

Radio Frequency Exposure

Graupner GmbH & Co. KG

FCC ID: ZKZ-MX-16-20A

Product Description: Computer System Graupner HoTT

Model No.: mx-16

Supplementary No.: mx-20

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: 86-755-86307736

Fax: 86-755-86307736

Report No.: LK11ER-A0101E-M

Issue Date: September 16, 2011

Test Date: September 05~16, 2011

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 EN62311 and §1.1307(b)(1) of this chapter.

EUT Specification

EUT	Computer System Graupner HoTT
Frequency band (Operating)	<input checked="" type="checkbox"/> FHSS: 2.400GHz ~ 2.483GHz <input type="checkbox"/> WLAN: 2.400GHz ~ 2.483GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz <input type="checkbox"/> Others _____
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	20.45dBm (110.92mW)
Antenna gain (Max)	1 dBi (Numeric gain:1.0dB)
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation
Note: 1. The maximum output power is <u>20.45 dBm (110.921mW)</u> at <u>2404MHz</u> (with <u>1.0 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=110.92mW

Numeric antenna gain=1.0

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 $S = 0.000199 \times 110.92 \times 1.0 \text{ mW / cm}^2 = 0.02207308 \text{ mW / cm}^2$

(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.)

Evaluation result : **PASS**