

## FCC Test Report

### (PART 24)

**Report No.:** RF170616D05-1

**FCC ID:** 2AMTS-LEC-2580P

**Test Model:** LEC-2580P

**Series Model:** LEC-2580xxxxxxx(where x can be 0-9, A-Z, a-z, any alphanumeric character or blank)

**Received Date:** Dec. 28, 2016

**Test Date:** Jan. 10, 2017 ~ Feb. 04, 2017

**Issued Date:** Jul. 26, 2017

**Applicant:** LEI Technology Canada Ltd.

**Address:** 3160A Orlando Drive, Mississauga, ON, L4V 1R5, Canada

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

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

**Test Location:** No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.



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### Release Control Record

| Issue No.     | Description      | Date Issued   |
|---------------|------------------|---------------|
| RF170616D05-1 | Original Release | Jul. 26, 2017 |

## 1 Certificate of Conformity

**Product:** Fanless Embedded System

**Brand:** Lanner

**Test Model:** LEC-2580P

**Series Model:** LEC-2580xxxxxxx(where x can be 0-9, A-Z, a-z, any alphanumeric character or blank)

**Sample Status:** Production Unit

**Applicant:** LEI Technology Canada Ltd.

**Test Date:** Jan. 10, 2017 ~ Feb. 04, 2017

**Standards:** FCC Part 24, Subpart E

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 EMC characteristics under the conditions specified in this report.

**Prepared by :** Evonne Liu , **Date:** Jul. 26, 2017  
Evonne Liu / Specialist

**Approved by :** David Huang , **Date:** Jul. 26, 2017  
David Huang / Project Engineer

## 2 Summary of Test Results

| Applied Standard: FCC Part 24 & Part 2 |                                    |        |                                                                                      |
|----------------------------------------|------------------------------------|--------|--------------------------------------------------------------------------------------|
| FCC Clause                             | Test Item                          | Result | Remarks                                                                              |
| 2.1046<br>24.232                       | Effective Isotropic Radiated Power | Pass   | Meet the requirement of limit.                                                       |
| 2.1046<br>24.232(d)                    | Peak to Average Ratio              | Pass   | Meet the requirement of limit.                                                       |
| 2.1055<br>24.235                       | Frequency Stability                | Pass   | Meet the requirement of limit.                                                       |
| 2.1049<br>24.238(b)                    | Occupied Bandwidth                 | Pass   | Meet the requirement of limit.                                                       |
| 24.238(b)                              | Band Edge Measurements             | Pass   | Meet the requirement of limit.                                                       |
| 2.1051<br>24.238                       | Conducted Spurious Emissions       | Pass   | Meet the requirement of limit.                                                       |
| 2.1053<br>24.238                       | Radiated Spurious Emissions        | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -25.77 dB at 127.97 MHz. |

### 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) (±) |
|------------------------------------|--------------------|--------------------------------|
| Conducted Emissions at mains ports | 150 kHz ~ 30 MHz   | 2.44 dB                        |
| Radiated Emissions up to 1 GHz     | 30 MHz ~ 200 MHz   | 2.93 dB                        |
|                                    | 200 MHz ~ 1000 MHz | 2.95 dB                        |
| Radiated Emissions above 1 GHz     | 1 GHz ~ 18 GHz     | 2.26 dB                        |
|                                    | 18 GHz ~ 40 GHz    | 1.94 dB                        |

## 2.2 Test Site and Instruments

| Description & Manufacturer                     | Model No.            | Serial No.          | Date of Calibration | Due Date of Calibration |
|------------------------------------------------|----------------------|---------------------|---------------------|-------------------------|
| Test Receiver<br>Agilent                       | ESCS 30              | 100027              | Jun. 06, 2016       | Jun. 05, 2017           |
| Spectrum Analyzer<br>Agilent                   | N9010A               | MY52220314          | Dec. 16, 2016       | Dec. 15, 2017           |
| Spectrum Analyzer<br>ROHDE & SCHWARZ           | FSU43                | 101261              | Dec. 13, 2016       | Dec. 12, 2017           |
| BILOG Antenna<br>SCHWARZBECK                   | VULB9168             | 9168-472            | Dec. 26, 2016       | Dec. 27, 2017           |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9120 D          | 9120D-969           | Dec. 12, 2016       | Dec. 11, 2017           |
| Double Ridge Guide Horn<br>Antenna EMCO        | 3115                 | 5619                | Dec. 27, 2016       | Dec. 26, 2017           |
| BILOG Antenna<br>SCHWARZBECK                   | VULB 9168            | 9168-153            | Dec. 13, 2016       | Dec. 12, 2017           |
| Agilent Communications<br>Tester-Wireless      | 8960 Series 10       | MY53201073          | Jul. 03, 2015       | Jul. 02, 2017           |
| Preamplifier<br>EMCI                           | EMC 012645           | 980115              | Oct. 21, 2016       | Oct. 20, 2017           |
| Preamplifier<br>EMCI                           | EMC 184045           | 980116              | Oct. 21, 2016       | Oct. 20, 2017           |
| Preamplifier<br>EMCI                           | EMC 330H             | 980112              | Oct. 21, 2016       | Oct. 20, 2017           |
| Power Meter<br>Anritsu                         | ML2495A              | 1232002             | Sep. 08, 2016       | Sep. 07, 2017           |
| Power Sensor<br>Anritsu                        | MA2411B              | 1207325             | Sep. 08, 2016       | Sep. 07, 2017           |
| RF signal cable<br>HUBER+SUHNNER               | SUCOFLEX 104         | 309219/4<br>2950114 | Oct. 21, 2016       | Oct. 20, 2017           |
| RF signal cable<br>HUBER+SUHNNER               | SUCOFLEX 104         | 250130/4            | Oct. 21, 2016       | Oct. 20, 2017           |
| RF Coaxial Cable<br>Worken                     | 8D-FB                | Cable-Ch10-01       | Oct. 21, 2016       | Oct. 20, 2017           |
| 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<br>Table Controller<br>MF | MF-7802              | NA                  | NA                  | NA                      |
| Radio Communication<br>Analyzer                | MT8820C              | 6201300640          | Aug. 10, 2015       | Aug. 09, 2017           |
| Temperature & Humidity<br>Chamber              | GTH-120-40-CP-A<br>R | MAA1306-019         | Sep. 02, 2016       | Sep. 01, 2017           |
| DC Power Supply<br>Topward                     | 33010D               | 807748              | Oct. 25, 2016       | Oct. 24, 2018           |
| Digital Multimeter<br>Fluke                    | 87-III               | 70360742            | Jul. 01, 2016       | Jun. 30, 2017           |
| Signal Generator<br>Agilent                    | N5182B               | MY53050430          | Oct. 19, 2016       | Oct. 18, 2017           |

- Note:
1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The test was performed in HwaYa Chamber 10.
  3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
  4. The IC Site Registration No. is IC7450F-10.

### 3 General Information

#### 3.1 General Description of EUT

|                            |                                                                                   |                     |
|----------------------------|-----------------------------------------------------------------------------------|---------------------|
| <b>Product</b>             | Fanless Embedded System                                                           |                     |
| <b>Brand</b>               | Lanner                                                                            |                     |
| <b>Test Model</b>          | LEC-2580P                                                                         |                     |
| <b>Series Model</b>        | LEC-2580xxxxxx(where x can be 0-9, A-Z, a-z, any alphanumeric character or blank) |                     |
| <b>Status of EUT</b>       | Production Unit                                                                   |                     |
| <b>Power Supply Rating</b> | 24.0 Vdc (adapter)                                                                |                     |
| <b>Modulation Type</b>     | GPRS                                                                              | GMSK                |
|                            | EDGE                                                                              | GMSK, 8PSK          |
|                            | WCDMA                                                                             | BPSK                |
|                            | CDMA                                                                              | QPSK, OQPSK, HPSK   |
|                            | LTE                                                                               | QPSK, 16QAM         |
| <b>Frequency Range</b>     | GPRS/EDGE                                                                         | 1850.2 ~ 1909.8 MHz |
|                            | WCDMA                                                                             | 1852.4 ~ 1907.6 MHz |
|                            | CDMA                                                                              | 1851.3 ~ 1908.8 MHz |
|                            | LTE Band 2 (Channel Bandwidth: 1.4 MHz)                                           | 1850.7 ~ 1909.3 MHz |
|                            | LTE Band 2 (Channel Bandwidth: 3 MHz)                                             | 1851.5 ~ 1908.5 MHz |
|                            | LTE Band 2 (Channel Bandwidth: 5 MHz)                                             | 1852.5 ~ 1907.5 MHz |
|                            | LTE Band 2 (Channel Bandwidth: 10 MHz)                                            | 1855.0 ~ 1905.0 MHz |
|                            | LTE Band 2 (Channel Bandwidth: 15 MHz)                                            | 1857.5 ~ 1902.5 MHz |
|                            | LTE Band 2 (Channel Bandwidth: 20 MHz)                                            | 1860.0 ~ 1900.0 MHz |
|                            | LTE Band 25 (Channel Bandwidth: 1.4 MHz)                                          | 1850.7 ~ 1914.3 MHz |
|                            | LTE Band 25 (Channel Bandwidth: 3 MHz)                                            | 1851.5 ~ 1913.5 MHz |
|                            | LTE Band 25 (Channel Bandwidth: 5 MHz)                                            | 1852.5 ~ 1912.5 MHz |
|                            | LTE Band 25 (Channel Bandwidth: 10 MHz)                                           | 1855.0 ~ 1910.0 MHz |
|                            | LTE Band 25 (Channel Bandwidth: 15 MHz)                                           | 1857.5 ~ 1907.5 MHz |
|                            | LTE Band 25 (Channel Bandwidth: 20 MHz)                                           | 1860.0 ~ 1905.0 MHz |
| <b>Max. EIRP Power</b>     | GPRS                                                                              | 1390.91 mW          |
|                            | EDGE                                                                              | 525.17 mW           |
|                            | WCDMA                                                                             | 220.95 mW           |
|                            | CDMA                                                                              | 214.93 mW           |
|                            | LTE Band 2 (Channel Bandwidth: 1.4 MHz)                                           | 133.14 mW           |
|                            | LTE Band 2 (Channel Bandwidth: 3 MHz)                                             | 135.93 mW           |
|                            | LTE Band 2 (Channel Bandwidth: 5 MHz)                                             | 137.18 mW           |
|                            | LTE Band 2 (Channel Bandwidth: 10 MHz)                                            | 140.38 mW           |
|                            | LTE Band 2 (Channel Bandwidth: 15 MHz)                                            | 142.33 mW           |
|                            | LTE Band 2 (Channel Bandwidth: 20 MHz)                                            | 144.64 mW           |
|                            | LTE Band 25 (Channel Bandwidth: 1.4 MHz)                                          | 142.00 mW           |
|                            | LTE Band 25 (Channel Bandwidth: 3 MHz)                                            | 144.98 mW           |
|                            | LTE Band 25 (Channel Bandwidth: 5 MHz)                                            | 147.33 mW           |
|                            | LTE Band 25 (Channel Bandwidth: 10 MHz)                                           | 149.04 mW           |
|                            | LTE Band 25 (Channel Bandwidth: 15 MHz)                                           | 151.46 mW           |

|                            |                                          |           |
|----------------------------|------------------------------------------|-----------|
| <b>Emission Designator</b> | LTE Band 25 (Channel Bandwidth: 20 MHz)  | 153.57 mW |
|                            | GPRS                                     | 245KGXW   |
|                            | EDGE                                     | 249KG7W   |
|                            | WCDMA                                    | 4M19F9W   |
|                            | CDMA                                     | 1M28F9W   |
|                            | LTE Band 2 (Channel Bandwidth: 1.4 MHz)  | 1M09W7D   |
|                            | LTE Band 2 (Channel Bandwidth: 3 MHz)    | 2M70G7D   |
|                            | LTE Band 2 (Channel Bandwidth: 5 MHz)    | 4M49W7D   |
|                            | LTE Band 2 (Channel Bandwidth: 10 MHz)   | 9M0W7D    |
|                            | LTE Band 2 (Channel Bandwidth: 15 MHz)   | 13M5G7D   |
|                            | LTE Band 2 (Channel Bandwidth: 20 MHz)   | 18M0W7D   |
|                            | LTE Band 25 (Channel Bandwidth: 1.4 MHz) | 1M09W7D   |
|                            | LTE Band 25 (Channel Bandwidth: 3 MHz)   | 2M70G7D   |
|                            | LTE Band 25 (Channel Bandwidth: 5 MHz)   | 4M49W7D   |
|                            | LTE Band 25 (Channel Bandwidth: 10 MHz)  | 8M98W7D   |
|                            | LTE Band 25 (Channel Bandwidth: 15 MHz)  | 13M5G7D   |
|                            | LTE Band 25 (Channel Bandwidth: 20 MHz)  | 18M1W7D   |
| <b>Antenna Type</b>        | Fixed Internal Antenna                   |           |
| <b>Accessory Device</b>    | Refer to Note as below                   |           |
| <b>Data Cable Supplied</b> | Refer to Note as below                   |           |

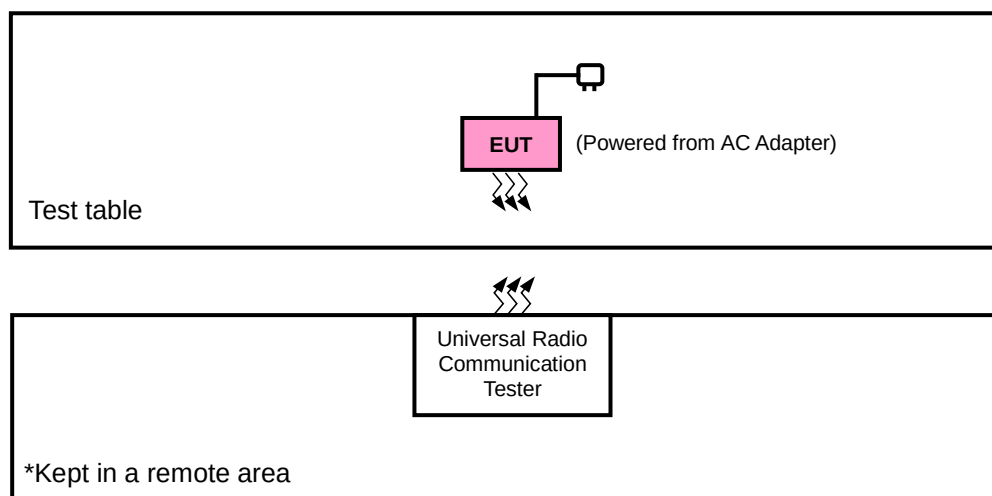
Note:

1. The EUT contains following accessory devices.

| Product     | Brand          | Model                  | Description                                           |
|-------------|----------------|------------------------|-------------------------------------------------------|
| Adapter     | FSP GROUP INC. | FSP120-AAAN2           | I/P: 100-240 Vac, 50-60 Hz, 1.8 A<br>O/P: 24 Vdc, 5 A |
| Battery     | Panasonic      | CR2032L-JP-W-1A        | 3 Vdc, 230 mAh                                        |
| Main Board  | Lanner         | LEB-2580-V1.0          | --                                                    |
| CPU         | Intel          | i7-6600U               | 2.6G                                                  |
| Memory      | Transcend      | TS512MSK64W3N(Samsung) | 4G DDR3L 1333MHz                                      |
| HDD         | Intel          | SSDSC2BX480G401940783  | 480G                                                  |
| WWAN Module | Sierra         | MC7354                 | --                                                    |

2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

## 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.

| No. | Product                              | Brand | Model No. | Serial No. | FCC ID |
|-----|--------------------------------------|-------|-----------|------------|--------|
| 1.  | Universal Radio Communication Tester | R&S   | CMU200    | 123295     | N/A    |

| No. | Signal Cable Description Of The Above Support Units |
|-----|-----------------------------------------------------|
| 1.  | N/A                                                 |

Note:

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

### 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        | EIRP    | Radiated Emission |
|-------------|---------|-------------------|
| GPRS        | Z-plane | Z-axis            |
| EDGE        | Z-plane | Z-axis            |
| WCDMA       | Z-plane | Z-axis            |
| CDMA        | Z-plane | Z-axis            |
| LTE Band 2  | Z-plane | Z-axis            |
| LTE Band 25 | Z-plane | Z-axis            |

#### GSM

| EUT Configure Mode | Test Item             | Available Channel | Tested Channel | Mode       |
|--------------------|-----------------------|-------------------|----------------|------------|
| -                  | EIRP                  | 512 to 810        | 512, 661, 810  | GPRS, EDGE |
| -                  | Frequency Stability   | 512 to 810        | 512, 810       | GPRS, EDGE |
| -                  | Occupied Bandwidth    | 512 to 810        | 512, 661, 810  | GPRS, EDGE |
| -                  | Band Edge             | 512 to 810        | 512, 810       | GPRS, EDGE |
| -                  | Peak to Average Ratio | 512 to 810        | 512, 661, 810  | GPRS, EDGE |
| -                  | Conducuted Emission   | 512 to 810        | 512, 661, 810  | GPRS, EDGE |
| -                  | Radiated Emission     | 512 to 810        | 512, 661, 810  | GPRS, EDGE |

