TEST REPORT

No. 2013EEB00535-EMC

for

TCT Mobile Limited

CDMA Mobile phone

Model Name: Tigris CDMA

Marketing Name: ALCATEL C230

FCC ID: RAD438

with

Hardware Version: PIO

Software Version: V1.4

Issued Date: 2014-01-26

Test Laboratory:
FCC 2.948 Listed: No.310359
IC O.A.T.S listed: No.6629C-1

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.

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CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name:	TMC Shenzhen, Telecommunication Metrology Center of MIIT
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1.2. Testing Environment

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

1.3. Project data

Testing Start Date:	2013-11-18
Testing End Date:	2014-01-26

1.4. Signature

Du Zhaoxuan
(Prepared this test report)

Zhang Bojun
(Reviewed this test report)

Lu Minniu
Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	TCT Mobile Limited
Address /Post:	5F, E building, No. 232, Liang Jing Road, ZhangJiang High-Tech Park, Pudong Area,Shanghai,201203,P.R.China
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2.2. Manufacturer Information

Company Name:	TCT Mobile Limited
Address /Post:	5F, E building, No. 232, Liang Jing Road, ZhangJiang High-Tech Park, Pudong Area,Shanghai,201203,P.R.China
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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	CDMA Mobile phone
Model Name	Tigris CDMA
Marketing Name	ALCATEL C230
FCC ID	RAD438

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	/	PIO	V1.4

*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
AE1	Battery	/
AE2	Travel charger	/
AE3	USB cable	/

AE1

Model	CAB22E0000C1
Manufacturer	BYD
Capacitance	750mAh
Nominal voltage	3.7V

AE2-1

Model	CBA3002AG0C2
Manufacturer	Ten Pao
Length of cable	118cm

AE2-2

Model	CBA3002AG0C1
Manufacturer	BYD
Length of cable	118cm

AE3

Model	/
Manufacturer	/
Length of cable	80cm

*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 + AE2-1	Charging mode
Set.2	EUT1+ AE1 + AE2-2	Charging mode
Set.3	EUT1+ AE1 + AE3	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	10-1-2012 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	2003

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber (11.20 meters×6.10meters×5.60meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.5 dB, 3 m distance, from 30 to 1000 MHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 0.5 Ω

Conducted chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. =35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber (11.20 meters×6.10 meters×6.60 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 0.5 Ω
Voltage Standing Wave Ratio （VSWR）	≤ 6 dB, from 1 to 6 GHz，3 m distance

6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:	
P	Pass
NA	Not applicable
F	Fail

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

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CAL PERIOD
1	Test Receiver	ESCI	100701	R&S	2014.07.31	1 year
2	Test Receiver	ESCI	100702	R&S	2014.07.31	1 year
3	Test Receiver	FSP 40	100378	R&S	2014.12.20	1 year
4	BiLog Antenna	VULB9163	9163 330	Schwarzbeck	2014.02.24	3 years
5	LISN	ESH2-Z5	100196	R&S	2015.01.14	1 year
6	Dual-Ridge Waveguide Horn Antenna	3117	00066577	ETS-Lindgren	2016.04.01	3 years
7	Universal Radio Communication Tester	E5515C	GB44051324	Agilent	2014.05.21	1 year

ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission (§15.109(a))

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 a distance of 3 meters is tested. Tested in accordance with the procedures of ANSI C63.4 - 2003, section 8.3.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 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 Lenovo Thinkcentre M4099t, and the serial number of the PC is SA08850737. 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

*Note: The original limit is defined at 10m test distance. This limit is calculated according to CISPR requirements.

A.1.4 Test Condition

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	120kHz (IF bandwidth)	5
Above 1000	1MHz/1MHz	15

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.

Note: the result contains vertical part and Horizontal part

Set.1 Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
17354.000000	61.3	H	14.4	12.7	74.0
16702.000000	60.1	V	14.2	13.9	74.0
16705.000000	60.1	V	14.2	13.9	74.0
16615.000000	60.0	V	14.2	14.0	74.0
17341.000000	59.8	V	14.4	14.2	74.0
16693.000000	59.7	H	14.2	14.3	74.0

Set.1 Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
8046.125000	38.1	H	7.5	15.9	54.0
16734.000000	48.1	H	14.3	5.9	54.0
17318.000000	48.1	H	14.4	5.9	54.0
15687.000000	47.3	V	13.1	6.7	54.0
10564.000000	40.1	V	10.1	13.9	54.0
13668.000000	43.9	H	11.5	10.1	54.0

