# FCC RADIO TEST REPORT

## FCC ID: 2AI2O-M135YB

| | |
|---|---|
| **Sample:** | IOT DISPLAY |
| **Trade Name:** | Omni |
| **Main Model:** | M135YB |
| **Additional Model:** | N/A |
| **Report No.:** | UNIA25080510ER-62 |

### Prepared for

Shenzhen Omni Intelligent Technology Co., Ltd.

11th Floor, Building 31, Lianchuang Tech park, No.21 Bulan road, Longgang District Shenzhen, China

### Prepared by

Shenzhen United Testing Technology Co., Ltd.

D101&D401, No. 107, Kaicheng High-Tech Park, Taoyuan Community, Dalang Sub-District, Longhua District, Shenzhen, Guangdong, China

# TEST RESULT CERTIFICATION

| | |
|---|---|
| **Applicant**: | Shenzhen Omni Intelligent Technology Co., Ltd. |
| Address: | 11th Floor, Building 31, Lianchuang Tech park, No.21 Bulan road, Longgang District Shenzhen, China |
| **Manufacturer**: | Shenzhen Omni Intelligent Technology Co., Ltd. |
| Address: | 11th Floor, Building 31, Lianchuang Tech park, No.21 Bulan road, Longgang District Shenzhen, China |

**Product description**

| | |
|---|---|
| Product: | IOT DISPLAY |
| Trade Name: | Omni |
| Model Name: | M135YB |
| **Test Methods**: | FCC CFR Title 47 Part 2<br>FCC CFR Title 47 Part 22 Subpart H<br>FCC CFR Title 47 Part 24 Subpart E<br>FCC CFR Title 47 Part 27 Subpart L<br>FCC CFR Title 47 Part 27 Subpart H |

This device described above has been tested by Shenzhen United Testing Technology Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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**Date of Test**:

| | |
|---|---|
| Date (s) of performance of tests: | Aug. 13, 2025 ~ Sep. 22, 2025 |
| Date of Issue: | Sep. 22, 2025 |
| Test Result: | Pass |

Prepared by: Jason Ye

Jason Ye/Editor

Reviewer: Kelly Cheng

Kelly Cheng/Supervisor

Approved & Authorized Signer: Liuze

Liuze/Manager

Table of Contents Page

# 1 TEST SUMMARY

## 1.1 TEST PROCEDURES AND RESULTS

| DESCRIPTION OF TEST | STANDARD | RESULT |
|---|---|---|
| RF Output Power | Part 2.1046<br>Part 22.913 (a)(5)<br>Part 24.232 (c)<br>Part 27.50 (c)(10)<br>Part 27.50 (d)(4) | COMPLIANT |
| Peak-to-Average Power Ratio | Part 24.232 (d)<br>Part 22.913 (d)<br>Part 27.50(d)(5) | COMPLIANT |
| Modulation Characteristics | Part 2.1047 | COMPLIANT |
| 99% & -26 dB Occupied Bandwidth | Part 2.1049<br>Part 22.917(b)<br>Part 24.238(b)<br>Part 27.53(g)<br>Part 27.53(h)<br>Part 27.53(m) | COMPLIANT |
| Out of band emission at antenna terminals | Part 2.1053<br>Part 22.917(a)<br>Part 24.238 (a)<br>Part 27.53 (g)<br>Part 27.53 (h) | COMPLIANT |
| Field strength of spurious radiation | Part 22.917(a)<br>Part 24.238 (a)<br>Part 27.53 (g)<br>Part 27.53 (h) | COMPLIANT |
| Frequency stability vs. temperature | Part 22.355<br>Part 24.235<br>Part 27.54<br>Part 2.1055(a)(1)(b) | COMPLIANT |
| Frequency stability vs. voltage | Part 22.355<br>Part 24.235<br>Part 27.54<br>Part 2.1055(d)(2) | COMPLIANT |

## 1.2 TEST FACILITY

Test Firm : Shenzhen United Testing Technology Co., Ltd.

Address : D101&D401, No. 107, Kaicheng High-Tech Park, Taoyuan Community, Dalang Sub-District, Longhua District, Shenzhen, Guangdong, China

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.The testing quality system of our laboratory meets with ISO/IEC-17025 requirements. This approval result is accepted by MRA of APLAC.

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

A2LA Certificate Number: 4747.01

The EMC Laboratory has been accredited by A2LA, and in compliance with ISO/IEC 17025:2017 General Requirements for testing Laboratories.

FCC Registration Number: 674885

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission.

IC Registration Number: 31584

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada.

## 1.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

A. Conducted Measurement:

| Test Site | Method | Measurement Frequency Range | U, (dB) | NOTE |
|---|---|---|---|---|
| UNI | ANSI | 9kHz ~ 150kHz | 2.96 | |
| | | 150kHz ~ 30MHz | 2.44 | |

B. Radiated Measurement:

| Test Site | Method | Measurement Frequency Range | U, (dB) | NOTE |
|---|---|---|---|---|
| UNI | ANSI | 9kHz ~ 30MHz | 2.50 | |
| | | 30MHz ~ 1000MHz | 4.80 | |
| | | Above 1000MHz | 4.13 | |

# 2 GENERAL INFORMATION

## 2.1 GENERAL DESCRIPTION OF EUT

| | |
|---|---|
| Product | IOT DISPLAY |
| Trade Name | Omni |
| Main Model | M135YB |
| Additional Model | N/A |
| Model Difference | N/A |
| FCC ID | 2AI2O-M135YB |
| Antenna Type | Internal Antenna |
| Antenna Gain | LTE Band 2: 1.25dBi, LTE Band 4: 1.86dBi, LTE Band 5: 2.3dBi<br>LTE Band 12: 1.53dBi, LTE Band 13: 2.15dBi |
| CAT-M1 Frequency Range | LTE Band 2: TX: 1850.7-1909.3MHz RX: 1930.7-1989.3MHz<br>LTE Band 4: TX: 1710.7-1754.3MHz RX: 2110.7-2154.3MHz<br>LTE Band 5: TX: 824.7-848.3MHzRX: 869.7-893.3MHz<br>LTE Band 12: TX: 699.7-715.3MHz RX: 729.7-745.3MHz<br>LTE Band 13: TX: 779.5-784.5MHz RX: 748.5-753.5MHz |
| CAT-M1 Frequency Band | BAND 2/4/5/12/13 |
| Modulation Type | ☒ QPSK ☒ 16QAM |
| Battery | DC 3.7V, 1200mAh |
| Power Source | DC 3.7V from Internal Battery or DC 36V from External power supply |
| Adapter | N/A |

Note:RB only support a maximum of 6RB.

## 2.2 Carrier Test frequency list

FDD Band 2

| Test Frequency ID | Bandwidth [MHz] | $N_{UL}$ | Frequency of Uplink [MHz] | $N_{DL}$ | Frequency of Downlink [MHz] |
|---|---|---|---|---|---|
| Low Range | 1.4 | 18607 | 1850.7 | 607 | 1930.7 |
| | 3 | 18615 | 1851.5 | 615 | 1931.5 |
| | 5 | 18625 | 1852.5 | 625 | 1932.5 |
| | 10 | 18650 | 1855 | 650 | 1935 |
| | 15 [1] | 18675 | 1857.5 | 675 | 1937.5 |
| | 20 [1] | 18700 | 1860 | 700 | 1940 |
| Mid Range | 1.4/3/5/10 15 [1]/20 [1] | 18900 | 1880 | 900 | 1960 |
| High Range | 1.4 | 19193 | 1909.3 | 1193 | 1989.3 |
| | 3 | 19185 | 1908.5 | 1185 | 1988.5 |
| | 5 | 19175 | 1907.5 | 1175 | 1987.5 |
| | 10 | 19150 | 1905 | 1150 | 1985 |
| | 15 [1] | 19125 | 1902.5 | 1125 | 1982.5 |
| | 20 [1] | 19100 | 1900 | 1100 | 1980 |
| NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed. | | | | | |

FDD Band 4

| Test Frequency ID | Bandwidth [MHz] | $N_{UL}$ | Frequency of Uplink [MHz] | $N_{DL}$ | Frequency of Downlink [MHz] |
|---|---|---|---|---|---|
| Low Range | 1.4 | 19957 | 1710.7 | 1957 | 2110.7 |
| | 3 | 19965 | 1711.5 | 1965 | 2111.5 |
| | 5 | 19975 | 1712.5 | 1975 | 2112.5 |
| | 10 | 20000 | 1715 | 2000 | 2115 |
| | 15 | 20025 | 1717.5 | 2025 | 2117.5 |
| | 20 | 20050 | 1720 | 2050 | 2120 |
| Mid Range | 1.4/3/5/10/15/20 | 20175 | 1732.5 | 2175 | 2132.5 |
| High Range | 1.4 | 20393 | 1754.3 | 2393 | 2154.3 |
| | 3 | 20385 | 1753.5 | 2385 | 2153.5 |
| | 5 | 20375 | 1752.5 | 2375 | 2152.5 |
| | 10 | 20350 | 1750 | 2350 | 2150 |
| | 15 | 20325 | 1747.5 | 2325 | 2147.5 |
| | 20 | 20300 | 1745 | 2300 | 2145 |

