



# TEST REPORT

## No. I20Z60988-EMC01

for

**HMD Global Oy**

**Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN**

**Model Name: TA-1275**

**FCC ID: 2AJOTTA-1275**

with

**Hardware Version: 99651\_1\_10**

**Software Version: 00WW\_0\_070**

**Issued Date: 2020-07-08**

**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.

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

**Test Laboratory:**

**CTTL-Telecommunication Technology Labs, CAICT**

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

Tel: +86(0)10-62304633-2512, Fax: +86(0)10-62304633-2504

Email: [cttl\\_terminals@caict.ac.cn](mailto:cttl_terminals@caict.ac.cn), website: [www.caict.ac.cn](http://www.caict.ac.cn)

## **REPORT HISTORY**

| Report Number   | Revision | Description             | Issue Date |
|-----------------|----------|-------------------------|------------|
| I20Z60988-EMC01 | Rev.0    | 1 <sup>st</sup> edition | 2020-07-08 |

Note: the latest revision of the test report supersedes all previous versions.

## **CONTENTS**

|                                                                  |    |
|------------------------------------------------------------------|----|
| 1. TEST LABORATORY .....                                         | 4  |
| 1.1. INTRODUCTION & ACCREDITATION .....                          | 4  |
| 1.2. TESTING LOCATION .....                                      | 4  |
| 1.3. TESTING ENVIRONMENT .....                                   | 4  |
| 1.4. PROJECT DATA .....                                          | 4  |
| 1.5. SIGNATURE .....                                             | 4  |
| 2. CLIENT INFORMATION .....                                      | 5  |
| 2.1. APPLICANT INFORMATION .....                                 | 5  |
| 2.2. MANUFACTURER INFORMATION .....                              | 5  |
| 3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) ..... | 6  |
| 3.1. ABOUT EUT .....                                             | 6  |
| 3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST .....   | 6  |
| 3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST .....    | 6  |
| 3.4. EUT SET-UPS .....                                           | 7  |
| 4. REFERENCE DOCUMENTS .....                                     | 8  |
| 4.1. REFERENCE DOCUMENTS FOR TESTING .....                       | 8  |
| 5. LABORATORY ENVIRONMENT .....                                  | 9  |
| 6. SUMMARY OF TEST RESULTS .....                                 | 10 |
| 7. TEST EQUIPMENTS UTILIZED .....                                | 11 |
| ANNEX A: MEASUREMENT RESULTS .....                               | 12 |
| ANNEX B: PERSONS INVOLVED IN THIS TESTING .....                  | 34 |

## **1. Test Laboratory**

### **1.1. Introduction & Accreditation**

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2005 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (CN0066). The detail accreditation scope can be found on NVLAP website.

### **1.2. Testing Location**

#### **CTTL (huayuan North Road)**

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China100191

### **1.3. Testing Environment**

Normal Temperature: 15-35°C  
Relative Humidity: 20-75%

### **1.4. Project data**

Testing Start Date: 2020-06-16  
Testing End Date: 2020-06-30

### **1.5. Signature**



---

Li Yan

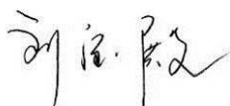
(Prepared this test report)



---

Zhang Ying

(Reviewed this test report)



---

Liu Baodian

Deputy Director of the laboratory  
(Approved this test report)

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: HMD Global Oy  
Address: Bertel Jungin aukio 9,02600 Espoo, Finland  
City: /  
Postal Code: /  
Country: /  
Contact: Rosario Casillo  
Email: Rosario.Casillo@hmdglobal.com  
Telephone: /

### **2.2. Manufacturer Information**

Company Name: HMD Global Oy  
Address: Bertel Jungin aukio 9,02600 Espoo, Finland  
City: /  
Postal Code: /  
Country: /  
Contact: Rosario Casillo  
Email: Rosario.Casillo@hmdglobal.com  
Telephone: /

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

#### 3.1. About EUT

|                     |                                                     |
|---------------------|-----------------------------------------------------|
| Description         | Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN |
| Model Name          | TA-1275                                             |
| FCC ID              | 2AJOTTA-1275                                        |
| Extreme vol. Limits | 3.6VDC to 4.4VDC (nominal: 3.85VDC)                 |

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL, Telecommunication Technology Labs, CAICT.

#### 3.2. Internal Identification of EUT used during the test

| EUT ID* | SN or IMEI | HW Version | SW Version |
|---------|------------|------------|------------|
| EUT2    | /          | 99651_1_10 | 00WW_0_070 |

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

#### 3.3. Internal Identification of AE used during the test

| AE ID* | Description | SN | Remarks |
|--------|-------------|----|---------|
| AE1    | Battery     | /  | /       |
| AE2    | Charger     | /  | /       |
| AE3    | Charger     | /  | /       |
| AE4    | Charger     | /  | /       |
| AE5    | USB Cable   | /  | /       |
| AE6    | USB Cable   | /  | /       |
| AE7    | Headset     | /  | /       |

##### AE1

|                 |                                           |
|-----------------|-------------------------------------------|
| Model           | WT242                                     |
| Manufacturer    | Jiade Energy Technology (Zhuhai) Co., Ltd |
| Capacitance     | 4380mAh                                   |
| Nominal voltage | /                                         |

##### AE2

|                 |                                       |
|-----------------|---------------------------------------|
| Model           | CH-35U                                |
| Manufacturer    | Shenzhen Tianyin Electronics Co., Ltd |
| Length of cable | /                                     |

##### AE3

|                 |                                       |
|-----------------|---------------------------------------|
| Model           | CH-51B                                |
| Manufacturer    | Shenzhen Tianyin Electronics Co., Ltd |
| Length of cable | /                                     |

##### AE4

|                 |                                     |
|-----------------|-------------------------------------|
| Model           | PA-AR5V1A-023                       |
| Manufacturer    | Yutong electronics(Huizhou) co.,ltd |
| Length of cable | /                                   |

**AE5**

|                 |                              |
|-----------------|------------------------------|
| Model           | CB-35A                       |
| Manufacturer    | Leagtech Electronics Co.,Ltd |
| Length of cable | /                            |

**AE6**

|                 |                                  |
|-----------------|----------------------------------|
| Model           | CB-35A                           |
| Manufacturer    | Shenzhen BRL Technology Co.,Ltd. |
| Length of cable | /                                |

**AE7**

|                 |                             |
|-----------------|-----------------------------|
| Model           | HS-34                       |
| Manufacturer    | New Leader Industry Co.,Ltd |
| Length of cable | /                           |

Note: The USB cables are shielded.

**3.4. General Description**

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM850, WCDMA Band 5, and LTE Band 5.

**3.5. EUT set-ups**

| <b>EUT set-up No.</b> | <b>Combination of EUT and AE</b> | <b>Remarks</b>                                   |
|-----------------------|----------------------------------|--------------------------------------------------|
| Set.1                 | EUT2+ AE1 + AE2+ AE5             | Charger+MP3+Front Camera<br>License RX band mode |
| Set.2                 | EUT2+ AE1 + AE3+ AE5+ AE7        | Charger+Rear Camera                              |
| Set.3                 | EUT2+ AE1 + AE4+ AE6+ AE7        | Charger+ MP4                                     |
| Set.4                 | EUT2+ AE1 + AE5/AE6+ AE7         | USB mode +FM                                     |

**Note:** TA-1275 is a variant model based on TA-1270, According to the declaration of changes provided by the applicant and FCC KDB publication 484596 D01; all results are cited from the initial model. The report number for initial model is I20Z60929-EMC04 (FCC ID: 2AJOTTA-1270).

## **4. Reference Documents**

### **4.1. Reference Documents for testing**

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

| <b>Reference</b>       | <b>Title</b>                                                                                                                                                                     | <b>Version</b> |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| FCC Part 15, Subpart B | Radio frequency devices - Unintentional Radiators                                                                                                                                | 2019           |
| ANSI C63.4             | American National Standard for<br>Methods of Measurement of Radio-<br>Noise Emissions from Low-Voltage<br>Electrical and Electronic Equipment<br>in the Range of 9 kHz to 40 GHz | 2014           |

Note: The test methods have no deviation with standards.



