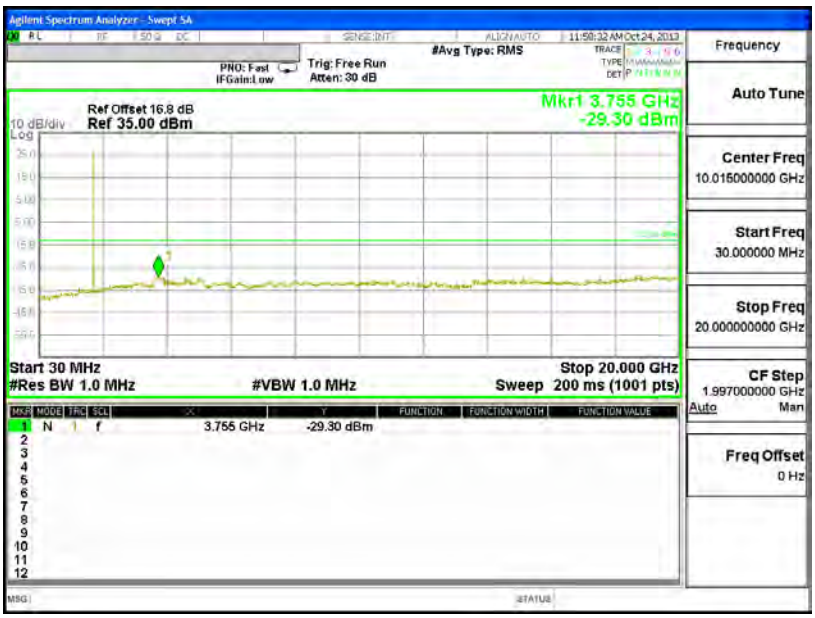
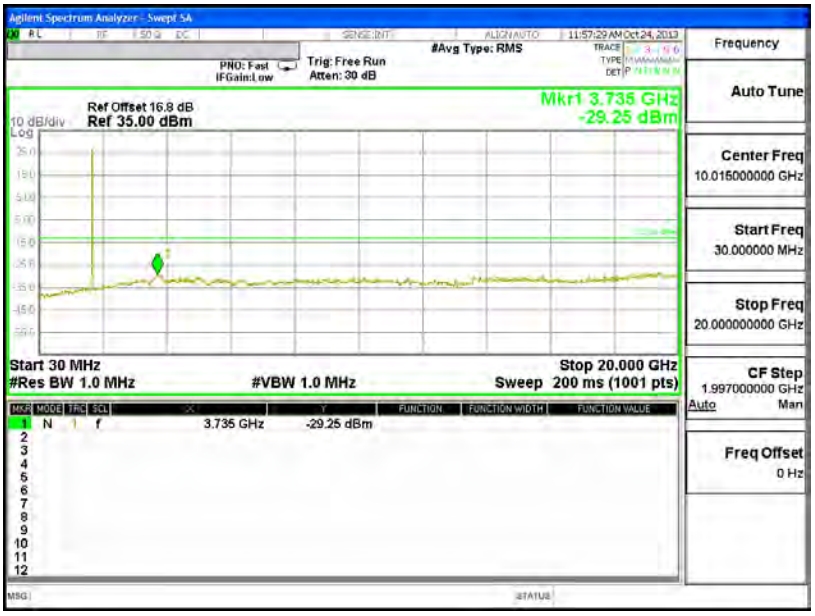
HIGH, RB1-0, 30 TO 20000 MHz



