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

***A**ttestation of **G**lobal **C**ompliance (Shenzhen) Co., Ltd.*

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

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

2. TECHNICAL INFORMATION

Details of technical specification refer to the description in follows:
Transmitter/Receiver (TX/RX)

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

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.

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 (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^2)
0-1 Hz	--	$3.2*10^4$	$4*10^4$	--
1-8 Hz	10000	$3.2*10^4/f^2$	$4*10^4/f^2$	--
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

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
θ,ϕ = elevation and azimuth angles to point of investigation
r = distance from observation point to the antenna
η_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.

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＜61V/m

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