



CTC Laboratories, Inc.

## TEST REPORT

**Report No.** .....: **CTC2025004008**  
**FCC ID**.....: **2BB6E-GLMM24A01**  
**Applicant**.....: **UCLLOUDLINK ( SINGAPORE ) PTE.LTD**  
**Address**.....: **80 ROBINSON ROAD #02-00 SINGAPORE(068898)**  
**Manufacturer**.....: **UCLLOUDLINK ( SINGAPORE ) PTE.LTD**  
**Address**.....: **80 ROBINSON ROAD #02-00 SINGAPORE(068898)**  
**Product Name**.....: **LTE Module**  
**Trade Mark**.....: **GlocalMe**  
**Model/Type reference**.....: **GLMM24A01**  
**Listed Model(s)** .....: **/**  
**Standard**.....: **CFR47 PART 90S**  
**Test Report Form No.**.....: **CTC-TR-057\_A1**  
**Master TRF**.....: **Dated 2024-09-20**  
**Date of receipt of test sample:** **Jan. 6, 2025**  
**Date of testing**.....: **Jan. 6, 2025 ~ Feb. 28, 2025**  
**Date of issue**.....: **Mar. 26, 2025**  
**Result**.....: **PASS**

Compiled by:  
(Printed name+signature) Jim Jiang

Jim Jiang

Supervised by:  
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Eric Zhang

Approved by:  
(Printed name+signature) Totti Zhao



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CTC Laboratories, Inc.

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## 1. SUMMARY

### 1.1. Test Standards

[FCC Part 90 Subpart S](#): Regulations Governing Licensing and Use of Frequencies in the 806-824, 851-869, 896-901, and 935-940 MHz Bands.

[ANSI C63.26: 2015](#): American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

[KDB 971168 D01 Power Meas License Digital Systems v03](#): MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS.

### 1.2. Report Version

| Revised No. | Report No.    | Date of issue | Description |
|-------------|---------------|---------------|-------------|
| 01          | CTC2025004008 | Mar. 26, 2025 | Original    |
|             |               |               |             |
|             |               |               |             |



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### 1.3. Test Description

| Test Item                                | Section in CFR 47                                  | Result | Test Engineer |
|------------------------------------------|----------------------------------------------------|--------|---------------|
| Conducted Output Power                   | Part 2.1046<br>Part 22.913(a)                      | Pass   | Alicia Liu    |
| Peak-to-Average Ratio                    | Part 24.232                                        | Pass   | Alicia Liu    |
| 99% Occupied Bandwidth & 26 dB Bandwidth | Part 2.1049<br>Part 22.917(b)<br>Part 90.209       | Pass   | Alicia Liu    |
| Band Edge                                | Part 2.1051<br>Part 22.917<br>Part 90.691          | Pass   | Alicia Liu    |
| Conducted Spurious Emissions             | Part 2.1051<br>Part 22.917<br>Part 90.691          | Pass   | Alicia Liu    |
| Frequency stability vs temperature       | Part 2.1055(a)(1)(b)<br>Part 22.355<br>Part 90.213 | Pass   | Alicia Liu    |
| Frequency stability vs voltage           | Part 2.1055(d)(1)(2)<br>Part 22.355<br>Part 90.213 | Pass   | Alicia Liu    |
| ERP and EIRP                             | Part 22.913(a)<br>Part 90.635                      | Pass   | Alicia Liu    |
| Radiated Spurious Emissions              | Part 2.1053<br>Part 22.917<br>Part 90.691          | N/A    | N/A           |

Note: The measurement uncertainty is not included in the test result.





## 1.4. Test Facility

### Address of the report laboratory

#### CTC Laboratories, Inc.

Add: Room 101 of Building B, Room 107, 108, 207, 208 of Building A, No. 7, Lanqing 1st Road, Luhuhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China

### Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

#### A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

#### FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. EMC Laboratory has been registered and fully described in a report filed with the (FCC)Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 951311, Aug 26, 2017.

