

## FCC Test Report (Part 27)

**Report No.:** RFBEEKK-WTW-P20080111-3

**FCC ID:** 2AARN-DLWPH-8M

**Test Model:** DLWPH-8M

**Series Model:** DLWPH-8M-RW

**Received Date:** Aug. 06, 2020

**Test Date:** Sep. 02, 2020 ~ Oct. 20, 2020

**Issued Date:** Oct. 21, 2020

**Applicant:** PHIHONG TECHNOLOGY CO. LTD.

**Address:** No.568, Fu Xing 3rd Rd., Guishan, Tao Yuan Hsien, 333 Taiwan

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location:** No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, Taiwan

**FCC Registration /  
Designation Number:** 788550 / TW0003



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### Release Control Record

| Issue No.              | Description      | Date Issued   |
|------------------------|------------------|---------------|
| RFBEKK-WTW-P20080111-3 | Original Release | Oct. 21, 2020 |

## 1 Certificate of Conformity

**Product:** EV charging system module 4G with WI-FI

**Brand:** Pihong Technology Co., Ltd.

**Test Model:** DLWPH-8M

**Series Model:** DLWPH-8M-RW

**Sample Status:** Engineering Sample

**Applicant:** PHIHONG TECHNOLOGY CO. LTD.

**Test Date:** Sep. 02, 2020 ~ Oct. 20, 2020

**Standards:** FCC Part 27, Subpart C, F, H, L, N

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

**Prepared by :** Lena Wang, **Date:** Oct. 21, 2020  
Lena Wang / Specialist

**Approved by :** Dylan Chiou, **Date:** Oct. 21, 2020  
Dylan Chiou / Senior Project Engineer

## 2 Summary of Test Results

| Applied Standard: FCC Part 27 & Part 2 |                        |                        |                           |                                                                           |        |                                                                                         |
|----------------------------------------|------------------------|------------------------|---------------------------|---------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------------|
| FCC Clause                             |                        |                        |                           | Test Item                                                                 | Result | Remarks                                                                                 |
| WCDMA B4 /<br>LTE B4                   | LTE B12/<br>LTE B71    | LTE B13                | LTE B66                   |                                                                           |        |                                                                                         |
| 2.1046<br>27.50<br>(d)(4)              | 2.1046<br>27.50<br>(c) | 2.1046<br>27.50<br>(b) | 2.1046<br>27.50<br>(d)(4) | Equivalent Isotropically<br>Radiated Power / Equivalent<br>Radiated Power | Pass   | Meet the requirement of limit.                                                          |
| 2.1047                                 | 2.1047                 | 2.1047                 | 2.1047                    | Modulation Characteristics                                                | Pass   | Meet the requirement of limit.                                                          |
| 27.50<br>(d)(5)                        | ----                   | ----                   | 27.50<br>(d)(5)           | Peak To Average Ratio                                                     | Pass   | Meet the requirement of limit.                                                          |
| 2.1055<br>27.54                        | 2.1055<br>27.54        | 2.1055<br>27.54        | 2.1055<br>27.54           | Frequency Stability<br>Stay with the authorized<br>bands of operation     | Pass   | Meet the requirement of limit.                                                          |
| 2.1049                                 | 2.1049                 | 2.1049                 | 2.1049                    | Occupied Bandwidth                                                        | Pass   | Meet the requirement of limit.                                                          |
| 27.53(h)                               | 27.53(g)               | 27.53(c)               | 27.53(h)                  | Band Edge Measurements                                                    | Pass   | Meet the requirement of limit.                                                          |
| 2.1051<br>27.53(h)                     | 2.1051<br>27.53(g)     | 2.1051<br>27.53(c)(f)  | 2.1051<br>27.53(h)        | Conducted Spurious<br>Emissions                                           | Pass   | Meet the requirement of limit.                                                          |
| 2.1053<br>27.53(h)                     | 2.1053<br>27.53(g)     | 2.1053<br>27.53(c)(f)  | 2.1053<br>27.53(h)        | Radiated Spurious<br>Emissions                                            | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -7.50<br>dB at 1569.00 MHz. |

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement                    | Frequency        | Expanded Uncertainty<br>(k=2) (±) |
|--------------------------------|------------------|-----------------------------------|
| Radiated Emissions up to 1 GHz | 9kHz ~ 30MHz     | 3.04 dB                           |
|                                | 30MHz ~ 200MHz   | 3.86 dB                           |
|                                | 200MHz ~ 1000MHz | 3.87 dB                           |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz     | 2.29 dB                           |
|                                | 18GHz ~ 40GHz    | 2.29 dB                           |

## 2.2 Test Site and Instruments

| Description & Manufacturer                 | Model No.                              | Serial No.                      | Date of Calibration            | Due Date of Calibration        |
|--------------------------------------------|----------------------------------------|---------------------------------|--------------------------------|--------------------------------|
| Test Receiver<br>KEYSIGHT                  | N9038A                                 | MY55420137                      | Apr. 16, 2020                  | Apr. 15, 2021                  |
| Spectrum Analyzer<br>ROHDE & SCHWARZ       | FSP40                                  | 100039                          | Jun. 12, 2020                  | Jun. 11, 2021                  |
| Spectrum Analyzer<br>KEYSIGHT              | N9030B                                 | MY57140953                      | Jul. 02, 2020                  | Jul. 01, 2021                  |
| MXG Vector signal generator<br>Agilent     | N5182B                                 | MY53050162                      | Jan. 14, 2020                  | Jan. 13, 2021                  |
| BILOG Antenna<br>SCHWARZBECK               | VULB9168                               | 9168-472                        | Nov. 08, 2019                  | Nov. 07, 2020                  |
| HORN Antenna<br>SCHWARZBECK                | BBHA 9120D                             | 9120D-969                       | Nov. 24, 2019                  | Nov. 23, 2020                  |
| BILOG Antenna<br>SCHWARZBECK               | VULB9168                               | 9168-160                        | Nov. 07, 2019                  | Nov. 06, 2020                  |
| HORN Antenna<br>SCHWARZBECK                | BBHA 9120 D                            | 9120D-1169                      | Nov. 24, 2019                  | Nov. 23, 2020                  |
| HORN Antenna<br>SCHWARZBECK                | BBHA 9170                              | BBHA9170241                     | Nov. 24, 2019                  | Nov. 23, 2020                  |
| Loop Antenna<br>EMCI                       | EM-6879                                | 269                             | Sep. 18, 2019<br>Sep. 17, 2020 | Sep. 17, 2020<br>Sep. 16, 2021 |
| Preamplifier<br>Agilent<br>(Below 1GHz)    | 8447D                                  | 2944A10638                      | Jun. 08, 2020                  | Jun. 07, 2021                  |
| Preamplifier<br>Agilent<br>(Above 1GHz)    | 8449B                                  | 3008A02367                      | Feb. 18, 2020                  | Feb. 17, 2021                  |
| RF signal cable<br>HUBER+SUHNER&EMCI       | SUCOFLEX 104 &<br>EMC104-SM-<br>SM8000 | CABLE-CH9-02<br>(248780+171006) | Jan. 18, 2020                  | Jan. 17, 2021                  |
| RF signal cable<br>HUBER+SUHNER            | SUCOFLEX 104                           | CABLE-CH9-<br>(250795/4)        | Jan. 18, 2020                  | Jan. 17, 2021                  |
| RF signal cable<br>Woken                   | 8D-FB                                  | Cable-CH9-01                    | Jun. 08, 2020                  | Jun. 07, 2021                  |
| Software<br>BV ADT                         | ADT_Radiated_<br>V7.6.15.9.5           | NA                              | NA                             | NA                             |
| Antenna Tower<br>EMCO                      | 2070/2080                              | 512.835.4684                    | NA                             | NA                             |
| Turn Table<br>EMCO                         | 2087-2.03                              | NA                              | NA                             | NA                             |
| Antenna Tower & Turn<br>BV ADT             | AT100                                  | AT93021705                      | NA                             | NA                             |
| Turn Table<br>BV ADT                       | TT100                                  | TT93021705                      | NA                             | NA                             |
| Turn Table Controller<br>BV ADT            | SC100                                  | SC93021705                      | NA                             | NA                             |
| Boresight Antenna Fixture                  | FBA-01                                 | FBA-SIP01                       | NA                             | NA                             |
| JFW 20dB attenuation                       | 50HF-020-SMA                           | NA                              | NA                             | NA                             |
| True RMS Clamp Meter<br>Fluke              | 325                                    | 31130711WS                      | Jun. 06, 2020                  | Jun. 05, 2021                  |
| Radio Communication<br>Analyzer<br>Anritsu | MT8820C                                | 6201300640                      | Jul. 01, 2019                  | Jun. 30, 2021                  |

|                                         |                  |             |               |               |
|-----------------------------------------|------------------|-------------|---------------|---------------|
| Radio Communication Analyzer<br>Anritsu | MT8821C          | 6201462755  | Feb. 13, 2020 | Feb. 12, 2021 |
| Temperature & Humidity Chamber          | GTH-120-40-CP-AR | MAA1306-019 | Sep. 18, 2019 | Sep. 17, 2020 |
|                                         |                  |             | Sep. 09, 2020 | Sep. 08, 2021 |
| DC Power Supply<br>Topward              | 33010D           | 807748      | NA            | NA            |

Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 9.

### 3 General Information

#### 3.1 General Description of EUT

|                     |                                                                     |                          |                                                |
|---------------------|---------------------------------------------------------------------|--------------------------|------------------------------------------------|
| Product             | EV charging system module 4G with WI-FI                             |                          |                                                |
| Brand               | Phihong Technology Co., Ltd.                                        |                          |                                                |
| Test Model          | DLWPH-8M                                                            |                          |                                                |
| Series Model        | DLWPH-8M-RW                                                         |                          |                                                |
| Model Difference    | Refer to Note as below                                              |                          |                                                |
| Status of EUT       | Engineering Sample                                                  |                          |                                                |
| Power Supply Rating | 10Vdc~35Vdc (for DC power supply)                                   |                          |                                                |
| Modulation Type     | WCDMA: BPSK, QPSK<br>HSDPA: BPSK<br>HSUPA: QPSK<br>LTE: QPSK, 16QAM |                          |                                                |
| Operating Frequency | WCDMA Band 4                                                        |                          | 1712.4MHz ~ 1752.6MHz                          |
|                     | LTE Band 4                                                          | Channel Bandwidth 1.4MHz | 1710.7MHz ~ 1754.3MHz                          |
|                     |                                                                     | Channel Bandwidth 3MHz   | 1711.5MHz ~ 1753.5MHz                          |
|                     |                                                                     | Channel Bandwidth 5MHz   | 1712.5MHz ~ 1752.5MHz                          |
|                     |                                                                     | Channel Bandwidth 10MHz  | 1715.0MHz ~ 1750.0MHz                          |
|                     |                                                                     | Channel Bandwidth 15MHz  | 1717.5MHz ~ 1747.5MHz                          |
|                     |                                                                     | Channel Bandwidth 20MHz  | 1720.0MHz ~ 1745.0MHz                          |
|                     | LTE Band 12                                                         | Channel Bandwidth 1.4MHz | 699.7MHz ~ 715.3MHz                            |
|                     |                                                                     | Channel Bandwidth 3MHz   | 700.5MHz ~ 714.5MHz                            |
|                     |                                                                     | Channel Bandwidth 5MHz   | 701.5MHz ~ 713.5MHz                            |
|                     |                                                                     | Channel Bandwidth 10MHz  | 704.0MHz ~ 711.0MHz                            |
|                     | LTE Band 13                                                         | Channel Bandwidth 5MHz   | 779.5MHz ~ 784.5MHz                            |
|                     |                                                                     | Channel Bandwidth 10MHz  | 782.0MHz                                       |
|                     | LTE Band 66                                                         | Channel Bandwidth 1.4MHz | 1710.7MHz ~ 1779.3MHz                          |
|                     |                                                                     | Channel Bandwidth 3MHz   | 1711.5MHz ~ 1778.5MHz                          |
|                     |                                                                     | Channel Bandwidth 5MHz   | 1712.5MHz ~ 1777.5MHz                          |
|                     |                                                                     | Channel Bandwidth 10MHz  | 1715.0MHz ~ 1775.0MHz                          |
|                     |                                                                     | Channel Bandwidth 15MHz  | 1717.5MHz ~ 1772.5MHz                          |
|                     |                                                                     | Channel Bandwidth 20MHz  | 1720.0MHz ~ 1770.0MHz                          |
|                     | LTE Band 71                                                         | Channel Bandwidth 5MHz   | 665.5MHz ~ 695.5MHz                            |
|                     |                                                                     | Channel Bandwidth 10MHz  | 668.0MHz ~ 693.0MHz                            |
|                     |                                                                     | Channel Bandwidth 15MHz  | 670.5MHz ~ 690.5MHz                            |
|                     |                                                                     | Channel Bandwidth 20MHz  | 673.0MHz ~ 688.0MHz                            |
| Max. EIRP Power     | WCDMA Band 4                                                        |                          | 320.627mW (25.06dBm)                           |
|                     |                                                                     |                          | QPSK      16QAM                                |
|                     | LTE Band 4                                                          | Channel Bandwidth 1.4MHz | 319.890mW (25.05dBm)      262.422mW (24.19dBm) |
|                     |                                                                     | Channel Bandwidth 3MHz   | 344.350mW (25.37dBm)      263.027mW (24.20dBm) |
|                     |                                                                     | Channel Bandwidth 5MHz   | 331.894mW (25.21dBm)      277.332mW (24.43dBm) |
|                     |                                                                     | Channel Bandwidth 10MHz  | 311.889mW (24.94dBm)      244.906mW (23.89dBm) |
|                     |                                                                     |                          |                                                |

|                     |              |                          |                         |                         |
|---------------------|--------------|--------------------------|-------------------------|-------------------------|
|                     |              | Channel Bandwidth 15MHz  | 342.768mW<br>(25.35dBm) | 269.774mW<br>(24.31dBm) |
|                     |              | Channel Bandwidth 20MHz  | 336.512mW<br>(25.27dBm) | 280.543mW<br>(24.48dBm) |
| Max. EIRP Power     | LTE Band 66  |                          | QPSK                    | 16QAM                   |
|                     |              | Channel Bandwidth 1.4MHz | 322.107mW<br>(25.08dBm) | 250.035mW<br>(23.98dBm) |
|                     |              | Channel Bandwidth 3MHz   | 319.890mW<br>(25.05dBm) | 250.611mW<br>(23.99dBm) |
|                     |              | Channel Bandwidth 5MHz   | 322.107mW<br>(25.08dBm) | 251.189mW<br>(24.00dBm) |
|                     |              | Channel Bandwidth 10MHz  | 324.304mW<br>(25.11dBm) | 248.313mW<br>(23.95dBm) |
|                     |              | Channel Bandwidth 15MHz  | 319.154mW<br>(25.04dBm) | 250.611mW<br>(23.99dBm) |
|                     |              | Channel Bandwidth 20MHz  | 312.608mW<br>(24.95dBm) | 255.270mW<br>(24.07dBm) |
| Max. ERP Power      |              |                          | QPSK                    | 16QAM                   |
|                     | LTE Band 12  | Channel Bandwidth 1.4MHz | 128.825mW<br>(21.10dBm) | 103.514mW<br>(20.15dBm) |
|                     |              | Channel Bandwidth 3MHz   | 127.938mW<br>(21.07dBm) | 101.158mW<br>(20.05dBm) |
|                     |              | Channel Bandwidth 5MHz   | 125.026mW<br>(20.97dBm) | 113.763mW<br>(20.56dBm) |
|                     |              | Channel Bandwidth 10MHz  | 125.603mW<br>(20.99dBm) | 109.396mW<br>(20.39dBm) |
|                     | LTE Band 13  | Channel Bandwidth 5MHz   | 73.114mW<br>(18.64dBm)  | 59.979mW<br>(17.78dBm)  |
|                     |              | Channel Bandwidth 10MHz  | 80.168mW<br>(19.04dBm)  | 58.345mW<br>(17.66dBm)  |
|                     | LTE Band 71  | Channel Bandwidth 5MHz   | 84.918mW<br>(19.29dBm)  | 66.834mW<br>(18.25dBm)  |
|                     |              | Channel Bandwidth 10MHz  | 83.946mW<br>(19.24dBm)  | 62.806mW<br>(17.98dBm)  |
|                     |              | Channel Bandwidth 15MHz  | 84.918mW<br>(19.29dBm)  | 62.661mW<br>(17.97dBm)  |
|                     |              | Channel Bandwidth 20MHz  | 84.333mW<br>(19.26dBm)  | 62.951mW<br>(17.99dBm)  |
| Emission Designator | WCDMA Band 4 |                          | 4M14F9W                 |                         |
|                     |              |                          | QPSK                    | 16QAM                   |
|                     | LTE Band 4   | Channel Bandwidth 1.4MHz | 1M09G7D                 | 1M09D7W                 |
|                     |              | Channel Bandwidth 3MHz   | 2M70G7D                 | 2M70D7W                 |
|                     |              | Channel Bandwidth 5MHz   | 4M49G7D                 | 4M49D7W                 |
|                     |              | Channel Bandwidth 10MHz  | 8M95G7D                 | 8M95D7W                 |
|                     |              | Channel Bandwidth 15MHz  | 13M4G7D                 | 13M4D7W                 |
|                     |              | Channel Bandwidth 20MHz  | 17M9G7D                 | 17M9D7W                 |
|                     | LTE Band 12  | Channel Bandwidth 1.4MHz | 1M09G7D                 | 1M09D7W                 |
|                     |              | Channel Bandwidth 3MHz   | 2M70G7D                 | 2M70D7W                 |
|                     |              | Channel Bandwidth 5MHz   | 4M49G7D                 | 4M49D7W                 |
|                     |              | Channel Bandwidth 10MHz  | 8M96G7D                 | 8M97D7W                 |
|                     | LTE Band 13  | Channel Bandwidth 5MHz   | 4M49G7D                 | 4M49D7W                 |
|                     |              | Channel Bandwidth 10MHz  | 8M95G7D                 | 8M95D7W                 |
|                     | LTE Band 66  | Channel Bandwidth 1.4MHz | 1M09G7D                 | 1M09D7W                 |
|                     |              | Channel Bandwidth 3MHz   | 2M70G7D                 | 2M70D7W                 |
|                     |              | Channel Bandwidth 5MHz   | 4M49G7D                 | 4M49D7W                 |
|                     |              | Channel Bandwidth 10MHz  | 8M95G7D                 | 8M95D7W                 |
|                     |              | Channel Bandwidth 15MHz  | 13M4G7D                 | 13M4D7W                 |

|                   |                        |                         |         |         |
|-------------------|------------------------|-------------------------|---------|---------|
|                   | LTE Band 71            | Channel Bandwidth 20MHz | 17M9G7D | 17M9D7W |
|                   |                        | Channel Bandwidth 5MHz  | 4M49G7D | 4M49D7W |
|                   |                        | Channel Bandwidth 10MHz | 8M96G7D | 8M96D7W |
|                   |                        | Channel Bandwidth 15MHz | 13M5G7D | 13M5D7W |
|                   |                        | Channel Bandwidth 20MHz | 17M9G7D | 17M9D7W |
| Antenna Type      | Refer to Note as below |                         |         |         |
| Antenna Connector | Refer to Note as below |                         |         |         |
| Accessory Device  | NA                     |                         |         |         |
| Cable Supplied    | NA                     |                         |         |         |

Note:

1. All models are listed as below.

| Brand                        | Model       | Difference of WLAN Antenna type |
|------------------------------|-------------|---------------------------------|
| Phihong Technology Co., Ltd. | DLWPH-8M    | internal antenna                |
|                              | DLWPH-8M-RW | external antenna                |

2. The following antennas were provided to the EUT.

| Brand  | Model          | Antenna Gain(dBi)              |             |             |             | Antenna Type | Connector Type |
|--------|----------------|--------------------------------|-------------|-------------|-------------|--------------|----------------|
|        |                | WCDMA Band 4 / LTE Band 4 / 66 | LTE Band 12 | LTE Band 13 | LTE Band 71 |              |                |
| Gortec | DR0727-4201BSM | 1.70                           | -1.09       | -3.11       | -2.45       | PCB          | SMA Male       |

### 3.2 Configuration of System under Test



Remote site

Radio Communication  
Analyzer (C)

#### 3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| ID | Product                      | Brand   | Model No.      | Serial No. | FCC ID | Remarks            |
|----|------------------------------|---------|----------------|------------|--------|--------------------|
| A. | DC Power Supply              | Topward | 33010D         | 807748     | NA     | -                  |
| B. | Ext. Antenna                 | Gortec  | DR0727-4201BSM | NA         | NA     | Provided by client |
| C. | Radio Communication Analyzer | Anritsu | MT8821C        | 6201462755 | NA     | -                  |

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks |
|----|--------------|------|------------|--------------------|--------------|---------|
| 1. | Power cable  | 1    | 1          | -                  | 0            | -       |

### 3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned on Z-plane. Following channel(s) was (were) selected for the final test as listed below.

#### WCDMA Band 4

| EUT Configure Mode | Test Item                    | Available Channel | Tested Channel                                          | Mode                |
|--------------------|------------------------------|-------------------|---------------------------------------------------------|---------------------|
| -                  | EIRP                         | 1312 to 1513      | 1312(1712.4MHz),<br>1413(1732.6MHz),<br>1513(1752.6MHz) | WCDMA, HSDPA, HSUPA |
| -                  | Modulation Characteristics   | 1312 to 1513      | 1413(1732.6MHz)                                         | WCDMA, HSDPA, HSUPA |
| -                  | Frequency Stability          | 1312 to 1513      | 1312(1712.4MHz),<br>1513(1752.6MHz)                     | WCDMA               |
| -                  | Occupied Bandwidth           | 1312 to 1513      | 1312(1712.4MHz),<br>1413(1732.6MHz),<br>1513(1752.6MHz) | WCDMA, HSDPA, HSUPA |
| -                  | Band Edge                    | 1312 to 1513      | 1312(1712.4MHz),<br>1513(1752.6MHz)                     | WCDMA, HSDPA, HSUPA |
| -                  | Peak To Average Ratio        | 1312 to 1513      | 1312(1712.4MHz),<br>1413(1732.6MHz),<br>1513(1752.6MHz) | WCDMA, HSDPA, HSUPA |
| -                  | Conducted Emission           | 1312 to 1513      | 1312(1712.4MHz),<br>1413(1732.6MHz),<br>1513(1752.6MHz) | WCDMA, HSDPA, HSUPA |
| -                  | Radiated Emission Below 1GHz | 1312 to 1513      | 1513(1752.6MHz)                                         | WCDMA               |
| -                  | Radiated Emission Above 1GHz | 1312 to 1513      | 1312(1712.4MHz),<br>1413(1732.6MHz),<br>1513(1752.6MHz) | WCDMA               |

#### Note:

1. This device was tested under all modulations. The worst case of conducted output power was found in WCDMA modulation. Therefore, only EIRP, modulation characteristics, occupied bandwidth, band edge, conducted Emission and peak to average ratio items had been tested under WCDMA, HSDPA and HSUPA mode, the other items were performed under WCDMA mode only.
2. For radiated emission below 1GHz, select the worst radiated emission (above 1GHz) channel for final testing.

# LTE Band 4

| EUT Configure Mode | Test Item                  | Available Channel | Tested Channel                                             | Channel Bandwidth | Modulation   | Mode                 |
|--------------------|----------------------------|-------------------|------------------------------------------------------------|-------------------|--------------|----------------------|
| -                  | EIRP                       | 19957 to 20393    | 19957(1710.7MHz),<br>20175(1732.5MHz),<br>20393(1754.3MHz) | 1.4MHz            | QPSK / 16QAM | 1 RB / 2 RB Offset   |
|                    |                            | 19965 to 20385    | 19965(1711.5MHz),<br>20175(1732.5MHz),<br>20385(1753.5MHz) | 3MHz              | QPSK / 16QAM | 1 RB / 7 RB Offset   |
|                    |                            | 19975 to 20375    | 19975(1712.5MHz),<br>20175(1732.5MHz),<br>20375(1752.5MHz) | 5MHz              | QPSK / 16QAM | 1 RB / 0 RB Offset   |
|                    |                            | 20000 to 20350    | 20000(1715.0MHz),<br>20175(1732.5MHz),<br>20350(1750.0MHz) | 10MHz             | QPSK / 16QAM | 1 RB / 24 RB Offset  |
|                    |                            | 20025 to 20325    | 20025(1717.5MHz),<br>20175(1732.5MHz),<br>20325(1747.5MHz) | 15MHz             | QPSK / 16QAM | 1 RB / 37 RB Offset  |
|                    |                            | 20050 to 20300    | 20050(1720.0MHz),<br>20175(1732.5MHz),<br>20300(1745.0MHz) | 20MHz             | QPSK / 16QAM | 1 RB / 0 RB Offset   |
| -                  | Modulation Characteristics | 20050 to 20300    | 20175(1732.5MHz)                                           | 20MHz             | QPSK / 16QAM | 100 RB / 0 RB Offset |
| -                  | Frequency Stability        | 19957 to 20393    | 19957(1710.7MHz),<br>20393(1754.3MHz)                      | 1.4MHz            | QPSK         | 6 RB / 0 RB Offset   |
|                    |                            | 19965 to 20385    | 19965(1711.5MHz),<br>20385(1753.5MHz)                      | 3MHz              | QPSK         | 15 RB / 0 RB Offset  |
|                    |                            | 19975 to 20375    | 19975(1712.5MHz),<br>20375(1752.5MHz)                      | 5MHz              | QPSK         | 25 RB / 0 RB Offset  |
|                    |                            | 20000 to 20350    | 20000(1715.0MHz),<br>20350(1750.0MHz)                      | 10MHz             | QPSK         | 50 RB / 0 RB Offset  |
|                    |                            | 20025 to 20325    | 20025(1717.5MHz),<br>20325(1747.5MHz)                      | 15MHz             | QPSK         | 75 RB / 0 RB Offset  |
|                    |                            | 20050 to 20300    | 20050(1720.0MHz),<br>20300(1745.0MHz)                      | 20MHz             | QPSK         | 100 RB / 0 RB Offset |
| -                  | Emission Bandwidth         | 19957 to 20393    | 19957(1710.7MHz),<br>20175(1732.5MHz),<br>20393(1754.3MHz) | 1.4MHz            | QPSK / 16QAM | 6 RB / 0RB Offset    |
|                    |                            | 19965 to 20385    | 19965(1711.5MHz),<br>20175(1732.5MHz),<br>20385(1753.5MHz) | 3MHz              | QPSK / 16QAM | 15 RB / 0RB Offset   |
|                    |                            | 19975 to 20375    | 19975(1712.5MHz),<br>20175(1732.5MHz),<br>20375(1752.5MHz) | 5MHz              | QPSK / 16QAM | 25RB / 0RB Offset    |
|                    |                            | 20000 to 20350    | 20000(1715.0MHz),<br>20175(1732.5MHz),<br>20350(1750.0MHz) | 10MHz             | QPSK / 16QAM | 50RB / 0RB Offset    |
|                    |                            | 20025 to 20325    | 20025(1717.5MHz),<br>20175(1732.5MHz),<br>20325(1747.5MHz) | 15MHz             | QPSK / 16QAM | 75 RB / 0 RB Offset  |
|                    |                            | 20050 to 20300    | 20050(1720.0MHz),<br>20175(1732.5MHz),<br>20300(1745.0MHz) | 20MHz             | QPSK / 16QAM | 100 RB / 0 RB Offset |

