

# **TEST** Report

| Applicant:                                       | Shenzhen Flanger Musical Instruments Co., Limited                                                                        |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Address of Applicant:                            | F/513, FENGSHANG ERA BLDG D,514, JIAN'AN 1ST ROAD,<br>WENHUI COMMUNITY, XINAN STREET, BAO'AN DISTRICT<br>SHENZHEN, CHINA |
| Manufacturer :                                   | Shenzhen Flanger Musical Instruments Co., Limited                                                                        |
| Address of<br>Manufacturer :                     | F/513, FENGSHANG ERA BLDG D,514, JIAN'AN 1ST ROAD,<br>WENHUI COMMUNITY, XINAN STREET, BAO'AN DISTRICT<br>SHENZHEN, CHINA |
| Equipment Under Test (El                         | (TL                                                                                                                      |
| Product Name:                                    | Guitar intelligent pedal                                                                                                 |
| Model No.:                                       | KE1                                                                                                                      |
| Series model:                                    | AE-1, FE-1, LE-1, SE-1, GE-1, EP-05                                                                                      |
| Trade Mark:                                      | N/A                                                                                                                      |
| FCC ID:                                          | 2BHAE-KE1                                                                                                                |
| Applicable standards:<br>Date of sample receipt: | FCC CFR Title 47 Part 15 Subpart C Section 15.247<br>Feb. 06, 2025                                                       |
| Date of Test:                                    | Feb. 06, 2025 ~ Feb. 11, 2025                                                                                            |
| Date of report issued:                           | Feb. 11, 2025                                                                                                            |
| Test Result :                                    | PASS *                                                                                                                   |

\* In the configuration tested, the EUT complied with the standards specified above.



# 1. Version

| Version No. | Date          | Description |
|-------------|---------------|-------------|
| 00          | Feb. 11, 2025 | Original    |
|             |               |             |
|             |               |             |
|             |               |             |
|             |               |             |

Tested/ Prepared By

Heber He Date:

Feb. 11, 2025

**Project Engineer** 

Bruce Zhu Date:

Feb. 11, 2025

Reviewer



Feb. 11, 2025

Approved By :

Check By:



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# 3. Test Summary

| Test Item                        | Section in CFR 47  | Result |
|----------------------------------|--------------------|--------|
| Antenna Requirement              | 15.203/15.247 (c)  | Pass   |
| AC Power Line Conducted Emission | 15.207             | Pass   |
| Conducted Peak Output Power      | 15.247 (b)(1)      | Pass   |
| 20dB Occupied Bandwidth          | 15.247 (a)(1)      | Pass   |
| Carrier Frequencies Separation   | 15.247 (a)(1)      | Pass   |
| Hopping Channel Number           | 15.247 (a)(1)(iii) | Pass   |
| Dwell Time                       | 15.247 (a)(1)(iii) | Pass   |
| Radiated Emission                | 15.205/15.209      | Pass   |
| Band Edge                        | 15.247(d)          | Pass   |

#### Remarks:

- 1. Pass: The EUT complies with the essential requirements in the standard.
- 2. Test according to ANSI C63.10:2013

#### **Measurement Uncertainty**

| Test Item                                    | Frequency Range                      | Measurement Uncertainty           | Notes |  |  |  |
|----------------------------------------------|--------------------------------------|-----------------------------------|-------|--|--|--|
| Radiated Emission                            | 30~1000MHz                           | 4.37 dB                           | (1)   |  |  |  |
| Radiated Emission                            | 1~18GHz                              | 5.40 dB                           | (1)   |  |  |  |
| Radiated Emission                            | 18-40GHz                             | 5.45 dB                           | (1)   |  |  |  |
| Conducted Disturbance 0.15~30MHz 2.68 dB (1) |                                      |                                   |       |  |  |  |
| Note (1): The measurement unc                | ertainty is for coverage factor of k | =2 and a level of confidence of § | 95%.  |  |  |  |



# 4. General Information

# 4.1. General Description of EUT

| Product Name:                                                | Guitar intelligent pedal                                                      |
|--------------------------------------------------------------|-------------------------------------------------------------------------------|
| Model No.:                                                   | KE1                                                                           |
| Series model:                                                | AE-1, FE-1, LE-1, SE-1, GE-1, EP-05                                           |
| Test sample(s) ID:                                           | HTT202502084-1(Engineer sample)<br>HTT202502084-2(Normal sample)              |
| Operation Frequency:                                         | 2402MHz~2480MHz                                                               |
| Channel numbers:                                             | 79                                                                            |
| Channel separation:                                          | 1MHz                                                                          |
| Modulation type:                                             | GFSK, π/4-DQPSK                                                               |
| Antenna Type:                                                | Wire Antenna                                                                  |
| Antenna gain:                                                | 3.04 dBi                                                                      |
| Power Supply:                                                | DC 3.7V From Battery and DC 5V From External Circuit                          |
| Adapter Information<br>(Auxiliary test provided by the lab): | Mode: GS-0500200<br>Input: AC100-240V, 50/60Hz, 0.3A max<br>Output: DC 5V, 2A |



| Operation Frequency each of channel |           |         |           |         |           |         |           |  |
|-------------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|--|
| Channel                             | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |  |
| 1                                   | 2402MHz   | 21      | 2422MHz   | 41      | 2442MHz   | 61      | 2462MHz   |  |
| 2                                   | 2403MHz   | 22      | 2423MHz   | 42      | 2443MHz   | 62      | 2463MHz   |  |
| 3                                   | 2404MHz   | 23      | 2424MHz   | 43      | 2444MHz   | 63      | 2464MHz   |  |
| 4                                   | 2405MHz   | 24      | 2425MHz   | 44      | 2445MHz   | 64      | 2465MHz   |  |
| 5                                   | 2406MHz   | 25      | 2426MHz   | 45      | 2446MHz   | 65      | 2466MHz   |  |
| 6                                   | 2407MHz   | 26      | 2427MHz   | 46      | 2447MHz   | 66      | 2467MHz   |  |
| 7                                   | 2408MHz   | 27      | 2428MHz   | 47      | 2448MHz   | 67      | 2468MHz   |  |
| 8                                   | 2409MHz   | 28      | 2429MHz   | 48      | 2449MHz   | 68      | 2469MHz   |  |
| 9                                   | 2410MHz   | 29      | 2430MHz   | 49      | 2450MHz   | 69      | 2470MHz   |  |
| 10                                  | 2411MHz   | 30      | 2431MHz   | 50      | 2451MHz   | 70      | 2471MHz   |  |
| 11                                  | 2412MHz   | 31      | 2432MHz   | 51      | 2452MHz   | 71      | 2472MHz   |  |
| 12                                  | 2413MHz   | 32      | 2433MHz   | 52      | 2453MHz   | 72      | 2473MHz   |  |
| 13                                  | 2414MHz   | 33      | 2434MHz   | 53      | 2454MHz   | 73      | 2474MHz   |  |
| 14                                  | 2415MHz   | 34      | 2435MHz   | 54      | 2455MHz   | 74      | 2475MHz   |  |
| 15                                  | 2416MHz   | 35      | 2436MHz   | 55      | 2456MHz   | 75      | 2476MHz   |  |
| 16                                  | 2417MHz   | 36      | 2437MHz   | 56      | 2457MHz   | 76      | 2477MHz   |  |
| 17                                  | 2418MHz   | 37      | 2438MHz   | 57      | 2458MHz   | 77      | 2478MHz   |  |
| 18                                  | 2419MHz   | 38      | 2439MHz   | 58      | 2459MHz   | 78      | 2479MHz   |  |
| 19                                  | 2420MHz   | 39      | 2440MHz   | 59      | 2460MHz   | 79      | 2480MHz   |  |
| 20                                  | 2421MHz   | 40      | 2441MHz   | 60      | 2461MHz   |         |           |  |

Note:

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

| Channel             | Frequency |
|---------------------|-----------|
| The lowest channel  | 2402MHz   |
| The middle channel  | 2441MHz   |
| The Highest channel | 2480MHz   |

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 Shenzhen, Guangdong, China



## 4.2. Test mode

Transmitting mode Keep the EUT in continuously transmitting mode.

Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.

#### 4.3. Description of Support Units

None.

#### 4.4. Deviation from Standards

None.

#### 4.5. Abnormalities from Standard Conditions

None.

#### 4.6. Test Facility

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

#### FCC-Registration No.: 779513 Designation Number: CN1319

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

#### A2LA-Lab Cert. No.: 6435.01

Shenzhen HTT 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.

#### 4.7. Test Location

All tests were performed at:

Shenzhen HTT Technology Co.,Ltd.

