SGS-CSTC Standards Technical Services Co., Ltd.

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# TEST REPORT

| | |
|---|---|
| **Application No.**: | GZEM1408004144RF |
| **Applicant**: | Salcomp (Shenzhen) Co., Ltd. |
| **Manufacturer:** | Salcomp (Shenzhen) Co., Ltd. |
| **Factory:** | Salcomp (Shenzhen) Co., Ltd.<br>Salcomp Industrial Eletrônica da Amazônia Ltda<br>Salcomp Manufacturing India Pvt Ltd. |
| **FCC ID:** | SZQ-T130 |
| **Product Name:** | Verizon Wireless Charging Pad |
| **Product Description:** | Low Power Transmitter |
| **Model No.:** | VZW1COIL-WC |
| **Trade Mark:** | Verizon |
| **Standards:** | CFR 47 FCC PART 15 SUBPART C:2013 section 15.207<br>CFR 47 FCC PART 15 SUBPART C:2013 section 15.209 |
| **Date of Receipt**: | 2014-08-13 |
| **Date of Test**: | 2014-08-28 to 2014-08-29 |
| **Date of Issue**: | 2014-09-09 |
| **Test Result :** | **Pass*** |

* In the configuration tested, the EUT detailed in this report complied with the standards specified above. Please refer to section 3 of this report for further details.

Authorized Signature:

**Richard Li**
**Manager**

**The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.**

**The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.**

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# 2 Version

| Revision Record | | | | |
|---|---|---|---|---|
| **Version** | **Chapter** | **Date** | **Modifier** | **Remark** |
| 00 | | 2014-09-09 | | Original |
| | | | | |
| | | | | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| **Authorized for issue by:** | | | | |
| **Tested By** | | (Jack Liang) /Project Engineer | | 2014-08-28 to 2014-08-29<br>**Date** |
| **Prepared By** | | (June Chen) /Clerk | | 2014-09-09<br>**Date** |
| **Checked By** | | (Fred Zhu) /Reviewer | | 2014-09-09<br>**Date** |

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# 3 Test Summary

| ELECTROMAGNETIC INTERFERENCE (EMI) | | | | |
|---|---|---|---|---|
| **Test** | **Test Requirement** | **Test Method** | **Class / Severity** | **Result** |
| Radiated Emission (9 kHz to30MHz) | FCC PART 15 C section 15.209 | ANSI C 63.10: Clause 6.4 | Section 15.209 | PASS |
| Radiated Emission (30MHz to 1GHz) | FCC PART 15 section 15.209 | ANSI C 63.10: Clause 6.4 | section 15.209 | PASS |
| Conducted Emission (150 KHz to 30 MHz) | FCC PART 15 section 15.207 | ANSI C63.10: Clause 6.2 | section 15.207 | PASS |

**Remark:**

EUT: In this whole report EUT means Equipment Under Test.
N/A: not applicable. Refer to the relative section for the details.
Tx: In this whole report Tx (or tx) means Transmitter.
Rx: In this whole report Rx (or rx) means Receiver.
RF: In this whole report RF means Radio Frequency.

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# 5 General Information

## 5.1 Client Information

| | |
|---|---|
| Applicant: | Salcomp (Shenzhen) Co., Ltd. |
| Address of Applicant: | Salcomp Road, Furong Industrial Area, Xinqiao, Shajing, Baoan District, Shenzhen 518125 CHINA |
| Manufacturer: | Salcomp (Shenzhen) Co., Ltd. |
| Address of Manufacturer | Salcomp Road, Furong Industrial Area, Xinqiao, Shajing, Baoan District, Shenzhen 518125 CHINA |
| Factory: | Salcomp (Shenzhen) Co., Ltd. |
| Address of Factory: | Salcomp Road, Furong Industrial Area, Xinqiao, Shajing, BaoanDistrict, Shenzhen 518125 CHINA |
| Factory: | Salcomp Industrial Eletrônica da Amazônia Ltda |
| Address of Factory: | Av. dos Oitis, no. 4,145, Distrito Industrial 69075-842 Manaus, Amazonas BRAZIL |
| Factory: | Salcomp Manufacturing India Pvt Ltd |
| Address of Factory: | Nokia Telecom SEZ SIPCOT Industrial Park Phase III Chennai – Bangalore Highway Sriperumbudur, Tamil Nadu-602 105 |

## 5.2 General Description of E.U.T.

| | |
|---|---|
| Product Name: | Verizon Wireless Charging Pad |
| Model No.: | VZW1COIL-WC |
| Product Description: | Low Power Transmitter |

## 5.3 Details of E.U.T.

| | |
|---|---|
| Power Supply: | DC 5V(supplied by adaptor) |
| Transmitter details | Model: VZW1COIL-WC<br>Input: DC 5V, 1.8A<br>Output: 5W |

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## 5.4 Description of Support Units

The EUT has been tested with simulate receiver, resistor and adapter provided by applicant.

| | |
|---|---|
| Adapter details | Model: S32A02<br>Input: AC 100-240 50/60 Hz 0.4A<br>Output:DC 5V 1.8A |

## 5.5 Deviation from Standards

None.

## 5.6 Abnormalities from Standard Conditions

None.

## 5.7 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory,
198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District,
Guangzhou, China 510663
Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

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## 5.8 Test Facility

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

- **NVLAP (Lab Code: 200611-0)**

  SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

  The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **ACMA**

  SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

  Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

  SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

- **FCC (Registration No.: 282399)**

  SGS-CSTC Standards Technical Services Co., Ltd., 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 our files. Registration 282399, May 31, 2002.

- **Industry Canada (Registration No.: 4620B-1)**

  The 3m/10m Alternate Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Certification and Engineering of Industry Canada for radio equipment testing with Registration No. 4620B-1.

- **VCCI (Registration No.: R-2460, C-2584, G-449 and T-1179)**

  The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co. Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2460, C-2584，G-449 and T-1179 respectively.

- **CBTL (Lab Code: TL129)**

  SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01:2006-10 and Rules of procedure IECEE 02:2006-10, and the relevant IECEE CB-Scheme Operational documents.

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# 6 Equipment Used during Test

| Conducted Emission | | | | | | |
|---|---|---|---|---|---|---|
| No. | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. date (YYYY-MM-DD) | Cal.Due date (YYYY-MM-DD) |
| EMC0306 | Shielding Room | Zhong Yu | 8 x 3 x 3.8 $m^3$ | N/A | N/A | N/A |
| EMC0118 | Two-line v-netwok | R&S | ENV216 | 100359 | 2014-03-03 | 2015-03-03 |
| EMC0102 | LISN | SCHAFFNER CHASE | MN2050D/1 | 1421 | 2013-09-22 | 2014-09-22 |
| EMC2046 | Artificial Mains Network (LISN) | AFJ Instruments | LT32C | S.N.32031120150 | 2014-03-03 | 2015-03-03 |
| EMC0506 | EMI Test Receiver | Rohde & Schwarz | ESCS30 | 100085 | 2014-03-03 | 2015-03-03 |
| EMC0107 | Coaxial Cable | SGS | 2m | N/A | 2014-07-25 | 2016-07-25 |
| EMC0106 | Voltage Probe | SGS | N/A | N/A | 2014-4-19 | 2015-4-19 |
| EMC0120 | 8 Line ISN | Fischer Custom Communications | FCC-TLISN-T8-02 | 20550 | 2014-08-30 | 2015-08-30 |
| EMC0121 | 4 Line ISN | Fischer Custom Communications | FCC-TLISN-T4-02 | 20549 | 2014-08-30 | 2015-08-30 |
| EMC0122 | 2 Line ISN | Fischer Custom Communications | FCC-TLISN-T2-02 | 20548 | 2014-08-30 | 2015-08-30 |
| EMC2047 | CDN | Elektronik-Feinmechanik | L-801:AF2 | 2793 | 2011-11-11 | 2014-11-11 |
| EMC2048 | CDN | Elektronik-Feinmechanik | L-801:M2/M3 | 2738 | 2011-11-11 | 2014-11-11 |
| EMC2062 | 6dB Attenuator | HP | 8491A | 24487 | 2014-04-19 | 2015-04-19 |
| EMC167 | Conical metal housing | SGS-EMC | N/A | N/A | 2014-02-16 | 2016-02-16 |

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| RE in Chamber | | | | | | |
|---|---|---|---|---|---|---|
| No. | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. date (YYYY-MM-DD) | Cal.Due date (YYYY-MM-DD) |
| EMC0525 | Compact Semi-Anechoic Chamber | ChangZhou ZhongYu | N/A | N/A | 2013-12-5 | 2014-12-5 |
| EMC0522 | EMI Test Receiver | Rohde & Schwarz | ESIB26 | 100283 | 2014-04-19 | 2015-04-19 |
| EMC0056 | EMI Test Receiver | Rohde & Schwarz | ESCI | 100236 | 2014-03-03 | 2015-03-03 |
| EMC0528 | RI High frequency Cable | SGS | 20 m | N/A | 2014-05-09 | 2015-05-09 |
| EMC2025 | Trilog Broadband Antenna 30-1000MHz | SCHWARZBECK MESS-ELEKTRONIK | VULB 9160 | 9160-3372 | 2014-07-14 | 2017-07-14 |
| EMC0524 | Bi-log Type Antenna | Schaffner -Chase | CBL6112B | 2966 | 2013-08-31 | 2016-08-31 |
| EMC0519 | Bilog Type Antenna | Schaffner -Chase | CBL6143 | 5070 | 2014-05-04 | 2017-05-04 |
| EMC2026 | Horn Antenna 1-18GHz | SCHWARZBECK MESS-ELEKTRONIK | BBHA 9120D | 9120D-841 | 2013-08-31 | 2016-08-31 |
| EMC0518 | Horn Antenna | Rohde & Schwarz | HF906 | 100096 | 2012-07-01 | 2015-07-01 |
| EMC0521 | 1-26.5 GHz Pre-Amplifier | Agilent | 8449B | 3008A01649 | 2014-03-03 | 2015-03-03 |
| EMC2065 | Amplifier | HP | 8447F | N/A | 2014-08-25 | 2015-08-25 |
| EMC0075 | 310N Amplifier | Sonama | 310N | 272683 | 2014-03-03 | 2015-03-03 |
| EMC0523 | Active Loop Antenna | EMCO | 6502 | 42963 | 2014-03-03 | 2016-03-03 |
| EMC2041 | Broad-Band Horn Antenna (14)15-26.5(40)GHz | SCHWARZBECK MESS-ELEKTRONI | BBHA 9170 | 9170-375 | 2014-05-26 | 2017-05-26 |
| EMC2069 | 2.4GHz filter | Micro-Tronics | BRM 50702 | 149 | 2014-04-19 | 2015-04-19 |
| EMC0530 | 10m Semi-Anechoic Chamber | ETS | N/A | N/A | 2014-05-03 | 2016-05-03 |

| General used equipment | | | | | | |
|---|---|---|---|---|---|---|
| No. | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. date (YYYY-MM-DD) | Cal.Due date (YYYY-MM-DD) |
| EMC0006 | DMM | Fluke | 73 | 70681569 | 2013-09-13 | 2014-09-13 |
| EMC0007 | DMM | Fluke | 73 | 70671122 | 2013-09-13 | 2014-09-13 |

