

EMC TEST REPORT

FCC 47 CFR Part 15B
Industry Canada RSS-Gen

Electromagnetic compatibility - Unintentional radiators

Report Reference No. : G0M-1407-4002-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 S910	
Additional Models	None	
Hardware version	V15	
Firmware / Software version	2332	
Contains	FCC-ID: RFF-LD5PS	IC: 3177A-LD5PS
Test result	Passed	

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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: 2014-08-04

Date (s) of performance of tests: 2014-08-04 - 2014-10-17

Compiled by: Steffen Zunke

Tested by (+ signature).....: Steffen Zunke

Approved by (+ signature): Marcus Klein

Date of issue.....: 2014-10-27

Total number of pages.....: 27



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	2014-10-27	Initial Release	

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1 Equipment (Test item) Description

Description	Laser Distance Meter	
Model	Leica DISTO S910	
Additional Models	2332	
Serial number	None	
Hardware version	V15	
Software / Firmware version	2332	
Contains FCC-ID	RFF-LD5PS	
Contains IC	3177A-LD5PS	
Power supply	3.6VDC via rechargeable Battery	
AC/DC-Adaptor	Model : KS044067 Manufacturer : Ktec Input : 100-240VAC / 50-60Hz Output : 5VDC / 1.0A	
Radio module	Type	WLAN Module
	Model	WF121-A
	Manufacturer	Blue Giga
	HW Version	4
	SW Version	1.2.3-69
	FCC-ID	QOQ-WF121
	IC	5123A-BGTWF121
Radio module	Type	Bluetooth Module
	Model	nRF8001
	Manufacturer	Nordic Semiconductor
	HW Version	1.4
	SW Version	1.2
	FCC-ID	-
	IC	-

Manufacturer	Flextronics International GmbH Friesacher Strasse 3 9330 Althofen AUSTRIA
Highest emission frequency	Fmax [MHz] = 2.49GHz
Device classification	Class B
Equipment type	Tabletop
Number of tested samples	1

1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
AE	IPad	Apple	-	-
AE	Power Supply	Ktec	KS044067	-

***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	Measure mode with WLAN link to an iPad and charging

1.6 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
LPD-Antenna	R&S	HL 025	EF00327	2013-02	2016-02
EMI Test Receiver	R&S	ESU26	EF00887	2014-01	2015-01

Conducted emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
AMN	R&S	ESH2-Z5	EF00182	2012-10	2014-10
AMN	R&S	ESH3-Z5	EF00036	2012-11	2014-11
EMI Test Receiver	R&S	ESCS 30	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:

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

Net:

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

Limit:

This is the FCC Class B radiated emission limit (in units of 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:

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

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 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	For measurement results above 5GHz see relevant radio technology report G0M-1407-4002-TFC247BL / WF.pdf
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

