



TEST REPORT

No. I14Z45433-EMC01

for

TCT Mobile Limited

HSUPA/HSDPA/UMTS dual-band / GSM quadband mobile phone

Model Name: 4019M

FCC ID: RAD443

with

Hardware Version: PIO

Software Version: v121-C

Issued Date: May. 4th, 2014

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 TMC Beijing.

Test Laboratory:

FCC 2.948 Listed: No.733176

IC O.A.T.S listed: No.6629A-1

TMC Beijing, Telecommunication Metrology Center of Ministry of Industry and Information Technology

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

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1. Test Laboratory

1.1. Testing Location

Location A

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT
Address: No 52, Huayuan Bei Road, Haidian District, Beijing, P.R. China
Postal Code: 100191

1.2. Testing Environment

Normal Temperature: 15-35℃
Relative Humidity: 20-75%

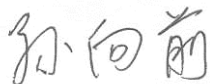
1.3. Project data

Testing Start Date: Mar. 24th, 2014
Testing End Date: Mar. 25th, 2014

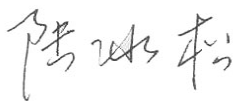
1.4. Signature



Qu Pengfei
(Prepared this test report)



Sun Xiangqian
(Reviewed this test report)



Lu Bingsong
Deputy Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: TCT Mobile Limited
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China.
City: Shanghai
Postal Code: 201203
Country: China
Contact Person: Gong Zhizhou
Contact Email: zhizhou.gong@jrdcom.com
Telephone: 0086-21-61460890
Fax: 0086-21-61460602

2.2. Manufacturer Information

Company Name: TCT Mobile Limited
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China.
City: Shanghai
Postal Code: 201203
Country: China
Telephone: 0086-21-61460890
Fax: 0086-21-61460602

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

3.1. About EUT

Description	HSUPA/HSDPA/UMTS dual-band / GSM quadband mobile phone
Model Name	4019M
Marketing Name	/
FCC ID	RAD443
Extreme vol. Limits	3.4VDC 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 Telecommunication Metrology Center of MIIT of People's Republic of China.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	014008000100401	PIO	v121-C

*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	B222150169A	/
AE2	Battery	B111248CCEA	/
AE3	Travel charger	/	/
AE4	Travel charger	/	/
AE5	USB cable	/	/
AE6	USB cable	/	/

AE1/AE2

Model	CAB31P0000C1
Manufacturer	BYD
Capacitance	1300 mAh
Nominal voltage	3.7 V

AE3

Model	CBA3007AG0C1
Manufacturer	BYD
Length of cable	/

AE4

Model	CBA3007AG0C3
Manufacturer	Yingju
Length of cable	/

AE5

Model	CDA3122002C2
Manufacturer	Shenghua
Length of cable	97 cm

AE6

Model	CDA3122002C1
Manufacturer	Juwei
Length of cable	101 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+ AE3 + AE5/AE6	Charger
Set.2	EUT1+ AE1/AE2+ AE4 + AE5/AE6	Charger
Set.3	EUT1+ AE1/AE2+ AE5/AE6	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	10-1-13 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	2009

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

Clause	List	Clause in FCC rules	Verdict	Location
1	Radiated Emission	15.109(a)	P	A
2	Conducted Emission	15.107(a)	P	A

7. Test Equipments Utilized

NO.	Description	TYPE	SERIESNUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1.	Test Receiver	ESCI 7	100948	R&S	2014-07-18	1 year
2.	Spectrum Analyzer	FSV	101047	R&S	2014-06-30	1 year
3.	Universal Radio Communication Tester	CMU200	109914	R&S	2015-04-13	1 year
4.	LISN	ESH2-Z5	829991/012	R&S	2015-04-14	1 year
5.	EMI Antenna	VULB 9163	9163-234	Schwarzbeck	2016-09-15	3 years
6.	EMI Antenna	3115	6914	ETS-Lindgren	2014-12-16	3 years
7.	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
8.	Monitor	E178FPc	CN-OWR979-64 180-7AJ-D2MS	DELL	N/A	N/A
9.	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
10.	Keyboard	L100	CN0RH6596589 07ATOI40	DELL	N/A	N/A
11.	Mouse	M-UAE119	LZ935220ZRC	Lenovo	N/A	N/A

ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission (§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 - 2009, 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.

