Radio Frequency Exposure

Graupner GmbH & Co. KG

FCC ID:	**ZKZ-33508**
Product Description:	**Receiver GR-16 HoTT**
Model No.:	**GR-16**
Prepared for:	**Graupner GmbH & Co. KG** Henriettenstr. 94-96 D-73230 Kirchheim Teck,Germany
Prepared by:	**Shenzhen Laker Testing Technology Co.,Ltd** 15C，Block 1,Sunshine Huayi Building,Nanhai West Road, Nanshan, Shenzhen, China Tel: 86-755-27617110 Fax: 86-755-27617110
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Test by: **Reviewed By:**

Owen Li

Edmund Zou

LIMIT

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See FCC part 15.247(i)and §1.1307(b)(1) of this chapter.

EUT Specification

EUT	Receiver GR-16 HoTT
Type of Modulation:	FHSS
Frequency Band:	2404 MHz ~ 2474 MHz
Number of Channels:	70
Channel Bandwidth:	1 MHz
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)*
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☒ Tx/Rx diversity
Max. output power	13.95dBm (24.83mW)
Antenna gain (Max)	1.5 dBi
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation
Note: *1. The maximum output power is 13.95dBm (24.83mW)) at 2439MHz (with 1.5 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.*	

TEST RESULT

No non-compliance noted.

Calculation

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

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 (mW) = P (W) / 1000 and
*d (cm) =100 * d (m)*

Yields

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

Where *d = distance in cm*
P = Power in mW
G = Numeric antenna gain
S = Power Density in mW / cm^2

Maximum Permissible Exposure

EUT Output Power=24.83mW
Numeric antenna gain=1.5
Substituting the MPE safe distance using d=20 cm into ***Equation 1*** :
Yields

$S=0.000199 \times P \times G$

Where *P = Power in mW*
G = Numeric antenna gain
S = Power Density in mW / cm2

The power density S = 0.000199×24.83×1.5=0.0074 mW / cm2

(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.)

Evaluation reslut : ***PASS***