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**

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.

Additional comments:

Version History

Version	Issue Date	Remarks	Revised by
V01	2014-10-27	Initial Release	

REPORT INDEX

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:

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	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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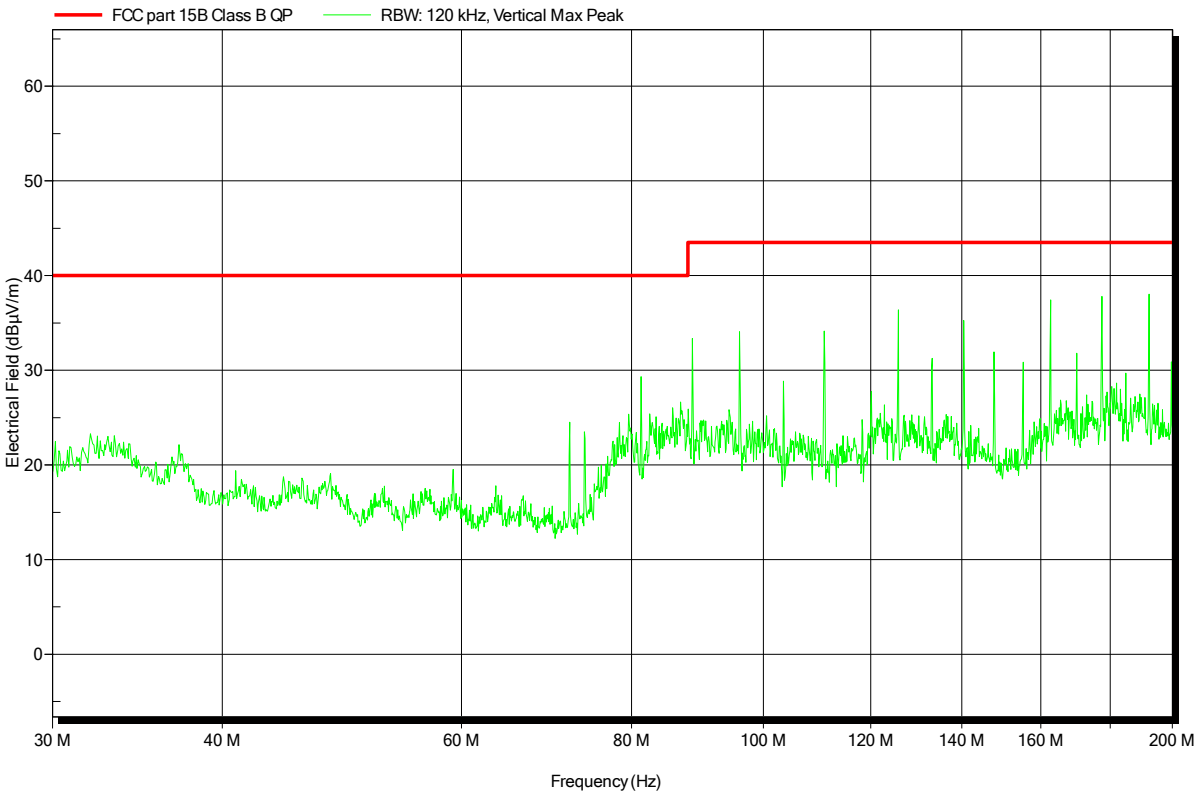

Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1407-4002

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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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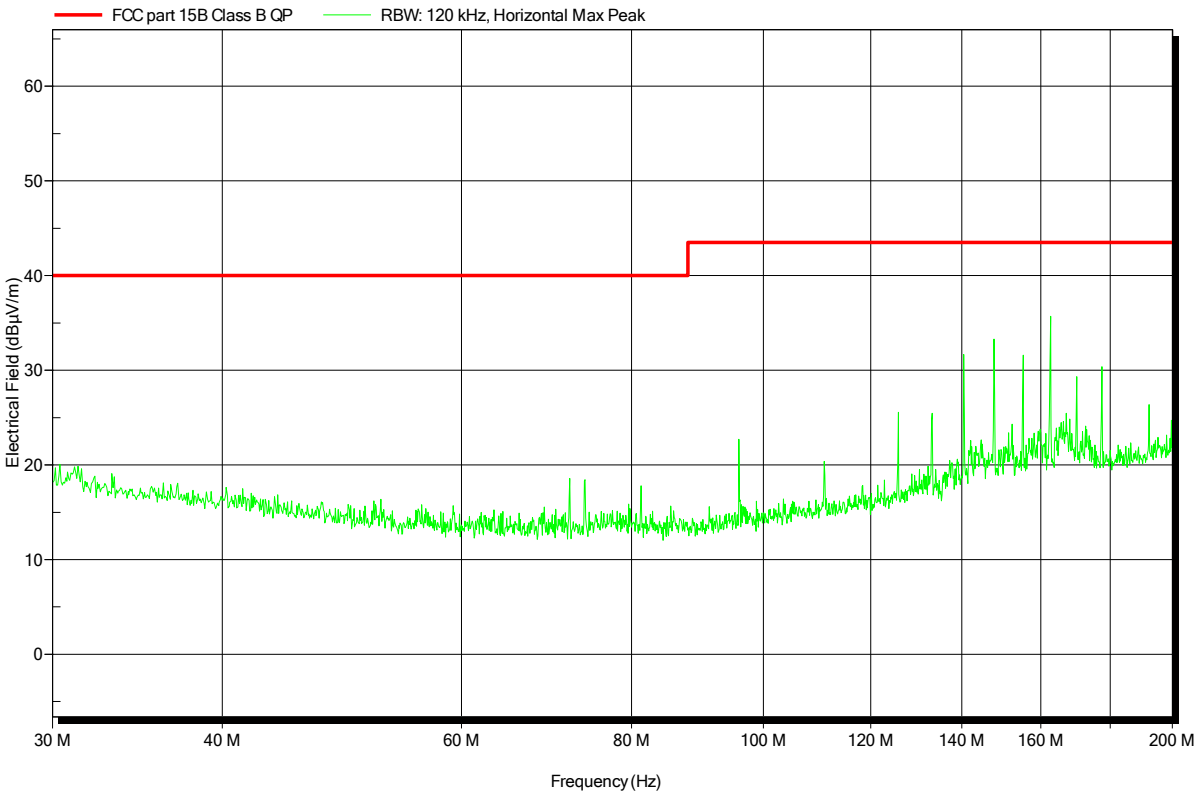

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EUT Name:	Laser Distance Meter
Model:	Leica DISTO S910
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Zunke
Test Conditions:	Tnom: 25°C, Unom: 3.6VDC via AC/DC Adapter
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3m, converted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

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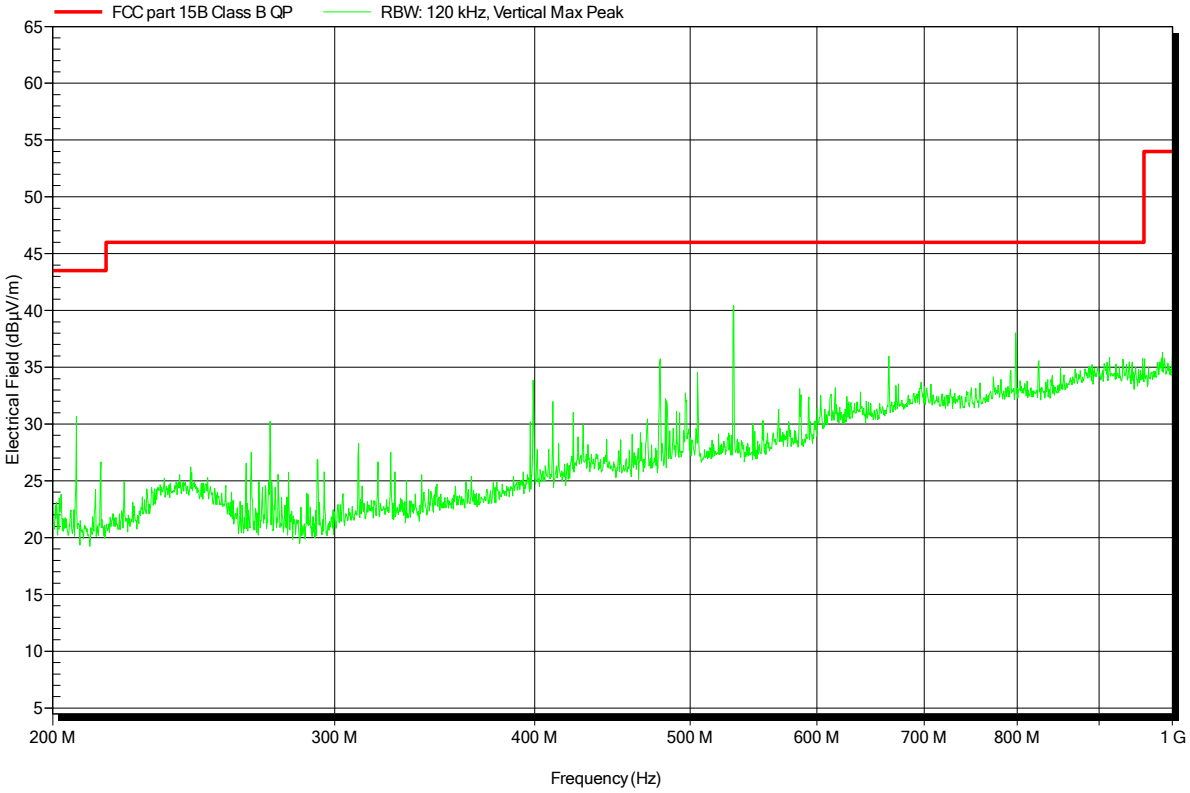

