

# TEST REPORT

**Applicant:** Aduro Technologies LLC

**Address of Applicant:** 475 WASHINGTON BLVD, MARINA DEL REY, California  
90292, United States

**Manufacturer/Factory:** Sichuan Aduro Technology CO., LTD

**Address of  
Manufacturer/Factory:** Building 23, Area A Meijiarongxiang Electronic Info Industry  
Park, Renshou, Meishan, Sichuan, China

**Equipment Under Test (EUT)**

Product Name: A19 smart light bulbs

Model No.: 81809-V2

Trade Mark: AduroSmart Eria

**FCC ID:** 2APKV-518912

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.247

**Date of sample receipt:** November 22, 2022

**Date of Test:** November 23, 2022-April 08, 2024

**Date of report issued:** April 08, 2024

**Test Result :** PASS \*

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

Authorized Signature:



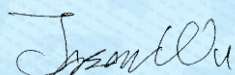
**Robinson Luo**  
**Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

| Report No.         | Version No. | Date              | Description                |
|--------------------|-------------|-------------------|----------------------------|
| GTS202211000223F01 | 00          | February 14, 2023 | Original                   |
| GTS202211000224F01 | 01          | April 08, 2024    | Class II permissive change |
|                    |             |                   |                            |
|                    |             |                   |                            |
|                    |             |                   |                            |

**Prepared By:**

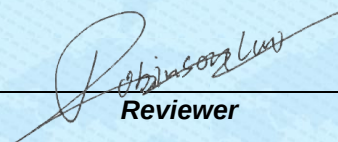


**Date:**

April 08, 2024

**Project Engineer**

**Check By:**



**Date:**

April 08, 2024

**Reviewer**

## 3 Contents

|                                                                  | Page |
|------------------------------------------------------------------|------|
| 1 COVER PAGE .....                                               | 1    |
| 2 VERSION .....                                                  | 2    |
| 3 CONTENTS .....                                                 | 3    |
| 4 TEST SUMMARY .....                                             | 4    |
| 4.1 MEASUREMENT UNCERTAINTY .....                                | 4    |
| 5 GENERAL INFORMATION .....                                      | 5    |
| 5.1 GENERAL DESCRIPTION OF EUT .....                             | 5    |
| 5.2 TEST MODE .....                                              | 7    |
| 5.3 DESCRIPTION OF SUPPORT UNITS .....                           | 7    |
| 5.4 DEVIATION FROM STANDARDS .....                               | 7    |
| 5.5 ABNORMALITIES FROM STANDARD CONDITIONS .....                 | 7    |
| 5.6 TEST FACILITY .....                                          | 7    |
| 5.7 TEST LOCATION .....                                          | 7    |
| 5.8 ADDITIONAL INSTRUCTIONS .....                                | 7    |
| 6 TEST INSTRUMENTS LIST .....                                    | 8    |
| 7 TEST RESULTS AND MEASUREMENT DATA .....                        | 10   |
| 7.1 ANTENNA REQUIREMENT .....                                    | 10   |
| 7.2 CONDUCTED EMISSIONS .....                                    | 11   |
| 7.3 SPURIOUS EMISSION IN NON-RESTRICTED & RESTRICTED BANDS ..... | 14   |
| 7.3.1 Radiated Emission Method .....                             | 14   |
| 8 TEST SETUP PHOTO .....                                         | 23   |
| 9 EUT CONSTRUCTIONAL DETAILS .....                               | 23   |

## 4 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)(3)     | N/A*   |
| Channel Bandwidth                | 15.247 (a)(2)     | N/A*   |
| Power Spectral Density           | 15.247 (e)        | N/A*   |
| Band Edge                        | 15.247(d)         | Pass   |
| Spurious Emission                | 15.205/15.209     | Pass   |

### Remarks:

1. Pass: The EUT complies with the essential requirements in the standard.
2. Test according to ANSI C63.10:2013
3. N/A\*: Not applicable. This's a Class II permissive change report, all of the changes are not effect to the RF performance, function and power. So the RF conducted test data directly reference the original report number GTS202211000223F01.

### 4.1 Measurement Uncertainty

| Test Item                        | Frequency Range | Measurement Uncertainty | Notes |
|----------------------------------|-----------------|-------------------------|-------|
| Radiated Emission                | 9kHz-30MHz      | 3.1dB                   | (1)   |
| Radiated Emission                | 30MHz-200MHz    | 3.8039dB                | (1)   |
| Radiated Emission                | 200MHz-1GHz     | 3.9679dB                | (1)   |
| Radiated Emission                | 1GHz-18GHz      | 4.29dB                  | (1)   |
| Radiated Emission                | 18GHz-40GHz     | 3.30dB                  | (1)   |
| AC Power Line Conducted Emission | 0.15MHz ~ 30MHz | 3.44dB                  | (1)   |

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

## 5 General Information

### 5.1 General Description of EUT

|                      |                                           |
|----------------------|-------------------------------------------|
| Product Info:        | A19 smart light bulbs                     |
| Model No.:           | 81809-V2                                  |
| Serial No.:          | 021623000094                              |
| Test sample(s) ID:   | GTS202211000224-1                         |
| Sample(s) Status     | Engineer sample                           |
| Operation Frequency: | 2405MHz~2480MHz                           |
| Channel numbers:     | 16                                        |
| Channel separation:  | 5MHz                                      |
| Modulation type:     | O-QPSK                                    |
| Antenna Type:        | PCB Antenna                               |
| Antenna gain:        | -1.85dBi (Declared by manufacturer)       |
| Power supply:        | Input: AC 110-130V, 50/60Hz, 0.078A, 8.5W |

Remark:

1. Antenna gain information provided by the customer
2. The relevant information of the sample is provided by the entrusting company, and the laboratory is not responsible for its authenticity.

