

RF Exposure Evaluation Report

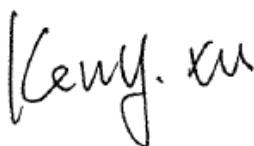
Application No.: SZEM2002000861CR
Applicant: Develco Products
Address of Applicant: Olof Palmes Alle 40, Aarhus N, 8240 Denmark
Manufacturer: Develco Products
Address of Manufacturer: Olof Palmes Alle 40, Aarhus N, 8240 Denmark
Factory: GPV
Address of Factory: 834 Moo 4, Bangpoo Industrial Estate Soi 11, 12, Sukhumvit Road, Praksa, Muang Samutprakarn 10280, Thailand

Equipment Under Test (EUT):

Product Name: Keypad
Model No.: KEPZB-110
Trade mark: Develco Products
FCC ID: ZigBee KeyPad
Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
47 CFR Part 2.1093
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2020-02-18
Date of Test: 2020-02-24 to 2020-03-04
Date of Issue: 2020-04-17

Test Result :	PASS*
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* In the configuration tested, the EUT complied with the standards specified above.



Keny Xu
EMC Laboratory Manager



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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020-04-17		Original

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

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4 General Information

4.1 General Description of EUT

Power Supply:	DC 6.0V by 1.5V x 4"AA" batteries
Operation Frequency:	2405MHz to 2480MHz
Modulation Type:	O-QPSK
Sample Type:	Fixed production
Number of Channels:	16
Channel Spacing:	5MHz
Antenna Type:	PCB Antenna
Antenna Gain:	1.5dBi

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4.2 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

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.3 Test Facility

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

- **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.

4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Other Information Requested by the Customer

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	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				
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

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 is 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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5.1.3 EUT RF Exposure Evaluation

Antenna Gain: 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)	Tune up power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Result
Lowest	2480	12	15.85	0.00445	1.0	PASS

Note: Refer to report No. SZEM200200086101 for EUT test Max tune up power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

- End of the Report -



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