

# TEST REPORT

**Applicant:** JMTek Industries(Shenzhen) co., Ltd

**Address of Applicant:** 14G, Innovation Tech Building, Quanzhi Science and Technology innovation Park, ShaJing Street, Bao'an District, ShenZhen, China

**Manufacturer/Factory:** JMTek Industries(Shenzhen) co., Ltd

**Address of Manufacturer/Factory:** 14G, Innovation Tech Building, Quanzhi Science and Technology innovation Park, ShaJing Street, Bao'an District, ShenZhen, China

**Equipment Under Test (EUT)**

Product Name: Wireless Mouse Pad

Model No.: WMP300,  
WMP300B, WMP300G

**FCC ID:** 2APU5-WMP300

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

**Date of sample receipt:** Dec. 31, 2019

**Date of Test:** Dec. 31, 2019 to Jan. 07, 2020

**Date of report issued:** Jan. 07, 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          | Jan. 07, 2020 | Original    |
|             |               |             |
|             |               |             |
|             |               |             |
|             |               |             |

Prepared By:



Date:

Jan. 07, 2020

Project Engineer

Check By:



Date:

Jan. 07, 2020

Reviewer

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## 4 Test Summary

| Test Item                        | Section in CFR 47 | Result |
|----------------------------------|-------------------|--------|
| Antenna requirement              | 15.203            | Pass   |
| AC Power Line Conducted Emission | 15.207            | Pass   |
| Spurious Emission                | 15.209(a)(f)      | Pass   |
| 20dB Bandwidth                   | 15.215            | Pass   |

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

### 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:        | Wireless Mouse Pad                            |
| Model No.:           | WMP300                                        |
| Serial No.:          | WMP300B, WMP300G                              |
| Hardware version:    | N/A                                           |
| Software version:    | N/A                                           |
| Test sample(s) ID:   | GTS201912000308-1                             |
| Sample(s) Status     | Engineer sample                               |
| Operation Frequency: | 110kHz ~ 205KHz                               |
| Modulation type:     | MSK                                           |
| Antenna Type:        | Inductive loop coil Antenna                   |
| Antenna gain:        | 0dBi                                          |
| Power supply:        | Input: DC 5V 2A<br>Output Power: DC 5V 1A, 5W |

## 5.2 Test mode

|                                                                                                                                                                                                                                              |                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| Transmitting mode                                                                                                                                                                                                                            | Keep the EUT in continuously transmitting mode |
| <i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i> |                                                |

## 5.3 Description of Support Units

| Manufacturer                        | Description        | Model  | Serial Number |
|-------------------------------------|--------------------|--------|---------------|
| JMTek Industries(Shenzhen) co., Ltd | Wireless Mouse Pad | WMP300 |               |
| OXIOS                               | Adapter            | 002    |               |
|                                     | Dummy load         | DL01   |               |

## 5.4 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

## 5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

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

## 5.6 Other Information Requested by the Customer

None.

## 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. 03 2015       | July. 02 2020           |
| 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. 26 2019       | June. 25 2020           |
| 4                  | BiConiLog Antenna                   | SCHWARZBECK<br>MESS-ELEKTRONIK | VULB9163                    | GTS214        | June. 26 2019       | June. 25 2020           |
| 5                  | Double -ridged waveguide horn       | SCHWARZBECK<br>MESS-ELEKTRONIK | BBHA 9120 D                 | GTS208        | June. 26 2019       | June. 25 2020           |
| 6                  | Horn Antenna                        | ETS-LINDGREN                   | 3160                        | GTS217        | June. 26 2019       | June. 25 2020           |
| 7                  | EMI Test Software                   | AUDIX                          | E3                          | N/A           | N/A                 | N/A                     |
| 8                  | Coaxial Cable                       | GTS                            | N/A                         | GTS213        | June. 26 2019       | June. 25 2020           |
| 9                  | Coaxial Cable                       | GTS                            | N/A                         | GTS211        | June. 26 2019       | June. 25 2020           |
| 10                 | Coaxial cable                       | GTS                            | N/A                         | GTS210        | June. 26 2019       | June. 25 2020           |
| 11                 | Coaxial Cable                       | GTS                            | N/A                         | GTS212        | June. 26 2019       | June. 25 2020           |
| 12                 | Amplifier(100kHz-3GHz)              | HP                             | 8347A                       | GTS204        | June. 26 2019       | June. 25 2020           |
| 13                 | Amplifier(2GHz-20GHz)               | HP                             | 84722A                      | GTS206        | June. 26 2019       | June. 25 2020           |
| 14                 | Amplifier (18-26GHz)                | Rohde & Schwarz                | AFS33-18002<br>650-30-8P-44 | GTS218        | June. 26 2019       | June. 25 2020           |
| 15                 | Band filter                         | Amindeon                       | 82346                       | GTS219        | June. 26 2019       | June. 25 2020           |
| 16                 | Power Meter                         | Anritsu                        | ML2495A                     | GTS540        | June. 26 2019       | June. 25 2020           |
| 17                 | Power Sensor                        | Anritsu                        | MA2411B                     | GTS541        | June. 26 2019       | June. 25 2020           |
| 18                 | Wideband Radio Communication Tester | Rohde & Schwarz                | CMW500                      | GTS575        | June. 26 2019       | June. 25 2020           |
| 19                 | Splitter                            | Agilent                        | 11636B                      | GTS237        | June. 26 2019       | June. 25 2020           |
| 20                 | Loop Antenna                        | ZHINAN                         | ZN30900A                    | GTS534        | June. 26 2019       | June. 25 2020           |
| 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. 26 2019       | June. 25 2020           |

