# TEST REPORT

| | |
|---|---|
| **Applicant:** | Actions Global (US) Inc |
| **Address of Applicant:** | 100 N HOWARD ST STE R, SPOKANE, Washington 99201, United States |
| **Manufacturer/Factory:** | Shen Zhen Proitav Technology Co.,Ltd |
| **Address of Manufacturer/Factory:** | 301-401, Building 16, Hejing Industrial Park, No.87, Hexiu West Road, Zhancheng Community, Fuhai St., Baoan District, Shenzhen, China |

**Equipment Under Test (EUT)**

| | |
|---|---|
| Product Name: | Hybrid Conference System with BYOD |
| Model No.: | eShare W50 |
| Trade Mark: | AV Access |
| **FCC ID:** | 2A9A5-ESHAREW50 |
| **Applicable standards:** | FCC CFR Title 47 Part 15 Subpart C Section 15.247 |
| **Date of sample receipt:** | October 24, 2022 |
| **Date of Test:** | October 25, 2022-December 02, 2022 |
| **Date of report issued:** | December 02, 2022 |
| **Test Result :** | PASS * |

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

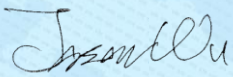
Authorized Signature:

**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

| Version No. | Date | Description |
|---|---|---|
| *00* | *December 02, 2022* | *Original* |
| | | |
| | | |
| | | |
| | | |

***Prepared By:***  ***Date:*** *December 02, 2022*

***Project Engineer***

***Check By:*** ***Date:*** *December 02, 2022*

***Reviewer***

# 3 Contents

Page

1 COVER PAGE ..... 1

2 VERSION ..... 2

3 CONTENTS ..... 3

4 TEST SUMMARY ..... 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

6 TEST INSTRUMENTS LIST ..... 8

7 TEST RESULTS AND MEASUREMENT DATA ..... 10

7.1 ANTENNA REQUIREMENT ..... 10
7.2 CONDUCTED EMISSIONS ..... 11
7.3 CONDUCTED PEAK OUTPUT POWER ..... 16
7.4 CHANNEL BANDWIDTH & 99% OCCUPY BANDWIDTH ..... 17
7.5 POWER SPECTRAL DENSITY ..... 18
7.6 SPURIOUS EMISSION SPURIOUS EMISSION IN NON-RESTRICTED & RESTRICTED BANDS ..... 19
*7.6.1 Conducted Emission Method ..... 19*
*7.6.2 Radiated Emission Method ..... 20*

8 TEST SETUP PHOTO ..... 39

9 EUT CONSTRUCTIONAL DETAILS ..... 39

# 4 Test Summary

| Test Item | Section | Result |
|---|---|---|
| Antenna requirement | FCC part 15.203/15.247 (c) | Pass |
| AC Power Line Conducted Emission | FCC part 15.207 | Pass |
| Conducted Peak Output Power | FCC part 15.247 (b)(3) | Pass |
| Channel Bandwidth & 99% OCB | FCC part 15.247 (a)(2) | Pass |
| Power Spectral Density | FCC part 15.247 (e) | Pass |
| Band Edge | FCC part 15.247(d) | Pass |
| Spurious Emission | FCC part 15.205/15.209 | Pass |

*Remark: Test according to ANSI C63.10:2013 and RSS-Gen*

*Pass: The EUT complies with the essential requirements in the standard.*

**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 Name: | Hybrid Conference System with BYOD |
| Model No.: | eShare W50 |
| Serial No.: | A22I0025 |
| Test sample(s) ID: | GTS202210000170-1 |
| Sample(s) Status | Engineer sample |
| Operation Frequency: | 802.11n(HT20): 2412MHz~2462MHz |
| Channel numbers: | 802.11n(HT20): 11 |
| Channel separation: | 5MHz |
| Modulation technology: | 802.11n(HT20) :<br>Orthogonal Frequency Division Multiplexing (OFDM) |
| Antenna Type: | Integral Antenna |
| Antenna gain: | 3.26dBi |
| Power supply: | AC Adapter 1:<br>Model: NBS24J120200D5<br>Input: AC 100-240V, 50/60Hz, 0.6A<br>Output: DC 12.0V, 2.0A, 24.0W<br>Switching Adaptor 2:<br>Model: FJ-SW1202000N<br>Input: AC 100-240V, 50/60Hz, 0.6A Max<br>Output: DC 12.0V, 2.0A, 24.0W |

| Operation Frequency each of channel | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 1 | 2412MHz | 4 | 2427MHz | 7 | 2442MHz | 10 | 2457MHz |
| 2 | 2417MHz | 5 | 2432MHz | 8 | 2447MHz | 11 | 2462MHz |
| 3 | 2422MHz | 6 | 2437MHz | 9 | 2452MHz | | |

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:

| **Test channel** | **Frequency (MHz)** |
|---|---|
| | 802.11n(HT20) |
| Lowest channel | 2412MHz |
| Middle channel | 2437MHz |
| Highest channel | 2462MHz |

## 5.2 Test mode

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

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

| | |
|---|---|
| Mode | 802.11n(HT20) |
| Data rate | 6.5Mbps |

## 5.3 Description of Support Units

| Manufacturer | Description | Model | Serial Number |
|---|---|---|---|
| Lenovo | Notebook PC | E40-80 | N/A |

## 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**

Designation Number: CN5029

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.

● **IC —Registration No.: 9079A**

CAB identifier: CN0091

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

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

## 5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
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 | April 22, 2022 | April 21, 2023 |
| 4 | BiConiLog Antenna | SCHWARZBECK MESS-ELEKTRONIK | VULB9168 | GTS640 | March 21, 2022 | March 20, 2023 |
| 5 | Double -ridged waveguide horn | SCHWARZBECK MESS-ELEKTRONIK | BBHA 9120 D | GTS208 | June 12, 2022 | June 11, 2023 |
| 6 | Horn Antenna | ETS-LINDGREN | 3160 | GTS217 | June 23, 2022 | June 22, 2023 |
| 7 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 8 | Coaxial Cable | GTS | N/A | GTS213 | April 22, 2022 | April 21, 2023 |
| 9 | Coaxial Cable | GTS | N/A | GTS211 | April 22, 2022 | April 21, 2023 |
| 10 | Coaxial cable | GTS | N/A | GTS210 | April 22, 2022 | April 21, 2023 |
| 11 | Coaxial Cable | GTS | N/A | GTS212 | April 22, 2022 | April 21, 2023 |
| 12 | Amplifier(100kHz-3GHz) | HP | 8347A | GTS204 | April 22, 2022 | April 21, 2023 |
| 13 | Amplifier (18-26GHz) | Rohde & Schwarz | AFS33-18002 650-30-8P-44 | GTS218 | June 23, 2022 | June 22, 2023 |
| 14 | Band filter | Amindeon | 82346 | GTS219 | June 23, 2022 | June 22, 2023 |
| 15 | Power Meter | Anritsu | ML2495A | GTS540 | June 23, 2022 | June 22, 2023 |
| 16 | Power Sensor | Anritsu | MA2411B | GTS541 | June 23, 2022 | June 22, 2023 |
| 17 | Wideband Radio Communication Tester | Rohde & Schwarz | CMW500 | GTS575 | April 22, 2022 | April 21, 2023 |
| 18 | Splitter | Agilent | 11636B | GTS237 | June 23, 2022 | June 22, 2023 |
| 19 | Loop Antenna | ZHINAN | ZN30900A | GTS534 | Nov. 29, 2022 | Nov. 28, 2023 |
| 20 | Broadband Preamplifier | SCHWARZBECK | BBV9718 | GTS535 | April 22, 2022 | April 21, 2023 |
| 21 | Breitband hornantenna | SCHWARZBECK | BBHA 9170 | GTS579 | Oct. 16, 2022 | Oct. 15, 2023 |
| 22 | Amplifier | TDK | PA-02-02 | GTS574 | Oct. 16, 2022 | Oct. 15, 2023 |
| 23 | Amplifier | TDK | PA-02-03 | GTS576 | Oct. 16, 2022 | Oct. 15, 2023 |
| 24 | PSA Series Spectrum Analyzer | Rohde & Schwarz | FSP | GTS578 | June 23, 2022 | June 22, 2023 |
| 25 | Amplifier(1GHz-26.5GHz) | HP | 8449B | GTS601 | April 22, 2022 | April 21, 2023 |

| 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 | May 14, 2022 | May 13, 2025 |
| 2 | EMI Test Receiver | R&S | ESCI 7 | GTS552 | April 24, 2022 | April 23, 2023 |
| 3 | Coaxial Switch | ANRITSU CORP | MP59B | GTS225 | June 23, 2022 | June 22, 2023 |
| 4 | ENV216 2-L-V-NETZNACHB.DE | ROHDE&SCHWARZ | ENV216 | GTS226 | April 22, 2022 | April 21, 2023 |
| 5 | Coaxial Cable | GTS | N/A | GTS227 | N/A | N/A |
| 6 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 7 | Thermo meter | JINCHUANG | GSP-8A | GTS639 | April 28, 2022 | April 27, 2023 |
| 8 | Absorbing clamp | Elektronik-Feinmechanik | MDS21 | GTS229 | April 15, 2022 | April 14, 2023 |
| 9 | ISN | SCHWARZBECK | NTFM 8158 | GTS565 | April 22, 2022 | April 21, 2023 |
| 10 | High voltage probe | SCHWARZBECK | TK9420 | GTS537 | April 22, 2022 | April 21, 2023 |

| RF Conducted Test: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | MXA Signal Analyzer | Agilent | N9020A | GTS566 | April 22, 2022 | April 21, 2023 |
| 2 | EMI Test Receiver | R&S | ESCI 7 | GTS552 | April 22, 2022 | April 21, 2023 |
| 3 | Spectrum Analyzer | Agilent | E4440A | GTS536 | April 22, 2022 | April 21, 2023 |
| 4 | MXG vector Signal Generator | Agilent | N5182A | GTS567 | April 22, 2022 | April 21, 2023 |
| 5 | ESG Analog Signal Generator | Agilent | E4428C | GTS568 | April 22, 2022 | April 21, 2023 |
| 6 | USB RF Power Sensor | DARE | RPR3006W | GTS569 | April 22, 2022 | April 21, 2023 |
| 7 | RF Switch Box | Shongyi | RFSW3003328 | GTS571 | April 22, 2022 | April 21, 2023 |
| 8 | Programmable Constant Temp & Humi Test Chamber | WEWON | WHTH-150L-40-880 | GTS572 | April 22, 2022 | April 21, 2023 |

