



# TEST REPORT

No. 2012TAR067

for

**TCT Mobile Limited**

**UMTS TriBand / GSM Quadband mobile phone**

**Model Name: Highway AWS**

**Marketing Name: one touch 871S**

**FCC ID : RAD246**

with

**Hardware Version: PIO2**

**Software Version: sw622**

**Issued Date: 2012-02-28**

**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 TMC Beijing.

**Test Laboratory:**

***DAR accreditation (DIN EN ISO/IEC 17025): No. DGA-PL-114/01-02***

***FCC 2.948 Listed: No.733176***

***IC O.A.T.S listed: No.6629A-1***

TMC Beijing, Telecommunication Metrology Center of Ministry of Industry and Information Technology

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

Tel:+86(0)10-62304633 , Fax:+86(0)10-62304633 Email:welcome@emcite.com. www.emcite.com

©Copyright. All rights reserved by TMC Beijing.

## **CONTENTS**

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

## **1. Test Laboratory**

### **1.1. Testing Location**

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT  
Address: No 52, Huayuan beilu, Haidian District, Beijing, P. R. China  
Postal Code: 100191  
Telephone: 00861062304633  
Fax: 00861062304633

### **1.2. Testing Environment**

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

### **1.3. Project data**

Testing Start Date: Feb 14, 2012  
Testing End Date: Feb 15, 2012

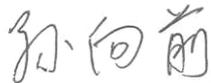
### **1.4. Signature**



---

**Liu Baodian**

**(Prepared this test report)**



---

**Sun Xiangqian**

**(Reviewed this test report)**



---

**Lu Bingsong**

**Deputy Director of the laboratory  
(Approved this test report)**

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: TCT Mobile Limited  
Address /Post: 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,  
Pudong Area Shanghai, P.R. China.  
City: Shanghai  
Postal Code: 201203  
Country: China  
Telephone: +86-21-61460890  
Fax: +86-21-61460602

### **2.2. Manufacturer Information**

Company Name: TCT Mobile Limited  
Address /Post: 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,  
Pudong Area Shanghai, P.R. China.  
City: Shanghai  
Postal Code: 201203  
Country: China  
Telephone: +86-21-61460890  
Fax: +86-21-61460602

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

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

Description	UMTS TriBand / GSM Quadband mobile phone
Model Name	Highway AWS
FCC ID	RAD246
Extreme vol. Limits	3.5VDC to 4.2VDC (nominal: 3.7VDC)

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

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

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	013082000011364	PIO2	Sw622

\*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
AE1	Battery	/
AE2	Battery	/
AE3	Travel Adapter	/
AE4	USB Cable	/
AE5	USB Cable	/
AE6	USB Cable	/
AE7	USB Cable	/

##### AE1

Model	CAB3120000C1
Manufacturer	BYD
Capacitance	850mAh
Nominal Voltage	3.7V

##### AE2

Model	CAB3120000C3
Manufacturer	BAK
Capacitance	850mAh
Nominal Voltage	3.7V

##### AE3

Model	CBA3002AG0C1
Manufacturer	BYD
Length of DC line	120cm

##### AE4

Model	CDA3122002C1
Manufacturer	Juwei
Length of headset line	100cm

AE5

Model CDA3122002C2  
 Manufacturer Shenhua  
 Length of headset line 100cm

AE6

Model CDA3122005C1  
 Manufacturer Juwei  
 Length of headset line 100cm

AE7

Model CDA3122005C2  
 Manufacturer Shenhua  
 Length of headset line 100cm

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

**3.4. EUT set-ups**

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1+ AE1/AE2+AE3	Charging
Set.2	EUT1+ AE1/AE2+AE4	USB

**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	July 10, 2008 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	2003

## 5. LABORATORY ENVIRONMENT

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

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.2 dB, 10 m distance, from 30 to 1000 MHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

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

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 0.5 Ω

**Conducted chamber** did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 0.5 Ω

**Fully-anechoic chamber** (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 0.5 Ω
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