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#### 4.8. Additional Instructions

| Test Software     | Special AT test command provided by manufacturer to Keep the EUT in continuously transmitting mode and hopping mode |
|-------------------|---------------------------------------------------------------------------------------------------------------------|
| Power level setup | Default                                                                                                             |



#### Cal.Due date Inventory Cal.Date Item **Test Equipment** Model No. Manufacturer No. (mm-dd-yy) (mm-dd-yy) 3m Semi- Anechoic Shenzhen C.R.T HTT-E028 1 9\*6\*6 Aug. 10 2024 Aug. 09 2027 technology co., LTD Chamber Shenzhen C.R.T 2 Control Room 4.8\*3.5\*3.0 HTT-E030 Aug. 10 2024 Aug. 09 2027 technology co., LTD 3 **EMI Test Receiver** ESCI7 HTT-E022 Apr. 26 2024 Apr. 25 2025 Rohde&Schwar HTT-E037 Apr. 26 2024 4 Rohde&Schwar FSP Apr. 25 2025 Spectrum Analyzer 5 Coaxial Cable ZDecl ZT26-NJ-NJ-0.6M HTT-E018 Apr. 26 2024 Apr. 25 2025 6 Coaxial Cable ZDecl ZT26-NJ-SMAJ-2M HTT-E019 Apr. 26 2024 Apr. 25 2025 7 Coaxial Cable ZDecl ZT26-NJ-SMAJ-0.6M HTT-E020 Apr. 26 2024 Apr. 25 2025 8 Coaxial Cable ZDecl ZT26-NJ-SMAJ-8.5M HTT-E021 Apr. 26 2024 Apr. 25 2025 Composite logarithmic 9 Schwarzbeck VULB 9168 HTT-E017 May. 21 2024 May. 20 2025 antenna May. 19 2025 10 Schwarzbeck BBHA9120D May. 20 2024 Horn Antenna HTT-E016 11 Loop Antenna Zhinan ZN30900C HTT-E039 Apr. 26 2024 Apr. 25 2025 12 OBH100400 HTT-E040 Horn Antenna Beijing Hangwei Dayang Apr. 26 2024 Apr. 25 2025 low frequency 13 Sonoma Instrument 310 HTT-E015 Apr. 26 2024 Apr. 25 2025 Amplifier high-frequency 14 HP 8449B HTT-E014 Apr. 26 2024 Apr. 25 2025 Amplifier Variable frequency power Shenzhen Anbiao 15 ANB-10VA HTT-082 Apr. 26 2024 Apr. 25 2025 Instrument Co., Ltd supply 16 **EMI Test Receiver** Rohde & Schwarz ESCS30 HTT-E004 Apr. 26 2024 Apr. 25 2025 17 Artificial Mains Rohde & Schwarz ESH3-Z5 HTT-E006 May. 23 2024 May. 22 2025 18 HTT-E038 May. 23 2024 Artificial Mains Rohde & Schwarz ENV-216 May. 22 2025 19 Z302S-NJ-BNCJ-1.5M HTT-E001 Cable Line Robinson Apr. 26 2024 Apr. 25 2025 20 Attenuator Robinson 6810.17A HTT-E007 Apr. 26 2024 Apr. 25 2025 Variable frequency power Shenzhen Yanghong YF-650 (5KVA) 21 HTT-E032 Apr. 26 2024 Apr. 25 2025 Electric Co., Ltd supply Shenzhen C.R.T 22 Control Room 8\*4\*3.5 HTT-E029 Aug. 10 2024 Aug. 09 2027 technology co., LTD 23 DC power supply Agilent E3632A HTT-E023 Apr. 26 2024 Apr. 25 2025 HTT-E024 24 **EMI Test Receiver** Agilent N9020A Apr. 26 2024 Apr. 25 2025 25 Agilent N5181A HTT-E025 Apr. 26 2024 Apr. 25 2025 Analog signal generator 26 Vector signal generator Agilent N5182A HTT-E026 Apr. 26 2024 Apr. 25 2025 27 U2021XA HTT-E027 Apr. 25 2025 Power sensor Keysight Apr. 26 2024 Temperature and Shenzhen Anbiao 28 TH10R HTT-074 Apr. 27 2025 Apr. 28 2024 humidity meter Instrument Co., Ltd Radiated Emission Test 29 Farad EZ-EMC N/A N/A N/A Software Conducted Emission 30 Farad EZ-EMC N/A N/A N/A Test Software 31 **RF** Test Software panshanrf TST N/A N/A N/A

# 5. Test Instruments list

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# 6. Test results and Measurement Data

# 6.1. Conducted Emissions

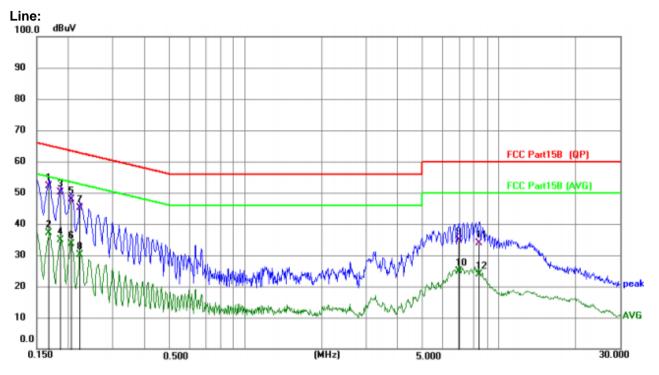
| Test Requirement:     | FCC Part15 C Section 15.207                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ,              |          |          |  |  |  |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------|----------|--|--|--|
| Test Method:          | ANSI C63.10:2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |          |          |  |  |  |
| Test Frequency Range: | 150KHz to 30MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |          |          |  |  |  |
| Class / Severity:     | Class B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Class B        |          |          |  |  |  |
| Receiver setup:       | RBW=9KHz, VBW=30KHz, S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | weep time=auto |          |          |  |  |  |
| Limit:                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Limit          | t (dBuV) |          |  |  |  |
|                       | Frequency range (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Quasi-peak     |          | rage     |  |  |  |
|                       | 0.15-0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 66 to 56*      |          | o 46*    |  |  |  |
|                       | 0.5-5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 56             |          | 6        |  |  |  |
|                       | 5-30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 60             | 5        | 0        |  |  |  |
| Test setup:           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |          |          |  |  |  |
| Test procedure:       | <ul> <li>* Decreases with the logarithm of the frequency.</li> <li>Reference Plane</li> <li>ISN 40cm 80cm Filter AC power</li> <li>Full Filter AC power</li> <li>Fequipment Under Test<br/>LISN Line Impedence Stabilization Network</li> <li>Test table height=0.8m</li> <li>The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 500hm/50uH coupling impedance for the measuring equipment.</li> <li>The peripheral devices are also connected to the main power through a LISN that provides a 500hm/50uH coupling impedance with 500hm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative</li> </ul> |                |          |          |  |  |  |
| Test Instruments:     | according to ANSI C63.10:<br>Refer to section 6.0 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                |          | -        |  |  |  |
| Test mode:            | Refer to section 5.2 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |          |          |  |  |  |
| Test environment:     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | nid.: 52%      | Press.:  | 1012mbar |  |  |  |
| Test voltage:         | AC 120V, 60Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | I              | 1        | 1        |  |  |  |
| Test results:         | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |          |          |  |  |  |
|                       | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |          |          |  |  |  |

Remark: Based on all tested data, the EUT complied with the FCC Part 15.207 standard limit for a wireless device, and with the worst case as below:



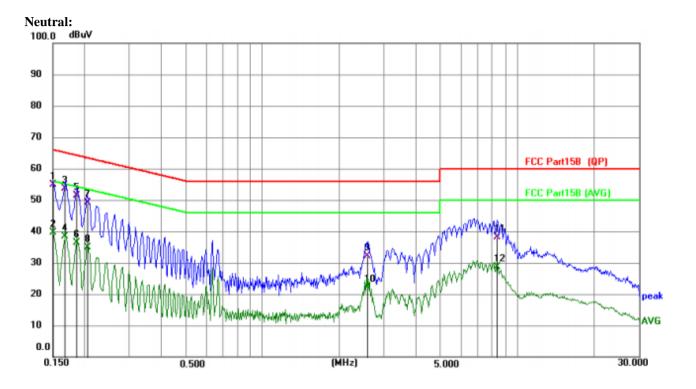
Report No.: HTT202502084F01

#### Measurement data:



| No. Mk. | Freq.  | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit | Over   |          |
|---------|--------|------------------|-------------------|------------------|-------|--------|----------|
|         | MHz    |                  | dB                | dBuV             | dBuV  | dB     | Detector |
| 1 *     | 0.1677 | 42.07            | 10.07             | 52.14            | 65.07 | -12.93 | QP       |
| 2       | 0.1677 | 26.95            | 10.07             | 37.02            | 55.07 | -18.05 | AVG      |
| 3       | 0.1855 | 40.00            | 10.14             | 50.14            | 64.24 | -14.10 | QP       |
| 4       | 0.1855 | 24.85            | 10.14             | 34.99            | 54.24 | -19.25 | AVG      |
| 5       | 0.2044 | 37.63            | 10.19             | 47.82            | 63.43 | -15.61 | QP       |
| 6       | 0.2044 | 23.55            | 10.19             | 33.74            | 53.43 | -19.69 | AVG      |
| 7       | 0.2220 | 34.92            | 10.21             | 45.13            | 62.74 | -17.61 | QP       |
| 8       | 0.2220 | 19.96            | 10.21             | 30.17            | 52.74 | -22.57 | AVG      |
| 9       | 6.9294 | 24.67            | 10.12             | 34.79            | 60.00 | -25.21 | QP       |
| 10      | 6.9294 | 14.84            | 10.12             | 24.96            | 50.00 | -25.04 | AVG      |
| 11      | 8.3706 | 23.86            | 10.10             | 33.96            | 60.00 | -26.04 | QP       |
| 12      | 8.3706 | 13.70            | 10.10             | 23.80            | 50.00 | -26.20 | AVG      |
|         |        |                  |                   |                  |       |        |          |