| Operation Frequency each of channel |           |         |           |         |           |         |           |
|-------------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Channel                             | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 11                                  | 2405MHz   | 15      | 2425MHz   | 19      | 2445MHz   | 23      | 2465MHz   |
| 12                                  | 2410MHz   | 16      | 2430MHz   | 20      | 2450MHz   | 24      | 2470MHz   |
| 13                                  | 2415MHz   | 17      | 2435MHz   | 21      | 2455MHz   | 25      | 2475MHz   |
| 14                                  | 2420MHz   | 18      | 2440MHz   | 22      | 2460MHz   | 26      | 2480MHz   |

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  | 2405MHz   |
| The middle channel  | 2440MHz   |
| The Highest channel | 2480MHz   |

## 5.2 Test mode

|                   |                                                 |
|-------------------|-------------------------------------------------|
| Transmitting mode | Keep the EUT in continuously transmitting mode. |
|-------------------|-------------------------------------------------|

## 5.3 Description of Support Units

|       |
|-------|
| None. |
|-------|

## 5.4 Deviation from Standards

|       |
|-------|
| None. |
|-------|

## 5.5 Abnormalities from Standard Conditions

|       |
|-------|
| None. |
|-------|

## 5.6 Test Facility

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> <li>● <b>FCC—Registration No.: 381383</b><br/>Designation Number: CN5029<br/>Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files.</li> <li>● <b>ISED —Registration No.: 9079A</b><br/>CAB identifier: CN0091<br/>The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of ISED for radio equipment testing</li> <li>● <b>NVLAP (LAB CODE:600179-0)</b><br/>Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).</li> </ul> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 5.7 Test Location

|                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| All tests were performed at:                                                                                                                                                                                                                                  |
| <p>Global United Technology Services Co., Ltd.<br/>Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102<br/>Tel: 0755-27798480<br/>Fax: 0755-27798960</p> |

## 5.8 Additional instructions

|                   |                                               |
|-------------------|-----------------------------------------------|
| Test Software     | Special test command provided by manufacturer |
| Power level setup | Default                                       |

## 6 Test Instruments list

| Radiated Emission: |                                     |                                |                       |               |                     |                         |
|--------------------|-------------------------------------|--------------------------------|-----------------------|---------------|---------------------|-------------------------|
| Item               | Test Equipment                      | Manufacturer                   | Model No.             | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
| 1                  | 3m Semi- Anechoic Chamber           | ZhongYu Electron               | 9.2(L)*6.2(W)* 6.4(H) | GTS250        | June 23, 2021       | June 22, 2024           |
| 2                  | Control Room                        | ZhongYu Electron               | 6.2(L)*2.5(W)* 2.4(H) | GTS251        | N/A                 | N/A                     |
| 3                  | EMI Test Receiver                   | Rohde & Schwarz                | ESU26                 | GTS203        | April 14, 2023      | April 13, 2024          |
| 4                  | BiConiLog Antenna                   | SCHWARZBECK<br>MESS-ELEKTRONIK | VULB9168              | GTS640        | March 19, 2023      | March 18, 2025          |
| 5                  | Double -ridged waveguide horn       | SCHWARZBECK<br>MESS-ELEKTRONIK | BBHA 9120 D           | GTS208        | April 17, 2023      | April 16, 2025          |
| 6                  | EMI Test Software                   | AUDIX                          | E3                    | N/A           | N/A                 | N/A                     |
| 7                  | Wideband Radio Communication Tester | Rohde & Schwarz                | CMW500                | GTS575        | April 14, 2023      | April 13, 2024          |
| 8                  | Loop Antenna                        | ZHINAN                         | ZN30900A              | GTS534        | Nov. 13, 2023       | Nov.12, 2024            |
| 9                  | Broadband Preamplifier              | SCHWARZBECK                    | BBV9718               | GTS535        | April 14, 2023      | April 13, 2024          |
| 10                 | Amplifier(1GHz-26.5GHz)             | HP                             | 8449B                 | GTS601        | April 14, 2023      | April 13, 2024          |
| 11                 | Horn Antenna (18-26.5GHz)           | /                              | UG-598A/U             | GTS664        | Oct. 29, 2023       | Oct. 28, 2024           |
| 12                 | Horn Antenna (26.5-40GHz)           | A.H Systems                    | SAS-573               | GTS665        | Oct. 29, 2023       | Oct. 28, 2024           |
| 13                 | FSV·Signal Analyzer (10Hz-40GHz)    | Keysight                       | FSV-40-N              | GTS666        | March 12, 2024      | March 11, 2025          |
| 14                 | Amplifier                           | /                              | LNA-1000-30S          | GTS650        | April 14, 2023      | April 13, 2024          |
| 15                 | CDNE M2+M3-16A                      | HCT                            | 30MHz-300MHz          | GTS692        | Nov. 08, 2023       | Nov.07, 2024            |
| 16                 | Wideband Amplifier                  | /                              | WDA-01004000-15P35    | GTS602        | April 14, 2023      | April 13, 2024          |
| 17                 | Thermo meter                        | JINCHUANG                      | GSP-8A                | GTS643        | April 19, 2023      | April 18, 2024          |
| 18                 | RE cable 1                          | GTS                            | N/A                   | GTS675        | July 31. 2023       | July 30. 2024           |
| 19                 | RE cable 2                          | GTS                            | N/A                   | GTS676        | July 31. 2023       | July 30. 2024           |
| 20                 | RE cable 3                          | GTS                            | N/A                   | GTS677        | July 31. 2023       | July 30. 2024           |
| 21                 | RE cable 4                          | GTS                            | N/A                   | GTS678        | July 31. 2023       | July 30. 2024           |
| 22                 | RE cable 5                          | GTS                            | N/A                   | GTS679        | July 31. 2023       | July 30. 2024           |
| 23                 | RE cable 6                          | GTS                            | N/A                   | GTS680        | July 31. 2023       | July 30. 2024           |
| 24                 | RE cable 7                          | GTS                            | N/A                   | GTS681        | July 31. 2023       | July 30. 2024           |
| 25                 | RE cable 8                          | GTS                            | N/A                   | GTS682        | July 31. 2023       | July 30. 2024           |