| 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.15 2019         | May.14 2022             |
| 2                  | EMI Test Receiver        | R&S                     | ESCI 7               | GTS552        | June. 26 2019       | June. 25 2020           |
| 3                  | Coaxial Switch           | ANRITSU CORP            | MP59B                | GTS225        | June. 26 2019       | June. 25 2020           |
| 4                  | Artificial Mains Network | SCHWARZBECK MESS        | NSLK8127             | GTS226        | June. 26 2019       | June. 25 2020           |
| 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             | KTJ                     | TA328                | GTS233        | June. 26 2019       | June. 25 2020           |
| 8                  | Absorbing clamp          | Elektronik-Feinmechanik | MDS21                | GTS229        | June. 26 2019       | June. 25 2020           |
| 9                  | ISN                      | SCHWARZBECK             | NTFM 8158            | GTD565        | June. 26 2019       | June. 25 2020           |

| 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     | June. 26 2019       | June. 25 2020           |
| 2                  | EMI Test Receiver                              | R&S          | ESCI 7           | GTS552     | June. 26 2019       | June. 25 2020           |
| 3                  | Spectrum Analyzer                              | Agilent      | E4440A           | GTS533     | June. 26 2019       | June. 25 2020           |
| 4                  | MXG vector Signal Generator                    | Agilent      | N5182A           | GTS567     | June. 26 2019       | June. 25 2020           |
| 5                  | ESG Analog Signal Generator                    | Agilent      | E4428C           | GTS568     | June. 26 2019       | June. 25 2020           |
| 6                  | USB RF Power Sensor                            | DARE         | RPR3006W         | GTS569     | June. 26 2019       | June. 25 2020           |
| 7                  | RF Switch Box                                  | Shongyi      | RFSW3003328      | GTS571     | June. 26 2019       | June. 25 2020           |
| 8                  | Programmable Constant Temp & Humi Test Chamber | WEWON        | WHTH-150L-40-880 | GTS572     | June. 26 2019       | June. 25 2020           |

| 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        | June. 26 2019       | June. 25 2020           |
| 2                       | Barometer                       | ChangChun    | DYM3      | GTS255        | June. 26 2019       | June. 25 2020           |

## 7 Test results and Measurement Data

### 7.1 Antenna requirement:

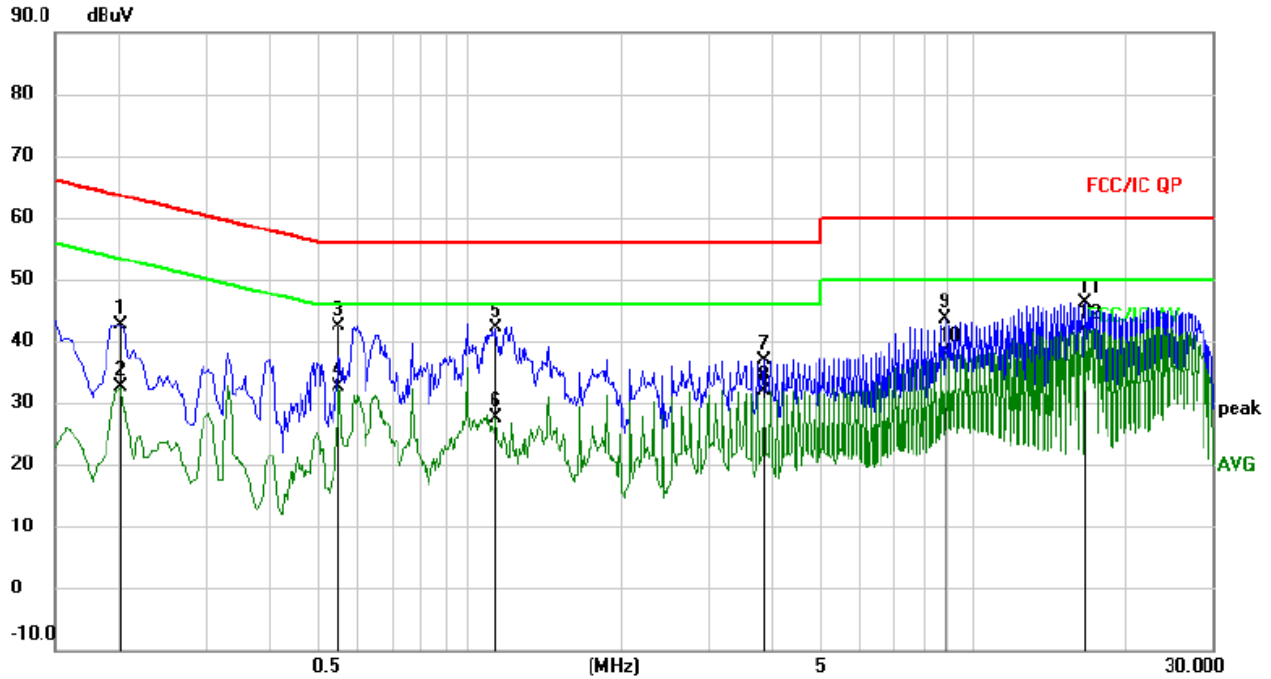
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <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 Inductive loop coil Antenna, the best case gain of the antenna is 0dBi, reference to the appendix II for details.                                                                                                                                                                                                                                                                                                                                                 |                             |

