

# **Shenzhen Academy of Information and Communications Technology**

## **TESTREPORT**

**No.B17N01624-EMC**

**for**

**Roam Data Inc.**

**POS Tablet**

**Model Name: Moby/M70**

**FCC ID: 2ABY6-M70**

**with**

**Hardware Version:9888C**

**Software Version:M70**

**Issued Date: 2017-11-24**

**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>
B17N01624-EMC	Rev.0	1st edition	2017-11-24

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## **1. Test Laboratory**

### **1.1. Testing Location**

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  
Postal Code: 518026  
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Fax: +86(0)755-33322001

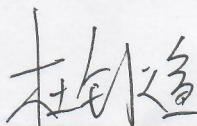
### **1.2. Testing Environment**

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

### **1.3. Project data**

Testing Start Date: 2017-10-26  
Testing End Date: 2017-11-22

### **1.4. Signature**



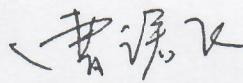
Du Zhaoxuan

(Prepared this test report)



Zhang Yunzhuan

(Reviewed this test report)



Cao Junfei

Director of the laboratory

(Approved this test report)

## **2. ClientInformation**

### **2.1. Applicant Information**

Company Name: Roam Data Inc.  
Address: 101 Federal Street, Suite 700, Boston, MA 02110 USA  
Contact Person: Christopher Rotsaert  
Telephone: 857-350-7418  
Fax: /  
E-Mail: christopher.rotsaert@ingenico.com

### **2.2. Manufacturer Information**

Company Name: Roam Data Inc.  
Address: 101 Federal Street, Suite 700, Boston, MA 02110 USA  
Contact Person: Christopher Rotsaert  
Telephone: 857-350-7418  
Fax: /  
E-Mail: christopher.rotsaert@ingenico.com

### **3. Equipment UnderTest (EUT) and Ancillary Equipment (AE)**

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

Description	POS Tablet
Model Name	Moby/M70
FCC ID	2ABY6-M70

The Equipment Under Test (EUT) are a model of POS Tablet with integrated antenna.

The EUT supports GPRS service and EGPRS service.

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**

UT04aa 17272MT70000095

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

#### **3.3. Internal Identification of AE**

<b>AE ID*</b>	<b>Description</b>	<b>SN</b>
AE1	Battery	/
AE2	Travel charger	/
AE3	USB cable	/
AE1	Model	Lithium polymer
	Manufacturer	Fenghua
	Capacity	4160mAh
	Nominal Voltage	3.7V
AE2	Model	DSA-12CB-05
	Manufacturer	DEE VAN ELECTRONICS (LONGCHUAN) CO.,LTD
	SN	/
AE3	Model	USB MICRO USB 1M
	Manufacturer	Upway Electronics Technology 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	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.

Reference	Title	Version
FCC Part 15, Subpart B	Radio frequency devices	10-1-2016 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
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18GHz, 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

## **6. SUMMARY OF TEST RESULTS**

<b>Abbreviations used in this clause:</b>	
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	2018.06.25	1 year
3.	Spectrum Analyzer	FSV40	101192	R&S	2018.05.22	1 year
4.	BiLog Antenna	VULB9163	9163 329	SCHWARZBECK	2020.02.27	3 years
5.	LISN	ENV216	102067	R&S	2017.12.09	1 year
6.	Horn Antenna	3117	00066577	ETS-lindgren	2019.04.05	3 years
7.	Universal Radio Communication Tester	CMU200	114545	R&S	2018.05.17	1 year
8.	PC	20ET-A00DC D	PF-010TM1	Lenovo	/	/
9.	Printer	P1008	VNF6C12491	HP	/	/
10.	Mouse	MOEUUOA	44NY517	Lenovo	/	/
11.	Chamber	FACT3-2.0	1285	ETS-Lindgren	2019.11.27	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:**

**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 2OET-A00DCD, and the serial number of the PC is PF-010TM1. 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)

