



# TEST REPORT

No. I14Z49088-EMC01

for

**TCT Mobile Limited**

**CDMA EVDO BC0/BC1/LTE 1 band Mobile phone**

**Model Name: Alto-4 EVDO**

**Marketing Name: A520L**

**FCC ID: RAD535**

with

**Hardware Version: PIO**

**Software Version: 5NPF**

**Issued Date: 2015-01-05**

**Note:**

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

**Test Laboratory:**

**FCC 2.948 Listed: No. 525429**

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I14Z49088-EMC01	Rev.0	1st edition	2015-01-05



## **CONTENTS**

<b>1. TEST LABORATORY.....</b>	<b>4</b>
<b>1.1. TESTING LOCATION.....</b>	<b>4</b>
<b>1.2. TESTING ENVIRONMENT.....</b>	<b>4</b>
<b>1.3. PROJECT DATA.....</b>	<b>4</b>
<b>1.4. SIGNATURE.....</b>	<b>4</b>
<b>2. CLIENT INFORMATION.....</b>	<b>5</b>
<b>2.1. APPLICANT INFORMATION.....</b>	<b>5</b>
<b>2.2. MANUFACTURER INFORMATION.....</b>	<b>5</b>
<b>3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE).....</b>	<b>6</b>
<b>3.1. ABOUT EUT.....</b>	<b>6</b>
<b>3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST.....</b>	<b>6</b>
<b>3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST.....</b>	<b>6</b>
<b>3.4. EUT SET-UPS.....</b>	<b>8</b>
<b>4. REFERENCE DOCUMENTS.....</b>	<b>9</b>
<b>4.1. REFERENCE DOCUMENTS FOR TESTING.....</b>	<b>9</b>
<b>5. LABORATORY ENVIRONMENT.....</b>	<b>10</b>
<b>6. SUMMARY OF TEST RESULTS.....</b>	<b>11</b>
<b>7. TEST EQUIPMENTS UTILIZED.....</b>	<b>12</b>
<b>ANNEX A: MEASUREMENT RESULTS.....</b>	<b>13</b>

## **1. Test Laboratory**

### **1.1. Testing Location**

**Location 1: CTTL(huayuan North Road)**

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

### **1.2. Testing Environment**

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

### **1.3. Project data**

Testing Start Date: 2014-12-16

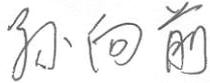
Testing End Date: 2014-12-25

### **1.4. Signature**



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**Qu Pengfei**  
**(Prepared this test report)**



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**Sun Xiangqian**  
**(Reviewed this test report)**



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**Lu Bingsong**  
**Director of the laboratory**  
**(Approved this test report)**



## **2. Client Information**

### **2.1. Applicant Information**

Company Name: TCT Mobile Limited  
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,  
Pudong Area Shanghai, P.R. China.  
City: Shanghai  
Postal Code: 201203  
Country: China  
Contact Person: Gong Zhizhou  
Contact Email: zhizhou.gong@tcl.com  
Telephone: 0086-21-61460666  
Fax: 0086-21-61460602

### **2.2. Manufacturer Information**

Company Name: TCT Mobile Limited  
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,  
Pudong Area Shanghai, P.R. China.  
City: Shanghai  
Postal Code: 201203  
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### **3. Equipment Under Test (EUT) and Ancillary Equipment (AE)**

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

Description	CDMA EVDO BC0/BC1/LTE 1 band Mobile phone
Model Name	Alto-4 EVDO
Marketing Name	A520L
FCC ID	RAD535
Extreme vol. Limits	3.55VDC to 4.35VDC (nominal: 3.8VDC)

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MIIT of People's Republic of China.

#### **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>
EUT3	866274020005215	PIO	5NPF

\*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	/	14TCT-BA-2181
AE2	Battery	/	14TCT-BA-2182
AE3	Battery	/	14TCT-BA-2183
AE4	Battery	/	14TCT-BA-2185
AE5	Travel charger	/	14TCT-CH-2267
AE6	Travel charger	/	14TCT-CH-2268
AE7	USB cable	/	14TCT-DC-0185
AE8	USB cable	/	14TCT-DC-0666
AE9	USB cable	/	/
AE10	USB cable	/	/

AE1, AE2, AE3, AE4

Model	CAB2000013C2
Manufacturer	SCUD
Capacitance	2000mAh
Nominal voltage	3.8V

AE5, AE6

Model	CBA3000AG0C2
Manufacturer	BYD
Length of cable	/



AE7

Model	CDA3122005C1
Manufacturer	Juwei
Length of cable	94cm

AE8

Model	CDA3122005C2
Manufacturer	Shenhua
Length of cable	92cm

AE9

Model	CDA3122002C1
Manufacturer	Juwei
Length of cable	/

AE10

Model	CDA3122002C2
Manufacturer	Shenhua
Length of cable	/

\*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	EUT3+ AE3+AE5 + AE7/AE8	Charger
Set.2	EUT3+ AE3+AE7/AE8	USB

