

Radio Frequency Exposure Report

On Behalf of

Graupner CO.,Ltd

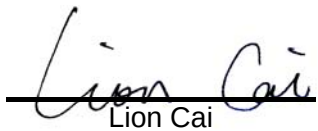
FCC ID: SNL-16005600
Product Description: 2.4GHz Radio Control Receiver
Model No.: GR-4
Supplementary Model: GR-4L

Prepared for: **Graupner CO.,Ltd**
202Dong 8th F,18, Bucheon-ro 198beon-gil, Wonmi-gu, Bucheon-si, Gyeonggi-do, Korea

Prepared by: **Bontek Compliance Testing Laboratory Ltd**
1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China
Tel: 86-755-86337020
Fax: 86-755-86337028

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Tested by:


Lion Cai

Reviewed by:


Owen Yang

Approved by:

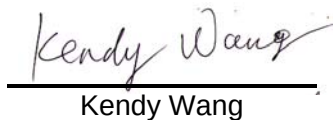

Kendy Wang

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	Graupner CO.,Ltd
Address of Applicant:	202Dong 8 th F,18, Bucheon-ro 198beon-gil, Wonmi-gu, Bucheon-si, Gyeonggi-do, Korea
Manufacturer 1:	SJ Technology(Shenzhen)Co.,Ltd
Address of manufacturer:	F6, 1 Bldg, A Area, Yintianxifa Industrial Area, Xixiang Town, Baoan District Shenzhen, Guangdong Province, China
Manufacturer 2:	Graupner CO.,Ltd
Address of Manufacturer:	202Dong 8 th F,18, Bucheon-ro 198beon-gil, Wonmi-gu, Bucheon-si, Gyeonggi-do, Korea

General Description of E.U.T

Items	Description
EUT Description:	2.4GHz Radio Control Receiver
Model No.:	GR-4
Trade Name:	HoTT
Supplementary Model:	GR-4L
Frequency Band:	2404.056~2479.095MHz
Number of Channels:	70
Type of Modulation:	FHSS
Antenna Gain:	1.5dBi
Antenna Type:	Integral Antenna
Rated Voltage:	Input: DC 3.6V~8.4V, Approx 70mA
Adapter description:	Model: N/A Input: N/A Output: N/A

Remark: * The test data gathered are from the production sample provided by the manufacturer.

* Supplementary models have the same circuit, but with different appearance

1.2 Objective

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 1.1307

1.3 General Description of Test

Items	Description
EUT Frequency band	☒ FHSS: 2.400GHz ~ 2.483GHz ☐ WLAN: 2.400GHz ~ 2.483GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5825GHz ☐ Others: _____
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others _____
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm ²) ☒ General Population/Uncontrolled exposure (S=1mW/cm ²) ☐ Others: _____
Antenna diversity	☒ Single antenna ☐ Multiple antennas: ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Max. output power	19.74dBm (0.0942W)
Antenna gain (Max)	1.5dBi (Numeric gain:1.41)
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation
Note: 1. The maximum output power is 19.74dBm (0.0942W) at 2404.056MHz (with 1.41 numeric antenna gain.) 2. For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20 cm, even if the calculations indicate that the MPE distance would be lesser.	

1.4 Human Exposure Assessment Results

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:

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

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

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)	19.740dBm (0.0942W)
Antenna gain (G)	1.5 dBi (Numeric gain: 1.41)
Exposure classification	S=1mW/cm ²
Minimum distance in meter (d) (from transmitting structure to the human body)	20cm (0.2m)
Yields $S = \frac{30 \times P \times G}{3770d^2}, \quad P=0.0942W, G=1.41, d=0.2$ $S=0.264mW/cm^2$ Or $d = \sqrt{\frac{30 \times P \times G}{3770S}}, \quad S=1, P=0.0155W, G=1.41$ $d=0.0325m$	
Conclusion: S=0.264mW/cm ² is significant lower than the General Population Exposure Power Density Limit 1mW/cm ² or except the distance when human body proximity to the antenna is less than 3.25cm then will reach the General Population Exposure Power Density Limit (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.)	