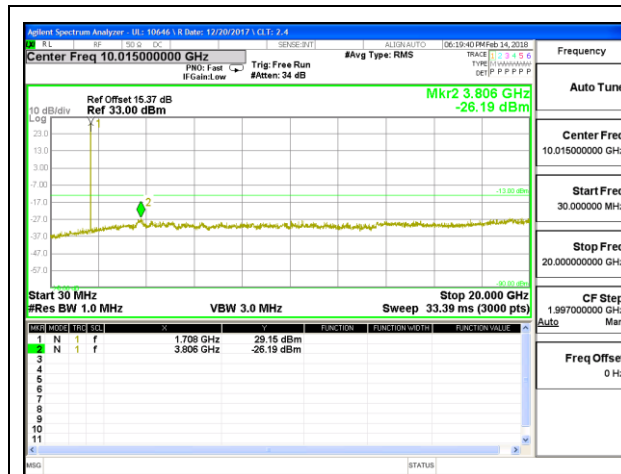
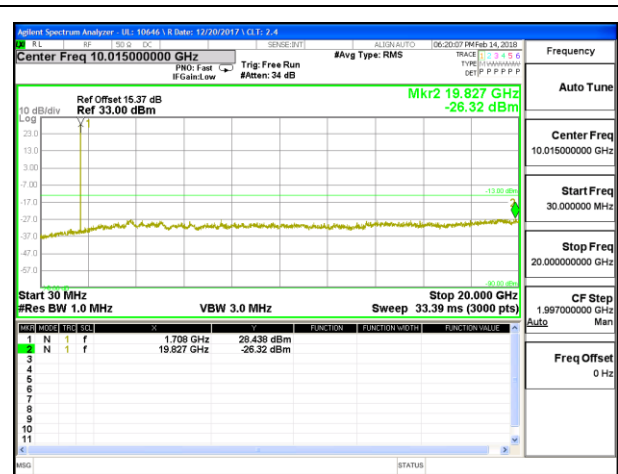
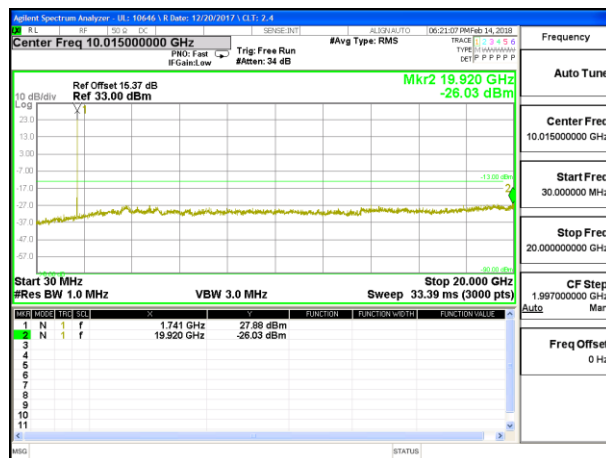




