



# TESTREPORT

No.I18N00930-EMC

for

**Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd**

**Mobile Hotspot**

**Model Name: cp331A**

**FCC ID: R38YLCP331A**

**Hardware Version: P1**

**Software Version: 2.0.158.P0.180824.cp331A**

**Issued Date: 2018-08-29**

**Designation Number: CN1210**

**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 SAICT.

**Test Laboratory:**

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I18N00930-EMC	Rev.0	1st edition	2018-08-29

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## 1. Test Laboratory

### 1.1. TestingLocation

Company Name: Shenzhen Academy of Information and Communications  
Technology  
Address: Building G, Shenzhen International Innovation Center, No.1006  
Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China  
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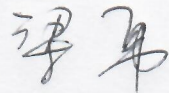
### 1.2. TestingEnvironment

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

### 1.3. Project data

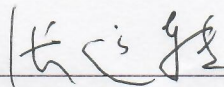
Testing Start Date: 2018-08-10  
Testing End Date: 2018-08-25

### 1.4. Signature



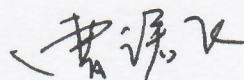
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Liang Yong  
(Prepared this test report)



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Zhang Yunzhan  
(Reviewed this test report)



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Cao Junfei  
Director of the laboratory  
(Approved this test report)

## **2. ClientInformation**

### **2.1. Applicant Information**

Company Name: Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd  
Coolpad Information Harbor, High-tech Industrial Park (North),  
Address: Nanshan District, Shenzhen, P.R.C.

### **2.2. Manufacturer Information**

Company Name: Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd  
Coolpad Information Harbor, High-tech Industrial Park (North),  
Address: Nanshan District, Shenzhen, P.R.C.

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

#### **3.1. About EUT**

Description	Mobile Hotspot
Model Name	cp331A
FCC ID	R38YLCP331A
Condition of EUT as received	No obvious damage in appearance

The Equipment Under Test (EUT) are a model of Mobile Hotspot with integrated antenna.

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
EUT1	860006040001733

\*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

Model	Li-ion rechargeable battery
Manufacturer	Tianjin Lishen Battery Joint-Stock Co.,Ltd.
Capacitance	2150 mAh
Nominal Voltage	3.85V

AE2

Model	RD0501000-USBA-18MG
Manufacturer	Shenzhen Ruide Electronic Industrial Co.,Ltd
S/N	/

AE3

Model	KP( W) 025
Manufacturer	Huizhou Shenhua Industrial CO.,LTD

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

### 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+AE3	Charging mode
Set.2	EUT1+ AE1+AE3	USB mode

## 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	10-1-2017 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 °C, Max. = 35°C
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-18000MHz,>90dB
Electrical insulation	>2MΩ
Ground system resistance	<4Ω
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 °C, Max. = 30 °C
Relative humidity	Min. =20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-10000MHz,>90dB
Electrical insulation	>2MΩ
Ground system resistance	<4Ω

**Fully-anechoic chamber** 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-18000MHz,>90dB
Electrical insulation	>2MΩ
Ground system resistance	<4Ω
VoltageStandingWaveRatio (VSWR)	≤ 6 dB, from 1 to 18GHz, 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 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	ESR7	101676	R&S	2018.11.29	1 year
2.	TestReceiver	ESCI	100702	R&S	2019.06.20	1 year
3.	Spectrum Analyzer	FSV40	101192	R&S	2019.05.21	1 year
4.	BiLog Antenna	3142E	00224831	ETS-lindgren	2021.05.17	3 years
5.	LISN	ENV216	102067	R&S	2019.07.18	1 year
6.	Horn Antenna	3117	00066577	ETS-lindgren	2019.04.05	3 years
7.	Universal Radio Communication Tester	CMU200	114545	R&S	2019.05.17	1 year
8.	PC	ThinkPad E480	PF-0Z56NV	Lenovo	/	/
9.	Printer	P1008	VNF6C12491	HP	/	/
10.	Mouse	MOEUUOA	44NY517	Lenovo	/	/
11.	Chamber	FACT3-2.0	1285	ETS-Lindgren	2020.07.20	3 years

## **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:**

**MP3 mode:** The EUT is keeping on playing mp3.

**Camera mode:** The EUT is keeping on taking photos.

**Charging mode:** The MS is synchronized to SS, and able to respond to paging messages and incoming call. An established call has been released. The MS is connected to a charger.