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

## 7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE
1	Test Receiver	ESCI	100344	R&S	2012-03-12
2	Test Receiver	ESCI	100766	R&S	2012-12-06
3	Test Receiver	ESI40	831564/002	R&S	2013-02-12
4	BiLog Antenna	VUL9163	9163-302	Schwarzbeck	2013-02-10
5	Signal Generator	SMB100A	102063	R&S	2012-03-05
6	LISN	ESH2-Z5	829991/012	R&S	2012-04-20
7	Universal Radio Communication Tester	CMU200	102228	R&S	2012-09-05
8	Dual-Ridge Waveguide Horn Antenna	3115	6914	EMCO	2013-01-18
9	PC	OPTIPLEX 755	3908243625	DELL	N/A
10	Monitor	E178FPc	CN-OWR979-64 180-7AJ-D2MS	DELL	N/A
11	Printer	DeskJet D2368	TH72E12G7Q	HP	N/A
12	Keyboard	L100	CN0RH6596589 07ATOI40	DELL	N/A
13	Mouse	VR-301	6927225500198	XINGYU	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 a distance of 3 meters is tested. Tested in accordance with the procedures of ANSI C63.4 - 2003, section 8.3.

#### **A.1.2 EUT Operating Mode:**

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. 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 755, and the serial number of the PC is 3908243625. 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 of emission (MHz)	Field strength (microvolts/meter)
30-88	100
88-216	150
216-960	200
Above 960	500

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

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100KHz/300KHz	5
1000-4000	1MHz/1MHz	15

### A.1.5 Measurement Results

A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss", and including the gain of receive antenna and the path loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{Mea}} + F_A + G_{\text{PL}}$$

Where

$F_A$ : Receive Antenna Factor

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

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

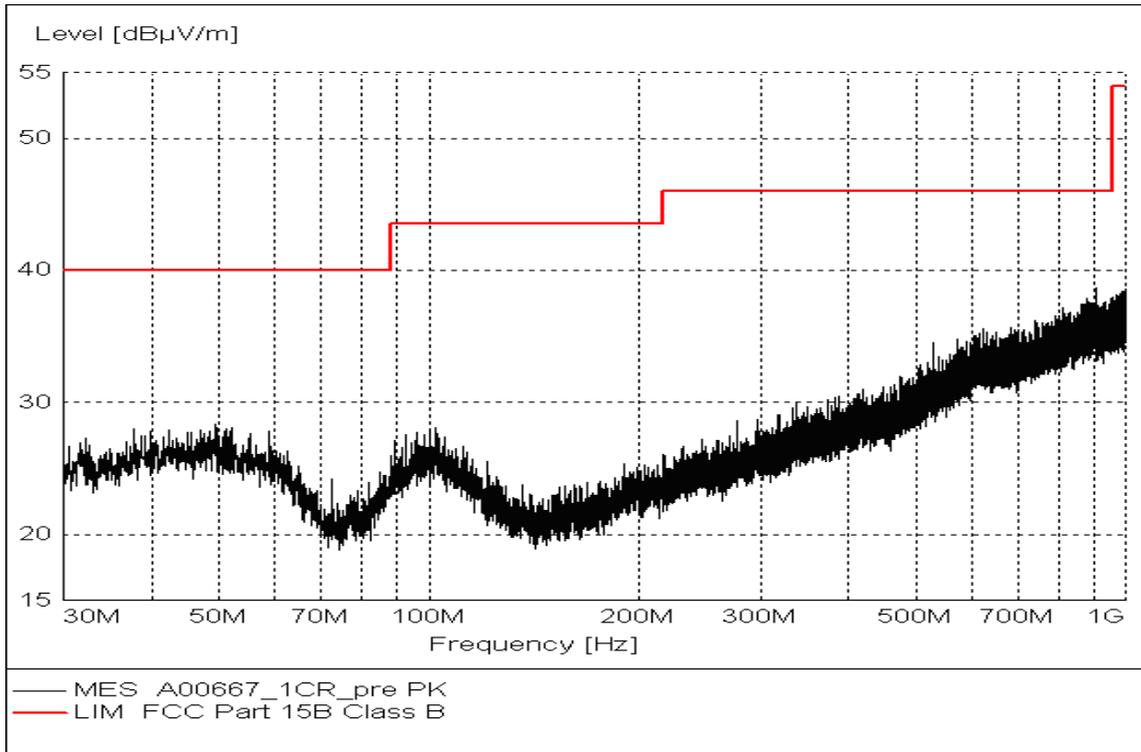
#### Charging Mode

Frequency(MHz)	Result(dBuV/m)	$G_{\text{PL}}$ (dB)	$F_A$ (dB/m)	$P_{\text{Mea}}$ (dBuV)	Polarity
3699.399	39.33	-19.5	33.4	25.43	VERTICAL
3697.395	39.28	-19.5	33.4	25.38	VERTICAL
3533.066	39.27	-19.4	33.4	25.27	VERTICAL
3701.403	39.25	-19.4	33.4	25.25	VERTICAL
3709.419	39.25	-19.4	33.4	25.25	VERTICAL
3535.07	39.24	-19.4	33.4	25.24	VERTICAL

