TEST REPORT
No. I16Z40406-EMC01

for

TCL Communication Ltd

GSM Quad-band / UMTS 5-band / LTE 8-band mobile phone

Model Name: 5051M

FCC ID: 2ACCJB049

with

Hardware Version: PIO

Software Version: PAS1

Issued Date: 2016-04-05

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.

Test Laboratory:

FCC 2.948 Listed: No.525429

CTTL,Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

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

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I16Z40406-EMC01	Rev.0	1st edition	2016-04-05

CONTENTS

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℃
Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2016-03-08
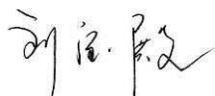Testing End Date: 2016-03-29

1.4. Signature

Zhang Hui

(Prepared this test report)

Qu Pengfei

(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:	5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203
City:	Shanghai
Postal Code:	201203
Country:	P. R. China
Contact Person:	Gong Zhizhou
Contact Email	zhizhou.gong@tcl.com
Telephone:	0086-21-31363544
Fax:	0086-21-61460602

2.2. Manufacturer Information

Company Name:	TCL Communication Ltd
Address /Post:	5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203
City:	Shanghai
Postal Code:	201203
Country:	P. R. China
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 / UMTS 5-band / LTE 8-band mobile phone
Model Name	5051M
FCC ID	2ACCJB049
Extreme vol. Limits	3.6VDC 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
EUT3	01462400010036	PIO	PAS1

*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	/	16TCT-BA-0218
AE2	Battery	/	/
AE3	USB Cable	/	16TCT-DC-0136
AE4	USB Cable	/	16TCT-DC-0137
AE5	Travel charger	/	16TCT-BA-0141
AE6	Travel charger	/	16TCT-BA-0136
AE7	Travel charger	/	16TCT-BA-0187
AE8	Travel charger	/	16TCT-BA-0039

AE1

Model	Polymer Tlp025H7
Manufacturer	Veken
Capacitance	2500mAh
Nominal voltage	3.85V

AE2

Model	Polymer Tlp025H7
Manufacturer	Jiade
Capacitance	2500mAh
Nominal voltage	3.85V

AE3，AE4
  Model   52691160TMC
  Manufacturer   Liqi
  Length of cable   103cm

AE5，AE6
  Model   CBA0058AG0C2
  Manufacturer   TENPAO
  Length of cable   /
AE7，AE8
  Model   CBA0058AG0C3
  Manufacturer   Yingju
  Length of cable   /

*AE ID: is used to identify the test sample in the lab internally.
Note: The USB cables are shielded.

3.4. <u>EUT set-ups</u>

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT3 + AE1 + AE3 + AE5	Charger
Set.2	EUT3 + AE1 + AE3 + AE7	Charger
Set.3	EUT3 + AE1 + AE3	USB

Note:

The GSM Quad-band / UMTS 5-band / LTE 8-band mobile phone 5051M manufactured by TCL Communication Ltd. is a variant model based on 5051A for conformance test. According to the declaration of changes, the results are inherited from the initial model. The report number of initial model is I16Z40408.

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	10-1-15 Edition
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low - Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014

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	A/B/C/D	The test is performed in test location A, B, C or D which are described in section 1.1 of this report

Items	Test Name	Clause in FCC rules	Clause in IC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	Section 5	B.1	P	A
2	Conducted Emission	15.107(a)	Section 5	B.2	P	A

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESU26	100235	R&S	2017-03-02	1 year
2	Universal Radio Communication Tester	CMW500	143008	R&S	2016-12-09	1 year
3	LISN	ENV216	101200	R&S	2016-07-07	1 year
4	EMI Antenna	VULB 9163	9163-514	Schwarzbeck	2017-11-24	3 years
5	EMI Antenna	3115	6914	ETS-Lindgren	2016-12-15	3 years
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 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 (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 = 4.3 dB, k=2.

