



# TEST REPORT

## No. I19Z60716-EMC01

for

**TCL Communication Ltd.**

**HSUPA/HSDPA/UMTS Tri Band/GSM Quad Band/LTE 5 Band Mobile**

**Phone**

**4052R**

**FCC ID: 2ACCJN031**

**Hardware Version: 04**

**Software Version: ZXXD**

**Issued Date: 2019-06-18**



**Note:**

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The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

**Test Laboratory:**

CTTL, Telecommunication Technology Labs, CAICT

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I19Z60716-EMC01	Rev.0	1 <sup>st</sup> edition	2019-06-18



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## 1. Test Laboratory

### 1.1. Testing Location

CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,  
P. R. China100191

### 1.2. Testing Environment

Normal Temperature: 15-35℃

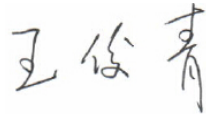
Relative Humidity: 20-75%

### 1.3. Project data

Testing Start Date: 2019-05-27

Testing End Date: 2019-06-06

### 1.4. Signature



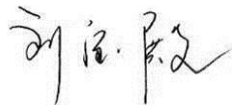
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Wang Junqing  
(Prepared this test report)



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Zhang Ying  
(Reviewed this test report)



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Deputy Director of the laboratory  
(Approved this test report)



## **2. Client Information**

### **2.1. Applicant Information**

Company Name: TCL Communication Ltd.  
Address: 7/F, Block F4, TCL International E City, Zhong Shan Yuan Road,  
Nanshan District, Shenzhen, Guangdong, P.R. China 518052  
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Country: China  
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Fax: 0086-755-36612000-81722

### **2.2. Manufacturer Information**

Company Name: TCL Communication Ltd.  
Address: 7/F, Block F4, TCL International E City, Zhong Shan Yuan Road,  
Nanshan District, Shenzhen, Guangdong, P.R. China 518052  
City: Shenzhen  
Postal Code: 518052  
Country: China  
Telephone: 0086-755-36611722  
Fax: 0086-75536612000-81722



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

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

Description	HSUPA/HSDPA/UMTS Tri Band/GSM Quad Band/LTE 5 Band Mobile Phone
Model Name	4052R
FCC ID	2ACCJN031
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 CTTL, Telecommunication Technology Labs, CAICT.

#### **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>
EUT1	015455000008606	04	ZXXD

\*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	/	/
AE2	Charger	/	/
AE3	USB Cable	/	/
AE4	Headset	/	/
AE5	Headset	/	/

##### AE1

Type	TLi013C1
Model	CAB1350001C1
Manufacturer	BYD
Capacitance	1350mAh
Nominal voltage	3.7V

##### AE2

Model	PA-5V550mA-005
Manufacturer	Puan
Length of cable	/

##### AE3

Model	/
Manufacturer	/
Length of cable	95cm

##### AE4

Model	/
Manufacturer	/
Length of cable	/



AE5

Model /

Manufacturer /

Length of cable /

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

Note: The USB cables are shielded.



### 3.4. EUT set-ups

<b>EUT set-up No.</b>	<b>Combination of EUT and AE</b>	<b>Remarks</b>
Set.3	EUT1+ AE1+ AE2+ AE3+ AE4/AE5	Charger+Headset(including FM function)
Set.6	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 - Unintentional Radiators	2016
ANSI C63.4	American National Standard for Methods of Measurement of Radio- Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014

Note: The test methods have no deviation with standards.

