

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 evaluate 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 provisions 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

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

Pd = Power Density [mW/cm²]

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 [cm]	Power Density [mW/cm ²]	Limit [mW/cm ²]	Result
[dBm]	[mW]	[dBi]	(numeric)				
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 [cm]	Power Density [mW/cm ²]	Limit [mW/cm ²]	Result
[dBm]	[mW]	[dBi]	(numeric)				
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:

$$CPD1/LPD1 + CPD2/LPD2 + \dots < 1$$

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.