



Part 15B TEST REPORT

No. 2012TAR043

for

Sierra Wireless Inc.

Mobile Hotspot

Model Name: AirCard 763S

FCC ID: N7NAC763S

IC: 2417C-AC763S

Issued Date: 2012-01-19

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:

DAR accreditation (DIN EN ISO/IEC 17025): No. DGA-PL-114/01-02

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

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT
Address: No 52, Huayuan beilu, Haidian District, Beijing, P. R. China
Postal Code: 100191
Telephone: 00861062304633-2678
Fax: 00861062304633-2504

1.2. Testing Environment

Normal Temperature: 15-35°C
Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: Dec. 23, 2011
Testing End Date: Dec. 28, 2011

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: Sierra Wireless Inc.
Address /Post: 13811 Wireless Way Richmond, British Columbia, Canada, V6V
3A4.
City: British Columbia
Country: Canada
Telephone: 1 604 231 1100
Fax: 1 604 231 1109

2.2. Manufacturer Information

Company Name: Sierra Wireless Inc.
Address /Post: 13811 Wireless Way Richmond, British Columbia, Canada, V6V
3A4.
City: British Columbia
Country: Canada
Telephone: 1 604 231 1100
Fax: 1 604 231 1109

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Mobile Hotspot
Model Name	AirCard 763S
FCC ID	N7NAC763S
IC	2417C-AC763S

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	001027009999999	DV1	SWI9200H2_00.00.02.02AP

*EUT ID: is used to identify the test sample in the lab internally.

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	July 10, 2008 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 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 70 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Normalised site attenuation (NSA)	< ±3.5 dB, 3 m distance, from 30 to 1000 MHz

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

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 70 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz
Site voltage standing-wave ratio	< 6 dB, 3 m distance, from 1000 to 18000 MHz

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

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =35 %, Max. = 80 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω

ESD test room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %

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.	NAME	TYPE	SERIES NUMBER	PRODUCER	CAL DUE DATE
1	Test Receiver	ESCI	100701	R&S	2012.08.04
2	Test Receiver	ESCI	100702	R&S	2012.08.04
3	BiLog Antenna	VULB9163	9163-329	Schwarzbeck	2014.02.24
4	LISN	ESH2-Z5	100196	R&S	2012.01.26
5	Spectrum Analyzer	FSP40	100378	R&S	2012.11.22
6	Universal Radio Communication Tester	CMU200	114545	R&S	2012.03.24
7	Universal Radio Communication Tester	E5515C	GB47460389	Agilent	2012.09.20
8	Dual-Ridge Waveguide Horn Antenna	3117	00066577	ETS	2013.03.31
9	Dual-Ridge Waveguide Horn Antenna	3117	00066585	ETS	2013.03.31
10	PC	ThinkCentre M4099t	SA08850737	Lenovo	N/A
11	Monitor	ThinkVision L1710A	3M0433981920957	Lenovo	N/A
12	Printer	Laserjet P1008	VNF6C12491	HP	N/A
13	Keyboard	KU-0225	0326342	Lenovo	N/A
14	Mouse	MO28UOL	4408458	Lenovo	N/A
15	Anechoic Chamber	FAC-T5-2.0	343074	ETS	2012.11.17

ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission

Reference

FCC: CFR Part 15.109(a)

A.1.1 Method of measurement

The field strength of radiated emissions from the unintentional radiator 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:

A.1.2.1 Charging Mode:

During the test, The EUT is connected to a charger, the EUT is operating in the charging mode.

A.1.2.2 USB Mode:

During the test, The EUT is connected to a PC via a USB cable. The model of the PC is Lenovo ThinkCentre M4099t, and the serial number of the PC is SA08850737.

