


EMC TEST REPORT	
FCC 47 CFR Part 15B	
Industry Canada RSS-Gen	
Electromagnetic compatibility - Unintentional radiators	
Report Reference No.	G0M-1110-1481 – C-1
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	FCC Filed Test Laboratory, Reg.-No.: 96970 A2LA Accredited Testing Laboratory, Certificate No.: 1983.01
 TESTING CERT# 1983.01	
Applicant's name	Changers GmbH
Address	Bleibtreustr. 53 10623 Berlin Germany
Test specification:	
Standard	47 CFR Part 15 Subpart B RSS-Gen, Issue 3, 2010-12 ANSI C63.4:2009
Equipment under test (EUT):	
Product description	Battery charger to charge mobile devices
Product Type	Mobile battery charger
Model No.	1021
Brand Name	Kalhuofummi
Hardware version	V2
Firmware / Software version	V 1.21
	FCC-ID: Z6L-1021 IC: N/A
Test result	Passed

Possible test case verdicts:

- not applicable to test object: N/A
- test object does meet the requirement.....: P (Pass)
- test object does not meet the requirement.....: F (Fail)

Testing:

Date of receipt of test item: 24.10.2011

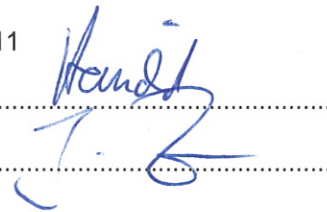
Date (s) of performance of tests: 27.10.2011 - 28.10.2011

Tested by (+ signature).....: Matthias Handrik

Approved by (+ signature): Jens Zimmermann

Date of issue: 03.11.2011

Total number of pages.....: 26


General remarks:

The test results presented in this report relate only to the object tested.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

Additional comments:

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1 Equipment (Test item) Description:

Description	Mobile battery charger
Model	1021
Serial number	6949866
Hardware version	V2
Software / Firmware version	V 1.21
FCC-ID	Z6L-1021
Power supply	5VDC over USB Port or solar module or 120VAC AC/DC Adapter
Manufacturer	Betec Magyarország Kft. Nagy-berki út 8/1 7634 Pécs Hungary
AC/DC-Adaptor	Model : SYS1308-2412-W2E Manufacturer : Sunload Input : 100-240VAC / 50-60Hz Output : 12VDC / 2.0A
Highest emission frequency	Fmax [MHz] = 64
Device classification	Class B
Equipment type	Tabletop
Number of tested samples	1

1.2 Supporting Equipment Used During Testing:

Product Type*	Device	Manufacturer	Model No.	Comments
AE	Laptop	DELL	Latitude D430	
AE	Resistor		6 Ω 250Watt	
AE	Solar Panel	Maroshi		
*Note: Use the following abbreviations: AE : Auxiliary/Associated Equipment, or SIM : Simulator (Not Subjected to Test) CABL : Connecting cables				

1.3 Input/Output Ports

Port #	Name	Type*	Cable Max. >3m	Cable Shielded	Comments
1	Solar Panel	DC			Solar / DC in
2	Micro-USB	USB		Yes	Output port Data
3	DC out	USB		Yes	USB for charging external devices
*Note: Use the following abbreviations: AC : AC power port DC : DC power port N/E : Non electrical I/O : Signal input or output port TP : Telecommunication port					

1.4 Operating Modes:

Mode #	Description
1	Charging with AC/DC Adapter / 6 Ω Load
2	USB connected to PC

1.5 Test Equipment Used During Testing

Radiated emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Biconical Antenna	R&S	HK 116	Inv. No. 0012	Jan 10	Jan 13
LPD-Antenne	R&S	HL 223	Inv. No. 0295	Feb 11	Feb 13
LPD-Antenna	R&S	HL 025	Inv. No. 0512	Feb 10	Feb 13
EMI Test Receiver	R&S	ESU8	Inv. No. 0567	Dec 10	Dec 11
EMI Test Receiver	R&S	ESCS30	Inv. No. 0474	Jun 11	Jun 12

Conducted emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
AMN	R&S	ESH2-Z5	Inv. No. 0288	Sep 10	Sep 12
AMN	R&S	ESH3-Z5	Inv. No. 0040	Nov 10	Nov 12
EMI Test Receiver	R&S	ESCS 30	Inv. No. 0474	Jun 11	Jun 12

2 Result Summary

FCC 47 CFR Part 15B, Industry Canada RSS-Gen				
Product Specific Standard	Requirement – Test	Reference Method	Result	Remarks
47 CFR 15.109 RSS-Gen 4.9 & 4.10	Radiated emissions	ANSI C 63.4	PASS	
47 CFR 15.107 RSS-Gen 7.2.4	AC power line conducted emissions	ANSI C63.4	PASS	
Remarks:				

