



TEST REPORT

No. I17Z61375-EMC01

for

TCL Communication Ltd.

GSM Quad Band Mobile phone

Model Name: 1066G/1066D

FCC ID: 2ACCJB098

with

Hardware Version: PIO

Software Version: V1.0

Issued Date: 2017-10-10



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.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I17Z61375-EMC01	Rev.0	1 st edition	2017-10-10

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1. Test Laboratory

1.1. Testing Location

Location: 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: 2017-09-13

Testing End Date: 2017-09-29

1.4. Signature



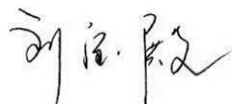
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Zhang Ying

(Reviewed this test report)



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2. Client Information

2.1. Applicant Information

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2.2. Manufacturer Information

Company Name: TCL Communication Ltd.
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Contact Email zhizhou.gong@tcl.com
Telephone: 0086-21-31363544
Fax: 0086-21-61460602

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

3.1. About EUT

Description	GSM Quad Band Mobile phone
Model Name	1066G/1066D
FCC ID	2ACCJB098
Extreme vol. Limits	3.6VDC to 4.2VDC (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
EUT2	015051000001590	PIO	V1.0

*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	/	/
AE2	Battery	/	/
AE3	Charger	/	16TCTCH1675
AE4	Charger	/	17TCTCH0245
AE5	USB cable		/

AE1

Model	CAB0400016C1
Manufacturer	BYD
Capacitance	400 mAh
Nominal voltage	3.7V

AE2

Model	CAB0750012C1
Manufacturer	BYD
Capacitance	750 mAh
Nominal voltage	3.7V

AE3

Model	CBA0066AGAC5
Manufacturer	PUAN
Length of cable	116cm

AE4

Model	CBA0066AGAC1
Manufacturer	BYD
Length of cable	121cm

AE5

Model	CDB0000072C3
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Manufacturer	JYK
Length of cable	80cm

*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	EUT2+ AE1+ AE3	Charger
Set.2	EUT2+ AE1+ AE4	Charger
Set.3	EUT2+ AE1+ AE5	USB

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	huayuan North Road	The test is performed in test location huayuan North Road 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	2018-03-01	1 year
2	Test Receiver	ESCI 7	100344	R&S	2018-03-15	1 year
3	Universal Radio Communication Tester	CMW500	143008	R&S	2017-12-01	1 year
4	LISN	ENV216	101200	R&S	2018-08-03	1 year
5	EMI Antenna	VULB 9163	9163-302	Schwarzbeck	2020-02-27	3 years
6	EMI Antenna	3115	6914	ETS-Lindgren	2017-12-15	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 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): 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
17962.033	43.7	-17.7	45.6	15.800	H
17956.933	43.5	-17.7	45.6	15.600	H
17959.767	43.4	-17.7	45.6	15.500	V
17922.367	43.3	-17.7	45.6	15.400	H
17959.200	43.3	-17.7	45.6	15.400	H
17938.233	43.3	-17.7	45.6	15.400	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
17937.100	55.5	-17.7	45.6	27.600	H
17882.700	55.5	-18.5	45.6	28.400	H
17943.900	55.2	-17.7	45.6	27.300	V
17872.500	55.0	-18.5	45.6	27.900	H
17942.767	54.9	-17.7	45.6	27.000	H
17930.867	54.6	-17.7	45.6	26.700	H

Sample calculation: Peak detector, 17930.867MHz

$$\text{Result} = P_{\text{Mea}} (26.7\text{dB}\mu\text{V}) + G_A (45.6\text{dB/m}) + G_{\text{PL}}(-17.7 \text{ dB}) = 54.6\text{dB}\mu\text{V/m}$$

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
17949.567	43.3	-17.7	45.6	15.400	H
17945.600	43.2	-17.7	45.6	15.300	H
17941.633	43.2	-17.7	45.6	15.300	V
17955.800	43.2	-17.7	45.6	15.300	H
17956.933	43.2	-17.7	45.6	15.300	H
17945.033	43.2	-17.7	45.6	15.300	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
17866.833	54.8	-18.5	45.6	27.700	H
17913.300	54.7	-18.5	45.6	27.600	H
17924.067	54.5	-17.7	45.6	26.600	V
17745.567	54.5	-18.5	45.6	27.400	H
17852.100	54.5	-18.5	45.6	27.400	H
17949.000	54.4	-17.7	45.6	26.500	H

