

## FCC Test Report (Part 27 – LTE B4/B7/B12/B17/B66)

**Report No.:** RFBHKI-WTW-P21120244-2

**FCC ID:** NKRUMC-MT2731CBN

**Test Model:** UMC-MT2731CBN

**Received Date:** Nov. 01, 2021

**Test Date:** Jan. 17 ~ Feb. 24, 2022

**Issued Date:** Jun. 09, 2022

**Applicant:** Wistron NeWeb Corporation

**Address:** 20 Park Ave. II, Hsinchu Science Park, Hsinchu 308, 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   |
|------------------------|------------------|---------------|
| RFBHKI-WTW-P21120244-2 | Original release | Jun. 09, 2022 |

## 1 Certificate of Conformity

**Product:** Cellular module

**Brand:** WNC

**Test Model:** UMC-MT2731CBN

**Sample Status:** Engineering sample

**Applicant:** Wistron NeWeb Corporation

**Test Date:** Jan. 17 ~ Feb. 24, 2022

**Standards:** FCC Part 27, Subpart C, H, L, M

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 :** Celine Chou , **Date:** Jun. 09, 2022  
Celine Chou / Senior Specialist

**Approved by :** Jeremy Lin , **Date:** Jun. 09, 2022  
Jeremy Lin / Project Engineer

## 2 Summary of Test Results

For LTE Band 4, B66

| Applied Standard: FCC Part 27 & Part 2 |                                         |        |                                                                                   |
|----------------------------------------|-----------------------------------------|--------|-----------------------------------------------------------------------------------|
| FCC Clause                             | Test Item                               | Result | Remarks                                                                           |
| 2.1046<br>27.50<br>(d)                 | Equivalent Isotropically radiated power | Pass   | Meet the requirement of limit.                                                    |
| 2.1047                                 | Modulation characteristics              | Pass   | Meet the requirement                                                              |
| 2.1055<br>27.54                        | Frequency Stability                     | Pass   | Meet the requirement of limit.                                                    |
| 2.1049                                 | Emission Bandwidth                      | Pass   | Meet the requirement of limit.                                                    |
| 2.1051<br>27.53<br>(h)                 | Out of Band Emission Measurements       | Pass   | Meet the requirement of limit.                                                    |
| 27.50<br>(d)(5)                        | Peak To Average Ratio                   | Pass   | Meet the requirement of limit.                                                    |
| 2.1051<br>27.53<br>(h)                 | Conducted Spurious Emissions            | Pass   | Meet the requirement of limit.                                                    |
| 2.1053<br>27.53<br>(h)                 | Radiated Spurious Emissions             | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -28.62dB at 77.53MHz. |

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

For LTE Band 7

| Applied Standard: FCC Part 27 & Part 2 |                                                  |        |                                                                                   |
|----------------------------------------|--------------------------------------------------|--------|-----------------------------------------------------------------------------------|
| FCC Clause                             | Test Item                                        | Result | Remarks                                                                           |
| 2.1046<br>27.50<br>(h)(2)              | Equivalent Isotropically radiated power          | Pass   | Meet the requirement of limit.                                                    |
| 2.1047                                 | Modulation characteristics                       | Pass   | Meet the requirement                                                              |
| 2.1055<br>27.54                        | Frequency Stability                              | Pass   | Meet the requirement of limit.                                                    |
| 2.1049                                 | Emission Bandwidth                               | Pass   | Meet the requirement of limit.                                                    |
| 2.1051<br>27.53<br>(m)(4)(6)           | Channel Edge / Out of Band Emission Measurements | Pass   | Meet the requirement of limit.                                                    |
| --                                     | Peak To Average Ratio                            | Pass   | Meet the requirement of limit.                                                    |
| 2.1051<br>27.53<br>(m)(4)(6)           | Conducted Spurious Emissions                     | Pass   | Meet the requirement of limit.                                                    |
| 2.1053<br>27.53<br>(m)(4)(6)           | Radiated Spurious Emissions                      | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -19.80dB at 83.35MHz. |

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

For LTE Band 12, LTE Band 17

| Applied Standard: FCC Part 27 & Part 2 |                                   |        |                                                                                     |
|----------------------------------------|-----------------------------------|--------|-------------------------------------------------------------------------------------|
| FCC Clause                             | Test Item                         | Result | Remarks                                                                             |
| 2.1046<br>27.50<br>(c)                 | Effective radiated power          | Pass   | Meet the requirement of limit.                                                      |
| 2.1047                                 | Modulation characteristics        | Pass   | Meet the requirement                                                                |
| 2.1055<br>27.54                        | Frequency Stability               | Pass   | Meet the requirement of limit.                                                      |
| 2.1049                                 | Emission Bandwidth                | Pass   | Meet the requirement of limit.                                                      |
| 2.1051<br>27.53<br>(g)                 | Out of Band Emission Measurements | Pass   | Meet the requirement of limit.                                                      |
| --                                     | Peak To Average Ratio             | Pass   | Meet the requirement of limit.                                                      |
| 2.1051<br>27.53<br>(g)                 | Conducted Spurious Emissions      | Pass   | Meet the requirement of limit.                                                      |
| 2.1053<br>27.53<br>(g)                 | Radiated Spurious Emissions       | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -26.33dB at 3537.50MHz. |

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 (k=2) ( $\pm$ ) |
|--------------------------------|------------------|--------------------------------------|
| Radiated Emissions up to 1 GHz | 9kHz ~ 30MHz     | 3.04 dB                              |
|                                | 30MHz ~ 200MHz   | 2.93 dB                              |
|                                | 200MHz ~ 1000MHz | 2.95 dB                              |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz     | 2.26 dB                              |
|                                | 18GHz ~ 40GHz    | 1.94 dB                              |

## 2.2 Test Site and Instruments

| Description & Manufacturer                     | Model No.             | Serial No.                    | Cal. Date     | Cal. Due      |
|------------------------------------------------|-----------------------|-------------------------------|---------------|---------------|
| Spectrum Analyzer<br>Agilent                   | N9010A                | MY52220314                    | Dec. 03, 2021 | Dec. 02, 2022 |
| Spectrum Analyzer<br>ROHDE & SCHWARZ           | FSU43                 | 101261                        | Apr. 12, 2021 | Apr. 11, 2022 |
| Broadband Horn Antenna<br>SCHWARZBECK          | BBHA 9170             | 148                           | Nov. 14, 2021 | Nov. 13, 2022 |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9120D            | 9120D-969                     | Nov. 14, 2021 | Nov. 13, 2022 |
| BILOG Antenna<br>SCHWARZBECK                   | VULB 9168             | 9168-472                      | Oct. 28, 2021 | Oct. 27, 2022 |
| Fixed Attenuator<br>WOKEN                      | MDCS18N-10            | MDCS18N-10-01                 | Apr. 13, 2021 | Apr. 12, 2022 |
| Loop Antenna<br>TESEQ                          | HLA 6121              | 45745                         | Jul. 21, 2021 | Jul. 20, 2022 |
| Preamplifier<br>EMCI                           | EMC001340             | 980201                        | Sep. 15, 2021 | Sep. 14, 2022 |
| Preamplifier<br>EMCI                           | EMC 012645            | 980115                        | Oct. 05, 2021 | Oct. 04, 2022 |
| Preamplifier<br>EMCI                           | EMC 184045            | 980116                        | Oct. 05, 2021 | Oct. 04, 2022 |
| Preamplifier<br>EMCI                           | EMC 330H              | 980112                        | Oct. 05, 2021 | Oct. 04, 2022 |
| RF Coaxial Cable<br>EMCI                       | EMC104-SM-SM-800<br>0 | 171005                        | Oct. 05, 2021 | Oct. 04, 2022 |
| RF Coaxial Cable<br>HUBER+SUHNNER              | SUCOFLEX 104          | EMC104-SM-SM-1000<br>(140807) | Oct. 05, 2021 | Oct. 04, 2022 |
| RF Coaxial Cable<br>WOKEN                      | 8D-FB                 | Cable-Ch10-01                 | Oct. 05, 2021 | Oct. 04, 2022 |
| Software<br>BV ADT                             | E3<br>6.120103        | NA                            | NA            | NA            |
| Antenna Tower<br>MF                            | MFA-440H              | NA                            | NA            | NA            |
| Turn Table<br>MF                               | MFT-201SS             | NA                            | NA            | NA            |
| Antenna Tower & Turn Table<br>Controller<br>MF | MF-7802               | NA                            | NA            | NA            |
| Temperature & Humidity<br>Chamber<br>TERCHY    | HRM-120RF             | 931022                        | Jan. 03, 2022 | Jan. 02, 2023 |
| True RMS Clamp Meter<br>Fluke                  | 325                   | 31130711WS                    | Jun. 02, 2021 | Jun. 01, 2022 |
| DC power supply<br>Keysight                    | U8002A                | MY56330015                    | NA            | NA            |
| Radio Communication<br>Analyzer<br>Anritsu     | MT8821C               | 6272278310                    | Jun. 23, 2021 | Jun. 22, 2022 |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in HwaYa Chamber 10.

### 3 General Information

#### 3.1 General Description of EUT

|                     |                                        |                       |
|---------------------|----------------------------------------|-----------------------|
| Product             | Cellular module                        |                       |
| Brand               | WNC                                    |                       |
| Test Model          | UMC-MT2731CBN                          |                       |
| Sample Status       | Engineering sample                     |                       |
| Power Supply Rating | 4.0Vdc                                 |                       |
| Modulation Type     | QPSK, 16QAM, 64QAM                     |                       |
| Operating Frequency | LTE Band 4 (Channel Bandwidth 1.4MHz)  | 1710.7MHz ~ 1754.3MHz |
|                     | LTE Band 4 (Channel Bandwidth 3MHz)    | 1711.5MHz ~ 1753.5MHz |
|                     | LTE Band 4 (Channel Bandwidth 5MHz)    | 1712.5MHz ~ 1752.5MHz |
|                     | LTE Band 4 (Channel Bandwidth 10MHz)   | 1715.0MHz ~ 1750.0MHz |
|                     | LTE Band 4 (Channel Bandwidth 15MHz)   | 1717.5MHz ~ 1747.5MHz |
|                     | LTE Band 4 (Channel Bandwidth 20MHz)   | 1720.0MHz ~ 1745.0MHz |
|                     | LTE Band 7 (Channel Bandwidth 5MHz)    | 2502.5MHz ~ 2567.5MHz |
|                     | LTE Band 7 (Channel Bandwidth 10MHz)   | 2505.0MHz ~ 2565.0MHz |
|                     | LTE Band 7 (Channel Bandwidth 15MHz)   | 2507.5MHz ~ 2562.5MHz |
|                     | LTE Band 7 (Channel Bandwidth 20MHz)   | 2510.0MHz ~ 2560.0MHz |
|                     | LTE Band 12 (Channel Bandwidth 1.4MHz) | 699.7MHz ~ 715.3MHz   |
|                     | LTE Band 12 (Channel Bandwidth 3MHz)   | 700.5MHz ~ 714.5MHz   |
|                     | LTE Band 12 (Channel Bandwidth 5MHz)   | 701.5MHz ~ 713.5MHz   |
|                     | LTE Band 12 (Channel Bandwidth 10MHz)  | 704.0MHz ~ 711.0MHz   |
|                     | LTE Band 17 (Channel Bandwidth 5MHz)   | 706.5MHz ~ 713.5MHz   |
|                     | LTE Band 17 (Channel Bandwidth 10MHz)  | 709.0MHz ~ 711.0MHz   |
|                     | LTE Band 66 (Channel Bandwidth 1.4MHz) | 1710.7MHz ~ 1779.3MHz |
|                     | LTE Band 66 (Channel Bandwidth 3MHz)   | 1711.5MHz ~ 1778.5MHz |
|                     | LTE Band 66 (Channel Bandwidth 5MHz)   | 1712.5MHz ~ 1777.5MHz |
|                     | LTE Band 66 (Channel Bandwidth 10MHz)  | 1715.0MHz ~ 1775.0MHz |
|                     | LTE Band 66 (Channel Bandwidth 15MHz)  | 1717.5MHz ~ 1772.5MHz |
|                     | LTE Band 66 (Channel Bandwidth 20MHz)  | 1720.0MHz ~ 1770.0MHz |

| Max. EIRP Power |                                        | QPSK                    | 16QAM                   | 64QAM                   |
|-----------------|----------------------------------------|-------------------------|-------------------------|-------------------------|
|                 | LTE Band 4 (Channel Bandwidth 1.4MHz)  | 261.818mW<br>(24.18dBm) | 212.814mW<br>(23.28dBm) | 167.880mW<br>(22.25dBm) |
|                 | LTE Band 4 (Channel Bandwidth 3MHz)    | 271.019mW<br>(24.33dBm) | 219.786mW<br>(23.42dBm) | 174.181mW<br>(22.41dBm) |
|                 | LTE Band 4 (Channel Bandwidth 5MHz)    | 257.040mW<br>(24.10dBm) | 219.280mW<br>(23.41dBm) | 167.494mW<br>(22.24dBm) |
|                 | LTE Band 4 (Channel Bandwidth 10MHz)   | 262.422mW<br>(24.19dBm) | 220.293mW<br>(23.43dBm) | 171.396mW<br>(22.34dBm) |
|                 | LTE Band 4 (Channel Bandwidth 15MHz)   | 277.971mW<br>(24.44dBm) | 225.424mW<br>(23.53dBm) | 173.780mW<br>(22.40dBm) |
|                 | LTE Band 4 (Channel Bandwidth 20MHz)   | 278.612mW<br>(24.45dBm) | 225.944mW<br>(23.54dBm) | 174.181mW<br>(22.41dBm) |
|                 | LTE Band 7 (Channel Bandwidth 5MHz)    | 303.389mW<br>(24.82dBm) | 245.471mW<br>(23.90dBm) | 190.546mW<br>(22.80dBm) |
|                 | LTE Band 7 (Channel Bandwidth 10MHz)   | 306.196mW<br>(24.86dBm) | 246.604mW<br>(23.92dBm) | 193.197mW<br>(22.86dBm) |
|                 | LTE Band 7 (Channel Bandwidth 15MHz)   | 311.172mW<br>(24.93dBm) | 266.073mW<br>(24.25dBm) | 194.536mW<br>(22.89dBm) |
|                 | LTE Band 7 (Channel Bandwidth 20MHz)   | 311.889mW<br>(24.94dBm) | 251.189mW<br>(24.00dBm) | 199.526mW<br>(23.00dBm) |
|                 | LTE Band 66 (Channel Bandwidth 1.4MHz) | 269.774mW<br>(24.31dBm) | 232.809mW<br>(23.67dBm) | 171.791mW<br>(22.35dBm) |
|                 | LTE Band 66 (Channel Bandwidth 3MHz)   | 282.488mW<br>(24.51dBm) | 240.436mW<br>(23.81dBm) | 170.608mW<br>(22.32dBm) |
|                 | LTE Band 66 (Channel Bandwidth 5MHz)   | 274.789mW<br>(24.39dBm) | 233.884mW<br>(23.69dBm) | 171.791mW<br>(22.35dBm) |
|                 | LTE Band 66 (Channel Bandwidth 10MHz)  | 267.917mW<br>(24.28dBm) | 234.423mW<br>(23.70dBm) | 181.970mW<br>(22.60dBm) |
|                 | LTE Band 66 (Channel Bandwidth 15MHz)  | 282.488mW<br>(24.51dBm) | 237.684mW<br>(23.76dBm) | 177.011mW<br>(22.48dBm) |
|                 | LTE Band 66 (Channel Bandwidth 20MHz)  | 283.139mW<br>(24.52dBm) | 237.684mW<br>(23.76dBm) | 180.717mW<br>(22.57dBm) |

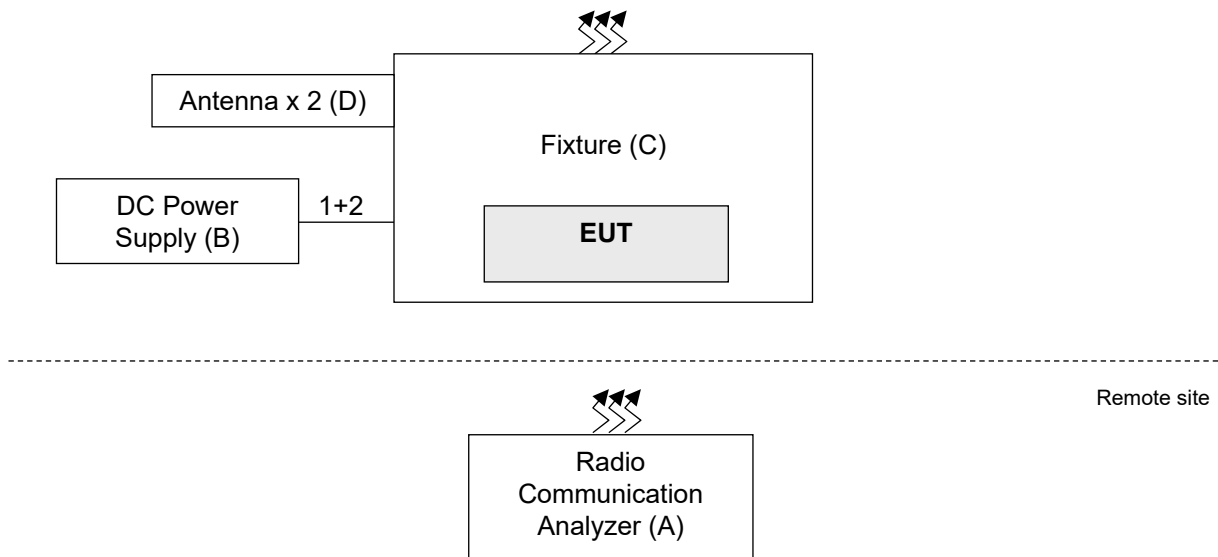
| Max. ERP Power      |                                        | QPSK                    | 16QAM                   | 64QAM                   |
|---------------------|----------------------------------------|-------------------------|-------------------------|-------------------------|
|                     | LTE Band 12 (Channel Bandwidth 1.4MHz) | 199.067mW<br>(22.99dBm) | 174.985mW<br>(22.43dBm) | 128.825mW<br>(21.10dBm) |
|                     | LTE Band 12 (Channel Bandwidth 3MHz)   | 200.447mW<br>(23.02dBm) | 177.828mW<br>(22.50dBm) | 139.637mW<br>(21.45dBm) |
|                     | LTE Band 12 (Channel Bandwidth 5MHz)   | 198.609mW<br>(22.98dBm) | 163.682mW<br>(22.14dBm) | 138.038mW<br>(21.40dBm) |
|                     | LTE Band 12 (Channel Bandwidth 10MHz)  | 207.970mW<br>(23.18dBm) | 161.808mW<br>(22.09dBm) | 137.088mW<br>(21.37dBm) |
|                     | LTE Band 17 (Channel Bandwidth 5MHz)   | 195.434mW<br>(22.91dBm) | 172.584mW<br>(22.37dBm) | 134.276mW<br>(21.28dBm) |
|                     | LTE Band 17 (Channel Bandwidth 10MHz)  | 208.449mW<br>(23.19dBm) | 176.198mW<br>(22.46dBm) | 141.254mW<br>(21.50dBm) |
| Emission Designator |                                        | QPSK                    | 16QAM                   | 64QAM                   |
|                     | LTE Band 4 (Channel Bandwidth 1.4MHz)  | 1M09G7D                 | 1M09D7W                 | 1M09D7W                 |
|                     | LTE Band 4 (Channel Bandwidth 3MHz)    | 2M69G7D                 | 2M69D7W                 | 2M69D7W                 |
|                     | LTE Band 4 (Channel Bandwidth 5MHz)    | 4M50G7D                 | 4M49D7W                 | 4M50D7W                 |
|                     | LTE Band 4 (Channel Bandwidth 10MHz)   | 8M98G7D                 | 8M99D7W                 | 8M99D7W                 |
|                     | LTE Band 4 (Channel Bandwidth 15MHz)   | 13M5G7D                 | 13M5D7W                 | 13M5D7W                 |
|                     | LTE Band 4 (Channel Bandwidth 20MHz)   | 18M0G7D                 | 18M0D7W                 | 18M0D7W                 |
|                     | LTE Band 7 (Channel Bandwidth 5MHz)    | 4M49G7D                 | 4M49D7W                 | 4M50D7W                 |
|                     | LTE Band 7 (Channel Bandwidth 10MHz)   | 8M98G7D                 | 8M98D7W                 | 8M99D7W                 |
|                     | LTE Band 7 (Channel Bandwidth 15MHz)   | 13M5G7D                 | 13M5D7W                 | 13M5D7W                 |
|                     | LTE Band 7 (Channel Bandwidth 20MHz)   | 18M0G7D                 | 18M0D7W                 | 18M0D7W                 |
|                     | LTE Band 12 (Channel Bandwidth 1.4MHz) | 1M09G7D                 | 1M09D7W                 | 1M09D7W                 |
|                     | LTE Band 12 (Channel Bandwidth 3MHz)   | 2M69G7D                 | 2M70D7W                 | 2M69D7W                 |
|                     | LTE Band 12 (Channel Bandwidth 5MHz)   | 4M50G7D                 | 4M50D7W                 | 4M50D7W                 |
|                     | LTE Band 12 (Channel Bandwidth 10MHz)  | 8M99G7D                 | 8M99D7W                 | 8M99D7W                 |
|                     | LTE Band 17 (Channel Bandwidth 5MHz)   | 4M50G7D                 | 4M50D7W                 | 4M51D7W                 |
|                     | LTE Band 17 (Channel Bandwidth 10MHz)  | 8M98G7D                 | 8M97D7W                 | 8M98D7W                 |
|                     | LTE Band 66 (Channel Bandwidth 1.4MHz) | 1M09G7D                 | 1M09D7W                 | 1M09D7W                 |
|                     | LTE Band 66 (Channel Bandwidth 3MHz)   | 2M69G7D                 | 2M69D7W                 | 2M69D7W                 |
|                     | LTE Band 66 (Channel Bandwidth 5MHz)   | 4M50G7D                 | 4M50D7W                 | 4M50D7W                 |
|                     | LTE Band 66 (Channel Bandwidth 10MHz)  | 8M99G7D                 | 8M99D7W                 | 8M98D7W                 |
|                     | LTE Band 66 (Channel Bandwidth 15MHz)  | 13M5G7D                 | 13M5D7W                 | 13M5D7W                 |
|                     | LTE Band 66 (Channel Bandwidth 20MHz)  | 18M0G7D                 | 18M0D7W                 | 18M0D7W                 |
| Antenna Type        | Refer to note                          |                         |                         |                         |
| Antenna Connector   | Refer to note                          |                         |                         |                         |
| Accessory Device    | NA                                     |                         |                         |                         |
| Cable Supplied      | NA                                     |                         |                         |                         |

Note: The antenna information is listed as below. (For support unit only)

| Type   | Connector | Gain (dBi) |             |           |           |           |           |            |            |            |            |            |            |
|--------|-----------|------------|-------------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|
|        |           | GSM<br>850 | GSM<br>1900 | LTE<br>B2 | LTE<br>B4 | LTE<br>B5 | LTE<br>B7 | LTE<br>B12 | LTE<br>B14 | LTE<br>B17 | LTE<br>B25 | LTE<br>B26 | LTE<br>B66 |
| Dipole | SMA       | 1.82       | 1.80        | 1.80      | 1.57      | 1.82      | 2.15      | 2.02       | 2.02       | 2.02       | 1.80       | 1.82       | 1.57       |

\* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

### 3.2 Configuration of System under Test



#### 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. | Radio Communication Analyzer | Anritsu            | MT8821C     | 6261806803    | NA     | -                        |
| B. | DC Power Supply              | JIN YIH Technology | SP3051      | SP30512050388 | NA     | -                        |
| C. | Fixture                      | NA                 | NA          | NA            | NA     | Provided by manufacturer |
| D. | Antenna x 2                  | WNC                | RF21S00802A | NA            | NA     | Provided by manufacturer |

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. | DC Power Cable | 1    | 1.8        | N                  | 0            | -       |
| 2. | DC Cable       | 1    | 0.12       | N                  | 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 as the table below. Following channel(s) was (were) selected for the final test as listed below:

| Band        | Radiated Emission |
|-------------|-------------------|
| LTE Band 4  | Z-plane           |
| LTE Band 7  | Z-plane           |
| LTE Band 12 | Z-plane           |
| LTE Band 17 | Z-plane           |
| LTE Band 66 | Z-plane           |

# LTE Band 4

| EUT Configure Mode | Test Item                  | Available Channel | Tested Channel                                                | Channel Bandwidth | Modulation              | RB #              |
|--------------------|----------------------------|-------------------|---------------------------------------------------------------|-------------------|-------------------------|-------------------|
| -                  | EIRP                       | 19957 to 20393    | 19957 (1710.7MHz),<br>20175 (1732.5MHz),<br>20393 (1754.3MHz) | 1.4MHz            | QPSK / 16QAM<br>/ 64QAM | 1<br>Half<br>Full |
|                    |                            | 19965 to 20385    | 19965 (1711.5MHz),<br>20175 (1732.5MHz),<br>20385 (1753.5MHz) | 3MHz              | QPSK / 16QAM<br>/ 64QAM | 1<br>Half<br>Full |
|                    |                            | 19975 to 20375    | 19975 (1712.5MHz),<br>20175 (1732.5MHz),<br>20375 (1752.5MHz) | 5MHz              | QPSK / 16QAM<br>/ 64QAM | 1<br>Half<br>Full |
|                    |                            | 20000 to 20350    | 20000 (1715.0MHz),<br>20175 (1732.5MHz),<br>20350 (1750.0MHz) | 10MHz             | QPSK / 16QAM<br>/ 64QAM | 1<br>Half<br>Full |
|                    |                            | 20025 to 20325    | 20025 (1717.5MHz),<br>20175 (1732.5MHz),<br>20325 (1747.5MHz) | 15MHz             | QPSK / 16QAM<br>/ 64QAM | 1<br>Half<br>Full |
|                    |                            | 20050 to 20300    | 20050 (1720.0MHz),<br>20175 (1732.5MHz),<br>20300 (1745.0MHz) | 20MHz             | QPSK / 16QAM<br>/ 64QAM | 1<br>Half<br>Full |
| -                  | Modulation Characteristics | 20050 to 20300    | 20175 (1732.5MHz)                                             | 20MHz             | QPSK / 16QAM<br>/ 64QAM | Full              |
| -                  | Frequency Stability        | 19957 to 20393    | 19957 (1710.7MHz),<br>20393 (1754.3MHz)                       | 1.4MHz            | QPSK                    | Full              |
|                    |                            | 19965 to 20385    | 19965 (1711.5MHz),<br>20385 (1753.5MHz)                       | 3MHz              | QPSK                    | Full              |
|                    |                            | 19975 to 20375    | 19975 (1712.5MHz),<br>20375 (1752.5MHz)                       | 5MHz              | QPSK                    | Full              |
|                    |                            | 20000 to 20350    | 20000 (1715.0MHz),<br>20350 (1750.0MHz)                       | 10MHz             | QPSK                    | Full              |
|                    |                            | 20025 to 20325    | 20025 (1717.5MHz),<br>20325 (1747.5MHz)                       | 15MHz             | QPSK                    | Full              |
|                    |                            | 20050 to 20300    | 20050 (1720.0MHz),<br>20300 (1745.0MHz)                       | 20MHz             | QPSK                    | Full              |
| -                  | Emission Bandwidth         | 19957 to 20393    | 19957 (1710.7MHz),<br>20175 (1732.5MHz),<br>20393 (1754.3MHz) | 1.4MHz            | QPSK / 16QAM<br>/ 64QAM | Full              |
|                    |                            | 19965 to 20385    | 19965 (1711.5MHz),<br>20175 (1732.5MHz),<br>20385 (1753.5MHz) | 3MHz              | QPSK / 16QAM<br>/ 64QAM | Full              |
|                    |                            | 19975 to 20375    | 19975 (1712.5MHz),<br>20175 (1732.5MHz),<br>20375 (1752.5MHz) | 5MHz              | QPSK / 16QAM<br>/ 64QAM | Full              |
|                    |                            | 20000 to 20350    | 20000 (1715.0MHz),<br>20175 (1732.5MHz),<br>20350 (1750.0MHz) | 10MHz             | QPSK / 16QAM<br>/ 64QAM | Full              |
|                    |                            | 20025 to 20325    | 20025 (1717.5MHz),<br>20175 (1732.5MHz),<br>20325 (1747.5MHz) | 15MHz             | QPSK / 16QAM<br>/ 64QAM | Full              |
|                    |                            | 20050 to 20300    | 20050 (1720.0MHz),<br>20175 (1732.5MHz),<br>20300 (1745.0MHz) | 20MHz             | QPSK / 16QAM<br>/ 64QAM | Full              |

| EUT<br>Configure<br>Mode | Test Item                | Available Channel | Tested Channel                                                | Channel<br>Bandwidth | Modulation              | RB #              |
|--------------------------|--------------------------|-------------------|---------------------------------------------------------------|----------------------|-------------------------|-------------------|
| -                        | Band Edge                | 19957 to 20393    | 19957 (1710.7MHz),<br>20393 (1754.3MHz)                       | 1.4MHz               | QPSK                    | 1<br>Half<br>Full |
|                          |                          | 19965 to 20385    | 19965 (1711.5MHz),<br>20385 (1753.5MHz)                       | 3MHz                 | QPSK                    | 1<br>Half<br>Full |
|                          |                          | 19975 to 20375    | 19975 (1712.5MHz),<br>20375 (1752.5MHz)                       | 5MHz                 | QPSK                    | 1<br>Half<br>Full |
|                          |                          | 20000 to 20350    | 20000 (1715.0MHz),<br>20350 (1750.0MHz)                       | 10MHz                | QPSK                    | 1<br>Half<br>Full |
|                          |                          | 20025 to 20325    | 20025 (1717.5MHz),<br>20325 (1747.5MHz)                       | 15MHz                | QPSK                    | 1<br>Half<br>Full |
|                          |                          | 20050 to 20300    | 20050 (1720.0MHz),<br>20300 (1745.0MHz)                       | 20MHz                | QPSK                    | 1<br>Half<br>Full |
| -                        | Peak To Average<br>Ratio | 19957 to 20393    | 19957 (1710.7MHz),<br>20175 (1732.5MHz),<br>20393 (1754.3MHz) | 1.4MHz               | QPSK / 16QAM<br>/ 64QAM | 1                 |
|                          |                          | 19965 to 20385    | 19965 (1711.5MHz),<br>20175 (1732.5MHz),<br>20385 (1753.5MHz) | 3MHz                 | QPSK / 16QAM<br>/ 64QAM | 1                 |
|                          |                          | 19975 to 20375    | 19975 (1712.5MHz),<br>20175 (1732.5MHz),<br>20375 (1752.5MHz) | 5MHz                 | QPSK / 16QAM<br>/ 64QAM | 1                 |
|                          |                          | 20000 to 20350    | 20000 (1715.0MHz),<br>20175 (1732.5MHz),<br>20350 (1750.0MHz) | 10MHz                | QPSK / 16QAM<br>/ 64QAM | 1                 |
|                          |                          | 20025 to 20325    | 20025 (1717.5MHz),<br>20175 (1732.5MHz),<br>20325 (1747.5MHz) | 15MHz                | QPSK / 16QAM<br>/ 64QAM | 1                 |
|                          |                          | 20050 to 20300    | 20050 (1720.0MHz),<br>20175 (1732.5MHz),<br>20300 (1745.0MHz) | 20MHz                | QPSK / 16QAM<br>/ 64QAM | 1                 |

| EUT Configure Mode | Test Item          | Available Channel | Tested Channel                                                | Channel Bandwidth | Modulation | RB # |
|--------------------|--------------------|-------------------|---------------------------------------------------------------|-------------------|------------|------|
| -                  | Conducted Emission | 19957 to 20393    | 19957 (1710.7MHz),<br>20175 (1732.5MHz),<br>20393 (1754.3MHz) | 1.4MHz            | QPSK       | 1    |
|                    |                    | 19965 to 20385    | 19965 (1711.5MHz),<br>20175 (1732.5MHz),<br>20385 (1753.5MHz) | 3MHz              | QPSK       | 1    |
|                    |                    | 19975 to 20375    | 19975 (1712.5MHz),<br>20175 (1732.5MHz),<br>20375 (1752.5MHz) | 5MHz              | QPSK       | 1    |
|                    |                    | 20000 to 20350    | 20000 (1715.0MHz),<br>20175 (1732.5MHz),<br>20350 (1750.0MHz) | 10MHz             | QPSK       | 1    |
|                    |                    | 20025 to 20325    | 20025 (1717.5MHz),<br>20175 (1732.5MHz),<br>20325 (1747.5MHz) | 15MHz             | QPSK       | 1    |
|                    |                    | 20050 to 20300    | 20050 (1720.0MHz),<br>20175 (1732.5MHz),<br>20300 (1745.0MHz) | 20MHz             | QPSK       | 1    |
| -                  | Radiated Emission  | 19957 to 20393    | 19957 (1710.7MHz),<br>20175 (1732.5MHz),<br>20393 (1754.3MHz) | 1.4MHz            | QPSK       | 1    |
|                    |                    | 19975 to 20375    | 19975 (1712.5MHz),<br>20175 (1732.5MHz),<br>20375 (1752.5MHz) | 5MHz              | QPSK       | 1    |
|                    |                    | 20050 to 20300    | 20050 (1720.0MHz),<br>20175 (1732.5MHz),<br>20300 (1745.0MHz) | 20MHz             | QPSK       | 1    |

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521-1 Section 6.6.3.1.4.1, choose the lowest, 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

# LTE Band 7

| EUT<br>Configure<br>Mode | Test item                     | Available channel | Tested channel                                                | Channel<br>Bandwidth | Modulation              | RB #              |
|--------------------------|-------------------------------|-------------------|---------------------------------------------------------------|----------------------|-------------------------|-------------------|
| -                        | EIRP                          | 20775 to 21425    | 20775 (2502.5MHz),<br>21100 (2535.0MHz),<br>21425 (2567.5MHz) | 5MHz                 | QPSK / 16QAM /<br>64QAM | 1<br>Half<br>Full |
|                          |                               | 20800 to 21400    | 20800 (2505.0MHz),<br>21100 (2535.0MHz),<br>21400 (2565.0MHz) | 10MHz                | QPSK / 16QAM /<br>64QAM | 1<br>Half<br>Full |
|                          |                               | 20825 to 21375    | 20825 (2507.5MHz),<br>21100 (2535.0MHz),<br>21375 (2562.5MHz) | 15MHz                | QPSK / 16QAM /<br>64QAM | 1<br>Half<br>Full |
|                          |                               | 20850 to 21350    | 20850 (2510.0MHz),<br>21100 (2535.0MHz),<br>21350 (2560.0MHz) | 20MHz                | QPSK / 16QAM /<br>64QAM | 1<br>Half<br>Full |
| -                        | Modulation<br>Characteristics | 20850 to 21350    | 21100 (2535.0MHz)                                             | 20MHz                | QPSK / 16QAM /<br>64QAM | Full              |
| -                        | Frequency Stability           | 20775 to 21425    | 20775 (2502.5MHz),<br>21425 (2567.5MHz)                       | 5MHz                 | QPSK                    | Full              |
|                          |                               | 20800 to 21400    | 20800 (2505.0MHz),<br>21400 (2565.0MHz)                       | 10MHz                | QPSK                    | Full              |
|                          |                               | 20825 to 21375    | 20825 (2507.5MHz),<br>21375 (2562.5MHz)                       | 15MHz                | QPSK                    | Full              |
|                          |                               | 20850 to 21350    | 20850 (2510.0MHz),<br>21350 (2560.0MHz)                       | 20MHz                | QPSK                    | Full              |
| -                        | Emission<br>Bandwidth         | 20775 to 21425    | 20775 (2502.5MHz),<br>21100 (2535.0MHz),<br>21425 (2567.5MHz) | 5MHz                 | QPSK / 16QAM /<br>64QAM | Full              |
|                          |                               | 20800 to 21400    | 20800 (2505.0MHz),<br>21100 (2535.0MHz),<br>21400 (2565.0MHz) | 10MHz                | QPSK / 16QAM /<br>64QAM | Full              |
|                          |                               | 20825 to 21375    | 20825 (2507.5MHz),<br>21100 (2535.0MHz),<br>21375 (2562.5MHz) | 15MHz                | QPSK / 16QAM /<br>64QAM | Full              |
|                          |                               | 20850 to 21350    | 20850 (2510.0MHz),<br>21100 (2535.0MHz),<br>21350 (2560.0MHz) | 20MHz                | QPSK / 16QAM /<br>64QAM | Full              |
| -                        | Out-of-Band<br>Emissions      | 20775 to 21425    | 20775 (2502.5MHz),<br>21425 (2567.5MHz)                       | 5MHz                 | QPSK                    | 1<br>Half<br>Full |
|                          |                               | 20800 to 21400    | 20800 (2505.0MHz),<br>21400 (2565.0MHz)                       | 10MHz                | QPSK                    | 1<br>Half<br>Full |
|                          |                               | 20825 to 21375    | 20825 (2507.5MHz),<br>21375 (2562.5MHz)                       | 15MHz                | QPSK                    | 1<br>Half<br>Full |
|                          |                               | 20850 to 21350    | 20850 (2510.0MHz),<br>21350 (2560.0MHz)                       | 20MHz                | QPSK                    | 1<br>Half<br>Full |

| EUT Configure Mode | Test item             | Available channel | Tested channel                                                | Channel Bandwidth | Modulation           | RB # |
|--------------------|-----------------------|-------------------|---------------------------------------------------------------|-------------------|----------------------|------|
| -                  | Peak to Average Ratio | 20775 to 21425    | 20775 (2502.5MHz),<br>21100 (2535.0MHz),<br>21425 (2567.5MHz) | 5MHz              | QPSK / 16QAM / 64QAM | 1    |
|                    |                       | 20800 to 21400    | 20800 (2505.0MHz),<br>21100 (2535.0MHz),<br>21400 (2565.0MHz) | 10MHz             | QPSK / 16QAM / 64QAM | 1    |
|                    |                       | 20825 to 21375    | 20825 (2507.5MHz),<br>21100 (2535.0MHz),<br>21375 (2562.5MHz) | 15MHz             | QPSK / 16QAM / 64QAM | 1    |
|                    |                       | 20850 to 21350    | 20850 (2510.0MHz),<br>21100 (2535.0MHz),<br>21350 (2560.0MHz) | 20MHz             | QPSK / 16QAM / 64QAM | 1    |
| -                  | Conducted Emission    | 20775 to 21425    | 20775 (2502.5MHz),<br>21100 (2535.0MHz),<br>21425 (2567.5MHz) | 5MHz              | QPSK                 | 1    |
|                    |                       | 20800 to 21400    | 20800 (2505.0MHz),<br>21100 (2535.0MHz),<br>21400 (2565.0MHz) | 10MHz             | QPSK                 | 1    |
|                    |                       | 20825 to 21375    | 20825 (2507.5MHz),<br>21100 (2535.0MHz),<br>21375 (2562.5MHz) | 15MHz             | QPSK                 | 1    |
|                    |                       | 20850 to 21350    | 20850 (2510.0MHz),<br>21100 (2535.0MHz),<br>21350 (2560.0MHz) | 20MHz             | QPSK                 | 1    |
| -                  | Radiated Emission     | 20775 to 21425    | 20775 (2502.5MHz),<br>21100 (2535.0MHz),<br>21425 (2567.5MHz) | 5MHz              | QPSK                 | 1    |
|                    |                       | 20850 to 21350    | 20850 (2510.0MHz),<br>21100 (2535.0MHz),<br>21350 (2560.0MHz) | 20MHz             | QPSK                 | 1    |