## 7.2 Conducted Emissions

| Test Requirement:     | FCC Part15 C Section 15.207                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--|-----------------------|--------------|--|------------|---------|----------|-----------|-----------|-------|----|----|------|----|----|
| Test Method:          | ANSI C63.10:2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Test Frequency Range: | 150KHz to 30MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Class / Severity:     | Class B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Receiver setup:       | RBW=9KHz, VBW=30KHz, Sweep time=auto                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Limit:                | <table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table> <p>* Decreases with the logarithm of the frequency.</p>                                                                                                                                                                                                                                                                                                                                                                  |           |  | Frequency range (MHz) | Limit (dBuV) |  | Quasi-peak | Average | 0.15-0.5 | 66 to 56* | 56 to 46* | 0.5-5 | 56 | 46 | 5-30 | 60 | 50 |
| Frequency range (MHz) | Limit (dBuV)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
|                       | Quasi-peak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Average   |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| 0.15-0.5              | 66 to 56*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 56 to 46* |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| 0.5-5                 | 56                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 46        |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| 5-30                  | 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 50        |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Test setup:           | <div><p style="text-align: center;"><b>Reference Plane</b></p><p><i>Remark:<br/>E.U.T: Equipment Under Test<br/>LISN: Line Impedance Stabilization Network<br/>Test table height=0.8m</i></p></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Test procedure:       | <div><div>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.</div><div>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).</div><div>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 on conducted measurement.</div></div> |           |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Test Instruments:     | Refer to section 6.0 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Test mode:            | Refer to section 5.2 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Test results:         | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |

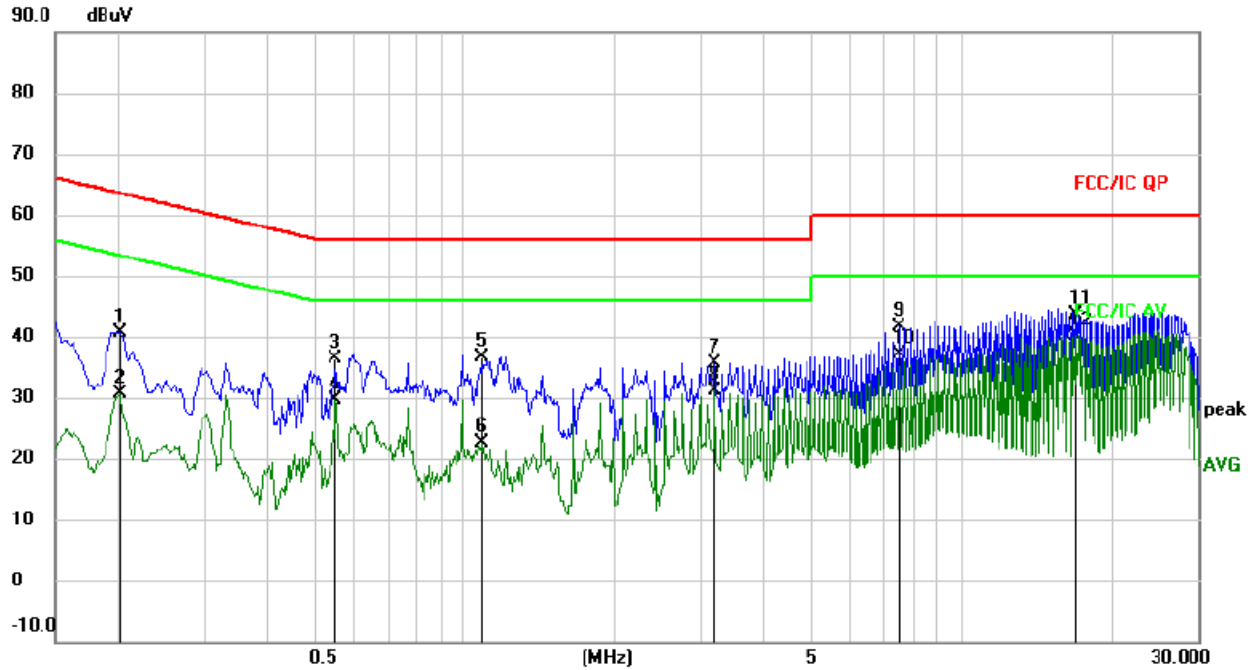
**Measurement data:**

Line:



| No. | Mk. | Freq.   | Reading Level | Correct Factor | Measurement | Limit | Over   |          |         |
|-----|-----|---------|---------------|----------------|-------------|-------|--------|----------|---------|
|     |     | MHz     | dBuV          |                | dBuV        | dBuV  | dB     | Detector | Comment |
| 1   |     | 0.2020  | 33.28         | 9.46           | 42.74       | 63.53 | -20.79 | QP       |         |
| 2   |     | 0.2020  | 23.07         | 9.46           | 32.53       | 53.53 | -21.00 | AVG      |         |
| 3   |     | 0.5500  | 32.57         | 9.80           | 42.37       | 56.00 | -13.63 | QP       |         |
| 4   |     | 0.5500  | 22.71         | 9.80           | 32.51       | 46.00 | -13.49 | AVG      |         |
| 5   |     | 1.1300  | 32.52         | 9.57           | 42.09       | 56.00 | -13.91 | QP       |         |
| 6   |     | 1.1300  | 18.13         | 9.57           | 27.70       | 46.00 | -18.30 | AVG      |         |
| 7   |     | 3.8580  | 27.21         | 9.72           | 36.93       | 56.00 | -19.07 | QP       |         |
| 8   |     | 3.8580  | 22.24         | 9.72           | 31.96       | 46.00 | -14.04 | AVG      |         |
| 9   |     | 8.8219  | 33.87         | 9.70           | 43.57       | 60.00 | -16.43 | QP       |         |
| 10  |     | 8.8219  | 28.35         | 9.70           | 38.05       | 50.00 | -11.95 | AVG      |         |
| 11  |     | 16.7619 | 36.43         | 9.73           | 46.16       | 60.00 | -13.84 | QP       |         |
| 12  | *   | 16.7619 | 32.22         | 9.73           | 41.95       | 50.00 | -8.05  | AVG      |         |

## Neutral:



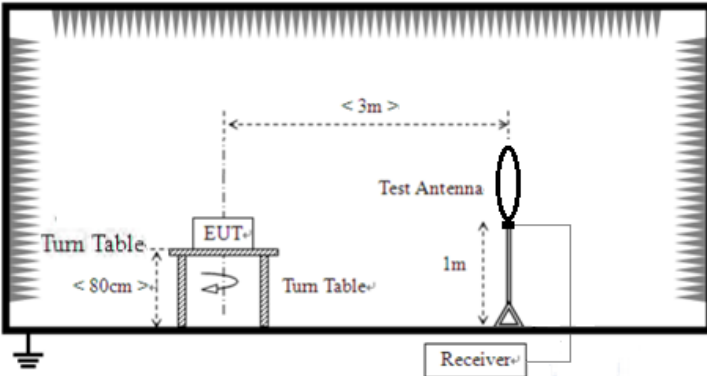
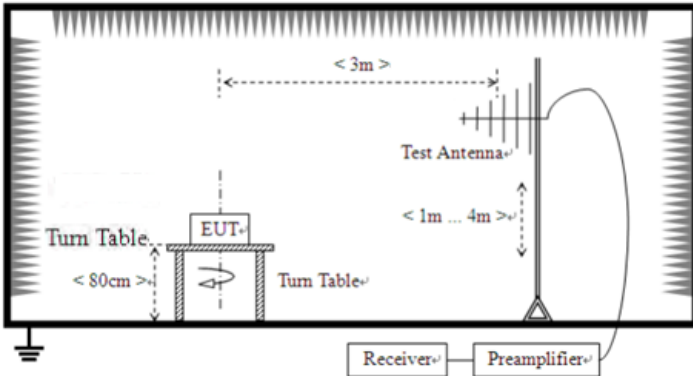
| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------|--------------------------|---------------|------------|----------|---------|
| 1   |     | 0.2020       | 31.28                    | 9.46              | 40.74                    | 63.53         | -22.79     | QP       |         |
| 2   |     | 0.2020       | 21.07                    | 9.46              | 30.53                    | 53.53         | -23.00     | AVG      |         |
| 3   |     | 0.5500       | 26.69                    | 9.80              | 36.49                    | 56.00         | -19.51     | QP       |         |
| 4   |     | 0.5500       | 19.71                    | 9.80              | 29.51                    | 46.00         | -16.49     | AVG      |         |
| 5   |     | 1.0780       | 27.02                    | 9.57              | 36.59                    | 56.00         | -19.41     | QP       |         |
| 6   |     | 1.0780       | 12.98                    | 9.57              | 22.55                    | 46.00         | -23.45     | AVG      |         |
| 7   |     | 3.1980       | 25.96                    | 9.67              | 35.63                    | 56.00         | -20.37     | QP       |         |
| 8   |     | 3.1980       | 21.39                    | 9.67              | 31.06                    | 46.00         | -14.94     | AVG      |         |
| 9   |     | 7.4980       | 32.01                    | 9.71              | 41.72                    | 60.00         | -18.28     | QP       |         |
| 10  |     | 7.4980       | 27.34                    | 9.71              | 37.05                    | 50.00         | -12.95     | AVG      |         |
| 11  |     | 16.9820      | 34.01                    | 9.74              | 43.75                    | 60.00         | -16.25     | QP       |         |
| 12  | *   | 16.9820      | 30.34                    | 9.74              | 40.08                    | 50.00         | -9.92      | AVG      |         |

## Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor

## 7.3 Spurious Emission

|                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                         |                  |                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------|------------------|------------------|
| Test Requirement:                                                                                                                                                                                                                                                                                    | FCC Part15 C Section 15.209                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                         |                  |                  |
| Test Method:                                                                                                                                                                                                                                                                                         | ANSI C63.10:2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                         |                  |                  |
| Test Frequency Range:                                                                                                                                                                                                                                                                                | 9kHz to 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                         |                  |                  |
| Test site:                                                                                                                                                                                                                                                                                           | Measurement Distance: 3m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                         |                  |                  |
| Receiver setup:                                                                                                                                                                                                                                                                                      | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Detector           | RBW                     | VBW              | Remark           |
|                                                                                                                                                                                                                                                                                                      | 9kHz- 30MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Quasi-peak         | 10kHz                   | 30kHz            | Quasi-peak Value |
|                                                                                                                                                                                                                                                                                                      | 30MHz-1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Quasi-peak         | 120kHz                  | 300kHz           | Quasi-peak Value |
|                                                                                                                                                                                                                                                                                                      | Above 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Peak               | 1MHz                    | 3MHz             | Peak Value       |
|                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | AV                 | 1MHz                    | 10Hz             | Average Value    |
| Remark: For the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission test in these three bands are based on measurements employing an average detector.                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                         |                  |                  |
| Limit:<br>(Spurious Emissions)                                                                                                                                                                                                                                                                       | <b>Limits for frequency below 30MHz</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                         |                  |                  |
|                                                                                                                                                                                                                                                                                                      | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Limit (uV/m)       | Measurement Distance(m) | Remark           |                  |
|                                                                                                                                                                                                                                                                                                      | 0.009-0.490                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2400/F(kHz)        | 300                     | Quasi-peak Value |                  |
|                                                                                                                                                                                                                                                                                                      | 0.490-1.705                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 24000/F(kHz)       | 30                      | Quasi-peak Value |                  |
|                                                                                                                                                                                                                                                                                                      | 1.705-30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 30                 | 30                      | Quasi-peak Value |                  |
|                                                                                                                                                                                                                                                                                                      | <b>Limits for frequency Above 30MHz</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                         |                  |                  |
|                                                                                                                                                                                                                                                                                                      | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Limit (dBuV/m @3m) | Remark                  |                  |                  |
|                                                                                                                                                                                                                                                                                                      | 30MHz-88MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 40.00              | Quasi-peak Value        |                  |                  |
|                                                                                                                                                                                                                                                                                                      | 88MHz-216MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 43.50              | Quasi-peak Value        |                  |                  |
|                                                                                                                                                                                                                                                                                                      | 216MHz-960MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 46.00              | Quasi-peak Value        |                  |                  |
|                                                                                                                                                                                                                                                                                                      | 960MHz-1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 54.00              | Quasi-peak Value        |                  |                  |
|                                                                                                                                                                                                                                                                                                      | Above 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 54.00              | Average Value           |                  |                  |
|                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 74.00              | Peak Value              |                  |                  |
| Remark: 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. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                         |                  |                  |
| Test Procedure:                                                                                                                                                                                                                                                                                      | <div>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div> <div>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</div> |                    |                         |                  |                  |

|                   |                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   | <p>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.</p> <p>7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.</p> |
| Test setup:       | <p>Below 30MHz</p>  <p>30MHz ~ 1000MHz</p>                                                                                                                                                                                              |
| Test Instruments: | Refer to section 6.0 for details                                                                                                                                                                                                                                                                                                                                                                             |
| Test mode:        | Refer to section 5.2 for details                                                                                                                                                                                                                                                                                                                                                                             |
| Test results:     | Pass                                                                                                                                                                                                                                                                                                                                                                                                         |