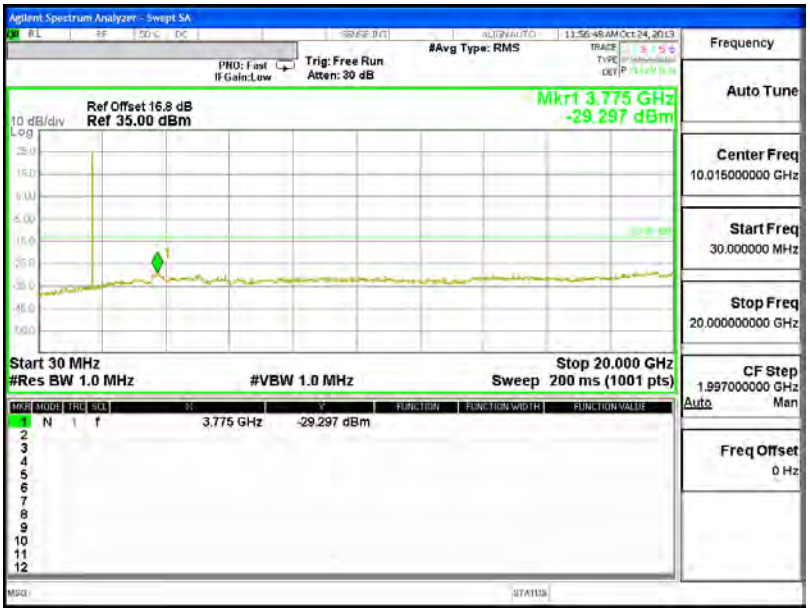
**Band 4 (3MHz BANDWIDTH)**

**LTE 16QAM**

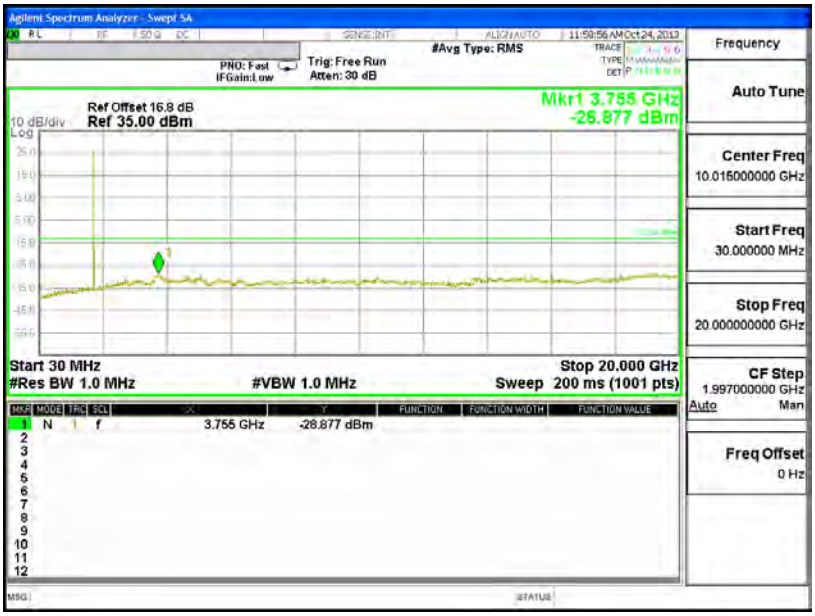
LOW, RB1-0, 30 TO 20000 MHz




MID, RB1-0, 30 TO 20000 MHz



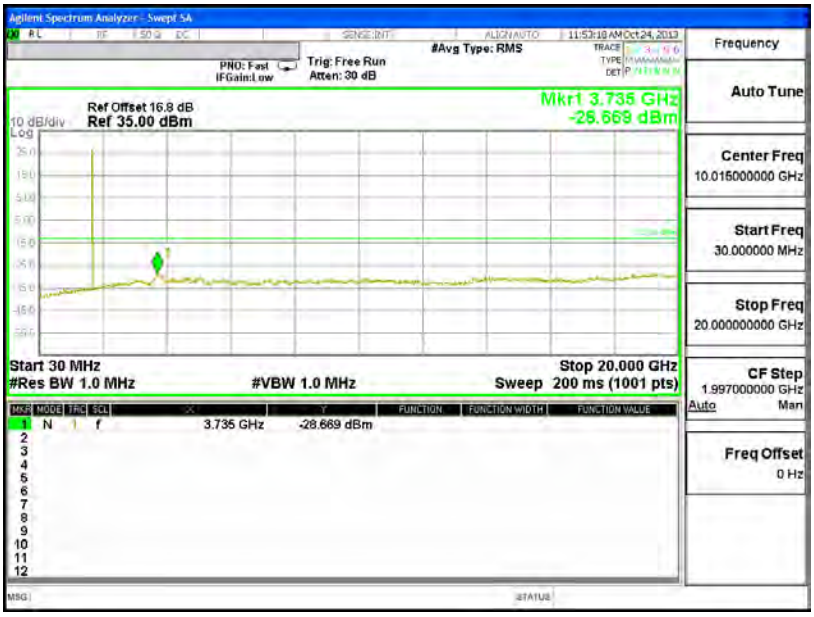
HIGH, RB1-0, 30 TO 20000 MHz



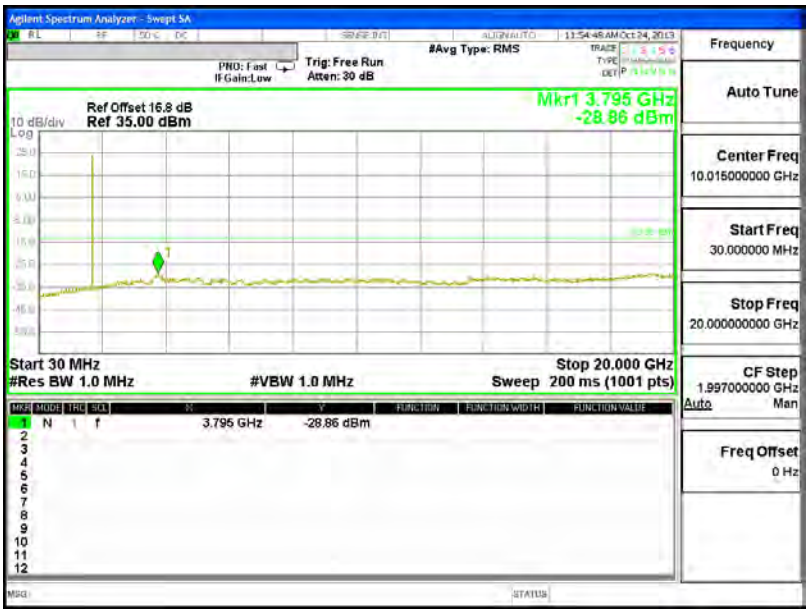
**Band 4 (5MHz BANDWIDTH)**

**LTE QPSK**

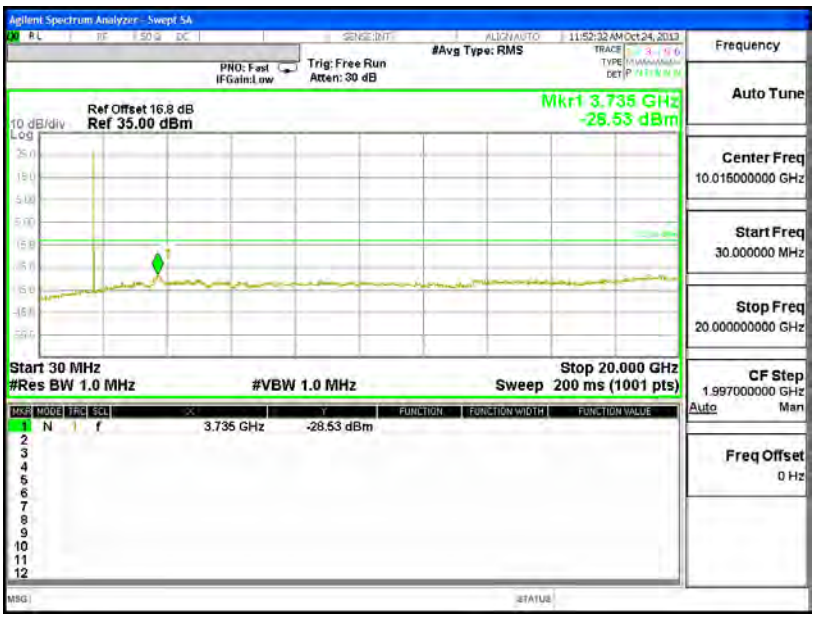
LOW, RB1-0, 30 TO 20000 MHz




MID, RB1-0, 30 TO 20000 MHz



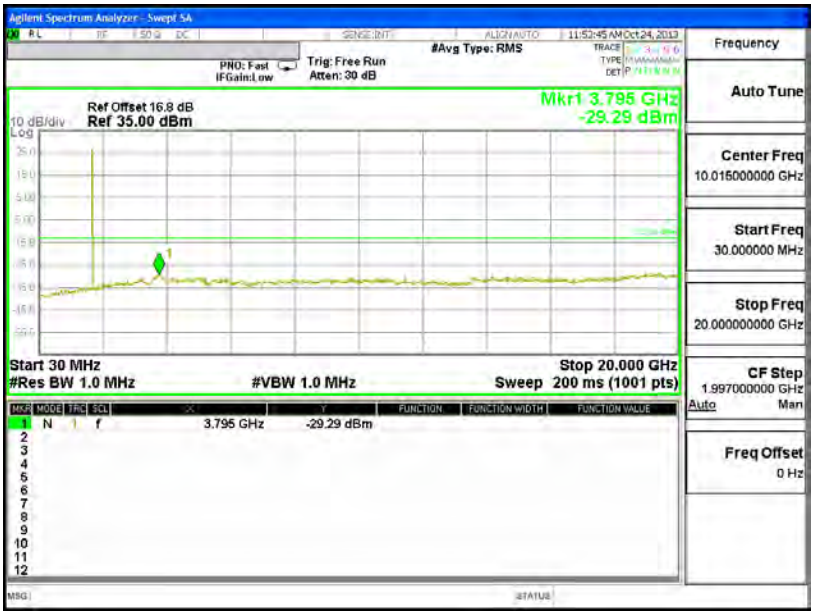
HIGH, RB1-0, 30 TO 20000 MHz



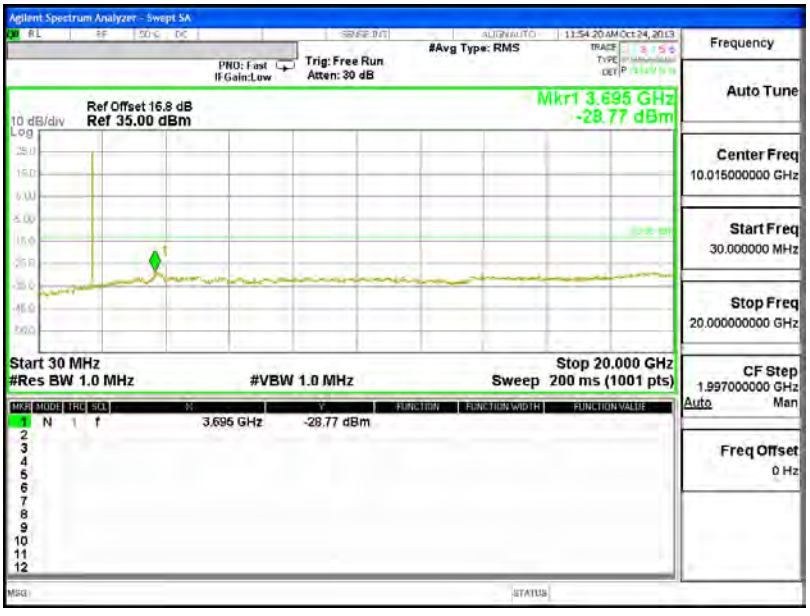
**Band 4 (5MHz BANDWIDTH)**

**LTE 16QAM**

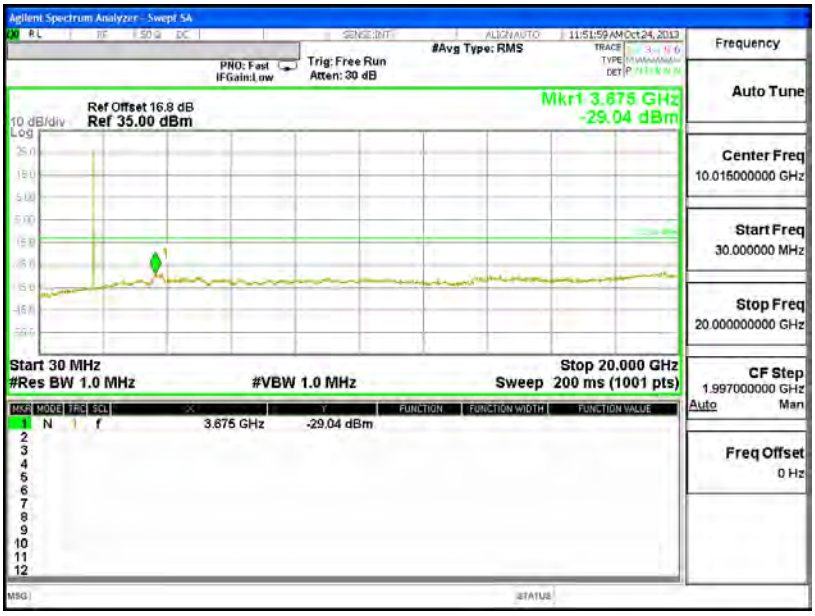
LOW, RB1-0, 30 TO 20000 MHz




MID, RB1-0, 30 TO 20000 MHz



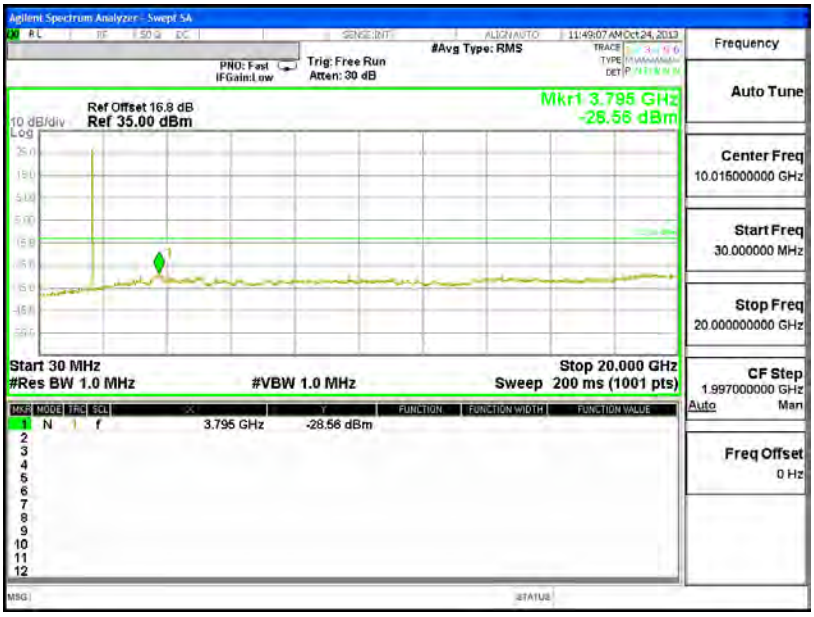
HIGH, RB1-0, 30 TO 20000 MHz



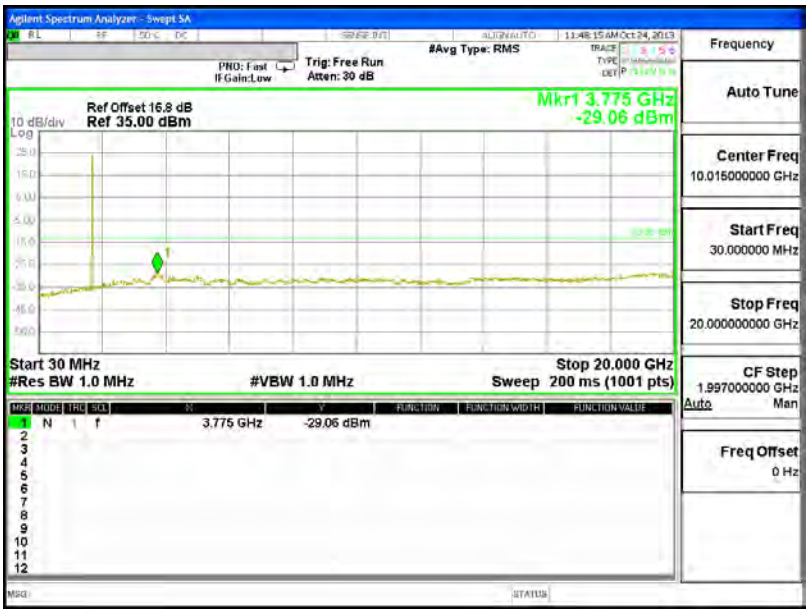
**Band 4 (10MHz BANDWIDTH)**

**LTE QPSK**

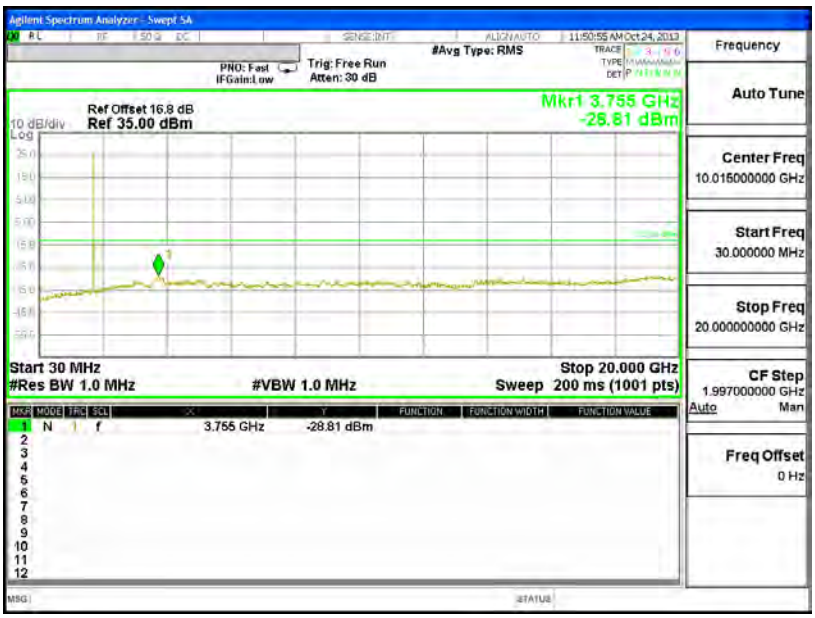
LOW, RB1-0, 30 TO 20000 MHz




MID, RB1-0, 30 TO 20000 MHz



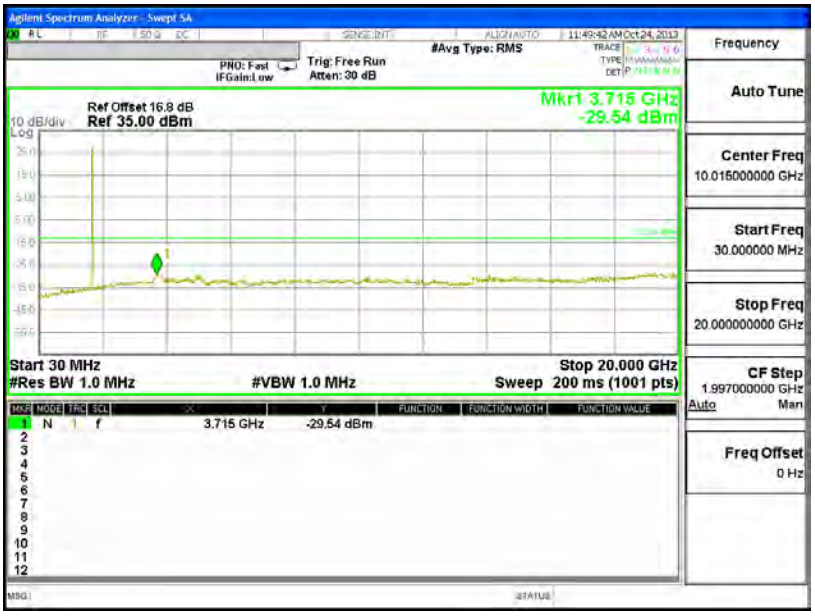
HIGH, RB1-0, 30 TO 20000 MHz



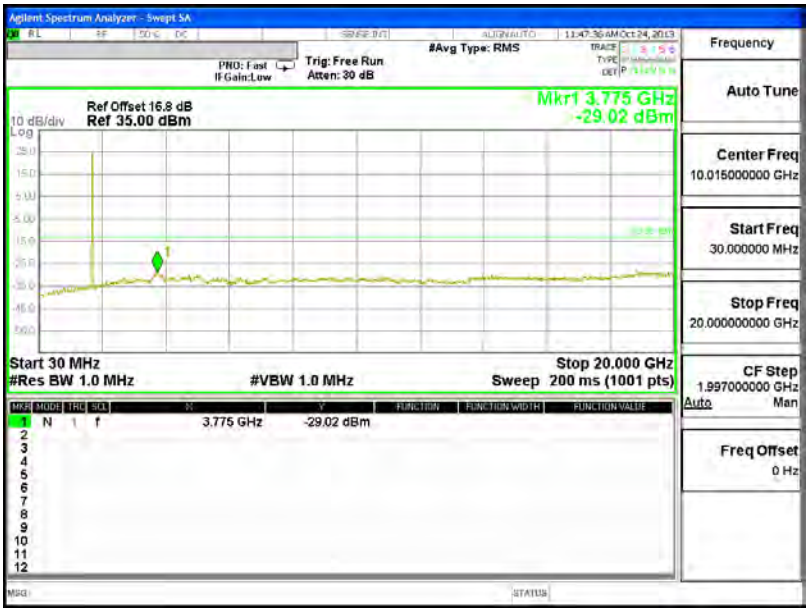
**Band 4 (10MHz BANDWIDTH)**

**LTE 16QAM**

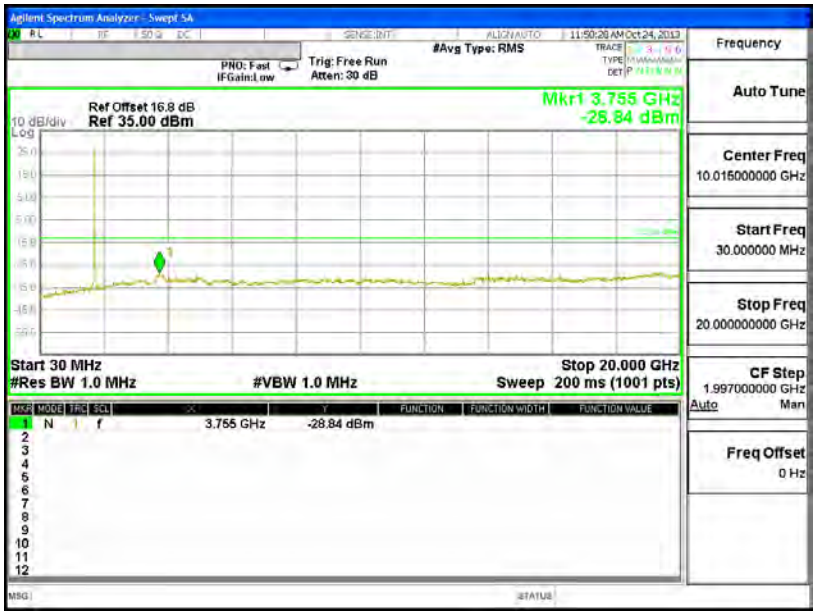
LOW, RB1-0, 30 TO 20000 MHz




MID, RB1-0, 30 TO 20000 MHz



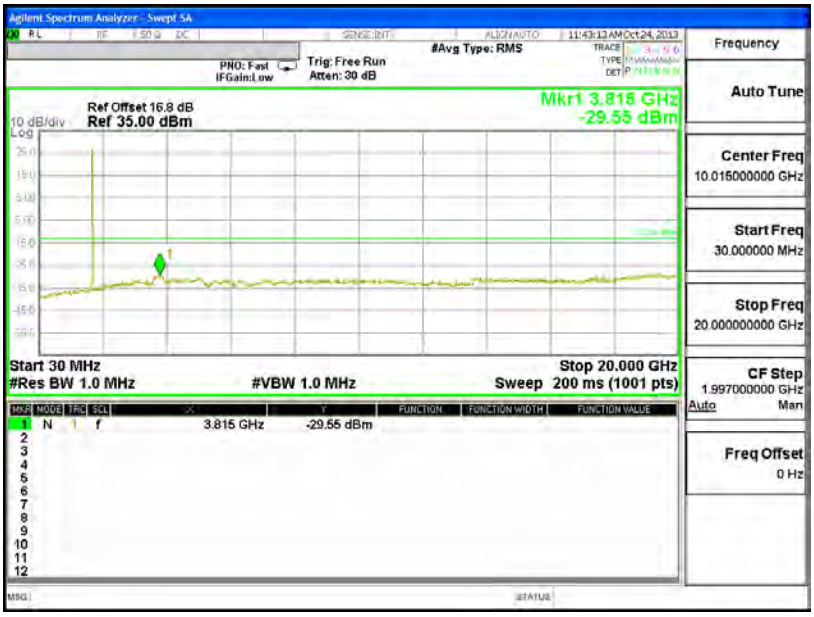
HIGH, RB1-0, 30 TO 20000 MHz



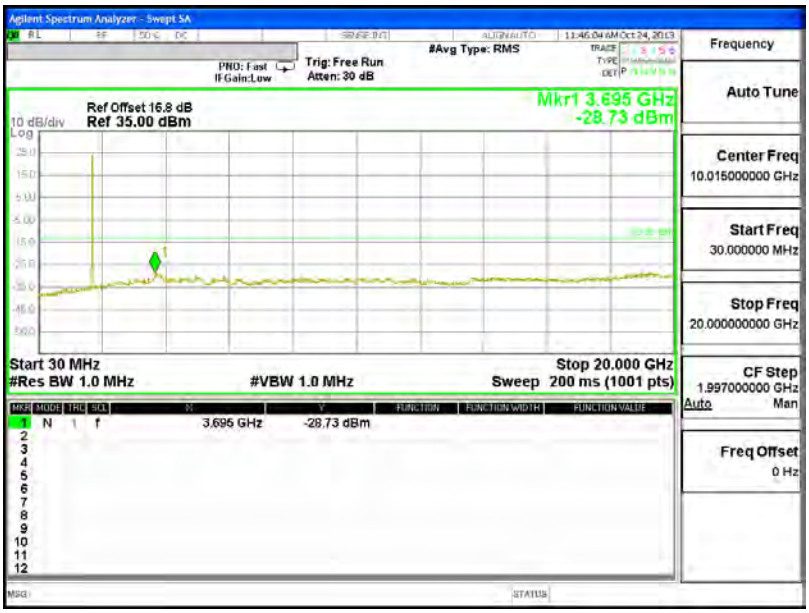
**Band 4 (15MHz BANDWIDTH)**

**LTE QPSK**

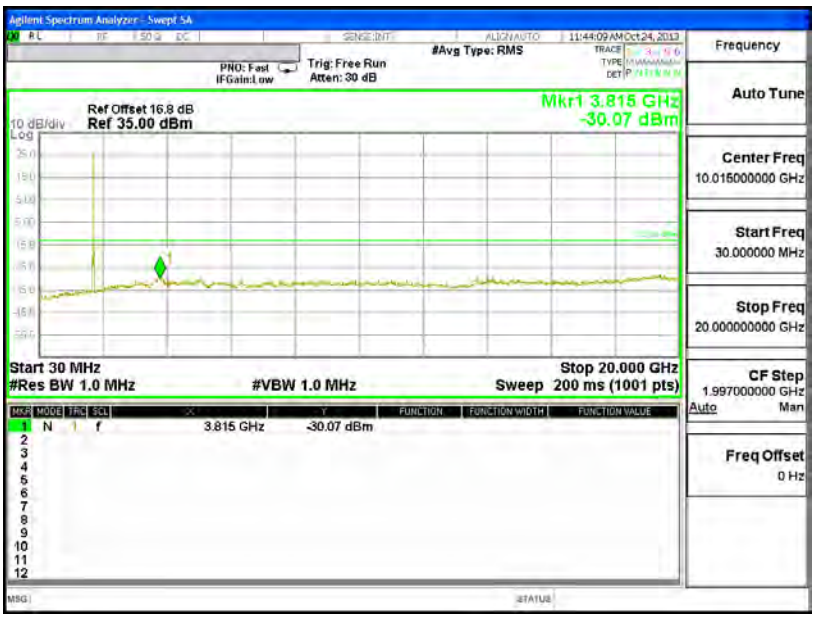
LOW, RB1-0, 30 TO 20000 MHz




MID, RB1-0, 30 TO 20000 MHz



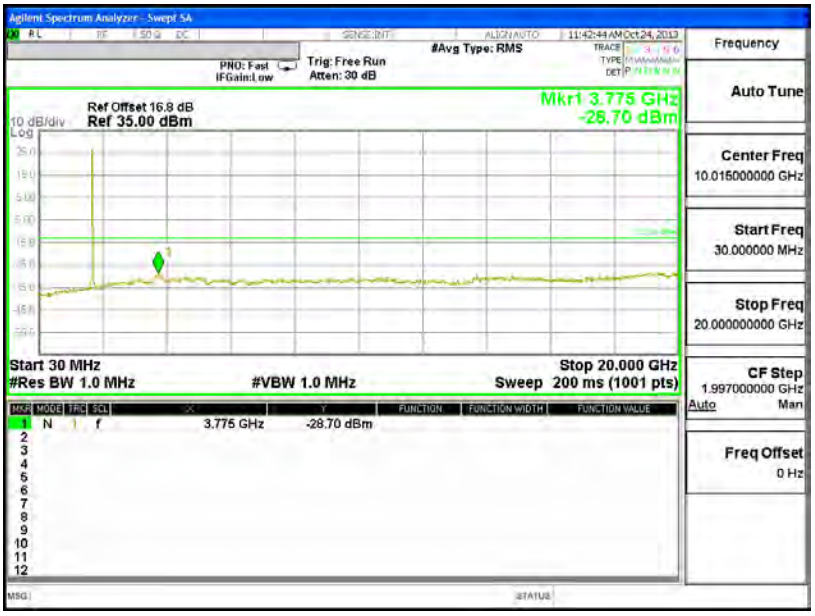
HIGH, RB1-0, 30 TO 20000 MHz



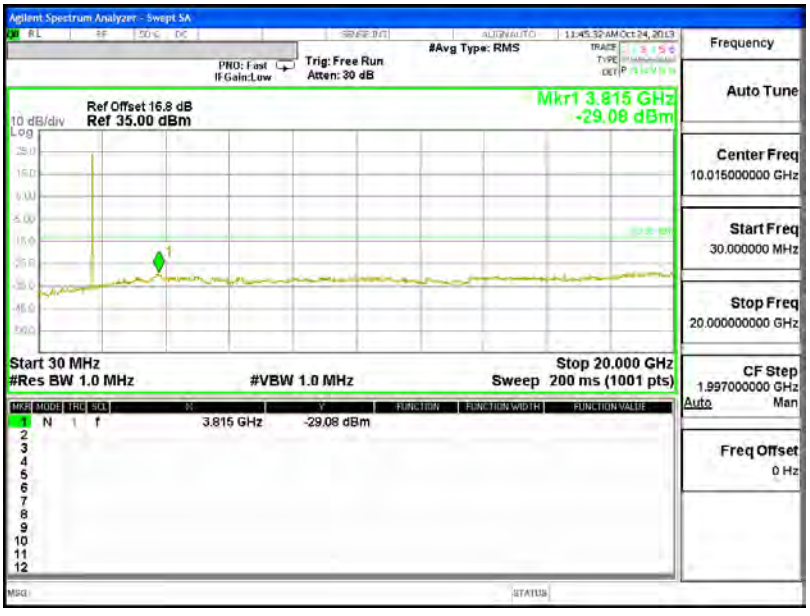
**Band 4 (15MHz BANDWIDTH)**

**LTE 16QAM**

LOW, RB1-0, 30 TO 20000 MHz



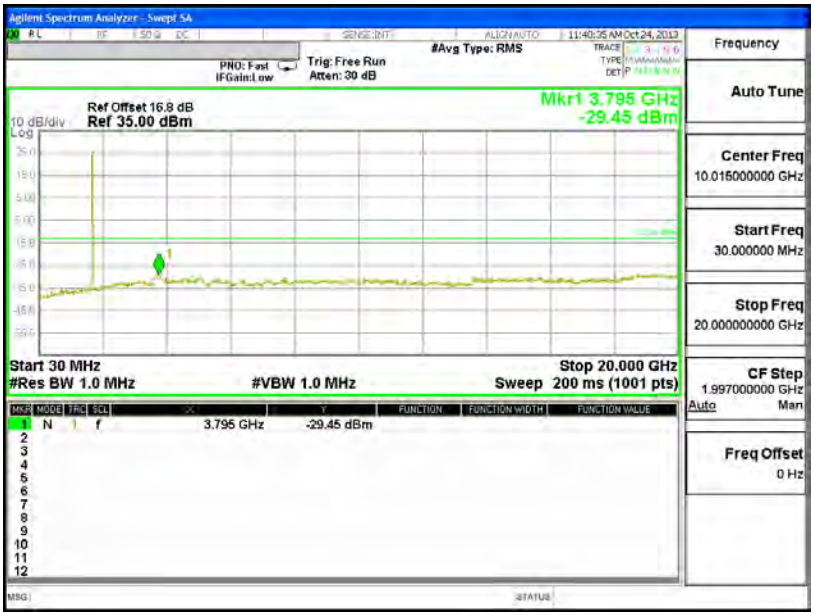

MID, RB1-0, 30 TO 20000 MHz



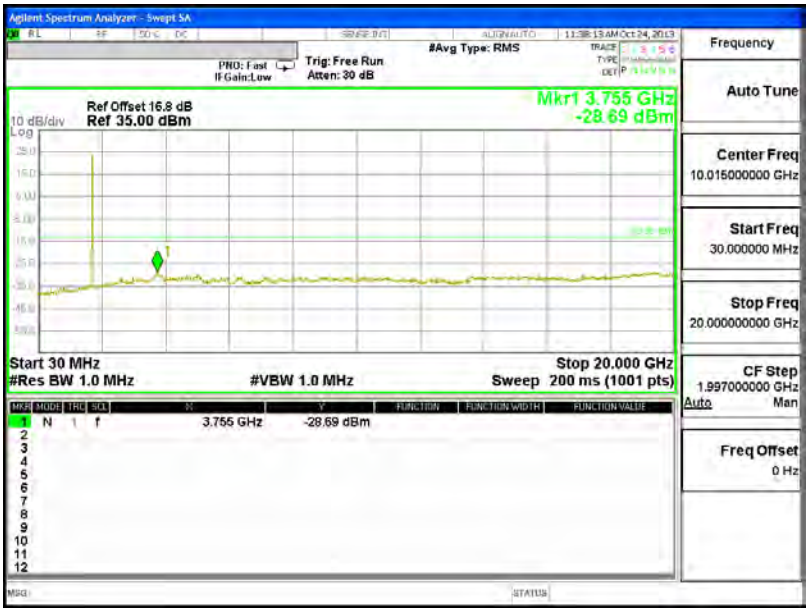
**Band 4 (20MHz BANDWIDTH)**

**LTE QPSK**

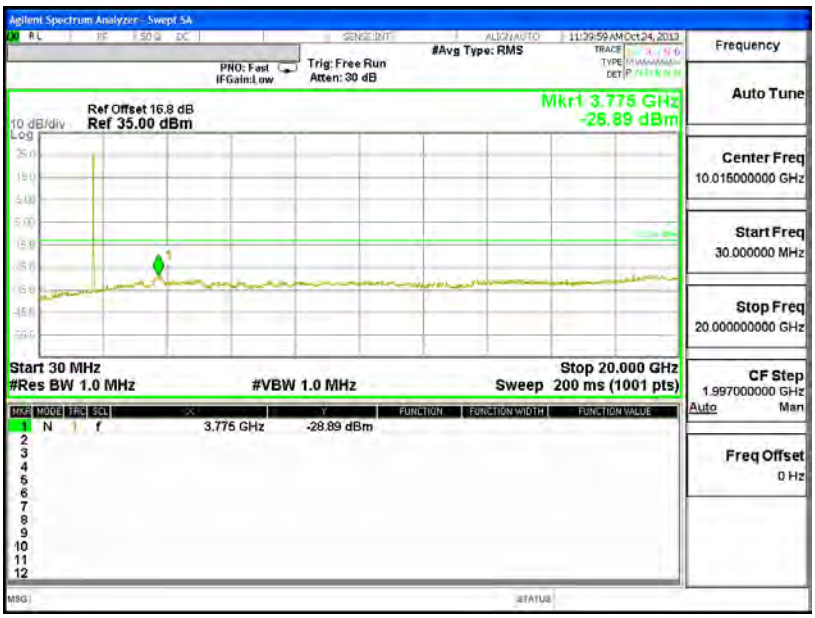
LOW, RB1-0, 30 TO 20000 MHz




MID, RB1-0, 30 TO 20000 MHz



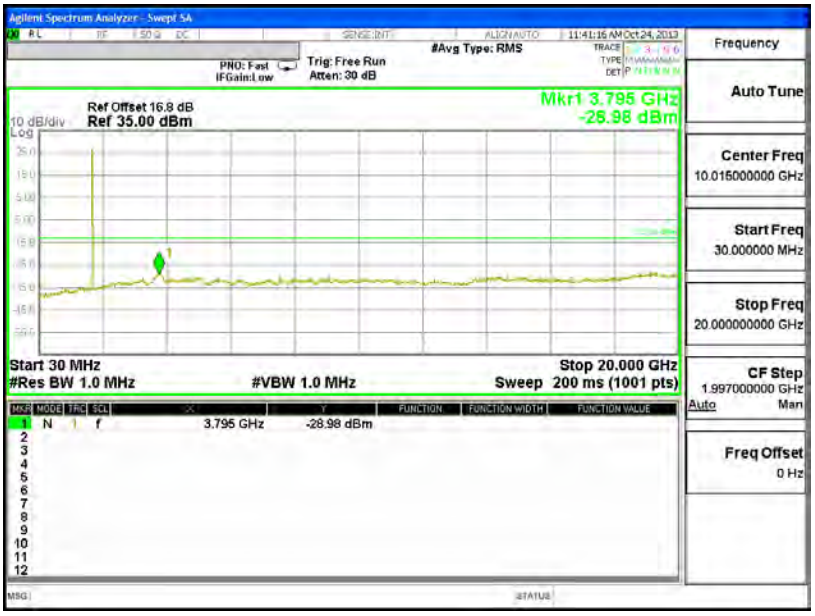
HIGH, RB1-0, 30 TO 20000 MHz



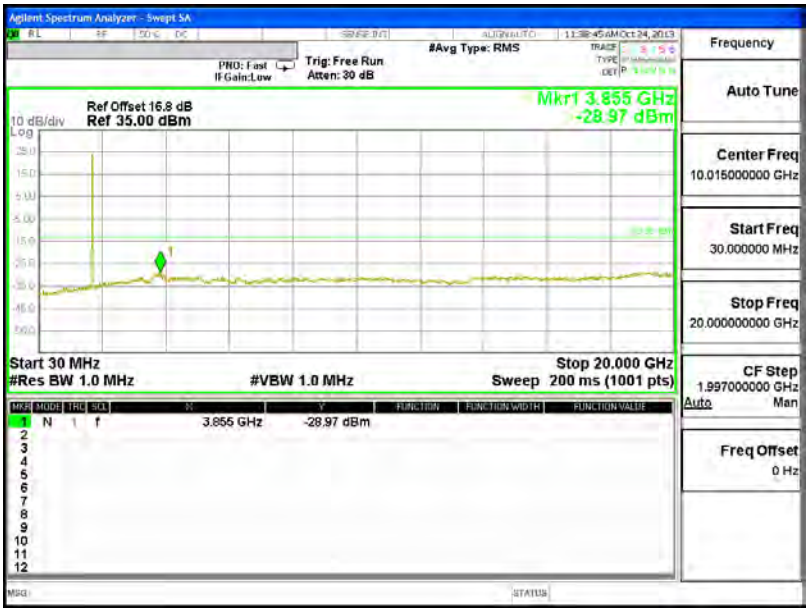
**Band 4 (20MHz BANDWIDTH)**

**LTE 16QAM**

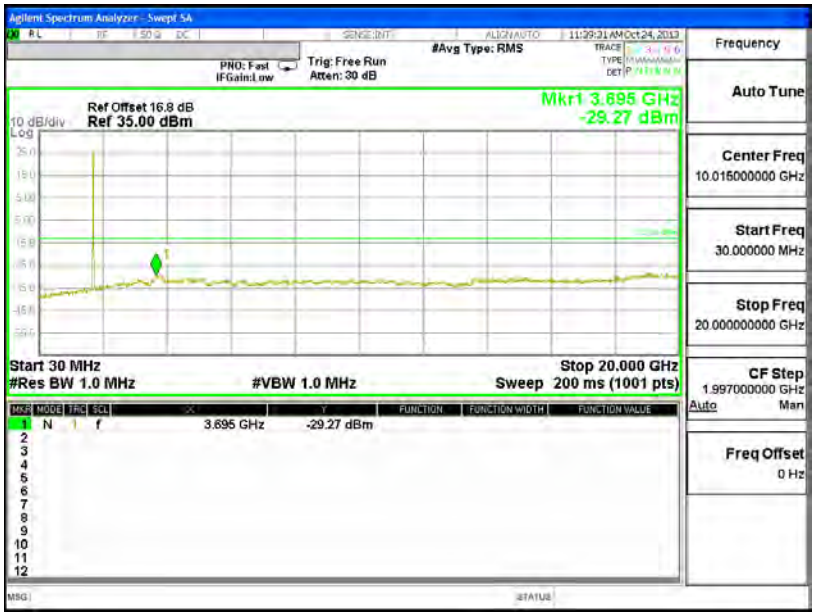
LOW, RB1-0, 30 TO 20000 MHz




MID, RB1-0, 30 TO 20000 MHz



HIGH, RB1-0, 30 TO 20000 MHz

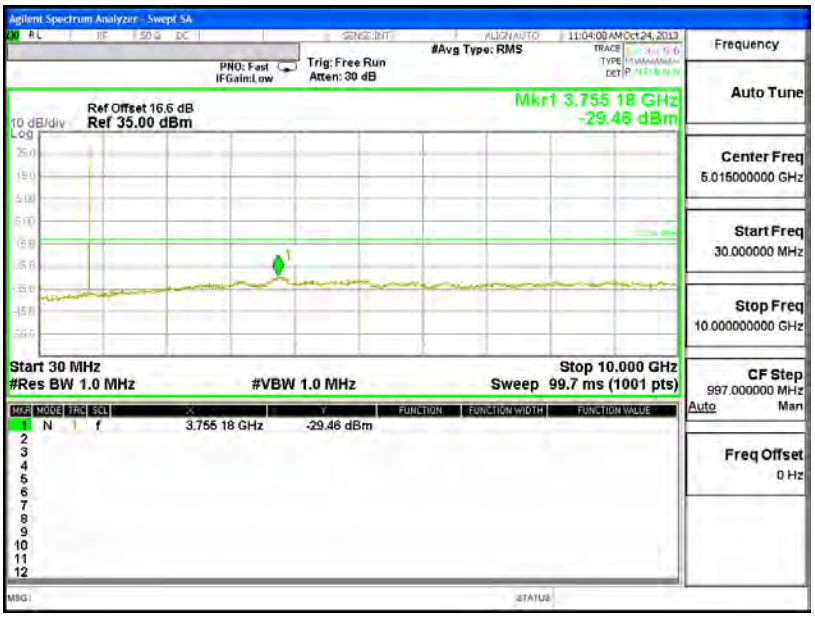


## 8.3.3. LTE BAND 5

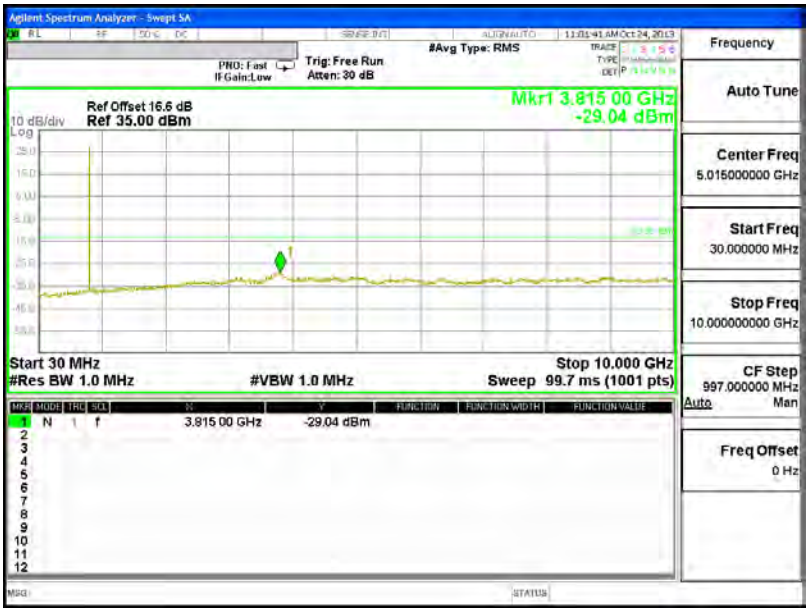
**Band 5 (1.4 MHz BANDWIDTH)**

**LTE QPSK**

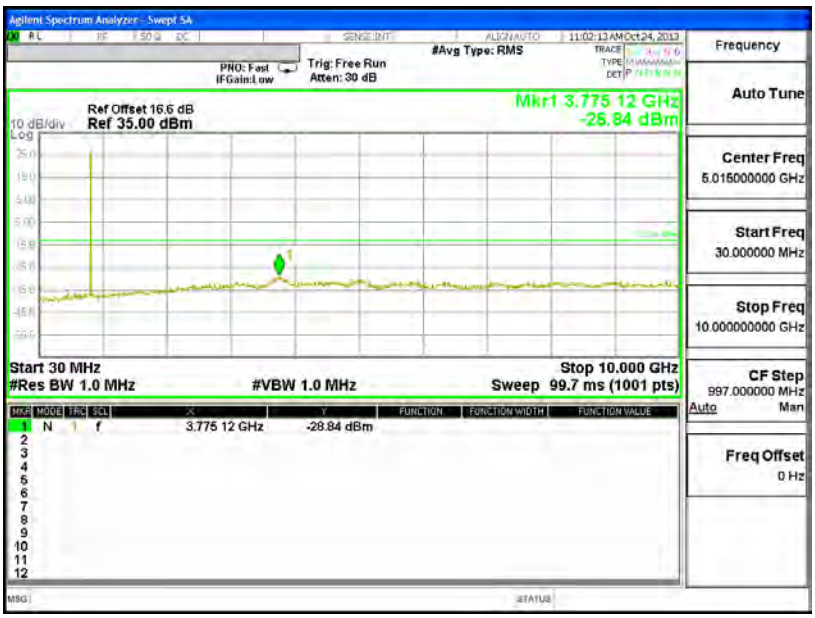
LOW, RB1-0, 30 TO 10000 MHz




MID, RB1-0, 30 TO 10000 MHz



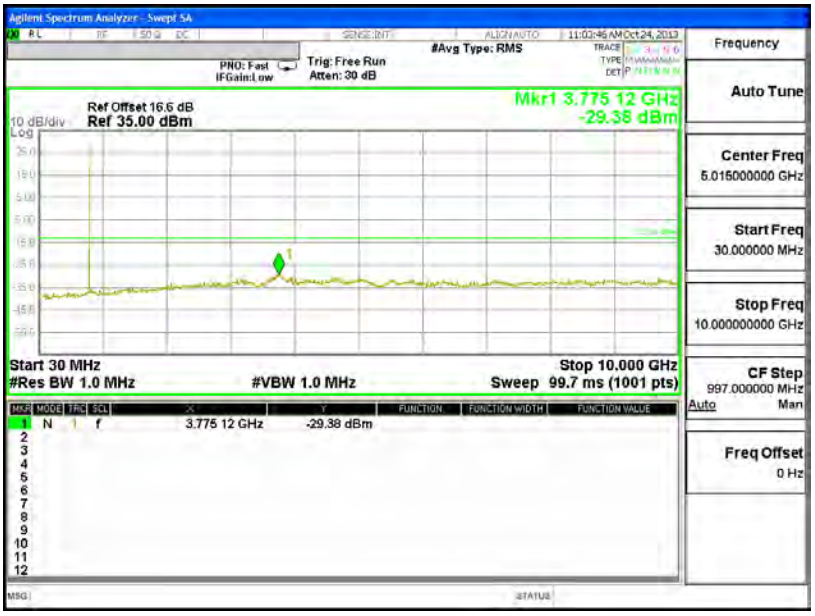
HIGH, RB1-0, 30 TO 10000 MHz



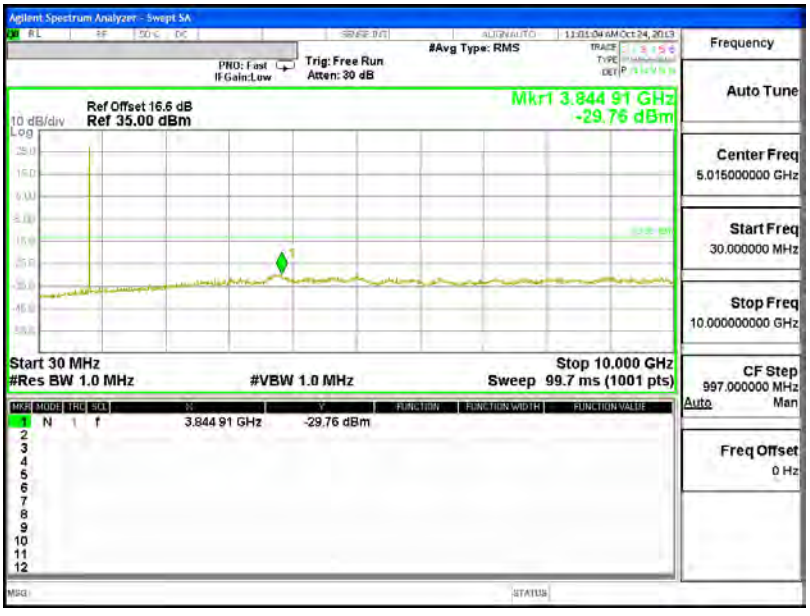
**Band 5 (1.4 MHz BANDWIDTH)**

**LTE 16QAM**

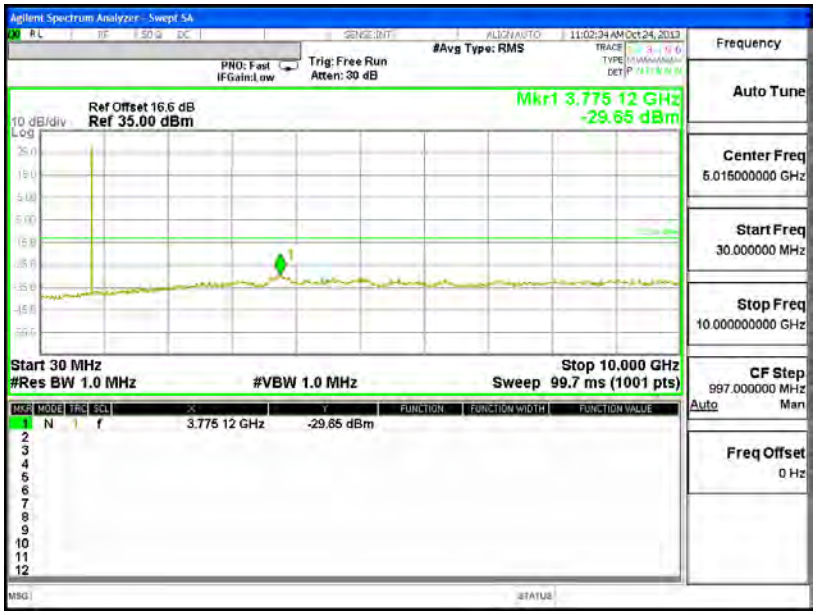
LOW, RB1-0, 30 TO 10000 MHz




MID, RB1-0, 30 TO 10000 MHz



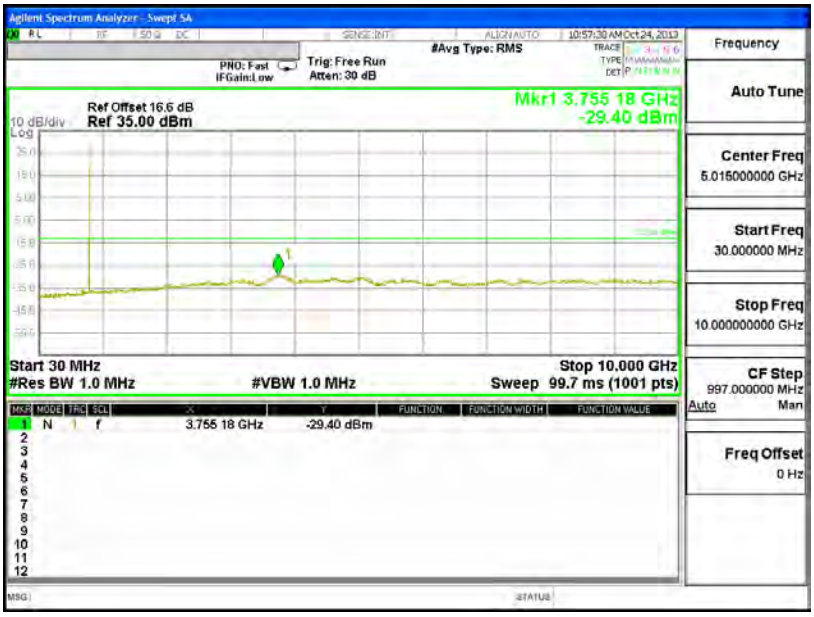
HIGH, RB1-0, 30 TO 10000 MHz



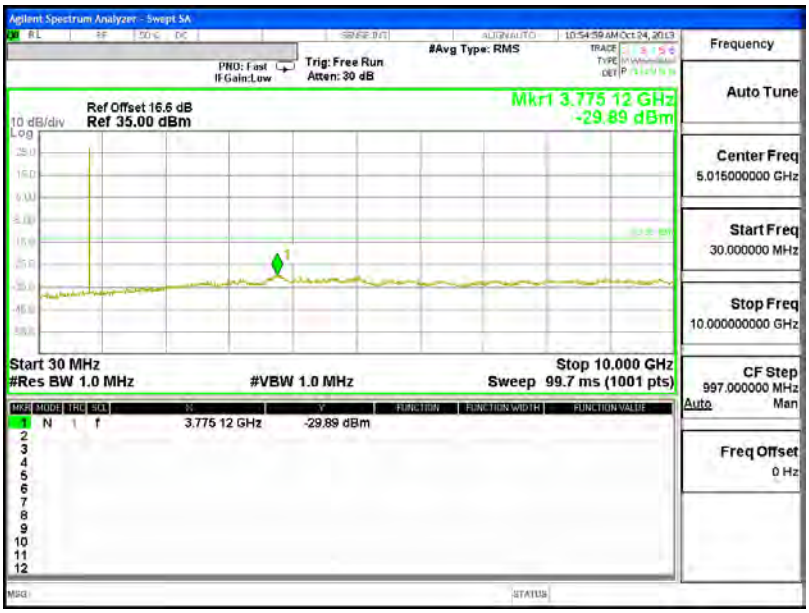
**Band 5 (3MHz BANDWIDTH)**

**LTE QPSK**

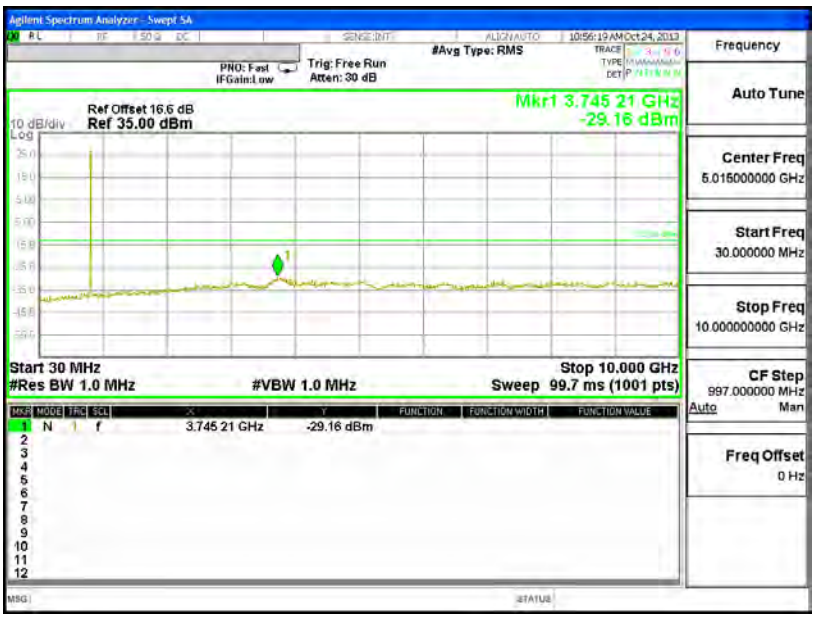
LOW, RB1-0, 30 TO 10000 MHz




MID, RB1-0, 30 TO 10000 MHz



HIGH, RB1-0, 30 TO 10000 MHz

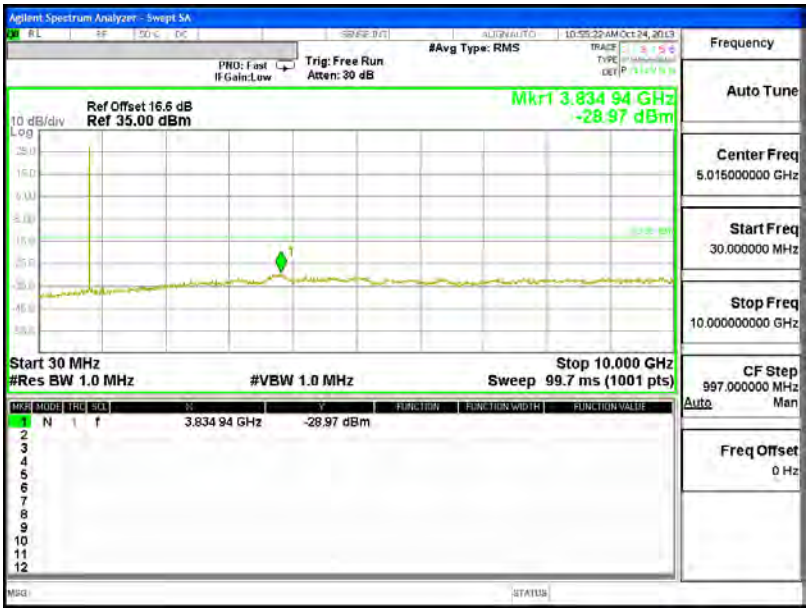


**Band 5 (3MHz BANDWIDTH)**

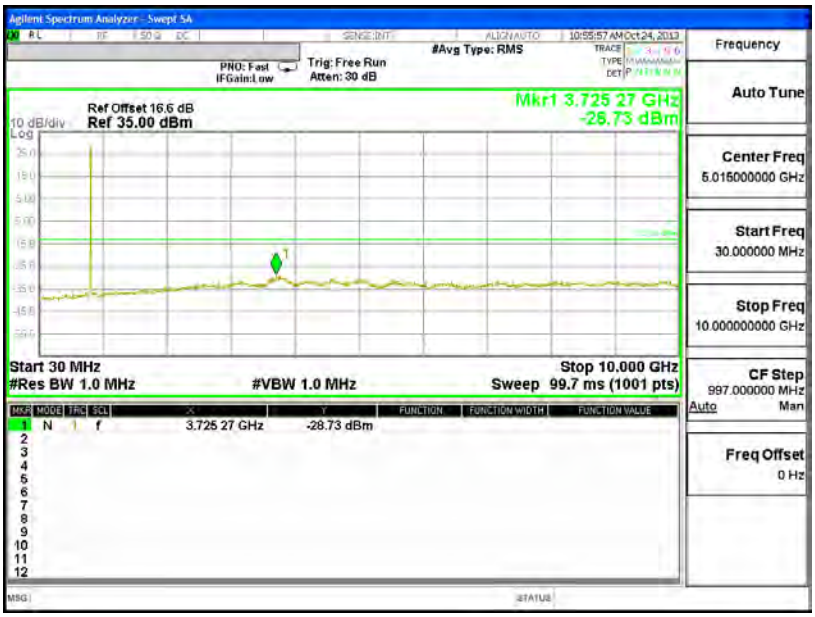
**LTE 16QAM**

LOW, RB1-0, 30 TO 10000 MHz


MID, RB1-0, 30 TO 10000 MHz



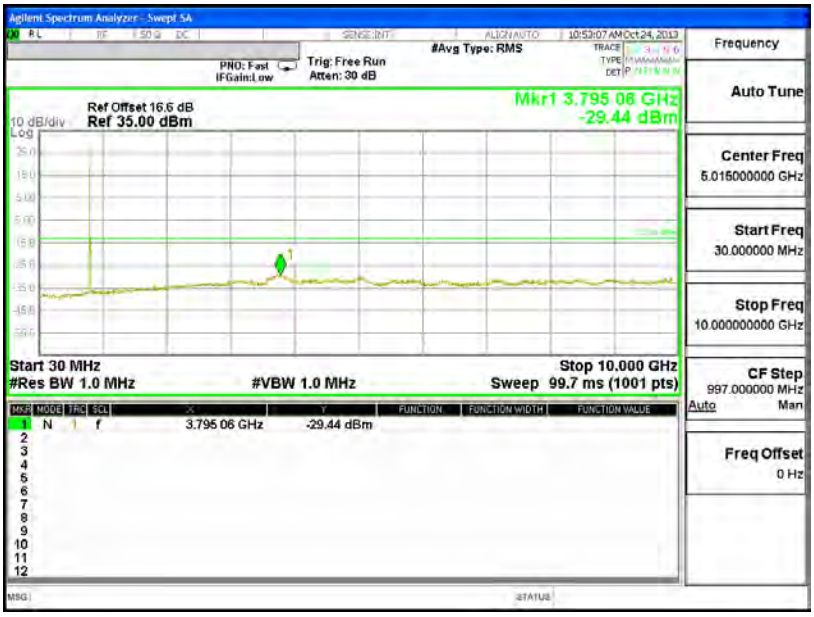
HIGH, RB1-0, 30 TO 10000 MHz



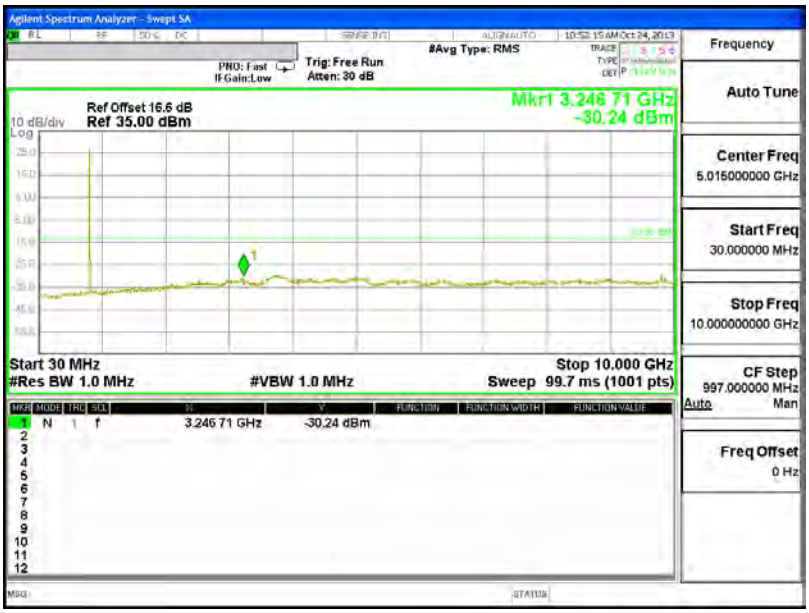
**Band 5 (5MHz BANDWIDTH)**

**LTE QPSK**

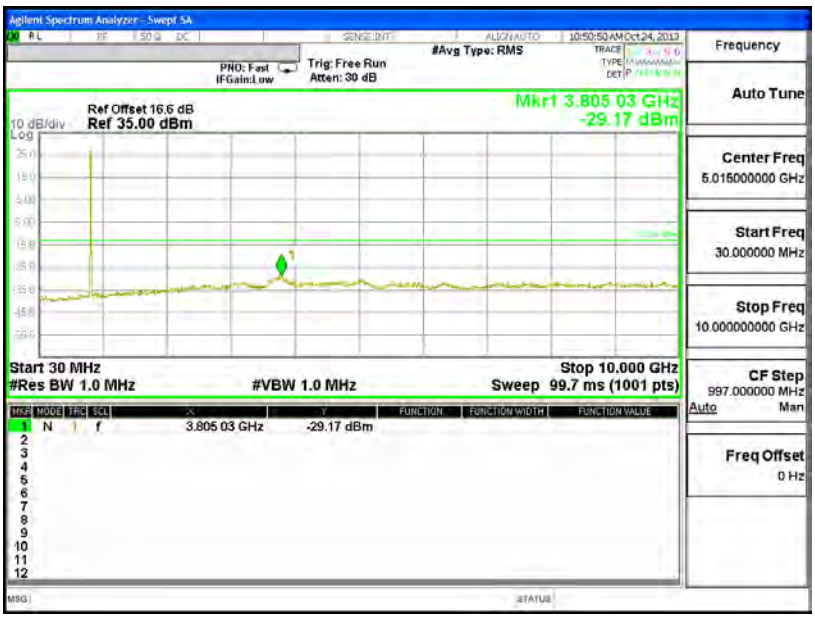
LOW, RB1-0, 30 TO 10000 MHz




MID, RB1-0, 30 TO 10000 MHz



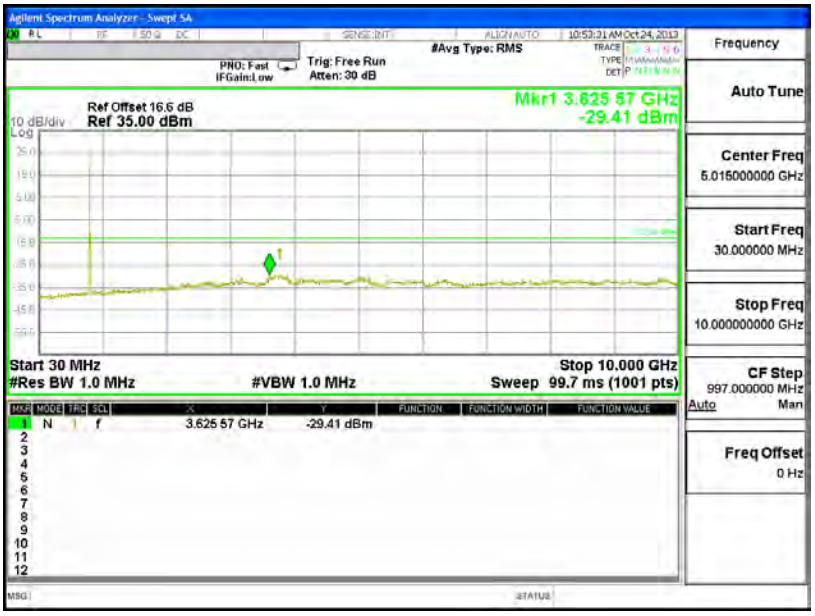
HIGH, RB1-0, 30 TO 10000 MHz



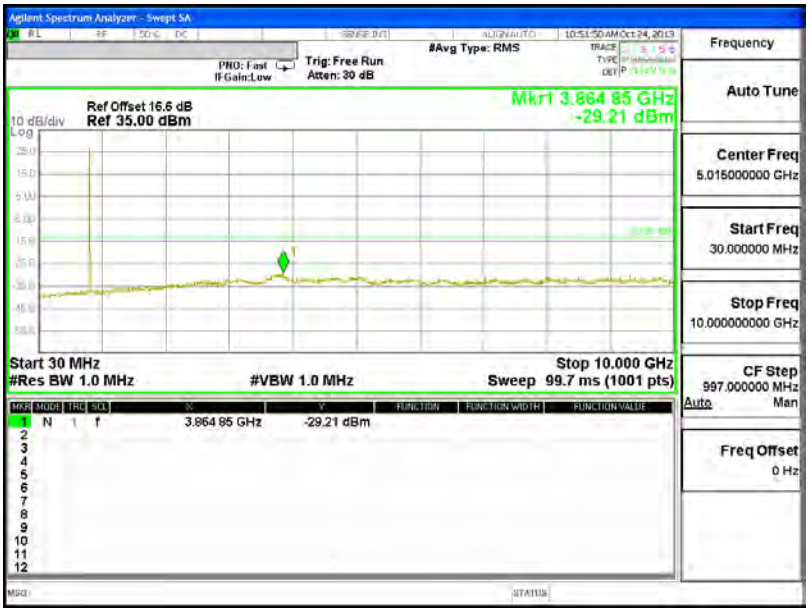
**Band 5 (5MHz BANDWIDTH)**

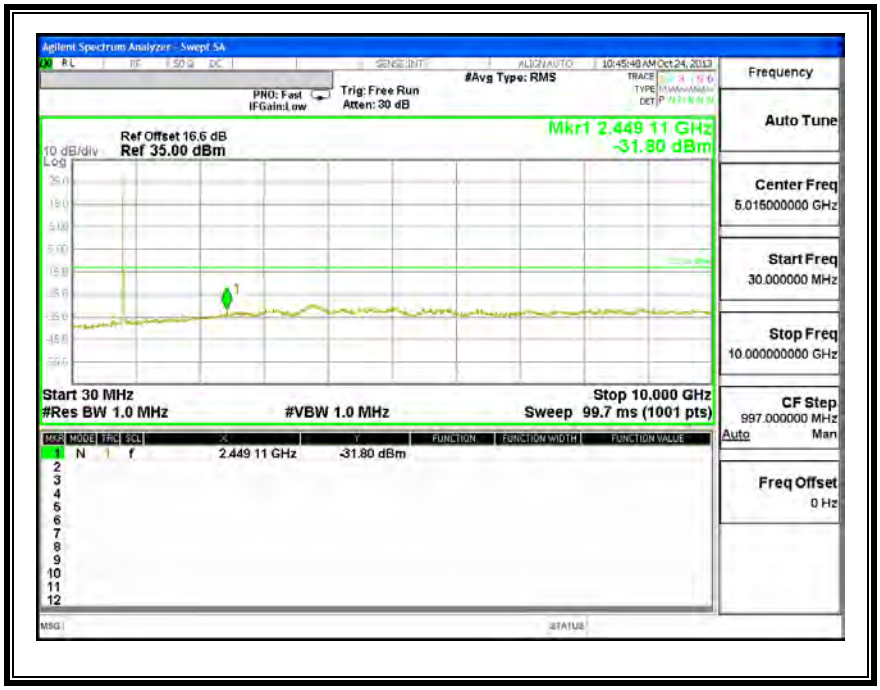
**LTE 16QAM**

LOW, RB1-0, 30 TO 10000 MHz




MID, RB1-0, 30 TO 10000 MHz

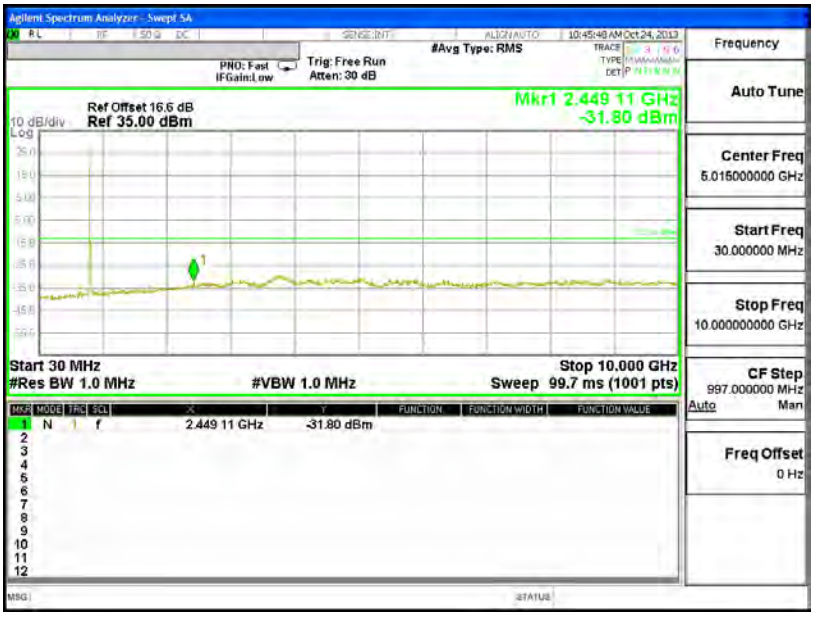




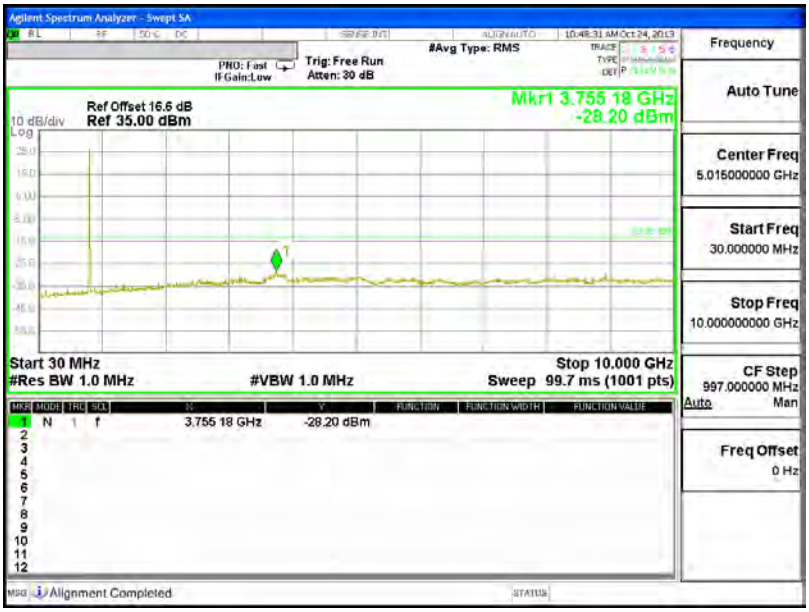
**Band 5 (10MHz BANDWIDTH)**

**LTE QPSK**

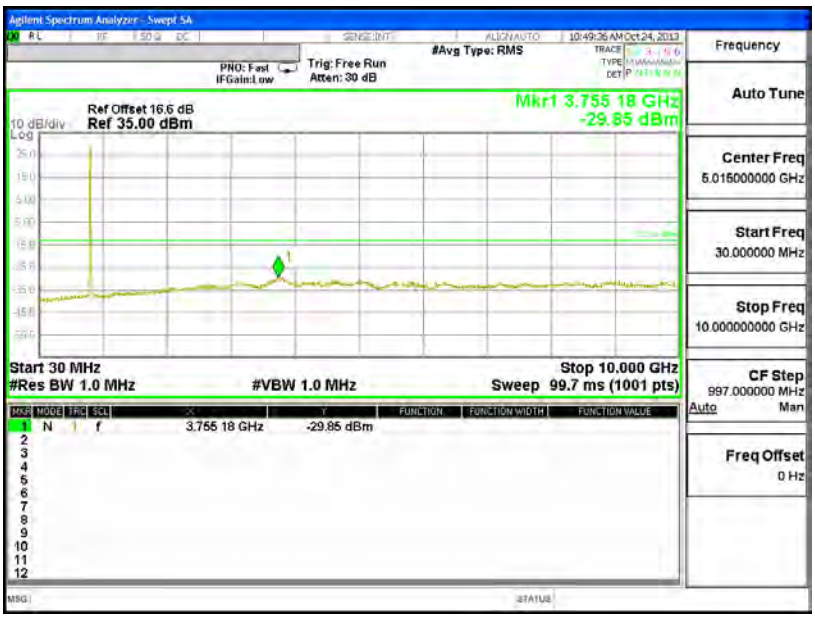
LOW, RB1-0, 30 TO 10000 MHz




MID, RB1-0, 30 TO 10000 MHz



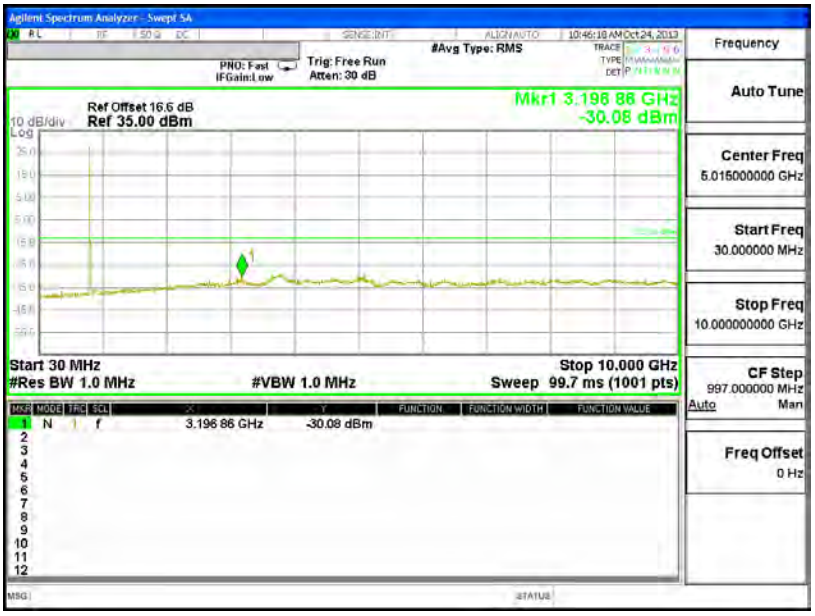
HIGH, RB1-0, 30 TO 10000 MHz