3 Test Conditions and Results

3.1 Test Conditions and Results – Radiated emissions

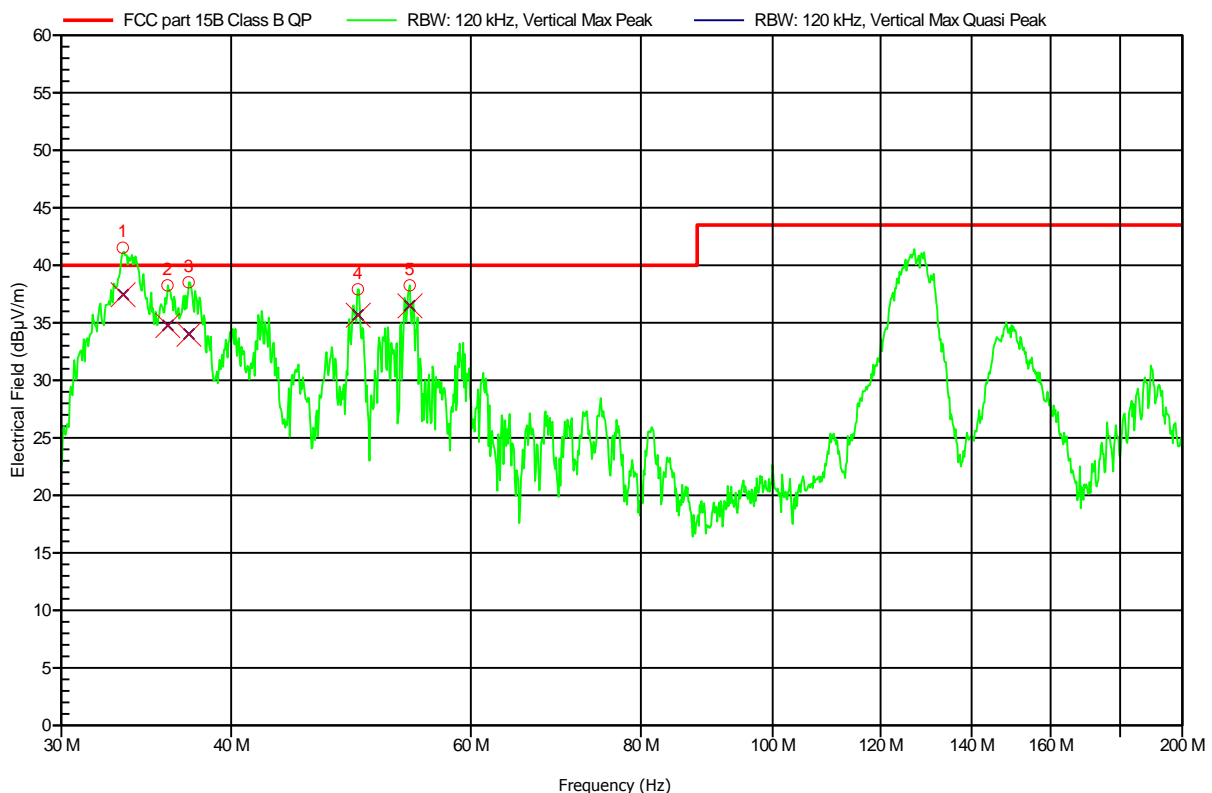
Radiated emissions acc. FCC 47 CFR 15.109 / IC RSS-Gen			Verdict: PASS	
Laboratory Parameters:		Required prior to the test		During the test
Ambient Temperature		15 to 35°C		22°C
Relative Humidity		30 to 60%		44%
Test according referenced standards		Reference Method		
		ANSI C63.4		
Sample is tested with respect to the requirements of the equipment class		Equipment class		
		Class B		
Test frequency range determined from highest emission frequency		Highest emission frequency		
		Fmax [MHz] = 64		
Fully configured sample scanned over the following frequency range		Frequency range		
		30MHz to 1GHz		
Operating mode		1 & 2		
Limits and results Class B				
Frequency [MHz]	Quasi-Peak [dBµV/m]	Result	Average [dBµV/m]	Result
30 – 88	40	PASS	-	-
88 – 216	43.5	PASS	-	-
216 – 960	46	PASS	-	-
960 – 1000	54	PASS	-	-
Comments:				

Spurious emissions under normal conditions according to FCC 15B

Order number: G0M-1110-1481

Manufacturer: Changers GmbH
 EUT Name: Mobile battery charger / Multi-Energy-Controller Charger
 Model: Changers Kalhuohfummi
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor)
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3m
 Mode: charging; 6 Ohm resistor
 Test Date: 27.10.2011
 Note: PASS

Index 1



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Status
33.3 MHz	37.46 dBµV/m	40 dBµV/m	-2.54 dB	Pass
35.916 MHz	34.78 dBµV/m	40 dBµV/m	-5.22 dB	Pass
37.224 MHz	34.03 dBµV/m	40 dBµV/m	-5.97 dB	Pass
49.566 MHz	35.68 dBµV/m	40 dBµV/m	-4.32 dB	Pass
54.108 MHz	36.49 dBµV/m	40 dBµV/m	-3.51 dB	Pass

Test Report No.: G0M-1110-1481-C-1

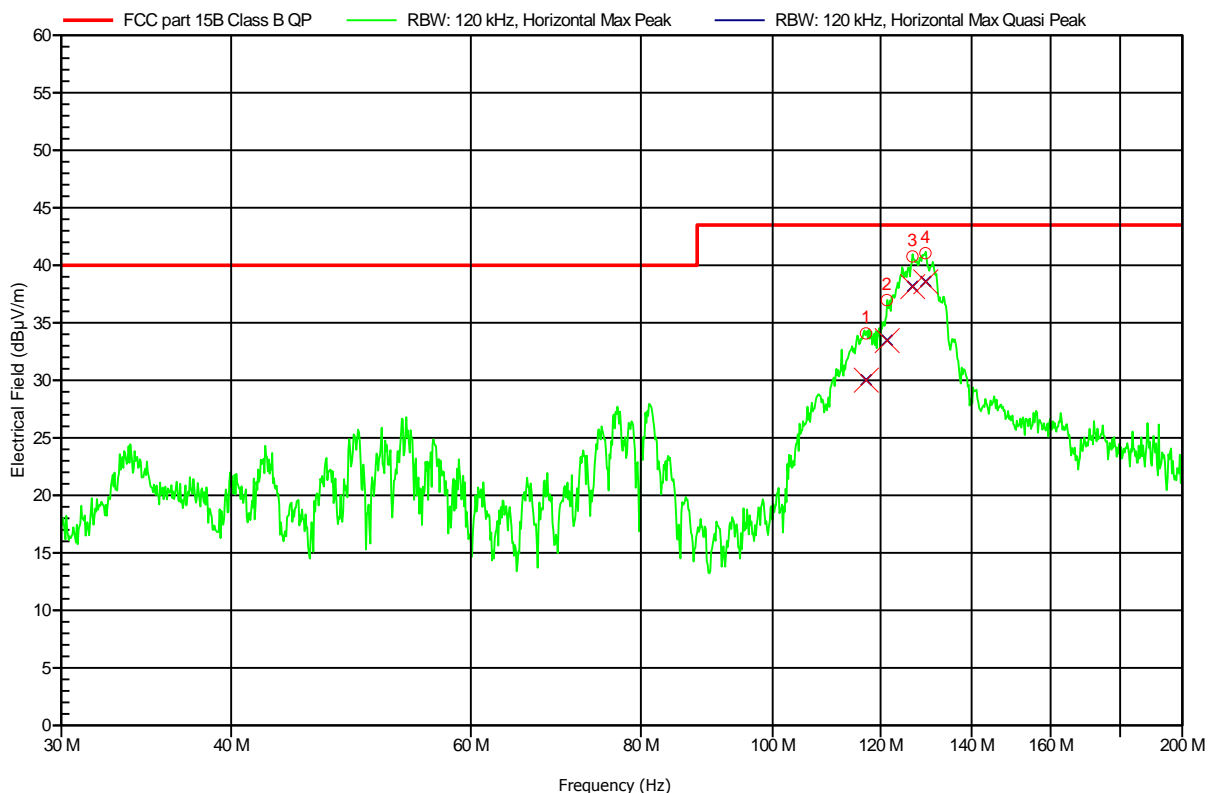
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Spurious emissions under normal conditions according to FCC 15B

Order number: G0M-1110-1481

Manufacturer: Changers GmbH
 EUT Name: Mobile battery charger / Multi-Energy-Controller Charger
 Model: Changers Kalhuohfummi
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor)
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3m
 Mode: charging; 6 Ohm resistor
 Test Date: 27.10.2011
 Note: PASS

