

## 12. OUT OF BAND EMISSIONS

### RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, and §27.53

### LIMITS

Part 24.238(a) & Part 22.917(a) 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.

Part 27: (m)(4) (4) For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

### TEST PROCEDURE

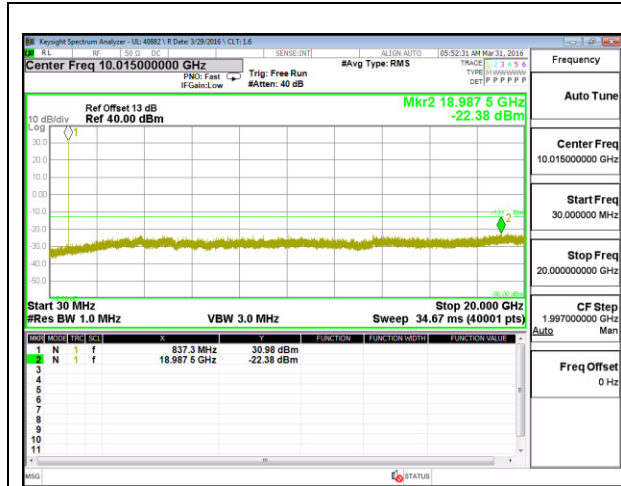
Per KDB 971168 D01 Power Meas License Digital Systems v02r02

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in a maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

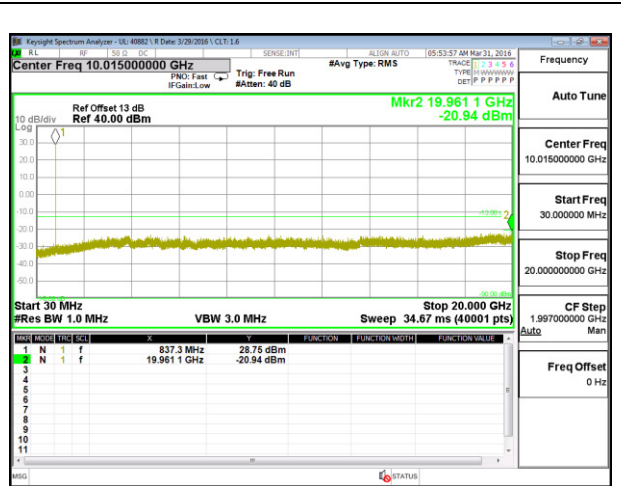
## 12.1. OUT OF BAND EMISSIONS RESULT AND PLOTS

### GSM

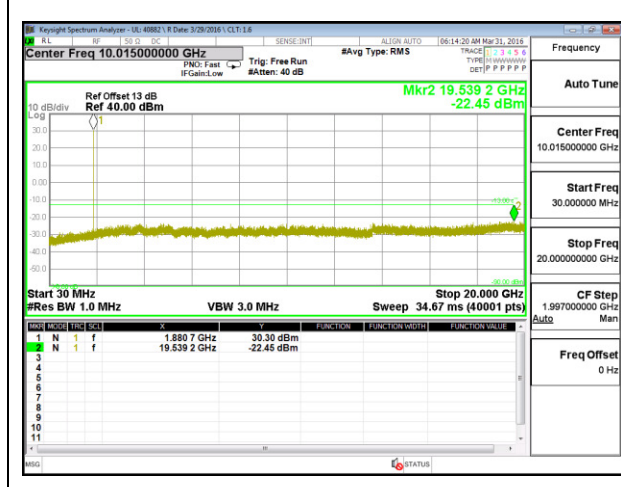
| Band    | Mode  | f (MHz) | Spur (dBm) | Spec (dBm) | Delta (dB) |
|---------|-------|---------|------------|------------|------------|
| GSM850  | GPRS  | 824.2   | -21.981    | -13        | -8.981     |
| GSM850  | GPRS  | 836.6   | -22.381    | -13        | -9.381     |
| GSM850  | GPRS  | 848.8   | -22.093    | -13        | -9.093     |
| GSM850  | EGPRS | 824.2   | -22.45     | -13        | -9.45      |
| GSM850  | EGPRS | 836.6   | -20.935    | -13        | -7.935     |
| GSM850  | EGPRS | 848.8   | -21.75     | -13        | -8.75      |
| GSM1900 | GPRS  | 1850.2  | -22.459    | -13        | -9.459     |
| GSM1900 | GPRS  | 1880    | -22.448    | -13        | -9.448     |
| GSM1900 | GPRS  | 1909.8  | -22.443    | -13        | -9.443     |
| GSM1900 | EGPRS | 1850.2  | -22.245    | -13        | -9.245     |
| GSM1900 | EGPRS | 1880    | -22.502    | -13        | -9.502     |
| GSM1900 | EGPRS | 1909.8  | -22.456    | -13        | -9.456     |