Spurious emissions under normal conditions according to FCC 15B

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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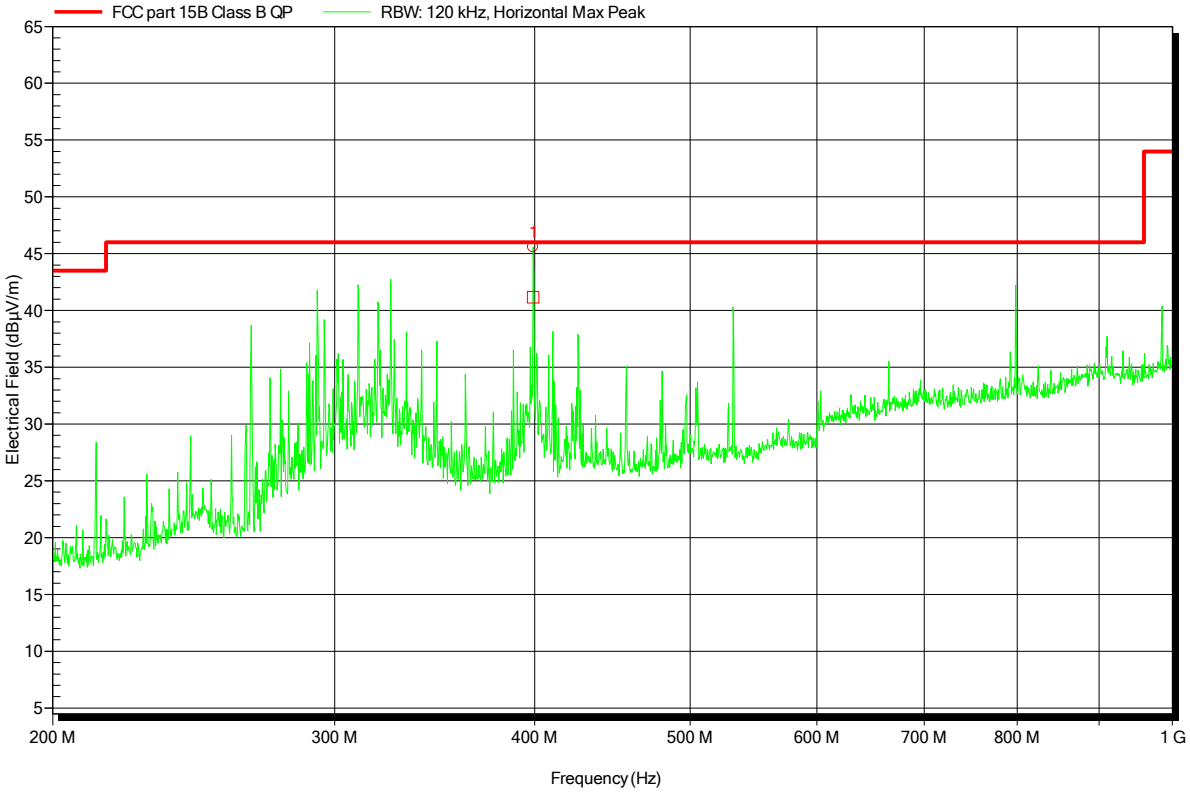

Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
398,995 MHz	41,17 dBµV/m	46 dBµV/m	-4,83 dB	Pass