Set.2 Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
16762.000000	59.7	V	14.3	14.3	74.0
17308.000000	59.6	V	14.4	14.4	74.0
16647.000000	59.6	H	14.2	14.4	74.0
16879.000000	59.6	H	14.3	14.4	74.0
16634.000000	59.4	V	14.2	14.6	74.0
16673.000000	59.4	V	14.2	14.6	74.0

Set.2 Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
16778.000000	47.5	H	14.3	6.5	54.0
15776.000000	47.1	H	13.3	6.9	54.0
13674.000000	43.6	H	11.5	10.4	54.0
10512.000000	40.0	V	10.1	14.0	54.0
8046.125000	37.8	H	7.5	16.2	54.0
3525.875000	38.3	V	3.7	15.7	54.0

Set.3 USB mode/ Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
16677.000000	59.1	V	14.2	14.9	74.0
16218.000000	59.0	H	13.7	15.0	74.0
16239.000000	59.0	V	13.7	15.0	74.0
16814.000000	59.0	V	14.3	15.0	74.0
16822.000000	58.9	H	14.3	15.1	74.0
17509.000000	58.8	V	14.5	15.2	74.0

Set.3 USB mode/ Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
16728.000000	47.5	V	14.3	6.5	54.0
15738.000000	47.0	H	13.2	7.0	54.0
13671.000000	43.5	V	11.5	10.5	54.0
1500.000000	42.3	V	-3.4	11.7	54.0
6000.375000	41.1	V	7.2	12.9	54.0
10518.000000	39.8	H	10.1	14.2	54.0

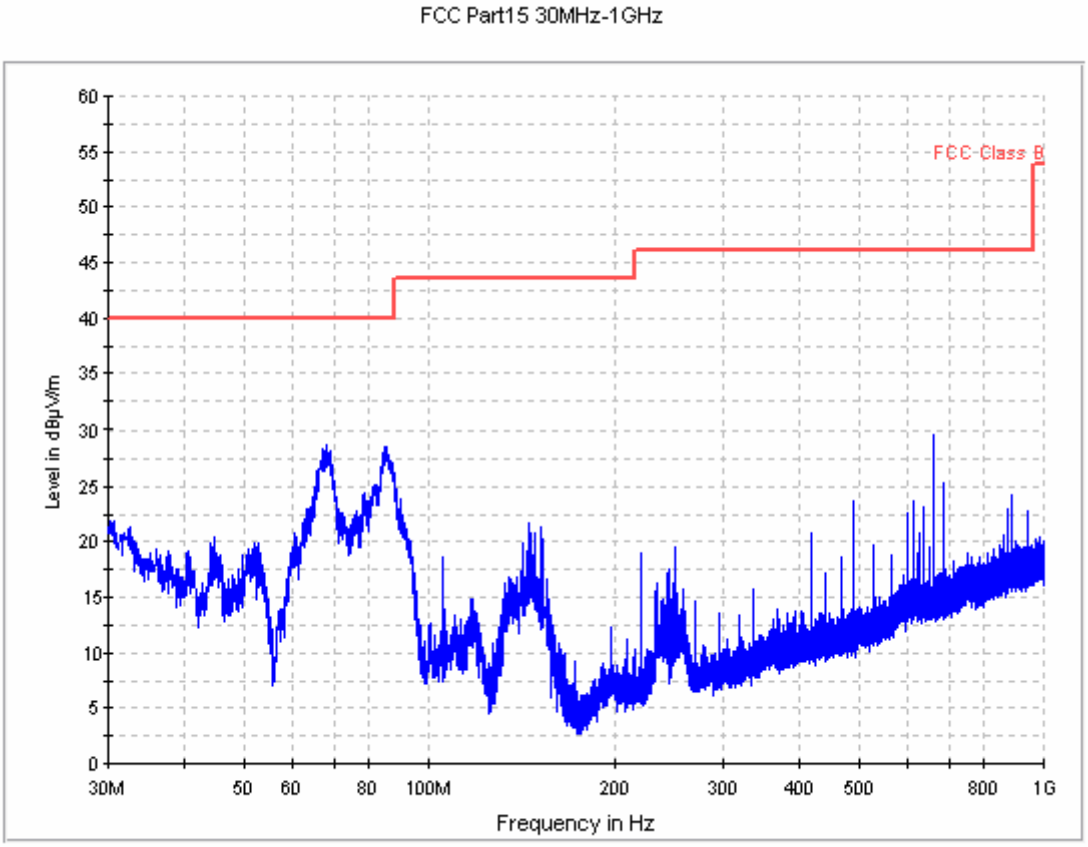

Figure A.1 Radiated Emission from 30MHz to 1GHz (Set.1, Charging mode)

