

RADIO REPORT FCC 47 CFR Part 15C ISED Canada RSS-247 Frequency hopping systems operating within the 2400.0 MHz - 2483.5 MHz MHz band	
Report Reference No	G0M-2205-1481-TFC247BT-V02
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	    DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	Leica Geosystems AG
Address	Heinrich-Wild-Strasse 9435 Heerbrugg SWITZERLAND
Test Specification	47 CFR Part 15C RSS-247, Issue 2, 2017-02 RSS-Gen, Issue 5, Amendment 2, 2021-02
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	GNSS Reference Server with BT
Model(s)	GR50
Additional Model(s)	None
Brand Name(s)	Leica
Hardware Version(s)	B
Software Version(s)	4.61
FCC ID	RFD-GR50BT
IC	3177A-GR50BT
Test Result	PASSED

Possible test case verdicts:		
Required by standard but not tested	N/T	
Not required by standard	N/R	
Not applicable to EUT	N/A	
Test object does meet the requirement	P(PASS)	
Test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 °C - 30 °C	
Test Lab Humidity	25 % - 55 %	
Date of performance	2023-11-22	
Date of receipt of test item	2022-07-21	
Report:		
Compiled by	Odai Qawasmeh	
Tested by (+ signature) (Responsible for Test)	Burkhard Pudell	
Approved by (+ signature) (Test Lab Engineer)	Radwan Jaafar	
Date of Issue	2023-11-22	
Total number of pages	61	
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:		

ADDITIONAL VARIANTS

Additional Variants (not tested and not evaluated variants)		
Not-tested Variant	Description	
1	Product Type Description	GNSS Surveying Receiver with Bluetooth
	Model name	GS25
	Brand name	Leica
	Hardware Version	B
	Software Version	4.61
	PMN	GS25
	HVIN	838043; 843495; 949988
	FVIN	4.61
Comment: Those named additional variants above have not been tested. Those additional variants of the series have been declared by the manufacturer. The test report explicitly states that those variants were neither tested nor assessed nor evaluated.		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2023-05-02	Initial Release	--
02	2023-11-22	Replaced document: G0M-2205-1481-TFC247BT-V01 Replaced by: G0M-2205-1481-TFC247BT-V02 Reason: page 18 - changed comment page 23 – added comment	B. Pudell

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
BR	Basic Rate (Bluetooth)
EDR	Enhanced Data Rate (Bluetooth)
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
RBW	Resolution bandwidth
RMS	Root mean square
VBW	Video bandwidth
V _{NOM}	Nominal supply voltage

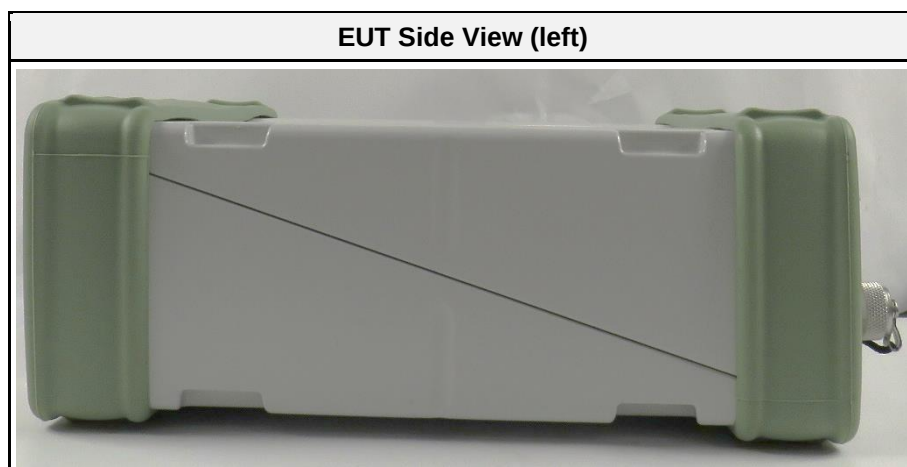
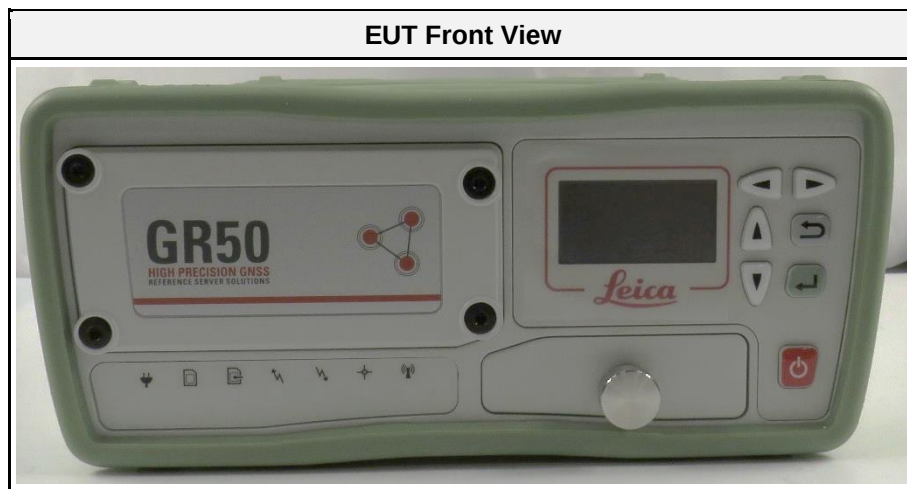
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1 Equipment (Test Item) Under Test

Description	GNSS Reference Server with BT	
Model	GR50	
Additional Model(s)	None	
Brand Name(s)	Leica	
Serial Number(s)	2092001	
Hardware Version(s)	B	
Software Version(s)	4.61	
PMN	GR50	
HVIN	841152; 841153	
FVIN	4.61	
HMN	N/A	
FCC ID	RFD-GR50BT	
IC	3177A-GR50BT	
Equipment type	End Product	
Radio type	Transceiver	
Assigned frequency bands	2400.0 MHz - 2483.5 MHz	
Radio technology	Bluetooth	
Modulation	GFSK, PI/4-DQPSK, 8-DPSK	
Number of antenna ports	1	
Radio Module	Type	Bluetooth module
	Model	PAN1310
	Manufacturer	Panasonic Industrial Devices Europe GmbH
	HW Version	02
	SW Version	03
	FCC-ID	T7VEBMU
	IC	216Q-EBMU
Antenna	Type	External
	Model	GEV263 (762858)
	Manufacturer	Radiall
	Gain	2 dBi
Supply Voltage	V _{NOM}	24 VDC (AC/DC Adapter) 14.8 VDC (Battery) 44 VDC (PoE)
Operating Temperature	T _{NOM}	25 °C
AC/DC-Adaptor	Model	GEV242
	Vendor	XP Power
	Input	110-240 VAC
	Output	24 VDC
Manufacturer	Leica Geosystems AG Heinrich-Wild-Strasse 9435 Heerbrugg SWITZERLAND	

1.1 Photos – Equipment External



EUT Side View (right)



EUT Back View



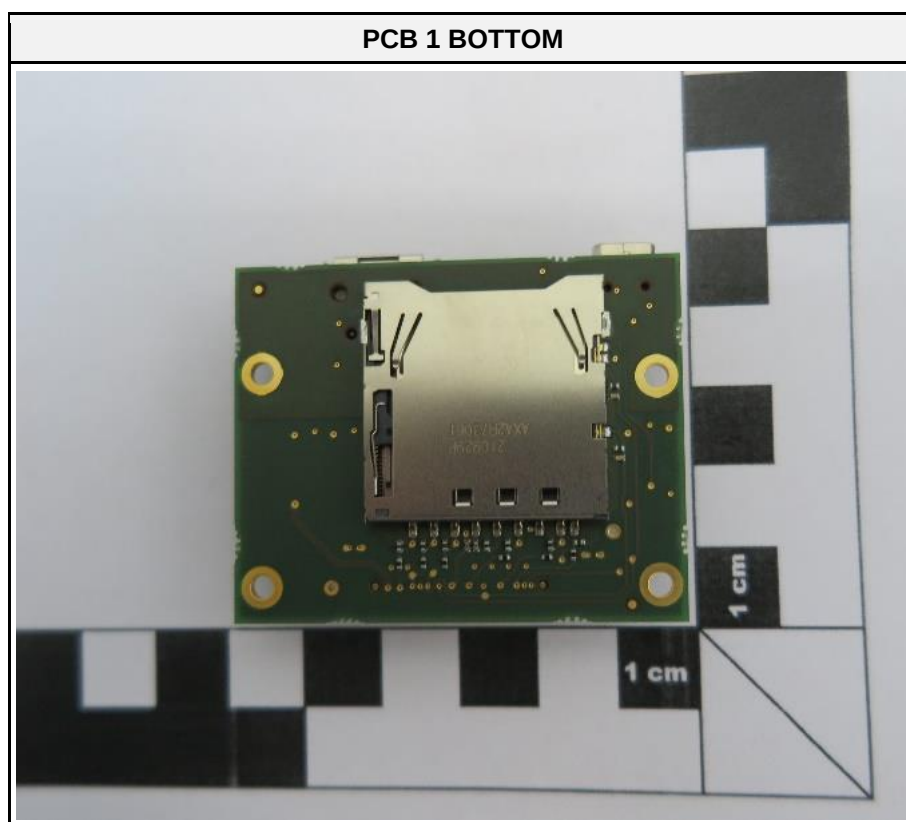
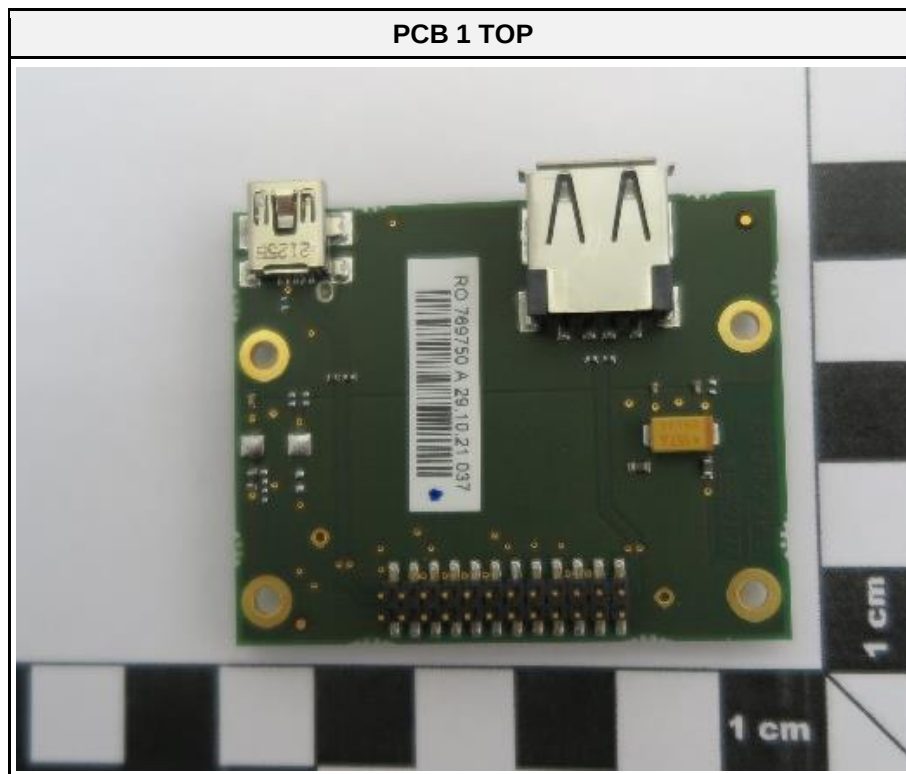
EUT Top View



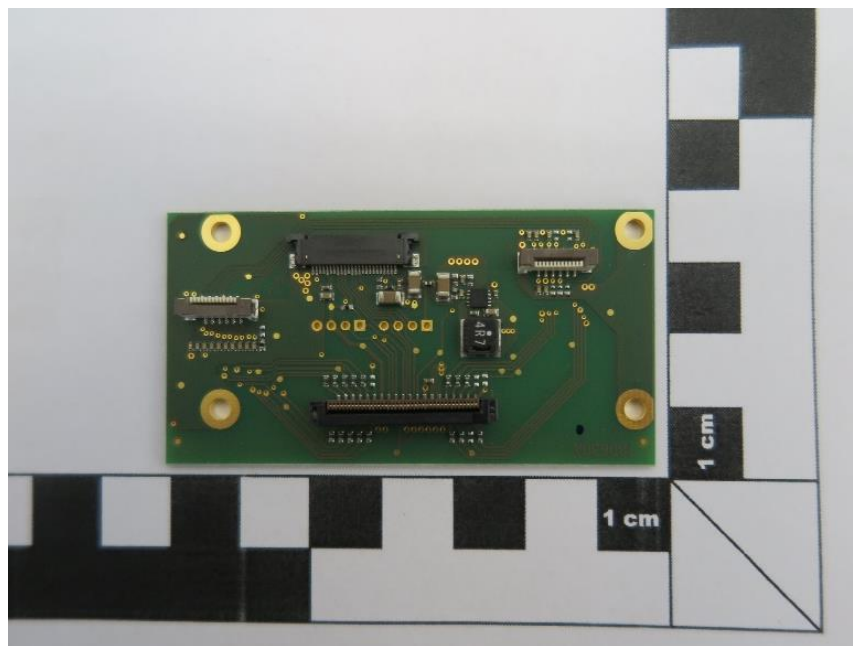
EUT Bottom View (BT)



