# FCC Test Report

| | |
|---|---|
| **Report No.:** | CAIJ-ESH-P21050315B-2 |
| **FCC ID:** | 2AZX2-BV000001 |
| **Product:** | 15W Car Wireless Charging Module |
| **Test Model:** | W015CN-01,W015CN-10,W015CN-XX |
| **Received Date:** | May.08, 2021 |
| **Test Date:** | May.08 to May.31,2021 |
| **Issued Date:** | May.31, 2021 |
| **Applicant:** | An Energy Technology Co., Ltd |
| **Address:** | No. 139 Huaye Road, Jintan,Changzhou, Jiangsu, China |
| **Manufacturer:** | An Energy Technology Co., Ltd |
| **Address:** | No. 139 Huaye Road, Jintan,Changzhou, Jiangsu, China |
| **Issued By:** | BUREAU VERITAS ADT (Shanghai) Corporation |
| **Lab Address:** | No. 829, Xinzhuan Road, Shanghai, P.R.China (201612) |

ACCREDITED
Test Lab
Cert 2343.01

## Table of Contents

## Release Control Record

| Issue No. | Description | Date Issued |
|---|---|---|
| CAIJ-ESH-P21050315B-2 | Original release | May.31, 2021 |

## 1 Certificate of Conformity

**Product:** 15W Car Wireless Charging Module

**Brand:** --

**Test Model:** W015CN-01,W015CN-10,W015CN-XX

**Applicant:** An Energy Technology Co., Ltd

**Test Date:** May.08 to May.31, 2021

**Standards:** 47 CFR FCC Part 15, Subpart C
ANSI C63.10:2013

The above equipment has been tested by **BUREAU VERITAS ADT (Shanghai) Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by :** Yuan ZHANG , **Date:** May.31, 2021

Project Engineer

**Approved by :** Daniel SUN , **Date:** May.31, 2021

EMC Lab Manager

## 2 Summary of Test Results

The EUT has been tested according to the following specifications:

| 47 CFR FCC Part 15, Subpart C | | | |
|---|---|---|---|
| FCC Clause | Test Item | Result | Remarks |
| 15.207 | AC Power Conducted Emission | NA | The EUT is powered by DC source. |
| 15.209 | Radiated Emissions Measurement | PASS | Meet the requirement of limit. |

## 2.1 Test Instruments

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| Hybrid Antenna(25MHz-1.5GHz) | Schwarzbeck | VULB9168 | E1A1012 | Jul.29, 20 | Jul.28, 22 |
| Horn Antenna(1GHz -18GHz) | Schwarzbeck | BBHA9120D | E1A1017 | Aug.25, 20 | Aug.24, 22 |
| Double Ridge Horn Antenna(18G-40G) | COM-POWER | AH-840 | E1A1040 | Jul.15, 20 | Jul.14, 22 |
| Pre-Amplifier(100kHz-1.3GHz) | Agilent | 8447D | E1A2001 | Apr.19, 21 | Apr.18, 22 |
| Pre-Amplifier(0.5GHz-18GHz) | EMCI | EMC184045SE | E1A2009 | Jul.06, 20 | Jul.05, 21 |
| Pre-Amplifier(18GHz-40GHz) | EMCI | EMC051845SE | E1A2008 | Jul.06, 20 | Jul.05, 21 |
| EMI test recerver | R&S | ESR7 | E1R1005 | Apr.19, 21 | Apr.18, 22 |
| Spectrum Analyzer | Keysight | N9030B | E1S1003 | Jul.23, 20 | Jul.22, 21 |
| Spectrum Analyzer | Keysight | N9020A | E1S1004 | Mar.02, 21 | Mar.01, 22 |
| EMI test recerver | R&S | ESCS30 | E1R1001 | May.11, 21 | May.10, 22 |
| LISN | R&S | ENV216 | E1L1011 | May.11, 21 | May.10, 22 |
| Humidity&Temp Tester | Baolima | WS508 | E1H1011 | Apr. 02, 21 | Apr. 01, 22 |
| RF Control Unit | Toscend | JS0806-2 | E1C5003 | N/A | N/A |
| Test Software | ADT | ADT_COND_V7.3.1 | N/A | N/A | N/A |
| Test Software | Toscend | JS32-RE | N/A | N/A | N/A |
| Test Software | Toscend | JS1120 | N/A | N/A | N/A |
| Test Software | Toscend | JS1120-3 | N/A | N/A | N/A |

## 2.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| Measurement | Frequency | Expanded Uncertainty (k=2) (±) |
|---|---|---|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz | 1.83 dB |
| Radiated Emissions up to 1 GHz | 30MHz ~ 1GHz | 5.36 dB |
| Radiated Emissions above 1 GHz | 1GHz ~ 6GHz | 3.47 dB |
| | 6GHz ~ 18GHz | 3.75 dB |
| | 18GHz ~ 40GHz | 3.30 dB |

## 2.3 Modification Record

There were no modifications required for compliance.