| No. | Mk. | Freq.  | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit | Over   |          |
|-----|-----|--------|------------------|-------------------|------------------|-------|--------|----------|
|     |     | MHz    |                  | dB                | dBuV             | dBuV  | dB     | Detector |
| 1   | *   | 0.1502 | 44.74            | 10.15             | 54.89            | 65.99 | -11.10 | QP       |
| 2   |     | 0.1502 | 29.53            | 10.15             | 39.68            | 55.99 | -16.31 | AVG      |
| 3   |     | 0.1678 | 43.33            | 10.21             | 53.54            | 65.07 | -11.53 | QP       |
| 4   |     | 0.1678 | 28.23            | 10.21             | 38.44            | 55.07 | -16.63 | AVG      |
| 5   |     | 0.1860 | 41.23            | 10.21             | 51.44            | 64.21 | -12.77 | QP       |
| 6   |     | 0.1860 | 26.15            | 10.21             | 36.36            | 54.21 | -17.85 | AVG      |
| 7   |     | 0.2046 | 38.82            | 10.20             | 49.02            | 63.42 | -14.40 | QP       |
| 8   |     | 0.2046 | 24.66            | 10.20             | 34.86            | 53.42 | -18.56 | AVG      |
| 9   |     | 2.5781 | 22.02            | 10.23             | 32.25            | 56.00 | -23.75 | QP       |
| 10  |     | 2.5781 | 11.98            | 10.23             | 22.21            | 46.00 | -23.79 | AVG      |
| 11  |     | 8.3491 | 28.06            | 10.19             | 38.25            | 60.00 | -21.75 | QP       |
| 12  |     | 8.3491 | 18.37            | 10.19             | 28.56            | 50.00 | -21.44 | AVG      |
|     |     |        |                  |                   |                  |       |        |          |

#### Notes:

- 1. An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3. Final Level =Receiver Read level + LISN Factor + Cable Los

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#### Test Requirement: FCC Part15 C Section 15.247 (b)(3) ANSI C63.10:2013 Test Method: Limit: 30dBm(for GFSK),20.97dBm(for EDR) Power sensor and Spectrum analyzer Test setup: E.U.T Non-Conducted Table Ground Reference Plane **Test Instruments:** Refer to section 6.0 for details Test mode: Refer to section 5.2 for details Pass Test results: 52% Press.: Test environment: Temp.: 25 °C Humid.: 1012mbar

# 6.2. Conducted Peak Output Power

#### **Measurement Data**

| Mode      | ТΧ    | Frequency | Packet | Packet Maximum Peak Conducted Output Power (dBm) |         |      |
|-----------|-------|-----------|--------|--------------------------------------------------|---------|------|
| Туре      | (MHz) | Туре      | ANT1   | Limit                                            | Verdict |      |
|           |       | 2402      | DH5    | -0.98                                            | <=20.97 | Pass |
| GFSK      | SISO  | 2441      | DH5    | -1.70                                            | <=20.97 | Pass |
|           |       | 2480      | DH5    | -2.93                                            | <=20.97 | Pass |
|           |       | 2402      | 2DH5   | -0.21                                            | <=20.97 | Pass |
| Pi/4DQPSK | SISO  | 2441      | 2DH5   | -0.86                                            | <=20.97 | Pass |
|           |       | 2480      | 2DH5   | -2.07                                            | <=20.97 | Pass |



# Test Requirement:FCC Part15 C Section 15.247 (a)(2)Test Method:ANSI C63.10:2013Limit:N/ATest setup:Spectrum AnalyzerImage: Construct of the setup:Image: Construct of the setup:Non-Conducted TableNon-Conducted Table

#### 6.3. 20dB Emission Bandwidth

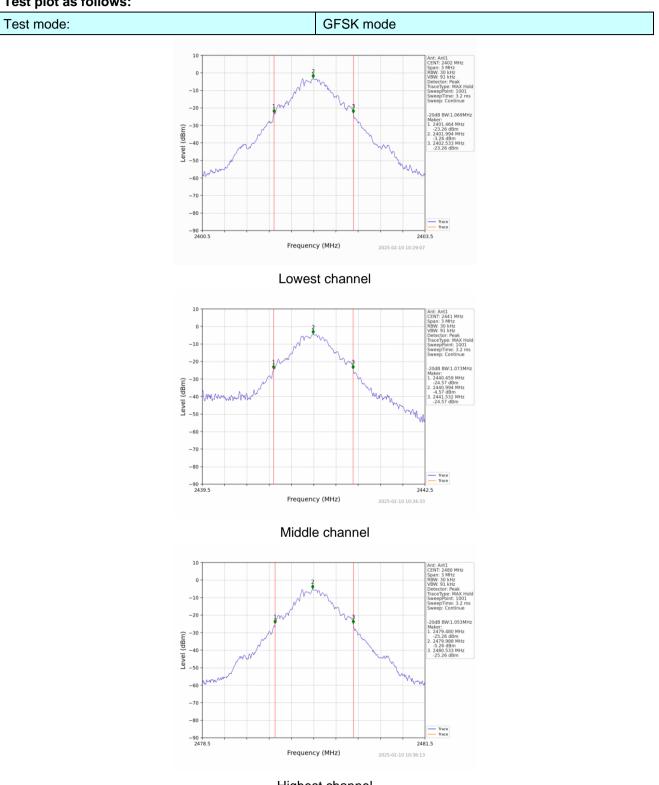
|                   | Ground Reference Plane |                                  |         |     |         |          |  |  |
|-------------------|------------------------|----------------------------------|---------|-----|---------|----------|--|--|
| Test Instruments: | Refer to see           | Refer to section 6.0 for details |         |     |         |          |  |  |
| Test mode:        | Refer to see           | ction 5.2 for a                  | details |     |         |          |  |  |
| Test results:     | Pass                   |                                  |         |     |         |          |  |  |
| Test environment: | Temp.:                 | 25 °C                            | Humid.: | 52% | Press.: | 1012mbar |  |  |

#### **Measurement Data**

| Mode      | ТΧ   | Frequency | Packet | ANT | 20dB Bandy | width (MHz) | Verdict |
|-----------|------|-----------|--------|-----|------------|-------------|---------|
| Туре      | Туре | (MHz)     | Туре   | ANT | Result     | Limit       | verdict |
|           |      | 2402      | DH5    | 1   | 1.069      | /           | Pass    |
| GFSK      | SISO | 2441      | DH5    | 1   | 1.073      | /           | Pass    |
|           |      | 2480      | DH5    | 1   | 1.053      | /           | Pass    |
|           |      | 2402      | 2DH5   | 1   | 1.345      | /           | Pass    |
| Pi/4DQPSK | SISO | 2441      | 2DH5   | 1   | 1.346      | /           | Pass    |
|           |      | 2480      | 2DH5   | 1   | 1.346      | /           | Pass    |

