

EMC TEST REPORT

FCC 47 CFR Part 15B
Industry Canada RSS-Gen

Electromagnetic compatibility - Unintentional radiators

Report Reference No. : G0M-1409-4154-EF0415B-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. Tre

Additional Models None

Hardware version V2.0

Firmware / Software version BLE-Stack SD110 V6.0.0

FCC-ID: 2ADAR504003

IC: 12372A-504003

Test result Passed

Test Report No.: G0M-1409-4154-EF0415B-V01

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

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: 2014-12-23

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

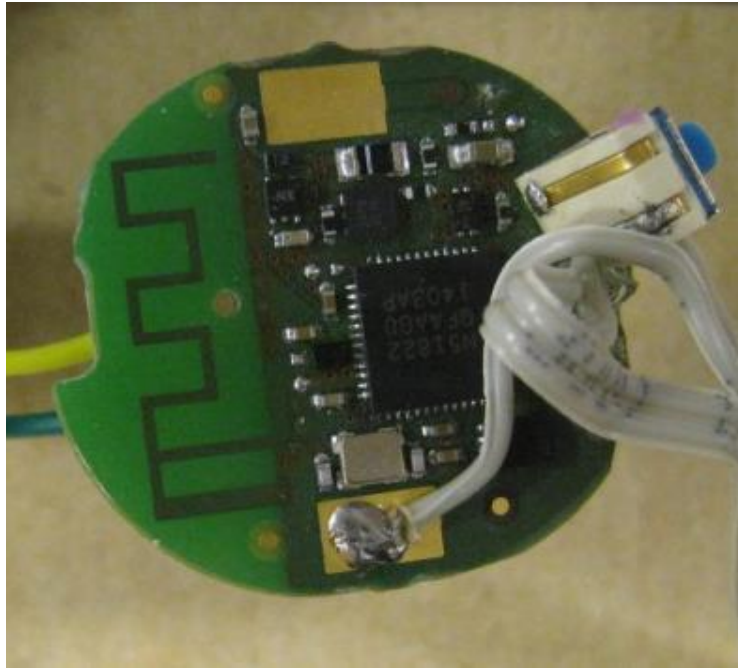
Description	electric device
Model	Tre
Additional Models	None
Serial number	None
Hardware version	V2.0
Software / Firmware version	BLE-Stack SD110 V6.0.0
FCC-ID	2ADAR504003
IC-ID	12372A-504003
Power supply	3 VDC battery
Manufacturer	Amor Gummiwaren GmbH August-Rost-Straße 4 99310 Arnstadt GERMANY
Highest emission frequency	Fmax [MHz] = 2540
Device classification	Class B
Equipment type	Tabletop
Number of tested samples	1

