



# RF TEST REPORT

**Applicant**      Quectel Wireless Solutions Co., Ltd  
**FCC ID**          XMR201909EC25AFX  
**Product**        LTE Module  
**Brand**           Quectel  
**Model**           EC25-AFX; EC25-AFX MINIPCIE  
**Report No.**      R1907A0408-R3 V1  
**Issue Date**     October 8, 2019

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2017)/ FCC CFR47 Part 27C (2017)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

*Performed by: Peng Tao*

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## Summary of Measurement Results

| Number                                                                                                                                                          | Test Case                               | Clause in FCC rules                                           | Verdict |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------|---------|
| 1                                                                                                                                                               | RF power output                         | 2.1046                                                        | PASS    |
| 2                                                                                                                                                               | Effective Isotropic Radiated power      | 27.50(d)(4)<br>/27.50(b)(10)<br>/27.50(c)(10)<br>/27.50(h)(2) | PASS    |
| 3                                                                                                                                                               | Occupied Bandwidth                      | 2.1049                                                        | PASS    |
| 4                                                                                                                                                               | Band Edge Compliance                    | 27.53(h)<br>/27.53(g)<br>/27.53(f) /27.53(c)<br>/27.53(m)     | PASS    |
| 5                                                                                                                                                               | Peak-to-Average Power Ratio             | 27.50(d)/KDB971168 D01(5.7)                                   | PASS    |
| 6                                                                                                                                                               | Frequency Stability                     | 2.1055 / 27.54                                                | PASS    |
| 7                                                                                                                                                               | Spurious Emissions at Antenna Terminals | 2.1051<br>/27.53(h)<br>/27.53(g)<br>/27.53(f)                 | PASS    |
| 8                                                                                                                                                               | Radiates Spurious Emission              | 2.1053<br>/27.53(h)<br>/27.53(g)<br>/27.53(f)                 | PASS    |
| Date of Testing: June 29, 2018~ July 16, 2018 and July 30, 2018~ July 31, 2018 and August 3, 2019~ August 13, 2019                                              |                                         |                                                               |         |
| Note: PASS: The EUT complies with the essential requirements in the standard.<br>FAIL: The EUT does not comply with the essential requirements in the standard. |                                         |                                                               |         |

# **1 Test Laboratory**

## **1.1 Notes of the Test Report**

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

## **1.2 Test facility**

### **CNAS (accreditation number: L2264)**

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

### **FCC (Designation number: CN1179, Test Firm Registration Number: 446626)**

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

### **IC (recognition number is 8510A)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

### **VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

### **A2LA (Certificate Number: 3857.01)**

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

### 1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.  
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## 2 General Description of Equipment under Test

### Client Information

|                             |                                                                                                                       |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Applicant</b>            | Quectel Wireless Solutions Co., Ltd                                                                                   |
| <b>Applicant address</b>    | Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233 |
| <b>Manufacturer</b>         | Quectel Wireless Solutions Co., Ltd                                                                                   |
| <b>Manufacturer address</b> | Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233 |

### General information

| EUT Description              |                                                                                                                                 |             |             |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|
| Model                        | EC25-AFX; EC25-AFX MINIPCIE                                                                                                     |             |             |
| IMEI                         | EC25-AFX :866834040000767<br>EC25-AFX MINIPCIE: 866834040002375                                                                 |             |             |
| Hardware Version             | R1.0                                                                                                                            |             |             |
| Software Version             | EC25AFXGAR07A01M1G                                                                                                              |             |             |
| Power Supply                 | External Power Supply                                                                                                           |             |             |
| Antenna Type                 | The EUT don't have standard Antenna, The Antenna used for testing in this report is the after-market accessory (Dipole Antenna) |             |             |
| Antenna Gain                 | 4dBi                                                                                                                            |             |             |
| Test Mode(s)                 | WCDMA Band IV;<br>LTE Band 4/12/13/ 66/ 71;                                                                                     |             |             |
| Test Modulation              | (WCDMA)QPSK; (LTE)QPSK 16QAM;                                                                                                   |             |             |
| HSDPA UE Category            | 24                                                                                                                              |             |             |
| HSUPA UE Category            | 6                                                                                                                               |             |             |
| LTE Category                 | 4                                                                                                                               |             |             |
| Maximum E.I.R.P./ E.R.P.     | WCDMA Band IV:                                                                                                                  | 25.62dBm    |             |
|                              | LTE Band 4:                                                                                                                     | 26.08dBm    |             |
|                              | LTE Band 12:                                                                                                                    | 20.48dBm    |             |
|                              | LTE Band 13:                                                                                                                    | 23.63dBm    |             |
|                              | LTE Band 66:                                                                                                                    | 27.51dBm    |             |
|                              | LTE Band 71:                                                                                                                    | 22.72dBm    |             |
| Rated Power Supply Voltage:  | 3.8V                                                                                                                            |             |             |
| Extreme Voltage              | Minimum: 3.3V     Maximum: 4.3V                                                                                                 |             |             |
| Extreme Temperature          | Lowest: -40°C     Highest: +85°C                                                                                                |             |             |
| Operating Frequency Range(s) | Mode                                                                                                                            | Tx (MHz)    | Rx (MHz)    |
|                              | WCDMA Band IV                                                                                                                   | 1710 ~ 1755 | 2110 ~ 2155 |
|                              | LTE Band 4                                                                                                                      | 1710 ~ 1755 | 2110 ~ 2155 |



|  |             |             |             |
|--|-------------|-------------|-------------|
|  | LTE Band 12 | 699 ~ 716   | 729 ~ 746   |
|  | LTE Band 13 | 777 ~ 787   | 746 ~ 756   |
|  | LTE Band 66 | 1710 ~ 1780 | 2110 ~ 2200 |
|  | LTE Band 71 | 663 ~ 698   | 617 ~ 652   |

Note: 1. The information of the EUT is declared by the manufacturer.

| Accessory equipment |                         |
|---------------------|-------------------------|
| Evaluation Board    | RF Cable                |
| RS232-to-USB Cable  | Antenna: Dipole Antenna |
| Headset             | DC 5V Adaptor           |

EC25-AFX and EC25-AFX MINIPCI-E are all LTE modules. They support the same frequency bands, use the same chipset and share the same software & hardware design. The main difference is on the carrier board.

EC25-AFX MINIPCI-E makes up of EC25-AFX module and PCI-E transferred board.

The transferred board switches EC25-AFX module to follow PCI Express Mini Card 1.2 standard connector protocol. No any other internal changes in EC25-AFX module.

Two models are identical in interior structure and components, and just connector interface is different for the marketing requirement.



### 3 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

#### **Test standards**

**FCC CFR47 Part 2 (2017)**

**FCC CFR47 Part 27C (2017)**

**ANSI/TIA-603-E (2016)**

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

## 4 Test Configuration

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes. EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (Xaxis, horizontal polarization) and the worst case was recorded.

All mode and data rates and positions and RB size and modulations were investigated.

Subsequently, only the worst case emissions are reported.

The following testing in WCDMA/LTE is set based on the maximum RF Output Power.

The following testing in different Bandwidth is set to detailin the following table:

Test modes are chosen to be reported as the worst case configuration below for WCDMA Band IV:

| Test items                              | Modes/Modulation               |
|-----------------------------------------|--------------------------------|
|                                         | WCDMA Band IV                  |
| RF power output                         | RMC<br>HSDPA/HSUPA<br>DC-HSDPA |
| Effective Isotropic Radiated power      | RMC                            |
| Occupied Bandwidth                      | RMC                            |
| Band Edge Compliance                    | RMC                            |
| Peak-to-Average Power Ratio             | RMC                            |
| Frequency Stability                     | RMC                            |
| Spurious Emissions at Antenna Terminals | RMC                            |
| Radiates Spurious Emission              | RMC                            |

Test modes are chosen to be reported as the worst case configuration below for LTE Band 4/12/13/66/71:

| Test items          | Modes  | Bandwidth (MHz) |   |   |    |    |    | Modulation |       | RB |     |      | Test Channel |   |   |
|---------------------|--------|-----------------|---|---|----|----|----|------------|-------|----|-----|------|--------------|---|---|
|                     |        | 1.4             | 3 | 5 | 10 | 15 | 20 | QPSK       | 16QAM | 1  | 50% | 100% | L            | M | H |
| RF power output     | LTE 4  | O               | O | O | O  | O  | O  | O          | O     | O  | O   | O    | O            | O | O |
|                     | LTE 12 | O               | O | O | O  | -  | -  | O          | O     | O  | O   | O    | O            | O | O |
|                     | LTE 13 | -               | - | O | O  | -  | -  | O          | O     | O  | O   | O    | O            | O | O |
|                     | LTE 66 | O               | O | O | O  | O  | O  | O          | O     | O  | O   | O    | O            | O | O |
|                     | LTE 71 | -               | - | O | O  | O  | O  | O          | O     | O  | O   | O    | O            | O | O |
| Effective Isotropic | LTE 4  | O               | O | O | O  | O  | O  | O          | O     | O  | O   | O    | O            | O | O |
|                     | LTE 12 | O               | O | O | O  | -  | -  | O          | O     | O  | O   | O    | O            | O | O |



|                                         |                                                                                                                                       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radiated power                          | LTE 13                                                                                                                                | - | - | O | O | - | - | O | O | O | O | O | O | O | O |
|                                         | LTE 66                                                                                                                                | O | O | O | O | O | O | O | O | O | O | O | O | O | O |
|                                         | LTE 71                                                                                                                                | - | - | O | O | O | O | O | O | O | O | O | O | O | O |
| Occupied Bandwidth                      | LTE 4                                                                                                                                 | O | O | O | O | O | O | O | O | - | - | O | O | O | O |
|                                         | LTE 12                                                                                                                                | O | O | O | O | - | - | O | O | - | - | O | O | O | O |
|                                         | LTE 13                                                                                                                                | - | - | O | O | - | - | O | O | - | - | O | O | O | O |
|                                         | LTE 66                                                                                                                                | O | O | O | O | O | O | O | O | - | - | O | O | O | O |
|                                         | LTE 71                                                                                                                                | - | - | O | O | O | O | O | O | - | - | O | O | O | O |
| Band Edge Compliance                    | LTE 4                                                                                                                                 | O | O | O | O | O | O | O | O | O | - | O | O | - | O |
|                                         | LTE 12                                                                                                                                | O | O | O | O | - | - | O | O | O | - | O | O | - | O |
|                                         | LTE 13                                                                                                                                | - | - | O | O | - | - | O | O | O | - | O | O | - | O |
|                                         | LTE 66                                                                                                                                | O | O | O | O | O | O | O | O | O | - | O | O | - | O |
|                                         | LTE 71                                                                                                                                | - | - | O | O | O | O | O | O | O | - | O | O | - | O |
| Peak-to-Average Power Ratio             | LTE 4                                                                                                                                 | O | O | O | O | O | O | O | O | - | - | O | O | O | O |
|                                         | LTE 12                                                                                                                                | O | O | O | O | - | - | O | O | - | - | O | O | O | O |
|                                         | LTE 13                                                                                                                                | - | - | O | O | - | - | O | O | - | - | O | O | O | O |
|                                         | LTE 66                                                                                                                                | O | O | O | O | O | O | O | O | - | - | O | O | O | O |
|                                         | LTE 71                                                                                                                                | - | - | O | O | O | O | O | O | - | - | O | O | O | O |
| Frequency Stability                     | LTE 4                                                                                                                                 | O | O | O | O | O | O | O | O | - | - | O | O | - | O |
|                                         | LTE 12                                                                                                                                | O | O | O | O | - | - | O | O | - | - | O | O | - | O |
|                                         | LTE 13                                                                                                                                | - | - | O | O | - | - | O | O | - | - | O | O | - | O |
|                                         | LTE 66                                                                                                                                | O | O | O | O | O | O | O | O | - | - | O | O | - | O |
|                                         | LTE 71                                                                                                                                | - | - | O | O | O | O | O | O | - | - | O | O | - | O |
| Spurious Emissions at Antenna Terminals | LTE 4                                                                                                                                 | O | O | O | O | O | O | O | - | O | O | O | O | O | O |
|                                         | LTE 12                                                                                                                                | O | O | O | O | - | - | O | - | O | O | O | O | O | O |
|                                         | LTE 13                                                                                                                                | - | - | O | O | - | - | O | - | O | O | O | O | O | O |
|                                         | LTE 66                                                                                                                                | O | O | O | O | O | O | O | - | O | O | O | O | O | O |
|                                         | LTE 71                                                                                                                                | - | - | O | O | O | O | O | - | O | O | O | O | O | O |
| Radiates Spurious Emission              | LTE 4                                                                                                                                 | - | - | O | - | - | - | O | - | O | - | - | O | O | O |
|                                         | LTE 12                                                                                                                                | - | - | O | - | - | - | O | - | O | - | - | O | O | O |
|                                         | LTE 13                                                                                                                                | - | - | O | - | - | - | O | - | O | - | - | O | O | O |
|                                         | LTE 66                                                                                                                                | - | - | O | - | - | - | O | - | O | - | - | O | O | O |
|                                         | LTE 71                                                                                                                                | - | - | O | - | - | - | O | - | O | - | - | O | O | O |
| Note                                    | 1. The mark "O" means that this configuration is chosen for testing.<br>2. The mark "-" means that this configuration is not testing. |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

