

MPE Calculation for FCC Uncontrolled Environment

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



$$S = \frac{PG}{4\pi R^2}$$

where: S = power density
 P = power input to the antenna
 G = power gain of the antenna in the direction of interest relative to an isotropic radiator
 R = distance to the center of radiation of the antenna

Source Based Time Averaged Duty Cycle is 100% in calculation below
 All Power values are Average Power

| | | Cellular Technology | | | | | | | | | | |
|--|-------|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Mobile Technology: | 2G | 3G | | | 4G | | | | | | | |
| Mobile Band: | B02 | B02 | B04 | B02 | B04 | B10 | B13 | B14 | B25 | B30 | B66 | B71 |
| Prediction frequency (MHz): | 1950 | 1950 | 2130 | 1950 | 2130 | 2150 | 750 | 760 | 1950 | 2350 | 2140 | 635 |
| Maximum peak output power (dBm): | 42.00 | 42.00 | 43.00 | 41.00 | 41.00 | 43.00 | 38.00 | 30.00 | 42.00 | 27.00 | 42.00 | 42.00 |
| Maximum peak output (W): | 15.85 | 15.85 | 19.95 | 12.59 | 12.59 | 19.95 | 6.31 | 1.00 | 15.85 | 0.50 | 15.85 | 15.85 |
| Prediction distance (cm): | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| MPE limit at prediction frequency (W/m ²): | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 5.00 | 5.07 | 10.00 | 10.00 | 10.00 | 4.23 |
| Power density at prediction frequency (W/m ²): | 1.261 | 1.261 | 1.588 | 1.002 | 1.002 | 1.588 | 0.502 | 0.080 | 1.261 | 0.040 | 1.261 | 1.261 |
| Ratio of Compliance (PD/MPE Limit) | 0.13 | 0.13 | 0.16 | 0.10 | 0.10 | 0.16 | 0.10 | 0.02 | 0.13 | 0.00 | 0.13 | 0.30 |

| | | WiFi Module 1 | | | | WiFi Module 2 | |
|--|----------|---|-------|-------|----------|--------------------------------------|--|
| | | FCC ID: PD98265NG | | | | FCC ID: RYK-WUBR508N | |
| | | Ref Intel Test Report No 160321-01.TR05 | | | | REF MRT Test Report No 2005RSU029-U3 | |
| | WiFi 2.4 | WiFi 5G | BT | BLE | WiFi 2.4 | WiFi 5G | |
| Prediction frequency (MHz): | 2400 | 5500 | 2400 | 2400 | 2400 | 5500 | |
| Maximum output power (dBm): | 20.30 | 20.30 | 10.40 | 3.61 | 19.00 | 18.50 | |
| Maximum output power (W): | 0.11 | 0.107 | 0.011 | 0.002 | 0.079 | 0.071 | |
| Prediction distance (cm): | 20 | 20 | 20 | 20 | 20 | 20 | |
| MPE limit at prediction frequency (W/m ²): | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | |
| Power density at prediction frequency (W/m ²): | 0.213 | 0.213 | 0.022 | 0.005 | 0.158 | 0.141 | |
| Ratio of Compliance (PD/MPE Limit) | 0.021 | 0.021 | 0.002 | 0.000 | 0.016 | 0.014 | |

Worst Case:

LTE B71: 0.298
 Module 1 WiFi 2.4 or 5 GHz: 0.021
 Module 2 WiFi 2.4 GHz: 0.016
Total Ratio of Compliance: 0.335

Calculation assumes antenna is kept at least 100 cm away from any persons
 Calculation assumes antenna is kept at least 20 cm away from any persons

Requirement: Total Ratio of Compliance must be Less than 1

Verdict: Pass