

Technical Note

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

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1 Summary

This document outlines RF radiation exposure level calculations for the Telecell products. 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 General Population/Uncontrolled Exposures

Telecells are deployed by trained personnel and fixed to the top of streetlight luminaires. However, the devices are used within the vicinity of the public so the limit from table 1(B) applies:

Limit:

$$PD_{\text{lim}} = \frac{f}{1500} \text{ mW/cm}^2, \text{ where } f \text{ is the frequency in MHz.}$$

At the minimum frequency of 910.5 MHz, the limit is 0.61 mW/cm².

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.

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

3.1.1 Power Density at 20 cm

A worst case EIRP of 100 mW is assumed for the Telecell. This is made on the basis that the maximum conducted power is +18dBm, and the specified antenna has a specified gain of 2dBi, giving an EIRP of 100mW.

At 20 cm, the power density is 0.02 mW/cm², which is below the FCC limit of 0.61 mW/cm². 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 $0.0002\text{mW}/\text{cm}^2$.

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 0.36 cm.