



# TEST REPORT

## No. I19Z62186-EMC01

**HMD Global Oy**

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

**Model Name: TA-1216**

**FCC ID: 2AJOTTA-1216**

**with**

**Hardware Version: 89572\_1\_12**

**Software Version: 000T\_0\_110**

**Issued Date: 2020-01-09**

**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:**

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I19Z62186-EMC01	Rev.0	1 <sup>st</sup> edition	2020-01-09

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## **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 (BDA)**

Address: No.18A, Kangding Street, Beijing Economic-Technology Development Area, Beijing, P. R. China 100176

### **1.3. Testing Environment**

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

### **1.4. Project data**

Testing Start Date: 2019-12-03  
Testing End Date: 2019-12-31

### **1.5. Signature**



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Li Yan

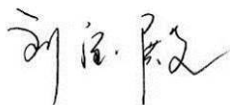
**(Prepared this test report)**



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Zhang Ying

**(Reviewed this test report)**



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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-1216
FCC ID	2AJOTTA-1216
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**

<b>EUT ID*</b>	<b>SN or IMEI</b>	<b>HW Version</b>	<b>SW Version</b>
EUT1	/	89572_1_12	000T_0_110

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

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

<b>AE ID*</b>	<b>Description</b>	<b>SN</b>	<b>Remarks</b>
AE1	Battery	/	/
AE2	Charger	/	/
AE3	Charger	/	/
AE4	Charger	/	/
AE5	USB Cable	/	/
AE6	USB Cable	/	/
AE7	Headset	/	/

##### **AE1**

Model	WT130
Manufacturer	GUANGDONG FENGHUA NEW ENERGY CO.,LTD
Capacitance	2920mAh
Nominal voltage	3.85v

##### **AE2**

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

##### **AE3**

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

##### **AE4**

Model	CH-35A
Manufacturer	Shenzhen Tianyin Electronics 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. EUT set-ups**

<b>EUT set-up No.</b>	<b>Combination of EUT and AE</b>	<b>Remarks</b>
Set.1	EUT1+ AE1+ AE2+ AE5/AE6	Charger+MP3+GNSS
Set.2	EUT1+ AE1+ AE3+ AE5/AE6	Charger+CAMERA
Set.3	EUT1+ AE1+ AE4+ AE5/AE6	Charger+CAMERA
Set.4	EUT1+ AE1+AE5/AE6+AE7	USB mode+FM

**Note:** TA-1216 is a variant model based on TA-1207, 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 119Z62142-EMC01 (FCC ID: 2AJOTTA-1207).

## **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	2016
ANSI C63.4	American National Standard for Methods of Measurement of Radio- Noise Emissions from Low-Voltage Electrical and Electronic Equipment 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; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4Ω
Normalised site attenuation (NSA)	< ± 4 dB, 3m/10m 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 3000 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; 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 3000 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; 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(BDA)
2	Conducted Emission	15.107(a)	A.2	BR	CTTL(BDA)

## 7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESU26	100376	R&S	2020-10-30	1 year
2	Test Receiver	ESCI	100766	R&S	2020-03-20	1 year
3	Universal Radio Communication Tester	CMW500	127406	R&S	2020-01-19	1 year
4	Universal Radio Communication Tester	CMW500	159408	R&S	2020-03-03	1 year
5	LISN	ENV216	825562/028	R&S	2020-03-10	1 year
6	EMI Antenna	VULB9163	9163-514	Schwarzbeck	2020-02-03	1 year
7	EMI Antenna	3117	00119021	ETS-Lindgren	2020-01-04	1 year
8	Signal Generator	SMF100A	101295	R&S	2020-11-06	1 year
9	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
10	Keyboard	KU-1601	2048361	Lenovo	N/A	N/A
11	Mouse	EMS-537A	8021S3MC	Lenovo	N/A	N/A

Test Item	Test Software and Version	Software Vendor
Radiated Continuous Emission	EMC32 V9.01	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 3 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 3/10 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. During the charging mode (set.1) the EUT is keeping on playing MP3 and the GNSS application is started up. During the charging mode (set.2) the camera is keeping on taking photos. During the USB mode the FM application is started up. 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.1.3 Measurement Limit**

Frequency range (MHz)	Field strength limit ( $\mu\text{V}/\text{m}$ )		
	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.

#### **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/1MHz	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: 5.40dB, 1GHz-18GHz: 4.32dB,  $k=2$ .

#### Measurement results for Set.1:

##### Charging Mode+ MP3+GNSS /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)
17983.500	38.7	-25.8	41.3	23.19	54.0	15.3	V
17983.000	38.6	-25.8	41.3	23.18	54.0	15.4	H
17988.500	38.6	-25.8	41.3	23.14	54.0	15.4	V
17959.000	38.6	-25.9	41.3	23.23	54.0	15.4	V
17975.500	38.6	-25.9	41.3	23.15	54.0	15.4	V
17990.500	38.6	-25.8	41.3	23.11	54.0	15.4	V

##### Charging Mode+ MP3+GNSS /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)
17973.500	51.6	-25.9	41.3	36.20	74.0	22.4	V
17958.000	51.3	-25.9	41.3	35.94	74.0	22.7	V
17895.500	51.3	-26.2	41.3	36.20	74.0	22.7	V
16559.500	51.1	-26.8	41.3	36.54	74.0	22.9	V
17814.000	51.0	-26.5	41.3	36.24	74.0	23.0	H
17857.500	50.9	-26.4	41.3	36.00	74.0	23.1	H

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

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

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
17968.000	38.9	-25.9	41.3	23.49	54.0	15.1	V
17971.000	38.8	-25.9	41.3	23.44	54.0	15.2	V
17981.500	38.8	-25.8	41.3	23.38	54.0	15.2	V
17990.000	38.8	-25.8	41.3	23.35	54.0	15.2	V
17995.500	38.8	-25.9	41.3	23.38	54.0	15.2	V
17986.500	38.8	-25.8	41.3	23.34	54.0	15.2	V

**Charging Mode+ CAMERA /Peak detector**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
3582.500	58.4	-35.2	33.2	60.44	74.0	15.6	H
3599.500	55.9	-35.3	33.2	58.05	74.0	18.1	H
3584.000	55.6	-35.2	33.2	57.61	74.0	18.4	H
3582.000	55.1	-35.2	33.2	57.10	74.0	18.9	H
3584.500	54.8	-35.2	33.2	56.80	74.0	19.2	H
3596.500	53.4	-35.3	33.2	55.51	74.0	20.6	H

