# FCC TEST REPORT
## FCC ID: 2ATOT-30004

| | |
|---|---|
| **Report Number** | ZKT-220915L6886-07 |
| Date of Test | Aug. 15, 2022 – Oct. 13, 2022 |
| Date of issue | Oct. 13, 2022 |
| Total number of pages | 33 |
| Test Result | PASS |
| **Testing Laboratory** | **Shenzhen ZKT Technology Co., Ltd.** |
| Address | 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China |
| **Applicant's name** | Lexi Device, Inc. |
| Address | 2342 Shattuck Ave, #260, Berkeley, CA 94704 US |
| **Manufacturer's name** | Jingrui Inspire Co.,Ltd. |
| Address | RM1306, Block 3 (C-1), Runhui Science Park,18 Shenzhou Rd., Huangpu Dist., Guangzhou, Guangdong Prov., P.R. China, 510663 |
| **Test specification:** | |
| Standard | FCC CFR Title 47 Part 15 Subpart C Section 15.249<br>ANSI C63.10:2013 |
| Test procedure | / |
| Non-standard test method | N/A |
| **Test Report Form No.** | TRF-EL-110_V0 |
| **Test Report Form(s) Originator** | ZKT Testing |
| **Master TRF** | Dated: 2020-01-06 |

This device described above has been tested by ZKT, 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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| | |
|---|---|
| **Product name** | Multi-Protocol Gateway |
| Trademark | Lexi |
| Model/Type reference | 30004, 30003, 30017, 30018, 300019, 30020, 30021 |
| Ratings | DC 5V 2A from adapter |

**Testing procedure and testing location:**

| | |
|---|---|
| **Testing Laboratory .....:** | **Shenzhen ZKT Technology Co., Ltd.** |
| Address .....: | 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China |
| Tested by (name + signature) .....: | Alen He |
| Reviewer (name + signature).....: | Joe Liu |
| Approved (name + signature) .....: | Lake Xie |

## Table of Contents

**1. VERSION**

| Report No. | Version | Description | Approved |
|---|---|---|---|
| ZKT-220915L6886-07 | Rev.01 | Initial issue of report | Oct. 13, 2022 |
| | | | |
| | | | |

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

| FCC Part15 (15.249) , Subpart C | | | |
|---|---|---|---|
| Standard Section | Test Item | Result | Remark |
| FCC part 15.203 | Antenna requirement | PASS | |
| FCC part 15.207 | AC Power Line Conducted Emi sion | PASS | |
| FCC part 15.249 | Fundamental &Radiated Spurious Emission Measurement | PASS | |
| FCC 15.215 ( c ) | 20dB Bandwidth | PASS | |
| FCC part 15.205 | Band Edge | PASS | |

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

## 2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.
Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225
Designation Number: CN1299
IC Registered No.: 27033

## 2.2 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 %。

| No. | Item | Uncertainty |
|---|---|---|
| 1 | Conducted Emission Test | ±1.38dB |
| 2 | RF power conducted | ±0.16dB |
| 3 | Spurious emissions conducted | ±0.21dB |
| 4 | All emissions radiated(<1G) | ±4.68dB |
| 5 | All emissions radiated(>1G) | ±4.89dB |
| 6 | Temperature | ±0.5°C |
| 7 | Humidity | ±2% |

## 3. GENERAL INFORMATION

### 3.1 GENERAL DESCRIPTION OF EUT

| | |
|---|---|
| Product Name: | Multi-Protocol Gateway |
| Model No.: | 30004 |
| Series Model No. | 30003, 30017, 30018, 300019, 30020, 30021 |
| Hardware Version: | V1.0 |
| Software Version: | SecureCRT |
| Sample(s) Status: | Engineer sample |
| Frequency band: | 903MHz - 927MHz |
| Channel separation: | 1MHz |
| Channel number: | 25 |
| Modulation technology: | FSK |
| Antenna Type: | Airgain Embedded Antenna |
| Antenna gain: | 0.6dBi |
| Power supply: | DC 5V 2A from adapter |

**Operation Frequency each of channel**

| Channel | Frequency | Channel | Frequency |
|---|---|---|---|
| 1 | 903 | 14 | 916 |
| 2 | 904 | 15 | 917 |
| 3 | 905 | 16 | 918 |
| 4 | 906 | 17 | 919 |
| 5 | 907 | 18 | 920 |
| 6 | 908 | 19 | 921 |
| 7 | 909 | 20 | 922 |
| 8 | 910 | 21 | 923 |
| 9 | 911 | 22 | 924 |
| 10 | 912 | 23 | 925 |
| 11 | 913 | 24 | 926 |
| 12 | 914 | 25 | 927 |
| 13 | 915 | | |

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

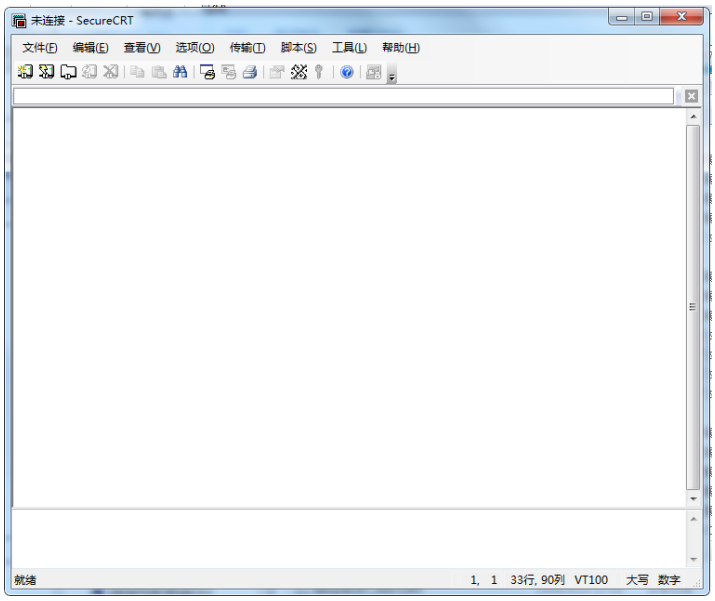
| Test channel | Frequency |
|---|---|
| The lowest channel | 903MHz |
| The middle channel | 915MHz |

| | |
|---|---|
| The Highest channel | 927MHz |

## 3.2 DESCRIPTION OF TEST MODES

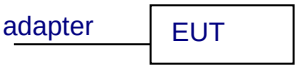
| | |
|---|---|
| Transmitting mode | Keep the EUT in continuously transmitting mode |
| Remark: During the test, the duty cycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data. | |

| |
|---|
| We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows: |
| Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case. |

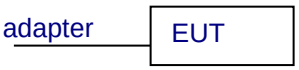
| | |
|---|---|
| Test Software | Test Tool   |
| Power level setup | <30dBm |

## 3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

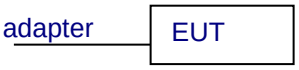
Conducted Emission




Radiated Emission




Conducted Spurious




## 3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. | Note |
|---|---|---|---|---|---|
| 1 | adapter | GUIZHOU VINMAN INDUSTRIAL CO.,LTD. | TAP12-050S200U1 | / | SDOC |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| | | | | | |

| Item | Shielded Type | Ferrite Core | Length | Note |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

