



TEST REPORT

No. I18Z61178-EMC01

for

TCL Communication Ltd.

GSM/UMTS/LTE mobile phone

Model Name: REVVL 2 5052W

FCC ID: 2ACCJH093

with

Hardware Version: 05

Software Version: vARA5

Issued Date: 2018-08-10



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
I18Z61178-EMC01	Rev.0	1 st edition	2018-08-10



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1. Test Laboratory

1.1. Testing Location

Location 1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China
100191

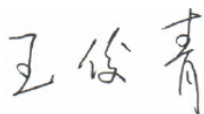
1.2. Testing Environment

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

1.3. Project data

Testing Start Date: 2017-07-18
Testing End Date: 2018-07-31

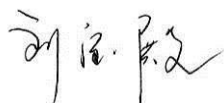
1.4. Signature



Wang Junqing
(Prepared this test report)



Zhang Ying
(Reviewed this test report)



Liu Baodian
(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: TCL Communication Ltd.
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Shenzhen, Guangdong, P.R. China 518052
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Fax: 0086-75536612000-81722

2.2. Manufacturer Information

Company Name: TCL Communication Ltd.
7/F, Block F4, TCL Communication Technology Building, TCL
Address /Post: 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: 0086-75536612000-81722

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

3.1. About EUT

Description	GSM/UMTS/LTE mobile phone
Model Name	REVV L 2 5052W
FCC ID	2ACCJH093
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, CAICT.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	015246000151151	05	vARA5

*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	/	18TCT-CH-0661/0669
AE3	Charger	/	18TCT-CH-0676/0683
AE4	USB Cable	/	18TCT-DC-0152
AE5	USB Cable	/	18TCT-DC-0260

AE1

Model	CAC2900019C1
Manufacturer	BYD
Capacitance	2900mAh
Nominal voltage	V

AE2

Model	CBA0059AGNC5
Manufacturer	Puan
Length of cable	/

AE3

Model	CBA0059AGNC7
Manufacturer	CHENYANG
Length of cable	/

AE4

Model	CDA0000024C8
Manufacturer	PUAN
Length of cable	cm

AE5

Model	CDA0000024C2
Manufacturer	Juwei
Length of cable	cm



*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+ AE4/AE5	Charger
Set.2	EUT1+ AE1+ AE3+ AE4/AE5	Charger
Set.3	EUT1+ AE1+ AE4/AE5	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

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
Location Column	1	The test is performed in test location 1 which is described in section 1.1 of this report

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

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	ESCI 7	100344	R&S	2019-02-28	1 year
3	Universal Radio Communication Tester	CMW500	143008	R&S	2018-12-26	1 year
3	Universal Radio Communication Tester	CMW500	116588	R&S	2018-11-26	1 year
4	LISN	ENV216	101200	R&S	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	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
8	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
9	Keyboard	L100	CN0RH6596589 07ATOI40	DELL	N/A	N/A
10	Mouse	M-UAE119	LZ935220ZRC	Lenovo	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 (charging mode of MS) at distances of 3 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 charging mode. During the test MS is connected to a charger in the case of charging mode.

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): 30MHz-1GHz: 4.86dB, 1GHz-18GHz: 5.26dB, $k=2$.

Measurement results for Set.1:

Charging Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
17992.067	40.0	-17.7	45.6	12.100	H
17980.167	39.9	-17.7	45.6	12.000	H
17975.633	39.9	-17.7	45.6	12.000	V
17966.567	39.9	-17.7	45.6	12.000	H
17964.300	39.9	-17.7	45.6	12.000	H
17983.000	39.8	-17.7	45.6	11.900	H

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
17963.733	51.3	-17.7	45.6	23.400	H
17855.500	51.2	-18.5	45.6	24.100	H
17964.867	50.7	-17.7	45.6	22.800	V
17984.700	50.7	-17.7	45.6	22.800	H
17900.833	50.7	-18.5	45.6	23.600	H
17977.900	50.6	-17.7	45.6	22.700	H

Measurement results for Set.2:

Charging Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17981.300	40.1	-17.7	45.6	12.200	H
17976.200	40.0	-17.7	45.6	12.100	H
17986.400	39.8	-17.7	45.6	11.900	V
17982.433	39.8	-17.7	45.6	11.900	H
17966.000	39.7	-17.7	45.6	11.800	H
17968.833	39.7	-17.7	45.6	11.800	H