## 5. LABORATORY ENVIRONMENT

**Semi-anechoic chamber SAC-1** (23 meters×17 meters×10 meters) did not exceed following limits along the EMC testing:

|                                                 |                                                   |
|-------------------------------------------------|---------------------------------------------------|
| Temperature                                     | Min. = 15 °C, Max. = 35 °C                        |
| Relative humidity                               | Min. = 15 %, Max. = 75 %                          |
| Shielding effectiveness                         | 0.014MHz - 1MHz, >60dB;<br>1MHz - 1000MHz, >90dB. |
| Electrical insulation                           | > 2 MΩ                                            |
| Ground system resistance                        | < 4Ω                                              |
| Normalised site attenuation (NSA)               | < ± 4 dB, 3m/10m distance,<br>from 30 to 1000 MHz |
| Site voltage standing-wave ratio ( $S_{VSWR}$ ) | Between 0 and 6 dB, from 1GHz to 18GHz            |
| Uniformity of field strength                    | Between 0 and 6 dB, from 80 to 6000 MHz           |

**Semi-anechoic chamber SAC-2** (10 meters×6.7meters×6.1meters) did not exceed following limits along the EMC testing:

|                                                 |                                                   |
|-------------------------------------------------|---------------------------------------------------|
| Temperature                                     | Min. = 15 °C, Max. = 35 °C                        |
| Relative humidity                               | Min. = 15 %, Max. = 75 %                          |
| Shielding effectiveness                         | 0.014MHz - 1MHz, >60dB;<br>1MHz - 1000MHz, >90dB. |
| Electrical insulation                           | > 2 MΩ                                            |
| Ground system resistance                        | < 4 Ω                                             |
| Normalised site attenuation (NSA)               | < ± 4 dB, 3m distance, from 30 to 1000 MHz        |
| Site voltage standing-wave ratio ( $S_{VSWR}$ ) | Between 0 and 6 dB, from 1GHz to 18GHz            |
| Uniformity of field strength                    | Between 0 and 6 dB, from 80 to 6000 MHz           |

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

|                          |                                               |
|--------------------------|-----------------------------------------------|
| Temperature              | Min. = 15 °C, Max. = 35 °C                    |
| Relative humidity        | Min. = 20 %, Max. = 75 %                      |
| Shielding effectiveness  | 0.014MHz-1MHz, >60dB;<br>1MHz—1000MHz, >90dB. |
| Electrical insulation    | > 2 MΩ                                        |
| Ground system resistance | < 4 Ω                                         |

## 6. SUMMARY OF TEST RESULTS

| Abbreviations used in this clause: |    |                                           |
|------------------------------------|----|-------------------------------------------|
| Verdict Column                     | P  | Pass                                      |
|                                    | NA | Not applicable                            |
|                                    | F  | Fail                                      |
|                                    | BR | Re-use test data from basic model report. |

| Items | Test Name          | Clause in FCC rules | Section in this report | Verdict | Test Location            |
|-------|--------------------|---------------------|------------------------|---------|--------------------------|
| 1     | Radiated Emission  | 15.109(a)           | A.1                    | BR      | CTTL(huayuan North Road) |
| 2     | Conducted Emission | 15.107(a)           | A.2                    | BR      | CTTL(huayuan North Road) |

## 7. Test Equipments Utilized

| NO. | Description      | TYPE         | SERIES<br>NUMBER         | MANUFACTURE     | CAL DUE<br>DATE | CALIBRATI<br>ON<br>INTERVAL |
|-----|------------------|--------------|--------------------------|-----------------|-----------------|-----------------------------|
| 1   | Test Receiver    | ESCI 3       | 100344                   | Rohde & Schwarz | 2021-02-26      | 1 year                      |
| 2   | LISN             | ENV216       | 101200                   | R&S             | 2021-05-17      | 1 year                      |
| 3   | EMI Antenna      | VULB 9163    | 483                      | Schwarzbeck     | 2020-09-17      | 1 year                      |
| 4   | EMI Antenna      | 3117         | 00139065                 | ETS-Lindgren    | 2020-11-15      | 1 year                      |
| 5   | Test Receiver    | ESU26        | 100235                   | Rohde & Schwarz | 2021-03-05      | 1 year                      |
| 7   | Signal Generator | SMF100A      | 101295                   | R&S             | 2020-11-06      | 1 year                      |
| 8   | PC               | OPTIPLEX 380 | 2X1YV2X                  | DELL            | N/A             | N/A                         |
| 9   | Printer          | P1606dn      | VNC3L52122               | HP              | N/A             | N/A                         |
| 10  | Keyboard         | L100         | CN0RH659658<br>907ATOI40 | DELL            | N/A             | N/A                         |
| 11  | Mouse            | M-UAE119     | LZ935220ZRC              | Lenovo          | N/A             | N/A                         |

| Test Item                    | Test Software and Version | Software Vendor |
|------------------------------|---------------------------|-----------------|
| Radiated Continuous Emission | EMC32 V9.01.00            | R&S             |
| Conducted Emission           | EMC32 V8.52.0             | R&S             |

## **ANNEX A: MEASUREMENT RESULTS**

### **A.1 Radiated Emission**

#### **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 distances of 10 meters(for 30MHz-1GHz) and 3 meters (for above 1GHz) 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, charging mode, MP3, MP4, Camera, FM and License RX band mode.

The EUT was tested while operating in licensed band RX mode. All licensed band receivers that tune in the range of 30MHz-960MHz, as listed in the Section 3.4, are investigated. Only the worst case emissions are reported.

The FM radio mode radiated testing was performed with the Low/Mid/High channel. Only the worst cases are reported.

All equipment is placed on the test table top and arranged in a typical configuration in accordance with ANSI C63.4-2014 and manipulated to obtain worst case emissions.

Note: I/O information: Printer – USB, Mouse – PS/2, Keyboard – USB.

#### **A.1.3 Measurement Limit**

| Frequency range<br>(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 above limit is for 3 meters test distance. 10 meters' limit is got by converting.

Limit (10m) = limit (3m) + 20(log (3/10))

#### **A.1.4 Test Condition**

| Frequency range (MHz) | RBW/VBW               | Sweep Time (s) | Detector        |
|-----------------------|-----------------------|----------------|-----------------|
| 30-1000               | 120kHz (IF Bandwidth) | 5              | Peak/Quasi-peak |
| Above 1000            | 1MHz/3MHz             | 15             | Peak, Average   |

### 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:

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

Where

$G_A$ : Antenna factor of receive antenna

$G_{\text{PL}}$ : Path Loss

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

Measurement uncertainty (worst case): 30MHz-1GHz: 5.16dB, 1GHz-18GHz: 5.44dB,  $k=2$ .

#### Measurement results for Set.1:

##### Charging Mode+ MP3+Front Camera /Average detector

| Frequency (MHz) | Measurement Result (dBμV/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBμV) | Limit (dBμV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17971.100       | 47.9                        | -5.4            | 33.8                  | 19.516                  | 54.0           | 6.1         | H                  |
| 17994.333       | 47.0                        | -5.4            | 33.8                  | 18.616                  | 54.0           | 7.0         | H                  |
| 17996.033       | 46.9                        | -5.4            | 33.8                  | 18.516                  | 54.0           | 7.1         | V                  |
| 17996.600       | 46.9                        | -5.4            | 33.8                  | 18.516                  | 54.0           | 7.1         | H                  |
| 17956.367       | 46.8                        | -5.4            | 33.8                  | 18.416                  | 54.0           | 7.2         | H                  |
| 17981.867       | 46.8                        | -5.4            | 33.8                  | 18.416                  | 54.0           | 7.2         | H                  |

##### Charging Mode+ MP3+Front Camera /Peak detector

| Frequency (MHz) | Measurement Result (dBμV/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBμV) | Limit (dBμV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17990.367       | 56.1                        | -5.4            | 33.8                  | 27.716                  | 74.0           | 17.9        | H                  |
| 17971.100       | 56.1                        | -5.4            | 33.8                  | 27.716                  | 74.0           | 17.9        | H                  |
| 17986.967       | 55.8                        | -5.4            | 33.8                  | 27.416                  | 74.0           | 18.2        | V                  |
| 17966.567       | 55.4                        | -5.4            | 33.8                  | 27.016                  | 74.0           | 18.6        | H                  |
| 17959.767       | 55.4                        | -5.4            | 33.8                  | 27.016                  | 74.0           | 18.6        | H                  |
| 17899.700       | 55.3                        | -5.7            | 33.8                  | 27.238                  | 74.0           | 18.7        | H                  |

**Measurement results for Set.2:**
**Charging Mode+ Rear Camera /Average detector**

| Frequency (MHz) | Measurement Result (dBμV/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBμV) | Limit (dBμV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17993.200       | 47.2                        | -5.4            | 33.8                  | 18.816                  | 54.0           | 6.8         | H                  |
| 17994.900       | 47.2                        | -5.4            | 33.8                  | 18.816                  | 54.0           | 6.8         | H                  |
| 17984.700       | 46.9                        | -5.4            | 33.8                  | 18.516                  | 54.0           | 7.1         | V                  |
| 17998.867       | 46.9                        | -5.4            | 33.8                  | 18.516                  | 54.0           | 7.1         | H                  |
| 17975.633       | 46.8                        | -5.4            | 33.8                  | 18.416                  | 54.0           | 7.2         | H                  |
| 17952.967       | 46.8                        | -5.4            | 33.8                  | 18.416                  | 54.0           | 7.2         | H                  |