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

**Measurement results for Set.3:**
**Charging Mode+ CAMERA /Average detector**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
17988.500	38.8	-25.8	41.3	23.33	54.0	15.2	H
17982.000	38.8	-25.8	41.3	23.32	54.0	15.2	V
17988.000	38.8	-25.8	41.3	23.29	54.0	15.2	V
17955.500	38.7	-25.9	41.3	23.36	54.0	15.3	V
17984.000	38.7	-25.8	41.3	23.23	54.0	15.3	V
17972.000	38.7	-25.9	41.3	23.28	54.0	15.3	V

**Charging Mode+ CAMERA /Peak detector**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
17966.000	51.4	-25.9	41.3	36.01	74.0	22.6	H
17995.500	51.0	-25.9	41.3	35.55	74.0	23.0	V
17987.500	51.0	-25.8	41.3	35.49	74.0	23.0	H
17963.000	50.9	-25.9	41.3	35.52	74.0	23.1	V
17966.500	50.9	-25.9	41.3	35.48	74.0	23.1	V
17955.500	50.8	-25.9	41.3	35.49	74.0	23.2	V

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

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

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
17985.000	38.8	-25.8	41.3	23.33	54.0	15.2	V
17979.500	38.7	-25.8	41.3	23.29	54.0	15.3	V
17990.500	38.7	-25.8	41.3	23.24	54.0	15.3	V
17970.500	38.7	-25.9	41.3	23.29	54.0	15.3	V
17984.500	38.7	-25.8	41.3	23.23	54.0	15.3	V
17981.000	38.7	-25.8	41.3	23.23	54.0	15.3	V

**USB Mode +FM /Peak detector**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
17721.000	51.5	-26.5	41.2	36.74	74.0	22.5	V
17994.500	51.0	-25.9	41.3	35.58	74.0	23.0	V
17734.500	51.0	-26.5	41.2	36.24	74.0	23.0	H
17990.500	50.9	-25.8	41.3	35.45	74.0	23.1	V
16622.000	50.9	-26.6	41.4	36.05	74.0	23.1	V
17905.500	50.9	-26.2	41.3	35.74	74.0	23.1	V

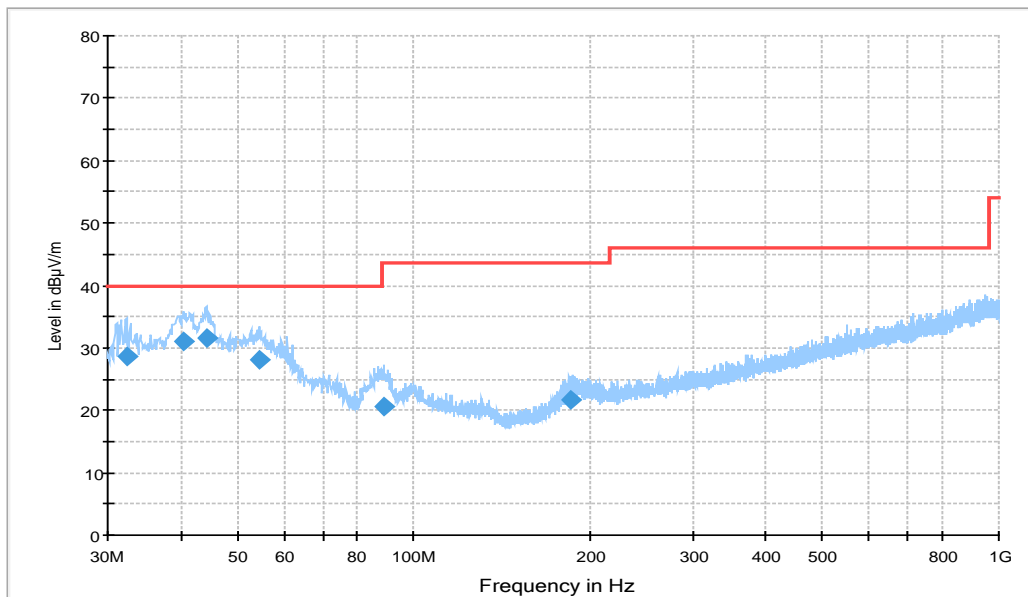
Note:

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



### Charging Mode + MP3+GNSS, Set.1

15B RE 30MHz-1GHz



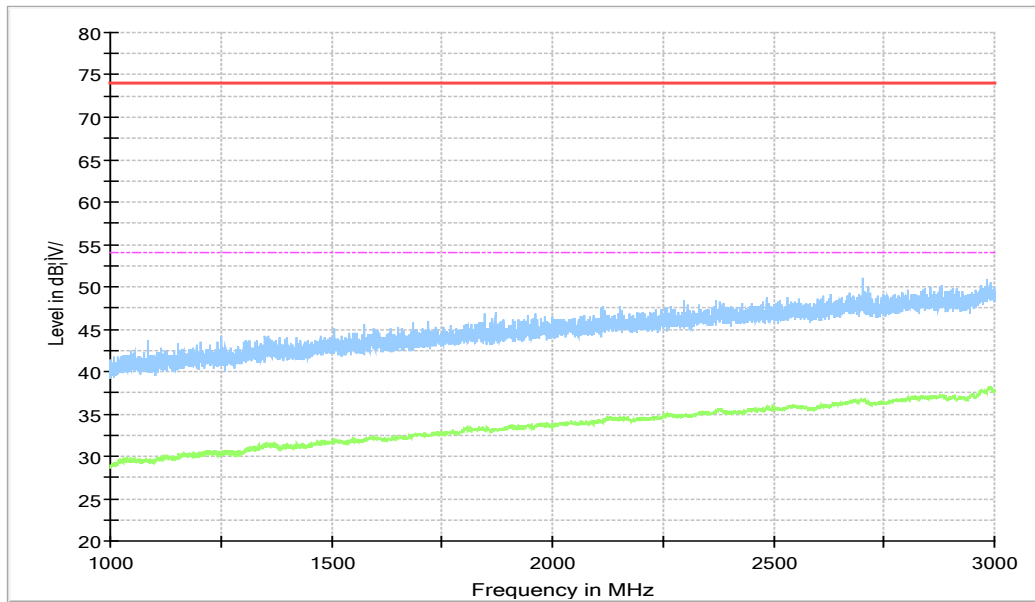
Note: the spike (98MHz) is coming from FM signal source.