## 1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16 – 4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements and is documented in the CTC Laboratories, Inc. quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTC Laboratories, Inc. is reported:

| Test Items                                 | Measurement Uncertainty | Notes |
|--------------------------------------------|-------------------------|-------|
| Frequency stability                        | 25 Hz                   | (1)   |
| Transmitter power conducted                | 0.57 dB                 | (1)   |
| Transmitter power Radiated                 | 2.20 dB                 | (1)   |
| Conducted spurious emission 9KHz-12.75 GHz | 1.60 dB                 | (1)   |
| Conducted Emission 9KHz-30MHz              | 3.39 dB                 | (1)   |
| Radiated Emission 30~1000MHz               | 4.24 dB                 | (1)   |
| Radiated Emission 1~18GHz                  | 5.16 dB                 | (1)   |
| Radiated Emission 18-40GHz                 | 5.54 dB                 | (1)   |
| Occupied Bandwidth                         | -----                   | (1)   |
| Emission Mask                              | -----                   | (1)   |

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|                                |       |     |
|--------------------------------|-------|-----|
| Modulation Characteristic      | ----- | (1) |
| Transmitter Frequency Behavior | ----- | (1) |

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 1.6. Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

|                     |           |
|---------------------|-----------|
| Normal Temperature: | 20°C-25°C |
| Relative Humidity:  | 50 %-55 % |
| Air Pressure:       | 101 kPa   |





## 2. GENERAL INFORMATION

### 2.1. Client Information

|               |                                                                                                                                       |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Applicant:    | UCCLOUDLINK (SINGAPORE) PTE.LTD                                                                                                       |
| Address:      | 80 ROBINSON ROAD #02-00 SINGAPORE(068898)                                                                                             |
| Manufacturer: | UCCLOUDLINK (SINGAPORE) PTE.LTD                                                                                                       |
| Address:      | 80 ROBINSON ROAD #02-00 SINGAPORE(068898)                                                                                             |
| Factory:      | Shenzhen uCloudlink Network Technology Co., Ltd.                                                                                      |
| Address:      | 3rd Floor, A part of Building 1, Shenzhen Software Industry Base, Nanshan District Xuefu Road, 518057 Shenzhen City, Guangdong, China |

### 2.2. General Description of EUT

|                       |                                                                |
|-----------------------|----------------------------------------------------------------|
| Product Name:         | LTE Module                                                     |
| Trade Mark:           | GlocalMe                                                       |
| Model/Type reference: | GLMM24A01                                                      |
| Listed Model(s):      | /                                                              |
| Model Difference:     | /                                                              |
| Sample ID:            | CTC241220-003-S002, CTC241220-003-S003                         |
| Power supply:         | Input: 3.8Vdc, 1A                                              |
| Hardware version:     | T20-MB-VB                                                      |
| Software version:     | T20_TSV1.0.000.002                                             |
| <b>LTE</b>            |                                                                |
| Operation Band:       | FDD Band 26 (814~824MHz): UL: 814MHz~824MHz, DL: 859MHz~869MHz |
| Modulation Type:      | QPSK, 16QAM                                                    |
| Antenna Type:         | FPC Antenna                                                    |
| Antenna Gain:         | -6.56dBi Max                                                   |



## 2.3. Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. The CMW500 used to control the EUT staying in continuous transmitting and receiving mode for testing.

### Test Frequency:

FDD Band 26

| Test channel | Bandwidth(MHz) | N <sub>UL</sub> | Frequency of Uplink (MHz) |
|--------------|----------------|-----------------|---------------------------|
| Low Range    | 1.4            | 26697           | 814.70                    |
|              | 3              | 26705           | 815.50                    |
|              | 5              | 26715           | 816.50                    |
| Mid Range    | 1.4/3/5/10     | 26740           | 819.00                    |
| High Range   | 1.4            | 26783           | 823.30                    |
|              | 3              | 26775           | 822.50                    |
|              | 5              | 26765           | 821.50                    |





