

# TEST REPORT

**Applicant:** INTERNATIONAL DEVELOPMENT COMPANY

**Address of Applicant:** 899 Henrietta Creek Road, Roanoke, Texas 76262, United States

**Manufacturer/Factory:** Zhongshan Quanxin Lighting Electrical Co., Ltd.

**Address of Manufacturer/Factory:** Hong Ji Street, Shalang, Long Ping Cun, West District, ZHONGSHAN Guangdong 528411 China

**Equipment Under Test (EUT)**

Product Name: Solar LED Light

Model No.: SR51FB22C-08, SR51FB22\*-## (Where "#" is used to denote numbers or blank for commercial purpose; Where "\*" is used to denote letters or blank for commercial purpose.)

**FCC ID:** 2AP35-SR51FB22C

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.249

**Date of sample receipt:** September 16, 2020

**Date of Test:** September 17-26, 2020

**Date of report issued:** September 26, 2020

**Test Result :** PASS \*

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

Authorized Signature:



**Robinson Lo**

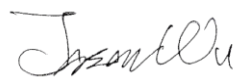
**Laboratory Manager**

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

| Version No. | Date               | Description |
|-------------|--------------------|-------------|
| 00          | September 26, 2020 | Original    |
|             |                    |             |
|             |                    |             |
|             |                    |             |
|             |                    |             |

Prepared By:

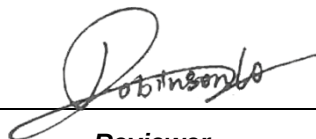


Date:

September 26, 2020

Project Engineer

Check By:



Date:

September 26, 2020

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 .....                                  | 6    |
| 5.3 DESCRIPTION OF SUPPORT UNITS .....               | 6    |
| 5.4 DEVIATION FROM STANDARDS .....                   | 6    |
| 5.5 ABNORMALITIES FROM STANDARD CONDITIONS .....     | 6    |
| 5.6 TEST FACILITY .....                              | 6    |
| 5.7 TEST LOCATION .....                              | 6    |
| 6 TEST INSTRUMENTS LIST .....                        | 7    |
| 7 TEST RESULTS AND MEASUREMENT DATA .....            | 9    |
| 7.1 ANTENNA REQUIREMENT .....                        | 9    |
| 7.2 RADIATED EMISSION METHOD .....                   | 10   |
| 7.2.1 Field Strength of The Fundamental Signal ..... | 12   |
| 7.2.2 Spurious emissions .....                       | 14   |
| 7.2.3 Bandedge emissions .....                       | 26   |
| 7.3 20dB OCCUPY BANDWIDTH .....                      | 28   |
| 8 TEST SETUP PHOTO .....                             | 30   |
| 9 EUT CONSTRUCTIONAL DETAILS .....                   | 30   |

## 4 Test Summary

| Test Item                                | Section in CFR 47     | Result |
|------------------------------------------|-----------------------|--------|
| Antenna requirement                      | 15.203                | Pass   |
| AC Power Line Conducted Emission         | 15.207                | N/A    |
| Field strength of the fundamental signal | 15.249 (a)            | Pass   |
| Spurious emissions                       | 15.249 (a) (d)/15.209 | Pass   |
| Band edge                                | 15.249 (d)/15.205     | Pass   |
| 20dB Occupied Bandwidth                  | 15.215 (c)            | Pass   |

Remarks:

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

### 4.1 Measurement Uncertainty

| Test Item                        | Frequency Range | Measurement Uncertainty | Notes |
|----------------------------------|-----------------|-------------------------|-------|
| 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 Name:                                                                                                                                                                          | Solar LED Light                                                                                                                                                         |
| Model No.:                                                                                                                                                                             | SR51FB22C-08, SR51FB22*-## ( Where "#" is used to denote numbers or blank for commercial purpose; Where "*" is used to denote letters or blank for commercial purpose.) |
| Test Model No:                                                                                                                                                                         | SR51FB22C-08                                                                                                                                                            |
| Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are appearance color and model name for commercial purpose. |                                                                                                                                                                         |
| Serial No.:                                                                                                                                                                            | QXSR51FB22C08                                                                                                                                                           |
| Test sample(s) ID:                                                                                                                                                                     | GTS202009000167-1                                                                                                                                                       |
| Sample(s) Status                                                                                                                                                                       | Engineered sample                                                                                                                                                       |
| Operation Frequency:                                                                                                                                                                   | 2420MHz, 2450MHz, 2470MHz                                                                                                                                               |
| Channel numbers:                                                                                                                                                                       | 3                                                                                                                                                                       |
| Modulation type:                                                                                                                                                                       | GFSK                                                                                                                                                                    |
| Antenna Type:                                                                                                                                                                          | Integral Antenna                                                                                                                                                        |
| Antenna gain:                                                                                                                                                                          | 3dBi(declare by applicant)                                                                                                                                              |
| Power supply:                                                                                                                                                                          | DC3.7V 2000mAh or solar power                                                                                                                                           |

#### Operation Frequency each of channel

| Channel             | Frequency |
|---------------------|-----------|
| The lowest channel  | 2420MHz   |
| The middle channel  | 2450MHz   |
| The Highest channel | 2470MHz   |

## 5.2 Test mode

|                                                 |                                                 |
|-------------------------------------------------|-------------------------------------------------|
| Transmitting mode                               | Keep the EUT in continuously transmitting mode. |
| Remark: During the test, Full battery is used . |                                                 |

### Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

| Axis                   | X     | Y     | Z     |
|------------------------|-------|-------|-------|
| Field Strength(dBuV/m) | 86.24 | 87.33 | 85.46 |

## 5.3 Description of Support Units

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

## 5.4 Deviation from Standards

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

## 5.5 Abnormalities from Standard Conditions

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

## 5.6 Test Facility

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

- **FCC —Registration No.: 381383**

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. Registration 381383.

- **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A

- **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

## 5.7 Test Location

|                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| All tests were performed at:                                                                                                                                                                                                                        |
| 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 |

## 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        | July. 02 2020       | July. 01 2025           |
| 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        | June. 25 2020       | June. 24 2021           |
| 4                  | BiConiLog Antenna                   | SCHWARZBECK<br>MESS-ELEKTRONIK | VULB9163                    | GTS214        | June. 25 2020       | June. 24 2021           |
| 5                  | Double -ridged waveguide horn       | SCHWARZBECK<br>MESS-ELEKTRONIK | BBHA 9120 D                 | GTS208        | June. 25 2020       | June. 24 2021           |
| 6                  | Horn Antenna                        | ETS-LINDGREN                   | 3160                        | GTS217        | June. 25 2020       | June. 24 2021           |
| 7                  | EMI Test Software                   | AUDIX                          | E3                          | N/A           | N/A                 | N/A                     |
| 8                  | Coaxial Cable                       | GTS                            | N/A                         | GTS213        | June. 25 2020       | June. 24 2021           |
| 9                  | Coaxial Cable                       | GTS                            | N/A                         | GTS211        | June. 25 2020       | June. 24 2021           |
| 10                 | Coaxial cable                       | GTS                            | N/A                         | GTS210        | June. 25 2020       | June. 24 2021           |
| 11                 | Coaxial Cable                       | GTS                            | N/A                         | GTS212        | June. 25 2020       | June. 24 2021           |
| 12                 | Amplifier(100kHz-3GHz)              | HP                             | 8347A                       | GTS204        | June. 25 2020       | June. 24 2021           |
| 13                 | Amplifier(2GHz-20GHz)               | HP                             | 84722A                      | GTS206        | June. 25 2020       | June. 24 2021           |
| 14                 | Amplifier (18-26GHz)                | Rohde & Schwarz                | AFS33-18002<br>650-30-8P-44 | GTS218        | June. 25 2020       | June. 24 2021           |
| 15                 | Band filter                         | Amindeon                       | 82346                       | GTS219        | June. 25 2020       | June. 24 2021           |
| 16                 | Power Meter                         | Anritsu                        | ML2495A                     | GTS540        | June. 25 2020       | June. 24 2021           |
| 17                 | Power Sensor                        | Anritsu                        | MA2411B                     | GTS541        | June. 25 2020       | June. 24 2021           |
| 18                 | Wideband Radio Communication Tester | Rohde & Schwarz                | CMW500                      | GTS575        | June. 25 2020       | June. 24 2021           |
| 19                 | Splitter                            | Agilent                        | 11636B                      | GTS237        | June. 25 2020       | June. 24 2021           |
| 20                 | Loop Antenna                        | ZHINAN                         | ZN30900A                    | GTS534        | June. 25 2020       | June. 24 2021           |
| 21                 | Breitband hornantenne               | SCHWARZBECK                    | BBHA 9170                   | GTS579        | Oct. 19 2019        | Oct. 18 2020            |
| 22                 | Amplifier                           | TDK                            | PA-02-02                    | GTS574        | Oct. 19 2019        | Oct. 18 2020            |
| 23                 | Amplifier                           | TDK                            | PA-02-03                    | GTS576        | Oct. 19 2019        | Oct. 18 2020            |
| 24                 | PSA Series Spectrum Analyzer        | Rohde & Schwarz                | FSP                         | GTS578        | June. 25 2020       | June. 24 2021           |

