TEST REPORT

No. 2013EEB00530-EMC

for

Shenzhen Sang Fei Consumer Communications Co., Ltd

WG-Raptor

Model Name: Philips W3500

Marketing Name: W3500

FCC ID: VQRCTW3500

with

Hardware Version: TMAO

Software Version: Philips_T3500_WCDMA_4+8_GPS_V1.0_20131031

Issued Date: 2013-12-06

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
Address:	No. 12 Building, Shangsha Innovation and Technology Park, Futian District
Postal Code:	518048
Telephone:	+86(0)755-33322000
Fax:	+86(0)755-33322001

1.2. Testing Environment

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

1.3. Project data

Testing Start Date:	2013-11-11
Testing End Date:	2013-12-05

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:	Shenzhen Sang Fei Consumer Communications Co., Ltd
Address /Post:	11 Science and Technology Road, Shenzhen Hi-tech Industrial Park, Nanshan District, Shenzhen, PRC
City:	Shenzhen
Postal Code:	518057
Country:	China
Telephone:	0755-86138466
Fax:	0755-26503914

2.2. Manufacturer Information

Company Name:	Shenzhen Sang Fei Consumer Communications Co., Ltd
Address /Post:	11 Science and Technology Road, Shenzhen Hi-tech Industrial Park, Nanshan District, Shenzhen, PRC
City:	Shenzhen
Postal Code:	518057
Country:	China
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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	WG-Raptor
Model Name	Philips W3500
Marketing Name	W3500
FCC ID	VQRCTW3500

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	862813026600158	TMAO	Philips_T3500_WCDMA_4+8_GPS_V1.0_20131031

*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	AB2200AWML
Manufacturer	SHENZHEN CYCLELONG POWER-TECH CO.LTD.
Capacitance	2200mAh
Nominal Voltage	3.7V

AE2-1

Model	A31-500650
Manufacturer	dongguan aohai power technology co.Ltd
Length of DC line	80cm

AE2-2

Model	3208SF
Manufacturer	Salcomp Co., Ltd. (Shenzhen)
Length of DC line	80cm

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 + AE3	USB mode
Set.3	EUT1+ AE1 + AE2-2	Charging 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	2013.12.21	1 year
4	BiLog Antenna	VULB9163	9163 330	Schwarzbeck	2014.02.24	3 years
5	LISN	ESH2-Z5	100196	R&S	2014.01.23	1 year
6	Dual-Ridge Waveguide Horn Antenna	3117	00066577	ETS-Lindgren	2016.04.01	3 years
7	Universal Radio Communication Tester	E5515C	GB47460389	Agilent	2014.08.01	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 of emission (MHz)	Field strength (microvolts/meter)
30-88	100
88-216	150
216-960	200
Above 960	500

*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
1000-4000	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

Frequency(MHz)	Result(dBuV/m)	A_{Rpl} (dB)	P_{mea}(dBuV)	Polarity
1152	32.4	-5.1	37.5	V
1276	30.2	-4.4	34.6	H
1865	33.5	-0.1	33.6	V
2357	37.7	1.7	36	V
3126.375	34.8	3.2	31.6	H
3239.875	35.7	3.3	32.4	H

Set.2 USB mode

Frequency(MHz)	Result(dBuV/m)	A_{Rpl} (dB)	P_{Mea}(dBuV)	Polarity
1075	38.9	-5.6	44.5	V
1500	45.5	-3.4	48.9	V
1596	39.7	-2.5	42.2	V
2357	38	1.7	36.3	V
3000.125	38	3	35	V
3559.625	34.2	3.7	30.5	H

Set.3 Charging mode

Frequency(MHz)	Result(dBuV/m)	A_{Rpl} (dB)	P_{mea}(dBuV)	Polarity
1152	35.6	-5.1	40.7	V
1320	31.2	-4.2	35.4	H
1988	33.7	0.9	32.8	V
2357	38.7	1.7	37	V
2651	35.1	2.3	32.8	V
3240.125	35	3.3	31.7	H

