EN 62479 TEST REPORT

On Behalf of

Cho-Liang Thermal Tech Co.,Ltd

2.4GHz Wireless Optical Mouse

Model No.: CNE-CMSW1X, CAMW-01X

Prepared for	:	Cho-Liang Thermal Tech Co.,Ltd
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Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
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Version Number	:	REV0

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DECLARATION

Applicant : Cho-Liang Thermal Tech Co.,Ltd

Manufacturer : Guangzhou Boda Electronic Equipment Co.,Ltd

Product : 2.4GHz Wireless Optical Mouse

(A) Model No. : CNE-CMSW1X, CAMW-01X

(B) DIFF : All model's the function, software and electric circuit are the same, only the name is different, so all the test were performed on the model CNE-CMSW1X

(C) Trade Name : N/A

(D) Testing supply : DC 3.0V From Battery For Mouse; DC 5V From PC For USB Dongle

Measurement Procedure Used:

EN 62479: 2010

Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. The measurement results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN 62479: 2010 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Alpha Product Testing Co., Ltd..

Tested by (name + signature).....: Store Chu, Test Engineer .....

Approved by (name + signature).....: Simple Guan, Project Manager .....

Date of issue..... .....: May 07,2015

1. General Information

1.1. Description of Device (EUT)

EUT Name	:	2.4GHz Wireless Optical Mouse
Trade Name		N/A
Model No.	:	CNE-CMSW1X, CAMW-01X
DIFF		All model's the function, software and electric circuit are the same, only the appearance is different, so all the test were performed on the model CNE-CMSW1X
Operation frequency	:	CH Low: 2405MHz; CH Middle: 2448MHz; CH High: 2472MHz;
Channel number	:	3
Modulation	:	GFSK
Antenna Type	:	Integral antenna, Maximum Gain: 0dBi
Applicant	:	Cho-Liang Thermal Tech Co.,Ltd
Address	:	5F-3, NO.14, Lane 609, Sec.5, Chung Hsin Rd., San Chung City, Taipei County, Taiwan.R.O.C.
Manufacturer	:	Guangzhou Boda Electronic Equipment Co.,Ltd
Address	:	4 Xiajiyuanyi Road, Xindun Avenue, XinDun Village.Xintang District, GZ, PRC
Sample Type	:	Prototype production

1.2. EN 62479 Standard

EN 62479: 2010: Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)

1.3. Product Function and Intended Use

The submitted sample is transmitter which declared transmitter channel frequency .
2410-2480MHz
The transmitter is powered by DC 3.0V From battery and DC 5.0 From PC .

1.4. Test Lab information

1.4.1 Laboratory Name

Shenzhen Alpha Product Testing Co., Ltd.

1.4.2 Location

Building B, East Area of Nanchang Second Industrial Zone,

Gushu 2nd Road, Bao'anDistrict, Shenzhen 518126,P.R.China

1.4.3 Test facility

August 11, 2014 File on Federal Communication Commission
Registration Number: 203110

July 18, 2014 Certificated by IC
Registration Number: 12135A

2. Limit

2.1. **Basic Restrictions Reference levels**

Council Recommendation 99/519/EC Annex II
Basic restrictions for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	Magnetic flux density (mT)	Current density (Ma/m2) (rms)	Whole body average SAR (W/kg)	Localised SAR (head and trunk) (W/kg)	Localised SAR (limbs) (W/kg)	Power density, S (W/m2)
0Hz	40	-	-	-	-	-
>0-1Hz	-	8	-	-	-	-
1-4Hz	-	8/f	-	-	-	-
4-1000Hz	-	2	-	-	-	-
1000Hz-100kHz	-	f/500	-	-	-	-
100kHz-10MHz	-	f/500	0.08	2	4	-
10MHz-10GHz	-	-	0.08	2	4	-
10-300GHz	-	-	-	-	-	10