**Charging Mode+ Rear Camera /Peak detector**

| Frequency (MHz) | Measurement Result (dBμV/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBμV) | Limit (dBμV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17998.300       | 56.1                        | -5.4            | 33.8                  | 27.716                  | 74.0           | 17.9        | H                  |
| 17994.333       | 55.7                        | -5.4            | 33.8                  | 27.316                  | 74.0           | 18.3        | H                  |
| 17965.433       | 55.4                        | -5.4            | 33.8                  | 27.016                  | 74.0           | 18.6        | V                  |
| 17959.767       | 55.4                        | -5.4            | 33.8                  | 27.016                  | 74.0           | 18.6        | H                  |
| 17983.000       | 55.4                        | -5.4            | 33.8                  | 27.016                  | 74.0           | 18.6        | H                  |
| 17999.433       | 55.4                        | -5.4            | 33.8                  | 27.016                  | 74.0           | 18.6        | H                  |

**Measurement results for Set.3:**
**Charger+ MP4 /Average detector**

| Frequency (MHz) | Measurement Result (dBμV/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBμV) | Limit (dBμV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17890.633       | 47.2                        | -5.7            | 33.8                  | 19.138                  | 54.0           | 6.8         | H                  |
| 17987.533       | 46.9                        | -5.4            | 33.8                  | 18.516                  | 54.0           | 7.1         | H                  |
| 17995.467       | 46.9                        | -5.4            | 33.8                  | 18.516                  | 54.0           | 7.1         | V                  |
| 17881.000       | 46.8                        | -5.7            | 33.8                  | 18.738                  | 54.0           | 7.2         | H                  |
| 17899.700       | 46.7                        | -5.7            | 33.8                  | 18.638                  | 54.0           | 7.3         | H                  |
| 17990.367       | 46.7                        | -5.4            | 33.8                  | 18.316                  | 54.0           | 7.3         | H                  |

**Charger+ MP4 /Peak detector**

| Frequency (MHz) | Measurement Result (dBμV/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBμV) | Limit (dBμV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17964.300       | 57.3                        | -5.4            | 33.8                  | 28.916                  | 74.0           | 16.7        | H                  |
| 17936.533       | 55.7                        | -5.4            | 33.8                  | 27.316                  | 74.0           | 18.3        | H                  |
| 17882.700       | 55.7                        | -5.7            | 33.8                  | 27.638                  | 74.0           | 18.3        | V                  |
| 17995.467       | 55.4                        | -5.4            | 33.8                  | 27.016                  | 74.0           | 18.6        | H                  |
| 17912.733       | 55.4                        | -5.7            | 33.8                  | 27.338                  | 74.0           | 18.6        | H                  |
| 18000.000       | 55.3                        | -6.5            | 33.8                  | 28.041                  | 74.0           | 18.7        | H                  |

**Measurement results for Set.4:**
**USB mode +FM /Average detector**

| Frequency (MHz) | Measurement Result (dBμV/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBμV) | Limit (dBμV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17966.567       | 47.1                        | -5.4            | 33.8                  | 18.716                  | 54.0           | 6.9         | H                  |
| 17985.833       | 46.8                        | -5.4            | 33.8                  | 18.416                  | 54.0           | 7.2         | H                  |
| 17996.033       | 46.8                        | -5.4            | 33.8                  | 18.416                  | 54.0           | 7.2         | V                  |
| 17993.767       | 46.7                        | -5.4            | 33.8                  | 18.316                  | 54.0           | 7.3         | H                  |
| 17989.233       | 46.6                        | -5.4            | 33.8                  | 18.216                  | 54.0           | 7.4         | H                  |
| 17873.633       | 46.6                        | -5.7            | 33.8                  | 18.538                  | 54.0           | 7.4         | H                  |

**USB mode +FM /Peak detector**

| Frequency (MHz) | Measurement Result (dBμV/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBμV) | Limit (dBμV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17916.133       | 55.6                        | -5.4            | 33.8                  | 27.216                  | 74.0           | 18.4        | H                  |
| 17994.333       | 55.6                        | -5.4            | 33.8                  | 27.216                  | 74.0           | 18.4        | H                  |
| 17993.767       | 55.3                        | -5.4            | 33.8                  | 26.916                  | 74.0           | 18.7        | V                  |
| 17908.767       | 55.2                        | -5.7            | 33.8                  | 27.138                  | 74.0           | 18.8        | H                  |
| 17976.767       | 55.1                        | -5.4            | 33.8                  | 26.716                  | 74.0           | 18.9        | H                  |
| 17985.267       | 55.1                        | -5.4            | 33.8                  | 26.716                  | 74.0           | 18.9        | H                  |



## Charging Mode+ MP3, Set.1

Full Spectrum

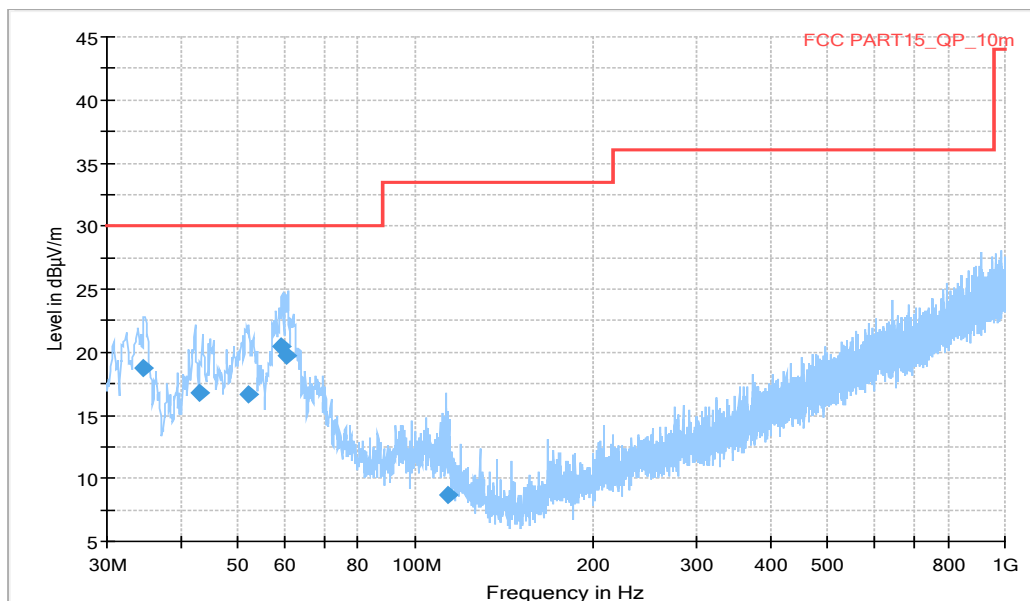
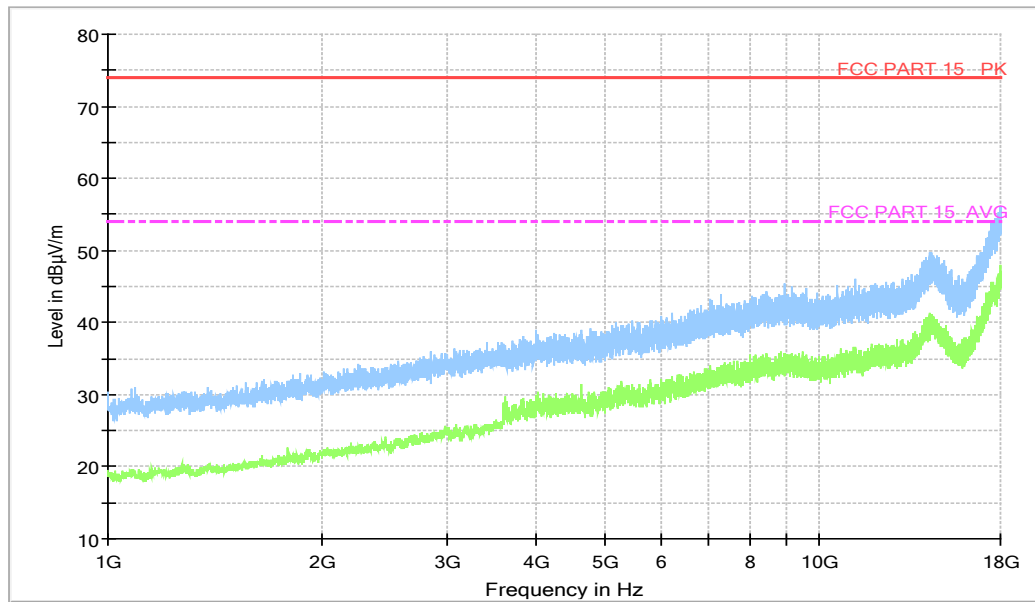


