



# FCC TEST REPORT

## FCC ID:2BATZ-M16

**Report Number**..... : ZKT-2501020123E

**Date of Test**..... Jan. 02, 2025 to Jan. 10, 2025

**Date of issue**..... : Jan. 10, 2025

**Total number of pages**..... 30

**Test Result** ..... : PASS

**Testing Laboratory**..... : Shenzhen ZKT Technology Co., Ltd.

**Address** ..... : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

**Applicant's name** ..... : Shenzhen Smooth Wireless Intelligent Manufacturing Co., Ltd.

**Address** ..... : 201, Building A, Zhuoke Science Park, 190 Chongqing Road, Zhancheng Community, Fuhai Street, Baoan District, Shenzhen

**Manufacturer's name** ..... : Shenzhen Smooth Wireless Intelligent Manufacturing Co., Ltd.

**Address** ..... : 201, Building A, Zhuoke Science Park, 190 Chongqing Road, Zhancheng Community, Fuhai Street, Baoan District, Shenzhen

### Test specification:

**Standard**..... : FCC CFR Title 47 Part 15 Subpart C

**Test procedure**..... : /

**Non-standard test method** ..... : N/A

**Test Report Form No**..... : TRF-EL-107\_V0

**Test Report Form(s) Originator**..... : ZKT Testing

**Master TRF** ..... : Dated: 2020-01-06

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of ZKT, this document may be altered or revised by ZKT, personal only, and shall be noted in the revision of the document.

**Product name**..... : Wireless charger

**Trademark** ..... : N/A

**Model/Type reference**..... : M16  
M18, CT19, CT20, CT25, CT30

**Ratings**..... : Input: 9V $\overline{\text{---}}$ 2A, 12V $\overline{\text{---}}$ 2A  
Wireless Output : 15W Max(Wireless Phone), 5W Max(TWS), 2.5W Max (iWatch)



**Testing procedure and testing location:**

**Testing Laboratory.....: Shenzhen ZKT Technology Co., Ltd.**

**Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China**

**Tested by (name + signature).....: Jim Liu**

*Jim Liu*

**Reviewer (name + signature).....: Jackson Fang**

*Jackson Fang*

**Approved (name + signature).....: Lake Xie**





## TABLE OF CONTENTS

|                                                   |           |
|---------------------------------------------------|-----------|
| <b>1. VERSION</b>                                 | <b>4</b>  |
| <b>2. TEST SUMMARY</b>                            | <b>5</b>  |
| 2.1 TEST FACILITY                                 | 6         |
| 2.2 MEASUREMENT UNCERTAINTY                       | 6         |
| <b>3. GENERAL INFORMATION</b>                     | <b>7</b>  |
| 3.1 GENERAL DESCRIPTION OF EUT                    | 7         |
| 3.2 Test mode                                     | 8         |
| 3.3 Block Diagram of EUT Configuration            | 9         |
| 3.4 Test Conditions                               | 9         |
| 3.5 Description Of Support Units (Conducted Mode) | 9         |
| 3.6 EQUIPMENTS LIST FOR ALL TEST ITEMS            | 10        |
| <b>4. CONDUCTED EMISSION TEST</b>                 | <b>12</b> |
| 4.1 CONDUCTED EMISSION MEASUREMENT                | 12        |
| 4.1.1 POWER LINE CONDUCTED EMISSION Limits        | 12        |
| 4.1.2 TEST PROCEDURE                              | 12        |
| 4.1.3 DEVIATION FROM TEST STANDARD                | 12        |
| 4.1.4 TEST SETUP                                  | 13        |
| 4.1.5 EUT OPERATING CONDITIONS                    | 13        |
| 4.1.6 Test Result                                 | 14        |
| <b>5. RADIATED EMISSION MEASUREMENT</b>           | <b>16</b> |
| 5.1 Radiated Emission Limits                      | 16        |
| 5.2 Anechoic Chamber Test Setup Diagram           | 17        |
| 5.3 Test Procedure                                | 17        |
| 5.4 DEVIATION FROM TEST STANDARD                  | 17        |
| 5.5 Test Result                                   | 18        |
| <b>6. 20DB BANDWIDTH TEST</b>                     | <b>24</b> |
| <b>7. ANTENNA REQUIREMENT</b>                     | <b>27</b> |
| <b>8. TEST SETUP PHOTO</b>                        | <b>28</b> |
| <b>9. EUT CONSTRUCTIONAL DETAILS</b>              | <b>28</b> |



1. VERSION

| Report No.      | Version | Description             | Approved      |
|-----------------|---------|-------------------------|---------------|
| ZKT-2501020123E | Rev.01  | Initial issue of report | Jan. 10, 2025 |
|                 |         |                         |               |



## 2. 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   |

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report



## 2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.  
Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225  
Designation Number: CN1299  
IC Registered No.: 27033  
CAB identifier: CN0110

## 2.2 MEASUREMENT UNCERTAINTY

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

| No. | Item                                              | Uncertainty |
|-----|---------------------------------------------------|-------------|
| 1   | 3m camber Radiated spurious emission(9KHz-30MHz)  | U=4.5dB     |
| 2   | 3m camber Radiated spurious emission(30MHz-1GHz)  | U=4.8dB     |
| 3   | 3m chamber Radiated spurious emission(1GHz-6GHz)  | U=4.9dB     |
| 4   | 3m chamber Radiated spurious emission(6GHz-40GHz) | U=5.0dB     |
| 5   | Conducted disturbance                             | U=3.2dB     |
| 6   | RF conducted Spurious Emission                    | U=2.2dB     |
| 7   | RF Occupied Bandwidth                             | U=1.8MHz    |
| 8   | humidity uncertainty                              | U=5.3%      |
| 9   | Temperature uncertainty                           | U=0.59℃     |



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                      |                                                                                                                                                      |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name:        | Wireless charger                                                                                                                                     |
| Model No.:           | M16<br>M18, CT19, CT20, CT25, CT30                                                                                                                   |
| Serial No.:          | N/A                                                                                                                                                  |
| Model Difference:    | Only for different model name                                                                                                                        |
| Hardware version:    | H 1.0                                                                                                                                                |
| Software version:    | V 1.1                                                                                                                                                |
| Operation Frequency: | ANT 1&2: 115kHz~205kHz<br>ANT 3: 260kHz~350kHz                                                                                                       |
| Modulation type:     | ASK                                                                                                                                                  |
| Antenna Type:        | ANT 1&2&3: Loop Coil Antenna                                                                                                                         |
| Antenna gain:        | ANT 1&2&3: 0dBi                                                                                                                                      |
| Ratings:             | Input: 9V $\overline{\text{---}}$ 2A, 12V $\overline{\text{---}}$ 2A<br>Wireless Output : 15W Max(Wireless Phone), 5W Max(TWS),<br>2.5W Max (iWatch) |
| Transmitting mode    | Keep the EUT in continuously wireless charging mode                                                                                                  |