| EUT Configure Mode | Test Item             | Available Channel | Tested Channel                                             | Channel Bandwidth | Modulation   | Mode                                                              |
|--------------------|-----------------------|-------------------|------------------------------------------------------------|-------------------|--------------|-------------------------------------------------------------------|
| -                  | Band Edge             | 19957 to 20393    | 19957(1710.7MHz),<br>20393(1754.3MHz)                      | 1.4MHz            | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 5 RB Offset<br>6 RB / 0 RB Offset    |
|                    |                       | 19965 to 20385    | 19965(1711.5MHz),<br>20385(1753.5MHz)                      | 3MHz              | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 14 RB Offset<br>15 RB / 0 RB Offset  |
|                    |                       | 19975 to 20375    | 19975(1712.5MHz),<br>20375(1752.5MHz)                      | 5MHz              | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 24 RB Offset<br>25 RB / 0 RB Offset  |
|                    |                       | 20000 to 20350    | 20000(1715.0MHz),<br>20350(1750.0MHz)                      | 10MHz             | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 49 RB Offset<br>50 RB / 0 RB Offset  |
|                    |                       | 20025 to 20325    | 20025(1717.5MHz),<br>20325(1747.5MHz)                      | 15MHz             | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 74 RB Offset<br>75 RB / 0 RB Offset  |
|                    |                       | 20050 to 20300    | 20050(1720.0MHz),<br>20300(1745.0MHz)                      | 20MHz             | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 99 RB Offset<br>100 RB / 0 RB Offset |
| -                  | Peak To Average Ratio | 19957 to 20393    | 19957(1710.7MHz),<br>20175(1732.5MHz),<br>20393(1754.3MHz) | 1.4MHz            | QPSK / 16QAM | 1 RB / 2 RB Offset                                                |
|                    |                       | 19965 to 20385    | 19965(1711.5MHz),<br>20175(1732.5MHz),<br>20385(1753.5MHz) | 3MHz              | QPSK / 16QAM | 1 RB / 7 RB Offset                                                |
|                    |                       | 19975 to 20375    | 19975(1712.5MHz),<br>20175(1732.5MHz),<br>20375(1752.5MHz) | 5MHz              | QPSK / 16QAM | 1 RB / 0 RB Offset                                                |
|                    |                       | 20000 to 20350    | 20000(1715.0MHz),<br>20175(1732.5MHz),<br>20350(1750.0MHz) | 10MHz             | QPSK / 16QAM | 1 RB / 24 RB Offset                                               |
|                    |                       | 20025 to 20325    | 20025(1717.5MHz),<br>20175(1732.5MHz),<br>20325(1747.5MHz) | 15MHz             | QPSK / 16QAM | 1 RB / 37 RB Offset                                               |
|                    |                       | 20050 to 20300    | 20050(1720.0MHz),<br>20175(1732.5MHz),<br>20300(1745.0MHz) | 20MHz             | QPSK / 16QAM | 1 RB / 0 RB Offset                                                |
| -                  | Conducted Emission    | 19957 to 20393    | 19957(1710.7MHz),<br>20175(1732.5MHz),<br>20393(1754.3MHz) | 1.4MHz            | QPSK         | 1 RB / 2 RB Offset                                                |
|                    |                       | 19965 to 20385    | 19965(1711.5MHz),<br>20175(1732.5MHz),<br>20385(1753.5MHz) | 3MHz              | QPSK         | 1 RB / 7 RB Offset                                                |
|                    |                       | 19975 to 20375    | 19975(1712.5MHz),<br>20175(1732.5MHz),<br>20375(1752.5MHz) | 5MHz              | QPSK         | 1 RB / 0 RB Offset                                                |
|                    |                       | 20000 to 20350    | 20000(1715.0MHz),<br>20175(1732.5MHz),<br>20350(1750.0MHz) | 10MHz             | QPSK         | 1 RB / 24 RB Offset                                               |
|                    |                       | 20025 to 20325    | 20025(1717.5MHz),<br>20175(1732.5MHz),<br>20325(1747.5MHz) | 15MHz             | QPSK         | 1 RB / 37 RB Offset                                               |
|                    |                       | 20050 to 20300    | 20050(1720.0MHz),<br>20175(1732.5MHz),<br>20300(1745.0MHz) | 20MHz             | QPSK         | 1 RB / 0 RB Offset                                                |

| EUT Configure Mode | Test Item                    | Available Channel | Tested Channel                                             | Channel Bandwidth | Modulation | Mode               |
|--------------------|------------------------------|-------------------|------------------------------------------------------------|-------------------|------------|--------------------|
| -                  | Radiated Emission Below 1GHz | 19957 to 20393    | 19957(1710.7MHz),                                          | 1.4MHz            | QPSK       | 1 RB / 2 RB Offset |
| -                  | Radiated Emission Above 1GHz | 19957 to 20393    | 19957(1710.7MHz),<br>20175(1732.5MHz),<br>20393(1754.3MHz) | 1.4MHz            | QPSK       | 1 RB / 2 RB Offset |
|                    |                              | 19975 to 20375    | 19975(1712.5MHz),<br>20175(1732.5MHz),<br>20375(1752.5MHz) | 5MHz              | QPSK       | 1 RB / 0 RB Offset |
|                    |                              | 20050 to 20300    | 20050(1720.0MHz),<br>20175(1732.5MHz),<br>20300(1745.0MHz) | 20MHz             | QPSK       | 1 RB / 0 RB Offset |

Note:

1. For radiated emission below 1GHz, select the worst radiated emission (above 1GHz) channel for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5MHz & highest channel bandwidth for final test.
3. The conducted output power for QPSK and 16QAM, measured value of QPSK is higher than 16QAM mode. Therefore, only EIRP, Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK and 16QAM modes, the other test items were performed under QPSK mode only.

# LTE Band 12

| EUT Configure Mode | Test item                  | Available channel | Tested channel                                            | Channel Bandwidth | Modulation   | Mode                                                             |
|--------------------|----------------------------|-------------------|-----------------------------------------------------------|-------------------|--------------|------------------------------------------------------------------|
| -                  | ERP                        | 23017 to 23173    | 23017(699.7MHz),<br>23095(707.5MHz),<br>23173(715.3MHz)   | 1.4MHz            | QPSK / 16QAM | 3 RB / 1 RB Offset                                               |
|                    |                            | 23025 to 23165    | 23025(700.5MHz),<br>23095(707.5MHz),<br>23165(714.5MHz)   | 3MHz              | QPSK / 16QAM | 1 RB / 7 RB Offset                                               |
|                    |                            | 23035 to 23155    | 23035(701.5MHz),<br>23095(707.5MHz),<br>23155(713.5MHz)   | 5MHz              | QPSK / 16QAM | 1 RB / 12 RB Offset                                              |
|                    |                            | 23060 to 23130    | 23060(704.0MHz),<br>23095(707.5 MHz),<br>23130(711.0 MHz) | 10MHz             | QPSK / 16QAM | 1 RB / 24 RB Offset                                              |
| -                  | Modulation Characteristics | 23060 to 23130    | 23095(707.5MHz)                                           | 10MHz             | QPSK / 16QAM | 50 RB / 0 RB Offset                                              |
| -                  | Frequency Stability        | 23017 to 23173    | 23017(699.7MHz),<br>23173(715.3MHz)                       | 1.4MHz            | QPSK         | 6 RB / 0 RB Offset                                               |
|                    |                            | 23025 to 23165    | 23025(700.5MHz),<br>23165(714.5MHz)                       | 3MHz              | QPSK         | 15 RB / 0 RB Offset                                              |
|                    |                            | 23035 to 23155    | 23035(701.5MHz),<br>23155(713.5MHz)                       | 5MHz              | QPSK         | 25 RB / 0 RB Offset                                              |
|                    |                            | 23060 to 23130    | 23060(704.0MHz),<br>23130(711.0MHz)                       | 10MHz             | QPSK         | 50 RB / 0 RB Offset                                              |
| -                  | Emission Bandwidth         | 23017 to 23173    | 23017(699.7MHz),<br>23095(707.5MHz),<br>23173(715.3MHz)   | 1.4MHz            | QPSK / 16QAM | 6 RB / 0 RB Offset                                               |
|                    |                            | 23025 to 23165    | 23025(700.5MHz),<br>23095(707.5MHz),<br>23165(714.5MHz)   | 3MHz              | QPSK / 16QAM | 15 RB / 0 RB Offset                                              |
|                    |                            | 23035 to 23155    | 23035(701.5MHz),<br>23095(707.5MHz),<br>23155(713.5MHz)   | 5MHz              | QPSK / 16QAM | 25 RB / 0 RB Offset                                              |
|                    |                            | 23060 to 23130    | 23060(704.0MHz),<br>23095(707.5MHz),<br>23130(711.0MHz)   | 10MHz             | QPSK / 16QAM | 50 RB / 0 RB Offset                                              |
| -                  | Band Edge                  | 23017 to 23173    | 23017(699.7MHz),<br>23173(715.3MHz)                       | 1.4MHz            | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 5 RB Offset<br>6 RB / 0 RB Offset   |
|                    |                            | 23025 to 23165    | 23025(700.5MHz),<br>23165(714.5MHz)                       | 3MHz              | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 14 RB Offset<br>15 RB / 0 RB Offset |
|                    |                            | 23035 to 23155    | 23035(701.5MHz),<br>23155(713.5MHz)                       | 5MHz              | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 24 RB Offset<br>25 RB / 0 RB Offset |
|                    |                            | 23060 to 23130    | 23060(704.0MHz),<br>23130(711.0MHz)                       | 10MHz             | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 49 RB Offset<br>50 RB / 0 RB Offset |
| -                  | Peak to Average Ratio      | 23017 to 23173    | 23017(699.7MHz),<br>23095(707.5MHz),<br>23173(715.3MHz)   | 1.4MHz            | QPSK / 16QAM | 3 RB / 1 RB Offset                                               |
|                    |                            | 23025 to 23165    | 23025(700.5MHz),<br>23095(707.5MHz),<br>23165(714.5MHz)   | 3MHz              | QPSK / 16QAM | 1 RB / 7 RB Offset                                               |
|                    |                            | 23035 to 23155    | 23035(701.5MHz),<br>23095(707.5MHz),<br>23155(713.5MHz)   | 5MHz              | QPSK / 16QAM | 1 RB / 12 RB Offset                                              |
|                    |                            | 23060 to 23130    | 23060(704.0MHz),<br>23095(707.5MHz),<br>23130(711.0MHz)   | 10MHz             | QPSK / 16QAM | 1 RB / 24 RB Offset                                              |

| EUT Configure Mode | Test item                    | Available channel | Tested channel                                          | Channel Bandwidth | Modulation | Mode                |
|--------------------|------------------------------|-------------------|---------------------------------------------------------|-------------------|------------|---------------------|
| -                  | Conducted Emission           | 23017 to 23173    | 23017(699.7MHz),<br>23095(707.5MHz),<br>23173(715.3MHz) | 1.4MHz            | QPSK       | 3 RB / 1 RB Offset  |
|                    |                              | 23025 to 23165    | 23025(700.5MHz),<br>23095(707.5MHz),<br>23165(714.5MHz) | 3MHz              | QPSK       | 1 RB / 7 RB Offset  |
|                    |                              | 23035 to 23155    | 23035(701.5MHz),<br>23095(707.5MHz),<br>23155(713.5MHz) | 5MHz              | QPSK       | 1 RB / 12 RB Offset |
|                    |                              | 23060 to 23130    | 23060(704.0MHz),<br>23095(707.5MHz),<br>23130(711.0MHz) | 10MHz             | QPSK       | 1 RB / 24 RB Offset |
| -                  | Radiated Emission Below 1GHz | 23035 to 23155    | 23155(713.5MHz)                                         | 5MHz              | QPSK       | 1 RB / 12 RB Offset |
| -                  | Radiated Emission Above 1GHz | 23017 to 23173    | 23017(699.7MHz),<br>23095(707.5MHz),<br>23173(715.3MHz) | 1.4MHz            | QPSK       | 3 RB / 1 RB Offset  |
|                    |                              | 23035 to 23155    | 23035(701.5MHz),<br>23095(707.5MHz),<br>23155(713.5MHz) | 5MHz              | QPSK       | 1 RB / 12 RB Offset |
|                    |                              | 23060 to 23130    | 23060(704.0MHz),<br>23095(707.5MHz),<br>23130(711.0MHz) | 10MHz             | QPSK       | 1 RB / 24 RB Offset |

Note:

1. For radiated emission below 1GHz, select the worst radiated emission (above 1GHz) channel for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the 1.4MHz & highest channel bandwidth for final test.
3. The conducted output power for QPSK and 16QAM, measured value of QPSK is higher than 16QAM mode. Therefore, only ERP, Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK and 16QAM modes, the other test items were performed under QPSK mode only.

# LTE Band 13

| EUT Configure Mode | Test item                    | Available channel | Tested channel                                          | Channel Bandwidth | Modulation   | Mode                                                             |
|--------------------|------------------------------|-------------------|---------------------------------------------------------|-------------------|--------------|------------------------------------------------------------------|
| -                  | ERP                          | 23205 to 23255    | 23205(779.5MHz),<br>23230(782.0MHz),<br>23255(784.5MHz) | 5MHz              | QPSK / 16QAM | 1 RB / 0 RB Offset                                               |
|                    |                              | 23230             | 23230(782.0MHz)                                         | 10MHz             | QPSK / 16QAM | 1 RB / 0 RB Offset                                               |
| -                  | Modulation Characteristics   | 23230             | 23230(782.0MHz),                                        | 10MHz             | QPSK / 16QAM | 50 RB / 0 RB Offset                                              |
| -                  | Frequency Stability          | 23205 to 23255    | 23205(779.5MHz),<br>23255(784.5MHz)                     | 5MHz              | QPSK         | 25 RB / 0 RB Offset                                              |
|                    |                              | 23230             | 23230(782.0MHz),                                        | 10MHz             | QPSK         | 50 RB / 0 RB Offset                                              |
| -                  | Emission Bandwidth           | 23205 to 23255    | 23205(779.5MHz),<br>23230(782.0MHz),<br>23255(784.5MHz) | 5MHz              | QPSK / 16QAM | 25 RB / 0 RB Offset                                              |
|                    |                              | 23230             | 23230(782.0MHz)                                         | 10MHz             | QPSK / 16QAM | 50 RB / 0 RB Offset                                              |
| -                  | Band Edge                    | 23205 to 23255    | 23205(779.5MHz),<br>23255(784.5MHz)                     | 5MHz              | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 24 RB Offset<br>25 RB / 0 RB Offset |
|                    |                              | 23230             | 23230(782.0MHz)                                         | 10MHz             | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 49 RB Offset<br>50 RB / 0 RB Offset |
| -                  | Peak to Average Ratio        | 23205 to 23255    | 23205(779.5MHz),<br>23230(782.0MHz),<br>23255(784.5MHz) | 5MHz              | QPSK / 16QAM | 1 RB / 0 RB Offset                                               |
|                    |                              | 23230             | 23230(782.0MHz)                                         | 10MHz             | QPSK / 16QAM | 1 RB / 0 RB Offset                                               |
| -                  | Conducted Emission           | 23205 to 23255    | 23205(779.5MHz),<br>23230(782.0MHz),<br>23255(784.5MHz) | 5MHz              | QPSK         | 1 RB / 0 RB Offset                                               |
|                    |                              | 23230             | 23230(782.0MHz)                                         | 10MHz             | QPSK         | 1 RB / 0 RB Offset                                               |
| -                  | Radiated Emission Below 1GHz | 23205 to 23255    | 23255(784.5MHz)                                         | 5MHz              | QPSK         | 1 RB / 0 RB Offset                                               |
| -                  | Radiated Emission Above 1GHz | 23205 to 23255    | 23205(779.5MHz),<br>23230(782.0MHz),<br>23255(784.5MHz) | 5MHz              | QPSK         | 1 RB / 0 RB Offset                                               |
|                    |                              | 23230             | 23230(782.0MHz)                                         | 10MHz             | QPSK         | 1 RB / 0 RB Offset                                               |

## Note:

- For radiated emission below 1GHz, select the worst radiated emission (above 1GHz) channel for final testing.
- For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the 5MHz & highest channel bandwidth for final test.
- The conducted output power for QPSK and 16QAM, measured value of QPSK is higher than 16QAM mode. Therefore, only ERP, Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK and 16QAM modes, the other test items were performed under QPSK mode only.

# LTE Band 66

| EUT Configure Mode | Test Item                  | Available Channel | Tested Channel                                                   | Channel Bandwidth | Modulation   | Mode                 |
|--------------------|----------------------------|-------------------|------------------------------------------------------------------|-------------------|--------------|----------------------|
| -                  | EIRP                       | 131979 to 132665  | 131979 (1710.7MHz),<br>132322 (1745.0MHz),<br>132665 (1779.3MHz) | 1.4MHz            | QPSK / 16QAM | 3 RB / 3 RB Offset   |
|                    |                            | 131987 to 132657  | 131987 (1711.5MHz),<br>132322 (1745.0MHz),<br>132657 (1778.5MHz) | 3MHz              | QPSK / 16QAM | 1 RB / 14 RB Offset  |
|                    |                            | 131997 to 132647  | 131997 (1712.5MHz),<br>132322 (1745.0MHz),<br>132647 (1777.5MHz) | 5MHz              | QPSK / 16QAM | 1 RB / 12 RB Offset  |
|                    |                            | 132022 to 132622  | 132022 (1715.0MHz),<br>132322 (1745.0MHz),<br>132622 (1775.0MHz) | 10MHz             | QPSK / 16QAM | 1 RB / 24 RB Offset  |
|                    |                            | 132047 to 132597  | 132047 (1717.5MHz),<br>132322 (1745.0MHz),<br>132597 (1772.5MHz) | 15MHz             | QPSK / 16QAM | 1 RB / 37 RB Offset  |
|                    |                            | 132072 to 132572  | 132072 (1720.0MHz),<br>132322 (1745.0MHz),<br>132572 (1770.0MHz) | 20MHz             | QPSK / 16QAM | 1 RB / 0 RB Offset   |
| -                  | Modulation Characteristics | 132072 to 132572  | 132322 (1745.0MHz)                                               | 20MHz             | QPSK / 16QAM | 100 RB / 0 RB Offset |
| -                  | Frequency Stability        | 131979 to 132665  | 131979 (1710.7MHz),<br>132665 (1779.3MHz)                        | 1.4MHz            | QPSK         | 6 RB / 0 RB Offset   |
|                    |                            | 131987 to 132657  | 131987 (1711.5MHz),<br>132657 (1778.5MHz)                        | 3MHz              | QPSK         | 15 RB / 0 RB Offset  |
|                    |                            | 131997 to 132647  | 131997 (1712.5MHz),<br>132647 (1777.5MHz)                        | 5MHz              | QPSK         | 25 RB / 0 RB Offset  |
|                    |                            | 132022 to 132622  | 132022 (1715.0MHz),<br>132622 (1775.0MHz)                        | 10MHz             | QPSK         | 50 RB / 0 RB Offset  |
|                    |                            | 132047 to 132597  | 132047 (1717.5MHz),<br>132597 (1772.5MHz)                        | 15MHz             | QPSK         | 75 RB / 0 RB Offset  |
|                    |                            | 132072 to 132572  | 132072 (1720.0MHz),<br>132572 (1770.0MHz)                        | 20MHz             | QPSK         | 100 RB / 0 RB Offset |
| -                  | Emission Bandwidth         | 131979 to 132665  | 131979 (1710.7MHz),<br>132322 (1745.0MHz),<br>132665 (1779.3MHz) | 1.4MHz            | QPSK / 16QAM | 6 RB / 0 RB Offset   |
|                    |                            | 131987 to 132657  | 131987 (1711.5MHz),<br>132322 (1745.0MHz),<br>132657 (1778.5MHz) | 3MHz              | QPSK / 16QAM | 15 RB / 0 RB Offset  |
|                    |                            | 131997 to 132647  | 131997 (1712.5MHz),<br>132322 (1745.0MHz),<br>132647 (1777.5MHz) | 5MHz              | QPSK / 16QAM | 25 RB / 0 RB Offset  |
|                    |                            | 132022 to 132622  | 132022 (1715.0MHz),<br>132322 (1745.0MHz),<br>132622 (1775.0MHz) | 10MHz             | QPSK / 16QAM | 50 RB / 0 RB Offset  |
|                    |                            | 132047 to 132597  | 132047 (1717.5MHz),<br>132322 (1745.0MHz),<br>132597 (1772.5MHz) | 15MHz             | QPSK / 16QAM | 75 RB / 0 RB Offset  |
|                    |                            | 132072 to 132572  | 132072 (1720.0MHz),<br>132322 (1745.0MHz),<br>132572 (1770.0MHz) | 20MHz             | QPSK / 16QAM | 100 RB / 0 RB Offset |

| EUT Configure Mode | Test Item                    | Available Channel | Tested Channel                                             | Channel Bandwidth | Modulation | Mode                                                              |
|--------------------|------------------------------|-------------------|------------------------------------------------------------|-------------------|------------|-------------------------------------------------------------------|
| -                  | Band Edge                    | 131979 to 132665  | 131979 (1710.7MHz), 132665 (1779.3MHz)                     | 1.4MHz            | QPSK       | 1 RB / 0 RB Offset<br>1 RB / 5 RB Offset<br>6 RB / 0 RB Offset    |
|                    |                              | 131987 to 132657  | 131987 (1711.5MHz), 132657 (1778.5MHz)                     | 3MHz              | QPSK       | 1 RB / 0 RB Offset<br>1 RB / 14 RB Offset<br>15 RB / 0 RB Offset  |
|                    |                              | 131997 to 132647  | 131997 (1712.5MHz), 132647 (1777.5MHz)                     | 5MHz              | QPSK       | 1 RB / 0 RB Offset<br>1 RB / 24 RB Offset<br>25 RB / 0 RB Offset  |
|                    |                              | 132022 to 132622  | 132022 (1715.0MHz), 132622 (1775.0MHz)                     | 10MHz             | QPSK       | 1 RB / 0 RB Offset<br>1 RB / 49 RB Offset<br>50 RB / 0 RB Offset  |
|                    |                              | 132047 to 132597  | 132047 (1717.5MHz), 132597 (1772.5MHz)                     | 15MHz             | QPSK       | 1 RB / 0 RB Offset<br>1 RB / 74 RB Offset<br>75 RB / 0 RB Offset  |
|                    |                              | 132072 to 132572  | 132072 (1720.0MHz), 132572 (1770.0MHz)                     | 20MHz             | QPSK       | 1 RB / 0 RB Offset<br>1 RB / 99 RB Offset<br>100 RB / 0 RB Offset |
| -                  | Peak to Average Ratio        | 131979 to 132665  | 131979 (1710.7MHz), 132322 (1745.0MHz), 132665 (1779.3MHz) | 1.4MHz            | QPSK       | 3 RB / 3 RB Offset                                                |
|                    |                              | 131987 to 132657  | 131987 (1711.5MHz), 132322 (1745.0MHz), 132657 (1778.5MHz) | 3MHz              | QPSK       | 1 RB / 14 RB Offset                                               |
|                    |                              | 131997 to 132647  | 131997 (1712.5MHz), 132322 (1745.0MHz), 132647 (1777.5MHz) | 5MHz              | QPSK       | 1 RB / 12 RB Offset                                               |
|                    |                              | 132022 to 132622  | 132022 (1715.0MHz), 132322 (1745.0MHz), 132622 (1775.0MHz) | 10MHz             | QPSK       | 1 RB / 24 RB Offset                                               |
|                    |                              | 132047 to 132597  | 132047 (1717.5MHz), 132322 (1745.0MHz), 132597 (1772.5MHz) | 15MHz             | QPSK       | 1 RB / 37 RB Offset                                               |
|                    |                              | 132072 to 132572  | 132072 (1720.0MHz), 132322 (1745.0MHz), 132572 (1770.0MHz) | 20MHz             | QPSK       | 1 RB / 0 RB Offset                                                |
| -                  | Conducted Emission           | 131979 to 132665  | 131979 (1710.7MHz), 132322 (1745.0MHz), 132665 (1779.3MHz) | 1.4MHz            | QPSK       | 3 RB / 3 RB Offset                                                |
|                    |                              | 131987 to 132657  | 131987 (1711.5MHz), 132322 (1745.0MHz), 132657 (1778.5MHz) | 3MHz              | QPSK       | 1 RB / 14 RB Offset                                               |
|                    |                              | 131997 to 132647  | 131997 (1712.5MHz), 132322 (1745.0MHz), 132647 (1777.5MHz) | 5MHz              | QPSK       | 1 RB / 12 RB Offset                                               |
|                    |                              | 132022 to 132622  | 132022 (1715.0MHz), 132322 (1745.0MHz), 132622 (1775.0MHz) | 10MHz             | QPSK       | 1 RB / 24 RB Offset                                               |
|                    |                              | 132047 to 132597  | 132047 (1717.5MHz), 132322 (1745.0MHz), 132597 (1772.5MHz) | 15MHz             | QPSK       | 1 RB / 37 RB Offset                                               |
|                    |                              | 132072 to 132572  | 132072 (1720.0MHz), 132322 (1745.0MHz), 132572 (1770.0MHz) | 20MHz             | QPSK       | 1 RB / 0 RB Offset                                                |
| -                  | Radiated Emission Below 1GHz | 131979 to 132665  | 132665 (1779.3MHz)                                         | 1.4MHz            | QPSK       | 3 RB / 3 RB Offset                                                |
| -                  | Radiated Emission Above 1GHz | 131979 to 132665  | 131979 (1710.7MHz), 132322 (1745.0MHz), 132665 (1779.3MHz) | 1.4MHz            | QPSK       | 3 RB / 3 RB Offset                                                |
|                    |                              | 131997 to 132647  | 131997 (1712.5MHz), 132322 (1745.0MHz), 132647 (1777.5MHz) | 5MHz              | QPSK       | 1 RB / 12 RB Offset                                               |
|                    |                              | 132072 to 132572  | 132072 (1720.0MHz), 132322 (1745.0MHz), 132572 (1770.0MHz) | 20MHz             | QPSK       | 1 RB / 0 RB Offset                                                |

Note:

1. For radiated emission below 1GHz, select the worst radiated emission (above 1GHz) channel for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the 5MHz & highest channel bandwidth for final test.

3. The conducted output power for QPSK and 16QAM, measured value of QPSK is higher than 16QAM mode.  
Therefore, only EIRP, Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK and 16QAM modes, the other test items were performed under QPSK mode only.

