



TEST REPORT

No. I18Z61798-EMC01

for

TCL Communication Ltd.

LTE/WCDMA/GSM mobile phone

Model Name: 5008R

FCC ID: 2ACCJH100

with

Hardware Version: 03

Software Version: EX3NUCNO

Issued Date: 2018-11-19



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.

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

Report Number	Revision	Description	Issue Date
I18Z61798-EMC01	Rev.0	1 st edition	2018-11-19



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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. China
100191

CTTL (BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology Development
Area, Beijing, P. R. China 100176

1.2. Testing Environment

Normal Temperature: 15-35°C

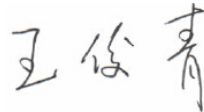
Relative Humidity: 20-75%

1.3. Project data

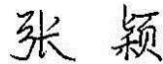
Testing Start Date: 2018-11-02

Testing End Date: 2018-11-19

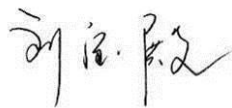
1.4. Signature



Wang Junqing
(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 /Post: 7/F, Block F4, TCL International E City, Zhong Shan Yuan Road,
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Contact Person: Gong Zhizhou
Contact Email: zhizhou.gong@tcl.com
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Fax: /

2.2. Manufacturer Information

Company Name: TCL Communication Ltd.
Address /Post: 7/F, Block F4, TCL International E City, Zhong Shan Yuan Road,
Nanshan District, Shenzhen, Guangdong, P.R. China 518052
Contact Person: Gong Zhizhou
Contact Email: zhizhou.gong@tcl.com
Telephone: 0086-755-36611722
Fax: /

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

3.1. About EUT

Description	LTE/WCDMA/GSM mobile phone
Model Name	5008R
FCC ID	2ACCJH100
Extreme vol. Limits	3.5VDC 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, Academy of Telecommunication Research, MIIT.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	015320000202700	03	EX3NUCNO

*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
AE7	Charger	/	18TCT-CH-0852
AE8	Charger	/	18TCT-CH-0362
AE9	USB Cable	/	18TCT-DC-0824
AE10	USB Cable	/	/
AE11	Headset	/	/

AE1

Model	CAC2900019C1
Manufacturer	BYD
Capacitance	3000mAh
Nominal voltage	V

AE7

Model	CBA0058AGHC5
Manufacturer	PUAN
Length of cable	/

AE8

Model	CBA0058AGAC7
Manufacturer	CHENGYANG
Length of cable	/

AE9

Model	CDA3122006C1
Manufacturer	PUAN
Length of cable	m



AE10
Model CDA312200CC2
Manufacturer SHENGHUA
Length of cable m
AE11
Model /
Manufacturer /
Length of cable m

*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.1	EUT1+ AE1+ AE7+ AE9/AE10	Charger +MP3
Set.2	EUT1+ AE1+ AE8+ AE9/AE10+AE11	Charger +FM+GPS
Set.3	EUT1+ AE1+ AE9/AE10	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, 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

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	ESU26	100235	R&S	2019-03-31	1 year
2	Test Receiver	ESCI3	100344	R&S	2019-02-28	1 year
3	Universal Radio Communication Tester	CMW500	116588	R&S	2018-11-26	1 year
4	LISN	ENV216	101200	Rohde & Schwarz	2019-04-15	1 year
5	EMI Antenna	VULB 9163	9163-302	Schwarzbeck	2020-02-27	3 years
6	EMI Antenna	3115	00167250	ETS-Lindgren	2020-05-21	3 years
7	Universal Radio Communication Tester	CMW500	143008	R&S	2018-12-26	1 year
8	Signal Generator	SMT06	831285/005	R&S	2019-02-04	1 year
9	PC	M4000e-17	M706GWXD	Lenovo	N/A	N/A
10	Printer	P1606dn	VNC3L52122	HP	N/A	N/A

Test Item	Test Software and Version	Software Vendor
Radiated Continuous Emission	EMC32 V9.01	R&S
Conducted Emission	EMC32 V8.52.0	R&S

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 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 – 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 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.

