

EMC TEST REPORT**FCC 47 CFR Part 15B
Industry Canada ICES-003****Electromagnetic compatibility - Unintentional radiators****Report Reference No.: G0M-1602-5371-EF0115B-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: Emperra GmbH E-Health Technologies****Address: Friedrich-Ebert-Str. 33
14469 Potsdam
Germany****Test specification:****Standard.....: 47 CFR Part 15 Subpart B
ICES-003, Issue 5:2012
ANSI C63.4:2014****Equipment under test (EUT):****Product description: Insulin Pen with BLE interface****Model No.: ESYSTA BT Pen B****Hardware version: A****Firmware / Software version: AA****Contains: FCC-ID: 2AHMS-BTPEN1 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: 2016-04-11

Date (s) of performance of tests: 2016-04-15

Compiled by: Matthias Laurisch

Tested by (+ signature).....: Marco Belz / Yu Yu

Approved by (+ signature): Marcus Klein
Head of Lab



Date of issue: 2016-04-22

Total number of pages: 24

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	2016-04-20	Initial Release	

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1 Equipment (Test item) Description

Description	Insulin Pen with BLE interface	
Model	ESYSTA BT Pen B	
Additional Models	Fehler! Verweisquelle konnte nicht gefunden werden. (*)	
Serial number	None	
Hardware version	A	
Software / Firmware version	AA	
Contains FCC-ID	2AHMS-BTPEN1	
Contains IC	N/A	
Power supply	3 VDC battery - non rechargeable	
Radio module	Type	BLE-Module
Manufacturer	Emperra GmbH E-Health Technologies Friedrich-Ebert-Str. 33 14469 Potsdam Germany	
Highest emission frequency	Fmax= 2480MHz	
Device classification	Class B	
Equipment type	Tabletop	
Number of tested samples	1	

(*) Declared by Customer

1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments (e.g. serial no.)
AE	USB – BT adapter	Nordic Semi Conductor		
AE	Laptop	DELL	E6420	With SW "Master Control Panel" V 3.10.0
None				
*Note: Use the following abbreviations: AE : Auxiliary/Associated Equipment, or SIM : Simulator (Not Subjected to Test) CABL : Connecting cables				

1.5 Input / Output Ports

Port #	Name	Type*	Max. Cable Length	Cable Shielded	Comments (e.g. Cat. of Cable)
1	N/A	N/A	N/A	N/A	
*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					

1.6 Operating Modes and Configurations

Mode #	Description
1	Bluetooth link and display shows counter

Configuration #	EUT Configuration
1	Fully assembled

1.7 Test Equipment Used During Testing

Measurement Software			
Description	Manufacturer	Name	Version
EMC Test Software	Dare Instruments	Radimation	2015.1.12

Radiated emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
TRILOG Broadband Antenna	Schwarzbeck	VULB 9162	EF00978	2015-10	2016-10
Double-Ridged Guide Antenna	ETS-Lindgren	3117	EF00976	2016-03	2017-03
EMI Test Receiver	R&S	ESU26	EF00887	2016-01	2017-01

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 ICES-003				
Product Specific Standard	Requirement – Test	Reference Method	Result	Remarks
47 CFR 15.109 ICES-003 Item 6.2	Radiated emissions	ANSI C 63.4	PASS	
47 CFR 15.107 ICES-003 Item 6.1	AC power line conducted emissions	ANSI C63.4	N/A	
Remarks:				

3 Test Conditions and Results

3.1 Test Conditions and Results – Radiated emissions

Radiated emissions acc. FCC 47 CFR 15.109 / ICES-003			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 %	37 %				
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					
	Fehler! Verweisquelle konnte nicht gefunden werden..8					
Fully configured sample scanned over the following frequency range	Frequency range					
	30 MHz to 14 GHz					
Operating mode	1					
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 C63.4:2014 requirements and is listed by FCC.
The measurement procedure is as follows:

Exploratory measurement:

- The EUT was placed on a non-conductive table at a height of 0.8m.
- The EUT and support equipment, if needed, were set up to simulate typical usage.
- Cables, of type and length specified by the manufacturer, were connected to at least one port of each type and were terminated by a device or simulating load of actual usage.
- The antenna was placed at a distance of 3 or 10 m.
- The received signal was monitored at the measurement receiver.
 - Cables not bundled were manipulated within the range of likely arrangements to produce the highest emission amplitude
 - To maximize the suspected emissions the EUT is rotated 360 degrees. If the signal exceeds the previous amplitude, go back to the corresponding azimuth and manipulate the cables again for maximizing the emissions if possible.
 - Move the antenna from 1 to 4m to maximize the suspected highest amplitude signal.
- This procedure has to be performed in both antenna polarizations, horizontal and vertical.
- The arrangement of the equipment with the maximum emission level is shown on the setup picture at item 1.3.

