



TEST REPORT

No. I14Z45242-EMC01

for

VSN Technologies Inc.

Quad GSM/Dual WCDMA Smart Phone

Model Name: V2000

Marketing Name: R.40

FCC ID: 2AA9WV2000

IC No.: 11665A-V2000

with

Hardware Version: P3

Software Version: TBW972148_8911_V007284

Issued Date: Mar. 13th, 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:

DAkks accreditation (DIN EN ISO/IEC 17025): No. D-PL-12123-01-01

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

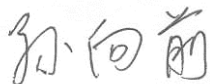
Testing Start Date: Feb. 26th, 2013
Testing End Date: Mar. 03rd, 2013

1.4. Signature



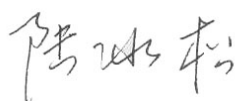
Qu Pengfei

(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: VSN Technologies Inc.
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Country: United States
Contact Person: Donghailun
Contact Email: amit.verma@vsnmobil.com
Telephone: 9546094912
Fax: 9543068450

2.2. Manufacturer Information

Company Name: Beijing Benywave Technology Co. Ltd.
Address /Post: NO.55 Jiachang 2 Road, OPTO-Mechatronics
Industrial Park, Tongzhou District
City: Beijing
Postal Code: 100111
Country: China
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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Quad GSM/Dual WCDMA Smart Phone
Model Name	V2000
Marketing Name	R.40
FCC ID	2AA9WV2000
IC No.	11665A-V2000
Extreme vol. Limits	3.6VDC 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	864513010011580	P3	TBW972148_8911_V007284
EUT2	864513010011616	P3	TBW972148_8911_V007284
EUT3	864513010011622	P3	TBW972148_8911_V007284

*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	/	1445242BA003
AE2	Battery	/	1445242BA007
AE3	Battery	/	1445242BA001
AE4	Travel charger	/	1445242CH002
AE5	USB cable	/	/

AE1, AE2, AE3

Model	TBT9605
Manufacturer	REVEL
Capacitance	1700mAh
Nominal voltage	3.7V

AE4

Model	/
Manufacturer	REVEL
Length of cable	/

AE5

Model	/
Manufacturer	REVEL
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	EUT1+ AE1+ AE3 + AE4	Charging mode
Set.3	EUT1+ AE1+ AE4	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	10-1-13 Edition
ICES-003	Information Technology Equipment (ITE) – Limits and methods of measurement	Issue 5
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

Items	Test Name	Clause in FCC rules	Clause in IC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	6.2	B.1	P	A
2	Conducted Emission	15.107(a)	6.1	B.2	P	A

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	2014-04-21
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 7	100948	R&S	2014-07-18
9	EMI Antenna	VULB 9163	9163-234	Schwarzbeck	2016-09-15
10	EMI Antenna	3115	6914	ETS-Lindgren	2014-12-15
11	Test Receiver	FSV	101047	R&S	2014-06-30

ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission

Reference

FCC: CFR Part 15.109(a)

IC: ICES-003 section 6.2

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 ($\mu\text{V/m}$)		
	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 μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
5656.094	30.5	-34.2	35.1	29.600	H
5655.625	30.5	-34.2	35.1	29.600	H
5658.281	30.4	-34.2	35.1	29.500	V
5652.500	30.4	-34.2	35.1	29.500	H
5661.875	30.4	-34.2	35.1	29.500	H
5656.406	30.4	-34.2	35.1	29.500	V

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
5708.906	42.5	-33.8	35.1	41.200	H
5641.094	42.5	-34.4	35.1	41.800	H
5657.656	42.5	-34.2	35.1	41.600	V
5664.219	42.4	-34.2	35.1	41.500	V
5819.688	42.2	-33.8	35.1	40.900	H
5363.281	42.2	-34.8	34.6	42.400	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
1874.688	38.3	-35.6	25.3	48.600	V
1924.844	35.0	-34.6	25.3	44.300	V
1925.156	34.7	-34.6	25.3	44.000	H
1924.688	34.7	-34.6	25.3	44.000	V
1793.438	34.3	-37.7	25.3	46.700	H
1797.031	34.2	-37.7	25.3	46.600	H