#### WCDMA

| EUT Configure Mode | Test Item             | Available Channel | Tested Channel   | Mode  |
|--------------------|-----------------------|-------------------|------------------|-------|
| -                  | EIRP                  | 9262 to 9538      | 9262, 9400, 9538 | WCDMA |
| -                  | Frequency Stability   | 9262 to 9538      | 9262, 9538       | WCDMA |
| -                  | Occupied Bandwidth    | 9262 to 9538      | 9262, 9400, 9538 | WCDMA |
| -                  | Band Edge             | 9262 to 9538      | 9262, 9538       | WCDMA |
| -                  | Peak to Average Ratio | 9262 to 9538      | 9262, 9400, 9538 | WCDMA |
| -                  | Conducuted Emission   | 9262 to 9538      | 9262, 9400, 9538 | WCDMA |
| -                  | Radiated Emission     | 9262 to 9538      | 9262, 9400, 9538 | WCDMA |

## CDMA

| EUT Configure Mode | Test Item             | Available Channel | Tested Channel | Mode  |
|--------------------|-----------------------|-------------------|----------------|-------|
| -                  | ERP                   | 25 to 1175        | 25, 600, 1175  | 1xRTT |
| -                  | Frequency Stability   | 25 to 1175        | 25, 1175       | 1xRTT |
| -                  | Occupied Bandwidth    | 25 to 1175        | 25, 600, 1175  | 1xRTT |
| -                  | Band Edge             | 25 to 1175        | 25, 600, 1175  | 1xRTT |
| -                  | Peak to Average Ratio | 25 to 1175        | 25, 1175       | 1xRTT |
| -                  | Condcudeted Emission  | 25 to 1175        | 25, 600, 1175  | 1xRTT |
| -                  | Radiated Emission     | 25 to 1175        | 25, 600, 1175  | 1xRTT |

## LTE Band 2

| EUT Configure Mode | Test Item             | Available Channel | Tested Channel      | Channel Bandwidth | Modulation  | Mode                 |
|--------------------|-----------------------|-------------------|---------------------|-------------------|-------------|----------------------|
| -                  | EIRP                  | 18607 to 19193    | 18607, 18900, 19193 | 1.4 MHz           | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18615 to 19185    | 18615, 18900, 19185 | 3 MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18625 to 19175    | 18625, 18900, 19175 | 5 MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18650 to 19150    | 18650, 18900, 19150 | 10 MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18675 to 19125    | 18675, 18900, 19125 | 15 MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18700 to 19100    | 18700, 18900, 19100 | 20 MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset   |
| -                  | Frequency Stability   | 18607 to 19193    | 18607, 19193        | 1.4 MHz           | QPSK        | 1 RB / 0 RB Offset   |
|                    |                       | 18615 to 19185    | 18615, 19185        | 3 MHz             | QPSK        | 1 RB / 0 RB Offset   |
|                    |                       | 18625 to 19175    | 18625, 19175        | 5 MHz             | QPSK        | 1 RB / 0 RB Offset   |
|                    |                       | 18650 to 19150    | 18650, 19150        | 10 MHz            | QPSK        | 1 RB / 0 RB Offset   |
|                    |                       | 18675 to 19125    | 18675, 19125        | 15 MHz            | QPSK        | 1 RB / 0 RB Offset   |
|                    |                       | 18700 to 19100    | 18700, 19100        | 20 MHz            | QPSK        | 1 RB / 0 RB Offset   |
| -                  | Occupied Bandwidth    | 18607 to 19193    | 18607, 18900, 19193 | 1.4 MHz           | QPSK, 16QAM | 6 RB / 0 RB Offset   |
|                    |                       | 18615 to 19185    | 18615, 18900, 19185 | 3 MHz             | QPSK, 16QAM | 15 RB / 0 RB Offset  |
|                    |                       | 18625 to 19175    | 18625, 18900, 19175 | 5 MHz             | QPSK, 16QAM | 25 RB / 0 RB Offset  |
|                    |                       | 18650 to 19150    | 18650, 18900, 19150 | 10 MHz            | QPSK, 16QAM | 50 RB / 0 RB Offset  |
|                    |                       | 18675 to 19125    | 18675, 18900, 19125 | 15 MHz            | QPSK, 16QAM | 75 RB / 0 RB Offset  |
|                    |                       | 18700 to 19100    | 18700, 18900, 19100 | 20 MHz            | QPSK, 16QAM | 100 RB / 0 RB Offset |
| -                  | Peak to Average Ratio | 18607 to 19193    | 18607, 18900, 19193 | 1.4 MHz           | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18615 to 19185    | 18615, 18900, 19185 | 3 MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18625 to 19175    | 18625, 18900, 19175 | 5 MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18650 to 19150    | 18650, 18900, 19150 | 10 MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18675 to 19125    | 18675, 18900, 19125 | 15 MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18700 to 19100    | 18700, 18900, 19100 | 20 MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset   |
| -                  | Band Edge             | 18607 to 19193    | 18607               | 1.4 MHz           | QPSK        | 1 RB / 0 RB Offset   |
|                    |                       |                   |                     |                   |             | 6 RB / 0 RB Offset   |
|                    |                       | 18615 to 19185    | 19193               | 1.4 MHz           | QPSK        | 1 RB / 5 RB Offset   |
|                    |                       |                   |                     |                   |             | 6 RB / 0 RB Offset   |
|                    |                       | 18615 to 19185    | 18615               | 3 MHz             | QPSK        | 1 RB / 0 RB Offset   |
|                    |                       |                   |                     |                   |             | 15 RB / 0 RB Offset  |
|                    |                       | 18615 to 19185    | 19185               | 3 MHz             | QPSK        | 1 RB / 14 RB Offset  |
|                    |                       |                   |                     |                   |             | 15 RB / 0 RB Offset  |
|                    |                       | 18625 to 19175    | 18625               | 5 MHz             | QPSK        | 1 RB / 0 RB Offset   |
|                    |                       |                   |                     |                   |             | 25 RB / 0 RB Offset  |

|   |                    |                |                     |         |      |                      |
|---|--------------------|----------------|---------------------|---------|------|----------------------|
|   |                    |                | 19175               | 5 MHz   | QPSK | 1 RB / 24 RB Offset  |
|   |                    |                |                     |         |      | 25 RB / 0 RB Offset  |
|   |                    | 18650 to 19150 | 18650               | 10 MHz  | QPSK | 1 RB / 0 RB Offset   |
|   |                    |                |                     |         |      | 50 RB / 0 RB Offset  |
|   |                    |                | 19150               | 10 MHz  | QPSK | 1 RB / 49 RB Offset  |
|   |                    |                |                     |         |      | 50 RB / 0 RB Offset  |
|   |                    | 18675 to 19125 | 18675               | 15 MHz  | QPSK | 1 RB / 0 RB Offset   |
|   |                    |                |                     |         |      | 75 RB / 0 RB Offset  |
|   |                    |                | 19125               | 15 MHz  | QPSK | 1 RB / 74 RB Offset  |
|   |                    |                |                     |         |      | 75 RB / 0 RB Offset  |
|   |                    | 18700 to 19100 | 18700               | 20 MHz  | QPSK | 1 RB / 0 RB Offset   |
|   |                    |                |                     |         |      | 100 RB / 0 RB Offset |
|   |                    |                | 19100               | 20 MHz  | QPSK | 1 RB / 99 RB Offset  |
|   |                    |                |                     |         |      | 100 RB / 0 RB Offset |
| - | Conducted Emission | 18607 to 19193 | 18607, 18900, 19193 | 1.4 MHz | QPSK | 1 RB / 0 RB Offset   |
|   |                    | 18615 to 19185 | 18615, 18900, 19185 | 3 MHz   | QPSK | 1 RB / 0 RB Offset   |
|   |                    | 18625 to 19175 | 18625, 18900, 19175 | 5 MHz   | QPSK | 1 RB / 0 RB Offset   |
|   |                    | 18650 to 19150 | 18650, 18900, 19150 | 10 MHz  | QPSK | 1 RB / 0 RB Offset   |
|   |                    | 18675 to 19125 | 18675, 18900, 19125 | 15 MHz  | QPSK | 1 RB / 0 RB Offset   |
|   |                    | 18700 to 19100 | 18700, 18900, 19100 | 20 MHz  | QPSK | 1 RB / 0 RB Offset   |
| - | Radiated Emission  | 18700 to 19100 | 18700, 18900, 19100 | 20 MHz  | QPSK | 1 RB / 0 RB Offset   |

**Note:** This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

#### LTE Band 25

| EUT Configure Mode | Test Item             | Available Channel | Tested Channel      | Channel Bandwidth | Modulation   | Mode                 |
|--------------------|-----------------------|-------------------|---------------------|-------------------|--------------|----------------------|
|                    | EIRP                  | 26047 to 26683    | 26047, 26365, 26683 | 1.4 MHz           | QPSK / 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 26055 to 26675    | 26055, 26365, 26675 | 3 MHz             | QPSK / 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 26065 to 26665    | 26065, 26365, 26665 | 5 MHz             | QPSK / 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 26090 to 26640    | 26090, 26365, 26640 | 10 MHz            | QPSK / 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 26115 to 26615    | 26115, 26365, 26615 | 15 MHz            | QPSK / 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 26140 to 26590    | 26140, 26365, 26590 | 20 MHz            | QPSK / 16QAM | 1 RB / 0 RB Offset   |
|                    | Frequency Stability   | 26047 to 26683    | 26047, 26683        | 1.4 MHz           | QPSK         | 1 RB / 0 RB Offset   |
|                    |                       | 26055 to 26675    | 26055, 26675        | 3 MHz             | QPSK         | 1 RB / 0 RB Offset   |
|                    |                       | 26065 to 26665    | 26065, 26665        | 5 MHz             | QPSK         | 1 RB / 0 RB Offset   |
|                    |                       | 26090 to 26640    | 26090, 26640        | 10 MHz            | QPSK         | 1 RB / 0 RB Offset   |
|                    |                       | 26115 to 26615    | 26115, 26615        | 15 MHz            | QPSK         | 1 RB / 0 RB Offset   |
|                    |                       | 26140 to 26590    | 26140, 26590        | 20 MHz            | QPSK         | 1 RB / 0 RB Offset   |
|                    | Occupied Bandwidth    | 26047 to 26683    | 26047, 26365, 26683 | 1.4 MHz           | QPSK / 16QAM | 6 RB / 0 RB Offset   |
|                    |                       | 26055 to 26675    | 26055, 26365, 26675 | 3 MHz             | QPSK / 16QAM | 15 RB / 0 RB Offset  |
|                    |                       | 26065 to 26665    | 26065, 26365, 26665 | 5 MHz             | QPSK / 16QAM | 25 RB / 0 RB Offset  |
|                    |                       | 26090 to 26640    | 26090, 26365, 26640 | 10 MHz            | QPSK / 16QAM | 50 RB / 0 RB Offset  |
|                    |                       | 26115 to 26615    | 26115, 26365, 26615 | 15 MHz            | QPSK / 16QAM | 75 RB / 0 RB Offset  |
|                    |                       | 26140 to 26590    | 26140, 26365, 26590 | 20 MHz            | QPSK / 16QAM | 100 RB / 0 RB Offset |
|                    | Peak to Average Ratio | 26047 to 26683    | 26047, 26365, 26683 | 1.4 MHz           | QPSK / 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 26055 to 26675    | 26055, 26365, 26675 | 3 MHz             | QPSK / 16QAM | 1 RB / 7 RB Offset   |
|                    |                       | 26065 to 26665    | 26065, 26365, 26665 | 5 MHz             | QPSK / 16QAM | 1 RB / 12 RB Offset  |
|                    |                       | 26090 to 26640    | 26090, 26365, 26640 | 10 MHz            | QPSK / 16QAM | 1 RB / 24 RB Offset  |
|                    |                       | 26115 to 26615    | 26115, 26365, 26615 | 15 MHz            | QPSK / 16QAM | 75 RB / 0 RB Offset  |
|                    |                       | 26140 to 26590    | 26140, 26365, 26590 | 20 MHz            | QPSK / 16QAM | 100 RB / 0 RB Offset |

| EUT Configure Mode | Test Item          | Available Channel | Tested Channel      | Channel Bandwidth | Modulation | Mode                 |
|--------------------|--------------------|-------------------|---------------------|-------------------|------------|----------------------|
| -                  | Band Edge          | 26047 to 26683    | 26047               | 1.4 MHz           | QPSK       | 1 RB / 0 RB Offset   |
|                    |                    |                   |                     |                   |            | 6 RB / 0 RB Offset   |
|                    |                    |                   | 26683               | 1.4 MHz           | QPSK       | 1 RB / 5 RB Offset   |
|                    |                    |                   |                     |                   |            | 6 RB / 0 RB Offset   |
|                    |                    | 26055 to 26675    | 26055               | 3 MHz             | QPSK       | 1 RB / 0 RB Offset   |
|                    |                    |                   |                     |                   |            | 1 RB / 0 RB Offset   |
|                    |                    |                   | 26675               | 3 MHz             | QPSK       | 1 RB / 14 RB Offset  |
|                    |                    |                   |                     |                   |            | 15 RB / 0 RB Offset  |
|                    |                    | 26065 to 26665    | 26065               | 5 MHz             | QPSK       | 1 RB / 0 RB Offset   |
|                    |                    |                   |                     |                   |            | 25 RB / 0 RB Offset  |
|                    |                    |                   | 26665               | 5 MHz             | QPSK       | 1 RB / 24 RB Offset  |
|                    |                    |                   |                     |                   |            | 25 RB / 0 RB Offset  |
|                    |                    | 26090 to 26640    | 26090               | 10 MHz            | QPSK       | 1 RB / 0 RB Offset   |
|                    |                    |                   |                     |                   |            | 50 RB / 0 RB Offset  |
|                    |                    |                   | 26640               | 10 MHz            | QPSK       | 1 RB / 49 RB Offset  |
|                    |                    |                   |                     |                   |            | 50 RB / 0 RB Offset  |
|                    |                    | 26115 to 26615    | 26115               | 15 MHz            | QPSK       | 1 RB / 0 RB Offset   |
|                    |                    |                   |                     |                   |            | 75 RB / 0 RB Offset  |
|                    |                    |                   | 26615               | 15 MHz            | QPSK       | 1 RB / 74 RB Offset  |
|                    |                    |                   |                     |                   |            | 75 RB / 0 RB Offset  |
|                    |                    | 26140 to 26590    | 26140               | 20 MHz            | QPSK       | 1 RB / 0 RB Offset   |
|                    |                    |                   |                     |                   |            | 100 RB / 0 RB Offset |
|                    |                    |                   | 26590               | 20 MHz            | QPSK       | 1 RB / 99 RB Offset  |
|                    |                    |                   |                     |                   |            | 100 RB / 0 RB Offset |
| -                  | Conducted Emission | 26047 to 26683    | 26047, 26365, 26683 | 1.4 MHz           | QPSK       | 1 RB / 5 RB Offset   |
|                    |                    | 26055 to 26675    | 26055, 26365, 26675 | 3 MHz             | QPSK       | 1 RB / 7 RB Offset   |
|                    |                    | 26065 to 26665    | 26065, 26365, 26665 | 5 MHz             | QPSK       | 1 RB / 12 RB Offset  |
|                    |                    | 26090 to 26640    | 26090, 26365, 26640 | 10 MHz            | QPSK       | 1 RB / 24 RB Offset  |
|                    |                    | 26115 to 26615    | 26115, 26365, 26615 | 15 MHz            | QPSK       | 1 RB / 0 RB Offset   |
|                    |                    | 26140 to 26590    | 26140, 26365, 26590 | 20 MHz            | QPSK       | 1 RB / 0 RB Offset   |
| -                  | Radiated Emission  | 26140 to 26590    | 26140, 26365, 26590 | 20 MHz            | QPSK       | 1 RB / 0 RB Offset   |

**Note:** This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

#### **Test Condition:**

| Test Item             | Environmental Conditions | Input Power    | Tested By  |
|-----------------------|--------------------------|----------------|------------|
| EIRP                  | 26 deg. C, 58 % RH       | 3 Vdc          | Toby Tian  |
| Frequency Stability   | 26 deg. C, 58 % RH       | 3 Vdc          | Taylor Liu |
| Occupied Bandwidth    | 26 deg. C, 58 % RH       | 3 Vdc          | Taylor Liu |
| Band Edge             | 26 deg. C, 58 % RH       | 3 Vdc          | Taylor Liu |
| Peak to Average Ratio | 26 deg. C, 58 % RH       | 3 Vdc          | Taylor Liu |
| Conducuted Emission   | 26 deg. C, 58 % RH       | 3 Vdc          | Taylor Liu |
| Radiated Emission     | 25 deg. C, 65 % RH       | 120 Vac, 60 Hz | Toby Tian  |

### **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**

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

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 24**

**KDB 971168 D01 Power Meas License Digital Systems v02r02**

**ANSI/TIA/EIA-603-D 2010**

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

## 4 Test Types and Results

### 4.1 Output Power Measurement

#### 4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 2 watts e.i.r.p.

#### 4.1.2 Test Procedures

##### **EIRP / ERP Measurement:**

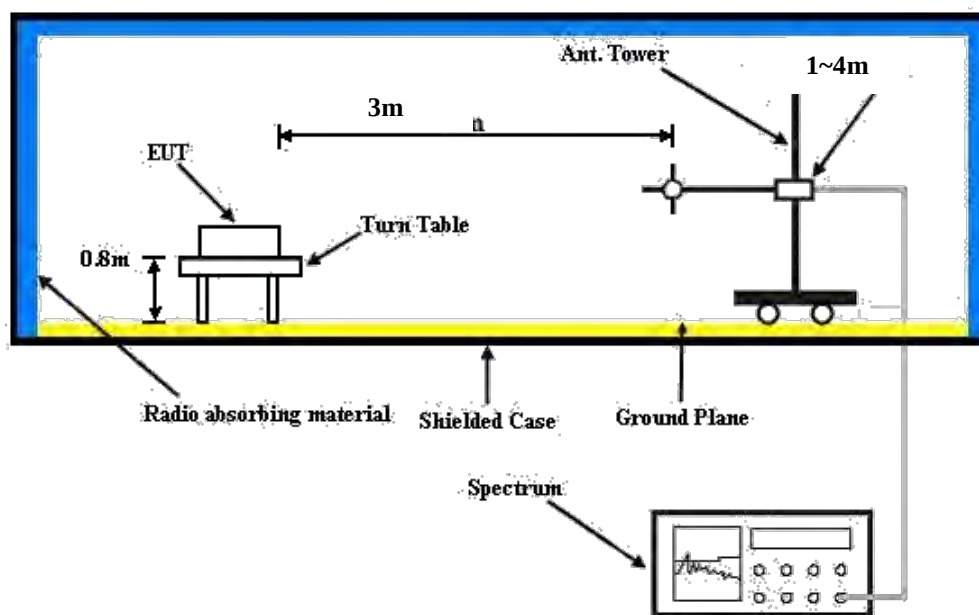
- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1 MHz for GSM, GPRS & EDGE, 5 MHz for WCDMA and CDMA, and 10 MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G.
- d.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ . E.R.P power can be calculated from E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.P.R \text{ power} - 2.15 \text{ dBi}$ .