Measurement results for Set.1:

Charging Mode/Average detector

Frequency(MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV)	Polarity
17991.500	50.7	-17.7	45.6	22.800	VERTICAL
17971.100	50.3	-17.7	45.6	22.400	HORIZONTAL
17938.800	50.3	-17.7	45.6	22.400	HORIZONTAL
17773.050	50.3	-18.5	45.6	23.200	HORIZONTAL
17980.450	50.2	-17.7	45.6	22.300	VERTICAL
17932.850	50.2	-17.7	45.6	22.300	HORIZONTAL

Charging Mode/Peak detector

Frequency(MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV)	Polarity
17971.950	60.7	-17.7	45.6	32.800	HORIZONTAL
17956.650	59.8	-17.7	45.6	31.900	HORIZONTAL
17817.250	59.7	-18.5	45.6	32.600	VERTICAL
17797.700	59.5	-18.5	45.6	32.400	HORIZONTAL
17664.250	59.4	-18.9	45.6	32.700	HORIZONTAL
17997.450	59.4	-17.7	45.6	31.500	VERTICAL

Measurement results for Set.2:

Charging Mode/Average detector

Frequency(MHz)	Result(dB μV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV)	Polarity
17868.250	50.6	-18.5	45.6	23.500	HORIZONTAL
17915.850	50.6	-17.7	45.6	22.700	HORIZONTAL
17874.200	50.4	-18.5	45.6	23.300	VERTICAL
17925.200	50.3	-17.7	45.6	22.400	HORIZONTAL
17974.500	50.2	-17.7	45.6	22.300	VERTICAL
17888.650	50.2	-18.5	45.6	23.100	HORIZONTAL

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV)	Polarity
17879.300	60.2	-18.5	45.6	33.100	HORIZONTAL
17943.050	60.1	-17.7	45.6	32.200	HORIZONTAL
17830.850	60.0	-18.5	45.6	32.900	VERTICAL
17908.200	59.9	-18.5	45.6	32.800	HORIZONTAL
17862.300	59.9	-18.5	45.6	32.800	VERTICAL
17920.100	59.7	-17.7	45.6	31.800	VERTICAL

Measurement results for Set.3:

USB Mode/Average detector

Frequency(MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{mea}(dBμV)	Polarity
17945.600	51.0	-17.7	45.6	23.100	HORIZONTAL
17882.700	50.8	-18.5	45.6	23.700	HORIZONTAL
17966.850	50.6	-17.7	45.6	22.700	HORIZONTAL
17880.150	50.6	-18.5	45.6	23.500	VERTICAL
17914.150	50.6	-18.5	45.6	23.500	VERTICAL
17968.550	50.5	-17.7	45.6	22.600	HORIZONTAL

USB Mode/ Peak detector

Frequency(MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{mea}(dBμV)	Polarity
17950.700	62.3	-17.7	45.6	34.400	VERTICAL
17521.450	61.2	-19.2	45.6	34.800	HORIZONTAL
17931.150	61.2	-17.7	45.6	33.300	HORIZONTAL
17927.750	61.0	-17.7	45.6	33.100	HORIZONTAL
17994.050	61.0	-17.7	45.6	33.100	VERTICAL
17985.550	61.0	-17.7	45.6	33.100	HORIZONTAL