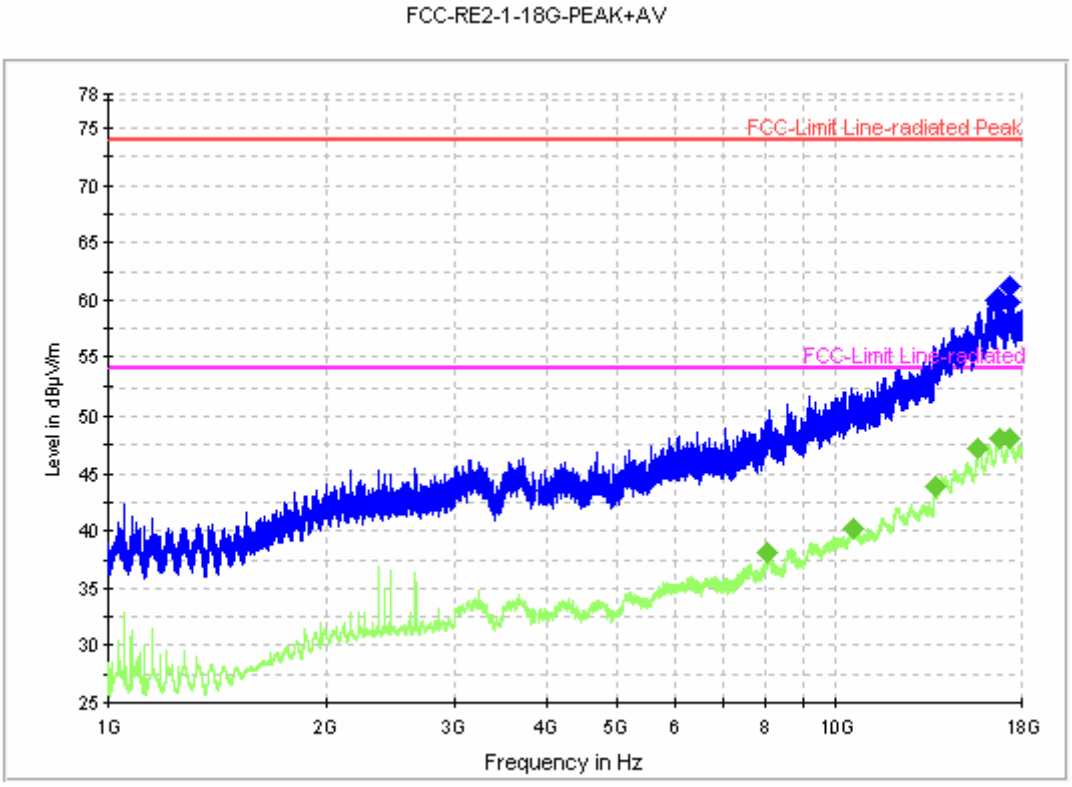

Figure A.2 Radiated Emission from 1GHz to 18GHz (Set.1, Charging mode)