**USB mode:** The model of the PC is Lenovo ThinkPad E480, and the serial number of the PC is PF-0Z56NV. 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)

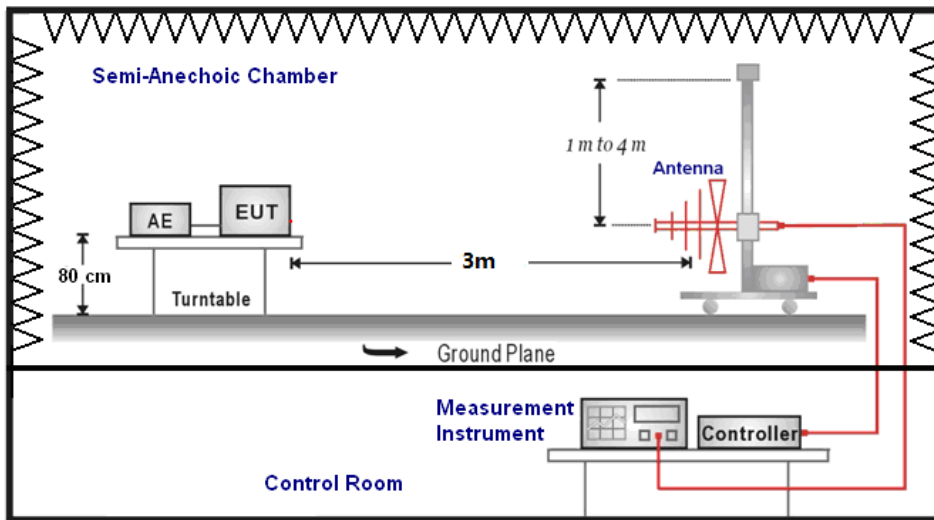
Frequency range (MHz)	Field strength limit ( $\mu\text{V}/\text{m}$ )		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

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

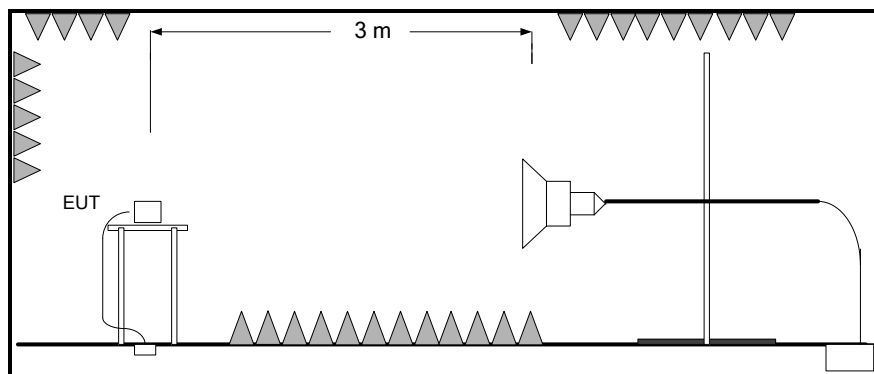
#### **A.1.4 Test Condition**

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

**A.1.5 Test set-up:  
30MHz-1GHz**



**1GHz-18GHz**



### A.1.6 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:

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

Where

$G_A$ : Antenna factor of receive antenna

$G_{PL}$ : PathLoss

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

Note: the result contains vertical part and Horizontal part

**RE Measurement uncertainty:** 30M-1GHz: 4.90dB (k=2);  
1GHz-18GHz: 5.12 dB (k=2)

#### Set.1 MP3 mode / Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Limit (dB $\mu$ V/m)	Margin(dB)	Polarity	ARpl (dB/m)	$P_{\text{Mea}}$ (dB $\mu$ V)
12878.5	56.12	74	17.88	H	19.9	36.22
13971.5	56.5	74	17.5	H	19.6	36.9
14530	57.3	74	16.7	H	20.3	37
15646	58.79	74	15.21	H	21.3	37.49
16605	57.95	74	16.05	H	22.9	35.05
17692.5	57.35	74	16.65	H	22.9	34.45

