

**FCC ID:**

**QWY-ATM-R-132**

**Prediction of MPE limit at given distance**

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

where: S = Power density  
P = Power input to the antenna  
G = Antenna gain  
R = Distance to the center of radiation of the antenna

Technologies:

| Technologies: | Max. Power: (AVG) | Max. Gain: | Min. Pathloss: |
|---------------|-------------------|------------|----------------|
| 2G GSM850     | 34 dBm            | -2.0 dBi   | 2.8 dB         |
| 2G PCS1900    | 31 dBm            | +0.8 dBi   | 5.0 dB         |
| 3G Band V     | 25 dBm            | -2.0 dBi   | 2.8 dB         |
| LTE 5         | 25 dBm            | -2.0 dBi   | 2.8 dB         |
| LTE 7         | 25 dBm            | +1.3 dBi   | 5.2 dB         |

**MPE results for FCC:**

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled "Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure"

| Frequency Range (MHz) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minutes) |
|-----------------------|-------------------------------------|--------------------------|
| 300 -1500             | f/1500                              | 30                       |
| 1500 - 100000         | 1.0                                 | 30                       |

where f = Frequency (MHz)

Prediction: worst case

|   |                                     | < 1500 MHz                           | > 1500 MHz                    |
|---|-------------------------------------|--------------------------------------|-------------------------------|
|   |                                     | WWAN                                 | WWAN                          |
| P | Max power input to the antenna      | 31.2 dBm                             | 26.0 dBm                      |
| R | Distance                            | 20 cm                                | 20 cm                         |
| G | Antenna gain                        | -2.0 dBi                             | -2.4 dBi                      |
| S | MPE limit for uncontrolled exposure | 0.56 mW/cm <sup>2</sup> (worst case) | 1 mW/cm <sup>2</sup>          |
|   | <b>Calculated Power density:</b>    | <b>0.17 mW/cm<sup>2</sup></b>        | <b>0.10 mW/cm<sup>2</sup></b> |

**This prediction demonstrates the following:**

The power density levels for FCC at a distance of 20 cm are below the maximum levels allowed by regulations.



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