


RF-EXPOSURE REPORT FCC 47 CFR Part 2.1093 RF-Exposure evaluation of portable equipment	
Report Reference No	G0M-2204-1411-TFC093PE-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	 <p>A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Test Firm Designation Number: DE0008</p>
Applicant	Leica Geosystems AG
Address	Heinrich-Wild-Strasse 9435 Heerbrugg SWITZERLAND
Test Specification	According to FCC rules
Standard	FCC 47 CFR 2.1093
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Transmitter to be used with Locator to detect cables and pipes
Model(s)	DA175 1Watt
Additional Model(s)	None
Brand Name(s)	Leica
Hardware Version(s)	1.4
Software Version(s)	V3.01
FCC-ID	RFD-DA175
Test Result	PASSED

Possible test case verdicts:		
required by standard but not tested	N/T	
not required by standard	N/R	
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 receipt of test item	2022-09-16	
Report:		
Compiled by	Odai Qawasmeh	
Tested by (+ signature) (Responsible for Test)	Odai Qawasmeh	
Approved by (+ signature) (Test Lab Engineer)	Burkhard Pudell	
Date of Issue	2023-01-26	
Total number of pages	16	
General Remarks:		
<p>The test results presented in this report relate only to the object tested.</p> <p>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.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p>		
Additional Comments:		

ADDITIONAL VARIANTS

Additional Variants (not tested and not evaluated variants)		
Not-tested Variant	Description	
1	Product Type Description	Utility Locator to detect cables and pipes
	Model name	DD120
	Brand name	Leica
	Hardware Version	C
	Software Version	0.4.215
2	Product Type Description	Utility Locator to detect cables and pipes
	Model name	DD130
	Brand name	Leica
	Hardware Version	C
	Software Version	0.4.215
3	Product Type Description	Utility Locator to detect cables and pipes
	Model name	LKO-1000
	Brand name	Sonel
	Hardware Version	C
	Software Version	0.4.215
4	Product Type Description	Utility Locator to detect cables and pipes
	Model name	i550
	Brand name	GeoMax / Elma for Denmark
	Hardware Version	C
	Software Version	0.4.215
5	Product Type Description	Utility Locator to detect cables and pipes
	Model name	i500
	Brand name	GeoMax
	Hardware Version	C
	Software Version	0.4.215
6	Product Type Description	Utility Locator to detect cables and pipes
	Model name	i750XF
	Brand name	GeoMax / BT for UK
	Hardware Version	C
	Software Version	0.4.215
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	2023-01-26	Initial Release	

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EIRP	Equivalent Isotropic Radiated Power
ERP	Effective Radiated Power
EUT	Equipment Under Test
LPE	Low Power Exclusion

REPORT INDEX

1	Equipment (Test Item) Under Test	7
1.1	Reference Documents.....	8
2	Result Summary	9
3	RF-Exposure classification	10
4	RF-Exposure limits and exclusion thresholds	11
5	RF-Exposure Evaluation	12
6	Radiated Field Measurement	13
6.1	Test Conditions and Results – Electric and magnetic field strength	13
7	Evaluation Results	15
8	ANNEX A Results	16

1 Equipment (Test Item) Under Test

Description	Transmitter to be used with Locator to detect cables and pipes
Model	DA175 1Watt
Additional Model(s)	None
Brand Name(s)	Leica
Serial Number(s)	Prototype
Hardware Version(s)	1.4
Software Version(s)	V3.01
FCC ID	RFD-DA175
Equipment type	End Product
Environment	General public
Use case	Body worn

1.1 Reference Documents

Document Type	Document No.	Issued by	Date
IEEE Standard for Safety Levels	IEEE Std C95.1	IEEE	2006-04-19

2 Result Summary

FCC KDB 447498 – Single radiation sources					
Product Standard Reference	Requirement	Reference Method	Frequency	Distance [mm]	Verdict
47 CFR 2.1093	SAR Test Exclusion	KDB 447498	32.768 kHz	5.0	PASS
Comment:					

3 RF-Exposure classification

RF-Exposure Categories	
Fixed	A fixed device is defined as a device physically secured at one fixed location and cannot be easily re-located.
Mobile	A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.
Portable	A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

RF-Exposure Categories	
Occupational / Controlled	Limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
General population / Uncontrolled	Exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

4 RF-Exposure limits and exclusion thresholds

Limits – Electric field strength		
	Action level ^a	Persons in controlled environments
Frequency range (kHz)	E (rms) (V/m)	E (rms) (V/m)
3 kHz to 100 kHz	614	1842
^a Within this frequency range the term “action level” is equivalent to the term “general public” in IEEE Std C95.6-2002.		

