 16QAM

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

**Chamber**  
 3m Chamber H

**Pre-amplifier**  
 3m Chamber H

**Filter**  
 Filter

**Limit**  
 LTE B41

| Frequency (GHz)               | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|-------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (2506MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 5.01                          | -62.8            | H               | 3.0      | -12.8                   | 36.9   | 1.0        | -48.7 | -25.0 | -23.7 |       |
| 7.52                          | -65.8            | H               | 3.0      | -12.0                   | 35.9   | 1.0        | -46.9 | -25.0 | -21.9 |       |
| 10.02                         | -66.7            | H               | 3.0      | -10.1                   | 33.7   | 1.0        | -42.8 | -25.0 | -17.8 |       |
| 5.01                          | -62.9            | V               | 3.0      | -12.7                   | 36.9   | 1.0        | -48.6 | -25.0 | -23.6 |       |
| 7.52                          | -66.5            | V               | 3.0      | -12.9                   | 35.9   | 1.0        | -47.8 | -25.0 | -22.8 |       |
| 10.02                         | -67.2            | V               | 3.0      | -11.0                   | 33.7   | 1.0        | -43.6 | -25.0 | -18.6 |       |
| <b>Mid Channel (2593MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 5.19                          | -63.3            | H               | 3.0      | -13.0                   | 36.8   | 1.0        | -48.8 | -25.0 | -23.8 |       |
| 7.78                          | -64.6            | H               | 3.0      | -10.5                   | 35.7   | 1.0        | -45.2 | -25.0 | -20.2 |       |
| 10.37                         | -66.6            | H               | 3.0      | -9.9                    | 33.7   | 1.0        | -42.6 | -25.0 | -17.6 |       |
| 5.19                          | -63.7            | V               | 3.0      | -13.2                   | 36.8   | 1.0        | -49.0 | -25.0 | -24.0 |       |
| 7.78                          | -65.4            | V               | 3.0      | -11.6                   | 35.7   | 1.0        | -46.2 | -25.0 | -21.2 |       |
| 10.37                         | -67.0            | V               | 3.0      | -10.7                   | 33.7   | 1.0        | -43.4 | -25.0 | -18.4 |       |
| <b>High Channel (2680MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 5.36                          | -63.2            | H               | 3.0      | -12.6                   | 36.8   | 1.0        | -48.4 | -25.0 | -23.4 |       |
| 8.04                          | -65.1            | H               | 3.0      | -10.7                   | 35.4   | 1.0        | -45.1 | -25.0 | -20.1 |       |
| 10.72                         | -66.3            | H               | 3.0      | -9.4                    | 33.7   | 1.0        | -42.2 | -25.0 | -17.2 |       |
| 5.36                          | -63.3            | V               | 3.0      | -12.5                   | 36.8   | 1.0        | -48.3 | -25.0 | -23.3 |       |
| 8.04                          | -66.4            | V               | 3.0      | -12.3                   | 35.4   | 1.0        | -46.7 | -25.0 | -21.7 |       |
| 10.72                         | -66.3            | V               | 3.0      | -9.9                    | 33.7   | 1.0        | -42.6 | -25.0 | -17.6 |       |

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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 #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 30606  
**Configuration:** EUT Only  
**Mode:** LTE Band 66, 20MHz QPSK

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

Chamber

3m Chamber H

Pre-amplifier

3m Chamber H

Filter

Filter

Limit

EIRP

| Frequency (GHz)                 | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|---------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1720.0MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.44                            | -70.4            | H               | 3.0      | -22.5                   | 37.7   | 1.0        | -59.2 | -13.0 | -46.2 |       |
| 5.16                            | -71.2            | H               | 3.0      | -20.9                   | 36.8   | 1.0        | -56.8 | -13.0 | -43.8 |       |
| 6.88                            | -73.4            | H               | 3.0      | -20.3                   | 36.4   | 1.0        | -55.8 | -13.0 | -42.8 |       |
| 3.44                            | -70.1            | V               | 3.0      | -23.0                   | 37.7   | 1.0        | -59.7 | -13.0 | -46.7 |       |
| 5.16                            | -70.8            | V               | 3.0      | -20.3                   | 36.8   | 1.0        | -56.2 | -13.0 | -43.2 |       |
| 6.88                            | -72.9            | V               | 3.0      | -20.0                   | 36.4   | 1.0        | -55.4 | -13.0 | -42.4 |       |
| <b>Mid Channel (1745.0MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.49                            | -70.6            | H               | 3.0      | -22.8                   | 37.6   | 1.0        | -59.4 | -13.0 | -46.4 |       |
| 5.24                            | -72.7            | H               | 3.0      | -22.3                   | 36.8   | 1.0        | -58.1 | -13.0 | -45.1 |       |
| 6.98                            | -73.1            | H               | 3.0      | -19.9                   | 36.4   | 1.0        | -55.3 | -13.0 | -42.3 |       |
| 3.49                            | -70.3            | V               | 3.0      | -23.1                   | 37.6   | 1.0        | -59.8 | -13.0 | -46.8 |       |
| 5.24                            | -72.5            | V               | 3.0      | -21.9                   | 36.8   | 1.0        | -57.8 | -13.0 | -44.8 |       |
| 6.98                            | -73.9            | V               | 3.0      | -20.8                   | 36.4   | 1.0        | -56.2 | -13.0 | -43.2 |       |
| <b>High Channel (1770.0MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 3.54                            | -71.7            | H               | 3.0      | -23.8                   | 37.6   | 1.0        | -60.4 | -13.0 | -47.4 |       |
| 5.31                            | -73.0            | H               | 3.0      | -22.4                   | 36.8   | 1.0        | -58.2 | -13.0 | -45.2 |       |
| 7.08                            | -73.7            | H               | 3.0      | -20.4                   | 36.3   | 1.0        | -55.7 | -13.0 | -42.7 |       |
| 3.54                            | -70.7            | V               | 3.0      | -23.4                   | 37.6   | 1.0        | -60.0 | -13.0 | -47.0 |       |
| 5.31                            | -72.2            | V               | 3.0      | -21.5                   | 36.8   | 1.0        | -57.3 | -13.0 | -44.3 |       |
| 7.08                            | -72.7            | V               | 3.0      | -19.5                   | 36.3   | 1.0        | -54.8 | -13.0 | -41.8 |       |

