

It is evident from [Figure 27](#) that 2-D pattern plots typically provided in antenna specifications are a simplification of the real 3-D situation. Often, 2-D plots are reduced even further to a set of simple specifications based on the antenna gain and 3 dB beamwidth.

## Detachable Antenna Selection

Select the correct antenna type to support the required frequency band (2.4 GHz or 5 GHz) and desired coverage pattern.

To select the correct antenna type for the deployment, download and read Aruba's outdoor antenna specifications: <http://www.arubanetworks.com/products/access-points/antennas.php>.



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All figures are shown with a 100 meter (328 feet) mounting height above the ground and for a 18 Mbps coverage area.

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## Detachable Outdoor Antenna Types

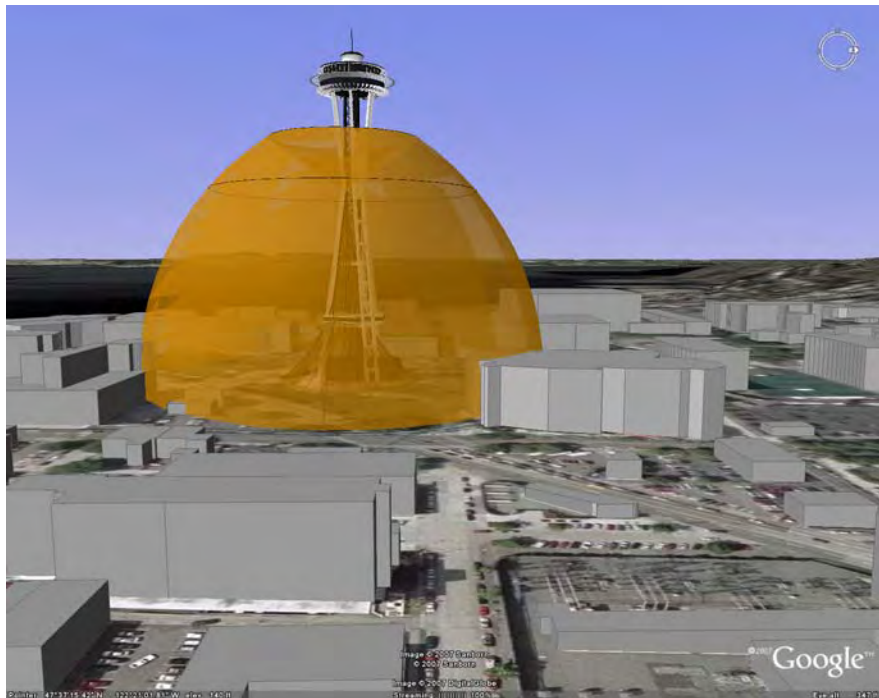
These are some of the terms used to describe Aruba's detachable antenna offerings. Terminology and degree of sector in Aruba's antenna specifications are determined by the horizontal 3 dB beamwidth.

- **Down-Tilt:** An omni-directional antenna that focuses its energy downwards.
- **Sector/Patch:** A directional antenna that provides a focused sector of coverage from a central point (Example: +/- 45 degrees from a 90 degree center point).
- **Panel:** A flat formed antenna that directs energy to a sector of coverage. This type of antenna is often ideal for point-to-point WDS bridging or wireless mesh backhaul applications.