## 3.5EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

| Item | Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|---|---|---|---|---|---|---|
| 1 | Spectrum Analyzer (9kHz-26.5GHz) | KEYSIGHT | 9020A | MY55370835 | Oct. 18, 2021 | Oct. 17, 2022 |
| 2 | Spectrum Analyzer (1GHz-40GHz) | R&S | FSQ | 100363 | Oct. 17, 2021 | Oct. 16, 2022 |
| 3 | EMI Test Receiver (9kHz-7GHz) | R&S | ESCI7 | 101169 | Oct. 18, 2021 | Oct. 17, 2022 |
| 4 | Bilog Antenna (30MHz-1500MHz) | Schwarzbeck | VULB9168 | N/A | Oct. 17, 2021 | Oct. 16, 2022 |
| 5 | Horn Antenna (1GHz-18GHz) | Agilent | AH-118 | 071145 | Oct. 17, 2021 | Oct. 16, 2022 |
| 6 | Loop Antenna | TESEQ | HLA6121 | 58357 | Oct. 17, 2021 | Oct. 16, 2022 |
| 7 | Amplifier (30-1000MHz) | EM Electronics | EM330 Amplifier | 060747 | Oct. 17, 2021 | Oct. 16, 2022 |
| 8 | Amplifier (1GHz-26.5GHz) | Agilent | 8449B | 3008A00315 | Oct. 18, 2021 | Oct. 17, 2022 |
| 9 | RF cables1 (9kHz-30MHz) | N/A | 9kHz-30MHz | N/A | Oct. 18, 2021 | Oct. 17, 2022 |
| 10 | RF cables2 (30MHz-1GHz) | N/A | 30MHz-1GHz | N/A | Oct. 18, 2021 | Oct. 17, 2022 |
| 11 | RF cables3 (1GHz-40GHz) | N/A | 1GHz-40GHz | N/A | Oct. 18, 2021 | Oct. 17, 2022 |
| 12 | ESG Signal Generator | Agilent | E4421B | N/A | Oct. 18, 2021 | Oct. 17, 2022 |
| 13 | Signal Generator | Agilent | N5182A | N/A | Oct. 22, 2021 | Oct. 21, 2022 |
| 14 | Magnetic Field Probe Tester | Narda | ELT-400 | 0-0344 | Oct. 17, 2021 | Oct. 16, 2022 |
| 15 | MWRF Power Meter Test system | MW | MW100-RPCB | N/A | Oct. 22, 2021 | Oct. 21, 2022 |
| 16 | D.C. Power Supply | LongWei | TPR-6405D | N/A | \ | \ |
| 17 | EMC Software | Frad | EZ-EMC | Ver.EMC-CON 3A1.1 | \ | \ |
| 18 | RF Software | MW | MTS8310 | V2.0.0.0 | \ | \ |
| 19 | Turntable | MF | MF-7802BS | N/A | \ | \ |
| 20 | Antenna tower | MF | MF-7802BS | N/A | \ | \ |

Conduction Test equipment

| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|---|---|---|---|---|---|---|
| 1 | LISN | R&S | ENV216 | 101471 | Oct. 22, 2021 | Oct. 21, 2022 |
| 2 | LISN | CYBERTEK | EM5040A | E1850400149 | Oct. 22, 2021 | Oct. 21, 2022 |
| 3 | Test Cable | N/A | C01 | N/A | Oct. 18, 2021 | Oct. 17, 2022 |
| 4 | Test Cable | N/A | C02 | N/A | Oct. 18, 2021 | Oct. 17, 2022 |
| 5 | EMI Test Receiver | R&S | ESCI3 | 101393 | Oct. 17, 2021 | Oct. 16, 2022 |
| 6 | EMC Software | Frad | EZ-EMC | Ver.EMC-CON 3A1.1 | \ | \ |

## 4. EMC EMISSION TEST

### 4.1 CONDUCTED EMISSION MEASUREMENT

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.207 |
| Test Method: | ANSI C63.10:2013 |
| Test Frequency Range: | 150KHz to 30MHz |
| Receiver setup: | RBW=9KHz, VBW=30KHz, Sweep time=auto |

#### 4.1.1 POWER LINE CONDUCTED EMISSION Limits

| FREQUENCY (MHz) | Limit (dBuV) | | Standard |
|---|---|---|---|
| | Quasi-peak | Average | |
| 0.15 -0.5 | 66 - 56 * | 56 - 46 * | FCC |
| 0.50 -5.0 | 56.00 | 46.00 | FCC |
| 5.0 -30.0 | 60.00 | 50.00 | FCC |

Note:

(1) *Decreases with the logarithm of the frequency.

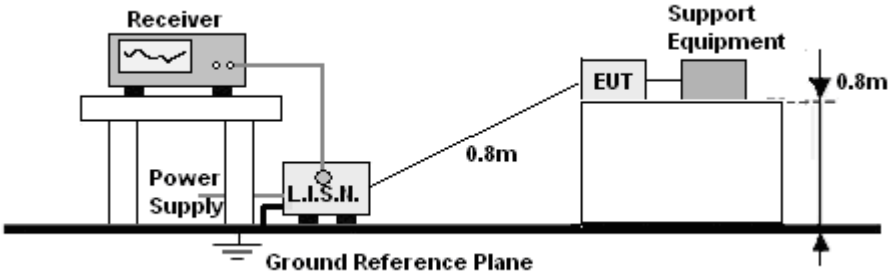
#### 4.1.2 TEST PROCEDURE

a. The EUT was placed 0.1 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TEST SETUP




4.1.5 EUT OPERATING CONDITIONS

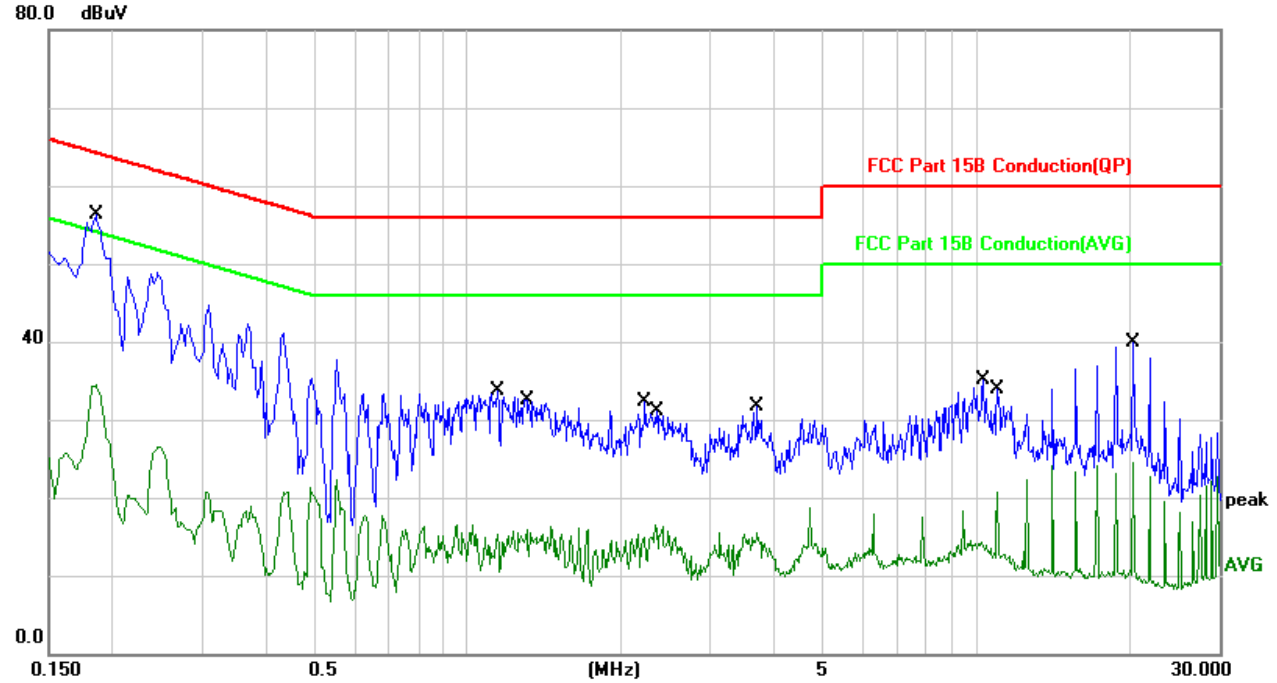
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.