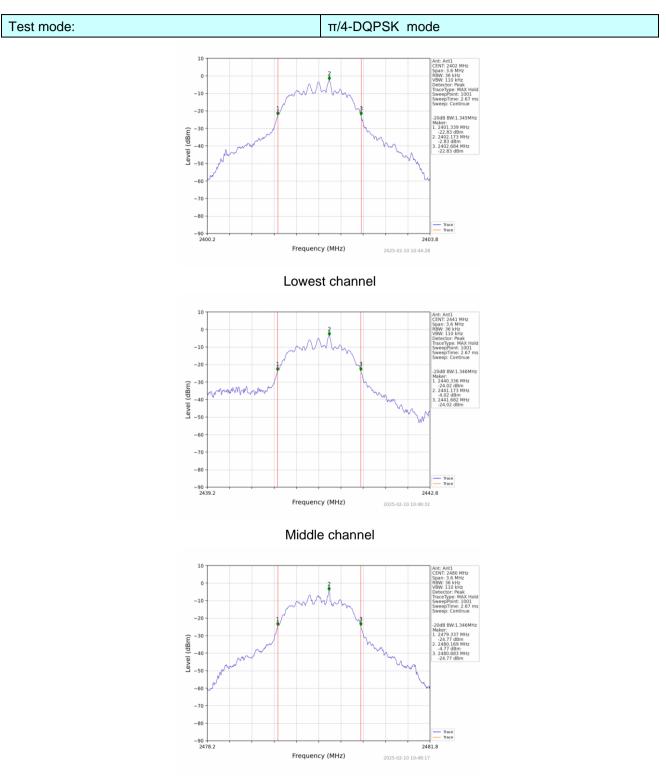


#### Test plot as follows:



Highest channel





Highest channel



# 6.4. Frequencies Separation

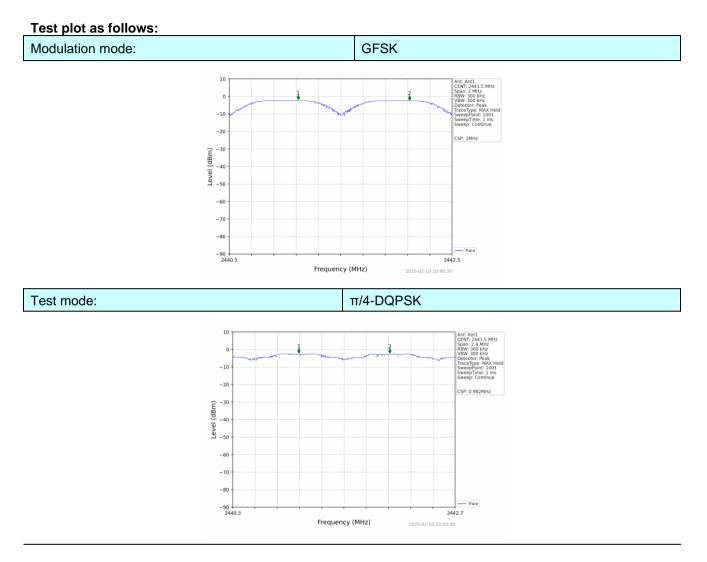
| Test Requirement: | FCC Part1   | 5 C Section 1               | 5.247 (a)(1) |            |             |              |  |  |
|-------------------|-------------|-----------------------------|--------------|------------|-------------|--------------|--|--|
| Test Method:      | ANSI C63.   | 10:2013                     |              |            |             |              |  |  |
| Receiver setup:   | RBW=100     | KHz, VBW=30                 | 00KHz, detec | tor=Peak   |             |              |  |  |
| Limit:            |             | IB bandwidth<br>K ∶ 0.025MH | Iz or 2/3 of | the 20dB b | oandwidth ( | whichever is |  |  |
| Test setup:       | Sp          |                             |              |            |             |              |  |  |
| Test Instruments: | Refer to se | ction 6.0 for a             | details      |            |             |              |  |  |
| Test mode:        | Refer to se | ction 5.2 for a             | details      |            |             |              |  |  |
| Test results:     | Pass        | Pass                        |              |            |             |              |  |  |
| Test environment: | Temp.:      | 25 °C                       | Humid.:      | 52%        | Press.:     | 1012mbar     |  |  |
|                   |             |                             |              |            |             |              |  |  |

#### Measurement Data

|           |      |           |        | Ant1               |                |         |         |
|-----------|------|-----------|--------|--------------------|----------------|---------|---------|
| Mode      | ТΧ   | Frequency | Packet | Channel Separation | 20dB Bandwidth | Limit   | Verdict |
| woue      | Туре | (MHz)     | Туре   | (MHz)              | (MHz)          | (MHz)   | verdict |
| GFSK      | SISO | HOPP      | DH5    | 1.000              | 1.073          | >=0.715 | Pass    |
| Pi/4DQPSK | SISO | HOPP      | 2DH5   | 0.982              | 1.346          | >=0.897 | Pass    |

Remark: We have tested all mode at high, middle and low channel, and recorded worst case at middle







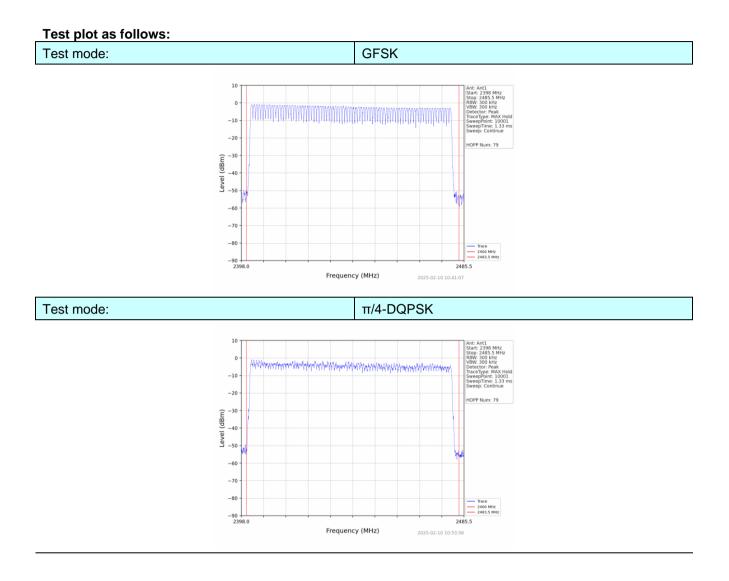
| Test Requirement: | FCC Part15             | FCC Part15 C Section 15.247 (a)(1)(iii) |             |              |            |          |  |  |  |  |
|-------------------|------------------------|-----------------------------------------|-------------|--------------|------------|----------|--|--|--|--|
| Test Method:      | ANSI C63.1             | 0:2013                                  |             |              |            |          |  |  |  |  |
| Receiver setup:   | RBW=100k<br>Detector=P | Hz, VBW=30<br>eak                       | 0kHz, Frequ | ency range=2 | 2400MHz-24 | 83.5MHz, |  |  |  |  |
| Limit:            | 15 channels            | 15 channels                             |             |              |            |          |  |  |  |  |
| Test setup:       | Spe                    |                                         |             | 2.U.T        |            |          |  |  |  |  |
| Test Instruments: | Refer to see           | ction 6.0 for c                         | letails     |              |            |          |  |  |  |  |
| Test mode:        | Refer to see           | ction 5.2 for c                         | letails     |              |            |          |  |  |  |  |
| Test results:     | Pass                   | Pass                                    |             |              |            |          |  |  |  |  |
| Test environment: | Temp.:                 | 25 °C                                   | Humid.:     | 52%          | Press.:    | 1012mbar |  |  |  |  |

# 6.5. Hopping Channel Number

#### **Measurement Data:**

| Mode      | Hopping channel numbers | Limit | Result |
|-----------|-------------------------|-------|--------|
| GFSK      | 79                      | 245   | Pass   |
| π/4-DQPSK | 79                      | ≥15   | Pass   |







# 6.6. Dwell Time

| Test Requirement: | FCC Part15   | 5 C Section 1   | 5.247 (a)(1)(i | iii)          |         |          |  |  |  |
|-------------------|--------------|-----------------|----------------|---------------|---------|----------|--|--|--|
| Test Method:      | ANSI C63.1   | 0:2013          |                |               |         |          |  |  |  |
| Receiver setup:   | RBW=1MH      | z, VBW=1M⊦      | lz, Span=0H    | z, Detector=F | Peak    |          |  |  |  |
| Limit:            | 0.4 Second   | 0.4 Second      |                |               |         |          |  |  |  |
| Test setup:       | Sp           |                 |                |               |         |          |  |  |  |
| Test Instruments: | Refer to see | ction 6.0 for c | letails        |               |         |          |  |  |  |
| Test mode:        | Refer to see | ction 5.2 for c | letails        |               |         |          |  |  |  |
| Test results:     | Pass         | Pass            |                |               |         |          |  |  |  |
| Test environment: | Temp.:       | 25 °C           | Humid.:        | 52%           | Press.: | 1012mbar |  |  |  |
|                   |              |                 |                |               |         |          |  |  |  |



#### **Measurement Data**

| Modulation | Packet | Burst time<br>(ms) | Dwell time<br>(ms) | Limit (ms) | Result |  |
|------------|--------|--------------------|--------------------|------------|--------|--|
|            | DH1    | 0.380              | 119.700            |            |        |  |
| GFSK       | DH3    | 1.638              | 248.976            | 400        | Pass   |  |
|            | DH5    | 2.884              | 282.632            |            |        |  |
|            | 2-DH1  | 0.390              | 124.800            |            |        |  |
| π/4DQPSK   | 2-DH3  | 1.650              | 268.950            | 400        | Pass   |  |
|            | 2-DH5  | 2.892              | 306.552            |            |        |  |

Note:We have tested all mode at high, middle and low channel, and recoreded worst case at middle channel.