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521-1 Section 6.6.3.1.4.1, choose the 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

# LTE Band 12

| EUT Configure Mode | Test item                  | Available channel | Tested channel                                              | Channel Bandwidth | Modulation              | RB #              |
|--------------------|----------------------------|-------------------|-------------------------------------------------------------|-------------------|-------------------------|-------------------|
| -                  | ERP                        | 23017 to 23173    | 23017 (699.7MHz),<br>23095 (707.5MHz),<br>23173 (715.3MHz)  | 1.4MHz            | QPSK / 16QAM /<br>64QAM | 1<br>Half<br>Full |
|                    |                            | 23025 to 23165    | 23025 (700.5MHz),<br>23095 (707.5MHz),<br>23165 (714.5MHz)  | 3MHz              | QPSK / 16QAM /<br>64QAM | 1<br>Half<br>Full |
|                    |                            | 23035 to 23155    | 23035 (701.5MHz),<br>23095 (707.5MHz),<br>23155 (713.5MHz)  | 5MHz              | QPSK / 16QAM /<br>64QAM | 1<br>Half<br>Full |
|                    |                            | 23060 to 23130    | 23060 (704.0MHz),<br>23095 (707.5MHz),<br>23130 (711.0 MHz) | 10MHz             | QPSK / 16QAM /<br>64QAM | 1<br>Half<br>Full |
| -                  | Modulation Characteristics | 23060 to 23130    | 23095 (707.5MHz)                                            | 10MHz             | QPSK / 16QAM /<br>64QAM | Full              |
| -                  | Frequency Stability        | 23017 to 23173    | 23017 (699.7MHz),<br>23173 (715.3MHz)                       | 1.4MHz            | QPSK                    | Full              |
|                    |                            | 23025 to 23165    | 23025 (700.5MHz),<br>23165 (714.5MHz)                       | 3MHz              | QPSK                    | Full              |
|                    |                            | 23035 to 23155    | 23035 (701.5MHz),<br>23155 (713.5MHz)                       | 5MHz              | QPSK                    | Full              |
|                    |                            | 23060 to 23130    | 23060 (704.0MHz),<br>23130 (711.0MHz)                       | 10MHz             | QPSK                    | Full              |
| -                  | Emission Bandwidth         | 23017 to 23173    | 23017 (699.7MHz),<br>23095 (707.5MHz),<br>23173 (715.3MHz)  | 1.4MHz            | QPSK / 16QAM /<br>64QAM | Full              |
|                    |                            | 23025 to 23165    | 23025 (700.5MHz),<br>23095 (707.5MHz),<br>23165 (714.5MHz)  | 3MHz              | QPSK / 16QAM /<br>64QAM | Full              |
|                    |                            | 23035 to 23155    | 23035 (701.5MHz),<br>23095 (707.5MHz),<br>23155 (713.5MHz)  | 5MHz              | QPSK / 16QAM /<br>64QAM | Full              |
|                    |                            | 23060 to 23130    | 23060 (704.0MHz),<br>23095 (707.5MHz),<br>23130 (711.0MHz)  | 10MHz             | QPSK / 16QAM /<br>64QAM | Full              |
| -                  | Band Edge                  | 23017 to 23173    | 23017 (699.7MHz),<br>23173 (715.3MHz)                       | 1.4MHz            | QPSK                    | 1<br>Half<br>Full |
|                    |                            | 23025 to 23165    | 23025 (700.5MHz),<br>23165 (714.5MHz)                       | 3MHz              | QPSK                    | 1<br>Half<br>Full |
|                    |                            | 23035 to 23155    | 23035 (701.5MHz),<br>23155 (713.5MHz)                       | 5MHz              | QPSK                    | 1<br>Half<br>Full |
|                    |                            | 23060 to 23130    | 23060 (704.0MHz),<br>23130 (711.0MHz)                       | 10MHz             | QPSK                    | 1<br>Half<br>Full |

| EUT Configure Mode | Test item             | Available channel | Tested channel                                             | Channel Bandwidth | Modulation           | RB # |
|--------------------|-----------------------|-------------------|------------------------------------------------------------|-------------------|----------------------|------|
| -                  | Peak to Average Ratio | 23017 to 23173    | 23017 (699.7MHz),<br>23095 (707.5MHz),<br>23173 (715.3MHz) | 1.4MHz            | QPSK / 16QAM / 64QAM | 1    |
|                    |                       | 23025 to 23165    | 23025 (700.5MHz),<br>23095 (707.5MHz),<br>23165 (714.5MHz) | 3MHz              | QPSK / 16QAM / 64QAM | 1    |
|                    |                       | 23035 to 23155    | 23035 (701.5MHz),<br>23095 (707.5MHz),<br>23155 (713.5MHz) | 5MHz              | QPSK / 16QAM / 64QAM | 1    |
|                    |                       | 23060 to 23130    | 23060 (704.0MHz),<br>23095 (707.5MHz),<br>23130 (711.0MHz) | 10MHz             | QPSK / 16QAM / 64QAM | 1    |
| -                  | Conducted Emission    | 23017 to 23173    | 23017 (699.7MHz),<br>23095 (707.5MHz),<br>23173 (715.3MHz) | 1.4MHz            | QPSK                 | 1    |
|                    |                       | 23025 to 23165    | 23025 (700.5MHz),<br>23095 (707.5MHz),<br>23165 (714.5MHz) | 3MHz              | QPSK                 | 1    |
|                    |                       | 23035 to 23155    | 23035 (701.5MHz),<br>23095 (707.5MHz),<br>23155 (713.5MHz) | 5MHz              | QPSK                 | 1    |
|                    |                       | 23060 to 23130    | 23060 (704.0MHz),<br>23095 (707.5MHz),<br>23130 (711.0MHz) | 10MHz             | QPSK                 | 1    |
| -                  | Radiated Emission     | 23017 to 23173    | 23017 (699.7MHz),<br>23095 (707.5MHz),<br>23173 (715.3MHz) | 1.4MHz            | QPSK                 | 1    |
|                    |                       | 23035 to 23155    | 23035 (701.5MHz),<br>23095 (707.5MHz),<br>23155 (713.5MHz) | 5MHz              | QPSK                 | 1    |
|                    |                       | 23060 to 23130    | 23060 (704.0MHz),<br>23095 (707.5MHz),<br>23130 (711.0MHz) | 10MHz             | QPSK                 | 1    |

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521-1 Section 6.6.3.1.4.1, choose the lowest, 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

# LTE Band 17

| EUT Configure Mode | Test item                  | Available channel | Tested channel                                             | Channel Bandwidth | Modulation              | RB #              |
|--------------------|----------------------------|-------------------|------------------------------------------------------------|-------------------|-------------------------|-------------------|
| -                  | ERP                        | 23755 to 23825    | 23755 (706.5MHz),<br>23790 (710.0MHz),<br>23825 (713.5MHz) | 5MHz              | QPSK / 16QAM /<br>64QAM | 1<br>Half<br>Full |
|                    |                            | 23780 to 23800    | 23780 (709.0MHz),<br>23790 (710.0MHz),<br>23800 (711.0MHz) | 10MHz             | QPSK / 16QAM /<br>64QAM | 1<br>Half<br>Full |
| -                  | Modulation Characteristics | 23780 to 23800    | 23790 (710.0MHz)                                           | 10MHz             | QPSK / 16QAM /<br>64QAM | Full              |
| -                  | Frequency Stability        | 23755 to 23825    | 23755 (706.5MHz),<br>23825 (713.5MHz)                      | 5MHz              | QPSK                    | Full              |
|                    |                            | 23780 to 23800    | 23780 (709.0MHz),<br>23800 (711.0MHz)                      | 10MHz             | QPSK                    | Full              |
| -                  | Emission Bandwidth         | 23755 to 23825    | 23755 (706.5MHz),<br>23790 (710.0MHz),<br>23825 (713.5MHz) | 5MHz              | QPSK / 16QAM /<br>64QAM | Full              |
|                    |                            | 23780 to 23800    | 23780 (709.0MHz),<br>23790 (710.0MHz),<br>23800 (711.0MHz) | 10MHz             | QPSK / 16QAM /<br>64QAM | Full              |
| -                  | Band Edge                  | 23755 to 23825    | 23755 (706.5MHz),<br>23825 (713.5MHz)                      | 5MHz              | QPSK                    | 1<br>Half<br>Full |
|                    |                            | 23780 to 23800    | 23780 (709.0MHz),<br>23800 (711.0MHz)                      | 10MHz             | QPSK                    | 1<br>Half<br>Full |
| -                  | Peak to Average Ratio      | 23755 to 23825    | 23755 (706.5MHz),<br>23790 (710.0MHz),<br>23825 (713.5MHz) | 5MHz              | QPSK / 16QAM /<br>64QAM | 1                 |
|                    |                            | 23780 to 23800    | 23780 (709.0MHz),<br>23790 (710.0MHz),<br>23800 (711.0MHz) | 10MHz             | QPSK / 16QAM /<br>64QAM | 1                 |
| -                  | Conducted Emission         | 23755 to 23825    | 23755 (706.5MHz),<br>23790 (710.0MHz),<br>23825 (713.5MHz) | 5MHz              | QPSK                    | 1                 |
|                    |                            | 23780 to 23800    | 23780 (709.0MHz),<br>23790 (710.0MHz),<br>23800 (711.0MHz) | 10MHz             | QPSK                    | 1                 |
| -                  | Radiated Emission          | 23755 to 23825    | 23755 (706.5MHz),<br>23790 (710.0MHz),<br>23825 (713.5MHz) | 5MHz              | QPSK                    | 1                 |
|                    |                            | 23780 to 23800    | 23780 (709.0MHz),<br>23790 (710.0MHz),<br>23800 (711.0MHz) | 10MHz             | QPSK                    | 1                 |

## Note:

- For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
- For radiated emission above 1GHz, according to 3GPP 36.521-1 Section 6.6.3.1.4.1, choose the 5MHz & highest channel bandwidth for final test.
- The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

# LTE Band 66

| EUT Configure Mode | Test Item                  | Available Channel | Tested Channel                                                   | Channel Bandwidth | Modulation           | RB #              |
|--------------------|----------------------------|-------------------|------------------------------------------------------------------|-------------------|----------------------|-------------------|
| -                  | EIRP                       | 131979 to 132665  | 131979 (1710.7MHz),<br>132322 (1745.0MHz),<br>132665 (1779.3MHz) | 1.4MHz            | QPSK / 16QAM / 64QAM | 1<br>Half<br>Full |
|                    |                            | 131987 to 132657  | 131987 (1711.5MHz),<br>132322 (1745.0MHz),<br>132657 (1778.5MHz) | 3MHz              | QPSK / 16QAM / 64QAM | 1<br>Half<br>Full |
|                    |                            | 131997 to 132647  | 131997 (1712.5MHz),<br>132322 (1745.0MHz),<br>132647 (1777.5MHz) | 5MHz              | QPSK / 16QAM / 64QAM | 1<br>Half<br>Full |
|                    |                            | 132022 to 132622  | 132022 (1715.0MHz),<br>132322 (1745.0MHz),<br>132622 (1775.0MHz) | 10MHz             | QPSK / 16QAM / 64QAM | 1<br>Half<br>Full |
|                    |                            | 132047 to 132597  | 132047 (1717.5MHz),<br>132322 (1745.0MHz),<br>132597 (1772.5MHz) | 15MHz             | QPSK / 16QAM / 64QAM | 1<br>Half<br>Full |
|                    |                            | 132072 to 132572  | 132072 (1720.0MHz),<br>132322 (1745.0MHz),<br>132572 (1770.0MHz) | 20MHz             | QPSK / 16QAM / 64QAM | 1<br>Half<br>Full |
| -                  | Modulation Characteristics | 132072 to 132572  | 132322 (1745.0MHz)                                               | 20MHz             | QPSK / 16QAM / 64QAM | Full              |
| -                  | Frequency Stability        | 131979 to 132665  | 131979 (1710.7MHz),<br>132665 (1779.3MHz)                        | 1.4MHz            | QPSK                 | Full              |
|                    |                            | 131987 to 132657  | 131987 (1711.5MHz),<br>132657 (1778.5MHz)                        | 3MHz              | QPSK                 | Full              |
|                    |                            | 131997 to 132647  | 131997 (1712.5MHz),<br>132647 (1777.5MHz)                        | 5MHz              | QPSK                 | Full              |
|                    |                            | 132022 to 132622  | 132022 (1715.0MHz),<br>132622 (1775.0MHz)                        | 10MHz             | QPSK                 | Full              |
|                    |                            | 132047 to 132597  | 132047 (1717.5MHz),<br>132597 (1772.5MHz)                        | 15MHz             | QPSK                 | Full              |
|                    |                            | 132072 to 132572  | 132072 (1720.0MHz),<br>132572 (1770.0MHz)                        | 20MHz             | QPSK                 | Full              |
| -                  | Emission Bandwidth         | 131979 to 132665  | 131979 (1710.7MHz),<br>132322 (1745.0MHz),<br>132665 (1779.3MHz) | 1.4MHz            | QPSK / 16QAM / 64QAM | Full              |
|                    |                            | 131987 to 132657  | 131987 (1711.5MHz),<br>132322 (1745.0MHz),<br>132657 (1778.5MHz) | 3MHz              | QPSK / 16QAM / 64QAM | Full              |
|                    |                            | 131997 to 132647  | 131997 (1712.5MHz),<br>132322 (1745.0MHz),<br>132647 (1777.5MHz) | 5MHz              | QPSK / 16QAM / 64QAM | Full              |
|                    |                            | 132022 to 132622  | 132022 (1715.0MHz),<br>132322 (1745.0MHz),<br>132622 (1775.0MHz) | 10MHz             | QPSK / 16QAM / 64QAM | Full              |
|                    |                            | 132047 to 132597  | 132047 (1717.5MHz),<br>132322 (1745.0MHz),<br>132597 (1772.5MHz) | 15MHz             | QPSK / 16QAM / 64QAM | Full              |
|                    |                            | 132072 to 132572  | 132072 (1720.0MHz),<br>132322 (1745.0MHz),<br>132572 (1770.0MHz) | 20MHz             | QPSK / 16QAM / 64QAM | Full              |

| EUT<br>Configure<br>Mode | Test Item                | Available Channel | Tested Channel                                                   | Channel<br>Bandwidth | Modulation              | RB #              |
|--------------------------|--------------------------|-------------------|------------------------------------------------------------------|----------------------|-------------------------|-------------------|
| -                        | Band Edge                | 131979 to 132665  | 131979 (1710.7MHz),<br>132665 (1779.3MHz)                        | 1.4MHz               | QPSK                    | 1<br>Half<br>Full |
|                          |                          | 131987 to 132657  | 131987 (1711.5MHz),<br>132657 (1778.5MHz)                        | 3MHz                 | QPSK                    | 1<br>Half<br>Full |
|                          |                          | 131997 to 132647  | 131997 (1712.5MHz),<br>132647 (1777.5MHz)                        | 5MHz                 | QPSK                    | 1<br>Half<br>Full |
|                          |                          | 132022 to 132622  | 132022 (1715.0MHz),<br>132622 (1775.0MHz)                        | 10MHz                | QPSK                    | 1<br>Half<br>Full |
|                          |                          | 132047 to 132597  | 132047 (1717.5MHz),<br>132597 (1772.5MHz)                        | 15MHz                | QPSK                    | 1<br>Half<br>Full |
|                          |                          | 132072 to 132572  | 132072 (1720.0MHz),<br>132572 (1770.0MHz)                        | 20MHz                | QPSK                    | 1<br>Half<br>Full |
| -                        | Peak to Average<br>Ratio | 131979 to 132665  | 131979 (1710.7MHz),<br>132322 (1745.0MHz),<br>132665 (1779.3MHz) | 1.4MHz               | QPSK / 16QAM /<br>64QAM | 1                 |
|                          |                          | 131987 to 132657  | 131987 (1711.5MHz),<br>132322 (1745.0MHz),<br>132657 (1778.5MHz) | 3MHz                 | QPSK / 16QAM /<br>64QAM | 1                 |
|                          |                          | 131997 to 132647  | 131997 (1712.5MHz),<br>132322 (1745.0MHz),<br>132647 (1777.5MHz) | 5MHz                 | QPSK / 16QAM /<br>64QAM | 1                 |
|                          |                          | 132022 to 132622  | 132022 (1715.0MHz),<br>132322 (1745.0MHz),<br>132622 (1775.0MHz) | 10MHz                | QPSK / 16QAM /<br>64QAM | 1                 |
|                          |                          | 132047 to 132597  | 132047 (1717.5MHz),<br>132322 (1745.0MHz),<br>132597 (1772.5MHz) | 15MHz                | QPSK / 16QAM /<br>64QAM | 1                 |
|                          |                          | 132072 to 132572  | 132072 (1720.0MHz),<br>132322 (1745.0MHz),<br>132572 (1770.0MHz) | 20MHz                | QPSK / 16QAM /<br>64QAM | 1                 |

| EUT Configure Mode | Test Item          | Available Channel | Tested Channel                                                   | Channel Bandwidth | Modulation | RB # |
|--------------------|--------------------|-------------------|------------------------------------------------------------------|-------------------|------------|------|
| -                  | Conducted Emission | 131979 to 132665  | 131979 (1710.7MHz),<br>132322 (1745.0MHz),<br>132665 (1779.3MHz) | 1.4MHz            | QPSK       | 1    |
|                    |                    | 131987 to 132657  | 131987 (1711.5MHz),<br>132322 (1745.0MHz),<br>132657 (1778.5MHz) | 3MHz              | QPSK       | 1    |
|                    |                    | 131997 to 132647  | 131997 (1712.5MHz),<br>132322 (1745.0MHz),<br>132647 (1777.5MHz) | 5MHz              | QPSK       | 1    |
|                    |                    | 132022 to 132622  | 132022 (1715.0MHz),<br>132322 (1745.0MHz),<br>132622 (1775.0MHz) | 10MHz             | QPSK       | 1    |
|                    |                    | 132047 to 132597  | 132047 (1717.5MHz),<br>132322 (1745.0MHz),<br>132597 (1772.5MHz) | 15MHz             | QPSK       | 1    |
|                    |                    | 132072 to 132572  | 132072 (1720.0MHz),<br>132322 (1745.0MHz),<br>132572 (1770.0MHz) | 20MHz             | QPSK       | 1    |
| -                  | Radiated Emission  | 131979 to 132665  | 131979 (1710.7MHz),<br>132322 (1745.0MHz),<br>132665 (1779.3MHz) | 1.4MHz            | QPSK       | 1    |
|                    |                    | 131997 to 132647  | 131997 (1712.5MHz),<br>132322 (1745.0MHz),<br>132647 (1777.5MHz) | 5MHz              | QPSK       | 1    |
|                    |                    | 132072 to 132572  | 132072 (1720.0MHz),<br>132322 (1745.0MHz),<br>132572 (1770.0MHz) | 20MHz             | QPSK       | 1    |

Note:

- For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
- For radiated emission above 1GHz, according to 3GPP 36.521-1 Section 6.6.3.1.4.1, choose the lowest, 5MHz & highest channel bandwidth for final test.
- The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

#### Test Condition:

| Test Item                  | Environmental Conditions | Input Power | Tested By    |
|----------------------------|--------------------------|-------------|--------------|
| EIRP / ERP                 | 25deg. C, 60%RH          | 4.0Vdc      | James Yang   |
| Modulation Characteristics | 25deg. C, 60%RH          | 4.0Vdc      | James Yang   |
| Frequency Stability        | 25deg. C, 60%RH          | 4.0Vdc      | James Yang   |
| Occupied Bandwidth         | 25deg. C, 60%RH          | 4.0Vdc      | James Yang   |
| Band Edge                  | 25deg. C, 60%RH          | 4.0Vdc      | James Yang   |
| Peak To Average Ratio      | 25deg. C, 60%RH          | 4.0Vdc      | James Yang   |
| Conducted Emission         | 25deg. C, 60%RH          | 4.0Vdc      | James Yang   |
| Radiated Emission          | 22deg. C, 64%RH          | 4.0Vdc      | Vincent Chen |

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

ANSI 63.26-2015

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

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

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

For LTE Band 4, LTE Band 66:

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

For LTE Band 7:

Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

For LTE Band 12, LTE Band 17:

Control and mobile stations in the 698-746 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 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 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 / ERP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

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

$$\text{ERP} = P_{\text{Meas}} + G_T - 2.15$$

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

Conducted Power Measurement:



#### 4.1.4 Test Results

##### Conducted Output Power (dBm)

| LTE Band 4 |           |                 |           |       |        |       |
|------------|-----------|-----------------|-----------|-------|--------|-------|
| BW         | MCS Index | RB Size         | RB Offset | Low   | Mid    | High  |
|            |           | Channel         |           | 20050 | 20175  | 20300 |
|            |           | Frequency (MHz) |           | 1720  | 1732.5 | 1745  |
| 20M        | QPSK      | 1               | 0         | 22.57 | 22.50  | 22.34 |
|            |           | 1               | 50        | 22.88 | 22.63  | 22.37 |
|            |           | 1               | 99        | 22.30 | 22.28  | 21.96 |
|            |           | 50              | 0         | 21.43 | 21.52  | 21.19 |
|            |           | 50              | 25        | 21.36 | 21.49  | 21.16 |
|            |           | 50              | 50        | 21.33 | 21.54  | 21.30 |
|            |           | 100             | 0         | 21.21 | 21.48  | 21.14 |
| 20M        | 16QAM     | 1               | 0         | 21.86 | 21.79  | 21.59 |
|            |           | 1               | 50        | 21.97 | 21.74  | 21.61 |
|            |           | 1               | 99        | 21.80 | 21.73  | 21.62 |
|            |           | 50              | 0         | 20.42 | 20.42  | 20.29 |
|            |           | 50              | 25        | 20.52 | 20.56  | 20.53 |
|            |           | 50              | 50        | 20.62 | 20.63  | 20.60 |
|            |           | 100             | 0         | 20.46 | 20.56  | 20.45 |
| 20M        | 64QAM     | 1               | 0         | 20.77 | 20.76  | 20.67 |
|            |           | 1               | 50        | 20.84 | 20.83  | 20.78 |
|            |           | 1               | 99        | 20.35 | 20.38  | 20.26 |
|            |           | 50              | 0         | 19.43 | 19.55  | 19.40 |
|            |           | 50              | 25        | 19.46 | 19.61  | 19.39 |
|            |           | 50              | 50        | 19.41 | 19.53  | 19.33 |
|            |           | 100             | 0         | 19.43 | 19.57  | 19.38 |

| LTE Band 4 |           |                 |           |        |        |        |
|------------|-----------|-----------------|-----------|--------|--------|--------|
| BW         | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|            |           | Channel         |           | 20025  | 20175  | 20325  |
|            |           | Frequency (MHz) |           | 1717.5 | 1732.5 | 1747.5 |
| 15M        | QPSK      | 1               | 0         | 22.56  | 22.46  | 22.31  |
|            |           | 1               | 37        | 22.87  | 22.78  | 22.54  |
|            |           | 1               | 74        | 22.40  | 22.42  | 22.16  |
|            |           | 36              | 0         | 21.43  | 21.54  | 21.23  |
|            |           | 36              | 19        | 21.54  | 21.66  | 21.37  |
|            |           | 36              | 39        | 21.32  | 21.53  | 21.34  |
|            |           | 75              | 0         | 21.25  | 21.53  | 21.24  |
| 15M        | 16QAM     | 1               | 0         | 21.86  | 21.65  | 21.60  |
|            |           | 1               | 37        | 21.96  | 21.78  | 21.72  |
|            |           | 1               | 74        | 21.92  | 21.84  | 21.78  |
|            |           | 36              | 0         | 20.51  | 20.55  | 20.49  |
|            |           | 36              | 19        | 20.47  | 20.57  | 20.47  |
|            |           | 36              | 39        | 20.21  | 20.43  | 20.33  |
|            |           | 75              | 0         | 20.37  | 20.61  | 20.60  |
| 15M        | 64QAM     | 1               | 0         | 20.67  | 20.65  | 20.61  |
|            |           | 1               | 37        | 20.83  | 20.83  | 20.81  |
|            |           | 1               | 74        | 20.69  | 20.77  | 20.76  |
|            |           | 36              | 0         | 19.32  | 19.48  | 19.54  |
|            |           | 36              | 19        | 19.38  | 19.55  | 19.61  |
|            |           | 36              | 39        | 19.27  | 19.54  | 19.58  |
|            |           | 75              | 0         | 19.13  | 19.43  | 19.57  |

| LTE Band 4 |           |                 |           |       |        |       |
|------------|-----------|-----------------|-----------|-------|--------|-------|
| BW         | MCS Index | RB Size         | RB Offset | Low   | Mid    | High  |
|            |           | Channel         |           | 20000 | 20175  | 20350 |
|            |           | Frequency (MHz) |           | 1715  | 1732.5 | 1750  |
| 10M        | QPSK      | 1               | 0         | 22.58 | 22.57  | 22.28 |
|            |           | 1               | 24        | 22.62 | 22.50  | 22.12 |
|            |           | 1               | 49        | 22.48 | 22.51  | 22.12 |
|            |           | 25              | 0         | 21.33 | 21.44  | 20.99 |
|            |           | 25              | 12        | 21.39 | 21.56  | 21.05 |
|            |           | 25              | 25        | 21.46 | 21.63  | 21.10 |
|            |           | 50              | 0         | 21.29 | 21.57  | 20.94 |
| 10M        | 16QAM     | 1               | 0         | 21.56 | 21.79  | 21.56 |
|            |           | 1               | 24        | 21.86 | 21.84  | 21.61 |
|            |           | 1               | 49        | 21.24 | 21.58  | 21.36 |
|            |           | 25              | 0         | 20.14 | 20.46  | 20.32 |
|            |           | 25              | 12        | 20.32 | 20.63  | 20.55 |
|            |           | 25              | 25        | 20.26 | 20.64  | 20.50 |
|            |           | 50              | 0         | 20.21 | 20.57  | 20.36 |
| 10M        | 64QAM     | 1               | 0         | 20.68 | 20.67  | 20.57 |
|            |           | 1               | 24        | 20.77 | 20.59  | 20.54 |
|            |           | 1               | 49        | 20.51 | 20.68  | 20.46 |
|            |           | 25              | 0         | 19.31 | 19.48  | 19.17 |
|            |           | 25              | 12        | 19.38 | 19.57  | 19.31 |
|            |           | 25              | 25        | 19.44 | 19.66  | 19.32 |
|            |           | 50              | 0         | 19.26 | 19.59  | 19.29 |

| LTE Band 4 |           |                 |           |        |        |        |
|------------|-----------|-----------------|-----------|--------|--------|--------|
| BW         | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|            |           | Channel         |           | 19975  | 20175  | 20375  |
|            |           | Frequency (MHz) |           | 1712.5 | 1732.5 | 1752.5 |
| 5M         | QPSK      | 1               | 0         | 22.46  | 22.51  | 22.24  |
|            |           | 1               | 12        | 22.32  | 22.53  | 22.14  |
|            |           | 1               | 24        | 22.05  | 22.33  | 22.06  |
|            |           | 12              | 0         | 21.17  | 21.43  | 21.16  |
|            |           | 12              | 6         | 21.36  | 21.62  | 21.26  |
|            |           | 12              | 13        | 21.10  | 21.48  | 21.21  |
|            |           | 25              | 0         | 21.06  | 21.54  | 21.24  |
| 5M         | 16QAM     | 1               | 0         | 21.58  | 21.73  | 21.63  |
|            |           | 1               | 12        | 21.70  | 21.84  | 21.77  |
|            |           | 1               | 24        | 21.56  | 21.67  | 21.51  |
|            |           | 12              | 0         | 20.36  | 20.46  | 20.28  |
|            |           | 12              | 6         | 20.44  | 20.59  | 20.43  |
|            |           | 12              | 13        | 20.28  | 20.49  | 20.37  |
|            |           | 25              | 0         | 20.10  | 20.43  | 20.22  |
| 5M         | 64QAM     | 1               | 0         | 20.41  | 20.66  | 20.46  |
|            |           | 1               | 12        | 20.54  | 20.67  | 20.58  |
|            |           | 1               | 24        | 20.42  | 20.59  | 20.37  |
|            |           | 12              | 0         | 19.14  | 19.68  | 19.19  |
|            |           | 12              | 6         | 18.87  | 19.46  | 19.01  |
|            |           | 12              | 13        | 18.93  | 19.53  | 19.17  |
|            |           | 25              | 0         | 18.76  | 19.47  | 19.17  |

| LTE Band 4 |           |                 |           |        |        |        |
|------------|-----------|-----------------|-----------|--------|--------|--------|
| BW         | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|            |           | Channel         |           | 19965  | 20175  | 20385  |
|            |           | Frequency (MHz) |           | 1711.5 | 1732.5 | 1753.5 |
| 3M         | QPSK      | 1               | 0         | 22.53  | 22.46  | 22.28  |
|            |           | 1               | 7         | 22.75  | 22.76  | 22.60  |
|            |           | 1               | 14        | 22.63  | 22.59  | 22.48  |
|            |           | 8               | 0         | 21.60  | 21.56  | 21.54  |
|            |           | 8               | 3         | 21.40  | 21.43  | 21.46  |
|            |           | 8               | 7         | 21.50  | 21.50  | 21.52  |
|            |           | 15              | 0         | 21.26  | 21.32  | 21.42  |
| 3M         | 16QAM     | 1               | 0         | 21.55  | 21.48  | 21.56  |
|            |           | 1               | 7         | 21.73  | 21.85  | 21.83  |
|            |           | 1               | 14        | 21.78  | 21.71  | 21.78  |
|            |           | 8               | 0         | 20.45  | 20.46  | 20.80  |
|            |           | 8               | 3         | 20.62  | 20.65  | 21.07  |
|            |           | 8               | 7         | 20.47  | 20.54  | 21.06  |
|            |           | 15              | 0         | 20.40  | 20.48  | 20.91  |
| 3M         | 64QAM     | 1               | 0         | 20.33  | 20.75  | 20.37  |
|            |           | 1               | 7         | 20.35  | 20.84  | 20.53  |
|            |           | 1               | 14        | 20.21  | 20.81  | 20.48  |
|            |           | 8               | 0         | 18.81  | 19.46  | 19.11  |
|            |           | 8               | 3         | 18.96  | 19.65  | 19.37  |
|            |           | 8               | 7         | 18.76  | 19.57  | 19.24  |
|            |           | 15              | 0         | 18.57  | 19.47  | 19.14  |

| LTE Band 4 |           |                 |           |        |        |        |
|------------|-----------|-----------------|-----------|--------|--------|--------|
| BW         | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|            |           | Channel         |           | 19957  | 20175  | 20393  |
|            |           | Frequency (MHz) |           | 1710.7 | 1732.5 | 1754.3 |
| 1.4M       | QPSK      | 1               | 0         | 22.54  | 22.38  | 22.28  |
|            |           | 1               | 2         | 22.61  | 22.49  | 22.47  |
|            |           | 1               | 5         | 22.53  | 22.43  | 22.41  |
|            |           | 3               | 0         | 22.51  | 22.52  | 22.59  |
|            |           | 3               | 1         | 22.46  | 22.57  | 22.58  |
|            |           | 3               | 3         | 22.45  | 22.54  | 22.57  |
|            |           | 6               | 0         | 21.38  | 21.53  | 21.64  |
| 1.4M       | 16QAM     | 1               | 0         | 21.55  | 21.57  | 21.35  |
|            |           | 1               | 2         | 21.71  | 21.70  | 21.58  |
|            |           | 1               | 5         | 21.53  | 21.62  | 21.48  |
|            |           | 3               | 0         | 21.57  | 21.65  | 21.44  |
|            |           | 3               | 1         | 21.50  | 21.62  | 21.35  |
|            |           | 3               | 3         | 21.61  | 21.57  | 21.36  |
|            |           | 6               | 0         | 20.28  | 20.46  | 20.12  |
| 1.4M       | 64QAM     | 1               | 0         | 20.31  | 20.56  | 20.29  |
|            |           | 1               | 2         | 20.68  | 20.52  | 20.31  |
|            |           | 1               | 5         | 20.59  | 20.66  | 20.57  |
|            |           | 3               | 0         | 20.36  | 20.63  | 20.32  |
|            |           | 3               | 1         | 20.35  | 20.67  | 20.38  |
|            |           | 3               | 3         | 20.39  | 20.63  | 20.43  |
|            |           | 6               | 0         | 19.06  | 19.49  | 19.19  |

| LTE Band 7 |           |                 |           |       |       |       |
|------------|-----------|-----------------|-----------|-------|-------|-------|
| BW         | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|            |           | Channel         |           | 20850 | 21100 | 21350 |
|            |           | Frequency (MHz) |           | 2510  | 2535  | 2560  |
| 20M        | QPSK      | 1               | 0         | 22.79 | 21.92 | 21.68 |
|            |           | 1               | 50        | 22.56 | 21.84 | 21.68 |
|            |           | 1               | 99        | 22.17 | 21.54 | 21.45 |
|            |           | 50              | 0         | 21.58 | 21.03 | 20.95 |
|            |           | 50              | 25        | 21.31 | 20.85 | 20.87 |
|            |           | 50              | 50        | 21.32 | 20.90 | 20.97 |
|            |           | 100             | 0         | 21.34 | 20.93 | 21.09 |
| 20M        | 16QAM     | 1               | 0         | 21.85 | 21.14 | 20.87 |
|            |           | 1               | 50        | 21.78 | 21.18 | 20.84 |
|            |           | 1               | 99        | 21.56 | 20.93 | 20.57 |
|            |           | 50              | 0         | 20.61 | 20.09 | 19.81 |
|            |           | 50              | 25        | 20.34 | 19.83 | 19.63 |
|            |           | 50              | 50        | 20.48 | 20.02 | 19.82 |
|            |           | 100             | 0         | 20.37 | 19.94 | 19.81 |
| 20M        | 64QAM     | 1               | 0         | 20.85 | 20.25 | 20.18 |
|            |           | 1               | 50        | 20.78 | 20.24 | 20.10 |
|            |           | 1               | 99        | 20.06 | 19.58 | 19.34 |
|            |           | 50              | 0         | 19.55 | 19.08 | 18.78 |
|            |           | 50              | 25        | 19.20 | 18.83 | 18.48 |
|            |           | 50              | 50        | 19.19 | 18.94 | 18.62 |
|            |           | 100             | 0         | 19.15 | 18.94 | 18.64 |