## 4.1.6 TEST RESULT

### 4.1.6 Test Result

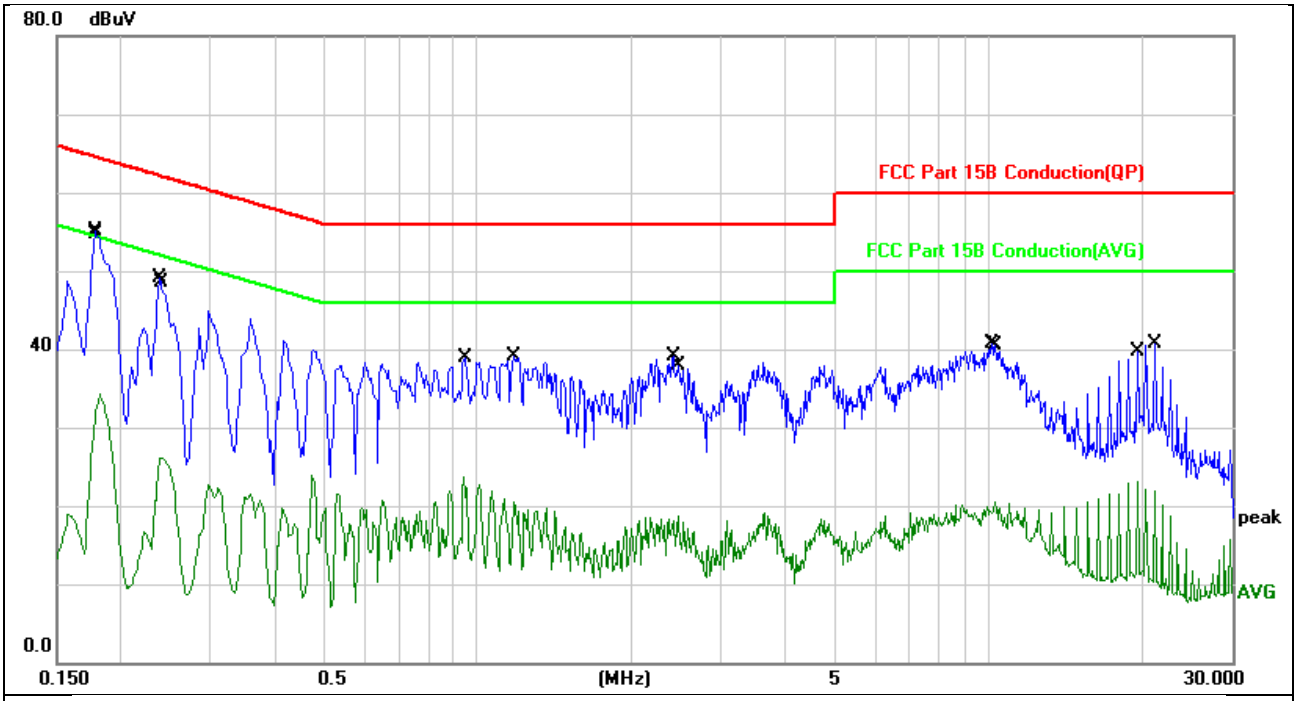
| | | | |
|---|---|---|---|
| Temperature : | 26℃ | Relative Humidity : | 54% |
| Pressure : | 101kPa | Phase : | L |
| **Test Voltage** : | AC 120V/60Hz | | |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | * | 0.1860 | 46.53 | 9.75 | 56.28 | 64.21 | -7.93 | QP | |
| 2 | | 0.1860 | 24.73 | 9.75 | 34.48 | 54.21 | -19.73 | AVG | |
| 3 | | 1.1460 | 23.92 | 9.74 | 33.66 | 56.00 | -22.34 | QP | |
| 4 | | 1.3060 | 6.21 | 9.72 | 15.93 | 46.00 | -30.07 | AVG | |
| 5 | | 2.2340 | 22.71 | 9.64 | 32.35 | 56.00 | -23.65 | QP | |
| 6 | | 2.3380 | 6.82 | 9.63 | 16.45 | 46.00 | -29.55 | AVG | |
| 7 | | 3.7060 | 21.97 | 9.69 | 31.66 | 56.00 | -24.34 | QP | |
| 8 | | 3.7060 | 5.87 | 9.69 | 15.56 | 46.00 | -30.44 | AVG | |
| 9 | | 10.2940 | 25.36 | 9.79 | 35.15 | 60.00 | -24.85 | QP | |
| 10 | | 10.9660 | 10.86 | 9.77 | 20.63 | 50.00 | -29.37 | AVG | |
| 11 | | 20.3700 | 30.38 | 9.52 | 39.90 | 60.00 | -20.10 | QP | |
| 12 | | 20.3700 | 15.07 | 9.52 | 24.59 | 50.00 | -25.41 | AVG | |

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor

| | | | |
|---|---|---|---|
| Temperature : | 26℃ | Relative Humidity : | 54% |
| Pressure : | 101kPa | Phase : | N |
| **Test Voltage** : | AC 120V/60Hz | | |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | * | 0.1780 | 45.31 | 9.75 | 55.06 | 64.57 | -9.51 | QP | |
| 2 | | 0.1819 | 24.49 | 9.75 | 34.24 | 54.39 | -20.15 | AVG | |
| 3 | | 0.2380 | 39.42 | 9.77 | 49.19 | 62.16 | -12.97 | QP | |
| 4 | | 0.2420 | 16.33 | 9.77 | 26.10 | 52.02 | -25.92 | AVG | |
| 5 | | 0.9420 | 13.89 | 9.77 | 23.66 | 46.00 | -22.34 | AVG | |
| 6 | | 1.1820 | 29.33 | 9.73 | 39.06 | 56.00 | -16.94 | QP | |
| 7 | | 2.4180 | 29.38 | 9.66 | 39.04 | 56.00 | -16.96 | QP | |
| 8 | | 2.4700 | 8.95 | 9.69 | 18.64 | 46.00 | -27.36 | AVG | |
| 9 | | 10.1780 | 30.93 | 9.76 | 40.69 | 60.00 | -19.31 | QP | |
| 10 | | 10.3139 | 10.78 | 9.78 | 20.56 | 50.00 | -29.44 | AVG | |
| 11 | | 19.5860 | 13.60 | 9.54 | 23.14 | 50.00 | -26.86 | AVG | |
| 12 | | 21.1540 | 31.19 | 9.51 | 40.70 | 60.00 | -19.30 | QP | |

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor

## 4.2 RADIATED EMISSION MEASUREMENT

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.209 |
| Test Method: | ANSI C63.10:2013 |
| Test Frequency Range: | 9kHz to 25GHz |
| Test site: | Measurement Distance: 3m |
| Receiver setup: | |

| Frequency | Detector | RBW | VBW | Value |
|---|---|---|---|---|
| 9KHz-150KHz | Quasi-peak | 200Hz | 600Hz | Quasi-peak |
| 150KHz-30MHz | Quasi-peak | 9KHz | 30KHz | Quasi-peak |
| 30MHz-1GHz | Quasi-peak | 120KHz | 300KHz | Quasi-peak |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | Peak | 1MHz | 10Hz | Average |

