

**Shenzhen Global Test Service Co., Ltd**

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

FCC PART 15 SUBPART C TEST REPORT**FCC PART 15 C(15.249)****Report Reference No.....: GTS20241115020-2-01****FCC ID.....: 2A43S-SKSJZ51**

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Date of issue: Dec.9, 2024

Representative Laboratory Name.: Shenzhen Global Test Service Co.,Ltd.

Address: No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

Applicant's name.....: Shenzhen Shikeshu Photoelectric Co., Ltd.

Address: Room 1808, Building 11, Tiedong Logistics District No.3 Ping' an Avenue, Pinghu Community, Pinghu Street, Longgang District, Shenzhen, China

Test specificationStandard: **FCC CFR 47 PART 15 C(15.249)****ANSI C63.10-2020**

TRF Originator.....: Shenzhen Global Test Service Co.,Ltd.

Master TRF: Dated 2014-12

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Test item description: Atmosphere lights

Trade Mark: N/A

Manufacturer: Shenzhen Shikeshu Photoelectric Co., Ltd.

Model/Type reference: SKS-JZ-51

Listed Models: N/A

Modulation Type.....: GFSK

Operation Frequency.....: 2402MHz

Hardware Version: N/A

Software Version: N/A

Rating: DC 3.0V

Result: **PASS**

TEST REPORT

| | |
|---|------------------------------|
| Test Report No. : GTS20241115020-2-01 | Dec.9, 2024 Date of issue |
|---|------------------------------|

Equipment under Test : Atmosphere lights

Model /Type : SKS-JZ-51

Listed model : N/A

Applicant : **Shenzhen Shikeshu Photoelectric Co., Ltd.**

Address : Room 1808, Building 11, Tiedong Logistics District No.3 Ping' an Avenue, Pinghu Community, Pinghu Street, Longgang District, Shenzhen, China

Manufacturer : **Shenzhen Shikeshu Photoelectric Co., Ltd.**

Address : Room 1808, Building 11, Tiedong Logistics District No.3 Ping' an Avenue, Pinghu Community, Pinghu Street, Longgang District, Shenzhen, China

| | |
|---------------------|-------------|
| Test Result: | PASS |
|---------------------|-------------|

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 15.249](#): Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz.

[ANSI C63.10-2020](#): American National Standard for Testing Unlicensed Wireless Devices

2. SUMMARY

2.1. General Remarks

| | | |
|--------------------------------|---|--------------|
| Date of receipt of test sample | : | Nov.27, 2024 |
| | : | |
| Testing commenced on | : | Nov.27, 2024 |
| | : | |
| Testing concluded on | : | Dec.07, 2024 |

2.2. Product Description

| | |
|----------------------|--|
| Product Name | Atmosphere lights |
| Trade Mark | N/A |
| Model/Type reference | SKS-JZ-51 |
| List Models | N/A |
| Model Declaration | N/A |
| Power supply: | DC 3.0V |
| Sample ID | GTS20241115020-2-S0001-1#GTS20241115020-2-S0001-2# |
| 2.4G | |
| Frequency Range | 2402MHz |
| Channel Number | 1 Channels |
| Modulation Type | GFSK |
| Antenna Description | PCB antenna, 0dBi(Max.) |

2.3. Equipment Under Test

Power supply system utilised

| | | | |
|----------------------|---|---|-----------------------------------|
| Power supply voltage | : | <input type="radio"/> 230V / 50 Hz | <input type="radio"/> 120V / 60Hz |
| | : | <input type="radio"/> 12 V DC | <input type="radio"/> 24 V DC |
| | : | <input checked="" type="radio"/> Other (specified in blank below) | |

DC 3.0V

2.4. Short description of the Equipment under Test (EUT)

This is a Atmosphere lights.
For more details, refer to the user's manual of the EUT.

2.5. EUT operation mode

| Mode of Operations | Frequency Range (MHz) | Data Rate (Mbps) |
|------------------------|-----------------------|------------------|
| 2.4G | 2402 | 1 |
| For Conducted Emission | | |
| Test Mode | | TX Mode |
| For Radiated Emission | | |
| Test Mode | | TX Mode |

| Channel | Frequency(MHz) |
|---------|----------------|
| 1 | 2402 |

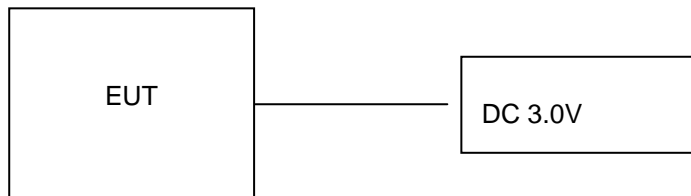
The EUT has been tested under operating condition.

This test was performed with EUT in X, Y, Z position and the worst case was found when EUT in X position.

Worst-case mode and channel used for 150 KHz-30 MHz power line conducted emissions was the mode and channel with the highest output power, which was determined to be 2.4G mode.

Worst-case mode and channel used for 9 KHz-1000 MHz radiated emissions was the mode and channel with the highest output power, that was determined to be 2.4G mode.

2.6. Block Diagram of Test Setup



2.7. EUT Exercise Software

The product continues to transmit signals after power on.

2.8. Special Accessories

| Manufacturer | Description | Model | Serial Number | Certificate |
|--------------|-------------|-------|---------------|-------------|
| -- | -- | -- | -- | -- |

2.9. External I/O Cable

| I/O Port Description | Quantity | Cable |
|----------------------|----------|-------|
| -- | -- | -- |

2.10. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2A43S-SKSJZ51** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.11. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong,China.

3.2. Test Facility

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

CNAS (No. CNAS L8169)

Shenzhen Global Test Service Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2019 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA (Certificate No. 4758.01)

Shenzhen Global Test Service Co., Ltd. has been assessed by the American Association for Laboratory Accreditation (A2LA). Certificate No. 4758.01.

Industry Canada Registration Number. is 24189.

FCC Designation Number is CN1234.

FCC Registered Test Site Number is165725.