A.1.3 Measurement Limit

Limit from CFR Part 15.109(a)

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

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/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
5067.031	41.0	-34.9	34.6	41.3	Vertical
5062.344	40.9	-34.6	34.6	40.9	Vertical
5334.844	40.7	-34.8	34.6	40.9	Horizontal
5675.000	40.7	-34.2	35.1	39.8	Vertical
5325.938	40.4	-34.8	34.6	40.6	Vertical
5281.406	40.4	-34.4	34.6	40.2	Vertical

Charging Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
5069.063	28.5	-34.9	34.6	28.8	Vertical
5343.750	28.4	-34.8	34.6	28.6	Vertical
5068.125	28.4	-34.9	34.6	28.7	Horizontal
5071.094	28.3	-34.9	34.6	28.6	Vertical
5068.281	28.3	-34.9	34.6	28.6	Vertical
5066.406	28.3	-34.9	34.6	28.6	Vertical

Measurement results for Set.2:
Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
5341.563	41.0	-34.8	34.6	41.2	Vertical
5342.188	40.9	-34.8	34.6	41.1	Horizontal
5348.281	40.6	-34.8	34.6	40.8	Vertical
5089.531	40.6	-34.9	34.6	40.9	Horizontal
5333.281	40.5	-34.8	34.6	40.7	Vertical
3909.219	40.4	-36.4	32.1	44.7	Vertical

Charging Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
5078.281	28.6	-34.9	34.6	28.9	Horizontal
5067.500	28.5	-34.9	34.6	28.8	Vertical
5063.281	28.4	-34.9	34.6	28.7	Vertical
5064.375	28.4	-34.9	34.6	28.7	Horizontal
5066.719	28.3	-34.9	34.6	28.6	Vertical
5060.625	28.3	-34.6	34.6	28.3	Vertical

Measurement result for Set.3:
USB Mode/ Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
5971.719	41.8	-33.5	35.1	40.2	Vertical
1499.688	41.8	-40.3	24.1	58.0	Vertical
5762.969	41.4	-33.8	35.1	40.1	Vertical
1498.594	41.2	-40.3	24.1	57.4	Horizontal
1499.375	41.0	-40.3	24.1	57.2	Vertical
5232.500	41.0	-34.5	34.6	40.9	Vertical

USB Mode/ Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
5345.000	28.6	-34.8	34.6	28.8	Vertical
5339.375	28.6	-34.8	34.6	28.8	Vertical
5069.844	28.5	-34.9	34.6	28.8	Vertical
5063.906	28.5	-34.9	34.6	28.8	Vertical
5352.656	28.5	-34.8	34.6	28.7	Vertical
5347.969	28.5	-34.8	34.6	28.7	Horizontal

