TEST REPORT

No. I19Z61094-EMC01

for

TCL Communication Ltd.

Smart Phone

5032W

FCC ID: 2ACCJB111

Hardware Version: 06

Software Version: 3E5H

Issued Date: 2019-08-30

TESTING
NVLAP LAB CODE 600118-0

Note:

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Test Laboratory:

CTTL, Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I19Z61094-EMC01	Rev.0	1st edition	2019-08-30

CONTENTS

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℃

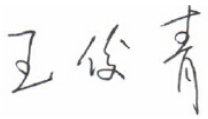
Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2019-08-12

Testing End Date: 2019-08-20

1.4. Signature



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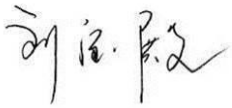
(Prepared this test report)

Zhang Ying

(Reviewed this test report)



Liu Baodian

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 Communication Technology Building, TCL International E City, Zhong Shan Yuan Road, Nanshan District, Shenzhen, Guangdong, P.R. China 518052
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2.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
Address:	7/F, Block F4, TCL Communication Technology Building, 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:	/

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

3.1. About EUT

Description	Smart Phone
Model Name	5032W
FCC ID	2ACCJB111
Extreme vol. Limits	3.65VDC to 4.4VDC (nominal: 3.8VDC)

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

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	015552000001506	06	3E5H

*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	Remarks
AE1	Battery	/	inbuilt
AE2	Charger	/	
AE3	USB	/	
AE4	Headset	/	/

AE1

Model	CAC3860001C1
Manufacturer	BYD
Capacitance	4000mAh
Nominal voltage	3.85V

AE2

Model	CBA0064AGNC1
Manufacturer	BYD
Length of cable	/

AE3

Model	CDA0000123C2
Manufacturer	SHENGHUA
Length of cable	98cm

AE4

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

EUT set-up No.	Combination of EUT and AE	Remarks
Set.3	EUT1+ AE1+ AE2+ AE3+ AE4	Charger+Headset(including FM function)
Set.4	EUT1+ AE1+ AE2+ AE3+ AE4	Charger+Headset(including Camera function)
Set.5	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 - 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	100766	R&S	2020-03-20	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	9163-301	Schwarzbeck	2020-02-28	1 year
5	EMI Antenna	3115	00167250	ETS-Lindgren	2020-05-14	1 year
6	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
7	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
8	Keyboard	L100	CN0RH659658907ATOI40	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. 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.1.3 Measurement Limit

Frequency range (MHz)	Field strength limit (μV/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:

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

Where

G_A: Antenna factor of receive antenna

G_{PL}: Path Loss

P_{Mea}: Measurement result on receiver.

Measurement uncertainty (worst case): U = 5.44 dB, k=2.

Measurement results for Set.3:

Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17822.633	46.4	-5.7	43.4	8.7	H
17390.833	46.2	-5.9	33.8	18.3	H
17489.433	46.2	-5.9	40.1	12.0	V
17975.633	46.2	-5.4	43.4	8.2	H
17490.000	46.1	-5.9	40.1	11.9	H
17943.900	46.1	-5.4	43.4	8.1	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17631.100	57.8	-6.9	43.4	21.3	H
17926.333	57.5	-5.4	33.8	29.1	H
17960.900	57.5	-5.4	43.4	19.5	V
17173.233	57.4	-6.3	40.1	23.6	H
17984.700	57.4	-5.4	43.4	19.4	H
17384.600	57.4	-6.5	40.1	23.8	H

Measurement results for Set.4:

Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17943.900	46.7	-5.4	43.4	8.7	H
17950.700	46.4	-5.4	33.8	18.0	H
17824.333	46.3	-5.7	43.4	8.6	V
17821.500	46.3	-5.7	43.4	8.6	H
17839.633	46.3	-5.7	43.4	8.6	H
17943.333	46.3	-5.4	43.4	8.3	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17496.800	59.2	-5.9	40.1	25.0	H
17959.767	58.2	-5.4	33.8	29.8	H
17388.567	57.7	-5.9	40.1	23.5	V
17918.967	57.6	-5.4	43.4	19.6	H
17907.633	57.6	-5.7	43.4	19.9	H
17626.000	57.6	-6.9	43.4	21.1	H

Measurement results for Set.5:

USB Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17942.767	46.6	-5.4	43.4	8.6	H
17935.400	46.5	-5.4	33.8	18.1	H
17489.433	46.2	-5.9	40.1	12.0	V
17957.500	46.2	-5.4	43.4	8.2	H
17960.333	46.2	-5.4	43.4	8.2	H
17958.067	46.2	-5.4	43.4	8.2	H

USB Mode/ Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17388.567	57.7	-5.9	40.1	23.5	H
17405.567	57.5	-5.9	33.8	29.6	H
17839.633	57.3	-5.7	43.4	19.6	V
17389.700	57.3	-5.9	40.1	23.1	H
17950.133	57.1	-5.4	43.4	19.1	H
17990.367	57.0	-5.4	43.4	19.0	H

Note: The measurement results of Set.3, Set.4 and Set.5 showed here are worst cases of the combinations of different batteries and USB cables.

Charging Mode, Set.3:

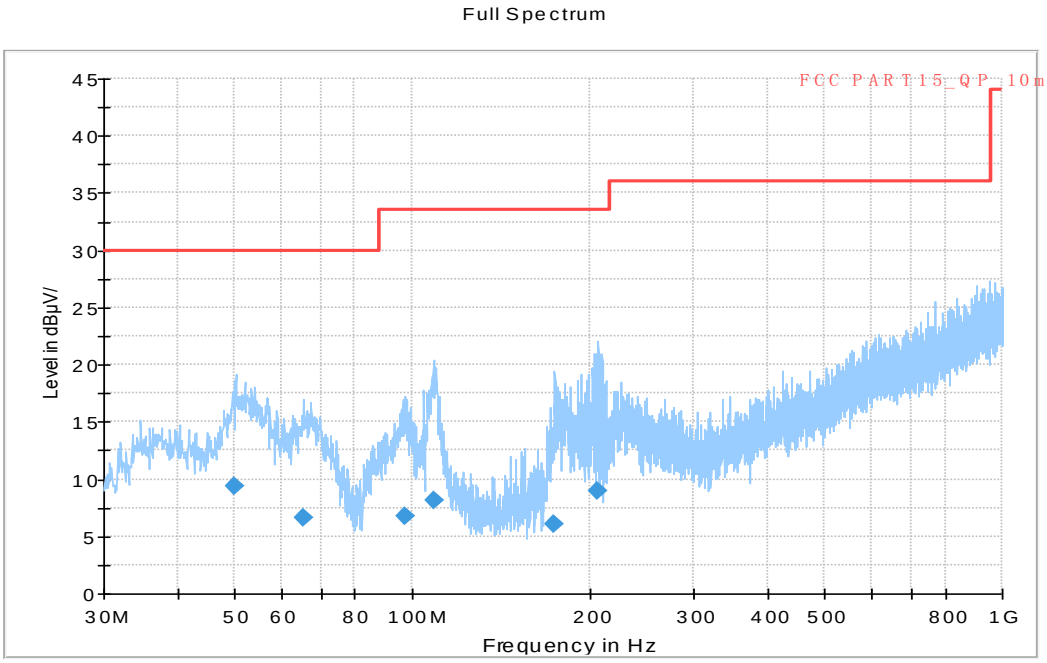

Fig A.1 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBµ/m)	Limit (dBµ/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
49.936000	9.34	30.00	20.66	216.0	V	210.0
65.308000	6.66	30.00	23.34	225.0	V	256.0
97.281000	6.77	33.50	26.75	225.0	V	300.0
108.990000	8.15	33.50	25.37	195.0	V	161.0
174.073000	6.10	33.50	27.42	176.0	V	241.0
206.734000	8.98	33.50	24.54	181.0	V	252.0