### 4.2.1 RADIATED EMISSION LIMITS

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental frequency | Field strength of fundamental (millivolts/meter) | Field strength of harmonics (microvolts/meter) |
|---|---|---|
| 902-928 MHz | 50 | 500 |
| 2400-2483.5 MHz | 50 | 500 |
| 5725-5875 MHz | 50 | 500 |
| 24.0-24.25 GHz | 250 | 2500 |

LIMITS OF RADIATED EMISSION MEASUREMENT

| FREQUENCY (MHz) | Limit (dBuV/m) (at 3M) | |
|---|---|---|
| | PEAK | AVERAGE |
| Above 1000 | 74 | 54 |

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

4.2.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 25GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-chamber test. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8m; above 1GHz, the height was 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.
g. For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.
The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
Note:

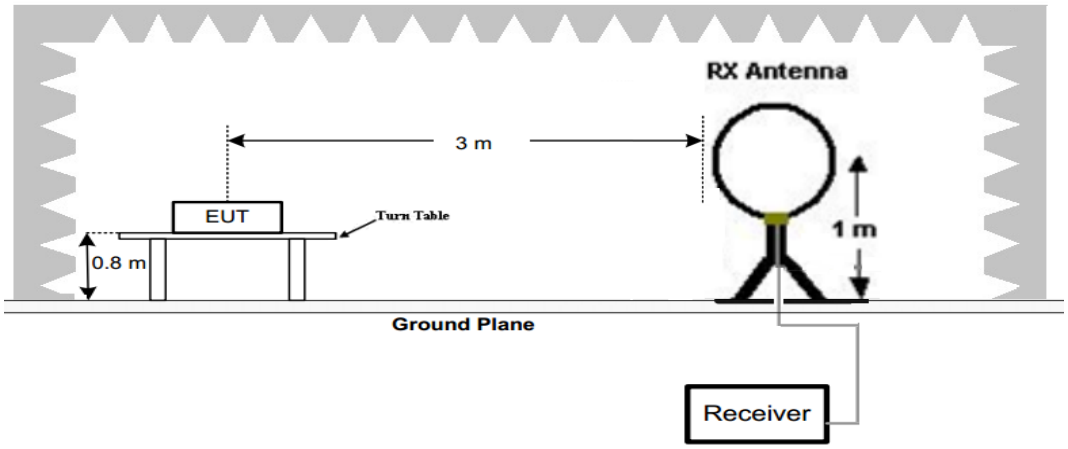
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

4.2.3 DEVIATION FROM TEST STANDARD

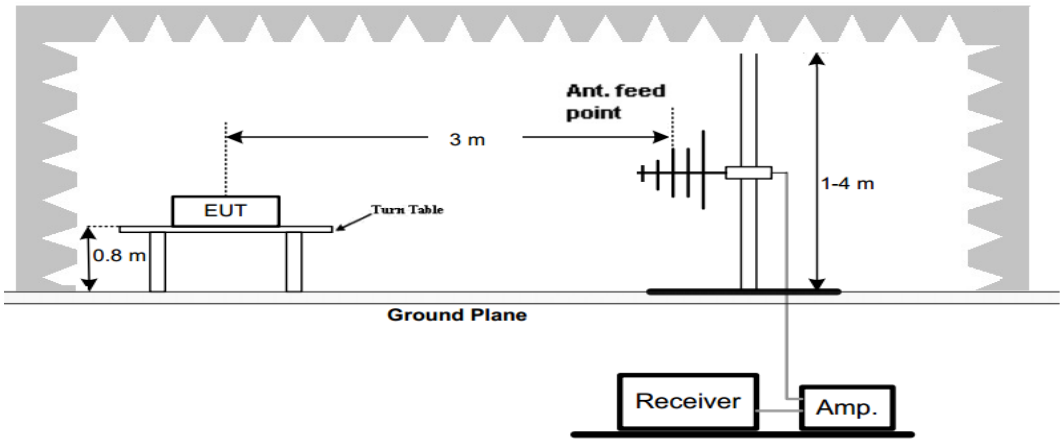
No deviation

4.2.4 TEST SETUP

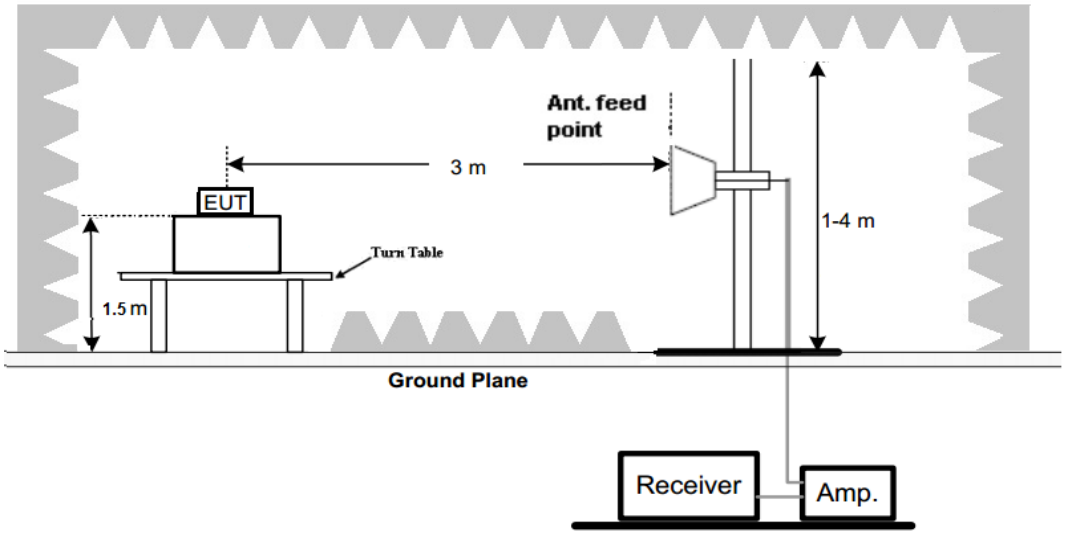
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz




（C）Radiated Emission Test-Up Frequency Above 1GHz




4.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.2.6 TEST RESULTS

Between 9KHz – 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

Field Strength of Fundamental:

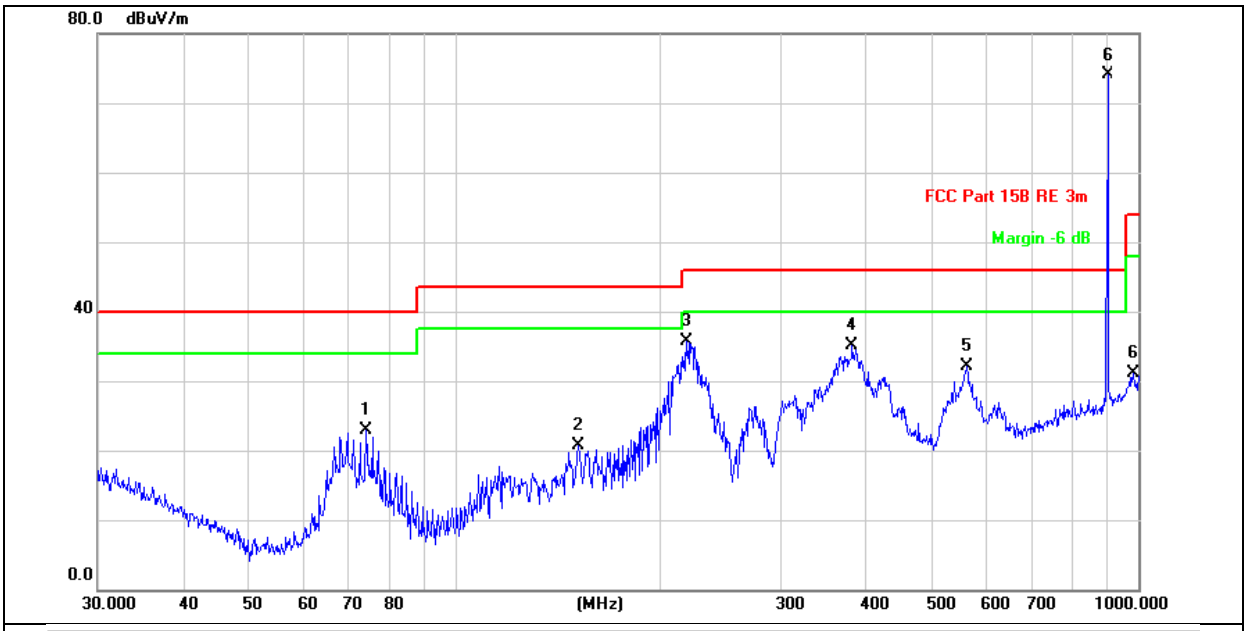
| Frequency (MHz) | Emission (dBuV/m) | PK/AV | Ant. Pol. | Limits PK/AV (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|
| 903 | 84.68 | PK | H | 114 | -29.32 |
| 903 | 66.94 | AV | H | 94 | -27.06 |
| 903 | 83.40 | PK | V | 114 | -30.60 |
| 903 | 60.34 | AV | V | 94 | -33.66 |

| Frequency (MHz) | Emission (dBuV/m) | PK/AV | Ant. Pol. | Limits PK/AV (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|
| 915 | 85.30 | PK | H | 114 | -28.70 |
| 915 | 67.30 | AV | H | 94 | -26.70 |
| 915 | 82.91 | PK | V | 114 | -31.09 |
| 915 | 58.58 | AV | V | 94 | -35.42 |

| Frequency (MHz) | Emission (dBuV/m) | PK/AV | Ant. Pol. | Limits PK/AV (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|
| 927 | 84.74 | PK | H | 114 | -29.26 |
| 927 | 67.12 | AV | H | 94 | -26.88 |
| 927 | 81.20 | PK | V | 114 | -32.80 |
| 927 | 62.91 | AV | V | 94 | -31.09 |

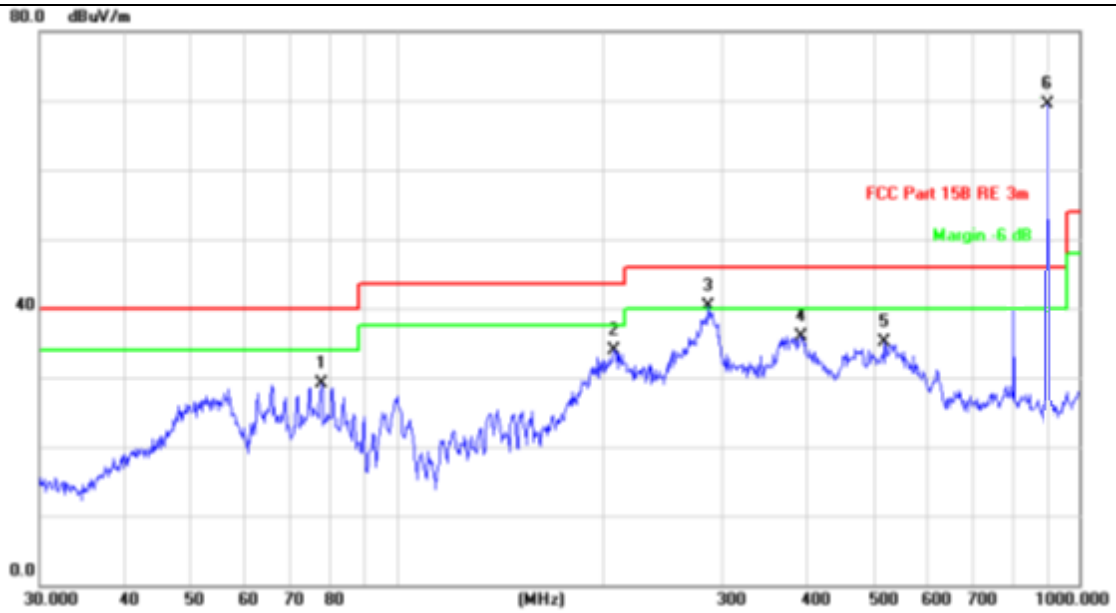
Between 30MHz – 1GHz

| | | | |
|---|---|---|---|
| Temperature: | 26℃ | Relative Humidity: | 54% |
| Pressure: | 101 kPa | Polarization: | Horizontal |
| Test Voltage: | AC120V | | |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 74.1350 | 37.98 | -15.14 | 22.84 | 40.00 | -17.16 | QP | 100 | 360 | |
| 2 | | 151.5971 | 30.38 | -9.60 | 20.78 | 43.50 | -22.72 | QP | 100 | 360 | |
| 3 | * | 218.3085 | 45.93 | -10.28 | 35.65 | 46.00 | -10.35 | QP | 100 | 360 | |
| 4 | | 381.2487 | 41.29 | -6.17 | 35.12 | 46.00 | -10.88 | QP | 100 | 360 | |
| 5 | | 560.6928 | 34.64 | -2.56 | 32.08 | 46.00 | -13.92 | QP | 100 | 360 | |
| 6 | | 903.6200 | 73.58 | -2.53 | 76.11 | 46.00 | 30.11 | QP | 100 | 360 | |

| | | | |
|---|---|---|---|
| Temperature: | 26℃ | Relative Humidity: | 54% |
| Pressure: | 101kPa | Polarization: | Vertical |
| Test Voltage: | AC120V | | |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 77.5928 | 44.35 | -15.17 | 29.18 | 40.00 | -10.82 | QP | 100 | 0 | |
| 2 | | 207.8501 | 44.05 | -10.12 | 33.93 | 43.50 | -9.57 | QP | 100 | 0 | |
| 3 | * | 285.9778 | 49.10 | -8.81 | 40.29 | 46.00 | -5.71 | QP | 100 | 0 | |
| 4 | | 390.7226 | 41.80 | -5.96 | 35.84 | 46.00 | -10.16 | QP | 100 | 0 | |
| 5 | | 519.0649 | 38.06 | -3.00 | 35.06 | 46.00 | -10.94 | QP | 100 | 0 | |
| 6 | | 801.7863 | 63.53 | 6.02 | 69.55 | 46.00 | 23.55 | QP | 100 | 0 | |

Remarks:
1.Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2.The emission levels of other frequencies are very lower than the limit and not show in test report.

