# TEST REPORT

## No.I16N00381-EMC

**for**

**Huawei Technologies Co., Ltd.**

**Smart Phone**

**Model Name: HUAWEI CUN-L23,CUN-L23**

**FCC ID: QISCUN-L23**

**with**

**Hardware Version: Ver.A**

**Software Version: CUN-L23C464B009**

**Issued Date: 2016-04-22**

**Test Laboratory:**

***FCC 2.948 Listed: No.342690***

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

**Test Laboratory:**

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# REPORT HISTORY

| Report Number | Revision | Description | Issue Date |
|---|---|---|---|
| I16N00381-EMC | Rev.0 | 1st edition | 2016-04-22 |

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# 1. Test Laboratory

## 1.1. Testing Location

| | |
|---|---|
| Address: | TCL International E city No. 1001 Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong, China |
| Postal Code: | 518048 |
| Telephone: | +86(755)33322000 |
| Fax: | +86(755)33322000 |

## 1.2. Testing Environment

| | |
|---|---|
| Normal Temperature: | 15-35℃ |
| Relative Humidity: | 20-75% |

## 1.3. Project data

| | |
|---|---|
| Testing Start Date: | 2016-04-13 |
| Testing End Date: | 2016-04-18 |

## 1.4. Signature

Liang Yong
**(Prepared this test report)**

Zhang Yunzhuan
**(Reviewed this test report)**

Zhang Bojun
**Director of the laboratory**
**(Approved this test report)**

# 2. Client Information

## 2.1. Applicant Information

| | |
|---|---|
| Company Name: | Huawei Technologies Co., Ltd. |
| Address: | Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C |

## 2.2. Manufacturer Information

| | |
|---|---|
| Company Name: | Huawei Technologies Co., Ltd. |
| Address: | Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C |

# 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

## 3.1. About EUT

| | |
|---|---|
| Description | Smart Phone |
| Model Name | HUAWEI CUN-L23,CUN-L23 |
| FCC ID | QISCUN-L23 |
| TX Band | GSM850/1900,WCDMA Band 2/4/5,LTE Band 2/4/5/7 |
| RX Band | GSM850/1900,WCDMA Band 2/4/5, LTE Band 2/4/5/7 |

The Equipment Under Test (EUT)are a model of Smart Phone with integrated antenna.
The EUT supports GPRS service and EGPRS service.It has MP3,camera,USB memory, FM radio, GPS receiver ,Bluetooth and WLAN functions.
Remark: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed information.

## 3.2. Internal Identification of EUT

| EUT ID* | SN or IMEI |
|---|---|
| EUT | 869890020201426 |

*EUT ID: is used to identify the test sample in the lab internally.

## 3.3. Internal Identification of AE

| AE ID* | Description | SN |
|---|---|---|
| AE1 | Battery | / |
| AE2 | Travel charger | / |
| AE3 | USB cable | / |

AE1-1

| | |
|---|---|
| Model | HB4342A1RBC |
| Manufacturer | SCUD (FUJIAN) Electronics Co., Ltd. |
| Capacitance | 2200mAh |
| Nominal voltage | 3.8V |

AE1-2

| | |
|---|---|
| Model | HB4342A1RBC |
| Manufacturer | Sunwoda Electronic Co., LTD. |
| Capacitance | 2200mAh |
| Nominal voltage | 3.8V |

AE2-1

| | |
|---|---|
| Model | HW-050100U01 |
| Manufacturer | BYD Company Limited |
| Length of cable | / |
| SN | B66660F3G00021 |

AE2-2

| | |
|---|---|
| Model | HW-050100E01 |
| Manufacturer | BYD Company Limited |
| Length of cable | / |
| SN | B66799F5F00383 |
| AE2-3 | |
| Model | HW-050100U01 |
| Manufacturer | SHENZHEN HUNTKEY ELECTRIC CO., LTD |
| Length of cable | / |
| SN | H666LGF4M07273 |
| AE2-4 | |
| Model | HW-050100E01 |
| Manufacturer | SHENZHEN HUNTKEY ELECTRIC CO., LTD |
| Length of cable | / |
| SN | H667LJF7L06674 |
| AE2-5 | |
| Model | HW-050100E01 |
| Manufacturer | Dongguan Phitek Electronics Co., Ltd |
| Length of cable | / |
| SN | P66707F9F18319 |
| AE2-6 | |
| Model | HW-050100U01 |
| Manufacturer | Dongguan Phitek Electronics Co., Ltd |
| Length of cable | / |
| SN | P66605F7A00061 |
| AE2-7 | |
| Model | HW-050100B01 |
| Manufacturer | BYD Company Limited |
| Length of cable | / |
| SN | / |
| AE2-8 | |
| Model | HW-050100A01 |
| Manufacturer | BYD Company Limited |
| Length of cable | / |
| SN | / |
| AE2-9 | |
| Model | HW-050100B01 |
| Manufacturer | SHENZHEN HUNTKEY ELECTRIC CO., LTD |
| Length of cable | / |
| SN | / |
| AE2-10 | |
| Model | HW-050100A01 |
| Manufacturer | SHENZHEN HUNTKEY ELECTRIC CO., LTD |
| Length of cable | / |
| SN | / |

| | |
|---|---|
| AE2-11 | |
| Model | HW-050100B01 |
| Manufacturer | Dongguan Phitek Electronics Co., Ltd |
| Length of cable | / |
| SN | / |
| AE2-12 | |
| Model | HW-050100A01 |
| Manufacturer | Dongguan Phitek Electronics Co., Ltd |
| Length of cable | / |
| SN | / |
| AE3-1 | |
| Model | / |
| Manufacturer | CHANGSHU HONGLIN TECHNOLOGY CO.,LTD. |
| Length of cable | 94cm |
| AE3-2 | |
| Model | / |
| Manufacturer | FOXCONN INTERCONNECT TECHNOLOGY LIMITED. |
| Length of cable | 94cm |

*AE ID: is used to identify the test sample in the lab internally.

## 3.4. EUT set-ups

| EUT set-up No. | Combination of EUT and AE | Remarks |
|---|---|---|
| Set.1 | EUT+ AE1-1 + AE2-1 + AE3-1 | Charging mode |
| Set.2 | EUT+ AE1-2 + AE2-2 + AE3-2 | Charging mode |
| Set.3 | EUT+ AE1-1 + AE2-3 + AE3-1 | Charging mode |
| Set.4 | EUT+ AE1-2 + AE2-4 + AE3-2 | Charging mode |
| Set.5 | EUT+ AE1-1 + AE2-5 + AE3-1 | Charging mode |
| Set.6 | EUT+ AE1-2 + AE2-6 + AE3-2 | Charging mode |
| Set.7 | EUT+ AE1-1 + AE3-1 | USB mode |
| Set.8 | EUT+ AE1-2 + AE3-2 | USB mode |

# 4. Reference Documents

## 4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

| Reference | Title | Version |
|---|---|---|
| FCC Part 15, Subpart B | Radio frequency devices | 10-1-2015 Edition |
| ANSI C63.4 | Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz | 2014 |

# 5. LABORATORY ENVIRONMENT

**Semi-anechoic chamber** did not exceed following limits along the EMC testing:

| | |
|---|---|
| Temperature | Min. = 15 ℃, Max. = 30 ℃ |
| Relative humidity | Min. = 35 %, Max. = 60 % |
| Shielding effectiveness | 0.014MHz-1MHz,>60dB;<br>1MHz-18000MHz,>90dB |
| Electrical insulation | > 2MΩ |
| Ground system resistance | < 4 Ω |
| Normalised site attenuation (NSA) | < ±4 dB, 3 m distance, from 30 to 1000 MHz |

**Shield room** did not exceed following limits along the EMC testing:

| | |
|---|---|
| Temperature | Min. = 15 ℃, Max. = 30 ℃ |
| Relative humidity | Min. =35 %, Max. = 60 % |
| Shielding effectiveness | 0.014MHz-1MHz,>60dB;<br>1MHz-10000MHz,>90dB |
| Electrical insulation | > 2MΩ |
| Ground system resistance | < 4 Ω |

**Fully-anechoic chamber** did not exceed following limits along the EMC testing:

| | |
|---|---|
| Temperature | Min. = 15 ℃, Max. = 30 ℃ |
| Relative humidity | Min. = 35 %, Max. = 60 % |
| Shielding effectiveness | 0.014MHz-1MHz,>60dB;<br>1MHz-18000MHz,>90dB |
| Electrical insulation | > 2MΩ |
| Ground system resistance | < 4 Ω |
| Voltage Standing Wave Ratio （VSWR） | ≤ 6 dB, from 1 to 18 GHz， 3 m distance |
| Uniformity of field strength | Between 0 and 6 dB, from 80 to 3000 MHz |

# 6. SUMMARY OF TEST RESULTS

| Abbreviations used in this clause: | |
|---|---|
| P | Pass |
| NA | Not applicable |
| F | Fail |

| Items | Test Name | Clause in FCC rules | Section in this report | Verdict |
|---|---|---|---|---|
| 1 | Radiated Emission | 15.109(a) | A.1 | P |
| 2 | Conducted Emission | 15.107(a) | A.2 | P |

## 7. Test Facilities Utilized

| NO. | NAME | TYPE | SERIES NUMBER | PRODUCER | CALDUE DATE | CAL PERIOD |
|---|---|---|---|---|---|---|
| 1. | Test Receiver | ESCI | 100701 | R&S | 2016.08.10 | 1 year |
| 2. | Test Receiver | ESCI | 100702 | R&S | 2016.05.30 | 1 year |
| 3. | Spectrum Analyzer | FSP 40 | 100378 | R&S | 2016.12.18 | 1 year |
| 4. | BiLog Antenna | VULB9163 | 9163 329 | Schwarzbeck | 2017.01.20 | 3 years |
| 5. | LISN | ESH2-Z5 | 100196 | R&S | 2017.01.12 | 1 year |
| 6. | Horn Antenna | 3117 | 00066585 | ETS-Lindgren | 2019.03.05 | 3 years |
| 7. | Universal Radio Communication Tester | E5515C | GB44051324 | Agilent | 2016.05.19 | 1 year |
| 8. | PC | M4099t | SA08850737 | Lenovo | / | / |
| 9. | Monitor | L1710d | 0M04340B10 01010 | Lenovo | / | / |
| 10. | Printer | P1008 | VNF6C12491 | HP | / | / |
| 11. | Keyboard | KB-0225 | 0723779 | Lenovo | / | / |
| 12. | Mouse | MO28UOL | 44B39412 | Lenovo | / | / |

# ANNEX A: MEASUREMENT RESULTS

## A.1 Radiated Emission (§15.109(a))

**Reference**

FCC: CFR Part 15.109(a)

### A.1.1 Method of measurement

The field strength of radiated emissions from the unintentional radiator (USB mode of MS and charging mode of MS) at a distance of 3 meters is tested. Tested in accordance with the procedures of ANSI C63.4 - 2014, section 8.3.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

### A.1.2 EUT Operating Mode:

The MS is operating in the USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode. The model of the PC is Lenovo Thinkcentre M4099t, and the serial number of the PC is SA08850737. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

### A.1.3 Measurement Limit

Limit from CFR Part 15.109(a)

| Frequency range (MHz) | Field strength limit (μV/m) | | |
|---|---|---|---|
| | Quasi-peak | Average | Peak |
| 30-88 | 100 | | |
| 88-216 | 150 | | |
| 216-960 | 200 | | |
| 960-1000 | 500 | | |
| >1000 | | 500 | 5000 |

*Note: The original limit is defined at 10m test distance. This limit is calculated according to CISPR requirements.

