3.10 MPE calculation

These equations are generally accurate in the far field of an antenna but will over predict power density in the near field, where they could be used for making a “worst case” prediction.

$$S = PG/4\pi R^2$$

where S = power density (in appropriate units, e.g. mW/cm^2)
P = power input to the antenna (in appropriate units e.g. mW)
G = power gain of the antenna in the direction of interest relative to the isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units e.g. cm)

Or

$$S = EIRP/4\pi R^2$$

where EIRP = equivalent isotropically radiated power

Calculation: (Antenna 1)

(Calculated for max. EIRP)

EIRP: 28.0 dBm = 631.0 mW

calculated at distance of 20 cm:

power density = $631.0 /4\pi 20^2$ = 0.126 mW/ cm^2

Calculation: (Antenna 2)

EIRP: 28.3 dBm = 676.1 mW

power density = $676.1/4\pi 20^2$ = 0.135 mW/ cm^2

Limit:

$1mW/ cm^2$ is the reference level for general public exposure according to the OET Bulletin 65, Edition 97-01 Table 1.

RF EXPOSURE INFO for high gain antenna

Environmental evaluation measurements of Maximum Permissible Exposure (MPE) to radio frequency (RF) radiation from transmitting devices for compliance with the technical rules and regulations of the U.S. Federal Communications Commission and Industry Canada.

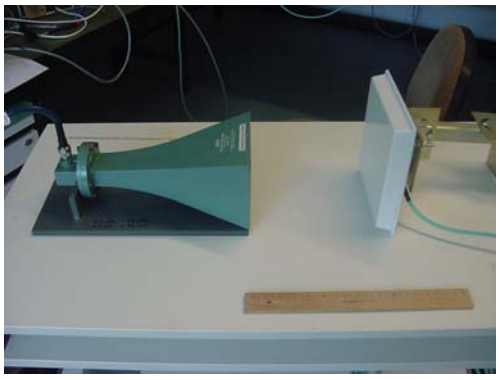
Description of EUT

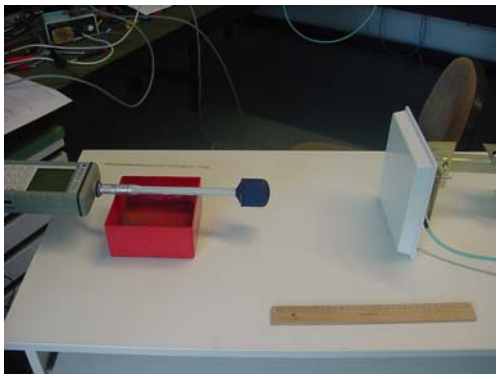
Siemens AG Model: wireless Client with antenna type ANT793-8DR including 3m coax cable.

1) The probe was positioned on a table at a separation distance of 20 cm from the radiating antenna and at a starting height of 5 cm to the center of the probe.
2) The table was positioned so that the initial start angle was 0 degrees.
3) The EUT was powered on and allowed sufficient time to stabilize. The EUT was operated at full power on a desired frequency.
4) The analyzer and the field probe was set for maximum hold, and set on the appropriate power range.
5) The table was rotated 360 degrees and the maximum reading was obtained for that elevation.
6) The antennas were lifted and lowered at maximum value in the horizontal plane to find the maximum in vertical position.

Result:
The max measured MPE value on a distance of 20 cm is: **0.44 mW/cm^2** by measurement with the analyzer
0.42 mW/cm^2 by measurement with the field probe

MPE System Specification:
- Electromagnetic Radiation Field probe, PMM Model 8053
  Frequency Range: 1 MHz to 40 GHz
  Calibration date: 05/2005
- Signal analyzer FSIQ26 from R&S
  Frequency range: 10 Hz to 26.5 GHz
  Calibration date: 07/2004





Limit:

1mW/ cm^2 is the reference level for general public exposure according to the OET Bulletin 65, Edition 97-01 Table 1.

3.21 MPE Calculation

These equations are generally accurate in the far field of an antenna but will over predict power density in the near field, where they could be used for making a "worst case" prediction.

$$S = PG/4\pi R^2$$

where S = power density (in appropriate units, e.g. mW/cm^2)
P = power input to the antenna (in appropriate units e.g. mW)
G = power gain of the antenna in the direction of interest relative to the isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units e.g. cm)

Or

$$S = EIRP/4\pi R^2$$

where EIRP = equivalent isotropically radiated power

Calculation: (Antenna 1)

(Calculated for max. EIRP)

EIRP: 28.3 dBm = 676.1 mW

calculated at distance of 20 cm:

power density = $676.1 /4\pi 20^2 = 0.135$ mW/ cm^2

Calculation: (Antenna 2)

EIRP: 28.6 dBm = 724.4 mW

power density = $724.4/4\pi 20^2 = 0.144$ mW/ cm^2

Limit:

1mW/ cm^2 is the reference level for general public exposure according to the OET Bulletin 65, Edition 97-01 Table 1.