Federal Communication Commission
Authorization and Evaluation Division
7435 Oakland Mills Road
Columbia, MD 21046

Attention: Reviewing Engineer

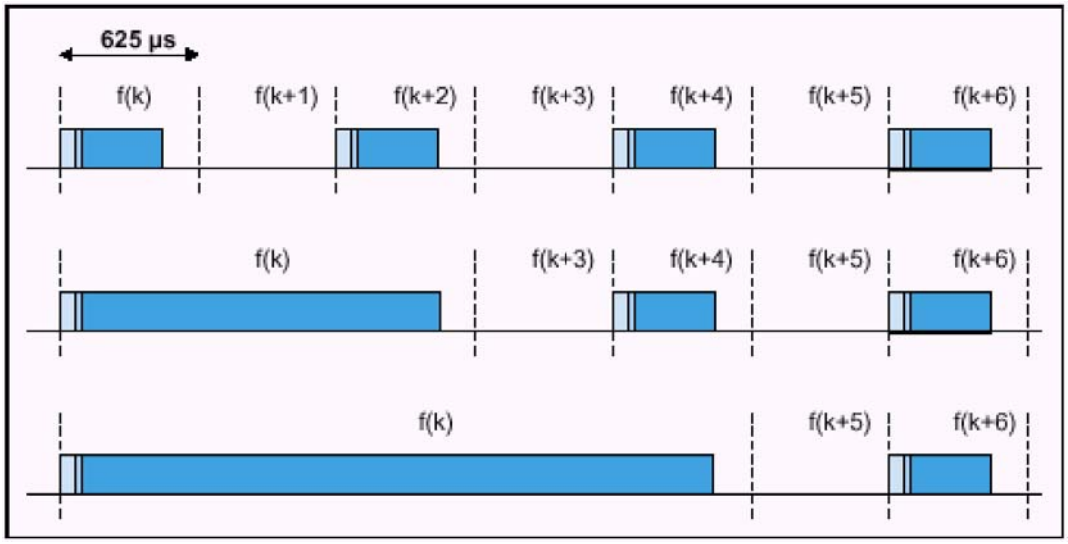
RF exposure information

The BaracodaPencil is a portable device with a built-in Bluetooth radio module using spread spectrum technique.

Due to the construction of the BaracodaPencil and the position of the internal antenna (it's placed on the centre of the device) a distance under normal operating conditions of more than 1cm can be expected. Due to the low power of the device (less than 2.5 mW) the MPE limits can be guaranteed as the calculation below shows:

EIRPmax = 4 dBm = 2.5 mW

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



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 0.76 = 1.9 mW = +2.79 dBm

Using the equation from OET Bulletin 65 to estimate the distance from the antenna:

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

Where,

R = distance to the centre of radiation of the antenna in cm
S = power density in mW/cm2 (1 mW/cm2 used for BaracodaPencil)
EIRP = effective isotropically radiated power in mW (2.5 for BaracodaPencil)

R = 0.39 cm

Therefore the 1 mW/cm2 requirement is not exceeded unless the body is less than 0.39 cm from the BaracodaPencil antenna.

In normal operation of BaracodaPencil, and due the construction characteristics of the equipment (antenna is centred inside of a plastic enclosure of more than 2 cm of diameter), the body will be more than 1 cm from the antenna. So that, the BaracodaPencil meets the MPE limits.