

EMC TEST REPORT

FCC 47 CFR Part 15B
Industry Canada RSS-Gen

Electromagnetic compatibility - Unintentional radiators

Report Reference No. : G0M-1409-4154-EF0315B-V01

Testing Laboratory : Eurofins Product Service GmbH

Address : Storkower Str. 38c
15526 Reichenwalde
Germany

Accreditation :



A2LA Accredited Testing Laboratory, Certificate No.: 1983.01
FCC Filed Test Laboratory, Reg.-No.: 96970
IC OATS Filing assigned code: 3470A

Applicant's name : Amor Gummiwaren GmbH

Address : August-Rost-Straße 4
99310 Arnstadt
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 : electric device

Model No. : Sei

Additional Models : None

Hardware version : V2.0

Firmware / Software version : BLE-Stack SD110 V6.0.0

FCC-ID: 2ADAR504004

IC: 12372A-504004

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: 2014-12-05

Date (s) of performance of tests: 2014-12-22

Compiled by: Jens Marquardt

Tested by (+ signature).....: Jens Marquardt



Approved by (+ signature): Marcus Klein



Date of issue: 2014-12-23

Total number of pages: 23

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:

Version History

Version	Issue Date	Remarks	Revised by
V01	2014-12-23	Initial Release	

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1 Equipment (Test item) Description

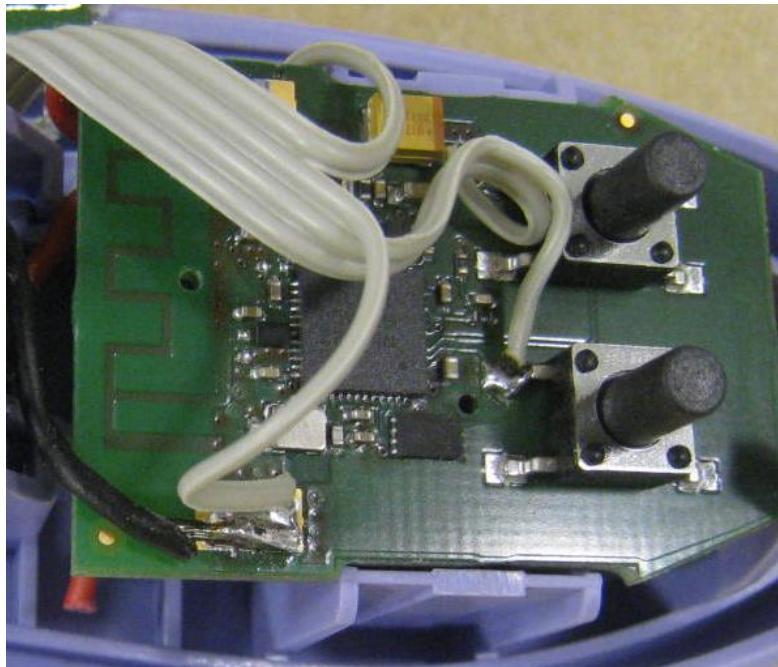
Description	electric device
Model	Sei
Additional Models	None
Serial number	None
Hardware version	V2.0
Software / Firmware version	BLE-Stack SD110 V6.0.0
FCC-ID	2ADAR504004
IC-ID	12372A-504004
Power supply	3 VDC battery
Manufacturer	Amor Gummiwaren GmbH August-Rost-Straße 4 99310 Arnstadt GERMANY
Highest emission frequency	Fmax [MHz] = 2540
Device classification	Class B
Equipment type	Tabletop
Number of tested samples	1