1GHz~25GHz

| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Pre-amplifier (dB) | Cable Loss (dB) | Antenna Factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| Low Channel: 903MHz | | | | | | | | | |
| V | 1806.00 | 54.57 | 30.26 | 4.18 | 24.97 | 53.46 | 74.00 | -20.54 | PK |
| V | 1806.00 | 39.88 | 30.26 | 4.18 | 24.97 | 38.77 | 54.00 | -15.23 | AV |
| V | 2709.00 | 54.17 | 30.31 | 4.7 | 24.82 | 53.38 | 74.00 | -20.62 | PK |
| V | 2709.00 | 39.61 | 30.31 | 4.7 | 24.82 | 38.82 | 54.00 | -15.18 | AV |
| V | 3612.00 | 52.29 | 30.43 | 5.13 | 24.7 | 51.69 | 74.00 | -22.31 | PK |
| V | 3612.00 | 37.94 | 30.43 | 5.13 | 24.7 | 37.34 | 54.00 | -16.66 | AV |
| H | 1806.00 | 54.79 | 30.26 | 4.18 | 24.97 | 53.68 | 74.00 | -20.32 | PK |
| H | 1806.00 | 40.59 | 30.26 | 4.18 | 24.97 | 39.48 | 54.00 | -14.52 | AV |
| H | 2709.00 | 54.03 | 30.31 | 4.7 | 24.82 | 53.24 | 74.00 | -20.76 | PK |
| H | 2709.00 | 38.87 | 30.31 | 4.7 | 24.82 | 38.08 | 54.00 | -15.92 | AV |
| H | 3612.00 | 52.06 | 30.43 | 5.13 | 24.7 | 51.46 | 74.00 | -22.54 | PK |
| H | 3612.00 | 38.73 | 30.43 | 5.13 | 24.7 | 38.13 | 54.00 | -15.87 | AV |

| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Pre-amplifier (dB) | Cable Loss (dB) | Antenna Factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| Middle Channel: 915MHz | | | | | | | | | |
| V | 1830.00 | 56.01 | 30.26 | 4.18 | 24.97 | 54.90 | 74.00 | -19.10 | PK |
| V | 1830.00 | 40.56 | 30.26 | 4.18 | 24.97 | 39.45 | 54.00 | -14.55 | AV |
| V | 2745.00 | 53.87 | 30.31 | 4.7 | 24.82 | 53.08 | 74.00 | -20.92 | PK |
| V | 2745.00 | 41.39 | 30.31 | 4.7 | 24.82 | 40.60 | 54.00 | -13.40 | AV |
| V | 3660.00 | 51.93 | 30.43 | 5.13 | 24.7 | 51.33 | 74.00 | -22.67 | PK |
| V | 3660.00 | 37.23 | 30.43 | 5.13 | 24.7 | 36.63 | 54.00 | -17.37 | AV |
| H | 1830.00 | 54.51 | 30.26 | 4.18 | 24.97 | 53.40 | 74.00 | -20.60 | PK |
| H | 1830.00 | 39.98 | 30.26 | 4.18 | 24.97 | 38.87 | 54.00 | -15.13 | AV |
| H | 2745.00 | 53.29 | 30.31 | 4.7 | 24.82 | 52.50 | 74.00 | -21.50 | PK |
| H | 2745.00 | 40.19 | 30.31 | 4.7 | 24.82 | 39.40 | 54.00 | -14.60 | AV |
| H | 3660.00 | 49.88 | 30.43 | 5.13 | 24.7 | 49.28 | 74.00 | -24.72 | PK |
| H | 3660.00 | 37.85 | 30.43 | 5.13 | 24.7 | 37.25 | 54.00 | -16.75 | AV |

| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Pre-amplifier (dB) | Cable Loss (dB) | Antenna Factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| High Channel: 927MHz | | | | | | | | | |
| V | 1854.00 | 55.49 | 30.26 | 4.18 | 24.97 | 54.38 | 74.00 | -19.62 | PK |
| V | 1854.00 | 40.46 | 30.26 | 4.18 | 24.97 | 39.35 | 54.00 | -14.65 | AV |
| V | 2781.00 | 54.44 | 30.31 | 4.7 | 24.82 | 53.65 | 74.00 | -20.35 | PK |
| V | 2781.00 | 38.85 | 30.31 | 4.7 | 24.82 | 38.06 | 54.00 | -15.94 | AV |
| V | 3708.00 | 51.62 | 30.43 | 5.13 | 24.7 | 51.02 | 74.00 | -22.98 | PK |
| V | 3708.00 | 39.14 | 30.43 | 5.13 | 24.7 | 38.54 | 54.00 | -15.46 | AV |
| H | 1854.00 | 54.99 | 30.26 | 4.18 | 24.97 | 53.88 | 74.00 | -20.12 | PK |
| H | 1854.00 | 39.56 | 30.26 | 4.18 | 24.97 | 38.45 | 54.00 | -15.55 | AV |
| H | 2781.00 | 52.77 | 30.31 | 4.7 | 24.82 | 51.98 | 74.00 | -22.02 | PK |
| H | 2781.00 | 40.89 | 30.31 | 4.7 | 24.82 | 40.10 | 54.00 | -13.90 | AV |
| H | 3708.00 | 51.11 | 30.43 | 5.13 | 24.7 | 50.51 | 74.00 | -23.49 | PK |
| H | 3708.00 | 36.92 | 30.43 | 5.13 | 24.7 | 36.32 | 54.00 | -17.68 | AV |

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

## 5. BANDWIDTH OF FREQUENCY BAND EDGE

5.1 TEST REQUIREMENT:

<table>
<tr><td>Test Requirement:</td><td colspan="5">FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td colspan="5">ANSI C63.10: 2013</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="5">All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.</td></tr>
<tr><td>Test site:</td><td colspan="5">Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Value</td></tr>
<tr><td></td><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td></td><td>Average</td><td>1MHz</td><td>3MHz</td><td>Average</td></tr>
</table>

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation

5.2 TEST PROCEDURE

Above 1GHz test procedure as below:

a. 1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
g. Test the EUT in the lowest channel,the Highest channel

Note:

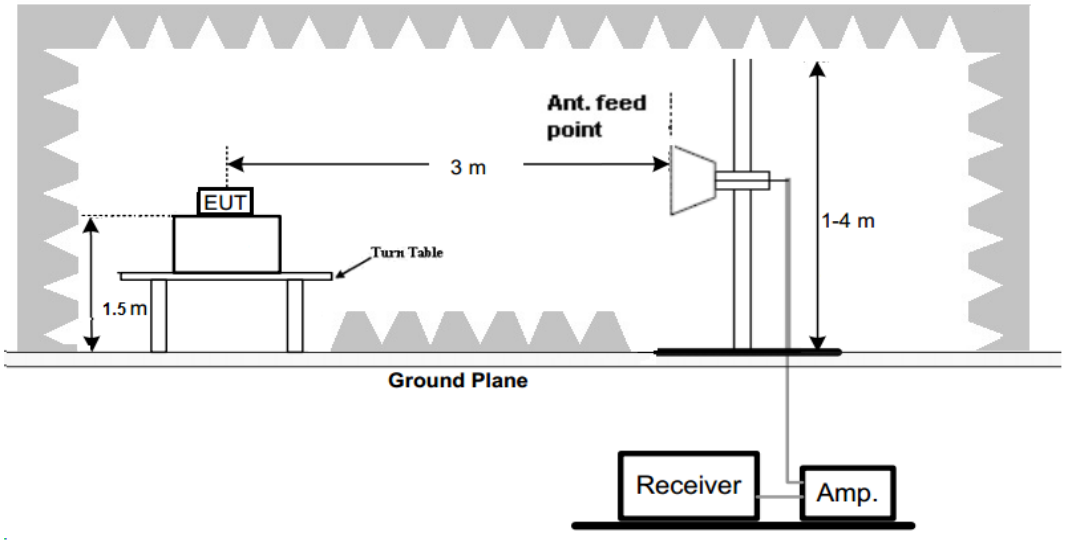
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