Limits – Magnetic field strength				
Frequency range (kHz)	Action level ^a		Persons in controlled environments	
	B _{rms} (mT)	H _{rms} (A/m)	B _{rms} (mT)	H _{rms} (A/m)
3.0–3.35	$3.79/f$	$3016/f$	$3.79/f$	$3016/f$
3.35–5000	1.13	900	1.13	900
NOTE— f is expressed in kHz.				
^a Within this frequency range the term “action level” is equivalent to the term “general public” in IEEE Std C95.6-2002.				

5 RF-Exposure Evaluation

Evaluation procedure acc. to FCC KDB 447498
<p><u>Standalone operational modes</u></p> <ol style="list-style-type: none"> 1) For each standalone operational mode the associated frequencies, conducted output power values, duty cycles and antenna separation distances to the human body are specified 2) From the conducted power and the duty cycle the source-based time averaged conducted output power is calculated 3) The transmission frequency, average power and separation distance is used to determine the SAR test exclusion power threshold value acc. to FCC KDB 447498 D01 4) If the time averaged output power of the transmission mode is lower than the SAR test exclusion power threshold value, the mode qualifies for SAR test exclusion and no further SAR evaluation is needed <p><u>Concurrent operational modes</u></p> <ol style="list-style-type: none"> 1) For each operational mode that participates in the concurrent operational mode, the estimated SAR is calculated from the source-based time average conducted output power and the separation distance to the human body for each transmission frequency of the operation mode 2) The maximum estimated SAR value for each operational mode is determined 3) The sum of SAR values of the maximum estimated SAR values for each operational mode is calculated 4) If the sum of SAR values is below the corresponding SAR limit, the concurrent operational mode qualifies for SAR test exclusion and no further evaluation is needed