#### LTE Band 71

| EUT Configure Mode | Test item                  | Available channel | Tested channel                                                | Channel Bandwidth | Modulation   | Mode                                                              |
|--------------------|----------------------------|-------------------|---------------------------------------------------------------|-------------------|--------------|-------------------------------------------------------------------|
| -                  | ERP                        | 133147 to 133447  | 133147 (665.5MHz),<br>133297 (680.5MHz),<br>133447 (695.5MHz) | 5 MHz             | QPSK / 16QAM | 1 RB / 0 RB Offset                                                |
|                    |                            | 133172 to 133422  | 133172 (668.0MHz),<br>133297 (680.5MHz),<br>133422 (693.0MHz) | 10 MHz            | QPSK / 16QAM | 1 RB / 24 RB Offset                                               |
|                    |                            | 133197 to 133397  | 133197 (670.5MHz),<br>133297 (680.5MHz),<br>133397 (690.5MHz) | 15 MHz            | QPSK / 16QAM | 1 RB / 0 RB Offset                                                |
|                    |                            | 133222 to 133372  | 133222 (673.0MHz),<br>133297 (680.5MHz),<br>133372 (688.0MHz) | 20 MHz            | QPSK / 16QAM | 1 RB / 99 RB Offset                                               |
| -                  | Modulation Characteristics | 133222 to 133372  | 133297 (680.5MHz)                                             | 20 MHz            | QPSK / 16QAM | 100 RB / 0 RB Offset                                              |
| -                  | Frequency Stability        | 133147 to 133447  | 133147 (665.5MHz),<br>133447 (695.5MHz)                       | 5 MHz             | QPSK         | 25 RB / 0 RB Offset                                               |
|                    |                            | 133172 to 133422  | 133172 (668.0MHz),<br>133422 (693.0MHz)                       | 10 MHz            | QPSK         | 50 RB / 0 RB Offset                                               |
|                    |                            | 133197 to 133397  | 133197 (670.5MHz),<br>133397 (690.5MHz)                       | 15 MHz            | QPSK         | 75 RB / 0 RB Offset                                               |
|                    |                            | 133222 to 133372  | 133222 (673.0MHz),<br>133372 (688.0MHz)                       | 20 MHz            | QPSK         | 100 RB / 0 RB Offset                                              |
| -                  | Emission Bandwidth         | 133147 to 133447  | 133147 (665.5MHz),<br>133297 (680.5MHz),<br>133447 (695.5MHz) | 5 MHz             | QPSK / 16QAM | 25 RB / 0 RB Offset                                               |
|                    |                            | 133172 to 133422  | 133172 (668.0MHz),<br>133297 (680.5MHz),<br>133422 (693.0MHz) | 10 MHz            | QPSK / 16QAM | 50 RB / 0 RB Offset                                               |
|                    |                            | 133197 to 133397  | 133197 (670.5MHz),<br>133297 (680.5MHz),<br>133397 (690.5MHz) | 15 MHz            | QPSK / 16QAM | 75 RB / 0 RB Offset                                               |
|                    |                            | 133222 to 133372  | 133222 (673.0MHz),<br>133297 (680.5MHz),<br>133372 (688.0MHz) | 20 MHz            | QPSK / 16QAM | 100 RB / 0 RB Offset                                              |
| -                  | Band Edge                  | 133147 to 133447  | 133147 (665.5MHz),<br>133447 (695.5MHz)                       | 5 MHz             | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 24 RB Offset<br>25 RB / 0 RB Offset  |
|                    |                            | 133172 to 133422  | 133172 (668.0MHz),<br>133422 (693.0MHz)                       | 10 MHz            | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 49 RB Offset<br>50 RB / 0 RB Offset  |
|                    |                            | 133197 to 133397  | 133197 (670.5MHz),<br>133397 (690.5MHz)                       | 15 MHz            | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 74 RB Offset<br>75 RB / 0 RB Offset  |
|                    |                            | 133222 to 133372  | 133222 (673.0MHz),<br>133372 (688.0MHz)                       | 20 MHz            | QPSK         | 1 RB / 0 RB Offset<br>1 RB / 99 RB Offset<br>100 RB / 0 RB Offset |
| -                  | Peak to Average Ratio      | 133147 to 133447  | 133147 (665.5MHz),<br>133297 (680.5MHz),<br>133447 (695.5MHz) | 5 MHz             | QPSK / 16QAM | 1 RB / 0 RB Offset                                                |
|                    |                            | 133172 to 133422  | 133172 (668.0MHz),<br>133297 (680.5MHz),<br>133422 (693.0MHz) | 10 MHz            | QPSK / 16QAM | 1 RB / 24 RB Offset                                               |
|                    |                            | 133197 to 133397  | 133197 (670.5MHz),<br>133297 (680.5MHz),<br>133397 (690.5MHz) | 15 MHz            | QPSK / 16QAM | 1 RB / 0 RB Offset                                                |
|                    |                            | 133222 to 133372  | 133222 (673.0MHz),<br>133297 (680.5MHz),<br>133372 (688.0MHz) | 20 MHz            | QPSK / 16QAM | 1 RB / 99 RB Offset                                               |

| EUT Configure Mode | Test item                    | Available channel | Tested channel                                                | Channel Bandwidth | Modulation | Mode                |
|--------------------|------------------------------|-------------------|---------------------------------------------------------------|-------------------|------------|---------------------|
| -                  | Conducted Emission           | 133147 to 133447  | 133147 (665.5MHz),<br>133297 (680.5MHz),<br>133447 (695.5MHz) | 5 MHz             | QPSK       | 1 RB / 0 RB Offset  |
|                    |                              | 133172 to 133422  | 133172 (668.0MHz),<br>133297 (680.5MHz),<br>133422 (693.0MHz) | 10 MHz            | QPSK       | 1 RB / 24 RB Offset |
|                    |                              | 133197 to 133397  | 133197 (670.5MHz),<br>133297 (680.5MHz),<br>133397 (690.5MHz) | 15 MHz            | QPSK       | 1 RB / 0 RB Offset  |
|                    |                              | 133222 to 133372  | 133222 (673.0MHz),<br>133297 (680.5MHz),<br>133372 (688.0MHz) | 20 MHz            | QPSK       | 1 RB / 99 RB Offset |
| -                  | Radiated Emission Below 1GHz | 133147 to 133447  | 133447 (695.5MHz)                                             | 5 MHz             | QPSK       | 1 RB / 0 RB Offset  |
| -                  | Radiated Emission Above 1GHz | 133147 to 133447  | 133147 (665.5MHz),<br>133297 (680.5MHz),<br>133447 (695.5MHz) | 5 MHz             | QPSK       | 1 RB / 0 RB Offset  |
|                    |                              | 133222 to 133372  | 133222 (673.0MHz),<br>133297 (680.5MHz),<br>133372 (688.0MHz) | 20 MHz            | QPSK       | 1 RB / 99 RB Offset |

**Note:**

1. For radiated emission below 1GHz, select the worst radiated emission (above 1GHz) channel for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the 5MHz & highest channel bandwidth for final test.
3. The conducted output power for QPSK and 16QAM, measured value of QPSK is higher than 16QAM mode. Therefore, only ERP, Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK and 16QAM modes, the other test items were performed under QPSK mode only.

**Test Condition:**

| Test Item                  | Environmental Conditions           | Input Power  | Tested By                          |
|----------------------------|------------------------------------|--------------|------------------------------------|
| EIRP / ERP                 | 25deg. C, 70%RH                    | 120Vac, 60Hz | Tank Wu                            |
| Modulation characteristics | 24deg. C, 64%RH                    | 120Vac, 60Hz | Tank Wu                            |
| Frequency Stability        | 24deg. C, 64%RH                    | 120Vac, 60Hz | Tank Wu                            |
| Occupied Bandwidth         | 24deg. C, 64%RH                    | 120Vac, 60Hz | Tank Wu                            |
| Band Edge                  | 24deg. C, 64%RH                    | 120Vac, 60Hz | Tank Wu                            |
| Peak To Average Ratio      | 24deg. C, 64%RH                    | 120Vac, 60Hz | Tank Wu                            |
| Conducted Emission         | 24deg. C, 64%RH                    | 120Vac, 60Hz | Tank Wu                            |
| Radiated Emission          | 22deg. C, 68%RH<br>23deg. C, 67%RH | 120Vac, 60Hz | Noah Chang, Greg Lin,<br>Titan Hsu |

### **3.4 EUT Operating Conditions**

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

### **3.5 General Description of Applied Standards and References**

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and References:

#### **Test Standard:**

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 27**

**ANSI 63.26-2015**

All test items have been performed and recorded as per the above standards.

#### **References Test Guidance:**

**KDB 971168 D01 Power Meas License Digital Systems v03r01**

**ANSI/TIA/EIA-603-E 2016**

All test items have been performed as a reference to the above KDB test guidance.

## 4 Test Types and Results

### 4.1 Output Power Measurement

#### 4.1.1 Limits of Output Power Measurement

WCDMA, LTE Band 4, LTE Band 66:

Mobile / Portable station are limited to 1 watts e.i.r.p.

LTE Band 12, LTE Band 13, LTE Band 71:

Control and mobile stations in the 698-746 MHz, 746-757 MHz, 787-788 MHz and 805-806 MHz band are limited to 30 watts ERP.

Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink, 746-757 MHz, 787-788 MHz and 805-806 MHz band are limited to 3 watts ERP.

#### 4.1.2 Test Procedures

##### Conducted Power Measurement:

The EUT was set up for the maximum power with WCDMA, LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

##### Maximum EIRP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is

given in Equation as follows:

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_T$$

where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as  $P_{\text{Meas}}$ , e.g., dBm or dBW)

$P_{\text{Meas}}$  measured transmitter output power or PSD, in dBm or dBW

$G_T$  gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

#### 4.1.3 Test Setup

For the actual test configuration, please refer to the attached file (Test Setup Photo).

Conducted Power Measurement:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.4 Test Results

##### Conducted Output Power (dBm)

| Band            | WCDMA IV |        |              |
|-----------------|----------|--------|--------------|
| Channel         | 1312     | 1413   | 1513         |
| Frequency       | 1712.4   | 1732.6 | 1752.6       |
| RMC 12.2K       | 23.14    | 23.32  | <b>23.36</b> |
| HSDPA Subtest-1 | 22.52    | 22.55  | 22.56        |
| HSDPA Subtest-2 | 22.52    | 22.54  | 22.58        |
| HSDPA Subtest-3 | 22.51    | 22.55  | 22.53        |
| HSDPA Subtest-4 | 22.48    | 22.55  | 22.53        |
| HSUPA Subtest-1 | 21.70    | 21.78  | 21.74        |
| HSUPA Subtest-2 | 21.69    | 21.75  | 21.75        |
| HSUPA Subtest-3 | 21.70    | 21.76  | 21.75        |
| HSUPA Subtest-4 | 21.71    | 21.77  | 21.76        |
| HSUPA Subtest-5 | 21.69    | 21.70  | 21.71        |

| LTE Band 4 |           |                 |   |        |        |        |
|------------|-----------|-----------------|---|--------|--------|--------|
| BW         | MCS Index | Channel         |   | 19957  | 20175  | 20393  |
|            |           | Frequency (MHz) |   | 1710.7 | 1732.5 | 1754.3 |
| 1.4M       | QPSK      | 1               | 0 | 23.14  | 23.23  | 23.09  |
|            |           | 1               | 2 | 23.23  | 23.35  | 23.21  |
|            |           | 1               | 5 | 23.18  | 23.31  | 23.21  |
|            |           | 3               | 0 | 23.12  | 23.28  | 23.20  |
|            |           | 3               | 1 | 23.28  | 23.33  | 23.25  |
|            |           | 3               | 3 | 23.23  | 23.31  | 23.28  |
|            |           | 6               | 0 | 22.27  | 22.30  | 22.28  |
|            | 16QAM     | 1               | 0 | 22.38  | 22.40  | 22.26  |
|            |           | 1               | 2 | 22.49  | 22.33  | 22.34  |
|            |           | 1               | 5 | 22.32  | 22.34  | 22.37  |
|            |           | 3               | 0 | 22.06  | 22.34  | 22.17  |
|            |           | 3               | 1 | 21.84  | 22.29  | 22.38  |
|            |           | 3               | 3 | 22.11  | 22.44  | 22.48  |
|            |           | 6               | 0 | 20.98  | 21.37  | 21.47  |

| LTE Band 4 |           |                 |    |        |        |        |
|------------|-----------|-----------------|----|--------|--------|--------|
| BW         | MCS Index | Channel         |    | 19965  | 20175  | 20385  |
|            |           | Frequency (MHz) |    | 1711.5 | 1732.5 | 1753.5 |
| 3M         | QPSK      | 1               | 0  | 23.27  | 23.51  | 23.55  |
|            |           | 1               | 7  | 23.23  | 23.67  | 23.30  |
|            |           | 1               | 14 | 23.26  | 23.30  | 23.29  |
|            |           | 8               | 0  | 22.28  | 22.37  | 22.37  |
|            |           | 8               | 3  | 22.31  | 22.41  | 22.34  |
|            |           | 8               | 7  | 22.34  | 22.40  | 22.33  |
|            |           | 15              | 0  | 22.37  | 22.37  | 22.30  |
|            | 16QAM     | 1               | 0  | 22.05  | 21.90  | 22.27  |
|            |           | 1               | 7  | 22.13  | 21.97  | 22.25  |
|            |           | 1               | 14 | 22.28  | 22.08  | 22.50  |
|            |           | 8               | 0  | 21.31  | 21.47  | 21.16  |
|            |           | 8               | 3  | 21.52  | 21.61  | 21.16  |
|            |           | 8               | 7  | 21.18  | 21.59  | 21.06  |
|            |           | 15              | 0  | 21.45  | 21.47  | 21.22  |

| LTE Band 4 |           |                 |    |        |        |        |
|------------|-----------|-----------------|----|--------|--------|--------|
| BW         | MCS Index | Channel         |    | 19975  | 20175  | 20375  |
|            |           | Frequency (MHz) |    | 1712.5 | 1732.5 | 1752.5 |
| 5M         | QPSK      | 1               | 0  | 23.29  | 23.51  | 23.10  |
|            |           | 1               | 12 | 23.40  | 23.38  | 23.23  |
|            |           | 1               | 24 | 23.16  | 23.08  | 23.25  |
|            |           | 12              | 0  | 22.35  | 22.35  | 22.48  |
|            |           | 12              | 6  | 22.40  | 22.38  | 22.47  |
|            |           | 12              | 13 | 22.41  | 22.40  | 22.43  |
|            |           | 25              | 0  | 22.32  | 22.38  | 22.41  |
|            | 16QAM     | 1               | 0  | 22.68  | 22.20  | 22.12  |
|            |           | 1               | 12 | 22.73  | 21.95  | 21.91  |
|            |           | 1               | 24 | 22.70  | 22.32  | 22.28  |
|            |           | 12              | 0  | 21.29  | 21.15  | 21.23  |
|            |           | 12              | 6  | 21.25  | 21.19  | 21.15  |
|            |           | 12              | 13 | 21.27  | 21.12  | 21.17  |
|            |           | 25              | 0  | 21.27  | 21.23  | 21.19  |

| LTE Band 4 |           |                 |    |       |        |       |
|------------|-----------|-----------------|----|-------|--------|-------|
| BW         | MCS Index | Channel         |    | 20000 | 20175  | 20350 |
|            |           | Frequency (MHz) |    | 1715  | 1732.5 | 1750  |
| 10M        | QPSK      | 1               | 0  | 23.05 | 23.00  | 23.19 |
|            |           | 1               | 24 | 23.06 | 23.24  | 23.19 |
|            |           | 1               | 49 | 22.77 | 23.10  | 23.11 |
|            |           | 25              | 0  | 22.38 | 22.31  | 22.33 |
|            |           | 25              | 12 | 22.31 | 22.42  | 22.29 |
|            |           | 25              | 25 | 22.25 | 22.40  | 22.23 |
|            |           | 50              | 0  | 22.39 | 22.34  | 22.27 |
|            | 16QAM     | 1               | 0  | 22.05 | 21.81  | 21.82 |
|            |           | 1               | 24 | 22.05 | 21.88  | 22.19 |
|            |           | 1               | 49 | 21.78 | 21.74  | 21.76 |
|            |           | 25              | 0  | 21.37 | 21.27  | 21.30 |
|            |           | 25              | 12 | 21.31 | 21.28  | 21.27 |
|            |           | 25              | 25 | 21.23 | 21.37  | 21.22 |
|            |           | 50              | 0  | 21.17 | 21.17  | 21.19 |

| LTE Band 4 |           |                 |    |        |        |        |
|------------|-----------|-----------------|----|--------|--------|--------|
| BW         | MCS Index | Channel         |    | 20025  | 20175  | 20325  |
|            |           | Frequency (MHz) |    | 1717.5 | 1732.5 | 1747.5 |
| 15M        | QPSK      | 1               | 0  | 23.44  | 23.50  | 23.13  |
|            |           | 1               | 37 | 23.39  | 23.65  | 23.46  |
|            |           | 1               | 74 | 23.27  | 23.27  | 23.22  |
|            |           | 36              | 0  | 22.57  | 22.36  | 22.43  |
|            |           | 36              | 19 | 22.36  | 22.40  | 22.27  |
|            |           | 36              | 39 | 22.26  | 22.43  | 22.32  |
|            |           | 75              | 0  | 22.45  | 22.45  | 22.19  |
|            | 16QAM     | 1               | 0  | 22.61  | 22.49  | 22.52  |
|            |           | 1               | 37 | 22.50  | 22.46  | 22.44  |
|            |           | 1               | 74 | 22.34  | 22.32  | 22.41  |
|            |           | 36              | 0  | 21.42  | 21.40  | 21.37  |
|            |           | 36              | 19 | 21.32  | 21.35  | 21.32  |
|            |           | 36              | 39 | 21.20  | 21.27  | 21.28  |
|            |           | 75              | 0  | 21.37  | 21.33  | 21.34  |

| LTE Band 4 |           |                 |    |       |        |       |
|------------|-----------|-----------------|----|-------|--------|-------|
| BW         | MCS Index | Channel         |    | 20050 | 20175  | 20300 |
|            |           | Frequency (MHz) |    | 1720  | 1732.5 | 1745  |
| 20M        | QPSK      | 1               | 0  | 23.57 | 23.20  | 23.20 |
|            |           | 1               | 50 | 23.52 | 23.52  | 23.37 |
|            |           | 1               | 99 | 22.95 | 23.13  | 23.07 |
|            |           | 50              | 0  | 22.50 | 22.37  | 22.54 |
|            |           | 50              | 25 | 22.35 | 22.37  | 22.39 |
|            |           | 50              | 50 | 22.33 | 22.43  | 22.29 |
|            |           | 100             | 0  | 22.42 | 22.45  | 22.41 |
|            | 16QAM     | 1               | 0  | 22.37 | 22.54  | 22.33 |
|            |           | 1               | 50 | 22.78 | 22.34  | 22.25 |
|            |           | 1               | 99 | 22.04 | 22.22  | 22.17 |
|            |           | 50              | 0  | 21.44 | 21.40  | 21.62 |
|            |           | 50              | 25 | 21.29 | 21.31  | 21.48 |
|            |           | 50              | 50 | 21.26 | 21.36  | 21.36 |
|            |           | 100             | 0  | 21.39 | 21.40  | 21.29 |

| LTE Band 12 |           |                 |   |       |       |       |
|-------------|-----------|-----------------|---|-------|-------|-------|
| BW          | MCS Index | Channel         |   | 23017 | 23095 | 23173 |
|             |           | Frequency (MHz) |   | 699.7 | 707.5 | 715.3 |
| 1.4M        | QPSK      | 1               | 0 | 23.86 | 24.06 | 24.07 |
|             |           | 1               | 2 | 24.14 | 24.21 | 24.17 |
|             |           | 1               | 5 | 23.94 | 24.05 | 24.19 |
|             |           | 3               | 0 | 24.02 | 24.06 | 24.16 |
|             |           | 3               | 1 | 24.05 | 24.22 | 24.34 |
|             |           | 3               | 3 | 24.26 | 24.22 | 24.26 |
|             |           | 6               | 0 | 23.18 | 23.24 | 23.24 |
|             | 16QAM     | 1               | 0 | 22.67 | 22.80 | 22.71 |
|             |           | 1               | 2 | 22.82 | 22.81 | 22.77 |
|             |           | 1               | 5 | 22.59 | 22.82 | 22.79 |
|             |           | 3               | 0 | 22.81 | 22.95 | 23.21 |
|             |           | 3               | 1 | 23.02 | 23.02 | 23.39 |
|             |           | 3               | 3 | 23.02 | 22.93 | 23.34 |
|             |           | 6               | 0 | 21.98 | 21.97 | 22.08 |

| LTE Band 12 |           |                 |    |       |       |       |
|-------------|-----------|-----------------|----|-------|-------|-------|
| BW          | MCS Index | Channel         |    | 23025 | 23095 | 23165 |
|             |           | Frequency (MHz) |    | 700.5 | 707.5 | 714.5 |
| 3M          | QPSK      | 1               | 0  | 24.00 | 24.04 | 24.23 |
|             |           | 1               | 7  | 24.31 | 24.09 | 24.04 |
|             |           | 1               | 14 | 24.12 | 23.93 | 24.31 |
|             |           | 8               | 0  | 23.15 | 23.18 | 23.29 |
|             |           | 8               | 3  | 23.30 | 23.19 | 23.37 |
|             |           | 8               | 7  | 23.20 | 23.23 | 23.33 |
|             |           | 15              | 0  | 23.12 | 23.25 | 23.31 |
|             | 16QAM     | 1               | 0  | 23.29 | 22.94 | 23.12 |
|             |           | 1               | 7  | 23.17 | 23.26 | 23.15 |
|             |           | 1               | 14 | 23.17 | 23.05 | 23.14 |
|             |           | 8               | 0  | 22.21 | 21.94 | 22.22 |
|             |           | 8               | 3  | 22.26 | 21.96 | 22.23 |
|             |           | 8               | 7  | 22.05 | 22.19 | 22.29 |
|             |           | 15              | 0  | 22.15 | 22.20 | 22.32 |

| LTE Band 12 |           |                 |    |       |       |       |
|-------------|-----------|-----------------|----|-------|-------|-------|
| BW          | MCS Index | Channel         |    | 23035 | 23095 | 23155 |
|             |           | Frequency (MHz) |    | 701.5 | 707.5 | 713.5 |
| 5M          | QPSK      | 1               | 0  | 23.85 | 24.00 | 24.16 |
|             |           | 1               | 12 | 24.19 | 24.21 | 24.15 |
|             |           | 1               | 24 | 23.87 | 24.02 | 24.16 |
|             |           | 12              | 0  | 23.10 | 23.13 | 23.10 |
|             |           | 12              | 6  | 23.01 | 23.24 | 23.29 |
|             |           | 12              | 13 | 23.05 | 23.21 | 23.35 |
|             |           | 25              | 0  | 23.06 | 23.16 | 23.22 |
|             | 16QAM     | 1               | 0  | 23.21 | 23.59 | 23.26 |
|             |           | 1               | 12 | 23.16 | 23.80 | 23.33 |
|             |           | 1               | 24 | 23.37 | 23.23 | 23.25 |
|             |           | 12              | 0  | 22.16 | 22.20 | 22.07 |
|             |           | 12              | 6  | 22.07 | 22.03 | 22.15 |
|             |           | 12              | 13 | 22.11 | 22.12 | 22.34 |
|             |           | 25              | 0  | 22.20 | 22.13 | 22.33 |

| LTE Band 12 |           |                 |    |       |       |       |
|-------------|-----------|-----------------|----|-------|-------|-------|
| BW          | MCS Index | Channel         |    | 23060 | 23095 | 23130 |
|             |           | Frequency (MHz) |    | 704   | 707.5 | 711   |
| 10M         | QPSK      | 1               | 0  | 23.71 | 23.83 | 23.86 |
|             |           | 1               | 24 | 23.83 | 24.10 | 24.23 |
|             |           | 1               | 49 | 23.90 | 23.99 | 24.10 |
|             |           | 25              | 0  | 22.94 | 23.13 | 23.20 |
|             |           | 25              | 12 | 23.01 | 23.19 | 23.18 |
|             |           | 25              | 25 | 23.15 | 23.15 | 23.28 |
|             |           | 50              | 0  | 23.05 | 23.20 | 23.26 |
|             | 16QAM     | 1               | 0  | 23.18 | 23.12 | 23.21 |
|             |           | 1               | 24 | 22.87 | 23.23 | 23.63 |
|             |           | 1               | 49 | 23.33 | 23.35 | 23.20 |
|             |           | 25              | 0  | 22.00 | 22.11 | 22.15 |
|             |           | 25              | 12 | 22.05 | 22.27 | 22.15 |
|             |           | 25              | 25 | 22.11 | 22.32 | 22.14 |
|             |           | 50              | 0  | 22.05 | 22.20 | 22.15 |

| LTE Band 13 |           |                 |    |       |       |       |
|-------------|-----------|-----------------|----|-------|-------|-------|
| BW          | MCS Index | Channel         |    | 23205 | 23230 | 23255 |
|             |           | Frequency (MHz) |    | 779.5 | 782   | 784.5 |
| 5M          | QPSK      | 1               | 0  | 23.90 | 23.82 | 23.70 |
|             |           | 1               | 12 | 23.78 | 23.67 | 23.85 |
|             |           | 1               | 24 | 23.65 | 23.78 | 23.64 |
|             |           | 12              | 0  | 22.92 | 22.87 | 22.98 |
|             |           | 12              | 6  | 23.03 | 22.91 | 23.17 |
|             |           | 12              | 13 | 22.87 | 22.99 | 23.04 |
|             |           | 25              | 0  | 23.08 | 22.96 | 22.95 |
|             | 16QAM     | 1               | 0  | 23.04 | 22.61 | 22.59 |
|             |           | 1               | 12 | 22.71 | 22.36 | 22.67 |
|             |           | 1               | 24 | 22.93 | 22.66 | 22.50 |
|             |           | 12              | 0  | 22.04 | 21.77 | 21.96 |
|             |           | 12              | 6  | 21.86 | 21.78 | 21.83 |
|             |           | 12              | 13 | 21.81 | 21.89 | 22.02 |
|             |           | 25              | 0  | 22.17 | 21.81 | 21.87 |

| LTE Band 13 |           |                 |    |       |
|-------------|-----------|-----------------|----|-------|
| BW          | MCS Index | Channel         |    | 23230 |
|             |           | Frequency (MHz) |    | 782   |
| 10M         | QPSK      | 1               | 0  | 24.30 |
|             |           | 1               | 24 | 24.05 |
|             |           | 1               | 49 | 24.05 |
|             |           | 25              | 0  | 23.02 |
|             |           | 25              | 12 | 23.01 |
|             |           | 25              | 25 | 22.90 |
|             |           | 50              | 0  | 23.01 |
|             | 16QAM     | 1               | 0  | 22.92 |
|             |           | 1               | 24 | 22.80 |
|             |           | 1               | 49 | 22.84 |
|             |           | 25              | 0  | 21.96 |
|             |           | 25              | 12 | 21.75 |
|             |           | 25              | 25 | 22.09 |
|             |           | 50              | 0  | 22.05 |

| LTE Band 66 |           |                 |   |        |        |        |
|-------------|-----------|-----------------|---|--------|--------|--------|
| BW          | MCS Index | Channel         |   | 131979 | 132322 | 132665 |
|             |           | Frequency (MHz) |   | 1710.7 | 1745   | 1779.3 |
| 1.4M        | QPSK      | 1               | 0 | 23.13  | 23.38  | 23.15  |
|             |           | 1               | 2 | 23.21  | 23.34  | 23.12  |
|             |           | 1               | 5 | 23.19  | 23.33  | 23.19  |
|             |           | 3               | 0 | 23.18  | 23.33  | 23.21  |
|             |           | 3               | 1 | 23.14  | 23.30  | 23.19  |
|             |           | 3               | 3 | 23.15  | 23.38  | 23.20  |
|             |           | 6               | 0 | 22.28  | 22.17  | 22.12  |
|             | 16QAM     | 1               | 0 | 22.04  | 22.13  | 22.11  |
|             |           | 1               | 2 | 22.19  | 22.15  | 22.28  |
|             |           | 1               | 5 | 22.19  | 22.14  | 22.19  |
|             |           | 3               | 0 | 22.16  | 22.17  | 22.26  |
|             |           | 3               | 1 | 22.10  | 22.20  | 22.02  |
|             |           | 3               | 3 | 22.12  | 22.11  | 22.20  |
|             |           | 6               | 0 | 21.22  | 21.20  | 21.25  |