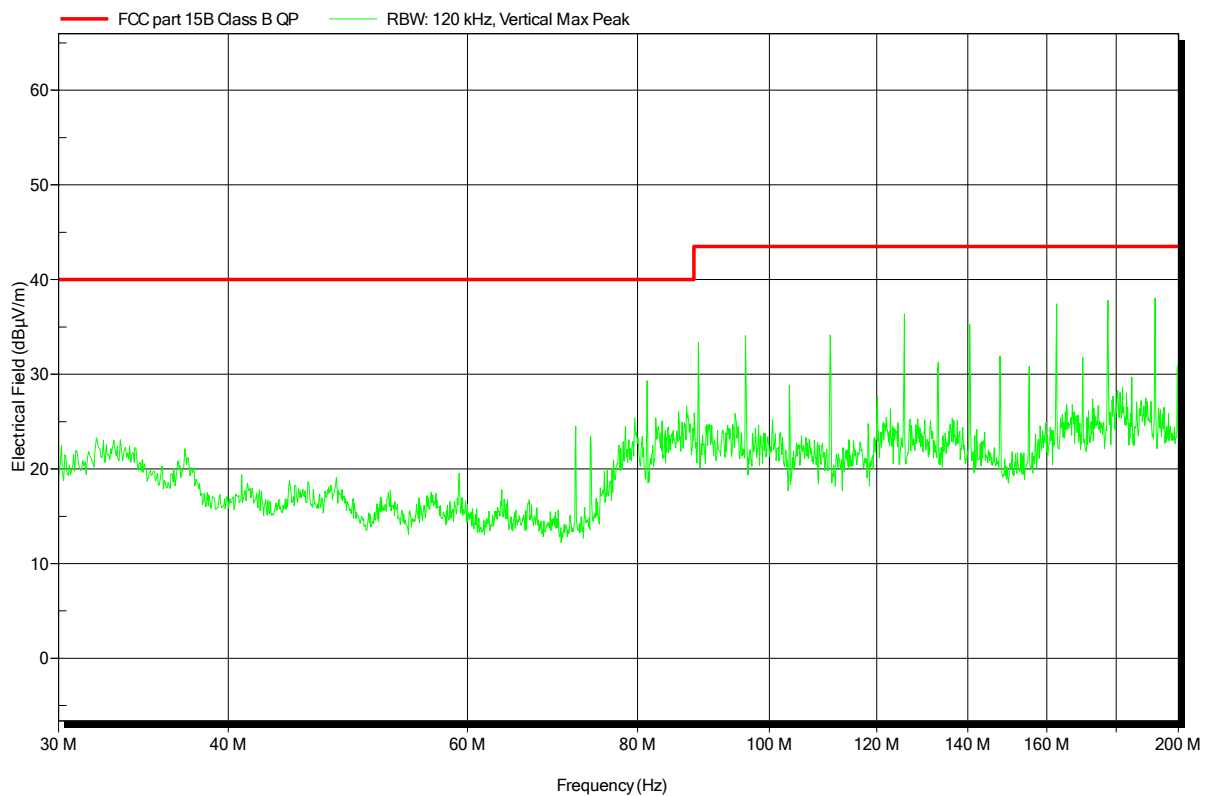
Radiated emissions acc. FCC 47 CFR 15.109 / IC RSS-Gen					Verdict: PASS	
Laboratory Parameters:		Required prior to the test		During the test		
Ambient Temperature		15 to 35 °C		25°C		
Relative Humidity		30 to 60 %		48%		
Test according referenced standards		Reference Method				
		ANSI C63.4				
Sample 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] = 2.49GHz				
Fully configured sample scanned over the following frequency range		Frequency range				
		30 MHz to 6 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: Bluetooth mode was considered, but no relevant different disturbances were determined.						

Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1407-4002

Manufacturer: Leica Geosystems AG
 EUT Name: Laser Distance Meter
 Model: Leica DISTO S910
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Zunke
 Test Conditions: Tnom: 25°C, Unom: 3.6VDC via AC/DC Adapter
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3m, converted to 10m
 Mode: measure mode, charging, WLAN active
 Test Date: 2014-09-09
 Note:

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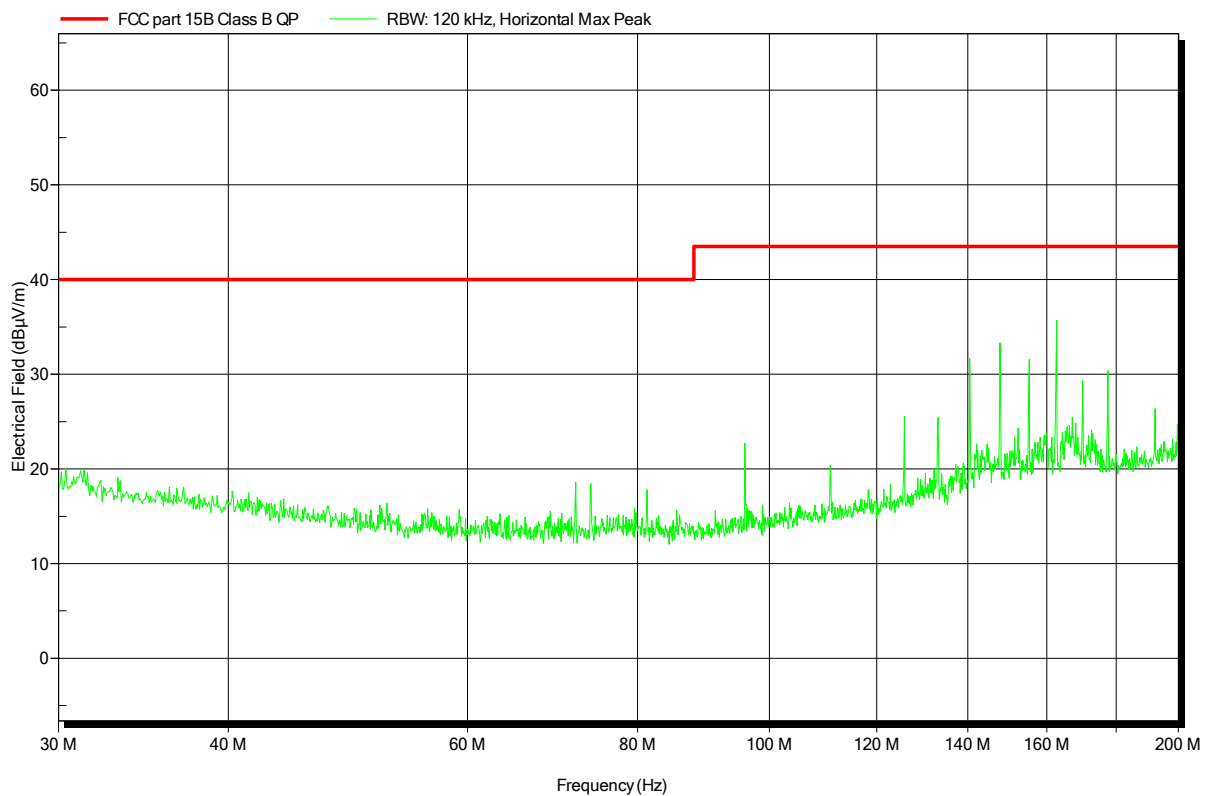
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1407-4002

Manufacturer: Leica Geosystems AG
 EUT Name: Laser Distance Meter
 Model: Leica DISTO S910
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Zunke
 Test Conditions: Tnom: 25°C, Unom: 3.6VDC via AC/DC Adapter
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3m, converted to 10m
 Mode: measure mode, charging, WLAN active
 Test Date: 2014-09-09
 Note:

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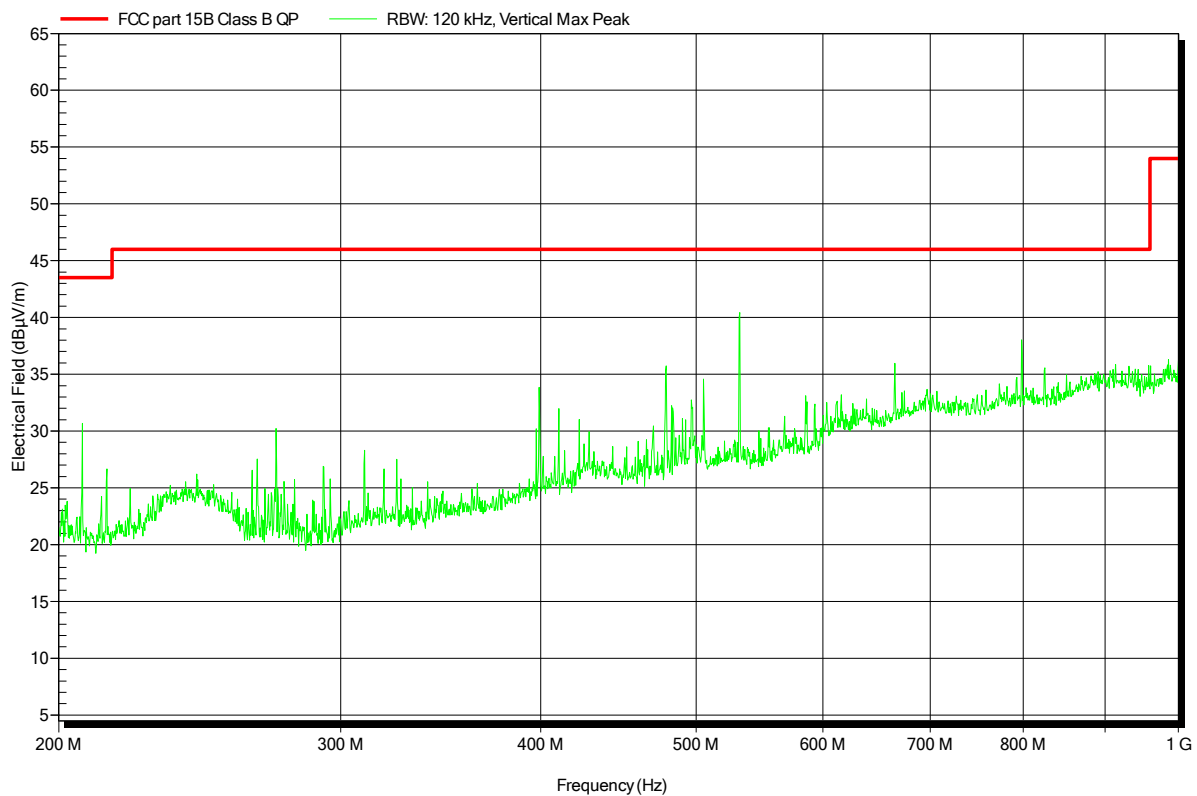