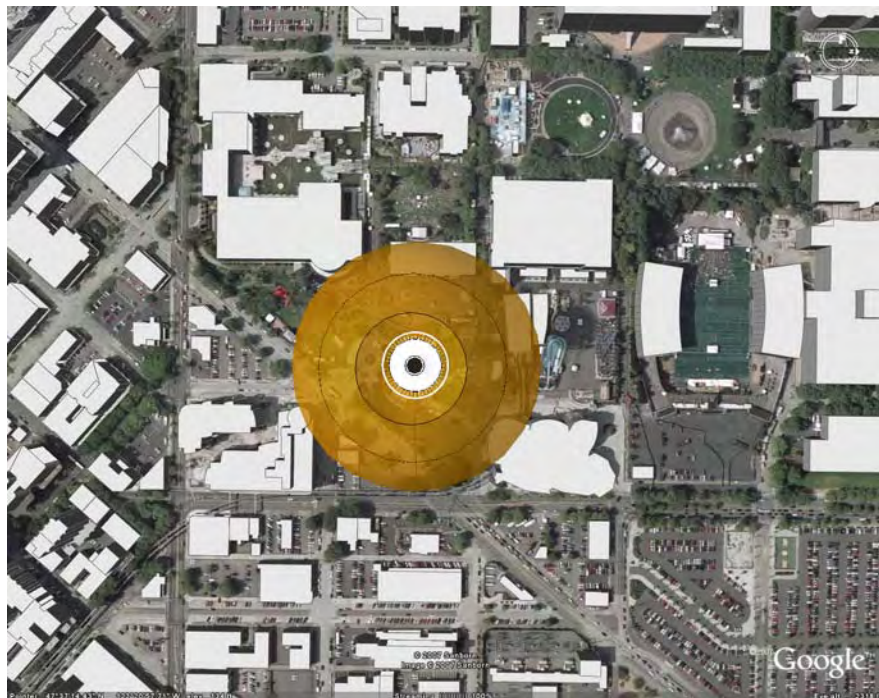
## Detachable Antenna Selection Tips

- If omni-directional coverage is desired with the greatest possible horizontal range from the AP, select one of Aruba's detachable antennas with high-gain, omni-directional coverage. Due to the tight vertical beamwidth of high-gain, omni-directional antennas, this typically requires mounting the antenna not more than 5 meters (16.5 feet) above the expected client locations in elevation.
- If omni-directional coverage is desired, but only high mounting locations are available (approx. 5 m (16.5 feet) to 10 m (33 feet)), consider the use of lower gain (3 dBi to 5 dBi) omni-directional antennas and a denser AP deployment. The lower gain antenna will reduce the maximum horizontal range of the AP, but will provide better vertical coverage.
- For very high mounting locations (>10 m/33 feet) such as light poles or monopoles, consider the use of an omni-directional antenna with electrical downtilt. A downtilt omni-directional antenna is an antenna that has a direction of maximum gain at approximately 45° down from horizontal.

**Figure 29** AP-ANT-90 E-Plane View (Side View)



**Figure 30** AP-ANT-90 H-Plane View (Top View)



- Alternatively, for high mounting locations, high-gain sector antennas may be used with mechanical downtilt. This will typically require the use of multiple access points per mounting location to provide omni-directional coverage.
- If a directional antenna is required to direct RF coverage, the detachable antenna must be capable of supporting all of the frequency bands that require support (2.4 GHz and/or 5 GHz).
- Directional antennas are selected to focus RF energy more efficiently to a targeted area.
- Directional antennas are also useful in areas where the surrounding materials have high amounts of RF attenuation or reflection and the RF signal needs to be guided in the direction of the least

amount of attenuation or reflection. For example, when mounting antennas on the outside surfaces of a building to provide coverage to outdoor spaces in front of the building, a directional antenna can be used to direct the coverage away from the building.

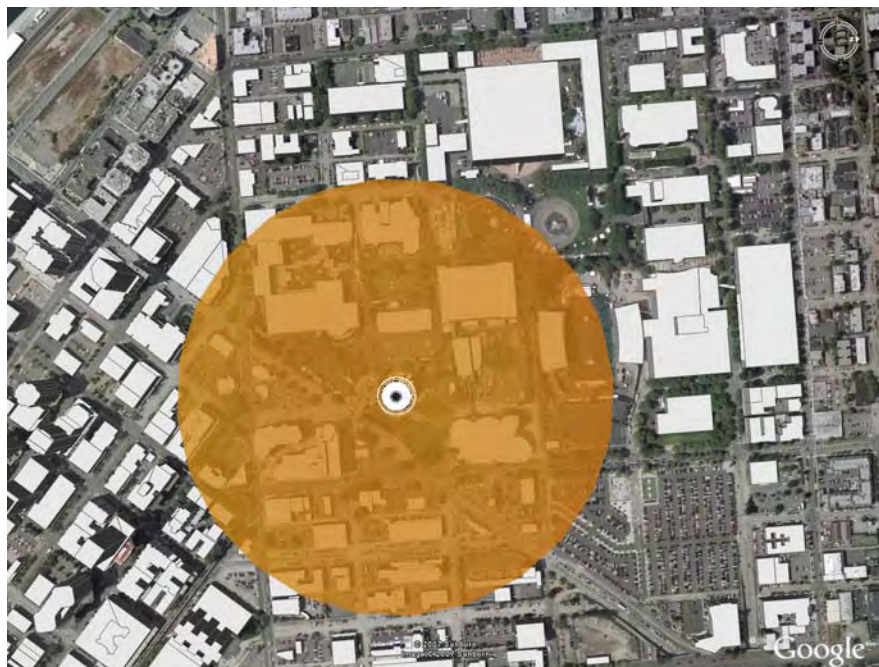
### High Mounting Omni-Directional Antenna Scenario (AP-ANT-80 vs. AP-ANT-90)

The AP-ANT-80 shows greater horizontal range due to its higher gain (8 dBi vs. 3 dBi) antenna, but in this very high mounting situation, the AP-ANT-90 may be a better choice for ground level coverage because the direction of maximum gain is directed downward toward the ground. This situation could potentially be improved if a lower mounting elevation was available for the AP-ANT-80, ideally about 5 m above Ground.

