ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No.	**: W16NR-D020**
AGR No.	**: A16OA-174**
Applicant	**: CREMOTECH Co., Ltd.**
Address	**: 401 202 Yemiji Bldg, 31, Hwangsaeul-ro 258beon-gil, Bundang-gu, Gyeonggi-do, Seongnam-si, South Korea**
Manufacturer	**: CREMOTECH Co., Ltd.**
Address	**: 401 202 Yemiji Bldg, 31, Hwangsaeul-ro 258beon-gil, Bundang-gu, Gyeonggi-do, Seongnam-si, South Korea**
Type of Equipment	**: Laser Beam Pro**
FCC ID.	**: 2AEQF-CLB2-UHXW**
Model Name	**: CLB2-UHXW**
Serial number	**: N/A**
Total page of Report	**: 9 pages (including this page)**
Date of Incoming	**: October 31, 2016**
Date of issue	**: November 18, 2016**

SUMMARY

The equipment complies with the regulation; ***FCC PART 15 SUBPART E Section 15.407***

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by: Ki-Hong, Nam / Asst, Chief Engineer, ONETECH Corp.

Approved by: Keun-Young, Choi / Vice President, ONETECH Corp.

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
W16NR-D020	November 18, 2016	Initial Issue	All

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1. VERIFICATION OF COMPLIANCE

Applicant	: CREMOTECH Co., Ltd.
Address	: 401 202 Yemiji Bldg, 31, Hwangsaeul-ro 258beon-gil, Bundang-gu, Gyeonggi-do, Seongnam-si, South Korea
Contact Person	: Yoon-Ho, Lee / Director
Telephone No.	: +82-10-8650-954
FCC ID	: 2AEQF-CLB2-UHXW
Model Name	: CLB2-UHXW
Serial Number	: N/A
Date	: November 18, 2016

EQUIPMENT CLASS	Unlicensed National Information infrastructure(UNII)
E.U.T. DESCRIPTION	Laser Beam Pro
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART E Section 15.407
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

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2. GENERAL INFORMATION

2.1 Product Description

The CREMOTECH Co., Ltd., Model CLB2-UHXW (referred to as the EUT in this report) is a Laser Beam Pro. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Laser Beam Pro		
FREQUENCY RANGE	Bluetooth LE	2 402 MHz ~ 2 480 MHz	
	Bluetooth	2 402 MHz ~ 2 480 MHz	
	WLAN 2.4 GHz Band	2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20))	
	WLAN 5 GHz Band	5 150 MHz ~ 5 250 MHz Band	5 180 MHz ~ 5 240 MHz (802.11n(HT20))
		5 725 MHz ~ 5 850 MHz Band	5 745 MHz ~ 5 825 MHz (802.11n(HT20))
MAX. RF OUTPUT POWER	Bluetooth LE	7.62 dBm	
	Bluetooth	1 Mbps	11.62 dBm
		2 Mbps	10.75 dBm
		3 Mbps	11.11 dBm
	WLAN 2.4 GHz Band	Wi-Fi 802.11b (15.39 dBm) Wi-Fi 802.11g (14.75 dBm) Wi-Fi 802.11n_20 MHz (13.86 dBm)	
	WLAN 5 GHz Band	5 150 MHz ~ 5 250 MHz Band	Wi-Fi 802.11a (9.96 dBm) Wi-Fi 802.11n_20 MHz (8.67 dBm)
		5 725 MHz ~ 5 850 MHz Band	Wi-Fi 802.11a (10.02 dBm) Wi-Fi 802.11n_20 MHz (8.70 dBm)
MODULATION TYPE	Bluetooth	GFSK for 1 Mbps, DQPSK for 2 Mbps, 8-DPSK for 3 Mbps	
	Bluetooth LE	GFSK	
	WLAN 2.4 GHz Band	DSSS Modulation(DBPSK/DQPSK/CCK)	
	WLAN 5 GHz Band	OFDM Modulation(BPSK/QPSK/16QAM/64QAM)	
Antenna Gain	Bluetooth Bluetooth LE WLAN 2.4 GHz Band	1.28 dBi	
	WLAN 5 GHz Band	5 150 MHz ~ 5 250 MHz Band	3.59 dBi
		5 725 MHz ~ 5 850 MHz Band	-0.1 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	32.768 kHz, 12 MHz, 24 MHz, 26 MHz		

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2.2 Alternative type(s)/model(s); also covered by this test report.