##### **Conducted Power Measurement:**

The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA, CDMA, and 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.

#### 4.1.3 Test Setup

##### EIRP / ERP Measurement:



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

##### Conducted Power Measurement:



#### 4.1.4 Test Results

##### Conducted Output Power (dBm)

| Band                  | GSM1900 |        |        |
|-----------------------|---------|--------|--------|
| Channel               | 512     | 661    | 810    |
| Frequency (MHz)       | 1850.2  | 1880.0 | 1909.8 |
| GPRS (GMSK, 1Tx-slot) | 30.19   | 30.29  | 30.21  |
| GPRS (GMSK, 2Tx-slot) | 29.51   | 29.55  | 29.45  |
| EDGE (8PSK, 1Tx-slot) | 25.79   | 25.91  | 25.77  |
| EDGE (8PSK, 2Tx-slot) | 25.74   | 25.80  | 25.71  |
| EDGE (8PSK, 3Tx-slot) | 25.55   | 25.63  | 25.54  |
| EDGE (8PSK, 4Tx-slot) | 24.28   | 24.30  | 24.21  |

| Band            | WCDMA II |        |        |
|-----------------|----------|--------|--------|
| Channel         | 9262     | 9400   | 9538   |
| Frequency (MHz) | 1852.4   | 1880.0 | 1907.6 |
| RMC 12.2K       | 22.81    | 23.05  | 23.02  |
| HSDPA Subtest-1 | 21.89    | 22.05  | 22.01  |
| HSDPA Subtest-2 | 21.54    | 21.67  | 22.05  |
| HSDPA Subtest-3 | 21.41    | 21.64  | 21.71  |
| HSDPA Subtest-4 | 21.89    | 21.62  | 21.74  |
| HSUPA Subtest-1 | 20.67    | 20.93  | 20.87  |
| HSUPA Subtest-2 | 18.73    | 18.99  | 18.81  |
| HSUPA Subtest-3 | 19.54    | 19.10  | 19.78  |
| HSUPA Subtest-4 | 18.77    | 18.89  | 18.85  |
| HSUPA Subtest-5 | 20.65    | 20.91  | 20.83  |

| Band              | CDMA    |       |         |
|-------------------|---------|-------|---------|
| Channel           | 25      | 600   | 1175    |
| Frequency (MHz)   | 1851.25 | 1880  | 1908.75 |
| RC1+SO55          | 22.65   | 22.67 | 22.77   |
| RC3+SO55          | 22.56   | 22.62 | 22.52   |
| RC3+SO32 (+F-SCH) | 22.47   | 22.53 | 22.48   |
| RC3+SO32 (+SCH)   | 22.41   | 22.48 | 22.39   |
| RTAP 153.6        | 22.38   | 22.41 | 22.36   |
| RETAP 4096        | 22.32   | 22.38 | 22.31   |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 18607 | Mid Ch 18900 | High Ch 19193 |               | Low Ch 18607 | Mid Ch 18900 | High Ch 19193 |               |
|           |         |           | 1850.7 MHz   | 1880.0 MHz   | 1909.3 MHz    |               | 1850.7 MHz   | 1880.0 MHz   | 1909.3 MHz    |               |
| 2 / 1.4M  | 1       | 0         | 22.72        | 23.01        | 22.96         | 0             | 21.65        | 21.92        | 21.88         | 1             |
|           | 1       | 2         | 22.56        | 22.92        | 22.83         | 0             | 21.59        | 21.82        | 21.78         | 1             |
|           | 1       | 5         | 22.48        | 22.71        | 22.59         | 0             | 21.33        | 21.66        | 21.62         | 1             |
|           | 3       | 0         | 22.65        | 22.91        | 22.95         | 0             | 21.64        | 21.83        | 21.93         | 1             |
|           | 3       | 1         | 22.51        | 22.76        | 22.75         | 0             | 21.39        | 21.68        | 21.78         | 1             |
|           | 3       | 3         | 22.39        | 22.68        | 22.62         | 0             | 21.30        | 21.62        | 21.68         | 1             |
|           | 6       | 0         | 21.71        | 21.88        | 21.91         | 1             | 20.52        | 20.88        | 20.85         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 18615 | Mid Ch 18900 | High Ch 19185 |               | Low Ch 18615 | Mid Ch 18900 | High Ch 19185 |               |
|           |         |           | 1851.5 MHz   | 1880.0 MHz   | 1908.5 MHz    |               | 1851.5 MHz   | 1880.0 MHz   | 1908.5 MHz    |               |
| 2 / 3M    | 1       | 0         | 22.74        | 23.05        | 23.01         | 0             | 21.65        | 22.04        | 22.00         | 1             |
|           | 1       | 7         | 22.59        | 22.90        | 22.92         | 0             | 21.56        | 21.94        | 21.85         | 1             |
|           | 1       | 14        | 22.38        | 22.80        | 22.66         | 0             | 21.42        | 21.83        | 21.69         | 1             |
|           | 8       | 0         | 21.87        | 21.92        | 21.81         | 1             | 20.79        | 20.77        | 20.60         | 2             |
|           | 8       | 3         | 21.78        | 21.80        | 21.72         | 1             | 20.76        | 20.81        | 20.70         | 2             |
|           | 8       | 7         | 21.52        | 21.58        | 21.57         | 1             | 20.62        | 20.56        | 20.56         | 2             |
|           | 15      | 0         | 21.64        | 21.96        | 21.82         | 1             | 20.59        | 20.90        | 20.85         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 18625 | Mid Ch 18900 | High Ch 19175 |               | Low Ch 18625 | Mid Ch 18900 | High Ch 19175 |               |
|           |         |           | 1852.5 MHz   | 1880.0 MHz   | 1907.5 MHz    |               | 1852.5 MHz   | 1880.0 MHz   | 1907.5 MHz    |               |
| 2 / 5M    | 1       | 0         | 22.83        | 23.14        | 23.04         | 0             | 21.79        | 22.05        | 21.99         | 1             |
|           | 1       | 12        | 22.73        | 23.03        | 22.90         | 0             | 21.70        | 21.94        | 21.81         | 1             |
|           | 1       | 24        | 22.45        | 22.87        | 22.75         | 0             | 21.43        | 21.75        | 21.81         | 1             |
|           | 12      | 0         | 21.82        | 21.87        | 21.73         | 1             | 20.64        | 20.73        | 20.53         | 2             |
|           | 12      | 6         | 21.71        | 21.75        | 21.57         | 1             | 20.63        | 20.69        | 20.48         | 2             |
|           | 12      | 13        | 21.56        | 21.65        | 21.50         | 1             | 20.46        | 20.49        | 20.40         | 2             |
|           | 25      | 0         | 21.62        | 22.07        | 21.91         | 1             | 20.73        | 20.93        | 20.87         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 18650 | Mid Ch 18900 | High Ch 19150 |               | Low Ch 18650 | Mid Ch 18900 | High Ch 19150 |               |
|           |         |           | 1855.0 MHz   | 1880.0 MHz   | 1905.0 MHz    |               | 1855.0 MHz   | 1880.0 MHz   | 1905.0 MHz    |               |
| 2 / 10M   | 1       | 0         | 23.17        | 23.29        | 23.11         | 0             | 22.16        | 22.24        | 22.09         | 1             |
|           | 1       | 24        | 23.01        | 23.13        | 22.99         | 0             | 22.02        | 22.06        | 21.87         | 1             |
|           | 1       | 49        | 22.86        | 22.94        | 22.87         | 0             | 21.84        | 21.88        | 21.74         | 1             |
|           | 25      | 0         | 21.84        | 21.96        | 21.85         | 1             | 20.78        | 20.93        | 20.71         | 2             |
|           | 25      | 12        | 21.74        | 21.84        | 21.74         | 1             | 20.66        | 20.80        | 20.65         | 2             |
|           | 25      | 25        | 21.57        | 21.69        | 21.55         | 1             | 20.61        | 20.58        | 20.56         | 2             |
|           | 50      | 0         | 22.14        | 22.21        | 22.09         | 1             | 20.89        | 21.17        | 20.90         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 18675 | Mid Ch 18900 | High Ch 19125 |               | Low Ch 18675 | Mid Ch 18900 | High Ch 19125 |               |
|           |         |           | 1857.5 MHz   | 1880.0 MHz   | 1902.5 MHz    |               | 1857.5 MHz   | 1880.0 MHz   | 1902.5 MHz    |               |
| 2 / 15M   | 1       | 0         | 23.13        | 23.31        | 23.09         | 0             | 22.06        | 22.28        | 22.03         | 1             |
|           | 1       | 37        | 22.99        | 23.16        | 22.97         | 0             | 22.00        | 22.13        | 21.86         | 1             |
|           | 1       | 74        | 22.88        | 23.08        | 22.85         | 0             | 21.84        | 21.96        | 21.85         | 1             |
|           | 36      | 0         | 21.73        | 21.88        | 21.76         | 1             | 20.57        | 20.82        | 20.68         | 2             |
|           | 36      | 19        | 21.62        | 21.79        | 21.60         | 1             | 20.57        | 20.70        | 20.60         | 2             |
|           | 36      | 39        | 21.38        | 21.57        | 21.48         | 1             | 20.26        | 20.61        | 20.49         | 2             |
|           | 75      | 0         | 22.10        | 22.10        | 22.04         | 1             | 21.04        | 21.22        | 21.00         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 18700 | Mid Ch 18900 | High Ch 19100 |               | Low Ch 18700 | Mid Ch 18900 | High Ch 19100 |               |
|           |         |           | 1860.0 MHz   | 1880.0 MHz   | 1900.0 MHz    |               | 1860.0 MHz   | 1880.0 MHz   | 1900.0 MHz    |               |
| 2 / 20M   | 1       | 0         | 23.14        | 23.32        | 23.17         | 0             | 22.06        | 22.25        | 22.09         | 1             |
|           | 1       | 50        | 22.99        | 23.19        | 23.07         | 0             | 21.92        | 22.16        | 21.99         | 1             |
|           | 1       | 99        | 22.83        | 23.04        | 22.91         | 0             | 21.84        | 21.98        | 21.80         | 1             |
|           | 50      | 0         | 21.79        | 21.93        | 21.84         | 1             | 20.78        | 20.82        | 20.81         | 2             |
|           | 50      | 25        | 21.70        | 21.84        | 21.70         | 1             | 20.57        | 20.77        | 20.69         | 2             |
|           | 50      | 50        | 21.41        | 21.68        | 21.50         | 1             | 20.47        | 20.59        | 20.55         | 2             |
|           | 100     | 0         | 22.01        | 22.21        | 22.13         | 1             | 20.89        | 21.15        | 21.01         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 26047 | Mid Ch 26365 | High Ch 26683 |               | Low Ch 26047 | Mid Ch 26365 | High Ch 26683 |               |
|           |         |           | 1850.7 MHz   | 1882.5 MHz   | 1914.3 MHz    |               | 1850.7 MHz   | 1882.5 MHz   | 1914.3 MHz    |               |
| 25 / 1.4M | 1       | 0         | 22.78        | 22.94        | 22.85         | 0             | 21.75        | 21.90        | 21.84         | 1             |
|           | 1       | 2         | 22.68        | 22.79        | 22.70         | 0             | 21.58        | 21.79        | 21.66         | 1             |
|           | 1       | 5         | 22.54        | 22.70        | 22.54         | 0             | 21.46        | 21.61        | 21.53         | 1             |
|           | 3       | 0         | 22.77        | 22.91        | 22.83         | 0             | 21.68        | 21.89        | 21.76         | 1             |
|           | 3       | 1         | 22.65        | 22.82        | 22.69         | 0             | 21.58        | 21.70        | 21.71         | 1             |
|           | 3       | 3         | 22.51        | 22.66        | 22.48         | 0             | 21.42        | 21.56        | 21.56         | 1             |
|           | 6       | 0         | 21.66        | 21.83        | 21.83         | 1             | 20.53        | 20.67        | 20.79         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 26055 | Mid Ch 26365 | High Ch 26675 |               | Low Ch 26055 | Mid Ch 26365 | High Ch 26675 |               |
|           |         |           | 1851.5 MHz   | 1882.5 MHz   | 1913.5 MHz    |               | 1851.5 MHz   | 1882.5 MHz   | 1913.5 MHz    |               |
| 25 / 3M   | 1       | 0         | 22.81        | 23.04        | 22.94         | 0             | 21.73        | 21.95        | 21.85         | 1             |
|           | 1       | 7         | 22.72        | 22.92        | 22.79         | 0             | 21.61        | 21.85        | 21.76         | 1             |
|           | 1       | 14        | 22.57        | 22.81        | 22.64         | 0             | 21.46        | 21.67        | 21.49         | 1             |
|           | 8       | 0         | 21.67        | 21.89        | 21.83         | 1             | 20.61        | 20.82        | 20.62         | 2             |
|           | 8       | 3         | 21.56        | 21.77        | 21.73         | 1             | 20.45        | 20.73        | 20.63         | 2             |
|           | 8       | 7         | 21.41        | 21.66        | 21.47         | 1             | 20.25        | 20.52        | 20.42         | 2             |
|           | 15      | 0         | 21.67        | 21.87        | 21.87         | 1             | 20.58        | 20.86        | 20.67         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 26065 | Mid Ch 26365 | High Ch 26665 |               | Low Ch 26065 | Mid Ch 26365 | High Ch 26665 |               |
|           |         |           | 1852.5 MHz   | 1882.5 MHz   | 1912.5 MHz    |               | 1852.5 MHz   | 1882.5 MHz   | 1912.5 MHz    |               |
| 25 / 5M   | 1       | 0         | 22.83        | 23.06        | 23.01         | 0             | 21.77        | 21.97        | 21.95         | 1             |
|           | 1       | 12        | 22.74        | 22.97        | 22.91         | 0             | 21.65        | 21.85        | 21.78         | 1             |
|           | 1       | 24        | 22.62        | 22.76        | 22.63         | 0             | 21.53        | 21.65        | 21.74         | 1             |
|           | 12      | 0         | 21.79        | 22.01        | 21.94         | 1             | 20.76        | 20.83        | 20.76         | 2             |
|           | 12      | 6         | 21.68        | 21.92        | 21.79         | 1             | 20.60        | 20.88        | 20.78         | 2             |
|           | 12      | 13        | 21.53        | 21.80        | 21.56         | 1             | 20.43        | 20.72        | 20.63         | 2             |
|           | 25      | 0         | 21.68        | 21.86        | 21.91         | 1             | 20.65        | 20.83        | 20.89         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 26090 | Mid Ch 26365 | High Ch 26640 |               | Low Ch 26090 | Mid Ch 26365 | High Ch 26640 |               |
|           |         |           | 1855.0 MHz   | 1882.5 MHz   | 1910.0 MHz    |               | 1855.0 MHz   | 1882.5 MHz   | 1910.0 MHz    |               |
| 25 / 10M  | 1       | 0         | 22.86        | 23.09        | 23.02         | 0             | 21.81        | 22.00        | 21.97         | 1             |
|           | 1       | 24        | 22.77        | 22.93        | 22.87         | 0             | 21.69        | 21.94        | 21.84         | 1             |
|           | 1       | 49        | 22.58        | 22.86        | 22.72         | 0             | 21.55        | 21.68        | 21.73         | 1             |
|           | 25      | 0         | 21.81        | 21.94        | 21.96         | 1             | 20.67        | 20.86        | 20.76         | 2             |
|           | 25      | 12        | 21.70        | 21.82        | 21.86         | 1             | 20.69        | 20.82        | 20.81         | 2             |
|           | 25      | 25        | 21.49        | 21.73        | 21.69         | 1             | 20.51        | 20.58        | 20.60         | 2             |
|           | 50      | 0         | 21.75        | 22.05        | 21.95         | 1             | 20.60        | 20.90        | 20.94         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 26115 | Mid Ch 26365 | High Ch 26615 |               | Low Ch 26115 | Mid Ch 26365 | High Ch 26615 |               |
|           |         |           | 1857.5 MHz   | 1882.5 MHz   | 1907.5 MHz    |               | 1857.5 MHz   | 1882.5 MHz   | 1907.5 MHz    |               |
| 25 / 15M  | 1       | 0         | 22.93        | 23.11        | 23.04         | 0             | 21.89        | 22.08        | 21.96         | 1             |
|           | 1       | 37        | 22.82        | 22.98        | 22.91         | 0             | 21.79        | 21.96        | 21.91         | 1             |
|           | 1       | 74        | 22.60        | 22.78        | 22.77         | 0             | 21.65        | 21.85        | 21.66         | 1             |
|           | 36      | 0         | 21.63        | 21.96        | 21.75         | 1             | 20.61        | 20.78        | 20.60         | 2             |
|           | 36      | 19        | 21.53        | 21.87        | 21.60         | 1             | 20.47        | 20.78        | 20.55         | 2             |
|           | 36      | 39        | 21.33        | 21.66        | 21.53         | 1             | 20.29        | 20.68        | 20.51         | 2             |
|           | 75      | 0         | 21.71        | 21.98        | 21.97         | 1             | 20.70        | 20.88        | 20.85         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low Ch 26140 | Mid Ch 26365 | High Ch 26590 |               | Low Ch 26140 | Mid Ch 26365 | High Ch 26590 |               |
|           |         |           | 1860.0 MHz   | 1882.5 MHz   | 1905.0 MHz    |               | 1860.0 MHz   | 1882.5 MHz   | 1905.0 MHz    |               |
| 25 / 20M  | 1       | 0         | 22.95        | 23.13        | 23.10         | 0             | 21.92        | 22.10        | 22.08         | 1             |
|           | 1       | 50        | 22.79        | 23.03        | 22.96         | 0             | 21.79        | 21.95        | 21.93         | 1             |
|           | 1       | 99        | 22.64        | 22.76        | 22.73         | 0             | 21.55        | 21.82        | 21.74         | 1             |
|           | 50      | 0         | 21.71        | 21.99        | 21.77         | 1             | 20.51        | 20.81        | 20.70         | 2             |
|           | 50      | 25        | 21.55        | 21.89        | 21.61         | 1             | 20.58        | 20.84        | 20.54         | 2             |
|           | 50      | 50        | 21.33        | 21.76        | 21.45         | 1             | 20.33        | 20.58        | 20.45         | 2             |
|           | 100     | 0         | 21.92        | 22.04        | 21.88         | 1             | 20.71        | 20.96        | 21.01         | 2             |

