



# TEST REPORT

No.I17N00063-EMC

for

**Power Idea Technology (Shenzhen) Co., Ltd.**

**TD-LTE digital mobile phone**

**Model Name: MD501**

**FCC ID: ZLE-MD501**

with

**Hardware Version: 1.04**

**Software Version: MD501\_US\_1.003.00\_20170103**

**Issued Date: 2017-02-28**

**Test Laboratory:**

*FCC 2.948 Listed: No.342690*

*IC O.A.T.S listed: No.21856-1*

**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:**

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

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

Tel:+86(0)10-62304633, Fax:+86(0)10-62304633Email:cttl@chinattl.com, website:[www.chinattl.com](http://www.chinattl.com)

©Copyright. All rights reserved by CTTL.



## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I17N00063-EMC	Rev.0	1st edition	2017-02-28



## **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 .....</b>	<b>6</b>
<b>3.3. INTERNAL IDENTIFICATION OF AE .....</b>	<b>6</b>
<b>3.4. EUT SET-UPS .....</b>	<b>7</b>
<b>4. REFERENCE DOCUMENTS.....</b>	<b>8</b>
<b>4.1. REFERENCE DOCUMENTS FOR TESTING.....</b>	<b>8</b>
<b>5. LABORATORY ENVIRONMENT.....</b>	<b>9</b>
<b>6. SUMMARY OF TEST RESULTS .....</b>	<b>10</b>
<b>7. TEST FACILITIES UTILIZED .....</b>	<b>11</b>
<b>ANNEX A: MEASUREMENT RESULTS.....</b>	<b>12</b>



## 1. Test Laboratory

### 1.1. Testing Location

Address: TCL International E city No. 1001 Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong, China  
Postal Code: 518048  
Telephone: +86(755)33322000  
Fax: +86(755)33322001

### 1.2. Testing Environment

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

### 1.3. Project data

Testing Start Date: 2017-01-18  
Testing End Date: 2017-02-13

### 1.4. Signature

---

Du Zhaoxuan  
(Prepared this test report)

---

Zhang Yunzhan  
(Reviewed this test report)

---

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



## **2. Client Information**

### **2.1. Applicant Information**

Company Name: Power Idea Technology (Shenzhen) Co., Ltd.  
4th Floor, A Section , Languang Science&technology Building , No.7  
Address: Xinxi RD , Hi-Tech Industrial Park North , Nanshan District ,  
ShenZhen , P.R.C.

### **2.2. Manufacturer Information**

Company Name: Power Idea Technology (Shenzhen) Co., Ltd.  
4th Floor, A Section , Languang Science&technology Building , No.7  
Address: Xinxi RD , Hi-Tech Industrial Park North , Nanshan District ,  
ShenZhen , P.R.C.

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

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

Description	TD-LTE digital mobile phone
Model Name	MD501
FCC ID	ZLE-MD501
IC number	11113A-MD501

The Equipment Under Test (EUT) are a model of Smart phone with integrated antenna.

The EUT supports GPRS service and EGPRS service. It has Bluetooth and WLAN functions.

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**

<b>EUT ID*</b>	<b>SN or IMEI</b>
EUT1	867453021949667

\*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	/
<b>AE1</b>		
Model	Li-ion Rechargeable Battery	
Manufacturer	Springpower Technology (Shenzhen) Co., LTD	
Capacitance	3950mAh	
Nominal Voltage	3.8V	
<b>AE2</b>		
Model	HKC0055010-2D	
Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO., LTD.	
SN	805B901675000015	
<b>AE3</b>		
Model	Micro 5PIN	
Manufacturer	Shenzhen Dechangsheng Electronic 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+ 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	10-1-2015 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. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-18000MHz,>90dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
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. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-10000MHz,>90dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω

**Fully-anechoic chamber** did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-18000MHz,>90dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18 GHz, 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 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	ESCI	100701	R&S	2017.08.09	1 year
2.	Test Receiver	ESR7	101675	R&S	2017.07.21	1 year
3.	Spectrum Analyzer	FSP 40	100378	R&S	2017.12.15	1 year
4.	BiLog Antenna	VULB9163	9163 330	Schwarzbeck	2017.04.22	3 years
5.	LISN	ESH2-Z5	100196	R&S	2018.01.05	1 year
6.	Horn Antenna	3117	00066585	ETS-Lindgren	2019.03.05	3 years
7.	Universal Radio Communication Tester	E5515C	GB44051324	Agilent	2017.05.18	1 year
8.	PC	2OET-A00DC D	PF-OIYDAK	Lenovo	/	/
9.	Printer	P1008	VNF6C12491	HP	/	/
10.	Mouse	MO28UOL	44B39412	Lenovo	/	/
11.	Chamber	FACT5-2.0	4166	ETS-Lindgren	2018.05.13	3 years