1.1 Photos – Equipment external

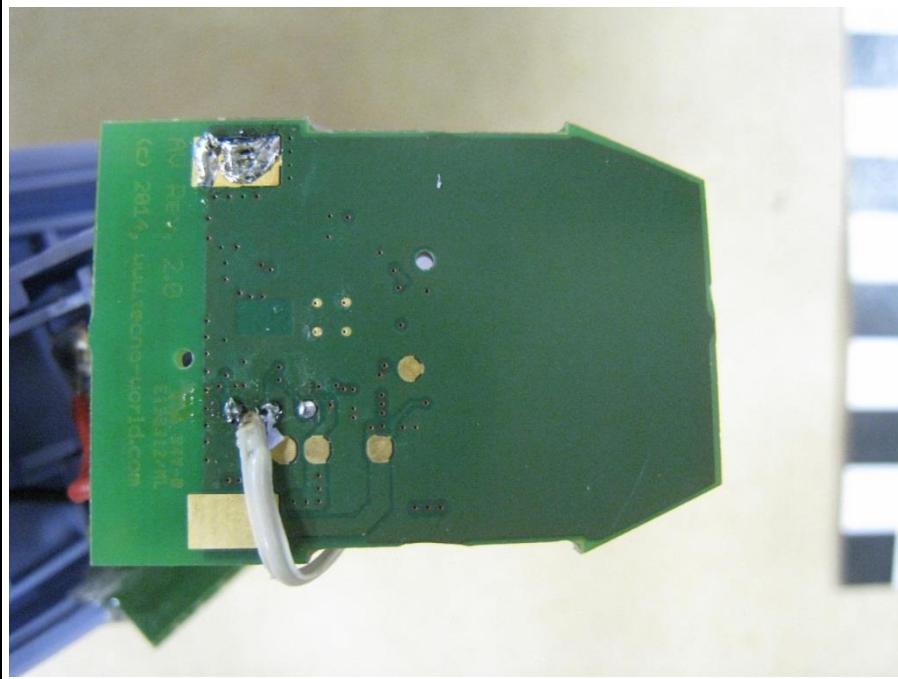


1.2 Photos – Equipment internal

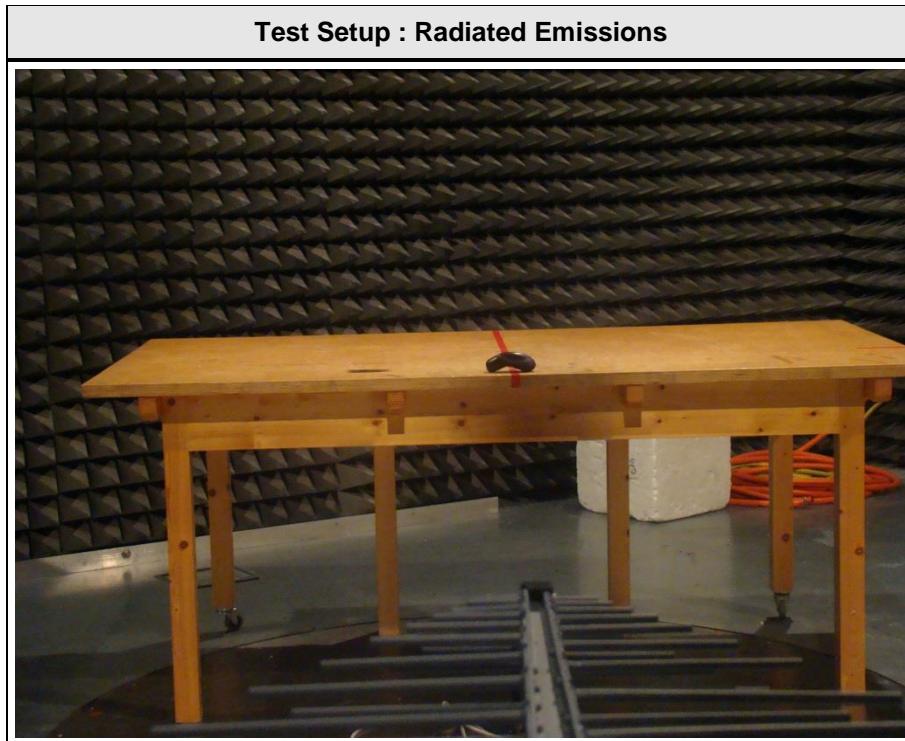
EUT PCB Top



EUT PCB Bottom



1.3 Photos – Test setup



1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
AE	smart phone	LG	G2	

***Note:** Use the following abbreviations:

AE : Auxiliary/Associated Equipment, or

SIM : Simulator (Not Subjected to Test)

CABL : Connecting cables

1.5 Input / Output Ports

No ports available

1.6 Operating Modes and Configurations

Mode #	Description
1	vibrating + Bluetooth communication

Configuration #	EUT Configuration
1	EUT in normal operation mode

1.7 Test Equipment Used During Testing

Measurement Software			
Description	Manufacturer	Name	Version
EMC Test Software	Dare Instruments	Radimation	2014.1.15

Radiated emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Biconical Antenna	R&S	HK 116	EF00012	2013-02	2016-02
LPD-Antenne	R&S	HL 223	EF00187	2014-03	2017-03
Horn antenna	Schwarzbeck	BBHA 9120D	EF00018	2013-09	2016-09
EMI Test Receiver	R&S	ESU26	EF00887	2014-01	2015-01

1.8 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dB μ V. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

$$\text{Reading on Analyzer (dB}\mu\text{V)} + \text{A.F. (dB)} = \text{Net field strength (dB}\mu\text{V/m)}$$

Net:

This is the net field strength measurement (as shown above).