Note: The measurement results of Set.1, Set.2 and Set.3 showed here are worst cases of the combinations of different batteries and USB cables.
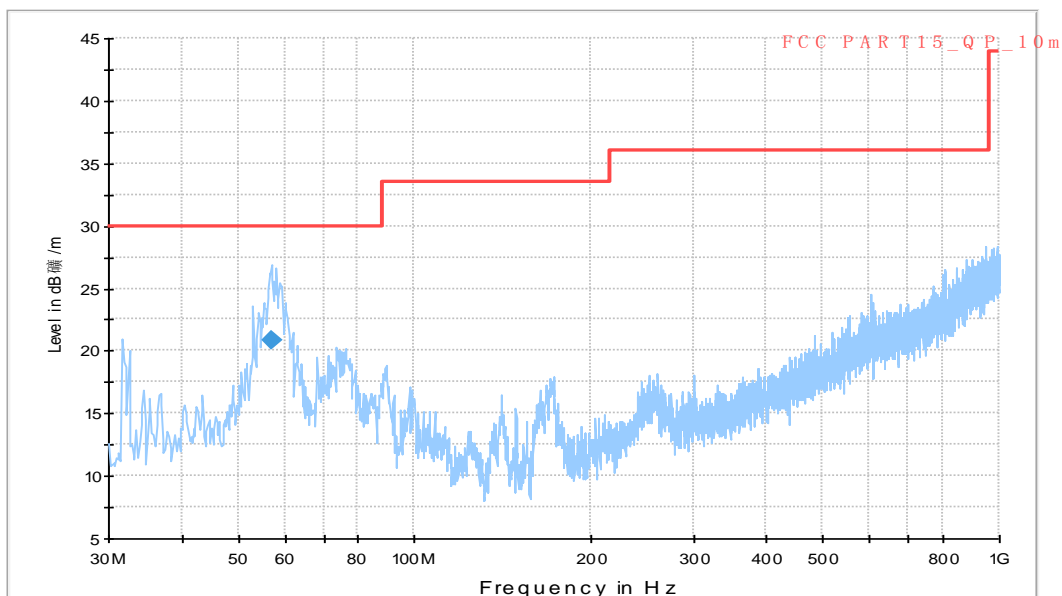
Charging Mode, Set.1

Normal RE_30M-1GHz_10m

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

Final Result 1

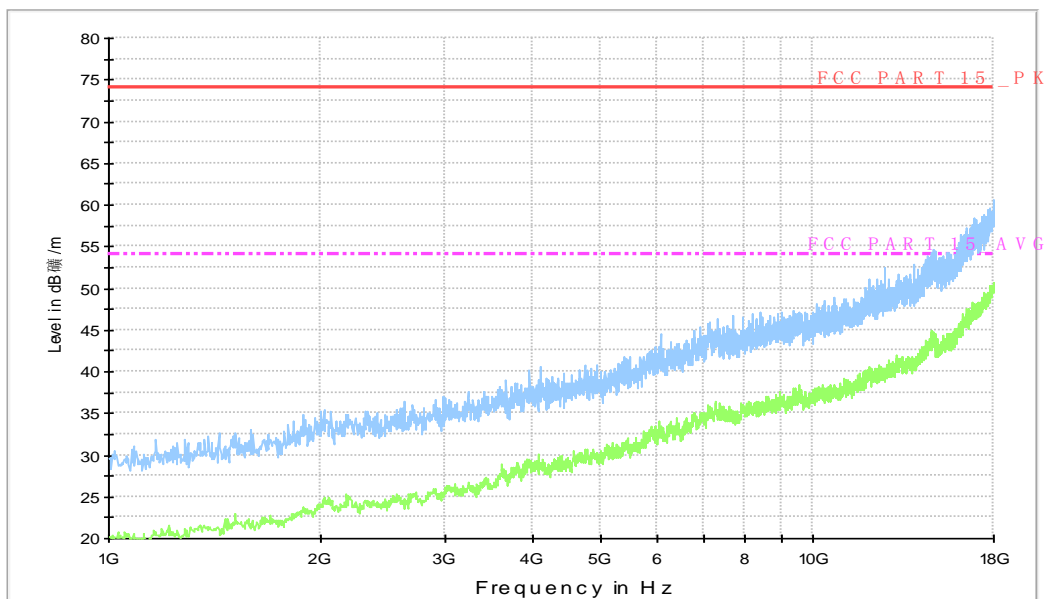| Frequency	QuasiPeak	Height	Polarization	Azimuth	Corr.	Margin	Limit
(MHz)	(dBµV/m)	(cm)		(deg)	(dB)	(dB)	(dBµV/m)
57.266000	20.8	125.0	V	61.0	-12.0	9.2	30.0