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

### Final Result 1

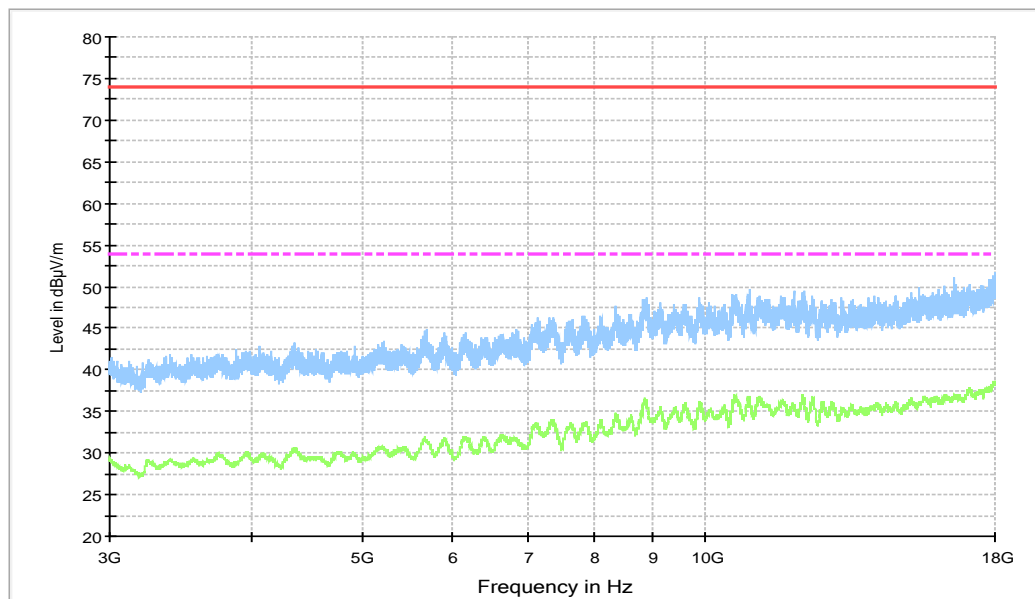
Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
32.328000	28.6	100.0	V	201.0	-0.6	11.4	40.0
40.476000	31.0	100.0	V	200.0	0.6	9.0	40.0
44.162000	31.4	100.0	V	90.0	0.7	8.6	40.0
54.541000	28.2	100.0	V	24.0	0.5	11.8	40.0
88.976000	20.6	125.0	V	-31.0	-3.3	22.9	43.5
186.07300	21.7	100.0	V	0.0	-2.4	21.8	43.5

Full Spectrum



**Figure A.2 Radiated Emission from 1GHz to 3GHz**

15b RE - 3GHz-18GHz



**Figure A.3 Radiated Emission from 3GHz to 18GHz**

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

## Charging Mode+ CAMERA, Set.2

15B RE 30MHz-1GHz

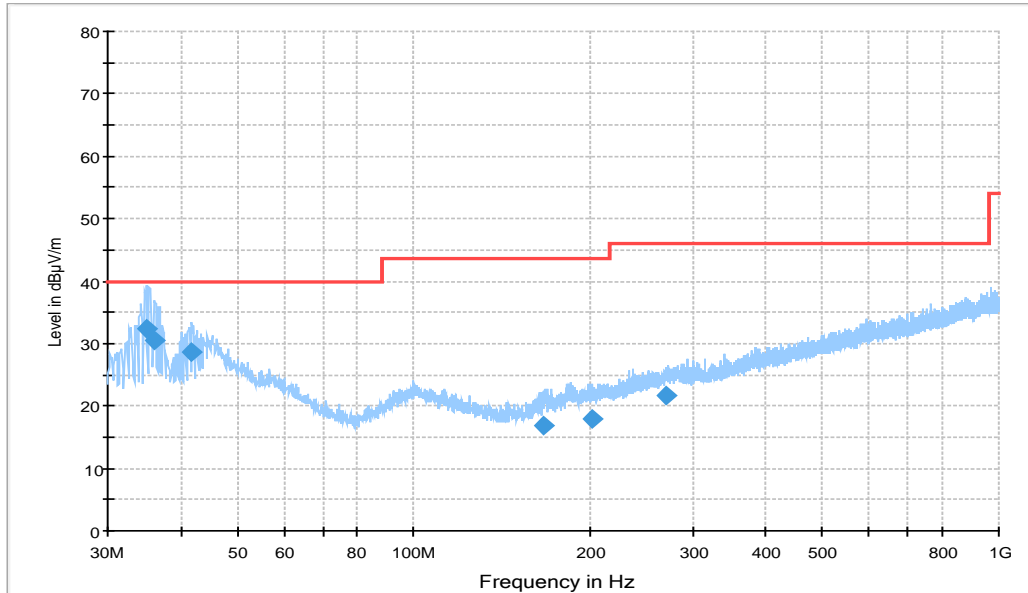
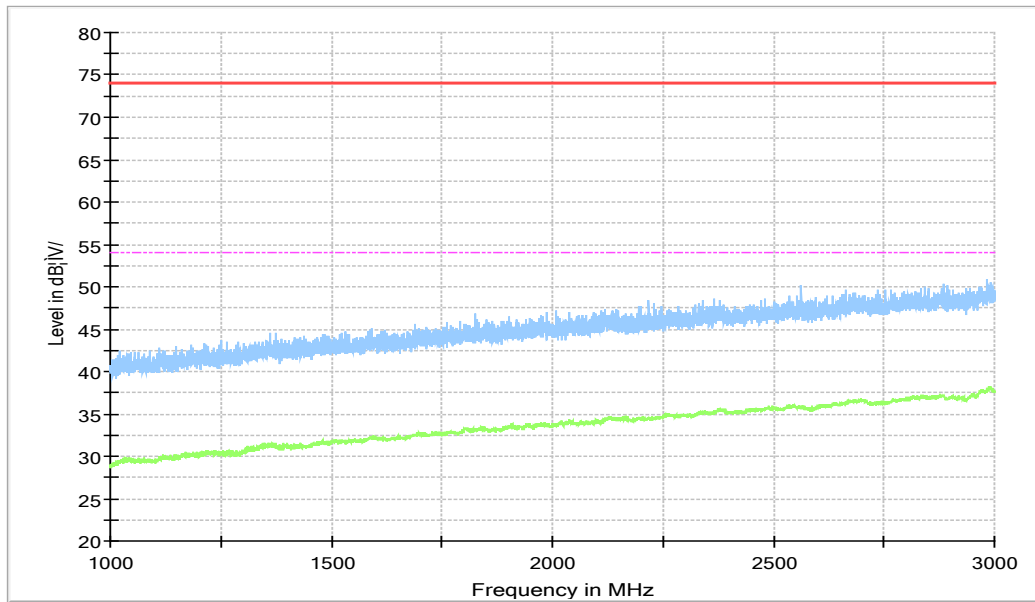


