**Shenzhen CTA Testing Technology Co., Ltd.**

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

# TEST REPORT
## FCC Rules and Regulations Part PART 15.249

| | |
|---|---|
| **Report Reference No……..:** | **CTA26052600801** |
| **FCC ID……..:** | **2BWAI-DH666-84A** |
| Compiled by ( position+printed name+signature…: | File administrators Zoey Cao |
| Supervised by ( position+printed name+signature…: | Project Engineer Ace Chai |
| Approved by ( position+printed name+signature…: | RF Manager Eric Wang |
| Date of issue ……: | Jun. 01, 2026 |
| **Testing Laboratory Name**……: | **Shenzhen CTA Testing Technology Co., Ltd.** |
| Address ……: | Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China |
| **Applicant's name**……: | **Shenzhen Kuayuetong Trading Co., Ltd.** |
| Address ……: | No.3 Dongpo Rd, Yangmei Cmty, Banan Subdist, Longgang Dist, Shenzhen, Bldg1, WanzhiTiandi L3-39. Shenzhen China |
| Standard……: | **FCC Rules and Regulations PART 15.249** |

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| | |
|---|---|
| **Test item description ……:** | **Toy series** |
| Trade Mark ……: | N/A |
| Manufacturer ……: | Shantou Chenghai Xindahua Toys Co.,Ltd |
| Model/Type reference ……: | DH666-84A |
| Listed Models ……: | DH666-84C-1, DH666-84D-1 |
| Modulation ……: | GFSK |
| Frequency …… | 2405-2475MHz |
| Ratings ……: | DC 3.0V From battery |
| Result ……: | **PASS** |

# TEST REPORT

| | | |
|---|---|---|
| Equipment under Test | : | Toy series |
| Model /Type | : | DH666-84A |
| Listed Models | : | DH666-84C-1, DH666-84D-1 |
| Model Difference | : | Transmitter (remote control) PCB board, circuit, structure and internal of these model(s) are the same, Only model number and receiver (toy car) are different for these models. The detailed information refer to product photos. |
| Risk Assessment andTest Coverage Statement | : | According to FCC standards, FCC ID certification only requires testing the Transmitter part of the product, not the receiver part. Referring to the product photos, For the main test and Listed models. The transmitter is the same, so the test results for the main test can cover the Listed models |
| **Applicant** | : | **Shenzhen Kuayuetong Trading Co., Ltd.** |
| Address | : | No.3 Dongpo Rd, Yangmei Cmty, Banan Subdist, Longgang Dist, Shenzhen, Bldg1, WanzhiTiandi L3-39. Shenzhen China |
| **Manufacturer** | : | **Shantou Chenghai Xindahua Toys Co.,Ltd** |
| Address | : | Chenghai District, Shantou 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 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+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024:** American National Standard for Testing Unlicensed Wireless Devices

# 2. SUMMARY

## 2.1. General Remarks

| | | |
|---|---|---|
| Date of receipt of test sample | : | May 26, 2026 |
| | | |
| Testing commenced on | : | May 26, 2026 |
| | | |
| Testing concluded on | : | Jun. 01, 2026 |

## 2.2. Product Description

| | |
|---|---|
| Name of EUT | Toy series |
| Model Number | DH666-84A |
| Power Rating | DC 3.0V From battery |
| Hardware version: | V1.0 |
| Software version: | V1.0 |
| Sample ID: | CTA260526008-1# (Engineer sample)<br>CTA260526008-2# (Normal sample) |
| Operation frequency | 2405-2475MHz |
| Modulation | GFSK |
| Antenna Type | Internal antenna |
| Antenna Gain | 0.17 dBi |

## 2.3. Equipment Under Test

### Power supply system utilised

| | | | | | |
|---|---|---|---|---|---|
| Power supply voltage | : | ○ | 230V / 50 Hz | ○ | 120V / 60Hz |
| | | ○ | 12 V DC | ○ | 24 V DC |
| | | ● | Other (specified in blank below) | | |

DC 3.0V From battery

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

The Equipment Under Test (EUT) is the Toy series.

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

## 2.5. EUT configuration

**The following peripheral devices and interface cables were connected during the measurement:**

● - supplied by the manufacturer
○ - supplied by the lab

| | | |
|---|---|---|
| | | |

## 2.6. EUT operation mode

The Applicant use Key to control the EUT for staying in continuous transmitting and receiving mode for testing .There is 25 channels provided to the EUT.

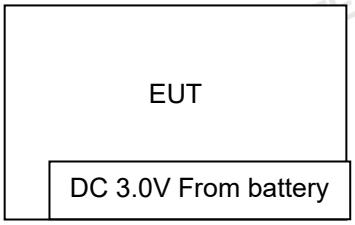
**Operation Frequency：**

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|---|---|
| **1** | **2405** | 11 | 2428 | 21 | 2471 |
| 2 | 2407 | 12 | 2435 | 22 | 2472 |
| 3 | 2408 | **13** | **2445** | 23 | 2473 |
| 4 | 2410 | 14 | 2451 | 24 | 2474 |
| 5 | 2411 | 15 | 2452 | **25** | **2475** |
| 6 | 2414 | 16 | 2453 | | |
| 7 | 2418 | 17 | 2454 | | |
| 8 | 2422 | 18 | 2462 | | |

Test frequency:

| Channel | Frequency (MHz) |
|---|---|
| Low | 2405 |
| Mid | 2445 |
| High | 2475 |

## 2.7. Block Diagram of Test Setup




## 2.8. 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 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:

Radiated Emission:

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

AC Main Conducted testing：

| | |
|---|---|
| Temperature: | 24 ° C |
| | |
| Humidity: | 45 % |
| | |
| Atmospheric pressure: | 950-1050mbar |

Conducted testing：

| | |
|---|---|
| Temperature: | 24 ° C |
| | |
| Humidity: | 45 % |
| | |
| Atmospheric pressure: | 950-1050mbar |

## 3.4. Summary of measurement results

| FCC PART 15.249 | | |
|---|---|---|
| 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 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 | / | 0.57 dB | (1) |
| Spectrum bandwidth | / | 1.1% | (1) |
| Radiated spurious emission (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) |