Index 3



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Status
117.078 MHz	30.04 dBµV/m	43.5 dBµV/m	-13.46 dB	Pass
121.302 MHz	33.47 dBµV/m	43.5 dBµV/m	-10.03 dB	Pass
126.66 MHz	38.16 dBµV/m	43.5 dBµV/m	-5.34 dB	Pass
129.48 MHz	38.58 dBµV/m	43.5 dBµV/m	-4.92 dB	Pass

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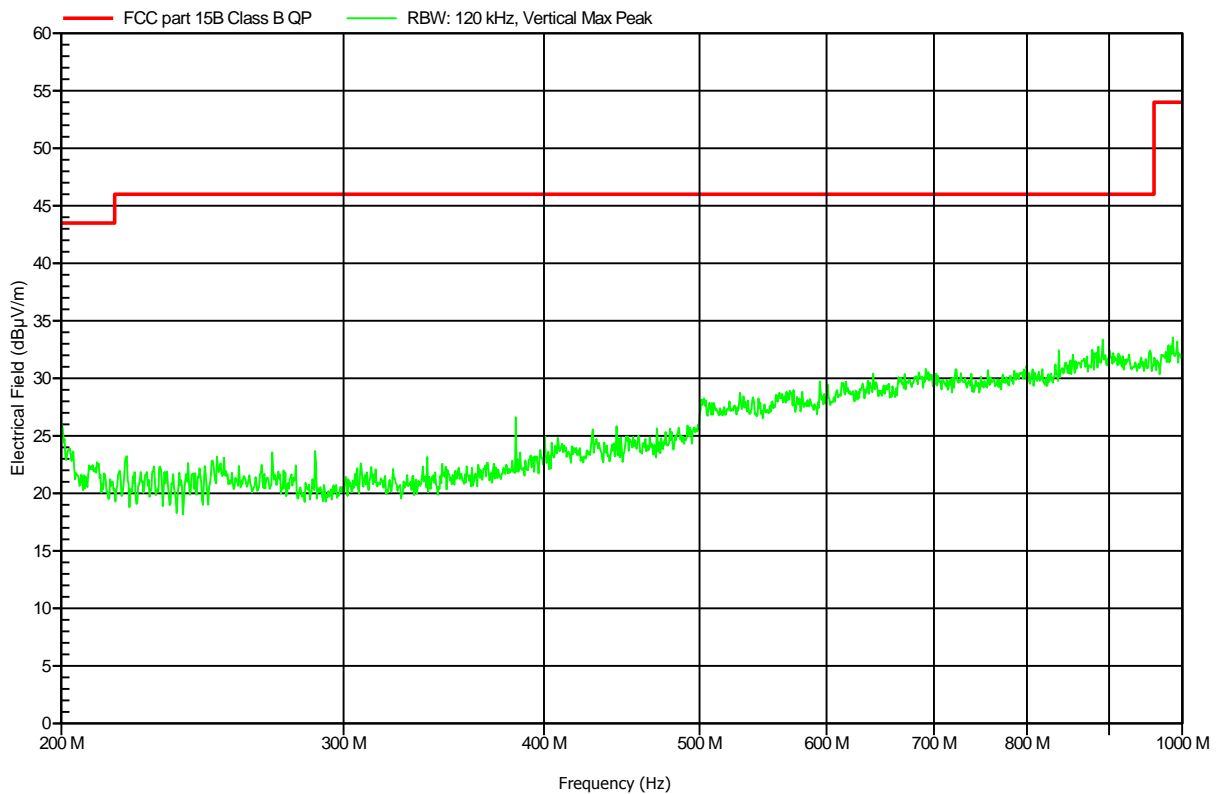
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 Storkower Str. 38c, D-15526 Reichenwalde, Germany

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EUT Name:	Mobile battery charger / Multi-Energy-Controller Charger
Model:	Changers Kalhuohfummi
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3m
Mode:	charging; 6 Ohm resistor
Test Date:	27.10.2011
Note:	PASS

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Test Report No.: G0M-1110-1481-C-1

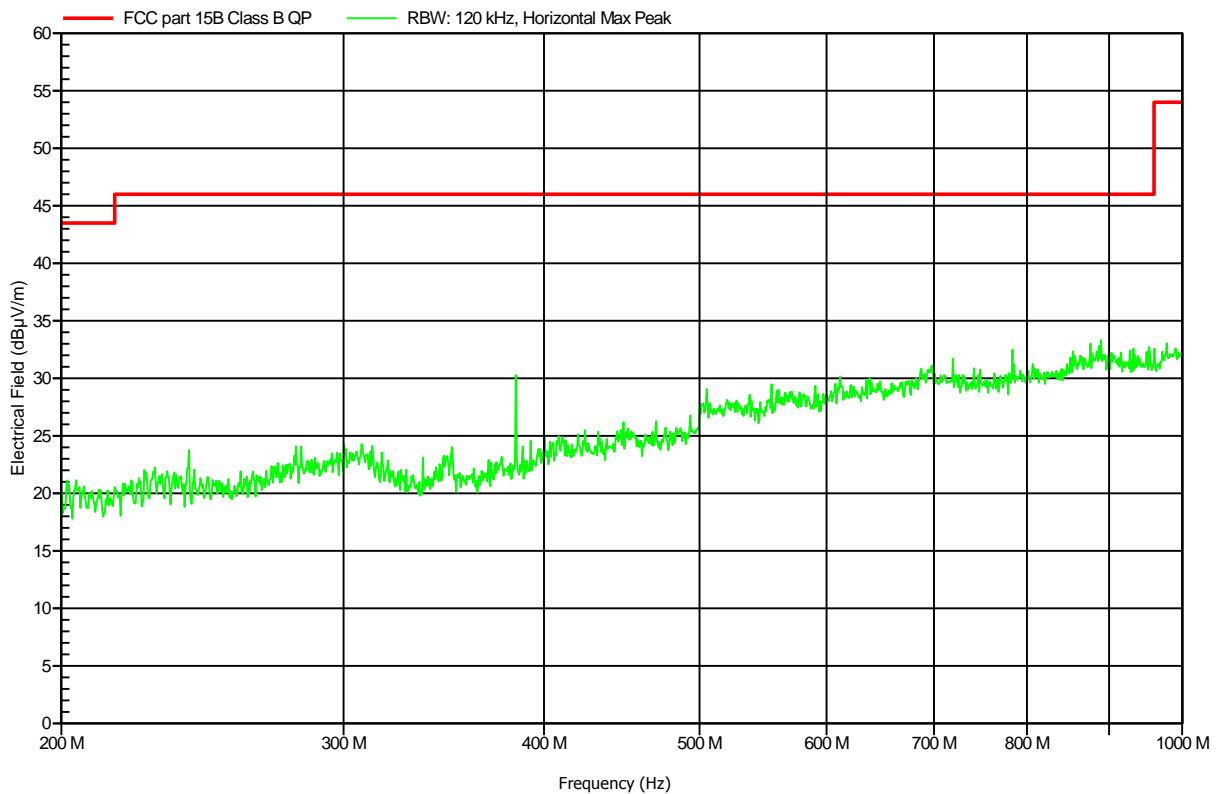
Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