Figure A.4 Radiated Emission from 30MHz to 1GHz

## Final Result 1

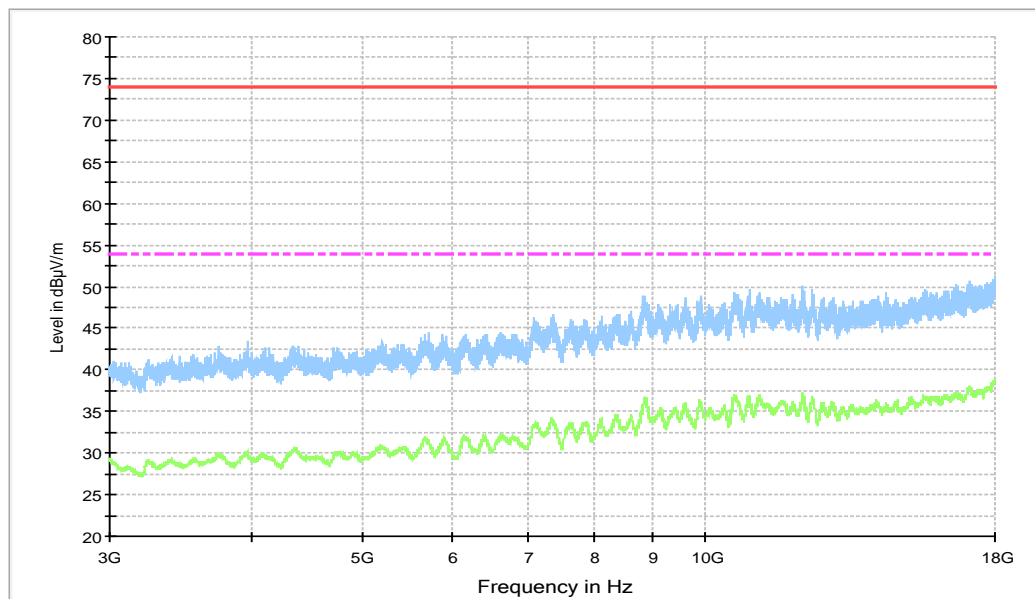
Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
34.947000	32.4	100.0	V	135.0	-0.2	7.6	40.0
36.014000	30.6	100.0	V	22.0	0.0	9.4	40.0
41.834000	28.5	110.0	V	-8.0	0.6	11.5	40.0
166.09100	17.0	119.0	V	194.0	-3.6	26.5	43.5
201.69000	18.0	110.0	V	-25.0	-1.4	25.5	43.5
269.10500	21.6	100.0	V	117.0	0.7	24.4	46.0

Full Spectrum



**Figure A.5 Radiated Emission from 1GHz to 3GHz**

15b RE - 3GHz-18GHz



**Figure A.6 Radiated Emission from 3GHz to 18GHz**

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

### Charging Mode+ CAMERA, Set.3

15B RE 30MHz-1GHz

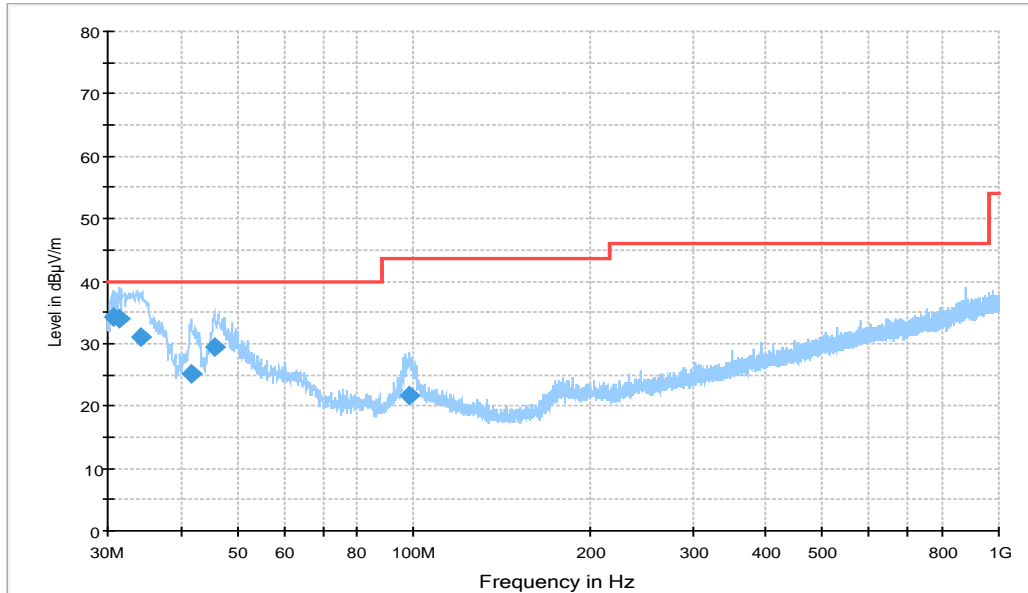
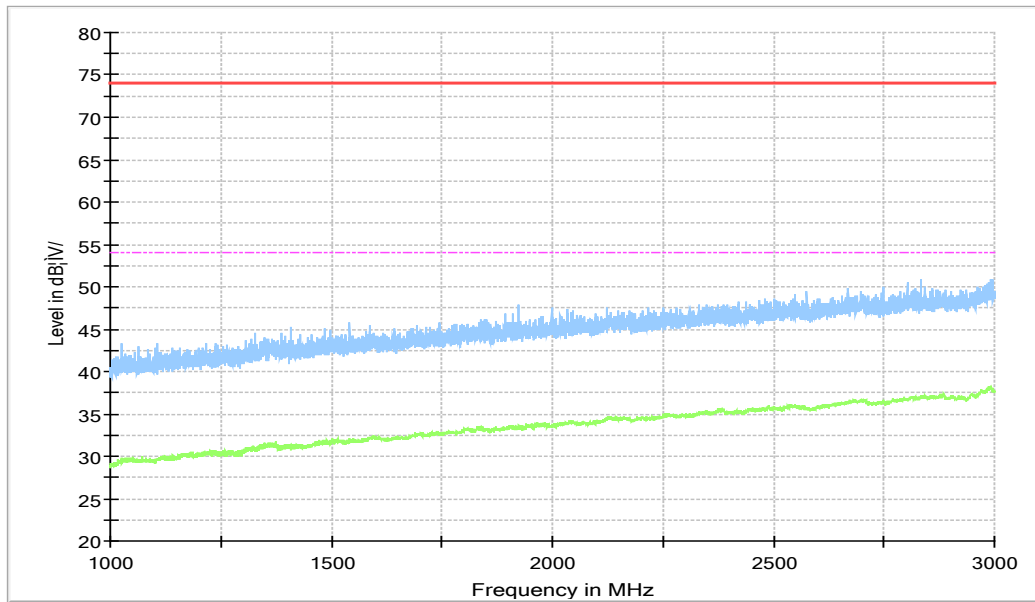