(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

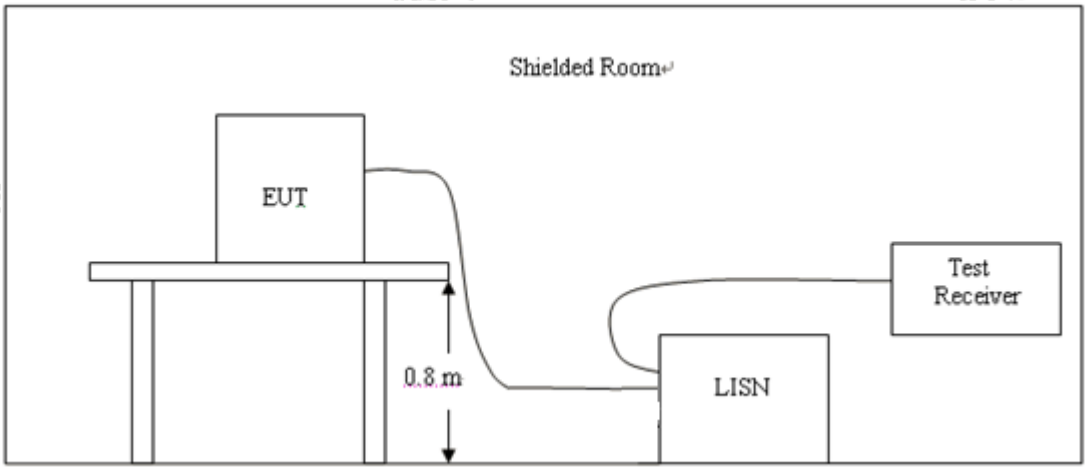
| Item. | Test Equipment | Manufacturer | Model No. | Equipment No. | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|---|
| **AC Conducted Test Equipment** | | | | | | |
| ☒1 | LISN | R&S | ENV216 | CTA-308 | 2025/08/04 | 2026/08/03 |
| ☒2 | LISN | R&S | ENV216 | CTA-314 | 2025/07/30 | 2026/07/29 |
| ☒3 | EMI Test Receiver | R&S | ESPI | CTA-307 | 2025/07/30 | 2026/07/29 |
| ☒4 | CE Cable | SKET | RF Cable (9kHz-30MHz) | CTA-367 | 2025/07/30 | 2026/07/29 |
| ☒5 | Temperature and humidity meter | Chigo | ZG-7020 | CTA-327 | 2025/07/31 | 2026/07/30 |
| ☒6 | EMI Test Software | Tonscend | TS®JS32-CE | 5.0.0.1 | N/A | N/A |
| **RF Radiation Test Equipment** | | | | | | |
| ☒1 | EMI Test Receiver | R&S | ESCI | CTA-306 | 2025/07/30 | 2026/07/29 |
| ☒2 | Spectrum analyzer | R&S | FSV40-N | CTA-344 | 2026/05/16 | 2027/05/15 |
| ☒3 | Ultra-Broadband Antenna | Schwarzbeck | VULB9163 | CTA-310 | 2023/10/17 | 2026/10/16 |
| ☒4 | Horn Antenna | Schwarzbeck | BBHA 9120D | CTA-309 | 2023/10/13 | 2026/10/12 |
| ☒5 | Loop Antenna | Zhinan | ZN30900C | CTA-311 | 2023/10/17 | 2026/10/16 |
| ☒6 | Horn Antenna | Schwarzbeck | BBHA 9170 | CTA-346 | 2025/05/18 | 2028/05/17 |
| ☒7 | Amplifier | Schwarzbeck | BBV9745 | CTA-312 | 2025/07/30 | 2026/07/29 |
| ☒8 | Amplifier | Tonscend | TAP-011840 | CTA-313 | 2025/07/30 | 2026/07/29 |
| ☒9 | Amplifier | SKET | LNPA 1840G-50 | CTA-345 | 2026/05/16 | 2027/05/15 |
| ☒10 | 6dB attenuator | Shanghaihuaxiang | GZL-TS5-6-6 | CTA-347 | 2026/05/16 | 2027/05/15 |
| ☒11 | RF cable | SKET | RF Cable (9kHz-1GHz) | CTA-360 | 2025/09/25 | 2026/09/24 |
| ☒12 | RF cable | SKET | RF Cable (1GHz-18GHz) | CTA-361 | 2025/09/25 | 2026/09/24 |
| ☒13 | Coaxialcable (1GHz-40GHz) | SKET | RE-04-D | CTA-348 | 2026/05/16 | 2027/05/15 |
| ☒14 | Coaxialcable (1GHz-40GHz) | SKET | RE-04-M | CTA-349 | 2026/05/16 | 2027/05/15 |
| ☒15 | Coaxialcable (1GHz-40GHz) | SKET | RE-04-L | CTA-350 | 2026/05/16 | 2027/05/15 |
| ☒16 | Temperature and humidity meter | Chigo | ZG-7020 | CTA-328 | 2025/07/31 | 2026/07/30 |
| ☒17 | 2.4GFilter | HX Microwave | HXLBQ-DZA61 | CTA-365 | 2025/07/31 | 2026/07/30 |
| ☐18 | 5GFilter | CONCEPT | CNF05150M05850Q16A | CTA-366 | 2025/07/31 | 2026/07/30 |
| ☐19 | High-Pass Filter | XingBo | XBLBQ-GTA18 | CTA-402 | 2025/07/30 | 2026/07/29 |
| ☐20 | High-Pass Filter | XingBo | XBLBQ-GTA27 | CTA-403 | 2025/07/30 | 2026/07/29 |
| ☐21 | High-Pass Filter | XingBo | XBLBQ-GTA10 | CTA-364 | 2025/07/30 | 2026/07/29 |
| ☒22 | EMI Test Software | Tonscend | TS®JS32-RE | 5.0.0.2 | N/A | N/A |
| **RF Conducted Test Equipment** | | | | | | |
| ☒1 | Spectrum Analyzer | Agilent | N9020A | CTA-342 | 2025/07/30 | 2026/07/29 |
| ☐2 | Spectrum analyzer | R&S | FSV40-N | CTA-344 | 2026/05/16 | 2027/05/15 |
| ☒3 | RF Coaxial Cable | SKET | RF Cable (9kHz-40GHz) | CTA-368 | 2025/07/30 | 2026/07/29 |
| ☒4 | Temperature and humidity meter | ZG-7020 | Chigo | CTA-329 | 2025/07/31 | 2026/07/30 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ☐5 | Programmable Constant Temperature And Humidity Test Chamber | DONGGUAN JINGYU | HT-H-408 | CTA-053 | 2025/07/30 | 2026/07/29 |
| ☐6 | Vector Signal generator | Agilent | N5182A | CTA-305 | 2025/07/30 | 2026/07/29 |
| ☐7 | Analog Signal Generator | R&S | E4421B | CTA-304 | 2025/07/30 | 2026/07/29 |
| ☐8 | WIDEBAND RADIO COMMUNICATION TESTER | R&S | CMW500 | CTA-302 | 2025/07/30 | 2026/07/29 |
| ☒9 | Automatic control unit | Tonscend | JS0806-2 | CTA-351 | 2025/07/30 | 2026/07/29 |
| ☒10 | RF Test Software | Tonscend | TS®JS1120-3 | 3.1.65 | N/A | N/A |
| ☒11 | RF Test Software | Tonscend | TS®JS1120 | 3.1.46 | N/A | N/A |
| ☒12 | RF Connection Cable | N/A | N/A | 1# | Each time | N/A |