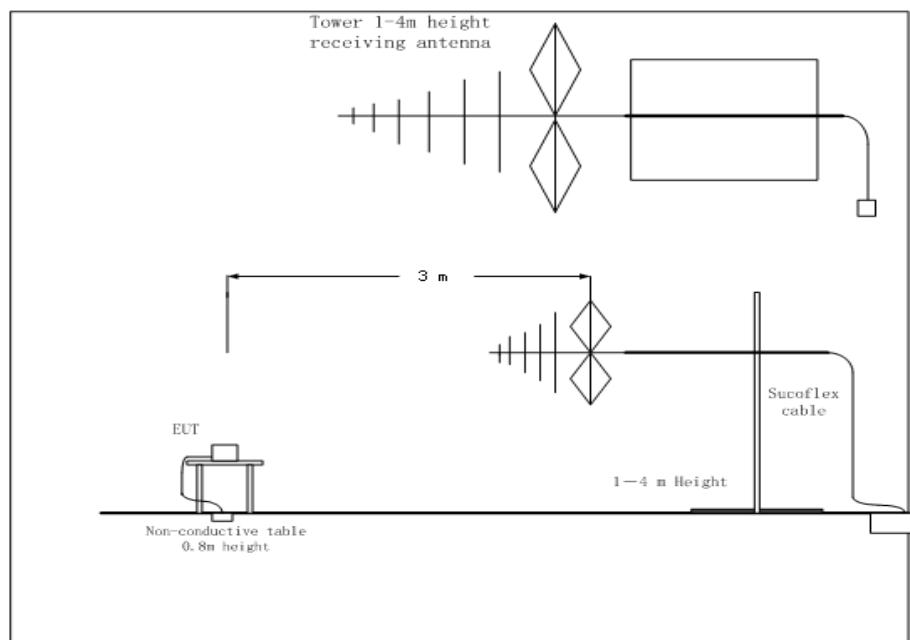
Frequency range (MHz)	Field strength limit ( $\mu$ V/m)		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

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

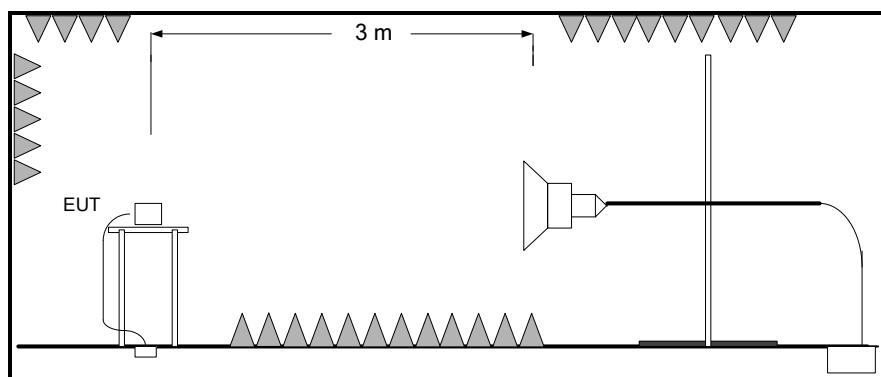
#### **A.1.4 Test Condition**

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

$G_{PL}$ : Path Loss

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

Note: the result contains vertical part and Horizontal part

**RE Measurement uncertainty:** 30MHz-1GHz: 4.90dB (k=2);  
1GHz-18GHz: 5.32 dB (k=2)

#### Set.1 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)
13901.5	55.42	74	18.58	V	20.6	34.82
14670	56.05	74	17.95	V	21.2	34.85
15564	60.13	74	13.87	V	23.4	36.73
15922.5	62.28	74	11.72	H	24.7	37.58
16581.5	62.24	74	11.76	V	26.4	35.84
17707.5	62.67	74	11.33	H	27.6	35.07

#### Set.1 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)
13910.5	43.7	54	10.3	V	21.1	22.6
14656	44.03	54	9.97	V	21.3	22.73
15573	48.48	54	5.52	V	23.7	24.78
15942.5	49.83	54	4.17	V	24.9	24.93
16596	50.54	54	3.46	V	26.3	24.24
17707.5	50.33	54	3.67	V	27.6	22.73

**Set.2 USB 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)
13872	54.87	74	19.13	V	20.2	34.67
14723	55.63	74	18.37	V	21.4	34.23
15019.5	59.66	74	14.34	V	22.4	37.26
15932.5	61.57	74	12.43	V	24.8	36.77
17109.5	62.6	74	11.4	H	26.2	36.4
17153.5	62.24	74	11.76	H	26.2	36.04