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

A.1.4 Test Condition

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100kHz/300kHz	5
1000-18000	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:

$$\text{Result} = P_{\text{Mea}} + A_{\text{Rpl}} = P_{\text{Mea}} + G_A + G_{\text{PL}}$$

Where

G_A : Antenna factor of receive antenna

G_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Charging Mode

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{mea} (dBuV)	Polarity
87.677	38.38	-15.5	11.2	42.68	VERTICAL
94.031	41.51	-15.8	11.7	45.61	VERTICAL
97.184	39.62	-15.6	11.2	44.02	VERTICAL
109.678	38.71	-15.5	13.4	40.81	VERTICAL
181.871	38.74	-15.8	14.3	40.24	VERTICAL
184.803	41.39	-15.8	16.3	40.89	VERTICAL

USB Mode

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{mea} (dBuV)	Polarity
30.514	33.78	-14.3	10.9	37.18	VERTICAL
30.728	33.69	-14.3	10.9	37.09	VERTICAL
79.814	29.84	-14.6	11.1	33.34	VERTICAL
291.140	29.65	-14.9	17.6	26.95	VERTICAL
291.440	30.01	-14.9	17.6	27.31	VERTICAL
300.020	30.08	-14.9	17.6	27.38	VERTICAL

Charging Mode

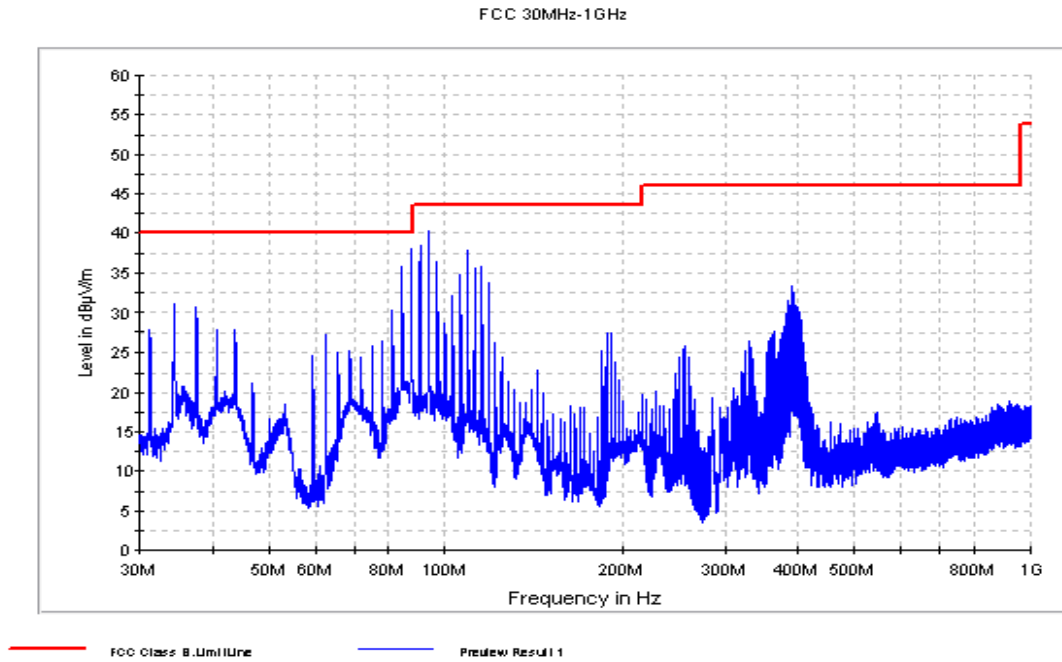