# 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 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. | | |

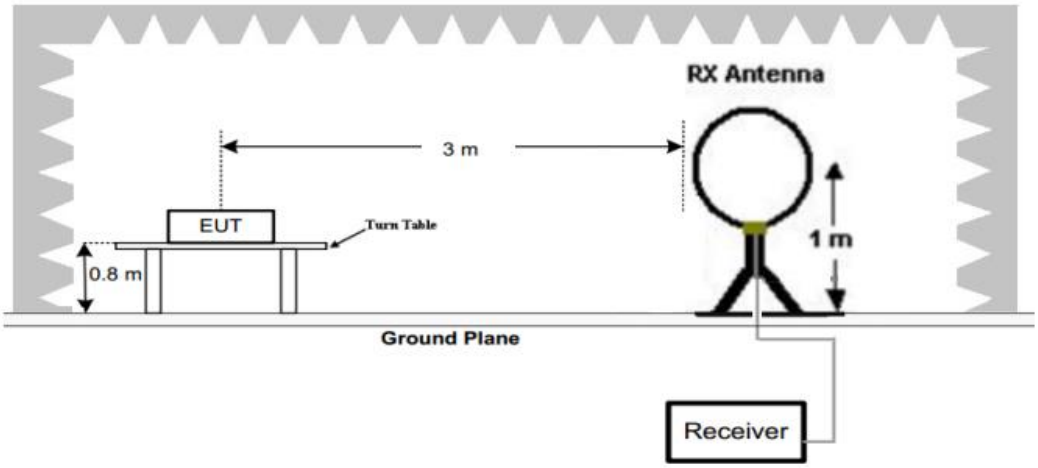
**TEST RESULTS**

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

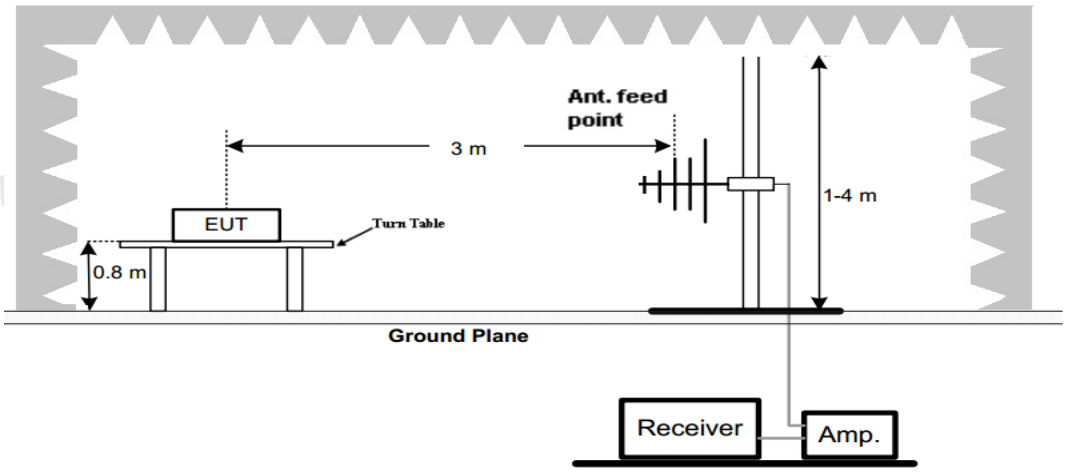
## 4.2. Radiated Emission and Band Edges

**TEST CONFIGURATION**

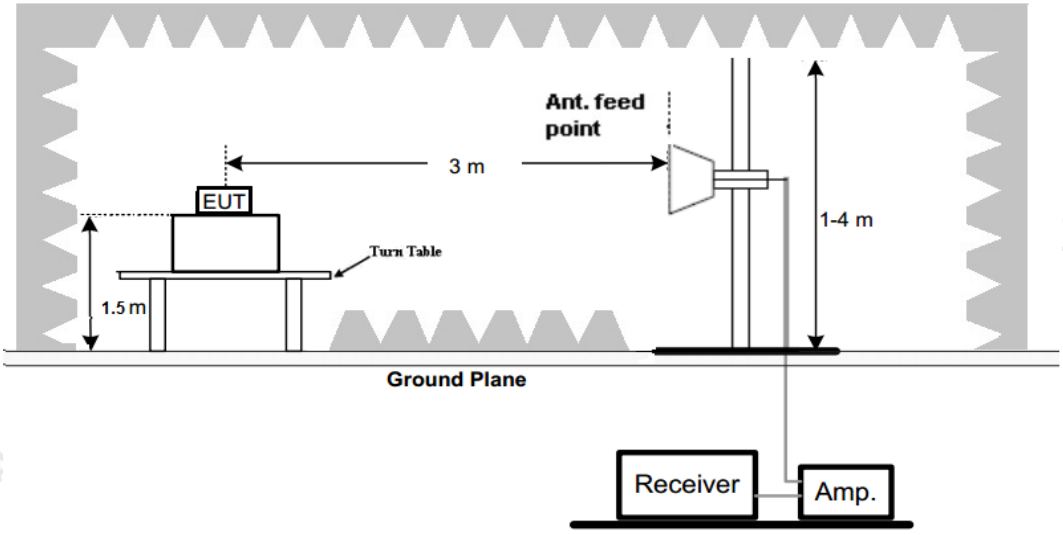
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz

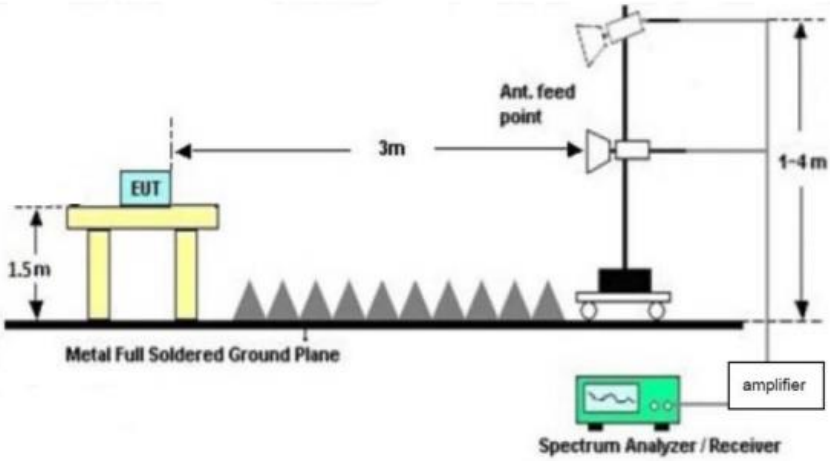



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz




(C) Radiated Emission Test Set-Up, Frequency above 1000MHz






**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.
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. The EUT minimum operation frequency was 26MHz and maximum operation frequency was 1910MHz.so radiated emission test frequency band from 9KHz 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<br>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**

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)

Radiated emission limits

| Frequency (MHz) | Distance (Meters) | Radiated (dBμV/m) | 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 | 43.5 | 150 |
| 216-960 | 3 | 46.0 | 200 |
| Above 960 | 3 | 54.0 | 500 |