## 2.4. Measurement Instruments List

| 3. RF Test System - SRD |                                       |              |           |            |                  |
|-------------------------|---------------------------------------|--------------|-----------|------------|------------------|
| Item                    | Test Equipment                        | Manufacturer | Model No. | Serial No. | Calibrated Until |
| 1                       | Spectrum Analyzer                     | R&S          | FSV40-N   | 101331     | Mar. 21, 2025    |
| 2                       | MXA Signal Analyzer                   | Keysight     | N9020A    | MY46471737 | Dec. 12, 2025    |
| 3                       | MXG Vector Signal Generator           | Agilent      | N5182A    | MY47420864 | Dec. 12, 2025    |
| 4                       | PSG Analog Signal Generator           | Agilent      | E8257D    | MY46521908 | Dec. 12, 2025    |
| 5                       | EXG Analog Signal Generator           | Keysight     | N5173B    | MY59100842 | Dec. 12, 2025    |
| 6                       | MXG Vector Signal Generator           | Keysight     | N5182B    | MY59100212 | Dec. 12, 2025    |
| 7                       | USB Wideband Power Sensor             | Keysight     | U2021XA   | MY55130004 | Mar. 21, 2025    |
| 8                       | USB Wideband Power Sensor             | Keysight     | U2021XA   | MY55130006 | Mar. 21, 2025    |
| 9                       | Wideband Radio Communication Tester   | R&S          | CMW500    | 102414     | Dec. 12, 2025    |
| 10                      | High and low temperature test chamber | ESPEC        | MT3035    | /          | Mar. 21, 2025    |
| 11                      | RF Control Unit                       | Tonscend     | JS0806-2  | /          | Aug. 21, 2025    |

| Radiated Emission |                              |              |            |            |                  |
|-------------------|------------------------------|--------------|------------|------------|------------------|
| Item              | Test Equipment               | Manufacturer | Model No.  | Serial No. | Calibrated Until |
| 1                 | Trilog-Broadband Antenna     | Schwarzbeck  | VULB 9163  | 01026      | Dec. 24, 2025    |
| 2                 | Horn Antenna                 | Schwarzbeck  | BBHA 9120D | 9120D-647  | Sep. 25, 2025    |
| 3                 | Test Receiver                | Keysight     | N9038A     | MY56400071 | Dec. 12, 2025    |
| 4                 | Broadband Amplifier          | SCHWARZBECK  | BBV9743B   | 259        | Dec. 12, 2025    |
| 5                 | Mirowave Broadband Amplifier | SCHWARZBECK  | BBV9718C   | 111        | Dec. 12, 2025    |
| 6                 | 3m chamber 3                 | YIHENG       | EE106      | /          | Aug. 28, 2026    |
| 7                 | Test Software                | FARA         | EZ-EMC     | FA-03A2    | /                |

Note: 1. The Cal. Interval was one year.

2. The Cal. Interval was three year of the chamber

3. The cable loss has calculated in test result which connection between each test instruments.



## 4. TEST ITEM AND RESULTS

### 4.1. Conducted Output Power

#### LIMIT:

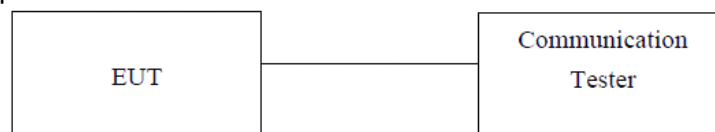
§ 90.635 Limitations on power and antenna height.

(a) The effective radiated power and antenna height for base stations may not exceed 1 kilowatt (30 dBw) and 304 m. (1,000 ft.) above average terrain (AAT), respectively, or the equivalent thereof as determined from the Table. These are maximum values, and applicants will be required to justify power levels and antenna heights requested.

(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

#### TEST CONFIGURATION

- For Conducted output Power



*Note: Measurement setup for testing on Antenna connector*

#### TEST PROCEDURE

- For Conducted output Power
  1. The transmitter output port was connected to base station.
  2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
  3. Set EUT at maximum power through base station.
  4. Select lowest, middle, and highest channels for each band and different modulation.
  5. Measure the maximum PK burst power and maximum Avg. burst power.