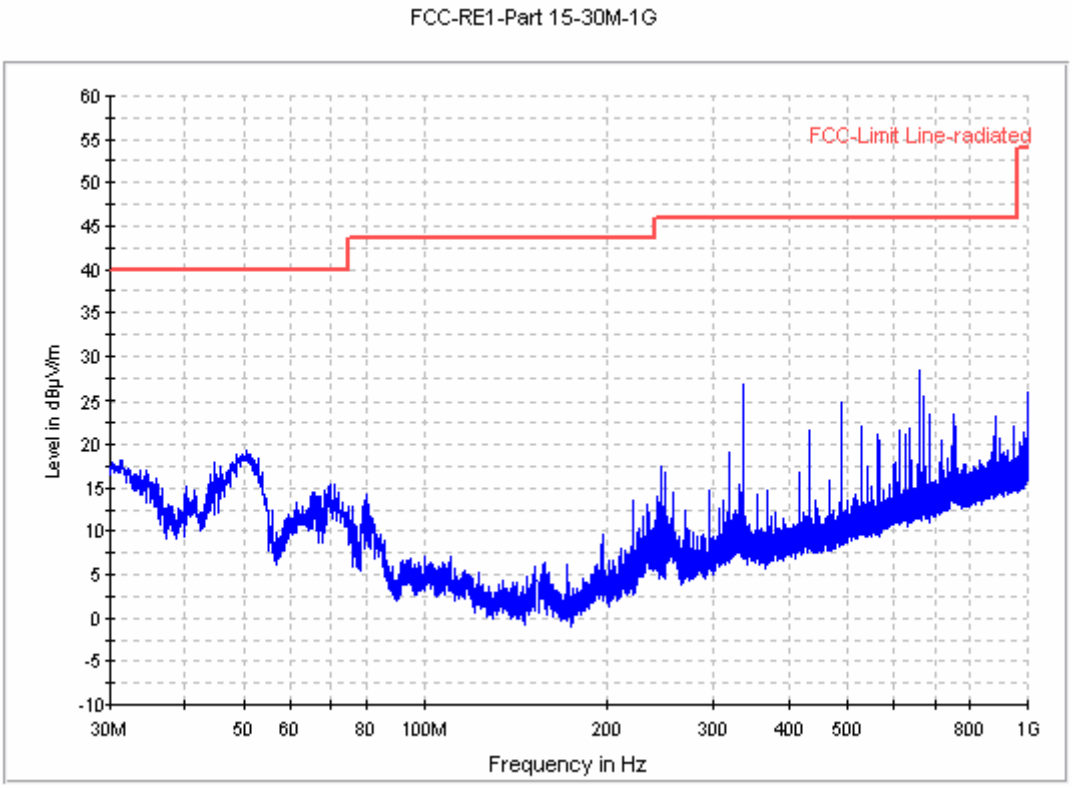

Figure A.3 Radiated Emission from 30MHz to 1GHz (Set.2, Charging mode)

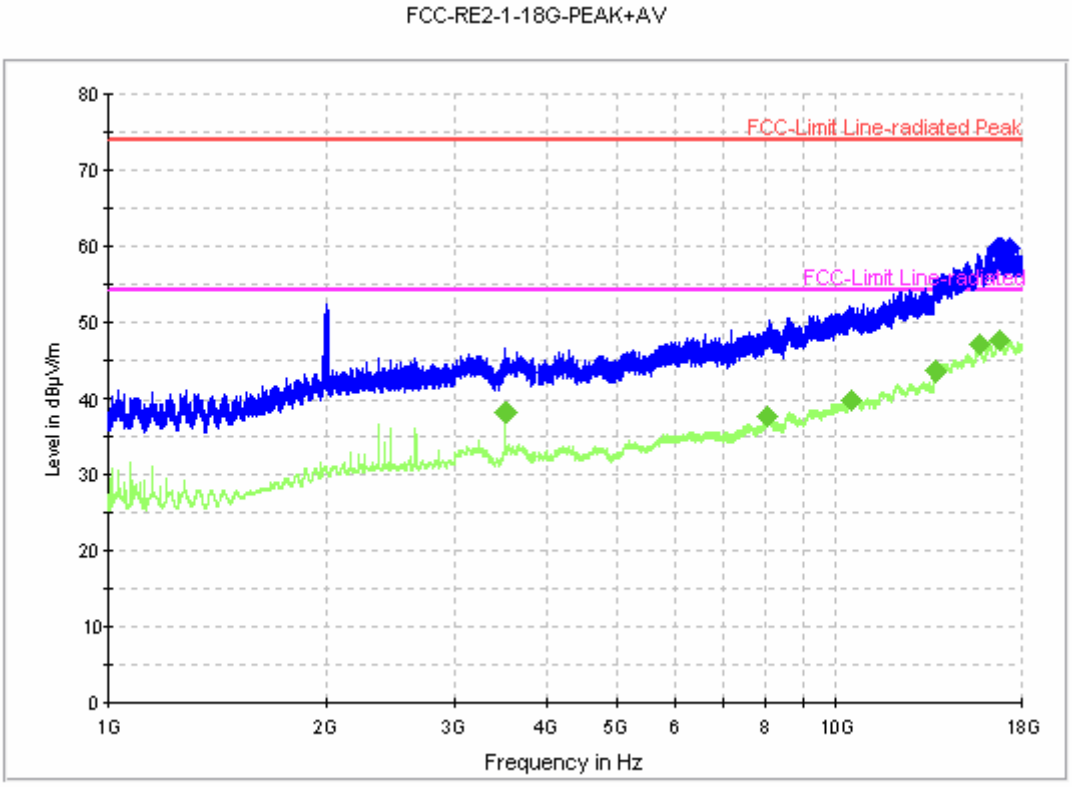

Figure A.4 Radiated Emission from 1GHz to 18GHz (Set.2, Charging mode)

