

# RF Exposure Evaluation Report

**Application No.:** SZEM1905013523CR  
**Applicant:** Develco Products  
**Address of Applicant:** Olof Palmes Alle 40 Aarhus N 8240 Denmark  
**Manufacturer:** Develco Products  
**Address of Manufacturer:** Tangen 6, 8200 Aarhus N, Denmark  
**Factory:** GPV Electronics TH.  
**Address of Factory:** 834 Moo4, Bangpoo industrial Estate Soi 11, 12, Sukhumvit Road, Praksa, Muang Dis. Samutprakarn 10280, Thailand  
**EUT Name:** Wireless gateway  
**Model No.:** MGW101-xxx  
**Trade mark:** Squid.link Gateway  
**FCC ID:** 2AHNM-MGW101  
**Standards:** 47 CFR Part 1.1307 (2016)  
47 CFR Part 1.1310 (2016)  
**Date of Receipt:** 2019-05-05  
**Date of Test:** 2019-05-08 to 2019-06-15  
**Date of Issue:** 2019-06-18

<b>Test Result :</b>	<b>PASS*</b>
----------------------	--------------

\* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu  
EMC Laboratory Manager



## 2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2019-06-18		Original

Authorized for issue by:			
			
		<hr/> <b>Bill Chen /Project Engineer</b>	
			
		<hr/> <b>Eric Fu /Reviewer</b>	



### 3 Contents

	Page
1 COVER PAGE .....	1
2 VERSION .....	2
3 CONTENTS .....	3
4 GENERAL DESCRIPTION OF EUT .....	4
4.1 TEST LOCATION .....	5
4.2 TEST FACILITY .....	5
4.3 DEVIATION FROM STANDARDS .....	5
4.4 ABNORMALITIES FROM STANDARD CONDITIONS .....	5
4.5 OTHER INFORMATION REQUESTED BY THE CUSTOMER .....	5
5 RF EXPOSURE EVALUATION .....	6
5.1 RF EXPOSURE COMPLIANCE REQUIREMENT .....	6
5.1.1 Limits .....	6
5.1.2 Test Procedure .....	6
4.1.3 EUT RF EXPOSURE EVALUATION .....	7



## 4 General Description of EUT

Power supply:	Power supply adapter
For BLE:	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	PCB Antenna
Antenna Gain:	1dBi
For 2.4G wifi:	
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11
Channel Spacing:	5MHz
Antenna Type:	PCB Antenna
Antenna Gain:	1.5dBi



## 4.1 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

## 4.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

## 4.3 Deviation from Standards

None.

## 4.4 Abnormalities from Standard Conditions

None.

## 4.5 Other Information Requested by the Customer

None.



## 5 RF Exposure Evaluation

### 5.1 RF Exposure Compliance Requirement

#### 5.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

**TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula:  $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

R = distance between observation point and center of the radiator in cm

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

#### 5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.



**4.1.3 EUT RF Exposure Evaluation**

Remark: The Bluetooth and Wifi function can't synchronous transmission at the same time.

**For BLE**

Antenna: 1dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.26 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit	Result
Lowest	2402	14.38	27.42	0.0069	1.0	PASS

Note: Refer to report No. SZEM190501352302 for EUT test Max Conducted Peak Output Power value. The distancer calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

**For 2.4G Wifi**

Antenna: 1.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.41 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit	Result
Lowest	2412	25.85	384.59	0.1079	1.0	PASS

Note: Refer to report No. SZEM190501352303 for EUT test Max Conducted Peak Output Power value. The distancer calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

**exposure conditions for simultaneous transmission operations**

The BLE and the WiFi can simultaneous transmission at the same time.

So, Simultaneous transmission SAR test is not required, because the Max. sum of the MPE ratios is 0.0069+0.1079=0.1148<1.

- End of the Report -