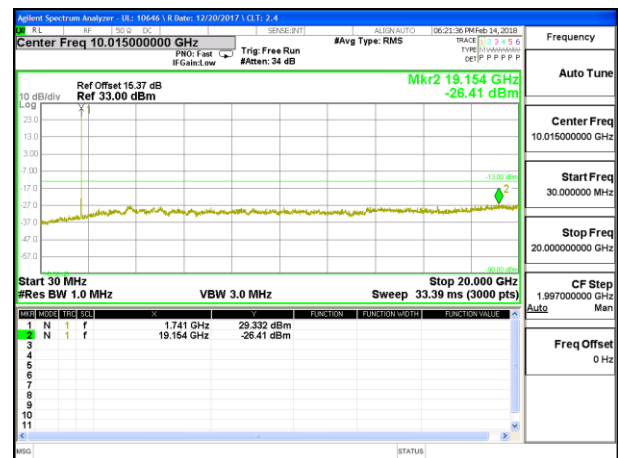
LTE B66 10MHz QPSK Low Channel RB1-0



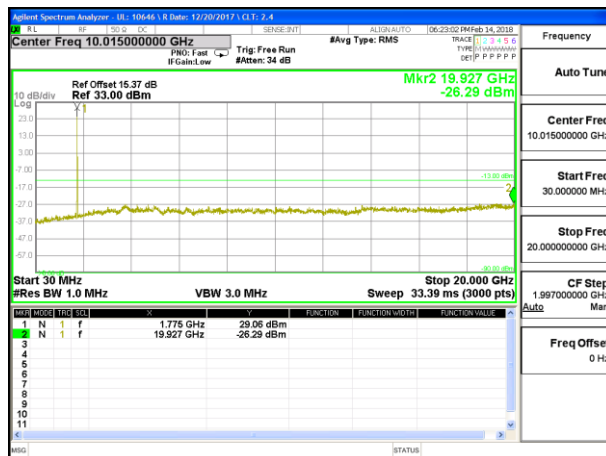
LTE B66 10MHz 16QAM Low Channel RB1-0



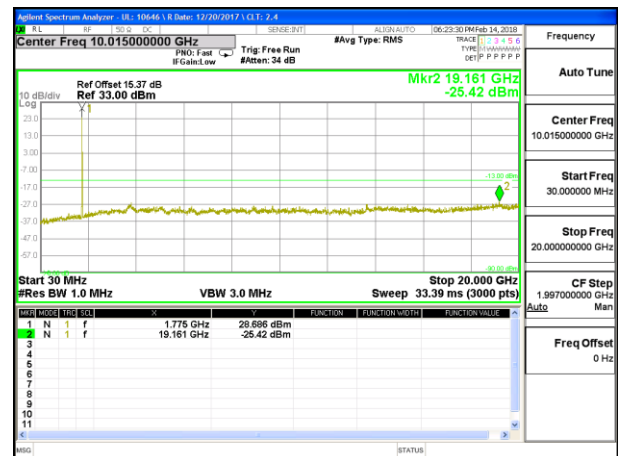
LTE B66 10MHz QPSK Middle Channel RB1-0



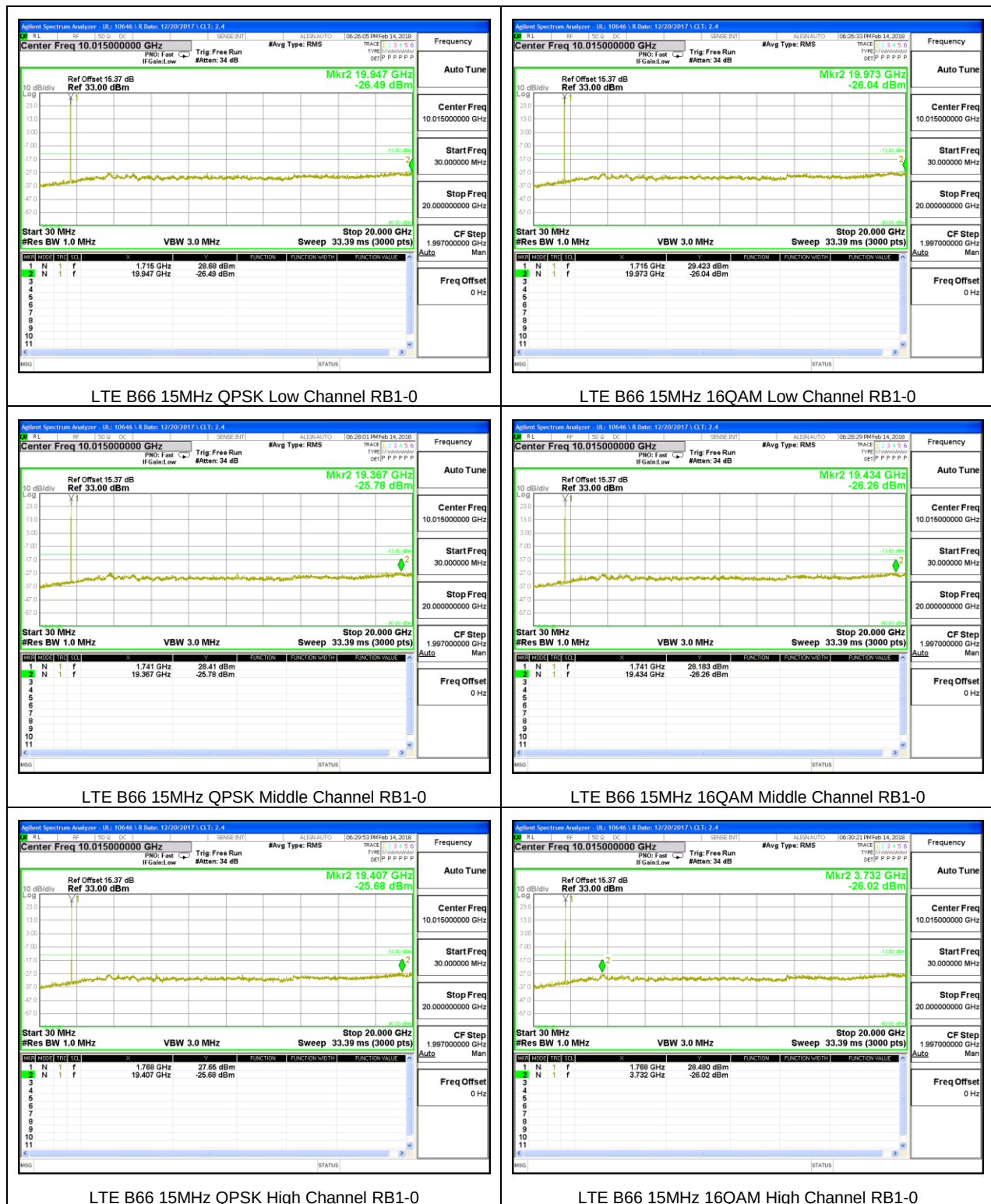
LTE B66 10MHz 16QAM Middle Channel RB1-0