## 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

**Semi-anechoic chamber SAC-2** (10 meters×6.7meters×6.1meters) 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, 3m distance, from 30 to 1000 MHz
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 18GHz
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

Abbreviations used in this clause:		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	B.1	P	CTTL(huayuan North Road)
2	Conducted Emission	15.107(a)	B.2	P	CTTL(huayuan North Road)



## 7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESCi7	100948	R&S	2019-06-27	1 Year
2	Universal Radio Communication Tester	CMW500	143008	R&S	2019-11-26	1 year
3	LISN	ENV216	101200	R&S	2020-03-14	1 year
4	EMI Antenna	VULB 9163	9163-483	Schwarzbeck	2019-08-21	1 year
5	EMI Antenna	3115	00167250	ETS-Lindgren	2019-06-17	1 year
6	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
7	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
8	Keyboard	L100	CN0RH6596589 07ATOI40	DELL	N/A	N/A
9	Mouse	M-UAE119	LZ935220ZRC	Lenovo	N/A	N/A

## **ANNEX A: MEASUREMENT RESULTS**

### **A.1 Radiated Emission**

#### **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 EUT and charging mode of EUT) 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 – 2014, 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 EUT is operating in the USB mode and charging mode. During the test EUT 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 EUT, reading and erasing the data after copy action was finished.

Note: I/O information: Printer – USB, Mouse – PS/2, Keyboard – USB.

#### **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):  $U = 5.44 \text{ dB}$ ,  $k=2$ .

#### Measurement results for Set.3:

##### Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
17793.167	34.5	-25.7	43.4	16.842	H
17877.600	34.4	-25.7	43.4	16.742	H
17869.100	34.3	-25.7	43.4	16.642	V
17489.433	34.3	-25.9	40.1	20.145	H
17924.067	34.3	-25.5	43.4	16.402	H
17879.300	34.3	-25.7	43.4	16.642	H

##### Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
17456.567	45.8	-25.9	40.1	31.645	H
17853.233	45.7	-25.7	43.4	28.042	H
17975.633	45.5	-25.5	43.4	27.602	V
17884.967	45.4	-25.7	43.4	27.742	H
17865.133	45.4	-25.7	43.4	27.742	H
17939.367	45.3	-25.5	43.4	27.402	H

**Measurement results for Set.6:**

**USB Mode/Average detector**

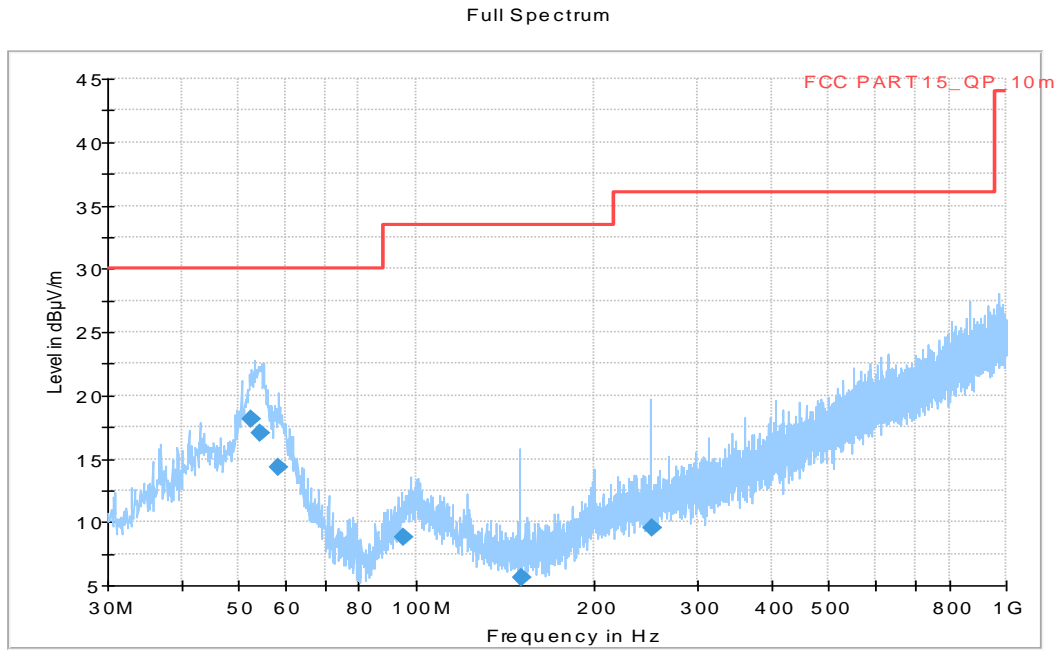
Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
6043.900	37.4	-36.1	34.4	39.141	H
17827.733	34.6	-25.7	43.4	16.942	H
17888.367	34.4	-25.7	43.4	16.742	V
17946.167	34.4	-25.5	43.4	16.502	H
17878.167	34.3	-25.7	43.4	16.642	H
17830.000	34.3	-25.7	43.4	16.642	H