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1407-4002

Manufacturer:	Leica Geosystems AG
EUT Name:	Laser Distance Meter
Model:	Leica DISTO S910
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Zunke
Test Conditions:	Tnom: 25°C, Unom: 3.6VDC via AC/DC Adapter
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3m, converted to 10m
Mode:	measure mode, charging, WLAN active
Test Date:	2014-09-09
Note:	

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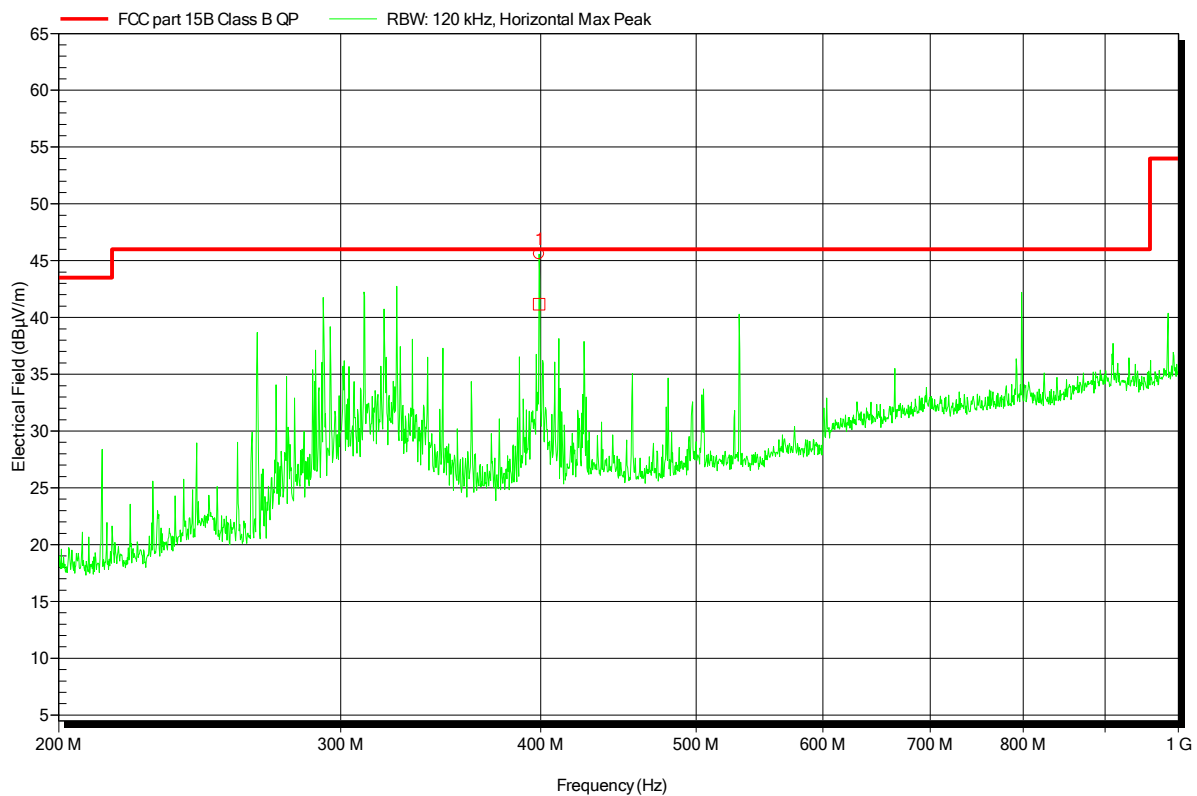