Normal RE_1G-18GHz

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

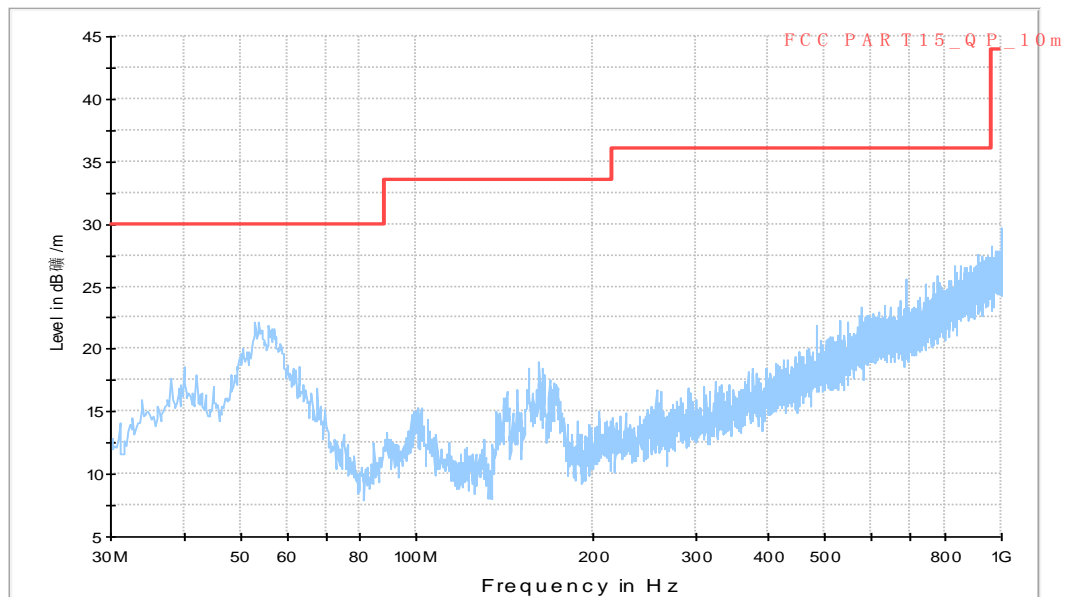**Charging Mode, Set.2**

Normal RE_30M-1GHz_10m

Figure A.3 Radiated Emission from 30MHz to 1GHz
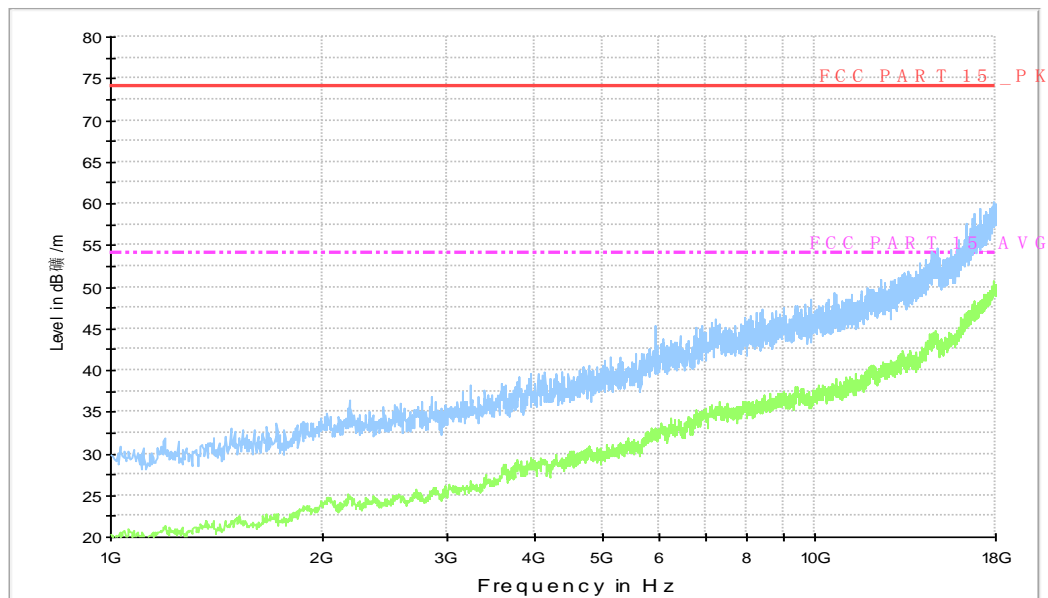
Normal RE_1G-18GHz