Figure A.7 Radiated Emission from 30MHz to 1GHz

### Final Result 1

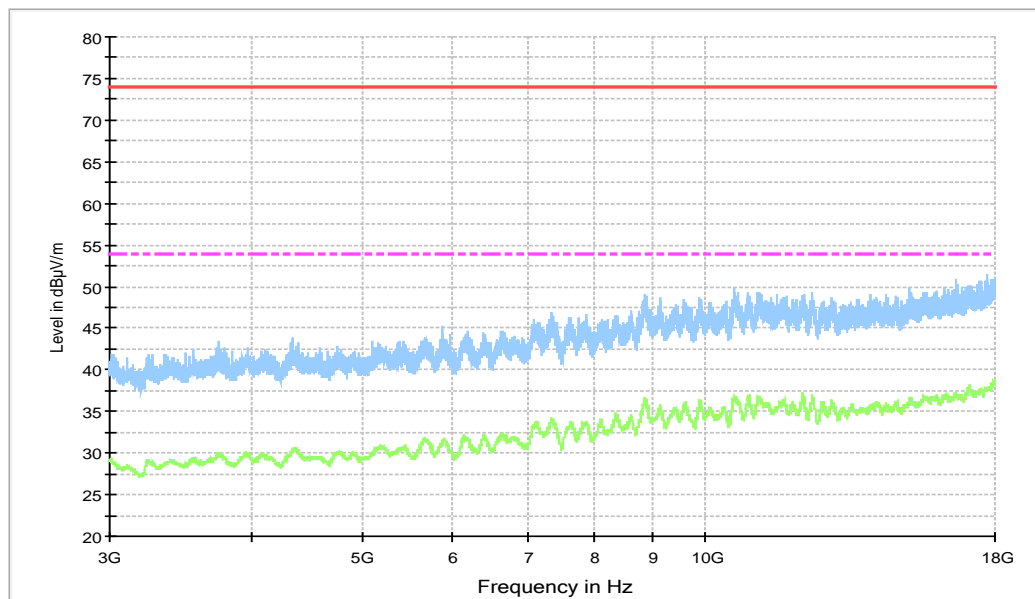
Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.776000	34.3	100.0	V	135.0	-0.9	5.7	40.0
31.455000	34.0	100.0	V	128.0	-0.8	6.0	40.0
34.171000	31.2	100.0	V	-41.0	-0.3	8.8	40.0
41.737000	25.2	110.0	V	194.0	0.6	14.8	40.0
45.617000	29.4	100.0	V	45.0	0.7	10.6	40.0
98.191000	21.7	125.0	V	194.0	-1.3	21.8	43.5