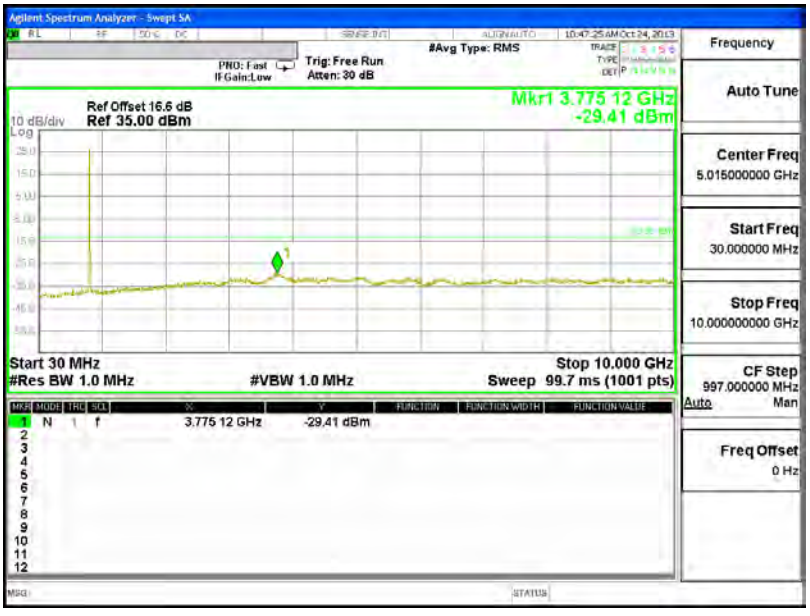
**Band 5 (10MHz BANDWIDTH)**

**LTE 16QAM**

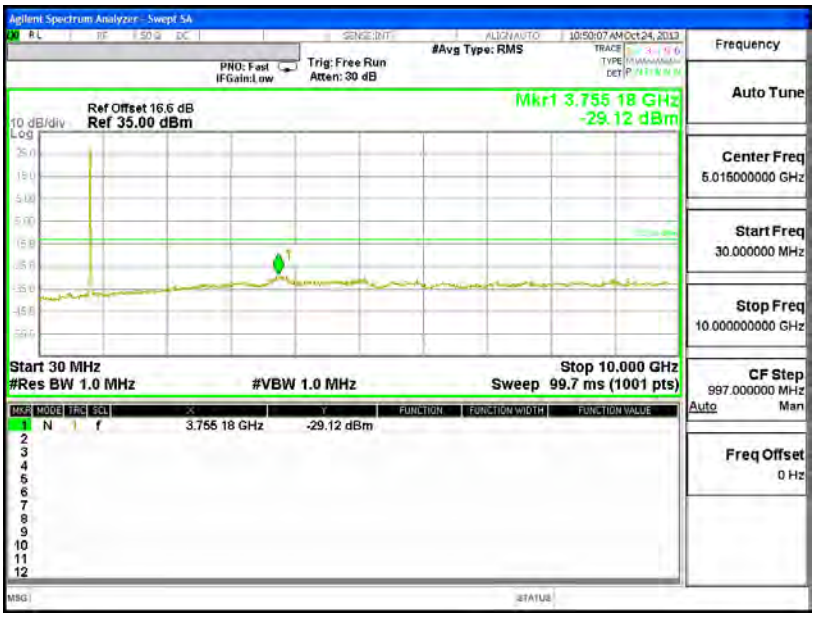
LOW, RB1-0, 30 TO 10000 MHz




MID, RB1-0, 30 TO 10000 MHz



HIGH, RB1-0, 30 TO 10000 MHz

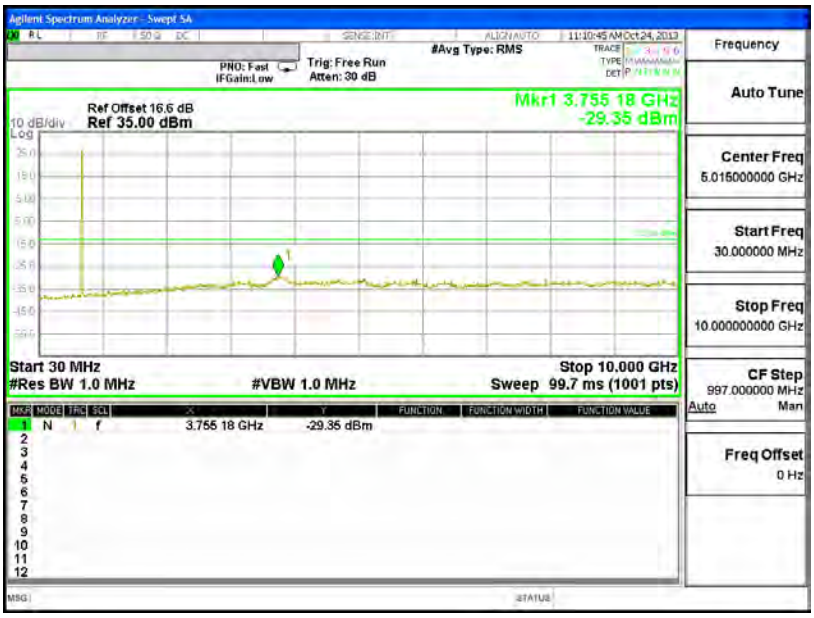


## 8.3.4. LTE BAND 17

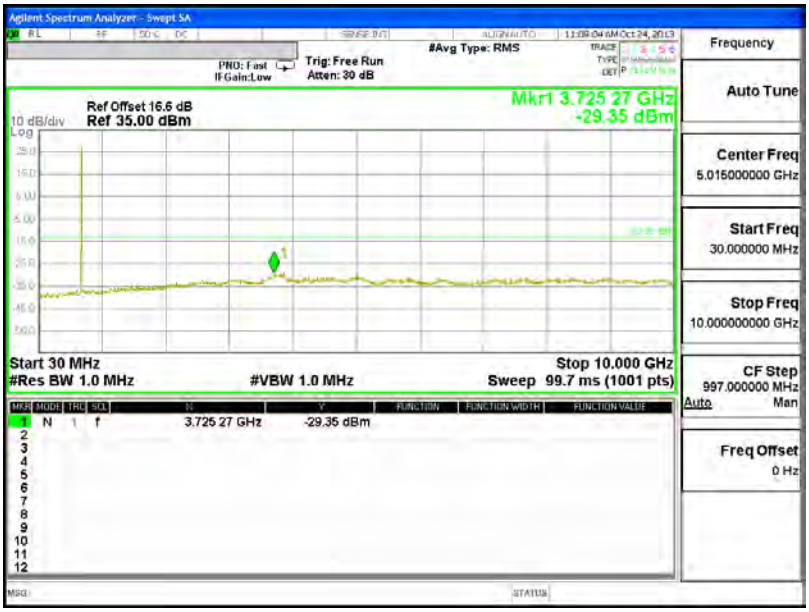
**Band 17 (5MHz BANDWIDTH)**

**LTE QPSK**

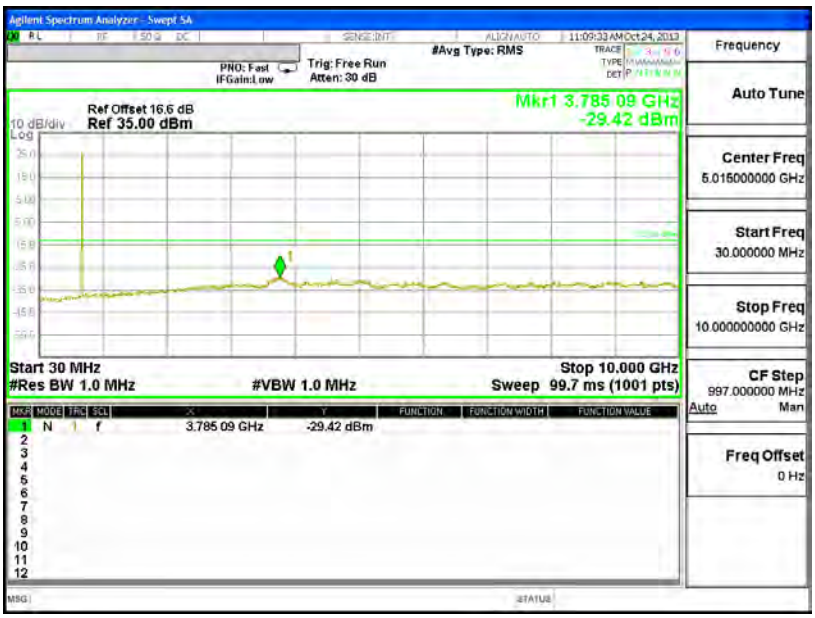
LOW, RB1-0, 30 TO 10000 MHz




MID, RB1-0, 30 TO 10000 MHz



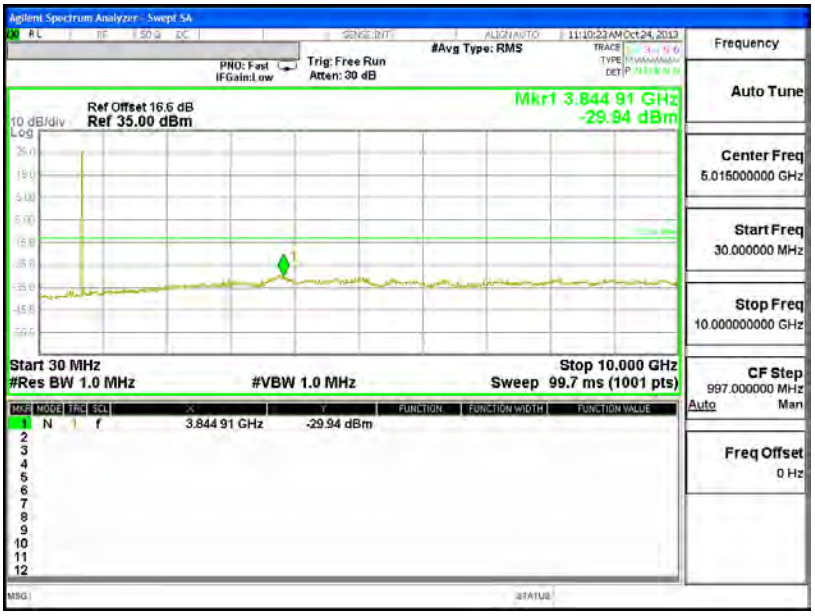
HIGH, RB1-0, 30 TO 10000 MHz



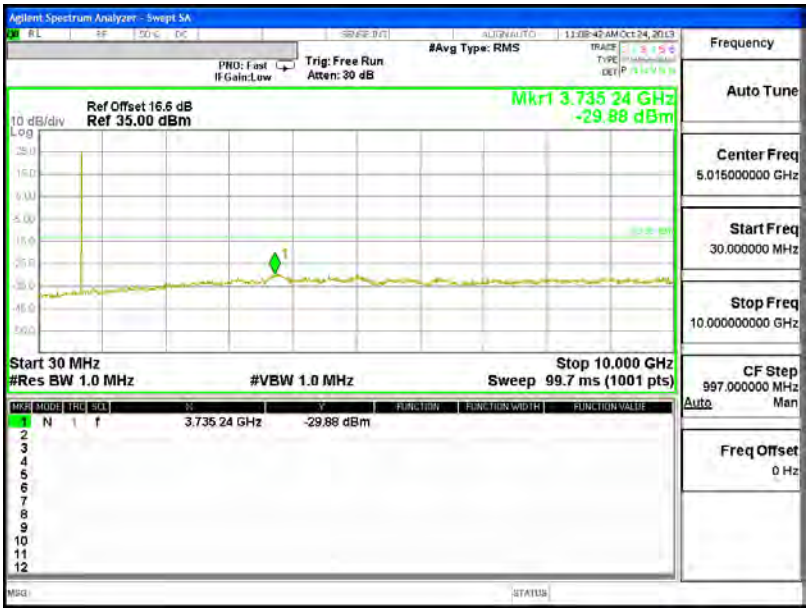
**Band 17 (5MHz BANDWIDTH)**

**LTE 16QAM**

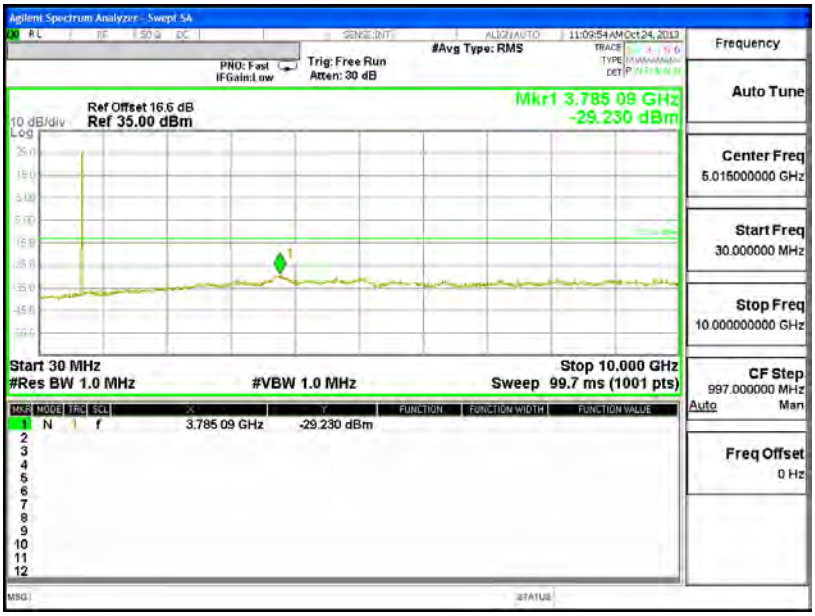
LOW, RB1-0, 30 TO 10000 MHz




MID, RB1-0, 30 TO 10000 MHz



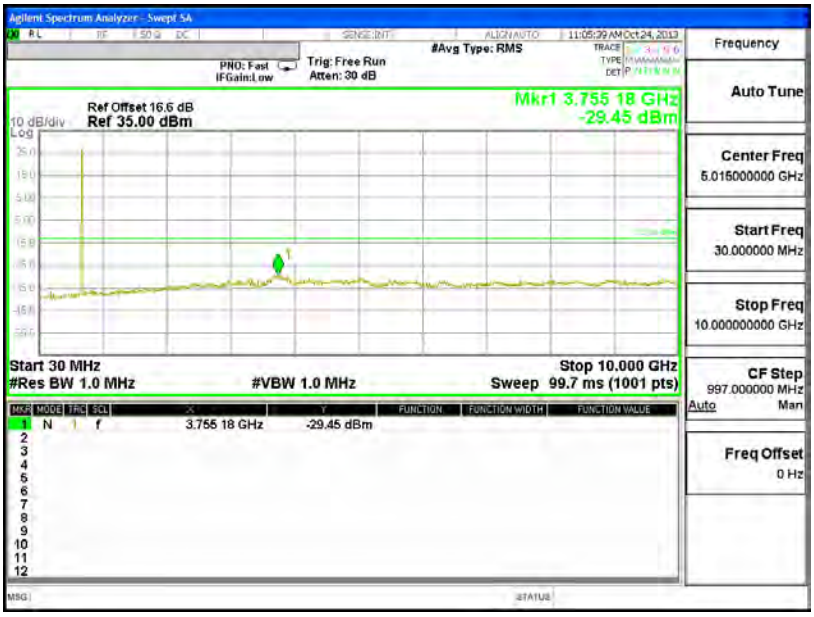
HIGH, RB1-0, 30 TO 10000 MHz



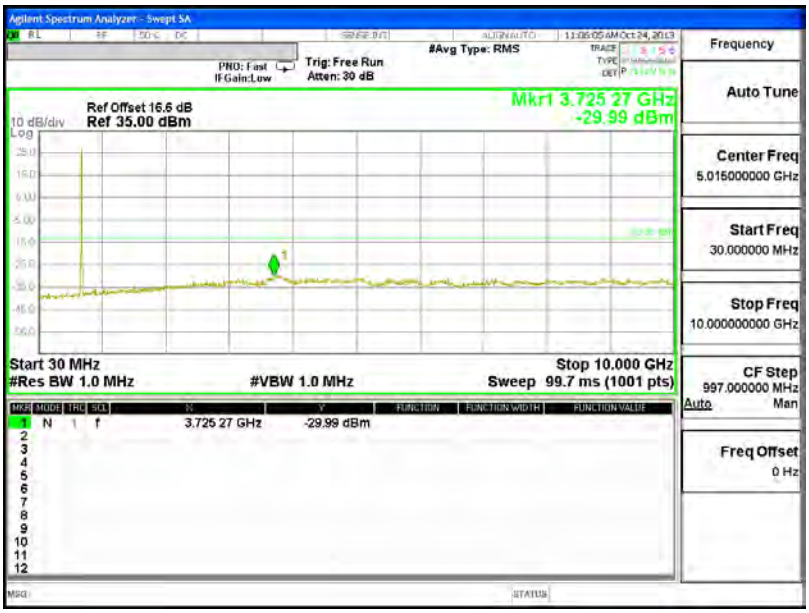
**Band 17 (10MHz BANDWIDTH)**

**LTE QPSK**

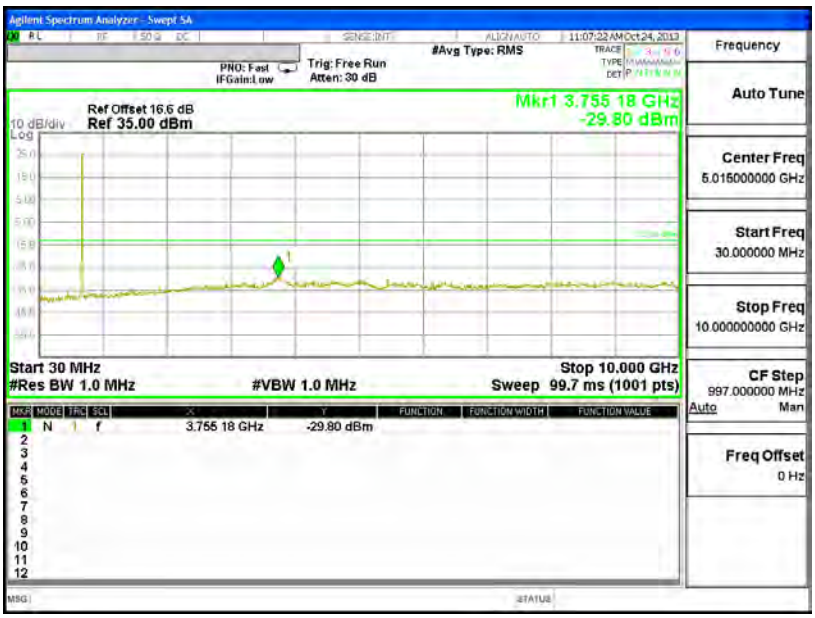
LOW, RB1-0, 30 TO 10000 MHz




MID, RB1-0, 30 TO 10000 MHz



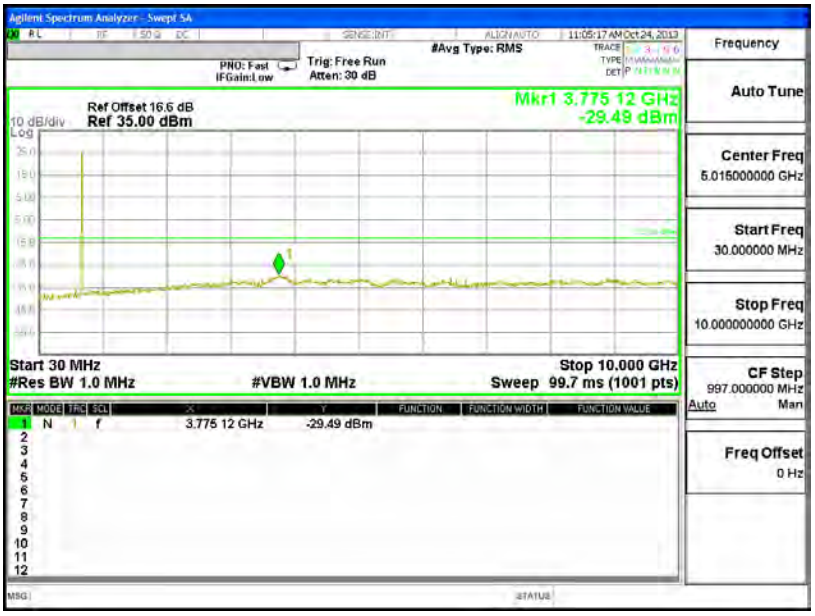
HIGH, RB1-0, 30 TO 10000 MHz



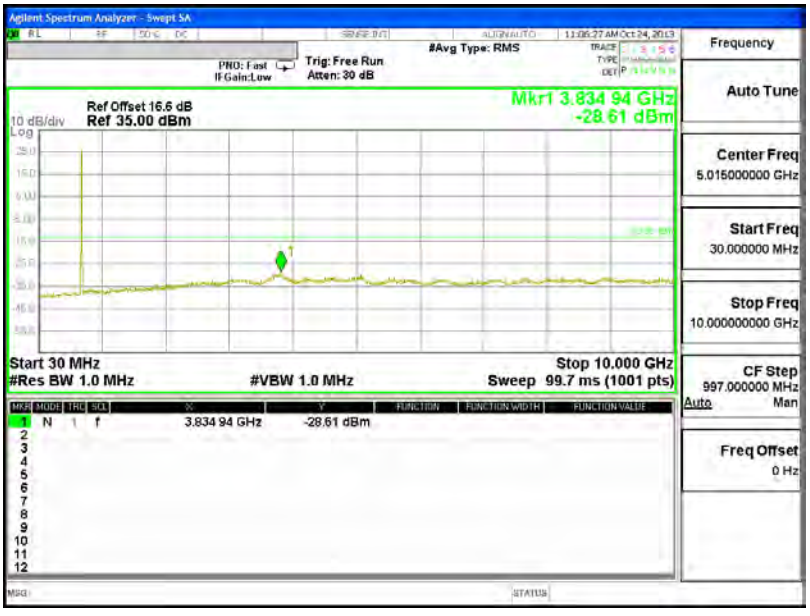
**Band 17 (10MHz BANDWIDTH)**

**LTE 16QAM**

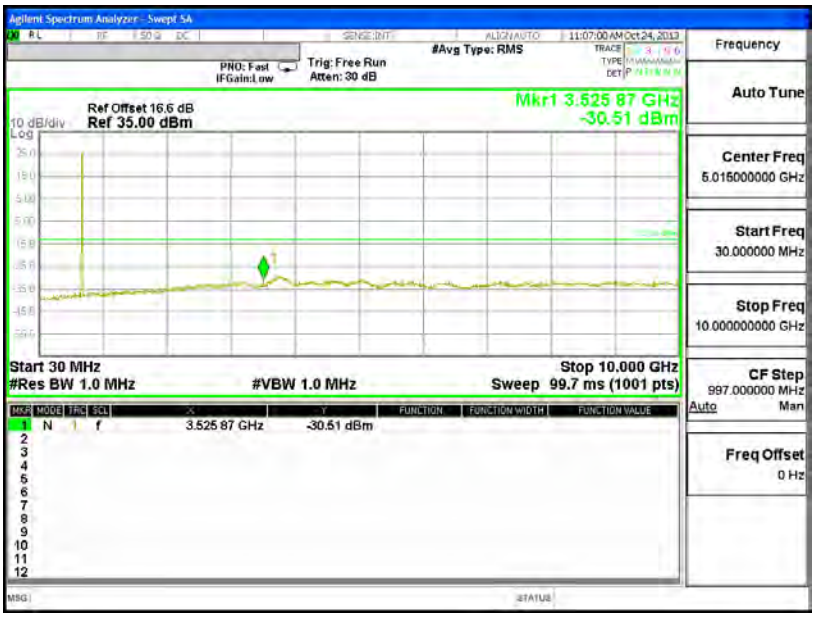
LOW, RB1-0, 30 TO 10000 MHz




MID, RB1-0, 30 TO 10000 MHz



HIGH, RB1-0, 30 TO 10000 MHz



## 8.4. PEAK-TO-AVERAGE RATIO

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

### 8.4.1. LTE BAND 2

| Mode | Channel Band-width (MHZ) | Modulation | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio (PAR) |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| QPSK | 1.4 | RB1-0 | 1880 | 28.66 | 23.06 | 5.6 |

| Mode | Channel Band-width | Ch. No. | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| 16QAM | 1.4 | RB1-0 | 1880 | 28.74 | 22.22 | 6.52 |

*Peak Reading = Average Reading + Peak-to-Average Ratio

| Mode | Channel Band-width (MHZ) | Modulation | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio (PAR) |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| QPSK | 3.0 | RB1-0 | 1880 | 28.33 | 22.16 | 6.17 |

| Mode | Channel Band-width | Ch. No. | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| 16QAM | 3.0 | RB1-0 | 1880 | 28.18 | 21.45 | 6.73 |

*Peak Reading = Average Reading + Peak-to-Average Ratio

| Mode | Channel Band-width (MHZ) | Modulation | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio (PAR) |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| QPSK | 5.0 | RB1-0 | 1880 | 28.65 | 22.23 | 6.42 |

| Mode | Channel Band-width | Ch. No. | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| 16QAM | 5.0 | RB1-0 | 1880 | 28.51 | 21.49 | 7.02 |

*Peak Reading = Average Reading + Peak-to-Average Ratio

| Mode | Channel Band-width (MHZ) | Modulation | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio (PAR) |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| QPSK | 10.0 | RB1-0 | 1880 | 29.46 | 22.24 | 7.22 |
| | | | | | | |
| Mode | Channel Band-width | Ch. No. | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio |
| | | | | *Peak | Average | |
| 16QAM | 10.0 | RB1-0 | 1880 | 29.1 | 21.49 | 7.61 |
| *Peak Reading = Average Reading + Peak-to-Average Ratio | | | | | | |

| Mode | Channel Band-width (MHZ) | Modulation | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio (PAR) |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| QPSK | 15.0 | RB1-0 | 1880 | 27.24 | 21.29 | 5.95 |
| | | | | | | |
| Mode | Channel Band-width | Ch. No. | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio |
| | | | | *Peak | Average | |
| 16QAM | 15.0 | RB1-0 | 1880 | 28.21 | 20.56 | 7.65 |
| *Peak Reading = Average Reading + Peak-to-Average Ratio | | | | | | |

| Mode | Channel Band-width (MHZ) | Modulation | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio (PAR) |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| QPSK | 20.0 | RB1-0 | 1880 | 26.6 | 19.80 | 6.80 |
| | | | | | | |
| Mode | Channel Band-width | Ch. No. | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio |
| | | | | *Peak | Average | |
| 16QAM | 20.0 | RB1-0 | 1880 | 27.42 | 19.11 | 8.31 |