| Conducted Emission |                      |                         |                      |               |                     |                         |
|--------------------|----------------------|-------------------------|----------------------|---------------|---------------------|-------------------------|
| Item               | Test Equipment       | Manufacturer            | Model No.            | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
| 1                  | Shielding Room       | ZhongYu Electron        | 7.3(L)x3.1(W)x2.9(H) | GTS252        | July 12, 2022       | July 11, 2027           |
| 2                  | EMI Test Receiver    | R&S                     | ESCI 7               | GTS552        | April 14, 2023      | April 13, 2024          |
| 3                  | LISN                 | ROHDE & SCHWARZ         | ENV216               | GTS226        | April 14, 2023      | April 13, 2024          |
| 4                  | Coaxial Cable        | GTS                     | N/A                  | GTS227        | N/A                 | N/A                     |
| 5                  | EMI Test Software    | AUDIX                   | E3                   | N/A           | N/A                 | N/A                     |
| 6                  | Thermo meter         | JINCHUANG               | GSP-8A               | GTS642        | April 19, 2023      | April 18, 2024          |
| 7                  | Absorbing clamp      | Elektronik-Feinmechanik | MDS21                | GTS229        | April 14, 2023      | April 13, 2024          |
| 8                  | ISN                  | SCHWARZBECK             | NTFM 8158            | GTS565        | April 14, 2023      | April 13, 2024          |
| 9                  | High voltage probe   | SCHWARZBECK             | TK9420               | GTS537        | April 14, 2023      | April 13, 2024          |
| 10                 | Antenna end assembly | Weinschel               | 1870A                | GTS560        | April 14, 2023      | April 13, 2024          |

| General used equipment: |                |              |           |               |                     |                         |
|-------------------------|----------------|--------------|-----------|---------------|---------------------|-------------------------|
| Item                    | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
| 1                       | Barometer      | KUMAO        | SF132     | GTS647        | April 19, 2023      | April 18, 2024          |

## 7 Test results and Measurement Data

### 7.1 Antenna requirement

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>Standard requirement:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                     | FCC Part15 C Section 15.203 /247(c) |
| <b>15.203 requirement:</b><br>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. |                                     |
| <b>15.247(c) (1)(i) requirement:</b><br>(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.                                                                                |                                     |
| <b>EUT Antenna:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |
| The antenna is PCB antenna, reference to the appendix II for details.                                                                                                                                                                                                                                                                                                                                                                                                            |                                     |

