



# LTE TEST REPORT

No.24T04Z200327-007

for

**Samsung Electronics Co., Ltd.**

**Multi-band GSM/WCDMA/LTE Tablet with Bluetooth,WLAN**

**Model Name: SM-X117U**

**FCC ID: ZCASM117U**

with

**Hardware Version: REV1.0**

**Software Version: X117U.001**

**Issued Date: 2025-02-18**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

**Test Laboratory:**

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## **REPORT HISTORY**

| Report Number    | Revision | Description             | Issue Date |
|------------------|----------|-------------------------|------------|
| 24T04Z200327-007 | Rev.0    | 1 <sup>st</sup> edition | 2025-02-18 |

Note: the latest revision of the test report supersedes all previous version.

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## 1. Test Laboratory

### 1.1. Introduction & Accreditation

**Telecommunication Technology Labs, CAICT** is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

### 1.2. Testing Location

Location 1: CTTL (huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,  
P. R. China 100191

Location 2: CTTL (BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology  
Development Area, Beijing, P. R. China 100176

### 1.3. Testing Environment

Normal Temperature: 15-35℃

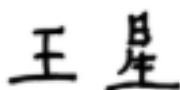
Relative Humidity: 20-75%

### 1.4. Project Data

Testing Start Date: 2024-12-09

Testing End Date: 2025-02-18

### 1.5. Signature



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Wang Xing

(Prepared this test report)



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Zhou Yu

(Reviewed this test report)



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Zhao Hui Lin

(Approved this test report)

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: Samsung Electronics Co., Ltd.  
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### **2.2. Manufacturer Information**

Company Name: Samsung Electronics Co., Ltd.  
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Contact: Kobe Cho  
Email: ggobi.cho@samsung.com  
Telephone: +82-10-2722-4159

### **3. Equipment Under Test (EUT) and Ancillary Equipment (AE)**

#### **3.1. About EUT**

|                     |                                                     |
|---------------------|-----------------------------------------------------|
| Description         | Multi-band GSM/WCDMA/LTE Tablet with Bluetooth,WLAN |
| Model Name          | SM-X117U                                            |
| FCC ID              | ZCASMX117U                                          |
| Antenna             | Embedded                                            |
| Output power        | 24.85dBm maximum EIRP measured for LTE Band 7       |
| Extreme Voltage     | 3.45VDC to 4.4VDC (nominal: 3.82VDC)                |
| Extreme Temperature | -10°C to +55°C                                      |

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL.

#### **3.2. Internal Identification of EUT used during the test**

| EUT ID* | SN              | HW Version | SW Version | Date of receipt |
|---------|-----------------|------------|------------|-----------------|
| UT07a   | 2404200327UT07a | REV1.0     | X117U.001  | 2024-12-02      |
| UT04a   | 2404200327UT04a | REV1.0     | X117U.001  | 2024-12-04      |
| UT05a   | 2404200327UT05a | REV1.0     | X117U.001  | 2024-12-04      |
| UT29a   | 2404200327UT29a | REV1.0     | X117U.001  | 2025-01-16      |

UT04a, UT05a and UT29a were used for emission limit test and UT07a was used for other testing cases.

\*EUT ID: is used to identify the test sample in the lab internally.

#### **3.3. Internal Identification of AE used during the test**

| AE ID* | Description |
|--------|-------------|
| AE1    | Battery     |

|              |                                     |
|--------------|-------------------------------------|
| Model        | CSL2799B7-3                         |
| Manufacturer | SCUD (FUJIAN) Electronics Co., Ltd. |
| Capacitance  | 5000mAh                             |

\*AE ID: is used to identify the test sample in the lab internally.

## **4. Reference Documents**

### **4.1. Documents supplied by applicant**

EUT parameters are supplied by the customer, which are the bases of testing. CAICT is not responsible for the accuracy of customer supplied technical information that may affect the test results (for example, antenna gain and loss of customer supplied cable).

### **4.2. Reference Documents for testing**

The following documents listed in this section are referred for testing.

| <b>Reference</b> | <b>Title</b>                                                                                      | <b>Version</b>     |
|------------------|---------------------------------------------------------------------------------------------------|--------------------|
| FCC Part 24      | PERSONAL COMMUNICATIONS SERVICES                                                                  | 10-1-23<br>Edition |
| FCC Part 22      | PUBLIC MOBILE SERVICES                                                                            | 10-1-23<br>Edition |
| FCC Part 27      | MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES                                                    | 10-1-23<br>Edition |
| ANSI/TIA-603-E   | Land Mobile FM or PM Communications Equipment Measurement and Performance Standards               | 2016               |
| ANSI C63.26      | American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services | 2015               |
| KDB 971168 D01   | MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS                           | v03r01             |

## 5. Summary of Test Result

### LTE Band 2

| Items | Test Name                   | Clause in FCC rules | Verdict |
|-------|-----------------------------|---------------------|---------|
| 1     | Output Power                | 24.232              | P       |
| 2     | Emission Limit              | 2.1051/24.238       | P       |
| 3     | Frequency Stability         | 2.1055              | P       |
| 4     | Occupied Bandwidth          | 2.1049              | P       |
| 5     | Emission Bandwidth          | 24.238              | P       |
| 6     | Band Edge Compliance        | 24.238              | P       |
| 7     | Conducted Spurious Emission | 24.238              | P       |
| 8     | Peak-to-Average Power Ratio | 24.232              | P       |

### LTE Band 4

| Items | Test Name                   | Clause in FCC rules | Verdict |
|-------|-----------------------------|---------------------|---------|
| 1     | Output Power                | 27.50               | P       |
| 2     | Emission Limit              | 2.1051/27.53        | P       |
| 3     | Frequency Stability         | 2.1055              | P       |
| 4     | Occupied Bandwidth          | 2.1049              | P       |
| 5     | Emission Bandwidth          | 27.53               | P       |
| 6     | Band Edge Compliance        | 27.53               | P       |
| 7     | Conducted Spurious Emission | 27.53               | P       |
| 8     | Peak-to-Average Power Ratio | 27.50               | P       |

### LTE Band 5

| Items | Test Name                   | Clause in FCC rules | Verdict |
|-------|-----------------------------|---------------------|---------|
| 1     | Output Power                | 22.913              | P       |
| 2     | Emission Limit              | 2.1051/22.917       | P       |
| 3     | Frequency Stability         | 2.1055              | P       |
| 4     | Occupied Bandwidth          | 2.1049              | P       |
| 5     | Emission Bandwidth          | 22.917              | P       |
| 6     | Band Edge Compliance        | 22.917              | P       |
| 7     | Conducted Spurious Emission | 22.917              | P       |

### LTE Band 7

| Items | Test Name                   | Clause in FCC rules | Verdict |
|-------|-----------------------------|---------------------|---------|
| 1     | Output Power                | 27.50               | P       |
| 2     | Emission Limit              | 2.1051/27.53        | P       |
| 3     | Frequency Stability         | 2.1055              | P       |
| 4     | Occupied Bandwidth          | 2.1049              | P       |
| 5     | Emission Bandwidth          | 27.53               | P       |
| 6     | Band Edge Compliance        | 27.53               | P       |
| 7     | Conducted Spurious Emission | 27.53               | P       |
| 8     | Peak-to-Average Power Ratio | 27.50               | P       |

### LTE Band 12

| Items | Test Name                   | Clause in FCC rules | Verdict |
|-------|-----------------------------|---------------------|---------|
| 1     | Output Power                | 27.50               | P       |
| 2     | Emission Limit              | 2.1051/27.53        | P       |
| 3     | Frequency Stability         | 2.1055              | P       |
| 4     | Occupied Bandwidth          | 2.1049              | P       |
| 5     | Emission Bandwidth          | 27.53               | P       |
| 6     | Band Edge Compliance        | 27.53               | P       |
| 7     | Conducted Spurious Emission | 27.53               | P       |
| 8     | Peak-to-Average Power Ratio | 27.50               | P       |

### LTE Band 13

| Items | Test Name                   | Clause in FCC rules | Verdict |
|-------|-----------------------------|---------------------|---------|
| 1     | Output Power                | 27.50               | P       |
| 2     | Emission Limit              | 2.1051/27.53        | P       |
| 3     | Frequency Stability         | 2.1055              | P       |
| 4     | Occupied Bandwidth          | 2.1049              | P       |
| 5     | Emission Bandwidth          | 27.53               | P       |
| 6     | Band Edge Compliance        | 27.53               | P       |
| 7     | Conducted Spurious Emission | 27.53               | P       |
| 8     | Peak-to-Average Power Ratio | 27.50               | P       |

### LTE Band 66

| Items | Test Name                   | Clause in FCC rules | Verdict |
|-------|-----------------------------|---------------------|---------|
| 1     | Output Power                | 27.50               | P       |
| 2     | Emission Limit              | 2.1051/27.53        | P       |
| 3     | Frequency Stability         | 2.1055              | P       |
| 4     | Occupied Bandwidth          | 2.1049              | P       |
| 5     | Emission Bandwidth          | 27.53               | P       |
| 6     | Band Edge Compliance        | 27.53               | P       |
| 7     | Conducted Spurious Emission | 27.53               | P       |
| 8     | Peak-to-Average Power Ratio | 27.50               | P       |

### Terms used in Verdict column

|    |                                                                                |
|----|--------------------------------------------------------------------------------|
| P  | Pass. The EUT complies with the essential requirements in the standard.        |
| NP | Not Performed. The test was not performed by CTTL.                             |
| NA | Not Applicable. The test was not applicable.                                   |
| BR | Re-use test data from basic model report.                                      |
| F  | Fail. The EUT does not comply with the essential requirements in the standard. |

All the test results are based on normal power.

Measurement uncertainty is not taken into account when stating conformity with a specified requirement.

### Explanation of worst-case configuration

The worst-case scenario for all measurements is based on the conducted output power measurement investigation results. Output power was measured on QPSK, 16QAM and 64QAM modulations. It was found that QPSK was the worst case. All testing was performed using QPSK modulations to represent the worst case unless otherwise stated. The test results shown in the following sections represent the worst case emission.

## 6. Test Equipment Utilized

| Description                          | Type              | Series Number  | Manufacture  | Cal Due Date | Calibration Interval |
|--------------------------------------|-------------------|----------------|--------------|--------------|----------------------|
| Wideband Radio Communication Tester  | CMW500            | 159082         | R&S          | 2025-12-03   | 1 year               |
| Spectrum Analyzer                    | FSV               | 101576         | R&S          | 2025-05-08   | 1 year               |
| Climate chamber                      | SH-241            | 92004642       | ESPEC        | 2025-10-29   | 1 year               |
| Test Receiver                        | FSV30             | 101525         | R&S          | 2025-01-18   | 1 year               |
| Test Receiver                        | FSV40             | 101047         | R&S          | 2025-07-28   | 1 year               |
| Antenna                              | VULB9163          | 9163-482       | Schwarzbeck  | 2025-05-19   | 1 year               |
| Antenna                              | LB-7180-NF        | J2030013000005 | A-INFO       | 2025-05-16   | 1 year               |
| Antenna                              | LB-180400-25-C-KF | 2110084000006  | A-INFO       | 2025-05-15   | 1 year               |
| Antenna                              | 9117              | 167            | Schwarzbeck  | 2025-10-15   | 2 years              |
| Antenna                              | 3115              | 00146404       | ETS-Lindgren | 2025-05-16   | 1 year               |
| Antenna                              | 3116              | 2663           | ETS-Lindgren | 2025-02-21   | 1 year               |
| Signal Generator                     | SMF100A           | 101295         | R&S          | 2025-02-04   | 1 year               |
| Power Amplifier                      | 5S1G4             | 0341863        | AR           | /            | /                    |
| Universal Radio Communication Tester | CMW500            | 143008         | R&S          | 2025-01-31   | 1 year               |

Note: Only the latest Cal Due Dates of equipment are listed above and all equipment is in valid calibration period when used.

## 7. Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.26. All measurement uncertainty values are shown with a coverage factor of  $k = 2$  to indicate a 95% level of confidence. Measurement uncertainty is not taken into account when stating conformity with a specified requirement.

| Test item                       |                 | Measurement uncertainty |
|---------------------------------|-----------------|-------------------------|
| Output Power(dB)                | Conducted       | 1.90                    |
|                                 | Radiated        | 3.10                    |
| Emission Limit(dB)              |                 | 3.67                    |
| Frequency Stability             | FE(ppm)         | 1.16                    |
|                                 | $F_L F_H$ (kHz) | 173.51                  |
| Occupied Bandwidth(%)           |                 | 0.72                    |
| Emission Bandwidth(%)           |                 | 0.75                    |
| Band Edge Compliance(dB)        |                 | 1.94                    |
| Conducted Spurious Emission(dB) |                 | 4.77(0-20GHz)           |
|                                 |                 | 6.27(20-30GHz)          |
| Peak-to-Average Power Ratio(dB) |                 | 2.10                    |

## **Annex A: Measurement Results**

### **A.1 Output Power**

#### **A.1.1 Summary**

During the process of testing, the EUT was controlled via communication tester to ensure max power transmission and proper modulation.

In all cases, output power is within the specified limits.

#### **A.1.2 Conducted**

##### **A.1.2.1 Method of Measurements**

The EUT was set up for the max output power with pseudo random data modulation.

These measurements were done at 3 frequencies (bottom, middle and top of operational frequency range) for each bandwidth.

The results below include a correction factor for cable loss that is provided by the customer.

##### **A.1.2.2 Measurement Result**

###### **LTE band 2**

| Bandwidth | RB size/offset | Frequency (MHz) | Power (dBm) |       |       |
|-----------|----------------|-----------------|-------------|-------|-------|
|           |                |                 | QPSK        | 16QAM | 64QAM |
| 1.4MHz    | 1 RB high      | 1909.3          | 23.45       | 22.34 | 21.77 |
|           |                | 1880.0          | 23.44       | 22.34 | 21.80 |
|           |                | 1850.7          | 23.45       | 22.26 | 21.82 |
|           | 1 RB low       | 1909.3          | 23.48       | 22.22 | 21.79 |
|           |                | 1880.0          | 23.42       | 22.33 | 21.84 |
|           |                | 1850.7          | 23.46       | 22.32 | 21.78 |
|           | 50% RB mid     | 1909.3          | 23.60       | 22.18 | 21.83 |
|           |                | 1880.0          | 23.58       | 22.17 | 21.86 |
|           |                | 1850.7          | 23.61       | 22.10 | 21.85 |
|           | 100% RB        | 1909.3          | 22.71       | 21.84 | 20.75 |
|           |                | 1880.0          | 22.66       | 21.83 | 20.77 |
|           |                | 1850.7          | 22.65       | 21.81 | 20.72 |
| 3MHz      | 1 RB high      | 1908.5          | 23.39       | 22.20 | 21.74 |
|           |                | 1880.0          | 23.38       | 22.12 | 21.66 |
|           |                | 1851.5          | 23.41       | 22.21 | 21.75 |
|           | 1 RB low       | 1908.5          | 23.35       | 22.20 | 21.70 |
|           |                | 1880.0          | 23.36       | 22.10 | 21.71 |
|           |                | 1851.5          | 23.31       | 22.12 | 21.72 |
|           | 50% RB mid     | 1908.5          | 22.66       | 21.74 | 20.74 |
|           |                | 1880.0          | 22.64       | 21.75 | 20.80 |
|           |                | 1851.5          | 22.68       | 21.73 | 20.74 |
|           | 100% RB        | 1908.5          | 22.63       | 21.68 | 20.69 |

|       |            |        |       |       |       |
|-------|------------|--------|-------|-------|-------|
|       |            | 1880.0 | 22.58 | 21.62 | 20.68 |
|       |            | 1851.5 | 22.59 | 21.59 | 20.61 |
| 5MHz  | 1 RB high  | 1907.5 | 23.65 | 22.54 | 21.86 |
|       |            | 1880.0 | 23.58 | 22.39 | 21.80 |
|       |            | 1852.5 | 23.65 | 22.58 | 21.89 |
|       | 1 RB low   | 1907.5 | 23.59 | 22.53 | 21.87 |
|       |            | 1880.0 | 23.60 | 22.49 | 21.89 |
|       |            | 1852.5 | 23.60 | 22.40 | 21.88 |
|       | 50% RB mid | 1907.5 | 22.77 | 21.80 | 20.83 |
|       |            | 1880.0 | 22.73 | 21.74 | 20.85 |
|       |            | 1852.5 | 22.76 | 21.79 | 20.84 |
|       | 100% RB    | 1907.5 | 22.71 | 21.76 | 20.77 |
|       |            | 1880.0 | 22.67 | 21.72 | 20.77 |
|       |            | 1852.5 | 22.71 | 21.75 | 20.78 |
| 10MHz | 1 RB high  | 1905.0 | 23.73 | 22.56 | 22.00 |
|       |            | 1880.0 | 23.68 | 22.44 | 21.88 |
|       |            | 1855.0 | 23.74 | 22.62 | 21.98 |
|       | 1 RB low   | 1905.0 | 23.69 | 22.54 | 21.88 |
|       |            | 1880.0 | 23.70 | 22.46 | 21.92 |
|       |            | 1855.0 | 23.71 | 22.56 | 21.97 |
|       | 50% RB mid | 1905.0 | 22.73 | 21.81 | 20.82 |
|       |            | 1880.0 | 22.73 | 21.79 | 20.85 |
|       |            | 1855.0 | 22.79 | 21.83 | 20.85 |
|       | 100% RB    | 1905.0 | 22.70 | 21.71 | 20.71 |
|       |            | 1880.0 | 22.69 | 21.70 | 20.76 |
|       |            | 1855.0 | 22.75 | 21.78 | 20.79 |
| 15MHz | 1 RB high  | 1902.5 | 23.66 | 22.51 | 21.93 |
|       |            | 1880.0 | 23.62 | 22.48 | 21.88 |
|       |            | 1857.5 | 23.68 | 22.51 | 21.92 |
|       | 1 RB low   | 1902.5 | 23.59 | 22.49 | 21.82 |
|       |            | 1880.0 | 23.72 | 22.56 | 21.96 |
|       |            | 1857.5 | 23.67 | 22.51 | 21.86 |
|       | 50% RB mid | 1902.5 | 22.73 | 21.77 | 20.83 |
|       |            | 1880.0 | 22.73 | 21.75 | 20.85 |
|       |            | 1857.5 | 22.78 | 21.79 | 20.86 |
|       | 100% RB    | 1902.5 | 22.67 | 21.67 | 20.69 |
|       |            | 1880.0 | 22.68 | 21.70 | 20.77 |
|       |            | 1857.5 | 22.74 | 21.76 | 20.80 |
| 20MHz | 1 RB high  | 1900.0 | 23.59 | 22.40 | 21.83 |
|       |            | 1880.0 | 23.56 | 22.32 | 21.90 |
|       |            | 1860.0 | 23.61 | 22.50 | 21.85 |
|       | 1 RB low   | 1900.0 | 23.51 | 22.47 | 21.79 |
|       |            | 1880.0 | 23.56 | 22.35 | 21.87 |

|  |            |        |       |       |       |
|--|------------|--------|-------|-------|-------|
|  |            | 1860.0 | 23.55 | 22.30 | 21.83 |
|  | 50% RB mid | 1900.0 | 22.76 | 21.77 | 20.79 |
|  |            | 1880.0 | 22.87 | 21.79 | 20.84 |
|  |            | 1860.0 | 22.81 | 21.83 | 20.84 |
|  | 100% RB    | 1900.0 | 22.63 | 21.64 | 20.67 |
|  |            | 1880.0 | 22.68 | 21.69 | 20.75 |
|  |            | 1860.0 | 22.79 | 21.81 | 20.83 |