#### TEST RESULTS

Please see the appendix for every tested band.





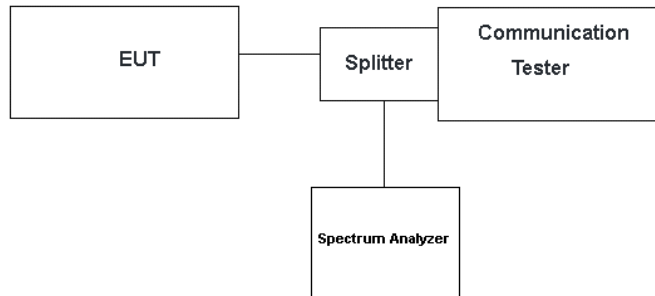
## 4.2. Peak-to-Average Ratio

### LIMIT

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13dB.

### TEST CONFIGURATION

- For Peak-to-Average Ratio



### TEST PROCEDURE

- For Peak-to-Average Ratio
  1. The testing follows FCC KDB 971168 v02r02 Section 5.7.1.
  2. The EUT was connected to spectrum and communication tester via a splitter
  3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
  4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
  6. Record the deviation as Peak to Average Ratio.

### TEST RESULTS

Please see the appendix for every tested band.



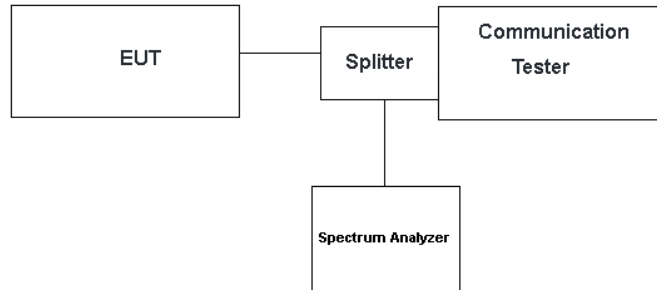


### 4.3. Occupy Bandwidth

#### LIMIT

N/A

#### TEST CONFIGURATION



#### TEST PROCEDURE

1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer
2. RBW was set to about 1% of emission BW,  $VBW \geq 3$  times RBW.
3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

#### TEST RESULTS

Please see the appendix for every tested band.



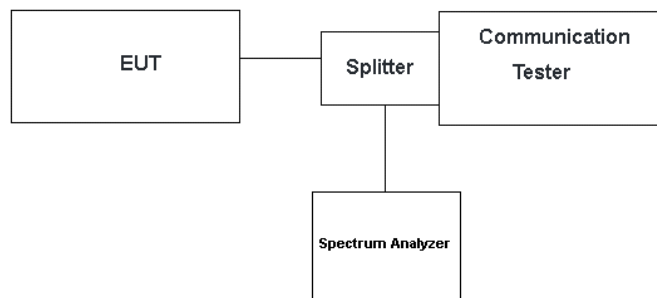


## 4.4. Out of band emission at antenna terminals

### LIMIT

**FDD Band 26:** 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.

The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.



### TEST PROCEDURE

1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. The resolution bandwidth of the spectrum analyzer was set at 1MHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
3. For the out of band: Set the RBW = 1MHz VBW  $\geq 3$  times RBW, Start=30MHz, Stop= 10th harmonic.

### TEST RESULTS

Please see the appendix for every tested band.

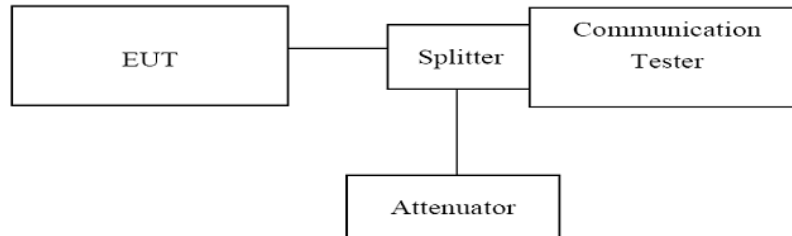


## 4.5. Receiver Spurious Emissions at Antenna Terminal

### LIMIT

RSS-GEN7.1.3, Receiver-spurious emissions at any discrete frequency shall not exceed 2 nW in the band 30-1000 MHz, nor 5 nW above 1000 MHz.

