

MPE Calculation For Symbol Photon Wireless LAN

A 5GHz Spread Spectrum device has a measured output power of 83.75mW with a worst-case antenna gain of 3.7dBi. The equipment can operate in the bands listed in the table below. The equipment is proposed as meeting the OET65 requirements for use at 20cm.

The wavelength of the equipment is:

$$\frac{3 \times 10^8}{5180 \times 10^6} = 0.058\text{m}$$

Thus, the far field region is defined as being:

$$\frac{\lambda}{2\pi} = \frac{0.058}{6.283} = 0.009\text{m or } 9\text{mm}$$

Therefore, the formula below is applicable as any distance greater than 9mm is in the far field. Thus, predicting the worst case RF Power Density at 20cm from the antenna would be:

$$S = \frac{P \times G}{4\pi R^2} = \frac{83.75 \times 2.34}{12.57 \times 20^2} = 0.039\text{mW/cm}^2$$

where:

- P = power measured in mW
- G = antenna gain as numeric gain, (2.34 numeric / 3.7dBi)
- R = distance in cm

MPE for Occupational/Controlled Exposure from 5150 to 5825MHz is 5mW/cm²

MPE for General Population/Uncontrolled Exposure from 5150 to 5825MHz is 1mW/cm²

Therefore, the unit under test has a power density, which is less than both the General Population and Occupational exposure limits. This is the case for the equipment under test in all conditions of operation. The tables below show the Power Density result for each channel and antenna configuration.

| Frequency (MHz) | Measured Conducted Power (mW) | Antenna Gain | | Power Density (mW/cm ²) |
|-----------------|-------------------------------|--------------|---------|-------------------------------------|
| | | dBi | Numeric | |
| 5180 | 49.20 | 3.7 | 2.34 | 0.023 |
| 5180 | 49.20 | 2 | 1.58 | 0.015 |
| 5240 | 49.55 | 3.7 | 2.34 | 0.023 |
| 5240 | 49.55 | 2 | 1.58 | 0.016 |
| 5260 | 83.75 | 3.7 | 2.34 | 0.039 |
| 5260 | 83.75 | 2 | 1.58 | 0.026 |
| 5320 | 75.51 | 3.7 | 2.34 | 0.035 |
| 5320 | 75.51 | 2 | 1.58 | 0.024 |

MPE Calculation For Symbol Hydra Wireless LAN - continued

| Frequency (MHz) | Measured Conducted Power (mW) | Antenna Gain | | Power Density (mW/cm ²) |
|-----------------|-------------------------------|--------------|---------|-------------------------------------|
| | | dBi | Numeric | |
| 5745 | 72.44 | 3.7 | 2.34 | 0.034 |
| 5745 | 72.44 | 2 | 1.58 | 0.023 |
| 5805 | 69.02 | 3.7 | 2.34 | 0.032 |
| 5805 | 69.02 | 2 | 1.58 | 0.022 |
| 5830 | 75.16 | 3.7 | 2.34 | 0.035 |
| 5830 | 75.16 | 2 | 1.58 | 0.024 |