-. None

3. EUT MODIFICATIONS

-. None

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4. MAXIMUM PERMISSIBLE EXPOSURE

4.1 RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment are f/1500 mW/cm² for the frequency range between 300 MHz and 1 500 MHz and 1.0 mW/cm² for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm² exposure is calculated as follows:

$E = \sqrt{(30 * P * G)} / d$, and $S = E^2 / Z = E^2 / 377$, because 1 mW/cm² = 10 W/m²

Where

S = Power density in mW/cm², Z = Impedance of free space, 377 Ω

E = Electric filed strength in V/m, G = Numeric antenna gain, and d = distance in meter

Combing equations and rearranging the terms to express the distance as a function of the remaining variable

$d = \sqrt{(30 * P * G) / (377 * 10 S)}$

Changing to units of mW and cm, using P (mW) = P (W) / 1 000, d (cm) = 0.01 * d (m)

$d = 0.282 * \sqrt{(P * G) / S}$

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in mW/cm²

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4.2 EUT Description

<table>
<tr><td>Kind of EUT</td><td colspan="3">Laser Beam Pro</td></tr>
<tr><td>Operating Frequency Band</td><td colspan="3">☐ Wireless Microphone: 494.000 MHz ~ 501.000 MHz
and 498.200 MHz ~ 505.200 MHz
■ WLAN: 2 412 MHz ~ 2 462 MHz
■ WLAN: 5 180 MHz ~ 5 240 MHz
■ WLAN: 5 745 MHz ~ 5 825 MHz
■ Bluetooth: 2 402 MHz ~ 2 480 MHz
■ Bluetooth BLE: 2 402 MHz ~ 2 480 MHz</td></tr>
<tr><td rowspan="7">MAX. RF OUTPUT POWER</td><td>Bluetooth LE</td><td colspan="2">7.62 dBm</td></tr>
<tr><td rowspan="3">Bluetooth</td><td>1 Mbps</td><td>11.62 dBm</td></tr>
<tr><td>2 Mbps</td><td>10.75 dBm</td></tr>
<tr><td>3 Mbps</td><td>11.11 dBm</td></tr>
<tr><td>WLAN 2.4 GHz Band</td><td colspan="2">Wi-Fi 802.11b (15.39 dBm)
Wi-Fi 802.11g (14.75 dBm)
Wi-Fi 802.11n_20 MHz (13.86 dBm)</td></tr>
<tr><td rowspan="2">WLAN 5 GHz Band</td><td>5 150 MHz ~
5 250 MHz Band</td><td>Wi-Fi 802.11a (9.96 dBm)
Wi-Fi 802.11n_20 MHz (8.67 dBm)</td></tr>
<tr><td>5 725 MHz ~
5 850 MHz Band</td><td>Wi-Fi 802.11a (10.02 dBm)
Wi-Fi 802.11n_20 MHz (8.70 dBm)</td></tr>
<tr><td rowspan="3">Antenna Gain</td><td>Bluetooth
Bluetooth LE
WLAN 2.4 GHz Band</td><td colspan="2">1.28 dBi</td></tr>
<tr><td rowspan="2">WLAN 5 GHz Band</td><td>5 150 MHz ~
5 250 MHz Band</td><td>3.59 dBi</td></tr>
<tr><td>5 725 MHz ~
5 850 MHz Band</td><td>-0.1 dBi</td></tr>
<tr><td>Exposure
Evaluation Applied</td><td colspan="3">■ MPE
☐ SAR
☐ N/A</td></tr>
</table>

* 2.4 GHz & 5 GHz can not transmit at the same time

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4.3 Calculated MPE Safe Distance

4.3.1 Test data

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance	Max tune up power		Antenna Gain		Power Density (mW/cm²) @ 20 cm Separation	Limit (mW/cm²)
		(dBm)	(dBm)	(mW)	Log	Linear		
5 150	802.11a	9.5 ± 0.5	10.0	10.0	3.59	2.29	0.0045	1.00
~ 5 250	802.11n_ HT20	8.5 ± 0.5	9.0	7.94			0.0036	1.00
5 725	802.11a	10.0 ± 0.5	10.5	11.22	-0.1	0.98	0.0022	1.00
~ 5 825	802.11n_ HT20	8.5 ± 0.5	9.0	7.94			0.0015	1.00

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