| LTE Band 7 |           |                 |           |        |       |        |
|------------|-----------|-----------------|-----------|--------|-------|--------|
| BW         | MCS Index | RB Size         | RB Offset | Low    | Mid   | High   |
|            |           | Channel         |           | 20825  | 21100 | 21375  |
|            |           | Frequency (MHz) |           | 2507.5 | 2535  | 2562.5 |
| 15M        | QPSK      | 1               | 0         | 22.56  | 21.83 | 21.68  |
|            |           | 1               | 37        | 22.78  | 22.08 | 21.89  |
|            |           | 1               | 74        | 22.31  | 21.59 | 21.45  |
|            |           | 36              | 0         | 21.69  | 20.95 | 20.82  |
|            |           | 36              | 19        | 21.66  | 20.98 | 20.95  |
|            |           | 36              | 39        | 21.57  | 20.87 | 20.84  |
|            |           | 75              | 0         | 21.53  | 20.90 | 20.78  |
| 15M        | 16QAM     | 1               | 0         | 21.80  | 20.97 | 20.84  |
|            |           | 1               | 37        | 22.10  | 21.24 | 21.06  |
|            |           | 1               | 74        | 21.61  | 20.74 | 20.58  |
|            |           | 36              | 0         | 20.71  | 19.96 | 19.90  |
|            |           | 36              | 19        | 20.65  | 19.95 | 19.96  |
|            |           | 36              | 39        | 20.66  | 19.94 | 19.94  |
|            |           | 75              | 0         | 20.63  | 20.02 | 19.96  |
| 15M        | 64QAM     | 1               | 0         | 20.72  | 20.21 | 20.15  |
|            |           | 1               | 37        | 20.74  | 20.15 | 20.07  |
|            |           | 1               | 74        | 20.39  | 20.06 | 19.92  |
|            |           | 36              | 0         | 19.24  | 19.01 | 18.95  |
|            |           | 36              | 19        | 19.14  | 19.02 | 18.95  |
|            |           | 36              | 39        | 18.96  | 18.83 | 18.69  |
|            |           | 75              | 0         | 18.99  | 18.96 | 18.75  |

| LTE Band 7 |           |                 |           |       |       |       |
|------------|-----------|-----------------|-----------|-------|-------|-------|
| BW         | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|            |           | Channel         |           | 20800 | 21100 | 21400 |
|            |           | Frequency (MHz) |           | 2505  | 2535  | 2565  |
| 10M        | QPSK      | 1               | 0         | 22.67 | 21.80 | 21.63 |
|            |           | 1               | 24        | 22.71 | 21.83 | 21.58 |
|            |           | 1               | 49        | 22.40 | 21.63 | 21.34 |
|            |           | 25              | 0         | 21.57 | 20.94 | 20.66 |
|            |           | 25              | 12        | 21.63 | 20.94 | 20.70 |
|            |           | 25              | 25        | 21.59 | 20.86 | 20.57 |
|            |           | 50              | 0         | 21.63 | 20.97 | 20.70 |
| 10M        | 16QAM     | 1               | 0         | 21.56 | 21.05 | 20.86 |
|            |           | 1               | 24        | 21.77 | 20.84 | 20.61 |
|            |           | 1               | 49        | 21.40 | 20.96 | 20.75 |
|            |           | 25              | 0         | 20.32 | 19.88 | 19.73 |
|            |           | 25              | 12        | 20.28 | 19.93 | 19.82 |
|            |           | 25              | 25        | 20.20 | 19.86 | 19.68 |
|            |           | 50              | 0         | 20.28 | 19.97 | 19.71 |
| 10M        | 64QAM     | 1               | 0         | 20.70 | 20.22 | 20.08 |
|            |           | 1               | 24        | 20.71 | 20.26 | 20.17 |
|            |           | 1               | 49        | 20.39 | 20.01 | 19.86 |
|            |           | 25              | 0         | 19.38 | 19.06 | 18.85 |
|            |           | 25              | 12        | 19.32 | 19.11 | 18.83 |
|            |           | 25              | 25        | 19.14 | 19.01 | 18.71 |
|            |           | 50              | 0         | 19.02 | 18.94 | 18.54 |

| LTE Band 7 |           |                 |           |        |       |        |
|------------|-----------|-----------------|-----------|--------|-------|--------|
| BW         | MCS Index | RB Size         | RB Offset | Low    | Mid   | High   |
|            |           | Channel         |           | 20775  | 21100 | 21425  |
|            |           | Frequency (MHz) |           | 2502.5 | 2535  | 2567.5 |
| 5M         | QPSK      | 1               | 0         | 22.51  | 21.78 | 21.43  |
|            |           | 1               | 12        | 22.67  | 22.17 | 21.75  |
|            |           | 1               | 24        | 22.39  | 21.72 | 21.35  |
|            |           | 12              | 0         | 21.48  | 20.85 | 20.52  |
|            |           | 12              | 6         | 21.37  | 20.84 | 20.48  |
|            |           | 12              | 13        | 21.38  | 20.87 | 20.49  |
|            |           | 25              | 0         | 21.40  | 20.93 | 20.55  |
| 5M         | 16QAM     | 1               | 0         | 21.62  | 21.06 | 20.78  |
|            |           | 1               | 12        | 21.75  | 21.38 | 21.00  |
|            |           | 1               | 24        | 21.26  | 20.79 | 20.40  |
|            |           | 12              | 0         | 20.36  | 19.88 | 19.44  |
|            |           | 12              | 6         | 20.26  | 19.87 | 19.36  |
|            |           | 12              | 13        | 20.28  | 19.95 | 19.47  |
|            |           | 25              | 0         | 20.18  | 19.86 | 19.34  |
| 5M         | 64QAM     | 1               | 0         | 20.61  | 20.10 | 19.94  |
|            |           | 1               | 12        | 20.65  | 20.36 | 20.30  |
|            |           | 1               | 24        | 20.60  | 20.12 | 20.10  |
|            |           | 12              | 0         | 19.33  | 18.95 | 18.84  |
|            |           | 12              | 6         | 19.37  | 18.97 | 18.79  |
|            |           | 12              | 13        | 19.31  | 18.95 | 18.78  |
|            |           | 25              | 0         | 19.24  | 18.94 | 18.68  |

| LTE Band 12 |           |                 |           |       |       |       |
|-------------|-----------|-----------------|-----------|-------|-------|-------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|             |           | Channel         |           | 23060 | 23095 | 23130 |
|             |           | Frequency (MHz) |           | 704   | 707.5 | 711   |
| 10M         | QPSK      | 1               | 0         | 22.94 | 23.02 | 23.05 |
|             |           | 1               | 24        | 23.19 | 23.14 | 23.31 |
|             |           | 1               | 49        | 23.00 | 22.93 | 23.14 |
|             |           | 25              | 0         | 22.00 | 21.97 | 22.21 |
|             |           | 25              | 12        | 21.99 | 22.05 | 22.23 |
|             |           | 25              | 25        | 21.84 | 22.02 | 22.21 |
|             |           | 50              | 0         | 21.86 | 22.07 | 22.17 |
| 10M         | 16QAM     | 1               | 0         | 22.16 | 22.04 | 22.16 |
|             |           | 1               | 24        | 22.16 | 22.10 | 22.22 |
|             |           | 1               | 49        | 22.03 | 22.06 | 22.18 |
|             |           | 25              | 0         | 21.14 | 21.26 | 21.43 |
|             |           | 25              | 12        | 20.99 | 21.17 | 21.38 |
|             |           | 25              | 25        | 21.06 | 21.21 | 21.43 |
|             |           | 50              | 0         | 21.11 | 21.23 | 21.46 |
| 10M         | 64QAM     | 1               | 0         | 21.34 | 21.35 | 21.38 |
|             |           | 1               | 24        | 21.34 | 21.42 | 21.50 |
|             |           | 1               | 49        | 21.12 | 21.23 | 21.38 |
|             |           | 25              | 0         | 20.11 | 20.21 | 20.36 |
|             |           | 25              | 12        | 20.02 | 20.14 | 20.29 |
|             |           | 25              | 25        | 20.08 | 20.26 | 20.36 |
|             |           | 50              | 0         | 19.91 | 20.17 | 20.32 |

| LTE Band 12 |           |                 |           |       |       |       |
|-------------|-----------|-----------------|-----------|-------|-------|-------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|             |           | Channel         |           | 23035 | 23095 | 23155 |
|             |           | Frequency (MHz) |           | 701.5 | 707.5 | 713.5 |
| 5M          | QPSK      | 1               | 0         | 22.83 | 23.01 | 22.86 |
|             |           | 1               | 12        | 22.81 | 23.08 | 23.11 |
|             |           | 1               | 24        | 22.33 | 22.66 | 22.43 |
|             |           | 12              | 0         | 21.55 | 21.88 | 21.63 |
|             |           | 12              | 6         | 21.63 | 22.05 | 21.81 |
|             |           | 12              | 13        | 21.47 | 21.93 | 21.79 |
|             |           | 25              | 0         | 21.59 | 22.05 | 21.86 |
| 5M          | 16QAM     | 1               | 0         | 21.98 | 21.94 | 22.04 |
|             |           | 1               | 12        | 22.02 | 22.08 | 22.27 |
|             |           | 1               | 24        | 21.80 | 21.97 | 22.25 |
|             |           | 12              | 0         | 20.79 | 21.07 | 21.35 |
|             |           | 12              | 6         | 20.76 | 21.13 | 21.45 |
|             |           | 12              | 13        | 20.66 | 21.07 | 21.43 |
|             |           | 25              | 0         | 20.78 | 21.18 | 21.46 |
| 5M          | 64QAM     | 1               | 0         | 21.17 | 21.05 | 20.88 |
|             |           | 1               | 12        | 21.47 | 21.40 | 21.53 |
|             |           | 1               | 24        | 21.29 | 21.24 | 20.99 |
|             |           | 12              | 0         | 20.13 | 20.14 | 19.86 |
|             |           | 12              | 6         | 20.18 | 20.21 | 19.92 |
|             |           | 12              | 13        | 20.07 | 20.17 | 19.92 |
|             |           | 25              | 0         | 19.96 | 20.06 | 19.78 |

| LTE Band 12 |           |                 |           |       |       |       |
|-------------|-----------|-----------------|-----------|-------|-------|-------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|             |           | Channel         |           | 23025 | 23095 | 23165 |
|             |           | Frequency (MHz) |           | 700.5 | 707.5 | 714.5 |
| 3M          | QPSK      | 1               | 0         | 22.83 | 22.91 | 22.96 |
|             |           | 1               | 7         | 22.95 | 23.06 | 23.15 |
|             |           | 1               | 14        | 22.71 | 22.94 | 23.01 |
|             |           | 8               | 0         | 21.85 | 22.12 | 22.24 |
|             |           | 8               | 3         | 21.82 | 22.16 | 22.34 |
|             |           | 8               | 7         | 21.80 | 22.12 | 22.25 |
|             |           | 15              | 0         | 21.68 | 22.05 | 22.22 |
| 3M          | 16QAM     | 1               | 0         | 22.16 | 22.48 | 22.32 |
|             |           | 1               | 7         | 22.20 | 22.52 | 22.63 |
|             |           | 1               | 14        | 22.12 | 22.57 | 22.56 |
|             |           | 8               | 0         | 20.62 | 21.15 | 21.11 |
|             |           | 8               | 3         | 20.65 | 21.17 | 21.10 |
|             |           | 8               | 7         | 20.70 | 21.24 | 21.20 |
|             |           | 15              | 0         | 20.50 | 21.05 | 20.95 |
| 3M          | 64QAM     | 1               | 0         | 21.18 | 21.41 | 21.14 |
|             |           | 1               | 7         | 21.38 | 21.33 | 21.58 |
|             |           | 1               | 14        | 21.02 | 21.31 | 21.09 |
|             |           | 8               | 0         | 19.83 | 20.16 | 19.94 |
|             |           | 8               | 3         | 19.72 | 20.13 | 19.99 |
|             |           | 8               | 7         | 19.68 | 20.09 | 20.01 |
|             |           | 15              | 0         | 19.57 | 20.03 | 19.96 |

| LTE Band 12 |           |                 |           |       |       |       |
|-------------|-----------|-----------------|-----------|-------|-------|-------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|             |           | Channel         |           | 23017 | 23095 | 23173 |
|             |           | Frequency (MHz) |           | 699.7 | 707.5 | 715.3 |
| 1.4M        | QPSK      | 1               | 0         | 22.80 | 22.81 | 22.87 |
|             |           | 1               | 2         | 23.03 | 23.04 | 23.12 |
|             |           | 1               | 5         | 22.85 | 22.87 | 22.93 |
|             |           | 3               | 0         | 22.90 | 22.95 | 22.94 |
|             |           | 3               | 1         | 22.75 | 22.85 | 22.74 |
|             |           | 3               | 3         | 22.64 | 22.86 | 22.83 |
|             |           | 6               | 0         | 21.84 | 22.15 | 22.04 |
| 1.4M        | 16QAM     | 1               | 0         | 21.87 | 21.76 | 22.06 |
|             |           | 1               | 2         | 22.26 | 22.17 | 22.56 |
|             |           | 1               | 5         | 21.91 | 21.87 | 22.34 |
|             |           | 3               | 0         | 21.78 | 21.86 | 22.40 |
|             |           | 3               | 1         | 21.89 | 22.04 | 22.54 |
|             |           | 3               | 3         | 21.72 | 21.88 | 22.45 |
|             |           | 6               | 0         | 21.11 | 21.28 | 21.77 |
| 1.4M        | 64QAM     | 1               | 0         | 21.04 | 21.19 | 21.07 |
|             |           | 1               | 2         | 21.09 | 21.02 | 21.23 |
|             |           | 1               | 5         | 20.95 | 21.19 | 21.01 |
|             |           | 3               | 0         | 20.84 | 21.08 | 20.80 |
|             |           | 3               | 1         | 20.77 | 21.12 | 20.89 |
|             |           | 3               | 3         | 20.58 | 21.05 | 20.75 |
|             |           | 6               | 0         | 19.55 | 20.01 | 19.62 |

| LTE Band 17 |           |                 |           |       |       |       |
|-------------|-----------|-----------------|-----------|-------|-------|-------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|             |           | Channel         |           | 23780 | 23790 | 23800 |
|             |           | Frequency (MHz) |           | 709   | 710   | 711   |
| 10M         | QPSK      | 1               | 0         | 22.73 | 23.11 | 22.98 |
|             |           | 1               | 24        | 23.31 | 23.32 | 22.75 |
|             |           | 1               | 49        | 23.00 | 22.65 | 22.69 |
|             |           | 25              | 0         | 21.91 | 22.16 | 22.03 |
|             |           | 25              | 12        | 22.32 | 21.80 | 22.18 |
|             |           | 25              | 25        | 21.98 | 21.69 | 21.67 |
|             |           | 50              | 0         | 21.74 | 22.05 | 21.69 |
| 10M         | 16QAM     | 1               | 0         | 22.08 | 21.74 | 22.11 |
|             |           | 1               | 24        | 21.99 | 22.59 | 22.13 |
|             |           | 1               | 49        | 21.88 | 21.97 | 22.04 |
|             |           | 25              | 0         | 21.06 | 21.14 | 20.69 |
|             |           | 25              | 12        | 21.11 | 20.81 | 21.22 |
|             |           | 25              | 25        | 20.84 | 20.94 | 21.03 |
|             |           | 50              | 0         | 20.70 | 20.90 | 20.97 |
| 10M         | 64QAM     | 1               | 0         | 21.12 | 21.08 | 21.30 |
|             |           | 1               | 24        | 21.04 | 21.63 | 21.29 |
|             |           | 1               | 49        | 20.92 | 21.09 | 20.86 |
|             |           | 25              | 0         | 20.06 | 20.00 | 19.72 |
|             |           | 25              | 12        | 19.95 | 19.76 | 20.23 |
|             |           | 25              | 25        | 20.09 | 19.90 | 19.91 |
|             |           | 50              | 0         | 20.03 | 19.72 | 20.21 |

| LTE Band 17 |           |                 |           |       |       |       |
|-------------|-----------|-----------------|-----------|-------|-------|-------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|             |           | Channel         |           | 23755 | 23790 | 23825 |
|             |           | Frequency (MHz) |           | 706.5 | 710   | 713.5 |
| 5M          | QPSK      | 1               | 0         | 22.84 | 23.03 | 22.62 |
|             |           | 1               | 12        | 23.04 | 22.77 | 22.79 |
|             |           | 1               | 24        | 22.78 | 22.95 | 22.60 |
|             |           | 12              | 0         | 21.96 | 21.80 | 22.19 |
|             |           | 12              | 6         | 22.10 | 21.97 | 21.81 |
|             |           | 12              | 13        | 21.94 | 21.76 | 21.87 |
|             |           | 25              | 0         | 21.95 | 21.72 | 21.70 |
| 5M          | 16QAM     | 1               | 0         | 21.93 | 21.69 | 21.88 |
|             |           | 1               | 12        | 22.29 | 22.50 | 22.18 |
|             |           | 1               | 24        | 21.91 | 21.84 | 21.98 |
|             |           | 12              | 0         | 20.96 | 20.93 | 20.93 |
|             |           | 12              | 6         | 21.04 | 21.20 | 21.05 |
|             |           | 12              | 13        | 20.97 | 20.95 | 21.10 |
|             |           | 25              | 0         | 20.99 | 20.75 | 21.16 |
| 5M          | 64QAM     | 1               | 0         | 21.09 | 21.01 | 21.30 |
|             |           | 1               | 12        | 21.34 | 21.41 | 21.25 |
|             |           | 1               | 24        | 21.02 | 20.89 | 20.86 |
|             |           | 12              | 0         | 19.98 | 20.28 | 20.09 |
|             |           | 12              | 6         | 20.03 | 20.02 | 20.11 |
|             |           | 12              | 13        | 19.92 | 20.10 | 19.74 |
|             |           | 25              | 0         | 19.97 | 19.80 | 19.81 |

| LTE Band 66 |           |                 |           |        |        |        |
|-------------|-----------|-----------------|-----------|--------|--------|--------|
| BW          | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|             |           | Channel         |           | 132072 | 132322 | 132572 |
|             |           | Frequency (MHz) |           | 1720   | 1745   | 1770   |
| 20M         | QPSK      | 1               | 0         | 22.63  | 22.11  | 22.46  |
|             |           | 1               | 50        | 22.55  | 22.95  | 22.56  |
|             |           | 1               | 99        | 22.48  | 22.27  | 22.45  |
|             |           | 50              | 0         | 21.67  | 21.35  | 21.62  |
|             |           | 50              | 25        | 21.68  | 21.42  | 21.62  |
|             |           | 50              | 50        | 21.34  | 21.51  | 21.33  |
|             |           | 100             | 0         | 21.62  | 21.47  | 21.82  |
| 20M         | 16QAM     | 1               | 0         | 21.68  | 21.58  | 21.73  |
|             |           | 1               | 50        | 21.73  | 22.19  | 21.81  |
|             |           | 1               | 99        | 22.10  | 21.75  | 22.09  |
|             |           | 50              | 0         | 20.07  | 20.36  | 20.11  |
|             |           | 50              | 25        | 20.20  | 20.69  | 20.72  |
|             |           | 50              | 50        | 20.52  | 20.36  | 20.71  |
|             |           | 100             | 0         | 20.33  | 20.26  | 20.46  |
| 20M         | 64QAM     | 1               | 0         | 20.51  | 20.78  | 20.58  |
|             |           | 1               | 50        | 20.59  | 20.87  | 21.00  |
|             |           | 1               | 99        | 20.57  | 20.77  | 20.84  |
|             |           | 50              | 0         | 19.62  | 19.70  | 19.38  |
|             |           | 50              | 25        | 19.34  | 19.43  | 19.41  |
|             |           | 50              | 50        | 19.32  | 19.58  | 19.78  |
|             |           | 100             | 0         | 19.36  | 19.67  | 19.44  |

| LTE Band 66 |           |                 |           |        |        |        |
|-------------|-----------|-----------------|-----------|--------|--------|--------|
| BW          | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|             |           | Channel         |           | 132047 | 132322 | 132597 |
|             |           | Frequency (MHz) |           | 1717.5 | 1745   | 1772.5 |
| 15M         | QPSK      | 1               | 0         | 22.12  | 22.29  | 22.64  |
|             |           | 1               | 37        | 22.65  | 22.94  | 22.74  |
|             |           | 1               | 74        | 22.35  | 22.49  | 22.35  |
|             |           | 36              | 0         | 21.66  | 21.79  | 21.59  |
|             |           | 36              | 19        | 21.28  | 21.74  | 21.69  |
|             |           | 36              | 39        | 21.39  | 21.35  | 21.83  |
|             |           | 75              | 0         | 21.51  | 21.25  | 21.38  |
| 15M         | 16QAM     | 1               | 0         | 21.66  | 21.69  | 21.55  |
|             |           | 1               | 37        | 22.19  | 21.87  | 21.81  |
|             |           | 1               | 74        | 22.03  | 22.13  | 21.78  |
|             |           | 36              | 0         | 20.61  | 20.37  | 20.39  |
|             |           | 36              | 19        | 20.46  | 20.49  | 20.39  |
|             |           | 36              | 39        | 20.58  | 20.27  | 20.29  |
|             |           | 75              | 0         | 20.61  | 20.69  | 20.18  |
| 15M         | 64QAM     | 1               | 0         | 20.64  | 20.56  | 20.63  |
|             |           | 1               | 50        | 20.91  | 20.84  | 20.72  |
|             |           | 1               | 99        | 20.59  | 20.57  | 20.82  |
|             |           | 50              | 0         | 19.54  | 19.74  | 19.82  |
|             |           | 50              | 25        | 19.48  | 19.89  | 19.65  |
|             |           | 50              | 50        | 19.82  | 19.65  | 19.30  |
|             |           | 100             | 0         | 19.62  | 19.59  | 19.56  |

| LTE Band 66 |           |                 |           |        |        |        |
|-------------|-----------|-----------------|-----------|--------|--------|--------|
| BW          | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|             |           | Channel         |           | 132022 | 132322 | 132622 |
|             |           | Frequency (MHz) |           | 1715   | 1745   | 1775   |
| 10M         | QPSK      | 1               | 0         | 22.23  | 22.22  | 22.44  |
|             |           | 1               | 24        | 22.49  | 22.47  | 22.71  |
|             |           | 1               | 49        | 22.55  | 22.34  | 22.20  |
|             |           | 25              | 0         | 21.54  | 21.26  | 21.80  |
|             |           | 25              | 12        | 21.30  | 21.68  | 21.45  |
|             |           | 25              | 25        | 21.80  | 21.33  | 21.48  |
|             |           | 50              | 0         | 21.56  | 21.75  | 21.84  |
| 10M         | 16QAM     | 1               | 0         | 21.72  | 21.62  | 21.67  |
|             |           | 1               | 24        | 22.13  | 21.93  | 22.12  |
|             |           | 1               | 49        | 21.53  | 21.91  | 21.96  |
|             |           | 25              | 0         | 20.50  | 20.11  | 20.11  |
|             |           | 25              | 12        | 20.43  | 20.73  | 20.37  |
|             |           | 25              | 25        | 20.48  | 20.36  | 20.56  |
|             |           | 50              | 0         | 20.47  | 20.40  | 20.49  |
| 10M         | 64QAM     | 1               | 0         | 20.67  | 20.78  | 20.40  |
|             |           | 1               | 50        | 20.73  | 20.84  | 21.03  |
|             |           | 1               | 99        | 20.28  | 20.83  | 20.39  |
|             |           | 50              | 0         | 19.30  | 19.52  | 19.29  |
|             |           | 50              | 25        | 19.63  | 19.53  | 19.59  |
|             |           | 50              | 50        | 19.66  | 19.30  | 19.45  |
|             |           | 100             | 0         | 19.80  | 19.74  | 19.75  |

| LTE Band 66 |           |                 |           |        |        |        |
|-------------|-----------|-----------------|-----------|--------|--------|--------|
| BW          | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|             |           | Channel         |           | 131997 | 132322 | 132647 |
|             |           | Frequency (MHz) |           | 1712.5 | 1745   | 1777.5 |
| 5M          | QPSK      | 1               | 0         | 22.37  | 22.08  | 22.34  |
|             |           | 1               | 12        | 22.77  | 22.82  | 22.63  |
|             |           | 1               | 24        | 22.39  | 22.47  | 22.49  |
|             |           | 12              | 0         | 21.53  | 21.25  | 21.76  |
|             |           | 12              | 6         | 21.58  | 21.61  | 21.38  |
|             |           | 12              | 13        | 21.53  | 21.30  | 21.63  |
|             |           | 25              | 0         | 21.54  | 21.24  | 21.63  |
| 5M          | 16QAM     | 1               | 0         | 21.68  | 21.52  | 21.55  |
|             |           | 1               | 12        | 21.98  | 21.79  | 21.93  |
|             |           | 1               | 24        | 21.83  | 22.12  | 21.71  |
|             |           | 12              | 0         | 20.35  | 20.41  | 20.42  |
|             |           | 12              | 6         | 20.47  | 20.62  | 20.64  |
|             |           | 12              | 13        | 20.48  | 20.77  | 20.69  |
|             |           | 25              | 0         | 20.47  | 20.40  | 20.20  |
| 5M          | 64QAM     | 1               | 0         | 20.48  | 20.73  | 20.23  |
|             |           | 1               | 50        | 20.78  | 20.61  | 20.70  |
|             |           | 1               | 99        | 20.54  | 20.56  | 20.38  |
|             |           | 50              | 0         | 19.52  | 19.55  | 19.68  |
|             |           | 50              | 25        | 19.62  | 19.46  | 19.72  |
|             |           | 50              | 50        | 19.56  | 19.30  | 19.82  |
|             |           | 100             | 0         | 19.50  | 19.39  | 19.38  |

| LTE Band 66 |           |                 |           |        |        |        |
|-------------|-----------|-----------------|-----------|--------|--------|--------|
| BW          | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|             |           | Channel         |           | 131987 | 132322 | 132657 |
|             |           | Frequency (MHz) |           | 1711.5 | 1745   | 1778.5 |
| 3M          | QPSK      | 1               | 0         | 22.23  | 22.40  | 22.49  |
|             |           | 1               | 7         | 22.56  | 22.48  | 22.94  |
|             |           | 1               | 14        | 22.54  | 22.15  | 22.11  |
|             |           | 8               | 0         | 21.81  | 21.35  | 21.73  |
|             |           | 8               | 3         | 21.78  | 21.38  | 21.73  |
|             |           | 8               | 7         | 21.32  | 21.43  | 21.36  |
|             |           | 15              | 0         | 21.31  | 21.31  | 21.33  |
| 3M          | 16QAM     | 1               | 0         | 21.54  | 21.69  | 21.51  |
|             |           | 1               | 7         | 22.17  | 21.82  | 22.24  |
|             |           | 1               | 14        | 21.79  | 22.08  | 21.62  |
|             |           | 8               | 0         | 20.35  | 20.51  | 20.10  |
|             |           | 8               | 3         | 20.52  | 20.39  | 20.18  |
|             |           | 8               | 7         | 20.19  | 20.36  | 20.44  |
|             |           | 15              | 0         | 20.56  | 20.34  | 20.67  |
| 3M          | 64QAM     | 1               | 0         | 20.23  | 20.75  | 20.38  |
|             |           | 1               | 50        | 20.56  | 20.74  | 20.62  |
|             |           | 1               | 99        | 20.38  | 20.72  | 20.70  |
|             |           | 50              | 0         | 19.70  | 19.29  | 19.41  |
|             |           | 50              | 25        | 19.55  | 19.54  | 19.51  |
|             |           | 50              | 50        | 19.53  | 19.28  | 19.74  |
|             |           | 100             | 0         | 19.28  | 19.50  | 19.74  |

| LTE Band 66 |           |                 |           |        |        |        |
|-------------|-----------|-----------------|-----------|--------|--------|--------|
| BW          | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|             |           | Channel         |           | 131979 | 132322 | 132665 |
|             |           | Frequency (MHz) |           | 1710.7 | 1745   | 1779.3 |
| 1.4M        | QPSK      | 1               | 0         | 22.51  | 22.07  | 22.50  |
|             |           | 1               | 2         | 22.57  | 22.53  | 22.74  |
|             |           | 1               | 5         | 22.33  | 22.66  | 22.30  |
|             |           | 3               | 0         | 21.81  | 21.29  | 21.57  |
|             |           | 3               | 1         | 21.40  | 21.55  | 21.51  |
|             |           | 3               | 3         | 21.38  | 21.52  | 21.27  |
|             |           | 6               | 0         | 21.60  | 21.57  | 21.52  |
| 1.4M        | 16QAM     | 1               | 0         | 21.69  | 21.92  | 21.76  |
|             |           | 1               | 2         | 21.68  | 21.84  | 21.81  |
|             |           | 1               | 5         | 22.10  | 21.89  | 21.75  |
|             |           | 3               | 0         | 20.29  | 20.07  | 20.25  |
|             |           | 3               | 1         | 20.37  | 20.38  | 20.17  |
|             |           | 3               | 3         | 20.69  | 20.32  | 20.47  |
|             |           | 6               | 0         | 20.37  | 20.54  | 20.19  |
| 1.4M        | 64QAM     | 1               | 0         | 20.23  | 20.63  | 20.74  |
|             |           | 1               | 50        | 20.55  | 20.77  | 20.53  |
|             |           | 1               | 99        | 20.48  | 20.78  | 20.65  |
|             |           | 50              | 0         | 19.32  | 19.80  | 19.37  |
|             |           | 50              | 25        | 19.77  | 19.63  | 19.81  |
|             |           | 50              | 50        | 19.65  | 19.69  | 19.46  |
|             |           | 100             | 0         | 19.52  | 19.39  | 19.27  |

**EIRP / ERP Power (dBm)**

| LTE Band 4 |           |                 |           |       |        |       |
|------------|-----------|-----------------|-----------|-------|--------|-------|
| BW         | MCS Index | RB Size         | RB Offset | Low   | Mid    | High  |
|            |           | Channel         |           | 20050 | 20175  | 20300 |
|            |           | Frequency (MHz) |           | 1720  | 1732.5 | 1745  |
| 20M        | QPSK      | 1               | 0         | 24.14 | 24.07  | 23.91 |
|            |           | 1               | 50        | 24.45 | 24.20  | 23.94 |
|            |           | 1               | 99        | 23.87 | 23.85  | 23.53 |
|            |           | 50              | 0         | 23.00 | 23.09  | 22.76 |
|            |           | 50              | 25        | 22.93 | 23.06  | 22.73 |
|            |           | 50              | 50        | 22.90 | 23.11  | 22.87 |
|            |           | 100             | 0         | 22.78 | 23.05  | 22.71 |
| 20M        | 16QAM     | 1               | 0         | 23.43 | 23.36  | 23.16 |
|            |           | 1               | 50        | 23.54 | 23.31  | 23.18 |
|            |           | 1               | 99        | 23.37 | 23.30  | 23.19 |
|            |           | 50              | 0         | 21.99 | 21.99  | 21.86 |
|            |           | 50              | 25        | 22.09 | 22.13  | 22.10 |
|            |           | 50              | 50        | 22.19 | 22.20  | 22.17 |
|            |           | 100             | 0         | 22.03 | 22.13  | 22.02 |
| 20M        | 64QAM     | 1               | 0         | 22.34 | 22.33  | 22.24 |
|            |           | 1               | 50        | 22.41 | 22.40  | 22.35 |
|            |           | 1               | 99        | 21.92 | 21.95  | 21.83 |
|            |           | 50              | 0         | 21.00 | 21.12  | 20.97 |
|            |           | 50              | 25        | 21.03 | 21.18  | 20.96 |
|            |           | 50              | 50        | 20.98 | 21.10  | 20.90 |
|            |           | 100             | 0         | 21.00 | 21.14  | 20.95 |

\*EIRP = Conducted + antenna gain (1.57dBi)

| LTE Band 4 |           |                 |           |        |        |        |
|------------|-----------|-----------------|-----------|--------|--------|--------|
| BW         | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|            |           | Channel         |           | 20025  | 20175  | 20325  |
|            |           | Frequency (MHz) |           | 1717.5 | 1732.5 | 1747.5 |
| 15M        | QPSK      | 1               | 0         | 24.13  | 24.03  | 23.88  |
|            |           | 1               | 37        | 24.44  | 24.35  | 24.11  |
|            |           | 1               | 74        | 23.97  | 23.99  | 23.73  |
|            |           | 36              | 0         | 23.00  | 23.11  | 22.80  |
|            |           | 36              | 19        | 23.11  | 23.23  | 22.94  |
|            |           | 36              | 39        | 22.89  | 23.10  | 22.91  |
|            |           | 75              | 0         | 22.82  | 23.10  | 22.81  |
| 15M        | 16QAM     | 1               | 0         | 23.43  | 23.22  | 23.17  |
|            |           | 1               | 37        | 23.53  | 23.35  | 23.29  |
|            |           | 1               | 74        | 23.49  | 23.41  | 23.35  |
|            |           | 36              | 0         | 22.08  | 22.12  | 22.06  |
|            |           | 36              | 19        | 22.04  | 22.14  | 22.04  |
|            |           | 36              | 39        | 21.78  | 22.00  | 21.90  |
|            |           | 75              | 0         | 21.94  | 22.18  | 22.17  |
| 15M        | 64QAM     | 1               | 0         | 22.24  | 22.22  | 22.18  |
|            |           | 1               | 37        | 22.40  | 22.40  | 22.38  |
|            |           | 1               | 74        | 22.26  | 22.34  | 22.33  |
|            |           | 36              | 0         | 20.89  | 21.05  | 21.11  |
|            |           | 36              | 19        | 20.95  | 21.12  | 21.18  |
|            |           | 36              | 39        | 20.84  | 21.11  | 21.15  |
|            |           | 75              | 0         | 20.70  | 21.00  | 21.14  |

\*EIRP = Conducted + antenna gain (1.57dBi)

| LTE Band 4 |           |                 |           |       |        |       |
|------------|-----------|-----------------|-----------|-------|--------|-------|
| BW         | MCS Index | RB Size         | RB Offset | Low   | Mid    | High  |
|            |           | Channel         |           | 20000 | 20175  | 20350 |
|            |           | Frequency (MHz) |           | 1715  | 1732.5 | 1750  |
| 10M        | QPSK      | 1               | 0         | 24.15 | 24.14  | 23.85 |
|            |           | 1               | 24        | 24.19 | 24.07  | 23.69 |
|            |           | 1               | 49        | 24.05 | 24.08  | 23.69 |
|            |           | 25              | 0         | 22.90 | 23.01  | 22.56 |
|            |           | 25              | 12        | 22.96 | 23.13  | 22.62 |
|            |           | 25              | 25        | 23.03 | 23.20  | 22.67 |
|            |           | 50              | 0         | 22.86 | 23.14  | 22.51 |
| 10M        | 16QAM     | 1               | 0         | 23.13 | 23.36  | 23.13 |
|            |           | 1               | 24        | 23.43 | 23.41  | 23.18 |
|            |           | 1               | 49        | 22.81 | 23.15  | 22.93 |
|            |           | 25              | 0         | 21.71 | 22.03  | 21.89 |
|            |           | 25              | 12        | 21.89 | 22.20  | 22.12 |
|            |           | 25              | 25        | 21.83 | 22.21  | 22.07 |
|            |           | 50              | 0         | 21.78 | 22.14  | 21.93 |
| 10M        | 64QAM     | 1               | 0         | 22.25 | 22.24  | 22.14 |
|            |           | 1               | 24        | 22.34 | 22.16  | 22.11 |
|            |           | 1               | 49        | 22.08 | 22.25  | 22.03 |
|            |           | 25              | 0         | 20.88 | 21.05  | 20.74 |
|            |           | 25              | 12        | 20.95 | 21.14  | 20.88 |
|            |           | 25              | 25        | 21.01 | 21.23  | 20.89 |
|            |           | 50              | 0         | 20.83 | 21.16  | 20.86 |