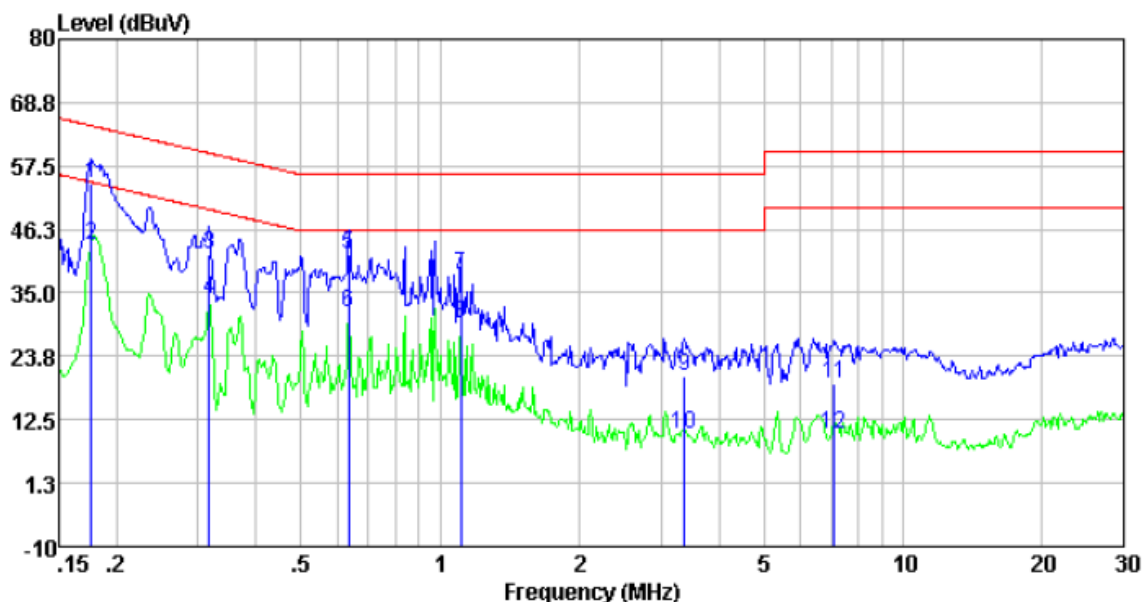
## 7.2 Conducted Emissions

|                                                  |                                                                                                                                                                                                    |       |              |     |           |          |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------|-----|-----------|----------|
| Test Requirement:                                | FCC Part15 C Section 15.207                                                                                                                                                                        |       |              |     |           |          |
| Test Method:                                     | ANSI C63.10:2013                                                                                                                                                                                   |       |              |     |           |          |
| Test Frequency Range:                            | 150KHz to 30MHz                                                                                                                                                                                    |       |              |     |           |          |
| Class / Severity:                                | Class B                                                                                                                                                                                            |       |              |     |           |          |
| Receiver setup:                                  | RBW=9KHz, VBW=30KHz, Sweep time=auto                                                                                                                                                               |       |              |     |           |          |
| Limit:                                           | Frequency range (MHz)                                                                                                                                                                              |       | Limit (dBuV) |     |           |          |
|                                                  |                                                                                                                                                                                                    |       | Quasi-peak   |     | Average   |          |
|                                                  | 0.15-0.5                                                                                                                                                                                           |       | 66 to 56*    |     | 56 to 46* |          |
|                                                  | 0.5-5                                                                                                                                                                                              |       | 56           |     | 46        |          |
|                                                  | 5-30                                                                                                                                                                                               |       | 60           |     | 50        |          |
| * Decreases with the logarithm of the frequency. |                                                                                                                                                                                                    |       |              |     |           |          |
| Test setup:                                      | <div><p style="text-align: center;"><b>Reference Plane</b></p><p><i>Remark</i><br/>E.U.T: Equipment Under Test<br/>LISN: Line Impedance Stabilization Network<br/>Test table height=0.8m</p></div> |       |              |     |           |          |
| Test Instruments:                                | Refer to section 6.0 for details                                                                                                                                                                   |       |              |     |           |          |
| Test mode:                                       | Refer to section 5.2 for details                                                                                                                                                                   |       |              |     |           |          |
| Test environment:                                | Temp.:                                                                                                                                                                                             | 25 °C | Humid.:      | 52% | Press.:   | 1012mbar |
| Test voltage:                                    | AC 120V, 60Hz                                                                                                                                                                                      |       |              |     |           |          |
| Test results:                                    | Pass                                                                                                                                                                                               |       |              |     |           |          |

## Measurement data

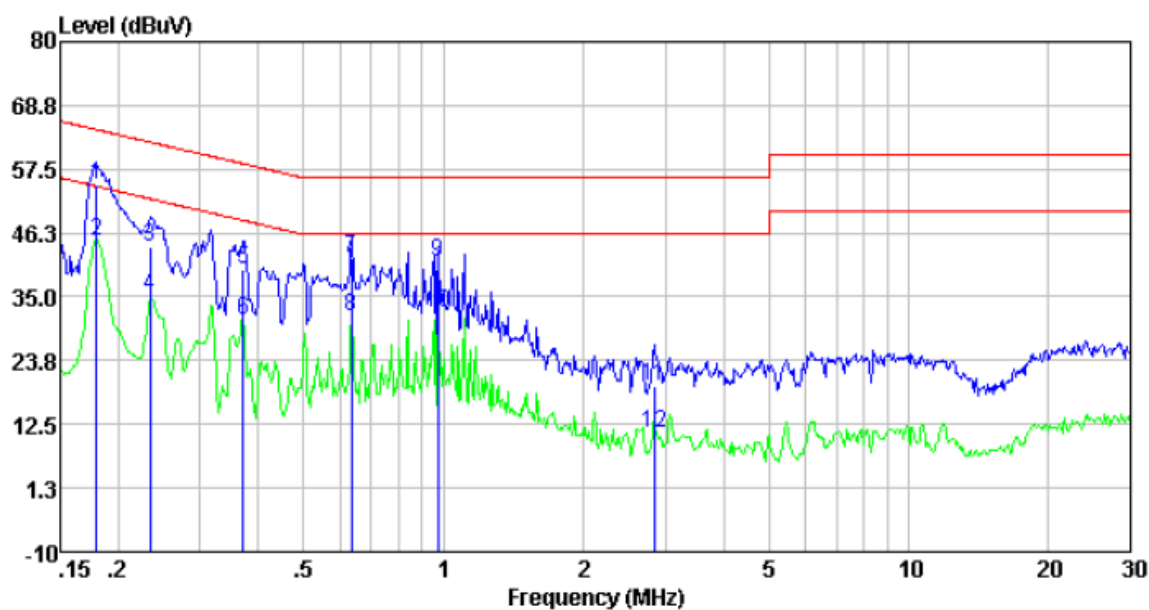
Pre-scan all test modes, found worst case at 2480MHz, and so only show the test result of 2480MHz

|            |                   |                 |      |
|------------|-------------------|-----------------|------|
| Test mode: | Transmitting mode | Phase Polarity: | Line |
|------------|-------------------|-----------------|------|



| Freq | Reading level | LISN/ISN factor | Cable loss | Level | Limit level | Over limit | Remark  |
|------|---------------|-----------------|------------|-------|-------------|------------|---------|
| MHz  | dBuV          | dB              | dB         | dBuV  | dBuV        | dB         |         |
| 0.18 | 44.47         | 10.09           | 0.01       | 54.57 | 64.68       | -10.11     | QP      |
| 0.18 | 33.50         | 10.09           | 0.01       | 43.60 | 54.68       | -11.08     | Average |
| 0.32 | 31.92         | 9.98            | 0.01       | 41.91 | 59.80       | -17.89     | QP      |
| 0.32 | 23.71         | 9.98            | 0.01       | 33.70 | 49.80       | -16.10     | Average |
| 0.63 | 31.68         | 9.96            | 0.02       | 41.66 | 56.00       | -14.34     | QP      |
| 0.63 | 21.63         | 9.96            | 0.02       | 31.61 | 46.00       | -14.39     | Average |
| 1.11 | 28.23         | 9.94            | 0.03       | 38.20 | 56.00       | -17.80     | QP      |
| 1.11 | 19.47         | 9.94            | 0.03       | 29.44 | 46.00       | -16.56     | Average |
| 3.36 | 10.45         | 9.74            | 0.05       | 20.24 | 56.00       | -35.76     | QP      |
| 3.36 | 0.05          | 9.74            | 0.05       | 9.84  | 46.00       | -36.16     | Average |
| 7.10 | 9.23          | 9.70            | 0.09       | 19.02 | 60.00       | -40.98     | QP      |
| 7.10 | 0.03          | 9.70            | 0.09       | 9.82  | 50.00       | -40.18     | Average |

|            |                   |                 |         |
|------------|-------------------|-----------------|---------|
| Test mode: | Transmitting mode | Phase Polarity: | Neutral |
|------------|-------------------|-----------------|---------|



