



March 21, 2011

Compliance Testing
Ste-107, 3356 N San Marcos Pl
Chandler, AZ 85225
United States

The purpose of this letter is to confirm the value of the RFID antenna gain for Industry Canada certification purposes. As per the document on antenna gain calculations you sent, we have determined the gain as described below. The radiation resistance, R_r , (in Ω) is given by:

$$R_r = 31171 \times \left(\frac{A^2}{\lambda^4} \right) = \frac{31171 \cdot (83.8 \cdot 83.8 \times 10^{-6} \cdot 3)^2}{22.11^4} = 5.79 \times 10^{-5}$$

where A is the loop area (in m^2), and λ is the wavelength (in m). The loss resistance of the antenna, R_l , is given by:

$$R_l = 2.4$$

The antenna efficiency is given by:

$$\eta = \frac{R_r}{R_l} = \frac{5.79 \times 10^{-5}}{2.4} = 2.41 \times 10^{-5}$$

Finally, the antenna gain is calculated by:

$$\text{Antenna Gain} = 10 \cdot \log(\eta) = 10 \cdot \log(2.41 \times 10^{-5}) = -46 \text{ dB}$$

If you have questions or wish to clarify any part of this antenna gain calculation, you can contact me via email or telephone.

Sincerely,

Jeffrey Wishart, Ph.D.
Project Engineer
jwishart@ecotality.com
602-345-9023