Charging Mode, Set.1

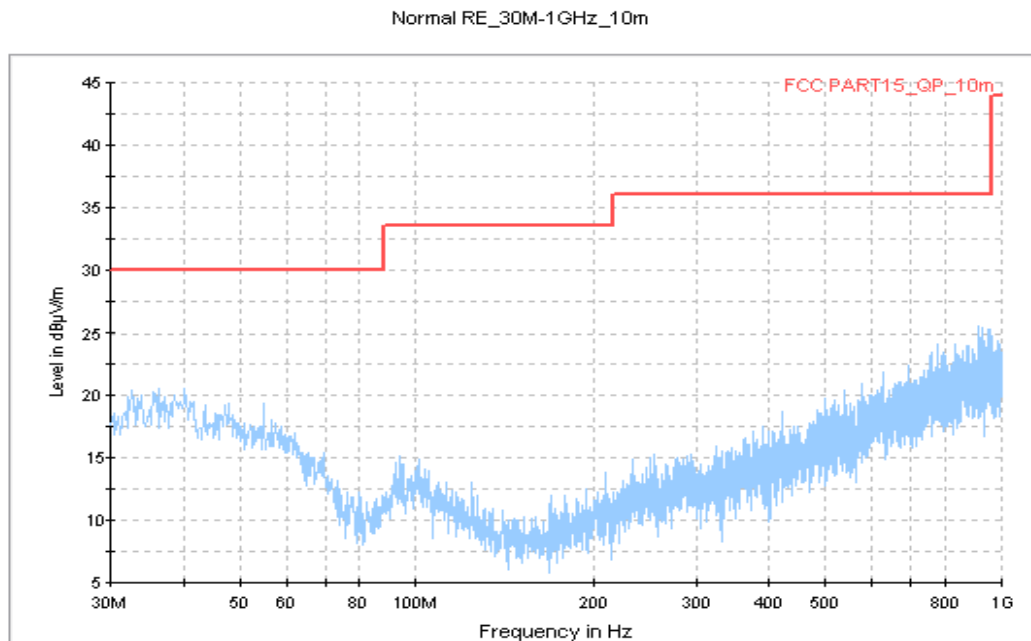


Figure A.1 Radiated Emission from 30MHz to 1GHz

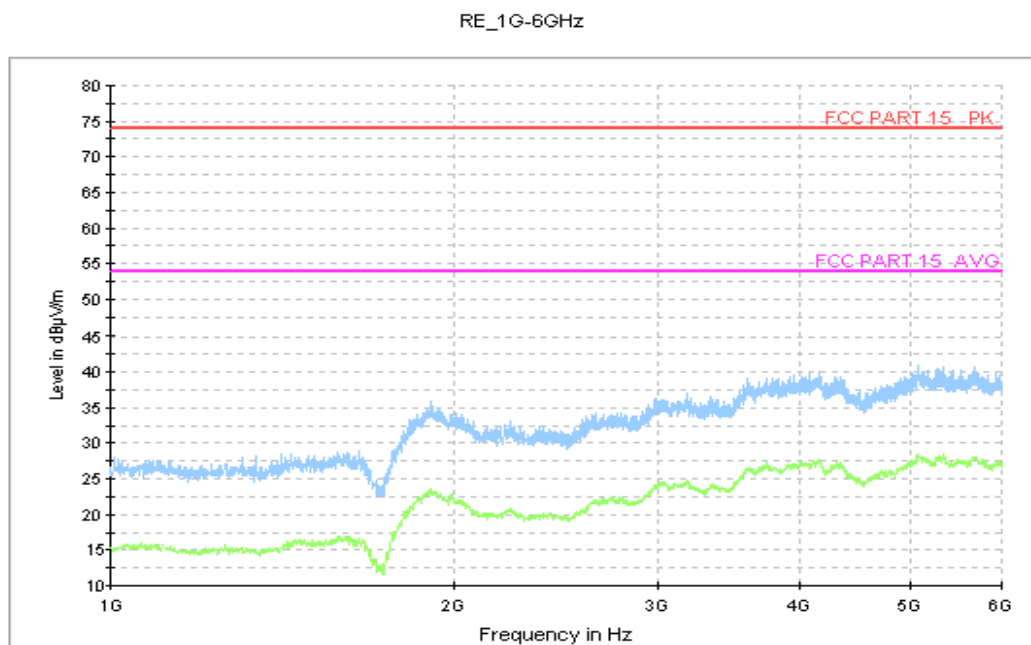


Figure A.2 Radiated Emission from 1GHz to 8GHz

Charging Mode, Set.2

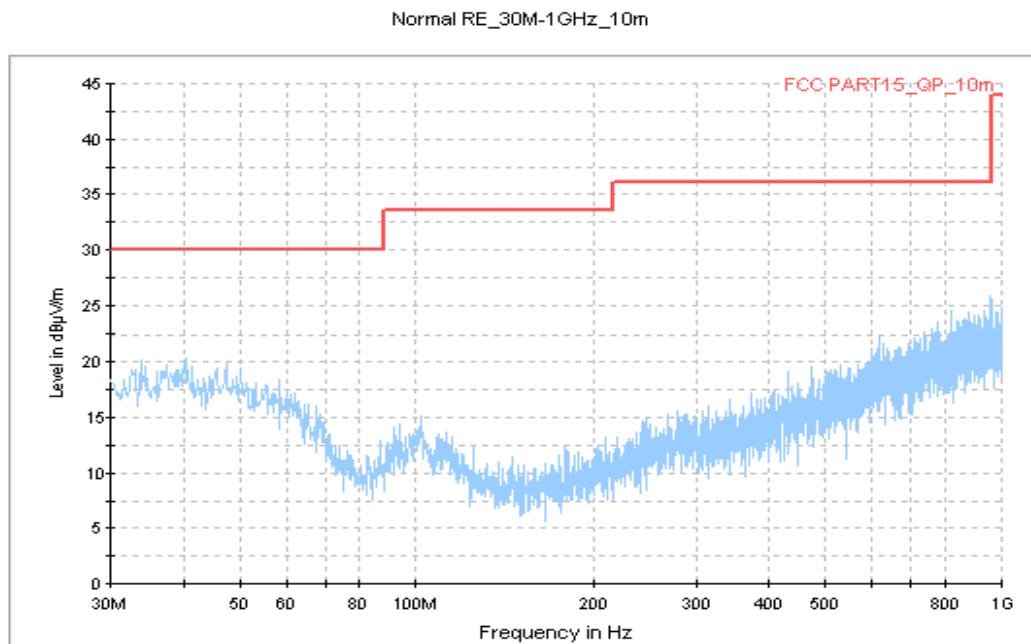