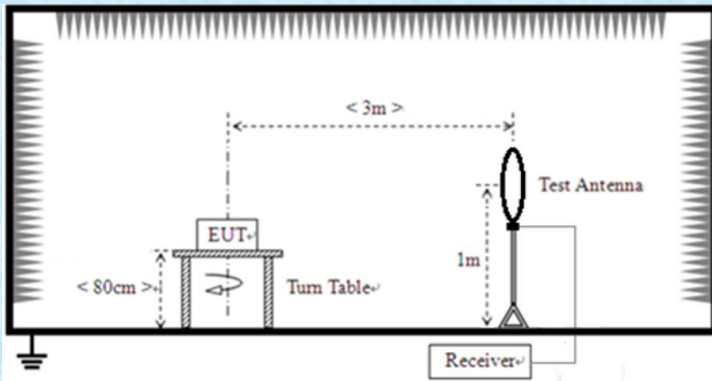
| Freq | Reading level | LISN/ISN factor | Cable loss | Level | Limit level | Over limit | Remark  |
|------|---------------|-----------------|------------|-------|-------------|------------|---------|
| MHz  | dBuV          | dB              | dB         | dBuV  | dBuV        | dB         |         |
| 0.18 | 44.63         | 10.10           | 0.01       | 54.74 | 64.50       | -9.76      | QP      |
| 0.18 | 34.73         | 10.10           | 0.01       | 44.84 | 54.50       | -9.66      | Average |
| 0.23 | 33.72         | 10.03           | 0.01       | 43.76 | 62.30       | -18.54     | QP      |
| 0.23 | 24.97         | 10.03           | 0.01       | 35.01 | 52.30       | -17.29     | Average |
| 0.37 | 29.75         | 9.96            | 0.01       | 39.72 | 58.47       | -18.75     | QP      |
| 0.37 | 20.94         | 9.96            | 0.01       | 30.91 | 48.47       | -17.56     | Average |
| 0.63 | 31.74         | 9.96            | 0.02       | 41.72 | 56.00       | -14.28     | QP      |
| 0.63 | 21.65         | 9.96            | 0.02       | 31.63 | 46.00       | -14.37     | Average |
| 0.97 | 31.27         | 9.96            | 0.03       | 41.26 | 56.00       | -14.74     | QP      |
| 0.97 | 22.29         | 9.96            | 0.03       | 32.28 | 46.00       | -13.72     | Average |
| 2.84 | 9.75          | 9.54            | 0.05       | 19.34 | 56.00       | -36.66     | QP      |
| 2.84 | 1.27          | 9.54            | 0.05       | 10.86 | 46.00       | -35.14     | Average |

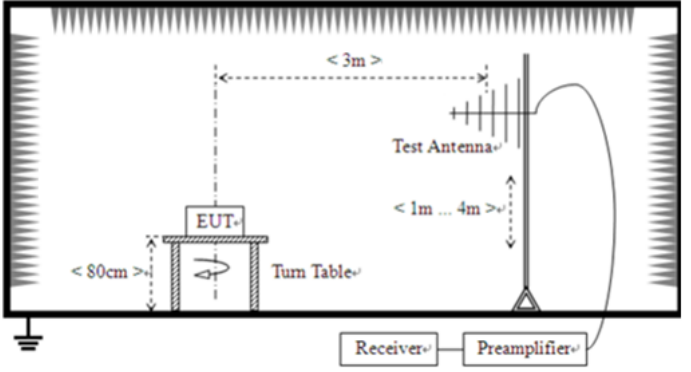
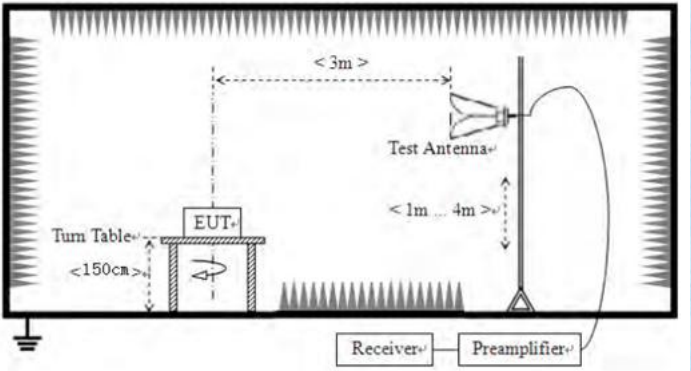
## Notes:

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 Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

## 7.3 Spurious Emission in Non-restricted & restricted Bands

### 7.3.1 Radiated Emission Method

|                       |                                                                                                                            |              |          |                      |            |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------|--------------|----------|----------------------|------------|
| Test Requirement:     | FCC Part15 C Section 15.209                                                                                                |              |          |                      |            |
| Test Method:          | ANSI C63.10:2013                                                                                                           |              |          |                      |            |
| Test Frequency Range: | 9kHz to 25GHz                                                                                                              |              |          |                      |            |
| Test site:            | Measurement Distance: 3m                                                                                                   |              |          |                      |            |
| Receiver setup:       | Frequency                                                                                                                  | Detector     | RBW      | VBW                  | Value      |
|                       | 9KHz-150KHz                                                                                                                | Quasi-peak   | 200Hz    | 600Hz                | Quasi-peak |
|                       | 150KHz-30MHz                                                                                                               | Quasi-peak   | 9KHz     | 30KHz                | Quasi-peak |
|                       | 30MHz-1GHz                                                                                                                 | Quasi-peak   | 120KHz   | 300KHz               | Quasi-peak |
|                       | Above 1GHz                                                                                                                 | Peak         | 1MHz     | 3MHz                 | Peak       |
|                       |                                                                                                                            | Peak         | 1MHz     | 10Hz                 | Average    |
|                       | Note: For Duty cycle ≥ 98%, average detector set as above For Duty cycle < 98%, average detector set as below: VBW ≥ 1 / T |              |          |                      |            |
| Limit:                | Frequency                                                                                                                  | Limit (uV/m) | Value    | Measurement Distance |            |
|                       | 0.009MHz-0.490MHz                                                                                                          | 2400/F(KHz)  | QP/PK/AV | 300m                 |            |
|                       | 0.490MHz-1.705MHz                                                                                                          | 24000/F(KHz) | QP       | 30m                  |            |
|                       | 1.705MHz-30MHz                                                                                                             | 30           | QP       | 30m                  |            |
|                       | 30MHz-88MHz                                                                                                                | 100          | QP       | 3m                   |            |
|                       | 88MHz-216MHz                                                                                                               | 150          | QP       |                      |            |
|                       | 216MHz-960MHz                                                                                                              | 200          | QP       |                      |            |
|                       | 960MHz-1GHz                                                                                                                | 500          | QP       |                      |            |
|                       | Above 1GHz                                                                                                                 | 500          | Average  |                      |            |
|                       |                                                                                                                            | 5000         | Peak     |                      |            |
| Test setup:           | For radiated emissions from 9kHz to 30MHz                                                                                  |              |          |                      |            |
|                       |                                        |              |          |                      |            |

