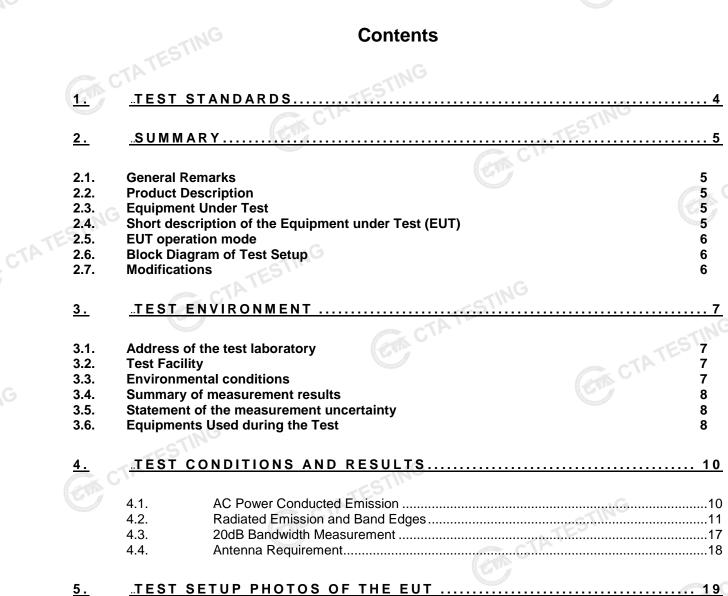
# Shenzhen CTA Testing Technology Co., Ltd.



Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

| FCC ID   | : CTA24042300401<br>: 2BF6S-ND-FT15J  |               |
|--|---|---------------|
| Compiled by  | nature File administrators Jinghua Xiao   | C             |
| Supervised by<br>position+printed name+sig   | nature Project Engineer Zoey Cao  | Sector Sector |
| Approved by<br>( position+printed name+sig   | nature RF Manager Eric Wang   |               |
| Date of issue  |   |               |
| Testing Laboratory Name  | Shenzhen CTA Testing Technology Co., Ltd.   | TING          |
| Address  | Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community<br>Fuhai Street, Bao'an District, Shenzhen, China   | /,            |
|  | 1 Stra  |               |
| Applicant's name   | Zhongshan Nengdi Technology Co., Ltd. 🛛 🖤   |               |
|  | 6/F Building 2 Jucheng Industrial Park 66 Taile Road West Distr   | ct,           |
| Address<br>Standard<br>Shenzhen CTA Testing Te<br>This publication may be rep  | 6/F, Building 2, Jucheng Industrial Park, 66 Taile Road, West Distr<br>Xiaolan, Zhongshan City, Guangdong Province, China<br>   | ict,          |
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| Equipment under Test :   Equipment under Test :   Addel /Type :   Model /Type :   ND-FT15J   Listed Models :   Matrix :   Applicant :   Christian 2 <th></th> <th></th> <th></th>  |  |                                  |                          |
|--|--|----------------------------------|--------------------------|
| Equipment under Test       : 24G-smart fan light controller         Model /Type       : ND-FT15J         Listed Models       : N/A         Applicant       : Zhongshan Nengdi Technology Co., Ltd.         Address       : 6/F, Building 2, Jucheng Industrial Park, 66 Taile Road, West Dis Xiaolan, Zhongshan City, Guangdong Province, China         Manufacturer       : Zhongshan Nengdi Technology Co., Ltd.         Address       : 6/F, Building 2, Jucheng Industrial Park, 66 Taile Road, West Dis Xiaolan, Zhongshan City, Guangdong Province, China         Maddress       : 6/F, Building 2, Jucheng Industrial Park, 66 Taile Road, West Dis Xiaolan, Zhongshan City, Guangdong Province, 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 or laboratory. | port No.: CTA24042300401                   |                                  | Page 2 of 2              |
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| Applicant       :       Zhongshan Nengdi Technology Co., Ltd.         Address       :       :       :         Manufacturer       :       :       :         Address       :       :       :         Manufacturer       :       :       :         Address       :       :       :         Address       :       :       :         Address       :       :       :         Address       :       :       :         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 laboratory.   |  | N1/A                             |                          |
| Address       : 6/F, Building 2, Jucheng Industrial Park, 66 Taile Road, West Dis Xiaolan, Zhongshan City, Guangdong Province, China         Manufacturer       : Zhongshan Nengdi Technology Co., Ltd.         Address       :: 6/F, Building 2, Jucheng Industrial Park, 66 Taile Road, West Dis Xiaolan, Zhongshan City, Guangdong Province, China         Address       :: 6/F, Building 2, Jucheng Industrial Park, 66 Taile Road, West Dis Xiaolan, Zhongshan City, Guangdong Province, 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 o laboratory.  | Listed Models                              | : N/A                            |                          |
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| Xiaolan, Zhongshan City, Guangdong Province, China         Manufacturer       :         Address       :         Address       :         Manufacturer       :         Address       :         6/F, Building 2, Jucheng Industrial Park, 66 Taile Road, West Dis Xiaolan, Zhongshan City, Guangdong Province, 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 or laboratory.   |  | ESTINC                           |                          |
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| Test Result: PASS<br>The test report merely corresponds to the test sample.<br>It is not permitted to copy extracts of these test result without the written permission of<br>laboratory.  |  | • •                              |                          |
| Test Result: PASS<br>The test report merely corresponds to the test sample.<br>It is not permitted to copy extracts of these test result without the written permission of<br>laboratory.  | TESTING                                    |                                  |                          |
| The test report merely corresponds to the test sample.<br>It is not permitted to copy extracts of these test result without the written permission or<br>laboratory.   | K CTA I                                    | STING                            |                          |
| It is not permitted to copy extracts of these test result without the written permission of laboratory.  | Test Re                                    | sult: CTATES                     |                          |
| It is not permitted to copy extracts of these test result without the written permission of laboratory.  |  | C.                               | CIATES CITATES           |
| CTATESTING<br>CTATESTING<br>TATESTING  | It is not permitted to contract aboratory. |                                  |                          |
|  | CTATESTING                                 | GA CTATESTING                    | TATESTING                |
|  |  |                                  | CIT.                     |



