

1.1 Indoor RF Safety Measurements

In order to determine compliance with accepted standards at the TSC, RF safety measurements were taken at the beginning of the testing. The following description provides the results of this activity.

The maximum permissible exposure limit for RF radiation, as recommended by ANSI, and adopted by Boeing, is that the power density shall not exceed 1 mw/cm^2 (one milliwatt per square centimeter) for an exposure time of 6 minutes. To determine max power density limits for longer exposure time, reference is made to Fig 5.0-3 of document titled " RF Power Density Measurements At The TSC Facility For Certification Of A Radiation Hazard Free Environment " dated 7-19-02.

To verify that no radiation hazard exists for personnel working in the area during evaluation testing of Eagle's repeater system, two different measurement methods were used. They are an indirect measurement, and a direct measurement.

a) Indirect Method:

For the indirect measurement method, the power into the ceiling down-link Tx antenna (this is the antenna that radiates RF energy into the area in question) was measured with a spectrum analyzer, and was found to be about 0 dBm or 1 milliwatt of burst peak power. The ceiling antenna is a hemispherical omni antenna with a typical nominal gain of 0 dBic. This equates to an effective aperture of about 0.0032 square meters at the Iridium frequency band of 1616 to 1626.5 MHz. Using these parameters the calculation for power density indicates a value of 0.03125 mw/cm^2 at the antenna far field distance of 0.035 meters. The power density then decreases at the rate of 6 db / octave of distance. The conclusion arrived at from this measurement is that the power density level is well below the recommended max exposure limits as set forth by the ANSI standard.

b) Direct Method:

The direct method for power density measurement utilizes the Narda Measurement System Equipment. This equipment consists of a Model: 495 hand held meter, along with a Model-95 Hand held RF probe, which have been calibrated by a certified standards lab. The most sensitive full scale reading of the meter is 1 mw/cm^2 , with three major divisions and 20 minor divisions equal to 0.05 mw/cm^2 . When the probe was held approximately 1 meter from the ceiling antenna the meter indicated a reading of less than 1 minor division, or 0.05 mw/cm^2 . Again the conclusion arrived at from this measurement is that the power density level is well below the recommended maximum exposure limits as set forth by the ANSI standards.

Since the power density levels obtained from the two measurement methods are comparable in value it can be stated with a high level of confidence that personnel working in the immediate area of the radiating antenna are not being (or have not been) exposed to hazardous RF radiation levels, even when working there for several hours at a time. However it should be noted that according to OSHA rules, all personnel in an RF controlled area must be made aware of the possible health risk associated with the RF radiation they are being exposed to.