Technical Note

Subject: **FCC Submission - Telecell RF Radiation Exposure Levels**

Date: 18 May 2010   Document ref: LLT167 01

1   Summary

This document outlines RF radiation exposure level calculations for the NEMA and Conduit Telecells. Levels are specified as a power density.

Limits are those defined in FCC *§ 1.1310   Radio frequency radiation exposure limits*.

In summary, the RF radiation exposure levels at a distance of 20 cm are below the specified FCC limits.

2   FCC § 1.1310 Limits

2.1   Limits for Occupational/Controlled Exposures

This is appropriate for the Telecells since they are deployed by trained personnel and fixed to the top of streetlight luminaires.

Limit:

$$PD_{\lim} = \frac{f}{300} \ \text{mW/cm}^2, \text{ where } f \text{ is the frequency in MHz.}$$

At the minimum frequency of 910.5 MHz, the limit is 3.03 mW/cm^2.

3   RF Radiated Exposure Calculations

3.1   Power Density Expression

The power density, *PD*, at a range *R* from the transmitter with an effective isotropic radiated power *EIRP*, is given by:

$$PD = \frac{EIRP}{4\pi R^2}.$$

To calculate the closest range at which the power density reaches the FCC limits, the following expression is used.

$$R = \sqrt{\frac{EIRP}{4\pi PD_{\lim}}}.$$

3.1.1   Power Density at 20 cm

A worst case EIRP of 100 mW is assumed for the Telecell. At 20 cm, the power density is 0.02 mW/cm^2, which is below the FCC limit of 3.03 mW/cm^2. This is based on a duty cycle of 100%. However, during normal operation, the transmit duty cycle will typically be less than 1% when averaged over a 30 minute period which will mean that in practice the averaged power density will be closer to 0.0002mW/ cm^2.

QP4016 07- Tech Note Template

3.1.2   Minimum safe distance

Assuming a worst case EIRP of 100mW and a duty cycle of 1%, the power density meets the FCC limit at a distance of 0.16 cm.