Spurious emissions under normal conditions according to FCC 15B

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EUT Name:	Mobile battery charger / Multi-Energy-Controller Charger
Model:	Changers Kalhuohfummi
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3m
Mode:	charging; 6 Ohm resistor
Test Date:	27.10.2011
Note:	PASS

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Test Report No.: G0M-1110-1481-C-1

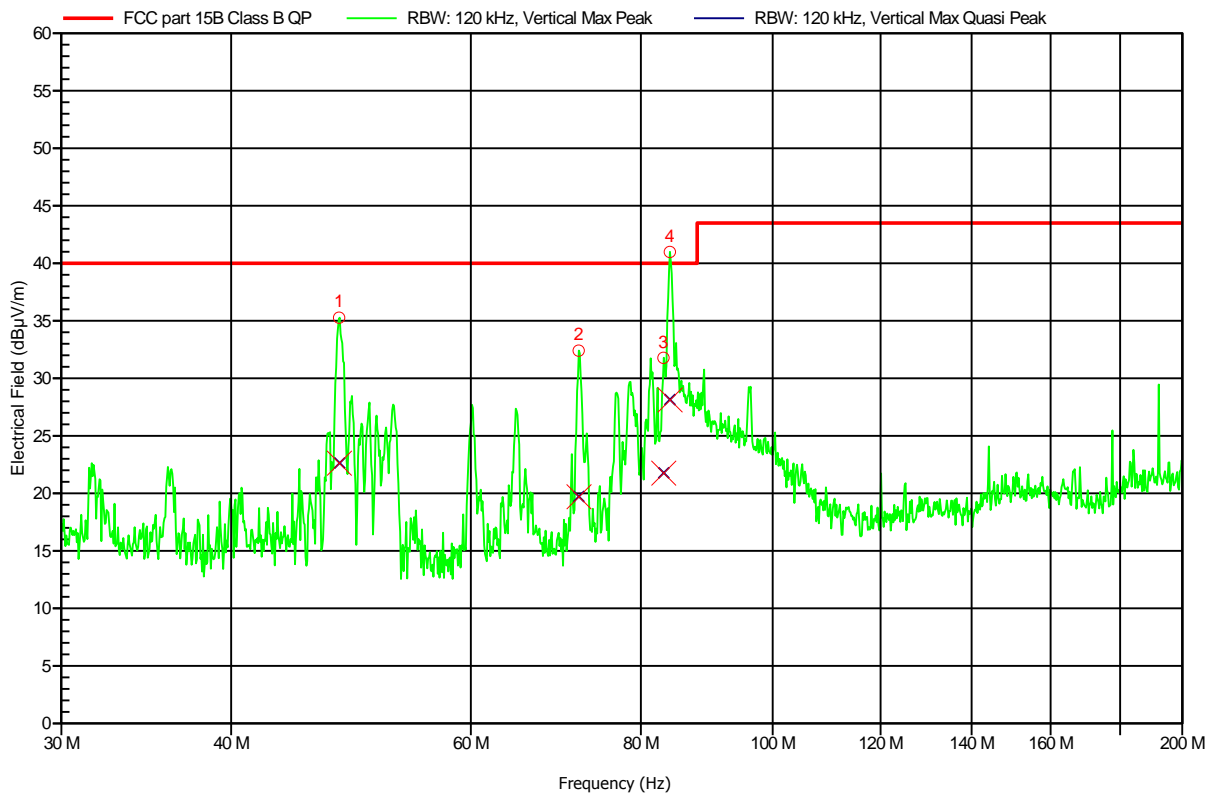
Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

Spurious emissions under normal conditions according to FCC 15B

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Manufacturer: Changers GmbH
 EUT Name: Mobile battery charger / Multi-Energy-Controller Charger
 Model: Changers Kalhuohfummi
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor)
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3m
 Mode: connected to PC; 6 Ohm resistor; Solar pannel
 Test Date: 27.10.2011
 Note: PASS

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Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Status
48.018 MHz	22.64 dBµV/m	40 dBµV/m	-17.36 dB	Pass
72.012 MHz	19.72 dBµV/m	40 dBµV/m	-20.28 dB	Pass
83.112 MHz	21.78 dBµV/m	40 dBµV/m	-18.22 dB	Pass
84.03 MHz	28.15 dBµV/m	40 dBµV/m	-11.85 dB	Pass

Test Report No.: G0M-1110-1481-C-1

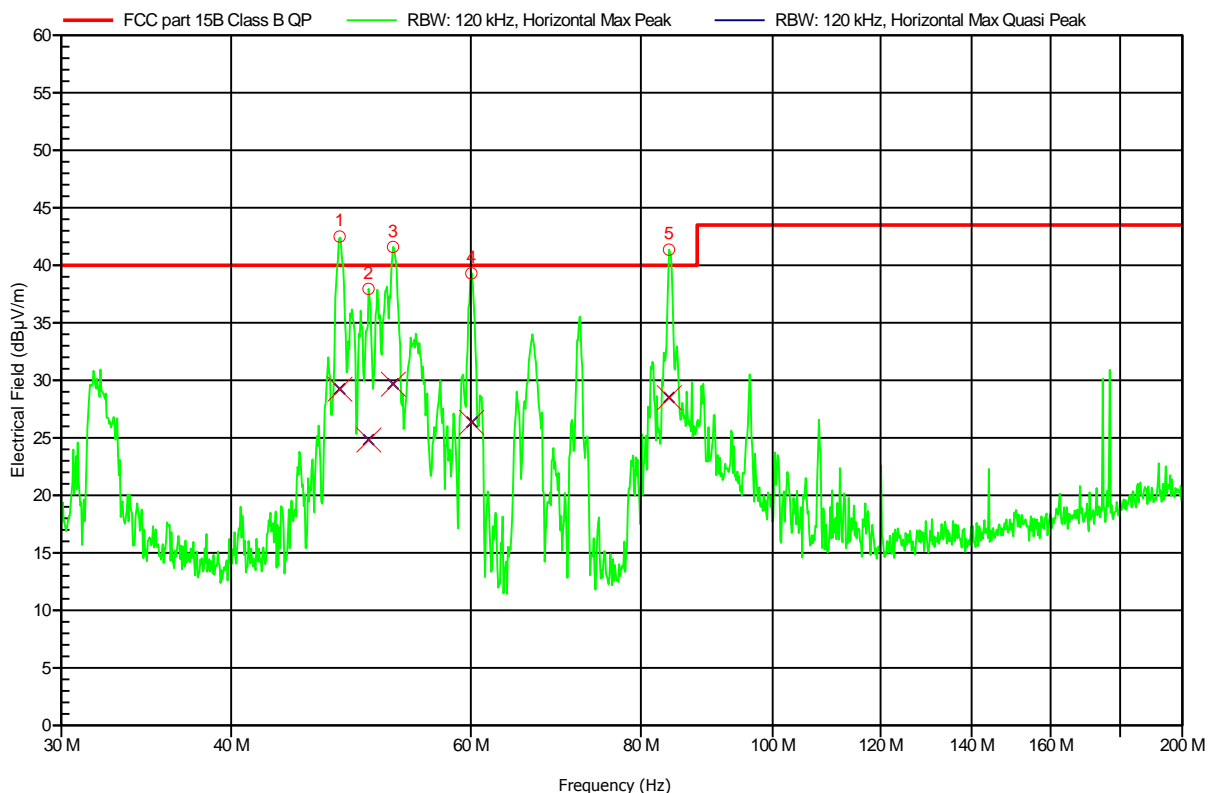
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Spurious emissions under normal conditions according to FCC 15B