Full Spectrum



**Figure A.8 Radiated Emission from 1GHz to 3GHz**

15b RE - 3GHz-18GHz



**Figure A.9 Radiated Emission from 3GHz to 18GHz**

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

### USB Mode +FM, Set.4

15B RE 30MHz-1GHz

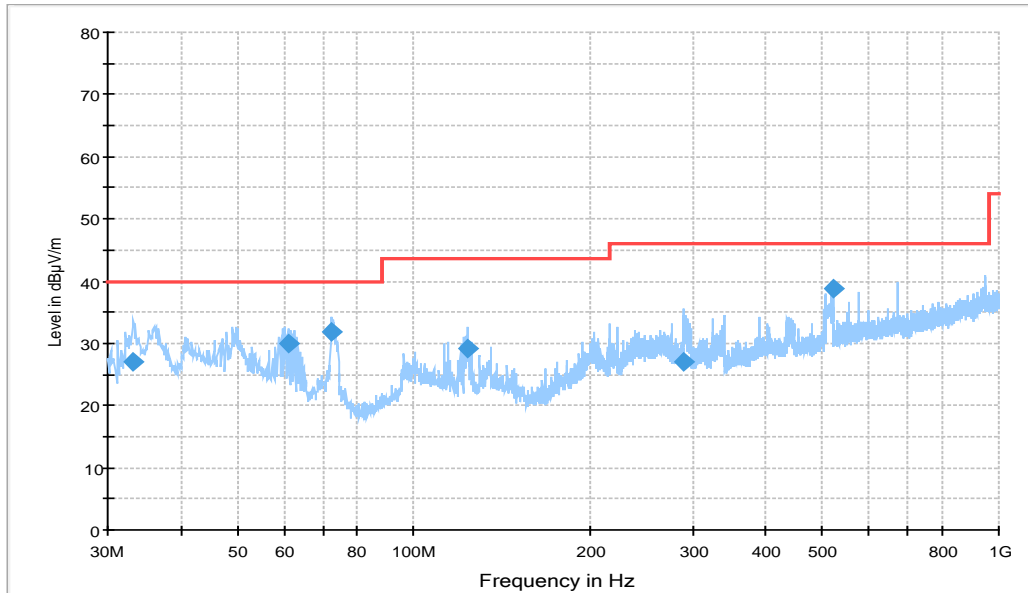
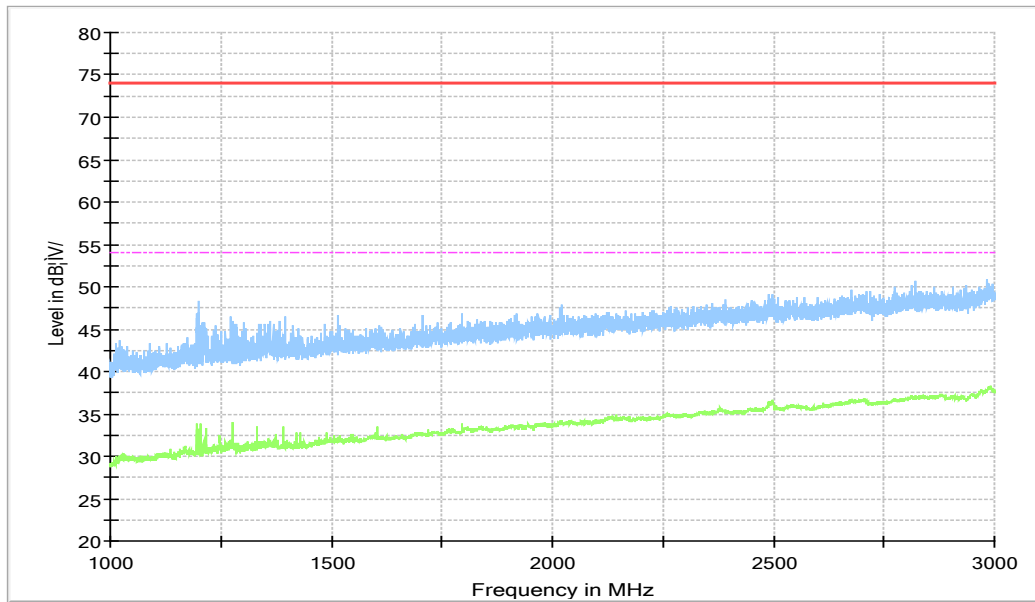


Figure A.10 Radiated Emission from 30MHz to 1GHz

### Final Result 1

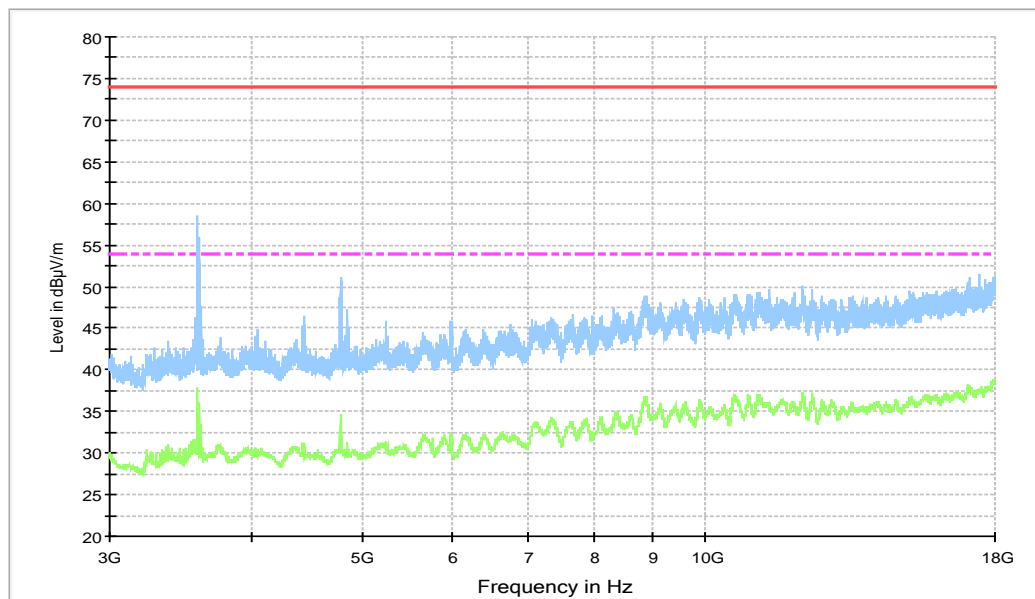
Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
33.201000	27.2	100.0	V	239.0	-0.5	12.8	40.0
61.040000	30.1	110.0	V	41.0	-0.4	9.9	40.0
72.292000	31.9	100.0	V	73.0	-4.7	8.1	40.0
123.99300	29.2	125.0	H	283.0	-3.3	14.3	43.5
288.60200	26.9	100.0	H	0.0	1.2	19.1	46.0
520.14100	38.8	100.0	V	315.0	7.5	7.2	46.0

Full Spectrum



**Figure A.11 Radiated Emission from 1GHz to 3GHz**

15b RE - 3GHz-18GHz



**Figure A.12 Radiated Emission from 3GHz to 18GHz**

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



## 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 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. During the charging mode (set.1) the EUT is keeping on playing MP3 and the GNSS application is started up. During the charging mode (set.2) the camera is keeping on taking photos. During the USB mode the FM application is started up. 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 (dB $\mu$ V)	
	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:  $U= 3.10$  dB,  $k=2$ .