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

A.1.3 Measurement Limit

Frequency range (MHz)	Field strength limit ($\mu\text{V/m}$)		
	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_{PL} : Path Loss

P_{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)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Antenna Pol. (H/V)
17988.667	39.5	-25.5	43.4	21.602	H
17943.900	39.4	-25.5	43.4	21.502	H
17970.533	39.3	-25.5	43.4	21.402	V
17988.100	39.2	-25.5	43.4	21.302	H
17966.567	39.2	-25.5	43.4	21.302	H
17940.500	39.2	-25.5	43.4	21.302	H

Charging Mode/QP detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Antenna Pol. (H/V)
952.470	27.7	-17.3	22.0	22.997	H
949.948	26.9	-17.3	22.0	22.197	H
954.022	26.9	-17.3	22.0	22.197	V
951.112	26.8	-17.3	22.0	22.097	H
930.839	26.7	-17.3	21.9	22.097	H
950.821	26.6	-17.3	22.0	21.897	H

Measurement results for Set.2:

Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17969.400	40.0	-25.5	43.4	22.102	H
17964.300	39.9	-25.5	43.4	22.002	H
17976.767	39.8	-25.5	43.4	21.902	V
17968.833	39.7	-25.5	43.4	21.802	H
17951.833	39.7	-25.5	43.4	21.802	H
17988.667	39.6	-25.5	43.4	21.702	H

Charging Mode/QP detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
958.096	28.2	-17.3	22.0	23.497	H
952.664	27.9	-17.3	22.0	23.197	H
932.100	26.8	-17.3	21.9	22.197	V
910.178	26.5	-17.8	21.7	22.553	H
904.455	26.4	-17.8	21.7	22.453	H
934.622	26.4	-17.3	21.9	21.797	H

Measurement results for Set.3:

USB Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
5904.500	40.4	-36.2	34.2	42.449	H
17973.367	40.0	-25.5	43.4	22.102	H
17965.433	40.0	-25.5	43.4	22.102	V
17987.533	39.9	-25.5	43.4	22.002	H
17966.000	39.9	-25.5	43.4	22.002	H
17979.600	39.8	-25.5	43.4	21.902	H

USB Mode/QP detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
39.118	26.7	-25.2	11.2	40.692	H
45.035	25.3	-25.2	13.3	37.248	H
39.797	25.2	-25.2	11.2	39.192	V
39.312	24.8	-25.2	11.2	38.792	H
38.342	24.8	-25.2	11.2	38.792	H
39.215	24.2	-25.2	11.2	38.192	H