1.1 Photos – Equipment external

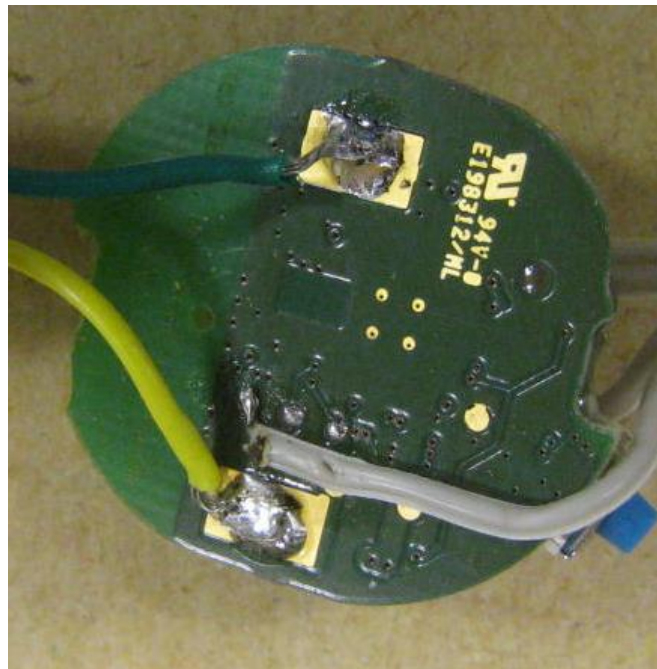


1.2 Photos – Equipment internal

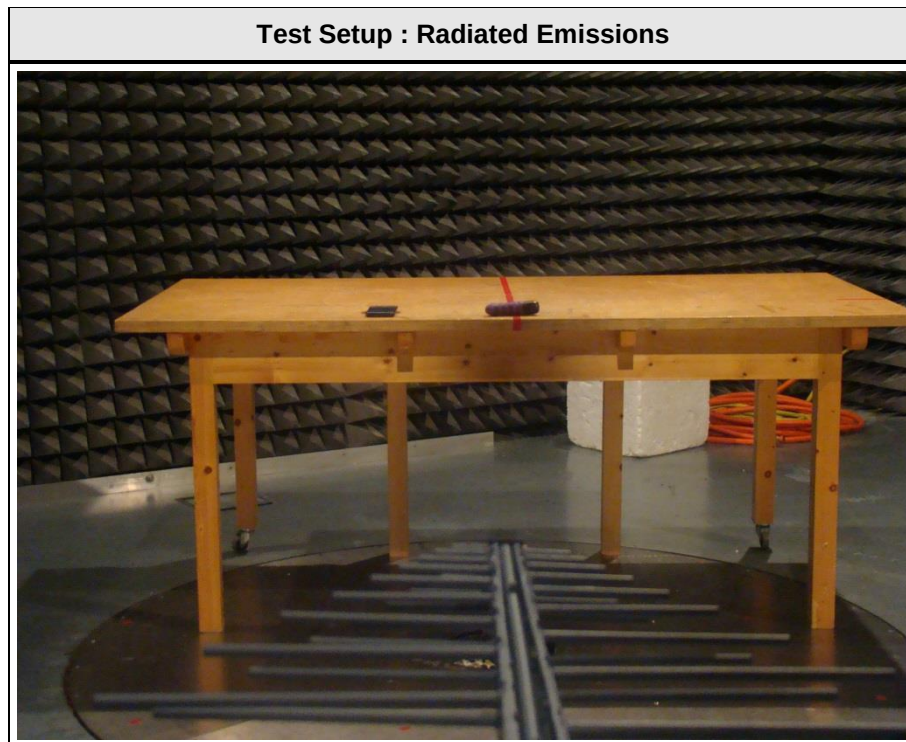
EUT PCB Top



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:

Reading	+	AF	=	Net Reading	:	Net reading - FCC limit	=	Margin
21.5 dB μ V	+	26 dB	=	47.5 dB μ V/m	:	47.5 dB μ V/m - 57.0 dB μ V/m	=	-9.5 dB

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 [dBµV/m]	Result	Average [dBµV/m]	Result	Peak [dBµV/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:

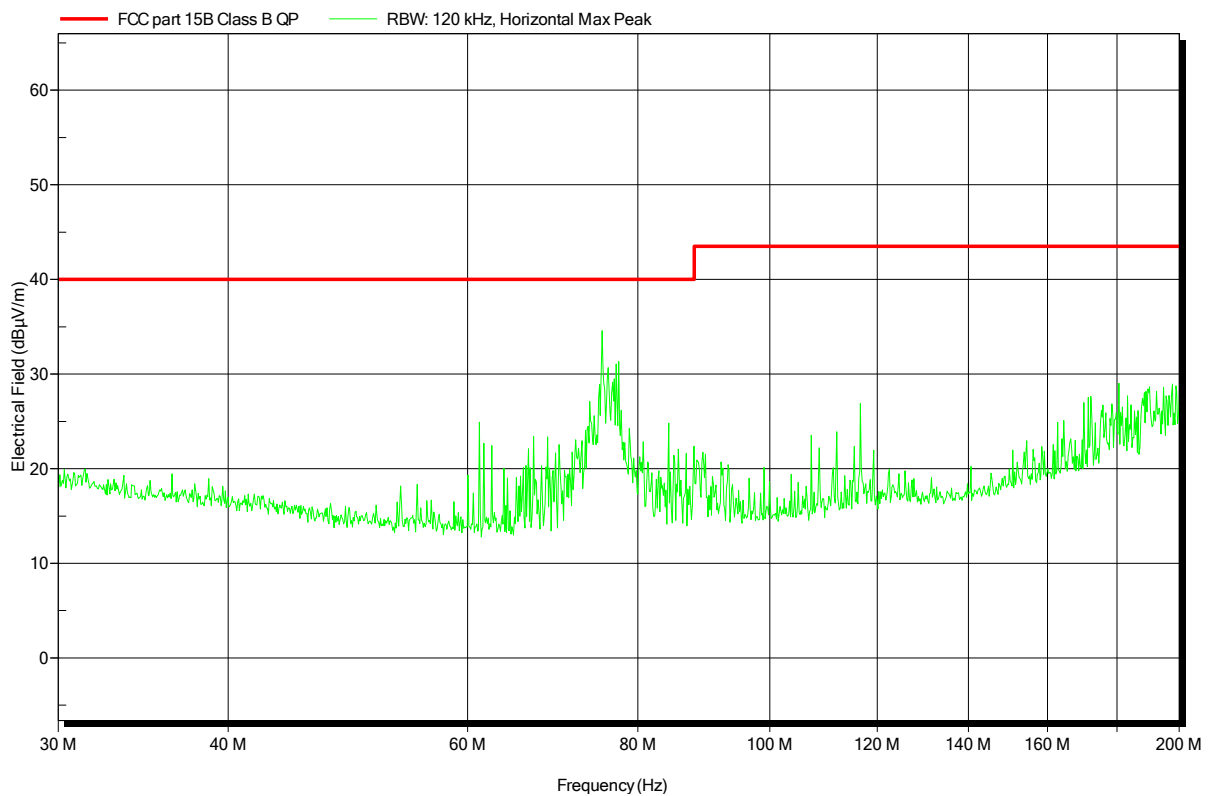
- 1) The EUT was placed on a 0.8 m non conductive table at a 3 m distance from the receive antenna (ANSI C63.4: 2009 item 6.2)
- 2) The antenna output was connected to the measurement receiver
- 3) A biconical antenna was used for the frequency range 30 – 200 MHz, a logarithmic periodical antenna was 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:	Tre
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:	2014-12-23
Note:	