\*EIRP = Conducted + antenna gain (1.57dBi)

| LTE Band 4 |           |                 |           |        |        |        |
|------------|-----------|-----------------|-----------|--------|--------|--------|
| BW         | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|            |           | Channel         |           | 19975  | 20175  | 20375  |
|            |           | Frequency (MHz) |           | 1712.5 | 1732.5 | 1752.5 |
| 5M         | QPSK      | 1               | 0         | 24.03  | 24.08  | 23.81  |
|            |           | 1               | 12        | 23.89  | 24.10  | 23.71  |
|            |           | 1               | 24        | 23.62  | 23.90  | 23.63  |
|            |           | 12              | 0         | 22.74  | 23.00  | 22.73  |
|            |           | 12              | 6         | 22.93  | 23.19  | 22.83  |
|            |           | 12              | 13        | 22.67  | 23.05  | 22.78  |
|            |           | 25              | 0         | 22.63  | 23.11  | 22.81  |
| 5M         | 16QAM     | 1               | 0         | 23.15  | 23.30  | 23.20  |
|            |           | 1               | 12        | 23.27  | 23.41  | 23.34  |
|            |           | 1               | 24        | 23.13  | 23.24  | 23.08  |
|            |           | 12              | 0         | 21.93  | 22.03  | 21.85  |
|            |           | 12              | 6         | 22.01  | 22.16  | 22.00  |
|            |           | 12              | 13        | 21.85  | 22.06  | 21.94  |
|            |           | 25              | 0         | 21.67  | 22.00  | 21.79  |
| 5M         | 64QAM     | 1               | 0         | 21.98  | 22.23  | 22.03  |
|            |           | 1               | 12        | 22.11  | 22.24  | 22.15  |
|            |           | 1               | 24        | 21.99  | 22.16  | 21.94  |
|            |           | 12              | 0         | 20.71  | 21.25  | 20.76  |
|            |           | 12              | 6         | 20.44  | 21.03  | 20.58  |
|            |           | 12              | 13        | 20.50  | 21.10  | 20.74  |
|            |           | 25              | 0         | 20.33  | 21.04  | 20.74  |

\*EIRP = Conducted + antenna gain (1.57dBi)

| LTE Band 4 |           |                 |           |        |        |        |
|------------|-----------|-----------------|-----------|--------|--------|--------|
| BW         | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|            |           | Channel         |           | 19965  | 20175  | 20385  |
|            |           | Frequency (MHz) |           | 1711.5 | 1732.5 | 1753.5 |
| 3M         | QPSK      | 1               | 0         | 24.10  | 24.03  | 23.85  |
|            |           | 1               | 7         | 24.32  | 24.33  | 24.17  |
|            |           | 1               | 14        | 24.20  | 24.16  | 24.05  |
|            |           | 8               | 0         | 23.17  | 23.13  | 23.11  |
|            |           | 8               | 3         | 22.97  | 23.00  | 23.03  |
|            |           | 8               | 7         | 23.07  | 23.07  | 23.09  |
|            |           | 15              | 0         | 22.83  | 22.89  | 22.99  |
| 3M         | 16QAM     | 1               | 0         | 23.12  | 23.05  | 23.13  |
|            |           | 1               | 7         | 23.30  | 23.42  | 23.40  |
|            |           | 1               | 14        | 23.35  | 23.28  | 23.35  |
|            |           | 8               | 0         | 22.02  | 22.03  | 22.37  |
|            |           | 8               | 3         | 22.19  | 22.22  | 22.64  |
|            |           | 8               | 7         | 22.04  | 22.11  | 22.63  |
|            |           | 15              | 0         | 21.97  | 22.05  | 22.48  |
| 3M         | 64QAM     | 1               | 0         | 21.90  | 22.32  | 21.94  |
|            |           | 1               | 7         | 21.92  | 22.41  | 22.10  |
|            |           | 1               | 14        | 21.78  | 22.38  | 22.05  |
|            |           | 8               | 0         | 20.38  | 21.03  | 20.68  |
|            |           | 8               | 3         | 20.53  | 21.22  | 20.94  |
|            |           | 8               | 7         | 20.33  | 21.14  | 20.81  |
|            |           | 15              | 0         | 20.14  | 21.04  | 20.71  |

\*EIRP = Conducted + antenna gain (1.57dBi)

| LTE Band 4 |           |                 |           |        |        |        |
|------------|-----------|-----------------|-----------|--------|--------|--------|
| BW         | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|            |           | Channel         |           | 19957  | 20175  | 20393  |
|            |           | Frequency (MHz) |           | 1710.7 | 1732.5 | 1754.3 |
| 1.4M       | QPSK      | 1               | 0         | 24.11  | 23.95  | 23.85  |
|            |           | 1               | 2         | 24.18  | 24.06  | 24.04  |
|            |           | 1               | 5         | 24.10  | 24.00  | 23.98  |
|            |           | 3               | 0         | 24.08  | 24.09  | 24.16  |
|            |           | 3               | 1         | 24.03  | 24.14  | 24.15  |
|            |           | 3               | 3         | 24.02  | 24.11  | 24.14  |
|            |           | 6               | 0         | 22.95  | 23.10  | 23.21  |
| 1.4M       | 16QAM     | 1               | 0         | 23.12  | 23.14  | 22.92  |
|            |           | 1               | 2         | 23.28  | 23.27  | 23.15  |
|            |           | 1               | 5         | 23.10  | 23.19  | 23.05  |
|            |           | 3               | 0         | 23.14  | 23.22  | 23.01  |
|            |           | 3               | 1         | 23.07  | 23.19  | 22.92  |
|            |           | 3               | 3         | 23.18  | 23.14  | 22.93  |
|            |           | 6               | 0         | 21.85  | 22.03  | 21.69  |
| 1.4M       | 64QAM     | 1               | 0         | 21.88  | 22.13  | 21.86  |
|            |           | 1               | 2         | 22.25  | 22.09  | 21.88  |
|            |           | 1               | 5         | 22.16  | 22.23  | 22.14  |
|            |           | 3               | 0         | 21.93  | 22.20  | 21.89  |
|            |           | 3               | 1         | 21.92  | 22.24  | 21.95  |
|            |           | 3               | 3         | 21.96  | 22.20  | 22.00  |
|            |           | 6               | 0         | 20.63  | 21.06  | 20.76  |

\*EIRP = Conducted + antenna gain (1.57dBi)

| LTE Band 7 |           |                 |           |       |       |       |
|------------|-----------|-----------------|-----------|-------|-------|-------|
| BW         | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|            |           | Channel         |           | 20850 | 21100 | 21350 |
|            |           | Frequency (MHz) |           | 2510  | 2535  | 2560  |
| 20M        | QPSK      | 1               | 0         | 24.94 | 24.07 | 23.83 |
|            |           | 1               | 50        | 24.71 | 23.99 | 23.83 |
|            |           | 1               | 99        | 24.32 | 23.69 | 23.60 |
|            |           | 50              | 0         | 23.73 | 23.18 | 23.10 |
|            |           | 50              | 25        | 23.46 | 23.00 | 23.02 |
|            |           | 50              | 50        | 23.47 | 23.05 | 23.12 |
|            |           | 100             | 0         | 23.49 | 23.08 | 23.24 |
| 20M        | 16QAM     | 1               | 0         | 24.00 | 23.29 | 23.02 |
|            |           | 1               | 50        | 23.93 | 23.33 | 22.99 |
|            |           | 1               | 99        | 23.71 | 23.08 | 22.72 |
|            |           | 50              | 0         | 22.76 | 22.24 | 21.96 |
|            |           | 50              | 25        | 22.49 | 21.98 | 21.78 |
|            |           | 50              | 50        | 22.63 | 22.17 | 21.97 |
|            |           | 100             | 0         | 22.52 | 22.09 | 21.96 |
| 20M        | 64QAM     | 1               | 0         | 23.00 | 22.40 | 22.33 |
|            |           | 1               | 50        | 22.93 | 22.39 | 22.25 |
|            |           | 1               | 99        | 22.21 | 21.73 | 21.49 |
|            |           | 50              | 0         | 21.70 | 21.23 | 20.93 |
|            |           | 50              | 25        | 21.35 | 20.98 | 20.63 |
|            |           | 50              | 50        | 21.34 | 21.09 | 20.77 |
|            |           | 100             | 0         | 21.30 | 21.09 | 20.79 |

\*EIRP = Conducted + antenna gain (2.15dBi)

| LTE Band 7 |           |                 |           |        |       |        |
|------------|-----------|-----------------|-----------|--------|-------|--------|
| BW         | MCS Index | RB Size         | RB Offset | Low    | Mid   | High   |
|            |           | Channel         |           | 20825  | 21100 | 21375  |
|            |           | Frequency (MHz) |           | 2507.5 | 2535  | 2562.5 |
| 15M        | QPSK      | 1               | 0         | 24.71  | 23.98 | 23.83  |
|            |           | 1               | 37        | 24.93  | 24.23 | 24.04  |
|            |           | 1               | 74        | 24.46  | 23.74 | 23.60  |
|            |           | 36              | 0         | 23.84  | 23.10 | 22.97  |
|            |           | 36              | 19        | 23.81  | 23.13 | 23.10  |
|            |           | 36              | 39        | 23.72  | 23.02 | 22.99  |
|            |           | 75              | 0         | 23.68  | 23.05 | 22.93  |
| 15M        | 16QAM     | 1               | 0         | 23.95  | 23.12 | 22.99  |
|            |           | 1               | 37        | 24.25  | 23.39 | 23.21  |
|            |           | 1               | 74        | 23.76  | 22.89 | 22.73  |
|            |           | 36              | 0         | 22.86  | 22.11 | 22.05  |
|            |           | 36              | 19        | 22.80  | 22.10 | 22.11  |
|            |           | 36              | 39        | 22.81  | 22.09 | 22.09  |
|            |           | 75              | 0         | 22.78  | 22.17 | 22.11  |
| 15M        | 64QAM     | 1               | 0         | 22.87  | 22.36 | 22.30  |
|            |           | 1               | 37        | 22.89  | 22.30 | 22.22  |
|            |           | 1               | 74        | 22.54  | 22.21 | 22.07  |
|            |           | 36              | 0         | 21.39  | 21.16 | 21.10  |
|            |           | 36              | 19        | 21.29  | 21.17 | 21.10  |
|            |           | 36              | 39        | 21.11  | 20.98 | 20.84  |
|            |           | 75              | 0         | 21.14  | 21.11 | 20.90  |

\*EIRP = Conducted + antenna gain (2.15dBi)

| LTE Band 7 |           |                 |           |       |       |       |
|------------|-----------|-----------------|-----------|-------|-------|-------|
| BW         | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|            |           | Channel         |           | 20800 | 21100 | 21400 |
|            |           | Frequency (MHz) |           | 2505  | 2535  | 2565  |
| 10M        | QPSK      | 1               | 0         | 24.82 | 23.95 | 23.78 |
|            |           | 1               | 24        | 24.86 | 23.98 | 23.73 |
|            |           | 1               | 49        | 24.55 | 23.78 | 23.49 |
|            |           | 25              | 0         | 23.72 | 23.09 | 22.81 |
|            |           | 25              | 12        | 23.78 | 23.09 | 22.85 |
|            |           | 25              | 25        | 23.74 | 23.01 | 22.72 |
|            |           | 50              | 0         | 23.78 | 23.12 | 22.85 |
| 10M        | 16QAM     | 1               | 0         | 23.71 | 23.20 | 23.01 |
|            |           | 1               | 24        | 23.92 | 22.99 | 22.76 |
|            |           | 1               | 49        | 23.55 | 23.11 | 22.90 |
|            |           | 25              | 0         | 22.47 | 22.03 | 21.88 |
|            |           | 25              | 12        | 22.43 | 22.08 | 21.97 |
|            |           | 25              | 25        | 22.35 | 22.01 | 21.83 |
|            |           | 50              | 0         | 22.43 | 22.12 | 21.86 |
| 10M        | 64QAM     | 1               | 0         | 22.85 | 22.37 | 22.23 |
|            |           | 1               | 24        | 22.86 | 22.41 | 22.32 |
|            |           | 1               | 49        | 22.54 | 22.16 | 22.01 |
|            |           | 25              | 0         | 21.53 | 21.21 | 21.00 |
|            |           | 25              | 12        | 21.47 | 21.26 | 20.98 |
|            |           | 25              | 25        | 21.29 | 21.16 | 20.86 |
|            |           | 50              | 0         | 21.17 | 21.09 | 20.69 |

\*EIRP = Conducted + antenna gain (2.15dBi)

| LTE Band 7 |           |                 |           |        |       |        |
|------------|-----------|-----------------|-----------|--------|-------|--------|
| BW         | MCS Index | RB Size         | RB Offset | Low    | Mid   | High   |
|            |           | Channel         |           | 20775  | 21100 | 21425  |
|            |           | Frequency (MHz) |           | 2502.5 | 2535  | 2567.5 |
| 5M         | QPSK      | 1               | 0         | 24.66  | 23.93 | 23.58  |
|            |           | 1               | 12        | 24.82  | 24.32 | 23.90  |
|            |           | 1               | 24        | 24.54  | 23.87 | 23.50  |
|            |           | 12              | 0         | 23.63  | 23.00 | 22.67  |
|            |           | 12              | 6         | 23.52  | 22.99 | 22.63  |
|            |           | 12              | 13        | 23.53  | 23.02 | 22.64  |
|            |           | 25              | 0         | 23.55  | 23.08 | 22.70  |
| 5M         | 16QAM     | 1               | 0         | 23.77  | 23.21 | 22.93  |
|            |           | 1               | 12        | 23.90  | 23.53 | 23.15  |
|            |           | 1               | 24        | 23.41  | 22.94 | 22.55  |
|            |           | 12              | 0         | 22.51  | 22.03 | 21.59  |
|            |           | 12              | 6         | 22.41  | 22.02 | 21.51  |
|            |           | 12              | 13        | 22.43  | 22.10 | 21.62  |
|            |           | 25              | 0         | 22.33  | 22.01 | 21.49  |
| 5M         | 64QAM     | 1               | 0         | 22.76  | 22.25 | 22.09  |
|            |           | 1               | 12        | 22.80  | 22.51 | 22.45  |
|            |           | 1               | 24        | 22.75  | 22.27 | 22.25  |
|            |           | 12              | 0         | 21.48  | 21.10 | 20.99  |
|            |           | 12              | 6         | 21.52  | 21.12 | 20.94  |
|            |           | 12              | 13        | 21.46  | 21.10 | 20.93  |
|            |           | 25              | 0         | 21.39  | 21.09 | 20.83  |

\*EIRP = Conducted + antenna gain (2.15dBi)

| LTE Band 12 |           |                 |           |       |       |       |
|-------------|-----------|-----------------|-----------|-------|-------|-------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|             |           | Channel         |           | 23060 | 23095 | 23130 |
|             |           | Frequency (MHz) |           | 704   | 707.5 | 711   |
| 10M         | QPSK      | 1               | 0         | 22.81 | 22.89 | 22.92 |
|             |           | 1               | 24        | 23.06 | 23.01 | 23.18 |
|             |           | 1               | 49        | 22.87 | 22.80 | 23.01 |
|             |           | 25              | 0         | 21.87 | 21.84 | 22.08 |
|             |           | 25              | 12        | 21.86 | 21.92 | 22.10 |
|             |           | 25              | 25        | 21.71 | 21.89 | 22.08 |
|             |           | 50              | 0         | 21.73 | 21.94 | 22.04 |
| 10M         | 16QAM     | 1               | 0         | 22.03 | 21.91 | 22.03 |
|             |           | 1               | 24        | 22.03 | 21.97 | 22.09 |
|             |           | 1               | 49        | 21.90 | 21.93 | 22.05 |
|             |           | 25              | 0         | 21.01 | 21.13 | 21.30 |
|             |           | 25              | 12        | 20.86 | 21.04 | 21.25 |
|             |           | 25              | 25        | 20.93 | 21.08 | 21.30 |
|             |           | 50              | 0         | 20.98 | 21.10 | 21.33 |
| 10M         | 64QAM     | 1               | 0         | 21.21 | 21.22 | 21.25 |
|             |           | 1               | 24        | 21.21 | 21.29 | 21.37 |
|             |           | 1               | 49        | 20.99 | 21.10 | 21.25 |
|             |           | 25              | 0         | 19.98 | 20.08 | 20.23 |
|             |           | 25              | 12        | 19.89 | 20.01 | 20.16 |
|             |           | 25              | 25        | 19.95 | 20.13 | 20.23 |
|             |           | 50              | 0         | 19.78 | 20.04 | 20.19 |

\*ERP = Conducted + antenna gain (2.02dBi) - 2.15

| LTE Band 12 |           |                 |           |       |       |       |
|-------------|-----------|-----------------|-----------|-------|-------|-------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|             |           | Channel         |           | 23035 | 23095 | 23155 |
|             |           | Frequency (MHz) |           | 701.5 | 707.5 | 713.5 |
| 5M          | QPSK      | 1               | 0         | 22.70 | 22.88 | 22.73 |
|             |           | 1               | 12        | 22.68 | 22.95 | 22.98 |
|             |           | 1               | 24        | 22.20 | 22.53 | 22.30 |
|             |           | 12              | 0         | 21.42 | 21.75 | 21.50 |
|             |           | 12              | 6         | 21.50 | 21.92 | 21.68 |
|             |           | 12              | 13        | 21.34 | 21.80 | 21.66 |
|             |           | 25              | 0         | 21.46 | 21.92 | 21.73 |
| 5M          | 16QAM     | 1               | 0         | 21.85 | 21.81 | 21.91 |
|             |           | 1               | 12        | 21.89 | 21.95 | 22.14 |
|             |           | 1               | 24        | 21.67 | 21.84 | 22.12 |
|             |           | 12              | 0         | 20.66 | 20.94 | 21.22 |
|             |           | 12              | 6         | 20.63 | 21.00 | 21.32 |
|             |           | 12              | 13        | 20.53 | 20.94 | 21.30 |
|             |           | 25              | 0         | 20.65 | 21.05 | 21.33 |
| 5M          | 64QAM     | 1               | 0         | 21.04 | 20.92 | 20.75 |
|             |           | 1               | 12        | 21.34 | 21.27 | 21.40 |
|             |           | 1               | 24        | 21.16 | 21.11 | 20.86 |
|             |           | 12              | 0         | 20.00 | 20.01 | 19.73 |
|             |           | 12              | 6         | 20.05 | 20.08 | 19.79 |
|             |           | 12              | 13        | 19.94 | 20.04 | 19.79 |
|             |           | 25              | 0         | 19.83 | 19.93 | 19.65 |

\*ERP = Conducted + antenna gain (2.02dBi) - 2.15

| LTE Band 12 |           |                 |           |       |       |       |
|-------------|-----------|-----------------|-----------|-------|-------|-------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|             |           | Channel         |           | 23025 | 23095 | 23165 |
|             |           | Frequency (MHz) |           | 700.5 | 707.5 | 714.5 |
| 3M          | QPSK      | 1               | 0         | 22.70 | 22.78 | 22.83 |
|             |           | 1               | 7         | 22.82 | 22.93 | 23.02 |
|             |           | 1               | 14        | 22.58 | 22.81 | 22.88 |
|             |           | 8               | 0         | 21.72 | 21.99 | 22.11 |
|             |           | 8               | 3         | 21.69 | 22.03 | 22.21 |
|             |           | 8               | 7         | 21.67 | 21.99 | 22.12 |
|             |           | 15              | 0         | 21.55 | 21.92 | 22.09 |
| 3M          | 16QAM     | 1               | 0         | 22.03 | 22.35 | 22.19 |
|             |           | 1               | 7         | 22.07 | 22.39 | 22.50 |
|             |           | 1               | 14        | 21.99 | 22.44 | 22.43 |
|             |           | 8               | 0         | 20.49 | 21.02 | 20.98 |
|             |           | 8               | 3         | 20.52 | 21.04 | 20.97 |
|             |           | 8               | 7         | 20.57 | 21.11 | 21.07 |
|             |           | 15              | 0         | 20.37 | 20.92 | 20.82 |
| 3M          | 64QAM     | 1               | 0         | 21.05 | 21.28 | 21.01 |
|             |           | 1               | 7         | 21.25 | 21.20 | 21.45 |
|             |           | 1               | 14        | 20.89 | 21.18 | 20.96 |
|             |           | 8               | 0         | 19.70 | 20.03 | 19.81 |
|             |           | 8               | 3         | 19.59 | 20.00 | 19.86 |
|             |           | 8               | 7         | 19.55 | 19.96 | 19.88 |
|             |           | 15              | 0         | 19.44 | 19.90 | 19.83 |

\*ERP = Conducted + antenna gain (2.02dBi) - 2.15

| LTE Band 12 |           |                 |           |       |       |       |
|-------------|-----------|-----------------|-----------|-------|-------|-------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|             |           | Channel         |           | 23017 | 23095 | 23173 |
|             |           | Frequency (MHz) |           | 699.7 | 707.5 | 715.3 |
| 1.4M        | QPSK      | 1               | 0         | 22.67 | 22.68 | 22.74 |
|             |           | 1               | 2         | 22.90 | 22.91 | 22.99 |
|             |           | 1               | 5         | 22.72 | 22.74 | 22.80 |
|             |           | 3               | 0         | 22.77 | 22.82 | 22.81 |
|             |           | 3               | 1         | 22.62 | 22.72 | 22.61 |
|             |           | 3               | 3         | 22.51 | 22.73 | 22.70 |
|             |           | 6               | 0         | 21.71 | 22.02 | 21.91 |
| 1.4M        | 16QAM     | 1               | 0         | 21.74 | 21.63 | 21.93 |
|             |           | 1               | 2         | 22.13 | 22.04 | 22.43 |
|             |           | 1               | 5         | 21.78 | 21.74 | 22.21 |
|             |           | 3               | 0         | 21.65 | 21.73 | 22.27 |
|             |           | 3               | 1         | 21.76 | 21.91 | 22.41 |
|             |           | 3               | 3         | 21.59 | 21.75 | 22.32 |
|             |           | 6               | 0         | 20.98 | 21.15 | 21.64 |
| 1.4M        | 64QAM     | 1               | 0         | 20.91 | 21.06 | 20.94 |
|             |           | 1               | 2         | 20.96 | 20.89 | 21.10 |
|             |           | 1               | 5         | 20.82 | 21.06 | 20.88 |
|             |           | 3               | 0         | 20.71 | 20.95 | 20.67 |
|             |           | 3               | 1         | 20.64 | 20.99 | 20.76 |
|             |           | 3               | 3         | 20.45 | 20.92 | 20.62 |
|             |           | 6               | 0         | 19.42 | 19.88 | 19.49 |

\*ERP = Conducted + antenna gain (2.02dBi) - 2.15

| LTE Band 17 |           |                 |           |       |       |       |
|-------------|-----------|-----------------|-----------|-------|-------|-------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|             |           | Channel         |           | 23780 | 23790 | 23800 |
|             |           | Frequency (MHz) |           | 709   | 710   | 711   |
| 10M         | QPSK      | 1               | 0         | 22.60 | 22.98 | 22.85 |
|             |           | 1               | 24        | 23.18 | 23.19 | 22.62 |
|             |           | 1               | 49        | 22.87 | 22.52 | 22.56 |
|             |           | 25              | 0         | 21.78 | 22.03 | 21.90 |
|             |           | 25              | 12        | 22.19 | 21.67 | 22.05 |
|             |           | 25              | 25        | 21.85 | 21.56 | 21.54 |
|             |           | 50              | 0         | 21.61 | 21.92 | 21.56 |
| 10M         | 16QAM     | 1               | 0         | 21.95 | 21.61 | 21.98 |
|             |           | 1               | 24        | 21.86 | 22.46 | 22.00 |
|             |           | 1               | 49        | 21.75 | 21.84 | 21.91 |
|             |           | 25              | 0         | 20.93 | 21.01 | 20.56 |
|             |           | 25              | 12        | 20.98 | 20.68 | 21.09 |
|             |           | 25              | 25        | 20.71 | 20.81 | 20.90 |
|             |           | 50              | 0         | 20.57 | 20.77 | 20.84 |
| 10M         | 64QAM     | 1               | 0         | 20.99 | 20.95 | 21.17 |
|             |           | 1               | 24        | 20.91 | 21.50 | 21.16 |
|             |           | 1               | 49        | 20.79 | 20.96 | 20.73 |
|             |           | 25              | 0         | 19.93 | 19.87 | 19.59 |
|             |           | 25              | 12        | 19.82 | 19.63 | 20.10 |
|             |           | 25              | 25        | 19.96 | 19.77 | 19.78 |
|             |           | 50              | 0         | 19.90 | 19.59 | 20.08 |

\*ERP = Conducted + antenna gain (2.02dBi) - 2.15

| LTE Band 17 |           |                 |           |       |       |       |
|-------------|-----------|-----------------|-----------|-------|-------|-------|
| BW          | MCS Index | RB Size         | RB Offset | Low   | Mid   | High  |
|             |           | Channel         |           | 23755 | 23790 | 23825 |
|             |           | Frequency (MHz) |           | 706.5 | 710   | 713.5 |
| 5M          | QPSK      | 1               | 0         | 22.71 | 22.90 | 22.49 |
|             |           | 1               | 12        | 22.91 | 22.64 | 22.66 |
|             |           | 1               | 24        | 22.65 | 22.82 | 22.47 |
|             |           | 12              | 0         | 21.83 | 21.67 | 22.06 |
|             |           | 12              | 6         | 21.97 | 21.84 | 21.68 |
|             |           | 12              | 13        | 21.81 | 21.63 | 21.74 |
|             |           | 25              | 0         | 21.82 | 21.59 | 21.57 |
| 5M          | 16QAM     | 1               | 0         | 21.80 | 21.56 | 21.75 |
|             |           | 1               | 12        | 22.16 | 22.37 | 22.05 |
|             |           | 1               | 24        | 21.78 | 21.71 | 21.85 |
|             |           | 12              | 0         | 20.83 | 20.80 | 20.80 |
|             |           | 12              | 6         | 20.91 | 21.07 | 20.92 |
|             |           | 12              | 13        | 20.84 | 20.82 | 20.97 |
|             |           | 25              | 0         | 20.86 | 20.62 | 21.03 |
| 5M          | 64QAM     | 1               | 0         | 20.96 | 20.88 | 21.17 |
|             |           | 1               | 12        | 21.21 | 21.28 | 21.12 |
|             |           | 1               | 24        | 20.89 | 20.76 | 20.73 |
|             |           | 12              | 0         | 19.85 | 20.15 | 19.96 |
|             |           | 12              | 6         | 19.90 | 19.89 | 19.98 |
|             |           | 12              | 13        | 19.79 | 19.97 | 19.61 |
|             |           | 25              | 0         | 19.84 | 19.67 | 19.68 |

\*ERP = Conducted + antenna gain (2.02dBi) - 2.15

| LTE Band 66 |           |                 |           |        |        |        |
|-------------|-----------|-----------------|-----------|--------|--------|--------|
| BW          | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|             |           | Channel         |           | 132072 | 132322 | 132572 |
|             |           | Frequency (MHz) |           | 1720   | 1745   | 1770   |
| 20M         | QPSK      | 1               | 0         | 24.20  | 23.68  | 24.03  |
|             |           | 1               | 50        | 24.12  | 24.52  | 24.13  |
|             |           | 1               | 99        | 24.05  | 23.84  | 24.02  |
|             |           | 50              | 0         | 23.24  | 22.92  | 23.19  |
|             |           | 50              | 25        | 23.25  | 22.99  | 23.19  |
|             |           | 50              | 50        | 22.91  | 23.08  | 22.90  |
|             |           | 100             | 0         | 23.19  | 23.04  | 23.39  |
| 20M         | 16QAM     | 1               | 0         | 23.25  | 23.15  | 23.30  |
|             |           | 1               | 50        | 23.30  | 23.76  | 23.38  |
|             |           | 1               | 99        | 23.67  | 23.32  | 23.66  |
|             |           | 50              | 0         | 21.64  | 21.93  | 21.68  |
|             |           | 50              | 25        | 21.77  | 22.26  | 22.29  |
|             |           | 50              | 50        | 22.09  | 21.93  | 22.28  |
|             |           | 100             | 0         | 21.90  | 21.83  | 22.03  |
| 20M         | 64QAM     | 1               | 0         | 22.08  | 22.35  | 22.15  |
|             |           | 1               | 50        | 22.16  | 22.44  | 22.57  |
|             |           | 1               | 99        | 22.14  | 22.34  | 22.41  |
|             |           | 50              | 0         | 21.19  | 21.27  | 20.95  |
|             |           | 50              | 25        | 20.91  | 21.00  | 20.98  |
|             |           | 50              | 50        | 20.89  | 21.15  | 21.35  |
|             |           | 100             | 0         | 20.93  | 21.24  | 21.01  |

\*EIRP = Conducted + antenna gain (1.57dBi)

| LTE Band 66 |           |                 |           |        |        |        |
|-------------|-----------|-----------------|-----------|--------|--------|--------|
| BW          | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|             |           | Channel         |           | 132047 | 132322 | 132597 |
|             |           | Frequency (MHz) |           | 1717.5 | 1745   | 1772.5 |
| 15M         | QPSK      | 1               | 0         | 23.69  | 23.86  | 24.21  |
|             |           | 1               | 37        | 24.22  | 24.51  | 24.31  |
|             |           | 1               | 74        | 23.92  | 24.06  | 23.92  |
|             |           | 36              | 0         | 23.23  | 23.36  | 23.16  |
|             |           | 36              | 19        | 22.85  | 23.31  | 23.26  |
|             |           | 36              | 39        | 22.96  | 22.92  | 23.40  |
|             |           | 75              | 0         | 23.08  | 22.82  | 22.95  |
| 15M         | 16QAM     | 1               | 0         | 23.23  | 23.26  | 23.12  |
|             |           | 1               | 37        | 23.76  | 23.44  | 23.38  |
|             |           | 1               | 74        | 23.60  | 23.70  | 23.35  |
|             |           | 36              | 0         | 22.18  | 21.94  | 21.96  |
|             |           | 36              | 19        | 22.03  | 22.06  | 21.96  |
|             |           | 36              | 39        | 22.15  | 21.84  | 21.86  |
|             |           | 75              | 0         | 22.18  | 22.26  | 21.75  |
| 15M         | 64QAM     | 1               | 0         | 22.21  | 22.13  | 22.20  |
|             |           | 1               | 50        | 22.48  | 22.41  | 22.29  |
|             |           | 1               | 99        | 22.16  | 22.14  | 22.39  |
|             |           | 50              | 0         | 21.11  | 21.31  | 21.39  |
|             |           | 50              | 25        | 21.05  | 21.46  | 21.22  |
|             |           | 50              | 50        | 21.39  | 21.22  | 20.87  |
|             |           | 100             | 0         | 21.19  | 21.16  | 21.13  |

\*EIRP = Conducted + antenna gain (1.57dBi)

| LTE Band 66 |           |                 |           |        |        |        |
|-------------|-----------|-----------------|-----------|--------|--------|--------|
| BW          | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|             |           | Channel         |           | 132022 | 132322 | 132622 |
|             |           | Frequency (MHz) |           | 1715   | 1745   | 1775   |
| 10M         | QPSK      | 1               | 0         | 23.80  | 23.79  | 24.01  |
|             |           | 1               | 24        | 24.06  | 24.04  | 24.28  |
|             |           | 1               | 49        | 24.12  | 23.91  | 23.77  |
|             |           | 25              | 0         | 23.11  | 22.83  | 23.37  |
|             |           | 25              | 12        | 22.87  | 23.25  | 23.02  |
|             |           | 25              | 25        | 23.37  | 22.90  | 23.05  |
|             |           | 50              | 0         | 23.13  | 23.32  | 23.41  |
| 10M         | 16QAM     | 1               | 0         | 23.29  | 23.19  | 23.24  |
|             |           | 1               | 24        | 23.70  | 23.50  | 23.69  |
|             |           | 1               | 49        | 23.10  | 23.48  | 23.53  |
|             |           | 25              | 0         | 22.07  | 21.68  | 21.68  |
|             |           | 25              | 12        | 22.00  | 22.30  | 21.94  |
|             |           | 25              | 25        | 22.05  | 21.93  | 22.13  |
|             |           | 50              | 0         | 22.04  | 21.97  | 22.06  |
| 10M         | 64QAM     | 1               | 0         | 22.24  | 22.35  | 21.97  |
|             |           | 1               | 50        | 22.30  | 22.41  | 22.60  |
|             |           | 1               | 99        | 21.85  | 22.40  | 21.96  |
|             |           | 50              | 0         | 20.87  | 21.09  | 20.86  |
|             |           | 50              | 25        | 21.20  | 21.10  | 21.16  |
|             |           | 50              | 50        | 21.23  | 20.87  | 21.02  |
|             |           | 100             | 0         | 21.37  | 21.31  | 21.32  |

\*EIRP = Conducted + antenna gain (1.57dBi)

| LTE Band 66 |           |                 |           |        |        |        |
|-------------|-----------|-----------------|-----------|--------|--------|--------|
| BW          | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|             |           | Channel         |           | 131997 | 132322 | 132647 |
|             |           | Frequency (MHz) |           | 1712.5 | 1745   | 1777.5 |
| 5M          | QPSK      | 1               | 0         | 23.94  | 23.65  | 23.91  |
|             |           | 1               | 12        | 24.34  | 24.39  | 24.20  |
|             |           | 1               | 24        | 23.96  | 24.04  | 24.06  |
|             |           | 12              | 0         | 23.10  | 22.82  | 23.33  |
|             |           | 12              | 6         | 23.15  | 23.18  | 22.95  |
|             |           | 12              | 13        | 23.10  | 22.87  | 23.20  |
|             |           | 25              | 0         | 23.11  | 22.81  | 23.20  |
| 5M          | 16QAM     | 1               | 0         | 23.25  | 23.09  | 23.12  |
|             |           | 1               | 12        | 23.55  | 23.36  | 23.50  |
|             |           | 1               | 24        | 23.40  | 23.69  | 23.28  |
|             |           | 12              | 0         | 21.92  | 21.98  | 21.99  |
|             |           | 12              | 6         | 22.04  | 22.19  | 22.21  |
|             |           | 12              | 13        | 22.05  | 22.34  | 22.26  |
|             |           | 25              | 0         | 22.04  | 21.97  | 21.77  |
| 5M          | 64QAM     | 1               | 0         | 22.05  | 22.30  | 21.80  |
|             |           | 1               | 50        | 22.35  | 22.18  | 22.27  |
|             |           | 1               | 99        | 22.11  | 22.13  | 21.95  |
|             |           | 50              | 0         | 21.09  | 21.12  | 21.25  |
|             |           | 50              | 25        | 21.19  | 21.03  | 21.29  |
|             |           | 50              | 50        | 21.13  | 20.87  | 21.39  |
|             |           | 100             | 0         | 21.07  | 20.96  | 20.95  |

\*EIRP = Conducted + antenna gain (1.57dBi)

| LTE Band 66 |           |                 |           |        |        |        |
|-------------|-----------|-----------------|-----------|--------|--------|--------|
| BW          | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|             |           | Channel         |           | 131987 | 132322 | 132657 |
|             |           | Frequency (MHz) |           | 1711.5 | 1745   | 1778.5 |
| 3M          | QPSK      | 1               | 0         | 23.80  | 23.97  | 24.06  |
|             |           | 1               | 7         | 24.13  | 24.05  | 24.51  |
|             |           | 1               | 14        | 24.11  | 23.72  | 23.68  |
|             |           | 8               | 0         | 23.38  | 22.92  | 23.30  |
|             |           | 8               | 3         | 23.35  | 22.95  | 23.30  |
|             |           | 8               | 7         | 22.89  | 23.00  | 22.93  |
|             |           | 15              | 0         | 22.88  | 22.88  | 22.90  |
| 3M          | 16QAM     | 1               | 0         | 23.11  | 23.26  | 23.08  |
|             |           | 1               | 7         | 23.74  | 23.39  | 23.81  |
|             |           | 1               | 14        | 23.36  | 23.65  | 23.19  |
|             |           | 8               | 0         | 21.92  | 22.08  | 21.67  |
|             |           | 8               | 3         | 22.09  | 21.96  | 21.75  |
|             |           | 8               | 7         | 21.76  | 21.93  | 22.01  |
|             |           | 15              | 0         | 22.13  | 21.91  | 22.24  |
| 3M          | 64QAM     | 1               | 0         | 21.80  | 22.32  | 21.95  |
|             |           | 1               | 50        | 22.13  | 22.31  | 22.19  |
|             |           | 1               | 99        | 21.95  | 22.29  | 22.27  |
|             |           | 50              | 0         | 21.27  | 20.86  | 20.98  |
|             |           | 50              | 25        | 21.12  | 21.11  | 21.08  |
|             |           | 50              | 50        | 21.10  | 20.85  | 21.31  |
|             |           | 100             | 0         | 20.85  | 21.07  | 21.31  |