| LTE Band 66 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 131987 | 132322 | 132657 |
|             |           | Frequency (MHz) |    | 1711.5 | 1745   | 1778.5 |
| 3M          | QPSK      | 1               | 0  | 23.10  | 23.35  | 23.10  |
|             |           | 1               | 7  | 23.18  | 23.32  | 23.11  |
|             |           | 1               | 14 | 23.17  | 23.35  | 23.13  |
|             |           | 8               | 0  | 22.10  | 22.18  | 22.10  |
|             |           | 8               | 3  | 22.14  | 22.15  | 22.14  |
|             |           | 8               | 7  | 22.25  | 22.20  | 22.16  |
|             |           | 15              | 0  | 22.29  | 22.14  | 22.15  |
|             | 16QAM     | 1               | 0  | 22.29  | 22.18  | 22.29  |
|             |           | 1               | 7  | 22.14  | 22.21  | 22.20  |
|             |           | 1               | 14 | 22.28  | 22.22  | 22.12  |
|             |           | 8               | 0  | 21.12  | 21.20  | 21.20  |
|             |           | 8               | 3  | 21.30  | 21.29  | 21.20  |
|             |           | 8               | 7  | 21.18  | 21.11  | 21.14  |
|             |           | 15              | 0  | 21.14  | 21.18  | 21.14  |

| LTE Band 66 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 131997 | 132322 | 132647 |
|             |           | Frequency (MHz) |    | 1712.5 | 1745   | 1777.5 |
| 5M          | QPSK      | 1               | 0  | 23.15  | 23.32  | 23.16  |
|             |           | 1               | 12 | 23.22  | 23.38  | 23.14  |
|             |           | 1               | 24 | 23.16  | 23.32  | 23.19  |
|             |           | 12              | 0  | 22.16  | 22.11  | 22.09  |
|             |           | 12              | 6  | 22.18  | 22.20  | 22.15  |
|             |           | 12              | 13 | 22.12  | 22.11  | 22.14  |
|             |           | 25              | 0  | 22.20  | 22.12  | 22.30  |
|             | 16QAM     | 1               | 0  | 22.21  | 22.30  | 22.26  |
|             |           | 1               | 12 | 22.15  | 22.13  | 22.16  |
|             |           | 1               | 24 | 22.12  | 22.19  | 22.25  |
|             |           | 12              | 0  | 21.19  | 21.17  | 21.18  |
|             |           | 12              | 6  | 21.19  | 21.14  | 21.14  |
|             |           | 12              | 13 | 21.10  | 21.19  | 21.26  |
|             |           | 25              | 0  | 21.30  | 21.30  | 21.25  |

| LTE Band 66 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 132022 | 132322 | 132622 |
|             |           | Frequency (MHz) |    | 1715   | 1745   | 1775   |
| 10M         | QPSK      | 1               | 0  | 23.11  | 23.30  | 23.12  |
|             |           | 1               | 24 | 23.22  | 23.41  | 23.10  |
|             |           | 1               | 49 | 23.20  | 23.31  | 23.19  |
|             |           | 25              | 0  | 22.01  | 22.08  | 22.19  |
|             |           | 25              | 12 | 22.15  | 22.17  | 22.21  |
|             |           | 25              | 25 | 22.23  | 22.30  | 22.23  |
|             |           | 50              | 0  | 22.27  | 22.14  | 22.24  |
|             | 16QAM     | 1               | 0  | 22.00  | 22.13  | 22.04  |
|             |           | 1               | 24 | 22.19  | 22.25  | 22.23  |
|             |           | 1               | 49 | 22.11  | 22.20  | 22.24  |
|             |           | 25              | 0  | 21.18  | 21.12  | 21.21  |
|             |           | 25              | 12 | 21.13  | 21.17  | 21.28  |
|             |           | 25              | 25 | 21.20  | 21.15  | 21.11  |
|             |           | 50              | 0  | 21.24  | 21.26  | 21.22  |

| LTE Band 66 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 132047 | 132322 | 132597 |
|             |           | Frequency (MHz) |    | 1717.5 | 1745   | 1772.5 |
| 15M         | QPSK      | 1               | 0  | 23.11  | 23.33  | 23.12  |
|             |           | 1               | 37 | 23.20  | 23.34  | 23.21  |
|             |           | 1               | 74 | 23.10  | 23.31  | 23.21  |
|             |           | 36              | 0  | 22.00  | 22.01  | 22.08  |
|             |           | 36              | 19 | 22.13  | 22.11  | 22.30  |
|             |           | 36              | 39 | 22.16  | 22.19  | 22.16  |
|             |           | 75              | 0  | 22.15  | 22.20  | 22.29  |
|             | 16QAM     | 1               | 0  | 22.22  | 22.29  | 22.27  |
|             |           | 1               | 37 | 22.24  | 22.22  | 22.11  |
|             |           | 1               | 74 | 22.19  | 22.11  | 22.14  |
|             |           | 36              | 0  | 21.19  | 21.33  | 21.07  |
|             |           | 36              | 19 | 21.25  | 21.26  | 21.15  |
|             |           | 36              | 39 | 21.27  | 21.28  | 21.29  |
|             |           | 75              | 0  | 21.24  | 21.18  | 21.24  |

| LTE Band 66 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 132072 | 132322 | 132575 |
|             |           | Frequency (MHz) |    | 1720   | 1745   | 1770   |
| 20M         | QPSK      | 1               | 0  | 23.12  | 23.25  | 23.22  |
|             |           | 1               | 50 | 23.16  | 23.18  | 23.14  |
|             |           | 1               | 99 | 23.13  | 23.17  | 23.13  |
|             |           | 50              | 0  | 22.17  | 22.54  | 22.19  |
|             |           | 50              | 25 | 22.07  | 22.12  | 22.05  |
|             |           | 50              | 50 | 22.16  | 22.13  | 22.18  |
|             |           | 100             | 0  | 22.10  | 22.14  | 22.11  |
|             | 16QAM     | 1               | 0  | 22.20  | 22.37  | 22.22  |
|             |           | 1               | 50 | 22.14  | 22.19  | 22.05  |
|             |           | 1               | 99 | 22.14  | 22.17  | 22.13  |
|             |           | 50              | 0  | 21.33  | 21.31  | 21.11  |
|             |           | 50              | 25 | 21.11  | 21.18  | 21.10  |
|             |           | 50              | 50 | 21.29  | 21.23  | 21.15  |
|             |           | 100             | 0  | 21.28  | 21.26  | 21.10  |

| LTE Band 71 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 133147 | 133297 | 133447 |
|             |           | Frequency (MHz) |    | 665.5  | 680.5  | 695.5  |
| 5M          | QPSK      | 1               | 0  | 23.83  | 23.85  | 23.89  |
|             |           | 1               | 12 | 23.81  | 23.78  | 23.83  |
|             |           | 1               | 24 | 23.77  | 23.81  | 23.89  |
|             |           | 12              | 0  | 22.77  | 22.70  | 22.75  |
|             |           | 12              | 6  | 22.84  | 22.88  | 22.74  |
|             |           | 12              | 13 | 22.74  | 22.86  | 22.76  |
|             |           | 25              | 0  | 22.72  | 22.86  | 22.81  |
|             | 16QAM     | 1               | 0  | 22.53  | 22.46  | 22.85  |
|             |           | 1               | 12 | 22.41  | 22.56  | 22.45  |
|             |           | 1               | 24 | 22.57  | 22.43  | 22.41  |
|             |           | 12              | 0  | 21.83  | 21.73  | 21.90  |
|             |           | 12              | 6  | 21.83  | 21.77  | 21.89  |
|             |           | 12              | 13 | 21.89  | 21.77  | 21.84  |
|             |           | 25              | 0  | 21.70  | 21.77  | 21.73  |

| LTE Band 71 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 133172 | 133297 | 133422 |
|             |           | Frequency (MHz) |    | 668    | 680.5  | 693    |
| 10M         | QPSK      | 1               | 0  | 23.83  | 23.82  | 23.76  |
|             |           | 1               | 24 | 23.84  | 23.78  | 23.76  |
|             |           | 1               | 49 | 23.70  | 23.84  | 23.76  |
|             |           | 25              | 0  | 22.80  | 22.87  | 22.72  |
|             |           | 25              | 12 | 22.87  | 22.86  | 22.79  |
|             |           | 25              | 25 | 22.86  | 22.79  | 22.70  |
|             |           | 50              | 0  | 22.76  | 22.79  | 22.81  |
|             | 16QAM     | 1               | 0  | 22.58  | 22.54  | 22.51  |
|             |           | 1               | 24 | 22.45  | 22.55  | 22.47  |
|             |           | 1               | 49 | 22.53  | 22.56  | 22.57  |
|             |           | 25              | 0  | 21.77  | 21.75  | 21.87  |
|             |           | 25              | 12 | 21.82  | 21.75  | 21.78  |
|             |           | 25              | 25 | 21.87  | 21.86  | 21.86  |
|             |           | 50              | 0  | 21.85  | 21.73  | 21.78  |

| LTE Band 71 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 133197 | 133297 | 133397 |
|             |           | Frequency (MHz) |    | 670.5  | 680.5  | 690.5  |
| 15M         | QPSK      | 1               | 0  | 23.79  | 23.72  | 23.89  |
|             |           | 1               | 37 | 23.83  | 23.73  | 23.72  |
|             |           | 1               | 74 | 23.75  | 23.87  | 23.74  |
|             |           | 36              | 0  | 22.70  | 22.76  | 22.82  |
|             |           | 36              | 19 | 22.79  | 22.77  | 22.71  |
|             |           | 36              | 39 | 22.83  | 22.82  | 22.79  |
|             |           | 75              | 0  | 22.78  | 22.77  | 22.84  |
|             | 16QAM     | 1               | 0  | 22.41  | 22.51  | 22.45  |
|             |           | 1               | 37 | 22.40  | 22.50  | 22.57  |
|             |           | 1               | 74 | 22.43  | 22.45  | 22.54  |
|             |           | 36              | 0  | 21.89  | 21.84  | 21.90  |
|             |           | 36              | 19 | 21.88  | 21.84  | 21.73  |
|             |           | 36              | 39 | 21.89  | 21.83  | 21.74  |
|             |           | 75              | 0  | 21.71  | 21.77  | 21.85  |

| LTE Band 71 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 133222 | 133297 | 133372 |
|             |           | Frequency (MHz) |    | 673    | 680.5  | 688    |
| 20M         | QPSK      | 1               | 0  | 23.73  | 23.82  | 23.84  |
|             |           | 1               | 50 | 23.74  | 23.75  | 23.73  |
|             |           | 1               | 99 | 23.86  | 23.77  | 23.70  |
|             |           | 50              | 0  | 22.75  | 22.90  | 22.73  |
|             |           | 50              | 25 | 22.74  | 22.70  | 22.83  |
|             |           | 50              | 50 | 22.81  | 22.80  | 22.70  |
|             |           | 100             | 0  | 22.70  | 22.75  | 22.87  |
|             | 16QAM     | 1               | 0  | 22.50  | 22.54  | 22.59  |
|             |           | 1               | 50 | 22.47  | 22.48  | 22.49  |
|             |           | 1               | 99 | 22.48  | 22.57  | 22.43  |
|             |           | 50              | 0  | 21.72  | 21.78  | 21.75  |
|             |           | 50              | 25 | 21.82  | 21.77  | 21.90  |
|             |           | 50              | 50 | 21.86  | 21.84  | 21.78  |
|             |           | 100             | 0  | 21.83  | 21.80  | 21.72  |

**EIRP Power(dBm)**

| Band            | WCDMA IV |        |        |
|-----------------|----------|--------|--------|
| Channel         | 1312     | 1413   | 1513   |
| Frequency       | 1712.4   | 1732.6 | 1752.6 |
| RMC 12.2K       | 24.84    | 25.02  | 25.06  |
| HSDPA Subtest-1 | 24.22    | 24.25  | 24.26  |
| HSDPA Subtest-2 | 24.22    | 24.24  | 24.28  |
| HSDPA Subtest-3 | 24.21    | 24.25  | 24.23  |
| HSDPA Subtest-4 | 24.18    | 24.25  | 24.23  |
| HSUPA Subtest-1 | 23.40    | 23.48  | 23.44  |
| HSUPA Subtest-2 | 23.39    | 23.45  | 23.45  |
| HSUPA Subtest-3 | 23.40    | 23.46  | 23.45  |
| HSUPA Subtest-4 | 23.41    | 23.47  | 23.46  |
| HSUPA Subtest-5 | 23.39    | 23.40  | 23.41  |

\*EIRP = Conducted + antenna gain (1.70dBi)

| LTE Band 4 |           |                 |   |        |        |        |
|------------|-----------|-----------------|---|--------|--------|--------|
| BW         | MCS Index | Channel         |   | 19957  | 20175  | 20393  |
|            |           | Frequency (MHz) |   | 1710.7 | 1732.5 | 1754.3 |
| 1.4M       | QPSK      | 1               | 0 | 24.84  | 24.93  | 24.79  |
|            |           | 1               | 2 | 24.93  | 25.05  | 24.91  |
|            |           | 1               | 5 | 24.88  | 25.01  | 24.91  |
|            |           | 3               | 0 | 24.82  | 24.98  | 24.90  |
|            |           | 3               | 1 | 24.98  | 25.03  | 24.95  |
|            |           | 3               | 3 | 24.93  | 25.01  | 24.98  |
|            |           | 6               | 0 | 23.97  | 24.00  | 23.98  |
|            | 16QAM     | 1               | 0 | 24.08  | 24.10  | 23.96  |
|            |           | 1               | 2 | 24.19  | 24.03  | 24.04  |
|            |           | 1               | 5 | 24.02  | 24.04  | 24.07  |
|            |           | 3               | 0 | 23.76  | 24.04  | 23.87  |
|            |           | 3               | 1 | 23.54  | 23.99  | 24.08  |
|            |           | 3               | 3 | 23.81  | 24.14  | 24.18  |
|            |           | 6               | 0 | 22.68  | 23.07  | 23.17  |

| LTE Band 4 |           |                 |    |        |        |        |
|------------|-----------|-----------------|----|--------|--------|--------|
| BW         | MCS Index | Channel         |    | 19965  | 20175  | 20385  |
|            |           | Frequency (MHz) |    | 1711.5 | 1732.5 | 1753.5 |
| 3M         | QPSK      | 1               | 0  | 24.97  | 25.21  | 25.25  |
|            |           | 1               | 7  | 24.93  | 25.37  | 25.00  |
|            |           | 1               | 14 | 24.96  | 25.00  | 24.99  |
|            |           | 8               | 0  | 23.98  | 24.07  | 24.07  |
|            |           | 8               | 3  | 24.01  | 24.11  | 24.04  |
|            |           | 8               | 7  | 24.04  | 24.10  | 24.03  |
|            |           | 15              | 0  | 24.07  | 24.07  | 24.00  |
|            | 16QAM     | 1               | 0  | 23.75  | 23.60  | 23.97  |
|            |           | 1               | 7  | 23.83  | 23.67  | 23.95  |
|            |           | 1               | 14 | 23.98  | 23.78  | 24.20  |
|            |           | 8               | 0  | 23.01  | 23.17  | 22.86  |
|            |           | 8               | 3  | 23.22  | 23.31  | 22.86  |
|            |           | 8               | 7  | 22.88  | 23.29  | 22.76  |
|            |           | 15              | 0  | 23.15  | 23.17  | 22.92  |

\*EIRP = Conducted + antenna gain (1.70dBi)

| LTE Band 4 |           |                 |    |        |        |        |
|------------|-----------|-----------------|----|--------|--------|--------|
| BW         | MCS Index | Channel         |    | 19975  | 20175  | 20375  |
|            |           | Frequency (MHz) |    | 1712.5 | 1732.5 | 1752.5 |
| 5M         | QPSK      | 1               | 0  | 24.99  | 25.21  | 24.80  |
|            |           | 1               | 12 | 25.10  | 25.08  | 24.93  |
|            |           | 1               | 24 | 24.86  | 24.78  | 24.95  |
|            |           | 12              | 0  | 24.05  | 24.05  | 24.18  |
|            |           | 12              | 6  | 24.10  | 24.08  | 24.17  |
|            |           | 12              | 13 | 24.11  | 24.10  | 24.13  |
|            |           | 25              | 0  | 24.02  | 24.08  | 24.11  |
|            | 16QAM     | 1               | 0  | 24.38  | 23.90  | 23.82  |
|            |           | 1               | 12 | 24.43  | 23.65  | 23.61  |
|            |           | 1               | 24 | 24.40  | 24.02  | 23.98  |
|            |           | 12              | 0  | 22.99  | 22.85  | 22.93  |
|            |           | 12              | 6  | 22.95  | 22.89  | 22.85  |
|            |           | 12              | 13 | 22.97  | 22.82  | 22.87  |
|            |           | 25              | 0  | 22.97  | 22.93  | 22.89  |

| LTE Band 4 |           |                 |    |       |        |       |
|------------|-----------|-----------------|----|-------|--------|-------|
| BW         | MCS Index | Channel         |    | 20000 | 20175  | 20350 |
|            |           | Frequency (MHz) |    | 1715  | 1732.5 | 1750  |
| 10M        | QPSK      | 1               | 0  | 24.75 | 24.70  | 24.89 |
|            |           | 1               | 24 | 24.76 | 24.94  | 24.89 |
|            |           | 1               | 49 | 24.47 | 24.80  | 24.81 |
|            |           | 25              | 0  | 24.08 | 24.01  | 24.03 |
|            |           | 25              | 12 | 24.01 | 24.12  | 23.99 |
|            |           | 25              | 25 | 23.95 | 24.10  | 23.93 |
|            |           | 50              | 0  | 24.09 | 24.04  | 23.97 |
|            | 16QAM     | 1               | 0  | 23.75 | 23.51  | 23.52 |
|            |           | 1               | 24 | 23.75 | 23.58  | 23.89 |
|            |           | 1               | 49 | 23.48 | 23.44  | 23.46 |
|            |           | 25              | 0  | 23.07 | 22.97  | 23.00 |
|            |           | 25              | 12 | 23.01 | 22.98  | 22.97 |
|            |           | 25              | 25 | 22.93 | 23.07  | 22.92 |
|            |           | 50              | 0  | 22.87 | 22.87  | 22.89 |

\*EIRP = Conducted + antenna gain (1.70dBi)

| LTE Band 4 |           |                 |    |        |        |        |
|------------|-----------|-----------------|----|--------|--------|--------|
| BW         | MCS Index | Channel         |    | 20025  | 20175  | 20325  |
|            |           | Frequency (MHz) |    | 1717.5 | 1732.5 | 1747.5 |
| 15M        | QPSK      | 1               | 0  | 25.14  | 25.20  | 24.83  |
|            |           | 1               | 37 | 25.09  | 25.35  | 25.16  |
|            |           | 1               | 74 | 24.97  | 24.97  | 24.92  |
|            |           | 36              | 0  | 24.27  | 24.06  | 24.13  |
|            |           | 36              | 19 | 24.06  | 24.10  | 23.97  |
|            |           | 36              | 39 | 23.96  | 24.13  | 24.02  |
|            |           | 75              | 0  | 24.15  | 24.15  | 23.89  |
|            | 16QAM     | 1               | 0  | 24.31  | 24.19  | 24.22  |
|            |           | 1               | 37 | 24.20  | 24.16  | 24.14  |
|            |           | 1               | 74 | 24.04  | 24.02  | 24.11  |
|            |           | 36              | 0  | 23.12  | 23.10  | 23.07  |
|            |           | 36              | 19 | 23.02  | 23.05  | 23.02  |
|            |           | 36              | 39 | 22.90  | 22.97  | 22.98  |
|            |           | 75              | 0  | 23.07  | 23.03  | 23.04  |

| LTE Band 4 |           |                 |    |       |        |       |
|------------|-----------|-----------------|----|-------|--------|-------|
| BW         | MCS Index | Channel         |    | 20050 | 20175  | 20300 |
|            |           | Frequency (MHz) |    | 1720  | 1732.5 | 1745  |
| 20M        | QPSK      | 1               | 0  | 25.27 | 24.90  | 24.90 |
|            |           | 1               | 50 | 25.22 | 25.22  | 25.07 |
|            |           | 1               | 99 | 24.65 | 24.83  | 24.77 |
|            |           | 50              | 0  | 24.20 | 24.07  | 24.24 |
|            |           | 50              | 25 | 24.05 | 24.07  | 24.09 |
|            |           | 50              | 50 | 24.03 | 24.13  | 23.99 |
|            |           | 100             | 0  | 24.12 | 24.15  | 24.11 |
|            | 16QAM     | 1               | 0  | 24.07 | 24.24  | 24.03 |
|            |           | 1               | 50 | 24.48 | 24.04  | 23.95 |
|            |           | 1               | 99 | 23.74 | 23.92  | 23.87 |
|            |           | 50              | 0  | 23.14 | 23.10  | 23.32 |
|            |           | 50              | 25 | 22.99 | 23.01  | 23.18 |
|            |           | 50              | 50 | 22.96 | 23.06  | 23.06 |
|            |           | 100             | 0  | 23.09 | 23.10  | 22.99 |

\*EIRP = Conducted + antenna gain (1.70dBi)

| LTE Band 66 |           |                 |   |        |        |        |
|-------------|-----------|-----------------|---|--------|--------|--------|
| BW          | MCS Index | Channel         |   | 131979 | 132322 | 132665 |
|             |           | Frequency (MHz) |   | 1710.7 | 1745   | 1779.3 |
| 1.4M        | QPSK      | 1               | 0 | 24.83  | 25.08  | 24.85  |
|             |           | 1               | 2 | 24.91  | 25.04  | 24.82  |
|             |           | 1               | 5 | 24.89  | 25.03  | 24.89  |
|             |           | 3               | 0 | 24.88  | 25.03  | 24.91  |
|             |           | 3               | 1 | 24.84  | 25.00  | 24.89  |
|             |           | 3               | 3 | 24.85  | 25.08  | 24.90  |
|             |           | 6               | 0 | 23.98  | 23.87  | 23.82  |
|             | 16QAM     | 1               | 0 | 23.74  | 23.83  | 23.81  |
|             |           | 1               | 2 | 23.89  | 23.85  | 23.98  |
|             |           | 1               | 5 | 23.89  | 23.84  | 23.89  |
|             |           | 3               | 0 | 23.86  | 23.87  | 23.96  |
|             |           | 3               | 1 | 23.80  | 23.90  | 23.72  |
|             |           | 3               | 3 | 23.82  | 23.81  | 23.90  |
|             |           | 6               | 0 | 22.92  | 22.90  | 22.95  |

| LTE Band 66 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 131987 | 132322 | 132657 |
|             |           | Frequency (MHz) |    | 1711.5 | 1745   | 1778.5 |
| 3M          | QPSK      | 1               | 0  | 24.80  | 25.05  | 24.80  |
|             |           | 1               | 7  | 24.88  | 25.02  | 24.81  |
|             |           | 1               | 14 | 24.87  | 25.05  | 24.83  |
|             |           | 8               | 0  | 23.80  | 23.88  | 23.80  |
|             |           | 8               | 3  | 23.84  | 23.85  | 23.84  |
|             |           | 8               | 7  | 23.95  | 23.90  | 23.86  |
|             |           | 15              | 0  | 23.99  | 23.84  | 23.85  |
|             | 16QAM     | 1               | 0  | 23.99  | 23.88  | 23.99  |
|             |           | 1               | 7  | 23.84  | 23.91  | 23.90  |
|             |           | 1               | 14 | 23.98  | 23.92  | 23.82  |
|             |           | 8               | 0  | 22.82  | 22.90  | 22.90  |
|             |           | 8               | 3  | 23.00  | 22.99  | 22.90  |
|             |           | 8               | 7  | 22.88  | 22.81  | 22.84  |
|             |           | 15              | 0  | 22.84  | 22.88  | 22.84  |

\*EIRP = Conducted + antenna gain (1.70dBi)

| LTE Band 66 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 131997 | 132322 | 132647 |
|             |           | Frequency (MHz) |    | 1712.5 | 1745   | 1777.5 |
| 5M          | QPSK      | 1               | 0  | 24.85  | 25.02  | 24.86  |
|             |           | 1               | 12 | 24.92  | 25.08  | 24.84  |
|             |           | 1               | 24 | 24.86  | 25.02  | 24.89  |
|             |           | 12              | 0  | 23.86  | 23.81  | 23.79  |
|             |           | 12              | 6  | 23.88  | 23.90  | 23.85  |
|             |           | 12              | 13 | 23.82  | 23.81  | 23.84  |
|             |           | 25              | 0  | 23.90  | 23.82  | 24.00  |
|             | 16QAM     | 1               | 0  | 23.91  | 24.00  | 23.96  |
|             |           | 1               | 12 | 23.85  | 23.83  | 23.86  |
|             |           | 1               | 24 | 23.82  | 23.89  | 23.95  |
|             |           | 12              | 0  | 22.89  | 22.87  | 22.88  |
|             |           | 12              | 6  | 22.89  | 22.84  | 22.84  |
|             |           | 12              | 13 | 22.80  | 22.89  | 22.96  |
|             |           | 25              | 0  | 23.00  | 23.00  | 22.95  |

| LTE Band 66 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 132022 | 132322 | 132622 |
|             |           | Frequency (MHz) |    | 1715   | 1745   | 1775   |
| 10M         | QPSK      | 1               | 0  | 24.81  | 25.00  | 24.82  |
|             |           | 1               | 24 | 24.92  | 25.11  | 24.80  |
|             |           | 1               | 49 | 24.90  | 25.01  | 24.89  |
|             |           | 25              | 0  | 23.71  | 23.78  | 23.89  |
|             |           | 25              | 12 | 23.85  | 23.87  | 23.91  |
|             |           | 25              | 25 | 23.93  | 24.00  | 23.93  |
|             |           | 50              | 0  | 23.97  | 23.84  | 23.94  |
|             | 16QAM     | 1               | 0  | 23.70  | 23.83  | 23.74  |
|             |           | 1               | 24 | 23.89  | 23.95  | 23.93  |
|             |           | 1               | 49 | 23.81  | 23.90  | 23.94  |
|             |           | 25              | 0  | 22.88  | 22.82  | 22.91  |
|             |           | 25              | 12 | 22.83  | 22.87  | 22.98  |
|             |           | 25              | 25 | 22.90  | 22.85  | 22.81  |
|             |           | 50              | 0  | 22.94  | 22.96  | 22.92  |

