

EMC-TRF-01 Rev 1.0

Report No.: GZCR230200019302 Page: 1 of 11 FCC ID: PIYHPK27-23A5T

# **RF Exposure Report**

Application No.:	GZCR2302000193AT
Applicant:	Mattel Asia Pacific Sourcing Ltd.
Address of Applicant:	11/F., South Tower, World Finance Centre, Harbour City, Tsimshatsui, Kowloon 852, Hong Kong
Manufacturer:	Mattel Asia Pacific Sourcing Ltd.
Address of Manufacturer:	11/F., South Tower, World Finance Centre, Harbour City, Tsimshatsui, Kowloon 852, Hong Kong
Equipment Under Test (EU	Т):
EUT Name:	HOT WHEELS® Monster Trucks HW Transforming Rhinomite RC™
	Vehicle
Model No.:	HPK27
Trade Mark:	Mattel
Standard(s) :	FCC Rules 47 CFR §2.1093
	KDB 447498 D04 interim General RF Exposure Guidance v01
Date of Receipt:	2023-02-10
Date of Test:	2023-02-10 to 2023-03-02
Date of Issue:	2023-03-03
Test Result:	Pass*

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

23 day Lin

Ricky Liu Manager



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Revision Record							
Version	Chapter	Date	Modifier	Remark			
01		2023-03-03		Original			

Authorized for issue by		
Tested By	Curry Wu/Project Engineer	
Reviewed By	Riday Lin	
	Ricky Liu/Reviewer	



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### **3** General Information

### 3.1 General Description of E.U.T.

	☑ Portable device
Product Type:	Mobile device
	Fixed device

### 3.2 Details of E.U.T.

Power supply:	3V DC(1.5V x 2 "AA" Size Batteries)
Operation Frequency:	2420MHz to 2462MHz
Modulation Type:	GFSK
Number of Channels:	43
Channel spacing:	1MHz
Antenna Type:	Integral
Antenna Gain:	0.58dBi

### 3.3 Separation Distance

Minimum test separation distance:	5mm			
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.			



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#### 3.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory, 198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

#### 3.5 Test Facility

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



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#### • NVLAP (Lab Code: 200611-0)

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

#### • ACMA

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

#### • SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

#### • FCC Recognized Accredited Test Firm(Registration No.: 486818)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

#### • ISED (Registration No.: 4620B, CAB identifier: CN0052)

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

#### • VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

#### • CBTL (Lab Code: TL129)

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.



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## 4 FCC Radiofrequency radiation exposure limits

Test exemptions apply for devices used in general population/uncontrolled exposure environments, according to the SAR-based, or MPE-based exemption thresholds.

### 4.1 Blanket 1 mW Blanket Exemption

The 1 mW Blanket Exemption of §1.1307(b)(3)(i)(A) applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance.

The 1-mW blanket exemption applies at separation distances less than 0.5 cm, including where there is no separation. This exemption shall not be used in conjunction with other exemption criteria other than those for multiple RF sources in paragraph §1.1307(b)(3)(ii)(A).

The 1-mW exemption is independent of service type and covers the full range of 100 kHz to 100 GHz, but it shall not be used in conjunction with other exemption criteria or in devices with higher-power transmitters operating in the same time-averaging period. Exposure from such higher-power transmitters would invalidate the underlying assumption that exposure from the lower-power transmitter is the only contributor to SAR in the relevant volume of tissue.

### 4.2 MPE-based Exemption

General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table B.1 [Table 1 of §1.1307(b)(1)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

RF Source Frequency			Minimum Distance			Threshold ERP
<i>f</i> ∟ MHz		<i>f</i> ⊢ MHz	λ∟ / 2π		λ <sub>Η</sub> / 2π	W
0.3	-	1.34	159 m	_	35.6 m	1,920 R <sup>2</sup>
1.34	-	30	35.6 m	_	1.6 m	3,450 R²/f ²
30	-	300	1.6 m	_	159 mm	3.83 R <sup>2</sup>
300	-	1,500	159 mm	_	31.8 mm	0.0128 R <sup>2</sup> f
1,500	1,500 – 100,000 31.8 mm – 0.5 mm 19.2R <sup>2</sup>					
Subscripts L and H are low and high; $\lambda$ is wavelength.						
From §1.1307(	b)(3)(i)(	C), modified by a	dding Minimum D	)istance	e columns.	