**Figure 31** AP-ANT-80 E-Plane View (Side View)



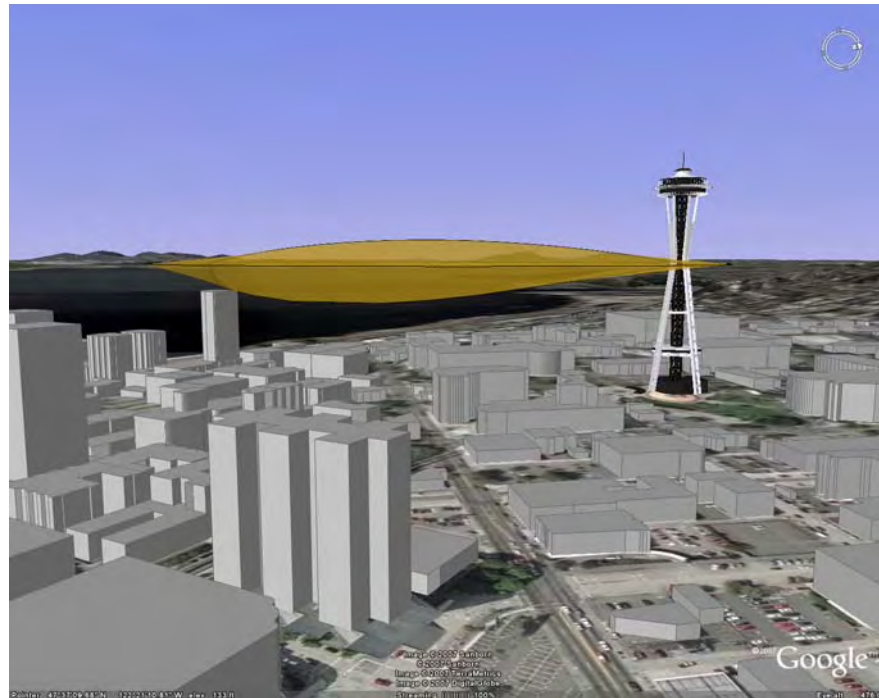
**Figure 32** AP-ANT-80 H-Plane View (Top View)



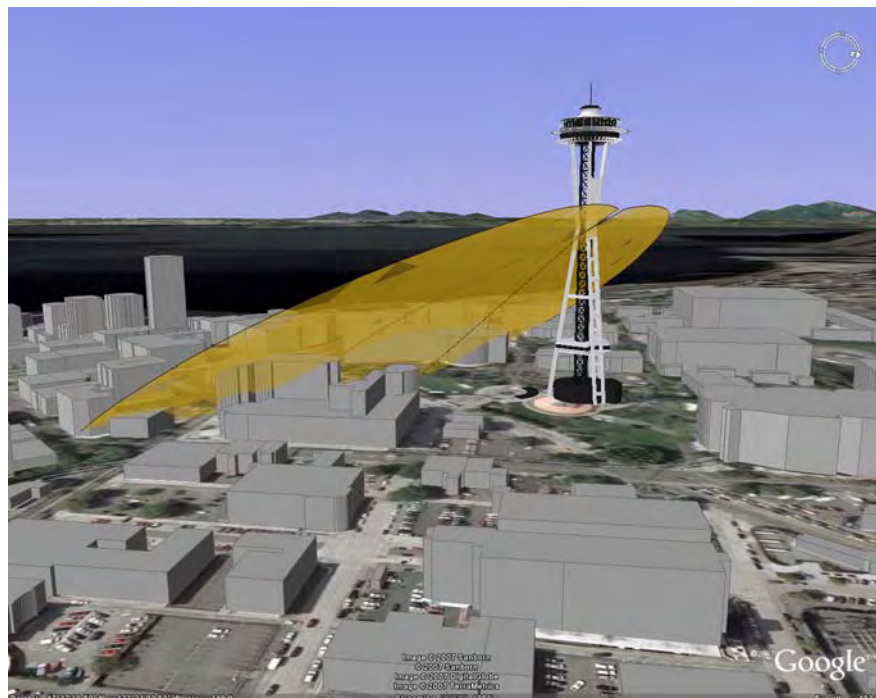
### High Mounting Directional Antenna Scenario

The AP-ANT-82 is a high gain (12 dBi), directional antenna with a 90 degree 3 dB beamwidth in azimuth. For this high mounting condition, this antenna provides a long range in the direction of maximum gain, but it would require mechanical downtilt for ground level coverage.