FDD Band 5

| Test Frequency ID | Bandwidth [MHz] | $N_{UL}$ | Frequency of Uplink [MHz] | $N_{DL}$ | Frequency of Downlink [MHz] |
|---|---|---|---|---|---|
| Low Range | 1.4 | 20407 | 824.7 | 2407 | 869.7 |
| | 3 | 20415 | 825.5 | 2415 | 870.5 |
| | 5 | 20425 | 826.5 | 2425 | 871.5 |
| | 10 [1] | 20450 | 829 | 2450 | 874 |
| Mid Range | 1.4/3/5 10 [1] | 20525 | 836.5 | 2525 | 881.5 |
| High Range | 1.4 | 20643 | 848.3 | 2643 | 893.3 |
| | 3 | 20635 | 847.5 | 2635 | 892.5 |
| | 5 | 20625 | 846.5 | 2625 | 891.5 |
| | 10 [1] | 20600 | 844 | 2600 | 889 |
| NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed. | | | | | |

FDD Band 12

**Table 4.3.1.1.12-1: Test frequencies for E-UTRA channel bandwidth for operating band 12**

| Test Frequency ID | Bandwidth [MHz] | $N_{UL}$ | Frequency of Uplink [MHz] | $N_{DL}$ | Frequency of Downlink [MHz] |
|---|---|---|---|---|---|
| Low Range | 1.4 | 23017 | 699.7 | 5017 | 729.7 |
| | 3 | 23025 | 700.5 | 5025 | 730.5 |
| | 5 [1] | 23035 | 701.5 | 5035 | 731.5 |
| | 10 [1] | 23060 | 704 | 5060 | 734 |
| Mid Range | 1.4/3 5 [1]/10 [1] | 23095 | 707.5 | 5095 | 737.5 |
| High Range | 1.4 | 23173 | 715.3 | 5173 | 745.3 |
| | 3 | 23165 | 714.5 | 5165 | 744.5 |
| | 5 [1] | 23155 | 713.5 | 5155 | 743.5 |
| | 10 [1] | 23130 | 711 | 5130 | 741 |
| NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed. | | | | | |

FDD Band 13

| Test Frequency ID | Bandwidth [MHz] | $N_{UL}$ | Frequency of Uplink [MHz] | $N_{DL}$ | Frequency of Downlink [MHz] |
|---|---|---|---|---|---|
| Low Range | 5 [1] | 23205 | 779.5 | 5205 | 748.5 |
| | 10 [1] | 23230 | 782 | 5230 | 751 |
| Mid Range | 5 [1]/10 [1] | 23230 | 782 | 5230 | 751 |
| High Range | 5 [1] | 23255 | 784.5 | 5255 | 753.5 |
| | 10 [1] | 23230 | 782 | 5230 | 751 |
| NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed. | | | | | |

## 2.3 Test environment and mode

| | |
|---|---|
| **Operating Environment:** | |
| Temperature: | Normal: 15℃ ~ 35℃, Extreme: -30℃ ~ +50℃ |
| Humidity: | 20 % ~ 75 % RH |
| Atmospheric Pressure: | 1008 mbar |
| Voltage: | Nominal: 3.7Vdc, Extreme: Low 3.33 Vdc, High 4.07 Vdc |
| **Test mode:** | |
| CAT M1 LTE QPSK mode | Keep the EUT communication with simulated station in QPSK mode |
| CAT M1 LTE 16-QAM mode | Keep the EUT communication with simulated station in 16-QAM mode |
| Remark: The EUT has been tested under continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing. The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for these modes. Just the worst case position (H mode) shown in report. | |

## 2.4 DESCRIPTION OF TEST SETUP

Operation of EUT during Radiation testing:


Table for auxiliary equipment:

| Equipment Description | Manufacturer | Model | Calibration Due Date |
|---|---|---|---|
| N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A |

## 2.5 MEASUREMENT INSTRUMENTS LIST

| Item | Equipment | Manufacturer | Model No. | Serial No. | Calibrated until |
|---|---|---|---|---|---|
| Conduction Emissions Measurement | | | | | |
| 1 | Conducted Emission Test Software | EZ-EMC | Ver.CCS-3A1-CE | N/A | N/A |
| 2 | AMN | Schwarzbeck | NNLK8121 | 8121370 | 2026.03.25 |
| 3 | AAN | TESEQ | T8-Cat6 | 38888 | 2026.03.25 |
| 4 | Pulse Limiter | CYBRTEK | EM5010 | E115010056 | 2026.03.25 |
| 5 | EMI Test Receiver | Rohde&Schwarz | ESCI | 101210 | 2026.03.25 |
| Radiated Emissions Measurement | | | | | |
| 1 | Radiated Emission Test Software | EZ-EMC | Ver.CCS-03A1 | N/A | N/A |
| 2 | Horn Antenna | Sunol | DRH-118 | A101415 | 2027.03.27 |
| 3 | Broadband Hybrid Antenna | Sunol | JB1 | A090215 | 2027.03.27 |
| 4 | PREAMP | HP | 8449B | 3008A00160 | 2026.03.29 |
| 5 | PREAMP | HP | 8447D | 2944A07999 | 2026.03.25 |
| 6 | EMI TEST RECEIVER | Rohde&Schwarz | ESR3 | 101891 | 2026.03.25 |
| 7 | VECTOR Signal Generator | Rohde&Schwarz | SMU200A | 101521 | 2026.03.25 |
| 8 | Signal Generator | Agilent | E4421B | MY4335105 | 2026.03.25 |
| 9 | MXA Signal Analyzer | Agilent | N9020A | MY50510140 | 2026.03.25 |
| 10 | MXA Signal Analyzer | Keysight | N9020A | MY51110104 | 2026.03.25 |
| 11 | RF Power sensor | DARE | RPR3006W | 15I00041SNO88 | 2026.03.26 |
| 12 | RF Power sensor | DARE | RPR3006W | 15I00041SNO89 | 2026.03.26 |
| 13 | RF power divider | Anritsu | K241B | 992289 | 2026.03.26 |
| 14 | Wideband radio communication tester | Rohde&Schwarz | CMW500 | 154987 | 2026.03.25 |
| 15 | Active Loop Antenna | Com-Power | AL-130R | 10160009 | 2026.05.26 |
| 16 | Broadband Hybrid Antennas | Schwarzbeck | VULB9163 | VULB9163#958 | 2026.03.25 |
| 17 | Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-1680 | 2026.03.25 |
| 18 | Horn Antenna | A-INFOMW | LB-180400-KF | J211060660 | 2026.03.25 |
| 19 | Microwave Broadband Preamplifier | Schwarzbeck | BBV 9721 | 100472 | 2026.03.26 |
| 20 | Signal Generator | Agilent | N5183A | MY47420153 | 2026.03.27 |
| 21 | Spctrum Analyzer | Rohde&Schwarz | FSP 40 | 100501 | 2026.03.27 |
| 22 | Power Meter | KEYSIGHT | N1911A | MY50520168 | 2026.03.27 |
| 23 | Frequency Meter | VICTOR | VC2000 | 997406086 | 2026.03.27 |
| 24 | DC Power Source | HYELEC | HY5020E | 055161818 | 2026.03.27 |

