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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
Test Result :	PASS*

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

中国·深圳·科技园中区M-10栋一号厂房

Keny. Ku

Keny Xu EMC Laboratory Manager



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2 Version

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

Authorized for issue by:		
	Bive chen	
	Bill Chen /Project Engineer	
	Evic Fu	
	Eric Fu /Reviewer	



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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



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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

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None.



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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 ²)	Averaging time (minutes)					
(A) Limits for Occupational/Controlled Exposures									
0.3–3.0 3.0–30 30–300 300–1500 1500–100,000	614 1842/f 61.4	1.63 4.89/f 0.163	*(100) *(900/f²) 1.0 f/300 5	6 6 6 6 6					

(B) Limits for General Population/Uncontrolled Exposure

0.3–1.34 1.34–30	614 824/f	1.63 2.19/f	*(100) *(180/f²)	30 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: $Pd = (Pout^{*}G)/(4^{*} Pi^{*} R^{2})$

Where

Pd = power density in mW/cm2

Pout = 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

Pd id the limit of MPE, 1 mW/cm2. 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.



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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	Max Conducted	Output Power	Power Density	Limit	Result
	(MHz)	Peak Output	to Antenna	at R = 20 cm		
		Power (dBm)	(mW)	(mW/cm2)		
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	Max Conducted	Output Power	Power Density	Limit	Result
	(MHz)	Peak Output	to Antenna	at R = 20 cm		
		Power (dBm)	(mW)	(mW/cm2)		
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 -



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