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 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor)
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3m
 Mode: connected to PC; 6 Ohm resistor; Solar pannel
 Test Date: 27.10.2011
 Note: PASS

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Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Status
48.06 MHz	29.25 dBµV/m	40 dBµV/m	-10.75 dB	Pass
50.466 MHz	24.84 dBµV/m	40 dBµV/m	-15.16 dB	Pass
52.602 MHz	29.69 dBµV/m	40 dBµV/m	-10.31 dB	Pass
60.054 MHz	26.36 dBµV/m	40 dBµV/m	-13.64 dB	Pass
83.898 MHz	28.51 dBµV/m	40 dBµV/m	-11.49 dB	Pass

Test Report No.: G0M-1110-1481-C-1

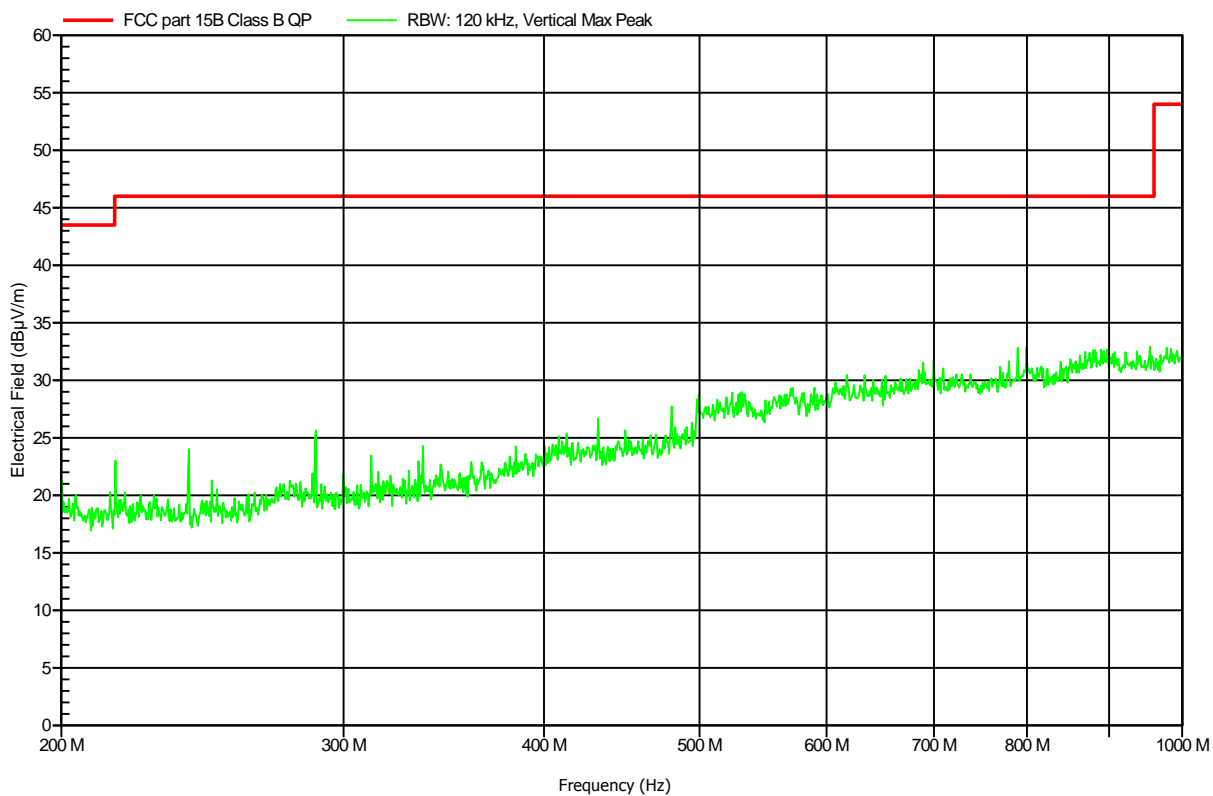
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Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3m
Mode:	connected to PC; 6 Ohm resistor; Solar pannel
Test Date:	27.10.2011
Note:	PASS

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Test Report No.: G0M-1110-1481-C-1