Charging Mode, Set.1

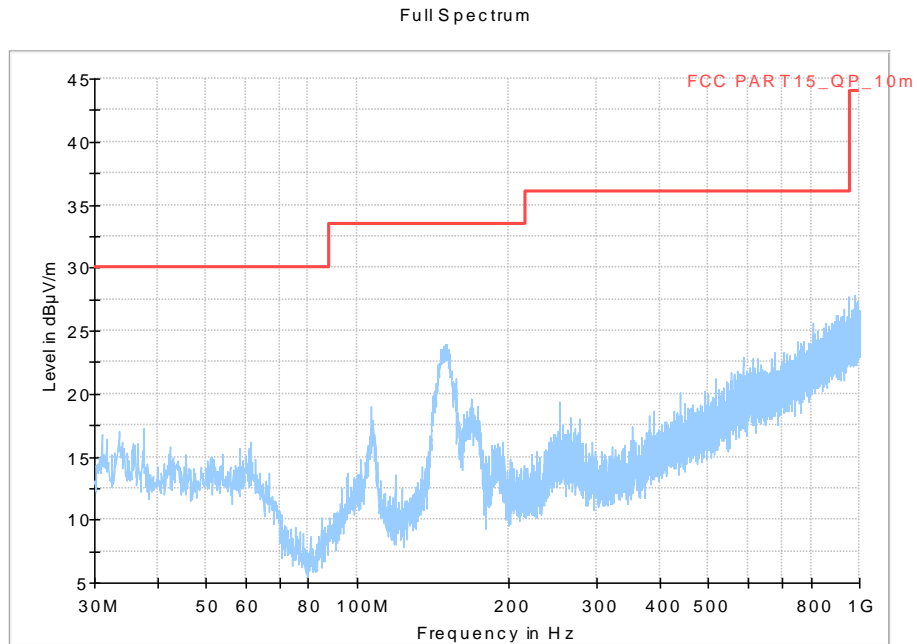


Fig A.1 Radiated Emission from 30MHz to 1GHz

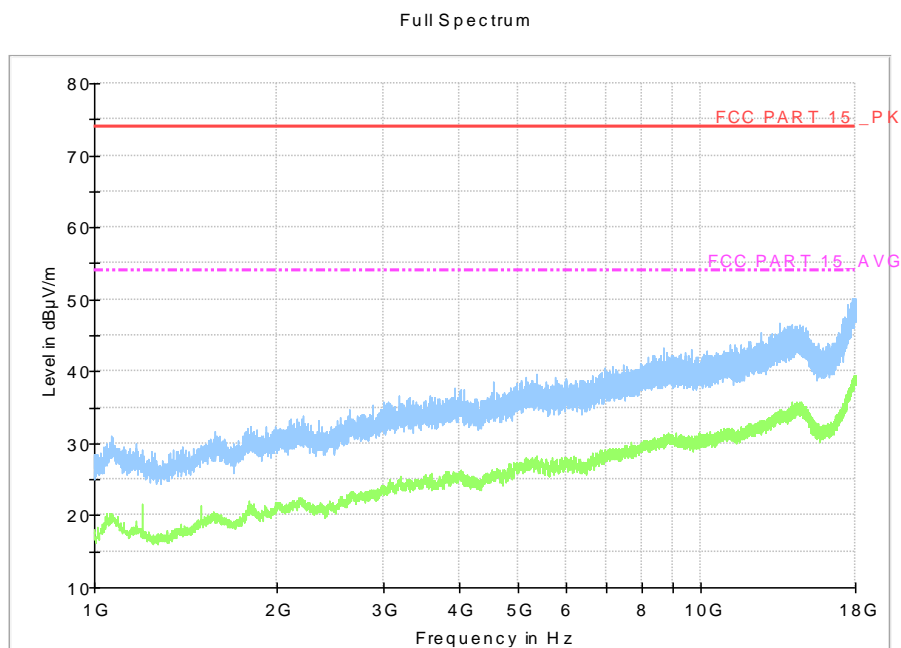
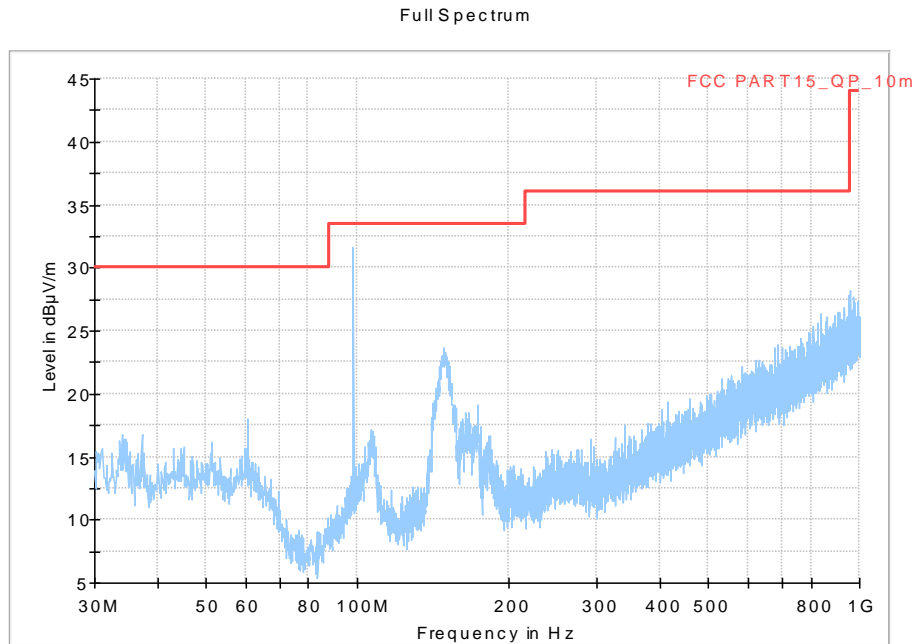


Fig A.2 Radiated Emission from 1GHz to 18GHz

Charging Mode, Set.2



Note: The spike over the limit is coming from FM signal.

