

## RF EXPOSURE STATEMENT

### Carborne Transmitters

Pursuant to Section 15.247(a)(5), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. *See* § 1.1307(b)(1). Fixed stations operating under Section 15.247 of Part 15 of the FCC Rules are categorically excluded from making such studies or preparing and EA.

Individual installations of the equipment that will be operated as described in this application filing will use high gain (6 dBi or greater) antenna(s) permanently mounted on subway cars in areas not normally accessible or near passengers.

However, it is recognized that the Commission may have some concern and wish to have a showing of the separation distance needed to insure compliance. Maximum EIRP from any system configuration is less than 36 dBm. Using 36 dBm (4 watts) as the maximum power from the unit and calculating the separation distance required to meet the MPE limit specified in table 1 of Section 1.1310 of 1 mW/cm<sup>2</sup> for uncontrolled exposure yields the following results:

$$P_{\text{den}} = 4/4\pi R^2; \quad P_{\text{den}} = 0.318 / R^2; \quad \text{calculating: } R^2 = 20 \text{ cm}; \quad P_{\text{den}} = .8 \text{ mW/cm}^2$$

The duty cycle of the carborne transmitters is 8% according to the transmission protocol. Correcting the above by the duty cycle gives 0.064 mW/cm<sup>2</sup>, well below the 1 mW/cm<sup>2</sup> specification for safety in an uncontrolled environment.

The antennas will be mounted in an area of the subway car that is not accessible to the general population and the uncontrolled exposure requirement is always met as a result of the installation arrangement. The separation distance will always be more than 20 cm. Further, the beam pattern from the antennas and the mounting arrangement will direct the radiated energy in such a manner that it will have a low elevation angle which will provide additional protection for the general population.

During antenna maintenance operations, RF power systems should be turned off that feed power to the antennas. Performing the same calculation as above except substituting the MPE limit for general/uncontrolled exposure, the separation distance required for compliance is 18 cm. Adjusting for duty cycle the separation distance becomes 13 cm in this case. Because assurances for maintaining 20 cm separation cannot be given, SAR tests were conducted on the antenna used with the carborne units. These tests showed that in a touching condition the SAR limits for uncontrolled environment were met. The following statement will be added to the user/installation manual for the wayside transmitters:

" CAUTION: Before performing any maintenance on the antennas or other radio frequency components of this transmitter you are instructed to turn the RF transmitter off. You should avoid performing any system maintenance while the RF transmitter is in operation. This unit has been tested and found to comply with applicable FCC limits for SAR level compliance based on uncontrolled environments when in contact with the antenna cover. "