# EIRP Power (dBm)

| GPRS  |         |                 |           |                        |            |           |                    |
|-------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z     | 512     | 1850.2          | -15.34    | 36.57                  | 21.23      | 132.80    | H                  |
|       | 661     | 1880.0          | -15.41    | 37.22                  | 21.81      | 151.84    |                    |
|       | 810     | 1909.8          | -15.47    | 37.18                  | 21.71      | 148.32    |                    |
|       | 512     | 1850.2          | -6.55     | 37.65                  | 31.10      | 1288.55   | V                  |
|       | 661     | 1880.0          | -6.15     | 37.58                  | 31.43      | 1390.91   |                    |
|       | 810     | 1909.8          | -6.47     | 37.48                  | 31.01      | 1261.83   |                    |

| EDGE  |         |                 |           |                        |            |           |                    |
|-------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z     | 512     | 1850.2          | -19.18    | 36.57                  | 17.39      | 54.85     | H                  |
|       | 661     | 1880.0          | -19.81    | 37.22                  | 17.41      | 55.13     |                    |
|       | 810     | 1909.8          | -19.96    | 37.18                  | 17.22      | 52.75     |                    |
|       | 512     | 1850.2          | -10.46    | 37.65                  | 27.19      | 523.72    | V                  |
|       | 661     | 1880.0          | -10.38    | 37.58                  | 27.20      | 525.17    |                    |
|       | 810     | 1909.8          | -10.34    | 37.48                  | 27.14      | 517.61    |                    |

| WCDMA |         |                 |           |                        |            |           |                    |
|-------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z     | 9262    | 1852.4          | -24.49    | 36.57                  | 12.08      | 16.15     | H                  |
|       | 9400    | 1880.0          | -25.08    | 37.22                  | 12.14      | 16.38     |                    |
|       | 9538    | 1907.6          | -25.08    | 37.18                  | 12.10      | 16.23     |                    |
|       | 9262    | 1852.4          | -14.28    | 37.65                  | 23.37      | 217.32    | V                  |
|       | 9400    | 1880.0          | -14.14    | 37.58                  | 23.44      | 220.95    |                    |
|       | 9538    | 1907.6          | -14.16    | 37.48                  | 23.32      | 214.78    |                    |

| CDMA  |         |                 |           |                        |            |           |                    |
|-------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z     | 25      | 1851.25         | -24.48    | 36.57                  | 12.09      | 16.19     | H                  |
|       | 600     | 1880.00         | -24.69    | 37.22                  | 12.53      | 17.92     |                    |
|       | 1175    | 1908.75         | -24.96    | 37.18                  | 12.22      | 16.68     |                    |
|       | 25      | 1851.25         | -14.56    | 37.65                  | 23.09      | 203.75    | V                  |
|       | 600     | 1880.00         | -14.26    | 37.58                  | 23.32      | 214.93    |                    |
|       | 1175    | 1908.75         | -14.36    | 37.48                  | 23.12      | 205.12    |                    |

| LTE Band 2                         |         |                 |           |                        |            |           |                    |
|------------------------------------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 1.4 MHz / QPSK  |         |                 |           |                        |            |           |                    |
| Plane                              | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z                                  | 18607   | 1850.7          | -27.65    | 36.57                  | 8.92       | 7.80      | H                  |
|                                    | 18900   | 1880.0          | -28.22    | 37.22                  | 9.00       | 7.95      |                    |
|                                    | 19193   | 1909.3          | -28.21    | 37.18                  | 8.97       | 7.89      |                    |
|                                    | 18607   | 1850.7          | -16.45    | 37.65                  | 21.20      | 131.86    | V                  |
|                                    | 18900   | 1880.0          | -16.34    | 37.58                  | 21.24      | 133.14    |                    |
|                                    | 19193   | 1909.3          | -16.29    | 37.48                  | 21.19      | 131.52    |                    |
| Channel Bandwidth: 1.4 MHz / 16QAM |         |                 |           |                        |            |           |                    |
| Z                                  | 18607   | 1850.7          | -28.52    | 36.57                  | 8.05       | 6.39      | H                  |
|                                    | 18900   | 1880.0          | -29.12    | 37.22                  | 8.10       | 6.46      |                    |
|                                    | 19193   | 1909.3          | -29.11    | 37.18                  | 8.07       | 6.42      |                    |
|                                    | 18607   | 1850.7          | -17.25    | 37.65                  | 20.40      | 109.67    | V                  |
|                                    | 18900   | 1880.0          | -17.14    | 37.58                  | 20.44      | 110.74    |                    |
|                                    | 19193   | 1909.3          | -17.14    | 37.48                  | 20.34      | 108.14    |                    |

| LTE Band 2                       |         |                 |           |                        |            |           |                    |
|----------------------------------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 3 MHz / QPSK  |         |                 |           |                        |            |           |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z                                | 18615   | 1851.5          | -27.58    | 36.57                  | 8.99       | 7.93      | H                  |
|                                  | 18900   | 1880.0          | -28.04    | 37.22                  | 9.18       | 8.29      |                    |
|                                  | 19185   | 1908.5          | -28.10    | 37.18                  | 9.08       | 8.09      |                    |
|                                  | 18615   | 1851.5          | -16.40    | 37.65                  | 21.25      | 133.38    | V                  |
|                                  | 18900   | 1880.0          | -16.25    | 37.58                  | 21.33      | 135.93    |                    |
|                                  | 19185   | 1908.5          | -16.20    | 37.48                  | 21.28      | 134.28    |                    |
| Channel Bandwidth: 3 MHz / 16QAM |         |                 |           |                        |            |           |                    |
| Z                                | 18615   | 1851.5          | -28.49    | 36.57                  | 8.08       | 6.43      | H                  |
|                                  | 18900   | 1880.0          | -29.10    | 37.22                  | 8.12       | 6.49      |                    |
|                                  | 19185   | 1908.5          | -29.07    | 37.18                  | 8.11       | 6.47      |                    |
|                                  | 18615   | 1851.5          | -17.20    | 37.65                  | 20.45      | 110.94    | V                  |
|                                  | 18900   | 1880.0          | -16.87    | 37.58                  | 20.71      | 117.84    |                    |
|                                  | 19185   | 1908.5          | -17.02    | 37.48                  | 20.46      | 111.17    |                    |

| LTE Band 2                       |         |                 |           |                        |            |           |                    |
|----------------------------------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 5 MHz / QPSK  |         |                 |           |                        |            |           |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z                                | 18625   | 1852.5          | -27.41    | 36.57                  | 9.16       | 8.25      | H                  |
|                                  | 18900   | 1880.0          | -28.00    | 37.22                  | 9.22       | 8.36      |                    |
|                                  | 19175   | 1907.5          | -28.03    | 37.18                  | 9.15       | 8.23      |                    |
|                                  | 18625   | 1852.5          | -16.32    | 37.65                  | 21.33      | 135.86    | V                  |
|                                  | 18900   | 1880.0          | -16.21    | 37.58                  | 21.37      | 137.18    |                    |
|                                  | 19175   | 1907.5          | -16.12    | 37.48                  | 21.36      | 136.77    |                    |
| Channel Bandwidth: 5 MHz / 16QAM |         |                 |           |                        |            |           |                    |
| Z                                | 18625   | 1852.5          | -28.41    | 36.57                  | 8.16       | 6.55      | H                  |
|                                  | 18900   | 1880.0          | -29.05    | 37.22                  | 8.17       | 6.57      |                    |
|                                  | 19175   | 1907.5          | -29.05    | 37.18                  | 8.13       | 6.50      |                    |
|                                  | 18625   | 1852.5          | -17.01    | 37.65                  | 20.64      | 115.90    | V                  |
|                                  | 18900   | 1880.0          | -16.81    | 37.58                  | 20.77      | 119.48    |                    |
|                                  | 19175   | 1907.5          | -16.94    | 37.48                  | 20.54      | 113.24    |                    |

| LTE Band 2                        |         |                 |           |                        |            |           |                    |
|-----------------------------------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 10 MHz / QPSK  |         |                 |           |                        |            |           |                    |
| Plane                             | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z                                 | 18650   | 1855.0          | -27.32    | 36.57                  | 9.25       | 8.42      | H                  |
|                                   | 18900   | 1880.0          | -27.93    | 37.22                  | 9.29       | 8.50      |                    |
|                                   | 19150   | 1905.0          | -27.95    | 37.18                  | 9.23       | 8.38      |                    |
|                                   | 18650   | 1855.0          | -16.24    | 37.65                  | 21.41      | 138.39    | V                  |
|                                   | 18900   | 1880.0          | -16.11    | 37.58                  | 21.47      | 140.38    |                    |
|                                   | 19150   | 1905.0          | -16.05    | 37.48                  | 21.43      | 139.00    |                    |
| Channel Bandwidth: 10 MHz / 16QAM |         |                 |           |                        |            |           |                    |
| Z                                 | 18650   | 1855.0          | -28.32    | 36.57                  | 8.25       | 6.69      | H                  |
|                                   | 18900   | 1880.0          | -28.94    | 37.22                  | 8.28       | 6.74      |                    |
|                                   | 19150   | 1905.0          | -28.95    | 37.18                  | 8.23       | 6.66      |                    |
|                                   | 18650   | 1855.0          | -16.96    | 37.65                  | 20.69      | 117.25    | V                  |
|                                   | 18900   | 1880.0          | -16.74    | 37.58                  | 20.84      | 121.42    |                    |
|                                   | 19150   | 1905.0          | -16.80    | 37.48                  | 20.68      | 116.95    |                    |

| LTE Band 2                        |         |                 |           |                        |            |           |                    |
|-----------------------------------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 15 MHz / QPSK  |         |                 |           |                        |            |           |                    |
| Plane                             | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z                                 | 18675   | 1857.5          | -27.24    | 36.57                  | 9.33       | 8.57      | H                  |
|                                   | 18900   | 1880.0          | -27.84    | 37.22                  | 9.38       | 8.68      |                    |
|                                   | 19125   | 1902.5          | -27.82    | 37.18                  | 9.36       | 8.63      |                    |
|                                   | 18675   | 1857.5          | -16.15    | 37.65                  | 21.50      | 141.29    | V                  |
|                                   | 18900   | 1880.0          | -16.05    | 37.58                  | 21.53      | 142.33    |                    |
|                                   | 19125   | 1902.5          | -15.99    | 37.48                  | 21.49      | 140.93    |                    |
| Channel Bandwidth: 15 MHz / 16QAM |         |                 |           |                        |            |           |                    |
| Z                                 | 18675   | 1857.5          | -28.26    | 36.57                  | 8.31       | 6.78      | H                  |
|                                   | 18900   | 1880.0          | -28.87    | 37.22                  | 8.35       | 6.85      |                    |
|                                   | 19125   | 1902.5          | -28.89    | 37.18                  | 8.29       | 6.75      |                    |
|                                   | 18675   | 1857.5          | -16.86    | 37.65                  | 20.79      | 119.98    | V                  |
|                                   | 18900   | 1880.0          | -16.68    | 37.58                  | 20.90      | 123.11    |                    |
|                                   | 19125   | 1902.5          | -16.72    | 37.48                  | 20.76      | 119.12    |                    |

| LTE Band 2                        |         |                 |           |                        |            |           |                    |
|-----------------------------------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 20 MHz / QPSK  |         |                 |           |                        |            |           |                    |
| Plane                             | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z                                 | 18700   | 1860.0          | -27.12    | 36.57                  | 9.45       | 8.81      | H                  |
|                                   | 18900   | 1880.0          | -27.73    | 37.22                  | 9.49       | 8.90      |                    |
|                                   | 19100   | 1900.0          | -27.77    | 37.18                  | 9.41       | 8.73      |                    |
|                                   | 18700   | 1860.0          | -16.10    | 37.65                  | 21.55      | 142.92    | V                  |
|                                   | 18900   | 1880.0          | -15.98    | 37.58                  | 21.60      | 144.64    |                    |
|                                   | 19100   | 1900.0          | -15.89    | 37.48                  | 21.59      | 144.21    |                    |
| Channel Bandwidth: 20 MHz / 16QAM |         |                 |           |                        |            |           |                    |
| Z                                 | 18700   | 1860.0          | -28.20    | 36.57                  | 8.37       | 6.87      | H                  |
|                                   | 18900   | 1880.0          | -28.81    | 37.22                  | 8.41       | 6.94      |                    |
|                                   | 19100   | 1900.0          | -28.80    | 37.18                  | 8.38       | 6.89      |                    |
|                                   | 18700   | 1860.0          | -16.76    | 37.65                  | 20.89      | 122.77    | V                  |
|                                   | 18900   | 1880.0          | -16.60    | 37.58                  | 20.98      | 125.40    |                    |
|                                   | 19100   | 1900.0          | -16.65    | 37.48                  | 20.83      | 121.06    |                    |

| LTE Band 25                        |         |                 |           |                        |            |           |                    |
|------------------------------------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 1.4 MHz / QPSK  |         |                 |           |                        |            |           |                    |
| Plane                              | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z                                  | 26047   | 1850.7          | -27.53    | 36.57                  | 9.04       | 8.02      | H                  |
|                                    | 26365   | 1882.5          | -28.10    | 37.22                  | 9.12       | 8.17      |                    |
|                                    | 26683   | 1914.3          | -30.01    | 39.09                  | 9.08       | 8.09      |                    |
|                                    | 26047   | 1850.7          | -16.15    | 37.65                  | 21.50      | 141.29    | V                  |
|                                    | 26365   | 1882.5          | -16.06    | 37.58                  | 21.52      | 142.00    |                    |
|                                    | 26683   | 1914.3          | -16.45    | 37.92                  | 21.47      | 140.28    |                    |
| Channel Bandwidth: 1.4 MHz / 16QAM |         |                 |           |                        |            |           |                    |
| Z                                  | 26047   | 1850.7          | -28.08    | 36.57                  | 8.49       | 7.07      | H                  |
|                                    | 26365   | 1882.5          | -28.67    | 37.22                  | 8.55       | 7.17      |                    |
|                                    | 26683   | 1914.3          | -30.65    | 39.09                  | 8.44       | 6.98      |                    |
|                                    | 26047   | 1850.7          | -17.76    | 37.65                  | 19.89      | 97.52     | V                  |
|                                    | 26365   | 1882.5          | -17.65    | 37.58                  | 19.93      | 98.47     |                    |
|                                    | 26683   | 1914.3          | -18.01    | 37.92                  | 19.91      | 97.95     |                    |