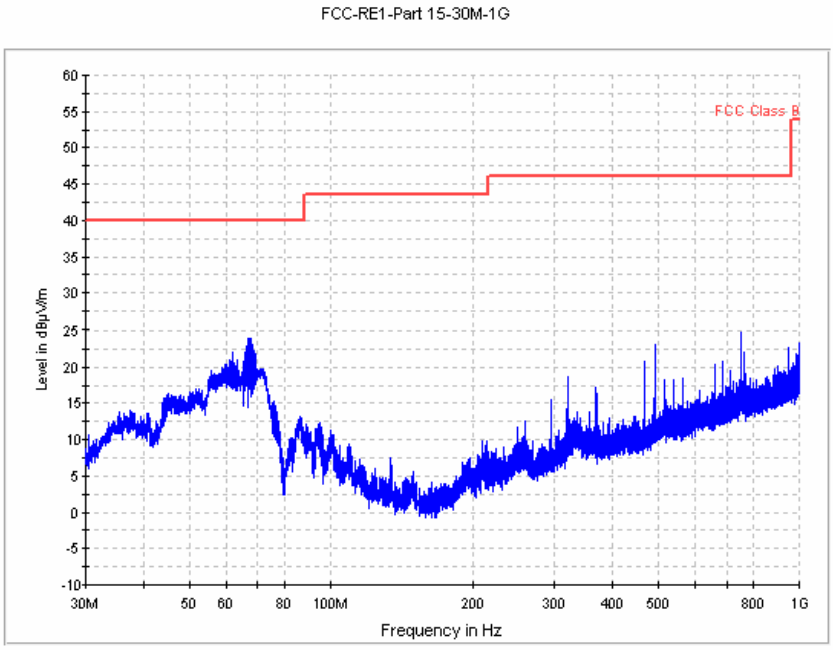

Figure A.1 Radiated Emission from 30MHz to 1GHz (Set.1, Charging mode)

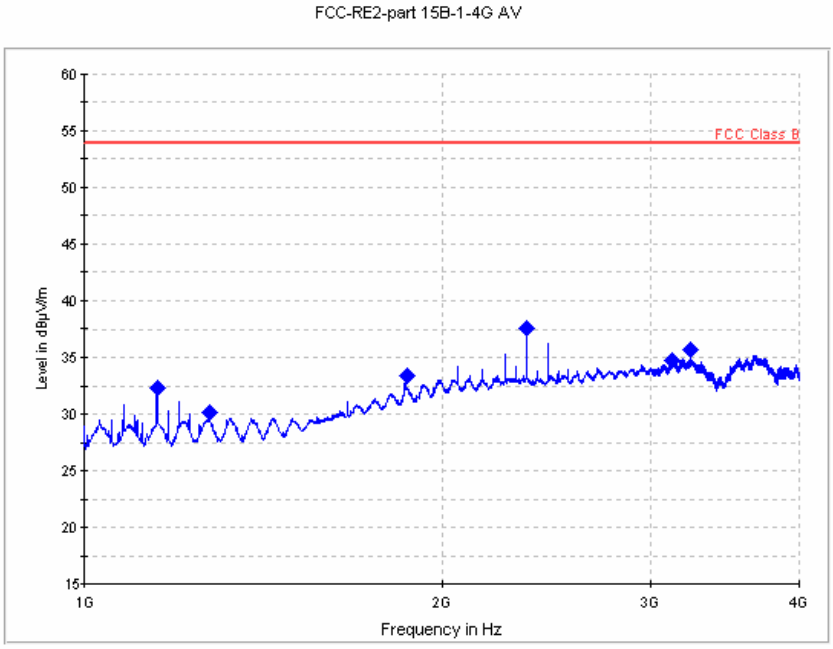

Figure A.2 Radiated Emission from 1GHz to 4GHz (Set.1, Charging mode)