# 3 ERP AND EIRP

## 3.1 LIMIT

LTE Band 2: 2W(33dBm) EIRP

LTE Band 4: 1W(30dBm) EIRP

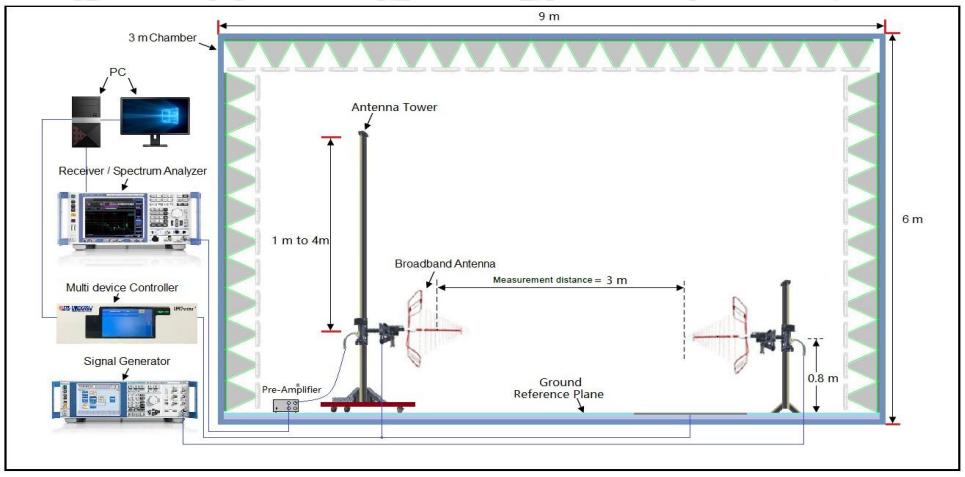
LTE Band 5: 7W(38.50dBm) ERP

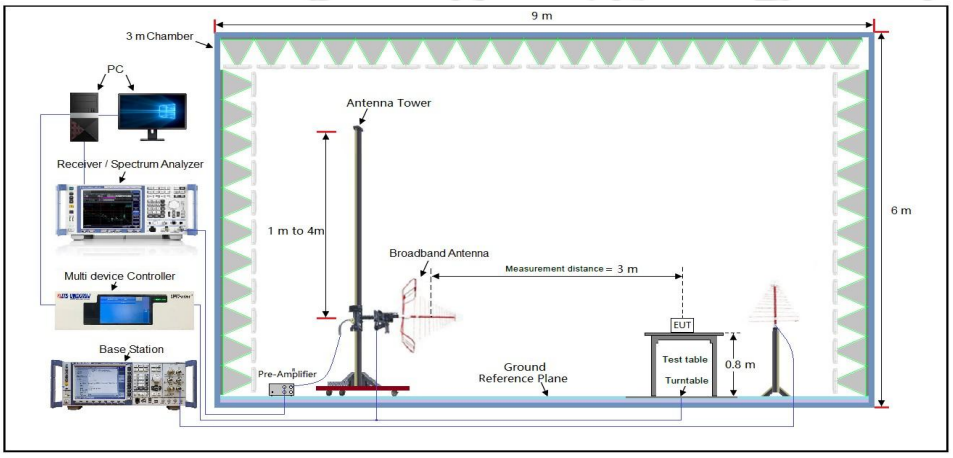
LTE Band 12: 3W(34.77dBm) ERP

LTE Band 13: 3W(34.77dBm) ERP

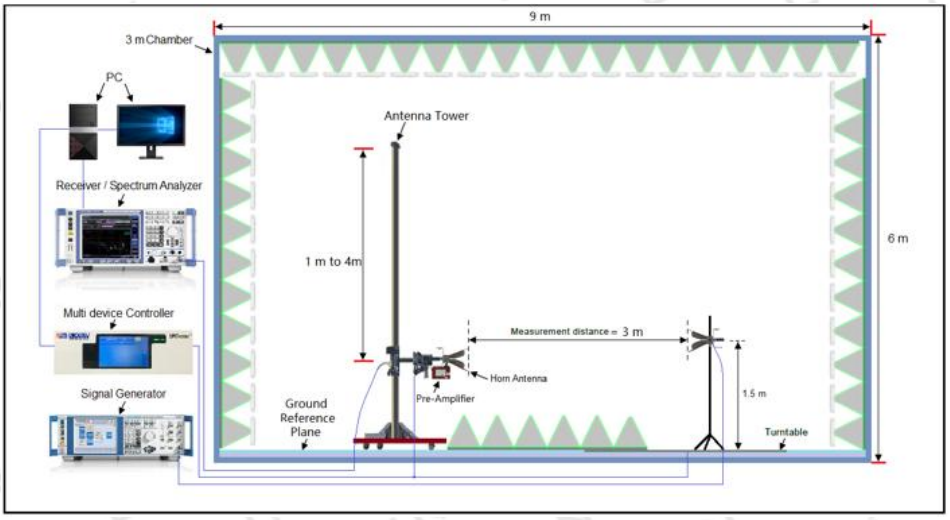
## 3.2 TEST CONFIGURATION

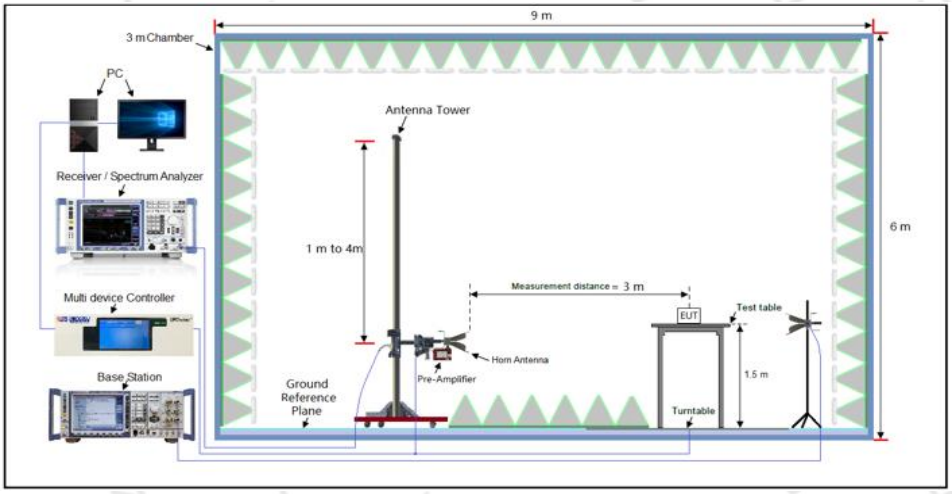
Radiated Power 30MHz to 1GHz Test setup



Radiated Power Above 1GHz Test setup



### 3.3 TEST PROCEDURE

Radiated Test:

1. Place the EUT in the center of the turntable.
   a) For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table at a nominal height of 80 cm above the reference ground plane
   b) For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table at a nominal height of 1.5 m above the ground plane.
2. Unless the EUT uses an integral antenna, the EUT shall be terminated with a non-radiating transmitter load. In cases where the EUT uses an adjustable antenna, the antenna shall be adjusted through typical positions and lengths to maximize emissions levels.
3. The EUT shall be tested while operating on the frequency per manufacturer specification. Set the transmitter to operate in continuous transmit mode.
4. Receiver or Spectrum set as follow:
   Below 1GHz, RBW=100kHz, VBW=300kHz, Detector=Peak, Sweep time=Auto
   Above 1GHz, RBW=1MHz, VBW=3MHz, Detector=Peck, Sweep time=Auto
5. Each emission under consideration shall be evaluated:
   a) Raise and lower the measurement antenna from 1 m to 4 m, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
   b) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.
   c) Return the turntable to the azimuth where the highest emission amplitude level was observed.
   d) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.
   e) Record the measured emission amplitude level and frequency

8. Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna.
9. Connect a signal generator to the substitution antenna; locate the signal generator so as to minimize any potential influences on the measurement results. Set the signal generator to the frequency where emissions are detected, and set an output power level such that the radiated signal can be detected by the measurement instrument, with sufficient dynamic range relative to the noise floor.
10. For each emission that was detected and measured in the initial test
    a) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude.
    b) Adjust the signal generator output power level until the amplitude detected by the measurement instrument equals the amplitude level of the emission previously measured directly in step 5 and step 6.
    c) Record the output power level of the signal generator when equivalence is achieved in step b).
11. Repeat step 8 through step 10 with the measurement antenna oriented in the opposite polarization.
12. Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:

Pe = Ps(dBm) − cable loss (dB) + antenna gain (dBd)

where

Pe = equivalent emission power in dBm

Ps = source (signal generator) power in dBm

*NOTE—dBd refers to the measured antenna gain in decibels relative to a half-wave dipole.*

13. Correct the antenna gain of the substitution antenna if necessary to reference the emission power to a half-wave dipole. When using measurement antennas with the gain specified in dBi, the equivalent dipole-referenced gain can be determined from:

gain (dBd) = gain (dBi) − 2.15 dB.

If necessary, the antenna gain can be calculated from calibrated antenna factor information

14. Provide the complete measurement results as a part of the test report.

Conducted Test:

The EUT is coupled to the SS with attenuator through power splitter; the RF load attached to EUT antenna terminal is 50ohm, the path loss as the factor is calibrated to correct the reading. A system simulator was used to establish communication with the EUT , Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported. The measurements were performed on all modes at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.