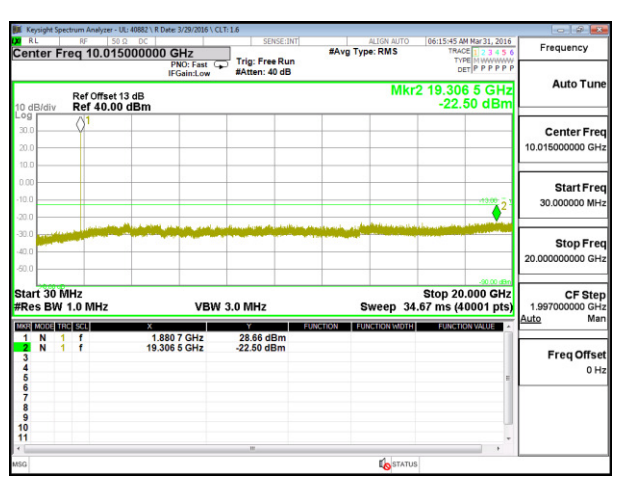
GSM850 GPRS Middle Channel



GSM850 EGPRS Middle Channel



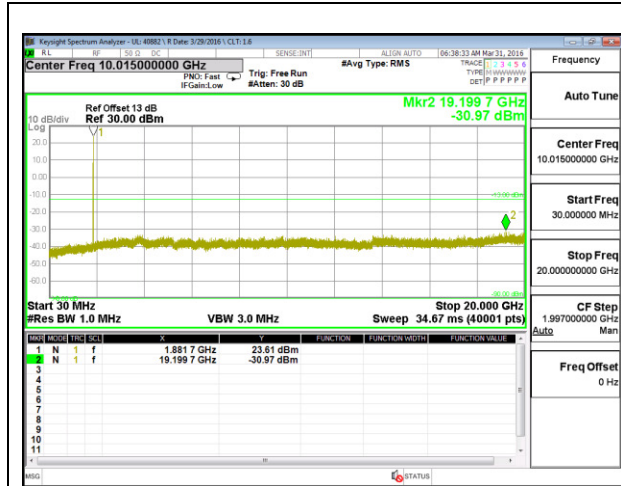
GSM1900 GPRS Middle Channel



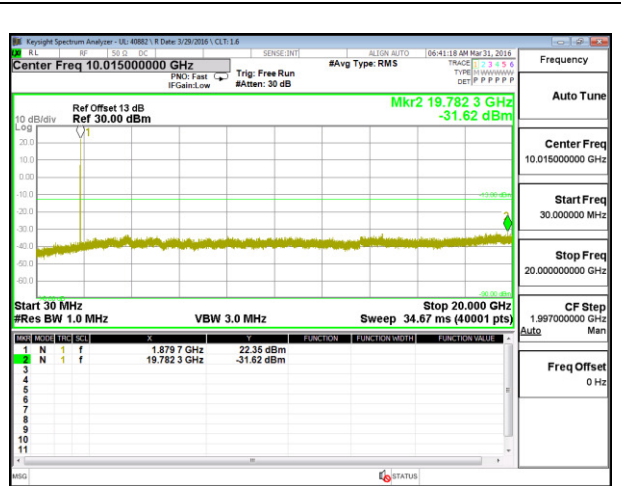
GSM1900 EGPRS Middle Channel

**WCDMA**

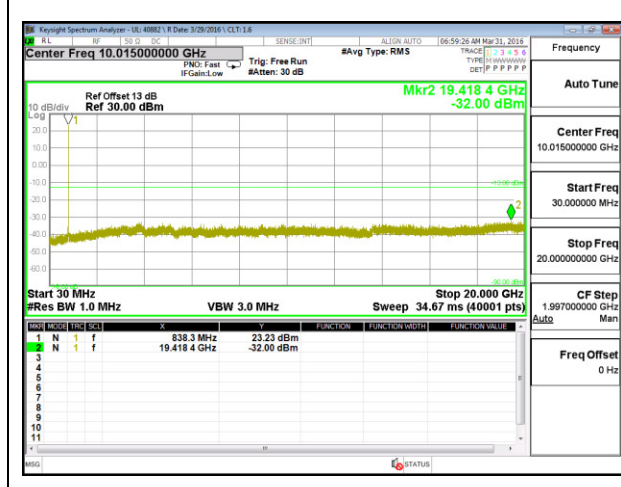
| Band   | Mode  | f (MHz) | Spur (dBm) | 99% BW (MHz) | Delta (dB) |
|--------|-------|---------|------------|--------------|------------|
| Band 2 | REL99 | 1852.4  | -30.943    | -13          | -17.943    |
| Band 2 | REL99 | 1880    | -30.972    | -13          | -17.972    |
| Band 2 | REL99 | 1907.6  | -31.85     | -13          | -18.85     |
| Band 2 | HSDPA | 1852.4  | -32.038    | -13          | -19.038    |
| Band 2 | HSDPA | 1880    | -31.615    | -13          | -18.615    |
| Band 2 | HSDPA | 1907.6  | -32.182    | -13          | -19.182    |
| Band 5 | REL99 | 826.4   | -32.355    | -13          | -19.355    |
| Band 5 | REL99 | 836.6   | -32.001    | -13          | -19.001    |
| Band 5 | REL99 | 846.6   | -31.38     | -13          | -18.38     |
| Band 5 | HSDPA | 826.4   | -32.349    | -13          | -19.349    |
| Band 5 | HSDPA | 836.6   | -32.121    | -13          | -19.121    |
| Band 5 | HSDPA | 846.6   | -32.134    | -13          | -19.134    |



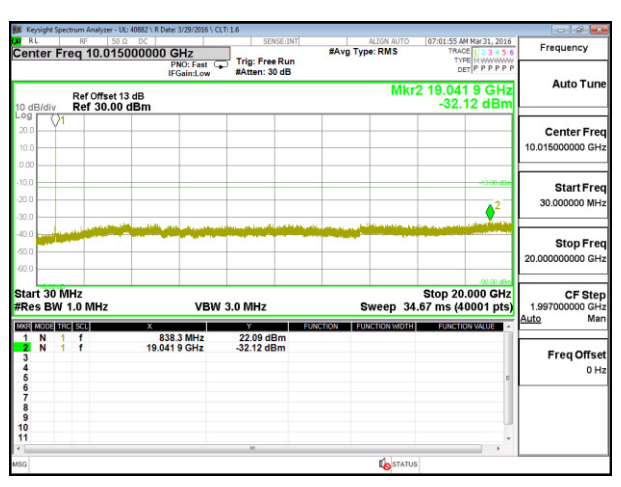
B2 REL99 Middle Channel



B2 HSDPA Middle Channel



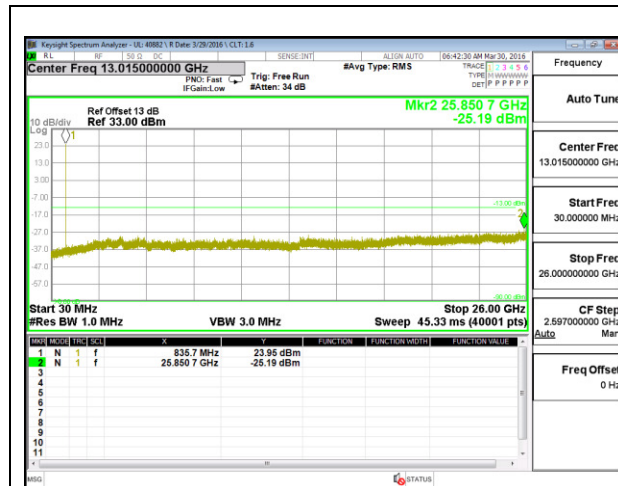
B5 REL99 Middle Channel



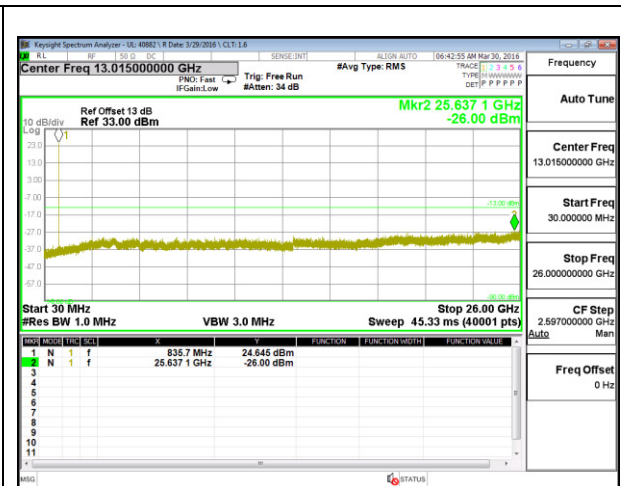
B5 HSDPA Middle Channel

**LTE Band 5**

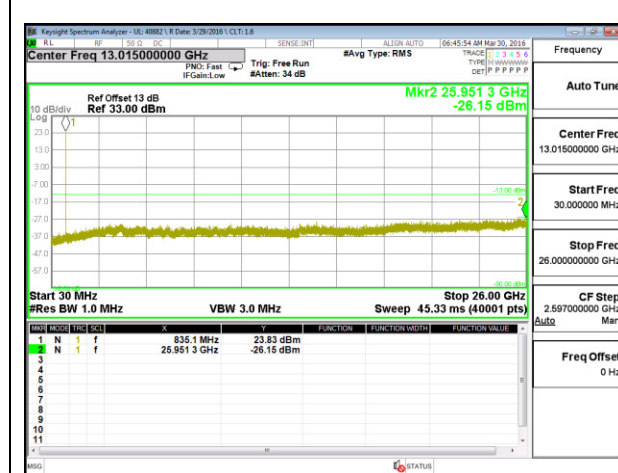
| BW(MHz) | Mode  | f (MHz) | Spur (dBm) | Spec (dBm) | Delta (dB) |
|---------|-------|---------|------------|------------|------------|
| 1.4     | QPSK  | 824.7   | -26.16     | -13        | -13.16     |
| 1.4     | QPSK  | 836.5   | -25.19     | -13        | -12.19     |
| 1.4     | QPSK  | 848.3   | -25.44     | -13        | -12.44     |
| 1.4     | 16QAM | 824.7   | -26.01     | -13        | -13.01     |
| 1.4     | 16QAM | 836.5   | -26.00     | -13        | -13.00     |
| 1.4     | 16QAM | 848.3   | -25.87     | -13        | -12.87     |
| 3       | QPSK  | 825.5   | -25.95     | -13        | -12.95     |
| 3       | QPSK  | 836.5   | -26.15     | -13        | -13.15     |
| 3       | QPSK  | 847.5   | -25.56     | -13        | -12.56     |
| 3       | 16QAM | 825.5   | -25.83     | -13        | -12.83     |
| 3       | 16QAM | 836.5   | -25.80     | -13        | -12.8      |
| 3       | 16QAM | 847.5   | -26.15     | -13        | -13.15     |
| 5       | QPSK  | 826.5   | -25.97     | -13        | -12.97     |
| 5       | QPSK  | 836.5   | -25.31     | -13        | -12.31     |
| 5       | QPSK  | 846.5   | -26.11     | -13        | -13.11     |
| 5       | 16QAM | 826.5   | -25.82     | -13        | -12.82     |
| 5       | 16QAM | 836.5   | -25.58     | -13        | -12.58     |
| 5       | 16QAM | 846.5   | -26.29     | -13        | -13.29     |
| 10      | QPSK  | 829     | -25.74     | -13        | -12.74     |
| 10      | QPSK  | 836.5   | -25.69     | -13        | -12.69     |
| 10      | QPSK  | 844     | -26.06     | -13        | -13.06     |
| 10      | 16QAM | 829     | -25.49     | -13        | -12.49     |
| 10      | 16QAM | 836.5   | -26.28     | -13        | -13.28     |
| 10      | 16QAM | 844     | -26.12     | -13        | -13.12     |