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17962.033	50.9	-17.7	45.6	23.000	H
17993.767	50.8	-17.7	45.6	22.900	H
17983.000	50.7	-17.7	45.6	22.800	V
17950.700	50.7	-17.7	45.6	22.800	H
17754.633	50.6	-18.5	45.6	23.500	H
17977.900	50.5	-17.7	45.6	22.600	H

Measurement results for Set.3:

USB Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17976.200	40.1	-17.7	45.6	12.200	H
17985.267	40.0	-17.7	45.6	12.100	H
17980.733	39.9	-17.7	45.6	12.000	V
17974.500	39.8	-17.7	45.6	11.900	H
17995.467	39.8	-17.7	45.6	11.900	H
17963.733	39.8	-17.7	45.6	11.900	H

USB Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
1493.000	53.0	-40.3	24.1	69.200	H
1494.133	52.3	-40.3	24.1	68.500	H
1499.233	52.1	-40.3	24.1	68.300	V
1498.667	52.0	-40.3	24.1	68.200	H
1498.100	52.0	-40.3	24.1	68.200	H
1493.567	51.9	-40.3	24.1	68.100	H

Sample calculation: Peak detector, 1493.000MHz

$$\text{Result} = P_{\text{Mea}} (69.2\text{dB}\mu\text{V}) + G_A (24.1\text{dB/m}) + G_{\text{PL}}(-40.3\text{dB}) = 53.0 \text{ B}\mu\text{V/m}$$

