RF Exposure Evaluation Report

Application No.:	SZEM2004002299CR
Applicant:	Echelon Fitness Multimedia LLC
Address of Applicant:	6011 Century Oaks Drive, Chattanoog, Tennessee 37416 United States
Manufacturer:	SHENZHEN KINSTONE D&T DEVELOP CO., LTD
Address of Manufacturer:	5F, A2B, XinJianXing Tech Industrial Park, Fengxin Road, Lou Cun, Gongming Street, Guangming New Dist., Shenzhen, China
Factory:	SHENZHEN KINSTONE D&T DEVELOP CO., LTD
Address of Factory:	5F, A2B, XinJianXing Tech Industrial Park, Fengxin Road, Lou Cun, Gongming Street, Guangming New Dist., Shenzhen, China

Equipment Under Test (EUT):

EUT Name:	ECHELON 21.5 INCH SCREEN
Model No.:	ECHKIN215
Trade Mark:	ECHELON
FCC ID:	2AWD4-KS215A
Standards:	47 CFR PART 1.1310
	47 CFR PART 2.1091
	447498 D01 General RF Exposure Guidance v06
Date of Receipt:	2020-04-08
Date of Test:	2020-04-09 to 2020-06-24
Date of Issue:	2020-06-30
Test Result :	**PASS***

* 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		2020-06-30		Original

Authorized for issue by:				
		Calvin Weng **Calvin Weng /Project Engineer**		
		Eric Fu **Eric Fu /Reviewer**		

3 Contents

4 General Information

4.1 General Description of EUT

Power Supply:		DC12V/5000mA by power adapter
		Adapter input: AC100-240V, 50/60Hz, 1.5A
		Adapter model: JHD-AD065C-120500
Cable:		Power adapter cable: 2m unshielded cable without ferrite core
For BT:		
Bluetooth Version:		5.0
Operation Frequency:		2402MHz to 2480MHz
Spectrum Technology:	Spread	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:		GFSK, π/4DQPSK, 8DPSK
Number of Channels:		79
Channel Spacing:		1MHz
Antenna Type:		Ant1:PIFA antenna
Antenna Gain:		Ant1:1.2dBi
For BLE:		
Operation Frequency:		2402MHz to 2480MHz
Modulation Type:		GFSK
Number of Channels:		40
Channel Spacing:		2MHz
Antenna Type:		Ant1:PIFA antenna
Antenna Gain:		Ant1:1.2dBi
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:		Ant1: PIFA antenna; Ant2: PIFA antenna
Antenna Gain:		Ant1:1.2dBi; Ant2:1.2dBi

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For 5G WIFI
Operation Frequency:

Band	Mode	Frequency Range(MHz)	Number of channels
UNII Band I	IEEE 802.11a/n20/ac	5180-5240	4
	IEEE 802.11n40/ac40	5190-5230	2
	IEEE 802.11ac80	5210	1
UNII Band III	IEEE 802.11a/n20/ac	5745-5825	5
	IEEE 802.11n40/ac40	5755-5795	2
	IEEE 802.11ac80	5775	1

Modulation Type: 802.11a/n: OFDM(BPSK/QPSK/16QAM/64QAM)
802.11ac: OFDM(BPSK/QPSK/16QAM/64QAM/256QAM)

TPC Function: Not support
Antenna Type: Ant1: PIFA antenna; Ant2: PIFA antenna
Antenna Gain: Ant1:1.6dBi; Ant2:1.6dBi
S/N: ECHKS21500000
Software version: Android 9.0
Hardware version: AD-Z33P-V1.0

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

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.

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 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.

4.1.3 EUT RF Exposure Evaluation

For BT:

Antenna Gain: 1.2dBi (ant1)

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.318 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
2441	7.42	5.52	0.0014	1.0	PASS

Note: Refer to report No. SZEM200400229902 for EUT test Max Conducted Peak Output Power value.
The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For BLE:

Antenna Gain: 1.2dBi (ant1)

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.318 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
2440	7.61	5.77	0.0015	1.0	PASS

Note: Refer to report No. SZEM200400229903 for EUT test Max Conducted Peak Output Power value.
The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For 2.4G:

Antenna Gain: ant1:1.2dBi; ant2:1.2dBi (directional gain: 4.21dBi)

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.318(2.636 for directional gain) in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Standard-alone:(ant1)

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
2462	19.6	91.20	0.0239	1.0	PASS

Simultaneous transmission:

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
2437	22.23	167.11	0.0876	1.0	PASS

Note: Refer to report No. SZEM200400229904 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For 5G:

Antenna Gain: ant1:1.6dBi; ant2:1.6dBi (directional gain: 4.61dBi)

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.445(2.891 for directional gain) in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Standard-alone:(ant1 & ant2 is the same)

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
5825	17.47	55.85	0.0161	1.0	PASS

Simultaneous transmission:

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
5825	20.34	108.14	0.0622	1.0	PASS

Note: Refer to report No. SZEM200400229905 for EUT test Max Conducted Output 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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