#### Set.1 MP3 mode / Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Limit (dB $\mu$ V/m)	Margin(dB)	Polarity	ARpl (dB/m)	$P_{\text{Mea}}$ (dB $\mu$ V)
12540.5	44.92	54	9.08	H	20	24.92
12903.5	45.32	54	8.68	H	20	25.32
14014.5	45.18	54	8.82	H	19.5	25.68
14698	46.3	54	7.7	H	20.7	25.6
16639.5	47.24	54	6.76	H	22.5	24.74
17707	46.28	54	7.72	H	22.9	23.38

**Set.2 USB mode with Camera mode / Peak detector**

Frequency(MHz)	Result(dBuV/m)	Limit (dB $\mu$ V/m)	Margin(dB)	Polarity	ARpl (dB/m)	P <sub>Mea</sub> (dB $\mu$ V)
13985	56.65	74	17.35	H	19.6	37.05
14634	57.1	74	16.9	V	20.6	36.5
15054.5	56.12	74	17.88	V	19.9	36.22
15604	57.58	74	16.42	H	21.3	36.28
17032.5	57.97	74	16.03	H	22.4	35.57
17666.5	56.66	74	17.34	V	22.5	34.16

**Set.2 USB mode with Camera mode / Average detector**

Frequency(MHz)	Result(dBuV/m)	Limit (dB $\mu$ V/m)	Margin(dB)	Polarity	ARpl (dB/m)	P <sub>Mea</sub> (dB $\mu$ V)
13925.5	44.5	54	9.5	H	19.8	24.7
14674.5	45.24	54	8.76	V	20.7	24.54
15573.5	45.14	54	8.86	V	21	24.14
15636	46.63	54	7.37	H	21.3	25.33
16639.5	46.37	54	7.63	H	22.5	23.87
17703.5	45.7	54	8.3	V	22.9	22.8

Note: The measurement result of Set.1 and Set.2 showed here are worst cases of combinations of different batteries and USB cables.

