



TEST REPORT

No. I14Z45138-EMC01

for

TCT Mobile Limited

UMTS triband/GSM quadband mobile phone

Model Name: Miata 3G

Marketing Name: 6016A

FCC ID: RAD463

with

Hardware Version: Proto

Software Version: v1AC4_US+Z2

Issued Date: Feb. 28th, 2013

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

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CONTENTS

1. TEST LABORATORY.....	3
1.1. TESTING LOCATION.....	3
1.2. TESTING ENVIRONMENT.....	3
1.3. PROJECT DATA.....	3
1.4. SIGNATURE.....	3
2. CLIENT INFORMATION.....	4
2.1. APPLICANT INFORMATION.....	4
2.2. MANUFACTURER INFORMATION.....	4
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE).....	5
3.1. ABOUT EUT.....	5
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST.....	5
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST.....	5
3.4. EUT SET-UPS.....	7
4. REFERENCE DOCUMENTS.....	8
4.1. REFERENCE DOCUMENTS FOR TESTING.....	8
5. LABORATORY ENVIRONMENT.....	9
6. SUMMARY OF TEST RESULTS.....	10
7. TEST EQUIPMENTS UTILIZED.....	11
ANNEX A: MEASUREMENT RESULTS.....	12

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°C
Relative Humidity: 20-75%

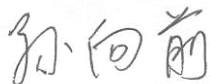
1.3. Project data

Testing Start Date: Jan. 26th, 2013
Testing End Date: Feb. 27th, 2013

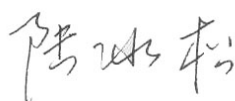
1.4. Signature



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	UMTS triband/GSM quadband mobile phone
Model Name	Miata 3G
Marketing Name	6016A
FCC ID	RAD463
Extreme vol. Limits	3.5VDC 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
EUT2	014027000000825	Proto	v1AC4_US+Z2

*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	Travel charger	/	TCT-CHR-1604
AE2	Travel charger	/	TCT-CHR-1603
AE3	Travel charger	/	TCT-CHR-1655
AE4	Travel charger	/	TCT-CHR-1658
AE5	USB cable	/	TCT-DC-0455
AE6	USB cable	/	TCT-DC-0337
AE7	USB cable	/	/
AE8	USB cable	/	/
AE9	Headset	/	/
AE10	Headset	/	/
AE11	Headset	/	/
AE12	Headset	/	/
AE13	battery	/	/
AE14	battery	/	/

AE1, AE2

Model	CBA3008AG0C1
Manufacturer	BYD
Length of cable	/

AE3, AE4

Model	CBA3008AG0C2
Manufacturer	Tenpao
Length of cable	/

AE5	
Model	CDA3122005C1
Manufacturer	Juwei
Length of cable	98.5 cm
AE6	
Model	CDA3122005C2
Manufacturer	Shenhua
Length of cable	98.5 cm
AE7	
Model	CDA3122002C2
Manufacturer	Shenhua
Length of cable	/
AE8	
Model	CDA3122002C1
Manufacturer	Juwei
Length of cable	/
AE9	
Model	CCB3160A11C4
Manufacturer	Meihao
Length of cable	/
AE10	
Model	CCB3160A11C1
Manufacturer	Juwei
Length of cable	/
AE11	
Model	CCB3160A15C4
Manufacturer	Meihao
Length of cable	/
AE12	
Model	CCB3160A15C1
Manufacturer	Juwei
Length of cable	/
AE13	
Model	CAC1700001C1
Manufacturer	BYD
Capacitance	1700 mAh
Nominal voltage	3.8V
AE14	
Model	CAC1700003C2
Manufacturer	SCUD
Capacitance	1700 mAh
Nominal voltage	3.8V

*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.5	EUT2+ AE13 + AE6 + AE2	Charging mode
Set.6	EUT2+ AE13 + 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	10-1-12 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
1	LISN	ESH2-Z5	829991/012	R&S	2014-04-14
2	Universal Radio Communication Tester	CMU200	109914	R&S	2014-04-18
3	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A
4	Monitor	E178FPc	CN-OWR979-6 4180-7AJ-D2M S	DELL	N/A
5	Printer	P1606dn	VNC3L52122	HP	N/A
6	Keyboard	L100	CN0RH659658 907ATOI40	DELL	N/A
7	Mouse	M-UAE119	LZ935220ZRC	Lenovo	N/A
8	Test Receiver	ESCI	100344	R&S	2014-03-28
9	Test Receiver	ESCI 7	100948	R&S	2014-07-18
10	EMI Antenna	VULB 9163	9163-234	Schwarzbeck	2016-09-15
11	EMI Antenna	3115	6914	ETS-Lindgren	2014-12-15
12	Test Receiver	FSV	101047	R&S	2014-06-30