Sample calculation: Peak detector, 17949.000MHz

Result =P_{Mea} (26.5dB μ V)+ G_A (45.6dB/m)+ G_{PL}(-17.7 dB) =54.4dB μ V/m

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
17953.533	44.0	-17.7	45.6	16.100	H
17947.300	44.0	-17.7	45.6	16.100	H
17954.100	44.0	-17.7	45.6	16.100	V
17968.833	44.0	-17.7	45.6	16.100	H
17941.633	43.9	-17.7	45.6	16.000	H
17925.767	43.9	-17.7	45.6	16.000	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
17938.800	55.4	-17.7	45.6	27.500	H
17852.100	55.1	-18.5	45.6	28.000	H
17921.800	55.1	-17.7	45.6	27.200	V
17876.467	55.0	-18.5	45.6	27.900	H
17833.967	55.0	-18.5	45.6	27.900	H
17873.067	54.9	-18.5	45.6	27.800	H

Sample calculation: Peak detector, 17873.067MHz

Result =P_{Mea} (27.8dB μ V)+ G_A (45.6dB/m)+ G_{PL}(-18.5dB) =54.9dB μ V/m

Charging Mode, Set.1

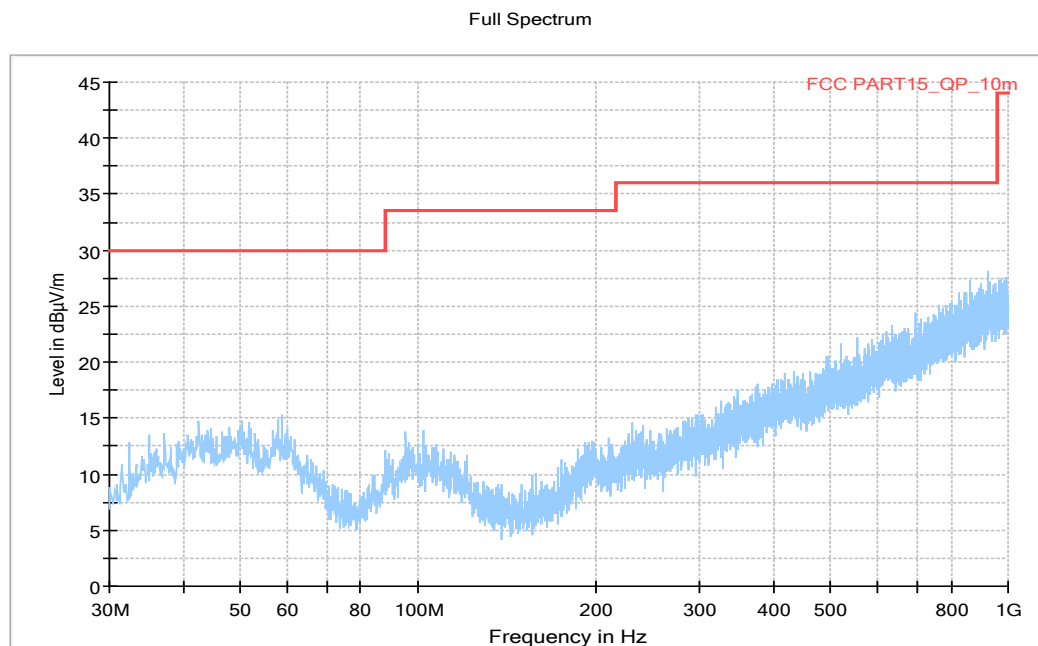


Figure A.1 Radiated Emission from 30MHz to 1GHz

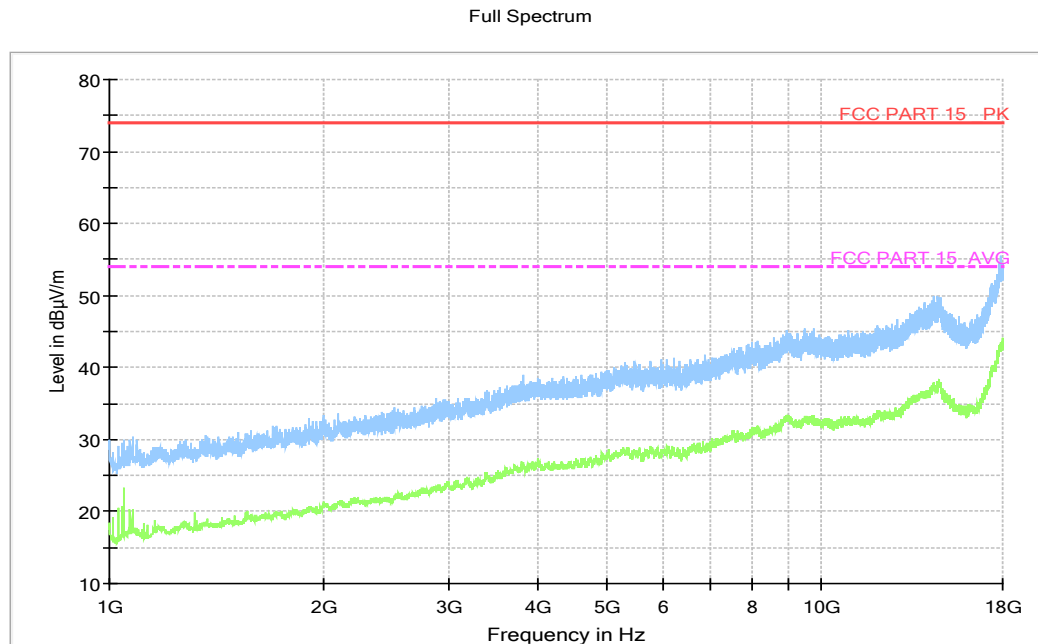


Figure A.2 Radiated Emission from 1GHz to 18GHz

Charging Mode, Set.2

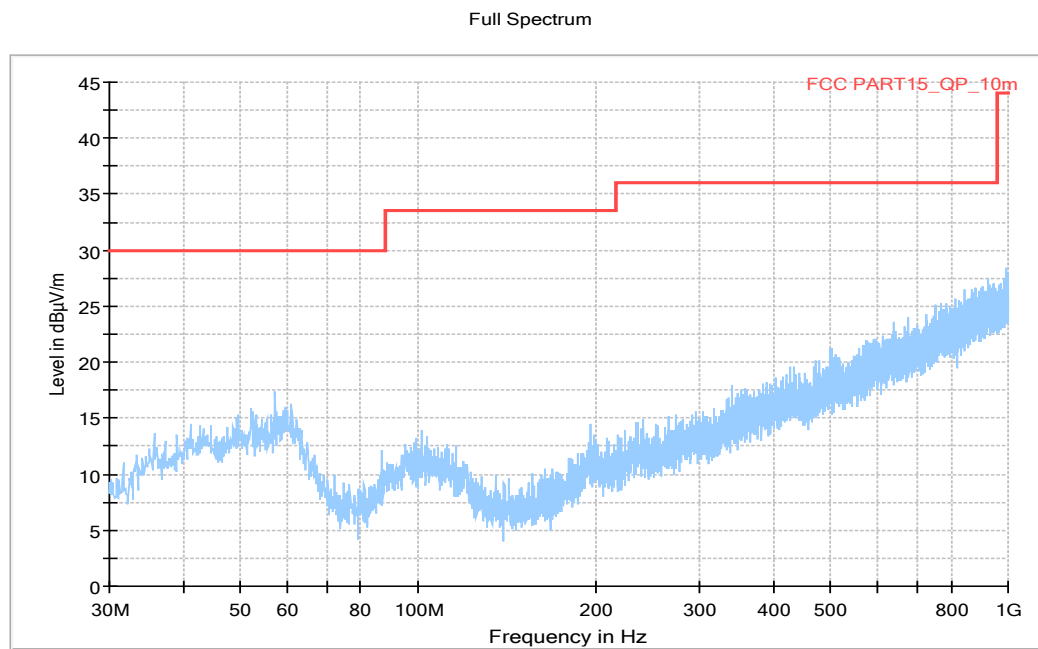


Figure A.3 Radiated Emission from 30MHz to 1GHz