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# 7 Emission Test Results

## 7.1 Radiated Emissions

Test Requirement: FCC Part15 C

Test Method: ANSI C63.10:2009

Frequency Range: 9 kHz to1GHz

Measurement Distance: 3 m

Detector: peak and average for pre-scan

Class / Limit:

| **Frequency range** MHz | **Field strength (uV/m)** | **Measurement Distance (meters)** |
|---|---|---|
| 0.009 to 0.490 | 2400/F(kHz) | 300 |
| 0.490 to 1.705 | 24000/F(kHz) | 30 |
| 1.705 to 30.0 | 30 | 30 |
| 30 to 88 | 100 | 3 |
| 88 to 216 | 150 | 3 |
| 216 to 960 | 200 | 3 |
| Above 960 | 500 | 3 |

Correction factor used due to measurement distance of 3m:

| **Frequency range** MHz | **Field strength (dBuV/m)** | **Measurement Distance (meters)** |
|---|---|---|
| 0.009 to 0.490 | 67.6-20log(f)(kHz)+40 | 3 |
| 0.490 to 1.705 | 87.6-20log(f)(kHz)+20 | 3 |
| 1.705 to 30.0 | 49.5 | 3 |
| 30 to 88 | 40.0 | 3 |
| 88 to 216 | 43.5 | 3 |
| 216 to 960 | 46.0 | 3 |
| Above 960 | 49.0 | 3 |

### 7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22.0 °C Humidity: 51 %RH Atmospheric Pressure: 1006 mbar

EUT Operation: Test the EUT in charging &standby mode.

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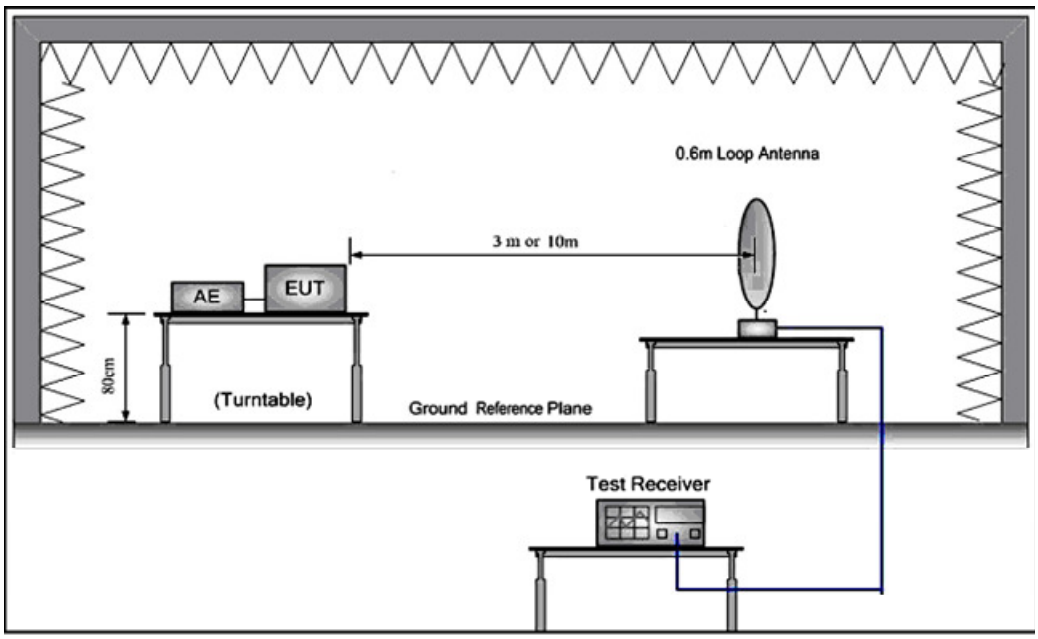
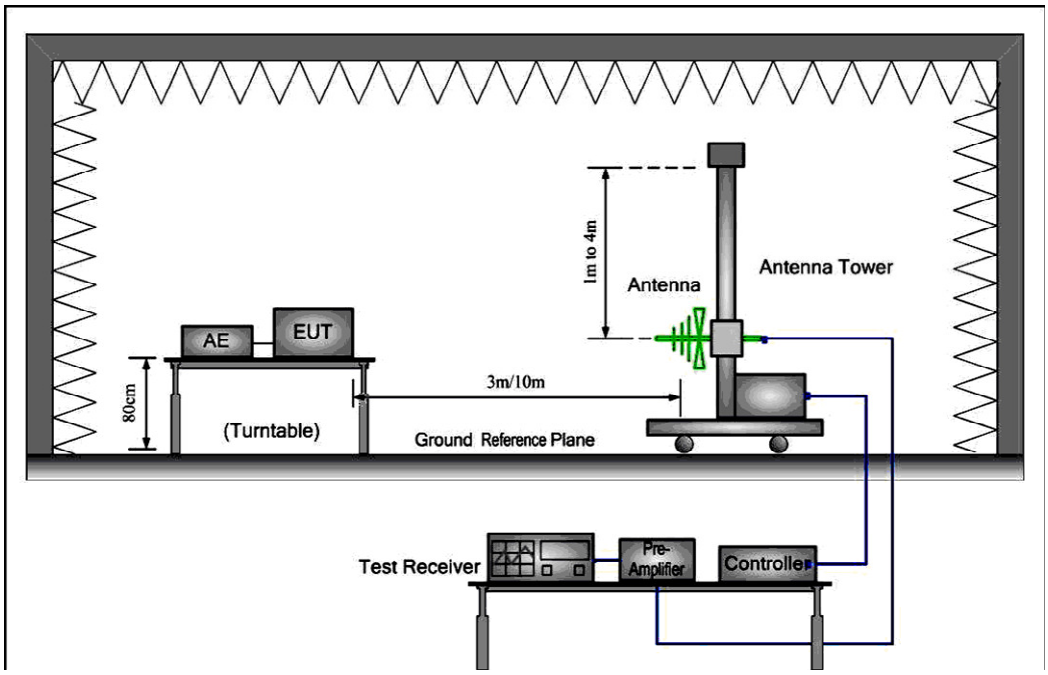
**Test Configuration:**

1)9 kHz to 30 MHz emissions:




2)30 MHz to 1 GHz emissions:

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**Test Procedure:**

1) 9 kHz to 30 MHz emissions:

For testing performed with the loop antenna. The center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specied distance from the EUT.During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

2) 30 MHz to 1 GHz emissions:

For testing perfomed with the bi-log type antenna. The measurement is performed with the EUT rotated 360º, the antenna height scaned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

**Detector** Peak for pre-scan

| Test Receiver test setup | Detector | | |
|---|---|---|---|
| | 9 kHz-150 kHz | 150 kHz-30 MHz | 30 MHz-1000 MHz |
| RBW | 200 Hz | 9 kHz | 120 kHz |
| VBW | ≥ RBW | ≥ RBW | ≥ RBW |
| Sweep | auto | auto | auto |
| Detector function | QP | QP | QP |
| Trace | max hold | max hold | max hold |

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### 7.1.2 Spurious Emission: below 30 MHz

**Charging with max load mode**

| No. | Frequency (MHz) | Reading (dBuV/m) | Correct Factor(dB) | Result (dBuV/m) | Limit (dBuV/m) | Over limit (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 0.03 | 58.12 | 0.02 | 58.14 | 78.06 | -19.92 | PK |
| 2 | 0.71 | 41.22 | 0.07 | 41.29 | 50.57 | -9.28 | PK |
| 3 | 1.65 | 31.92 | 0.09 | 32.01 | 49.50 | -17.49 | PK |
| 4 | 4.22 | 22.82 | 0.10 | 22.92 | 49.50 | -26.58 | PK |
| 5 | 6.56 | 22.31 | 0.10 | 22.41 | 49.50 | -27.09 | PK |
| 6 | 25.12 | 23.25 | 0.10 | 23.35 | 49.50 | -26.15 | PK |

**Charging with mid load mode**

| No. | Frequency (MHz) | Reading (dBuV/m) | Correct Factor(dB) | Result (dBuV/m) | Limit (dBuV/m) | Over limit (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 0.12 | 58.34 | 0.02 | 58.36 | 86.02 | -27.66 | PK |
| 2 | 0.63 | 41.22 | 0.07 | 41.29 | 51.61 | -10.32 | PK |
| 3 | 3.62 | 31.62 | 0.09 | 31.71 | 49.50 | -17.79 | PK |
| 4 | 5.43 | 22.36 | 0.10 | 22.46 | 49.50 | -27.04 | PK |
| 5 | 12.36 | 22.57 | 0.10 | 22.67 | 49.50 | -26.83 | PK |
| 6 | 25.25 | 23.23 | 0.10 | 23.33 | 49.50 | -26.17 | PK |

**Charging with min load mode**

| No. | Frequency (MHz) | Reading (dBuV/m) | Correct Factor(dB) | Result (dBuV/m) | Limit (dBuV/m) | Over limit (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 0.06 | 58.22 | 0.02 | 58.24 | 72.04 | -13.80 | PK |
| 2 | 0.65 | 41.12 | 0.07 | 41.19 | 51.34 | -10.15 | PK |
| 3 | 4.23 | 31.65 | 0.09 | 31.74 | 49.50 | -17.76 | PK |
| 4 | 5.83 | 22.24 | 0.10 | 22.34 | 49.50 | -27.16 | PK |
| 5 | 9.25 | 22.65 | 0.10 | 22.75 | 49.50 | -26.75 | PK |
| 6 | 25.62 | 23.12 | 0.10 | 23.22 | 49.50 | -26.28 | PK |