\*EIRP = Conducted + antenna gain (1.57dBi)

| LTE Band 66 |           |                 |           |        |        |        |
|-------------|-----------|-----------------|-----------|--------|--------|--------|
| BW          | MCS Index | RB Size         | RB Offset | Low    | Mid    | High   |
|             |           | Channel         |           | 131979 | 132322 | 132665 |
|             |           | Frequency (MHz) |           | 1710.7 | 1745   | 1779.3 |
| 1.4M        | QPSK      | 1               | 0         | 24.08  | 23.64  | 24.07  |
|             |           | 1               | 2         | 24.14  | 24.10  | 24.31  |
|             |           | 1               | 5         | 23.90  | 24.23  | 23.87  |
|             |           | 3               | 0         | 23.38  | 22.86  | 23.14  |
|             |           | 3               | 1         | 22.97  | 23.12  | 23.08  |
|             |           | 3               | 3         | 22.95  | 23.09  | 22.84  |
|             |           | 6               | 0         | 23.17  | 23.14  | 23.09  |
| 1.4M        | 16QAM     | 1               | 0         | 23.26  | 23.49  | 23.33  |
|             |           | 1               | 2         | 23.25  | 23.41  | 23.38  |
|             |           | 1               | 5         | 23.67  | 23.46  | 23.32  |
|             |           | 3               | 0         | 21.86  | 21.64  | 21.82  |
|             |           | 3               | 1         | 21.94  | 21.95  | 21.74  |
|             |           | 3               | 3         | 22.26  | 21.89  | 22.04  |
|             |           | 6               | 0         | 21.94  | 22.11  | 21.76  |
| 1.4M        | 64QAM     | 1               | 0         | 21.80  | 22.20  | 22.31  |
|             |           | 1               | 50        | 22.12  | 22.34  | 22.10  |
|             |           | 1               | 99        | 22.05  | 22.35  | 22.22  |
|             |           | 50              | 0         | 20.89  | 21.37  | 20.94  |
|             |           | 50              | 25        | 21.34  | 21.20  | 21.38  |
|             |           | 50              | 50        | 21.22  | 21.26  | 21.03  |
|             |           | 100             | 0         | 21.09  | 20.96  | 20.84  |

\*EIRP = Conducted + antenna gain (1.57dBi)

## 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



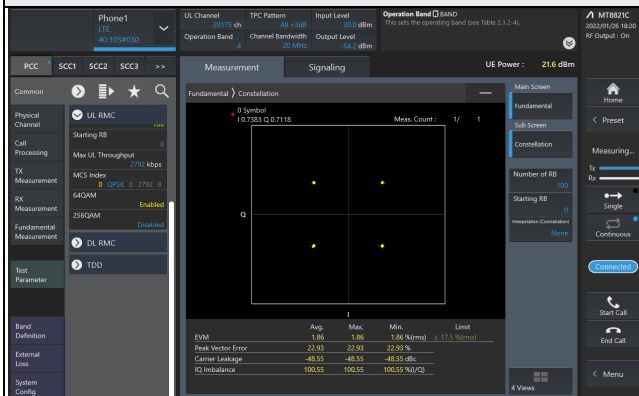
## 4.2.4 Test Results

### LTE Band 4

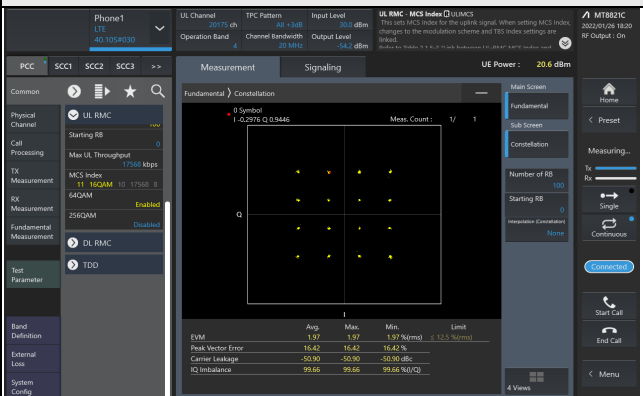
#### Spectrum Plot of Measurement Value

Channel: 20175 / Frequency (MHz): 1732.5MHz

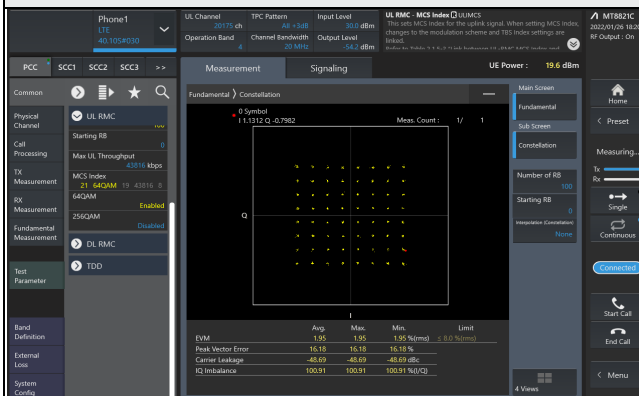
#### QPSK



#### 16QAM



#### 64QAM

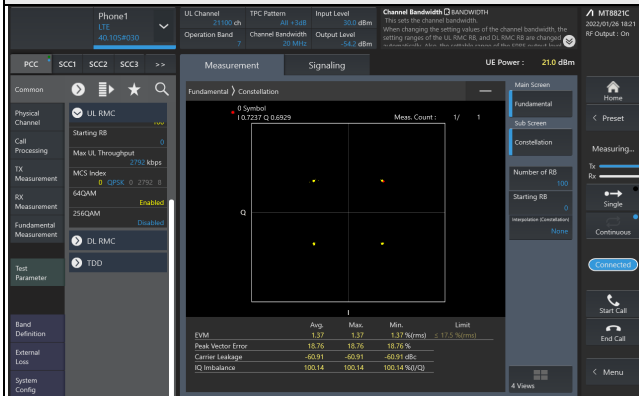


## LTE Band 7

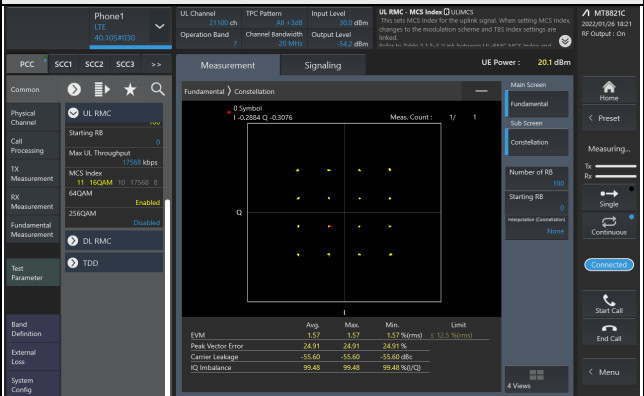
### Spectrum Plot of Measurement Value

Channel: 21100 / Frequency (MHz): 2535.0MHz

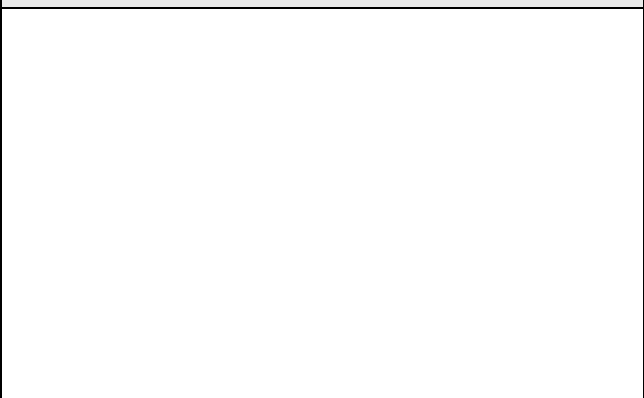
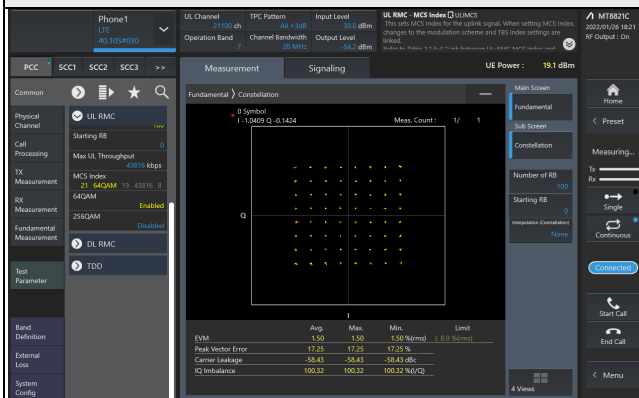
#### QPSK



#### 16QAM



#### 64QAM

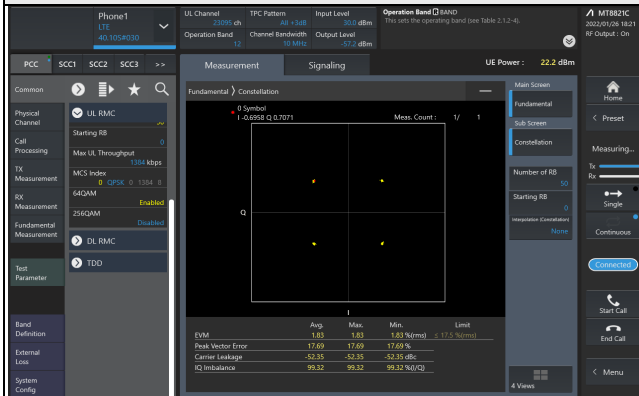


## LTE Band 12

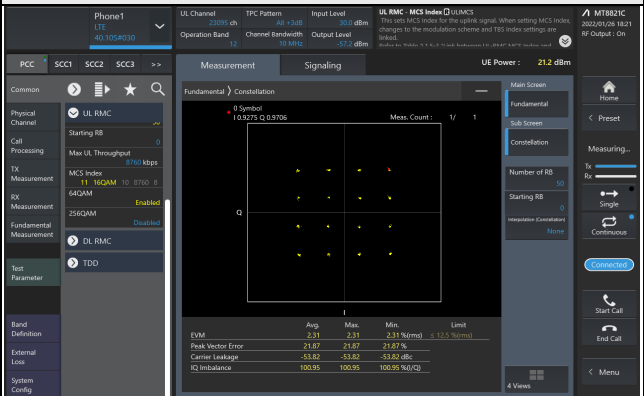
### Spectrum Plot of Measurement Value

Channel: 23095 / Frequency (MHz): 707.5MHz

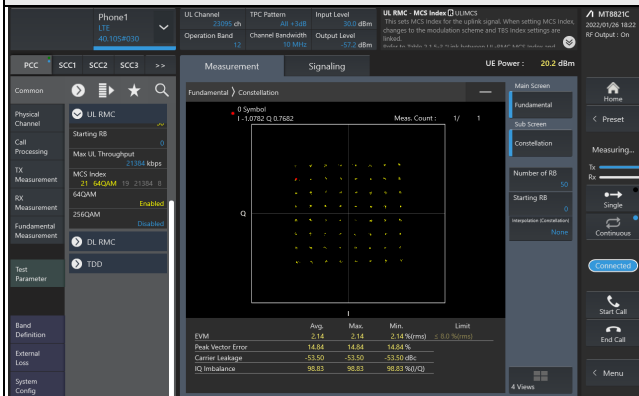
#### QPSK



#### 16QAM



#### 64QAM

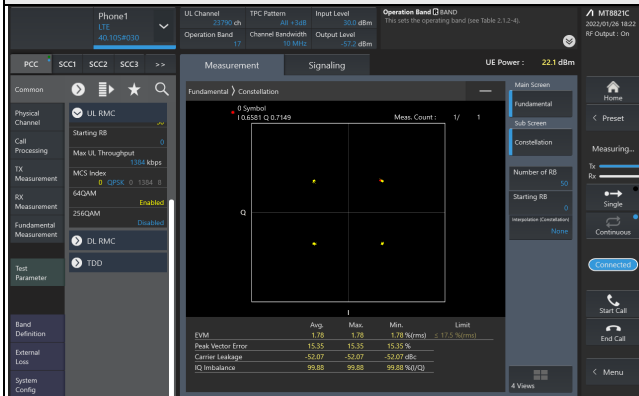


## LTE Band 17

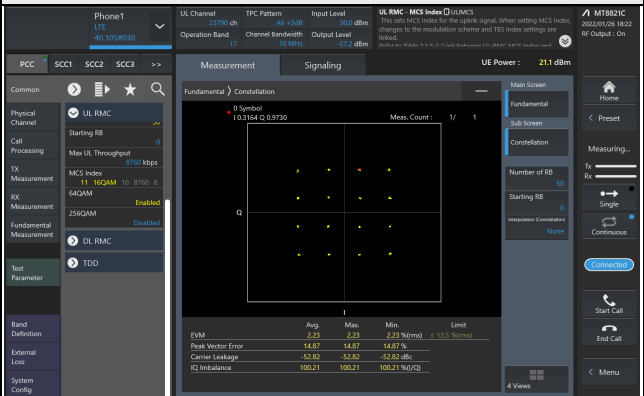
### Spectrum Plot of Measurement Value

Channel: 23790 / Frequency (MHz): 710.0MHz

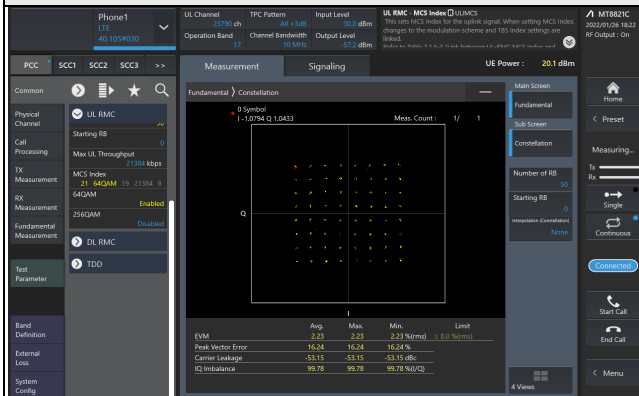
#### QPSK



#### 16QAM



#### 64QAM

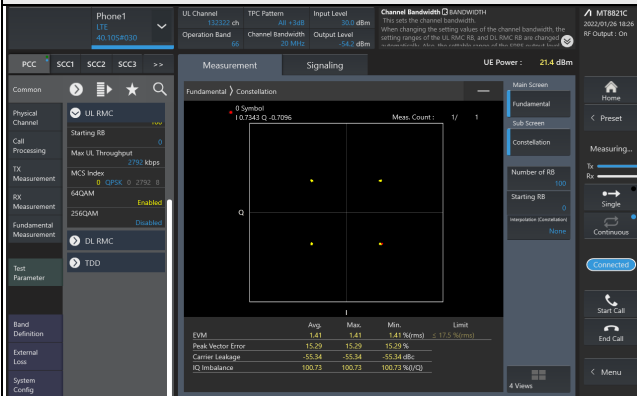


## LTE Band 66

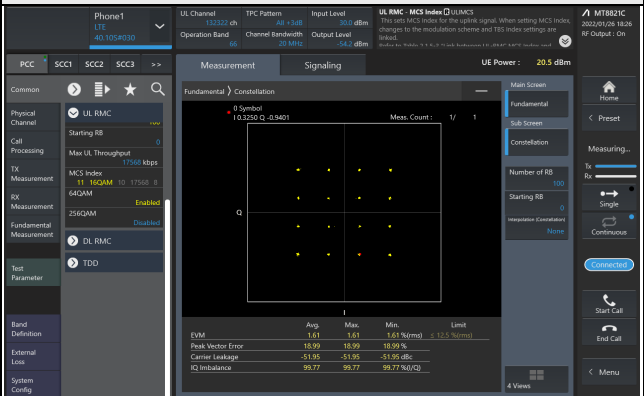
### Spectrum Plot of Measurement Value

Channel: 132322 / Frequency (MHz): 1745.0MHz

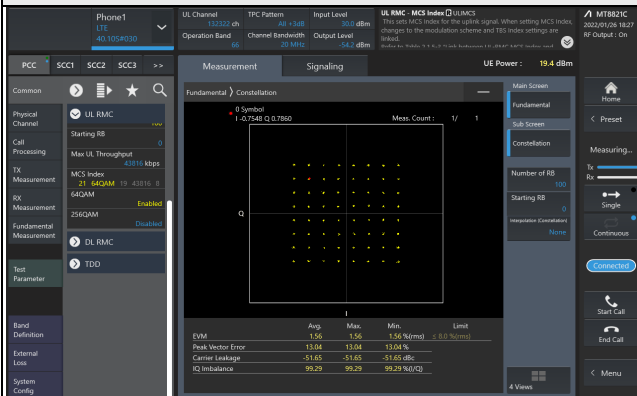
#### QPSK



#### 16QAM



#### 64QAM



### 4.3 Frequency Stability Measurement

#### 4.3.1 Limits of Frequency Stability Measurement

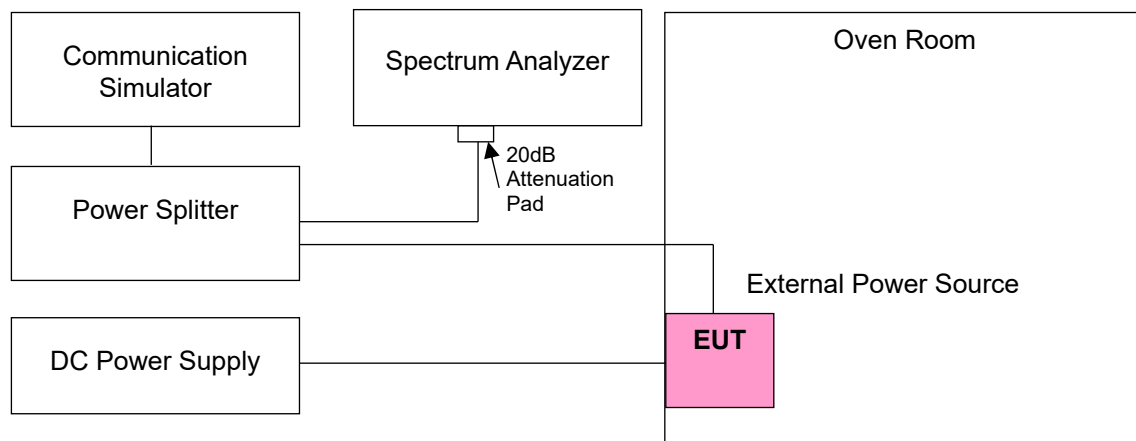
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

#### 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>(Vdc) | LTE Band 4                |                       |                 |                       |
|------------------|---------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 1.4 MHz |                       |                 |                       |
|                  | Low Channel               |                       | High Channel    |                       |
|                  | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 1710.700004               | 0.002                 | 1754.300001     | 0.001                 |
| 3.4              | 1710.700001               | 0.001                 | 1754.300004     | 0.002                 |
| 4.6              | 1710.700004               | 0.002                 | 1754.300002     | 0.001                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

##### 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        | 1710.700003               | 0.002                 | 1754.300004     | 0.002                 |
| -30        | 1710.700003               | 0.002                 | 1754.300004     | 0.002                 |
| -20        | 1710.700001               | 0.001                 | 1754.300001     | 0.001                 |
| -10        | 1710.700003               | 0.002                 | 1754.300003     | 0.002                 |
| 0          | 1710.700002               | 0.001                 | 1754.300002     | 0.001                 |
| 10         | 1710.700001               | 0.001                 | 1754.300003     | 0.002                 |
| 20         | 1710.699999               | -0.001                | 1754.299996     | -0.002                |
| 30         | 1710.699999               | -0.001                | 1754.299998     | -0.001                |
| 40         | 1710.699998               | -0.001                | 1754.299999     | -0.001                |
| 50         | 1710.699998               | -0.001                | 1754.299997     | -0.002                |
| 60         | 1710.699997               | -0.002                | 1754.299997     | -0.002                |
| 70         | 1710.699996               | -0.002                | 1754.299997     | -0.002                |
| 80         | 1710.699999               | -0.001                | 1754.299998     | -0.001                |
| 85         | 1710.699998               | -0.001                | 1754.299996     | -0.002                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 4              |                       |                 |                       |
|------------------|-------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 3 MHz |                       |                 |                       |
|                  | Low Channel             |                       | High Channel    |                       |
|                  | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 1711.500003             | 0.002                 | 1753.500001     | 0.001                 |
| 3.4              | 1711.500002             | 0.001                 | 1753.500003     | 0.002                 |
| 4.6              | 1711.500002             | 0.001                 | 1753.500003     | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### 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             | 0.002                 | 1753.500004     | 0.002                 |
| -30        | 1711.500001             | 0.001                 | 1753.500004     | 0.002                 |
| -20        | 1711.500001             | 0.001                 | 1753.500002     | 0.001                 |
| -10        | 1711.500002             | 0.001                 | 1753.500003     | 0.002                 |
| 0          | 1711.500004             | 0.002                 | 1753.500001     | 0.001                 |
| 10         | 1711.500004             | 0.002                 | 1753.500002     | 0.001                 |
| 20         | 1711.499996             | -0.002                | 1753.499997     | -0.002                |
| 30         | 1711.499996             | -0.002                | 1753.499997     | -0.002                |
| 40         | 1711.499996             | -0.002                | 1753.499996     | -0.002                |
| 50         | 1711.499999             | -0.001                | 1753.499999     | -0.001                |
| 60         | 1711.499996             | -0.002                | 1753.499998     | -0.001                |
| 70         | 1711.499998             | -0.001                | 1753.499998     | -0.001                |
| 80         | 1711.499997             | -0.002                | 1753.499996     | -0.002                |
| 85         | 1711.499996             | -0.002                | 1753.499998     | -0.001                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 4             |                       |                 |                       |
|------------------|------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 5MHz |                       |                 |                       |
|                  | Low Channel            |                       | High Channel    |                       |
|                  | Frequency (MHz)        | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 1712.500002            | 0.001                 | 1752.500003     | 0.002                 |
| 3.4              | 1712.500003            | 0.002                 | 1752.500002     | 0.001                 |
| 4.6              | 1712.500001            | 0.001                 | 1752.500001     | 0.001                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4             |                       |                 |                       |
|------------|------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth 5MHz |                       |                 |                       |
|            | Low Channel            |                       | High Channel    |                       |
|            | Frequency (MHz)        | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1712.500001            | 0.001                 | 1752.500001     | 0.001                 |
| -30        | 1712.500001            | 0.001                 | 1752.500004     | 0.002                 |
| -20        | 1712.500004            | 0.002                 | 1752.500001     | 0.001                 |
| -10        | 1712.500003            | 0.002                 | 1752.500001     | 0.001                 |
| 0          | 1712.500004            | 0.002                 | 1752.500002     | 0.001                 |
| 10         | 1712.500004            | 0.002                 | 1752.500003     | 0.002                 |
| 20         | 1712.499998            | -0.001                | 1752.499998     | -0.001                |
| 30         | 1712.499996            | -0.002                | 1752.499999     | -0.001                |
| 40         | 1712.499997            | -0.002                | 1752.499997     | -0.002                |
| 50         | 1712.499999            | -0.001                | 1752.499999     | -0.001                |
| 60         | 1712.499997            | -0.002                | 1752.499996     | -0.002                |
| 70         | 1712.499998            | -0.001                | 1752.499997     | -0.002                |
| 80         | 1712.499999            | -0.001                | 1752.499999     | -0.001                |
| 85         | 1712.499999            | -0.001                | 1752.499997     | -0.002                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 4              |                       |                 |                       |
|------------------|-------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 10MHz |                       |                 |                       |
|                  | Low Channel             |                       | High Channel    |                       |
|                  | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 1715.000001             | 0.001                 | 1750.000003     | 0.002                 |
| 3.4              | 1715.000002             | 0.001                 | 1750.000002     | 0.001                 |
| 4.6              | 1715.000003             | 0.002                 | 1750.000004     | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4              |                       |                 |                       |
|------------|-------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth 10MHz |                       |                 |                       |
|            | Low Channel             |                       | High Channel    |                       |
|            | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1715.000001             | 0.001                 | 1750.000002     | 0.001                 |
| -30        | 1715.000003             | 0.002                 | 1750.000004     | 0.002                 |
| -20        | 1715.000003             | 0.002                 | 1750.000001     | 0.001                 |
| -10        | 1715.000002             | 0.001                 | 1750.000002     | 0.001                 |
| 0          | 1715.000003             | 0.002                 | 1750.000001     | 0.001                 |
| 10         | 1715.000001             | 0.001                 | 1750.000001     | 0.001                 |
| 20         | 1714.999996             | -0.002                | 1749.999998     | -0.001                |
| 30         | 1714.999996             | -0.002                | 1749.999996     | -0.002                |
| 40         | 1714.999996             | -0.002                | 1749.999997     | -0.002                |
| 50         | 1714.999998             | -0.001                | 1749.999998     | -0.001                |
| 60         | 1714.999996             | -0.002                | 1749.999999     | -0.001                |
| 70         | 1714.999997             | -0.002                | 1749.999999     | -0.001                |
| 80         | 1714.999998             | -0.001                | 1749.999998     | -0.001                |
| 85         | 1714.999998             | -0.001                | 1749.999999     | -0.001                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 4              |                       |                 |                       |
|------------------|-------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 15MHz |                       |                 |                       |
|                  | Low Channel             |                       | High Channel    |                       |
|                  | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 1717.500002             | 0.001                 | 1747.500003     | 0.002                 |
| 3.4              | 1717.500004             | 0.002                 | 1747.500002     | 0.001                 |
| 4.6              | 1717.500001             | 0.001                 | 1747.500002     | 0.001                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4              |                       |                 |                       |
|------------|-------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth 15MHz |                       |                 |                       |
|            | Low Channel             |                       | High Channel    |                       |
|            | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1717.500002             | 0.001                 | 1747.500003     | 0.002                 |
| -30        | 1717.500003             | 0.002                 | 1747.500003     | 0.002                 |
| -20        | 1717.500004             | 0.002                 | 1747.500001     | 0.001                 |
| -10        | 1717.500001             | 0.001                 | 1747.500003     | 0.002                 |
| 0          | 1717.500003             | 0.002                 | 1747.500003     | 0.002                 |
| 10         | 1717.500004             | 0.002                 | 1747.500003     | 0.002                 |
| 20         | 1717.499999             | -0.001                | 1747.499999     | -0.001                |
| 30         | 1717.499997             | -0.002                | 1747.499997     | -0.002                |
| 40         | 1717.499999             | -0.001                | 1747.499997     | -0.002                |
| 50         | 1717.499996             | -0.002                | 1747.499997     | -0.002                |
| 60         | 1717.499999             | -0.001                | 1747.499997     | -0.002                |
| 70         | 1717.499998             | -0.001                | 1747.499998     | -0.001                |
| 80         | 1717.499998             | -0.001                | 1747.499999     | -0.001                |
| 85         | 1717.499998             | -0.001                | 1747.499997     | -0.002                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 4              |                       |                 |                       |
|------------------|-------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 20MHz |                       |                 |                       |
|                  | Low Channel             |                       | High Channel    |                       |
|                  | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 1720.000001             | 0.001                 | 1745.000004     | 0.002                 |
| 3.4              | 1720.000004             | 0.002                 | 1745.000004     | 0.002                 |
| 4.6              | 1720.000004             | 0.002                 | 1745.000003     | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 4              |                       |                 |                       |
|------------|-------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth 20MHz |                       |                 |                       |
|            | Low Channel             |                       | High Channel    |                       |
|            | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 1720.000003             | 0.002                 | 1745.000001     | 0.001                 |
| -30        | 1720.000002             | 0.001                 | 1745.000003     | 0.002                 |
| -20        | 1720.000002             | 0.001                 | 1745.000001     | 0.001                 |
| -10        | 1720.000004             | 0.002                 | 1745.000004     | 0.002                 |
| 0          | 1720.000003             | 0.002                 | 1745.000003     | 0.002                 |
| 10         | 1720.000003             | 0.002                 | 1745.000001     | 0.001                 |
| 20         | 1719.999997             | -0.002                | 1744.999996     | -0.002                |
| 30         | 1719.999999             | -0.001                | 1744.999997     | -0.002                |
| 40         | 1719.999996             | -0.002                | 1744.999999     | -0.001                |
| 50         | 1719.999998             | -0.001                | 1744.999997     | -0.002                |
| 60         | 1719.999999             | -0.001                | 1744.999999     | -0.001                |
| 70         | 1719.999996             | -0.002                | 1744.999999     | -0.001                |
| 80         | 1719.999999             | -0.001                | 1744.999996     | -0.002                |
| 85         | 1719.999998             | -0.001                | 1744.999999     | -0.001                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 7             |                       |                 |                       |
|------------------|------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 5MHz |                       |                 |                       |
|                  | Low Channel            |                       | High Channel    |                       |
|                  | Frequency (MHz)        | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 2502.500002            | 0.001                 | 2567.500004     | 0.002                 |
| 3.4              | 2502.500002            | 0.001                 | 2567.500003     | 0.001                 |
| 4.6              | 2502.500001            | 0.000                 | 2567.500004     | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 7             |                       |                 |                       |
|------------|------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth 5MHz |                       |                 |                       |
|            | Low Channel            |                       | High Channel    |                       |
|            | Frequency (MHz)        | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 2502.500003            | 0.001                 | 2567.500004     | 0.002                 |
| -30        | 2502.500001            | 0.000                 | 2567.500004     | 0.002                 |
| -20        | 2502.500002            | 0.001                 | 2567.500004     | 0.002                 |
| -10        | 2502.500002            | 0.001                 | 2567.500002     | 0.001                 |
| 0          | 2502.500004            | 0.002                 | 2567.500001     | 0.000                 |
| 10         | 2502.500002            | 0.001                 | 2567.500001     | 0.000                 |
| 20         | 2502.499997            | -0.001                | 2567.499997     | -0.001                |
| 30         | 2502.499999            | 0.000                 | 2567.499996     | -0.002                |
| 40         | 2502.499996            | -0.002                | 2567.499999     | 0.000                 |
| 50         | 2502.499999            | 0.000                 | 2567.499998     | -0.001                |
| 60         | 2502.499999            | 0.000                 | 2567.499999     | 0.000                 |
| 70         | 2502.499996            | -0.002                | 2567.499996     | -0.002                |
| 80         | 2502.499999            | 0.000                 | 2567.499998     | -0.001                |
| 85         | 2502.499999            | 0.000                 | 2567.499999     | 0.000                 |

### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 7              |                       |                 |                       |
|------------------|-------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 10MHz |                       |                 |                       |
|                  | Low Channel             |                       | High Channel    |                       |
|                  | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 2505.000001             | 0.000                 | 2565.000002     | 0.001                 |
| 3.4              | 2505.000004             | 0.002                 | 2565.000002     | 0.001                 |
| 4.6              | 2505.000002             | 0.001                 | 2565.000001     | 0.000                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 7              |                       |                 |                       |
|------------|-------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth 10MHz |                       |                 |                       |
|            | Low Channel             |                       | High Channel    |                       |
|            | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 2505.000004             | 0.002                 | 2565.000003     | 0.001                 |
| -30        | 2505.000001             | 0.000                 | 2565.000002     | 0.001                 |
| -20        | 2505.000004             | 0.002                 | 2565.000001     | 0.000                 |
| -10        | 2505.000004             | 0.002                 | 2565.000003     | 0.001                 |
| 0          | 2505.000001             | 0.000                 | 2565.000001     | 0.000                 |
| 10         | 2505.000001             | 0.000                 | 2565.000002     | 0.001                 |
| 20         | 2504.999996             | -0.002                | 2564.999998     | -0.001                |
| 30         | 2504.999998             | -0.001                | 2564.999999     | 0.000                 |
| 40         | 2504.999998             | -0.001                | 2564.999996     | -0.002                |
| 50         | 2504.999999             | 0.000                 | 2564.999998     | -0.001                |
| 60         | 2504.999996             | -0.002                | 2564.999998     | -0.001                |
| 70         | 2504.999997             | -0.001                | 2564.999996     | -0.002                |
| 80         | 2504.999999             | 0.000                 | 2564.999999     | 0.000                 |
| 85         | 2504.999998             | -0.001                | 2564.999999     | 0.000                 |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 7              |                       |                 |                       |
|------------------|-------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 15MHz |                       |                 |                       |
|                  | Low Channel             |                       | High Channel    |                       |
|                  | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 2507.500001             | 0.000                 | 2562.500004     | 0.002                 |
| 3.4              | 2507.500001             | 0.000                 | 2562.500001     | 0.000                 |
| 4.6              | 2507.500002             | 0.001                 | 2562.500004     | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 7              |                       |                 |                       |
|------------|-------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth 15MHz |                       |                 |                       |
|            | Low Channel             |                       | High Channel    |                       |
|            | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 2507.500003             | 0.001                 | 2562.500001     | 0.000                 |
| -30        | 2507.500002             | 0.001                 | 2562.500001     | 0.000                 |
| -20        | 2507.500001             | 0.000                 | 2562.500004     | 0.002                 |
| -10        | 2507.500002             | 0.001                 | 2562.500002     | 0.001                 |
| 0          | 2507.500004             | 0.002                 | 2562.500001     | 0.000                 |
| 10         | 2507.500004             | 0.002                 | 2562.500002     | 0.001                 |
| 20         | 2507.499996             | -0.002                | 2562.499999     | 0.000                 |
| 30         | 2507.499997             | -0.001                | 2562.499999     | 0.000                 |
| 40         | 2507.499996             | -0.002                | 2562.499997     | -0.001                |
| 50         | 2507.499996             | -0.002                | 2562.499999     | 0.000                 |
| 60         | 2507.499997             | -0.001                | 2562.499998     | -0.001                |
| 70         | 2507.499996             | -0.002                | 2562.499996     | -0.002                |
| 80         | 2507.499996             | -0.002                | 2562.499996     | -0.002                |
| 85         | 2507.499998             | -0.001                | 2562.499997     | -0.001                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 7              |                       |                 |                       |
|------------------|-------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 20MHz |                       |                 |                       |
|                  | Low Channel             |                       | High Channel    |                       |
|                  | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 2510.000002             | 0.001                 | 2560.000001     | 0.000                 |
| 3.4              | 2510.000003             | 0.001                 | 2560.000004     | 0.002                 |
| 4.6              | 2510.000001             | 0.000                 | 2560.000004     | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 7              |                       |                 |                       |
|------------|-------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth 20MHz |                       |                 |                       |
|            | Low Channel             |                       | High Channel    |                       |
|            | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 2510.000001             | 0.000                 | 2560.000001     | 0.000                 |
| -30        | 2510.000003             | 0.001                 | 2560.000002     | 0.001                 |
| -20        | 2510.000002             | 0.001                 | 2560.000001     | 0.000                 |
| -10        | 2510.000001             | 0.000                 | 2560.000001     | 0.000                 |
| 0          | 2510.000001             | 0.000                 | 2560.000004     | 0.002                 |
| 10         | 2510.000001             | 0.000                 | 2560.000004     | 0.002                 |
| 20         | 2509.999997             | -0.001                | 2559.999996     | -0.002                |
| 30         | 2509.999996             | -0.002                | 2559.999997     | -0.001                |
| 40         | 2509.999996             | -0.002                | 2559.999997     | -0.001                |
| 50         | 2509.999998             | -0.001                | 2559.999996     | -0.002                |
| 60         | 2509.999999             | 0.000                 | 2559.999998     | -0.001                |
| 70         | 2509.999997             | -0.001                | 2559.999997     | -0.001                |
| 80         | 2509.999996             | -0.002                | 2559.999999     | 0.000                 |
| 85         | 2509.999999             | 0.000                 | 2559.999998     | -0.001                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 12               |                       |                 |                       |
|------------------|---------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 1.4 MHz |                       |                 |                       |
|                  | Low Channel               |                       | High Channel    |                       |
|                  | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 699.700004                | 0.006                 | 715.300002      | 0.003                 |
| 3.4              | 699.700002                | 0.003                 | 715.300001      | 0.001                 |
| 4.6              | 699.700001                | 0.001                 | 715.300003      | 0.004                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### 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        | 699.700003                | 0.004                 | 715.300001      | 0.001                 |
| -30        | 699.700004                | 0.006                 | 715.300003      | 0.004                 |
| -20        | 699.700004                | 0.006                 | 715.300001      | 0.001                 |
| -10        | 699.700004                | 0.006                 | 715.300001      | 0.001                 |
| 0          | 699.700004                | 0.006                 | 715.300003      | 0.004                 |
| 10         | 699.700003                | 0.004                 | 715.300002      | 0.003                 |
| 20         | 699.699996                | -0.006                | 715.299997      | -0.004                |
| 30         | 699.699999                | -0.001                | 715.299996      | -0.006                |
| 40         | 699.699997                | -0.004                | 715.299999      | -0.001                |
| 50         | 699.699998                | -0.003                | 715.299999      | -0.001                |
| 60         | 699.699996                | -0.006                | 715.299997      | -0.004                |
| 70         | 699.699997                | -0.004                | 715.299998      | -0.003                |
| 80         | 699.699997                | -0.004                | 715.299999      | -0.001                |
| 85         | 699.699997                | -0.004                | 715.299998      | -0.003                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 12             |                       |                 |                       |
|------------------|-------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 3 MHz |                       |                 |                       |
|                  | Low Channel             |                       | High Channel    |                       |
|                  | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 700.500001              | 0.001                 | 714.500001      | 0.001                 |
| 3.4              | 700.500003              | 0.004                 | 714.500003      | 0.004                 |
| 4.6              | 700.500003              | 0.004                 | 714.500003      | 0.004                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### 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        | 700.500001              | 0.001                 | 714.500003      | 0.004                 |
| -30        | 700.500001              | 0.001                 | 714.500004      | 0.006                 |
| -20        | 700.500001              | 0.001                 | 714.500004      | 0.006                 |
| -10        | 700.500003              | 0.004                 | 714.500002      | 0.003                 |
| 0          | 700.500002              | 0.003                 | 714.500004      | 0.006                 |
| 10         | 700.500001              | 0.001                 | 714.500003      | 0.004                 |
| 20         | 700.499998              | -0.003                | 714.499998      | -0.003                |
| 30         | 700.499997              | -0.004                | 714.499997      | -0.004                |
| 40         | 700.499997              | -0.004                | 714.499999      | -0.001                |
| 50         | 700.499997              | -0.004                | 714.499996      | -0.006                |
| 60         | 700.499996              | -0.006                | 714.499997      | -0.004                |
| 70         | 700.499997              | -0.004                | 714.499997      | -0.004                |
| 80         | 700.499997              | -0.004                | 714.499998      | -0.003                |
| 85         | 700.499998              | -0.003                | 714.499997      | -0.004                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 12            |                       |                 |                       |
|------------------|------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 5MHz |                       |                 |                       |
|                  | Low Channel            |                       | High Channel    |                       |
|                  | Frequency (MHz)        | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 701.500001             | 0.001                 | 713.500003      | 0.004                 |
| 3.4              | 701.500001             | 0.001                 | 713.500003      | 0.004                 |
| 4.6              | 701.500003             | 0.004                 | 713.500001      | 0.001                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 12            |                       |                 |                       |
|------------|------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth 5MHz |                       |                 |                       |
|            | Low Channel            |                       | High Channel    |                       |
|            | Frequency (MHz)        | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 701.500003             | 0.004                 | 713.500001      | 0.001                 |
| -30        | 701.500001             | 0.001                 | 713.500002      | 0.003                 |
| -20        | 701.500004             | 0.006                 | 713.500004      | 0.006                 |
| -10        | 701.500001             | 0.001                 | 713.500003      | 0.004                 |
| 0          | 701.500004             | 0.006                 | 713.500001      | 0.001                 |
| 10         | 701.500001             | 0.001                 | 713.500004      | 0.006                 |
| 20         | 701.499999             | -0.001                | 713.499999      | -0.001                |
| 30         | 701.499996             | -0.006                | 713.499998      | -0.003                |
| 40         | 701.499996             | -0.006                | 713.499997      | -0.004                |
| 50         | 701.499999             | -0.001                | 713.499999      | -0.001                |
| 60         | 701.499996             | -0.006                | 713.499998      | -0.003                |
| 70         | 701.499996             | -0.006                | 713.499998      | -0.003                |
| 80         | 701.499997             | -0.004                | 713.499998      | -0.003                |
| 85         | 701.499999             | -0.001                | 713.499997      | -0.004                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 12             |                       |                 |                       |
|------------------|-------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 10MHz |                       |                 |                       |
|                  | Low Channel             |                       | High Channel    |                       |
|                  | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 704.000004              | 0.006                 | 711.000003      | 0.004                 |
| 3.4              | 704.000003              | 0.004                 | 711.000001      | 0.001                 |
| 4.6              | 704.000004              | 0.006                 | 711.000003      | 0.004                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 12             |                       |                 |                       |
|------------|-------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth 10MHz |                       |                 |                       |
|            | Low Channel             |                       | High Channel    |                       |
|            | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 704.000003              | 0.004                 | 711.000002      | 0.003                 |
| -30        | 704.000001              | 0.001                 | 711.000002      | 0.003                 |
| -20        | 704.000001              | 0.001                 | 711.000004      | 0.006                 |
| -10        | 704.000004              | 0.006                 | 711.000001      | 0.001                 |
| 0          | 704.000003              | 0.004                 | 711.000002      | 0.003                 |
| 10         | 704.000003              | 0.004                 | 711.000001      | 0.001                 |
| 20         | 703.999998              | -0.003                | 710.999998      | -0.003                |
| 30         | 703.999996              | -0.006                | 710.999999      | -0.001                |
| 40         | 703.999997              | -0.004                | 710.999999      | -0.001                |
| 50         | 703.999999              | -0.001                | 710.999998      | -0.003                |
| 60         | 703.999996              | -0.006                | 710.999997      | -0.004                |
| 70         | 703.999998              | -0.003                | 710.999996      | -0.006                |
| 80         | 703.999997              | -0.004                | 710.999996      | -0.006                |
| 85         | 703.999999              | -0.001                | 710.999997      | -0.004                |

### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 17            |                       |                 |                       |
|------------------|------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth 5MHz |                       |                 |                       |
|                  | Low Channel            |                       | High Channel    |                       |
|                  | Frequency (MHz)        | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 706.500004             | 0.006                 | 713.500004      | 0.006                 |
| 3.4              | 706.500004             | 0.006                 | 713.500003      | 0.004                 |
| 4.6              | 706.500003             | 0.004                 | 713.500004      | 0.006                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 17            |                       |                 |                       |
|------------|------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth 5MHz |                       |                 |                       |
|            | Low Channel            |                       | High Channel    |                       |
|            | Frequency (MHz)        | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 706.500004             | 0.006                 | 713.500001      | 0.001                 |
| -30        | 706.500002             | 0.003                 | 713.500004      | 0.006                 |
| -20        | 706.500004             | 0.006                 | 713.500001      | 0.001                 |
| -10        | 706.500001             | 0.001                 | 713.500004      | 0.006                 |
| 0          | 706.500002             | 0.003                 | 713.500002      | 0.003                 |
| 10         | 706.500004             | 0.006                 | 713.500001      | 0.001                 |
| 20         | 706.499996             | -0.006                | 713.499997      | -0.004                |
| 30         | 706.499996             | -0.006                | 713.499998      | -0.003                |
| 40         | 706.499998             | -0.003                | 713.499999      | -0.001                |
| 50         | 706.499999             | -0.001                | 713.499996      | -0.006                |
| 60         | 706.499998             | -0.003                | 713.499996      | -0.006                |
| 70         | 706.499996             | -0.006                | 713.499999      | -0.001                |
| 80         | 706.499999             | -0.001                | 713.499999      | -0.001                |
| 85         | 706.499998             | -0.003                | 713.499999      | -0.001                |

#### Frequency Error vs. Voltage

| Voltage (Vdc) | LTE Band 17             |                       |                 |                       |
|---------------|-------------------------|-----------------------|-----------------|-----------------------|
|               | Channel Bandwidth 10MHz |                       |                 |                       |
|               | Low Channel             |                       | High Channel    |                       |
|               | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0           | 709.000001              | 0.001                 | 711.000002      | 0.003                 |
| 3.4           | 709.000004              | 0.006                 | 711.000002      | 0.003                 |
| 4.6           | 709.000004              | 0.006                 | 711.000003      | 0.004                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 17             |                       |                 |                       |
|------------|-------------------------|-----------------------|-----------------|-----------------------|
|            | Channel Bandwidth 10MHz |                       |                 |                       |
|            | Low Channel             |                       | High Channel    |                       |
|            | Frequency (MHz)         | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -40        | 709.000001              | 0.001                 | 711.000002      | 0.003                 |
| -30        | 709.000002              | 0.003                 | 711.000003      | 0.004                 |
| -20        | 709.000002              | 0.003                 | 711.000004      | 0.006                 |
| -10        | 709.000003              | 0.004                 | 711.000003      | 0.004                 |
| 0          | 709.000002              | 0.003                 | 711.000004      | 0.006                 |
| 10         | 709.000001              | 0.001                 | 711.000004      | 0.006                 |
| 20         | 708.999999              | -0.001                | 710.999997      | -0.004                |
| 30         | 708.999999              | -0.001                | 710.999998      | -0.003                |
| 40         | 708.999996              | -0.006                | 710.999997      | -0.004                |
| 50         | 708.999997              | -0.004                | 710.999997      | -0.004                |
| 60         | 708.999998              | -0.003                | 710.999998      | -0.003                |
| 70         | 708.999996              | -0.006                | 710.999999      | -0.001                |
| 80         | 708.999997              | -0.004                | 710.999996      | -0.006                |
| 85         | 708.999999              | -0.001                | 710.999998      | -0.003                |

#### Frequency Error vs. Voltage

| Voltage (Vdc) | LTE Band 66                |                       |                 |                       |
|---------------|----------------------------|-----------------------|-----------------|-----------------------|
|               | Channel Bandwidth: 1.4 MHz |                       |                 |                       |
|               | Low Channel                |                       | High Channel    |                       |
|               | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0           | 1710.700004                | 0.002                 | 1779.300004     | 0.002                 |
| 3.4           | 1710.700003                | 0.002                 | 1779.300001     | 0.001                 |
| 4.6           | 1710.700002                | 0.001                 | 1779.300003     | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### 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                 | 1779.300002     | 0.001                 |
| -30        | 1710.700004                | 0.002                 | 1779.300003     | 0.002                 |
| -20        | 1710.700003                | 0.002                 | 1779.300002     | 0.001                 |
| -10        | 1710.700003                | 0.002                 | 1779.300003     | 0.002                 |
| 0          | 1710.700004                | 0.002                 | 1779.300003     | 0.002                 |
| 10         | 1710.700004                | 0.002                 | 1779.300002     | 0.001                 |
| 20         | 1710.699997                | -0.002                | 1779.299996     | -0.002                |
| 30         | 1710.699998                | -0.001                | 1779.299999     | -0.001                |
| 40         | 1710.699996                | -0.002                | 1779.299999     | -0.001                |
| 50         | 1710.699997                | -0.002                | 1779.299998     | -0.001                |
| 60         | 1710.699997                | -0.002                | 1779.299997     | -0.002                |
| 70         | 1710.699999                | -0.001                | 1779.299996     | -0.002                |
| 80         | 1710.699997                | -0.002                | 1779.299998     | -0.001                |
| 85         | 1710.699996                | -0.002                | 1779.299997     | -0.002                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 66              |                       |                 |                       |
|------------------|--------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth: 3 MHz |                       |                 |                       |
|                  | Low Channel              |                       | High Channel    |                       |
|                  | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 1711.500004              | 0.002                 | 1778.500002     | 0.001                 |
| 3.4              | 1711.500002              | 0.001                 | 1778.500002     | 0.001                 |
| 4.6              | 1711.500003              | 0.002                 | 1778.500001     | 0.001                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### 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        | 1711.500004              | 0.002                 | 1778.500004     | 0.002                 |
| -30        | 1711.500003              | 0.002                 | 1778.500002     | 0.001                 |
| -20        | 1711.500003              | 0.002                 | 1778.500003     | 0.002                 |
| -10        | 1711.500004              | 0.002                 | 1778.500001     | 0.001                 |
| 0          | 1711.500002              | 0.001                 | 1778.500003     | 0.002                 |
| 10         | 1711.500003              | 0.002                 | 1778.500002     | 0.001                 |
| 20         | 1711.499999              | -0.001                | 1778.499996     | -0.002                |
| 30         | 1711.499996              | -0.002                | 1778.499999     | -0.001                |
| 40         | 1711.499998              | -0.001                | 1778.499996     | -0.002                |
| 50         | 1711.499997              | -0.002                | 1778.499997     | -0.002                |
| 60         | 1711.499998              | -0.001                | 1778.499998     | -0.001                |
| 70         | 1711.499999              | -0.001                | 1778.499997     | -0.002                |
| 80         | 1711.499999              | -0.001                | 1778.499999     | -0.001                |
| 85         | 1711.499997              | -0.002                | 1778.499997     | -0.002                |

### Frequency Error vs. Voltage

| Voltage (Vdc) | LTE Band 66              |                       |                 |                       |
|---------------|--------------------------|-----------------------|-----------------|-----------------------|
|               | Channel Bandwidth: 5 MHz |                       |                 |                       |
|               | Low Channel              |                       | High Channel    |                       |
|               | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0           | 1712.500003              | 0.002                 | 1777.500001     | 0.001                 |
| 3.4           | 1712.500001              | 0.001                 | 1777.500003     | 0.002                 |
| 4.6           | 1712.500001              | 0.001                 | 1777.500002     | 0.001                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

### 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                 | 1777.500002     | 0.001                 |
| -30        | 1712.500003              | 0.002                 | 1777.500002     | 0.001                 |
| -20        | 1712.500002              | 0.001                 | 1777.500003     | 0.002                 |
| -10        | 1712.500003              | 0.002                 | 1777.500001     | 0.001                 |
| 0          | 1712.500003              | 0.002                 | 1777.500003     | 0.002                 |
| 10         | 1712.500002              | 0.001                 | 1777.500002     | 0.001                 |
| 20         | 1712.499998              | -0.001                | 1777.499997     | -0.002                |
| 30         | 1712.499998              | -0.001                | 1777.499997     | -0.002                |
| 40         | 1712.499997              | -0.002                | 1777.499996     | -0.002                |
| 50         | 1712.499996              | -0.002                | 1777.499999     | -0.001                |
| 60         | 1712.499999              | -0.001                | 1777.499996     | -0.002                |
| 70         | 1712.499999              | -0.001                | 1777.499996     | -0.002                |
| 80         | 1712.499997              | -0.002                | 1777.499999     | -0.001                |
| 85         | 1712.499998              | -0.001                | 1777.499996     | -0.002                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 66               |                       |                 |                       |
|------------------|---------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth: 10 MHz |                       |                 |                       |
|                  | Low Channel               |                       | High Channel    |                       |
|                  | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 1715.000003               | 0.002                 | 1775.000002     | 0.001                 |
| 3.4              | 1715.000003               | 0.002                 | 1775.000004     | 0.002                 |
| 4.6              | 1715.000004               | 0.002                 | 1775.000001     | 0.001                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### 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                 | 1775.000001     | 0.001                 |
| -30        | 1715.000002               | 0.001                 | 1775.000002     | 0.001                 |
| -20        | 1715.000004               | 0.002                 | 1775.000004     | 0.002                 |
| -10        | 1715.000003               | 0.002                 | 1775.000001     | 0.001                 |
| 0          | 1715.000004               | 0.002                 | 1775.000004     | 0.002                 |
| 10         | 1715.000003               | 0.002                 | 1775.000002     | 0.001                 |
| 20         | 1714.999998               | -0.001                | 1774.999998     | -0.001                |
| 30         | 1714.999999               | -0.001                | 1774.999997     | -0.002                |
| 40         | 1714.999996               | -0.002                | 1774.999997     | -0.002                |
| 50         | 1714.999998               | -0.001                | 1774.999999     | -0.001                |
| 60         | 1714.999997               | -0.002                | 1774.999996     | -0.002                |
| 70         | 1714.999996               | -0.002                | 1774.999999     | -0.001                |
| 80         | 1714.999998               | -0.001                | 1774.999997     | -0.002                |
| 85         | 1714.999997               | -0.002                | 1774.999997     | -0.002                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 66               |                       |                 |                       |
|------------------|---------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth: 15 MHz |                       |                 |                       |
|                  | Low Channel               |                       | High Channel    |                       |
|                  | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 1717.500001               | 0.001                 | 1772.500001     | 0.001                 |
| 3.4              | 1717.500002               | 0.001                 | 1772.500004     | 0.002                 |
| 4.6              | 1717.500002               | 0.001                 | 1772.500003     | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### 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        | 1717.500002               | 0.001                 | 1772.500004     | 0.002                 |
| -30        | 1717.500003               | 0.002                 | 1772.500001     | 0.001                 |
| -20        | 1717.500004               | 0.002                 | 1772.500002     | 0.001                 |
| -10        | 1717.500001               | 0.001                 | 1772.500003     | 0.002                 |
| 0          | 1717.500004               | 0.002                 | 1772.500004     | 0.002                 |
| 10         | 1717.500003               | 0.002                 | 1772.500003     | 0.002                 |
| 20         | 1717.499997               | -0.002                | 1772.499998     | -0.001                |
| 30         | 1717.499999               | -0.001                | 1772.499999     | -0.001                |
| 40         | 1717.499998               | -0.001                | 1772.499998     | -0.001                |
| 50         | 1717.499999               | -0.001                | 1772.499998     | -0.001                |
| 60         | 1717.499999               | -0.001                | 1772.499999     | -0.001                |
| 70         | 1717.499999               | -0.001                | 1772.499999     | -0.001                |
| 80         | 1717.499999               | -0.001                | 1772.499999     | -0.001                |
| 85         | 1717.499999               | -0.001                | 1772.499996     | -0.002                |

#### Frequency Error vs. Voltage

| Voltage<br>(Vdc) | LTE Band 66               |                       |                 |                       |
|------------------|---------------------------|-----------------------|-----------------|-----------------------|
|                  | Channel Bandwidth: 20 MHz |                       |                 |                       |
|                  | Low Channel               |                       | High Channel    |                       |
|                  | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.0              | 1720.000001               | 0.001                 | 1770.000002     | 0.001                 |
| 3.4              | 1720.000001               | 0.001                 | 1770.000003     | 0.002                 |
| 4.6              | 1720.000001               | 0.001                 | 1770.000003     | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

#### 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        | 1720.000002               | 0.001                 | 1770.000004     | 0.002                 |
| -30        | 1720.000001               | 0.001                 | 1770.000003     | 0.002                 |
| -20        | 1720.000002               | 0.001                 | 1770.000002     | 0.001                 |
| -10        | 1720.000004               | 0.002                 | 1770.000004     | 0.002                 |
| 0          | 1720.000002               | 0.001                 | 1770.000003     | 0.002                 |
| 10         | 1720.000003               | 0.002                 | 1770.000003     | 0.002                 |
| 20         | 1719.999998               | -0.001                | 1769.999998     | -0.001                |
| 30         | 1719.999998               | -0.001                | 1769.999996     | -0.002                |
| 40         | 1719.999997               | -0.002                | 1769.999998     | -0.001                |
| 50         | 1719.999998               | -0.001                | 1769.999999     | -0.001                |
| 60         | 1719.999998               | -0.001                | 1769.999996     | -0.002                |
| 70         | 1719.999997               | -0.002                | 1769.999996     | -0.002                |
| 80         | 1719.999998               | -0.001                | 1769.999996     | -0.002                |
| 85         | 1719.999996               | -0.002                | 1769.999996     | -0.002                |

## 4.4 Emission Bandwidth Measurement

### 4.4.1 Limits of Emission Bandwidth Measurement

According to FCC 2.1049, the occupied bandwidth, 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.

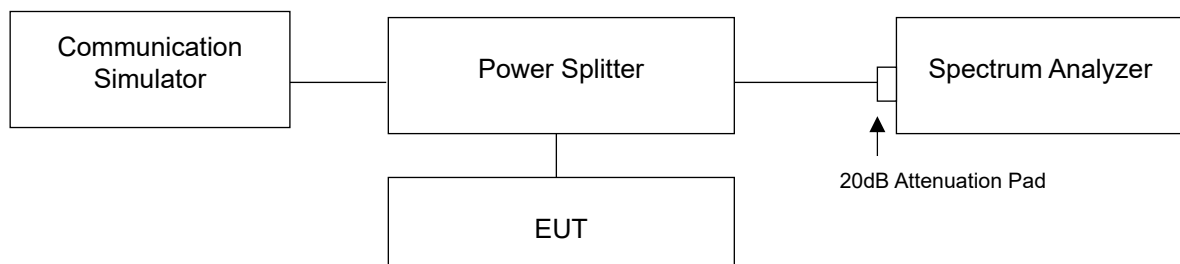
### 4.4.2 Test Procedure

For the 26dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

- The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
- The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set  $\geq 3 \times \text{RBW}$ .
- Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
- The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target “-X dB” requirement, i.e., if the requirement calls for measuring the -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
- Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
- Determine the following reference values: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
- Determine the “-X dB amplitude” as equal to (Reference Value - X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
- Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB amplitude” determined in step f). If a marker is below this “-X dB amplitude” value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers.
- The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

For the occupied bandwidth measurement method, please refer to section 5.4.4 of ANSI C63.26.

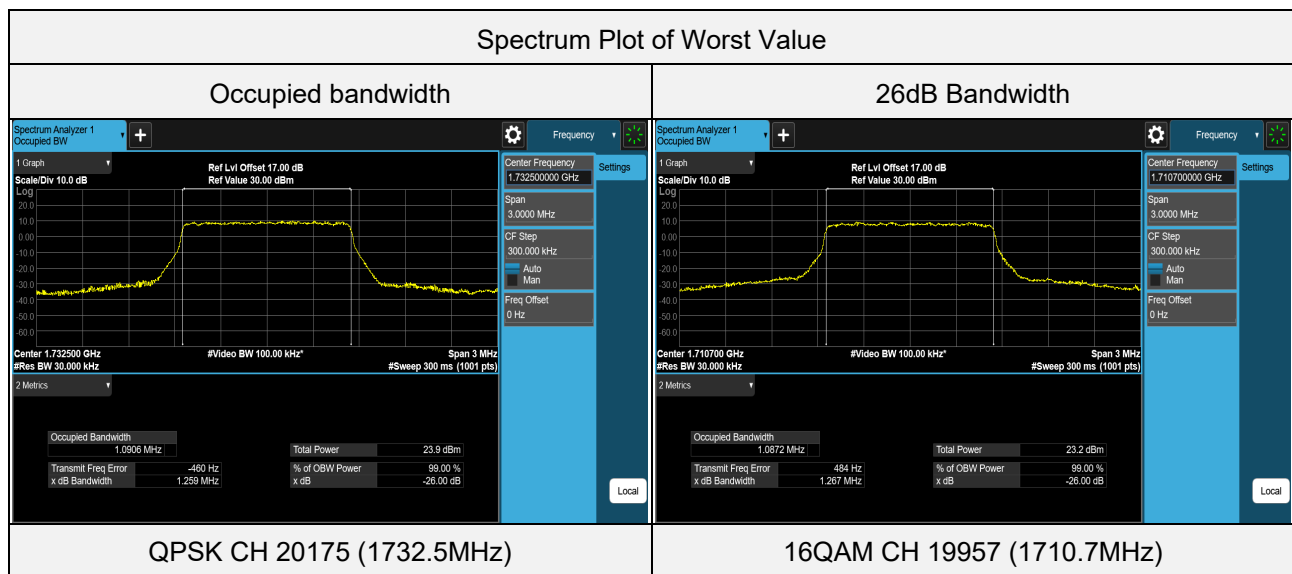
### 4.4.3 Test Setup



#### 4.4.4 Test Result

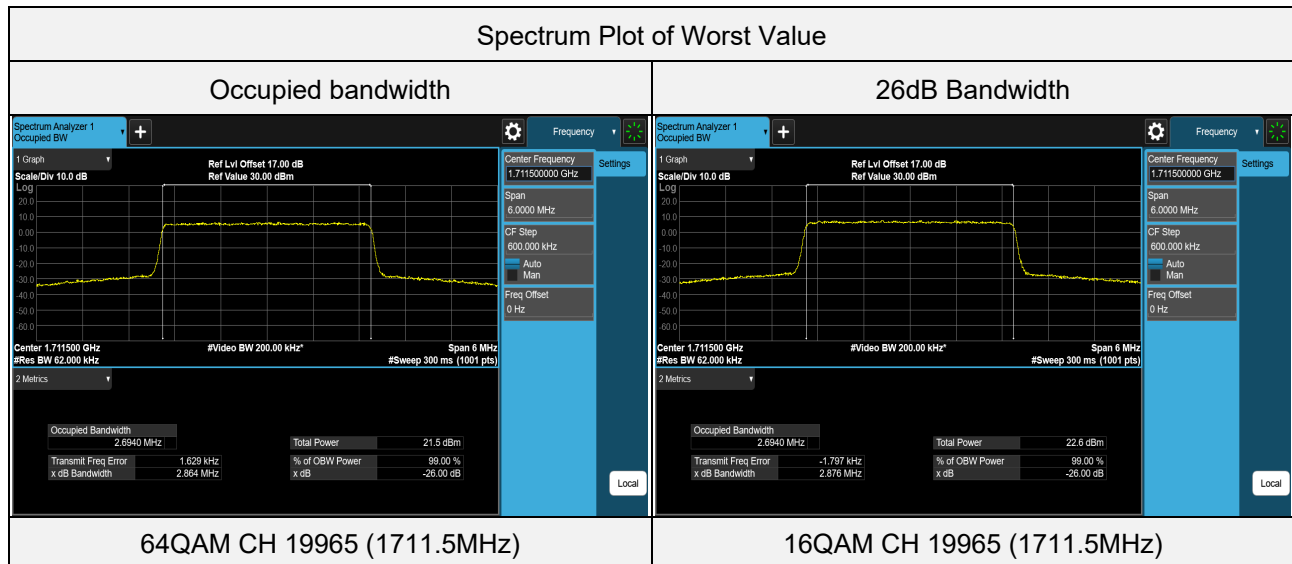
##### LTE Band 4 (Channel Bandwidth 1.4MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 19957   | 1710.7          | 1.0873                   | 1.258                |
| QPSK           | 20175   | 1732.5          | 1.0906                   | 1.259                |
| QPSK           | 20393   | 1754.3          | 1.0893                   | 1.256                |
| 16QAM          | 19957   | 1710.7          | 1.0872                   | 1.267                |
| 16QAM          | 20175   | 1732.5          | 1.0863                   | 1.256                |
| 16QAM          | 20393   | 1754.3          | 1.0862                   | 1.253                |
| 64QAM          | 19957   | 1710.7          | 1.0880                   | 1.258                |
| 64QAM          | 20175   | 1732.5          | 1.0882                   | 1.255                |
| 64QAM          | 20393   | 1754.3          | 1.0871                   | 1.252                |



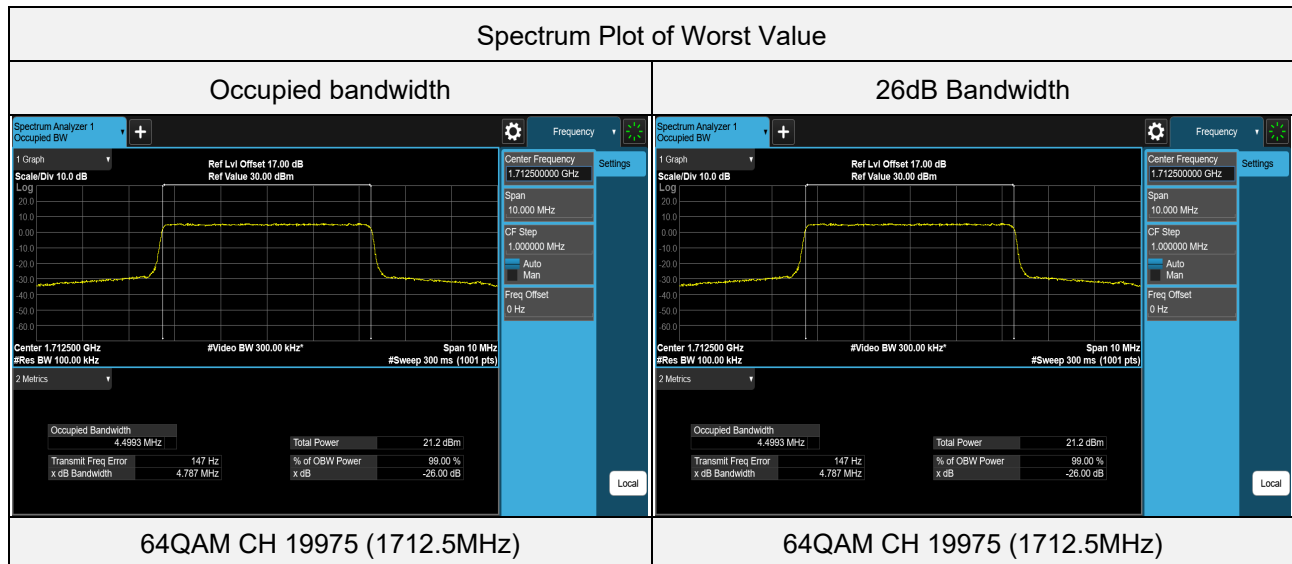
### LTE Band 4 (Channel Bandwidth 3MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 19965   | 1711.5          | 2.6933                   | 2.869                |
| QPSK           | 20175   | 1732.5          | 2.6936                   | 2.865                |
| QPSK           | 20385   | 1753.5          | 2.6915                   | 2.869                |
| 16QAM          | 19965   | 1711.5          | 2.6940                   | 2.876                |
| 16QAM          | 20175   | 1732.5          | 2.6928                   | 2.867                |
| 16QAM          | 20385   | 1753.5          | 2.6905                   | 2.870                |
| 64QAM          | 19965   | 1711.5          | 2.6940                   | 2.864                |
| 64QAM          | 20175   | 1732.5          | 2.6934                   | 2.864                |
| 64QAM          | 20385   | 1753.5          | 2.6920                   | 2.856                |



### LTE Band 4 (Channel Bandwidth 5MHz)

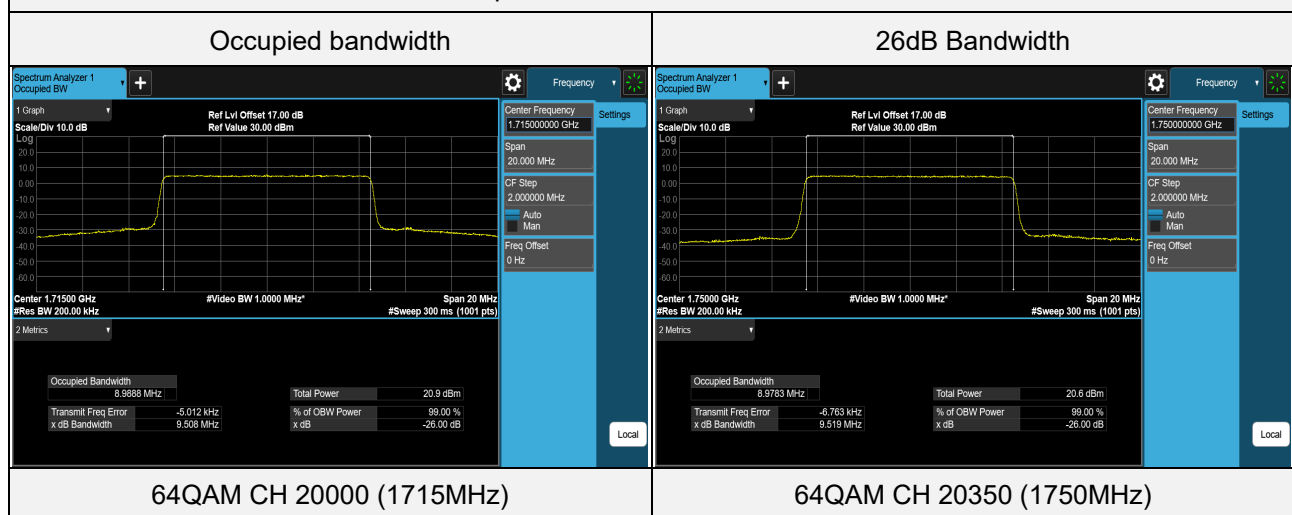
| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 19975   | 1712.5          | 4.4965                   | 4.784                |
| QPSK           | 20175   | 1732.5          | 4.4948                   | 4.778                |
| QPSK           | 20375   | 1752.5          | 4.4927                   | 4.774                |
| 16QAM          | 19975   | 1712.5          | 4.4932                   | 4.773                |
| 16QAM          | 20175   | 1732.5          | 4.4907                   | 4.769                |
| 16QAM          | 20375   | 1752.5          | 4.4922                   | 4.763                |
| 64QAM          | 19975   | 1712.5          | 4.4993                   | 4.787                |
| 64QAM          | 20175   | 1732.5          | 4.4932                   | 4.783                |
| 64QAM          | 20375   | 1752.5          | 4.4930                   | 4.777                |



# LTE Band 4 (Channel Bandwidth 10MHz)

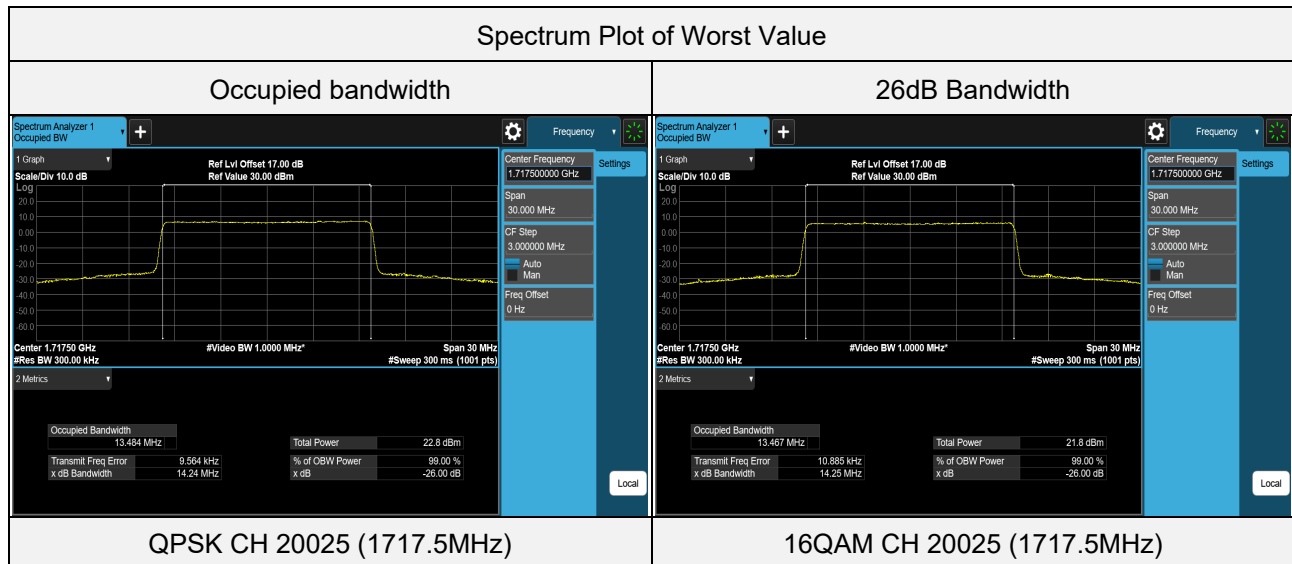
| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 20000   | 1715            | 8.9845                   | 9.516                |
| QPSK           | 20175   | 1732.5          | 8.9803                   | 9.499                |
| QPSK           | 20350   | 1750            | 8.9769                   | 9.498                |
| 16QAM          | 20000   | 1715            | 8.9858                   | 9.502                |
| 16QAM          | 20175   | 1732.5          | 8.9791                   | 9.488                |
| 16QAM          | 20350   | 1750            | 8.9745                   | 9.498                |
| 64QAM          | 20000   | 1715            | 8.9888                   | 9.508                |
| 64QAM          | 20175   | 1732.5          | 8.9783                   | 9.505                |
| 64QAM          | 20350   | 1750            | 8.9783                   | 9.519                |

## Spectrum Plot of Worst Value



### LTE Band 4 (Channel Bandwidth 15MHz)

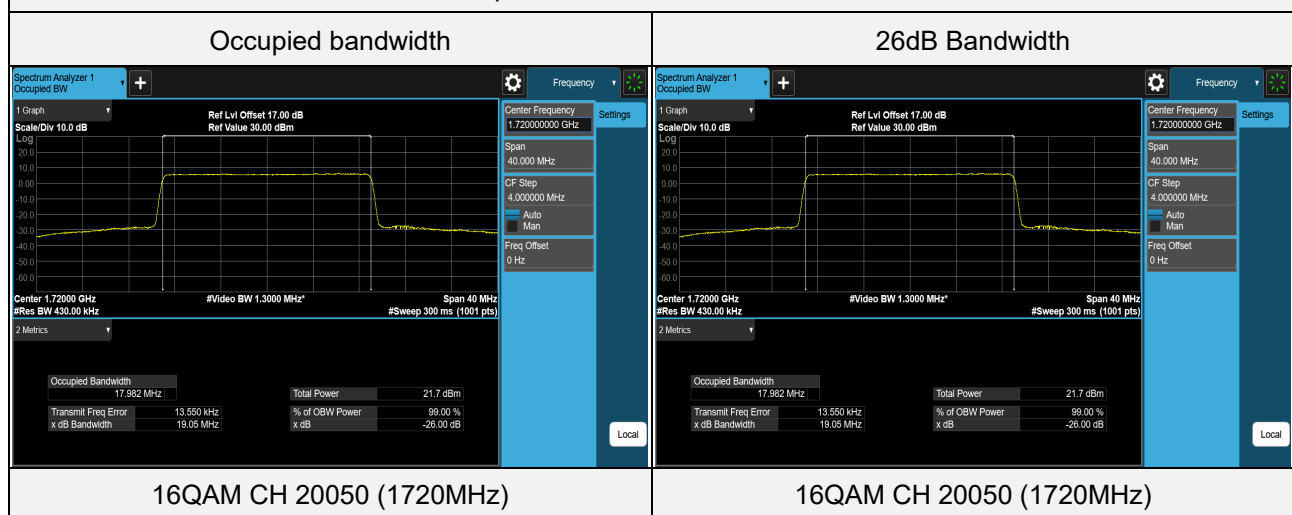
| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 20025   | 1717.5          | 13.484                   | 14.24                |
| QPSK           | 20175   | 1732.5          | 13.471                   | 14.23                |
| QPSK           | 20325   | 1747.5          | 13.462                   | 14.22                |
| 16QAM          | 20025   | 1717.5          | 13.467                   | 14.25                |
| 16QAM          | 20175   | 1732.5          | 13.456                   | 14.23                |
| 16QAM          | 20325   | 1747.5          | 13.452                   | 14.22                |
| 64QAM          | 20025   | 1717.5          | 13.465                   | 14.25                |
| 64QAM          | 20175   | 1732.5          | 13.457                   | 14.22                |
| 64QAM          | 20325   | 1747.5          | 13.448                   | 14.23                |