MP3 mode / Charging mode: Set 1

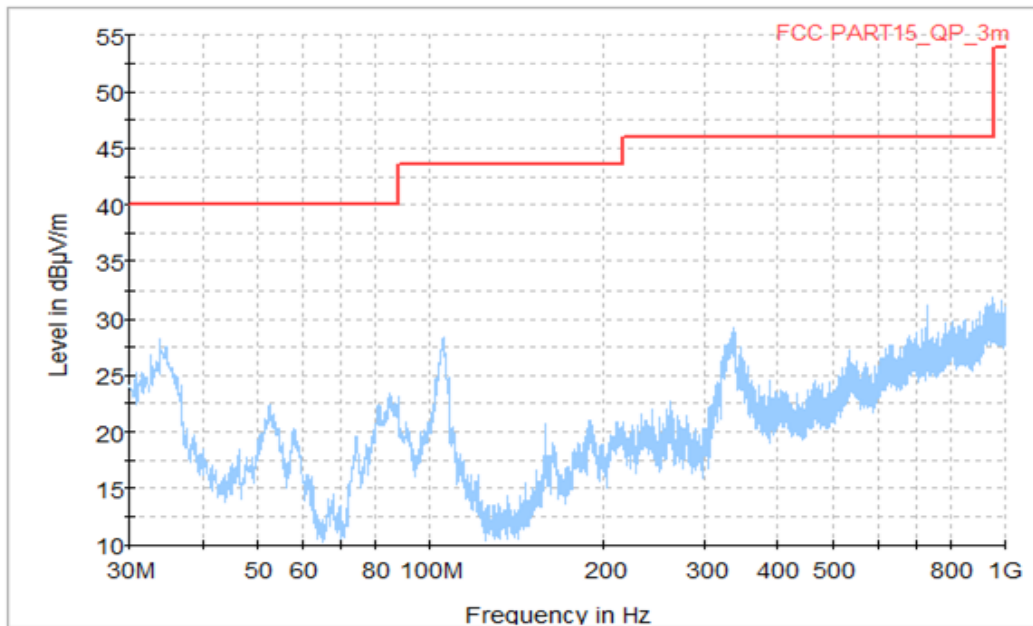


Figure A.1 Radiated Emission from 30MHz to 1GHz

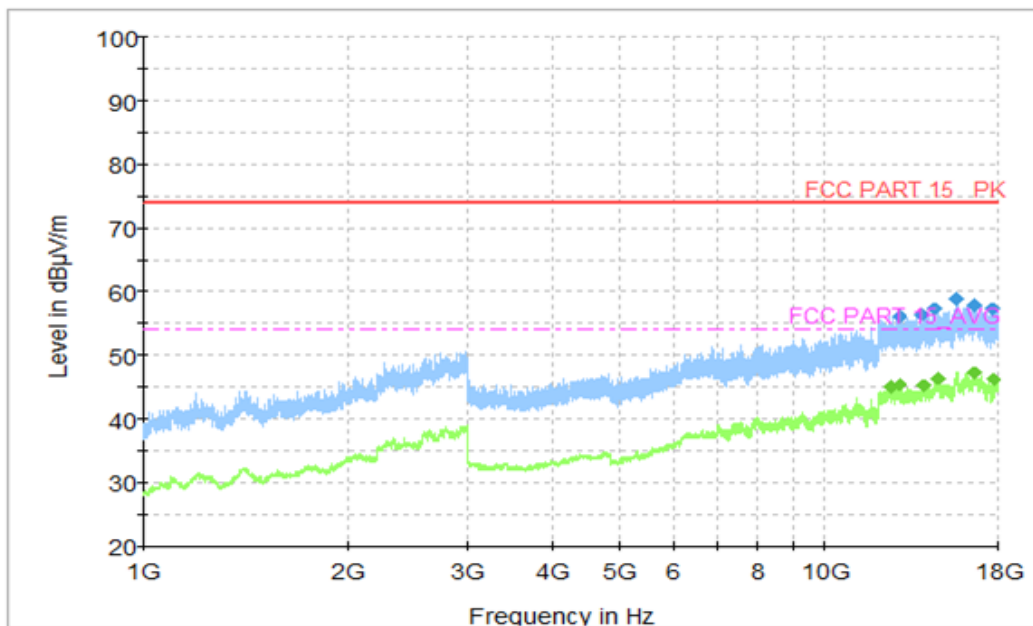


Figure A.2 Radiated Emission from 1GHz to 18GHz



USB mode with Camera mode : Set 2

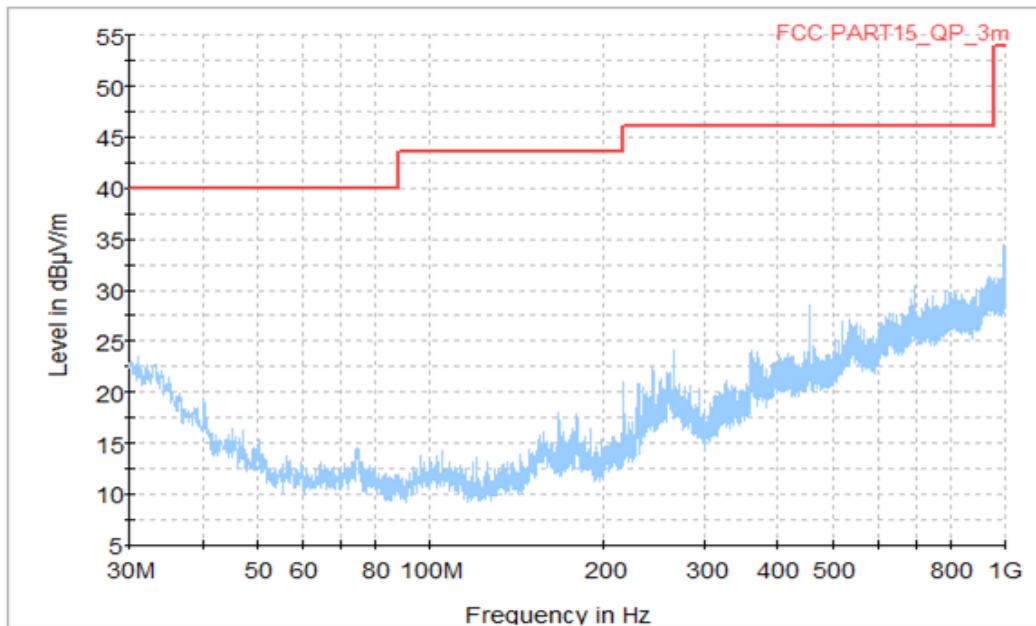


Figure A.3 Radiated Emission from 30MHz to 1GHz



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

## B.2 Conducted Emission (§15.107(a))

### Reference

FCC: CFR Part 15.107(a)

### B.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 150kHz to 30MHz shall not exceed the limits. Tested in accordance with the procedures of ANSI C63.4 -2014, section 7.3.