## Measurement data:

Note: Limit dBuV/m @3m = Limit dBuV/m @300m+ 80

Limit dBuV/m @3m = Limit dBuV/m @30m + 40

9 kHz~30 MHz

| Frequency | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (kHz)     | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 24.6000   | 38.65         | 20.15  | 58.80          | 139.34   | -80.54 | PK            |
| 24.6000   | 35.42         | 20.15  | 55.57          | 119.34   | -63.77 | AV            |
| 57.6500   | 48.95         | 20.33  | 69.28          | 132.29   | -63.01 | PK            |
| 57.6500   | 44.67         | 20.33  | 65.00          | 112.29   | -47.29 | AV            |
| 125.7000  | 67.36         | 20.55  | 87.91          | 125.63   | -37.72 | PK            |
| 125.7000  | 62.48         | 20.55  | 83.03          | 105.63   | -22.60 | AV            |
| 688.3500  | 30.25         | 20.64  | 50.89          | 70.85    | -19.96 | QP            |
| 968.6800  | 33.68         | 21.26  | 54.94          | 67.88    | -12.94 | QP            |
| 1232.4500 | 23.68         | 22.32  | 46.00          | 65.86    | -19.86 | QP            |

Note:

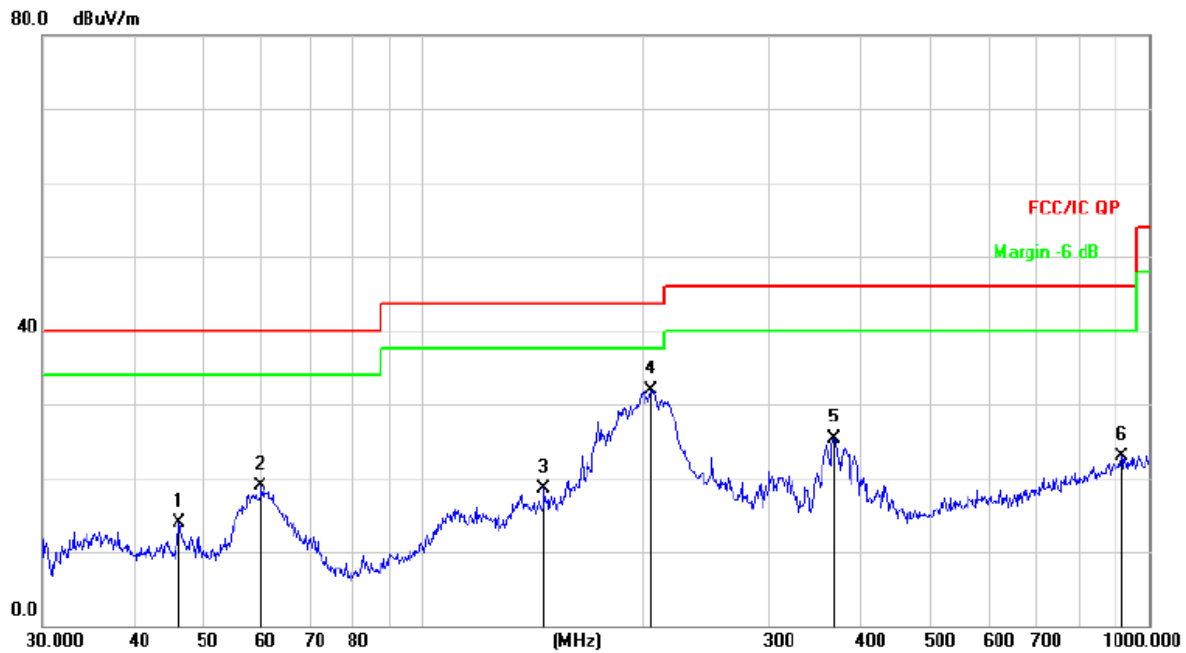
Pre-scan in the all of mode, the worst case in of was recorded.

Factor = antenna factor + cable loss – pre-amplifier.

Margin = Emission Level- Limit.

