



**Title:** Test of Aruba Networks AP60 802.11a/b/g Access Point  
**To:** FCC 47 CFR Part 15.247,15.407,IC RSS-210  
**Serial #:** TUV R24-A4 REV E  
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#### 4.2.1.3 Maximum Permissible Exposure

**FCC, Part 15 Subpart C §15.247(b)(5)**  
**Industry Canada RSS-210 §14**

#### Calculations for Maximum Permissible Exposure Levels

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 centimetres<sup>2</sup>

Substituting the logarithmic form of power and gain using:

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

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

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 / centimetres<sup>2</sup> (Limit S = 1mW / cm<sup>2</sup> from §1.310 Table 1)

Maximum output power observed from power measurements – +19.7dBm

| Power Density Limit (mW / cm <sup>2</sup> ) | Maximum Measured Output Power (dBm) | Antenna Gain (dBi) | MPE Distance (cm) |
|---------------------------------------------|-------------------------------------|--------------------|-------------------|
| 1                                           | +19.7                               | 12                 | 38.5              |

## Specification

### Maximum Permissible Exposure Limits

§15.247 (b)(5) Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency levels in excess of the Commission's guidelines. See §1.1307 (b)(1) of this chapter.

Limit S = 1mW / cm<sup>2</sup> from 1.310 Table 1

Note: for mobile or fixed location transmitters the minimum separation distance is 20cm, even if calculations indicate the MPE distance to be less.

## Traceability

| METHOD                                                                        | TEST EQUIPMENT USED                        |
|-------------------------------------------------------------------------------|--------------------------------------------|
| Measurements were made per work instruction WI-01 'Measuring RF Output Power' | Bar 1, RVA 01, K-CBL 8, K-CBL 10, S-Anlr 1 |

## Laboratory Measurement Uncertainty for Power Measurements

|                              |       |
|------------------------------|-------|
| Measurement uncertainty (dB) | ±1.33 |
|------------------------------|-------|

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