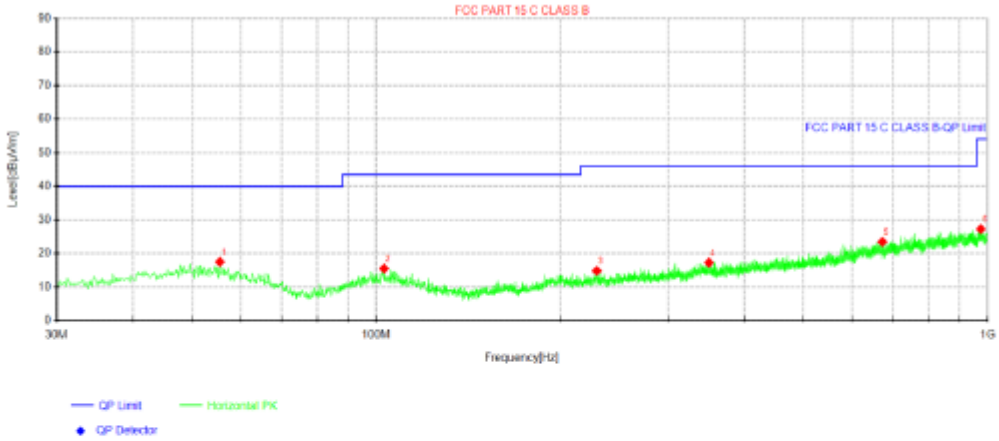
**TEST RESULTS**

Remark:

1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
2. GFSK were tested at Low, Middle, and High channel and recorded worst mode at the High channel.
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.

**For 30MHz-1GHz**

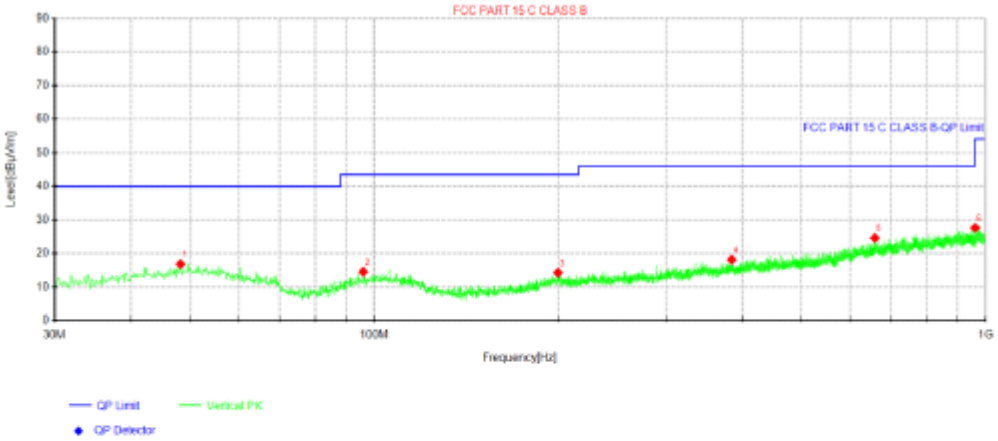
Horizontal




| Suspected Data List | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NO. | Freq. [MHz] | Reading [dBμV] | Level [dBμV/m] | Factor [dB/m] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1 | 55.4625 | 28.51 | 17.51 | -11.00 | 40.00 | 22.49 | 100 | 281 | Horizontal |
| 2 | 102.992 | 28.05 | 15.51 | -12.54 | 43.50 | 27.99 | 100 | 233 | Horizontal |
| 3 | 229.577 | 27.91 | 14.82 | -13.09 | 46.00 | 31.18 | 100 | 257 | Horizontal |
| 4 | 350.221 | 27.86 | 17.28 | -10.58 | 46.00 | 28.72 | 100 | 281 | Horizontal |
| 5 | 672.988 | 28.34 | 23.46 | -4.88 | 46.00 | 22.54 | 100 | 1 | Horizontal |
| 6 | 975.143 | 28.57 | 27.27 | -1.30 | 54.00 | 26.73 | 100 | 57 | Horizontal |

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)

Vertical




| Suspected Data List | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NO. | Freq. [MHz] | Reading [dBμV] | Level [dBμV/m] | Factor [dB/m] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1 | 48.1875 | 27.41 | 16.84 | -10.57 | 40.00 | 23.16 | 100 | 300 | Vertical |
| 2 | 95.96 | 27.83 | 14.53 | -13.30 | 43.50 | 28.97 | 100 | 345 | Vertical |
| 3 | 199.871 | 27.38 | 14.26 | -13.12 | 43.50 | 29.24 | 100 | 184 | Vertical |
| 4 | 384.413 | 28.64 | 18.14 | -10.50 | 46.00 | 27.86 | 100 | 219 | Vertical |
| 5 | 659.166 | 29.67 | 24.64 | -5.03 | 46.00 | 21.36 | 100 | 356 | Vertical |
| 6 | 961.806 | 29.06 | 27.66 | -1.40 | 54.00 | 26.34 | 100 | 360 | Vertical |

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)

**For 1GHz to 25GHz**

***GFSK (above 1GHz)***

| Frequency(MHz): | | | 2405 | | Polarity: | | HORIZONTAL | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier (dB) | Correction Factor (dB/m) |
| 2405.00 | 86.04 | PK | 114 | 27.96 | 107.53 | 28.02 | 4.33 | 53.84 | -21.49 |
| 2405.00 | 82.15 | AV | 94 | 11.85 | 103.64 | 28.02 | 4.33 | 53.84 | -21.49 |
| 4810.00 | 49.03 | PK | 74 | 24.97 | 63.79 | 33.54 | 5.71 | 54.01 | -14.76 |
| 4810.00 | 39.41 | AV | 54 | 14.59 | 54.17 | 33.54 | 5.71 | 54.01 | -14.76 |
| 7215.00 | 53.08 | PK | 74 | 20.92 | 63.45 | 36.39 | 6.95 | 53.71 | -10.37 |
| 7215.00 | 42.68 | AV | 54 | 11.32 | 53.05 | 36.39 | 6.95 | 53.71 | -10.37 |

| Frequency(MHz): | | | 2405 | | Polarity: | | VERTICAL | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier (dB) | Correction Factor (dB/m) |
| 2405.00 | 83.92 | PK | 114 | 30.08 | 105.41 | 28.02 | 4.33 | 53.84 | -21.49 |
| 2405.00 | 79.62 | AV | 94 | 14.38 | 101.11 | 28.02 | 4.33 | 53.84 | -21.49 |
| 4810.00 | 46.27 | PK | 74 | 27.73 | 61.03 | 33.54 | 5.71 | 54.01 | -14.76 |
| 4810.00 | 37.19 | AV | 54 | 16.81 | 51.95 | 33.54 | 5.71 | 54.01 | -14.76 |
| 7215.00 | 51.09 | PK | 74 | 22.91 | 61.46 | 36.39 | 6.95 | 53.71 | -10.37 |
| 7215.00 | 41.00 | AV | 54 | 13.00 | 51.37 | 36.39 | 6.95 | 53.71 | -10.37 |

