



TEST REPORT

No. I14Z45902-EMC01

for

TCT Mobile Limited

HSDPA/HSUPA/HSPA+/UMTS Quad bands / GSM Quad bands/LTE 5

bands mobile phone

Model Name: Rio-4G LATAM

Marketing Name: 5050A

FCC ID: RAD488

with

Hardware Version: PIO

Software Version: 9G1B

Issued Date: Mar. 08th, 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

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1. Test Laboratory

1.1. Testing Location

Location D

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT
Address: No.18A, Kangding Street, Beijing Economic-Technological
Development Area, Beijing, China
Postal Code: 100176

1.2. Testing Environment

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

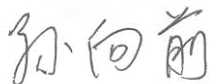
1.3. Project data

Testing Start Date: Apr. 25th, 2014
Testing End Date: Apr. 28th, 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
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Country: China
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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
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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	HSDPA/HSUPA/HSPA+/UMTS Quad bands / GSM Quad bands/LTE 5 bands mobile phone
Model Name	Rio-4G LATAM
Marketing Name	5050A
FCC ID	RAD488
Extreme vol. Limits	3.5VDC to 4.2VDC (nominal: 3.9VDC)

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	014035000002550	PIO	9G1B
EUT2	014035000002071	PIO	9G1B

*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*	描述	序列号	备注
AE1	Battery	/	1445902BA015
AE2	Battery	/	1445902BA012
AE3	Travel charger	/	TCT-CHR-0137
AE4	Travel charger	/	TCT-CHR-0992
AE5	USB cable	/	1445902DC014
AE6	USB cable	/	1445902DC011
AE7	Battery	/	1445902BA006
AE8	Battery	/	1445902BA014

AE1, AE2, AE7, AE8

Model	CAC2000003C3
Manufacturer	SCUD
Capacitance	2000 mAh
Nominal voltage	3.8V

AE3, AE4

Model	CBA3000AG0C1
Manufacturer	TEN PAO
Length of cable	/

AE5, AE6

Model	CDA3122002C2
Manufacturer	/
Length of cable	98cm

*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	EUT2+ AE1/AE2/AE7/AE8+ AE3 + AE5/AE6	Charging mode
Set.3	EUT2+ AE1/AE2/AE7/AE8+ AE5/AE6	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	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	< 4Ω
Normalised site attenuation (NSA)	< ± 4 dB, 3m/10m distance, from 30 to 1000 MHz
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

Fully-anechoic chamber FAC-3 (9 meters×6.5 meters×4 meters) 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
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
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	D
2	Conducted Emission	15.107(a)	P	D

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESCI	100344	R&S	2015-03-03	1 year
2	Test Receiver	ESCI 7	100948	R&S	2014-07-18	1 year
3	Universal Radio Communication Tester	CMU200	109914	R&S	2015-04-13	1 year
4	Test Receiver	FSV	101047	R&S	2014-06-30	1 year
5	LISN	ESH2-Z5	829991/012	R&S	2015-04-14	1 year
6	EMI Antenna	VULB 9163	9163-234	Schwarzbeck	2016-09-16	3 years
7	EMI Antenna	3115	6914	ETS-Lindgren	2014-12-15	3 years
8	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
9	Monitor	E178FPc	CN-OWR979-64180-7AJ-D2MS	DELL	N/A	N/A
10	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
11	Keyboard	L100	CN0RH659658907 ATOI40	DELL	N/A	N/A
12	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 a distance of 3 meters (above 1GHz) and 10 meters (below 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 meters (above 1GHz) and 10 meters (below 1GHz) 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 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

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 result for Set.1:

Charging Mode/Average detector

Frequency(MHz)	Result(dB $\mu\text{V}/\text{m}$)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μV)	Polarity
5970.938	38.6	-33.5	35.1	37.000	V
5947.813	39.2	-33.5	35.1	37.600	V
5972.500	39.0	-33.5	35.1	37.400	H
5973.125	40.2	-33.5	35.1	38.600	V
5972.344	39.3	-33.5	35.1	37.700	V
5769.844	39.0	-33.8	35.1	37.700	V