3.3. Environmental conditions

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

| | |
|-----------------------|--------------|
| Temperature: | 15-35 ° C |
| | |
| Humidity: | 30-60 % |
| | |
| Atmospheric pressure: | 950-1050mbar |

3.4. Statement of the measurement uncertainty

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

Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

| Test | Range | Measurement Uncertainty | Notes |
|-----------------------|------------|-------------------------|-------|
| Radiated Emission | 30~1000MHz | 4.10 dB | (1) |
| Radiated Emission | 1~18GHz | 4.32 dB | (1) |
| Radiated Emission | 18-40GHz | 5.54 dB | (1) |
| Conducted Disturbance | 0.15~30MHz | 3.12 dB | (1) |

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

3.5. Test Description

| Applied Standard: FCC Part 15 Subpart C | | | | |
|--|--------------------------------|--|-----------|--------|
| FCC Rules | Description of Test | Test Sample | Result | Remark |
| §15.207(a) | Conduction Emissions | N/A | N/A | N/A |
| §15.205(a) §15.209(a) §15.249(a) §15.249(c) | Radiated Emissions Measurement | GTS20241115020-2-S0001-1# GTS20241115020-2-S0001-2# | Compliant | Note 1 |
| §15.249 | Band Edges Measurement | GTS20241115020-2-S0001-1# | Compliant | Note 1 |
| §15.249, §15.215 | 20 dB Bandwidth | GTS20241115020-2-S0001-1# | Compliant | Note 1 |
| §15.203 | Antenna Requirements | / | Compliant | Note 1 |

Remark:

1. The measurement uncertainty is not included in the test result.
2. NA = Not Applicable; NP = Not Performed
3. Note 1 – Test results inside test report;
4. Note 2 – Test results in other test report (MPE Report).
5. We tested all test mode and recorded worst case in report

3.6. Equipments Used during the Test

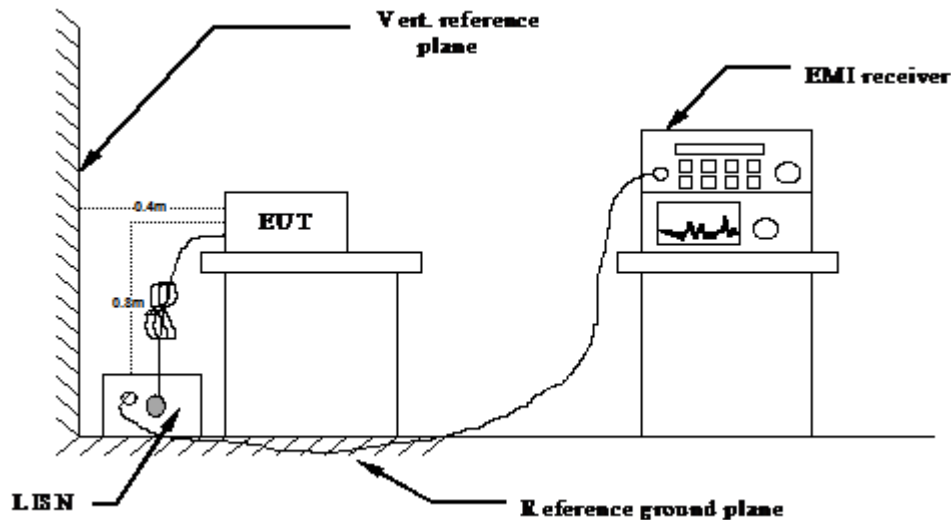
| Test Equipment | Manufacturer | Model No. | Serial No. | Calibration Date | Calibration Due Date |
|-------------------------------|-----------------------------------|--------------------|-----------------|------------------|----------------------|
| LISN | CYBERTEK | EM5040A | E1850400105 | 2024/07/15 | 2025/07/14 |
| LISN | R&S | ESH2-Z5 | 893606/008 | 2024/07/15 | 2025/07/14 |
| EMI Test Receiver | R&S | ESPI3 | 101841-cd | 2024/07/15 | 2025/07/14 |
| EMI Test Receiver | R&S | ESCI7 | 101102 | 2024/07/15 | 2025/07/14 |
| Spectrum Analyzer | Agilent | N9020A | MY48010425 | 2024/07/15 | 2025/07/14 |
| Spectrum Analyzer | R&S | FSV40-N | 101800 | 2024/07/15 | 2025/07/14 |
| Vector Signal generator | Agilent | N5181A | MY49060502 | 2024/07/15 | 2025/07/14 |
| Signal generator | Agilent | N5182A | 3610AO1069 | 2024/07/15 | 2025/07/14 |
| Climate Chamber | ESPEC | EL-10KA | A20120523 | 2024/07/15 | 2025/07/14 |
| Controller | EM Electronics | Controller EM 1000 | N/A | N/A | N/A |
| Horn Antenna | Schwarzbeck | BBHA 9120D | 01622 | 2024/07/15 | 2025/07/14 |
| Active Loop Antenna | Beijing Da Ze Technology Co.,Ltd. | ZN30900C | 15006 | 2024/07/15 | 2025/07/14 |
| Bilog Antenna | Schwarzbeck | VULB9163 | 000976 | 2024/07/15 | 2025/07/14 |
| Broadband Horn Antenna | SCHWARZBECK | BBHA 9170 | 791 | 2024/07/15 | 2025/07/14 |
| Amplifier | Schwarzbeck | BBV 9743 | #202 | 2024/01/27 | 2025/01/26 |
| Amplifier | Taiwan Chengyi | EMC051845B | 980355 | 2024/01/27 | 2025/01/26 |
| Amplifier | Schwarzbeck | BBV9179 | 9719-025 | 2024/01/27 | 2025/01/26 |
| Temperature/Humidity Meter | Gangxing | CTH-608 | 02 | 2024/07/15 | 2025/07/14 |
| High-Pass Filter | HUBER+SUHNER | RG214 | RE01 | 2024/07/15 | 2025/07/14 |
| High-Pass Filter | HUBER+SUHNER | RG214 | RE02 | 2024/07/15 | 2025/07/14 |
| RF Cable(below 1GHz) | HUBER+SUHNER | RG214 | RE01 | 2024/07/15 | 2025/07/14 |
| RF Cable(above 1GHz) | HUBER+SUHNER | RG214 | RE02 | 2024/07/15 | 2025/07/14 |
| Data acquisition card | Agilent | U2531A | TW53323507 | 2024/07/15 | 2025/07/14 |
| Power Sensor | Agilent | U2021XA | MY5365004 | 2024/07/15 | 2025/07/14 |
| Test Control Unit | Tonscend | JS0806-1 | 178060067 | 2024/07/15 | 2025/07/14 |
| Automated filter bank | Tonscend | JS0806-F | 19F8060177 | 2024/07/15 | 2025/07/14 |
| Wireless Communication Tester | Rohde&Schwarz | CMW500 | 125408 | 2024/07/15 | 2025/07/14 |
| EMI Test Software | Tonscend | JS1120-1 | Ver 2.6.8.0518 | / | / |
| EMI Test Software | Tonscend | JS1120-3 | Ver 2.5.77.0418 | / | / |
| EMI Test Software | Tonscend | JS32-CE | Ver 2.5 | / | / |
| EMI Test Software | Tonscend | JS32-RE | Ver 2.5.1.8 | / | / |

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

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2020.
- 2 Support equipment, if needed, was placed as per ANSI C63.10-2020
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2020
- 4 All support equipments received AC power from a second LISN, if any.
- 5 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 6 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 7 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

| Frequency range (MHz) | Limit (dBuV) | |
|-----------------------|--------------|-----------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

DISTURBANCE Calculation

The AC mains conducted disturbance is calculated by adding the 10dB Pulse Limiter and Cable Factor and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$CD \text{ (dBuV)} = RA \text{ (dBuV)} + PL \text{ (dB)} + CL \text{ (dB)}$$

| | |
|----------------------------------|--|
| Where CD = Conducted Disturbance | CL = Cable Attenuation Factor (Cable Loss) |
| RA = Reading Amplitude | PL = 10 dB Pulse Limiter Factor |