## 3.4 Test Result

| LTE Band 2-1.4MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 19.42 | 18.95 | ≤33.00 | Pass |
| | Mid | 19.86 | 18.18 | | |
| | High | 19.66 | 18.28 | | |
| 16QAM | Low | 19.31 | 18.13 | ≤33.00 | Pass |
| | Mid | 19.62 | 18.19 | | |
| | High | 19.42 | 18.17 | | |

| LTE Band 2-3MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 20.42 | 18.29 | ≤33.00 | Pass |
| | Mid | 20.82 | 18.19 | | |
| | High | 20.51 | 18.28 | | |
| 16QAM | Low | 20.41 | 18.25 | ≤33.00 | Pass |
| | Mid | 20.72 | 18.24 | | |
| | High | 20.42 | 18.18 | | |

| LTE Band 2-5MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 20.43 | 18.21 | ≤33.00 | Pass |
| | Mid | 20.72 | 18.17 | | |
| | High | 20.51 | 18.29 | | |
| 16QAM | Low | 20.43 | 18.35 | ≤33.00 | Pass |
| | Mid | 20.66 | 18.08 | | |
| | High | 20.37 | 18.13 | | |

| LTE Band 2-10MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 20.52 | 18.16 | ≤33.00 | Pass |
| | Mid | 20.84 | 18.21 | | |
| | High | 20.46 | 18.19 | | |
| 16QAM | Low | 20.61 | 18.42 | ≤33.00 | Pass |
| | Mid | 20.88 | 18.34 | | |
| | High | 20.46 | 18.19 | | |

| LTE Band 2-15MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 20.45 | 18.18 | ≤33.00 | Pass |
| | Mid | 20.79 | 18.23 | | |
| | High | 20.6 | 18.17 | | |
| 16QAM | Low | 20.33 | 18.23 | ≤33.00 | Pass |
| | Mid | 20.67 | 18.12 | | |
| | High | 20.44 | 18.05 | | |

| LTE Band 2-20MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 20.43 | 18.17 | ≤33.00 | Pass |
| | Mid | **20.92** | 18.08 | | |
| | High | 20.47 | 18.32 | | |
| 16QAM | Low | 20.26 | 18.23 | ≤33.00 | Pass |
| | Mid | **20.88** | 18.05 | | |
| | High | 20.44 | 18.08 | | |

| LTE Band 4-1.4MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 19.25 | 18.14 | ≤30.00 | Pass |
| | Mid | 19.58 | 18.74 | | |
| | High | 20.66 | 18.22 | | |
| 16QAM | Low | 19.12 | 18.02 | ≤30.00 | Pass |
| | Mid | 19.45 | 18.86 | | |
| | High | 20.55 | 18.05 | | |

| LTE Band 4-3MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 19.13 | 18.08 | ≤30.00 | Pass |
| | Mid | 19.62 | 18.62 | | |
| | High | 19.75 | 18.24 | | |
| 16QAM | Low | 19.92 | 17.93 | ≤30.00 | Pass |
| | Mid | 21.28 | 18.68 | | |
| | High | 20.41 | 18.14 | | |

| LTE Band 4-5MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 19.19 | 18.08 | ≤30.00 | Pass |
| | Mid | 19.47 | 18.79 | | |
| | High | 20.51 | 18.38 | | |
| 16QAM | Low | 21.21 | 18.33 | ≤30.00 | Pass |
| | Mid | 21.30 | 18.58 | | |
| | High | 20.36 | 18.54 | | |

| LTE Band 4-10MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 21.21 | 18.92 | ≤30.00 | Pass |
| | Mid | 21.12 | 18.72 | | |
| | High | 20.52 | 18.23 | | |
| 16QAM | Low | 21.41 | 18.31 | ≤30.00 | Pass |
| | Mid | 21.01 | 18.86 | | |
| | High | 20.42 | 18.16 | | |

| LTE Band 4-15MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 21.13 | 17.97 | ≤30.00 | Pass |
| | Mid | 21.54 | 18.83 | | |
| | High | 20.72 | 18.16 | | |
| 16QAM | Low | 20.92 | 18.01 | ≤30.00 | Pass |
| | Mid | 21.41 | 18.68 | | |
| | High | 20.44 | 17.95 | | |

| LTE Band 4-20MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 21.13 | 18.91 | ≤30.00 | Pass |
| | Mid | **21.69** | 18.53 | | |
| | High | 20.52 | 18.41 | | |
| 16QAM | Low | 20.88 | 18.11 | ≤30.00 | Pass |
| | Mid | **21.65** | 19.57 | | |
| | High | 20.97 | 18.02 | | |

| LTE Band 5-1.4MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 20.63 | 18.25 | ≤38.50 | Pass |
| | Mid | 20.48 | 18.74 | | |
| | High | 20.22 | 18.54 | | |
| 16QAM | Low | 20.48 | 18.18 | ≤38.50 | Pass |
| | Mid | 20.39 | 18.85 | | |
| | High | 20.12 | 18.41 | | |

| LTE Band 5-3MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 21.02 | 18.23 | ≤38.50 | Pass |
| | Mid | 20.44 | 18.62 | | |
| | High | 21.29 | 18.57 | | |
| 16QAM | Low | 21.40 | 18.09 | ≤38.50 | Pass |
| | Mid | 20.24 | 18.69 | | |
| | High | 21.13 | 18.51 | | |

| LTE Band 5-5MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 21.03 | 18.12 | ≤38.50 | Pass |
| | Mid | 21.27 | 18.65 | | |
| | High | 21.17 | 18.63 | | |
| 16QAM | Low | 21.02 | 18.34 | ≤38.50 | Pass |
| | Mid | 20.21 | 18.56 | | |
| | High | 20.98 | 18.43 | | |

| LTE Band 5-10MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 21.05 | 18.15 | ≤38.50 | Pass |
| | Mid | **21.48** | 18.76 | | |
| | High | 21.13 | 18.55 | | |
| 16QAM | Low | 21.07 | 18.34 | ≤38.50 | Pass |
| | Mid | **21.43** | 18.75 | | |
| | High | 21.15 | 18.57 | | |

| LTE Band 12-1.4MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 21.63 | 19.58 | ≤34.77 | Pass |
| | Mid | 21.21 | 20.22 | | |
| | High | 21.64 | 19.65 | | |
| 16QAM | Low | 21.44 | 19.46 | ≤34.77 | Pass |
| | Mid | 21.06 | 20.24 | | |
| | High | 21.52 | 19.53 | | |

| LTE Band 12-3MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 21.55 | 19.54 | ≤34.77 | Pass |
| | Mid | 22.01 | 20.12 | | |
| | High | 21.67 | 19.67 | | |
| 16QAM | Low | 21.36 | 19.37 | ≤34.77 | Pass |
| | Mid | 21.93 | 20.13 | | |
| | High | 21.46 | 19.58 | | |

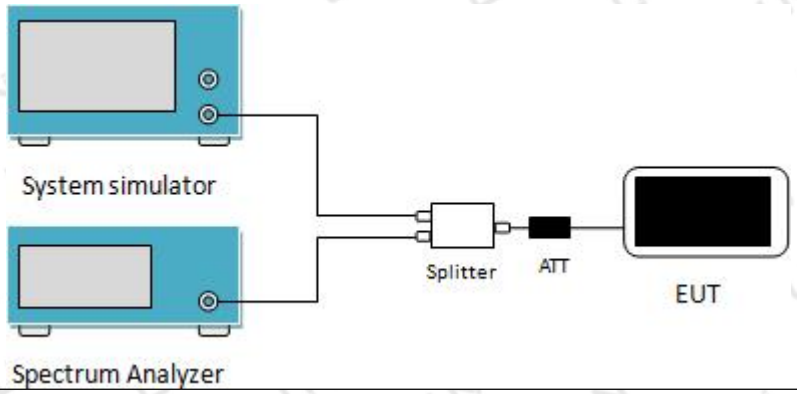
| LTE Band 12-5MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 21.52 | 19.43 | ≤34.77 | Pass |
| | Mid | 22.04 | 20.15 | | |
| | High | 21.57 | 19.75 | | |
| 16QAM | Low | 21.59 | 19.74 | ≤34.77 | Pass |
| | Mid | 22.15 | 20.07 | | |
| | High | 21.38 | 19.54 | | |

| LTE Band 12-10MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 21.61 | 19.39 | ≤34.77 | Pass |
| | Mid | **22.21** | 20.22 | | |
| | High | 21.56 | 19.69 | | |
| 16QAM | Low | 21.64 | 19.63 | ≤34.77 | Pass |
| | Mid | **22.19** | 20.21 | | |
| | High | 21.56 | 19.72 | | |

| LTE Band 13-5MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Low | 21.02 | 18.29 | ≤44.77 | Pass |
| | Mid | 21.21 | 18.99 | | |
| | High | 21.12 | 17.85 | | |
| 16QAM | Low | 20.88 | 18.15 | ≤44.77 | Pass |
| | Mid | 21.55 | 18.95 | | |
| | High | 20.92 | 17.75 | | |

| LTE Band 13-10MHz | | | | | |
|---|---|---|---|---|---|
| Modulation | Channel | EIRP (dBm) | | Limit (dBm) | Result |
| | | Vertical | Horizontal | | |
| QPSK | Mid | **21.88** | 18.72 | ≤44.77 | Pass |
| 16QAM | Mid | **21.72** | 18.73 | | |