Figure A.4 Radiated Emission from 1GHz to 18GHz
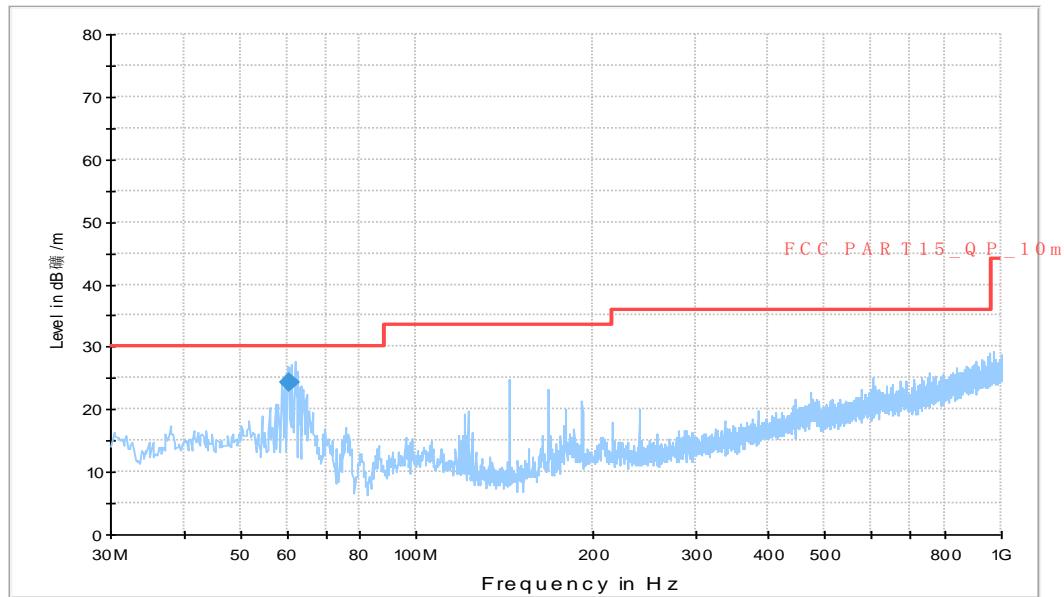
USB Mode, Set.3