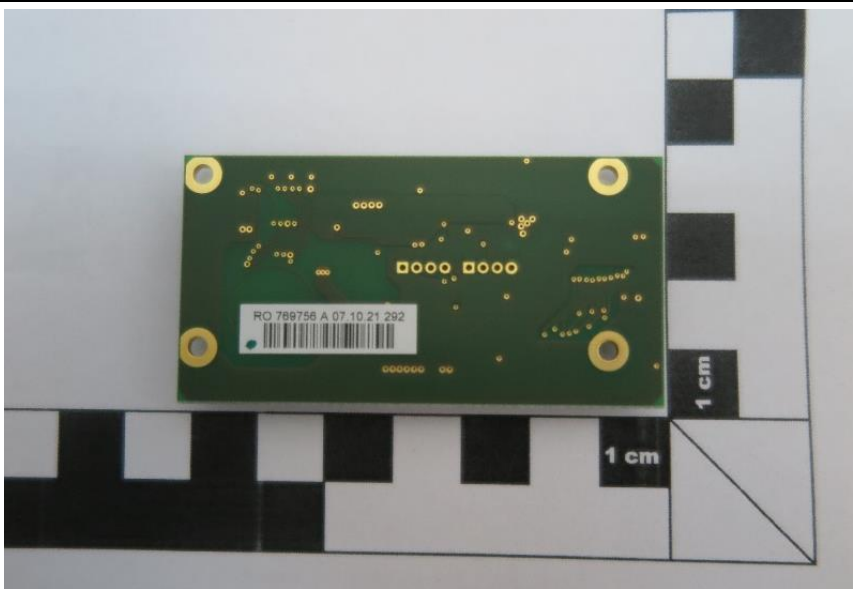
1.2 Photos – Equipment Internal



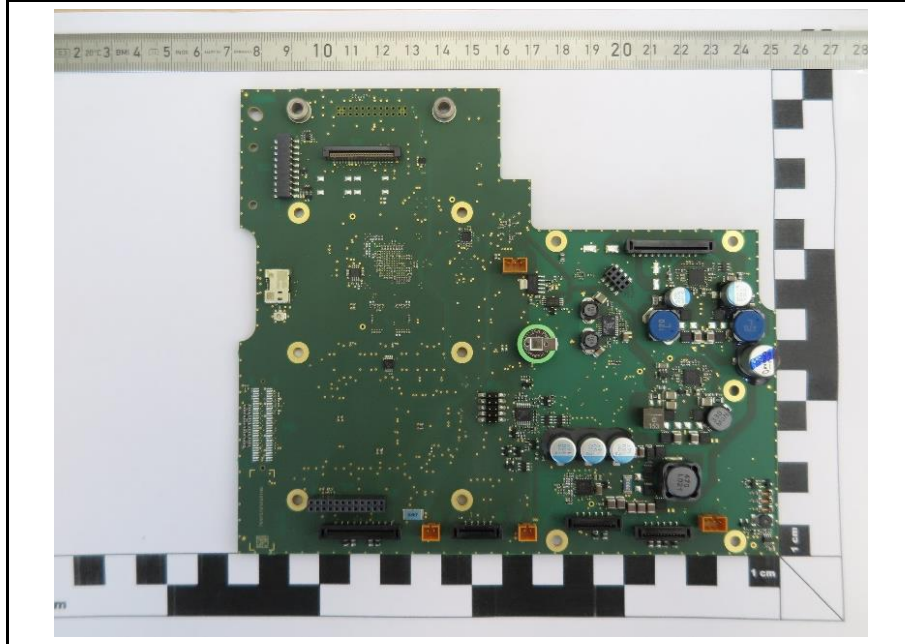
PCB 2 TOP



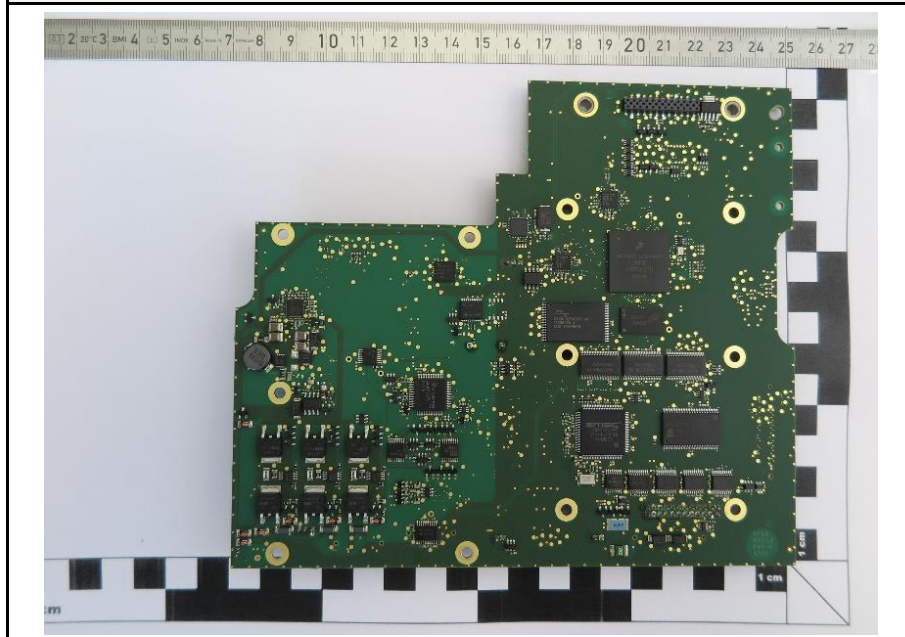
PCB 2 BOTTOM



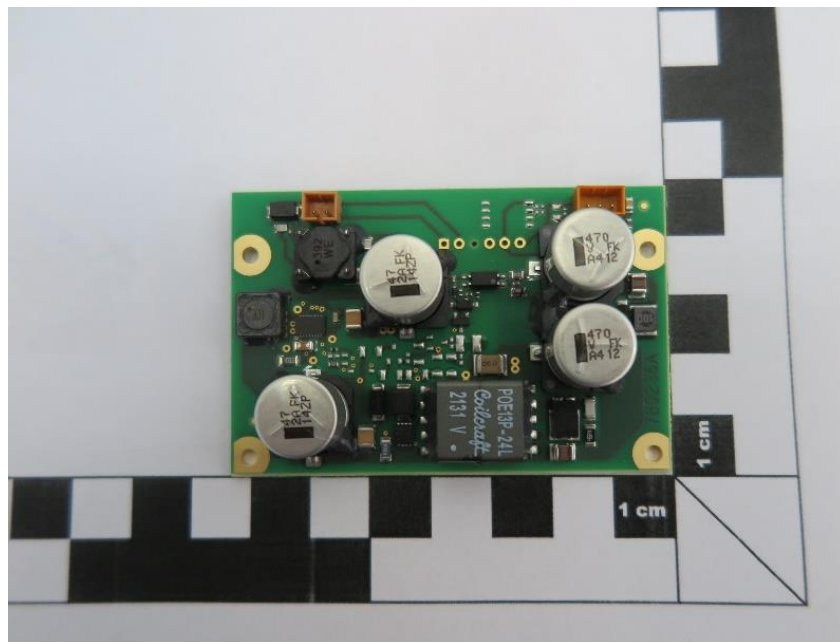
PCB 3 TOP



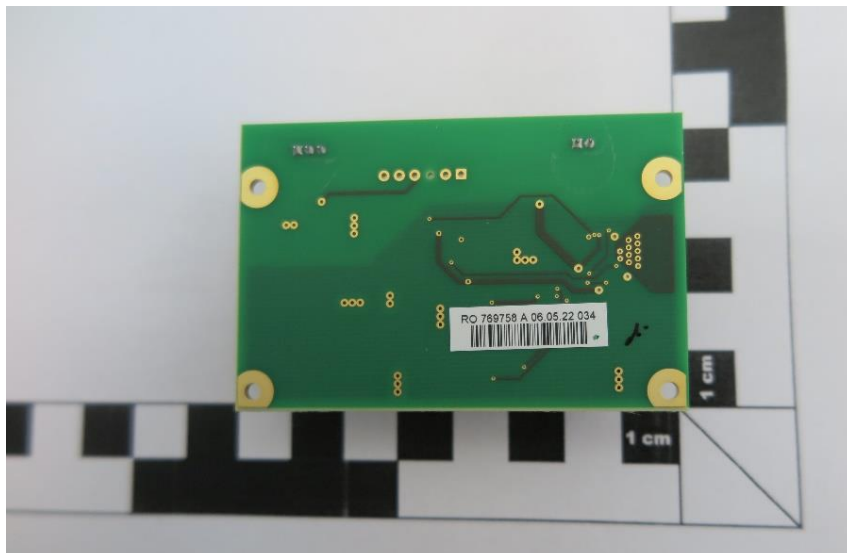
PCB 3 BOTTOM



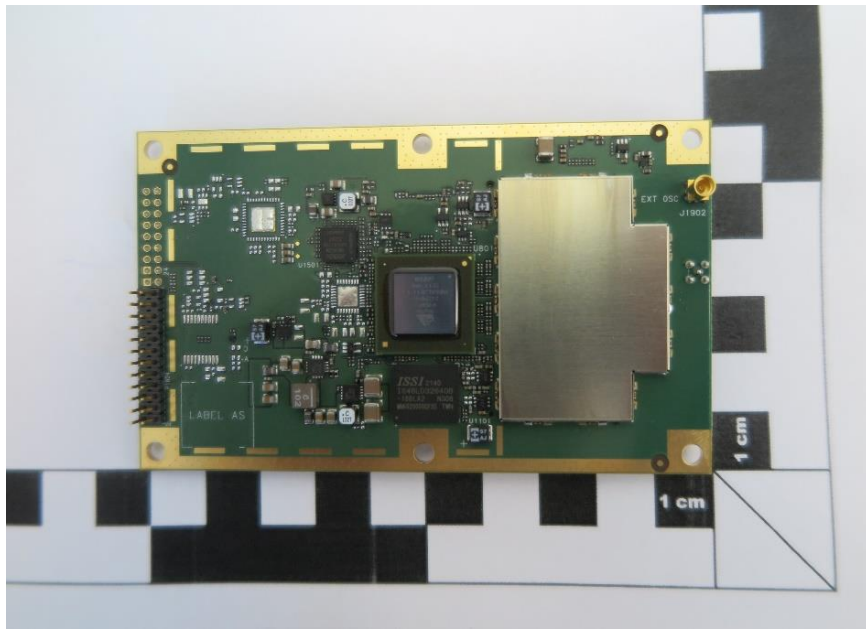
PCB 4 TOP



PCB 4 BOTTOM



PCB 5 TOP



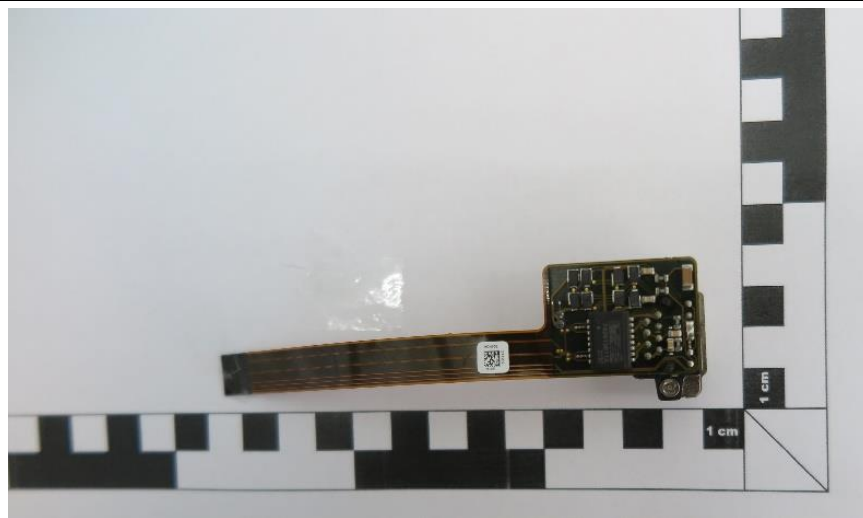
PCB 5 BOTTOM



PCB 6 TOP



PCB 6 BOTTOM



1.3 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Notebook	HP	-	for configuring test modes
SFT	Bluetool	-	-	
CBL	Serial Cable	Leica Geosystems	GEV160 (733 280)	
AE	PoE	Trendnet	TPE-115GI	Power over Ethernet Injector
CBL	Lemo Cable	Leica Geosystems	GEV233 (767 898)	Cable for third party sensors
CBL	OSC Cable	Leica Geosystems	GEV169 (733 293)	for oscillator input
CBL	Coax Cable	Leica Geosystems	GEV150 (667 744)	Puls per Second (PPS) Cable
CBL	Ethernet Cable	Dätwyler	Cat. 6e S/FTP	RJ45
AE	USB Stick	Sandisk	Sandisk Ultra Fit 32 GB	for Data Backup
AE	GNSS Antenna	Leica Geosystems	AS11 (892 561)	-
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.4 Test Modes

Mode	Description
DH5 Single	Mode = Transmit Modulation = GFSK Spreading = None Packet type = DH5 Duty cycle = 78%
Receive	Mode = Receive
Comment: The above settings were determined as the worst case during the evaluation. The selection of test modes is based on measuring the output power of all operating modes prior to compliance. The operating modes with the highest output power were selected for the compliance tests. The worst case found from the module test report number 24838RET.101, issued by Intel on 2006-12-13, is lower than that determined by the output power EIRP procedure described above.	

1.5 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	0	2402
F2	Tx	78	2480

1.6 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:

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

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:

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

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/m	= 47.5 dBμV/m	:	47.5 dBμV/m - 57.0 dBμV/m	= -9.5 dB

2 Result Summary

FCC 47 CFR Part 15C, ISED RSS-247				
Product Standard Reference	Requirement	Reference Method	Result	Remarks
ISED RSS-Gen, Issue 5 A2 (section 6.7)	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only
FCC § 15.247(a)(1) ISED RSS-247 § 5.1 Issue 2	20 dB Bandwidth	ANSI C63.10-2013	N/T	
FCC § 15.247(a)(1)(iii) ISED RSS-247, Issue 2 (section 5.1)	Number of hopping frequencies	ANSI C63.10-2013	N/T	
FCC § 15.247(a)(1) ISED RSS-247, Issue 2 (section 5.1)	Frequency hopping channel separation	ANSI C63.10-2013	N/T	
FCC § 15.247(a)(1)(iii) ISED RSS-247, Issue 2 (section 5.1)	Time of occupancy (Dwell time)	ANSI C63.10-2013	N/T	
FCC § 15.247(b) ISED RSS-247, Issue 2 (section 5.4)	Maximum peak conducted power	ANSI C63.10-2013	PASS	Note 1
FCC § 15.207 ISED RSS-247, Issue 2 (section 3.1)	AC power line conducted emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Band edge compliance	ANSI C63.10-2013	PASS	Note 1
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Conducted spurious emissions	ANSI C63.10-2013	N/T	
FCC § 15.247(d) FCC § 15.209 ISED RSS-Gen, Issue 5 A2 (section 6.13)	Transmitter radiated spurious emissions	ANSI C63.10-2013	PASS	
ISED RSS-247, Issue 2 (section 3.1)	Receiver radiated spurious emissions	ANSI C63.4-2014	PASS	
Note 1: Due to the integration of a pre-certified module, only partial and spot check tests were performed with reference to the 24838RET.101 by Intel.				
Comment: The Decision Rule is applied on the basis of ETSI TR 102 273 and ETSI TR 100 028. These standards provide guidance on how to calculate and apply measurement uncertainty whilst providing maximum uncertainties allowance. In all cases due consideration will be given to ILAC-G8:09/2019. Where a result is considered conditional in respect of its proximity to the limit line, the customer would be made aware of situation so that they can make an informed decision on how to proceed.				

Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

3 Test Conditions and Results

3.1 Test Conditions and Results - Maximum peak conducted output power

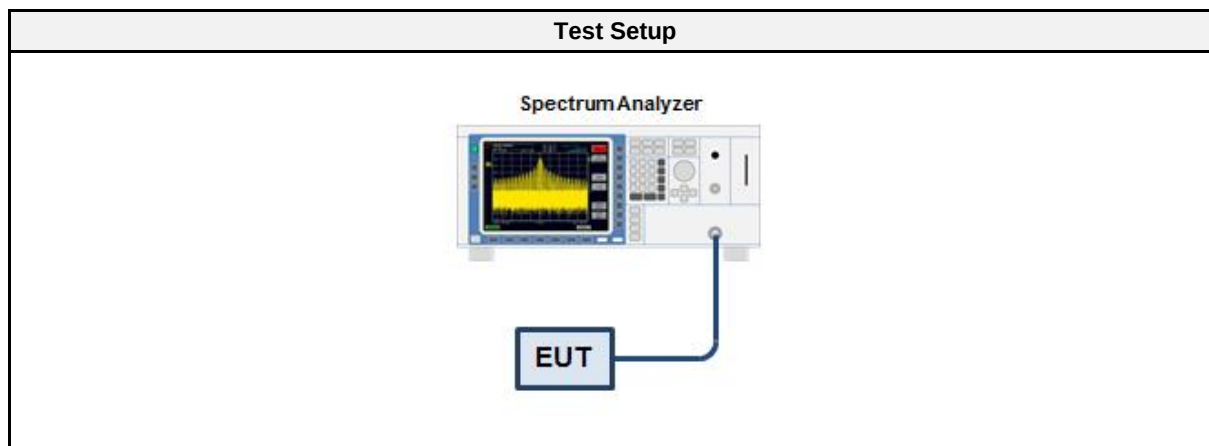
3.1.1 Information

Test Information	
Reference	ISED RSS-247, Issue 2 (section 5.4)
Measurement Method	ANSI C63.10 11.9.1
Measurement Uncertainty	± 2.86 dB
Operator	Odai Qawasmeh
Date	2022-12-16

3.1.2 Limits

Limits
1 W (30 dBm)
The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.1.3 Setup



3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01003	2022-07	2023-07
Cable	Gigalane	CAAAZ	EF00779	2022-02	2023-02

3.1.5 Procedure

Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Analyzer resolution bandwidth is set $\geq$ DTS bandwidth 3. Detector set to peak and max hold 4. Sweep time is set to auto 5. After the trace has stabilized a marker is set to peak of envelope

Test Report No.: G0M-2205-1481-TFC247BT-V02

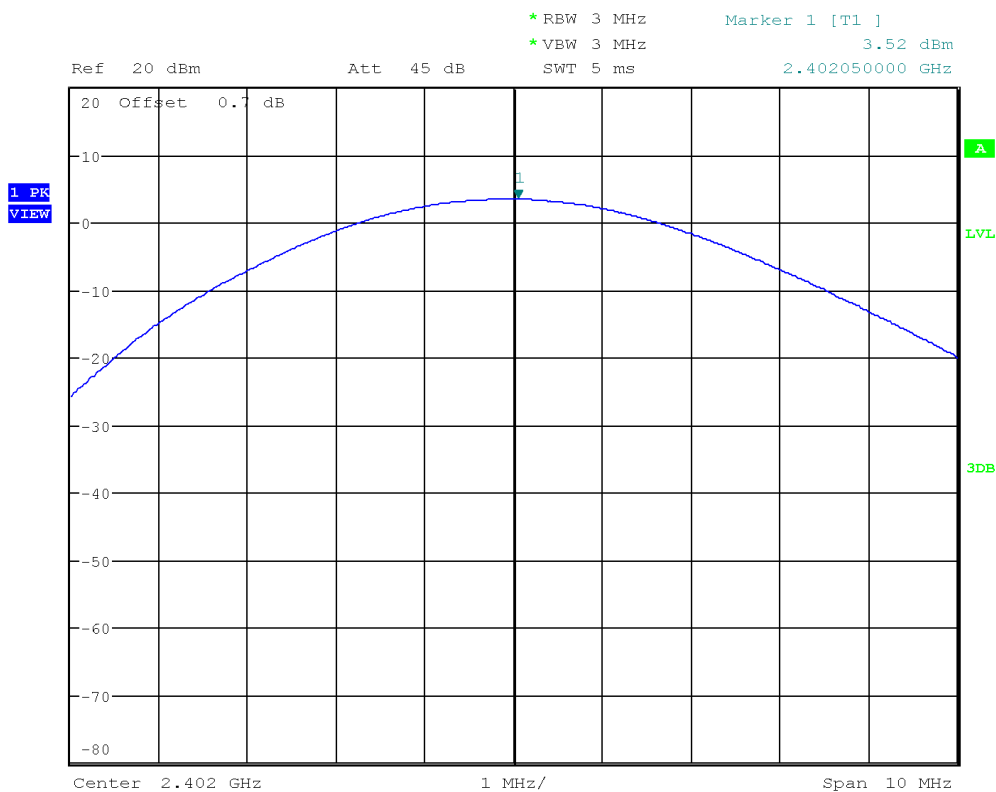
Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.1.6 Results

Test Results				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2402	3.518	0.0022	1.0	PASS
Comment: Declared peak gain: 2 dBi corresponds to 5.52 dBm EIRP				

Peak Conducted Output Power

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: Leica Geosystems AG
 Model: GR50
 Test Sample ID: GNSS Reference Server with BT
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.5
 Operational Mode: DH5, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Odai Qawasmeh
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-12-16
 Note: ISED Spot Check
 Peak Power [dBm]: 3.518
 Peak Power [W]: 0.0022



Date: 16.DEC.2022 17:28:49

Test Report No.: G0M-2205-1481-TFC247BT-V02

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

3.2 Test Conditions and Results - AC powerline conducted emissions

3.2.1 Information

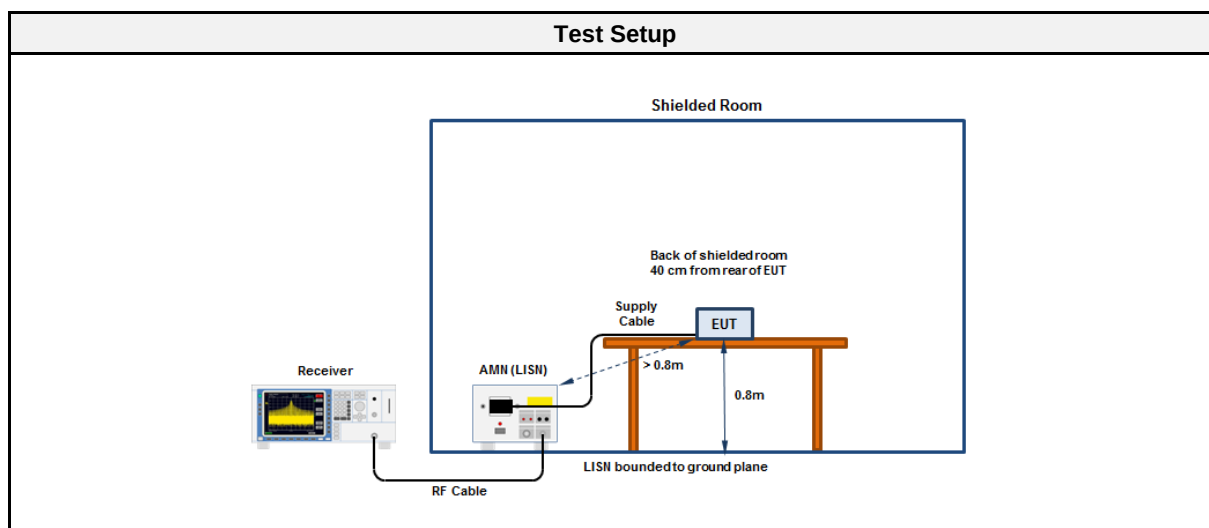
Test Information	
Reference	FCC § 15.207; ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.2
Measurement Uncertainty	± 3.82 dB
Operator	Odai Qawasmeh
Date	2022-08-24

3.2.2 Limits

Limits		
Frequency [MHz]	Quasi-Peak [dBμV]	Average [dBμV]
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5	56	46
5 - 30	60	50

* Limit decreases linearly with the logarithm of the frequency

3.2.3 Setup



3.2.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESR7	EF00943	2022-08	2023-08
Pulse Limiter	R&S	ESH3-Z2	EF01222	2021-07	2023-07
LISN	Schwarzbeck	NSLK 8127 RC	EF01592	2021-07	2023-07

3.2.5 Setup Photos

Setup for measurements 150 kHz – 30 MHz (with AC/DC Adapter)



Setup for measurements 150 kHz – 30 MHz (with PoE)