Figure A.3 Radiated Emission from 30MHz to 1GHz

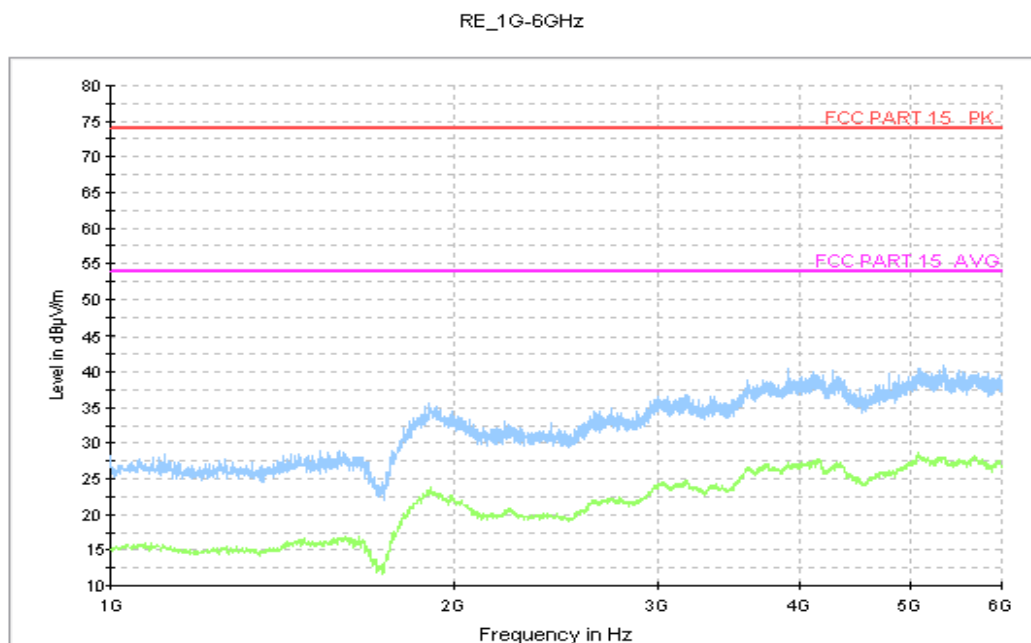


Figure A.4 Radiated Emission from 1GHz to 8GHz

USB Mode, Set.3

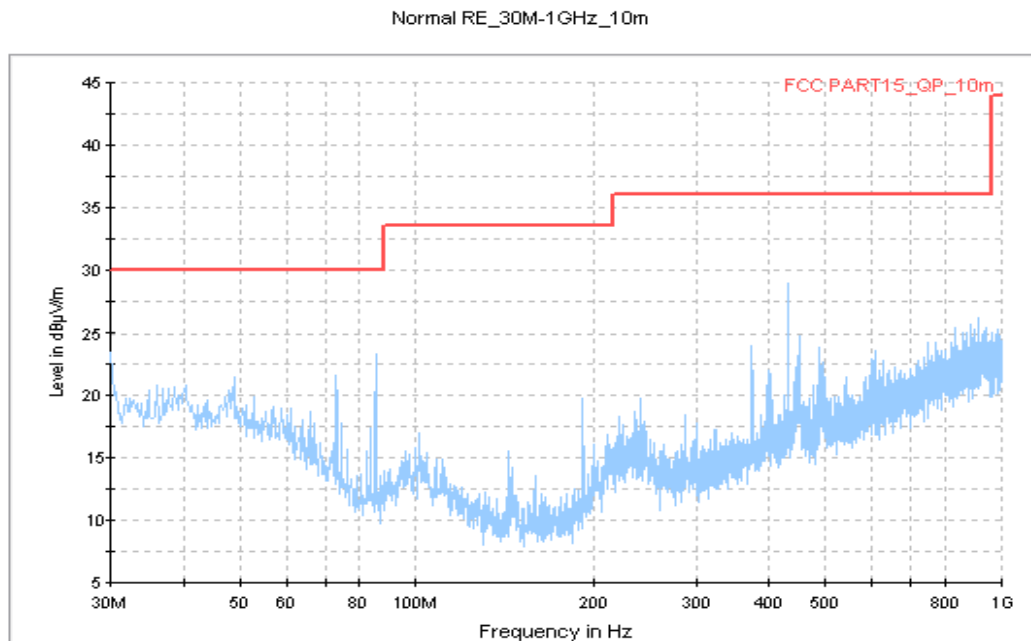


Figure A.5 Radiated Emission from 30MHz to 1GHz