| *Peak Reading = Average Reading + Peak-to-Average Ratio | | | | | | |

## 8.4.2. LTE BAND 4

| Mode | Channel Band-width (MHZ) | Modulation | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio (PAR) |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| QPSK | 1.4 | RB1-0 | 1732.5 | 25.15 | 21.49 | 3.66 |
| | | | | | | |
| Mode | Channel Band-width | Ch. No. | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio |
| | | | | *Peak | Average | |
| 16QAM | 1.4 | RB1-0 | 1732.5 | 25.33 | 21.36 | 3.97 |
| *Peak Reading = Average Reading + Peak-to-Average Ratio | | | | | | |

| Mode | Channel Band-width (MHZ) | Modulation | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio (PAR) |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| QPSK | 3.0 | RB1-0 | 1732.5 | 25.18 | 21.44 | 3.74 |
| | | | | | | |
| Mode | Channel Band-width | Ch. No. | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio |
| | | | | *Peak | Average | |
| 16QAM | 3.0 | RB1-0 | 1732.5 | 25.29 | 21.25 | 4.04 |
| *Peak Reading = Average Reading + Peak-to-Average Ratio | | | | | | |

| Mode | Channel Band-width (MHZ) | Modulation | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio (PAR) |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| QPSK | 5.0 | RB1-0 | 1732.5 | 25.37 | 21.47 | 3.90 |
| | | | | | | |
| Mode | Channel Band-width | Ch. No. | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio |
| | | | | *Peak | Average | |
| 16QAM | 5.0 | RB1-0 | 1732.5 | 25.51 | 21.27 | 4.24 |
| *Peak Reading = Average Reading + Peak-to-Average Ratio | | | | | | |

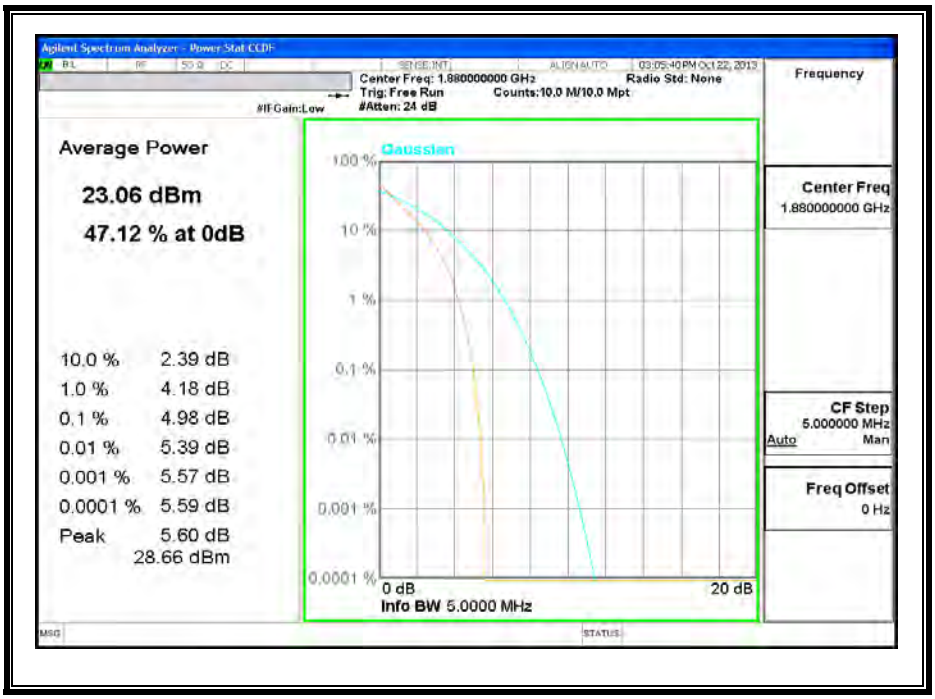
| Mode | Channel Band-width (MHZ) | Modulation | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio (PAR) |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| QPSK | 10.0 | RB1-0 | 1732.5 | 27.14 | 21.5 | 5.64 |
| | | | | | | |
| Mode | Channel Band-width | Ch. No. | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio |
| | | | | *Peak | Average | |
| 16QAM | 10.0 | RB1-0 | 1732.5 | 27.28 | 21.29 | 5.99 |
| *Peak Reading = Average Reading + Peak-to-Average Ratio | | | | | | |

| Mode | Channel Band-width (MHZ) | Modulation | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio (PAR) |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| QPSK | 15.0 | RB1-0 | 1732.5 | 26.37 | 20.27 | 6.10 |
| | | | | | | |
| Mode | Channel Band-width | Ch. No. | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio |
| | | | | *Peak | Average | |
| 16QAM | 15.0 | RB1-0 | 1732.5 | 27.35 | 20.15 | 7.20 |
| *Peak Reading = Average Reading + Peak-to-Average Ratio | | | | | | |

| Mode | Channel Band-width (MHZ) | Modulation | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio (PAR) |
|---|---|---|---|---|---|---|
| | | | | *Peak | Average | |
| QPSK | 20.0 | RB1-0 | 1732.5 | 25.75 | 18.78 | 6.97 |
| | | | | | | |
| Mode | Channel Band-width | Ch. No. | f (MHz) | Couducted Power (dBm) | | Peak-to-Average Ratio |
| | | | | *Peak | Average | |
| 16QAM | 20.0 | RB1-0 | 1732.5 | 26.44 | 18.69 | 7.75 |
| *Peak Reading = Average Reading + Peak-to-Average Ratio | | | | | | |

## LTE BAND 2

### 1.4MHz QPSK



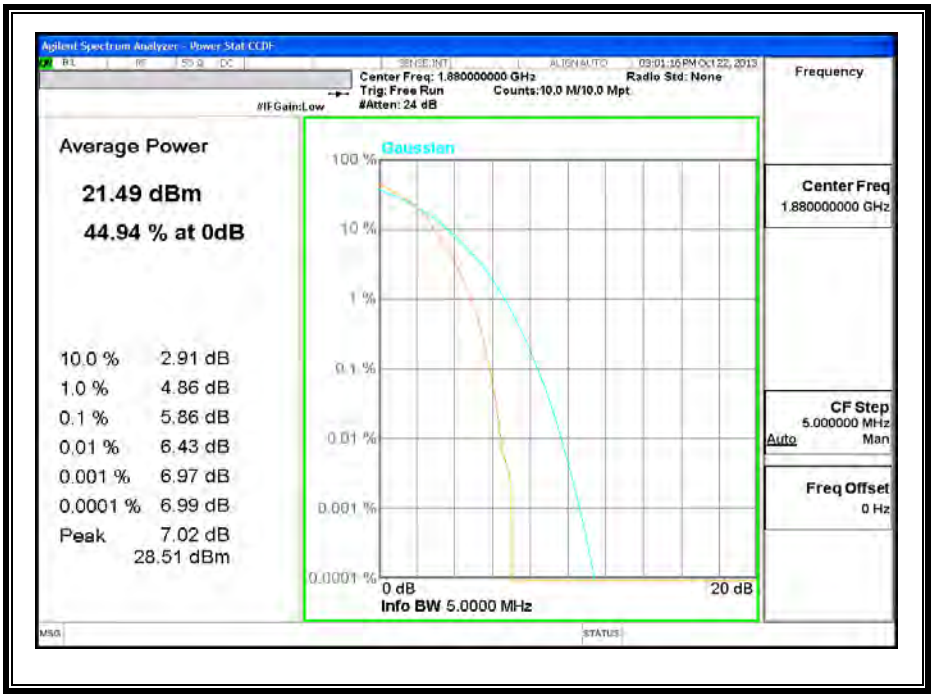

### 1.4MHz 16QAM

**3.0MHz QPSK**


**3.0MHz 16QAM**

**5.0MHz QPSK**

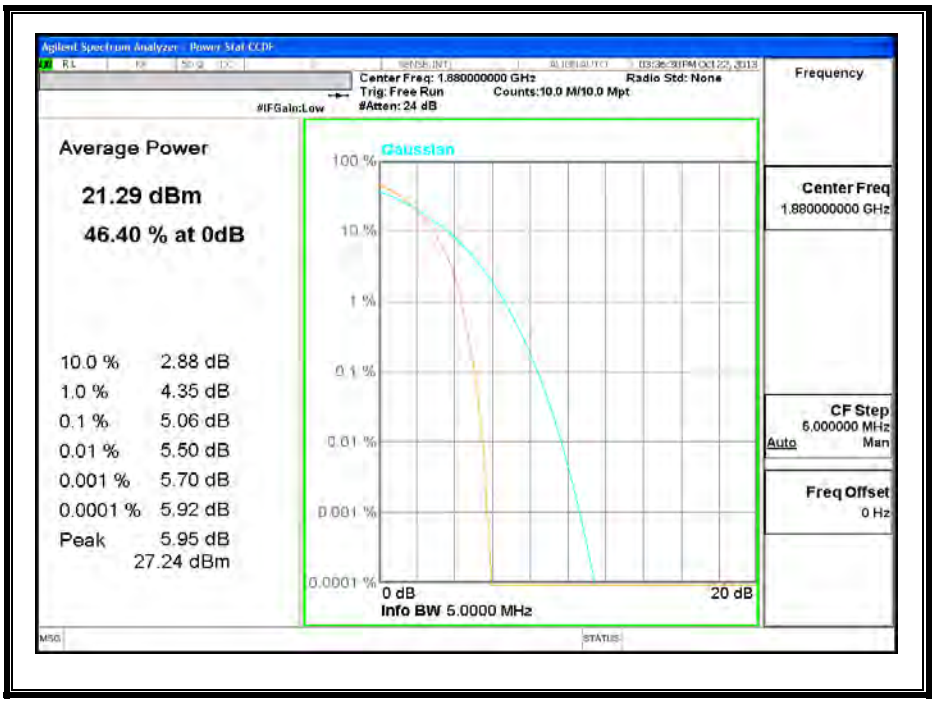

**5.0MHz 16QAM**



**10MHz QPSK**


**10MHz 16QAM**

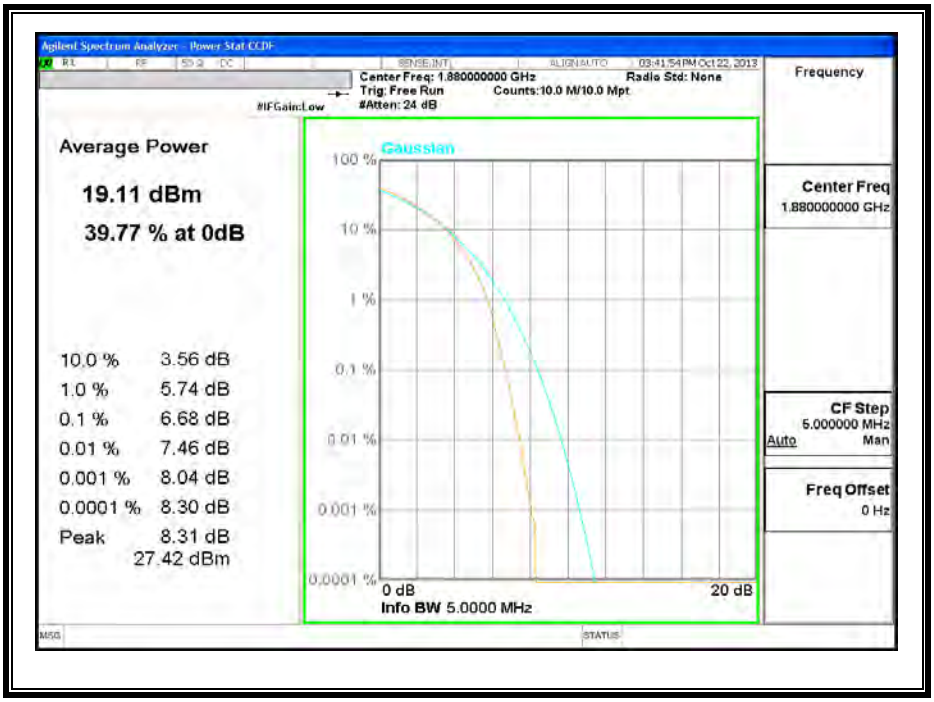
**15MHz QPSK**




**15MHz 16QAM**

**20MHz QPSK**


**20MHz 16QAM**

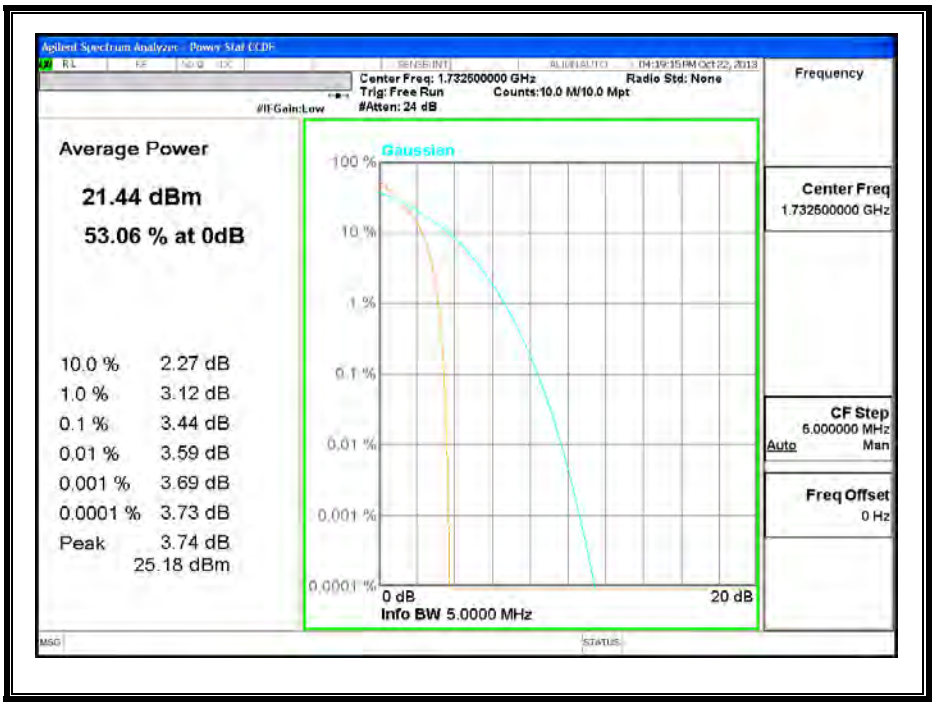


## LTE BAND 4

### 1.4MHz QPSK


### 1.4MHz 16QAM

**3.0MHz QPSK**




**3.0MHz 16QAM**

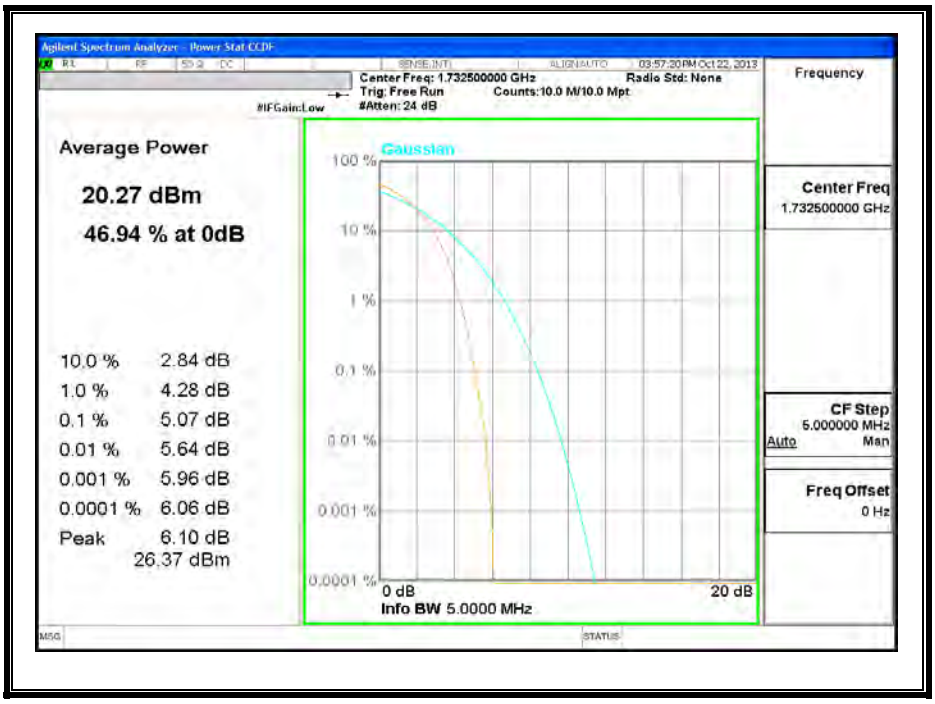
**5.0MHz QPSK**


**5.0MHz 16QAM**

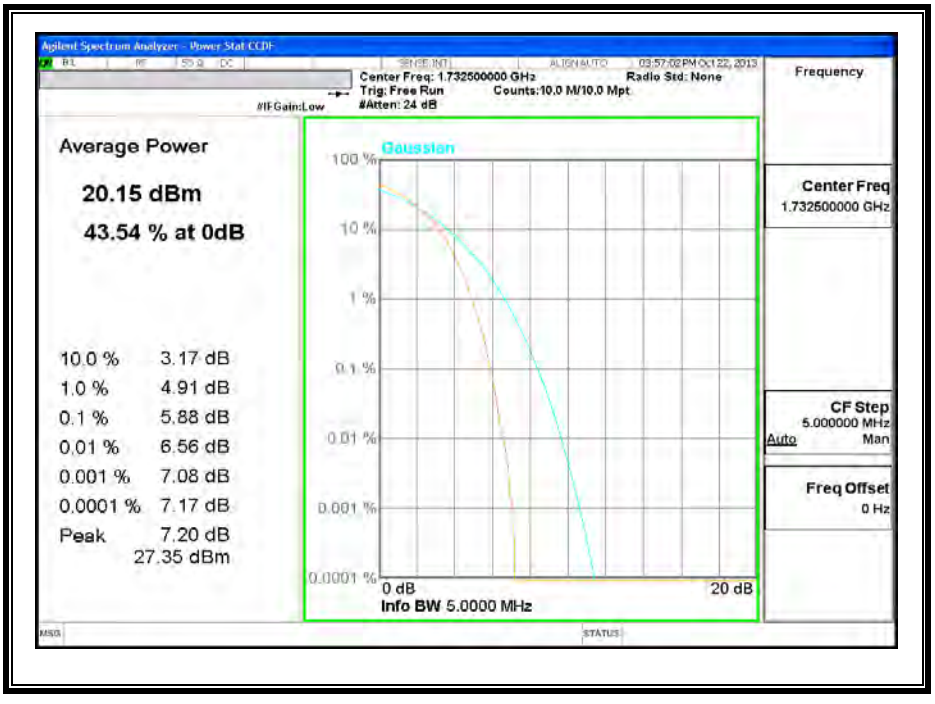
**10MHz QPSK**


**10MHz 16QAM**

**15MHz QPSK**

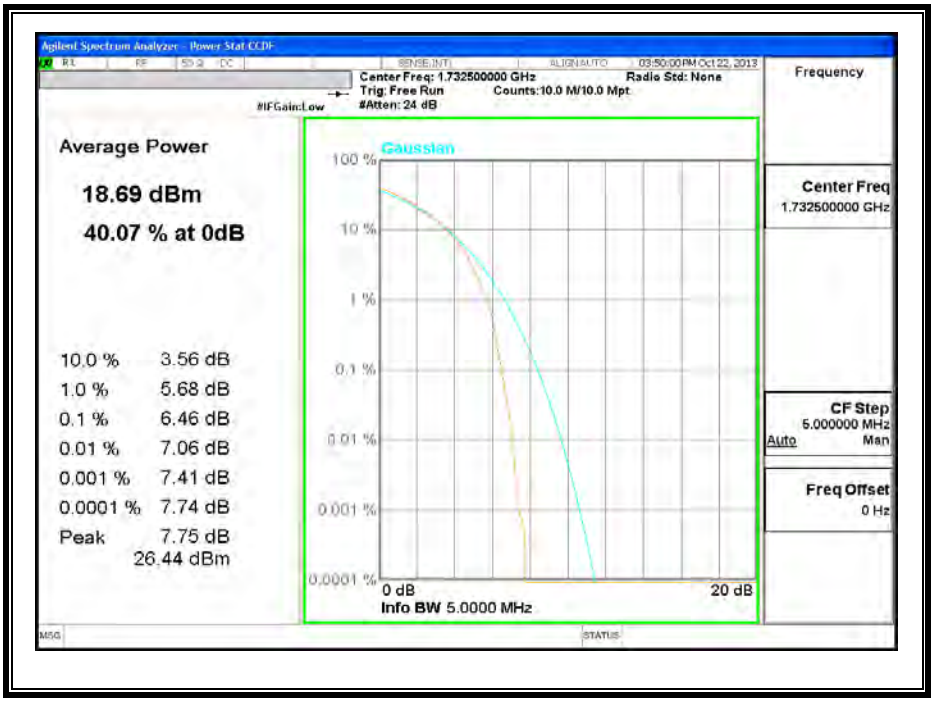



**15MHz 16QAM**



**20MHz QPSK**


**20MHz 16QAM**



# 8.5. FREQUENCY STABILITY

**RULE PART(S)**

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

**LIMITS**

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of ±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.