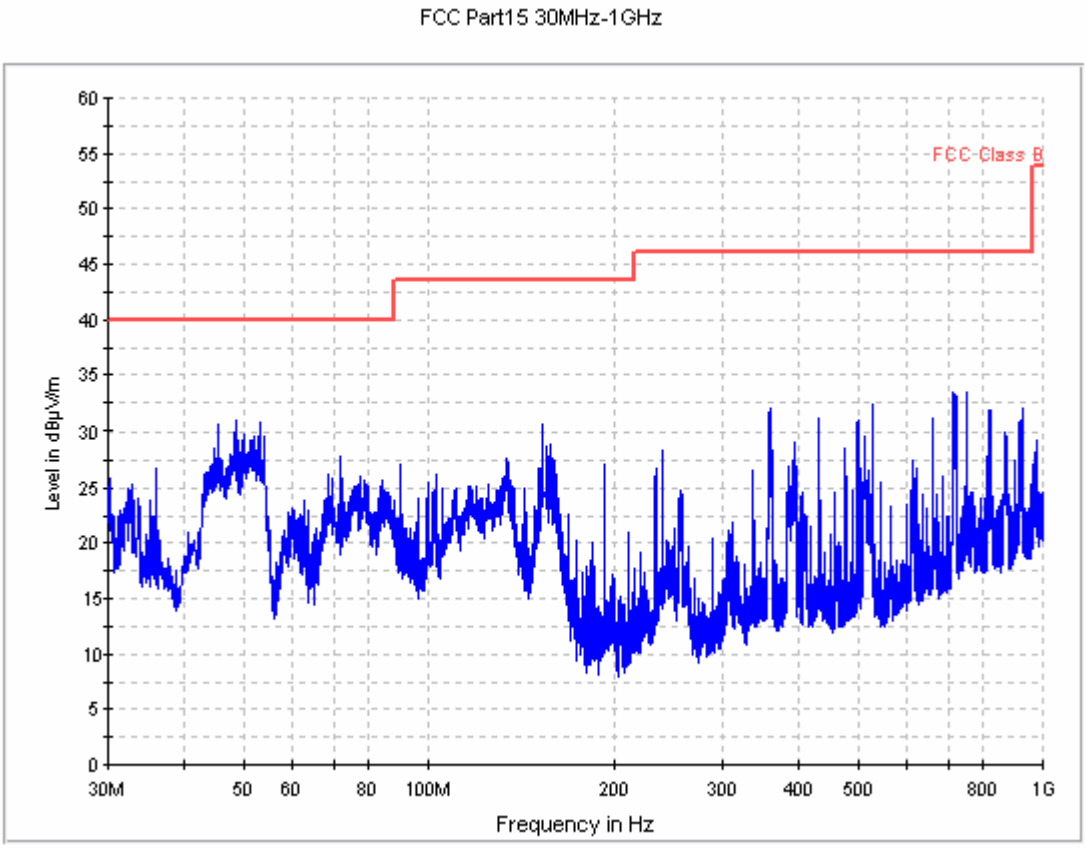

Figure A.5 Radiated Emission from 30MHz to 1GHz (Set.3, USB mode)