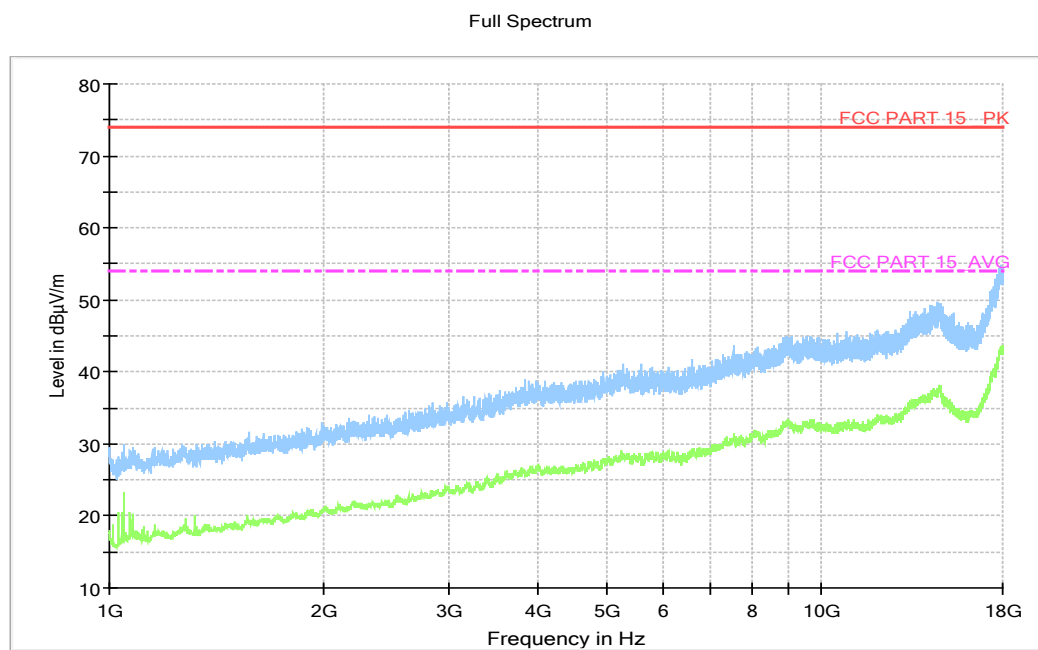


Figure A.4 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.3

Full Spectrum

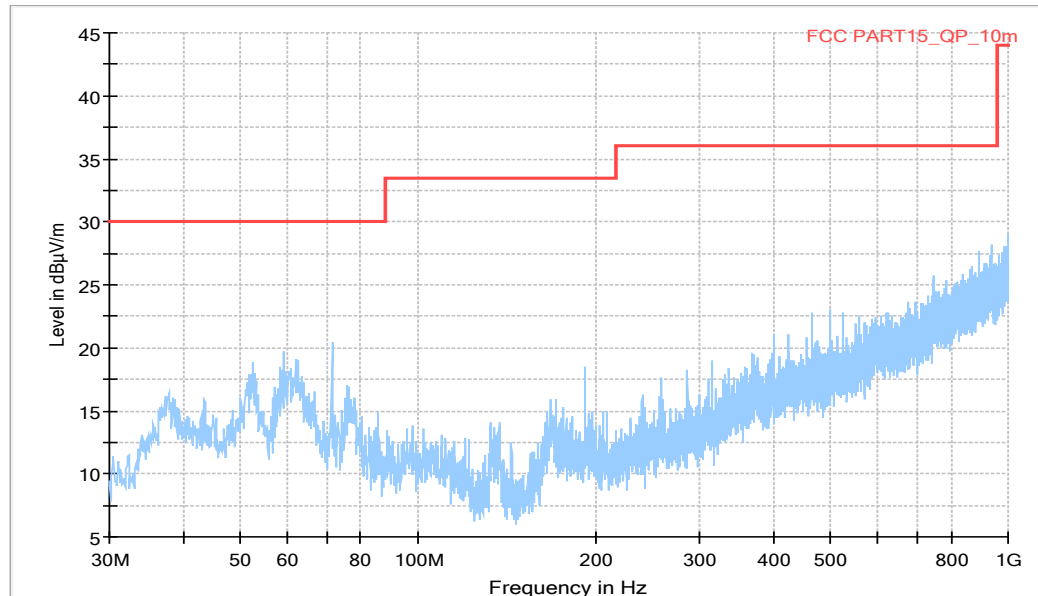


Figure A.5 Radiated Emission from 30MHz to 1GHz

Full Spectrum

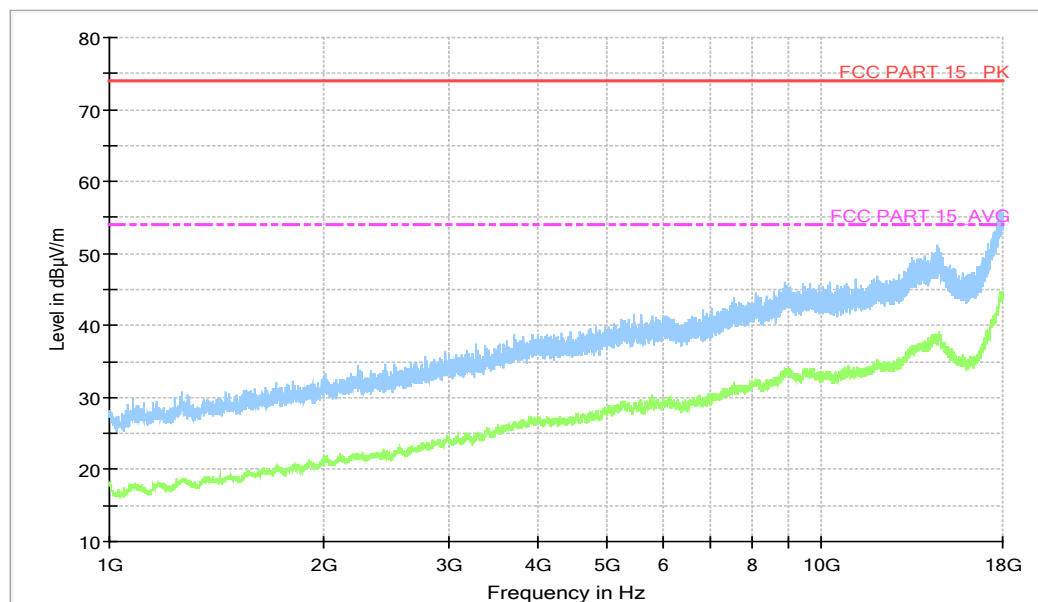


Figure A.6 Radiated Emission from 1GHz to 18GHz

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.