Charging Mode, Set.1

Full Spectrum

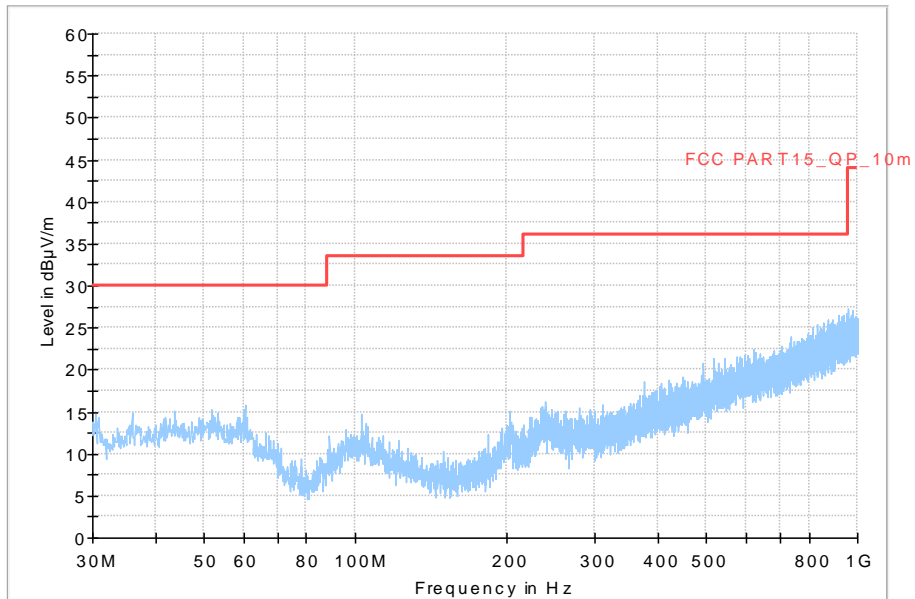


Fig.1 Radiated Emission from 30MHz to 1GHz

Full Spectrum

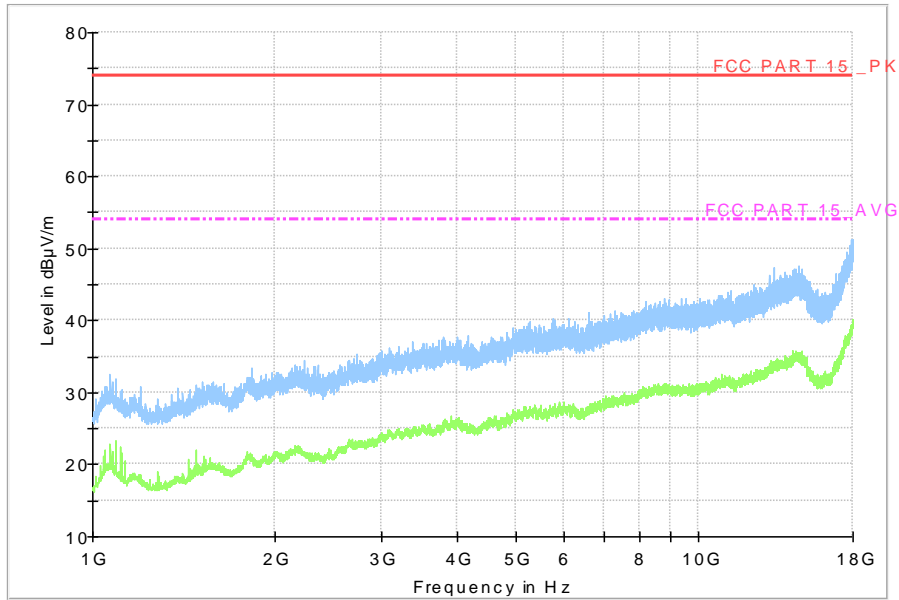


Fig.2 Radiated Emission from 1GHz to 18GHz

Charging Mode, Set.2

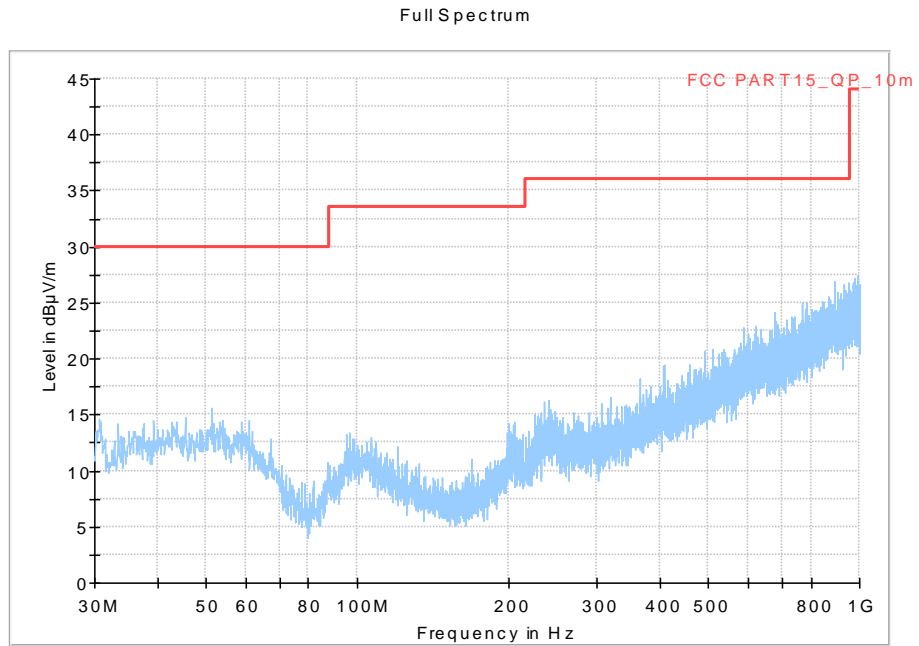


Fig.3 Radiated Emission from 30MHz to 1GHz

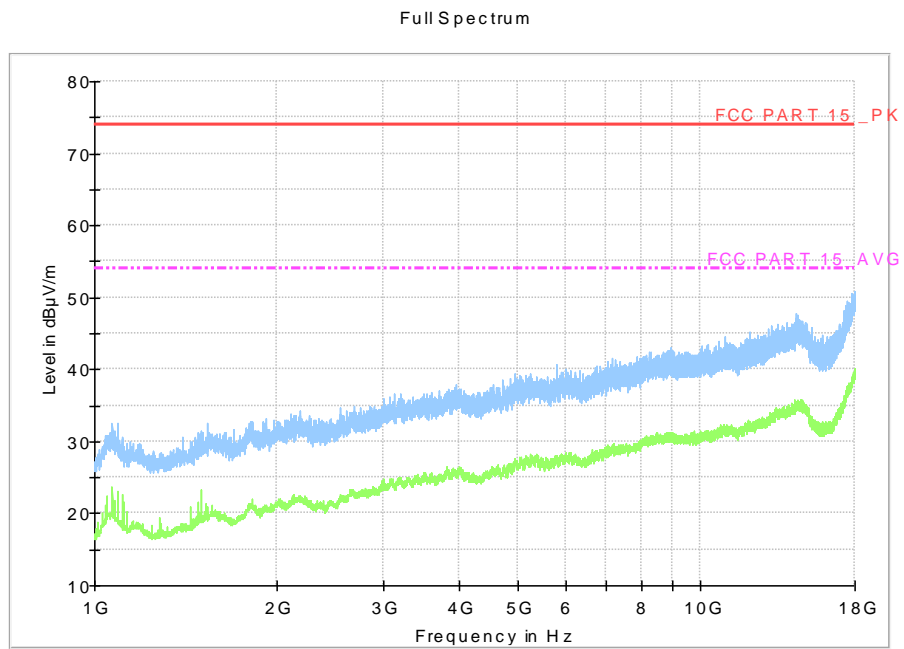


Fig.4 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.3

