



Calculations for Maximum Permissible Exposure Levels

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AERAS Networks

ARAS01-B1 Aeras Networks WaveLink 4500 5.3GHz Microwave Fixed Link

RF Radiation Exposure

FCC, Part 15 Subpart C §15.247(f)

Industry Canada RSS-210 §6.2.2(q1)(iv)(g)

Given

$$E = \sqrt{(30 * P * G) / d}$$

and

$$S = E^2 / 3770$$

where

E = field strength in volts/meter

P = power in watts

G = numeric antenna gain

d = distance in meters

S = power density in milliwatts / square centimeter

Combining and rearranging the terms to express the distance as a function of the variables, yields:

$$d = \sqrt{(30 * P * G) / (3770 * S)}$$

Rearrange to milliwatts and centimeters

$$P(\text{mw}) = P(\text{watts}) / 1000$$

$$d(\text{cm}) = d(\text{m}) * 100$$

yields

$$d = 100 * \sqrt{(30 * (P / 1000) * G) / (3770 * S)}$$

$$d = 0.282 * \sqrt{(P * G / S)}$$

where

d = distance in centimetres

P = Power in mW

G = Numeric Antenna Gain

S = Power Density in centimetres²

Substituting the logarithmic form of power and gain using:

$$P(\text{mW}) = 10^{(P(\text{dBm})/10)} \text{ and}$$

$$G(\text{numeric}) = 10^{(G(\text{dBi})/10)}$$

Yields:

$$d = 0.282 * 10^{((P + G) / 20)} / \sqrt{S}$$

where

d = MPE distance in centimetres

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW / centimetres² (Limit S = 1mW / cm² from §1.310 Table 1)

Maximum output power observed from power measurements – **+7.9dBm**

Maximum antenna gain – **28.5dBi**

Power Density Limit (mW / cm ²)	Maximum Measured Output Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)
1	7.9	28.5	18.6

MPE Distance 18.6cm