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Report No.: CTA24042300401

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CTATES 6. ING <u>- ri</u>

# 1. <u>TEST STANDARDS</u>

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 C63.10:2013 : American National Standard for Testing Unlicensed Wireless Devices

Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz Range of 9 kHz to 40GHz Americ Americ Range of 9 kHz to 40GHz CTA TESTING

# 2. SUMMARY

# 2.1. General Remarks

| Date of receipt of test sample | :                | Apr. 16, 2024 |         |       |
|--------------------------------|------------------|---------------|---------|-------|
|                                | and the second   | GV            |         |       |
| Testing commenced on           |                  | Apr. 16, 2024 |         | TE    |
|                                | COLUMN THE OWNER |               | (0) 11d | CTP ' |
| Testing concluded on           | :                | Apr. 24, 2024 |         |       |
|                                |                  |               |         |       |

|   | 2.2. Product Description |  |                   |
|---|--------------------------|--|-------------------|
|   | ED                       | G  |                   |
| 6 | Name of EUT              | 2.4G-smart fan light controller                                      |                   |
|   | Model Number             | ND-FT15J   |                   |
|   | Power Rating             | DC 3.0V From battery   |                   |
|   | Sample ID:               | CTA240423004-1# (Engineer sample)<br>CTA240423004-2# (Normal sample) | TEST              |
|   | Operation frequency      | 2402MHz  | CTA I             |
|   | Modulation               | GFSK   |                   |
|   | Antenna Type             | PCB antenna  | ALT TO MAN TO ALT |
|   | Antenna Gain             | 0.25 dBi   |                   |

# 2.3. Equipment Under Test

# Power supply system utilised

| Power supply system uti | lised        | TATEST                                    |               |         |
|-------------------------|--------------|---|---------------|---------|
| Power supply voltage    |              | O 230V / 50 Hz                            | O 120V / 60Hz |         |
|                         | and a second | 0 12 V DC                                 | O 24 V DC     |         |
|                         |              | <ul> <li>Other (specified in b</li> </ul> | lank below)   |         |
| NG                      |              | DC 3.0V From batter                       | Y             | GTA CTA |

# 2.4. Short description of the Equipment under Test (EUT) This is a 2.4G-smart for light and a

GA CTATESTING For more details, refer to the user's manual of the EUT.

# 2.5. EUT operation mode

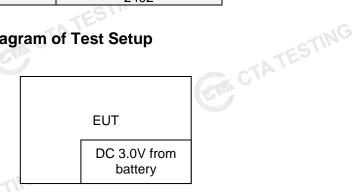
The Applicant use Key to control the EUT for staying in continuous transmitting and receiving mode for testing .There is 1 channels provided to the EUT.

| <b>Operation Frequency:</b> | CTA '              |
|-----------------------------|--------------------|
| Channel                     | Frequency<br>(MHz) |
| 01                          | 2402               |

Test frequency:

| Channel | Frequency<br>(MHz) |
|---------|--------------------|
| 01      | 2402               |
|         | TESI               |

# 2.6. Block Diagram of Test Setup



# 2.7. Modifications

No modifications were implemented to meet testing criteria.

# 3. TEST ENVIRONMENT

# 3.1. Address of the test laboratory

# Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

# 3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations: FCC-Registration No.: 517856 Designation Number: CN1318

Shenzhen CTA Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

#### Industry Canada Registration Number. Is: 27890 CAB identifier: CN0127 The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio TATEST equipment testing.