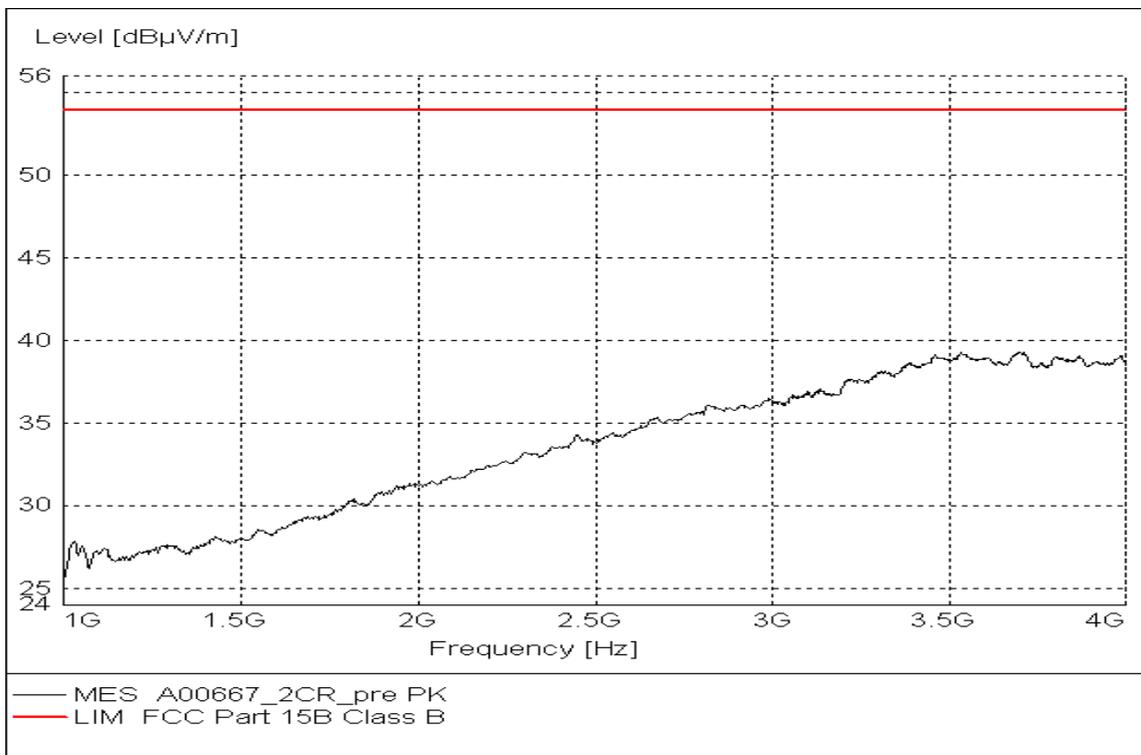
#### USB Mode

Frequency(MHz)	Result(dBuV/m)	$G_{\text{PL}}$ (dB)	$F_A$ (dB/m)	$P_{\text{mea}}$ (dBuV)	Polarity
2991.984	39.61	-19.5	29.2	29.91	HORIZONTAL
3699.399	39.14	-19.5	33.4	25.24	HORIZONTAL
3697.395	39.13	-19.5	33.4	25.23	VERTICAL
3701.403	39.13	-19.4	33.4	25.13	VERTICAL
3533.066	39.08	-19.4	33.4	25.08	VERTICAL
3703.407	39.08	-19.4	33.4	25.08	VERTICAL