**Set.2USB 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)
13907.5	43.48	54	10.52	H	21	22.48
14688	44.28	54	9.72	V	21.6	22.68
15570	48.58	54	5.42	V	23.6	24.98
15940	49.9	54	4.1	H	24.9	25
17110	50.8	54	3.2	H	26.2	24.6
17711	50.45	54	3.55	H	27.7	22.75

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

Charging mode: Set 1

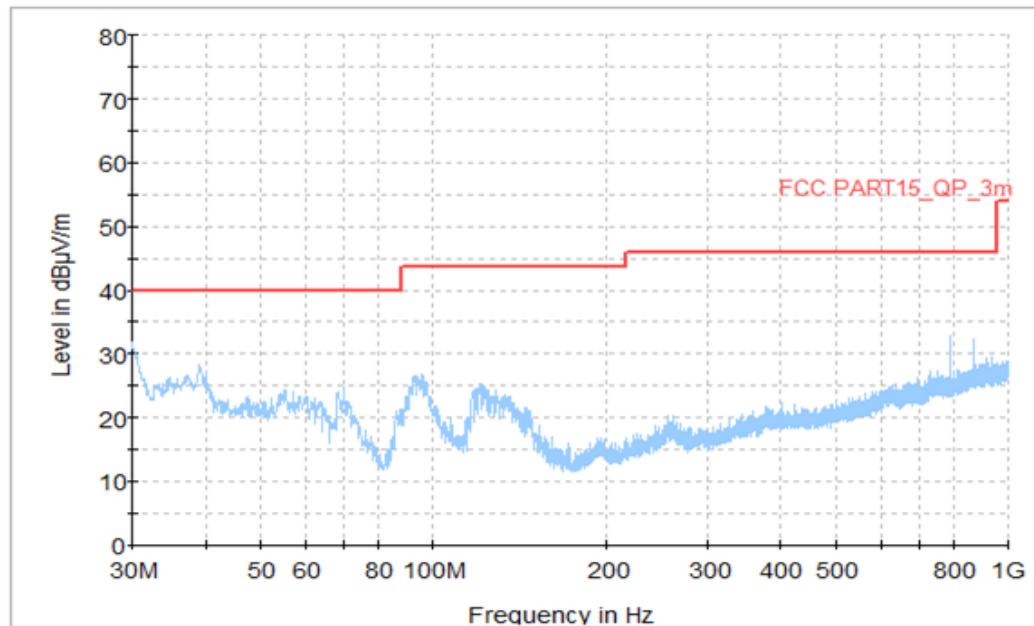


Figure A.1 Radiated Emission from 30MHz to 1GHz