**LTE band 4**

| Bandwidth | RB size/offset | Frequency (MHz) | Power (dBm) |       |       |
|-----------|----------------|-----------------|-------------|-------|-------|
|           |                |                 | QPSK        | 16QAM | 64QAM |
| 1.4MHz    | 1 RB high      | 1754.3          | 23.91       | 22.82 | 22.28 |
|           |                | 1732.5          | 23.95       | 22.76 | 22.18 |
|           |                | 1710.7          | 24.00       | 22.83 | 22.41 |
|           | 1 RB low       | 1754.3          | 23.97       | 22.72 | 22.27 |
|           |                | 1732.5          | 23.96       | 22.79 | 22.29 |
|           |                | 1710.7          | 24.06       | 22.73 | 22.32 |
|           | 50% RB mid     | 1754.3          | 24.09       | 22.63 | 22.27 |
|           |                | 1732.5          | 24.12       | 22.55 | 22.26 |
|           |                | 1710.7          | 24.20       | 22.73 | 22.44 |
|           | 100% RB        | 1754.3          | 23.16       | 22.27 | 21.18 |
|           |                | 1732.5          | 23.17       | 22.27 | 21.17 |
|           |                | 1710.7          | 23.26       | 22.34 | 21.25 |
| 3MHz      | 1 RB high      | 1753.5          | 23.77       | 22.67 | 22.11 |
|           |                | 1732.5          | 23.84       | 22.65 | 22.15 |
|           |                | 1711.5          | 23.85       | 22.57 | 22.15 |
|           | 1 RB low       | 1753.5          | 23.80       | 22.54 | 22.13 |
|           |                | 1732.5          | 23.82       | 22.62 | 22.18 |
|           |                | 1711.5          | 23.90       | 22.65 | 22.21 |
|           | 50% RB mid     | 1753.5          | 23.10       | 22.17 | 21.13 |
|           |                | 1732.5          | 23.11       | 22.18 | 21.13 |
|           |                | 1711.5          | 23.17       | 22.22 | 21.23 |
|           | 100% RB        | 1753.5          | 23.01       | 22.04 | 21.05 |
|           |                | 1732.5          | 23.05       | 22.04 | 21.05 |
|           |                | 1711.5          | 23.09       | 22.11 | 21.12 |
| 5MHz      | 1 RB high      | 1752.5          | 24.02       | 22.90 | 22.18 |
|           |                | 1732.5          | 24.04       | 22.87 | 22.21 |
|           |                | 1712.5          | 24.09       | 22.94 | 22.30 |
|           | 1 RB low       | 1752.5          | 24.07       | 22.80 | 22.22 |
|           |                | 1732.5          | 24.07       | 22.87 | 22.23 |
|           |                | 1712.5          | 24.16       | 22.95 | 22.40 |
|           | 50% RB mid     | 1752.5          | 23.17       | 22.21 | 21.22 |
|           |                | 1732.5          | 23.19       | 22.18 | 21.23 |
|           |                | 1712.5          | 23.23       | 22.22 | 21.29 |
|           | 100% RB        | 1752.5          | 23.17       | 22.15 | 21.18 |
|           |                | 1732.5          | 23.12       | 22.16 | 21.15 |
|           |                | 1712.5          | 23.19       | 22.21 | 21.21 |
| 10MHz     | 1 RB high      | 1750.0          | 24.12       | 22.93 | 22.25 |
|           |                | 1732.5          | 24.12       | 22.92 | 22.27 |
|           |                | 1715.0          | 24.20       | 22.94 | 22.39 |
|           | 1 RB low       | 1750.0          | 24.14       | 22.98 | 22.28 |

|       |            |        |       |       |       |
|-------|------------|--------|-------|-------|-------|
|       |            | 1732.5 | 24.11 | 22.90 | 22.29 |
|       |            | 1715.0 | 24.23 | 22.98 | 22.48 |
|       | 50% RB mid | 1750.0 | 23.19 | 22.22 | 21.21 |
|       |            | 1732.5 | 23.19 | 22.20 | 21.21 |
|       |            | 1715.0 | 23.22 | 22.22 | 21.23 |
|       | 100% RB    | 1750.0 | 23.15 | 22.15 | 21.14 |
|       |            | 1732.5 | 23.15 | 22.11 | 21.14 |
|       |            | 1715.0 | 23.22 | 22.18 | 21.20 |
| 15MHz | 1 RB high  | 1747.5 | 24.05 | 22.92 | 22.21 |
|       |            | 1732.5 | 24.12 | 22.93 | 22.24 |
|       |            | 1717.5 | 24.14 | 22.90 | 22.29 |
|       | 1 RB low   | 1747.5 | 24.11 | 22.93 | 22.36 |
|       |            | 1732.5 | 24.09 | 22.85 | 22.31 |
|       |            | 1717.5 | 24.17 | 22.99 | 22.30 |
|       | 50% RB mid | 1747.5 | 23.13 | 22.13 | 21.20 |
|       |            | 1732.5 | 23.14 | 22.15 | 21.17 |
|       |            | 1717.5 | 23.18 | 22.18 | 21.23 |
|       | 100% RB    | 1747.5 | 23.16 | 22.12 | 21.15 |
|       |            | 1732.5 | 23.13 | 22.11 | 21.12 |
|       |            | 1717.5 | 23.19 | 22.18 | 21.18 |
| 20MHz | 1 RB high  | 1745.0 | 24.00 | 22.84 | 22.17 |
|       |            | 1732.5 | 24.03 | 22.87 | 22.27 |
|       |            | 1720.0 | 24.03 | 22.75 | 22.20 |
|       | 1 RB low   | 1745.0 | 24.00 | 22.74 | 22.13 |
|       |            | 1732.5 | 24.03 | 22.81 | 22.19 |
|       |            | 1720.0 | 24.06 | 22.78 | 22.28 |
|       | 50% RB mid | 1745.0 | 23.21 | 22.21 | 21.19 |
|       |            | 1732.5 | 23.22 | 22.21 | 21.21 |
|       |            | 1720.0 | 23.27 | 22.27 | 21.27 |
|       | 100% RB    | 1745.0 | 23.17 | 22.13 | 21.14 |
|       |            | 1732.5 | 23.14 | 22.11 | 21.14 |
|       |            | 1720.0 | 23.23 | 22.18 | 21.24 |

**LTE band 5**

| Bandwidth | RB size/offset | Frequency (MHz) | Power (dBm) |       |       |
|-----------|----------------|-----------------|-------------|-------|-------|
|           |                |                 | QPSK        | 16QAM | 64QAM |
| 1.4MHz    | 1 RB high      | 848.3           | 24.27       | 23.44 | 22.60 |
|           |                | 836.5           | 24.24       | 23.52 | 22.46 |
|           |                | 824.7           | 24.25       | 23.54 | 22.46 |
|           | 1 RB low       | 848.3           | 24.21       | 23.40 | 22.52 |
|           |                | 836.5           | 24.25       | 23.48 | 22.52 |
|           |                | 824.7           | 24.26       | 23.57 | 22.54 |
|           | 50% RB mid     | 848.3           | 24.38       | 23.42 | 22.62 |
|           |                | 836.5           | 24.39       | 23.38 | 22.55 |
|           |                | 824.7           | 24.40       | 23.39 | 22.64 |
|           | 100% RB        | 848.3           | 23.47       | 22.61 | 21.53 |
|           |                | 836.5           | 23.47       | 22.58 | 21.49 |
|           |                | 824.7           | 23.48       | 22.53 | 21.49 |
| 3MHz      | 1 RB high      | 847.5           | 24.12       | 23.38 | 22.47 |
|           |                | 836.5           | 24.16       | 23.31 | 22.44 |
|           |                | 825.5           | 24.15       | 23.29 | 22.41 |
|           | 1 RB low       | 847.5           | 24.10       | 23.42 | 22.37 |
|           |                | 836.5           | 24.09       | 23.28 | 22.39 |
|           |                | 825.5           | 24.20       | 23.30 | 22.44 |
|           | 50% RB mid     | 847.5           | 23.44       | 22.50 | 21.56 |
|           |                | 836.5           | 23.40       | 22.42 | 21.50 |
|           |                | 825.5           | 23.43       | 22.45 | 21.51 |
|           | 100% RB        | 847.5           | 23.38       | 22.39 | 21.48 |
|           |                | 836.5           | 23.35       | 22.35 | 21.41 |
|           |                | 825.5           | 23.37       | 22.38 | 21.44 |
| 5MHz      | 1 RB high      | 846.5           | 24.35       | 23.61 | 22.51 |
|           |                | 836.5           | 24.32       | 23.63 | 22.61 |
|           |                | 826.5           | 24.37       | 23.65 | 22.48 |
|           | 1 RB low       | 846.5           | 24.37       | 23.64 | 22.55 |
|           |                | 836.5           | 24.34       | 23.61 | 22.54 |
|           |                | 826.5           | 24.40       | 23.64 | 22.67 |
|           | 50% RB mid     | 846.5           | 23.49       | 22.48 | 21.58 |
|           |                | 836.5           | 23.47       | 22.48 | 21.54 |
|           |                | 826.5           | 23.52       | 22.47 | 21.60 |
|           | 100% RB        | 846.5           | 23.47       | 22.50 | 21.53 |
|           |                | 836.5           | 23.46       | 22.45 | 21.54 |
|           |                | 826.5           | 23.49       | 22.46 | 21.55 |
| 10MHz     | 1 RB high      | 844.0           | 24.45       | 23.69 | 22.68 |
|           |                | 836.5           | 24.45       | 23.73 | 22.56 |
|           |                | 829.0           | 24.45       | 23.67 | 22.65 |
|           | 1 RB low       | 844.0           | 24.48       | 23.67 | 22.62 |

|  |            |       |       |       |       |
|--|------------|-------|-------|-------|-------|
|  |            | 836.5 | 24.47 | 23.74 | 22.57 |
|  |            | 829.0 | 24.52 | 23.82 | 22.70 |
|  | 50% RB mid | 844.0 | 23.52 | 22.51 | 21.59 |
|  |            | 836.5 | 23.50 | 22.48 | 21.55 |
|  |            | 829.0 | 23.53 | 22.52 | 21.59 |
|  | 100% RB    | 844.0 | 23.47 | 22.45 | 21.50 |
|  |            | 836.5 | 23.50 | 22.47 | 21.49 |
|  |            | 829.0 | 23.49 | 22.48 | 21.52 |

**LTE band 7**

| Bandwidth | RB size/offset | Frequency (MHz) | Power (dBm) |       |       |
|-----------|----------------|-----------------|-------------|-------|-------|
|           |                |                 | QPSK        | 16QAM | 64QAM |
| 5MHz      | 1 RB high      | 2567.5          | 23.62       | 22.80 | 21.85 |
|           |                | 2535.0          | 23.44       | 22.83 | 21.74 |
|           |                | 2502.5          | 23.27       | 22.50 | 21.49 |
|           | 1 RB low       | 2567.5          | 23.64       | 22.89 | 21.86 |
|           |                | 2535.0          | 23.44       | 22.82 | 21.66 |
|           |                | 2502.5          | 23.29       | 22.61 | 21.48 |
|           | 50% RB mid     | 2567.5          | 22.77       | 21.79 | 20.83 |
|           |                | 2535.0          | 22.56       | 21.63 | 20.70 |
|           |                | 2502.5          | 22.40       | 21.44 | 20.47 |
|           | 100% RB        | 2567.5          | 22.74       | 21.76 | 20.78 |
|           |                | 2535.0          | 22.55       | 21.60 | 20.62 |
|           |                | 2502.5          | 22.39       | 21.42 | 20.40 |
| 10MHz     | 1 RB high      | 2565.0          | 23.70       | 22.98 | 21.99 |
|           |                | 2535.0          | 23.60       | 22.90 | 21.79 |
|           |                | 2505.0          | 23.38       | 22.63 | 21.56 |
|           | 1 RB low       | 2565.0          | 23.73       | 22.98 | 21.92 |
|           |                | 2535.0          | 23.49       | 22.87 | 21.70 |
|           |                | 2505.0          | 23.38       | 22.59 | 21.62 |
|           | 50% RB mid     | 2565.0          | 22.77       | 21.80 | 20.79 |
|           |                | 2535.0          | 22.61       | 21.65 | 20.68 |
|           |                | 2505.0          | 22.42       | 21.46 | 20.47 |
|           | 100% RB        | 2565.0          | 22.77       | 21.78 | 20.81 |
|           |                | 2535.0          | 22.61       | 21.63 | 20.68 |
|           |                | 2505.0          | 22.41       | 21.40 | 20.44 |
| 15MHz     | 1 RB high      | 2562.5          | 23.65       | 22.91 | 21.87 |
|           |                | 2535.0          | 23.56       | 22.85 | 21.76 |
|           |                | 2507.5          | 23.35       | 22.60 | 21.45 |
|           | 1 RB low       | 2562.5          | 23.70       | 22.89 | 21.90 |
|           |                | 2535.0          | 23.47       | 22.77 | 21.66 |
|           |                | 2507.5          | 23.30       | 22.69 | 21.56 |
|           | 50% RB mid     | 2562.5          | 22.74       | 21.77 | 20.81 |
|           |                | 2535.0          | 22.57       | 21.63 | 20.69 |
|           |                | 2507.5          | 22.36       | 21.39 | 20.42 |
|           | 100% RB        | 2562.5          | 22.75       | 21.74 | 20.73 |
|           |                | 2535.0          | 22.56       | 21.60 | 20.61 |
|           |                | 2507.5          | 22.33       | 21.34 | 20.36 |
| 20MHz     | 1 RB high      | 2560.0          | 23.55       | 22.83 | 21.71 |
|           |                | 2535.0          | 23.51       | 22.88 | 21.78 |
|           |                | 2510.0          | 23.24       | 22.52 | 21.49 |
|           | 1 RB low       | 2560.0          | 23.57       | 22.82 | 21.75 |

|  |            |        |       |       |       |
|--|------------|--------|-------|-------|-------|
|  |            | 2535.0 | 23.30 | 22.66 | 21.56 |
|  |            | 2510.0 | 23.21 | 22.55 | 21.48 |
|  | 50% RB mid | 2560.0 | 22.79 | 21.79 | 20.80 |
|  |            | 2535.0 | 22.63 | 21.67 | 20.67 |
|  |            | 2510.0 | 22.42 | 21.44 | 20.43 |
|  | 100% RB    | 2560.0 | 22.66 | 21.66 | 20.69 |
|  |            | 2535.0 | 22.55 | 21.54 | 20.57 |
|  |            | 2510.0 | 22.29 | 21.27 | 20.30 |

**LTE band 12**

| Bandwidth | RB size/offset | Frequency (MHz) | Power (dBm) |       |       |
|-----------|----------------|-----------------|-------------|-------|-------|
|           |                |                 | QPSK        | 16QAM | 64QAM |
| 1.4MHz    | 1 RB high      | 715.3           | 23.88       | 23.12 | 22.13 |
|           |                | 707.5           | 23.78       | 23.08 | 22.12 |
|           |                | 699.7           | 23.80       | 23.20 | 22.14 |
|           | 1 RB low       | 715.3           | 23.86       | 23.19 | 22.10 |
|           |                | 707.5           | 23.80       | 23.03 | 22.10 |
|           |                | 699.7           | 23.83       | 23.12 | 22.15 |
|           | 50% RB mid     | 715.3           | 23.98       | 23.04 | 22.28 |
|           |                | 707.5           | 23.94       | 22.98 | 22.21 |
|           |                | 699.7           | 23.96       | 23.02 | 22.25 |
|           | 100% RB        | 715.3           | 23.14       | 22.24 | 21.16 |
|           |                | 707.5           | 23.04       | 22.14 | 21.02 |
|           |                | 699.7           | 23.09       | 22.20 | 21.08 |
| 3MHz      | 1 RB high      | 714.5           | 23.73       | 23.12 | 22.10 |
|           |                | 707.5           | 23.67       | 22.98 | 22.03 |
|           |                | 700.5           | 23.72       | 22.98 | 22.02 |
|           | 1 RB low       | 714.5           | 23.69       | 23.09 | 22.08 |
|           |                | 707.5           | 23.69       | 23.00 | 21.97 |
|           |                | 700.5           | 23.74       | 23.04 | 22.09 |
|           | 50% RB mid     | 714.5           | 23.07       | 22.15 | 21.14 |
|           |                | 707.5           | 23.00       | 22.05 | 21.05 |
|           |                | 700.5           | 23.05       | 22.09 | 21.12 |
|           | 100% RB        | 714.5           | 23.00       | 21.99 | 20.97 |
|           |                | 707.5           | 22.93       | 21.92 | 20.93 |
|           |                | 700.5           | 23.00       | 21.99 | 20.99 |
| 5MHz      | 1 RB high      | 713.5           | 23.94       | 23.31 | 22.19 |
|           |                | 707.5           | 23.91       | 23.20 | 22.16 |
|           |                | 701.5           | 23.92       | 23.12 | 22.17 |
|           | 1 RB low       | 713.5           | 23.91       | 23.18 | 22.16 |
|           |                | 707.5           | 23.94       | 23.28 | 22.20 |
|           |                | 701.5           | 23.99       | 23.26 | 22.26 |
|           | 50% RB mid     | 713.5           | 23.14       | 22.13 | 21.18 |
|           |                | 707.5           | 23.09       | 22.11 | 21.11 |
|           |                | 701.5           | 23.11       | 22.10 | 21.14 |
|           | 100% RB        | 713.5           | 23.08       | 22.06 | 21.12 |
|           |                | 707.5           | 23.05       | 22.06 | 21.06 |
|           |                | 701.5           | 23.09       | 22.10 | 21.09 |
| 10MHz     | 1 RB high      | 711.0           | 24.03       | 23.36 | 22.27 |
|           |                | 707.5           | 24.01       | 23.37 | 22.18 |
|           |                | 704.0           | 23.99       | 23.21 | 22.14 |
|           | 1 RB low       | 711.0           | 24.01       | 23.23 | 22.28 |

|  |            |       |       |       |       |
|--|------------|-------|-------|-------|-------|
|  |            | 707.5 | 24.02 | 23.37 | 22.16 |
|  |            | 704.0 | 24.06 | 23.46 | 22.29 |
|  | 50% RB mid | 711.0 | 23.12 | 22.13 | 21.15 |
|  |            | 707.5 | 23.09 | 22.12 | 21.12 |
|  |            | 704.0 | 23.09 | 22.09 | 21.11 |
|  | 100% RB    | 711.0 | 23.05 | 22.02 | 21.05 |
|  |            | 707.5 | 23.02 | 22.01 | 21.02 |
|  |            | 704.0 | 23.01 | 21.99 | 21.01 |