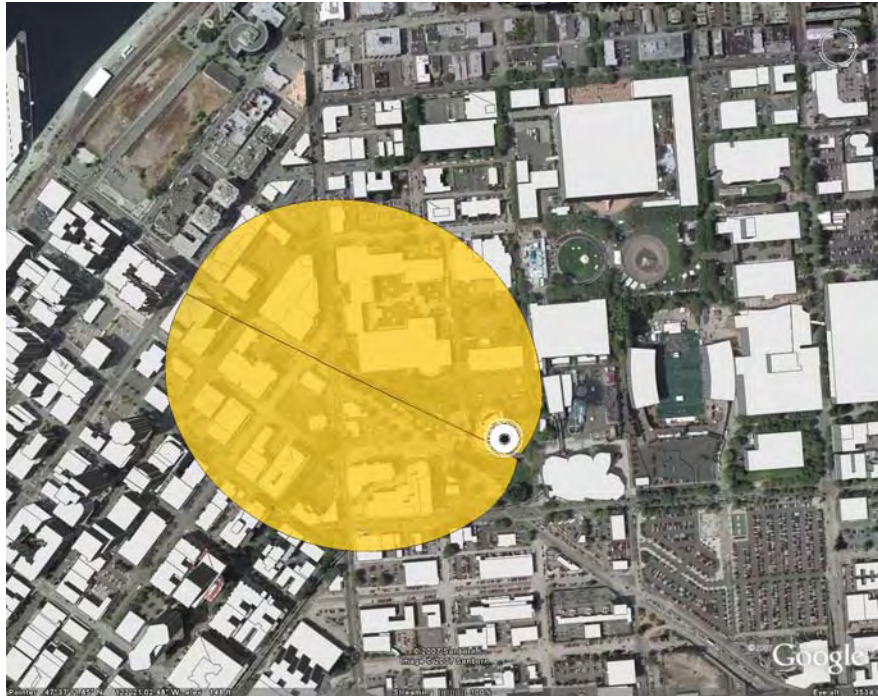
**Figure 33** AP-ANT-82 E-Plane View (Side View)



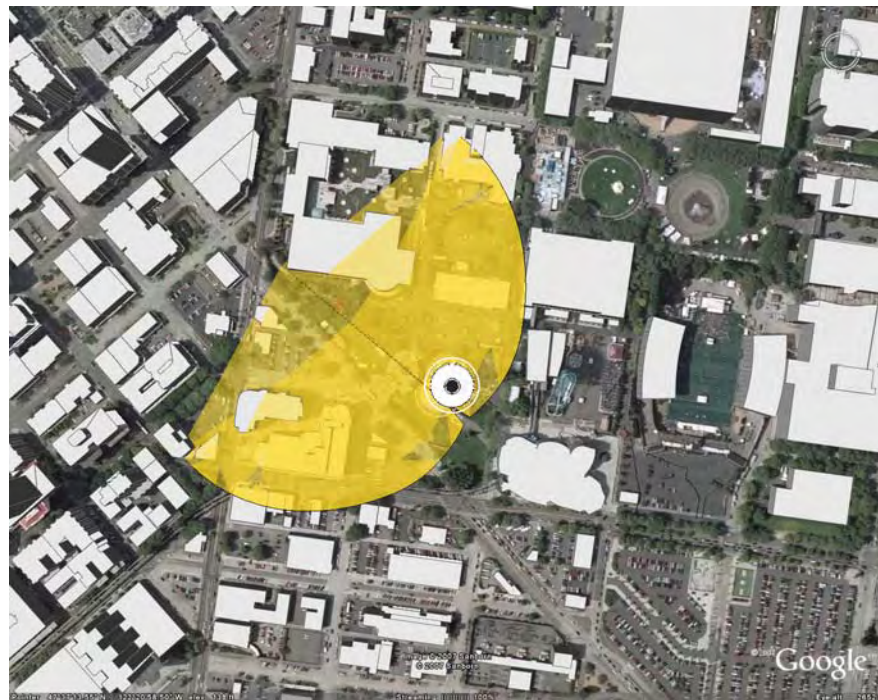
**Figure 34** AP-ANT-82 with 30 Degree Downtilt E-Plane View (Side View)