## 3 General Information

### 3.1 General Description of EUT

| | |
|---|---|
| Product | 15W Car Wireless Charging Module |
| Brand | -- |
| Test Model | W015CN-01,W015CN-10,W015CN-XX |
| Power Rating | Input:16-20Vdc, 2A(max) |
| Modulation Type | ASK |
| Modulation Technology | WPT |
| Operating Frequency | 110kHz~145kHz |
| Antenna Type | Coil Antenna |
| Antenna Connector | -- |

Note:

1. For more details, please refer to the User's manual of the EUT.
2. All these models are same except appearance.

### 3.1.1 Test Mode Applicability:

| EUT Configure Mode | Applicable to | | | | Description |
|---|---|---|---|---|---|
| | RE (9 kHz~30MHz) | RE (30MHz~1GHz) | PLC | BW | |
| - | √ | √ | - | - | - |

Where **RE≥1G:** Radiated Emission above 1GHz **RE< 1G:** Radiated Emission below 1GHz

**PLC: Power Line Conducted Emission** **BW: 20dB Spectrum Bandwidth**

**Radiated Emission Test RE (9 kHz~30MHz):**

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE |
|---|---|---|---|---|
| - | Charging | 110-145kHz | 127.8kHz | ASK |

**Radiated Emission Test RE (30MHz~1GHz):**

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE |
|---|---|---|---|---|
| - | Charging | 110-145kHz | 127.8kHz | ASK |

**Power Line Conducted Emission Test:**

☐ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE |
|---|---|---|---|---|
| - | Charging | 110-145kHz | 127.8kHz | ASK |

### 3.1.2 Test Condition:

| Applicable to | Normal Environmental Conditions | Normal Input Power |
|---|---|---|
| RE (9 kHz~30MHz) | 23deg. C, 58%RH | DC 16~20V |
| RE (30MHz~1GHz) | 23deg. C, 58%RH | DC 16~20V |
| PLC | -- | -- |

## 3.2 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

## 3.3 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standard:

**FCC Part 15, Subpart C (15.207, 15.209)**

**ANSI C63.10:2013**

All relaxed test items have been performed and recorded as per the above standard.

## 4 Test Procedure and Results

### 4.1 AC Power Conducted Emission

#### 4.1.1 Limits

| Frequency (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 - 0.5 | 66 - 56 | 56 - 46 |
| 0.50 - 5.0 | 56 | 46 |
| 5.0 - 30.0 | 60 | 50 |

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

#### 4.1.2 Test Procedures

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

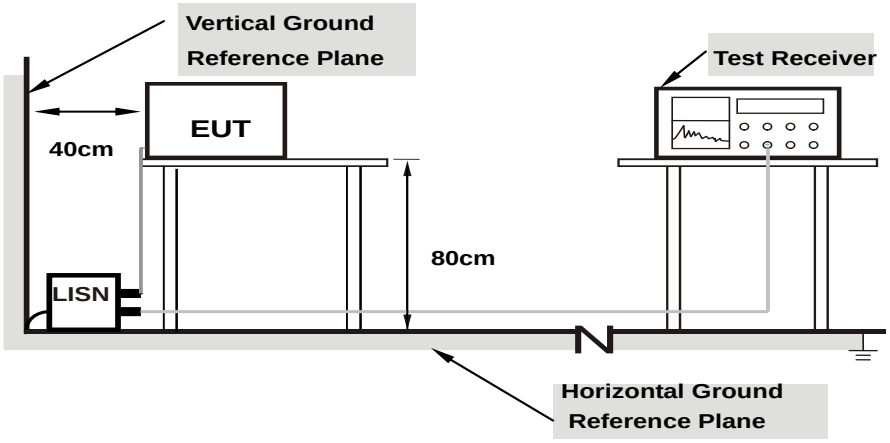
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

**NOTE:** The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

#### 4.1.3 Deviation from Test Standard

No deviation.

### 4.1.4 Test Setup




**Note: 1.Support units were connected to second LISN.**

For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 4.1.5 EUT Operating Conditions

Same as 4.1.6.

### 4.1.6 Test Results

Not applicable. The EUT is powered by DC source.

