



Test report No. : 4790121321-US-R0-V0  
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Issued date : 2022/11/22  
FCC ID : RFD-RH18

# Maximum Permissible Exposure Report

**Product** : Dragon staff  
**Model Name** : RH18, CCD18  
**FCC ID** : RFD-RH18  
**Test Regulation** : 47 CFR FCC Part 2.1093  
**Received Date** : 2021/10/27  
**Test Date** : 2021/10/29  
**Issued Date** : 2022/11/22  
**Applicant** : Leica Geosystems AG  
Heinrich Wild Strasse, 9435 Heerbrugg, Switzerland  
**Issued By** : Underwriters Laboratories Taiwan Co., Ltd.  
Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd.,  
Zhudong Township, Hsinchu County, Taiwan



The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report are responsible of the test sample(s) provided by the client only and are not to be used to indicate applicability to other similar products.

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Doc No: 17-EM-F0864 / 5.0





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## 1. Attestation of Test Results

**APPLICANT:** Leica Geosystems - Part of Hexagon  
 Heinrich Wild Strasse, 9435 Heerbrugg, Switzerland

**MANUFACTURER:** Graf Elektronik GmbH  
 In Steinen 5, 6850 Dornbirn, Austria

**EUT DESCRIPTION:** Dragon staff

**BRAND:** Leica

**MODEL:** RH18, CCD18

**SAMPLE STAGE:** Mass-Production

<b>APPLICABLE STANDARDS</b>	
<b>STANDARD</b>	<b>Test Results</b>
47 CFR FCC PART 2.1093	PASS

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:

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 Project Handler

Date : 2022/11/22

Approved and Authorized By:

Kent Liu  
 Senior Laboratory Engineer

Date : 2022/11/22

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## 2. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with KDB 447498 D01 General RF Exposure Guidance v06.

## 3. Facilities and Accreditation

<b>Test Location</b>	Underwriters Laboratories Taiwan Co., Ltd.
<b>Address</b>	Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
<b>Accreditation Certificate</b>	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398.

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## 4. Equipment Under Test

### 4.1. Description of EUT

<b>Product Name</b>	Dragon staff	
<b>Brand Name</b>	Leica	
<b>Model Name</b>	RH18, CCD18	
<b>Operating Frequency</b>	Bluetooth EDR	2402MHz ~ 2480MHz
	Bluetooth LE	2402MHz ~ 2480MHz
<b>Modulation</b>	Bluetooth EDR	GFSK, $\pi/4$ -DQPSK, 8DPSK
	Bluetooth LE	GFSK
<b>Number of Channel</b>	Bluetooth EDR	79
	Bluetooth LE	40

Note:

1. The EUT inside has two technology modules as below table:

<b>Brand</b>	<b>Model</b>	<b>Functional</b>
u-blox	OBS421	Only Bluetooth BR/EDR
u-blox	NINA-B301	Only Bluetooth LE

2. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual.

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## 4.2. Description of Available Antennas

Ant. No.	Transmitter Circuit	Brand Name	Model Name	Ant. Type	Maximum Gain (dBi)
1	Chain (0)	LEICA	877520	Dipole	1
2	Chain (0)	LEICA	904755	Dipole	2.3

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual.

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## 5. Requirement

Following FCC KDB 447498 D01 “General SAR test exclusion guidance”

The corresponding SAR Exclusion Threshold condition, listed below:

- 1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:  
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]  $\cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where
  - $f(\text{GHz})$  is the RF channel transmit frequency in GHz.
  - Power and distance are rounded to the nearest mW and mm before calculation.
  - The result is rounded to one decimal place for comparison. The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm is applied to determine SAR test exclusion.
  
- 2) At 100 MHz to 6 GHz and for test separation distances  $> 50$  mm, the SAR test exclusion threshold is determined according to the following:
  - a) [Threshold at 50 mm in step 1) + (test separation distance - 50mm)  $\cdot$  ( f(MHz)/150)] mW, at 100MHz to 1500 MHz
  - b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)  $\cdot$  10] mW at  $> 1500$  MHz and  $\leq 6$  GHz
  
- 3) At frequencies below 100 MHz, the following may be considered for SAR test exclusion.
  - a) The threshold at the corresponding test separation distance at 100 MHz in step 2) is multiplied by  $[1 + \log(100/f(\text{MHz}))]$  for test separation distances  $> 50$  mm and  $< 200$  mm.
  - b) The threshold determined by the equation in a) for 50 mm and 100 MHz is multiplied by  $\frac{1}{2}$  for test separation distances  $\leq 50$  mm.
  - c) SAR measurement procedures are not established below 100 MHz. When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any test results to be acceptable.

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## 6. Radio Frequency Radiation Exposure Evaluation

### Bluetooth EDR

Evaluation Frequency (MHz)	Max. Average power (mW)	Antenna Gain (dBi)	Min. test separation distance (mm)	SAR test exclusion calculation value	1g SAR test exclusion thresholds	Result
2402 ~ 2480	6.607	1.00	5	2.081	$\leq 3$	PASS

### Bluetooth LE

Evaluation Frequency (MHz)	Max. Average power (mW)	Antenna Gain (dBi)	Min. test separation distance (mm)	SAR test exclusion calculation value	1g SAR test exclusion thresholds	Result
2402 ~ 2480	3.802	2.30	5	1.197	$\leq 3$	PASS

Note:

1. Calculate SAR test exclusion thresholds from section 5.1 formulas.

### Conclusion:

Since Source-base time average power is below SAR test exclusion power thresholds, the SAR evaluation is not required.

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**END OF REPORT**

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