Charging Mode/Peak detector

Frequency(MHz)	Result(dB $\mu\text{V}/\text{m}$)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μV)	Polarity
5987.188	41.7	-33.5	35.1	40.100	V
5919.531	41.4	-34.1	35.1	40.400	V
5970.469	41.2	-33.5	35.1	39.600	H
5750.469	40.9	-33.8	35.1	39.600	V
5963.281	40.9	-33.5	35.1	39.300	V
5754.531	40.9	-33.8	35.1	39.600	V

Measurement result 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
5972.031	36.4	-33.5	35.1	34.800	H
3595.625	33.1	-37.4	32.1	38.400	V
1995.625	31.2	-35.7	25.3	41.600	V
1849.688	30.7	-36.5	25.3	41.900	H
1860.313	30.6	-35.9	25.3	41.200	V
1993.750	30.3	-35.7	25.3	40.700	V

USB Mode/ Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dB μ V)	Polarity
1999.219	48.2	-35.7	25.3	58.600	V
3595.625	48.0	-37.4	32.1	53.300	H
1995.625	48.0	-35.7	25.3	58.400	V
1849.688	47.1	-36.5	25.3	58.300	H
1860.313	46.9	-35.9	25.3	57.500	V
1993.750	46.9	-35.7	25.3	57.300	V