### TEST CONFIGURATION



### TEST PROCEDURE

1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
3. Set the RBW= 100kHz, VBW =300kHz,below 1GHz
4. Set the RBW= 1MHz, VBW = 3MHz,above1GHz,
5. Start=30MHz, Stop= 10th harmonic.

### TEST RESULTS

Note: Not Applicable.





## 4.6. Band Edge compliance

### LIMIT

Part 22.917 specify 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.

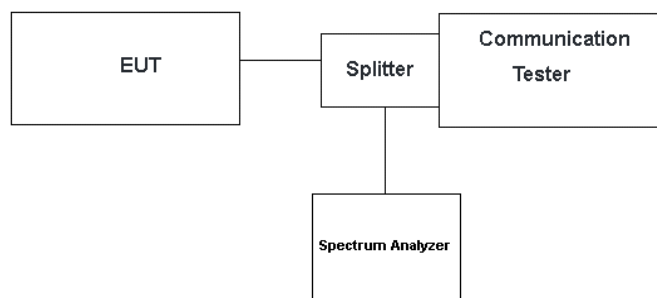
The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Part 90.691 (a) Out of band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $116 \log_{10}(f/6.1)$  decibels or  $50 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

### TEST CONFIGURATION



### TEST PROCEDURE

6. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
7. RBW was set to about 1% of emission BW,  $VBW \geq 3$  times RBW.

### TEST RESULTS

Please see the appendix for every tested band.