## 5 Test Case Results

### 5.1 RF Power Output

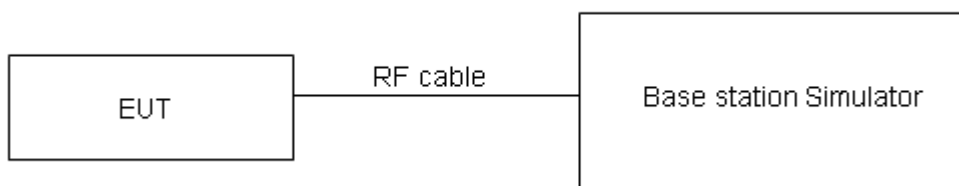
#### Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C ~25°C  | 45%~50%           | 101.5kPa |

#### Methods of Measurement

During the process of the testing, The EUT is controlled by the Base Station Simulator to ensure max power transmission and proper modulation.

#### Test Setup



The loss between RF output port of the EUT and the input port of the tester has been taken into consideration.

#### Limits

No specific RF power output requirements in part 2.1046.

#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U=0.4$  dB.

**Test Results**

| WCDMA Band IV   |              | AV Conducted Power(dBm) |              |              |
|-----------------|--------------|-------------------------|--------------|--------------|
|                 |              | Channel 1312            | Channel 1413 | Channel 1513 |
|                 |              | 1712.4 (MHz)            | 1732.6 (MHz) | 1752.6(MHz)  |
| <b>RMC</b>      |              | 23.39                   | 23.34        | 23.25        |
| <b>HSDPA</b>    | Sub - Test 1 | 22.36                   | 22.16        | 22.19        |
|                 | Sub - Test 2 | 22.44                   | 22.14        | 22.26        |
|                 | Sub - Test 3 | 21.83                   | 21.64        | 21.78        |
|                 | Sub - Test 4 | 21.92                   | 21.69        | 21.76        |
| <b>HSUPA</b>    | Sub - Test 1 | 22.13                   | 22.15        | 22.07        |
|                 | Sub - Test 2 | 21.80                   | 21.73        | 21.63        |
|                 | Sub - Test 3 | 22.27                   | 22.21        | 22.12        |
|                 | Sub - Test 4 | 22.37                   | 22.13        | 22.16        |
|                 | Sub - Test 5 | 22.44                   | 22.18        | 22.19        |
| <b>DC-HSDPA</b> | Sub - Test 1 | 22.73                   | 22.70        | 22.82        |
|                 | Sub - Test 2 | 22.72                   | 22.69        | 22.58        |
|                 | Sub - Test 3 | 22.30                   | 22.18        | 22.09        |
|                 | Sub - Test 4 | 22.29                   | 22.17        | 22.34        |

| LTE Band 4 |            |         |           | AV Conducted Power(dBm) |              |              |
|------------|------------|---------|-----------|-------------------------|--------------|--------------|
| Bandwidth  | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              |
|            |            |         |           | 19957/1710.7            | 20175/1732.5 | 20393/1754.3 |
| 1.4MHz     | QPSK       | 1       | 0         | 23.55                   | 23.20        | 23.42        |
|            |            | 1       | 2         | 23.44                   | 23.53        | 23.46        |
|            |            | 1       | 5         | 23.20                   | 23.54        | 23.68        |
|            |            | 3       | 0         | 23.32                   | 23.22        | 23.55        |
|            |            | 3       | 2         | 23.28                   | 23.33        | 23.40        |
|            |            | 3       | 3         | 23.31                   | 23.42        | 23.39        |
|            |            | 6       | 0         | 22.30                   | 22.40        | 22.64        |
|            | 16QAM      | 1       | 0         | 22.45                   | 22.25        | 23.27        |
|            |            | 1       | 2         | 22.52                   | 22.79        | 23.15        |
|            |            | 1       | 5         | 22.38                   | 22.98        | 23.37        |
|            |            | 3       | 0         | 22.23                   | 22.32        | 22.43        |
|            |            | 3       | 2         | 22.32                   | 22.39        | 22.26        |
|            |            | 3       | 3         | 22.39                   | 22.47        | 22.47        |
|            |            | 6       | 0         | 21.34                   | 21.48        | 21.68        |
| Bandwidth  | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              |
|            |            |         |           | 19965/1711.5            | 20175/1732.5 | 20385/1753.5 |
| 3MHz       | QPSK       | 1       | 0         | 23.57                   | 23.24        | 23.45        |
|            |            | 1       | 7         | 23.47                   | 23.58        | 23.50        |
|            |            | 1       | 14        | 23.23                   | 23.59        | 23.72        |
|            |            | 8       | 0         | 22.42                   | 22.34        | 22.68        |
|            |            | 8       | 4         | 22.40                   | 22.43        | 22.52        |
|            |            | 8       | 7         | 22.41                   | 22.53        | 22.49        |
|            |            | 15      | 0         | 22.33                   | 22.44        | 22.67        |
|            | 16QAM      | 1       | 0         | 22.48                   | 22.27        | 23.30        |
|            |            | 1       | 7         | 22.55                   | 22.84        | 23.19        |
|            |            | 1       | 14        | 22.40                   | 23.02        | 23.40        |
|            |            | 8       | 0         | 21.34                   | 21.45        | 21.55        |
|            |            | 8       | 4         | 21.43                   | 21.52        | 21.38        |
|            |            | 8       | 7         | 21.49                   | 21.59        | 21.60        |
|            |            | 15      | 0         | 21.37                   | 21.52        | 21.71        |
| Bandwidth  | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              |
|            |            |         |           | 19975/1712.5            | 20175/1732.5 | 20375/1752.5 |
| 5MHz       | QPSK       | 1       | 0         | 23.54                   | 23.22        | 23.41        |
|            |            | 1       | 13        | 23.45                   | 23.54        | 23.47        |
|            |            | 1       | 24        | 23.20                   | 23.54        | 23.68        |
|            |            | 12      | 0         | 22.39                   | 22.29        | 22.64        |
|            |            | 12      | 6         | 22.38                   | 22.39        | 22.47        |
|            |            | 12      | 13        | 22.39                   | 22.51        | 22.45        |
|            |            | 25      | 0         | 22.31                   | 22.43        | 22.65        |



|           | 16QAM      | 1       | 0         | 22.45                   | 22.23        | 23.27        |
|-----------|------------|---------|-----------|-------------------------|--------------|--------------|
|           |            | 1       | 13        | 22.52                   | 22.82        | 23.16        |
|           |            | 1       | 24        | 22.37                   | 23.00        | 23.36        |
|           |            | 12      | 0         | 21.32                   | 21.41        | 21.52        |
|           |            | 12      | 6         | 21.40                   | 21.47        | 21.34        |
|           |            | 12      | 13        | 21.46                   | 21.54        | 21.56        |
|           |            | 25      | 0         | 21.35                   | 21.48        | 21.66        |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              |
|           |            |         |           | 20000/1715              | 20175/1732.5 | 20350/1750   |
| 10MHz     | QPSK       | 1       | 0         | 23.56                   | 23.23        | 23.44        |
|           |            | 1       | 25        | 23.48                   | 23.59        | 23.51        |
|           |            | 1       | 49        | 23.22                   | 23.58        | 23.71        |
|           |            | 25      | 0         | 22.42                   | 22.34        | 22.68        |
|           |            | 25      | 13        | 22.41                   | 22.44        | 22.51        |
|           |            | 25      | 25        | 22.41                   | 22.55        | 22.50        |
|           |            | 50      | 0         | 22.39                   | 22.45        | 22.69        |
|           | 16QAM      | 1       | 0         | 22.47                   | 22.26        | 23.29        |
|           |            | 1       | 25        | 22.55                   | 22.86        | 23.19        |
|           |            | 1       | 49        | 22.40                   | 23.02        | 23.39        |
|           |            | 25      | 0         | 21.35                   | 21.46        | 21.56        |
|           |            | 25      | 13        | 21.42                   | 21.51        | 21.37        |
|           |            | 25      | 25        | 21.49                   | 21.59        | 21.60        |
|           |            | 50      | 0         | 21.38                   | 21.53        | 21.70        |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              |
|           |            |         |           | 20025/1717.5            | 20175/1732.5 | 20325/1747.5 |
| 15MHz     | QPSK       | 1       | 0         | 23.55                   | 23.19        | 23.42        |
|           |            | 1       | 38        | 23.46                   | 23.58        | 23.48        |
|           |            | 1       | 74        | 23.19                   | 23.53        | 23.67        |
|           |            | 36      | 0         | 22.40                   | 22.30        | 22.65        |
|           |            | 36      | 18        | 22.38                   | 22.39        | 22.47        |
|           |            | 36      | 39        | 22.38                   | 22.52        | 22.46        |
|           |            | 75      | 0         | 22.37                   | 22.41        | 22.64        |
|           | 16QAM      | 1       | 0         | 22.42                   | 22.24        | 23.27        |
|           |            | 1       | 38        | 22.53                   | 22.83        | 23.17        |
|           |            | 1       | 74        | 22.37                   | 22.98        | 23.36        |
|           |            | 36      | 0         | 21.32                   | 21.44        | 21.53        |
|           |            | 36      | 18        | 21.39                   | 21.46        | 21.33        |
|           |            | 36      | 39        | 21.47                   | 21.55        | 21.57        |
|           |            | 75      | 0         | 21.35                   | 21.48        | 21.66        |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              |
|           |            |         |           | 20050/1720              | 20175/1732.5 | 20300/1745   |
| 20MHz     | QPSK       | 1       | 0         | 23.52                   | 23.15        | 23.39        |
|           |            | 1       | 50        | 23.45                   | 23.54        | 23.46        |