## **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	10-1-13 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	2009

## 5. LABORATORY ENVIRONMENT

**Semi-anechoic chamber SAC-1** (23 meters×17meters×10meters) 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, 10 m distance
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 6GHz
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

<b>Abbreviations used in this clause:</b>		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail
Location Column	1/2/3/4	The test is performed in test location 1, 2, 3 or 4 which are described in section 1.1 of this report

<b>Clause</b>	<b>List</b>	<b>Clause in FCC rules</b>	<b>Verdict</b>	<b>Location</b>
1	Radiated Emission	15.109(a)	P	1
2	Conducted Emission	15.107(a)	P	1



## 7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESCI	100344	R&S	2015-03-03	1 year
2	Test Receiver	ESCI 7	100948	R&S	2015-07-16	1 year
3	Universal Radio Communication Tester	CMU200	109914	R&S	2015-04-13	1 year
4	Test Receiver	FSV	101047	R&S	2015-07-03	1 year
5	LISN	ENV216	101200	R&S	2015-07-07	1 year
6	EMI Antenna	VULB 9163	9163-234	Schwarzbeck	2016-09-16	3 years
7	EMI Antenna	3115	9906-5827	ETS-Lindgren	2016-11-19	3 years
8	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
9	Monitor	E178FPc	CN-OWR979-64180-7AJ-D2MS	DELL	N/A	N/A
10	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
11	Keyboard	L100	CN0RH659658907 ATOI40	DELL	N/A	N/A
12	Mouse	M-UAE119	LZ935220ZRC	Lenovo	N/A	N/A

## **ANNEX A: MEASUREMENT RESULTS**

### **A.1 Radiated Emission (§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 - 2009, 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. The model of the PC is DELL OPTIPLEX 380, and the serial number of the PC is 2X1YV2X. 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**

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):  $U = 4.3 \text{ dB}$ ,  $k=2$ .

#### Measurement results for Set.1:

##### Charging Mode/Average detector

Frequency(MHz)	Result(dB $\mu$ V/m)	$G_{\text{PL}}$ (dB)	$G_A$ (dB/m)	$P_{\text{Mea}}$ (dB $\mu$ V)	Polarity
9951.063	35.3	-24.9	38.0	22.200	V
9962.313	35.2	-24.2	38.0	21.400	H
9958.938	35.2	-24.9	38.0	22.100	V
9852.625	35.1	-24.8	38.0	21.900	H
9993.813	35.1	-24.2	38.0	21.300	H
9996.625	35.1	-24.2	38.0	21.300	H

##### Charging Mode/Peak detector

Frequency(MHz)	Result(dB $\mu$ V/m)	$G_{\text{PL}}$ (dB)	$G_A$ (dB/m)	$P_{\text{Mea}}$ (dB $\mu$ V)	Polarity
9962.313	47.5	-24.2	38.0	33.700	H
9946.563	47.4	-24.9	38.0	34.300	H
9013.938	47.3	-26.7	38.4	35.600	V
9022.375	47.2	-26.7	38.4	35.500	H
9904.938	47.2	-24.9	38.0	34.100	V
9938.688	47.1	-24.9	38.0	34.000	V