**TEST PROCEDURE**

Use CMW 500 with Frequency Error measurement capability.

- Temp. = −30° to +50°C
- Voltage =low voltage, 10.8VDC, Normal, 12.0VDC and High voltage, 13.2VDC.

**Frequency Stability vs Temperature:**
The EUT is place inside a temperature chamber. The temperature is set to 20ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.

**Frequency Stability vs Voltage:**
The peak frequency error is recorded (worst-case).

**MODES TESTED**

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 17

**RESULTS**

See the following pages.

**LTE BAND 2, QPSK – 1880.0 MHz**

| Reference Frequency: Mid Channel 1880.000009 MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz | | | | |
|---|---|---|---|---|
| Power Supply (Vdc) | Environment Temperature (*C) | Frequency Deviation Measureed with Time Elapse | | |
| | | (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | 50 | ***1879.999982*** | 0.014 | 2.5 |
| 12.00 | 40 | ***1879.999979*** | 0.016 | 2.5 |
| 12.00 | 30 | ***1880.000009*** | 0.000 | 2.5 |
| 12.00 | ***20*** | ***1880.000009*** | ***0*** | ***2.5*** |
| 12.00 | 10 | ***1880.000010*** | 0.000 | 2.5 |
| 12.00 | 0 | ***1880.000000*** | 0.005 | 2.5 |
| 12.00 | -10 | ***1880.000010*** | -0.001 | 2.5 |
| 12.00 | -20 | ***1880.000011*** | -0.001 | 2.5 |
| 12.00 | -30 | ***1880.000009*** | 0.000 | 2.5 |

| Reference Frequency: Mid Channel 1880.000009 MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz | | | | |
|---|---|---|---|---|
| Power Supply (Vdc) | Environment Temperature (*C) | Frequency Deviation Measureed with Time Elapse | | |
| | | (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | ***20*** | ***1880.000009*** | ***0*** | ***2.5*** |
| 13.20 | 20 | 1880.000018 | *-0.005* | 2.5 |
| 10.80 | 20 | 1880.000025 | *-0.009* | 2.5 |
| End Voltage(7.5V) | 20 | 1880.000015 | *-0.003* | 2.5 |

**LTE BAND 2, 16QAM – 1880.0 MHz**

| Reference Frequency: Mid Channel 1880.000007 MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz | | | | |
|---|---|---|---|---|
| Power Supply (Vdc) | Environment Temperature (*C) | Frequency Deviation Measureed with Time Elapse | | |
| | | (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | 50 | ***1880.000030*** | -0.012 | 2.5 |
| 12.00 | 40 | ***1879.999979*** | 0.015 | 2.5 |
| 12.00 | 30 | ***1880.000007*** | 0.000 | 2.5 |
| 12.00 | ***20*** | ***1880.000007*** | ***0*** | ***2.5*** |
| 12.00 | 10 | ***1880.000009*** | -0.001 | 2.5 |
| 12.00 | 0 | ***1880.000007*** | 0.000 | 2.5 |
| 12.00 | -10 | ***1880.000004*** | 0.002 | 2.5 |
| 12.00 | -20 | ***1880.000005*** | 0.001 | 2.5 |
| 12.00 | -30 | ***1880.000006*** | 0.001 | 2.5 |

| Reference Frequency: Mid Channel 1880.000007 MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz | | | | |
|---|---|---|---|---|
| Power Supply (Vdc) | Environment Temperature (*C) | Frequency Deviation Measureed with Time Elapse | | |
| | | (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | ***20*** | ***1880.000007*** | ***0*** | ***2.5*** |
| 13.20 | 20 | 1880.000014 | *-0.004* | 2.5 |
| 10.80 | 20 | 1880.000009 | *-0.001* | 2.5 |
| End Voltage(7.5V) | 20 | 1880.000008 | *-0.001* | 2.5 |

**LTE BAND 4 – 1732.5 MHz QPSK**

| Reference Frequency: Mid Channel 1732.499975MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 4331.250 Hz | | | | |
|---|---|---|---|---|
| Power Supply | Environment | Frequency Deviation Measureed with Time Elapse | | |
| (Vdc) | Temperature (*C) | (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | 50 | ***1732.500021*** | -0.026 | 2.5 |
| 12.00 | 40 | ***1732.500016*** | -0.023 | 2.5 |
| 12.00 | 30 | ***1732.500021*** | -0.026 | 2.5 |
| 12.00 | ***20*** | ***1732.499975*** | ***0*** | ***2.5*** |
| 12.00 | 10 | ***1732.500016*** | -0.023 | 2.5 |
| 12.00 | 0 | ***1732.499984*** | -0.005 | 2.5 |
| 12.00 | -10 | ***1732.499982*** | -0.004 | 2.5 |
| 12.00 | -20 | ***1732.499985*** | -0.005 | 2.5 |
| 12.00 | -30 | ***1732.499984*** | -0.005 | 2.5 |

| Reference Frequency: Mid Channel 1732.499975MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 4331.250 Hz | | | | |
|---|---|---|---|---|
| Power Supply | Environment | Frequency Deviation Measureed with Time Elapse | | |
| (Vdc) | Temperature (*C) | (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | ***20*** | ***1732.499975*** | ***0*** | ***2.5*** |
| 13.20 | 20 | 1732.499984 | *-0.005* | 2.5 |
| 10.80 | 20 | 1732.499988 | *-0.008* | 2.5 |
| End Voltage(7.5V) | 20 | 1732.499972 | *0.002* | 2.5 |

**LTE BAND 4 – 1732.5 MHz, 16QAM**

| Reference Frequency: Mid Channel 1732.499983MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 4331.250 Hz | | | | |
|---|---|---|---|---|
| Power Supply | Environment | Frequency Deviation Measureed with Time Elapse | | |
| (Vdc) | Temperature (*C) | (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | 50 | ***1732.500021*** | -0.022 | 2.5 |
| 12.00 | 40 | ***1732.500018*** | -0.020 | 2.5 |
| 12.00 | 30 | ***1732.500021*** | -0.022 | 2.5 |
| 12.00 | ***20*** | ***1732.499983*** | ***0*** | ***2.5*** |
| 12.00 | 10 | ***1732.499982*** | 0.001 | 2.5 |
| 12.00 | 0 | ***1732.499980*** | 0.002 | 2.5 |
| 12.00 | -10 | ***1732.499980*** | 0.002 | 2.5 |
| 12.00 | -20 | ***1732.499984*** | -0.001 | 2.5 |
| 12.00 | -30 | ***1732.499986*** | -0.001 | 2.5 |

| Reference Frequency: Mid Channel 1732.499983MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 4331.250 Hz | | | | |
|---|---|---|---|---|
| Power Supply | Environment | Frequency Deviation Measureed with Time Elapse | | |
| (Vdc) | Temperature (*C) | (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | ***20*** | ***1732.499983*** | ***0*** | ***2.5*** |
| 13.20 | 20 | 1732.499986 | *-0.002* | 2.5 |
| 10.80 | 20 | 1732.499991 | *-0.005* | 2.5 |
| End Voltage(7.5V) | 20 | 1732.499979 | *0.002* | 2.5 |

**LTE BAND 5 – 836.5 MHz QPSK**

| Reference Frequency: Mid Channel 836.500004 MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 2091.250 Hz | | | | |
|---|---|---|---|---|
| Power Supply | Environment | Frequency Deviation Measureed with Time Elapse | | |
| (Vdc) | Temperature (*C) | (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | 50 | 836.500000 | 0.005 | 2.5 |
| 12.00 | 40 | 836.499998 | 0.007 | 2.5 |
| 12.00 | 30 | 836.499987 | 0.020 | 2.5 |
| 12.00 | ***20*** | ***836.500004*** | ***0*** | ***2.5*** |
| 12.00 | 10 | 836.499998 | 0.007 | 2.5 |
| 12.00 | 0 | 836.499999 | 0.006 | 2.5 |
| 12.00 | -10 | 836.500000 | 0.005 | 2.5 |
| 12.00 | -20 | 836.499998 | 0.007 | 2.5 |
| 12.00 | -30 | 836.499999 | 0.006 | 2.5 |

| Reference Frequency: Mid Channel 836.500004 MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 2091.250 Hz | | | | |
|---|---|---|---|---|
| Power Supply | Environment | Frequency Deviation Measureed with Time Elapse | | |
| (Vdc) | Temperature (*C) | (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | ***20*** | 836.500004 | ***0*** | ***2.5*** |
| 13.20 | 20 | 836.500015 | *-0.013* | 2.5 |
| 10.80 | 20 | 836.500017 | *-0.016* | 2.5 |
| End Voltage(7.5V) | 20 | 836.500001 | *0.004* | 2.5 |

**LTE BAND 5 – 836.5 MHZ, 16QAM**

| Reference Frequency: Mid Channel 836.500008 MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 2091.250 Hz | | | | |
|---|---|---|---|---|
| Power Supply | Environment | Frequency Deviation Measureed with Time Elapse | | |
| (Vdc) | Temperature (*C) | (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | 50 | 836.499998 | 0.012 | 2.5 |
| 12.00 | 40 | 836.499995 | 0.016 | 2.5 |
| 12.00 | 30 | 836.499994 | 0.017 | 2.5 |
| 12.00 | ***20*** | ***836.500008*** | ***0*** | ***2.5*** |
| 12.00 | 10 | 836.499997 | 0.013 | 2.5 |
| 12.00 | 0 | 836.499992 | 0.019 | 2.5 |
| 12.00 | -10 | 836.499992 | 0.019 | 2.5 |
| 12.00 | -20 | 836.499995 | 0.016 | 2.5 |
| 12.00 | -30 | 836.499997 | 0.013 | 2.5 |

| Reference Frequency: Mid Channel 836.500008 MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 2091.250 Hz | | | | |
|---|---|---|---|---|
| Power Supply | Environment | Frequency Deviation Measureed with Time Elapse | | |
| (Vdc) | Temperature (*C) | (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | ***20*** | ***836.500008*** | ***0*** | ***2.5*** |
| 13.20 | 20 | 836.500016 | *-0.010* | 2.5 |
| 10.80 | 20 | 836.500021 | *-0.016* | 2.5 |
| End Voltage(7.5V) | 20 | 836.500003 | *0.006* | 2.5 |

**LTE BAND 17 – 710.0 MHz QPSK**

| Reference Frequency: Mid Channel 709.999990MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 1775.000 Hz | | | | |
|---|---|---|---|---|
| Power Supply (Vdc) | Environment Temperature (*C) | Frequency Deviation Measureed with Time Elapse (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | 50 | ***709.999981*** | 0.012 | 2.5 |
| 12.00 | 40 | ***709.999994*** | -0.005 | 2.5 |
| 12.00 | 30 | ***709.999992*** | -0.004 | 2.5 |
| 12.00 | ***20*** | ***709.999990*** | ***0*** | ***2.5*** |
| 12.00 | 10 | ***709.999991*** | -0.002 | 2.5 |
| 12.00 | 0 | ***709.999992*** | -0.003 | 2.5 |
| 12.00 | -10 | ***709.999995*** | -0.007 | 2.5 |
| 12.00 | -20 | ***709.999993*** | -0.004 | 2.5 |
| 12.00 | -30 | ***709.999992*** | -0.003 | 2.5 |

| Reference Frequency: Mid Channel 709.999990MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 1775.000 Hz | | | | |
|---|---|---|---|---|
| Power Supply (Vdc) | Environment Temperature (*C) | Frequency Deviation Measureed with Time Elapse (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | ***20*** | ***709.999990*** | ***0*** | ***2.5*** |
| 13.20 | 20 | 709.999994 | *-0.006* | 2.5 |
| 10.80 | 20 | 709.999997 | *-0.010* | 2.5 |
| End Voltage(7.5V) | 20 | 709.999987 | *0.004* | 2.5 |

**LTE BAND 17 – 710.0 MHZ, 16QAM**

| Reference Frequency: Mid Channel 709.999987.0MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 1775.000 Hz | | | | |
|---|---|---|---|---|
| Power Supply (Vdc) | Environment Temperature (*C) | Frequency Deviation Measureed with Time Elapse (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | 50 | ***709.999981*** | 0.008 | 2.5 |
| 12.00 | 40 | ***709.999989*** | -0.003 | 2.5 |
| 12.00 | 30 | ***709.999986*** | 0.001 | 2.5 |
| 12.00 | ***20*** | ***709.999987*** | ***0*** | ***2.5*** |
| 12.00 | 10 | ***709.999984*** | 0.004 | 2.5 |
| 12.00 | 0 | ***709.999985*** | 0.003 | 2.5 |
| 12.00 | -10 | ***709.999983*** | 0.005 | 2.5 |
| 12.00 | -20 | ***709.999985*** | 0.002 | 2.5 |
| 12.00 | -30 | ***709.999985*** | 0.002 | 2.5 |

| Reference Frequency: Mid Channel 709.999987MHz @ 20ºC<br>Limit: within the authorized block or +- 2.5 ppm = 1775.000 Hz | | | | |
|---|---|---|---|---|
| Power Supply (Vdc) | Environment Temperature (*C) | Frequency Deviation Measureed with Time Elapse (MHz) | Delta (ppm) | Limit (ppm) |
| 12.00 | ***20*** | ***709.999987*** | ***0*** | ***2.5*** |
| 13.20 | 20 | 709.999992 | *-0.007* | 2.5 |
| 10.80 | 20 | 709.999995 | *-0.011* | 2.5 |
| End Voltage(7.5V) | 20 | 709.999982 | *0.007* | 2.5 |

# 9. RADIATED TEST RESULTS

## 9.1. 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 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.

27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.

27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

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

**TEST PROCEDURE**

ANSI / TIA / EIA 603C Clause 2.2.17
KDB 971168 v02r01 RF power output using broadband peak and average power meter method.

**MODES TESTED**

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 17

**RESULTS**

## BAND 2

### EIRP LTE Band 2 (1.4 MHz BANDWIDTH)

| Mode | RB Offset/ RB Size | f (MHz) | EIRP (Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 1.4MHz Band QPSK | 1/0 | 1850.7 | 24.80 | 302.00 |
| | | 1880.0 | **25.95** | 393.55 |
| | | 1909.3 | 24.97 | 314.05 |
| 1.4MHz Band 16QAM | 1/0 | 1850.7 | 23.95 | 248.31 |
| | | 1880.0 | **25.20** | 331.13 |
| | | 1909.3 | 24.12 | 258.23 |

### EIRP LTE Band 2 (3MHz BANDWIDTH)

| Mode | RB Offset/ RB Size | f (MHz) | EIRP (Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 3.0MHz Band QPSK | 1/0 | 1851.5 | 24.55 | 285.10 |
| | | 1880.0 | **25.70** | 371.54 |
| | | 1908.5 | 25.42 | 348.34 |
| 3.0MHz Band 16QAM | 1/0 | 1851.5 | 23.75 | 237.14 |
| | | 1880.0 | **24.90** | 309.03 |
| | | 1908.5 | 24.52 | 283.14 |

### EIRP LTE Band 2 (5MHz BANDWIDTH)

| Mode | RB Offset/ RB Size | f (MHz) | EIRP (Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 5.0MHz Band QPSK | 1/0 | 1852.5 | 24.65 | 291.74 |
| | | 1880.0 | **26.00** | 398.11 |
| | | 1907.5 | 25.52 | 356.45 |
| 5.0MHz Band 16QAM | 1/0 | 1852.5 | 23.75 | 237.14 |
| | | 1880.0 | **25.10** | 323.59 |
| | | 1907.5 | 24.52 | 283.14 |

### EIRP LTE Band 2 (10MHz BANDWIDTH)

| Mode | RB Offset/ RB Size | f (MHz) | EIRP (Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 10.0MHz Band QPSK | 1/0 | 1855.0 | 25.05 | 319.89 |
| | | 1880.0 | **26.40** | 436.52 |
| | | 1905.0 | 25.62 | 364.75 |
| 10.0MHz Band 16QAM | 1/0 | 1855.0 | 24.15 | 260.02 |
| | | 1880.0 | **25.50** | 354.81 |
| | | 1905.0 | 24.62 | 289.73 |

**EIRP LTE Band 2 (15MHz BANDWIDTH)**

| Mode | RB Offset/ RB Size | f (MHz) | EIRP (Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 15MHz Band QPSK | 1/0 | 1857.5 | 25.05 | 319.89 |
| | | 1880.0 | **26.40** | 436.52 |
| | | 1902.5 | 25.32 | 340.41 |
| 15MHz Band 16QAM | 1/0 | 1857.5 | 23.75 | 237.14 |
| | | 1880.0 | **25.10** | 323.59 |
| | | 1902.5 | 23.92 | 246.60 |

**EIRP LTE Band 2 (20MHz BANDWIDTH)**

| Mode | RB Offset/ RB Size | f (MHz) | EIRP (Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 20.0MHz Band QPSK | 1/0 | 1860.0 | 24.75 | 298.54 |
| | | 1880.0 | **25.30** | 338.84 |
| | | 1900.0 | 25.22 | 332.66 |
| 20MHz Band 16QAM | 1/0 | 1860.0 | 23.75 | 237.14 |
| | | 1880.0 | **24.40** | 275.42 |
| | | 1900.0 | 24.22 | 264.24 |

**BAND 4**

**EIRP LTE Band 4 (1.4 MHz BANDWIDTH)**

| Mode | RB Offset/ RB Size | f (MHz) | EIRP(Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 1.4 MHZ BAND QPSK | 1/0 | 1710.7 | 23.26 | 211.84 |
| | | 1732.5 | 23.45 | 221.31 |
| | | 1754.3 | **24.45** | 278.61 |
| 1.4 MHZ BAND 16QAM | 1/0 | 1710.7 | 22.36 | 172.19 |
| | | 1732.5 | 22.55 | 179.89 |
| | | 1754.3 | **23.55** | 226.46 |

**EIRP LTE Band 4 (3MHz BANDWIDTH)**

| Mode | RB Offset/ RB Size | f (MHz) | EIRP(Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 3.0 MHZ BAND QPSK | 1/0 | 1711.5 | 23.46 | 221.82 |
| | | 1732.5 | 23.55 | 226.46 |
| | | 1753.5 | **24.15** | 260.02 |
| 3.0 MHZ BAND 16QAM | 1/0 | 1711.5 | 22.56 | 180.30 |
| | | 1732.5 | 22.65 | 184.08 |
| | | 1753.5 | **23.25** | 211.35 |

**EIRP LTE Band 4 (5MHz BANDWIDTH)**

| Mode | RB Offset/ RB size | f (MHz) | EIRP(Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 5.0 MHZ BAND QPSK | 1/0 | 1712.5 | 23.36 | 216.77 |
| | | 1732.5 | 23.55 | 226.46 |
| | | 1752.5 | **23.85** | 242.66 |
| 5.0 MHZ BAND 16QAM | 1/0 | 1712.5 | 22.36 | 172.19 |
| | | 1732.5 | 22.65 | 184.08 |
| | | 1752.5 | **22.95** | 197.24 |

## EIRP LTE Band 4 (10MHz BANDWIDTH)

| Mode | RB Offset/ RB Size | f (MHz) | EIRP(Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 10.0 MHZ BAND QPSK | 1/0 | 1715.0 | 23.46 | 221.82 |
| | | 1732.5 | **23.85** | 242.66 |
| | | 1750.0 | 23.35 | 216.27 |
| 10.0 MHZ BAND 16QAM | 1/0 | 1715.0 | 22.46 | 176.20 |
| | | 1732.5 | **22.85** | 192.75 |
| | | 1750.0 | 22.45 | 175.79 |

## EIRP LTE Band 4 (15MHz BANDWIDTH)

| Mode | RB Offset/ RB Size | f (MHz) | EIRP(Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 15.0 MHZ BAND QPSK | 1/0 | 1717.5 | 23.16 | 207.01 |
| | | 1732.5 | **24.05** | 254.10 |
| | | 1747.5 | 23.15 | 206.54 |
| 15.0 MHZ BAND 16QAM | 1/0 | 1717.5 | 22.16 | 164.44 |
| | | 1732.5 | **23.05** | 201.84 |
| | | 1747.5 | 22.15 | 164.06 |

## EIRP LTE Band 4 (20MHz BANDWIDTH)

| Mode | RB Offset/ RB Size | f (MHz) | EIRP(Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 20.0 MHZ BAND QPSK | 1/0 | 1720.0 | 22.26 | 168.27 |
| | | 1732.5 | **24.15** | 260.02 |
| | | 1745.0 | 23.45 | 221.31 |
| 20.0 MHZ BAND 16QAM | 1/0 | 1720.0 | 21.36 | 136.77 |
| | | 1732.5 | **23.25** | 211.35 |
| | | 1745.0 | 22.55 | 179.89 |

## BAND 5

## ERP LTE Band 5 (1.4 MHz BANDWIDTH)

| Mode | RB Offset/ RB Size | f (MHz) | ERP (Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 1.4MHz Band QPSK | 1/0 | 824.7 | **24.66** | 292.42 |
| | | 836.5 | 23.36 | 216.77 |
| | | 848.3 | 23.65 | 231.74 |
| 1.4MHz Band 16QAM | 1/0 | 824.7 | **23.66** | 232.27 |
| | | 836.5 | 22.36 | 172.19 |
| | | 848.3 | 22.65 | 184.08 |

## ERP LTE Band 5 (3MHz BANDWIDTH)

| Mode | RB Offset/ RB Size | f (MHz) | ERP (Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 3.0 MHZ BAND QPSK | 1/0 | 825.5 | **24.86** | 306.20 |
| | | 836.5 | 23.46 | 221.82 |
| | | 847.5 | 23.85 | 242.66 |
| 3.0 MHZ BAND 16QAM | 1/0 | 825.5 | **23.86** | 243.22 |
| | | 836.5 | 22.56 | 180.30 |
| | | 847.5 | 22.85 | 192.75 |

## ERP LTE Band 5 (5MHz BANDWIDTH)

| Mode | RB Offset/ RB Size | f (MHz) | ERP (Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 5MHz Band QPSK | 1/0 | 826.5 | **24.56** | 285.76 |
| | | 836.5 | 23.26 | 211.84 |
| | | 846.5 | 24.05 | 254.10 |
| 5MHz Band 16QAM | 1/0 | 826.5 | **23.66** | 232.27 |
| | | 836.5 | 22.26 | 168.27 |
| | | 846.5 | 23.05 | 201.84 |

## ERP LTE Band 5 (10MHz BANDWIDTH)

| Mode | RB Offset/ RB Size | f (MHz) | ERP (Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 10.0 MHZ BAND QPSK | 1/0 | 829.0 | **24.86** | 306.20 |
| | | 836.5 | 23.46 | 221.82 |
| | | 844.0 | 24.05 | 254.10 |
| 10.0 MHZ BAND 16QAM | 1/0 | 829.0 | **23.86** | 243.22 |
| | | 836.5 | 22.46 | 176.20 |
| | | 844.0 | 23.05 | 201.84 |

## BAND 17

## ERP LTE Band 17 (5MHz BANDWIDTH)

| Mode | RB Offset/ RB Size | f (MHz) | ERP (Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 5MHz Band QPSK | 1/0 | 706.5 | **22.20** | 165.96 |
| | | 710.0 | 20.69 | 117.22 |
| | | 713.5 | 21.50 | 141.25 |
| 5MHz Band 16QAM | 1/0 | 706.5 | **21.20** | 131.83 |
| | | 710.0 | 19.69 | 93.11 |
| | | 713.5 | 20.50 | 112.20 |

## ERP LTE Band 17 (10MHz BANDWIDTH)

| Mode | RB Offset/ RB Size | f (MHz) | ERP (Average) | |
|---|---|---|---|---|
| | | | dBm | mW |
| 10.0 MHZ BAND QPSK | 1/0 | 710.0 | **21.19** | 131.52 |
| 10.0 MHZ BAND 16QAM | 1/0 | 710.0 | **20.19** | 104.47 |

## 9.1.1. LTE BAND 2

**AVERAGE**

**EIRP LTE QPSK Band 2 (1.4 MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 12/30/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 2 QPSK 1.4MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.851 | 14.5 | V | 0.98 | 7.93 | 21.40 | 33.0 | -11.6 | |
| 1.851 | 17.9 | H | 0.98 | 7.93 | 24.80 | 33.0 | -8.2 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.880 | 14.8 | V | 0.98 | 7.48 | 21.28 | 33.0 | -11.7 | |
| 1.880 | 19.5 | H | 0.98 | 7.48 | 25.95 | 33.0 | -7.1 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.909 | 15.2 | V | 0.98 | 7.10 | 21.29 | 33.0 | -11.7 | |
| 1.909 | 18.9 | H | 0.98 | 7.10 | 24.97 | 33.0 | -8.0 | |

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**EIRP LTE 16QAM Band 2 (1.4 MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 12/30/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 2 16QAM 1.4MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.851 | 13.7 | V | 0.98 | 7.93 | 20.65 | 33.0 | -12.4 | |
| 1.851 | 17.0 | H | 0.98 | 7.93 | 23.95 | 33.0 | -9.1 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.880 | 13.9 | V | 0.98 | 7.48 | 20.43 | 33.0 | -12.6 | |
| 1.880 | 18.7 | H | 0.98 | 7.48 | 25.20 | 33.0 | -7.8 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.909 | 14.4 | V | 0.98 | 7.10 | 20.54 | 33.0 | -12.5 | |
| 1.909 | 18.0 | H | 0.98 | 7.10 | 24.12 | 33.0 | -8.9 | |

Rev. 10.15.13

**EIRP LTE QPSK Band 2 (3MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 12/30/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 2 QPSK 3MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.852 | 14.1 | V | 0.98 | 7.93 | 21.05 | 33.0 | -12.0 | |
| 1.852 | 17.6 | H | 0.98 | 7.93 | 24.55 | 33.0 | -8.5 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.880 | 14.0 | V | 0.98 | 7.48 | 20.53 | 33.0 | -12.5 | |
| 1.880 | 19.2 | H | 0.98 | 7.48 | 25.70 | 33.0 | -7.3 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.909 | 14.0 | V | 0.98 | 7.10 | 20.14 | 33.0 | -12.9 | |
| 1.909 | 19.3 | H | 0.98 | 7.10 | 25.42 | 33.0 | -7.6 | |

Rev. 10.15.13

**EIRP LTE 16QAM Band 2 (3MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 12/30/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 2 16QAM 3MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.852 | 13.3 | V | 0.98 | 7.93 | 20.25 | 33.0 | -12.8 | |
| 1.852 | 16.8 | H | 0.98 | 7.93 | 23.75 | 33.0 | -9.3 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.880 | 13.2 | V | 0.98 | 7.48 | 19.73 | 33.0 | -13.3 | |
| 1.880 | 18.4 | H | 0.98 | 7.48 | 24.90 | 33.0 | -8.1 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.909 | 13.3 | V | 0.98 | 7.10 | 19.44 | 33.0 | -13.6 | |
| 1.909 | 18.4 | H | 0.98 | 7.10 | 24.52 | 33.0 | -8.5 | |

Rev. 10.15.13

**EIRP LTE QPSK Band 2 (5MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 12/30/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 2 QPSK 5MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.853 | 14.1 | V | 0.98 | 7.93 | 21.05 | 33.0 | -12.0 | |
| 1.853 | 17.7 | H | 0.98 | 7.93 | 24.65 | 33.0 | -8.4 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.880 | 13.9 | V | 0.98 | 7.48 | 20.43 | 33.0 | -12.6 | |
| 1.880 | 19.5 | H | 0.98 | 7.48 | 26.00 | 33.0 | -7.0 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.908 | 13.5 | V | 0.98 | 7.10 | 19.64 | 33.0 | -13.4 | |
| 1.908 | 19.4 | H | 0.98 | 7.10 | 25.52 | 33.0 | -7.5 | |

Rev. 10.15.13

**EIRP LTE 16QAM Band 2 (5MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 12/30/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 2 16QAM 5MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.853 | 13.2 | V | 0.98 | 7.93 | 20.15 | 33.0 | -12.9 | |
| 1.853 | 16.8 | H | 0.98 | 7.93 | 23.75 | 33.0 | -9.3 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.880 | 13.0 | V | 0.98 | 7.48 | 19.53 | 33.0 | -13.5 | |
| 1.880 | 18.6 | H | 0.98 | 7.48 | 25.10 | 33.0 | -7.9 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.908 | 12.7 | V | 0.98 | 7.10 | 18.84 | 33.0 | -14.2 | |
| 1.908 | 18.4 | H | 0.98 | 7.10 | 24.52 | 33.0 | -8.5 | |