|  |       |     |    |       |       |       |
|--|-------|-----|----|-------|-------|-------|
|  |       | 1   | 99 | 23.17 | 23.52 | 23.64 |
|  |       | 50  | 0  | 22.37 | 22.25 | 22.61 |
|  |       | 50  | 25 | 22.36 | 22.35 | 22.44 |
|  |       | 50  | 50 | 22.35 | 22.47 | 22.42 |
|  |       | 100 | 0  | 22.34 | 22.36 | 22.60 |
|  | 16QAM | 1   | 0  | 22.40 | 22.20 | 23.22 |
|  |       | 1   | 50 | 22.49 | 22.81 | 23.13 |
|  |       | 1   | 99 | 22.35 | 22.95 | 23.34 |
|  |       | 50  | 0  | 21.29 | 21.40 | 21.50 |
|  |       | 50  | 25 | 21.36 | 21.44 | 21.30 |
|  |       | 50  | 50 | 21.44 | 21.50 | 21.53 |
|  |       | 100 | 0  | 21.33 | 21.44 | 21.63 |

| LTE Band 12 |            |         |           | AV Conducted Power(dBm) |             |             |
|-------------|------------|---------|-----------|-------------------------|-------------|-------------|
| Bandwidth   | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |             |
|             |            |         |           | 23017/699.7             | 23095/707.5 | 23173/715.3 |
| 1.4MHz      | QPSK       | 1       | 0         | 23.63                   | 23.64       | 23.61       |
|             |            | 1       | 2         | 23.67                   | 23.57       | 23.69       |
|             |            | 1       | 5         | 23.61                   | 23.50       | 23.70       |
|             |            | 3       | 0         | 23.50                   | 23.54       | 23.63       |
|             |            | 3       | 2         | 23.45                   | 23.50       | 23.54       |
|             |            | 3       | 3         | 23.66                   | 23.62       | 23.63       |
|             |            | 6       | 0         | 22.61                   | 22.57       | 22.65       |
|             | 16QAM      | 1       | 0         | 22.95                   | 22.18       | 22.96       |
|             |            | 1       | 2         | 22.94                   | 22.55       | 23.20       |
|             |            | 1       | 5         | 22.76                   | 22.36       | 22.86       |
|             |            | 3       | 0         | 22.58                   | 22.60       | 22.74       |
|             |            | 3       | 2         | 22.52                   | 22.50       | 22.51       |
|             |            | 3       | 3         | 22.52                   | 22.58       | 22.46       |
|             |            | 6       | 0         | 21.71                   | 21.63       | 21.84       |
| Bandwidth   | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |             |
|             |            |         |           | 23025/700.5             | 23095/707.5 | 23165/714.5 |
| 3MHz        | QPSK       | 1       | 0         | 23.65                   | 23.68       | 23.64       |
|             |            | 1       | 7         | 23.70                   | 23.62       | 23.73       |
|             |            | 1       | 14        | 23.64                   | 23.55       | 23.74       |
|             |            | 8       | 0         | 22.60                   | 22.66       | 22.76       |
|             |            | 8       | 4         | 22.57                   | 22.60       | 22.66       |
|             |            | 8       | 7         | 22.76                   | 22.73       | 22.73       |
|             |            | 15      | 0         | 22.64                   | 22.61       | 22.68       |
|             | 16QAM      | 1       | 0         | 22.98                   | 22.20       | 22.99       |
|             |            | 1       | 7         | 22.97                   | 22.60       | 23.24       |



|           |            | 1       | 14        | 22.78                   | 22.40       | 22.89       |
|-----------|------------|---------|-----------|-------------------------|-------------|-------------|
|           |            | 8       | 0         | 21.69                   | 21.73       | 21.86       |
|           |            | 8       | 4         | 21.63                   | 21.63       | 21.63       |
|           |            | 8       | 7         | 21.62                   | 21.70       | 21.59       |
|           |            | 15      | 0         | 21.74                   | 21.67       | 21.87       |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |             |
|           |            |         |           | 23035/701.5             | 23095/707.5 | 23155/713.5 |
| 5MHz      | QPSK       | 1       | 0         | 23.63                   | 23.63       | 23.61       |
|           |            | 1       | 13        | 23.69                   | 23.62       | 23.71       |
|           |            | 1       | 24        | 23.60                   | 23.49       | 23.69       |
|           |            | 12      | 0         | 22.58                   | 22.62       | 22.73       |
|           |            | 12      | 6         | 22.55                   | 22.56       | 22.61       |
|           |            | 12      | 13        | 22.73                   | 22.72       | 22.70       |
|           |            | 25      | 0         | 22.68                   | 22.58       | 22.65       |
|           | 16QAM      | 1       | 0         | 22.92                   | 22.17       | 22.96       |
|           |            | 1       | 13        | 22.95                   | 22.59       | 23.22       |
|           |            | 1       | 24        | 22.75                   | 22.36       | 22.85       |
|           |            | 12      | 0         | 21.67                   | 21.72       | 21.84       |
|           |            | 12      | 6         | 21.59                   | 21.57       | 21.58       |
|           |            | 12      | 13        | 21.60                   | 21.66       | 21.56       |
|           |            | 25      | 0         | 21.72                   | 21.63       | 21.82       |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |             |
|           |            |         |           | 23060/704               | 23095/707.5 | 23130/711   |
| 10MHz     | QPSK       | 1       | 0         | 23.60                   | 23.59       | 23.58       |
|           |            | 1       | 25        | 23.68                   | 23.58       | 23.69       |
|           |            | 1       | 49        | 23.58                   | 23.48       | 23.66       |
|           |            | 25      | 0         | 22.55                   | 22.57       | 22.69       |
|           |            | 25      | 13        | 22.53                   | 22.52       | 22.58       |
|           |            | 25      | 25        | 22.70                   | 22.67       | 22.66       |
|           |            | 50      | 0         | 22.65                   | 22.53       | 22.61       |
|           | 16QAM      | 1       | 0         | 22.90                   | 22.13       | 22.91       |
|           |            | 1       | 25        | 22.91                   | 22.57       | 23.18       |
|           |            | 1       | 49        | 22.73                   | 22.33       | 22.83       |
|           |            | 25      | 0         | 21.64                   | 21.68       | 21.81       |
|           |            | 25      | 13        | 21.56                   | 21.55       | 21.55       |
|           |            | 25      | 25        | 21.57                   | 21.61       | 21.52       |
|           |            | 50      | 0         | 21.70                   | 21.59       | 21.79       |

| LTE Band 13 |            |         |           | Conducted Power(dBm)    |           |             |
|-------------|------------|---------|-----------|-------------------------|-----------|-------------|
| Bandwidth   | Modulation | RB size | RB offset | Channel/Frequency (MHz) |           |             |
|             |            |         |           | 23205/779.5             | 23230/782 | 23255/784.5 |
| 5MHz        | QPSK       | 1       | 0         | 23.72                   | 23.63     | 23.78       |
|             |            | 1       | 13        | 23.79                   | 23.68     | 23.77       |
|             |            | 1       | 24        | 23.58                   | 23.69     | 23.65       |
|             |            | 12      | 0         | 22.87                   | 22.77     | 22.82       |
|             |            | 12      | 6         | 22.85                   | 22.80     | 22.86       |
|             |            | 12      | 13        | 22.75                   | 22.82     | 22.83       |
|             |            | 25      | 0         | 22.81                   | 22.74     | 22.80       |
|             | 16QAM      | 1       | 0         | 23.06                   | 22.41     | 22.60       |
|             |            | 1       | 13        | 23.14                   | 22.45     | 22.35       |
|             |            | 1       | 24        | 23.03                   | 22.16     | 22.43       |
|             |            | 12      | 0         | 21.50                   | 21.52     | 21.68       |
|             |            | 12      | 6         | 21.63                   | 21.75     | 21.65       |
|             |            | 12      | 13        | 21.76                   | 21.60     | 21.57       |
|             |            | 25      | 0         | 21.74                   | 21.96     | 21.62       |
| Bandwidth   | Modulation | RB size | RB offset | Channel/Frequency (MHz) |           |             |
| 10MHz       | QPSK       | 1       | 0         | /                       | 23.76     | /           |
|             |            | 1       | 25        | /                       | 23.85     | /           |
|             |            | 1       | 49        | /                       | 23.71     | /           |
|             |            | 25      | 0         | /                       | 22.87     | /           |
|             |            | 25      | 13        | /                       | 22.79     | /           |
|             |            | 25      | 25        | /                       | 22.88     | /           |
|             |            | 50      | 0         | /                       | 22.74     | /           |
|             | 16QAM      | 1       | 0         | /                       | 23.11     | /           |
|             |            | 1       | 25        | /                       | 23.41     | /           |
|             |            | 1       | 49        | /                       | 22.94     | /           |
|             |            | 25      | 0         | /                       | 21.78     | /           |
|             |            | 25      | 13        | /                       | 21.83     | /           |
|             |            | 25      | 25        | /                       | 21.88     | /           |
|             |            | 50      | 0         | /                       | 21.82     | /           |

| LTE Band 66 |            |         |           | Conducted Power(dBm)    |             |               |
|-------------|------------|---------|-----------|-------------------------|-------------|---------------|
| Bandwidth   | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |               |
|             |            |         |           | 131979/1710.7           | 132322/1745 | 132665/1779.3 |
| 1.4MHz      | QPSK       | 1       | 0         | 23.42                   | 23.57       | 23.56         |
|             |            | 1       | 2         | 23.30                   | 23.76       | 23.57         |
|             |            | 1       | 5         | 23.37                   | 23.64       | 23.45         |
|             |            | 3       | 0         | 23.47                   | 23.58       | 23.26         |



|           |            | 3       | 2         | 23.35                   | 23.75       | 23.33         |
|-----------|------------|---------|-----------|-------------------------|-------------|---------------|
|           |            | 3       | 3         | 23.59                   | 23.55       | 23.36         |
|           |            | 6       | 0         | 22.51                   | 22.73       | 22.34         |
|           | 16QAM      | 1       | 0         | 22.84                   | 22.38       | 22.20         |
|           |            | 1       | 2         | 22.43                   | 22.76       | 22.57         |
|           |            | 1       | 5         | 22.57                   | 22.42       | 22.22         |
|           |            | 3       | 0         | 22.53                   | 22.57       | 22.27         |
|           |            | 3       | 2         | 22.32                   | 22.76       | 22.43         |
|           |            | 3       | 3         | 22.69                   | 22.62       | 22.45         |
|           |            | 6       | 0         | 21.65                   | 21.84       | 21.45         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |               |
|           |            |         |           | 131987/1711.5           | 132322/1745 | 132657/1778.5 |
| 3MHz      | QPSK       | 1       | 0         | 23.44                   | 23.61       | 23.59         |
|           |            | 1       | 7         | 23.33                   | 23.81       | 23.61         |
|           |            | 1       | 14        | 23.40                   | 23.69       | 23.49         |
|           |            | 8       | 0         | 22.57                   | 22.70       | 22.39         |
|           |            | 8       | 4         | 22.47                   | 22.85       | 22.45         |
|           |            | 8       | 7         | 22.69                   | 22.66       | 22.46         |
|           |            | 15      | 0         | 22.54                   | 22.77       | 22.37         |
|           | 16QAM      | 1       | 0         | 22.87                   | 22.40       | 22.23         |
|           |            | 1       | 7         | 22.46                   | 22.81       | 22.61         |
|           |            | 1       | 14        | 22.59                   | 22.46       | 22.25         |
|           |            | 8       | 0         | 21.64                   | 21.70       | 21.39         |
|           |            | 8       | 4         | 21.43                   | 21.89       | 21.55         |
|           |            | 8       | 7         | 21.79                   | 21.74       | 21.58         |
|           |            | 15      | 0         | 21.68                   | 21.88       | 21.48         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |               |
|           |            |         |           | 131997/1712.5           | 132322/1745 | 132647/1777.5 |
| 5MHz      | QPSK       | 1       | 0         | 23.41                   | 23.59       | 23.55         |
|           |            | 1       | 13        | 23.31                   | 23.77       | 23.58         |
|           |            | 1       | 24        | 23.37                   | 23.64       | 23.45         |
|           |            | 12      | 0         | 22.54                   | 22.65       | 22.35         |
|           |            | 12      | 6         | 22.45                   | 22.81       | 22.40         |
|           |            | 12      | 13        | 22.67                   | 22.64       | 22.42         |
|           |            | 25      | 0         | 22.52                   | 22.76       | 22.35         |
|           | 16QAM      | 1       | 0         | 22.84                   | 22.36       | 22.20         |
|           |            | 1       | 13        | 22.43                   | 22.79       | 22.58         |
|           |            | 1       | 24        | 22.56                   | 22.44       | 22.21         |
|           |            | 12      | 0         | 21.62                   | 21.66       | 21.36         |
|           |            | 12      | 6         | 21.40                   | 21.84       | 21.51         |
|           |            | 12      | 13        | 21.76                   | 21.69       | 21.54         |
|           |            | 25      | 0         | 21.66                   | 21.84       | 21.43         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |               |