Figure A.1 Radiated Emission from 30MHz to 1GHz

## Final Result 1

| Frequency<br>(MHz) | QuasiPeak<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) | Meas.<br>Time<br>(ms) | Bandwidth<br>(kHz) | Height<br>(cm) | Pol | Azimuth<br>(deg) |
|--------------------|-----------------------|-------------------|----------------|-----------------------|--------------------|----------------|-----|------------------|
| 34.453000          | 18.77                 | 30.00             | 11.23          | 1000.0                | 120.000            | 208.0          | V   | 210.0            |
| 42.919000          | 16.82                 | 30.00             | 13.18          | 1000.0                | 120.000            | 381.0          | V   | -26.0            |
| 52.273000          | 16.60                 | 30.00             | 13.40          | 1000.0                | 120.000            | 100.0          | V   | 7.0              |
| 59.308000          | 20.42                 | 30.00             | 9.58           | 1000.0                | 120.000            | 100.0          | V   | -25.0            |
| 60.666000          | 19.77                 | 30.00             | 10.23          | 1000.0                | 120.000            | 107.0          | V   | -29.0            |
| 113.34100          | 8.68                  | 33.50             | 24.84          | 1000.0                | 120.000            | 112.0          | V   | 16.0             |

Full Spectrum



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

## Charger+ Rear Camera, Set.2

Full Spectrum

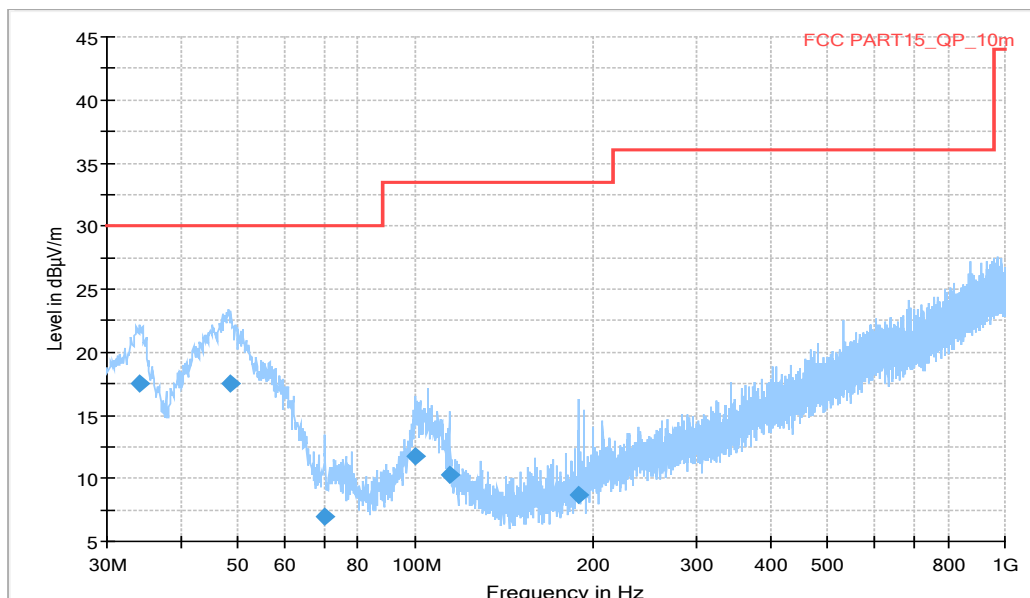
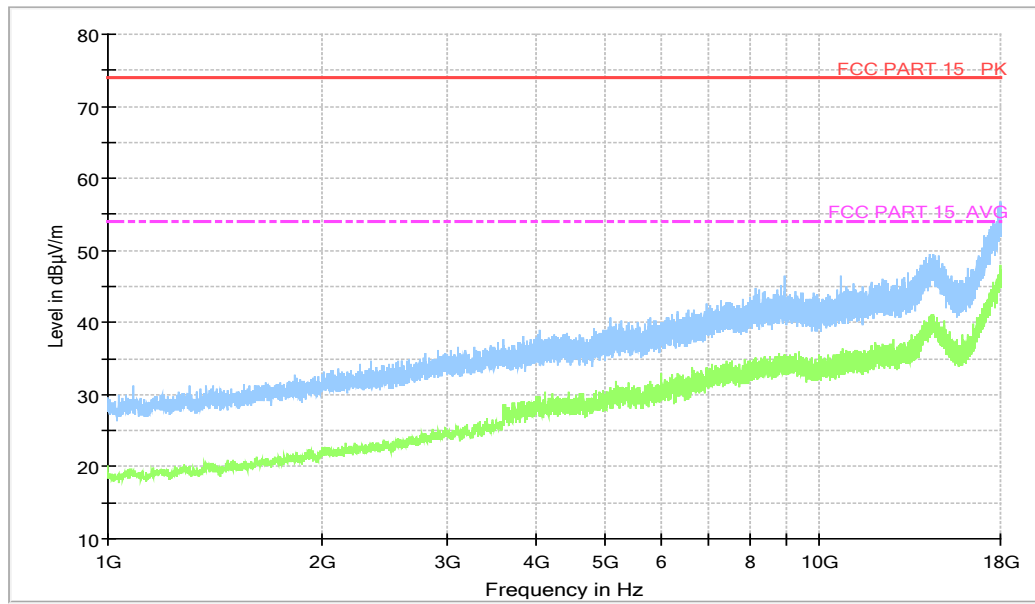


Figure A.3 Radiated Emission from 30MHz to 1GHz

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 34.106000       | 17.47              | 30.00          | 12.53       | 1000.0          | 120.000         | 277.0       | V   | 156.0         |
| 48.573000       | 17.50              | 30.00          | 12.50       | 1000.0          | 120.000         | 118.0       | V   | -4.0          |
| 70.315000       | 6.94               | 30.00          | 23.06       | 1000.0          | 120.000         | 125.0       | V   | 13.0          |
| 99.960000       | 11.69              | 33.50          | 21.83       | 1000.0          | 120.000         | 220.0       | V   | -6.0          |
| 114.35300       | 10.27              | 33.50          | 23.25       | 1000.0          | 120.000         | 119.0       | V   | 30.0          |
| 188.70600       | 8.74               | 33.50          | 24.78       | 1000.0          | 120.000         | 125.0       | V   | 106.0         |

Full Spectrum



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

### Charger mode +MP4, Set.3

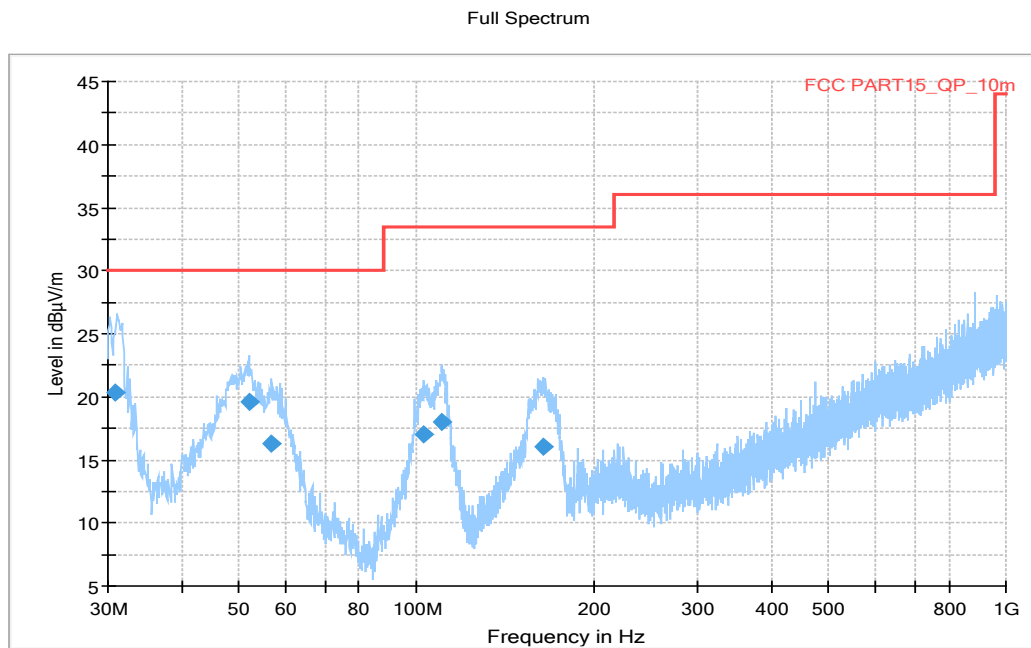
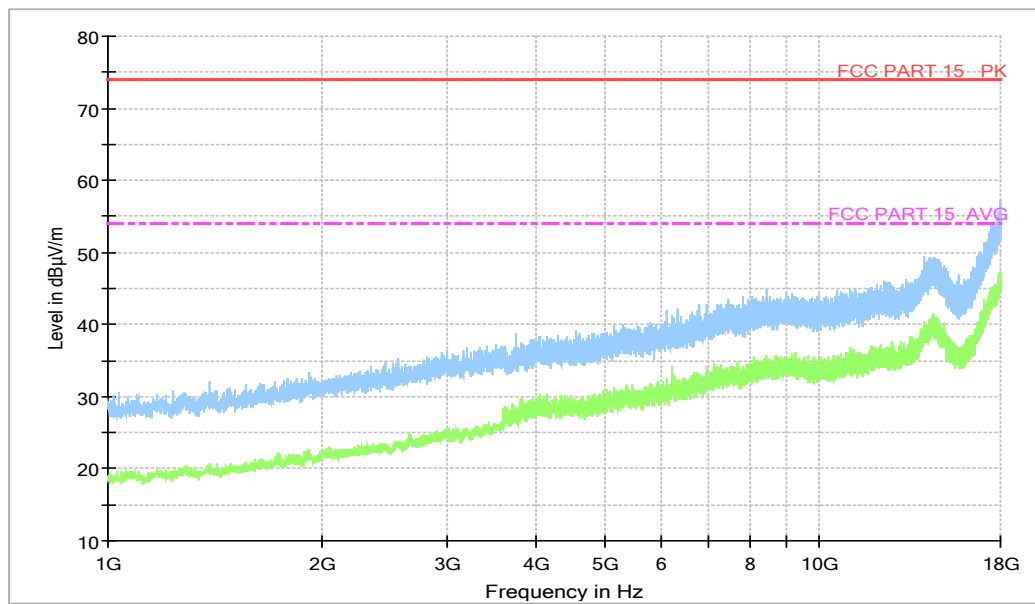