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | <p>For radiated emissions from 30MHz to 1GHz</p>  <p>For radiated emissions above 1GHz</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p>Test Procedure:</p> | <ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) 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 10dB margin would be re-tested one by one using peak, quasi-peak or</li> </ol> |

|                   |                                                                |       |         |     |         |          |
|-------------------|----------------------------------------------------------------|-------|---------|-----|---------|----------|
|                   | average method as specified and then reported in a data sheet. |       |         |     |         |          |
| Test Instruments: | Refer to section 6.0 for details                               |       |         |     |         |          |
| Test mode:        | Refer to section 5.2 for details                               |       |         |     |         |          |
| Test environment: | Temp.:                                                         | 25 °C | Humid.: | 52% | Press.: | 1012mbar |
| Test voltage:     | AC 120V, 60Hz                                                  |       |         |     |         |          |
| Test results:     | Pass                                                           |       |         |     |         |          |

## Measurement data:

*Remark:*

*Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

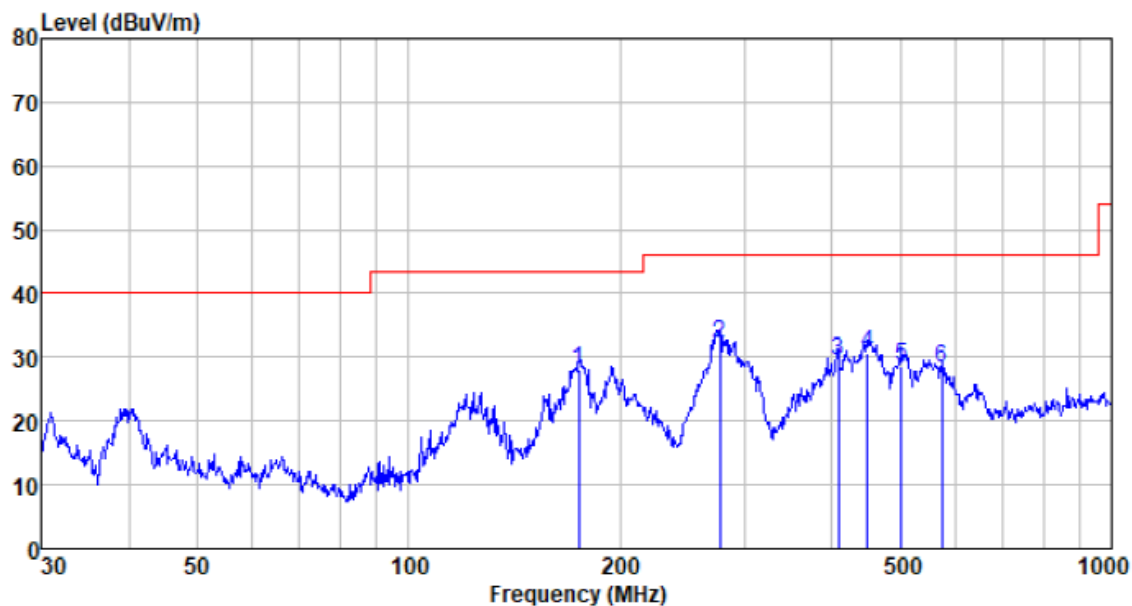
### ■ 9kHz~30MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

## ■ Below 1GHz

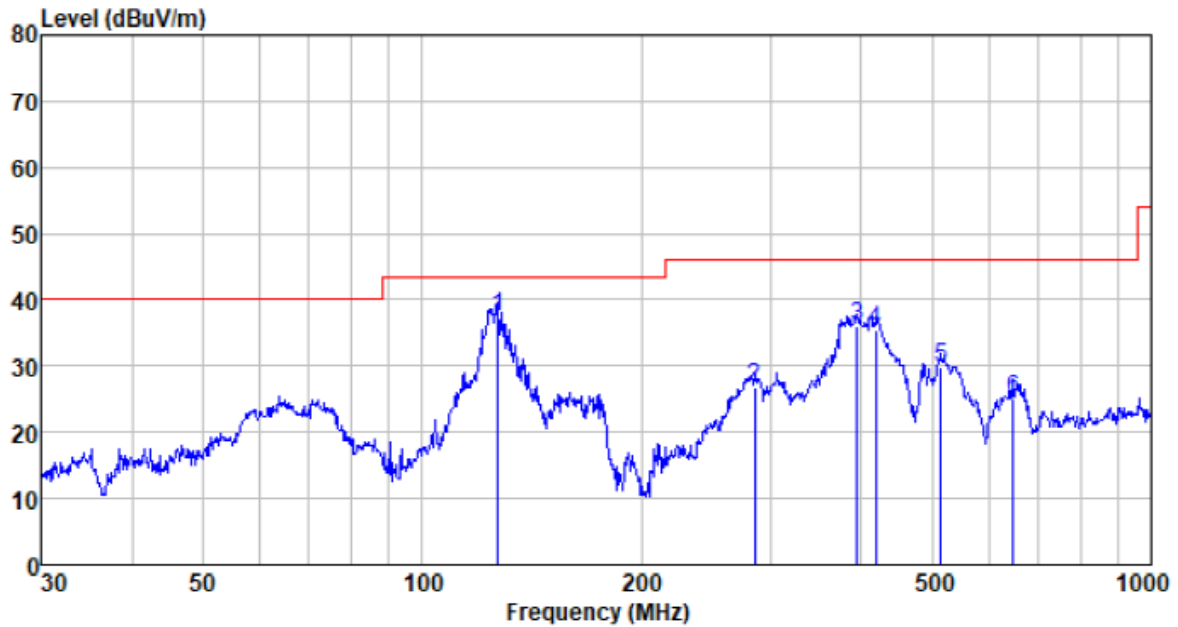
Pre-scan all test modes, found worst case at 2480MHz, and so only show the test result of 2480MHz