Project	Name	Version
Radiated Emission	EMC32	Version 10.01.00
Conducted Emission	EMC32	Version 8.53.0

## **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:**

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 Lenovo 2OET-A00DCD, and the serial number of the PC is PF-OIYDAK. 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)

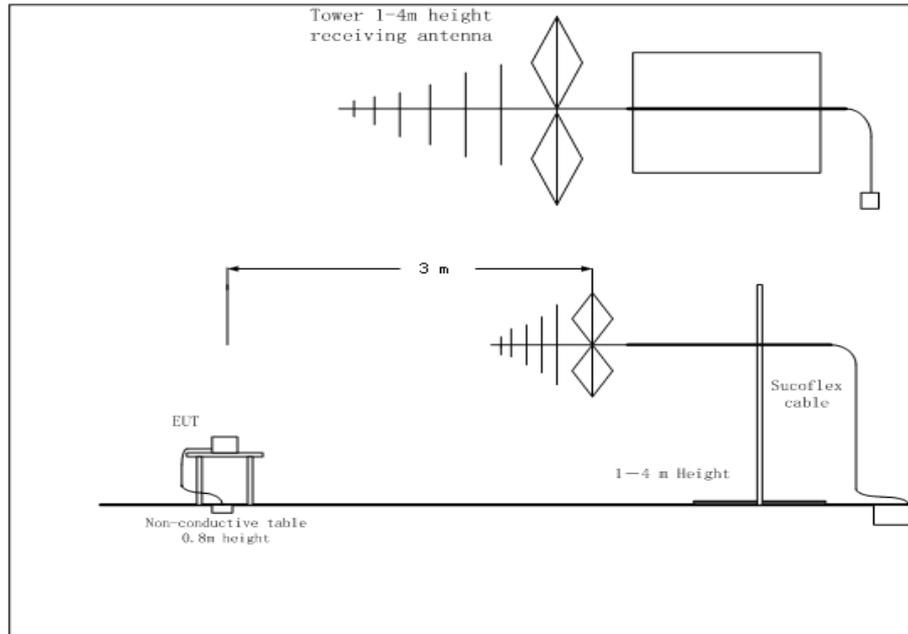
Frequency range (MHz)	Field strength limit ( $\mu\text{V}/\text{m}$ )		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

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

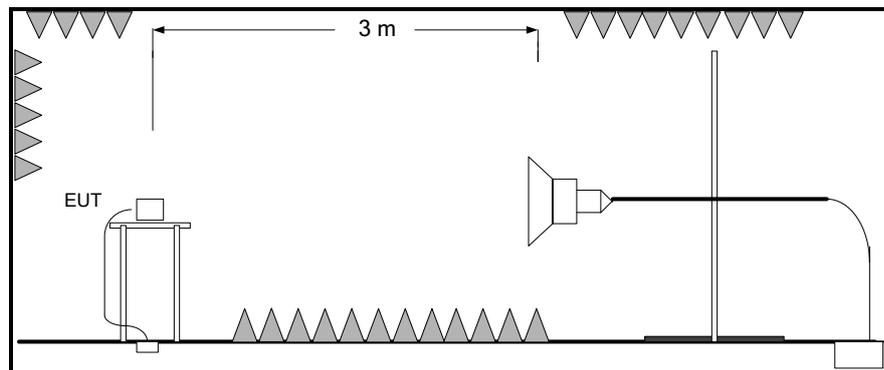
#### **A.1.4 Test Condition**

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:

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

Where

$G_A$ : Antenna factor of receive antenna

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

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

Note: the result contains vertical part and Horizontal part

**RE Measurement uncertainty:** 30M-1GHz: 5.12dB (k=2);  
1GHz-18GHz: 4.48 dB (k=2)

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

Frequency(MHz)	Result(dBuV/m)	Limit (dB $\mu$ V/m)	Margin(dB)	Polarity	$A_{Rpl}$ (dB)	$P_{\text{Mea}}$ (dB $\mu$ V)
14145.500000	55.69	74.00	18.31	V	11.2	44.49
15070.000000	55.58	74.00	18.42	V	12.1	43.48
15819.000000	57.43	74.00	16.57	V	12.8	44.63
16188.000000	57.40	74.00	16.60	V	13.1	44.3
16674.000000	58.57	74.00	15.43	V	13.8	44.77
17375.000000	58.73	74.00	15.27	V	14.0	44.73