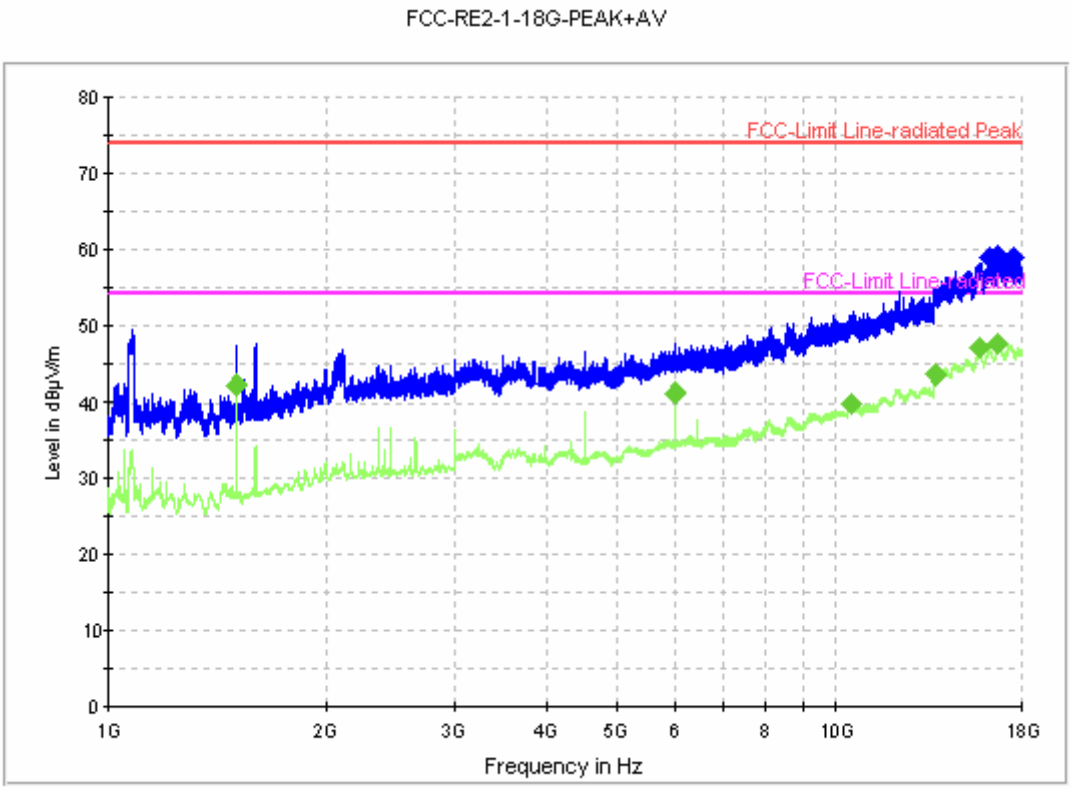

Figure A.6 Radiated Emission from 1GHz to 18GHz (Set.3, USB mode)

A.2 Conducted Emission (§15.107(a))

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 - 2003, section 7.2.

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 Lenovo Thinkcentre M4099t, and the serial number of the PC is SA08850737. 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	Sweep Time(s)
9kHz	1

A.2.5 Measurement Results

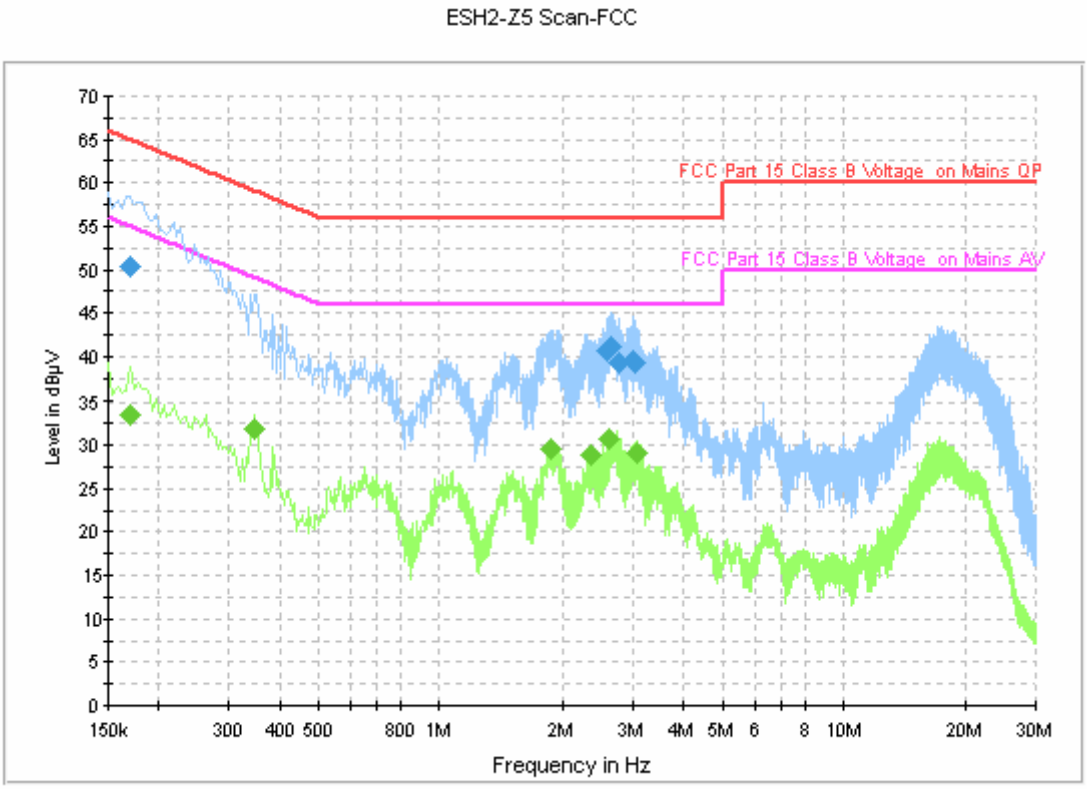

Figure A.7 Conducted Emission (Set.1, Charging mode)