### LTE Band 4 (Channel Bandwidth 20MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 20050   | 1720            | 17.970                   | 19.05                |
| QPSK           | 20175   | 1732.5          | 17.948                   | 19.02                |
| QPSK           | 20300   | 1745            | 17.943                   | 19.02                |
| 16QAM          | 20050   | 1720            | 17.982                   | 19.05                |
| 16QAM          | 20175   | 1732.5          | 17.954                   | 19.02                |
| 16QAM          | 20300   | 1745            | 17.951                   | 19.03                |
| 64QAM          | 20050   | 1720            | 17.971                   | 19.04                |
| 64QAM          | 20175   | 1732.5          | 17.950                   | 19.02                |
| 64QAM          | 20300   | 1745            | 17.949                   | 19.03                |

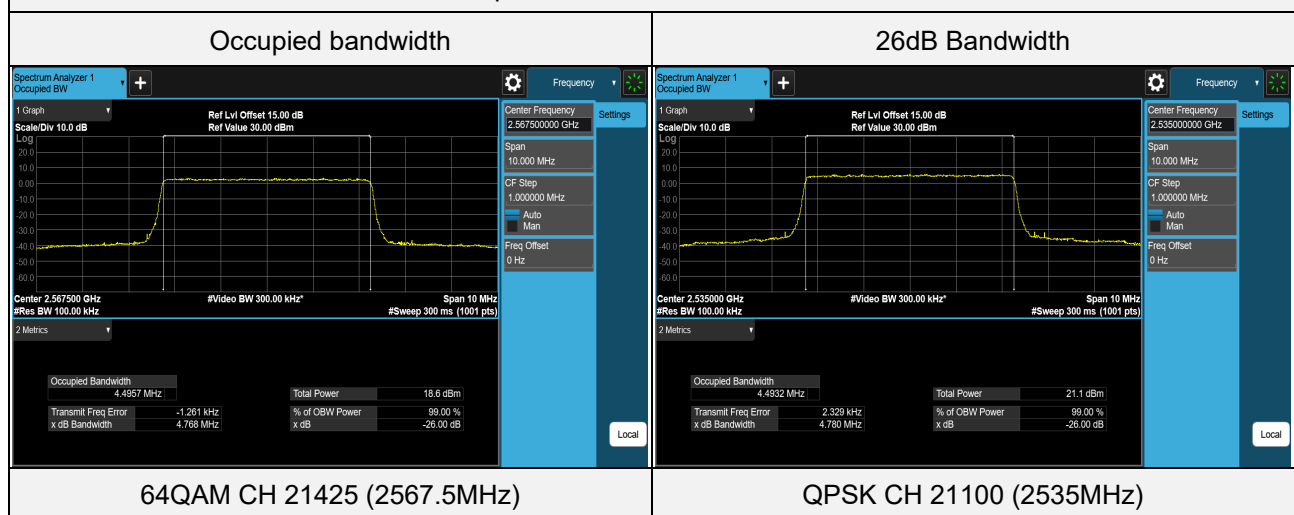
### Spectrum Plot of Worst Value



# LTE Band 7 (Channel Bandwidth 5MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 20775   | 2502.5          | 4.4882                   | 4.767                |
| QPSK           | 21100   | 2535            | 4.4932                   | 4.780                |
| QPSK           | 21425   | 2567.5          | 4.4916                   | 4.780                |
| 16QAM          | 20775   | 2502.5          | 4.4892                   | 4.766                |
| 16QAM          | 21100   | 2535            | 4.4939                   | 4.771                |
| 16QAM          | 21425   | 2567.5          | 4.4883                   | 4.771                |
| 64QAM          | 20775   | 2502.5          | 4.4921                   | 4.772                |
| 64QAM          | 21100   | 2535            | 4.4925                   | 4.776                |
| 64QAM          | 21425   | 2567.5          | 4.4957                   | 4.768                |

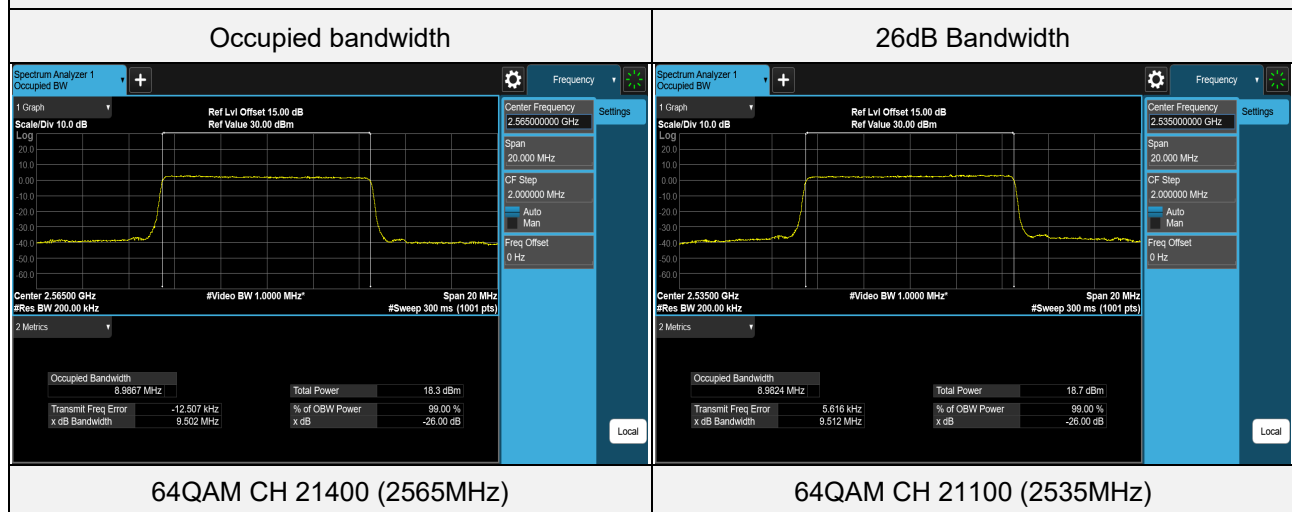
## Spectrum Plot of Worst Value



### LTE Band 7 (Channel Bandwidth 10MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 20800   | 2505            | 8.9718                   | 9.488                |
| QPSK           | 21100   | 2535            | 8.9834                   | 9.498                |
| QPSK           | 21400   | 2565            | 8.9813                   | 9.492                |
| 16QAM          | 20800   | 2505            | 8.9678                   | 9.482                |
| 16QAM          | 21100   | 2535            | 8.9783                   | 9.492                |
| 16QAM          | 21400   | 2565            | 8.9840                   | 9.488                |
| 64QAM          | 20800   | 2505            | 8.9694                   | 9.498                |
| 64QAM          | 21100   | 2535            | 8.9824                   | 9.512                |
| 64QAM          | 21400   | 2565            | 8.9867                   | 9.502                |

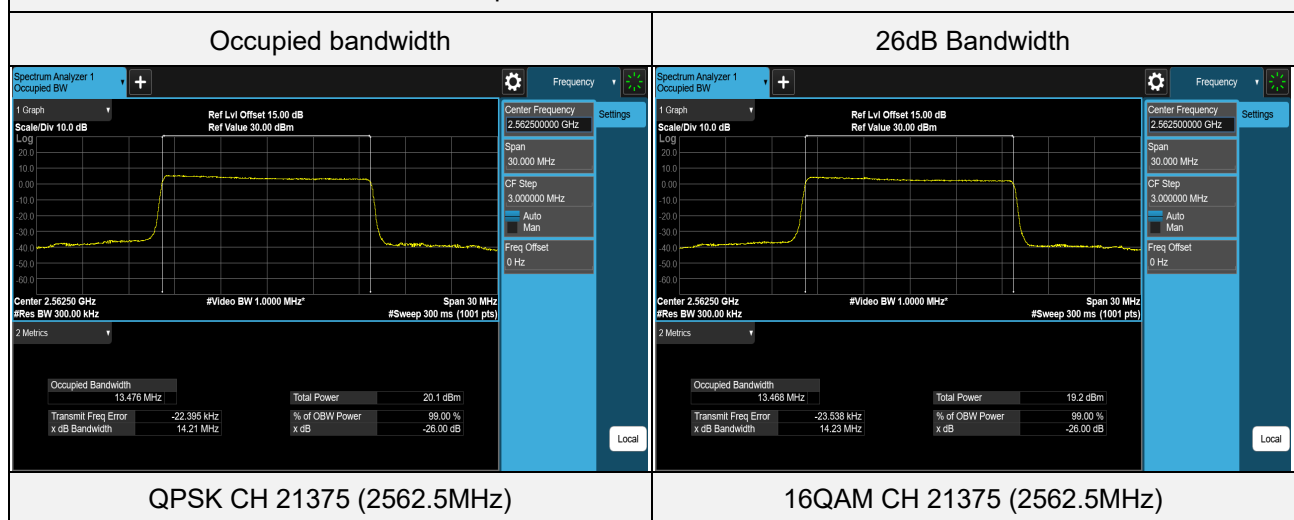
### Spectrum Plot of Worst Value



# LTE Band 7 (Channel Bandwidth 15MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 20825   | 2507.5          | 13.431                   | 14.21                |
| QPSK           | 21100   | 2535            | 13.475                   | 14.22                |
| QPSK           | 21375   | 2562.5          | 13.476                   | 14.21                |
| 16QAM          | 20825   | 2507.5          | 13.427                   | 14.22                |
| 16QAM          | 21100   | 2535            | 13.469                   | 14.22                |
| 16QAM          | 21375   | 2562.5          | 13.468                   | 14.23                |
| 64QAM          | 20825   | 2507.5          | 13.425                   | 14.21                |
| 64QAM          | 21100   | 2535            | 13.464                   | 14.23                |
| 64QAM          | 21375   | 2562.5          | 13.462                   | 14.21                |

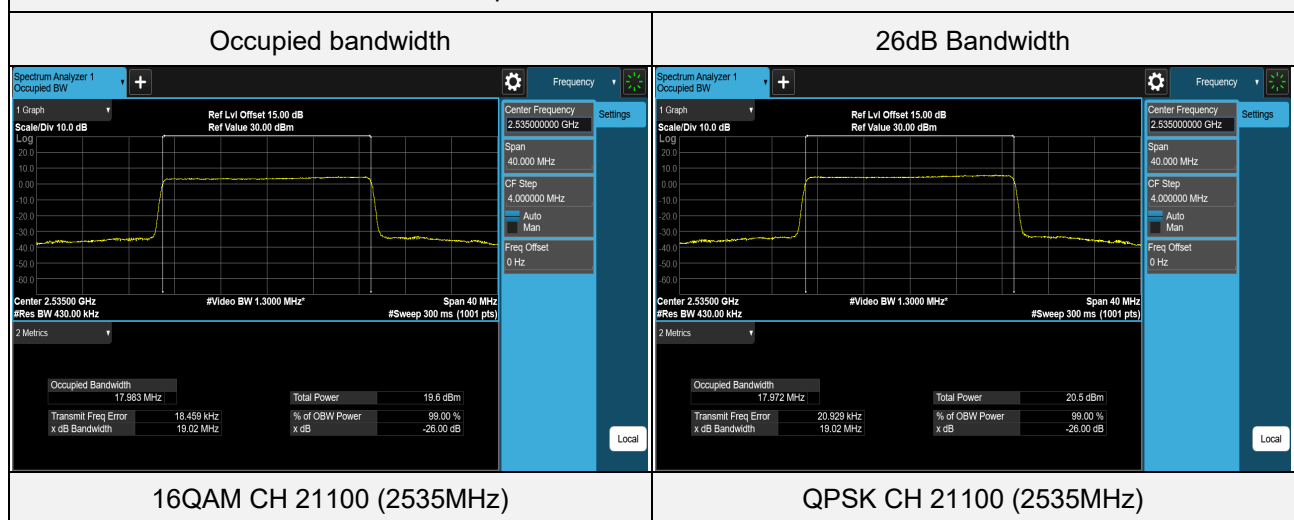
## Spectrum Plot of Worst Value



# LTE Band 7 (Channel Bandwidth 20MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 20850   | 2510            | 17.870                   | 18.98                |
| QPSK           | 21100   | 2535            | 17.972                   | 19.02                |
| QPSK           | 21350   | 2560            | 17.937                   | 18.99                |
| 16QAM          | 20850   | 2510            | 17.896                   | 18.99                |
| 16QAM          | 21100   | 2535            | 17.983                   | 19.02                |
| 16QAM          | 21350   | 2560            | 17.942                   | 18.99                |
| 64QAM          | 20850   | 2510            | 17.883                   | 18.99                |
| 64QAM          | 21100   | 2535            | 17.979                   | 19.02                |
| 64QAM          | 21350   | 2560            | 17.934                   | 19.00                |

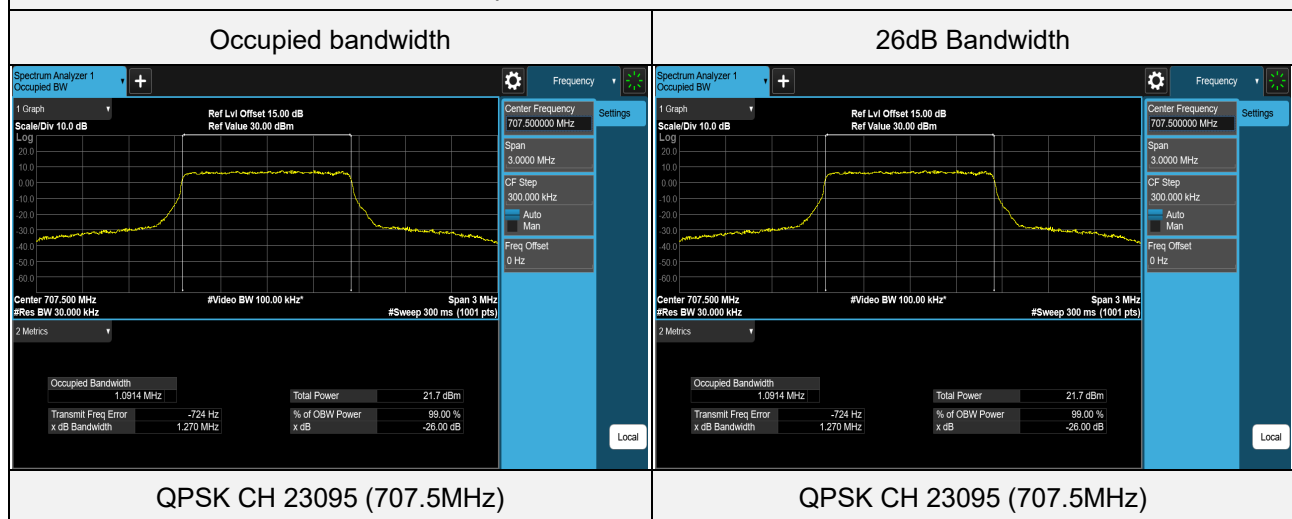
## Spectrum Plot of Worst Value



### LTE Band 12 (Channel Bandwidth 1.4MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 23017   | 699.7           | 1.0872                   | 1.252                |
| QPSK           | 23095   | 707.5           | 1.0914                   | 1.270                |
| QPSK           | 23173   | 715.3           | 1.0905                   | 1.263                |
| 16QAM          | 23017   | 699.7           | 1.0870                   | 1.254                |
| 16QAM          | 23095   | 707.5           | 1.0869                   | 1.261                |
| 16QAM          | 23173   | 715.3           | 1.0866                   | 1.246                |
| 64QAM          | 23017   | 699.7           | 1.0886                   | 1.248                |
| 64QAM          | 23095   | 707.5           | 1.0885                   | 1.244                |
| 64QAM          | 23173   | 715.3           | 1.0882                   | 1.250                |

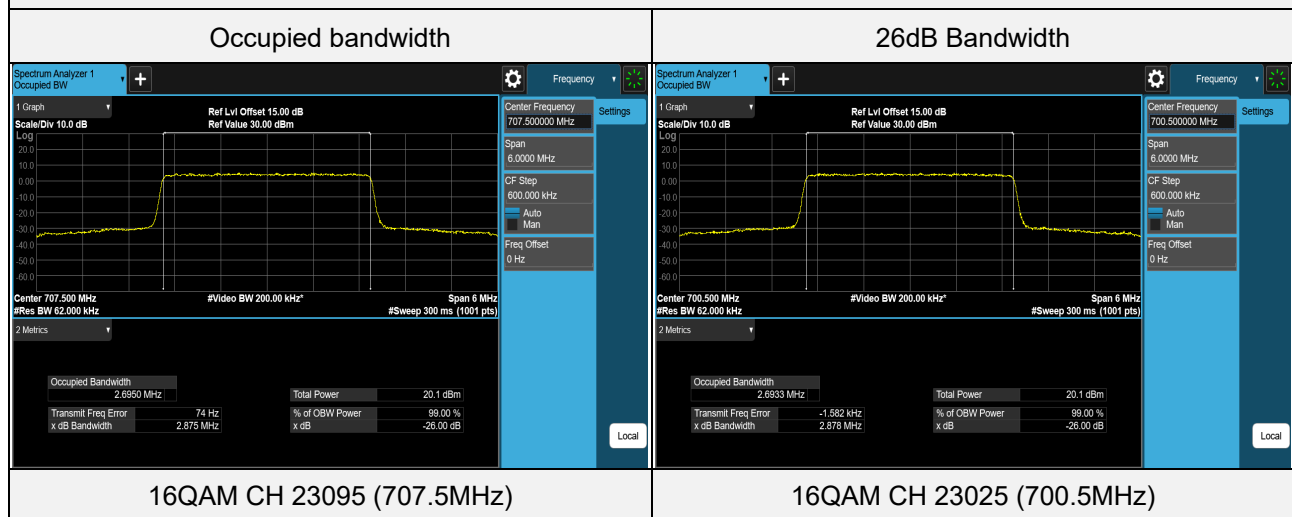
### Spectrum Plot of Worst Value



### LTE Band 12 (Channel Bandwidth 3MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 23025   | 700.5           | 2.6916                   | 2.875                |
| QPSK           | 23095   | 707.5           | 2.6932                   | 2.870                |
| QPSK           | 23165   | 714.5           | 2.6932                   | 2.870                |
| 16QAM          | 23025   | 700.5           | 2.6933                   | 2.878                |
| 16QAM          | 23095   | 707.5           | 2.6950                   | 2.875                |
| 16QAM          | 23165   | 714.5           | 2.6926                   | 2.867                |
| 64QAM          | 23025   | 700.5           | 2.6925                   | 2.861                |
| 64QAM          | 23095   | 707.5           | 2.6925                   | 2.859                |
| 64QAM          | 23165   | 714.5           | 2.6915                   | 2.860                |

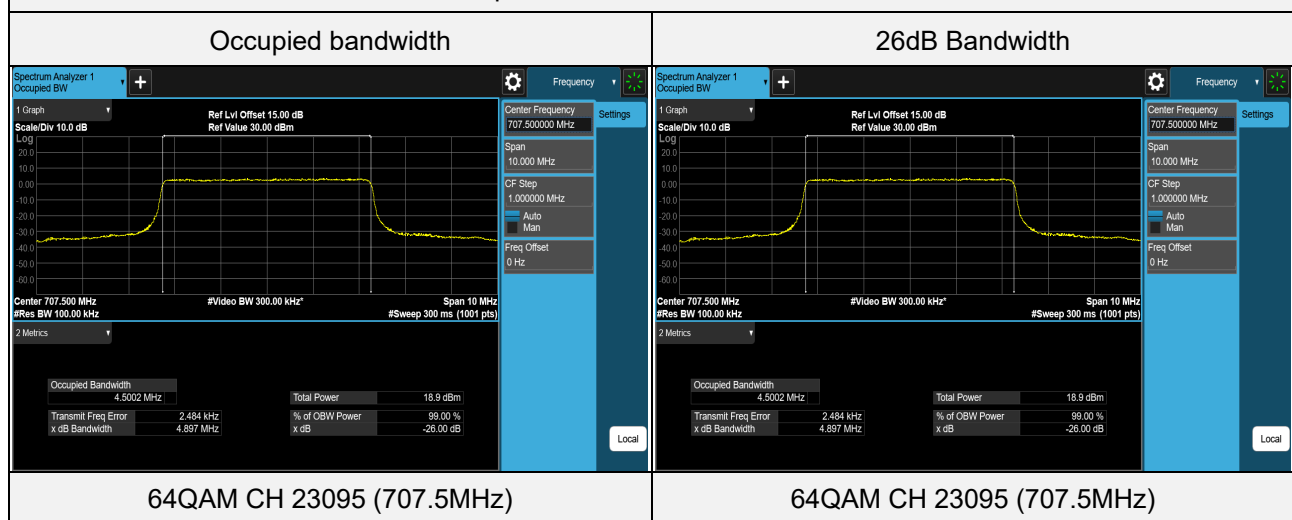
### Spectrum Plot of Worst Value



### LTE Band 12 (Channel Bandwidth 5MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 23035   | 701.5           | 4.4971                   | 4.896                |
| QPSK           | 23095   | 707.5           | 4.4983                   | 4.881                |
| QPSK           | 23155   | 713.5           | 4.4959                   | 4.884                |
| 16QAM          | 23035   | 701.5           | 4.4937                   | 4.864                |
| 16QAM          | 23095   | 707.5           | 4.4952                   | 4.865                |
| 16QAM          | 23155   | 713.5           | 4.4932                   | 4.870                |
| 64QAM          | 23035   | 701.5           | 4.4950                   | 4.892                |
| 64QAM          | 23095   | 707.5           | 4.5002                   | 4.897                |
| 64QAM          | 23155   | 713.5           | 4.4954                   | 4.881                |

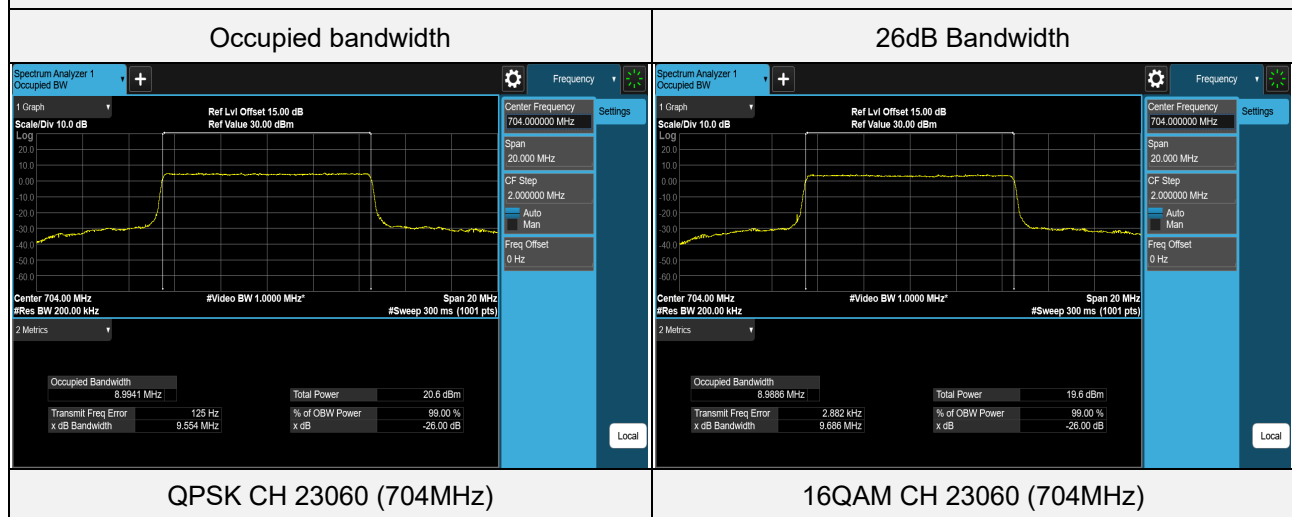
### Spectrum Plot of Worst Value



### LTE Band 12 (Channel Bandwidth 10MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 23060   | 704             | 8.9941                   | 9.554                |
| QPSK           | 23095   | 707.5           | 8.9925                   | 9.542                |
| QPSK           | 23130   | 711             | 8.9750                   | 9.562                |
| 16QAM          | 23060   | 704             | 8.9886                   | 9.686                |
| 16QAM          | 23095   | 707.5           | 8.9847                   | 9.548                |
| 16QAM          | 23130   | 711             | 8.9720                   | 9.547                |
| 64QAM          | 23060   | 704             | 8.9939                   | 9.583                |
| 64QAM          | 23095   | 707.5           | 8.9904                   | 9.601                |
| 64QAM          | 23130   | 711             | 8.9744                   | 9.560                |

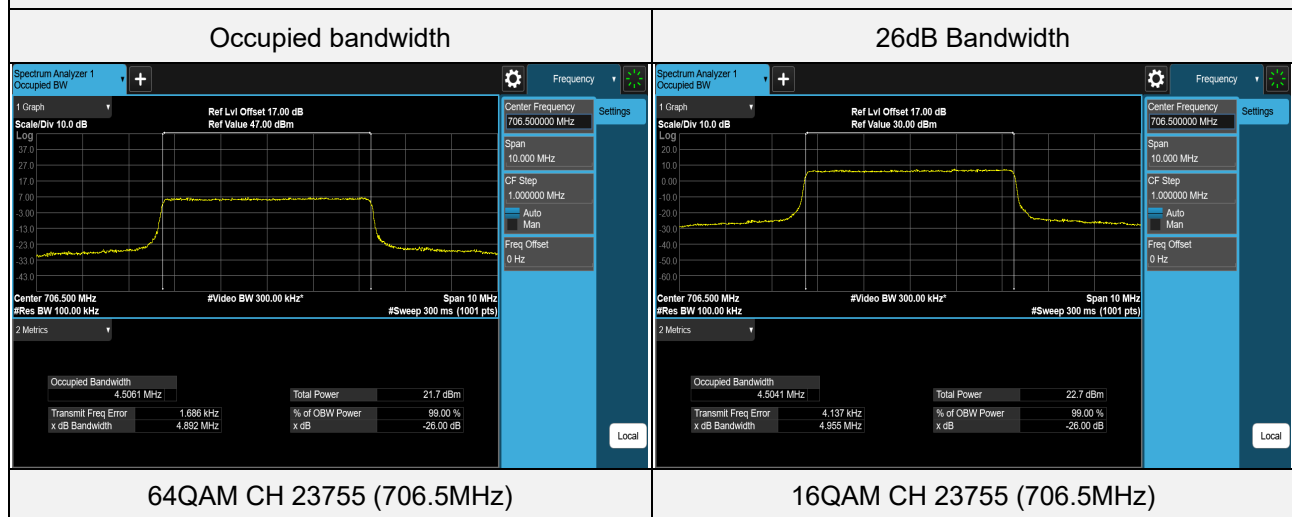
### Spectrum Plot of Worst Value



### LTE Band 17 (Channel Bandwidth 5MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 23755   | 706.5           | 4.5007                   | 4.920                |
| QPSK           | 23790   | 710             | 4.4939                   | 4.871                |
| QPSK           | 23825   | 713.5           | 4.4929                   | 4.852                |
| 16QAM          | 23755   | 706.5           | 4.5041                   | 4.955                |
| 16QAM          | 23790   | 710             | 4.4907                   | 4.836                |
| 16QAM          | 23825   | 713.5           | 4.4876                   | 4.840                |
| 64QAM          | 23755   | 706.5           | 4.5061                   | 4.892                |
| 64QAM          | 23790   | 710             | 4.4949                   | 4.855                |
| 64QAM          | 23825   | 713.5           | 4.4880                   | 4.840                |

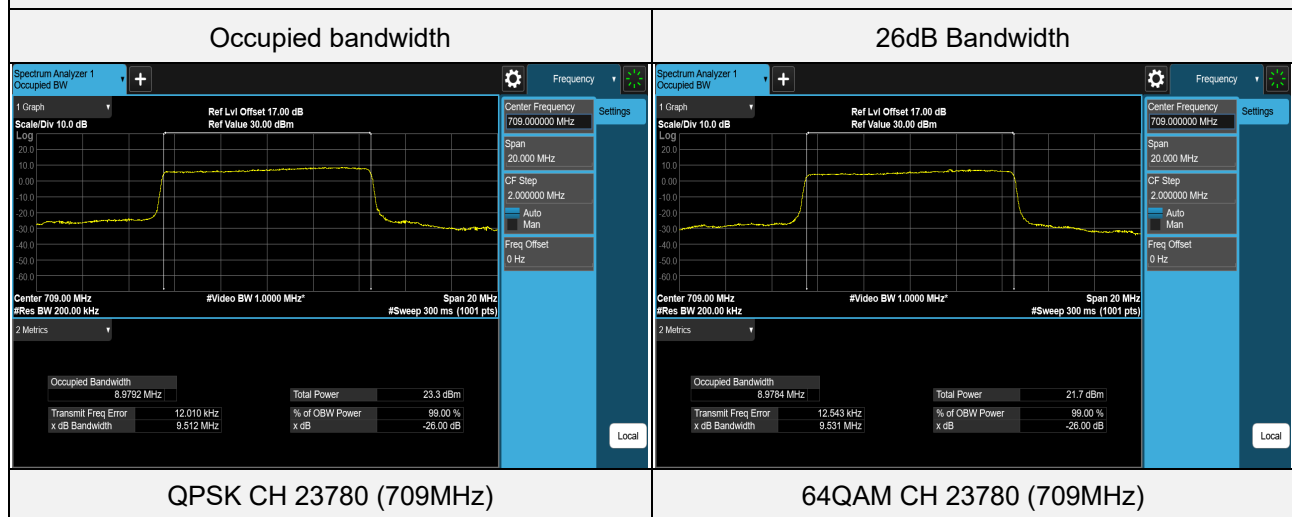
### Spectrum Plot of Worst Value



### LTE Band 17 (Channel Bandwidth 10MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 23780   | 709             | 8.9792                   | 9.512                |
| QPSK           | 23790   | 710             | 8.9555                   | 9.503                |
| QPSK           | 23800   | 711             | 8.9422                   | 9.505                |
| 16QAM          | 23780   | 709             | 8.9731                   | 9.513                |
| 16QAM          | 23790   | 710             | 8.9570                   | 9.522                |
| 16QAM          | 23800   | 711             | 8.9403                   | 9.503                |
| 64QAM          | 23780   | 709             | 8.9784                   | 9.531                |
| 64QAM          | 23790   | 710             | 8.9556                   | 9.517                |
| 64QAM          | 23800   | 711             | 8.9422                   | 9.499                |

### Spectrum Plot of Worst Value



| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 131979  | 1710.7          | 1.0882                   | 1.259                |
| QPSK           | 132322  | 1745            | 1.0891                   | 1.258                |
| QPSK           | 132665  | 1779.3          | 1.0896                   | 1.256                |
| 16QAM          | 131979  | 1710.7          | 1.0879                   | 1.258                |
| 16QAM          | 132322  | 1745            | 1.0868                   | 1.242                |
| 16QAM          | 132665  | 1779.3          | 1.0886                   | 1.254                |
| 64QAM          | 131979  | 1710.7          | 1.0870                   | 1.257                |
| 64QAM          | 132322  | 1745            | 1.0882                   | 1.254                |
| 64QAM          | 132665  | 1779.3          | 1.0875                   | 1.254                |

The figure displays two side-by-side screenshots of a Spectrum Analyzer interface, showing the spectrum plot of the worst value for two different channels. Both plots are labeled "Occupied bandwidth" and "26dB Bandwidth".