**LTE band 13**

| Bandwidth | RB size/offset | Frequency (MHz) | Power (dBm) |       |       |
|-----------|----------------|-----------------|-------------|-------|-------|
|           |                |                 | QPSK        | 16QAM | 64QAM |
| 5MHz      | 1 RB high      | 784.5           | 23.84       | 23.10 | 22.09 |
|           |                | 782.0           | 23.89       | 23.12 | 22.14 |
|           |                | 779.5           | 23.83       | 23.04 | 22.04 |
|           | 1 RB low       | 784.5           | 23.85       | 23.10 | 22.12 |
|           |                | 782.0           | 23.88       | 23.03 | 22.05 |
|           |                | 779.5           | 23.90       | 23.12 | 22.07 |
|           | 50% RB mid     | 784.5           | 22.99       | 22.02 | 21.10 |
|           |                | 782.0           | 23.01       | 22.07 | 21.10 |
|           |                | 779.5           | 23.01       | 22.03 | 21.08 |
|           | 100% RB        | 784.5           | 22.97       | 22.02 | 21.05 |
|           |                | 782.0           | 22.97       | 22.01 | 21.03 |
|           |                | 779.5           | 22.95       | 21.98 | 20.99 |
| 10MHz     | 1 RB high      | 782.0           | 23.94       | 23.12 | 22.19 |
|           | 1 RB low       | 782.0           | 24.01       | 23.20 | 22.13 |
|           | 50% RB mid     | 782.0           | 23.04       | 22.07 | 21.11 |
|           | 100% RB        | 782.0           | 22.98       | 21.97 | 20.97 |

**LTE band 66**

| Bandwidth | RB size/offset | Frequency (MHz) | Power (dBm) |       |       |
|-----------|----------------|-----------------|-------------|-------|-------|
|           |                |                 | QPSK        | 16QAM | 64QAM |
| 1.4MHz    | 1 RB high      | 1779.3          | 23.85       | 22.54 | 22.05 |
|           |                | 1745.0          | 23.88       | 22.58 | 22.13 |
|           |                | 1710.7          | 24.00       | 22.82 | 22.32 |
|           | 1 RB low       | 1779.3          | 23.80       | 22.54 | 22.15 |
|           |                | 1745.0          | 23.89       | 22.54 | 22.17 |
|           |                | 1710.7          | 24.03       | 22.73 | 22.22 |
|           | 50% RB mid     | 1779.3          | 23.97       | 22.51 | 22.15 |
|           |                | 1745.0          | 24.04       | 22.51 | 22.20 |
|           |                | 1710.7          | 24.16       | 22.64 | 22.38 |
|           | 100% RB        | 1779.3          | 23.05       | 22.17 | 21.02 |
|           |                | 1745.0          | 23.09       | 22.20 | 21.10 |
|           |                | 1710.7          | 23.22       | 22.32 | 21.19 |
| 3MHz      | 1 RB high      | 1778.5          | 23.77       | 22.50 | 22.10 |
|           |                | 1745.0          | 23.79       | 22.52 | 22.08 |
|           |                | 1711.5          | 23.94       | 22.61 | 22.13 |
|           | 1 RB low       | 1778.5          | 23.76       | 22.47 | 22.02 |
|           |                | 1745.0          | 23.75       | 22.48 | 22.00 |
|           |                | 1711.5          | 23.92       | 22.74 | 22.18 |
|           | 50% RB mid     | 1778.5          | 23.02       | 22.06 | 21.06 |
|           |                | 1745.0          | 23.07       | 22.13 | 21.10 |
|           |                | 1711.5          | 23.21       | 22.26 | 21.22 |
|           | 100% RB        | 1778.5          | 22.95       | 21.98 | 20.95 |
|           |                | 1745.0          | 22.99       | 21.99 | 21.02 |
|           |                | 1711.5          | 23.14       | 22.16 | 21.13 |
| 5MHz      | 1 RB high      | 1777.5          | 23.98       | 22.81 | 22.19 |
|           |                | 1745.0          | 24.03       | 22.79 | 22.23 |
|           |                | 1712.5          | 24.13       | 22.96 | 22.28 |
|           | 1 RB low       | 1777.5          | 23.98       | 22.81 | 22.13 |
|           |                | 1745.0          | 24.06       | 22.76 | 22.27 |
|           |                | 1712.5          | 24.19       | 23.04 | 22.37 |
|           | 50% RB mid     | 1777.5          | 23.09       | 22.09 | 21.14 |
|           |                | 1745.0          | 23.14       | 22.11 | 21.17 |
|           |                | 1712.5          | 23.26       | 22.26 | 21.27 |
|           | 100% RB        | 1777.5          | 23.04       | 22.06 | 21.06 |
|           |                | 1745.0          | 23.10       | 22.13 | 21.11 |
|           |                | 1712.5          | 23.23       | 22.23 | 21.25 |
| 10MHz     | 1 RB high      | 1775.0          | 24.08       | 22.92 | 22.28 |
|           |                | 1745.0          | 24.14       | 22.83 | 22.36 |
|           |                | 1715.0          | 24.19       | 23.09 | 22.41 |
|           | 1 RB low       | 1775.0          | 24.09       | 22.93 | 22.29 |

|       |            |        |       |       |       |
|-------|------------|--------|-------|-------|-------|
|       |            | 1745.0 | 24.17 | 22.91 | 22.34 |
|       |            | 1715.0 | 24.25 | 23.06 | 22.42 |
|       | 50% RB mid | 1775.0 | 23.12 | 22.13 | 21.14 |
|       |            | 1745.0 | 23.18 | 22.19 | 21.17 |
|       |            | 1715.0 | 23.27 | 22.27 | 21.27 |
|       | 100% RB    | 1775.0 | 23.09 | 22.08 | 21.09 |
|       |            | 1745.0 | 23.16 | 22.15 | 21.17 |
|       |            | 1715.0 | 23.22 | 22.23 | 21.24 |
| 15MHz | 1 RB high  | 1772.5 | 24.04 | 22.80 | 22.22 |
|       |            | 1745.0 | 24.09 | 22.79 | 22.23 |
|       |            | 1717.5 | 24.12 | 22.98 | 22.39 |
|       | 1 RB low   | 1772.5 | 24.05 | 22.86 | 22.17 |
|       |            | 1745.0 | 24.09 | 22.82 | 22.20 |
|       |            | 1717.5 | 24.19 | 22.91 | 22.39 |
|       | 50% RB mid | 1772.5 | 23.13 | 22.10 | 21.15 |
|       |            | 1745.0 | 23.18 | 22.16 | 21.20 |
|       |            | 1717.5 | 23.22 | 22.20 | 21.27 |
|       | 100% RB    | 1772.5 | 23.09 | 22.06 | 21.07 |
|       |            | 1745.0 | 23.15 | 22.13 | 21.14 |
|       |            | 1717.5 | 23.25 | 22.22 | 21.22 |
| 20MHz | 1 RB high  | 1770.0 | 23.94 | 22.60 | 22.12 |
|       |            | 1745.0 | 23.99 | 22.82 | 22.12 |
|       |            | 1720.0 | 24.03 | 22.84 | 22.20 |
|       | 1 RB low   | 1770.0 | 23.88 | 22.76 | 22.11 |
|       |            | 1745.0 | 24.03 | 22.87 | 22.22 |
|       |            | 1720.0 | 24.12 | 22.83 | 22.24 |
|       | 50% RB mid | 1770.0 | 23.17 | 22.15 | 21.16 |
|       |            | 1745.0 | 23.23 | 22.19 | 21.21 |
|       |            | 1720.0 | 23.30 | 22.27 | 21.29 |
|       | 100% RB    | 1770.0 | 23.07 | 22.03 | 21.05 |
|       |            | 1745.0 | 23.16 | 22.13 | 21.14 |
|       |            | 1720.0 | 23.21 | 22.20 | 21.22 |

### A.1.3 Radiated

#### A.1.3.1 Description

This is the test for the maximum radiated power from the EUT.

**FDD Band 2:** Part 24.232(c) specifies "Mobile and portable stations are limited to 2 watts EIRP".

**FDD Band 4/66:** Part 27.50(d)(4) specifies "Fixed, mobile, and portable(handheld) stations operating in the 1710–1755 MHz band and mobile and portable stations operating in the 1695–1710 MHz and 1755–1780 MHz bands are limited to 1 watt EIRP".

**FDD Band 5:** Part 22.913(a) specifies "The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts".

**FDD Band 7:** Part 27.50(h)(2) specifies "Mobile stations are limited to 2.0 watts EIRP".

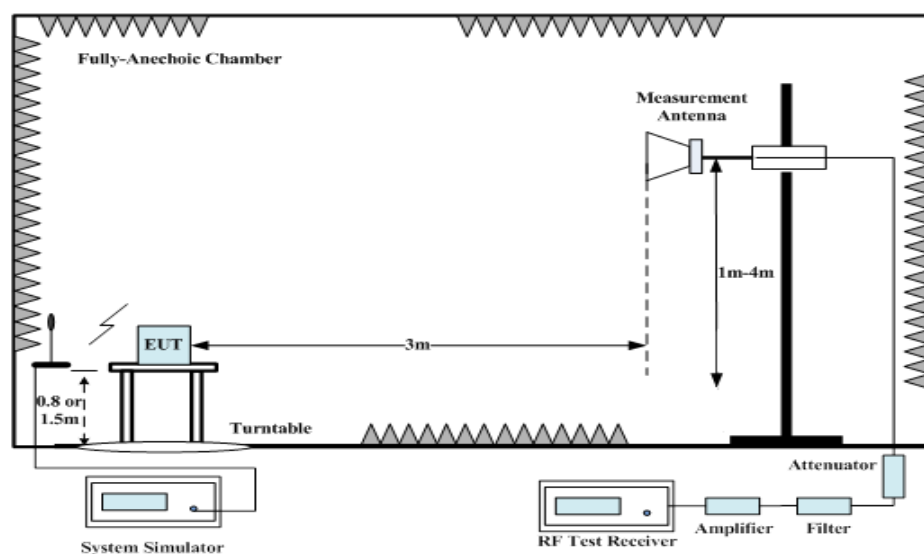
**FDD Band 12:** Part 27.50(c) (10) specifies "Portable stations (hand-held devices) in the 600 MHz uplink band and the 698–746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP".

**FDD Band 13:** Part 27.50(b) specifies "Portable stations (hand-held devices) transmitting in the 746–757 MHz, 776–788 MHz, and 805–806 MHz bands are limited to 3 watts ERP".

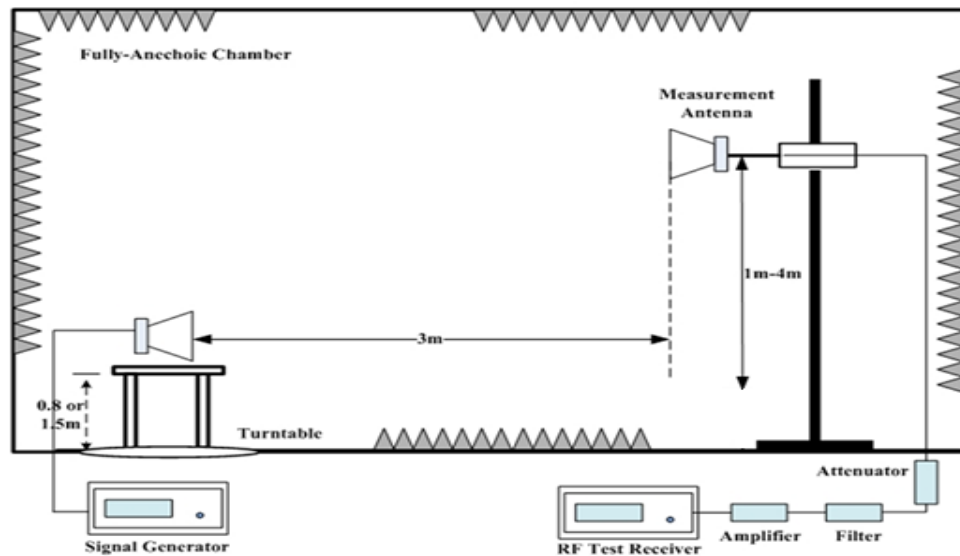
#### A.1.3.2 Method of Measurement

The measurements procedures in ANSI C63.26 are used.

1. EUT was placed on a 0.8/1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The receiving antenna shall be varied from 1 to 4m in height above the reference ground. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and the EUT is manipulated through all orthogonal planes representative of its typical use. The test is carried out with both vertical and horizontal polarization of the receiving antenna. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with rms detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power ( $P_{Mea}$ ) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded ( $P_r$ ). The power of signal source ( $P_{Mea}$ ) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. An amplifier should be connected to the Signal Source output port. And the cable should be connected between the amplifier and the substitution antenna.  
The cable loss ( $P_{cl}$ ), the substitution antenna Gain ( $G_a$ ) and the amplifier Gain ( $P_{Ag}$ ) should be recorded after test.  
The measurement results are obtained as described below:  
Power (EIRP) =  $P_{Mea} + P_{Ag} - P_{cl} + G_a$
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15$ .

Note: The antenna gain information was provided by the client. The laboratory is not responsible for identifying its authenticity during the test.

### A.1.3.3 Measurement result

#### LTE Band 2-EIRP

Limits:  $\leq 33\text{dBm}$  (2W)

| Mod.  | Bandwidth<br>(MHz) | Frequency<br>(MHz) | P <sub>Mea</sub><br>(dBm) | P <sub>cl</sub><br>(dB) | P <sub>Ag</sub><br>(dB) | G <sub>a</sub><br>(dBi) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Ant.Pol |
|-------|--------------------|--------------------|---------------------------|-------------------------|-------------------------|-------------------------|---------------|----------------|----------------|---------|
| QPSK  | 1.4                | 1850.70            | -18.19                    | 6.76                    | 43.75                   | 5.48                    | 24.27         | 33.00          | 8.73           | H       |
|       |                    | 1880.00            | -18.23                    | 6.96                    | 43.75                   | 5.46                    | 24.02         | 33.00          | 8.98           | H       |
|       |                    | 1909.30            | -18.71                    | 6.88                    | 43.77                   | 5.07                    | 23.24         | 33.00          | 9.76           | H       |
|       | 3                  | 1851.50            | -18.36                    | 6.76                    | 43.75                   | 5.48                    | 24.09         | 33.00          | 8.91           | H       |
|       |                    | 1880.00            | -18.49                    | 6.96                    | 43.75                   | 5.46                    | 23.76         | 33.00          | 9.24           | H       |
|       |                    | 1908.50            | -18.77                    | 6.88                    | 43.77                   | 5.07                    | 23.20         | 33.00          | 9.80           | H       |
|       | 5                  | 1852.50            | -18.31                    | 6.76                    | 43.75                   | 5.47                    | 24.16         | 33.00          | 8.84           | H       |
|       |                    | 1880.00            | -18.21                    | 6.96                    | 43.75                   | 5.46                    | 24.04         | 33.00          | 8.96           | H       |
|       |                    | 1907.50            | -18.28                    | 6.88                    | 43.77                   | 5.09                    | 23.70         | 33.00          | 9.30           | H       |
|       | 10                 | 1855.00            | -18.09                    | 6.76                    | 43.75                   | 5.47                    | 24.36         | 33.00          | 8.64           | H       |
|       |                    | 1880.00            | -18.08                    | 6.96                    | 43.75                   | 5.46                    | 24.17         | 33.00          | 8.83           | H       |
|       |                    | 1907.50            | -17.94                    | 6.88                    | 43.77                   | 5.09                    | 24.04         | 33.00          | 8.96           | H       |
|       | 15                 | 1857.50            | -17.83                    | 6.76                    | 43.75                   | 5.47                    | 24.63         | 33.00          | 8.37           | H       |
|       |                    | 1880.00            | -18.07                    | 6.96                    | 43.75                   | 5.46                    | 24.18         | 33.00          | 8.82           | H       |
|       |                    | 1902.50            | -17.64                    | 6.88                    | 43.77                   | 5.15                    | 24.40         | 33.00          | 8.60           | H       |
|       | 20                 | 1860.00            | -17.71                    | 6.76                    | 43.75                   | 5.47                    | 24.75         | 33.00          | 8.25           | H       |
|       |                    | 1880.00            | -18.07                    | 6.96                    | 43.75                   | 5.46                    | 24.18         | 33.00          | 8.82           | H       |
|       |                    | 1900.00            | -17.36                    | 6.81                    | 43.77                   | 5.18                    | 24.77         | 33.00          | 8.23           | H       |
| 16QAM | 1.4                | 1850.70            | -19.09                    | 6.76                    | 43.75                   | 5.48                    | 23.37         | 33.00          | 9.63           | H       |
|       |                    | 1880.00            | -19.18                    | 6.96                    | 43.75                   | 5.46                    | 23.07         | 33.00          | 9.93           | H       |
|       |                    | 1909.30            | -19.58                    | 6.88                    | 43.77                   | 5.07                    | 22.37         | 33.00          | 10.63          | H       |
|       | 3                  | 1851.50            | -18.36                    | 6.76                    | 43.75                   | 5.48                    | 23.24         | 33.00          | 9.76           | H       |
|       |                    | 1880.00            | -18.49                    | 6.96                    | 43.75                   | 5.46                    | 23.06         | 33.00          | 9.94           | H       |
|       |                    | 1908.50            | -18.77                    | 6.88                    | 43.77                   | 5.07                    | 22.39         | 33.00          | 10.61          | H       |
|       | 5                  | 1852.50            | -19.06                    | 6.76                    | 43.75                   | 5.47                    | 23.41         | 33.00          | 9.59           | H       |
|       |                    | 1880.00            | -18.99                    | 6.96                    | 43.75                   | 5.46                    | 23.26         | 33.00          | 9.74           | H       |
|       |                    | 1907.50            | -19.11                    | 6.88                    | 43.77                   | 5.09                    | 22.87         | 33.00          | 10.13          | H       |
|       | 10                 | 1855.00            | -18.78                    | 6.76                    | 43.75                   | 5.47                    | 23.67         | 33.00          | 9.33           | H       |
|       |                    | 1880.00            | -19.00                    | 6.96                    | 43.75                   | 5.46                    | 23.25         | 33.00          | 9.75           | H       |
|       |                    | 1907.50            | -18.66                    | 6.88                    | 43.77                   | 5.09                    | 23.32         | 33.00          | 9.68           | H       |
|       | 15                 | 1857.50            | -18.58                    | 6.76                    | 43.75                   | 5.47                    | 23.88         | 33.00          | 9.12           | H       |
|       |                    | 1880.00            | -18.90                    | 6.96                    | 43.75                   | 5.46                    | 23.35         | 33.00          | 9.65           | H       |
|       |                    | 1902.50            | -18.44                    | 6.88                    | 43.77                   | 5.15                    | 23.60         | 33.00          | 9.40           | H       |
|       | 20                 | 1860.00            | -18.38                    | 6.76                    | 43.75                   | 5.47                    | 24.08         | 33.00          | 8.92           | H       |
|       |                    | 1880.00            | -18.89                    | 6.96                    | 43.75                   | 5.46                    | 23.36         | 33.00          | 9.64           | H       |
|       |                    | 1900.00            | -18.10                    | 6.81                    | 43.77                   | 5.18                    | 24.03         | 33.00          | 8.97           | H       |
| 64QAM | 1.4                | 1850.70            | -19.97                    | 6.76                    | 43.75                   | 5.48                    | 22.49         | 33.00          | 10.51          | H       |
|       |                    | 1880.00            | -20.08                    | 6.96                    | 43.75                   | 5.46                    | 22.17         | 33.00          | 10.83          | H       |

|  |    |         |        |      |       |      |       |       |       |   |
|--|----|---------|--------|------|-------|------|-------|-------|-------|---|
|  |    | 1909.30 | -20.50 | 6.88 | 43.77 | 5.07 | 21.45 | 33.00 | 11.55 | H |
|  | 3  | 1851.50 | -20.16 | 6.76 | 43.75 | 5.48 | 22.29 | 33.00 | 10.71 | H |
|  |    | 1880.00 | -20.23 | 6.96 | 43.75 | 5.46 | 22.02 | 33.00 | 10.98 | H |
|  |    | 1908.50 | -20.50 | 6.88 | 43.77 | 5.07 | 21.47 | 33.00 | 11.53 | H |
|  | 5  | 1852.50 | -20.08 | 6.76 | 43.75 | 5.47 | 22.39 | 33.00 | 10.61 | H |
|  |    | 1880.00 | -20.01 | 6.96 | 43.75 | 5.46 | 22.24 | 33.00 | 10.76 | H |
|  |    | 1907.50 | -20.10 | 6.88 | 43.77 | 5.09 | 21.88 | 33.00 | 11.12 | H |
|  | 10 | 1855.00 | -19.92 | 6.76 | 43.75 | 5.47 | 22.53 | 33.00 | 10.47 | H |
|  |    | 1880.00 | -19.94 | 6.96 | 43.75 | 5.46 | 22.31 | 33.00 | 10.69 | H |
|  |    | 1907.50 | -19.77 | 6.88 | 43.77 | 5.09 | 22.21 | 33.00 | 10.79 | H |
|  | 15 | 1857.50 | -19.62 | 6.76 | 43.75 | 5.47 | 22.84 | 33.00 | 10.16 | H |
|  |    | 1880.00 | -19.89 | 6.96 | 43.75 | 5.46 | 22.36 | 33.00 | 10.64 | H |
|  |    | 1902.50 | -19.50 | 6.88 | 43.77 | 5.15 | 22.54 | 33.00 | 10.46 | H |
|  | 20 | 1860.00 | -19.49 | 6.76 | 43.75 | 5.47 | 22.97 | 33.00 | 10.03 | H |
|  |    | 1880.00 | -19.80 | 6.96 | 43.75 | 5.46 | 22.45 | 33.00 | 10.55 | H |
|  |    | 1900.00 | -19.19 | 6.81 | 43.77 | 5.18 | 22.94 | 33.00 | 10.06 | H |