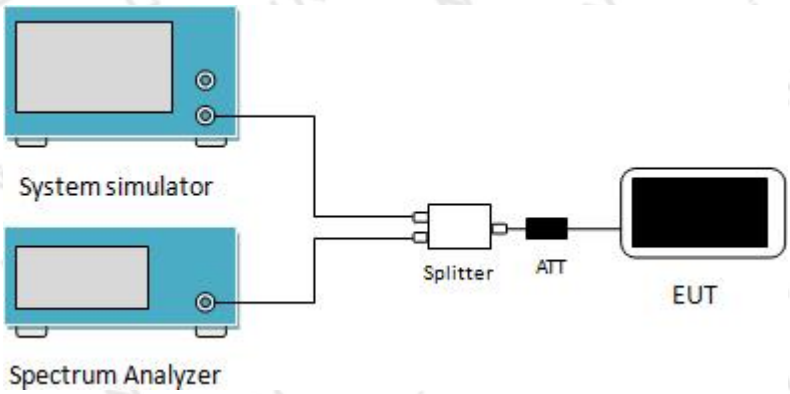
# 4 PEAK-TO-AVERAGE POWER RATIO

| | |
|---|---|
| Test Requirement: | Part 24.232 (d), Part 27.50(d)(5) |
| Limit: | The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB. |
| Test setup: |  |
| Test Procedure: | 1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.<br>2 Set the CCDF option in spectrum analyzer, RBW ≥OBW,<br>3 Set the EUT working in highest power level, measured and recorded the 0.1% as PAPR level.<br>4 Repeat step 1~3 at other frequency and modulations. |
| Test Instruments: | Refer to section 2.5 for details |
| Test mode: | Refer to section 2.3 for details |
| Test results: | Passed |

## 4.1 Test Result

Please refer to Appendix LTE 4G RF test data

# 5 OCCUPY BANDWIDTH

| | |
|---|---|
| Test Requirement: | Part 22.917(b), Part 24.238(b), Part 27.53(g), Part 27.53(h) |
| Test Setup: |  |
| Test Procedure: | 1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer<br>2. RBW was set to about 1% ~ 5% of emission BW, VBW= 3 times RBW.<br>3. -26dBc display line was placed on the screen (or 99%bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace. |
| Test Instruments: | Refer to section 2.5 for details |
| Test mode: | Refer to section 2.3 for details |
| Test results: | Passed |

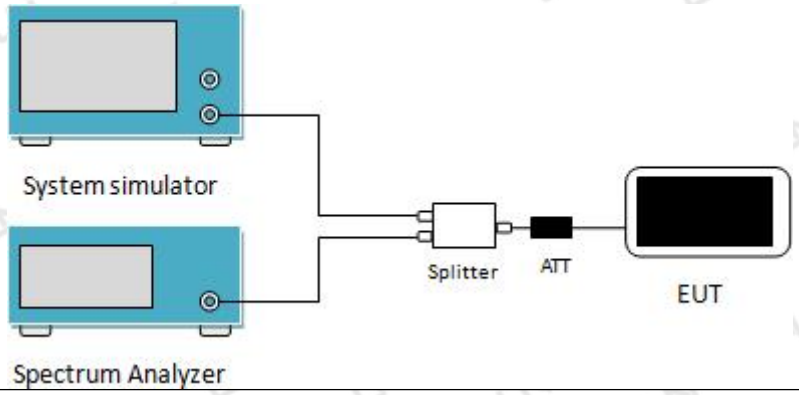
## 5.1 Test Result

Please refer to Appendix LTE 4G RF test data

# 6 MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

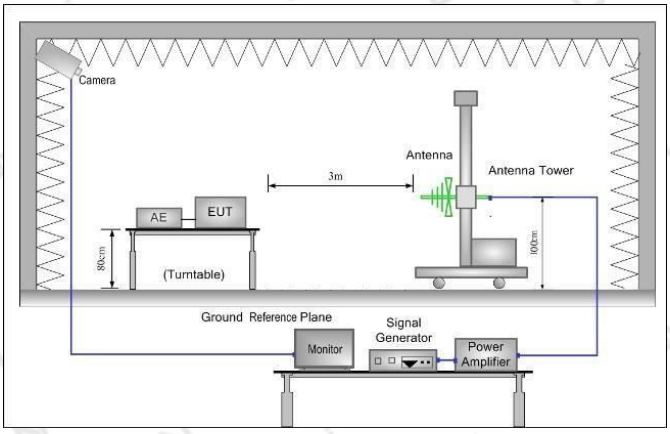
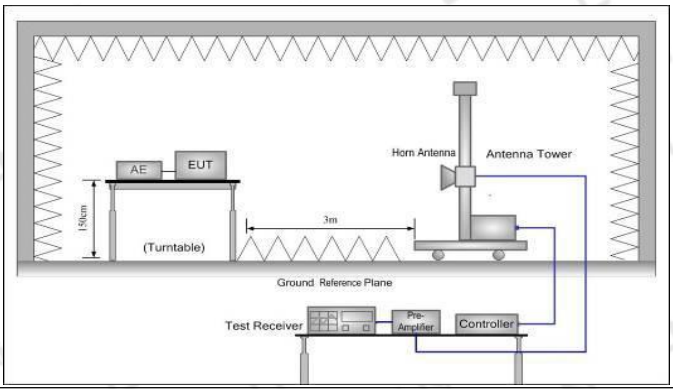
# 7 OUT OF BAND EMISSION AT ANTENNA TERMINALS

| | |
|---|---|
| Test Requirement: | Part 22.917(a), Part 24.238 (a), part 27.53(g), part 27.53(h), |
| Limit: | §22.917, §24.238, §27.53 (c), (g), (h), §90.691, §90.543 (Band 14)<br>The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.<br>§27.53 (a) (Band 30, 40)<br>The minimum permissible attenuation level of any spurious emissions is 70 + 10 log (P) dB where transmitting power (P) in Watts.<br>§27.53 (m) (Band 7, 41)<br>The minimum permissible attenuation level of any spurious emissions is 55 + 10 log (P) dB where transmitting power (P) in Watts.<br>§96.41<br>(e) 3.5 GHz Emissions and Interference Limits—<br>(2) Additional protection levels. Notwithstanding paragraph (d)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz. |
| Test setup: |  |
| Test Procedure: | 1 The RF output of the transceiver was connected to a spectrum analyzer through appropriateattenuation.<br>2 For the out of band: For Band 5 & 12 & 17 set the RBW=100 kHz, VBW=300 kHz and for Band 2 & 4 & 7 set the RBW=1 MHz, VBW=3 MHz when below 1 GHz, RBW =1 MHz, VBW=3 MHz when above 1 GHz, Start=30MHz, Stop= 10thharmonic.<br>3 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions. |
| Test Instruments: | Refer to section 2.5 for details |
| Test mode: | Refer to section 2.3 for details |
| Test results: | Passed |
| Remark: | Pre-scan all RB Size and offset, and found the RB Size and offset of worst case, so the report shows only the worst case test data. |

7.1 Test Result

Please refer to Appendix LTE 4G RF test data

# 8 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

| | |
|---|---|
| Test Requirement: | Part 22.917(a), Part 24.238 (a), Part 27.53(g), Part 27.53(m), Part 27.53(h) |
| Limit: | §22.917(a), §24.238(a), §27.53 (g), (h), §90.691<br>The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.<br>§27.53 (Band 13)<br>(c) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.<br>(f) Emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals. (-70 dBW/MHz = -40dBm/MHz).<br>§27.53 (m) (Band 7)<br>At least 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. |
| Test setup: | Below1GHz<br>  <br><br>Above1GHz<br>  <br> |

| | |
|---|---|
| Test Procedure: | 1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz)/1.5m(above 1GHz) above the ground at a 3 meter camber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.<br>2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.<br>3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method. |

| | |
|---|---|
| Test Procedure: | 4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.<br>ERP / EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) – Cable Loss (dB) |
| Test Instruments: | Refer to section 2.5 for details |
| Test mode: | Refer to section 2.3 for details |
| Test results: | Passed |