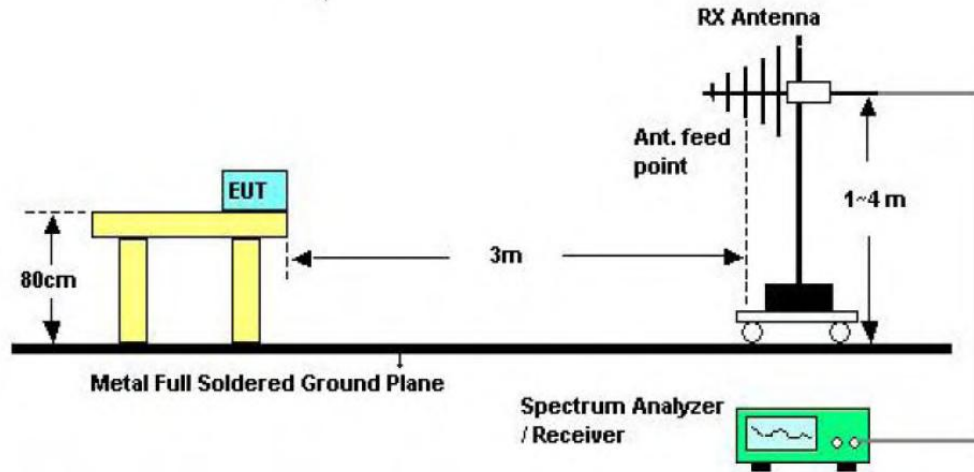
## 4.7. Radiated Power Measurement

### LIMIT

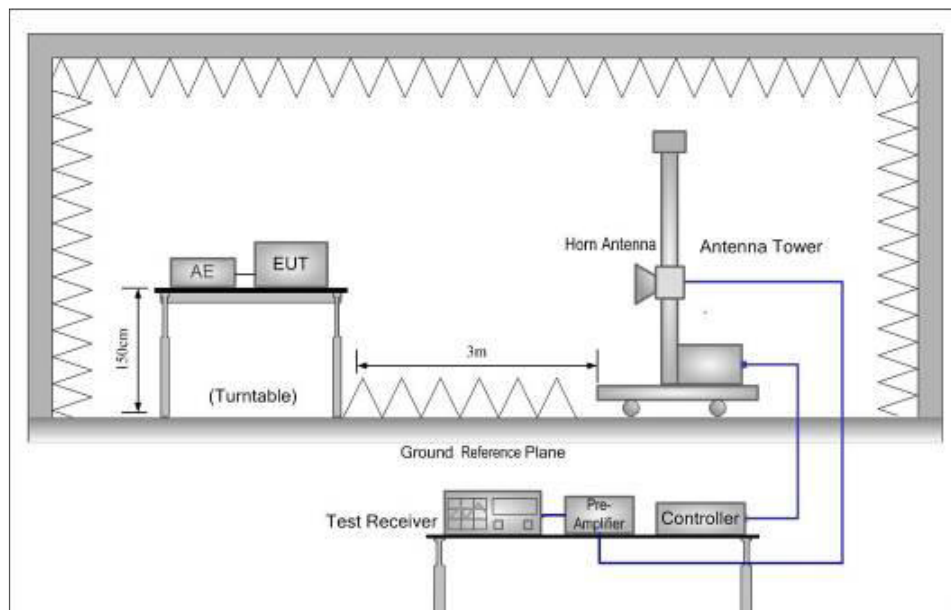
LTE FDD Band 26: N/A

### TEST CONFIGURATION

For the actual test configuration, please refer to the related Item – EUT Test Photos.



Below 1GHz



Above 1GHz



## **TEST PROCEDURE**

1. EUT was placed on a 1.50 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 height of receiving antenna is 1.50m. 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 transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, and the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an 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 (PMea) 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 (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. An amplifier should be connected to the Signal Source output port. And the cable should be connecting between the Amplifier and the Substitution Antenna. The cable loss (Pcl), the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAG) should be recorded after test.
6. The measurement results are obtained as described below:  
$$\text{Power(EIRP)} = \text{PMea} - \text{PAG} - \text{Pcl} + \text{Ga}$$

We used N5182A microwave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substitution test; The measurement results are amend as described below:  
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dBi) and known input power.  
ERP can be calculated from EIRP by subtracting the gain of the dipole,  $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$ .

## **TEST RESULTS**

Remark:

1. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "X axis" position was the worst, and test data recorded in this report.
2. Pre-scan all antenna, only show the test data for worse case antenna on the test report.



| LTE Band 26 (814-824) - 1.4MHz |         |           |            |             |        |
|--------------------------------|---------|-----------|------------|-------------|--------|
| Modulation                     | Channel | ERP (dBm) |            | Limit (dBm) | Result |
|                                |         | Vertical  | Horizontal |             |        |
| QPSK                           | Low     | 23.31     | 20.75      | /           | PASS   |
|                                | Mid     | 23.55     | 20.96      |             |        |
|                                | High    | 23.60     | 20.63      |             |        |
| 16QAM                          | Low     | 23.33     | 20.76      |             |        |
|                                | Mid     | 23.61     | 20.70      |             |        |
|                                | High    | 23.25     | 20.94      |             |        |

| LTE Band 26 (814-824) - 3MHz |         |           |            |             |        |
|------------------------------|---------|-----------|------------|-------------|--------|
| Modulation                   | Channel | ERP (dBm) |            | Limit (dBm) | Result |
|                              |         | Vertical  | Horizontal |             |        |
| QPSK                         | Low     | 23.52     | 20.39      | /           | PASS   |
|                              | Mid     | 23.28     | 20.45      |             |        |
|                              | High    | 23.53     | 20.35      |             |        |
| 16QAM                        | Low     | 23.49     | 20.42      |             |        |
|                              | Mid     | 23.56     | 20.68      |             |        |
|                              | High    | 23.39     | 20.35      |             |        |

| LTE Band 26 (814-824) - 5MHz |         |           |            |             |        |
|------------------------------|---------|-----------|------------|-------------|--------|
| Modulation                   | Channel | ERP (dBm) |            | Limit (dBm) | Result |
|                              |         | Vertical  | Horizontal |             |        |
| QPSK                         | Low     | 23.56     | 20.35      | /           | PASS   |
|                              | Mid     | 23.64     | 20.25      |             |        |
|                              | High    | 23.97     | 20.47      |             |        |
| 16QAM                        | Low     | 23.35     | 20.26      |             |        |
|                              | Mid     | 23.28     | 20.60      |             |        |
|                              | High    | 23.26     | 20.56      |             |        |