Rev. 10.15.13

**EIRP LTE QPSK Band 2 (10MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 12/30/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 2 QPSK 10MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.855 | 17.1 | V | 0.98 | 7.93 | 24.05 | 33.0 | -9.0 | |
| 1.855 | 18.1 | H | 0.98 | 7.93 | 25.05 | 33.0 | -8.0 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.880 | 17.7 | V | 0.98 | 7.48 | 24.23 | 33.0 | -8.8 | |
| 1.880 | 19.9 | H | 0.98 | 7.48 | 26.40 | 33.0 | -6.6 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.905 | 18.1 | V | 0.98 | 7.10 | 24.24 | 33.0 | -8.8 | |
| 1.905 | 19.5 | H | 0.98 | 7.10 | 25.62 | 33.0 | -7.4 | |

Rev. 10.15.13

**EIRP LTE 16QAM Band 2 (10MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 12/30/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 2 16QAM 10MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.855 | 16.2 | V | 0.98 | 7.93 | 23.15 | 33.0 | -9.9 | |
| 1.855 | 17.2 | H | 0.98 | 7.93 | 24.15 | 33.0 | -8.9 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.880 | 16.8 | V | 0.98 | 7.48 | 23.33 | 33.0 | -9.7 | |
| 1.880 | 19.0 | H | 0.98 | 7.48 | 25.50 | 33.0 | -7.5 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.905 | 17.1 | V | 0.98 | 7.10 | 23.24 | 33.0 | -9.8 | |
| 1.905 | 18.5 | H | 0.98 | 7.10 | 24.62 | 33.0 | -8.4 | |

Rev. 10.15.13

**EIRP LTE QPSK Band 2 (15MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 12/30/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 2 QPSK 15MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.858 | 15.3 | V | 0.98 | 7.93 | 22.25 | 33.0 | -10.8 | |
| 1.858 | 18.1 | H | 0.98 | 7.93 | 25.05 | 33.0 | -8.0 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.880 | 16.2 | V | 0.98 | 7.48 | 22.73 | 33.0 | -10.3 | |
| 1.880 | 19.9 | H | 0.98 | 7.48 | 26.40 | 33.0 | -6.6 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.903 | 15.9 | V | 0.98 | 7.10 | 22.04 | 33.0 | -11.0 | |
| 1.903 | 19.2 | H | 0.98 | 7.10 | 25.32 | 33.0 | -7.7 | |

Rev. 10.15.13

**EIRP LTE 16QAM Band 2 (15MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 12/30/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 2 16QAM 15MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.858 | 14.1 | V | 0.98 | 7.93 | 21.05 | 33.0 | -12.0 | |
| 1.858 | 16.8 | H | 0.98 | 7.93 | 23.75 | 33.0 | -9.3 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.880 | 14.9 | V | 0.98 | 7.48 | 21.43 | 33.0 | -11.6 | |
| 1.880 | 18.6 | H | 0.98 | 7.48 | 25.10 | 33.0 | -7.9 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.903 | 14.6 | V | 0.98 | 7.10 | 20.74 | 33.0 | -12.3 | |
| 1.903 | 17.8 | H | 0.98 | 7.10 | 23.92 | 33.0 | -9.1 | |

Rev. 10.15.13

**EIRP LTE QPSK Band 2 (20MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 12/30/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 2 QPSK 20MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.860 | 17.1 | V | 0.98 | 7.93 | 24.05 | 33.0 | -9.0 | |
| 1.860 | 17.8 | H | 0.98 | 7.93 | 24.75 | 33.0 | -8.3 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.880 | 17.3 | V | 0.98 | 7.48 | 23.83 | 33.0 | -9.2 | |
| 1.880 | 18.8 | H | 0.98 | 7.48 | 25.30 | 33.0 | -7.7 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.900 | 17.6 | V | 0.98 | 7.10 | 23.74 | 33.0 | -9.3 | |
| 1.900 | 19.1 | H | 0.98 | 7.10 | 25.22 | 33.0 | -7.8 | |

Rev. 10.15.13

**EIRP LTE 16QAM Band 2 (20MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 12/30/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 2 16QAM 20MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.860 | 16.2 | V | 0.98 | 7.93 | 23.15 | 33.0 | -9.9 | |
| 1.860 | 16.8 | H | 0.98 | 7.93 | 23.75 | 33.0 | -9.3 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.880 | 16.4 | V | 0.98 | 7.48 | 22.93 | 33.0 | -10.1 | |
| 1.880 | 17.9 | H | 0.98 | 7.48 | 24.40 | 33.0 | -8.6 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.900 | 16.5 | V | 0.98 | 7.10 | 22.64 | 33.0 | -10.4 | |
| 1.900 | 18.1 | H | 0.98 | 7.10 | 24.22 | 33.0 | -8.8 | |

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## 9.1.2. LTE BAND 4

**AVERAGE**

**EIRP LTE QPSK Band 4 (1.4 MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 4 QPSK 1.4MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.711 | 15.1 | V | 0.95 | 8.49 | 22.63 | 30.0 | -7.4 | |
| 1.711 | 15.7 | H | 0.95 | 8.49 | 23.26 | 30.0 | -6.7 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.733 | 15.1 | V | 0.95 | 8.60 | 22.79 | 30.0 | -7.2 | |
| 1.733 | 15.8 | H | 0.95 | 8.60 | 23.45 | 30.0 | -6.6 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.754 | 15.4 | V | 0.95 | 8.70 | 23.17 | 30.0 | -6.8 | |
| 1.754 | 16.7 | H | 0.95 | 8.70 | 24.45 | 30.0 | -5.6 | |

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**EIRP LTE 16QAM Band 4 (1.4 MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 4 16QAM 1.4MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.711 | 14.2 | V | 0.95 | 8.49 | 21.73 | 30.0 | -8.3 | |
| 1.711 | 14.8 | H | 0.95 | 8.49 | 22.36 | 30.0 | -7.6 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.733 | 14.2 | V | 0.95 | 8.60 | 21.89 | 30.0 | -8.1 | |
| 1.733 | 14.9 | H | 0.95 | 8.60 | 22.55 | 30.0 | -7.5 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.754 | 14.5 | V | 0.95 | 8.70 | 22.27 | 30.0 | -7.7 | |
| 1.754 | 15.8 | H | 0.95 | 8.70 | 23.55 | 30.0 | -6.5 | |

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**EIRP LTE QPSK Band 4 (3MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 4 QPSK 3MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.712 | 14.7 | V | 0.95 | 8.49 | 22.23 | 30.0 | -7.8 | |
| 1.712 | 15.9 | H | 0.95 | 8.49 | 23.46 | 30.0 | -6.5 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.733 | 15.2 | V | 0.95 | 8.60 | 22.89 | 30.0 | -7.1 | |
| 1.733 | 15.9 | H | 0.95 | 8.60 | 23.55 | 30.0 | -6.5 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.753 | 15.1 | V | 0.95 | 8.70 | 22.87 | 30.0 | -7.1 | |
| 1.753 | 16.4 | H | 0.95 | 8.70 | 24.15 | 30.0 | -5.9 | |

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**EIRP LTE 16QAM Band 4 (3MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 4 16QAM 3MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.712 | 13.8 | V | 0.95 | 8.49 | 21.33 | 30.0 | -8.7 | |
| 1.712 | 15.0 | H | 0.95 | 8.49 | 22.56 | 30.0 | -7.4 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.733 | 14.3 | V | 0.95 | 8.60 | 21.99 | 30.0 | -8.0 | |
| 1.733 | 15.0 | H | 0.95 | 8.60 | 22.65 | 30.0 | -7.4 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.753 | 14.2 | V | 0.95 | 8.70 | 21.97 | 30.0 | -8.0 | |
| 1.753 | 15.5 | H | 0.95 | 8.70 | 23.25 | 30.0 | -6.8 | |

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**EIRP LTE QPSK Band 4 (5MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 4 QPSK 5MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.712 | 14.9 | V | 0.95 | 8.49 | 22.43 | 30.0 | -7.6 | |
| 1.712 | 15.8 | H | 0.95 | 8.49 | 23.36 | 30.0 | -6.6 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.733 | 15.4 | V | 0.95 | 8.60 | 23.09 | 30.0 | -6.9 | |
| 1.733 | 15.9 | H | 0.95 | 8.60 | 23.55 | 30.0 | -6.5 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.753 | 14.9 | V | 0.95 | 8.70 | 22.67 | 30.0 | -7.3 | |
| 1.753 | 16.1 | H | 0.95 | 8.70 | 23.85 | 30.0 | -6.2 | |

Rev. 10.15.13

**EIRP LTE 16QAM Band 4 (5MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 4 16QAM 5MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.712 | 14.0 | V | 0.95 | 8.49 | 21.53 | 30.0 | -8.5 | |
| 1.712 | 14.8 | H | 0.95 | 8.49 | 22.36 | 30.0 | -7.6 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.733 | 14.5 | V | 0.95 | 8.60 | 22.19 | 30.0 | -7.8 | |
| 1.733 | 15.0 | H | 0.95 | 8.60 | 22.65 | 30.0 | -7.4 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.753 | 14.0 | V | 0.95 | 8.70 | 21.77 | 30.0 | -8.2 | |
| 1.753 | 15.2 | H | 0.95 | 8.70 | 22.95 | 30.0 | -7.1 | |

Rev. 10.15.13

**EIRP LTE QPSK Band 4 (10MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 4 QPSK 10MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.715 | 14.6 | V | 0.95 | 8.49 | 22.13 | 30.0 | -7.9 | |
| 1.715 | 15.9 | H | 0.95 | 8.49 | 23.46 | 30.0 | -6.5 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.733 | 15.6 | V | 0.95 | 8.60 | 23.29 | 30.0 | -6.7 | |
| 1.733 | 16.2 | H | 0.95 | 8.60 | 23.85 | 30.0 | -6.2 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.750 | 14.0 | V | 0.95 | 8.70 | 21.77 | 30.0 | -8.2 | |
| 1.750 | 15.6 | H | 0.95 | 8.70 | 23.35 | 30.0 | -6.7 | |

Rev. 10.15.13

**EIRP LTE 16QAM Band 4 (10MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 4 16QAM 10MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.715 | 13.6 | V | 0.95 | 8.49 | 21.13 | 30.0 | -8.9 | |
| 1.715 | 14.9 | H | 0.95 | 8.49 | 22.46 | 30.0 | -7.5 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.733 | 14.6 | V | 0.95 | 8.60 | 22.29 | 30.0 | -7.7 | |
| 1.733 | 15.2 | H | 0.95 | 8.60 | 22.85 | 30.0 | -7.2 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.750 | 13.1 | V | 0.95 | 8.70 | 20.87 | 30.0 | -9.1 | |
| 1.750 | 14.7 | H | 0.95 | 8.70 | 22.45 | 30.0 | -7.6 | |

Rev. 10.15.13

**EIRP LTE QPSK Band 4 (15MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 4 QPSK 15MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.718 | 15.1 | V | 0.95 | 8.49 | 22.63 | 30.0 | -7.4 | |
| 1.718 | 15.6 | H | 0.95 | 8.49 | 23.16 | 30.0 | -6.8 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.733 | 15.8 | V | 0.95 | 8.60 | 23.49 | 30.0 | -6.5 | |
| 1.733 | 16.4 | H | 0.95 | 8.60 | 24.05 | 30.0 | -6.0 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.748 | 13.6 | V | 0.95 | 8.70 | 21.37 | 30.0 | -8.6 | |
| 1.748 | 15.4 | H | 0.95 | 8.70 | 23.15 | 30.0 | -6.9 | |

Rev. 10.15.13

**EIRP LTE 16QAM Band 4 (15MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 4 16QAM 15MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.718 | 14.1 | V | 0.95 | 8.49 | 21.63 | 30.0 | -8.4 | |
| 1.718 | 14.6 | H | 0.95 | 8.49 | 22.16 | 30.0 | -7.8 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.733 | 14.8 | V | 0.95 | 8.60 | 22.49 | 30.0 | -7.5 | |
| 1.733 | 15.4 | H | 0.95 | 8.60 | 23.05 | 30.0 | -7.0 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.748 | 12.6 | V | 0.95 | 8.70 | 20.37 | 30.0 | -9.6 | |
| 1.748 | 14.4 | H | 0.95 | 8.70 | 22.15 | 30.0 | -7.9 | |

Rev. 10.15.13

**EIRP LTE QPSK Band 4 (20MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 4 QPSK 20MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.720 | 14.3 | V | 0.95 | 8.49 | 21.83 | 30.0 | -8.2 | |
| 1.720 | 14.7 | H | 0.95 | 8.49 | 22.26 | 30.0 | -7.7 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.733 | 15.6 | V | 0.95 | 8.60 | 23.29 | 30.0 | -6.7 | |
| 1.733 | 16.5 | H | 0.95 | 8.60 | 24.15 | 30.0 | -5.9 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.745 | 14.3 | V | 0.95 | 8.70 | 22.07 | 30.0 | -7.9 | |
| 1.745 | 15.7 | H | 0.95 | 8.70 | 23.45 | 30.0 | -6.6 | |

Rev. 10.15.13

**EIRP LTE 16QAM Band 4 (20MHz BANDWIDTH)**

**High Frequency Fundamental Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT with keyboard
**Mode:** LTE Band 4 16QAM 20MHz BW

**Test Equipment:**
**Receiving: Horn T344, and Chamber D SMA Cables**
**Substitution: Horn T60 Substitution, and 8ft SMA Cable**

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 1.720 | 13.4 | V | 0.95 | 8.49 | 20.93 | 30.0 | -9.1 | |
| 1.720 | 13.8 | H | 0.95 | 8.49 | 21.36 | 30.0 | -8.6 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 1.733 | 14.7 | V | 0.95 | 8.60 | 22.39 | 30.0 | -7.6 | |
| 1.733 | 15.6 | H | 0.95 | 8.60 | 23.25 | 30.0 | -6.8 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 1.745 | 13.4 | V | 0.95 | 8.70 | 21.17 | 30.0 | -8.8 | |
| 1.745 | 14.8 | H | 0.95 | 8.70 | 22.55 | 30.0 | -7.5 | |

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## 9.1.3. LTE BAND 5

**AVERAGE**

**ERP LTE QPSK Band 5 (1.4 MHz BANDWIDTH)**

**High Frequency Substitution Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT only
**Mode:** LTE Band 5 QPSK 1.4MHz BW

**Test Equipment:**
**Receiving: Sunol T407, and Chamber D Cable**
**Substitution: Dipole S/N: 00022117, and 8ft SMA Cable**

| f MHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 824.70 | 19.51 | V | 0.7 | 0.0 | 18.86 | 38.5 | -19.6 | |
| 824.70 | 25.31 | H | 0.7 | 0.0 | 24.66 | 38.5 | -13.8 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 836.50 | 18.61 | V | 0.7 | 0.0 | 17.96 | 38.5 | -20.5 | |
| 836.50 | 24.01 | H | 0.7 | 0.0 | 23.36 | 38.5 | -15.1 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 848.30 | 19.20 | V | 0.7 | 0.0 | 18.55 | 38.5 | -19.9 | |
| 848.30 | 24.30 | H | 0.7 | 0.0 | 23.65 | 38.5 | -14.8 | |

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**ERP LTE 16QAM Band 5 (1.4 MHz BANDWIDTH)**

**High Frequency Substitution Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT only
**Mode:** LTE Band 5 16QAM 1.4MHz BW

**Test Equipment:**
**Receiving: Sunol T407, and Chamber D Cable**
**Substitution: Dipole S/N: 00022117, and 8ft SMA Cable**

| f MHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 824.70 | 18.51 | V | 0.7 | 0.0 | 17.86 | 38.5 | -20.6 | |
| 824.70 | 24.31 | H | 0.7 | 0.0 | 23.66 | 38.5 | -14.8 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 836.50 | 17.61 | V | 0.7 | 0.0 | 16.96 | 38.5 | -21.5 | |
| 836.50 | 23.01 | H | 0.7 | 0.0 | 22.36 | 38.5 | -16.1 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 848.30 | 18.20 | V | 0.7 | 0.0 | 17.55 | 38.5 | -20.9 | |
| 848.30 | 23.30 | H | 0.7 | 0.0 | 22.65 | 38.5 | -15.8 | |

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**ERP LTE QPSK Band 5 (3MHz BANDWIDTH)**

**High Frequency Substitution Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT only
**Mode:** LTE Band 5 QPSK 3MHz BW

**Test Equipment:**
**Receiving: Sunol T407, and Chamber D Cable**
**Substitution: Dipole S/N: 00022117, and 8ft SMA Cable**

| f MHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 825.50 | 19.61 | V | 0.7 | 0.0 | 18.96 | 38.5 | -19.5 | |
| 825.50 | 25.51 | H | 0.7 | 0.0 | 24.86 | 38.5 | -13.6 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 836.50 | 18.41 | V | 0.7 | 0.0 | 17.76 | 38.5 | -20.7 | |
| 836.50 | 24.11 | H | 0.7 | 0.0 | 23.46 | 38.5 | -15.0 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 847.50 | 19.20 | V | 0.7 | 0.0 | 18.55 | 38.5 | -19.9 | |
| 847.50 | 24.50 | H | 0.7 | 0.0 | 23.85 | 38.5 | -14.6 | |

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**ERP LTE 16QAM Band 5 (3MHz BANDWIDTH)**

**High Frequency Substitution Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT only
**Mode:** LTE Band 5 16QAM 3MHz BW

**Test Equipment:**
**Receiving: Sunol T407, and Chamber D Cable**
**Substitution: Dipole S/N: 00022117, and 8ft SMA Cable**

| f MHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 825.50 | 18.61 | V | 0.7 | 0.0 | 17.96 | 38.5 | -20.5 | |
| 825.50 | 24.51 | H | 0.7 | 0.0 | 23.86 | 38.5 | -14.6 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 836.50 | 17.41 | V | 0.7 | 0.0 | 16.76 | 38.5 | -21.7 | |
| 836.50 | 23.21 | H | 0.7 | 0.0 | 22.56 | 38.5 | -15.9 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 847.50 | 18.20 | V | 0.7 | 0.0 | 17.55 | 38.5 | -20.9 | |
| 847.50 | 23.50 | H | 0.7 | 0.0 | 22.85 | 38.5 | -15.6 | |

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**ERP LTE QPSK Band 5 (5MHz BANDWIDTH)**

**High Frequency Substitution Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/23/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT only
**Mode:** LTE Band 5 QPSK 5MHz BW

**Test Equipment:**
**Receiving: Sunol T407, and Chamber D Cable**
**Substitution: Dipole S/N: 00022117, and 8ft SMA Cable**

| f MHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 826.50 | 19.71 | V | 0.7 | 0.0 | 19.06 | 38.5 | -19.4 | |
| 826.50 | 25.21 | H | 0.7 | 0.0 | 24.56 | 38.5 | -13.9 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 836.50 | 18.51 | V | 0.7 | 0.0 | 17.86 | 38.5 | -20.6 | |
| 836.50 | 23.91 | H | 0.7 | 0.0 | 23.26 | 38.5 | -15.2 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 846.50 | 19.50 | V | 0.7 | 0.0 | 18.85 | 38.5 | -19.6 | |
| 846.50 | 24.70 | H | 0.7 | 0.0 | 24.05 | 38.5 | -14.4 | |

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**ERP LTE 16QAM Band 5 (5MHz BANDWIDTH)**

**High Frequency Substitution Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/23/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT only
**Mode:** LTE Band 5 16QAM 5MHz BW

**Test Equipment:**
**Receiving: Sunol T407, and Chamber d Cable**
**Substitution: Dipole S/N: 00022117, and 8ft SMA Cable**

| f MHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 826.50 | 18.71 | V | 0.7 | 0.0 | 18.06 | 38.5 | -20.4 | |
| 826.50 | 24.31 | H | 0.7 | 0.0 | 23.66 | 38.5 | -14.8 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 836.50 | 17.61 | V | 0.7 | 0.0 | 16.96 | 38.5 | -21.5 | |
| 836.50 | 22.91 | H | 0.7 | 0.0 | 22.26 | 38.5 | -16.2 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 846.50 | 18.50 | V | 0.7 | 0.0 | 17.85 | 38.5 | -20.6 | |
| 846.50 | 23.70 | H | 0.7 | 0.0 | 23.05 | 38.5 | -15.4 | |

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**ERP LTE QPSK Band 5 (10MHz BANDWIDTH)**

**High Frequency Substitution Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/23/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT only
**Mode:** LTE Band 5 QPSK 10MHz BW

**Test Equipment:**
**Receiving: Sunol T407, and Chamber D Cable**
**Substitution: Dipole S/N: 00022117, and 8ft SMA Cable**

| f MHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 829.00 | 19.71 | V | 0.7 | 0.0 | 19.06 | 38.5 | -19.4 | |
| 829.00 | 25.51 | H | 0.7 | 0.0 | 24.86 | 38.5 | -13.6 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 836.50 | 18.61 | V | 0.7 | 0.0 | 17.96 | 38.5 | -20.5 | |
| 836.50 | 24.11 | H | 0.7 | 0.0 | 23.46 | 38.5 | -15.0 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 844.00 | 19.70 | V | 0.7 | 0.0 | 19.05 | 38.5 | -19.4 | |
| 844.00 | 24.70 | H | 0.7 | 0.0 | 24.05 | 38.5 | -14.4 | |

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**ERP LTE 16QAM Band 5 (10MHz BANDWIDTH)**

**High Frequency Substitution Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/23/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT only
**Mode:** LTE Band 5 16QAM 10MHz BW

**Test Equipment:**
**Receiving: Sunol T407, and Chamber D Cable**
**Substitution: Dipole S/N: 00022117, and 8ft SMA Cable**

| f MHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 829.00 | 18.71 | V | 0.7 | 0.0 | 18.06 | 38.5 | -20.4 | |
| 829.00 | 24.51 | H | 0.7 | 0.0 | 23.86 | 38.5 | -14.6 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 836.50 | 17.61 | V | 0.7 | 0.0 | 16.96 | 38.5 | -21.5 | |
| 836.50 | 23.11 | H | 0.7 | 0.0 | 22.46 | 38.5 | -16.0 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 844.00 | 18.70 | V | 0.7 | 0.0 | 18.05 | 38.5 | -20.4 | |
| 844.00 | 23.70 | H | 0.7 | 0.0 | 23.05 | 38.5 | -15.4 | |

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## 9.1.4. LTE BAND 17

**AVERAGE**

**ERP LTE QPSK Band 17 (5MHz BANDWIDTH)**

**High Frequency Substitution Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT only
**Mode:** LTE Band 17 QPSK 5MHz BW

**Test Equipment:**
**Receiving: Sunol T407, and Chamber D Cable**
**Substitution: Dipole S/N: 00022117, and 8ft SMA Cable**

| f MHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 706.50 | 14.50 | V | 0.55 | 0.0 | 13.95 | 34.8 | -20.8 | |
| 706.50 | 22.75 | H | 0.55 | 0.0 | 22.20 | 34.8 | -12.6 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 710.00 | 13.45 | V | 0.55 | 0.0 | 12.90 | 34.8 | -21.9 | |
| 710.00 | 21.24 | H | 0.55 | 0.0 | 20.69 | 34.8 | -14.1 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 713.50 | 12.90 | V | 0.55 | 0.0 | 12.35 | 34.8 | -22.4 | |
| 713.50 | 22.05 | H | 0.55 | 0.0 | 21.50 | 34.8 | -13.3 | |

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**ERP LTE 16QAM Band 17 (5MHz BANDWIDTH)**

**High Frequency Substitution Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT only
**Mode:** LTE Band 17 16QAM 5MHz BW

**Test Equipment:**
**Receiving: Sunol T407, and Chamber D Cable**
**Substitution: Dipole S/N: 00022117, and 8ft SMA Cable**

| f MHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| Low Ch | | | | | | | | |
| 706.50 | 13.50 | V | 0.55 | 0.0 | 12.95 | 34.8 | -21.8 | |
| 706.50 | 21.75 | H | 0.55 | 0.0 | 21.20 | 34.8 | -13.6 | |
| | | | | | | | | |
| Mid Ch | | | | | | | | |
| 710.00 | 12.45 | V | 0.55 | 0.0 | 11.90 | 34.8 | -22.9 | |
| 710.00 | 20.24 | H | 0.55 | 0.0 | 19.69 | 34.8 | -15.1 | |
| | | | | | | | | |
| High Ch | | | | | | | | |
| 713.50 | 11.90 | V | 0.55 | 0.0 | 11.35 | 34.8 | -23.4 | |
| 713.50 | 21.05 | H | 0.55 | 0.0 | 20.50 | 34.8 | -14.3 | |

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**ERP LTE QPSK Band 17 (10MHz BANDWIDTH)**

**High Frequency Substitution Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT only
**Mode:** LTE Band 17 QPSK 10MHz BW

**Test Equipment:**
**Receiving: Sunol T407, and Chamber D Cable**
**Substitution: Dipole S/N: 00022117, and 8ft SMA Cable**

| f MHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| 710.00 | 14.55 | V | 0.55 | 0.0 | 14.00 | 34.8 | -20.8 | |
| 710.00 | 21.74 | H | 0.55 | 0.0 | 21.19 | 34.8 | -13.6 | |

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**ERP LTE 16QAM Band 17 (10MHz BANDWIDTH)**

**High Frequency Substitution Measurement**
**Compliance Certification Services Chamber D**

Main

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** R.ZHENG
**Configuration:** EUT only
**Mode:** LTE Band 17 16QAM 10MHz BW

**Test Equipment:**
**Receiving: Sunol T407, and Chamber D Cable**
**Substitution: Dipole S/N: 00022117, and 8ft SMA Cable**

| f MHz | SG reading (dBm) | Ant. Pol. (H/V) | Cable Loss (dB) | Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|---|---|---|---|---|---|---|---|---|
| 710.00 | 13.55 | V | 0.55 | 0.0 | 13.00 | 34.8 | -21.8 | |
| 710.00 | 20.74 | H | 0.55 | 0.0 | 20.19 | 34.8 | -14.6 | |

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# 9.2. FIELD STRENGTH OF SPURIOUS RADIATION

**RULE PART(S)**

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

**LIMIT**

§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.

§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.

§27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB.

