SAR Calculations for Bluelight

Bluelight Maximum Transmit Power(Pt) = +8 dBm

Bluelight Max Antenna Gain (Gt) = +5.5 dBi

Bluelight EIRPmax = Pt + Gt = 13.5 dBm = 22.4 mW

The worst case transmit duty cycle for a data only Bluetooth device would be transmission of DH5 packets in a piconet with one other user. This is shown as the bottom row in Figure 2.2 below.

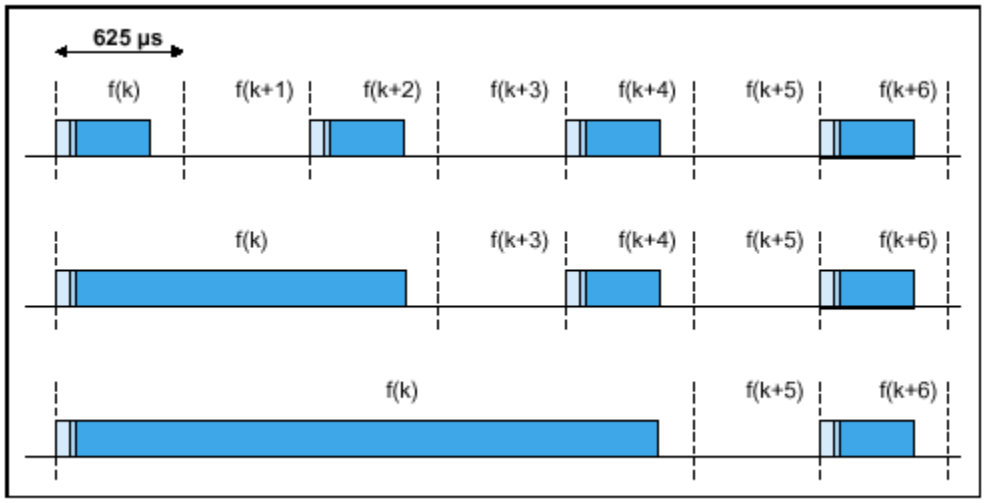

Figure 2.2: Multi-slot packets

For DH5 packets the transmitter transmits across five 625 microsecond slots minus a guard band of 259 microseconds. The transmission is followed by a 625 microsecond receive slot. The transmission duty cycle (Tdc) for this case can be calculated as:

$$Tdc = \frac{(625 * 5) - 259}{625 * 6}$$

Tdc = 76%

The average power for DH5 packets would be:

EIRPmax X .76 = 17.0 mW = +12.3 dBm

Using the equation for an estimate of distance from the antenna from OET Bulletin 65:

$$R = (EIRP/4\pi S)^{1/2}$$

Where,

R= distance to the center of radiation of the antenna in cm
S = power density in mW/cm^2 (1 mW/cm^2 used for Bluelight)
EIRP = effective isotropically radiated power in mW (17 for Bluelight)

R = 1.16 cm

Therefore the 1 mW/cm2 requirement is not exceeded unless the body is less than 1.16 cm from the Bluelight antenna. In normal operation of Bluelight, the body will be more than 20 cm from the antenna.