EMC TEST REPORT

FCC 47 CFR Part 15B
Industry Canada RSS-Gen

Electromagnetic compatibility - Unintentional radiators

Report Reference No. ..... :	G0M-1405-3836-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 ..... :	Leica Geosystems AG
Address ..... :	Heinrich Wild Strasse 9435 Heerbrugg SWITZERLAND
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	Laser Distance Meter
Model No.	Leica DISTO E7100i
Additional Models	None
Hardware version	V04
Firmware / Software version	0309
Contains	FCC-ID: RFF-LD1BT IC: 3177A-LD1BT
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 ..... :	2014-05-15
Date (s) of performance of tests ..... :	2014-05-16 - 2014-05-19
Compiled by..... :	Steffen Zunke
Tested by (+ signature)..... :	Matthias Handrik
Approved by (+ signature) ..... :	Marcus Klein
Date of issue..... :	2014-05-23
Total number of pages..... :	20

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	2014-05-23	Initial Release	

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1 Equipment (Test item) Description

Description	Laser Distance Meter	
Model	Leica DISTO E7100i	
Additional Models	None	
Serial number	None	
Hardware version	V04	
Software / Firmware version	0309	
Contains FCC-ID	RFF-LD1BT	
Contains IC	3177A-LD1BT	
Power supply	3 VDC Battery	
AC/DC-Adaptor	None	
Radio module	Type	Bluetooth Radio Module
	Model	nRF51822
	Manufacturer	Nordic Semiconducto
	HW Version	G0
	SW Version	6.0.0
Manufacturer	Flextronics Munkas u. 28 8660 Tab Hungary	
Highest emission frequency	> 1000 MHz (up to 5th Harm)	
Device classification	Class B	
Equipment type	Tabletop	
Number of tested samples	1	

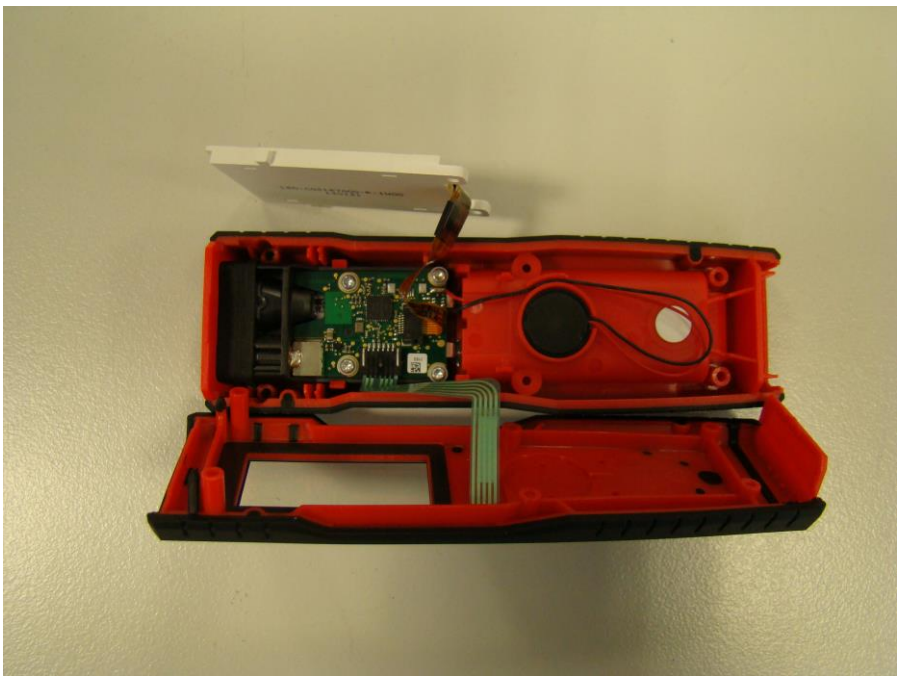
1.1 Photos – Equipment external

EUT


EUT


1.2 Photos – Equipment internal

EUT inside


EUT PCB


1.3 Photos – Test setup

Test Setup : Radiated Emissions


1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
AE	I-PAD	Apple	-	-

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

AE : Auxiliary/Associated Equipment, or

SIM : Simulator (Not Subjected to Test)

CABL : Connecting cables

1.5 Operating Modes

Mode #	Description
1	EUT in continuous measure mode, with Bluetooth transmission to an I-Pad

