**Appendix G:** **MPE Calculation**

2.1091 Radio frequency radiation exposure evaluation: mobile devices.

For purposes of these requirements mobile devices are defined by the FCC as transmitters 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 centimetres is normally maintained between radiating structures and the body of the user or nearby persons. These devices are normally evaluated for exposure potential with relation to the MPE limits. As the 20cm separation specified under FCC rules may not be achievable under normal operation of the EUT, an RF exposure calculation is needed to show the minimum distance required to be less than 0.208mW/cm$^2$ power density limit, as required under FCC rules.

**Prediction of MPE limit at a given distance**

Equation from page 19 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2} \text{ or } \frac{EIRP}{4\pi R^2} \quad \text{re - arranged} \quad R = \sqrt{\frac{P\ G}{S\ 4\pi}} \text{ or } \sqrt{\frac{EIRP}{S\ 4\pi}}$$

where:

S = power density (Limit) (in appropriate units, e.g. mW/cm$^2$)
EIRP = equivalent (or effective) isotropically radiated power (mW)
R = distance to the center of radiation of the antenna (cm)
P = power input to the antenna (mW)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
(***numeric*** gain. = $G = 10^{\frac{dB}{10}}$

Result

| Prediction Frequency (MHz) | FIELD ST'GH (dBµV/m) @ 3m | Maximum EIRP (dBm) | Maximum EIRP (mW) | Power density limit f/1500 (S) (mW/cm$^2$) | Distance (R) cm required to be less than 0.208 mW/cm$^2$ |
|---|---|---|---|---|---|
| 312 | 73.3 | -21.96 | 0.006371512 | 0.208 | 0.049372447 |

Note: As Per ANSI C63.10-2009 Clause 7.8.2

$$P_{(EIRP)} = \frac{(Ed)^2}{30\ G}$$

Where P is the power, in W
E is the measured peak field strength, in V/m
d is the distance at which the measurement was made, in m
G is the numeric gain of the radiating element. (if G is unknown, then G=1.64 when calculating the ERP and G=1 when calculating the EIRP)