USB Mode/ Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dB μ V)	Polarity
1992.344	56.1	-35.7	25.3	66.500	H
1997.344	54.2	-35.7	25.3	64.600	H
1999.063	52.3	-35.7	25.3	62.700	V
1196.719	50.2	-41.3	24.1	67.400	V
1887.813	49.2	-35.6	25.3	59.500	H
2798.750	48.9	-38.5	28.9	58.500	V

Charging Mode, Set.1

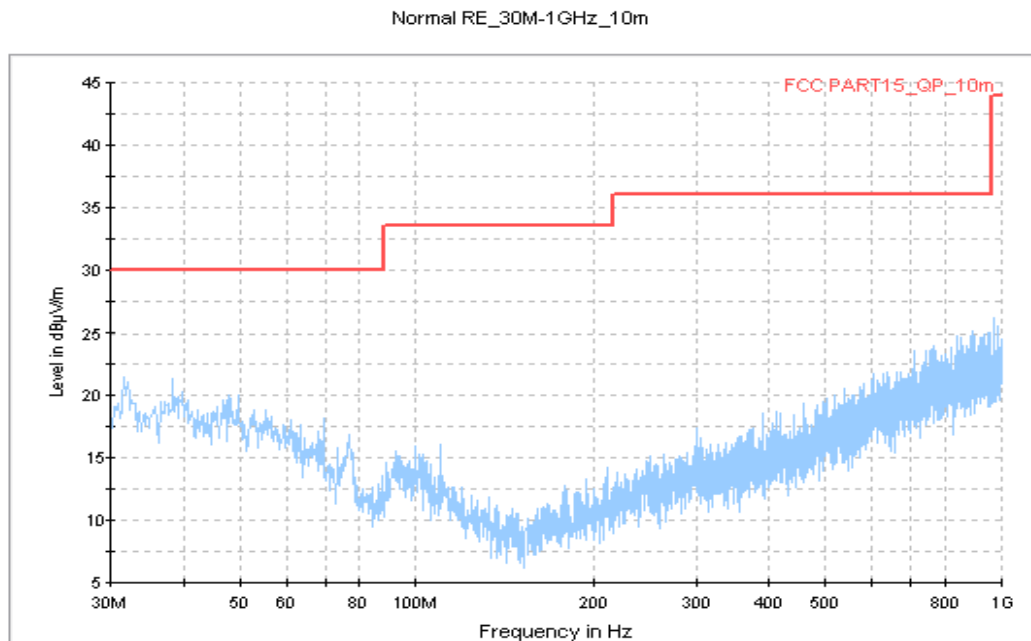


Figure A.1 Radiated Emission from 30MHz to 1GHz

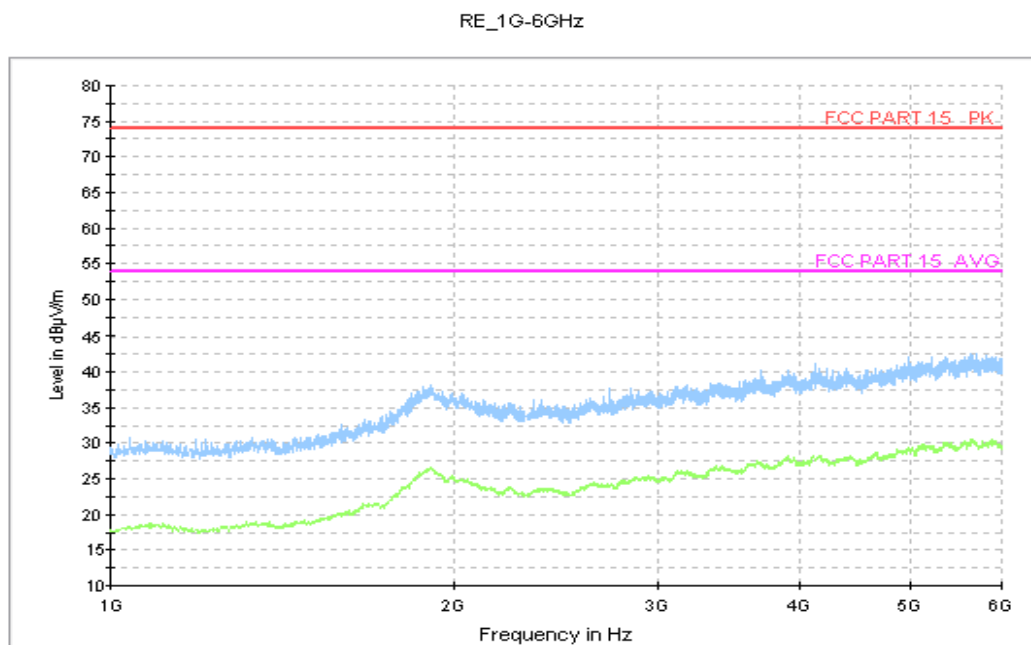


