

# TEST REPORT

Report No.:SHATBL2512011W01

**Applicant** : Shenzhen DOOGEE Hengtong Technology CO.,LTD

**Product Name** : Tablet

**Brand Name** : DOOGEE

**Model Name** : Tab G5

**Series Model** : Tab G5+,Tab G5 Pro,Tab G5 Pro+,Tab G5 Max,  
Tab G5 Ultra

**FCC ID** : 2AX4YTABG5

**Test Standard** : FCC CFR Title 47 Part 15 Subpart C Section 15.247

**Date of Sample Arrival** : Dec.03, 2025

**Date of Test** : Dec.03, 2025~Jan.31.2026

**Issue Date** : Jan.31, 2026

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**TABLE OF CONTENTS**

|                                                           |    |
|-----------------------------------------------------------|----|
| REVISION HISTORY .....                                    | 3  |
| DECLARATION OF REPORT .....                               | 4  |
| SUMMARY OF TEST RESULT .....                              | 5  |
| 1. GENERAL DESCRIPTION .....                              | 6  |
| 1.1. Applicant .....                                      | 6  |
| 1.2. Manufacturer .....                                   | 6  |
| 1.3. Factory .....                                        | 6  |
| 1.4. General Information of EUT .....                     | 7  |
| 1.5. Equipment Specification .....                        | 8  |
| 1.6. Modification of EUT .....                            | 8  |
| 1.7. Laboratory Information .....                         | 8  |
| 1.8. Applicable Standards .....                           | 8  |
| 2. TEST CONFIGURATION OF EUT .....                        | 9  |
| 2.1. Carrier Frequency Channel .....                      | 9  |
| 2.2. Test Modes .....                                     | 10 |
| 2.3. Block Diagram of Test System .....                   | 11 |
| 2.4. Description of Support Units .....                   | 11 |
| 2.5. Test Software and Power Level .....                  | 12 |
| 2.6. EUT Operating Conditions .....                       | 12 |
| 2.7. Equipment List .....                                 | 13 |
| 2.8. Measurement Uncertainty .....                        | 15 |
| 2.9. Environmental conditions .....                       | 15 |
| 3. TEST RESULT .....                                      | 16 |
| 3.1. Maximum Peak Conducted Output Power .....            | 16 |
| 3.2. Number of Hopping Frequencies .....                  | 18 |
| 3.3. Dwell Time .....                                     | 19 |
| 3.4. Duty Cycle .....                                     | 20 |
| 3.5. 20dB Bandwidth .....                                 | 21 |
| 3.6. Carrier Frequency Separation .....                   | 22 |
| 3.7. Conducted Band Edge .....                            | 23 |
| 3.8. Conducted Spurious Emission .....                    | 24 |
| 3.9. Radiated Spurious Emission and Restricted Band ..... | 25 |
| 3.10. AC Power-Line Conducted Emission .....              | 29 |
| 3.11. Antenna Requirement .....                           | 31 |
| 4. TEST SETUP PHOTOGRAPHS .....                           | 31 |
| 5. EXTERNAL AND INTERNAL PHOTOS OF THE EUT .....          | 31 |

## REVISION HISTORY

| Rev. | Issue Date   | Report No.       | Effect Page | Contents        |
|------|--------------|------------------|-------------|-----------------|
| 00   | Jan.31, 2026 | SHATBL2512011W01 | ALL         | Initial Release |

## DECLARATION OF REPORT

1. The device has been tested by ATBL, and the test results show that the equipment under test (EUT) is in compliance with the requirements of 47 CFR 15.247. And it is applicable only to the tested sample identified in the report.
2. This report shall not be reproduced except in full, without the written approval of ATBL, this document only be altered or revised by ATBL, personal only, and shall be noted in the revision of the document.
3. The general information of EUT in this report is provided by the customer or manufacture, ATBL is only responsible for the test data but not for the information provided by the customer or manufacture.
4. The results in this report is only apply to the sample as tested under conditions. The customer or manufacturer is responsible for ensuring that the additional production units of this model have the same electrical and mechanical components.
5. In this report, '☐' indicates that EUT does not support content after '☐', and '☑' indicates that it supports content after '☑'

## SUMMARY OF TEST RESULT

| Report Section | Standard Section                     | Test Item                                      | Judgment    | Remark |
|----------------|--------------------------------------|------------------------------------------------|-------------|--------|
| 3.1            | 47 CFR 15.247(b)(1)                  | Maximum Peak Conducted Output Power            | PASS        | --     |
| 3.2            | 47 CFR 15.247(a)(1)(iii)             | Number of Hopping Frequencies                  | PASS        | --     |
| 3.3            | 47 CFR 15.247(a)(1)(iii)             | Dwell Time                                     | PASS        | --     |
| 3.4            | 47 CFR 15.247(a)(1)                  | 20dB Bandwidth                                 | Report only | --     |
| 3.5            | 47 CFR 15.247(a)(1)                  | Carrier Frequency Separation                   | PASS        | --     |
| 3.6            | 47 CFR 15.247(d)                     | Conducted Band Edge                            | PASS        | --     |
| 3.7            | 47 CFR 15.247(d)                     | Conducted Spurious Emission                    | PASS        | --     |
| 3.8            | 47 CFR 15.247(d)/15.209(a)/15.205(a) | Radiated Spurious Emission and Restricted Band | PASS        | --     |
| 3.9            | 47 CFR 15.207(a)                     | AC Power-Line Conducted Emission               | PASS        | --     |
| 3.10           | 47 CFR 15.203                        | Antenna Requirements                           | PASS        | --     |
| 3.11           | --                                   | Duty Cycle                                     | Report only | --     |