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

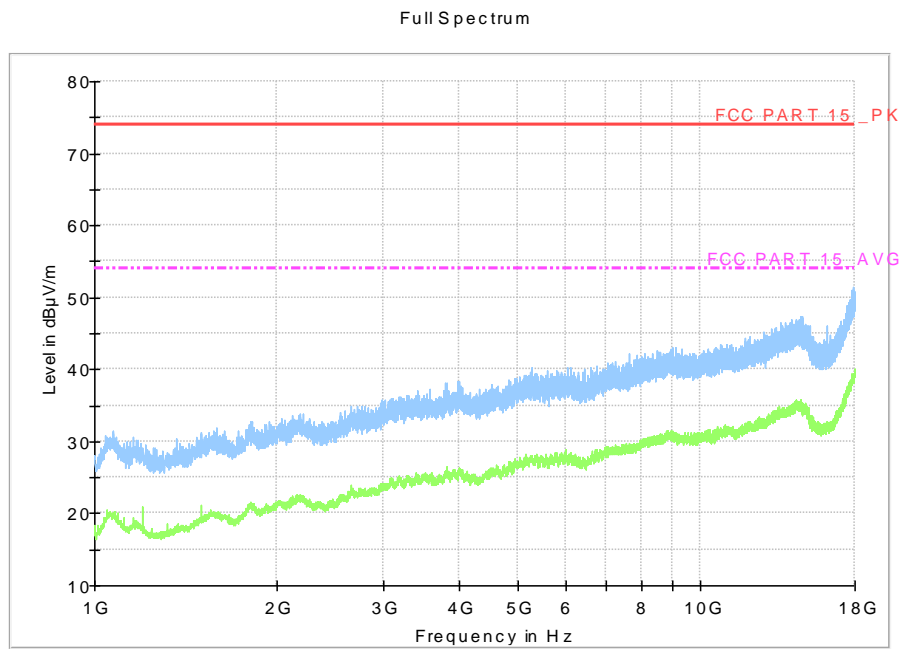


Fig A.4 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.3

Full Spectrum

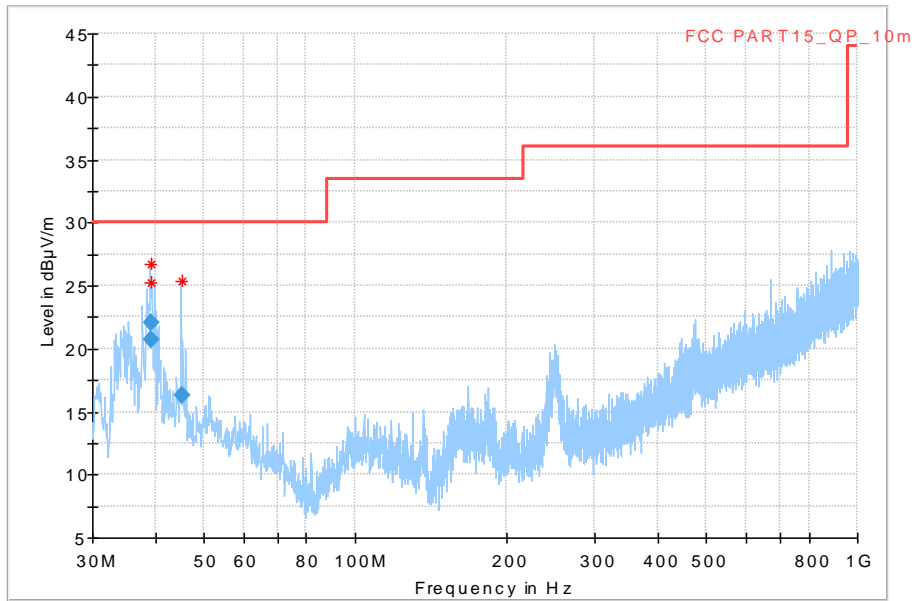


Fig A.5 Radiated Emission from 30MHz to 1GHz

Final Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
39.178000	22.04	30.00	7.96	1000.0	120.000	286.0	V	243.0
39.257000	20.71	30.00	9.29	1000.0	120.000	225.0	V	-26.0