|           |            |         |           | 132022/1715             | 132322/1745 | 132622/1775   |
|-----------|------------|---------|-----------|-------------------------|-------------|---------------|
| 10MHz     | QPSK       | 1       | 0         | 23.43                   | 23.60       | 23.58         |
|           |            | 1       | 25        | 23.34                   | 23.82       | 23.62         |
|           |            | 1       | 49        | 23.39                   | 23.68       | 23.48         |
|           |            | 25      | 0         | 22.57                   | 22.70       | 22.39         |
|           |            | 25      | 13        | 22.48                   | 22.86       | 22.44         |
|           |            | 25      | 25        | 22.69                   | 22.68       | 22.47         |
|           |            | 50      | 0         | 22.60                   | 22.78       | 22.39         |
|           | 16QAM      | 1       | 0         | 22.86                   | 22.39       | 22.22         |
|           |            | 1       | 25        | 22.46                   | 22.83       | 22.61         |
|           |            | 1       | 49        | 22.59                   | 22.46       | 22.24         |
|           |            | 25      | 0         | 21.65                   | 21.71       | 21.40         |
|           |            | 25      | 13        | 21.42                   | 21.88       | 21.54         |
|           |            | 25      | 25        | 21.79                   | 21.74       | 21.58         |
|           |            | 50      | 0         | 21.69                   | 21.89       | 21.47         |
| Bandwidth | Modulation | RB size | RB offset | Channel                 | Channel     | Channel       |
|           |            |         |           | 132047/1717.5           | 132322/1745 | 132597/1772.5 |
| 15MHz     | QPSK       | 1       | 0         | 23.42                   | 23.56       | 23.56         |
|           |            | 1       | 38        | 23.32                   | 23.81       | 23.59         |
|           |            | 1       | 74        | 23.36                   | 23.63       | 23.44         |
|           |            | 36      | 0         | 22.55                   | 22.66       | 22.36         |
|           |            | 36      | 18        | 22.45                   | 22.81       | 22.40         |
|           |            | 36      | 39        | 22.66                   | 22.65       | 22.43         |
|           |            | 75      | 0         | 22.58                   | 22.74       | 22.34         |
|           | 16QAM      | 1       | 0         | 22.81                   | 22.37       | 22.20         |
|           |            | 1       | 38        | 22.44                   | 22.80       | 22.59         |
|           |            | 1       | 74        | 22.56                   | 22.42       | 22.21         |
|           |            | 36      | 0         | 21.62                   | 21.69       | 21.37         |
|           |            | 36      | 18        | 21.39                   | 21.83       | 21.50         |
|           |            | 36      | 39        | 21.77                   | 21.70       | 21.55         |
|           |            | 75      | 0         | 21.66                   | 21.84       | 21.43         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |               |
|           |            |         |           | 132072/1720             | 132322/1745 | 132572/1770   |
| 20MHz     | QPSK       | 1       | 0         | 23.39                   | 23.52       | 23.53         |
|           |            | 1       | 50        | 23.31                   | 23.77       | 23.57         |
|           |            | 1       | 99        | 23.34                   | 23.62       | 23.41         |
|           |            | 50      | 0         | 22.52                   | 22.61       | 22.32         |
|           |            | 50      | 25        | 22.43                   | 22.77       | 22.37         |
|           |            | 50      | 50        | 22.63                   | 22.60       | 22.39         |
|           |            | 100     | 0         | 22.55                   | 22.69       | 22.30         |
|           | 16QAM      | 1       | 0         | 22.79                   | 22.33       | 22.15         |
|           |            | 1       | 50        | 22.40                   | 22.78       | 22.55         |
|           |            | 1       | 99        | 22.54                   | 22.39       | 22.19         |



|  |  |     |    |       |       |       |
|--|--|-----|----|-------|-------|-------|
|  |  | 50  | 0  | 21.59 | 21.65 | 21.34 |
|  |  | 50  | 25 | 21.36 | 21.81 | 21.47 |
|  |  | 50  | 50 | 21.74 | 21.65 | 21.51 |
|  |  | 100 | 0  | 21.64 | 21.80 | 21.40 |

| LTE Band 71 |            |         |           | Conducted Power(dBm)    |              |              |
|-------------|------------|---------|-----------|-------------------------|--------------|--------------|
| Bandwidth   | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              |
|             |            |         |           | 133147/665.5            | 133297/680.5 | 133447/695.5 |
| 5MHz        | QPSK       | 1       | 0         | 23.15                   | 23.23        | 22.96        |
|             |            | 1       | 13        | 23.44                   | 23.23        | 23.08        |
|             |            | 1       | 24        | 23.25                   | 23.06        | 23.07        |
|             |            | 12      | 0         | 22.15                   | 22.33        | 22.29        |
|             |            | 12      | 6         | 22.20                   | 22.19        | 22.21        |
|             |            | 12      | 13        | 22.38                   | 22.36        | 22.33        |
|             |            | 25      | 0         | 22.17                   | 22.40        | 22.20        |
|             | 16QAM      | 1       | 0         | 22.08                   | 22.64        | 22.90        |
|             |            | 1       | 13        | 22.20                   | 22.85        | 22.91        |
|             |            | 1       | 24        | 22.22                   | 22.43        | 22.78        |
|             |            | 12      | 0         | 21.29                   | 21.23        | 21.07        |
|             |            | 12      | 6         | 21.25                   | 21.28        | 21.26        |
|             |            | 12      | 13        | 21.38                   | 21.23        | 21.13        |
|             |            | 25      | 0         | 21.32                   | 21.50        | 21.31        |
| Bandwidth   | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              |
|             |            |         |           | 133172/668              | 133297/680.5 | 133422/693   |
| 10MHz       | QPSK       | 1       | 0         | 23.17                   | 23.24        | 22.99        |
|             |            | 1       | 25        | 23.47                   | 23.28        | 23.12        |
|             |            | 1       | 49        | 23.27                   | 23.10        | 23.10        |
|             |            | 25      | 0         | 22.18                   | 22.38        | 22.33        |
|             |            | 25      | 13        | 22.23                   | 22.24        | 22.25        |
|             |            | 25      | 25        | 22.40                   | 22.40        | 22.38        |
|             |            | 50      | 0         | 22.25                   | 22.42        | 22.24        |
|             | 16QAM      | 1       | 0         | 22.10                   | 22.67        | 22.92        |
|             |            | 1       | 25        | 22.23                   | 22.89        | 22.94        |
|             |            | 1       | 49        | 22.25                   | 22.45        | 22.81        |
|             |            | 25      | 0         | 21.32                   | 21.28        | 21.11        |
|             |            | 25      | 13        | 21.27                   | 21.32        | 21.29        |
|             |            | 25      | 25        | 21.41                   | 21.28        | 21.17        |
|             |            | 50      | 0         | 21.35                   | 21.55        | 21.35        |
| Bandwidth   | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              |
|             |            |         |           | 133197/670.5            | 133297/680.5 | 133397/690.5 |
| 15MHz       | QPSK       | 1       | 0         | 23.16                   | 23.01        | 22.97        |



|           |            | 1       | 38        | 23.45                   | 23.11      | 23.09      |
|-----------|------------|---------|-----------|-------------------------|------------|------------|
|           |            | 1       | 74        | 23.24                   | 23.09      | 23.06      |
|           |            | 36      | 0         | 22.16                   | 22.25      | 22.30      |
|           |            | 36      | 18        | 22.20                   | 22.21      | 22.21      |
|           |            | 36      | 39        | 22.37                   | 22.13      | 22.34      |
|           |            | 75      | 0         | 22.23                   | 22.11      | 22.19      |
|           |            | 1       | 0         | 22.05                   | 22.07      | 22.90      |
|           | 16QAM      | 1       | 38        | 22.21                   | 22.09      | 22.92      |
|           |            | 1       | 74        | 22.22                   | 22.22      | 22.78      |
|           |            | 36      | 0         | 21.29                   | 21.25      | 21.08      |
|           |            | 36      | 18        | 21.24                   | 21.20      | 21.25      |
|           |            | 36      | 39        | 21.39                   | 21.12      | 21.14      |
|           |            | 75      | 0         | 21.32                   | 21.11      | 21.31      |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |            |            |
|           |            |         |           | 133222/673              | 133322/683 | 133372/688 |
| 20MHz     | QPSK       | 1       | 0         | 23.13                   | 23.16      | 22.94      |
|           |            | 1       | 50        | 23.44                   | 23.23      | 23.07      |
|           |            | 1       | 99        | 23.22                   | 23.04      | 23.03      |
|           |            | 50      | 0         | 22.13                   | 22.29      | 22.26      |
|           |            | 50      | 25        | 22.18                   | 22.15      | 22.18      |
|           |            | 50      | 50        | 22.34                   | 22.32      | 22.30      |
|           |            | 100     | 0         | 22.20                   | 22.33      | 22.15      |
|           | 16QAM      | 1       | 0         | 22.03                   | 22.61      | 22.85      |
|           |            | 1       | 50        | 22.17                   | 22.84      | 22.88      |
|           |            | 1       | 99        | 22.20                   | 22.38      | 22.76      |
|           |            | 50      | 0         | 21.26                   | 21.22      | 21.05      |
|           |            | 50      | 25        | 21.21                   | 21.25      | 21.22      |
|           |            | 50      | 50        | 21.36                   | 21.19      | 21.10      |
|           |            | 100     | 0         | 21.30                   | 21.46      | 21.28      |

## 5.2 Effective Isotropic Radiated Power

### Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C ~25°C  | 45%~50%           | 101.5kPa |

### Methods of Measurement

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI/TIA-603-E (2016).

a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.

b) Key the transmitter, then rotate the EUT 360° azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).

c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.

d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading.  $LOSS = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$

e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:  $ERP \text{ (dBm)} = LVL \text{ (dBm)} + LOSS \text{ (dB)}$

f) The maximum ERP is the maximum value determined in the preceding step.