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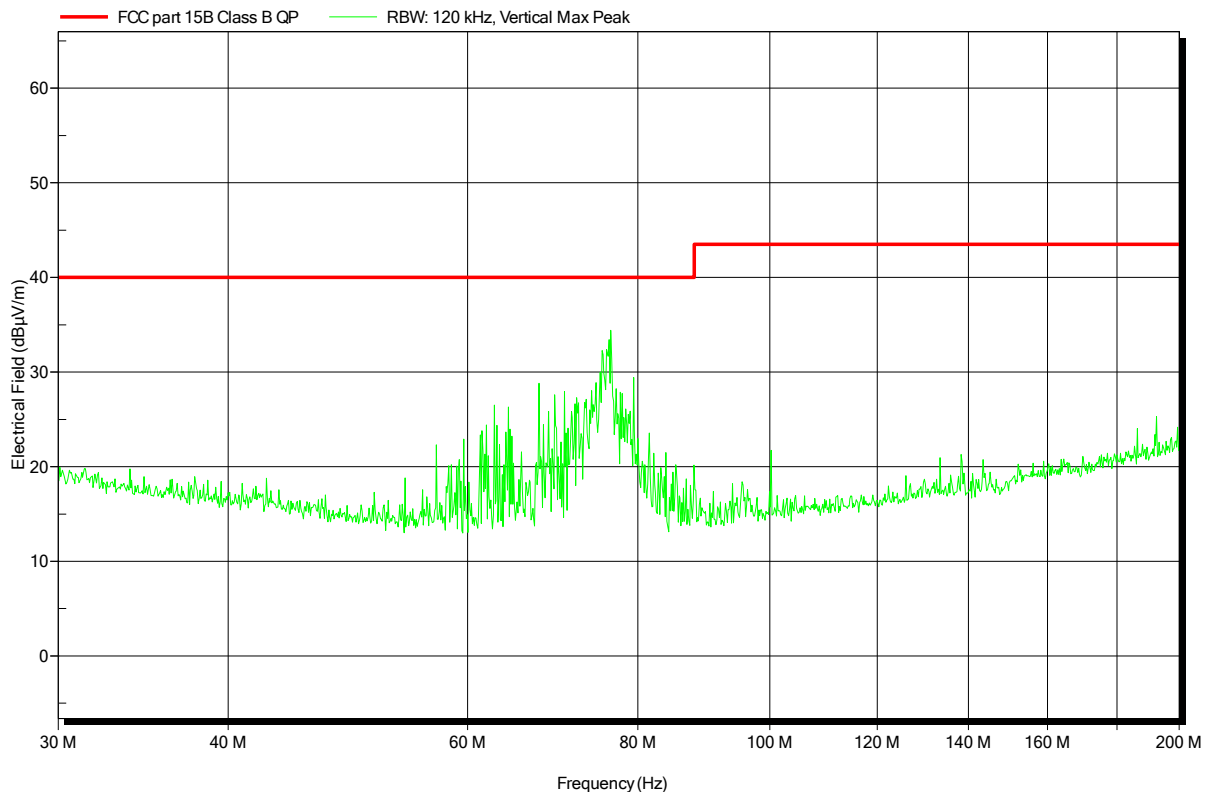
Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

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 Operator: Mr. Marquardt
 Test Conditions: Tnom: 23°C, Unom: 3 VDC (battery)
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3m
 Mode: vibrating + BT
 Test Date: 2014-12-23
 Note:

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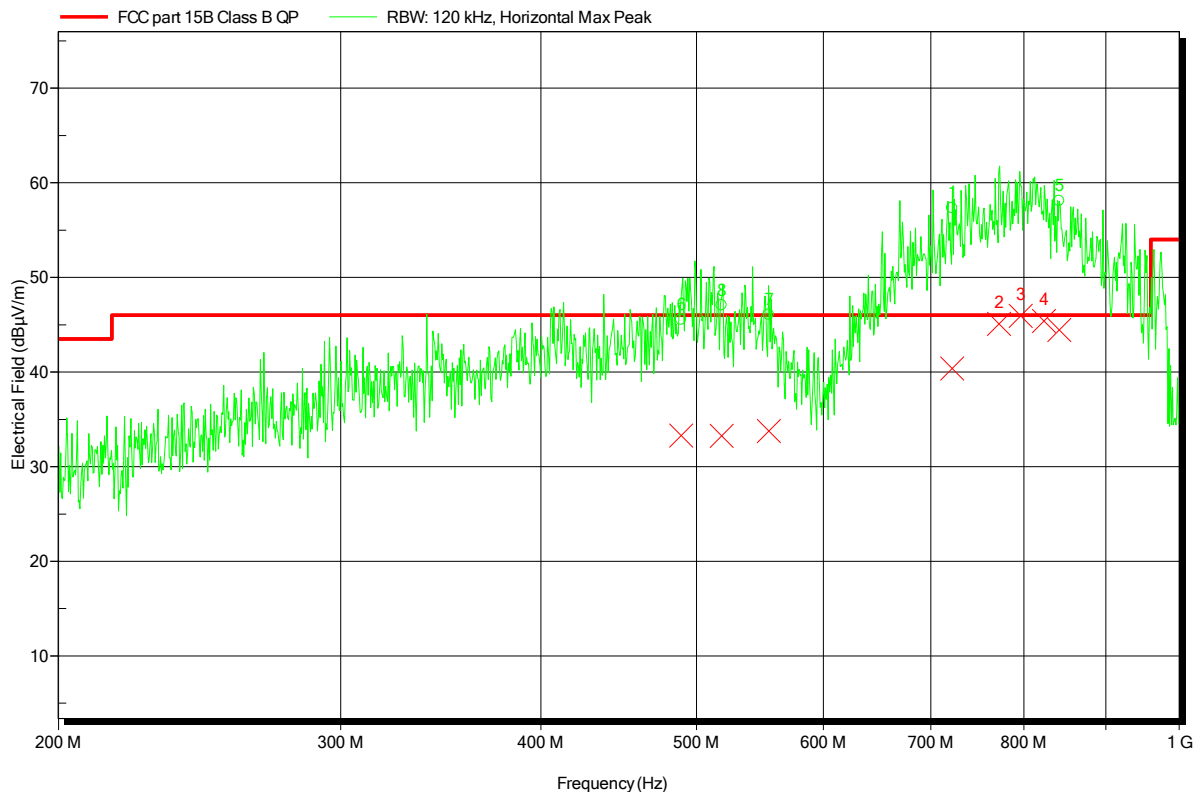