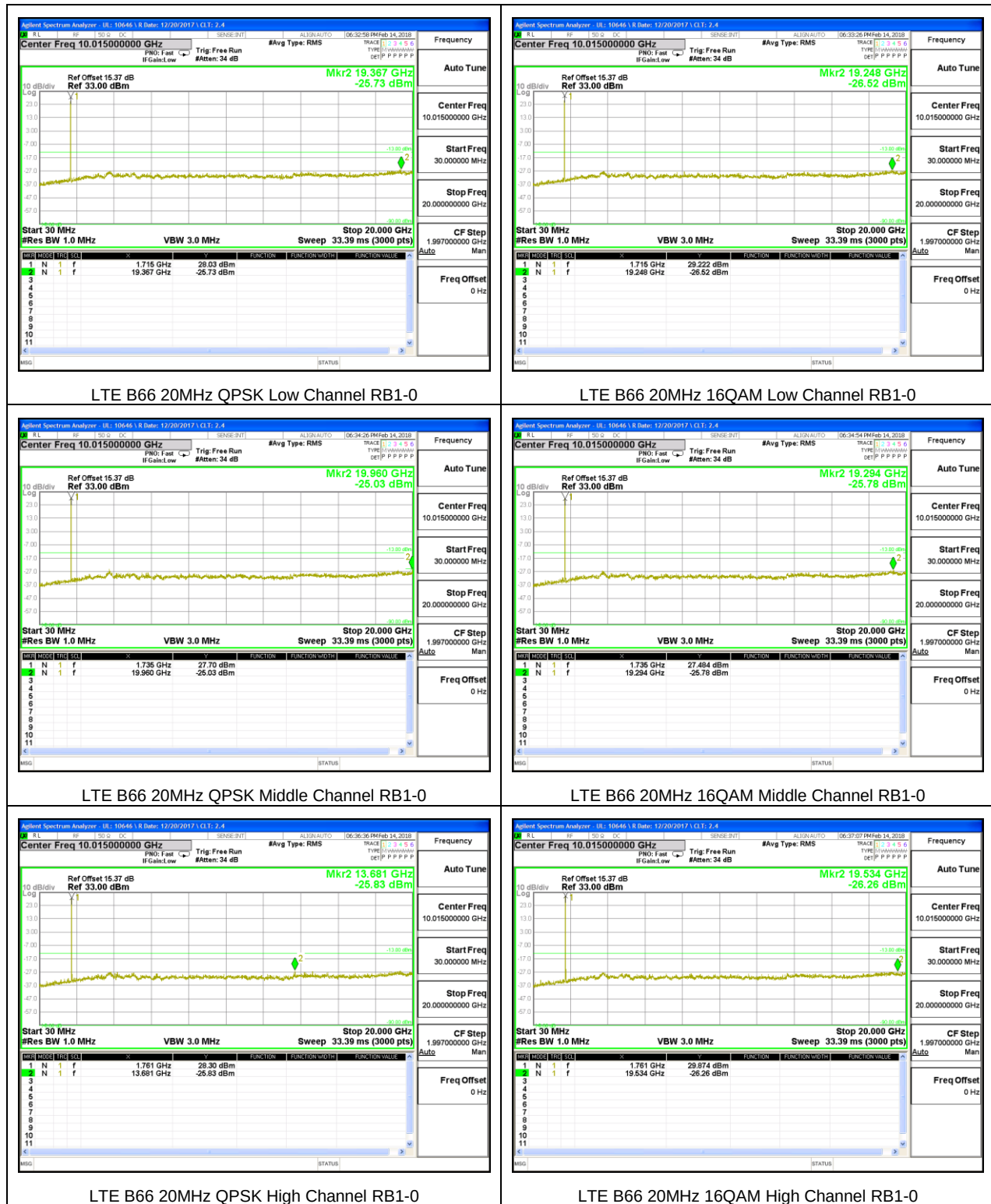


LTE B66 10MHz QPSK High Channel RB1-0

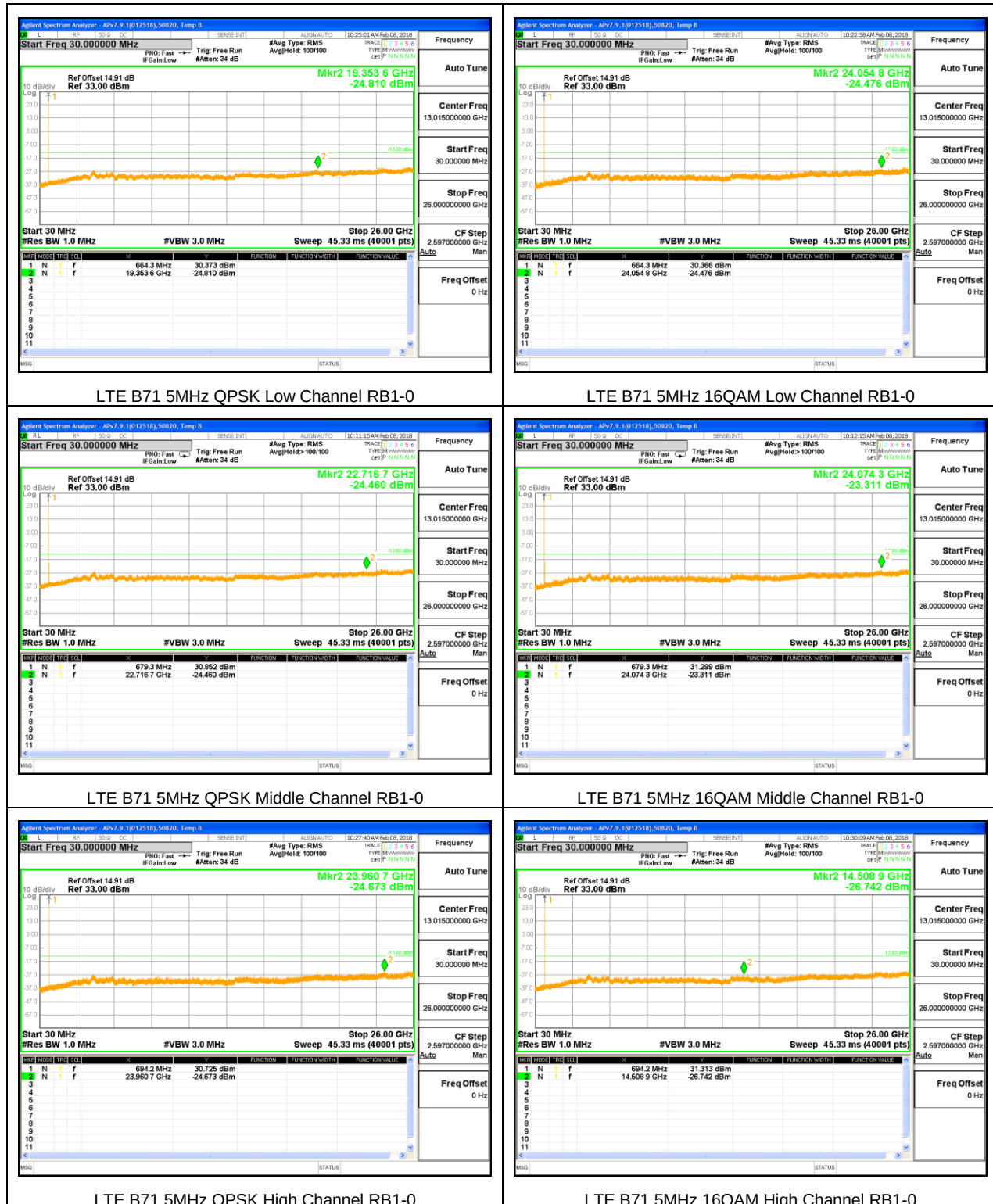


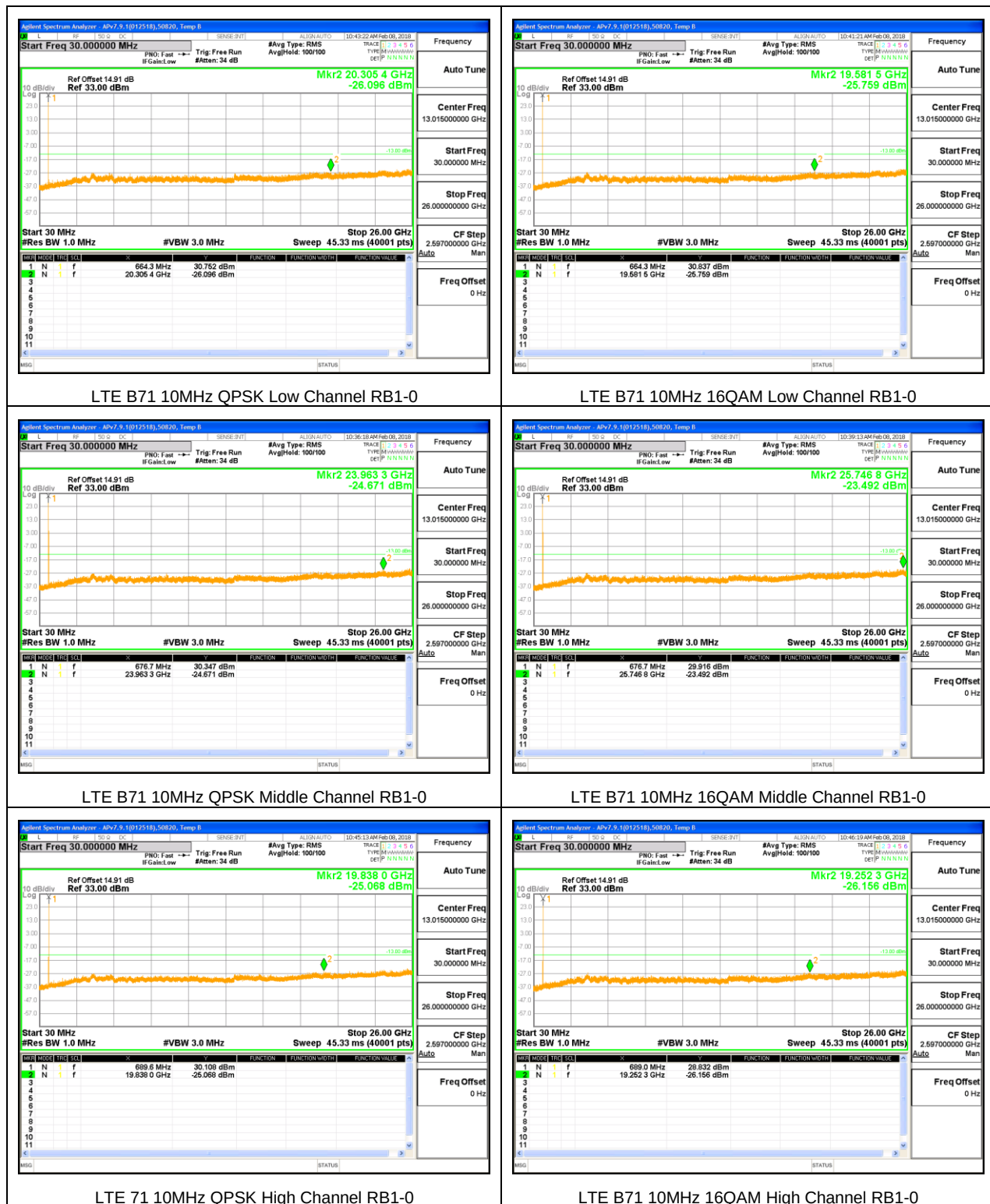
LTE B66 10MHz 16QAM High Channel RB1-0

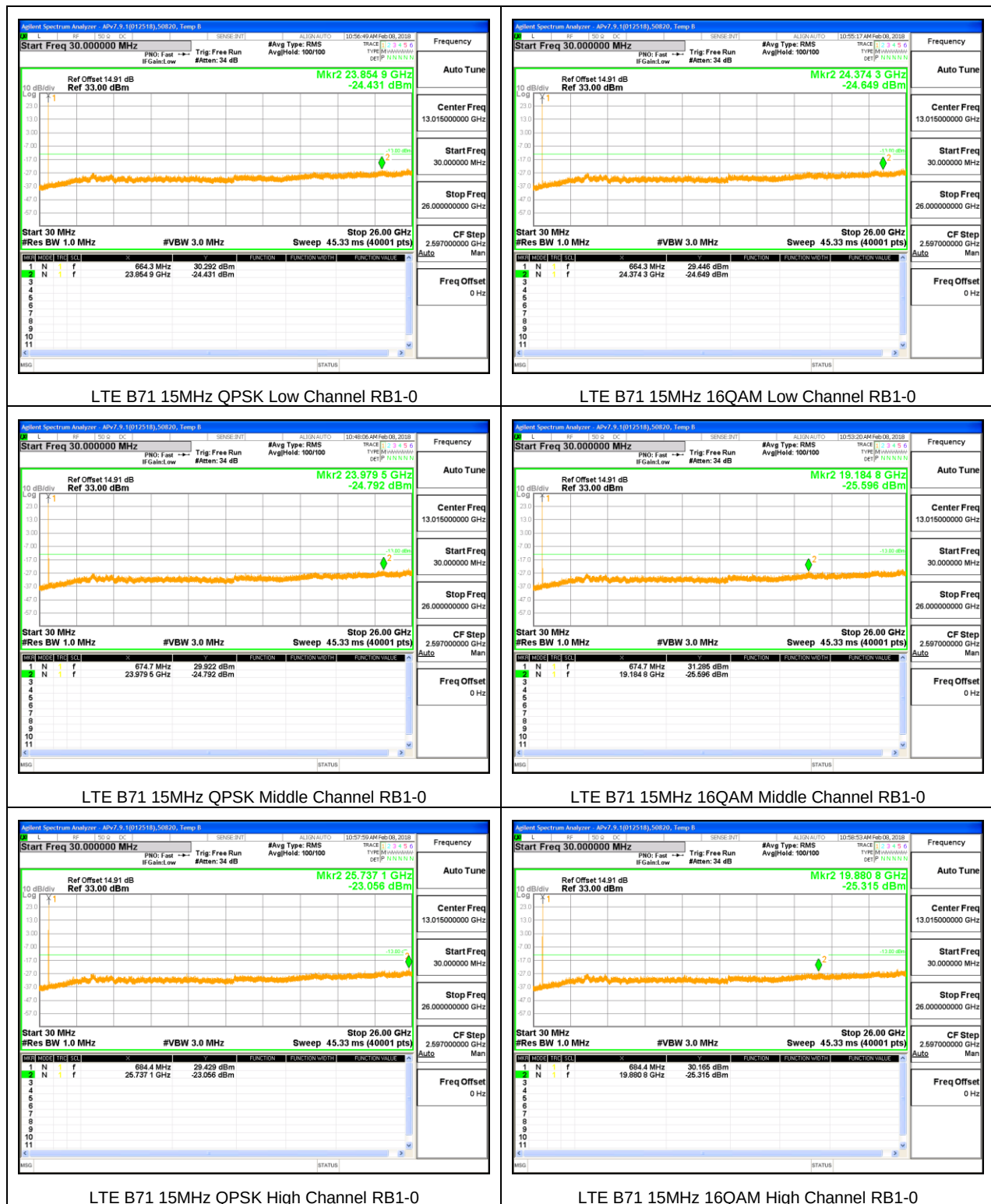




### 8.3.13. ANT 1, LTE BAND 71









## 8.4. FREQUENCY STABILITY

### RULE PART(S)

§2.1055, §22.355, §24.235, §27.54, §90.213 and §90.539

### LIMITS

FCC: §22.355, §90.213

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

FCC: §90.539

(e) The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 ppm or better when AFC is locked to a base station, and 5 ppm or better when AFC is not locked.

FCC: §24.235 & §27.54

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

### TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. =  $-30^{\circ}\text{C}$  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 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 14
- LTE Band 17

- LTE Band 25
- LTE Band 26
- LTE Band 30
- LTE Band 41
- LTE Band 66
- LTE Band 71

## **RESULTS**

See the following pages.

### 8.4.1. LTE BAND 2

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 12491 | <b>Date:</b> | 3/13/18 |
|------------|-------|--------------|---------|

#### 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    | 1851.0028                  | 1909.3342                   |               |                                 |
| Extreme (50C)  |           | 1851.0029                  | 1909.3343                   | 35.2          | 0.019                           |
| Extreme (40C)  |           | 1851.0028                  | 1909.3342                   | -34.0         | -0.018                          |