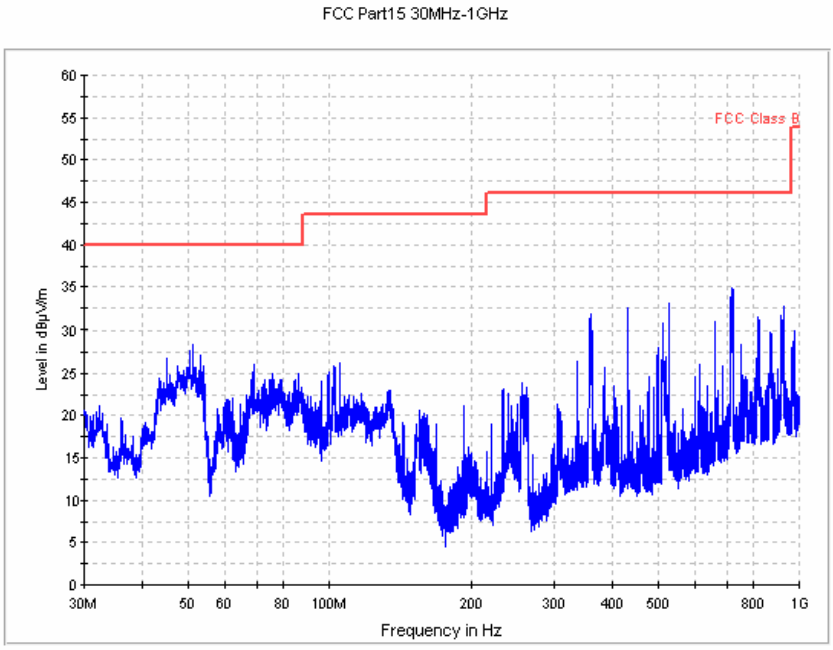

Figure A.3 Radiated Emission from 30MHz to 1GHz (Set.2, USB mode)

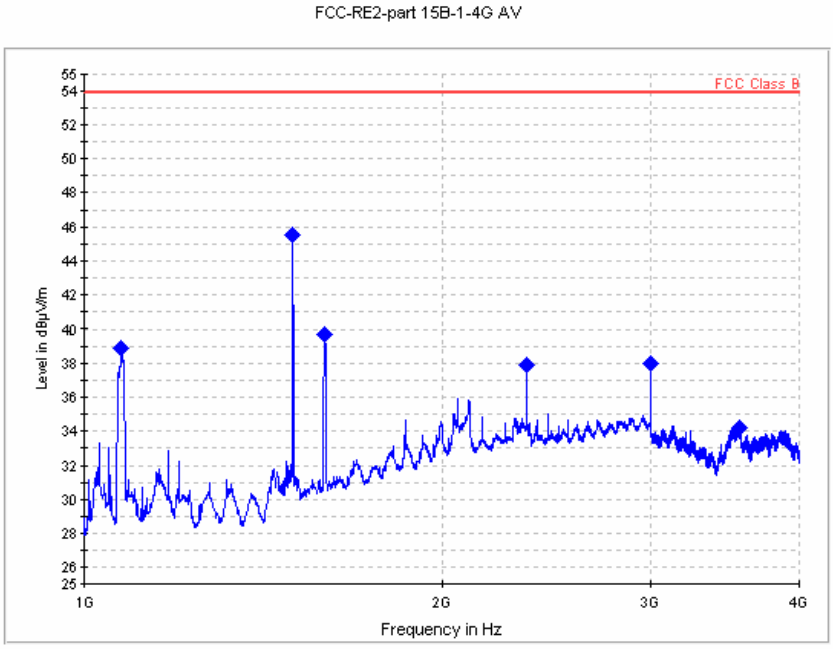

Figure A.4 Radiated Emission from 1GHz to 4GHz (Set.2, USB mode)

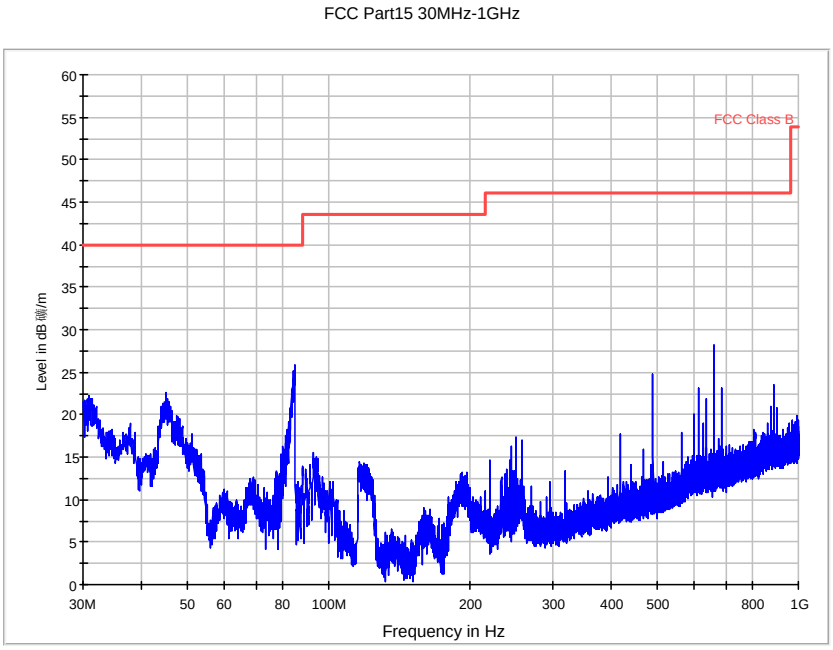

Figure A.5 Radiated Emission from 30MHz to 1GHz (Set.3, Charging mode)