Figure A.5 Radiated Emission from 30MHz to 1GHz

### Final Result 1

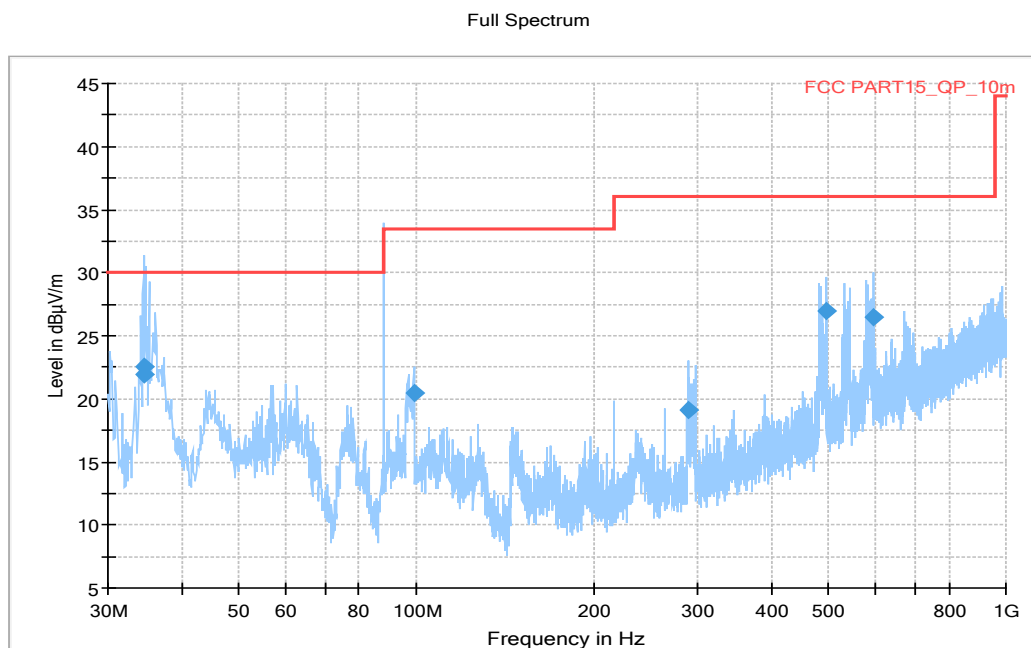
| Frequency<br>(MHz) | QuasiPeak<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) | Meas.<br>Time<br>(ms) | Bandwidth<br>(kHz) | Height<br>(cm) | Pol | Azimuth<br>(deg) |
|--------------------|-----------------------|-------------------|----------------|-----------------------|--------------------|----------------|-----|------------------|
| 30.924000          | 20.32                 | 30.00             | 9.68           | 1000.0                | 120.000            | 125.0          | V   | 30.0             |
| 52.019000          | 19.54                 | 30.00             | 10.46          | 1000.0                | 120.000            | 113.0          | V   | 93.0             |
| 56.749000          | 16.33                 | 30.00             | 13.67          | 1000.0                | 120.000            | 102.0          | V   | 19.0             |
| 102.73200          | 16.99                 | 33.50             | 16.53          | 1000.0                | 120.000            | 220.0          | V   | 0.0              |
| 110.37600          | 17.97                 | 33.50             | 15.55          | 1000.0                | 120.000            | 117.0          | V   | -25.0            |
| 164.39100          | 16.01                 | 33.50             | 17.51          | 1000.0                | 120.000            | 125.0          | V   | -11.0            |

Full Spectrum



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

## USB mode +FM, Set.4



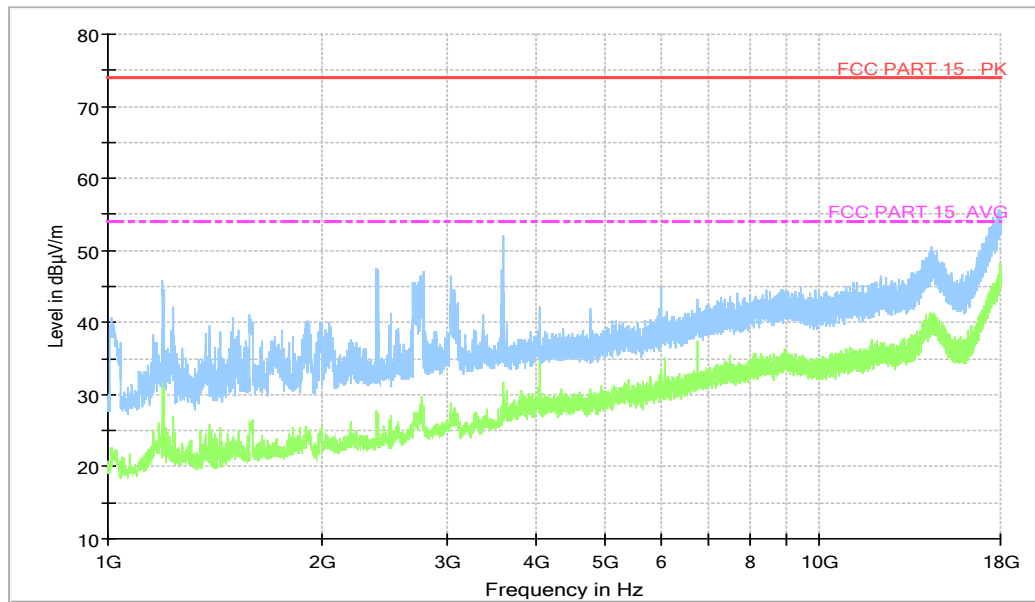
**Figure A.7 Radiated Emission from 30MHz to 1GHz**

Note: the spike (98MHz) is coming from FM singal source .

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 34.619000       | 21.90              | 30.00          | 8.10        | 1000.0          | 120.000         | 384.0       | V   | 120.0         |
| 34.638000       | 22.52              | 30.00          | 7.48        | 1000.0          | 120.000         | 101.0       | V   | 178.0         |
| 99.064000       | 20.50              | 33.50          | 13.02       | 1000.0          | 120.000         | 181.0       | V   | 12.0          |
| 288.55600       | 19.05              | 36.00          | 16.97       | 1000.0          | 120.000         | 103.0       | V   | 182.0         |
| 496.13600       | 27.00              | 36.00          | 9.02        | 1000.0          | 120.000         | 275.0       | V   | 11.0          |
| 595.27400       | 26.44              | 36.00          | 9.58        | 1000.0          | 120.000         | 181.0       | V   | -4.0          |

Full Spectrum



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

Note: The measurement results showed here are worst cases of the combinations of different cables.