### B.2.2 EUT Operating Mode:

**MP3 mode:** The EUT is keeping on playing mp3.

**Camera mode:** The EUT is keeping on taking photos.

**Charging mode:** The MS is synchronized to SS, and able to respond to paging messages and incoming call. An established call has been released. The MS is connected to a charger.

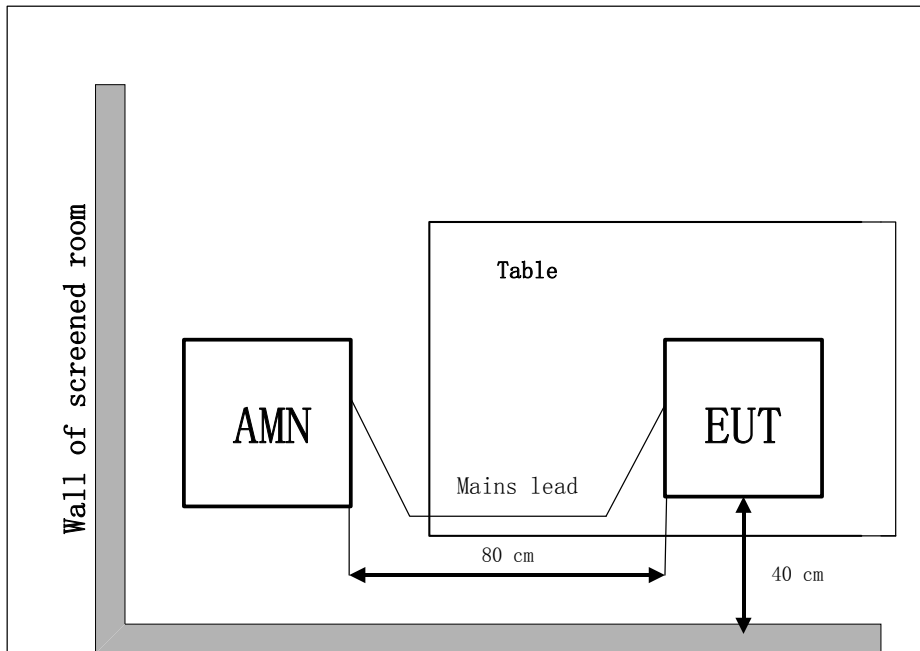
**USB mode:** The model of the PC is Lenovo ThinkPad E480, and the serial number of the PC is PF-0Z56NV. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