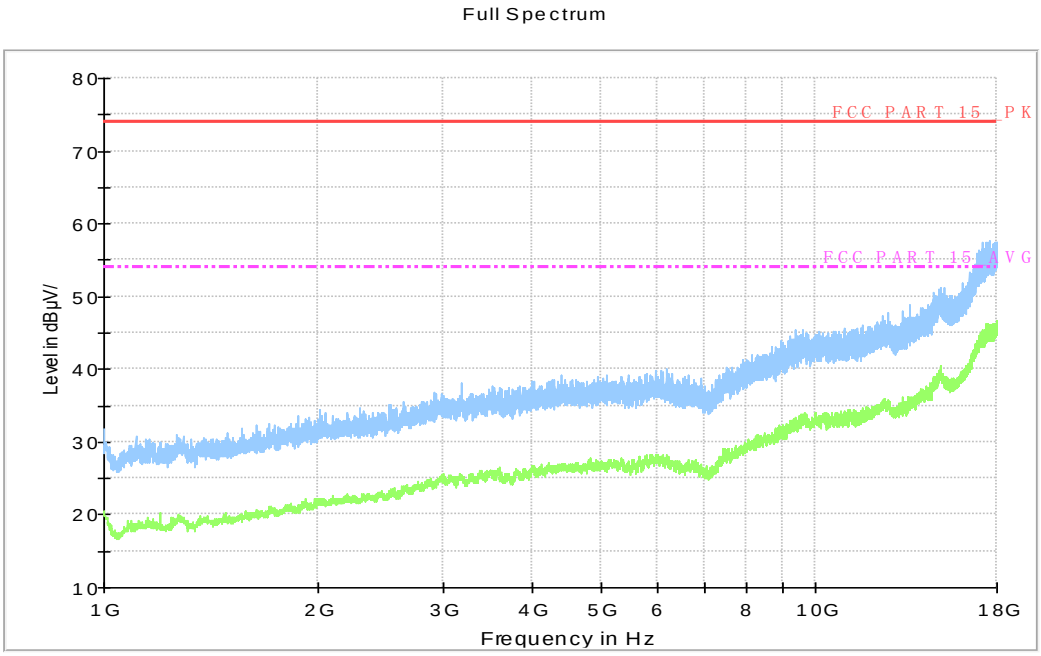

Fig A.2 Radiated Emission from 1GHz to 18GHz

Charging Mode, Set.4:

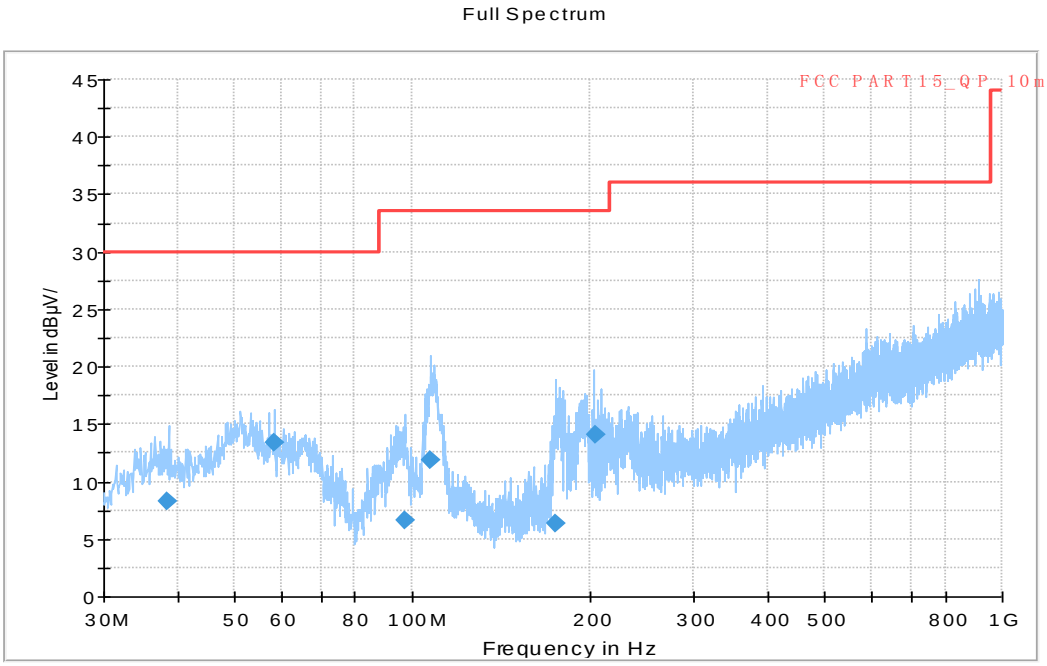

Fig A.3 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBµ/m)	Limit (dBµ/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
38.513000	8.24	30.00	21.76	225.0	V	109.0
58.444000	13.35	30.00	16.65	205.0	V	97.0
97.004000	6.64	33.50	26.88	207.0	V	60.0
107.489000	11.90	33.50	21.62	225.0	V	200.0
174.803000	6.34	33.50	27.18	175.0	V	294.0
204.267000	14.04	33.50	19.48	178.0	V	300.0