**Standby mode**

| No. | Frequency (MHz) | Reading (dBuV/m) | Correct Factor(dB) | Result (dBuV/m) | Limit (dBuV/m) | Over limit (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 0.05 | 57.22 | 0.02 | 57.24 | 73.62 | -16.38 | PK |
| 2 | 0.95 | 42.34 | 0.07 | 42.41 | 48.05 | -5.64 | PK |
| 3 | 4.23 | 31.21 | 0.09 | 31.30 | 49.50 | -18.2 | PK |
| 4 | 8.29 | 23.32 | 0.10 | 23.42 | 49.50 | -26.08 | PK |
| 5 | 10.34 | 23.45 | 0.10 | 23.55 | 49.50 | -25.95 | PK |
| 6 | 22.34 | 23.62 | 0.10 | 23.72 | 49.50 | -25.78 | PK |

**Remark:**

**Result = Reading+ Correct Factor**

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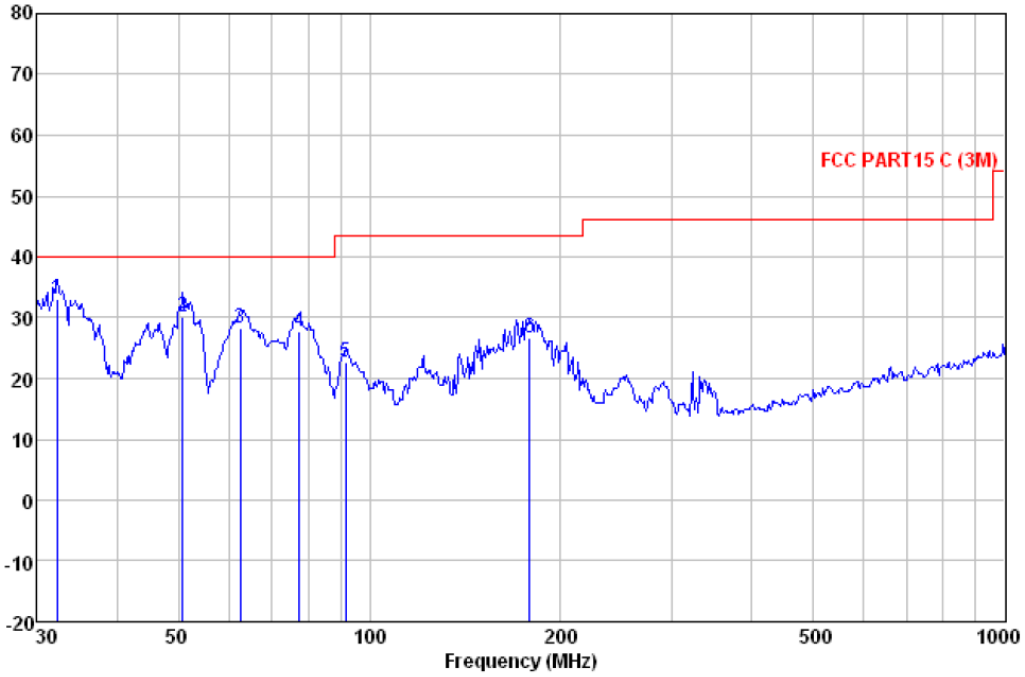
### 7.1.3 Spurious Emssion: above 30 MHz

**Charging with max load mode**

Vertical:

Peak scan

Level (dBµV/m)




Quasi-peak measurement

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 32.179 | 51.59 | 12.32 | 0.84 | 31.60 | 33.15 | 40.00 | -6.85 | QP |
| 50.764 | 47.50 | 13.21 | 1.10 | 31.60 | 30.21 | 40.00 | -9.79 | QP |
| 62.651 | 47.13 | 11.63 | 1.13 | 31.60 | 28.29 | 40.00 | -11.71 | QP |
| 77.593 | 49.74 | 8.20 | 1.28 | 31.60 | 27.62 | 40.00 | -12.38 | QP |
| 91.816 | 40.76 | 12.24 | 1.32 | 31.60 | 22.72 | 43.50 | -20.78 | QP |
| 178.758 | 46.51 | 9.62 | 1.84 | 31.33 | 26.64 | 43.50 | -16.86 | QP |

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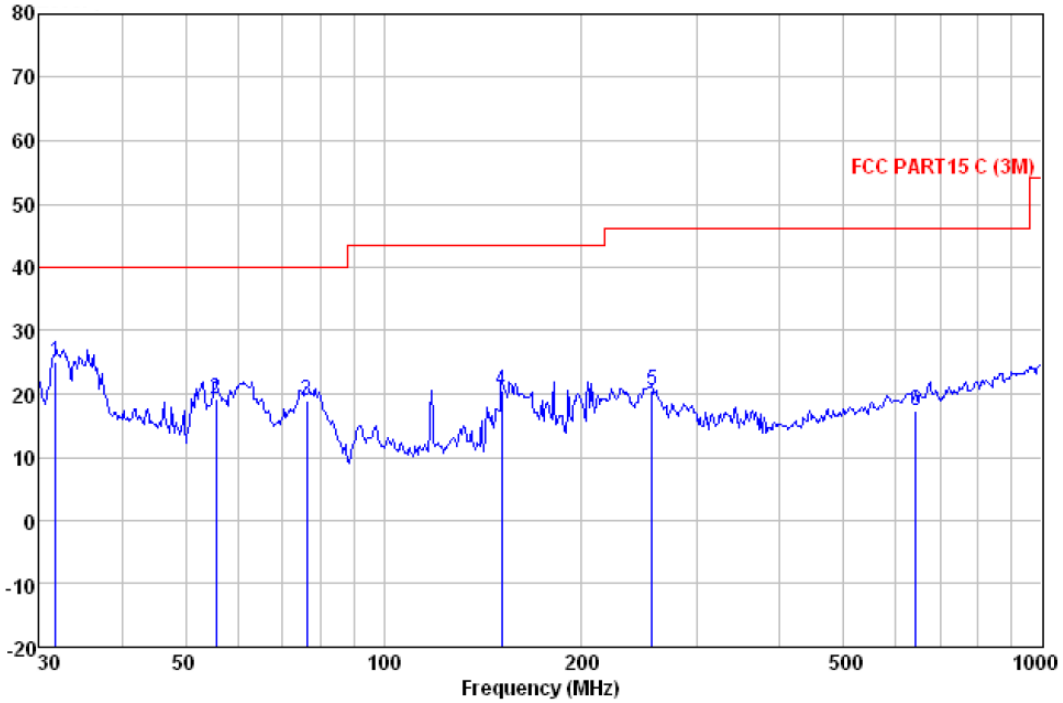
Horizontal:

Peak scan

Level (dBµV/m)




Quasi-peak measurement

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 31.731 | 43.42 | 12.32 | 0.84 | 31.60 | 24.98 | 40.00 | -15.02 | QP |
| 55.609 | 36.60 | 12.97 | 1.10 | 31.60 | 19.07 | 40.00 | -20.93 | QP |
| 76.512 | 41.36 | 8.03 | 1.27 | 31.60 | 19.06 | 40.00 | -20.94 | QP |
| 151.067 | 41.95 | 8.29 | 1.66 | 31.41 | 20.49 | 43.50 | -23.01 | QP |
| 255.623 | 37.43 | 12.06 | 2.22 | 31.30 | 20.41 | 46.00 | -25.59 | QP |
| 642.861 | 26.64 | 18.61 | 3.30 | 31.25 | 17.30 | 46.00 | -28.70 | QP |

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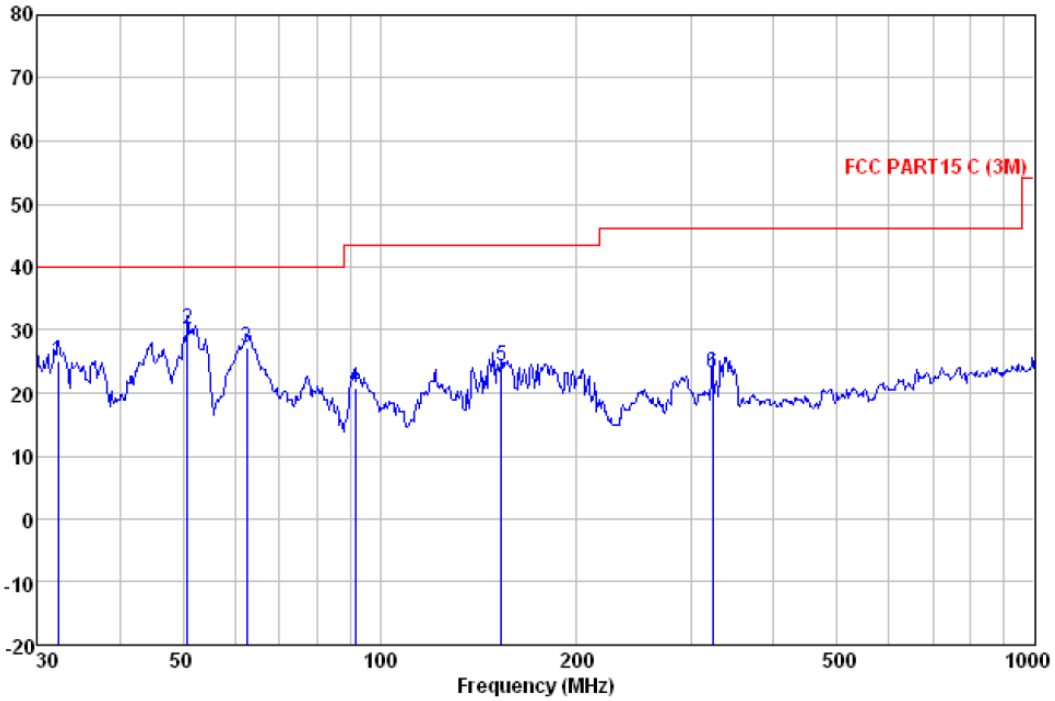
**Charging with mid load mode**

Vertical:

Peak scan

Level (dBµV/m)




Quasi-peak measurement

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 32.179 | 43.59 | 12.32 | 0.84 | 31.60 | 25.15 | 40.00 | -14.85 | QP |
| 50.764 | 47.50 | 13.21 | 1.10 | 31.60 | 30.21 | 40.00 | -9.79 | QP |
| 62.651 | 46.13 | 11.63 | 1.13 | 31.60 | 27.29 | 40.00 | -12.71 | QP |
| 91.816 | 38.76 | 12.24 | 1.32 | 31.60 | 20.72 | 43.50 | -22.78 | QP |
| 153.200 | 45.65 | 8.39 | 1.69 | 31.39 | 24.34 | 43.50 | -19.16 | QP |
| 322.189 | 38.47 | 13.46 | 2.45 | 31.25 | 23.13 | 46.00 | -22.87 | QP |