#### Charging Mode +MP3+GNSS, Set.1

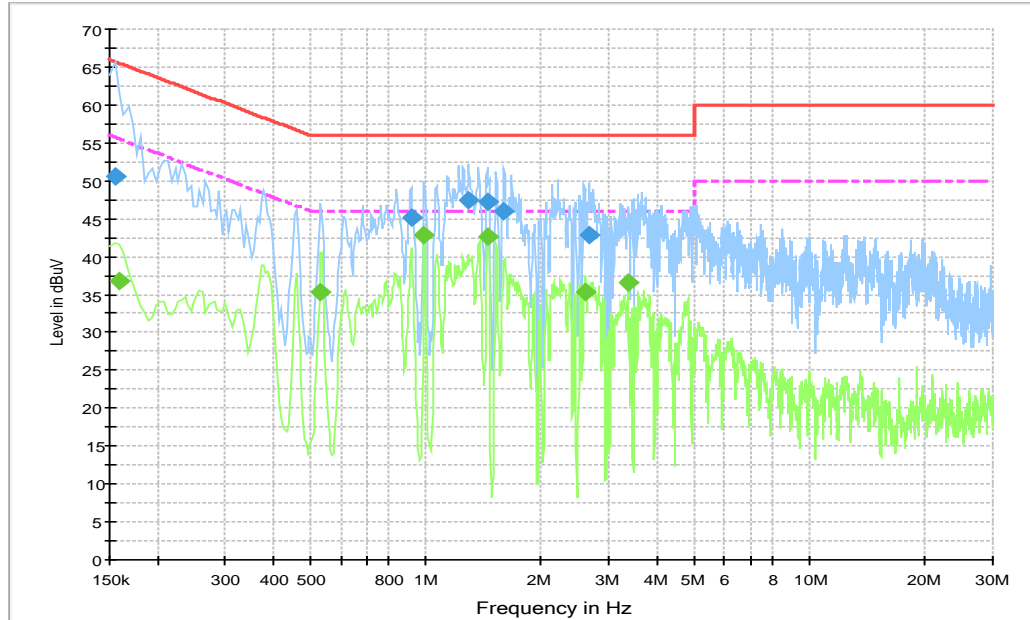


Figure A.13 Conducted Emission

#### Final Result 1

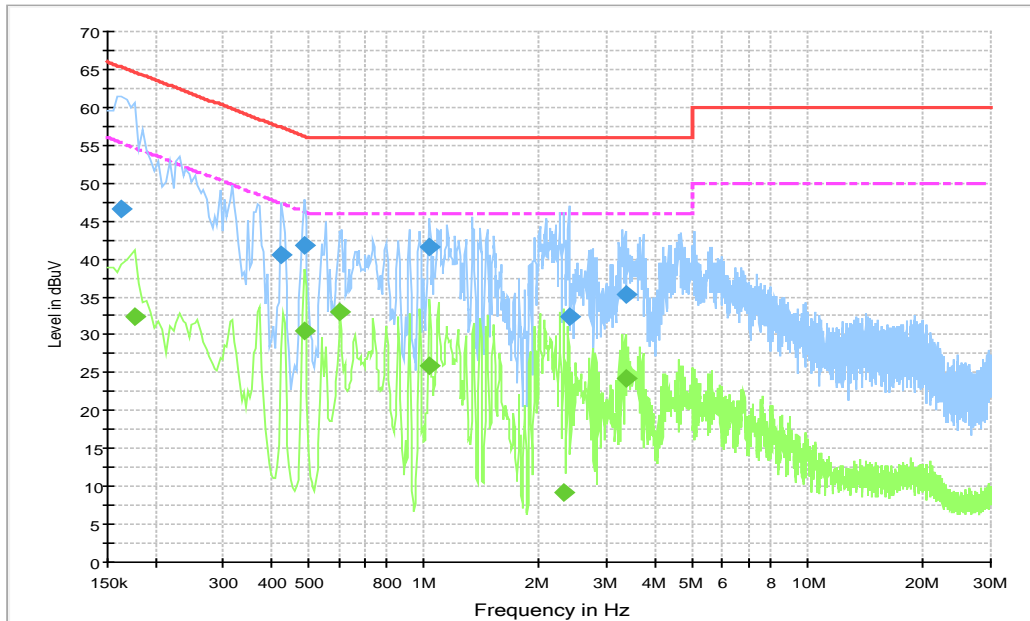
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	50.6	10000.0	9.000	On	L1	28.0	15.1	65.8
0.915000	45.2	10000.0	9.000	On	L1	19.9	10.8	56.0
1.293000	47.5	10000.0	9.000	On	N	19.8	8.5	56.0
1.450500	47.3	10000.0	9.000	On	N	19.8	8.7	56.0
1.599000	46.0	10000.0	9.000	On	N	19.8	10.0	56.0
2.670000	42.8	10000.0	9.000	On	N	19.8	13.2	56.0

#### Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.159000	36.9	10000.0	9.000	On	N	27.1	18.7	55.5
0.532500	35.4	10000.0	9.000	On	L1	20.0	10.6	46.0
0.991500	42.9	10000.0	9.000	On	N	19.9	3.1	46.0
1.450500	42.7	10000.0	9.000	On	N	19.8	3.3	46.0
2.593500	35.3	10000.0	9.000	On	N	19.8	10.7	46.0
3.358500	36.6	10000.0	9.000	On	N	19.8	9.4	46.0

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

**. Charging Mode + CAMERA, Set.2**



**Figure A.14 Conducted Emission**

**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.163500	46.6	10000.0	9.000	On	N	26.3	18.7	65.3
0.424500	40.5	10000.0	9.000	On	L1	20.0	16.8	57.4
0.487500	41.9	10000.0	9.000	On	L1	20.0	14.3	56.2
1.032000	41.5	10000.0	9.000	On	L1	19.9	14.5	56.0
2.386500	32.4	10000.0	9.000	On	L1	19.8	23.6	56.0
3.349500	35.3	10000.0	9.000	On	L1	19.8	20.7	56.0

**Final Result 2**

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	32.4	10000.0	9.000	On	L1	23.8	22.2	54.6
0.487500	30.4	10000.0	9.000	On	L1	20.0	15.8	46.2
0.604500	32.9	10000.0	9.000	On	L1	20.0	13.1	46.0
1.036500	25.9	10000.0	9.000	On	L1	19.9	20.1	46.0
2.319000	9.3	10000.0	9.000	On	L1	19.8	36.7	46.0
3.349500	24.2	10000.0	9.000	On	L1	19.8	21.8	46.0