**Measurement results for Set.2:****USB Mode/Average detector**

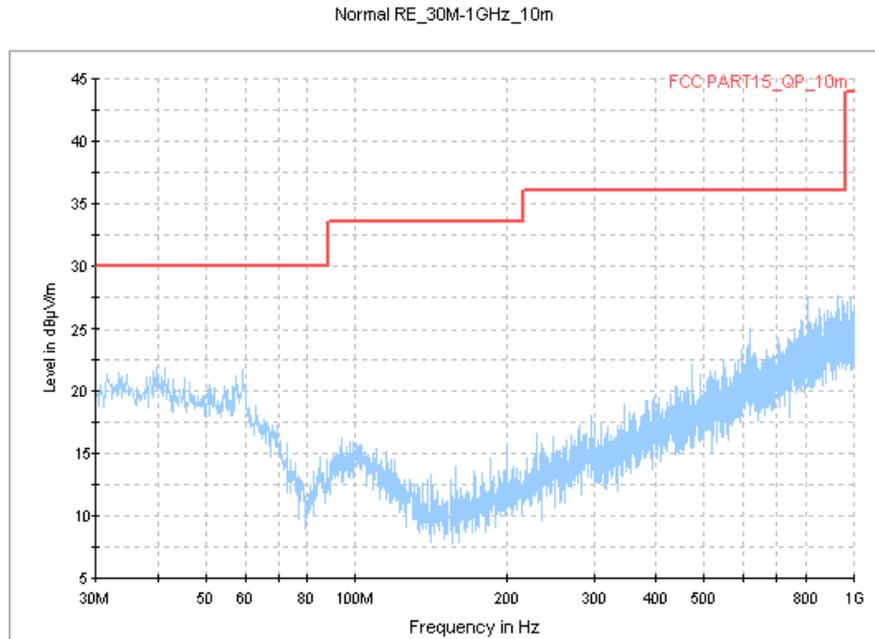
Frequency(MHz)	Result(dB $\mu$ V/m)	G <sub>PL</sub> (dB)	G <sub>A</sub> (dB/m)	P <sub>Mea</sub> (dB $\mu$ V)	Polarity
9966.250	35.4	-24.2	38.0	21.600	V
9963.438	35.1	-24.2	38.0	21.300	V
9945.438	35.1	-24.9	38.0	22.000	V
9992.125	35.0	-24.2	38.0	21.200	V
9968.500	35.0	-24.2	38.0	21.200	H
9949.375	35.0	-24.9	38.0	21.900	H

**USB Mode/Peak detector**

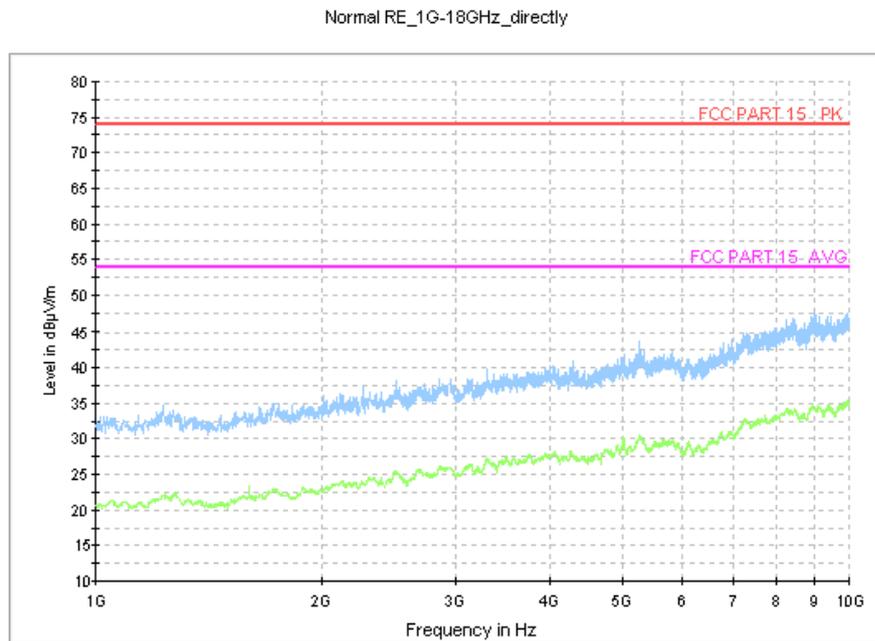
Frequency(MHz)	Result(dB $\mu$ V/m)	G <sub>PL</sub> (dB)	G <sub>A</sub> (dB/m)	P <sub>Mea</sub> (dB $\mu$ V)	Polarity
1451.688	51.5	-40.2	24.1	67.600	H
1452.250	51.4	-40.2	24.1	67.500	H
1462.375	51.3	-40.0	24.1	67.200	V
1460.125	51.0	-40.0	24.1	66.900	V
1464.063	50.9	-40.0	24.1	66.800	H
1456.750	50.8	-40.2	24.1	66.900	H

Note: The measurement results of Set.1, Set.2 showed here are worst cases of the combinations of different USB cables.