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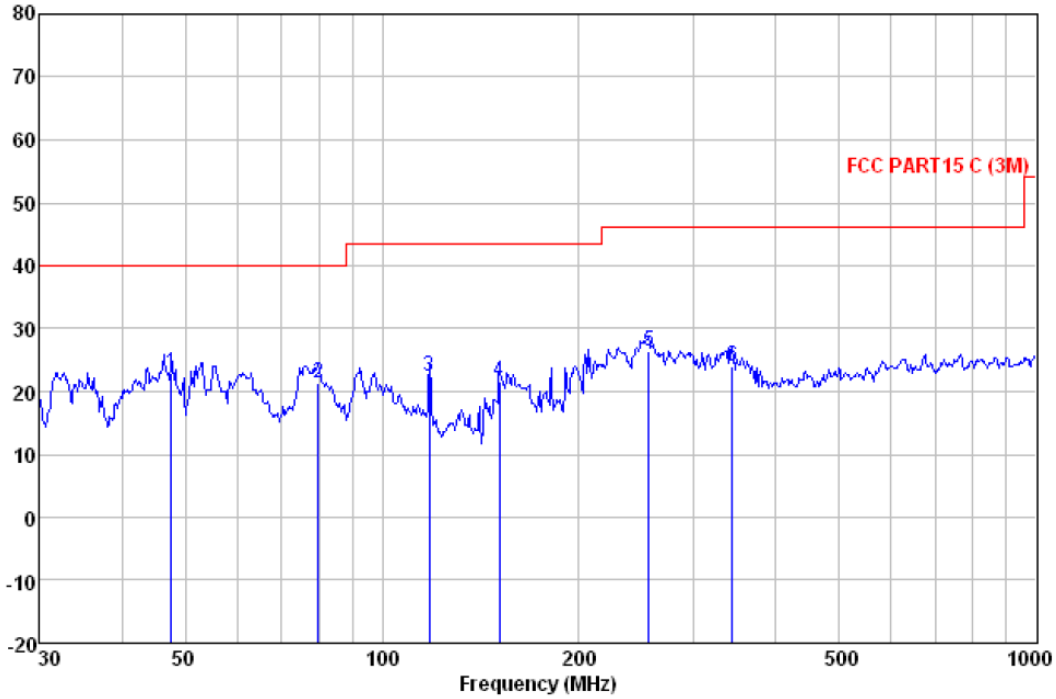
Horizontal:

Peak scan

Level (dBµV/m)




Quasi-peak measurement

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 47.659 | 39.98 | 13.39 | 1.07 | 31.60 | 22.84 | 40.00 | -17.16 | QP |
| 79.800 | 43.13 | 8.54 | 1.29 | 31.60 | 21.36 | 40.00 | -18.64 | QP |
| 118.186 | 41.73 | 10.79 | 1.45 | 31.55 | 22.42 | 43.50 | -21.08 | QP |
| 151.067 | 42.95 | 8.29 | 1.66 | 31.41 | 21.49 | 43.50 | -22.01 | QP |
| 255.623 | 43.43 | 12.06 | 2.22 | 31.30 | 26.41 | 46.00 | -19.59 | QP |
| 343.180 | 38.48 | 14.17 | 2.54 | 31.20 | 23.99 | 46.00 | -22.01 | QP |

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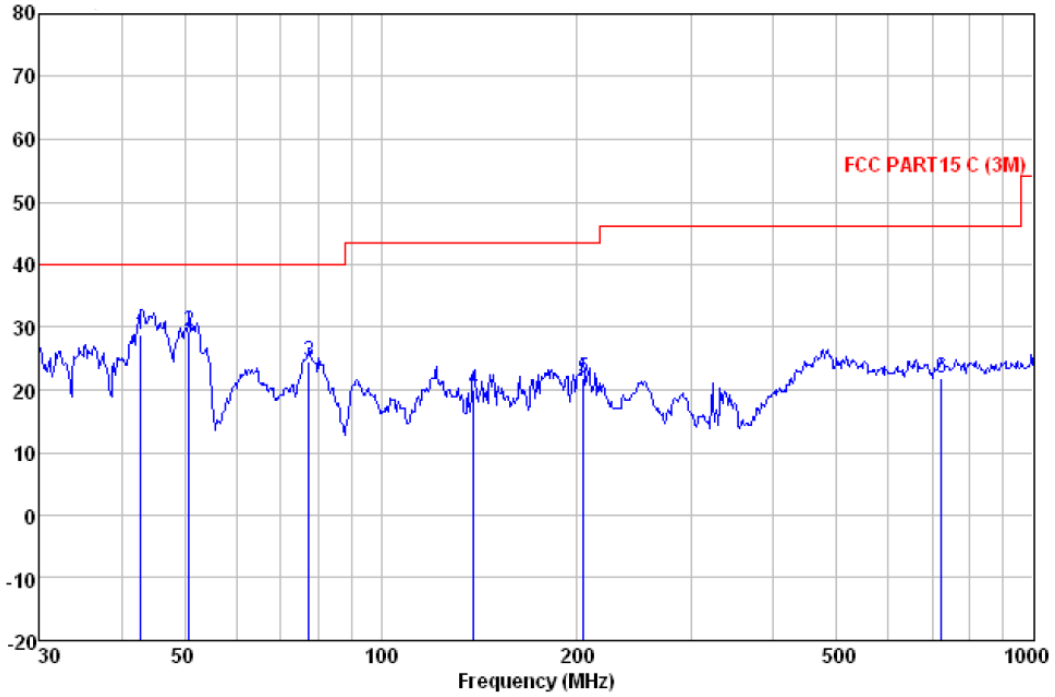
**Charging with min load mode**

Vertical:

Peak scan

Level (dBµV/m)




Quasi-peak measurement

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 42.900 | 45.80 | 13.56 | 1.02 | 31.60 | 28.78 | 40.00 | -11.22 | QP |
| 50.764 | 46.50 | 13.21 | 1.10 | 31.60 | 29.21 | 40.00 | -10.79 | QP |
| 77.593 | 46.74 | 8.20 | 1.28 | 31.60 | 24.62 | 40.00 | -15.38 | QP |
| 138.874 | 41.68 | 8.24 | 1.54 | 31.47 | 19.99 | 43.50 | -23.51 | QP |
| 204.238 | 40.53 | 10.70 | 1.91 | 31.30 | 21.84 | 43.50 | -21.66 | QP |
| 724.261 | 30.51 | 19.10 | 3.54 | 31.20 | 21.95 | 46.00 | -24.05 | QP |

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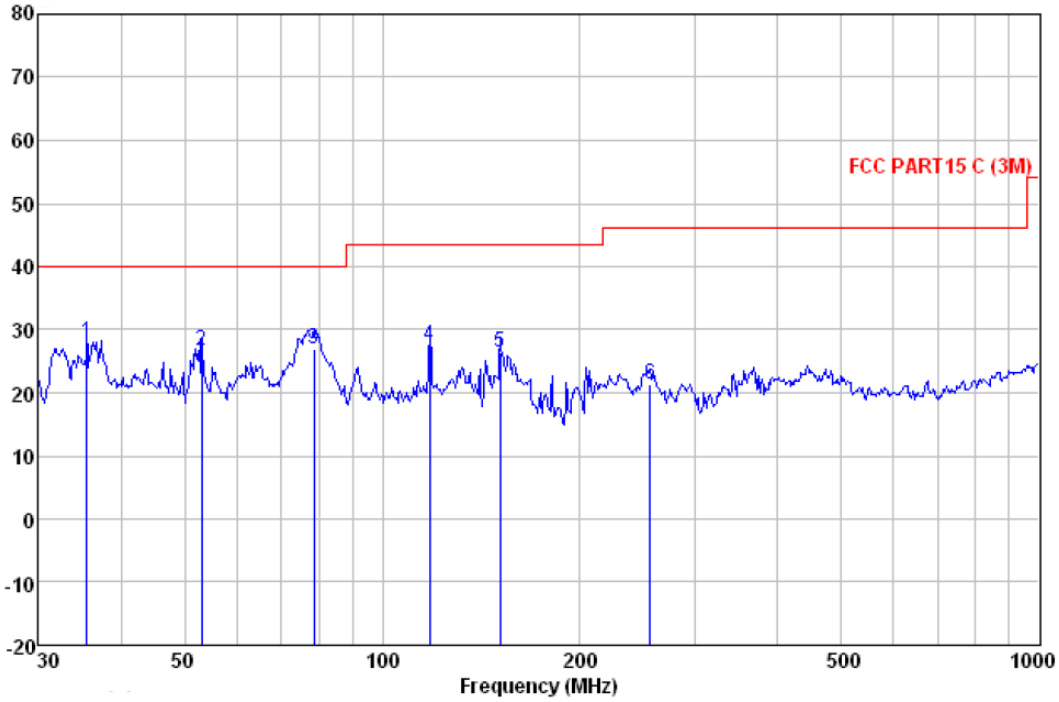
Horizontal:

Peak scan

Level (dBµV/m)




Quasi-peak measurement

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 35.499 | 46.14 | 12.44 | 0.92 | 31.60 | 27.90 | 40.00 | -12.10 | QP |
| 53.131 | 44.00 | 13.10 | 1.10 | 31.60 | 26.60 | 40.00 | -13.40 | QP |
| 78.689 | 48.80 | 8.37 | 1.29 | 31.60 | 26.86 | 40.00 | -13.14 | QP |
| 118.186 | 46.73 | 10.79 | 1.45 | 31.55 | 27.42 | 43.50 | -16.08 | QP |
| 151.067 | 47.95 | 8.29 | 1.66 | 31.41 | 26.49 | 43.50 | -17.01 | QP |
| 255.623 | 38.43 | 12.06 | 2.22 | 31.30 | 21.41 | 46.00 | -24.59 | QP |