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 ($\mu\text{V}/\text{m}$)		
	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.5:

Charging Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
5903.125	32.2	-34.1	35.1	31.200	H
5932.500	32.2	-34.1	35.1	31.200	V
5920.000	32.2	-34.1	35.1	31.200	V
5931.250	32.2	-34.1	35.1	31.200	H
5906.875	32.2	-34.1	35.1	31.200	V
5895.625	32.2	-34.1	35.1	31.200	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
5859.375	44.6	-33.8	35.1	43.300	H
5580.625	44.6	-34.2	35.1	43.700	V
5688.750	44.5	-34.2	35.1	43.600	V
5635.000	44.5	-34.4	35.1	43.800	V
5360.625	44.4	-34.8	34.6	44.600	H
5381.250	44.3	-34.3	34.6	44.000	V

Measurement result for Set.6:

USB Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dB μ V)	Polarity
1874.375	36.9	-35.6	25.3	47.200	V
1498.125	36.5	-40.3	24.1	52.700	H
1498.750	36.4	-40.3	24.1	52.600	V
1497.500	36.4	-40.3	24.1	52.600	V
1496.875	36.0	-40.3	24.1	52.200	H
1496.250	35.8	-40.3	24.1	52.000	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
1998.125	54.8	-35.7	25.3	65.200	V
1196.875	50.5	-41.3	24.1	67.700	H
1498.125	50.4	-40.3	24.1	66.600	V
2788.125	50.1	-38.5	28.9	59.700	H
1498.750	50.1	-40.3	24.1	66.300	V
1868.125	50.0	-35.9	25.3	60.600	H

