

RF EXPOSURE CALCULATIONS FOR ANTENNA OF WIRELESS LAN CARD,  
ERA-201D1

From FCC1.1310 table 1A, the maximum permissible RF exposure for an uncontrolled environment is  $1\text{mW}/(\text{cm}^2)$ , where,  $(\text{cm}^2) = \text{square cm}$ .

The electric field generated for a  $1\text{mW}/(\text{cm}^2)$  exposure (S) is calculated as follows:

$$S = E^2/Z$$

where, S = Power density

E = Electric field

Z = Impedance

$$E^2 = S \times Z$$

$$1\text{mW}/(\text{cm}^2) = 10 \text{ W}/(\text{m}^2)$$

Z is 377 ohms of the impedance of free space, where E and H field are perpendicular.

Thus the Electric field to produce a  $1\text{mW}/(\text{cm}^2)$  exposure is :

$$E = \sqrt{10 \times 377} = 61.4 \text{ V/m} , \text{ which is equivalent to } 1 \text{ mW}/(\text{cm}^2).$$

Maximum conducted peak output power is 18.1dBm (refer to page A11 of test report 21AE0018YW-1) . The maximum radiated output power resulted in 64.6 mW.

Using the relationship between electric field E, effective radiated power in watts P, and distance in meters D, the corresponding distance D to produce a  $1\text{mW}/(\text{cm}^2)$  is calculated in the following expression:

$$D = \sqrt{(P \times 30) / E^2} = \sqrt{(64.6 \times 10^{-3} \times 30) / 61.4^2} = 0.023 \text{ m} = 2.3\text{cm}$$

Where, P : maximum effective conducted power measured, 18.1dBm (= 64.6 mW)

E : electric field equivalent to  $1 \text{ mW}/(\text{cm}^2)$ , 61.4 V/m

**Notice to Users in Installation Manual:**

AIBO with this wireless LAN card is required to operate with a separation distance of 20 cm or more from persons in order to comply with FCC RF exposure requirements.