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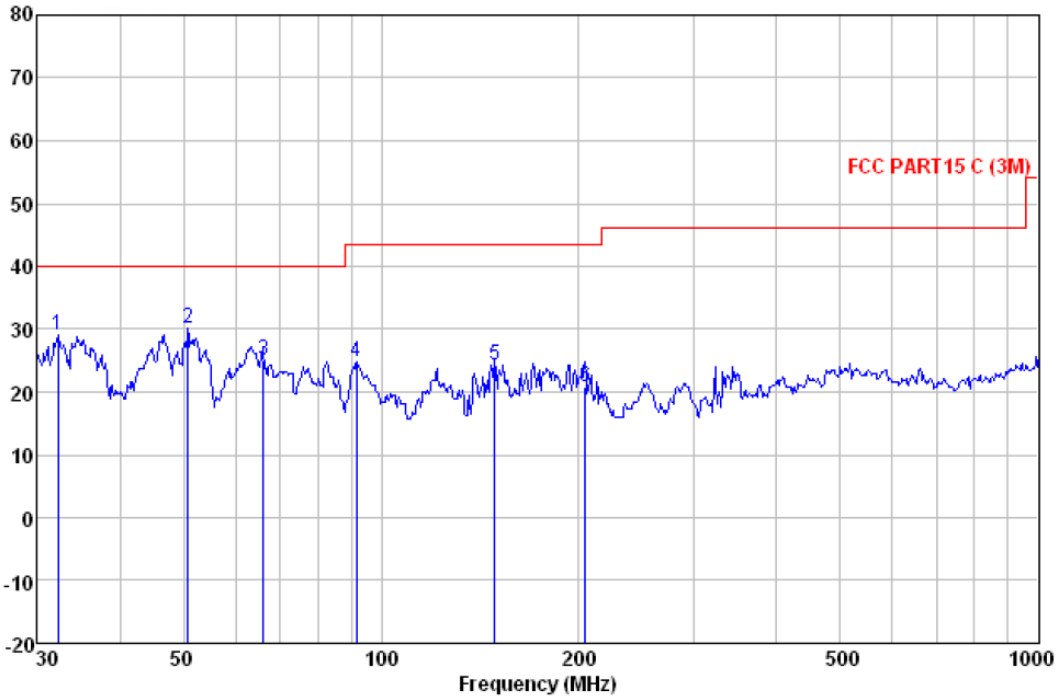
**Standby mode:**

Vertical:

Peak scan

Level (dBµV/m)




Quasi-peak measurement

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 32.179 | 47.59 | 12.32 | 0.84 | 31.60 | 29.15 | 40.00 | -10.85 | QP |
| 50.764 | 47.50 | 13.21 | 1.10 | 31.60 | 30.21 | 40.00 | -9.79 | QP |
| 66.266 | 45.28 | 10.16 | 1.16 | 31.60 | 25.00 | 40.00 | -15.00 | QP |
| 91.816 | 42.76 | 12.24 | 1.32 | 31.60 | 24.72 | 43.50 | -18.78 | QP |
| 148.963 | 45.79 | 8.26 | 1.64 | 31.41 | 24.28 | 43.50 | -19.22 | QP |
| 204.238 | 39.53 | 10.70 | 1.91 | 31.30 | 20.84 | 43.50 | -22.66 | QP |

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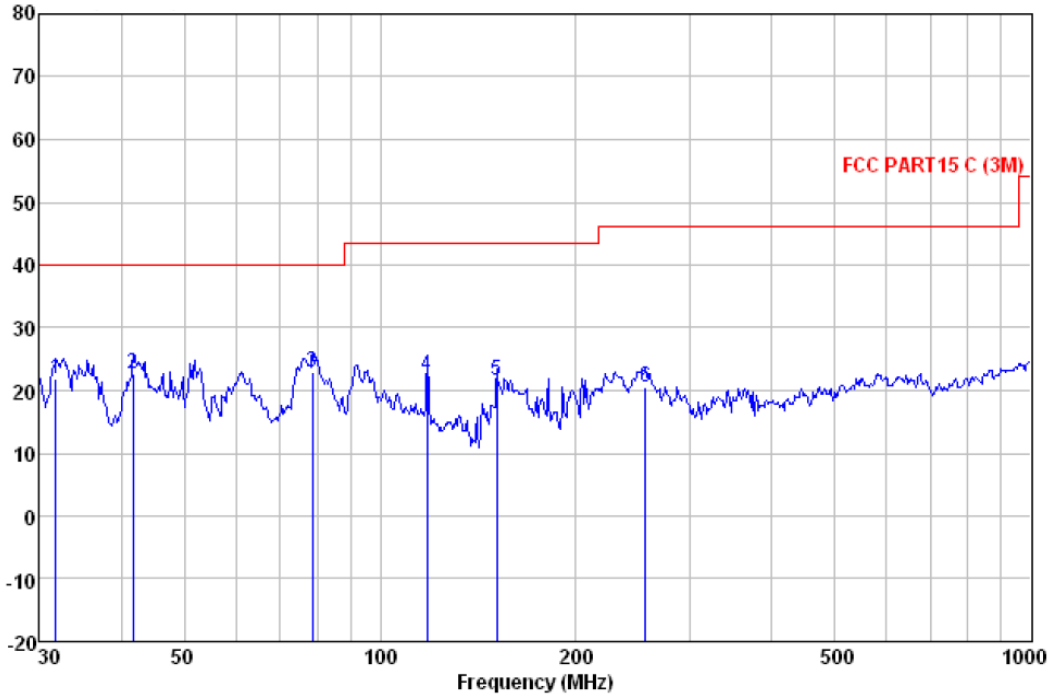
Horizontal:

Peak scan

Level (dBµV/m)




Quasi-peak measurement

| Freq | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 31.731 | 40.42 | 12.32 | 0.84 | 31.60 | 21.98 | 40.00 | -18.02 | QP |
| 41.713 | 39.63 | 13.57 | 1.01 | 31.60 | 22.61 | 40.00 | -17.39 | QP |
| 78.689 | 44.80 | 8.37 | 1.29 | 31.60 | 22.86 | 40.00 | -17.14 | QP |
| 118.186 | 41.73 | 10.79 | 1.45 | 31.55 | 22.42 | 43.50 | -21.08 | QP |
| 151.067 | 42.95 | 8.29 | 1.66 | 31.41 | 21.49 | 43.50 | -22.01 | QP |
| 255.623 | 37.43 | 12.06 | 2.22 | 31.30 | 20.41 | 46.00 | -25.59 | QP |

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## 7.2 Conducted Emissions at Mains Terminals 150 kHz to 30 MHz

**Test Requirement:** FCC Part 15 C section 15.207

**Test Method:** ANSI C63.10: Clause 6.2

**Frequency Range:** 150 kHz to 30 MHz

**Detector:** Peak for pre-scan (9 kHz Resolution Bandwidth)

**Test Limit**

**Limits for conducted disturbance at the mains ports of class B**

| Frequency Range (MHz) | Class B Limit dB(μV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56 | 56 to 46 |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |
| NOTE 1 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz. | | |

EUT Operation: Test the EUT in charging & standby mode. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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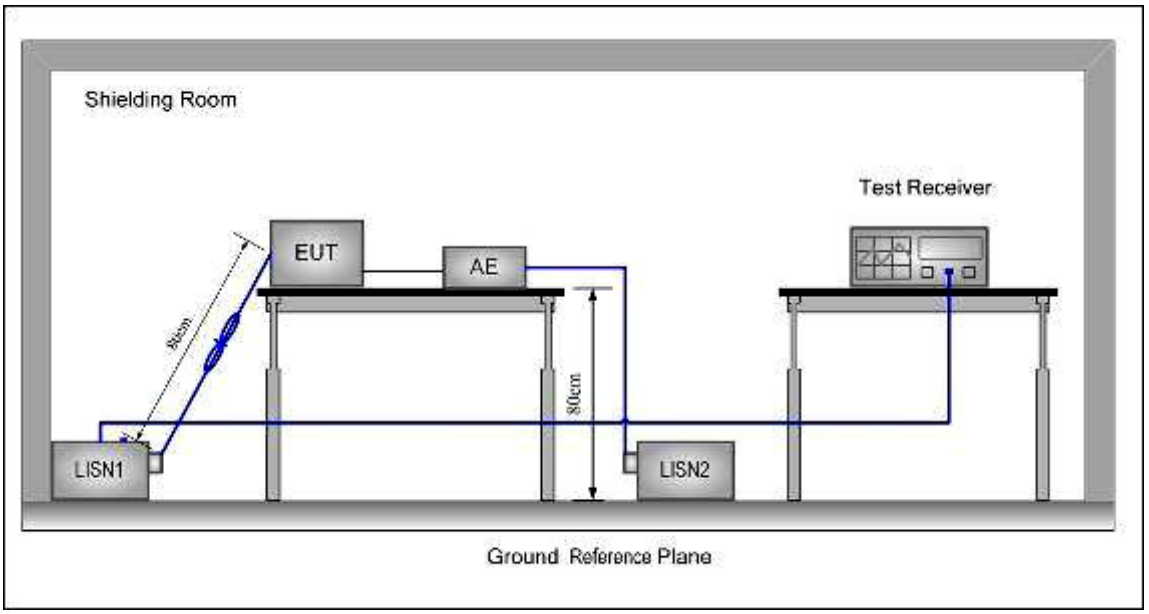
**Test Configuration:**




**Test procedure:**

1. The mains terminal disturbance voltage test was conducted in a shielded room.

2. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.

4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

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### 7.2.1 Measurement Data

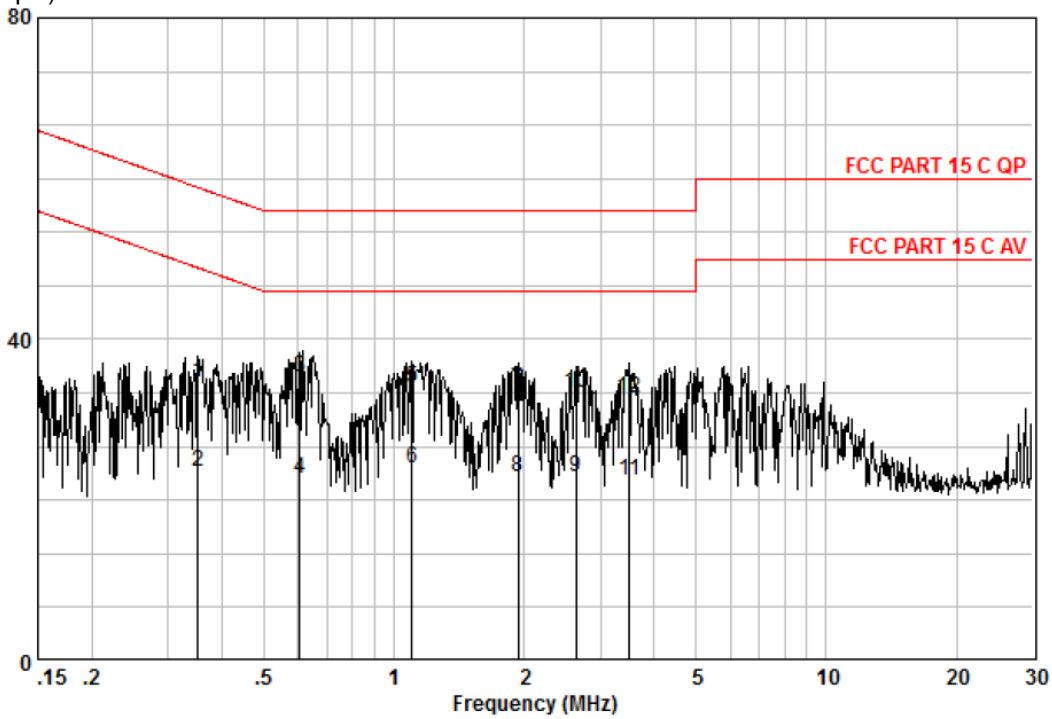
An initial pre-scan was performed on the live and neutral lines with peak detector.
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected. For EUT the communicating was worst case mode.