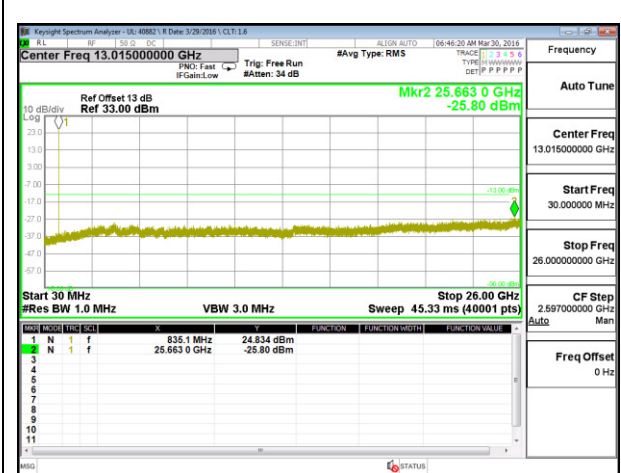
LTE B5 1.4MHz QPSK Middle Channel



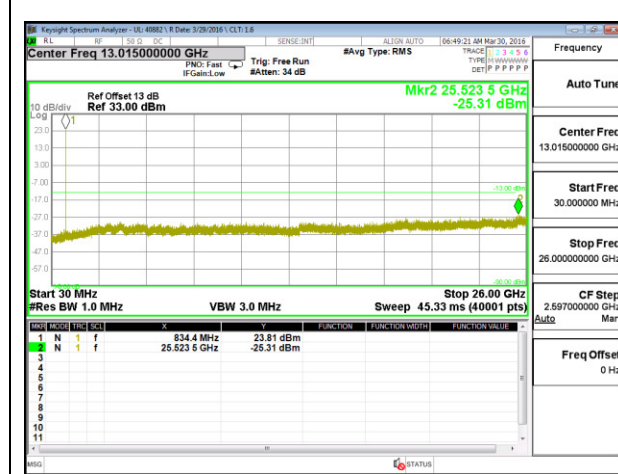
LTE B5 1.4MHz 16QAM Middle Channel



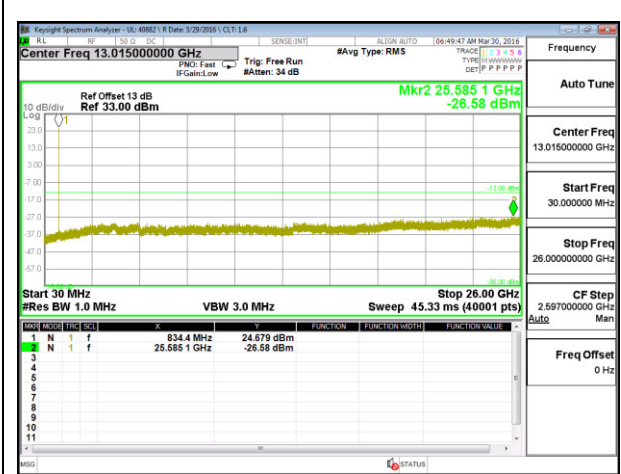
LTE B5 3MHz QPSK Middle Channel



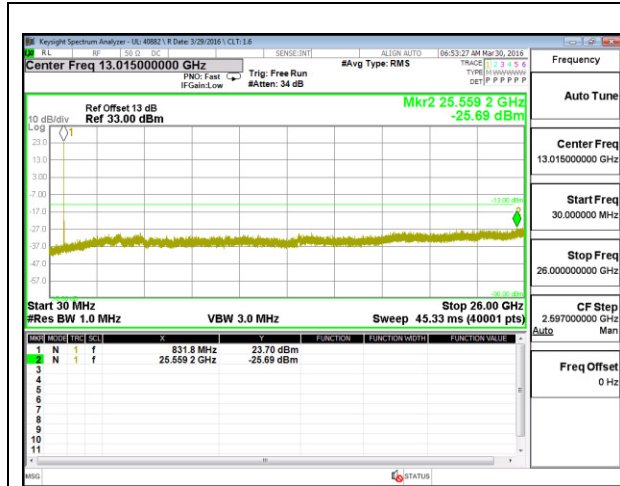
LTE B5 3MHz 16QAM Middle Channel



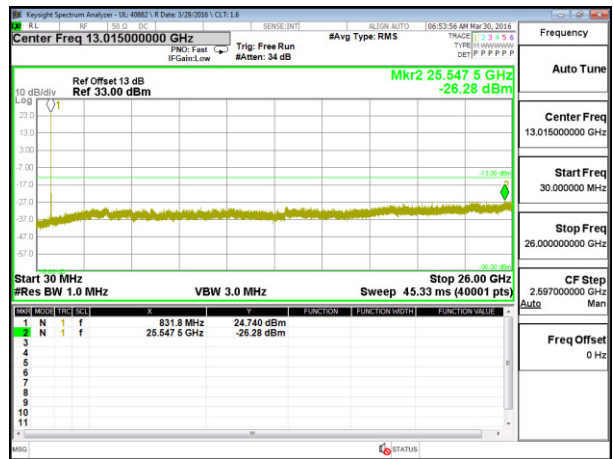
LTE B5 5MHz QPSK Middle Channel



LTE B5 5MHz 16QAM Middle Channel



LTE B5 10MHz QPSK Middle Channel

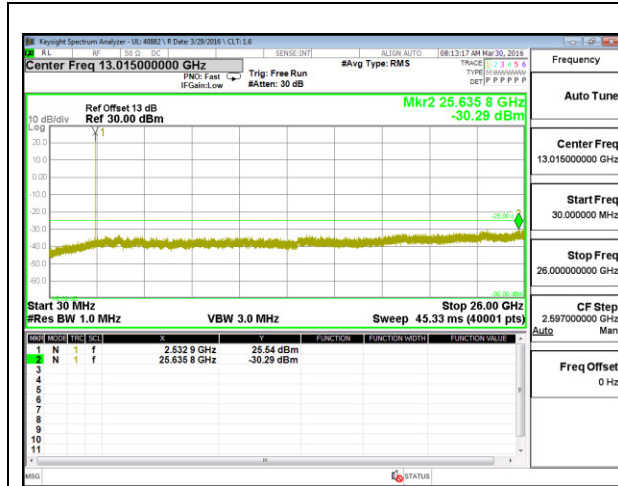


LTE B5 10MHz 16QAM Middle Channel



**LTE Band 7**

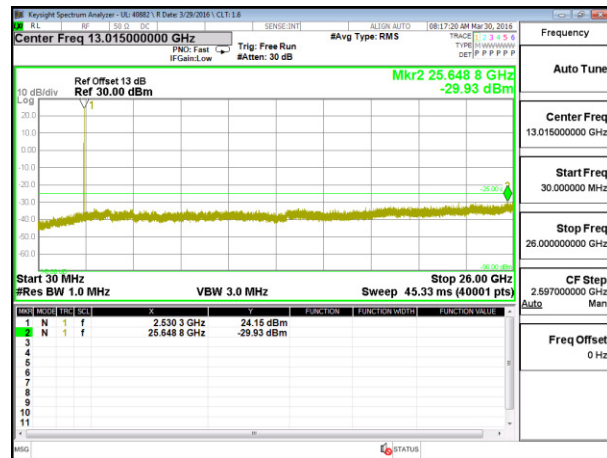
| BW(MHz) | Mode  | f (MHz) | Spur (dBm) | Spec (dBm) | Delta (dB) |
|---------|-------|---------|------------|------------|------------|
| 5       | QPSK  | 2502.5  | -29.88     | -25        | -4.88      |
| 5       | QPSK  | 2535    | -30.29     | -25        | -5.29      |
| 5       | QPSK  | 2567.5  | -29.89     | -25        | -4.89      |
| 5       | 16QAM | 2502.5  | -30.19     | -25        | -5.19      |
| 5       | 16QAM | 2535    | -30.47     | -25        | -5.47      |
| 5       | 16QAM | 2567.5  | -30.12     | -25        | -5.12      |
| 10      | QPSK  | 2505    | -30.28     | -25        | -5.28      |
| 10      | QPSK  | 2535    | -29.94     | -25        | -4.94      |
| 10      | QPSK  | 2565    | -30.29     | -25        | -5.29      |
| 10      | 16QAM | 2505    | -29.79     | -25        | -4.79      |
| 10      | 16QAM | 2535    | -29.53     | -25        | -4.53      |
| 10      | 16QAM | 2565    | -29.84     | -25        | -4.84      |
| 15      | QPSK  | 2507.5  | -30.44     | -25        | -5.44      |
| 15      | QPSK  | 2535    | -30.18     | -25        | -5.18      |
| 15      | QPSK  | 2562.5  | -29.16     | -25        | -4.16      |
| 15      | 16QAM | 2507.5  | -29.66     | -25        | -4.66      |
| 15      | 16QAM | 2535    | -30.16     | -25        | -5.16      |
| 15      | 16QAM | 2562.5  | -29.75     | -25        | -4.75      |
| 20      | QPSK  | 2510    | -30.32     | -25        | -5.32      |
| 20      | QPSK  | 2535    | -30.4      | -25        | -5.4       |
| 20      | QPSK  | 2560    | -29.95     | -25        | -4.95      |
| 20      | 16QAM | 2510    | -29.85     | -25        | -4.85      |
| 20      | 16QAM | 2535    | -29.94     | -25        | -4.94      |
| 20      | 16QAM | 2560    | -30.02     | -25        | -5.02      |