Figure A.1 Radiated Emission from 30MHz to 1GHz

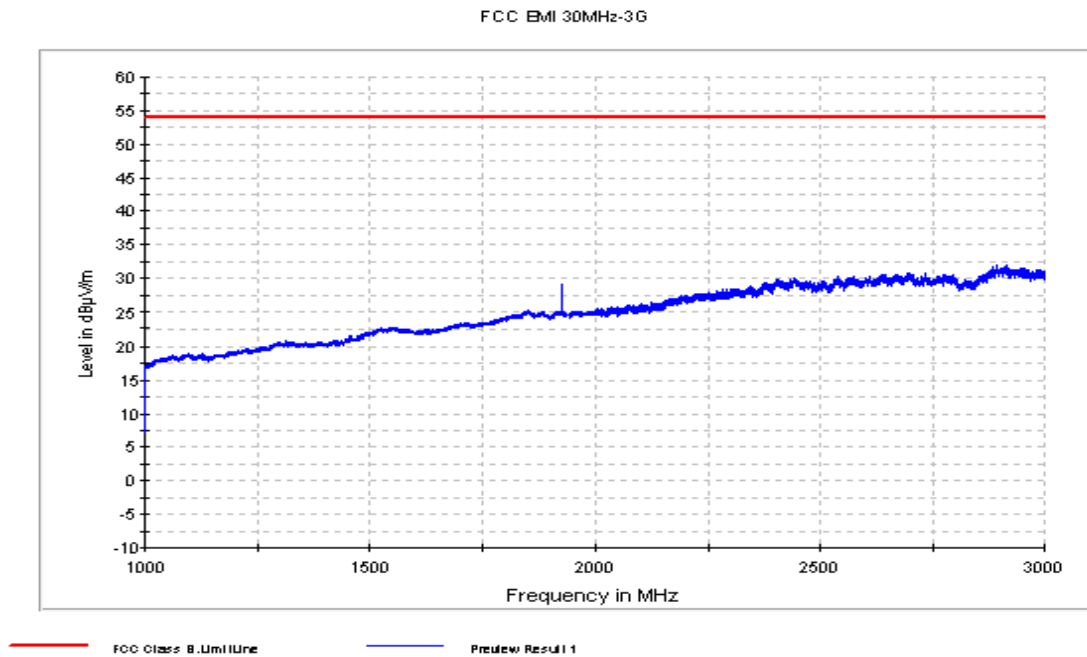


Figure A.2 Radiated Emission from 1GHz to 3GHz

FCC Part EMI 1-18G

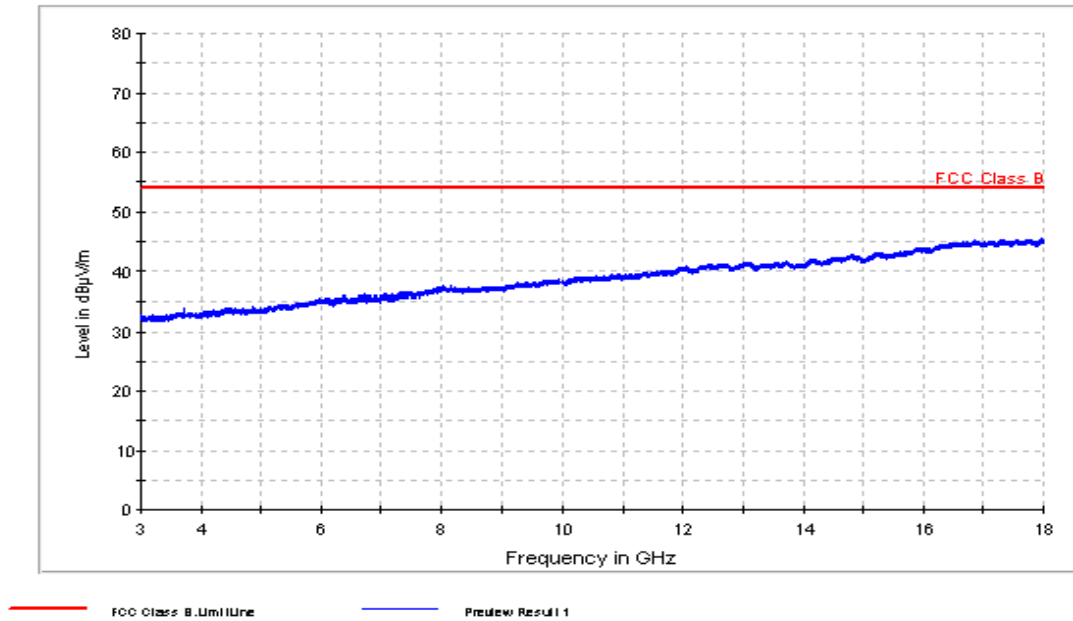


Figure A.3 Radiated Emission from 3GHz to 18GHz

USB Mode

FCC 30MHz-1GHz

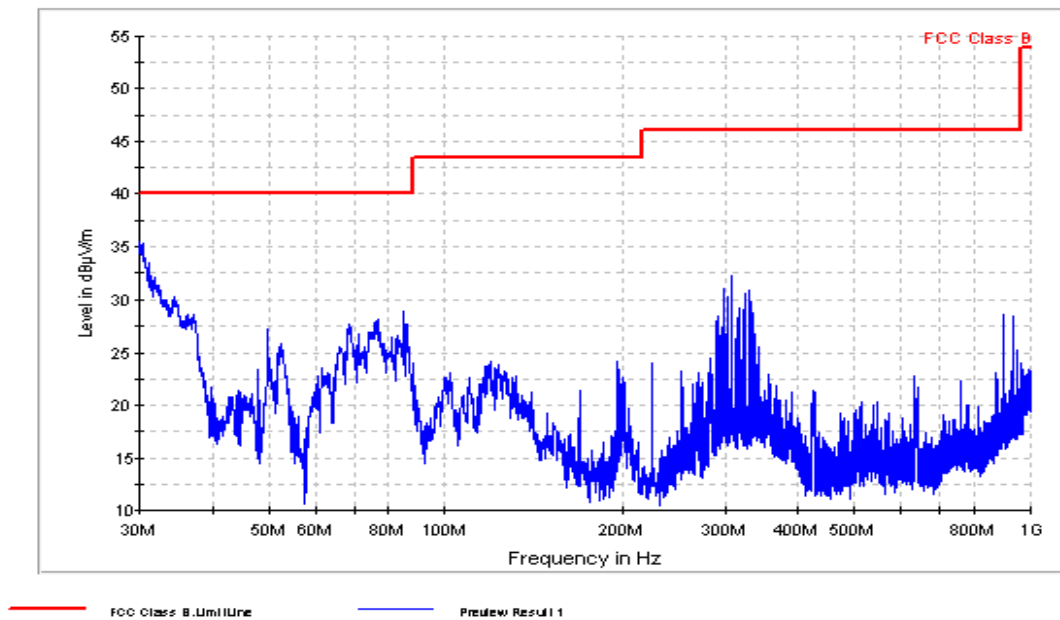


Figure A.4 Radiated Emission from 30MHz to 1GHz

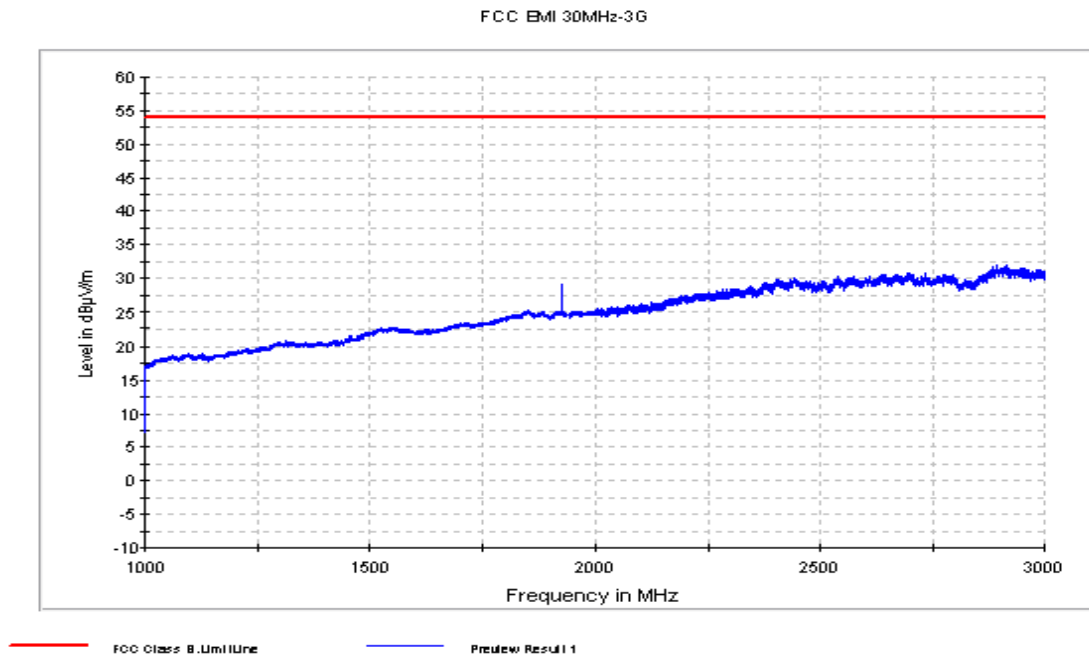


Figure A.5 Radiated Emission from 1GHz to 3GHz

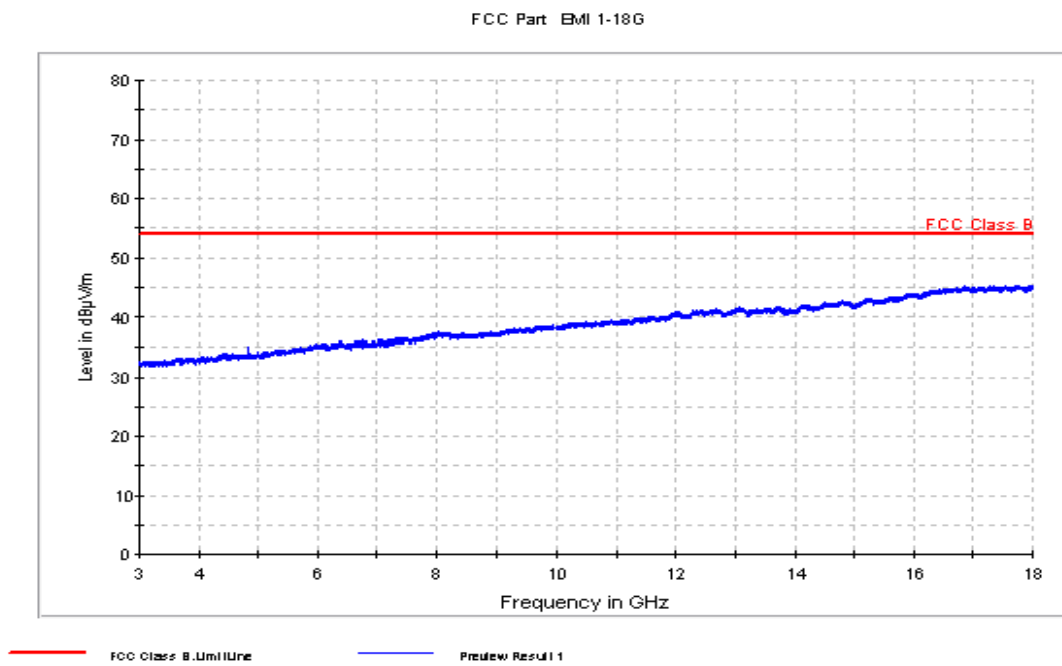


Figure A.6 Radiated Emission from 3GHz to 18GHz

A.2 Conducted Emission