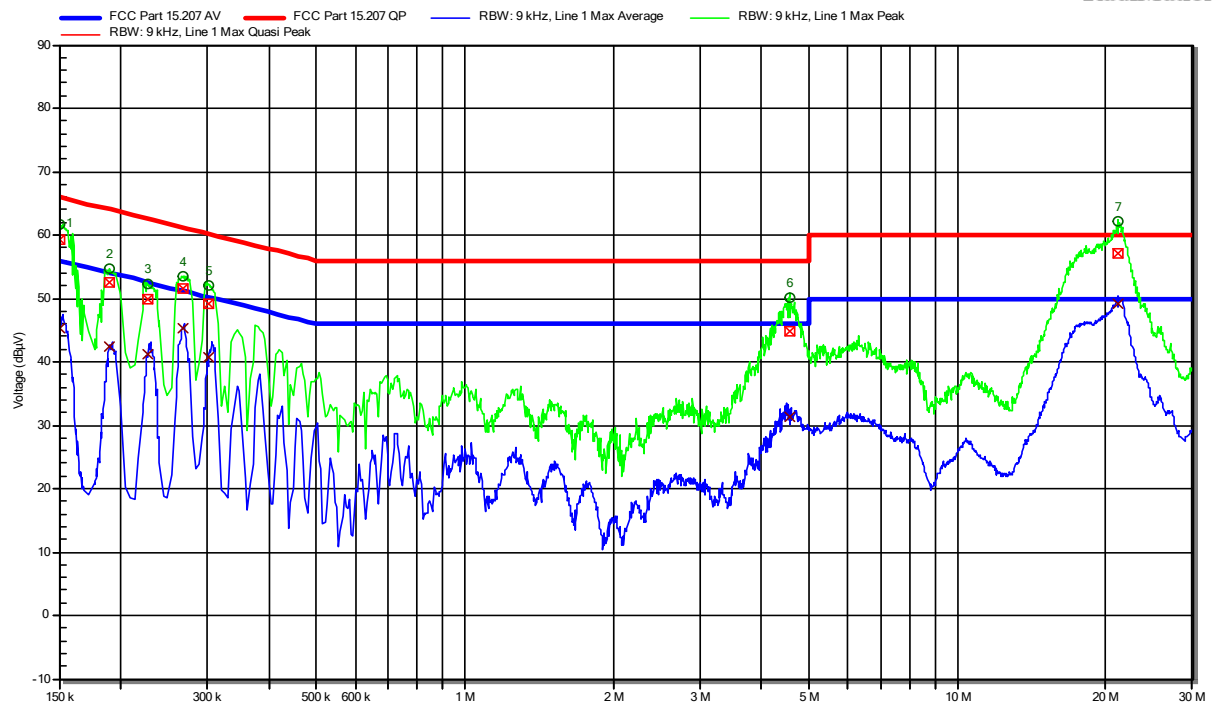


Conducted emissions at the mains power port according to FCC 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Test Date: 2022-08-24
 Operating Conditions: ambient temperature: 27 °Celsius
 power input:
 LISN: Schwarzbeck NSLK 8127 RC L1
 Operational Mode: BT Classic, 2402 MHz, DH5
 EUT Configuration:
 Applied to Port: 120 VAC / 60 Hz
 Note 1: with PoE

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	150 kHz	59.26 dBμV	66 dBμV	-6.74 dB	Pass	Line 1
2	190.05 kHz	52.57 dBμV	64.03 dBμV	-11.47 dB	Pass	Line 1
3	226.95 kHz	49.93 dBμV	62.56 dBμV	-12.63 dB	Pass	Line 1
4	267.9 kHz	51.5 dBμV	61.18 dBμV	-9.68 dB	Pass	Line 1
5	301.65 kHz	49.21 dBμV	60.2 dBμV	-10.98 dB	Pass	Line 1
6	4.556 MHz	44.75 dBμV	56 dBμV	-11.25 dB	Pass	Line 1
7	21.201 MHz	57.09 dBμV	60 dBμV	-2.91 dB	Pass	Line 1
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	150 kHz	45.39 dBμV	56 dBμV	-10.61 dB	Pass	Line 1
2	190.05 kHz	42.31 dBμV	54.03 dBμV	-11.72 dB	Pass	Line 1
3	226.95 kHz	41.19 dBμV	52.56 dBμV	-11.37 dB	Pass	Line 1
4	267.9 kHz	45.37 dBμV	51.18 dBμV	-5.82 dB	Pass	Line 1
5	301.65 kHz	40.74 dBμV	50.2 dBμV	-9.46 dB	Pass	Line 1
6	4.556 MHz	31.29 dBμV	46 dBμV	-14.71 dB	Pass	Line 1
7	21.201 MHz	49.07 dBμV	50 dBμV	-0.93 dB	Pass	Line 1

Test Report No.: G0M-2205-1481-TFC247BT-V02

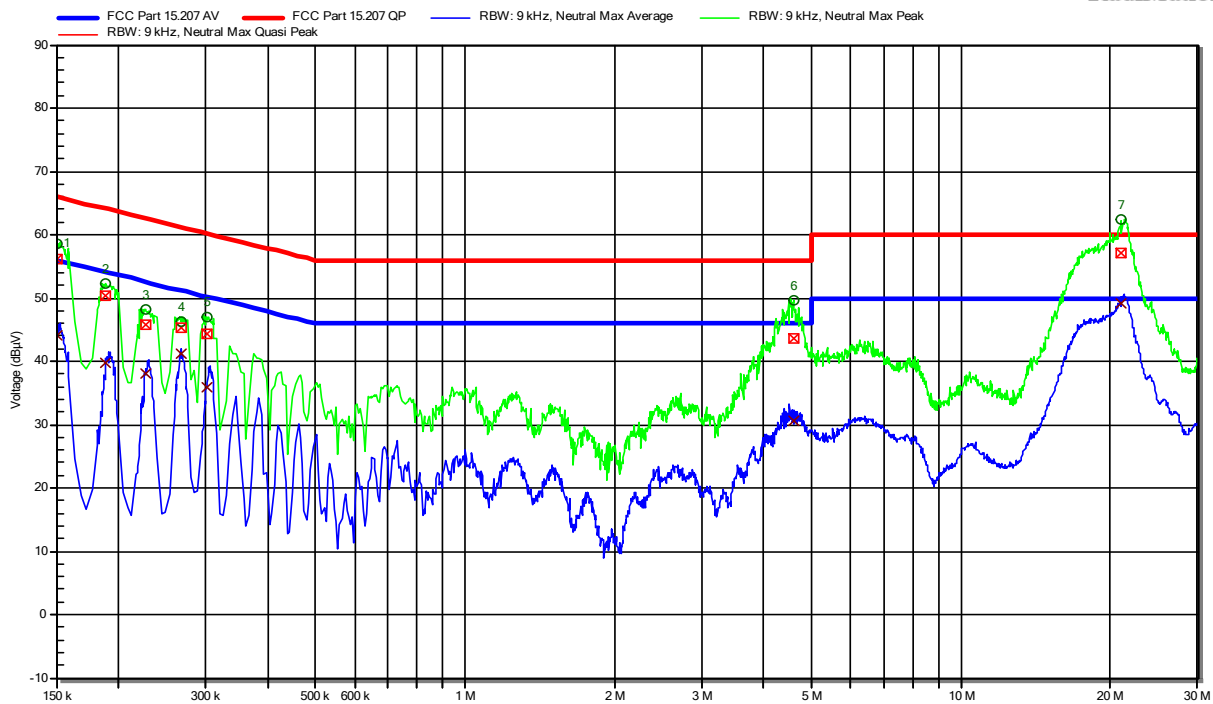
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Conducted emissions at the mains power port according to FCC 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Test Date: 2022-08-24
 Operating Conditions: ambient temperature: 27 °Celsius
 power input:
 LISN: Schwarzbeck NSLK 8127
 Operational Mode: BT Classic, 2402 MHz, DH5
 EUT Configuration:
 Applied to Port: 120 VAC / 60 Hz
 Note 1: with PoE

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	150 kHz	56.24 dBμV	66 dBμV	-9.76 dB	Pass	Neutral
2	188.7 kHz	50.37 dBμV	64.09 dBμV	-13.72 dB	Pass	Neutral
3	226.5 kHz	45.76 dBμV	62.58 dBμV	-16.82 dB	Pass	Neutral
4	267.45 kHz	45.19 dBμV	61.2 dBμV	-16.01 dB	Pass	Neutral
5	301.2 kHz	44.25 dBμV	60.21 dBμV	-15.96 dB	Pass	Neutral
6	4.592 MHz	43.68 dBμV	56 dBμV	-12.32 dB	Pass	Neutral
7	21.071 MHz	57.05 dBμV	60 dBμV	-2.95 dB	Pass	Neutral
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	150 kHz	44.12 dBμV	56 dBμV	-11.88 dB	Pass	Neutral
2	188.7 kHz	39.87 dBμV	54.09 dBμV	-14.22 dB	Pass	Neutral
3	226.5 kHz	38.17 dBμV	52.58 dBμV	-14.41 dB	Pass	Neutral
4	267.45 kHz	41.25 dBμV	51.2 dBμV	-9.94 dB	Pass	Neutral
5	301.2 kHz	35.95 dBμV	50.21 dBμV	-14.26 dB	Pass	Neutral
6	4.592 MHz	30.5 dBμV	46 dBμV	-15.5 dB	Pass	Neutral
7	21.071 MHz	49.06 dBμV	50 dBμV	-0.94 dB	Pass	Neutral

Test Report No.: G0M-2205-1481-TFC247BT-V02

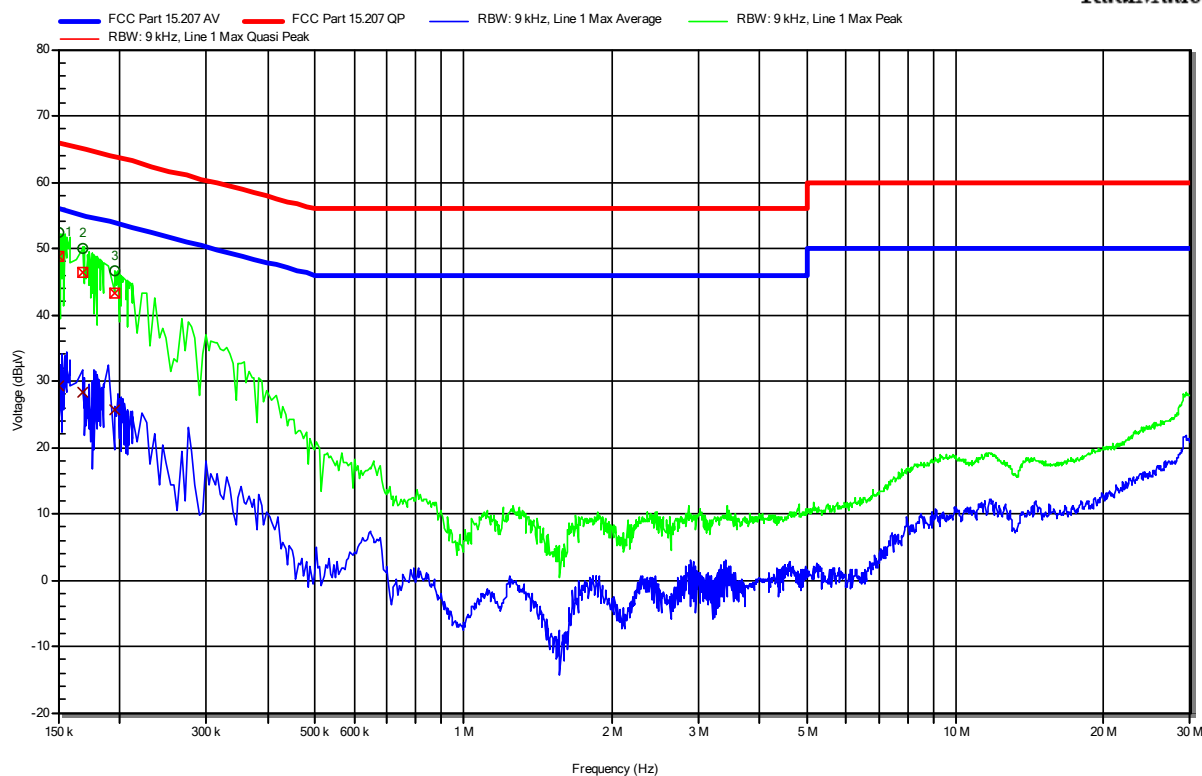
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Conducted emissions at the mains power port according to FCC 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Test Date: 2022-08-24
 Operating Conditions: ambient temperature: 27 °Celsius
 power input:
 LISN: Schwarzbeck NSLK 8127 RC L1
 Operational Mode: BT Classic, 2402 MHz, DH5
 EUT Configuration:
 Applied to Port: 120 VAC / 60 Hz
 Note 1: with AC/DC Adapter

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	150 kHz	48.68 dBµV	66 dBµV	-17.32 dB	Pass	Line 1
2	168 kHz	46.46 dBµV	65.06 dBµV	-18.6 dB	Pass	Line 1
3	195.9 kHz	43.27 dBµV	63.78 dBµV	-20.51 dB	Pass	Line 1

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	150 kHz	29.36 dBµV	56 dBµV	-26.64 dB	Pass	Line 1
2	168 kHz	28.22 dBµV	55.06 dBµV	-26.84 dB	Pass	Line 1
3	195.9 kHz	25.77 dBµV	53.78 dBµV	-28.01 dB	Pass	Line 1

Test Report No.: G0M-2205-1481-TFC247BT-V02

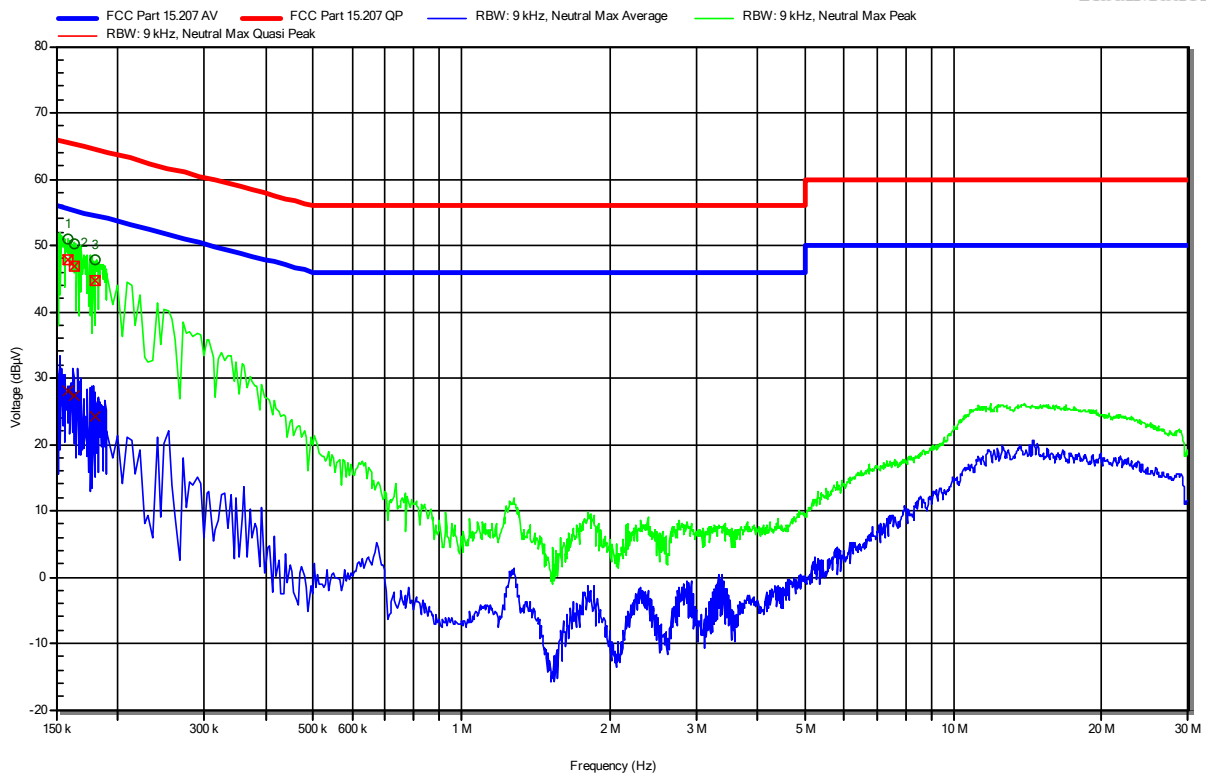
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Conducted emissions at the mains power port according to FCC 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Test Date: 2022-08-24
 Operating Conditions: ambient temperature: 27 °Celsius
 power input:
 LISN: Schwarzbeck NSLK 8127
 Operational Mode: BT Classic, 2402 MHz, DH5
 EUT Configuration:
 Applied to Port: 120 VAC / 60 Hz
 Note 1: with AC/DC Adapter

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	158.55 kHz	47.74 dBμV	65.54 dBμV	-17.8 dB	Pass	Neutral
2	163.95 kHz	46.92 dBμV	65.26 dBμV	-18.34 dB	Pass	Neutral
3	180.6 kHz	44.71 dBμV	64.46 dBμV	-19.75 dB	Pass	Neutral

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	158.55 kHz	27.97 dBμV	55.54 dBμV	-27.56 dB	Pass	Neutral
2	163.95 kHz	27.26 dBμV	55.26 dBμV	-28 dB	Pass	Neutral
3	180.6 kHz	24.15 dBμV	54.46 dBμV	-30.31 dB	Pass	Neutral

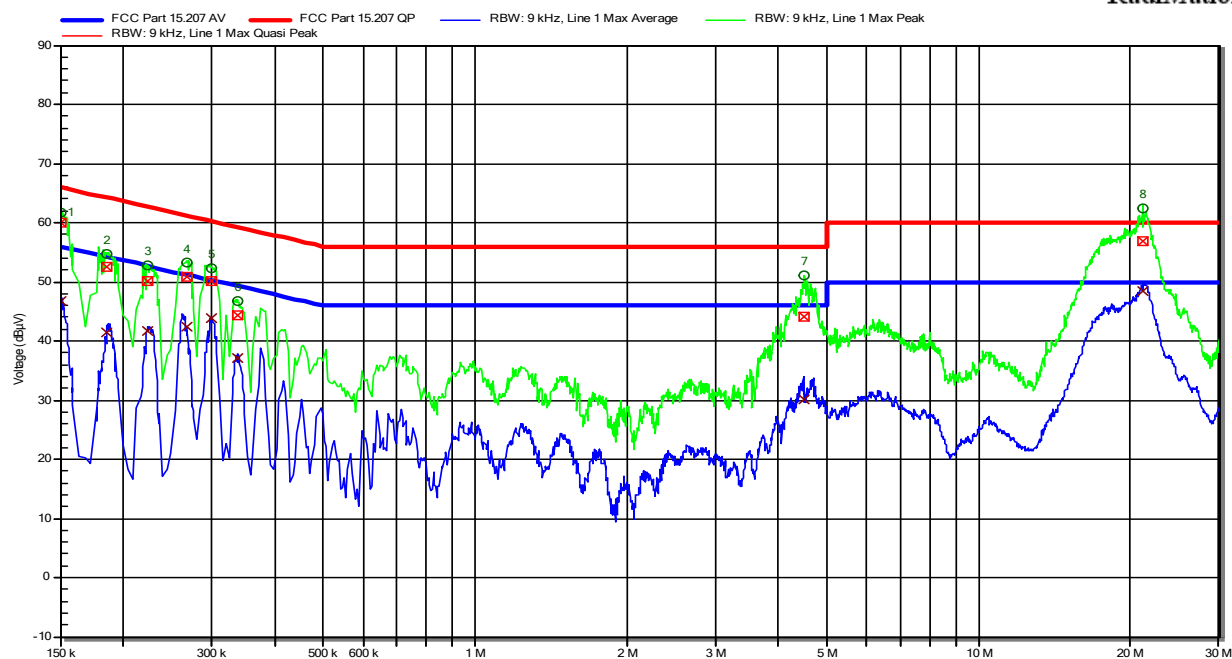
Test Report No.: G0M-2205-1481-TFC247BT-V02

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

Conducted emissions at the mains power port according to RSS-247 Issue 2, RSS-Gen Issue 5

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Test Date: 2022-08-24
 Operating Conditions: ambient temperature: 27 °Celsius
 power input:
 LISN: Schwarzbeck NSLK 8127 RC L1
 Operational Mode: BT Classic, 2402 MHz
 EUT Configuration:
 Applied to Port: 120 VAC / 60 Hz
 Note 1: with PoE