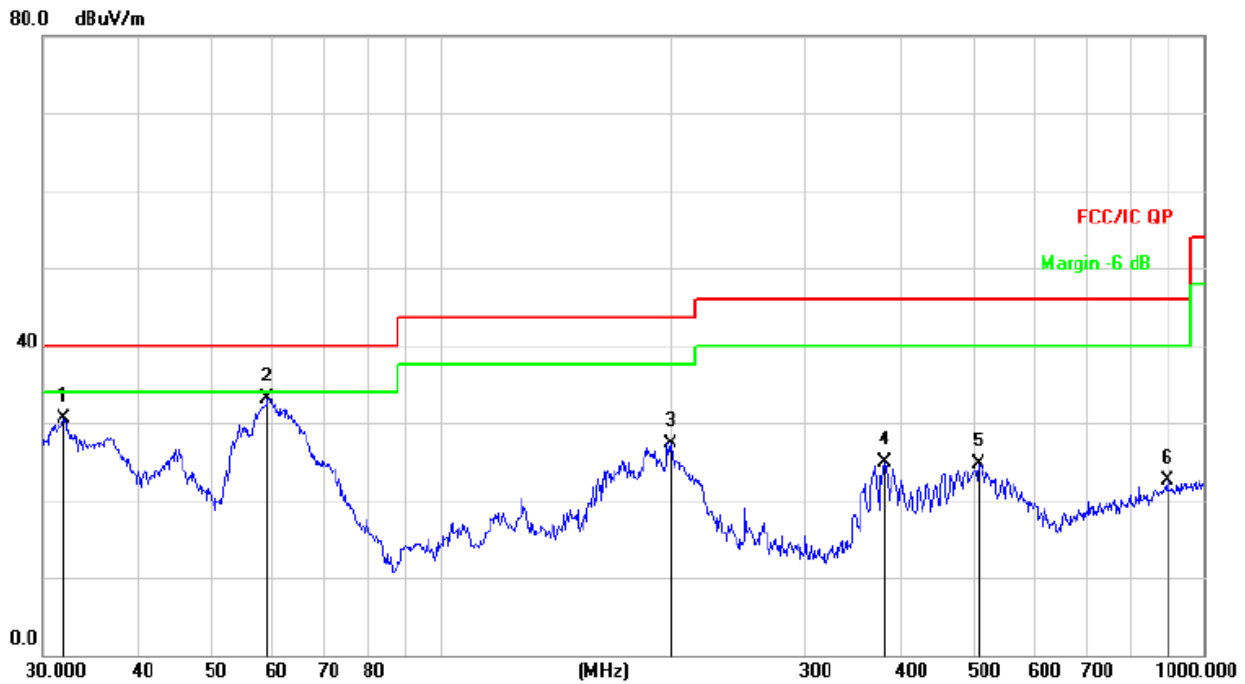
## 30MHz~1GHz

Horizontal



| No. | Mk. | Freq.    | Reading | Correct | Measure- | Limit | Over   |          |
|-----|-----|----------|---------|---------|----------|-------|--------|----------|
|     |     | MHz      | Level   | Factor  | ment     |       |        | Detector |
|     |     |          | dBuV    | dB      | dBuV/m   | dB/m  | dB     |          |
| 1   |     | 46.1779  | 28.93   | -15.06  | 13.87    | 40.00 | -26.13 | QP       |
| 2   |     | 59.8588  | 34.84   | -15.90  | 18.94    | 40.00 | -21.06 | QP       |
| 3   |     | 146.8877 | 37.76   | -19.30  | 18.46    | 43.50 | -25.04 | QP       |
| 4   | *   | 206.3976 | 48.14   | -16.15  | 31.99    | 43.50 | -11.51 | QP       |
| 5   |     | 368.1116 | 37.12   | -11.82  | 25.30    | 46.00 | -20.70 | QP       |
| 6   |     | 916.0687 | 24.30   | -1.37   | 22.93    | 46.00 | -23.07 | QP       |

## Vertical



| No. | Mk. | Freq.    | Reading | Correct | Measure- | Limit | Over   |          |
|-----|-----|----------|---------|---------|----------|-------|--------|----------|
|     |     | MHz      | Level   | Factor  | ment     |       |        | Detector |
|     |     |          | dBuV    | dB      | dBuV/m   | dB/m  | dB     |          |
| 1   |     | 31.9546  | 47.35   | -16.91  | 30.44    | 40.00 | -9.56  | QP       |
| 2   | *   | 59.0251  | 49.00   | -15.81  | 33.19    | 40.00 | -6.81  | QP       |
| 3   |     | 199.2855 | 43.74   | -16.35  | 27.39    | 43.50 | -16.11 | QP       |
| 4   |     | 379.9141 | 36.44   | -11.55  | 24.89    | 46.00 | -21.11 | QP       |
| 5   |     | 506.4791 | 33.39   | -8.78   | 24.61    | 46.00 | -21.39 | QP       |
| 6   |     | 893.8567 | 24.15   | -1.63   | 22.52    | 46.00 | -23.48 | QP       |