| Extreme (30C)  |           | 1851.0028                  | 1909.3342                   | -53.5         | -0.028                          |
| Extreme (10C)  |           | 1851.0027                  | 1909.3341                   | -115.7        | -0.062                          |
| Extreme (0C)   |           | 1851.0029                  | 1909.3343                   | 56.7          | 0.030                           |
| Extreme (-10C) |           | 1851.0029                  | 1909.3343                   | 43.9          | 0.023                           |
| Extreme (-20C) |           | 1851.0028                  | 1909.3343                   | 28.1          | 0.015                           |
| Extreme (-30C) |           | 1851.0028                  | 1909.3343                   | 27.0          | 0.014                           |
|                |           |                            |                             |               |                                 |
| 20C            | 15%       | 1851.0028                  | 1909.3342                   | -40.6         | -0.022                          |
|                | -15%      | 1851.0028                  | 1909.3342                   | -44.2         | -0.024                          |
|                | End Point | 1851.0028                  | 1909.3342                   | -42.4         | -0.023                          |

### 8.4.2. LTE BAND 5

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 12491 | <b>Date:</b> | 3/13/18 |
|------------|-------|--------------|---------|

#### 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    | 824.9045                   | 848.8125                    |               |                                 |
| Extreme (50C)  |           | 824.9045                   | 848.8125                    | 30.0          | 0.036                           |
| Extreme (40C)  |           | 824.9045                   | 848.8125                    | 32.2          | 0.038                           |
| Extreme (30C)  |           | 824.9046                   | 848.8125                    | 63.4          | 0.076                           |
| Extreme (10C)  |           | 824.9045                   | 848.8125                    | 39.2          | 0.047                           |
| Extreme (0C)   |           | 824.9046                   | 848.8125                    | 58.2          | 0.070                           |
| Extreme (-10C) |           | 824.9045                   | 848.8125                    | 18.1          | 0.022                           |
| Extreme (-20C) |           | 824.9045                   | 848.8125                    | 14.5          | 0.017                           |
| Extreme (-30C) |           | 824.9045                   | 848.8125                    | 28.0          | 0.033                           |
|                |           |                            |                             |               |                                 |
| 20C            | 15%       | 824.9046                   | 848.8125                    | 44.2          | 0.053                           |
|                | -15%      | 824.9046                   | 848.8125                    | 45.1          | 0.054                           |
|                | End Point | 824.9046                   | 848.8125                    | 45.7          | 0.055                           |

### 8.4.3. LTE BAND 7

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 12491 | <b>Date:</b> | 3/13/18 |
|------------|-------|--------------|---------|