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	150 kHz	60.08 dBμV	66 dBμV	-5.92 dB	Pass	Line 1
2	185.55 kHz	52.62 dBμV	64.23 dBμV	-11.61 dB	Pass	Line 1
3	223.35 kHz	50.18 dBμV	62.69 dBμV	-12.52 dB	Pass	Line 1
4	267 kHz	50.91 dBμV	61.21 dBμV	-10.3 dB	Pass	Line 1
5	300.75 kHz	50.18 dBμV	60.22 dBμV	-10.04 dB	Pass	Line 1
6	337.65 kHz	44.24 dBμV	59.26 dBμV	-15.02 dB	Pass	Line 1
7	4.515 MHz	44.18 dBμV	56 dBμV	-11.82 dB	Pass	Line 1
8	21.192 MHz	56.77 dBμV	60 dBμV	-3.23 dB	Pass	Line 1
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	150 kHz	46.8 dBμV	56 dBμV	-9.2 dB	Pass	Line 1
2	185.55 kHz	41.51 dBμV	54.23 dBμV	-12.72 dB	Pass	Line 1
3	223.35 kHz	41.76 dBμV	52.69 dBμV	-10.94 dB	Pass	Line 1
4	267 kHz	42.32 dBμV	51.21 dBμV	-8.9 dB	Pass	Line 1
5	300.75 kHz	43.79 dBμV	50.22 dBμV	-6.44 dB	Pass	Line 1
6	337.65 kHz	37.2 dBμV	49.26 dBμV	-12.06 dB	Pass	Line 1
7	4.515 MHz	30.19 dBμV	46 dBμV	-15.81 dB	Pass	Line 1
8	21.192 MHz	48.55 dBμV	50 dBμV	-1.45 dB	Pass	Line 1

Test Report No.: G0M-2205-1481-TFC247BT-V02

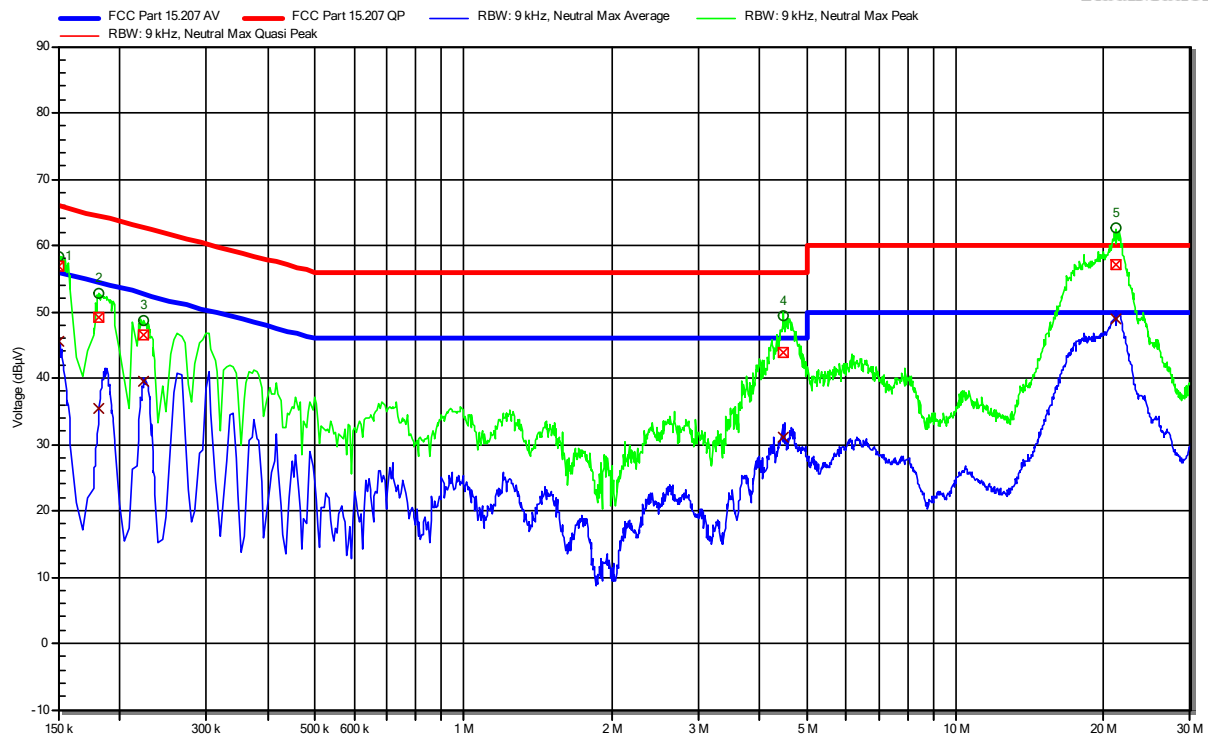
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Conducted emissions at the mains power port according to RSS-247 Issue 2, RSS-Gen Issue 5

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Test Date: 2022-08-24
 Operating Conditions: ambient temperature: 27 °Celsius
 power input:
 LISN: Schwarzbeck NSLK 8127
 Operational Mode: BT Classic, 2402 MHz
 EUT Configuration:
 Applied to Port: 120 VAC / 60 Hz
 Note 1: with PoE

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	150 kHz	56.82 dBµV	66 dBµV	-9.18 dB	Pass	Neutral
2	181.95 kHz	49.22 dBµV	64.4 dBµV	-15.18 dB	Pass	Neutral
3	224.25 kHz	46.39 dBµV	62.66 dBµV	-16.27 dB	Pass	Neutral
4	4.466 MHz	43.8 dBµV	56 dBµV	-12.2 dB	Pass	Neutral
5	21.233 MHz	57.1 dBµV	60 dBµV	-2.9 dB	Pass	Neutral

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	150 kHz	45.47 dBµV	56 dBµV	-10.53 dB	Pass	Neutral
2	181.95 kHz	35.32 dBµV	54.4 dBµV	-19.07 dB	Pass	Neutral
3	224.25 kHz	39.56 dBµV	52.66 dBµV	-13.1 dB	Pass	Neutral
4	4.466 MHz	30.97 dBµV	46 dBµV	-15.03 dB	Pass	Neutral
5	21.233 MHz	48.98 dBµV	50 dBµV	-1.02 dB	Pass	Neutral

Test Report No.: G0M-2205-1481-TFC247BT-V02

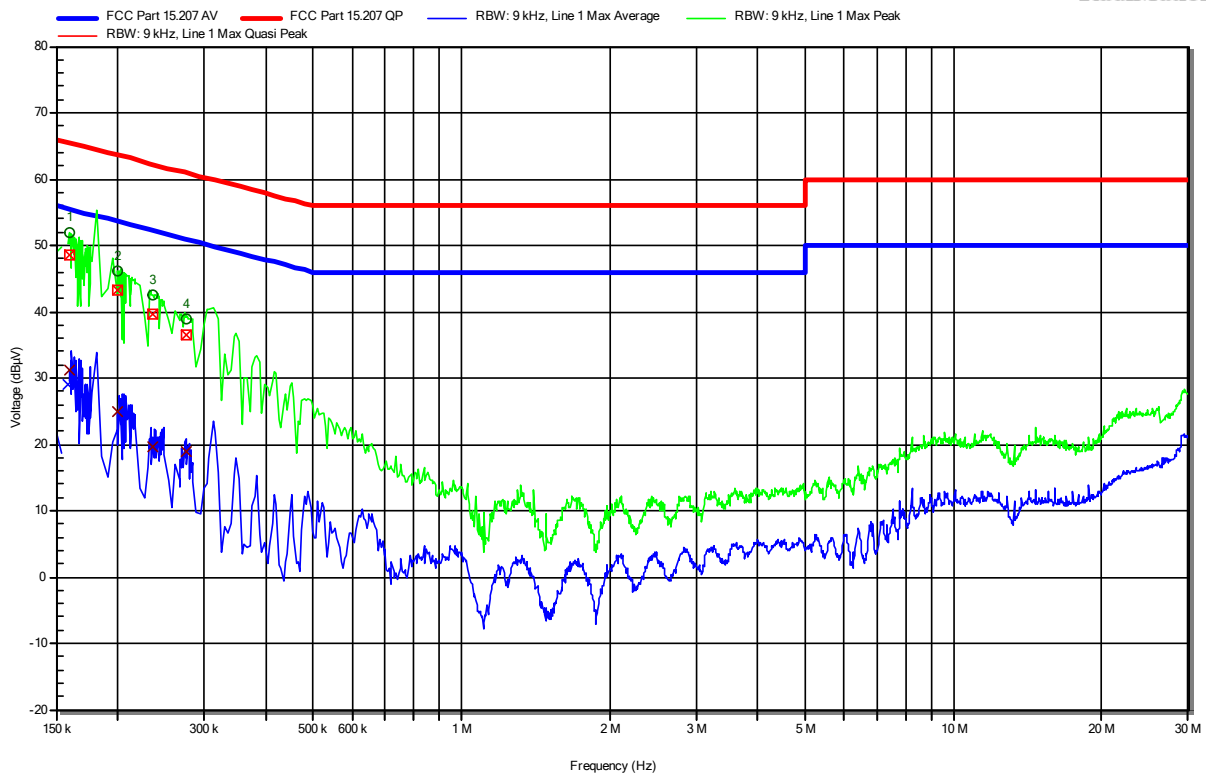
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Conducted emissions at the mains power port according to RSS-247 Issue 2, RSS-Gen Issue 5

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Test Date: 2022-08-24
 Operating Conditions: ambient temperature: 27 °Celsius
 power input:
 LISN: Schwarzbeck NSLK 8127 RC L1
 Operational Mode: BT Classic, 2402 MHz
 EUT Configuration:
 Applied to Port: 120 VAC / 60 Hz
 Note 1: with AC/DC Adapter

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Radiation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	159.45 kHz	48.64 dBµV	65.49 dBµV	-16.85 dB	Pass	Line 1
2	199.95 kHz	43.18 dBµV	63.61 dBµV	-20.44 dB	Pass	Line 1
3	235.05 kHz	39.56 dBµV	62.27 dBµV	-22.71 dB	Pass	Line 1
4	276 kHz	36.61 dBµV	60.94 dBµV	-24.33 dB	Pass	Line 1

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	159.45 kHz	31.32 dBµV	55.49 dBµV	-24.17 dB	Pass	Line 1
2	199.95 kHz	24.98 dBµV	53.61 dBµV	-28.64 dB	Pass	Line 1
3	235.05 kHz	19.59 dBµV	52.27 dBµV	-32.68 dB	Pass	Line 1
4	276 kHz	18.93 dBµV	50.94 dBµV	-32 dB	Pass	Line 1

Test Report No.: G0M-2205-1481-TFC247BT-V02

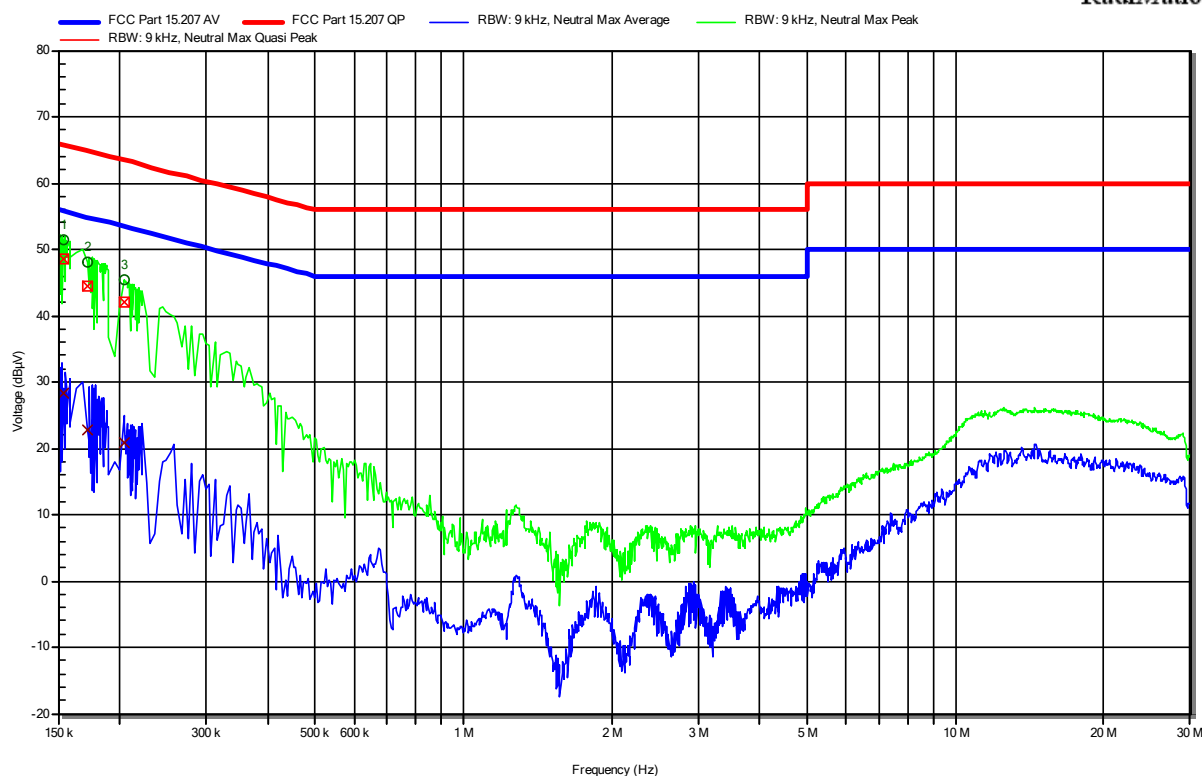
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Conducted emissions at the mains power port according to RSS-247 Issue 2, RSS-Gen Issue 5

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Test Date: 2022-08-24
 Operating Conditions: ambient temperature: 27 °Celsius
 power input:
 LISN: Schwarzbeck NSLK 8127
 Operational Mode: BT Classic, 2402 MHz
 EUT Configuration:
 Applied to Port: 120 VAC / 60 Hz
 Note 1: with AC/DC Adapter

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RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	154.05 kHz	48.46 dBµV	65.78 dBµV	-17.32 dB	Pass	Neutral
2	172.5 kHz	44.56 dBµV	64.84 dBµV	-20.28 dB	Pass	Neutral
3	204 kHz	41.98 dBµV	63.45 dBµV	-21.47 dB	Pass	Neutral

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	154.05 kHz	28.3 dBµV	55.78 dBµV	-27.48 dB	Pass	Neutral
2	172.5 kHz	22.83 dBµV	54.84 dBµV	-32.01 dB	Pass	Neutral
3	204 kHz	20.74 dBµV	53.45 dBµV	-32.7 dB	Pass	Neutral

Test Report No.: G0M-2205-1481-TFC247BT-V02

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

3.3 Test Conditions and Results - Band-edge compliance

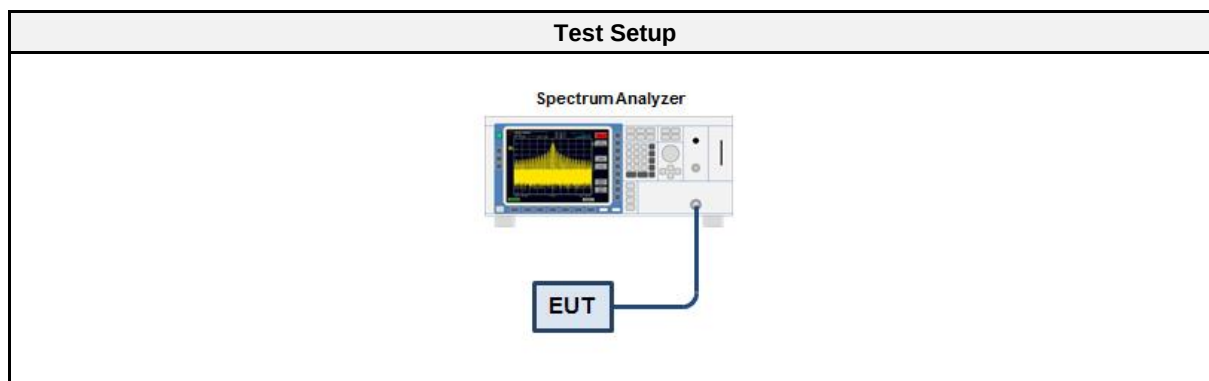
3.3.1 Information

Test Information	
Reference	ISED RSS-247, Issue 2 (section 5.5)
Measurement Uncertainty	± 3.64 dB
Measurement Method	ANSI C63.10 11.13
Operator	Odai Qawasmeh
Date	2022-12-16

3.3.2 Limits

Limits	
Power Measurement	Out-of-band attenuation [dB]
Peak	20
RMS	30

3.3.3 Setup



3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01003	2022-07	2023-07
Cable	Gigalane	CAAZ	EF00779	2022-02	2023-02

3.3.5 Procedure

Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels within frequency band and outside frequency band 5. Band edge attenuation is determined from level difference

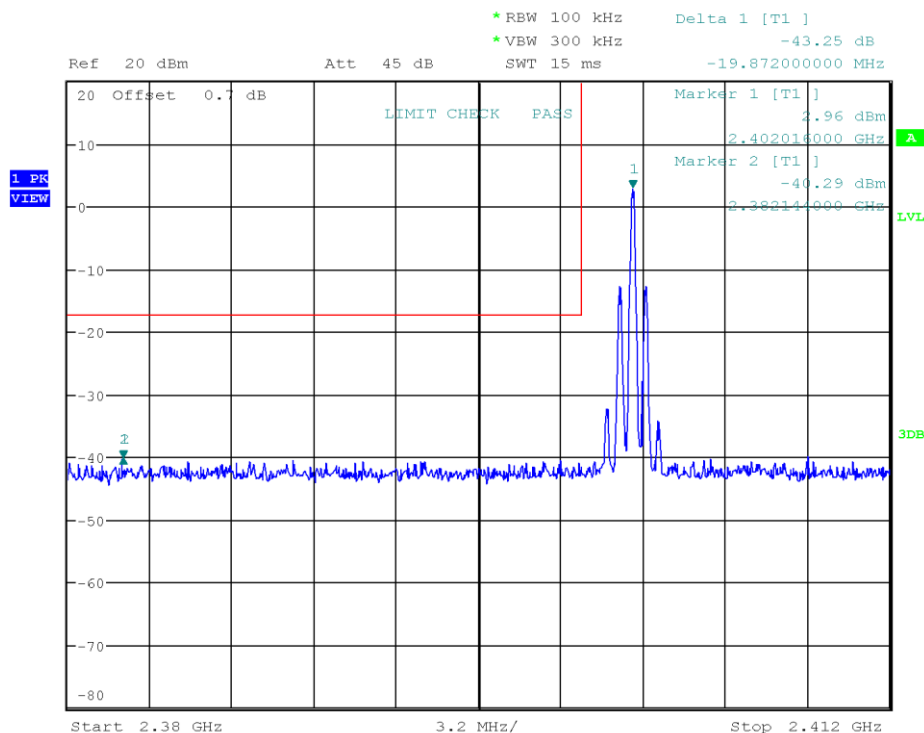
3.3.6 Results

Test Results - Single				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
GFSK	2402	-43.25	-20	PASS
GFSK	2480	-42.51	-20	PASS

Test Results - Hopping				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
GFSK	2402	-47.631	-20	PASS
GFSK	2480	-47.90	-20	PASS

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: Leica Geosystems AG
 Model: GR50
 Test Sample ID: GNSS Reference Server with BT
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operational Mode: DH5, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Odai Qawasmeh
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-12-16
 Note: ISED Spot Check
 Band-edge: Lower
 In-band Frequency [MHz]: 2402.016
 Max. in-band Level [dBm/100 kHz]: 2.96
 Out-of-band Frequency [MHz]: 2382.144
 Max. out-of-band Level [dBm/100 kHz]: -40.293
 Attenuation [dB]: -43.25