8.1 Test Result

**LTE Band 2 part: Low channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| 5580 | V | -41.21 | -13 | -28.21 |
| 3720 | V | -39.22 | -13 | -26.22 |
| 695.5 | V | -47.53 | -13 | -34.53 |
| 412.1 | V | -49.15 | -13 | -36.15 |
| 5580 | H | -38.65 | -13 | -25.65 |
| 3720 | H | -41.31 | -13 | -28.31 |
| 678.3 | H | -47.69 | -13 | -34.69 |
| 452.1 | H | -48.67 | -13 | -35.67 |

**Middle channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| 5640 | V | -39.65 | -13 | -26.65 |
| 3760 | V | -38.77 | -13 | -25.77 |
| 885.1 | V | -47.75 | -13 | -34.75 |
| 618.7 | V | -48.41 | -13 | -35.41 |
| 5640 | H | -47.52 | -13 | -34.52 |
| 3760 | H | -41.83 | -13 | -28.83 |
| 851.3 | H | -44.75 | -13 | -31.75 |
| 732.5 | H | -47.17 | -13 | -34.17 |

**High channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| 5700 | V | -41.23 | -13 | -28.23 |
| 3800 | V | -41.05 | -13 | -28.05 |
| 664.5 | V | -46.94 | -13 | -33.94 |
| 525.8 | V | -45.82 | -13 | -32.82 |
| 5700 | H | -38.32 | -13 | -25.32 |
| 3800 | H | -38.95 | -13 | -25.95 |
| 669.8 | H | -47.86 | -13 | -34.86 |
| 574.4 | H | -46.75 | -13 | -33.75 |

**LTE Band 4 part: Low channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| 5160 | V | -38.62 | -13 | -25.62 |
| 3440 | V | -38.42 | -13 | -25.42 |
| 745.5 | V | -44.41 | -13 | -31.41 |
| 528.1 | V | -47.15 | -13 | -34.15 |
| 5160 | H | -38.43 | -13 | -25.43 |
| 3440 | H | -40.16 | -13 | -27.16 |
| 520.5 | H | -46.42 | -13 | -33.42 |
| 395.8 | H | -42.32 | -13 | -29.32 |

**Middle channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| 5197.5 | V | -38.04 | -13 | -25.04 |
| 3465 | V | -37.78 | -13 | -24.78 |
| 669.4 | V | -45.94 | -13 | -32.94 |
| 512.5 | V | -47.90 | -13 | -34.90 |
| 5197.5 | H | -37.98 | -13 | -24.98 |
| 3465 | H | -39.38 | -13 | -26.38 |
| 569.4 | H | -46.62 | -13 | -33.62 |
| 469.3 | H | -45.04 | -13 | -32.04 |

**High channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| 5235 | V | -37.62 | -13 | -24.62 |
| 3490 | V | -39.07 | -13 | -26.07 |
| 711.1 | V | -47.89 | -13 | -34.89 |
| 528.7 | V | -47.21 | -13 | -34.21 |
| 5235 | H | -37.82 | -13 | -24.82 |
| 3490 | H | -38.06 | -13 | -25.06 |
| 612.5 | H | -45.52 | -13 | -32.52 |
| 553.9 | H | -44.73 | -13 | -31.73 |

**LTE Band 5 part:**

**Low channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| 2487 | V | -40.25 | -13 | -27.25 |
| 1658 | V | -41.02 | -13 | -28.02 |
| 512.2 | V | -46.50 | -13 | -33.5 |
| 365.5 | V | -46.52 | -13 | -33.52 |
| 2487 | H | -39.29 | -13 | -26.29 |
| 1658 | H | -40.17 | -13 | -27.17 |
| 521.1 | H | -44.41 | -13 | -31.41 |
| 336.5 | H | -43.46 | -13 | -30.46 |

**Middle channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| 2509.5 | V | -41.55 | -13 | -28.55 |
| 1673 | V | -41.96 | -13 | -28.96 |
| 725.8 | V | -46.16 | -13 | -33.16 |
| 616.6 | V | -46.70 | -13 | -33.70 |
| 2509.5 | H | -40.18 | -13 | -27.18 |
| 1673 | H | -41.98 | -13 | -28.98 |
| 705.5 | H | -45.58 | -13 | -32.58 |
| 558.9 | H | -44.22 | -13 | -31.22 |

**High channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| 2532 | V | -39.09 | -13 | -26.09 |
| 1688 | V | -39.02 | -13 | -26.02 |
| 648.3 | V | -46.05 | -13 | -33.05 |
| 482.7 | V | -46.17 | -13 | -33.17 |
| 2532 | H | -39.69 | -13 | -26.69 |
| 1688 | H | -40.71 | -13 | -27.71 |
| 785.6 | H | -45.82 | -13 | -32.82 |
| 615.7 | H | -47.17 | -13 | -34.17 |

**LTE Band 12 part:**

**Low channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| 512.4 | V | -35.58 | -13 | -22.58 |
| 816.4 | V | -36.61 | -13 | -23.61 |
| 1408 | V | -27.18 | -13 | -14.18 |
| 2112 | V | -36.67 | -13 | -23.67 |
| 2122 | H | -35.17 | -13 | -22.17 |
| 2830 | H | -36.33 | -13 | -23.33 |
| 415.3 | H | -26.85 | -13 | -13.85 |
| 622.5 | H | -36.27 | -13 | -23.27 |

**Middle channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBc) | Margin (dB) |
|---|---|---|---|---|
| 2133 | V | -34.75 | -13 | -21.75 |
| 2844 | V | -35.77 | -13 | -22.77 |
| 1422 | V | -26.29 | -13 | -13.29 |
| 2133 | V | -35.88 | -13 | -22.88 |
| 2104.5 | H | -37.11 | -13 | -24.11 |
| 2806 | H | -38.33 | -13 | -25.33 |
| 1403 | H | -28.68 | -13 | -15.68 |
| 2104.5 | H | -38.24 | -13 | -25.24 |

**High channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| 2122.5 | V | -36.58 | -13 | -23.58 |
| 2830 | V | -37.78 | -13 | -24.78 |
| 1415 | V | -28.22 | -13 | -15.22 |
| 2122.5 | V | -37.53 | -13 | -24.53 |
| 2140.5 | H | -35.91 | -13 | -22.91 |
| 2854 | H | -36.88 | -13 | -23.88 |
| 1427 | H | -27.31 | -13 | -14.31 |
| 2140.5 | H | -37.67 | -13 | -24.67 |

**LTE Band 13 part:**

**Low channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| 2338.5 | V | -37.65 | -13 | -24.65 |
| 3118 | V | -40.37 | -13 | -27.37 |
| 559 | V | -34.94 | -13 | -21.94 |
| 638.5 | V | -41.75 | -13 | -28.75 |
| 2346 | H | -37.18 | -13 | -24.18 |
| 3128 | H | -40.27 | -13 | -27.27 |
| 564.8 | H | -34.71 | -13 | -21.71 |
| 546.4 | H | -41.32 | -13 | -28.32 |

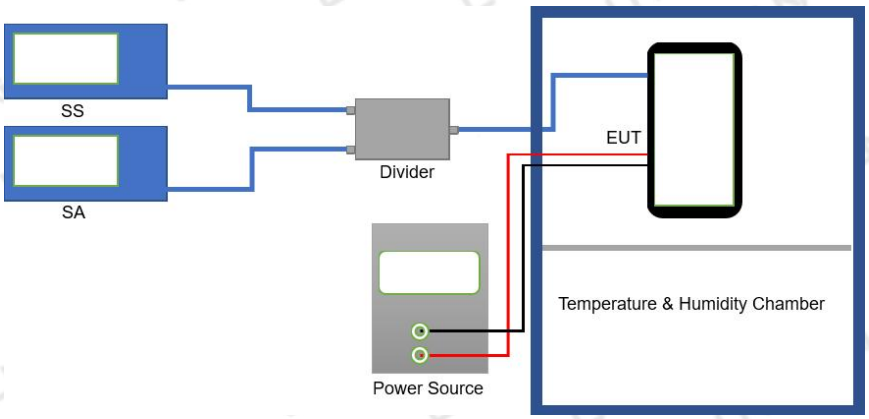
**Middle channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBc) | Margin (dB) |
|---|---|---|---|---|
| 2353.5 | V | -36.64 | -13 | -23.64 |
| 3138 | V | -39.76 | -13 | -26.76 |
| 569.5 | V | -34.49 | -13 | -21.49 |
| 453.3 | V | -40.61 | -13 | -27.61 |
| 564 | H | -30.25 | -13 | -17.25 |
| 2346 | H | -36.37 | -13 | -23.37 |
| 3128 | H | -39.48 | -13 | -26.48 |
| 464.7 | H | -34.25 | -13 | -21.25 |