Charging Mode, Set.1

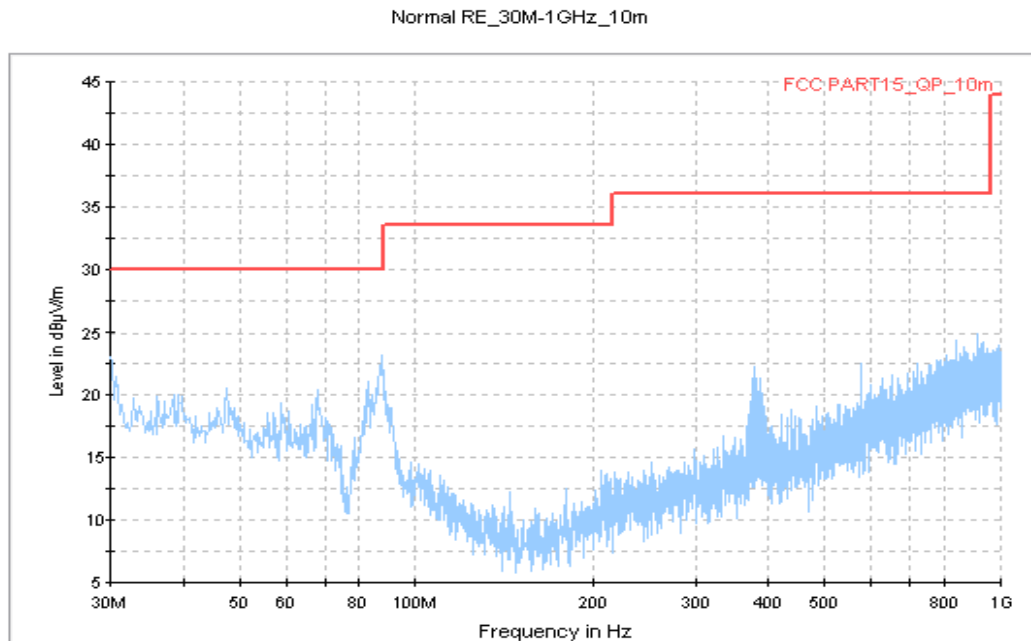


Figure A.1 Radiated Emission from 30MHz to 1GHz

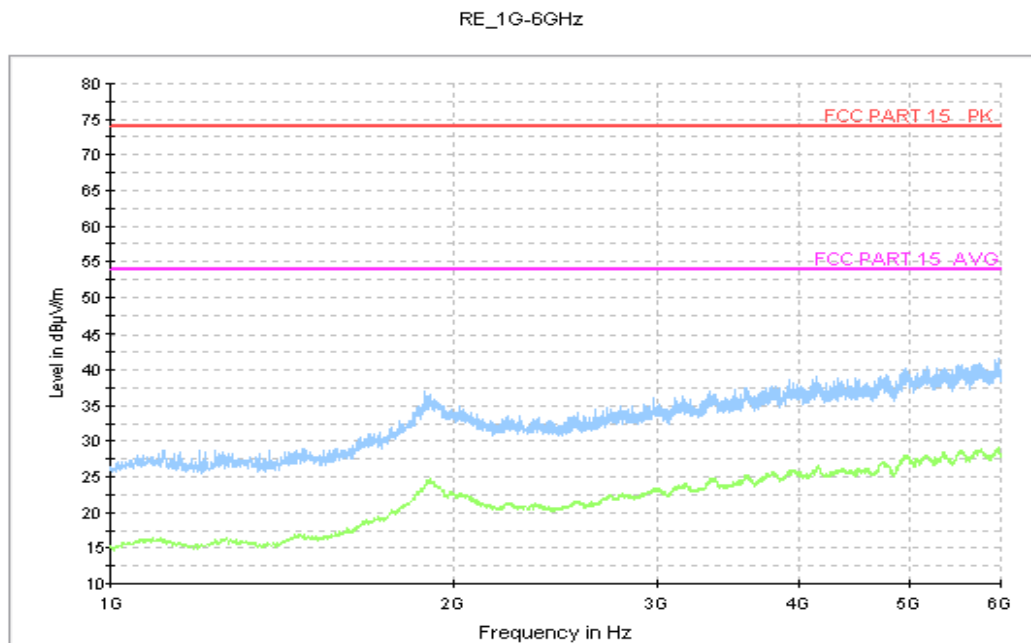


Figure A.2 Radiated Emission from 1GHz to 6GHz

USB Mode, Set.3

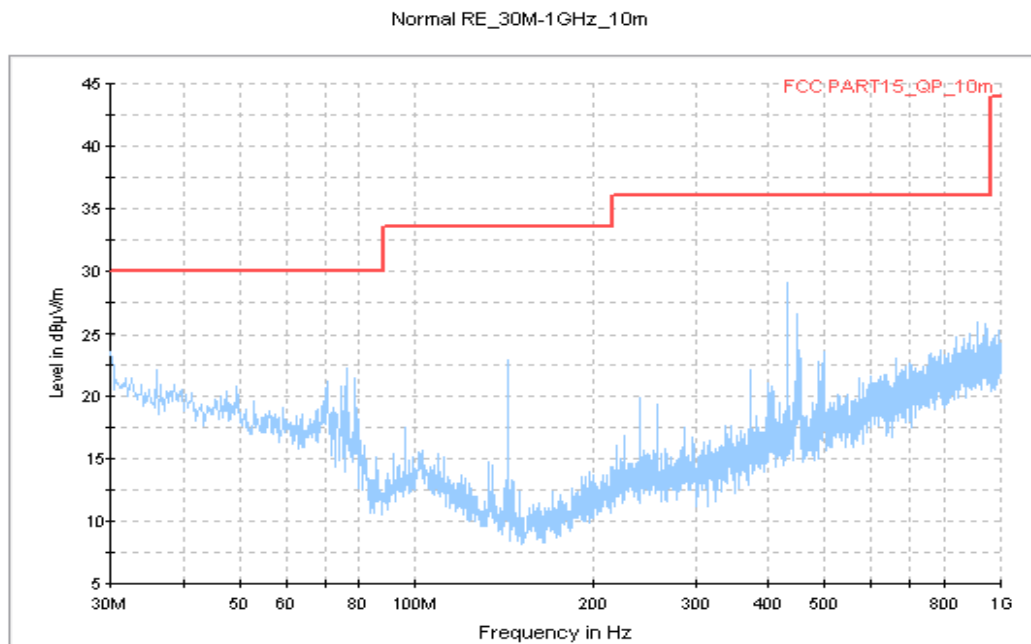