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:

A.2.2.1 Charging Mode:

During the test, The EUT is connected to a charger, the EUT is operating in the charging mode.

A.2.2.2 USB Mode:

During the test, The EUT is connected to a PC via a USB cable. The model of the PC is Lenovo ThinkCentre M4099t, and the serial number of the PC is SA08850737. .

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	Sweep Time(s)
9kHz	1

A.2.5 Measurement Results
Charging Mode

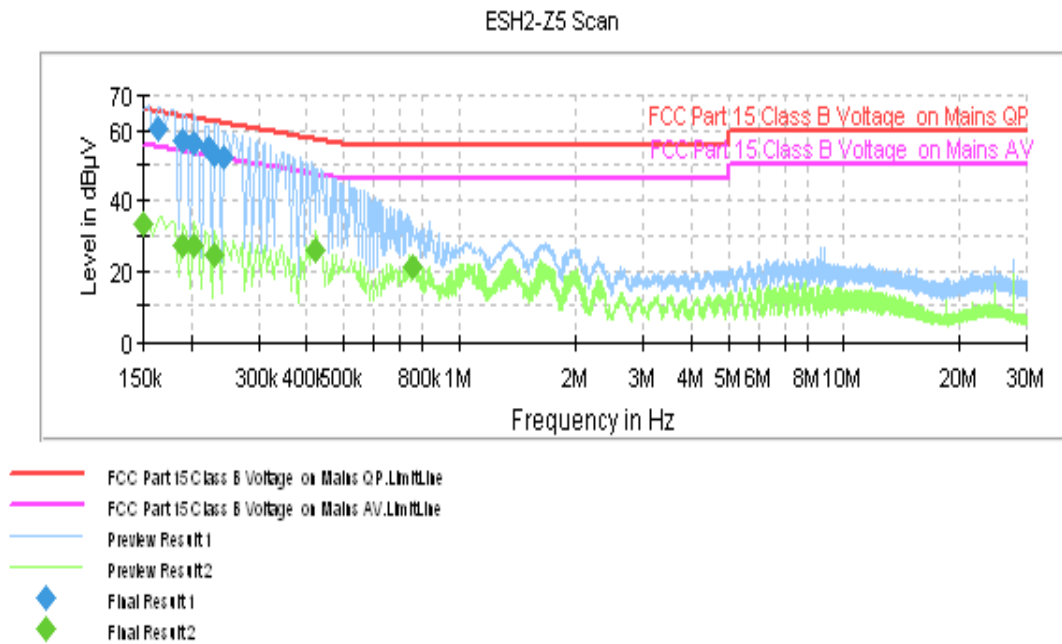


Figure A.4 Conducted Emission (Charging mode)