## 1. GENERAL DESCRIPTION

### 1.1. Applicant

Name : Shenzhen DOOGEE Hengtong Technology CO.,LTD  
Address : B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No.22,Longhua New District Shenzhen China

### 1.2. Manufacturer

Name : Shenzhen DOOGEE Hengtong Technology CO.,LTD  
Address : B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No.22,Longhua New District Shenzhen China

### 1.3. Factory

Name : Shenzhen DOOGEE Hengtong Technology CO.,LTD  
Address : B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No.22,Longhua New District Shenzhen China

#### 1.4. General Information of EUT

|                        |                                                           |
|------------------------|-----------------------------------------------------------|
| Equipment Name         | Tablet                                                    |
| Model Name             | Tab G5                                                    |
| Series model           | Tab G5+,Tab G5 Pro,Tab G5 Pro+,Tab G5 Max,Tab G5 Ultra    |
| Model Difference       | Only the model name, appearance color, and memory differ. |
| Sample No.             | 20251203004                                               |
| Power supply           | DC 3.85V                                                  |
| Adapter                | Input:AC100-240V~50/60Hz 0.3A<br>Output:5.0V,2.0A,10.0W   |
| Battery                | DC 3.85V 7500mAh                                          |
| Hardware Version       | L30-T616ES-V2.0-250925-Q                                  |
| Software Version       | DOOGEE-Tab G5-EEA-Android16.0-20251126                    |
| Antenna Type           | FPC Antenna                                               |
| Antenna Gain           | -0.2dBi                                                   |
| Connecting I/O Port(s) | Refer to the remark below                                 |

Remark:

The above information of EUT was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

### 1.5. Equipment Specification

| Equipment Specification           |                            |                    |
|-----------------------------------|----------------------------|--------------------|
| Frequency Range                   | 2402MHz - 2480MHz          |                    |
| Number of Channels                | 79                         |                    |
| Carrier Frequency of Each Channel | 2402 + n*1 MHz; n = 0 ~ 78 |                    |
| Maximum Output Power To Antenna   | ☑Bluetooth BR(1Mbps):      | 6.41dBm (0.00438W) |
|                                   | ☑Bluetooth EDR(2Mbps):     | 6.79dBm (0.00478W) |
|                                   | ☑Bluetooth EDR(3Mbps):     | 7.05dBm (0.00507W) |
| Type of Modulation                | ☑Bluetooth BR(1Mbps):      | GFSK               |
|                                   | ☑Bluetooth EDR(2Mbps):     | $\pi/4$ -DQPSK     |
|                                   | ☑Bluetooth EDR(3Mbps):     | 8-DPSK             |

### 1.6. Modification of EUT

No modifications are made to the EUT during all test items.

### 1.7. Laboratory Information

|                         |   |                                                                                        |
|-------------------------|---|----------------------------------------------------------------------------------------|
| Company Name            | : | Shanghai ATBL Technology Co., Ltd.                                                     |
| Address                 | : | Building 8, No.160 Basheng Road, Waigaoqiao Free Trade Zone, Pudong New Area, Shanghai |
| Telephone               | : | +86(0)21-51298625                                                                      |
| FCC-Registration Number | : | 485917                                                                                 |
| Designation Number      | : | CN1306                                                                                 |
| A2LA Number             | : | 6184.01                                                                                |
| CNAS Number             | : | CNAS L14531                                                                            |
| ISED Designation Number | : | 27371                                                                                  |
| CAB identifier          | : | CN0116                                                                                 |

### 1.8. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

47 CFR Part 15 Subpart C §15.247

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

ANSI C63.10-2020

Remark:

All test items were verified and recorded according to the standards and without any deviation during the test.