| RF Conducted Test: |                                                |              |                  |            |                        |                            |
|--------------------|------------------------------------------------|--------------|------------------|------------|------------------------|----------------------------|
| Item               | Test Equipment                                 | Manufacturer | Model No.        | Serial No. | Cal.Date<br>(mm-dd-yy) | Cal.Due date<br>(mm-dd-yy) |
| 1                  | MXA Signal Analyzer                            | Agilent      | N9020A           | GTS566     | June. 25 2020          | June. 24 2021              |
| 2                  | EMI Test Receiver                              | R&S          | ESCI 7           | GTS552     | June. 25 2020          | June. 24 2021              |
| 3                  | Spectrum Analyzer                              | Agilent      | E4440A           | GTS533     | June. 25 2020          | June. 24 2021              |
| 4                  | MXG vector Signal Generator                    | Agilent      | N5182A           | GTS567     | June. 25 2020          | June. 24 2021              |
| 5                  | ESG Analog Signal Generator                    | Agilent      | E4428C           | GTS568     | June. 25 2020          | June. 24 2021              |
| 6                  | USB RF Power Sensor                            | DARE         | RPR3006W         | GTS569     | June. 25 2020          | June. 24 2021              |
| 7                  | RF Switch Box                                  | Shongyi      | RFSW3003328      | GTS571     | June. 25 2020          | June. 24 2021              |
| 8                  | Programmable Constant Temp & Humi Test Chamber | WEWON        | WHTH-150L-40-880 | GTS572     | June. 25 2020          | June. 24 2021              |

| General used equipment: |                                 |              |           |               |                        |                            |
|-------------------------|---------------------------------|--------------|-----------|---------------|------------------------|----------------------------|
| Item                    | Test Equipment                  | Manufacturer | Model No. | Inventory No. | Cal.Date<br>(mm-dd-yy) | Cal.Due date<br>(mm-dd-yy) |
| 1                       | Humidity/ Temperature Indicator | KTJ          | TA328     | GTS243        | June. 25 2020          | June. 24 2021              |
| 2                       | Barometer                       | ChangChun    | DYM3      | GTS255        | June. 25 2020          | June. 24 2021              |

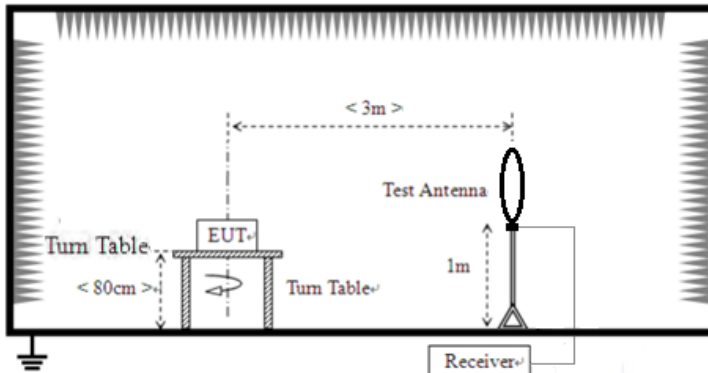


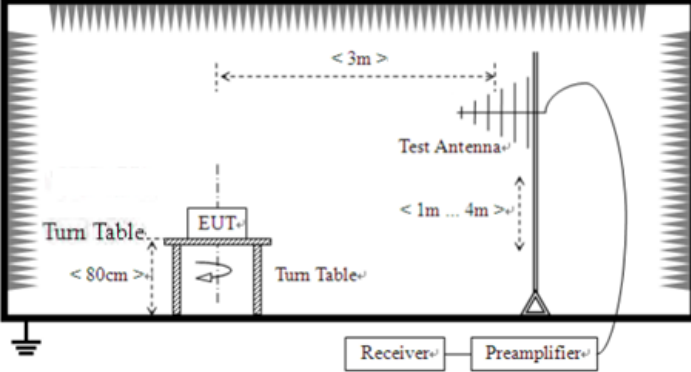
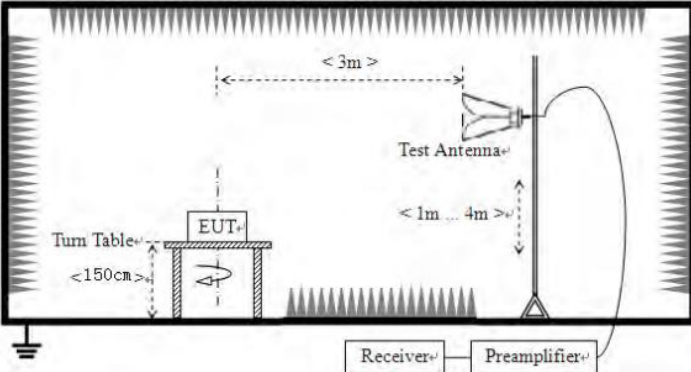
## 7 Test results and Measurement Data

### 7.1 Antenna requirement

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>Standard requirement:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                     | FCC Part15 C Section 15.203 |
| <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>EUT Antenna:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             |
| The antenna is integral antenna, the best case gain of the antenna is 3dBi, reference to the appendix II for details                                                                                                                                                                                                                                                                                                                                                             |                             |

## 7.2 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    | Remark           |
|                                                      | 9kHz-150kHz                                                                                                                                                                                                                                                    | Quasi-peak | 200Hz              | 300Hz  | Quasi-peak Value |
|                                                      | 150kHz-30MHz                                                                                                                                                                                                                                                   | Quasi-peak | 9kHz               | 10kHz  | Quasi-peak Value |
|                                                      | 30MHz-1GHz                                                                                                                                                                                                                                                     | Quasi-peak | 120KHz             | 300KHz | Quasi-peak Value |
|                                                      | Above 1GHz                                                                                                                                                                                                                                                     | Peak       | 1MHz               | 3MHz   | Peak Value       |
|                                                      |                                                                                                                                                                                                                                                                | Peak       | 1MHz               | 10Hz   | Average Value    |
| Limit:<br>(Field strength of the fundamental signal) | Frequency                                                                                                                                                                                                                                                      |            | Limit (dBuV/m @3m) |        | Remark           |
|                                                      | 2400MHz-2483.5MHz                                                                                                                                                                                                                                              |            | 94.00              |        | Average Value    |
|                                                      |                                                                                                                                                                                                                                                                |            | 114.00             |        | Peak Value       |
| Limit:<br>(Spurious Emissions)                       | Frequency                                                                                                                                                                                                                                                      |            | Limit (uV/m)       |        | Remark           |
|                                                      | 0.009MHz-0.490MHz                                                                                                                                                                                                                                              |            | 2400/F(kHz) @300m  |        | Quasi-peak Value |
|                                                      | 0.490MHz-1.705MHz                                                                                                                                                                                                                                              |            | 24000/F(kHz) @30m  |        | Quasi-peak Value |
|                                                      | 1.705MHz-30.0MHz                                                                                                                                                                                                                                               |            | 30 @30m            |        | Quasi-peak Value |
|                                                      | 30MHz-88MHz                                                                                                                                                                                                                                                    |            | 100 @3m            |        | Quasi-peak Value |
|                                                      | 88MHz-216MHz                                                                                                                                                                                                                                                   |            | 150 @3m            |        | Quasi-peak Value |
|                                                      | 216MHz-960MHz                                                                                                                                                                                                                                                  |            | 200 @3m            |        | Quasi-peak Value |
|                                                      | 960MHz-1GHz                                                                                                                                                                                                                                                    |            | 500 @3m            |        | Quasi-peak Value |
|                                                      | Above 1GHz                                                                                                                                                                                                                                                     |            | 500 @3m            |        | Average Value    |
|                                                      |                                                                                                                                                                                                                                                                |            | 5000 @3m           |        | Peak Value       |
| Limit:<br>(band edge)                                | Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation. |            |                    |        |                  |
| Test setup:                                          | For radiated emissions from 9kHz to 30MHz                                                                                                                                                                                                                      |            |                    |        |                  |
|                                                      |                                                                                                                                                                            |            |                    |        |                  |
|                                                      | For radiated emissions from 30MHz to1GHz                                                                                                                                                                                                                       |            |                    |        |                  |

