

Radio Exposure Evaluation Report

FCC ID : 2BOYO-SGW-10
Contains FCC ID : XMR2021EM05G
Equipment : Wireless Security Gateway
Brand Name : SKS
Model Name : SGW-10-1
Applicant : TAIWAN SHIN KONG SECURITY CO.,LTD
No. 128, Xing'ai Rd., Neihu Dist., Taipei City 114508, Taiwan
Manufacturer : TAIWAN SHIN KONG SECURITY CO.,LTD
No. 128, Xing'ai Rd., Neihu Dist., Taipei City 114508, Taiwan
Standard : 47 CFR FCC Part 2 Subpart J, section 2.1091

The product was received on Mar. 17, 2025, and testing was started from Apr. 07, 2025 and completed on Apr. 08, 2025. We, SPORTON INTERNATIONAL INC. Hsinhua Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR FCC Part 2 Subpart J, section 2.1091 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Hsinhua Laboratory, the test report shall not be reproduced except in full.


Approved by: Jackson Tsai

SPORTON INTERNATIONAL INC. Hsinhua Laboratory
No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)



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Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

None

Reviewed by: Sam Tsai

Report Producer: Michelle Tsai



1 General Description

1.1 Information

1.1.1 EUT General Information

RF General Information		
Evaluation Mode	Frequency Range (MHz)	Modulation Type
2.4GHz WLAN	2400 - 2483.5	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)
LoRa	902 - 928	LoRa (125kHz/500kHz)
Matter	2400 - 2483.5	DSSS (O-QPSK)
WWAN	LTE Band 2: 1850 - 1910	LTE: QPSK / 16QAM
	LTE Band 4: 1710 - 1755	
	LTE Band 5: 824 - 849	
	LTE Band 7: 2500 - 2570	
	LTE Band 12: 699 - 716	
	LTE Band 13: 777 - 787	
	LTE Band 14: 788 - 798	
	LTE Band 25: 1850 - 1915	
	LTE Band 26: 814 - 849	
	LTE Band 38: 2570 - 2620	
	LTE Band 41: 2496 - 2690	
	LTE Band 66: 1710 - 1780	
	LTE Band 71: 663 - 698	

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Support
1	Dusun	DSGW-750-wifi1	PCB	N/A	WiFi 2.4G
2	Dusun	DSGW-750-wifi2	PCB	N/A	WiFi 2.4G
3	Dusun	DSM-04B	PCB	N/A	Matter
4	JESONcom	5Q004U	Dipole	I-Pex	Lora
5	JESONcom	32L008A	LDS	N/A	LTE

Ant.	Port	Gain (dBi)		
		2.4G	Matter	LoRa
1	1	1.42	-	-
2	2	1.54	-	-
3	1	-	2.41	-
4	1	-	-	2.48

Ant.	Port	WWAN antenna Gain (dBi)					
		LTE					
		Band 2	Band 4	Band 5	Band 7	Band 12	Band 13
5	1	1.89	2.8	0.43	2.88	4.3	0.76

Ant.	Port	WWAN antenna Gain (dBi)						
		LTE						
		Band 14	Band 25	Band 26	Band 38	Band 41	Band 66	Band 71
5	1	0.76	1.89	0.25	4.16	4.16	2.8	4.3

Note 1: The EUT has five antennas.

For 2.4GHz function:

For IEEE 802.11 b/g/n/VHT/ax/be mode (1TX/1RX)

Ant. 1 (port 1), Ant. 2 (port 2) could transmit/receive.

Support diversity function and pre-tested on each single chain, the worst case was Ant. 1 (port 1) and it was recorded in this test report.

For Matter function:

For IEEE 802.15.4 mode (1TX/1RX)

Ant. 3 (port 1) could transmit/receive.

For LoRa function:

For LoRa mode (1TX/1RX)

Ant. 4 (port 1) could transmit/receive.

For WWAN 4G function:

For WWAN 4G mode (1TX/1RX)

Ant. 5 (port 1) could transmit/receive.