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

Frequency(MHz)	Result(dBuV/m)	Limit (dB $\mu$ V/m)	Margin(dB)	Polarity	$A_{Rpl}$ (dB)	$P_{\text{Mea}}$ (dB $\mu$ V)
14523.000000	43.64	54.00	10.36	V	11.8	31.84
15139.500000	44.39	54.00	9.61	V	12.1	32.29
15695.500000	45.67	54.00	8.33	V	12.7	32.97
16224.500000	45.97	54.00	8.03	V	13.1	32.87
16795.500000	46.63	54.00	7.37	V	13.9	32.73
17346.500000	45.94	54.00	8.06	V	14.0	31.94

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

Frequency(MHz)	Result(dBuV/m)	Limit (dB $\mu$ V/m)	Margin(dB)	Polarity	A <sub>Rpl</sub> (dB)	P <sub>Mea</sub> (dB $\mu$ V)
14093.000000	54.37	74.00	19.63	V	11.1	43.27
15095.000000	54.82	74.00	19.18	V	12.1	42.72
15697.000000	55.90	74.00	18.10	V	12.7	43.2
16420.500000	54.96	74.00	19.04	V	13.6	41.36
16772.000000	55.73	74.00	18.27	V	13.9	41.83
17334.000000	55.17	74.00	18.83	V	14.0	41.17

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

Frequency(MHz)	Result(dBuV/m)	Limit (dB $\mu$ V/m)	Margin(dB)	Polarity	A <sub>Rpl</sub> (dB)	P <sub>Mea</sub> (dB $\mu$ V)
14529.000000	43.00	54.00	11.00	V	11.8	31.2
15075.500000	43.43	54.00	10.57	V	12.1	31.33
15774.500000	44.41	54.00	9.59	V	12.8	31.61
16232.000000	44.07	54.00	9.93	V	13.1	30.97
16844.000000	44.38	54.00	9.62	V	13.9	30.48
17351.500000	43.98	54.00	10.02	V	14.0	29.98