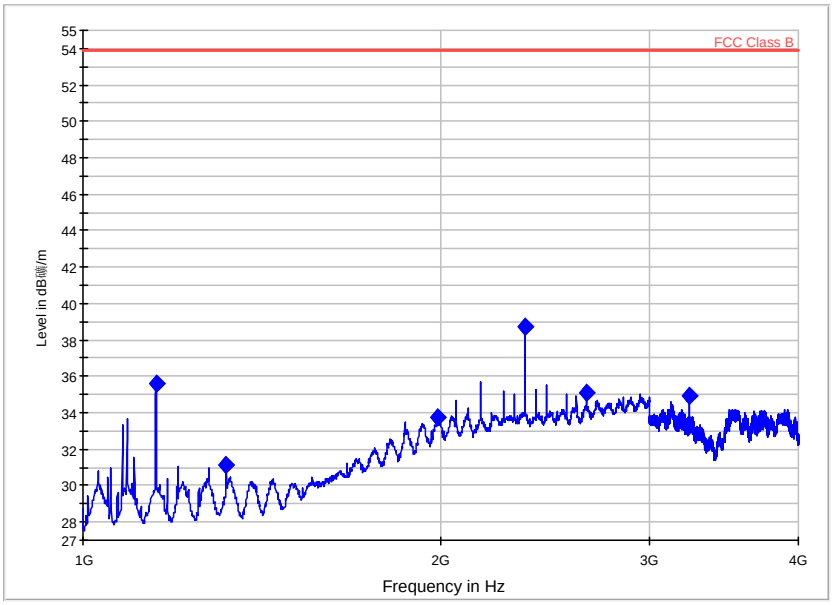

Figure A.6 Radiated Emission from 1GHz to 4GHz (Set.3, Charging mode)

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

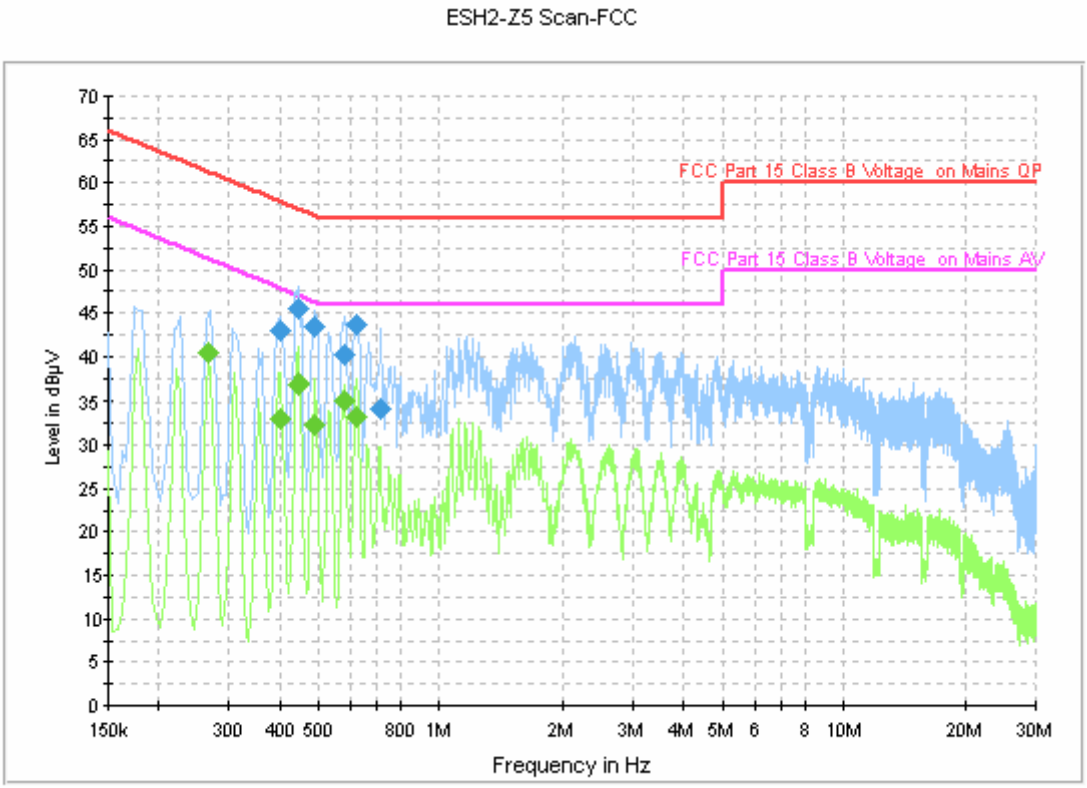

Figure A.7 Conducted Emission (Set.1, Charging mode)

