Radio Frequency Exposure

Graupner GmbH & Co. KG

FCC ID:	**ZKZ-MX-12A**
Product Description:	**Computer System Graupner HoTT**
Model No.:	**mx-12**
Prepared for:	**Graupner GmbH & Co. KG** Henriettenstr. 94-96 D-73230 Kirchheim Teck,Germany
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Test Date:	September 05~16,2011

Test by: **Reviewed By:**

Owen Li

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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 EN62311and §1.1307(b)(1) of this chapter.

EUT Specification

EUT	Computer System Graupner HoTT
Frequency band (Operating)	☒ 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)*
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☒ Tx/Rx diversity
Max. output power	20.20dBm (104.71mW)
Antenna gain (Max)	1 dBi (Numeric gain:1.0dB)
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation

Note:

1. *The maximum output power is 20.20 dBm (104.71mW) at 2404MHz (with 1.0 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=104.71mW
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 / cm^2

The power density S = $0.000199 \times 104.71 \times 1.0$ *mW / cm^2* =0.02083729 *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 reslut : ***PASS***