Airgo 802.11a/b/g True MIMO APx Module
FCC ID: SA3-AGN1223AR0100

MPE Calculations

The EUT is an 802.11 abg radio module that operates either at 2.4 or at 5 GHz. The radio uses 3 antennas in MIMO (multiple in, multiple out) configuration. Two of the antennas are transmit/receive, the third antenna is receive only. The receive only antenna is the center antenna of the triplet..

Each transmit antenna is fed half the total radio output power at that frequency.

Maximum Power output:

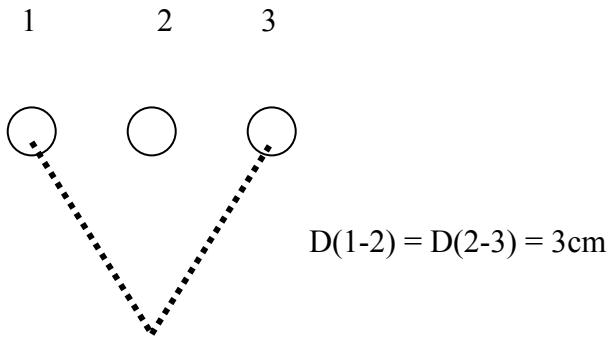
2.4 GHz:	28.9 dBm (2412 MHz in 802.11g mode)
5 GHz:	29.1 dBm (5745 MHz DTS)

Antenna gain, 2.4GHz:	2 dBi
Antenna gain, 5 GHz:	3 dBi

One-half power 2.4 GHz:	25.9 dBm
One-half power 5 GHz:	26.1 dBm

Maximum EIRP from each 2.4 GHz transmit antenna is	25.9 + 2 = 27.9	dBm EIRP
Maximum EIRP from each 5 GHz transmit antenna is	26.1 + 3 = 29.1	dBm EIRP

To determine the overall exposure at 20 cm from the EUT, the contribution from each antenna will be added and then compared to the limit of 1 mW/cm^2



d1 (20cm from RX only antenna 2)

A point 20 cm from the projected center of the EUT antennas is intuitively the point at which both antennas are at their minimum separation distance, meaning the greatest field strength contribution will be located here. This is the result of a number of iterations of the calculation spread sheet, choosing different locations along the length of the EUT for exposure points. Power density decreases as the square of the separation distance, so that even if the 20 cm point is directly in front of one of the antennas, the contributions from the other antennas are less.

Antenna 1 distance to d1: $(3^2 + 20^2)^{0.5} = 20.2cm = 0.202m$

Antenna 2 distance to d1: $(3^2 + 20^2)^{0.5}$ = 20.2 cm = 0.202m

The field strength contribution from each antenna is calculated using the equation

E, V/m = $(30*\text{EIRP,watts})^{0.5}$/separation distance

Maximum EIRP from each 2.4 GHz transmit antenna is 27.9 dBm EIRP = 0.617 watt EIRP
Maximum EIRP from each 5 GHz transmit antenna is 29.1 dBm EIRP = 0.813 watt EIRP

S, mW/cm2 = E/3770 , E in V/m

Total exposure at d1:

Worst case, 2.4 GHz operation: 0.241 mW.cm2
Worst case, 5 GHz operation: 0.290 mW/cm2

FCC Limit: 1.0 mW/cm2