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.170000	50.4	FLO	L1	10.0	14.6	65.0
2.578000	40.6	FLO	L1	10.2	15.4	56.0
2.650000	41.1	FLO	L1	10.2	14.9	56.0
2.750000	39.3	FLO	L1	10.1	16.7	56.0
3.002000	39.4	FLO	L1	10.2	16.6	56.0
3.018000	39.4	FLO	L1	10.2	16.6	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.170000	33.5	FLO	L1	10.0	21.5	55.0
0.346000	31.9	FLO	L1	10.0	17.1	49.1
1.870000	29.6	FLO	L1	10.1	16.4	46.0
2.354000	28.8	FLO	L1	10.1	17.2	46.0
2.622000	30.7	FLO	L1	10.2	15.3	46.0
3.054000	29.0	FLO	L1	10.2	17.0	46.0

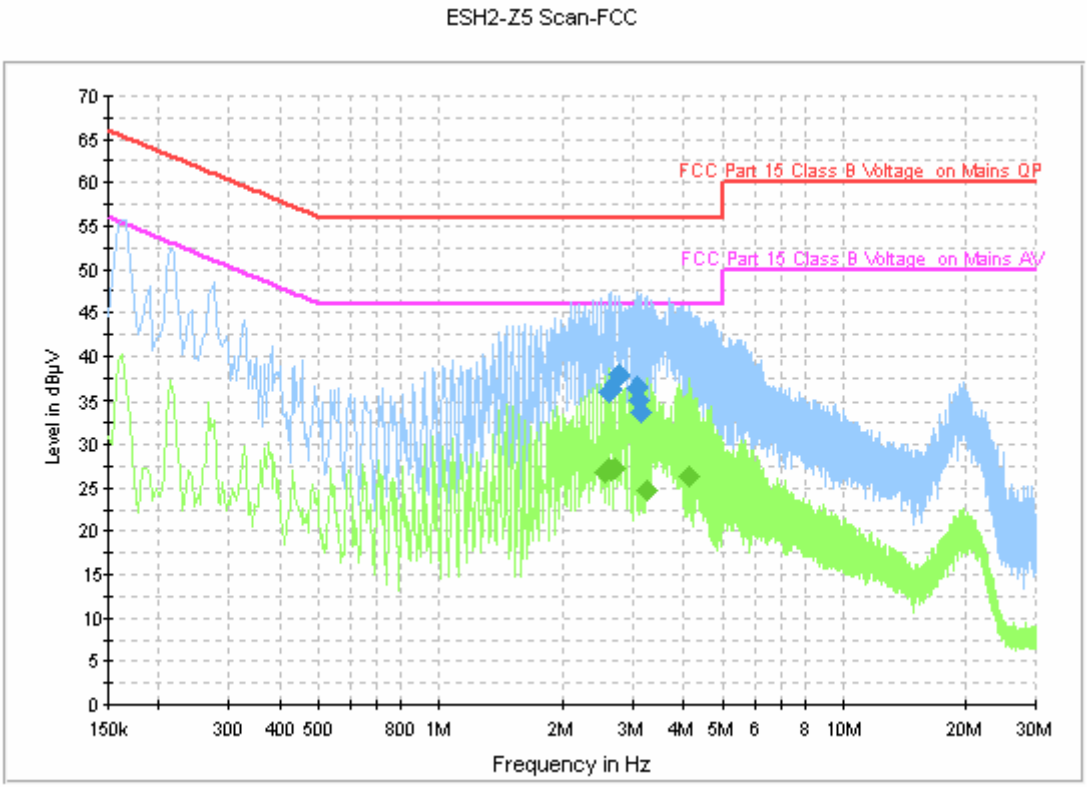

Figure A.8 Conducted Emission (Set.2, Charging mode)