#### A2LA-Lab Cert. No.: 6534.01

Shenzhen CTA Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

# 3.3. Environmental conditions

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

Radiated Emission:

| Tamanaratura          | 23 ° C       |
|-----------------------|--------------|
| Temperature:          | 23 0         |
|                       |              |
| Humidity:             | 48 %         |
| NG                    |              |
| Atmospheric pressure: | 950-1050mbar |
|                       |              |

# CTATES AC Main Conducted testing:

| C Main Conducted testing: |              |
|---------------------------|--------------|
| Temperature:              | 24 ° C       |
| C                         |              |
| Humidity:                 | 45 %         |
|                           | C/           |
| Atmospheric pressure:     | 950-1050mbar |

Conducted testina:

| o o na a o to o a no |                |
|---|----------------|
| Temperature:  | 24 ° C         |
|   |                |
| Humidity:   | 45 %           |
| STIN  |                |
| Atmospheric pressure:   | 950-1050mbar   |
| C.  | GIA CTATESTING |

# 3.4. Summary of measurement results

| FCC Part 15.249(a) | Field Strength of Fundamental | PASS |
|--------------------|-------------------------------|------|
| FCC Part 15.209    | Spurious Emission             | PASS |
| FCC Part 15.209    | Band edge                     | PASS |
| FCC Part 15.215(c) | 20dB bandwidth                | PASS |
| FCC Part 15.207    | Conducted Emission            | N/A  |
| FCC Part 15.203    | Antenna Requirement           | PASS |

# 3.5. 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 TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen CTA Testing Technology 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 CTA Testing Technology Co., Ltd. :

| Test                                       | Range       | Measurement<br>Uncertainty | Notes |
|--|-------------|----------------------------|-------|
| Radiated Emission                          | 9KHz~30MHz  | 3.02 dB                    | (1)   |
| Radiated Emission                          | 30~1000MHz  | 4.06 dB                    | (1)   |
| Radiated Emission                          | 1~18GHz     | 5.14 dB                    | (1)   |
| Radiated Emission                          | 18-40GHz    | 5.38 dB                    | (1)   |
| Conducted Disturbance                      | 0.15~30MHz  | 2.14 dB                    | (1)   |
| Output Peak power                          | 30MHz~18GHz | 0.55 dB                    | (1)   |
| Power spectral density                     | 1           | 0.57 dB                    | (1)   |
| Spectrum bandwidth                         | /           | 1.1%                       | (1)   |
| Radiated spurious emission<br>(30MHz-1GHz) | 30~1000MHz  | 4.10 dB                    | (1)   |
| Radiated spurious emission (1GHz-18GHz)    | 1~18GHz     | 4.32 dB                    | (1)   |
| Radiated spurious emission (18GHz-40GHz)   | 18-40GHz    | 5.54 dB                    | (1)   |

CTATESTING (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

# 3.6. Equipments Used during the Test

| Test Equipment    | Manufacturer | Model No. | Equipment<br>No. | Calibration<br>Date | Calibration<br>Due Date |
|-------------------|--------------|-----------|------------------|---------------------|-------------------------|
| LISN              | R&S ENV216   |           | CTA-308          | 2023/08/02          | 2024/08/01              |
| LISN              | R&S          | ENV216    | CTA-314          | 2023/08/02          | 2024/08/01              |
| EMI Test Receiver | R&S          | ESPI      | CTA-307          | 2023/08/02          | 2024/08/01              |
| EMI Test Receiver | R&S          | ESCI      | CTA-306          | 2023/08/02          | 2024/08/01              |
| Spectrum Analyzer | Agilent      | N9020A    | CTA-301          | 2023/08/02          | 2024/08/01              |
| STING             |              |           | ·                |                     | and the second second   |
|                   |              |           |                  |                     |                         |