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 Model: Tre
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Marquardt
 Test Conditions: Tnom: 23°C, Unom: 3 VDC (battery)
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3m
 Mode: vibrating + BT
 Test Date: 2014-12-23
 Note:

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Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
489.15 MHz	33.28 dBµV/m	46 dBµV/m	-12.72 dB	Pass
518.385 MHz	33.27 dBµV/m	46 dBµV/m	-12.73 dB	Pass
554.873 MHz	33.75 dBµV/m	46 dBµV/m	-12.25 dB	Pass
721.606 MHz	40.39 dBµV/m	46 dBµV/m	-5.61 dB	Pass
771.926 MHz	45.09 dBµV/m	46 dBµV/m	-0.91 dB	Pass
796.291 MHz	45.94 dBµV/m	46 dBµV/m	-0.06 dB	Pass
823.411 MHz	45.39 dBµV/m	46 dBµV/m	-0.61 dB	Pass
841.576 MHz	44.46 dBµV/m	46 dBµV/m	-1.54 dB	Pass

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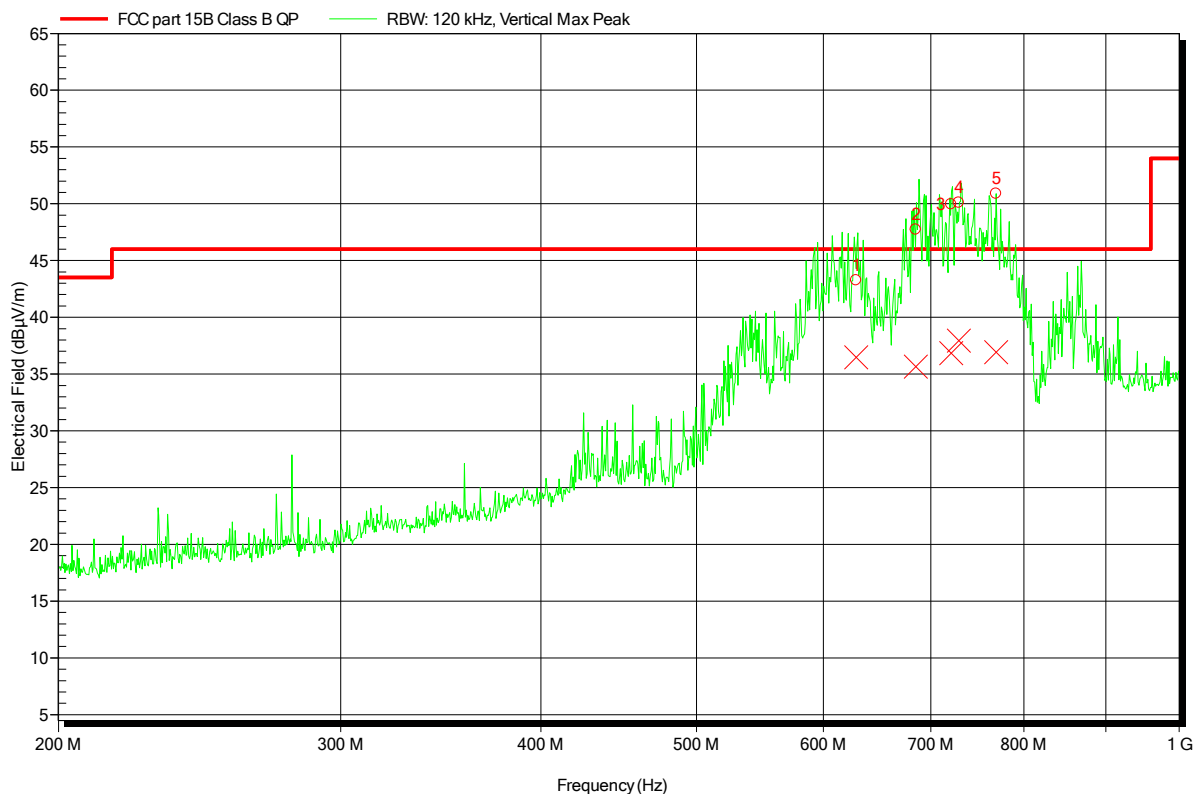
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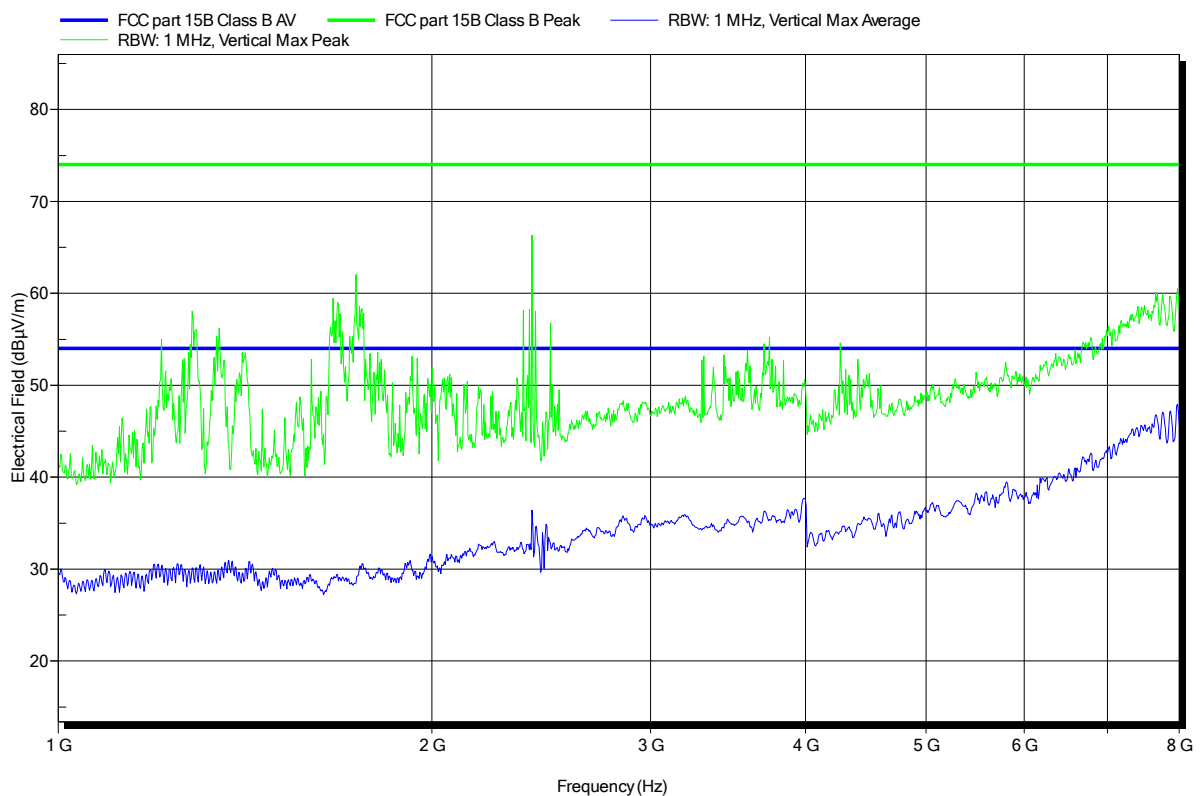
Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
629.03 MHz	36.48 dBµV/m	46 dBµV/m	-9.52 dB	Pass
685.04 MHz	35.64 dBµV/m	46 dBµV/m	-10.36 dB	Pass
720.86 MHz	36.84 dBµV/m	46 dBµV/m	-9.16 dB	Pass
728.72 MHz	37.93 dBµV/m	46 dBµV/m	-8.07 dB	Pass
768.662 MHz	36.93 dBµV/m	46 dBµV/m	-9.07 dB	Pass