\*EIRP = Conducted + antenna gain (1.70dBi)

| LTE Band 66 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 132047 | 132322 | 132597 |
|             |           | Frequency (MHz) |    | 1717.5 | 1745   | 1772.5 |
| 15M         | QPSK      | 1               | 0  | 24.81  | 25.03  | 24.82  |
|             |           | 1               | 37 | 24.90  | 25.04  | 24.91  |
|             |           | 1               | 74 | 24.80  | 25.01  | 24.91  |
|             |           | 36              | 0  | 23.70  | 23.71  | 23.78  |
|             |           | 36              | 19 | 23.83  | 23.81  | 24.00  |
|             |           | 36              | 39 | 23.86  | 23.89  | 23.86  |
|             |           | 75              | 0  | 23.85  | 23.90  | 23.99  |
|             | 16QAM     | 1               | 0  | 23.92  | 23.99  | 23.97  |
|             |           | 1               | 37 | 23.94  | 23.92  | 23.81  |
|             |           | 1               | 74 | 23.89  | 23.81  | 23.84  |
|             |           | 36              | 0  | 22.89  | 23.03  | 22.77  |
|             |           | 36              | 19 | 22.95  | 22.96  | 22.85  |
|             |           | 36              | 39 | 22.97  | 22.98  | 22.99  |
|             |           | 75              | 0  | 22.94  | 22.88  | 22.94  |

| LTE Band 66 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 132072 | 132322 | 132575 |
|             |           | Frequency (MHz) |    | 1720   | 1745   | 1770   |
| 20M         | QPSK      | 1               | 0  | 24.82  | 24.95  | 24.92  |
|             |           | 1               | 50 | 24.86  | 24.88  | 24.84  |
|             |           | 1               | 99 | 24.83  | 24.87  | 24.83  |
|             |           | 50              | 0  | 23.87  | 24.24  | 23.89  |
|             |           | 50              | 25 | 23.77  | 23.82  | 23.75  |
|             |           | 50              | 50 | 23.86  | 23.83  | 23.88  |
|             |           | 100             | 0  | 23.80  | 23.84  | 23.81  |
|             | 16QAM     | 1               | 0  | 23.90  | 24.07  | 23.92  |
|             |           | 1               | 50 | 23.84  | 23.89  | 23.75  |
|             |           | 1               | 99 | 23.84  | 23.87  | 23.83  |
|             |           | 50              | 0  | 23.03  | 23.01  | 22.81  |
|             |           | 50              | 25 | 22.81  | 22.88  | 22.80  |
|             |           | 50              | 50 | 22.99  | 22.93  | 22.85  |
|             |           | 100             | 0  | 22.98  | 22.96  | 22.80  |

\*EIRP = Conducted + antenna gain (1.70dBi)

**ERP Power (dBm)**

| LTE Band 12 |           |                 |   |       |       |       |
|-------------|-----------|-----------------|---|-------|-------|-------|
| BW          | MCS Index | Channel         |   | 23017 | 23095 | 23173 |
|             |           | Frequency (MHz) |   | 699.7 | 707.5 | 715.3 |
| 1.4M        | QPSK      | 1               | 0 | 20.62 | 20.82 | 20.83 |
|             |           | 1               | 2 | 20.90 | 20.97 | 20.93 |
|             |           | 1               | 5 | 20.70 | 20.81 | 20.95 |
|             |           | 3               | 0 | 20.78 | 20.82 | 20.92 |
|             |           | 3               | 1 | 20.81 | 20.98 | 21.10 |
|             |           | 3               | 3 | 21.02 | 20.98 | 21.02 |
|             |           | 6               | 0 | 19.94 | 20.00 | 20.00 |
|             | 16QAM     | 1               | 0 | 19.43 | 19.56 | 19.47 |
|             |           | 1               | 2 | 19.58 | 19.57 | 19.53 |
|             |           | 1               | 5 | 19.35 | 19.58 | 19.55 |
|             |           | 3               | 0 | 19.57 | 19.71 | 19.97 |
|             |           | 3               | 1 | 19.78 | 19.78 | 20.15 |
|             |           | 3               | 3 | 19.78 | 19.69 | 20.10 |
|             |           | 6               | 0 | 18.74 | 18.73 | 18.84 |

| LTE Band 12 |           |                 |    |       |       |       |
|-------------|-----------|-----------------|----|-------|-------|-------|
| BW          | MCS Index | Channel         |    | 23025 | 23095 | 23165 |
|             |           | Frequency (MHz) |    | 700.5 | 707.5 | 714.5 |
| 3M          | QPSK      | 1               | 0  | 20.76 | 20.80 | 20.99 |
|             |           | 1               | 7  | 21.07 | 20.85 | 20.80 |
|             |           | 1               | 14 | 20.88 | 20.69 | 21.07 |
|             |           | 8               | 0  | 19.91 | 19.94 | 20.05 |
|             |           | 8               | 3  | 20.06 | 19.95 | 20.13 |
|             |           | 8               | 7  | 19.96 | 19.99 | 20.09 |
|             |           | 15              | 0  | 19.88 | 20.01 | 20.07 |
|             | 16QAM     | 1               | 0  | 20.05 | 19.70 | 19.88 |
|             |           | 1               | 7  | 19.93 | 20.02 | 19.91 |
|             |           | 1               | 14 | 19.93 | 19.81 | 19.90 |
|             |           | 8               | 0  | 18.97 | 18.70 | 18.98 |
|             |           | 8               | 3  | 19.02 | 18.72 | 18.99 |
|             |           | 8               | 7  | 18.81 | 18.95 | 19.05 |
|             |           | 15              | 0  | 18.91 | 18.96 | 19.08 |

\*ERP = Conducted + antenna gain (-1.09dBi)-2.15

| LTE Band 12 |           |                 |    |       |       |       |
|-------------|-----------|-----------------|----|-------|-------|-------|
| BW          | MCS Index | Channel         |    | 23035 | 23095 | 23155 |
|             |           | Frequency (MHz) |    | 701.5 | 707.5 | 713.5 |
| 5M          | QPSK      | 1               | 0  | 20.61 | 20.76 | 20.92 |
|             |           | 1               | 12 | 20.95 | 20.97 | 20.91 |
|             |           | 1               | 24 | 20.63 | 20.78 | 20.92 |
|             |           | 12              | 0  | 19.86 | 19.89 | 19.86 |
|             |           | 12              | 6  | 19.77 | 20.00 | 20.05 |
|             |           | 12              | 13 | 19.81 | 19.97 | 20.11 |
|             |           | 25              | 0  | 19.82 | 19.92 | 19.98 |
|             | 16QAM     | 1               | 0  | 19.97 | 20.35 | 20.02 |
|             |           | 1               | 12 | 19.92 | 20.56 | 20.09 |
|             |           | 1               | 24 | 20.13 | 19.99 | 20.01 |
|             |           | 12              | 0  | 18.92 | 18.96 | 18.83 |
|             |           | 12              | 6  | 18.83 | 18.79 | 18.91 |
|             |           | 12              | 13 | 18.87 | 18.88 | 19.10 |
|             |           | 25              | 0  | 18.96 | 18.89 | 19.09 |

| LTE Band 12 |           |                 |    |       |       |       |
|-------------|-----------|-----------------|----|-------|-------|-------|
| BW          | MCS Index | Channel         |    | 23060 | 23095 | 23130 |
|             |           | Frequency (MHz) |    | 704   | 707.5 | 711   |
| 10M         | QPSK      | 1               | 0  | 20.47 | 20.59 | 20.62 |
|             |           | 1               | 24 | 20.59 | 20.86 | 20.99 |
|             |           | 1               | 49 | 20.66 | 20.75 | 20.86 |
|             |           | 25              | 0  | 19.70 | 19.89 | 19.96 |
|             |           | 25              | 12 | 19.77 | 19.95 | 19.94 |
|             |           | 25              | 25 | 19.91 | 19.91 | 20.04 |
|             |           | 50              | 0  | 19.81 | 19.96 | 20.02 |
|             | 16QAM     | 1               | 0  | 19.94 | 19.88 | 19.97 |
|             |           | 1               | 24 | 19.63 | 19.99 | 20.39 |
|             |           | 1               | 49 | 20.09 | 20.11 | 19.96 |
|             |           | 25              | 0  | 18.76 | 18.87 | 18.91 |
|             |           | 25              | 12 | 18.81 | 19.03 | 18.91 |
|             |           | 25              | 25 | 18.87 | 19.08 | 18.90 |
|             |           | 50              | 0  | 18.81 | 18.96 | 18.91 |

\*ERP = Conducted + antenna gain (-1.09dBi)-2.15

| LTE Band 13 |           |                 |    |       |       |       |
|-------------|-----------|-----------------|----|-------|-------|-------|
| BW          | MCS Index | Channel         |    | 23205 | 23230 | 23255 |
|             |           | Frequency (MHz) |    | 779.5 | 782   | 784.5 |
| 5M          | QPSK      | 1               | 0  | 18.64 | 18.56 | 18.44 |
|             |           | 1               | 12 | 18.52 | 18.41 | 18.59 |
|             |           | 1               | 24 | 18.39 | 18.52 | 18.38 |
|             |           | 12              | 0  | 17.66 | 17.61 | 17.72 |
|             |           | 12              | 6  | 17.77 | 17.65 | 17.91 |
|             |           | 12              | 13 | 17.61 | 17.73 | 17.78 |
|             |           | 25              | 0  | 17.82 | 17.70 | 17.69 |
|             | 16QAM     | 1               | 0  | 17.78 | 17.35 | 17.33 |
|             |           | 1               | 12 | 17.45 | 17.10 | 17.41 |
|             |           | 1               | 24 | 17.67 | 17.40 | 17.24 |
|             |           | 12              | 0  | 16.78 | 16.51 | 16.70 |
|             |           | 12              | 6  | 16.60 | 16.52 | 16.57 |
|             |           | 12              | 13 | 16.55 | 16.63 | 16.76 |
|             |           | 25              | 0  | 16.91 | 16.55 | 16.61 |

| LTE Band 13 |           |                 |    |       |
|-------------|-----------|-----------------|----|-------|
| BW          | MCS Index | Channel         |    | 23230 |
|             |           | Frequency (MHz) |    | 782   |
| 10M         | QPSK      | 1               | 0  | 19.04 |
|             |           | 1               | 24 | 18.79 |
|             |           | 1               | 49 | 18.79 |
|             |           | 25              | 0  | 17.76 |
|             |           | 25              | 12 | 17.75 |
|             |           | 25              | 25 | 17.64 |
|             |           | 50              | 0  | 17.75 |
|             | 16QAM     | 1               | 0  | 17.66 |
|             |           | 1               | 24 | 17.54 |
|             |           | 1               | 49 | 17.58 |
|             |           | 25              | 0  | 16.70 |
|             |           | 25              | 12 | 16.49 |
|             |           | 25              | 25 | 16.83 |
|             |           | 50              | 0  | 16.79 |

\*ERP = Conducted + antenna gain (-3.11dBi)-2.15

| LTE Band 71 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 133147 | 133297 | 133447 |
|             |           | Frequency (MHz) |    | 665.5  | 680.5  | 695.5  |
| 5M          | QPSK      | 1               | 0  | 19.23  | 19.25  | 19.29  |
|             |           | 1               | 12 | 19.21  | 19.18  | 19.23  |
|             |           | 1               | 24 | 19.17  | 19.21  | 19.29  |
|             |           | 12              | 0  | 18.17  | 18.10  | 18.15  |
|             |           | 12              | 6  | 18.24  | 18.28  | 18.14  |
|             |           | 12              | 13 | 18.14  | 18.26  | 18.16  |
|             |           | 25              | 0  | 18.12  | 18.26  | 18.21  |
|             | 16QAM     | 1               | 0  | 17.93  | 17.86  | 18.25  |
|             |           | 1               | 12 | 17.81  | 17.96  | 17.85  |
|             |           | 1               | 24 | 17.97  | 17.83  | 17.81  |
|             |           | 12              | 0  | 17.23  | 17.13  | 17.30  |
|             |           | 12              | 6  | 17.23  | 17.17  | 17.29  |
|             |           | 12              | 13 | 17.29  | 17.17  | 17.24  |
|             |           | 25              | 0  | 17.10  | 17.17  | 17.13  |

| LTE Band 71 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 133172 | 133297 | 133422 |
|             |           | Frequency (MHz) |    | 668    | 680.5  | 693    |
| 10M         | QPSK      | 1               | 0  | 19.23  | 19.22  | 19.16  |
|             |           | 1               | 24 | 19.24  | 19.18  | 19.16  |
|             |           | 1               | 49 | 19.10  | 19.24  | 19.16  |
|             |           | 25              | 0  | 18.20  | 18.27  | 18.12  |
|             |           | 25              | 12 | 18.27  | 18.26  | 18.19  |
|             |           | 25              | 25 | 18.26  | 18.19  | 18.10  |
|             |           | 50              | 0  | 18.16  | 18.19  | 18.21  |
|             | 16QAM     | 1               | 0  | 17.98  | 17.94  | 17.91  |
|             |           | 1               | 24 | 17.85  | 17.95  | 17.87  |
|             |           | 1               | 49 | 17.93  | 17.96  | 17.97  |
|             |           | 25              | 0  | 17.17  | 17.15  | 17.27  |
|             |           | 25              | 12 | 17.22  | 17.15  | 17.18  |
|             |           | 25              | 25 | 17.27  | 17.26  | 17.26  |
|             |           | 50              | 0  | 17.25  | 17.13  | 17.18  |

\*ERP = Conducted + antenna gain (-2.45dBi)-2.15

| LTE Band 71 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 133197 | 133297 | 133397 |
|             |           | Frequency (MHz) |    | 670.5  | 680.5  | 690.5  |
| 15M         | QPSK      | 1               | 0  | 19.19  | 19.12  | 19.29  |
|             |           | 1               | 37 | 19.23  | 19.13  | 19.12  |
|             |           | 1               | 74 | 19.15  | 19.27  | 19.14  |
|             |           | 36              | 0  | 18.10  | 18.16  | 18.22  |
|             |           | 36              | 19 | 18.19  | 18.17  | 18.11  |
|             |           | 36              | 39 | 18.23  | 18.22  | 18.19  |
|             |           | 75              | 0  | 18.18  | 18.17  | 18.24  |
|             | 16QAM     | 1               | 0  | 17.81  | 17.91  | 17.85  |
|             |           | 1               | 37 | 17.80  | 17.90  | 17.97  |
|             |           | 1               | 74 | 17.83  | 17.85  | 17.94  |
|             |           | 36              | 0  | 17.29  | 17.24  | 17.30  |
|             |           | 36              | 19 | 17.28  | 17.24  | 17.13  |
|             |           | 36              | 39 | 17.29  | 17.23  | 17.14  |
|             |           | 75              | 0  | 17.11  | 17.17  | 17.25  |

| LTE Band 71 |           |                 |    |        |        |        |
|-------------|-----------|-----------------|----|--------|--------|--------|
| BW          | MCS Index | Channel         |    | 133222 | 133297 | 133372 |
|             |           | Frequency (MHz) |    | 673    | 680.5  | 688    |
| 20M         | QPSK      | 1               | 0  | 19.13  | 19.22  | 19.24  |
|             |           | 1               | 50 | 19.14  | 19.15  | 19.13  |
|             |           | 1               | 99 | 19.26  | 19.17  | 19.10  |
|             |           | 50              | 0  | 18.15  | 18.30  | 18.13  |
|             |           | 50              | 25 | 18.14  | 18.10  | 18.23  |
|             |           | 50              | 50 | 18.21  | 18.20  | 18.10  |
|             |           | 100             | 0  | 18.10  | 18.15  | 18.27  |
|             | 16QAM     | 1               | 0  | 17.90  | 17.94  | 17.99  |
|             |           | 1               | 50 | 17.87  | 17.88  | 17.89  |
|             |           | 1               | 99 | 17.88  | 17.97  | 17.83  |
|             |           | 50              | 0  | 17.12  | 17.18  | 17.15  |
|             |           | 50              | 25 | 17.22  | 17.17  | 17.30  |
|             |           | 50              | 50 | 17.26  | 17.24  | 17.18  |
|             |           | 100             | 0  | 17.23  | 17.20  | 17.12  |

\*ERP = Conducted + antenna gain (-2.45dBi)-2.15

## 4.2 Modulation Characteristics Measurement

### 4.2.1 Limits of Modulation Characteristics

N/A

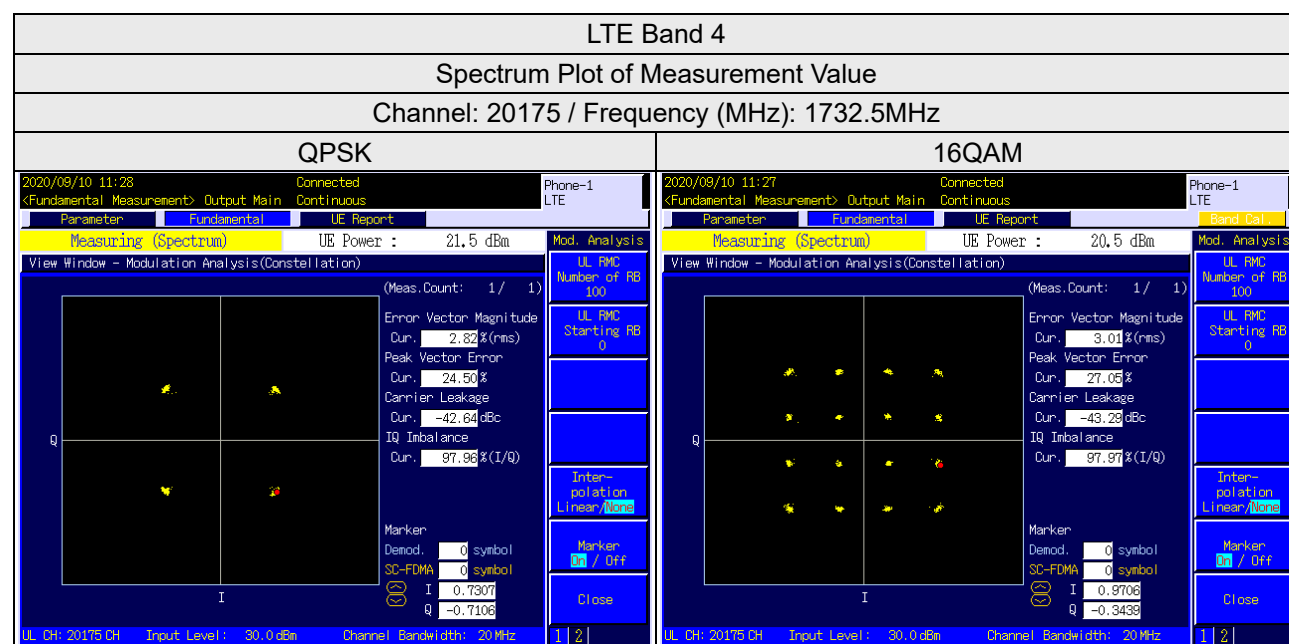
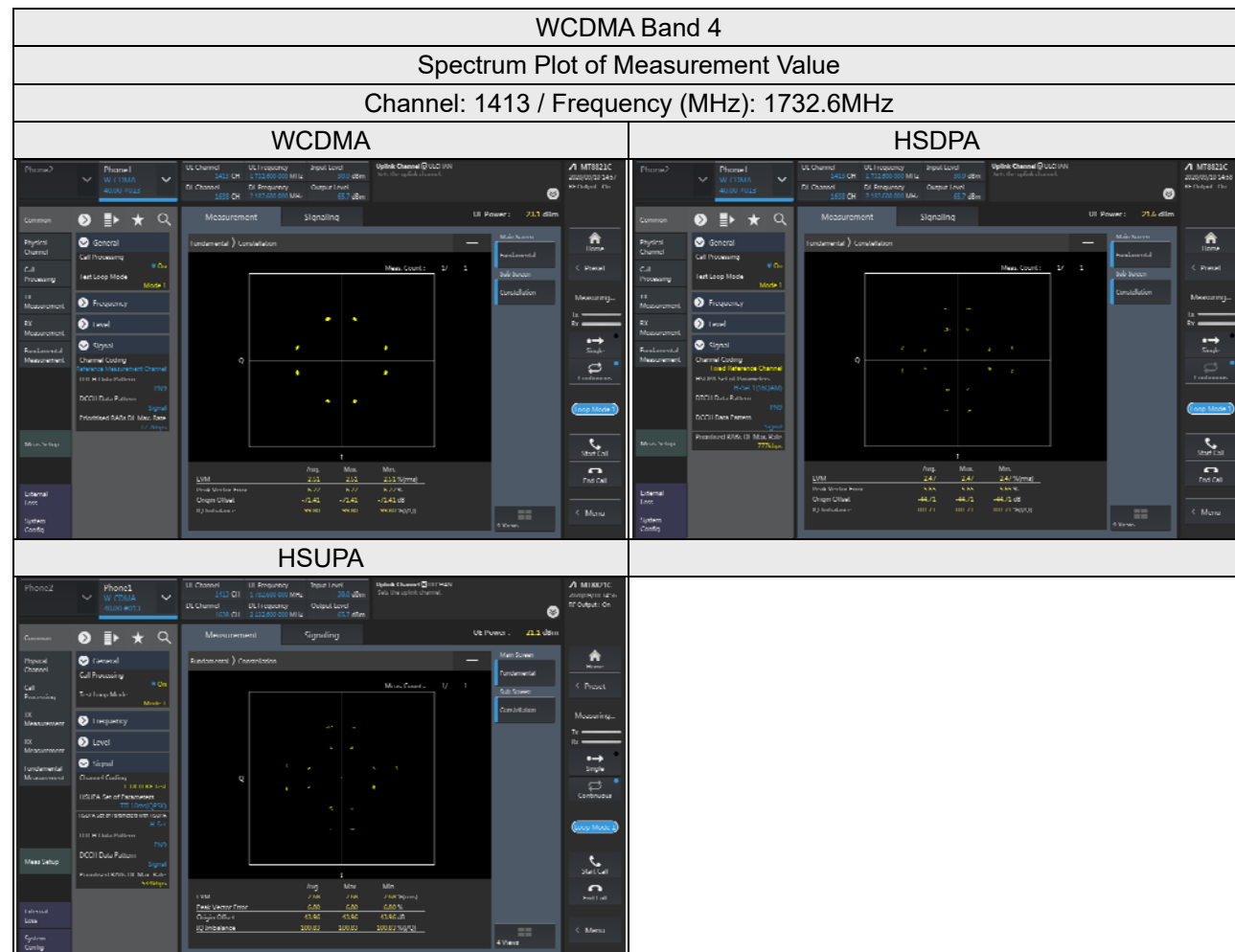
### 4.2.2 Test Procedure

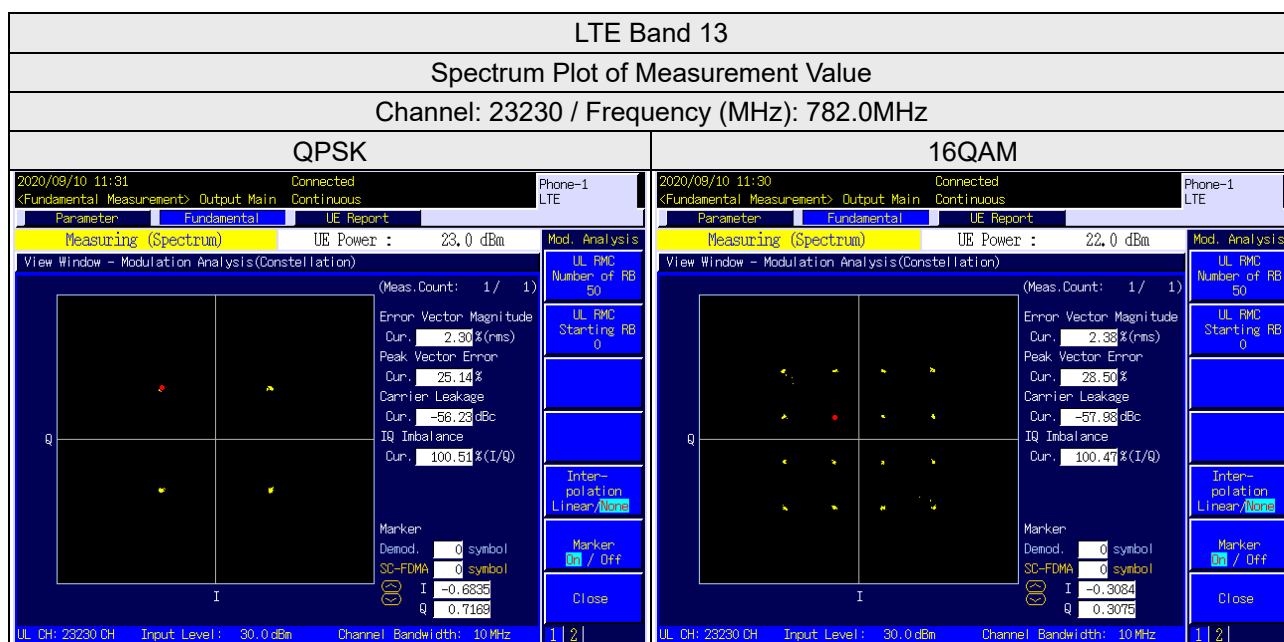
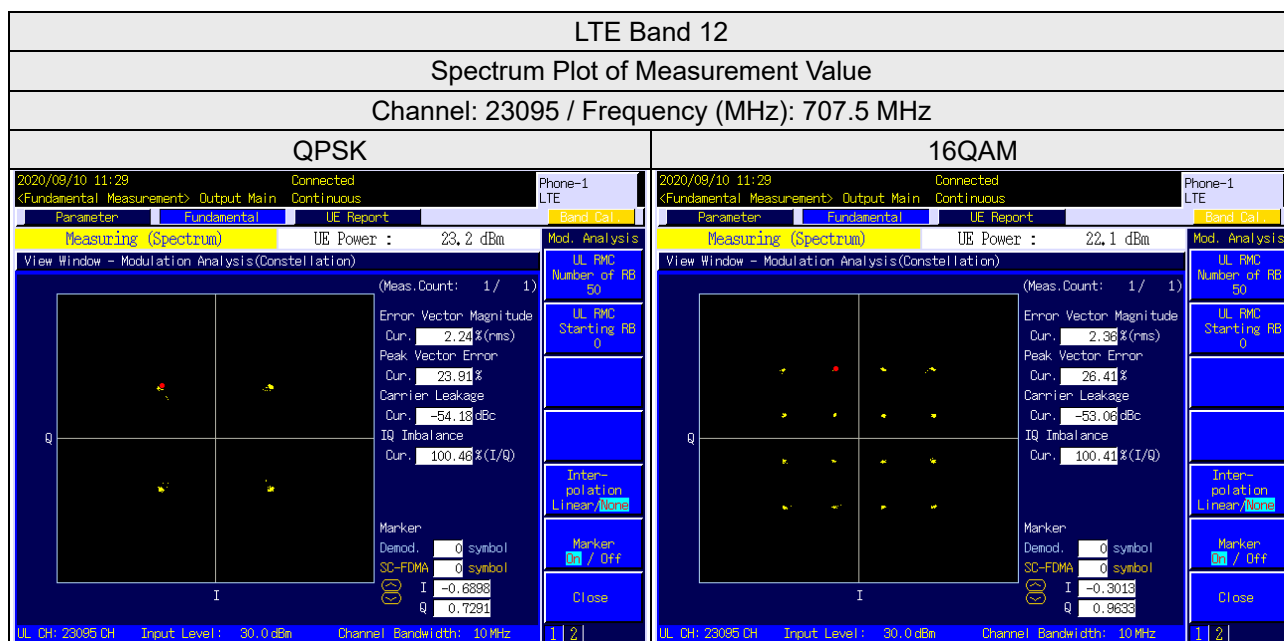
Connect the EUT to Communication Simulator via the antenna connector, The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