| LTE Band 25                      |         |                 |           |                        |            |           |                    |
|----------------------------------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 3 MHz / QPSK  |         |                 |           |                        |            |           |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z                                | 26055   | 1851.5          | -27.41    | 36.57                  | 9.16       | 8.25      | H                  |
|                                  | 26365   | 1882.5          | -28.00    | 37.22                  | 9.22       | 8.36      |                    |
|                                  | 26675   | 1913.5          | -29.94    | 39.11                  | 9.17       | 8.26      |                    |
|                                  | 26055   | 1851.5          | -16.08    | 37.65                  | 21.57      | 143.58    | V                  |
|                                  | 26365   | 1882.5          | -15.97    | 37.58                  | 21.61      | 144.98    |                    |
|                                  | 26675   | 1913.5          | -16.37    | 37.93                  | 21.56      | 143.22    |                    |
| Channel Bandwidth: 3 MHz / 16QAM |         |                 |           |                        |            |           |                    |
| Z                                | 26055   | 1851.5          | -28.01    | 36.57                  | 8.56       | 7.18      | H                  |
|                                  | 26365   | 1882.5          | -28.61    | 37.22                  | 8.61       | 7.27      |                    |
|                                  | 26675   | 1913.5          | -30.54    | 39.11                  | 8.57       | 7.19      |                    |
|                                  | 26055   | 1851.5          | -17.70    | 37.65                  | 19.95      | 98.88     | V                  |
|                                  | 26365   | 1882.5          | -17.60    | 37.58                  | 19.98      | 99.61     |                    |
|                                  | 26675   | 1913.5          | -17.97    | 37.93                  | 19.96      | 99.08     |                    |

| LTE Band 25                      |         |                 |           |                        |            |           |                    |
|----------------------------------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 5 MHz / QPSK  |         |                 |           |                        |            |           |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z                                | 26065   | 1852.5          | -27.34    | 36.57                  | 9.23       | 8.38      | H                  |
|                                  | 26365   | 1882.5          | -27.96    | 37.22                  | 9.26       | 8.44      |                    |
|                                  | 26665   | 1912.5          | -29.87    | 39.11                  | 9.24       | 8.39      |                    |
|                                  | 26065   | 1852.5          | -16.01    | 37.65                  | 21.64      | 145.92    | V                  |
|                                  | 26365   | 1882.5          | -15.90    | 37.58                  | 21.68      | 147.33    |                    |
|                                  | 26665   | 1912.5          | -16.31    | 37.96                  | 21.65      | 146.22    |                    |
| Channel Bandwidth: 5 MHz / 16QAM |         |                 |           |                        |            |           |                    |
| Z                                | 26065   | 1852.5          | -27.94    | 36.57                  | 8.63       | 7.30      | H                  |
|                                  | 26365   | 1882.5          | -28.57    | 37.22                  | 8.65       | 7.33      |                    |
|                                  | 26665   | 1912.5          | -30.47    | 39.11                  | 8.64       | 7.31      |                    |
|                                  | 26065   | 1852.5          | -17.64    | 37.65                  | 20.01      | 100.25    | V                  |
|                                  | 26365   | 1882.5          | -17.56    | 37.58                  | 20.02      | 100.53    |                    |
|                                  | 26665   | 1912.5          | -17.96    | 37.96                  | 20.00      | 100.00    |                    |

| LTE Band 25                       |         |                 |           |                        |            |           |                    |
|-----------------------------------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 10 MHz / QPSK  |         |                 |           |                        |            |           |                    |
| Plane                             | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z                                 | 26090   | 1855.0          | -27.22    | 36.57                  | 9.35       | 8.61      | H                  |
|                                   | 26365   | 1882.5          | -27.82    | 37.22                  | 9.40       | 8.72      |                    |
|                                   | 26640   | 1910.0          | -29.80    | 39.19                  | 9.39       | 8.69      |                    |
|                                   | 26090   | 1855.0          | -15.97    | 37.65                  | 21.68      | 147.27    | V                  |
|                                   | 26365   | 1882.5          | -15.85    | 37.58                  | 21.73      | 149.04    |                    |
|                                   | 26640   | 1910.0          | -16.43    | 38.15                  | 21.72      | 148.59    |                    |
| Channel Bandwidth: 10 MHz / 16QAM |         |                 |           |                        |            |           |                    |
| Z                                 | 26090   | 1855.0          | -27.89    | 36.57                  | 8.68       | 7.38      | H                  |
|                                   | 26365   | 1882.5          | -28.50    | 37.22                  | 8.72       | 7.45      |                    |
|                                   | 26640   | 1910.0          | -30.48    | 39.19                  | 8.71       | 7.43      |                    |
|                                   | 26090   | 1855.0          | -17.56    | 37.65                  | 20.09      | 102.12    | V                  |
|                                   | 26365   | 1882.5          | -17.46    | 37.58                  | 20.12      | 102.87    |                    |
|                                   | 26640   | 1910.0          | -18.07    | 38.15                  | 20.08      | 101.86    |                    |

| LTE Band 25                       |         |                 |           |                        |            |           |                    |
|-----------------------------------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 15 MHz / QPSK  |         |                 |           |                        |            |           |                    |
| Plane                             | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z                                 | 26115   | 1857.5          | -27.15    | 36.57                  | 9.42       | 8.75      | H                  |
|                                   | 26365   | 1882.5          | -27.74    | 37.22                  | 9.48       | 8.88      |                    |
|                                   | 26615   | 1907.5          | -29.76    | 39.23                  | 9.47       | 8.85      |                    |
|                                   | 26115   | 1857.5          | -15.89    | 37.65                  | 21.76      | 150.00    | V                  |
|                                   | 26365   | 1882.5          | -15.78    | 37.58                  | 21.80      | 151.46    |                    |
|                                   | 26615   | 1907.5          | -16.43    | 38.22                  | 21.79      | 151.01    |                    |
| Channel Bandwidth: 15 MHz / 16QAM |         |                 |           |                        |            |           |                    |
| Z                                 | 26115   | 1857.5          | -27.81    | 36.57                  | 8.76       | 7.52      | H                  |
|                                   | 26365   | 1882.5          | -28.43    | 37.22                  | 8.79       | 7.58      |                    |
|                                   | 26615   | 1907.5          | -30.46    | 39.23                  | 8.77       | 7.53      |                    |
|                                   | 26115   | 1857.5          | -17.39    | 37.65                  | 20.26      | 106.19    | V                  |
|                                   | 26365   | 1882.5          | -17.31    | 37.58                  | 20.27      | 106.49    |                    |
|                                   | 26615   | 1907.5          | -17.98    | 38.22                  | 20.24      | 105.68    |                    |

| LTE Band 25                       |         |                 |           |                        |            |           |                    |
|-----------------------------------|---------|-----------------|-----------|------------------------|------------|-----------|--------------------|
| Channel Bandwidth: 20 MHz / QPSK  |         |                 |           |                        |            |           |                    |
| Plane                             | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | EIRP (dBm) | EIRP (mW) | Polarization (H/V) |
| Z                                 | 26140   | 1860.0          | -27.08    | 36.57                  | 9.49       | 8.90      | H                  |
|                                   | 26365   | 1882.5          | -27.69    | 37.22                  | 9.53       | 8.98      |                    |
|                                   | 26590   | 1905.0          | -29.20    | 38.72                  | 9.52       | 8.95      |                    |
|                                   | 26140   | 1860.0          | -15.80    | 37.65                  | 21.85      | 153.14    | V                  |
|                                   | 26365   | 1882.5          | -15.72    | 37.58                  | 21.86      | 153.57    |                    |
|                                   | 26590   | 1905.0          | -15.74    | 37.56                  | 21.82      | 152.05    |                    |
| Channel Bandwidth: 20 MHz / 16QAM |         |                 |           |                        |            |           |                    |
| Z                                 | 26140   | 1860.0          | -27.75    | 36.57                  | 8.82       | 7.62      | H                  |
|                                   | 26365   | 1882.5          | -28.39    | 37.22                  | 8.83       | 7.65      |                    |
|                                   | 26590   | 1905.0          | -29.94    | 38.72                  | 8.78       | 7.55      |                    |
|                                   | 26140   | 1860.0          | -17.35    | 37.65                  | 20.30      | 107.18    | V                  |
|                                   | 26365   | 1882.5          | -17.24    | 37.58                  | 20.34      | 108.22    |                    |
|                                   | 26590   | 1905.0          | -17.27    | 37.56                  | 20.29      | 106.91    |                    |

## 4.2 Frequency Stability Measurement

### 4.2.1 Limits of Frequency Stability Measurement

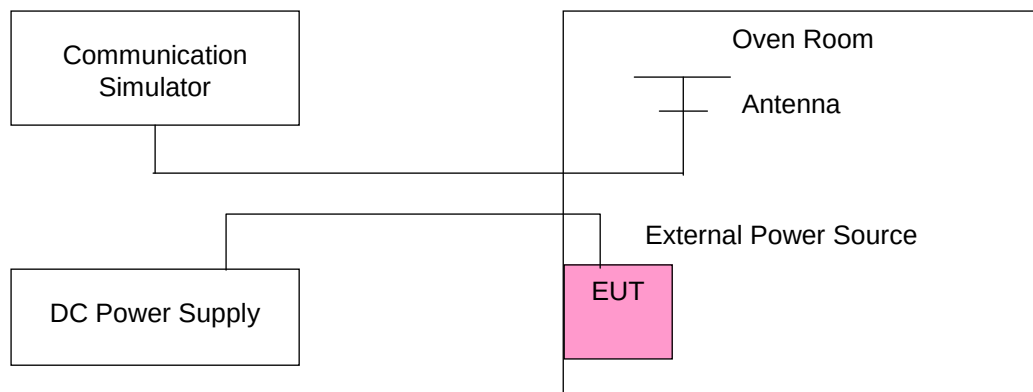
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

### 4.2.2 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  $\pm 0.5$  °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.

### 4.2.3 Test Setup



#### 4.2.4 Test Results

##### Frequency Error vs. Voltage

| Voltage<br>(Volts) | GPRS            |                       |                 |                       | Limit (ppm) |
|--------------------|-----------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Low Channel     |                       | High Channel    |                       |             |
|                    | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1850.200004     | 0.002                 | 1909.800004     | 0.002                 | 2.5         |
| 20.4               | 1850.200003     | 0.001                 | 1909.800003     | 0.001                 | 2.5         |
| 27.6               | 1850.200002     | 0.001                 | 1909.800004     | 0.002                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