### B.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

**B.2.4 Test set-up:**



**B.2.5 Test Condition in charging mode**

Voltage (V)	Frequency (Hz)
120	50
240	50

RBW	Sweep Time(s)
9kHz	1

**CE Measurement uncertainty:** 3.10 dB (k=2)

**B.2.6 Measurement Results**

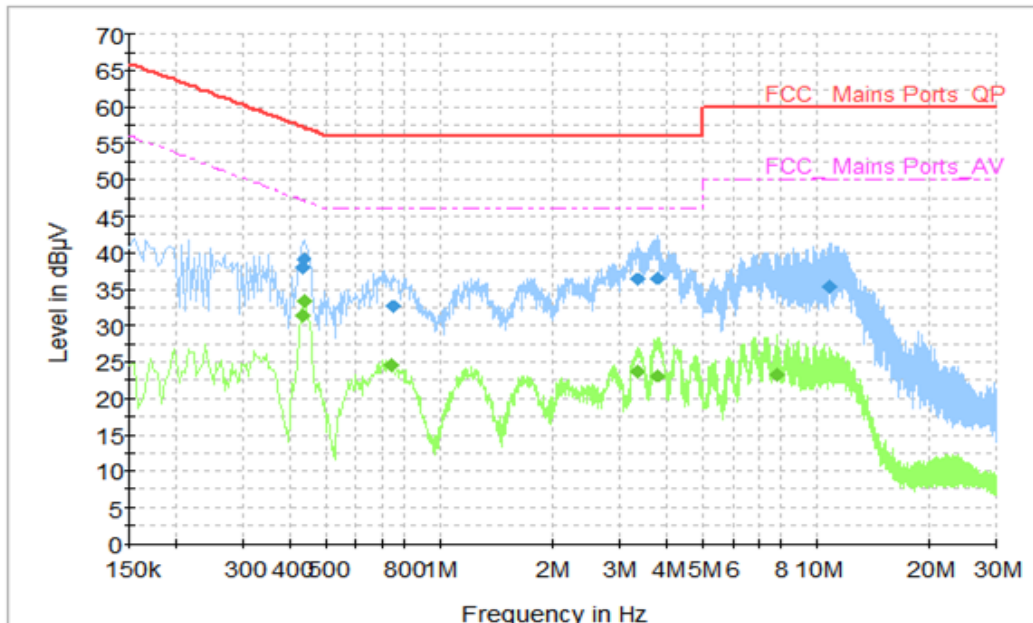
QuasiPeak(dB  $\mu$ V) /Average(dB  $\mu$ V) = $P_{Mea}$ +Corr

Where

Corr: PathLoss + Voltage Division Factor

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

**MP3 mode / Charging mode: Set 1**  
**Voltage: 120V**



**Figure B.1 Conducted Emission**

**Final Measurement Detector 1**

Frequency (MHz)	QuasiPeak (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.43	38	57.25	19.26	N	9.7	28.3
0.434	39.2	57.18	17.98	N	9.7	29.5
0.75	32.59	56	23.41	L1	9.7	22.89
3.362	36.34	56	19.66	N	9.7	26.64
3.786	36.51	56	19.49	N	9.7	26.81
10.846	35.3	60	24.7	N	9.8	25.5

**Final Measurement Detector 2**

Frequency (MHz)	Average (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.43	31.44	47.25	15.81	N	9.7	21.74
0.438	33.36	47.1	13.74	N	9.7	23.66
0.746	24.54	46	21.46	N	9.7	14.84
3.346	23.68	46	22.32	N	9.7	13.98
3.782	23.1	46	22.9	N	9.7	13.4
7.842	23.36	50	26.64	N	9.8	13.56