## License RX band mode, Set.1

### GSM850MHz MID CHANNEL (881.6MHz)

Full Spectrum

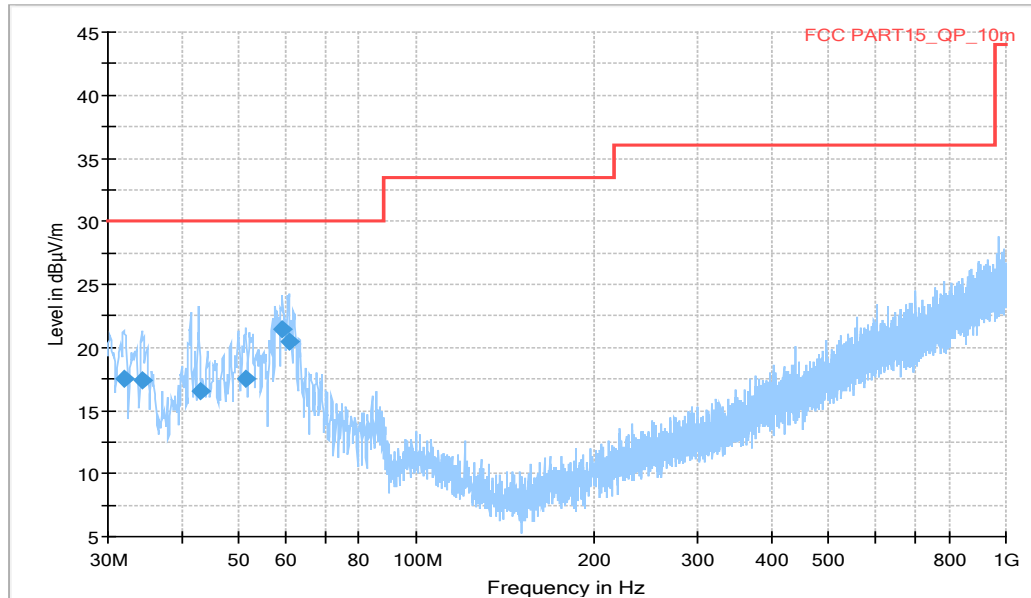
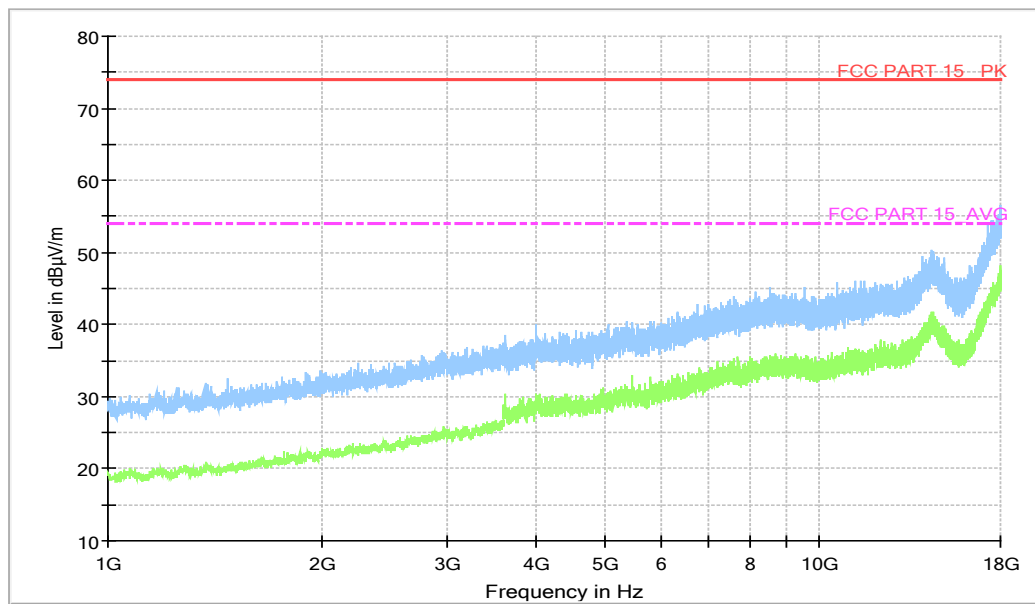


Figure A.9 Radiated Emission from 30MHz to 1GHz

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 32.060000       | 17.55              | 30.00          | 12.45       | 1000.0          | 120.000         | 101.0       | V   | -15.0         |
| 34.388000       | 17.44              | 30.00          | 12.56       | 1000.0          | 120.000         | 117.0       | V   | -30.0         |
| 42.924000       | 16.49              | 30.00          | 13.51       | 1000.0          | 120.000         | 191.0       | V   | 210.0         |
| 51.497000       | 17.52              | 30.00          | 12.48       | 1000.0          | 120.000         | 404.0       | V   | 60.0          |
| 59.257000       | 21.44              | 30.00          | 8.56        | 1000.0          | 120.000         | 103.0       | V   | -30.0         |
| 60.786000       | 20.42              | 30.00          | 9.58        | 1000.0          | 120.000         | 101.0       | V   | -4.0          |

Full Spectrum



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

## WCDMA Band 5 MID CHANNEL (881.6MHz)

Full Spectrum

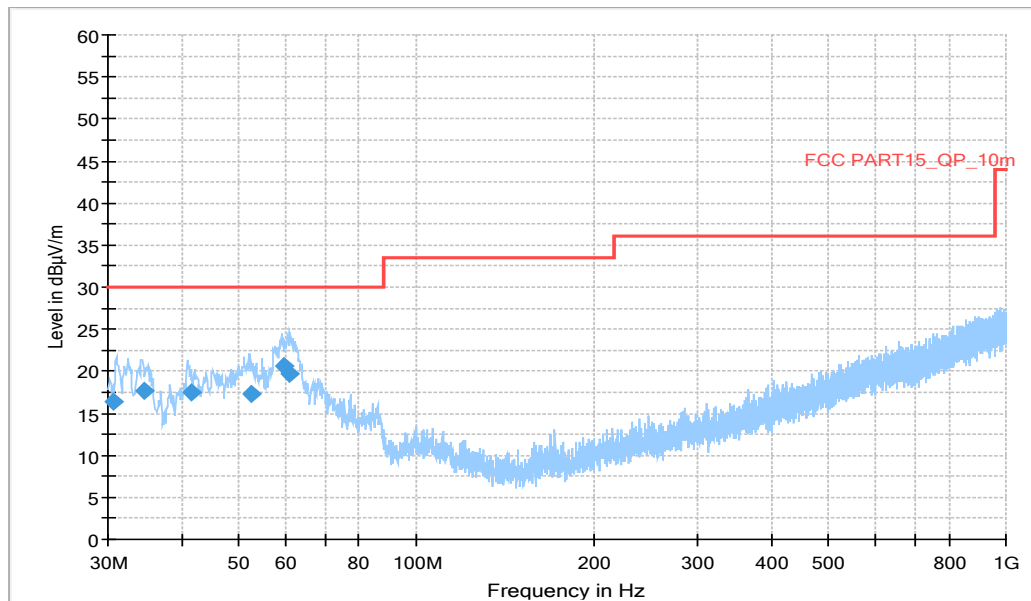
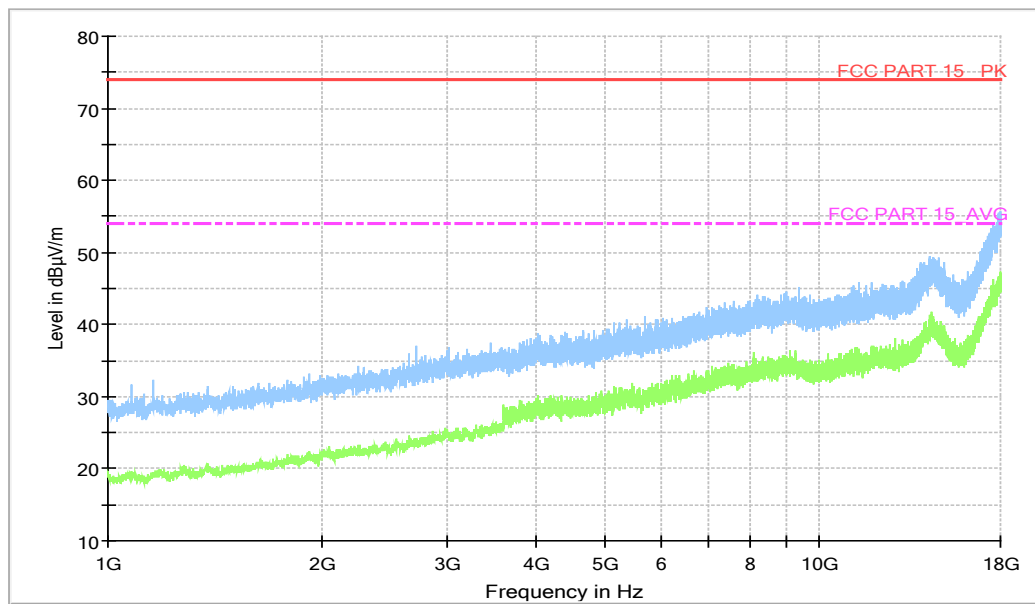


Figure A.11 Radiated Emission from 30MHz to 1GHz

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 30.647000       | 16.37              | 30.00          | 13.63       | 1000.0          | 120.000         | 320.0       | V   | 84.0          |
| 34.568000       | 17.73              | 30.00          | 12.27       | 1000.0          | 120.000         | 317.0       | V   | 4.0           |
| 41.464000       | 17.43              | 30.00          | 12.57       | 1000.0          | 120.000         | 212.0       | V   | -30.0         |
| 52.559000       | 17.25              | 30.00          | 12.75       | 1000.0          | 120.000         | 104.0       | V   | 187.0         |
| 59.460000       | 20.69              | 30.00          | 9.31        | 1000.0          | 120.000         | 103.0       | V   | 94.0          |
| 61.077000       | 19.63              | 30.00          | 10.37       | 1000.0          | 120.000         | 106.0       | V   | -10.0         |

Full Spectrum



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

## A.2 Conducted Emission

### 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, charging mode, MP3, MP4, CAMERA and FM mode.

The model of the PC is Lenovo M4000e-17, and the serial number of the PC is M706RMW2. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

Note: I/O information: Printer – USB, Mouse – PS/2, Keyboard – USB.

