RF Human Exposure Analysis

Users may be concerned with the power levels achieved using booster amplifiers in-line with the handset, cradle and automobile antenna.

Global standards organizations (including the FCC) have dictated that the maximum mean power flux density exposure level in the 30 MHz to 300 GHz frequency range shall not be above 10 W/m^2 or 1 mW/cm^2.

The far field on-axis power flux density (W/m^2) is calculated using the following formula:

$$S = G\, P_T\, /\, 4\pi R^2,$$

Where:

G	=	Numerical gain of the antenna
P_T	=	Power delivered to the antenna in watts
R	=	Distance from the antenna in meters

The following table shows the maximum output power of the booster amplifier combined with an antenna with 5dBd gain. This is the maximum antenna gain permissible as documented in the user/installation manual. The resulting radiated power density is compared to MPE limits for both uncontrolled and controlled environments.

Output power of the amplifier:	2W maximum (1.3W +/-0.3W specified by manufacturer)	
Antenna Gain: Maximum antenna gain allowed as described in user/installation manual.	5dBd	
Operational Frequency:	824-849MHz	
Minimum distance (Controlled): From radiating source for personnel aware of radiofrequency equipment and who are able to limit their exposure time. (Installation Technicians)	0.5m Antenna mounted on vehicle exterior	
Minimum distance (Uncontrolled): From radiating source for personnel unaware of radiofrequency equipment and who are not able to limit their exposure time. (General Public)	0.5m Antenna mounted on vehicle exterior	
Estimated RF Power Density:	$0.33mW/cm^2$	
Maximum Permissible Exposure (MPE):	**Controlled** 6 min avg exposure $2.75mW/cm^2$	**Uncontrolled** 30 min avg exposure $0.55mW/cm^2$
Complies with MPE Limits	**Yes**	**Yes**

Table 1. MPE Calculations

5-55 Henlow Bay, Winnipeg, Manitoba R3Y 1G4
Phone: 204-489-3200   Fax: 204-489-8300