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

Charging Mode, Set.1

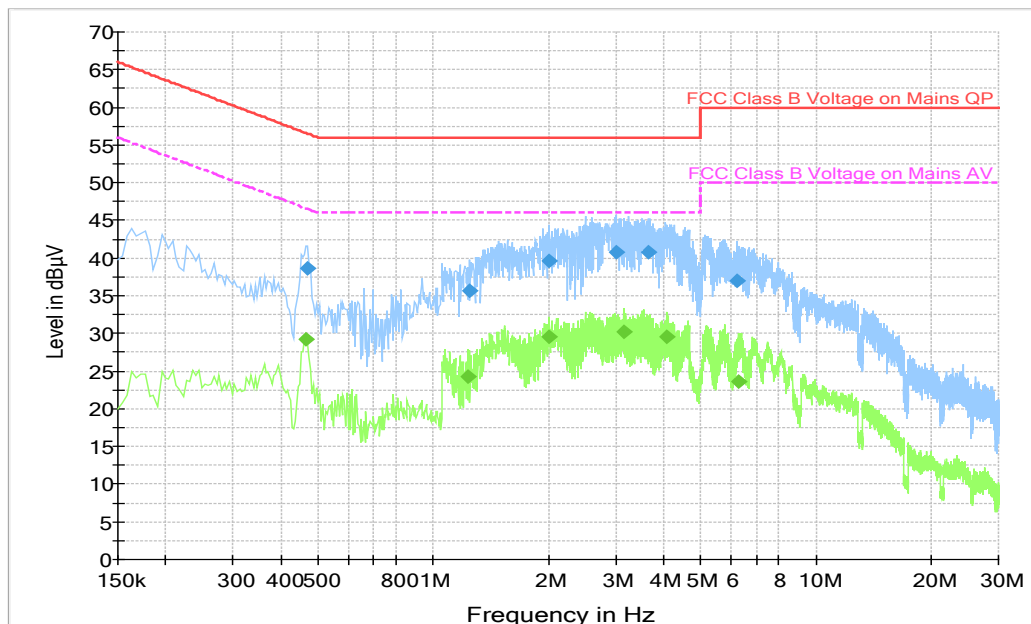


Figure A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.469500	38.6	2000.0	9.000	On	L1	19.9	18.0	56.5
1.243500	35.6	2000.0	9.000	On	L1	19.8	20.4	56.0
2.004000	39.7	2000.0	9.000	On	L1	19.7	16.3	56.0
3.003000	40.7	2000.0	9.000	On	L1	19.7	15.3	56.0
3.651000	40.8	2000.0	9.000	On	L1	19.7	15.2	56.0
6.216000	37.0	2000.0	9.000	On	L1	19.8	23.0	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.465000	29.2	2000.0	9.000	On	L1	19.9	17.4	46.6
1.234500	24.3	2000.0	9.000	On	L1	19.8	21.7	46.0
2.004000	29.6	2000.0	9.000	On	L1	19.7	16.4	46.0
3.138000	30.3	2000.0	9.000	On	L1	19.7	15.7	46.0
4.087500	29.5	2000.0	9.000	On	L1	19.7	16.5	46.0
6.256500	23.6	2000.0	9.000	On	L1	19.8	26.4	50.0

Charging Mode, Set.2

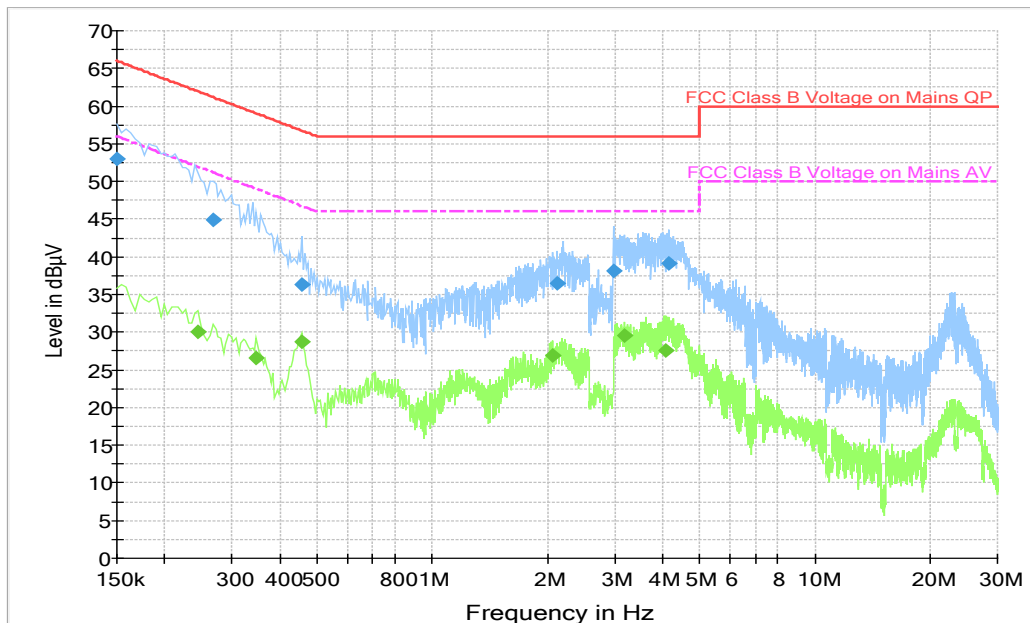


Figure A.8 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	53.0	2000.0	9.000	On	L1	20.2	13.0	66.0
0.267000	44.9	2000.0	9.000	On	L1	19.9	16.3	61.2
0.456000	36.4	2000.0	9.000	On	N	19.9	20.4	56.8
2.112000	36.6	2000.0	9.000	On	L1	19.7	19.4	56.0
2.971500	38.1	2000.0	9.000	On	L1	19.7	17.9	56.0
4.168500	39.1	2000.0	9.000	On	L1	19.7	16.9	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.244500	30.1	2000.0	9.000	On	L1	19.9	21.9	51.9
0.348000	26.5	2000.0	9.000	On	N	19.9	22.5	49.0
0.456000	28.8	2000.0	9.000	On	N	19.9	18.0	46.8
2.062500	26.9	2000.0	9.000	On	L1	19.7	19.1	46.0
3.183000	29.6	2000.0	9.000	On	L1	19.7	16.4	46.0
4.065000	27.6	2000.0	9.000	On	L1	19.7	18.4	46.0

