RF Exposure Statement

Product description

Test item	: Communication Robot (WLAN 11b/g)
Applicant	: Yukai Engineering Inc.
Address	: 101 Musashiya-Sky bldg., 16-11, Tomihisa-cho, Shinjuku, Tokyo 162-0067, Japan
Model	: YE-RB002G
FCC ID	: 2AFXT-RB002-W
Operating frequency range	: 2412 - 2462 MHz
TX output power	: 23.35 dBm
Maximum Antenna Gain	: +2.31 dBi
Family model	: YE-RB002T (The color of case is different.)
Simultaneous Transmitter	: BROADCOM BLUETOOTH MODULE
Model	: BCM20737S
FCC ID	: 2AFXT-RB002-B
Operating frequency range	: 2402 - 2480 MHz
TX output power	: 2.6 dBm
Maximum Antenna Gain	: -1.5 dBi

Maximum Permissible Exposure

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.
The criteria of "General Population/ Uncontrolled Exposure" listed in the below table shall be used to evaluated the environmental impact of human exposure to radio-frequency radiation as specified in 1.1307(b), except in the case of portable devices which shall be evaluated according to the previsions of 2.1093.

(A) Limits for Occupational/Controlled Exposure

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	$*900/f^2$	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 (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
0.3-1.34	614	1.63	*100	30
1.34-30	842/f	2.19/f	$*180/f^2$	30
30-300	61.4	0.073	0.2	30
300-1500	-	-	f/500	30
1500-100000	-	-	1.0	30

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

MPE Calculation method

$$\mathbf{Pd} = \frac{\boldsymbol{P \times G}}{\boldsymbol{4\pi \times d^2}}$$

Pd = Power Density [mW/cm^2]
P = RF output power [mW]
G = EUT antenna gain (numeric)
d = Separation distance between EUT and human body [cm]

From the data of test report, the RF power density can be obtained.

Calculated result

Exposure Environment : General Population / Uncontrolled Exposure
Model : YE-RB002G (WLAN 11b/g)
FCC ID : 2AFXT-RB002-W
Operating frequency range : 2412 - 2462 MHz

RF output power		EUT antenna gain		Distance	Power Density	Limit	Result
[dBm]	[mW]	[dBi]	(numeric)	[cm]	[mW/cm^2]	[mW/cm^2]	
23.35	216.27	2.31	1.70	20	0.073143	1.0	Complied

Exposure Environment : General Population / Uncontrolled Exposure
Model : BCM20737S (Bluetooth)
FCC ID : 2AFXT-RB002-B
Operating frequency range : 2402 - 2480 MHz

RF output power		EUT antenna gain		Distance	Power Density	Limit	Result
[dBm]	[mW]	[dBi]	(numeric)	[cm]	[mW/cm^2]	[mW/cm^2]	
2.60	1.82	-1.50	0.71	20	0.000257	1.0	Complied

Both of YE-RB002G (WLAN 11b/g) and BCM20737S (Bluetooth) can transmit simultaneously, the formula of calculated the MPE is:

$$\mathrm{CPD1/LPD1} + \mathrm{CPD2/LPD2} + \cdots < 1$$

CPD = Calculated Power Density
LPD = Limit of Power Density

Therefore, the worst-case situation is 0.073143/1 + 0.000257/1 = 0.0734 < 1.

This confirmed that this device comply with FCC 1.1310 MPE limit.