1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information

Applicant:	Shenzhen Water World Co., Ltd.
Address of applicant:	No. 602, Block B, Digital Building, Garden City, No. 1079, Nanhai Road, Shekou Subdistrict, Nanshan District, Shenzhen
Manufacturer:	Shenzhen Water World Co., Ltd.
Address of manufacturer:	No. 602, Block B, Digital Building, Garden City, No. 1079, Nanhai Road, Shekou Subdistrict, Nanshan District, Shenzhen

General Description of EUT:

Product Name:	2.4GHz+BT Wireless LAN Module
Trade Name	/
Model No.:	RE743
Adding Model(s):	/
Rated Voltage:	DC3.3V
FCC ID:	2AYCN-RE743
Equipment Type:	Mobile or Fixed

Technical Characteristics of EUT:

Wi-Fi

Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 802.11b/g/n(HT20) 2422-2452MHz for 802.11n(HT40)
RF Output Power:	18.32dBm (Conducted)
Type of Modulation:	DBPSK,BPSK,DQPSK,QPSK,16QAM,64QAM
Quantity of Channels:	11 for 802.11b/g/n(HT20); 7 for 802.11n(HT40)
Channel Separation:	5MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	1dBi

Bluetooth

Bluetooth Version:	V5.0 (BLE mode)
Frequency Range:	2402-2480MHz
RF Output Power:	1.03dBm (Conducted)
Data Rate:	1Mbps
Modulation:	GFSK
Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	PCB Antenna

Antenna Gain: 1dBi

1.2 Standard Applicable

According to §1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

(a) Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density

1.3 MPE Calculation Method

$S = (30*P*G) / (377*R^2)$

S = power density (in appropriate units, e.g., mw/cm^2)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

1.4 MPE Calculation Result

For Wi-Fi:
Maximum Tune-Up output power: 19.0 (dBm)
Maximum peak output power at antenna input terminal: 79.43 (mW)
Prediction distance: >20(cm)
Prediction frequency: 2437 (MHz)
Antenna gain: 1 (dBi)
Directional gain (numeric gain): 1.26
The worst case is power density at prediction frequency at 20cm: 0.0199 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

For Bluetooth:
Maximum Tune-Up output power: 2.0 (dBm)
Maximum peak output power at antenna input terminal: 1.58 (mW)
Prediction distance: >20(cm)
Prediction frequency: 2402(MHz)
Antenna gain: 1 (dBi)
Directional gain (numeric gain): 1.26
The worst case is power density at prediction frequency at 20cm: 0.0004 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

WIFI and BT is the use the same antenna cannot simultaneous transmission;

Result: Pass