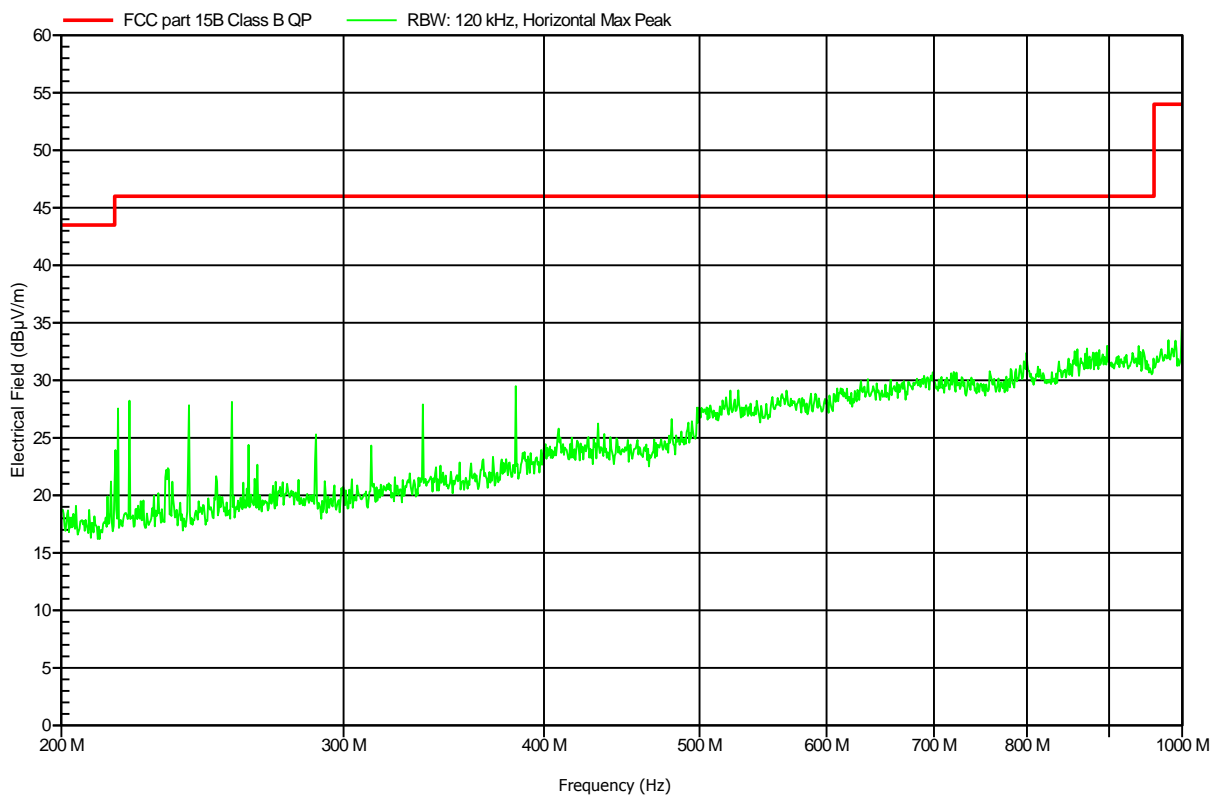
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Spurious emissions under normal conditions according to FCC 15B

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Manufacturer:	Changers GmbH
EUT Name:	Mobile battery charger / Multi-Energy-Controller Charger
Model:	Changers Kalhuohfummi
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3m
Mode:	connected to PC; 6 Ohm resistor; Solar pannel
Test Date:	27.10.2011
Note:	PASS

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Test Report No.: G0M-1110-1481-C-1

Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.2 Test Conditions and Results – AC power line conducted emissions

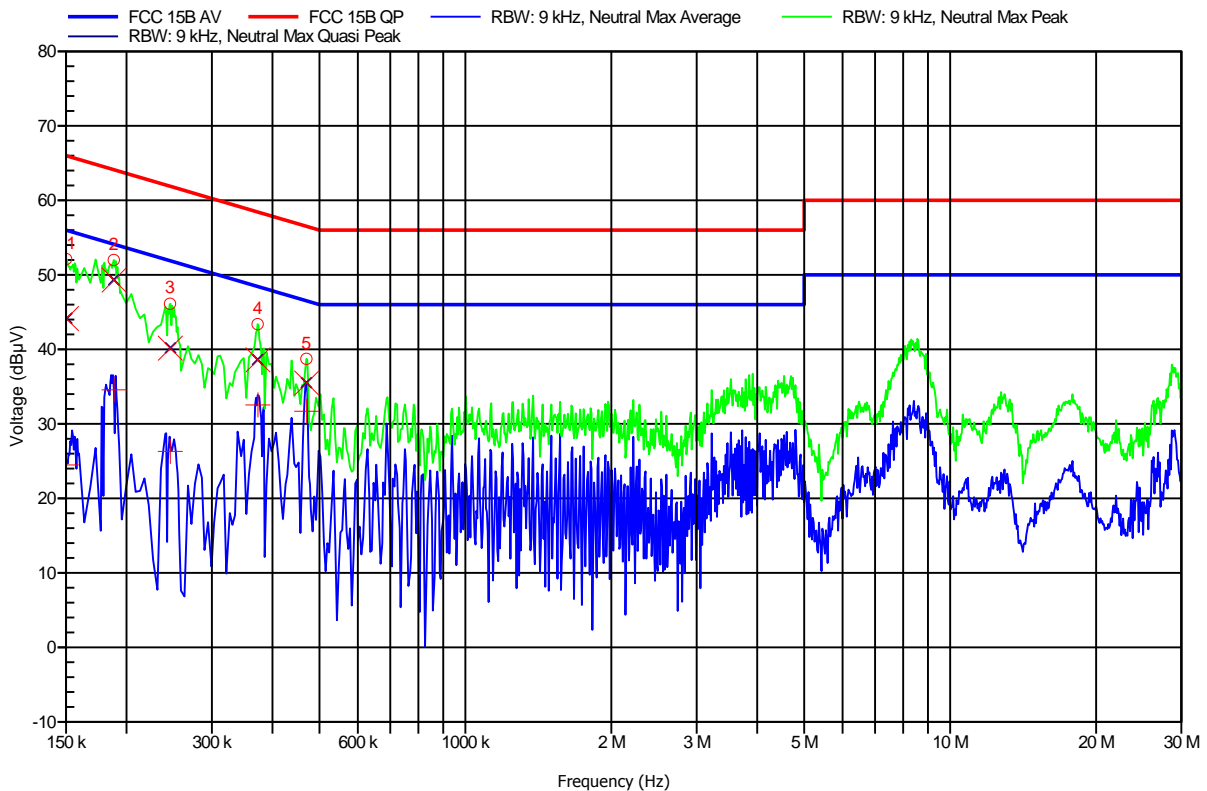
Conducted emissions acc. FCC 47 CFR 15.107 / IC RSS-Gen			Verdict: PASS	
Laboratory Parameters:	Required prior to the test		During the test	
Ambient Temperature	15 to 35°C		22°C	
Relative Humidity	30 to 60%		44%	
Test according referenced standards	Reference Method			
	ANSI C63.4			
Fully configured sample scanned over the following frequency range	Frequency range			
	0.15MHz to 30MHz			
Sample is tested with respect to the requirements of the equipment class	Equipment class			
	Class B			
Points of Application	Application Interface			
AC Mains	LISN			
Operating mode	1 & 2			
Limits and results Class B				
Frequency [MHz]	Quasi-Peak [dBµV]	Result	Average [dBµV]	Result
0.15 to 5	66 to 56*	PASS	56 to 46*	PASS
0.5 to 5	56	PASS	46	PASS
5 to 30	60	PASS	50	PASS
Comments:				
* Limit decreases linearly with the logarithm of the frequency.				