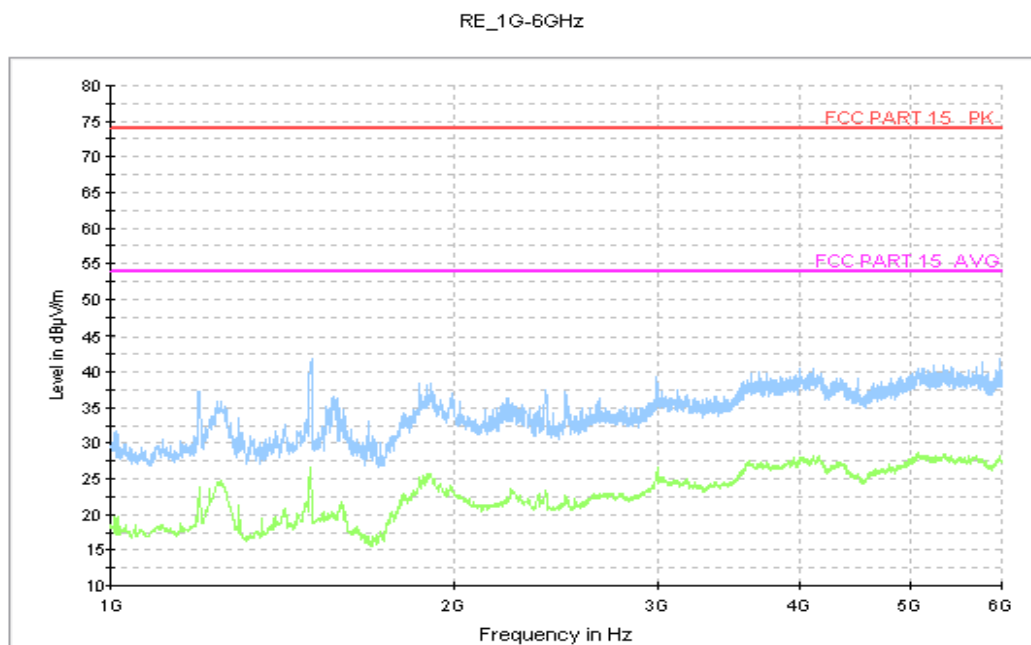


Figure A.6 Radiated Emission from 1GHz to 8GHz

A.2 Conducted Emission (§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 - 2009, 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: $U= 2.9 \text{ dB}$, $k=2$.