USB mode with Camera mode : Set 2  
Voltage: 120V

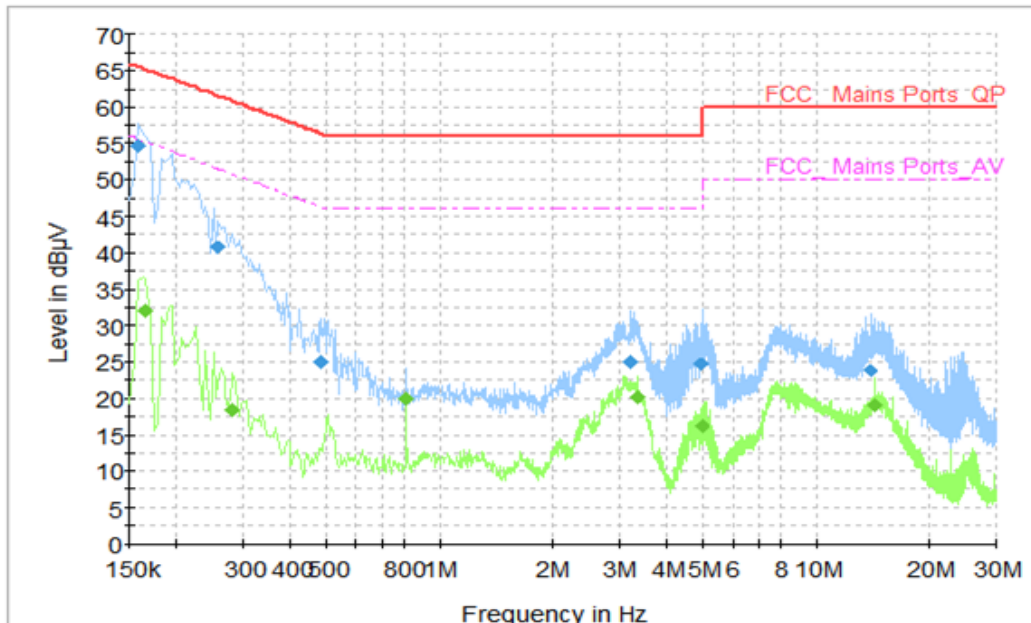


Figure B.2 Conducted Emission

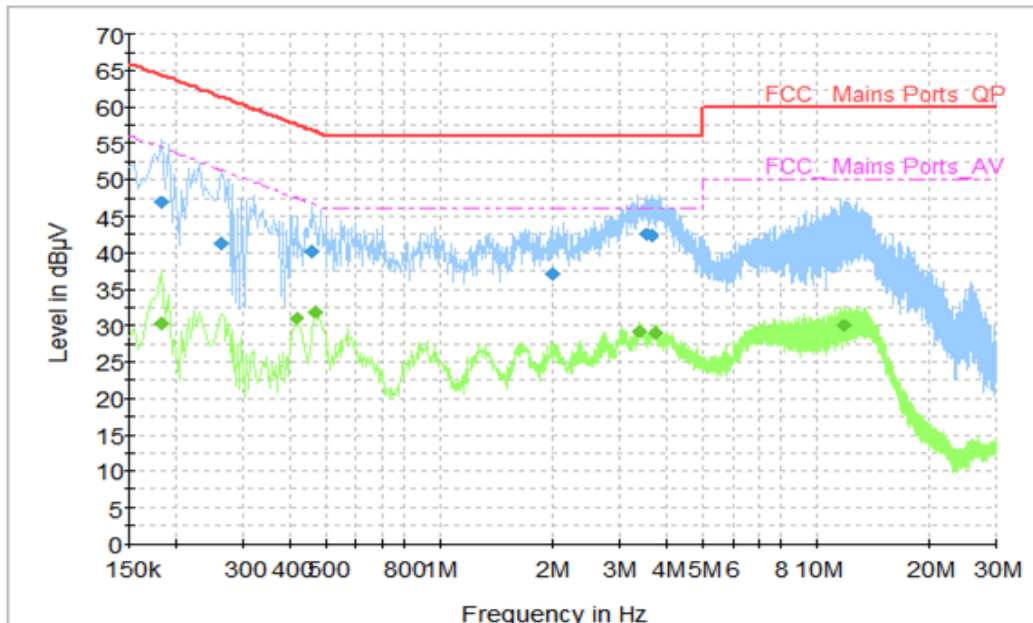
**Final Measurement Detector 1**

Frequency (MHz)	QuasiPeak (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.158	54.6	65.57	10.97	L1	9.7	44.9
0.258	40.76	61.5	20.74	L1	9.7	31.06
0.482	24.95	56.31	31.35	L1	9.7	15.25
3.214	25.02	56	30.98	N	9.7	15.32
4.938	24.72	56	31.28	N	9.7	15.02
13.874	23.89	60	36.11	L1	10.1	13.79

**Final Measurement Detector 2**

Frequency (MHz)	Average (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.166	32.17	55.16	22.98	N	9.6	22.57
0.282	18.38	50.76	32.38	L1	9.7	8.68
0.814	19.96	46	26.04	N	9.7	10.26
3.354	20.09	46	25.91	L1	9.7	10.39
4.966	16.21	46	29.79	N	9.7	6.51
14.302	19.08	50	30.92	L1	10.1	8.98