Figure A.3 Radiated Emission from 30MHz to 1GHz

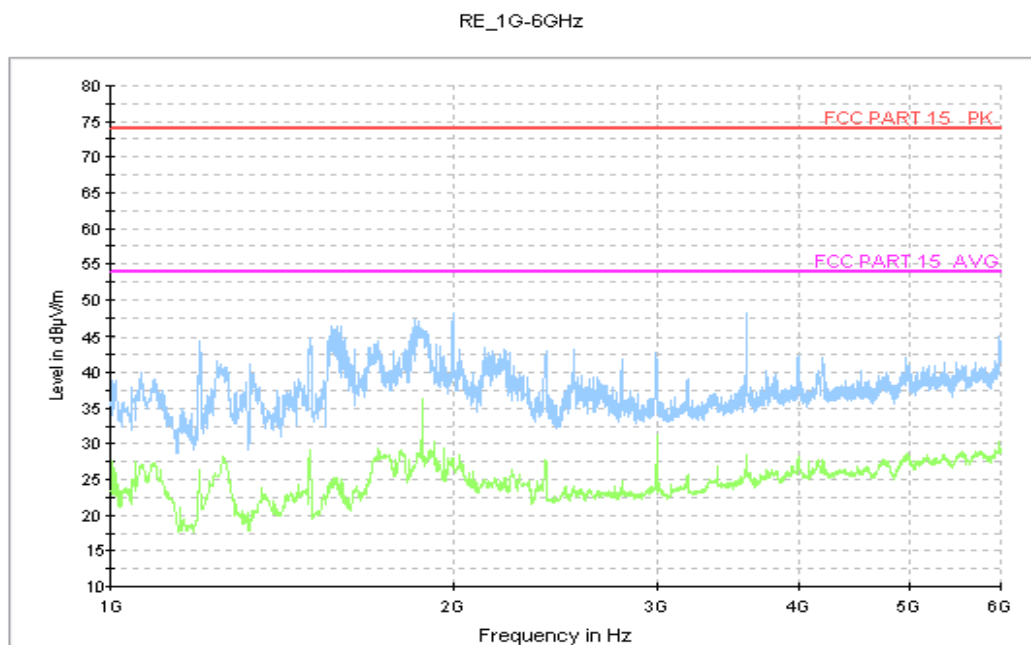


Figure A.4 Radiated Emission from 1GHz to 6GHz

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 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