## 2. TEST CONFIGURATION OF EUT

### 2.1. Carrier Frequency Channel

| Frequency Band  | Channel   | Frequency MHz | Channel   | Frequency MHz | Channel   | Frequency MHz |
|-----------------|-----------|---------------|-----------|---------------|-----------|---------------|
| 2402 - 2480 MHz | <b>00</b> | <b>2402</b>   | 27        | 2429          | 54        | 2456          |
|                 | 01        | 2403          | 28        | 2430          | 55        | 2457          |
|                 | 02        | 2404          | 29        | 2431          | 56        | 2458          |
|                 | 03        | 2405          | 30        | 2432          | 57        | 2459          |
|                 | 04        | 2406          | 31        | 2433          | 58        | 2460          |
|                 | 05        | 2407          | 32        | 2434          | 59        | 2461          |
|                 | 06        | 2408          | 33        | 2435          | 60        | 2462          |
|                 | 07        | 2409          | 34        | 2436          | 61        | 2463          |
|                 | 08        | 2410          | 35        | 2437          | 62        | 2464          |
|                 | 09        | 2411          | 36        | 2438          | 63        | 2465          |
|                 | 10        | 2412          | 37        | 2439          | 64        | 2466          |
|                 | 11        | 2413          | 38        | 2440          | 65        | 2467          |
|                 | 12        | 2414          | <b>39</b> | <b>2441</b>   | 66        | 2468          |
|                 | 13        | 2415          | 40        | 2442          | 67        | 2469          |
|                 | 14        | 2416          | 41        | 2443          | 68        | 2470          |
|                 | 15        | 2417          | 42        | 2444          | 69        | 2471          |
|                 | 16        | 2418          | 43        | 2445          | 70        | 2472          |
|                 | 17        | 2419          | 44        | 2446          | 71        | 2473          |
|                 | 18        | 2420          | 45        | 2447          | 72        | 2474          |
|                 | 19        | 2421          | 46        | 2448          | 73        | 2475          |
|                 | 20        | 2422          | 47        | 2449          | 74        | 2476          |
|                 | 21        | 2423          | 48        | 2450          | 75        | 2477          |
|                 | 22        | 2424          | 49        | 2451          | 76        | 2478          |
|                 | 23        | 2425          | 50        | 2452          | 77        | 2479          |
|                 | 24        | 2426          | 51        | 2453          | <b>78</b> | <b>2480</b>   |
|                 | 25        | 2427          | 52        | 2454          | --        | --            |
|                 | 26        | 2428          | 53        | 2455          | --        | --            |

Remark:

Low Channel: **CH00\_2402 MHz**; Middle Channel: **CH39\_2441 MHz**; High Channel: **CH78\_2480 MHz**.

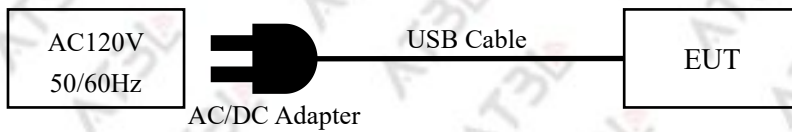
## 2.2. Test Modes

The table below is showing all test modes to demonstrate in compliance with the standard.

| Summary Table of Test Modes                   |                             |                                        |                                |
|-----------------------------------------------|-----------------------------|----------------------------------------|--------------------------------|
| Test Item                                     | Data Rate / Modulation      |                                        |                                |
|                                               | Bluetooth BR(1Mbps)<br>GFSK | Bluetooth EDR(2Mbps)<br>$\pi/4$ -DQPSK | Bluetooth EDR(3Mbps)<br>8-DPSK |
| For Conducted<br>and Radiated<br>Test         | Mode 1: CH00_2402 MHz       | Mode 5: CH00_2402 MHz                  | Mode 9: CH00_2402 MHz          |
|                                               | Mode 2: CH39_2441 MHz       | Mode 6: CH39_2441 MHz                  | Mode 10: CH39_2441 MHz         |
|                                               | Mode 3: CH78_2480 MHz       | Mode 7: CH78_2480 MHz                  | Mode 11: CH78_2480 MHz         |
|                                               | Mode 4: Hopping             | Mode 8: Hopping                        | Mode 12: Hopping               |
| For AC<br>Power-line<br>Conducted<br>Emission | Mode 10: CH39_2441 MHz      |                                        |                                |

## 2.3. Block Diagram of Test System

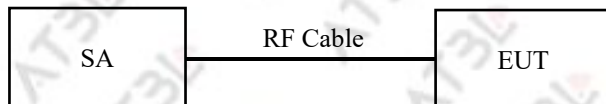
### 2.3.1. For AC Power-Line Conducted Emission



### 2.3.2. For Radiated Spurious Emission



### 2.3.3. For Conducted Test



## 2.4. Description of Support Units

| NO. | Unit     | Brand | Model        | S/N |
|-----|----------|-------|--------------|-----|
| 1   | RF Cable | PE    | MXHQ87WJ3000 | N/A |
| 2   | N/A      | N/A   | N/A          | N/A |

## 2.5. Test Software and Power Level

| EUT Configure mode No. | Test conditions for modulation technology |                |               |
|------------------------|-------------------------------------------|----------------|---------------|
| Mode A                 | GFSK                                      |                |               |
| Mode B                 | $\pi/4$ -DQPSK                            |                |               |
| Mode C                 | 8DPSK                                     |                |               |
| RF Power Setting Value |                                           |                |               |
| Channel                | GFSK                                      | $\pi/4$ -DQPSK | 8DPSK         |
|                        | Power setting                             | Power setting  | Power setting |
| 0                      | Default-LV9                               | Default-LV9    | Default-LV9   |
| 39                     | Default-LV9                               | Default-LV9    | Default-LV9   |
| 78                     | Default-LV9                               | Default-LV9    | Default-LV9   |

Note:

- For the test results, the EUT had been tested with all conditions, and the worst-case mode of data will Recording in the report.
- By means of test software which provided by manufacture, the power levels during the tests were set according to the above table were set according to the above table.

## 2.6. EUT Operating Conditions

For AC power-line conducted emission, the EUT was connected under the large package sizes transmission.

For radiated spurious emission and conducted test, the engineering test program was provided and make the EUT to continuous transmit/receive.