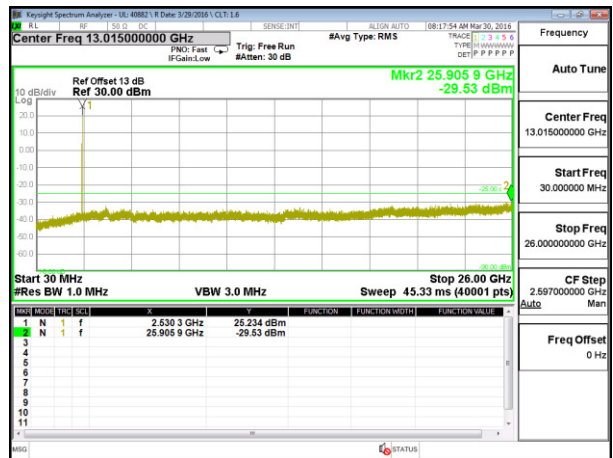
LTE B7 5MHz QPSK Middle Channel



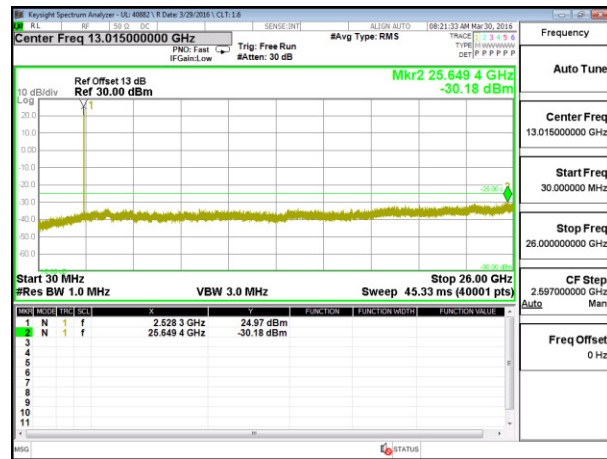
LTE B7 5MHz 16QAM Middle Channel



LTE B7 10MHz QPSK Middle Channel



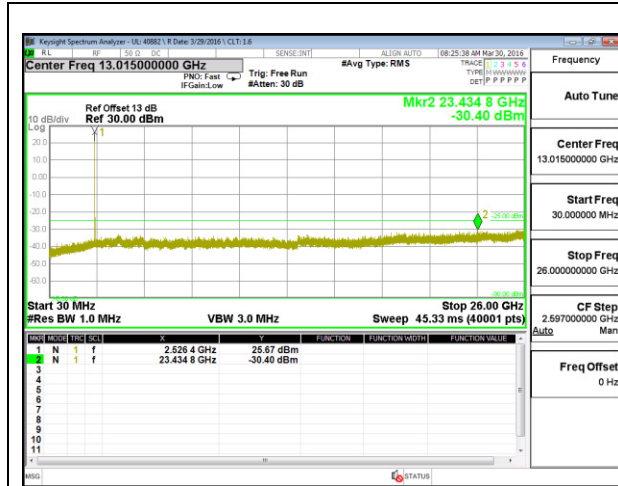
LTE B7 10MHz 16QAM Middle Channel



LTE B7 15MHz QPSK Middle Channel



LTE B7 15MHz 16QAM Middle Channel



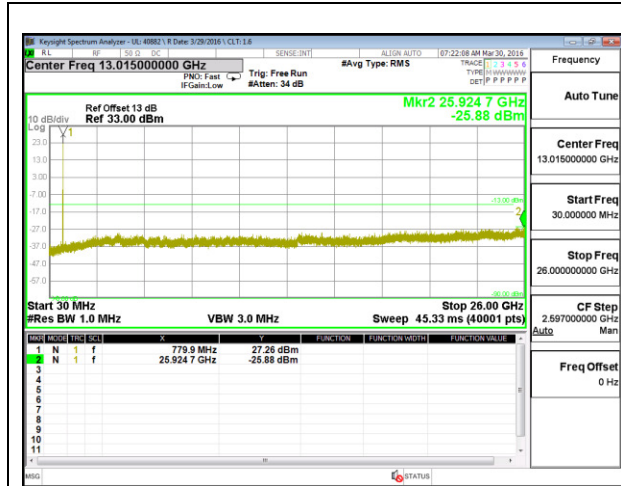
LTE B7 20MHz QPSK Middle Channel



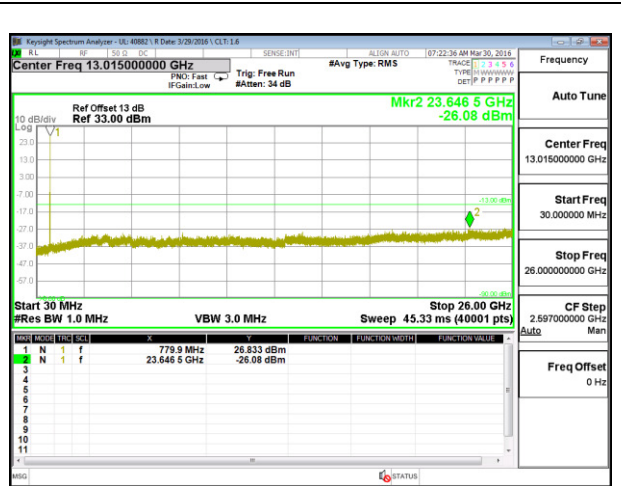
LTE B7 20MHz 16QAM Middle Channel

**LTE Band 13**

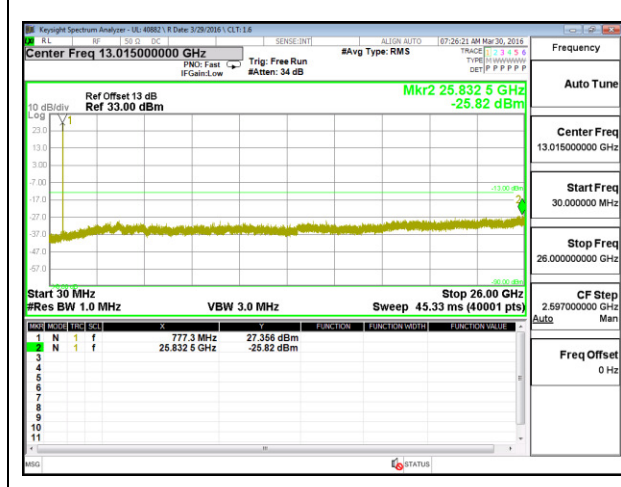
| BW(MHz) | Mode  | f (MHz) | Spur (dBm) | Spec (dBm) | Delta (dB) |
|---------|-------|---------|------------|------------|------------|
| 5       | QPSK  | 779.5   | -25.51     | -13        | -12.51     |
| 5       | QPSK  | 782     | -25.88     | -13        | -12.88     |
| 5       | QPSK  | 784.5   | -25.72     | -13        | -12.72     |
| 5       | 16QAM | 779.5   | -20.66     | -13        | -7.66      |
| 5       | 16QAM | 782     | -26.08     | -13        | -13.08     |
| 5       | 16QAM | 784.5   | -26.08     | -13        | -13.08     |
| 10      | QPSK  | 782     | -25.82     | -13        | -12.82     |
| 10      | 16QAM | 782     | -25.56     | -13        | -12.56     |



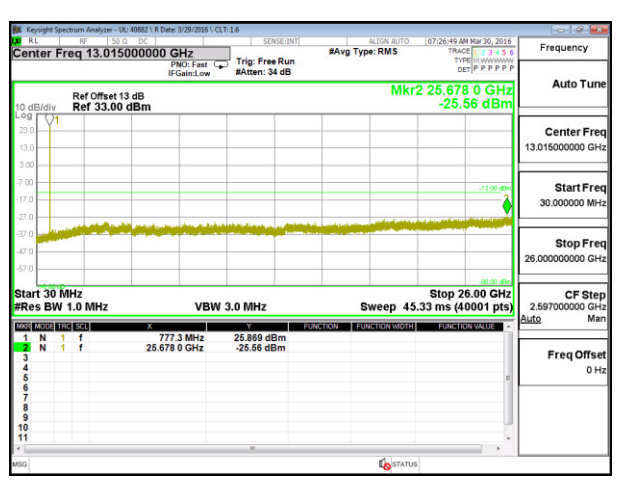
