

DTC Communications, Inc.
75 Northeastern Blvd.
Nashua, NH 03062
www.dtccom.com

**RF Exposure Information for:
Letter Beacon LB1
H25LB1**

When installed as directed, this equipment complies with the FCC radiation exposure limits set forth for an uncontrolled environment. This equipment must be installed and operated with the antennas specified or similar antennas, at a minimum of 6 cm of separation distance between the antenna and any person's body during normal operation.

The LB1 device is a credit card sized package beacon, which is not body-worn. This device uses an internal antenna. Typically the device is remotely located and is intended for temporary unattended use in law enforcement operations under Part-90. The unit operates between 150 and 174 MHz with low transmission duty cycles and has an output power of less than 0.05 Watts. This device is battery operated and has a limited life of no more than several days.

FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b). These limits are based on IEEE/ANSI C95.1-1992 and OET65 97-01.

Table 1
Maximum Permissible Exposure (MPE) Limits

Frequency Range (MHz)	Controlled Exposure (6-Minute Average)			Uncontrolled Exposure (30-Minute Average)		
	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)
0.3-3.0	614	1.63	(100)*			
3.0-30	1842/f	4.89/f	(900/f ²)*			
0.3-1.34				614	1.63	(100)*
1.34-30				824/f	2.19/f	(180/f ²)*
30-300	61.4	0.163	1.0	27.5	0.073	0.2
300-1500	—	—	f/300	—	—	f/1500
1,500-100,000	—	—	5	—	—	1.0

f = frequency, in MHz.

* = Plane-wave equivalent power. (This means the equivalent far-field strength that would have the E- or H-field component calculated or measured. It does not apply well in the near field of an antenna.)

— = Not specified.

In the 150-170 MHz band for uncontrolled environments (a repeater under police radio service control) E-field limits and H-field limits are the same according the table, that is, 0.2 mW/cm²

The internal loop antenna type is not a high efficiency radiator, nevertheless, the gain of this antenna will be assumed to be similar to a dipole antenna for this evaluation. Consider a narrow

band “dipole-like” gain of 2.1 dBiC. Duty Factor will not be considered in this calculation, but it would be expected that the safe distance would be further reduced.

Calculations can be made to predict RF field strength and power density levels around typical RF sources. In the case of the repeater with a single radiating “dipole-like” antenna, a prediction of the power density in the far-field can be made by the use of the general equation:

$$S = \frac{PG}{4 \cdot r^2}$$

Where: S = Power Density in mW/cm²
 P= power input to the antenna in mW
 G = Power Gain of Antenna dBiC
 r = Distance to the center of radiation of the antenna (cm)

PG is also known as EIRP or equivalent (or effective) isotropically radiated power

Peak Beacon Power = 0.05 Watts or 50 mW
 Antenna Gain = 2.1 dBiC = 1.6 Numeric

Solving for a minimum safety (keep-away) distance:

$$r = \sqrt{PG/4TS} = \sqrt{EIRP/4TS}$$

$$r = \sqrt{(50 \times 1.6)/(4 \cdot \pi(0.2))} = 5.64 \text{ cm}$$

So the minimum safe distance is approximately 6 cm.

Therefore, the localized specific absorption rate (SAR) limits as specified in ANSI/IEEE Std. C95.1-1992 are not exceeded when the device is used as described in the Users Manual. The Users Manual contains a warning and instructions on limiting RF exposure by instructing the user to install the unit so as to insure a minimum distance of 6cm from the antenna to the general public.


 Michael J. Murphy
 RF/Video Applications