## 2.7. Equipment List

### 2.7.1. For AC Power-Line Conducted Emission

| Kind of Equipment         | Manu<br>facturer | Type No.                          | Serial No. | equipment<br>number | Calibrated<br>until | Calibrated<br>due until | Cal.<br>Interval |
|---------------------------|------------------|-----------------------------------|------------|---------------------|---------------------|-------------------------|------------------|
| EMI Test Receiver         | R&S              | ESPI                              | 100679     | SHATBL-E012         | 2025.03.17          | 2026.03.16              | 1 year           |
| LISN                      | R&S              | ENV216                            | 101300     | SHATBL-E013         | 2025.03.17          | 2026.03.16              | 1 year           |
| LISN                      | R&S              | ENV216                            | 100333     | SHATBL-E041         | 2025.03.17          | 2026.03.16              | 1 year           |
| CE Cable                  | Chuangce<br>xing | 2M                                | EMI0014    | SHATBL-E014         | N/A                 | N/A                     | N/A              |
| Temperature &<br>Humidity | Deli             | Deli                              | EMI0015    | SHATBL-E015         | 2025.08.01          | 2026.07.31              | 1 year           |
| Testing Software          | FALA             | EZ-EMC(V<br>er.EMC-C<br>ON 3A1.1) | EMI0044    | SHATBL-E044         | N/A                 | N/A                     | N/A              |

### 2.7.2. For Radiated Spurious Emission

| Kind of Equipment                         | Manu<br>facturer | Type No.            | Serial No.           | equipment<br>number | Calibrated<br>until | Calibrated<br>due until | Cal.<br>Interval |
|-------------------------------------------|------------------|---------------------|----------------------|---------------------|---------------------|-------------------------|------------------|
| Signal analyzer                           | Agilent          | N9020A              | MY50200811           | SHATBL-E017         | 2025.03.17          | 2026.03.16              | 1 year           |
| Amplifier                                 | JPT              | JPA0118-5<br>5-303A | 1910001800055<br>000 | SHATBL-E006         | 2025.03.24          | 2026.03.23              | 1 year           |
| Amplifier                                 | JPT              | JPA-10M1<br>G32     | 2101010003500<br>1   | SHATBL-E005         | 2025.03.17          | 2026.03.16              | 1 year           |
| Antenna/Turn<br>table Controller          | Brilliant        | N/A                 | N/A                  | SHATBL-E007         | N/A                 | N/A                     | N/A              |
| Loop<br>Antenna(9kHz-30<br>MHz)           | Daze             | ZN30900C            | 20077                | SHATBL-E042         | 2025.05.13          | 2026.05.12              | 1 year           |
| Bilog Antenna                             | SCHWAR<br>ZBECK  | VULB<br>9168        | 01174                | SHATBL-E008         | 2025.05.20          | 2026.05.19              | 1 year           |
| Broad-band Horn<br>Antenna                | SCHWAR<br>ZBECK  | BBHA<br>9120D       | 02334                | SHATBL-E009         | 2025.05.20          | 2026.05.19              | 1 year           |
| Horn Antenna                              | COM-PO<br>WER    | AH-1840             | 10100008             | SHATBL-E043         | 2025.07.28          | 2026.07.27              | 1 year           |
| Thermometer                               | DeLi             | N/A                 | N/A                  | SHATBL-E015         | 2025.08.01          | 2026.07.31              | 1 year           |
| Test Software                             | FALA             | EMC-RI(V<br>er.4A2) | N/A                  | N/A                 | N/A                 | N/A                     | N/A              |
| Wideband radio<br>communication<br>tester | R&S              | CMW500              | 101331               | SHATBL-W044         | 2025.07.28          | 2026.07.27              | 1 year           |
| Spectrum analyzer                         | R&S              | FSV40-N             | 101761               | SHATBL-W036         | 2025.07.28          | 2026.07.27              | 1 year           |

### 2.7.3. For Conducted Test

| Kind of Equipment                         | Manu<br>facturer | Type No.        | Serial No.    | equipment<br>number | Calibrated<br>until | Calibrated<br>due until | Cal.<br>Interval |
|-------------------------------------------|------------------|-----------------|---------------|---------------------|---------------------|-------------------------|------------------|
| Power sensor                              | DARE             | RPR3006<br>W    | 16I00054SN016 | SHATBL-W008         | 2025.07.28          | 2026.07.27              | 1 year           |
| Adjustable<br>Attenuator                  | Agilent          | 8494B           | MY42144015    | SHATBL-W009         | 2025.07.28          | 2026.07.27              | 1 year           |
| Adjustable<br>Attenuator                  | Agilent          | 8496B           | MY42143776    | SHATBL-W010         | 2025.07.28          | 2026.07.27              | 1 year           |
| Environmental<br>Test Chamber             | KSON             | THS-B6C-<br>150 | 9159K         | SHATBL-W019         | 2025.03.17          | 2026.03.16              | 1 year           |
| Signal analyzer                           | Keysight         | N9020A          | MY50510136    | SHATBL-W003         | 2025.07.18          | 2026.07.17              | 1 year           |
| Vector signal<br>generator                | Agilent          | N5182A          | MY48180764    | SHATBL-W043         | 2025.07.18          | 2026.07.17              | 1 year           |
| Analog signal<br>generator                | Keysight         | N5182B          | MY57300196    | SHATBL-W005         | 2025.07.18          | 2026.07.17              | 1 year           |
| Wideband radio<br>communication<br>tester | R&S              | CMW500          | 101331        | SHATBL-W007         | 2025.07.28          | 2026.07.27              | 1 year           |
| Switch Box                                | Cesheng          | smu 1003        | WCS20221215   | SHATBL-W046         | 2025.03.19          | 2026.03.18              | 1 year           |
| Thermometer                               | DeLi             | N/A             | N/A           | SHATBL-W011         | 2025.08.01          | 2026.07.31              | 1 year           |
| Test Software                             | Cesheng          | WCS-WC<br>N     | N/A           | SHATBL-W021         | N/A                 | N/A                     | N/A              |