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.402000	43.0	FLO	L1	10.0	14.8	57.8
0.446000	45.5	FLO	L1	10.0	11.5	56.9
0.490000	43.5	FLO	L1	10.0	12.7	56.2
0.582000	40.1	FLO	L1	10.1	15.9	56.0
0.622000	43.7	FLO	L1	10.0	12.3	56.0
0.714000	34.1	FLO	N	10.0	21.9	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.266000	40.4	FLO	L1	10.0	10.8	51.2
0.402000	33.1	FLO	L1	10.0	14.7	47.8
0.446000	37.0	FLO	L1	10.0	9.9	46.9
0.490000	32.4	FLO	L1	10.0	13.7	46.2
0.578000	35.1	FLO	L1	10.1	10.9	46.0
0.622000	33.3	FLO	L1	10.0	12.7	46.0

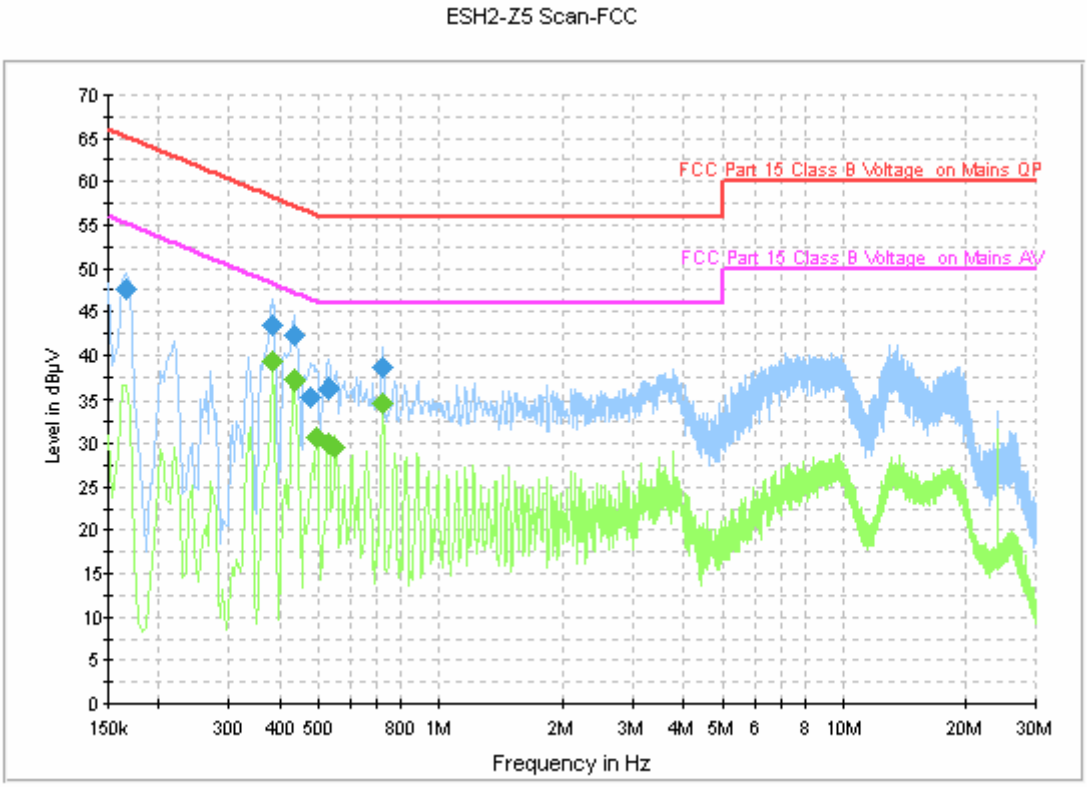

Figure A.8 Conducted Emission (Set.2, USB mode)