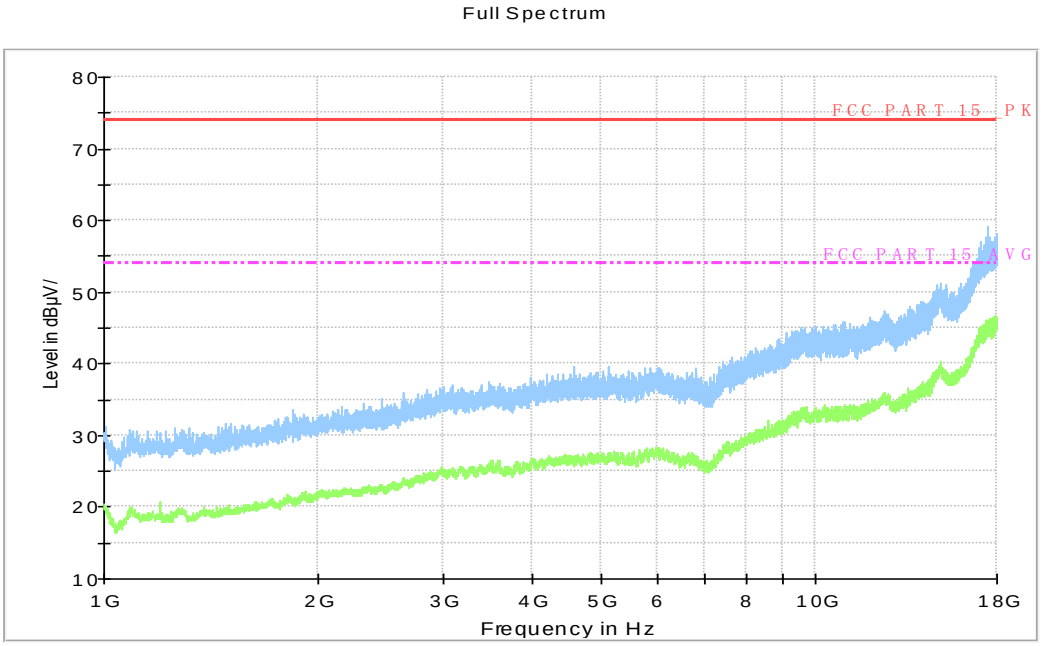

Fig A.4 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.5

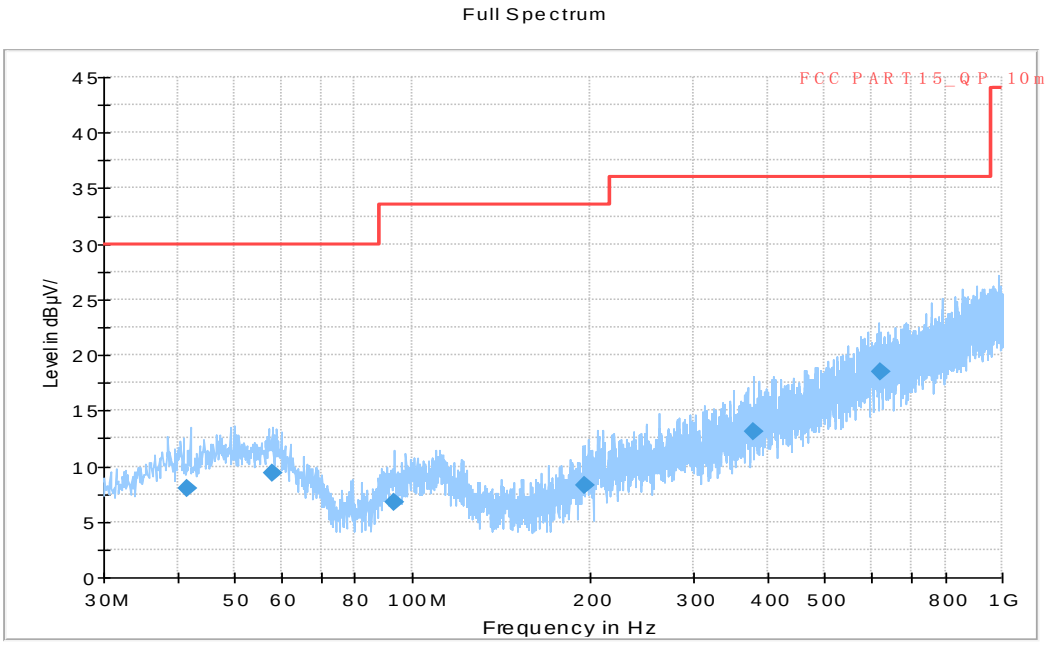

Fig A.5 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBµ/m)	Limit (dBµ/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
41.488000	8.07	30.00	21.93	283.0	V	191.0
57.853000	9.39	30.00	20.61	281.0	V	241.0