Remark:

Calibration duration for above equipments is 1 year.

## 2.8. Measurement Uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

| No. | Item                                             | Uncertainty          |
|-----|--------------------------------------------------|----------------------|
| 1   | RF output power, conducted                       | $\pm 0.958\text{dB}$ |
| 2   | Conducted spurious emissions                     | $\pm 2.988\text{dB}$ |
| 3   | All emissions, radiated 9KHz-30MHz               | $\pm 0.96\text{dB}$  |
| 4   | All emissions, radiated 30MHz-1GHz               | $\pm 2.50\text{dB}$  |
| 5   | All emissions, radiated 1GHz-18GHz               | $\pm 3.51\text{dB}$  |
| 6   | All emissions, radiated 18GHz-40GHz              | $\pm 3.56\text{dB}$  |
| 7   | Occupied bandwidth                               | $\pm 23.20\text{Hz}$ |
| 8   | Power spectral density                           | $\pm 0.886\text{dB}$ |
| 9   | AC Power Line Conducted Emission 0.15MHz ~ 30MHz | $\pm 1.20\text{dB}$  |

## 2.9. Environmental conditions

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

|             |                     |        |
|-------------|---------------------|--------|
| Temperature | Normal Temperature: | 22°C   |
| Voltage     | Normal Voltage:     | 3.85V  |
| Other       | Relative Humidity:  | 57%    |
|             | Air Pressure:       | 102kPa |

### 3. TEST RESULT

#### 3.1. Maximum Peak Conducted Output Power

##### 3.1.1. Limit

47 CFR 15.247(b)(1): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

##### 3.1.2. Test Procedure

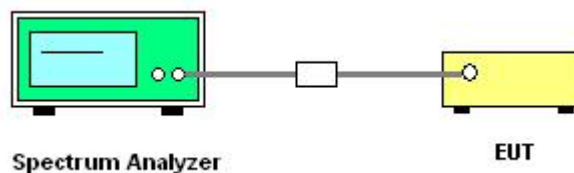
ANSI C63.10-2020 clause 7.8.5: This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. The hopping shall be disabled for this test:

1. Use the following spectrum analyzer settings:
  - ① Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
  - ② RBW > 20 dB bandwidth of the emission being measured.
  - ③ VBW ≥ RBW.
  - ④ Sweep: Auto.
  - ⑤ Detector function: Peak.
  - ⑥ Trace: Max hold.
2. Allow trace to stabilize.
3. Use the marker-to-peak function to set the marker to the peak of the emission.
4. The indicated level is the peak output power, after any corrections for external attenuators and cables.
5. A plot of the test results and setup description shall be included in the test report.

Remark:

A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

##### 3.1.3. Test Setup



### 3.1.4. Test Result of Maximum Peak Conducted Output Power

Please refer to the Appendix A1

### 3.2. Number of Hopping Frequencies

#### 3.2.1. Limit

47 CFR 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

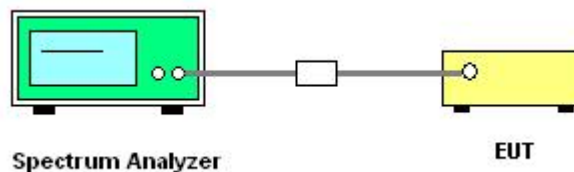
#### 3.2.2. Test Procedure

ANSI C63.10-2020 clause 7.8.3: The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
2. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
3. VBW  $\geq$  RBW.
4. Sweep: Auto.
5. Detector function: Peak.
6. Trace: Max hold.
7. Allow the trace to stabilize.

It might prove necessary to break the span up into sub ranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

#### 3.2.3. Test Setup



#### 3.2.4. Test Result of Number of Hopping Frequencies

Please refer to the Appendix A2

### 3.3. Dwell Time

#### 3.3.1. Limit

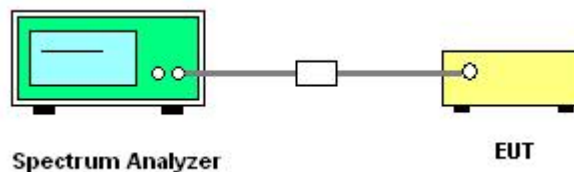
47 CFR 15.247(a)(1)(iii): The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

#### 3.3.2. Test Procedure

ANSI C63.10-2020 clause 7.8.4: The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Zero span, centered on a hopping channel.
2. RBW shall be  $\leq$  channel spacing and where possible RBW should be set  $\gg 1/T$ , where T is the expected dwell time per channel.
3. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
4. Detector function: Peak.
5. Trace: Max hold.
6. Use the marker-delta function to determine the transmit time per hop.
7. The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements.