Charging Mode, Set.1

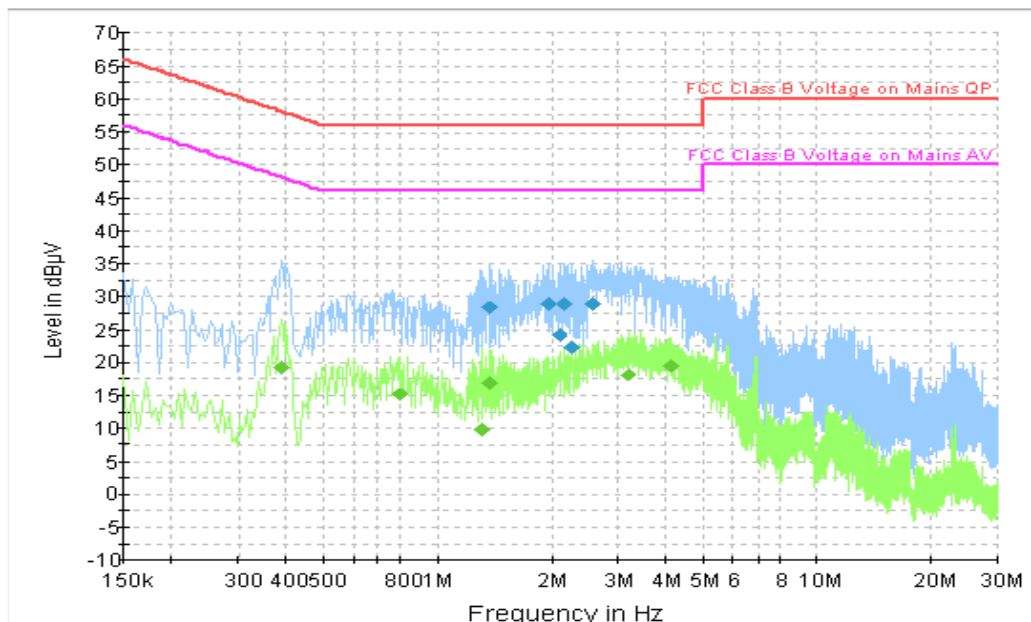


Figure A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.374000	28.3	GND	L1	9.7	27.7	56.0
1.968000	28.9	GND	L1	9.7	27.1	56.0
2.103000	24.2	GND	L1	9.7	31.8	56.0
2.170500	29.0	GND	L1	9.7	27.0	56.0
2.256000	22.2	GND	L1	9.7	33.8	56.0
2.584500	28.9	GND	L1	9.7	27.1	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.388500	19.2	GND	N	9.8	28.9	48.1
0.802500	15.0	GND	N	9.8	31.0	46.0
1.311000	9.9	GND	L1	9.7	36.1	46.0
1.374000	16.8	GND	L1	9.7	29.2	46.0
3.192000	18.0	GND	N	9.7	28.0	46.0
4.137000	19.4	GND	N	9.7	26.6	46.0