g) When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g. transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and the point where power is applied to the antenna. ERP can then be calculated as follows:

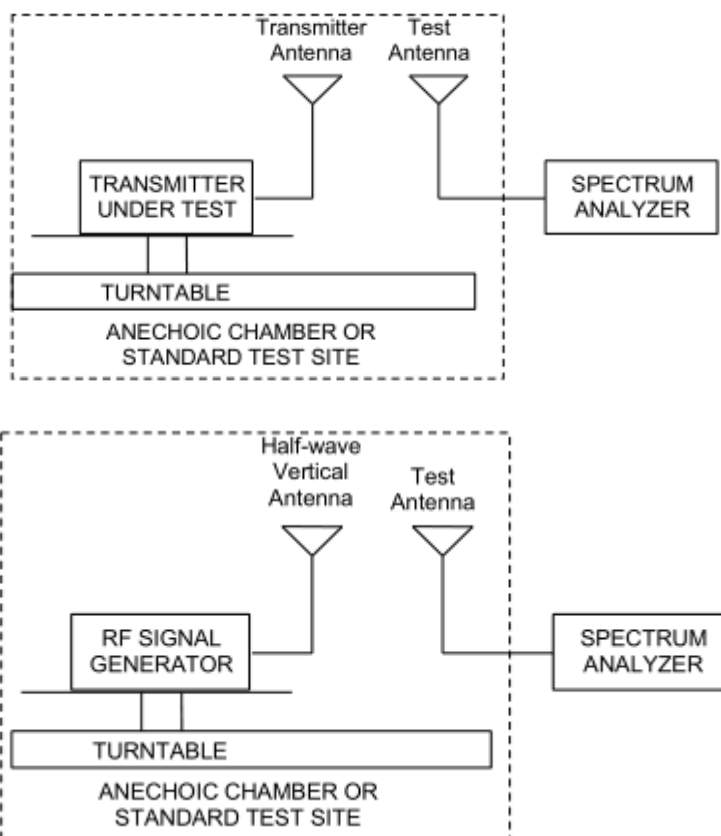
$$EIRP \text{ (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBi)}$$

where: dBd refers to gain relative to an ideal dipole.

$$EIRP \text{ (dBm)} = ERP \text{ (dBm)} + 2.15 \text{ (dB.)}$$

The RB allocation refers to section 5.1, using the maximum output power configuration.

## Test setup



Note: Area side:2.4mX3.6m

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

### Limits

Rule Part 27.50(b) (10) specifies that “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”

Rule Part 27.50(c) (10) specifies that “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”

Rule Part 27.50(d) (4) specifies that “Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.”

|                        |                                |
|------------------------|--------------------------------|
| Part 27.50(b)(10)Limit | $\leq 3 \text{ W}$ (34.77 dBm) |
| Part 27.50(c)(10)Limit | $\leq 3 \text{ W}$ (34.77 dBm) |
| Part 27.50(d)(4)Limit  | $\leq 1 \text{ W}$ (30 dBm)    |

### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 1.19 \text{ dB}$

**Test Results**

The measurement is performed for both of horizontal and vertical antenna Polarization, and only the data of worst mode is recorded in this report.

| Mode                 | Channel | Frequency (MHz) | Polarization | EIRP (dBm) | Limit (dBm) | Conclusion |
|----------------------|---------|-----------------|--------------|------------|-------------|------------|
| <b>WCDMA Band IV</b> | Low     | 1712.4          | Horizontal   | 25.59      | 30          | Pass       |
|                      | Mid     | 1732.6          | Horizontal   | 25.62      | 30          | Pass       |
|                      | High    | 1752.6          | Horizontal   | 25.26      | 30          | Pass       |

| <b>LTE Band 4</b>      |         |                 |              |            |             |            |
|------------------------|---------|-----------------|--------------|------------|-------------|------------|
| Bandwidth              | Channel | Frequency (MHz) | Polarization | EIRP (dBm) | Limit (dBm) | Conclusion |
| <b>1.4 MHz (QPSK)</b>  | Low     | 1710.7          | Horizontal   | 26.08      | 30          | Pass       |
|                        | Mid     | 1732.5          | Horizontal   | 25.73      | 30          | Pass       |
|                        | High    | 1754.3          | Horizontal   | 25.24      | 30          | Pass       |
| <b>3 MHz (QPSK)</b>    | Low     | 1711.5          | Horizontal   | 25.83      | 30          | Pass       |
|                        | Mid     | 1732.5          | Horizontal   | 25.57      | 30          | Pass       |
|                        | High    | 1753.5          | Horizontal   | 25.23      | 30          | Pass       |
| <b>5 MHz (QPSK)</b>    | Low     | 1712.5          | Horizontal   | 25.90      | 30          | Pass       |
|                        | Mid     | 1732.5          | Horizontal   | 25.71      | 30          | Pass       |
|                        | High    | 1752.5          | Horizontal   | 24.99      | 30          | Pass       |
| <b>10 MHz (QPSK)</b>   | Low     | 1715            | Horizontal   | 25.56      | 30          | Pass       |
|                        | Mid     | 1732.5          | Horizontal   | 25.55      | 30          | Pass       |
|                        | High    | 1750            | Horizontal   | 25.69      | 30          | Pass       |
| <b>15 MHz (QPSK)</b>   | Low     | 1717.5          | Horizontal   | 25.87      | 30          | Pass       |
|                        | Mid     | 1732.5          | Horizontal   | 25.66      | 30          | Pass       |
|                        | High    | 1747.5          | Horizontal   | 25.53      | 30          | Pass       |
| <b>20 MHz (QPSK)</b>   | Low     | 1720            | Horizontal   | 25.51      | 30          | Pass       |
|                        | Mid     | 1732.5          | Horizontal   | 25.40      | 30          | Pass       |
|                        | High    | 1745            | Horizontal   | 25.79      | 30          | Pass       |
| <b>1.4 MHz (16QAM)</b> | Low     | 1710.7          | Horizontal   | 25.45      | 30          | Pass       |
|                        | Mid     | 1732.5          | Horizontal   | 24.90      | 30          | Pass       |
|                        | High    | 1754.3          | Horizontal   | 24.69      | 30          | Pass       |
| <b>3 MHz (16QAM)</b>   | Low     | 1711.5          | Horizontal   | 25.19      | 30          | Pass       |
|                        | Mid     | 1732.5          | Horizontal   | 24.76      | 30          | Pass       |
|                        | High    | 1753.5          | Horizontal   | 24.67      | 30          | Pass       |
| <b>5 MHz (16QAM)</b>   | Low     | 1712.5          | Horizontal   | 25.52      | 30          | Pass       |
|                        | Mid     | 1732.5          | Horizontal   | 25.54      | 30          | Pass       |
|                        | High    | 1752.5          | Horizontal   | 24.78      | 30          | Pass       |
| <b>10 MHz (16QAM)</b>  | Low     | 1715            | Horizontal   | 25.22      | 30          | Pass       |
|                        | Mid     | 1732.5          | Horizontal   | 25.03      | 30          | Pass       |
|                        | High    | 1750            | Horizontal   | 25.36      | 30          | Pass       |



|                           |      |        |            |       |    |      |
|---------------------------|------|--------|------------|-------|----|------|
| <b>15 MHz<br/>(16QAM)</b> | Low  | 1717.5 | Horizontal | 25.19 | 30 | Pass |
|                           | Mid  | 1732.5 | Horizontal | 25.22 | 30 | Pass |
|                           | High | 1747.5 | Horizontal | 24.99 | 30 | Pass |
| <b>20 MHz<br/>(16QAM)</b> | Low  | 1720   | Horizontal | 25.22 | 30 | Pass |
|                           | Mid  | 1732.5 | Horizontal | 24.88 | 30 | Pass |
|                           | High | 1745   | Horizontal | 25.35 | 30 | Pass |

| LTE Band 12                |         |                 |              |           |             |            |
|----------------------------|---------|-----------------|--------------|-----------|-------------|------------|
| Bandwidth                  | Channel | Frequency (MHz) | Polarization | ERP (dBm) | Limit (dBm) | Conclusion |
| <b>1.4 MHz<br/>(QPSK)</b>  | Low     | 699.7           | Horizontal   | 18.96     | 34.77       | Pass       |
|                            | Mid     | 707.5           | Horizontal   | 20.31     | 34.77       | Pass       |
|                            | High    | 715.3           | Horizontal   | 20.26     | 34.77       | Pass       |
| <b>3 MHz<br/>(QPSK)</b>    | Low     | 700.5           | Horizontal   | 19.55     | 34.77       | Pass       |
|                            | Mid     | 707.5           | Horizontal   | 19.90     | 34.77       | Pass       |
|                            | High    | 714.5           | Horizontal   | 20.16     | 34.77       | Pass       |
| <b>5 MHz<br/>(QPSK)</b>    | Low     | 701.5           | Horizontal   | 19.11     | 34.77       | Pass       |
|                            | Mid     | 707.5           | Horizontal   | 20.04     | 34.77       | Pass       |
|                            | High    | 713.5           | Horizontal   | 20.48     | 34.77       | Pass       |
| <b>10 MHz<br/>(QPSK)</b>   | Low     | 704             | Horizontal   | 19.21     | 34.77       | Pass       |
|                            | Mid     | 707.5           | Horizontal   | 19.33     | 34.77       | Pass       |
|                            | High    | 711             | Horizontal   | 19.83     | 34.77       | Pass       |
| <b>1.4 MHz<br/>(16QAM)</b> | Low     | 699.7           | Horizontal   | 18.66     | 34.77       | Pass       |
|                            | Mid     | 707.5           | Horizontal   | 19.77     | 34.77       | Pass       |
|                            | High    | 715.3           | Horizontal   | 19.97     | 34.77       | Pass       |
| <b>3 MHz<br/>(16QAM)</b>   | Low     | 700.5           | Horizontal   | 19.19     | 34.77       | Pass       |
|                            | Mid     | 707.5           | Horizontal   | 19.56     | 34.77       | Pass       |
|                            | High    | 714.5           | Horizontal   | 19.92     | 34.77       | Pass       |
| <b>5 MHz<br/>(16QAM)</b>   | Low     | 701.5           | Horizontal   | 18.89     | 34.77       | Pass       |
|                            | Mid     | 707.5           | Horizontal   | 19.93     | 34.77       | Pass       |
|                            | High    | 713.5           | Horizontal   | 20.38     | 34.77       | Pass       |
| <b>10 MHz<br/>(16QAM)</b>  | Low     | 704             | Horizontal   | 18.55     | 34.77       | Pass       |
|                            | Mid     | 707.5           | Horizontal   | 18.57     | 34.77       | Pass       |
|                            | High    | 711             | Horizontal   | 19.30     | 34.77       | Pass       |

| LTE Band 13   |         |                 |              |           |             |            |
|---------------|---------|-----------------|--------------|-----------|-------------|------------|
| Bandwidth     | Channel | Frequency (MHz) | Polarization | ERP (dBm) | Limit (dBm) | Conclusion |
| 5MHz (QPSK)   | Low     | 779.5           | Horizontal   | 23.26     | 34.77       | Pass       |
|               | Mid     | 782             | Horizontal   | 23.25     | 34.77       | Pass       |
|               | High    | 784.5           | Horizontal   | 23.36     | 34.77       | Pass       |
| 10MHz (QPSK)  | Mid     | 782             | Horizontal   | 23.63     | 34.77       | Pass       |
| 5MHz (16QAM)  | Low     | 779.5           | Horizontal   | 22.65     | 34.77       | Pass       |
|               | Mid     | 782             | Horizontal   | 22.89     | 34.77       | Pass       |
|               | High    | 784.5           | Horizontal   | 22.78     | 34.77       | Pass       |
| 10MHz (16QAM) | Mid     | 782             | Horizontal   | 23.26     | 34.77       | Pass       |