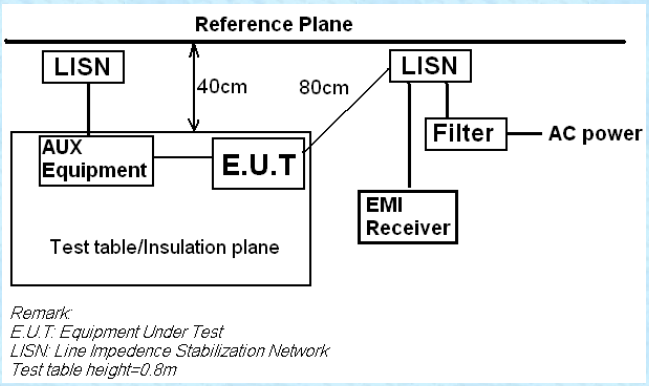
| General used equipment: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | Humidity/ Temperature Indicator | KTJ | TA328 | GTS243 | April 25, 2022 | April 24, 2023 |
| 2 | Barometer | KUMAO | SF132 | GTS647 | July 26, 2022 | July 25, 2023 |

# 7 Test results and Measurement Data

## 7.1 Antenna requirement

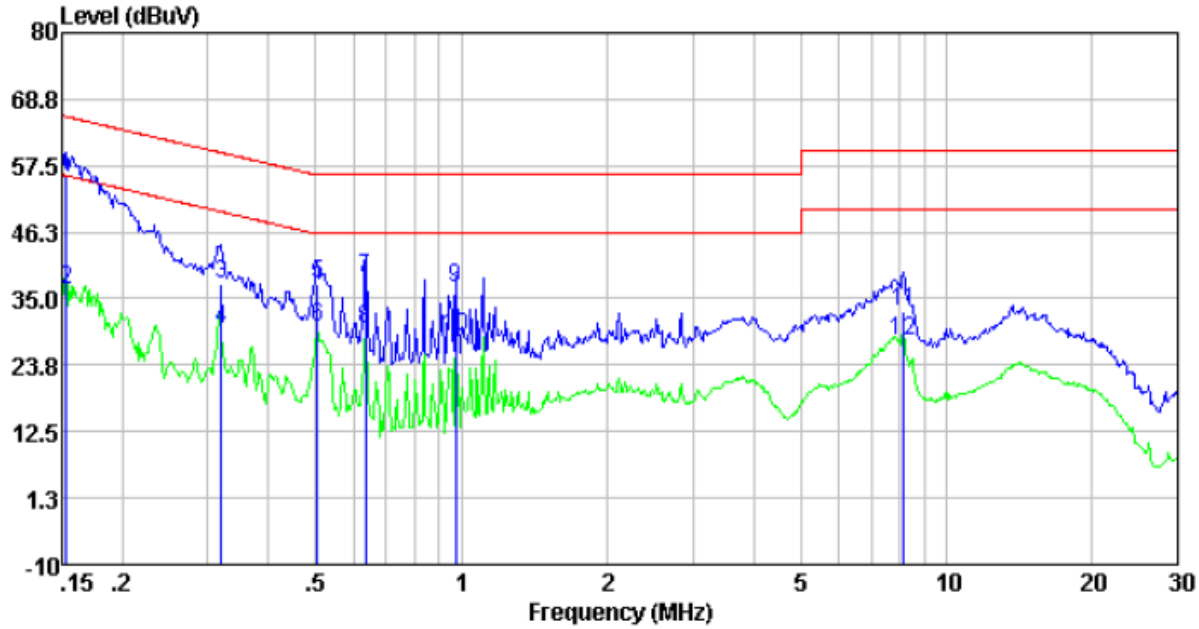
| | |
|---|---|
| **Standard requirement:** | FCC Part15 C Section 15.203 /247(c) |
| **15.203 requirement:**<br>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna 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.<br>**15.247(c) (1)(i) requirement:**<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. | |
| **EUT Antenna:** | |
| The antenna is integral 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 |
| Receiver setup: | RBW=9KHz, VBW=30KHz, Sweep time=auto |
| Limit: | Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average<br>0.15-0.5: 66 to 56* / 56 to 46*<br>0.5-5: 56 / 46<br>5-30: 60 / 50<br>* Decreases with the logarithm of the frequency. |
| Test setup: |  <br>*Remark:*<br>*E.U.T: Equipment Under Test*<br>*LISN: Line Impedence Stabilization Network*<br>*Test table height=0.8m* |
| Test procedure: | 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.<br>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).<br>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement. |
| 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 |

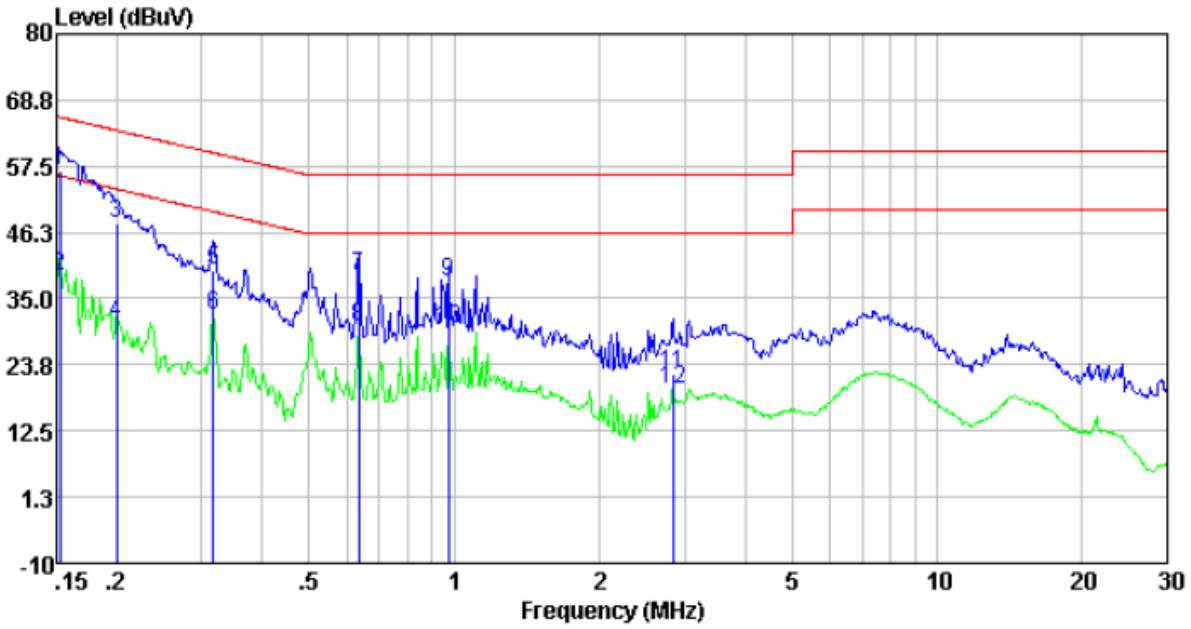
Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

**Measurement data**
**AC Adapter 1:**
**Line:**



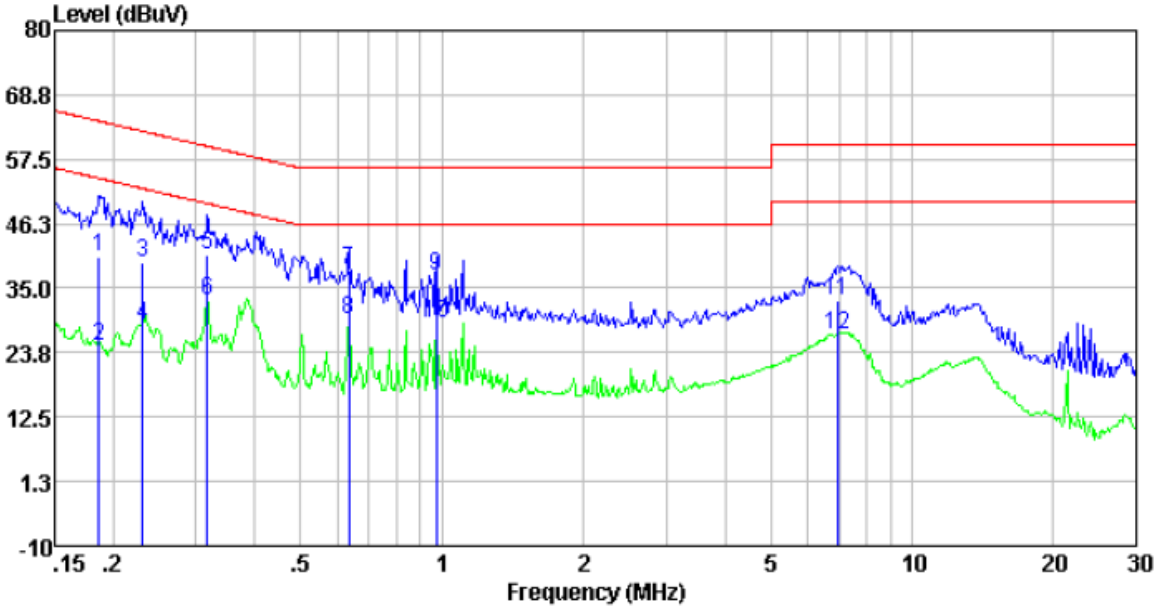

| Freq | Reading level | LISN/ISN factor | Cable loss | Level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB | dB | dBuV | dBuV | dB | |
| 0.15 | 45.55 | 10.12 | 0.01 | 55.68 | 65.82 | -10.14 | QP |
| 0.15 | 26.48 | 10.12 | 0.01 | 36.61 | 55.82 | -19.21 | Average |
| 0.32 | 27.66 | 9.98 | 0.01 | 37.65 | 59.71 | -22.06 | QP |
| 0.32 | 19.86 | 9.98 | 0.01 | 29.85 | 49.71 | -19.86 | Average |
| 0.50 | 27.59 | 9.96 | 0.01 | 37.56 | 56.00 | -18.44 | QP |
| 0.50 | 20.14 | 9.96 | 0.01 | 30.11 | 46.00 | -15.89 | Average |
| 0.63 | 28.56 | 9.96 | 0.02 | 38.54 | 56.00 | -17.46 | QP |
| 0.63 | 19.77 | 9.96 | 0.02 | 29.75 | 46.00 | -16.25 | Average |
| 0.97 | 26.88 | 9.96 | 0.03 | 36.87 | 56.00 | -19.13 | QP |
| 0.97 | 18.53 | 9.96 | 0.03 | 28.52 | 46.00 | -17.48 | Average |
| 8.15 | 22.97 | 9.65 | 0.10 | 32.72 | 60.00 | -27.28 | QP |
| 8.15 | 18.06 | 9.65 | 0.10 | 27.81 | 50.00 | -22.19 | Average |