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

Charging Mode, Set.2

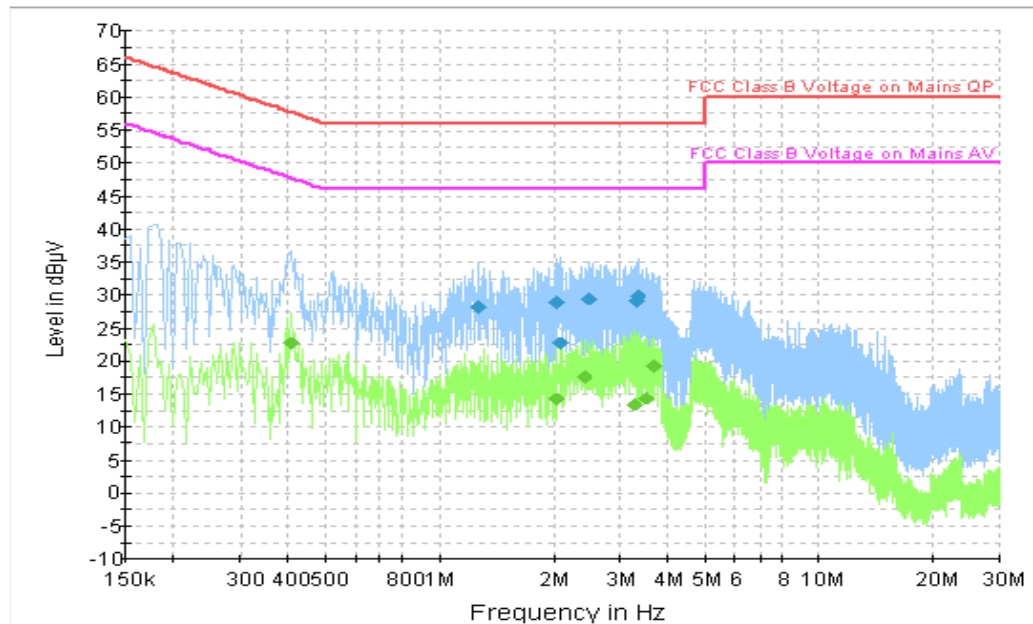


Figure A.8 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.270500	28.2	GND	N	9.7	27.8	56.0
2.049000	29.0	GND	N	9.7	27.0	56.0
2.080500	22.7	GND	N	9.7	33.3	56.0
2.481000	29.5	GND	N	9.7	26.5	56.0
3.295500	29.0	GND	N	9.7	27.0	56.0
3.340500	29.7	GND	N	9.7	26.3	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.406500	22.7	GND	N	9.8	25.0	47.7
2.035500	14.1	GND	N	9.7	31.9	46.0
2.422500	17.6	GND	N	9.7	28.4	46.0
3.282000	13.3	GND	N	9.7	32.7	46.0
3.529500	14.4	GND	N	9.7	31.6	46.0
3.687000	19.2	GND	N	9.7	26.8	46.0

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

USB Mode, Set.3

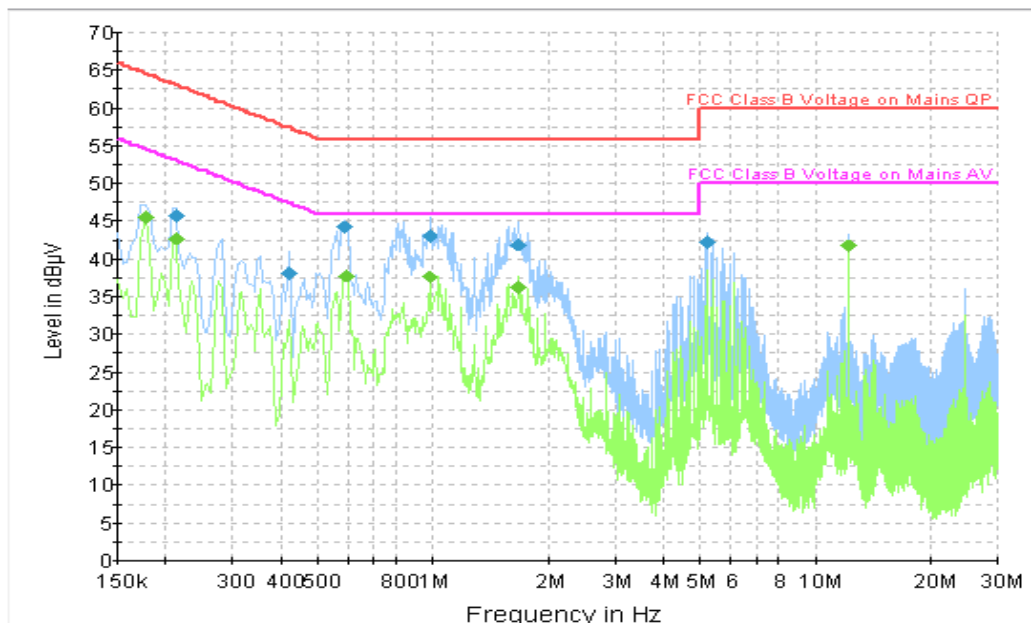


Figure A.9 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.213000	45.8	GND	N	9.8	17.3	63.1
0.420000	38.1	GND	L1	9.8	19.3	57.4
0.586500	44.2	GND	N	9.8	11.8	56.0
0.982500	43.0	GND	N	9.7	13.0	56.0
1.671000	42.0	GND	L1	9.7	14.0	56.0
5.212500	42.2	GND	N	9.7	17.8	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	45.6	GND	N	9.8	9.0	54.6
0.213000	42.7	GND	N	9.8	10.4	53.1
0.595500	37.8	GND	L1	9.8	8.2	46.0
0.982500	37.6	GND	N	9.7	8.4	46.0
1.671000	36.3	GND	L1	9.7	9.7	46.0
12.205500	41.8	GND	L1	9.5	8.2	50.0

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

END OF REPORT