

Radio Frequency Exposure

Graupner GmbH & Co. KG

FCC ID: ZKZ-33505

Product Description: Receiver GR-12S HoTT

Model No.: GR-12S

Prepared for: Graupner GmbH & Co. KG

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Test by:

Reviewed By:



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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-12S HoTT
Type of Modulation:	FHSS
Frequency Band:	2404 MHz ~ 2474 MHz
Number of Channels:	70
Channel Bandwidth:	1 MHz
Device category	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others _____
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure ($S = 5mW/cm^2$) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure ($S = 1mW/cm^2$)
Antenna diversity	<input type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input checked="" type="checkbox"/> Tx/Rx diversity
Max. output power	-2.02dBm (0.628mW)
Antenna gain (Max)	1.5 dBi
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation
Note: 1. The maximum output power is <u>-2.02dBm (0.628mW)</u> at <u>2404MHz</u> (with <u>1.5 numeric antenna gain</u> .) 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

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

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

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

Equation 1

Where d = distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power Density in mW / cm²

Maximum Permissible Exposure

EUT Output Power=0.628mW

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

$$\text{The power density } S = 0.000199 \times 0.628 \times 1.5 = 0.00019 \text{ mW / cm}^2$$

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW / cm² even if the calculation indicates that the power density would be larger.)

Evaluation result : **PASS**