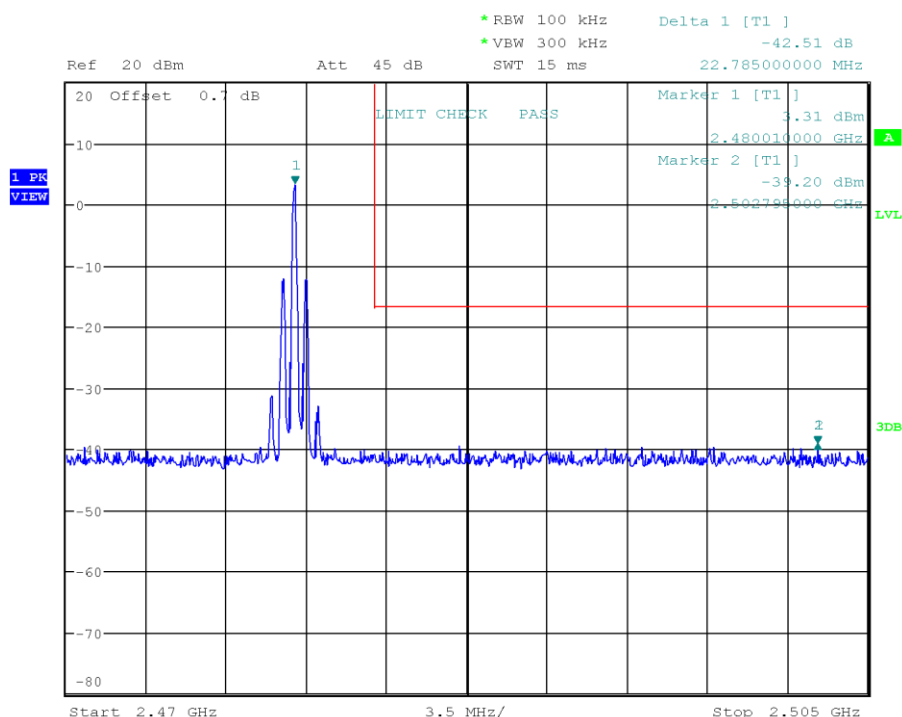
Date: 16.DEC.2022 17:29:38

Test Report No.: G0M-2205-1481-TFC247BT-V02

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

Emissions in nonrestricted frequency bands at the Band-edge

Project Number:	G0M-2205-1481
Applicant:	Leica Geosystems AG
Model Description:	Leica Geosystems AG
Model:	GR50
Test Sample ID:	GNSS Reference Server with BT
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operational Mode:	DH5, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Odai Qawasmeh
Test Site:	Eurofins Product Service GmbH
Test Date:	2022-12-16
Note:	ISED Spot Check
Band-edge	Upper
In-band Frequency [MHz]:	2480.01
Max. in-band Level [dBm/100 kHz]:	3.313
Out-of-band Frequency [MHz]:	2502.795
Max. out-of-band Level [dBm/100 kHz]:	-39.199
Attenuation [dB]:	-42.51



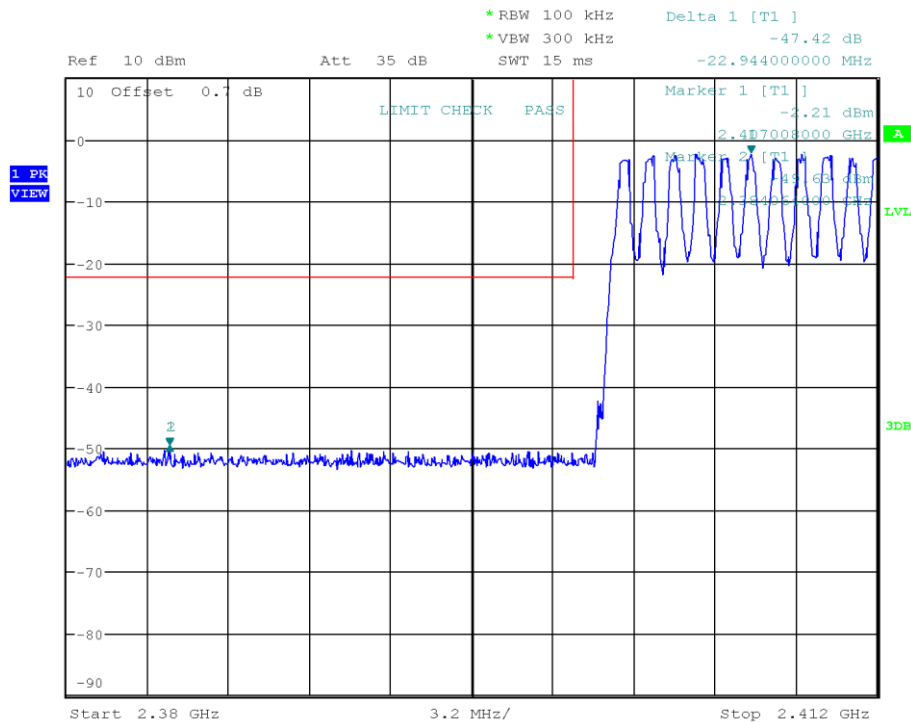
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Test Report No.: G0M-2205-1481-TFC247BT-V02

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

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: Leica Geosystems AG
 Model: GR50
 Test Sample ID: GNSS Reference Server with BT
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operational Mode: DH5, Hopping
 Operating Conditions: Tnom/Vnom
 Operator: Odai Qawasmeh
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-12-16
 Note: ISED Spot Check
 Band-edge: Lower
 In-band Frequency [MHz]: 2407.008
 Max. in-band Level [dBm/100 kHz]: -2.209
 Out-of-band Frequency [MHz]: 2384.064
 Max. out-of-band Level [dBm/100 kHz]: -49.631
 Attenuation [dB]: -47.42



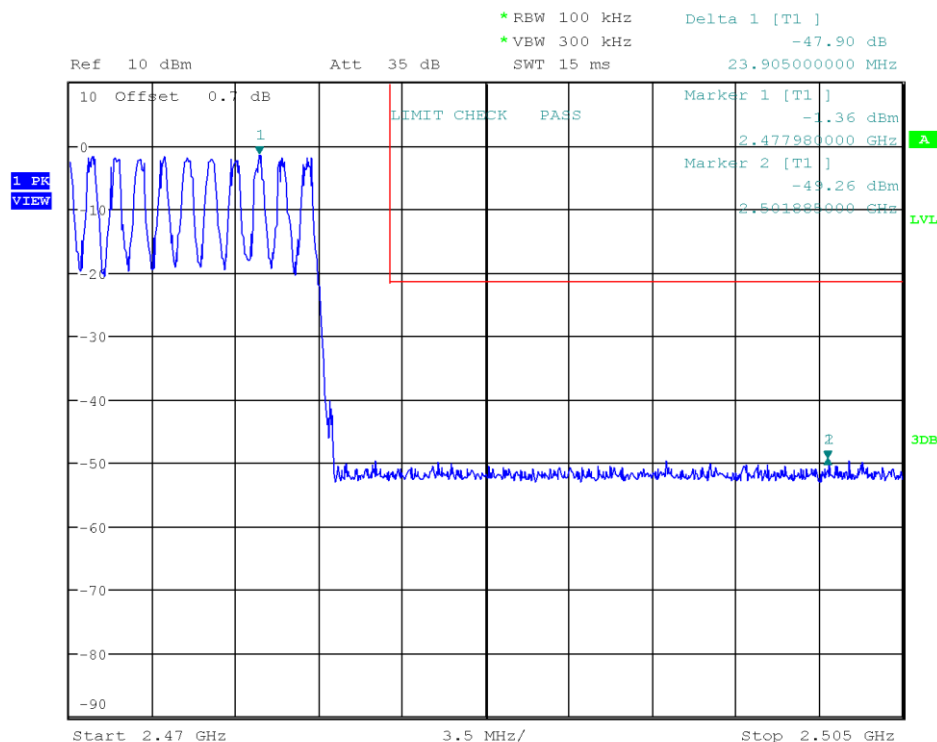
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Test Report No.: G0M-2205-1481-TFC247BT-V02

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

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: Leica Geosystems AG
 Model: GR50
 Test Sample ID: GNSS Reference Server with BT
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operational Mode: DH5, Hopping
 Operating Conditions: Tnom/Vnom
 Operator: Odai Qawasmeh
 Test Site: Eurofins Product Service GmbH
 Test Date: 2022-12-16
 Note: ISED Spot Check
 Band-edge: Upper
 In-band Frequency [MHz]: 2477.98
 Max. in-band Level [dBm/100 kHz]: -1.364
 Out-of-band Frequency [MHz]: 2501.885
 Max. out-of-band Level [dBm/100 kHz]: -49.26
 Attenuation [dB]: -47.9



Date: 16.DEC.2022 17:34:24

Test Report No.: G0M-2205-1481-TFC247BT-V02

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

3.4 Test Conditions and Results - Transmitter radiated emissions

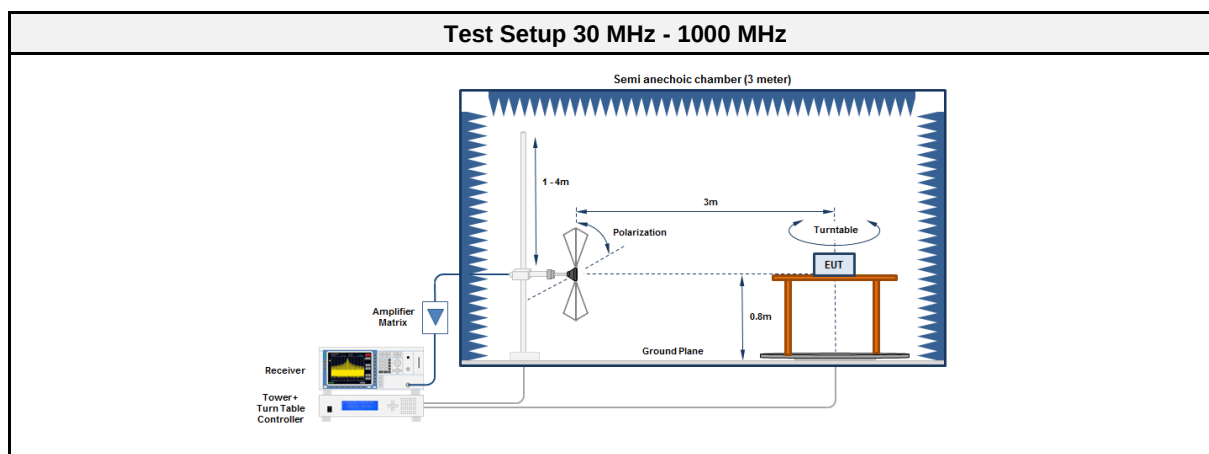
3.4.1 Information

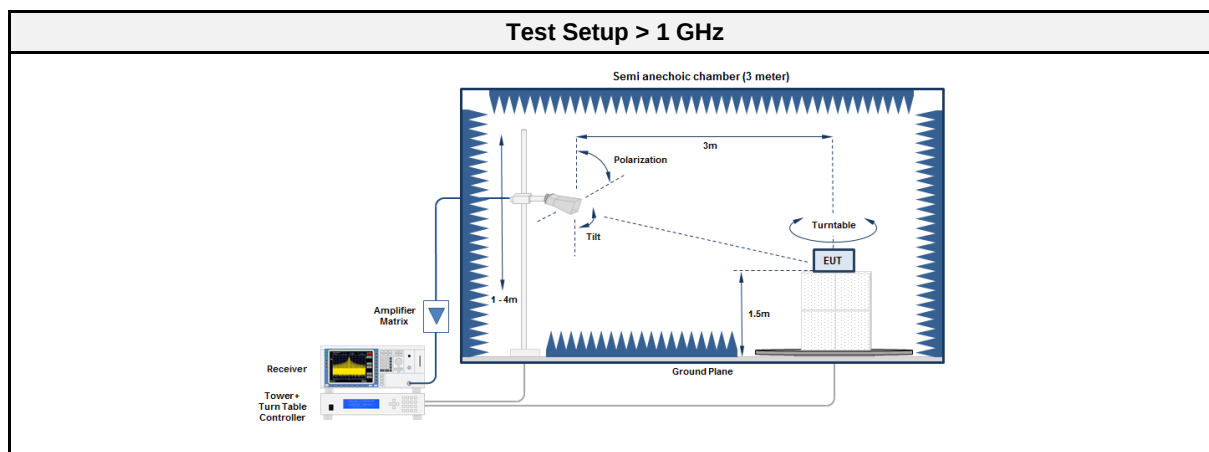
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISSED RSS-Gen, Issue 5 A2 (section 6.13)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6
Operator	Odai Qawasmeh
Date	2022-08-08

3.4.2 Limits

Limits			
Frequency range [MHz]	Detector	Field strength [µV/m]	Measurement distance [m]
0.009 - 0.09	Average	2400/F[kHz]	300
0.09 - 0.110	Quasi-Peak	2400/F[kHz]	300
0.110 - 0.490	Average	2400/F[kHz]	300
0.490 - 1.705	Quasi-Peak	24000/F[kHz]	30
1.705 - 30.0	Quasi-Peak	30	30
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

3.4.3 Setup





3.4.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

Test Equipment 30 MHz - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF01011	2022-06	2025-06
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2021-07	2023-01
Antenna	R&S	HK 116	EF00030	2021-05	2024-05
Antenna	R&S	HL 223	EF00187	2022-06	2025-06

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF01011	2022-06	2025-06
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2021-07	2023-01
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10
Antenna	Schwarzbeck	HWRD 650	EF01679	2021-03	2024-03
Antenna	Amplifier Research	AT4560	EF00302	2021-06	2023-06

3.4.5 Procedure

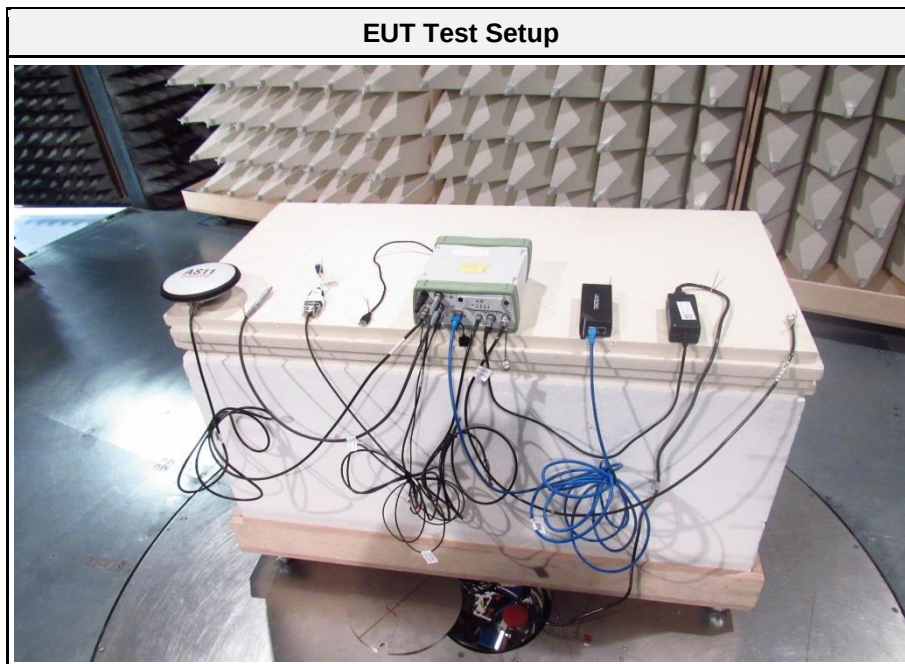
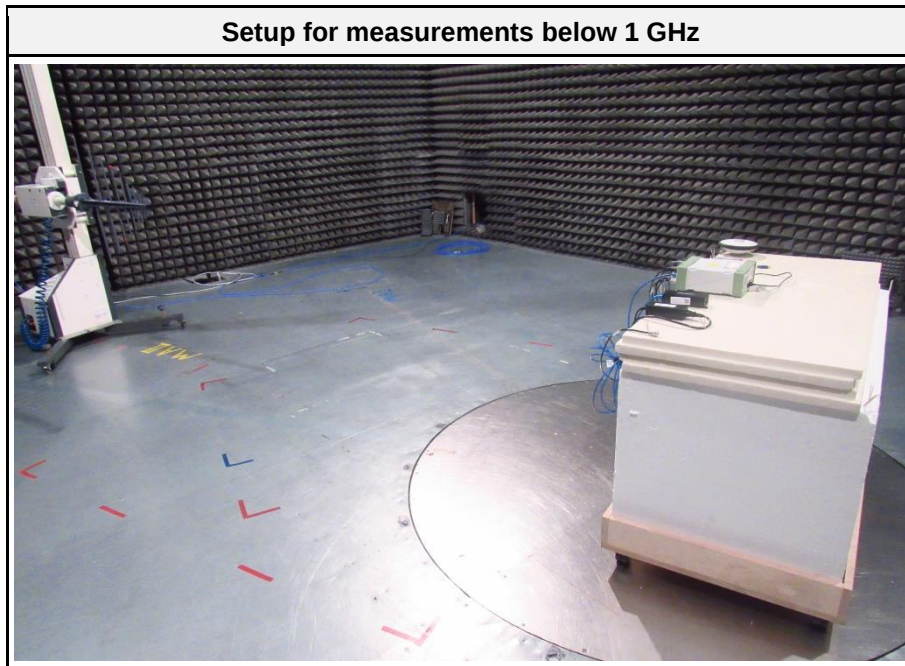
Test Procedure 30 MHz - 1000 MHz
1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector

Test Procedure > 1 GHz
1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector

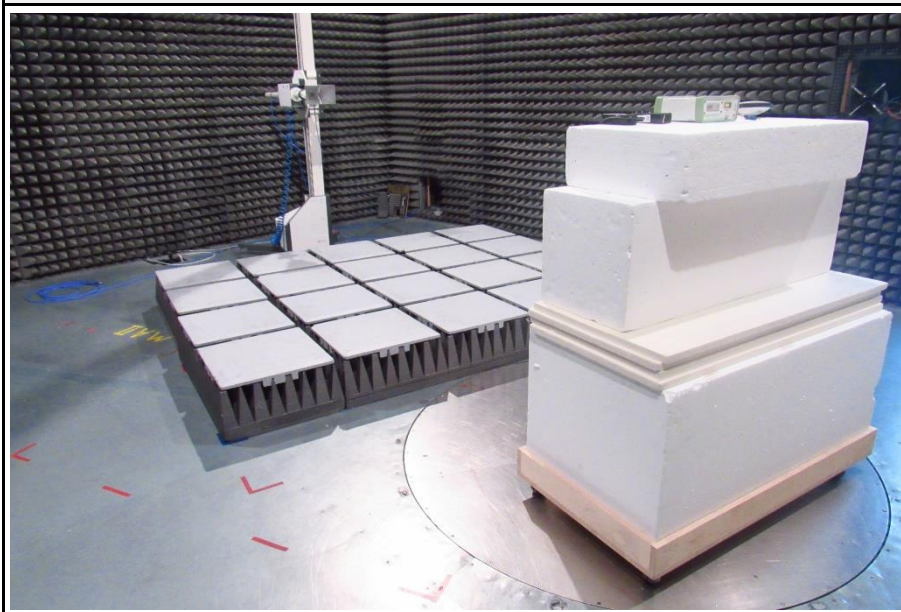
3.4.6 Results

Test Results - DH5						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2402	73.1271	30.70	qpk	ver	40.00	-09.33
2402	114.8715	30.00	qpk	ver	43.50	-13.50
2402	171.8225	30.60	pk	ver	43.50	-12.88
2402	284	30.70	pk	hor	46.00	-15.27
2402	2350.1	40.84	pk	hor	74.00	-33.16
2402	2350.1	32.66	avg	hor	54.00	-21.34
2402	2376.1	42.37	pk	hor	74.00	-31.63
2402	2376.1	35.32	avg	hor	54.00	-18.68
2402	4803.9	46.00	pk	hor	74.00	-28.00
2402	4803.9	38.94	avg	hor	54.00	-15.06
2402	17858	49.62	pk	ver	74.00	-24.38
2402	17858	36.53	avg	ver	54.00	-17.47
2402	19806	46.72	pk	ver	74.00	-27.28
2402	19806	30.96	avg	ver	54.00	-23.04

