SAR Evaluation Report

Application No.:	SZEM1901010079CR
Applicant:	Mattel Asia Pacific Sourcing Limited
Address of Applicant:	13/F., South Tower, World Finance Centre, Harbour City, Tsimshatsui, Kowloon, Hong Kong.
Factory:	Wynnewood Industrial (Heyuan) Co., Ltd.
Address of Factory:	The Cross of Xingye Avenue and Science Technology, No. 8 Road in Hitech Zone, Heyuan City, Guangdong Province
Equipment Under Test (EUT):	
EUT Name:	HWiD PORTAL
Model No.:	HID00
Trade Mark:	Hotwheel
FCC ID:	PIY-HID00-19A5R
Standards:	47 CFR Part 1.1307 47 CFR Part 2.1093 KDB447498D01 General RF Exposure Guidance v06
Date of Receipt:	2019-01-04
Date of Test:	2019-01-15 to 2019-01-16
Date of Issue:	2019-01-25
Test Result :	**PASS***

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

Keny Xu
EMC Laboratory Manager

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2019-01-25		Original

Authorized for issue by:				
		Gebin Sun **Gebin Sun /Project Engineer**		
		Eric Fu **Eric Fu /Reviewer**		

3 Contents

4 General Information

4.1 General Description of EUT

Power Supply:	Rechargeable battery DC3.7V, charged by DC5V
For BLE:	
Operation Frequency	2402MHz to 2480MHz
Bluetooth Version:	BLE V4.2
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing	2MHz
Sample Type:	Portable production
Antenna Type:	Internal
Antenna Gain:	-0.6dBi
For NFC:	
Operation Frequency:	13.56MHz
Modulation Type:	ASK
Number of Channels	1
Antenna Type	Loop Antenna
Antenna Gain:	0dBi

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:

• **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.

4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Other Information Requested by the Customer

None.

5 SAR Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

5.1.2 Limits

Standalone SAR test exclusion considerations

a) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

f(GHz) is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation[17]

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

b) For 100 MHz to 6 GHz and *test separation distances* > 50 mm, the 1-g and 10-g *SAR test exclusion thresholds* are determined by the following (also illustrated in Appendix B):32

1) {[Power allowed at *numeric threshold* for 50 mm in step a)] + [(test separation distance – 50 mm)·(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz

2) {[Power allowed at *numeric threshold* for 50 mm in step a)] + [(test separation distance – 50 mm)·10]} mW, for > 1500 MHz and ≤ 6 GHz

c) For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):33

1) For *test separation distances* > 50 mm and < 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by [1 + log(100/f(MHz))]

2) For *test separation distances* ≤ 50 mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by ½

3) SAR measurement procedures are not established below 100 MHz.

Simultaneous transmission SAR test exclusion considerations
b) When an antenna qualifies for the standalone SAR test exclusion of 4.3.1 and also transmits simultaneously with other antennas, the standalone SAR value must be estimated according to the following to determine the simultaneous transmission SAR test exclusion criteria:36

1) [(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)]·[√f(GHz)/*x*] W/kg, for *test separation distances* ≤ 50 mm;
where *x* = 7.5 for 1-g SAR and *x* = 18.75 for 10-g SAR.
2) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the *test separation distance* is > 50 mm.37

5.1.3 EUT RF Exposure

1) exposure conditions for standalone operations

For BLE

The Max. power (including tune-up tolerance) is 0.05 dBm on the lowest channel 2.402 GHz (*)
0.05 dBm logarithmic terms convert to numeric result is nearly 1.01 mW
According to the formula. calculate the test exclusion thresholds:

$$General\ RF\ Exposure = \frac{(Max.Power\ of\ channel, including\ tune-up\ tolerance, mW) * \sqrt{f\ (GHz)}}{(min.test\ separation\ distance, mm)}$$

$$General\ RF\ Exposure = (1.01\ mW / 5\ mm)\ x\ \sqrt{2.402\ GHz} = 0.31 \quad (1)$$

SAR requirement:

$$S = 3.0 \quad (2)$$

(1) < (2)
So the SAR report is not required.

(*) Max. power refer to Report No.:SZEM190101007901

For NFC

The Max. power (including tune-up tolerance) is -38.98dBm(0.00013mW)(*) (1)
According to the formula. Calculate the test exclusion thresholds:

$$General\ RF\ Exposure = \frac{(Max.\ Power\ of\ channel,\ \ including\ tune-up\ tolerance,\ \ mW) * \sqrt{f\ (GHz)}}{(min.\ test\ separation\ distance, mm)}$$

General RF Exposure=(0.00013mW/5mm) x [√0.01356(GHz)]=0.000003
SAR requirement:
S=474 x [1 + log(100/f(MHz))] x ½=442.65mW (2)
(1)<(2)
So the SAR report is not required.

(*) Refer to Test Report SZEM190101007902 for EUT test Max Conducted Peak Output Power (including tune-up tolerance) value.
E=EIRP-20logD+104.8
EIRP=45.82dBuv/m (Refer to Test Report SZEM190101007902)
D=10m
E=45.82-20log(10)+104.8
E=-38.98dBm

2) exposure conditions for simultaneous transmission operations

According to the formula. Calculate the test exclusion thresholds:

[(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)]·[√f(GHz)/*x*] W/kg, for *test separation distances* ≤ 50 mm;

where x = 7.5 for 1-g SAR

Simultaneous transmission MPE test is not required, because the Max. sum of the MPE ratios for BLE and NFC is 0.31/7.5+0.000003/7.5=0.0413 < 1.6

- End of the Report -