**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.

**MODES TESTED**

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 17

**RESULTS**

## 9.2.1. LTE BAND 2

**QPSK Band 2 (1.4 MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 2_QPSK_1.4MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 24 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1850.7MHz) | | | | | | | | | |
| 3.701 | -8.6 | V | 3.0 | 36.8 | 1.0 | -44.5 | -13.0 | -31.5 | |
| 5.552 | -8.8 | V | 3.0 | 36.3 | 1.0 | -44.1 | -13.0 | -31.1 | |
| 3.701 | -7.1 | H | 3.0 | 36.8 | 1.0 | -42.9 | -13.0 | -29.9 | |
| | | | | | | | | | |
| Mid Ch, (1880.0MHz) | | | | | | | | | |
| 3.760 | -5.2 | V | 3.0 | 36.8 | 1.0 | -41.0 | -13.0 | -28.0 | |
| 3.760 | -2.1 | H | 3.0 | 36.8 | 1.0 | -37.8 | -13.0 | -24.8 | |
| | | | | | | | | | |
| High Ch, (1909.3MHz) | | | | | | | | | |
| 3.819 | -5.0 | V | 3.0 | 36.7 | 1.0 | -40.7 | -13.0 | -27.7 | |
| 3.819 | -2.8 | H | 3.0 | 36.7 | 1.0 | -38.5 | -13.0 | -25.5 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 2 (1.4 MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 2_16QAM_1.4MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 24 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1850.7MHz) | | | | | | | | | |
| 3.701 | -7.6 | V | 3.0 | 36.8 | 1.0 | -43.4 | -13.0 | -30.4 | |
| 5.552 | -9.1 | V | 3.0 | 36.3 | 1.0 | -44.4 | -13.0 | -31.4 | |
| 3.701 | -7.9 | H | 3.0 | 36.8 | 1.0 | -43.7 | -13.0 | -30.7 | |
| | | | | | | | | | |
| Mid Ch, (1880.0MHz) | | | | | | | | | |
| 3.760 | -5.4 | V | 3.0 | 36.8 | 1.0 | -41.2 | -13.0 | -28.2 | |
| 3.760 | -2.5 | H | 3.0 | 36.8 | 1.0 | -38.2 | -13.0 | -25.2 | |
| | | | | | | | | | |
| High Ch, (1909.3MHz) | | | | | | | | | |
| 3.819 | -6.2 | V | 3.0 | 36.7 | 1.0 | -41.9 | -13.0 | -28.9 | |
| 3.819 | -2.5 | H | 3.0 | 36.7 | 1.0 | -38.2 | -13.0 | -25.2 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**QPSK Band 2 (3MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 2_QPSK_3MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 24 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1851.5MHz) | | | | | | | | | |
| 3.703 | -9.6 | V | 3.0 | 36.8 | 1.0 | -45.4 | -13.0 | -32.4 | |
| 5.555 | -6.8 | V | 3.0 | 36.3 | 1.0 | -42.1 | -13.0 | -29.1 | |
| 3.703 | -6.4 | H | 3.0 | 36.8 | 1.0 | -42.2 | -13.0 | -29.2 | |
| 5.555 | -8.8 | H | 3.0 | 36.3 | 1.0 | -44.1 | -13.0 | -31.1 | |
| | | | | | | | | | |
| Mid Ch, (1880.0MHz) | | | | | | | | | |
| 3.760 | -6.4 | V | 3.0 | 36.8 | 1.0 | -42.2 | -13.0 | -29.2 | |
| 5.640 | -8.2 | V | 3.0 | 36.3 | 1.0 | -43.5 | -13.0 | -30.5 | |
| 7.520 | -18.3 | V | 3.0 | 36.6 | 1.0 | -53.9 | -13.0 | -40.9 | |
| 3.760 | -1.9 | H | 3.0 | 36.8 | 1.0 | -37.7 | -13.0 | -24.7 | |
| 5.640 | -19.9 | H | 3.0 | 36.3 | 1.0 | -55.2 | -13.0 | -42.2 | |
| 7.520 | -17.2 | H | 3.0 | 36.6 | 1.0 | -52.8 | -13.0 | -39.8 | |
| | | | | | | | | | |
| High Ch, (1908.5MHz) | | | | | | | | | |
| 3.817 | -5.6 | V | 3.0 | 36.7 | 1.0 | -41.4 | -13.0 | -28.4 | |
| 3.817 | -2.1 | H | 3.0 | 36.7 | 1.0 | -37.8 | -13.0 | -24.8 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 2 (3MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 2_16QAM_3MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 24 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1851.5MHz) | | | | | | | | | |
| 3.703 | -10.2 | V | 3.0 | 36.8 | 1.0 | -46.0 | -13.0 | -33.0 | |
| 5.555 | -7.8 | V | 3.0 | 36.3 | 1.0 | -43.1 | -13.0 | -30.1 | |
| 3.703 | -5.4 | H | 3.0 | 36.8 | 1.0 | -41.2 | -13.0 | -28.2 | |
| 5.555 | -10.9 | H | 3.0 | 36.3 | 1.0 | -46.2 | -13.0 | -33.2 | |
| | | | | | | | | | |
| Mid Ch, (1880.0MHz) | | | | | | | | | |
| 3.760 | -6.0 | V | 3.0 | 36.8 | 1.0 | -41.8 | -13.0 | -28.8 | |
| 5.640 | -7.5 | V | 3.0 | 36.3 | 1.0 | -42.8 | -13.0 | -29.8 | |
| 7.520 | -17.6 | V | 3.0 | 36.6 | 1.0 | -53.2 | -13.0 | -40.2 | |
| 3.760 | -2.0 | H | 3.0 | 36.8 | 1.0 | -37.7 | -13.0 | -24.7 | |
| 5.640 | -19.8 | H | 3.0 | 36.3 | 1.0 | -55.1 | -13.0 | -42.1 | |
| 7.520 | -18.3 | H | 3.0 | 36.6 | 1.0 | -53.9 | -13.0 | -40.9 | |
| | | | | | | | | | |
| High Ch, (1908.5MHz) | | | | | | | | | |
| 3.817 | -3.6 | V | 3.0 | 36.7 | 1.0 | -39.3 | -13.0 | -26.3 | |
| 3.817 | -2.1 | H | 3.0 | 36.7 | 1.0 | -37.8 | -13.0 | -24.8 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**QPSK Band 2 (5MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 2_QPSK_5MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 24 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1852.5MHz) | | | | | | | | | |
| 3.705 | -10.1 | V | 3.0 | 36.8 | 1.0 | -45.9 | -13.0 | -32.9 | |
| 5.558 | -8.3 | V | 3.0 | 36.3 | 1.0 | -43.6 | -13.0 | -30.6 | |
| 3.705 | -6.5 | H | 3.0 | 36.8 | 1.0 | -42.3 | -13.0 | -29.3 | |
| 5.558 | -8.2 | H | 3.0 | 36.3 | 1.0 | -43.5 | -13.0 | -30.5 | |
| | | | | | | | | | |
| Mid Ch, (1880.0MHz) | | | | | | | | | |
| 3.760 | -6.0 | V | 3.0 | 36.8 | 1.0 | -41.8 | -13.0 | -28.8 | |
| 5.640 | -11.9 | V | 3.0 | 36.3 | 1.0 | -47.2 | -13.0 | -34.2 | |
| 7.520 | -17.8 | V | 3.0 | 36.6 | 1.0 | -53.4 | -13.0 | -40.4 | |
| 3.760 | -2.0 | H | 3.0 | 36.8 | 1.0 | -37.7 | -13.0 | -24.7 | |
| 5.640 | -18.8 | H | 3.0 | 36.3 | 1.0 | -54.1 | -13.0 | -41.1 | |
| 7.520 | -18.3 | H | 3.0 | 36.6 | 1.0 | -53.9 | -13.0 | -40.9 | |
| | | | | | | | | | |
| High Ch, (1907.5MHz) | | | | | | | | | |
| 3.815 | -5.1 | V | 3.0 | 36.7 | 1.0 | -40.8 | -13.0 | -27.8 | |
| 3.815 | -2.5 | H | 3.0 | 36.7 | 1.0 | -38.2 | -13.0 | -25.2 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 2 (5MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 2_16QAM_5MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 24 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1852.5MHz) | | | | | | | | | |
| 3.705 | -9.2 | V | 3.0 | 36.8 | 1.0 | -45.0 | -13.0 | -32.0 | |
| 5.558 | -8.6 | V | 3.0 | 36.3 | 1.0 | -43.9 | -13.0 | -30.9 | |
| 3.705 | -7.9 | H | 3.0 | 36.8 | 1.0 | -43.7 | -13.0 | -30.7 | |
| 5.558 | -5.9 | H | 3.0 | 36.3 | 1.0 | -41.2 | -13.0 | -28.2 | |
| | | | | | | | | | |
| Mid Ch, (1880.0MHz) | | | | | | | | | |
| 3.760 | -5.9 | V | 3.0 | 36.8 | 1.0 | -41.7 | -13.0 | -28.7 | |
| 5.640 | -10.9 | V | 3.0 | 36.3 | 1.0 | -46.2 | -13.0 | -33.2 | |
| 7.520 | -16.5 | V | 3.0 | 36.6 | 1.0 | -52.1 | -13.0 | -39.1 | |
| 3.760 | -1.8 | H | 3.0 | 36.8 | 1.0 | -37.6 | -13.0 | -24.6 | |
| 5.640 | -19.6 | H | 3.0 | 36.3 | 1.0 | -54.9 | -13.0 | -41.9 | |
| 7.520 | -16.7 | H | 3.0 | 36.6 | 1.0 | -52.3 | -13.0 | -39.3 | |
| | | | | | | | | | |
| High Ch, (1907.5MHz) | | | | | | | | | |
| 3.815 | -4.0 | V | 3.0 | 36.7 | 1.0 | -39.7 | -13.0 | -26.7 | |
| 3.815 | -2.7 | H | 3.0 | 36.7 | 1.0 | -38.4 | -13.0 | -25.4 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**QPSK Band 2 (10MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 2_QPSK_10MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 24 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1855.0MHz) | | | | | | | | | |
| 3.710 | -9.5 | V | 3.0 | 36.8 | 1.0 | -45.4 | -13.0 | -32.4 | |
| 5.565 | -8.2 | V | 3.0 | 36.3 | 1.0 | -43.5 | -13.0 | -30.5 | |
| 3.710 | -6.1 | H | 3.0 | 36.8 | 1.0 | -41.9 | -13.0 | -28.9 | |
| 5.565 | -13.1 | H | 3.0 | 36.3 | 1.0 | -48.4 | -13.0 | -35.4 | |
| | | | | | | | | | |
| Mid Ch, (1880.0MHz) | | | | | | | | | |
| 3.760 | -6.2 | V | 3.0 | 36.8 | 1.0 | -41.9 | -13.0 | -28.9 | |
| 5.640 | -9.4 | V | 3.0 | 36.3 | 1.0 | -44.7 | -13.0 | -31.7 | |
| 7.520 | -17.8 | V | 3.0 | 36.6 | 1.0 | -53.4 | -13.0 | -40.4 | |
| 3.760 | -1.7 | H | 3.0 | 36.8 | 1.0 | -37.5 | -13.0 | -24.5 | |
| 5.640 | -19.1 | H | 3.0 | 36.3 | 1.0 | -54.4 | -13.0 | -41.4 | |
| 7.520 | -18.7 | H | 3.0 | 36.6 | 1.0 | -54.3 | -13.0 | -41.3 | |
| | | | | | | | | | |
| High Ch, (1905.0MHz) | | | | | | | | | |
| 3.810 | -5.5 | V | 3.0 | 36.7 | 1.0 | -41.2 | -13.0 | -28.2 | |
| 3.810 | -5.6 | H | 3.0 | 36.7 | 1.0 | -41.4 | -13.0 | -28.4 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 2 (10MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 2_16QAM_10MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 24 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1855.0MHz) | | | | | | | | | |
| 3.710 | -9.0 | V | 3.0 | 36.8 | 1.0 | -44.8 | -13.0 | -31.8 | |
| 5.565 | -8.7 | V | 3.0 | 36.3 | 1.0 | -44.0 | -13.0 | -31.0 | |
| 3.710 | -7.3 | H | 3.0 | 36.8 | 1.0 | -43.1 | -13.0 | -30.1 | |
| 5.565 | -15.1 | H | 3.0 | 36.3 | 1.0 | -50.4 | -13.0 | -37.4 | |
| | | | | | | | | | |
| Mid Ch, (1880.0MHz) | | | | | | | | | |
| 3.760 | -6.2 | V | 3.0 | 36.8 | 1.0 | -42.0 | -13.0 | -29.0 | |
| 5.640 | -8.2 | V | 3.0 | 36.3 | 1.0 | -43.5 | -13.0 | -30.5 | |
| 7.520 | -16.6 | V | 3.0 | 36.6 | 1.0 | -52.2 | -13.0 | -39.2 | |
| 3.760 | -2.7 | H | 3.0 | 36.8 | 1.0 | -38.4 | -13.0 | -25.4 | |
| 5.640 | -20.4 | H | 3.0 | 36.3 | 1.0 | -55.7 | -13.0 | -42.7 | |
| 7.520 | -18.7 | H | 3.0 | 36.6 | 1.0 | -54.3 | -13.0 | -41.3 | |
| | | | | | | | | | |
| High Ch, (1905.0MHz) | | | | | | | | | |
| 3.810 | -6.1 | V | 3.0 | 36.7 | 1.0 | -41.9 | -13.0 | -28.9 | |
| 3.810 | -4.1 | H | 3.0 | 36.7 | 1.0 | -39.8 | -13.0 | -26.8 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**QPSK Band 2 (15MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 2_QPSK_15MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 24 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1857.5MHz) | | | | | | | | | |
| 3.715 | -8.9 | V | 3.0 | 36.8 | 1.0 | -44.7 | -13.0 | -31.7 | |
| 5.573 | -8.8 | V | 3.0 | 36.3 | 1.0 | -44.1 | -13.0 | -31.1 | |
| 3.715 | -6.6 | H | 3.0 | 36.8 | 1.0 | -42.4 | -13.0 | -29.4 | |
| 5.573 | -15.6 | H | 3.0 | 36.3 | 1.0 | -50.9 | -13.0 | -37.9 | |
| | | | | | | | | | |
| Mid Ch, (1880.0MHz) | | | | | | | | | |
| 3.760 | -7.0 | V | 3.0 | 36.8 | 1.0 | -42.8 | -13.0 | -29.8 | |
| 5.640 | -15.1 | V | 3.0 | 36.3 | 1.0 | -50.4 | -13.0 | -37.4 | |
| 7.520 | -17.5 | V | 3.0 | 36.6 | 1.0 | -53.1 | -13.0 | -40.1 | |
| 3.760 | -2.0 | H | 3.0 | 36.8 | 1.0 | -37.7 | -13.0 | -24.7 | |
| 5.640 | -17.6 | H | 3.0 | 36.3 | 1.0 | -52.9 | -13.0 | -39.9 | |
| 7.520 | -16.6 | H | 3.0 | 36.6 | 1.0 | -52.2 | -13.0 | -39.2 | |
| | | | | | | | | | |
| High Ch, (1902.5MHz) | | | | | | | | | |
| 3.805 | -8.1 | V | 3.0 | 36.7 | 1.0 | -43.8 | -13.0 | -30.8 | |
| 3.805 | -4.5 | H | 3.0 | 36.7 | 1.0 | -40.2 | -13.0 | -27.2 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 2 (15MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 2_16QAM_15MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 24 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1857.5MHz) | | | | | | | | | |
| 3.715 | -9.6 | V | 3.0 | 36.8 | 1.0 | -45.4 | -13.0 | -32.4 | |
| 5.573 | -8.4 | V | 3.0 | 36.3 | 1.0 | -43.7 | -13.0 | -30.7 | |
| 3.715 | -5.8 | H | 3.0 | 36.8 | 1.0 | -41.6 | -13.0 | -28.6 | |
| 5.573 | -13.9 | H | 3.0 | 36.3 | 1.0 | -49.2 | -13.0 | -36.2 | |
| | | | | | | | | | |
| Mid Ch, (1880.0MHz) | | | | | | | | | |
| 3.760 | -7.0 | V | 3.0 | 36.8 | 1.0 | -42.7 | -13.0 | -29.7 | |
| 5.640 | -13.8 | V | 3.0 | 36.3 | 1.0 | -49.1 | -13.0 | -36.1 | |
| 7.520 | -16.2 | V | 3.0 | 36.6 | 1.0 | -51.8 | -13.0 | -38.8 | |
| 3.760 | -1.2 | H | 3.0 | 36.8 | 1.0 | -36.9 | -13.0 | -23.9 | |
| 5.640 | -17.4 | H | 3.0 | 36.3 | 1.0 | -52.7 | -13.0 | -39.7 | |
| 7.520 | -15.6 | H | 3.0 | 36.6 | 1.0 | -51.2 | -13.0 | -38.2 | |
| | | | | | | | | | |
| High Ch, (1902.5MHz) | | | | | | | | | |
| 3.805 | -7.6 | V | 3.0 | 36.7 | 1.0 | -43.4 | -13.0 | -30.4 | |
| 3.805 | -4.4 | H | 3.0 | 36.7 | 1.0 | -40.1 | -13.0 | -27.1 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**QPSK Band 2 (20MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 2_QPSK_20MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 24 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1860.0MHz) | | | | | | | | | |
| 3.720 | -9.1 | V | 3.0 | 36.8 | 1.0 | -44.9 | -13.0 | -31.9 | |
| 5.580 | -5.8 | V | 3.0 | 36.3 | 1.0 | -41.1 | -13.0 | -28.1 | |
| 3.720 | -6.8 | H | 3.0 | 36.8 | 1.0 | -42.6 | -13.0 | -29.6 | |
| 5.580 | -15.5 | H | 3.0 | 36.3 | 1.0 | -50.8 | -13.0 | -37.8 | |
| | | | | | | | | | |
| Mid Ch, (1880.0MHz) | | | | | | | | | |
| 3.760 | -7.2 | V | 3.0 | 36.8 | 1.0 | -43.0 | -13.0 | -30.0 | |
| 5.640 | -13.5 | V | 3.0 | 36.3 | 1.0 | -48.9 | -13.0 | -35.9 | |
| 7.520 | -15.5 | V | 3.0 | 36.6 | 1.0 | -51.1 | -13.0 | -38.1 | |
| 3.760 | -2.6 | H | 3.0 | 36.8 | 1.0 | -38.4 | -13.0 | -25.4 | |
| 5.640 | -19.7 | H | 3.0 | 36.3 | 1.0 | -55.0 | -13.0 | -42.0 | |
| 7.520 | -16.1 | H | 3.0 | 36.6 | 1.0 | -51.7 | -13.0 | -38.7 | |
| | | | | | | | | | |
| High Ch, (1900.0MHz) | | | | | | | | | |
| 3.800 | -0.9 | V | 3.0 | 36.7 | 1.0 | -36.6 | -13.0 | -23.6 | |
| 3.800 | 0.6 | H | 3.0 | 36.7 | 1.0 | -35.1 | -13.0 | -22.1 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 2 (20MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/24/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 2_16QAM_20MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 24 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1860.0MHz) | | | | | | | | | |
| 3.720 | -8.4 | V | 3.0 | 36.8 | 1.0 | -44.2 | -13.0 | -31.2 | |
| 5.580 | -4.5 | V | 3.0 | 36.3 | 1.0 | -39.8 | -13.0 | -26.8 | |
| 3.720 | -6.6 | H | 3.0 | 36.8 | 1.0 | -42.4 | -13.0 | -29.4 | |
| 5.580 | -16.1 | H | 3.0 | 36.3 | 1.0 | -51.4 | -13.0 | -38.4 | |
| | | | | | | | | | |
| Mid Ch, (1880.0MHz) | | | | | | | | | |
| 3.760 | -7.4 | V | 3.0 | 36.8 | 1.0 | -43.1 | -13.0 | -30.1 | |
| 5.640 | -13.8 | V | 3.0 | 36.3 | 1.0 | -49.1 | -13.0 | -36.1 | |
| 7.520 | -16.1 | V | 3.0 | 36.6 | 1.0 | -51.7 | -13.0 | -38.7 | |
| 3.760 | -2.1 | H | 3.0 | 36.8 | 1.0 | -37.8 | -13.0 | -24.8 | |
| 5.640 | -19.8 | H | 3.0 | 36.3 | 1.0 | -55.1 | -13.0 | -42.1 | |
| 7.520 | -15.1 | H | 3.0 | 36.6 | 1.0 | -50.7 | -13.0 | -37.7 | |
| | | | | | | | | | |
| High Ch, (1900.0MHz) | | | | | | | | | |
| 3.800 | -1.0 | V | 3.0 | 36.7 | 1.0 | -36.7 | -13.0 | -23.7 | |
| 3.800 | 0.6 | H | 3.0 | 36.7 | 1.0 | -35.2 | -13.0 | -22.2 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

## 9.2.2. LTE BAND 4

**QPSK Band 4 (1.4 MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 4_QPSK_1.4MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1710.7MHz) | | | | | | | | | |
| 3.421 | -19.0 | V | 3.0 | 37.0 | 1.0 | -55.1 | -13.0 | -42.1 | |
| 3.421 | -23.8 | H | 3.0 | 37.0 | 1.0 | -59.8 | -13.0 | -46.8 | |
| | | | | | | | | | |
| Mid Ch, (1732.5MHz) | | | | | | | | | |
| 3.465 | -24.5 | V | 3.0 | 37.0 | 1.0 | -60.5 | -13.0 | -47.5 | |
| 3.465 | -18.7 | H | 3.0 | 37.0 | 1.0 | -54.7 | -13.0 | -41.7 | |
| | | | | | | | | | |
| High Ch, (1754.3MHz) | | | | | | | | | |
| 3.509 | -21.4 | V | 3.0 | 37.0 | 1.0 | -57.4 | -13.0 | -44.4 | |
| 7.017 | -15.5 | V | 3.0 | 36.5 | 1.0 | -51.0 | -13.0 | -38.0 | |
| 3.509 | -18.1 | H | 3.0 | 37.0 | 1.0 | -54.1 | -13.0 | -41.1 | |
| 7.017 | -16.6 | H | 3.0 | 36.5 | 1.0 | -52.0 | -13.0 | -39.0 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 4 (1.4 MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 4_16QAM_1.4MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1710.7MHz) | | | | | | | | | |
| 3.421 | -19.5 | V | 3.0 | 37.0 | 1.0 | -55.5 | -13.0 | -42.5 | |
| 3.421 | -23.5 | H | 3.0 | 37.0 | 1.0 | -59.6 | -13.0 | -46.6 | |
| | | | | | | | | | |
| Mid Ch, (1732.5MHz) | | | | | | | | | |
| 3.465 | -26.4 | V | 3.0 | 37.0 | 1.0 | -62.4 | -13.0 | -49.4 | |
| 3.465 | -19.1 | H | 3.0 | 37.0 | 1.0 | -55.1 | -13.0 | -42.1 | |
| | | | | | | | | | |
| High Ch, (1754.3MHz) | | | | | | | | | |
| 3.509 | -21.5 | V | 3.0 | 37.0 | 1.0 | -57.4 | -13.0 | -44.4 | |
| 7.017 | -14.9 | V | 3.0 | 36.5 | 1.0 | -50.4 | -13.0 | -37.4 | |
| 3.509 | -18.4 | H | 3.0 | 37.0 | 1.0 | -54.3 | -13.0 | -41.3 | |
| 7.017 | -15.2 | H | 3.0 | 36.5 | 1.0 | -50.7 | -13.0 | -37.7 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**QPSK Band 4 (3MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 4_QPSK_3MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1711.5MHz) | | | | | | | | | |
| 3.423 | -20.3 | V | 3.0 | 37.0 | 1.0 | -56.4 | -13.0 | -43.4 | |
| 3.423 | -23.6 | H | 3.0 | 37.0 | 1.0 | -59.7 | -13.0 | -46.7 | |
| | | | | | | | | | |
| Mid Ch, (1732.5MHz) | | | | | | | | | |
| 3.465 | -24.0 | V | 3.0 | 37.0 | 1.0 | -60.0 | -13.0 | -47.0 | |
| 3.465 | -19.2 | H | 3.0 | 37.0 | 1.0 | -55.2 | -13.0 | -42.2 | |
| | | | | | | | | | |
| High Ch, (1753.5MHz) | | | | | | | | | |
| 3.507 | -23.5 | V | 3.0 | 37.0 | 1.0 | -59.5 | -13.0 | -46.5 | |
| 7.014 | -15.2 | V | 3.0 | 36.5 | 1.0 | -50.7 | -13.0 | -37.7 | |
| 3.507 | -19.7 | H | 3.0 | 37.0 | 1.0 | -55.7 | -13.0 | -42.7 | |
| 7.014 | -14.3 | H | 3.0 | 36.5 | 1.0 | -49.8 | -13.0 | -36.8 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 4 (3MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 4_16QAM_3MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1711.5MHz) | | | | | | | | | |
| 3.423 | -19.6 | V | 3.0 | 37.0 | 1.0 | -55.6 | -13.0 | -42.6 | |
| 3.423 | -22.2 | H | 3.0 | 37.0 | 1.0 | -58.2 | -13.0 | -45.2 | |
| | | | | | | | | | |
| Mid Ch, (1732.5MHz) | | | | | | | | | |
| 3.465 | -23.3 | V | 3.0 | 37.0 | 1.0 | -59.3 | -13.0 | -46.3 | |
| 3.465 | -18.8 | H | 3.0 | 37.0 | 1.0 | -54.8 | -13.0 | -41.8 | |
| | | | | | | | | | |
| High Ch, (1753.5MHz) | | | | | | | | | |
| 3.507 | -23.9 | V | 3.0 | 37.0 | 1.0 | -59.8 | -13.0 | -46.8 | |
| 7.014 | -14.4 | V | 3.0 | 36.5 | 1.0 | -49.9 | -13.0 | -36.9 | |
| 3.507 | -18.6 | H | 3.0 | 37.0 | 1.0 | -54.5 | -13.0 | -41.5 | |
| 7.014 | -16.1 | H | 3.0 | 36.5 | 1.0 | -51.6 | -13.0 | -38.6 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**QPSK Band 4 (5MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 4_QPSK_5MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1712.5MHz) | | | | | | | | | |
| 3.425 | -20.4 | V | 3.0 | 37.0 | 1.0 | -56.4 | -13.0 | -43.4 | |
| 3.425 | -24.6 | H | 3.0 | 37.0 | 1.0 | -60.6 | -13.0 | -47.6 | |
| | | | | | | | | | |
| Mid Ch, (1732.5MHz) | | | | | | | | | |
| 3.465 | -24.5 | V | 3.0 | 37.0 | 1.0 | -60.5 | -13.0 | -47.5 | |
| 3.465 | -19.6 | H | 3.0 | 37.0 | 1.0 | -55.6 | -13.0 | -42.6 | |
| | | | | | | | | | |
| High Ch, (1752.5MHz) | | | | | | | | | |
| 3.505 | -25.4 | V | 3.0 | 37.0 | 1.0 | -61.3 | -13.0 | -48.3 | |
| 7.010 | -16.4 | V | 3.0 | 36.5 | 1.0 | -51.9 | -13.0 | -38.9 | |
| 3.505 | -22.3 | H | 3.0 | 37.0 | 1.0 | -58.3 | -13.0 | -45.3 | |
| 7.010 | -17.2 | H | 3.0 | 36.5 | 1.0 | -52.7 | -13.0 | -39.7 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 4 (5MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 4_16QAM_5MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1712.5MHz) | | | | | | | | | |
| 3.425 | -19.3 | V | 3.0 | 37.0 | 1.0 | -55.4 | -13.0 | -42.4 | |
| 3.425 | -22.9 | H | 3.0 | 37.0 | 1.0 | -58.9 | -13.0 | -45.9 | |
| | | | | | | | | | |
| Mid Ch, (1732.5MHz) | | | | | | | | | |
| 3.465 | -24.7 | V | 3.0 | 37.0 | 1.0 | -60.7 | -13.0 | -47.7 | |
| 3.465 | -19.2 | H | 3.0 | 37.0 | 1.0 | -55.2 | -13.0 | -42.2 | |
| | | | | | | | | | |
| High Ch, (1752.5MHz) | | | | | | | | | |
| 3.505 | -24.4 | V | 3.0 | 37.0 | 1.0 | -60.4 | -13.0 | -47.4 | |
| 7.010 | -15.8 | V | 3.0 | 36.5 | 1.0 | -51.3 | -13.0 | -38.3 | |
| 3.505 | -19.8 | H | 3.0 | 37.0 | 1.0 | -55.8 | -13.0 | -42.8 | |
| 7.010 | -17.2 | H | 3.0 | 36.5 | 1.0 | -52.7 | -13.0 | -39.7 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**QPSK Band 4 (10MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 4_QPSK_10MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1715.0MHz) | | | | | | | | | |
| 3.430 | -18.7 | V | 3.0 | 37.0 | 1.0 | -54.8 | -13.0 | -41.8 | |
| 3.430 | -23.3 | H | 3.0 | 37.0 | 1.0 | -59.3 | -13.0 | -46.3 | |
| | | | | | | | | | |
| Mid Ch, (1732.5MHz) | | | | | | | | | |
| 3.465 | -24.0 | V | 3.0 | 37.0 | 1.0 | -60.0 | -13.0 | -47.0 | |
| 3.465 | -19.4 | H | 3.0 | 37.0 | 1.0 | -55.4 | -13.0 | -42.4 | |
| | | | | | | | | | |
| High Ch, (1750.0MHz) | | | | | | | | | |
| 3.500 | -22.5 | V | 3.0 | 37.0 | 1.0 | -58.4 | -13.0 | -45.4 | |
| 7.000 | -18.1 | V | 3.0 | 36.5 | 1.0 | -53.5 | -13.0 | -40.5 | |
| 3.500 | -22.5 | H | 3.0 | 37.0 | 1.0 | -58.5 | -13.0 | -45.5 | |
| 7.000 | -17.7 | H | 3.0 | 36.5 | 1.0 | -53.2 | -13.0 | -40.2 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 4 (10MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 4_16QAM_10MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1715.0MHz) | | | | | | | | | |
| 3.430 | -18.4 | V | 3.0 | 37.0 | 1.0 | -54.4 | -13.0 | -41.4 | |
| 3.430 | -22.9 | H | 3.0 | 37.0 | 1.0 | -58.9 | -13.0 | -45.9 | |
| | | | | | | | | | |
| Mid Ch, (1732.5MHz) | | | | | | | | | |
| 3.465 | -24.0 | V | 3.0 | 37.0 | 1.0 | -60.0 | -13.0 | -47.0 | |
| 3.465 | -18.6 | H | 3.0 | 37.0 | 1.0 | -54.6 | -13.0 | -41.6 | |
| | | | | | | | | | |
| High Ch, (1750.0MHz) | | | | | | | | | |
| 3.500 | -25.2 | V | 3.0 | 37.0 | 1.0 | -61.1 | -13.0 | -48.1 | |
| 7.000 | -15.8 | V | 3.0 | 36.5 | 1.0 | -51.3 | -13.0 | -38.3 | |
| 3.500 | -22.1 | H | 3.0 | 37.0 | 1.0 | -58.1 | -13.0 | -45.1 | |
| 7.000 | -16.7 | H | 3.0 | 36.5 | 1.0 | -52.1 | -13.0 | -39.1 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**QPSK Band 4 (15MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 4_QPSK_15MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1717.5MHz) | | | | | | | | | |
| 3.435 | -19.3 | V | 3.0 | 37.0 | 1.0 | -55.3 | -13.0 | -42.3 | |
| 3.435 | -23.1 | H | 3.0 | 37.0 | 1.0 | -59.1 | -13.0 | -46.1 | |
| | | | | | | | | | |
| Mid Ch, (1732.5MHz) | | | | | | | | | |
| 3.465 | -24.1 | V | 3.0 | 37.0 | 1.0 | -60.1 | -13.0 | -47.1 | |
| 3.465 | -19.9 | H | 3.0 | 37.0 | 1.0 | -55.9 | -13.0 | -42.9 | |
| | | | | | | | | | |
| High Ch, (1747.5MHz) | | | | | | | | | |
| 3.495 | -23.9 | V | 3.0 | 37.0 | 1.0 | -59.9 | -13.0 | -46.9 | |
| 6.990 | -17.5 | V | 3.0 | 36.5 | 1.0 | -52.9 | -13.0 | -39.9 | |
| 3.495 | -26.1 | H | 3.0 | 37.0 | 1.0 | -62.1 | -13.0 | -49.1 | |
| 6.990 | -18.4 | H | 3.0 | 36.5 | 1.0 | -53.8 | -13.0 | -40.8 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 4 (15MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 4_16QAM_15MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1717.5MHz) | | | | | | | | | |
| 3.435 | -19.1 | V | 3.0 | 37.0 | 1.0 | -55.1 | -13.0 | -42.1 | |
| 3.435 | -22.3 | H | 3.0 | 37.0 | 1.0 | -58.3 | -13.0 | -45.3 | |
| | | | | | | | | | |
| Mid Ch, (1732.5MHz) | | | | | | | | | |
| 3.465 | -23.6 | V | 3.0 | 37.0 | 1.0 | -59.6 | -13.0 | -46.6 | |
| 3.465 | -17.9 | H | 3.0 | 37.0 | 1.0 | -53.9 | -13.0 | -40.9 | |
| | | | | | | | | | |
| High Ch, (1747.5MHz) | | | | | | | | | |
| 3.495 | -23.5 | V | 3.0 | 37.0 | 1.0 | -59.5 | -13.0 | -46.5 | |
| 6.990 | -16.7 | V | 3.0 | 36.5 | 1.0 | -52.2 | -13.0 | -39.2 | |
| 3.495 | -25.2 | H | 3.0 | 37.0 | 1.0 | -61.2 | -13.0 | -48.2 | |
| 6.990 | -18.3 | H | 3.0 | 36.5 | 1.0 | -53.8 | -13.0 | -40.8 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**QPSK Band 4 (20MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 4_QPSK_20MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1720.0MHz) | | | | | | | | | |
| 3.440 | -19.5 | V | 3.0 | 37.0 | 1.0 | -55.5 | -13.0 | -42.5 | |
| 3.440 | -23.2 | H | 3.0 | 37.0 | 1.0 | -59.2 | -13.0 | -46.2 | |
| | | | | | | | | | |
| Mid Ch, (1732.5MHz) | | | | | | | | | |
| 3.465 | -1.4 | V | 3.0 | 37.0 | 10.0 | -28.4 | -13.0 | -15.4 | |
| 3.465 | -23.6 | V | 3.0 | 37.0 | 1.0 | -59.6 | -13.0 | -46.6 | |
| 3.465 | -20.0 | H | 3.0 | 37.0 | 1.0 | -56.0 | -13.0 | -43.0 | |
| | | | | | | | | | |
| High Ch, (1745.0MHz) | | | | | | | | | |
| 3.490 | -21.1 | V | 3.0 | 37.0 | 1.0 | -57.1 | -13.0 | -44.1 | |
| 6.980 | -19.0 | V | 3.0 | 36.5 | 1.0 | -54.4 | -13.0 | -41.4 | |
| 3.490 | -27.5 | H | 3.0 | 37.0 | 1.0 | -63.5 | -13.0 | -50.5 | |
| 6.980 | -18.2 | H | 3.0 | 36.5 | 1.0 | -53.7 | -13.0 | -40.7 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 4 (20MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 4_16QAM_20MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (1720.0MHz) | | | | | | | | | |
| 3.440 | -19.0 | V | 3.0 | 37.0 | 1.0 | -55.0 | -13.0 | -42.0 | |
| 3.440 | -22.9 | H | 3.0 | 37.0 | 1.0 | -58.9 | -13.0 | -45.9 | |
| Mid Ch, (1732.5MHz) | | | | | | | | | |
| 3.465 | -23.3 | V | 3.0 | 37.0 | 1.0 | -59.3 | -13.0 | -46.3 | |
| 3.465 | -20.6 | H | 3.0 | 37.0 | 1.0 | -56.6 | -13.0 | -43.6 | |
| High Ch, (1745.0MHz) | | | | | | | | | |
| 3.490 | -20.4 | V | 3.0 | 37.0 | 1.0 | -56.4 | -13.0 | -43.4 | |
| 6.980 | -17.1 | V | 3.0 | 36.5 | 1.0 | -52.5 | -13.0 | -39.5 | |
| 3.490 | -26.4 | H | 3.0 | 37.0 | 1.0 | -62.3 | -13.0 | -49.3 | |
| 6.980 | -18.8 | H | 3.0 | 36.5 | 1.0 | -54.3 | -13.0 | -41.3 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