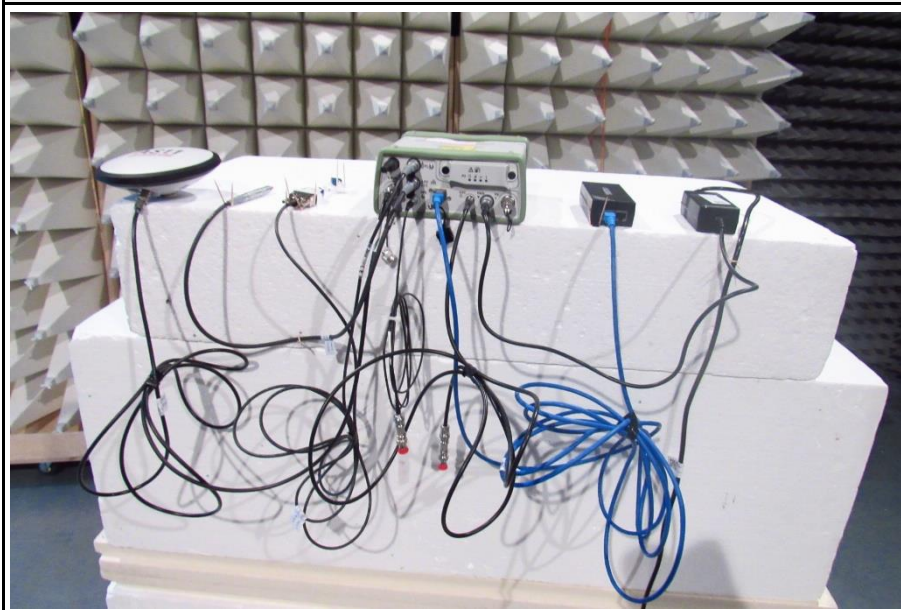
3.4.7 Setup Photos



Setup for measurements above 1 GHz



EUT Test Setup



3.5 Test Conditions and Results - Receiver radiated emissions

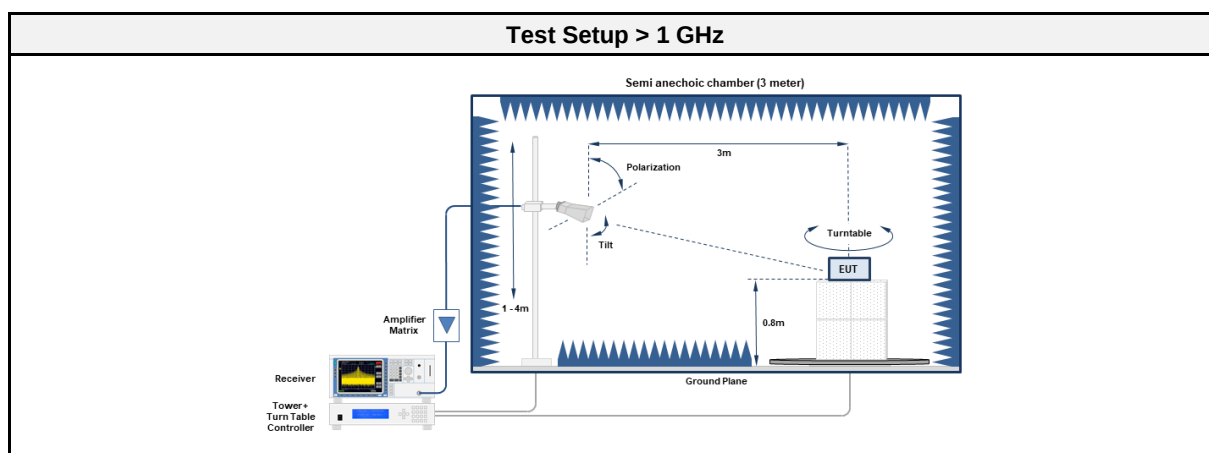
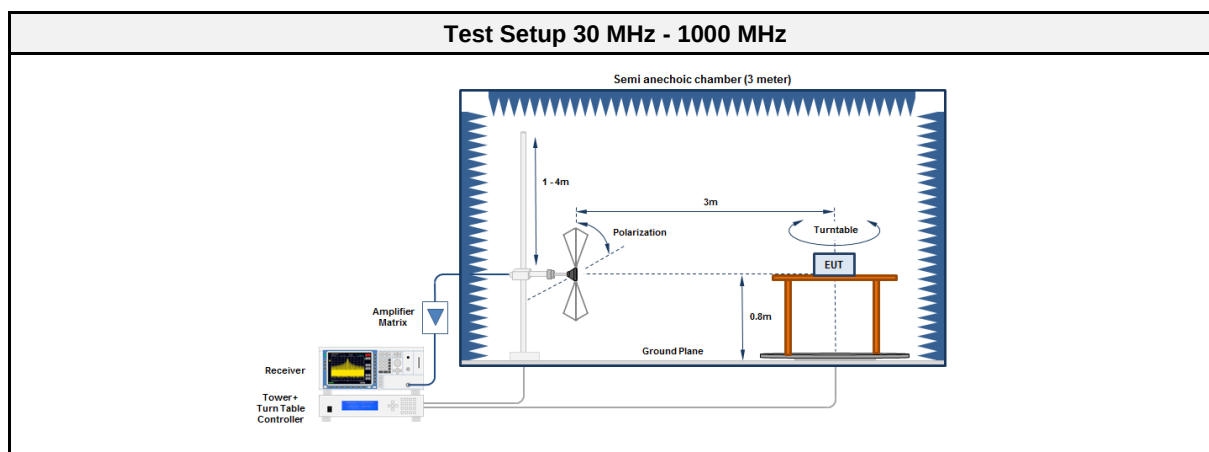
3.5.1 Information

Test Information	
Reference	ISED RSS-247, Issue 2 (section 3.1)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.4-2014 8.1-8.3
Operator	Odai Qawasmeh
Date	2022-08-08

3.5.2 Limits

Limits			
Frequency range [MHz]	Detector	Field strength [$\mu\text{V/m}$]	Measurement distance [m]
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

3.5.3 Setup



3.5.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

Test Equipment 30 MHz - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF01011	2022-06	2025-06
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2021-07	2023-01
Antenna	R&S	HK 116	EF00030	2021-05	2024-05
Antenna	R&S	HL 223	EF00187	2022-06	2025-06

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF01011	2022-06	2025-06
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2021-07	2023-01
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10
Antenna	Schwarzbeck	HWRD 650	EF01679	2021-03	2024-03

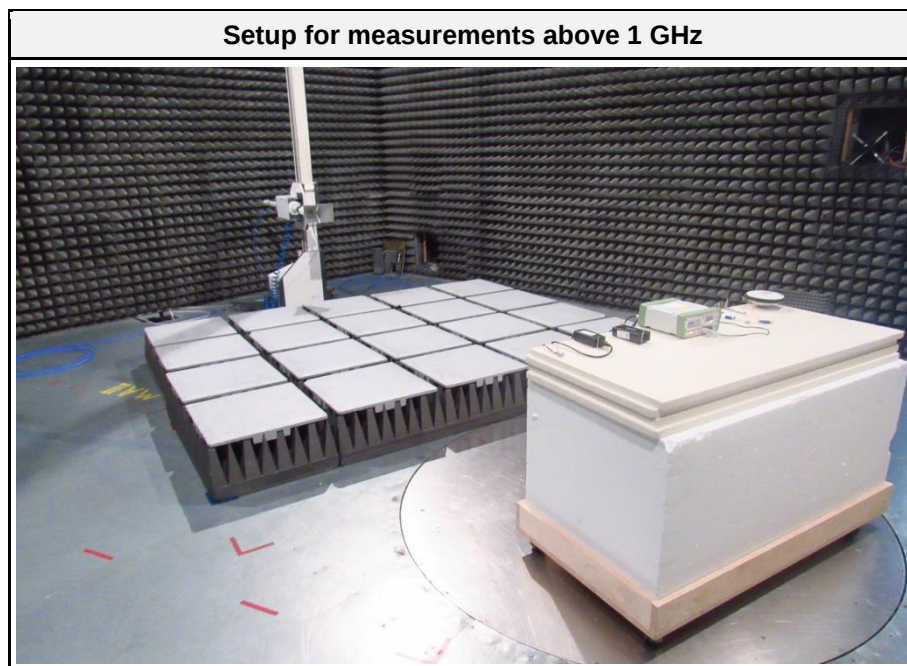
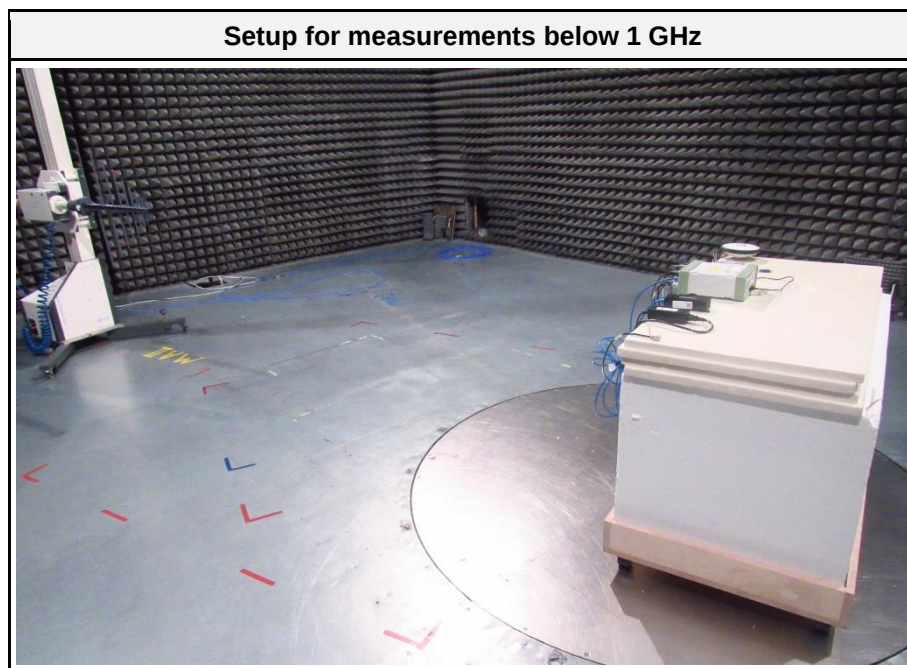
3.5.5 Procedure

Test Procedure	
1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT is set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector	

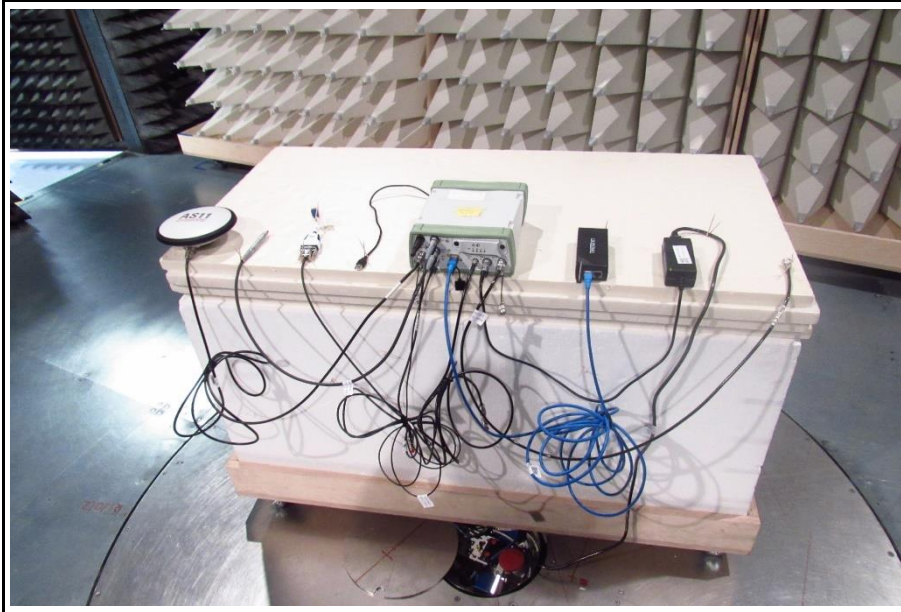
3.5.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2402	70.8255	33.00	pk	ver	40.00	-07.02
2402	71.7406	32.60	qpk	ver	40.00	-07.35
2402	76.2315	32.30	qpk	hor	40.00	-07.70
2402	81.7589	29.20	qpk	ver	40.00	-10.81
2402	82.53	29.50	qpk	ver	40.00	-10.48
2402	86.9812	28.20	qpk	ver	40.00	-11.80
2402	117.023	32.20	pk	ver	43.50	-11.29
2402	136.0588	23.00	pk	ver	43.50	-20.48
2402	172.511	32.00	pk	ver	43.50	-11.52
2402	295.98	34.00	pk	hor	46.00	-12.04
2402	500.02	35.10	pk	ver	46.00	-10.90
2402	780	33.50	pk	hor	46.00	-12.47
2402	6376	49.13	pk	ver	74.00	-24.87
2402	6376	37.27	avg	ver	53.98	-16.71
2402	17864	49.69	pk	ver	74.00	-24.31
2402	17864	36.43	avg	ver	53.98	-17.55

3.5.7 Setup Photos



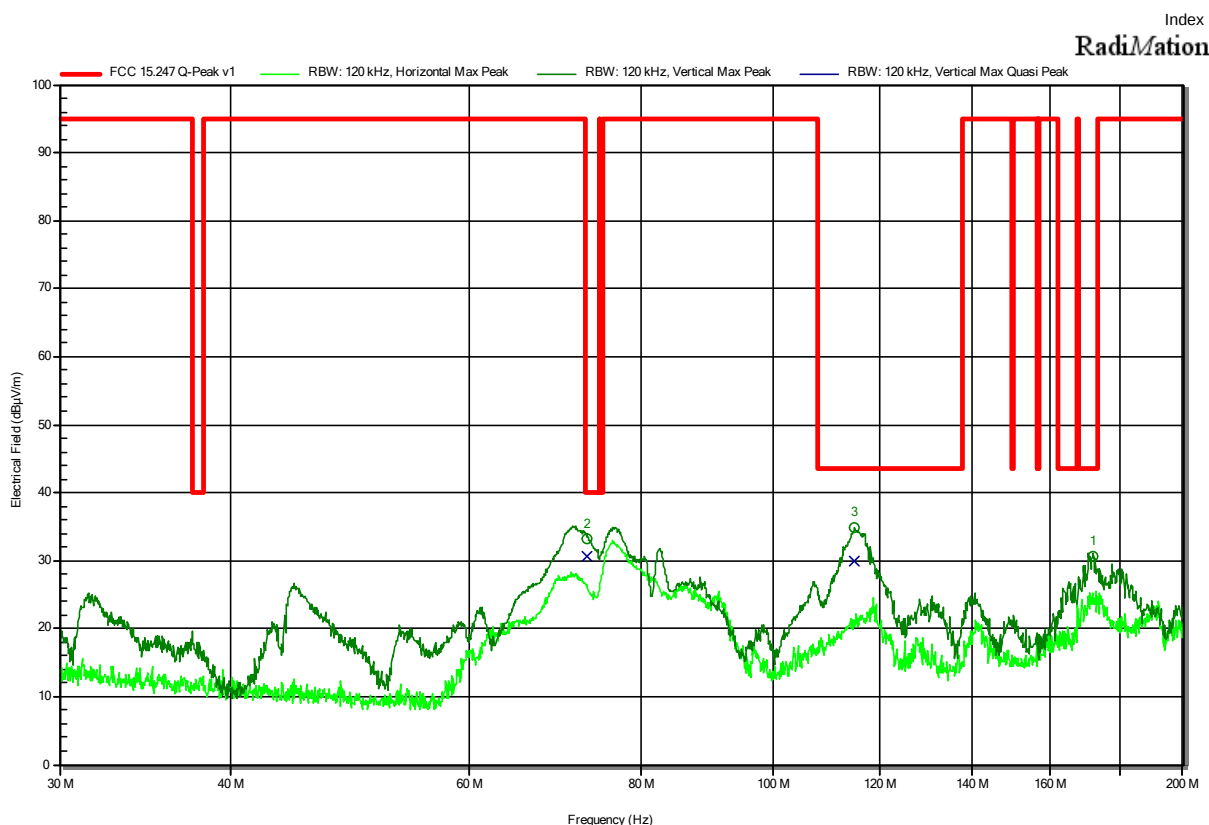
EUT Test Setup



ANNEX A Transmitter spurious emissions

Radiated Spurious Emissions according to FCC 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 27 °Celsius, Vnom: 24 VDC
 Antenna: Rohde & Schwarz HK 116
 Measurement distance: 3 m
 Mode: Tx; BT Classic, 2402 MHz, DH5
 Test Date: 2022-08-09
 Note:



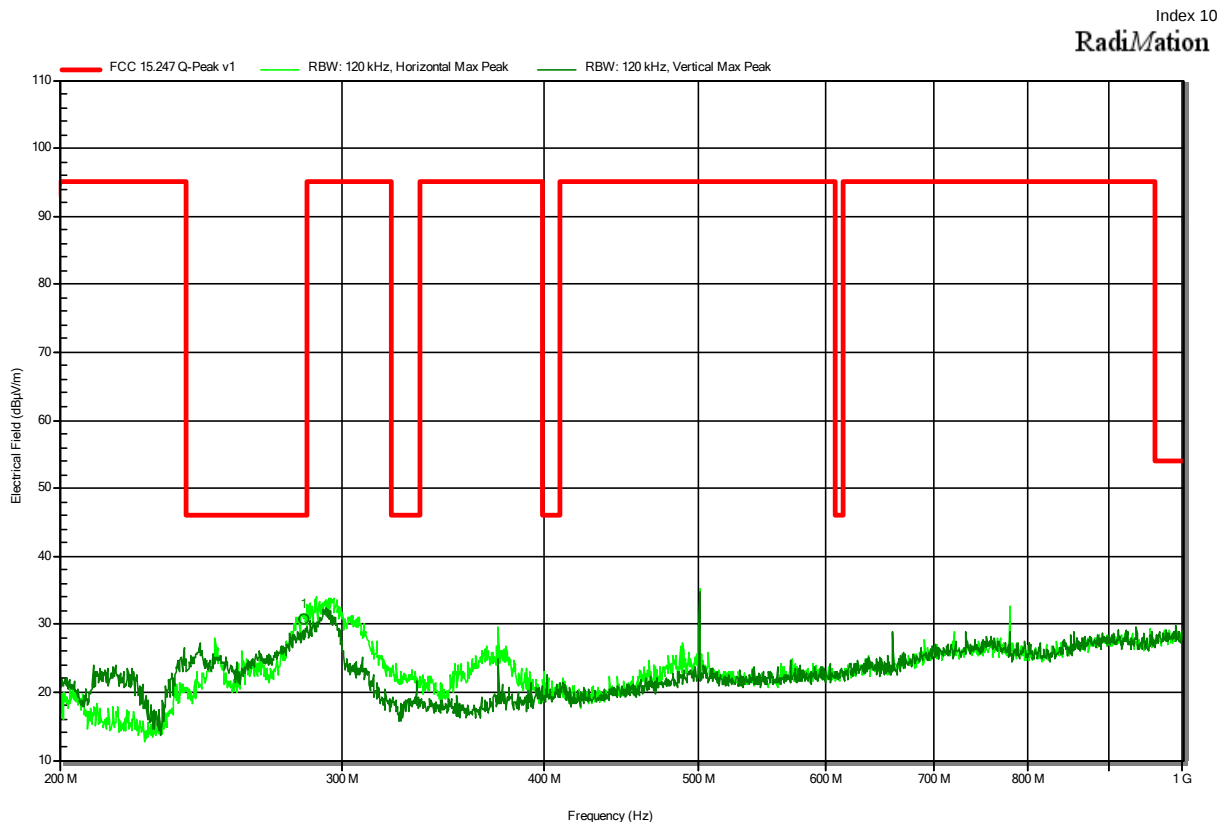
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
171.8225 MHz	30.6 dBµV/m	43.5 dBµV/m	-12.88 dB	Pass	Vertical
Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
73.1271 MHz	30.7 dBµV/m	40 dBµV/m	-9.33 dB	Pass	Vertical
114.8715 MHz	30 dBµV/m	43.5 dBµV/m	-13.5 dB	Pass	Vertical