### A.1.4 Test Condition

| Frequency of emission (MHz) | RBW/VBW | Sweep Time(s) |
|---|---|---|
| 30-1000 | 120kHz (IF bandwidth) | 5 |
| Above 1000 | 1MHz/3MHz | 15 |

### A.1.5 Measurement Results

A "reference path loss" is established and the $A_{Rpl}$ is the attenuation of “reference path loss”. It includes the antenna factor of receive antenna and the path loss.

The measurement results are obtained as described below:

Result = $P_{Mea} + A_{Rpl} = P_{Mea} + G_A + G_{PL}$

Where

$G_A$: Antenna factor of receive antenna

$G_{PL}$: Path Loss

$P_{Mea}$: Measurement result on receiver.

Note: the result contains vertical part and Horizontal part

**RE Measurement uncertainty:** 30M-1GHz: 5.08dB (k=2);
1GHz-18GHz: 4.56 dB (k=2)

**Set.1 Charging mode / Peak detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBμV/m) |
|---|---|---|---|---|---|
| 14214.000000 | 58.9 | V | 13.4 | 15.1 | 74.0 |
| 15183.000000 | 59.2 | H | 14.3 | 14.8 | 74.0 |
| 15766.500000 | 61.1 | H | 14.4 | 12.9 | 74.0 |
| 16297.000000 | 60.8 | V | 15.2 | 13.2 | 74.0 |
| 16874.000000 | 61.6 | V | 16.1 | 12.4 | 74.0 |
| 17415.000000 | 61.4 | V | 16.2 | 12.6 | 74.0 |

**Set.1 Charging mode / Average detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBμV/m) |
|---|---|---|---|---|---|
| 14152.500000 | 46.4 | H | 13.3 | 7.6 | 54.0 |
| 15173.000000 | 47.6 | V | 14.3 | 6.4 | 54.0 |
| 15671.500000 | 48.8 | V | 14.4 | 5.2 | 54.0 |
| 16215.000000 | 49.3 | V | 14.9 | 4.7 | 54.0 |
| 16849.000000 | 49.9 | H | 16.0 | 4.1 | 54.0 |
| 17403.000000 | 49.5 | V | 16.2 | 4.5 | 54.0 |

**Set.2 Charging mode / Peak detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|
| 14095.000000 | 58.2 | H | 13.1 | 15.8 | 74.0 |
| 14629.500000 | 59.1 | H | 13.9 | 14.9 | 74.0 |
| 15686.000000 | 60.5 | H | 14.4 | 13.5 | 74.0 |
| 16206.500000 | 61.1 | V | 14.9 | 12.9 | 74.0 |
| 16906.500000 | 61.6 | H | 16.3 | 12.4 | 74.0 |
| 17364.500000 | 62.7 | V | 16.0 | 11.3 | 74.0 |

**Set.2 Charging mode / Average detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|
| 14129.000000 | 46.3 | H | 13.2 | 7.7 | 54.0 |
| 15162.500000 | 47.7 | V | 14.3 | 6.3 | 54.0 |
| 15679.000000 | 48.7 | V | 14.4 | 5.3 | 54.0 |
| 16219.500000 | 49.2 | H | 14.9 | 4.8 | 54.0 |
| 16777.000000 | 49.7 | V | 15.6 | 4.3 | 54.0 |
| 17422.000000 | 49.5 | H | 16.2 | 4.5 | 54.0 |

**Set.3 Charging mode / Peak detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|
| 14158.500000 | 58.3 | V | 13.3 | 15.7 | 74.0 |
| 15151.000000 | 58.8 | V | 14.3 | 15.2 | 74.0 |
| 15666.000000 | 60.6 | H | 14.4 | 13.4 | 74.0 |
| 16120.500000 | 60.6 | H | 15.1 | 13.4 | 74.0 |
| 16797.500000 | 60.8 | H | 15.7 | 13.2 | 74.0 |
| 17355.500000 | 61.2 | V | 15.9 | 12.8 | 74.0 |

**Set.3 Charging mode / Average detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|
| 14549.500000 | 46.6 | H | 13.8 | 7.4 | 54.0 |
| 15157.000000 | 47.6 | V | 14.3 | 6.4 | 54.0 |
| 15692.000000 | 48.5 | V | 14.4 | 5.5 | 54.0 |
| 16202.000000 | 48.9 | H | 15.0 | 5.1 | 54.0 |
| 16841.500000 | 49.5 | H | 16.0 | 4.5 | 54.0 |
| 17406.000000 | 49.1 | V | 16.2 | 4.9 | 54.0 |

**Set.4 Charging mode / Peak detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|
| 14169.500000 | 57.8 | V | 13.3 | 16.2 | 74.0 |
| 15182.000000 | 59.3 | H | 14.3 | 14.7 | 74.0 |
| 15720.500000 | 60.3 | H | 14.4 | 13.7 | 74.0 |
| 16357.500000 | 60.4 | H | 15.5 | 13.6 | 74.0 |
| 16830.500000 | 60.6 | H | 15.9 | 13.4 | 74.0 |
| 17399.000000 | 60.7 | H | 16.1 | 13.3 | 74.0 |

**Set.4 Charging mode / Average detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|
| 14543.000000 | 46.4 | V | 13.7 | 7.6 | 54.0 |
| 15157.000000 | 47.5 | V | 14.3 | 6.5 | 54.0 |
| 15702.500000 | 48.4 | H | 14.4 | 5.6 | 54.0 |
| 16198.500000 | 49.1 | H | 15.0 | 4.9 | 54.0 |
| 16856.000000 | 49.3 | V | 16.0 | 4.7 | 54.0 |
| 17334.500000 | 49.1 | V | 15.8 | 4.9 | 54.0 |

**Set.5 Charging mode / Peak detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|
| 14129.000000 | 58.0 | H | 13.2 | 16.0 | 74.0 |
| 15150.500000 | 59.1 | H | 14.3 | 14.9 | 74.0 |
| 15807.000000 | 59.9 | H | 14.6 | 14.1 | 74.0 |
| 16218.000000 | 60.6 | H | 14.9 | 13.4 | 74.0 |
| 16776.500000 | 61.6 | H | 15.6 | 12.4 | 74.0 |
| 17369.500000 | 60.2 | V | 16.0 | 13.8 | 74.0 |

**Set.5 Charging mode / Average detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|
| 14526.500000 | 46.4 | V | 13.7 | 7.6 | 54.0 |
| 15179.500000 | 47.5 | V | 14.3 | 6.5 | 54.0 |
| 15773.500000 | 48.2 | H | 14.5 | 5.8 | 54.0 |
| 16203.500000 | 48.5 | V | 15.0 | 5.5 | 54.0 |
| 16846.500000 | 49.0 | H | 16.0 | 5.0 | 54.0 |
| 17426.000000 | 48.8 | V | 16.2 | 5.2 | 54.0 |

**Set.6 Charging mode / Peak detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|
| 14139.500000 | 58.1 | H | 13.3 | 15.9 | 74.0 |
| 15176.000000 | 59.2 | H | 14.3 | 14.8 | 74.0 |
| 15678.500000 | 59.9 | H | 14.4 | 14.1 | 74.0 |
| 16289.000000 | 60.7 | V | 15.2 | 13.3 | 74.0 |
| 16842.500000 | 61.1 | V | 16.0 | 12.9 | 74.0 |
| 17473.500000 | 60.7 | V | 16.1 | 13.3 | 74.0 |

**Set.6 Charging mode / Average detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|
| 14535.500000 | 46.4 | V | 13.7 | 7.6 | 54.0 |
| 15153.000000 | 47.3 | H | 14.3 | 6.7 | 54.0 |
| 15684.000000 | 48.1 | V | 14.4 | 5.9 | 54.0 |
| 16198.500000 | 48.5 | V | 15.0 | 5.5 | 54.0 |
| 16838.500000 | 49.0 | H | 15.9 | 5.0 | 54.0 |
| 17406.000000 | 48.6 | H | 16.2 | 5.4 | 54.0 |

**Set.7 USB mode / Peak detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|
| 14517.000000 | 58.4 | V | 13.6 | 15.6 | 74.0 |
| 15152.000000 | 59.6 | V | 14.3 | 14.4 | 74.0 |
| 15690.500000 | 60.3 | H | 14.4 | 13.7 | 74.0 |
| 16237.000000 | 61.2 | H | 14.9 | 12.8 | 74.0 |
| 16712.500000 | 61.9 | V | 15.5 | 12.1 | 74.0 |
| 17490.500000 | 61.6 | H | 16.0 | 12.4 | 74.0 |

**Set.7 USB mode / Average detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|
| 14533.500000 | 46.4 | V | 13.7 | 7.6 | 54.0 |
| 15178.500000 | 47.7 | V | 14.3 | 6.3 | 54.0 |
| 15671.500000 | 48.5 | V | 14.4 | 5.5 | 54.0 |
| 16226.500000 | 49.2 | H | 14.9 | 4.8 | 54.0 |
| 16790.000000 | 49.6 | V | 15.7 | 4.4 | 54.0 |
| 17425.500000 | 49.3 | H | 16.2 | 4.7 | 54.0 |

**Set.8 USB mode / Peak detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|
| 14514.500000 | 58.3 | H | 13.6 | 15.7 | 74.0 |
| 15176.500000 | 60.1 | V | 14.3 | 13.9 | 74.0 |
| 15772.000000 | 59.9 | V | 14.5 | 14.1 | 74.0 |
| 16180.000000 | 60.8 | H | 15.0 | 13.2 | 74.0 |
| 16880.000000 | 61.7 | V | 16.2 | 12.3 | 74.0 |
| 17346.000000 | 61.0 | V | 15.9 | 13.0 | 74.0 |

**Set.8 USB mode / Average detector**

| Frequency(MHz) | Result(dBuV/m) | Polarity | $A_{Rpl}$ (dB) | Margin(dB) | Limit (dBµV/m) |
|---|---|---|---|---|---|
| 14539.000000 | 46.6 | V | 13.7 | 7.4 | 54.0 |
| 15162.000000 | 47.6 | H | 14.3 | 6.4 | 54.0 |
| 15742.000000 | 48.4 | V | 14.4 | 5.6 | 54.0 |
| 16213.500000 | 48.9 | V | 14.9 | 5.1 | 54.0 |
| 16836.000000 | 49.3 | H | 15.9 | 4.7 | 54.0 |
| 17346.500000 | 49.0 | H | 15.9 | 5.0 | 54.0 |

Note: The measurement result of Set.1,Set.2,Set.3,Set.4, Set.5,Set.6, Set.7 and Set.8 showed here are worst cases of combinations of different batteries and USB cables.