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	47.7	FLO	N	10.1	17.5	65.2
0.382000	43.4	FLO	N	10.0	14.9	58.2
0.434000	42.2	FLO	L1	10.0	15.0	57.2
0.478000	35.3	FLO	L1	10.0	21.1	56.4
0.530000	36.3	FLO	L1	10.0	19.7	56.0
0.718000	38.6	FLO	L1	10.0	17.4	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.386000	39.2	FLO	N	10.0	8.9	48.1
0.434000	37.3	FLO	L1	10.0	9.9	47.2
0.494000	30.7	FLO	L1	10.0	15.4	46.1
0.530000	30.1	FLO	L1	10.0	15.9	46.0
0.550000	29.6	FLO	L1	10.1	16.4	46.0
0.722000	34.7	FLO	L1	10.0	11.3	46.0

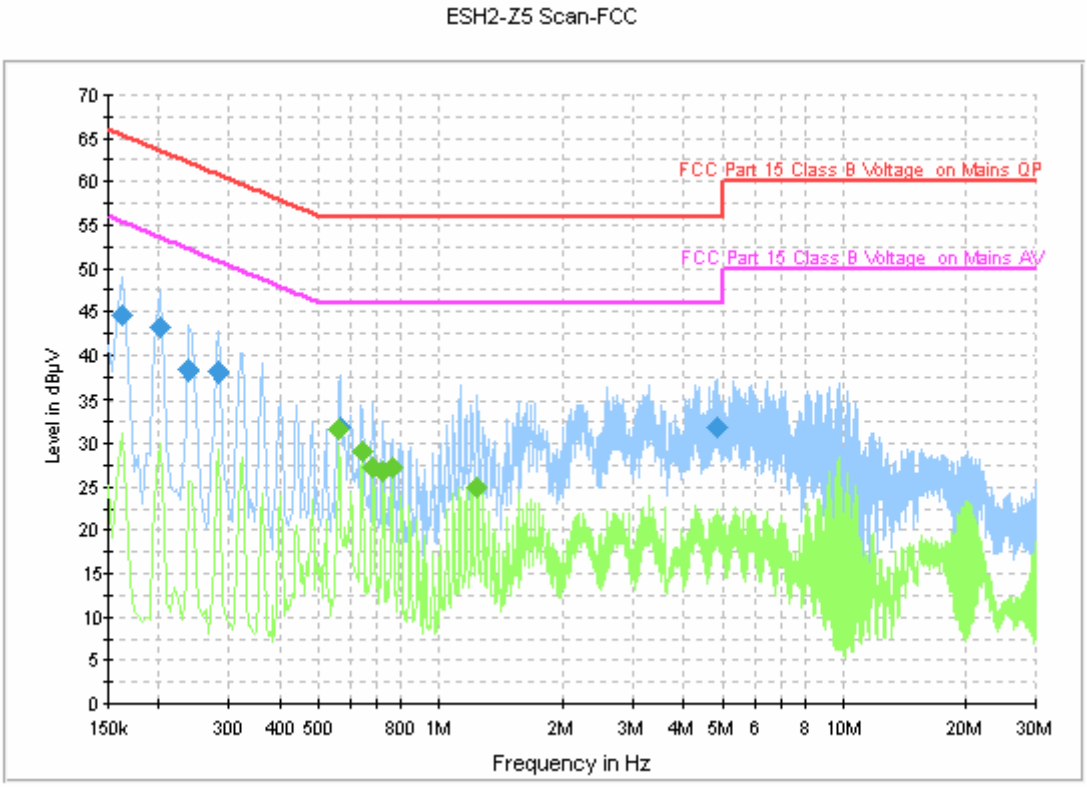

Figure A.9 Conducted Emission (Set.3, Charging mode)

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.162000	44.6	FLO	N	10.1	20.7	65.4
0.202000	43.1	FLO	N	10.1	20.4	63.5
0.238000	38.4	FLO	N	10.0	23.8	62.2
0.282000	38.2	FLO	L1	10.0	22.5	60.8
0.566000	32.0	FLO	L1	10.1	24.0	56.0
4.850000	31.9	FLO	L1	10.2	24.1	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.562000	31.5	FLO	L1	10.1	14.5	46.0
0.642000	29.1	FLO	L1	10.0	16.9	46.0
0.682000	27.2	FLO	L1	10.0	18.8	46.0
0.722000	26.7	FLO	L1	10.0	19.3	46.0
0.762000	27.2	FLO	L1	10.1	18.8	46.0
1.242000	25.1	FLO	L1	10.1	20.9	46.0

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