## 5.3 DEVIATION FROM TEST STANDARD

No deviation

## 5.4 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz




## 5.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULT

| | Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Pre-amplifier (dB) | Cable Loss (dB) | Antenna Factor (dB/m) | Emission level (dBuV/m) | Limit (dBuV/m) | Detector Type | Result |
|---|---|---|---|---|---|---|---|---|---|---|
| FSK | Low Channel: 903MHz | | | | | | | | | |
| | H | 897.6 | 56.06 | 32.4 | 3.22 | 19.26 | 46.14 | 74 | PK | PASS |
| | H | 897.6 | 36.58 | 32.4 | 3.22 | 19.26 | 26.66 | 54 | AV | PASS |
| | H | 902 | 53.20 | 32.4 | 3.22 | 19.26 | 43.28 | 74 | PK | PASS |
| | H | 902 | 40.09 | 32.4 | 3.22 | 19.26 | 30.17 | 54 | AV | PASS |
| | V | 897.6 | 49.94 | 32.4 | 3.22 | 19.26 | 40.02 | 74 | PK | PASS |
| | V | 897.6 | 40.53 | 32.4 | 3.22 | 19.26 | 30.61 | 54 | AV | PASS |
| | V | 902 | 53.59 | 32.4 | 3.22 | 19.26 | 43.67 | 74 | PK | PASS |
| | V | 902 | 39.40 | 32.4 | 3.22 | 19.26 | 29.48 | 54 | AV | PASS |
| | High Channel: 927MHz | | | | | | | | | |
| | H | 928 | 46.81 | 32.4 | 3.22 | 19.26 | 36.89 | 74 | PK | PASS |
| | H | 928 | 39.49 | 32.4 | 3.22 | 19.26 | 29.57 | 54 | AV | PASS |
| | H | 932.9 | 51.59 | 32.4 | 3.22 | 19.26 | 41.67 | 74 | PK | PASS |
| | H | 932.9 | 40.66 | 32.4 | 3.22 | 19.26 | 30.74 | 54 | AV | PASS |
| | V | 928 | 57.92 | 32.4 | 3.22 | 19.26 | 48.00 | 74 | PK | PASS |
| | V | 928 | 44.38 | 32.4 | 3.22 | 19.26 | 34.46 | 54 | AV | PASS |
| | V | 932.9 | 54.31 | 32.4 | 3.22 | 19.26 | 44.39 | 74 | PK | PASS |
| | V | 932.9 | 40.55 | 32.4 | 3.22 | 19.26 | 30.63 | 54 | AV | PASS |

**Remark:**
1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit

## 6. CHANNEL BANDWIDTH

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.215(c) |
| Test Method: | ANSI C63.10: 2013 |

### 6.1 APPLIED PROCEDURES / LIMIT

| Section | Test Item | Frequency Range (MHz) | Result |
|---|---|---|---|
| 15.215(c) | Bandwidth | 2400-2483.5 | PASS |

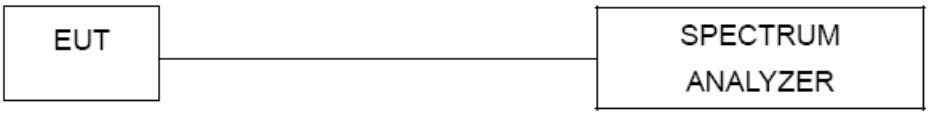
### 6.2 TEST PROCEDURE

1. Set resolution bandwidth (RBW) =1% to 5% of the OBW,
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 6.3 DEVIATION FROM STANDARD

No deviation.

### 6.4 TEST SETUP




### 6.5 EUT OPERATION CONDITIONS

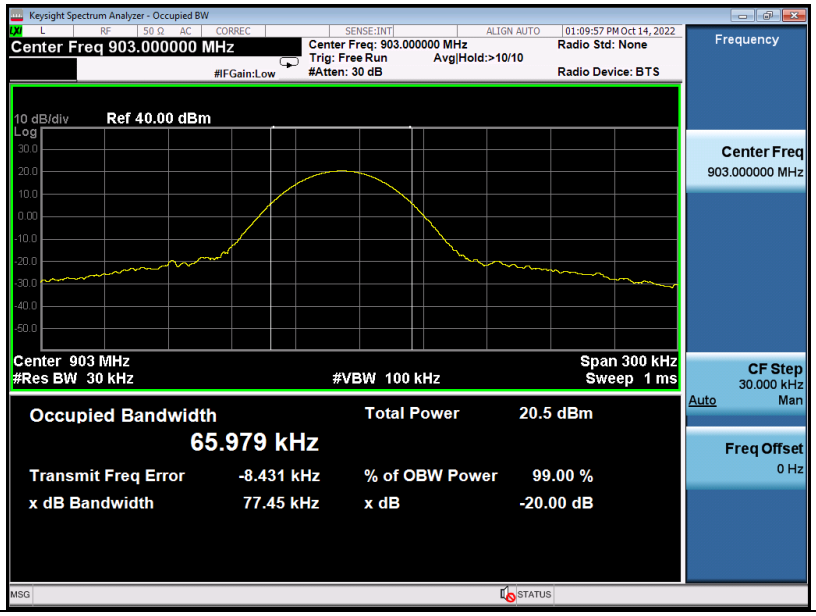
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

## 6.6 TEST RESULT

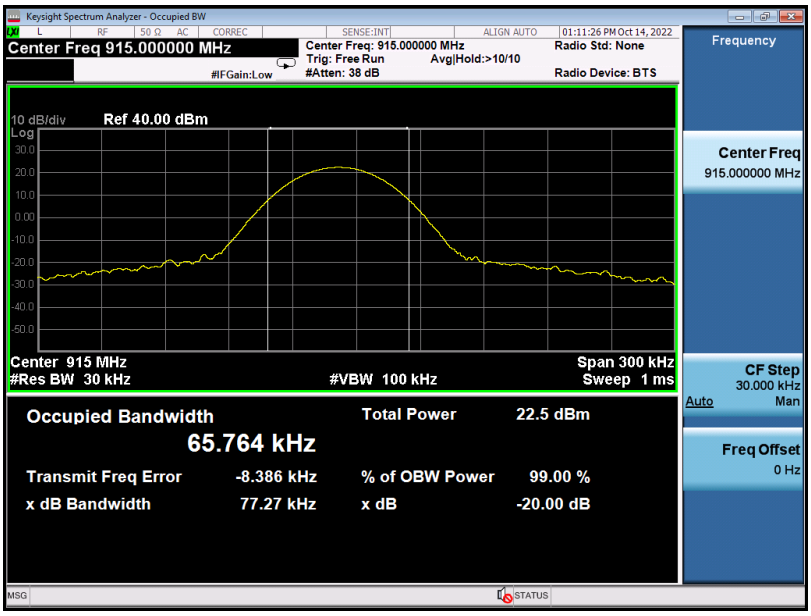
| | | | |
|---|---|---|---|
| Temperature： | 26℃ | Relative Humidity： | 54% |
| Pressure： | 101kPa | Test Voltage ： | DC5.0V |
| Test Mode ： | FSK | | |

| Test channel | 99% Channel Bandwidth (KHz) | 20dB Channel Bandwidth (KHz) | Result |
|---|---|---|---|
| Lowest | 65.979 | 77.45 | Pass |
| Middle | 65.764 | 77.27 | |
| Highest | 66.699 | 77.56 | |