**Charging mode: Set 1**

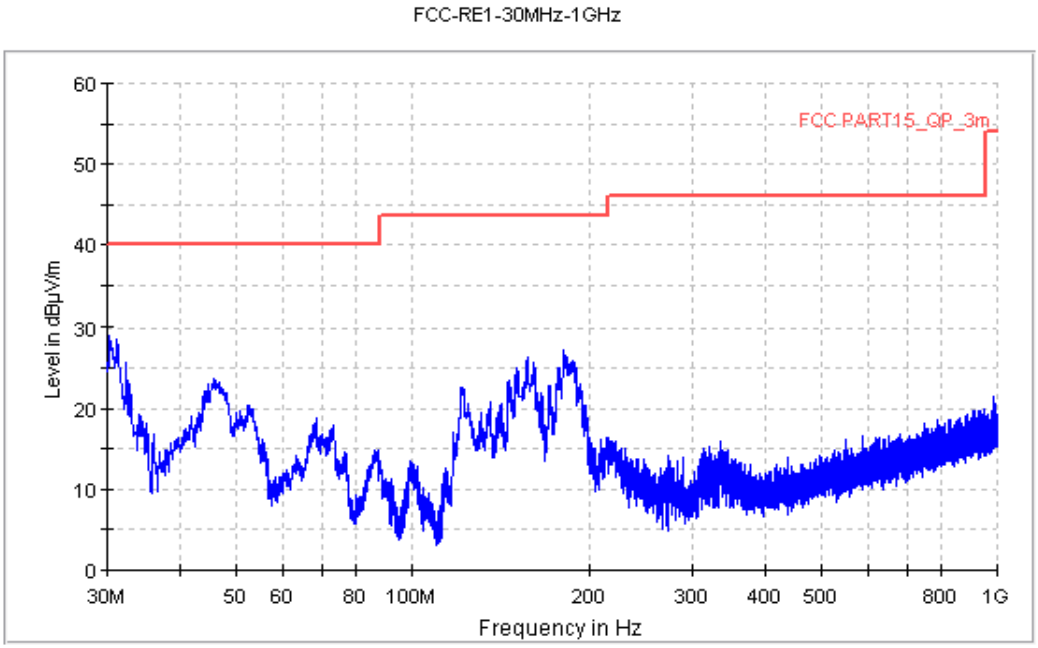


**Figure A.1 Radiated Emission from 30MHz to 1GHz**

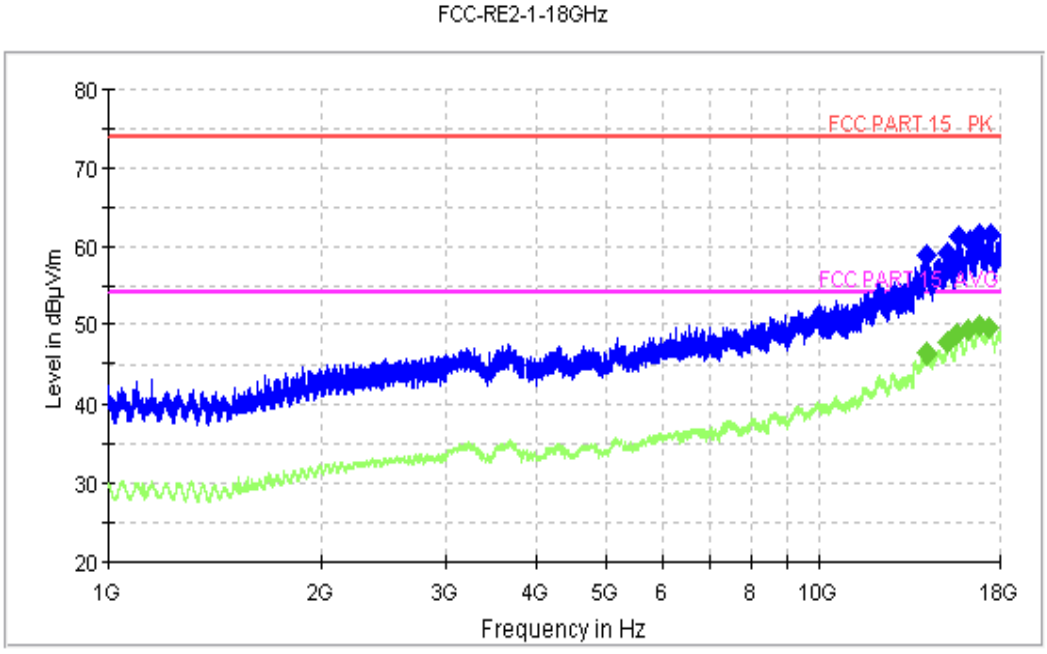


**Figure A.2 Radiated Emission from 1GHz to 18GHz**

**Charging mode: Set 2**

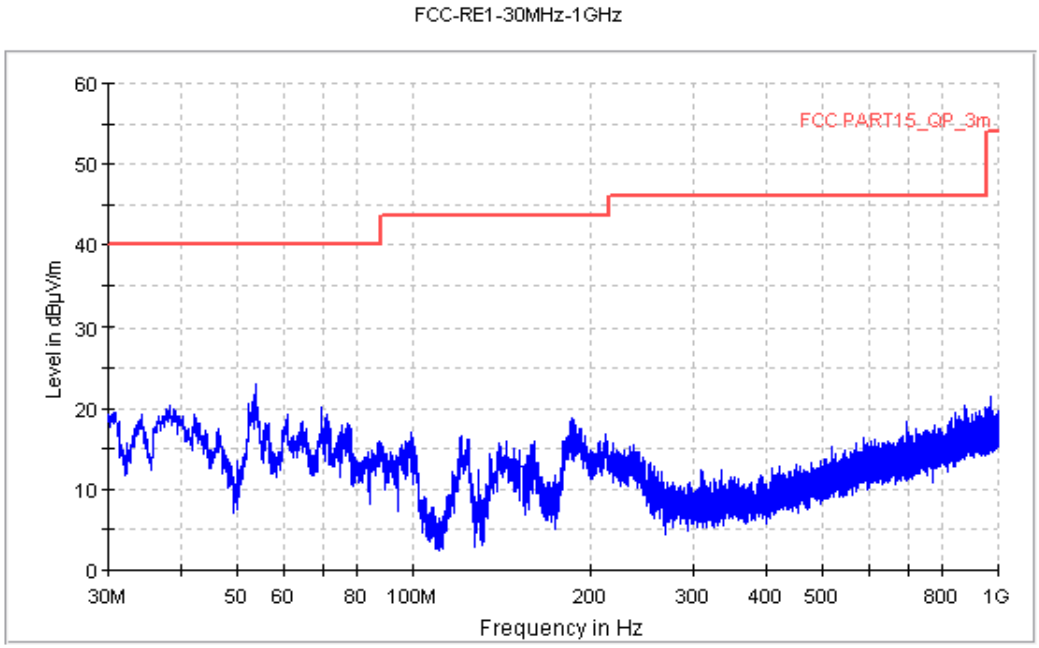


**Figure A.3 Radiated Emission from 30MHz to 1GHz**

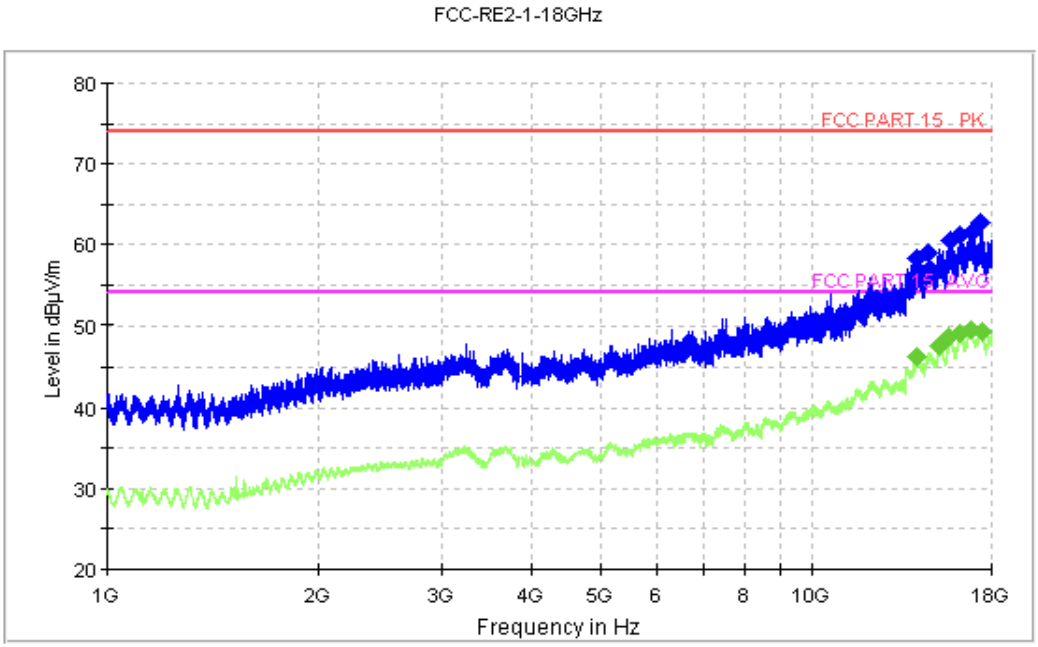


**Figure A.4 Radiated Emission from 1GHz to 18GHz**

**Charging mode: Set 3**

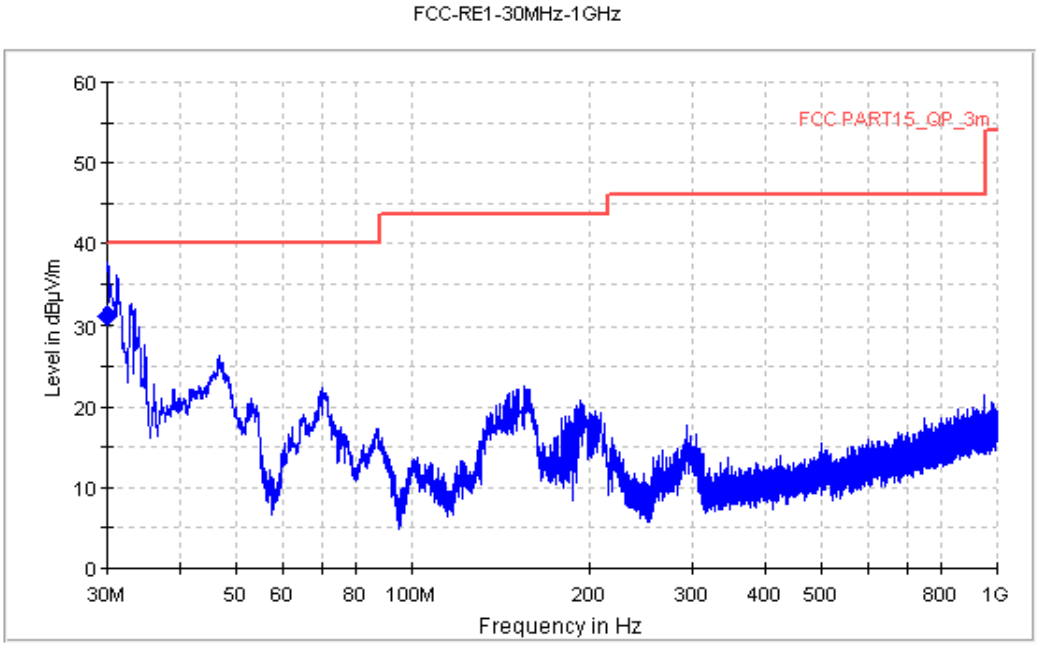


**Figure A.5 Radiated Emission from 30MHz to 1GHz**

**Final Result 1**

| Frequency (MHz) | QuasiPeak (dBµV/m) | Bandwidth (kHz) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) |
|---|---|---|---|---|---|---|
| 30.000000 | 31.1 | 120.000 | V | 71.0 | -36.5 | 8.9 |

