

# Health Test Report

Report No.: AGC00688210624EH04

**PRODUCT DESIGNATION** : Ruuvi Gateway  
**BRAND NAME** : Ruuvi  
**MODEL NAME** : Ruuvi Gateway  
**APPLICANT** : Ruuvi Innovations Ltd (Oy)  
**DATE OF ISSUE** : Aug. 12, 2021  
**STANDARD(S)** : EN 62311:2008  
: EN 50665:2017  
**REPORT VERSION** : V1.0



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**REPORT REVISE RECORD**

| Report Version | Revise Time | Issued Date   | Valid Version | Notes           |
|----------------|-------------|---------------|---------------|-----------------|
| V1.0           | /           | Aug. 12, 2021 | Valid         | Initial Release |

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## 1. TEST RESULT CERTIFICATION

|                            |  |
|----------------------------|--|
| <b>Applicant</b>           | Ruuvii Innovations Ltd (Oy)                            |
| <b>Address</b>             | Hämeenkatu 10 B 132, 11100 RIIHIMÄKI, FINLAND          |
| <b>manufacturer</b>        | Ruuvii Innovations Ltd (Oy)                            |
| <b>Address</b>             | Hämeenkatu 10 B 132, 11100 RIIHIMÄKI, FINLAND          |
| <b>Factory</b>             | Promistel Industries                                   |
| <b>Address</b>             | 11 Rue de l'essor - 77760 La Chapelle la Reine, FRANCE |
| <b>Product Designation</b> | Ruuvii Gateway   |
| <b>Brand Name</b>          | Ruuvii   |
| <b>Test Model</b>          | Ruuvii Gateway   |
| <b>Date of test</b>        | Jul. 12, 2021 to Aug. 12, 2021                         |
| <b>Test Result</b>         | Pass   |

We (AGC), Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the European Standard EN 62311. The results of testing in this report apply to the product/system which was tested only.

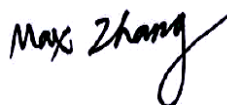
Prepared By



Cool Cheng  
Project Engineer

Aug. 12, 2021

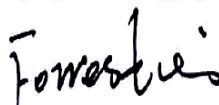
Reviewed By



Max Zhang  
Reviewer

Aug. 12, 2021

Approved By



Forrest Lei  
Authorized Officer

Aug. 12, 2021

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## 2. TECHNICAL INFORMATION

Details of technical specification refer to the description in follows:

Transmitter/Receiver (TX/RX)

|                            |   |
|----------------------------|---|
| <b>Operating Frequency</b> | 2402-2480MHz, 2412-2472MHz  |
| <b>Modulation type</b>     | BT(BLE):GFSK<br>2.4GWIFI;<br>802.11b:DQPSK, DBPSK, CCK<br>802.11g/n: 64-QAM, 16-QAM, QPSK, BPSK |
| <b>Bluetooth Version</b>   | V5.0  |
| <b>Hardware Version</b>    | A2  |
| <b>Software Version</b>    | 1   |
| <b>Antenna designation</b> | BT(BLE) : SMA cloverleaf/dipole Antenna<br>2.4G WIFI: PCB Antenna                               |
| <b>Number of channels</b>  | BT(BLE) :40<br>2.4G WIFI:13   |
| <b>Antenna Gain</b>        | BT(BLE) :0dBi<br>2.4G WIFI: 0dBi  |
| <b>Power Supply</b>        | DC 5V by adapter  |

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### 3. RF EXPOSURE MEASUREMENT

#### 3.1 INTRODUCTION

This International Standard applies to electronic and electrical equipment for which no dedicated product- or product family standard regarding human exposure to electromagnetic fields applies.

This generic standard applies to electronic and electrical apparatus for which no dedicated product- or product family standard regarding human exposure to electromagnetic fields applies.

The frequency range covered is 0 Hz to 300 GHz.

The object of this generic standard is to provide assessment methods and criteria to evaluate such equipment against basic restrictions or reference levels on exposure of the general public related to electric, magnetic, electromagnetic fields and induced and contact current.

NOTE: This standard is intended to cover both intentional and non-intentional radiators. If the equipment complies with the requirements in another relevant standard, e.g. EN 62479 covering low power equipment, then the requirements of this standard (IEC 62311) are considered to be met and the application of this standard to that equipment is not necessary.