93.027000	6.78	33.50	26.74	284.0	V	171.0
196.332000	8.35	33.50	25.17	111.0	V	160.0
378.124000	13.11	36.00	22.91	317.0	V	300.0
622.559000	18.53	36.00	17.49	125.0	V	210.0

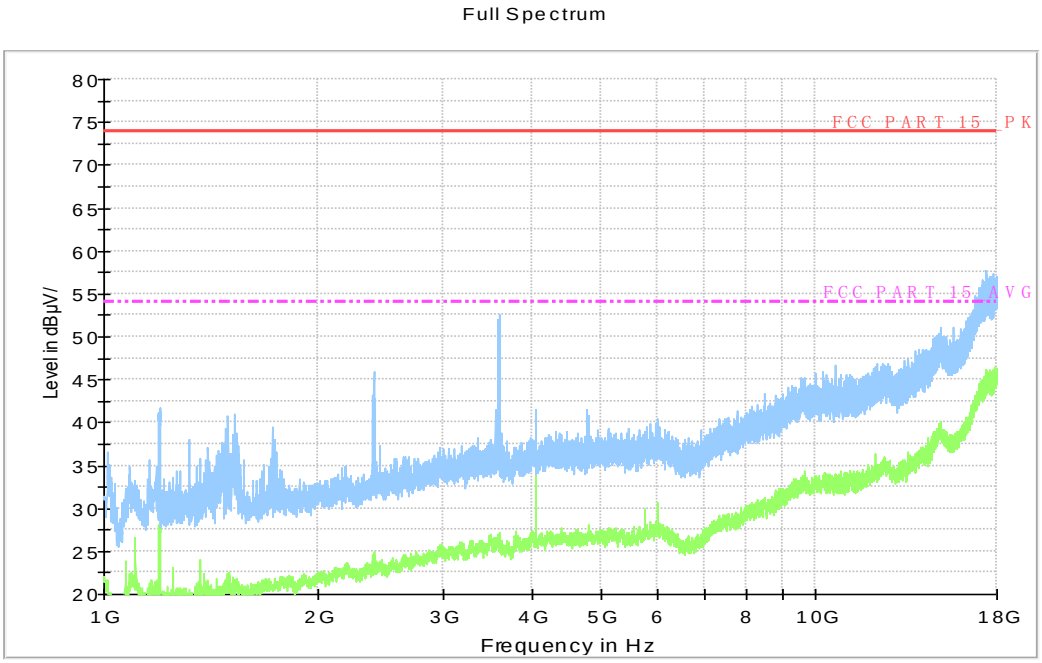

Fig A.6 Radiated Emission from 1GHz to 18GHz

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 (dBμV)	
	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 dB, *k*=2.