**MP3 mode / Charging mode: Set 1**  
**Voltage: 240V**



**Figure B.3 Conducted Emission**

**Final Measurement Detector 1**

Frequency (MHz)	QuasiPeak (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.182	46.92	64.39	17.48	N	9.6	37.32
0.262	41.26	61.37	20.11	N	9.6	31.66
0.458	40.17	56.73	16.56	N	9.6	30.57
1.986	36.99	56	19.01	N	9.7	27.29
3.538	42.49	56	13.51	L1	9.7	32.79
3.65	42.32	56	13.68	L1	9.7	32.62

**Final Measurement Detector 2**

Frequency (MHz)	Average (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.182	30.38	54.39	24.01	N	9.6	20.78
0.414	30.99	47.57	16.58	N	9.7	21.29
0.466	31.83	46.59	14.75	N	9.7	22.13
3.386	29.3	46	16.7	N	9.7	19.6
3.75	29	46	17	N	9.7	19.3
11.854	30.02	50	19.98	N	9.9	20.12

USB mode with Camera mode : Set 2  
Voltage: 240V

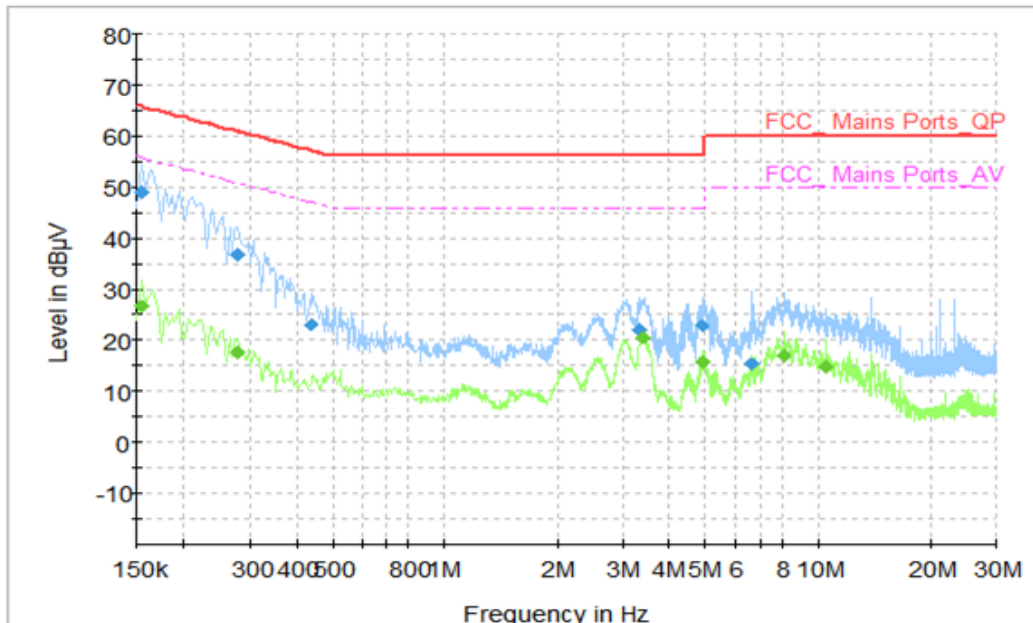


Figure B.4 Conducted Emission

**Final Measurement Detector 1**

Frequency (MHz)	QuasiPeak (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.154	49.12	65.78	16.66	N	9.6	39.52
0.278	36.76	60.88	24.11	L1	9.7	27.06
0.438	23.08	57.1	34.01	L1	9.7	13.38
3.33	22.18	56	33.82	N	9.7	12.48
4.894	22.85	56	33.15	N	9.7	13.15
6.638	15.34	60	44.66	L1	9.8	5.54

**Final Measurement Detector 2**

Frequency (MHz)	Average (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.154	26.68	55.78	29.1	N	9.6	17.08
0.278	17.66	50.88	33.22	L1	9.7	7.96
3.406	20.58	46	25.42	L1	9.7	10.88
4.926	15.66	46	30.34	N	9.7	5.96
8.07	17	50	33	L1	9.8	7.2
10.49	14.87	50	35.13	N	9.8	5.07

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