Dwell time=Pulse time (ms) x (1600  $\div$  2  $\div$  79) x31.6 Second for DH1, 2-DH1

Dwell time=Pulse time (ms) × (1600  $\div$  4  $\div$  79) ×31.6 Second for DH3, 2-DH3

Dwell time=Pulse time (ms) x (1600  $\div$  6  $\div$  79) x31.6 Second for DH5, 2-DH5



Test plot as follows:

#### Report No.: HTT202502084F01

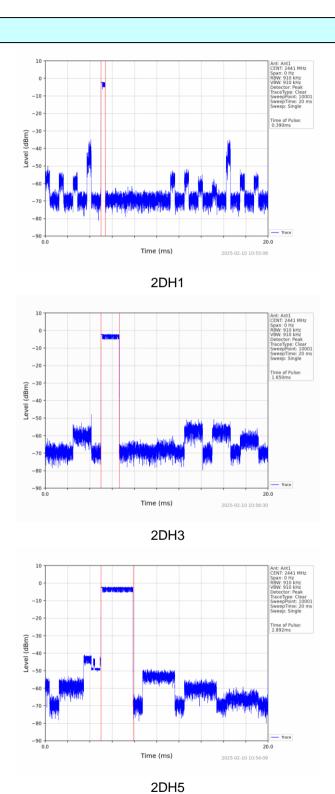
#### GFSK mode 10 Span: 0 Hz RBW: 910 kHz VBW: 910 kHz 0 -10 -20 Time of Pulse 0.380ms -30 Level (dBm) -40 -5 -60 -70 -80 -90 + 0.0 Trace 20.0 Time (ms) 2025-02-10 10:42:16 DH1 10 Ant: Ant1 CENT: 2441 MH Span: 0 Hz RBW: 910 kHz VBW: 910 kHz nt1 2441 MHz -10 -20 Time of Pulse 1.638ms (mgp) -40 -40 -50 -60 -70 -80 Trace -90 20.0 Time (ms) 2025-02-10 10:43:11 DH3 10 Ant: Ant1 CENT: 2441 I Span: 0 Hz RBW: 1 MHz VBW: 1 MHz Detector: Pe TraceType: C SweepPoint: SweepTime: Sweep: Singl C -10 -20 Time of Pulse 2.884ms -30 Level (dBm) -40 -50 -60 -70 -80 -90 +-0.0 Trace 20.0 Time (ms) 2025-02-10 10:41:21

DH5

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#### π/4-DQPSK mode

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 Shenzhen, Guangdong, China



# 6.7. Band Edge

## 6.7.1. Conducted Emission Method

| Test Requirement: | FCC Part15                                               | 5 C Section 1                                                                       | 5.247 (d) |     |         |          |  |  |
|-------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------|-----------|-----|---------|----------|--|--|
| Test Method:      | ANSI C63.1                                               | 0:2013                                                                              |           |     |         |          |  |  |
| Receiver setup:   | RBW=100k                                                 | RBW=100kHz, VBW=300kHz, Detector=Peak                                               |           |     |         |          |  |  |
| Limit:            | spectrum in<br>is produced<br>the 100 kHz<br>the desired |                                                                                     |           |     |         |          |  |  |
| Test setup:       | Spec                                                     | Measurement.  Spectrum Analyzer  E.U.T  Non-Conducted Table  Ground Reference Plane |           |     |         |          |  |  |
| Test Instruments: | Refer to see                                             | ction 6.0 for c                                                                     | letails   |     |         |          |  |  |
| Test mode:        | Refer to see                                             | ction 5.2 for c                                                                     | letails   |     |         |          |  |  |
| Test results:     | Pass                                                     |                                                                                     |           |     |         |          |  |  |
| Test environment: | Temp.:                                                   | 25 °C                                                                               | Humid.:   | 52% | Press.: | 1012mbar |  |  |



Test plot as follows:

GFSK Mode:

#### Report No.: HTT202502084F01

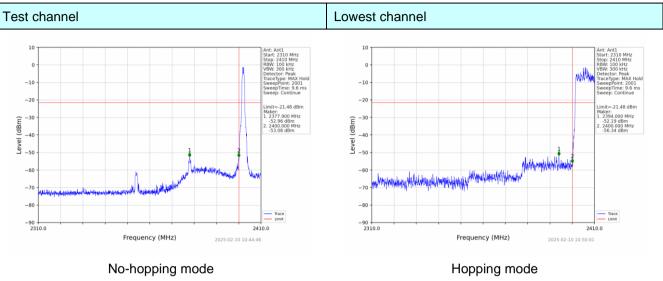
#### Test channel Lowest channel 10 -10 -10 -20 -20 -21.51 dBn 21.51 dB iker: 2378.050 MHz -50.96 dBm 2400.000 MHz -54.38 dBm (dBm) -30 -31 Level (dBm) -40 -40 ) -+--50 -50 MANAMAN -60 -6 -70 -70 -80 -8 Trace Limit -90 2410.0 2410.0 Frequency (MHz) Frequency (MHz) 2025-02-10 10:29:25 2025-02-10 10:37:48 No-hopping mode Hopping mode Test channel: Highest channel 10 0 -10 -10 -20 -21 51 dB 21 51 d aker: 2494.848 MHz -59.73 dBm 2483.500 MHz -62.41 dBm (dBm) -30 (dBm) aker: 2495.044 MHz -53.64 dBm 2483.500 MHz -62.38 dBm -3 -40 -40 -40 –40 –50 -40 –40 –50 monnan -60 -60 -70 -70 -80 -80 Trace Limit Trace Limit -90 2472.0 2500.0 2500.0 Frequency (MHz) Frequency (MHz) 2025-02-10 10:36:31 2025-02-10 10:38:04

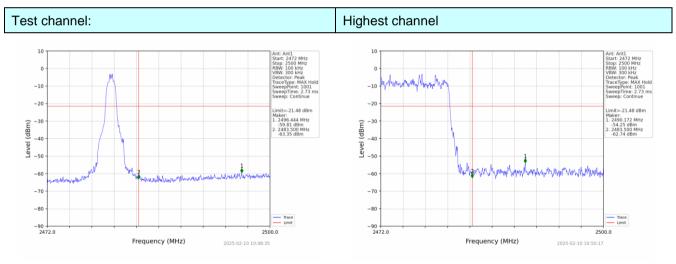
No-hopping mode

Hopping mode



#### π/4-DQPSK Mode:





No-hopping mode

Hopping mode



| 6.7.2. Radiated E     | Emission Me                                                                                                                                                                                                                                               | thod                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |                     |                |                      |  |  |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------|----------------|----------------------|--|--|
| Test Requirement:     | FCC Part15                                                                                                                                                                                                                                                | C Section 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 5.209 and 15      | .205                |                |                      |  |  |
| Test Method:          | ANSI C63.1                                                                                                                                                                                                                                                | 0:2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                     |                |                      |  |  |
| Test Frequency Range: |                                                                                                                                                                                                                                                           | estrict bands<br>lata was sho                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   | , only the w        | orst band's (ź | 2310MHz to           |  |  |
| Test site:            | Measureme                                                                                                                                                                                                                                                 | nt Distance:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |                     |                |                      |  |  |
| Receiver setup:       | Frequenc                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                     |                | emark                |  |  |
|                       | Above 1G                                                                                                                                                                                                                                                  | Hz Pea                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   | Hz 3MH              |                | k Value              |  |  |
|                       | E.                                                                                                                                                                                                                                                        | Pea                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   | Hz 10H              |                | ige Value            |  |  |
| Limit:                | Fre                                                                                                                                                                                                                                                       | equency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   | dBuV/m @3i<br>54.00 |                | emark                |  |  |
|                       | Abo                                                                                                                                                                                                                                                       | ve 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   | 74.00               |                | ige Value<br>k Value |  |  |
|                       | Turn Tables<br><150cm;                                                                                                                                                                                                                                    | - A-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | < 1m<br>Receiver+ |                     |                |                      |  |  |
| Test Procedure:       | <ul> <li>ground a determine</li> <li>2. The EUT antenna, tower.</li> <li>3. The ante ground to horizonta measure</li> <li>4. For each and then and then and the romaximum</li> <li>5. The test-Specified</li> <li>6. If the emilimit specified</li> </ul> | <ul> <li>Receiver Preamplifier</li> <li>1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have</li> </ul> |                   |                     |                |                      |  |  |
| Test Instruments:     | Refer to sec                                                                                                                                                                                                                                              | tion 6.0 for d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | etails            |                     |                |                      |  |  |
| Test mode:            | Refer to sec                                                                                                                                                                                                                                              | tion 5.2 for d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | etails            |                     |                |                      |  |  |
| Test results:         | Pass                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                     |                |                      |  |  |
| Test environment:     | Temp.:                                                                                                                                                                                                                                                    | 25 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Humid.:           | 52%                 | Press.:        | 1012mbar             |  |  |

#### Padiated Emission Method 7 0

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#### **Measurement Data**

Remark: GFSK, Pi/4 DQPSK all have been tested, only worse case GFSK is reported.