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 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Marquardt
 Test Conditions: Tnom: 23°C, Unom: 3 VDC (battery)
 Antenna: Schwarzbeck BBHA 9120D, horizontal
 Measurement distance: 3m
 Mode: vibrating + BT
 Test Date: 2014-12-23
 Note:

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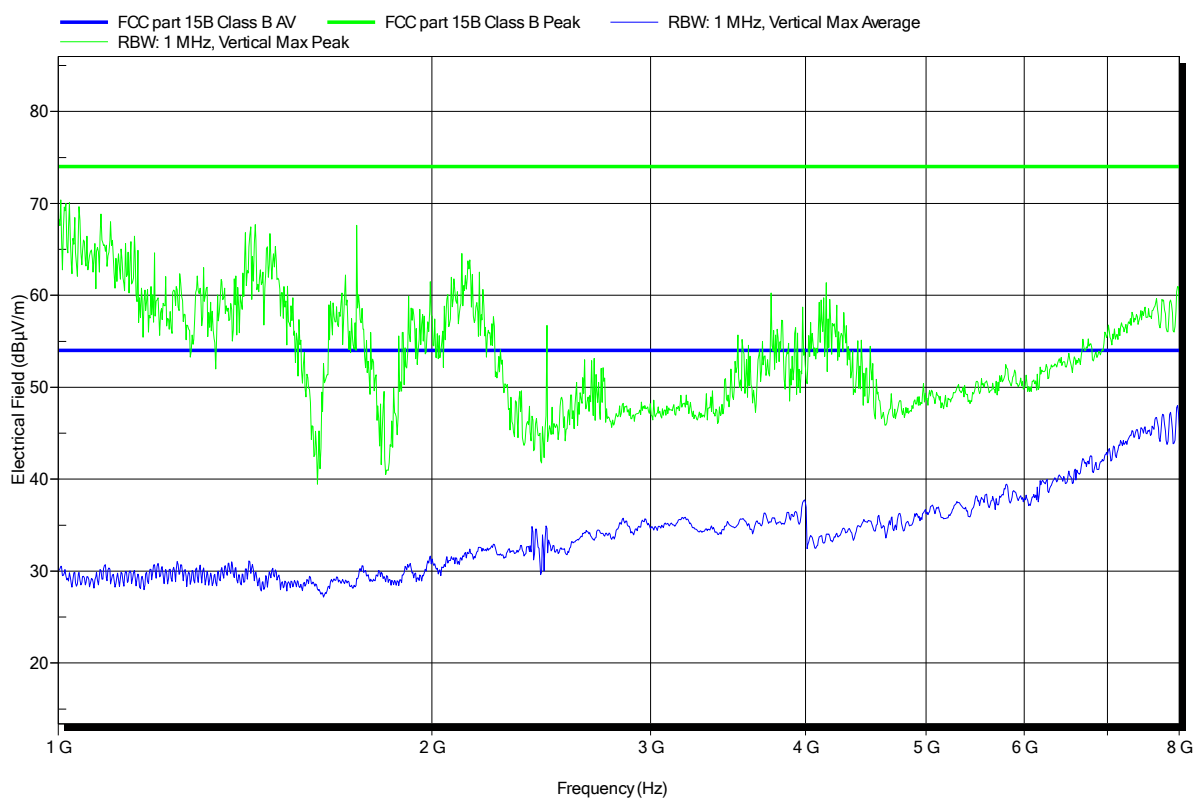


