TECOM AMPS CELLEMENTRY RADIO MODULE:

Fcc does not normally issue grants for equipment authorizations of cellular modules when their final configuration is not controlled. If the unit will be used as a portable device or changes in the antenna are made this could affect the MPE and will require SAR compliance. FCC will like to know what will be the products final end use and indicate what controls will be applied to this device. FCC also requests that an appropriate warning label be place on the unit for the user and bystanders knowledge.

1. If this unit will be used as a portable device an additional test will be required, which is called SAR measurements (SPECIIFC ABSORPTION RATE). The measurements are determined by the amount of heat the human body will absorb due to the portables transmitter power output.

2. If the unit is use only as a mobile device then no SAR measurements are required, but MPE measurements will apply to this unit. Following is an alternate measurement method that Fcc will accept, this method does not require special equipment and the applicant can use this calculation to provide the information needed for this requirement. All that is need is:

   A) The antenna gain (in numeric ratio) that will be used with the device. (If more than one antenna is going to be used with the unit than calculations for all antenna has to be done.)
   B) The transmitters maximum power output.

Alternate Measurement Method:

Since the unit transmits in the 800MHz range the following limit applies.

F(MHz)	**(POWER DENSITY (mW/cm^2)**
300 – 1500	f / 1500

For this calculation used the middle frequency 835MHz (any frequency within the TX unit can be used). Used a 2dBi antenna (2 numeric ratio) and a TX maximum power output of .55 watts.

Calculation:

835 / 1500 = .556 mW/cm^2

$P = E^2 / 3770$ (power density formula)

$E^2 = .556 mW/cm^2 * 3770$ (converted to calculate field strength)

E = 45.78 V/m

$$E = \frac{\sqrt{30 * P * G}}{D}$$

E= Field strength in V/m
P = TX maximum power output in Watts.
G= Antenna in Numeric gain that will be used with TX unit
D= Distance in Meters

For mobile devices Fcc request that applicant provide the minimum distance for compliance.

$$D = \frac{\sqrt{30 * .55 * 2}}{45.78 \text{ V/m}}$$

D = .125m or 12.5cm this is the minimum distance for compliance.

3. Please describe in detail what will be the end use of this device what controls will be applied to the device.

4. According to Section 2.1091 (d)(3); A label should be place on the unit to help maintain it in compliance with the exposure guidelines for the mobile device and inform the user or bystander of the minimum separation distance from the transmitters structures and proper installation of antennas.

The following wording can be made in the user manual:

While operating this device, radio frequency radiation exposure limits (47 CFR 1.1310) may be exceeded at distances closer than 20 centimeters (8 inches) from the device antenna (s).

The following wording can be made in the label that will be place on the unit.

Please maintain a minimum separation distance of ____ cm from the transmitter antenna (s). This will help assure continue compliance with FCC exposure limits (47 CFR 1.310).