

Radio Frequency Exposure Report

On Behalf of

YOKOMO LTD.

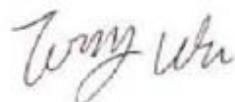
5-23-7, AYASE, ADACHI-KU, TOKYO, 120-0005, JAPAN

Product Name:	2.4GHz WiFi module
Model/Type No.:	BL-WM, RP-WM
FCC ID:	2AL04-BLWM
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TABLE OF CONTENTS

1 - GENERAL INFORMATION	3
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
1.2 OBJECTIVE	4
1.3 GENERAL DESCRIPTION OF TEST	4
1.4 HUMAN EXPOSURE ASSESSMENT RESULTS	5



1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	YOKOMO LTD.
Address of Applicant:	5-23-7, AYASE, ADACHI-KU, TOKYO, 120-0005, JAPAN
Manufacturer 1:	SJ Technology(Shenzhen)Co.,Ltd
Address of manufacturer:	F6, 1 Bldg, A Area, Yintianxifa Industrial Area, Xixiang Town, Baoan District Shenzhen, Guangdong Province, China

General Description of E.U.T

Items	Description
EUT Description:	2.4GHz WiFi module
Model No.:	BL-WM
Supplementary Model:	RP-WM
Frequency Band:	IEEE 802.11b : 2412MHz~2462MHz; IEEE 802.11g : 2412MHz~2462MHz; IEEE 802.11n HT20 : 2412MHz~2462MHz;
Channel Spacing:	IEEE 802.11b : 5MHz IEEE 802.11g : 5MHz IEEE 802.11n HT20 : 5MHz
Number of Channels:	IEEE 802.11b : 11 Channels; IEEE 802.11g : 11 Channels; IEEE 802.11n HT20 : 11 Channels;
Transmit Data Rate:	maximum of 150Mbps
Type of Modulation:	IEEE 802.11b: CCK IEEE 802.11g: OFDM IEEE 802.11n HT20: OFDM
Hardware:	P876-010
Firmware :	V1.020
Antenna Type:	$\lambda/4$ MONOPOLE ANTENNA
Antenna Gain:	-5dBi
Power Rating:	DC 5V-7.4V

Remark: * The test data gathered are from the production sample provided by the manufacturer.
 *Supplementary models have the same circuit, only the appearance and name are different.

1.2 Objective

The objective of the following report is used to demonstrate that EUT operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the relative provisions of FCC 47CFR Part 1.1307

1.3 General Description of Test

Items	Description
EUT Frequency band	<input type="checkbox"/> FHSS: 2.400GHz ~ 2.483GHz <input checked="" 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 ~ 5825GHz <input type="checkbox"/> Others: _____
Device category	<input type="checkbox"/> Portable (<20cm separation) <input type="checkbox"/> Mobile (>20cm separation) <input checked="" type="checkbox"/> Others _____ Stationary type (>20cm separation)
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure ($S = 5\text{mW/cm}^2$) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure ($S=1\text{mW/cm}^2$) <input type="checkbox"/> Others: _____
Antenna diversity	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas: <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
Max. output power	10.96dBm (0.012W)
Antenna gain (Max)	-5dBi (Numeric gain:0.32)
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

Note:

1. The maximum output power is 10.96dBm at IEEE 802.11N HT20 mode 2437MHz (with 0.32 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.

1.4 Human Exposure Assessment Results

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:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = 100 * d \text{ (m)}$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \text{Equation 1}$$

Where d = distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power Density in mW/cm²

EUT parameter (data from the separate report)	
Given	Where G: numerical gain of transmitting antenna; TP: Transmitted power in watt; d: distance from the transmitting antenna in meter
$E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$	
Max average output power in Watt (TP)	10.96dBm (0.012W)
Antenna gain (G)	-5dBi (Numeric gain:0.32)
Exposure classification	$S=1\text{mW/cm}^2$
Minimum distance in meter (d) (from transmitting structure to the human body)	20cm (0.2m)

Yields

$$S = \frac{30xPxG}{3770d^2}, \quad P=0.012W, G=0.32, d=0.2$$

$$S=0.007\text{mW/cm}^2$$

Or

$$d = \sqrt{\frac{30xPxG}{3770S}}, \quad S=1, P=0.012W, G=0.32$$

$$d=0.006\text{m}$$

Conclusion:

$S=0.007\text{mW/cm}^2$ is significant lower than the General Population Exposure Power Density Limit 1mW/cm^2 or except the distance when human body proximity to the antenna is less than 0.6 cm then will reach the General Population Exposure Power Density Limit

(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.)