Limit:

This is the FCC Class B radiated emission limit (in units of dB μ V/m). The FCC limits are given in units of μ V/m. The following formula is used to convert the units of μ V/m to dB μ V/m:

$$\text{Limit (dB}\mu\text{V/m)} = 20 * \log (\mu\text{V/m})$$

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example only:

$$\begin{array}{lll} \text{Reading} + \text{AF} = & \text{Net Reading} : & \text{Net reading} - \text{FCC limit} = \text{Margin} \\ 21.5 \text{ dB}\mu\text{V} + 26 \text{ dB} = & 47.5 \text{ dB}\mu\text{V/m} : & 47.5 \text{ dB}\mu\text{V/m} - 57.0 \text{ dB}\mu\text{V/m} = -9.5 \text{ dB} \end{array}$$

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	N/A	battery only
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		23°C			
Relative Humidity	30 to 60 %		34%			
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] = 2540					
Fully configured sample scanned over the following frequency range	Frequency range					
	30 MHz to 13 GHz					
Operating mode configuration	1					
Limits and results Class B						
Frequency [MHz]	Quasi-Peak [dB μ V/m]	Result	Average [dB μ V/m]	Result	Peak [dB μ V/m]	Result
30 – 88	40	PASS	-		-	-
88 – 216	43.5	PASS	-		-	-
216 – 960	46	PASS	-		-	-
960 – 1000	54	PASS	-		-	-
> 1000	-	-	54	PASS	74	PASS
Comments:						

Test Procedure:

The test site is in accordance with ANSI C63.4:2009 requirements and is listed by FCC.
The measurement procedure is as follows:

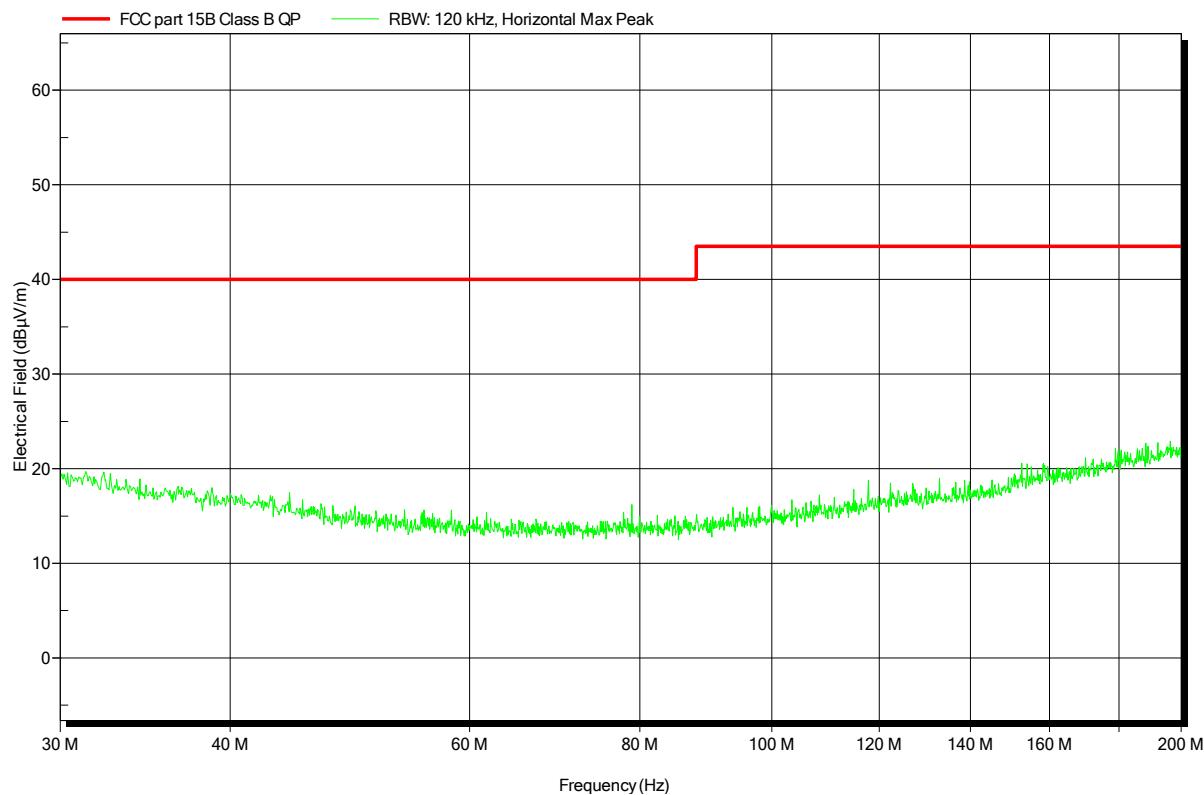
- 1) The EUT was placed on a 0.8 m non conductive table at a 3 m distance from the receive antenna (ANSI C63.4: 2009 item 6.2)
- 2) The antenna output was connected to the measurement receiver
- 3) A biconical antenna was used for the frequency range 30 – 200 MHz, a logarithmic periodical antenna was used for the frequency range from 200 – 1000 MHz. Above one 1 GHz a Double Ridged Broadband Horn antenna was used. The antenna was placed on an adjustable height antenna mast
- 4) Emissions were maximized at each frequency by rotating the EUT and adjusting the receive antenna height and polarization. The maximum values were recorded.

Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1409-4154

Manufacturer: Amor Gummiwaren GmbH
EUT Name: electric device
Model: Sei
Test Site: Eurofins Product Service GmbH
Operator: Mr. Marquardt
Test Conditions: Tnom: 23°C, Unom: 3 VDC (battery)
Antenna: Rohde & Schwarz HK 116, Horizontal
Measurement distance: 3m
Mode: vibrating + BT
Test Date: 2014-12-22
Note:

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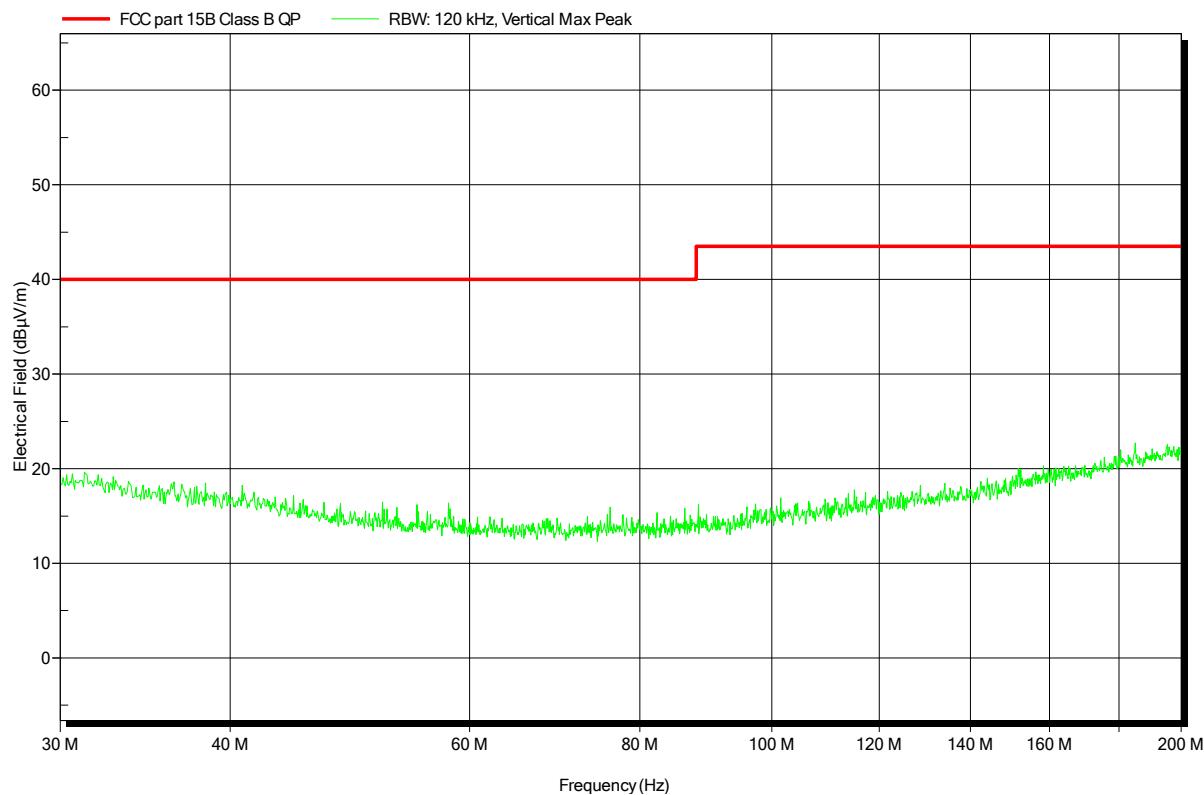