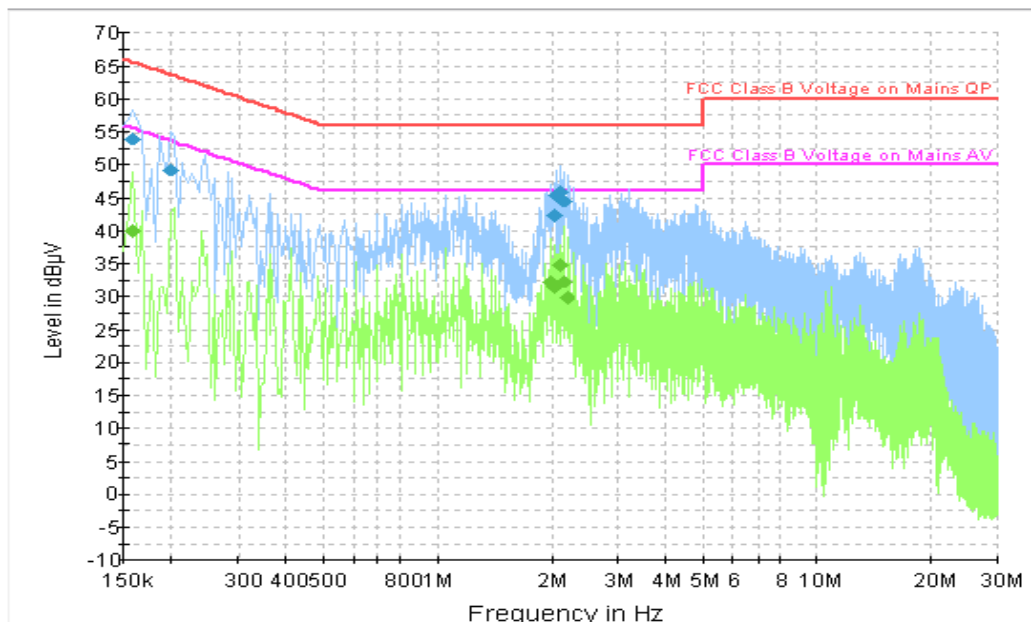


Figure A.5 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.159000	53.9	GND	N	9.8	11.6	65.5
0.199500	49.3	GND	L1	9.8	14.3	63.6
2.040000	42.3	GND	L1	9.7	13.7	56.0
2.071500	45.4	GND	L1	9.7	10.6	56.0
2.112000	45.8	GND	L1	9.7	10.2	56.0
2.157000	44.6	GND	L1	9.7	11.4	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.159000	40.0	GND	N	9.8	15.5	55.5
1.995000	32.2	GND	L1	9.7	13.8	46.0
2.040000	31.5	GND	L1	9.7	14.5	46.0
2.112000	34.7	GND	L1	9.7	11.3	46.0
2.157000	32.3	GND	L1	9.7	13.7	46.0
2.202000	29.7	GND	L1	9.7	16.3	46.0

USB Mode, Set.3

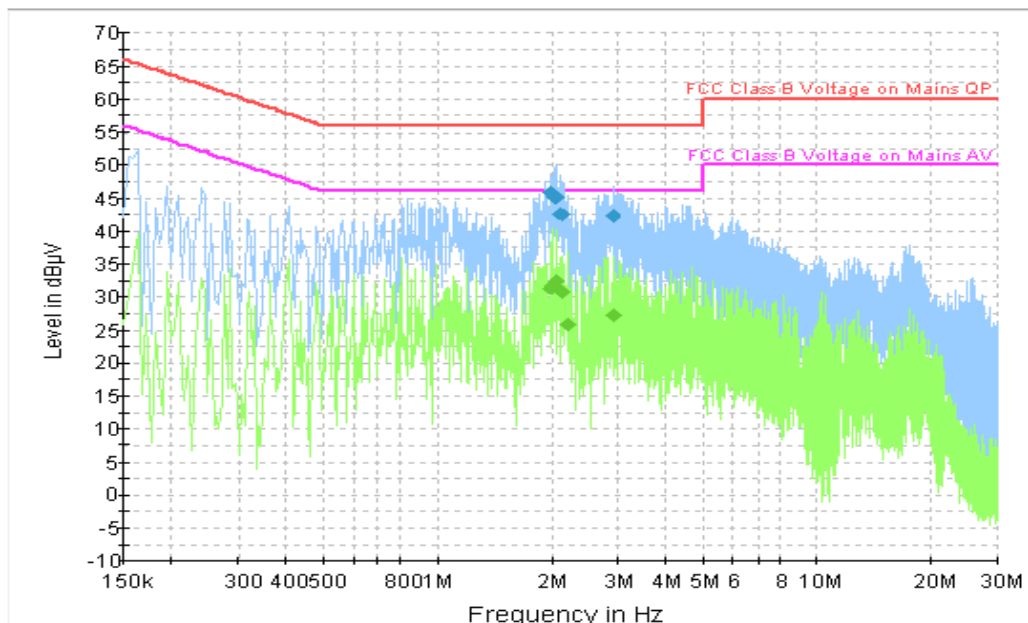


Figure A.6 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.986000	45.8	GND	L1	9.7	10.2	56.0
2.035500	45.2	GND	L1	9.7	10.8	56.0
2.067000	45.1	GND	L1	9.7	10.9	56.0
2.107500	42.7	GND	L1	9.7	13.3	56.0
2.139000	42.4	GND	L1	9.7	13.6	56.0
2.895000	42.4	GND	L1	9.7	13.6	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.990500	31.4	GND	L1	9.7	14.6	46.0
2.022000	31.8	GND	L1	9.7	14.2	46.0
2.067000	32.4	GND	L1	9.7	13.6	46.0
2.139000	30.8	GND	L1	9.7	15.2	46.0
2.224500	25.9	GND	L1	9.7	20.1	46.0
2.940000	27.1	GND	L1	9.7	18.9	46.0

END OF REPORT