Spurious emissions under normal conditions according to FCC 15B

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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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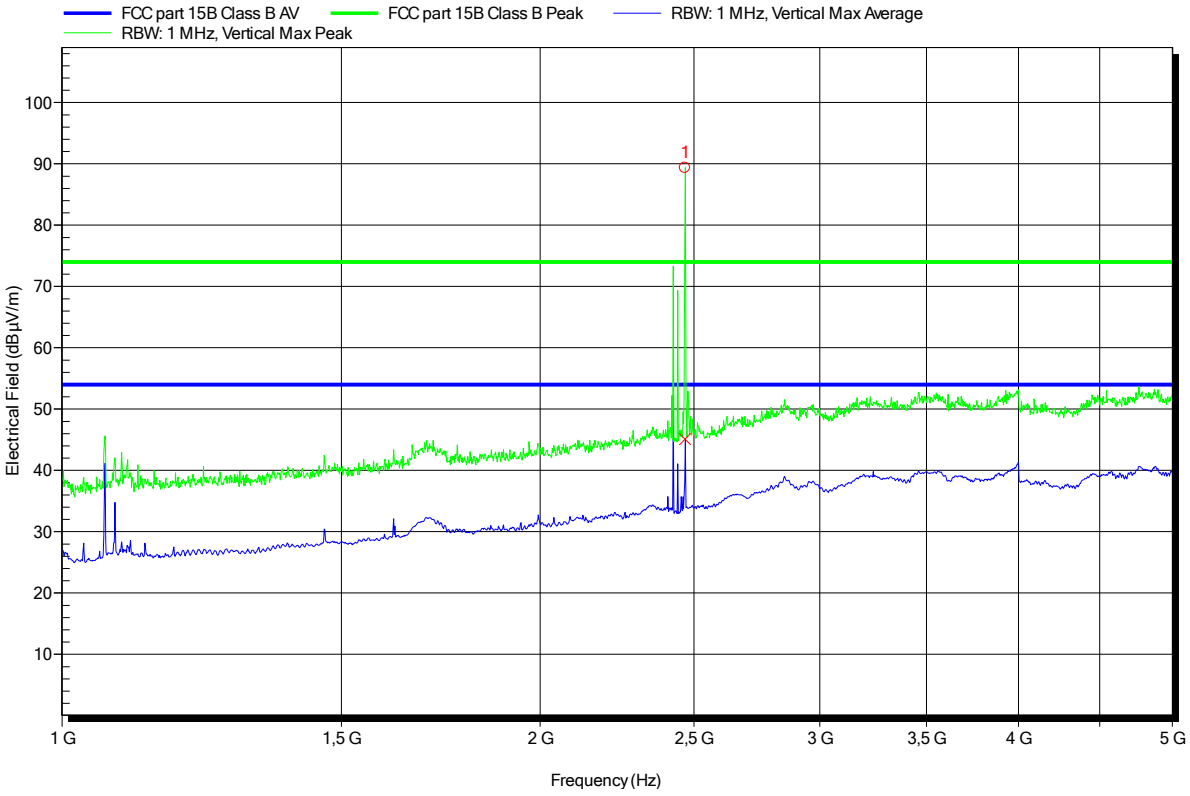

Frequency
2,467 GHz WLAN carrier

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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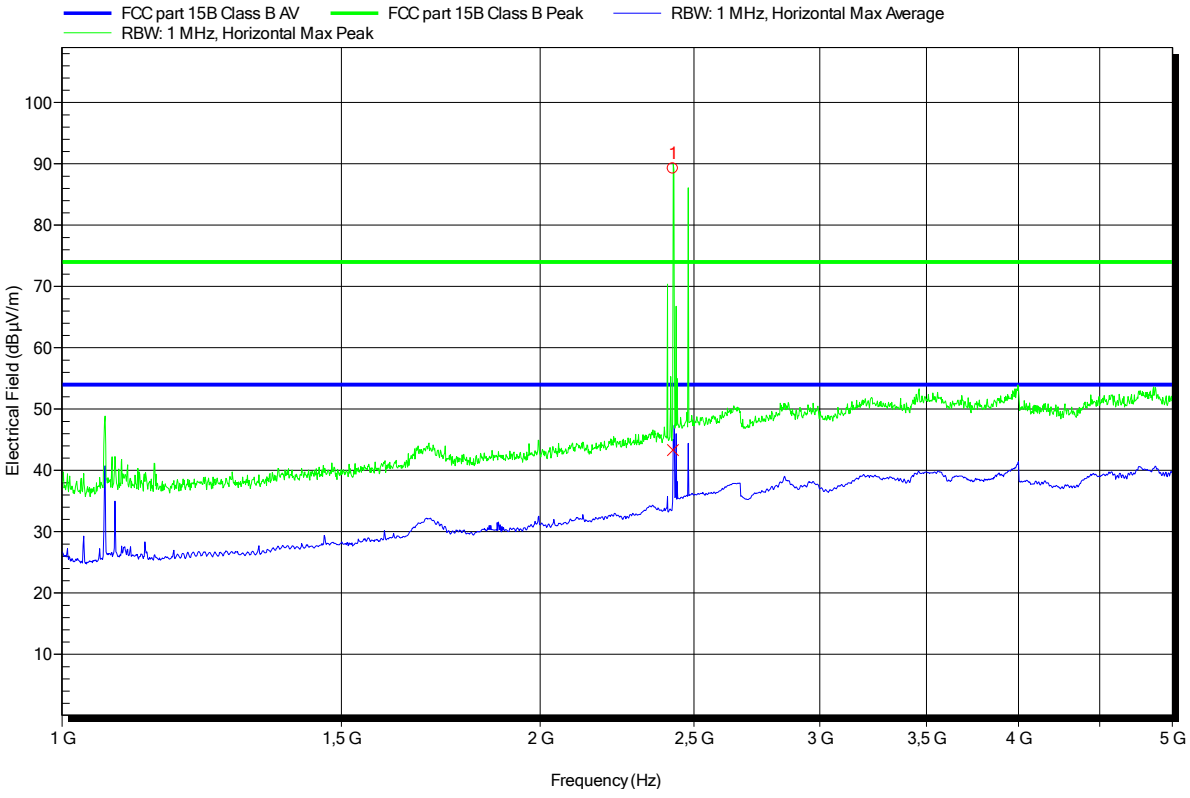