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

### Charging Mode + CAMERA, Set.3

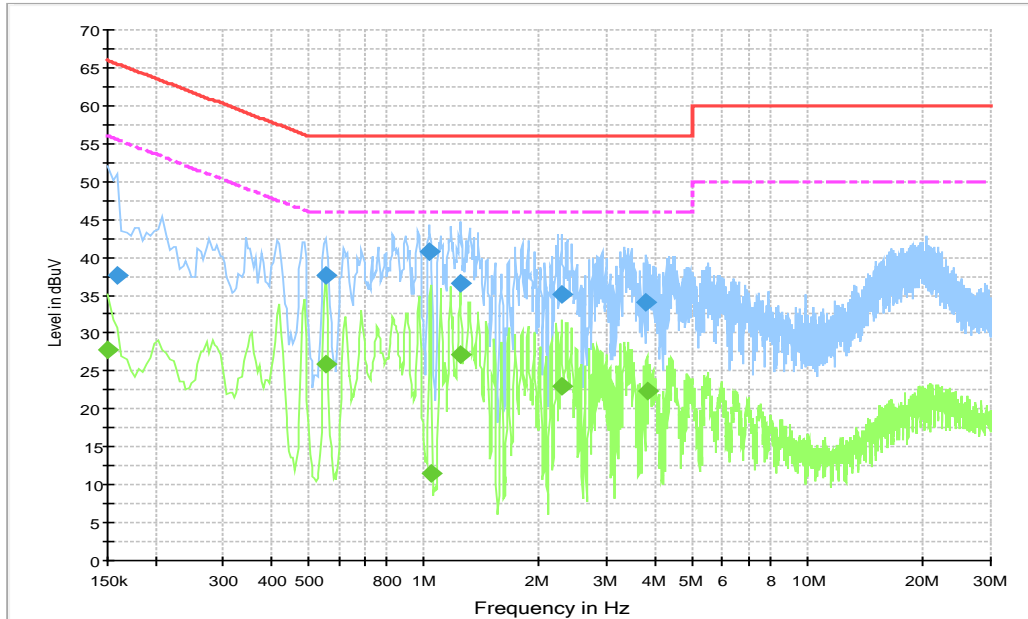


Figure A.15 Conducted Emission

#### Final Result 1

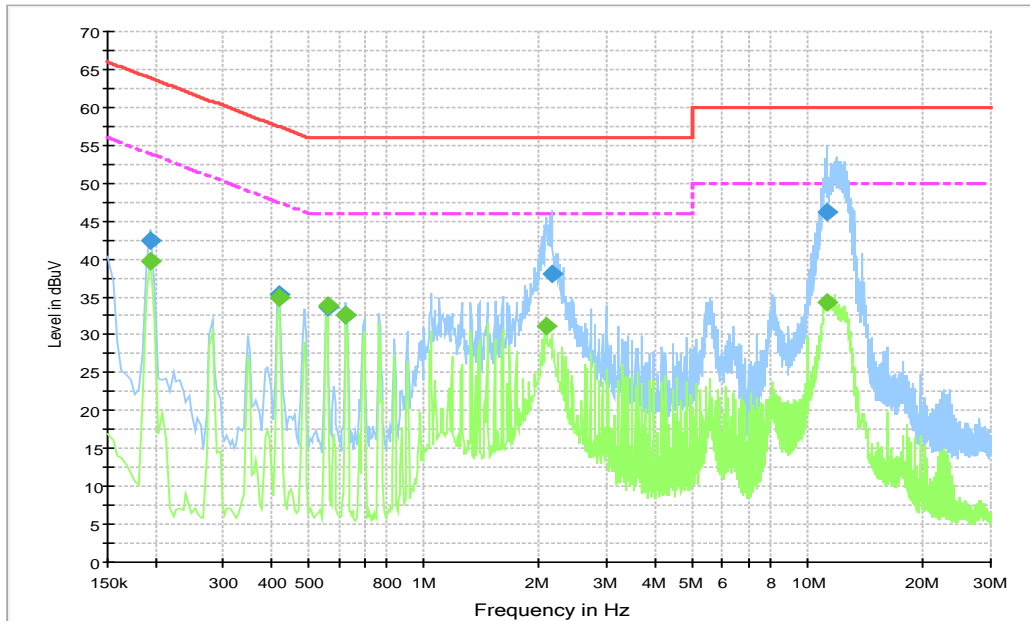
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.159000	37.6	10000.0	9.000	On	N	27.1	27.9	65.5
0.555000	37.6	10000.0	9.000	On	L1	20.0	18.4	56.0
1.032000	40.8	10000.0	9.000	On	N	19.9	15.2	56.0
1.248000	36.6	10000.0	9.000	On	L1	19.9	19.4	56.0
2.287500	35.1	10000.0	9.000	On	L1	19.8	20.9	56.0
3.804000	34.1	10000.0	9.000	On	L1	19.8	21.9	56.0

#### Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	27.7	10000.0	9.000	On	L1	28.9	28.3	56.0
0.555000	25.9	10000.0	9.000	On	L1	20.0	20.1	46.0
1.041000	11.5	10000.0	9.000	On	L1	19.9	34.5	46.0
1.243500	27.2	10000.0	9.000	On	L1	19.9	18.8	46.0
2.287500	23.0	10000.0	9.000	On	L1	19.8	23.0	46.0
3.808500	22.4	10000.0	9.000	On	L1	19.8	23.6	46.0

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

**.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)
0.195000	42.5	10000.0	9.000	On	L1	20.8	21.4	63.8
0.420000	35.2	10000.0	9.000	On	N	20.0	22.2	57.4
0.559500	33.7	10000.0	9.000	On	N	20.0	22.3	56.0
0.627000	32.6	10000.0	9.000	On	L1	20.0	23.4	56.0
2.157000	37.9	10000.0	9.000	On	L1	19.8	18.1	56.0
11.193000	46.2	10000.0	9.000	On	L1	20.0	13.8	60.0

**Final Result 2**

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.195000	39.7	10000.0	9.000	On	N	20.8	14.1	53.8
0.420000	34.9	10000.0	9.000	On	N	20.0	12.6	47.4
0.559500	33.9	10000.0	9.000	On	N	20.0	12.1	46.0
0.627000	32.6	10000.0	9.000	On	L1	20.0	13.4	46.0
2.089500	31.1	10000.0	9.000	On	N	19.8	14.9	46.0
11.211000	34.3	10000.0	9.000	On	L1	20.0	15.7	50.0

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



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

Test Item	Tester
Radiated Emission	Zhao Wenhui, Li Zongliang
Conducted Emission	Guo Qian

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