**Neutral:**



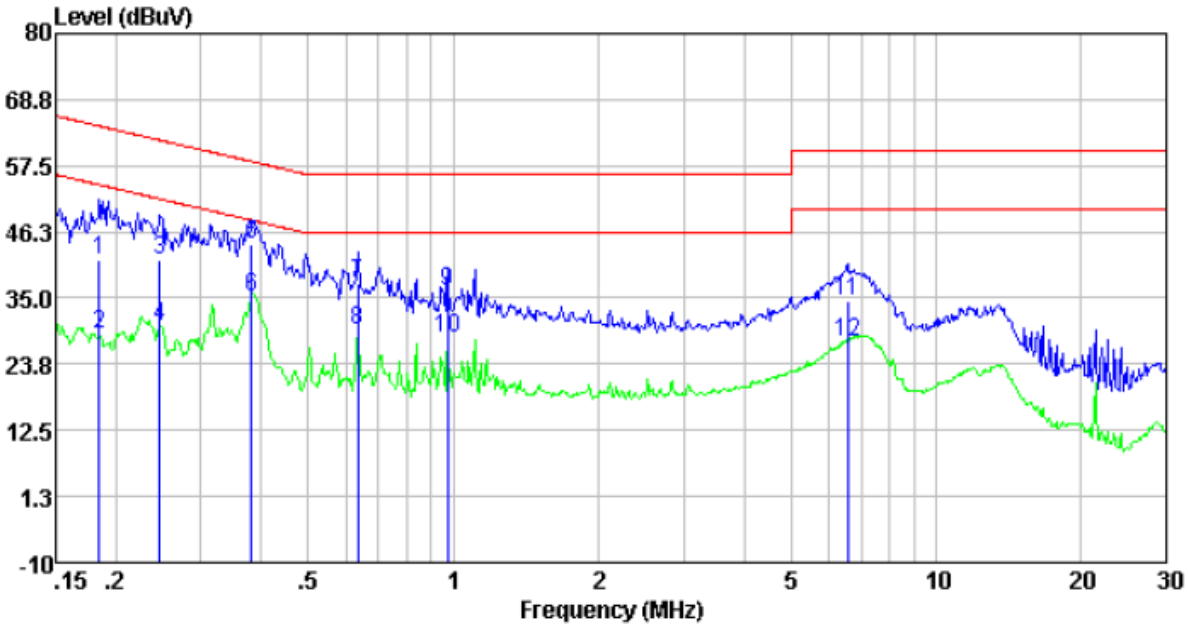

| Freq | Reading level | LISN/ISN factor | Cable loss | Level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB | dB | dBuV | dBuV | dB | |
| 0.15 | 46.66 | 10.15 | 0.01 | 56.82 | 65.87 | -9.05 | QP |
| 0.15 | 28.78 | 10.15 | 0.01 | 38.94 | 55.87 | -16.93 | Average |
| 0.20 | 37.76 | 10.06 | 0.01 | 47.83 | 63.62 | -15.79 | QP |
| 0.20 | 20.74 | 10.06 | 0.01 | 30.81 | 53.62 | -22.81 | Average |
| 0.32 | 29.85 | 9.97 | 0.01 | 39.83 | 59.80 | -19.97 | QP |
| 0.32 | 22.08 | 9.97 | 0.01 | 32.06 | 49.80 | -17.74 | Average |
| 0.63 | 28.82 | 9.96 | 0.02 | 38.80 | 56.00 | -17.20 | QP |
| 0.63 | 20.16 | 9.96 | 0.02 | 30.14 | 46.00 | -15.86 | Average |
| 0.97 | 27.67 | 9.96 | 0.03 | 37.66 | 56.00 | -18.34 | QP |
| 0.97 | 19.78 | 9.96 | 0.03 | 29.77 | 46.00 | -16.23 | Average |
| 2.84 | 12.68 | 9.54 | 0.05 | 22.27 | 56.00 | -33.73 | QP |
| 2.84 | 9.99 | 9.54 | 0.05 | 19.58 | 46.00 | -26.42 | Average |

**Switching Adaptor 2:**
**Line:**




| Freq | Reading level | LISN/ISN factor | Cable loss | Level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB | dB | dBuV | dBuV | dB | |
| 0.19 | 30.31 | 10.07 | 0.01 | 40.39 | 64.20 | -23.81 | QP |
| 0.19 | 14.74 | 10.07 | 0.01 | 24.82 | 54.20 | -29.38 | Average |
| 0.23 | 29.31 | 10.03 | 0.01 | 39.35 | 62.44 | -23.09 | QP |
| 0.23 | 18.49 | 10.03 | 0.01 | 28.53 | 52.44 | -23.91 | Average |
| 0.32 | 30.67 | 9.98 | 0.01 | 40.66 | 59.80 | -19.14 | QP |
| 0.32 | 22.98 | 9.98 | 0.01 | 32.97 | 49.80 | -16.83 | Average |
| 0.63 | 28.11 | 9.96 | 0.02 | 38.09 | 56.00 | -17.91 | QP |
| 0.63 | 19.71 | 9.96 | 0.02 | 29.69 | 46.00 | -16.31 | Average |
| 0.97 | 27.01 | 9.96 | 0.03 | 37.00 | 56.00 | -19.00 | QP |
| 0.97 | 18.89 | 9.96 | 0.03 | 28.88 | 46.00 | -17.12 | Average |
| 6.95 | 23.17 | 9.70 | 0.09 | 32.96 | 60.00 | -27.04 | QP |
| 6.95 | 17.15 | 9.70 | 0.09 | 26.94 | 50.00 | -23.06 | Average |

**Neutral:**

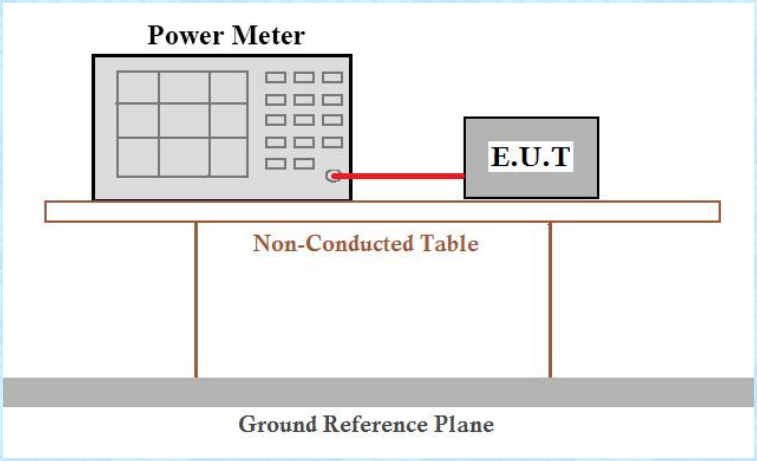



| Freq | Reading level | LISN/ISN factor | Cable loss | Level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB | dB | dBuV | dBuV | dB | |
| 0.18 | 31.50 | 10.09 | 0.01 | 41.60 | 64.28 | -22.68 | QP |
| 0.18 | 18.62 | 10.09 | 0.01 | 28.72 | 54.28 | -25.56 | Average |
| 0.25 | 31.51 | 10.01 | 0.01 | 41.53 | 61.86 | -20.33 | QP |
| 0.25 | 20.01 | 10.01 | 0.01 | 30.03 | 51.86 | -21.83 | Average |
| 0.38 | 34.22 | 9.96 | 0.01 | 44.19 | 58.25 | -14.06 | QP |
| 0.38 | 25.29 | 9.96 | 0.01 | 35.26 | 48.25 | -12.99 | Average |
| 0.63 | 27.60 | 9.96 | 0.02 | 37.58 | 56.00 | -18.42 | QP |
| 0.63 | 19.61 | 9.96 | 0.02 | 29.59 | 46.00 | -16.41 | Average |
| 0.97 | 26.16 | 9.96 | 0.03 | 36.15 | 56.00 | -19.85 | QP |
| 0.97 | 18.30 | 9.96 | 0.03 | 28.29 | 46.00 | -17.71 | Average |
| 6.56 | 24.94 | 9.56 | 0.08 | 34.58 | 60.00 | -25.42 | QP |
| 6.56 | 17.98 | 9.56 | 0.08 | 27.62 | 50.00 | -22.38 | Average |

*Notes:*

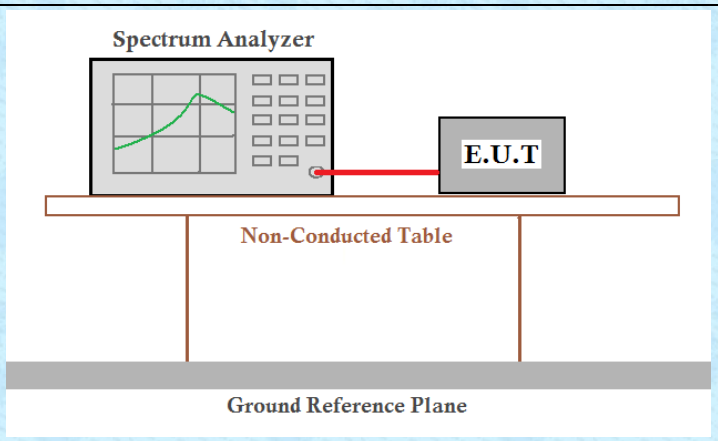
1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. *If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.*

## 7.3 Conducted Peak Output Power

| | |
|---|---|
| Test Requirement : | FCC Part15 C Section 15.247 (b)(3) |
| Test Method : | KDB558074 D01 15.247 Meas Guidance v05r02 |
| Limit: | 30dBm<br>36dBm(4W for e.i.r.p) |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

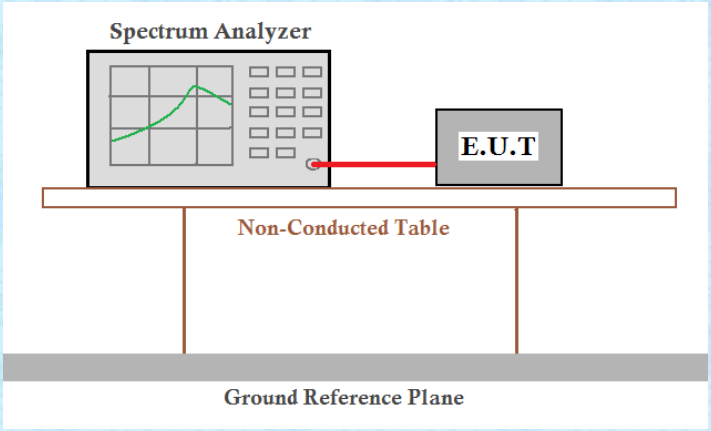
**Measurement Data:** The detailed test data see Appendix for WIFI_2.4G.

## 7.4 Channel Bandwidth & 99% Occupy Bandwidth

| | |
|---|---|
| Test Requirement : | FCC Part15 C Section 15.247 (a)(2) |
| Test Method : | KDB558074 D01 15.247 Meas Guidance v05r02 |
| Limit: | >500KHz |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data:** The detailed test data see Appendix for WIFI_2.4G.

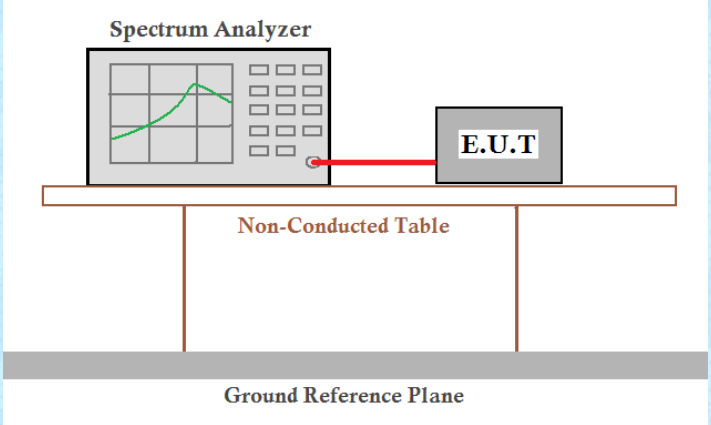
## 7.5 Power Spectral Density

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (e) |
| Test Method: | KDB558074 D01 15.247 Meas Guidance v05r02 |
| Limit: | 8dBm/3kHz |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data:** The detailed test data see Appendix for WIFI_2.4G.