**Charging Mode**



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



**Figure A.2 Radiated Emission from 1GHz to 4GHz**

USB Mode

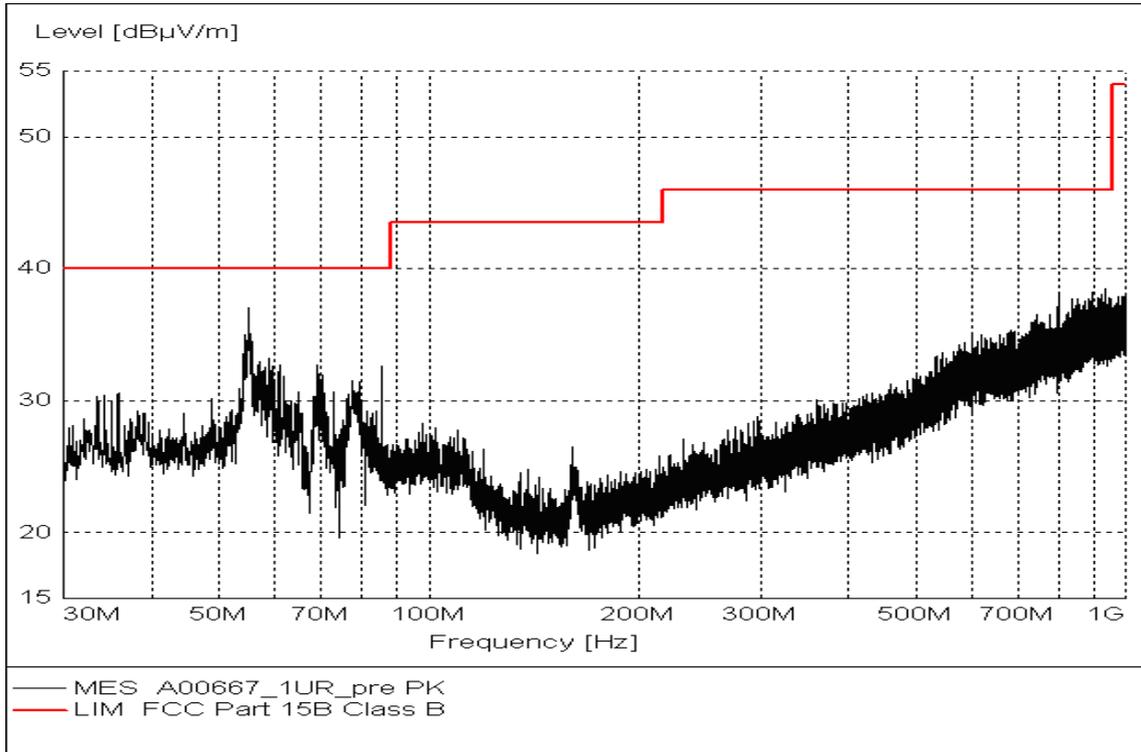


Figure A.3 Radiated Emission from 30MHz to 1GHz

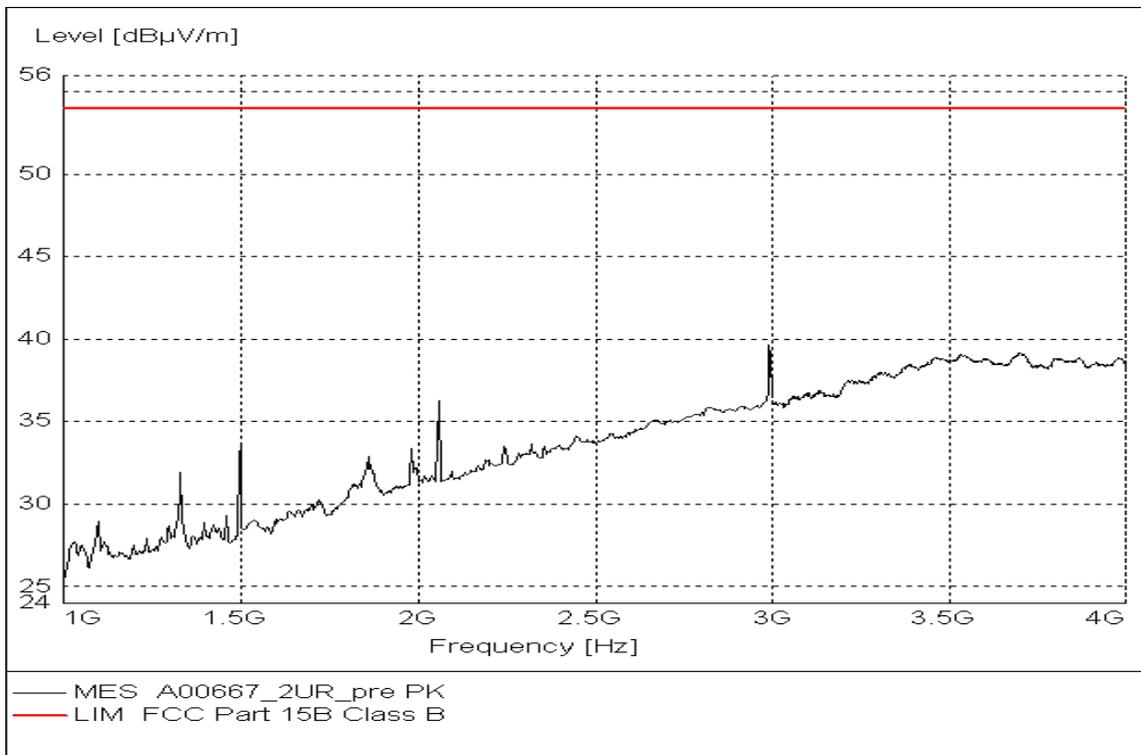


Figure A.4 Radiated Emission from 1GHz to 4GHz

## 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 - 2003, 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 755, and the serial number of the PC is 3908243625. 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	Sweep Time(s)
9kHz	1