| LTE Band 66     |         |                 |              |            |             |            |
|-----------------|---------|-----------------|--------------|------------|-------------|------------|
| Band width      | Channel | Frequency (MHz) | Polarization | EIRP (dBm) | Limit (dBm) | Conclusion |
| 1.4 MHz (QPSK)  | Low     | 1710.70         | Horizontal   | 27.17      | 30          | Pass       |
|                 | Mid     | 1745.00         | Horizontal   | 27.10      | 30          | Pass       |
|                 | High    | 1779.30         | Horizontal   | 26.05      | 30          | Pass       |
| 3 MHz (QPSK)    | Low     | 1711.50         | Horizontal   | 27.51      | 30          | Pass       |
|                 | Mid     | 1745.00         | Horizontal   | 27.06      | 30          | Pass       |
|                 | High    | 1778.50         | Horizontal   | 26.01      | 30          | Pass       |
| 5 MHz (QPSK)    | Low     | 1712.50         | Horizontal   | 26.92      | 30          | Pass       |
|                 | Mid     | 1745.00         | Horizontal   | 26.78      | 30          | Pass       |
|                 | High    | 1777.50         | Horizontal   | 25.98      | 30          | Pass       |
| 10 MHz (QPSK)   | Low     | 1715.00         | Horizontal   | 27.25      | 30          | Pass       |
|                 | Mid     | 1745.00         | Horizontal   | 27.30      | 30          | Pass       |
|                 | High    | 1775.00         | Horizontal   | 26.13      | 30          | Pass       |
| 15 MHz (QPSK)   | Low     | 1717.50         | Horizontal   | 27.01      | 30          | Pass       |
|                 | Mid     | 1745.00         | Horizontal   | 27.12      | 30          | Pass       |
|                 | High    | 1772.50         | Horizontal   | 26.43      | 30          | Pass       |
| 20 MHz (QPSK)   | Low     | 1720.00         | Horizontal   | 26.98      | 30          | Pass       |
|                 | Mid     | 1745.00         | Horizontal   | 27.02      | 30          | Pass       |
|                 | High    | 1770.00         | Horizontal   | 26.31      | 30          | Pass       |
| 1.4 MHz (16QAM) | Low     | 1710.70         | Horizontal   | 26.54      | 30          | Pass       |
|                 | Mid     | 1745.00         | Horizontal   | 26.27      | 30          | Pass       |
|                 | High    | 1779.30         | Horizontal   | 25.50      | 30          | Pass       |
| 3 MHz (16QAM)   | Low     | 1711.50         | Horizontal   | 26.87      | 30          | Pass       |
|                 | Mid     | 1745.00         | Horizontal   | 26.25      | 30          | Pass       |
|                 | High    | 1778.50         | Horizontal   | 25.45      | 30          | Pass       |



|                           |      |         |            |       |    |      |
|---------------------------|------|---------|------------|-------|----|------|
| <b>5 MHz<br/>(16QAM)</b>  | Low  | 1712.50 | Horizontal | 26.14 | 30 | Pass |
|                           | Mid  | 1745.00 | Horizontal | 26.21 | 30 | Pass |
|                           | High | 1777.50 | Horizontal | 25.37 | 30 | Pass |
| <b>10 MHz<br/>(16QAM)</b> | Low  | 1715.00 | Horizontal | 26.61 | 30 | Pass |
|                           | Mid  | 1745.00 | Horizontal | 26.48 | 30 | Pass |
|                           | High | 1775.00 | Horizontal | 25.50 | 30 | Pass |
| <b>15 MHz<br/>(16QAM)</b> | Low  | 1717.50 | Horizontal | 26.63 | 30 | Pass |
|                           | Mid  | 1745.00 | Horizontal | 26.98 | 30 | Pass |
|                           | High | 1772.50 | Horizontal | 26.19 | 30 | Pass |
| <b>20 MHz<br/>(16QAM)</b> | Low  | 1720.00 | Horizontal | 26.79 | 30 | Pass |
|                           | Mid  | 1745.00 | Horizontal | 26.60 | 30 | Pass |
|                           | High | 1770.00 | Horizontal | 25.97 | 30 | Pass |

| LTE Band 71               |         |                 |              |           |             |            |
|---------------------------|---------|-----------------|--------------|-----------|-------------|------------|
| Bandwidth                 | Channel | Frequency (MHz) | Polarization | ERP (dBm) | Limit (dBm) | Conclusion |
| <b>5 MHz<br/>(QPSK)</b>   | Low     | 665.5           | Horizontal   | 21.30     | 34.77       | Pass       |
|                           | Mid     | 680.5           | Horizontal   | 22.72     | 34.77       | Pass       |
|                           | High    | 695.5           | Horizontal   | 22.54     | 34.77       | Pass       |
| <b>10 MHz<br/>(QPSK)</b>  | Low     | 668             | Horizontal   | 21.15     | 34.77       | Pass       |
|                           | Mid     | 680.5           | Horizontal   | 22.42     | 34.77       | Pass       |
|                           | High    | 693             | Horizontal   | 22.17     | 34.77       | Pass       |
| <b>15 MHz<br/>(QPSK)</b>  | Low     | 670.5           | Horizontal   | 21.32     | 34.77       | Pass       |
|                           | Mid     | 680.5           | Horizontal   | 21.74     | 34.77       | Pass       |
|                           | High    | 690.5           | Horizontal   | 22.44     | 34.77       | Pass       |
| <b>20 MHz<br/>(QPSK)</b>  | Low     | 673             | Horizontal   | 21.41     | 34.77       | Pass       |
|                           | Mid     | 683             | Horizontal   | 22.66     | 34.77       | Pass       |
|                           | High    | 688             | Horizontal   | 22.52     | 34.77       | Pass       |
| <b>5 MHz<br/>(16QAM)</b>  | Low     | 665.5           | Horizontal   | 20.62     | 34.77       | Pass       |
|                           | Mid     | 680.5           | Horizontal   | 22.25     | 34.77       | Pass       |
|                           | High    | 695.5           | Horizontal   | 22.03     | 34.77       | Pass       |
| <b>10 MHz<br/>(16QAM)</b> | Low     | 668             | Horizontal   | 20.61     | 34.77       | Pass       |
|                           | Mid     | 680.5           | Horizontal   | 21.70     | 34.77       | Pass       |
|                           | High    | 693             | Horizontal   | 21.64     | 34.77       | Pass       |
| <b>15 MHz<br/>(16QAM)</b> | Low     | 670.5           | Horizontal   | 20.64     | 34.77       | Pass       |
|                           | Mid     | 680.5           | Horizontal   | 21.30     | 34.77       | Pass       |
|                           | High    | 690.5           | Horizontal   | 21.90     | 34.77       | Pass       |
| <b>20 MHz<br/>(16QAM)</b> | Low     | 673             | Horizontal   | 20.92     | 34.77       | Pass       |
|                           | Mid     | 683             | Horizontal   | 21.94     | 34.77       | Pass       |
|                           | High    | 688             | Horizontal   | 21.88     | 34.77       | Pass       |

Note: 1. EIRP= E.R.P+2.15

### 5.3 Occupied Bandwidth

#### Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C ~25°C  | 45%~50%           | 101.5kPa |

#### Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.

RBW is set to 51 kHz, VBW is set to 160 kHz for WCDMA Band IV.

RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/12/66 (1.4MHz).

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 4/12/66 (3MHz).

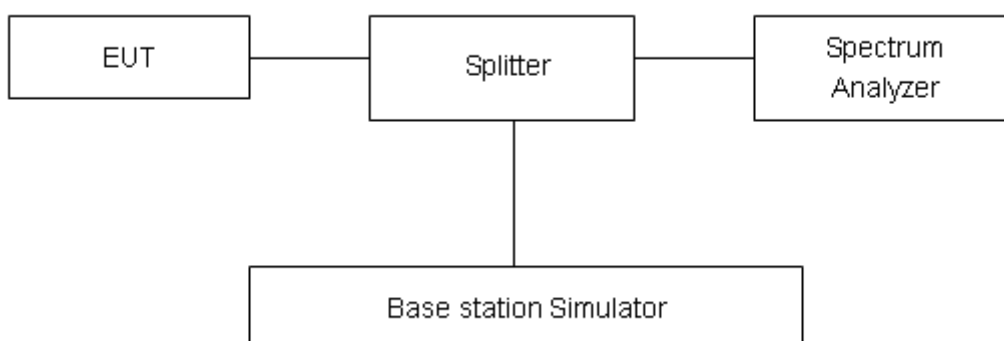
RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 4/12/13/66/71 (5MHz).

RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 4/12/13/66/71 (10MHz).

RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 4/66/71 (15MHz/20MHz).

99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

#### Test Setup



#### Limits

No specific occupied bandwidth requirements in part 2.1049.

#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U=624\text{Hz}$ .

**Test Result**
**EC25-AFX**

| Mode                | Channel | Frequency (MHz) | 99% Power Bandwidth(MHz) | -26dBc Bandwidth(MHz) |
|---------------------|---------|-----------------|--------------------------|-----------------------|
| WCDMA Band IV (RMC) | 1312    | 1712.4          | 4.1288                   | 4.696                 |
|                     | 1413    | 1732.6          | 4.1217                   | 4.714                 |
|                     | 1513    | 1752.6          | 4.1281                   | 4.715                 |

| LTE Band 4 |            |                 |         |                 |                          |                       |
|------------|------------|-----------------|---------|-----------------|--------------------------|-----------------------|
| RB         | Modulation | Bandwidth (MHz) | Channel | Frequency (MHz) | 99% Power Bandwidth(MHz) | -26dBc Bandwidth(MHz) |
| 100%       | QPSK       | 1.4             | 19957   | 1710.7          | 1.1282                   | 1.366                 |
|            |            |                 | 20175   | 1732.5          | 1.1272                   | 1.362                 |
|            |            |                 | 20393   | 1754.3          | 1.1412                   | 1.369                 |
|            |            | 3               | 19965   | 1711.5          | 2.7521                   | 3.075                 |
|            |            |                 | 20175   | 1732.5          | 2.7431                   | 3.075                 |
|            |            |                 | 20385   | 1753.5          | 2.7428                   | 3.085                 |
|            |            | 5               | 19975   | 1712.5          | 4.5161                   | 5.049                 |
|            |            |                 | 20175   | 1732.5          | 4.5341                   | 5.033                 |
|            |            |                 | 20375   | 1752.5          | 4.5121                   | 5.057                 |
|            |            | 10              | 20000   | 1715            | 9.0083                   | 10.070                |
|            |            |                 | 20175   | 1732.5          | 9.0383                   | 10.210                |
|            |            |                 | 20350   | 1750            | 9.0426                   | 10.080                |
|            |            | 15              | 20025   | 1717.5          | 13.4140                  | 14.650                |
|            |            |                 | 20175   | 1732.5          | 13.4770                  | 14.810                |
|            |            |                 | 20325   | 1747.5          | 13.4540                  | 14.740                |
|            |            | 20              | 20050   | 1720            | 17.8660                  | 19.240                |
|            |            |                 | 20175   | 1732.5          | 17.8520                  | 19.150                |
|            |            |                 | 20300   | 1745            | 17.8910                  | 19.490                |
|            | 16QAM      | 1.4             | 19957   | 1710.7          | 1.1249                   | 1.334                 |
|            |            |                 | 20175   | 1732.5          | 1.1305                   | 1.353                 |
|            |            |                 | 20393   | 1754.3          | 1.1225                   | 1.377                 |
|            |            | 3               | 19965   | 1711.5          | 2.7348                   | 3.064                 |
|            |            |                 | 20175   | 1732.5          | 2.7630                   | 3.089                 |
|            |            |                 | 20385   | 1753.5          | 2.7407                   | 3.079                 |
|            |            | 5               | 19975   | 1712.5          | 4.5356                   | 5.040                 |
|            |            |                 | 20175   | 1732.5          | 4.5138                   | 5.037                 |
|            |            |                 | 20375   | 1752.5          | 4.5368                   | 5.045                 |
|            |            | 10              | 20000   | 1715            | 9.0158                   | 10.050                |