Horizontal:



| Freq<br>MHz | Reading<br>level<br>dBuV | Antenna<br>factor<br>dB/m | Cable<br>loss<br>dB | Preamp<br>factor<br>dB | level<br>dBuV/m | Limit<br>level<br>dBuV/m | Over<br>limit<br>dB | Remark |
|-------------|--------------------------|---------------------------|---------------------|------------------------|-----------------|--------------------------|---------------------|--------|
| 174.424     | 45.34                    | 10.91                     | 1.71                | 30.00                  | 27.96           | 43.50                    | -15.54              | QP     |
| 277.094     | 47.37                    | 12.67                     | 2.25                | 30.00                  | 32.29           | 46.00                    | -13.71              | QP     |
| 408.946     | 40.65                    | 15.89                     | 2.90                | 30.00                  | 29.44           | 46.00                    | -16.56              | QP     |
| 449.556     | 40.92                    | 16.69                     | 3.08                | 30.00                  | 30.69           | 46.00                    | -15.31              | QP     |
| 502.940     | 37.74                    | 17.65                     | 3.32                | 30.00                  | 28.71           | 46.00                    | -17.29              | QP     |
| 572.614     | 35.78                    | 18.86                     | 3.62                | 30.00                  | 28.26           | 46.00                    | -17.74              | QP     |

Vertical:



| Freq<br>MHz | Reading<br>level<br>dBuV | Antenna<br>factor<br>dB/m | Cable<br>loss<br>dB | Preamp<br>factor<br>dB | level<br>dBuV/m | Limit<br>level<br>dBuV/m | Over<br>limit<br>dB | Remark |
|-------------|--------------------------|---------------------------|---------------------|------------------------|-----------------|--------------------------|---------------------|--------|
| 127.218     | 54.49                    | 11.65                     | 1.41                | 30.00                  | 37.55           | 43.50                    | -5.95               | QP     |
| 285.978     | 41.85                    | 12.75                     | 2.29                | 30.00                  | 26.89           | 46.00                    | -19.11              | QP     |
| 394.855     | 47.50                    | 15.55                     | 2.83                | 30.00                  | 35.88           | 46.00                    | -10.12              | QP     |
| 419.108     | 46.42                    | 16.10                     | 2.94                | 30.00                  | 35.46           | 46.00                    | -10.54              | QP     |
| 515.437     | 38.56                    | 17.88                     | 3.37                | 30.00                  | 29.81           | 46.00                    | -16.19              | QP     |
| 647.386     | 31.00                    | 20.04                     | 3.91                | 30.00                  | 24.95           | 46.00                    | -21.05              | QP     |

## ■ Above 1GHz

## ■ Unwanted Emissions in Non-restricted Frequency Bands

|               |                |
|---------------|----------------|
| Test channel: | Lowest channel |
|---------------|----------------|

### Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4810.00         | 35.84             | 31.08                 | 7.30            | 38.36              | 35.86          | 74.00               | -38.14          | Vertical     |
| 7215.00         | 30.86             | 35.95                 | 9.44            | 38.97              | 37.28          | 74.00               | -36.72          | Vertical     |
| 9620.00         | 30.60             | 37.93                 | 10.01           | 39.69              | 38.85          | 74.00               | -35.15          | Vertical     |
| 4810.00         | 39.83             | 31.08                 | 7.30            | 38.36              | 39.85          | 74.00               | -34.15          | Horizontal   |
| 7215.00         | 32.49             | 35.95                 | 9.44            | 38.97              | 38.91          | 74.00               | -35.09          | Horizontal   |
| 9620.00         | 29.89             | 37.93                 | 10.01           | 39.69              | 38.14          | 74.00               | -35.86          | Horizontal   |

### Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4810.00         | 24.93             | 31.08                 | 7.30            | 38.36              | 24.95          | 54.00               | -29.05          | Vertical     |
| 7215.00         | 19.71             | 35.95                 | 9.44            | 38.97              | 26.13          | 54.00               | -27.87          | Vertical     |
| 9620.00         | 18.88             | 37.93                 | 10.01           | 39.69              | 27.13          | 54.00               | -26.87          | Vertical     |
| 4810.00         | 29.00             | 31.08                 | 7.30            | 38.36              | 29.02          | 54.00               | -24.98          | Horizontal   |
| 7215.00         | 21.79             | 35.95                 | 9.44            | 38.97              | 28.21          | 54.00               | -25.79          | Horizontal   |
| 9620.00         | 18.49             | 37.93                 | 10.01           | 39.69              | 26.74          | 54.00               | -27.26          | Horizontal   |