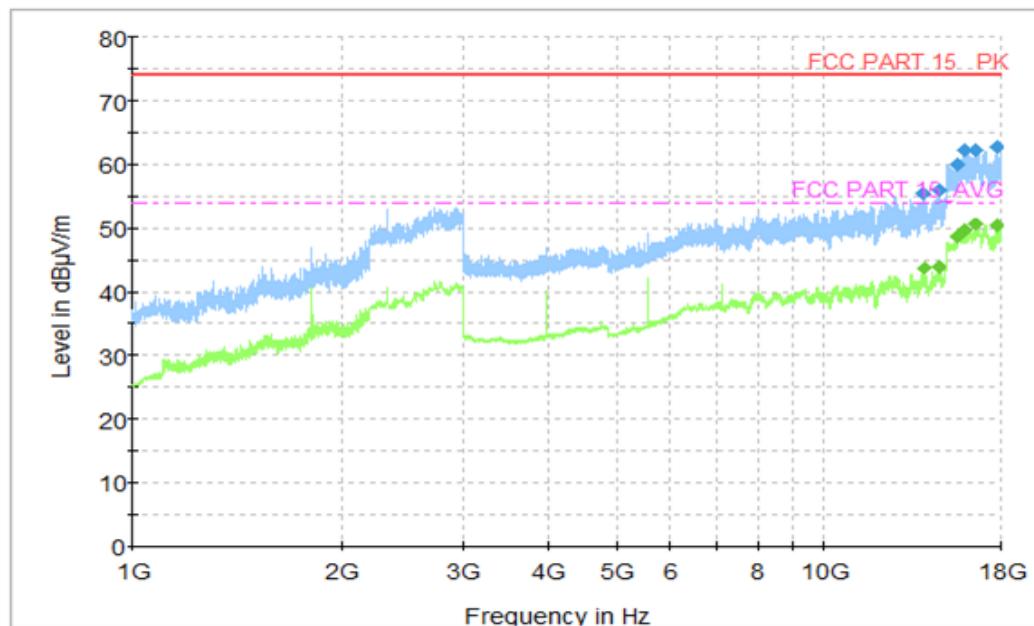
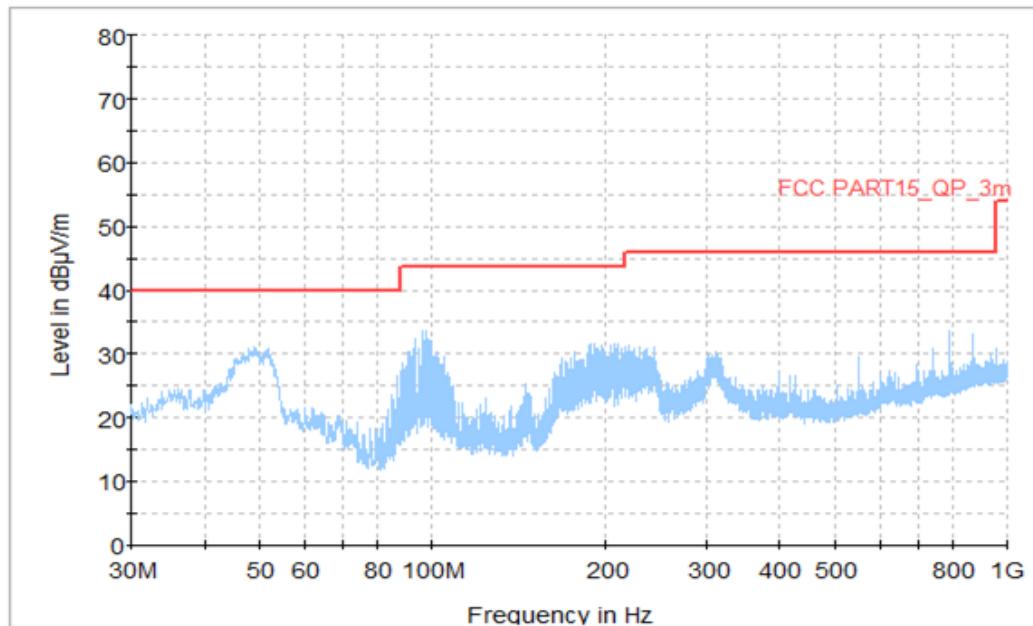


Figure A.2 Radiated Emission from 1GHz to 18GHz

**USB 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:

**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.

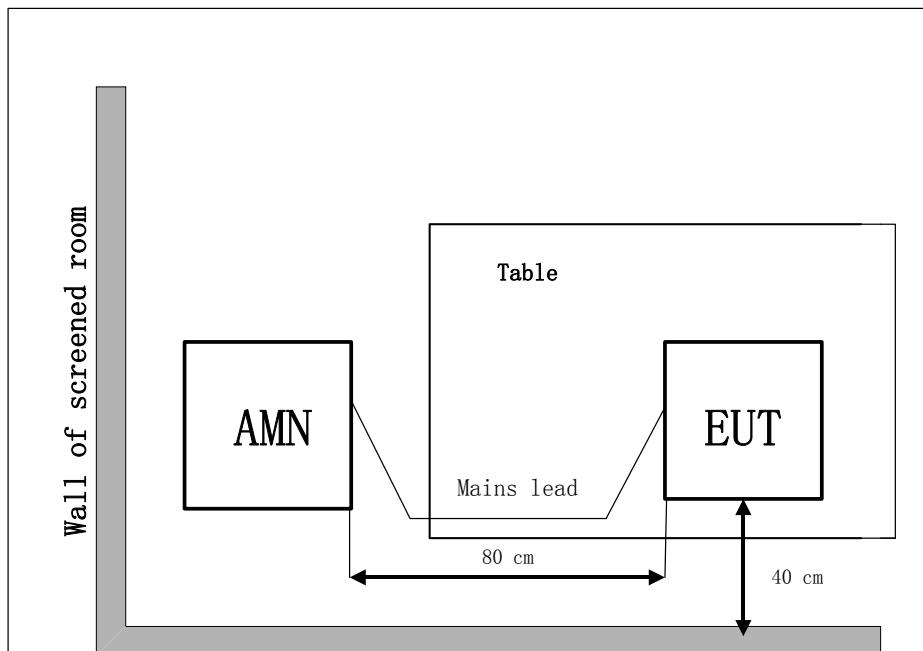
**USB mode:** The model of the PC is Lenovo 2OET-A00DCD, and the serial number of the PC is PF-010TM1. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