Charging mode: Set 1

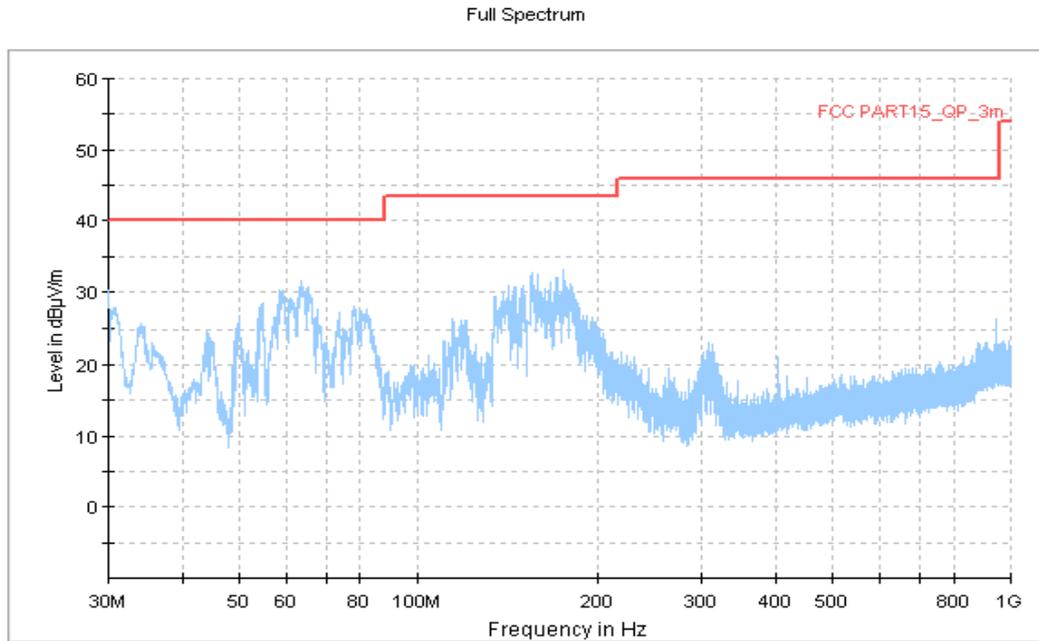


Figure A.1 Radiated Emission from 30MHz to 1GHz

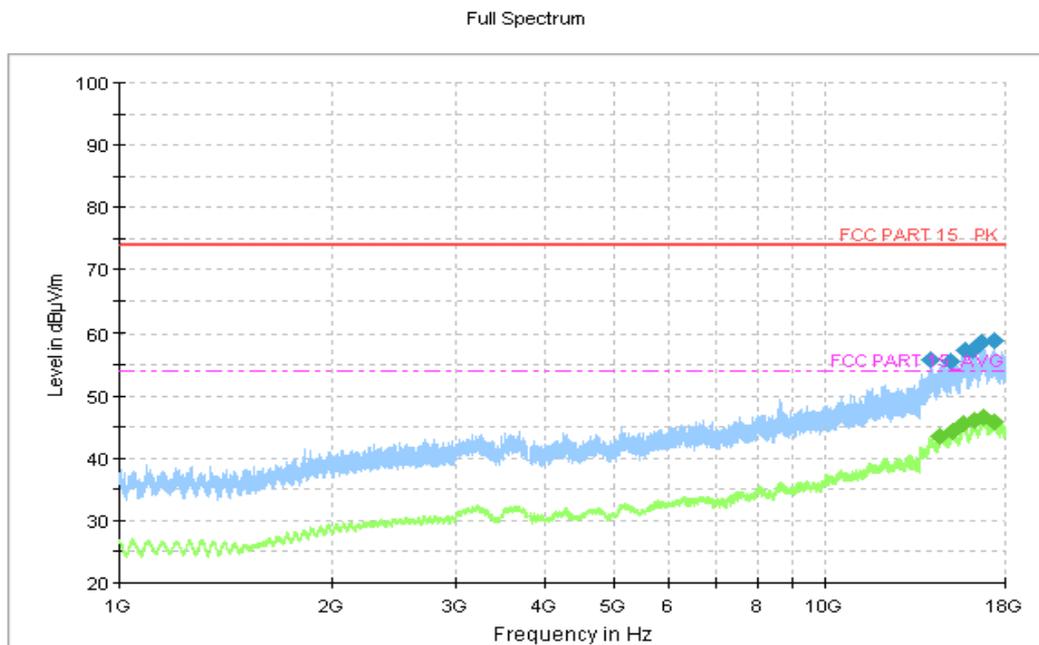
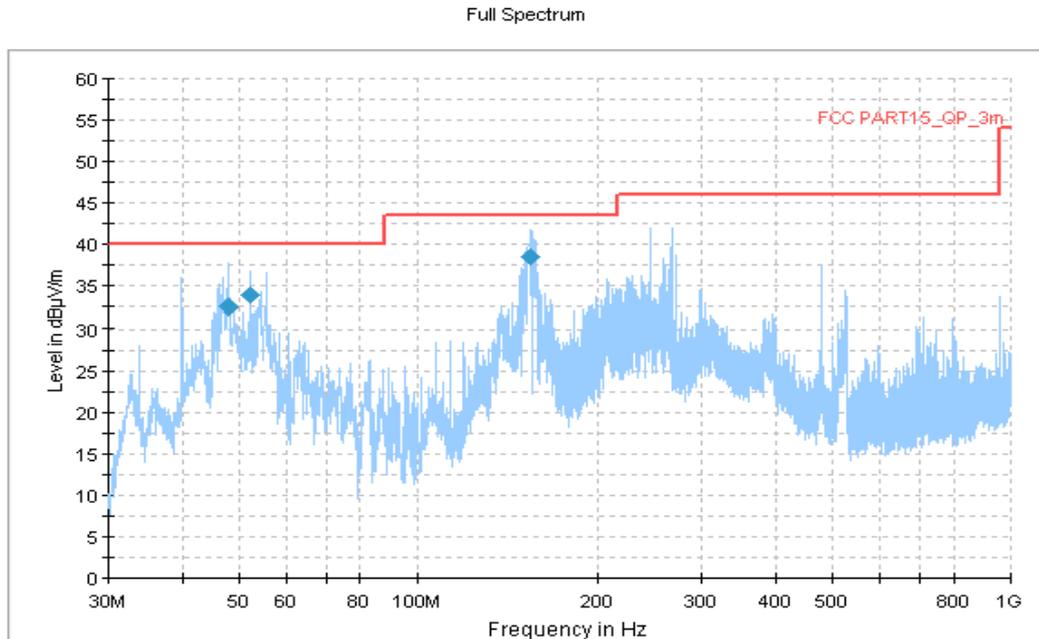