45.215000	16.26	30.00	13.74	1000.0	120.000	216.0	V	65.0

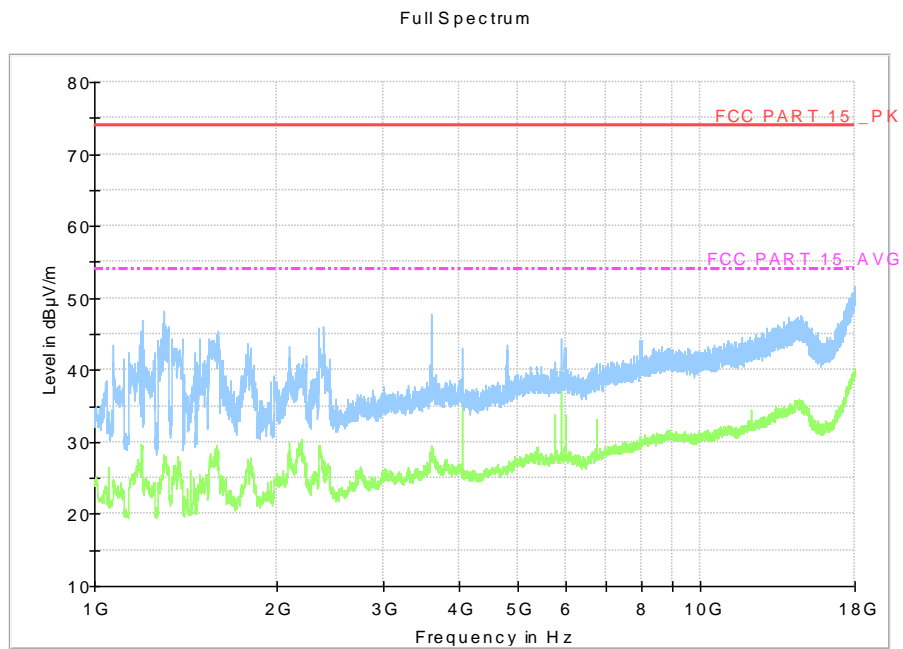


Fig A.6 Radiated Emission from 1GHz to 18GHz

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 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.

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

A.2.3 Measurement Limit

Frequency of emission (MHz)	Conducted limit (dB μ 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