1.6 Test Equipment Used During Testing

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
LPD-Antenna	R&S	HL 025	EF00327	2013-02	2016-02
EMI Test Receiver	R&S	ESU8	EF00379	2014-03	2015-03
EMI Test Receiver	R&S	ESCS30	EF00295	2013-10	2014-10

1.7 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 dBµV. 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:

Reading on Analyzer (dBµV) + A.F. (dB) = Net field strength (dBµV/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 dBµV/m). The FCC limits are given in units of µV/m. The following formula is used to convert the units of µV/m to dBµV/m:

Limit (dBµV/m) = 20*log (µV/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 dBµV	+	26 dB	=	47.5 dBµV/m	:	47.5 dBµV/m - 57.0 dBµV/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	-
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 %	33 %
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	
	> 1000 MHz (up to 5th Harm)	
Fully configured sample scanned over the following frequency range	Frequency range	
	30 MHz to 5 GHz	
Operating mode	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:
Measurements above 5 GHz were shown in relevant Radio Test Report G0M-1405-3836-TFC247BL.

Spurious emissions under normal conditions according to FCC Part 15B

Project number: G0M-1403-3712

Manufacturer:	Leica Geosystems AG
EUT Name:	Laser Distance Meter
Model:	Leica DISTO D110
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Zunke
Test Conditions:	Tnom: 22°C, Unom: 3VDC Battery
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3m
Mode:	continuous working mode, with Bluetooth connection
Test Date:	2014-05-16
Note:	

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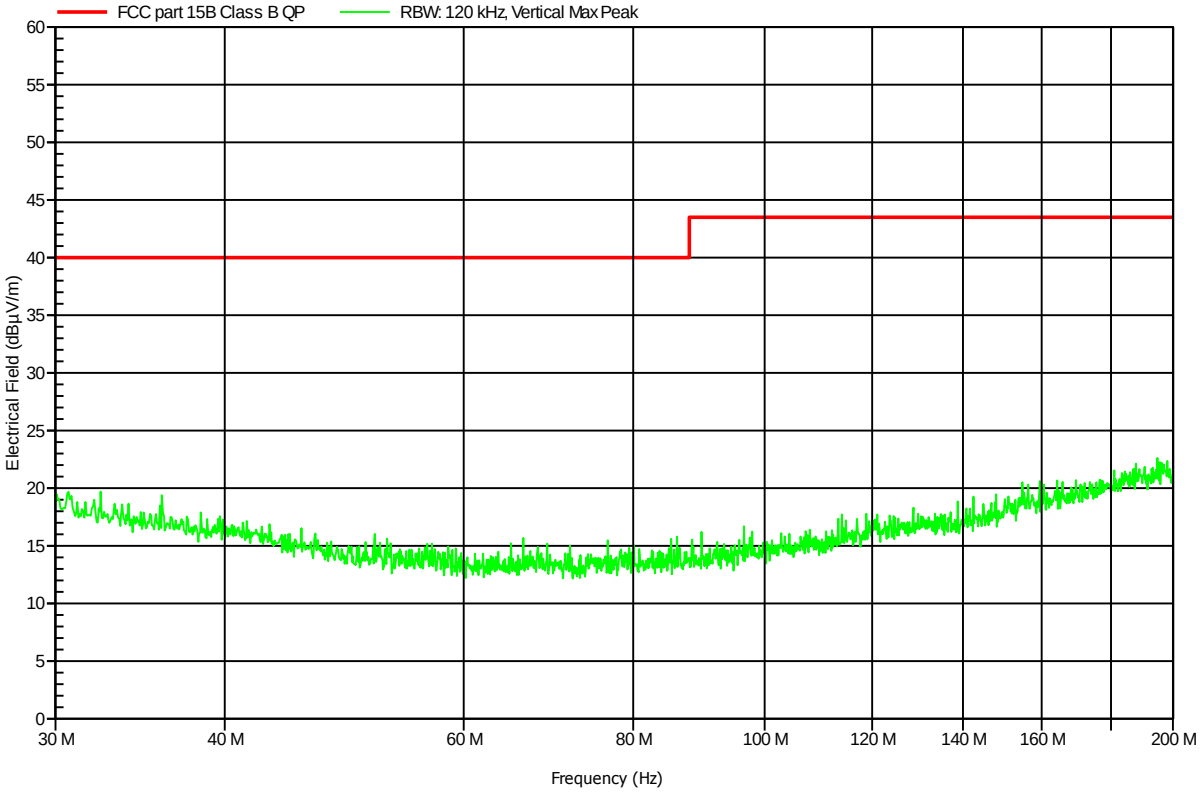