## 4.2 Radiated Emissions Measurement

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part15, must also comply with the radiated emission limits specified in Section 15.209(a).

| Frequency (MHz) | Frequency (MHz) | Frequency (MHz) | Frequency (GHz) |
|---|---|---|---|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| 0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 - 1710 | 10.6 - 12.7 |
| 6.26775 - 6.26825 | 108 - 121.94 | 1718.8 - 1722.2 | 13.25 - 13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.52475 - 156.525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2690 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 - 335.4 | 3600 - 4400 | (2) |
| 13.36 - 13.41 | -- | -- | -- |

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

| FCC Part 15C 15.209 | | |
|---|---|---|
| Frequency [MHz] | Field Strength [uV/m] | Measured Distance [Meters] |
| 0.009 - 0.490 | 2400/F (kHz) | 300 |
| 0.490 - 1.705 | 24000/F (kHz) | 30 |
| 1.705 - 30 | 30 | 30 |
| 30 - 88 | 100 | 3 |
| 88 - 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| Above 960 | 500 | 3 |

**4.2.1 Test Procedure Reference**

ANSI C63.10 Section 6.3 (General Requirements)

**4.2.2 Test Procedures**

**For Radiated emission below 30MHz**

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degree to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Both X and Y axes of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotate table was turned from 0 degree to 360 degree to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

**For Radiated emission above 30MHz**

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna 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.

d. 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

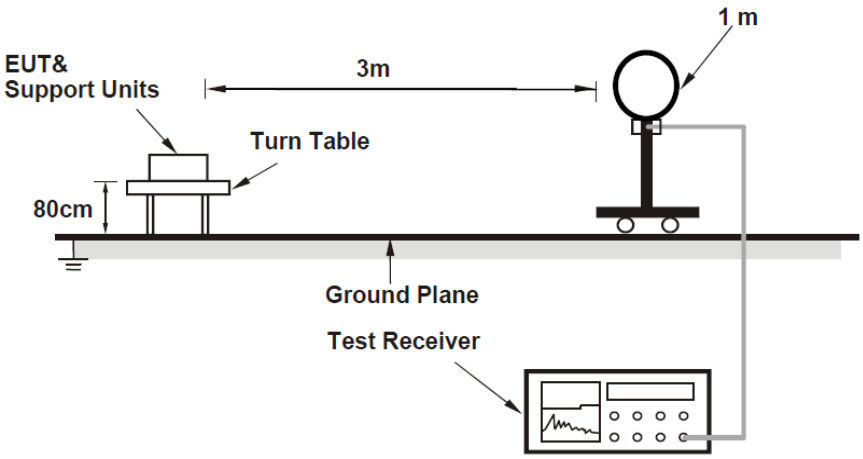
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

### 4.2.3 Deviation from Test Standard

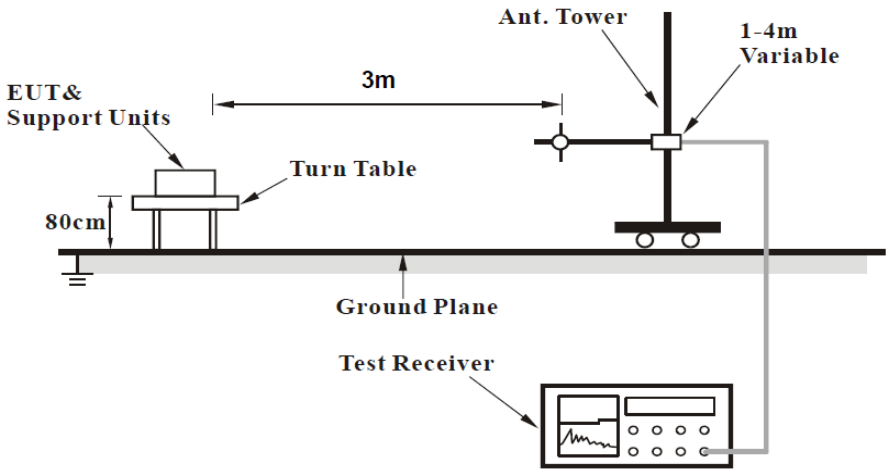
No deviation.