Operation Mode: GFSK

| Freque             | ncy(MHz)                        | :   | 24                | 02             | Pola                   | arity:                      | Н                       |                           | NL                             |
|--------------------|---------------------------------|-----|-------------------|----------------|------------------------|-----------------------------|-------------------------|---------------------------|--------------------------------|
| Frequency<br>(MHz) | Emis<br>Le <sup>v</sup><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) |
| 2390.00            | 59.72                           | PK  | 74                | 14.28          | 61.11                  | 27.2                        | 4.31                    | 32.9                      | -1.39                          |
| 2390.00            | 46.23                           | AV  | 54                | 7.77           | 47.62                  | 27.2                        | 4.31                    | 32.9                      | -1.39                          |
| Freque             | ncy(MHz)                        | :   | 24                | 02             | Pola                   | arity:                      |                         | VERTICAL                  |                                |
| Frequency<br>(MHz) | Emis<br>Le <sup>.</sup><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) |
| 2390.00            | 59.56                           | PK  | 74                | 14.44          | 60.95                  | 27.2                        | 4.31                    | 32.9                      | -1.39                          |
| 2390.00            | 45.96                           | AV  | 54                | 8.04           | 47.35                  | 27.2                        | 4.31                    | 32.9                      | -1.39                          |
| Freque             | ncy(MHz)                        | :   | 24                | 80             | P olarity:             |                             | н                       | IORIZONTA                 | AL.                            |
| Frequency<br>(MHz) | Emis<br>Le <sup>v</sup><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) |
| 2483.50            | 56.53                           | PK  | 74                | 17.47          | 57.46                  | 27.4                        | 4.47                    | 32.8                      | -0.93                          |
| 2483.50            | 45.00                           | AV  | 54                | 9.00           | 45.93                  | 27.4                        | 4.47                    | 32.8                      | -0.93                          |
| Freque             | ncy(MHz)                        | :   | 24                | 80             | Pola                   | arity:                      |                         | VERTICAL                  |                                |
| Frequency<br>(MHz) | Emis<br>Le <sup>v</sup><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) |
| 2483.50            | 54.50                           | PK  | 74                | 19.50          | 55.43                  | 27.4                        | 4.47                    | 32.8                      | -0.93                          |
| 2483.50            | 45.12                           | AV  | 54                | 8.88           | 46.05                  | 27.4                        | 4.47                    | 32.8                      | -0.93                          |

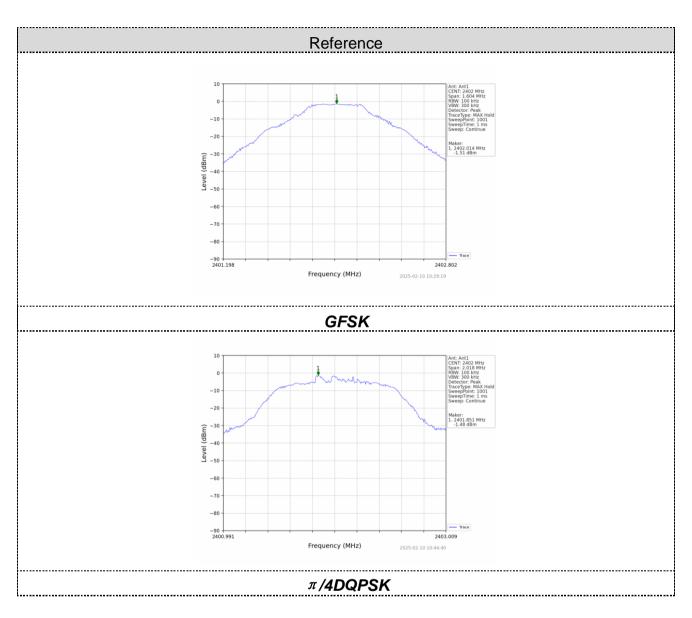


| 6.8. | Spurious | Emission |
|------|----------|----------|
|------|----------|----------|

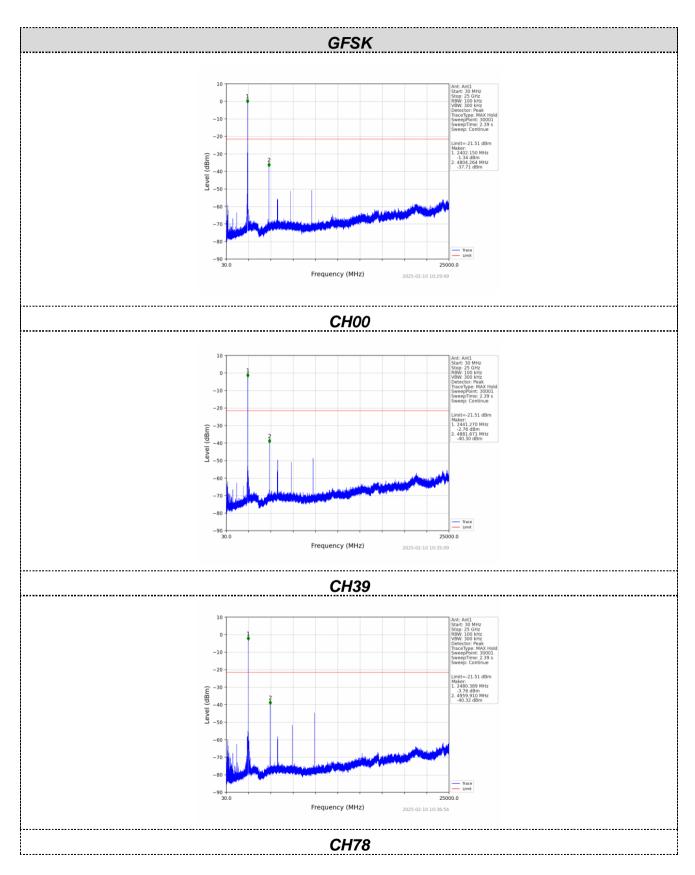
# 6.8.1. Conducted Emission Method

| Test Requirement: | FCC Part15 C                                                                                           | Section 2                                                                         | 15.247 (d)                                          |                                                        |                                             |                                             |  |  |  |  |  |
|-------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------|---------------------------------------------|---------------------------------------------|--|--|--|--|--|
| Test Method:      | ANSI C63.10:2                                                                                          | 2013                                                                              |                                                     |                                                        |                                             |                                             |  |  |  |  |  |
| Limit:            | In any 100 kH:<br>spectrum inter<br>is produced by<br>the 100 kHz ba<br>the desired po<br>measurement. | ntional rac<br>/ the inter<br>andwidth<br>wer, base                               | liator is opera<br>ntional radiato<br>within the ba | ating, the radio<br>or shall be at l<br>nd that contai | o frequency<br>east 20 dB t<br>ns the highe | power that<br>below that in<br>est level of |  |  |  |  |  |
| Test setup:       | Spectr                                                                                                 | Spectrum Analyzer         E.U.T         Non-Conducted Table                       |                                                     |                                                        |                                             |                                             |  |  |  |  |  |
| Test Instruments: | Refer to section                                                                                       | on 6.0 for                                                                        | details                                             |                                                        |                                             |                                             |  |  |  |  |  |
| Test mode:        | Refer to section                                                                                       | on 5.2 for                                                                        | details                                             |                                                        |                                             |                                             |  |  |  |  |  |
| Test results:     | Pass                                                                                                   |                                                                                   |                                                     |                                                        |                                             |                                             |  |  |  |  |  |
| Test environment: | Temp.: 2                                                                                               | Temp.:         25 °C         Humid.:         52%         Press.:         1012mbar |                                                     |                                                        |                                             |                                             |  |  |  |  |  |