**The following Quasi-Peak and Average measurements were performed on the EUT:**

**Charging with max load mode**

Neutral Line

Level(dBµV)




Measure data:

| Freq | Read Level | Cable Loss | LISN Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB | dB | dBuV | dBuV | dB | |
| 0,352 | 24,96 | 0,08 | 9,66 | 34,70 | 58,91 | -24,22 | QP |
| 0,352 | 13,72 | 0,08 | 9,66 | 23,46 | 48,91 | -25,46 | AVERAGE |
| 0,604 | 25,54 | 0,07 | 9,67 | 35,28 | 56,00 | -20,72 | QP |
| 0,604 | 12,87 | 0,07 | 9,67 | 22,61 | 46,00 | -23,39 | AVERAGE |
| 1,100 | 24,18 | 0,05 | 9,68 | 33,91 | 56,00 | -22,09 | QP |
| 1,100 | 14,17 | 0,05 | 9,68 | 23,90 | 46,00 | -22,10 | AVERAGE |
| 1,939 | 24,04 | 0,05 | 9,69 | 33,78 | 56,00 | -22,22 | QP |
| 1,939 | 13,12 | 0,05 | 9,69 | 22,86 | 46,00 | -23,14 | AVERAGE |
| 2,636 | 13,00 | 0,12 | 9,69 | 22,81 | 46,00 | -23,19 | AVERAGE |
| 2,636 | 23,46 | 0,12 | 9,69 | 33,27 | 56,00 | -22,73 | QP |
| 3,509 | 12,55 | 0,16 | 9,71 | 22,41 | 46,00 | -23,59 | AVERAGE |
| 3,509 | 22,94 | 0,16 | 9,71 | 32,80 | 56,00 | -23,20 | QP |

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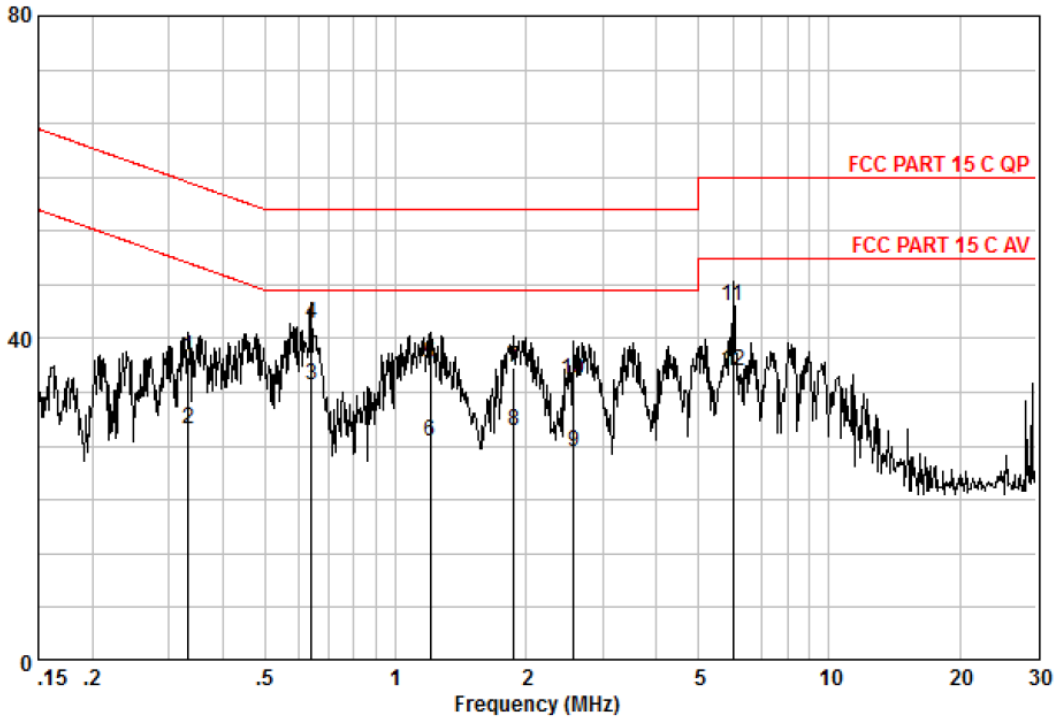
Live Line

Level(dBμV)




Measure result:

| Freq | Read Level | Cable Loss | LISN Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB | dB | dBuV | dBuV | dB | |
| 0.332 | 27.86 | 0.09 | 9.70 | 37.65 | 59.40 | -21.75 | QP |
| 0.332 | 18.95 | 0.09 | 9.70 | 28.74 | 49.40 | -20.66 | AVERAGE |
| 0.641 | 24.38 | 0.07 | 9.70 | 34.15 | 46.00 | -11.85 | AVERAGE |
| 0.641 | 32.04 | 0.07 | 9.70 | 41.81 | 56.00 | -14.19 | QP |
| 1.203 | 27.02 | 0.05 | 9.70 | 36.77 | 56.00 | -19.23 | QP |
| 1.203 | 17.58 | 0.05 | 9.70 | 27.33 | 46.00 | -18.67 | AVERAGE |
| 1.878 | 26.56 | 0.05 | 9.70 | 36.31 | 56.00 | -19.69 | QP |
| 1.878 | 18.76 | 0.05 | 9.70 | 28.51 | 46.00 | -17.49 | AVERAGE |
| 2.581 | 16.22 | 0.11 | 9.70 | 26.03 | 46.00 | -19.97 | AVERAGE |
| 2.581 | 25.14 | 0.11 | 9.70 | 34.95 | 56.00 | -21.05 | QP |
| 5.993 | 34.10 | 0.18 | 9.75 | 44.03 | 60.00 | -15.97 | QP |
| 5.993 | 26.06 | 0.18 | 9.75 | 35.99 | 50.00 | -14.01 | AVERAGE |

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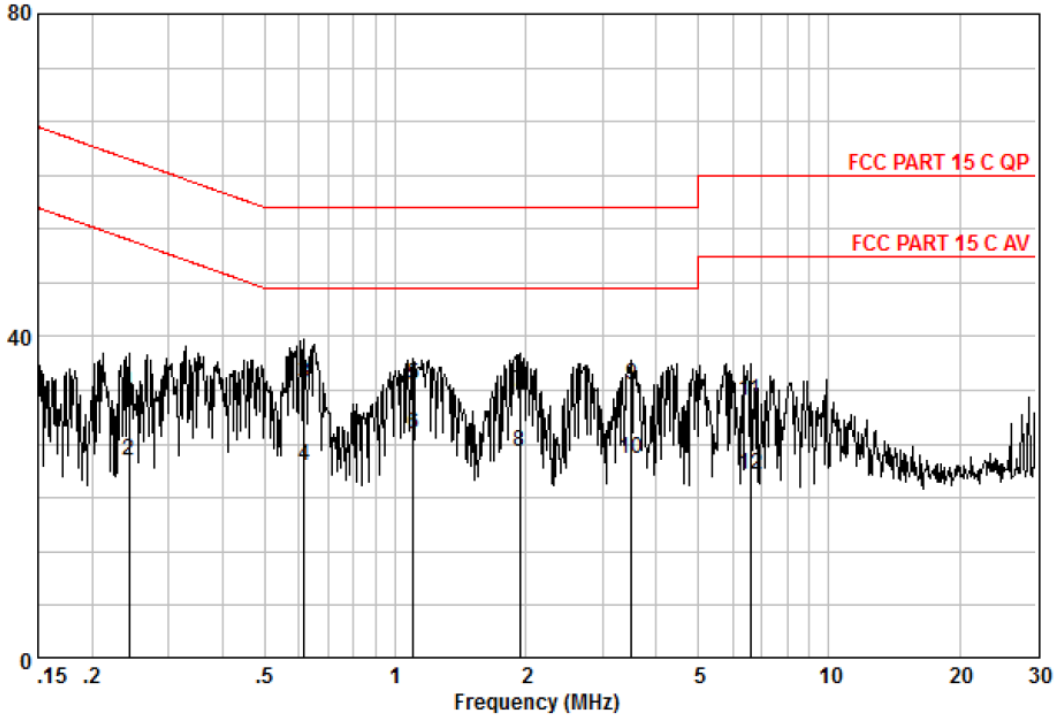
**Charging with mid load mode**

Neutral Line

Level(dBµV)




Measure data:

| Freq | Read Level | Cable Loss | LISN Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB | dB | dBuV | dBuV | dB | |
| 0,243 | 23,16 | 0,11 | 9,66 | 32,93 | 62,00 | -29,06 | QP |
| 0,243 | 14,96 | 0,11 | 9,66 | 24,73 | 52,00 | -27,26 | AVERAGE |
| 0,617 | 24,44 | 0,07 | 9,67 | 34,18 | 56,00 | -21,82 | QP |
| 0,617 | 14,14 | 0,07 | 9,67 | 23,88 | 46,00 | -22,12 | AVERAGE |
| 1,100 | 24,24 | 0,05 | 9,68 | 33,97 | 56,00 | -22,03 | QP |
| 1,100 | 18,08 | 0,05 | 9,68 | 27,81 | 46,00 | -18,19 | AVERAGE |
| 1,939 | 23,38 | 0,05 | 9,69 | 33,12 | 56,00 | -22,88 | QP |
| 1,939 | 16,02 | 0,05 | 9,69 | 25,76 | 46,00 | -20,24 | AVERAGE |
| 3,509 | 24,12 | 0,16 | 9,71 | 33,98 | 56,00 | -22,02 | QP |
| 3,509 | 14,96 | 0,16 | 9,71 | 24,82 | 46,00 | -21,18 | AVERAGE |
| 6,592 | 22,10 | 0,17 | 9,73 | 31,99 | 60,00 | -28,01 | QP |
| 6,592 | 12,96 | 0,17 | 9,73 | 22,85 | 50,00 | -27,15 | AVERAGE |