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### 3.2 TEST LIMIT

According to EN 62311:2008, the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified 1999/5/EC.

| Reference level for electric, magnetic and electromagnetic fields<br>(0Hz to 300GHz, Unperturbed rms values) |                        |                        |                      |   |
|--|------------------------|------------------------|----------------------|---|
| Frequency Range  | E-field Strength (V/m) | H-Field Strength (A/m) | B-Field (UT)         | Equivalent plane Wave Power Density (W/m <sup>2</sup> ) |
| 0-1 Hz   | --                     | $3.2 \cdot 10^4$       | $4 \cdot 10^4$       | --  |
| 1-8 Hz   | 10000                  | $3.2 \cdot 10^4 / f^2$ | $4 \cdot 10^4 / f^2$ | --  |
| 8-25 Hz  | 10000                  | $4000 / f$             | $5000 / f$           | --  |
| 0.025-0.8 KHz  | $250 / f$              | $4 / f$                | $5 / f$              | --  |
| 0.8-3 KHz  | $250 / f$              | 5                      | 6.25                 | --  |
| 3-150 KHz  | 87                     | 5                      | 6.25                 | --  |
| 0.15-1 MHz   | 87                     | $0.73 / f$             | $0.92 / f$           | --  |
| 1-10 MHz   | $87 / f^{1/2}$         | $0.73 / f$             | $0.92 / f$           | --  |
| 10-400 MHz   | 28                     | 0.073                  | 0.092                | 2   |
| 400-2000 MHz   | $1.375 f^{1/2}$        | $0.0037 f^{1/2}$       | $0.0046 f^{1/2}$     | $f / 200$   |
| 2-300 GHz  | 61                     | 0.16                   | 0.20                 | 10  |

\*Note:

1. f as indicated in the frequency range column.
2. Provided that basic restrictions are met and adverse indirect effects can be excluded, field strength values can be exceeded.
3. For frequencies between 100 kHz and 10 GHz, S, E2, H2 and B2 are to be averaged over any 6-min period.
4. For peak values at frequencies up to 100 kHz see Table 4, note 3.
5. For peak values at frequencies exceeding 100 kHz see Figs.1 and 2. Between 100 KHz and 10MHz, peak values for the field strengths are obtained by interpolation from the 1.5-fold peak at 100 kHz to the 32-fold peak at 10 MHz. For frequencies exceeding 10 MHz it is suggested that the peak equivalent plane wave power density, as averaged over the pulse width, does not exceed 1,000 times the S restrictions, or that the field strength does not exceed 32 times the field strength exposure levels given in the table.
6. For frequencies exceeding 10 GHz, S, E2, H2 and B2 are to be averaged over any 68/ f1.05 –min period (f in GHz).
7. No E-field value is provided for frequencies < 1 Hz, which are effectively static electric fields, Electric shock from low impedance sources is prevented by established electrical safety procedures for such equipment

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#### 4. CLASSIFICATION OF THE ASSESSMENT METHODS

According to User manual, The antenna of the product is at least 20cm away from the body of the user. Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the user's manual. So, this product under normal use is located on electromagnetic far field between the human body.

Far Field Calculation Formula

$$E = \eta_0 H = \frac{\sqrt{30PG(\theta, \phi)}}{r}$$

G = antenna gain relative to an isotropic antenna  
 $\theta, \phi$  = elevation and azimuth angles to point of investigation  
 r = distance from observation point to the antenna  
 $\eta_0$  = Characteristic impedance of free space

#### 5. EUT OPERATION CONDITION

Set the EUT to transmit at lowest, middle and highest channel individually at maximum power.

The EUT cannot transmit simultaneous for different operated band.

**Note:** only worst case (High Power of Highest Channel) recorded in the test report.

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## 6. TEST RESULTS

BT/2.4G WIFI: Antenna gain=0dBi (Numeric 1)

| EUT       | Maximum Output Power | Output Power | E-Field Strength | E-Field Limit | Result    |
|-----------|----------------------|--------------|------------------|---------------|-----------|
|           | dBm                  | mW           | V/m              | V/m           | Pass/Fail |
| BT(BLE)   | 5.4                  | 3.47         | 1.61             | 61            | Pass      |
| 2.4G WIFI | 9.8                  | 9.55         | 2.68             | 61            | Pass      |

Note:

The BT and 2.4GHz WIFI band can transmit simultaneously:

For simultaneously transmit system, the calculated power:

$$1.61+2.68=4.29<61\text{V/m}$$

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2. Any report issued by Company as a result of this application for testing services (the “Report”) shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.
3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.
4. The non-CMA report issued by AGC is only permitted to be used by the client as internal reference use and shall not be used for public demonstration purpose.
5. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.
6. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.
7. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.
8. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.
9. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.
10. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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