

## MPE Calculations

Systems operating under the provision of 47 CFR 1.1307(b)(1) shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the FCC guidelines.

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user or nearby persons and can therefore be considered a mobile transmitter per 47 CFR 2.1091(b). The MPE calculation for this exposure is shown below.

### Using the Antennas with highest output power:

The peak radiated output power (EIRP) is calculated as follows:

| <i>Antenna</i>       | <i>Frequency (GHz)</i> | <i>Power input to the antenna (P) (dBm)</i> | <i>Power gain of the antenna (G) (dBi)</i> | <i>EIRP (P+G) (dBm)</i> | <i>EIRP <math>\text{Log}^{-1}(\text{dBm}/10)</math> (mW)</i> |
|----------------------|------------------------|---|--|-------------------------|--|
| Wayu (Fujitsu Topaz) | 5                      | 23.30                                       | 0.98                                       | 24.28                   | 267.92   |
| Wayu (Fujitsu Topaz) | 2.4                    | 24.10                                       | 1.65                                       | 25.75                   | 375.84   |

$$\text{EIRP} = P + G$$

Where

P = Power input to the antenna (mW).

G = Power gain of the antenna (dBi)

The numeric gain (G) of the antenna with a gain specified in dB is determined by:

| <i>Antenna</i>       | <i>Frequency (GHz)</i> | <i>Antenna Gain (G) (dBi)</i> | <i>Numeric Antenna Gain <math>\text{Log}^{-1}(\text{dBm}/10)</math> (dB)</i> |
|----------------------|------------------------|-------------------------------|--|
| Wayu (Fujitsu Topaz) | 5                      | 0.98                          | 1.25   |
| Wayu (Fujitsu Topaz) | 2.4                    | 1.65                          | 1.46   |

$$G = \text{Log}^{-1}(\text{dB antenna gain}/10)$$

Power density at the specific separation:

| <i>Antenna</i>       | <i>Frequency (GHz)</i> | <i>Power input to the antenna (P) (mW)</i> | <i>Numeric Power Gain of the Antenna (G) (dB)</i> | <i>Maximum Power Spectral Density <math>S=PG/(4R^2\pi)</math> (mW/cm<sup>2</sup>)</i> | <i>Maximum Power Spectral Density Limit (mW/cm<sup>2</sup>)</i> |
|----------------------|------------------------|--|---|---|---|
| Wayu (Fujitsu Topaz) | 5                      | 213.80                                     | 1.25  | 0.053   | 1.00  |
| Wayu (Fujitsu Topaz) | 2.4                    | 257.04                                     | 1.46  | 0.075   | 1.00  |

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

Where

S = Maximum power density (mW/cm<sup>2</sup>)

P = Power input to the antenna (mW).

G = Numeric power gain of the antenna

R = Distance to the center of the radiation of the antenna (20cm = limit for MPE)

The maximum permissible exposure (MPE) for the general population is 1mW/cm<sup>2</sup>.

The power density at 20cm does not exceed the 1mW/cm<sup>2</sup> limit. Therefore, the exposure condition is compliant with FCC rules.