### A.2.4 Measurement Results Charging Mode

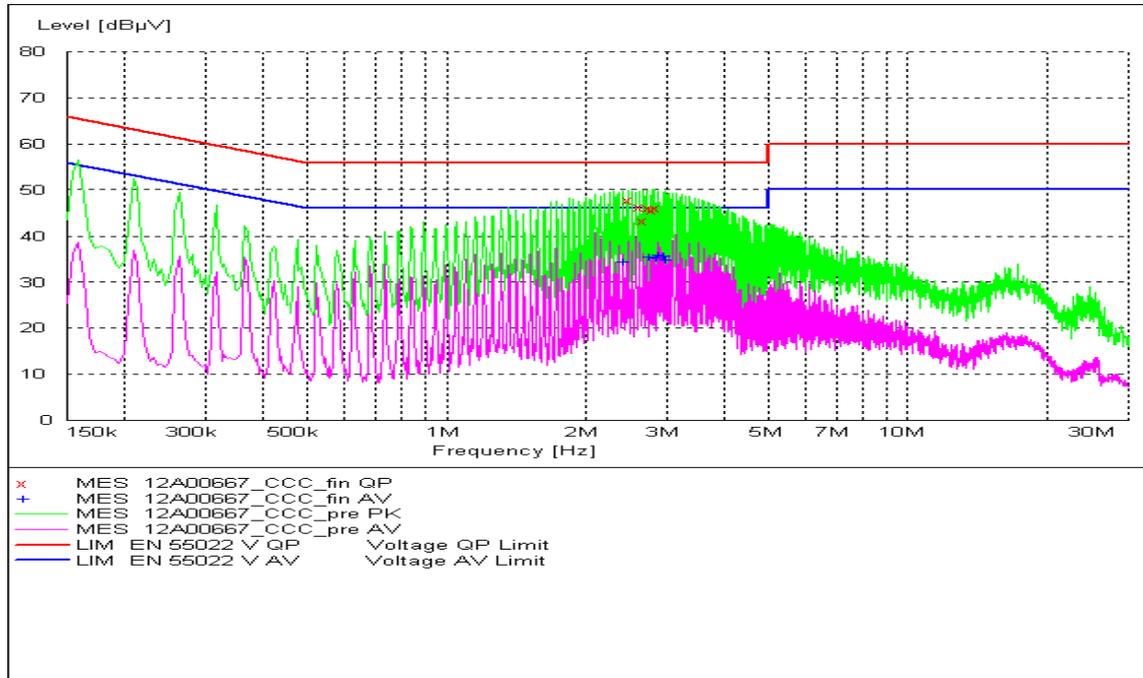


Figure A.5 Conducted Emission

#### MEASUREMENT RESULT: "12A00667\_CCC\_fin QP"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB	/	/
2.466839	47.90	10.1	56	8.1	L1	GND
2.619223	46.30	10.1	56	9.7	N	GND
2.677425	43.30	10.1	56	12.7	N	GND
2.726006	46.00	10.1	56	10.0	N	GND
2.781020	45.60	10.1	56	10.4	N	GND
2.831480	46.20	10.1	56	9.8	N	GND