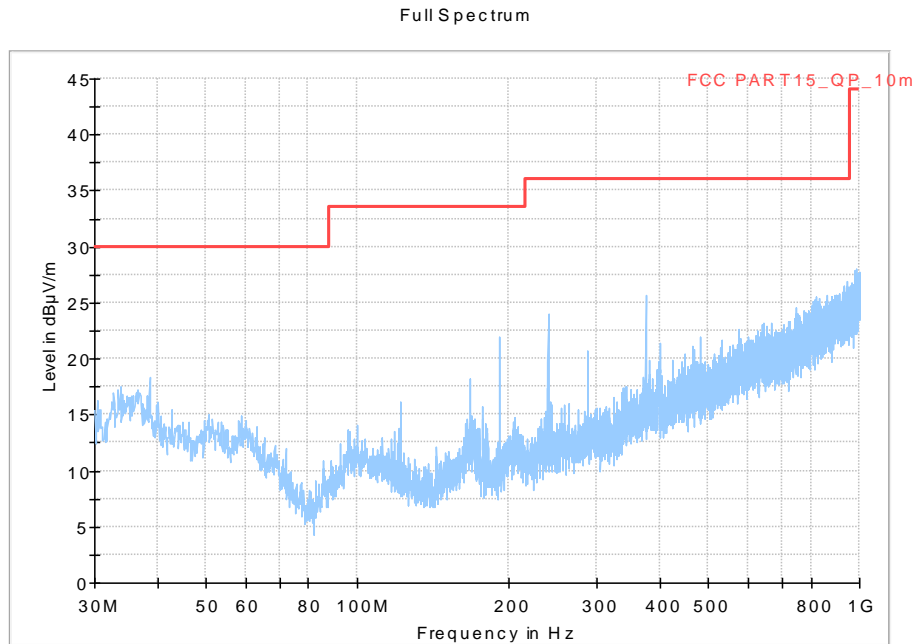


Fig.5 Radiated Emission from 30MHz to 1GHz

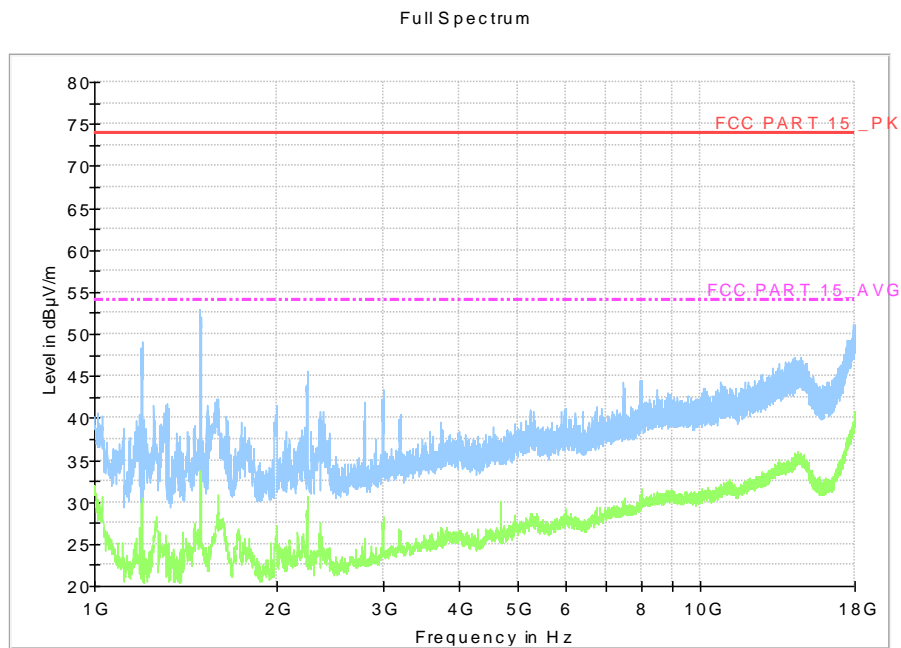


Fig.6 Radiated Emission from 1GHz to 18GHz

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 charging mode. During the test MS is connected to a charger in the case of charging mode.

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: $U= 3.38\text{dB}$, $k=2$.