# LTE Band 4-EIRP

Limits: ≤30dBm (1W)

| Mod.  | Bandwidth<br>(MHz) | Frequency<br>(MHz) | P <sub>Mea</sub><br>(dBm) | P <sub>cl</sub><br>(dB) | P <sub>Ag</sub><br>(dB) | G <sub>a</sub><br>(dBi) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Ant.Pol |
|-------|--------------------|--------------------|---------------------------|-------------------------|-------------------------|-------------------------|---------------|----------------|----------------|---------|
| QPSK  | 1.4                | 1710.70            | -20.35                    | 6.39                    | 44.08                   | 6.01                    | 23.35         | 30.00          | 6.65           | H       |
|       |                    | 1732.50            | -20.28                    | 6.18                    | 44.14                   | 5.84                    | 23.52         | 30.00          | 6.48           | H       |
|       |                    | 1754.30            | -19.61                    | 6.25                    | 44.17                   | 5.73                    | 24.04         | 30.00          | 5.96           | H       |
|       | 3                  | 1711.50            | -20.32                    | 6.39                    | 44.10                   | 6.01                    | 23.39         | 30.00          | 6.61           | H       |
|       |                    | 1732.50            | -20.45                    | 6.18                    | 44.14                   | 5.84                    | 23.35         | 30.00          | 6.65           | H       |
|       |                    | 1754.30            | -19.65                    | 6.25                    | 44.13                   | 5.74                    | 23.97         | 30.00          | 6.03           | H       |
|       | 5                  | 1712.50            | -20.83                    | 6.39                    | 44.90                   | 6.00                    | 23.68         | 30.00          | 6.32           | H       |
|       |                    | 1732.50            | -20.10                    | 6.18                    | 44.14                   | 5.84                    | 23.70         | 30.00          | 6.30           | H       |
|       |                    | 1752.50            | -19.35                    | 6.25                    | 44.14                   | 5.74                    | 24.29         | 30.00          | 5.71           | H       |
|       | 10                 | 1715.00            | -20.23                    | 6.39                    | 44.37                   | 5.98                    | 23.73         | 30.00          | 6.27           | H       |
|       |                    | 1732.50            | -20.06                    | 6.18                    | 44.14                   | 5.84                    | 23.74         | 30.00          | 6.26           | H       |
|       |                    | 1750.00            | -19.46                    | 6.25                    | 44.15                   | 5.77                    | 24.21         | 30.00          | 5.79           | H       |
|       | 15                 | 1717.50            | -19.72                    | 6.39                    | 44.11                   | 5.96                    | 23.96         | 30.00          | 6.04           | H       |
|       |                    | 1732.50            | -19.94                    | 6.18                    | 44.14                   | 5.84                    | 23.86         | 30.00          | 6.14           | H       |
|       |                    | 1747.50            | -19.44                    | 6.25                    | 44.25                   | 5.72                    | 24.29         | 30.00          | 5.71           | H       |
|       | 20                 | 1720.00            | -19.53                    | 6.39                    | 44.18                   | 5.94                    | 24.20         | 30.00          | 5.80           | H       |
|       |                    | 1732.50            | -19.92                    | 6.18                    | 44.14                   | 5.84                    | 23.88         | 30.00          | 6.12           | H       |
|       |                    | 1745.00            | -20.09                    | 6.25                    | 44.46                   | 5.74                    | 23.86         | 30.00          | 6.14           | H       |
| 16QAM | 1.4                | 1710.70            | -21.06                    | 6.39                    | 44.08                   | 6.01                    | 22.64         | 30.00          | 7.36           | H       |
|       |                    | 1732.50            | -21.01                    | 6.18                    | 44.14                   | 5.84                    | 22.79         | 30.00          | 7.21           | H       |
|       |                    | 1754.30            | -20.30                    | 6.25                    | 44.17                   | 5.73                    | 23.35         | 30.00          | 6.65           | H       |
|       | 3                  | 1711.50            | -21.10                    | 6.39                    | 44.10                   | 6.01                    | 22.61         | 30.00          | 7.39           | H       |
|       |                    | 1732.50            | -21.14                    | 6.18                    | 44.14                   | 5.84                    | 22.66         | 30.00          | 7.34           | H       |
|       |                    | 1754.30            | -20.22                    | 6.25                    | 44.13                   | 5.74                    | 23.40         | 30.00          | 6.60           | H       |
|       | 5                  | 1712.50            | -21.55                    | 6.39                    | 44.90                   | 6.00                    | 22.96         | 30.00          | 7.04           | H       |
|       |                    | 1732.50            | -20.85                    | 6.18                    | 44.14                   | 5.84                    | 22.95         | 30.00          | 7.05           | H       |
|       |                    | 1752.50            | -20.08                    | 6.25                    | 44.14                   | 5.74                    | 23.56         | 30.00          | 6.44           | H       |
|       | 10                 | 1715.00            | -20.98                    | 6.39                    | 44.37                   | 5.98                    | 22.98         | 30.00          | 7.02           | H       |
|       |                    | 1732.50            | -20.82                    | 6.18                    | 44.14                   | 5.84                    | 22.98         | 30.00          | 7.02           | H       |
|       |                    | 1750.00            | -20.17                    | 6.25                    | 44.15                   | 5.77                    | 23.50         | 30.00          | 6.50           | H       |
|       | 15                 | 1717.50            | -20.37                    | 6.39                    | 44.11                   | 5.96                    | 23.31         | 30.00          | 6.69           | H       |
|       |                    | 1732.50            | -20.67                    | 6.18                    | 44.14                   | 5.84                    | 23.13         | 30.00          | 6.87           | H       |
|       |                    | 1747.50            | -20.25                    | 6.25                    | 44.25                   | 5.72                    | 23.48         | 30.00          | 6.52           | H       |
|       | 20                 | 1720.00            | -20.18                    | 6.39                    | 44.18                   | 5.94                    | 23.55         | 30.00          | 6.45           | H       |
|       |                    | 1732.50            | -20.56                    | 6.18                    | 44.14                   | 5.84                    | 23.24         | 30.00          | 6.76           | H       |
|       |                    | 1745.00            | -20.80                    | 6.25                    | 44.46                   | 5.74                    | 23.15         | 30.00          | 6.85           | H       |
| 64QAM | 1.4                | 1710.70            | -22.01                    | 6.39                    | 44.08                   | 6.01                    | 21.69         | 30.00          | 8.31           | H       |
|       |                    | 1732.50            | -21.97                    | 6.18                    | 44.14                   | 5.84                    | 21.83         | 30.00          | 8.17           | H       |
|       |                    | 1754.30            | -21.15                    | 6.25                    | 44.17                   | 5.73                    | 22.50         | 30.00          | 7.50           | H       |
|       | 3                  | 1711.50            | -22.08                    | 6.39                    | 44.10                   | 6.01                    | 21.63         | 30.00          | 8.37           | H       |
|       |                    | 1732.50            | -22.09                    | 6.18                    | 44.14                   | 5.84                    | 21.71         | 30.00          | 8.29           | H       |
|       |                    | 1754.30            | -21.26                    | 6.25                    | 44.13                   | 5.74                    | 22.36         | 30.00          | 7.64           | H       |
|       | 5                  | 1712.50            | -22.60                    | 6.39                    | 44.90                   | 6.00                    | 21.91         | 30.00          | 8.09           | H       |
|       |                    | 1732.50            | -21.99                    | 6.18                    | 44.14                   | 5.84                    | 21.81         | 30.00          | 8.19           | H       |

|  |    |         |        |      |       |      |       |       |      |   |
|--|----|---------|--------|------|-------|------|-------|-------|------|---|
|  |    | 1752.50 | -21.09 | 6.25 | 44.14 | 5.74 | 22.55 | 30.00 | 7.45 | H |
|  |    |         |        |      |       |      |       |       |      |   |
|  | 10 | 1715.00 | -22.07 | 6.39 | 44.37 | 5.98 | 21.89 | 30.00 | 8.11 | H |
|  |    | 1732.50 | -21.82 | 6.18 | 44.14 | 5.84 | 21.98 | 30.00 | 8.02 | H |
|  |    | 1750.00 | -21.10 | 6.25 | 44.15 | 5.77 | 22.57 | 30.00 | 7.43 | H |
|  | 15 | 1717.50 | -21.54 | 6.39 | 44.11 | 5.96 | 22.14 | 30.00 | 7.86 | H |
|  |    | 1732.50 | -21.70 | 6.18 | 44.14 | 5.84 | 22.10 | 30.00 | 7.90 | H |
|  |    | 1747.50 | -21.29 | 6.25 | 44.25 | 5.72 | 22.44 | 30.00 | 7.56 | H |
|  | 20 | 1720.00 | -21.22 | 6.39 | 44.18 | 5.94 | 22.51 | 30.00 | 7.49 | H |
|  |    | 1732.50 | -21.79 | 6.18 | 44.14 | 5.84 | 22.01 | 30.00 | 7.99 | H |
|  |    | 1745.00 | -21.83 | 6.25 | 44.46 | 5.74 | 22.12 | 30.00 | 7.88 | H |

### LTE Band 5-ERP

Limits: ≤38.45dBm (7W)

| Mod.  | Bandwidth<br>(MHz) | Frequency<br>(MHz) | PMea<br>(dBm) | Pcl<br>(dB) | PAg<br>(dB) | Ga<br>(dBi) | Correction<br>(dB) | ERP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Ant.Pol |
|-------|--------------------|--------------------|---------------|-------------|-------------|-------------|--------------------|--------------|----------------|----------------|---------|
| QPSK  | 1.4                | 824.70             | -22.88        | 4.04        | 45.79       | -0.67       | 2.15               | 16.05        | 38.45          | 22.40          | H       |
|       |                    | 836.50             | -22.80        | 4.12        | 45.66       | -0.73       | 2.15               | 15.86        | 38.45          | 22.59          | H       |
|       |                    | 848.30             | -23.51        | 4.23        | 45.55       | -0.83       | 2.15               | 14.83        | 38.45          | 23.62          | H       |
|       | 3                  | 825.50             | -23.07        | 4.02        | 45.78       | -0.63       | 2.15               | 15.91        | 38.45          | 22.54          | H       |
|       |                    | 836.50             | -23.03        | 4.12        | 45.66       | -0.73       | 2.15               | 15.63        | 38.45          | 22.82          | H       |
|       |                    | 847.50             | -23.60        | 4.23        | 45.56       | -0.82       | 2.15               | 14.75        | 38.45          | 23.70          | H       |
|       | 5                  | 826.50             | -22.84        | 4.02        | 45.77       | -0.63       | 2.15               | 16.12        | 38.45          | 22.33          | H       |
|       |                    | 836.50             | -22.75        | 4.12        | 45.66       | -0.73       | 2.15               | 15.91        | 38.45          | 22.54          | H       |
|       |                    | 846.50             | -23.28        | 4.23        | 45.56       | -0.81       | 2.15               | 15.09        | 38.45          | 23.36          | H       |
|       | 10                 | 829.00             | -22.58        | 4.02        | 45.77       | -0.63       | 2.15               | 16.39        | 38.45          | 22.06          | H       |
|       |                    | 836.50             | -22.63        | 4.12        | 45.66       | -0.73       | 2.15               | 16.03        | 38.45          | 22.42          | H       |
|       |                    | 844.00             | -22.94        | 4.23        | 45.59       | -0.73       | 2.15               | 15.54        | 38.45          | 22.91          | H       |
| 16QAM | 1.4                | 824.70             | -23.84        | 4.04        | 45.79       | -0.67       | 2.15               | 15.09        | 38.45          | 23.36          | H       |
|       |                    | 836.50             | -23.42        | 4.12        | 45.66       | -0.73       | 2.15               | 15.24        | 38.45          | 23.21          | H       |
|       |                    | 848.30             | -24.12        | 4.23        | 45.55       | -0.83       | 2.15               | 14.22        | 38.45          | 24.23          | H       |
|       | 3                  | 825.50             | -23.95        | 4.02        | 45.78       | -0.63       | 2.15               | 15.03        | 38.45          | 23.42          | H       |
|       |                    | 836.50             | -23.79        | 4.12        | 45.66       | -0.73       | 2.15               | 14.87        | 38.45          | 23.58          | H       |
|       |                    | 847.50             | -24.46        | 4.23        | 45.56       | -0.82       | 2.15               | 13.89        | 38.45          | 24.56          | H       |
|       | 5                  | 826.50             | -23.75        | 4.02        | 45.77       | -0.63       | 2.15               | 15.21        | 38.45          | 23.24          | H       |
|       |                    | 836.50             | -23.45        | 4.12        | 45.66       | -0.73       | 2.15               | 15.21        | 38.45          | 23.24          | H       |
|       |                    | 846.50             | -24.08        | 4.23        | 45.56       | -0.81       | 2.15               | 14.29        | 38.45          | 24.16          | H       |
|       | 10                 | 829.00             | -23.36        | 4.02        | 45.77       | -0.63       | 2.15               | 15.61        | 38.45          | 22.84          | H       |
|       |                    | 836.50             | -23.39        | 4.12        | 45.66       | -0.73       | 2.15               | 15.27        | 38.45          | 23.18          | H       |
|       |                    | 844.00             | -23.91        | 4.23        | 45.59       | -0.73       | 2.15               | 14.57        | 38.45          | 23.88          | H       |
| 64QAM | 1.4                | 824.70             | -24.78        | 4.04        | 45.79       | -0.67       | 2.15               | 14.15        | 38.45          | 24.30          | H       |
|       |                    | 836.50             | -24.53        | 4.12        | 45.66       | -0.73       | 2.15               | 14.13        | 38.45          | 24.32          | H       |
|       |                    | 848.30             | -25.24        | 4.23        | 45.55       | -0.83       | 2.15               | 13.10        | 38.45          | 25.35          | H       |
|       | 3                  | 825.50             | -24.91        | 4.02        | 45.78       | -0.63       | 2.15               | 14.07        | 38.45          | 24.38          | H       |
|       |                    | 836.50             | -24.67        | 4.12        | 45.66       | -0.73       | 2.15               | 13.99        | 38.45          | 24.46          | H       |
|       |                    | 847.50             | -25.28        | 4.23        | 45.56       | -0.82       | 2.15               | 13.07        | 38.45          | 25.38          | H       |
|       | 5                  | 826.50             | -25.92        | 4.02        | 45.77       | -0.63       | 2.15               | 13.05        | 38.45          | 25.40          | V       |
|       |                    | 836.50             | -24.56        | 4.12        | 45.66       | -0.73       | 2.15               | 14.10        | 38.45          | 24.35          | H       |
|       |                    | 846.50             | -25.16        | 4.23        | 45.56       | -0.81       | 2.15               | 13.21        | 38.45          | 25.24          | H       |
|       | 10                 | 829.00             | -24.45        | 4.02        | 45.77       | -0.63       | 2.15               | 14.52        | 38.45          | 23.93          | H       |
|       |                    | 836.50             | -24.50        | 4.12        | 45.66       | -0.73       | 2.15               | 14.16        | 38.45          | 24.29          | H       |
|       |                    | 844.00             | -24.92        | 4.23        | 45.59       | -0.73       | 2.15               | 13.56        | 38.45          | 24.89          | H       |