**RF** Test Software

N/A

|    |   |                           |             |  |                     | ATESI                   |
|----|---|---------------------------|-------------|--|---------------------|-------------------------|
|    | Report No.: CTA2404                       | 12300401                  |             |  | Page                | e 9 of 24               |
|    | Spectrum Analyzer                         | R&S                       | FSP         | CTA-337  | 2023/08/02          | 2024/08/01              |
|    | Vector Signal generator                   | Agilent                   | N5182A      | CTA-305  | 2023/08/02          | 2024/08/01              |
|    | Analog Signal<br>Generator                | R&S                       | SML03       | CTA-304  | 2023/08/02          | 2024/08/01              |
|    | WIDEBAND RADIO<br>COMMUNICATION<br>TESTER | CMW500                    | R&S         | CTA-302  | 2023/08/02          | 2024/08/01              |
|    | Temperature and<br>humidity meter         | Chigo                     | ZG-7020     | CTA-326  | 2023/08/02          | 2024/08/01              |
|    | Ultra-Broadband<br>Antenna                | Schwarzbeck               | VULB9163    | CTA-310  | 2023/10/17          | 2024/10/16              |
| TE | Horn Antenna                              | Schwarzbeck               | BBHA 9120D  | CTA-309  | 2023/10/13          | 2024/10/12              |
|    | Loop Antenna                              | Zhinan                    | ZN30900C    | CTA-311  | 2023/10/17          | 2024/10/16              |
|    | Horn Antenna                              | Beijing Hangwei<br>Dayang | OBH100400   | CTA-336  | 2021/08/07          | 2024/08/06              |
|    | Amplifier                                 | Schwarzbeck               | BBV 9745    | CTA-312  | 2023/08/02          | 2024/08/01              |
|    | Amplifier                                 | Taiwan chengyi            | EMC051845B  | CTA-313  | 2023/08/02          | 2024/08/01              |
|    | Directional coupler                       | NARDA                     | 4226-10     | CTA-303  | 2023/08/02          | 2024/08/01              |
|    | High-Pass Filter                          | XingBo                    | XBLBQ-GTA18 | CTA-402  | 2023/08/02          | 2024/08/01              |
|    | High-Pass Filter                          | XingBo                    | XBLBQ-GTA27 | CTA-403  | 2023/08/02          | 2024/08/01              |
|    | Automated filter<br>bank                  | Tonscend                  | JS0806-F    | CTA-404  | 2023/08/02          | 2024/08/01              |
|    | Power Sensor                              | Agilent                   | U2021XA     | CTA-405  | 2023/08/02          | 2024/08/01              |
|    | Amplifier                                 | Schwarzbeck               | BBV9719     | CTA-406  | 2023/08/02          | 2024/08/01              |
| 1  |   |                           |             | Contraction of the second seco |                     |                         |
|    | Test Equipment                            | Manufacturer              | Model No.   | Version<br>number  | Calibration<br>Date | Calibration<br>Due Date |
| TE | EMI Test Software                         | Tonscend                  | TS®JS32-RE  | 5.0.0.2  | N/A                 | N/A                     |
|    | EMI Test Software                         | Tonscend                  | TS®JS32-CE  | 5.0.0.1  | N/A                 | N/A                     |
|    | RF Test Software                          | Tonscend                  | TS®JS1120-3 | 3.1.65   | N/A                 | N/A                     |
|    |   |                           | - D         |  | +                   | 10                      |

TS®JS1120

Tonscend

3.1.46

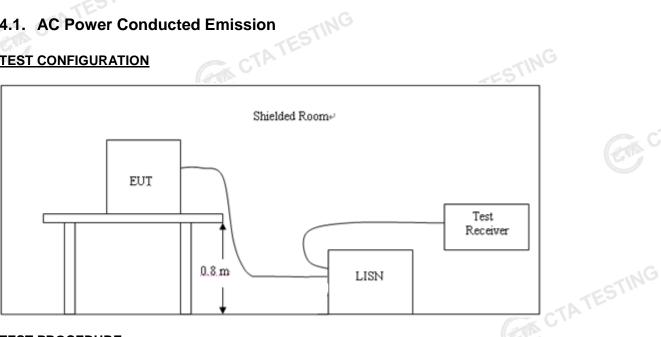
N/A

CA CTA

# 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.
- 2, Support equipment, if needed, was placed as per ANSI C63.10.
- 3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4. If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5, All support equipments received AC power from a second LISN, if any.
- 6, 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.
- 7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

## AC Power Conducted Emission Limit

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

| Frequency renge (MHz)                        | Limit      | (dBuV)    |
|--|------------|-----------|
| Frequency range (MHz)                        | 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 freque |            | 23 usur   |

Decreases with the logarithm of the frequency.

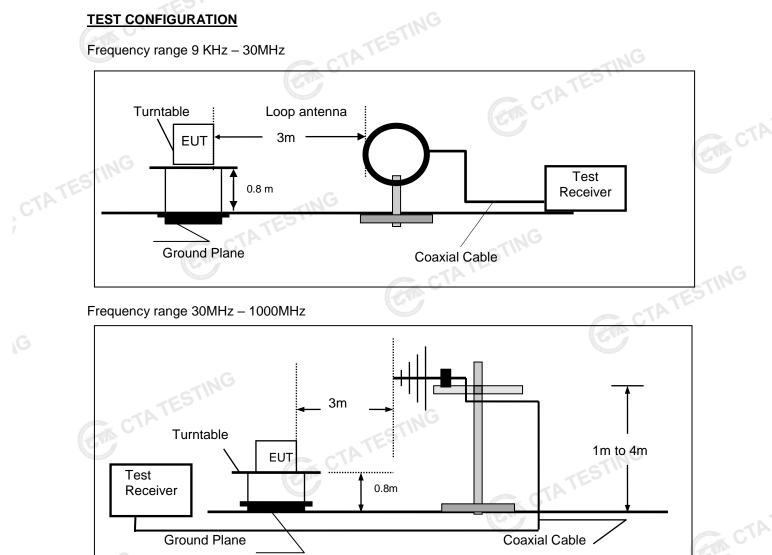
# TEST RESULTS

The EUT is powered by the Battery, so this test item is not applicable for the EUT. GTA TESTING