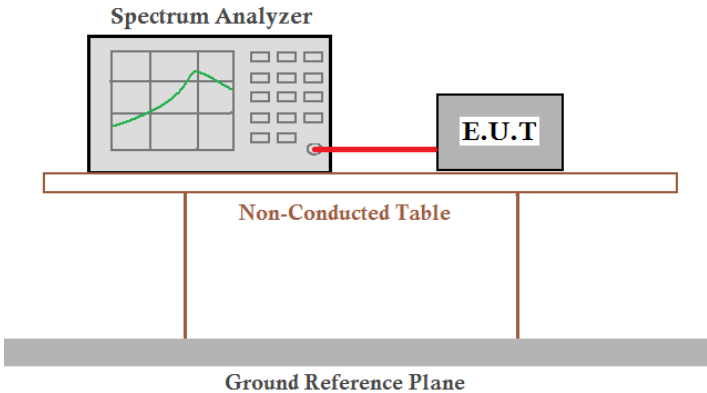
### Note:

Pre-scan in the all of mode, the worst case in of was recorded.

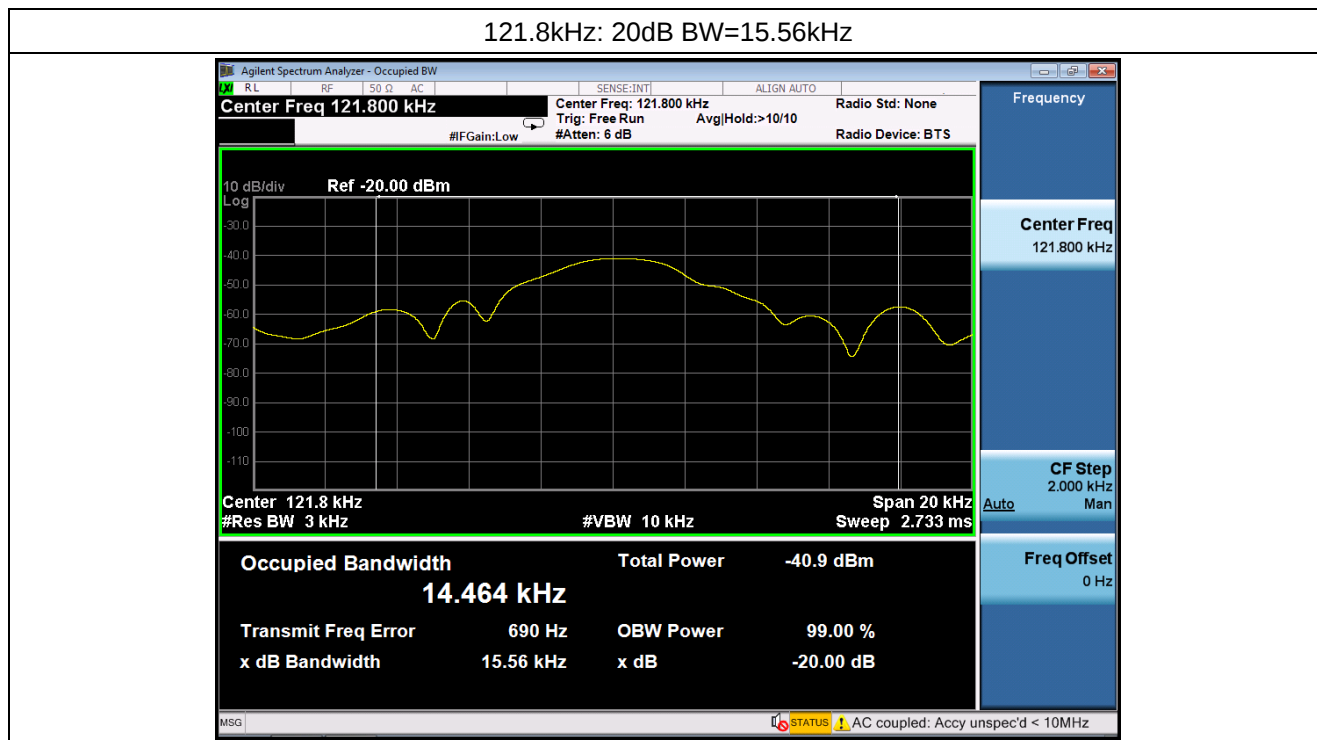
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Margin = Emission Level- Limit.

## 7.4 20dB Occupy Bandwidth

|                   |                                                                                                                                                                                                                                                                                                                |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 C Section 15.215                                                                                                                                                                                                                                                                                    |
| Test Method:      | ANSI C63.10:2013                                                                                                                                                                                                                                                                                               |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both 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



## 8 Test Setup Photo

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

## 9 EUT Constructional Details

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

-----End-----