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |  <p>For radiated emissions above 1GHz</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Test Procedure:   | <ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) 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 average method as specified and then reported in a data sheet.</li> </ol> |
| 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 results:     | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Test voltage:     | DC3.7V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**Measurement data:**

**7.2.1 Field Strength of The Fundamental Signal**

**Peak value:**

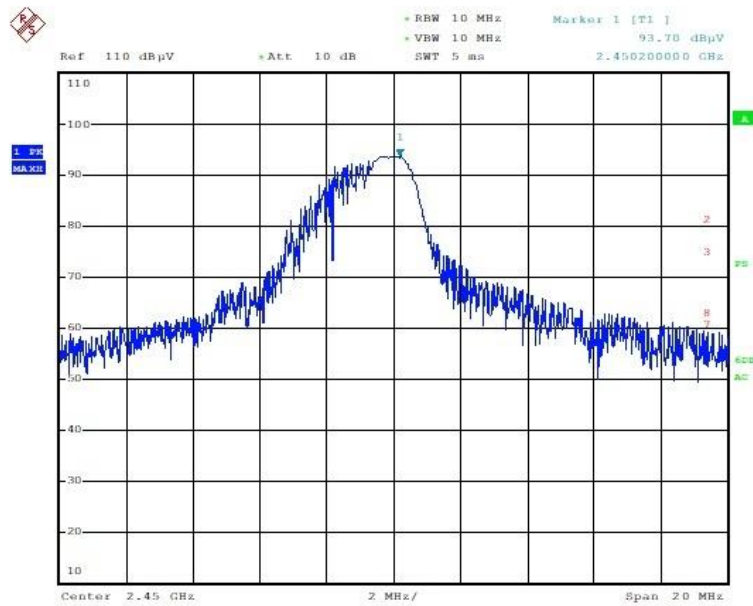
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 2420.00         | 83.26             | 27.49                 | 2.94            | 36.88                    | 76.81          | 114.00              | -37.19          | Vertical     |
| 2420.00         | 85.77             | 27.49                 | 2.94            | 36.88                    | 79.32          | 114.00              | -34.68          | Horizontal   |
| 2450.00         | 82.17             | 27.57                 | 2.96            | 36.90                    | 75.80          | 114.00              | -38.20          | Vertical     |
| 2450.00         | 93.70             | 27.57                 | 2.96            | 36.90                    | 87.33          | 114.00              | -26.67          | Horizontal   |
| 2470.00         | 80.84             | 27.62                 | 2.98            | 36.92                    | 74.52          | 114.00              | -39.48          | Vertical     |
| 2470.00         | 84.69             | 27.62                 | 2.98            | 36.92                    | 78.37          | 114.00              | -35.63          | Horizontal   |

**Average value:**

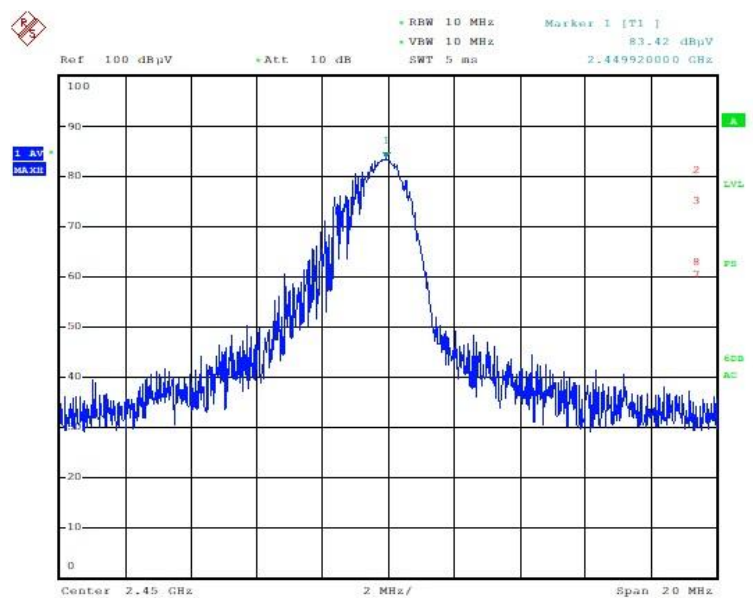
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 2420.00         | 78.42             | 27.49                 | 2.94            | 36.88                    | 71.97          | 94.00               | -22.03          | Vertical     |
| 2420.00         | 80.95             | 27.49                 | 2.94            | 36.88                    | 74.50          | 94.00               | -19.50          | Horizontal   |
| 2450.00         | 76.24             | 27.57                 | 2.96            | 36.90                    | 69.87          | 94.00               | -24.13          | Vertical     |
| 2450.00         | 83.42             | 27.57                 | 2.96            | 36.90                    | 77.05          | 94.00               | -16.95          | Horizontal   |
| 2470.00         | 75.49             | 27.62                 | 2.98            | 36.92                    | 69.17          | 94.00               | -24.83          | Vertical     |
| 2470.00         | 79.07             | 27.62                 | 2.98            | 36.92                    | 72.75          | 94.00               | -21.25          | Horizontal   |

Test plot as follows:

Only show the worst case: 2450MHz, Horizontal



PK detector is for PK value



RMS detector is for AV value

## 7.2.2 Spurious emissions

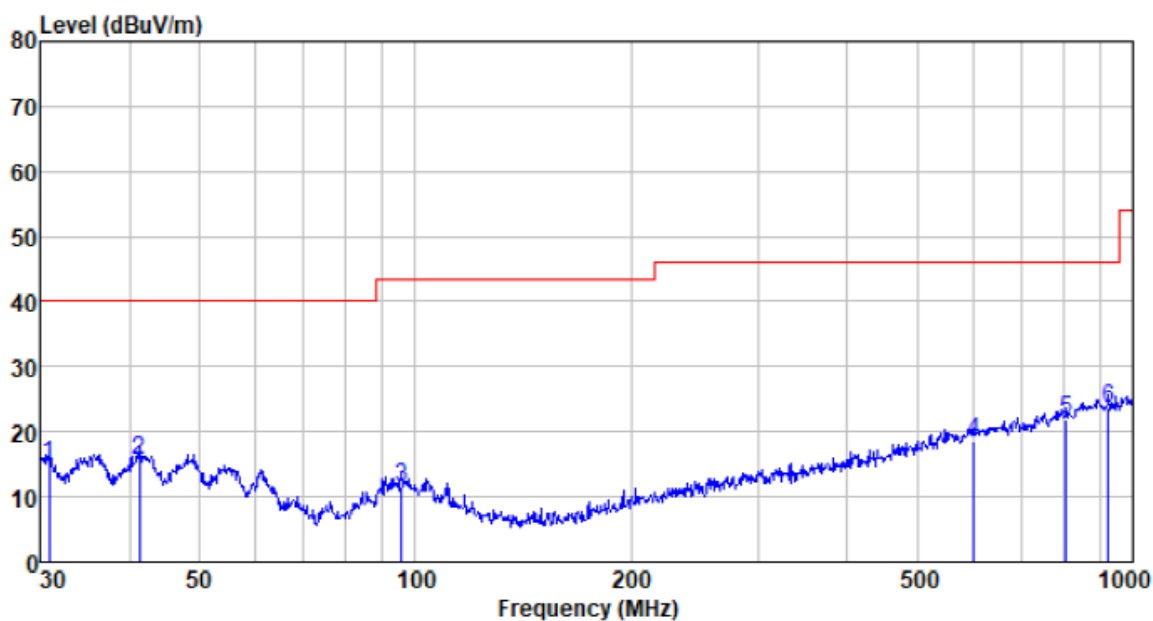
### ■ Below 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o), the test result no need to reported.