##### Frequency Error vs. Temperature

| Temp. (°C) | GSM             |                       |                 |                       | Limit (ppm) |
|------------|-----------------|-----------------------|-----------------|-----------------------|-------------|
|            | Low Channel     |                       | High Channel    |                       |             |
|            | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1850.200004     | 0.002                 | 1909.799997     | -0.002                | 2.5         |
| -20        | 1850.200003     | 0.002                 | 1909.799998     | -0.001                | 2.5         |
| -10        | 1850.199997     | -0.002                | 1909.799997     | -0.002                | 2.5         |
| 0          | 1850.199997     | -0.002                | 1909.799998     | -0.001                | 2.5         |
| 10         | 1850.199998     | -0.001                | 1909.799997     | -0.001                | 2.5         |
| 20         | 1850.199998     | -0.001                | 1909.800002     | 0.001                 | 2.5         |
| 30         | 1850.199998     | -0.001                | 1909.800003     | 0.002                 | 2.5         |
| 40         | 1850.200004     | 0.002                 | 1909.800002     | 0.001                 | 2.5         |
| 50         | 1850.200004     | 0.002                 | 1909.800001     | 0.001                 | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | EDGE            |                       |                 |                       | Limit (ppm) |
|--------------------|-----------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Low Channel     |                       | High Channel    |                       |             |
|                    | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1850.200003     | 0.002                 | 1909.800004     | 0.002                 | 2.5         |
| 20.4               | 1850.200002     | 0.001                 | 1909.800003     | 0.002                 | 2.5         |
| 27.6               | 1850.200002     | 0.001                 | 1909.800002     | 0.001                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | EDGE            |                       |                 |                       | Limit (ppm) |
|------------|-----------------|-----------------------|-----------------|-----------------------|-------------|
|            | Low Channel     |                       | High Channel    |                       |             |
|            | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1850.200004     | 0.002                 | 1909.800004     | 0.002                 | 2.5         |
| -20        | 1850.199999     | -0.001                | 1909.800002     | 0.001                 | 2.5         |
| -10        | 1850.199998     | -0.001                | 1909.800002     | 0.001                 | 2.5         |
| 0          | 1850.199996     | -0.002                | 1909.799999     | -0.001                | 2.5         |
| 10         | 1850.199998     | -0.001                | 1909.799996     | -0.002                | 2.5         |
| 20         | 1850.199999     | -0.001                | 1909.799999     | -0.001                | 2.5         |
| 30         | 1850.200001     | 0.001                 | 1909.799997     | -0.001                | 2.5         |
| 40         | 1850.200004     | 0.002                 | 1909.799999     | -0.001                | 2.5         |
| 50         | 1850.200002     | 0.001                 | 1909.800002     | 0.001                 | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | WCDMA           |                       |                 |                       | Limit (ppm) |
|--------------------|-----------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Low Channel     |                       | High Channel    |                       |             |
|                    | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1852.400003     | 0.001                 | 1907.600001     | 0.001                 | 2.5         |
| 20.4               | 1852.400001     | 0.001                 | 1907.600004     | 0.002                 | 2.5         |
| 27.6               | 1852.400002     | 0.001                 | 1907.600002     | 0.001                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | WCDMA           |                       |                 |                       | Limit (ppm) |
|------------|-----------------|-----------------------|-----------------|-----------------------|-------------|
|            | Low Channel     |                       | High Channel    |                       |             |
|            | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1852.399998     | -0.001                | 1907.600004     | 0.002                 | 2.5         |
| -20        | 1852.399998     | -0.001                | 1907.600003     | 0.002                 | 2.5         |
| -10        | 1852.399997     | -0.002                | 1907.600004     | 0.002                 | 2.5         |
| 0          | 1852.399996     | -0.002                | 1907.600003     | 0.002                 | 2.5         |
| 10         | 1852.400002     | 0.001                 | 1907.600002     | 0.001                 | 2.5         |
| 20         | 1852.400004     | 0.002                 | 1907.599999     | -0.001                | 2.5         |
| 30         | 1852.400003     | 0.001                 | 1907.599998     | -0.001                | 2.5         |
| 40         | 1852.400003     | 0.002                 | 1907.599997     | -0.002                | 2.5         |
| 50         | 1852.400001     | 0.001                 | 1907.599998     | -0.001                | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | CDMA            |                       |                 |                       | Limit (ppm) |
|--------------------|-----------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Low Channel     |                       | High Channel    |                       |             |
|                    | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1851.250003     | 0.002                 | 1908.750004     | 0.002                 | 2.5         |
| 20.4               | 1851.250004     | 0.002                 | 1908.750002     | 0.001                 | 2.5         |
| 27.6               | 1851.250004     | 0.002                 | 1908.750004     | 0.002                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | CDMA            |                       |                 |                       | Limit (ppm) |
|------------|-----------------|-----------------------|-----------------|-----------------------|-------------|
|            | Low Channel     |                       | High Channel    |                       |             |
|            | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1851.250001     | 0.001                 | 1908.750002     | 0.001                 | 2.5         |
| -20        | 1851.249998     | -0.001                | 1908.749999     | -0.001                | 2.5         |
| -10        | 1851.249996     | -0.002                | 1908.749998     | -0.001                | 2.5         |
| 0          | 1851.249998     | -0.001                | 1908.749999     | -0.001                | 2.5         |
| 10         | 1851.249998     | -0.001                | 1908.749998     | -0.001                | 2.5         |
| 20         | 1851.249998     | -0.001                | 1908.749997     | -0.002                | 2.5         |
| 30         | 1851.250002     | 0.001                 | 1908.750003     | 0.001                 | 2.5         |
| 40         | 1851.250002     | 0.001                 | 1908.750004     | 0.002                 | 2.5         |
| 50         | 1851.250003     | 0.001                 | 1908.750002     | 0.001                 | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 2                 |                       |                 |                       | Limit (ppm) |
|--------------------|----------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 1.4 MHz |                       |                 |                       |             |
|                    | Low Channel                |                       | High Channel    |                       |             |
|                    | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1850.700003                | 0.002                 | 1909.300001     | 0.001                 | 2.5         |
| 20.4               | 1850.700004                | 0.002                 | 1909.300002     | 0.001                 | 2.5         |
| 27.6               | 1850.700002                | 0.001                 | 1909.300003     | 0.002                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 2                 |                       |                 |                       | Limit (ppm) |
|------------|----------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 1.4 MHz |                       |                 |                       |             |
|            | Low Channel                |                       | High Channel    |                       |             |
|            | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1850.700003                | 0.001                 | 1909.300002     | 0.001                 | 2.5         |
| -20        | 1850.700003                | 0.002                 | 1909.299999     | -0.001                | 2.5         |
| -10        | 1850.700003                | 0.002                 | 1909.299996     | -0.002                | 2.5         |
| 0          | 1850.700002                | 0.001                 | 1909.299998     | -0.001                | 2.5         |
| 10         | 1850.700003                | 0.002                 | 1909.299997     | -0.001                | 2.5         |
| 20         | 1850.699997                | -0.002                | 1909.299999     | -0.001                | 2.5         |
| 30         | 1850.699999                | -0.001                | 1909.300002     | 0.001                 | 2.5         |
| 40         | 1850.699997                | -0.002                | 1909.300004     | 0.002                 | 2.5         |
| 50         | 1850.699997                | -0.002                | 1909.300003     | 0.002                 | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 2               |                       |                 |                       | Limit (ppm) |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 3 MHz |                       |                 |                       |             |
|                    | Low Channel              |                       | High Channel    |                       |             |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1851.500002              | 0.001                 | 1907.500004     | 0.002                 | 2.5         |
| 20.4               | 1851.500004              | 0.002                 | 1907.500002     | 0.001                 | 2.5         |
| 27.6               | 1851.500003              | 0.001                 | 1907.500003     | 0.002                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 2               |                       |                 |                       | Limit (ppm) |
|------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 3 MHz |                       |                 |                       |             |
|            | Low Channel              |                       | High Channel    |                       |             |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1851.500002              | 0.001                 | 1907.500004     | 0.002                 | 2.5         |
| -20        | 1851.500003              | 0.002                 | 1907.500002     | 0.001                 | 2.5         |
| -10        | 1851.499996              | -0.002                | 1907.500003     | 0.002                 | 2.5         |
| 0          | 1851.499997              | -0.002                | 1907.499996     | -0.002                | 2.5         |
| 10         | 1851.499996              | -0.002                | 1907.499996     | -0.002                | 2.5         |
| 20         | 1851.499998              | -0.001                | 1907.499997     | -0.002                | 2.5         |
| 30         | 1851.499996              | -0.002                | 1907.499998     | -0.001                | 2.5         |
| 40         | 1851.500002              | 0.001                 | 1907.499997     | -0.002                | 2.5         |
| 50         | 1851.500003              | 0.002                 | 1907.500004     | 0.002                 | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 2               |                       |                 |                       | Limit (ppm) |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 5 MHz |                       |                 |                       |             |
|                    | Low Channel              |                       | High Channel    |                       |             |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1852.500002              | 0.001                 | 1907.500003     | 0.001                 | 2.5         |
| 20.4               | 1852.500003              | 0.002                 | 1907.500003     | 0.001                 | 2.5         |
| 27.6               | 1852.500002              | 0.001                 | 1907.500001     | 0.001                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 2               |                       |                 |                       | Limit (ppm) |
|------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 5 MHz |                       |                 |                       |             |
|            | Low Channel              |                       | High Channel    |                       |             |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1852.499998              | -0.001                | 1907.499999     | -0.001                | 2.5         |
| -20        | 1852.499996              | -0.002                | 1907.499996     | -0.002                | 2.5         |
| -10        | 1852.499997              | -0.002                | 1907.499996     | -0.002                | 2.5         |
| 0          | 1852.499997              | -0.001                | 1907.499997     | -0.002                | 2.5         |
| 10         | 1852.499999              | -0.001                | 1907.500003     | 0.002                 | 2.5         |
| 20         | 1852.500003              | 0.002                 | 1907.500002     | 0.001                 | 2.5         |
| 30         | 1852.500002              | 0.001                 | 1907.500002     | 0.001                 | 2.5         |
| 40         | 1852.500002              | 0.001                 | 1907.500003     | 0.002                 | 2.5         |
| 50         | 1852.500003              | 0.002                 | 1907.500002     | 0.001                 | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 2                |                       |                 |                       | Limit (ppm) |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 10 MHz |                       |                 |                       |             |
|                    | Low Channel               |                       | High Channel    |                       |             |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1855.000001               | 0.001                 | 1905.000003     | 0.002                 | 2.5         |
| 20.4               | 1855.000004               | 0.002                 | 1905.000003     | 0.001                 | 2.5         |
| 27.6               | 1855.000004               | 0.002                 | 1905.000002     | 0.001                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 2                |                       |                 |                       | Limit (ppm) |
|------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 10 MHz |                       |                 |                       |             |
|            | Low Channel               |                       | High Channel    |                       |             |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1855.000003               | 0.002                 | 1904.999997     | -0.002                | 2.5         |
| -20        | 1855.000001               | 0.001                 | 1904.999997     | -0.001                | 2.5         |
| -10        | 1854.999998               | -0.001                | 1904.999999     | -0.001                | 2.5         |
| 0          | 1854.999997               | -0.002                | 1904.999997     | -0.001                | 2.5         |
| 10         | 1854.999997               | -0.002                | 1904.999998     | -0.001                | 2.5         |
| 20         | 1854.999999               | -0.001                | 1905.000003     | 0.002                 | 2.5         |
| 30         | 1854.999996               | -0.002                | 1905.000001     | 0.001                 | 2.5         |
| 40         | 1855.000003               | 0.002                 | 1905.000002     | 0.001                 | 2.5         |
| 50         | 1855.000001               | 0.001                 | 1905.000004     | 0.002                 | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 2                |                       |                 |                       | Limit (ppm) |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 15 MHz |                       |                 |                       |             |
|                    | Low Channel               |                       | High Channel    |                       |             |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1857.500002               | 0.001                 | 1902.500004     | 0.002                 | 2.5         |
| 20.4               | 1857.500002               | 0.001                 | 1902.500002     | 0.001                 | 2.5         |
| 27.6               | 1857.500002               | 0.001                 | 1902.500002     | 0.001                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 2                |                       |                 |                       | Limit (ppm) |
|------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 15 MHz |                       |                 |                       |             |
|            | Low Channel               |                       | High Channel    |                       |             |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1857.500004               | 0.002                 | 1902.500001     | 0.001                 | 2.5         |
| -20        | 1857.499996               | -0.002                | 1902.500004     | 0.002                 | 2.5         |
| -10        | 1857.499996               | -0.002                | 1902.500003     | 0.001                 | 2.5         |
| 0          | 1857.499999               | -0.001                | 1902.499998     | -0.001                | 2.5         |
| 10         | 1857.499998               | -0.001                | 1902.499997     | -0.002                | 2.5         |
| 20         | 1857.499998               | -0.001                | 1902.499999     | -0.001                | 2.5         |
| 30         | 1857.500002               | 0.001                 | 1902.499997     | -0.002                | 2.5         |
| 40         | 1857.500004               | 0.002                 | 1902.499998     | -0.001                | 2.5         |
| 50         | 1857.500004               | 0.002                 | 1902.500002     | 0.001                 | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 2                |                       |                 |                       | Limit (ppm) |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 20 MHz |                       |                 |                       |             |
|                    | Low Channel               |                       | High Channel    |                       |             |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1860.000002               | 0.001                 | 1900.000003     | 0.001                 | 2.5         |
| 20.4               | 1860.000002               | 0.001                 | 1900.000004     | 0.002                 | 2.5         |
| 27.6               | 1860.000002               | 0.001                 | 1900.000003     | 0.002                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 2                |                       |                 |                       | Limit (ppm) |
|------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 20 MHz |                       |                 |                       |             |
|            | Low Channel               |                       | High Channel    |                       |             |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1859.999998               | -0.001                | 1900.000004     | 0.002                 | 2.5         |
| -20        | 1859.999996               | -0.002                | 1900.000001     | 0.001                 | 2.5         |
| -10        | 1859.999997               | -0.002                | 1900.000004     | 0.002                 | 2.5         |
| 0          | 1859.999997               | -0.002                | 1900.000003     | 0.001                 | 2.5         |
| 10         | 1860.000004               | 0.002                 | 1900.000002     | 0.001                 | 2.5         |
| 20         | 1860.000002               | 0.001                 | 1899.999996     | -0.002                | 2.5         |
| 30         | 1860.000001               | 0.001                 | 1899.999996     | -0.002                | 2.5         |
| 40         | 1860.000002               | 0.001                 | 1899.999997     | -0.002                | 2.5         |
| 50         | 1860.000003               | 0.002                 | 1899.999997     | -0.002                | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 25                |                       |                 |                       | Limit (ppm) |
|--------------------|----------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 1.4 MHz |                       |                 |                       |             |
|                    | Low Channel                |                       | High Channel    |                       |             |
|                    | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1850.700002                | 0.001                 | 1914.300001     | 0.001                 | 2.5         |
| 20.4               | 1850.700004                | 0.002                 | 1914.300003     | 0.002                 | 2.5         |
| 27.6               | 1850.700002                | 0.001                 | 1914.300002     | 0.001                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 25                |                       |                 |                       | Limit (ppm) |
|------------|----------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 1.4 MHz |                       |                 |                       |             |
|            | Low Channel                |                       | High Channel    |                       |             |
|            | Frequency (MHz)            | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1850.699998                | -0.001                | 1914.300002     | 0.001                 | 2.5         |
| -20        | 1850.699996                | -0.002                | 1914.299998     | -0.001                | 2.5         |
| -10        | 1850.699998                | -0.001                | 1914.299998     | -0.001                | 2.5         |
| 0          | 1850.699998                | -0.001                | 1914.299998     | -0.001                | 2.5         |
| 10         | 1850.699999                | -0.001                | 1914.299997     | -0.002                | 2.5         |
| 20         | 1850.700001                | 0.001                 | 1914.299996     | -0.002                | 2.5         |
| 30         | 1850.700001                | 0.001                 | 1914.300004     | 0.002                 | 2.5         |
| 40         | 1850.700004                | 0.002                 | 1914.300002     | 0.001                 | 2.5         |
| 50         | 1850.700003                | 0.001                 | 1914.300002     | 0.001                 | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 25              |                       |                 |                       | Limit (ppm) |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 3 MHz |                       |                 |                       |             |
|                    | Low Channel              |                       | High Channel    |                       |             |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1851.500003              | 0.001                 | 1913.500001     | 0.001                 | 2.5         |
| 20.4               | 1851.500001              | 0.001                 | 1913.500002     | 0.001                 | 2.5         |
| 27.6               | 1851.500002              | 0.001                 | 1913.500004     | 0.002                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 25              |                       |                 |                       | Limit (ppm) |
|------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 3 MHz |                       |                 |                       |             |
|            | Low Channel              |                       | High Channel    |                       |             |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1851.500003              | 0.002                 | 1913.499997     | -0.001                | 2.5         |
| -20        | 1851.500002              | 0.001                 | 1913.499997     | -0.001                | 2.5         |
| -10        | 1851.500002              | 0.001                 | 1913.499999     | -0.001                | 2.5         |
| 0          | 1851.499996              | -0.002                | 1913.499999     | -0.001                | 2.5         |
| 10         | 1851.499997              | -0.002                | 1913.500002     | 0.001                 | 2.5         |
| 20         | 1851.499997              | -0.002                | 1913.500002     | 0.001                 | 2.5         |
| 30         | 1851.499997              | -0.002                | 1913.500002     | 0.001                 | 2.5         |
| 40         | 1851.499998              | -0.001                | 1913.500002     | 0.001                 | 2.5         |
| 50         | 1851.500002              | 0.001                 | 1913.500004     | 0.002                 | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 25              |                       |                 |                       | Limit (ppm) |
|--------------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 5 MHz |                       |                 |                       |             |
|                    | Low Channel              |                       | High Channel    |                       |             |
|                    | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1852.500002              | 0.001                 | 1912.500003     | 0.002                 | 2.5         |
| 20.4               | 1852.500003              | 0.001                 | 1912.500003     | 0.002                 | 2.5         |
| 27.6               | 1852.500002              | 0.001                 | 1912.500003     | 0.001                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 25              |                       |                 |                       | Limit (ppm) |
|------------|--------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 5 MHz |                       |                 |                       |             |
|            | Low Channel              |                       | High Channel    |                       |             |
|            | Frequency (MHz)          | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1852.500003              | 0.002                 | 1912.500004     | 0.002                 | 2.5         |
| -20        | 1852.500001              | 0.001                 | 1912.500004     | 0.002                 | 2.5         |
| -10        | 1852.500003              | 0.002                 | 1912.499999     | -0.001                | 2.5         |
| 0          | 1852.500004              | 0.002                 | 1912.499997     | -0.001                | 2.5         |
| 10         | 1852.500002              | 0.001                 | 1912.499998     | -0.001                | 2.5         |
| 20         | 1852.499997              | -0.001                | 1912.499997     | -0.002                | 2.5         |
| 30         | 1852.499998              | -0.001                | 1912.499996     | -0.002                | 2.5         |
| 40         | 1852.499996              | -0.002                | 1912.500004     | 0.002                 | 2.5         |
| 50         | 1852.499997              | -0.002                | 1912.500002     | 0.001                 | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 25               |                       |                 |                       | Limit (ppm) |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 10 MHz |                       |                 |                       |             |
|                    | Low Channel               |                       | High Channel    |                       |             |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1855.000003               | 0.002                 | 1910.000003     | 0.002                 | 2.5         |
| 20.4               | 1855.000003               | 0.001                 | 1910.000002     | 0.001                 | 2.5         |
| 27.6               | 1855.000001               | 0.001                 | 1910.000004     | 0.002                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 25               |                       |                 |                       | Limit (ppm) |
|------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 10 MHz |                       |                 |                       |             |
|            | Low Channel               |                       | High Channel    |                       |             |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1855.000003               | 0.002                 | 1910.000003     | 0.002                 | 2.5         |
| -20        | 1855.000001               | 0.001                 | 1910.000003     | 0.001                 | 2.5         |
| -10        | 1854.999999               | -0.001                | 1910.000004     | 0.002                 | 2.5         |
| 0          | 1854.999997               | -0.002                | 1909.999999     | -0.001                | 2.5         |
| 10         | 1854.999996               | -0.002                | 1909.999998     | -0.001                | 2.5         |
| 20         | 1854.999998               | -0.001                | 1909.999997     | -0.001                | 2.5         |
| 30         | 1854.999998               | -0.001                | 1909.999998     | -0.001                | 2.5         |
| 40         | 1855.000003               | 0.002                 | 1909.999999     | -0.001                | 2.5         |
| 50         | 1855.000003               | 0.002                 | 1910.000003     | 0.002                 | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 25               |                       |                 |                       | Limit (ppm) |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 15 MHz |                       |                 |                       |             |
|                    | Low Channel               |                       | High Channel    |                       |             |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1857.500004               | 0.002                 | 1907.500004     | 0.002                 | 2.5         |
| 20.4               | 1857.500004               | 0.002                 | 1907.500004     | 0.002                 | 2.5         |
| 27.6               | 1857.500002               | 0.001                 | 1907.500004     | 0.002                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 25               |                       |                 |                       | Limit (ppm) |
|------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 15 MHz |                       |                 |                       |             |
|            | Low Channel               |                       | High Channel    |                       |             |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1857.499997               | -0.002                | 1907.499998     | -0.001                | 2.5         |
| -20        | 1857.499999               | -0.001                | 1907.499996     | -0.002                | 2.5         |
| -10        | 1857.499997               | -0.001                | 1907.499999     | -0.001                | 2.5         |
| 0          | 1857.499996               | -0.002                | 1907.499999     | -0.001                | 2.5         |
| 10         | 1857.499998               | -0.001                | 1907.500002     | 0.001                 | 2.5         |
| 20         | 1857.500003               | 0.002                 | 1907.500002     | 0.001                 | 2.5         |
| 30         | 1857.500004               | 0.002                 | 1907.500002     | 0.001                 | 2.5         |
| 40         | 1857.500002               | 0.001                 | 1907.500003     | 0.002                 | 2.5         |
| 50         | 1857.500002               | 0.001                 | 1907.500001     | 0.001                 | 2.5         |

### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 25               |                       |                 |                       | Limit (ppm) |
|--------------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|                    | Channel Bandwidth: 20 MHz |                       |                 |                       |             |
|                    | Low Channel               |                       | High Channel    |                       |             |
|                    | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| 24                 | 1860.000001               | 0.001                 | 1905.000001     | 0.001                 | 2.5         |
| 20.4               | 1860.000003               | 0.002                 | 1905.000003     | 0.002                 | 2.5         |
| 27.6               | 1860.000001               | 0.001                 | 1905.000001     | 0.001                 | 2.5         |

**Note:** The applicant defined the normal working voltage of the battery is from 20.4 Vdc to 27.6 Vdc.

### Frequency Error vs. Temperature

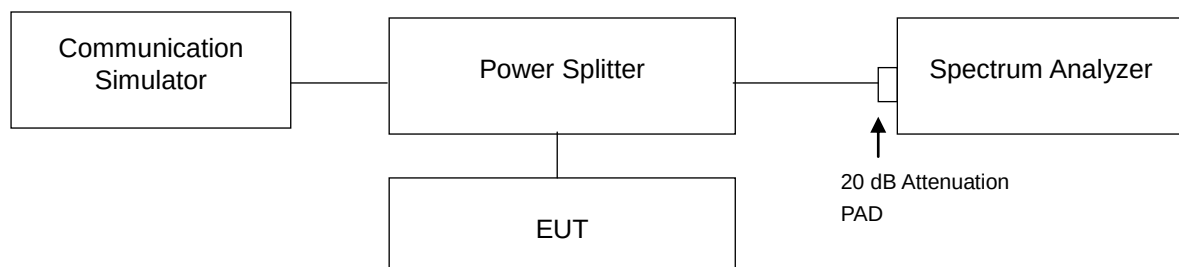
| Temp. (°C) | LTE Band 25               |                       |                 |                       | Limit (ppm) |
|------------|---------------------------|-----------------------|-----------------|-----------------------|-------------|
|            | Channel Bandwidth: 20 MHz |                       |                 |                       |             |
|            | Low Channel               |                       | High Channel    |                       |             |
|            | Frequency (MHz)           | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |             |
| -30        | 1860.000003               | 0.002                 | 1905.000003     | 0.002                 | 2.5         |
| -20        | 1859.999997               | -0.001                | 1905.000001     | 0.001                 | 2.5         |
| -10        | 1859.999999               | -0.001                | 1905.000001     | 0.001                 | 2.5         |
| 0          | 1859.999998               | -0.001                | 1904.999998     | -0.001                | 2.5         |
| 10         | 1859.999997               | -0.002                | 1904.999997     | -0.002                | 2.5         |
| 20         | 1859.999998               | -0.001                | 1904.999999     | -0.001                | 2.5         |
| 30         | 1860.000003               | 0.002                 | 1904.999997     | -0.002                | 2.5         |
| 40         | 1860.000002               | 0.001                 | 1904.999996     | -0.002                | 2.5         |
| 50         | 1860.000003               | 0.002                 | 1905.000004     | 0.002                 | 2.5         |