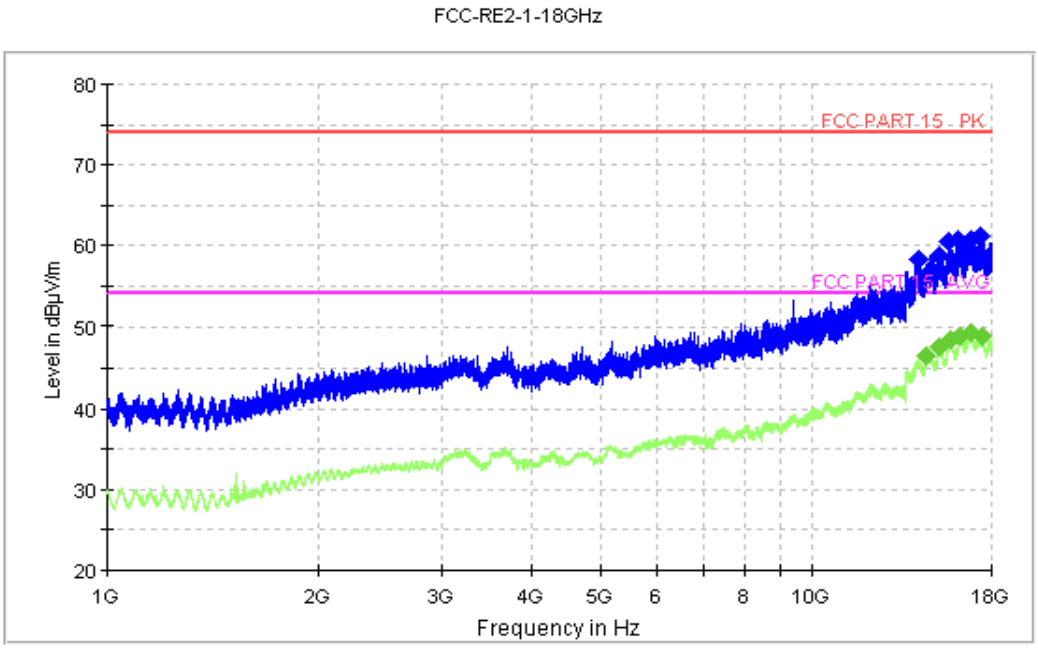


**Figure A.6 Radiated Emission from 1GHz to 18GHz**

**Charging mode: Set 4**

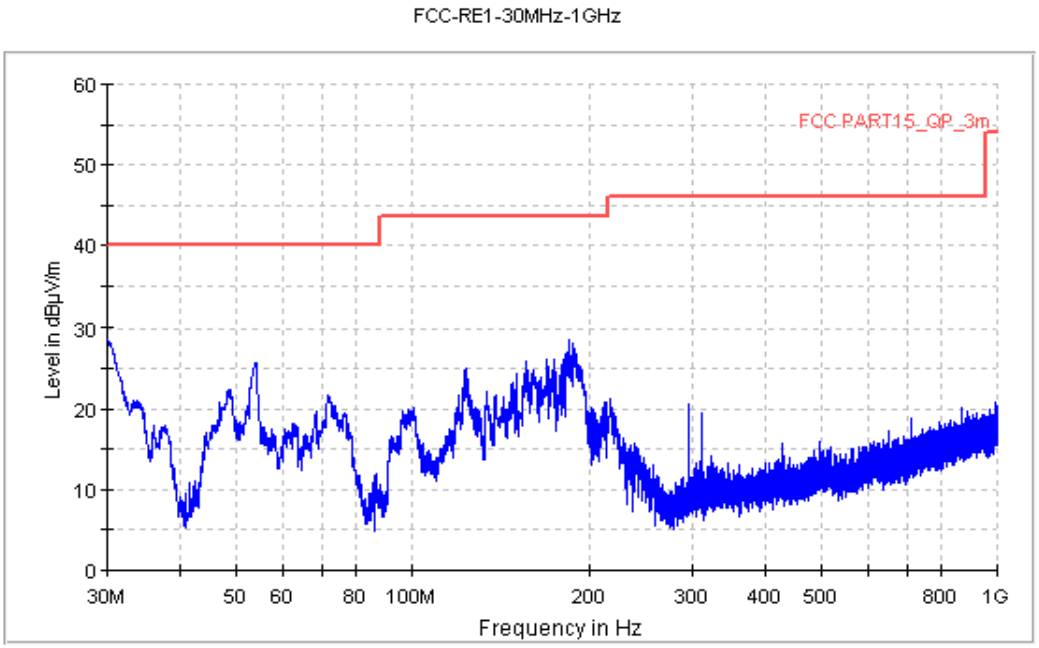


**Figure A.7 Radiated Emission from 30MHz to 1GHz**

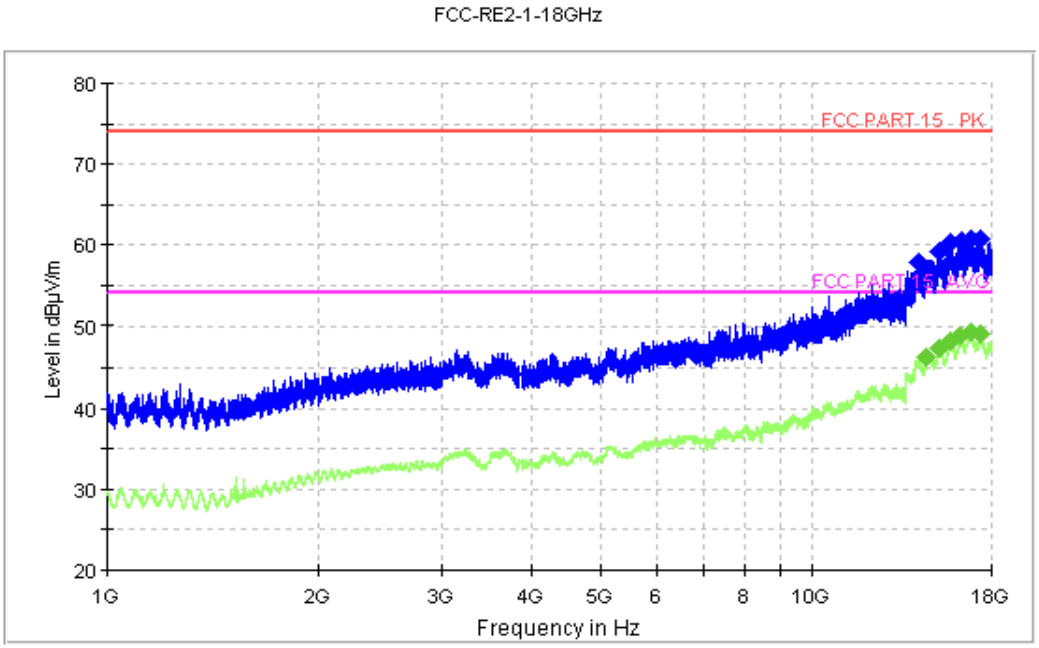


**Figure A.8 Radiated Emission from 1GHz to 18GHz**

**Charging mode: Set 5**

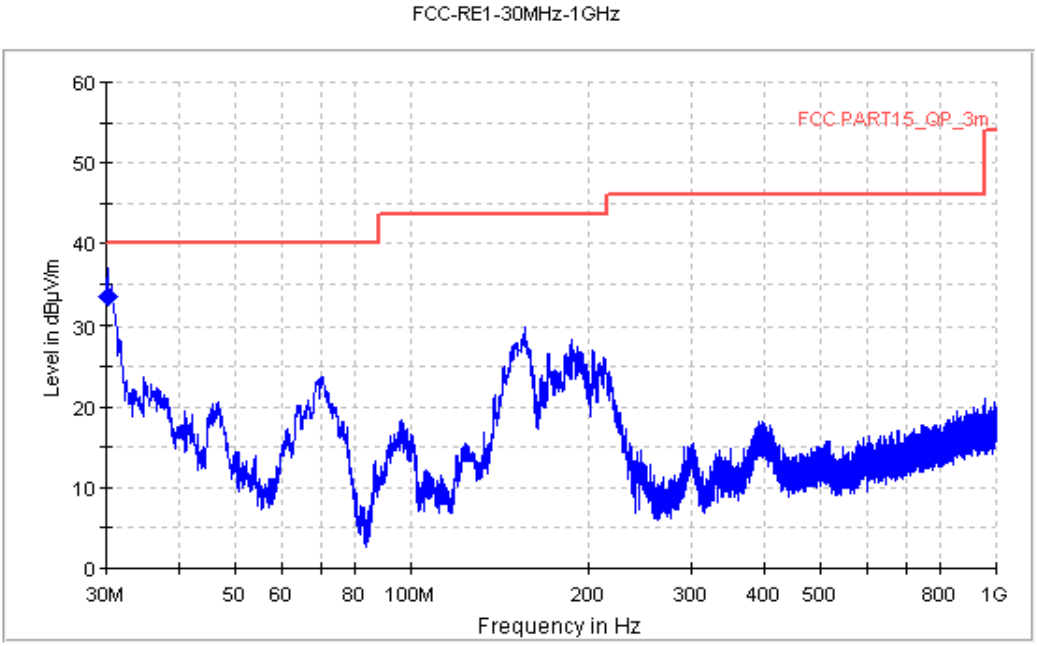


**Figure A.9 Radiated Emission from 30MHz to 1GHz**

**Final Result 1**

| Frequency (MHz) | QuasiPeak (dBµV/m) | Bandwidth (kHz) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) |
|---|---|---|---|---|---|---|
| 30.245000 | 33.5 | 120.000 | V | 189.0 | -36.6 | 6.5 |