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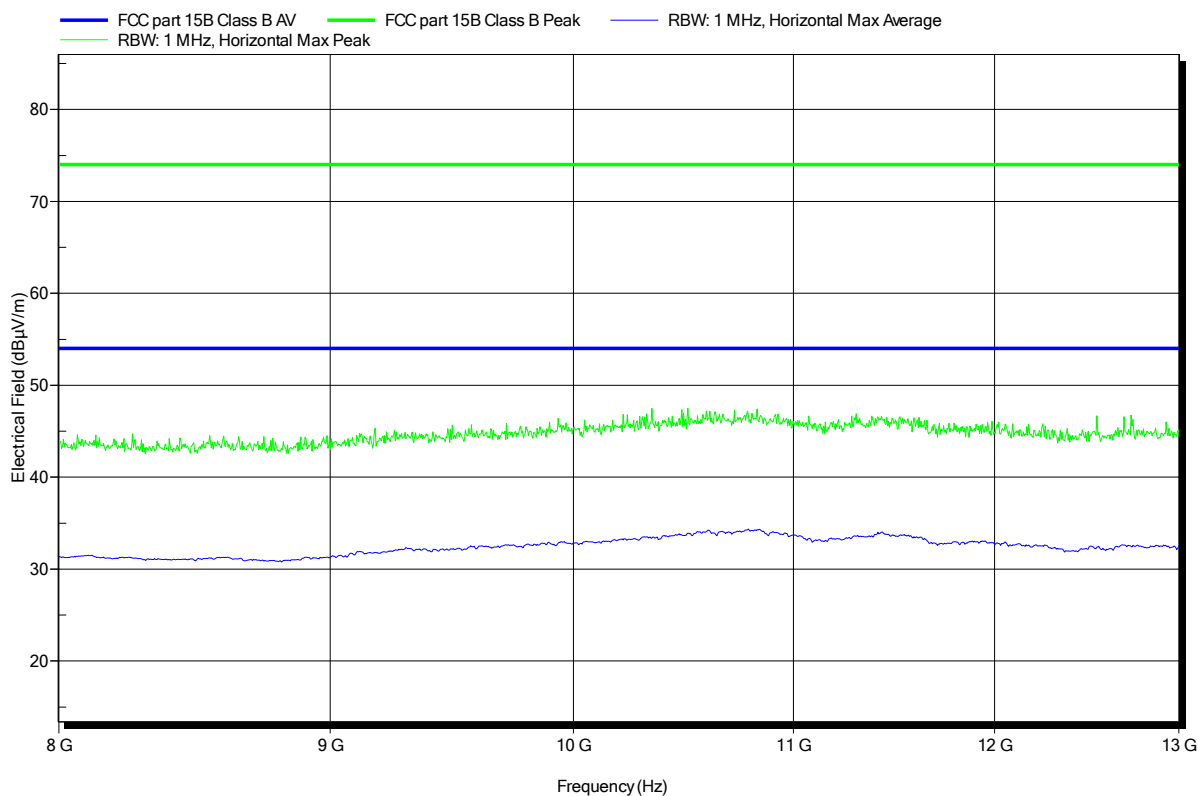


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