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

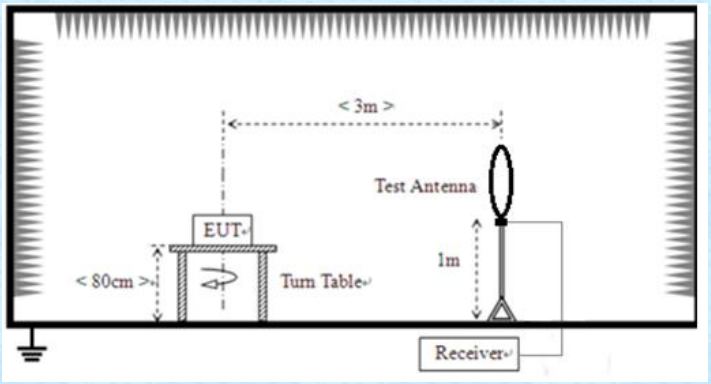
### 7.6.1 Conducted Emission Method

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (d) |
| Test Method: | KDB558074 D01 15.247 Meas Guidance v05r02 |
| Limit: | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

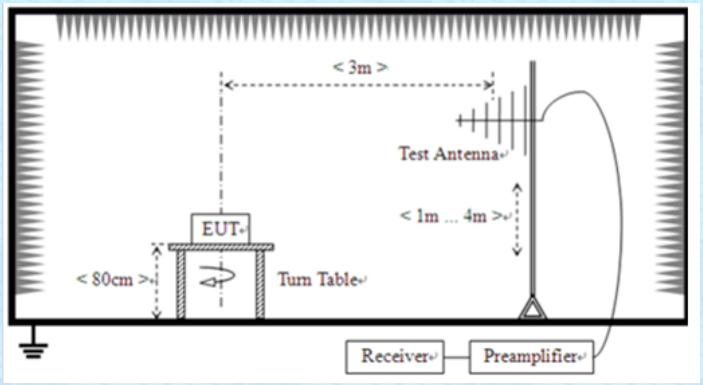
**Measurement Data:** The detailed test data see Appendix for WIFI_2.4G.

### 7.6.2 Radiated Emission Method

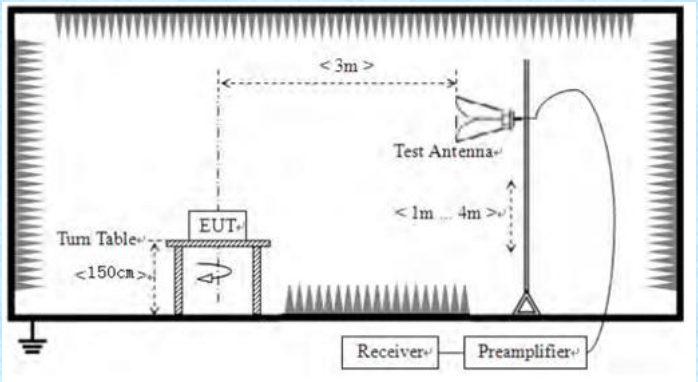
<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013 & RSS-Gen</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 25GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>9KHz-150KHz</td><td>Quasi-peak</td><td>200Hz</td><td>600Hz</td><td>Quasi-peak</td></tr>
<tr><td>150KHz-30MHz</td><td>Quasi-peak</td><td>9KHz</td><td>30KHz</td><td>Quasi-peak</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average</td></tr>
</table>
</td></tr>
<tr><td>FCC Limit:</td><td>
<table>
<tr><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100**</td><td>3</td></tr>
<tr><td>88-216</td><td>150**</td><td>3</td></tr>
<tr><td>216-960</td><td>200**</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
<br>The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>IC Limit:</td><td>
Table 5 – General field strength limits at frequencies above 30 MHz
<table>
<tr><th>Frequency (MHz)</th><th>Field strength (µV/m at 3 m)</th></tr>
<tr><td>30 – 88</td><td>100</td></tr>
<tr><td>88 – 216</td><td>150</td></tr>
<tr><td>216 – 960</td><td>200</td></tr>
<tr><td>Above 960</td><td>500</td></tr>
</table>
Table 6 – General field strength limits at frequencies below 30 MHz
<table>
<tr><th>Frequency</th><th>Magnetic field strength (H-Field) (µA/m)</th><th>Measurement distance (m)</th></tr>
<tr><td>9 - 490 kHz [1]</td><td>6.37/F (F in kHz)</td><td>300</td></tr>
<tr><td>490 - 1705 kHz</td><td>63.7/F (F in kHz)</td><td>30</td></tr>
<tr><td>1.705 - 30 MHz</td><td>0.08</td><td>30</td></tr>
</table>
Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.
</td></tr>
<tr><td>Test setup:</td><td>For radiated emissions from 9kHz to 30MHz</td></tr>
</table>




For radiated emissions from 30MHz to1GHz




For radiated emissions above 1GHz




| | |
|---|---|
| Test Procedure: | 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.<br>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.<br>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. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 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.<br>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. | | | | | |
| Test Instruments: | Refer to 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 | | | | | |

*Remarks:*

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

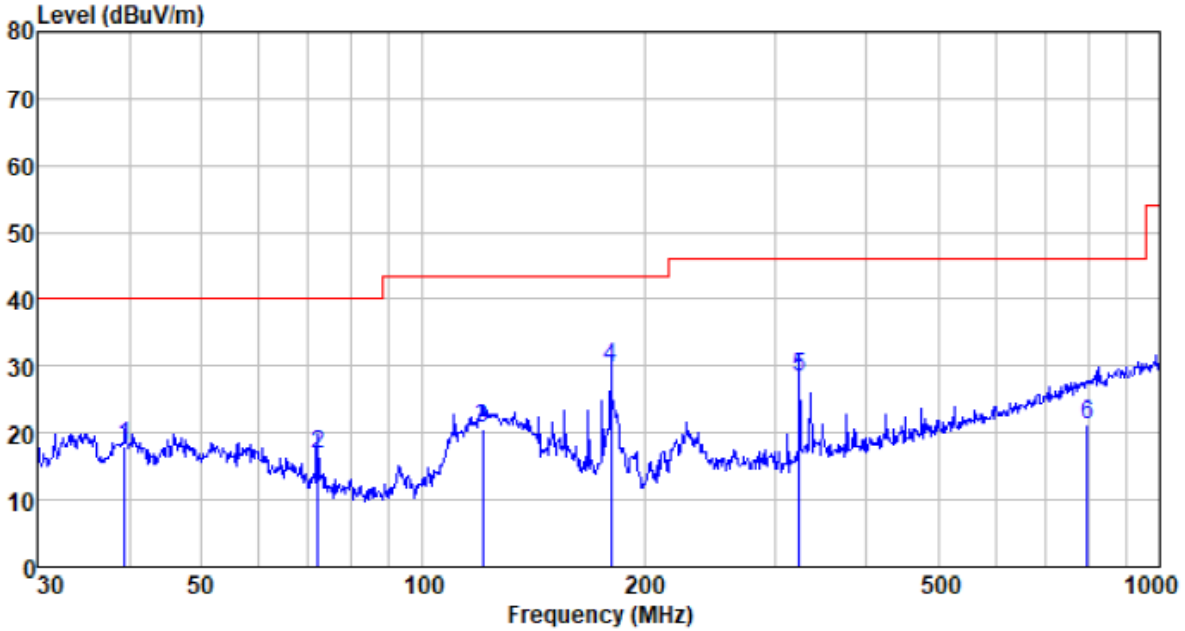
**Measurement data:**

■ **9kHz~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) & RSS-Gen 6.13, the test result no need to reported.

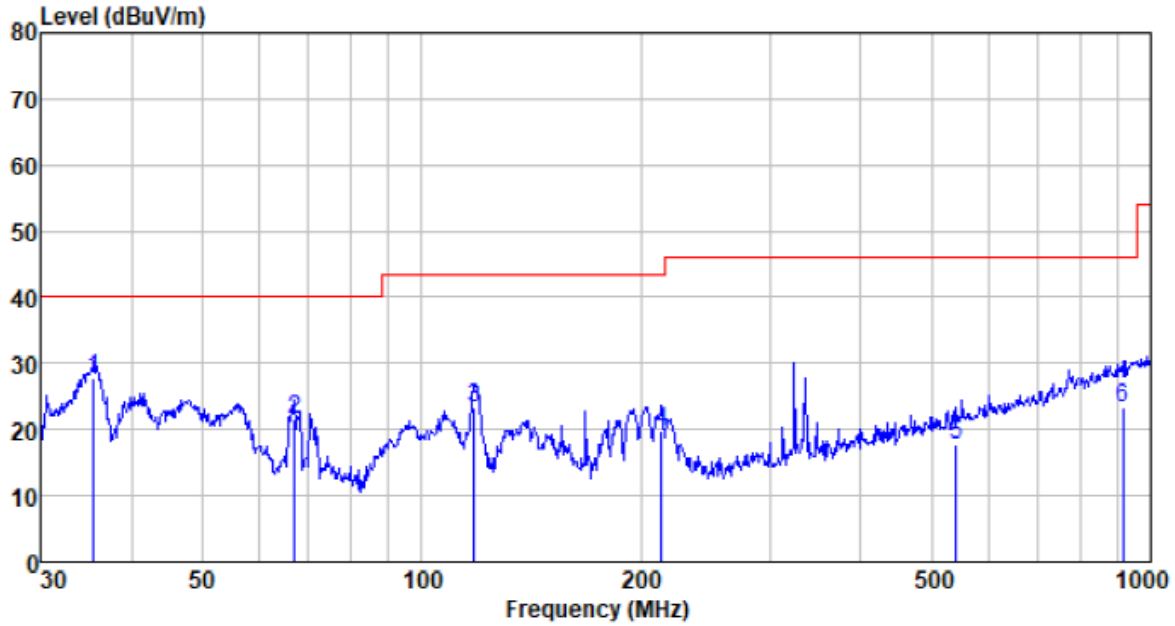
- **All adapter have test, only the worst case adapter 1 report.**
- **Below 1GHz**