Figure A.2 Radiated Emission from 1GHz to 18GHz

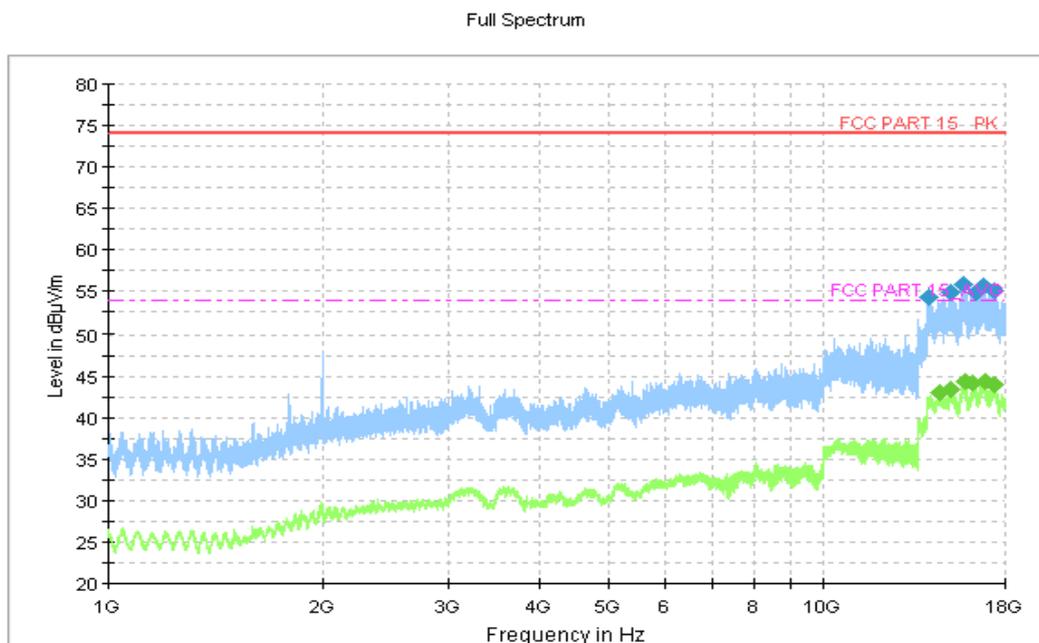
USB mode: Set 2



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

Final\_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
47.885000	32.64	40.00	7.36	V	-32.9
52.197000	33.98	40.00	6.02	V	-33.2
154.16600	38.56	43.52	4.96	H	-37.5



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

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

### 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:

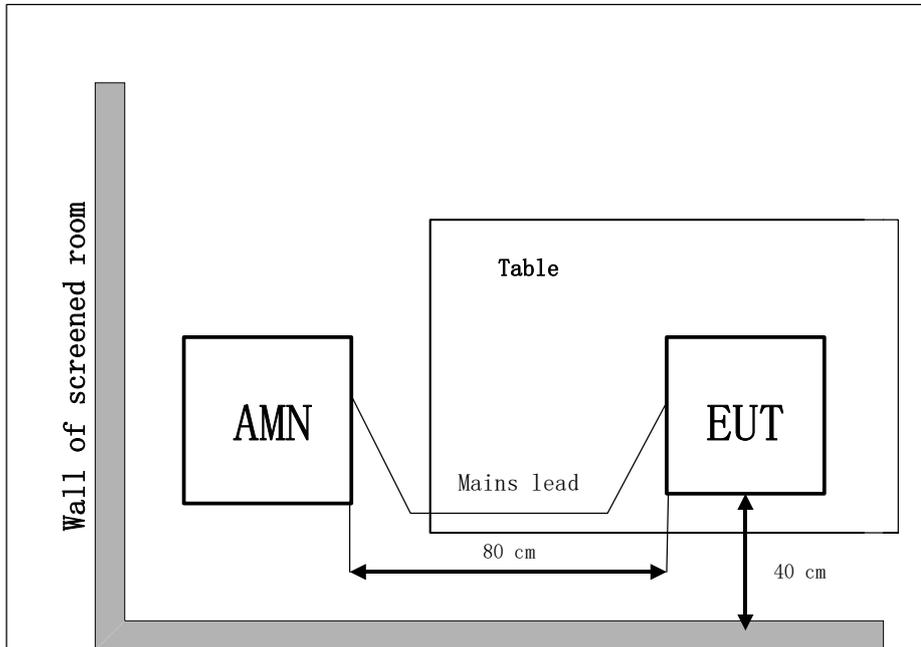
The MS is operating in the USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode. The model of the PC is Lenovo 2OET-A00DCD, and the serial number of the PC is PF-OIYDAK. The software is used 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 set-up:**



