MPE Calculations

Below are MPE calculations for mobile use in each band of operation.

802.11b/g

Prediction of MPE limit at a given distance

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

$$S \cup \frac{PG}{4 \cup R^2}$$

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

Maximum peak output power at the antenna terminal:	18.37	(dBm)
Maximum peak output power at the antenna terminal:	68.706844	(mW)
Antenna gain(typical):	4	(dBi)
Maximum antenna gain:	2.511886432	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2412	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm^2)
Power density at prediction frequency:	0.034334	(mW/cm^2)
Maximum allowable antenna gain:	18.64269855	(dBi)

802.11a - (a)(1)

Prediction of MPE limit at a given distance

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

$$S \cup \frac{PG}{4 \cup R^2}$$

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

Maximum peak output power at the antenna terminal:	13.33	(dBm)
Maximum peak output power at the antenna terminal:	21.52781735	(mW)
Antenna gain(typical):	5	(dBi)
Maximum antenna gain:	3.16227766	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5240	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm^2)
Power density at prediction frequency:	0.013543	(mW/cm^2)
Maximum allowable antenna gain:	23.68269855	(dBi)

802.11a - (a)(2)

Prediction of MPE limit at a given distance

Equation 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

Maximum peak output power at the antenna terminal:	20.05	(dBm)
Maximum peak output power at the antenna terminal:	101.1579454	(mW)
Antenna gain(typical):	4.7	(dBi)
Maximum antenna gain:	2.951209227	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5280	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm^2)
Power density at prediction frequency:	0.059392	(mW/cm^2)
Maximum allowable antenna gain:	16.96269855	(dBi)

802.11a - (a)(3)

Prediction of MPE limit at a given distance

Equation 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

Maximum peak output power at the antenna terminal:	20.03	(dBm)
Maximum peak output power at the antenna terminal:	100.6931669	(mW)
Antenna gain(typical):	4.5	(dBi)
Maximum antenna gain:	2.818382931	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5745	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm^2)
Power density at prediction frequency:	0.056459	(mW/cm^2)
Maximum allowable antenna gain:	16.98269855	(dBi)

Conclusion

The above calculations are for a single radio. Since this device can operate with two radios simultaneously, a worst case prediction as to the power density with both radios can be determined by doubling the highest power density found above.

At 5745MHz Pd(single) = 0.06mW/cm^2 @ 20cm

Therefore Pd(dual) = 0.12mW/cm^2 @ 20cm

which is well below the limit of 1mW/cm^2 @ 20cm