### 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	60
240	60

RBW	Sweep Time(s)
9kHz	1

**CE Measurement uncertainty:**2.72 dB (k=2)

**B.2.6 Measurement Results**

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

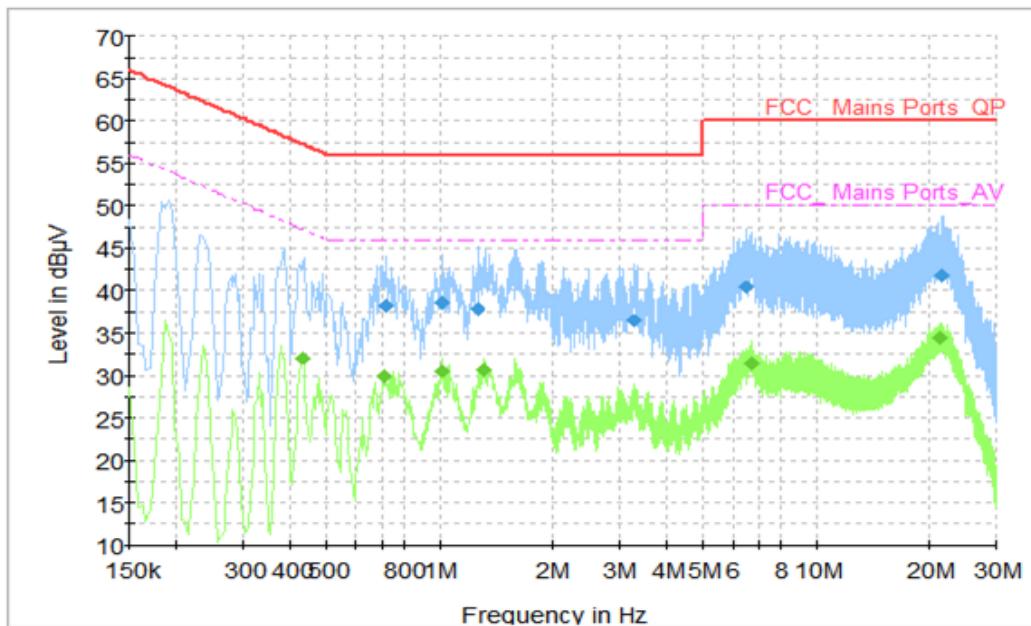
Where

Corr:PathLoss + Voltage Division Factor

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

Charging mode: Set 1

Voltage:120V



**Figure B.3 Conducted Emission**

**Final Measurement Detector 1**

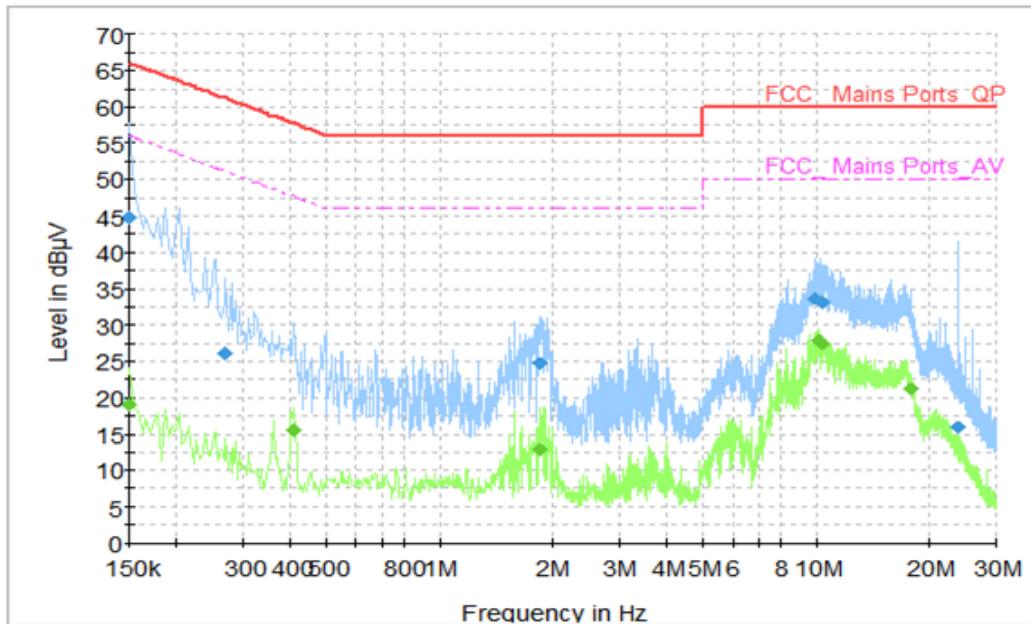
Frequency (MHz)	QuasiPeak (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.722	38.26	56	17.74	N	9.7	28.56
1.014	38.64	56	17.36	N	9.7	28.94
1.258	37.78	56	18.22	N	9.7	28.08
3.278	36.42	56	19.58	N	9.7	26.72
6.494	40.31	60	19.69	N	9.8	30.51
21.35	41.75	60	18.25	N	10.4	31.35