## 9.2.3. LTE BAND 5

**QPSK Band 5 (1.4 MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 5_QPSK_1.4MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 22 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (824.7MHz) | | | | | | | | | |
| 1.649 | -19.1 | V | 3.0 | 38.2 | 10.0 | -47.2 | -13.0 | -34.2 | |
| 2.474 | -17.8 | V | 3.0 | 37.5 | 10.0 | -45.3 | -13.0 | -32.3 | |
| 1.649 | -17.4 | H | 3.0 | 38.2 | 10.0 | -45.6 | -13.0 | -32.6 | |
| 2.474 | -23.4 | H | 3.0 | 37.5 | 10.0 | -50.9 | -13.0 | -37.9 | |
| Mid Ch, (836.5MHz) | | | | | | | | | |
| 1.673 | -17.0 | V | 3.0 | 38.1 | 10.0 | -45.1 | -13.0 | -32.1 | |
| 2.510 | -17.6 | V | 3.0 | 37.5 | 10.0 | -45.1 | -13.0 | -32.1 | |
| 1.673 | -16.3 | H | 3.0 | 38.1 | 10.0 | -44.5 | -13.0 | -31.5 | |
| 2.510 | -21.0 | H | 3.0 | 37.5 | 10.0 | -48.5 | -13.0 | -35.5 | |
| High Ch, 848.3MHz) | | | | | | | | | |
| 1.697 | -18.0 | V | 3.0 | 38.1 | 10.0 | -46.1 | -13.0 | -33.1 | |
| 2.545 | -20.7 | V | 3.0 | 37.5 | 10.0 | -48.1 | -13.0 | -35.1 | |
| 1.697 | -14.3 | H | 3.0 | 38.1 | 10.0 | -42.4 | -13.0 | -29.4 | |
| 2.545 | -23.6 | H | 3.0 | 37.5 | 10.0 | -51.0 | -13.0 | -38.0 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 5 (1.4 MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 5_16QAM_1.4MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 22 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (824.7MHz) | | | | | | | | | |
| 1.649 | -17.7 | V | 3.0 | 38.2 | 10.0 | -45.8 | -13.0 | -32.8 | |
| 2.474 | -18.4 | V | 3.0 | 37.5 | 10.0 | -45.8 | -13.0 | -32.8 | |
| 1.649 | -16.8 | H | 3.0 | 38.2 | 10.0 | -45.0 | -13.0 | -32.0 | |
| 2.474 | -23.0 | H | 3.0 | 37.5 | 10.0 | -50.5 | -13.0 | -37.5 | |
| Mid Ch, (836.5MHz) | | | | | | | | | |
| 1.673 | -16.3 | V | 3.0 | 38.1 | 10.0 | -44.4 | -13.0 | -31.4 | |
| 2.510 | -15.8 | V | 3.0 | 37.5 | 10.0 | -43.3 | -13.0 | -30.3 | |
| 1.673 | -16.4 | H | 3.0 | 38.1 | 10.0 | -44.5 | -13.0 | -31.5 | |
| 2.510 | -21.2 | H | 3.0 | 37.5 | 10.0 | -48.7 | -13.0 | -35.7 | |
| High Ch, 848.3MHz) | | | | | | | | | |
| 1.697 | -16.8 | V | 3.0 | 38.1 | 10.0 | -44.8 | -13.0 | -31.8 | |
| 2.545 | -20.6 | V | 3.0 | 37.5 | 10.0 | -48.0 | -13.0 | -35.0 | |
| 1.697 | -14.8 | H | 3.0 | 38.1 | 10.0 | -42.9 | -13.0 | -29.9 | |
| 2.545 | -25.9 | H | 3.0 | 37.5 | 10.0 | -53.3 | -13.0 | -40.3 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**QPSK Band 5 (3MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 5_QPSK_3MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 22 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (825.5MHz) | | | | | | | | | |
| 1.651 | -18.4 | V | 3.0 | 38.2 | 10.0 | -46.6 | -13.0 | -33.6 | |
| 2.477 | -17.8 | V | 3.0 | 37.5 | 10.0 | -45.3 | -13.0 | -32.3 | |
| 1.651 | -17.5 | H | 3.0 | 38.2 | 10.0 | -45.7 | -13.0 | -32.7 | |
| 2.477 | -22.9 | H | 3.0 | 37.5 | 10.0 | -50.4 | -13.0 | -37.4 | |
| Mid Ch, (836.5MHz) | | | | | | | | | |
| 1.673 | -16.4 | V | 3.0 | 38.1 | 10.0 | -44.5 | -13.0 | -31.5 | |
| 2.510 | -17.3 | V | 3.0 | 37.5 | 10.0 | -44.8 | -13.0 | -31.8 | |
| 1.673 | -16.1 | H | 3.0 | 38.1 | 10.0 | -44.2 | -13.0 | -31.2 | |
| 2.510 | -22.6 | H | 3.0 | 37.5 | 10.0 | -50.0 | -13.0 | -37.0 | |
| High Ch, (847.5MHz) | | | | | | | | | |
| 1.695 | -14.7 | V | 3.0 | 38.1 | 10.0 | -42.8 | -13.0 | -29.8 | |
| 2.543 | -15.0 | V | 3.0 | 37.5 | 10.0 | -42.4 | -13.0 | -29.4 | |
| 1.695 | -20.0 | H | 3.0 | 38.1 | 10.0 | -48.1 | -13.0 | -35.1 | |
| 2.543 | -22.5 | H | 3.0 | 37.5 | 10.0 | -50.0 | -13.0 | -37.0 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 5 (3MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 5_16QAM_3MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 22 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (825.5MHz) | | | | | | | | | |
| 1.651 | -18.8 | V | 3.0 | 38.2 | 10.0 | -47.0 | -13.0 | -34.0 | |
| 2.477 | -18.4 | V | 3.0 | 37.5 | 10.0 | -45.9 | -13.0 | -32.9 | |
| 1.651 | -17.0 | H | 3.0 | 38.2 | 10.0 | -45.1 | -13.0 | -32.1 | |
| 2.477 | -21.7 | H | 3.0 | 37.5 | 10.0 | -49.1 | -13.0 | -36.1 | |
| Mid Ch, (836.5MHz) | | | | | | | | | |
| 1.673 | -16.2 | V | 3.0 | 38.1 | 10.0 | -44.3 | -13.0 | -31.3 | |
| 2.510 | -17.2 | V | 3.0 | 37.5 | 10.0 | -44.6 | -13.0 | -31.6 | |
| 1.673 | -15.5 | H | 3.0 | 38.1 | 10.0 | -43.6 | -13.0 | -30.6 | |
| 2.510 | -24.8 | H | 3.0 | 37.5 | 10.0 | -52.3 | -13.0 | -39.3 | |
| High Ch, (847.5MHz) | | | | | | | | | |
| 1.695 | -19.9 | V | 3.0 | 38.1 | 10.0 | -48.0 | -13.0 | -35.0 | |
| 2.543 | -15.3 | V | 3.0 | 37.5 | 10.0 | -42.8 | -13.0 | -29.8 | |
| 1.695 | -20.3 | H | 3.0 | 38.1 | 10.0 | -48.4 | -13.0 | -35.4 | |
| 2.543 | -22.0 | H | 3.0 | 37.5 | 10.0 | -49.4 | -13.0 | -36.4 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**QPSK Band 5 (5MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 5_QPSK_5MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 22 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (826.5MHz) | | | | | | | | | |
| 1.653 | -18.0 | V | 3.0 | 38.1 | 10.0 | -46.1 | -13.0 | -33.1 | |
| 2.480 | -19.1 | V | 3.0 | 37.5 | 10.0 | -46.6 | -13.0 | -33.6 | |
| 1.653 | -17.5 | H | 3.0 | 38.1 | 10.0 | -45.6 | -13.0 | -32.6 | |
| 2.480 | -22.5 | H | 3.0 | 37.5 | 10.0 | -50.0 | -13.0 | -37.0 | |
| Mid Ch, (836.5MHz) | | | | | | | | | |
| 1.673 | -16.6 | V | 3.0 | 38.1 | 10.0 | -44.7 | -13.0 | -31.7 | |
| 2.510 | -20.5 | V | 3.0 | 37.5 | 10.0 | -48.0 | -13.0 | -35.0 | |
| 1.673 | -16.4 | H | 3.0 | 38.1 | 10.0 | -44.6 | -13.0 | -31.6 | |
| 2.510 | -23.3 | H | 3.0 | 37.5 | 10.0 | -50.7 | -13.0 | -37.7 | |
| High Ch, (846.5MHz) | | | | | | | | | |
| 1.693 | -20.4 | V | 3.0 | 38.1 | 10.0 | -48.5 | -13.0 | -35.5 | |
| 2.540 | -17.1 | V | 3.0 | 37.5 | 10.0 | -44.5 | -13.0 | -31.5 | |
| 1.693 | -19.2 | H | 3.0 | 38.1 | 10.0 | -47.3 | -13.0 | -34.3 | |
| 2.540 | -23.3 | H | 3.0 | 37.5 | 10.0 | -50.8 | -13.0 | -37.8 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 5 (5MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 5_16QAM_5MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 22 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (826.5MHz) | | | | | | | | | |
| 1.653 | -17.9 | V | 3.0 | 38.1 | 10.0 | -46.0 | -13.0 | -33.0 | |
| 2.480 | -18.8 | V | 3.0 | 37.5 | 10.0 | -46.3 | -13.0 | -33.3 | |
| 1.653 | -16.9 | H | 3.0 | 38.1 | 10.0 | -45.0 | -13.0 | -32.0 | |
| 2.480 | -22.7 | H | 3.0 | 37.5 | 10.0 | -50.2 | -13.0 | -37.2 | |
| | | | | | | | | | |
| Mid Ch, (836.5MHz) | | | | | | | | | |
| 1.673 | -16.4 | V | 3.0 | 38.1 | 10.0 | -44.5 | -13.0 | -31.5 | |
| 2.510 | -21.8 | V | 3.0 | 37.5 | 10.0 | -49.2 | -13.0 | -36.2 | |
| 1.673 | -16.0 | H | 3.0 | 38.1 | 10.0 | -44.1 | -13.0 | -31.1 | |
| 2.510 | -24.1 | H | 3.0 | 37.5 | 10.0 | -51.5 | -13.0 | -38.5 | |
| | | | | | | | | | |
| High Ch, (846.5MHz) | | | | | | | | | |
| 1.693 | -19.7 | V | 3.0 | 38.1 | 10.0 | -47.8 | -13.0 | -34.8 | |
| 2.540 | -17.1 | V | 3.0 | 37.5 | 10.0 | -44.5 | -13.0 | -31.5 | |
| 1.693 | -18.5 | H | 3.0 | 38.1 | 10.0 | -46.6 | -13.0 | -33.6 | |
| 2.540 | -22.9 | H | 3.0 | 37.5 | 10.0 | -50.4 | -13.0 | -37.4 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**QPSK Band 5 (10MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 5_QPSK_10MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 22 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (829.0MHz) | | | | | | | | | |
| 1.658 | -18.2 | V | 3.0 | 38.1 | 10.0 | -46.4 | -13.0 | -33.4 | |
| 2.487 | -20.5 | V | 3.0 | 37.5 | 10.0 | -48.0 | -13.0 | -35.0 | |
| 1.658 | -17.3 | H | 3.0 | 38.1 | 10.0 | -45.4 | -13.0 | -32.4 | |
| 2.487 | -23.0 | H | 3.0 | 37.5 | 10.0 | -50.4 | -13.0 | -37.4 | |
| Mid Ch, (836.5MHz) | | | | | | | | | |
| 1.673 | -18.4 | V | 3.0 | 38.1 | 10.0 | -46.5 | -13.0 | -33.5 | |
| 2.510 | -15.0 | V | 3.0 | 37.5 | 10.0 | -42.4 | -13.0 | -29.4 | |
| 1.673 | -17.2 | H | 3.0 | 38.1 | 10.0 | -45.4 | -13.0 | -32.4 | |
| 2.510 | -22.5 | H | 3.0 | 37.5 | 10.0 | -49.9 | -13.0 | -36.9 | |
| High Ch, (844.0MHz) | | | | | | | | | |
| 1.688 | -18.2 | V | 3.0 | 38.1 | 10.0 | -46.3 | -13.0 | -33.3 | |
| 2.532 | -20.9 | V | 3.0 | 37.5 | 10.0 | -48.4 | -13.0 | -35.4 | |
| 1.688 | -18.8 | H | 3.0 | 38.1 | 10.0 | -46.9 | -13.0 | -33.9 | |
| 2.532 | -24.9 | H | 3.0 | 37.5 | 10.0 | -52.3 | -13.0 | -39.3 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 5 (10MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/25/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 5_16QAM_10MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber D | T144 8449B | Filter 1 | Part 22 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (829.0MHz) | | | | | | | | | |
| 1.658 | -18.1 | V | 3.0 | 38.1 | 10.0 | -46.2 | -13.0 | -33.2 | |
| 2.487 | -19.9 | V | 3.0 | 37.5 | 10.0 | -47.3 | -13.0 | -34.3 | |
| 1.658 | -16.7 | H | 3.0 | 38.1 | 10.0 | -44.9 | -13.0 | -31.9 | |
| 2.487 | -23.7 | H | 3.0 | 37.5 | 10.0 | -51.2 | -13.0 | -38.2 | |
| Mid Ch, (836.5MHz) | | | | | | | | | |
| 1.673 | -17.5 | V | 3.0 | 38.1 | 10.0 | -45.7 | -13.0 | -32.7 | |
| 2.510 | -15.0 | V | 3.0 | 37.5 | 10.0 | -42.5 | -13.0 | -29.5 | |
| 1.673 | -16.0 | H | 3.0 | 38.1 | 10.0 | -44.2 | -13.0 | -31.2 | |
| 2.510 | -22.6 | H | 3.0 | 37.5 | 10.0 | -50.1 | -13.0 | -37.1 | |
| High Ch, (844.0MHz) | | | | | | | | | |
| 1.688 | -18.3 | V | 3.0 | 38.1 | 10.0 | -46.4 | -13.0 | -33.4 | |
| 2.532 | -21.0 | V | 3.0 | 37.5 | 10.0 | -48.4 | -13.0 | -35.4 | |
| 1.688 | -17.6 | H | 3.0 | 38.1 | 10.0 | -45.7 | -13.0 | -32.7 | |
| 2.532 | -25.5 | H | 3.0 | 37.5 | 10.0 | -53.0 | -13.0 | -40.0 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

## 9.2.4. LTE BAND 17

**QPSK Band 17 (5MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/28/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 17_QPSK_5MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber E | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (706.5MHz) | | | | | | | | | |
| 1.413 | 9.7 | V | 3.0 | 38.6 | 1.0 | -27.9 | -13.0 | -14.9 | |
| 2.120 | -5.6 | V | 3.0 | 37.6 | 1.0 | -42.3 | -13.0 | -29.3 | |
| 2.826 | -5.0 | V | 3.0 | 37.4 | 1.0 | -41.4 | -13.0 | -28.4 | |
| 3.533 | -7.3 | V | 3.0 | 36.9 | 1.0 | -43.2 | -13.0 | -30.2 | |
| 4.239 | -11.5 | V | 3.0 | 36.5 | 1.0 | -47.0 | -13.0 | -34.0 | |
| 1.413 | 0.0 | H | 3.0 | 38.6 | 1.0 | -37.6 | -13.0 | -24.6 | |
| 2.120 | -13.8 | H | 3.0 | 37.6 | 1.0 | -50.4 | -13.0 | -37.4 | |
| 2.826 | -13.5 | H | 3.0 | 37.4 | 1.0 | -49.9 | -13.0 | -36.9 | |
| 3.533 | -4.7 | H | 3.0 | 36.9 | 1.0 | -40.6 | -13.0 | -27.6 | |
| 4.239 | -11.0 | H | 3.0 | 36.5 | 1.0 | -46.5 | -13.0 | -33.5 | |
| | | | | | | | | | |
| Mid Ch, (711.0MHz) | | | | | | | | | |
| 1.422 | 12.9 | V | 3.0 | 38.5 | 1.0 | -24.7 | -13.0 | -11.7 | |
| 2.133 | -16.4 | V | 3.0 | 37.6 | 1.0 | -53.0 | -13.0 | -40.0 | |
| 2.844 | -7.4 | V | 3.0 | 37.4 | 1.0 | -43.8 | -13.0 | -30.8 | |
| 3.555 | -8.0 | V | 3.0 | 36.9 | 1.0 | -43.9 | -13.0 | -30.9 | |
| 4.266 | -16.3 | V | 3.0 | 36.5 | 1.0 | -51.8 | -13.0 | -38.8 | |
| 1.422 | 4.1 | H | 3.0 | 38.5 | 1.0 | -33.5 | -13.0 | -20.5 | |
| 2.133 | -8.4 | H | 3.0 | 37.6 | 1.0 | -45.0 | -13.0 | -32.0 | |
| 2.844 | -19.5 | H | 3.0 | 37.4 | 1.0 | -55.9 | -13.0 | -42.9 | |
| 3.555 | -9.7 | H | 3.0 | 36.9 | 1.0 | -45.7 | -13.0 | -32.7 | |
| 4.266 | -14.8 | H | 3.0 | 36.5 | 1.0 | -50.3 | -13.0 | -37.3 | |
| | | | | | | | | | |
| High Ch, (713.5MHz) | | | | | | | | | |
| 1.427 | 8.2 | V | 3.0 | 38.5 | 1.0 | -29.3 | -13.0 | -16.3 | |
| 2.141 | -0.3 | V | 3.0 | 37.6 | 1.0 | -37.0 | -13.0 | -24.0 | |
| 2.854 | -1.2 | V | 3.0 | 37.4 | 1.0 | -37.6 | -13.0 | -24.6 | |
| 3.568 | -5.9 | V | 3.0 | 36.9 | 1.0 | -41.8 | -13.0 | -28.8 | |
| 4.281 | -9.3 | V | 3.0 | 36.5 | 1.0 | -44.8 | -13.0 | -31.8 | |
| 1.427 | 3.5 | H | 3.0 | 38.5 | 1.0 | -34.0 | -13.0 | -21.0 | |
| 2.141 | -8.6 | H | 3.0 | 37.6 | 1.0 | -45.2 | -13.0 | -32.2 | |
| 2.854 | -10.2 | H | 3.0 | 37.4 | 1.0 | -46.6 | -13.0 | -33.6 | |
| 3.568 | -3.1 | H | 3.0 | 36.9 | 1.0 | -39.0 | -13.0 | -26.0 | |
| 4.281 | -12.6 | H | 3.0 | 36.5 | 1.0 | -48.1 | -13.0 | -35.1 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 17 (5MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/28/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 17_16QAM_5MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber E | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (706.5MHz) | | | | | | | | | |
| 1.413 | 9.1 | V | 3.0 | 38.6 | 1.0 | -28.5 | -13.0 | -15.5 | |
| 2.120 | -5.9 | V | 3.0 | 37.6 | 1.0 | -42.5 | -13.0 | -29.5 | |
| 2.826 | -5.5 | V | 3.0 | 37.4 | 1.0 | -41.8 | -13.0 | -28.8 | |
| 3.533 | -7.6 | V | 3.0 | 36.9 | 1.0 | -43.5 | -13.0 | -30.5 | |
| 4.239 | -11.1 | V | 3.0 | 36.5 | 1.0 | -46.6 | -13.0 | -33.6 | |
| 1.413 | -0.9 | H | 3.0 | 38.6 | 1.0 | -38.5 | -13.0 | -25.5 | |
| 2.120 | -13.8 | H | 3.0 | 37.6 | 1.0 | -50.5 | -13.0 | -37.5 | |
| 2.826 | -14.1 | H | 3.0 | 37.4 | 1.0 | -50.5 | -13.0 | -37.5 | |
| 3.533 | -4.0 | H | 3.0 | 36.9 | 1.0 | -39.9 | -13.0 | -26.9 | |
| 4.239 | -10.5 | H | 3.0 | 36.5 | 1.0 | -46.0 | -13.0 | -33.0 | |
| | | | | | | | | | |
| Mid Ch, (711.0MHz) | | | | | | | | | |
| 1.422 | 12.5 | V | 3.0 | 38.5 | 1.0 | -25.1 | -13.0 | -12.1 | |
| 2.133 | -16.5 | V | 3.0 | 37.6 | 1.0 | -53.1 | -13.0 | -40.1 | |
| 2.844 | -8.0 | V | 3.0 | 37.4 | 1.0 | -44.4 | -13.0 | -31.4 | |
| 3.555 | -7.1 | V | 3.0 | 36.9 | 1.0 | -43.0 | -13.0 | -30.0 | |
| 4.266 | -14.2 | V | 3.0 | 36.5 | 1.0 | -49.7 | -13.0 | -36.7 | |
| 1.422 | 3.8 | H | 3.0 | 38.5 | 1.0 | -33.8 | -13.0 | -20.8 | |
| 2.133 | -8.8 | H | 3.0 | 37.6 | 1.0 | -45.4 | -13.0 | -32.4 | |
| 2.844 | -20.0 | H | 3.0 | 37.4 | 1.0 | -56.4 | -13.0 | -43.4 | |
| 3.555 | -9.6 | H | 3.0 | 36.9 | 1.0 | -45.5 | -13.0 | -32.5 | |
| 4.266 | -14.8 | H | 3.0 | 36.5 | 1.0 | -50.3 | -13.0 | -37.3 | |
| | | | | | | | | | |
| High Ch, (713.5MHz) | | | | | | | | | |
| 1.427 | 7.9 | V | 3.0 | 38.5 | 1.0 | -29.6 | -13.0 | -16.6 | |
| 2.141 | -1.2 | V | 3.0 | 37.6 | 1.0 | -37.8 | -13.0 | -24.8 | |
| 2.854 | -2.1 | V | 3.0 | 37.4 | 1.0 | -38.5 | -13.0 | -25.5 | |
| 3.568 | -5.9 | V | 3.0 | 36.9 | 1.0 | -41.8 | -13.0 | -28.8 | |
| 4.281 | -10.6 | V | 3.0 | 36.5 | 1.0 | -46.1 | -13.0 | -33.1 | |
| 1.427 | 3.1 | H | 3.0 | 38.5 | 1.0 | -34.4 | -13.0 | -21.4 | |
| 2.141 | -9.4 | H | 3.0 | 37.6 | 1.0 | -46.0 | -13.0 | -33.0 | |
| 2.854 | -10.5 | H | 3.0 | 37.4 | 1.0 | -46.9 | -13.0 | -33.9 | |
| 3.568 | -3.1 | H | 3.0 | 36.9 | 1.0 | -39.1 | -13.0 | -26.1 | |
| 4.281 | -12.2 | H | 3.0 | 36.5 | 1.0 | -47.7 | -13.0 | -34.7 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**QPSK Band 17 (10MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/28/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 17_QPSK_10MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber E | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (709.0MHz) | | | | | | | | | |
| 1.418 | 9.9 | V | 3.0 | 38.6 | 1.0 | -27.6 | -13.0 | -14.6 | |
| 2.127 | -5.8 | V | 3.0 | 37.6 | 1.0 | -42.4 | -13.0 | -29.4 | |
| 2.836 | -4.4 | V | 3.0 | 37.4 | 1.0 | -40.8 | -13.0 | -27.8 | |
| 3.545 | -6.5 | V | 3.0 | 36.9 | 1.0 | -42.5 | -13.0 | -29.5 | |
| 4.254 | -12.1 | V | 3.0 | 36.5 | 1.0 | -47.6 | -13.0 | -34.6 | |
| 1.418 | -0.2 | H | 3.0 | 38.6 | 1.0 | -37.7 | -13.0 | -24.7 | |
| 2.127 | -14.5 | H | 3.0 | 37.6 | 1.0 | -51.2 | -13.0 | -38.2 | |
| 2.836 | -13.0 | H | 3.0 | 37.4 | 1.0 | -49.3 | -13.0 | -36.3 | |
| 3.545 | -4.7 | H | 3.0 | 36.9 | 1.0 | -40.7 | -13.0 | -27.7 | |
| 4.254 | -11.4 | H | 3.0 | 36.5 | 1.0 | -46.9 | -13.0 | -33.9 | |
| | | | | | | | | | |
| Mid Ch, (710.0MHz) | | | | | | | | | |
| 1.420 | 9.9 | V | 3.0 | 38.5 | 1.0 | -27.7 | -13.0 | -14.7 | |
| 2.130 | -7.6 | V | 3.0 | 37.6 | 1.0 | -44.2 | -13.0 | -31.2 | |
| 2.840 | -3.5 | V | 3.0 | 37.4 | 1.0 | -39.9 | -13.0 | -26.9 | |
| 3.550 | -8.5 | V | 3.0 | 36.9 | 1.0 | -44.4 | -13.0 | -31.4 | |
| 4.260 | -17.4 | V | 3.0 | 36.5 | 1.0 | -52.9 | -13.0 | -39.9 | |
| 1.420 | 0.8 | H | 3.0 | 38.5 | 1.0 | -36.8 | -13.0 | -23.8 | |
| 2.130 | -6.2 | H | 3.0 | 37.6 | 1.0 | -42.8 | -13.0 | -29.8 | |
| 2.840 | -12.7 | H | 3.0 | 37.4 | 1.0 | -49.1 | -13.0 | -36.1 | |
| 3.550 | -8.4 | H | 3.0 | 36.9 | 1.0 | -44.3 | -13.0 | -31.3 | |
| 4.260 | -13.5 | H | 3.0 | 36.5 | 1.0 | -49.0 | -13.0 | -36.0 | |
| | | | | | | | | | |
| High Ch, (711.0MHz) | | | | | | | | | |
| 1.422 | 10.4 | V | 3.0 | 38.5 | 1.0 | -27.2 | -13.0 | -14.2 | |
| 2.133 | 5.2 | V | 3.0 | 37.6 | 1.0 | -31.4 | -13.0 | -18.4 | |
| 2.844 | -4.3 | V | 3.0 | 37.4 | 1.0 | -40.7 | -13.0 | -27.7 | |
| 3.555 | -9.1 | V | 3.0 | 36.9 | 1.0 | -45.0 | -13.0 | -32.0 | |
| 4.266 | -16.6 | V | 3.0 | 36.5 | 1.0 | -52.1 | -13.0 | -39.1 | |
| 1.422 | 1.0 | H | 3.0 | 38.5 | 1.0 | -36.6 | -13.0 | -23.6 | |
| 2.133 | -5.6 | H | 3.0 | 37.6 | 1.0 | -42.2 | -13.0 | -29.2 | |
| 2.844 | -16.0 | H | 3.0 | 37.4 | 1.0 | -52.4 | -13.0 | -39.4 | |
| 3.555 | -8.9 | H | 3.0 | 36.9 | 1.0 | -44.8 | -13.0 | -31.8 | |
| 4.266 | -15.8 | H | 3.0 | 36.5 | 1.0 | -51.3 | -13.0 | -38.3 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

**16QAM Band 17 (10MHz BANDWIDTH)**

**Compliance Certification Services**
**Above 1GHz High Frequency Substitution Measurement**

**Company:** Microsoft
**Project #:** 13U15414
**Date:** 10/28/13
**Test Engineer:** Tina Chu
**Configuration:** LTE BAND 17_16QAM_10MHz BW
**Mode:**

| Chamber | Pre-amplifer | Filter | Limit |
|---|---|---|---|
| 3m Chamber E | T144 8449B | Filter 1 | Part 27 |

| f GHz | SG reading (dBm) | Ant. Pol. (H/V) | Distance (m) | Preamp (dB) | Filter (dB) | EIRP (dBm) | Limit (dBm) | Delta (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Low Ch, (709.0MHz) | | | | | | | | | |
| 1.418 | 9.3 | V | 3.0 | 38.6 | 1.0 | -28.2 | -13.0 | -15.2 | |
| 2.127 | -6.0 | V | 3.0 | 37.6 | 1.0 | -42.6 | -13.0 | -29.6 | |
| 2.836 | -5.1 | V | 3.0 | 37.4 | 1.0 | -41.5 | -13.0 | -28.5 | |
| 3.545 | -5.9 | V | 3.0 | 36.9 | 1.0 | -41.8 | -13.0 | -28.8 | |
| 4.254 | -11.0 | V | 3.0 | 36.5 | 1.0 | -46.5 | -13.0 | -33.5 | |
| 1.418 | -1.4 | H | 3.0 | 38.6 | 1.0 | -38.9 | -13.0 | -25.9 | |
| 2.127 | -14.9 | H | 3.0 | 37.6 | 1.0 | -51.5 | -13.0 | -38.5 | |
| 2.836 | -13.7 | H | 3.0 | 37.4 | 1.0 | -50.1 | -13.0 | -37.1 | |
| 3.545 | -4.1 | H | 3.0 | 36.9 | 1.0 | -40.1 | -13.0 | -27.1 | |
| 4.254 | -11.5 | H | 3.0 | 36.5 | 1.0 | -47.0 | -13.0 | -34.0 | |
| | | | | | | | | | |
| Mid Ch, (710.0MHz) | | | | | | | | | |
| 1.420 | 9.6 | V | 3.0 | 38.5 | 1.0 | -28.0 | -13.0 | -15.0 | |
| 2.130 | -7.5 | V | 3.0 | 37.6 | 1.0 | -44.2 | -13.0 | -31.2 | |
| 2.840 | -3.5 | V | 3.0 | 37.4 | 1.0 | -39.9 | -13.0 | -26.9 | |
| 3.550 | -8.7 | V | 3.0 | 36.9 | 1.0 | -44.7 | -13.0 | -31.7 | |
| 4.260 | -17.1 | V | 3.0 | 36.5 | 1.0 | -52.6 | -13.0 | -39.6 | |
| 1.420 | 0.5 | H | 3.0 | 38.5 | 1.0 | -37.1 | -13.0 | -24.1 | |
| 2.130 | -6.7 | H | 3.0 | 37.6 | 1.0 | -43.4 | -13.0 | -30.4 | |
| 2.840 | -13.4 | H | 3.0 | 37.4 | 1.0 | -49.8 | -13.0 | -36.8 | |
| 3.550 | -7.7 | H | 3.0 | 36.9 | 1.0 | -43.7 | -13.0 | -30.7 | |
| 4.260 | -13.9 | H | 3.0 | 36.5 | 1.0 | -49.4 | -13.0 | -36.4 | |
| | | | | | | | | | |
| High Ch, (711.0MHz) | | | | | | | | | |
| 1.422 | 9.6 | V | 3.0 | 38.5 | 1.0 | -28.0 | -13.0 | -15.0 | |
| 2.133 | 4.2 | V | 3.0 | 37.6 | 1.0 | -32.4 | -13.0 | -19.4 | |
| 2.844 | -4.8 | V | 3.0 | 37.4 | 1.0 | -41.2 | -13.0 | -28.2 | |
| 3.555 | -8.6 | V | 3.0 | 36.9 | 1.0 | -44.5 | -13.0 | -31.5 | |
| 4.266 | -15.4 | V | 3.0 | 36.5 | 1.0 | -50.9 | -13.0 | -37.9 | |
| 1.422 | 0.3 | H | 3.0 | 38.5 | 1.0 | -37.3 | -13.0 | -24.3 | |
| 2.133 | -4.5 | H | 3.0 | 37.6 | 1.0 | -41.1 | -13.0 | -28.1 | |
| 2.844 | -16.4 | H | 3.0 | 37.4 | 1.0 | -52.8 | -13.0 | -39.8 | |
| 3.555 | -6.2 | H | 3.0 | 36.9 | 1.0 | -42.2 | -13.0 | -29.2 | |
| 4.266 | -15.8 | H | 3.0 | 36.5 | 1.0 | -51.4 | -13.0 | -38.4 | |

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.