### 4.3 Occupied Bandwidth Measurement

#### 4.3.1 Test Procedure

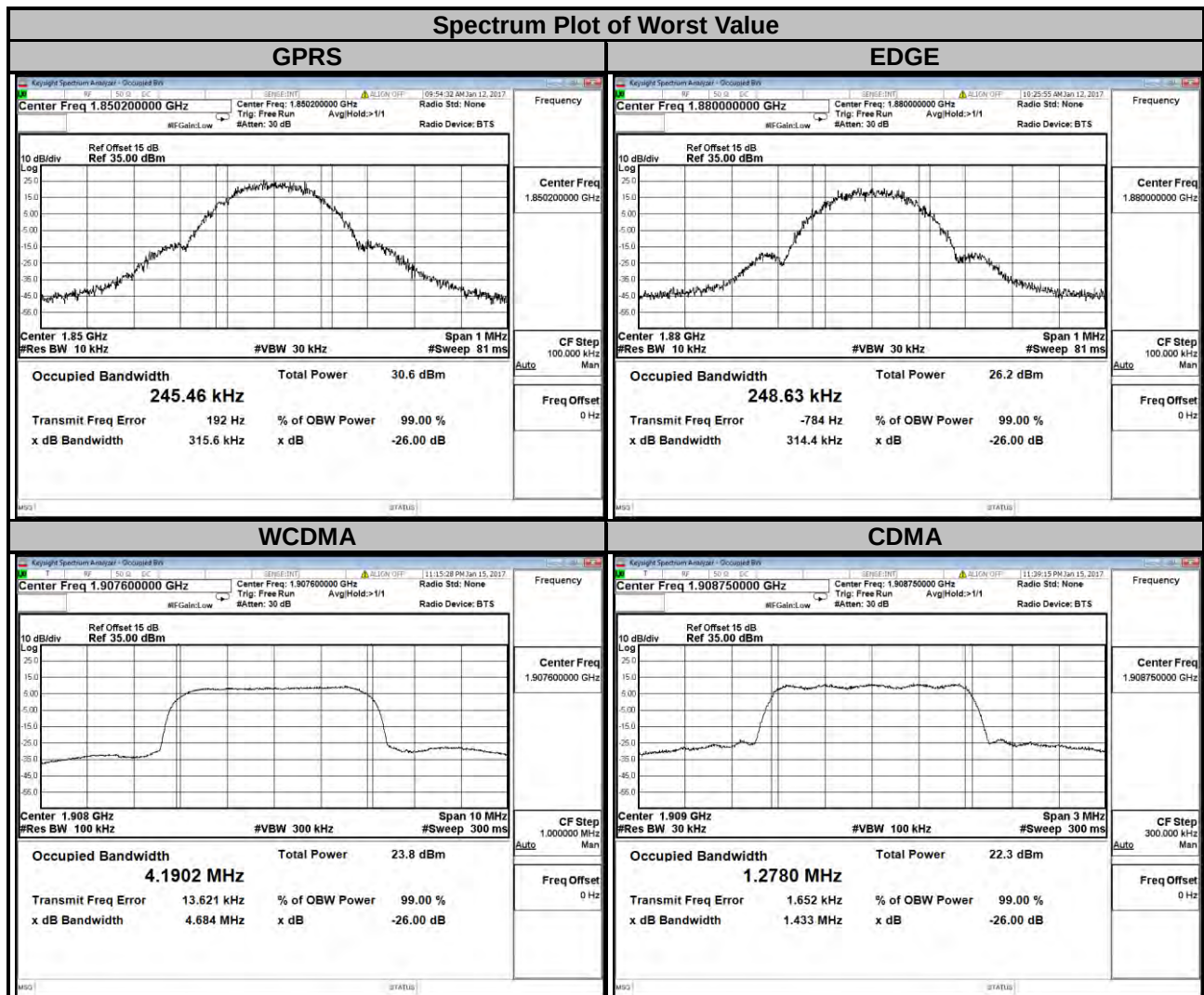
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

#### 4.3.2 Test Setup



#### 4.3.3 Test Result

| Channel | Frequency (MHz) | 99 % Occupied Bandwidth (kHz) |        | Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |
|---------|-----------------|-------------------------------|--------|---------|-----------------|-------------------------------|
|         |                 | GPRS                          | EDGE   |         |                 |                               |
| 512     | 1850.2          | 245.46                        | 244.77 | 9262    | 1852.4          | 4.1760                        |
| 661     | 1880.0          | 244.07                        | 248.63 | 9400    | 1880.0          | 4.1861                        |
| 810     | 1909.8          | 244.66                        | 243.30 | 9538    | 1907.6          | 4.1902                        |
| Channel | Frequency (MHz) | 99 % Occupied Bandwidth (kHz) |        |         |                 |                               |
|         |                 | CDMA                          |        |         |                 |                               |
| 25      | 1851.25         | 1.2743                        |        |         |                 |                               |
| 600     | 1880.00         | 1.2771                        |        |         |                 |                               |
| 1175    | 1908.75         | 1.2780                        |        |         |                 |                               |



## LTE Band 2

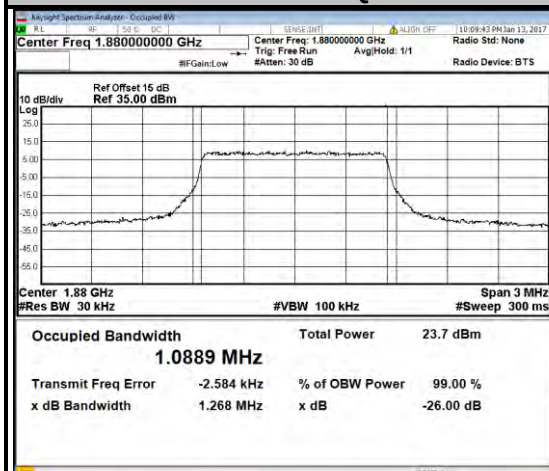
### Channel Bandwidth: 1.4 MHz

### Channel Bandwidth: 3 MHz

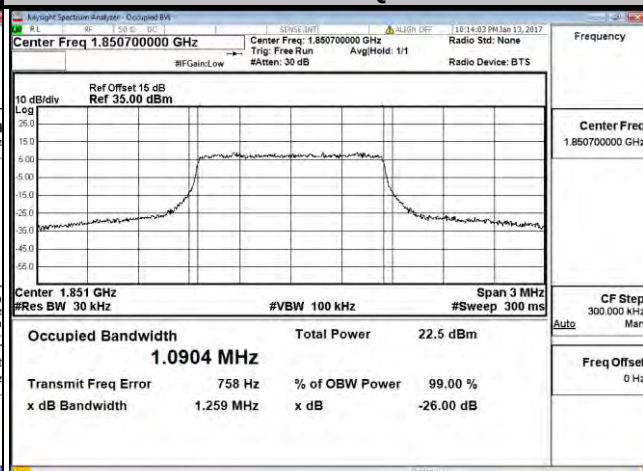
| Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        | Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        |
|---------|-----------------|-------------------------------|--------|---------|-----------------|-------------------------------|--------|
|         |                 | QPSK                          | 16QAM  |         |                 | QPSK                          | 16QAM  |
| 18607   | 1850.7          | 1.0888                        | 1.0904 | 18615   | 1851.5          | 2.6999                        | 2.6970 |
| 18900   | 1880.0          | 1.0889                        | 1.0855 | 18900   | 1880.0          | 2.7006                        | 2.6951 |
| 19193   | 1909.3          | 1.0872                        | 1.0904 | 19185   | 1908.5          | 2.7010                        | 2.6968 |

## Spectrum Plot of Worst Value

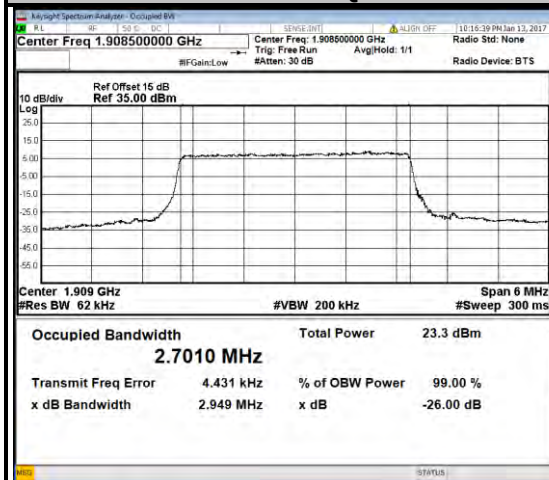
### 1.4 MHz / QPSK



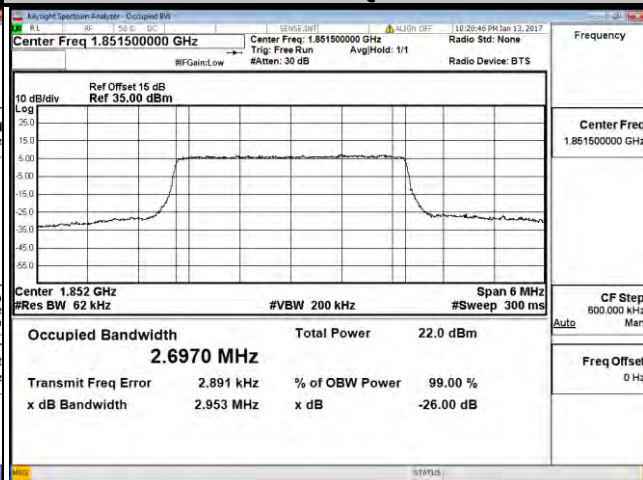
### 1.4 MHz / 16QAM



### 3 MHz / QPSK



### 3 MHz / 16QAM



## LTE Band 2

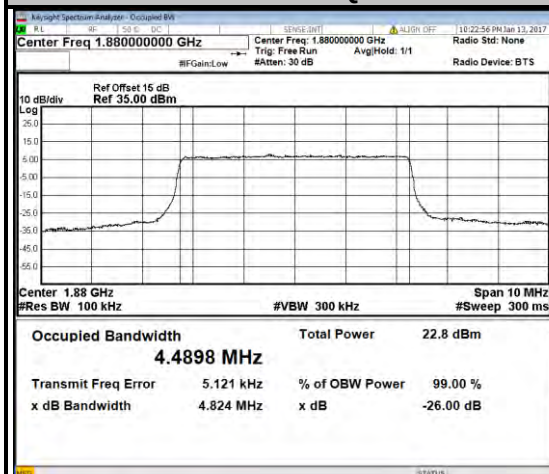
### Channel Bandwidth: 5 MHz

### Channel Bandwidth: 10 MHz

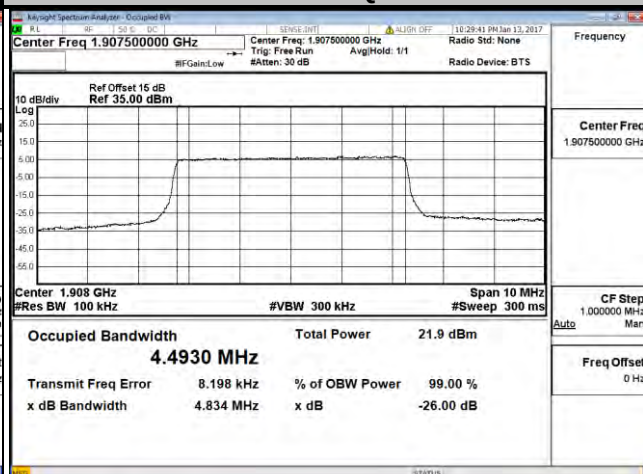
| Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        | Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        |
|---------|-----------------|-------------------------------|--------|---------|-----------------|-------------------------------|--------|
|         |                 | QPSK                          | 16QAM  |         |                 | QPSK                          | 16QAM  |
| 18625   | 1852.5          | 4.4872                        | 4.4885 | 18650   | 1855.0          | 8.9549                        | 8.9586 |
| 18900   | 1880.0          | 4.4898                        | 4.4896 | 18900   | 1880.0          | 8.9839                        | 8.9938 |
| 19175   | 1907.5          | 4.4888                        | 4.4930 | 19150   | 1905.0          | 8.9992                        | 9.0072 |

## Spectrum Plot of Worst Value

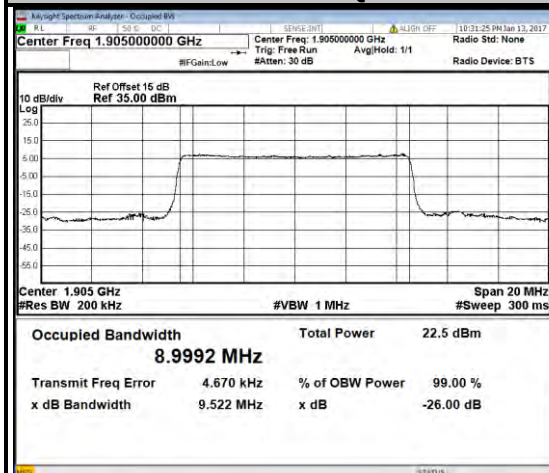
### 5 MHz / QPSK



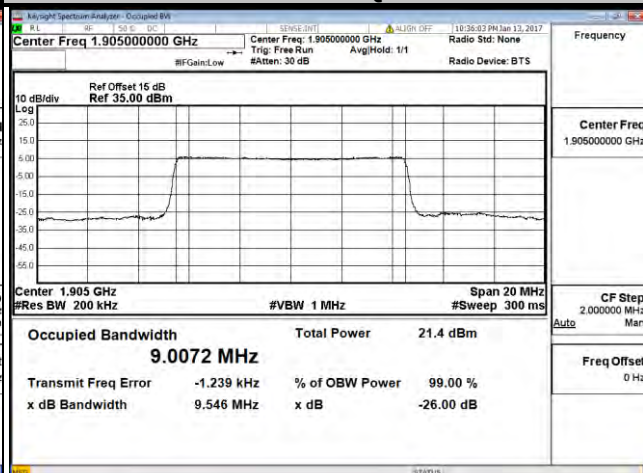
### 5 MHz / 16QAM



### 10 MHz / QPSK



### 10 MHz / 16QAM



## LTE Band 2

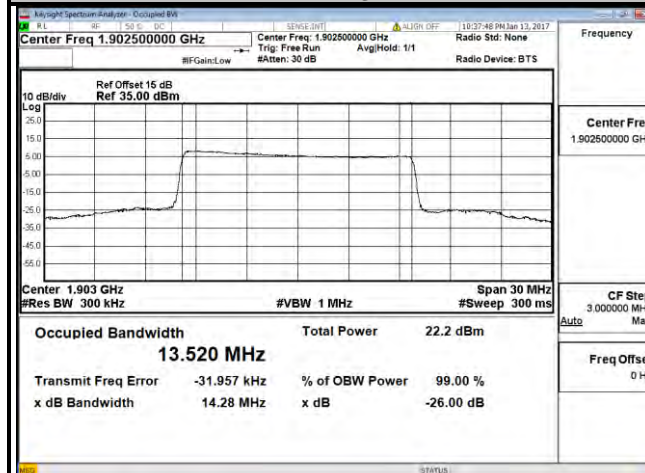
### Channel Bandwidth: 15 MHz

### Channel Bandwidth: 20 MHz

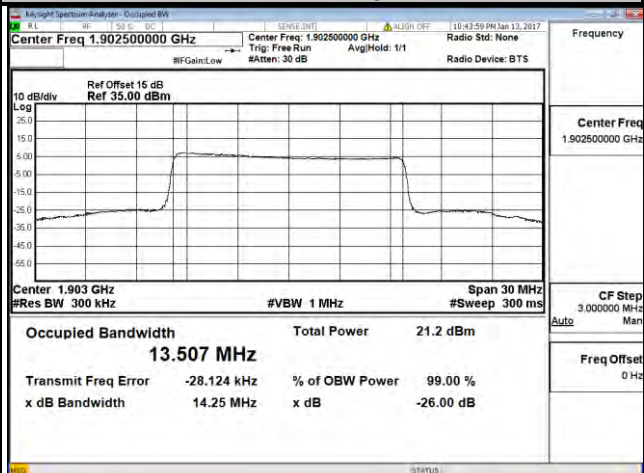
| Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |         | Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |         |
|---------|-----------------|-------------------------------|---------|---------|-----------------|-------------------------------|---------|
|         |                 | QPSK                          | 16QAM   |         |                 | QPSK                          | 16QAM   |
| 18675   | 1857.5          | 13.3780                       | 13.3760 | 18700   | 1860.0          | 17.7840                       | 17.8150 |
| 18900   | 1880.0          | 13.4900                       | 13.4870 | 18900   | 1880.0          | 18.0160                       | 18.0460 |
| 19125   | 1902.5          | 13.5200                       | 13.5070 | 19100   | 1900.0          | 17.9370                       | 17.9650 |