Charging Mode, Set.3

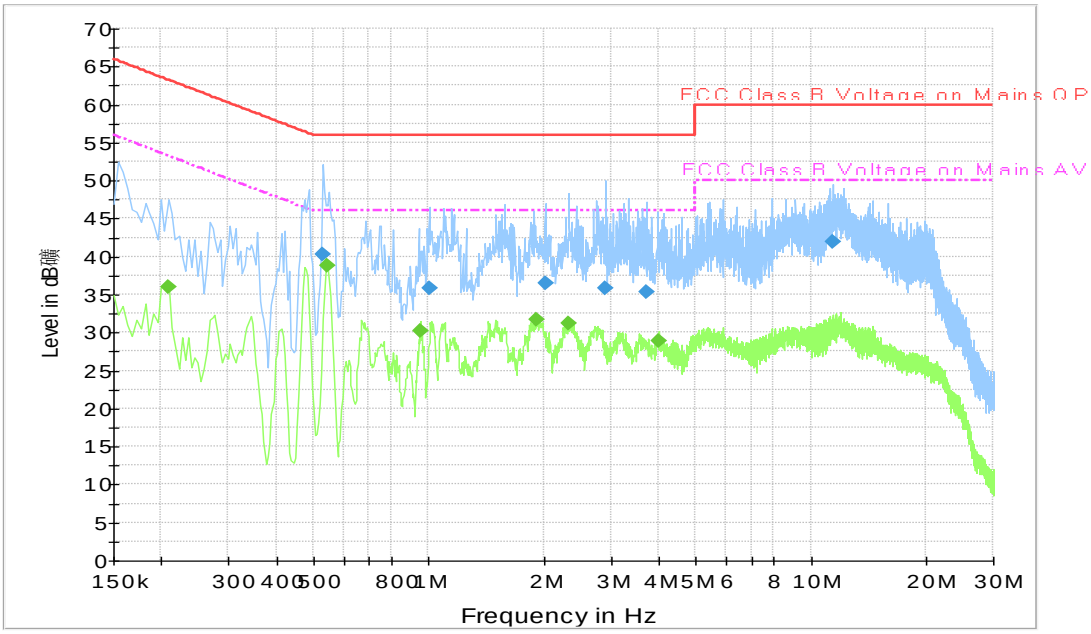

Fig A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.528000	40.3	2000.0	9.000	N	19.8	15.7	56.0
1.005000	35.8	2000.0	9.000	N	19.7	20.2	56.0
2.017500	36.5	2000.0	9.000	N	19.6	19.5	56.0
2.908500	35.9	2000.0	9.000	N	19.6	20.1	56.0
3.727500	35.4	2000.0	9.000	N	19.6	20.6	56.0
11.422500	41.9	2000.0	9.000	L1	19.7	18.1	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.208500	36.0	2000.0	9.000	L1	19.8	17.2	53.3
0.546000	38.8	2000.0	9.000	L1	19.8	7.2	46.0
0.951000	30.3	2000.0	9.000	L1	19.7	15.7	46.0
1.914000	31.8	2000.0	9.000	L1	19.6	14.2	46.0
2.319000	31.2	2000.0	9.000	L1	19.6	14.8	46.0
4.020000	28.8	2000.0	9.000	L1	19.6	17.2	46.0