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.163500	60.3	FLO	L1	10.0	5.0	65.3
0.190500	56.8	FLO	L1	10.0	7.2	64.0
0.204000	56.6	FLO	N	10.1	6.8	63.4
0.222000	55.0	FLO	L1	10.0	7.7	62.7
0.231000	52.8	FLO	L1	10.0	9.6	62.4
0.244500	52.4	FLO	L1	10.0	9.5	61.9

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	33.1	FLO	N	10.1	22.9	56.0
0.190500	27.2	FLO	L1	10.0	26.8	54.0
0.204000	27.4	FLO	L1	10.0	26.0	53.4
0.231000	24.5	FLO	N	10.0	27.9	52.4
0.424500	26.0	FLO	L1	10.0	21.4	47.4
0.757500	20.7	FLO	N	10.1	25.3	46.0

USB Mode

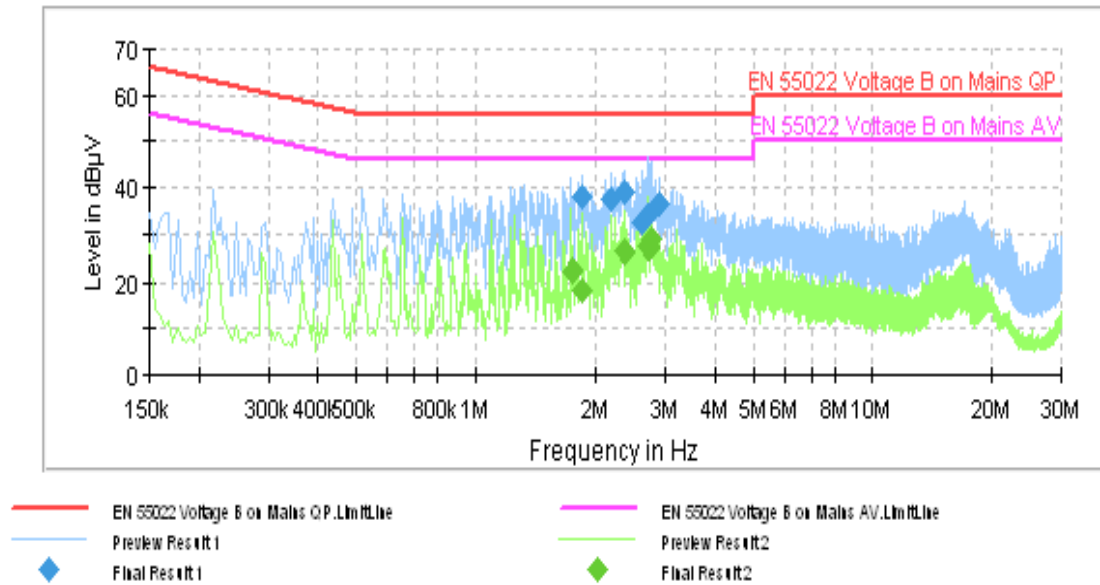


Figure A.4 Conducted Emission (USB mode)

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.842000	38.3	10.1	17.7	56.0
2.175000	37.7	10.1	18.3	56.0
2.359500	38.9	10.1	17.1	56.0
2.611500	32.5	10.2	23.5	56.0
2.688000	33.8	10.2	22.2	56.0
2.890500	36.7	10.1	19.3	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.743000	22.1	10.1	23.9	46.0
1.842000	18.2	10.1	27.8	46.0
2.359500	26.5	10.1	19.5	46.0
2.688000	27.6	10.2	18.4	46.0
2.719500	27.3	10.2	18.7	46.0
2.764500	28.7	10.1	17.3	46.0

END OF REPORT