Test Report No.: G0M-2205-1481-TFC247BT-V02

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

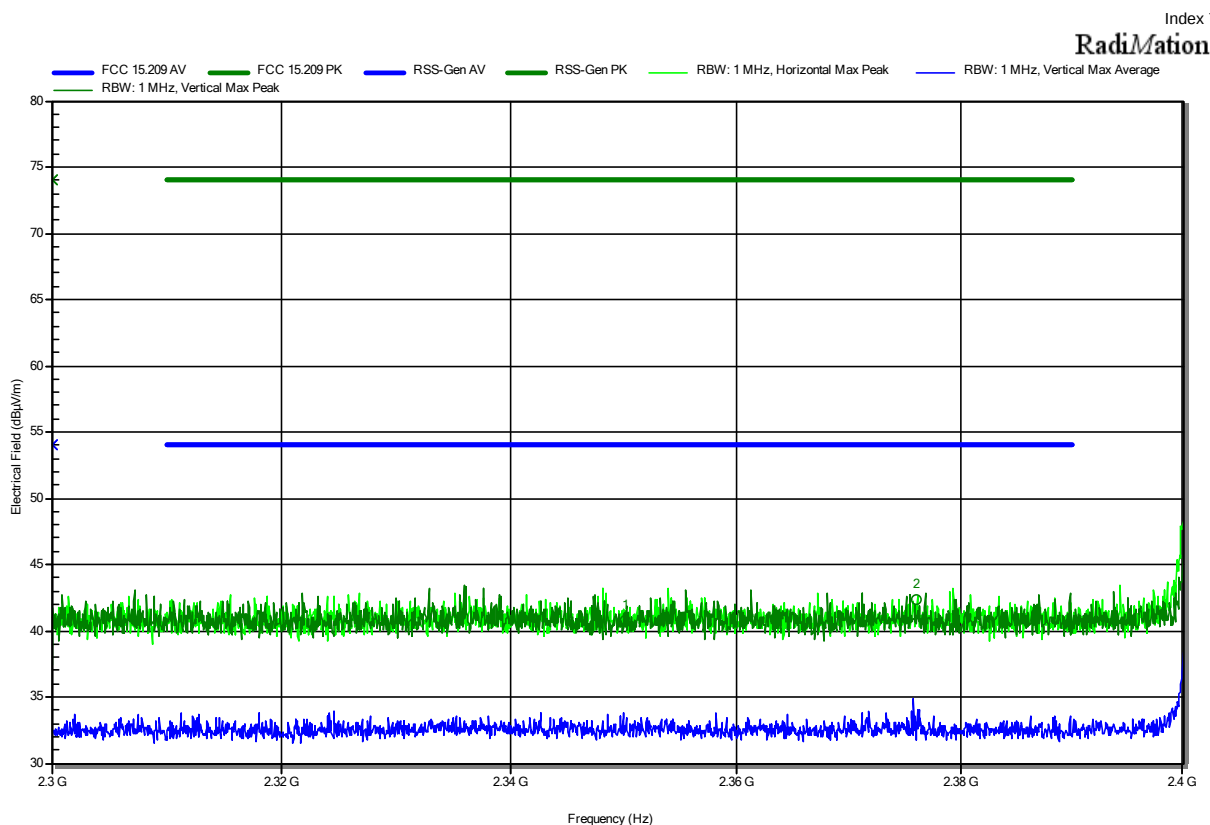
Radiated Spurious Emissions according to FCC 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 27 °Celsius, Vnom: 24 VDC
 Antenna: Rohde & Schwarz HL 223
 Measurement distance: 3 m
 Mode: Tx; BT Classic, 2402 MHz, DH5
 Test Date: 2022-08-09
 Note:



Radiated Spurious Emissions according to FCC 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 27 °Celsius, Vnom: 24 VDC
 Antenna: Schwarzbeck BBHA 9120D
 Measurement distance: 3 m
 Mode: Tx; BT Classic, 2402 MHz, DH5
 Test Date: 2022-08-08
 Note:



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.3501 GHz	40.84 dBµV/m	74 dBµV/m	-33.16 dB	Pass	Horizontal
2.3761 GHz	42.37 dBµV/m	74 dBµV/m	-31.63 dB	Pass	Horizontal

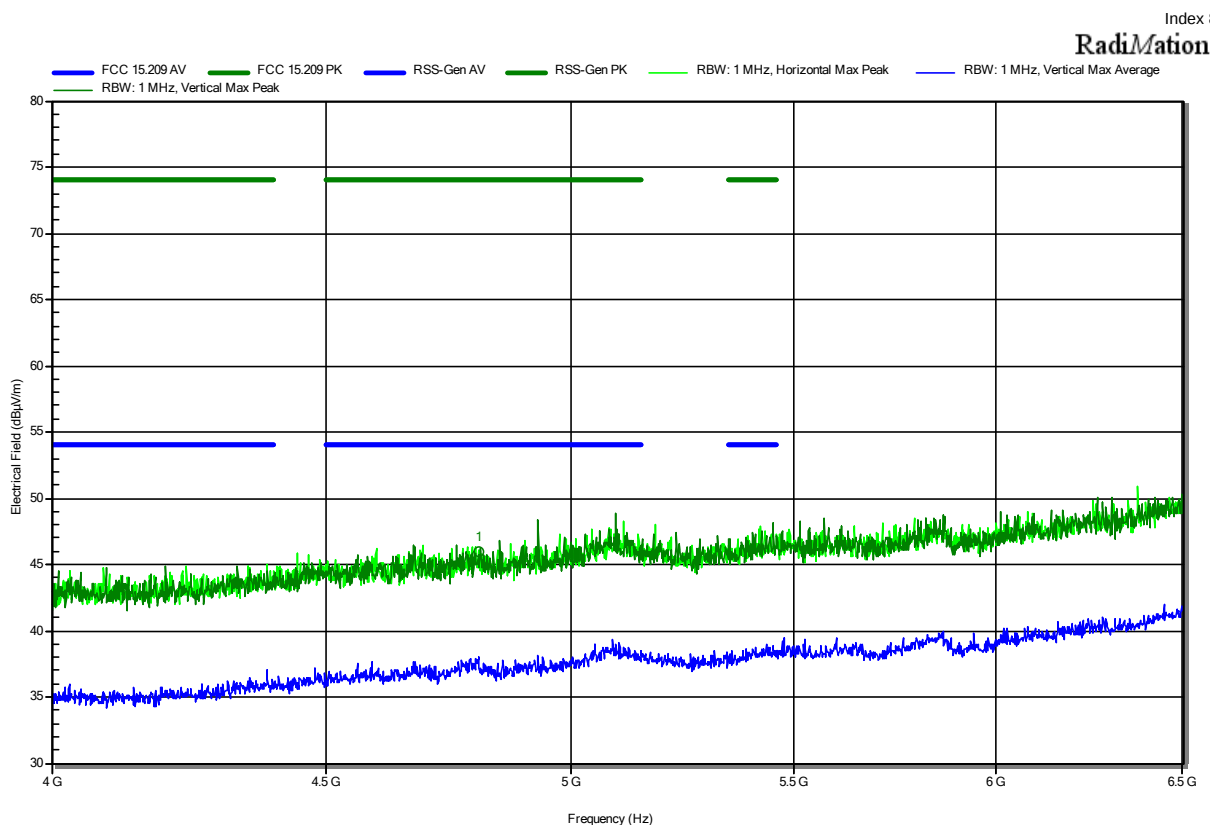
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.3501 GHz	32.66 dBµV/m	54 dBµV/m	-21.34 dB	Pass	Horizontal
2.3761 GHz	35.32 dBµV/m	54 dBµV/m	-18.68 dB	Pass	Horizontal

Test Report No.: G0M-2205-1481-TFC247BT-V02

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

Radiated Spurious Emissions according to FCC 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 27 °Celsius, Vnom: 24 VDC
 Antenna: Schwarzbeck BBHA 9120D
 Measurement distance: 3 m
 Mode: Tx; BT Classic, 2402 MHz, DH5
 Test Date: 2022-08-08
 Note:



Frequency 4.8039 GHz	Peak 46 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -28 dB	Peak Status Pass	Polarization Horizontal
Frequency 4.8039 GHz	Average 38.94 dBμV/m	Average Limit 54 dBμV/m	Average Difference -15.06 dB	Average Status Pass	Polarization Horizontal

Test Report No.: G0M-2205-1481-TFC247BT-V02

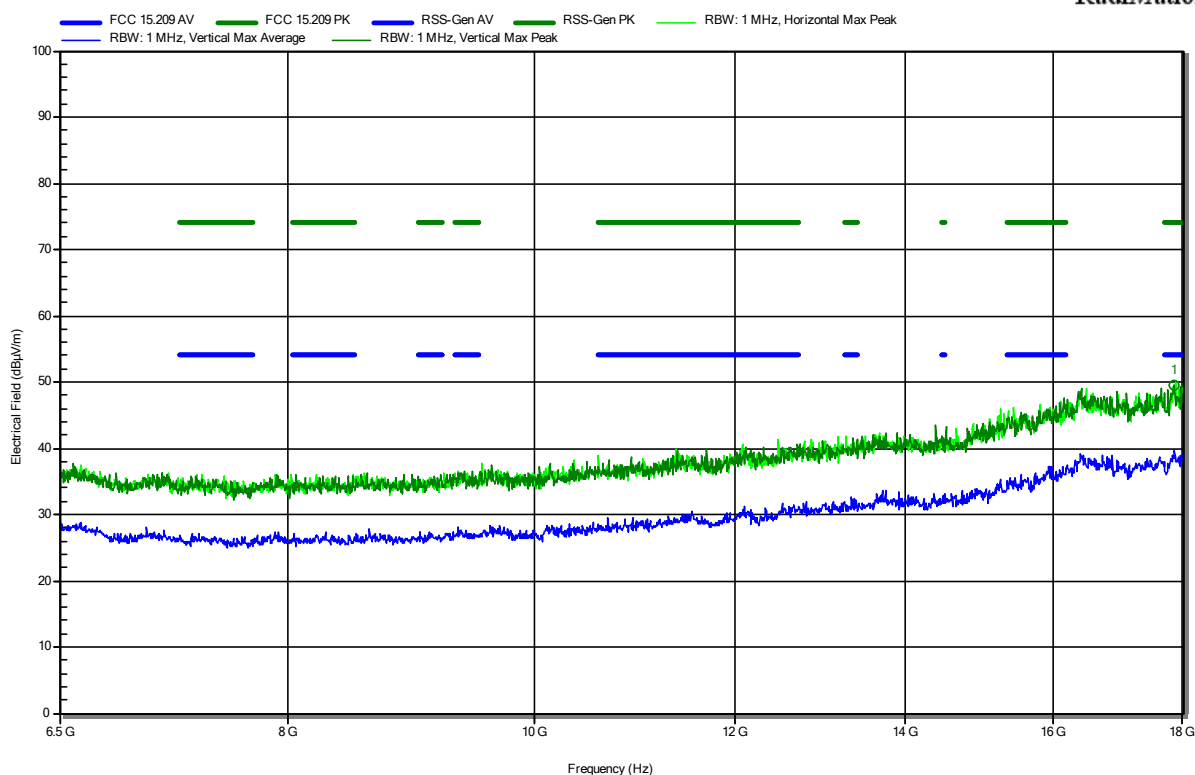
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to FCC 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 27 °Celsius, Vnom: 24 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; BT Classic, 2402 MHz, DH5
 Test Date: 2022-08-08
 Note:

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RadiMation



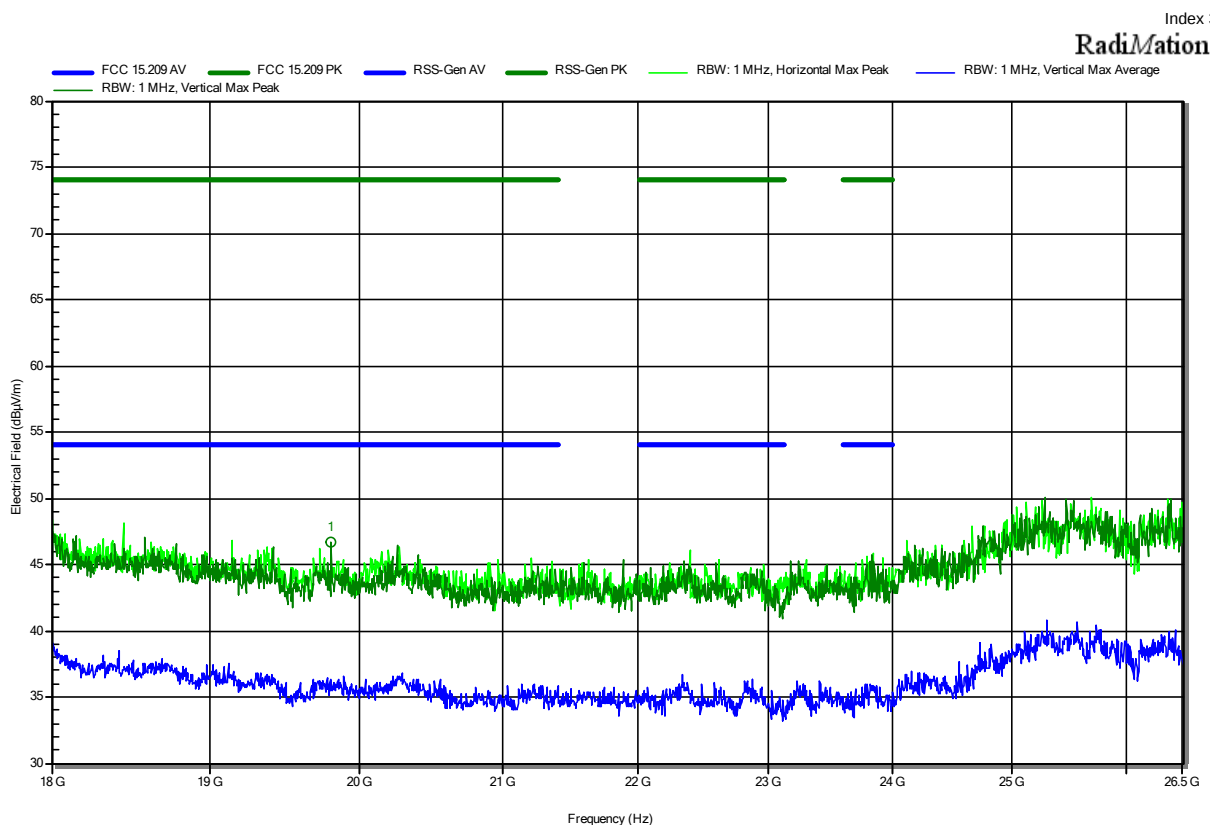
Frequency 17.858 GHz	Peak 49.62 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -24.38 dB	Peak Status Pass	Polarization Vertical
Frequency 17.858 GHz	Average 36.53 dBµV/m	Average Limit 54 dBµV/m	Average Difference -17.47 dB	Average Status Pass	Polarization Vertical

Test Report No.: G0M-2205-1481-TFC247BT-V02

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

Radiated Spurious Emissions according to FCC 15.247, RSS-247 Issue 2

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 27 °Celsius, Vnom: 24 VDC
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; BT Classic, 2402 MHz, DH5
 Test Date: 2022-08-08
 Note:

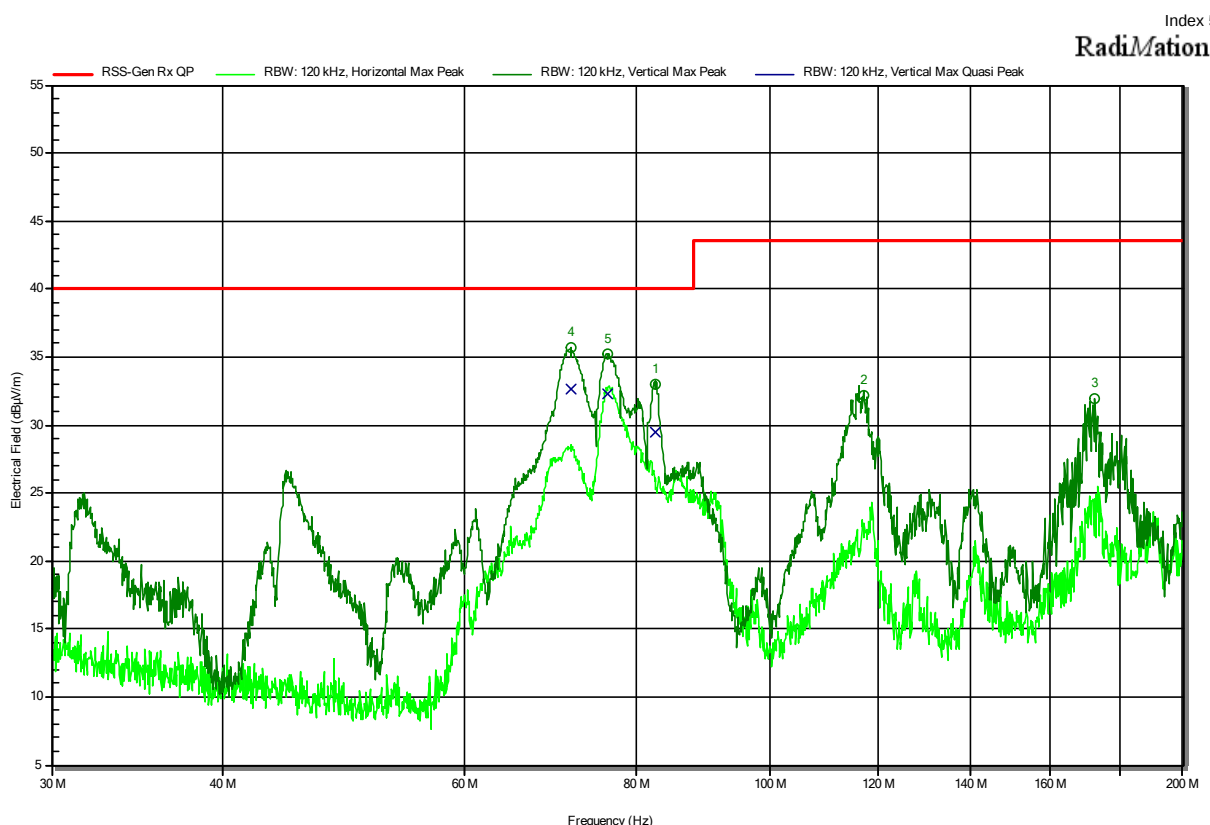


Frequency 19.806 GHz	Peak 46.72 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -27.28 dB	Peak Status Pass	Polarization Vertical
Frequency 19.806 GHz	Average 30.96 dBµV/m	Average Limit 54 dBµV/m	Average Difference -23.04 dB	Average Status Pass	Polarization Vertical