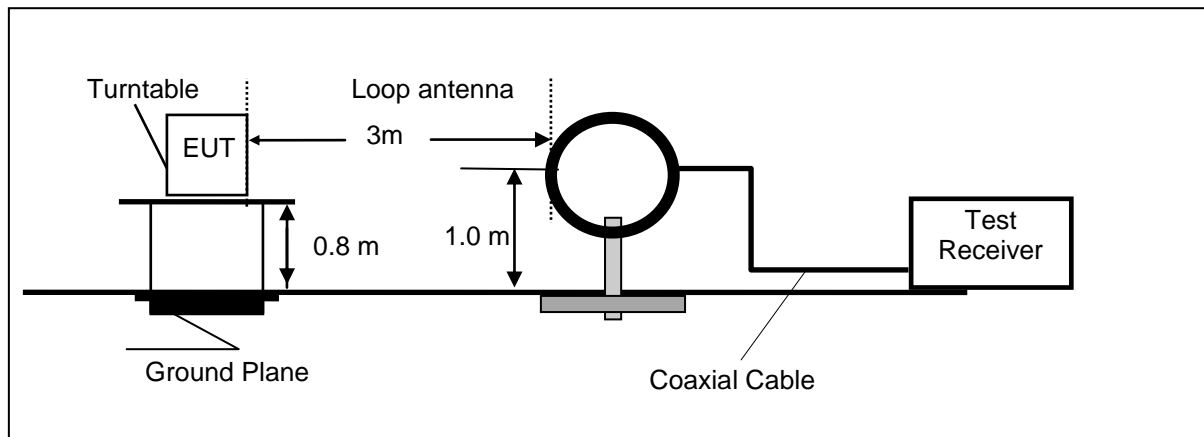
TEST RESULTS

Not applicable (DC 3.0V by battery)

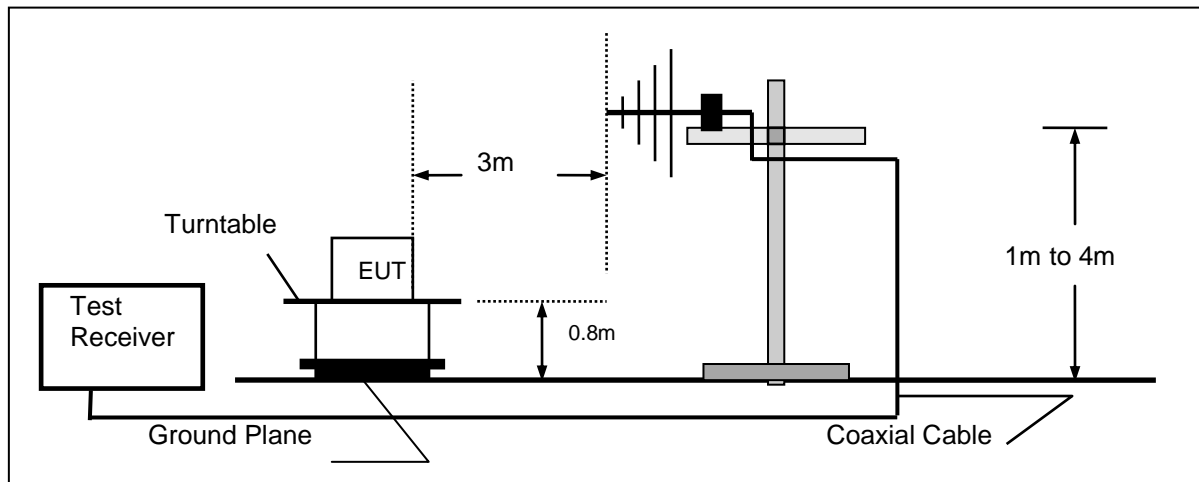
4.2. Radiated Emission

TEST CONFIGURATION

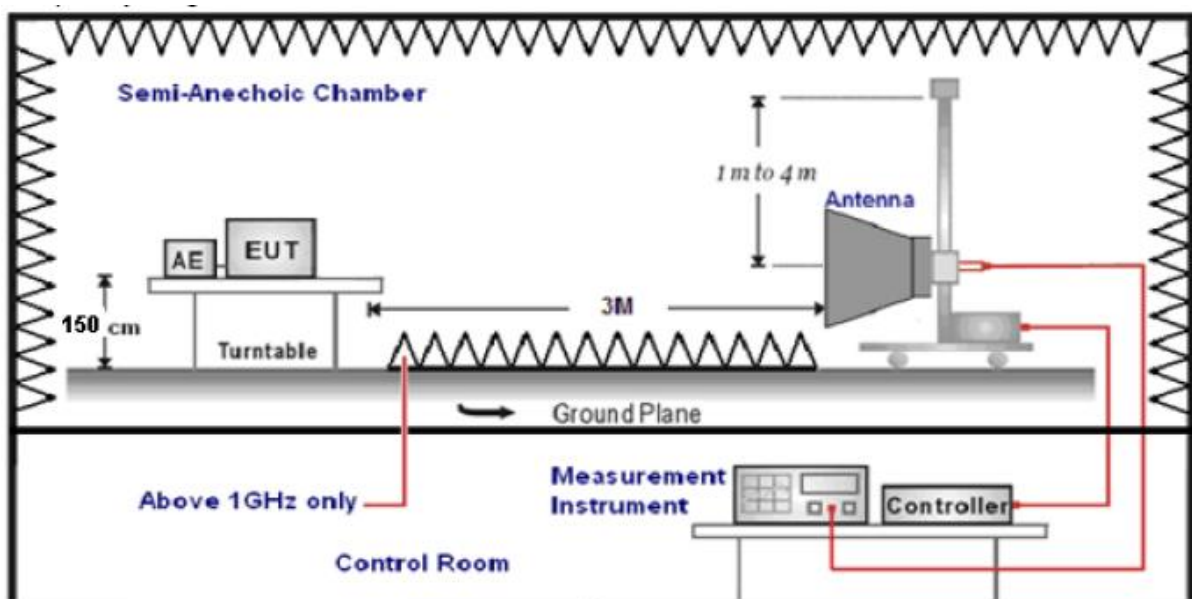
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz;the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range 1GHz – 25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 30MHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

| Test Frequency range | Test Antenna Type | Test Distance |
|----------------------|----------------------------|---------------|
| 9KHz-30MHz | Active Loop Antenna | 3 |
| 30MHz-1GHz | Ultra-Broadband Antenna | 3 |
| 1GHz-18GHz | Double Ridged Horn Antenna | 3 |
| 18GHz-25GHz | Horn Antenna | 1 |

7. Setting test receiver/spectrum as following table states:

| Test Frequency range | Test Receiver/Spectrum Setting | Detector |
|----------------------|---|----------|
| 9KHz-150KHz | RBW=200Hz/VBW=3KHz, Sweep time=Auto | QP |
| 150KHz-30MHz | RBW=9KHz/VBW=100KHz, Sweep time=Auto | QP |
| 30MHz-1GHz | RBW=120KHz/VBW=1000KHz, Sweep time=Auto | QP |
| 1GHz-40GHz | Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto | Peak |