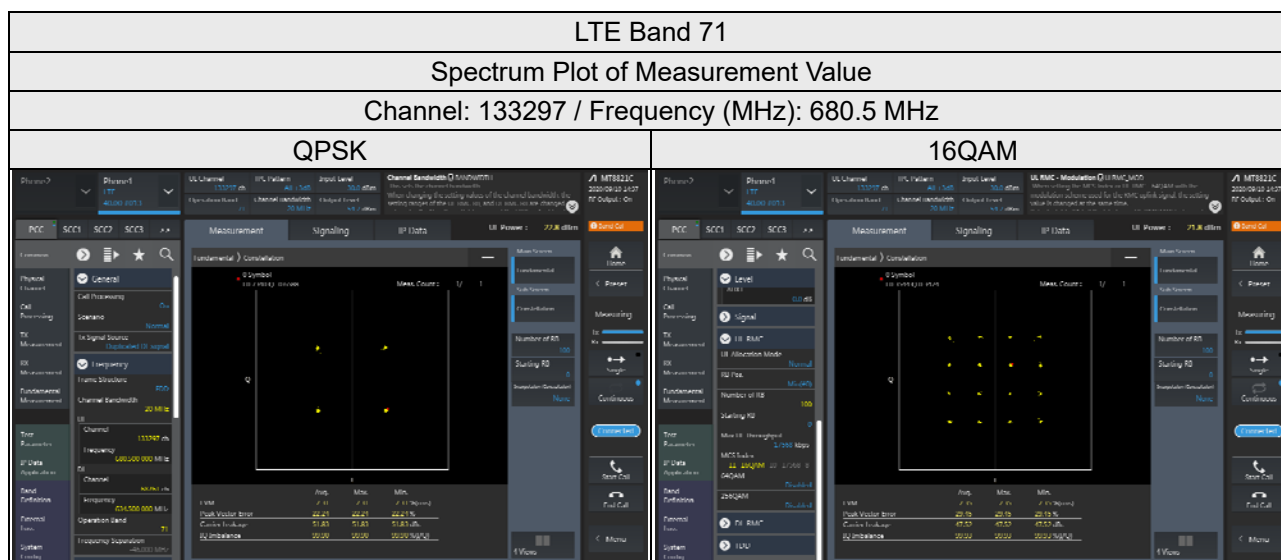
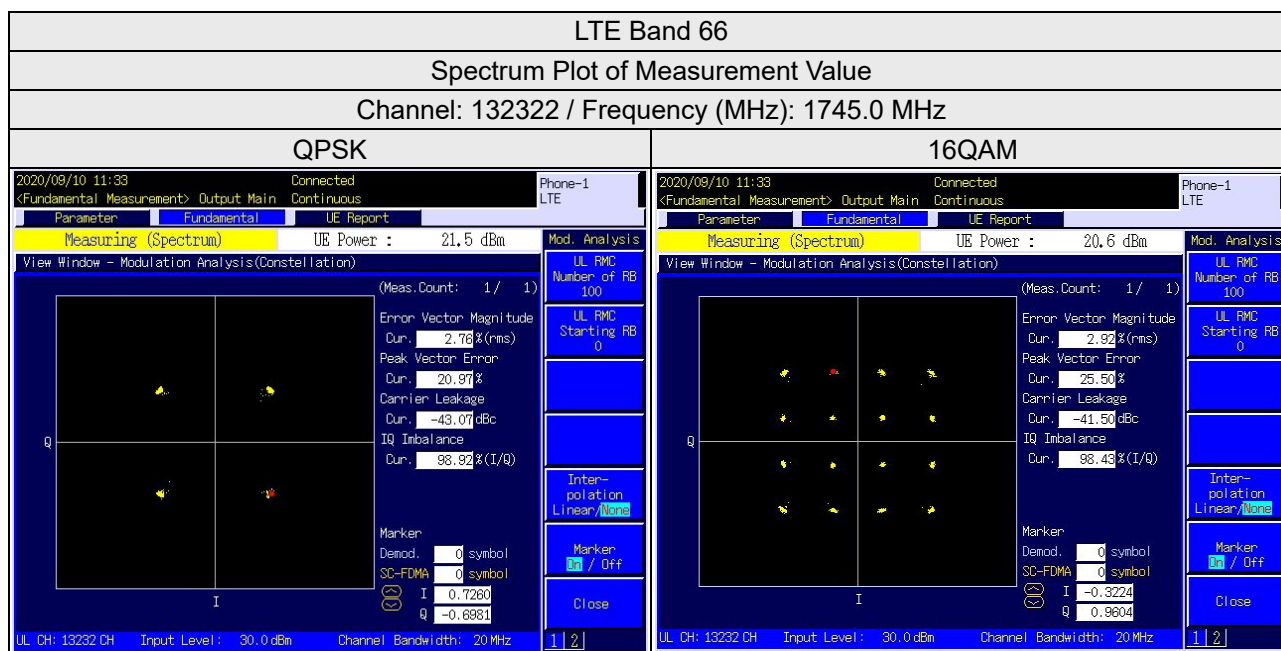
### 4.2.3 Test Setup



## 4.2.4 Test Results







### 4.3 Frequency Stability Measurement

#### 4.3.1 Limits of Frequency Stability Measurement

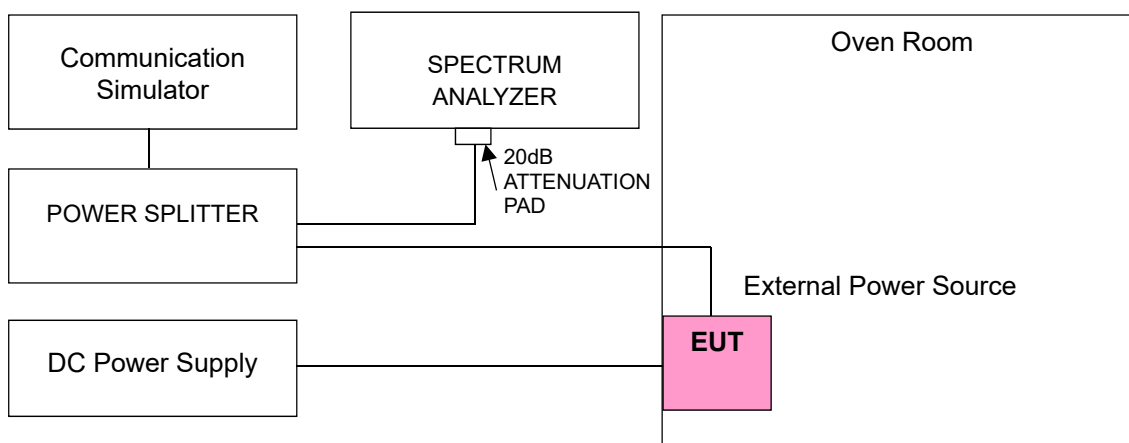
According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that "The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT  $-30^{\circ}\text{C} \sim 50^{\circ}\text{C}$ .

#### 4.3.2 Test Procedure

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

Note: The frequency error was recorded frequency error from the communication simulator.

#### 4.3.3 Test Setup



#### 4.3.4 Test Results

##### Frequency Error vs. Voltage

| Voltage<br>(Volts) | WCDMA Band 4    |                       |                 |                       |
|--------------------|-----------------|-----------------------|-----------------|-----------------------|
|                    | Low Channel     |                       | High Channel    |                       |
|                    | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12                 | 1712.400003     | 0.002                 | 1752.600002     | 0.001                 |
| 10                 | 1712.400003     | 0.002                 | 1752.600002     | 0.001                 |
| 35                 | 1712.400002     | 0.001                 | 1752.600003     | 0.001                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

##### Frequency Error vs. Temperature

| Temp. (°C) | WCDMA Band 4    |                       |                 |                       |
|------------|-----------------|-----------------------|-----------------|-----------------------|
|            | Low Channel     |                       | High Channel    |                       |
|            | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1712.400001     | 0.001                 | 1752.600001     | 0.001                 |
| -30        | 1712.400001     | 0.001                 | 1752.600001     | 0.001                 |
| -20        | 1712.400002     | 0.001                 | 1752.600001     | 0.001                 |
| -10        | 1712.400002     | 0.001                 | 1752.600001     | 0.001                 |
| 0          | 1712.400003     | 0.002                 | 1752.600004     | 0.002                 |
| 10         | 1712.400002     | 0.001                 | 1752.600004     | 0.002                 |
| 20         | 1712.399997     | -0.002                | 1752.599999     | -0.001                |
| 30         | 1712.399997     | -0.002                | 1752.599997     | -0.002                |
| 40         | 1712.399996     | -0.002                | 1752.599997     | -0.002                |
| 50         | 1712.399997     | -0.002                | 1752.599996     | -0.002                |
| 60         | 1712.399999     | -0.001                | 1752.599997     | -0.002                |
| 70         | 1712.399999     | -0.001                | 1752.599997     | -0.002                |
| 80         | 1712.399998     | -0.001                | 1752.599997     | -0.002                |
| 85         | 1712.399998     | -0.001                | 1752.599997     | -0.002                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 4                 |                       |                 |                       |
|-----------------|----------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 1.4 MHz |                       |                 |                       |
|                 | Low Channel                |                       | High Channel    |                       |
|                 | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 1710.700003                | 0.002                 | 1754.300002     | 0.001                 |
| 10              | 1710.700004                | 0.002                 | 1754.300001     | 0.001                 |
| 35              | 1710.700004                | 0.002                 | 1754.300003     | 0.002                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4                 |                       |                 |                       |
|------------|----------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 1.4 MHz |                       |                 |                       |
|            | Low Channel                |                       | High Channel    |                       |
|            | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1710.700001                | 0.001                 | 1754.300002     | 0.001                 |
| -30        | 1710.700001                | 0.001                 | 1754.300002     | 0.001                 |
| -20        | 1710.700002                | 0.001                 | 1754.300004     | 0.002                 |
| -10        | 1710.700001                | 0.001                 | 1754.300001     | 0.001                 |
| 0          | 1710.700002                | 0.001                 | 1754.300002     | 0.001                 |
| 10         | 1710.700003                | 0.002                 | 1754.300004     | 0.002                 |
| 20         | 1710.699998                | -0.001                | 1754.299999     | -0.001                |
| 30         | 1710.699999                | -0.001                | 1754.299999     | -0.001                |
| 40         | 1710.699998                | -0.001                | 1754.299996     | -0.002                |
| 50         | 1710.699998                | -0.001                | 1754.299999     | -0.001                |
| 60         | 1710.699998                | -0.001                | 1754.299998     | -0.001                |
| 70         | 1710.699997                | -0.002                | 1754.299997     | -0.002                |
| 80         | 1710.699998                | -0.001                | 1754.299999     | -0.001                |
| 85         | 1710.699999                | -0.001                | 1754.299997     | -0.001                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 4               |                       |                 |                       |
|-----------------|--------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 3 MHz |                       |                 |                       |
|                 | Low Channel              |                       | High Channel    |                       |
|                 | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 1711.500001              | 0.001                 | 1753.500002     | 0.001                 |
| 10              | 1711.500001              | 0.001                 | 1753.500004     | 0.002                 |
| 35              | 1711.500004              | 0.002                 | 1753.500002     | 0.001                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4               |                       |                 |                       |
|------------|--------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 3 MHz |                       |                 |                       |
|            | Low Channel              |                       | High Channel    |                       |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1711.500003              | 0.001                 | 1753.500002     | 0.001                 |
| -30        | 1711.500004              | 0.002                 | 1753.500001     | 0.001                 |
| -20        | 1711.500004              | 0.002                 | 1753.500004     | 0.002                 |
| -10        | 1711.500002              | 0.001                 | 1753.500001     | 0.001                 |
| 0          | 1711.500003              | 0.002                 | 1753.500003     | 0.002                 |
| 10         | 1711.500002              | 0.001                 | 1753.500003     | 0.002                 |
| 20         | 1711.499998              | -0.001                | 1753.499997     | -0.002                |
| 30         | 1711.499997              | -0.002                | 1753.499998     | -0.001                |
| 40         | 1711.499997              | -0.002                | 1753.499997     | -0.002                |
| 50         | 1711.499997              | -0.002                | 1753.499997     | -0.002                |
| 60         | 1711.499998              | -0.001                | 1753.499998     | -0.001                |
| 70         | 1711.499999              | -0.001                | 1753.499997     | -0.002                |
| 80         | 1711.499997              | -0.002                | 1753.499998     | -0.001                |
| 85         | 1711.499996              | -0.002                | 1753.499998     | -0.001                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 4               |                       |                 |                       |
|-----------------|--------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 5 MHz |                       |                 |                       |
|                 | Low Channel              |                       | High Channel    |                       |
|                 | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 1712.500003              | 0.002                 | 1752.500002     | 0.001                 |
| 10              | 1712.500001              | 0.001                 | 1752.500001     | 0.001                 |
| 35              | 1712.500003              | 0.002                 | 1752.500003     | 0.002                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4               |                       |                 |                       |
|------------|--------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 5 MHz |                       |                 |                       |
|            | Low Channel              |                       | High Channel    |                       |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1712.500002              | 0.001                 | 1752.500001     | 0.001                 |
| -30        | 1712.500004              | 0.002                 | 1752.500002     | 0.001                 |
| -20        | 1712.500001              | 0.001                 | 1752.500001     | 0.001                 |
| -10        | 1712.500002              | 0.001                 | 1752.500003     | 0.002                 |
| 0          | 1712.500004              | 0.002                 | 1752.500004     | 0.002                 |
| 10         | 1712.500001              | 0.001                 | 1752.500002     | 0.001                 |
| 20         | 1712.499996              | -0.002                | 1752.499997     | -0.002                |
| 30         | 1712.499999              | -0.001                | 1752.499996     | -0.002                |
| 40         | 1712.499996              | -0.002                | 1752.499999     | -0.001                |
| 50         | 1712.499997              | -0.002                | 1752.499998     | -0.001                |
| 60         | 1712.499997              | -0.002                | 1752.499996     | -0.002                |
| 70         | 1712.499997              | -0.002                | 1752.499998     | -0.001                |
| 80         | 1712.499998              | -0.001                | 1752.499998     | -0.001                |
| 85         | 1712.499999              | -0.001                | 1752.499998     | -0.001                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 4                |                       |                 |                       |
|-----------------|---------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 10 MHz |                       |                 |                       |
|                 | Low Channel               |                       | High Channel    |                       |
|                 | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 1715.000001               | 0.001                 | 1750.000004     | 0.002                 |
| 10              | 1715.000003               | 0.002                 | 1750.000004     | 0.002                 |
| 35              | 1715.000001               | 0.001                 | 1750.000003     | 0.001                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4                |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 10 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1715.000002               | 0.001                 | 1750.000002     | 0.001                 |
| -30        | 1715.000003               | 0.002                 | 1750.000003     | 0.002                 |
| -20        | 1715.000004               | 0.002                 | 1750.000002     | 0.001                 |
| -10        | 1715.000004               | 0.002                 | 1750.000003     | 0.002                 |
| 0          | 1715.000003               | 0.002                 | 1750.000001     | 0.001                 |
| 10         | 1715.000002               | 0.001                 | 1750.000003     | 0.002                 |
| 20         | 1714.999999               | -0.001                | 1749.999997     | -0.002                |
| 30         | 1714.999998               | -0.001                | 1749.999996     | -0.002                |
| 40         | 1714.999998               | -0.001                | 1749.999998     | -0.001                |
| 50         | 1714.999999               | -0.001                | 1749.999999     | -0.001                |
| 60         | 1714.999997               | -0.002                | 1749.999996     | -0.002                |
| 70         | 1714.999997               | -0.002                | 1749.999997     | -0.002                |
| 80         | 1714.999998               | -0.001                | 1749.999998     | -0.001                |
| 85         | 1714.999998               | -0.001                | 1749.999998     | -0.001                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 4                |                       |                 |                       |
|-----------------|---------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 15 MHz |                       |                 |                       |
|                 | Low Channel               |                       | High Channel    |                       |
|                 | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 1717.500004               | 0.002                 | 1747.500003     | 0.002                 |
| 10              | 1717.500002               | 0.001                 | 1747.500003     | 0.002                 |
| 35              | 1717.500002               | 0.001                 | 1747.500003     | 0.002                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4                |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 15 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1717.500002               | 0.001                 | 1747.500001     | 0.001                 |
| -30        | 1717.500002               | 0.001                 | 1747.500004     | 0.002                 |
| -20        | 1717.500003               | 0.002                 | 1747.500003     | 0.002                 |
| -10        | 1717.500001               | 0.001                 | 1747.500003     | 0.002                 |
| 0          | 1717.500003               | 0.002                 | 1747.500003     | 0.002                 |
| 10         | 1717.500002               | 0.001                 | 1747.500003     | 0.002                 |
| 20         | 1717.499998               | -0.001                | 1747.499998     | -0.001                |
| 30         | 1717.499998               | -0.001                | 1747.499999     | -0.001                |
| 40         | 1717.499998               | -0.001                | 1747.499998     | -0.001                |
| 50         | 1717.499997               | -0.002                | 1747.499998     | -0.001                |
| 60         | 1717.499996               | -0.002                | 1747.499997     | -0.002                |
| 70         | 1717.499999               | -0.001                | 1747.499998     | -0.001                |
| 80         | 1717.499997               | -0.002                | 1747.499997     | -0.002                |
| 85         | 1717.499998               | -0.001                | 1747.499996     | -0.002                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 4                |                       |                 |                       |
|-----------------|---------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 20 MHz |                       |                 |                       |
|                 | Low Channel               |                       | High Channel    |                       |
|                 | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 1720.000001               | 0.001                 | 1745.000003     | 0.002                 |
| 10              | 1720.000001               | 0.001                 | 1745.000003     | 0.002                 |
| 35              | 1720.000003               | 0.002                 | 1745.000003     | 0.002                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4                |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 20 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1720.000004               | 0.002                 | 1745.000004     | 0.002                 |
| -30        | 1720.000002               | 0.001                 | 1745.000002     | 0.001                 |
| -20        | 1720.000001               | 0.001                 | 1745.000003     | 0.002                 |
| -10        | 1720.000004               | 0.002                 | 1745.000003     | 0.001                 |
| 0          | 1720.000004               | 0.002                 | 1745.000004     | 0.002                 |
| 10         | 1720.000004               | 0.002                 | 1745.000002     | 0.001                 |
| 20         | 1719.999997               | -0.002                | 1744.999999     | -0.001                |
| 30         | 1719.999998               | -0.001                | 1744.999996     | -0.002                |
| 40         | 1719.999998               | -0.001                | 1744.999996     | -0.002                |
| 50         | 1719.999997               | -0.002                | 1744.999998     | -0.001                |
| 60         | 1719.999998               | -0.001                | 1744.999996     | -0.002                |
| 70         | 1719.999997               | -0.002                | 1744.999998     | -0.001                |
| 80         | 1719.999998               | -0.001                | 1744.999996     | -0.002                |
| 85         | 1719.999997               | -0.002                | 1744.999999     | -0.001                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 12                |                       |                 |                       |
|-----------------|----------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 1.4 MHz |                       |                 |                       |
|                 | Low Channel                |                       | High Channel    |                       |
|                 | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 699.700002                 | 0.003                 | 715.300004      | 0.005                 |
| 10              | 699.700003                 | 0.005                 | 715.300003      | 0.003                 |
| 35              | 699.700003                 | 0.004                 | 715.300003      | 0.004                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 12                |                       |                 |                       |
|------------|----------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 1.4 MHz |                       |                 |                       |
|            | Low Channel                |                       | High Channel    |                       |
|            | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 699.700004                 | 0.006                 | 715.300001      | 0.002                 |
| -30        | 699.700003                 | 0.005                 | 715.300001      | 0.002                 |
| -20        | 699.700002                 | 0.002                 | 715.300001      | 0.002                 |
| -10        | 699.700002                 | 0.003                 | 715.300003      | 0.004                 |
| 0          | 699.700002                 | 0.003                 | 715.300003      | 0.004                 |
| 10         | 699.700002                 | 0.003                 | 715.300002      | 0.003                 |
| 20         | 699.699997                 | -0.005                | 715.299997      | -0.004                |
| 30         | 699.699996                 | -0.006                | 715.299997      | -0.004                |
| 40         | 699.699997                 | -0.004                | 715.299999      | -0.002                |
| 50         | 699.699997                 | -0.005                | 715.299998      | -0.003                |
| 60         | 699.699998                 | -0.003                | 715.299998      | -0.002                |
| 70         | 699.699998                 | -0.003                | 715.299998      | -0.002                |
| 80         | 699.699997                 | -0.005                | 715.299997      | -0.004                |
| 85         | 699.699999                 | -0.002                | 715.299999      | -0.002                |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 12              |                       |                 |                       |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 3 MHz |                       |                 |                       |
|                    | Low Channel              |                       | High Channel    |                       |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12                 | 700.500002               | 0.002                 | 714.500004      | 0.005                 |
| 10                 | 700.500002               | 0.003                 | 714.500003      | 0.005                 |
| 35                 | 700.500001               | 0.002                 | 714.500002      | 0.002                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 12              |                       |                 |                       |
|------------|--------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 3 MHz |                       |                 |                       |
|            | Low Channel              |                       | High Channel    |                       |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 700.500003               | 0.004                 | 714.500003      | 0.003                 |
| -30        | 700.500001               | 0.001                 | 714.500002      | 0.003                 |
| -20        | 700.500003               | 0.005                 | 714.500004      | 0.005                 |
| -10        | 700.500001               | 0.002                 | 714.500001      | 0.002                 |
| 0          | 700.500003               | 0.004                 | 714.500001      | 0.002                 |
| 10         | 700.500004               | 0.005                 | 714.500004      | 0.005                 |
| 20         | 700.499999               | -0.002                | 714.499998      | -0.003                |
| 30         | 700.499997               | -0.005                | 714.499997      | -0.005                |
| 40         | 700.499998               | -0.003                | 714.499997      | -0.004                |
| 50         | 700.499997               | -0.004                | 714.499996      | -0.005                |
| 60         | 700.499998               | -0.002                | 714.499998      | -0.003                |
| 70         | 700.499997               | -0.005                | 714.499999      | -0.002                |
| 80         | 700.499997               | -0.004                | 714.499997      | -0.004                |
| 85         | 700.499998               | -0.003                | 714.499999      | -0.002                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 12              |                       |                 |                       |
|-----------------|--------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 5 MHz |                       |                 |                       |
|                 | Low Channel              |                       | High Channel    |                       |
|                 | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 701.500004               | 0.005                 | 713.500002      | 0.002                 |
| 10              | 701.500003               | 0.005                 | 713.500003      | 0.005                 |
| 35              | 701.500004               | 0.005                 | 713.500004      | 0.005                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 12              |                       |                 |                       |
|------------|--------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 5 MHz |                       |                 |                       |
|            | Low Channel              |                       | High Channel    |                       |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 701.500003               | 0.005                 | 713.500002      | 0.002                 |
| -30        | 701.500002               | 0.002                 | 713.500002      | 0.003                 |
| -20        | 701.500003               | 0.004                 | 713.500004      | 0.005                 |
| -10        | 701.500003               | 0.004                 | 713.500003      | 0.005                 |
| 0          | 701.500002               | 0.003                 | 713.500003      | 0.005                 |
| 10         | 701.500003               | 0.004                 | 713.500002      | 0.003                 |
| 20         | 701.499999               | -0.002                | 713.499996      | -0.005                |
| 30         | 701.499999               | -0.002                | 713.499997      | -0.004                |
| 40         | 701.499998               | -0.003                | 713.499998      | -0.003                |
| 50         | 701.499999               | -0.002                | 713.499997      | -0.005                |
| 60         | 701.499998               | -0.004                | 713.499999      | -0.002                |
| 70         | 701.499998               | -0.003                | 713.499997      | -0.004                |
| 80         | 701.499997               | -0.005                | 713.499998      | -0.003                |
| 85         | 701.499998               | -0.003                | 713.499996      | -0.006                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 12               |                       |                 |                       |
|-----------------|---------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 10 MHz |                       |                 |                       |
|                 | Low Channel               |                       | High Channel    |                       |
|                 | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 704.000003                | 0.005                 | 711.000001      | 0.001                 |
| 10              | 704.000001                | 0.002                 | 711.000003      | 0.004                 |
| 35              | 704.000002                | 0.002                 | 711.000002      | 0.003                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 12               |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 10 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 704.000004                | 0.006                 | 711.000003      | 0.004                 |
| -30        | 704.000003                | 0.004                 | 711.000002      | 0.003                 |
| -20        | 704.000001                | 0.002                 | 711.000003      | 0.004                 |
| -10        | 704.000003                | 0.005                 | 711.000004      | 0.005                 |
| 0          | 704.000003                | 0.004                 | 711.000004      | 0.005                 |
| 10         | 704.000002                | 0.003                 | 711.000002      | 0.002                 |
| 20         | 703.999999                | -0.002                | 710.999997      | -0.004                |
| 30         | 703.999998                | -0.003                | 710.999999      | -0.002                |
| 40         | 703.999999                | -0.002                | 710.999998      | -0.003                |
| 50         | 703.999999                | -0.002                | 710.999997      | -0.005                |
| 60         | 703.999998                | -0.003                | 710.999999      | -0.002                |
| 70         | 703.999999                | -0.002                | 710.999999      | -0.002                |
| 80         | 703.999997                | -0.004                | 710.999999      | -0.002                |
| 85         | 703.999998                | -0.003                | 710.999998      | -0.004                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 13              |                       |                 |                       |
|-----------------|--------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 5 MHz |                       |                 |                       |
|                 | Low Channel              |                       | High Channel    |                       |
|                 | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 779.500001               | 0.001                 | 784.500002      | 0.002                 |
| 10              | 779.500001               | 0.002                 | 784.500003      | 0.004                 |
| 35              | 779.500001               | 0.001                 | 784.500003      | 0.004                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 13              |                       |                 |                       |
|------------|--------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 5 MHz |                       |                 |                       |
|            | Low Channel              |                       | High Channel    |                       |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 779.500002               | 0.002                 | 784.500003      | 0.003                 |
| -30        | 779.500002               | 0.003                 | 784.500002      | 0.003                 |
| -20        | 779.500003               | 0.003                 | 784.500001      | 0.001                 |
| -10        | 779.500001               | 0.002                 | 784.500002      | 0.002                 |
| 0          | 779.500003               | 0.004                 | 784.500003      | 0.004                 |
| 10         | 779.500002               | 0.003                 | 784.500001      | 0.001                 |
| 20         | 779.499996               | -0.005                | 784.499998      | -0.003                |
| 30         | 779.499998               | -0.003                | 784.499999      | -0.001                |
| 40         | 779.499999               | -0.002                | 784.499997      | -0.004                |
| 50         | 779.499999               | -0.001                | 784.499997      | -0.004                |
| 60         | 779.499997               | -0.003                | 784.499997      | -0.004                |
| 70         | 779.499998               | -0.003                | 784.499997      | -0.004                |
| 80         | 779.499996               | -0.005                | 784.499999      | -0.002                |
| 85         | 779.499996               | -0.005                | 784.499998      | -0.003                |

#### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 13               |                       |
|--------------------|---------------------------|-----------------------|
|                    | Channel Bandwidth: 10 MHz |                       |
|                    | Frequency (MHz)           | Frequency Error (ppm) |
| 12                 | 782.000004                | 0.005                 |
| 10                 | 782.000002                | 0.003                 |
| 35                 | 782.000002                | 0.003                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 13               |                       |
|------------|---------------------------|-----------------------|
|            | Channel Bandwidth: 10 MHz |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) |
| -40        | 782.000003                | 0.003                 |
| -30        | 782.000004                | 0.005                 |
| -20        | 782.000003                | 0.004                 |
| -10        | 782.000003                | 0.003                 |
| 0          | 782.000004                | 0.004                 |
| 10         | 782.000003                | 0.004                 |
| 20         | 781.999997                | -0.004                |
| 30         | 781.999996                | -0.005                |
| 40         | 781.999999                | -0.002                |
| 50         | 781.999998                | -0.002                |
| 60         | 781.999998                | -0.003                |
| 70         | 781.999997                | -0.004                |
| 80         | 781.999997                | -0.004                |
| 85         | 781.999999                | -0.001                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 66                |                       |                 |                       |
|-----------------|----------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 1.4 MHz |                       |                 |                       |
|                 | Low Channel                |                       | High Channel    |                       |
|                 | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 1710.700003                | 0.002                 | 1779.300002     | 0.001                 |
| 10              | 1710.700002                | 0.001                 | 1779.300004     | 0.002                 |
| 35              | 1710.700002                | 0.001                 | 1779.300002     | 0.001                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 66                |                       |                 |                       |
|------------|----------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 1.4 MHz |                       |                 |                       |
|            | Low Channel                |                       | High Channel    |                       |
|            | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1710.700003                | 0.002                 | 1779.300003     | 0.002                 |
| -30        | 1710.700001                | 0.001                 | 1779.300002     | 0.001                 |
| -20        | 1710.700003                | 0.002                 | 1779.300003     | 0.002                 |
| -10        | 1710.700003                | 0.002                 | 1779.300003     | 0.001                 |
| 0          | 1710.700003                | 0.002                 | 1779.300004     | 0.002                 |
| 10         | 1710.700001                | 0.001                 | 1779.300002     | 0.001                 |
| 20         | 1710.699998                | -0.001                | 1779.299996     | -0.002                |
| 30         | 1710.699997                | -0.002                | 1779.299997     | -0.002                |
| 40         | 1710.699997                | -0.002                | 1779.299999     | -0.001                |
| 50         | 1710.699998                | -0.001                | 1779.299998     | -0.001                |
| 60         | 1710.699996                | -0.002                | 1779.299997     | -0.002                |
| 70         | 1710.699998                | -0.001                | 1779.299996     | -0.002                |
| 80         | 1710.699996                | -0.002                | 1779.299998     | -0.001                |
| 85         | 1710.699998                | -0.001                | 1779.299997     | -0.002                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 66              |                       |                 |                       |
|-----------------|--------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 3 MHz |                       |                 |                       |
|                 | Low Channel              |                       | High Channel    |                       |
|                 | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 1711.500002              | 0.001                 | 1778.500003     | 0.002                 |
| 10              | 1711.500003              | 0.002                 | 1778.500004     | 0.002                 |
| 35              | 1711.500004              | 0.002                 | 1778.500002     | 0.001                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 66              |                       |                 |                       |
|------------|--------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 3 MHz |                       |                 |                       |
|            | Low Channel              |                       | High Channel    |                       |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1711.500002              | 0.001                 | 1778.500004     | 0.002                 |
| -30        | 1711.500003              | 0.002                 | 1778.500002     | 0.001                 |
| -20        | 1711.500003              | 0.002                 | 1778.500002     | 0.001                 |
| -10        | 1711.500003              | 0.002                 | 1778.500002     | 0.001                 |
| 0          | 1711.500003              | 0.001                 | 1778.500002     | 0.001                 |
| 10         | 1711.500003              | 0.002                 | 1778.500004     | 0.002                 |
| 20         | 1711.499998              | -0.001                | 1778.499999     | -0.001                |
| 30         | 1711.499998              | -0.001                | 1778.499999     | -0.001                |
| 40         | 1711.499998              | -0.001                | 1778.499998     | -0.001                |
| 50         | 1711.499996              | -0.002                | 1778.499998     | -0.001                |
| 60         | 1711.499999              | -0.001                | 1778.499997     | -0.002                |
| 70         | 1711.499999              | -0.001                | 1778.499997     | -0.002                |
| 80         | 1711.499996              | -0.002                | 1778.499997     | -0.002                |
| 85         | 1711.499997              | -0.002                | 1778.499996     | -0.002                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 66              |                       |                 |                       |
|-----------------|--------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 5 MHz |                       |                 |                       |
|                 | Low Channel              |                       | High Channel    |                       |
|                 | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 1712.500003              | 0.002                 | 1777.500001     | 0.001                 |
| 10              | 1712.500002              | 0.001                 | 1777.500001     | 0.001                 |
| 35              | 1712.500001              | 0.001                 | 1777.500003     | 0.001                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 66              |                       |                 |                       |
|------------|--------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 5 MHz |                       |                 |                       |
|            | Low Channel              |                       | High Channel    |                       |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1712.500003              | 0.002                 | 1777.500004     | 0.002                 |
| -30        | 1712.500003              | 0.002                 | 1777.500004     | 0.002                 |
| -20        | 1712.500002              | 0.001                 | 1777.500002     | 0.001                 |
| -10        | 1712.500003              | 0.002                 | 1777.500003     | 0.002                 |
| 0          | 1712.500003              | 0.001                 | 1777.500001     | 0.001                 |
| 10         | 1712.500001              | 0.001                 | 1777.500001     | 0.001                 |
| 20         | 1712.499998              | -0.001                | 1777.499998     | -0.001                |
| 30         | 1712.499998              | -0.001                | 1777.499998     | -0.001                |
| 40         | 1712.499997              | -0.002                | 1777.499996     | -0.002                |
| 50         | 1712.499998              | -0.001                | 1777.499998     | -0.001                |
| 60         | 1712.499999              | -0.001                | 1777.499999     | -0.001                |
| 70         | 1712.499996              | -0.002                | 1777.499999     | -0.001                |
| 80         | 1712.499996              | -0.002                | 1777.499997     | -0.002                |
| 85         | 1712.499999              | -0.001                | 1777.499999     | -0.001                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 66               |                       |                 |                       |
|-----------------|---------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 10 MHz |                       |                 |                       |
|                 | Low Channel               |                       | High Channel    |                       |
|                 | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 1715.000004               | 0.002                 | 1775.000002     | 0.001                 |
| 10              | 1715.000001               | 0.001                 | 1775.000003     | 0.002                 |
| 35              | 1715.000003               | 0.002                 | 1775.000004     | 0.002                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 66               |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 10 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1715.000002               | 0.001                 | 1775.000003     | 0.001                 |
| -30        | 1715.000001               | 0.001                 | 1775.000002     | 0.001                 |
| -20        | 1715.000002               | 0.001                 | 1775.000003     | 0.002                 |
| -10        | 1715.000004               | 0.002                 | 1775.000003     | 0.001                 |
| 0          | 1715.000002               | 0.001                 | 1775.000003     | 0.002                 |
| 10         | 1715.000003               | 0.002                 | 1775.000002     | 0.001                 |
| 20         | 1714.999998               | -0.001                | 1774.999998     | -0.001                |
| 30         | 1714.999998               | -0.001                | 1774.999998     | -0.001                |
| 40         | 1714.999998               | -0.001                | 1774.999999     | -0.001                |
| 50         | 1714.999998               | -0.001                | 1774.999997     | -0.002                |
| 60         | 1714.999998               | -0.001                | 1774.999997     | -0.001                |
| 70         | 1714.999999               | -0.001                | 1774.999997     | -0.002                |
| 80         | 1714.999998               | -0.001                | 1774.999998     | -0.001                |
| 85         | 1714.999996               | -0.002                | 1774.999999     | -0.001                |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 66               |                       |                 |                       |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 15 MHz |                       |                 |                       |
|                    | Low Channel               |                       | High Channel    |                       |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12                 | 1717.500002               | 0.001                 | 1772.500003     | 0.001                 |
| 10                 | 1717.500002               | 0.001                 | 1772.500001     | 0.001                 |
| 35                 | 1717.500002               | 0.001                 | 1772.500001     | 0.001                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 66               |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 15 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1717.500003               | 0.002                 | 1772.500004     | 0.002                 |
| -30        | 1717.500004               | 0.002                 | 1772.500003     | 0.002                 |
| -20        | 1717.500003               | 0.002                 | 1772.500002     | 0.001                 |
| -10        | 1717.500002               | 0.001                 | 1772.500001     | 0.001                 |
| 0          | 1717.500003               | 0.001                 | 1772.500001     | 0.001                 |
| 10         | 1717.500002               | 0.001                 | 1772.500004     | 0.002                 |
| 20         | 1717.499999               | -0.001                | 1772.499999     | -0.001                |
| 30         | 1717.499998               | -0.001                | 1772.499997     | -0.002                |
| 40         | 1717.499998               | -0.001                | 1772.499997     | -0.001                |
| 50         | 1717.499998               | -0.001                | 1772.499998     | -0.001                |
| 60         | 1717.499997               | -0.002                | 1772.499997     | -0.002                |
| 70         | 1717.499996               | -0.002                | 1772.499996     | -0.002                |
| 80         | 1717.499997               | -0.002                | 1772.499997     | -0.002                |
| 85         | 1717.499999               | -0.001                | 1772.499998     | -0.001                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 66               |                       |                 |                       |
|-----------------|---------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 20 MHz |                       |                 |                       |
|                 | Low Channel               |                       | High Channel    |                       |
|                 | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 1720.000003               | 0.001                 | 1770.000002     | 0.001                 |
| 10              | 1720.000001               | 0.001                 | 1770.000001     | 0.001                 |
| 35              | 1720.000001               | 0.001                 | 1770.000003     | 0.002                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 66               |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 20 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1720.000003               | 0.002                 | 1770.000002     | 0.001                 |
| -30        | 1720.000002               | 0.001                 | 1770.000001     | 0.001                 |
| -20        | 1720.000004               | 0.002                 | 1770.000003     | 0.002                 |
| -10        | 1720.000003               | 0.001                 | 1770.000003     | 0.002                 |
| 0          | 1720.000004               | 0.002                 | 1770.000004     | 0.002                 |
| 10         | 1720.000002               | 0.001                 | 1770.000001     | 0.001                 |
| 20         | 1719.999996               | -0.002                | 1769.999997     | -0.002                |
| 30         | 1719.999996               | -0.002                | 1769.999996     | -0.002                |
| 40         | 1719.999998               | -0.001                | 1769.999997     | -0.002                |
| 50         | 1719.999997               | -0.002                | 1769.999999     | -0.001                |
| 60         | 1719.999998               | -0.001                | 1769.999998     | -0.001                |
| 70         | 1719.999999               | -0.001                | 1769.999997     | -0.002                |
| 80         | 1719.999996               | -0.002                | 1769.999999     | -0.001                |
| 85         | 1719.999998               | -0.001                | 1769.999999     | -0.001                |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 71              |                       |                 |                       |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|
|                    | Channel Bandwidth: 5 MHz |                       |                 |                       |
|                    | Low Channel              |                       | High Channel    |                       |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12                 | 665.500003               | 0.004                 | 695.500001      | 0.001                 |
| 10                 | 665.500002               | 0.002                 | 695.500002      | 0.003                 |
| 35                 | 665.500002               | 0.003                 | 695.500002      | 0.002                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 71              |                       |                 |                       |
|------------|--------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 5 MHz |                       |                 |                       |
|            | Low Channel              |                       | High Channel    |                       |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 665.500003               | 0.005                 | 695.500003      | 0.004                 |
| -30        | 665.500002               | 0.003                 | 695.500003      | 0.005                 |
| -20        | 665.500003               | 0.005                 | 695.500002      | 0.003                 |
| -10        | 665.500003               | 0.005                 | 695.500001      | 0.002                 |
| 0          | 665.500002               | 0.003                 | 695.500002      | 0.003                 |
| 10         | 665.500002               | 0.003                 | 695.500001      | 0.002                 |
| 20         | 665.499998               | -0.003                | 695.499997      | -0.005                |
| 30         | 665.499997               | -0.005                | 695.499999      | -0.002                |
| 40         | 665.499996               | -0.005                | 695.499998      | -0.003                |
| 50         | 665.499999               | -0.002                | 695.499997      | -0.004                |
| 60         | 665.499998               | -0.004                | 695.499998      | -0.003                |
| 70         | 665.499997               | -0.005                | 695.499998      | -0.003                |
| 80         | 665.499997               | -0.005                | 695.499999      | -0.002                |
| 85         | 665.499996               | -0.006                | 695.499999      | -0.001                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 71               |                       |                 |                       |
|-----------------|---------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 10 MHz |                       |                 |                       |
|                 | Low Channel               |                       | High Channel    |                       |
|                 | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 668.000003                | 0.004                 | 693.000004      | 0.006                 |
| 10              | 668.000004                | 0.006                 | 693.000002      | 0.002                 |
| 35              | 668.000001                | 0.002                 | 693.000003      | 0.005                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 71               |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 10 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 668.000002                | 0.002                 | 693.000004      | 0.005                 |
| -30        | 668.000003                | 0.004                 | 693.000002      | 0.003                 |
| -20        | 668.000003                | 0.004                 | 693.000004      | 0.006                 |
| -10        | 668.000003                | 0.004                 | 693.000004      | 0.006                 |
| 0          | 668.000004                | 0.005                 | 693.000003      | 0.005                 |
| 10         | 668.000002                | 0.003                 | 693.000003      | 0.004                 |
| 20         | 667.999998                | -0.003                | 692.999997      | -0.005                |
| 30         | 667.999997                | -0.005                | 692.999996      | -0.005                |
| 40         | 667.999998                | -0.003                | 692.999999      | -0.001                |
| 50         | 667.999999                | -0.002                | 692.999998      | -0.002                |
| 60         | 667.999997                | -0.005                | 692.999997      | -0.005                |
| 70         | 667.999997                | -0.005                | 692.999999      | -0.002                |
| 80         | 667.999997                | -0.005                | 692.999996      | -0.006                |
| 85         | 667.999997                | -0.005                | 692.999997      | -0.004                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 71               |                       |                 |                       |
|-----------------|---------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 15 MHz |                       |                 |                       |
|                 | Low Channel               |                       | High Channel    |                       |
|                 | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 670.500002                | 0.003                 | 690.500002      | 0.002                 |
| 10              | 670.500001                | 0.002                 | 690.500003      | 0.005                 |
| 35              | 670.500001                | 0.001                 | 690.500002      | 0.003                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 71               |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 15 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 670.500003                | 0.004                 | 690.500002      | 0.003                 |
| -30        | 670.500003                | 0.004                 | 690.500003      | 0.005                 |
| -20        | 670.500002                | 0.002                 | 690.500003      | 0.004                 |
| -10        | 670.500004                | 0.006                 | 690.500001      | 0.002                 |
| 0          | 670.500002                | 0.003                 | 690.500002      | 0.003                 |
| 10         | 670.500002                | 0.003                 | 690.500002      | 0.003                 |
| 20         | 670.499997                | -0.005                | 690.499999      | -0.002                |
| 30         | 670.499997                | -0.005                | 690.499996      | -0.006                |
| 40         | 670.499998                | -0.004                | 690.499997      | -0.004                |
| 50         | 670.499997                | -0.004                | 690.499997      | -0.005                |
| 60         | 670.499997                | -0.005                | 690.499999      | -0.002                |
| 70         | 670.499996                | -0.006                | 690.499998      | -0.003                |
| 80         | 670.499997                | -0.005                | 690.499997      | -0.005                |
| 85         | 670.499999                | -0.001                | 690.499999      | -0.002                |

### Frequency Error vs. Voltage

| Voltage (Volts) | LTE Band 71               |                       |                 |                       |
|-----------------|---------------------------|-----------------------|-----------------|-----------------------|
|                 | Channel Bandwidth: 20 MHz |                       |                 |                       |
|                 | Low Channel               |                       | High Channel    |                       |
|                 | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 12              | 673.000003                | 0.004                 | 688.000002      | 0.003                 |
| 10              | 673.000001                | 0.002                 | 688.000003      | 0.005                 |
| 35              | 673.000002                | 0.002                 | 688.000003      | 0.005                 |

Note: The applicant defined the normal working voltage is from 10Vdc to 35Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 71               |                       |                 |                       |
|------------|---------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth: 20 MHz |                       |                 |                       |
|            | Low Channel               |                       | High Channel    |                       |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 673.000003                | 0.005                 | 688.000002      | 0.002                 |
| -30        | 673.000002                | 0.003                 | 688.000003      | 0.004                 |
| -20        | 673.000001                | 0.002                 | 688.000002      | 0.003                 |
| -10        | 673.000003                | 0.004                 | 688.000002      | 0.003                 |
| 0          | 673.000003                | 0.004                 | 688.000002      | 0.002                 |
| 10         | 673.000004                | 0.006                 | 688.000002      | 0.003                 |
| 20         | 672.999999                | -0.002                | 687.999998      | -0.003                |
| 30         | 672.999999                | -0.002                | 687.999997      | -0.005                |
| 40         | 672.999996                | -0.005                | 687.999997      | -0.005                |
| 50         | 672.999997                | -0.005                | 687.999996      | -0.006                |
| 60         | 672.999997                | -0.005                | 687.999998      | -0.002                |
| 70         | 672.999996                | -0.006                | 687.999998      | -0.002                |
| 80         | 672.999999                | -0.002                | 687.999996      | -0.006                |
| 85         | 672.999997                | -0.005                | 687.999997      | -0.005                |

## 4.4 Occupied Bandwidth Measurement

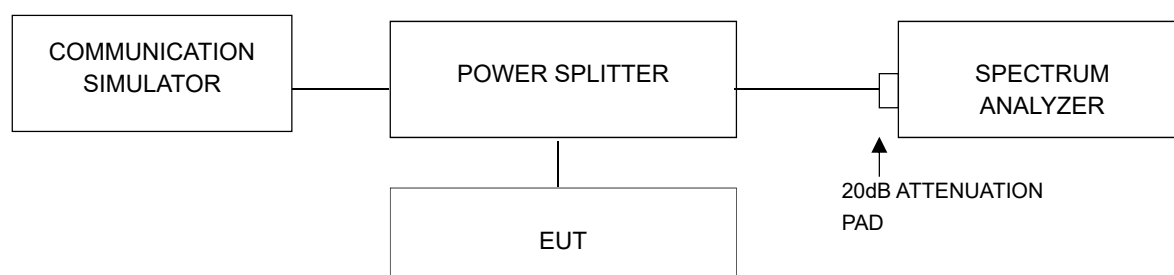
### 4.4.1 Limits of Occupied Bandwidth Measurement

The occupied bandwidth (OBW), that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 % of the total mean power radiated by a given emission.

### 4.4.2 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW = 51kHz and VBW = 160kHz for WCDMA; with RBW = 30kHz and VBW = 100kHz (Channel Bandwidth: 1.4MHz), RBW = 62kHz and VBW = 200kHz (Channel Bandwidth: 3MHz), RBW = 100kHz and VBW = 300kHz (Channel Bandwidth: 5MHz), RBW = 200kHz and VBW = 1MHz (Channel Bandwidth: 10MHz), RBW = 300kHz and VBW = 1MHz (Channel Bandwidth: 15MHz) and RBW = 430kHz and VBW = 1.3MHz (Channel Bandwidth: 20MHz). The 26dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 26dB.

### 4.4.3 Test Setup



#### 4.4.4 Test Result

##### Occupied Bandwidth

##### WCDMA Band 4

| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |       |
|---------|-----------------|------------------------------|-------|-------|
|         |                 | WCDMA                        | HSDPA | HSUPA |
| 1312    | 1712.4          | 4.14                         | 4.14  | 4.14  |
| 1413    | 1732.6          | 4.13                         | 4.13  | 4.14  |
| 1513    | 1752.6          | 4.14                         | 4.14  | 4.14  |

#### Spectrum Plot of Worst Value

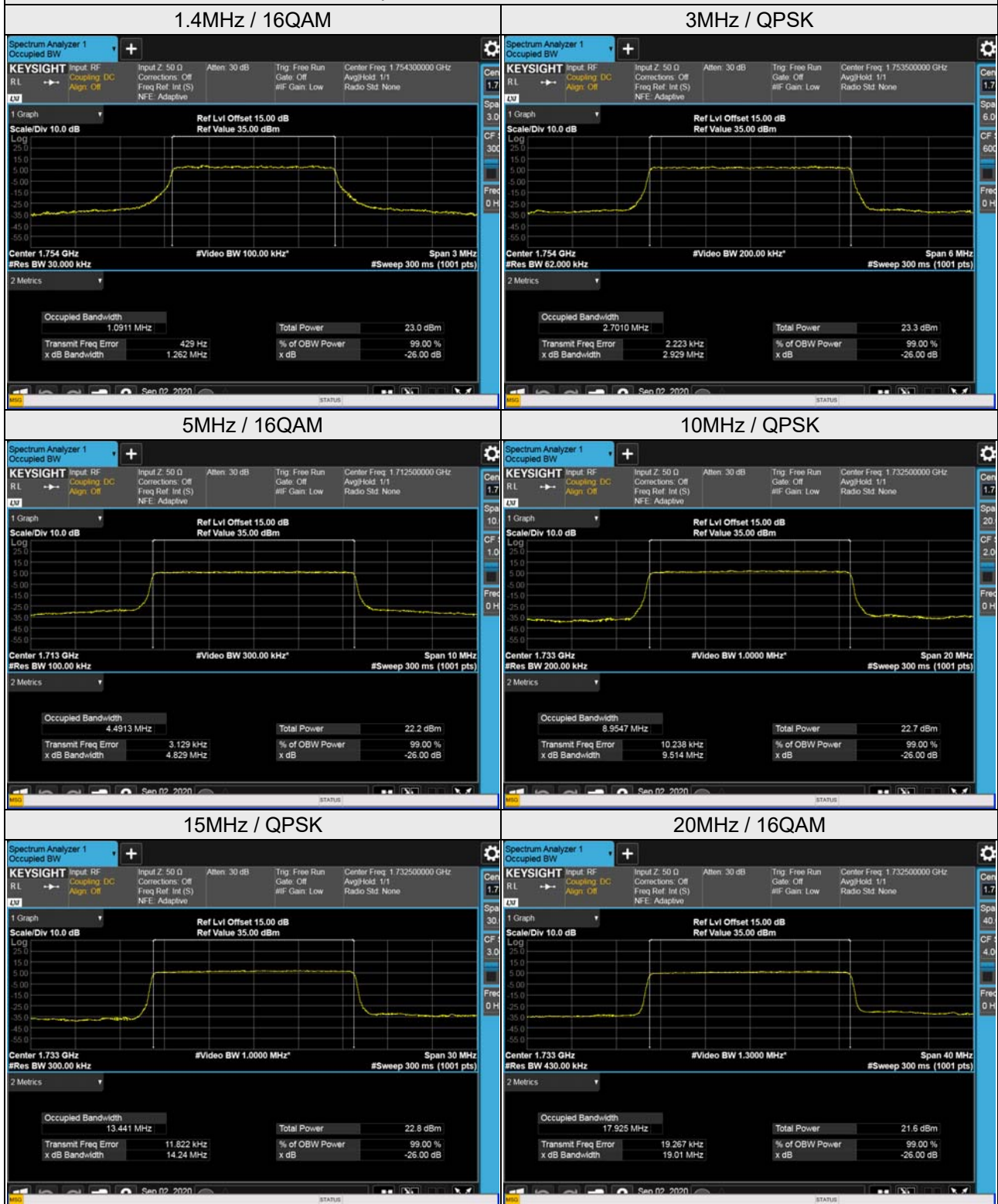


# LTE Band 4

| LTE Band 4, Channel Bandwidth 1.4MHz |                 |                              |       |
|--------------------------------------|-----------------|------------------------------|-------|
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                      |                 | QPSK                         | 16QAM |
| 19957                                | 1710.7          | 1.09                         | 1.09  |
| 20175                                | 1732.5          | 1.09                         | 1.09  |
| 20393                                | 1754.3          | 1.09                         | 1.09  |
| LTE Band 4, Channel Bandwidth 3MHz   |                 |                              |       |
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                      |                 | QPSK                         | 16QAM |
| 19965                                | 1711.5          | 2.70                         | 2.70  |
| 20175                                | 1732.5          | 2.70                         | 2.70  |
| 20385                                | 1753.5          | 2.70                         | 2.70  |
| LTE Band 4, Channel Bandwidth 5MHz   |                 |                              |       |
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                      |                 | QPSK                         | 16QAM |
| 19975                                | 1712.5          | 4.49                         | 4.49  |
| 20175                                | 1732.5          | 4.49                         | 4.49  |
| 20375                                | 1752.5          | 4.49                         | 4.49  |
| LTE Band 4, Channel Bandwidth 10MHz  |                 |                              |       |
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                      |                 | QPSK                         | 16QAM |
| 20000                                | 1715.0          | 8.95                         | 8.95  |
| 20175                                | 1732.5          | 8.95                         | 8.95  |
| 20350                                | 1750.0          | 8.95                         | 8.95  |
| LTE Band 4, Channel Bandwidth 15MHz  |                 |                              |       |
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                      |                 | QPSK                         | 16QAM |
| 20025                                | 1717.5          | 13.43                        | 13.41 |
| 20175                                | 1732.5          | 13.44                        | 13.43 |
| 20325                                | 1747.5          | 13.42                        | 13.40 |

| LTE Band 4, Channel Bandwidth 20MHz |                 |                              |       |
|-------------------------------------|-----------------|------------------------------|-------|
| Channel                             | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                     |                 | QPSK                         | 16QAM |
| 20050                               | 1720.0          | 17.88                        | 17.91 |
| 20175                               | 1732.5          | 17.91                        | 17.93 |
| 20300                               | 1745.0          | 17.85                        | 17.87 |

## Spectrum Plot of Worst Value

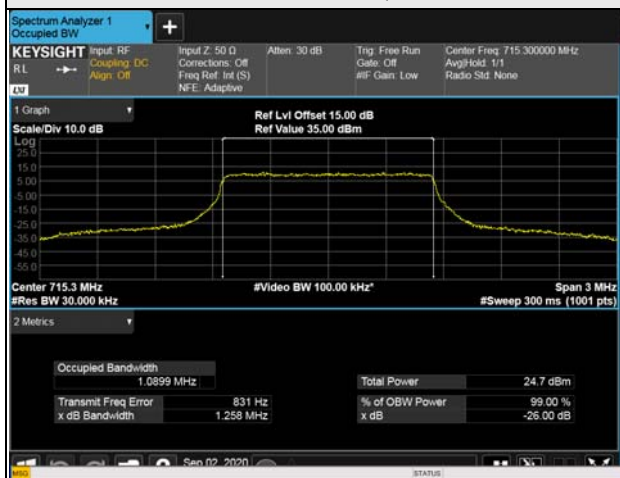


# LTE Band 12

| LTE Band 12, Channel Bandwidth 1.4MHz |                 |                              |       |
|---------------------------------------|-----------------|------------------------------|-------|
| Channel                               | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                       |                 | QPSK                         | 16QAM |
| 23017                                 | 699.7           | 1.09                         | 1.09  |
| 23095                                 | 707.5           | 1.09                         | 1.09  |
| 23173                                 | 715.3           | 1.09                         | 1.09  |
| LTE Band 12, Channel Bandwidth 3MHz   |                 |                              |       |
| Channel                               | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                       |                 | QPSK                         | 16QAM |
| 23025                                 | 700.5           | 2.70                         | 2.69  |
| 23095                                 | 707.5           | 2.70                         | 2.70  |
| 23165                                 | 714.5           | 2.70                         | 2.70  |
| LTE Band 12, Channel Bandwidth 5MHz   |                 |                              |       |
| Channel                               | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                       |                 | QPSK                         | 16QAM |
| 23035                                 | 701.5           | 4.49                         | 4.49  |
| 23095                                 | 707.5           | 4.49                         | 4.49  |
| 23155                                 | 713.5           | 4.49                         | 4.49  |
| LTE Band 12, Channel Bandwidth 10MHz  |                 |                              |       |
| Channel                               | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                       |                 | QPSK                         | 16QAM |
| 23060                                 | 704.0           | 8.96                         | 8.96  |
| 23095                                 | 707.5           | 8.96                         | 8.97  |
| 23130                                 | 711.0           | 8.94                         | 8.94  |