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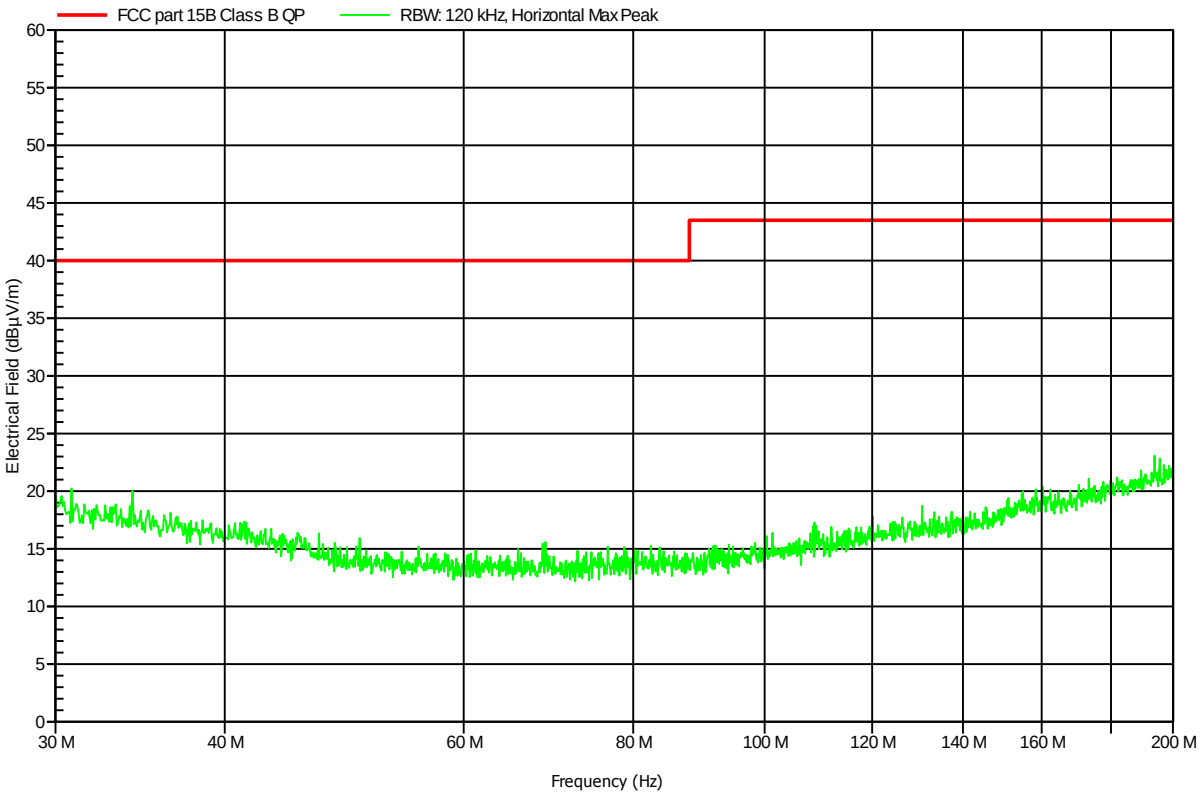