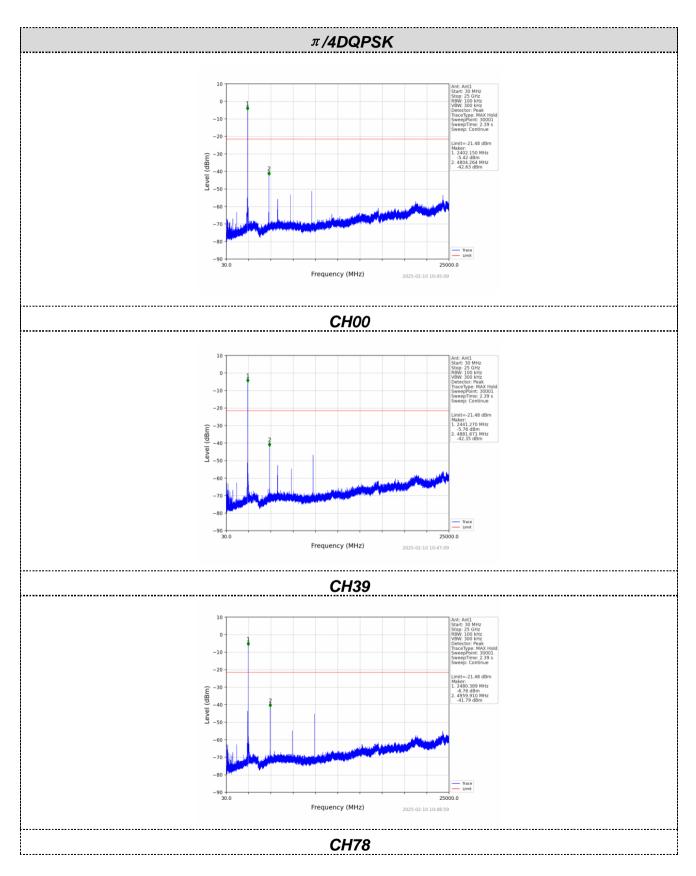




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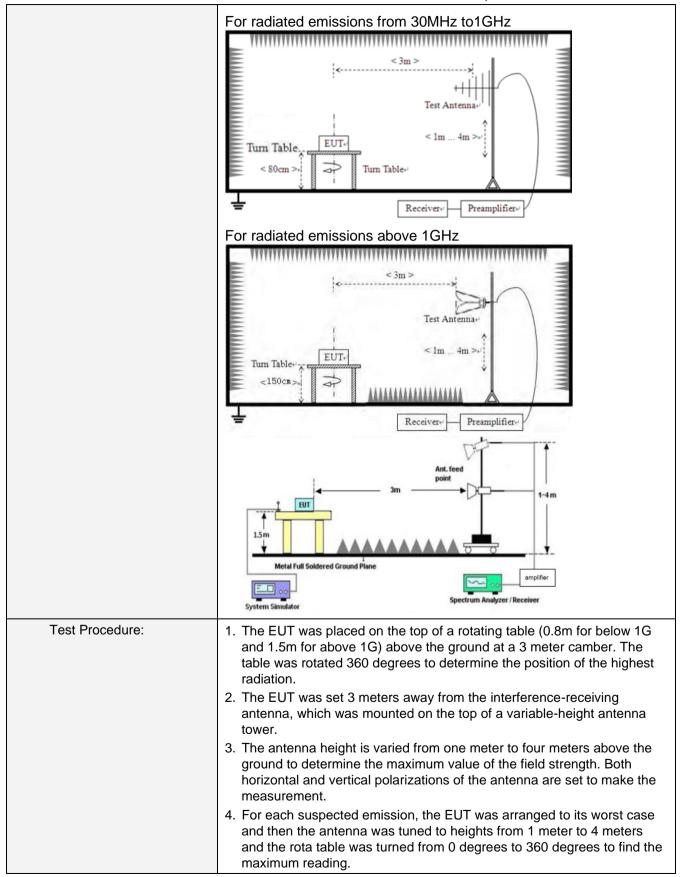
 1F, Building B, Huafeng International Robotics Industrial Park, Hangcheng Road,Nanchang Community, Xixiang Street, Bao'an District,
 Shenzhen, Guangdong, China



| 6.8.2. Radiated E     | mission Method       |        |              |         |         |       |     |                         |
|-----------------------|----------------------|--------|--------------|---------|---------|-------|-----|-------------------------|
| Test Requirement:     | FCC Part15 C Section | on 15  | 5.209        |         |         |       |     |                         |
| Test Method:          | ANSI C63.10:2013     |        |              |         |         |       |     |                         |
| Test Frequency Range: | 9kHz to 25GHz        |        |              |         |         |       |     |                         |
| Test site:            | Measurement Distar   | nce: 3 | 3m           |         |         |       |     |                         |
| Receiver setup:       | Frequency            | ۵      | Detector     | RBV     | N       | VBW   | '   | Value                   |
|                       | 9KHz-150KHz          | Qı     | uasi-peak    | 200     | Ηz      | 600Hz | z   | Quasi-peak              |
|                       | 150KHz-30MHz         | Qı     | lasi-peak    | 9KH     | lz      | 30KH: | z   | Quasi-peak              |
|                       | 30MHz-1GHz           | Qı     | lasi-peak    | 120K    | Hz      | 300KH | lz  | Quasi-peak              |
|                       | Above 1GHz           |        | Peak         | 1M⊦     | łz      | 3MHz  | z   | Peak                    |
|                       | 7,5076 16112         |        | Peak         | 1M⊦     | lz      | 10Hz  |     | Average                 |
| Limit:                | Frequency            |        | Limit (u∖    | //m)    | V       | alue  | Ν   | leasurement<br>Distance |
|                       | 0.009MHz-0.490M      | Hz     | 2400/F(k     | (Hz)    |         | QP    |     | 300m                    |
|                       | 0.490MHz-1.705M      | Hz     | 24000/F(KHz) |         | QP      |       | 30m |                         |
|                       | 1.705MHz-30MH        | Z      | 30           |         | QP      |       | 30m |                         |
|                       | 30MHz-88MHz          |        | 100          |         |         | QP    |     |                         |
|                       | 88MHz-216MHz         | _      | 150          |         |         | QP    |     |                         |
|                       | 216MHz-960MH         | Z      |              |         |         | QP    |     | 3m                      |
|                       | 960MHz-1GHz          |        | 500          |         | QP      |       |     |                         |
|                       | Above 1GHz           |        | 500          |         | Average |       |     |                         |
|                       |                      |        | 5000         |         | Peak    |       |     |                         |
| Test setup:           | For radiated emiss   | ions   | from 9kH     | z to 30 | MH      | Z     |     | _                       |
|                       | <pre></pre>          |        |              |         |         |       |     |                         |

# 6.8.2. Radiated Emission Method







|                   | Report No.: HTT202502084F01                                                                                                                                                                                                                                                                                                                            |               |                             |     |                |               |  |  |  |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------|-----|----------------|---------------|--|--|--|
|                   |                                                                                                                                                                                                                                                                                                                                                        | ,             | stem was set<br>imum Hold M |     | etect Function | and Specified |  |  |  |
|                   | 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. |               |                             |     |                |               |  |  |  |
| Test Instruments: | Refer to se                                                                                                                                                                                                                                                                                                                                            | ction 6.0 for | details                     |     |                |               |  |  |  |
| Test mode:        | Refer to se                                                                                                                                                                                                                                                                                                                                            | ction 5.2 for | details                     |     |                |               |  |  |  |
| Test environment: | Temp.:                                                                                                                                                                                                                                                                                                                                                 | 25 °C         | Humid.:                     | 52% | Press.:        | 1012mbar      |  |  |  |
| Test voltage:     | AC 120V, 60Hz                                                                                                                                                                                                                                                                                                                                          |               |                             |     |                |               |  |  |  |
| Test results:     | Pass                                                                                                                                                                                                                                                                                                                                                   |               |                             |     |                |               |  |  |  |

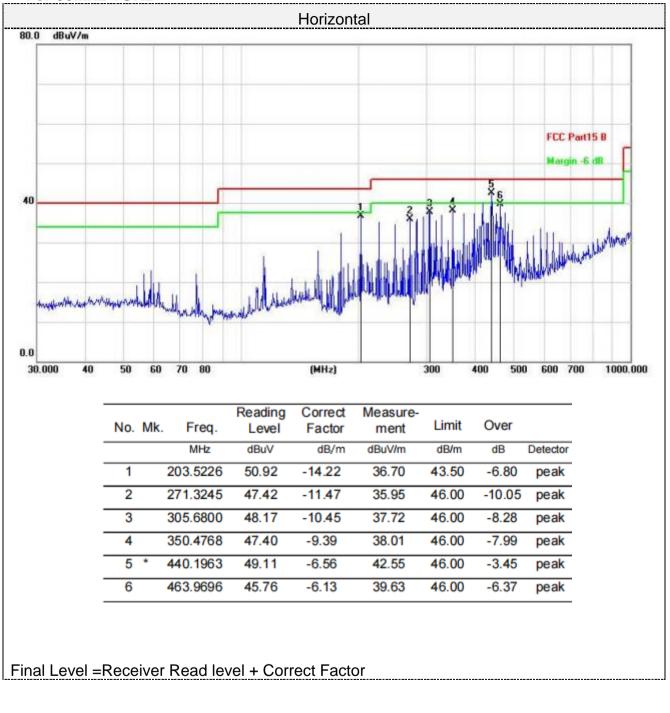
#### Measurement data:

Remarks:

- 1. During the test, pre-scan the GFSK,  $\pi/4$ -DQPSK modulation, and found the GFSK modulation which it is worse case.
- 2. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.
- 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.
- 4. Based on all tested data, the EUT complied with the FCC Part 15.207 standard limit for a wireless device, and with the worst case as DH5 2402MHz as below:



# For 30MHz-1GHz

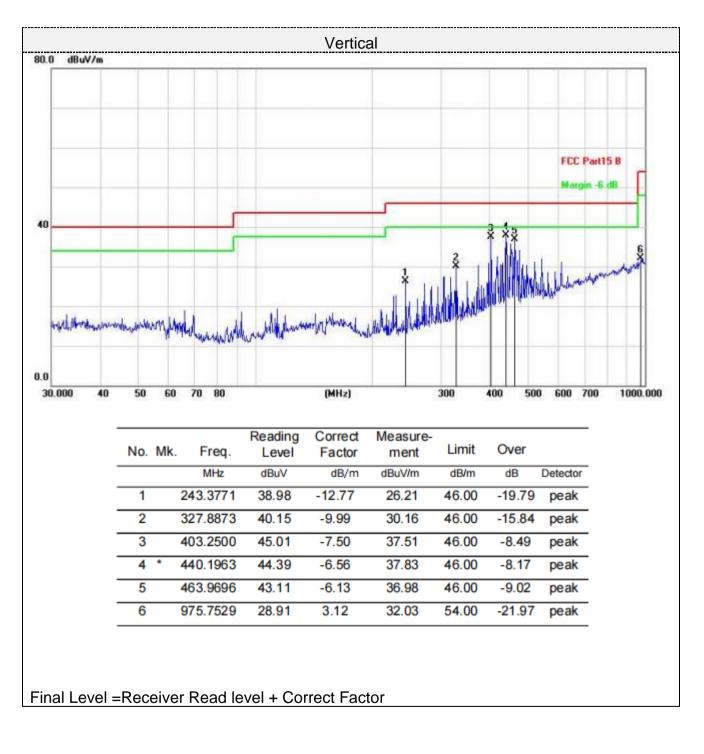


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# For 1GHz to 25GHz

Remark: For test above 1GHz GFSK,Pi/4 DQPSK were test at Low, Middle, and High channel; only the worst result of GFSK was reported as below:

| Freque             | Frequency(MHz): |                     |                   | 2402           |                        | Polarity:                   |                         | HORIZONTAL                |                                |  |  |
|--------------------|-----------------|---------------------|-------------------|----------------|------------------------|-----------------------------|-------------------------|---------------------------|--------------------------------|--|--|
| 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) |  |  |
| 4804.00            | 59.41           | PK                  | 74                | 14.59          | 53.71                  | 31                          | 6.5                     | 31.8                      | 5.7                            |  |  |
| 4804.00            | 41.81           | AV                  | 54                | 12.19          | 36.11                  | 31                          | 6.5                     | 31.8                      | 5.7                            |  |  |
| 7206.00            | 52.72           | PK                  | 74                | 21.28          | 40.07                  | 36                          | 8.15                    | 31.5                      | 12.65                          |  |  |
| 7206.00            | 44.73           | AV                  | 54                | 9.27           | 32.08                  | 36                          | 8.15                    | 31.5                      | 12.65                          |  |  |

| Freque             | Frequency(MHz):                 |    |                   | 2402           |                        | Polarity:                   |                         | VERTICAL                  |                                |  |  |
|--------------------|---------------------------------|----|-------------------|----------------|------------------------|-----------------------------|-------------------------|---------------------------|--------------------------------|--|--|
| Frequency<br>(MHz) | Emis<br>Le <sup>.</sup><br>(dBu |    | 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) |  |  |
| 4804.00            | 58.93                           | PK | 74                | 15.07          | 53.23                  | 31                          | 6.5                     | 31.8                      | 5.7                            |  |  |
| 4804.00            | 43.22                           | AV | 54                | 10.78          | 37.52                  | 31                          | 6.5                     | 31.8                      | 5.7                            |  |  |
| 7206.00            | 52.57                           | PK | 74                | 21.43          | 39.92                  | 36                          | 8.15                    | 31.5                      | 12.65                          |  |  |
| 7206.00            | 43.10                           | AV | 54                | 10.90          | 30.45                  | 36                          | 8.15                    | 31.5                      | 12.65                          |  |  |

| Freque             | Frequency(MHz): |                     |                   | 2441           |                        | Polarity:                   |                         | HORIZONTAL                |                                |  |  |
|--------------------|-----------------|---------------------|-------------------|----------------|------------------------|-----------------------------|-------------------------|---------------------------|--------------------------------|--|--|
| 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) | Correction<br>Factor<br>(dB/m) |  |  |
| 4882.00            | 60.75           | PK                  | 74                | 13.25          | 54.59                  | 31.2                        | 6.61                    | 31.65                     | 6.16                           |  |  |
| 4882.00            | 44.85           | AV                  | 54                | 9.15           | 38.69                  | 31.2                        | 6.61                    | 31.65                     | 6.16                           |  |  |
| 7323.00            | 53.21           | PK                  | 74                | 20.79          | 40.26                  | 36.2                        | 8.23                    | 31.48                     | 12.95                          |  |  |
| 7323.00            | 43.07           | AV                  | 54                | 10.93          | 30.12                  | 36.2                        | 8.23                    | 31.48                     | 12.95                          |  |  |

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| Freque             | Frequency(MHz):                 |     |                   | 2441           |                        | Polarity:                   |                         | VERTICAL                  |                                |  |
|--------------------|---------------------------------|-----|-------------------|----------------|------------------------|-----------------------------|-------------------------|---------------------------|--------------------------------|--|
| Frequency<br>(MHz) | Emis<br>Le <sup>.</sup><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) |  |
| 4882.00            | 60.86                           | PK  | 74                | 13.14          | 54.70                  | 31.2                        | 6.61                    | 31.65                     | 6.16                           |  |
| 4882.00            | 44.14                           | AV  | 54                | 9.86           | 37.98                  | 31.2                        | 6.61                    | 31.65                     | 6.16                           |  |
| 7323.00            | 52.67                           | PK  | 74                | 21.33          | 39.72                  | 36.2                        | 8.23                    | 31.48                     | 12.95                          |  |
| 7323.00            | 43.95                           | AV  | 54                | 10.05          | 31.00                  | 36.2                        | 8.23                    | 31.48                     | 12.95                          |  |

| Freque             | Frequency(MHz):                  |    |                   | 2480           |                        | Polarity:                   |                         | HORIZONTAL                |                                |  |
|--------------------|----------------------------------|----|-------------------|----------------|------------------------|-----------------------------|-------------------------|---------------------------|--------------------------------|--|
| Frequency<br>(MHz) | Emis<br>Le <sup>v</sup><br>(dBu) |    | 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) |  |
| 4960.00            | 62.58                            | PK | 74                | 11.42          | 55.92                  | 31.4                        | 6.76                    | 31.5                      | 6.66                           |  |
| 4960.00            | 42.66                            | AV | 54                | 11.34          | 36.00                  | 31.4                        | 6.76                    | 31.5                      | 6.66                           |  |
| 7440.00            | 53.50                            | PK | 74                | 20.50          | 40.20                  | 36.4                        | 8.35                    | 31.45                     | 13.3                           |  |
| 7440.00            | 45.92                            | AV | 54                | 8.08           | 32.62                  | 36.4                        | 8.35                    | 31.45                     | 13.3                           |  |

| Freque             | Frequency(MHz):     |    |                   | 2480           |                        | Polarity:                   |                         | VERTICAL                  |                                |  |  |
|--------------------|---------------------|----|-------------------|----------------|------------------------|-----------------------------|-------------------------|---------------------------|--------------------------------|--|--|
| Frequency<br>(MHz) | Emis<br>Lev<br>(dBu |    | 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) |  |  |
| 4960.00            | 63.94               | PK | 74                | 10.06          | 57.28                  | 31.4                        | 6.76                    | 31.5                      | 6.66                           |  |  |
| 4960.00            | 42.23               | AV | 54                | 11.77          | 35.57                  | 31.4                        | 6.76                    | 31.5                      | 6.66                           |  |  |
| 7440.00            | 54.34               | PK | 74                | 19.66          | 41.04                  | 36.4                        | 8.35                    | 31.45                     | 13.3                           |  |  |
| 7440.00            | 44.45               | AV | 54                | 9.55           | 31.15                  | 36.4                        | 8.35                    | 31.45                     | 13.3                           |  |  |

#### Remark:

(1) 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.

(2) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed.

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# 6.9. 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

# FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1) (I):

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

#### Antenna Connected Construction

The maximum gain of antenna was 3.04 dBi.

Remark: The antenna gain is provided by the customer, if the data provided by the customer is not accurate, Shenzhen HTT Technology Co., Ltd. does not assume any responsibility.



# 7. Test Setup Photo

Reference to the **appendix I** for details.

# 8. EUT Constructional Details

Reference to the **appendix II** for details.

-----End-----