#### QPSK, (20MHz BANDWIDTH)

| Limit          |           | 2500                       | 2570                        | 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    | 2500.3493                  | 2566.5345                   |               |                                 |
| Extreme (50C)  |           | 2500.3493                  | 2566.5345                   | 20.7          | 0.008                           |
| Extreme (40C)  |           | 2500.3493                  | 2566.5345                   | 45.7          | 0.018                           |
| Extreme (30C)  |           | 2500.3493                  | 2566.5345                   | 24.8          | 0.010                           |
| Extreme (10C)  |           | 2500.3493                  | 2566.5346                   | 70.1          | 0.028                           |
| Extreme (0C)   |           | 2500.3493                  | 2566.5345                   | 54.4          | 0.021                           |
| Extreme (-10C) |           | 2500.3493                  | 2566.5345                   | 30.6          | 0.012                           |
| Extreme (-20C) |           | 2500.3493                  | 2566.5345                   | 34.5          | 0.014                           |
| Extreme (-30C) |           | 2500.3493                  | 2566.5345                   | 20.7          | 0.008                           |
|                |           |                            |                             |               |                                 |
| 20C            | 15%       | 2500.3493                  | 2566.5345                   | 30.1          | 0.012                           |
|                | -15%      | 2500.3493                  | 2566.5345                   | 31.3          | 0.012                           |
|                | End Point | 2500.3493                  | 2566.5345                   | 33.2          | 0.013                           |

### 8.4.4. LTE BAND 12

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 12491 | <b>Date:</b> | 3/13/18 |
|------------|-------|--------------|---------|

#### QPSK, (10MHz BANDWIDTH)

| Limit          |           | 699                        | 716                         | 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    | 699.5368                   | 715.5109                    |               |                                 |
| Extreme (50C)  |           | 699.5369                   | 715.5109                    | 42.9          | 0.061                           |
| Extreme (40C)  |           | 699.5368                   | 715.5108                    | -48.0         | -0.068                          |
| Extreme (30C)  |           | 699.5367                   | 715.5108                    | -65.6         | -0.093                          |
| Extreme (10C)  |           | 699.5368                   | 715.5109                    | 9.4           | 0.013                           |
| Extreme (0C)   |           | 699.5367                   | 715.5108                    | -65.2         | -0.092                          |
| Extreme (-10C) |           | 699.5368                   | 715.5108                    | -28.9         | -0.041                          |
| Extreme (-20C) |           | 699.5369                   | 715.5109                    | 38.7          | 0.055                           |
| Extreme (-30C) |           | 699.5368                   | 715.5109                    | 19.1          | 0.027                           |
|                |           |                            |                             |               |                                 |
| 20C            | 15%       | 699.5368                   | 715.5108                    | -33.8         | -0.048                          |
|                | -15%      | 699.5368                   | 715.5108                    | -30.3         | -0.043                          |
|                | End Point | 699.5368                   | 715.5108                    | -35.4         | -0.050                          |

### 8.4.5. LTE BAND 13

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 12491 | <b>Date:</b> | 3/13/18 |
|------------|-------|--------------|---------|

#### QPSK, (10MHz BANDWIDTH)

| Limit          |           | 777                        | 787                         | 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    | 777.1201                   | 786.8402                    |               |                                 |
| Extreme (50C)  |           | 777.1200                   | 786.8401                    | -76.1         | -0.097                          |
| Extreme (40C)  |           | 777.1201                   | 786.8402                    | -17.3         | -0.022                          |
| Extreme (30C)  |           | 777.1201                   | 786.8402                    | 12.9          | 0.016                           |
| Extreme (10C)  |           | 777.1201                   | 786.8402                    | 14.3          | 0.018                           |
| Extreme (0C)   |           | 777.1202                   | 786.8403                    | 70.8          | 0.091                           |
| Extreme (-10C) |           | 777.1200                   | 786.8401                    | -57.9         | -0.074                          |
| Extreme (-20C) |           | 777.1201                   | 786.8402                    | 31.7          | 0.041                           |
| Extreme (-30C) |           | 777.1201                   | 786.8402                    | 46.3          | 0.059                           |
|                |           |                            |                             |               |                                 |
| 20C            | 15%       | 777.1201                   | 786.8402                    | 13.9          | 0.018                           |
|                | -15%      | 777.1201                   | 786.8402                    | 14.0          | 0.018                           |
|                | End Point | 777.1201                   | 786.8402                    | 13.9          | 0.018                           |

### 8.4.6. LTE BAND 14

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 12491 | <b>Date:</b> | 3/13/18 |
|------------|-------|--------------|---------|

#### QPSK, (10MHz BANDWIDTH)

| Limit          |           | 788                        | 798                         | 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    | 788.1113                   | 797.8750                    |               |                                 |
| Extreme (50C)  |           | 788.1113                   | 797.8749                    | -34.2         | -0.043                          |
| Extreme (40C)  |           | 788.1113                   | 797.8750                    | 34.2          | 0.043                           |
| Extreme (30C)  |           | 788.1112                   | 797.8749                    | -40.0         | -0.050                          |
| Extreme (10C)  |           | 788.1113                   | 797.8750                    | 28.5          | 0.036                           |
| Extreme (0C)   |           | 788.1113                   | 797.8750                    | 21.7          | 0.027                           |
| Extreme (-10C) |           | 788.1113                   | 797.8750                    | 19.1          | 0.024                           |
| Extreme (-20C) |           | 788.1113                   | 797.8750                    | 16.8          | 0.021                           |
| Extreme (-30C) |           | 788.1113                   | 797.8750                    | 11.0          | 0.014                           |
|                |           |                            |                             |               |                                 |
| 20C            | 15%       | 788.1113                   | 797.8750                    | 17.2          | 0.022                           |
|                | -15%      | 788.1113                   | 797.8750                    | 18.4          | 0.023                           |
|                | End Point | 788.1113                   | 797.8750                    | 19.3          | 0.024                           |

### 8.4.7. LTE BAND 17

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 10646 | <b>Date:</b> | 5/30/18 |
|------------|-------|--------------|---------|