|               |                |
|---------------|----------------|
| Test channel: | Middle channel |
|---------------|----------------|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4880.00         | 36.24             | 31.26                 | 7.04            | 38.38              | 36.16          | 74.00               | -37.84          | Vertical     |
| 7320.00         | 31.12             | 36.14                 | 9.18            | 39.00              | 37.44          | 74.00               | -36.56          | Vertical     |
| 9760.00         | 30.84             | 38.06                 | 10.27           | 39.73              | 39.44          | 74.00               | -34.56          | Vertical     |
| 4880.00         | 40.31             | 31.26                 | 7.04            | 38.38              | 40.23          | 74.00               | -33.77          | Horizontal   |
| 7320.00         | 32.79             | 36.14                 | 9.18            | 39.00              | 39.11          | 74.00               | -34.89          | Horizontal   |
| 9760.00         | 30.16             | 38.06                 | 10.27           | 39.73              | 38.76          | 74.00               | -35.24          | Horizontal   |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4880.00         | 25.26             | 31.26                 | 7.04            | 38.38              | 25.18          | 54.00               | -28.82          | Vertical     |
| 7320.00         | 19.94             | 36.14                 | 9.18            | 39.00              | 26.26          | 54.00               | -27.74          | Vertical     |
| 9760.00         | 19.08             | 38.06                 | 10.27           | 39.73              | 27.68          | 54.00               | -26.32          | Vertical     |
| 4880.00         | 29.37             | 31.26                 | 7.04            | 38.38              | 29.29          | 54.00               | -24.71          | Horizontal   |
| 7320.00         | 22.04             | 36.14                 | 9.18            | 39.00              | 28.36          | 54.00               | -25.64          | Horizontal   |
| 9760.00         | 18.72             | 38.06                 | 10.27           | 39.73              | 27.32          | 54.00               | -26.68          | Horizontal   |

|               |                 |
|---------------|-----------------|
| Test channel: | Highest channel |
|---------------|-----------------|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4960.00         | 35.97             | 31.46                 | 6.75            | 38.39              | 35.79          | 74.00               | -38.21          | Vertical     |
| 7440.00         | 30.95             | 36.35                 | 9.00            | 39.03              | 37.27          | 74.00               | -36.73          | Vertical     |
| 9920.00         | 30.68             | 38.20                 | 10.12           | 39.77              | 39.23          | 74.00               | -34.77          | Vertical     |
| 4960.00         | 39.98             | 31.46                 | 6.75            | 38.39              | 39.80          | 74.00               | -34.20          | Horizontal   |
| 7440.00         | 32.58             | 36.35                 | 9.00            | 39.03              | 38.90          | 74.00               | -35.10          | Horizontal   |
| 9920.00         | 29.98             | 38.20                 | 10.12           | 39.77              | 38.53          | 74.00               | -35.47          | Horizontal   |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4960.00         | 25.08             | 31.46                 | 6.75            | 38.39              | 24.90          | 54.00               | -29.10          | Vertical     |
| 7440.00         | 19.81             | 36.35                 | 9.00            | 39.03              | 26.13          | 54.00               | -27.87          | Vertical     |
| 9920.00         | 18.97             | 38.20                 | 10.12           | 39.77              | 27.52          | 54.00               | -26.48          | Vertical     |
| 4960.00         | 29.17             | 31.46                 | 6.75            | 38.39              | 28.99          | 54.00               | -25.01          | Horizontal   |
| 7440.00         | 21.90             | 36.35                 | 9.00            | 39.03              | 28.22          | 54.00               | -25.78          | Horizontal   |
| 9920.00         | 18.59             | 38.20                 | 10.12           | 39.77              | 27.14          | 54.00               | -26.86          | Horizontal   |

**Remarks:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

## ■ Unwanted Emissions in Restricted Frequency Bands

|               |                |
|---------------|----------------|
| Test channel: | Lowest channel |
|---------------|----------------|

### Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 2310.00         | 47.10             | 27.17                 | 4.65            | 38.52                    | 40.40          | 74.00               | -33.60          | Horizontal   |
| 2390.00         | 51.49             | 27.27                 | 4.60            | 38.56                    | 44.80          | 74.00               | -29.20          | Horizontal   |
| 2310.00         | 48.05             | 27.17                 | 4.65            | 38.52                    | 41.35          | 74.00               | -32.65          | Vertical     |
| 2390.00         | 52.98             | 27.27                 | 4.60            | 38.56                    | 46.29          | 74.00               | -27.71          | Vertical     |

### Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 2310.00         | 36.69             | 27.17                 | 4.65            | 38.52                    | 29.99          | 54.00               | -24.01          | Horizontal   |
| 2390.00         | 38.18             | 27.27                 | 4.60            | 38.56                    | 31.49          | 54.00               | -22.51          | Horizontal   |
| 2310.00         | 36.94             | 27.17                 | 4.65            | 38.52                    | 30.24          | 54.00               | -23.76          | Vertical     |
| 2390.00         | 39.23             | 27.27                 | 4.60            | 38.56                    | 32.54          | 54.00               | -21.46          | Vertical     |

|               |                 |
|---------------|-----------------|
| Test channel: | Highest channel |
|---------------|-----------------|

### Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 2483.50         | 49.70             | 27.38                 | 4.52            | 38.59                    | 43.01          | 74.00               | -30.99          | Horizontal   |
| 2500.00         | 48.07             | 27.40                 | 4.49            | 38.60                    | 41.36          | 74.00               | -32.64          | Horizontal   |
| 2483.50         | 51.25             | 27.38                 | 4.52            | 38.59                    | 44.56          | 74.00               | -29.44          | Vertical     |
| 2500.00         | 49.47             | 27.40                 | 4.49            | 38.60                    | 42.76          | 74.00               | -31.24          | Vertical     |

### Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 2483.50         | 37.57             | 27.38                 | 4.52            | 38.59                    | 30.88          | 54.00               | -23.12          | Horizontal   |
| 2500.00         | 36.97             | 27.40                 | 4.49            | 38.60                    | 30.26          | 54.00               | -23.74          | Horizontal   |
| 2483.50         | 37.11             | 27.38                 | 4.52            | 38.59                    | 30.42          | 54.00               | -23.58          | Vertical     |
| 2500.00         | 37.24             | 27.40                 | 4.49            | 38.60                    | 30.53          | 54.00               | -23.47          | Vertical     |

### Remarks:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

## 8 Test Setup Photo

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

## 9 EUT Constructional Details

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

-----End-----