#### 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/IF bandwidth | Sweep Time(s) |
| 9kHz             | 1             |

### A.2.5 Measurement Results

Measurement uncertainty:  $U = 3.08 \text{ dB}$ ,  $k=2$ .

#### Charger+MP3, Set.1

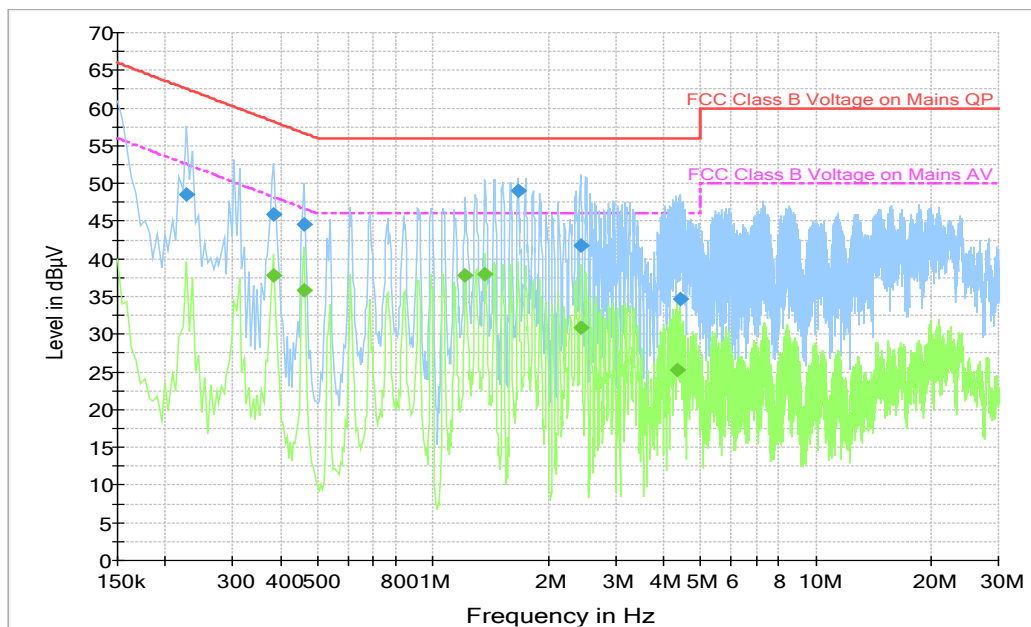


Figure A.13 Conducted Emission

#### Final Result 1

| Frequency<br>(MHz) | QuasiPeak<br>(dBμV) | Meas. Time<br>(ms) | Bandwidth<br>(kHz) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBμV) |
|--------------------|---------------------|--------------------|--------------------|--------|------|---------------|----------------|-----------------|
| 0.226500           | 48.6                | 1000.0             | 9.000              | On     | L1   | 20.0          | 14.0           | 62.6            |
| 0.384000           | 45.8                | 1000.0             | 9.000              | On     | L1   | 20.1          | 12.3           | 58.2            |
| 0.460500           | 44.5                | 1000.0             | 9.000              | On     | L1   | 20.1          | 12.2           | 56.7            |
| 1.666500           | 49.0                | 1000.0             | 9.000              | On     | N    | 19.9          | 7.0            | 56.0            |
| 2.436000           | 41.8                | 1000.0             | 9.000              | On     | L1   | 20.2          | 14.2           | 56.0            |
| 4.411500           | 34.6                | 1000.0             | 9.000              | On     | N    | 20.4          | 21.4           | 56.0            |

#### Final Result 2

| Frequency<br>(MHz) | Average<br>(dBμV) | Meas. Time<br>(ms) | Bandwidth<br>(kHz) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBμV) |
|--------------------|-------------------|--------------------|--------------------|--------|------|---------------|----------------|-----------------|
| 0.384000           | 37.9              | 1000.0             | 9.000              | On     | L1   | 20.1          | 10.3           | 48.2            |
| 0.460500           | 35.9              | 1000.0             | 9.000              | On     | L1   | 20.1          | 10.8           | 46.7            |
| 1.212000           | 37.8              | 1000.0             | 9.000              | On     | N    | 19.9          | 8.2            | 46.0            |
| 1.369500           | 38.0              | 1000.0             | 9.000              | On     | N    | 19.9          | 8.0            | 46.0            |
| 2.436000           | 30.9              | 1000.0             | 9.000              | On     | L1   | 20.2          | 15.1           | 46.0            |
| 4.335000           | 25.3              | 1000.0             | 9.000              | On     | L1   | 20.7          | 20.7           | 46.0            |

## . Charger+ Rear Camera, Set.2

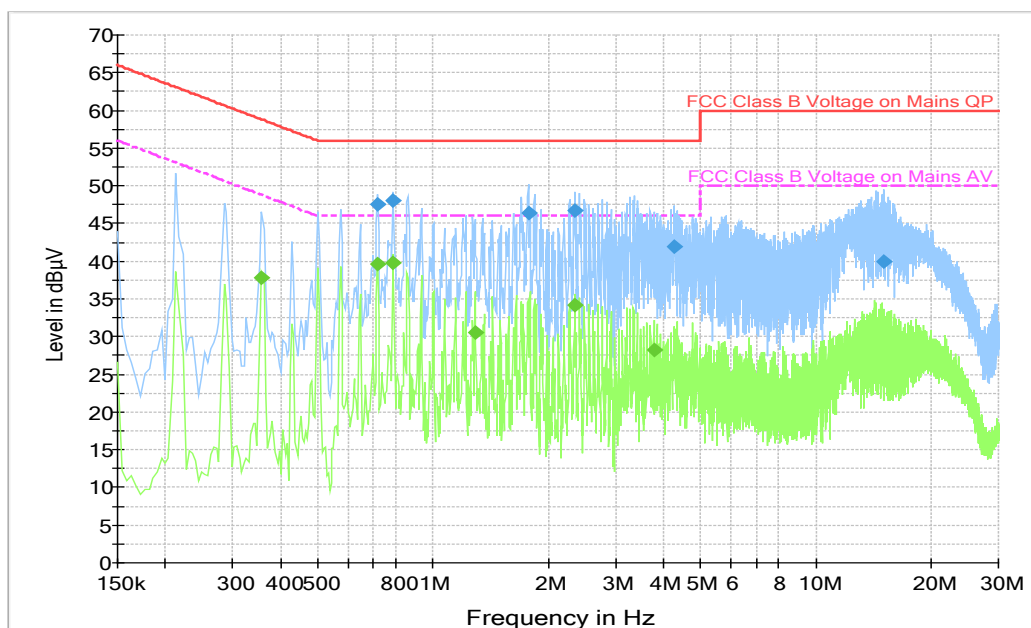


Figure A.14 Conducted Emission

### Final Result 1

| Frequency<br>(MHz) | QuasiPeak<br>(dBµV) | Meas. Time<br>(ms) | Bandwidth<br>(kHz) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBµV) |
|--------------------|---------------------|--------------------|--------------------|--------|------|---------------|----------------|-----------------|
| 0.717000           | 47.5                | 1000.0             | 9.000              | On     | N    | 20.0          | 8.5            | 56.0            |
| 0.789000           | 48.0                | 1000.0             | 9.000              | On     | N    | 20.0          | 8.0            | 56.0            |
| 1.774500           | 46.3                | 1000.0             | 9.000              | On     | L1   | 20.0          | 9.7            | 56.0            |
| 2.341500           | 46.7                | 1000.0             | 9.000              | On     | L1   | 20.1          | 9.3            | 56.0            |
| 4.267500           | 41.9                | 1000.0             | 9.000              | On     | L1   | 20.6          | 14.1           | 56.0            |
| 15.063000          | 39.9                | 1000.0             | 9.000              | On     | L1   | 24.1          | 20.1           | 60.0            |

### Final Result 2

| Frequency<br>(MHz) | Average<br>(dBµV) | Meas. Time<br>(ms) | Bandwidth<br>(kHz) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBµV) |
|--------------------|-------------------|--------------------|--------------------|--------|------|---------------|----------------|-----------------|
| 0.357000           | 37.8              | 1000.0             | 9.000              | On     | N    | 19.9          | 11.0           | 48.8            |
| 0.717000           | 39.7              | 1000.0             | 9.000              | On     | L1   | 20.1          | 6.3            | 46.0            |
| 0.789000           | 39.7              | 1000.0             | 9.000              | On     | N    | 20.0          | 6.3            | 46.0            |
| 1.288500           | 30.6              | 1000.0             | 9.000              | On     | N    | 19.9          | 15.4           | 46.0            |
| 2.341500           | 34.2              | 1000.0             | 9.000              | On     | L1   | 20.1          | 11.8           | 46.0            |
| 3.777000           | 28.2              | 1000.0             | 9.000              | On     | N    | 20.3          | 17.8           | 46.0            |