### 4.2.4 Test Setup

**For Radiated emission below 30MHz**



**For Radiated emission 30MHz to 1GHz**

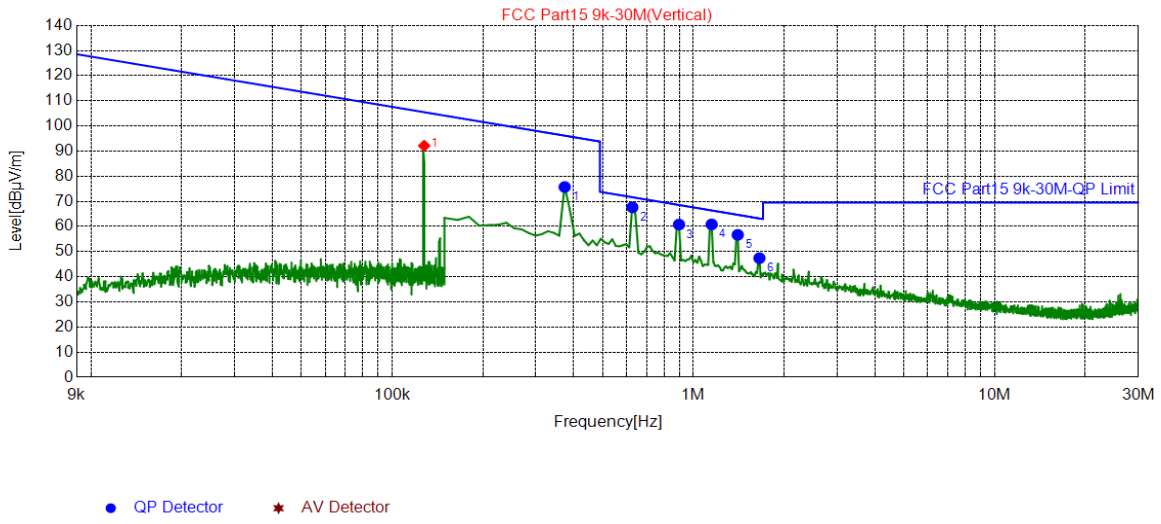



For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 4.2.5 Test Results

## Radiated Emissions Range 9kHz~30MHz

| Channel | 127.8kHz | Detector Function | Quasi-Peak (QP) |
|---|---|---|---|
| Frequency Range | 9kHz ~ 30MHz | | |




**Final Data List**

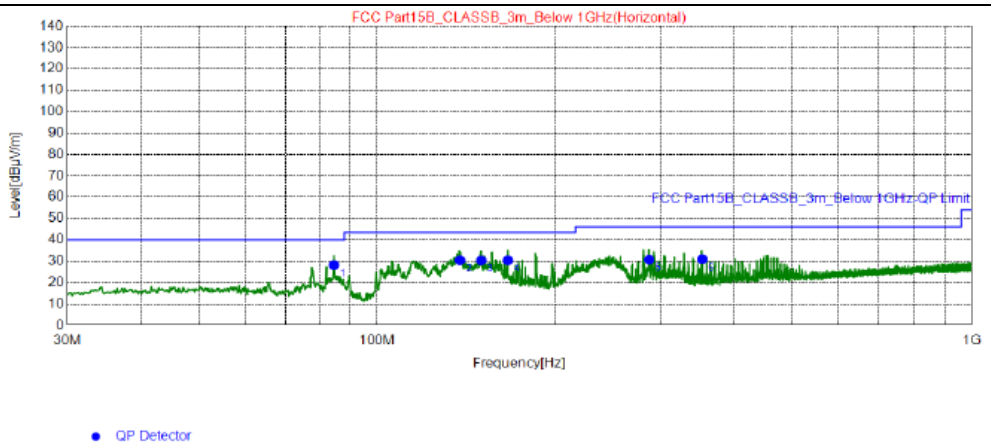
| NO. | Freq. [MHz] | QP Reading [dBµV/m] | Factor [dB] | QP Value [dBµV/m] | QP Limit [dBµV/m] | QP Margin [dB] | Height[cm] | Angle [°] |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.3739 | 55.71 | 20.01 | 75.72 | 96.15 | 20.43 | 100 | 159 |
| 2 | 0.6276 | 47.63 | 20.01 | 67.64 | 71.65 | 4.01 | 100 | 159 |
| 3 | 0.8963 | 40.79 | 20.01 | 60.80 | 68.56 | 7.76 | 100 | 159 |
| 4 | 1.1500 | 40.84 | 20.01 | 60.85 | 66.39 | 5.54 | 100 | 0 |
| 5 | 1.4037 | 36.68 | 20.01 | 56.69 | 64.66 | 7.97 | 100 | 0 |
| 6 | 1.6574 | 27.42 | 20.01 | 47.43 | 63.22 | 15.79 | 100 | 4 |

