RF EXPOSURE EVALUATION REPORT

Application No.:	SZCR2405001614AT
Applicant:	Segway Technology Co., Ltd.
Address of Applicant:	No. 395, Xiacheng South Road, Wujin National High-tech Industrial Development Zone, Changzhou, 213100 China
Manufacturer:	Segway Technology Co., Ltd.
Address of Manufacturer:	No. 395, Xiacheng South Road, Wujin National High-tech Industrial Development Zone, Changzhou, 213100 China
Factory:	Shenzhen Omni Intelligent Technology Co., LTD.
Address of Factory:	11th Floor, Building 31, Phase III, Lianchuang Technology Park,Nanwan Street, Longgang District, Shenzhen, Guang Dong, China
Equipment Under Test (EUT):	
EUT Name:	T-BOX
Model No.:	NB-ORBOXC14
Trade Mark:	Segway
FCC ID:	2BGR3-OR0002
Standard(s) :	FCC Rules 47 CFR §2.1091
	KDB 447498 D04 interim General RF Exposure Guidance v01
Date of Receipt:	2024-05-06
Date of Evaluation:	2024-05-14 to 2024-06-05
Date of Issue:	2024-06-08
Evaluation Result:	**Pass***

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

Keny Xu
EMC Laboratory Manager

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2024-06-08		Original

Authorized for issue by:				
		Vincent Chen		
		Vincent Chen/Project Engineer		
		Eric Fu		
		Eric Fu/Reviewer		

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2 Contents

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3 General Information

3.1 General Description of E.U.T.

Product Type:	☐ Portable device
	☒ Mobile device
	☐ Fixed device

3.2 Details of E.U.T.

Power supply:	DC 12V Input
For BLE:	
Cable Loss (for RF conducted test):	0.5dB
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0 LE
Modulation Type:	GFSK
Number of Channels:	40
Data Rate:	1Mbps, 2Mbps
Channel Spacing:	2MHz
Antenna Type:	PCB Antenna
Antenna Gain:	0.58dBi
For 3G:	
Cable Loss (for RF conducted test):	0.7dB(below 1GHz), 1dB(above 1GHz)
Sample Type:	Mobile production
Support Network:	RMC, HSDPA, HSUPA
Operation Frequency Band:	UMTS FDD Band II/V
Modulation Type:	QPSK for WCDMA
Supported Channel Bandwidth:	5MHz for WCDMA
UMTS Power Class:	Level 3
Antenna Type:	PIFA Antenna
Antenna Gain:	WCDMA B2: -1.25dBi; B5: -0.87dBi
For 4G:	
Cable Loss (for RF conducted test):	0.7dB(below 1GHz), 1dB(above 1GHz)
Sample Type:	Mobile production
LTE Operation	LTE FDD Band 2,4,12

Frequency Band:	
Modulation Type:	QPSK, 16QAM
LTE Power Class:	Level 3
Antenna Type:	PIFA Antenna
Antenna Gain:	B2: -1.25dBi, B4: -0.86dBi, B12: -0.72dBi

Remark:The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

3.3 Separation Distance

Minimum test separation distance:	20cm
Remark: This minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander.	

3.4 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, Nanshan District, Shenzhen, Guangdong, China. 518057.

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

No tests were sub-contracted.

3.5 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 (Member No. 1937)

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. Shenzhen EMC laboratory 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: CN1336

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

Designation Number: CN1336. Test Firm Registration Number: 787754.

• 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.

3.6 Deviation from Standards

None

3.7 Abnormalities from Standard Conditions

None

4 RF Exposure Compliance Requirement

4.1.1 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.

4.1.2 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 BLE:

Antenna Gain: 0.58dBi, which is 1.14 in linear scale

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Max Conducted AV Output Power (dBm)	Output Power (mW)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)	MPE ratio	Result
2402	2	1.58	0.0003	1.0000	0.0003	PASS

Remark: Max output power including tune up.

For WCDMA and LTE:

Antenna Gain: WCDMA B2: -1.25dBi, WCDMA B5: -0.87dBi, LTE B2: -1.25dBi, LTE B4: -0.86dBi, LTE B12: -0.72dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is WCDMA B2: 0.75dBi, WCDMA B5: 0.82dBi, LTE B2: 0.75dBi, LTE B4: 0.82dBi, LTE B12: 0.85dBi in linear scale.

Operation Band	Frequency (MHz)	Max Conducted Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)	MPE ratio	Result
WCDMA B2	1852.4	25	316.23	0.0629	1.0000	0.0629	PASS
WCDMA B5	826.4	25	316.23	0.0629	1.0000	0.0629	PASS
LTE B2	1850.7	26	398.11	0.0792	1.0000	0.0792	PASS
LTE B4	1710.7	26	398.11	0.0792	1.0000	0.0792	PASS
LTE B12	699.7	26	398.11	0.0792	0.4665	0.1698	PASS

Remark: Max output power including tune up.

For Maximum Simultaneous Transmission:

Operation mode	MPE ratio	Limit	Result
LTE Band 12+BLE	0.1701	1.0000	PASS

Remark: all the power listed above included tune up tolerance.

5 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal Photos for SZCR2405001614AT

--End of the Report--