



October 22, 1999

SAR Test Report for Motorola the 800 MHz mobile cellular phone (FCC ID IHDT5ZX1).

Prepared by:

Paul Moller, Principal Staff Engineer

Motorola Personal Communications Sector Product Safety Laboratory

Libertyville, Illinois

The Motorola Personal Communications Sector Product Safety Laboratory has evaluated the 800 MHz mobile cellular phone, FCC ID IHDT5ZX1, for the need to conduct SAR evaluation. Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because Motorola neither manufactures or supplies the antenna(s) that will be used in the installation of this product. Therefore, this product will be evaluated as a mobile device per 47 CFR §1.1310 titled 'Radiofrequency radiation exposure limits', generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as "a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons." The 800 MHz mobile cellular phone is intended to be installed into a vehicle such that the unit is physically secured at one location. In the installation guide supplied with the product, Motorola has made the following statement: **IMPORTANT:** To meet the FCC's RF Exposure Guidelines, the antenna should be installed so there is at least 30 cm of separation between the body of the user and nearby persons and the antenna". Based on the installation of the transceiver and the antenna, the transmitters radiating structure is more than 30 centimeters from the user. Thus, the 800 MHz mobile cellular phone is a "mobile device" as defined in section § 2.1091 paragraph (b).

Table 1 (B) of 47 CFR §1.1310 lists the limits for MPE for the General Population. Since the mobile cellular phone operates in the 800 MHz cellular band, the listed limit of $f/1500$ applies. The lowest transmit frequency for this product is 824.04 MHz, resulting in a lowest MPE of 0.549 mW/cm^2 . Since Motorola neither manufactures or supplies the antenna(s) that will be used in the installation of this product, it is not possible to measure the MPE of the actual device as it is installed per the installation manual. Therefore a calculation of MPE will be described in the next paragraph.

The MPE of a radiating structure can be calculated by knowing the transmit EIRP and the distance at which MPE is being calculated. In this case MPE will be calculated at 30 cm, which is the minimum separation between the body of the user and nearby persons and the antenna. The maximum transmit power for the 800 MHz mobile cellular phone is 3.8 Watts. When installed using a combined cable loss and antenna gain of a maximum of 1.2 dBi, the maximum EIRP will be 5.0 Watts. The model used for calculating power density in OET Bulletin 65, Edition 97-01, is the spherical model. Using this spherical model, 0.549 mW/cm^2 is achieved at a distance of 27cm from the antenna. Therefore, by requiring the user and nearby persons to remain at least 30cm from the antenna, the MPE is not exceeded.

A picture of the 800 MHz mobile cellular phone is shown in figure 1 below.



Figure 1, Side View.