**Charging Mode, Set.1**



**Fig.1 Radiated Emission from 30MHz to 1GHz**



**Fig.2 Radiated Emission from 1GHz to 10GHz**

USB Mode, Set.2

Normal RE\_30M-1GHz\_10m

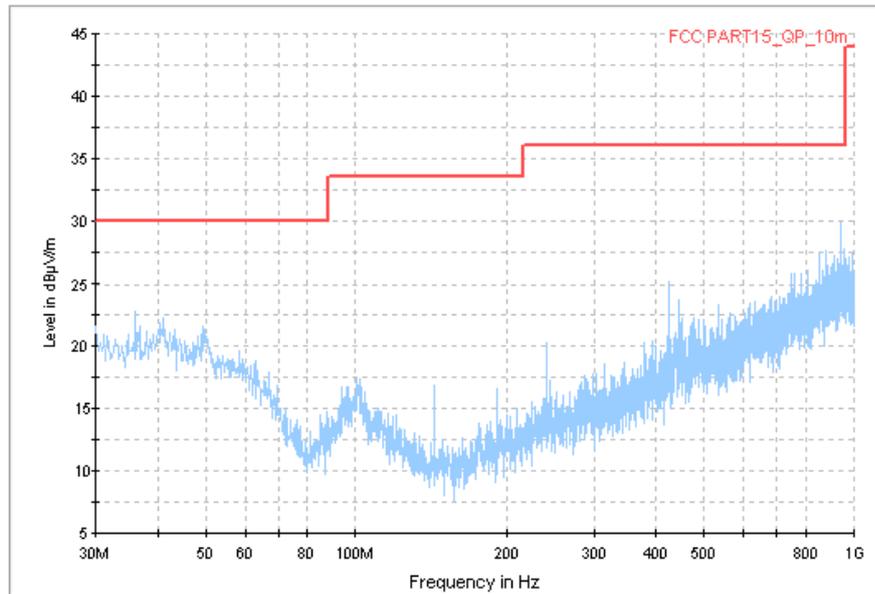


Fig.3 Radiated Emission from 30MHz to 1GHz

Normal RE\_1G-18GHz\_directly

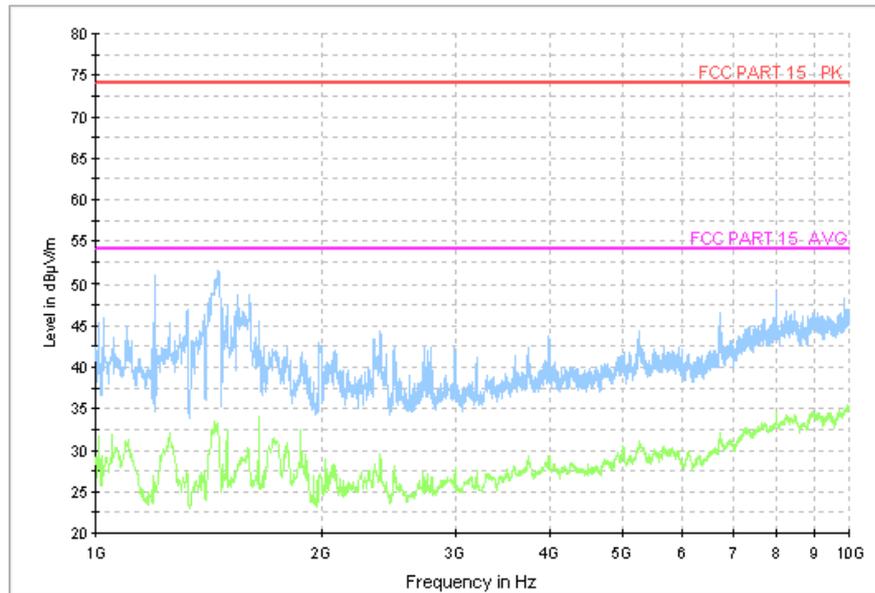


Fig.4 Radiated Emission from 1GHz to 18GHz

## A.2 Conducted Emission (§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 - 2009, section 7.2.

### A.2.2 EUT Operating Mode

The MS is operating in the USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode. The model of the PC is DELL OPTIPLEX 380, and the serial number of the PC is 2X1YV2X. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

### A.2.3 Measurement Limit

Frequency of emission (MHz)	Conducted limit (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