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1407-4002

Manufacturer: Leica Geosystems AG
 EUT Name: Laser Distance Meter
 Model: Leica DISTO S910
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Zunke
 Test Conditions: Tnom: 25°C, Unom: 3.6VDC via AC/DC Adapter
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3m, converted to 10m
 Mode: measure mode, charging, WLAN active
 Test Date: 2014-09-09
 Note:

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Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
398,995 MHz	41,17 dBµV/m	46 dBµV/m	-4,83 dB	Pass

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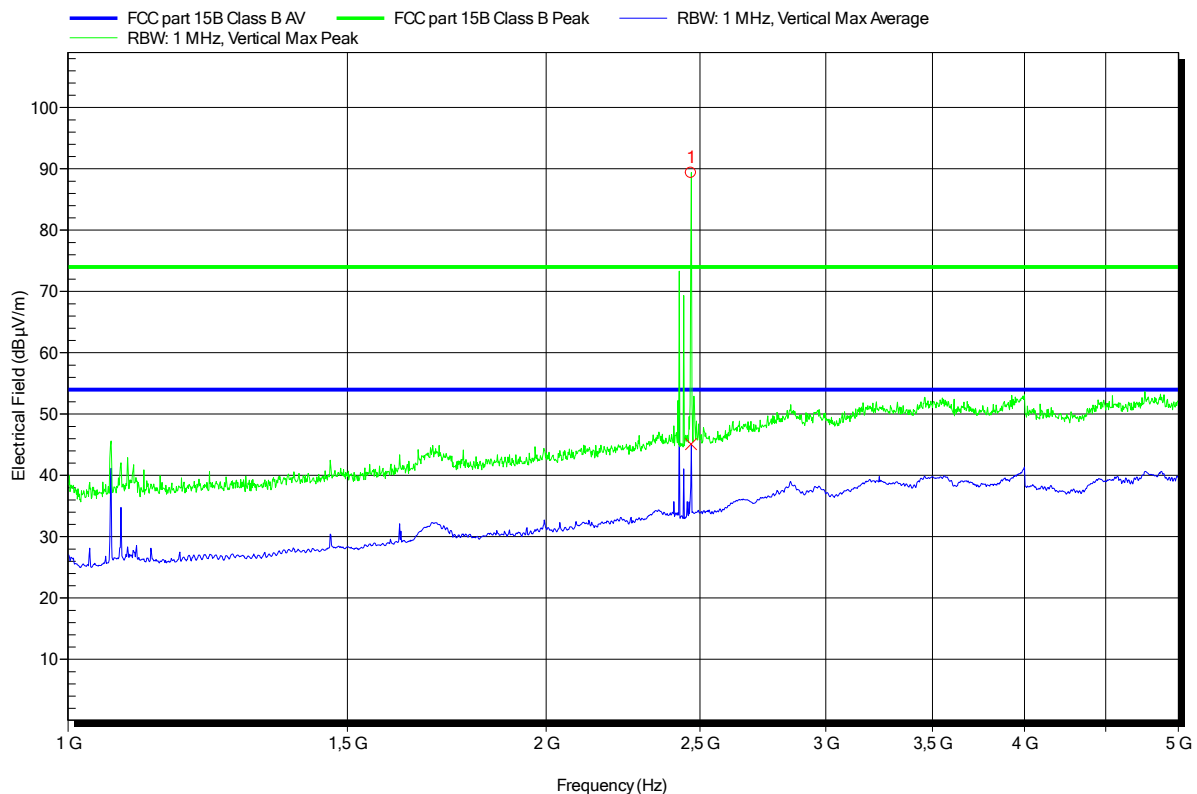
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1407-4002

Manufacturer: Leica Geosystems AG
 EUT Name: Laser Distance Meter
 Model: Leica DISTO S910
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Zunke
 Test Conditions: Tnom: 25°C, Unom: 3.6VDC via AC/DC Adapter
 Antenna: Rohde & Schwarz HL 025, Vertical
 Measurement distance: 3m, converted to 10m
 Mode: measure mode, charging, WLAN active
 Test Date: 2014-09-09
 Note:

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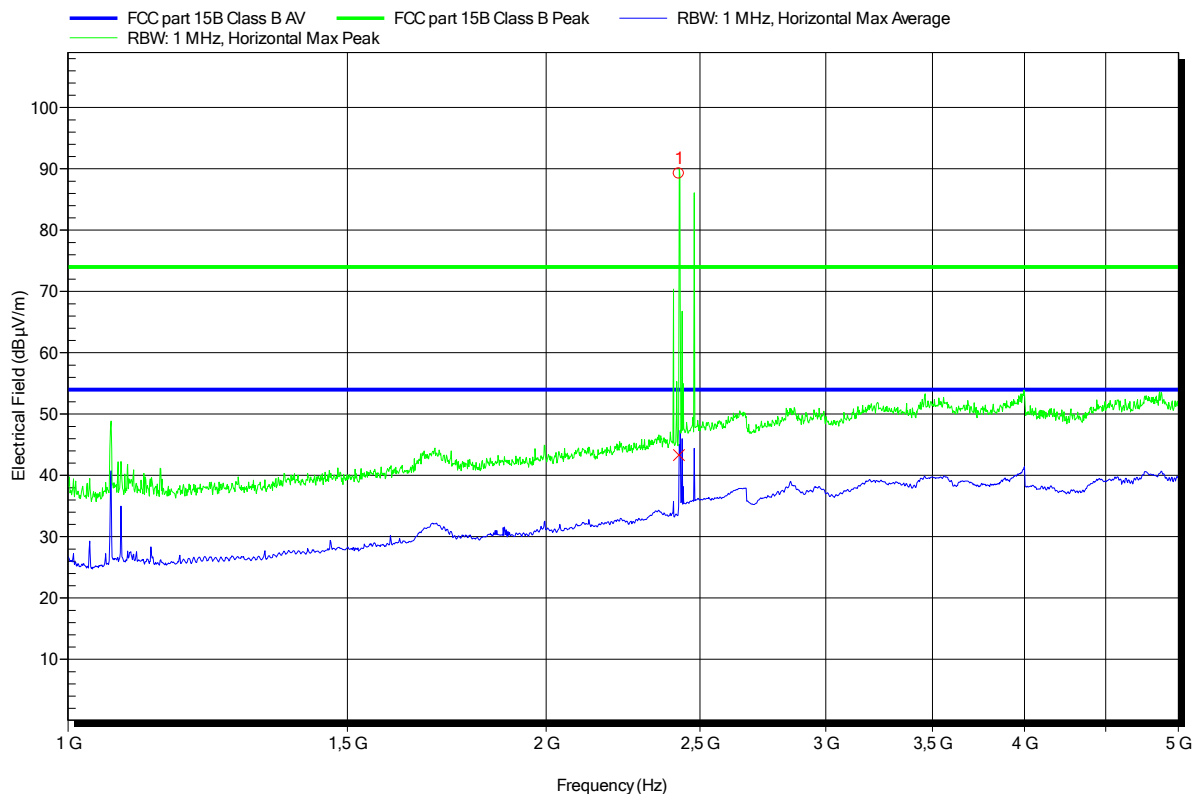
Frequency
 2,467 GHz WLAN carrier

Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1407-4002

Manufacturer: Leica Geosystems AG
 EUT Name: Laser Distance Meter
 Model: Leica DISTO S910
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Zunke
 Test Conditions: Tnom: 25°C, Unom: 3.6VDC via AC/DC Adapter
 Antenna: Rohde & Schwarz HL 025, Horizontal
 Measurement distance: 3m, converted to 10m
 Mode: measure mode, charging, WLAN active
 Test Date: 2014-09-09
 Note:

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Frequency
 2,425 GHz WLAN carrier