# LTE Band 7- EIRP

Limits: ≤33 dBm (2W)

| Mod.  | Bandwidth<br>(MHz) | Frequency<br>(MHz) | P <sub>Mea</sub><br>(dBm) | P <sub>cl</sub><br>(dB) | P <sub>Ag</sub><br>(dB) | G <sub>a</sub><br>(dBi) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Ant.Pol |
|-------|--------------------|--------------------|---------------------------|-------------------------|-------------------------|-------------------------|---------------|----------------|----------------|---------|
| QPSK  | 5                  | 2502.50            | -18.38                    | 7.84                    | 44.80                   | 5.83                    | 24.42         | 33.00          | 8.58           | H       |
|       |                    | 2535.00            | -18.10                    | 7.81                    | 44.82                   | 5.80                    | 24.71         | 33.00          | 8.29           | H       |
|       |                    | 2567.50            | -18.98                    | 8.24                    | 44.92                   | 5.90                    | 23.60         | 33.00          | 9.40           | H       |
|       | 10                 | 2505.00            | -18.99                    | 7.84                    | 45.25                   | 5.83                    | 24.26         | 33.00          | 8.74           | H       |
|       |                    | 2535.00            | -18.03                    | 7.81                    | 44.82                   | 5.80                    | 24.78         | 33.00          | 8.22           | H       |
|       |                    | 2565.00            | -18.58                    | 8.24                    | 44.97                   | 5.90                    | 24.04         | 33.00          | 8.96           | H       |
|       | 15                 | 2507.50            | -18.53                    | 7.84                    | 44.90                   | 5.83                    | 24.36         | 33.00          | 8.64           | H       |
|       |                    | 2535.00            | -18.07                    | 7.81                    | 44.82                   | 5.80                    | 24.74         | 33.00          | 8.26           | H       |
|       |                    | 2562.50            | -19.28                    | 7.95                    | 45.67                   | 5.89                    | 24.33         | 33.00          | 8.67           | H       |
|       | 20                 | 2510.00            | -19.19                    | 7.84                    | 45.11                   | 5.82                    | 23.90         | 33.00          | 9.10           | H       |
|       |                    | 2535.00            | -17.96                    | 7.81                    | 44.82                   | 5.80                    | 24.85         | 33.00          | 8.15           | H       |
|       |                    | 2560.00            | -19.28                    | 7.95                    | 45.98                   | 5.89                    | 24.63         | 33.00          | 8.37           | H       |
| 16QAM | 5                  | 2502.50            | -19.08                    | 7.84                    | 44.80                   | 5.83                    | 23.72         | 33.00          | 9.28           | H       |
|       |                    | 2535.00            | -18.83                    | 7.81                    | 44.82                   | 5.80                    | 23.98         | 33.00          | 9.02           | H       |
|       |                    | 2567.50            | -19.77                    | 8.24                    | 44.92                   | 5.90                    | 22.81         | 33.00          | 10.19          | H       |
|       | 10                 | 2505.00            | -19.79                    | 7.84                    | 45.25                   | 5.83                    | 23.46         | 33.00          | 9.54           | H       |
|       |                    | 2535.00            | -18.72                    | 7.81                    | 44.82                   | 5.80                    | 24.09         | 33.00          | 8.91           | H       |
|       |                    | 2565.00            | -19.36                    | 8.24                    | 44.97                   | 5.90                    | 23.26         | 33.00          | 9.74           | H       |
|       | 15                 | 2507.50            | -19.38                    | 7.84                    | 44.90                   | 5.83                    | 23.51         | 33.00          | 9.49           | H       |
|       |                    | 2535.00            | -18.77                    | 7.81                    | 44.82                   | 5.80                    | 24.04         | 33.00          | 8.96           | H       |
|       |                    | 2562.50            | -20.10                    | 7.95                    | 45.67                   | 5.89                    | 23.51         | 33.00          | 9.49           | H       |
|       | 20                 | 2510.00            | -20.08                    | 7.84                    | 45.11                   | 5.82                    | 23.01         | 33.00          | 9.99           | H       |
|       |                    | 2535.00            | -18.59                    | 7.81                    | 44.82                   | 5.80                    | 24.22         | 33.00          | 8.78           | H       |
|       |                    | 2560.00            | -20.09                    | 7.95                    | 45.98                   | 5.89                    | 23.82         | 33.00          | 9.18           | H       |
| 64QAM | 5                  | 2502.50            | -20.09                    | 7.84                    | 44.80                   | 5.83                    | 22.71         | 33.00          | 10.29          | H       |
|       |                    | 2535.00            | -19.80                    | 7.81                    | 44.82                   | 5.80                    | 23.01         | 33.00          | 9.99           | H       |
|       |                    | 2567.50            | -20.81                    | 8.24                    | 44.92                   | 5.90                    | 21.77         | 33.00          | 11.23          | H       |
|       | 10                 | 2505.00            | -20.80                    | 7.84                    | 45.25                   | 5.83                    | 22.45         | 33.00          | 10.55          | H       |
|       |                    | 2535.00            | -19.83                    | 7.81                    | 44.82                   | 5.80                    | 22.98         | 33.00          | 10.02          | H       |
|       |                    | 2565.00            | -20.42                    | 8.24                    | 44.97                   | 5.90                    | 22.20         | 33.00          | 10.80          | H       |
|       | 15                 | 2507.50            | -20.38                    | 7.84                    | 44.90                   | 5.83                    | 22.51         | 33.00          | 10.49          | H       |
|       |                    | 2535.00            | -19.86                    | 7.81                    | 44.82                   | 5.80                    | 22.95         | 33.00          | 10.05          | H       |
|       |                    | 2562.50            | -21.21                    | 7.95                    | 45.67                   | 5.89                    | 22.40         | 33.00          | 10.60          | H       |
|       | 20                 | 2510.00            | -21.12                    | 7.84                    | 45.11                   | 5.82                    | 21.97         | 33.00          | 11.03          | H       |
|       |                    | 2535.00            | -19.59                    | 7.81                    | 44.82                   | 5.80                    | 23.22         | 33.00          | 9.78           | H       |
|       |                    | 2560.00            | -21.03                    | 7.95                    | 45.98                   | 5.89                    | 22.88         | 33.00          | 10.12          | H       |

# LTE Band 12 - ERP

Limits:  $\leq 34.77\text{dBm}$  (3W)

| Mod.  | Bandwidth<br>(MHz) | Frequency<br>(MHz) | P <sub>Mea</sub><br>(dBm) | P <sub>cl</sub><br>(dB) | P <sub>Ag</sub><br>(dB) | G <sub>a</sub><br>(dBi) | Correction<br>(dB) | ERP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Ant.Pol |
|-------|--------------------|--------------------|---------------------------|-------------------------|-------------------------|-------------------------|--------------------|--------------|----------------|----------------|---------|
| QPSK  | 1.4                | 699.70             | -21.67                    | 3.66                    | 44.67                   | -0.67                   | 2.15               | 16.53        | 34.77          | 18.24          | V       |
|       |                    | 707.50             | -22.45                    | 3.66                    | 45.17                   | -0.54                   | 2.15               | 16.36        | 34.77          | 18.41          | H       |
|       |                    | 715.30             | -22.65                    | 3.77                    | 45.26                   | -0.46                   | 2.15               | 16.23        | 34.77          | 18.54          | H       |
|       | 3                  | 700.50             | -22.01                    | 3.66                    | 44.71                   | -0.66                   | 2.15               | 16.23        | 34.77          | 18.54          | V       |
|       |                    | 707.50             | -22.60                    | 3.66                    | 45.17                   | -0.54                   | 2.15               | 16.21        | 34.77          | 18.56          | H       |
|       |                    | 714.50             | -22.79                    | 3.77                    | 45.25                   | -0.49                   | 2.15               | 16.05        | 34.77          | 18.72          | H       |
|       | 5                  | 701.50             | -21.88                    | 3.66                    | 44.77                   | -0.64                   | 2.15               | 16.45        | 34.77          | 18.32          | H       |
|       |                    | 707.50             | -22.30                    | 3.66                    | 45.17                   | -0.54                   | 2.15               | 16.51        | 34.77          | 18.26          | H       |
|       |                    | 713.50             | -22.28                    | 3.77                    | 45.22                   | -0.50                   | 2.15               | 16.53        | 34.77          | 18.24          | H       |
|       | 10                 | 704.00             | -21.99                    | 3.66                    | 44.98                   | -0.59                   | 2.15               | 16.58        | 34.77          | 18.19          | H       |
|       |                    | 707.50             | -22.18                    | 3.66                    | 45.17                   | -0.54                   | 2.15               | 16.63        | 34.77          | 18.14          | H       |
|       |                    | 711.00             | -22.51                    | 3.77                    | 45.31                   | -0.52                   | 2.15               | 16.36        | 34.77          | 18.41          | H       |
| 16QAM | 1.4                | 699.70             | -22.36                    | 3.66                    | 44.67                   | -0.67                   | 2.15               | 15.84        | 34.77          | 18.93          | V       |
|       |                    | 707.50             | -23.29                    | 3.66                    | 45.17                   | -0.54                   | 2.15               | 15.52        | 34.77          | 19.25          | H       |
|       |                    | 715.30             | -23.39                    | 3.77                    | 45.26                   | -0.46                   | 2.15               | 15.49        | 34.77          | 19.28          | H       |
|       | 3                  | 700.50             | -22.62                    | 3.66                    | 44.71                   | -0.66                   | 2.15               | 15.62        | 34.77          | 19.15          | V       |
|       |                    | 707.50             | -23.42                    | 3.66                    | 45.17                   | -0.54                   | 2.15               | 15.39        | 34.77          | 19.38          | H       |
|       |                    | 714.50             | -23.42                    | 3.77                    | 45.25                   | -0.49                   | 2.15               | 15.42        | 34.77          | 19.35          | H       |
|       | 5                  | 701.50             | -22.65                    | 3.66                    | 44.77                   | -0.64                   | 2.15               | 15.68        | 34.77          | 19.09          | V       |
|       |                    | 707.50             | -23.17                    | 3.66                    | 45.17                   | -0.54                   | 2.15               | 15.64        | 34.77          | 19.13          | H       |
|       |                    | 713.50             | -23.07                    | 3.77                    | 45.22                   | -0.50                   | 2.15               | 15.74        | 34.77          | 19.03          | H       |
|       | 10                 | 704.00             | -22.73                    | 3.66                    | 44.98                   | -0.59                   | 2.15               | 15.84        | 34.77          | 18.93          | H       |
|       |                    | 707.50             | -22.98                    | 3.66                    | 45.17                   | -0.54                   | 2.15               | 15.83        | 34.77          | 18.94          | H       |
|       |                    | 711.00             | -23.16                    | 3.77                    | 45.31                   | -0.52                   | 2.15               | 15.71        | 34.77          | 19.06          | H       |
| 64QAM | 1.4                | 699.70             | -23.28                    | 3.66                    | 44.67                   | -0.67                   | 2.15               | 14.92        | 34.77          | 19.85          | V       |
|       |                    | 707.50             | -24.29                    | 3.66                    | 45.17                   | -0.54                   | 2.15               | 14.52        | 34.77          | 20.25          | H       |
|       |                    | 715.30             | -24.38                    | 3.77                    | 45.26                   | -0.46                   | 2.15               | 14.50        | 34.77          | 20.27          | H       |
|       | 3                  | 700.50             | -23.58                    | 3.66                    | 44.71                   | -0.66                   | 2.15               | 14.66        | 34.77          | 20.11          | V       |
|       |                    | 707.50             | -24.34                    | 3.66                    | 45.17                   | -0.54                   | 2.15               | 14.47        | 34.77          | 20.30          | H       |
|       |                    | 714.50             | -24.42                    | 3.77                    | 45.25                   | -0.49                   | 2.15               | 14.42        | 34.77          | 20.35          | H       |
|       | 5                  | 701.50             | -23.58                    | 3.66                    | 44.77                   | -0.64                   | 2.15               | 14.75        | 34.77          | 20.02          | V       |
|       |                    | 707.50             | -24.28                    | 3.66                    | 45.17                   | -0.54                   | 2.15               | 14.53        | 34.77          | 20.24          | H       |
|       |                    | 713.50             | -24.19                    | 3.77                    | 45.22                   | -0.50                   | 2.15               | 14.62        | 34.77          | 20.15          | H       |
|       | 10                 | 704.00             | -23.74                    | 3.66                    | 44.98                   | -0.59                   | 2.15               | 14.83        | 34.77          | 19.94          | H       |
|       |                    | 707.50             | -24.01                    | 3.66                    | 45.17                   | -0.54                   | 2.15               | 14.80        | 34.77          | 19.97          | H       |
|       |                    | 711.00             | -24.21                    | 3.77                    | 45.31                   | -0.52                   | 2.15               | 14.66        | 34.77          | 20.11          | H       |

### LTE Band 13 - ERP

Limits:  $\leq 34.77\text{dBm}$  (3W)

| Mod.  | Bandwidth<br>(MHz) | Frequency<br>(MHz) | P <sub>Mea</sub><br>(dBm) | P <sub>cl</sub><br>(dB) | P <sub>Ag</sub><br>(dB) | G <sub>a</sub><br>(dBi) | Correction<br>(dB) | ERP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Ant.Pol |
|-------|--------------------|--------------------|---------------------------|-------------------------|-------------------------|-------------------------|--------------------|--------------|----------------|----------------|---------|
| QPSK  | 5                  | 779.50             | -23.36                    | 4.10                    | 45.64                   | -0.29                   | 2.15               | 15.74        | 34.77          | 19.03          | H       |
|       |                    | 782.00             | -23.52                    | 4.10                    | 45.65                   | -0.35                   | 2.15               | 15.53        | 34.77          | 19.24          | H       |
|       |                    | 784.50             | -23.60                    | 4.10                    | 45.67                   | -0.38                   | 2.15               | 15.44        | 34.77          | 19.33          | H       |
|       | 10                 | 782.00             | -23.46                    | 4.10                    | 45.65                   | -0.35                   | 2.15               | 15.59        | 34.77          | 19.18          | H       |
| 16QAM | 5                  | 779.50             | -24.28                    | 4.10                    | 45.64                   | -0.29                   | 2.15               | 14.82        | 34.77          | 19.95          | H       |
|       |                    | 782.00             | -24.31                    | 4.10                    | 45.65                   | -0.35                   | 2.15               | 14.74        | 34.77          | 20.03          | H       |
|       |                    | 784.50             | -24.34                    | 4.10                    | 45.67                   | -0.38                   | 2.15               | 14.70        | 34.77          | 20.07          | H       |
|       | 10                 | 782.00             | -24.24                    | 4.10                    | 45.65                   | -0.35                   | 2.15               | 14.81        | 34.77          | 19.96          | H       |
| 64QAM | 5                  | 779.50             | -25.36                    | 4.10                    | 45.64                   | -0.29                   | 2.15               | 13.74        | 34.77          | 21.03          | H       |
|       |                    | 782.00             | -25.28                    | 4.10                    | 45.65                   | -0.35                   | 2.15               | 13.77        | 34.77          | 21.00          | H       |
|       |                    | 784.50             | -25.48                    | 4.10                    | 45.67                   | -0.38                   | 2.15               | 13.56        | 34.77          | 21.21          | H       |
|       | 10                 | 782.00             | -25.23                    | 4.10                    | 45.65                   | -0.35                   | 2.15               | 13.82        | 34.77          | 20.95          | H       |

# LTE Band 66- EIRP

Limits: ≤30dBm (1W)

| Mod.  | Bandwidth<br>(MHz) | Frequency<br>(MHz) | P <sub>Mea</sub><br>(dBm) | P <sub>cl</sub><br>(dB) | P <sub>Ag</sub><br>(dB) | G <sub>a</sub><br>(dBi) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Ant.Pol |
|-------|--------------------|--------------------|---------------------------|-------------------------|-------------------------|-------------------------|---------------|----------------|----------------|---------|
| QPSK  | 1.4                | 1710.70            | -20.30                    | 6.39                    | 44.08                   | 6.01                    | 23.40         | 30.00          | 6.60           | H       |
|       |                    | 1745.00            | -19.66                    | 6.25                    | 44.46                   | 5.74                    | 24.29         | 30.00          | 5.71           | H       |
|       |                    | 1779.30            | -18.37                    | 6.43                    | 44.03                   | 5.50                    | 24.73         | 30.00          | 5.27           | H       |
|       | 3                  | 1711.50            | -20.37                    | 6.39                    | 44.10                   | 6.01                    | 23.34         | 30.00          | 6.66           | H       |
|       |                    | 1745.00            | -19.76                    | 6.25                    | 44.46                   | 5.74                    | 24.19         | 30.00          | 5.81           | H       |
|       |                    | 1778.50            | -18.50                    | 6.43                    | 44.03                   | 5.51                    | 24.61         | 30.00          | 5.39           | H       |
|       | 5                  | 1712.50            | -20.94                    | 6.39                    | 44.90                   | 6.00                    | 23.57         | 30.00          | 6.43           | H       |
|       |                    | 1745.00            | -19.55                    | 6.25                    | 44.46                   | 5.74                    | 24.40         | 30.00          | 5.60           | H       |
|       |                    | 1777.50            | -18.50                    | 6.43                    | 44.18                   | 5.52                    | 24.77         | 30.00          | 5.23           | H       |
|       | 10                 | 1715.00            | -20.34                    | 6.39                    | 44.37                   | 5.98                    | 23.62         | 30.00          | 6.38           | H       |
|       |                    | 1745.00            | -19.46                    | 6.25                    | 44.46                   | 5.74                    | 24.49         | 30.00          | 5.51           | H       |
|       |                    | 1775.00            | -19.19                    | 6.43                    | 44.83                   | 5.54                    | 24.74         | 30.00          | 5.26           | H       |
|       | 15                 | 1717.50            | -19.70                    | 6.39                    | 44.11                   | 5.96                    | 23.98         | 30.00          | 6.02           | H       |
|       |                    | 1745.00            | -19.33                    | 6.25                    | 44.46                   | 5.74                    | 24.62         | 30.00          | 5.38           | H       |
|       |                    | 1772.50            | -18.54                    | 6.36                    | 44.06                   | 5.56                    | 24.72         | 30.00          | 5.28           | H       |
|       | 20                 | 1720.00            | -19.50                    | 6.39                    | 44.18                   | 5.94                    | 24.23         | 30.00          | 5.77           | H       |
|       |                    | 1745.00            | -19.38                    | 6.25                    | 44.46                   | 5.74                    | 24.57         | 30.00          | 5.43           | H       |
|       |                    | 1770.00            | -18.72                    | 6.36                    | 44.13                   | 5.59                    | 24.63         | 30.00          | 5.37           | H       |
| 16QAM | 1.4                | 1710.70            | -21.05                    | 6.39                    | 44.08                   | 6.01                    | 22.65         | 30.00          | 7.35           | H       |
|       |                    | 1745.00            | -20.45                    | 6.25                    | 44.46                   | 5.74                    | 23.50         | 30.00          | 6.50           | H       |
|       |                    | 1779.30            | -19.14                    | 6.43                    | 44.03                   | 5.50                    | 23.96         | 30.00          | 6.04           | H       |
|       | 3                  | 1711.50            | -21.14                    | 6.39                    | 44.10                   | 6.01                    | 22.57         | 30.00          | 7.43           | H       |
|       |                    | 1745.00            | -20.58                    | 6.25                    | 44.46                   | 5.74                    | 23.37         | 30.00          | 6.63           | H       |
|       |                    | 1778.50            | -19.22                    | 6.43                    | 44.03                   | 5.51                    | 23.89         | 30.00          | 6.11           | H       |
|       | 5                  | 1712.50            | -21.53                    | 6.39                    | 44.90                   | 6.00                    | 22.98         | 30.00          | 7.02           | H       |
|       |                    | 1745.00            | -20.32                    | 6.25                    | 44.46                   | 5.74                    | 23.63         | 30.00          | 6.37           | H       |
|       |                    | 1777.50            | -19.23                    | 6.43                    | 44.18                   | 5.52                    | 24.04         | 30.00          | 5.96           | H       |
|       | 10                 | 1715.00            | -21.03                    | 6.39                    | 44.37                   | 5.98                    | 22.93         | 30.00          | 7.07           | H       |
|       |                    | 1745.00            | -20.35                    | 6.25                    | 44.46                   | 5.74                    | 23.60         | 30.00          | 6.40           | H       |
|       |                    | 1775.00            | -20.01                    | 6.43                    | 44.83                   | 5.54                    | 23.92         | 30.00          | 6.08           | H       |
|       | 15                 | 1717.50            | -20.45                    | 6.39                    | 44.11                   | 5.96                    | 23.23         | 30.00          | 6.77           | H       |
|       |                    | 1745.00            | -20.18                    | 6.25                    | 44.46                   | 5.74                    | 23.77         | 30.00          | 6.23           | H       |
|       |                    | 1772.50            | -19.31                    | 6.36                    | 44.06                   | 5.56                    | 23.95         | 30.00          | 6.05           | H       |
|       | 20                 | 1720.00            | -20.27                    | 6.39                    | 44.18                   | 5.94                    | 23.46         | 30.00          | 6.54           | H       |
|       |                    | 1745.00            | -20.08                    | 6.25                    | 44.46                   | 5.74                    | 23.87         | 30.00          | 6.13           | H       |
|       |                    | 1770.00            | -19.41                    | 6.36                    | 44.13                   | 5.59                    | 23.94         | 30.00          | 6.06           | H       |
| 64QAM | 1.4                | 1710.70            | -22.02                    | 6.39                    | 44.08                   | 6.01                    | 21.68         | 30.00          | 8.32           | H       |
|       |                    | 1745.00            | -21.44                    | 6.25                    | 44.46                   | 5.74                    | 22.51         | 30.00          | 7.49           | H       |