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Measurement distance:	3m
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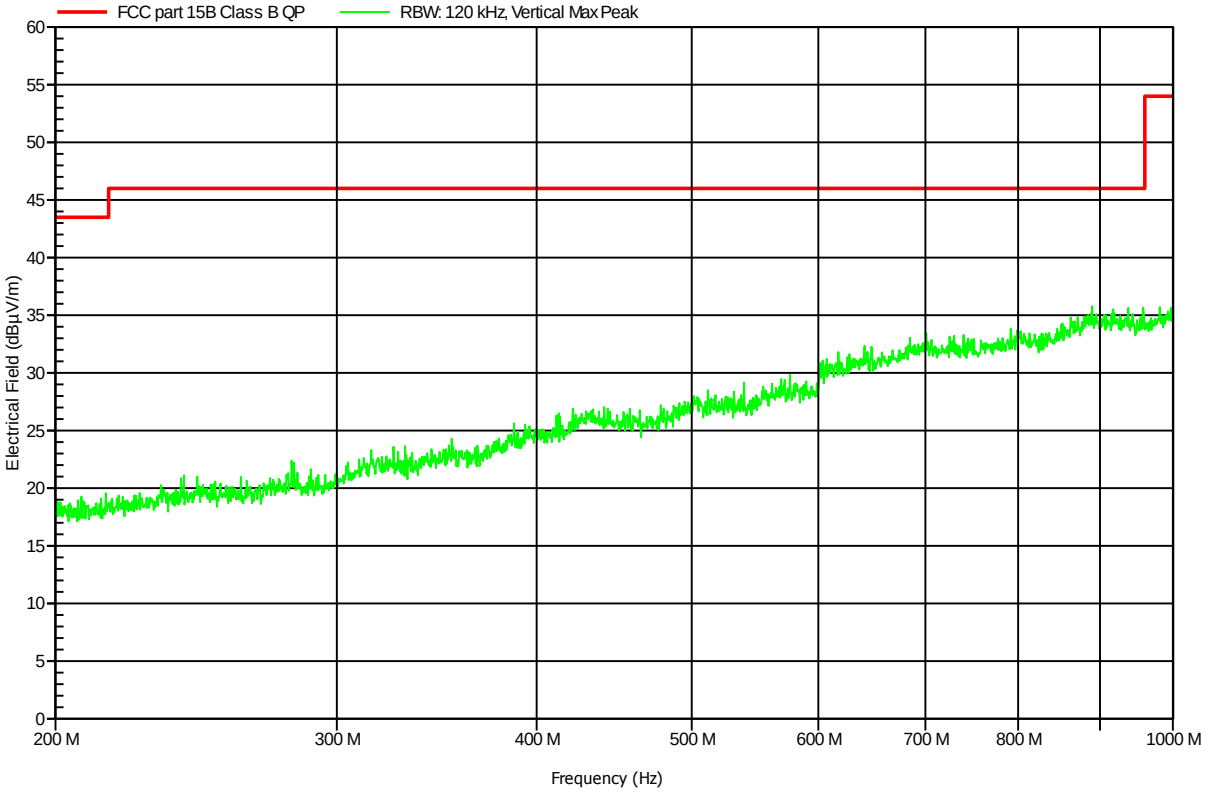

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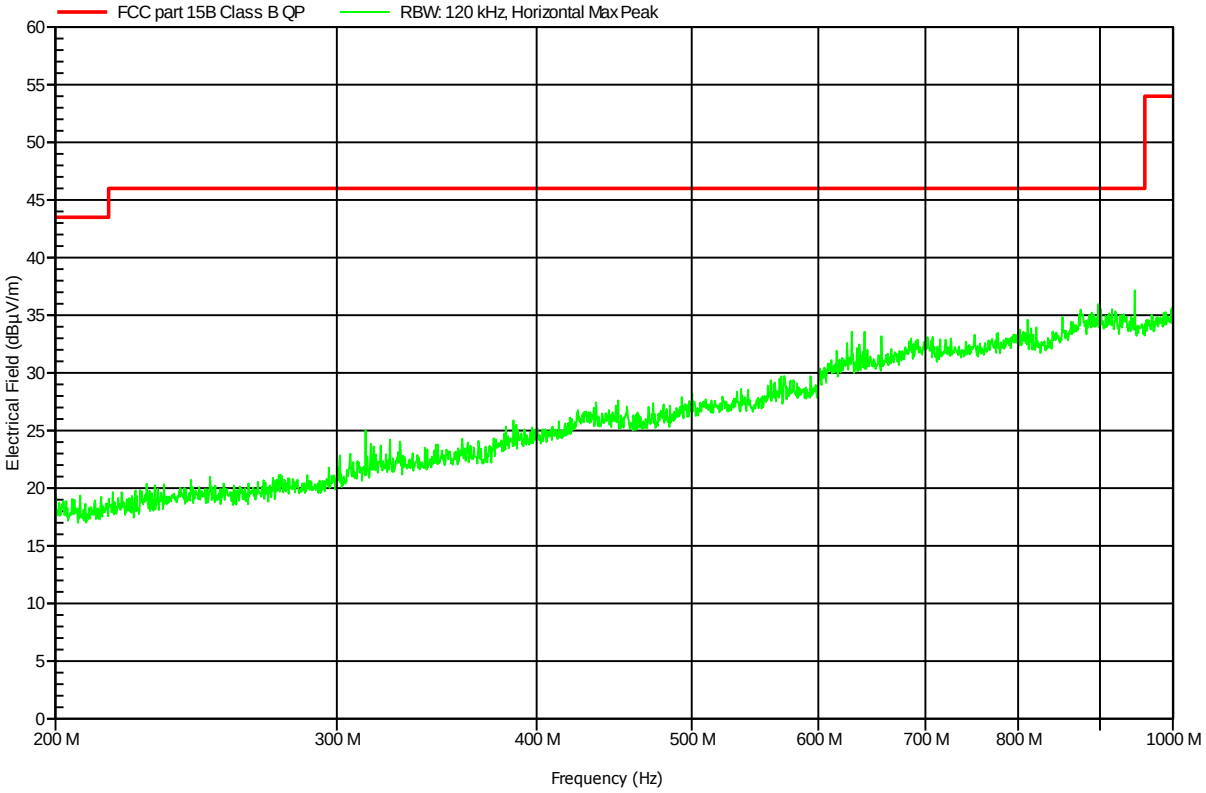