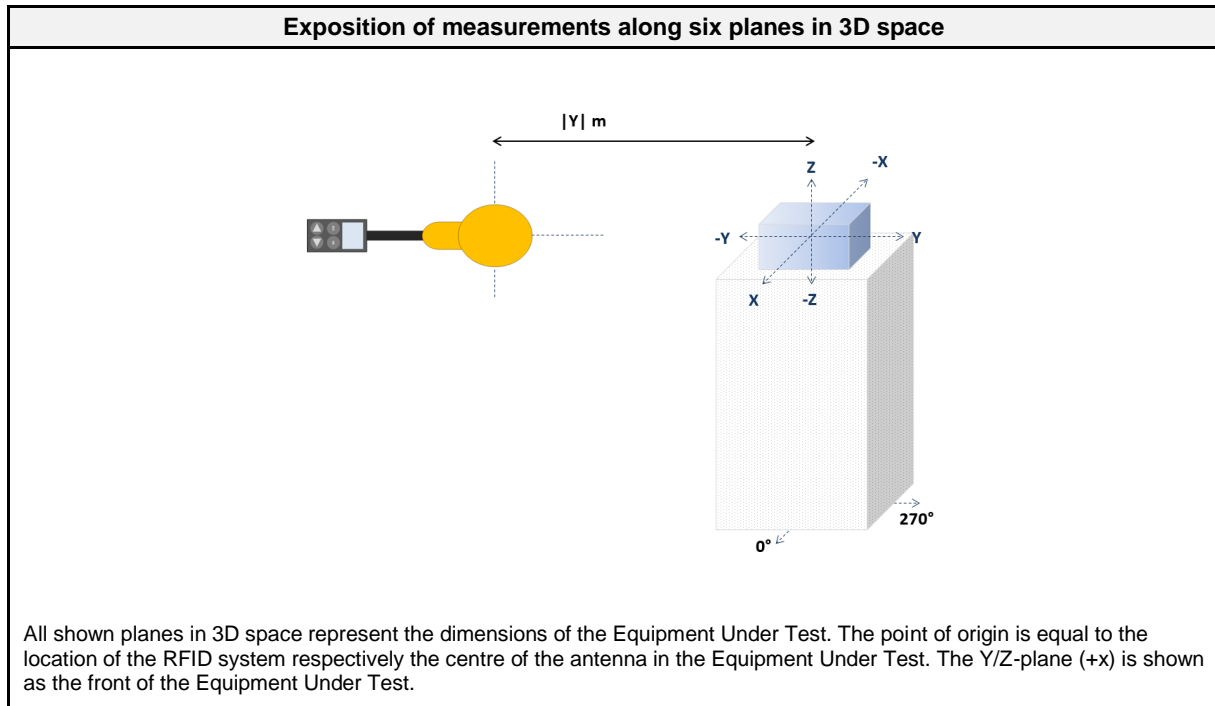
6 Radiated Field Measurement

6.1 Test Conditions and Results – Electric and magnetic field strength

6.1.1 Information

Test Information	
Measurement Method	Radiated only
Operator	Odai Qawasmeh
Date	2022-11-22

6.1.2 Setup



6.1.3 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic chamber	Frankonia	AC2	EF00196	-	-
Compact field analyzer	Narda Safety Test Solutions S.r.l.	EHP-50F	EF01830	2022-11	2023-11