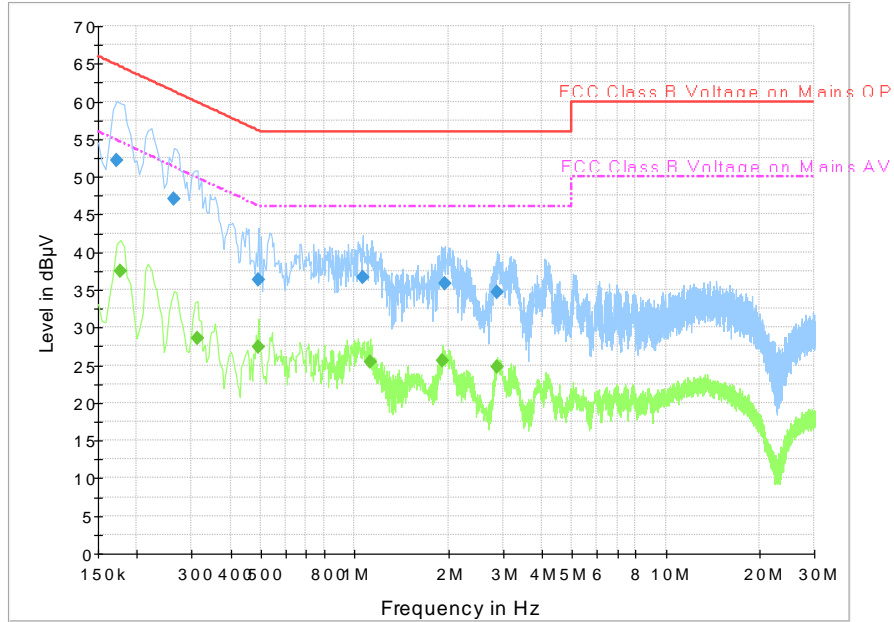


Fig A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.172500	52.2	2000.0	9.000	On	L1	19.8	12.6	64.8	
0.262500	47.1	2000.0	9.000	On	L1	19.8	14.2	61.4	
0.492000	36.3	2000.0	9.000	On	L1	19.9	19.9	56.1	
1.063500	36.7	2000.0	9.000	On	L1	19.6	19.3	56.0	
1.950000	35.8	2000.0	9.000	On	L1	19.7	20.2	56.0	
2.863500	34.7	2000.0	9.000	On	L1	19.7	21.3	56.0	

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.177000	37.5	2000.0	9.000	On	L1	19.8	17.1	54.6	
0.312000	28.6	2000.0	9.000	On	L1	19.8	21.3	49.9	
0.492000	27.4	2000.0	9.000	On	L1	19.9	18.7	46.1	
1.122000	25.4	2000.0	9.000	On	L1	19.6	20.6	46.0	
1.923000	25.7	2000.0	9.000	On	L1	19.7	20.3	46.0	
2.886000	24.7	2000.0	9.000	On	L1	19.7	21.3	46.0	

Charging Mode, Set.2

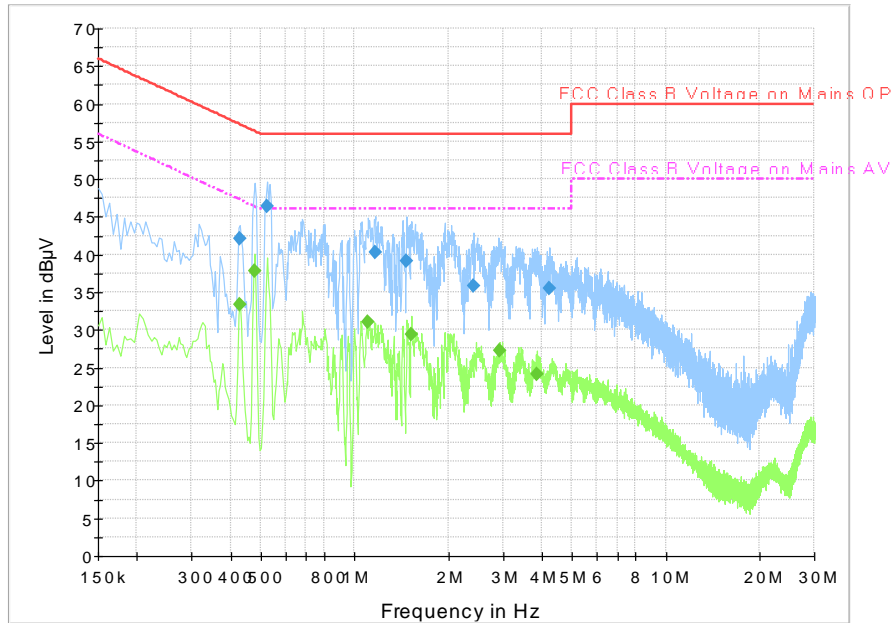


Fig A.8 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.429000	42.1	2000.0	9.000	On	L1	19.9	15.2	57.3	
0.523500	46.4	2000.0	9.000	On	L1	19.9	9.6	56.0	
1.167000	40.2	2000.0	9.000	On	L1	19.6	15.8	56.0	
1.473000	39.1	2000.0	9.000	On	L1	19.6	16.9	56.0	
2.422500	35.8	2000.0	9.000	On	L1	19.7	20.2	56.0	
4.218000	35.5	2000.0	9.000	On	L1	19.6	20.5	56.0	