**USB Mode/ Peak detector**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
3591.367	48.5	-38.0	31.1	55.443	H
17702.500	46.3	-26.9	43.4	29.752	H
17824.900	45.7	-25.7	43.4	28.042	V
17932.567	45.7	-25.5	43.4	27.802	H
17931.433	45.5	-25.5	43.4	27.602	H
17837.367	45.4	-25.7	43.4	27.742	H

Note: The measurement results of Set.3 and Set.6 showed here are worst cases of the combinations of different batteries and USB cables.

**Charging Mode, Set.3:**



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

**Final\_Result**

Frequency (MHz)	QuasiPeak (dBµ/m)	Limit (dBµ/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
52.596000	18.19	30.00	11.81	100.0	V	210.0
54.523000	17.05	30.00	12.95	178.0	V	65.0
58.384000	14.30	30.00	15.70	286.0	V	65.0
95.383000	8.79	33.50	24.73	104.0	V	20.0
150.409000	5.67	33.50	27.85	275.0	V	87.0
250.356000	9.50	36.00	26.52	125.0	V	-20.0



Full Spectrum

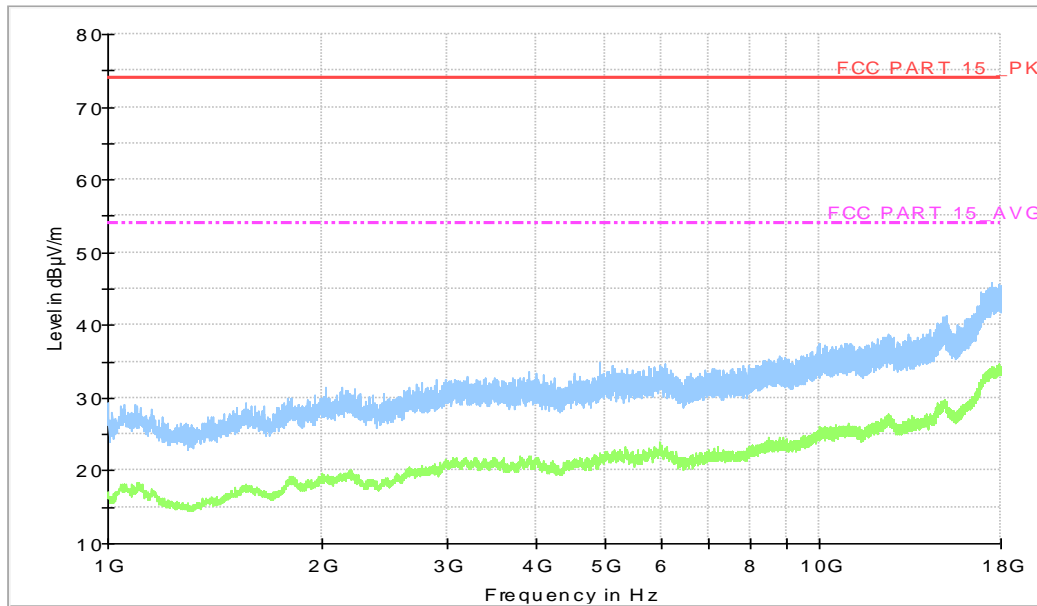


Fig A.2 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.6

Full Spectrum

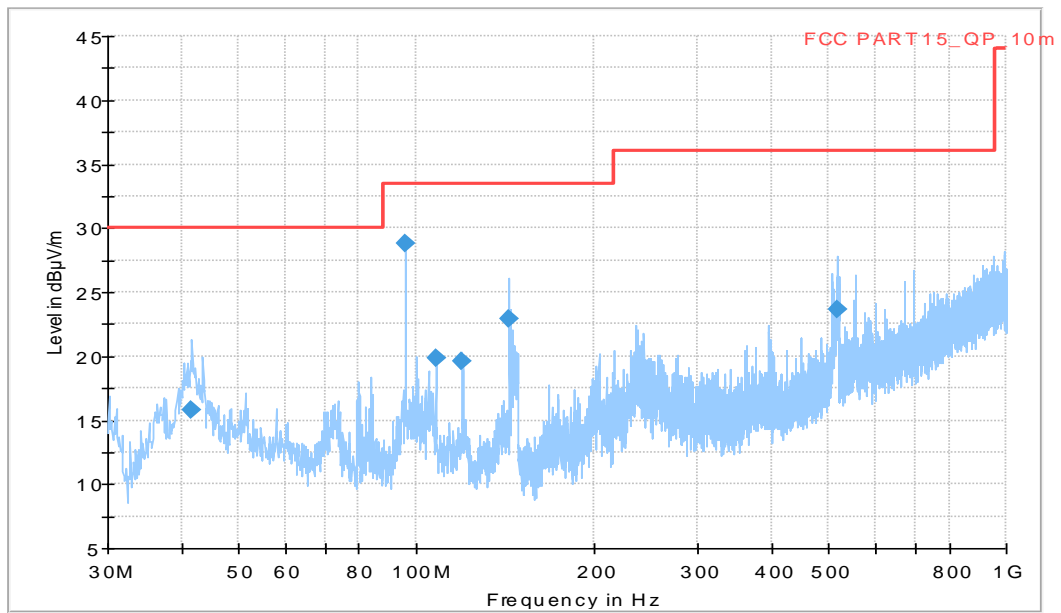
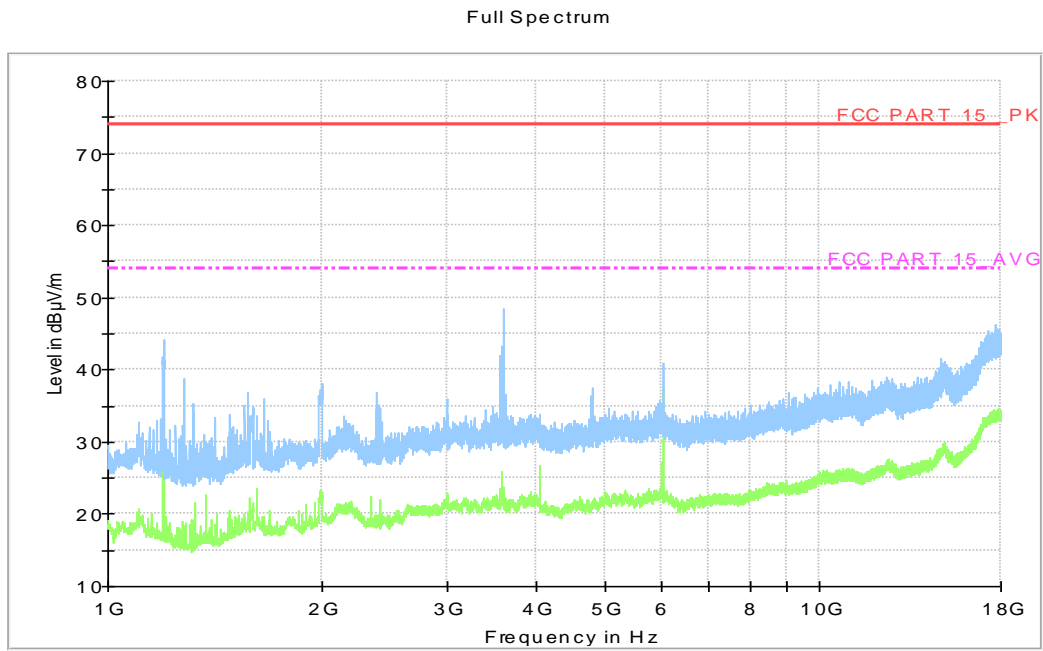