### 3.2 Test mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

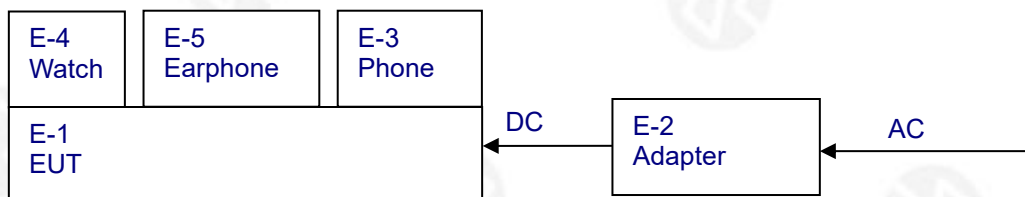
| Test Modes: | Test Coil                         | Description:                                                          |
|-------------|-----------------------------------|-----------------------------------------------------------------------|
| Mode 1      | ANT 1                             | AC/DC Adapter + EUT + Earphone (Battery Status: <1%)                  |
| Mode 2      |                                   | AC/DC Adapter + EUT + Earphone (Battery Status: 50%)                  |
| Mode 3      |                                   | AC/DC Adapter + EUT + Earphone (Battery Status: >98%)                 |
| Mode 4      | ANT 2                             | AC/DC Adapter + EUT + Phone (Battery Status: <1%)                     |
| Mode 5      |                                   | AC/DC Adapter + EUT + Phone (Battery Status: 50%)                     |
| Mode 6      |                                   | AC/DC Adapter + EUT + Phone (Battery Status: >98%)                    |
| Mode 7      | ANT 3                             | AC/DC Adapter + EUT + Phone (Battery Status: <1%)                     |
| Mode 8      |                                   | AC/DC Adapter + EUT + Phone (Battery Status: 50%)                     |
| Mode 9      |                                   | AC/DC Adapter + EUT + Phone (Battery Status: >98%)                    |
| Mode 10     | ANT 1<br>+<br>ANT 2<br>+<br>ANT 3 | AC/DC Adapter + EUT + Phone + Earphone + Watch (Battery Status: <1%)  |
| Mode 11     |                                   | AC/DC Adapter + EUT + Phone + Earphone + Watch (Battery Status: 50%)  |
| Mode 12     |                                   | AC/DC Adapter + EUT + Phone + Earphone + Watch (Battery Status: >98%) |



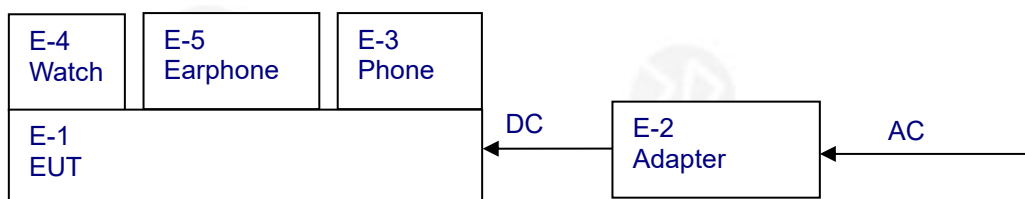


### 3.3 Block Diagram of EUT Configuration

#### Conducted Emission



#### Radiated Emission



### 3.4 Test Conditions

Temperature: 23~26℃

Relative Humidity: 54~63 %

### 3.5 Description Of Support Units (Conducted Mode)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment        | Mfr/Brand | Model/Type No. | Series No. | Note      |
|------|------------------|-----------|----------------|------------|-----------|
| E-1  | Wireless charger | N/A       | M16            | N/A        | EUT       |
| E-2  | Wall Charger     | N/A       | CA-15T         | N/A        | Auxiliary |
| E-3  | Phone            | Apple     | iPhone 13      | N/A        | Auxiliary |
| E-4  | Watch            | Apple     | iWatch S2      | N/A        | Auxiliary |
| E-5  | Earphone         | Apple     | AirPods 2      | N/A        | Auxiliary |

| Item | Shielded Type | Ferite Core | Length | Note                |
|------|---------------|-------------|--------|---------------------|
| C1   | NO            | NO          | 0.8M   | DC cable unshielded |
|      |               |             |        |                     |

#### Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.



### 3.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

#### Conduction Emissions Test

| Item | Kind of Equipment | Manufacturer | Type No. | Serial No.        | Firmware Version | Last calibration | Calibrated until |
|------|-------------------|--------------|----------|-------------------|------------------|------------------|------------------|
| 1    | LISN              | R&S          | ENV216   | 101471            | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 2    | LISN              | CYBERTEK     | EM5040A  | E1850400149       | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 3    | Test Cable        | N/A          | C-01     | N/A               | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 4    | EMI Test Receiver | R&S          | ESCI3    | 101393            | 4.42 SP3         | Sep. 29, 2024    | Sep. 28, 2025    |
| 5    | EMC Software      | Frad         | EZ-EMC   | Ver.EMC-CON 3A1.1 | N/A              | \                | \                |

#### Radiation Emissions & Radiation Spurious Emissions Test

| Item | Equipment                         | Manufacturer   | Type No.        | Serial No.         | Firmware Version | Last calibration | Calibrated until |
|------|-----------------------------------|----------------|-----------------|--------------------|------------------|------------------|------------------|
| 1    | Spectrum Analyzer (9kHz-26.5GHz)  | KEYSIGHT       | N9020A          | MY55370835         | A.17.05          | Sep. 29, 2024    | Sep. 28, 2025    |
| 2    | Spectrum Analyzer (10kHz-39.9GHz) | R&S            | FSV40-N         | 100363             | 1.71 SP2         | Sep. 30, 2024    | Sep. 29, 2025    |
| 3    | EMI Test Receiver (9kHz-7GHz)     | R&S            | ESCI7           | 100969             | 4.32             | Sep. 29, 2024    | Sep. 28, 2025    |
| 4    | Bilog Antenna (30MHz-1500MHz)     | Schwarzbeck    | VULB9168        | 00877              | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 5    | Horn Antenna (1GHz-18GHz)         | Agilent        | AH-118          | 071145             | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 6    | Horn Antenna (15GHz-40GHz)        | A.H.System     | SAS-574         | 588                | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 7    | Loop Antenna                      | TESEQ          | HLA6121         | 58357              | N/A              | Oct. 11, 2024    | Oct. 10, 2025    |
| 8    | Amplifier (30-1000MHz)            | EM Electronics | EM330 Amplifier | 60747              | N/A              | Sep. 29, 2024    | Sep. 28, 2025    |
| 9    | Amplifier (1GHz-26.5GHz)          | HuiPu          | 8449B           | 3008A00315         | N/A              | Sep. 29, 2024    | Sep. 28, 2025    |
| 10   | Amplifier (500MHz-40GHz)          | QuanJuDa       | DLE-161         | 097                | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 11   | Test Cable                        | N/A            | R-01            | N/A                | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 12   | Test Cable                        | N/A            | R-02            | N/A                | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 13   | Test Cable                        | N/A            | R-03            | N/A                | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 14   | D.C. Power Supply                 | LongWei        | TPR-6405D       | GQ7516             | N/A              | Sep. 29, 2024    | Sep. 28, 2025    |
| 15   | EMC Software                      | Frad           | EZ-EMC          | Ver.EMC-CO N 3A1.1 | N/A              | \                | \                |
| 16   | Turntable                         | MF             | MF-7802BS       | N/A                | N/A              | \                | \                |
| 17   | Antenna tower                     | MF             | MF-7802BS       | N/A                | N/A              | \                | \                |