#### 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    | 704.3340             | 715.6786              |            |                           |
| Extreme (50C)  |           | 704.3340             | 715.6786              | 42.9       | 0.060                     |
| Extreme (40C)  |           | 704.3339             | 715.6785              | -48.0      | -0.068                    |
| Extreme (30C)  |           | 704.3339             | 715.6785              | -65.6      | -0.092                    |
| Extreme (10C)  |           | 704.3340             | 715.6786              | 9.4        | 0.013                     |
| Extreme (0C)   |           | 704.3339             | 715.6785              | -65.2      | -0.092                    |
| Extreme (-10C) |           | 704.3340             | 715.6786              | -28.9      | -0.041                    |
| Extreme (-20C) |           | 704.3340             | 715.6786              | 38.7       | 0.054                     |
| Extreme (-30C) |           | 704.3340             | 715.6786              | 19.1       | 0.027                     |
|                |           |                      |                       |            |                           |
| 20C            | 15%       | 704.3340             | 715.6786              | -33.8      | -0.048                    |
|                | -15%      | 704.3340             | 715.6786              | -30.3      | -0.043                    |
|                | End Point | 704.3340             | 715.6786              | -35.4      | -0.050                    |

### 8.4.8. LTE BAND 25

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 10646 | <b>Date:</b> | 5/30/18 |
|------------|-------|--------------|---------|

#### QPSK, (20MHz BANDWIDTH)

| Limit          |           | 1850           | 1915            | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------|-----------------|------------|---------------------------|
| Condition      |           | F low @ -13dBm | F high @ -13dBm |            |                           |
| Temperature    | Voltage   | (MHz)          | (MHz)           |            |                           |
| Normal (20C)   | Normal    | 1850.8451      | 1914.1770       |            |                           |
| Extreme (50C)  |           | 1850.8451      | 1914.1770       | 35.2       | 0.019                     |
| Extreme (40C)  |           | 1850.8451      | 1914.1769       | -34.0      | -0.018                    |
| Extreme (30C)  |           | 1850.8450      | 1914.1769       | -53.5      | -0.028                    |
| Extreme (10C)  |           | 1850.8450      | 1914.1768       | -115.7     | -0.061                    |
| Extreme (0C)   |           | 1850.8451      | 1914.1770       | 56.7       | 0.030                     |
| Extreme (-10C) |           | 1850.8451      | 1914.1770       | 43.9       | 0.023                     |
| Extreme (-20C) |           | 1850.8451      | 1914.1770       | 28.1       | 0.015                     |
| Extreme (-30C) |           | 1850.8451      | 1914.1770       | 27.0       | 0.014                     |
|                |           |                |                 |            |                           |
| 20C            | 15%       | 1850.8450      | 1914.1769       | -40.6      | -0.022                    |
|                | -15%      | 1850.8450      | 1914.1769       | -44.2      | -0.023                    |
|                | End Point | 1850.8450      | 1914.1769       | -42.4      | -0.023                    |

### 8.4.9. LTE BAND 26 (PART 90S)

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 12491 | <b>Date:</b> | 3/13/18 |
|------------|-------|--------------|---------|

#### QPSK, (15MHz BANDWIDTH)

| Limit          |           | 824                  | 849                   | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition      |           | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) |            |                           |
| Temperature    | Voltage   |                      |                       |            |                           |
| Normal (20C)   | Normal    | 824.6352             | 823.6800              |            |                           |
| Extreme (50C)  |           | 824.6352             | 823.6800              | -32.0      | -0.038                    |
| Extreme (40C)  |           | 824.6353             | 823.6801              | 44.0       | 0.053                     |
| Extreme (30C)  |           | 824.6352             | 823.6800              | -45.3      | -0.054                    |
| Extreme (10C)  |           | 824.6353             | 823.6801              | 52.8       | 0.063                     |
| Extreme (0C)   |           | 824.6353             | 823.6801              | 25.8       | 0.031                     |
| Extreme (-10C) |           | 824.6352             | 823.6801              | 14.3       | 0.017                     |
| Extreme (-20C) |           | 824.6352             | 823.6801              | 15.2       | 0.018                     |
| Extreme (-30C) |           | 824.6352             | 823.6800              | -55.1      | -0.066                    |
|                |           |                      |                       |            |                           |
| 20C            | 15%       | 824.6352             | 823.6800              | 0.8        | 0.001                     |
|                | -15%      | 824.6353             | 823.6801              | 21.3       | 0.025                     |
|                | End Point | 824.6353             | 823.6801              | 21.6       | 0.026                     |

### 8.4.10. LTE BAND 30

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 12491 | <b>Date:</b> | 3/13/18 |
|------------|-------|--------------|---------|

#### 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    | 2305.4951            | 2314.5838             |            |                           |
| Extreme (50C)  |           | 2305.4951            | 2314.5838             | 27.4       | 0.012                     |
| Extreme (40C)  |           | 2305.4951            | 2314.5838             | 22.6       | 0.010                     |
| Extreme (30C)  |           | 2305.4951            | 2314.5838             | 38.1       | 0.016                     |
| Extreme (10C)  |           | 2305.4951            | 2314.5838             | 35.5       | 0.015                     |
| Extreme (0C)   |           | 2305.4951            | 2314.5838             | 42.9       | 0.019                     |
| Extreme (-10C) |           | 2305.4950            | 2314.5837             | -57.1      | -0.025                    |
| Extreme (-20C) |           | 2305.4951            | 2314.5838             | 40.3       | 0.017                     |
| Extreme (-30C) |           | 2305.4950            | 2314.5837             | -27.2      | -0.012                    |
|                |           |                      |                       |            |                           |
| 20C            | 15%       | 2305.4951            | 2314.5838             | 55.4       | 0.024                     |
|                | -15%      | 2305.4951            | 2314.5838             | 56.3       | 0.024                     |
|                | End Point | 2305.4951            | 2314.5838             | 53.5       | 0.023                     |