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.594000	36.0	FLO	L1	10.2	20.0	56.0
2.646000	36.3	FLO	L1	10.2	19.7	56.0
2.750000	37.9	FLO	L1	10.1	18.1	56.0
3.046000	36.6	FLO	L1	10.2	19.4	56.0
3.098000	35.1	FLO	L1	10.2	20.9	56.0
3.150000	33.7	FLO	L1	10.2	22.3	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.542000	26.9	FLO	L1	10.2	19.1	46.0
2.594000	27.2	FLO	L1	10.2	18.8	46.0
2.646000	27.0	FLO	L1	10.2	19.0	46.0
2.698000	27.2	FLO	L1	10.2	18.8	46.0
3.250000	24.8	FLO	L1	10.2	21.2	46.0
4.110000	26.3	FLO	L1	10.2	19.7	46.0

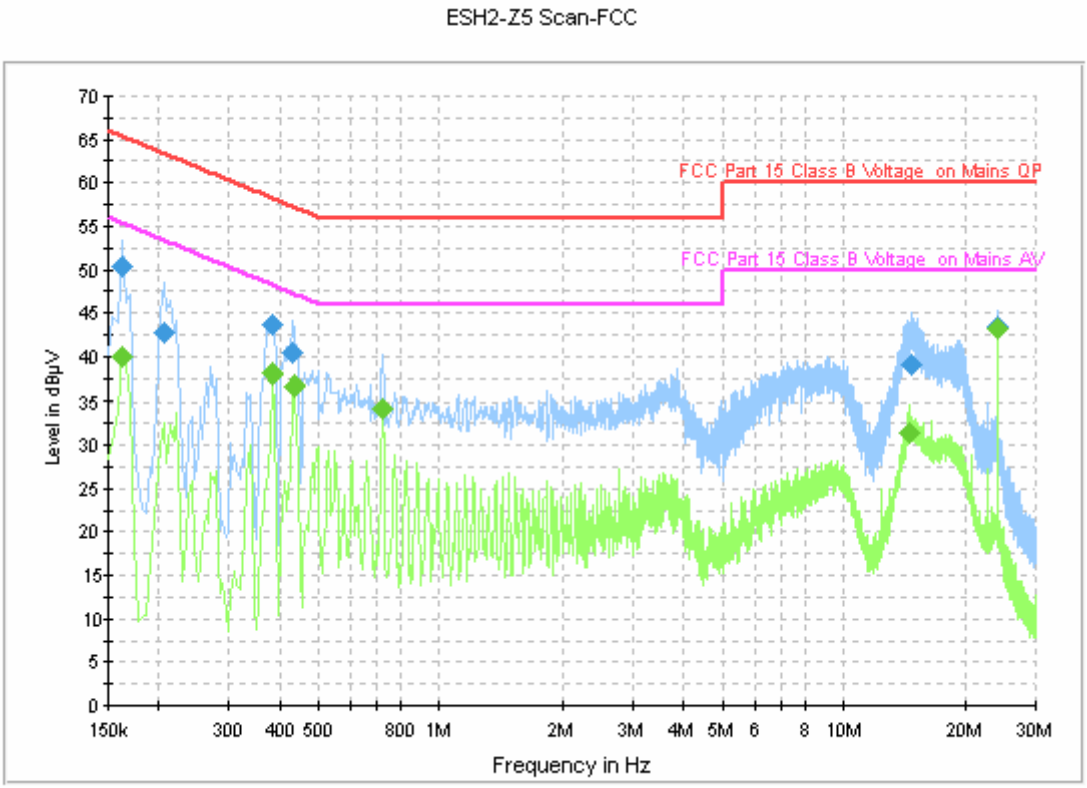

Figure A.9 Conducted Emission (Set.3, USB mode)

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.162000	50.3	FLO	N	10.1	15.0	65.4
0.206000	42.7	FLO	N	10.1	20.6	63.4
0.386000	43.8	FLO	N	10.0	14.4	58.1
0.430000	40.5	FLO	L1	10.0	16.8	57.3
14.726000	39.0	FLO	L1	10.5	21.0	60.0
23.998000	43.5	FLO	L1	10.6	16.5	60.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.162000	39.9	FLO	N	10.1	15.4	55.4
0.386000	38.2	FLO	N	10.0	9.9	48.1
0.434000	36.7	FLO	N	10.1	10.5	47.2
0.722000	34.2	FLO	L1	10.0	11.8	46.0
14.486000	31.5	FLO	L1	10.5	18.5	50.0
23.998000	43.3	FLO	L1	10.6	6.7	50.0

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