Charging Mode, Set.1

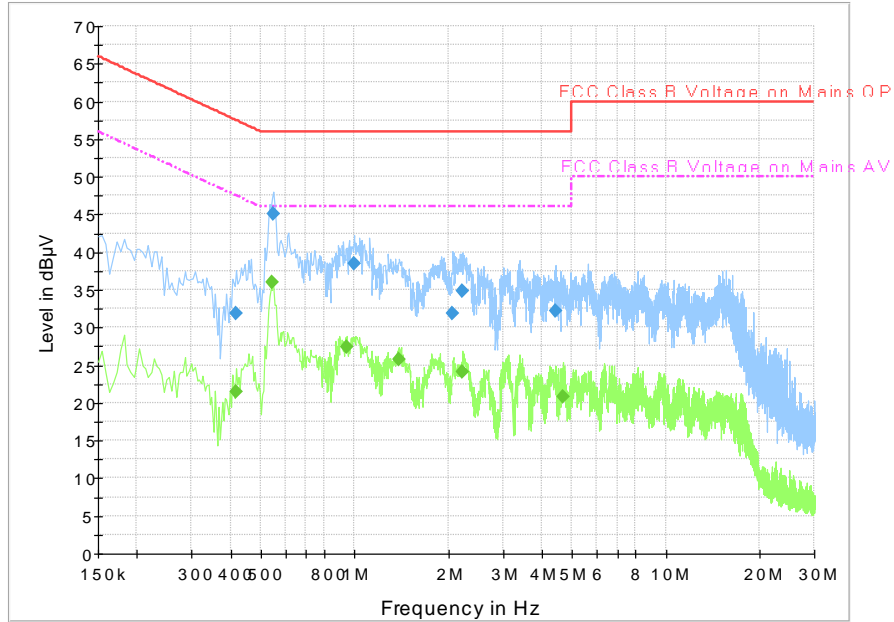


Figure A.5 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.415500	31.9	2000.0	9.000	On	L1	19.9	25.7	57.5
0.550500	45.1	2000.0	9.000	On	L1	19.9	10.9	56.0
0.996000	38.4	2000.0	9.000	On	L1	19.6	17.6	56.0
2.067000	31.8	2000.0	9.000	On	N	19.6	24.2	56.0
2.215500	34.9	2000.0	9.000	On	N	19.6	21.1	56.0
4.411500	32.3	2000.0	9.000	On	L1	19.6	23.7	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.415500	21.4	2000.0	9.000	On	L1	19.9	26.1	47.5
0.546000	35.9	2000.0	9.000	On	L1	19.9	10.1	46.0
0.946500	27.4	2000.0	9.000	On	L1	19.6	18.6	46.0
1.387500	25.7	2000.0	9.000	On	L1	19.6	20.3	46.0
2.215500	24.1	2000.0	9.000	On	N	19.6	21.9	46.0
4.668000	20.8	2000.0	9.000	On	L1	19.6	25.2	46.0