ANNEX B Receiver spurious emissions

Radiated Spurious Emissions according to RSS-247 Issue 2, RSS-Gen Issue 5

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 27 °Celsius, Vnom: 24 VDC
 Antenna: Rohde & Schwarz HK 116
 Measurement distance: 3 m
 Mode: Rx; BT Classic, 2402 MHz
 Test Date: 2022-08-09
 Note:



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
117.023 MHz	32.2 dBµV/m	43.5 dBµV/m	-11.29 dB	Pass	Vertical
172.511 MHz	32 dBµV/m	43.5 dBµV/m	-11.52 dB	Pass	Vertical
Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
71.7406 MHz	32.6 dBµV/m	40 dBµV/m	-7.35 dB	Pass	Vertical
76.2315 MHz	32.3 dBµV/m	40 dBµV/m	-7.7 dB	Pass	Vertical
82.53 MHz	29.5 dBµV/m	40 dBµV/m	-10.48 dB	Pass	Vertical

Test Report No.: G0M-2205-1481-TFC247BT-V02

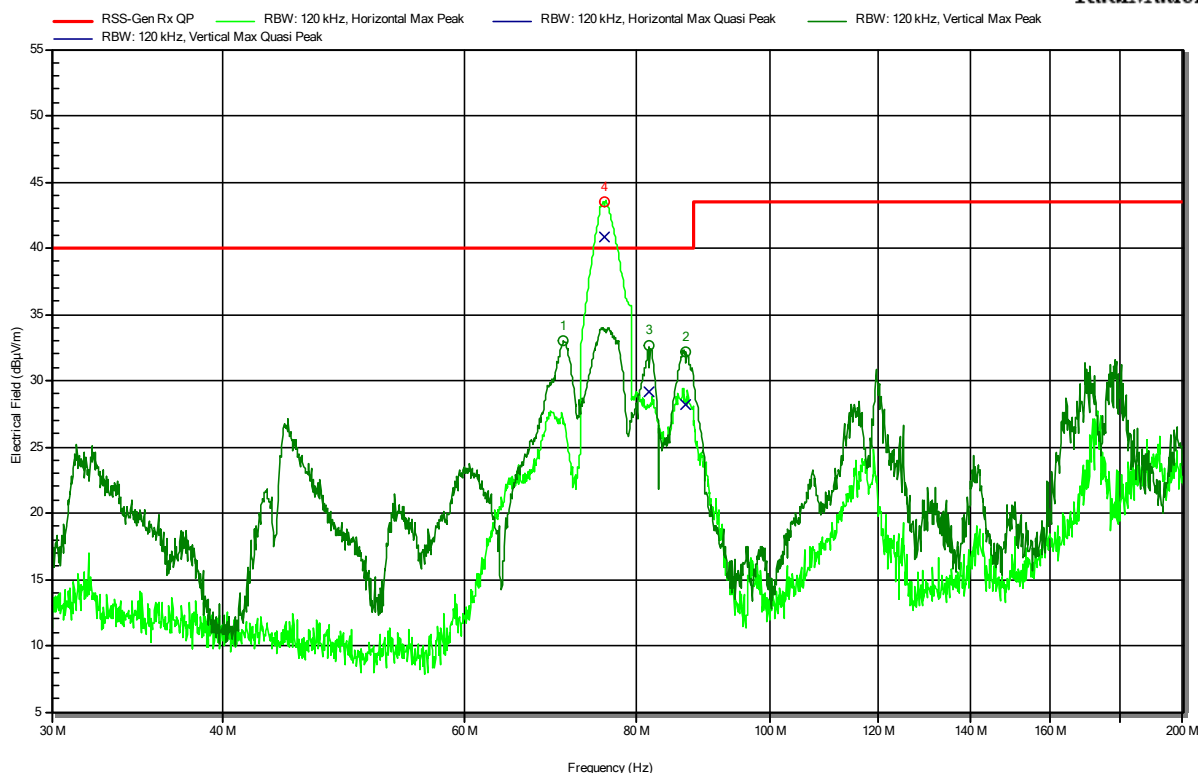
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to RSS-247 Issue 2, RSS-Gen Issue 5

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 27 °Celsius, Vnom: 24 VDC
 Antenna: Rohde & Schwarz HK 116
 Measurement distance: 3 m
 Mode: Rx; BT Classic, 2402 MHz
 Test Date: 2022-08-09
 Note: EUT vertical
 Emission not caused by radio module, see next page

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
70.8255 MHz	33 dBµV/m	40 dBµV/m	-7.02 dB	Pass	Vertical
Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
75.899 MHz	40.9 dBµV/m	40 dBµV/m	0.85 dB	----	Horizontal
81.7589 MHz	29.2 dBµV/m	40 dBµV/m	-10.81 dB	Pass	Vertical
86.9812 MHz	28.2 dBµV/m	40 dBµV/m	-11.8 dB	Pass	Vertical

Test Report No.: G0M-2205-1481-TFC247BT-V02

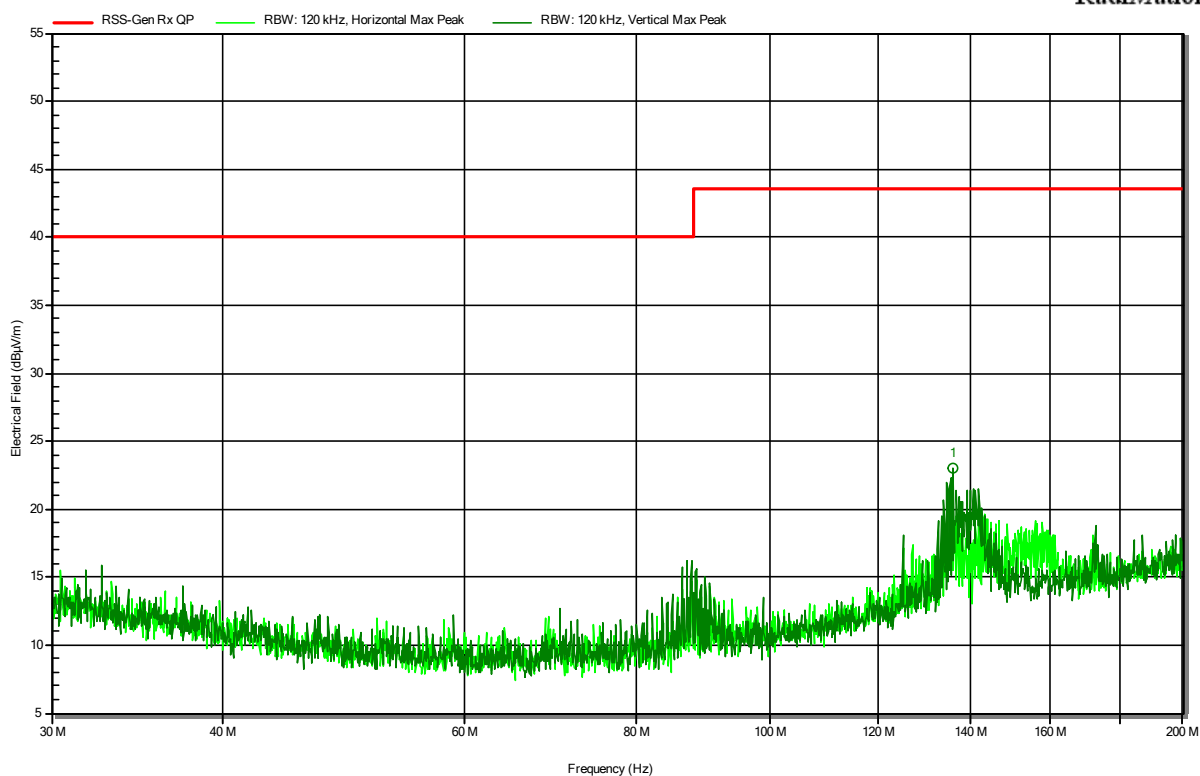
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to RSS-247 Issue 2, RSS-Gen Issue 5

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 27 °Celsius, Vnom: 24 VDC
 Antenna: Rohde & Schwarz HK 116
 Measurement distance: 3 m
 Mode: Rx; BT Classic, 2402 MHz
 Test Date: 2022-08-09
 Note: EUT vertical
 Without AC/DC Adapter

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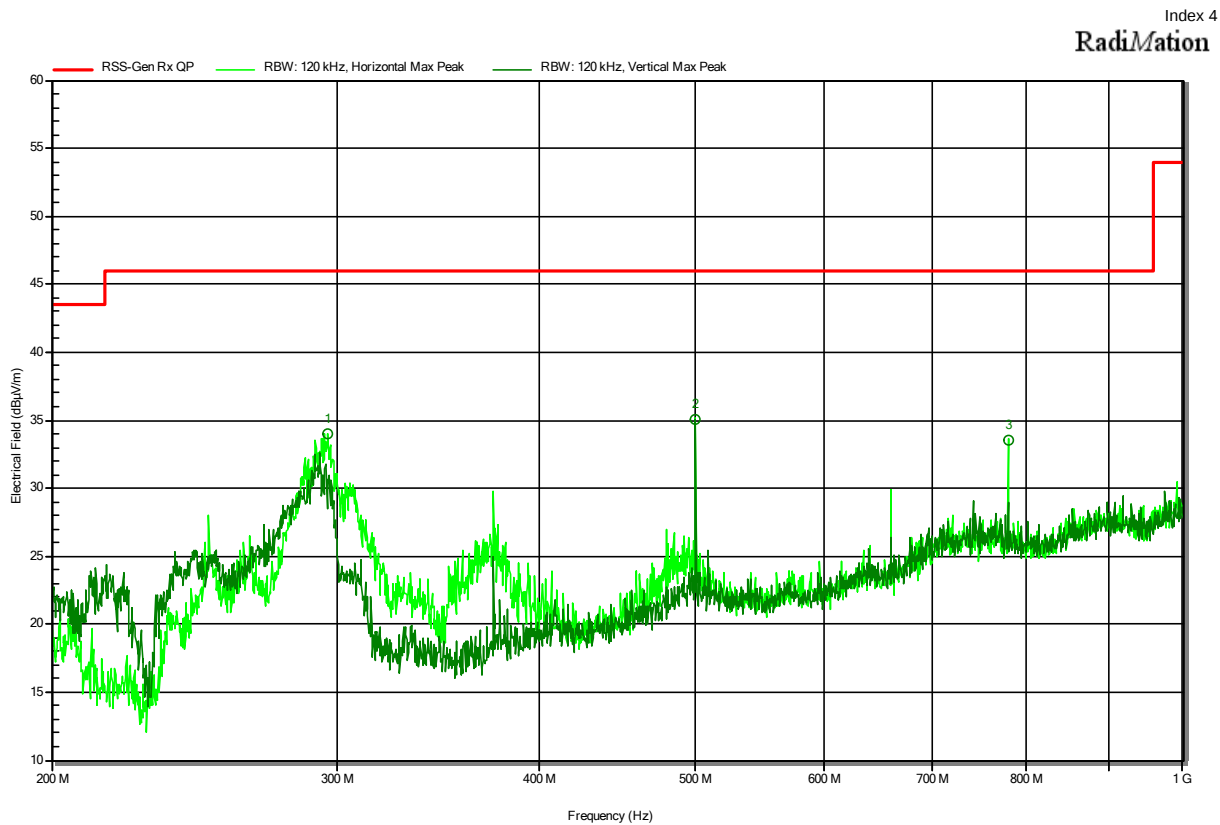
RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
136.0588 MHz	23 dBμV/m	43.5 dBμV/m	-20.48 dB	Pass	Vertical

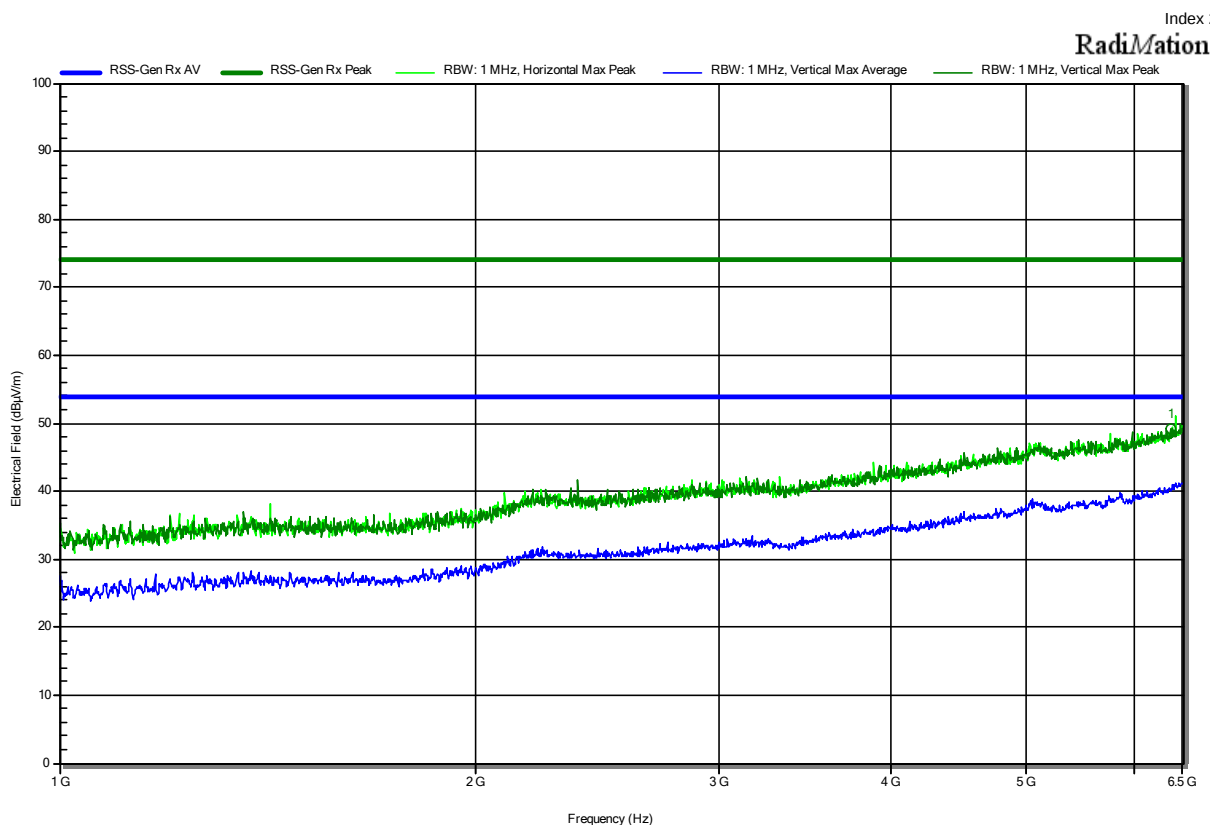
Radiated Spurious Emissions according to RSS-247 Issue 2, RSS-Gen Issue 5

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 27 °Celsius, Vnom: 24 VDC
 Antenna: Rohde & Schwarz HL 223
 Measurement distance: 3 m
 Mode: Rx; BT Classic, 2402 MHz
 Test Date: 2022-08-09
 Note:



Radiated Spurious Emissions according to RSS-247 Issue 2, RSS-Gen Issue 5

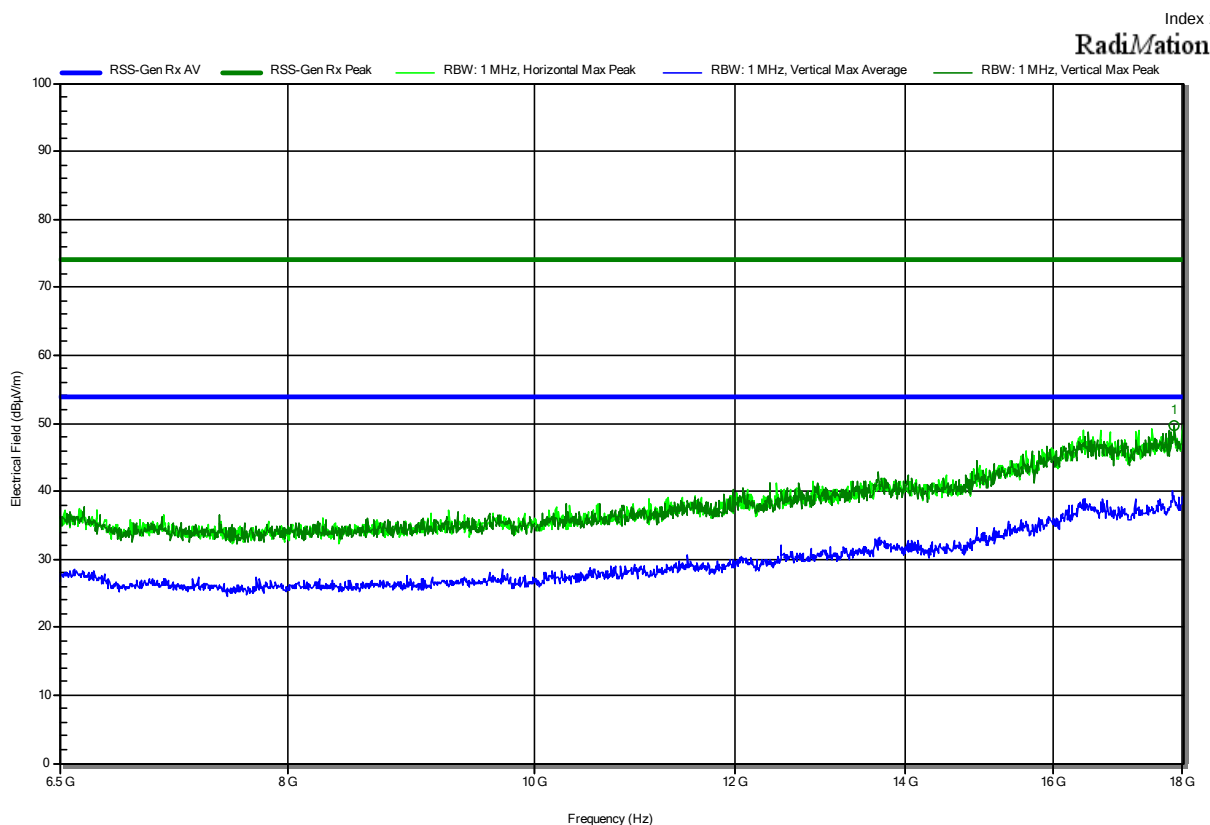
Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 27 °Celsius, Vnom: 24 VDC
 Antenna: Schwarzbeck BBHA 9120D
 Measurement distance: 3 m
 Mode: Rx; BT Classic, 2402 MHz
 Test Date: 2022-08-09
 Note:



Frequency 6.376 GHz	Peak 49.13 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -24.87 dB	Peak Status Pass	Polarization Vertical
Frequency 6.376 GHz	Average 37.27 dBµV/m	Average Limit 53.98 dBµV/m	Average Difference -16.71 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to RSS-247 Issue 2, RSS-Gen Issue 5

Project Number: G0M-2205-1481
 Applicant: Leica Geosystems AG
 Model Description: GNSS Reference Server with BT
 Model: GR50
 Test Sample ID: 40939
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 27 °Celsius, Vnom: 24 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Rx; BT Classic, 2402 MHz
 Test Date: 2022-08-09
 Note:



Frequency 17.864 GHz	Peak 49.69 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -24.31 dB	Peak Status Pass	Polarization Vertical
Frequency 17.864 GHz	Average 36.43 dBµV/m	Average Limit 53.98 dBµV/m	Average Difference -17.55 dB	Average Status Pass	Polarization Vertical

== = END OF TEST REPORT == =

Test Report No.: G0M-2205-1481-TFC247BT-V02

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