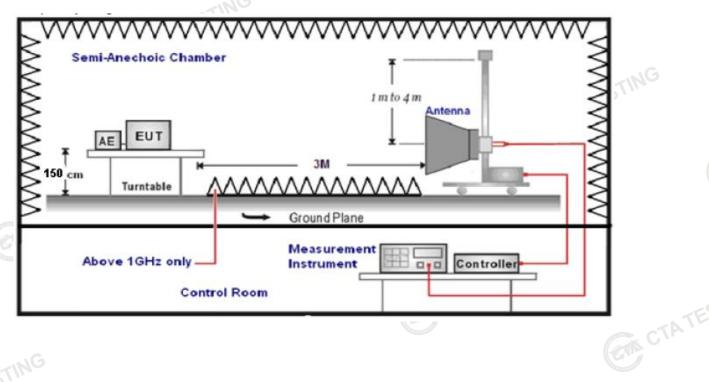
# 4.2. Radiated Emission and Band Edges

# **TEST CONFIGURATION**

Frequency range 9 KHz – 30MHz



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 -25GHz.

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- 2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C 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.
- Repeat above procedures until all frequency measurements have been completed. 4.
- The EUT minimum operation frequency was 26MHz and maximum operation frequency 5. was 1910MHz.so radiated emission test frequency band from 9KHz to 25GHz. 6.

| . The distance between test a | he distance between test antenna and EUT as following ta |               |  |  |  |
|-------------------------------|--|---------------|--|--|--|
| 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 Anternna  | 1             |  |  |  |

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

| 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,<br>Sweep time=Auto<br>Average Value: RBW=1MHz/VBW=10Hz,<br>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**

According 15.249, the field strength of emissions from intentional radiators operated within 2400MHz-2483.5 MHz shall not exceed 94dBµV/m (50mV/m):

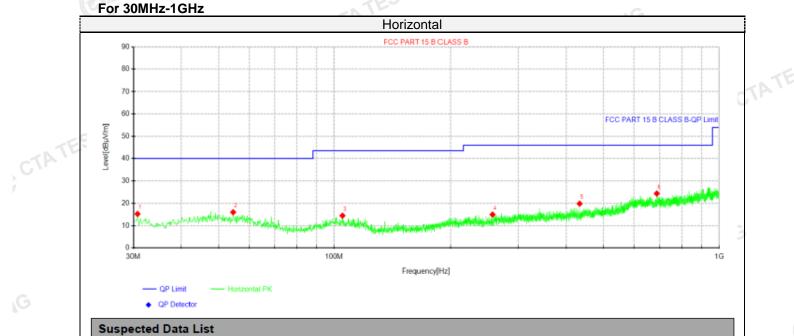
FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

In addition, 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)

|                         | Rac               | liated emission limits           |              |
|-------------------------|-------------------|----------------------------------|--------------|
| Frequency (MHz)         | Distance (Meters) | Radiated (µV/m)                  |              |
| 0.009-0.49              | 3                 | 20log(2400/F(KHz))+40log(300/3)  | 2400/F(KHz)  |
| 0.49-1.705              | 3                 | 20log(24000/F(KHz))+ 40log(30/3) | 24000/F(KHz) |
| 1.705-30                | 3                 | 20log(30)+ 40log(30/3)           | 30           |
| 30-88                   | 3                 | 40.0                             | 100          |
| 88-216                  | 3 614             | 43.5                             | 150 NG       |
| 216-960                 | 3                 | 46.0                             | 200          |
| Above 960               | 3                 | 54.0                             | 500          |
| TEST RESULTS<br>Remark: |                   |                                  | CA CTA       |

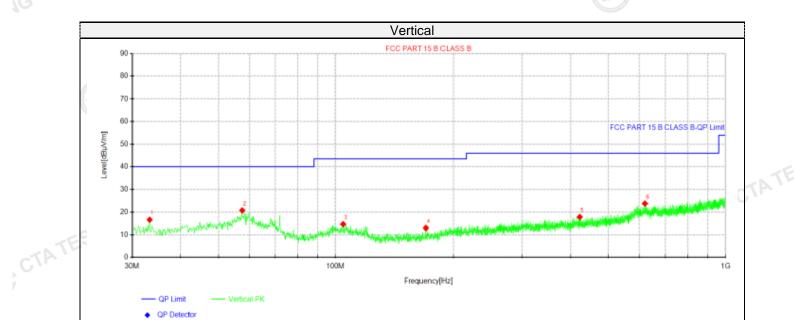
Remark: CTA TESTING

- 1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
- 2. Both modes of GFSK were tested at Low, Middle, and High channel and recorded worst mode at GFSK
- 3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.