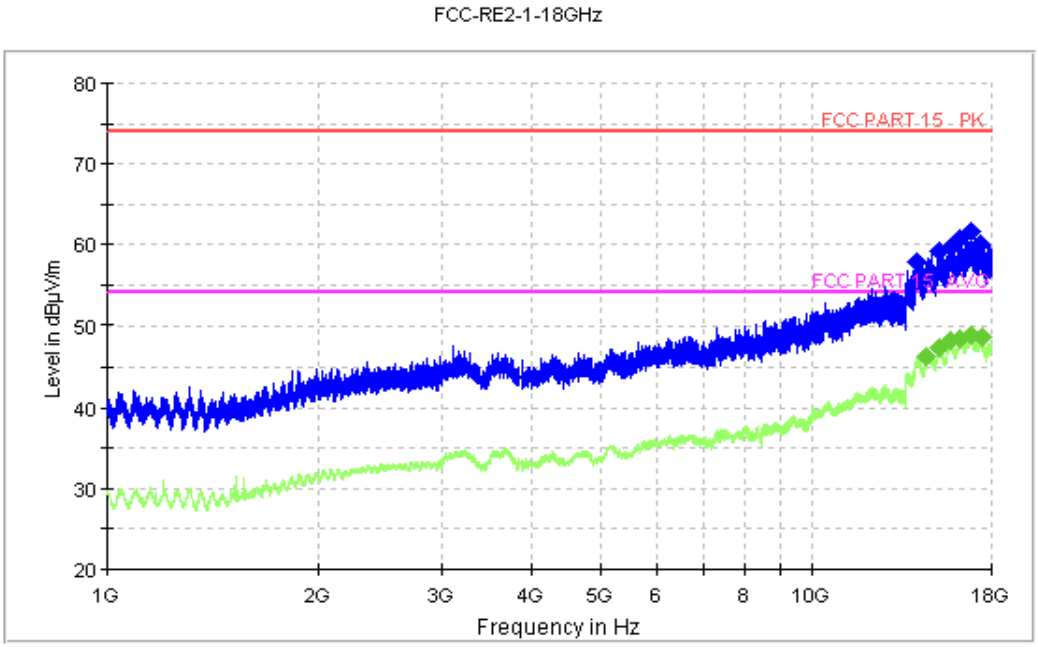


**Figure A.10 Radiated Emission from 1GHz to 18GHz**

**Charging mode: Set 6**

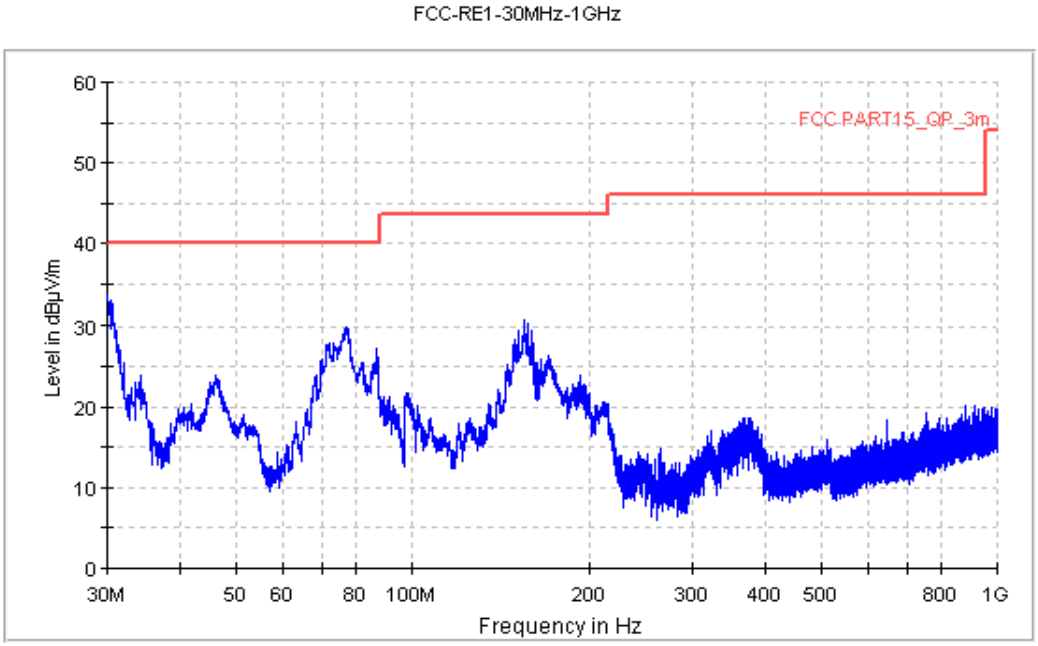


**Figure A.11 Radiated Emission from 30MHz to 1GHz**

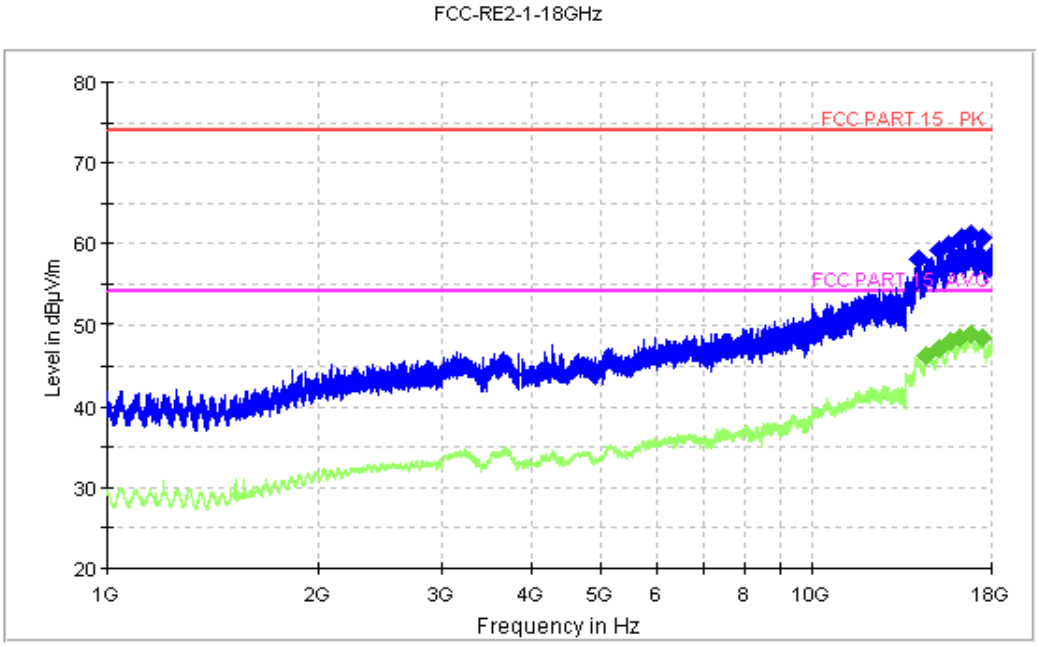


**Figure A.12 Radiated Emission from 1GHz to 18GHz**

**USB mode: Set 7**

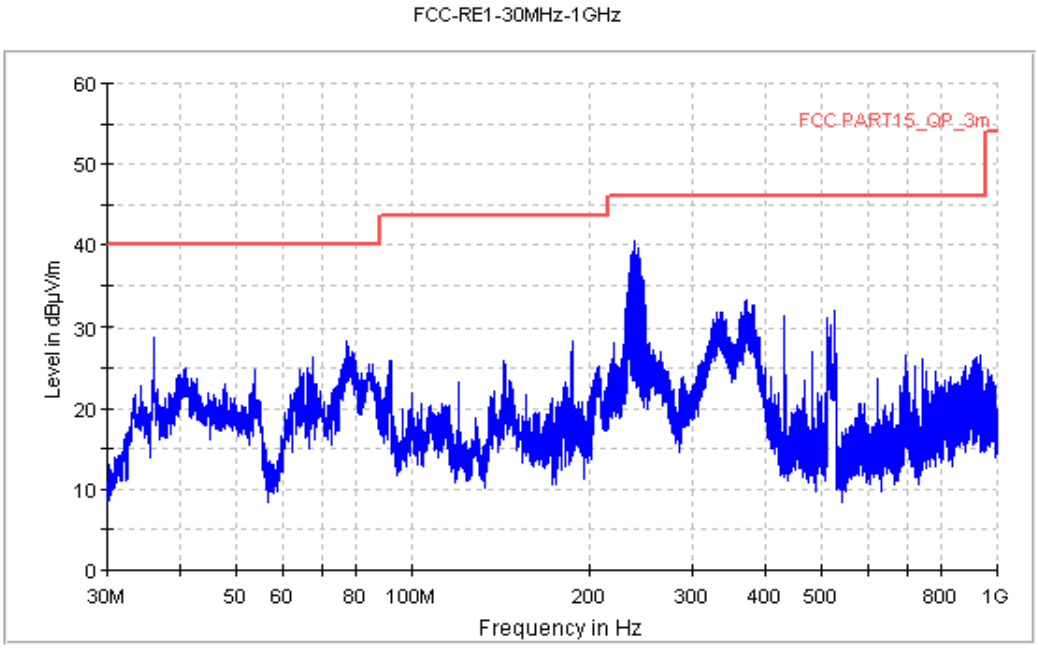


**Figure A.13 Radiated Emission from 30MHz to 1GHz**

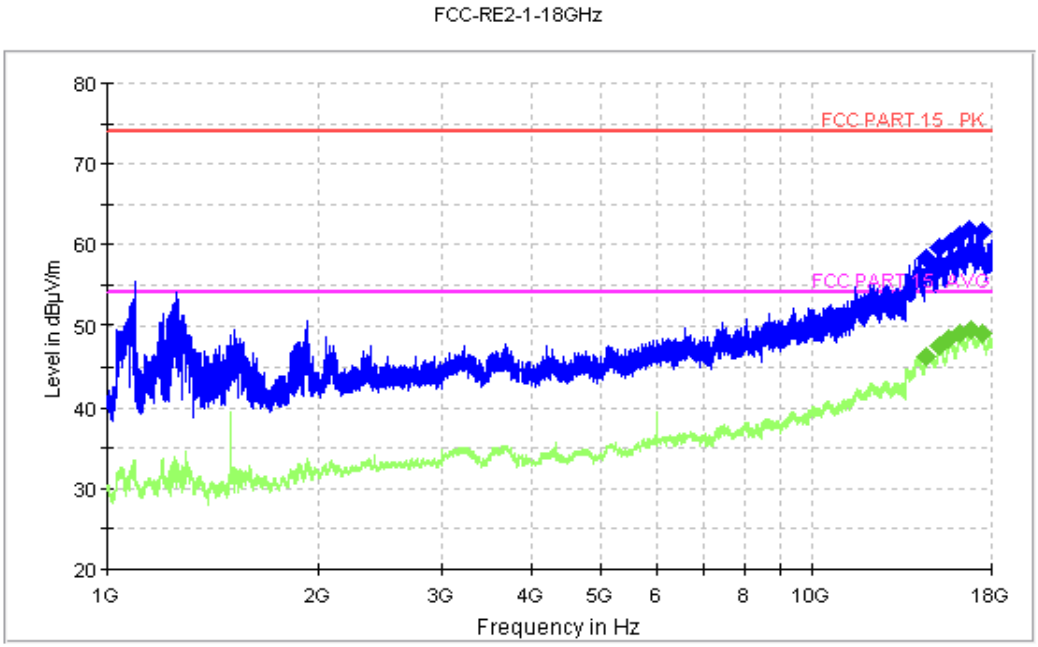


**Figure A.14 Radiated Emission from 1GHz to 18GHz**

**USB mode: Set 8**

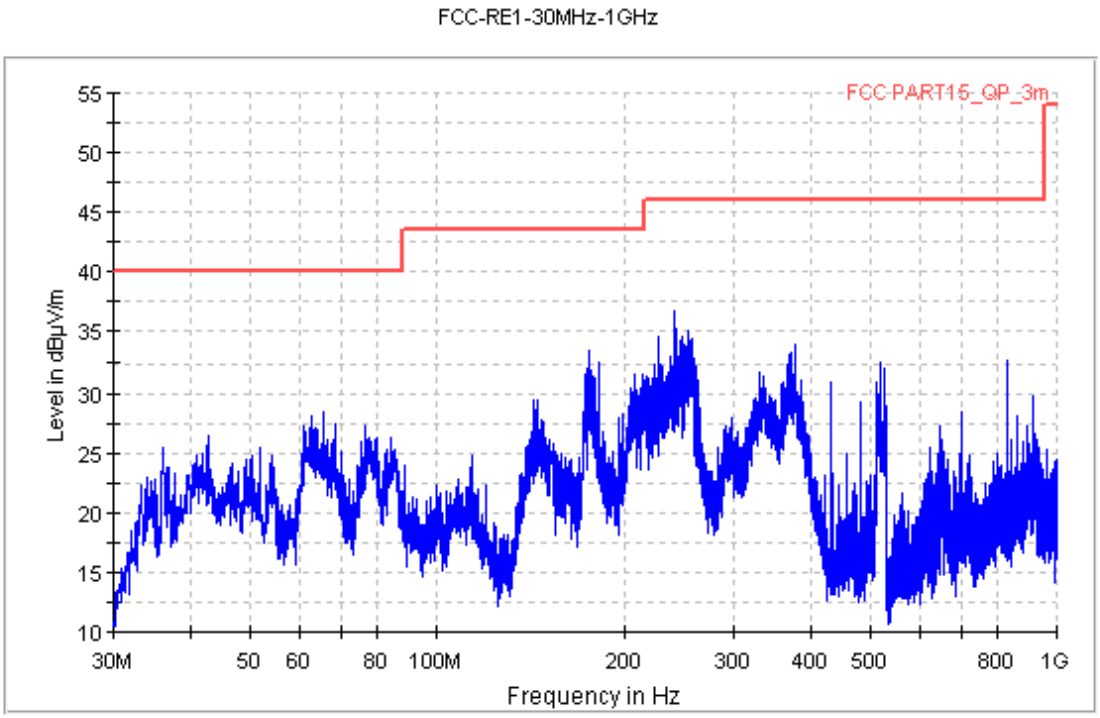


**Figure A.15 Radiated Emission from 30MHz to 1GHz**

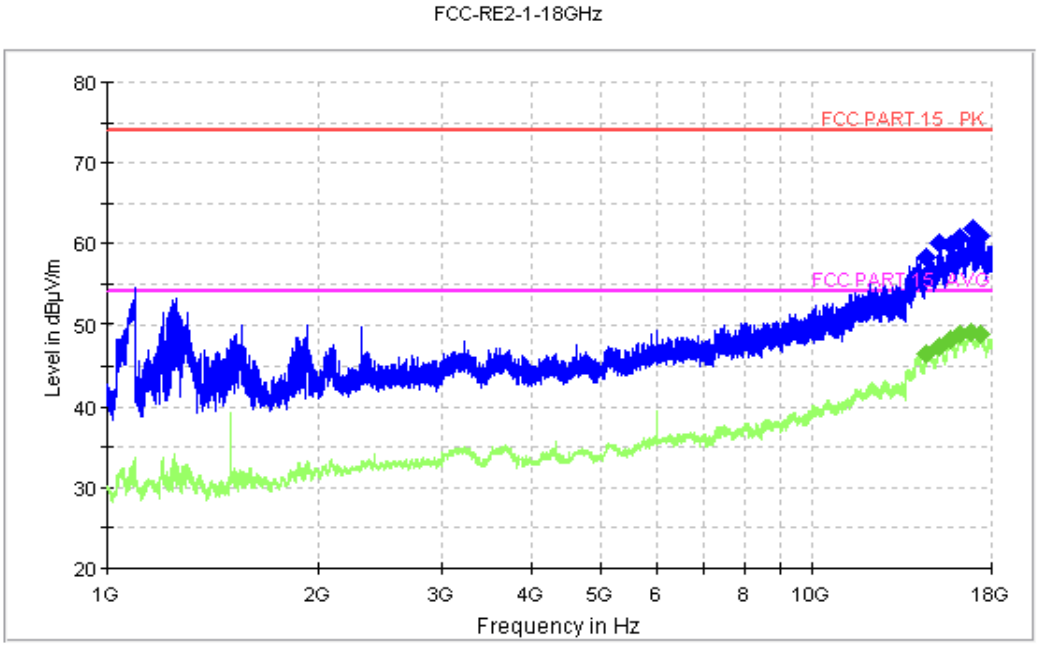


**Figure A.16 Radiated Emission from 1GHz to 18GHz**

**A.2 Conducted Emission (§15.107(a))**

**Reference**

FCC: CFR Part 15.107(a)

**A.2.1 Method of measurement**

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits. Tested in accordance with the procedures of ANSI C63.4 - 2014, section 7.3.

**A.2.2 EUT Operating Mode:**

The MS is operating in the USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode. The model of the PC is Lenovo Thinkcentre M4099t, and the serial number of the PC is SA08850737. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

**A.2.3 Measurement Limit**

| Frequency of emission (MHz) | Conducted limit (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |
| *Decreases with the logarithm of the frequency | | |

**A.2.4 Test Condition in charging mode**

| Voltage（V） | Frequency（Hz） |
|---|---|
| 120 | 60 |

| RBW | Sweep Time(s) |