#### 3.3.3. Test Setup



#### 3.3.4. Test Result of Duty Cycle and Dwell Time

Please refer to the Appendix A3

### 3.4. Duty Cycle

#### 3.4.1. Limit

There is no limit requirement for Duty Cycle.

#### 3.4.2. Test Procedure

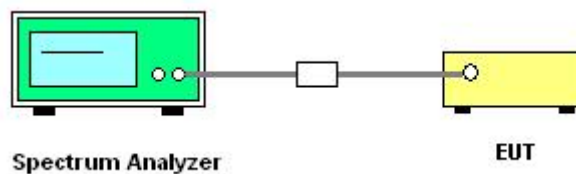
ANSI C63.10-2020 clause 11.6: Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

8. A diode detector and an oscilloscope that together have a sufficiently short response time to permit accurate measurements of the ON and OFF times of the transmitted signal.

9. The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:

- ① Set the center frequency of the instrument to the center frequency of the transmission.
- ② Set  $RBW \geq OBW$  if possible; otherwise, set RBW to the largest available value.
- ③ Set  $VBW \geq RBW$ . Set detector = average.
- ④ The zero-span measurement method shall not be used unless both RBW and VBW are  $> 50/T$  and the number of sweep points across duration  $T$  exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if  $T \leq 16.7 \mu s$ .)

#### 3.4.3. Test Setup



#### 3.4.4. Test Result of Duty Cycle

Please refer to the Appendix A3.

### 3.5. 20dB Bandwidth

#### 3.5.1. Limit

There is no limit requirement for 20dB Bandwidth.

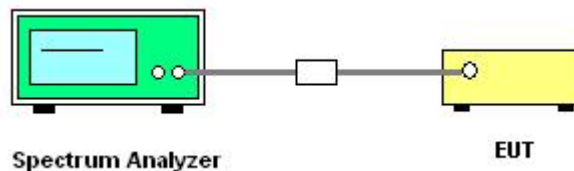
#### 3.5.2. Test Procedure

1. The testing follows ANSI C63.10-2020 clause 6.9.2 and 6.9.3.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW  $\geq$  1% of the 20 dB bandwidth; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold.
5. Measure and record the results in the test report.

#### 3.5.3. Test Setup



#### 3.5.4. Test Result of 20dB Bandwidth

Please refer to the Appendix A4

### 3.6. Carrier Frequency Separation

#### 3.6.1. Limit

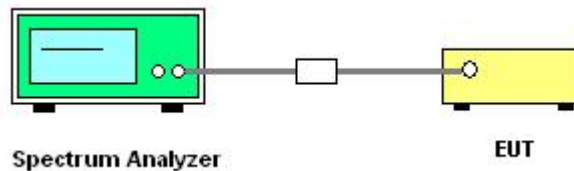
47 CFR 15.247(a)(1): Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

#### 3.6.2. Test Procedure

ANSI C63.10-2020 clause 7.8.2: The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Wide enough to capture the peaks of two adjacent channels.
2. RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
3. VBW  $\geq$  RBW.
4. Sweep: Auto.
5. Detector function: Peak.
6. Trace: Max hold.
7. Allow the trace to stabilize.
8. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. A plot of the data shall be included in the test report.

#### 3.6.3. Test Setup



#### 3.6.4. Test Result of Carrier Frequency Separation

Please refer to the Appendix A5

### 3.7. Conducted Band Edge

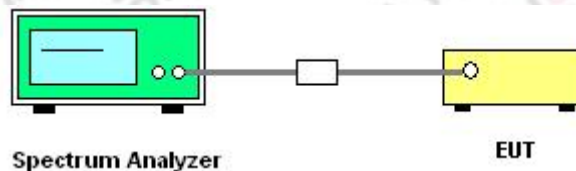
#### 3.7.1. Limit

47 CFR 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

#### 3.7.2. Test Procedure

1. The testing follows ANSI C63.10-2020 clause 6.10
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Conducted Band Edge measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the 100 kHz bandwidth within the band that contains the highest level of the desired power when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
4. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

#### 3.7.3. Test Setup



#### 3.7.4. Test Result of Conducted Band Edge

Please refer to the Appendix A6

### 3.8. Conducted Spurious Emission

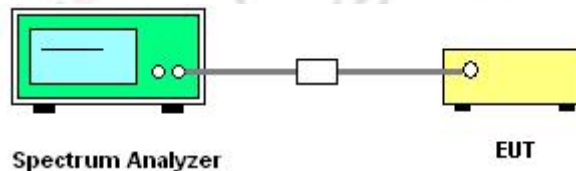
#### 3.8.1. Limit

47 CFR 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

#### 3.8.2. Test Procedure

1. The testing follows ANSI C63.10-2020 clause 7.8.8
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW = 300kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