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

| | |
|---------------------------|--|
| Where FS = Field Strength | CL = Cable Attenuation Factor (Cable Loss) |
| RA = Reading Amplitude | AG = Amplifier Gain |
| AF = Antenna Factor | |

$$Transd=AF +CL-AG$$

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

1. The pre-test has been done for the EUT in three axes and found the worst emission at position shown in test setup photos.

| Frequency (MHz) | Distance (Meters) | Radiated (dBμV/m) | Radiated (μV/m) |
|-----------------|-------------------|--|-----------------------|
| 0.009-0.49 | 3 | $20\log(2400/F(\text{KHz}))+40\log(300/3)$ | $2400/F(\text{KHz})$ |
| 0.49-1.705 | 3 | $20\log(24000/F(\text{KHz}))+40\log(30/3)$ | $24000/F(\text{KHz})$ |
| 1.705-30 | 3 | $20\log(30)+40\log(30/3)$ | 30 |
| 30-88 | 3 | 40.0 | 100 |
| 88-216 | 3 | 43.5 | 150 |
| 216-960 | 3 | 46.0 | 200 |
| Above 960 | 3 | 54.0 | 500 |

2. According to §15.249 (a) & RSS-210§B.10(a): Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental frequency | Field strength of fundamental | | Field strength of harmonics | |
|-----------------------|-------------------------------|--------|-----------------------------|--------|
| | millivolts/meter | dBuV/m | microvolts/meter | dBuV/m |
| 902-928 MHz | 50 | 94 | 500 | 54 |
| 2400-2483.5 MHz | 50 | 94 | 500 | 54 |
| 5725-5875 MHz | 50 | 94 | 500 | 54 |
| 24.0-24.25 GHz | 250 | 108 | 2500 | 68 |

As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

The field strength limits shall be measured using an average detector, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using an International Special Committee on Radio Interference (CISPR) quasi-peak detector.

TEST RESULTS

Remark: We measured Radiated Emission at 2.4G WLAN mode from 9KHz to 10GHz in AC120V and the worst case was recorded.

| | | | |
|---------------|-------------|----------------|------|
| Temperature | 24℃ | Humidity | 48% |
| Test Engineer | Evan Ouyang | Configurations | 2.4G |

For 9 KHz~30MHz

| Freq. (MHz) | Level (dBuV) | Over Limit (dB) | Over Limit (dBuV) | Remark |
|-------------|--------------|-----------------|-------------------|----------|
| - | - | - | - | See Note |

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

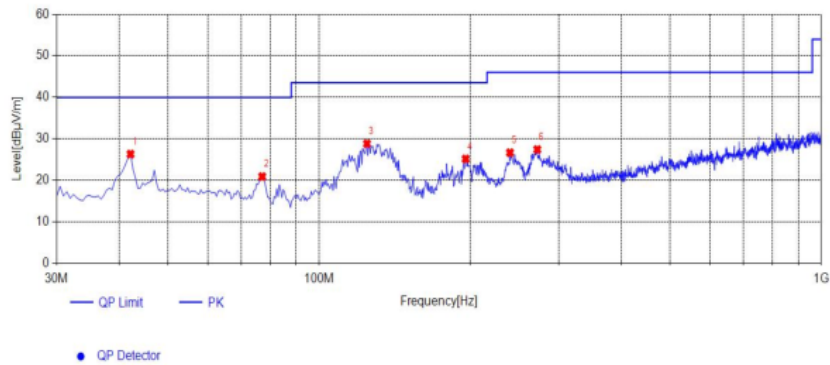
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

For 30MHz-1GHz

Horizontal

Test Graph



Suspected List

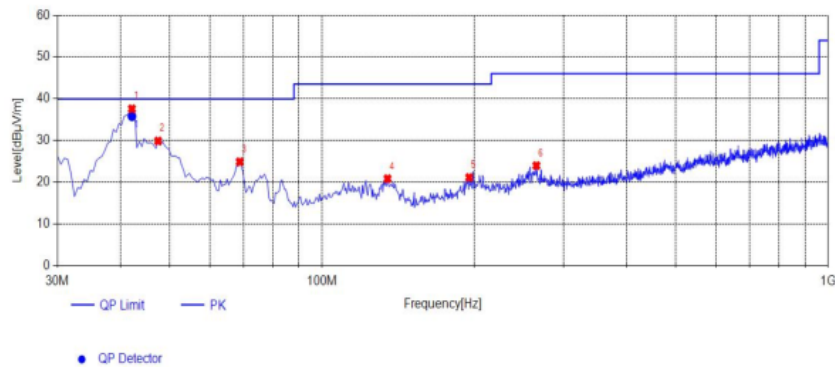
| NO. | Frequency [MHz] | Reading [dBμV/m] | Factor [dB] | Result [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Detector | Polarity | Remark |
|-----|-----------------|------------------|-------------|-----------------|----------------|-------------|-------------|-----------|----------|------------|--------|
| 1 | 42.125 | 37.91 | -11.60 | 26.31 | 40.00 | 13.69 | 100 | 282 | PK | Horizontal | PASS |
| 2 | 77.045 | 35.16 | -14.27 | 20.89 | 40.00 | 19.11 | 100 | 112 | PK | Horizontal | PASS |
| 3 | 124.575 | 42.03 | -13.21 | 28.82 | 43.50 | 14.68 | 100 | 270 | PK | Horizontal | PASS |
| 4 | 195.87 | 35.72 | -10.57 | 25.15 | 43.50 | 18.35 | 100 | 279 | PK | Horizontal | PASS |
| 5 | 240.005 | 35.72 | -9.07 | 26.65 | 46.00 | 19.35 | 100 | 263 | PK | Horizontal | PASS |
| 6 | 272.015 | 35.27 | -7.86 | 27.41 | 46.00 | 18.59 | 100 | 319 | PK | Horizontal | PASS |

Note:1. Result (dBμV/m) = Reading(dBμV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List

| NO. | Frequency [MHz] | Reading [dBμV/m] | Factor [dB] | Result [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Detector | Polarity | Remark |
|-----|-----------------|------------------|-------------|-----------------|----------------|-------------|-------------|-----------|----------|----------|--------|
| 1 | 42.125 | 49.19 | -11.60 | 37.59 | 40.00 | 2.41 | 100 | 272 | PK | Vertical | PASS |
| 2 | 47.46 | 41.04 | -11.15 | 29.89 | 40.00 | 10.11 | 100 | 327 | PK | Vertical | PASS |
| 3 | 68.8 | 38.65 | -13.76 | 24.89 | 40.00 | 15.11 | 100 | 122 | PK | Vertical | PASS |
| 4 | 134.76 | 34.88 | -14.04 | 20.84 | 43.50 | 22.66 | 100 | 198 | PK | Vertical | PASS |
| 5 | 195.385 | 31.73 | -10.61 | 21.12 | 43.50 | 22.38 | 100 | 242 | PK | Vertical | PASS |
| 6 | 265.225 | 32.03 | -8.06 | 23.97 | 46.00 | 22.03 | 100 | 185 | PK | Vertical | PASS |