LTE B13 5MHz QPSK Middle Channel



LTE B13 5MHz 16QAM Middle Channel



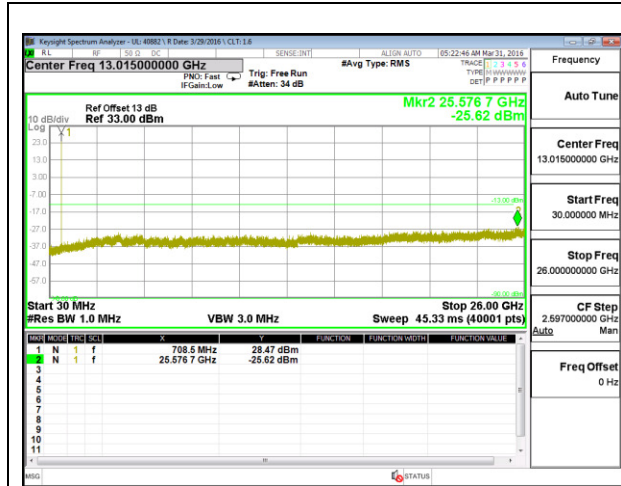
LTE B13 10MHz QPSK Middle Channel



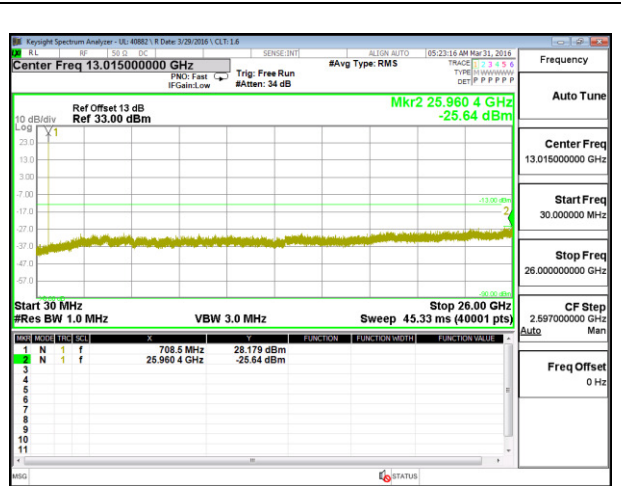
LTE B13 10MHz 16QAM Middle Channel

**LTE Band 17**

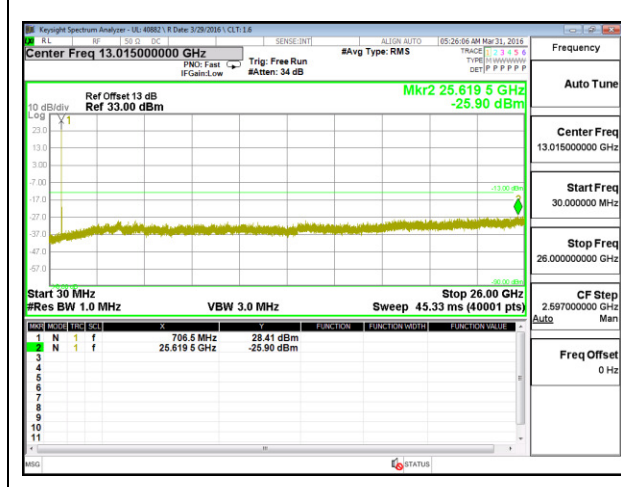
| BW(MHz) | Mode  | f (MHz) | Spur (dBm) | Spec (dBm) | Delta (dB) |
|---------|-------|---------|------------|------------|------------|
| 5       | QPSK  | 706.5   | -26.01     | -13        | -13.01     |
| 5       | QPSK  | 710     | -25.62     | -13        | -12.62     |
| 5       | QPSK  | 713.5   | -25.71     | -13        | -12.71     |
| 5       | 16QAM | 706.5   | -25.99     | -13        | -12.99     |
| 5       | 16QAM | 710     | -25.64     | -13        | -12.64     |
| 5       | 16QAM | 713.5   | -25.60     | -13        | -12.60     |
| 10      | QPSK  | 709     | -25.25     | -13        | -12.25     |
| 10      | QPSK  | 710     | -25.90     | -13        | -12.90     |
| 10      | QPSK  | 711     | -25.73     | -13        | -12.73     |
| 10      | 16QAM | 709     | -25.82     | -13        | -12.82     |
| 10      | 16QAM | 710     | -25.75     | -13        | -12.75     |
| 10      | 16QAM | 711     | -26.10     | -13        | -13.10     |