### Charger+MP4, Set.3

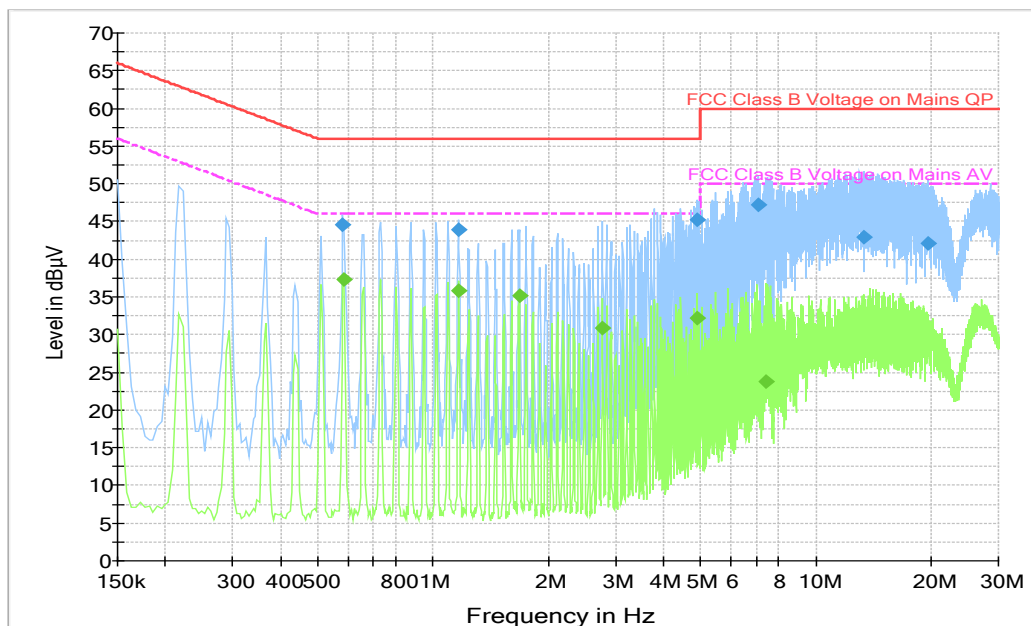


Figure A.15 Conducted Emission

#### Final Result 1

| Frequency<br>(MHz) | QuasiPeak<br>(dBμV) | Meas. Time<br>(ms) | Bandwidth<br>(kHz) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBμV) |
|--------------------|---------------------|--------------------|--------------------|--------|------|---------------|----------------|-----------------|
| 0.582000           | 44.5                | 1000.0             | 9.000              | On     | L1   | 20.1          | 11.5           | 56.0            |
| 1.167000           | 43.8                | 1000.0             | 9.000              | On     | L1   | 19.8          | 12.2           | 56.0            |
| 4.884000           | 45.2                | 1000.0             | 9.000              | On     | L1   | 20.8          | 10.8           | 56.0            |
| 7.075500           | 47.3                | 1000.0             | 9.000              | On     | N    | 21.7          | 12.7           | 60.0            |
| 13.402500          | 43.0                | 1000.0             | 9.000              | On     | N    | 23.4          | 17.0           | 60.0            |
| 19.707000          | 42.2                | 1000.0             | 9.000              | On     | N    | 25.0          | 17.8           | 60.0            |

#### Final Result 2

| Frequency<br>(MHz) | Average<br>(dBμV) | Meas. Time<br>(ms) | Bandwidth<br>(kHz) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBμV) |
|--------------------|-------------------|--------------------|--------------------|--------|------|---------------|----------------|-----------------|
| 0.586500           | 37.3              | 1000.0             | 9.000              | On     | L1   | 20.1          | 8.7            | 46.0            |
| 1.167000           | 35.8              | 1000.0             | 9.000              | On     | L1   | 19.8          | 10.2           | 46.0            |
| 1.680000           | 35.2              | 1000.0             | 9.000              | On     | L1   | 20.0          | 10.8           | 46.0            |
| 2.769000           | 30.9              | 1000.0             | 9.000              | On     | L1   | 20.3          | 15.1           | 46.0            |
| 4.884000           | 32.2              | 1000.0             | 9.000              | On     | L1   | 20.8          | 13.8           | 46.0            |
| 7.426500           | 23.8              | 1000.0             | 9.000              | On     | L1   | 21.6          | 26.2           | 50.0            |



## USB mode +FM, Set.4

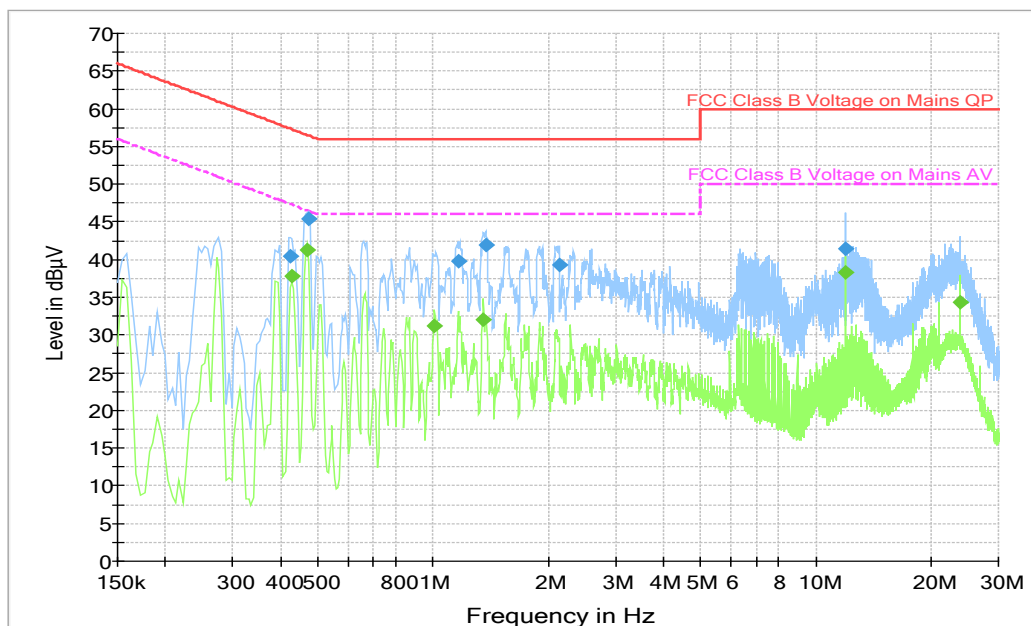


Figure A.16 Conducted Emission

### Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.424500        | 40.5             | 1000.0          | 9.000           | On     | N    | 19.9       | 16.9        | 57.4         |
| 0.474000        | 45.5             | 1000.0          | 9.000           | On     | L1   | 20.1       | 11.0        | 56.4         |
| 1.162500        | 39.8             | 1000.0          | 9.000           | On     | N    | 19.9       | 16.2        | 56.0         |
| 1.374000        | 41.9             | 1000.0          | 9.000           | On     | N    | 19.9       | 14.1        | 56.0         |
| 2.134500        | 39.3             | 1000.0          | 9.000           | On     | N    | 19.9       | 16.7        | 56.0         |
| 11.935500       | 41.4             | 1000.0          | 9.000           | On     | L1   | 22.7       | 18.6        | 60.0         |

### Final Result 2

| Frequency (MHz) | Average (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|----------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.429000        | 37.8           | 1000.0          | 9.000           | On     | L1   | 20.1       | 9.5         | 47.3         |
| 0.469500        | 41.3           | 1000.0          | 9.000           | On     | N    | 19.9       | 5.2         | 46.5         |
| 1.009500        | 31.2           | 1000.0          | 9.000           | On     | L1   | 19.8       | 14.8        | 46.0         |
| 1.356000        | 32.0           | 1000.0          | 9.000           | On     | L1   | 19.9       | 14.0        | 46.0         |
| 11.935500       | 38.3           | 1000.0          | 9.000           | On     | L1   | 22.7       | 11.7        | 50.0         |
| 23.869500       | 34.4           | 1000.0          | 9.000           | On     | L1   | 25.5       | 15.6        | 50.0         |

Note: The measurement results showed here are worst cases of the combinations of different cables.

**ANNEX B: Persons involved in this testing**

| Test Item          | Tester                            |
|--------------------|-----------------------------------|
| Radiated Emission  | Li Pengfei ,Wang Huan,Yan Hanchen |
| Conducted Emission | Shi Suolan                        |

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