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Model: Sei
Test Site: Eurofins Product Service GmbH
Operator: Mr. Marquardt
Test Conditions: $T_{nom}: 23^{\circ}\text{C}$, $U_{nom}: 3 \text{ VDC}$ (battery)
Antenna: Rohde & Schwarz HK 116, Vertical
Measurement distance: 3m
Mode: vibrating + BT
Test Date: 2014-12-22
Note:

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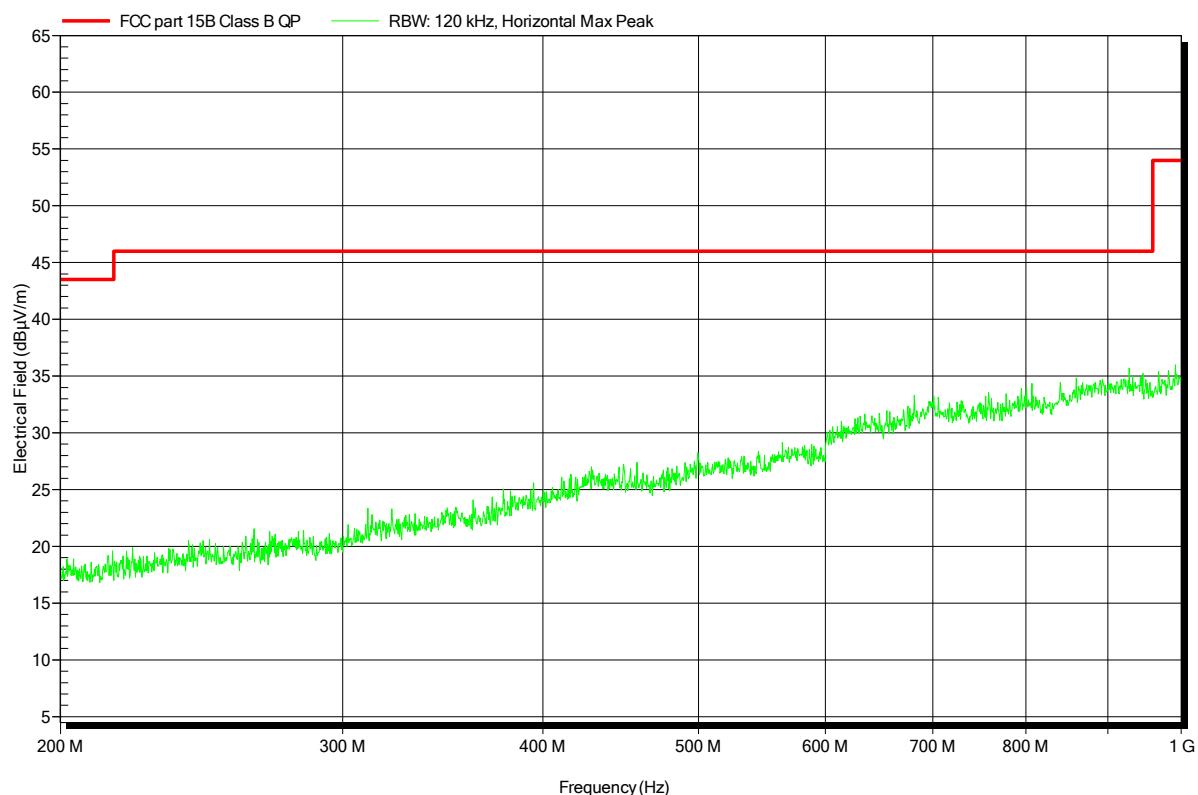


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EUT Name: electric device
Model: Sei
Test Site: Eurofins Product Service GmbH
Operator: Mr. Marquardt
Test Conditions: $T_{nom}: 23^{\circ}\text{C}$, $U_{nom}: 3 \text{ VDC}$ (battery)
Antenna: Rohde & Schwarz HL 223, Horizontal
Measurement distance: 3m
Mode: vibrating + BT
Test Date: 2014-12-22
Note:

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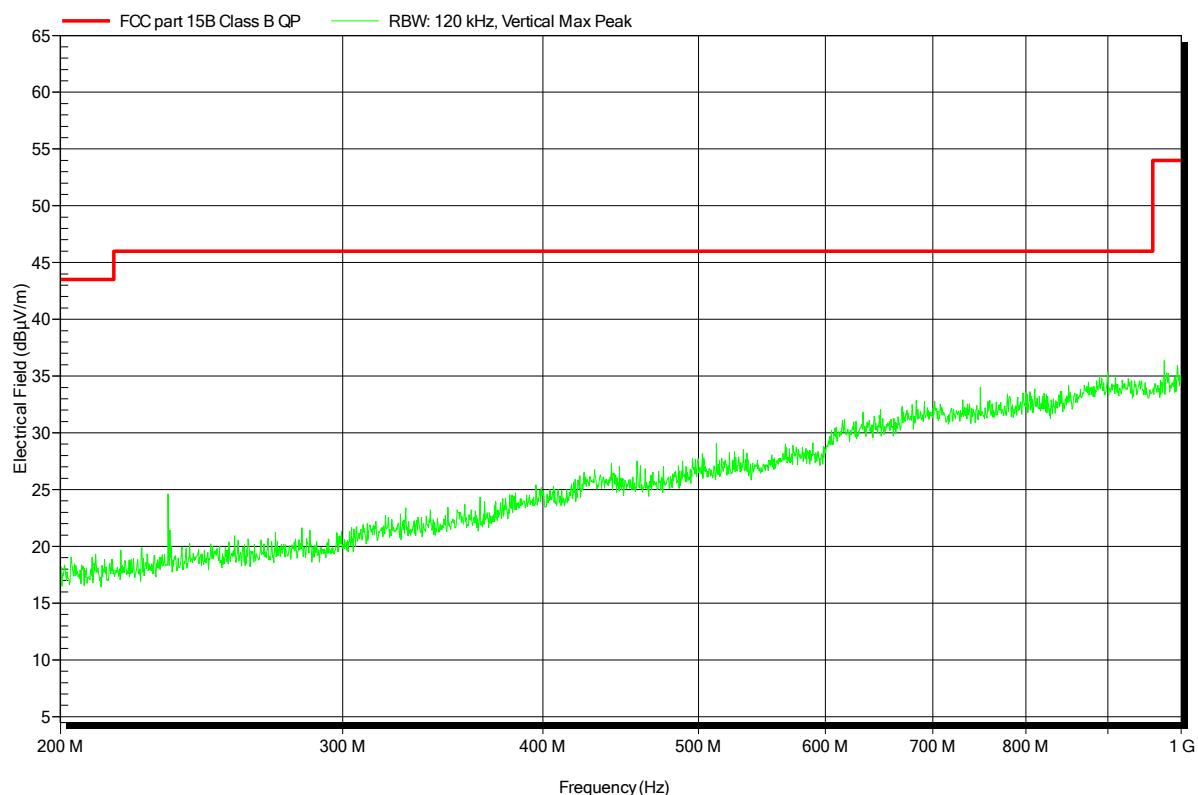


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Measurement distance: 3m
Mode: vibrating + BT
Test Date: 2014-12-22
Note:

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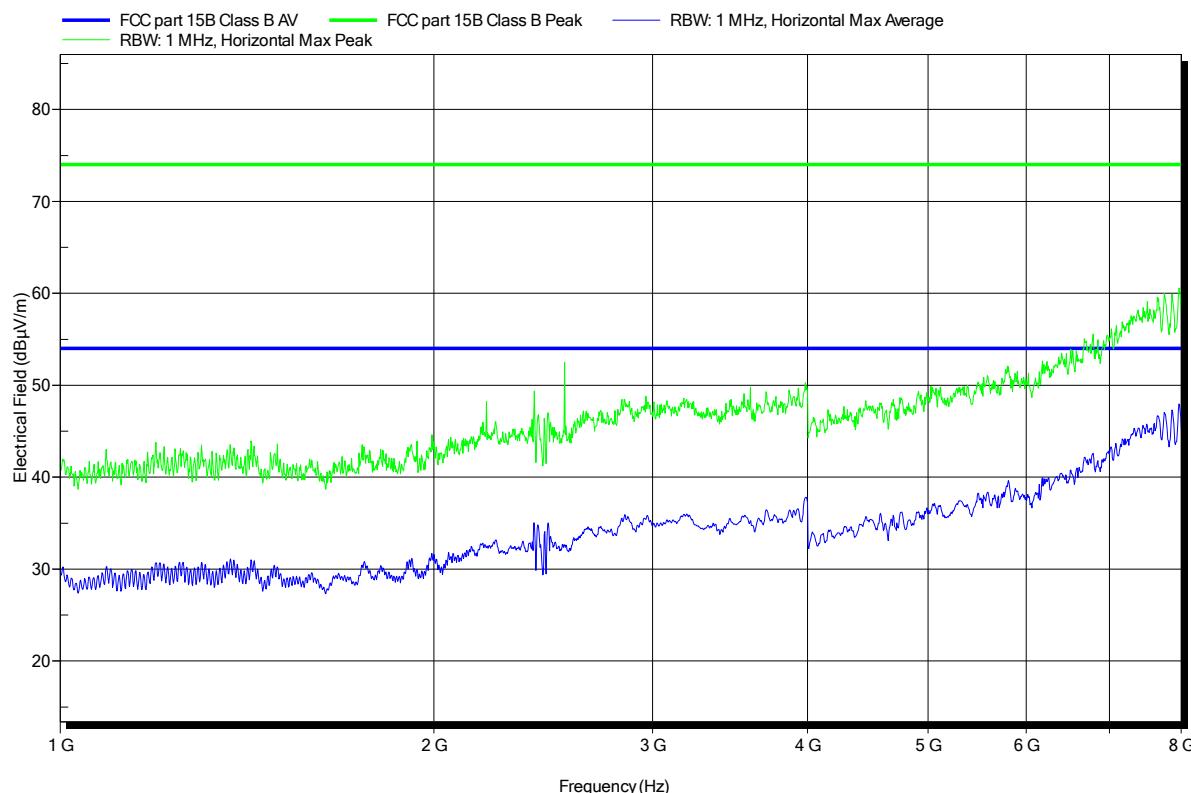


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Model: Sei
Test Site: Eurofins Product Service GmbH
Operator: Mr. Marquardt
Test Conditions: $T_{nom}: 23^{\circ}\text{C}$, $U_{nom}: 3 \text{ VDC}$ (battery)
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 3m
Mode: vibrating + BT
Test Date: 2014-12-22
Note:

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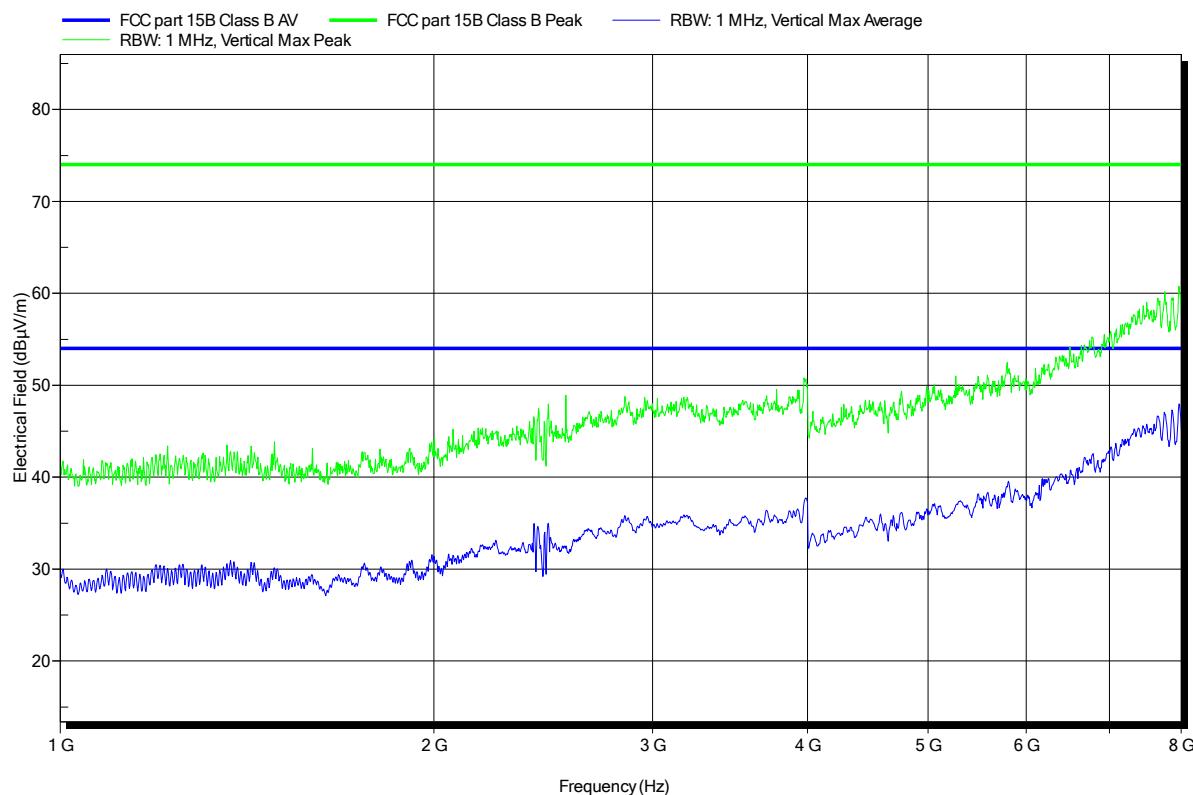