| Frequency(MHz): | | | 2445 | | Polarity: | | HORIZONTAL | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier (dB) | Correction Factor (dB/m) |
| 2445.00 | 84.85 | PK | 114 | 29.15 | 106.16 | 28.18 | 4.33 | 53.82 | -21.31 |
| 2445.00 | 81.65 | AV | 94 | 12.35 | 102.96 | 28.18 | 4.33 | 53.82 | -21.31 |
| 4890.00 | 49.16 | PK | 74 | 24.84 | 63.70 | 33.78 | 5.77 | 54.09 | -14.54 |
| 4890.00 | 39.39 | AV | 54 | 14.61 | 53.93 | 33.78 | 5.77 | 54.09 | -14.54 |
| 7335.00 | 52.75 | PK | 74 | 21.25 | 62.79 | 36.63 | 7.00 | 53.67 | -10.04 |
| 7335.00 | 43.38 | AV | 54 | 10.62 | 53.42 | 36.63 | 7.00 | 53.67 | -10.04 |

| Frequency(MHz): | | | 2445 | | Polarity: | | VERTICAL | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier (dB) | Correction Factor (dB/m) |
| 2445.00 | 82.63 | PK | 114 | 31.37 | 103.94 | 28.18 | 4.33 | 53.82 | -21.31 |
| 2445.00 | 78.29 | AV | 94 | 15.71 | 99.60 | 28.18 | 4.33 | 53.82 | -21.31 |
| 4890.00 | 47.15 | PK | 74 | 26.85 | 61.69 | 33.78 | 5.77 | 54.09 | -14.54 |
| 4890.00 | 37.68 | AV | 54 | 16.32 | 52.22 | 33.78 | 5.77 | 54.09 | -14.54 |
| 7335.00 | 51.03 | PK | 74 | 22.97 | 61.07 | 36.63 | 7.00 | 53.67 | -10.04 |
| 7335.00 | 40.70 | AV | 54 | 13.30 | 50.74 | 36.63 | 7.00 | 53.67 | -10.04 |

| Frequency(MHz): | | | 2475 | | Polarity: | | HORIZONTAL | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier (dB) | Correction Factor (dB/m) |
| 2475.00 | 83.59 | PK | 114 | 30.41 | 104.77 | 28.3 | 4.33 | 53.81 | -21.18 |
| 2475.00 | 80.51 | AV | 94 | 13.49 | 101.69 | 28.3 | 4.33 | 53.81 | -21.18 |
| 4950.00 | 49.28 | PK | 74 | 24.72 | 63.52 | 34.1 | 5.81 | 54.15 | -14.24 |
| 4950.00 | 38.92 | AV | 54 | 15.08 | 53.16 | 34.1 | 5.81 | 54.15 | -14.24 |
| 7425.00 | 52.44 | PK | 74 | 21.56 | 62.69 | 36.35 | 7.03 | 53.63 | -10.25 |
| 7425.00 | 42.58 | AV | 54 | 11.42 | 52.83 | 36.35 | 7.03 | 53.63 | -10.25 |

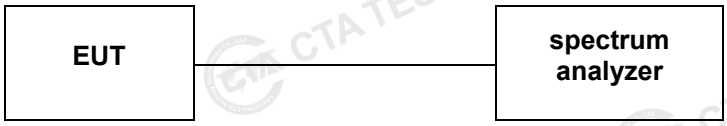
| Frequency(MHz): | | | 2475 | | Polarity: | | VERTICAL | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier (dB) | Correction Factor (dB/m) |
| 2475.00 | 82.33 | PK | 114 | 31.67 | 103.51 | 28.3 | 4.33 | 53.81 | -21.18 |
| 2475.00 | 78.17 | AV | 94 | 15.83 | 99.35 | 28.3 | 4.33 | 53.81 | -21.18 |
| 4950.00 | 47.79 | PK | 74 | 26.21 | 62.03 | 34.1 | 5.81 | 54.15 | -14.24 |
| 4950.00 | 36.44 | AV | 54 | 17.56 | 50.68 | 34.1 | 5.81 | 54.15 | -14.24 |
| 7425.00 | 50.62 | PK | 74 | 23.38 | 60.87 | 36.35 | 7.03 | 53.63 | -10.25 |
| 7425.00 | 41.02 | AV | 54 | 12.98 | 51.27 | 36.35 | 7.03 | 53.63 | -10.25 |

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
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.

## 4.3. 20dB Bandwidth Measurement

**TEST CONFIGURATION**




**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 20dB.

**LIMIT**

N/A

**TEST RESULTS**

| Modulation | Channel | 20dB bandwidth (MHz) | Result |
|---|---|---|---|
| 2.4G | Low | 0.963 | PASS |
| | Mid | 0.945 | |
| | High | 0.960 | |

Note: 1.The test results including the cable loss.

*GFSK*

*Low*

*Mid*

*High*

## 4.4. Emissions at Restricted Band

**Standard Applicable**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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) (see §15.205(c)).

**TEST CONFIGURATION**

**Test Procedures**

According to ANSI C63.10 Field Strength Approach (linear terms):

$$E = EIRP - 20 \log d + 104.8$$

Where:
E is the electric field strength in dBuV/m
EIRP is the equivalent isotropically radiated power in dBm
d is the specified measurement distance in m
f) Compare the resultant electric field strength level with the applicable regulatory limit.
g) Perform the radiated spurious emission test.

Where all terms are as previously defined.

1). Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2). Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to an EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3). Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz for peak detector and RBW=1MHz, VBW=3MHz for RMS detector, Max Hold=Average, Trace=100times for AV test.
4). Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5). Repeat above procedures until all measured frequencies were complete.
6). Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
7). Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see 12.2.5 for guidance on determining the applicable antenna gain)
8). Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
9). For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
10). Compare the resultant electric field strength level to the applicable regulatory limit.