|---|---|
| 9kHz | 1 |

**CE Measurement uncertainty:** 2.7 dB (k=2)

### A.2.5 Measurement Results

**Charging mode:Set.1**

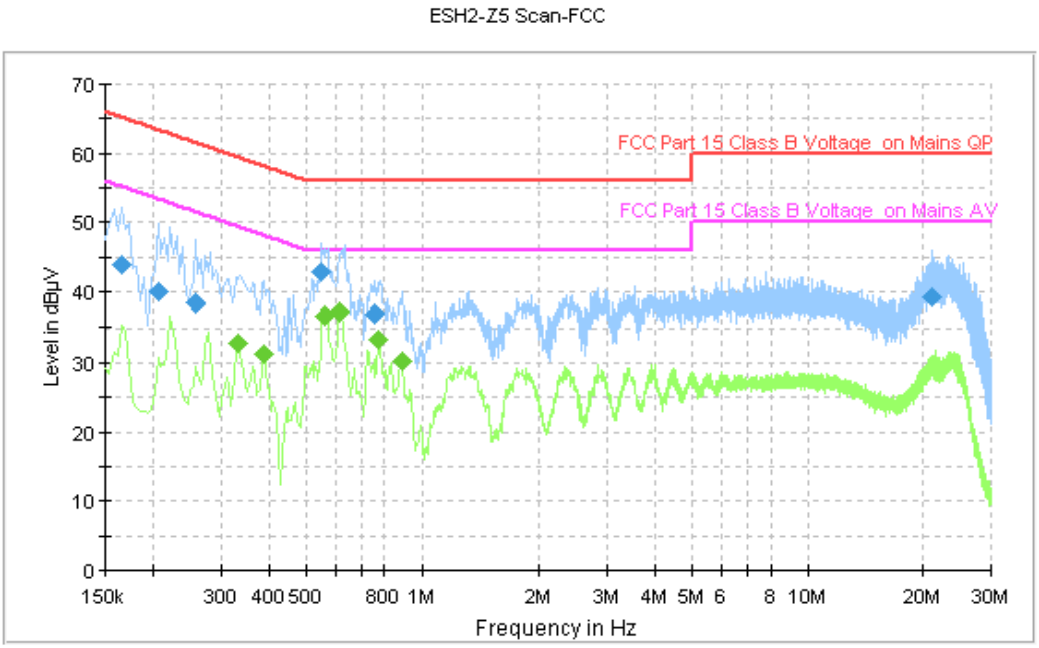


**Figure A.17 Conducted Emission**

**Final Measurement Detector 1**

| Frequency (MHz) | QuasiPeak (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.166000 | 43.8 | GND | L1 | 10.0 | 21.3 | 65.2 |
| 0.206000 | 40.0 | GND | L1 | 10.0 | 23.4 | 63.4 |
| 0.258000 | 38.4 | GND | L1 | 10.0 | 23.1 | 61.5 |
| 0.550000 | 43.0 | GND | N | 10.1 | 13.0 | 56.0 |
| 0.754000 | 36.9 | GND | N | 10.1 | 19.1 | 56.0 |
| 20.990000 | 39.4 | GND | L1 | 10.6 | 20.6 | 60.0 |

**Final Measurement Detector 2**

| Frequency (MHz) | Average (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.334000 | 32.8 | GND | N | 10.0 | 16.6 | 49.4 |
| 0.390000 | 31.3 | GND | N | 10.0 | 16.8 | 48.1 |
| 0.558000 | 36.6 | GND | N | 10.1 | 9.4 | 46.0 |
| 0.610000 | 37.2 | GND | N | 10.0 | 8.8 | 46.0 |
| 0.774000 | 33.2 | GND | N | 10.1 | 12.8 | 46.0 |
| 0.886000 | 30.3 | GND | N | 10.1 | 15.7 | 46.0 |

**Charging mode:Set.2**

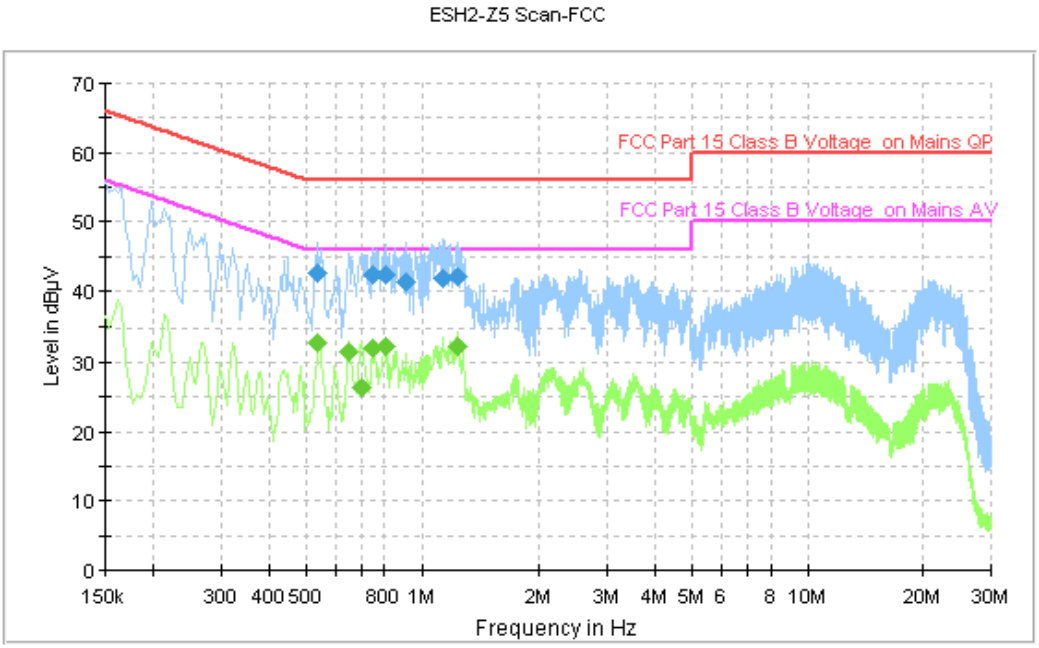


**Figure A.18 Conducted Emission**

**Final Measurement Detector 1**

| Frequency (MHz) | QuasiPeak (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.538000 | 42.6 | GND | L1 | 10.1 | 13.4 | 56.0 |
| 0.746000 | 42.5 | GND | L1 | 10.0 | 13.5 | 56.0 |
| 0.806000 | 42.4 | GND | L1 | 10.1 | 13.6 | 56.0 |
| 0.914000 | 41.3 | GND | L1 | 10.1 | 14.8 | 56.0 |
| 1.138000 | 41.9 | GND | L1 | 10.1 | 14.1 | 56.0 |
| 1.238000 | 42.0 | GND | L1 | 10.1 | 14.0 | 56.0 |