Table B.1—Thresholds For Single RF Sources Subject to Routine Environmental Evaluation

The table applies to any RF source (i.e. single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits. These criteria apply at separation distances from any part of the radiating structure of at least  $\lambda/2\pi$ . The thresholds are



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based on the general population MPE limits with a single perfect reflection, outside of the reactive nearfield, and in the main beam of the radiator.

For mobile devices that are not exempt per Table B.1 [Table 1 of \$1.1307(b)(1)(i)(C)] at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in \$1.1310 is necessary if the ERP of the device is greater than *ERP*<sub>20cm</sub> in Formula (B.1) [repeated from \$2.1091(c)(1); also in \$1.1307(b)(1)(i)(B)].

$$P_{\rm th} (\rm mW) = ERP_{20 \,\rm cm} (\rm mW) = \begin{cases} 2040f & 0.3 \,\rm GHz \le f < 1.5 \,\rm GHz \\ \\ 3060 & 1.5 \,\rm GHz \le f \le 6 \,\rm GHz \end{cases}$$
(B.1)

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i.e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of  $\lambda/4$  or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

Limit calculation						
Frequency range Frequency (MHz) $R(N2\pi)$ (m) Threshold ERP(W)						
300~1500MHz	915	0.0522	0.032			
1500~100000MHz	2480	0.0193	0.007			

#### 4.3 SAR-based Exemption

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the applicant may use the available maximum time-averaged power exclusively if the device antenna or radiating structure does not exceed an electrical length of  $\lambda/4$ .

As for devices with antennas of length greater than  $\lambda/4$  where the gain is not well defined, but always less than that of a half-wave dipole (length  $\lambda/2$ ), the available maximum time-averaged power generated by the device may be used in place of the maximum time-averaged ERP, where that value is not known. The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.



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The SAR-based exemption formula of \$1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold  $P_{th}$  (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive).  $P_{\rm th}$  is given by Formula (B.2).

 $P_{\rm th} (\rm mW) = \begin{cases} ERP_{20 \,\rm cm} (d/20 \,\rm cm)^x & d \le 20 \,\rm cm \\ \\ ERP_{20 \,\rm cm} & 20 \,\rm cm < d \le 40 \,\rm cm \end{cases}$ (B.2)

where

$$x = -\log_{10}\left(\frac{60}{ERP_{20}\operatorname{cm}\sqrt{f}}\right)$$

and *f* is in GHz, d is the separation distance (cm), and *ERP*<sub>20cm</sub> is per Formula (B.1).



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Example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)										
Frequency					Distand	ce(mm)				
(MHz)	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

#### Limit calculation Frequency range(GHz) Frequency(GHz) Х Distance(cm) Pth (mW) 0.915 1.474 8.133 0.3~1.5 0.5 2.48 1.905 2.717 1.5~6 0.5



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## 5 Measurement and Calculation

#### 5.1 Maximum transmit power

Test Mode	Test Channel	Maximum Average Field Strength (dBuv/m)	E.I.R.P (dBm)	E.I.R.P (mW)
GFSK	2420MHz	80.34*	-14.82	0.03

(\*) Note:

The Maximum Field Strength is based on the RF Test Report GZCR230200019301.

E=EIRP-20logD+104.7 E=80.34dBuv/m(Refer to test report GZCR230200019301) D=3m EIRP=80.34-(-20log(3)+104.7) EIRP=-14.82dBm(0.05mW)

### 5.2 RF Exposure Calculation

The Max E.I.R.P is 0.03mW.

**Remark**: we used the maximum power between the conducted power and ERP/EIRP to perform RF exposure exemption evaluation.

	Evaluation method	Exempt Limit(mW)	Verdict
	Blanket 1 mW Blanket Exemption	1mW	N/A
	MPE-based Exemption(ERP)	7mW(ERP)	N/A
$\boxtimes$	SAR-based Exemption(Pth)	2.7mW	Yes

So, the device is to qualify for SAR test exemption, the exemption report is in lieu of the SAR report.

--End of the Report--



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No.18% Active Mead, Sciented Park, Gaargabou Economic & Technology Development District, Guargabou, China 510663 t (86-20) 82155555 f (86-20) 82075058 www.sgsgroup.com.cn 中国・广州・经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com