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

Charging Mode, Set.4

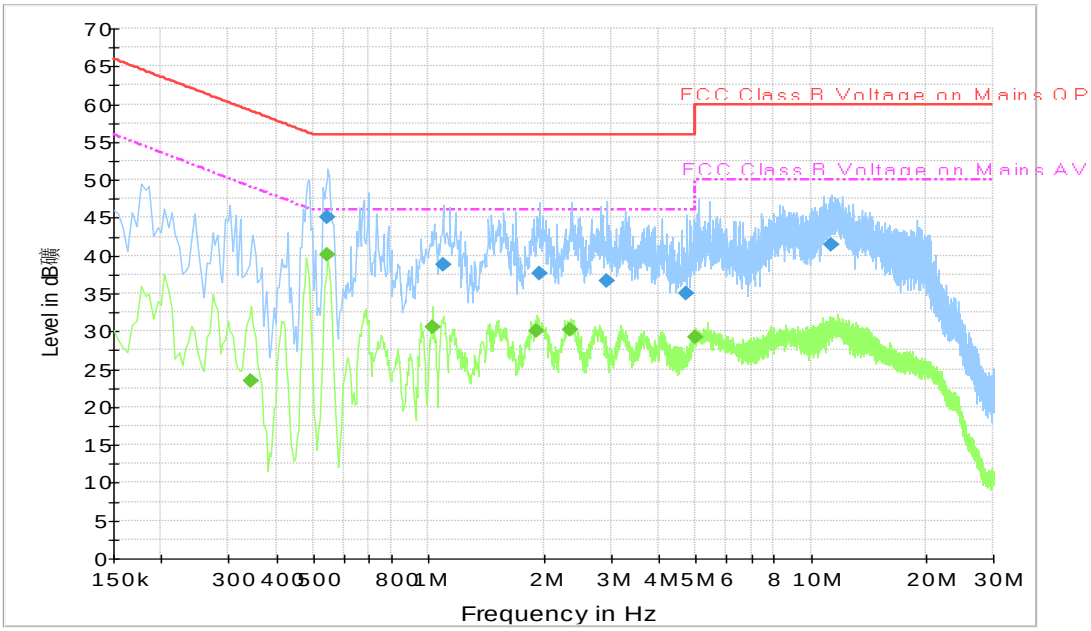

Fig A.8 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.546000	45.1	2000.0	9.000	N	19.8	10.9	56.0
1.090500	38.8	2000.0	9.000	N	19.7	17.2	56.0
1.950000	37.7	2000.0	9.000	N	19.6	18.3	56.0
2.922000	36.7	2000.0	9.000	N	19.6	19.3	56.0
4.731000	35.0	2000.0	9.000	N	19.6	21.0	56.0
11.278500	41.4	2000.0	9.000	L1	19.7	18.6	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.343500	23.4	2000.0	9.000	L1	19.8	25.7	49.1
0.546000	40.1	2000.0	9.000	L1	19.8	5.9	46.0
1.023000	30.5	2000.0	9.000	L1	19.7	15.5	46.0
1.923000	30.0	2000.0	9.000	L1	19.6	16.0	46.0
2.346000	30.2	2000.0	9.000	L1	19.6	15.8	46.0
4.969500	29.1	2000.0	9.000	L1	19.6	16.9	46.0

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

USB Mode, Set.5

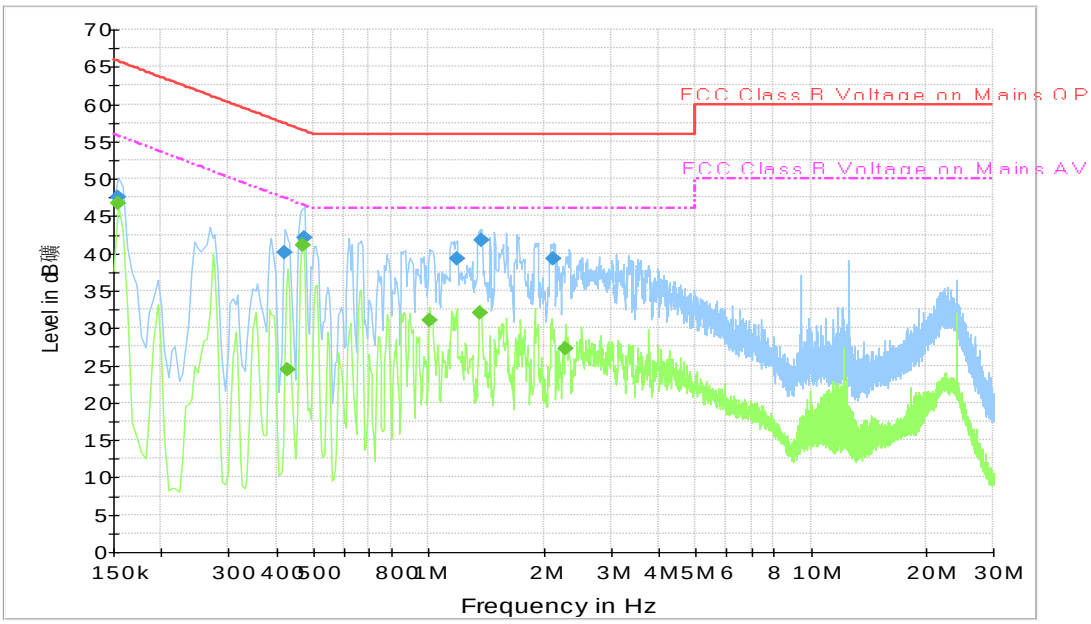

Fig A.9 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	47.5	2000.0	9.000	L1	29.7	18.2	65.8
0.420000	40.1	2000.0	9.000	L1	19.8	17.4	57.4
0.474000	42.1	2000.0	9.000	N	19.8	14.4	56.4
1.185000	39.3	2000.0	9.000	L1	19.7	16.7	56.0
1.374000	41.8	2000.0	9.000	L1	19.6	14.2	56.0
2.125500	39.3	2000.0	9.000	L1	19.6	16.7	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	46.6	2000.0	9.000	L1	29.7	9.1	55.8
0.429000	24.5	2000.0	9.000	N	19.8	22.8	47.3
0.469500	41.1	2000.0	9.000	N	19.8	5.4	46.5
1.005000	31.1	2000.0	9.000	L1	19.7	14.9	46.0
1.360500	32.1	2000.0	9.000	L1	19.6	13.9	46.0
2.274000	27.2	2000.0	9.000	N	19.6	18.8	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

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

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