Note:1. Result (dBμV/m) = Reading(dBμV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Field strength of fundamental:

| Frequency (MHz) | Pol. | Measure Result(PK, dBuV/m) | Measure Result(AV, dBuV/m) | Limit PK (dBuV/m) | Limit AV (dBuV/m) | Margin PK dB | Margin AV dB | Result |
|-----------------|------|----------------------------|----------------------------|-------------------|-------------------|--------------|--------------|--------|
| 2402 | H | 94.62 | 91.34 | 114.00 | 94.00 | 19.38 | 2.66 | Pass |
| 2402 | V | 94.48 | 91.15 | 114.00 | 94.00 | 19.52 | 2.85 | Pass |

For 1GHz to 25GHz

Channel 1 / 2458 MHz

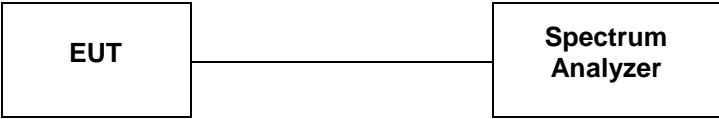
| Freq. MHz | Reading dBuV | Ant. Fac. dB/m | Pre. Fac. dB | Cab. Loss dB | Measured dBuV/m | Limit dBuV/m | Margin dB | Remark | Pol. |
|-----------|--------------|----------------|--------------|--------------|-----------------|--------------|-----------|---------|------------|
| 4804.00 | 51.18 | 32.44 | 30.25 | 7.95 | 61.32 | 74.00 | -12.68 | Peak | Horizontal |
| 4804.00 | 35.58 | 32.44 | 30.25 | 7.95 | 45.72 | 54.00 | -8.28 | Average | Horizontal |
| 4804.00 | 49.42 | 31.60 | 36.50 | 7.00 | 51.52 | 74.00 | -22.48 | Peak | Vertical |
| 4804.00 | 35.42 | 31.60 | 36.50 | 7.00 | 37.52 | 54.00 | -16.48 | Average | Vertical |

Notes:

- 1). Measuring frequencies from 9 KHz~10th harmonic or 26.5GHz (which is less), No emission found between lowest internal used/generated frequency to 30MHz.
- 2). Radiated emissions measured in frequency range from 9 KHz~10th harmonic or 26.5GHz (which is less) were made with an instrument using Peak detector mode.
- 3). Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4). Measured= Reading- Pre. Fac.+ Ant. Fac.+ Cab. Loss
- 5). Margin = Measured- Limit

4.3. 20dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

Use the following spectrum analyzer settings:
Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel
RBW = 1% to 5% of the 20 dB bandwidth
VBW =3 RBW
Sweep = auto
Detector function = peak
Trace = max hold
The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

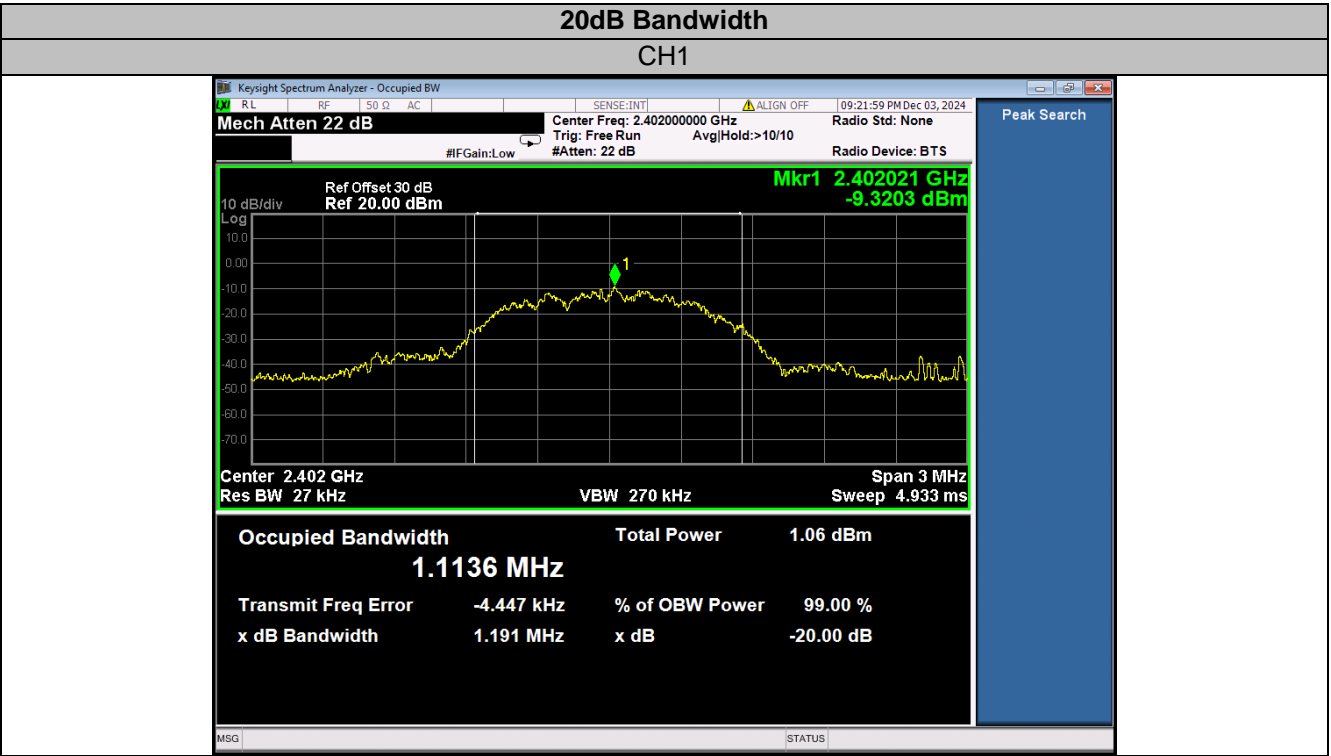
LIMIT

Non-Specified

TEST RESULTS

| | | | |
|---------------|-------------|----------------|-------|
| Temperature | 24.2℃ | Humidity | 54.9% |
| Test Engineer | Evan Ouyang | Configurations | 2.4G |

| Modulation | Channel | 20dB Bandwidth (MHz) | Result |
|------------|---------|----------------------|--------|
| GFSK | 1 | 1.1136 | Pass |