| Test channel: | Lowest | Polarziation: | Horizontal |
|---|---|---|---|



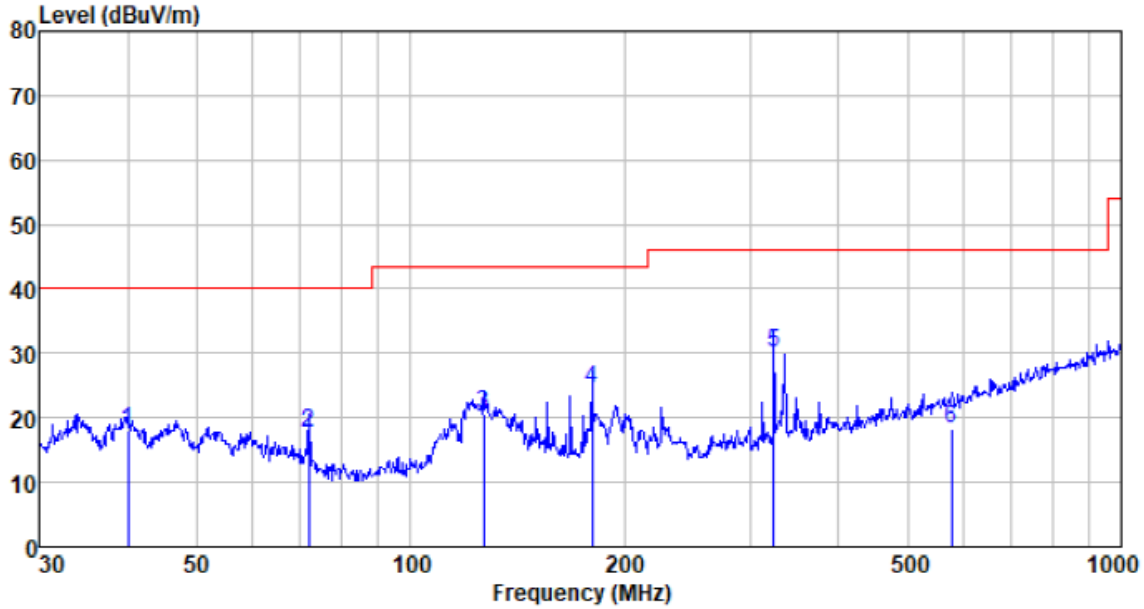

| Freq MHz | Reading level dBuV | Antenna factor dB/m | Cable loss dB | Preamp factor dB | level dBuV/m | Limit level dBuV/m | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|---|
| 39.437 | 39.88 | 13.42 | 0.00 | 35.27 | 18.03 | 40.00 | -21.97 | QP |
| 72.084 | 42.62 | 10.15 | 0.00 | 35.86 | 16.91 | 40.00 | -23.09 | QP |
| 120.699 | 45.62 | 11.25 | 0.00 | 36.24 | 20.63 | 43.50 | -22.87 | QP |
| 180.017 | 55.92 | 10.30 | 0.00 | 36.53 | 29.69 | 43.50 | -13.81 | QP |
| 324.456 | 51.83 | 13.30 | 0.00 | 36.93 | 28.20 | 46.00 | -17.80 | QP |
| 796.183 | 35.83 | 22.63 | 0.00 | 37.30 | 21.16 | 46.00 | -24.84 | QP |

| Test channel: | Lowest | Polarziation: | Vertical |
|---|---|---|---|



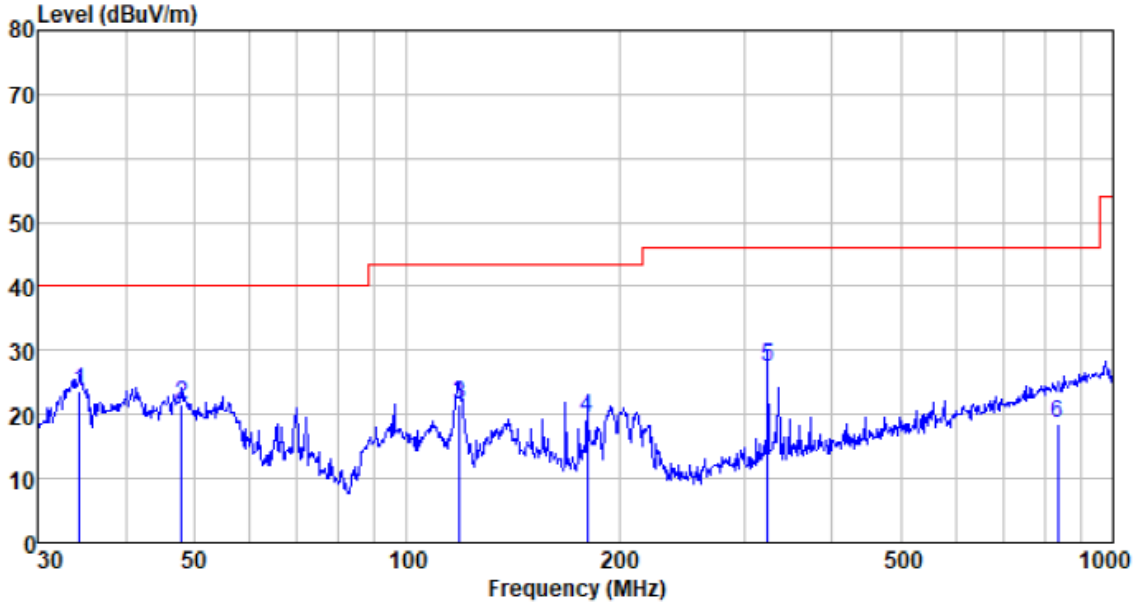

| Freq | Reading level | Antenna factor | Cable loss | Preamp factor | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 35.499 | 50.01 | 12.78 | 0.00 | 35.05 | 27.74 | 40.00 | -12.26 | QP |
| 66.967 | 46.36 | 11.10 | 0.00 | 35.81 | 21.65 | 40.00 | -18.35 | QP |
| 118.186 | 48.41 | 11.07 | 0.00 | 36.22 | 23.26 | 43.50 | -20.24 | QP |
| 213.015 | 46.36 | 9.93 | 0.00 | 36.65 | 19.64 | 43.50 | -23.86 | QP |
| 541.373 | 36.49 | 18.34 | 0.00 | 37.13 | 17.70 | 46.00 | -28.30 | QP |
| 916.069 | 36.74 | 24.03 | 0.00 | 37.36 | 23.41 | 46.00 | -22.59 | QP |

| Test channel: | Middle | Polarziation: | Horizontal |
|---|---|---|---|



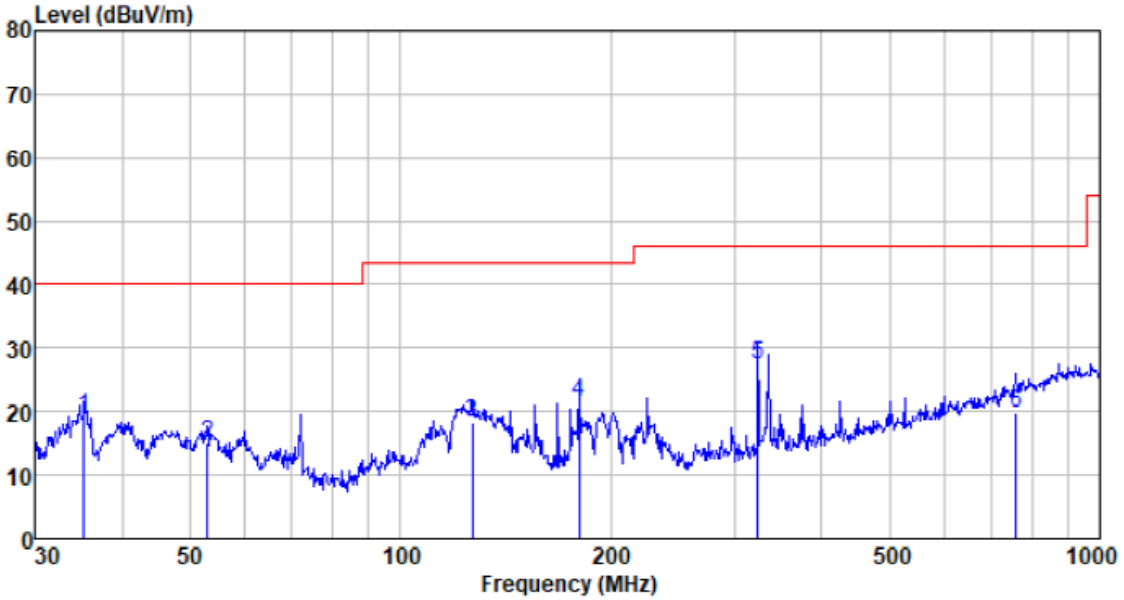

| Freq | Reading level | Antenna factor | Cable loss | Preamp factor | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 39.994 | 39.90 | 13.50 | 0.00 | 35.30 | 18.10 | 40.00 | -21.90 | QP |
| 71.832 | 43.50 | 10.19 | 0.00 | 35.86 | 17.83 | 40.00 | -22.17 | QP |
| 126.772 | 45.29 | 11.63 | 0.00 | 36.27 | 20.65 | 43.50 | -22.85 | QP |
| 180.017 | 50.64 | 10.30 | 0.00 | 36.53 | 24.41 | 43.50 | -19.09 | QP |
| 324.456 | 53.66 | 13.30 | 0.00 | 36.93 | 30.03 | 46.00 | -15.97 | QP |
| 576.644 | 36.66 | 18.93 | 0.00 | 37.16 | 18.43 | 46.00 | -27.57 | QP |

| Test channel: | Middle | Polarziation: | Vertical |
|---|---|---|---|



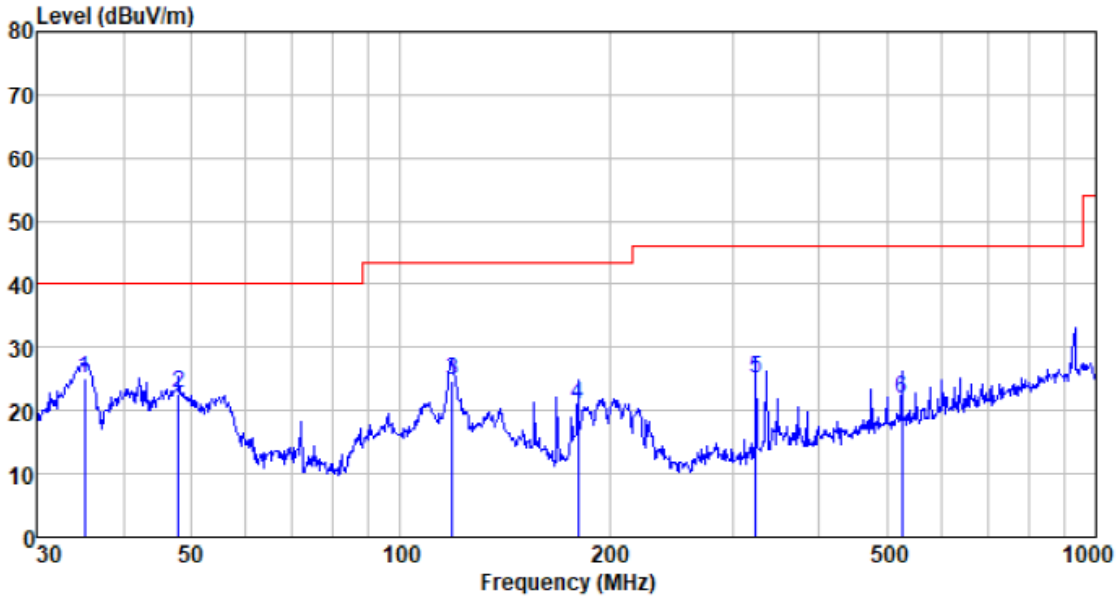

| Freq | Reading level | Antenna factor | Cable loss | Preamp factor | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 34.396 | 46.07 | 12.63 | 0.00 | 34.99 | 23.71 | 40.00 | -16.29 | QP |
| 47.994 | 43.83 | 13.26 | 0.00 | 35.54 | 21.55 | 40.00 | -18.45 | QP |
| 118.601 | 46.77 | 11.10 | 0.00 | 36.22 | 21.65 | 43.50 | -21.85 | QP |
| 180.017 | 45.62 | 10.30 | 0.00 | 36.53 | 19.39 | 43.50 | -24.11 | QP |
| 324.456 | 51.01 | 13.30 | 0.00 | 36.93 | 27.38 | 46.00 | -18.62 | QP |
| 836.244 | 32.70 | 23.15 | 0.00 | 37.32 | 18.53 | 46.00 | -27.47 | QP |