RF Conducted Test

| Item | Equipment                         | Manufacturer                | Type No.    | Serial No. | Firmware Version | Last calibration | Calibrated until |
|------|-----------------------------------|-----------------------------|-------------|------------|------------------|------------------|------------------|
| 1    | Spectrum Analyzer (9kHz-26.5GHz)  | KEYSIGHT                    | N9020A      | MY55370835 | A.17.05          | Sep. 29, 2024    | Sep. 28, 2025    |
| 2    | Spectrum Analyzer (10kHz-39.9GHz) | R&S                         | FSV40-N     | 100363     | 1.71 SP2         | Sep. 30, 2024    | Sep. 29, 2025    |
| 3    | Test Cable                        | N/A                         | RF-01       | N/A        | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 4    | Test Cable                        | N/A                         | RF-02       | N/A        | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 5    | Test Cable                        | N/A                         | RF-03       | N/A        | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 6    | ESG Signal Generator              | Agilent                     | E4421B      | GB40051203 | B.03.84          | Sep. 29, 2024    | Sep. 28, 2025    |
| 7    | Signal Generator                  | Agilent                     | N5182A      | MY47420215 | A.01.87          | Sep. 29, 2024    | Sep. 28, 2025    |
| 8    | Magnetic Field Probe Tester       | Narda                       | ELT-400     | 0-0344     | N/A              | Sep. 29, 2024    | Sep. 28, 2025    |
| 9    | Van der Hoofden measuring head    | Schwarzbeck Mess-elektronik | VDHH 9502   | 9502-039   | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 10   | Wideband Radio Communication Test | R&S                         | CMW500      | 106504     | V 3.7.22         | Sep. 30, 2024    | Sep. 29, 2025    |
| 11   | MWRF Power Meter Test system      | MW                          | MW100-RF CB | 10371      | N/A              | Sep. 29, 2024    | Sep. 28, 2025    |
| 12   | Power Meter                       | KEYSIGHT                    | N1912AP     | 926431     | A.05.00          | Sep. 29, 2024    | Sep. 28, 2025    |
| 13   | D.C. Power Supply                 | LongWei                     | TPR-6405D   | GQ7516     | N/A              | Sep. 29, 2024    | Sep. 28, 2025    |
| 14   | RF Software                       | MW                          | MTS8310     | V2.0.0.0   | N/A              | \                | \                |



#### 4. CONDUCTED EMISSION TEST

##### 4.1 CONDUCTED EMISSION MEASUREMENT

|                       |                                      |
|-----------------------|--------------------------------------|
| 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 |

##### 4.1.1 POWER LINE CONDUCTED EMISSION Limits

| FREQUENCY (MHz) | Limit (dBuV) |           | Standard |
|-----------------|--------------|-----------|----------|
|                 | Quas-peak    | Average   |          |
| 0.15 -0.5       | 66 - 56 *    | 56 - 46 * | FCC      |
| 0.50 -5.0       | 56.00        | 46.00     | FCC      |
| 5.0 -30.0       | 60.00        | 50.00     | FCC      |

Note:

(1) \*Decreases with the logarithm of the frequency.

##### 4.1.2 TEST PROCEDURE

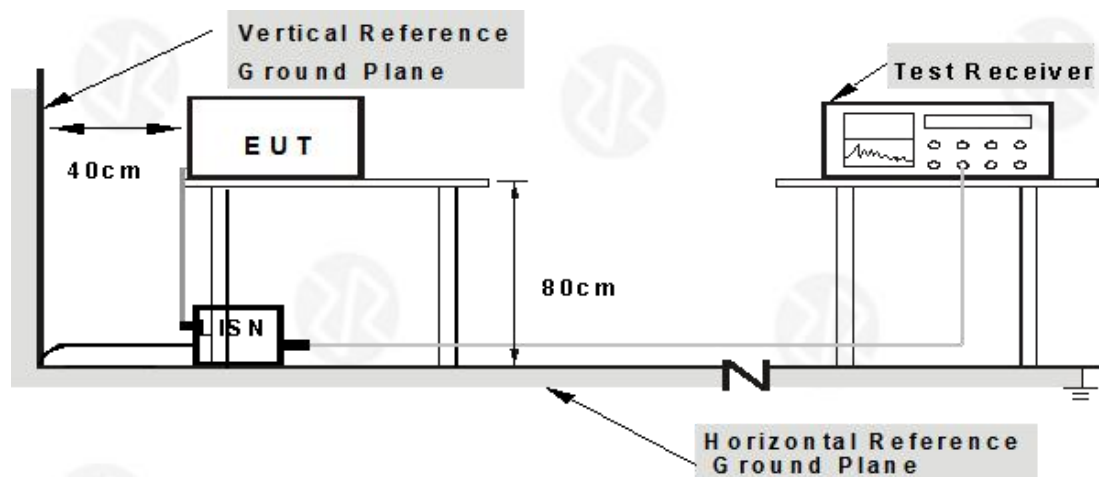
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

##### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation



#### 4.1.4 TEST SETUP



- Note:**
- 1.Support units were connected to second LISN.
  - 2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

#### 4.1.5 EUT OPERATING CONDITIONS

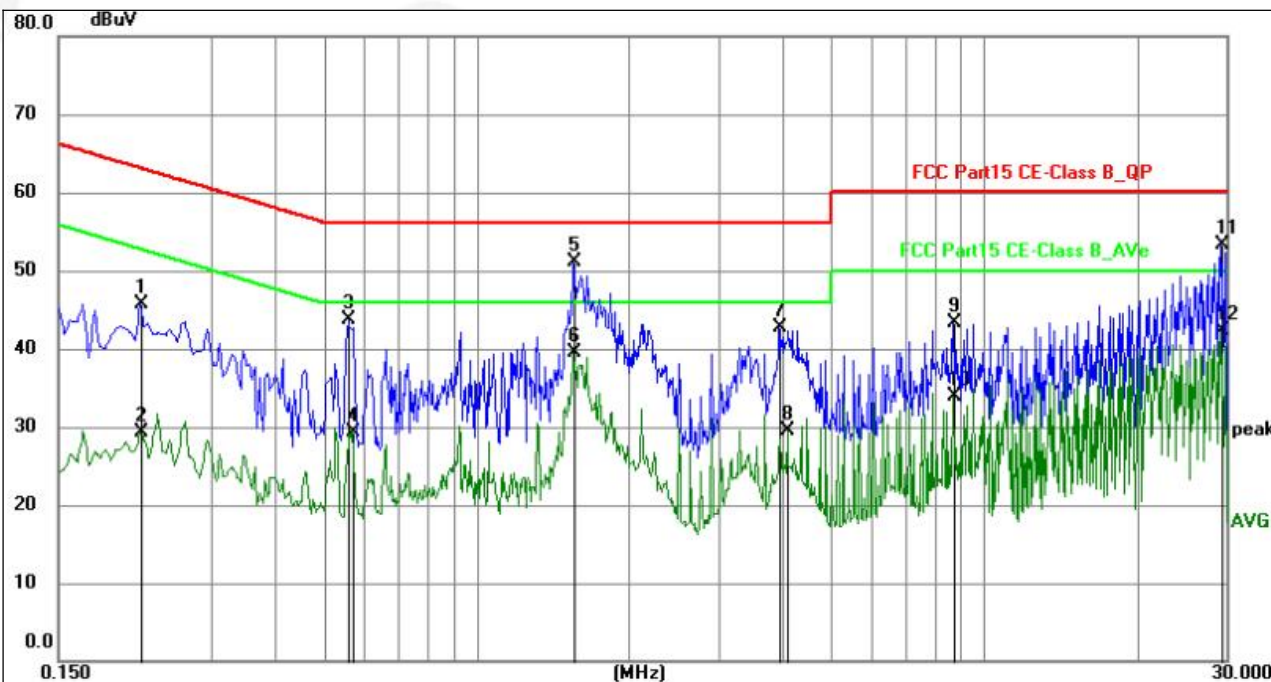
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.