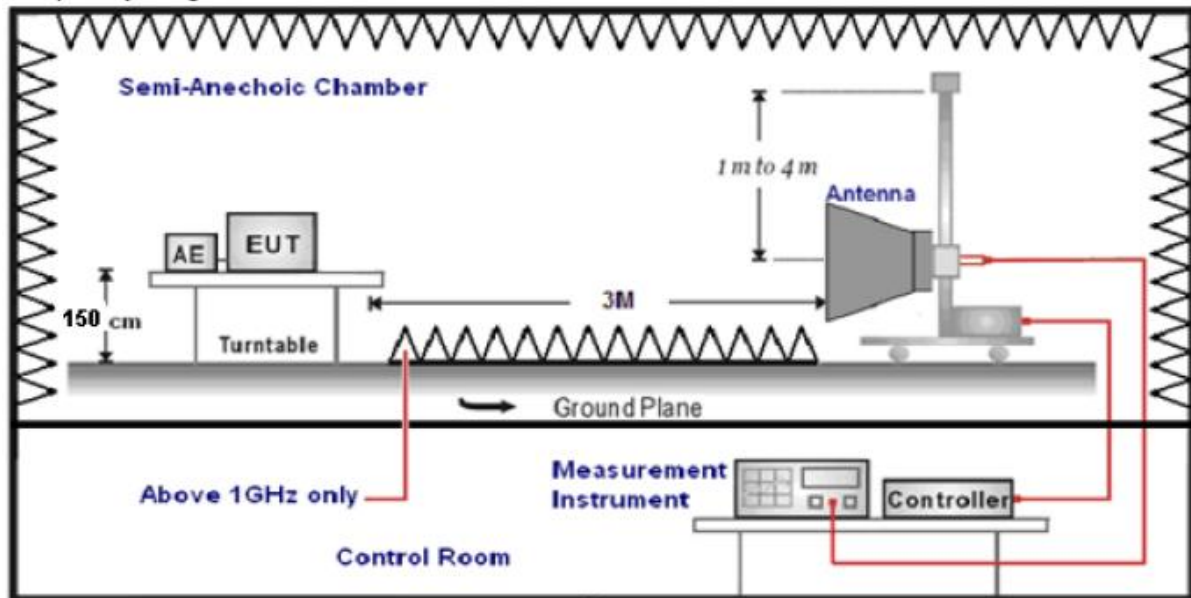


4.4. Band Edge Compliance of RF Emission

TEST REQUIREMENT

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 Section 15.209, whichever is the lesser attenuation.

TEST CONFIGURATION



TEST PROCEDURE

The EUT is placed on a turntable, which is 0.8m above the ground plane. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

Peak: RBW=120MHz, RBW=300MHz / Sweep=AUTO

Repeat the procedures until the peak versus polarization are measured.

LIMIT

Below -20dB of the highest emission level in operating band.

Radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)

TEST RESULTS**4.4.1 For Radiated Bandedge Measurement**

| | | | |
|---------------|-------------|----------------|-------|
| Temperature | 23.8°C | Humidity | 53.7% |
| Test Engineer | Evan Ouyang | Configurations | 2.4G |

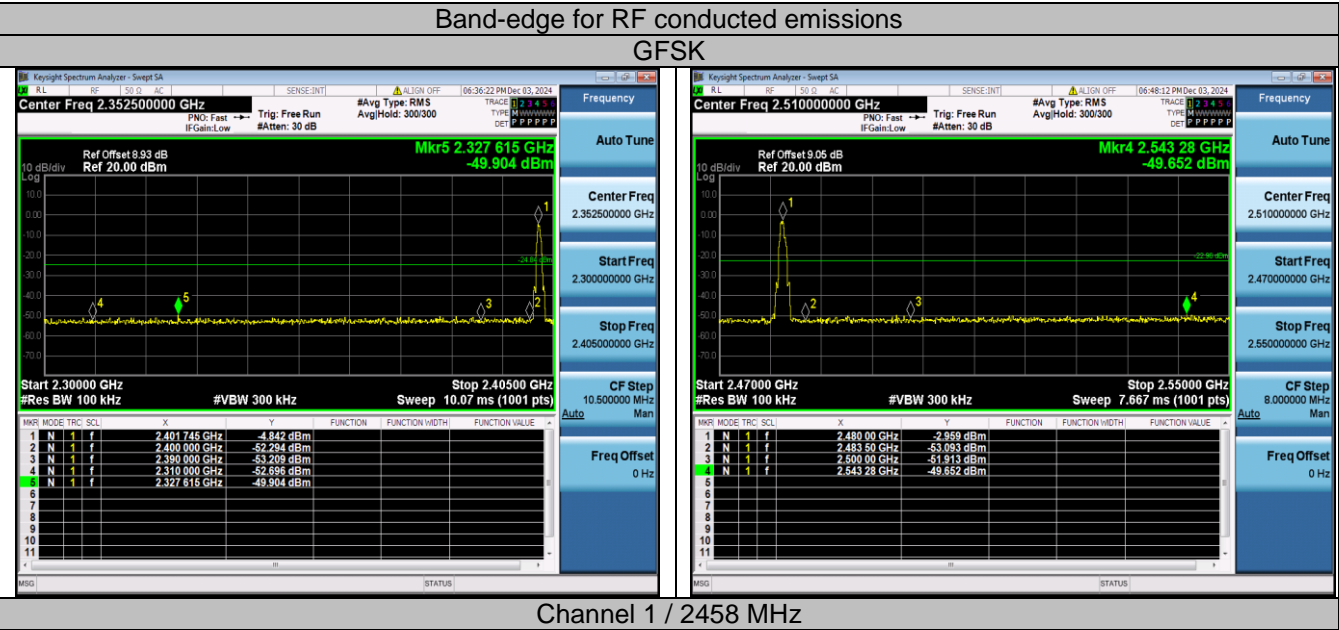
| Frequency(MHz): | | | 2402 | | | Polarity: | | | HORIZONTAL | | |
|-----------------|-------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
| 2390.00 | 45.73 | PK | 74.00 | -28.27 | 1.50 | 106 | 51.04 | 27.49 | 3.32 | 36.12 | -5.31 |
| 2390.00 | 34.86 | AV | 54.00 | -19.14 | 1.50 | 106 | 40.17 | 27.49 | 3.32 | 36.12 | -5.31 |
| Frequency(MHz): | | | 2402 | | | Polarity: | | | VERTICAL | | |
| Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
| 2390.00 | 48.97 | PK | 74.00 | -25.03 | 1.50 | 298 | 54.28 | 27.49 | 3.32 | 36.12 | -5.31 |
| 2390.00 | 30.30 | AV | 54.00 | -23.70 | 1.50 | 298 | 35.61 | 27.49 | 3.32 | 36.12 | -5.31 |
| Frequency(MHz): | | | 2402 | | | Polarity: | | | HORIZONTAL | | |
| Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
| 2483.50 | 46.29 | PK | 74.00 | -27.71 | 1.50 | 171 | 52.01 | 27.45 | 3.38 | 36.55 | -5.72 |
| 2483.50 | 35.13 | AV | 54.00 | -18.87 | 1.50 | 171 | 40.85 | 27.45 | 3.38 | 36.55 | -5.72 |
| Frequency(MHz): | | | 2402 | | | Polarity: | | | VERTICAL | | |
| Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
| 2483.50 | 49.67 | PK | 74.00 | -24.33 | 1.50 | 117 | 55.39 | 27.45 | 3.38 | 36.55 | -5.72 |
| 2483.50 | 29.37 | AV | 54.00 | -24.63 | 1.50 | 117 | 35.09 | 27.45 | 3.38 | 36.55 | -5.72 |

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

4.4.2 For Conducted Bandedge Measurement

| | | | |
|---------------|-------------|----------------|-------|
| Temperature | 22.9℃ | Humidity | 53.2% |
| Test Engineer | Evan Ouyang | Configurations | 2.4G |



4.5. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, 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.