#### MEASUREMENT RESULT: "12A00667\_CCC\_fin AV"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB	/	/
2.413214	34.30	10.1	46	11.7	N	GND
2.726006	35.50	10.1	46	10.5	N	GND
2.831480	35.20	10.1	46	10.8	N	GND
2.882857	35.80	10.1	46	10.2	N	GND
2.935165	35.70	10.1	46	10.3	N	GND
2.988423	34.90	10.1	46	11.1	N	GND

USB Mode

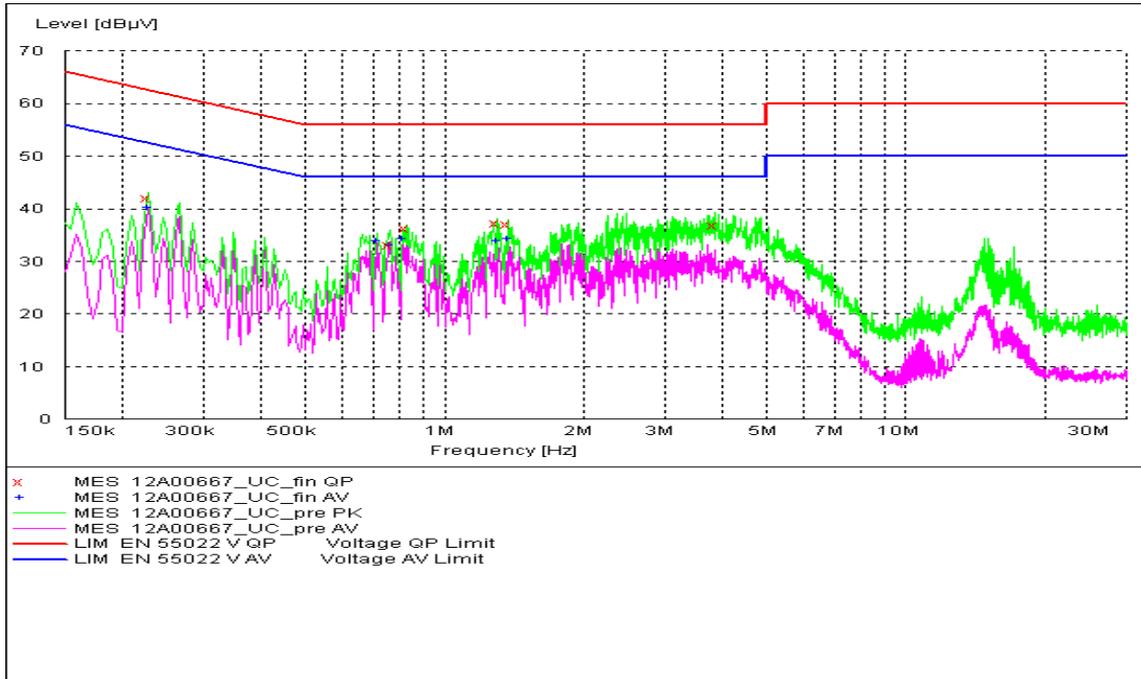


Figure A.6 Conducted Emission

MEASUREMENT RESULT: "12A00667\_UC\_fin QP"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB	/	/
0.226500	42.00	10.1	63	20.6	L1	GND
0.757500	33.10	10.1	56	22.9	L1	GND
0.829500	36.20	10.1	56	19.8	L1	GND
1.302000	37.20	10.1	56	18.8	L1	GND
1.378500	37.00	10.1	56	19.0	L1	GND
3.843925	36.80	10.1	56	19.2	N	GND

MEASUREMENT RESULT: "12A00667\_UC\_fin AV"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB	/	/
0.226500	40.30	10.1	53	12.3	L1	GND
0.717000	33.80	10.1	46	12.2	L1	GND
0.757500	33.10	10.1	46	12.9	L1	GND
0.811500	34.30	10.1	46	11.7	L1	GND
1.302000	34.00	10.1	46	12.0	L1	GND
1.378500	34.20	10.1	46	11.8	L1	GND

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