Note: (1)f is the frequency in Hz.
(2)The basic restriction on the current density is intended to protect against acute exposure effects on central nervous system tissues in the head and trunk of the body and includes a safety factor. The basic restrictions for ELF fields are based on established adverse effects on the central nervous system. Such acute effects are essentially instantaneous and there is no scientific justification to modify the basic restrictions for exposure of short duration. However, since the basic restriction refers to adverse effects on the central nervous system, this basic restriction may permit higher current densities in body tissues other than the central nervous system under the same exposure conditions.
(3)Because of electrical inhomogeneity of the body, current densities should be averaged over a cross section of 1cm2 perpendicular to the current direction.
(4)For frequencies up to 100 kHz, peak current density values can be obtained by multiplying the rms value by √2(=1.414). For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp)
(5)For frequencies up to 100kHz and for pulsed magnetic fields, the maximum current density associated with the pulses can be calculated from the rise/fall times and the maximum rate of change of magnetic flux density. The induced current density can then be compared with the appropriate basic restriction.
(6)All SAR values are to be averaged over any six-minute period.

(7)Localised SAR averaging mass is any 10g of contiguous tissue; the maximum SAR so obtained should be the value used for the estimation of exposure. These 10g of tissue are intended to be a mass of contiguous tissue with nearly homogeneous electrical properties. In specifying a contiguous mass of tissue, it is recognised that this concept can be used in computational dosimetry but may present difficulties for direct physical measurements. A simple geometry such as cubic tissue mass can be used provided that the calculated dosimetric quantities have conservation values relative to the exposure guidelines.
(8)For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp). Additionally, for pulsed exposures, in the frequency range 0,3 to 10GHz and for localised exposure of the head, in order to limit and avoid auditory effects caused by thermoelastic expansion, an additional basic restriction is recommended. This is that SA should not exceed 2mJ kg-1 averaged over 10g of tissue.

Reference Levels
Council Recommendation 99/519/EC Annex III
Reference levels for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density Seq (W/m2)
0-1Hz	-	3,2×104	4×104	-
1-8Hz	1000	3,2×104/f2	4×104/f2	-
8-25Hz	1000	4000/f	5000/f	-
0.025Hz-0,8kHz	250/f	4/f	5/f6,25	-
0,8-3kHz	250/f	5	6,25	-
3-150kHz	87	5	6,25	-
0,15-1MHz	87	0.73/f	0,92/f	-
1-10MHz	87/f1/2	0.73/f	0,92/f	-
10-400MHz	28	0.073	0,092	2
400-2000MHz	1,375 f1/2	0,0037 f1/2	0,0046f1/2	f/200
2-300GHz	61	0,16	0,20	10

Note: 1)As indicated in the frequency range column.
(2)For frequencies between 100kHz and 10GHz, Seq, E2, H2 and B2 are to be averaged over any six-minute period.
(3)For frequencies exceeding 10GHz, Seq, E2, H2 and B2 are to be averaged over any 68/.1.05-minute period (.in GHz).
(4)No E-field value is provided for frequencies <1Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 20kV/m. Spark discharges causing stress or annoyance should be avoided.

2.2. Limit calculations for radiated electric field strength measurement

For the calculation of the limits, the near field proportionality factor 1/d3 has been used. For ten times the distance, the level is decreased by the cubical, giving 60 dB.

Frequency range	Limit V/m @ 0.3m	Limit V/m @ 3m	Limit (add. span)
30 MHz – 400 MHz	28 V/m (149 dBµV/m)	89 dBµV/m	69 dBµV/m
400 MHz – 2 GHz	27.5 V/m – 61.5 V/m (149 dBµV/m – 155 dB µV/m)	89 dBµV/m	69 dBµV/m
		95 dBµA/m	75 dBµV/m
2 GHz – 300 GHz	61 V/m (155 dBµV/m)	95 dBµV/m	75 dBµV/m

To deal with reflexions, other effects due to the measurement in 3 m distance and to deal with a measurement uncertainty of at least 5 dB, an additional span of 20 dB has been added.