Figure A.2 Radiated Emission from 1GHz to 6GHz

USB Mode, Set.3

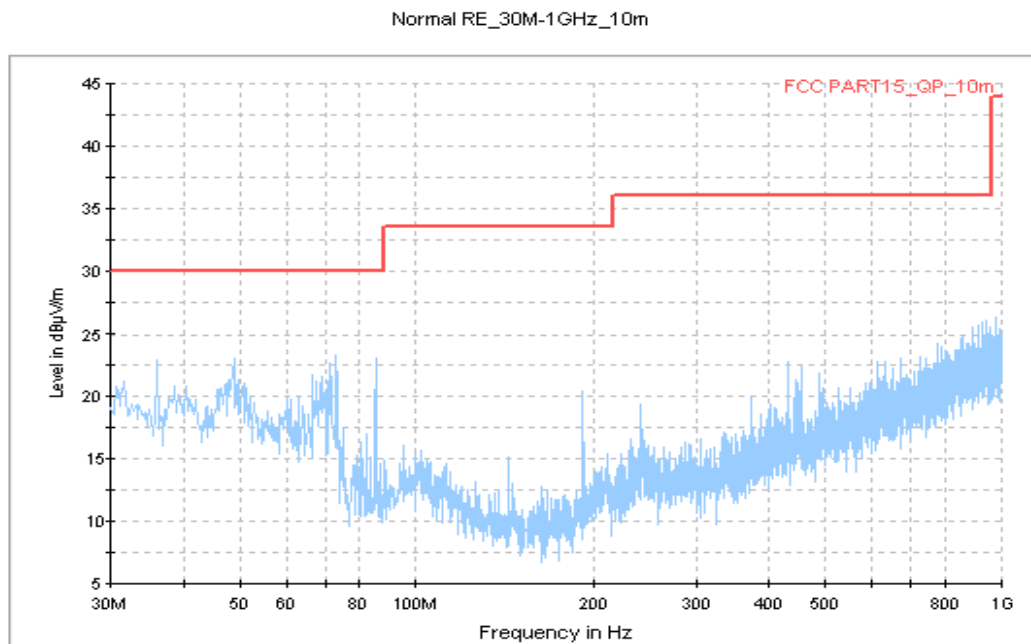


Figure A.3 Radiated Emission from 30MHz to 1GHz

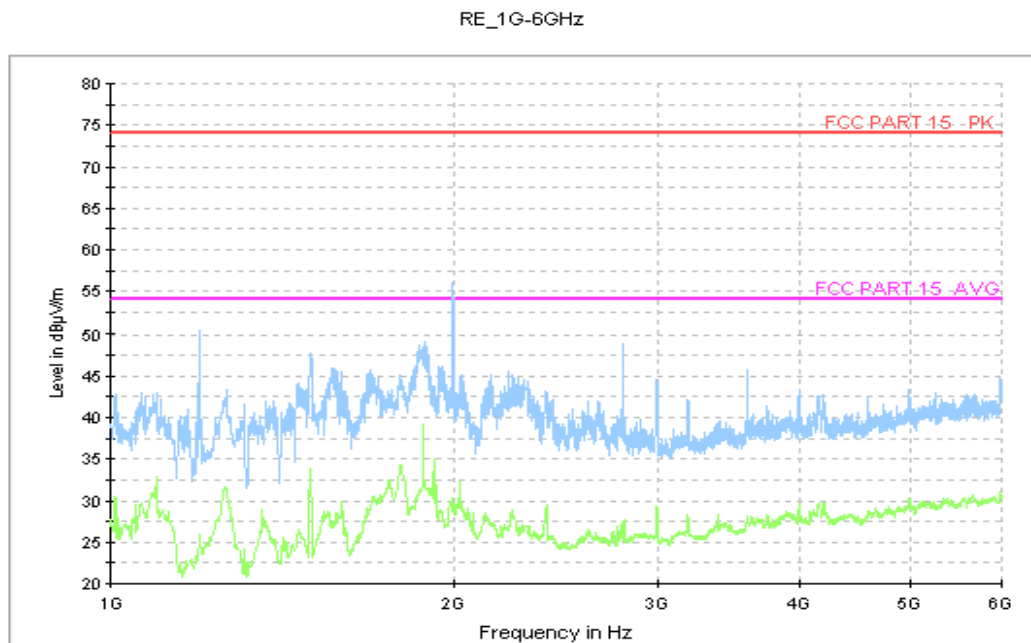


Figure A.4 Radiated Emission from 1GHz to 6GHz

A.2 Conducted Emission

Reference

FCC: CFR Part 15.107(a)

IC: ICES-003 section 6.1

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: $U= 2.9$ dB, $k=2$.