|  |    |         |        |      |       |      |       |       |      |   |
|--|----|---------|--------|------|-------|------|-------|-------|------|---|
|  |    | 1779.30 | -19.98 | 6.43 | 44.03 | 5.50 | 23.12 | 30.00 | 6.88 | H |
|  | 3  | 1711.50 | -22.15 | 6.39 | 44.10 | 6.01 | 21.56 | 30.00 | 8.44 | H |
|  |    | 1745.00 | -21.52 | 6.25 | 44.46 | 5.74 | 22.43 | 30.00 | 7.57 | H |
|  |    | 1778.50 | -20.16 | 6.43 | 44.03 | 5.51 | 22.95 | 30.00 | 7.05 | H |
|  | 5  | 1712.50 | -22.58 | 6.39 | 44.90 | 6.00 | 21.93 | 30.00 | 8.07 | H |
|  |    | 1745.00 | -21.28 | 6.25 | 44.46 | 5.74 | 22.67 | 30.00 | 7.33 | H |
|  |    | 1777.50 | -20.29 | 6.43 | 44.18 | 5.52 | 22.98 | 30.00 | 7.02 | H |
|  | 10 | 1715.00 | -22.16 | 6.39 | 44.37 | 5.98 | 21.80 | 30.00 | 8.20 | H |
|  |    | 1745.00 | -21.28 | 6.25 | 44.46 | 5.74 | 22.67 | 30.00 | 7.33 | H |
|  |    | 1775.00 | -20.96 | 6.43 | 44.83 | 5.54 | 22.97 | 30.00 | 7.03 | H |
|  | 15 | 1717.50 | -21.45 | 6.39 | 44.11 | 5.96 | 22.23 | 30.00 | 7.77 | H |
|  |    | 1745.00 | -21.13 | 6.25 | 44.46 | 5.74 | 22.82 | 30.00 | 7.18 | H |
|  |    | 1772.50 | -20.35 | 6.36 | 44.06 | 5.56 | 22.91 | 30.00 | 7.09 | H |
|  | 20 | 1720.00 | -21.35 | 6.39 | 44.18 | 5.94 | 22.38 | 30.00 | 7.62 | H |
|  |    | 1745.00 | -21.15 | 6.25 | 44.46 | 5.74 | 22.80 | 30.00 | 7.20 | H |
|  |    | 1770.00 | -20.59 | 6.36 | 44.13 | 5.59 | 22.76 | 30.00 | 7.24 | H |

## **A.2 Emission Limit**

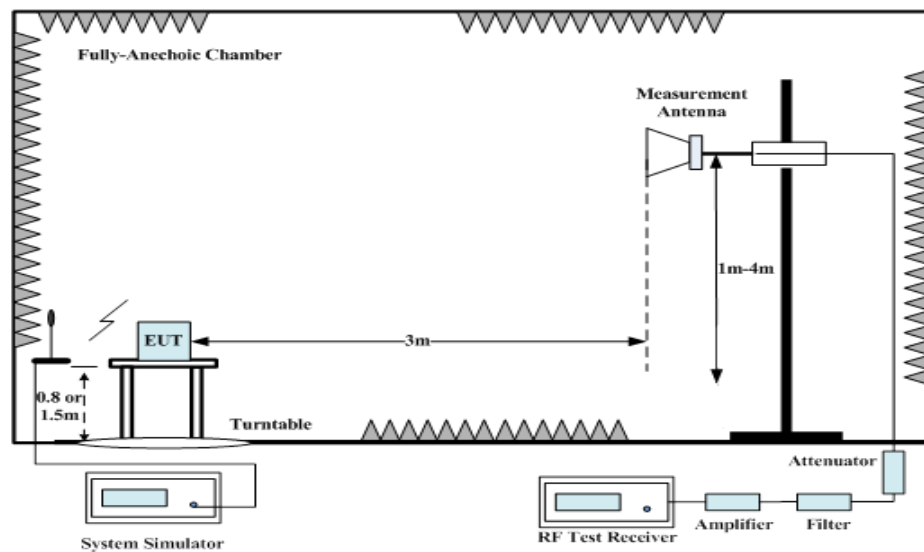
### **A.2.1 Measurement Method**

The measurement procedures in ANSI C63.26 are used.

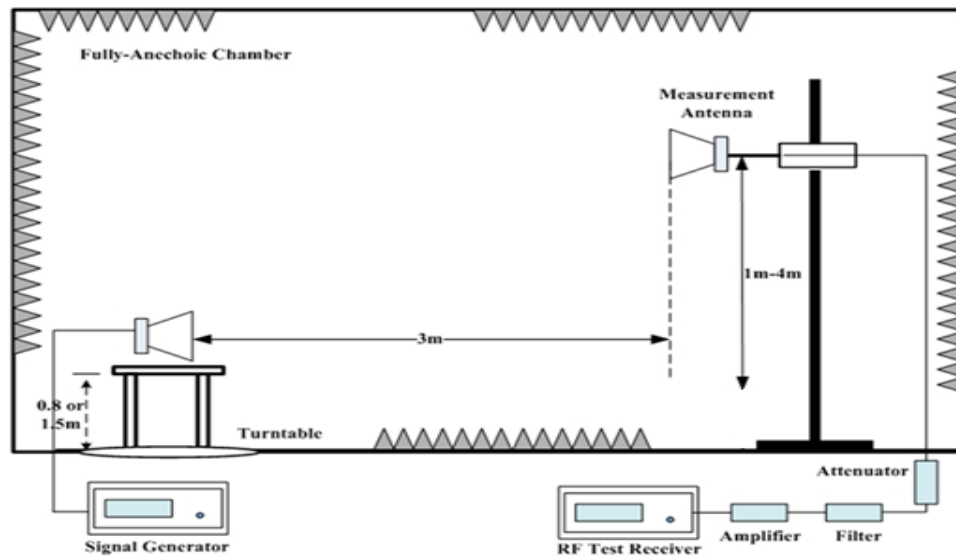
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of each LTE Band.

#### **The procedure of radiated spurious emissions is as follows:**

For measurements performed at frequencies less than or equal to 1 GHz, the EUT was placed on a 80cm-high non-conductive support; For measurements performed at frequencies above 1GHz,EUT was placed on a 1.5-meter-high non-conductive support. A measurement antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. In the initial test, the height of the measurement antenna was varied from 1 m to 4 m for the relative positioning that produces the maximum radiated signal level. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.



1. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
2. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. The height of measurement antenna varied between 1 m to 4 m to maximize the received signal amplitude for each emission that was detected and measured in the initial test. A power ( $P_{Mea}$ ) is applied to the input of the substitution antenna and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded ( $P_r$ ). The power of signal source ( $P_{Mea}$ ) is recorded. The test was performed with the measurement antenna in both vertical and horizontal polarization.

3. The Path loss ( $P_{pl}$ ) between the Signal Source and the Substitution Antenna and the Substitution Antenna Gain ( $G_a$ ) were recorded after test. A amplifier was connected in for the test. The Path loss ( $P_{pl}$ ) is the summation of the cable loss and the gain of the amplifier.
4. The measurement results are obtained as described below:

$$\text{Power (EIRP)} = P_{Mea} - P_{pl} + G_a$$

This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15 \text{ dBi}$ .

### A.2.2 Measurement Limit

**FDD Band 2:** Part 24.238 specifies that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power ( $P$ ) by a factor of at least  $43 + 10 \log(P)$  dB.

**FDD Band 4/ 66:** Part 27.53(h) specifies that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power ( $P$ ) by a factor of at least  $43 + 10 \log(P)$  dB.

**FDD Band 5:** Part 22.917 specifies that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power ( $P$ ) by a factor of at least  $43 + 10 \log(P)$  dB.

**FDD Band 7:** Part 27.53(m) specifies for mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log(P)$  dB on all frequencies between 5 megahertz and X megahertz

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

**FDD Band 12/13:** Part 27.53(g) states for operations in the 600 MHz band and the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

### A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of each LTE Band. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of each LTE Band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this. The range of evaluated frequency is from 9 kHz to 26GHz.

Note 1: Both of Vertical and Horizontal polarizations are evaluated, but only the worst case is recorded in this report.

### A.2.4 Measurement Results Table

| Frequency | Channel | Frequency Range | Result |
|-----------|---------|-----------------|--------|
| LTE Bands | Low     | 9kHz-26GHz      | Pass   |
|           | Middle  | 9kHz-26GHz      | Pass   |
|           | High    | 9kHz-26GHz      | Pass   |

### A.2.5 Sweep Table

| Subrange     | RBW    | VBW    |
|--------------|--------|--------|
| 9~150 kHz    | 0.2kHz | 0.6kHz |
| 150kHz~30MHz | 9kHz   | 27kHz  |
| 30MHz~1 GHz  | 100KHz | 300KHz |
| 1~26 GHz     | 1 MHz  | 3 MHz  |

## A.2.6 Measurement Result

### LTE Band 2, 1.4MHz, QPSK, Channel 18607

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|-----------------|------------------------|----------------------|-------------------|-----------------|-------------|-------------|--------------|
| 3701.50         | -61.23                 | 3.47                 | 10.39             | -54.31          | -13.00      | 41.31       | V            |
| 5552.00         | -59.84                 | 5.32                 | 11.20             | -53.96          | -13.00      | 40.96       | V            |
| 7400.50         | -52.02                 | 8.09                 | 10.10             | -50.01          | -13.00      | 37.01       | V            |
| 9251.00         | -51.60                 | 8.85                 | 11.70             | -48.75          | -13.00      | 35.75       | H            |
| 11092.00        | -49.98                 | 9.65                 | 12.59             | -47.04          | -13.00      | 34.04       | H            |
| 12960.50        | -49.24                 | 12.52                | 12.74             | -49.02          | -13.00      | 36.02       | V            |

### LTE Band 2, 1.4MHz, QPSK, Channel 18900

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|-----------------|------------------------|----------------------|-------------------|-----------------|-------------|-------------|--------------|
| 3761.00         | -63.95                 | 3.81                 | 10.16             | -57.60          | -13.00      | 44.60       | H            |
| 5640.50         | -57.89                 | 5.61                 | 11.38             | -52.12          | -13.00      | 39.12       | H            |
| 7507.00         | -53.44                 | 7.70                 | 10.21             | -50.93          | -13.00      | 37.93       | V            |
| 9393.00         | -50.52                 | 9.12                 | 11.50             | -48.14          | -13.00      | 35.14       | H            |
| 11285.00        | -49.47                 | 10.63                | 12.62             | -47.48          | -13.00      | 34.48       | H            |
| 13160.50        | -46.98                 | 13.21                | 12.54             | -47.65          | -13.00      | 34.65       | V            |

### LTE Band 2, 1.4MHz, QPSK, Channel 19193

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|-----------------|------------------------|----------------------|-------------------|-----------------|-------------|-------------|--------------|
| 3825.00         | -63.39                 | 3.93                 | 9.95              | -57.37          | -13.00      | 44.37       | H            |
| 5728.00         | -59.93                 | 5.89                 | 11.34             | -54.48          | -13.00      | 41.48       | H            |
| 7638.00         | -54.07                 | 6.77                 | 10.38             | -50.46          | -13.00      | 37.46       | V            |
| 9555.00         | -52.86                 | 8.59                 | 11.90             | -49.55          | -13.00      | 36.55       | H            |
| 11444.50        | -48.51                 | 12.41                | 12.56             | -48.36          | -13.00      | 35.36       | H            |
| 13375.50        | -46.18                 | 12.39                | 12.42             | -46.15          | -13.00      | 33.15       | V            |

**LTE Band 4, 1.4MHz QPSK, Channel 19957**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|-----------------|------------------------|----------------------|-------------------|-----------------|-------------|-------------|--------------|
| 3421.50         | -66.48                 | 3.24                 | 10.04             | -59.68          | -13.00      | 46.68       | H            |
| 10249.50        | -60.25                 | 10.93                | 11.90             | -59.28          | -13.00      | 46.28       | V            |
| 11983.00        | -58.90                 | 12.24                | 13.07             | -58.07          | -13.00      | 45.07       | H            |
| 13698.00        | -55.33                 | 13.05                | 12.20             | -56.18          | -13.00      | 43.18       | H            |
| 15408.00        | -58.28                 | 14.90                | 15.42             | -57.76          | -13.00      | 44.76       | H            |
| 17096.50        | -49.26                 | 18.45                | 13.51             | -54.20          | -13.00      | 41.20       | H            |

**LTE Band 4, 1.4MHz, QPSK, Channel 20175**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|-----------------|------------------------|----------------------|-------------------|-----------------|-------------|-------------|--------------|
| 8672.50         | -63.11                 | 8.54                 | 11.16             | -60.49          | -13.00      | 47.49       | H            |
| 10382.00        | -59.51                 | 10.70                | 11.98             | -58.23          | -13.00      | 45.23       | V            |
| 12128.00        | -58.86                 | 12.23                | 13.33             | -57.76          | -13.00      | 44.76       | V            |
| 13846.50        | -55.84                 | 13.08                | 12.10             | -56.82          | -13.00      | 43.82       | H            |
| 15606.00        | -57.31                 | 16.43                | 15.59             | -58.15          | -13.00      | 45.15       | H            |
| 17316.50        | -47.23                 | 19.25                | 13.17             | -53.31          | -13.00      | 40.31       | H            |

**LTE Band 4, 1.4MHz, QPSK, Channel 20393**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|-----------------|------------------------|----------------------|-------------------|-----------------|-------------|-------------|--------------|
| 3508.50         | -62.93                 | 3.11                 | 10.13             | -55.91          | -13.00      | 42.91       | H            |
| 10523.50        | -60.76                 | 10.40                | 11.92             | -59.24          | -13.00      | 46.24       | V            |
| 12267.50        | -60.39                 | 11.56                | 13.40             | -58.55          | -13.00      | 45.55       | H            |
| 14044.00        | -54.05                 | 14.10                | 12.24             | -55.91          | -13.00      | 42.91       | H            |
| 15795.50        | -57.15                 | 16.45                | 15.60             | -58.00          | -13.00      | 45.00       | V            |
| 17530.00        | -46.79                 | 19.68                | 13.13             | -53.34          | -13.00      | 40.34       | V            |

**LTE Band 5, 1.4MHz, QPSK, Channel 20407**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Correction | Peak ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|-------------------|------------|----------------|-------------|-------------|--------------|
| 2461.50         | -52.81                 | 4.31                 | 10.38             | 2.15       | -48.89         | -13.00      | 35.89       | V            |
| 4939.00         | -58.93                 | 4.90                 | 11.16             | 2.15       | -54.82         | -13.00      | 41.82       | V            |
| 5780.50         | -57.47                 | 5.68                 | 11.12             | 2.15       | -54.18         | -13.00      | 41.18       | V            |
| 6609.50         | -52.65                 | 7.01                 | 10.32             | 2.15       | -51.49         | -13.00      | 38.49       | H            |
| 7408.00         | -49.88                 | 8.05                 | 10.10             | 2.15       | -49.98         | -13.00      | 36.98       | V            |
| 8246.50         | -51.68                 | 7.59                 | 11.20             | 2.15       | -50.22         | -13.00      | 37.22       | V            |

**LTE Band 5, 1.4MHz, QPSK, Channel 20525**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | Path Loss(dB) | AntennaGain (dBi) | Correction | Peak ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|---------------|-------------------|------------|----------------|-------------|-------------|--------------|
| 2497.50         | -53.13                 | 4.45          | 10.31             | 2.15       | -49.42         | -13.00      | 36.42       | V            |
| 5023.50         | -57.81                 | 5.49          | 11.44             | 2.15       | -54.01         | -13.00      | 41.01       | H            |
| 5866.50         | -58.25                 | 5.62          | 10.93             | 2.15       | -55.09         | -13.00      | 42.09       | V            |
| 6694.00         | -53.63                 | 6.20          | 10.49             | 2.15       | -51.49         | -13.00      | 38.49       | V            |
| 7521.50         | -50.64                 | 7.71          | 10.24             | 2.15       | -50.26         | -13.00      | 37.26       | V            |
| 8362.50         | -50.94                 | 8.22          | 11.30             | 2.15       | -50.01         | -13.00      | 37.01       | H            |

**LTE Band 5, 1.4MHz, QPSK, Channel 20643**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | Path Loss(dB) | AntennaGain (dBi) | Correction | Peak ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|---------------|-------------------|------------|----------------|-------------|-------------|--------------|
| 2544.00         | -52.87                 | 4.62          | 10.30             | 2.15       | -49.34         | -13.00      | 36.34       | H            |
| 4254.00         | -58.60                 | 4.89          | 10.32             | 2.15       | -55.32         | -13.00      | 42.32       | V            |
| 5943.00         | -56.44                 | 5.44          | 10.71             | 2.15       | -53.32         | -13.00      | 40.32       | V            |
| 6772.50         | -54.02                 | 6.40          | 10.34             | 2.15       | -52.23         | -13.00      | 39.23       | V            |
| 7632.00         | -51.84                 | 6.73          | 10.36             | 2.15       | -50.36         | -13.00      | 37.36       | V            |
| 8475.50         | -50.78                 | 8.03          | 11.30             | 2.15       | -49.66         | -13.00      | 36.66       | H            |

**LTE Band 7, 5 MHz, QPSK, Channel 20775**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|-----------------|------------------------|----------------------|-------------------|-----------------|-------------|-------------|--------------|
| 5005.00         | -61.10                 | 5.15                 | 11.33             | -54.92          | -25.00      | 29.92       | V            |
| 7508.00         | -50.82                 | 7.70                 | 10.22             | -48.30          | -25.00      | 23.30       | V            |
| 10011.00        | -51.04                 | 9.35                 | 11.79             | -48.60          | -25.00      | 23.60       | V            |
| 12500.50        | -49.32                 | 12.35                | 13.60             | -48.07          | -25.00      | 23.07       | H            |
| 15024.00        | -47.89                 | 14.73                | 14.67             | -47.95          | -25.00      | 22.95       | H            |
| 17510.50        | -35.60                 | 19.71                | 13.11             | -42.20          | -25.00      | 17.20       | H            |

