

RF Exposure Evaluation Report

Application No.: SZCR2306002107ET (SGS HK NO.: T32320290053EM)
Applicant: New-Ray Toys Co., Ltd
Address of Applicant: Unit 09-11, 12/F Houston Centre,63 Mody Road, Tsimshatsui East, KLN, H.K.
Equipment Under Test (EUT):
EUT Name: BATTERY OPERATED SERIES - VEHICLES, CARS, TRUCKS, MONSTER TRUCK, TANKS, MOTORCYCLES, ATV, SNOWMOBILE, FIRE ENGINE, BUS, FORKLIFT, CONSTRUCTION, VOLVO, FARM SET, RIFLE, TRAIN, PLANES, CASTLE, AIR CRAFT CARRIER, HELICOPTER, HORSE, RODEO.
Item No.: 87913A
P.O./Ref. No.: Please refer to section 3.2
Country of Origin: CHINA
Labeled Age Grading: 3+
Requested Age Grading: 3+
FCC ID: Q4S-87913A
Standard(s) : FCC Rules 47 CFR §2.1093
KDB 447498 D04 interim General RF Exposure Guidance v01
Date of Receipt: 2023-06-30
Date of Evaluation: 2023-09-09 to 2023-09-13
Date of Issue: 2023-09-15

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		2023-09-15		Original

Authorized for issue by:			
		<i>Martin Tang</i>	
		Martin Tang/Project Engineer	
		<i>Eric Fu</i>	
		Eric Fu/Reviewer	



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2 Contents

	Page
1 Cover Page	1
2 Contents	3
3 General Information	4
3.1 General Description of E.U.T.	4
3.2 Details of E.U.T.	4
3.3 Separation Distance	5
3.4 Test Location	6
3.5 Test Facility	6
3.6 Deviation from Standards	6
3.7 Abnormalities from Standard Conditions	6
4 FCC Radiofrequency radiation exposure limits	7
4.1 Blanket 1 mW Blanket Exemption	7
4.2 MPE-based Exemption	7
4.3 SAR-based Exemption	8
5 Measurement and Calculation	11
5.1 Maximum transmit power	11
5.2 RF Exposure Calculation	11
6 EUT Constructional Details (EUT Photos)	11



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3 General Information

3.1 General Description of E.U.T.

Product Type:	<input checked="" type="checkbox"/> Portable device
	<input type="checkbox"/> Mobile device
	<input type="checkbox"/> Fixed device

3.2 Details of E.U.T.

Power supply:	4.5V DC(1.5V x 3 "AA" Size Batteries) for remote controller
Operation Frequency:	2405MHz-2480MHz
Modulation Type:	GFSK
Number of Channels:	3
Antenna Type:	PCB Antenna
Antenna Gain:	0dBi

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.

Reference No.:

00645C	00655	00664	00664B	00783	00814	00814A	00814B	00814C
00816	00816A	00816B	00816C	00817	00893	01013	01013A	01013B
01013C	01016	01016A	01016B	01016C	01063	01343	01443	01446
01693	01756	01756I	01785	01856	01953	01956	01963	01993
01993I	02003	02053	02056	02063	02066	02073	02076	02083
02083A	02083B	02086	02086A	02086B	02093A	02093B	02093C	02096
02096A	02096B	02096C	02106	02106A	02116	02116A	02126B	02136
02146	02206	02206A	02206B	02206C	02216	02216A	02216B	02216C
02226	02226A	02226B	02233	02243	02246	08023	08103	08303
08313	08323	08443	08463	08503	08503A	08605	08617	08618
08619	08753	08786	08791	08793	08794	08821	08848	08851
08852	08855	08857	08864	08867	08870	08871	010137	010138
010139	20063	20063I	20073	34186	37605	37605A	37605B	37606
37626	61395	61395I	61505	61525	66086	66086A	66096	66096A
66156	66166	SS-66216A	66166A	66176	66176A	66236	66236A	66246
66246A	66246B	76505	76725	76733	76735	85353	87193	87293
87533	87533AST	87533I	87543	87563	87573	87775	87843	87865
87893	87913	87913A	87943	88003A	88213	88215A	88233	88473
88483	88515	88525	88553	88555	88573	88595	88613	88633