|  |  |    |       |        |         |        |
|--|--|----|-------|--------|---------|--------|
|  |  |    | 20175 | 1732.5 | 9.0392  | 10.000 |
|  |  |    | 20350 | 1750   | 9.0281  | 10.090 |
|  |  | 15 | 20025 | 1717.5 | 13.4620 | 14.740 |
|  |  |    | 20175 | 1732.5 | 13.4740 | 14.730 |
|  |  |    | 20325 | 1747.5 | 13.4740 | 14.810 |
|  |  | 20 | 20050 | 1720   | 17.8840 | 19.410 |
|  |  |    | 20175 | 1732.5 | 17.9000 | 19.320 |
|  |  |    | 20300 | 1745   | 17.8550 | 19.320 |

| LTE Band 12 |            |                 |         |                 |                          |                       |
|-------------|------------|-----------------|---------|-----------------|--------------------------|-----------------------|
| RB          | Modulation | Bandwidth (MHz) | Channel | Frequency (MHz) | 99% Power Bandwidth(MHz) | -26dBc Bandwidth(MHz) |
| 100%        | QPSK       | 1.4             | 23017   | 699.7           | 1.1276                   | 1.362                 |
|             |            |                 | 23095   | 707.5           | 1.1259                   | 1.353                 |
|             |            |                 | 23173   | 715.3           | 1.1378                   | 1.342                 |
|             |            | 3               | 23025   | 700.5           | 2.7511                   | 3.064                 |
|             |            |                 | 23095   | 707.5           | 2.7413                   | 3.074                 |
|             |            |                 | 23165   | 714.5           | 2.7441                   | 3.073                 |
|             |            | 5               | 23035   | 701.5           | 4.5181                   | 5.050                 |
|             |            |                 | 23095   | 707.5           | 4.5262                   | 5.043                 |
|             |            |                 | 23155   | 713.5           | 4.5110                   | 4.989                 |
|             |            | 10              | 23060   | 704             | 9.0089                   | 10.040                |
|             |            |                 | 23095   | 707.5           | 9.0229                   | 10.090                |
|             |            |                 | 23130   | 711             | 9.0466                   | 10.080                |
|             | 16QAM      | 1.4             | 23017   | 699.7           | 1.1233                   | 1.328                 |
|             |            |                 | 23095   | 707.5           | 1.1305                   | 1.335                 |
|             |            |                 | 23173   | 715.3           | 1.1214                   | 1.358                 |
|             |            | 3               | 23025   | 700.5           | 2.7342                   | 3.065                 |
|             |            |                 | 23095   | 707.5           | 2.7584                   | 3.075                 |
|             |            |                 | 23165   | 714.5           | 2.7401                   | 3.068                 |
|             |            | 5               | 23035   | 701.5           | 4.5272                   | 5.035                 |
|             |            |                 | 23095   | 707.5           | 4.5071                   | 5.026                 |
|             |            |                 | 23155   | 713.5           | 4.5361                   | 5.063                 |
|             |            | 10              | 23060   | 704             | 9.0130                   | 10.070                |
|             |            |                 | 23095   | 707.5           | 9.0272                   | 9.989                 |
|             |            |                 | 23130   | 711             | 9.0403                   | 10.110                |

| LTE Band 13 |            |                 |         |                 |                          |                       |
|-------------|------------|-----------------|---------|-----------------|--------------------------|-----------------------|
| RB          | Modulation | Bandwidth (MHz) | Channel | Frequency (MHz) | 99% Power Bandwidth(MHz) | -26dBc Bandwidth(MHz) |
| 100%        | QPSK       | 5               | 23205   | 779.5           | 4.5103                   | 5.025                 |



|  |       |    |       |       |        |        |
|--|-------|----|-------|-------|--------|--------|
|  |       |    | 23230 | 782   | 4.5307 | 5.036  |
|  |       |    | 23255 | 784.5 | 4.4991 | 5.010  |
|  |       | 10 | 23230 | 782   | 9.0332 | 10.120 |
|  | 16QAM | 5  | 23205 | 779.5 | 4.5294 | 5.034  |
|  |       |    | 23230 | 782   | 4.5129 | 5.021  |
|  |       |    | 23255 | 784.5 | 4.5367 | 5.032  |
|  |       | 10 | 23230 | 782   | 9.0348 | 10.010 |
|  |       |    |       |       |        |        |

| LTE Band 66 |            |                 |         |                 |                          |                       |
|-------------|------------|-----------------|---------|-----------------|--------------------------|-----------------------|
| RB          | Modulation | Bandwidth (MHz) | Channel | Frequency (MHz) | 99% Power Bandwidth(MHz) | -26dBc Bandwidth(MHz) |
| 100%        | QPSK       | 1.4             | 131979  | 1710.7          | 1.1295                   | 1.385                 |
|             |            |                 | 132322  | 1745            | 1.1286                   | 1.364                 |
|             |            |                 | 132665  | 1779.3          | 1.1383                   | 1.350                 |
|             |            | 3               | 131987  | 1711.5          | 2.7481                   | 3.070                 |
|             |            |                 | 132322  | 1745            | 2.7435                   | 3.077                 |
|             |            |                 | 132657  | 1778.5          | 2.7434                   | 3.068                 |
|             |            | 5               | 131997  | 1712.5          | 4.5159                   | 5.042                 |
|             |            |                 | 132322  | 1745            | 4.5347                   | 5.042                 |
|             |            |                 | 132647  | 1777.5          | 4.5042                   | 5.037                 |
|             |            | 10              | 132022  | 1715            | 9.0110                   | 10.110                |
|             |            |                 | 132322  | 1745            | 9.0427                   | 10.200                |
|             |            |                 | 132622  | 1775            | 9.0373                   | 10.050                |
|             |            | 15              | 132047  | 1717.5          | 13.4110                  | 14.730                |
|             |            |                 | 132322  | 1745            | 13.4790                  | 14.730                |
|             |            |                 | 132597  | 1772.5          | 13.4530                  | 14.720                |
|             |            | 20              | 132072  | 1720            | 17.8570                  | 19.260                |
|             |            |                 | 132322  | 1745            | 17.8840                  | 19.310                |
|             |            |                 | 132572  | 1770            | 17.8970                  | 19.500                |
|             | 16QAM      | 1.4             | 131979  | 1710.7          | 1.1247                   | 1.332                 |
|             |            |                 | 132322  | 1745            | 1.1301                   | 1.350                 |
|             |            |                 | 132665  | 1779.3          | 1.1222                   | 1.360                 |
|             |            | 3               | 131987  | 1711.5          | 2.7340                   | 3.056                 |
|             |            |                 | 132322  | 1745            | 2.7701                   | 3.094                 |
|             |            |                 | 132657  | 1778.5          | 2.7384                   | 3.072                 |
|             |            | 5               | 131997  | 1712.5          | 4.5369                   | 5.046                 |
|             |            |                 | 132322  | 1745            | 4.5175                   | 5.046                 |
|             |            |                 | 132647  | 1777.5          | 4.5340                   | 5.043                 |
|             |            | 10              | 132022  | 1715            | 9.0146                   | 10.060                |
|             |            |                 | 132322  | 1745            | 9.0407                   | 10.040                |



|  |  |    |        |        |         |        |
|--|--|----|--------|--------|---------|--------|
|  |  |    | 132622 | 1775   | 9.0275  | 10.080 |
|  |  | 15 | 132047 | 1717.5 | 13.4620 | 14.740 |
|  |  |    | 132322 | 1745   | 13.4870 | 14.740 |
|  |  |    | 132597 | 1772.5 | 13.4630 | 14.850 |
|  |  |    | 132072 | 1720   | 17.8850 | 19.500 |
|  |  | 20 | 132322 | 1745   | 17.8840 | 19.410 |
|  |  |    | 132572 | 1770   | 17.8600 | 19.290 |

| LTE Band 71 |            |                 |         |                 |                          |                       |
|-------------|------------|-----------------|---------|-----------------|--------------------------|-----------------------|
| RB          | Modulation | Bandwidth (MHz) | Channel | Frequency (MHz) | 99% Power Bandwidth(MHz) | -26dBc Bandwidth(MHz) |
|             |            | 5               | 133147  | 665.5           | 4.5101                   | 5.025                 |
|             |            |                 | 133297  | 680.5           | 4.5218                   | 5.037                 |
|             |            |                 | 133447  | 695.5           | 4.5052                   | 5.012                 |
|             |            | 10              | 133172  | 668             | 9.0070                   | 10.120                |
|             |            |                 | 133297  | 680.5           | 9.0348                   | 10.180                |
|             |            |                 | 133422  | 693             | 9.0305                   | 10.040                |
|             |            | 15              | 133197  | 670.5           | 13.4130                  | 14.720                |
|             |            |                 | 133297  | 680.5           | 13.4490                  | 14.760                |
|             |            |                 | 133397  | 690.5           | 13.4690                  | 14.790                |
|             |            | 20              | 133222  | 673             | 17.8330                  | 19.240                |
|             |            |                 | 133322  | 683             | 17.8680                  | 19.250                |
|             |            |                 | 133372  | 688             | 17.9120                  | 19.430                |
|             |            | 5               | 133147  | 665.5           | 4.5289                   | 5.040                 |
|             |            |                 | 133297  | 680.5           | 4.5090                   | 5.016                 |
|             |            |                 | 133447  | 695.5           | 4.5335                   | 5.047                 |
|             |            | 10              | 133172  | 668             | 9.0112                   | 10.050                |
|             |            |                 | 133297  | 680.5           | 9.0370                   | 10.030                |
|             |            |                 | 133422  | 693             | 9.0266                   | 10.070                |
|             |            | 15              | 133197  | 670.5           | 13.4550                  | 14.740                |
|             |            |                 | 133297  | 680.5           | 13.4680                  | 14.730                |
|             |            |                 | 133397  | 690.5           | 13.4770                  | 14.790                |
|             |            | 20              | 133222  | 673             | 17.8350                  | 19.430                |
|             |            |                 | 133322  | 683             | 17.8930                  | 19.330                |
|             |            |                 | 133372  | 688             | 17.8710                  | 19.360                |



