

Maximum Permissible Exposure Report

For

Apex Toys (Shenzhen)Co., Ltd.

A.Floor 4,A001 Building,Zhi Ji Industrial Park, No.92 KuiChong

Street,LongGang district, Shenzhen, China

FCC ID: 2ADSO-GD-90A

FCC Rule(s): FCC 47CFR Part 1.1310

Product Description: ELF B

Tested Model: GD-90A

Report No.: HCT17JR304E-2

Sample Receipt Date: 2017-10-25

Tested Date: 2017-10-26 to 2017-11-18

Issued Date: 2017-11-20

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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information	
Applicant:	Apex Toys (Shenzhen)Co., Ltd.
Address of applicant:	A.Floor 4,A001 Building,Zhi Ji Industrial Park, No.92 KuiChong Street,LongGang district, Shenzhen, China
Manufacturer:	Apex Toys (Shenzhen)Co., Ltd.
Address of manufacturer:	A.Floor 4,A001 Building,Zhi Ji Industrial Park, No.92 KuiChong Street,LongGang district, Shenzhen, China

General Description of EUT	
Product Name:	ELF B
Trade Name:	APEX
Model No.:	GD-90A
Adding Model(s):	/
Rated Voltage:	3.7V by battery
Power Adapter Model:	/
<i>Note: The test data is gathered from a production sample,provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Frequency Range:	2402-2479MHz
Max Output Power:	0.076dBm
Data Rate:	/
Modulation:	GFSK
Quantity of Channels:	78
Channel Separation:	1MHz
Antenna Type:	Whip antenna
Antenna Gain:	0dBi
Lowest Internal Frequency of EUT:	12MHz

1.2 Test Standards

The objective of the following report is used to demonstrate that EUT operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the relative provisions of FCC 47CFR Part 1.1310

1.4 Human Exposure Assessment Results

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 Exposure				
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
300–1,500			f/300	6
1,500–100,000			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
300–1,500			f/1500	30
1,500–100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

Calculation

$$\text{Given } E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{3770}$$

Where E = Field Strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = 100 * d \text{ (m)}$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \text{Equation 1}$$

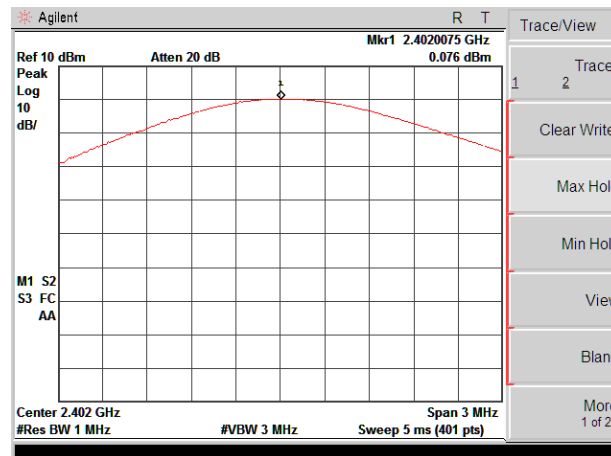
Where d = distance in cm

P = Power in mW

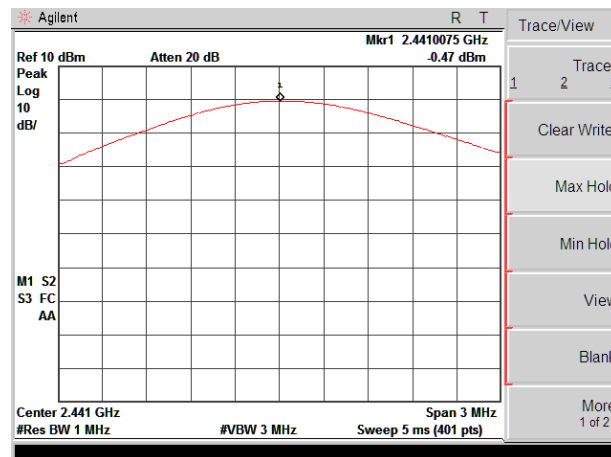
G = Numeric antenna gain

S = Power Density in mW / cm²

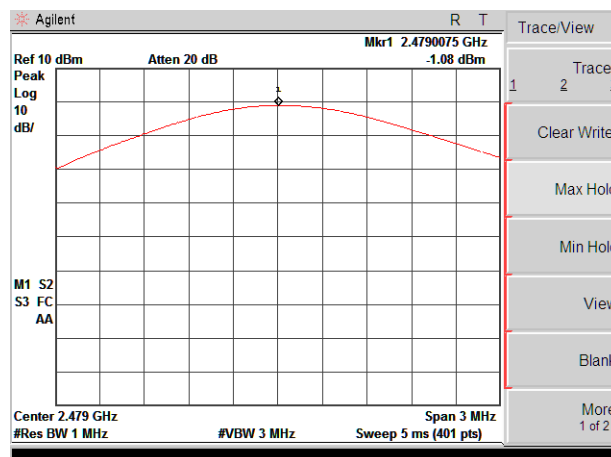
Peak output power: 2402MHz



Peak output power: 2441MHz



Peak output power: 2479MHz



EUT parameter (data from the separate report)	
Given $E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{3770}$	Where G: numerical gain of transmitting antenna; TP: Transmitted power in watt; d: distance from the transmitting antenna in meter
Max average output power in Watt (TP)	0.076dBm (0.001W=1.0mW)
Antenna gain (G)	0dBi (Numeric gain:1.0)
Exposure classification	S=1mW/cm ²
Minimum distance in meter (d) (from transmitting structure to the human body)	20cm (0.2m)
Yields $S = \frac{30 \times P \times G}{3770 d^2}, \quad P=0.001W=1.0mW, G=1.0, d=0.2m=20cm$ $S=0.00020mW/cm^2$	
Conclusion: S=0.00020mW/cm ² is significant lower than the FCC 47CFR Part 1.1310 Limit 1mW/cm ² . (For mobile or fixed location transmitters, the maximum power density is 1.0 mW / cm ² even if the calculation indicates that the power density would be larger.)	