Charging Mode, Set.1

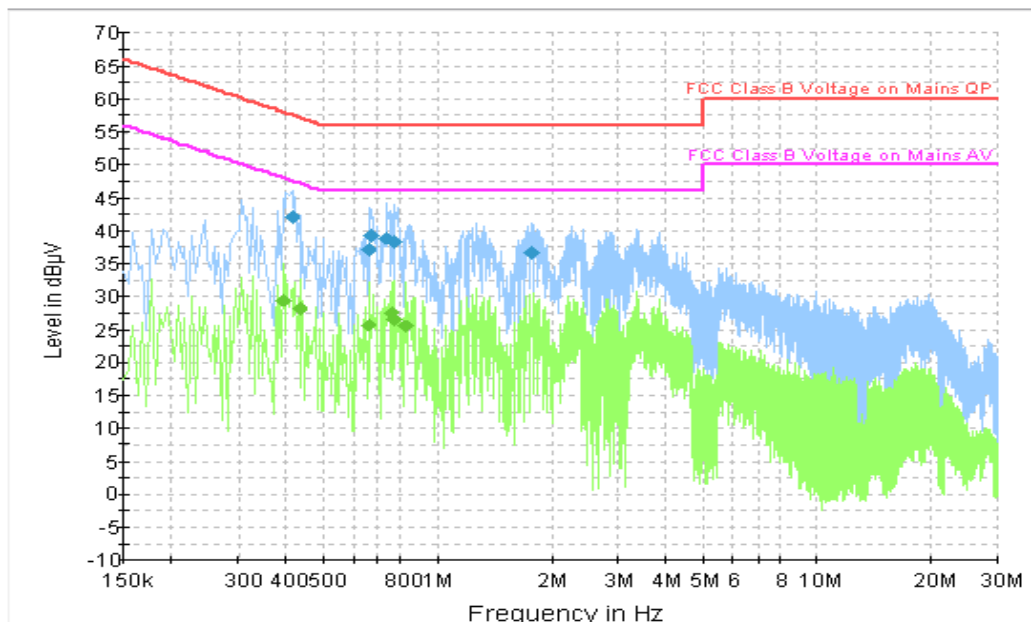


Figure A.5 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.415500	42.1	GND	L1	9.8	15.4	57.5
0.658500	37.2	GND	L1	9.8	18.8	56.0
0.672000	39.2	GND	L1	9.8	16.8	56.0
0.739500	38.9	GND	L1	9.8	17.1	56.0
0.775500	38.4	GND	L1	9.8	17.6	56.0
1.779000	36.6	GND	L1	9.7	19.4	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.393000	29.5	GND	L1	9.8	18.5	48.0
0.433500	28.2	GND	L1	9.8	19.0	47.2
0.658500	25.6	GND	L1	9.8	20.4	46.0
0.757500	27.6	GND	L1	9.8	18.4	46.0
0.775500	26.4	GND	L1	9.8	19.6	46.0
0.825000	25.6	GND	L1	9.8	20.4	46.0