### ■ Below 1GHz

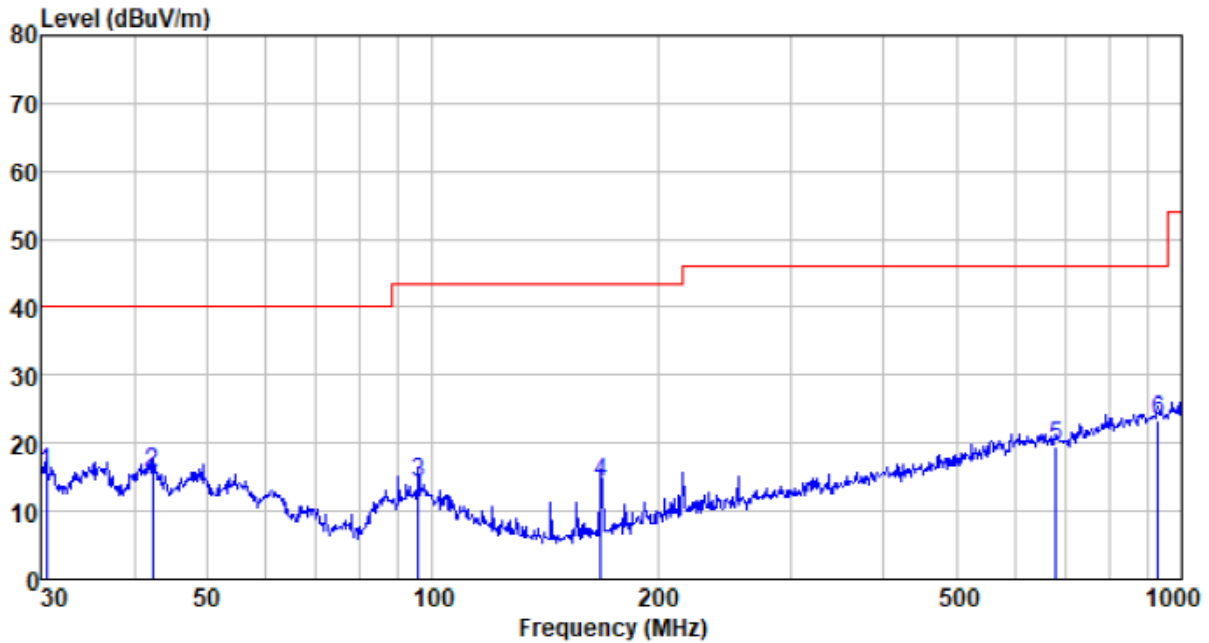
|               |                |
|---------------|----------------|
| Test channel: | Lowest channel |
|---------------|----------------|

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 |
|-------------|--------------------------|---------------------------|---------------------|------------------------|-----------------|--------------------------|---------------------|--------|
| 30.853      | 38.25                    | 11.22                     | 0.56                | 35.06                  | 14.97           | 40.00                    | -25.03              | QP     |
| 41.277      | 38.52                    | 12.21                     | 0.68                | 35.74                  | 15.67           | 40.00                    | -24.33              | QP     |
| 95.762      | 35.54                    | 11.59                     | 1.16                | 36.69                  | 11.60           | 43.50                    | -31.90              | QP     |
| 601.427     | 32.96                    | 19.50                     | 3.73                | 37.54                  | 18.65           | 46.00                    | -27.35              | QP     |
| 807.429     | 33.42                    | 21.47                     | 4.49                | 37.62                  | 21.76           | 46.00                    | -24.24              | QP     |
| 925.756     | 33.79                    | 22.41                     | 4.95                | 37.58                  | 23.57           | 46.00                    | -22.43              | QP     |

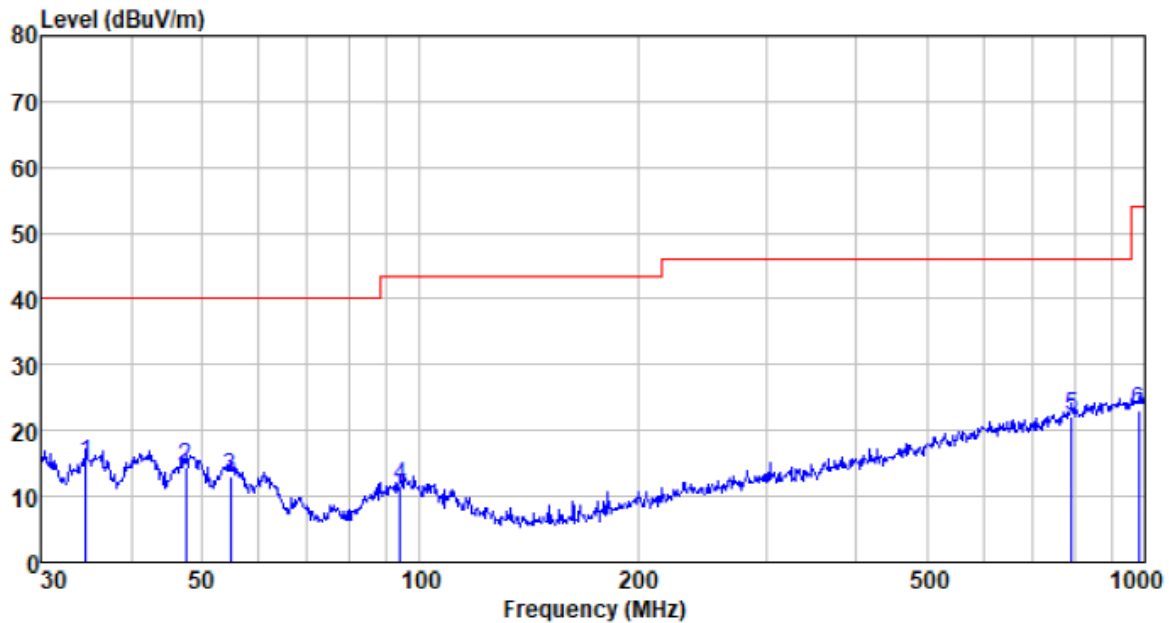
Vertical:



| 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 |
|-------------|--------------------------|---------------------------|---------------------|------------------------|-----------------|--------------------------|---------------------|--------|
| 30.531      | 38.93                    | 11.21                     | 0.56                | 35.04                  | 15.66           | 40.00                    | -24.34              | QP     |
| 42.302      | 38.44                    | 12.23                     | 0.69                | 35.79                  | 15.57           | 40.00                    | -24.43              | QP     |
| 95.762      | 38.14                    | 11.59                     | 1.16                | 36.69                  | 14.20           | 43.50                    | -29.30              | QP     |
| 167.824     | 41.22                    | 8.46                      | 1.67                | 37.18                  | 14.17           | 43.50                    | -29.33              | QP     |
| 679.960     | 33.38                    | 19.58                     | 4.01                | 37.61                  | 19.36           | 46.00                    | -26.64              | QP     |
| 929.008     | 33.66                    | 22.41                     | 4.96                | 37.57                  | 23.46           | 46.00                    | -22.54              | QP     |

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

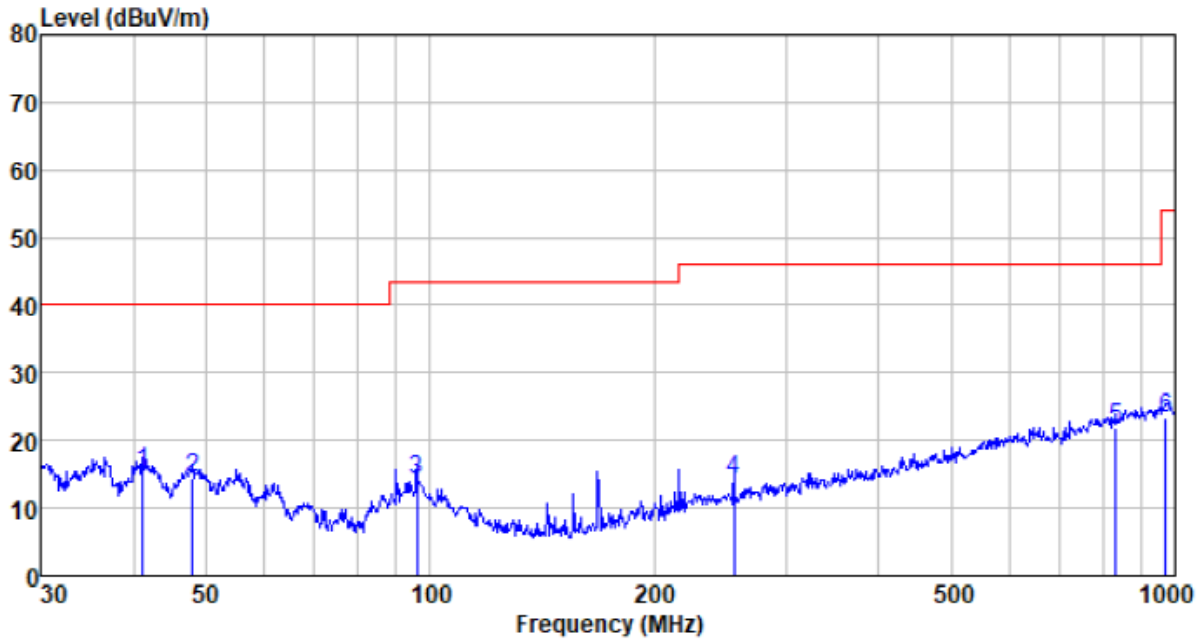
Horizontal:



| 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 |
|-------------|--------------------------|---------------------------|---------------------|------------------------|-----------------|--------------------------|---------------------|--------|
| 34.639      | 38.50                    | 11.29                     | 0.61                | 35.33                  | 15.07           | 40.00                    | -24.93              | QP     |
| 47.492      | 37.49                    | 12.28                     | 0.74                | 36.06                  | 14.45           | 40.00                    | -25.55              | QP     |
| 54.835      | 36.75                    | 11.80                     | 0.82                | 36.25                  | 13.12           | 40.00                    | -26.88              | QP     |
| 94.098      | 35.59                    | 11.31                     | 1.14                | 36.67                  | 11.37           | 43.50                    | -32.13              | QP     |
| 793.396     | 34.19                    | 21.28                     | 4.43                | 37.62                  | 22.28           | 46.00                    | -23.72              | QP     |
| 979.180     | 32.80                    | 22.63                     | 5.14                | 37.53                  | 23.04           | 54.00                    | -30.96              | QP     |