11). Perform radiated spurious emission testing until all measured frequencies were completed

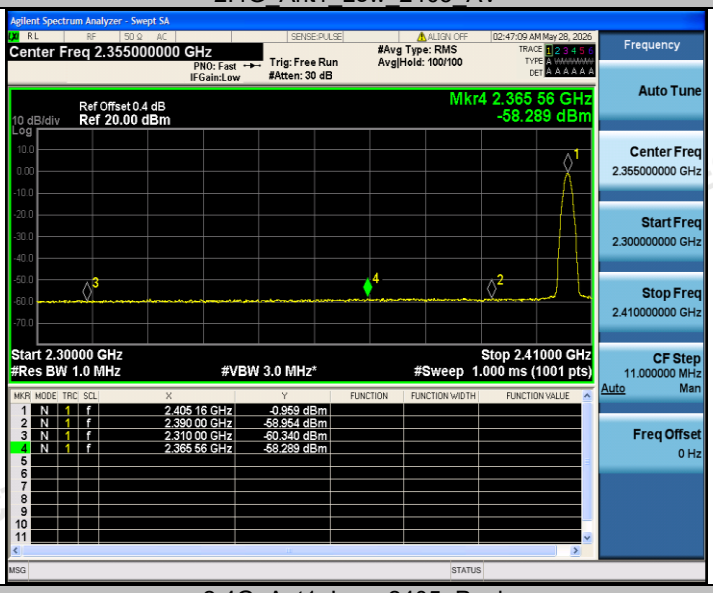
**Test Results**

| TestMode | ChName | Freq(MHz) | Detector | Freq [MHz] | Result [dBm] | Gain [dB] | DC Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Verdict |
|---|---|---|---|---|---|---|---|---|---|---|
| 2.4G | Low | 2405 | AV | 2310.000 | -60.34 | 2.00 | 1.10 | 37.96 | ≤54 | PASS |
| | | | AV | 2365.560 | -58.29 | 2.00 | 1.10 | 40.01 | ≤54 | PASS |
| | | | AV | 2390.000 | -58.95 | 2.00 | 1.10 | 39.35 | ≤54 | PASS |
| | | | Peak | 2310.000 | -51.06 | 2.00 | 0.00 | 46.14 | ≤74 | PASS |
| | | | Peak | 2379.420 | -47.76 | 2.00 | 0.00 | 49.44 | ≤74 | PASS |
| | | | Peak | 2390.000 | -50.74 | 2.00 | 0.00 | 46.46 | ≤74 | PASS |
| | High | 2475 | AV | 2483.500 | -59.14 | 2.00 | 1.10 | 39.16 | ≤54 | PASS |
| | | | AV | 2489.760 | -58.04 | 2.00 | 1.10 | 40.26 | ≤54 | PASS |
| | | | AV | 2500.000 | -58.84 | 2.00 | 1.10 | 39.46 | ≤54 | PASS |
| | | | Peak | 2483.500 | -51.42 | 2.00 | 0.00 | 45.78 | ≤74 | PASS |
| | | | Peak | 2495.440 | -48.59 | 2.00 | 0.00 | 48.61 | ≤74 | PASS |
| | | | Peak | 2500.000 | -51.25 | 2.00 | 0.00 | 45.95 | ≤74 | PASS |

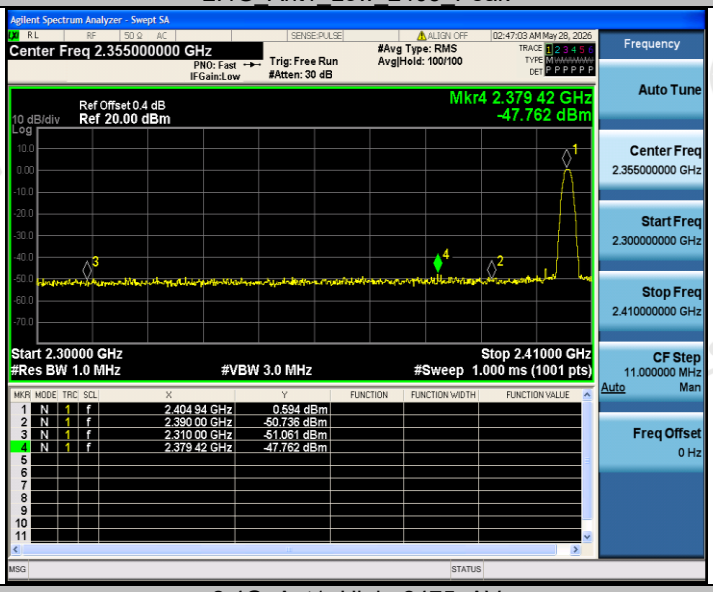
Note：The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

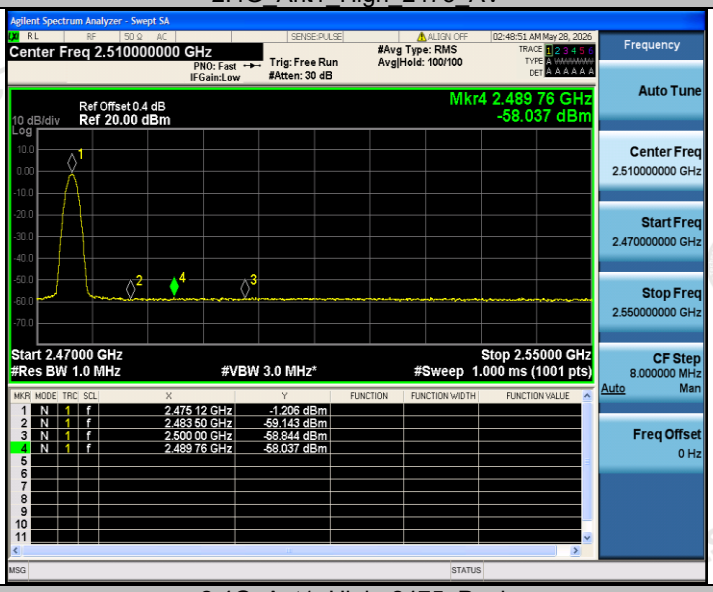
2.4G_Ant1_Low_2405_AV



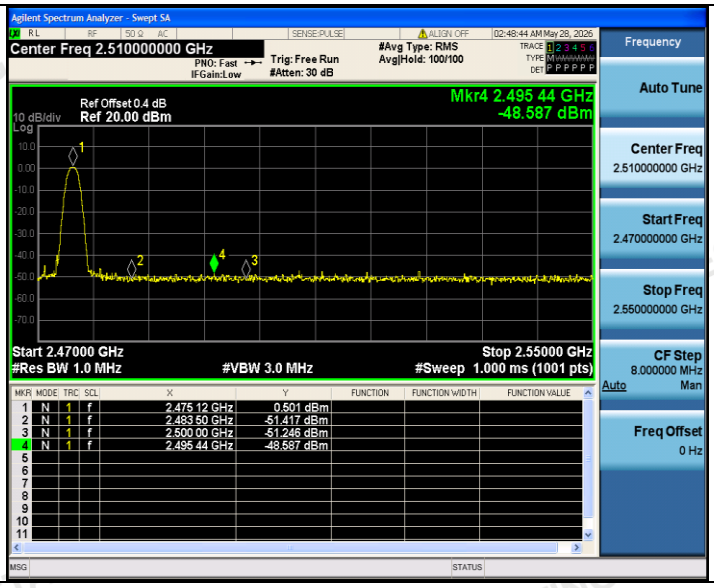

2.4G_Ant1_Low_2405_Peak




2.4G_Ant1_High_2475_AV




2.4G_Ant1_High_2475_Peak



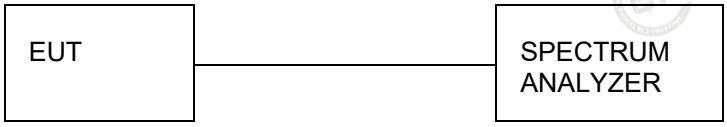

Remark:
1). Test results including cable loss;
2). Measured at difference Packet Type for each mode and recorded worst case for each mode.
3). "---"means that the fundamental frequency not for 15.209 limits requirement.
4). Measured at Hopping and Non-Hopping mode, recorded worst at Non-Hopping mode.
5). The other emission levels were very low against the limit.
6). The average measurement was not performed when the peak measured data under the limit of average detection.
7). Detector AV is setting spectrum/receiver. RBW=1MHz/VBW=3MHz/Sweep time=Auto/Detector=RMS, Max Hold=Average,Trace=100times.
*8).* Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.