## Spectrum Plot of Worst Value

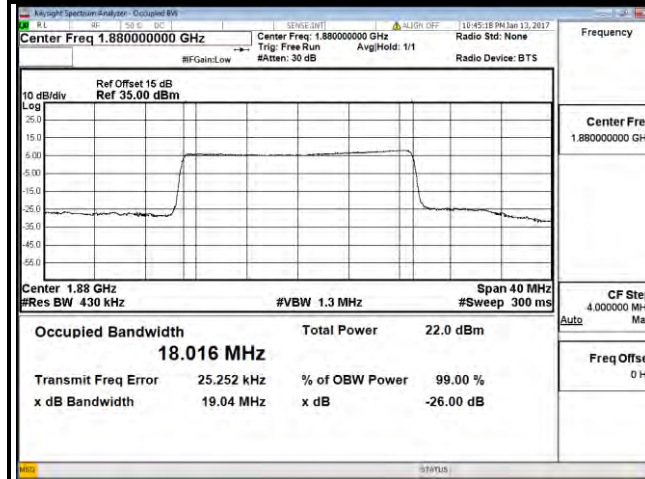
### 15 MHz / QPSK



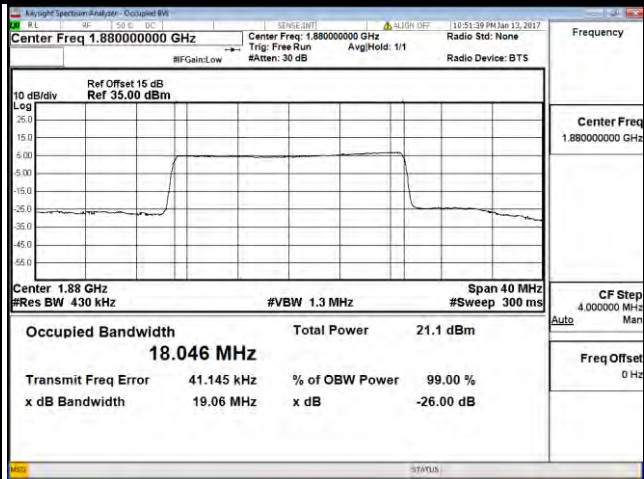
### 15 MHz / 16QAM



### 20 MHz / QPSK



### 20 MHz / 16QAM



## LTE Band 25

### Channel Bandwidth: 1.4 MHz

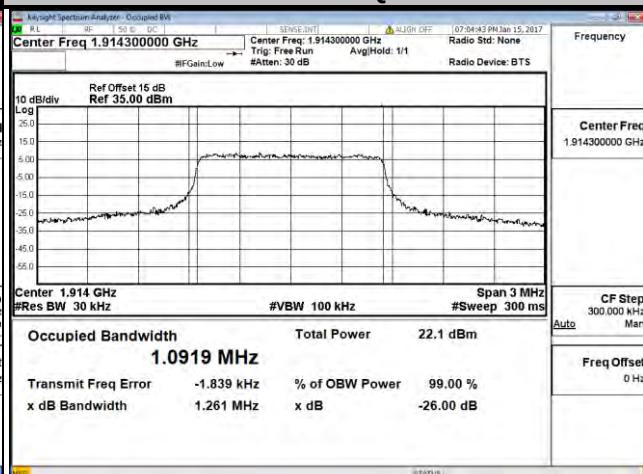
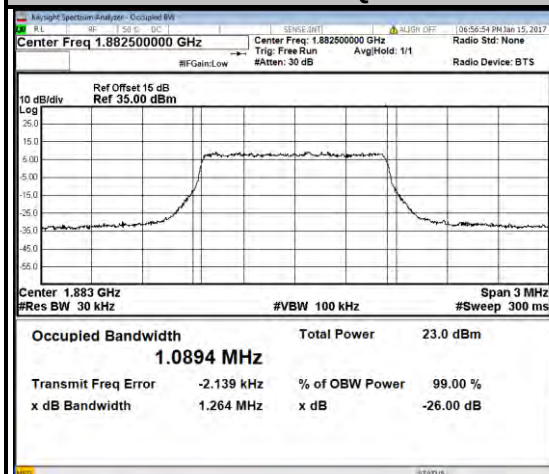
### Channel Bandwidth: 3 MHz

| Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        | Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        |
|---------|-----------------|-------------------------------|--------|---------|-----------------|-------------------------------|--------|
|         |                 | QPSK                          | 16QAM  |         |                 | QPSK                          | 16QAM  |
| 26047   | 1850.7          | 1.0892                        | 1.0909 | 26055   | 1851.5          | 2.6990                        | 2.6960 |
| 26365   | 1882.5          | 1.0894                        | 1.0890 | 26365   | 1882.5          | 2.6996                        | 2.6963 |
| 26683   | 1914.3          | 1.0884                        | 1.0919 | 26675   | 1913.5          | 2.6987                        | 2.6935 |

## Spectrum Plot of Worst Value

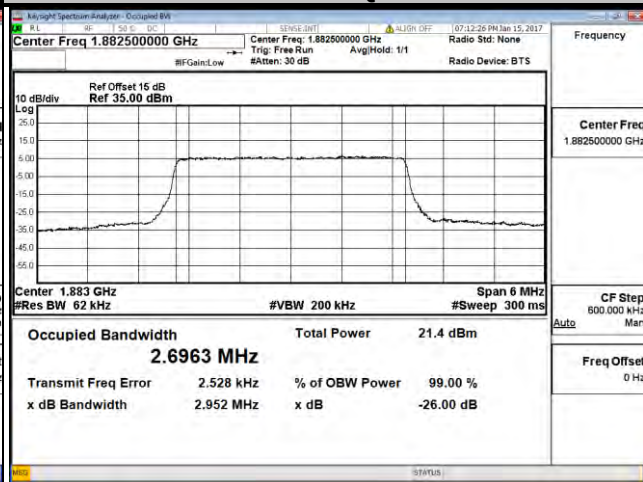
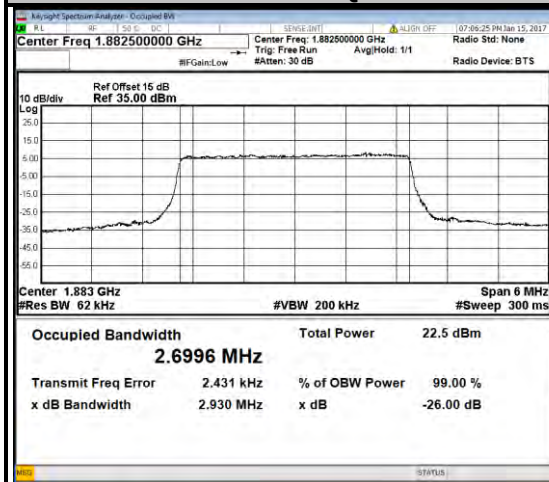
### 1.4 MHz / QPSK

### 1.4 MHz / 16QAM



### 3 MHz / QPSK

### 3 MHz / 16QAM



## LTE Band 25

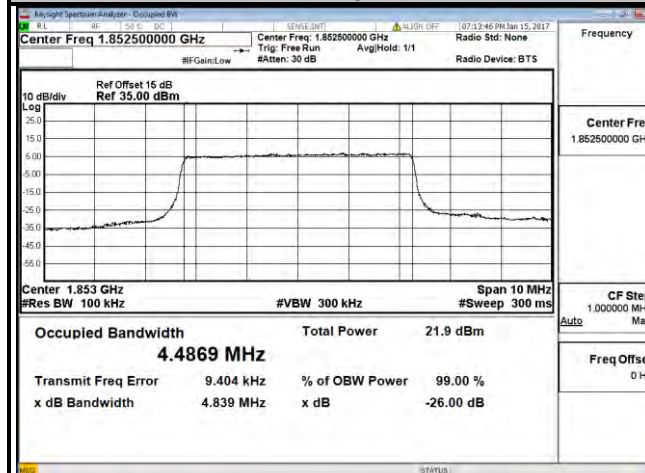
### Channel Bandwidth: 5 MHz

### Channel Bandwidth: 10 MHz

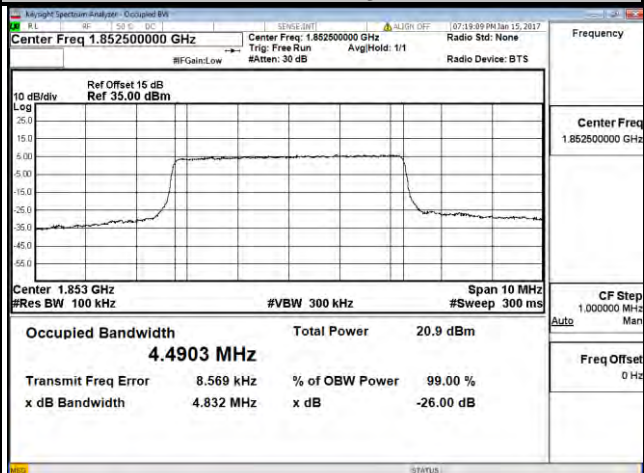
| Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        | Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |        |
|---------|-----------------|-------------------------------|--------|---------|-----------------|-------------------------------|--------|
|         |                 | QPSK                          | 16QAM  |         |                 | QPSK                          | 16QAM  |
| 26065   | 1852.5          | 4.4869                        | 4.4903 | 26090   | 1855.0          | 8.9494                        | 8.9569 |
| 26365   | 1882.5          | 4.4837                        | 4.4859 | 26365   | 1882.5          | 8.9765                        | 8.9786 |
| 26665   | 1912.5          | 4.4705                        | 4.4748 | 26640   | 1910.0          | 8.9347                        | 8.9431 |

## Spectrum Plot of Worst Value

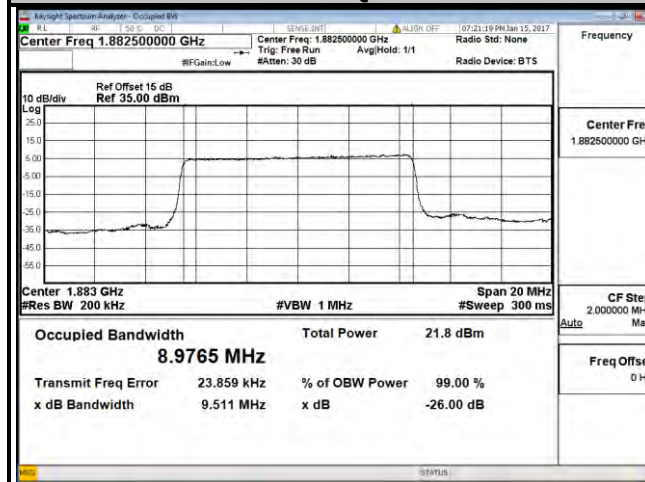
### 5 MHz / QPSK



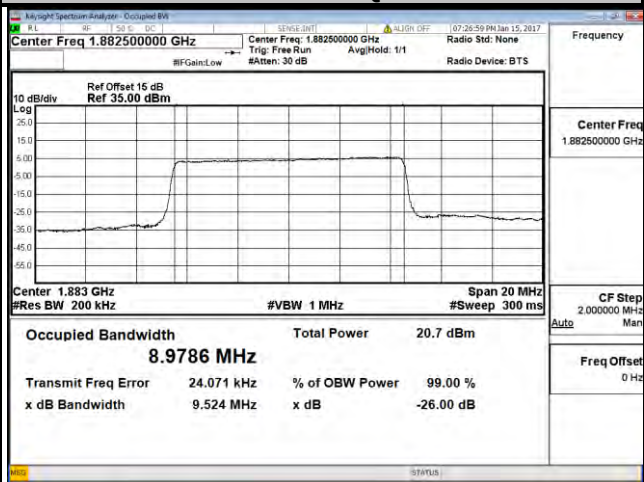
### 5 MHz / 16QAM



### 10 MHz / QPSK



### 10 MHz / 16QAM



## LTE BAND 25

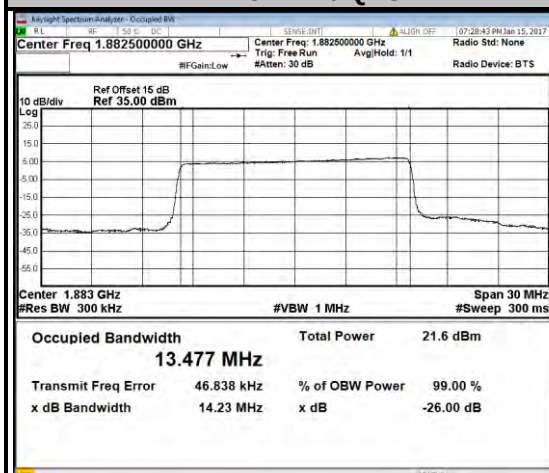
### Channel Bandwidth: 15 MHz

### Channel Bandwidth: 20 MHz

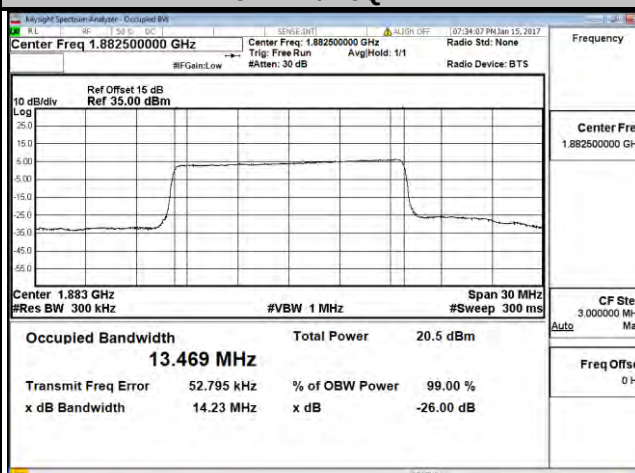
| Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |         | Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |         |
|---------|-----------------|-------------------------------|---------|---------|-----------------|-------------------------------|---------|
|         |                 | QPSK                          | 16QAM   |         |                 | QPSK                          | 16QAM   |
| 26115   | 1857.5          | 13.3830                       | 13.3710 | 26140   | 1860.0          | 17.7800                       | 17.8030 |
| 26365   | 1882.5          | 13.4770                       | 13.4690 | 26365   | 1882.5          | 17.9730                       | 18.0000 |
| 26615   | 1907.5          | 13.4700                       | 13.4630 | 26590   | 1905.0          | 18.0460                       | 18.0670 |

## Spectrum Plot of Worst Value

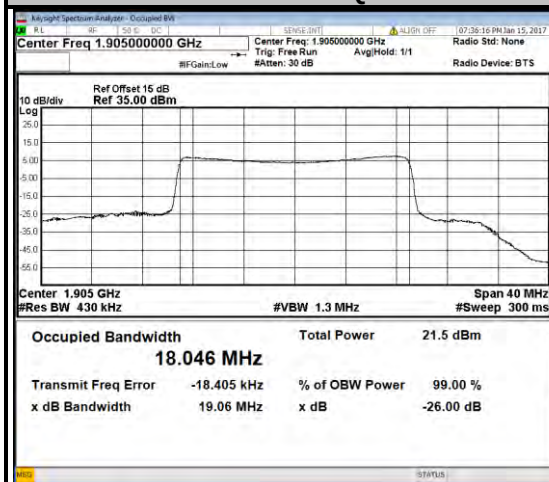
### 15 MHz / QPSK



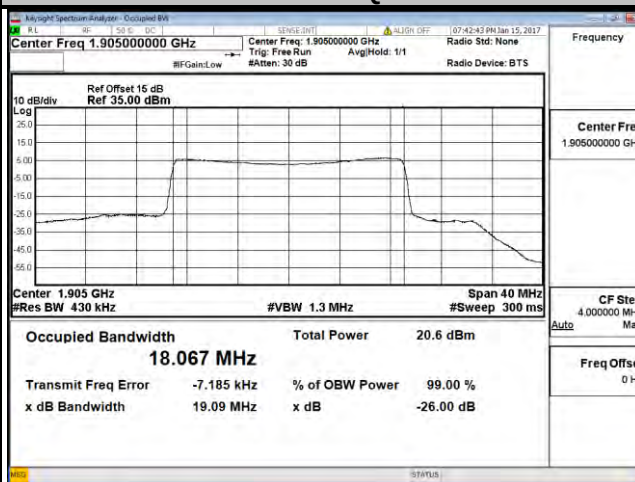
### 15 MHz / 16QAM



### 20 MHz / QPSK



### 20 MHz / 16QAM

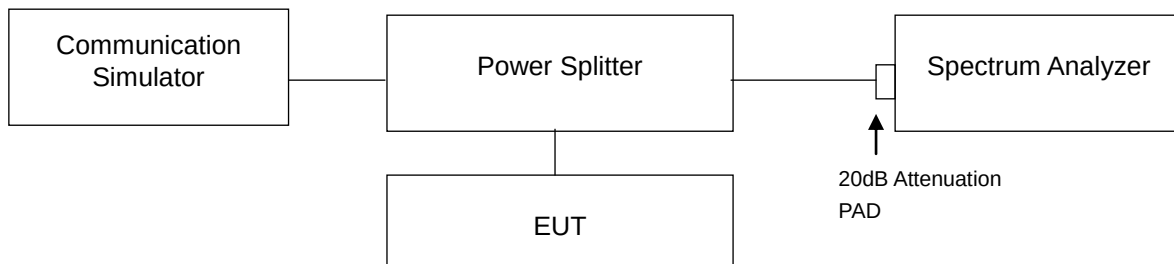


## 4.4 Band Edge Measurement

### 4.4.1 Limits of Band Edge Measurement

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

### 4.4.2 Test Setup



### 4.4.3 Test Procedures

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 10 kHz and VB of the spectrum is 30 kHz (GPRS/EDGE).
- The center frequency of spectrum is the band edge frequency and span is 5 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (WCDMA).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 13 kHz and VB of the spectrum is 51 kHz (CDMA / LTE Bandwidth 1.4 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 30 kHz and VB of the spectrum is 100 kHz (LTE Bandwidth 3 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (LTE Bandwidth 5 MHz/10 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 150 kHz and VB of the spectrum is 470 kHz (LTE Bandwidth 15 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 180 kHz and VB of the spectrum is 560 kHz (LTE Bandwidth 20 MHz).
- Record the max trace plot into the test report.

#### 4.4.4 Test Results