#### 3.8.3. Test Setup



#### 3.8.4. Test Result of Conducted Spurious Emission

Please refer to the Appendix A6

### 3.9. Radiated Spurious Emission and Restricted Band

#### 3.9.1. Limit

47 CFR 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

47 CFR 15.205(a): Only spurious emissions are permitted in any of the frequency bands listed below:

| Frequency (MHz) | Frequency (MHz)   | Frequency (MHz)     | Frequency (MHz) | Frequency (GHz) |
|-----------------|-------------------|---------------------|-----------------|-----------------|
| 0.090-0.110     | 12.29-12.293      | 149.9-150.05        | 1660-1710       | 8.025-8.5       |
| 0.495-0.505     | 12.51975-12.52025 | 156.52475-156.52525 | 1718.8-1722.2   | 9.0-9.2         |
| 2.1735-2.1905   | 12.57675-12.57725 | 156.7-156.9         | 2200-2300       | 9.3-9.5         |
| 4.125-4.128     | 13.36-13.41       | 162.0125-167.17     | 2310-2390       | 10.6-12.7       |
| 4.17725-4.17775 | 16.42-16.423      | 167.72-173.2        | 2483.5-2500     | 13.25-13.4      |
| 4.20725-4.20775 | 16.69475-16.69525 | 240-285             | 2690-2900       | 14.47-14.5      |
| 6.215-6.218     | 16.80425-16.80475 | 322-335.4           | 3260-3267       | 15.35-16.2      |
| 6.26775-6.26825 | 25.5-25.67        | 399.9-410           | 3332-3339       | 17.7-21.4       |
| 6.31175-6.31225 | 37.5-38.25        | 608-614             | 3345.8-3358     | 22.01-23.12     |
| 8.291-8.294     | 73-74.6           | 960-1240            | 3600-4400       | 23.6-24.0       |
| 8.362-8.366     | 74.8-75.2         | 1300-1427           | 4500-5150       | 31.2-31.8       |
| 8.37625-8.38675 | 108-121.94        | 1435-1626.5         | 5350-5460       | 36.43-36.5      |
| 8.41425-8.41475 | 123-138           | 1645.5-1646.5       | 7250-7750       | Above 38.6      |

47 CFR 15.209(a): The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009-0.490     | 2400/F(kHz)                       | 300                           |
| 0.490-1.705     | 24000/F(kHz)                      | 30                            |
| 1.705-30.0      | 30                                | 30                            |
| 30-88           | 100                               | 3                             |
| 88-216          | 150                               | 3                             |
| 216-960         | 200                               | 3                             |
| Above 960       | 500                               | 3                             |

### 3.9.2. Test Procedure

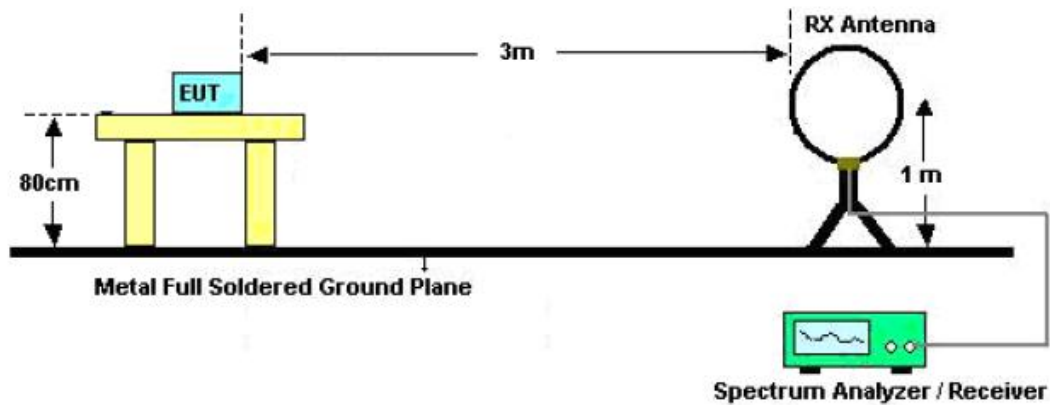
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings:
  - ① Span shall wide enough to fully capture the emission being measured;
  - ② Set RBW=100 kHz for  $f < 1$  GHz, RBW=1MHz for  $f > 1$ GHz ; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak;
  - ③ For average measurement: use duty cycle correction factor method per 15.35(c).  
Duty cycle = On time/100 milliseconds  
On time =  $N1 \cdot L1 + N2 \cdot L2 + \dots + Nn-1 \cdot Ln-1 + Nn \cdot Ln$   
Where N1 is number of type 1 pulses, L1 is length of type 1 pulses, etc.  
Average Emission Level = Peak Emission Level +  $20 \cdot \log(\text{Duty cycle})$
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Pre-amp Factor = Level
7. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
8. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