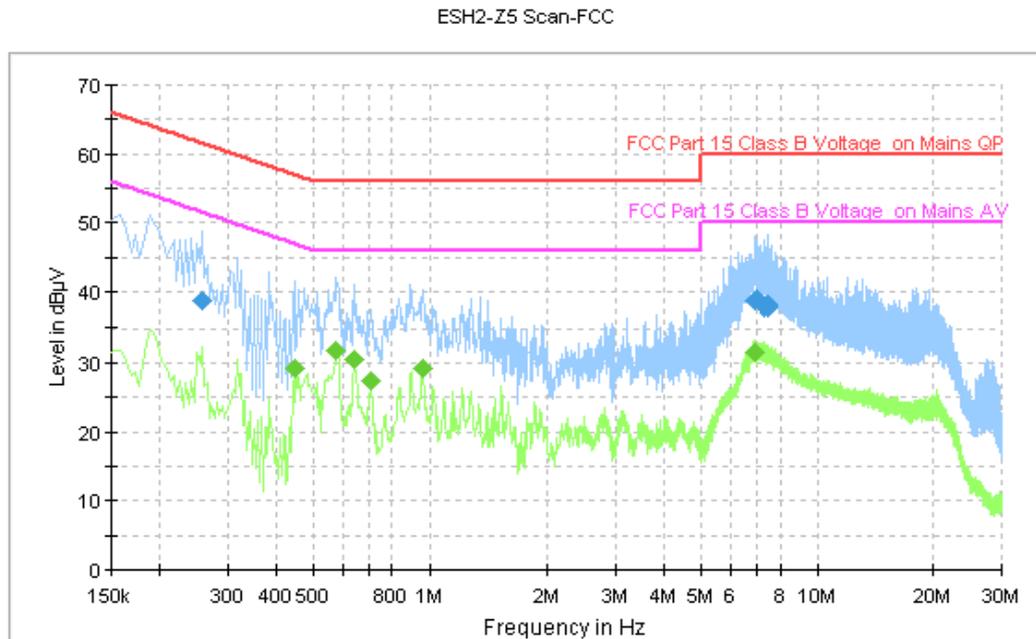
**A.2.5 Test Condition in charging mode**

Voltage (V)	Frequency (Hz)
120	60
240	60

RBW	Sweep Time(s)
9kHz	1

**CE Measurement uncertainty:** 3.06 dB (k=2)

**A.2.6 Measurement Results**  
**Charging mode:Set.1**  
**Voltage:120V**



**Figure A.5 Conducted Emission**

**Final Measurement Detector 1**

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.258000	38.8	GND	N	9.6	22.7	61.5
6.922000	38.8	GND	N	9.7	21.2	60.0
6.946000	39.0	GND	N	9.7	21.0	60.0
7.250000	38.1	GND	N	9.8	21.9	60.0
7.406000	38.2	GND	N	9.8	21.8	60.0
7.438000	38.1	GND	N	9.8	21.9	60.0

**Final Measurement Detector 2**

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.450000	29.2	GND	N	9.7	17.7	46.9
0.574000	31.9	GND	N	9.7	14.1	46.0
0.642000	30.5	GND	N	9.6	15.5	46.0
0.702000	27.4	GND	N	9.5	18.6	46.0
0.958000	29.1	GND	N	9.6	16.9	46.0
6.878000	31.6	GND	N	9.7	18.4	50.0