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.429000	33.3	2000.0	9.000	On	L1	19.9	14.0	47.3	
0.478500	37.8	2000.0	9.000	On	L1	19.9	8.6	46.4	
1.108500	31.0	2000.0	9.000	On	L1	19.6	15.0	46.0	
1.522500	29.4	2000.0	9.000	On	L1	19.7	16.6	46.0	
2.935500	27.3	2000.0	9.000	On	L1	19.7	18.7	46.0	
3.844500	24.1	2000.0	9.000	On	L1	19.6	21.9	46.0	

USB Mode, Set.3

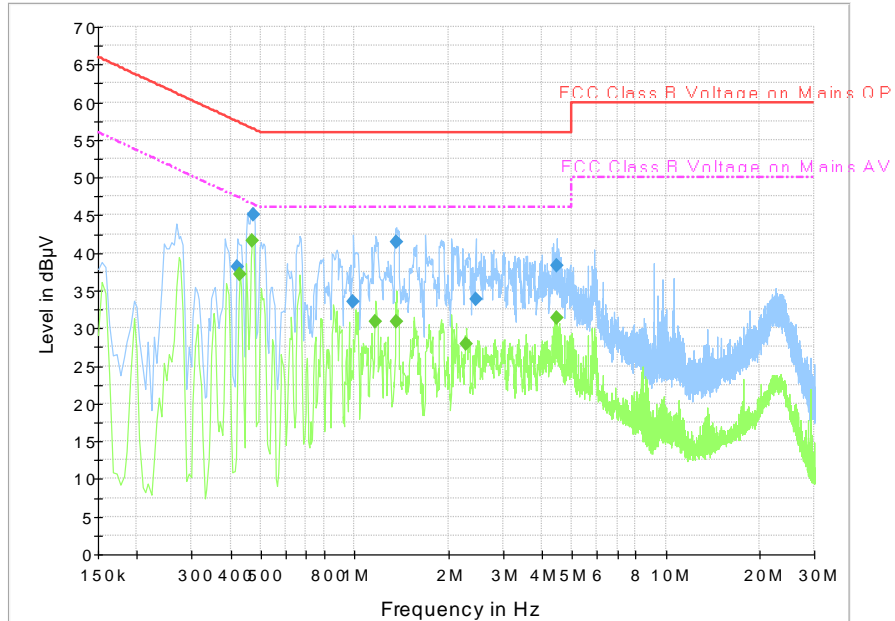


Fig A.9 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.420000	38.1	2000.0	9.000	On	N	19.9	19.3	57.4	
0.474000	45.0	2000.0	9.000	On	L1	19.9	11.4	56.4	
0.991500	33.4	2000.0	9.000	On	N	19.7	22.6	56.0	
1.360500	41.4	2000.0	9.000	On	L1	19.6	14.6	56.0	
2.449500	33.8	2000.0	9.000	On	N	19.6	22.2	56.0	
4.479000	38.4	2000.0	9.000	On	N	19.7	17.6	56.0	

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.429000	37.1	2000.0	9.000	On	L1	19.9	10.2	47.3	
0.469500	41.5	2000.0	9.000	On	L1	19.9	5.0	46.5	
1.171500	30.9	2000.0	9.000	On	L1	19.6	15.1	46.0	
1.365000	30.8	2000.0	9.000	On	L1	19.6	15.2	46.0	
2.278500	27.9	2000.0	9.000	On	L1	19.7	18.1	46.0	
4.479000	31.4	2000.0	9.000	On	N	19.7	14.6	46.0	



ANNEX B: Persons involved in this testing

Test Item	Tester
Conducted Continuous Emission	Shi Suolan
Radiated Continuous Emission	Li Jinpeng

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