Charging Mode, Set.5

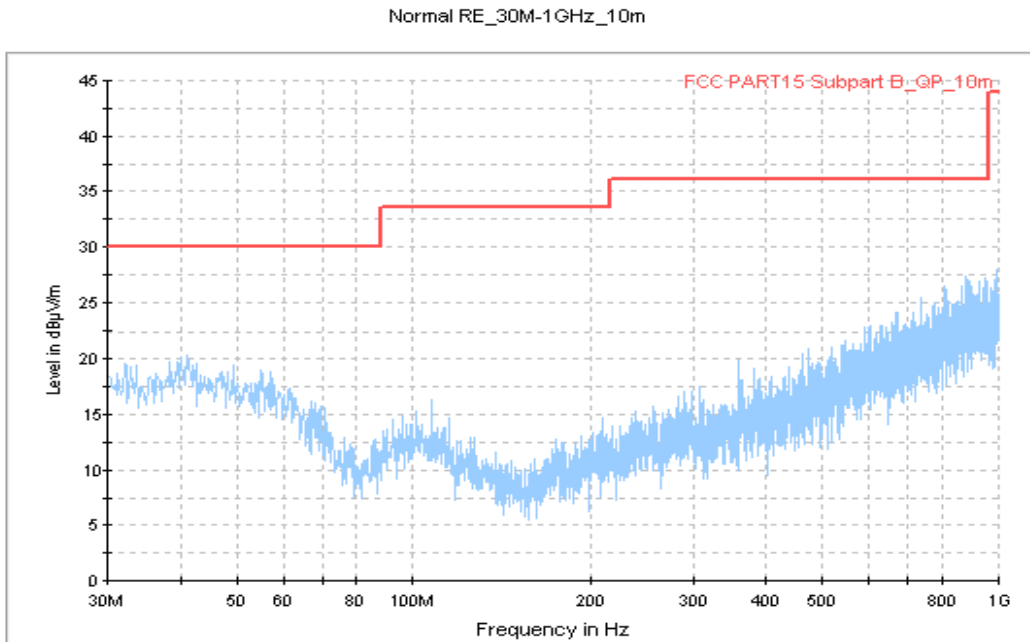


Figure A.1 Radiated Emission from 30MHz to 1GHz

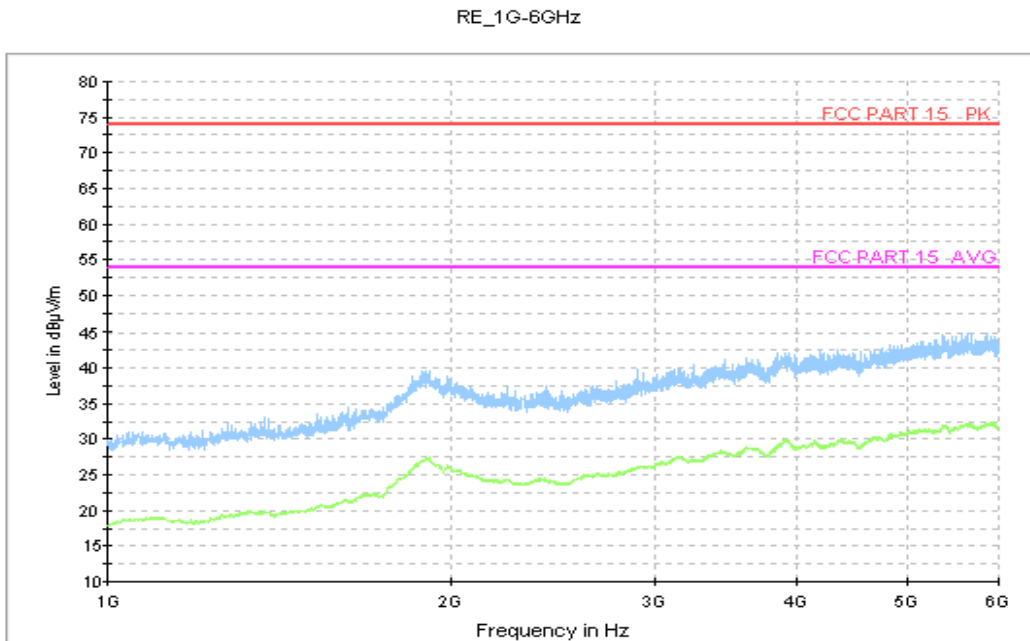


Figure A.2 Radiated Emission from 1GHz to 6GHz

USB Mode, Set.6

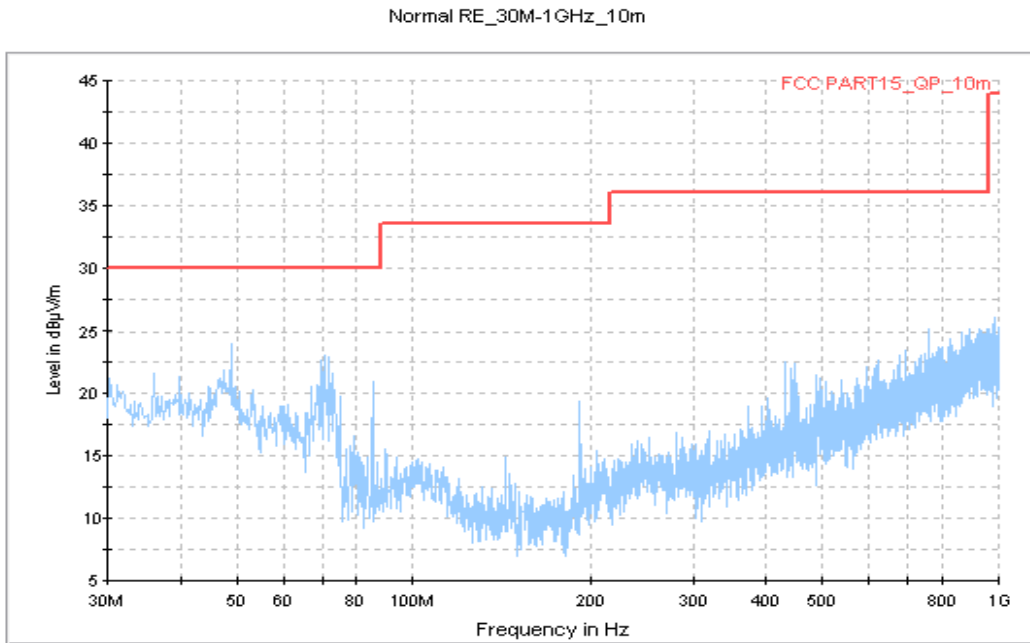