**Final Measurement Detector 2**

| Frequency (MHz) | Average (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.538000 | 32.9 | GND | L1 | 10.1 | 13.1 | 46.0 |
| 0.646000 | 31.6 | GND | L1 | 10.0 | 14.4 | 46.0 |
| 0.698000 | 26.4 | GND | L1 | 10.0 | 19.6 | 46.0 |
| 0.746000 | 32.1 | GND | L1 | 10.0 | 13.9 | 46.0 |
| 0.806000 | 32.3 | GND | L1 | 10.1 | 13.7 | 46.0 |
| 1.238000 | 32.3 | GND | L1 | 10.1 | 13.7 | 46.0 |

**Charging mode:Set.3**

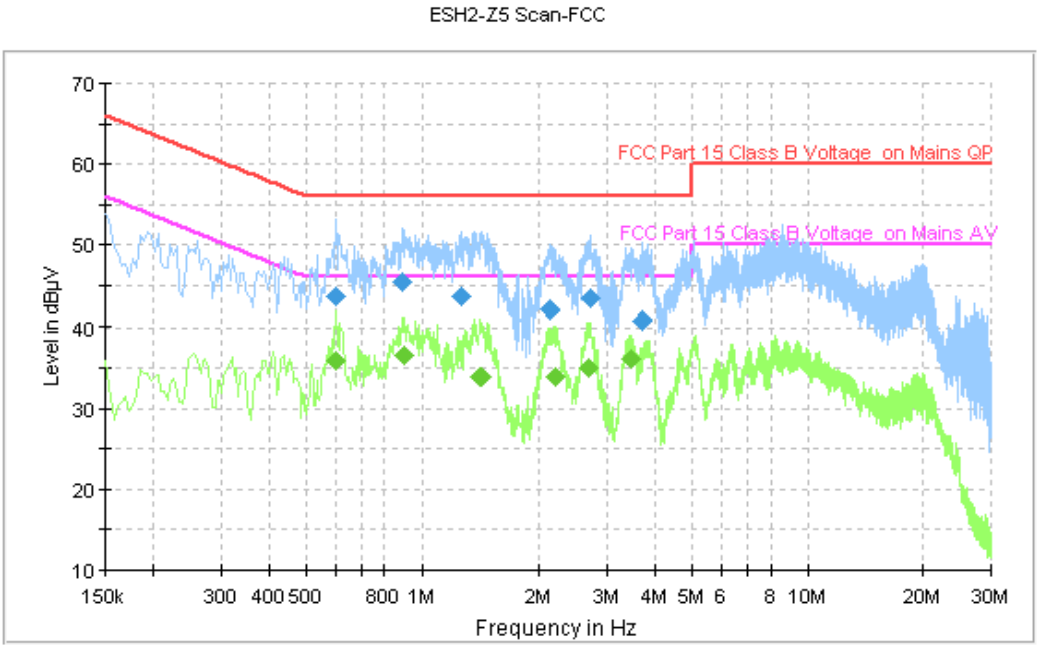


**Figure A.19 Conducted Emission**

**Final Measurement Detector 1**

| Frequency (MHz) | QuasiPeak (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.598000 | 43.7 | GND | L1 | 10.1 | 12.3 | 56.0 |
| 0.890000 | 45.4 | GND | L1 | 10.1 | 10.6 | 56.0 |
| 1.270000 | 43.7 | GND | N | 10.1 | 12.3 | 56.0 |
| 2.134000 | 42.0 | GND | L1 | 10.1 | 14.0 | 56.0 |
| 2.718000 | 43.4 | GND | L1 | 10.2 | 12.6 | 56.0 |
| 3.726000 | 40.8 | GND | N | 10.2 | 15.2 | 56.0 |

**Final Measurement Detector 2**

| Frequency (MHz) | Average (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.598000 | 35.8 | GND | L1 | 10.1 | 10.2 | 46.0 |
| 0.898000 | 36.6 | GND | L1 | 10.1 | 9.4 | 46.0 |
| 1.418000 | 34.0 | GND | L1 | 10.1 | 12.0 | 46.0 |
| 2.202000 | 33.9 | GND | L1 | 10.1 | 12.1 | 46.0 |
| 2.702000 | 35.1 | GND | L1 | 10.2 | 10.9 | 46.0 |
| 3.486000 | 36.0 | GND | L1 | 10.2 | 10.0 | 46.0 |

**Charging mode:Set.4**

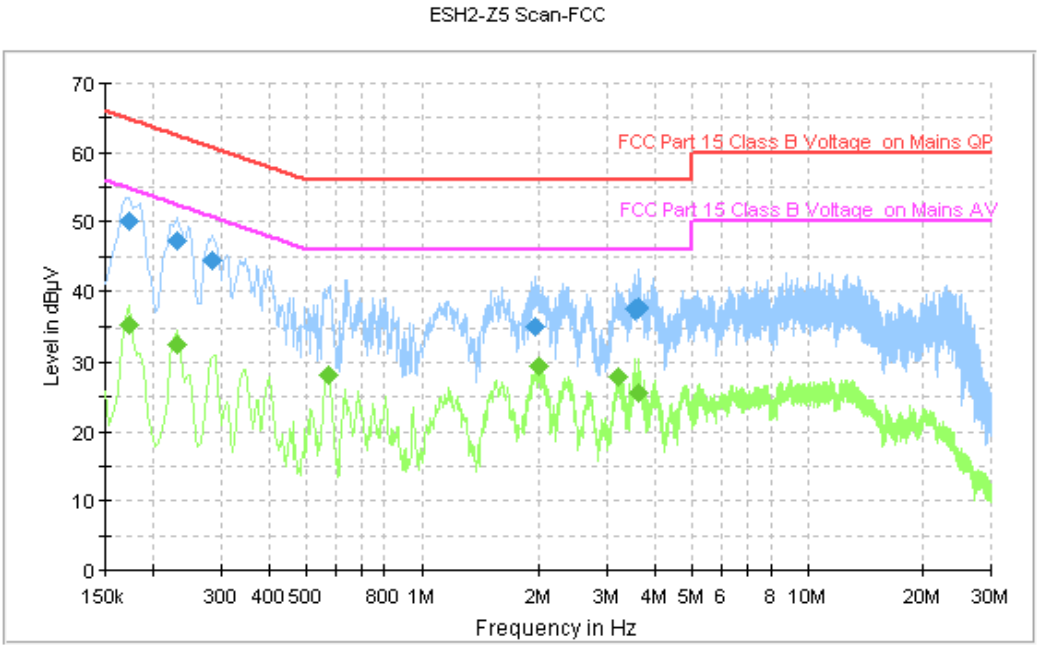


**Figure A.20 Conducted Emission**

**Final Measurement Detector 1**

| Frequency (MHz) | QuasiPeak (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.174000 | 50.1 | GND | L1 | 10.0 | 14.7 | 64.8 |
| 0.230000 | 47.2 | GND | N | 10.0 | 15.2 | 62.4 |
| 0.286000 | 44.3 | GND | N | 10.1 | 16.3 | 60.6 |
| 1.954000 | 35.0 | GND | L1 | 10.1 | 21.0 | 56.0 |
| 3.562000 | 37.5 | GND | L1 | 10.2 | 18.5 | 56.0 |
| 3.618000 | 37.8 | GND | L1 | 10.2 | 18.2 | 56.0 |

**Final Measurement Detector 2**

| Frequency (MHz) | Average (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.174000 | 35.5 | GND | L1 | 10.0 | 19.3 | 54.8 |
| 0.230000 | 32.5 | GND | N | 10.0 | 20.0 | 52.4 |
| 0.570000 | 28.2 | GND | N | 10.1 | 17.8 | 46.0 |
| 1.994000 | 29.4 | GND | L1 | 10.1 | 16.6 | 46.0 |
| 3.226000 | 28.0 | GND | L1 | 10.2 | 18.0 | 46.0 |
| 3.618000 | 25.6 | GND | L1 | 10.2 | 20.4 | 46.0 |

**Charging mode:Set.5**

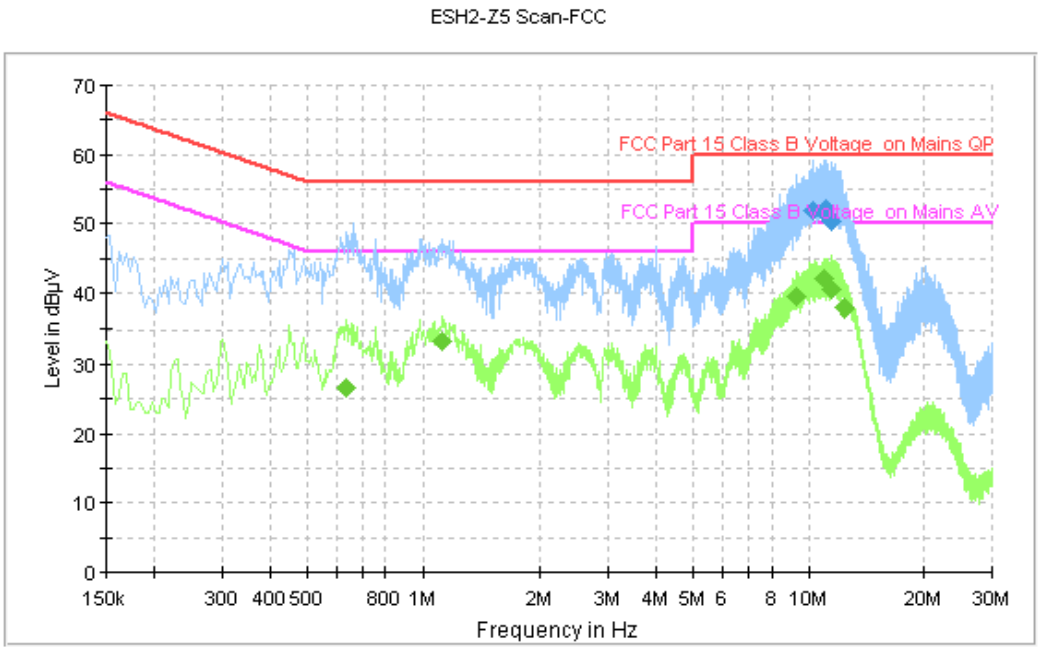


**Figure A.21 Conducted Emission**

**Final Measurement Detector 1**

| Frequency (MHz) | QuasiPeak (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 10.210000 | 51.8 | GND | L1 | 10.3 | 8.2 | 60.0 |
| 10.954000 | 51.9 | GND | L1 | 10.3 | 8.1 | 60.0 |
| 11.046000 | 52.1 | GND | L1 | 10.3 | 7.9 | 60.0 |
| 11.090000 | 52.1 | GND | L1 | 10.3 | 7.9 | 60.0 |
| 11.138000 | 51.3 | GND | L1 | 10.3 | 8.7 | 60.0 |
| 11.490000 | 50.5 | GND | L1 | 10.3 | 9.5 | 60.0 |