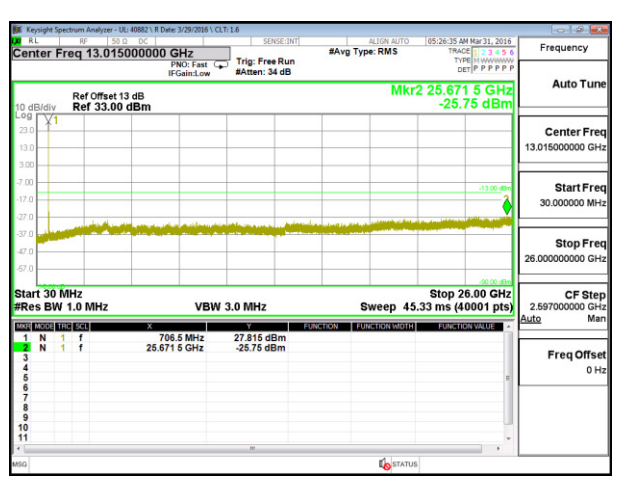
LTE B17 5MHz QPSK Middle Channel



LTE B17 5MHz 16QAM Middle Channel



LTE B17 10MHz QPSK Middle Channel

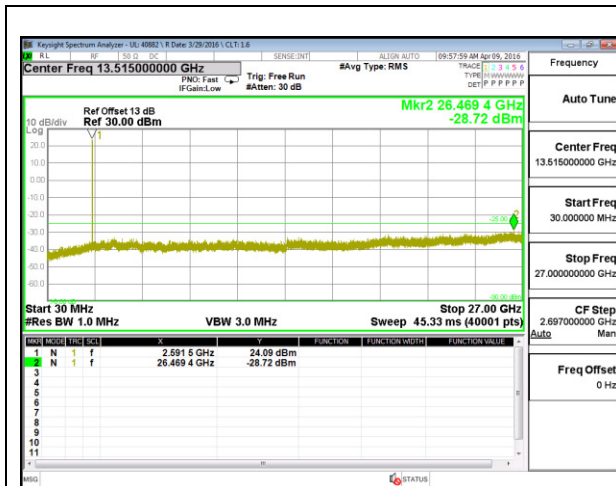


LTE B17 10MHz 16QAM Middle Channel

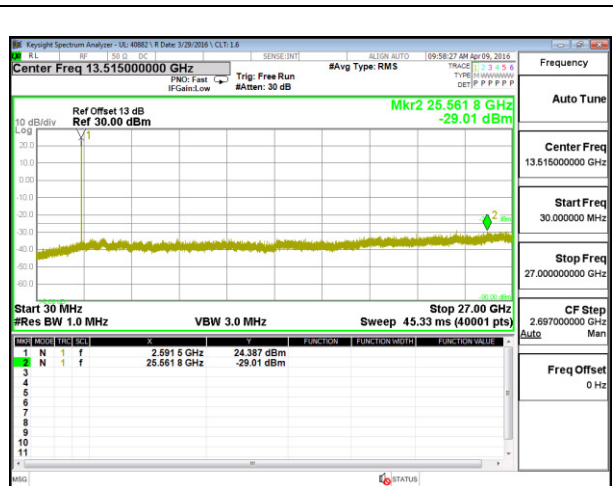
**LTE Band 41**

| BW(MHz) | Mode  | f (MHz) | Spur (dBm) | Spec (dBm) | Delta (dB) |
|---------|-------|---------|------------|------------|------------|
| 5       | QPSK  | 2498.5  | -29.92     | -25        | -4.92      |
| 5       | QPSK  | 2593    | -28.72     | -25        | -3.72      |
| 5       | QPSK  | 2687.5  | -29.32     | -25        | -4.32      |
| 5       | 16QAM | 2498.5  | -29.39     | -25        | -4.39      |
| 5       | 16QAM | 2593    | -29.01     | -25        | -4.01      |
| 5       | 16QAM | 2687.5  | -29.59     | -25        | -4.59      |
| 10      | QPSK  | 2501    | -29.33     | -25        | -4.33      |
| 10      | QPSK  | 2593    | -29.34     | -25        | -4.34      |
| 10      | QPSK  | 2685    | -29.83     | -25        | -4.83      |
| 10      | 16QAM | 2501    | -29.44     | -25        | -4.44      |
| 10      | 16QAM | 2593    | -29.22     | -25        | -4.22      |
| 10      | 16QAM | 2685    | -29.28     | -25        | -4.28      |
| 15      | QPSK  | 2503.5  | -29.48     | -25        | -4.48      |
| 15      | QPSK  | 2593    | -29.09     | -25        | -4.09      |
| 15      | QPSK  | 2682.5  | -29.35     | -25        | -4.35      |
| 15      | 16QAM | 2503.5  | -28.68     | -25        | -3.68      |
| 15      | 16QAM | 2593    | -29.65     | -25        | -4.65      |
| 15      | 16QAM | 2682.5  | -28.67     | -25        | -3.67      |
| 20      | QPSK  | 2506    | -29        | -25        | -4         |
| 20      | QPSK  | 2593    | -29.35     | -25        | -4.35      |
| 20      | QPSK  | 2680    | -29.86     | -25        | -4.86      |
| 20      | 16QAM | 2506    | -29.81     | -25        | -4.81      |
| 20      | 16QAM | 2593    | -29.54     | -25        | -4.54      |
| 20      | 16QAM | 2680    | -29.13     | -25        | -4.13      |