And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Test Result

The antenna used for this product is PCB Antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 0 dBi.

Reference to the **Internal photos**.

5. TEST SETUP PHOTOS OF THE EUT

Photo of Radiated Emissions Measurement



Fig. 1



Fig. 2

6. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

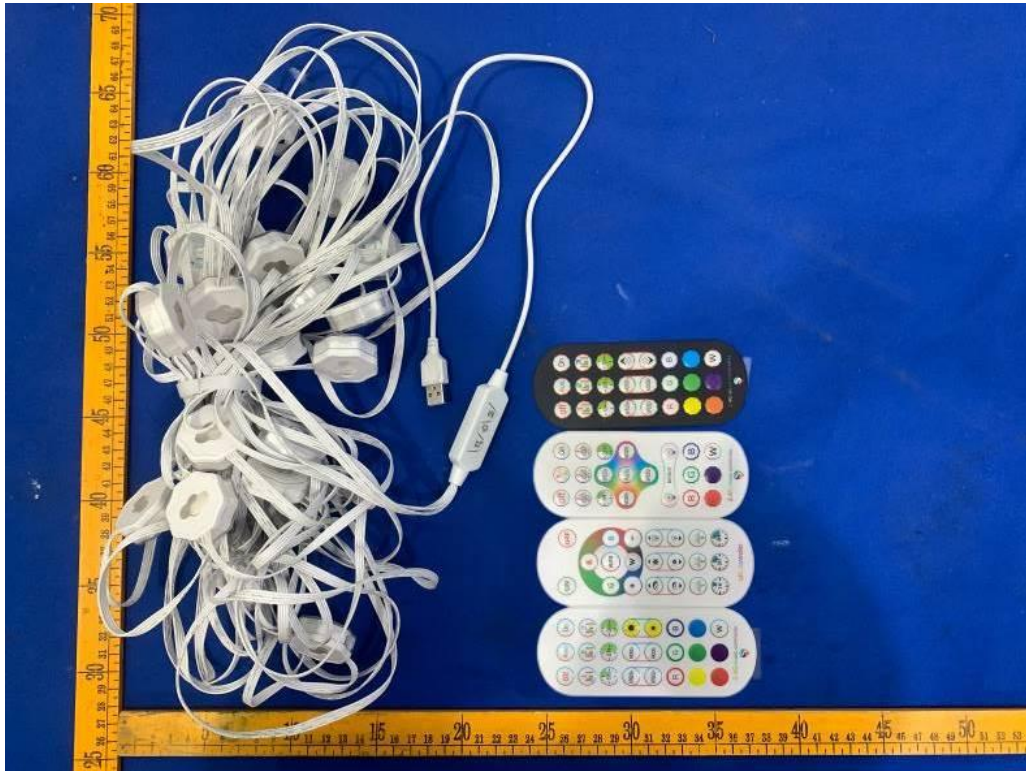


Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5

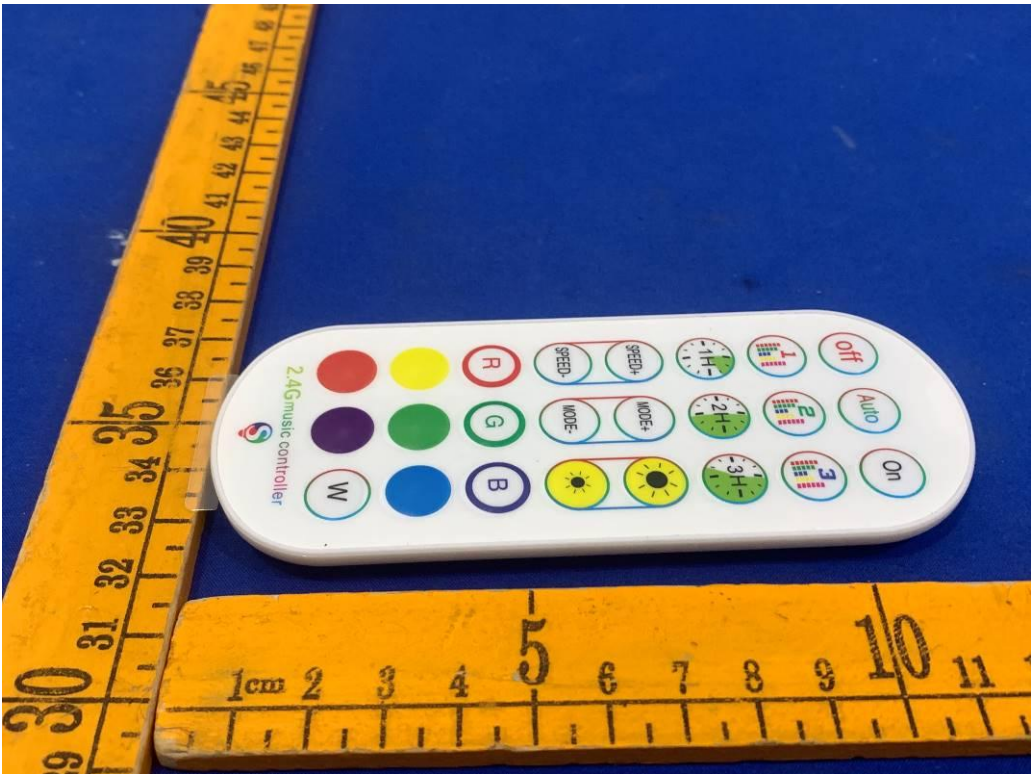


Fig. 6



Fig. 7

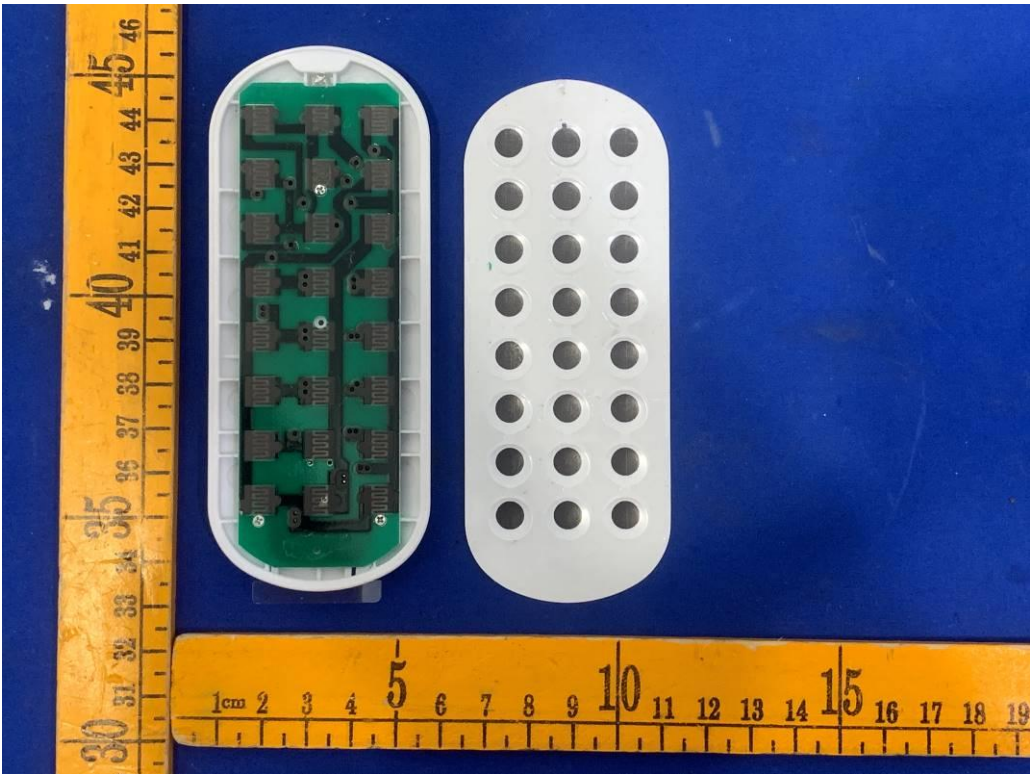


Fig. 8



Fig. 9



Fig. 10

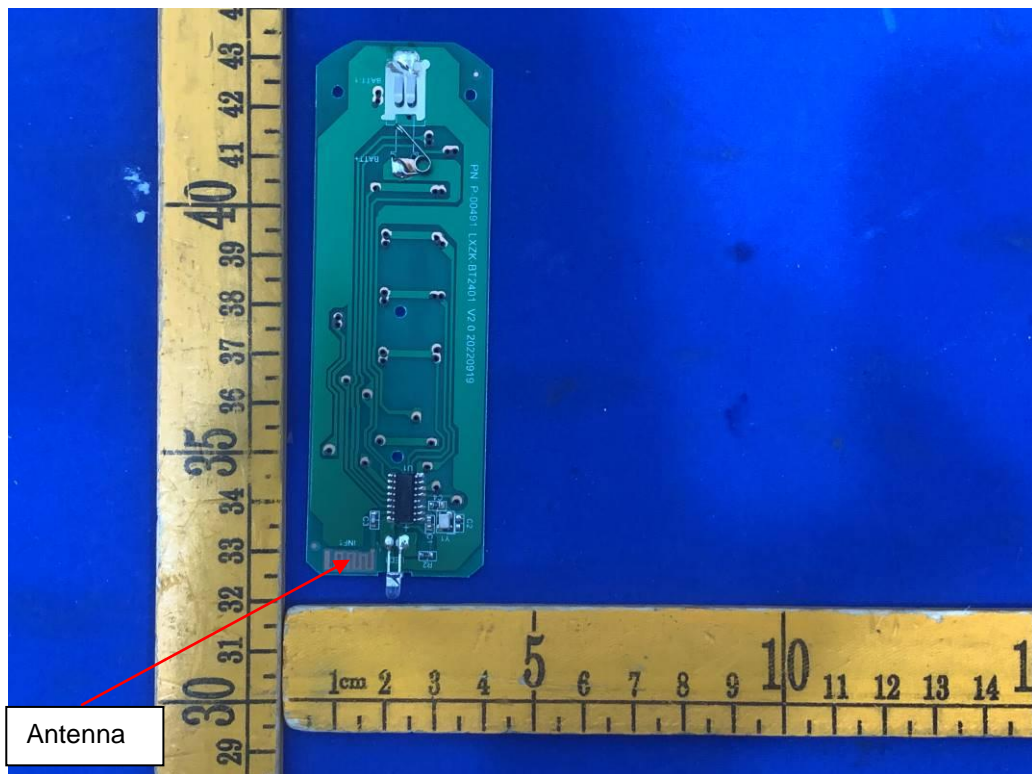


Fig. 11

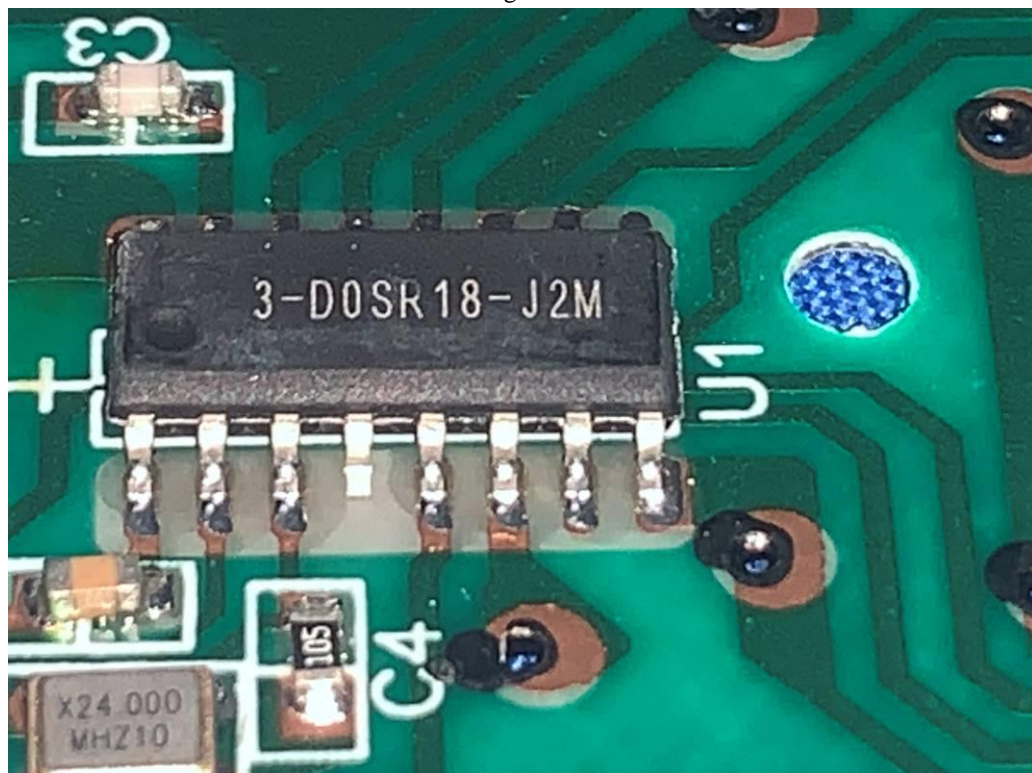


Fig. 12

.....End of Report.....