**Final Measurement Detector 2**

| Frequency (MHz) | Average (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.634000 | 26.6 | GND | L1 | 10.0 | 19.4 | 46.0 |
| 1.126000 | 33.2 | GND | L1 | 10.1 | 12.8 | 46.0 |
| 9.258000 | 39.4 | GND | L1 | 10.3 | 10.6 | 50.0 |
| 10.946000 | 42.1 | GND | L1 | 10.3 | 7.9 | 50.0 |
| 11.490000 | 40.5 | GND | L1 | 10.3 | 9.5 | 50.0 |
| 12.414000 | 37.9 | GND | L1 | 10.4 | 12.1 | 50.0 |

**Charging mode:Set.6**

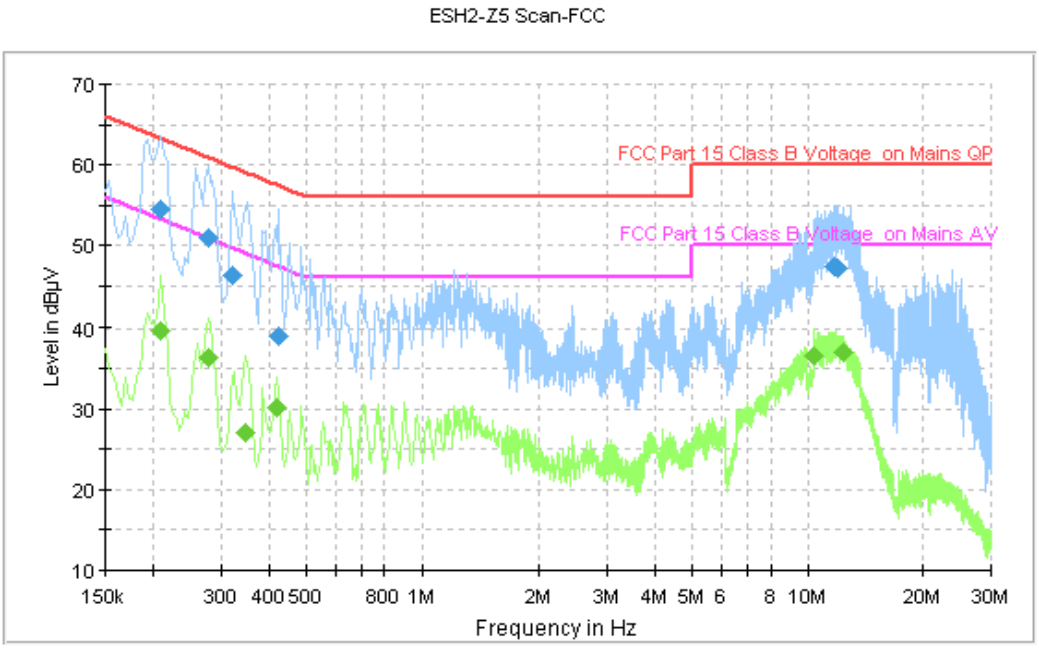


**Figure A.22 Conducted Emission**

**Final Measurement Detector 1**

| Frequency (MHz) | QuasiPeak (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.210000 | 54.5 | GND | L1 | 10.0 | 8.7 | 63.2 |
| 0.278000 | 51.0 | GND | L1 | 10.0 | 9.9 | 60.9 |
| 0.322000 | 46.3 | GND | N | 10.0 | 13.3 | 59.7 |
| 0.422000 | 39.0 | GND | L1 | 10.0 | 18.4 | 57.4 |
| 11.698000 | 47.5 | GND | L1 | 10.3 | 12.5 | 60.0 |
| 12.042000 | 47.2 | GND | L1 | 10.4 | 12.8 | 60.0 |

**Final Measurement Detector 2**

| Frequency (MHz) | Average (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.210000 | 39.6 | GND | L1 | 10.0 | 13.6 | 53.2 |
| 0.278000 | 36.3 | GND | L1 | 10.0 | 14.6 | 50.9 |
| 0.346000 | 27.1 | GND | L1 | 10.0 | 22.0 | 49.1 |
| 0.418000 | 30.1 | GND | L1 | 10.0 | 17.4 | 47.5 |
| 10.330000 | 36.5 | GND | L1 | 10.3 | 13.5 | 50.0 |
| 12.430000 | 36.9 | GND | L1 | 10.4 | 13.1 | 50.0 |

**USB mode:Set.7**

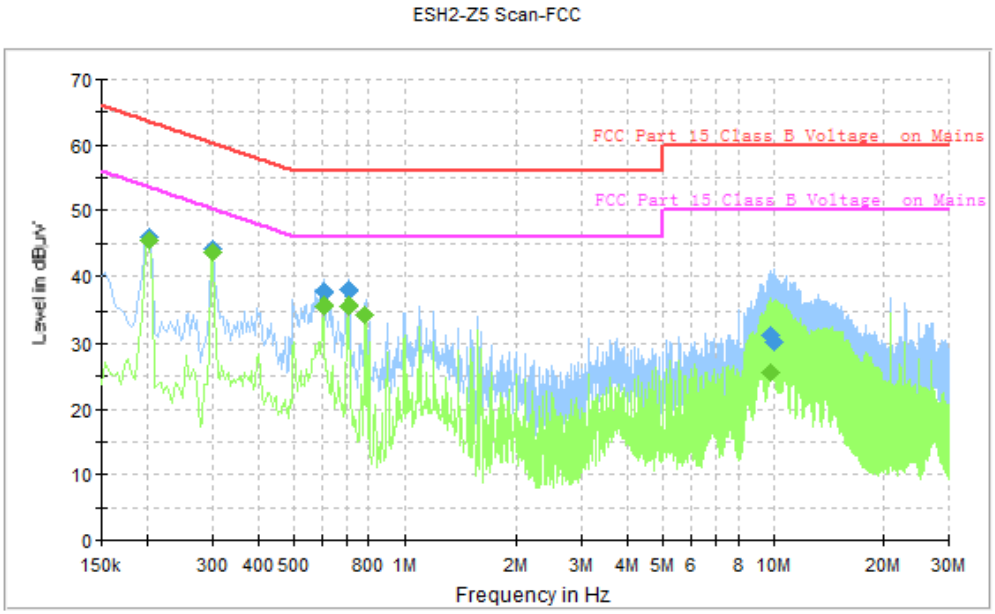


**Figure A.23 Conducted Emission**

**Final Measurement Detector 1**

| Frequency (MHz) | QuasiPeak (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.202000 | 45.9 | GND | N | 10.1 | 17.7 | 63.5 |
| 0.302000 | 44.1 | GND | N | 10.1 | 16.1 | 60.2 |
| 0.602000 | 37.6 | GND | N | 10.1 | 18.4 | 56.0 |
| 0.702000 | 38.1 | GND | N | 10.0 | 17.9 | 56.0 |
| 9.798000 | 31.2 | GND | L1 | 10.3 | 28.8 | 60.0 |
| 9.998000 | 30.3 | GND | L1 | 10.3 | 29.7 | 60.0 |

**Final Measurement Detector 2**

| Frequency (MHz) | Average (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.202000 | 45.5 | GND | N | 10.1 | 8.1 | 53.5 |
| 0.302000 | 43.7 | GND | N | 10.1 | 6.5 | 50.2 |
| 0.602000 | 35.6 | GND | N | 10.1 | 10.4 | 46.0 |
| 0.702000 | 35.7 | GND | N | 10.0 | 10.3 | 46.0 |
| 0.782000 | 34.3 | GND | L1 | 10.1 | 11.7 | 46.0 |
| 9.798000 | 25.6 | GND | L1 | 10.3 | 24.4 | 50.0 |

**USB mode:Set.8**

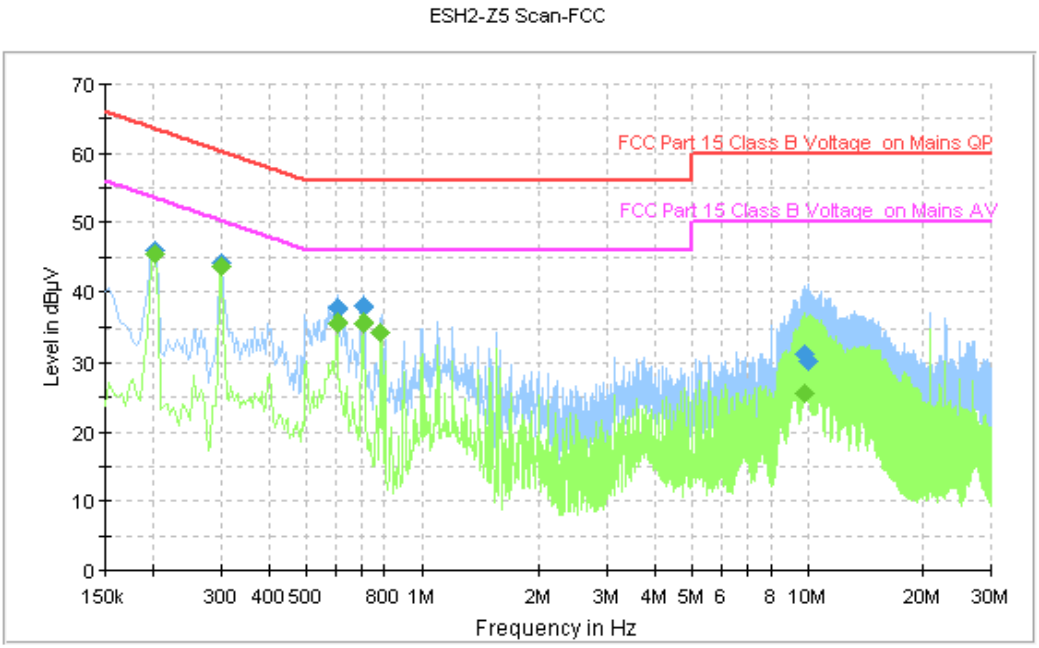


**Figure A.24 Conducted Emission**

**Final Measurement Detector 1**

| Frequency (MHz) | QuasiPeak (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.202000 | 45.9 | GND | N | 10.1 | 17.7 | 63.5 |
| 0.302000 | 44.1 | GND | N | 10.1 | 16.1 | 60.2 |
| 0.602000 | 37.6 | GND | N | 10.1 | 18.4 | 56.0 |
| 0.702000 | 38.1 | GND | N | 10.0 | 17.9 | 56.0 |
| 9.798000 | 31.2 | GND | L1 | 10.3 | 28.8 | 60.0 |
| 9.998000 | 30.3 | GND | L1 | 10.3 | 29.7 | 60.0 |

**Final Measurement Detector 2**

| Frequency (MHz) | Average (dBµV) | PE | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.202000 | 45.5 | GND | N | 10.1 | 8.1 | 53.5 |
| 0.302000 | 43.7 | GND | N | 10.1 | 6.5 | 50.2 |
| 0.602000 | 35.6 | GND | N | 10.1 | 10.4 | 46.0 |
| 0.702000 | 35.7 | GND | N | 10.0 | 10.3 | 46.0 |
| 0.782000 | 34.3 | GND | L1 | 10.1 | 11.7 | 46.0 |
| 9.798000 | 25.6 | GND | L1 | 10.3 | 24.4 | 50.0 |

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