| Test channel: | Highest | Polarziation: | Horizontal |
|---|---|---|---|




| Freq | Reading level | Antenna factor | Cable loss | Preamp factor | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 35.251 | 41.35 | 12.74 | 0.00 | 35.04 | 19.05 | 40.00 | -20.95 | QP |
| 52.945 | 37.65 | 13.01 | 0.00 | 35.64 | 15.02 | 40.00 | -24.98 | QP |
| 126.772 | 42.88 | 11.63 | 0.00 | 36.27 | 18.24 | 43.50 | -25.26 | QP |
| 180.017 | 47.64 | 10.30 | 0.00 | 36.53 | 21.41 | 43.50 | -22.09 | QP |
| 324.456 | 51.16 | 13.30 | 0.00 | 36.93 | 27.53 | 46.00 | -18.47 | QP |
| 758.041 | 35.00 | 21.93 | 0.00 | 37.28 | 19.65 | 46.00 | -26.35 | QP |

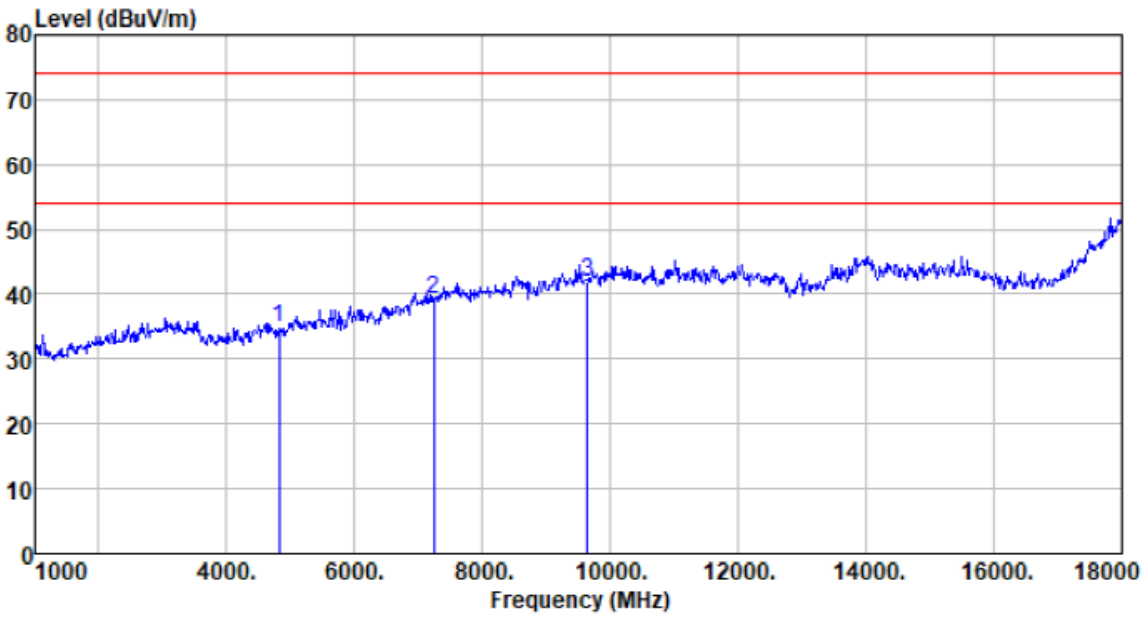
| Test channel: | Highest | Polarziation: | Vertical |
|---|---|---|---|




| Freq | Reading level | Antenna factor | Cable loss | Preamp factor | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 35.128 | 47.38 | 12.72 | 0.00 | 35.03 | 25.07 | 40.00 | -14.93 | QP |
| 47.994 | 44.88 | 13.26 | 0.00 | 35.54 | 22.60 | 40.00 | -17.40 | QP |
| 118.601 | 50.01 | 11.10 | 0.00 | 36.22 | 24.89 | 43.50 | -18.61 | QP |
| 180.017 | 47.21 | 10.30 | 0.00 | 36.53 | 20.98 | 43.50 | -22.52 | QP |
| 324.456 | 48.78 | 13.30 | 0.00 | 36.93 | 25.15 | 46.00 | -20.85 | QP |
| 526.397 | 40.94 | 18.08 | 0.00 | 37.12 | 21.90 | 46.00 | -24.10 | QP |

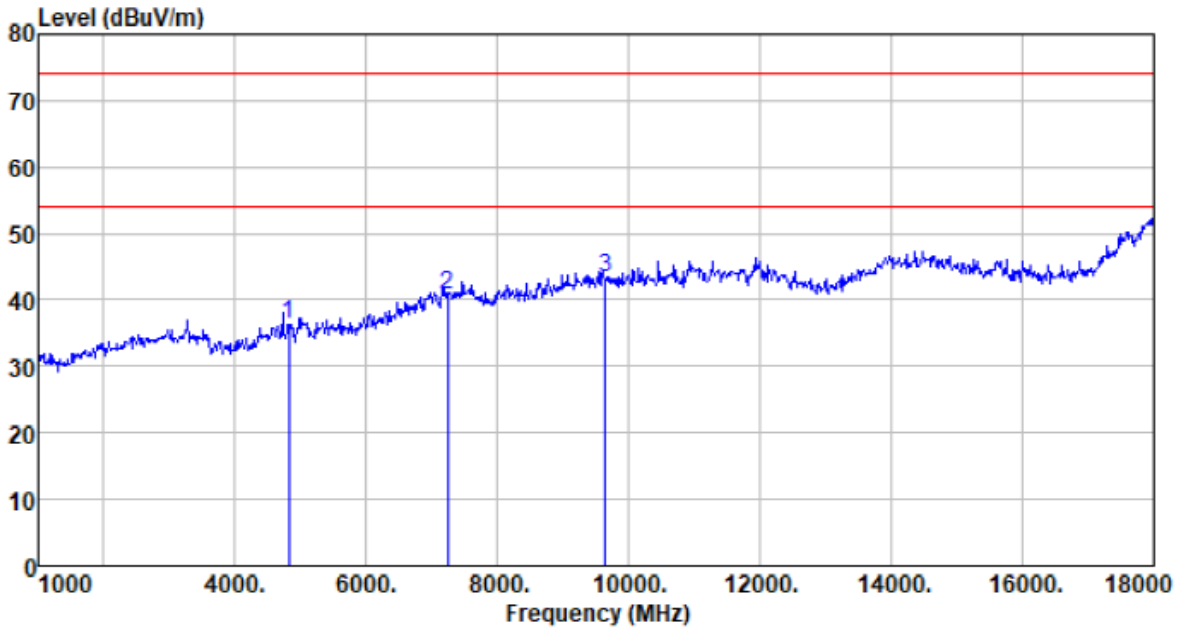
■ **Above 1GHz**

| Test channel: | Lowest | Polarziation: | Horizontal |
|---|---|---|---|



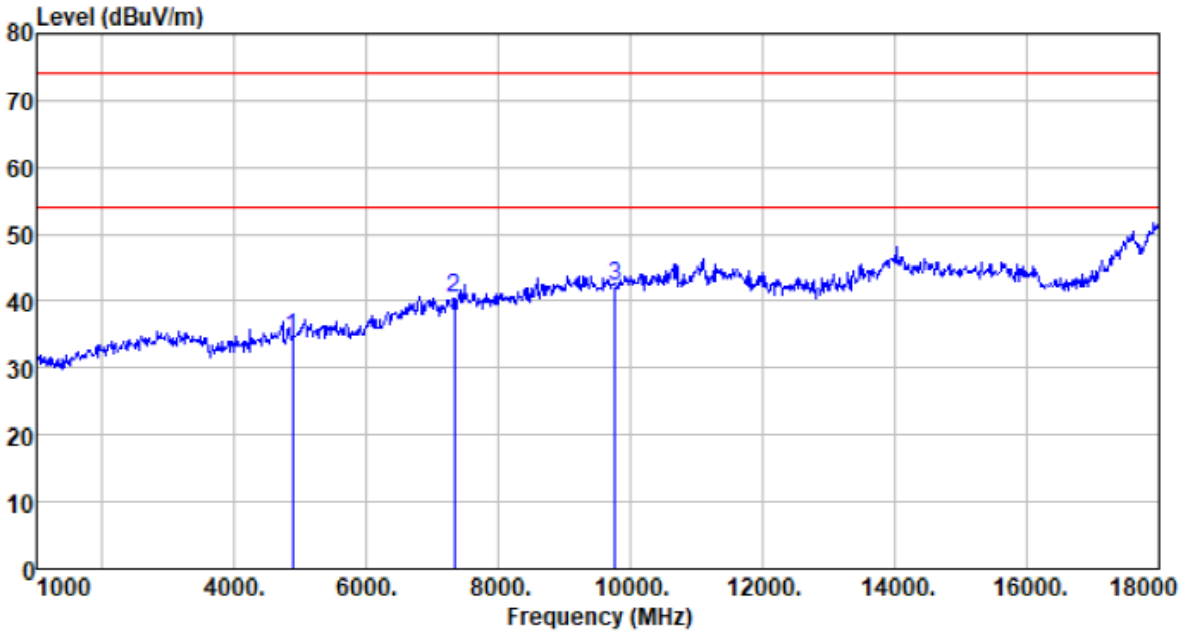

| Freq | Reading level | Antenna factor | Cable loss | Preamp factor | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 4824.000 | 37.32 | 31.11 | 4.63 | 38.36 | 34.70 | 74.00 | -39.30 | Peak |
| 7236.000 | 35.65 | 35.97 | 6.52 | 38.97 | 39.17 | 74.00 | -34.83 | Peak |
| 9648.000 | 35.66 | 37.95 | 7.99 | 39.69 | 41.91 | 74.00 | -32.09 | Peak |

