

RF EXPOSURE REPORT

OF

Applicant: GadgeTek Inc.
7F.-5,NO.369,FUXING N.RD.,SONGSHAN DIST.,TAIPEI
CITY 10541,TAIWAN

Product Name: Smart Cross

Brand Name: GTI

Model No.: GWD901

Model Difference: N/A

Report Number: E2/2019/70048

FCC ID 2AT5G-GWD901

IC 25297-GWD901

FCC Rule Part Part 2.1091

IC Rule Part RSS-102

Issue Date: Aug. 08, 2019

Date of Test: May 08, 2019 ~ Aug. 01, 2019

Date of EUT Received: May 08, 2019

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. The test data, data evaluation in this report is in compliance with FCC Rules Part 2 & ISSED RSS-102.

The test results of this report relate only to the tested sample identified in this report.

Approved By:

John Teh

John Yeh / Assistant Manager



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Revision History

Report Number	Revision	Description	Effected Page	Issue Date	Revised By
E/2019/70048	Rev.00	Initial creation of document	All	Aug. 08, 2019	Tiffany Kao

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1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

General:

Product Name:	Smart Cross	
Brand Name:	GTI	
Model No.:	GWD901	
Model Difference:	N/A	
Hardware Version:	N/A	
Software Version:	N/A	
Wireless Charger:	Model No.: GWD901C, Supplier: GadgeTek Inc.	
Power Supply:	3.7Vdc from Rechargeable Battery or 5.0V from wireless charger	
	Battery:	Model No.: PL400811D, Supplier: Huizhou Everpower Technology Co., Ltd.

Bluetooth Low Energy:

Frequency Range:	2402 – 2480MHz
Bluetooth Version	BT V5.0 single mode
Channel number:	40 channels
Modulation type:	GFSK
Transmit Power:	3.49dBm (BT 4.0) 3.53dBm (BT 5.0)
Antenna Designation:	Chip Antenna, Gain: -20dBi

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2 RF EXPOSURE

2.1 FCC Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Portable device with its physical nature to be used nearby, the distance between radiating structure and human is less than 20cm.

As per KDB 447498 D01 4.3.1, The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

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

*f (GHz) is the RF channel transmit frequency in GHz
Power and distance are rounded to the nearest mW and mm before calculation*

2.2 Measurement Result (Worst Case)

Step 1:

This is a portable device and the max. output power including tune-up tolerance is 2.143 (mW), lower than the threshold given and derived as formula given above, where

$$= 2.143(\text{mW})/5(\text{mm}) \cdot \sqrt{2.442 \text{ (GHz)}} = 0.67 < 3.0$$

Frequency (MHz)	Max. output power including tune-up tolerance(dBm)	Max. output power including tune-up tolerance(mW)	Distance (mm)	Result
2442	3.31	2.143	5	0.670

As the result of calculation result indicates, the RF exposure generating from given transmitter (transmitter employed digital modulation) can be excluded from SAR measurement, and is deemed compliant with RF exposure as per FCC.

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The table of quick reference in terms of power threshold

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

Note that the table present above is the table of quick reference, indexing the level of power threshold with respect to the corresponding frequency. The value of the index may be deviated, and therefore, the derivation of exemption based on KDB447498 D01 is used in this test report, relevantly.

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2.3 ISED Standard Applicable

As per RSS-102 Issue 5 March 19, 2015, any transmitter shall be compliant with applicable RF exposure prior to being market. In §2.5.1, SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1 (see next page for quick reference).

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power.

2.4 Measurement Result (Worst Case)

Freq. (MHz)	Max. output power including tune-up tolerance(dBm)	Peak Gain (dBi)	Max Conducted Output Power (mW)	e.i.r.p (mW)	Exemption Limit (mW)
2442	3.31	-20	2.143	0.021	4

Measurement Result

The Max. Conducted Output Power is 2.143mW when the device operates at the separation distance below or equals to 5mm. It is below the SAR exemption limit 4mW.

So that RF exposure generating from Bluetooth transmitter can be excluded based on RSS-102 Issue 5 March 19, 2015

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Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance^{4,5}

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

~ End of Report ~

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