Fig A.3 Radiated Emission from 30MHz to 1GHz

Final\_Result

Frequency (MHz)	QuasiPeak (dBµ/m)	Limit (dBµ/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
32.347000	15.75	30.00	14.25	207.0	V	155.0
94.422000	28.84	33.50	4.68	114.0	V	97.0
112.337000	19.84	33.50	13.68	178.0	V	112.0
125.583000	19.56	33.50	13.96	125.0	V	61.0
150.409000	22.94	33.50	10.58	214.0	V	173.0
524.862000	23.67	36.00	12.35	286.0	V	102.0



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

## A.2 Conducted Emission

### 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 EUT is operating in the USB mode and charging mode. During the test EUT 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. And during the test, FM, Camera recording are turned on for each 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 EUT, reading and erasing the data after copy action was finished.

Note: I/O information: Printer – USB, Mouse – PS/2, Keyboard – USB.

### 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:  $U= 3.08 \text{ dB}$ ,  $k=2$ .

#### Charging Mode, Set.3

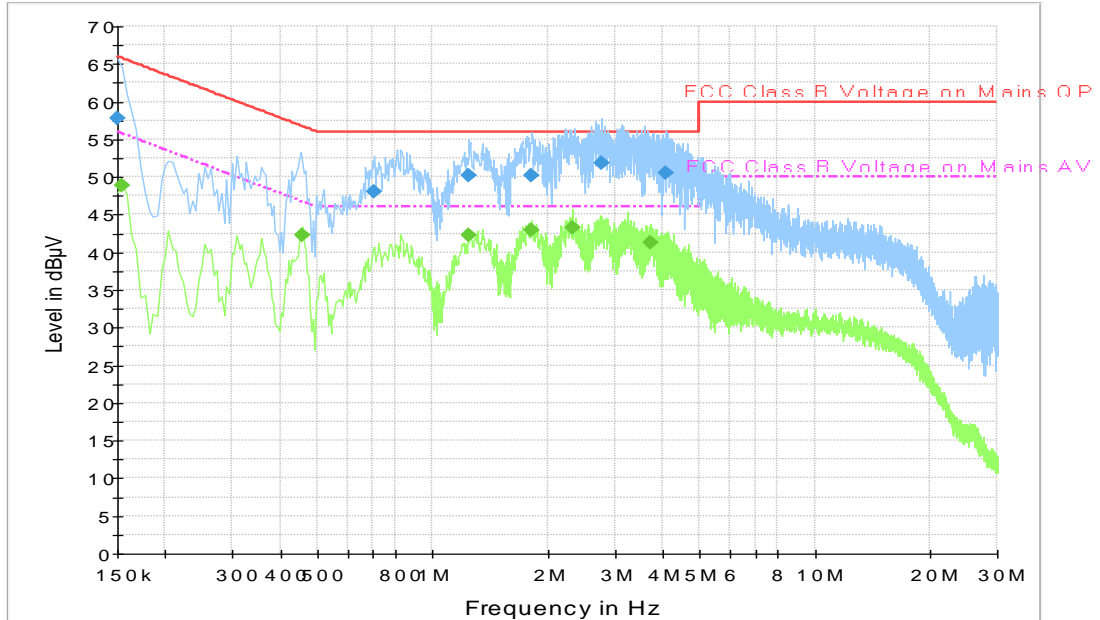


Fig A.5 Conducted Emission

#### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	57.9	2000.0	9.000	N	30.6	8.1	66.0
0.703500	48.0	2000.0	9.000	L1	19.8	8.0	56.0
1.243500	50.2	2000.0	9.000	L1	19.6	5.8	56.0
1.819500	50.2	2000.0	9.000	L1	19.6	5.8	56.0
2.764500	51.9	2000.0	9.000	L1	19.6	4.1	56.0
4.065000	50.6	2000.0	9.000	L1	19.6	5.4	56.0

#### Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	48.9	2000.0	9.000	L1	29.7	6.8	55.8
0.456000	42.2	2000.0	9.000	L1	19.8	4.5	46.8
1.243500	42.3	2000.0	9.000	L1	19.6	3.7	46.0
1.810500	42.9	2000.0	9.000	L1	19.6	3.1	46.0
2.323500	43.2	2000.0	9.000	L1	19.6	2.8	46.0
3.723000	41.3	2000.0	9.000	L1	19.6	4.7	46.0

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

USB Mode, Set.6

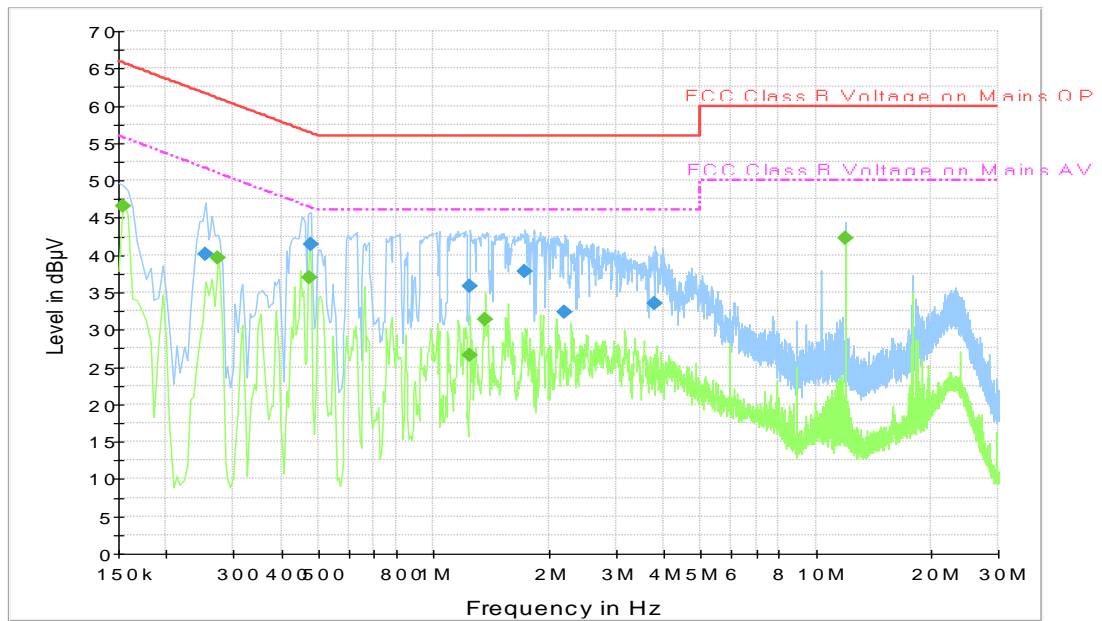


Fig A.6 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	47.9	2000.0	9.000	L1	29.7	17.8	65.8
0.424500	40.5	2000.0	9.000	L1	19.8	16.8	57.4
0.474000	44.9	2000.0	9.000	N	19.8	11.5	56.4
1.180500	40.2	2000.0	9.000	L1	19.7	15.8	56.0
1.347000	41.3	2000.0	9.000	L1	19.6	14.7	56.0
2.125500	39.9	2000.0	9.000	N	19.6	16.1	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	46.8	2000.0	9.000	L1	29.7	8.9	55.8
0.429000	37.0	2000.0	9.000	N	19.8	10.3	47.3
0.465000	41.7	2000.0	9.000	L1	19.8	4.9	46.6
1.162500	31.9	2000.0	9.000	L1	19.7	14.1	46.0
1.369500	30.9	2000.0	9.000	L1	19.6	15.1	46.0
2.265000	25.5	2000.0	9.000	N	19.6	20.5	46.0

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



**ANNEX B: PERSONS INVOLVED IN THIS TESTING**

<b>Test Item</b>	<b>Test Software and Version</b>	<b>Software Vendor</b>	<b>Test operator</b>
Conducted Emission	EMC32 V8.5.2	R&S	Wang Huan
Radiated Emission	EMC32 V9.01.00	R&S	Wang Huan

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