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88643	88673	88703	88704	88713	88714	88753	88763	88773
88793	88803	88803A	88813I	88815	88825	88825A	88825B	88853

88853A	88863	88873	88883	88893	88893A	88893B	89826
886771	888131	AS-01756	AS-02106	AS-02206	AS-02216	AS-20063	AS-61395
AS-66086A	AS-88525	AS-88763	AS-88853	SS-00645	SS-00645C	SS-00675B	SS-02106
SS-02106C	SS-02113A	SS-02116A	SS-02173A	SS-02176A	SS-02183A	SS-02186A	SS-02193A
SS-02196A	SS-05116	SS-05126	SS-08513	SS-08605	SS-33033	SS-33043	SS-33053
SS-33123	SS-33133C	SS-33143	SS-33153	SS-33173	SS-33295B	SS-33313	SS-34123
SS-34133	SS-34143	SS-34153	SS-34173	SS-34183	SS-38606	SS-38636	SS-66126A
SS-66126B	SS-66146B	SS-66226	SS-76436	SS-87073	SS-87843A	SS-88233C	SS-88253
SS-88753	SS-88763	SS-88773	/	/	/	/	/

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. 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.

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 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.

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

RF Source Frequency			Minimum Distance			Threshold ERP
f_L MHz		f_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	–	1.34	159 m	–	35.6 m	1,920 R ²
1.34	–	30	35.6 m	–	1.6 m	3,450 R ² /f ²
30	–	300	1.6 m	–	159 mm	3.83 R ²
300	–	1,500	159 mm	–	31.8 mm	0.0128 R ² f
1,500	–	100,000	31.8 mm	–	0.5 mm	19.2R ²

Subscripts L and H are low and high; λ is wavelength.
 From §1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.

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 near-field, 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_{20cm} in Formula (B.1) [repeated from §2.1091(c)(1); also in §1.1307(b)(1)(i)(B)].

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

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($\lambda/2\pi$)(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.



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_{th} is given by Formula (B.2).

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

where

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

and f is in GHz, d is the separation distance (cm), and $ERP_{20\text{cm}}$ 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 (MHz)	Distance(mm)									
	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)	X	Distance(cm)	Pth (mW)
0.3~1.5	0.915	1.474	0.5	8.133
1.5~6	2.48	1.905	0.5	2.717



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5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SZCR230600210702

The Max. power (including tune-up tolerance) is 3.66dBm on the channel 2.405GHz(*)

3.66dBm logarithmic terms convert to numeric result is nearly 2.32mW.

Note: $EIRP = pt \times gt = (Exd)^{2/30}$ (According to ANSI C63.10 Annex G.2).

where

pt is the transmitter output power in watts

gt is the numeric gain of the transmitting antenna (dimensionless)

E is the electric field strength in V/m

d is the measurement distance in meters (m)

$V/m = 10^{(((dBuV/m) - 120) / 20)}$

5.2 RF Exposure Calculation

The Max. power (including tune-up tolerance) is 3.66dBm on the channel 2.405GHz(*)

3.66dBm logarithmic terms convert to numeric result is nearly 2.32mW.

Remark: we used the maximum ERP/EIRP to perform RF exposure exemption evaluation.

	Evaluation method	Exempt Limit(mW)	Verdict
<input type="checkbox"/>	Blanket 1 mW Blanket Exemption	1mW	N/A
<input type="checkbox"/>	MPE-based Exemption(ERP)	7mW(ERP)	N/A
<input checked="" type="checkbox"/>	SAR-based Exemption(P_{th})	2.7mW	Yes

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

6 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal Photos for SZCR2306002107ET.

--End of the Report--