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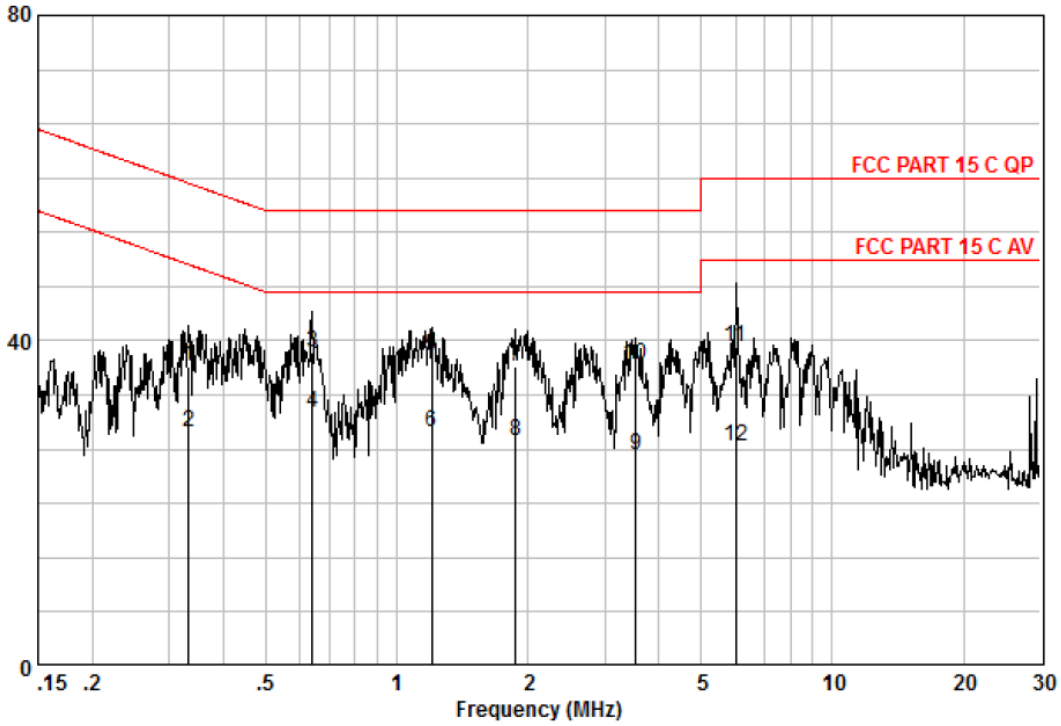
Live Line

Level(dBμV)




Measure result:

| Freq | Read Level | Cable Loss | LISN Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB | dB | dBuV | dBuV | dB | |
| 0.332 | 27.12 | 0.09 | 9.70 | 36.91 | 59.40 | -22.49 | QP |
| 0.332 | 19.02 | 0.09 | 9.70 | 28.81 | 49.40 | -20.59 | AVERAGE |
| 0.641 | 28.90 | 0.07 | 9.70 | 38.67 | 56.00 | -17.33 | QP |
| 0.641 | 21.33 | 0.07 | 9.70 | 31.10 | 46.00 | -14.90 | AVERAGE |
| 1.203 | 28.36 | 0.05 | 9.70 | 38.11 | 56.00 | -17.89 | QP |
| 1.203 | 19.02 | 0.05 | 9.70 | 28.77 | 46.00 | -17.23 | AVERAGE |
| 1.878 | 27.18 | 0.05 | 9.70 | 36.93 | 56.00 | -19.07 | QP |
| 1.878 | 18.02 | 0.05 | 9.70 | 27.77 | 46.00 | -18.23 | AVERAGE |
| 3.547 | 16.02 | 0.16 | 9.70 | 25.88 | 46.00 | -20.12 | AVERAGE |
| 3.547 | 27.24 | 0.16 | 9.70 | 37.10 | 56.00 | -18.90 | QP |
| 5.993 | 29.34 | 0.18 | 9.75 | 39.27 | 60.00 | -20.73 | QP |
| 5.993 | 17.02 | 0.18 | 9.75 | 26.95 | 50.00 | -23.05 | AVERAGE |

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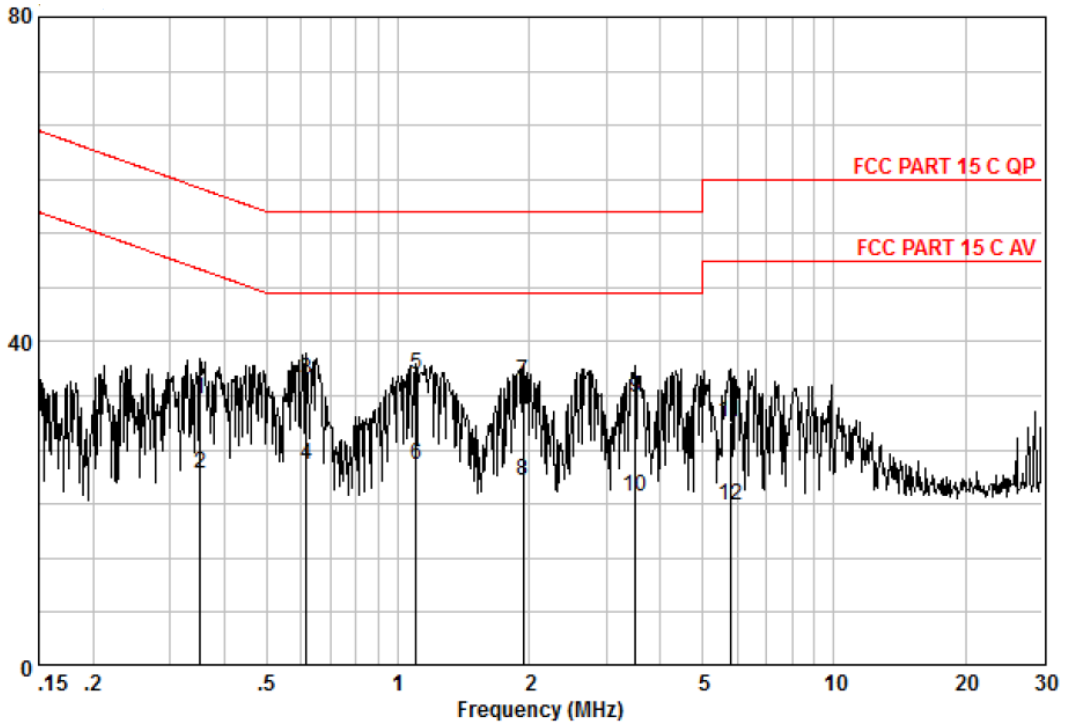
**Charging with min load mode**

Neutral Line

Level(dBµV)




Measure data:

| Freq | Read Level | Cable Loss | LISN Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB | dB | dBuV | dBuV | dB | |
| 0,352 | 23,12 | 0,08 | 9,66 | 32,86 | 58,91 | -26,06 | QP |
| 0,352 | 14,02 | 0,08 | 9,66 | 23,76 | 48,91 | -25,16 | AVERAGE |
| 0,617 | 25,48 | 0,07 | 9,67 | 35,22 | 56,00 | -20,78 | QP |
| 0,617 | 15,14 | 0,07 | 9,67 | 24,88 | 46,00 | -21,12 | AVERAGE |
| 1,100 | 26,14 | 0,05 | 9,68 | 35,87 | 56,00 | -20,13 | QP |
| 1,100 | 15,02 | 0,05 | 9,68 | 24,75 | 46,00 | -21,25 | AVERAGE |
| 1,939 | 25,32 | 0,05 | 9,69 | 35,06 | 56,00 | -20,94 | QP |
| 1,939 | 13,08 | 0,05 | 9,69 | 22,82 | 46,00 | -23,18 | AVERAGE |
| 3,509 | 23,28 | 0,16 | 9,71 | 33,14 | 56,00 | -22,86 | QP |
| 3,509 | 11,02 | 0,16 | 9,71 | 20,88 | 46,00 | -25,12 | AVERAGE |
| 5,774 | 20,14 | 0,18 | 9,72 | 30,04 | 60,00 | -29,96 | QP |
| 5,774 | 10,02 | 0,18 | 9,72 | 19,92 | 50,00 | -30,08 | AVERAGE |

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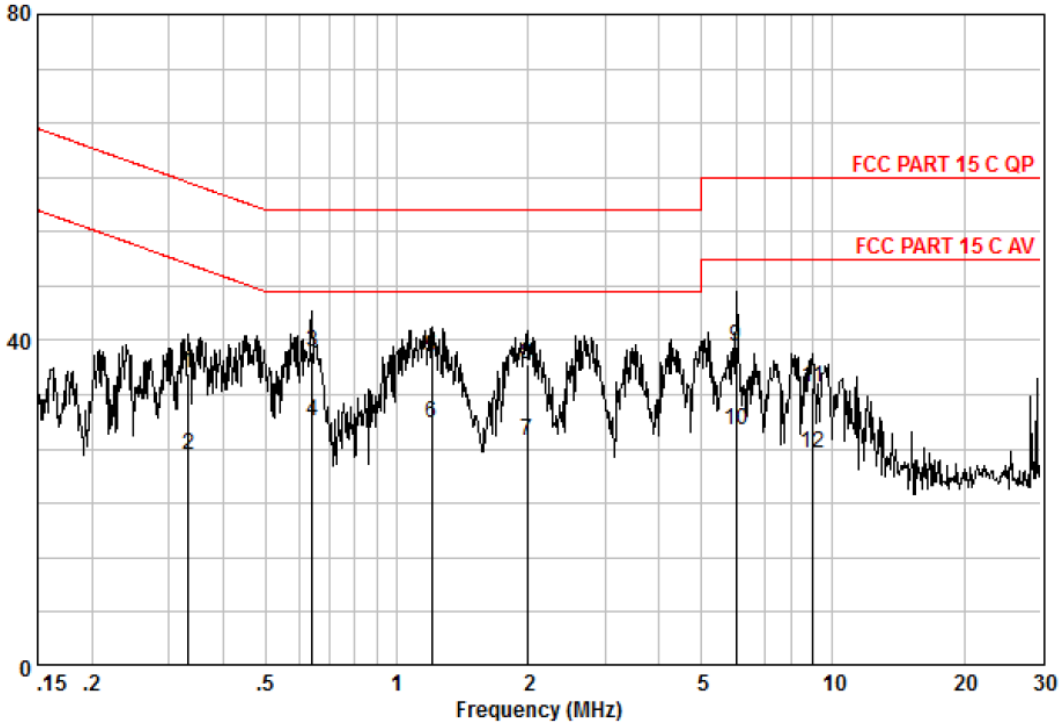
Live Line