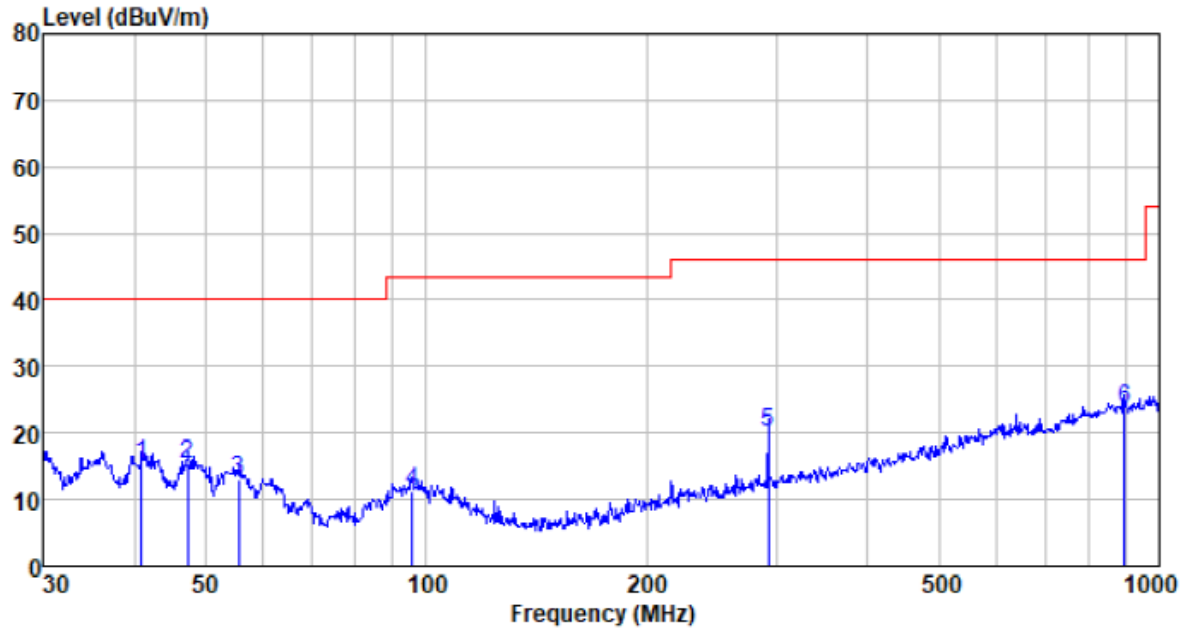
Vertical:



| Freq<br>MHz | Reading<br>level<br>dBuV | Antenna<br>factor<br>dB/m | Cable<br>loss<br>dB | Preamplifier<br>factor<br>dB | level<br>dBuV/m | Limit<br>level<br>dBuV/m | Over<br>limit<br>dB | Remark |
|-------------|--------------------------|---------------------------|---------------------|------------------------------|-----------------|--------------------------|---------------------|--------|
| 41.132      | 38.21                    | 12.21                     | 0.67                | 35.73                        | 15.36           | 40.00                    | -24.64              | QP     |
| 47.994      | 37.53                    | 12.28                     | 0.75                | 36.09                        | 14.47           | 40.00                    | -25.53              | QP     |
| 96.099      | 37.97                    | 11.65                     | 1.16                | 36.69                        | 14.09           | 43.50                    | -29.41              | QP     |
| 255.623     | 36.95                    | 12.33                     | 2.15                | 37.38                        | 14.05           | 46.00                    | -31.95              | QP     |
| 833.317     | 33.12                    | 21.71                     | 4.58                | 37.61                        | 21.80           | 46.00                    | -24.20              | QP     |
| 972.337     | 33.15                    | 22.59                     | 5.12                | 37.53                        | 23.33           | 54.00                    | -30.67              | QP     |

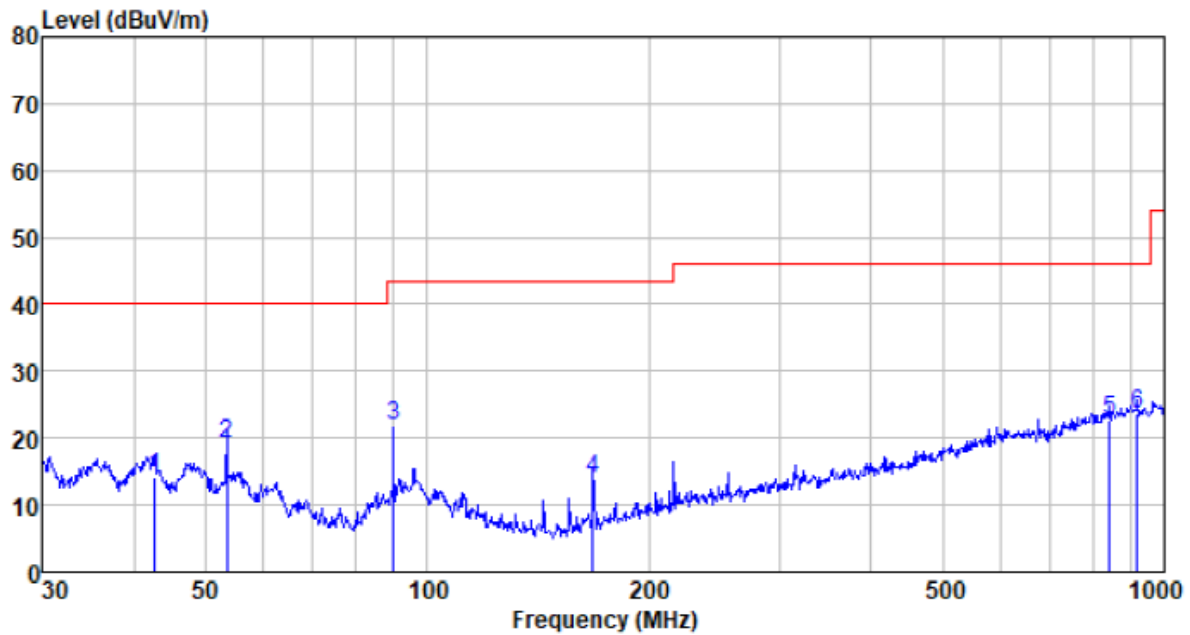
|               |                 |
|---------------|-----------------|
| Test channel: | Highest channel |
|---------------|-----------------|

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 |
|-------------|--------------------------|---------------------------|---------------------|------------------------|-----------------|--------------------------|---------------------|--------|
| 40.845      | 38.09                    | 12.21                     | 0.67                | 35.71                  | 15.26           | 40.00                    | -24.74              | QP     |
| 47.326      | 38.25                    | 12.28                     | 0.74                | 36.05                  | 15.22           | 40.00                    | -24.78              | QP     |
| 55.415      | 36.70                    | 11.75                     | 0.82                | 36.26                  | 13.01           | 40.00                    | -26.99              | QP     |
| 95.762      | 35.17                    | 11.59                     | 1.16                | 36.69                  | 11.23           | 43.50                    | -32.27              | QP     |
| 293.084     | 41.77                    | 13.42                     | 2.32                | 37.41                  | 20.10           | 46.00                    | -25.90              | QP     |
| 996.997     | 34.22                    | 22.27                     | 4.83                | 37.60                  | 23.72           | 46.00                    | -22.28              | QP     |

Vertical:

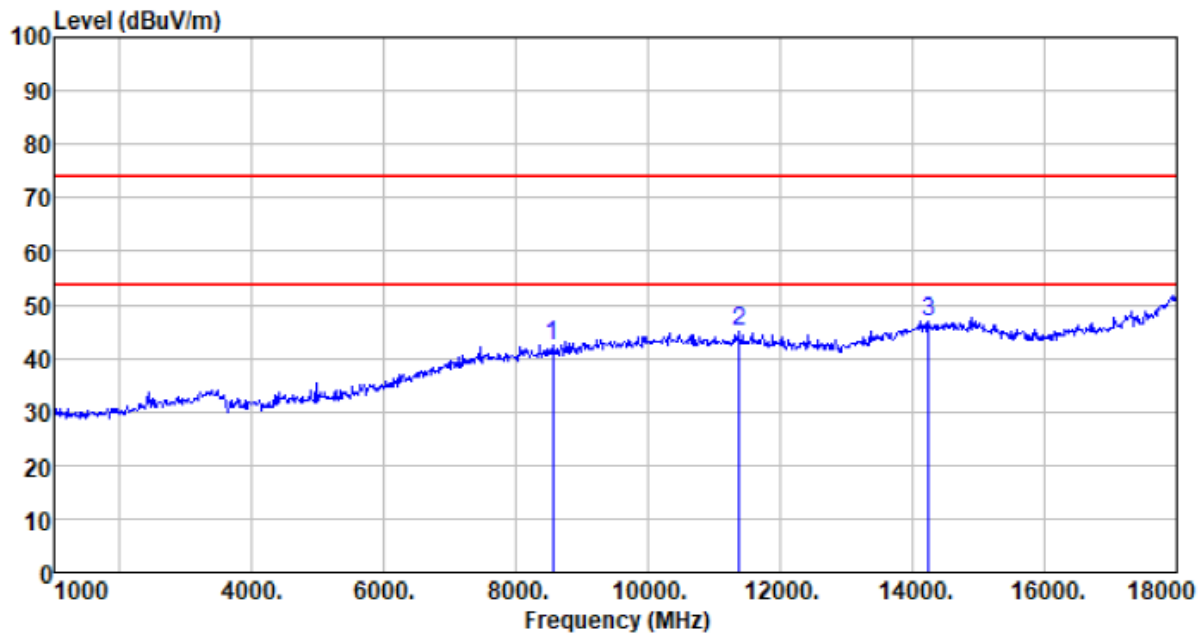


| Freq<br>MHz | Reading<br>level<br>dBuV | Antenna<br>factor<br>dB/m | Cable<br>loss<br>dB | Preamp<br>factor<br>dB | level<br>dBuV/m | Limit<br>level<br>dBuV/m | Over<br>limit<br>dB | Remark |
|-------------|--------------------------|---------------------------|---------------------|------------------------|-----------------|--------------------------|---------------------|--------|
| 42.750      | 37.13                    | 12.23                     | 0.69                | 35.82                  | 14.23           | 40.00                    | -25.77              | QP     |
| 53.505      | 42.68                    | 11.93                     | 0.80                | 36.23                  | 19.18           | 40.00                    | -20.82              | QP     |
| 89.905      | 46.69                    | 10.57                     | 1.11                | 36.64                  | 21.73           | 43.50                    | -21.77              | QP     |
| 167.824     | 40.84                    | 8.46                      | 1.67                | 37.18                  | 13.79           | 43.50                    | -29.71              | QP     |
| 842.130     | 34.00                    | 21.78                     | 4.63                | 37.61                  | 22.80           | 46.00                    | -23.20              | QP     |
| 919.287     | 34.02                    | 22.37                     | 4.93                | 37.58                  | 23.74           | 46.00                    | -22.26              | QP     |

■ Above 1GHz

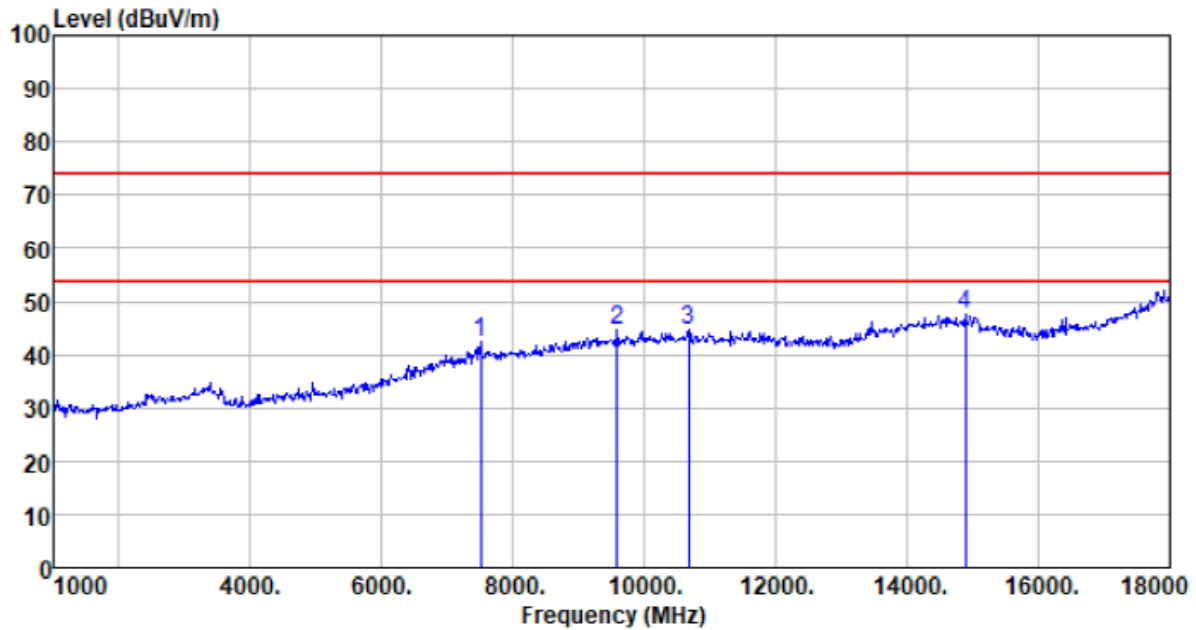
|               |                |
|---------------|----------------|
| Test channel: | Lowest channel |
|---------------|----------------|

Horizontal:



| Freq<br>MHz | Reading<br>level<br>dBuV | Antenna<br>factor<br>dB/m | Cable<br>loss<br>dB | Preamplifier<br>factor<br>dB | level<br>dBuV/m | Limit<br>level<br>dBuV/m | Over<br>limit<br>dB | Remark |
|-------------|--------------------------|---------------------------|---------------------|------------------------------|-----------------|--------------------------|---------------------|--------|
| 8548.000    | 32.75                    | 37.32                     | 7.17                | 34.90                        | 42.34           | 74.00                    | -31.66              | Peak   |
| 11370.000   | 33.34                    | 39.37                     | 8.68                | 36.33                        | 45.06           | 74.00                    | -28.94              | Peak   |
| 14243.000   | 32.13                    | 41.45                     | 9.74                | 36.35                        | 46.97           | 74.00                    | -27.03              | Peak   |

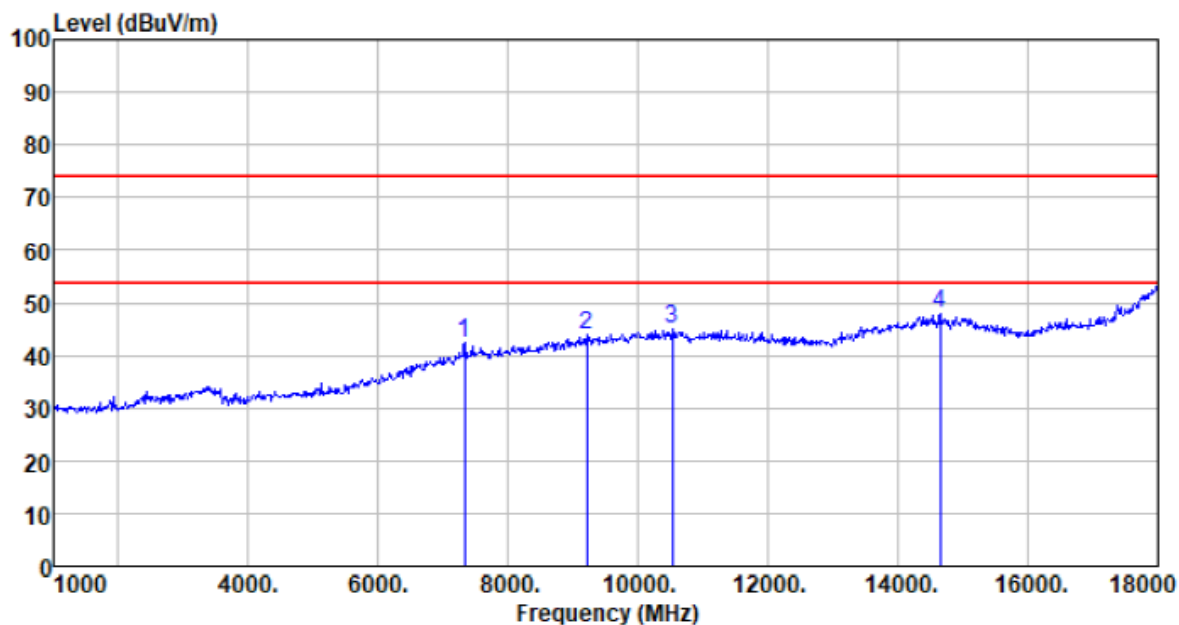
Vertical:



| Freq<br>MHz | Reading<br>level<br>dBuV | Antenna<br>factor<br>dB/m | Cable<br>loss<br>dB | Preamplifier<br>factor<br>dB | level<br>dBuV/m | Limit<br>level<br>dBuV/m | Over<br>limit<br>dB | Remark |
|-------------|--------------------------|---------------------------|---------------------|------------------------------|-----------------|--------------------------|---------------------|--------|
| 7511.000    | 34.21                    | 36.83                     | 6.83                | 35.54                        | 42.33           | 74.00                    | -31.67              | Peak   |
| 9585.000    | 33.85                    | 37.90                     | 7.96                | 34.92                        | 44.79           | 74.00                    | -29.21              | Peak   |
| 10673.000   | 32.95                    | 39.23                     | 8.40                | 36.00                        | 44.58           | 74.00                    | -29.42              | Peak   |
| 14889.000   | 32.43                    | 40.60                     | 10.07               | 35.47                        | 47.63           | 74.00                    | -26.37              | Peak   |

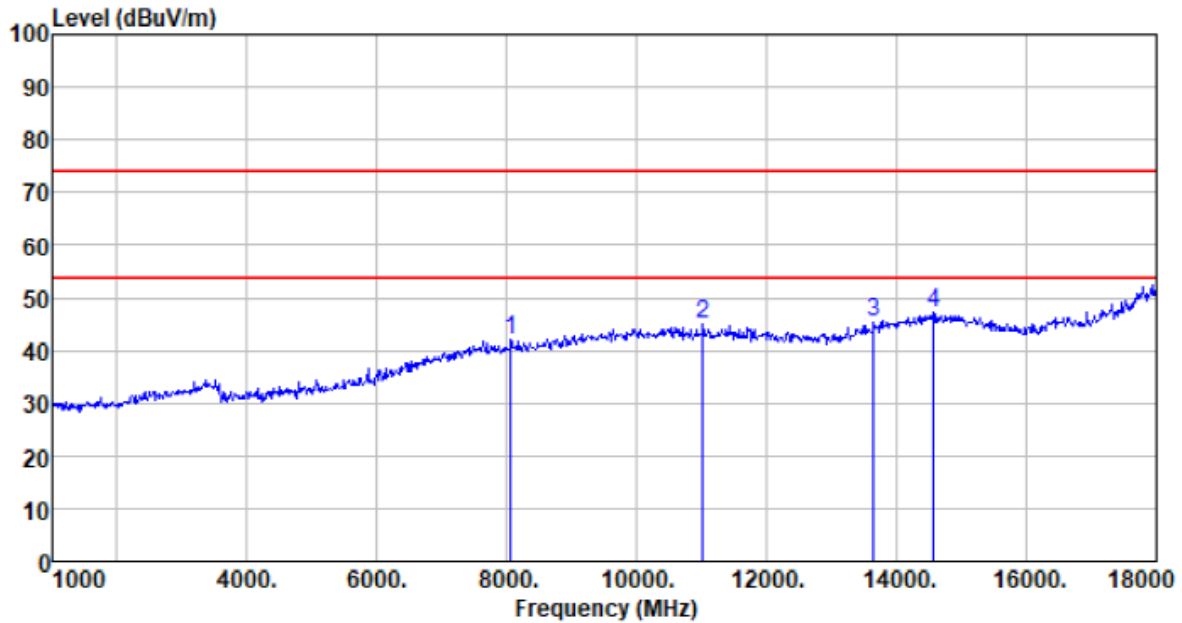
|               |                |
|---------------|----------------|
| Test channel: | Middle channel |
|---------------|----------------|

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 |
|-------------|--------------------------|---------------------------|---------------------|------------------------|-----------------|--------------------------|---------------------|--------|
| 7324.000    | 34.83                    | 36.43                     | 6.63                | 35.60                  | 42.29           | 74.00                    | -31.71              | Peak   |
| 9211.000    | 33.24                    | 37.63                     | 7.72                | 34.65                  | 43.94           | 74.00                    | -30.06              | Peak   |
| 10520.000   | 33.13                    | 39.20                     | 8.34                | 35.82                  | 44.85           | 74.00                    | -29.15              | Peak   |
| 14651.000   | 32.76                    | 41.10                     | 9.95                | 35.77                  | 48.04           | 74.00                    | -25.96              | Peak   |

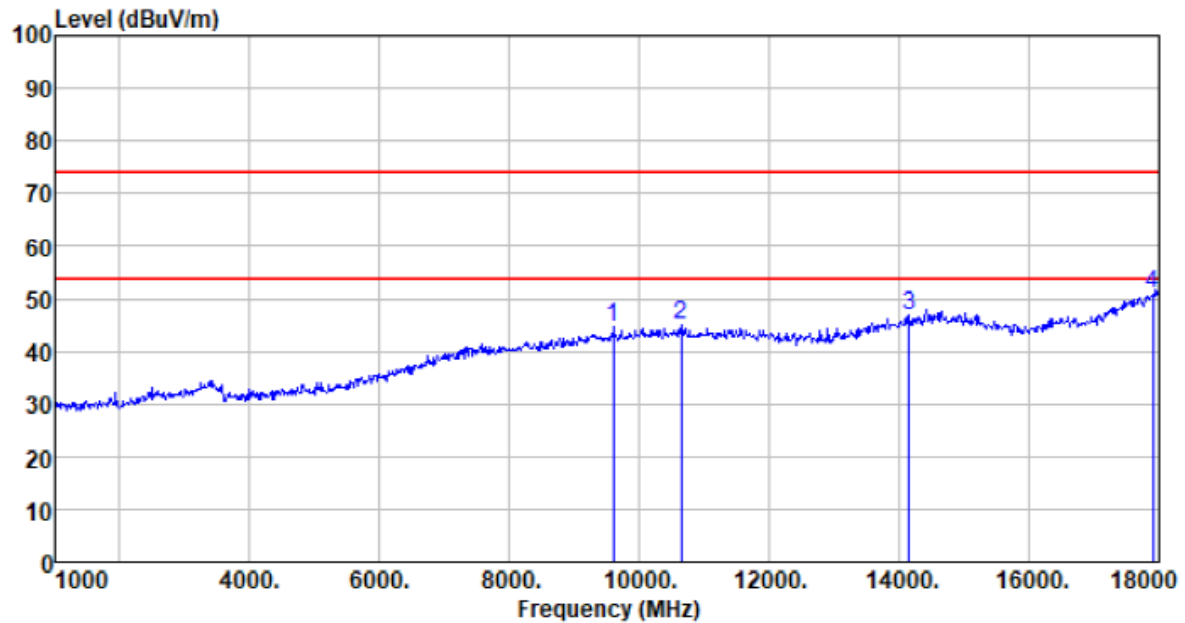
Vertical:



| 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 |
|-------------|--------------------------|---------------------------|---------------------|------------------------|-----------------|--------------------------|---------------------|--------|
| 8055.000    | 33.32                    | 37.39                     | 6.77                | 35.33                  | 42.15           | 74.00                    | -31.85              | Peak   |
| 11013.000   | 33.61                    | 39.30                     | 8.54                | 36.40                  | 45.05           | 74.00                    | -28.95              | Peak   |
| 13648.000   | 31.93                    | 40.64                     | 9.41                | 36.73                  | 45.25           | 74.00                    | -28.75              | Peak   |
| 14566.000   | 32.01                    | 41.30                     | 9.91                | 35.88                  | 47.34           | 74.00                    | -26.66              | Peak   |