**Final Measurement Detector 2**

Frequency (MHz)	Average (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.43	32.06	47.25	15.19	N	9.7	22.36
0.714	29.98	46	16.02	N	9.7	20.28
1.014	30.56	46	15.44	N	9.7	20.86
1.298	30.69	46	15.31	N	9.7	20.99
6.738	31.51	50	18.49	N	9.8	21.71
21.318	34.42	50	15.58	N	10.4	24.02

**USB mode: Set 2**

**Voltage:120V**



**Figure B.3 Conducted Emission**

**Final Measurement Detector 1**

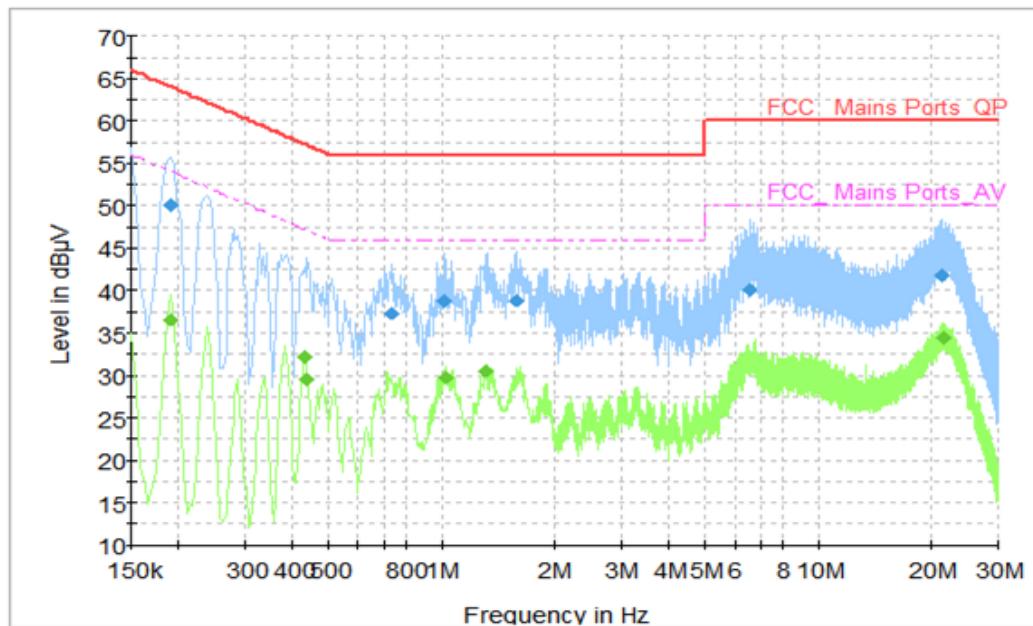
Frequency (MHz)	QuasiPeak (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.15	44.82	66	21.18	N	9.6	35.22
0.27	26.01	61.12	35.1	N	9.6	16.41
1.838	24.72	56	31.28	L1	9.7	15.02
9.914	33.69	60	26.31	N	9.8	23.89
10.406	33.15	60	26.85	L1	9.9	23.25
23.746	15.82	60	44.18	L1	10.1	5.72