| Test channel: | Lowest | Polarziation: | Vertical |
|---|---|---|---|



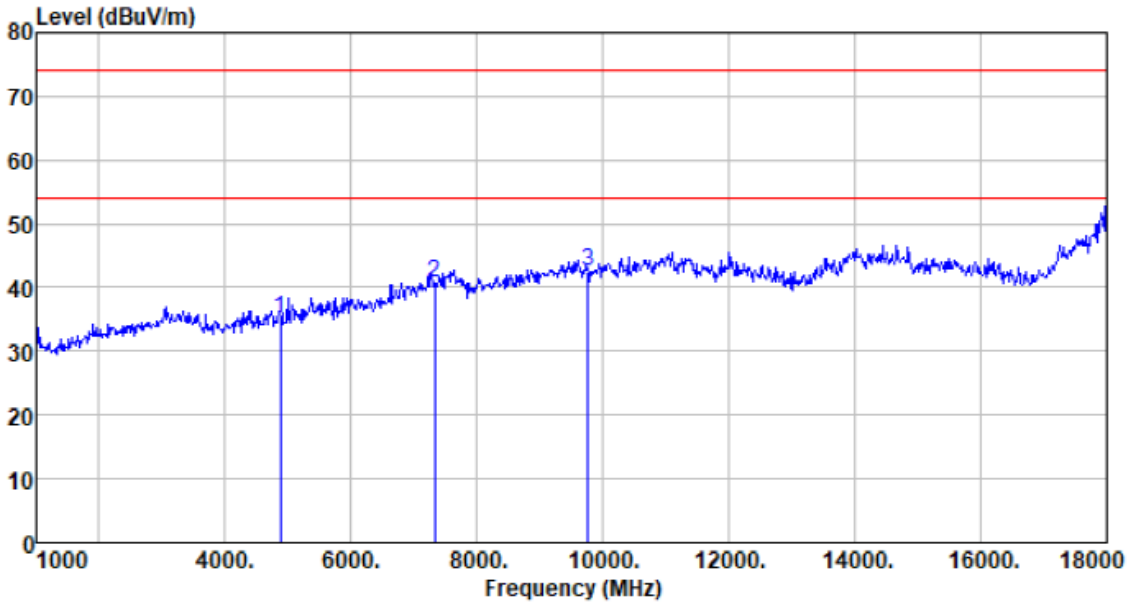

| Freq | Reading level | Antenna factor | Cable loss | Preamp factor | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 4824.000 | 38.88 | 31.11 | 4.63 | 38.36 | 36.26 | 74.00 | -37.74 | Peak |
| 7236.000 | 37.28 | 35.97 | 6.52 | 38.97 | 40.80 | 74.00 | -33.20 | Peak |
| 9648.000 | 37.29 | 37.95 | 7.99 | 39.69 | 43.54 | 74.00 | -30.46 | Peak |

| Test channel: | Middle | Polarziation: | Horizontal |
|---|---|---|---|



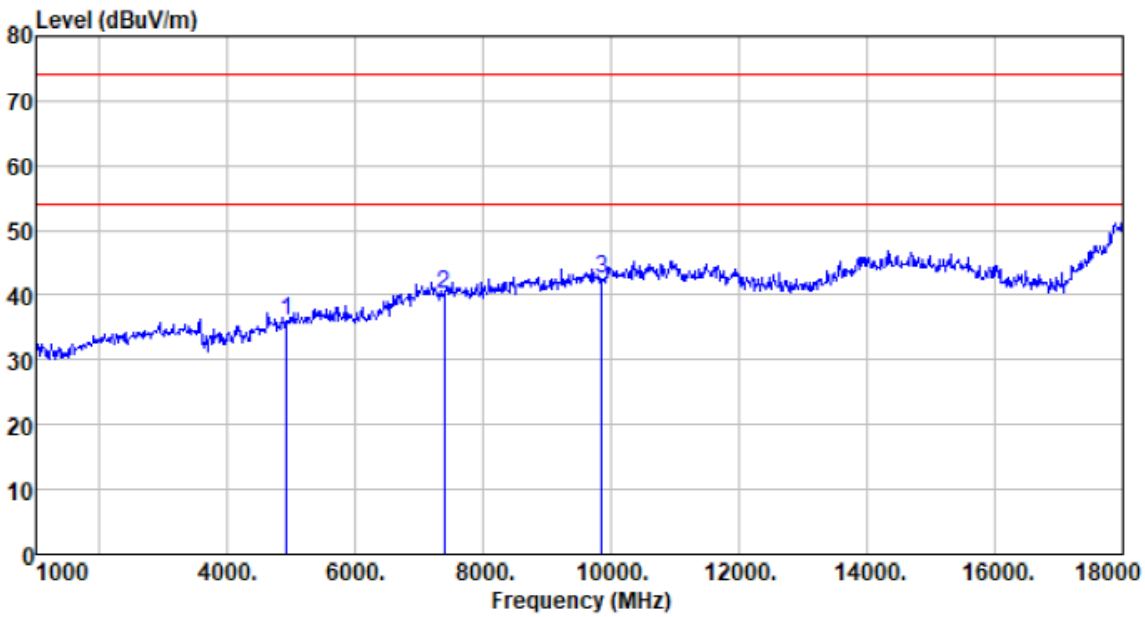

| Freq | Reading level | Antenna factor | Cable loss | Preamp factor | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 4884.000 | 36.93 | 31.28 | 4.69 | 38.38 | 34.52 | 74.00 | -39.48 | Peak |
| 7326.000 | 36.60 | 36.15 | 6.63 | 39.00 | 40.38 | 74.00 | -33.62 | Peak |
| 9768.000 | 35.90 | 38.07 | 8.03 | 39.73 | 42.27 | 74.00 | -31.73 | Peak |

| Test channel: | Middle | Polarziation: | Vertical |
|---|---|---|---|



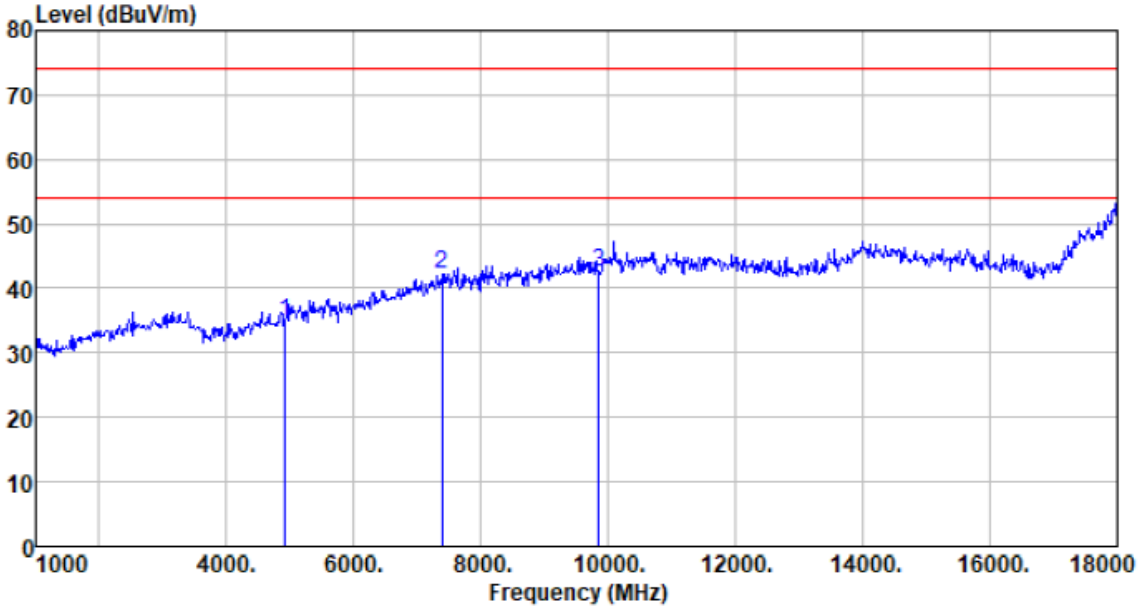

| Freq | Reading level | Antenna factor | Cable loss | Preamp factor | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 4884.000 | 37.55 | 31.28 | 4.69 | 38.38 | 35.14 | 74.00 | -38.86 | Peak |
| 7326.000 | 36.96 | 36.15 | 6.63 | 39.00 | 40.74 | 74.00 | -33.26 | Peak |
| 9768.000 | 36.08 | 38.07 | 8.03 | 39.73 | 42.45 | 74.00 | -31.55 | Peak |

| Test channel: | Highest | Polarziation: | Horizontal |
|---|---|---|---|




| Freq MHz | Reading level dBuV | Antenna factor dB/m | Cable loss dB | Preamp factor dB | level dBuV/m | Limit level dBuV/m | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|---|
| 4924.000 | 38.32 | 31.39 | 4.75 | 38.38 | 36.08 | 74.00 | -37.92 | Peak |
| 7386.000 | 36.06 | 36.27 | 6.71 | 39.02 | 40.02 | 74.00 | -33.98 | Peak |
| 9848.000 | 36.05 | 38.15 | 8.06 | 39.75 | 42.51 | 74.00 | -31.49 | Peak |

| Test channel: | Highest | Polarziation: | Vertical |
|---|---|---|---|




| Freq | Reading level | Antenna factor | Cable loss | Preamp factor | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 4924.000 | 37.16 | 31.39 | 4.75 | 38.38 | 34.92 | 74.00 | -39.08 | Peak |
| 7386.000 | 38.29 | 36.27 | 6.71 | 39.02 | 42.25 | 74.00 | -31.75 | Peak |
| 9848.000 | 36.08 | 38.15 | 8.06 | 39.75 | 42.54 | 74.00 | -31.46 | Peak |

*Remark:*

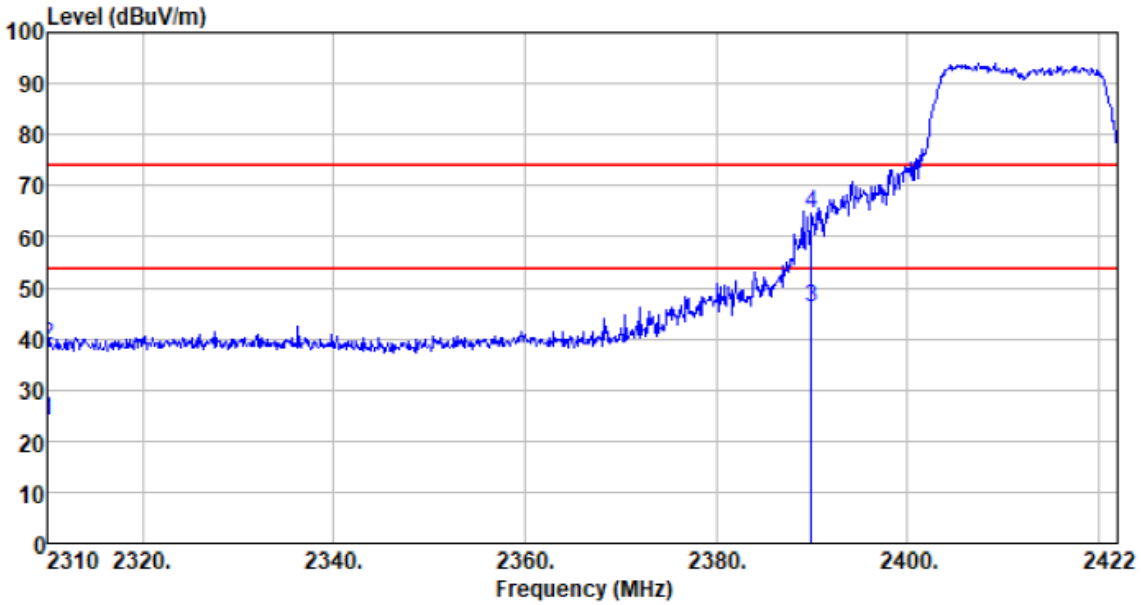
*1 Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*