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Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 3m
Mode: vibrating + BT
Test Date: 2014-12-22
Note:

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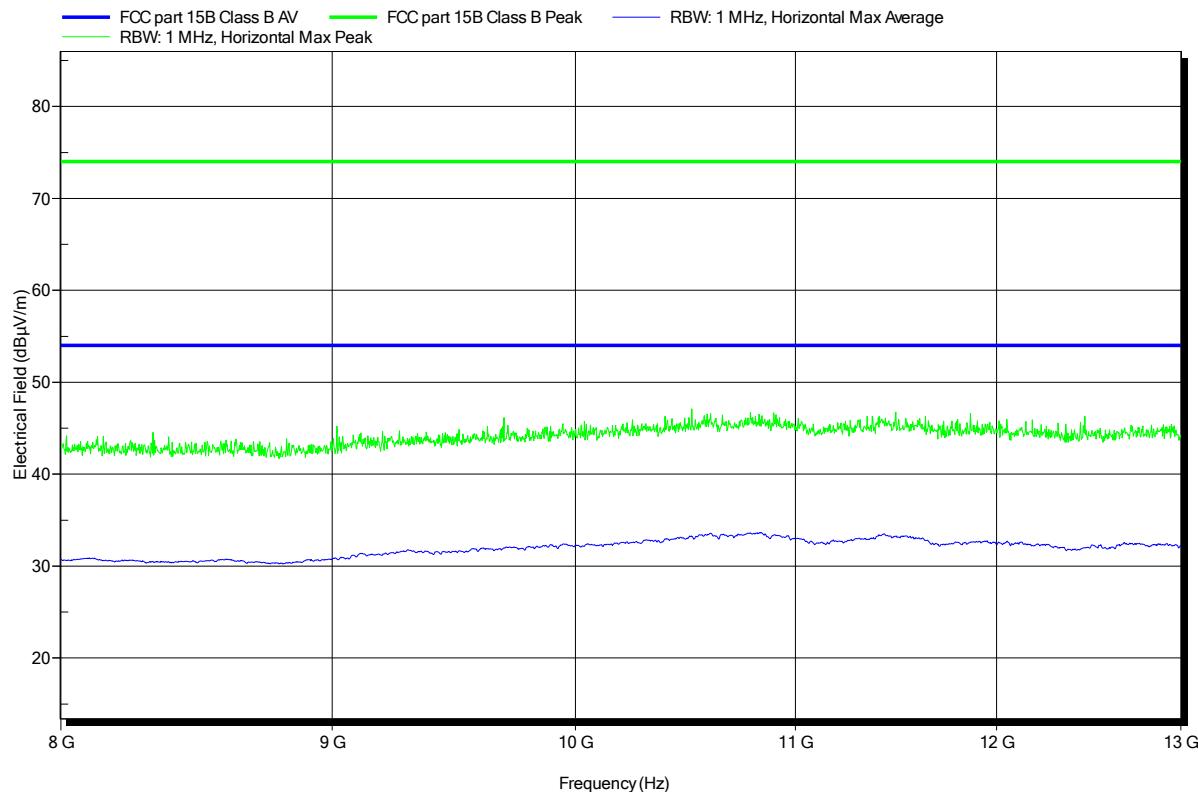


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Test Conditions: $T_{nom}: 23^{\circ}\text{C}$, $U_{nom}: 3 \text{ VDC}$ (battery)
Antenna: Schwarzbeck BBHA 9120D, Horizontal
Measurement distance: 3m
Mode: vibrating + BT
Test Date: 2014-12-22
Note:

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Operator: Mr. Marquardt
Test Conditions: $T_{nom}: 23^{\circ}\text{C}$, $U_{nom}: 3 \text{ VDC}$ (battery)
Antenna: Schwarzbeck BBHA 9120D, Vertical
Measurement distance: 3m
Mode: vibrating + BT
Test Date: 2014-12-22
Note:

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