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

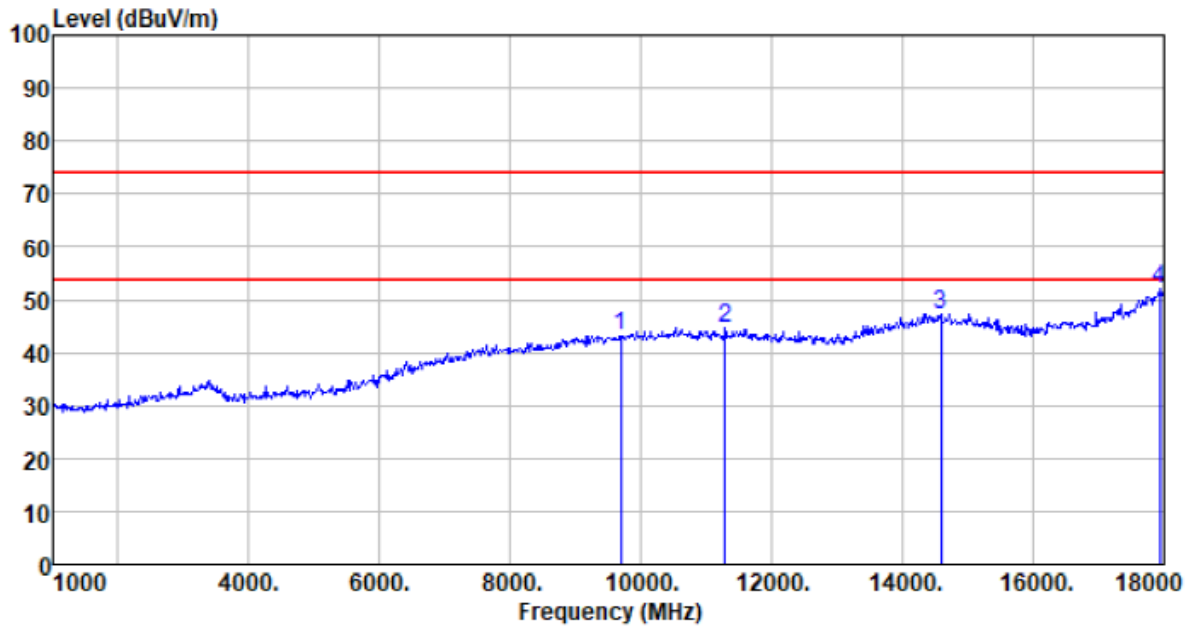
Horizontal:



| 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 |
|-------------|--------------------------|---------------------------|---------------------|------------------------|-----------------|--------------------------|---------------------|--------|
| 9602.000    | 33.59                    | 37.93                     | 7.97                | 34.94                  | 44.55           | 74.00                    | -29.45              | Peak   |
| 10639.000   | 33.31                    | 39.22                     | 8.38                | 35.96                  | 44.95           | 74.00                    | -29.05              | Peak   |
| 14158.000   | 32.15                    | 41.43                     | 9.70                | 36.47                  | 46.81           | 74.00                    | -27.19              | Peak   |
| 17898.000   | 29.79                    | 45.58                     | 11.94               | 36.21                  | 51.10           | 74.00                    | -22.90              | Peak   |



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 |
|-------------|--------------------------|---------------------------|---------------------|------------------------|-----------------|--------------------------|---------------------|--------|
| 9687.000    | 32.30                    | 38.03                     | 8.00                | 34.99                  | 43.34           | 74.00                    | -30.66              | Peak   |
| 11285.000   | 33.12                    | 39.35                     | 8.65                | 36.35                  | 44.77           | 74.00                    | -29.23              | Peak   |
| 14583.000   | 32.09                    | 41.30                     | 9.91                | 35.88                  | 47.42           | 74.00                    | -26.58              | Peak   |
| 17932.000   | 30.20                    | 45.99                     | 11.97               | 36.21                  | 51.95           | 74.00                    | -22.05              | Peak   |

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.
3. “\*”, means this data is the too weak instrument of signal is unable to test.

## 7.2.3 Bandedge emissions

|               |                |
|---------------|----------------|
| 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         | 34.81             | 27.59                 | 5.38            | 30.18                    | 37.60          | 74.00               | -36.40          | Horizontal   |
| 2390.00         | 37.81             | 27.59                 | 5.38            | 30.18                    | 40.60          | 74.00               | -33.40          | Horizontal   |
| 2400.00         | 53.87             | 27.58                 | 5.39            | 30.18                    | 56.66          | 74.00               | -17.34          | Horizontal   |
| 2310.00         | 34.23             | 27.59                 | 5.38            | 30.18                    | 37.02          | 74.00               | -36.98          | Vertical     |
| 2390.00         | 37.87             | 27.59                 | 5.38            | 30.18                    | 40.66          | 74.00               | -33.34          | Vertical     |
| 2400.00         | 55.37             | 27.58                 | 5.39            | 30.18                    | 58.16          | 74.00               | -15.85          | 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         | 26.28             | 27.59                 | 5.38            | 30.18                    | 29.07          | 54.00               | -24.93          | Horizontal   |
| 2390.00         | 29.51             | 27.59                 | 5.38            | 30.18                    | 32.30          | 54.00               | -21.71          | Horizontal   |
| 2400.00         | 40.44             | 27.58                 | 5.39            | 30.18                    | 43.23          | 54.00               | -10.77          | Horizontal   |
| 2310.00         | 26.54             | 27.59                 | 5.38            | 30.18                    | 29.33          | 54.00               | -24.67          | Vertical     |
| 2390.00         | 29.09             | 27.59                 | 5.38            | 30.18                    | 31.88          | 54.00               | -22.12          | Vertical     |
| 2400.00         | 41.61             | 27.58                 | 5.39            | 30.18                    | 44.40          | 54.00               | -9.60           | Vertical     |

|               |                 |
|---------------|-----------------|
| 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 |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 2483.50         | 39.31             | 27.53                 | 5.47            | 29.93              | 42.38          | 74.00               | -31.62          | Horizontal   |
| 2500.00         | 39.45             | 27.55                 | 5.49            | 29.93              | 42.56          | 74.00               | -31.44          | Horizontal   |
| 2483.50         | 39.31             | 27.53                 | 5.47            | 29.93              | 42.38          | 74.00               | -31.62          | Vertical     |
| 2500.00         | 39.96             | 27.55                 | 5.49            | 29.93              | 43.07          | 74.00               | -30.93          | Vertical     |

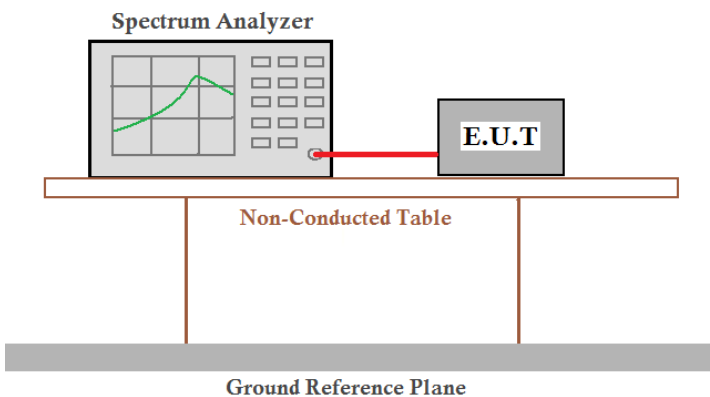
**Average value:**

| 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 |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 2483.50         | 32.27             | 27.53                 | 5.47            | 29.93              | 35.34          | 54.00               | -18.66          | Horizontal   |
| 2500.00         | 31.00             | 27.55                 | 5.49            | 29.93              | 34.11          | 54.00               | -19.89          | Horizontal   |
| 2483.50         | 33.06             | 27.53                 | 5.47            | 29.93              | 36.13          | 54.00               | -17.87          | Vertical     |
| 2500.00         | 30.50             | 27.55                 | 5.49            | 29.93              | 33.61          | 54.00               | -20.39          | Vertical     |

**Remark:**

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.

## 7.3 20dB Occupy Bandwidth

|                   |                                                                                                                                                                                                                                                                                                                                                   |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 C Section 15.249/15.215                                                                                                                                                                                                                                                                                                                |
| Test Method:      | ANSI C63.10:2013                                                                                                                                                                                                                                                                                                                                  |
| Limit:            | Operation Frequency range 2400MHz~2483.5MHz                                                                                                                                                                                                                                                                                                       |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 6.0 for details                                                                                                                                                                                                                                                                                                                  |
| Test mode:        | Refer to section 5.2 for details                                                                                                                                                                                                                                                                                                                  |
| Test results:     | Pass                                                                                                                                                                                                                                                                                                                                              |

### Measurement Data

| Test channel | 20dB bandwidth(MHz) | Result |
|--------------|---------------------|--------|
| Lowest       | 6.596               | Pass   |
| Middle       | 5.448               | Pass   |
| Highest      | 4.199               | Pass   |

Test plot as follows:



Lowest channel



Middle channel



Highest channel

## 8 Test Setup Photo

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

## 9 EUT Constructional Details

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

-----End-----