



Test report No. : 4788408771-US-R5-V0
Page : 1 of 10
Issued date : October 1, 2018
FCC ID : 2AQJEGC01

Maximum Permissible Exposure Report

Product : Smart Gateway
Model Name : SHC301
FCC ID : 2AQJEGC01
Test Regulation : 47 CFR FCC Part 2.1091
Received Date : May 28, 2018
Issued Date : October 1, 2018
Applicant : GalaThings Technology Inc.
9F.-6, NO.65, Gaotie 7th Rd., Zhubei City, Hsinchu
County 302, Taiwan (R.O.C.)
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 apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Telephone : +886-2-7737-3000
Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0864 / 1.0



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REVISION HISTORY

Original Test Report No.: 4788408771-US-R5-V0

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Facsimile (FAX) :+886-3-583-7948 Doc No: 17-EM-F001

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1. Attestation of Test Results

APPLICANT: GalaThings Technology Inc.
9F.-6, NO.65, Gaotie 7th Rd., Zhubei City,Hsinchu County 302,
Taiwan (R.O.C.)

MANUFACTURER WHA YU INDUSTRIAL CO., LTD
No.326,Sec 2,Kung Tao 5 Road,Hsin Chu City,Taiwan

EUT DESCRIPTION: Smart Gateway

BRAND: Mercu

MODEL: SHC301

SAMPLE STAGE: Identical Prototype

APPLICABLE STANDARDS	
STANDARD	Test Results
47 CFR FCC PART 2.1091	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. Measurement Uncertainties were not taken into account and are published for informational purposes only. 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:

Evelyn Lee Date : October 1, 2018
Project Handler

Approve By:

John Cheng Date : October 1, 2018
Project Engineer

Underwriters Laboratories Taiwan Co., Ltd.

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2. Test Methodology

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

3. Facilities and Accreditation

Test Location	Underwriters Laboratories Taiwan Co., Ltd.
Address	Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Accreditation Certificate	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398. The full scope of accreditation can be viewed at http://accreditation.taftw.org.tw/taf/public/basic/viewApplyItems.action?unitNo=3398

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4. Equipment Under Test

4.1. Description of EUT

Product Name	Smart Gateway	
Brand Name	Mercu	
Model Name	SHC301	
Operating Frequency	BT EDR	2402MHz ~ 2480MHz
	BLE	2402MHz ~ 2480MHz
	Zigbee	2405MHz ~ 2480MHz
	WLAN	2.4GHz: 2412MHz ~ 2462MHz 5GHz: 5180MHz ~ 5240MHz 5745MHz ~ 5825MHz
Modulation	BT EDR	GFSK, $\pi/4$ -DQPSK, 8DPSK
	BLE	GFSK
	Zigbee	DSSS
	WLAN	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Number of Channel	BT EDR	79
	BLE	40
	Zigbee	16

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Number of Channel	WLAN	2.4GHz: 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 5.18 ~ 5.24GHz: 802.11a, 802.11n (HT20), 802.11ac (HT20): 4 802.11n (HT40), 802.11ac (HT40): 2 802.11ac (HT80): 1 5.725 ~ 5.85GHz: 802.11a, 802.11n (HT20), 802.11ac (HT20): 5 802.11n (HT40), 802.11ac (HT40): 2 802.11ac (HT80): 1
Normal Voltage	5Vdc (adapter or host equipment)	
Hardware Version	N/A	
Software Version	N/A	

Note:

1. The EUT provides one completed transmitters and one receivers.

Modulation Mode	Tx,Rx Function
802.11b	1TX,1RX
802.11g	1TX,1RX
802.11a	1TX,1RX
802.11n (HT20)	1TX,1RX
802.11n (HT40)	1TX,1RX
802.11ac (HT80)	1TX,1RX

2. The EUT contains following accessory devices Product Brand Model Description USB Cable

Product	Brand	Model	Description
AC Adapter	PHIHONG	PSAF10A-050Q	I/P: 100-240Vac, 280mA, O/P: 5Vdc, 2000mA
AC Adapter	FLYPOWER	PS10I050K2000UU	I/P: 100-240Vac, 350mA, 50/60Hz O/P: 5Vdc, 2000mA
USB Cable	N/A	N/A	3 meter, non-shielded cable

3. 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

Antenna	Brand Name	Model Name	Antenna Type	Antenna Gain(dBi)
BT EDR	M.gear	C1920-510002-A(SRF2017850)	PCB	2.9

Antenna	Brand Name	Model Name	Antenna Type	Antenna Gain(dBi)
BLE	M.gear	C1920-510002-A(SRF2017850)	PCB	2.9

Antenna	Brand Name	Model Name	Antenna Type	Antenna Gain(dBi)
Zigbee	M.gear	C1920-510001-A(SRF2017345)	PCB	2.0

Antenna	Brand Name	Model Name	Antenna Type	Antenna Gain(dBi)
WLAN 2.4GHz	M.gear	C1920-510002-A(SRF2017850)	PCB	2.9

Antenna	Brand Name	Model Name	Antenna Type	Antenna Gain(dBi)
WLAN 5GHz	M.gear	C1920-510002-A(SRF2017850)	PCB	4.3

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5. Requirement

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30
Note 1: f = frequency in MHz, * means Plane-wave equivalent power density				
Note 2: 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.				

Power Density (S) is calculated by the following formula:

$$S=(P*G)/4\pi R^2$$

where: S = power density (in appropriate units, e.g. mW/ cm²)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

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6. Radio Frequency Radiation Exposure Evaluation

BT EDR

BT EDR						
Frequency	Max. power	Antenna Gain	Max. EIRP	Max. EIRP	Power density @ 20 cm	Limit
(MHz)	(dBm)	(dBi)	(dBm)	(mW)	(mW/cm ²)	(mW/cm ²)
2480	4.01	2.9	6.91	4.909	0.0010	1

BLE

BLE						
Frequency	Max. power	Antenna Gain	Max. EIRP	Max. EIRP	Power density @ 20 cm	Limit
(MHz)	(dBm)	(dBi)	(dBm)	(mW)	(mW/cm ²)	(mW/cm ²)
2480	-3.07	2.9	-0.17	0.962	0.0002	1

Zigbee

Zigbee						
Frequency	Max. power	Antenna Gain	Max. EIRP	Max. EIRP	Power density @ 20 cm	Limit
(MHz)	(dBm)	(dBi)	(dBm)	(mW)	(mW/cm ²)	(mW/cm ²)
2480	6.64	2.0	8.64	7.311	0.0015	1

WLAN 2.4GHz

WLAN 2.4GHz						
Frequency	Max. power	Antenna Gain	Max. EIRP	Max. EIRP	Power density @ 20 cm	Limit
(MHz)	(dBm)	(dBi)	(dBm)	(mW)	(mW/cm ²)	(mW/cm ²)
2412	20.92	2.9	23.82	240.991	0.0479	1

WLAN 5GHz

WLAN 5GHz						
Frequency	Max. power	Antenna Gain	Max. EIRP	Max. EIRP	Power density @ 20 cm	Limit
(MHz)	(dBm)	(dBi)	(dBm)	(mW)	(mW/cm ²)	(mW/cm ²)
5190	15.16	4.3	19.46	88.308	0.0176	1

Note:

1. Max. EIRP (dBm) = Max. Average power (dBm) + Antenna Gain (dBi)
2. Max. EIRP (mW) = $10^{(\text{Max. EIRP (dBm)} / 10)}$
3. Power density (mW/cm²) = Max. EIRP (mW) / $[4 \times \pi \times (\text{calculated distance})^2]$, the calculated distance is 20 cm.

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.

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