Normal RE_30M-1GHz_10m

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

Final Result 1

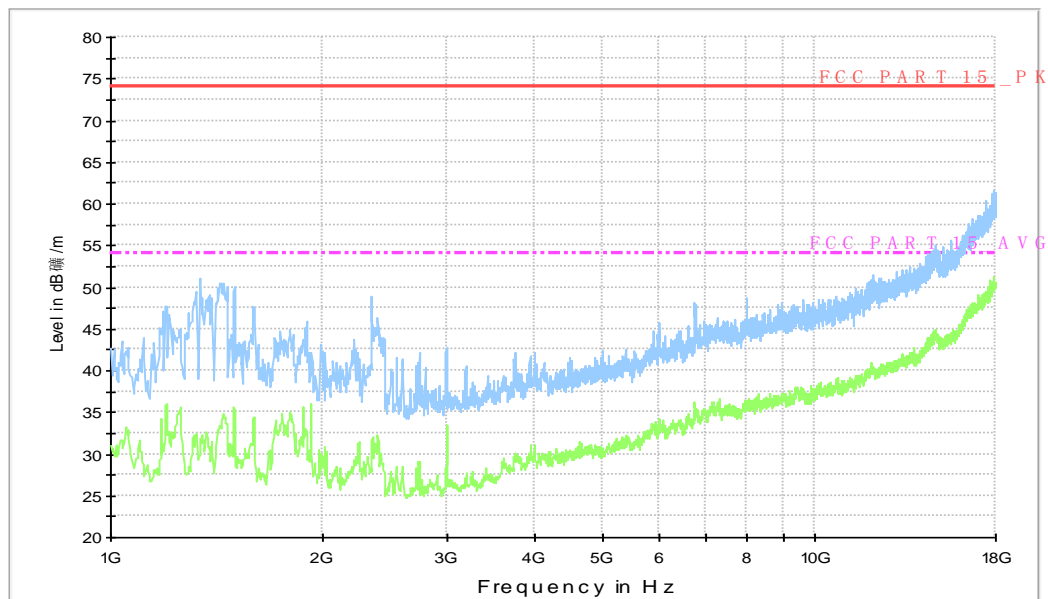| Frequency (MHz)	QuasiPeak (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
60.537000	24.2	100.0	V	265.0	-12.3	5.8	30.0

Normal RE_1G-18GHz

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.
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

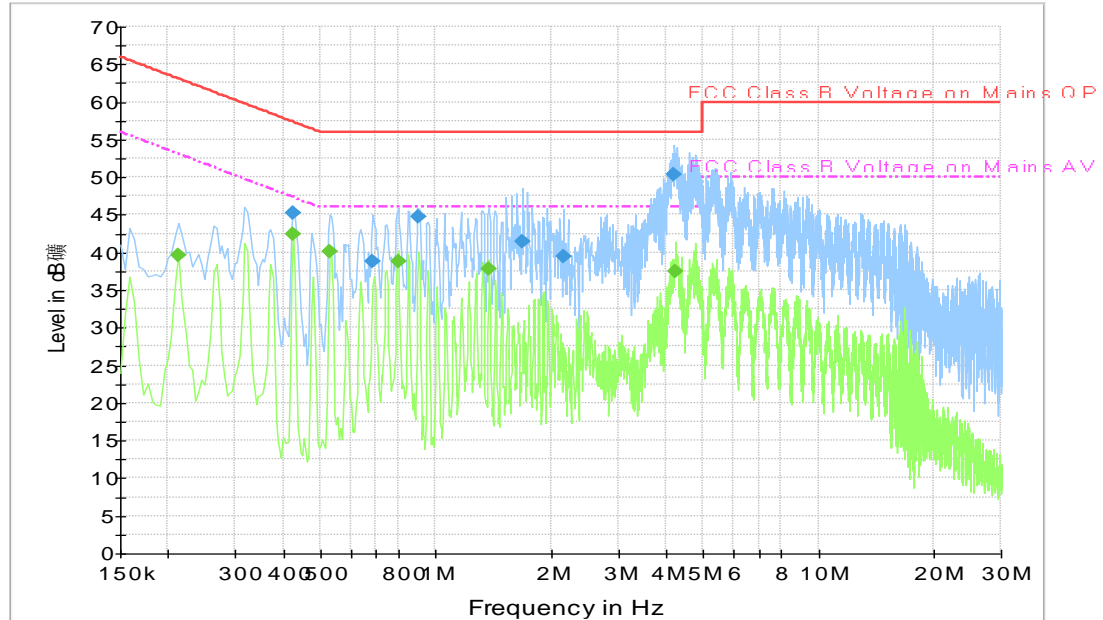Measurement uncertainty: U= 2.9 dB, k=2.