## 4.5. On Time and Duty Cycle

**Standard Applicable**

None; for reporting purpose only.

**TEST CONFIGURATION**




**Test Procedures**

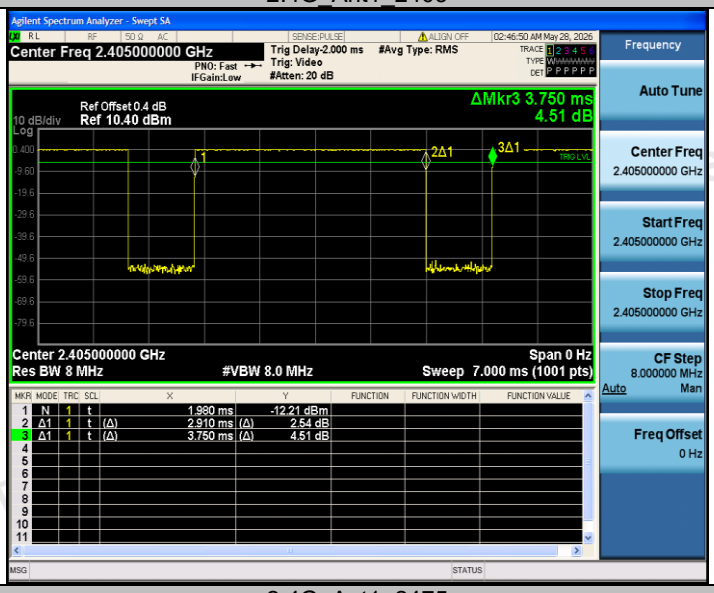
1). Set the Centre frequency of the spectrum analyzer to the transmitting frequency;
2). Set the span=0MHz, RBW=8MHz, VBW=8MHz, Sweep time=Auto;
3). Detector = peak;
4). Trace mode = Single hold.

**TEST RESULTS**

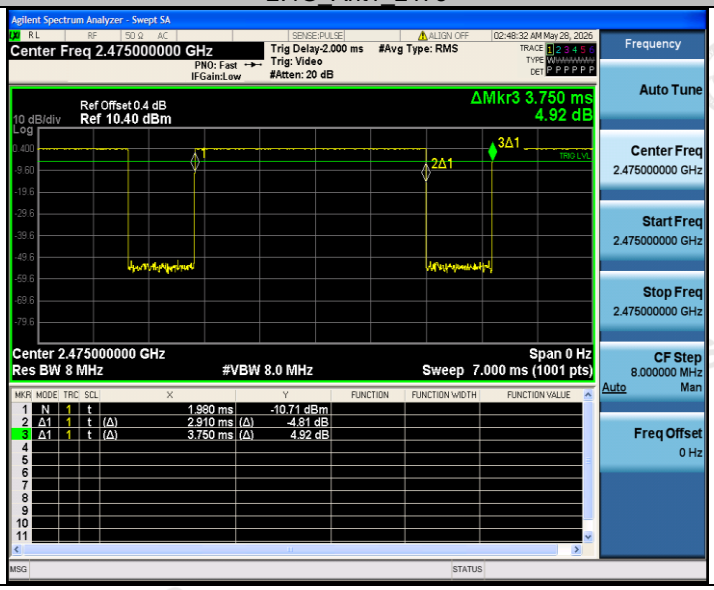
| TestMode | Freq(MHz) | ON Time [ms] | Period [ms] | DC [%] | xFactor | Limit | Verdict |
|---|---|---|---|---|---|---|---|
| 2.4G | 2405 | 2.91 | 3.75 | 77.60 | 1.10 | --- | --- |
| | 2475 | 2.91 | 3.75 | 77.60 | 1.10 | --- | --- |

Test Graphs

2.4G_Ant1_2405




2.4G_Ant1_2475



## 4.6. 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.

**Antenna Information**

The maximum gain of antenna was 0.17 dBi.

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.