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Test Conditions:	Tnom: 22°C, Unom: 3VDC Battery
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	3m
Mode:	continuous working mode, with Bluetooth connection
Test Date:	2014-05-19
Note:	

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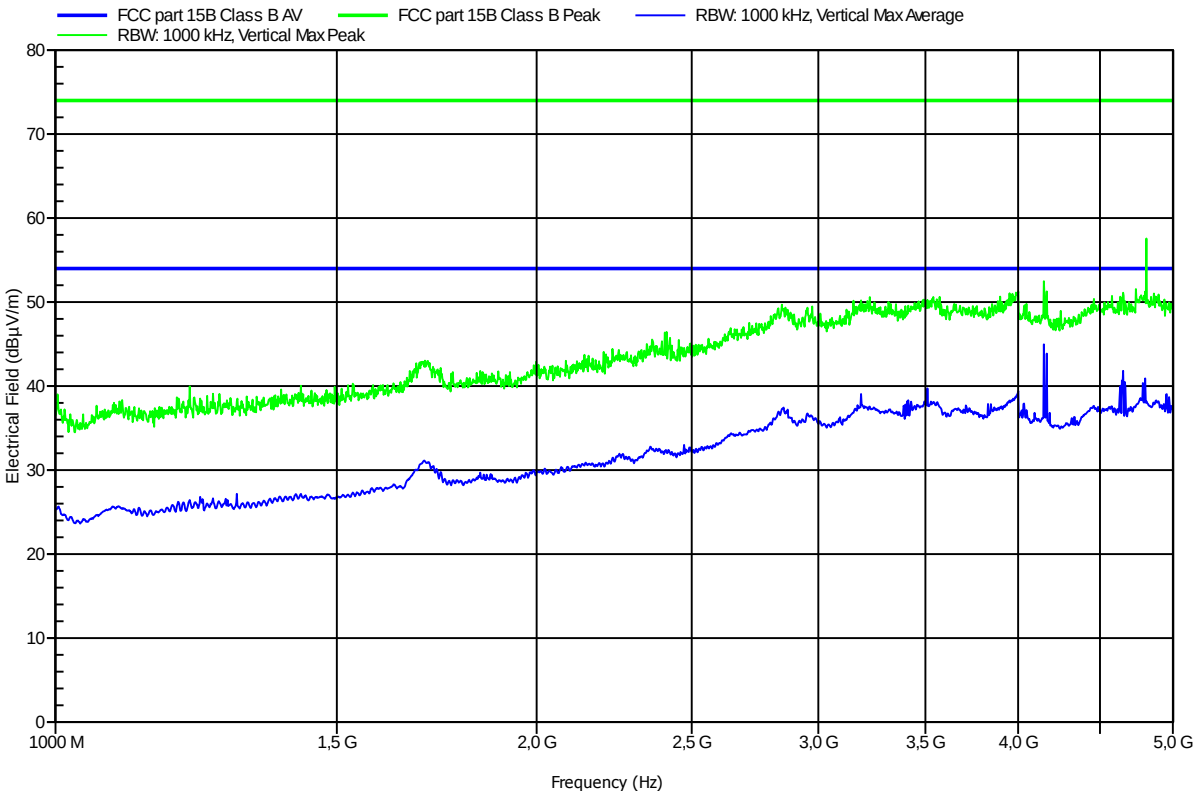

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Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	3m
Mode:	continuous working mode, with Bluetooth connection
Test Date:	2014-05-19
Note:	

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