Final measurement:

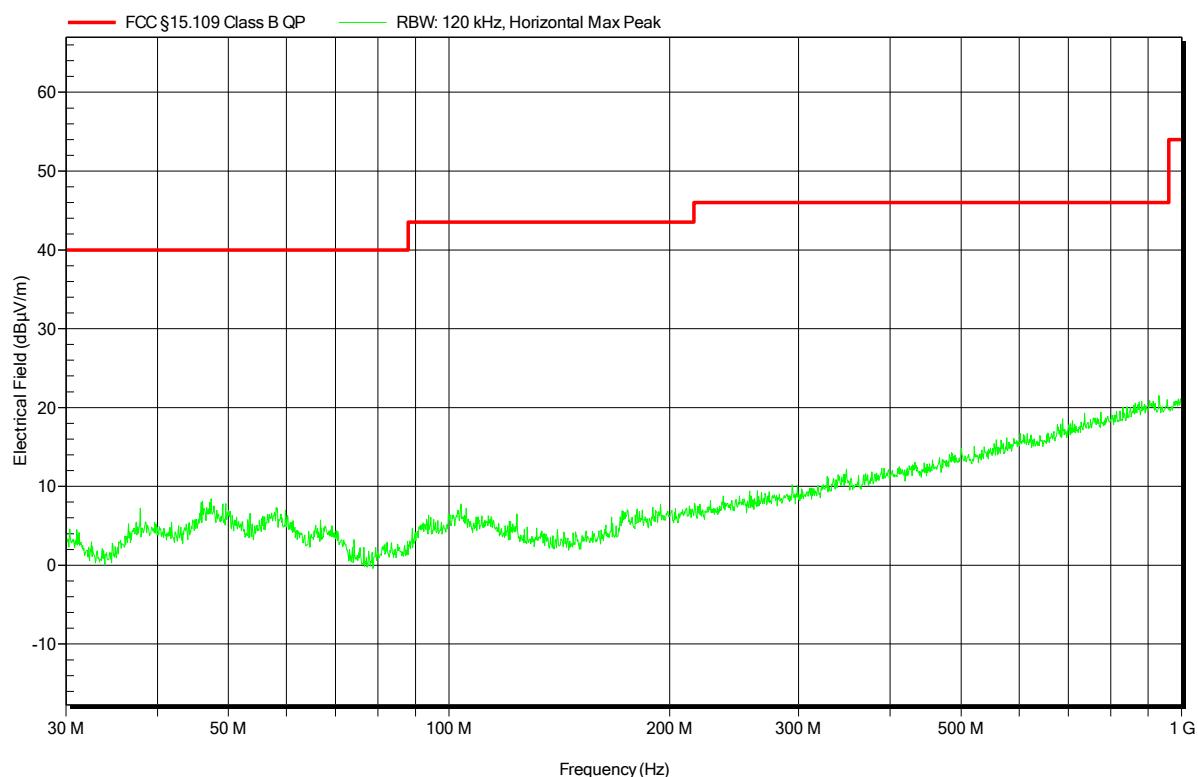
- The EUT was placed on a 0.8 m non-conductive table at a 3 m distance from the receive antenna. The antenna output was connected to the measurement receiver
- A biconical antenna was used for the frequency range 30 – 200 MHz, a logarithmic periodical antenna was used for the frequency range from 200 – 1000 MHz. Above one 1 GHz a Double Ridged Broadband Horn antenna was used. The antenna was placed on an adjustable height antenna mast
- The EUT and cable arrangement were based on the exploratory measurement results
- Emissions were maximized at each frequency by rotating the EUT and adjusting the receive antenna height and polarization. The maximum values were recorded.
- The test data of the worst-case conditions were recorded and shown on the next pages.

Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1602-5371

Applicant: Emperra GmbH E-Health Technologies
EUT Name: Insulin Pen with BLE interface
Model: ESYSTA BT Pen B
Test Site: Eurofins Product Service GmbH
Operator: Mr. Belz
Test Conditions: $T_{nom}: 23^{\circ}\text{C}$, $U_{nom}: 3 \text{ VDC}$ Battery
Antenna: Schwarzbeck VULB 9162, Horizontal
Measurement distance: 3m
Mode: 1
Test Date: 2016-04-15
Note:

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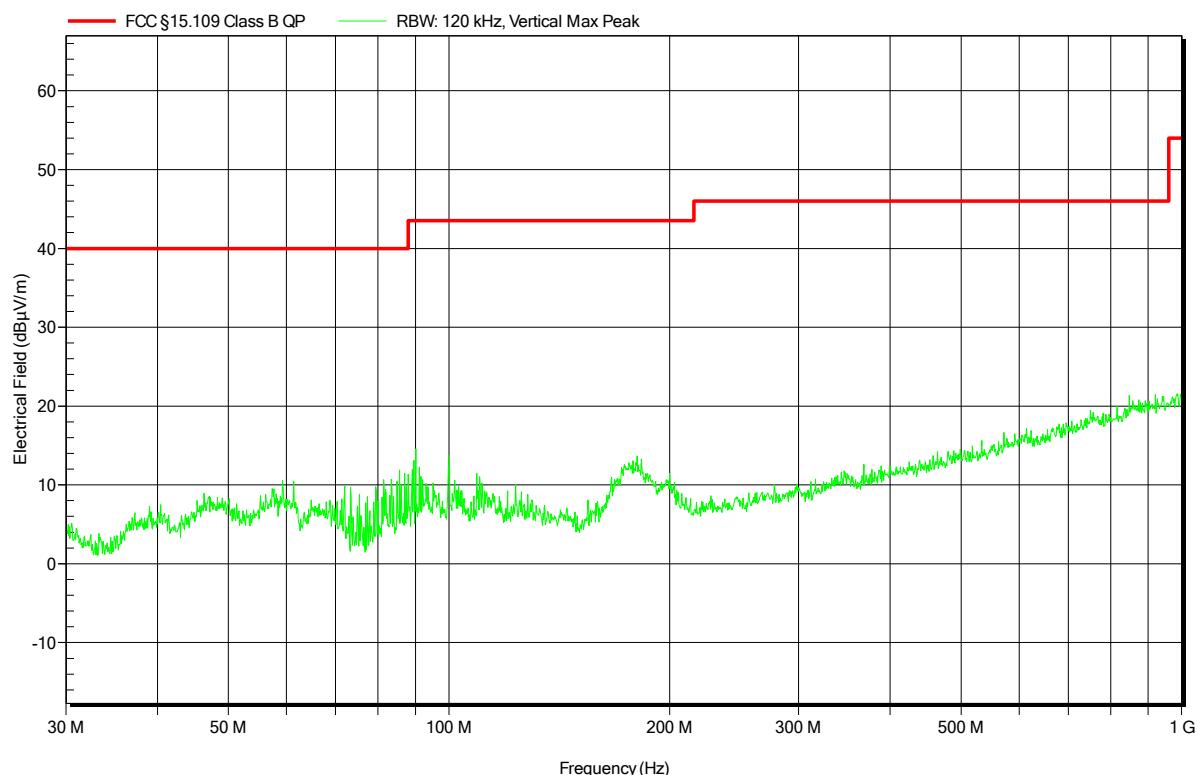
Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

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EUT Name: Insulin Pen with BLE interface
Model: ESYSTA BT Pen B
Test Site: Eurofins Product Service GmbH
Operator: Mr. Belz
Test Conditions: Tnom: 23°C, Unom: 3 VDC Battery
Antenna: Schwarzbeck VULB 9162, Vertical
Measurement distance: 3m
Mode: 1
Test Date: 2016-04-15
Note:

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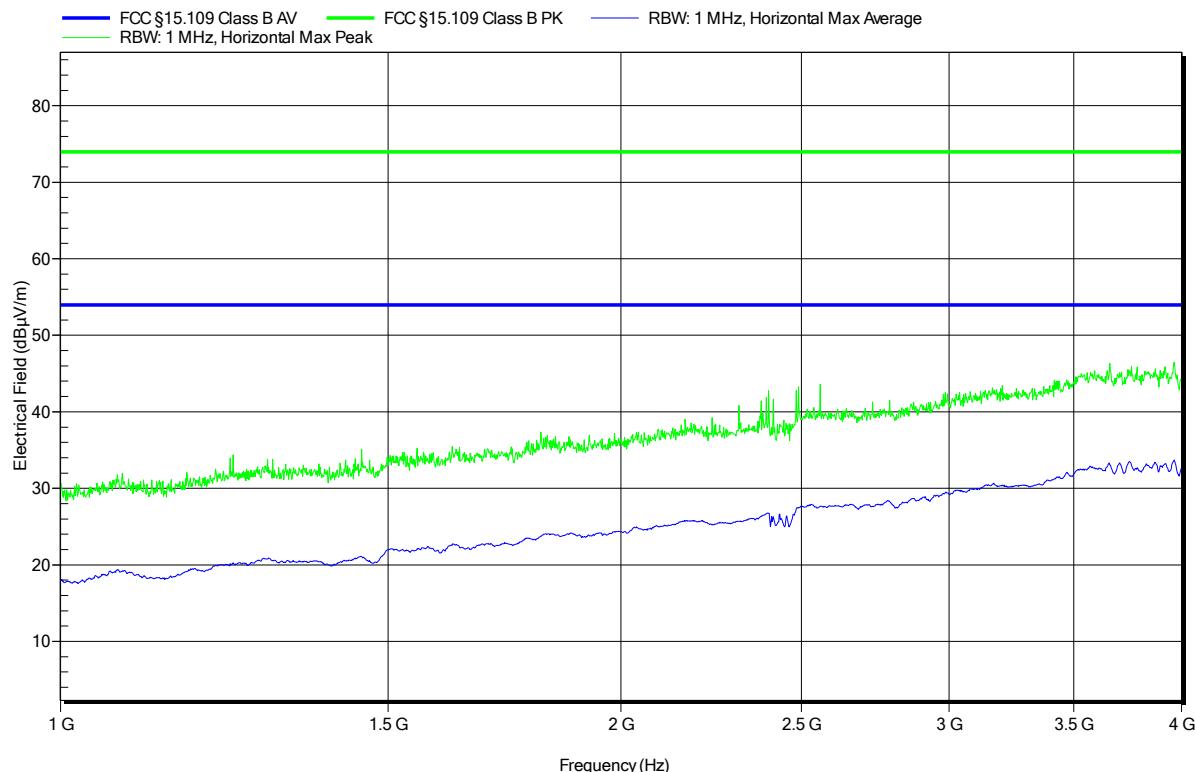


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 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Belz
 Test Conditions: Tnom: 23°C, Unom: 3 VDC Battery
 Antenna: Schwarzbeck VULB 9162, Horizontal
 Measurement distance: 3m
 Mode: 1
 Test Date: 2016-04-15
 Note:

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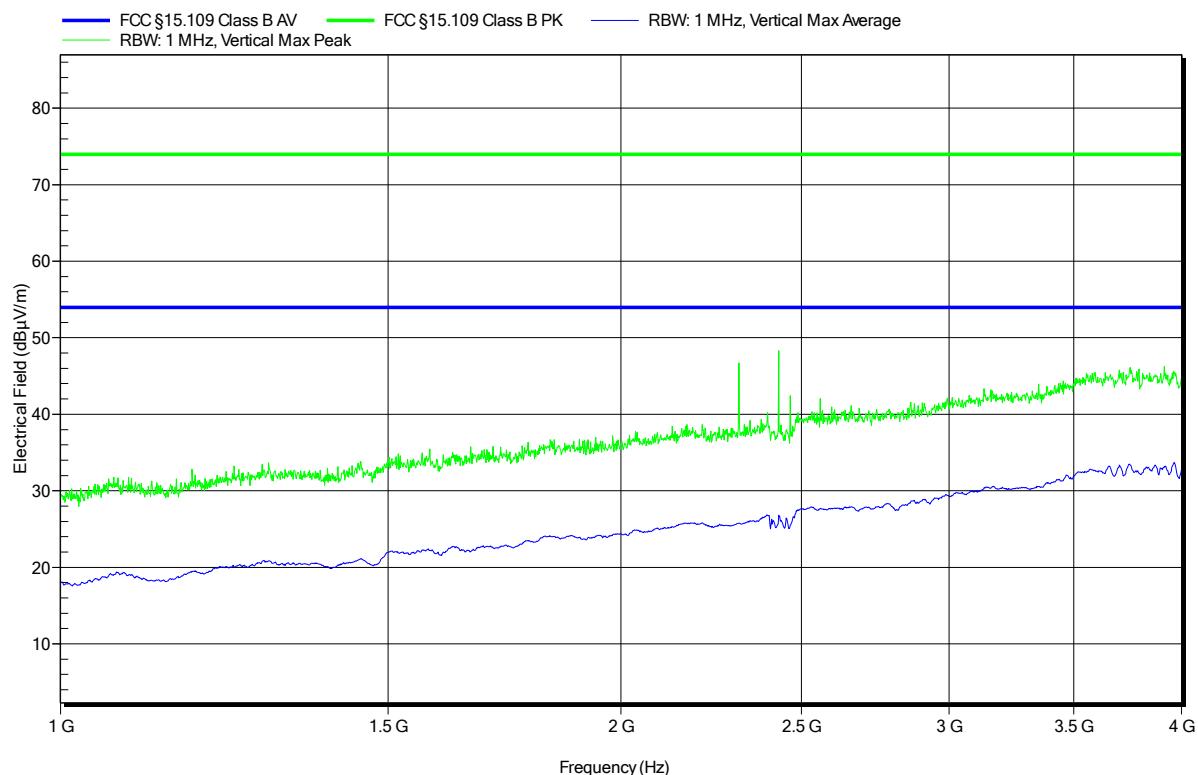


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Test Conditions: $T_{nom}: 23^{\circ}\text{C}$, $U_{nom}: 3 \text{ VDC}$ Battery
Antenna: Schwarzbeck VULB 9162, Vertical
Measurement distance: 3m
Mode: 1
Test Date: 2016-04-15
Note:

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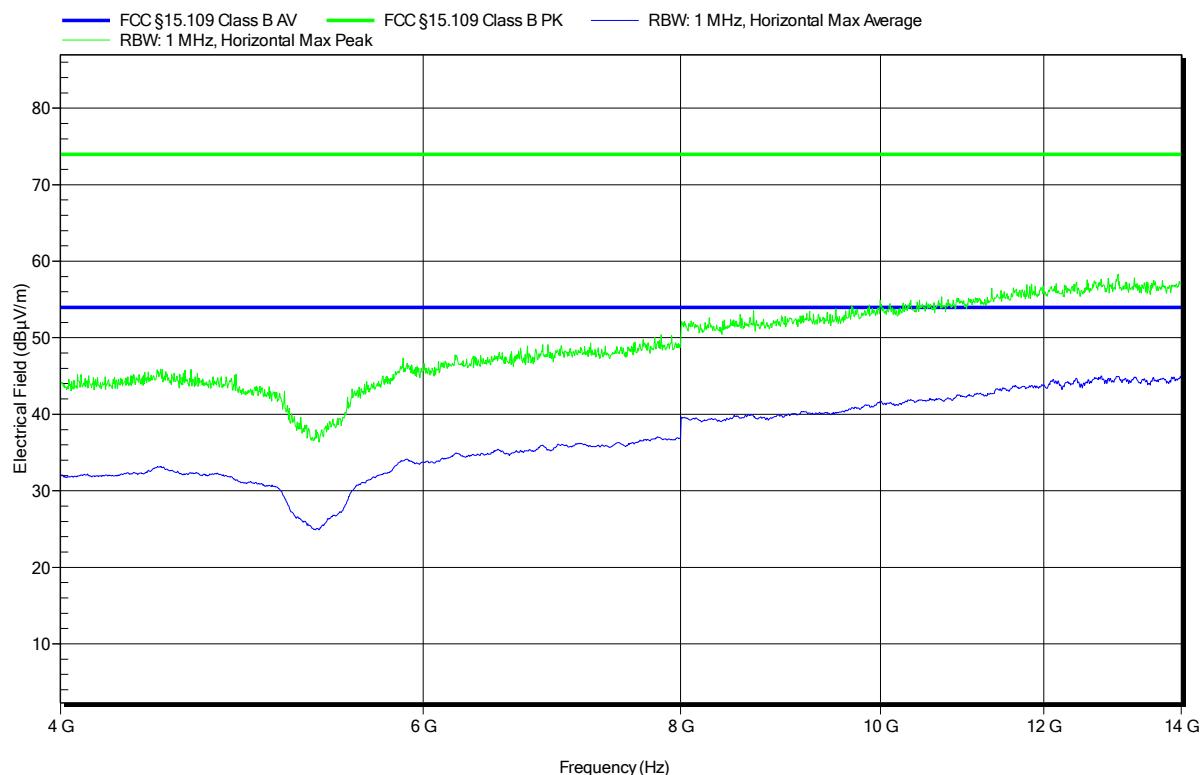