USB mode:Set.2  
Voltage:120V

ESH2-Z5 Scan-FCC

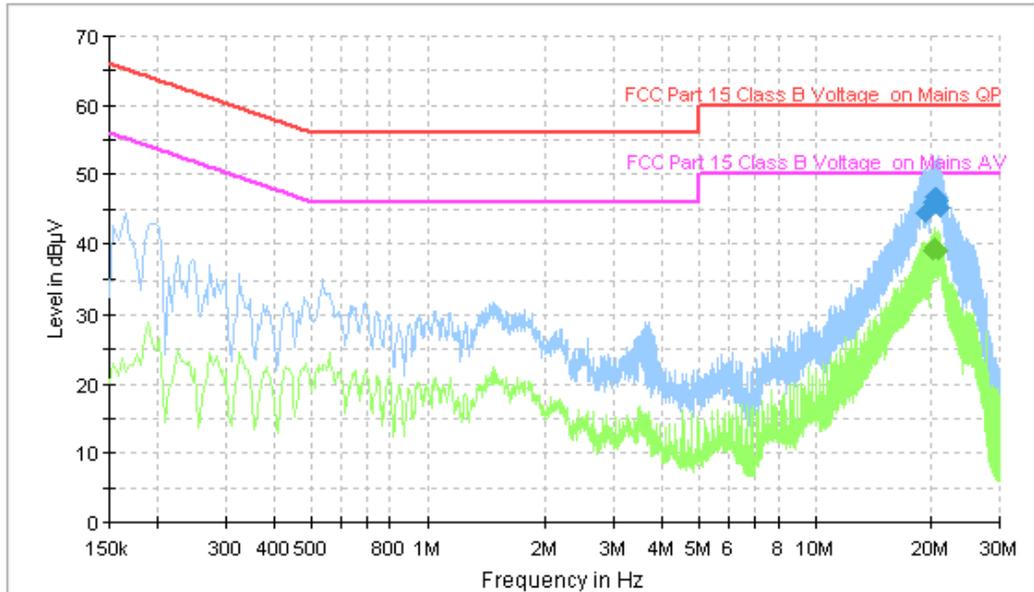


Figure A.6 Conducted Emission

**Final Measurement Detector 1**

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
19.182000	44.5	GND	N	10.0	15.5	60.0
20.086000	45.9	GND	N	10.0	14.1	60.0
20.394000	46.8	GND	N	10.0	13.2	60.0
20.570000	46.7	GND	N	10.0	13.3	60.0
20.734000	46.3	GND	N	10.0	13.7	60.0
21.034000	45.3	GND	N	10.0	14.7	60.0

**Final Measurement Detector 2**

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
20.170000	39.0	GND	N	10.0	11.0	50.0
20.278000	39.2	GND	N	10.0	10.9	50.0
20.446000	39.4	GND	N	10.0	10.6	50.0
20.462000	39.4	GND	N	10.0	10.6	50.0
20.470000	39.4	GND	N	10.0	10.6	50.0
20.750000	39.0	GND	N	10.0	11.0	50.0