**High channel**

| Frequency (MHz) | Polarity (H/V) | Emission Level (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| 2112 | V | -35.51 | -13 | -22.51 |
| 2816 | V | -36.68 | -13 | -23.68 |
| 508.7 | V | -27.15 | -13 | -14.15 |
| 2112 | V | -36.67 | -13 | -23.67 |
| 2830 | H | -35.17 | -13 | -22.17 |
| 515.8 | H | -36.34 | -13 | -23.34 |
| 622.9 | H | -26.85 | -13 | -13.85 |
| 2830 | H | -36.22 | -13 | -23.22 |

# 9 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

| | |
|---|---|
| Test Requirement: | Part 22.355, Part 24.235, Part 27.54, Part 2.1055(a)(1)(b) |
| Limit: | Cellular Band: ±2.5ppm PCS Band: Within the authorized frequency block |
| Test setup: |  |
| Test procedure: | 1. The equipment under test was connected to an external DC power supply and input rated voltage.<br>2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.<br>3. The EUT was placed inside the temperature chamber.<br>4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency.<br>5. Turn EUT off and set the chamber temperature to –30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency.<br>6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃reached |
| Test Instruments: | Refer to section 2.5 for details |
| Test mode: | Refer to section 2.3 for details |
| Test results: | Passed |

9.1 Test Result

**LTE Band 2 part:**

| Reference Frequency: LTE Band 2 (10MHz) Middle channel=18900 Frequency=1880.0MHz | | | | | |
|---|---|---|---|---|---|
| Temperature | | | | | |
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 3.7 | -30 | -6.97 | -0.003766 | Within authorized band for Band 2 | Pass |
| | -20 | -7.67 | -0.004144 | | |
| | -10 | -7.37 | -0.003982 | | |
| | 0 | -7.91 | -0.004207 | | |
| | 10 | -6.98 | -0.003713 | | |
| | 20 | -6.58 | -0.003500 | | |
| | 30 | -6.47 | -0.003389 | | |
| | 40 | -4.23 | -0.002215 | | |
| | 50 | -4.72 | -0.002472 | | |
| 16QAM | | | | | |
| 3.7 | -30 | -7.90 | -0.00427 | Within authorized band for Band 2 | Pass |
| | -20 | -5.44 | -0.00294 | | |
| | -10 | -7.10 | -0.00378 | | |
| | 0 | -7.81 | -0.00415 | | |
| | 10 | -7.94 | -0.00422 | | |
| | 20 | -4.92 | -0.00258 | | |
| | 30 | 4.42 | 0.00231 | | |
| | 40 | -4.92 | -0.00258 | | |
| | 50 | -7.52 | -0.00406 | | |

| Voltage | | | | | |
|---|---|---|---|---|---|
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 25 | 3.33 | -8.67 | -0.00468 | Within authorized band for Band 2 | Pass |
| | 3.70 | -7.77 | -0.00413 | | |
| | 4.07 | -8.2 | -0.00436 | | |
| 16QAM | | | | | |
| 25 | 3.33 | 4.51 | 0.002363 | Within authorized band for Band 2 | Pass |
| | 3.70 | 4.98 | 0.002609 | | |
| | 4.07 | 4.11 | 0.002154 | | |
| *Note: Only the worst case shown in the report.* | | | | | |

**LTE Band 4 part:**

| Reference Frequency: LTE Band 4(10MHz) Middle channel=20175 Frequency=1732.5MHz | | | | | |
|---|---|---|---|---|---|
| Temperature | | | | | |
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 3.7 | -30 | 4.33 | 0.00250 | Within authorized band for Band 4 | Pass |
| | -20 | 4.29 | 0.00248 | | |
| | -10 | -5.42 | -0.00310 | | |
| | 0 | 5.34 | 0.00305 | | |
| | 10 | 5.15 | 0.00294 | | |
| | 20 | 3.91 | 0.00228 | | |
| | 30 | 3.96 | 0.00231 | | |
| | 40 | 3.83 | 0.00223 | | |
| | 50 | -9.37 | -0.00541 | | |

| 16QAM | | | | | |
|---|---|---|---|---|---|
| 3.7 | -30 | -8.25 | -0.00476 | Within authorized band for Band 4 | Pass |
| | -20 | 4.36 | 0.00252 | | |
| | -10 | -7.85 | -0.00453 | | |
| | 0 | 4.69 | 0.00268 | | |
| | 10 | -6.85 | -0.00391 | | |
| | 20 | 5.24 | 0.00299 | | |
| | 30 | -6.69 | -0.00390 | | |
| | 40 | -6.15 | -0.00359 | | |
| | 50 | -6.38 | -0.00372 | | |
| **Voltage** | | | | | |
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 25 | 3.33 | -4.35 | -0.00253 | Within authorized band for Band 4 | Pass |
| | 3.70 | 3.88 | 0.00226 | | |
| | 4.07 | -5.97 | -0.00348 | | |
| 16QAM | | | | | |
| 25 | 3.33 | 4.41 | 0.00252 | Within authorized band for Band 4 | Pass |
| | 3.70 | 4.98 | 0.00285 | | |
| | 4.07 | 4.72 | 0.00270 | | |
| *Note: Only the worst case shown in the report.* | | | | | |

**LTE Band 5 part:**

| Reference Frequency: LTE Band 5(10MHz) Middle channel=20525 Frequency=836.5MHz | | | | | |
|---|---|---|---|---|---|
| Temperature | | | | | |
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 3.7 | -30 | -2.89 | -0.00349 | Within authorized band for Band 5 | Pass |
| | -20 | 3.26 | 0.00393 | | |
| | -10 | -4.05 | -0.00489 | | |
| | 0 | 2.69 | 0.00322 | | |
| | 10 | -2.78 | -0.00332 | | |
| | 20 | -2.71 | -0.00323 | | |
| | 30 | -4.76 | -0.00564 | | |
| | 40 | -4.62 | -0.00547 | | |
| | 50 | -4.45 | -0.00527 | | |

| | | | | | |
|---|---|---|---|---|---|
| 16QAM | | | | | |
| 3.7 | -30 | -2.99 | -0.00361 | Within authorized band for Band 5 | Pass |
| | -20 | -3.22 | -0.00388 | | |
| | -10 | -3.11 | -0.00371 | | |
| | 0 | -3.96 | -0.00473 | | |
| | 10 | -3.36 | -0.00402 | | |
| | 20 | -5.49 | -0.00651 | | |
| | 30 | -5.76 | -0.00683 | | |
| | 40 | -2.78 | -0.00332 | | |
| | 50 | 3.26 | 0.00393 | | |
| **Voltage** | | | | | |
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 25 | 3.33 | -4.35 | -0.00526 | Within authorized band for Band 5 | Pass |
| | 3.70 | -4.45 | -0.00538 | | |
| | 4.07 | -4.95 | -0.00599 | | |
| 16QAM | | | | | |
| 25 | 3.33 | -2.79 | -0.00334 | Within authorized band for Band 5 | Pass |
| | 3.70 | 2.88 | 0.00344 | | |
| | 4.07 | -2.93 | -0.00350 | | |
| *Note: Only the worst case shown in the report.* | | | | | |

**LTE Band 12 part:**

| Reference Frequency: LTE Band 12(10MHz) Middle channel=23095 Frequency=707.5MHz | | | | | |
|---|---|---|---|---|---|
| Temperature | | | | | |
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 3.7 | -30 | -4.36 | -0.00619 | Within authorized band for Band 12 | Pass |
| | -20 | -3.52 | -0.00500 | | |
| | -10 | -4.66 | -0.00662 | | |
| | 0 | -2.79 | -0.00394 | | |
| | 10 | -3.08 | -0.00435 | | |
| | 20 | -3.3 | -0.00466 | | |
| | 30 | 5.72 | 0.00805 | | |
| | 40 | -3.45 | -0.00485 | | |
| | 50 | 5.21 | 0.00733 | | |
| 16QAM | | | | | |
| 3.7 | -30 | 4.66 | 0.00662 | Within authorized band for Band 12 | Pass |
| | -20 | 3.22 | 0.00457 | | |
| | -10 | -2.4 | -0.00339 | | |
| | 0 | -1.77 | -0.00250 | | |
| | 10 | -2.62 | -0.00370 | | |
| | 20 | -3.98 | -0.00560 | | |
| | 30 | 5.92 | 0.00833 | | |
| | 40 | -3.09 | -0.00437 | | |
| | 50 | -2.50 | -0.00353 | | |