Charging Mode, Set.1

Figure A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.424500	45.2	2000.0	9.000	On	L1	19.9	12.1	57.4
0.685500	38.9	2000.0	9.000	On	N	19.8	17.2	56.0
0.901500	44.7	2000.0	9.000	On	L1	19.8	11.3	56.0
1.684500	41.5	2000.0	9.000	On	N	19.7	14.5	56.0
2.157000	39.4	2000.0	9.000	On	N	19.4	16.6	56.0
4.209000	50.4	2000.0	9.000	On	L1	19.6	5.6	56.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.213000	39.6	2000.0	9.000	On	L1	19.8	13.5	53.1
0.424500	42.4	2000.0	9.000	On	L1	19.9	5.0	47.4
0.528000	40.1	2000.0	9.000	On	L1	19.9	5.9	46.0
0.798000	38.8	2000.0	9.000	On	L1	19.8	7.2	46.0
1.378500	37.8	2000.0	9.000	On	L1	19.7	8.2	46.0
4.236000	37.5	2000.0	9.000	On	L1	19.6	8.5	46.0

Note: The measurement results showed here are worst cases of the combinations of different batteries and USB cables.
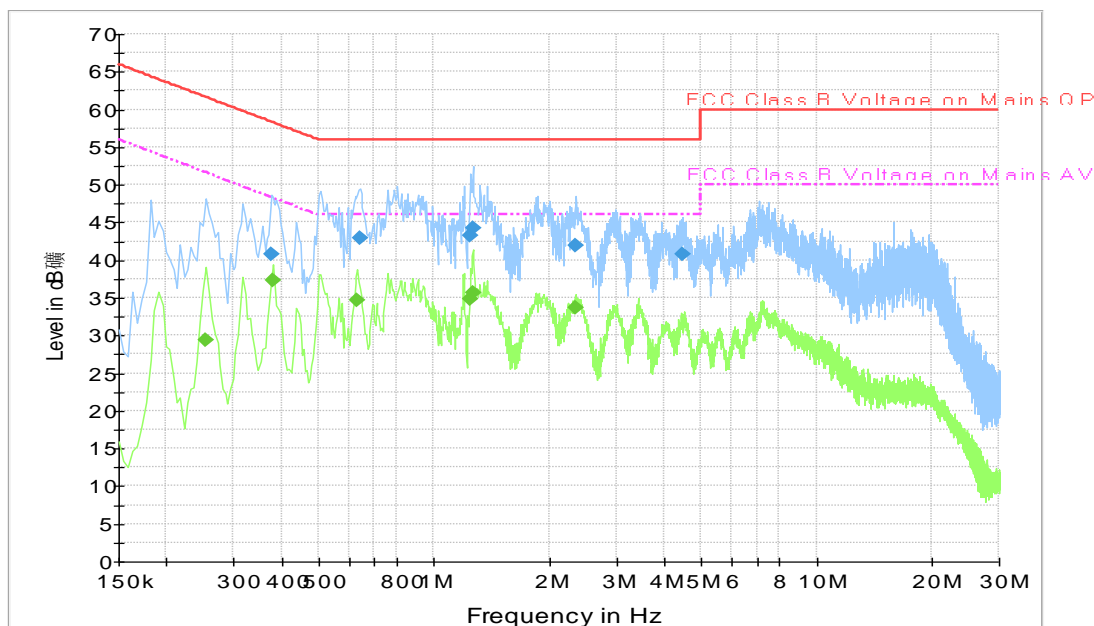
Charging Mode, Set.2

Figure A.8 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.375000	40.8	2000.0	9.000	On	L1	19.9	17.6	58.4
0.640500	42.9	2000.0	9.000	On	L1	19.8	13.1	56.0
1.248000	43.3	2000.0	9.000	On	L1	19.7	12.7	56.0
1.266000	44.3	2000.0	9.000	On	L1	19.7	11.7	56.0
2.355000	41.9	2000.0	9.000	On	L1	19.2	14.1	56.0
4.474500	40.8	2000.0	9.000	On	L1	19.6	15.2	56.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.253500	29.4	2000.0	9.000	On	L1	19.8	22.3	51.6
0.379500	37.2	2000.0	9.000	On	L1	19.9	11.1	48.3
0.631500	34.6	2000.0	9.000	On	L1	19.8	11.4	46.0
1.243500	34.8	2000.0	9.000	On	L1	19.7	11.2	46.0
1.266000	35.7	2000.0	9.000	On	L1	19.7	10.3	46.0
2.337000	33.8	2000.0	9.000	On	L1	19.3	12.2	46.0