1.1.3 Accessories

Accessories				
AC Adapter 1 (TAIWAN Plug)	Brand Name	Sunun	Model Name	SA182V-050300U
	Manufacturer	Dongguan Sunun Power Co., Ltd	SN	-
	Power Rating	I/P: 100 - 240Vac, 0.4A, O/P: 90-264Vdc, 3A		
	Power Cord	1.5 meter, non-shielded cable, w/o ferrite core		
Battery	Brand Name	EVE	Model Name	ICR18650/26V
	Manufacturer	EVE Energy CO., LTD	SN	-
	Power Rating	3.6Vdc, 2550mAh	Type	Li-ion, Yes
RJ45 Cable	Brand Name	DONGGUAN AOC ELECTRONICSCO., LTD	Model Name	CON-C-984
	Signal Line	1.5 meter, shielded cable		

Reminder: Regarding to more detail and other information, please refer to user manual.

1.2 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 2 Subpart J, section 2.1091
- ♦ KDB 447498 D04 Interim General RF Exposure Guidance v01

The following reference test guidance is not within the scope of accreditation of TAF.

- ♦ 47 CFR Part 1.1307
- ♦ 47 CFR Part 1.1310

1.3 Testing Location

Test Lab. : Sporton International Inc. Hsinhua Laboratory			
<input checked="" type="checkbox"/>	Hsinhua (TAF: 3785)	ADD: No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)	
		TEL: 886-3-327-3456	FAX: 886-3-327-0973
Test site Designation No. TW3785 with FCC.			

2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled 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)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	F/300	6
1500-100,000	-	-	5	6

(B) 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: f = frequency in MHz ; *Plane-wave equivalent power density

Multiple Transmitters Condition

Co-location as simultaneously transmitting (co-transmitting) and the evaluation shall be consider that simultaneous transmissions from co-located devices the individual transmitters are evaluated separately. After sum of the individual value (basic restriction / reference level) are measured/calculated also have to under basic restriction / reference level.

Co-transmitting mode:

1. WLAN 2.4GHz+LoRa+Matter+LTE

2.2 RF Exposure Exempt Measurement

Option	Refer Std.	Exemption Exposure Thresholds (TL)
A	§1.1307(b)(3)(i)(A)	Available maximum time-averaged power is no more than 1 mW
B	§1.1307(b)(3)(i)(B)	$P_{th}(mW) = \begin{cases} ERP_{20cm} (d / 20cm)^x \rightarrow d \leq 20cm \\ ERP_{20cm} \rightarrow 20cm < d \leq 40cm \end{cases}$ $x = -\log_{10} \left(\frac{60}{ERP_{20cm} \sqrt{f}} \right) \text{ and } f \text{ is in GHz}$ $\begin{cases} ERP_{20cm} : 0.3GHz \leq f < 1.5GHz \rightarrow 2040f(mW) \\ ERP_{20cm} : 1.5GHz \leq f \leq 6GHz \rightarrow 3060(mW) \end{cases}$
C	§1.1307(b)(3)(i)(C)	$\begin{cases} 0.3 \sim 1.34MHz \rightarrow ERP(W) = 1920R^2 \\ 1.34 \sim 30MHz \rightarrow ERP(W) = 3450R^2 / f^2 \\ 30 \sim 300MHz \rightarrow ERP(W) = 3.83R^2 \\ 300 \sim 1500MHz \rightarrow ERP(W) = 0.0128R^2 f \\ 1500 \sim 100000MHz \rightarrow ERP(W) = 19.2R^2 \end{cases}$ <p>f is in MHz; R is in m; $R > \lambda / 2\pi$</p>

2.3 Multiple RF Sources Exposure

Refer Std.	Exemption Exposure Thresholds (TL)
§1.1307(b)(3)(ii)(A)	The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required)
§1.1307(b)(3)(ii)(B)	$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{ExposureLimit_k} \leq 1$ <p>a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(B) of this section for P , including existing exempt transmitters and those being added.</p> <p>b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.</p> <p>c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.</p> <p>P_i = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).</p> <p>$P_{th,i}$ = the exemption threshold power (P_{th}) according to paragraph §1.1307(b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i.</p> <p>ERP_j = the ERP of fixed, mobile, or portable RF source j.</p> <p>$ERP_{th,j}$ = exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least $\lambda/2\pi$ according to the applicable formula of paragraph §1.1307 (b)(3)(i)(C) of this section.</p> <p>$Evaluated_k$ = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.</p> <p>$Evaluated Limit_k$ = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k, as applicable from § 1.1310 of this chapter.</p>