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 Operator: Mr. Belz
 Test Conditions: $T_{thom}: 23^{\circ}\text{C}$, $U_{nom}: 3 \text{ VDC}$ Battery
 Antenna: ETS-Lindgren 3117, Horizontal
 Measurement distance: 3m
 Mode: 1
 Test Date: 2016-04-15
 Note:

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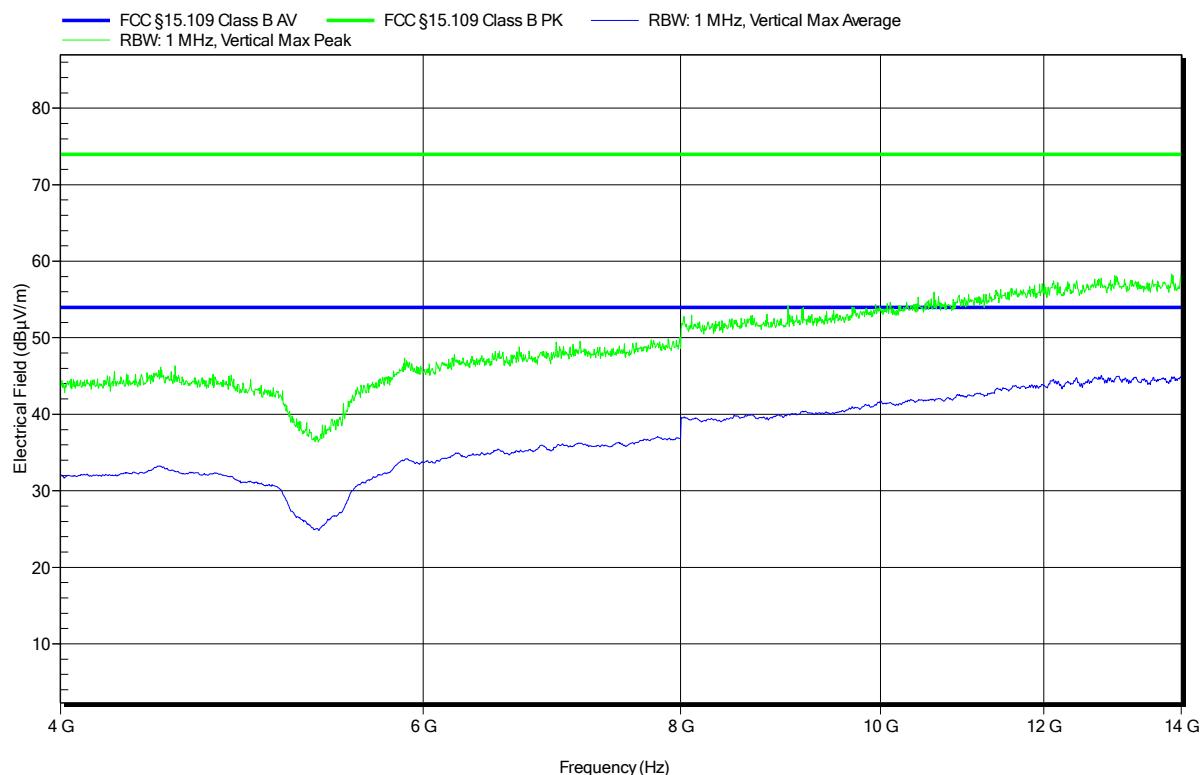
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

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 Antenna: ETS-Lindgren 3117, Vertical
 Measurement distance: 3m
 Mode: 1
 Test Date: 2016-04-15
 Note:

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