Figure A.3 Radiated Emission from 30MHz to 1GHz

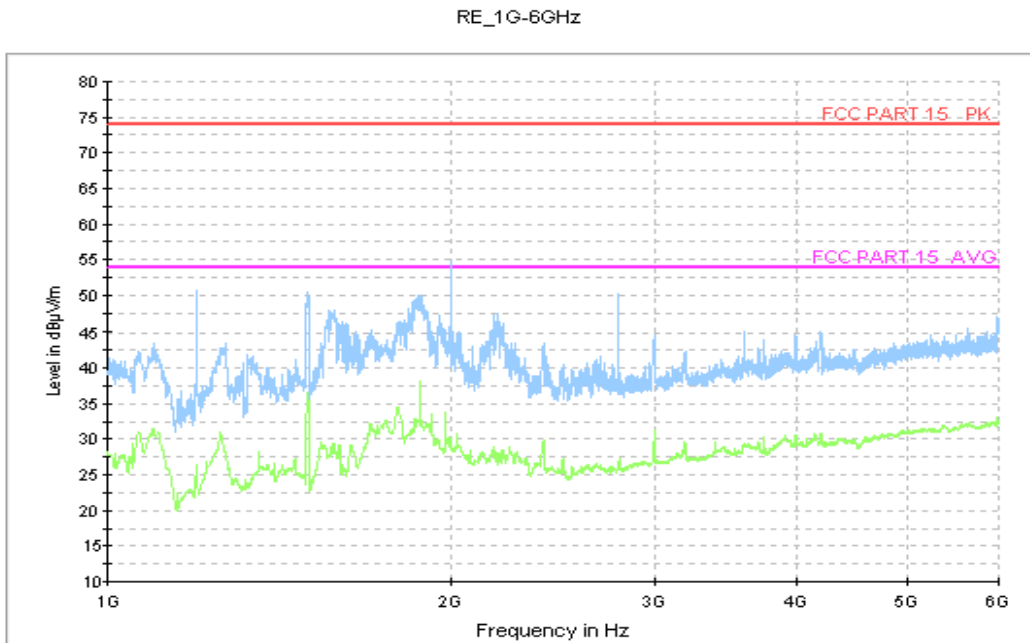


Figure A.4 Radiated Emission from 1GHz to 6GHz

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 (dB μ V)	
	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.5