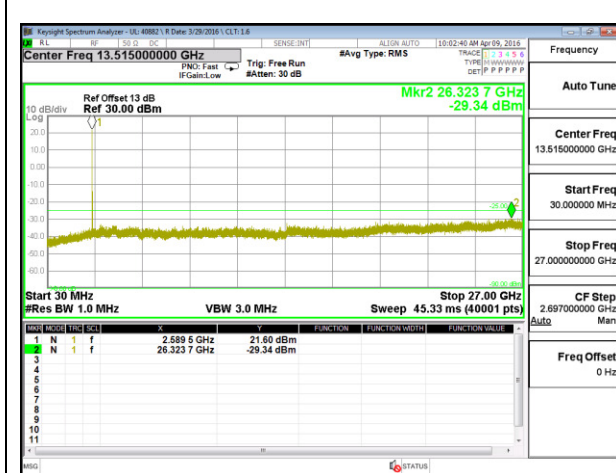




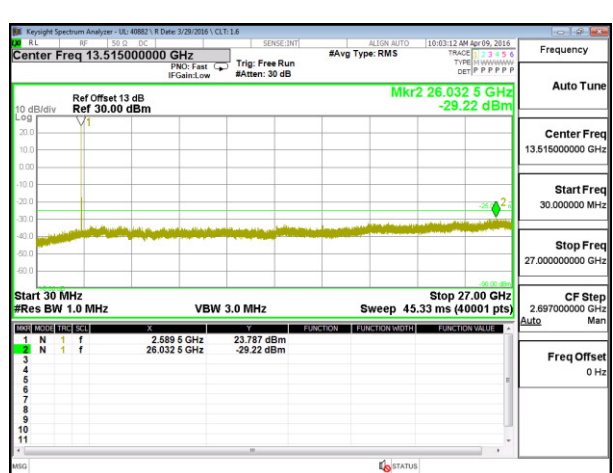
LTE B41 5MHz QPSK Middle Channel



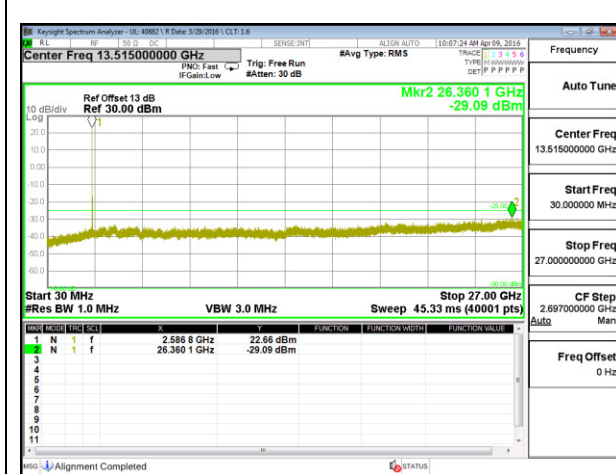
LTE B41 5MHz 16QAM Middle Channel



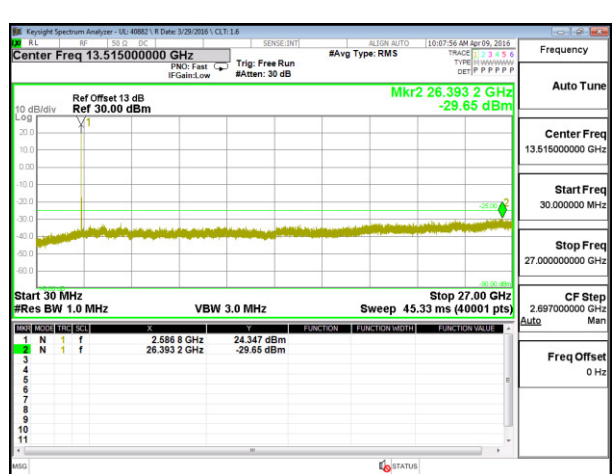
LTE B41 10MHz QPSK Middle Channel



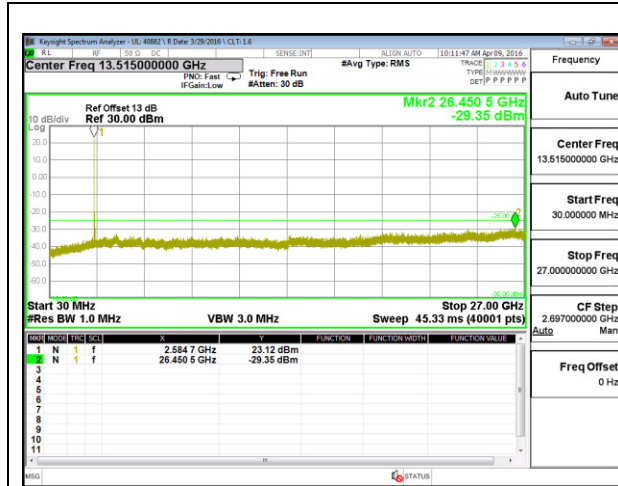
LTE B41 10MHz 16QAM Middle Channel



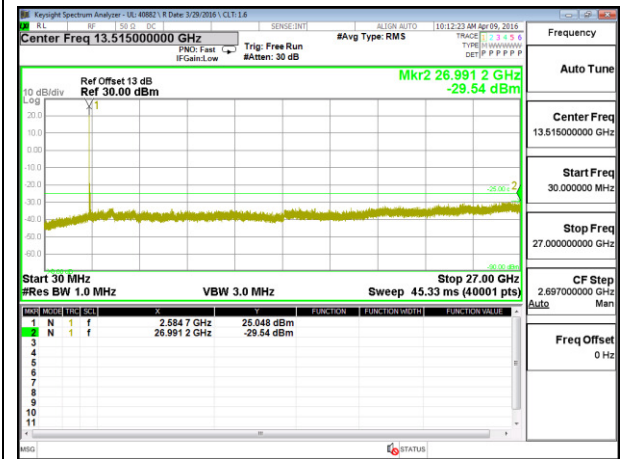
LTE B41 15MHz QPSK Middle Channel



LTE B41 15MHz 16QAM Middle Channel



LTE B41 20MHz QPSK Middle Channel



LTE B41 20MHz 16QAM Middle Channel

## **13. FREQUENCY STABILITY**

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

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

### **LIMITS**

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

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

§27.54 - The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### **TEST PROCEDURE**

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

### 13.1. FREQUENCY STABILITY RESULTS

**LTE Band 5**

| Reference Frequency: Mid Channel 836.5 MHz @ 20°C<br>Limit: to stay +/- 2.5 ppm = 2091.250 Hz |                              |   |             |             |
|---|------------------------------|---|-------------|-------------|
| Power Supply (Vdc)  | Environment Temperature (°C) | Frequency Deviation Measured with Time Elapse |             |             |
|   |                              | (MHz)   | Delta (ppm) | Limit (ppm) |
| 3.80  | 50                           | 836.500002                                    | -0.001      | 2.5         |
| 3.80  | 40                           | 836.500002                                    | -0.001      | 2.5         |
| 3.80  | 30                           | 836.500002                                    | -0.001      | 2.5         |
| <b>3.80</b>   | <b>20</b>                    | <b>836.500001</b>                             | <b>0</b>    | <b>2.5</b>  |
| 3.80  | 10                           | 836.500000                                    | 0.001       | 2.5         |
| 3.80  | 0                            | 836.500000                                    | 0.000       | 2.5         |
| 3.80  | -10                          | 836.500000                                    | 0.001       | 2.5         |
| 3.80  | -20                          | 836.500002                                    | -0.001      | 2.5         |
| 3.80  | -30                          | 836.499999                                    | 0.002       | 2.5         |

| Reference Frequency: PCS Mid Channel 836.5 MHz @ 20°C<br>Limit: to stay +/- 2.5 ppm = 2091.250 Hz |                              |   |             |             |
|---|------------------------------|---|-------------|-------------|
| Power Supply (Vdc)  | Environment Temperature (°C) | Frequency Deviation Measured with Time Elapse |             |             |
|   |                              | (MHz)   | Delta (ppm) | Limit (ppm) |
| <b>3.80</b>   | <b>20</b>                    | <b>836.500001</b>                             | <b>0</b>    | <b>2.5</b>  |
| 4.20  | 20                           | 836.5000017                                   | -0.001      | 2.5         |
| 3.60  | 20                           | 836.5000018                                   | -0.001      | 2.5         |

**WCDMA B2**

| Reference Frequency: Mid Channel 1880 MHz @ 20°C<br>Limit: to stay +/- 2.5 ppm = 4700.000 Hz |                              |   |             |             |
|--|------------------------------|---|-------------|-------------|
| Power Supply (Vdc)   | Environment Temperature (°C) | Frequency Deviation Measured with Time Elapse |             |             |
|  |                              | (MHz)   | Delta (ppm) | Limit (ppm) |
| 3.80   | 50                           | 1879.999999                                   | 0.001       | 2.5         |
| 3.80   | 40                           | 1880.000001                                   | 0.000       | 2.5         |
| 3.80   | 30                           | 1880.000001                                   | 0.000       | 2.5         |
| <b>3.80</b>  | <b>20</b>                    | <b>1880.000001</b>                            | <b>0</b>    | <b>2.5</b>  |
| 3.80   | 10                           | 1880.000001                                   | 0.000       | 2.5         |
| 3.80   | 0                            | 1880.000001                                   | 0.000       | 2.5         |
| 3.80   | -10                          | 1880.000002                                   | 0.000       | 2.5         |
| 3.80   | -20                          | 1880.000000                                   | 0.001       | 2.5         |
| 3.80   | -30                          | 1880.000003                                   | -0.001      | 2.5         |

| Reference Frequency: PCS Mid Channel 1880 MHz @ 20°C<br>Limit: to stay +/- 2.5 ppm = 4700.000 Hz |                              |   |             |             |
|--|------------------------------|---|-------------|-------------|
| Power Supply (Vdc)   | Environment Temperature (°C) | Frequency Deviation Measured with Time Elapse |             |             |
|  |                              | (MHz)   | Delta (ppm) | Limit (ppm) |
| <b>3.80</b>  | <b>20</b>                    | <b>1880.000001</b>                            | <b>0</b>    | <b>2.5</b>  |
| 4.20   | 20                           | 1880.000001                                   | 0.000       | 2.5         |
| 3.60   | 20                           | 1879.999999                                   | 0.001       | 2.5         |