| Juspe | ected Data     | LISU                          |                   |                  |                   |                |                |              |            |     |
|-------|----------------|-------------------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|------------|-----|
| NO.   | Freq.<br>[MHz] | Reading<br>[dBµV]             | Level<br>[dBµV/m] | Factor<br>[dB/m] | Limit<br>[dBµV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Polarity   |     |
|       | [IVITIZ]       | [aph.]                        | [uph will]        | [ub/iii]         | laphyuul          | [ub]           | lenii          | LJ           |            |     |
| 1     | 30.7275        | 29.60                         | 15.15             | -14.45           | 40.00             | 24.85          | 100            | 60           | Horizontal |     |
| 2     | 54.6138        | 27.82                         | 15.92             | -11.90           | 40.00             | 24.08          | 100            | 40           | Horizontal |     |
| 3     | 105.175        | 27.79                         | 14.36             | -13.43           | 43.50             | 29.14          | 100            | 220          | Horizontal |     |
| 4     | 256.858        | 27.33                         | 14.84             | -12.49           | 46.00             | 31.16          | 100            | 40           | Horizontal |     |
| 5     | 433.641        | 29.97                         | 19.78             | -10.19           | 46.00             | 26.22          | 100            | 280          | Horizontal |     |
| 6     | 687.538        | 29.60                         | 24.36             | -5.24            | 46.00             | 21.64          | 100            | 110          | Horizontal |     |
|       |                | µV/m)= Rea                    |                   |                  |                   | Amplifier      | rain (dD)      |              | GAN        | CTP |
|       |                | ∴Antenna Fao<br>_imit (dBµV/r |                   |                  | oss (dB) - Pre    | e Amplifier g  | jain (dB)      |              | Contrast.  |     |
|       |                |                               |                   |                  |                   |                |                |              |            |     |

Note:1).Level (dBµV/m)= Reading (dBµV)+ Factor (dB/m) 2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB) 3). Margin(dB) = Limit (dBµV/m) - Level (dBµV/m)



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# Suspected Data List

| Jusp | eoleu Dala | LISC    |          |        |          |        |        |       |          |
|------|------------|---------|----------|--------|----------|--------|--------|-------|----------|
| NO.  | Freq.      | Reading | Level    | Factor | Limit    | Margin | Height | Angle | Polarity |
| NO.  | [MHz]      | [dBµV]  | [dBµV/m] | [dB/m] | [dBµV/m] | [dB]   | [cm]   | [°]   | Tolarity |
| 1    | 33.2738    | 30.76   | 16.57    | -14.19 | 40.00    | 23.43  | 100    | 260   | Vertical |
| 2    | 57.645     | 33.35   | 20.74    | -12.61 | 40.00    | 19.26  | 100    | 280   | Vertical |
| 3    | 104.69     | 28.02   | 14.60    | -13.42 | 43.50    | 28.90  | 100    | 80    | Vertical |
| 4    | 170.528    | 28.45   | 12.97    | -15.48 | 43.50    | 30.53  | 100    | 200   | Vertical |
| 5    | 422.365    | 28.06   | 17.78    | -10.28 | 46.00    | 28.22  | 100    | 270   | Vertical |
| 6    | 621.215    | 29.04   | 23.78    | -5.26  | 46.00    | 22.22  | 100    | 130   | Vertical |

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

STING 2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB) 3). Margin(dB) = Limit (dB $\mu$ V/m) - Level (dB $\mu$ V/m) CTA CTA