**Left Plot (QPSK CH 132665 (1779.3 MHz)):**

- Center Frequency:** 1.7793000 GHz
- Span:** 3.0000 MHz
- CF Step:** 300.000 kHz
- Ref Lvl Offset:** 17.00 dB
- Ref Value:** 30.00 dBm
- #Video BW:** 100.00 kHz
- Span:** 3 MHz
- #Sweep:** 300 ms (1001 pts)
- Occupied Bandwidth:** 1.0896 MHz
- Total Power:** 23.5 dBm
- Transmit Freq Error:** -268 Hz
- % of OBW Power:** 99.00 %
- x dB Bandwidth:** 1.250 MHz
- x dB:** -26.00 dB

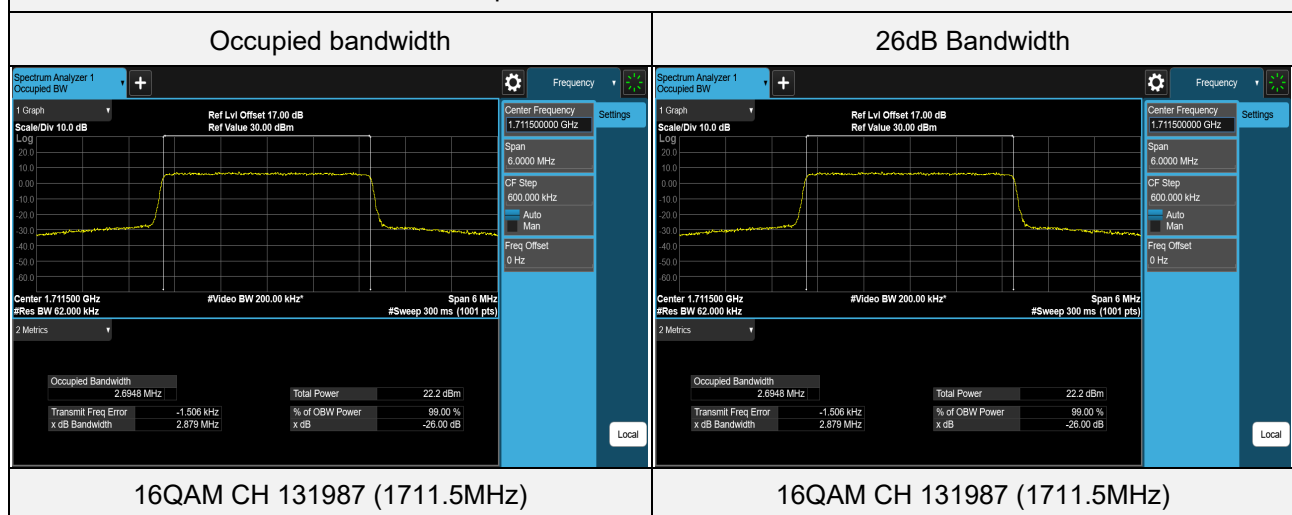
**Right Plot (QPSK CH 131979 (1710.7 MHz)):**

- Center Frequency:** 1.7107000 GHz
- Span:** 3.0000 MHz
- CF Step:** 300.000 kHz
- Ref Lvl Offset:** 17.00 dB
- Ref Value:** 47.00 dBm
- #Video BW:** 100.00 kHz
- Span:** 3 MHz
- #Sweep:** 300 ms (1001 pts)
- Occupied Bandwidth:** 1.0882 MHz
- Total Power:** 23.9 dBm
- Transmit Freq Error:** 999 Hz
- % of OBW Power:** 99.00 %
- x dB Bandwidth:** 1.259 MHz
- x dB:** -26.00 dB

### LTE Band 66 (Channel Bandwidth 3MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 131987  | 1711.5          | 2.6931                   | 2.867                |
| QPSK           | 132322  | 1745            | 2.6911                   | 2.868                |
| QPSK           | 132657  | 1778.5          | 2.6929                   | 2.872                |
| 16QAM          | 131987  | 1711.5          | 2.6948                   | 2.879                |
| 16QAM          | 132322  | 1745            | 2.6914                   | 2.876                |
| 16QAM          | 132657  | 1778.5          | 2.6926                   | 2.876                |
| 64QAM          | 131987  | 1711.5          | 2.6933                   | 2.867                |
| 64QAM          | 132322  | 1745            | 2.6922                   | 2.862                |
| 64QAM          | 132657  | 1778.5          | 2.6912                   | 2.857                |

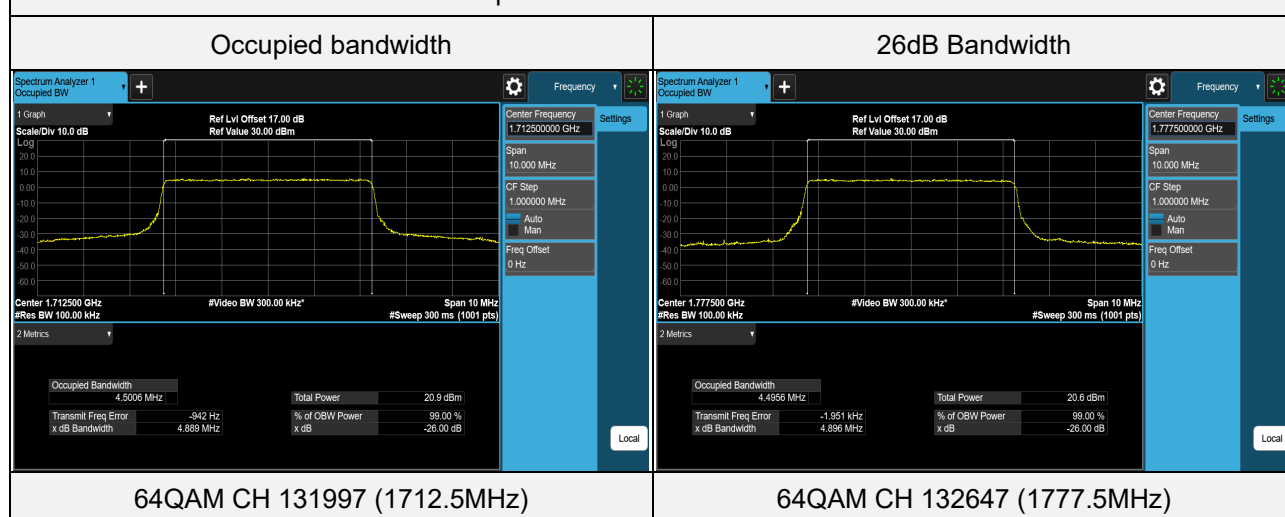
### Spectrum Plot of Worst Value



# LTE Band 66 (Channel Bandwidth 5MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 131997  | 1712.5          | 4.4980                   | 4.894                |
| QPSK           | 132322  | 1745            | 4.4965                   | 4.867                |
| QPSK           | 132647  | 1777.5          | 4.4996                   | 4.881                |
| 16QAM          | 131997  | 1712.5          | 4.4972                   | 4.870                |
| 16QAM          | 132322  | 1745            | 4.4904                   | 4.870                |
| 16QAM          | 132647  | 1777.5          | 4.4947                   | 4.892                |
| 64QAM          | 131997  | 1712.5          | 4.5006                   | 4.889                |
| 64QAM          | 132322  | 1745            | 4.4976                   | 4.879                |
| 64QAM          | 132647  | 1777.5          | 4.4956                   | 4.896                |

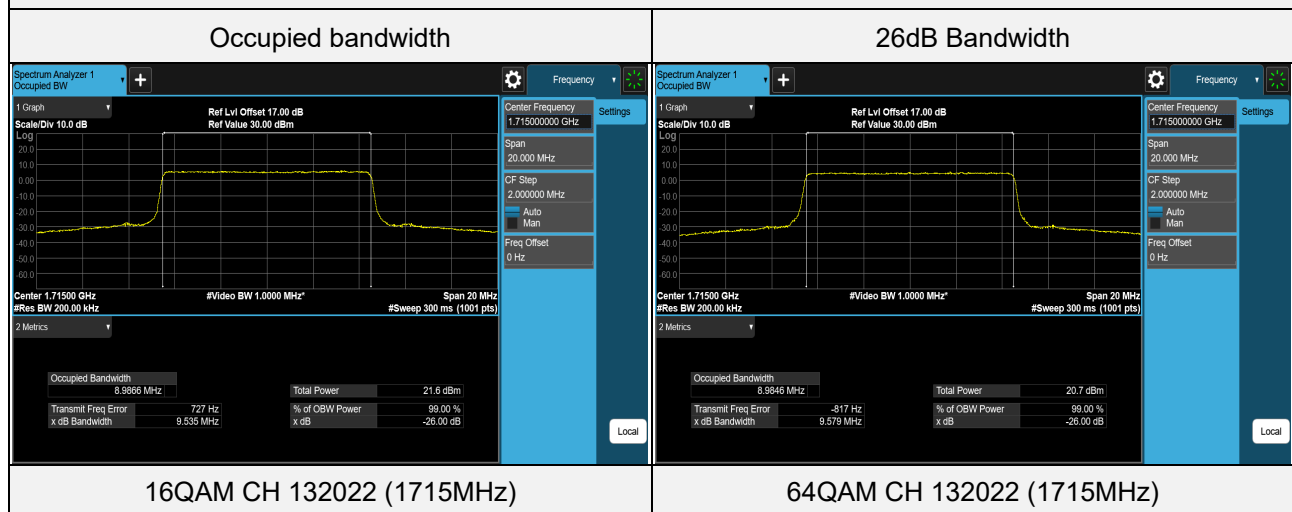
## Spectrum Plot of Worst Value



### LTE Band 66 (Channel Bandwidth 10MHz)

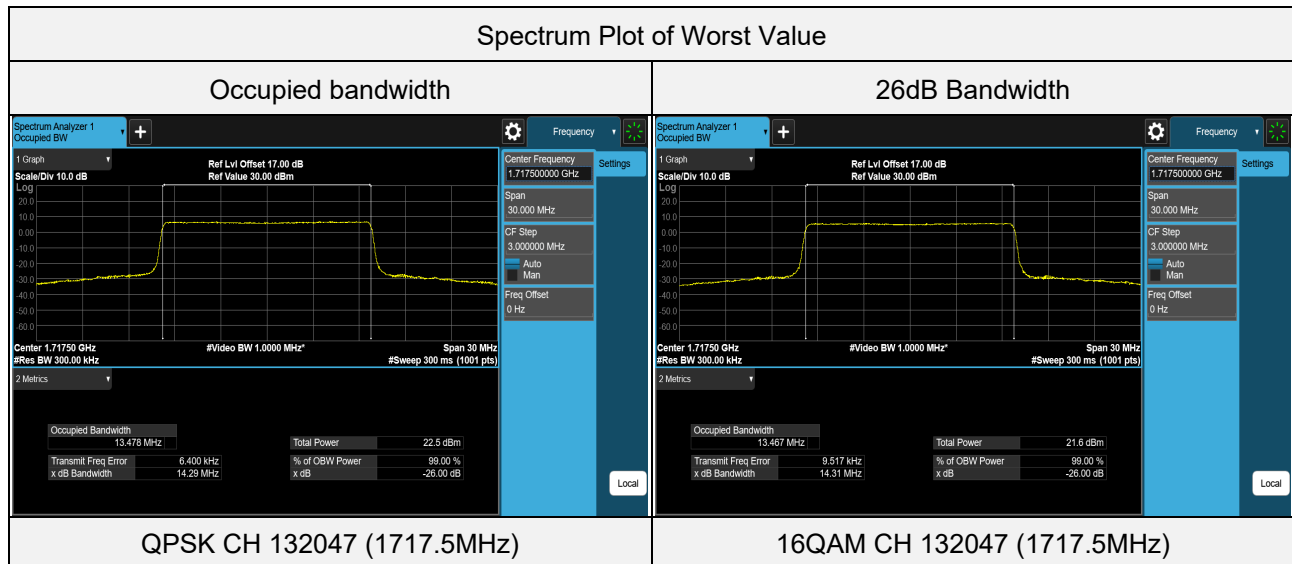
| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 132022  | 1715            | 8.9854                   | 9.558                |
| QPSK           | 132322  | 1745            | 8.9811                   | 9.558                |
| QPSK           | 132622  | 1775            | 8.9813                   | 9.551                |
| 16QAM          | 132022  | 1715            | 8.9866                   | 9.535                |
| 16QAM          | 132322  | 1745            | 8.9745                   | 9.533                |
| 16QAM          | 132622  | 1775            | 8.9766                   | 9.542                |
| 64QAM          | 132022  | 1715            | 8.9846                   | 9.579                |
| 64QAM          | 132322  | 1745            | 8.9826                   | 9.572                |
| 64QAM          | 132622  | 1775            | 8.9794                   | 9.559                |

### Spectrum Plot of Worst Value



### LTE Band 66 (Channel Bandwidth 15MHz)

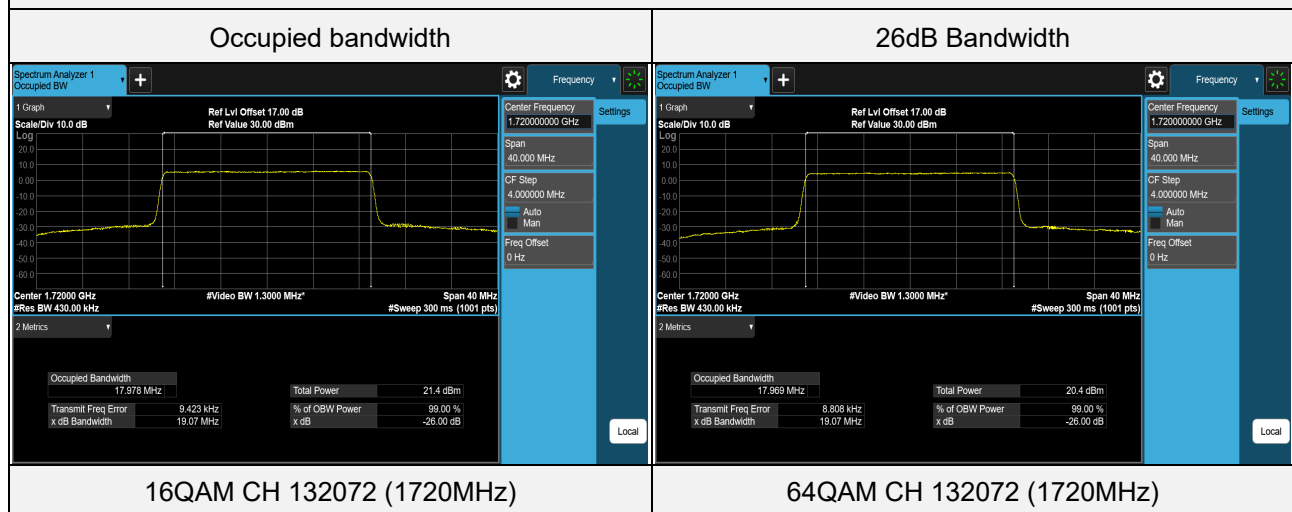
| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 132047  | 1717.5          | 13.478                   | 14.29                |
| QPSK           | 132322  | 1745            | 13.462                   | 14.27                |
| QPSK           | 132597  | 1772.5          | 13.462                   | 14.26                |
| 16QAM          | 132047  | 1717.5          | 13.467                   | 14.31                |
| 16QAM          | 132322  | 1745            | 13.461                   | 14.26                |
| 16QAM          | 132597  | 1772.5          | 13.450                   | 14.26                |
| 64QAM          | 132047  | 1717.5          | 13.462                   | 14.29                |
| 64QAM          | 132322  | 1745            | 13.455                   | 14.29                |
| 64QAM          | 132597  | 1772.5          | 13.450                   | 14.26                |



### LTE Band 66 (Channel Bandwidth 20MHz)

| Test Condition | Channel | Frequency (MHz) | Occupied bandwidth (MHz) | 26dB Bandwidth (MHz) |
|----------------|---------|-----------------|--------------------------|----------------------|
| QPSK           | 132072  | 1720            | 17.976                   | 19.07                |
| QPSK           | 132322  | 1745            | 17.946                   | 19.05                |
| QPSK           | 132572  | 1770            | 17.945                   | 19.03                |
| 16QAM          | 132072  | 1720            | 17.978                   | 19.07                |
| 16QAM          | 132322  | 1745            | 17.960                   | 19.03                |
| 16QAM          | 132572  | 1770            | 17.951                   | 19.04                |
| 64QAM          | 132072  | 1720            | 17.969                   | 19.07                |
| 64QAM          | 132322  | 1745            | 17.948                   | 19.03                |
| 64QAM          | 132572  | 1770            | 17.954                   | 19.05                |

### Spectrum Plot of Worst Value



## 4.5 Channel Edge / Out-of-Band Emissions Measurement

### 4.5.1 Limits of Band Edge / Out-of-Band Emissions Measurement

For LTE Band 4, LTE Band 66:

According to FCC 27.53(h), for operations in the 1695-1710MHz, 1710-1755MHz, 1755-1780 MHz, 1915-1920MHz, 1995-2000 MHz, 2000-2020MHz, 2110-2155MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log (P)$  dB. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

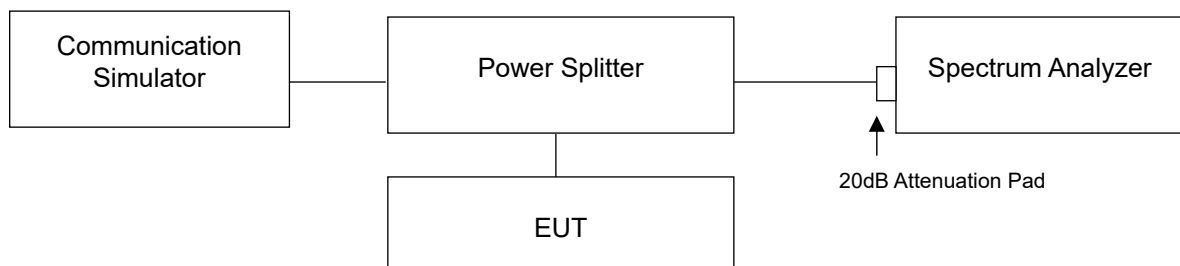
For LTE Band 7:

According to FCC 27.53(m)(4) regulations, any transmit power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that  $43 + 10 \log (P)$  dB on all frequencies between 2490.5MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5MHz. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed.

For LTE Band 12, LTE Band 17:

According to FCC 27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

### 4.5.2 Test Setup

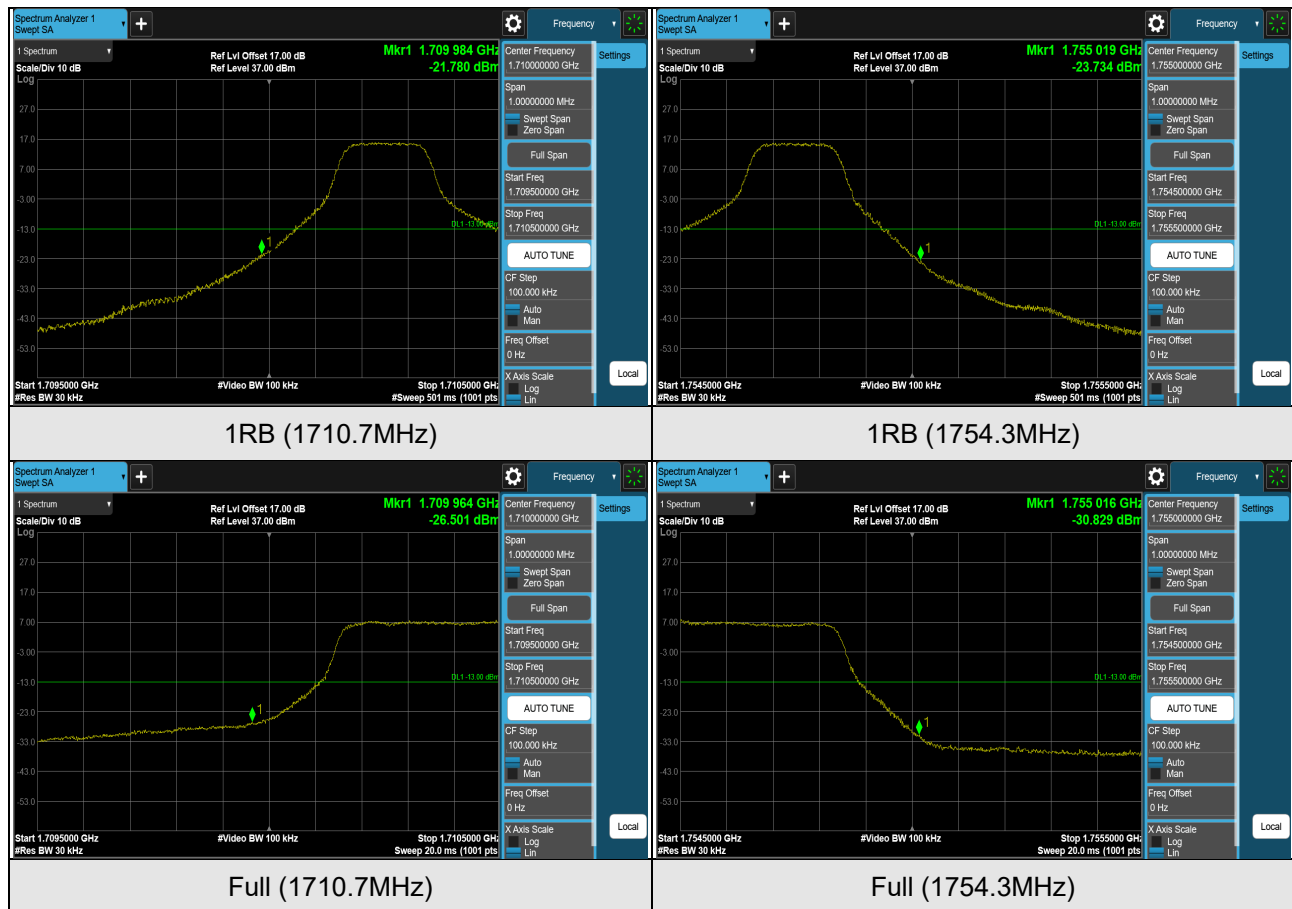


### 4.5.3 Test Procedures

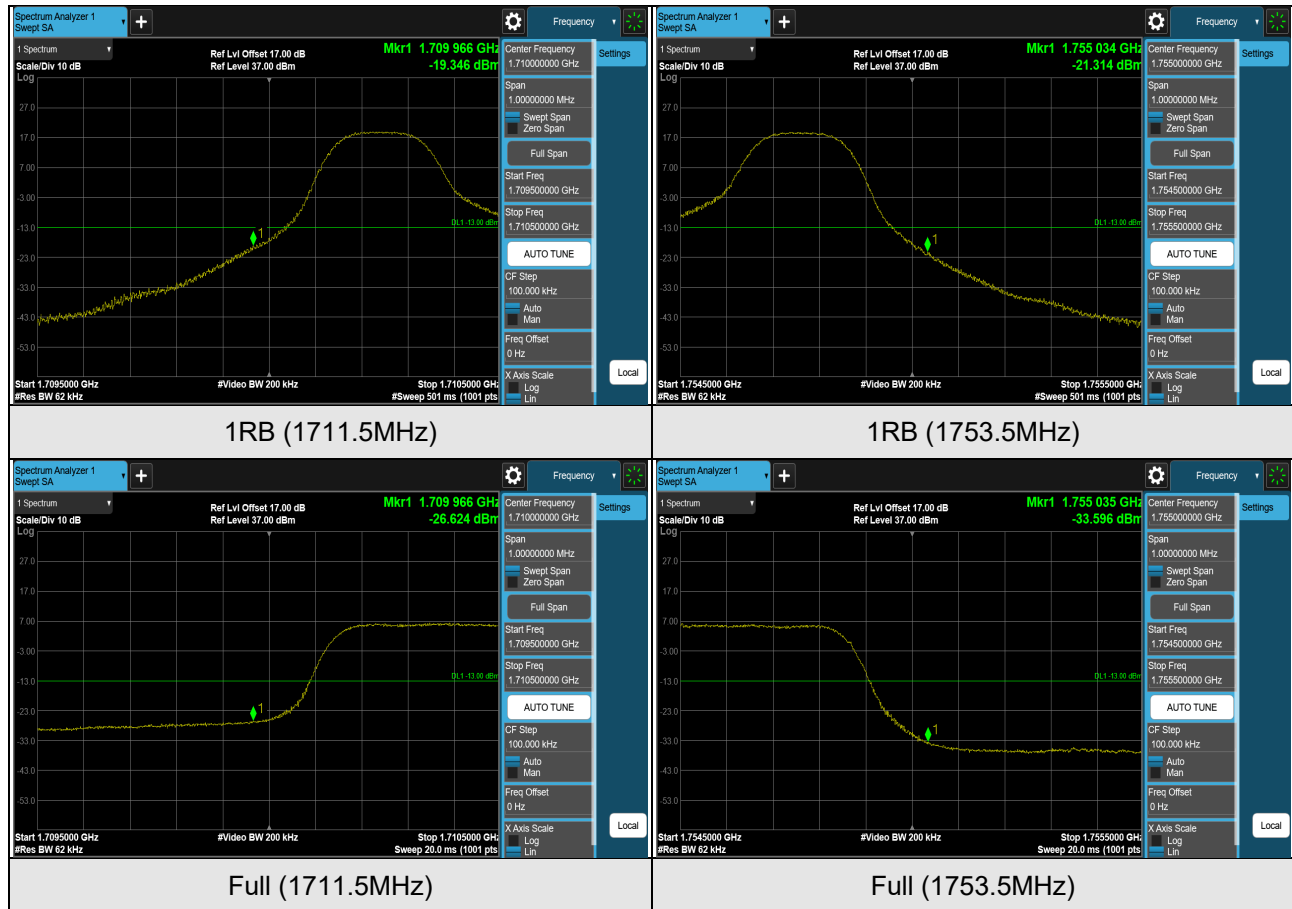
- The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. Band edge measurements were done at 2 channels: low and high operational frequency range.
- Measurement refer to ANSI C63.26 section 5.7.2 & 5.7.3 and FCC Part 27 section 27.53.
- Measure 5 MHz and 10 MHz channel bandwidth modes for LTE Band 7, extend the 1% range from 1M to 2M above and below the channel edge, then lower the limit further by  $10 \log (1000/100) = 10\text{dB}$  (i.e.  $-10 + -10 = -20\text{dB}$ ) to compensate for the integration from 100k to 1M, measure referring to ANSI C63.26 Section 5.7.2 (a)(1).
- Record the max trace plot into the test report.

## 4.5.4 Test Results

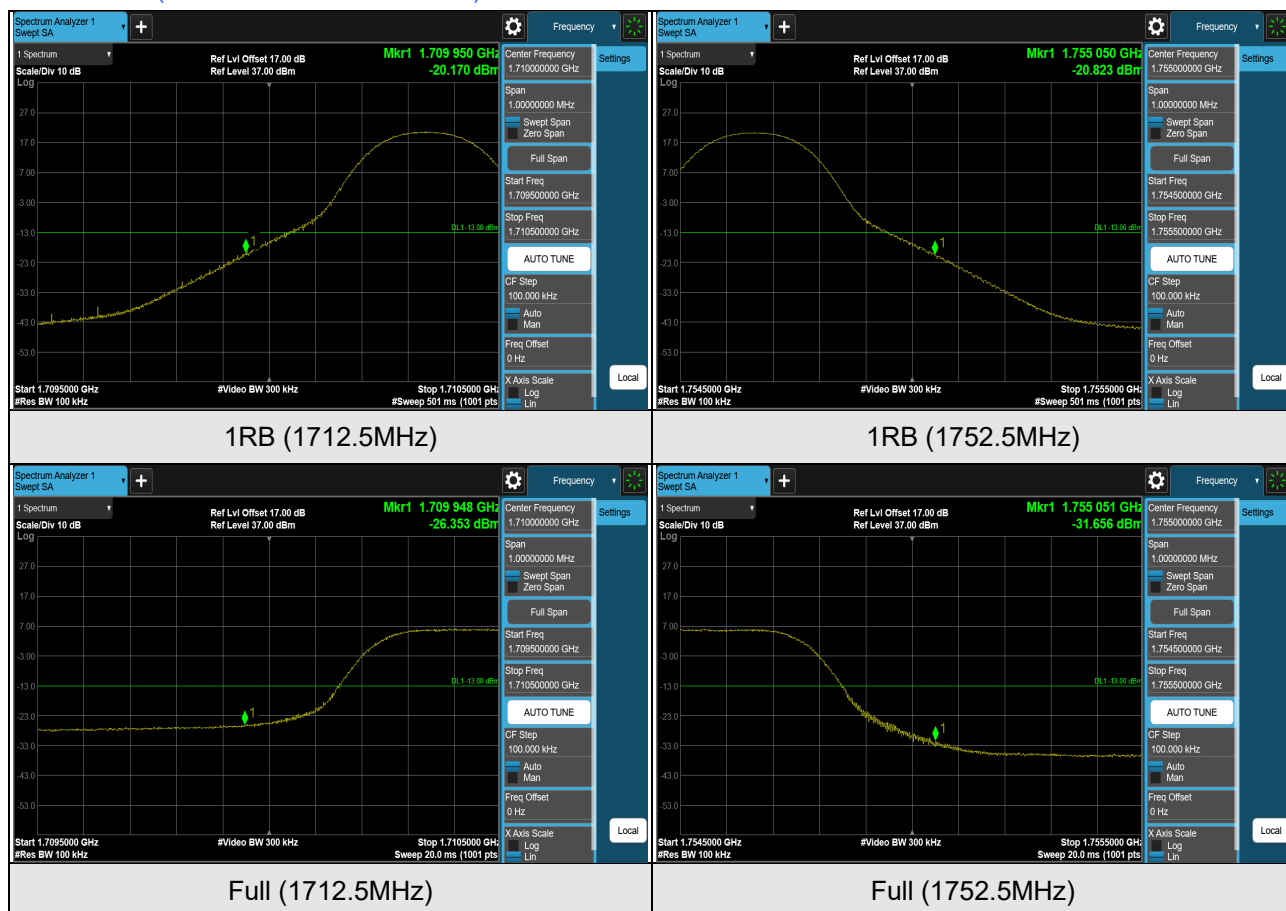
### LTE Band 4 (Channel Bandwidth 1.4MHz)



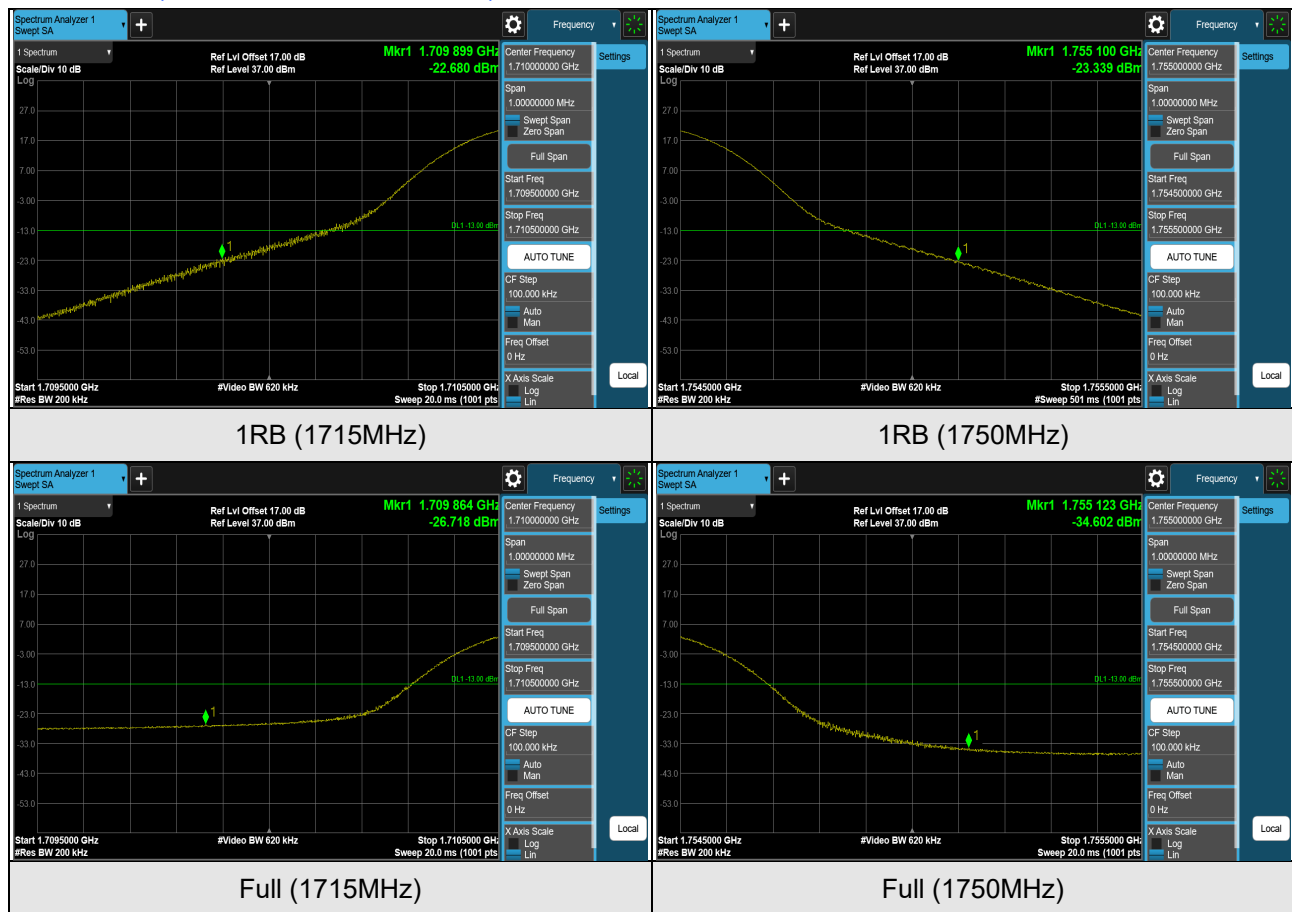
## LTE Band 4 (Channel Bandwidth 3MHz)



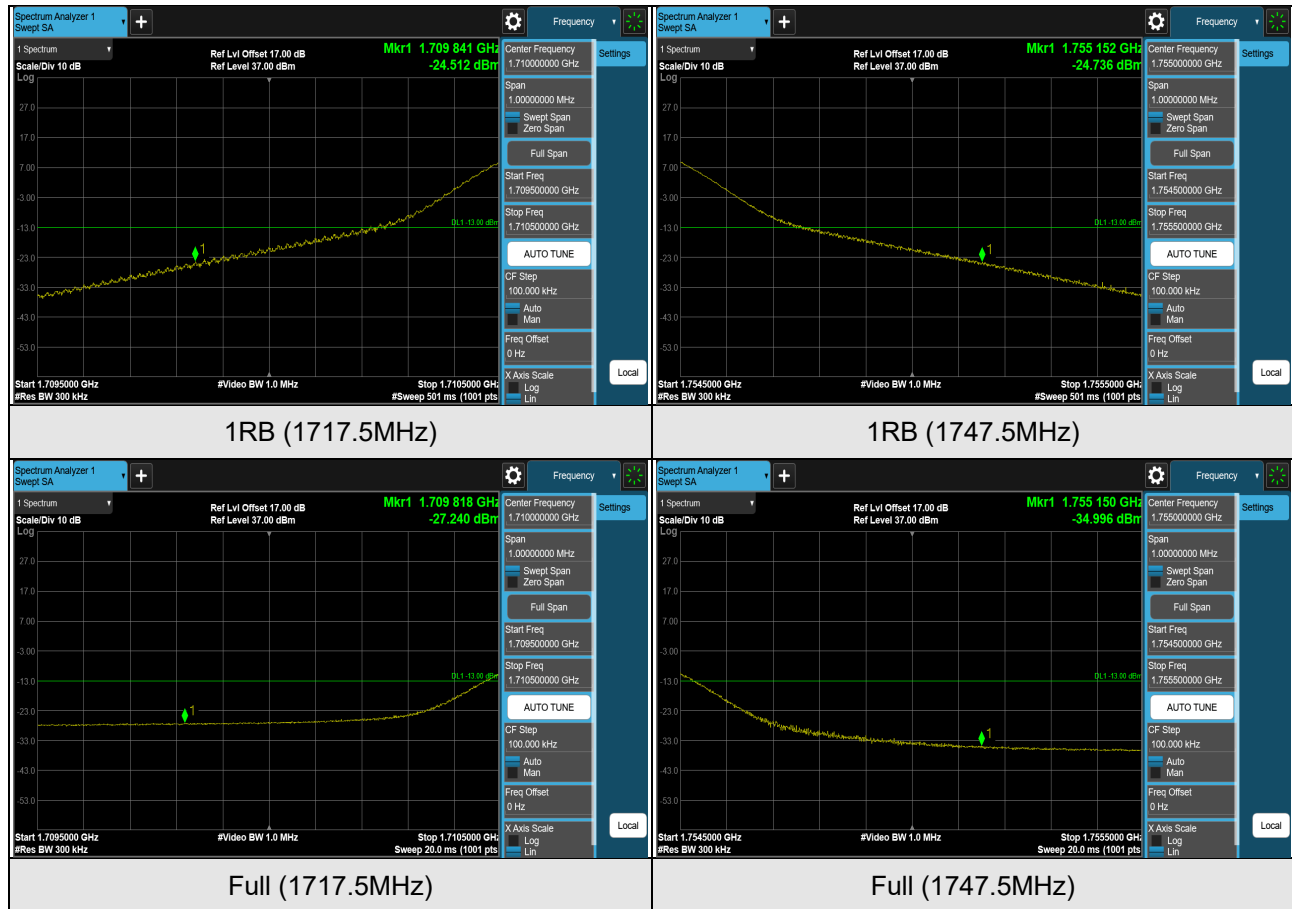
## LTE Band 4 (Channel Bandwidth 5MHz)



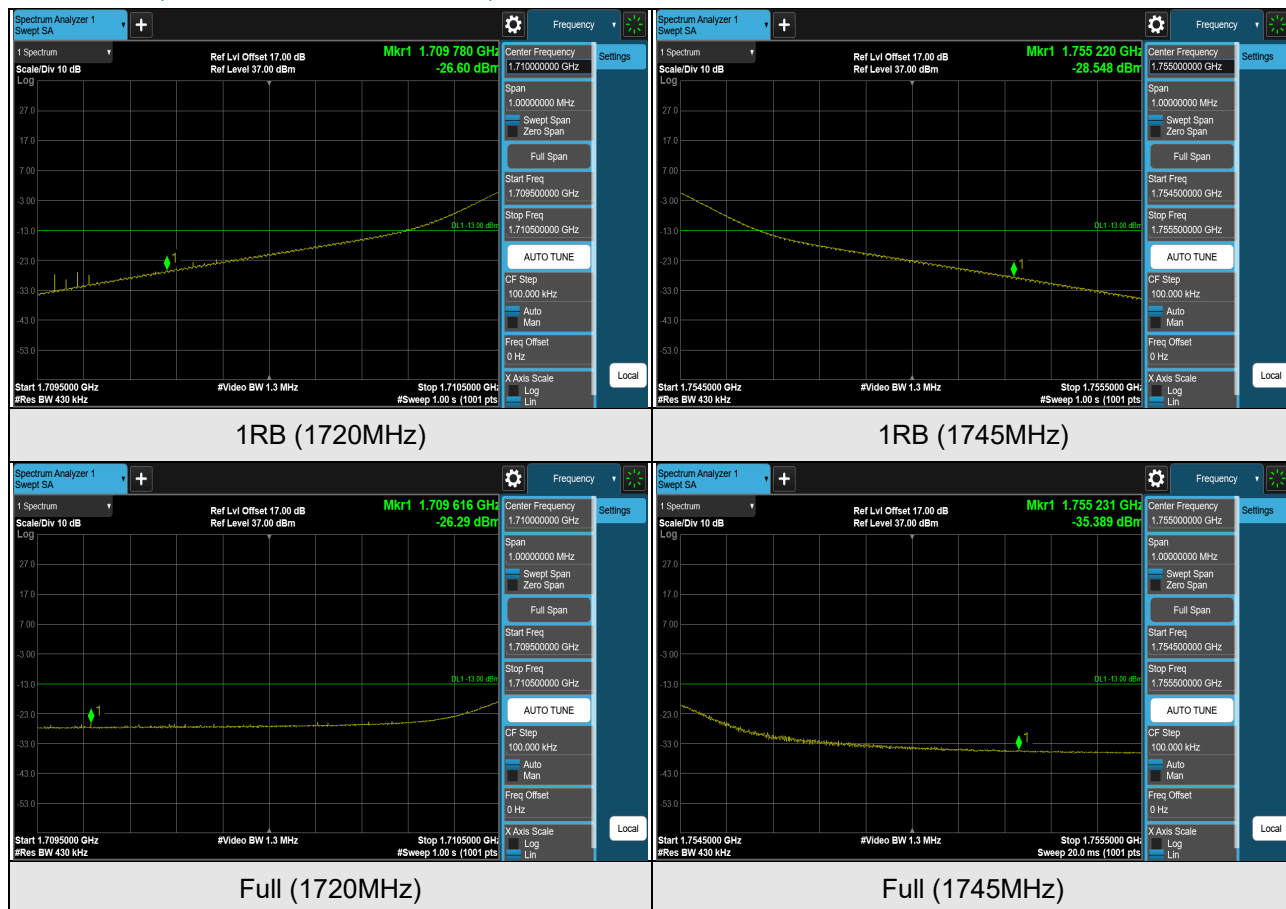
## LTE Band 4 (Channel Bandwidth 10MHz)



## LTE Band 4 (Channel Bandwidth 15MHz)



## LTE Band 4 (Channel Bandwidth 20MHz)



## LTE Band 7 (Channel Bandwidth 5MHz)