3.2 Test Conditions and Results – AC power line conducted emissions

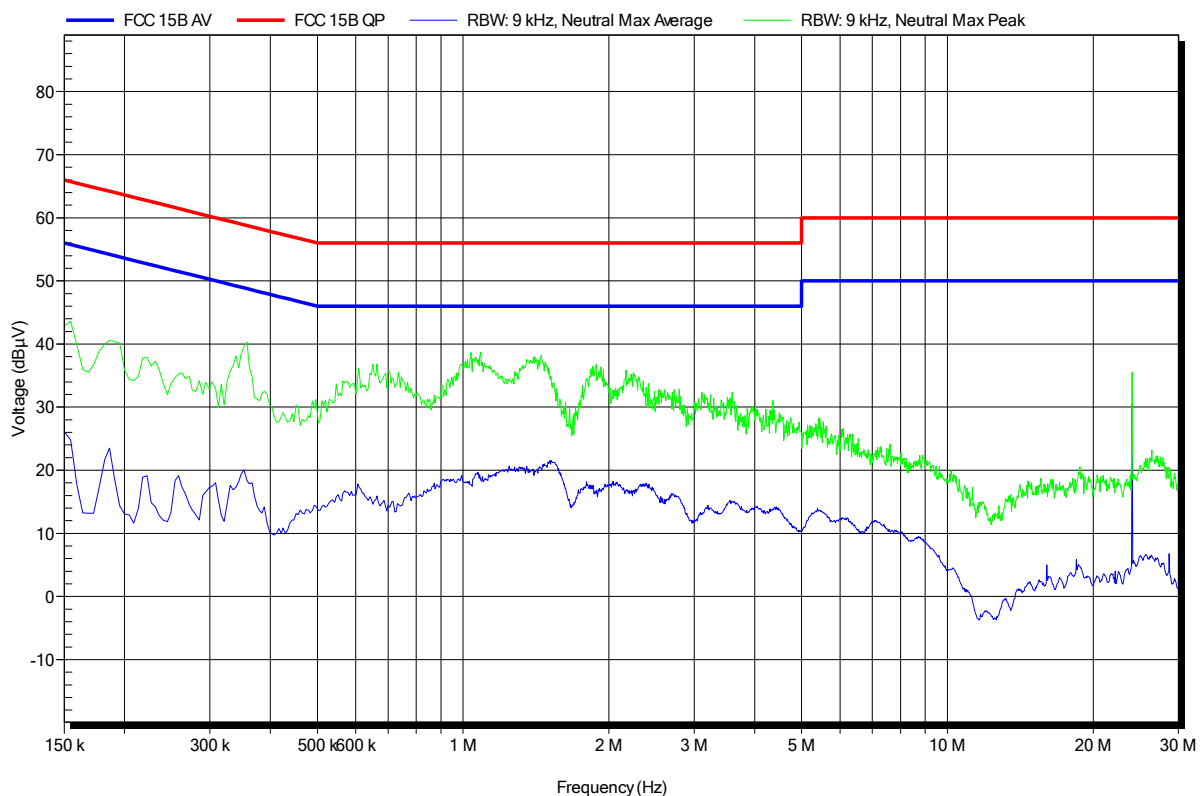
Conducted emissions acc. FCC 47 CFR 15.107 / IC RSS-Gen			Verdict: PASS	
Laboratory Parameters:		Required prior to the test	During the test	
Ambient Temperature		15 to 35 °C	25°C	
Relative Humidity		30 to 60 %	48%	
Test according referenced standards		Reference Method		
		ANSI C63.4		
Fully configured sample scanned over the following frequency range		Frequency range		
		0.15 MHz to 30 MHz		
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		
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

Project number: G0M-1407-4002

Manufacturer: Leica Geosystems AG
 EUT Name: Laser Distance Meter
 Model: Leica DISTO S910
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Zunke
 Test Conditions: Tnom: 25°C, Unom: 120 VAC
 LISN: ESH2-Z5 N
 Mode: measure mode, charging, WLAN link
 Test Date: 2014-09-09
 Note:

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Test Report No.: G0M-1407-4002-EF0115B-V01

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

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

Project number: G0M-1407-4002

Manufacturer: Leica Geosystems AG
 EUT Name: Laser Distance Meter
 Model: Leica DISTO S910
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Zunke
 Test Conditions: Tnom: 25°C, Unom: 120 VAC
 LISN: ESH2-Z5 L
 Mode: measure mode, charging, WLAN link
 Test Date: 2014-09-09
 Note:

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