**Final Measurement Detector 2**

Frequency (MHz)	Average (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.15	19.08	56	36.92	L1	9.7	9.38
0.41	15.45	47.65	32.2	N	9.7	5.75
1.834	12.87	46	33.13	N	9.7	3.17
10.05	27.8	50	22.2	N	9.8	18
10.406	27.54	50	22.46	N	9.8	17.74
17.806	21.23	50	28.77	L1	10.1	11.13

Charging mode: Set 1

Voltage:240V



**Figure B.3 Conducted Emission**

**Final Measurement Detector 1**

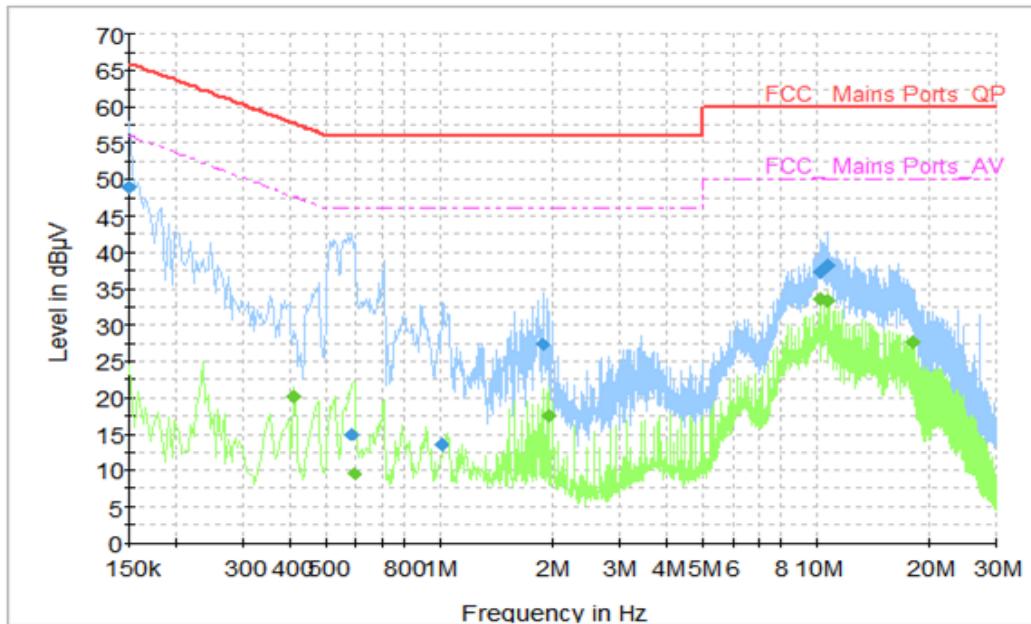
Frequency (MHz)	QuasiPeak (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.19	50.09	64.04	13.94	N	9.6	40.49
0.73	37.3	56	18.7	N	9.7	27.6
1.018	38.68	56	17.32	N	9.7	28.98
1.59	38.83	56	17.17	N	9.7	29.13
6.534	40.11	60	19.89	N	9.8	30.31
21.262	41.77	60	18.23	N	10.4	31.37

**Final Measurement Detector 2**

Frequency (MHz)	Average (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.19	36.62	54.04	17.41	N	9.6	27.02
0.43	32.2	47.25	15.05	N	9.7	22.5
0.438	29.52	47.1	17.58	N	9.7	19.82
1.026	29.77	46	16.23	N	9.7	20.07
1.302	30.61	46	15.39	N	9.7	20.91
21.346	34.47	50	15.53	N	10.4	24.07

**USB mode: Set 2**

**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)
0.15	49.04	66	16.96	L1	9.7	39.34
0.582	14.93	56	41.07	N	9.7	5.23
1.01	13.49	56	42.51	N	9.7	3.79
1.866	27.33	56	28.67	L1	9.7	17.63
10.226	37.25	60	22.75	N	9.8	27.45
10.714	38.25	60	21.75	N	9.8	28.45

**Final Measurement Detector 2**

Frequency (MHz)	Average (dB µV)	Limit (dB µV)	Margin (dB)	Line	Corr. (dB)	P <sub>Mea</sub> (dBµV)
0.41	20.14	47.65	27.5	L1	9.7	10.44
0.59	9.56	46	36.44	N	9.7	-0.14
1.942	17.43	46	28.57	L1	9.7	7.73
10.146	33.42	50	16.58	N	9.8	23.62
10.714	33.27	50	16.73	N	9.8	23.47
18.014	27.66	50	22.34	N	10.2	17.46

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