| LTE Band 26 (814-824) - 10MHz |         |           |            |             |        |
|-------------------------------|---------|-----------|------------|-------------|--------|
| Modulation                    | Channel | ERP (dBm) |            | Limit (dBm) | Result |
|                               |         | Vertical  | Horizontal |             |        |
| QPSK                          | Mid     | 23.27     | 20.92      | /           | PASS   |
| 16QAM                         | Mid     | 23.78     | 20.81      |             |        |

## 4.8. Radiated Spurious Emission

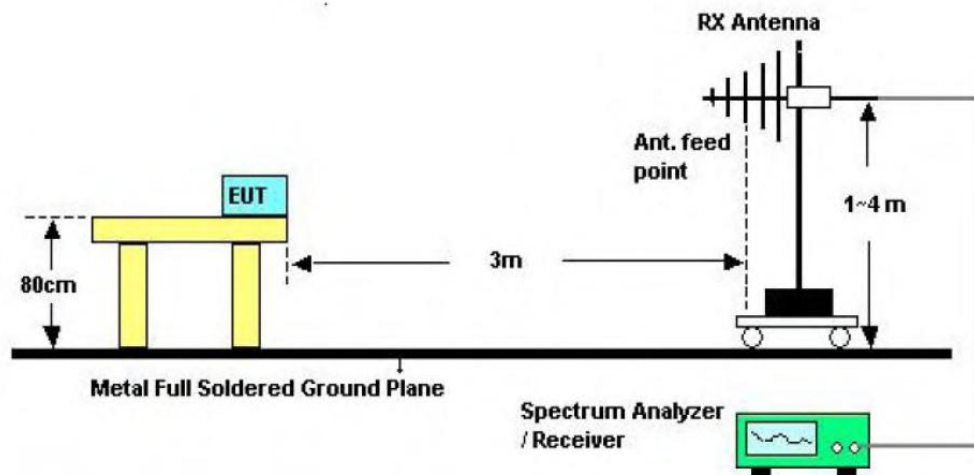
### LIMIT

**FDD Band 18:** 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.

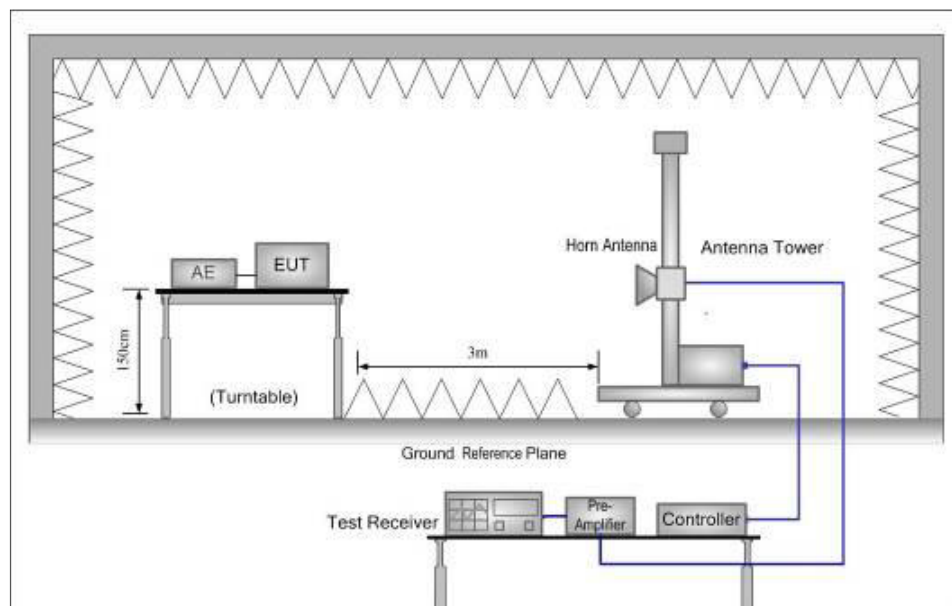
**FDD Band 26:** The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

### TEST CONFIGURATION

For the actual test configuration, please refer to the related Item – EUT Test Photos.