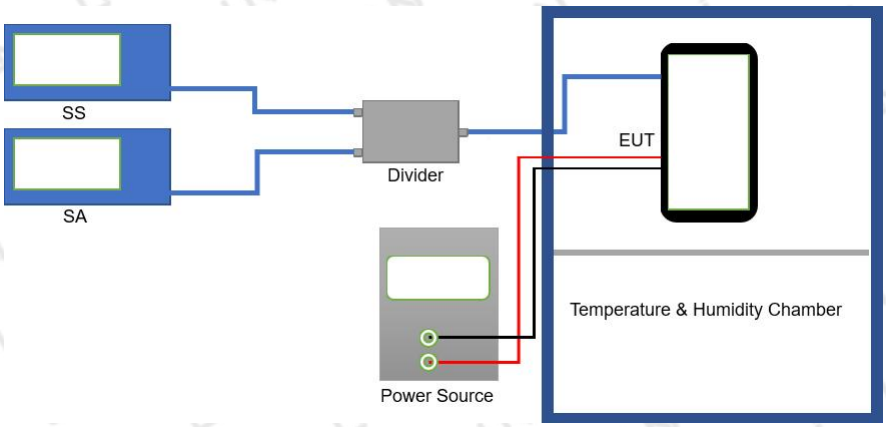
| Voltage | | | | | |
|---|---|---|---|---|---|
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 25 | 3.33 | -2.78 | -0.00393 | Within authorized band for Band 12 | Pass |
| | 3.70 | -3.81 | -0.00534 | | |
| | 4.07 | -5.92 | -0.00830 | | |
| 16QAM | | | | | |
| 25 | 3.33 | -2.99 | -0.00426 | Within authorized band for Band 12 | Pass |
| | 3.70 | -3.03 | -0.00432 | | |
| | 4.07 | 3.68 | 0.00520 | | |
| *Note: Only the worst case shown in the report.* | | | | | |

**LTE Band 13 part:**

| Reference Frequency: LTE Band 13(10MHz) Middle channel=23230 Frequency=782MHz | | | | | |
|---|---|---|---|---|---|
| Temperature | | | | | |
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 3.7 | -30 | -6.32 | -0.00811 | Within authorized band for Band 13 | Pass |
| | -20 | -3.62 | -0.00464 | | |
| | -10 | -5.08 | -0.00652 | | |
| | 0 | -3.95 | -0.00505 | | |
| | 10 | -5.16 | -0.00660 | | |
| | 20 | 4.42 | 0.00565 | | |
| | 30 | 3.39 | 0.00432 | | |
| | 40 | -2.83 | -0.00361 | | |
| | 50 | 3.18 | 0.00405 | | |
| 16QAM | | | | | |
| 3.7 | -30 | -4.95 | -0.00635 | Within authorized band for Band 13 | Pass |
| | -20 | -6.19 | -0.00794 | | |
| | -10 | 4.84 | 0.00619 | | |
| | 0 | 4.69 | 0.00600 | | |
| | 10 | 6.29 | 0.00804 | | |
| | 20 | 3.12 | 0.00398 | | |
| | 30 | -3.63 | -0.00463 | | |
| | 40 | 2.81 | 0.00357 | | |
| | 50 | -4.68 | -0.00599 | | |

| Voltage | | | | | |
|---|---|---|---|---|---|
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 25 | 3.33 | 5.49 | 0.00702 | Within authorized band for Band 13 | Pass |
| | 3.70 | 4.86 | 0.00622 | | |
| | 4.07 | 6.95 | 0.00889 | | |
| 16QAM | | | | | |
| 25 | 3.33 | 4.68 | 0.00600 | Within authorized band for Band 13 | Pass |
| | 3.70 | -3.61 | -0.00464 | | |
| | 4.07 | 6.27 | 0.00804 | | |
| *Note: Only the worst case shown in the report.* | | | | | |

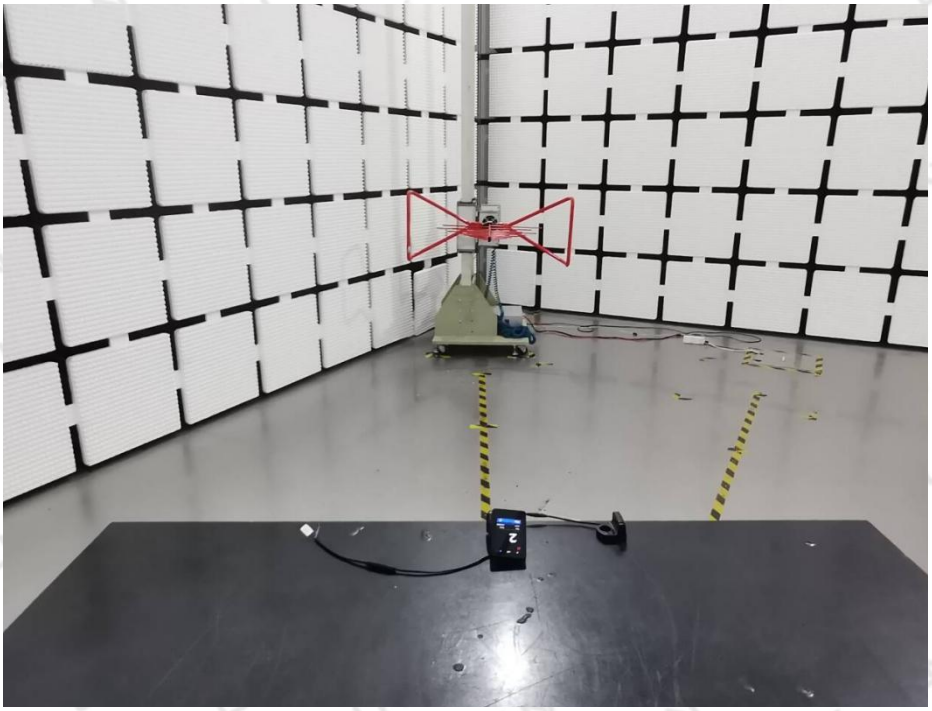
# 10 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

| | |
|---|---|
| Test Requirement: | Part 22.355, Part 24.235, Part 27.54, Part 2.1055(d)(2) |
| Limit: | Cellular Band: ±2.5ppm PCS Band: Within the authorized frequency block |
| Test setup: |  |
| Test procedure: | 1. Set chamber temperature to 25℃. Use a variable DC power source to power the EUT and set the voltage to rated voltage.<br>2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.<br>3. Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change. |
| Test Instruments: | Refer to section 2.5 for details |
| Test mode: | Refer to section 2.3 for details |
| Test results: | Passed |

## 10.1 Test Result

Refer to 9.1

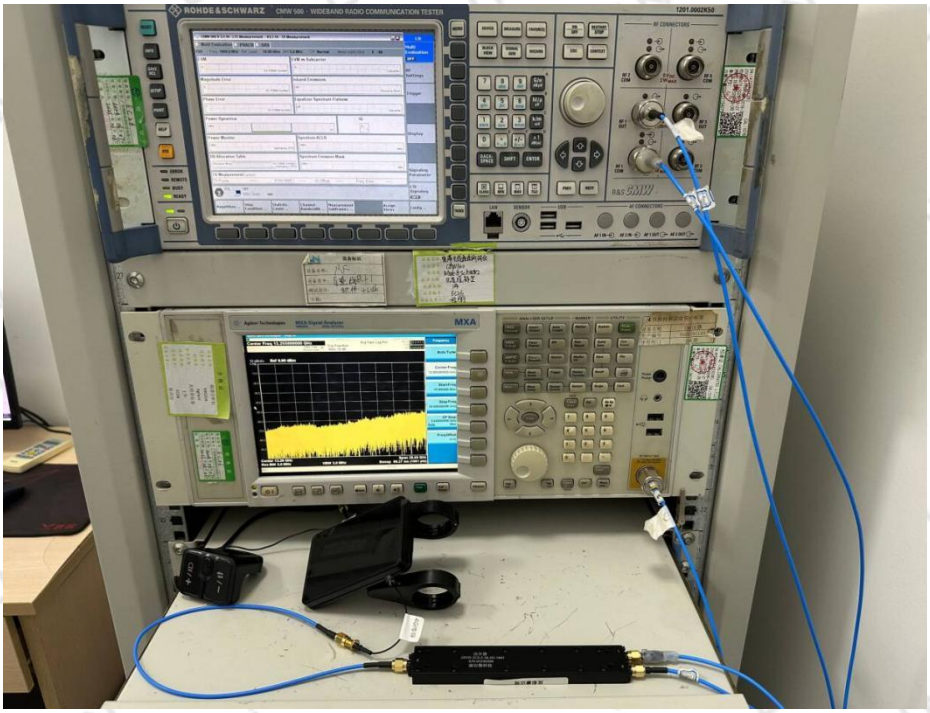
## 11 PHOTO OF TEST
**RADIATED EMISSION**



30MHz-1000MHz

Above 1GHz

**RF CONDUCTED**



## 12 EUT Constructional Details

Refer to the External Photos and Internal Photos for details.

***End of Report***