## Spectrum Plot of Worst Value

### 1.4MHz / 16QAM



### 3MHz / QPSK



### 5MHz / 16QAM

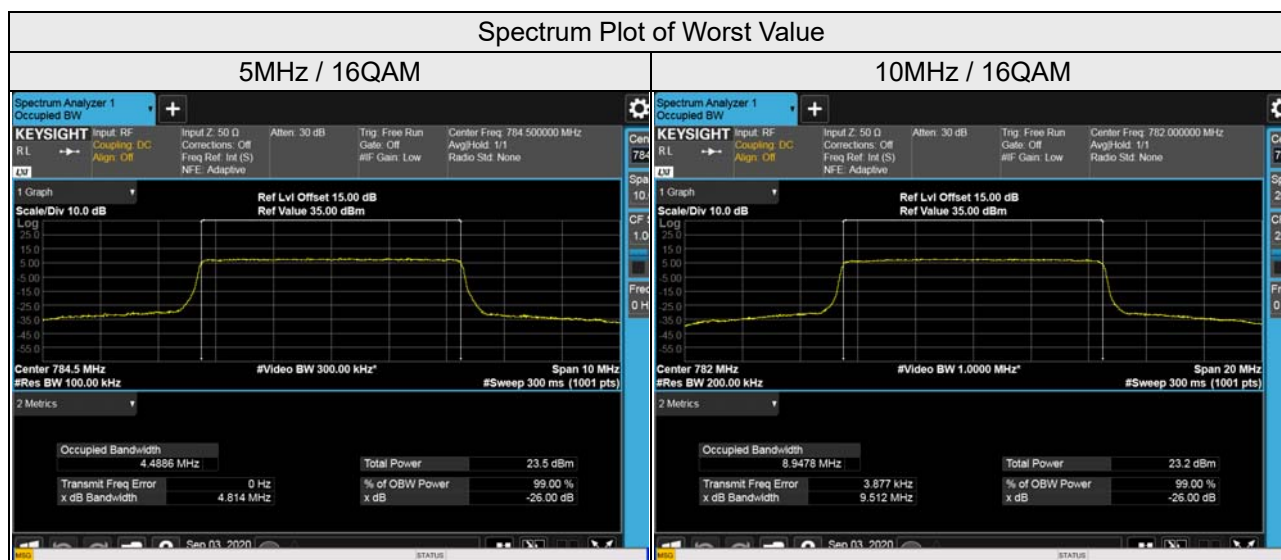


### 10MHz / 16QAM



# LTE Band 13

| LTE Band 13, Channel Bandwidth 5MHz  |                 |                              |       |
|--------------------------------------|-----------------|------------------------------|-------|
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                      |                 | QPSK                         | 16QAM |
| 23205                                | 779.5           | 4.49                         | 4.49  |
| 23230                                | 782.0           | 4.49                         | 4.49  |
| 23255                                | 784.5           | 4.49                         | 4.49  |
| LTE Band 13, Channel Bandwidth 10MHz |                 |                              |       |
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                      |                 | QPSK                         | 16QAM |
| 23230                                | 782.0           | 8.95                         | 8.95  |



# LTE Band 66

| LTE Band 66, Channel Bandwidth 1.4MHz |                 |                              |       |
|---------------------------------------|-----------------|------------------------------|-------|
| Channel                               | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                       |                 | QPSK                         | 16QAM |
| 131979                                | 1710.7          | 1.09                         | 1.09  |
| 132322                                | 1745.0          | 1.09                         | 1.09  |
| 132665                                | 1779.3          | 1.09                         | 1.09  |
| LTE Band 66, Channel Bandwidth 3MHz   |                 |                              |       |
| Channel                               | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                       |                 | QPSK                         | 16QAM |
| 131987                                | 1711.5          | 2.70                         | 2.70  |
| 132322                                | 1745.0          | 2.70                         | 2.70  |
| 132657                                | 1778.5          | 2.70                         | 2.70  |
| LTE Band 66, Channel Bandwidth 5MHz   |                 |                              |       |
| Channel                               | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                       |                 | QPSK                         | 16QAM |
| 131997                                | 1712.5          | 4.49                         | 4.49  |
| 132322                                | 1745.0          | 4.49                         | 4.49  |
| 132647                                | 1777.5          | 4.49                         | 4.49  |
| LTE Band 66, Channel Bandwidth 10MHz  |                 |                              |       |
| Channel                               | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                       |                 | QPSK                         | 16QAM |
| 132022                                | 1715.0          | 8.94                         | 8.95  |
| 132322                                | 1745.0          | 8.95                         | 8.95  |
| 132622                                | 1775.0          | 8.94                         | 8.95  |
| LTE Band 66, Channel Bandwidth 15MHz  |                 |                              |       |
| Channel                               | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                       |                 | QPSK                         | 16QAM |
| 132047                                | 1717.5          | 13.43                        | 13.41 |
| 132322                                | 1745.0          | 13.42                        | 13.40 |
| 132597                                | 1772.5          | 13.43                        | 13.42 |

| LTE Band 66, Channel Bandwidth 20MHz |                 |                              |       |
|--------------------------------------|-----------------|------------------------------|-------|
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                      |                 | QPSK                         | 16QAM |
| 132072                               | 1720.0          | 17.88                        | 17.90 |
| 132322                               | 1745.0          | 17.85                        | 17.87 |
| 132572                               | 1770.0          | 17.91                        | 17.94 |

## Spectrum Plot of Worst Value

1.4MHz / 16QAM



3MHz / QPSK



5MHz / 16QAM



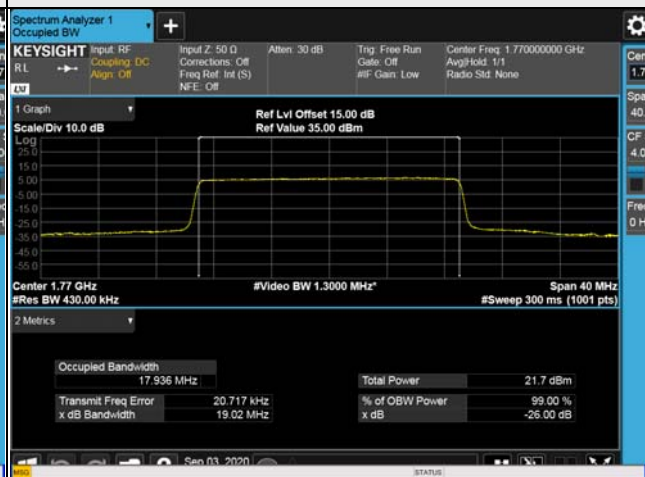
10MHz / 16QAM



15MHz / QPSK



20MHz / 16QAM



# LTE Band 71

| LTE Band 71, Channel Bandwidth 5MHz  |                 |                              |       |
|--------------------------------------|-----------------|------------------------------|-------|
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                      |                 | QPSK                         | 16QAM |
| 133147                               | 665.5           | 4.48                         | 4.49  |
| 133297                               | 680.5           | 4.48                         | 4.48  |
| 133447                               | 695.5           | 4.49                         | 4.49  |
| LTE Band 71, Channel Bandwidth 10MHz |                 |                              |       |
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                      |                 | QPSK                         | 16QAM |
| 133172                               | 668             | 8.94                         | 8.94  |
| 133297                               | 680.5           | 8.93                         | 8.93  |
| 133422                               | 693             | 8.96                         | 8.96  |
| LTE Band 71, Channel Bandwidth 15MHz |                 |                              |       |
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                      |                 | QPSK                         | 16QAM |
| 133197                               | 670.5           | 13.45                        | 13.43 |
| 133297                               | 680.5           | 13.40                        | 13.39 |
| 133397                               | 690.5           | 13.47                        | 13.45 |
| LTE Band 71, Channel Bandwidth 20MHz |                 |                              |       |
| Channel                              | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |
|                                      |                 | QPSK                         | 16QAM |
| 133222                               | 673             | 17.88                        | 17.90 |
| 133297                               | 680.5           | 17.83                        | 17.85 |
| 133372                               | 688             | 17.86                        | 17.93 |

## Spectrum Plot of Worst Value



## 26dB Bandwidth WCDMA Band 4

| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) |       |       |
|---------|-----------------|----------------------|-------|-------|
|         |                 | WCDMA                | HSDPA | HSUPA |
| 1312    | 1712.4          | 4.72                 | 4.73  | 4.73  |
| 1413    | 1732.6          | 4.70                 | 4.70  | 4.70  |
| 1513    | 1752.6          | 4.72                 | 4.72  | 4.72  |

### Spectrum Plot of Worst Value



# LTE Band 4

| LTE Band 4, Channel Bandwidth 1.4MHz |                 |                      |       |
|--------------------------------------|-----------------|----------------------|-------|
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                      |                 | QPSK                 | 16QAM |
| 19957                                | 1710.7          | 1.26                 | 1.26  |
| 20175                                | 1732.5          | 1.25                 | 1.27  |
| 20393                                | 1754.3          | 1.26                 | 1.26  |
| LTE Band 4, Channel Bandwidth 3MHz   |                 |                      |       |
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                      |                 | QPSK                 | 16QAM |
| 19965                                | 1711.5          | 2.92                 | 2.93  |
| 20175                                | 1732.5          | 2.93                 | 2.94  |
| 20385                                | 1753.5          | 2.93                 | 2.93  |
| LTE Band 4, Channel Bandwidth 5MHz   |                 |                      |       |
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                      |                 | QPSK                 | 16QAM |
| 19975                                | 1712.5          | 4.84                 | 4.83  |
| 20175                                | 1732.5          | 4.82                 | 4.84  |
| 20375                                | 1752.5          | 4.83                 | 4.82  |
| LTE Band 4, Channel Bandwidth 10MHz  |                 |                      |       |
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                      |                 | QPSK                 | 16QAM |
| 20000                                | 1715.0          | 9.51                 | 9.52  |
| 20175                                | 1732.5          | 9.51                 | 9.50  |
| 20350                                | 1750.0          | 9.51                 | 9.52  |
| LTE Band 4, Channel Bandwidth 15MHz  |                 |                      |       |
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                      |                 | QPSK                 | 16QAM |
| 20025                                | 1717.5          | 14.23                | 14.22 |
| 20175                                | 1732.5          | 14.24                | 14.23 |
| 20325                                | 1747.5          | 14.21                | 14.23 |

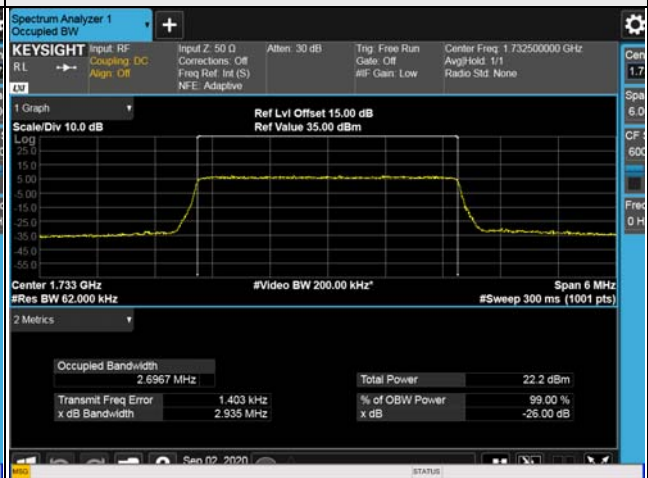
| LTE Band 4, Channel Bandwidth 20MHz |                 |                      |       |
|-------------------------------------|-----------------|----------------------|-------|
| Channel                             | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                     |                 | QPSK                 | 16QAM |
| 20050                               | 1720.0          | 19.00                | 19.01 |
| 20175                               | 1732.5          | 19.01                | 19.01 |
| 20300                               | 1745.0          | 18.98                | 18.97 |

## Spectrum Plot of Worst Value

1.4MHz / 16QAM



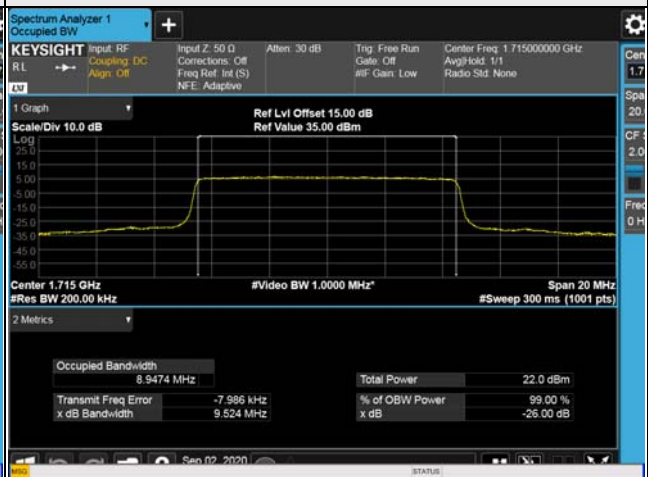
3MHz / 16QAM



5MHz / 16QAM



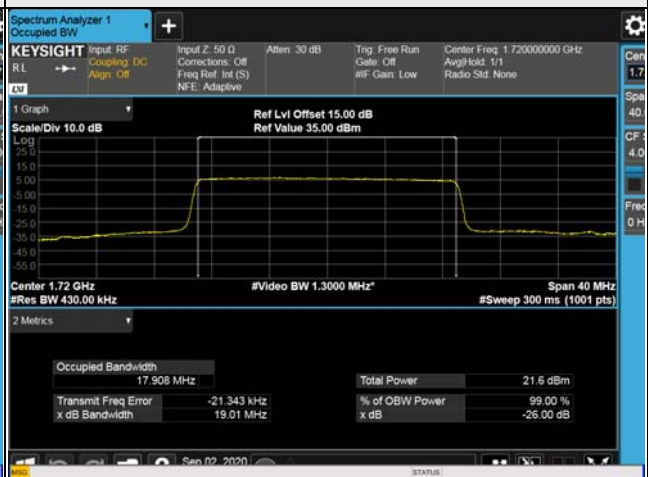
10MHz / 16QAM



15MHz / QPSK



20MHz / 16QAM

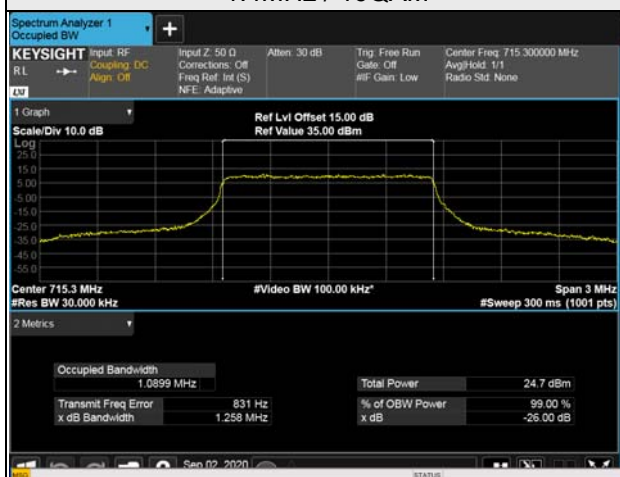


# LTE Band 12

| LTE Band 12, Channel Bandwidth 1.4MHz |                 |                      |       |
|---------------------------------------|-----------------|----------------------|-------|
| Channel                               | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                       |                 | QPSK                 | 16QAM |
| 23017                                 | 699.7           | 1.24                 | 1.25  |
| 23095                                 | 707.5           | 1.25                 | 1.25  |
| 23173                                 | 715.3           | 1.26                 | 1.26  |
| LTE Band 12, Channel Bandwidth 3MHz   |                 |                      |       |
| Channel                               | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                       |                 | QPSK                 | 16QAM |
| 23025                                 | 700.5           | 2.91                 | 2.92  |
| 23095                                 | 707.5           | 2.92                 | 2.92  |
| 23165                                 | 714.5           | 2.94                 | 2.92  |
| LTE Band 12, Channel Bandwidth 5MHz   |                 |                      |       |
| Channel                               | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                       |                 | QPSK                 | 16QAM |
| 23035                                 | 701.5           | 4.80                 | 4.80  |
| 23095                                 | 707.5           | 4.83                 | 4.81  |
| 23155                                 | 713.5           | 4.80                 | 4.82  |
| LTE Band 12, Channel Bandwidth 10MHz  |                 |                      |       |
| Channel                               | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                       |                 | QPSK                 | 16QAM |
| 23060                                 | 704.0           | 9.52                 | 9.53  |
| 23095                                 | 707.5           | 9.52                 | 9.53  |
| 23130                                 | 711.0           | 9.50                 | 9.49  |

## Spectrum Plot of Worst Value

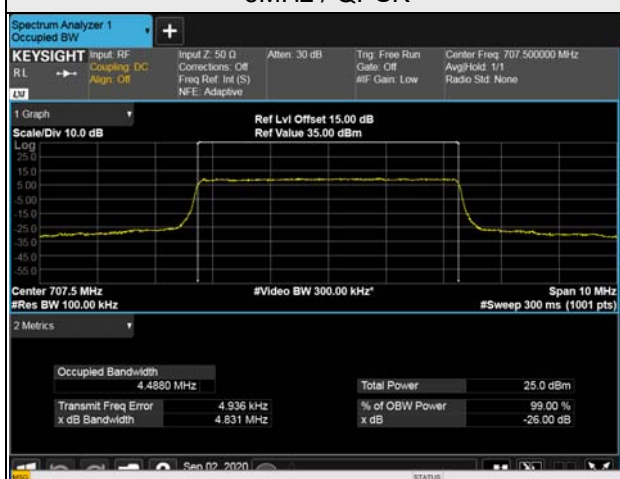
### 1.4MHz / 16QAM



### 3MHz / QPSK



### 5MHz / QPSK

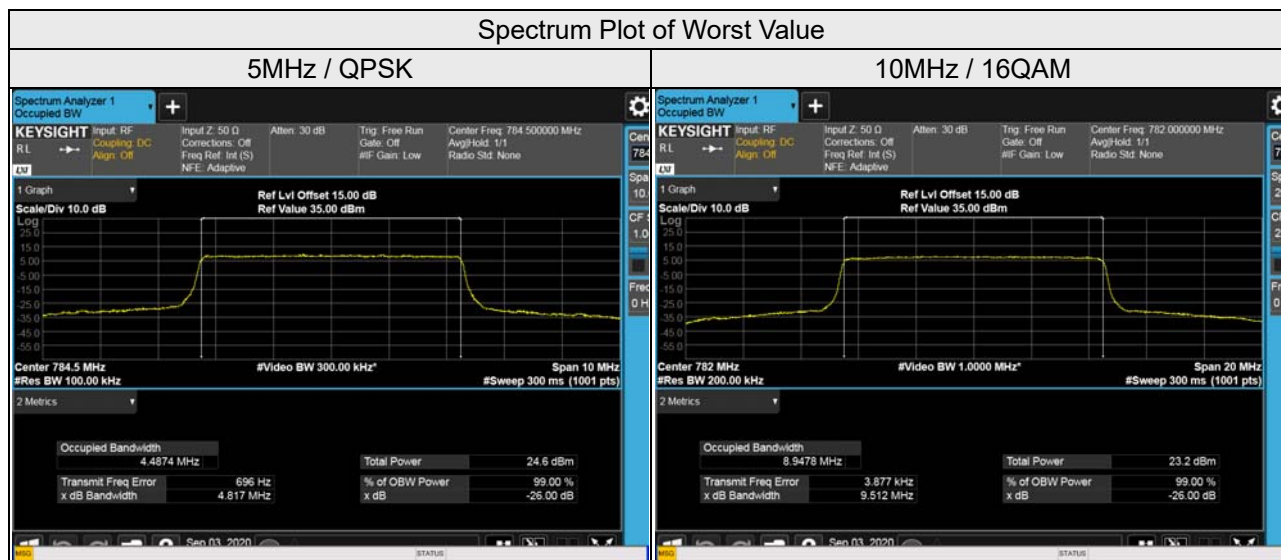


### 10MHz / 16QAM



# LTE Band 13

| LTE Band 13, Channel Bandwidth 5MHz  |                 |                      |       |
|--------------------------------------|-----------------|----------------------|-------|
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                      |                 | QPSK                 | 16QAM |
| 23205                                | 779.5           | 4.81                 | 4.81  |
| 23230                                | 782.0           | 4.81                 | 4.81  |
| 23255                                | 784.5           | 4.82                 | 4.81  |
| LTE Band 13, Channel Bandwidth 10MHz |                 |                      |       |
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                      |                 | QPSK                 | 16QAM |
| 23230                                | 782.0           | 9.49                 | 9.51  |



# LTE Band 66

| LTE Band 66, Channel Bandwidth 1.4MHz |                 |                      |       |
|---------------------------------------|-----------------|----------------------|-------|
| Channel                               | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                       |                 | QPSK                 | 16QAM |
| 131979                                | 1710.7          | 1.26                 | 1.27  |
| 132322                                | 1745.0          | 1.27                 | 1.26  |
| 132665                                | 1779.3          | 1.28                 | 1.30  |
| LTE Band 66, Channel Bandwidth 3MHz   |                 |                      |       |
| Channel                               | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                       |                 | QPSK                 | 16QAM |
| 131987                                | 1711.5          | 2.93                 | 2.93  |
| 132322                                | 1745.0          | 2.92                 | 2.93  |
| 132657                                | 1778.5          | 2.94                 | 2.95  |
| LTE Band 66, Channel Bandwidth 5MHz   |                 |                      |       |
| Channel                               | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                       |                 | QPSK                 | 16QAM |
| 131997                                | 1712.5          | 4.83                 | 4.82  |
| 132322                                | 1745.0          | 4.81                 | 4.82  |
| 132647                                | 1777.5          | 4.82                 | 4.84  |
| LTE Band 66, Channel Bandwidth 10MHz  |                 |                      |       |
| Channel                               | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                       |                 | QPSK                 | 16QAM |
| 132022                                | 1715.0          | 9.51                 | 9.51  |
| 132322                                | 1745.0          | 9.51                 | 9.51  |
| 132622                                | 1775.0          | 9.52                 | 9.50  |
| LTE Band 66, Channel Bandwidth 15MHz  |                 |                      |       |
| Channel                               | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                       |                 | QPSK                 | 16QAM |
| 132047                                | 1717.5          | 14.23                | 14.21 |
| 132322                                | 1745.0          | 14.23                | 14.22 |
| 132597                                | 1772.5          | 14.24                | 14.23 |

| LTE Band 66, Channel Bandwidth 20MHz |                 |                      |       |
|--------------------------------------|-----------------|----------------------|-------|
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                      |                 | QPSK                 | 16QAM |
| 132072                               | 1720.0          | 19.00                | 19.01 |
| 132322                               | 1745.0          | 18.98                | 18.99 |
| 132572                               | 1770.0          | 19.02                | 19.02 |

## Spectrum Plot of Worst Value

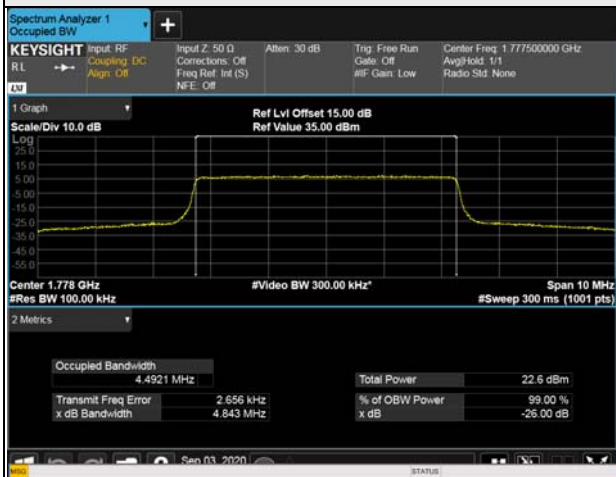
1.4MHz / 16QAM



3MHz / 16QAM



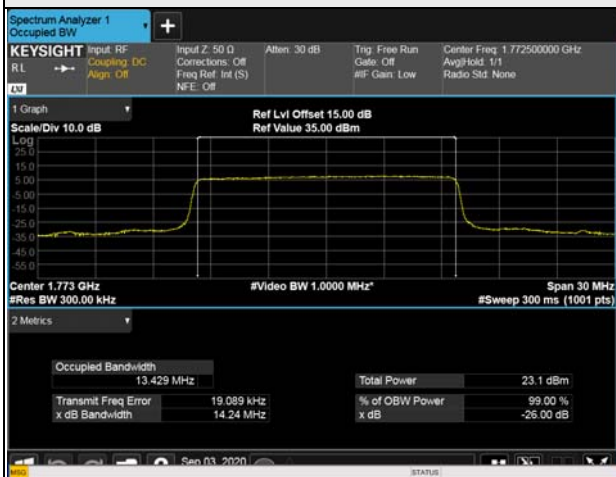
5MHz / 16QAM



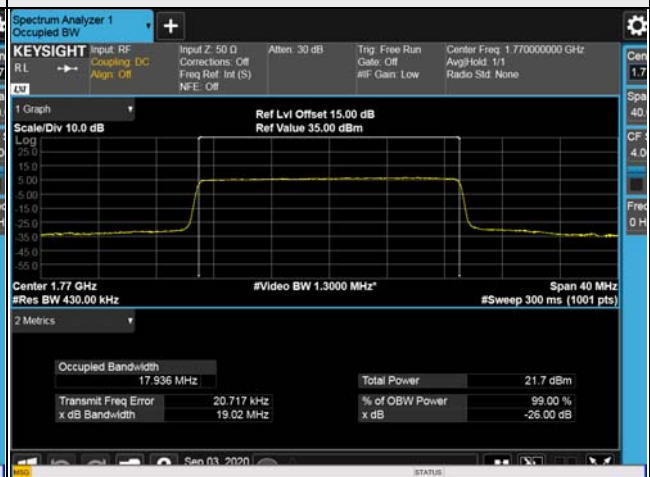
10MHz / QPSK



15MHz / QPSK



20MHz / 16QAM



# LTE Band 71

| LTE Band 71, Channel Bandwidth 5MHz  |                 |                      |       |
|--------------------------------------|-----------------|----------------------|-------|
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                      |                 | QPSK                 | 16QAM |
| 133147                               | 665.5           | 4.81                 | 4.81  |
| 133297                               | 680.5           | 4.82                 | 4.81  |
| 133447                               | 695.5           | 4.82                 | 4.81  |
| LTE Band 71, Channel Bandwidth 10MHz |                 |                      |       |
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                      |                 | QPSK                 | 16QAM |
| 133172                               | 668             | 9.51                 | 9.51  |
| 133297                               | 680.5           | 9.49                 | 9.50  |
| 133422                               | 693             | 9.53                 | 9.50  |
| LTE Band 71, Channel Bandwidth 15MHz |                 |                      |       |
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                      |                 | QPSK                 | 16QAM |
| 133197                               | 670.5           | 14.24                | 14.24 |
| 133297                               | 680.5           | 14.21                | 14.22 |
| 133397                               | 690.5           | 14.27                | 14.24 |
| LTE Band 71, Channel Bandwidth 20MHz |                 |                      |       |
| Channel                              | Frequency (MHz) | 26dB Bandwidth (MHz) |       |
|                                      |                 | QPSK                 | 16QAM |
| 133222                               | 673             | 19.02                | 19.03 |
| 133297                               | 680.5           | 18.97                | 18.96 |
| 133372                               | 688             | 18.98                | 19.03 |

## Spectrum Plot of Worst Value