Rev. 02.24.17

**16QAM LTE BAND 66 (20.0MHZ BANDWIDTH)**

**High Frequency Substitution Measurement**  
**UL Fremont Radiated Chamber**

**Company:**  
**Project #:** 11792476  
**Date:** 06/05/17  
**Test Engineer:** 30606  
**Configuration:** EUT Only  
**Mode:** LTE Band 66, 20MHz 16QAM

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

Chamber

3m Chamber H

Pre-amplifier

3m Chamber H

Filter

Filter

Limit

EIRP

| Frequency (GHz)                 | SA reading (dBm) | Ant. Pol. (H/V) | Distance | EIRP @ TX Ant End (dBm) | Preamp | Attenuator | EIRP  | Limit | Delta | Notes |
|---------------------------------|------------------|-----------------|----------|-------------------------|--------|------------|-------|-------|-------|-------|
| <b>Low Channel (1720.0MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.44                            | -70.3            | H               | 3.0      | -22.5                   | 37.7   | 1.0        | -59.2 | -13.0 | -46.2 |       |
| 5.16                            | -71.4            | H               | 3.0      | -21.1                   | 36.8   | 1.0        | -57.0 | -13.0 | -44.0 |       |
| 6.88                            | -73.0            | H               | 3.0      | -19.9                   | 36.4   | 1.0        | -55.4 | -13.0 | -42.4 |       |
| 3.44                            | -70.6            | V               | 3.0      | -23.5                   | 37.7   | 1.0        | -60.2 | -13.0 | -47.2 |       |
| 5.16                            | -71.7            | V               | 3.0      | -21.2                   | 36.8   | 1.0        | -57.0 | -13.0 | -44.0 |       |
| 6.88                            | -73.9            | V               | 3.0      | -20.9                   | 36.4   | 1.0        | -56.4 | -13.0 | -43.4 |       |
| <b>Mid Channel (1745.0MHz)</b>  |                  |                 |          |                         |        |            |       |       |       |       |
| 3.49                            | -70.5            | H               | 3.0      | -22.7                   | 37.6   | 1.0        | -59.3 | -13.0 | -46.3 |       |
| 5.24                            | -72.2            | H               | 3.0      | -21.8                   | 36.8   | 1.0        | -57.6 | -13.0 | -44.6 |       |
| 6.98                            | -73.8            | H               | 3.0      | -20.6                   | 36.4   | 1.0        | -56.0 | -13.0 | -43.0 |       |
| 3.49                            | -70.2            | V               | 3.0      | -23.0                   | 37.6   | 1.0        | -59.6 | -13.0 | -46.6 |       |
| 5.24                            | -72.7            | V               | 3.0      | -22.1                   | 36.8   | 1.0        | -58.0 | -13.0 | -45.0 |       |
| 6.98                            | -73.7            | V               | 3.0      | -20.6                   | 36.4   | 1.0        | -56.0 | -13.0 | -43.0 |       |
| <b>High Channel (1770.0MHz)</b> |                  |                 |          |                         |        |            |       |       |       |       |
| 3.54                            | -71.4            | H               | 3.0      | -23.5                   | 37.6   | 1.0        | -60.1 | -13.0 | -47.1 |       |
| 5.31                            | -72.7            | H               | 3.0      | -22.1                   | 36.8   | 1.0        | -57.9 | -13.0 | -44.9 |       |
| 7.08                            | -73.4            | H               | 3.0      | -20.1                   | 36.3   | 1.0        | -55.4 | -13.0 | -42.4 |       |
| 3.54                            | -70.7            | V               | 3.0      | -23.4                   | 37.6   | 1.0        | -60.0 | -13.0 | -47.0 |       |
| 5.31                            | -72.9            | V               | 3.0      | -22.2                   | 36.8   | 1.0        | -58.0 | -13.0 | -45.0 |       |
| 7.08                            | -73.5            | V               | 3.0      | -20.3                   | 36.3   | 1.0        | -55.6 | -13.0 | -42.6 |       |

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