

RF Exposure Evaluation

Product:	360 Rotation Bumper Car (12V) 2 Speed (Kidzone App)
Model no.:	060-ROT-16
FCC ID:	2BBEC060-ROT-16
Rating:	Supplied by 12VDC Li-ion Rechargeable Battery 4.5Ah Charged by 12.0Vdc, 0.5A external adapter
RF Transmission Frequency:	2402MHz-2480MHz for BT 2405MHz-2479MHz for 2.4G Hopping
Modulation:	BT: GFSK, $\pi/4$ -DQPSK, 8DPSK 2.4G Hopping: GFSK
Antenna Type:	PCB Antenna
Max Antenna Gain:	BT: -0.58dBi 2.4G Hopping: 0dBi
Description of the EUT:	The Equipment Under Test (EUT) is a 360 Rotation Bumper Car (12V) 2 Speed (Kidzone App) which support Bluetooth function and 2.4G hopping.
Reference Report	68.940.23.0027.01 68.940.23.0073.01

1. Limit and Guidelines on Exposure to Electromagnetic Fields

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 4.3.2(b) General RF Exposure Guidance v06, Mobile Portable RF Exposure, no SAR required if power is lower than the flowing threshold:

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:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})/x}] \text{ W/kg, for test separation distances } \leq 50 \text{ mm;}$$
where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.

2. Calculation method

For Bluetooth

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})/x}] \text{ W/kg} \leq 0.4$$

Radiated Power + tune up tolerance = 0.164mW

Distance = 5 mm

$f = 2.441 \text{ GHz}$

$$[0.164/5] \cdot \text{SQRT}(2.441/7.5) = 0.05$$

$$0.00682 \leq 0.4$$

For 2.4G Hopping

According to ANSI C63.10-2013 (9.5 Equations to calculate EIRP),

Calculate the EIRP from the radiated field strength in the far field using Equation (22):

$$\text{EIRP} = E_{\text{Meas}} + 20 \log(d_{\text{Meas}}) - 104.7 \quad (22)$$

where

EIRP is the equivalent isotropically radiated power, in dBm
 E_{Meas} is the field strength of the emission at the measurement distance, in dBμV/m
 d_{Meas} is the measurement distance, in m

NOTE—Because this equation yields the identical result whether the field strength is extrapolated using the default 20 dB/decade of distance extrapolation factor, or the field strength is not extrapolated for distance, this equation can generally be applied directly (with no further correction) to determine EIRP. In some cases, a different distance correction factor may be required; see 9.1.

Field Strength (E_{Meas}):	54.75 (dBuV/m) (f=2440MHz)
Measurement Distance(d_{Meas}):	3 (m)
Equivalent Isotropically Radiated Power(EIRP):	-40.41dBm 0.00009 (mW)

Radiated Power + tune up tolerance = 0.00009 mW

Distance = 5 mm

f = 2.44 GHz

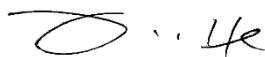
$[0.00009/5] * \text{SQRT}(2.44) / 7.5 = 0.0085$
 $0.000004 \leq 0.4$

Therefore, excluded from SAR testing.

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