Charging mode:Set.1  
Voltage:240V

ESH2-Z5 Scan-FCC

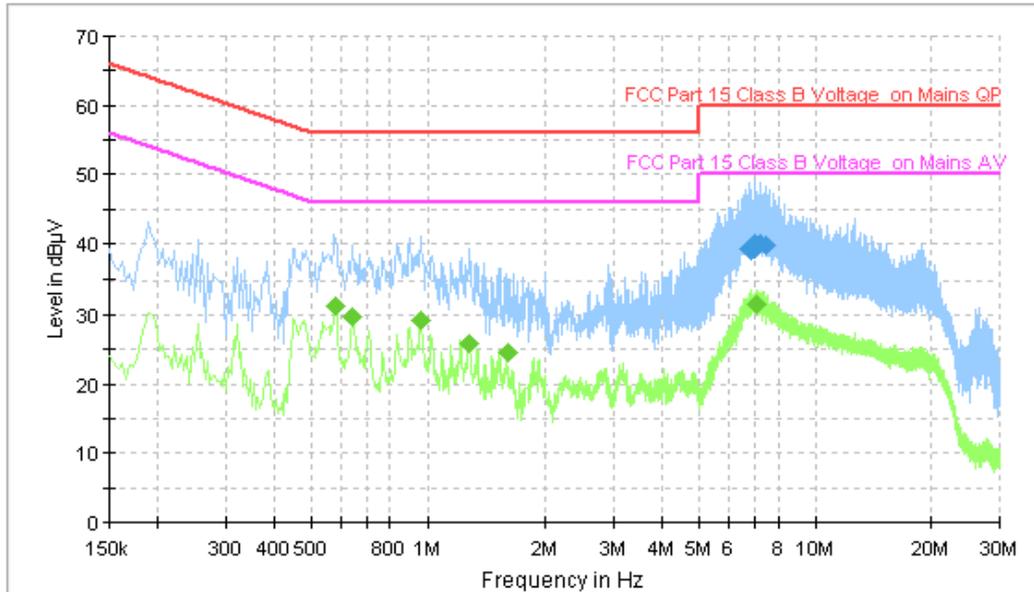


Figure A.7 Conducted Emission

**Final Measurement Detector 1**

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
6.754000	39.3	GND	N	9.7	20.7	60.0
6.846000	38.9	GND	N	9.7	21.1	60.0
6.986000	39.2	GND	N	9.7	20.8	60.0
6.998000	40.0	GND	N	9.7	20.0	60.0
7.170000	40.0	GND	N	9.7	20.0	60.0
7.438000	39.8	GND	N	9.8	20.2	60.0

**Final Measurement Detector 2**

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.578000	31.2	GND	N	9.6	14.8	46.0
0.642000	29.8	GND	N	9.6	16.2	46.0
0.962000	29.3	GND	N	9.6	16.7	46.0
1.282000	25.9	GND	N	9.6	20.1	46.0
1.602000	24.4	GND	N	9.6	21.6	46.0
7.066000	31.5	GND	N	9.7	18.5	50.0

USB mode:Set.2  
Voltage:240V

ESH2-Z5 Scan-FCC

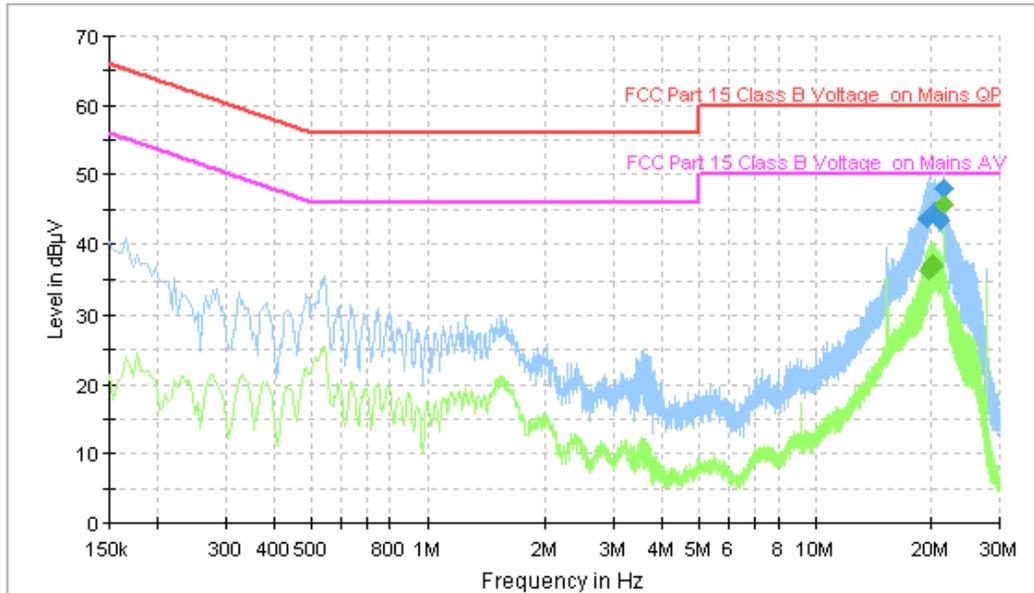


Figure A.8 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
19.570000	43.6	GND	N	10.0	16.4	60.0
19.766000	43.9	GND	N	10.0	16.1	60.0
20.282000	44.8	GND	N	10.0	15.2	60.0
20.746000	43.8	GND	N	10.0	16.2	60.0
21.038000	43.3	GND	N	10.0	16.7	60.0
21.506000	48.0	GND	N	10.0	12.0	60.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
19.782000	36.4	GND	N	10.0	13.6	50.0
19.974000	36.8	GND	N	10.0	13.2	50.0
20.050000	37.0	GND	N	10.0	13.0	50.0
20.142000	37.0	GND	N	10.0	13.0	50.0
20.182000	37.2	GND	N	10.0	12.8	50.0
21.506000	45.7	GND	N	10.0	4.3	50.0

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