## Radiated Emissions Range 30MHz~1GHz

## Below is the worst test data

| | | | |
|---|---|---|---|
| **Channel** | 127.8kHz | **Detector Function** | Quasi-Peak (QP) |
| **Frequency Range** | 30MHz ~ 1GHz | **Antenna Polarity** | Horizontal |

Test Plot:




**Final Data List**

| NO. | Freq. [MHz] | QP Reading [dBµV/m] | Factor [dB] | QP Value [dBµV/m] | QP Limit [dBµV/m] | QP Margin [dB] | Height [cm] | Angle [°] | Polarity |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 84.51 | 43.26 | -15.03 | 28.23 | 40.00 | 11.77 | 200 | 258 | Horizontal |
| 2 | 137.8 | 40.93 | -10.56 | 30.37 | 43.50 | 13.13 | 200 | 272 | Horizontal |
| 3 | 149.6 | 40.35 | -10.05 | 30.30 | 43.50 | 13.20 | 200 | 89 | Horizontal |
| 4 | 165.9 | 40.48 | -10.10 | 30.38 | 43.50 | 13.12 | 200 | 100 | Horizontal |
| 5 | 287.4 | 39.65 | -8.98 | 30.67 | 46.00 | 15.33 | 200 | 175 | Horizontal |
| 6 | 353.2 | 38.26 | -7.35 | 30.91 | 46.00 | 15.09 | 200 | 164 | Horizontal |

**REMARKS:**

1. Emission Level(dBuV/m) = Spectrum reading (dBuV) + Correction Factor(dB/m)

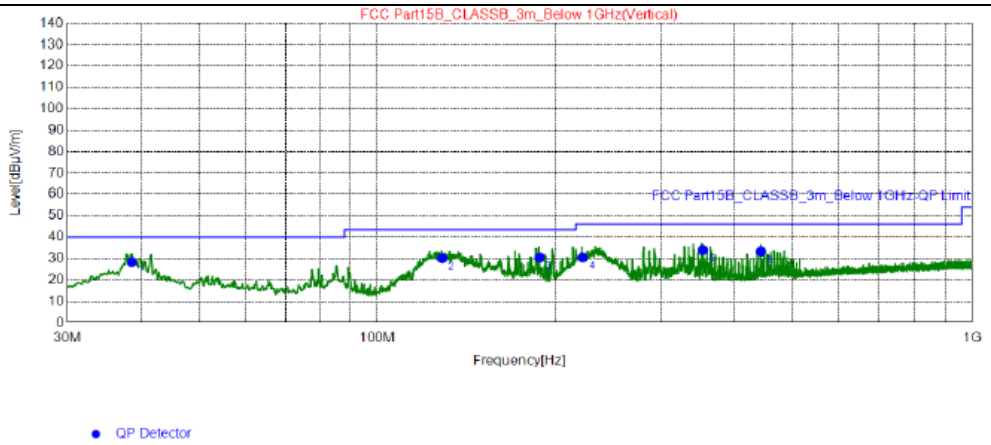
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. The other emission levels were very low against the limit.

4. Margin value = Limit value – Emission Level

| | | | |
|---|---|---|---|
| **Channel** | 127.8kHz | **Detector Function** | Quasi-Peak (QP) |
| **Frequency Range** | 30MHz ~ 1GHz | **Antenna Polarity** | Vertical |

Test Plot:




**Final Data List**

| NO. | Freq. [MHz] | QP Reading [dBµV/m] | Factor [dB] | QP Value [dBµV/m] | QP Limit [dBµV/m] | QP Margin [dB] | Height [cm] | Angle [°] | Polarity |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 38.53 | 39 | -10.61 | 28.39 | 40.00 | 11.61 | 100 | 25 | Vertical |
| 2 | 128.5 | 41.65 | -11.57 | 30.08 | 43.50 | 13.42 | 100 | 181 | Vertical |
| 3 | 187.7 | 41.76 | -11.37 | 30.39 | 43.50 | 13.11 | 100 | 43 | Vertical |
| 4 | 221.6 | 42.14 | -11.69 | 30.45 | 46.00 | 15.55 | 100 | 315 | Vertical |
| 5 | 353.3 | 41.23 | -7.35 | 33.88 | 46.00 | 12.12 | 100 | 51 | Vertical |
| 6 | 443.0 | 38.53 | -5.29 | 33.24 | 46.00 | 12.76 | 100 | 256 | Vertical |

**REMARKS:**

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. The other emission levels were very low against the limit.

4. Margin value = Limit value – Emission Level

## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

**--- END ---**