#### 4.1.6 Test Result

|                |              |                    |         |
|----------------|--------------|--------------------|---------|
| Temperature:   | 26℃          | Relative Humidity: | 54%     |
| Pressure:      | 101kPa       | Phase :            | L       |
| Test Voltage : | AC 120V/60Hz | Test Mode:         | Mode 10 |



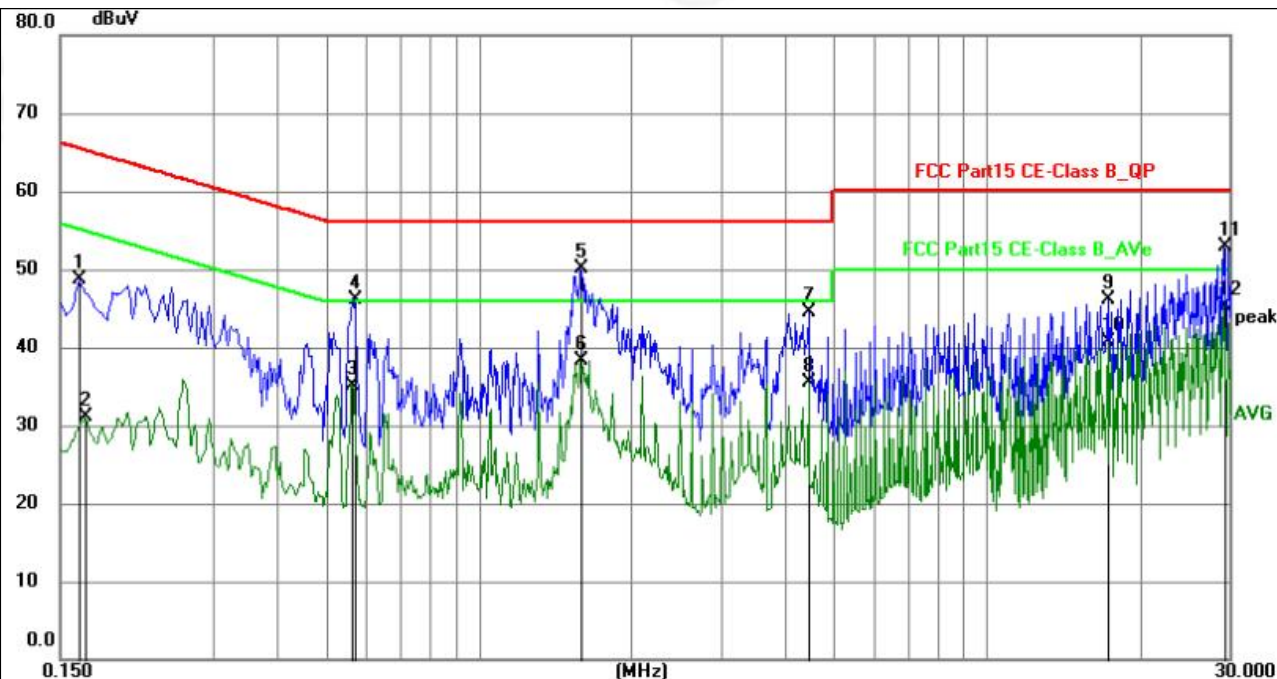
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1   | 0.2174          | 25.40          | 20.37       | 45.77        | 62.92        | -17.15      | QP       | P   |        |
| 2   | 0.2174          | 8.97           | 20.37       | 29.34        | 52.92        | -23.58      | AVG      | P   |        |
| 3   | 0.5594          | 23.44          | 20.30       | 43.74        | 56.00        | -12.26      | QP       | P   |        |
| 4   | 0.5684          | 9.10           | 20.30       | 29.40        | 46.00        | -16.60      | AVG      | P   |        |
| 5   | 1.5584          | 30.73          | 20.30       | 51.03        | 56.00        | -4.97       | QP       | P   |        |
| 6   | 1.5584          | 19.21          | 20.30       | 39.51        | 46.00        | -6.49       | AVG      | P   |        |
| 7   | 3.9615          | 22.37          | 20.33       | 42.70        | 56.00        | -13.30      | QP       | P   |        |
| 8   | 4.0964          | 9.10           | 20.34       | 29.44        | 46.00        | -16.56      | AVG      | P   |        |
| 9   | 8.7270          | 22.87          | 20.44       | 43.31        | 60.00        | -16.69      | QP       | P   |        |
| 10  | 8.7270          | 13.52          | 20.44       | 33.96        | 50.00        | -16.04      | AVG      | P   |        |
| 11  | 29.3505         | 32.52          | 20.77       | 53.29        | 60.00        | -6.71       | QP       | P   |        |
| 12  | 29.3505         | 21.44          | 20.77       | 42.21        | 50.00        | -7.79       | AVG      | P   |        |

#### 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 = Reading level + Correct Factor.
4. Correct Factor = Liss factor+ Cable loss factor + limiter factor.
5. Margin = Measurement Level-Limit.
6. All test modes were tested, with only the worst Mode 10 recorded.



|                |              |                    |         |
|----------------|--------------|--------------------|---------|
| Temperature:   | 26℃          | Relative Humidity: | 54%     |
| Pressure:      | 101kPa       | Phase :            | N       |
| Test Voltage : | AC 120V/60Hz | Test Mode:         | Mode 10 |



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1   | 0.1635          | 28.51          | 20.23       | 48.74        | 65.28        | -16.54      | QP       | P   |        |
| 2   | 0.1680          | 10.81          | 20.25       | 31.06        | 55.06        | -24.00      | AVG      | P   |        |
| 3   | 0.5637          | 14.91          | 20.29       | 35.20        | 46.00        | -10.80      | AVG      | P   |        |
| 4   | 0.5684          | 25.91          | 20.29       | 46.20        | 56.00        | -9.80       | QP       | P   |        |
| 5   | 1.5852          | 29.77          | 20.30       | 50.07        | 56.00        | -5.93       | QP       | P   |        |
| 6   | 1.5852          | 17.99          | 20.30       | 38.29        | 46.00        | -7.71       | AVG      | P   |        |
| 7   | 4.4699          | 24.10          | 20.35       | 44.45        | 56.00        | -11.55      | QP       | P   |        |
| 8   | 4.4699          | 15.21          | 20.35       | 35.56        | 46.00        | -10.44      | AVG      | P   |        |
| 9   | 17.3535         | 25.51          | 20.50       | 46.01        | 60.00        | -13.99      | QP       | P   |        |
| 10  | 17.3535         | 20.20          | 20.50       | 40.70        | 50.00        | -9.30       | AVG      | P   |        |
| 11  | 29.3460         | 32.17          | 20.73       | 52.90        | 60.00        | -7.10       | QP       | P   |        |
| 12  | 29.3460         | 24.54          | 20.73       | 45.27        | 50.00        | -4.73       | AVG      | P   |        |

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 = Reading level + Correct Factor.
4. Correct Factor = Lisen factor+ Cable loss factor + limiter factor.
5. Margin = Measurement Level-Limit.
6. All test modes were tested, with only the worst Mode 10 recorded.



## 5. RADIATED EMISSION MEASUREMENT

|                       |                             |            |        |        |            |
|-----------------------|-----------------------------|------------|--------|--------|------------|
| 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    | Value      |
|                       | 9KHz-150KHz                 | Quasi-peak | 200Hz  | 600Hz  | Quasi-peak |
|                       | 150KHz-30MHz                | Quasi-peak | 9KHz   | 30KHz  | Quasi-peak |
|                       | 30MHz-1GHz                  | Quasi-peak | 100KHz | 300KHz | Quasi-peak |
|                       | Above 1GHz                  | Peak       | 1MHz   | 3MHz   | Peak       |
|                       |                             | Peak       | 1MHz   | 10Hz   | Average    |