### 8.4.11. LTE BAND 41

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 12492 | <b>Date:</b> | 3/14/18 |
|------------|-------|--------------|---------|

#### QPSK, (20MHz BANDWIDTH)

| Limit          |           | 2496                 | 2690                  | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition      |           | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) |            |                           |
| Temperature    | Voltage   |                      |                       |            |                           |
| Normal (20C)   | Normal    | 2496.5737            | 2689.4002             |            |                           |
| Extreme (50C)  |           | 2496.5737            | 2689.4002             | 35.2       | 0.014                     |
| Extreme (40C)  |           | 2496.5736            | 2689.4001             | -54.6      | -0.021                    |
| Extreme (30C)  |           | 2496.5737            | 2689.4002             | 45.8       | 0.018                     |
| Extreme (10C)  |           | 2496.5737            | 2689.4002             | 35.9       | 0.014                     |
| Extreme (0C)   |           | 2496.5736            | 2689.4002             | -27.7      | -0.011                    |
| Extreme (-10C) |           | 2496.5737            | 2689.4002             | 26.1       | 0.010                     |
| Extreme (-20C) |           | 2496.5737            | 2689.4002             | 28.8       | 0.011                     |
| Extreme (-30C) |           | 2496.5737            | 2689.4002             | 29.9       | 0.012                     |
|                |           |                      |                       |            |                           |
| 20C            | 15%       | 2496.5737            | 2689.4002             | 40.1       | 0.015                     |
|                | -15%      | 2496.5737            | 2689.4002             | 41.6       | 0.016                     |
|                | End Point | 2496.5737            | 2689.4002             | 41.2       | 0.016                     |

### 8.4.12. LTE BAND 66

|            |       |              |         |
|------------|-------|--------------|---------|
| <b>ID:</b> | 12491 | <b>Date:</b> | 3/13/18 |
|------------|-------|--------------|---------|

#### QPSK, (20MHz BANDWIDTH)

| Limit          |           | 1710                 | 1780                  | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition      |           | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) |            |                           |
| Temperature    | Voltage   |                      |                       |            |                           |
| Normal (20C)   | Normal    | 1711.0121            | 1779.0121             |            |                           |
| Extreme (50C)  |           | 1711.0121            | 1779.0121             | 14.1       | 0.008                     |
| Extreme (40C)  |           | 1711.0121            | 1779.0121             | 31.1       | 0.018                     |
| Extreme (30C)  |           | 1711.0121            | 1779.0121             | 38.8       | 0.022                     |
| Extreme (10C)  |           | 1711.0122            | 1779.0121             | 74.1       | 0.042                     |
| Extreme (0C)   |           | 1711.0121            | 1779.0121             | 31.0       | 0.018                     |
| Extreme (-10C) |           | 1711.0121            | 1779.0121             | 32.8       | 0.019                     |
| Extreme (-20C) |           | 1711.0121            | 1779.0121             | 33.4       | 0.019                     |
| Extreme (-30C) |           | 1711.0121            | 1779.0120             | -30.4      | -0.017                    |
|                |           |                      |                       |            |                           |
| 20C            | 15%       | 1711.0122            | 1779.0121             | 52.6       | 0.030                     |
|                | -15%      | 1711.0122            | 1779.0121             | 53.4       | 0.031                     |
|                | End Point | 1711.0122            | 1779.0121             | 53.2       | 0.030                     |

### 8.4.13. LTE BAND 71

|            |       |              |         |              |      |
|------------|-------|--------------|---------|--------------|------|
| <b>ID:</b> | 12492 | <b>Date:</b> | 3/14/18 | <b>Unit:</b> | 1306 |
|------------|-------|--------------|---------|--------------|------|

#### QPSK, (20MHz BANDWIDTH)

| Limit          |           | 663               | 698                | Delta<br>(Hz) | Frequency<br>Stability<br>(ppm) |
|----------------|-----------|-------------------|--------------------|---------------|---------------------------------|
| Condition      |           | F low @<br>-13dBm | F high @<br>-13dBm |               |                                 |
| Temperature    | Voltage   | (MHz)             | (MHz)              |               |                                 |
| Normal (20C)   | Normal    | 663.0093          | 679.5516           |               |                                 |
| Extreme (50C)  |           | 663.0093          | 679.5516           | 13.2          | 0.019                           |
| Extreme (40C)  |           | 663.0093          | 679.5516           | 9.3           | 0.014                           |
| Extreme (30C)  |           | 663.0093          | 679.5516           | 7.3           | 0.011                           |
| Extreme (10C)  |           | 663.0093          | 679.5516           | 9.7           | 0.014                           |
| Extreme (0C)   |           | 663.0093          | 679.5516           | 8.2           | 0.012                           |
| Extreme (-10C) |           | 663.0093          | 679.5516           | 8.2           | 0.012                           |
| Extreme (-20C) |           | 663.0093          | 679.5516           | 13.9          | 0.020                           |
| Extreme (-30C) |           | 663.0093          | 679.5516           | 15.1          | 0.022                           |
|                |           |                   |                    |               |                                 |
| 20C            | 15%       | 663.0093          | 679.5516           | 8.1           | 0.012                           |
|                | -15%      | 663.0093          | 679.5516           | 8.5           | 0.012                           |
|                | End Point | 663.0093          | 679.5516           | 9.2           | 0.014                           |

## 8.5. PEAK-TO-AVERAGE POWER RATIO

### LIMIT

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.

### MODES TESTED

- LTE Band 2
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 14
- LTE Band 17
- LTE Band 25
- LTE Band 26
- LTE Band 30
- LTE Band 41
- LTE Band 66
- LTE Band 71

### RESULT

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

|            |       |              |        |
|------------|-------|--------------|--------|
| <b>ID:</b> | 50820 | <b>Date:</b> | 3/8/18 |
|------------|-------|--------------|--------|

### 8.5.1. LTE BAND 2





## 8.5.2. LTE BAND 5