6.1.4 Procedure

Test Procedure

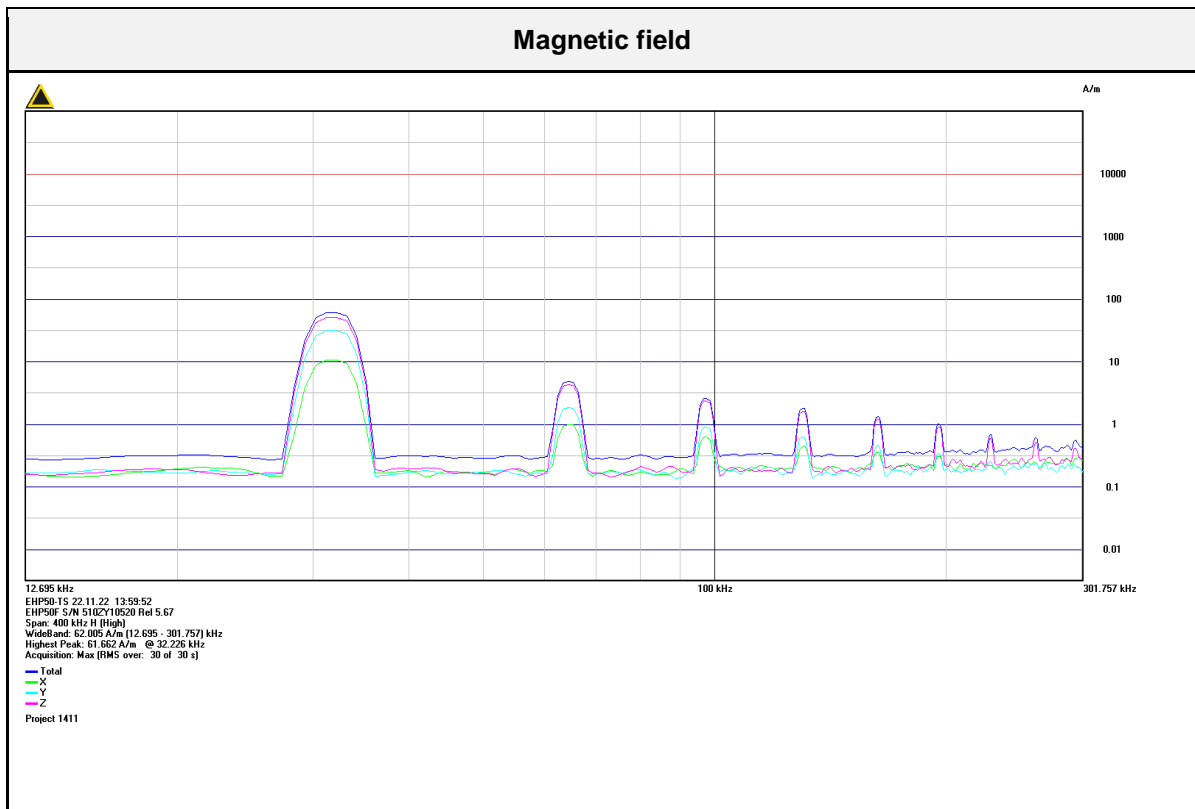
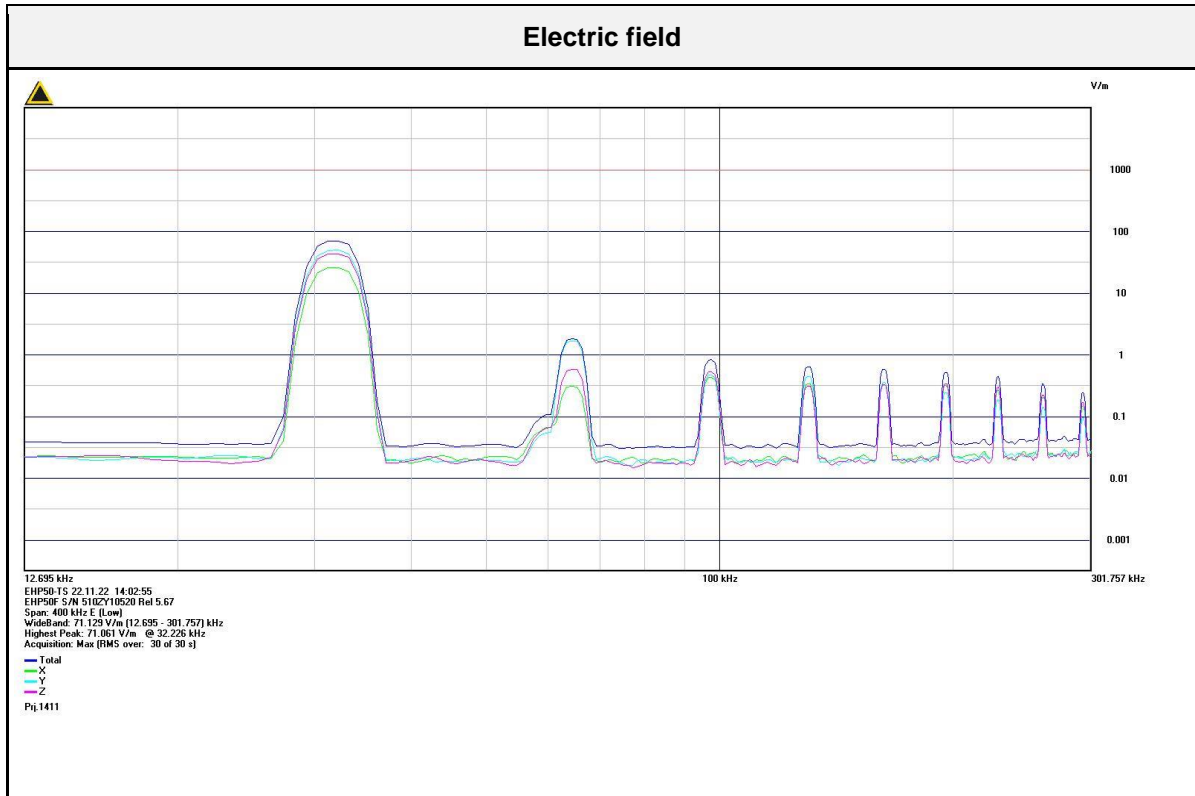
1. The test was performed in anechoic chamber and the EUT is installed at the edge of an 80 cm tall table which is constructed of non-metallic material
2. Any support equipment used to operate the device shall be placed along the edge with a minimum of 10 cm between each component
3. EUT transmitter is activated in test mode under normal conditions.
4. The perimeter of the EUT is scanned with an electric and magnetic field probe with a fixed distance of 10 cm away of the edge of the table
5. The electric and magnetic field strength is measured.
6. The maximum field strength values are recorded.

7 Evaluation Results

Results – Electric Field				
Frequency [kHz]	Position	Electric field strength [V/m]	Limit [V/m]	Verdict
32.768	X/Y/Z	71.061	614	PASS
Comment:				

Results – Magnetic Field				
Frequency [kHz]	Position	Magnetic field strength [A/m]	Limit [A/m]	Verdict
32.768	X/Y/Z	61.662	900	PASS
Comment:				

8 ANNEX A Results



=== END OF TEST REPORT ===