EMI voltage test in the ac-mains according to FCC 15B

Order number: G0M-1110-1481

Manufacturer: Changers GmbH
 EUT Name: Mobile battery charger / Multi-Energy-Controller Charger
 Model: Changers Kalhuohfummi
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor)
 LISN: ESH2-Z5 N
 Mode: charging; 6 Ohm resistor
 Test Date: 28.10.2011
 Note: PASS

Index 10



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Status
150 kHz	44.16 dBµV	66 dBµV	-21.84 dB	Pass
188.25 kHz	49.35 dBµV	64.11 dBµV	-14.77 dB	Pass
245.85 kHz	40.2 dBµV	61.9 dBµV	-21.7 dB	Pass
372.75 kHz	38.62 dBµV	58.44 dBµV	-19.82 dB	Pass
469.95 kHz	35.52 dBµV	56.51 dBµV	-20.99 dB	Pass

Frequency	Average	Average Limit	Average Difference	Status
150 kHz	24.52 dBµV	56 dBµV	-31.48 dB	Pass
188.25 kHz	34.61 dBµV	54.11 dBµV	-19.51 dB	Pass
245.85 kHz	26.34 dBµV	51.9 dBµV	-25.56 dB	Pass
372.75 kHz	32.58 dBµV	48.44 dBµV	-15.86 dB	Pass
469.95 kHz	31.73 dBµV	46.51 dBµV	-14.78 dB	Pass

Test Report No.: G0M-1110-1481-C-1

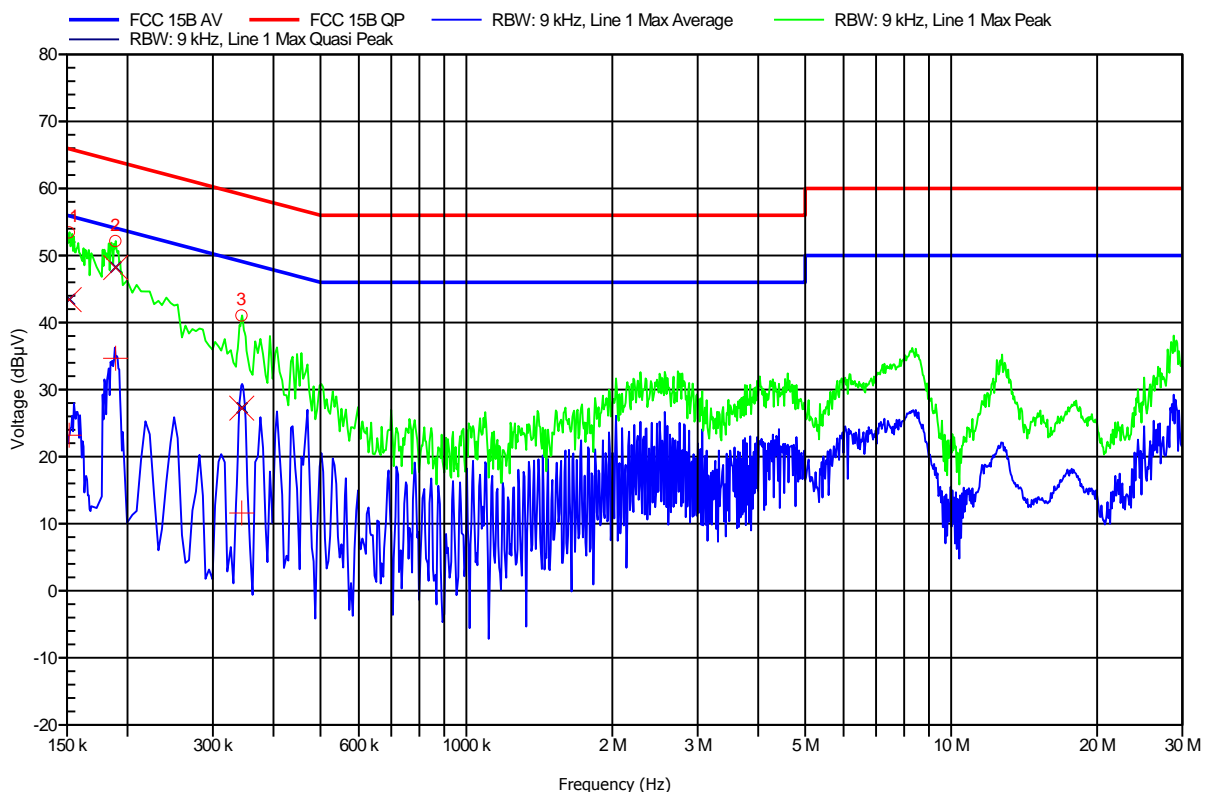
Eurofins Product Service GmbH
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EMI voltage test in the ac-mains according to FCC 15B

Order number: G0M-1110-1481

Manufacturer: Changers GmbH
 EUT Name: Mobile battery charger / Multi-Energy-Controller Charger
 Model: Changers Kalhuohfummi
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor)
 LISN: ESH2-Z5 L
 Mode: charging; 6 Ohm resistor
 Test Date: 28.10.2011
 Note: PASS

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Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Status
151.35 kHz	43.45 dBµV	65.93 dBµV	-22.47 dB	Pass
188.7 kHz	48.24 dBµV	64.09 dBµV	-15.86 dB	Pass
343.5 kHz	27.27 dBµV	59.12 dBµV	-31.84 dB	Pass

Frequency	Average	Average Limit	Average Difference	Status
151.35 kHz	23.23 dBµV	55.93 dBµV	-32.69 dB	Pass
188.7 kHz	34.72 dBµV	54.09 dBµV	-19.38 dB	Pass
343.5 kHz	11.64 dBµV	49.12 dBµV	-37.47 dB	Pass