Charging Mode, Set.2

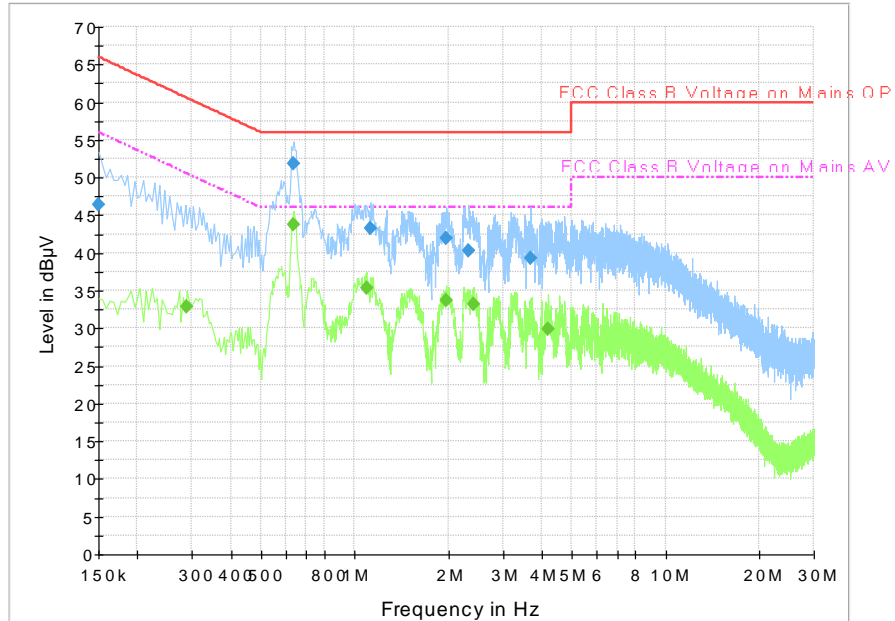


Figure A.5 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	46.4	2000.0	9.000	On	L1	20.2	19.6	66.0
0.636000	51.8	2000.0	9.000	On	L1	19.8	4.2	56.0
1.126500	43.3	2000.0	9.000	On	L1	19.6	12.7	56.0
1.968000	41.9	2000.0	9.000	On	L1	19.7	14.1	56.0
2.332500	40.3	2000.0	9.000	On	L1	19.7	15.7	56.0
3.691500	39.3	2000.0	9.000	On	L1	19.6	16.7	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.289500	32.8	2000.0	9.000	On	L1	19.8	17.7	50.5
0.636000	43.8	2000.0	9.000	On	L1	19.8	2.2	46.0
1.090500	35.3	2000.0	9.000	On	L1	19.6	10.7	46.0
1.968000	33.7	2000.0	9.000	On	L1	19.7	12.3	46.0
2.422500	33.2	2000.0	9.000	On	L1	19.7	12.8	46.0
4.177500	29.9	2000.0	9.000	On	L1	19.6	16.1	46.0

USB Mode, Set.3

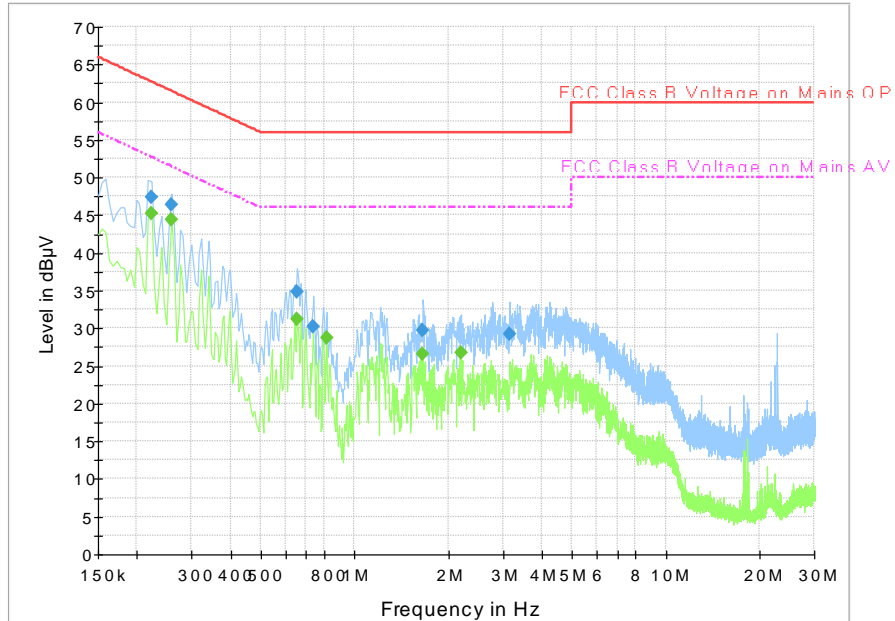


Figure A.6 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.222000	47.4	2000.0	9.000	On	N	19.8	15.3	62.7
0.258000	46.3	2000.0	9.000	On	N	19.8	15.1	61.5
0.654000	34.9	2000.0	9.000	On	N	19.9	21.1	56.0
0.739500	30.2	2000.0	9.000	On	N	19.9	25.8	56.0
1.662000	29.7	2000.0	9.000	On	N	19.6	26.3	56.0
3.142500	29.3	2000.0	9.000	On	L1	19.7	26.7	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.222000	45.2	2000.0	9.000	On	N	19.8	7.5	52.7
0.258000	44.4	2000.0	9.000	On	N	19.8	7.1	51.5
0.654000	31.3	2000.0	9.000	On	N	19.9	14.7	46.0
0.811500	28.8	2000.0	9.000	On	N	19.8	17.2	46.0
1.657500	26.5	2000.0	9.000	On	N	19.6	19.5	46.0
2.193000	26.7	2000.0	9.000	On	N	19.6	19.3	46.0



ANNEX B: Persons involved in this testing

Test Item	Tester
Radiation Emission	Shi Suolan
Conducted Emission	Shi Suolan

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