

# ***RF EXPOSURE EVALUATION REPORT***

**Application No.:** GZCR2110021245AT  
**Applicant:** Leica Geosystems AG  
**Address of Applicant:** Heinrich-Wild-Strasse CH-9435 Heerbrugg Switzerland  
**Manufacturer:** Leica Geosystems AG  
**Address of Manufacturer:** Heinrich-Wild-Strasse, 9435 Heerbrugg, Switzerland  
**Factory:** Hexagon Geosystems(Wuhan) Co., Ltd.  
**Address of Factory:** No.1, 2<sup>nd</sup> Road, Huagong Park, Eastlake High Technology Development Zone Wuhan(430223) China

**Equipment Under Test (EUT):**  
**EUT Name:** Total station  
**Model No.:** TS01 5" R500  
**Trade mark:** Leica  
**Standard(s) :** 47 CFR PART 1, Subpart I, Section 1.1310  
47 CFR PART 2, Subpart J, Section 2.1093  
KDB447498D01 General RF Exposure Guidance v06

**Date of Receipt:** 2021-9-15  
**Date of Evaluation:** 2021-09-16 to 2021-11-15  
**Date of Issue:** 2021-11-17

<b>Evaluation Result:</b>	<b>Pass*</b>
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\* In the configuration evaluated, the EUT complied with the standards specified above.

Kobe Jian  
EMC Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2021-11-17		Original

Authorized for issue by			
Tested By			
		Curry Wu/Project Engineer	
Reviewed By			
		Ricky Liu/Reviewer	



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## 2 Evaluation Summary

**Note:**

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.



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### 3 Contents

	Page
1 Cover Page .....	1
2 Evaluation Summary .....	3
3 Contents .....	4
4 General Information.....	5
4.1 Details of E.U.T. ....	5
4.2 Evaluating Location .....	5
4.3 Facility .....	6
4.4 Deviation from Standards.....	6
4.5 Abnormalities from Standard Conditions .....	6
5 Technical Requirements Specification.....	7
5.1 RF Exposure Evaluation .....	7
5.1.1 Limit & Test Method.....	7
5.1.2 Conclusion .....	7
6 EUT Constructional Details (EUT Photos) .....	8



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## 4 General Information

### 4.1 Details of E.U.T.

Power supply:	Adapter:
	Type: GEV289
	Input:100-240V AC 50-60Hz 0.5A
	Output:12.0V 2A 24W
	Charger:
	Input: DC12V 2A
	Output: DC8.4V 1.5A
	Battery:
	Type: GEB264
	Li-Ion Battery: 7.2V 31.7wh
Cable(s):	AC Cable:100cm unshielded
	DC cable: 75cm unshielded

#### For BLE:

Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V4.2 LE
Modulation Type:	GFSK
Data rate:	1Mb/s
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	Internal Antenna
Antenna Gain:	3dBi

#### For 2.4G WiFi:

Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz
	802.11n(HT40): 2422MHz to 2452MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK)
	802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11
	802.11 /n(HT40):7
Channel Spacing:	5MHz
Antenna Type:	Internal Antenna
Antenna Gain:	3dBi

### 4.2 Evaluating Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,  
 198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District,  
 Guangzhou, China 510663

Tel: +86 20 82155555

Fax: +86 20 82075059

No tests were sub-contracted.



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### 4.3 Facility

The facility is recognized, certified, or accredited by the following organizations:

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

- **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

- **ISED (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

- **VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)**

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

### 4.4 Deviation from Standards

None

### 4.5 Abnormalities from Standard Conditions

None



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## 5 Technical Requirements Specification

### 5.1 RF Exposure Evaluation

#### 5.1.1 Limit & Test Method

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:

$$\frac{[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot \sqrt{f(\text{GHz})}}{\leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where}}$$

- $f(\text{GHz})$  is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation<sup>17</sup>
- 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

#### 5.1.2 Conclusion

##### For BLE:

The Max. power (including tune-up tolerance) is 3.02 dBm on the middle channel 2.44 GHz (\*)  
 3.02 dBm logarithmic terms convert to numeric result is nearly 2.00 mW

According to the formula, calculate the test exclusion thresholds:

$$\frac{[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot \sqrt{f(\text{GHz})}}$$

$$\text{General RF Exposure} = (2.00 \text{ mW} / 5 \text{ mm}) \times \sqrt{2.44 \text{ GHz}} = 0.62 \quad (1)$$

SAR requirement:

$$S = 3.0 \quad (2)$$

$$(1) < (2)$$

So the SAR report is not required.

(\*) Max. power refer to Report No.: GZCR211002124501



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**For 2.4G WiFi:**

The Max. power (including tune-up tolerance) is 9.44 dBm on the middle channel 2.422 GHz (\*)  
 9.44 dBm logarithmic terms convert to numeric result is nearly 8.79 mW

According to the formula, calculate the test exclusion thresholds:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}]$$

$$\text{General RF Exposure} = (8.79 \text{ mW} / 5 \text{ mm}) \times \sqrt{2.422 \text{ GHz}} = 2.74 \tag{1}$$

SAR requirement:

$$S = 3.0 \tag{2}$$

$$(1) < (2)$$

So the SAR report is not required.

(\*) Max. power refer to Report No.:GZCR211002124502

## 6 EUT Constructional Details (EUT Photos)

Refer to appendix - external and internal photos for GZCR2110021245AT

- End of the Report -



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