Below 1GHz



Above 1GHz



## **TEST PROCEDURE**

1. EUT was placed on a 1.50 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 height of receiving antenna is 1.50m. 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 transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, and the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an 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 (PMea) 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 (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. An amplifier should be connected to the Signal Source output port. And the cable should be connecting between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
6. The measurement results are obtained as described below:  
$$\text{Power(EIRP)} = \text{PMea} - \text{PAg} - \text{Pcl} + \text{Ga}$$

We used SMF100A microwave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substitution test; The measurement results are amend as described below:

$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
7. 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,  $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$ .
8. Test frequency range should extend to 10<sup>th</sup> harmonic of highest fundamental frequency.

## **TEST RESULTS**

Remark:

1. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "Z axis" position was the worst, and test data recorded in this report.
2. Pre-scan all antenna, only show the test data for worse case antenna on the test report.





Measured data (worst case):

| Band 26 (814-824) Radiated Spurious Emissions |            |              |                   |             |              |             |        |
|-----------------------------------------------|------------|--------------|-------------------|-------------|--------------|-------------|--------|
| Bandwidth                                     | Modulation | Test Channel | Spurious Emission |             |              | Limit (dBm) | Result |
|                                               |            |              | Frequency         | Level (dBm) | Polarization |             |        |
| 10MHz                                         | QPSK       | M            | 1638.0            | -43.65      | Vertical     | -13.00      | Pass   |
|                                               |            |              | 2457.0            | -47.90      | Vertical     |             |        |
|                                               |            |              | 1638.0            | -46.27      | Horizontal   |             |        |
|                                               |            |              | 2457.0            | -54.02      | Horizontal   |             |        |
| 10MHz                                         | 16QAM      | M            | 1638.0            | -41.21      | Vertical     | -13.00      | Pass   |
|                                               |            |              | 2457.0            | -49.47      | Horizontal   |             |        |
|                                               |            |              | 1638.0            | -42.69      | Vertical     |             |        |
|                                               |            |              | 2457.0            | -53.03      | Horizontal   |             |        |

Remark:

1. The emission behavior belongs to narrowband spurious emission.
2. The emission levels of below 1 GHz are very lower than the limit above 10dB and not show in test report.



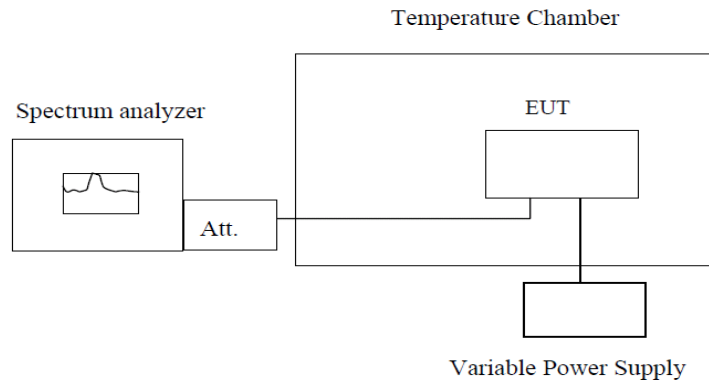


## 4.9. Frequency Stability

### LIMIT

Within the authorized frequency block

### TEST CONFIGURATION



**Note :** Measurement setup for testing on Antenna connector

### TEST PROCEDURE

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to -5°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10°C increased per stage until the highest temperature of +30°C reached.
7. Reduce the input voltage to specified extreme voltage variation (+/- 10%) and endpoint, record the maximum frequency change.

### TEST RESULTS

Please see the appendix for every tested band.

\*\*\*\*\*THE END\*\*\*\*\*