### 5.1 Radiated Emission Limits

#### Limits for frequency below 30MHz

| 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 |

#### Limits for frequency Above 30MHz

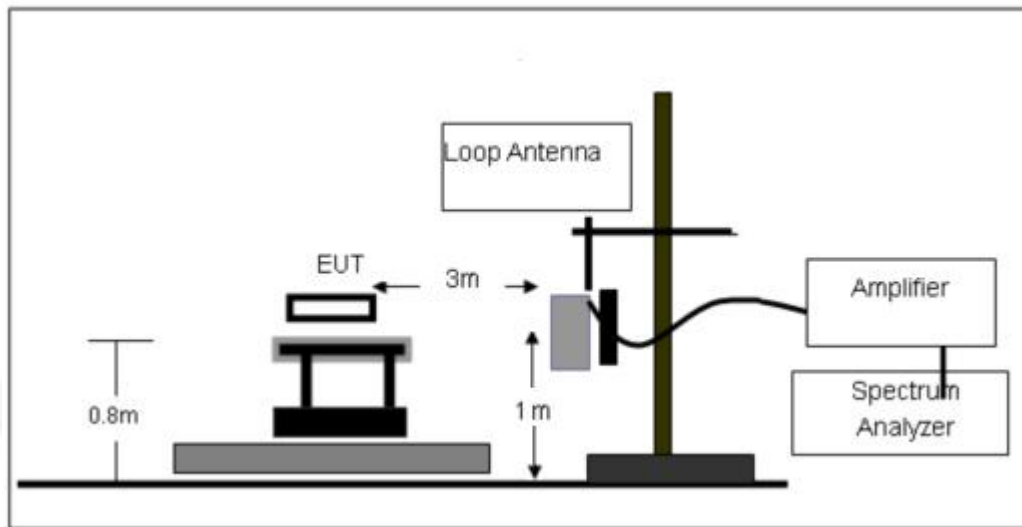
| Frequency     | Limit (dBuV/m @3m) | Remark           |
|---------------|--------------------|------------------|
| 30MHz-88MHz   | 40.00              | Quasi-peak Value |
| 88MHz-216MHz  | 43.50              | Quasi-peak Value |
| 216MHz-960MHz | 46.00              | Quasi-peak Value |
| 960MHz-1GHz   | 54.00              | Quasi-peak Value |
| Above 1GHz    | 54.00              | Average Value    |
|               | 74.00              | Peak Value       |



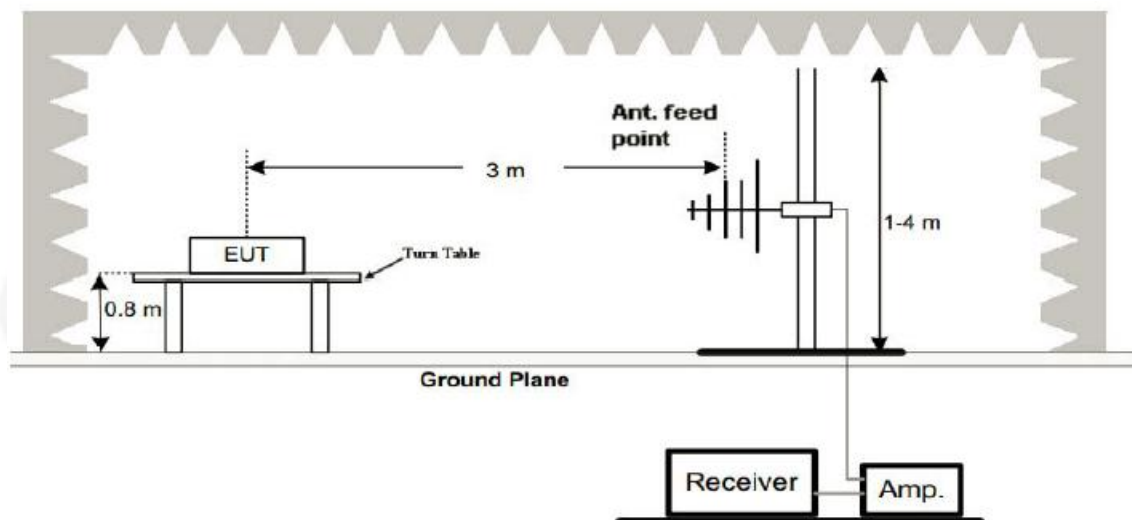


## 5.2 Anechoic Chamber Test Setup Diagram

### (A) Radiated Emission Test-Up Frequency Below 30MHz



### (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209 and FCC 15.205 limits.

## 5.3 Test Procedure

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna (calibrated by dipole antenna) are used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on measurement.

## 5.4 DEVIATION FROM TEST STANDARD

No deviation



## 5.5 Test Result

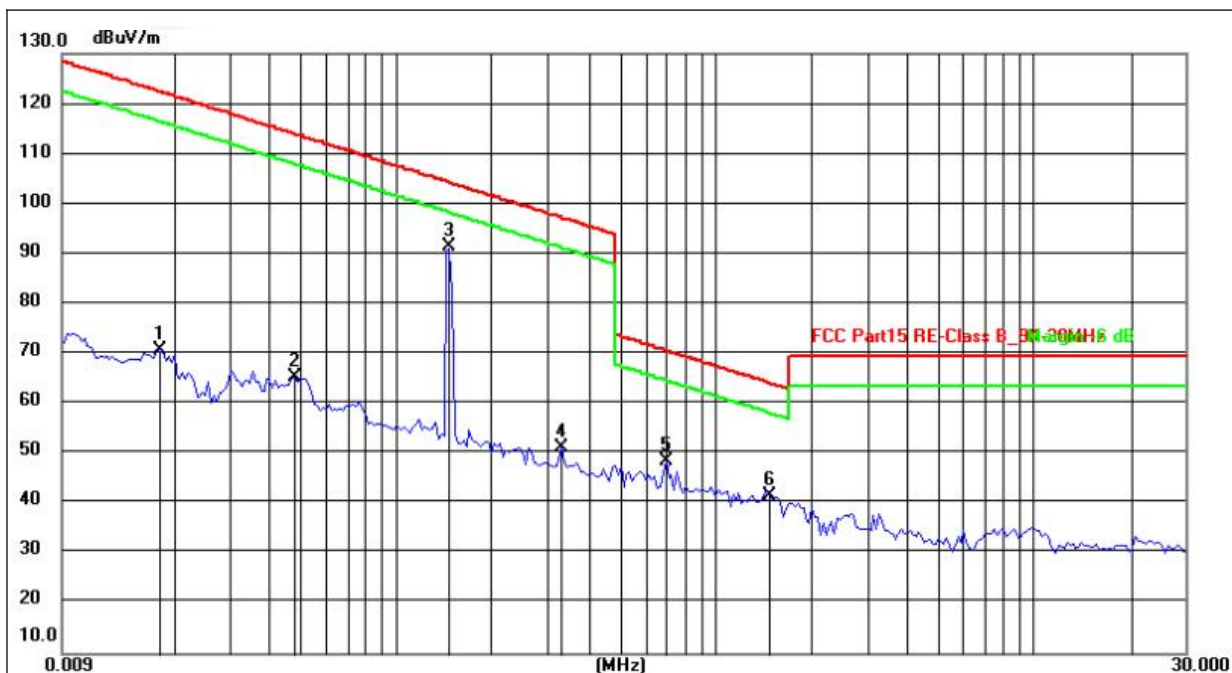
### Measurement data:

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

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

9 kHz~30 MHz:

|               |         |                    |         |
|---------------|---------|--------------------|---------|
| Temperature:  | 26°C    | Relative Humidity: | 54%     |
| Pressure:     | 101 kPa | Polarization:      | coaxial |
| Test Voltage: | DC 12V  | Test Mode:         | Mode 1  |