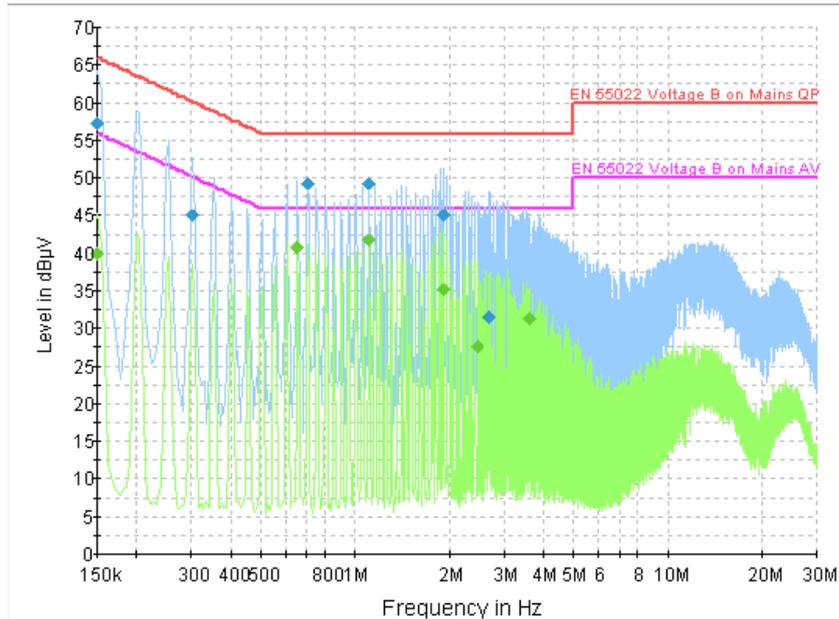
Voltage (V)	Frequency (Hz)
120	60

RBW/IF bandwidth	Sweep Time(s)
9kHz	1

### A.2.5 Measurement Results

Measurement uncertainty:  $U= 2.9$  dB,  $k=2$ .

#### Charging Mode, Set.1



**Fig.5 Conducted Emission**

#### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	57.2	GND	N	19.8	8.8	66.0
0.303000	45.0	GND	L1	19.9	15.2	60.2
0.703500	49.4	GND	L1	19.9	6.6	56.0
1.108500	49.4	GND	L1	19.8	6.6	56.0
1.909500	45.0	GND	L1	19.7	11.0	56.0
2.661000	31.6	GND	L1	19.7	24.4	56.0

#### Final Result 2

Frequency (MHz)	CAverage (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	39.9	GND	L1	19.7	16.1	56.0
0.654000	40.7	GND	L1	19.9	5.3	46.0
1.108500	41.7	GND	L1	19.8	4.3	46.0
1.909500	35.2	GND	L1	19.7	10.8	46.0
2.463000	27.6	GND	L1	19.7	18.4	46.0
3.619500	31.3	GND	L1	19.7	14.7	46.0

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

USB Mode, Set.2

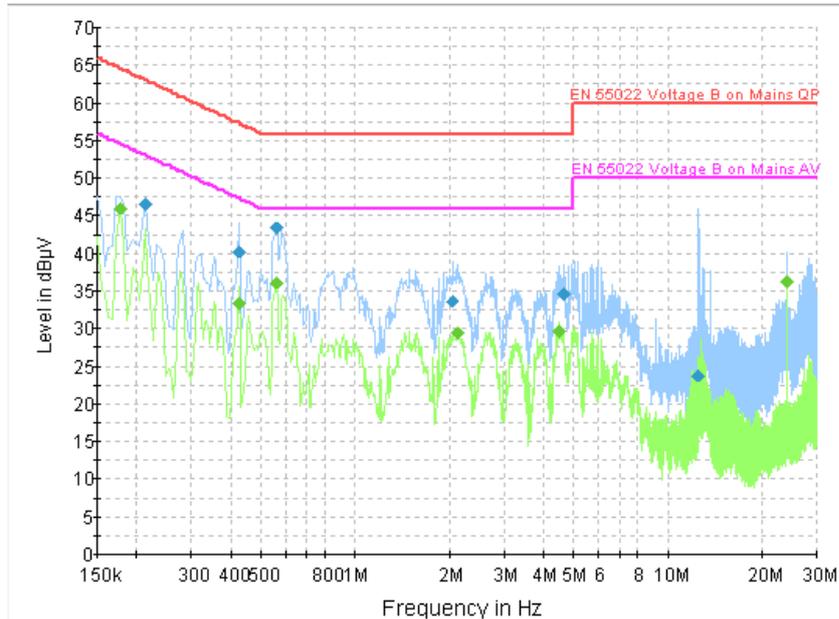


Fig.6 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.213000	46.6	GND	N	19.9	16.5	63.1
0.424500	40.4	GND	L1	20.0	17.0	57.4
0.559500	43.4	GND	L1	20.0	12.6	56.0
2.049000	33.7	GND	L1	19.7	22.3	56.0
4.623000	34.7	GND	N	19.6	21.3	56.0
12.574500	23.8	GND	L1	19.8	36.2	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	46.1	GND	N	19.9	8.5	54.6
0.424500	33.4	GND	L1	20.0	13.9	47.4
0.559500	36.2	GND	L1	20.0	9.8	46.0
2.121000	29.4	GND	N	19.7	16.6	46.0
4.528500	29.7	GND	L1	19.6	16.3	46.0
24.054000	36.3	GND	L1	19.8	13.7	50.0

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

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