**LTE Band 7, 5 MHz, QPSK, Channel 21100**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|-----------------|------------------------|----------------------|-------------------|-----------------|-------------|-------------|--------------|
| 5070.00         | -60.52                 | 5.30                 | 11.60             | -54.22          | -25.00      | 29.22       | V            |
| 7605.50         | -50.55                 | 7.58                 | 10.31             | -47.82          | -25.00      | 22.82       | V            |
| 10140.00        | -50.77                 | 9.75                 | 11.78             | -48.74          | -25.00      | 23.74       | V            |
| 12682.50        | -50.63                 | 11.73                | 13.14             | -49.22          | -25.00      | 24.22       | V            |
| 15197.00        | -48.39                 | 15.14                | 15.00             | -48.53          | -25.00      | 23.53       | H            |
| 17756.00        | -36.99                 | 19.56                | 13.46             | -43.09          | -25.00      | 18.09       | H            |

**LTE Band 7, 5 MHz, QPSK, Channel 21425**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|-----------------|------------------------|----------------------|-------------------|-----------------|-------------|-------------|--------------|
| 5135.50         | -58.31                 | 5.55                 | 11.60             | -52.26          | -25.00      | 27.26       | V            |
| 7702.50         | -55.96                 | 6.72                 | 10.60             | -52.08          | -25.00      | 27.08       | V            |
| 10271.00        | -47.10                 | 10.75                | 11.90             | -45.95          | -25.00      | 20.95       | V            |
| 12842.50        | -47.03                 | 13.01                | 12.92             | -47.12          | -25.00      | 22.12       | V            |
| 15395.50        | -48.09                 | 14.88                | 15.39             | -47.58          | -25.00      | 22.58       | H            |
| 17961.50        | -36.30                 | 20.02                | 13.48             | -42.84          | -25.00      | 17.84       | H            |

**LTE Band 12, 1.4MHz, QPSK, Channel 23017**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Correction | Peak ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|-------------------|------------|----------------|-------------|-------------|--------------|
| 1399.50         | -65.47                 | 3.24                 | 4.98              | 2.15       | -65.88         | -13.00      | 52.88       | H            |
| 2111.00         | -61.90                 | 4.20                 | 4.93              | 2.15       | -63.32         | -13.00      | 50.32       | V            |
| 2809.50         | -57.44                 | 4.93                 | 6.66              | 2.15       | -57.86         | -13.00      | 44.86       | H            |
| 3512.36         | -67.68                 | 5.54                 | 8.22              | 2.15       | -67.15         | -13.00      | 54.15       | H            |
| 4196.81         | -65.64                 | 6.20                 | 9.10              | 2.15       | -64.89         | -13.00      | 51.89       | V            |
| 4907.59         | -65.59                 | 6.73                 | 9.81              | 2.15       | -64.66         | -13.00      | 51.66       | H            |

**LTE Band 12, 1.4MHz, QPSK, Channel 23095**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Correction | Peak ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|-------------------|------------|----------------|-------------|-------------|--------------|
| 1415.00         | -66.08                 | 3.25                 | 5.06              | 2.15       | -66.42         | -13.00      | 53.42       | V            |
| 2135.50         | -61.45                 | 4.23                 | 5.01              | 2.15       | -62.82         | -13.00      | 49.82       | H            |
| 2820.50         | -57.25                 | 4.94                 | 6.68              | 2.15       | -57.66         | -13.00      | 44.66       | V            |
| 3531.38         | -67.28                 | 5.63                 | 8.24              | 2.15       | -66.82         | -13.00      | 53.82       | V            |
| 4256.29         | -65.91                 | 6.23                 | 9.16              | 2.15       | -65.13         | -13.00      | 52.13       | H            |
| 4946.10         | -65.74                 | 6.70                 | 9.85              | 2.15       | -64.74         | -13.00      | 51.74       | H            |

**LTE Band 12, 1.4MHz, QPSK, Channel 23173**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Correction | Peak ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|-------------------|------------|----------------|-------------|-------------|--------------|
| 1430.50         | -66.32                 | 3.28                 | 5.14              | 2.15       | -66.61         | -13.00      | 53.61       | H            |
| 2155.00         | -61.42                 | 4.25                 | 5.06              | 2.15       | -62.76         | -13.00      | 49.76       | V            |
| 2867.00         | -56.89                 | 4.96                 | 6.76              | 2.15       | -57.24         | -13.00      | 44.24       | H            |
| 3590.85         | -66.49                 | 6.24                 | 8.33              | 2.15       | -66.55         | -13.00      | 53.55       | H            |
| 4284.56         | -65.46                 | 6.21                 | 9.18              | 2.15       | -64.64         | -13.00      | 51.64       | V            |
| 5018.25         | -65.77                 | 6.57                 | 9.93              | 2.15       | -64.56         | -13.00      | 51.56       | V            |

**LTE Band 13, 5MHz, QPSK, Channel 23205**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Correction | Peak ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|-------------------|------------|----------------|-------------|-------------|--------------|
| 2342.73         | -50.80                 | 4.45                 | 5.63              | 2.15       | -51.77         | -13.00      | 38.77       | H            |
| 3117.50         | -61.85                 | 5.38                 | 7.28              | 2.15       | -62.10         | -13.00      | 49.10       | V            |
| 3895.00         | -61.16                 | 6.11                 | 8.75              | 2.15       | -60.67         | -13.00      | 47.67       | H            |
| 4680.00         | -59.14                 | 6.49                 | 9.58              | 2.15       | -58.20         | -13.00      | 45.20       | V            |
| 5457.50         | -58.94                 | 6.90                 | 10.54             | 2.15       | -57.45         | -13.00      | 44.45       | H            |
| 6237.50         | -57.20                 | 7.42                 | 10.74             | 2.15       | -56.03         | -13.00      | 43.03       | V            |

**LTE Band 13, 5MHz, QPSK, Channel 23230**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Correction | Peak ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|-------------------|------------|----------------|-------------|-------------|--------------|
| 2346.20         | -50.18                 | 4.45                 | 5.64              | 2.15       | -51.14         | -13.00      | 38.14       | H            |
| 3132.50         | -61.99                 | 5.39                 | 7.32              | 2.15       | -62.21         | -13.00      | 49.21       | V            |
| 3912.50         | -60.24                 | 6.12                 | 8.78              | 2.15       | -59.73         | -13.00      | 46.73       | H            |
| 4692.50         | -59.75                 | 6.50                 | 9.59              | 2.15       | -58.81         | -13.00      | 45.81       | V            |
| 5477.50         | -59.07                 | 6.97                 | 10.57             | 2.15       | -57.62         | -13.00      | 44.62       | V            |
| 6252.50         | -56.50                 | 7.45                 | 10.75             | 2.15       | -55.35         | -13.00      | 42.35       | V            |

**LTE Band 13, 5MHz, QPSK, Channel 23255**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Correction | Peak ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|-------------------|------------|----------------|-------------|-------------|--------------|
| 2354.15         | -49.60                 | 4.46                 | 5.66              | 2.15       | -50.55         | -13.00      | 37.55       | H            |
| 3152.50         | -61.66                 | 5.37                 | 7.37              | 2.15       | -61.81         | -13.00      | 48.81       | V            |
| 3915.00         | -59.93                 | 6.12                 | 8.78              | 2.15       | -59.42         | -13.00      | 46.42       | V            |
| 4705.00         | -59.44                 | 6.51                 | 9.61              | 2.15       | -58.49         | -13.00      | 45.49       | V            |
| 5497.50         | -58.57                 | 7.05                 | 10.60             | 2.15       | -57.17         | -13.00      | 44.17       | V            |
| 6270.00         | -55.81                 | 7.47                 | 10.77             | 2.15       | -54.66         | -13.00      | 41.66       | V            |

**LTE Band 66, 1.4MHz QPSK, Channel 131979**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|-------------------|-----------------|-------------|-------------|--------------|
| 3421.50         | -66.60                 | 3.24                 | 10.04             | -59.80          | -13.00      | 46.80       | H            |
| 10271.00        | -60.40                 | 10.75                | 11.90             | -59.25          | -13.00      | 46.25       | H            |
| 11987.50        | -59.12                 | 12.22                | 13.08             | -58.26          | -13.00      | 45.26       | V            |
| 13692.50        | -54.94                 | 13.03                | 12.20             | -55.77          | -13.00      | 42.77       | H            |
| 15394.50        | -58.36                 | 14.88                | 15.39             | -57.85          | -13.00      | 44.85       | H            |
| 17111.00        | -49.53                 | 18.45                | 13.49             | -54.49          | -13.00      | 41.49       | H            |

**LTE Band 66, 1.4MHz, QPSK, Channel 132322**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|-------------------|-----------------|-------------|-------------|--------------|
| 3490.00         | -67.79                 | 2.86                 | 10.10             | -60.55          | -13.00      | 47.55       | H            |
| 10471.00        | -60.04                 | 10.36                | 11.93             | -58.47          | -13.00      | 45.47       | V            |
| 12216.00        | -59.51                 | 12.17                | 13.40             | -58.28          | -13.00      | 45.28       | H            |
| 13949.50        | -54.16                 | 14.69                | 12.15             | -56.70          | -13.00      | 43.70       | H            |
| 15697.50        | -57.10                 | 16.66                | 15.50             | -58.26          | -13.00      | 45.26       | H            |
| 17446.50        | -46.89                 | 19.26                | 13.05             | -53.10          | -13.00      | 40.10       | H            |

**LTE Band 66, 1.4MHz, QPSK, Channel 132665**

| Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>pl</sub> (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|-----------------|------------------------|----------------------|-------------------|-----------------|-------------|-------------|--------------|
| 8904.50         | -63.75                 | 8.05                 | 11.60             | -60.20          | -13.00      | 47.20       | H            |
| 10680.50        | -61.45                 | 10.03                | 12.08             | -59.40          | -13.00      | 46.40       | H            |
| 12461.00        | -58.70                 | 12.86                | 13.52             | -58.04          | -13.00      | 45.04       | V            |
| 14228.00        | -56.81                 | 13.10                | 12.63             | -57.28          | -13.00      | 44.28       | H            |
| 16028.50        | -55.80                 | 17.41                | 15.31             | -57.90          | -13.00      | 44.90       | V            |
| 17785.00        | -47.53                 | 19.55                | 13.48             | -53.60          | -13.00      | 40.60       | H            |

Note: Peak EIRP (dBm) = P<sub>Mea</sub>(dBm) - Path Loss(dB) + Antenna Gain(dBi)

### **A.3 Frequency Stability**

#### **A.3.1 Method of Measurement**

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20 °C and rated supply voltage. Two reference points are established at the applicable unwanted emissions limit using a RBW equal to the RBW required by the unwanted emissions specification of the applicable regulatory standard. These reference points measured using the lowest and highest channel of operation shall be identified as  $F_L$  and  $F_H$  respectively.

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of CMW500.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30°C.
3. With the EUT, powered via nominal voltage, connected to the CMW500, and in a simulated call on middle channel for each LTE band, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50°C.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the center channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 °C decrements from +50°C to -30°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of the lower, higher and nominal voltage. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress.

### A.3.2 Measurement results

#### LTE band 2, 20MHz bandwidth QPSK(worst case of all bandwidths)

##### Frequency Error vs Temperature

| Temperature(°C) | Voltage(V) | FL(MHz)  | FH(MHz)  | Offset(Hz) | Frequency error(ppm) |
|-----------------|------------|----------|----------|------------|----------------------|
| 20              | 3.82       | 1850.860 | 1909.140 |            |                      |
| 50              |            |          |          | 1.97       | 0.0011               |
| 40              |            |          |          | 1.53       | 0.0008               |
| 30              |            |          |          | 1.82       | 0.0010               |
| 10              |            |          |          | -0.90      | 0.0005               |
| 0               |            |          |          | -1.32      | 0.0007               |
| -10             |            |          |          | 2.40       | 0.0013               |
| -20             |            |          |          | 2.80       | 0.0015               |
| -30             |            |          |          | 1.67       | 0.0009               |

##### Frequency Error vs Voltage

| Voltage(V) | Temperature(°C) | FL(MHz)  | FH(MHz)  | Offset(Hz) | Frequency error(ppm) |
|------------|-----------------|----------|----------|------------|----------------------|
| 3.45       | 20              | 1850.860 | 1909.140 | 0.42       | 0.0002               |
| 4.4        |                 |          |          | 1.57       | 0.0008               |

#### LTE band 4, 20MHz bandwidth QPSK(worst case of all bandwidths)

##### Frequency Error vs Temperature

| Temperature(°C) | Voltage(V) | FL(MHz)  | FH(MHz)  | Offset(Hz) | Frequency error(ppm) |
|-----------------|------------|----------|----------|------------|----------------------|
| 20              | 3.82       | 1710.860 | 1754.140 |            |                      |
| 50              |            |          |          | -1.00      | 0.0006               |
| 40              |            |          |          | -0.09      | 0.0000               |
| 30              |            |          |          | -2.86      | 0.0017               |
| 10              |            |          |          | -2.42      | 0.0014               |
| 0               |            |          |          | -2.20      | 0.0013               |
| -10             |            |          |          | -1.00      | 0.0006               |
| -20             |            |          |          | -2.30      | 0.0013               |
| -30             |            |          |          | -1.97      | 0.0011               |

##### Frequency Error vs Voltage

| Voltage(V) | Temperature(°C) | FL(MHz)  | FH(MHz)  | Offset(Hz) | Frequency error(ppm) |
|------------|-----------------|----------|----------|------------|----------------------|
| 3.45       | 20              | 1710.860 | 1754.140 | -2.09      | 0.0012               |
| 4.4        |                 |          |          | -2.15      | 0.0012               |

**LTE band 5, 10MHz bandwidth QPSK(worst case of all bandwidths)**
**Frequency Error vs Temperature**

| Temperature(°C) | Voltage(V) | FL(MHz) | FH(MHz) | Offset(Hz) | Frequency error(ppm) |
|-----------------|------------|---------|---------|------------|----------------------|
| 20              | 3.82       | 824.430 | 848.570 |            |                      |
| 50              |            |         |         | 0.50       | 0.0006               |
| 40              |            |         |         | 1.55       | 0.0018               |
| 30              |            |         |         | 1.42       | 0.0017               |
| 10              |            |         |         | 1.60       | 0.0019               |
| 0               |            |         |         | 1.90       | 0.0023               |
| -10             |            |         |         | 0.97       | 0.0012               |
| -20             |            |         |         | 1.16       | 0.0014               |
| -30             |            |         |         | 0.42       | 0.0005               |

**Frequency Error vs Voltage**

| Voltage(V) | Temperature(°C) | FL(MHz) | FH(MHz) | Offset(Hz) | Frequency error(ppm) |
|------------|-----------------|---------|---------|------------|----------------------|
| 3.45       | 20              | 824.430 | 848.570 | 0.14       | 0.0002               |
| 4.4        |                 |         |         | 0.24       | 0.0003               |

**LTE band 7, 20MHz bandwidth QPSK(worst case of all bandwidths)**
**Frequency Error vs Temperature**

| Temperature(°C) | Voltage(V) | FL(MHz)  | FH(MHz)  | Offset(Hz) | Frequency error(ppm) |
|-----------------|------------|----------|----------|------------|----------------------|
| 20              | 3.82       | 2500.700 | 2569.300 |            |                      |
| 50              |            |          |          | -1.02      | 0.0004               |
| 40              |            |          |          | 0.77       | 0.0003               |
| 30              |            |          |          | -0.13      | 0.0001               |
| 10              |            |          |          | -0.74      | 0.0003               |
| 0               |            |          |          | 1.25       | 0.0005               |
| -10             |            |          |          | -1.10      | 0.0004               |
| -20             |            |          |          | 0.12       | 0.0000               |
| -30             |            |          |          | -0.79      | 0.0003               |

**Frequency Error vs Voltage**

| Voltage(V) | Temperature(°C) | FL(MHz)  | FH(MHz)  | Offset(Hz) | Frequency error(ppm) |
|------------|-----------------|----------|----------|------------|----------------------|
| 3.45       | 20              | 2500.700 | 2569.300 | -1.10      | 0.0004               |
| 4.4        |                 |          |          | -0.17      | 0.0001               |

**LTE band 12, 10MHz bandwidth QPSK(worst case of all bandwidths)**
**Frequency Error vs Temperature**

| Temperature(°C) | Voltage(V) | FL(MHz) | FH(MHz) | Offset(Hz) | Frequency error(ppm) |
|-----------------|------------|---------|---------|------------|----------------------|
| 20              | 3.82       | 699.490 | 715.510 |            |                      |
| 50              |            |         |         | 0.36       | 0.0005               |
| 40              |            |         |         | -0.10      | 0.0001               |
| 30              |            |         |         | 0.39       | 0.0005               |
| 10              |            |         |         | 1.53       | 0.0022               |
| 0               |            |         |         | -0.89      | 0.0013               |
| -10             |            |         |         | 0.26       | 0.0004               |
| -20             |            |         |         | -0.54      | 0.0008               |
| -30             |            |         |         | 2.78       | 0.0039               |

**Frequency Error vs Voltage**

| Voltage(V) | Temperature(°C) | FL(MHz) | FH(MHz) | Offset(Hz) | Frequency error(ppm) |
|------------|-----------------|---------|---------|------------|----------------------|
| 3.45       | 20              | 699.490 | 715.510 | 1.89       | 0.0027               |
| 4.4        |                 |         |         | -0.49      | 0.0007               |

**LTE band 13, 10MHz bandwidth QPSK(worst case of all bandwidths)**
**Frequency Error vs Temperature**

| Temperature(°C) | Voltage(V) | FL(MHz) | FH(MHz) | Offset(Hz) | Frequency error(ppm) |
|-----------------|------------|---------|---------|------------|----------------------|
| 20              | 3.82       | 777.490 | 786.520 |            |                      |
| 50              |            |         |         | 0.93       | 0.0012               |
| 40              |            |         |         | -1.82      | 0.0023               |
| 30              |            |         |         | -0.13      | 0.0002               |
| 10              |            |         |         | 0.22       | 0.0003               |
| 0               |            |         |         | 1.10       | 0.0014               |
| -10             |            |         |         | 1.14       | 0.0015               |
| -20             |            |         |         | -0.10      | 0.0001               |
| -30             |            |         |         | -0.30      | 0.0004               |

**Frequency Error vs Voltage**

| Voltage(V) | Temperature(°C) | FL(MHz) | FH(MHz) | Offset(Hz) | Frequency error(ppm) |
|------------|-----------------|---------|---------|------------|----------------------|
| 3.45       | 20              | 777.490 | 786.520 | -0.76      | 0.0010               |
| 4.4        |                 |         |         | 2.30       | 0.0029               |

**LTE band 66, 20MHz bandwidth QPSK(worst case of all bandwidths)**

**Frequency Error vs Temperature**

| Temperature(°C) | Voltage(V) | FL(MHz)  | FH(MHz)  | Offset(Hz) | Frequency error(ppm) |
|-----------------|------------|----------|----------|------------|----------------------|
| 20              | 3.82       | 1710.860 | 1779.140 |            |                      |
| 50              |            |          |          | -0.16      | 0.0001               |
| 40              |            |          |          | 0.37       | 0.0002               |
| 30              |            |          |          | -0.50      | 0.0003               |
| 10              |            |          |          | -1.05      | 0.0006               |
| 0               |            |          |          | -0.33      | 0.0002               |
| -10             |            |          |          | -0.26      | 0.0001               |
| -20             |            |          |          | 1.33       | 0.0008               |
| -30             |            |          |          | 1.99       | 0.0011               |

**Frequency Error vs Voltage**

| Voltage(V) | Temperature(°C) | FL(MHz)  | FH(MHz)  | Offset(Hz) | Frequency error(ppm) |
|------------|-----------------|----------|----------|------------|----------------------|
| 3.45       | 20              | 1710.860 | 1779.140 | 2.73       | 0.0016               |
| 4.4        |                 |          |          | 1.96       | 0.0011               |

#### **A.4 Occupied Bandwidth**

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequency. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

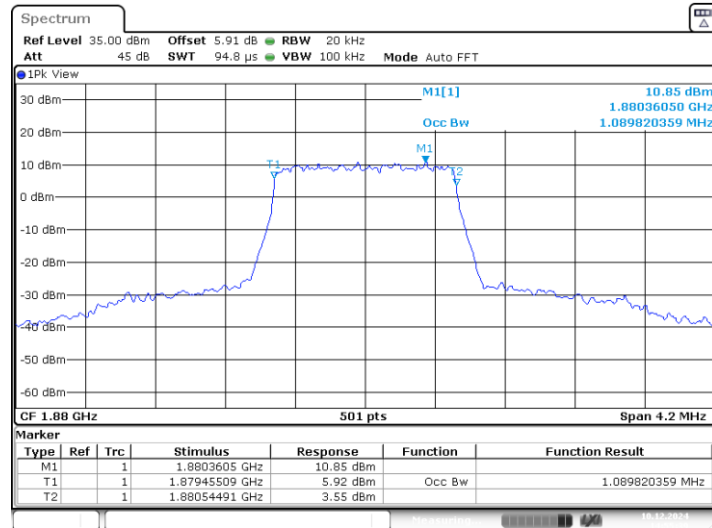
The measurement method is from ANSI C63.26:

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts.
- b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set  $\geq 3 \times \text{RBW}$ .
- c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
- d) Set the detection mode to peak, and the trace mode to max-hold.