Test Report No.: G0M-1110-1481-C-1

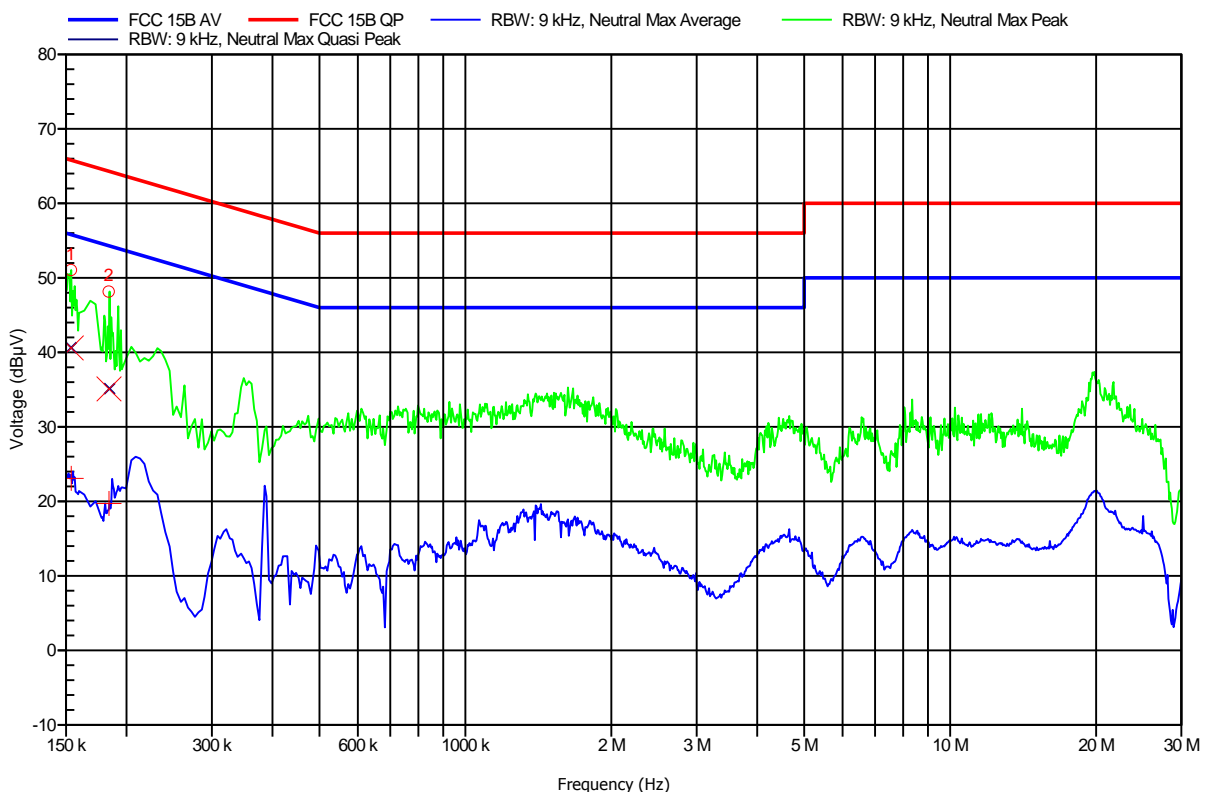
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EMI voltage test in the ac-mains according to FCC 15B

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 EUT Name: Mobile battery charger / Multi-Energy-Controller Charger
 Model: Changers Kalhuohfummi
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor)
 LISN: ESH2-Z5 N
 Mode: connected to PC; 6 Ohm resistor; Solar panel
 Test Date: 28.10.2011
 Note: PASS

Index 13



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Status
153.6 kHz	40.62 dBµV	65.8 dBµV	-25.18 dB	Pass
183.75 kHz	35.13 dBµV	64.31 dBµV	-29.18 dB	Pass
Frequency	Average	Average Limit	Average Difference	Status
153.6 kHz	23.12 dBµV	55.8 dBµV	-32.68 dB	Pass
183.75 kHz	19.75 dBµV	54.31 dBµV	-34.56 dB	Pass

Test Report No.: G0M-1110-1481-C-1

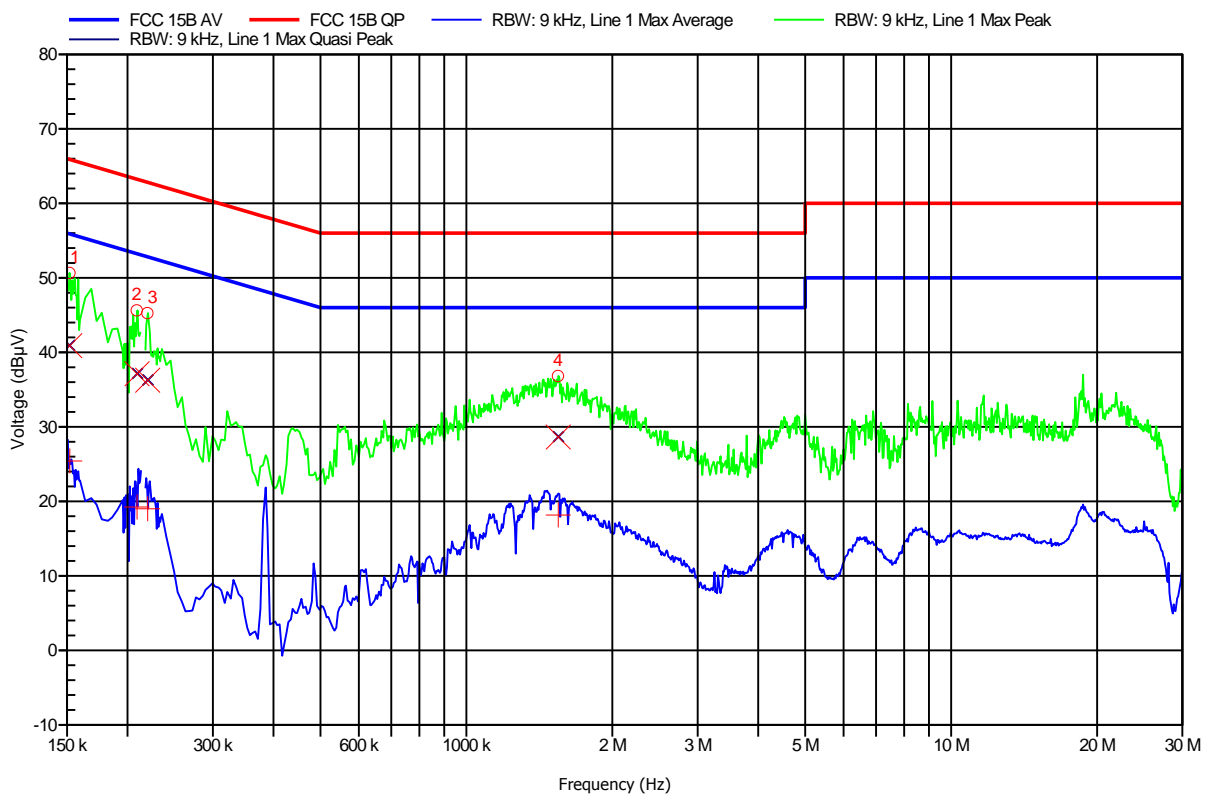
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Test Site: Eurofins Product Service GmbH
Operator: Mr. Handrik
Test Conditions: Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor)
LISN: ESH2-Z5 L
Mode: connected to PC; 6 Ohm resistor; Solar panel
Test Date: 28.10.2011
Note: PASS

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Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Status
151.8 kHz	40.93 dBµV	65.9 dBµV	-24.97 dB	Pass
208.95 kHz	37.18 dBµV	63.25 dBµV	-26.07 dB	Pass
219.75 kHz	36.3 dBµV	62.83 dBµV	-26.53 dB	Pass
1.545 MHz	28.68 dBµV	56 dBµV	-27.32 dB	Pass

Frequency	Average	Average Limit	Average Difference	Status
151.8 kHz	25.45 dBµV	55.9 dBµV	-30.45 dB	Pass
208.95 kHz	19.28 dBµV	53.25 dBµV	-33.97 dB	Pass
219.75 kHz	19.04 dBµV	52.83 dBµV	-33.79 dB	Pass
1.545 MHz	18.2 dBµV	46 dBµV	-27.8 dB	Pass

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