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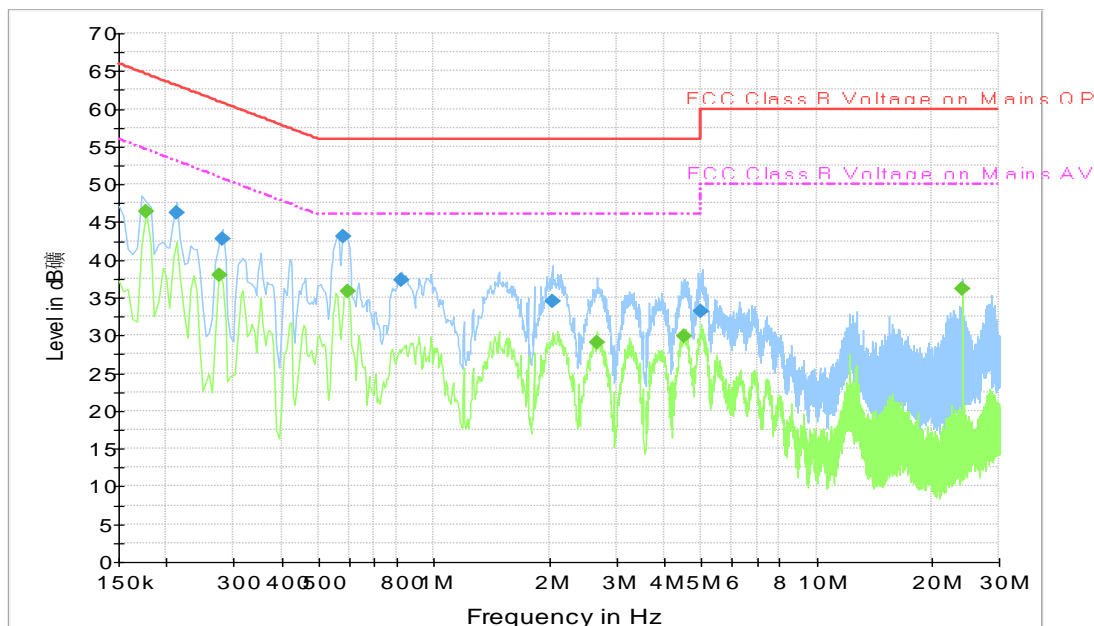
USB Mode, Set.3

Figure A.9 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.213000	46.2	2000.0	9.000	On	N	19.8	16.9	63.1
0.280500	42.7	2000.0	9.000	On	N	19.8	18.1	60.8
0.582000	43.1	2000.0	9.000	On	L1	19.9	12.9	56.0
0.825000	37.3	2000.0	9.000	On	N	19.8	18.7	56.0
2.035500	34.6	2000.0	9.000	On	L1	19.7	21.4	56.0
4.978500	33.1	2000.0	9.000	On	L1	19.6	22.9	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	46.4	2000.0	9.000	On	N	19.8	8.2	54.6
0.276000	38.0	2000.0	9.000	On	N	19.8	12.9	50.9
0.595500	35.9	2000.0	9.000	On	L1	19.8	10.1	46.0
2.665500	29.1	2000.0	9.000	On	L1	19.4	16.9	46.0
4.492500	29.9	2000.0	9.000	On	L1	19.6	16.1	46.0
23.995500	36.2	2000.0	9.000	On	N	20.1	13.8	50.0

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

END OF REPORT