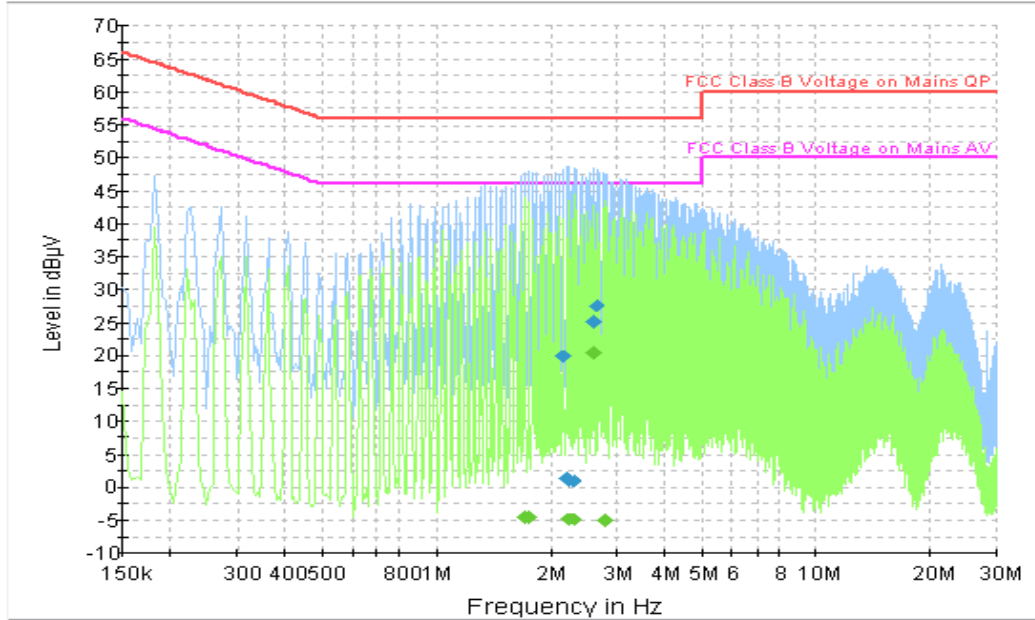


Figure A.5 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.157000	19.8	GND	N	9.7	36.2	56.0
2.206500	1.3	GND	L1	9.7	54.7	56.0
2.251500	1.2	GND	L1	9.7	54.8	56.0
2.296500	1.0	GND	L1	9.7	55.0	56.0
2.607000	25.0	GND	N	9.7	31.0	56.0
2.652000	27.6	GND	N	9.7	28.4	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.711500	-4.6	GND	L1	9.7	50.6	46.0
1.756500	-4.5	GND	L1	9.7	50.5	46.0
2.251500	-4.9	GND	L1	9.7	50.9	46.0
2.296500	-4.9	GND	L1	9.7	50.9	46.0
2.607000	20.4	GND	N	9.7	25.6	46.0
2.791500	-5.1	GND	L1	9.7	51.1	46.0

USB Mode, Set.6

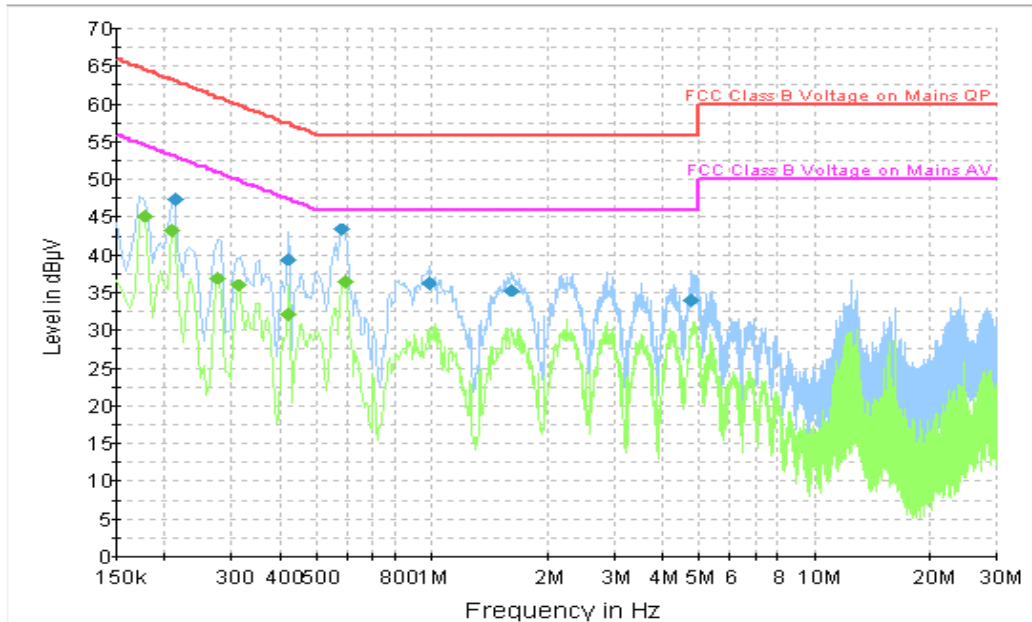


Figure A.6 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.213000	47.4	GND	L1	9.8	15.7	63.1
0.420000	39.5	GND	N	9.8	17.9	57.4
0.577500	43.3	GND	N	9.8	12.7	56.0
0.978000	36.3	GND	L1	9.7	19.7	56.0
1.617000	35.4	GND	L1	9.7	20.6	56.0
4.762500	34.0	GND	L1	9.8	22.0	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	45.2	GND	L1	9.8	9.4	54.6
0.208500	43.3	GND	L1	9.8	9.9	53.3
0.276000	37.0	GND	L1	9.8	13.9	50.9
0.312000	36.0	GND	L1	9.8	13.9	49.9
0.420000	32.2	GND	L1	9.8	15.2	47.4
0.595500	36.5	GND	L1	9.8	9.5	46.0

END OF REPORT