*2 "*", means this data is the too weak instrument of signal is unable to test.*

*2. The emission levels of other frequencies are very lower than the limit and not show in test report.*

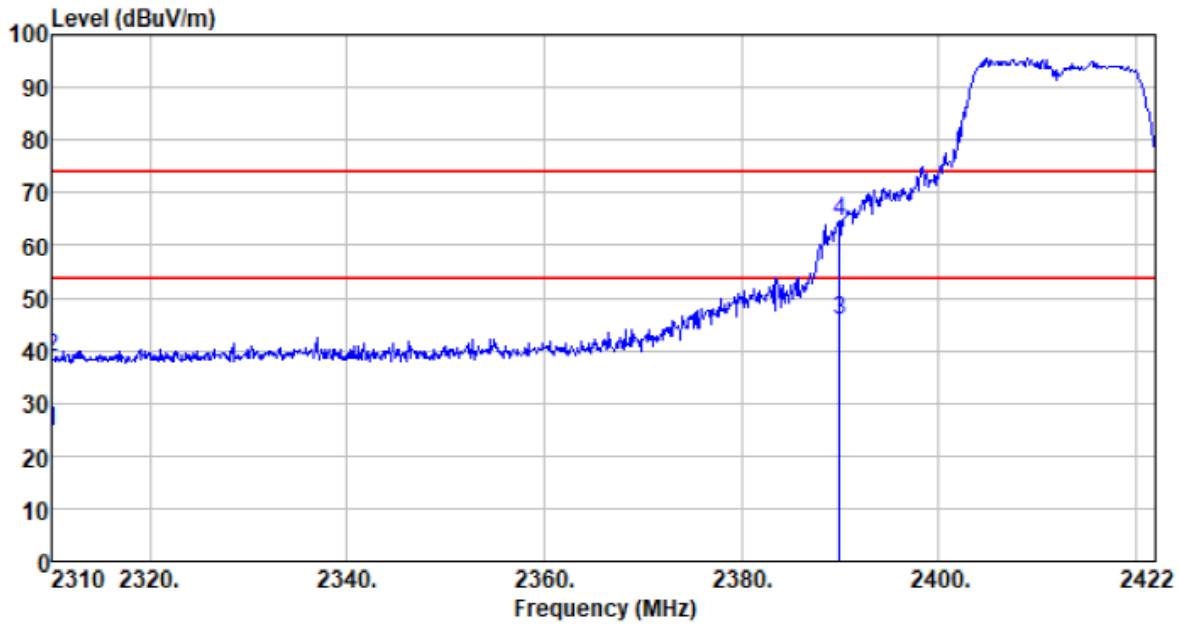
■ **Unwanted Emissions in restricted Frequency Bands**

| Test channel: | Lowest | Polarziation: | Horizontal |
|---|---|---|---|



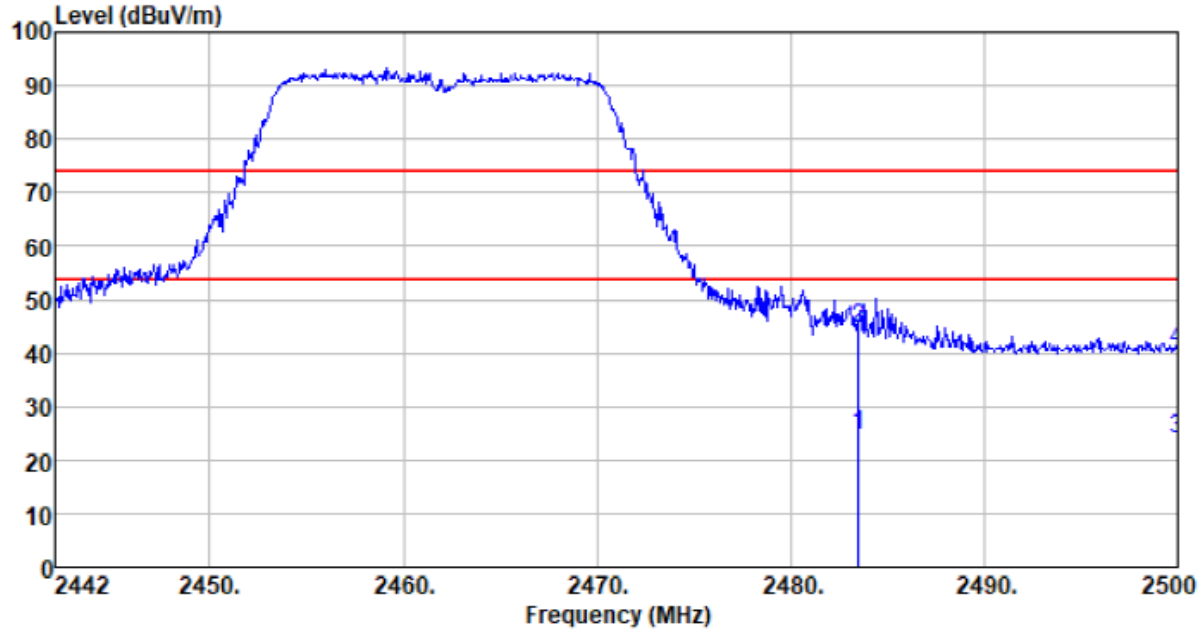

| Freq MHz | Reading level dBuV | Antenna factor dB/m | Cable loss dB | Preamp factor dB | level dBuV/m | Limit level dBuV/m | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|---|
| 2310.000 | 32.37 | 27.17 | 2.81 | 38.52 | 23.83 | 54.00 | -30.17 | Average |
| 2310.000 | 47.22 | 27.17 | 2.81 | 38.52 | 38.68 | 74.00 | -35.32 | Peak |
| 2390.000 | 54.68 | 27.27 | 2.91 | 38.56 | 46.30 | 54.00 | -7.70 | Average |
| 2390.000 | 72.83 | 27.27 | 2.91 | 38.56 | 64.45 | 74.00 | -9.55 | Peak |

| Test channel: | Lowest | Polarziation: | Vertical |
|---|---|---|---|



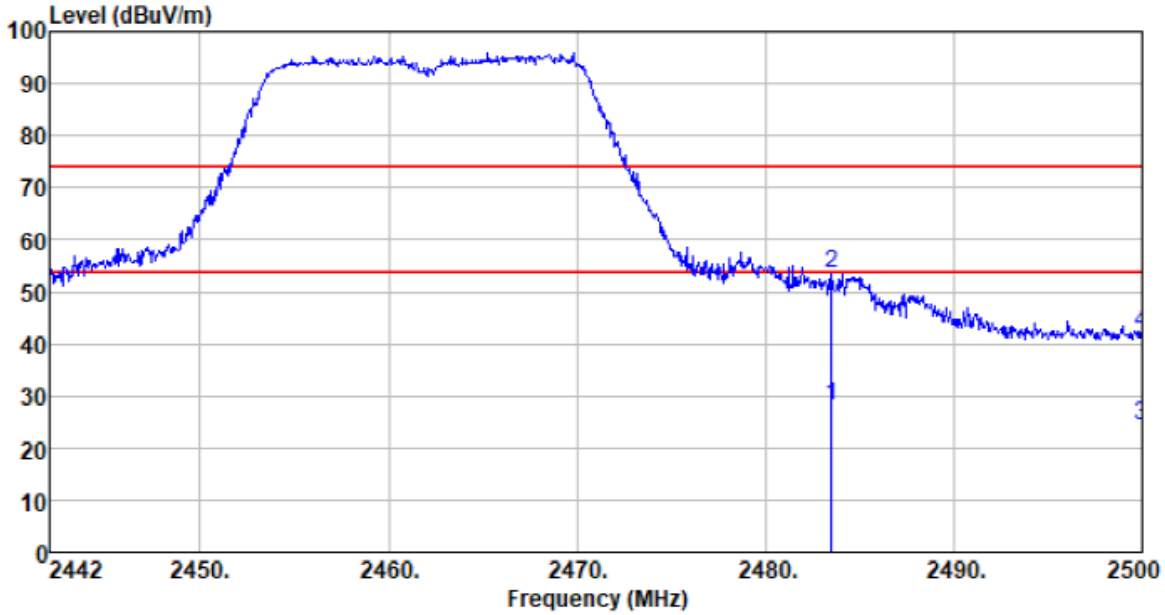

| Freq | Reading level | Antenna factor | Cable loss | Preamp factor | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 2310.000 | 33.38 | 27.17 | 2.81 | 38.52 | 24.84 | 54.00 | -29.16 | Average |
| 2310.000 | 47.32 | 27.17 | 2.81 | 38.52 | 38.78 | 74.00 | -35.22 | Peak |
| 2390.000 | 54.14 | 27.27 | 2.91 | 38.56 | 45.76 | 54.00 | -8.24 | Average |
| 2390.000 | 73.10 | 27.27 | 2.91 | 38.56 | 64.72 | 74.00 | -9.28 | Peak |

| Test channel: | Highest | Polarziation: | Horizontal |
|---|---|---|---|




| Freq | Reading level | Antenna factor | Cable loss | Preamp factor | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 2483.500 | 32.87 | 27.38 | 2.99 | 38.59 | 24.65 | 54.00 | -29.35 | Average |
| 2483.500 | 52.82 | 27.38 | 2.99 | 38.59 | 44.60 | 74.00 | -29.40 | Peak |
| 2500.000 | 32.15 | 27.40 | 3.01 | 38.60 | 23.96 | 54.00 | -30.04 | Average |
| 2500.000 | 48.84 | 27.40 | 3.01 | 38.60 | 40.65 | 74.00 | -33.35 | Peak |

| Test channel: | Highest | Polarziation: | Vertical |
|---|---|---|---|




| Freq | Reading level | Antenna factor | Cable loss | Preamp factor | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 2483.500 | 36.24 | 27.38 | 2.99 | 38.59 | 28.02 | 54.00 | -25.98 | Average |
| 2483.500 | 61.82 | 27.38 | 2.99 | 38.59 | 53.60 | 74.00 | -20.40 | Peak |
| 2500.000 | 32.54 | 27.40 | 3.01 | 38.60 | 24.35 | 54.00 | -29.65 | Average |
| 2500.000 | 50.22 | 27.40 | 3.01 | 38.60 | 42.03 | 74.00 | -31.97 | Peak |

*Remarks:*

1. *The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.*
2. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
3. *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------