2.4 MPE Calculation Method

The MPE was calculated at 20 cm to show compliance with the power density limit.
The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

2.5 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

WLAN 2.4GHz

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;G1D	1.42	16.13	15.40	0.50	38.905	20	B	3060.0	0.0127
2.4G;D1D	1.42	13.89	13.16	0.50	23.227	20	B	3060.0	0.0076

LoRa

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
0.9G;LoRa-500	2.48	20.09	20.42	0.50	123.595	20	B	2224.6	0.0556
0.9G;LoRa-125	2.48	20.44	20.77	0.50	133.968	20	B	2180.4	0.0615

Matter

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	2.41	16.71	16.97	0.50	55.847	20	B	3060.0	0.0183

LTE

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
LTE B2;D1D	1.89	25.5	25.24	0.50	374.973	20	B	3060.0	0.1226
LTE B4;D1D	2.80	25.5	26.15	0.50	462.381	20	B	3060.0	0.1512
LTE B5;D1D	0.43	25.5	23.78	0.50	267.917	20	B	1979.3	0.1354
LTE B7;D1D	2.88	25.5	26.23	0.50	470.977	20	B	3060.0	0.1540
LTE B12;D1D	4.30	25.5	27.65	0.50	653.131	20	B	1679.3	0.3891
LTE B13;D1D	0.76	25.5	24.11	0.50	289.068	20	B	1870.8	0.1546
LTE B14;D1D	0.76	25.5	24.11	0.50	289.068	20	B	1897.2	0.1524
LTE B25;D1D	1.89	25.5	25.24	0.50	374.973	20	B	3060.0	0.1226
LTE B26;D1D	0.25	25.5	23.60	0.50	257.040	20	B	1979.3	0.1299
LTE B38;D1D	4.16	25.5	27.51	0.50	632.412	20	B	3060.0	0.2067
LTE B41;D1D	4.16	25.5	27.51	0.50	632.412	20	B	3060.0	0.2067
LTE B66;D1D	2.80	25.5	26.15	0.50	462.381	20	B	3060.0	0.1512
LTE B71;D1D	4.30	25.5	27.65	0.50	653.131	20	B	1597.2	0.4091

Note 1: Option A, B and C refer as clause 2.2

Note 2: For option B, Pth(mW) convert to TL ERP(mW); For option C, ERP(W) convert to TL ERP(mW)

Note 3: TL Ratio=Tune-up ERP(mW)/TL ERP(mW)



Simultaneous Transmission Analysis Mode:

WLAN 2.4GHz+LoRa+Matter+LTE

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;G1D	1.42	16.13	15.40	0.50	38.905	20	B	3060.0	0.0127
0.9G;LoRa-125	2.48	20.44	20.77	0.50	133.968	20	B	2180.4	0.0615
2.4G;D1D	2.41	16.71	16.97	0.50	55.847	20	B	3060.0	0.0183
LTE B71;D1D	4.30	25.5	27.65	0.50	653.131	20	B	1597.2	0.4091
								Sum TL	0.5016
								Ratio Limit	1

Note 1: Option A, B and C refer as clause 2.2

Note 2: For option B, Pth(mW) convert to TL ERP(mW); For option C, ERP(W) convert to TL ERP(mW)

Note 3: TL Ratio=Tune-up ERP(mW)/TL ERP(mW)

Note 4: Refer as clause 2.3 Multiple RF Sources Exposure. Please follow below option and sum TL ration table.

Option	Sum TL Ratio_B	Option	Sum TL Ratio_C	Option	Sum TL Ratio_E
B	$\sum_{i=1}^a \frac{P_i}{P_{th,i}}$	C	$\sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}}$	E	$\sum_{k=1}^c \frac{Evaluated_k}{ExposureLimit_k}$

Note: The above antenna gain was declared by manufacturer.

————THE END————