**LTE Band 13**

| Reference Frequency: Mid Channel 782 MHz @ 20°C |                              |   |             |             |
|---|------------------------------|---|-------------|-------------|
| Limit: to stay +/- 2.5 ppm = 1955.000 Hz        |                              |   |             |             |
| Power Supply (Vdc)                              | Environment Temperature (°C) | Frequency Deviation Measured with Time Elapse |             |             |
|   |                              | (MHz)   | Delta (ppm) | Limit (ppm) |
| 3.80  | 50                           | 782.000001                                    | -0.004      | 2.5         |
| 3.80  | 40                           | 782.000001                                    | -0.003      | 2.5         |
| 3.80  | 30                           | 782.000001                                    | -0.003      | 2.5         |
| <b>3.80</b>                                     | <b>20</b>                    | <b>781.999998</b>                             | <b>0</b>    | <b>2.5</b>  |
| 3.80  | 10                           | 782.000001                                    | -0.003      | 2.5         |
| 3.80  | 0                            | 781.999998                                    | 0.000       | 2.5         |
| 3.80  | -10                          | 782.000001                                    | -0.003      | 2.5         |
| 3.80  | -20                          | 782.000001                                    | -0.004      | 2.5         |
| 3.80  | -30                          | 782.000001                                    | -0.004      | 2.5         |

| Reference Frequency: PCS Mid Channel 782 MHz @ 20°C |                              |   |             |             |
|---|------------------------------|---|-------------|-------------|
| Limit: to stay +/- 2.5 ppm = 1955.000 Hz            |                              |   |             |             |
| Power Supply (Vdc)                                  | Environment Temperature (°C) | Frequency Deviation Measured with Time Elapse |             |             |
|   |                              | (MHz)   | Delta (ppm) | Limit (ppm) |
| <b>3.80</b>   | <b>20</b>                    | <b>781.999998</b>                             | <b>0</b>    | <b>2.5</b>  |
| 4.20  | 20                           | 782.0000003                                   | -0.002      | 2.5         |
| 3.60  | 20                           | 782.0000002                                   | -0.002      | 2.5         |

**LTE Band 17**

| Reference Frequency: Mid Channel 710 MHz @ 20°C<br>Limit: to stay +/- 2.5 ppm = 1775.000 Hz |                              |   |             |             |
|---|------------------------------|---|-------------|-------------|
| Power Supply (Vdc)  | Environment Temperature (°C) | Frequency Deviation Measured with Time Elapse |             |             |
|   |                              | (MHz)   | Delta (ppm) | Limit (ppm) |
| 3.80  | 50                           | 710.000001                                    | -0.001      | 2.5         |
| 3.80  | 40                           | 710.000001                                    | 0.000       | 2.5         |
| 3.80  | 30                           | 709.999999                                    | 0.003       | 2.5         |
| <b>3.80</b>   | <b>20</b>                    | <b>710.000001</b>                             | <b>0</b>    | <b>2.5</b>  |
| 3.80  | 10                           | 710.000001                                    | 0.000       | 2.5         |
| 3.80  | 0                            | 709.999999                                    | 0.003       | 2.5         |
| 3.80  | -10                          | 709.999999                                    | 0.003       | 2.5         |
| 3.80  | -20                          | 710.000001                                    | 0.000       | 2.5         |
| 3.80  | -30                          | 710.000001                                    | 0.000       | 2.5         |

| Reference Frequency: PCS Mid Channel 710 MHz @ 20°C<br>Limit: to stay +/- 2.5 ppm = 1775.000 Hz |                              |   |             |             |
|---|------------------------------|---|-------------|-------------|
| Power Supply (Vdc)  | Environment Temperature (°C) | Frequency Deviation Measured with Time Elapse |             |             |
|   |                              | (MHz)   | Delta (ppm) | Limit (ppm) |
| <b>3.80</b>   | <b>20</b>                    | <b>710.000001</b>                             | <b>0</b>    | <b>2.5</b>  |
| 4.20  | 20                           | 710.0000006                                   | 0.000       | 2.5         |
| 3.60  | 20                           | 710.0000008                                   | 0.000       | 2.5         |

**LTE Band 41**

| Reference Frequency: Mid Channel 2593 MHz @ 20°C<br>Limit: to stay +/- 2.5 ppm = 6482.500 Hz |                              |   |             |             |
|--|------------------------------|---|-------------|-------------|
| Power Supply (Vdc)   | Environment Temperature (°C) | Frequency Deviation Measured with Time Elapse |             |             |
|  |                              | (MHz)   | Delta (ppm) | Limit (ppm) |
| 3.80   | 50                           | 2593.000001                                   | 0.000       | 2.5         |
| 3.80   | 40                           | 2593.000000                                   | 0.001       | 2.5         |
| 3.80   | 30                           | 2593.000002                                   | 0.000       | 2.5         |
| <b>3.80</b>  | <b>20</b>                    | <b>2593.000001</b>                            | <b>0</b>    | <b>2.5</b>  |
| 3.80   | 10                           | 2593.000000                                   | 0.000       | 2.5         |
| 3.80   | 0                            | 2592.999999                                   | 0.001       | 2.5         |
| 3.80   | -10                          | 2593.000001                                   | 0.000       | 2.5         |
| 3.80   | -20                          | 2593.000000                                   | 0.000       | 2.5         |
| 3.80   | -30                          | 2592.999999                                   | 0.001       | 2.5         |

| Reference Frequency: PCS Mid Channel 2593 MHz @ 20°C<br>Limit: to stay +/- 2.5 ppm = 6482.500 Hz |                              |   |             |             |
|--|------------------------------|---|-------------|-------------|
| Power Supply (Vdc)   | Environment Temperature (°C) | Frequency Deviation Measured with Time Elapse |             |             |
|  |                              | (MHz)   | Delta (ppm) | Limit (ppm) |
| <b>3.80</b>  | <b>20</b>                    | <b>2593.000001</b>                            | <b>0</b>    | <b>2.5</b>  |
| 4.20   | 20                           | 2593.000001                                   | 0.000       | 2.5         |
| 3.60   | 20                           | 2593  | 0.000       | 2.5         |



## 14. RADIATED TEST RESULTS

### 14.1. RADIATED POWER (ERP & EIRP)

#### RULE PART(S)

FCC: §2. 1046, §22. 913, §24. 232 and §27.50

#### LIMITS

22.913 (a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232 (c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

27.50 (b) - (10) Portable stations (handheld devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP. (LTE B13)

27.50 (c) - (10) Portable stations (handheld devices) are limited to 3 watts ERP; (LTE B17)

27.50 (h) - (2) Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power. (LTE B41 & 7)

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13dB.

#### TEST PROCEDURE

ANSI / TIA / EIA 603D Clause 2.2.17; PSA setting reference to 971168 D01 v02r02

For peak power measurement with a PSA:

a) Set the RBW  $\geq$  OBW; b) Set VBW  $\geq 3 \times$  RBW; c) Set span  $\geq 2 \times$  RBW; d) Sweep time = auto couple; e) Detector = peak; f) Ensure that the number of measurement points  $\geq$  span/RBW; g) Trace mode = max hold;

For average power measurement with a PSA:

a) Set span to at least 1.5 times the OBW; b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz; c) Set VBW  $\geq 3 \times$  RBW; d) Set number of points in sweep  $\geq 2 \times$  span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle  $\geq 98$ ; h) Use trigger to capture bursts If burst duty cycle  $< 98$ ; i) Trace average at least 100 traces in power averaging (*i.e.*, RMS) mode. j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function.