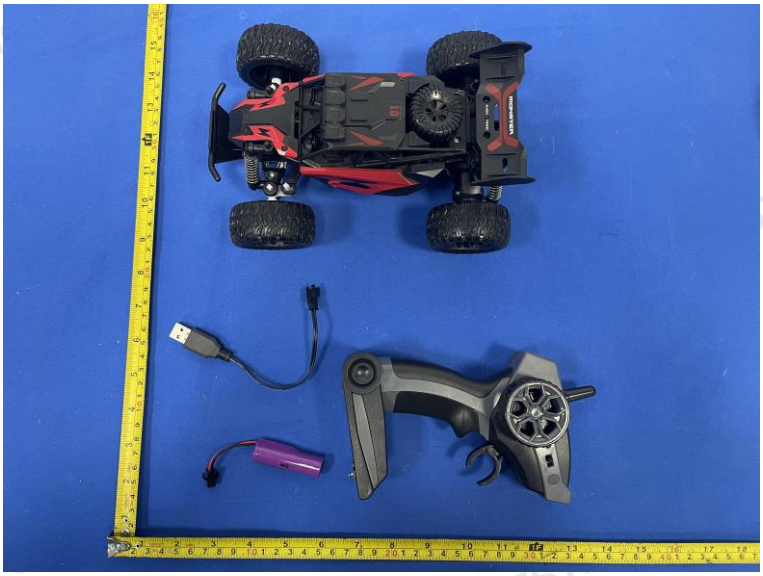
# 5. Test Setup Photos of the EUT

# 6. Test Photos of the EUT

DH666-84A

DH666-84A

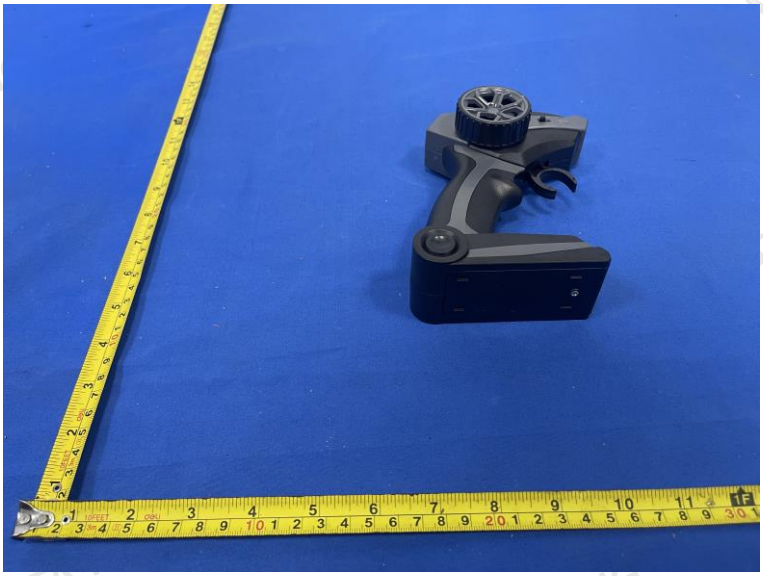
DH666-84C-1

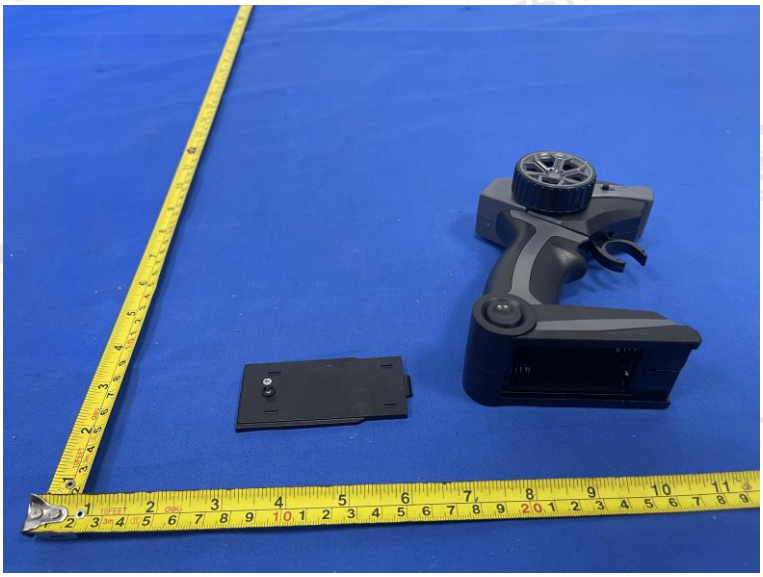


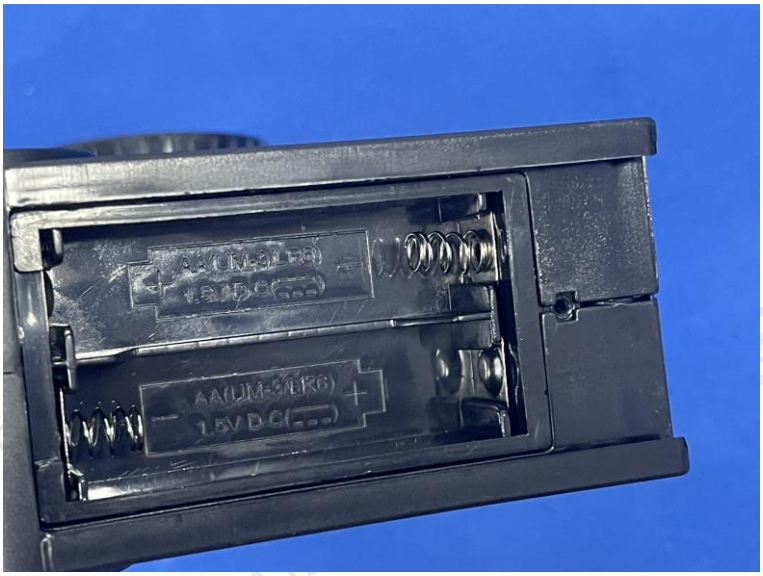
DH666-84C-1

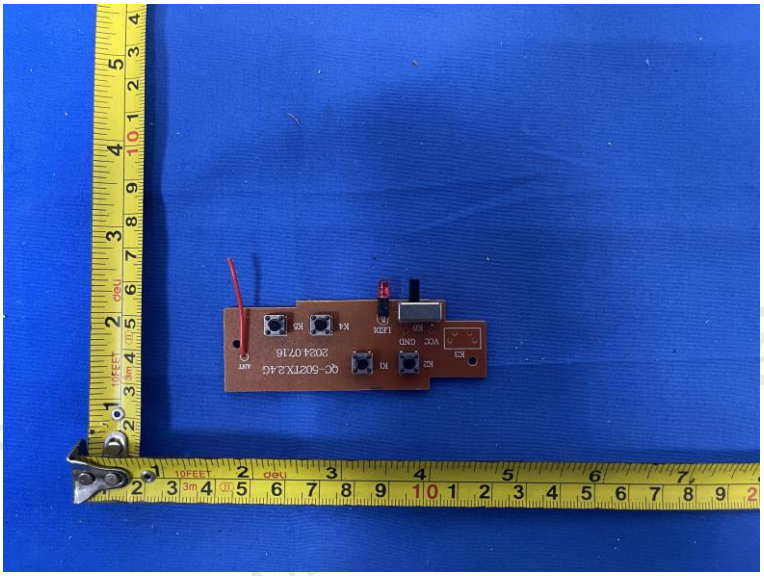
DH666-84D-1

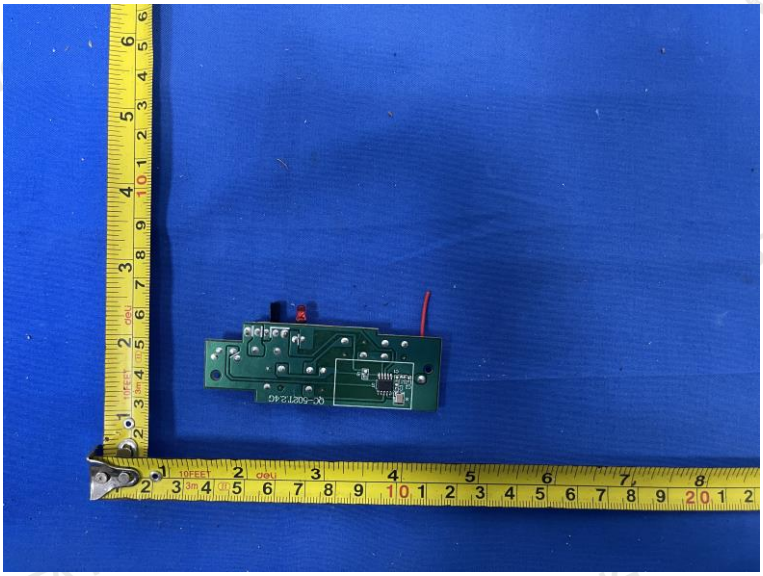
DH666-84D-1






AA(UM-3/LR6)
1.5V DC
AA(UM-3/LR6)
1.5V DC


QC-502TX2.4G
2024.07.16



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