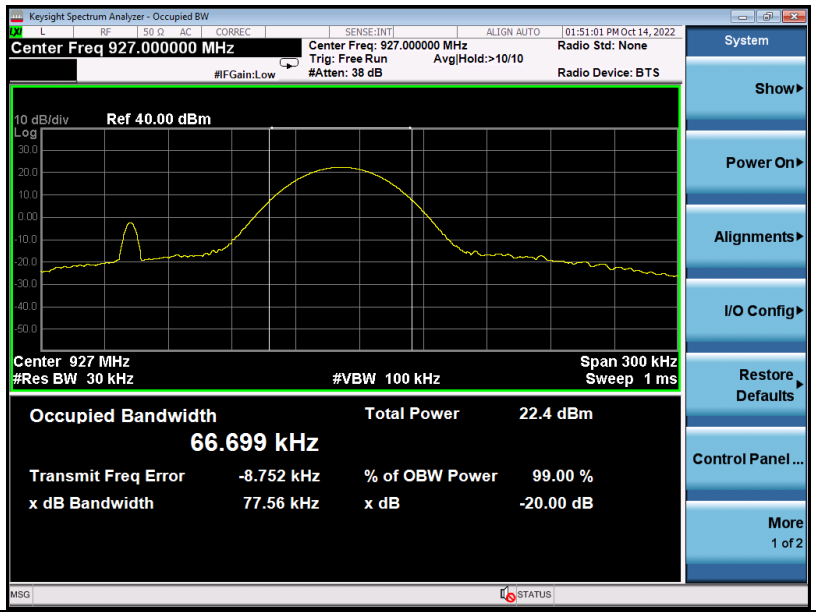
Lowest




Middle


Keysight Spectrum Analyzer - Occupied BW
Center Freq 915.000000 MHz
Center Freq: 915.000000 MHz
Trig: Free Run
Avg|Hold:>10/10
#IFGain:Low
#Atten: 38 dB
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 40.00 dBm
Log
Center Freq
915.000000 MHz
Center 915 MHz
#Res BW 30 kHz
#VBW 100 kHz
Span 300 kHz
Sweep 1 ms
CF Step
30.000 kHz
Auto
Man
Occupied Bandwidth
65.764 kHz
Total Power
22.5 dBm
Transmit Freq Error
-8.386 kHz
% of OBW Power
99.00 %
x dB Bandwidth
77.27 kHz
x dB
-20.00 dB
Freq Offset
0 Hz
MSG
STATUS

Highest


Keysight Spectrum Analyzer - Occupied BW
Center Freq 927.000000 MHz
Center Freq: 927.000000 MHz
Trig: Free Run
Avg|Hold:>10/10
#IFGain:Low
#Atten: 38 dB
Radio Std: None
Radio Device: BTS
System
Show
Power On
Alignments
I/O Config
Restore Defaults
Control Panel ...
More
1 of 2
10 dB/div
Ref 40.00 dBm
Log
Center 927 MHz
#Res BW 30 kHz
#VBW 100 kHz
Span 300 kHz
Sweep 1 ms
Occupied Bandwidth
66.699 kHz
Total Power
22.4 dBm
Transmit Freq Error
-8.752 kHz
% of OBW Power
99.00 %
x dB Bandwidth
77.56 kHz
x dB
-20.00 dB
MSG
STATUS

## 7. ANTENNA REQUIREMENT

| Standard requirement: | FCC Part15 C Section 15.203 /247(c) |
|---|---|

15.203 requirement:

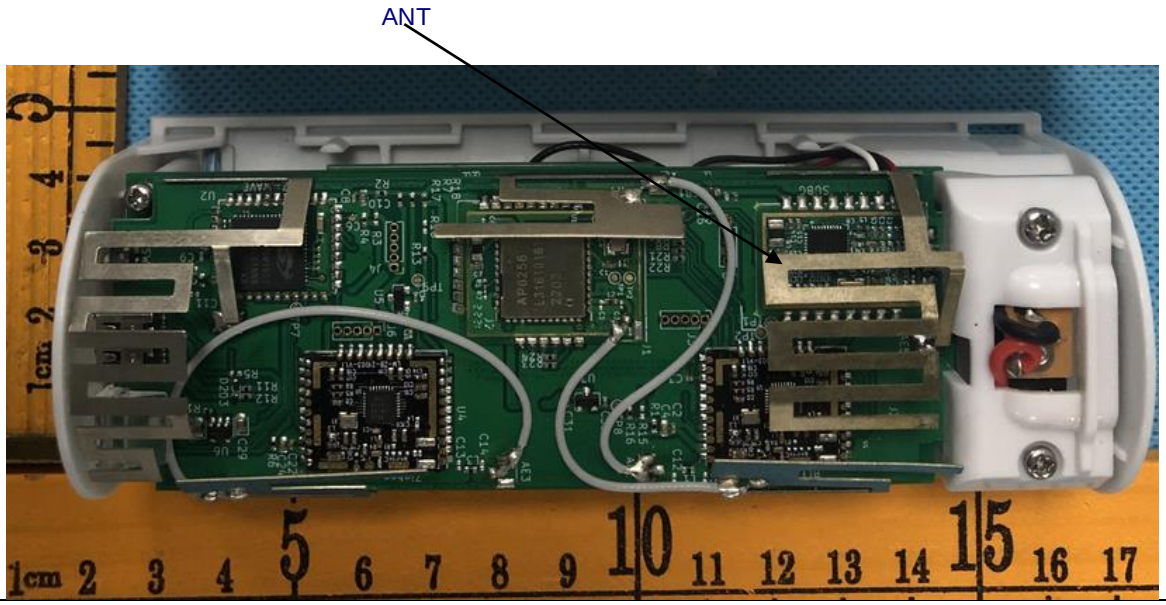
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(c) (1)(i) requirement:

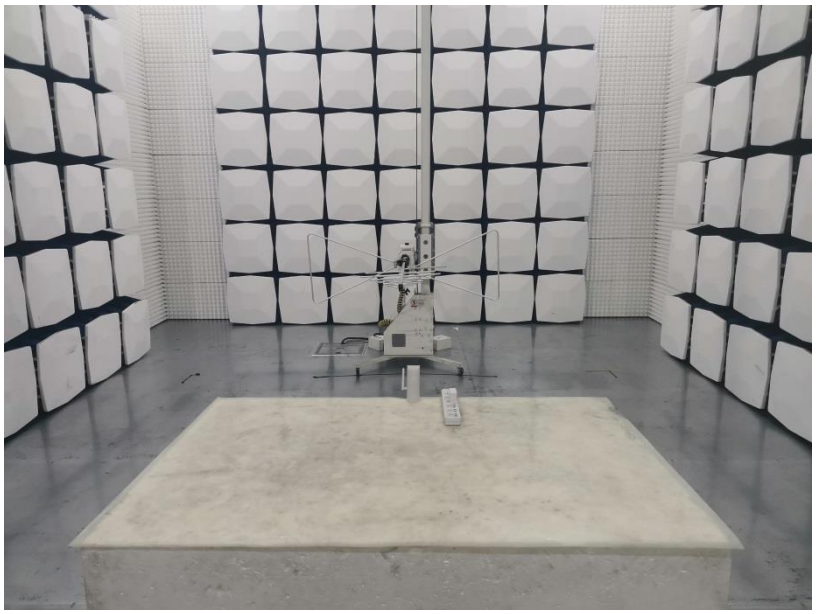
(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

EUT Antenna:

The antenna is Airgain Embedded Antenna, the best case gain of the antennas are 0.6dBi, reference to the below photo for details



## 8. TEST SETUP PHOTO



## 9. EUT CONSTRUCTIONAL DETAILS

Please refer to external photos file and internal photos file

※※※※※ **END OF REPORT** ※※※※※