USB Mode, Set.3

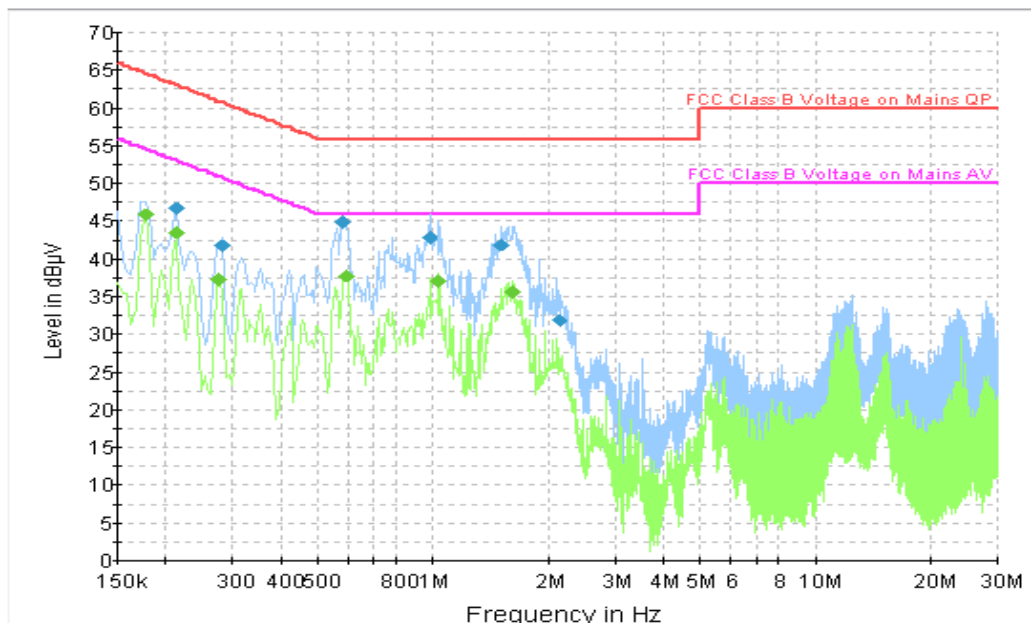


Figure A.6 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.213000	46.7	GND	N	9.8	16.4	63.1
0.280500	41.7	GND	N	9.8	19.1	60.8
0.582000	44.9	GND	L1	9.8	11.1	56.0
0.982500	42.9	GND	L1	9.7	13.1	56.0
1.513500	41.9	GND	L1	9.7	14.1	56.0
2.148000	31.9	GND	N	9.7	24.1	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.177000	45.9	GND	N	9.8	8.7	54.6
0.213000	43.5	GND	N	9.8	9.6	53.1
0.276000	37.3	GND	N	9.8	13.7	50.9
0.595500	37.8	GND	N	9.8	8.2	46.0
1.036500	37.1	GND	N	9.7	8.9	46.0
1.617000	35.6	GND	N	9.7	10.4	46.0

END OF REPORT