For additional three times the distance, the level is decreased by additional 30 dB.

Frequency range	Limit V/m @ 0.1m	Limit V/m @ 3m	Limit (add. span)
30 MHz – 400MHz	28 V/m (149 dBµV/m)	59 dBµV/m	39 dBµV/m
400 MHz – 2 GHz	27.5 V/m – 61.5 V/m (149 dBµV/m – 155 dBµV/m)	59 dBµV/m	39 dBµV/m
		65 dBµA/m	45 dBµV/m
2 GHz – 300 GHz	61 V/m (155 dBµV/m)	65 dBµV/m	45 dBµV/m

To deal with reflexions, other effects due to the measurement in 3 m distance and to deal with a measurement uncertainty of at least 5 dB, an additional span of 20 dB has been added.

Limits for radiated field according to EN 55022 / CISPR 22 for a class B appliance:

Frequency range	Limit dBµV/m @ 3m Peak	Limit dBµV/m @ 3m QP or Average
30 MHz – 230MHz		40 dBµV/m quasi-peak
230 MHz – 1 GHz		47 dBµV/m quasi-peak
1 GHz – 3 GHz	70 dBµV/m peak	50 dBµV/m average
3 GHz – 6 GHz	74 dBµV/m peak	54 dBµV/m average

Conclusion: If the requirements for radiated emissions according to EN 55022 / CISPR 22 or other standards with the same limits are fulfilled, also the EMF requirements for the measured frequency range are fulfilled

2.3. Limit for Low-power exclusion level (Pmax)

When SAR is the basic restriction, a conservative minimum value for Pmax can be derived, equal to the localized SAR limit (SARmax) multiplied by the averaging mass (m):
Pmax = SARmax m (A.1) Example values of Pmax according to Equation (A.1) are provided in Table A.1 for cases described by the ICNIRP guidelines [1], IEEE Std C95.1-1999 [2] and IEEE Std C95.1-2005 [3] where SAR limits are defined. Other exposure guidelines or standards may be applicable depending on national regulations.

Table A.1 – Example values of SAR-based P_{max} for some cases described by ICNIRP, IEEE Std C95.1-1999 and IEEE Std C95.1-2005

Guideline / Standard	SAR limit, SAR_{max} W/kg	Averaging mass, m g	P_{max} mW	Exposure tier[a]	Region of body[a]
ICNIRP [1]	2	10	20	General public	Head and trunk
	4	10	40	General public	Limbs
	10	10	100	Occupational	Head and trunk
	20	10	200	Occupational	Limbs
IEEE Std C95.1-1999 [2]	1,6	1	1,6	Uncontrolled environment	Head, trunk, arms, legs
	4	10	40	Uncontrolled environment	Hands, wrists, feet and ankles
	8	1	8	Controlled environment	Head, trunk, arms, legs
	20	10	200	Controlled environment	Hands, wrists, feet and ankles
IEEE Std C95.1-2005 [3]	2	10	20	Action level	Body except extremities and pinnae
	4	10	40	Action level	Extremities and pinnae
	10	10	100	Controlled environment	Body except extremities and pinnae
	20	10	200	Controlled environment	Extremities and pinnae

[a] Consult the appropriate standard for more information and definitions of terms.

3. Test Results

Refer to the report T1850408 02 for more details.

3.1. Compliance Criteria*

Result:	Pass

From results of report T1850408 02 can be assumed that the compliance criteria is fulfilled (max. radiated power is less than 20mW). The assumption is made with an uncertainty of 30%.

Frequency (MHz)	Maximum output power(dBm)	Maximum output power(mW)	Limit (mW)	Conclusion
2405MHz (For Mouse)	-10.97dBm	0.080	20	PASS

Frequency (MHz)	Maximum output power(dBm)	Maximum output power(mW)	Limit (mW)	Conclusion
2405MHz (For USB Dongle)	-11.92dBm	0.064	20	PASS

-------END OF THE REPORT--------