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# For 1GHz to 25GHz

|                    | GFSK (above 1GHz)    |     |                   |                |                        |                             |                         |                           |                                |  |
|--------------------|----------------------|-----|-------------------|----------------|------------------------|-----------------------------|-------------------------|---------------------------|--------------------------------|--|
| Frequency(MHz):    |                      |     | 2402 Polarity:    |                |                        | HORIZONTAL                  |                         |                           |                                |  |
| Frequency<br>(MHz) | Emis<br>Lev<br>(dBu) | vel | Limit<br>(dBuV/m) | Margin<br>(dB) | Raw<br>Value<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Factor<br>(dB) | Pre-<br>amplifier<br>(dB) | Correction<br>Factor<br>(dB/m) |  |
| 2402.00            | 99.91                | PK  | 114.00            | 14.09          | 111.19                 | 27.47                       | 3.43                    | 42.18                     | -11.28                         |  |
| 2402.00            | 80.64                | AV  | 94.00             | 13.36          | 91.92                  | 27.47                       | 3.43                    | 42.18                     | -11.28                         |  |
| 4804.00            | 49.97                | PK  | 74.00             | 24.03          | 54.22                  | 32.35                       | 5.12                    | 41.72                     | -4.25                          |  |
| 4804.00            | 40.35                | AV  | 54.00             | 13.65          | 44.60                  | 32.35                       | 5.12                    | 41.72                     | -4.25                          |  |
| 7206.00            | 52.06                | PK  | 74.00             | 21.94          | 52.58                  | 36.59                       | 6.5                     | 43.61                     | -0.52                          |  |
| 7206.00            | 37.88                | AV  | 54.00             | 16.12          | 38.40                  | 36.59                       | 6.5                     | 43.61                     | -0.52                          |  |

| Freque             | ncy(MHz) | :                   | 2402              |                | Pola                   | arity:                      |                         |                           |                                |
|--------------------|----------|---------------------|-------------------|----------------|------------------------|-----------------------------|-------------------------|---------------------------|--------------------------------|
| Frequency<br>(MHz) | -        | sion<br>vel<br>V/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Raw<br>Value<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Factor<br>(dB) | Pre-<br>amplifier<br>(dB) | Correction<br>Factor<br>(dB/m) |
| 2402.00            | 97.20    | PK                  | 114.00            | 16.80          | 108.48                 | 27.47                       | 3.43                    | 42.18                     | -11.28                         |
| 2402.00            | 77.98    | AV                  | 94.00             | 16.02          | 89.26                  | 27.47                       | 3.43                    | 42.18                     | -11.28                         |
| 4804.00            | 47.31    | PK                  | 74.00             | 26.69          | 51.56                  | 32.35                       | 5.12                    | 41.72                     | -4.25                          |
| 4804.00            | 38.47    | AV                  | 54.00             | 15.53          | 42.72                  | 32.35                       | 5.12                    | 41.72                     | -4.25                          |
| 7206.00            | 49.95    | PK                  | 74.00             | 24.05          | 50.47                  | 36.59                       | 6.5                     | 43.61                     | -0.52                          |
| 7206.00            | 36.76    | AV                  | 54.00             | 17.24          | 37.28                  | 36.59                       | 6.5                     | 43.61                     | -0.52                          |

#### REMARKS:

1.

Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m) Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)- Pre-amplifier Margin value = Limit value- Emission level. -- Mean the PK detector measured value is below average limit. 2.

3.

4.

# Results of Band Edges Test (Radiated)

| Frequ              | ency(MHz)  | :                    | 2402              |                | Pola                   | arity:                      | F                       | IORIZONT                  | 4L                             |
|--------------------|------------|----------------------|-------------------|----------------|------------------------|-----------------------------|-------------------------|---------------------------|--------------------------------|
| Frequency<br>(MHz) |            | sion<br>vel<br>V/m)  | Limit<br>(dBuV/m) | Margin<br>(dB) | Raw<br>Value<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Factor<br>(dB) | Pre-<br>amplifier<br>(dB) | Correction<br>Factor<br>(dB/m) |
| 2390.00            | 62.11      | PK                   | 74                | 11.89          | 72.53                  | 27.42                       | 4.31                    | 42.15                     | -10.42                         |
| 2390.00            | 43.30      | AV                   | 54                | 10.70          | 53.72                  | 27.42                       | 4.31                    | 42.15                     | -10.42                         |
| Frequ              | ency(MHz)  | :                    | 24                | 02             | Pola                   | arity:                      |                         | VERTICAL                  |                                |
| Frequency<br>(MHz) |            | sion<br>vel<br>V/m)  | Limit<br>(dBuV/m) | Margin<br>(dB) | Raw<br>Value<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Factor<br>(dB) | Pre-<br>amplifier<br>(dB) | Correctio<br>Factor<br>(dB/m)  |
| 2390.00            | 60.23      | PK                   | 74                | 13.77          | 70.65                  | 27.42                       | 4.31                    | 42.15                     | -10.42                         |
| 2390.00            | 40.62      | AV                   | 54                | 13.38          | 51.04                  | 27.42                       | 4.31                    | 42.15                     | -10.42                         |
| Frequ              | iency(MHz) | ):                   | 24                | 02             | Pola                   | arity:                      | F                       | IORIZONT                  | AL .                           |
| Frequency<br>(MHz) | Le         | sion<br>vel<br>V/m)  | Limit<br>(dBuV/m) | Margin<br>(dB) | Raw<br>Value<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Factor<br>(dB) | Pre-<br>amplifier<br>(dB) | Correctio<br>Factor<br>(dB/m)  |
| 2483.50            | 61.32      | ΡK                   | 74                | 12.68          | 71.43                  | 27.7                        | 4.47                    | 42.28                     | -10.11                         |
| 2483.50            | 42.86      | AV                   | 54                | 11.14          | 52.97                  | 27.7                        | 4.47                    | 42.28                     | -10.11                         |
| Frequ              | iency(MHz) | ):                   | 24                | 02             | Pola                   | arity:                      |                         | VERTICAL                  | -                              |
| Frequency<br>(MHz) | Le         | ssion<br>vel<br>V/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Raw<br>Value<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Factor<br>(dB) | Pre-<br>amplifier<br>(dB) | Correctio<br>Factor<br>(dB/m)  |
| 2483.50            | 59.15      | PK                   | 74                | 14.85          | 69.26                  | 27.7                        | 4.47                    | 42.28                     | -10.11                         |
| 2483.50            | 40.35      | AV                   | 54                | 13.65          | 50.46                  | 27.7                        | 4.47                    | 42.28                     | -10.11                         |