Frequency
2,425 GHz WLAN carrier

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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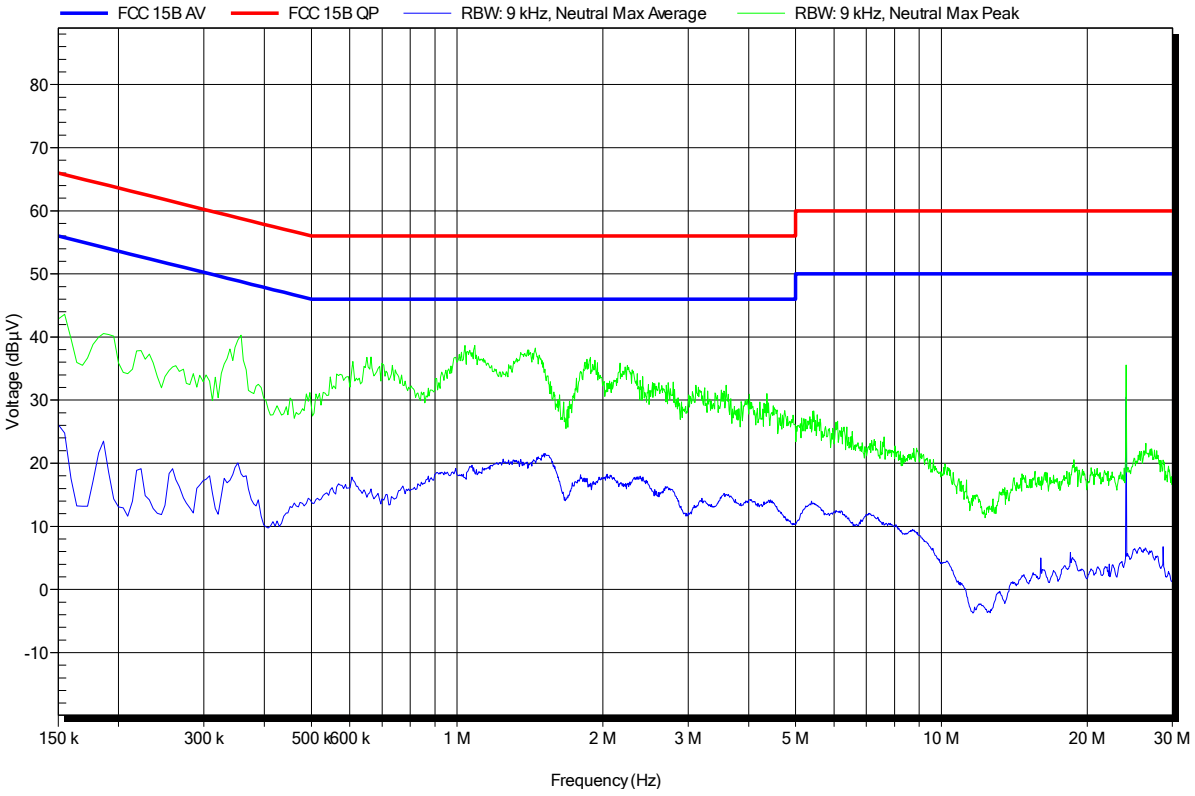

EMI voltage test in the ac-mains according to FCC 15B

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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