#### Remark:

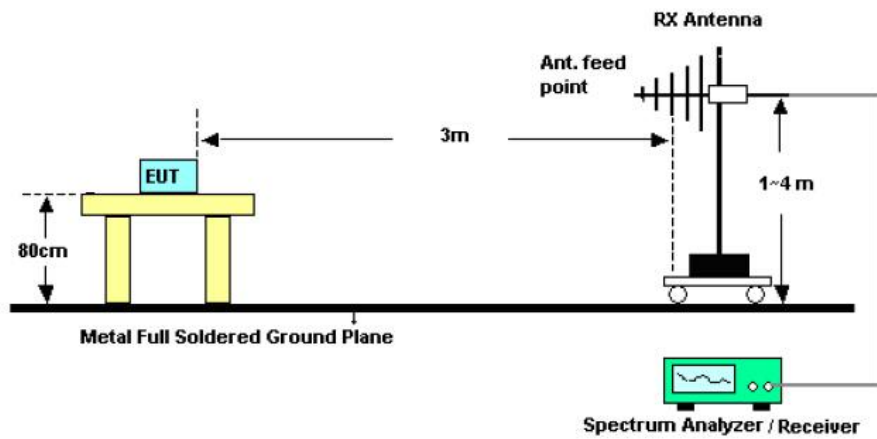
The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.70dB) derived from  $20 \log(\text{dwell time}/100\text{ms})$ . This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

### 3.9.3. Test Setup

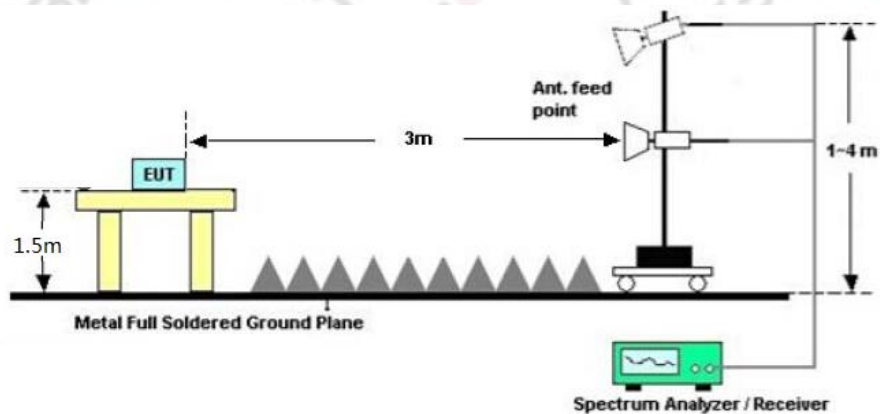
#### 3.9.3.1. For radiated emissions below 30MHz



#### 3.9.3.2. For radiated emissions from 30MHz to 1GHz



#### 3.9.3.3. For radiated emissions above 1GHz



### 3.9.4. Test Result of Radiated Spurious Emission

Please refer to the Appendix A7

### 3.10. AC Power-Line Conducted Emission

#### 3.10.1. Limit

47 CFR 15.207(a): For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table:

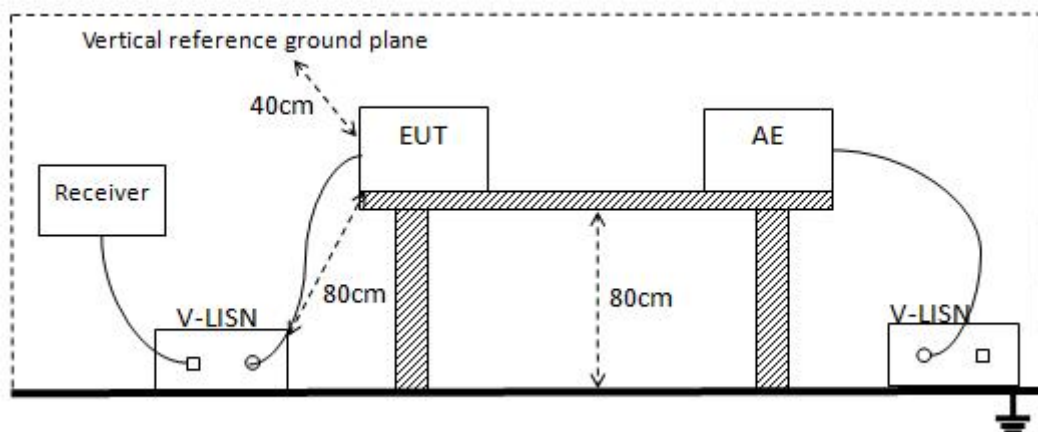
| Frequency of emission (MHz) | Conducted limit (dBμV) |           |
|-----------------------------|------------------------|-----------|
|                             | Quasi-peak             | Average   |
| 0.15-0.5                    | 66 to 56*              | 56 to 46* |
| 0.5-5                       | 56                     | 46        |
| 5-30                        | 60                     | 50        |

\*Decreases with the logarithm of the frequency.

#### 3.10.2. Test Procedure

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

#### 3.10.3. Test Setup



#### 3.10.4. Test Result of AC Power-Line Conducted Emission

Please refer to the Appendix A8

### **3.11. Antenna Requirement**

#### **3.11.1. Standard Requirement**

According to 47 CFR 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.

#### **3.11.2. EUT Antenna**

The antenna used for the EUT is FPC antenna, which meets the antenna requirements.

## **4. TEST SETUP PHOTOGRAPHS**

Please refer to Appendix J\_Test Setup Template

## **5. EXTERNAL AND INTERNAL PHOTOS OF THE EUT**

Please refer to Appendix K\_ External Photos of the EUT

Please refer to Appendix K\_ Internal Photos of the EUT

\*\*\*\*\*END\*\*\*\*\*