Note:

- 1) Emission level (dBuV/m) = Meter Reading+ antenna Factor+ cable loss- preamp factor.
- 2) Margin value = Limits-Emission level.
- 3) -- Mean the PK detector measured value is below average limit.
- 4) The other emission levels were very low against the limit.
- 5) RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

# 4.3. 20dB Bandwidth Measurement



# **TEST PROCEDURE**

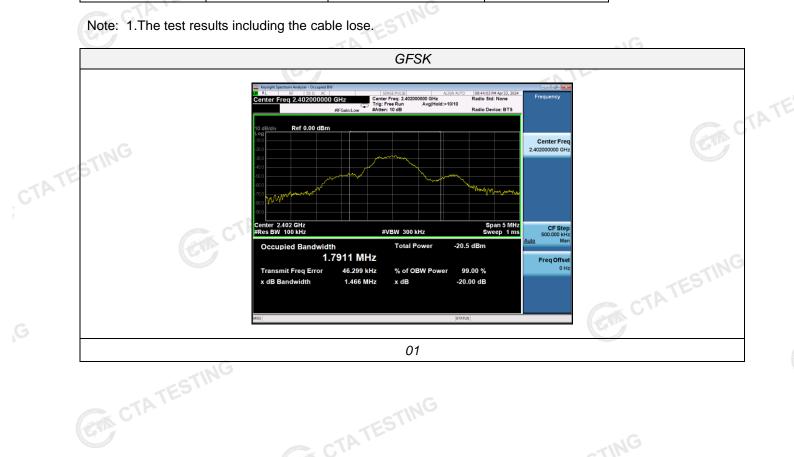
The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30KHz RBW and 300KHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus CTATESTING 20dB.

# LIMIT

# **TEST RESULTS**

|              |         | TATESTIN                |        |         |
|--------------|---------|-------------------------|--------|---------|
| N/A          |         |                         |        | TESTING |
| TEST RESULTS |         |                         |        | CIL     |
| Modulation   | Channel | 20dB bandwidth<br>(MHz) | Result |         |
| GFSK         | 01      | 1.466                   | PASS   |         |



# 4.4. 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 CTATE 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

The maximum gain of antenna was 0.25 dBi. Remark: The ant-Remark: The antenna gain is provided by the customer, if the data provided by the customer is not accurate, Shenzhen CTA Testing Technology Co., Ltd. does not assume any responsibility. CTATES

# 5. Test Setup Photos of the EUT



# 6. Test Photos of the EUT



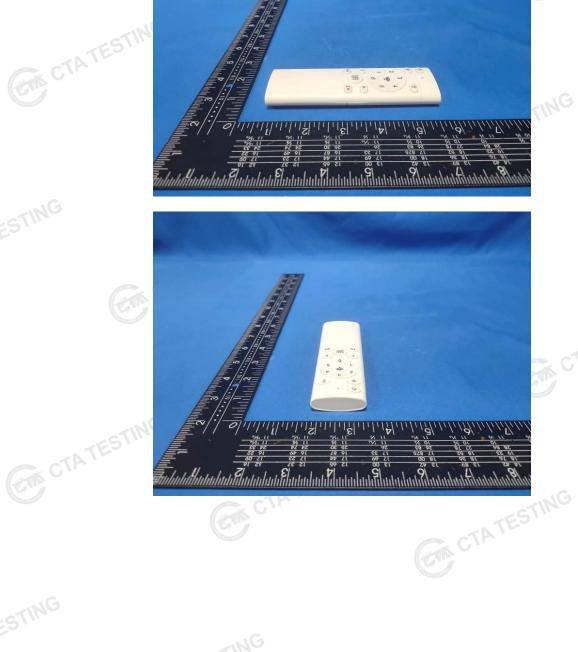
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