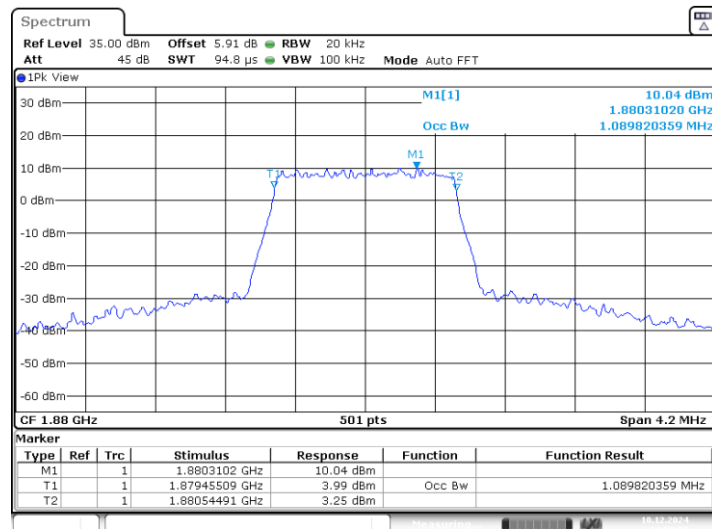
### LTE band 2,1.4MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%)(MHz) |       |
|-----------------|-------------------------------|-------|
|                 | QPSK                          | 16QAM |
| 1880            | 1.090                         | 1.090 |

### LTE band 2 , 1.4MHz Bandwidth,MID,QPSK (99% BW)



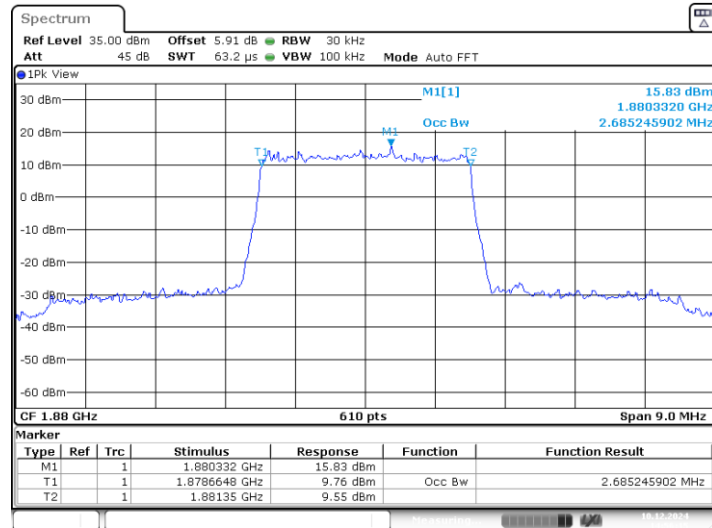
### LTE band 2 , 1.4MHz Bandwidth,MID,16QAM (99% BW)



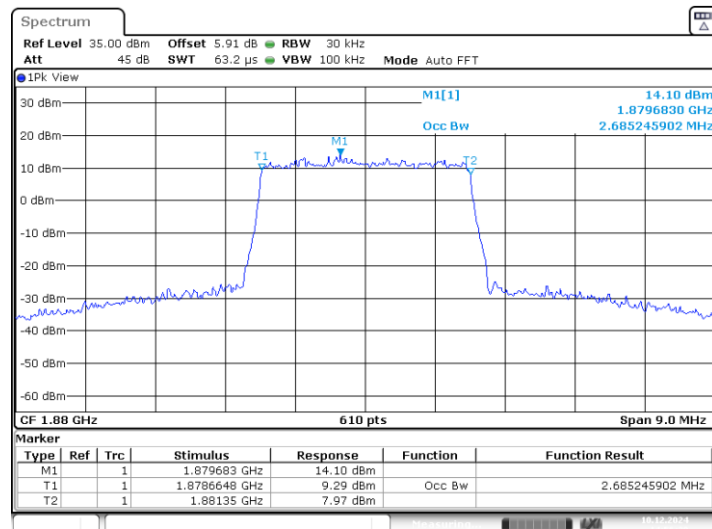
### LTE band 2,3MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%)(MHz) |       |
|-----------------|-------------------------------|-------|
|                 | QPSK                          | 16QAM |
| 1880            | 2.685                         | 2.685 |

### LTE band 2 , 3MHz Bandwidth,MID,QPSK (99% BW)



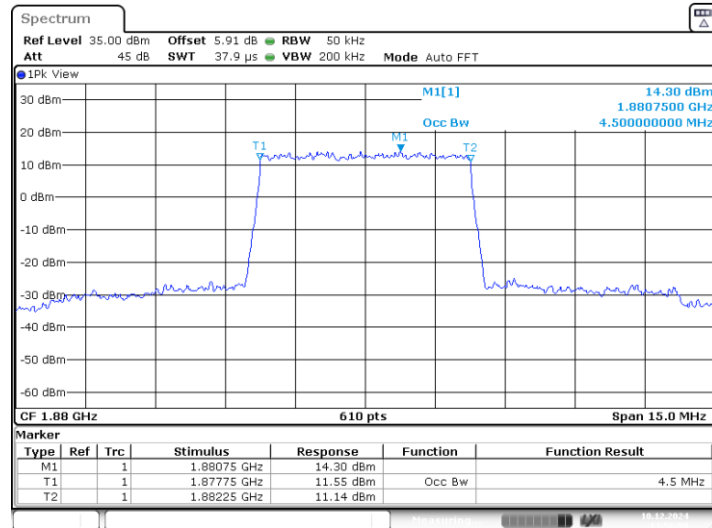
### LTE band 2 , 3MHz Bandwidth,MID,16QAM (99% BW)



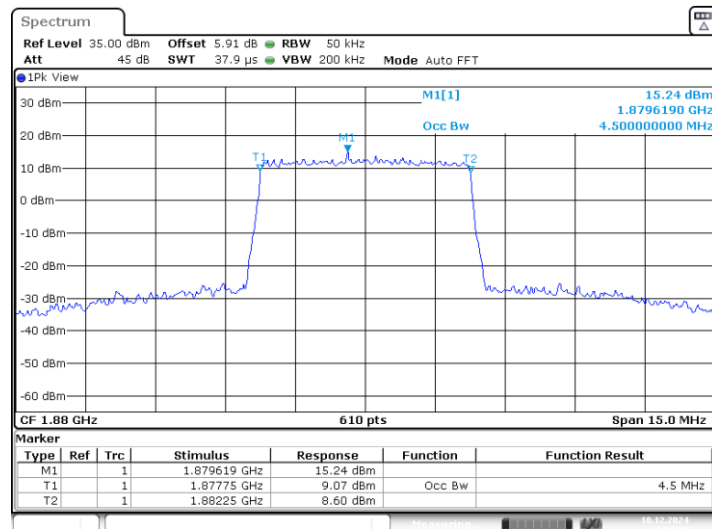
### LTE band 2,5MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%)(MHz) |       |
|-----------------|-------------------------------|-------|
|                 | QPSK                          | 16QAM |
| 1880            | 4.500                         | 4.500 |

### LTE band 2 , 5MHz Bandwidth,MID,QPSK (99% BW)



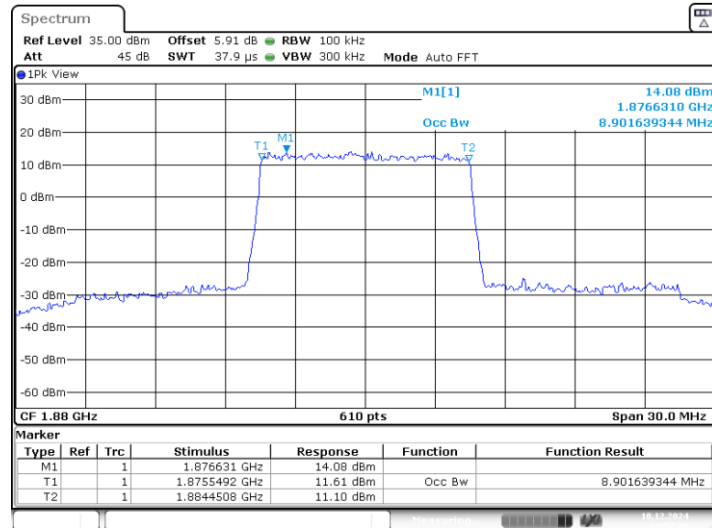
### LTE band 2 , 5MHz Bandwidth,MID,16QAM (99% BW)



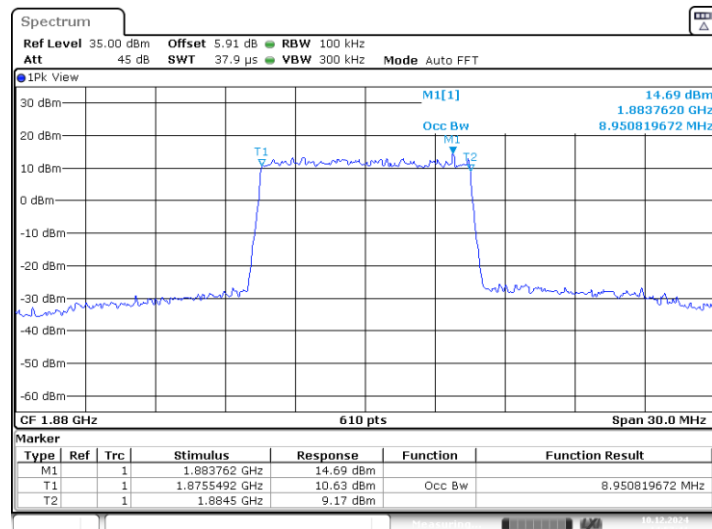
### LTE band 2,10MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%)(MHz) |       |
|-----------------|-------------------------------|-------|
|                 | QPSK                          | 16QAM |
| 1880            | 8.902                         | 8.951 |

### LTE band 2 , 10MHz Bandwidth,MID,QPSK (99% BW)



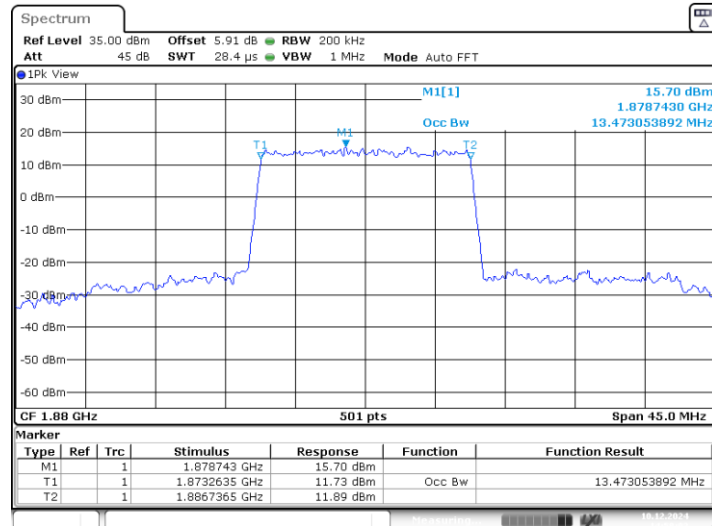
### LTE band 2 , 10MHz Bandwidth,MID,16QAM (99% BW)



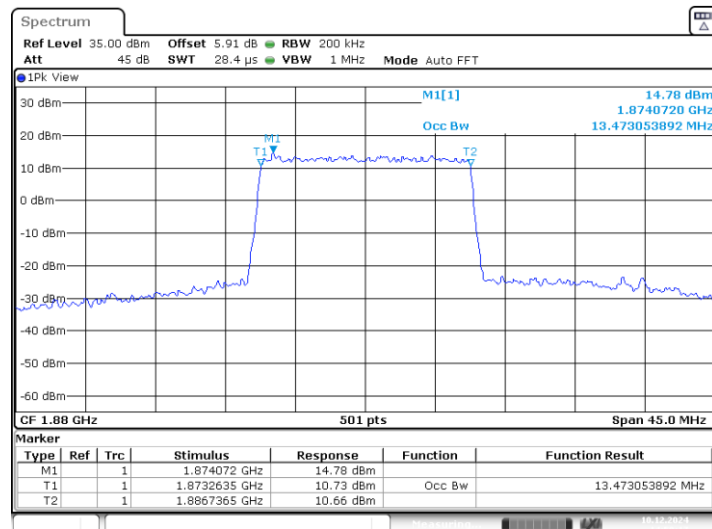
### LTE band 2,15MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%)(MHz) |        |
|-----------------|-------------------------------|--------|
|                 | QPSK                          | 16QAM  |
| 1880            | 13.473                        | 13.473 |

### LTE band 2 , 15MHz Bandwidth,MID,QPSK (99% BW)



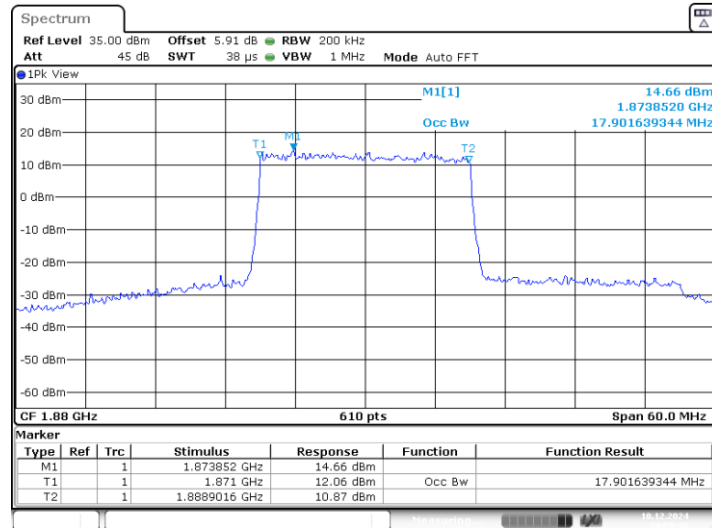
### LTE band 2 , 15MHz Bandwidth,MID,16QAM (99% BW)



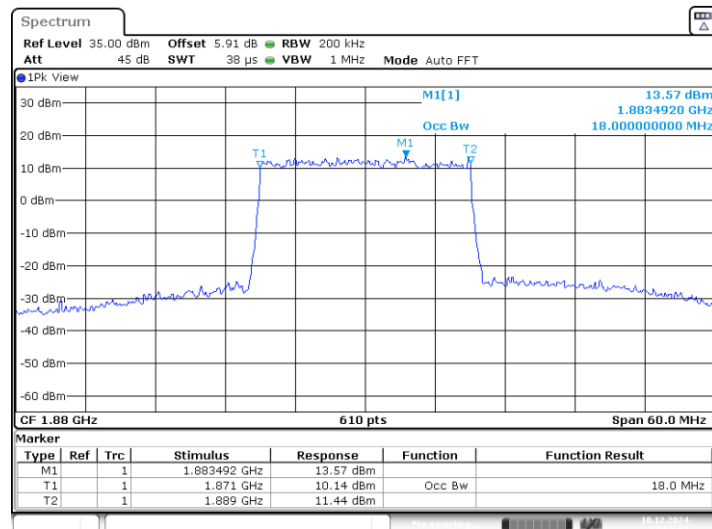
### LTE band 2,20MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%)(MHz) |        |
|-----------------|-------------------------------|--------|
|                 | QPSK                          | 16QAM  |
| 1880            | 17.902                        | 18.000 |

### LTE band 2 , 20MHz Bandwidth,MID,QPSK (99% BW)



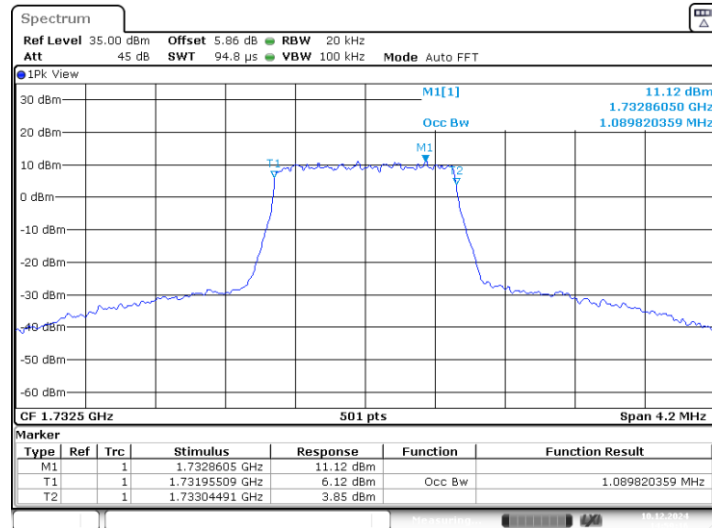
### LTE band 2 , 20MHz Bandwidth,MID,16QAM (99% BW)



### LTE band 4,1.4MHz(99%)

| Frequency (MHz) | Occupied Bandwidth (99%)(MHz) |       |
|-----------------|-------------------------------|-------|
|                 | QPSK                          | 16QAM |
| 1732.5          | 1.090                         | 1.090 |

### LTE band 4 , 1.4MHz Bandwidth,MID,QPSK (99% BW)



### LTE band 4 , 1.4MHz Bandwidth,MID,16QAM (99% BW)