Level(dBμV)




Measure result:

| Freq | Read Level | Cable Loss | LISN Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB | dB | dBuV | dBuV | dB | |
| 0,332 | 26,22 | 0,09 | 9,70 | 36,01 | 59,40 | -23,39 | QP |
| 0,332 | 16,14 | 0,09 | 9,70 | 25,93 | 49,40 | -23,47 | AVERAGE |
| 0,641 | 28,88 | 0,07 | 9,70 | 38,65 | 56,00 | -17,35 | QP |
| 0,641 | 20,39 | 0,07 | 9,70 | 30,16 | 46,00 | -15,84 | AVERAGE |
| 1,203 | 28,28 | 0,05 | 9,70 | 38,03 | 56,00 | -17,97 | QP |
| 1,203 | 20,14 | 0,05 | 9,70 | 29,89 | 46,00 | -16,11 | AVERAGE |
| 1,991 | 18,02 | 0,05 | 9,70 | 27,77 | 46,00 | -18,23 | AVERAGE |
| 1,991 | 27,34 | 0,05 | 9,70 | 37,09 | 56,00 | -18,91 | QP |
| 5,993 | 29,30 | 0,18 | 9,75 | 39,23 | 60,00 | -20,77 | QP |
| 5,993 | 19,02 | 0,18 | 9,75 | 28,95 | 50,00 | -21,05 | AVERAGE |
| 9,011 | 24,28 | 0,20 | 9,80 | 34,28 | 60,00 | -25,72 | QP |
| 9,011 | 16,08 | 0,20 | 9,80 | 26,08 | 50,00 | -23,92 | AVERAGE |

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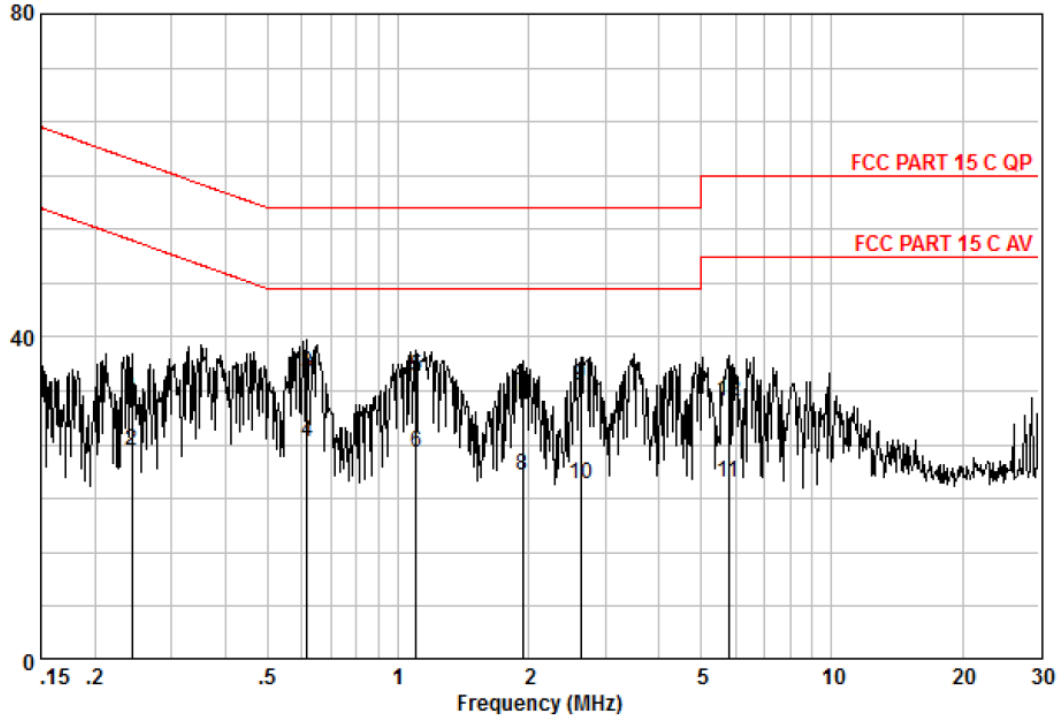
**Standby mode:**

Neutral Line

Level(dBμV)




Measure data:

| Freq | Read Level | Cable Loss | LISN Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB | dB | dBuV | dBuV | dB | |
| 0.243 | 22.42 | 0.11 | 9.66 | 32.19 | 62.00 | -29.80 | QP |
| 0.243 | 16.14 | 0.11 | 9.66 | 25.91 | 52.00 | -26.08 | AVERAGE |
| 0.617 | 25.80 | 0.07 | 9.67 | 35.54 | 56.00 | -20.46 | QP |
| 0.617 | 17.27 | 0.07 | 9.67 | 27.01 | 46.00 | -18.99 | AVERAGE |
| 1.100 | 25.28 | 0.05 | 9.68 | 35.01 | 56.00 | -20.99 | QP |
| 1.100 | 16.02 | 0.05 | 9.68 | 25.75 | 46.00 | -20.25 | AVERAGE |
| 1.939 | 23.12 | 0.05 | 9.69 | 32.86 | 56.00 | -23.14 | QP |
| 1.939 | 13.08 | 0.05 | 9.69 | 22.82 | 46.00 | -23.18 | AVERAGE |
| 2.636 | 24.26 | 0.12 | 9.69 | 34.07 | 56.00 | -21.93 | QP |
| 2.636 | 12.02 | 0.12 | 9.69 | 21.83 | 46.00 | -24.17 | AVERAGE |
| 5.774 | 12.02 | 0.18 | 9.72 | 21.92 | 50.00 | -28.08 | AVERAGE |
| 5.774 | 22.20 | 0.18 | 9.72 | 32.10 | 60.00 | -27.90 | QP |

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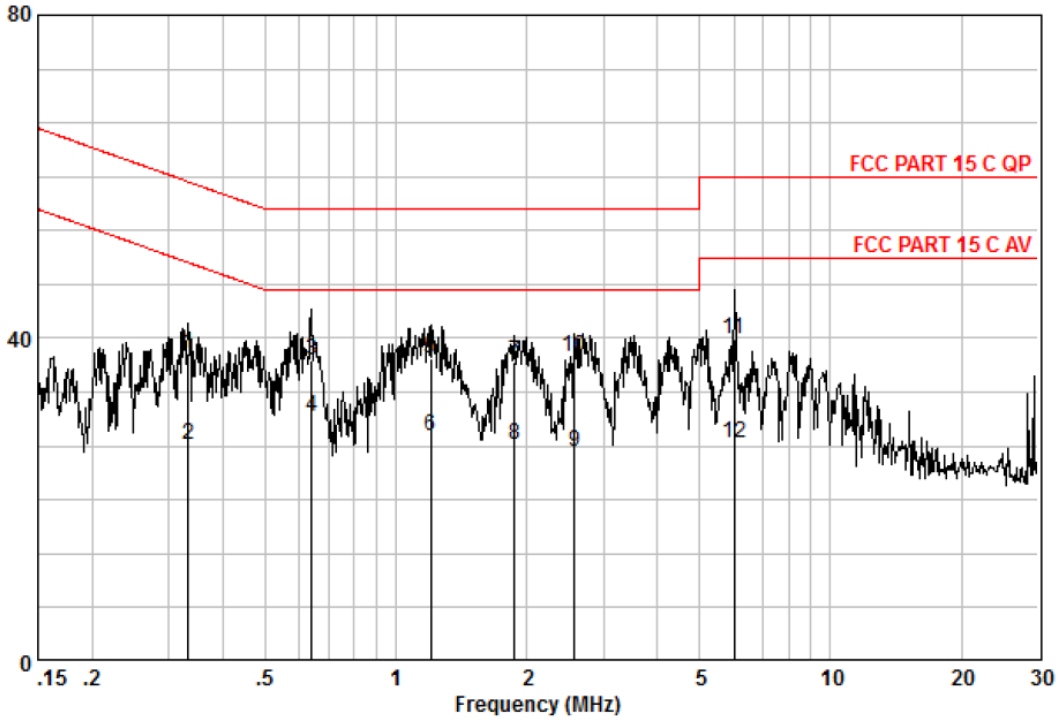
Live Line

Level(dBμV)




Measure result:

| Freq | Read Level | Cable Loss | LISN Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB | dB | dBuV | dBuV | dB | |
| 0.332 | 28.32 | 0.09 | 9.70 | 38.11 | 59.40 | -21.29 | QP |
| 0.332 | 17.08 | 0.09 | 9.70 | 26.87 | 49.40 | -22.53 | AVERAGE |
| 0.641 | 27.46 | 0.07 | 9.70 | 37.23 | 56.00 | -18.77 | QP |
| 0.641 | 20.57 | 0.07 | 9.70 | 30.34 | 46.00 | -15.66 | AVERAGE |
| 1.203 | 27.64 | 0.05 | 9.70 | 37.39 | 56.00 | -18.61 | QP |
| 1.203 | 18.08 | 0.05 | 9.70 | 27.83 | 46.00 | -18.17 | AVERAGE |
| 1.878 | 27.26 | 0.05 | 9.70 | 37.01 | 56.00 | -18.99 | QP |
| 1.878 | 17.14 | 0.05 | 9.70 | 26.89 | 46.00 | -19.11 | AVERAGE |
| 2.581 | 16.02 | 0.11 | 9.70 | 25.83 | 46.00 | -20.17 | AVERAGE |
| 2.581 | 27.96 | 0.11 | 9.70 | 37.77 | 56.00 | -18.23 | QP |
| 5.993 | 30.02 | 0.18 | 9.75 | 39.95 | 60.00 | -20.05 | QP |
| 5.993 | 17.02 | 0.18 | 9.75 | 26.95 | 50.00 | -23.05 | AVERAGE |

**--End of Report--**

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