USB Mode, Set.3

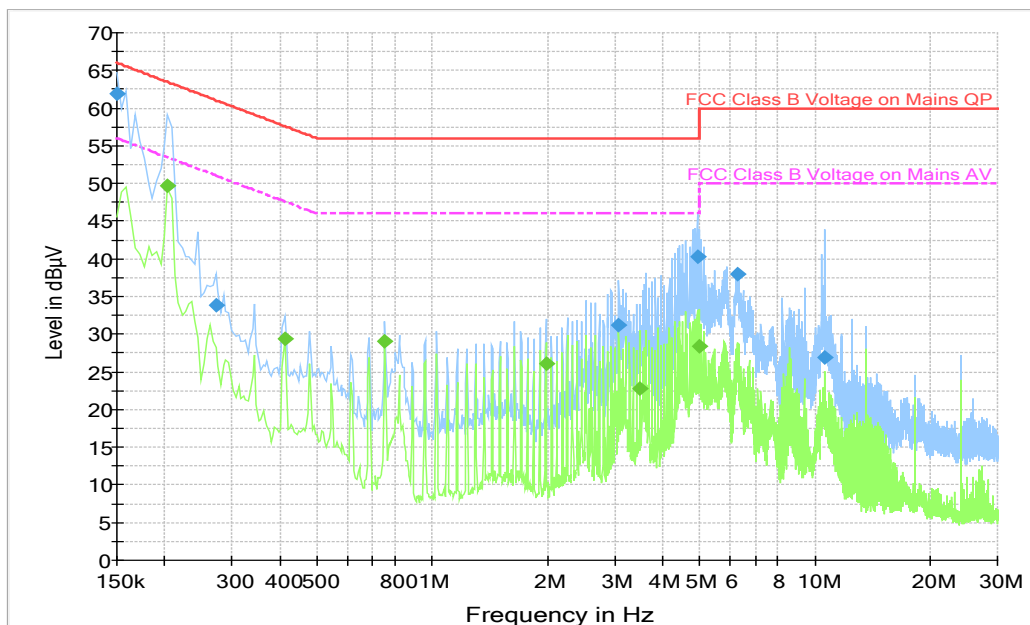


Figure A.9 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	62.0	2000.0	9.000	On	N	20.2	4.0	66.0
0.271500	33.9	2000.0	9.000	On	N	19.9	27.1	61.1
3.075000	31.3	2000.0	9.000	On	L1	19.7	24.7	56.0
4.924500	40.3	2000.0	9.000	On	N	19.7	15.7	56.0
6.301500	38.0	2000.0	9.000	On	N	19.8	22.0	60.0
10.581000	26.9	2000.0	9.000	On	N	20.0	33.1	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.204000	49.7	2000.0	9.000	On	L1	19.8	3.7	53.4
0.411000	29.3	2000.0	9.000	On	N	19.9	18.3	47.6
0.753000	29.0	2000.0	9.000	On	N	19.8	17.0	46.0
1.981500	26.1	2000.0	9.000	On	N	19.7	19.9	46.0
3.484500	22.8	2000.0	9.000	On	L1	19.7	23.2	46.0
4.992000	28.5	2000.0	9.000	On	N	19.7	17.5	46.0

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 600118-0

Telecommunication Technology Labs, CAICT

Beijing
China

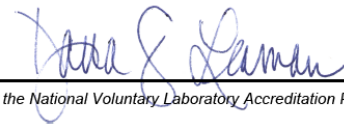
*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

Electromagnetic Compatibility & Telecommunications

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2016-09-29 through 2017-09-30

Effective Dates



For the National Voluntary Laboratory Accreditation Program

END OF REPORT