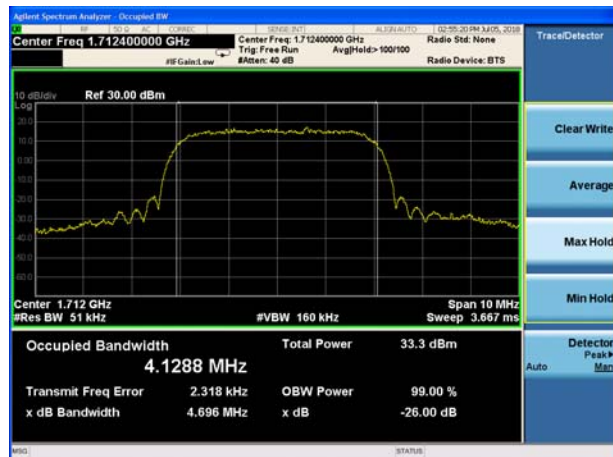
## EC25-AFX MINIPCIE

| LTE Band 12 |            |                 |         |                 |                          |                       |
|-------------|------------|-----------------|---------|-----------------|--------------------------|-----------------------|
| RB          | Modulation | Bandwidth (MHz) | Channel | Frequency (MHz) | 99% Power Bandwidth(MHz) | -26dBc Bandwidth(MHz) |
| 100%        | QPSK       | 1.4             | 23095   | 707.5           | 1.1254                   | 1.353                 |
|             |            | 3               | 23095   | 707.5           | 2.7455                   | 3.081                 |
|             |            | 5               | 23095   | 707.5           | 4.5253                   | 5.016                 |
|             |            | 10              | 23095   | 707.5           | 9.0398                   | 10.140                |
|             | 16QAM      | 1.4             | 23095   | 707.5           | 1.1285                   | 1.334                 |
|             |            | 3               | 23095   | 707.5           | 2.7583                   | 3.074                 |
|             |            | 5               | 23095   | 707.5           | 4.5101                   | 5.022                 |
|             |            | 10              | 23095   | 707.5           | 9.0209                   | 10.030                |

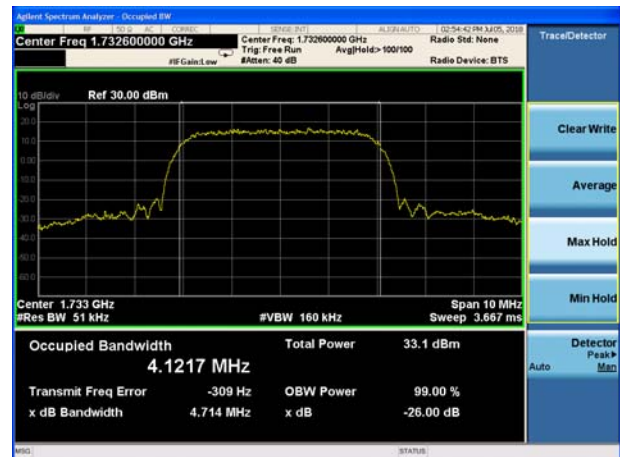


## EC25-AFX

## WCDMA Band IV CH-Low



## WCDMA Band IV CH Middle



## WCDMA Band IV CH High

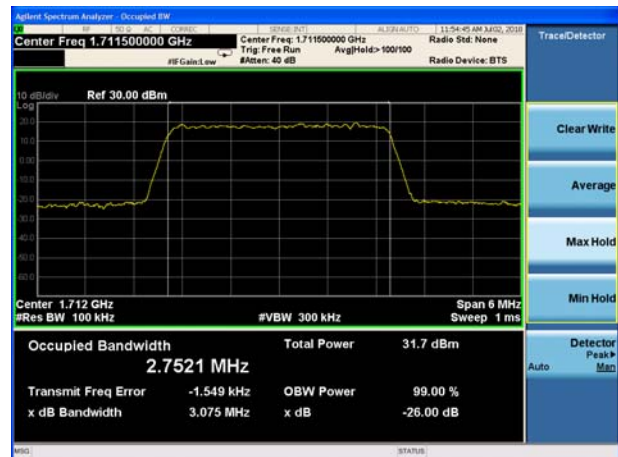




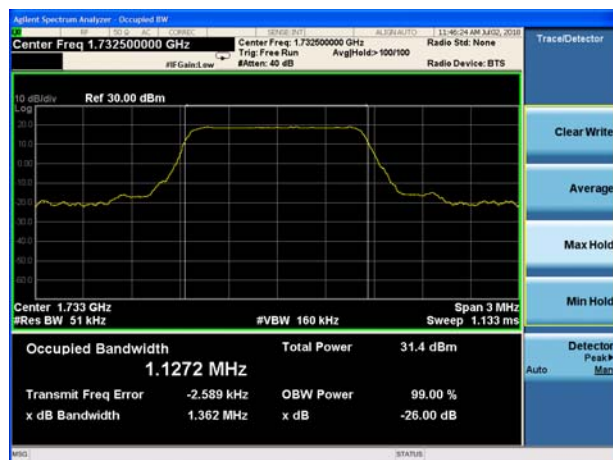
## LTE Band 4 QPSK 1.4MHz CH-Low



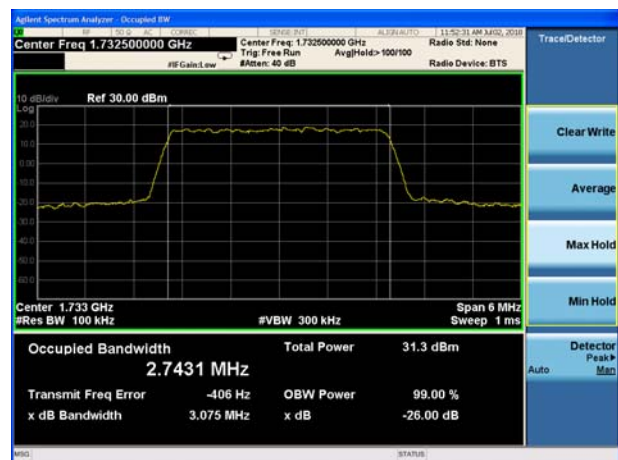
## LTE Band 4 QPSK 3MHz CH-Low



## LTE Band 4 QPSK 1.4MHz CH-Middle



## LTE Band 4 QPSK 3MHz CH-Middle



## LTE Band 4 QPSK 1.4MHz CH-High



## LTE Band 4 QPSK 3MHz CH-High





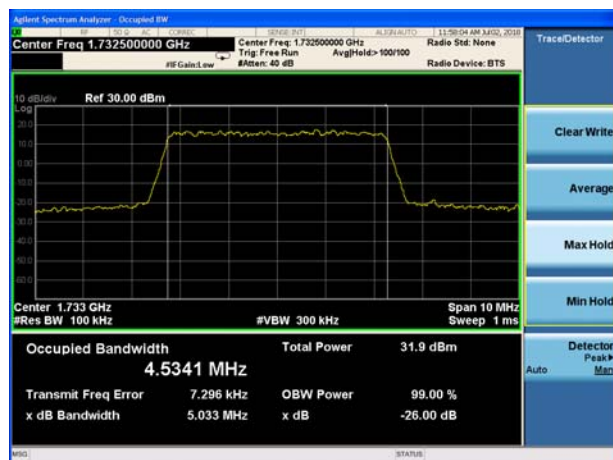
## LTE Band 4 QPSK 5MHz CH-Low



## LTE Band 4 QPSK 10MHz CH-Low



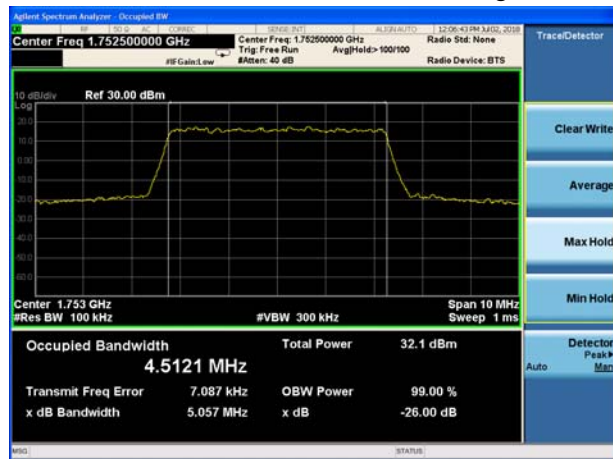
## LTE Band 4 QPSK 5MHz CH-Middle



## LTE Band 4 QPSK 10MHz CH-Middle



## LTE Band 4 QPSK 5MHz CH-High

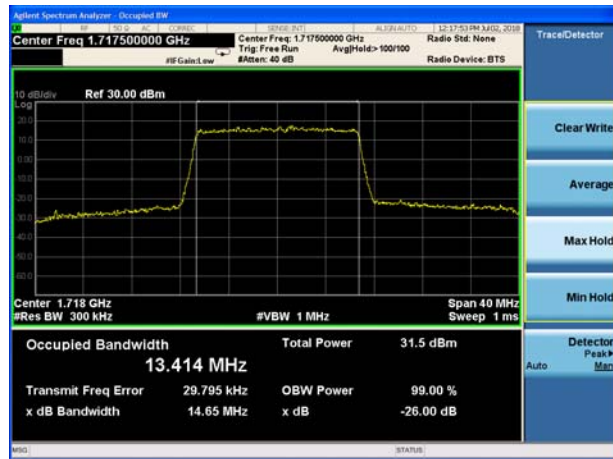


## LTE Band 4 QPSK 10MHz CH-High





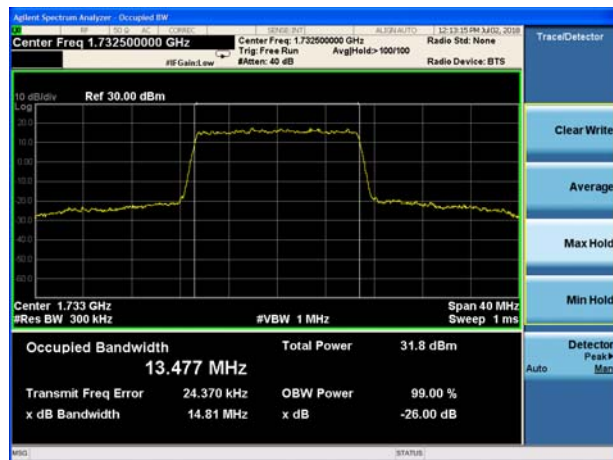
## LTE Band 4 QPSK 15MHz CH-Low



## LTE Band 4 QPSK 20MHz CH-Low



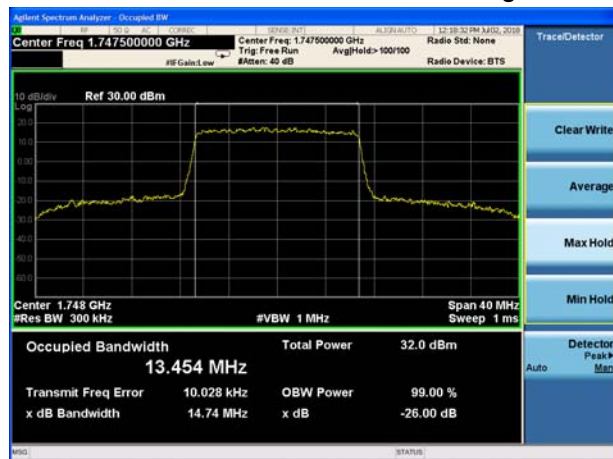
## LTE Band 4 QPSK 15MHz CH-Middle



## LTE Band 4 QPSK 20MHz CH-Middle



## LTE Band 4 QPSK 15MHz CH-High



## LTE Band 4 QPSK 20MHz CH-High