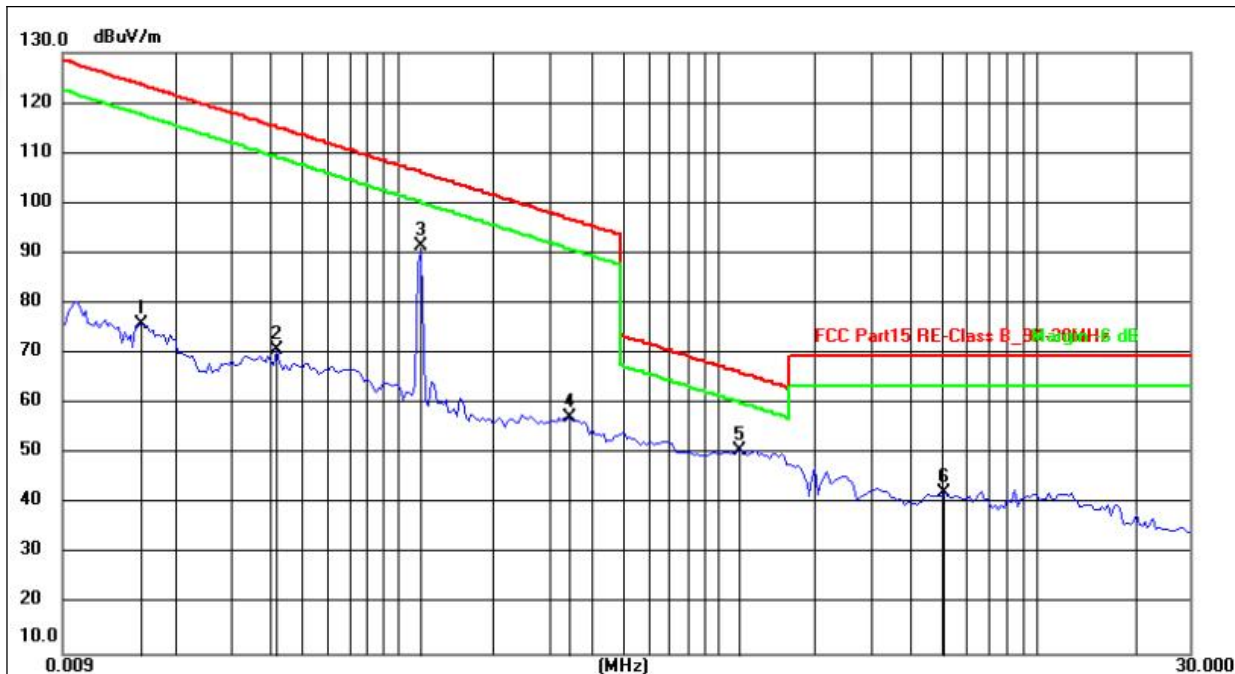
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 0.0183          | 50.25          | 20.47         | 70.72          | 122.36         | -51.64      | peak     |
| 2   | 0.0483          | 45.43          | 19.79         | 65.22          | 113.93         | -48.71      | peak     |
| 3   | 0.1467          | 71.39          | 20.04         | 91.43          | 104.28         | -12.85      | peak     |
| 4   | 0.3326          | 31.09          | 20.13         | 51.22          | 97.17          | -45.95      | peak     |
| 5   | 0.7043          | 28.25          | 20.38         | 48.63          | 70.65          | -22.02      | peak     |
| 6   | 1.4916          | 21.68          | 19.88         | 41.56          | 64.13          | -22.57      | peak     |

### Remarks:

1. An initial pre-scan was performed on the peak detector.
2. Quasi-Peak measurement were performed at the frequencies with maximized peak emission.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Final Level = Reading level + Correct Factor.
5. Correct Factor = Antenna factor+ Cable loss factor - Amplifier factor.
6. Margin= Measurement Level-Limit.



|               |         |                    |         |
|---------------|---------|--------------------|---------|
| Temperature:  | 26°C    | Relative Humidity: | 54%     |
| Pressure:     | 101 kPa | Polarization:      | coaxial |
| Test Voltage: | DC 12V  | Test Mode:         | Mode 4  |



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 0.0158          | 55.25          | 20.49         | 75.74          | 123.63         | -47.89      | peak     |
| 2   | 0.0420          | 50.83          | 19.94         | 70.77          | 115.14         | -44.37      | peak     |
| 3   | 0.1171          | 71.70          | 19.86         | 91.56          | 106.23         | -14.67      | peak     |
| 4   | 0.3462          | 37.20          | 20.14         | 57.34          | 96.82          | -39.48      | peak     |
| 5   | 1.1693          | 30.85          | 19.93         | 50.78          | 66.25          | -15.47      | peak     |
| 6   | 5.1391          | 22.68          | 19.45         | 42.13          | 69.54          | -27.41      | peak     |

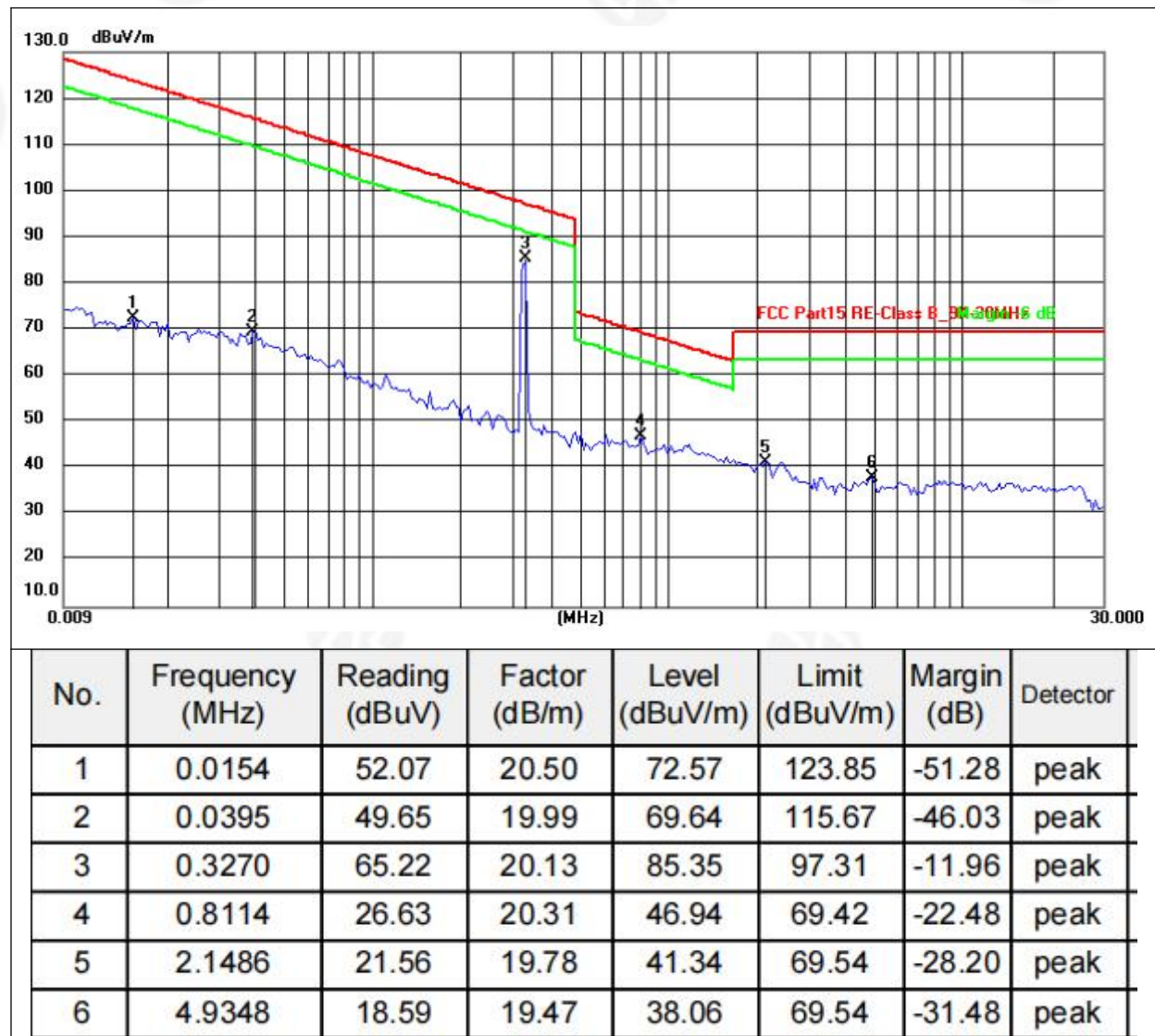
Remarks:

1. An initial pre-scan was performed on the peak detector.
2. Quasi-Peak measurement were performed at the frequencies with maximized peak emission.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Final Level = Reading level + Correct Factor.
5. Correct Factor = Antenna factor+ Cable loss factor - Amplifier factor.
6. Margin= Measurement Level-Limit.





|               |         |                    |         |
|---------------|---------|--------------------|---------|
| Temperature:  | 26°C    | Relative Humidity: | 54%     |
| Pressure:     | 101 kPa | Polarization:      | coaxial |
| Test Voltage: | DC 12V  | Test Mode:         | Mode 7  |

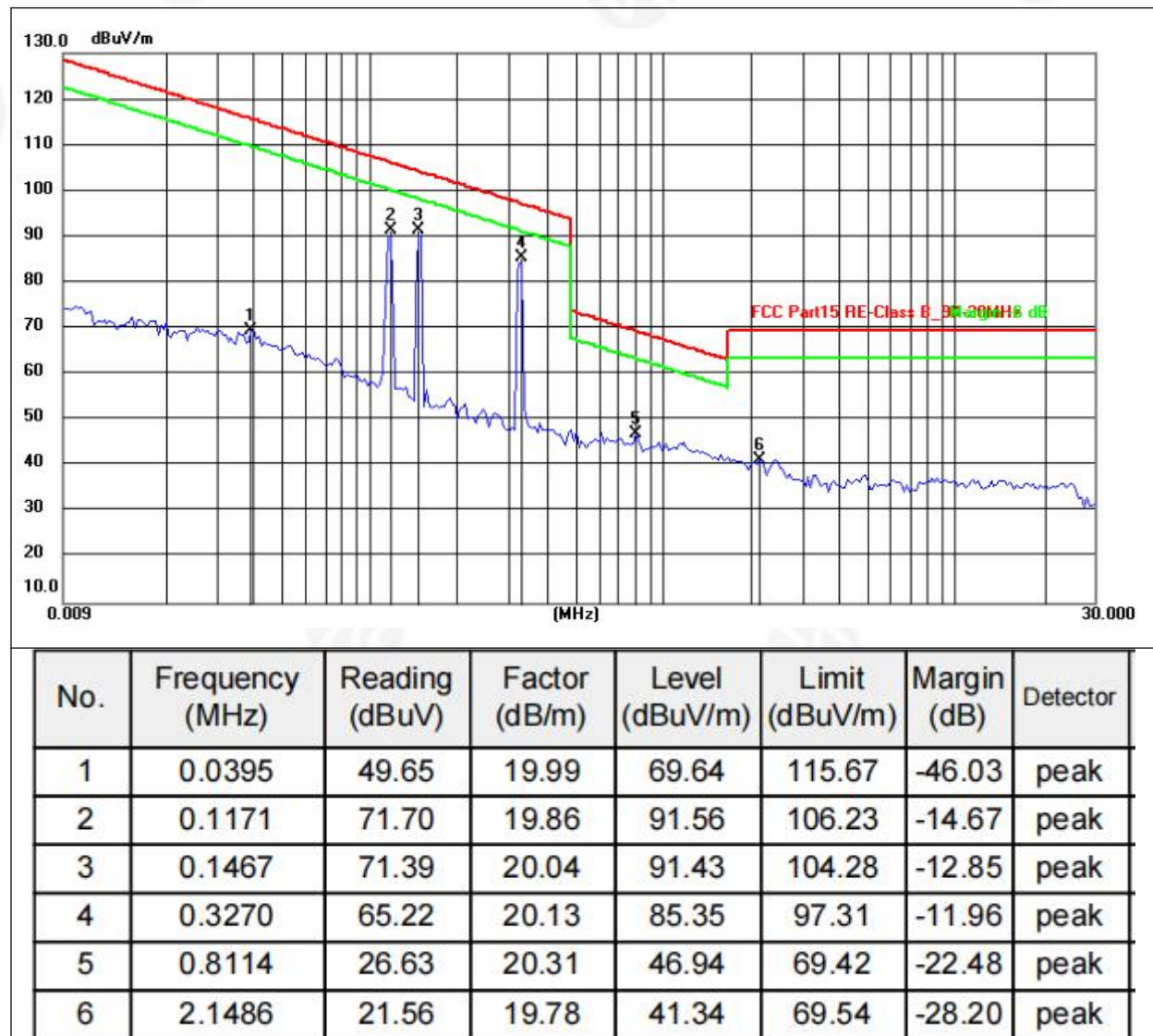


Remarks:

1. An initial pre-scan was performed on the peak detector.
2. Quasi-Peak measurement were performed at the frequencies with maximized peak emission.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Final Level = Reading level + Correct Factor.
5. Correct Factor = Antenna factor+ Cable loss factor - Amplifier factor.
6. Margin= Measurement Level-Limit.



|               |         |                    |         |
|---------------|---------|--------------------|---------|
| Temperature:  | 26℃     | Relative Humidity: | 54%     |
| Pressure:     | 101 kPa | Polarization:      | coaxial |
| Test Voltage: | DC 12V  | Test Mode:         | Mode 10 |



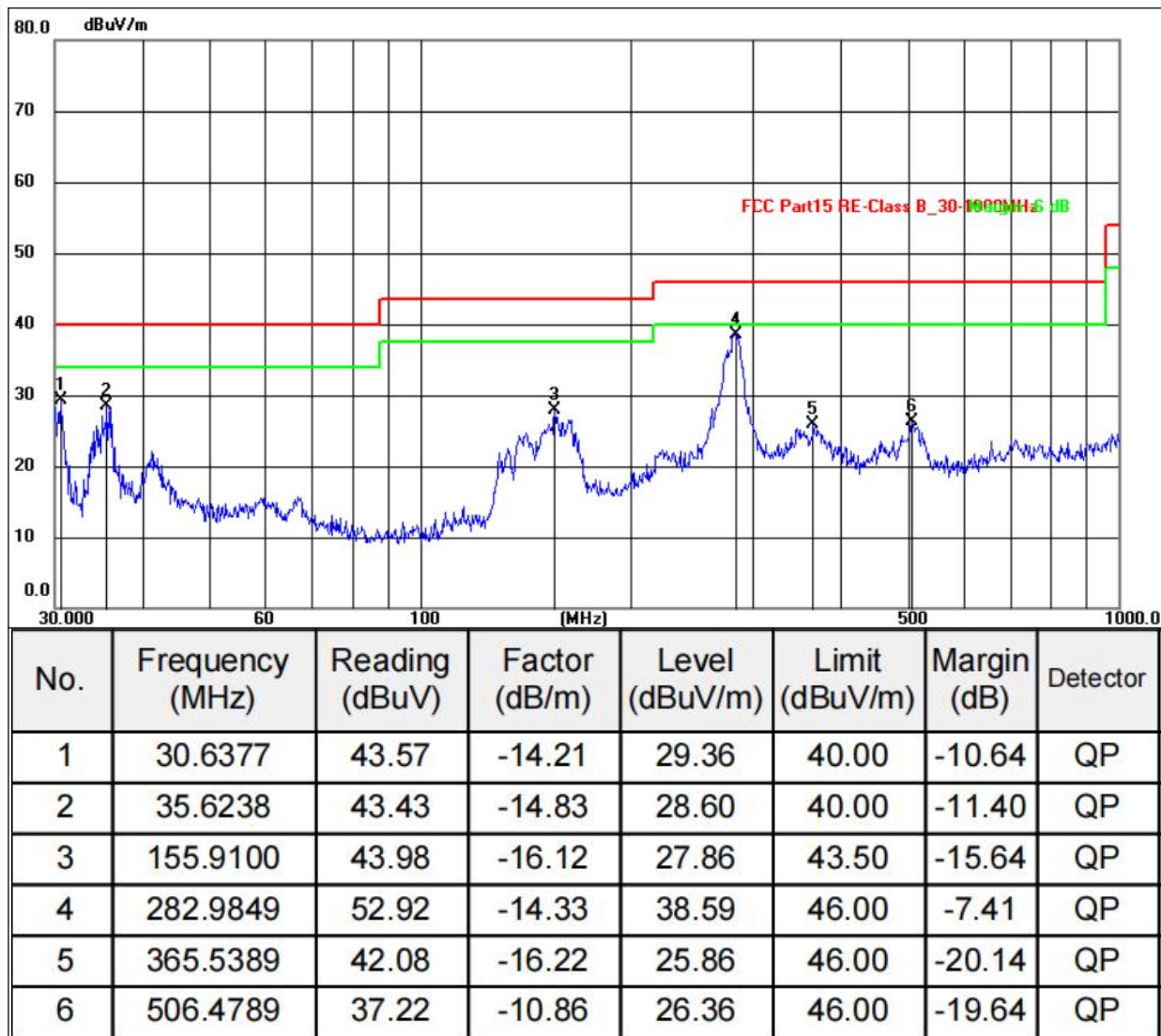
Remarks:

1. An initial pre-scan was performed on the peak detector.
2. Quasi-Peak measurement were performed at the frequencies with maximized peak emission.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Final Level = Reading level + Correct Factor.
5. Correct Factor = Antenna factor+ Cable loss factor - Amplifier factor.
6. Margin= Measurement Level-Limit.



30MHz-1GHz

|               |         |                    |            |
|---------------|---------|--------------------|------------|
| Temperature:  | 26℃     | Relative Humidity: | 54%        |
| Pressure:     | 101 kPa | Polarization:      | Horizontal |
| Test Voltage: | DC 12V  | Test Mode:         | Mode 10    |



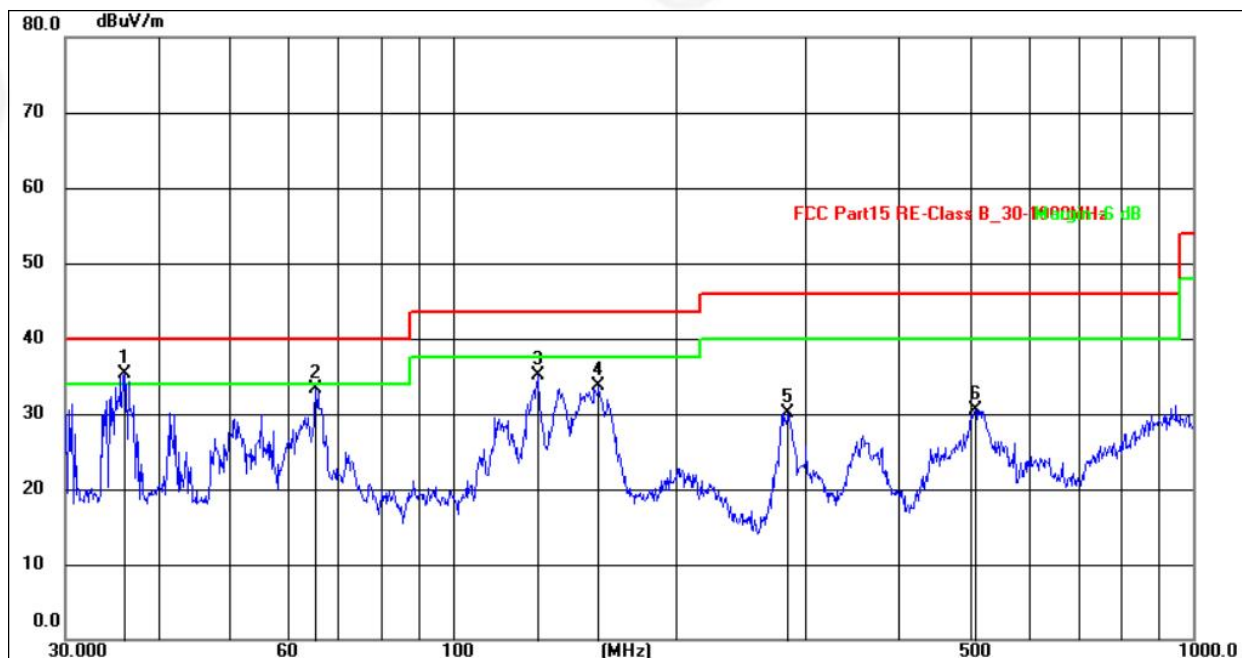
Remarks:

1. An initial pre-scan was performed on the peak detector.
2. Quasi-Peak measurement were performed at the frequencies with maximized peak emission.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Final Level = Reading level + Correct Factor.
5. Correct Factor = Antenna factor+ Cable loss factor - Amplifier factor.
6. Margin= Measurement Level-Limit.
7. All test modes were tested, with only the worst Mode 10 recorded.





|               |        |                    |          |
|---------------|--------|--------------------|----------|
| Temperature:  | 26℃    | Relative Humidity: | 54%      |
| Pressure:     | 101kPa | Polarization:      | Vertical |
| Test Voltage: | DC 12V | Test Mode:         | Mode 10  |



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 36.0007         | 52.58          | -17.35        | 35.23          | 40.00          | -4.77       | QP       |
| 2   | 65.3431         | 52.08          | -18.76        | 33.32          | 40.00          | -6.68       | QP       |
| 3   | 130.3788        | 56.02          | -20.97        | 35.05          | 43.50          | -8.45       | QP       |
| 4   | 157.5587        | 53.69          | -20.06        | 33.63          | 43.50          | -9.87       | QP       |
| 5   | 283.9791        | 48.58          | -18.42        | 30.16          | 46.00          | -15.84      | QP       |
| 6   | 508.2581        | 41.26          | -10.67        | 30.59          | 46.00          | -15.41      | QP       |

Remarks:

1. An initial pre-scan was performed on the peak detector.
2. Quasi-Peak measurement were performed at the frequencies with maximized peak emission.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Final Level = Reading level + Correct Factor.
5. Correct Factor = Antenna factor+ Cable loss factor - Amplifier factor.
6. Margin= Measurement Level-Limit.
7. All test modes were tested, with only the worst Mode 10 recorded.



## 6. 20DB BANDWIDTH TEST

1. Se span = 1.5 ~ 5 times OBW.
2. Set RBW = 1KHz.
3. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
4. Detector = peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

### TEST SETUP





|              |        |                    |        |
|--------------|--------|--------------------|--------|
| Temperature: | 26 °C  | Relative Humidity: | 54%    |
| Pressure:    | 101kPa | Test Voltage:      | DC 12V |

| Test Coil | Frequency (kHz) | 20dB Bandwidth (kHz) | Result |
|-----------|-----------------|----------------------|--------|
| ANT 1     | 146.72          | 2.713                | Pass   |
| ANT 2     | 117.14          | 2.721                | Pass   |
| ANT 3     | 327             | 2.7                  | Pass   |

ANT 1:



ANT 2:





ANT 3:





## 7. ANTENNA REQUIREMENT

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Standard requirement:                                                                                                                                                                                                                                                                                                                                                                                                                                                     | FCC Part15 C Section 15.203 |
| 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. |                             |
| EUT Antenna:                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             |
| The antenna is Loop Coil antenna, the best case gain of the antennas is 0dBi, reference to the appendix II for details                                                                                                                                                                                                                                                                                                                                                    |                             |





## 8. TEST SETUP PHOTO

Reference to the appendix I for details.

## 9. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

\*\*\*\*\* **END OF REPORT** \*\*\*\*\*