**Figure 35** AP-ANT-82 H-Plane View (Top View)



**Figure 36** AP-ANT-82 with 30 Degree Downtilt H-Plane View (Top View)





## Product Specifications

### Mechanical (AP-85TX, AP-85FX, and AP-85LX)

- Device Dimensions (HxWxD):
  - 10.80" x 12.64" x 3.07"
  - 274 mm x 321 mm x 78 mm
- Device Weight: 7.40 lbs/3.36 kgs
- Device Weight with Mounting Plate: 9.65 lbs/4.38 kgs
- Device Weight with Mounting Plate and Mounting Bracket: 10.85 lbs/4.92 kgs
- Shipping Dimensions:
  - 15.7" x 12.2" x 9.3"
  - 399 mm x 310 mm x 236 mm
- Shipping Weight: 13.50 lbs/6.12 kgs
- Temperature:
  - Operating: -30°C to 55°C (-22°F to 131°F)
  - Storage: -40°C to 70°C (-40°F to 158°F)
- Relative Humidity: 0% to 95% non-condensing
- Altitude: 0-3000 m (0-9850 ft)
- Survival Wind Speed: 125 mph (201 km/hr)
- Mounting:
  - Articulating adjustable pole or mast mount kit (included)
  - Antenna mount bracket (optional)
- Antenna: Quad, N-type Female interfaces for external antenna support
- Ground: Electrical safety/ground terminal point
- Visual Status Indicators (LEDs):
  - Onboard LED array for RSSI level reading
  - PWR - Power/Status
  - LINK/ACT - LAN/Network Link Status
  - RADIO 0 - Radio 0 Status
  - RADIO 1 - Radio 1 Status
  - RSSI (Radio 0) - RSSI Level for Radio 0
  - RSSI (Radio 1) - RSSI Level for Radio 1

## Electrical

### AP-85TX

- 1 x 10/100 Base-T auto-sensing Ethernet (RJ-45) Interface
  - IEEE 802.3 BaseT and 802.3u 100BaseTX compliant
  - PoE 48V DC Power over Ethernet (IEEE 802.3af compliant)
  - Serial over Ethernet (SoE)
  - Auto-sensing MDI/MDX
- 1 x 12 V DC / up to 2.0 A power interface (for external solar supplied DC power)
- 1 x Electrical Ground / Safety Terminal
- Fully environmentally hardened connector types (all interfaces)

### AP-85FX

- 1 x 100BASE-FX data uplink port for multi-mode, dual-fiber connectivity
  - 1310 nm wavelength, 2 km over MMF Interface
  - LC fiber optic connector type
- 1 x 12 V DC up to 2.0 A power interface (for external solar supplied DC power)
- 1 x 90-228 V~ / 500 mA auto-sensing power interface with transient power surge suppression
- 1 x Serial Console Port
- 1 x Electrical Ground / Safety Terminal
- Fully environmentally hardened connector types (all interfaces)

### AP-85LX

- 1 x 100BASE-LX data uplink port for single-mode, dual-fiber connectivity
  - 1310 nm wavelength, 10km over SMF
  - LC fiber optic connector type
- 1 x 12 V DC up to 2.0 A power interface (for external solar supplied DC power)
- 1 x 90-228 V~ / 500 mA auto-sensing power interface with transient power surge suppression
- 1 x Serial Console Port
- 1 x Electrical Ground / Safety Terminal
- Fully environmentally hardened connector types (all interfaces)

## Maximum Power Draw

**Table 6** AP-85 Series Maximum Power Draw

AP Model	Power Source	Measurement Condition	Max Current (Amps)	Max Power (Watts)
AP-85TX	PoE	48 V	0.25	12
AP-85TX, AP-85FX, AP-85LX	DC	12 V	0.8	9.6
AP-85FX, AP-85LX	AC	240 V, 60 Hz	0.18 (RMS)	20.14



## Wireless LAN

- Network Standards - IEEE 802.11b, IEEE 802.11g and IEEE 802.11a
- Antenna Type - None. Detachable, outdoor rated, 2.4 or 5 GHz antenna options available
- Radio Technology:
  - 802.11a/g - Orthogonal Frequency Division Multiplexing (OFDM)
  - 802.11b - Direct Sequence Spread Spectrum (DSSS)
- Radio Modulation Type:
  - 802.11a - BPSK, QPSK, 16-QAM, 64-QAM
  - 802.11b - DQPSK/CCK, DQPSK, DBPSK
  - 802.11g - OFDM, DQPSK/CCK, DQPSK, DBPSK
- Media Access Control - CSMA/CA with ACK
- Data Rates:
  - 802.11a - 6, 9, 12, 18, 24, 36, 48 and 54 Mbps per channel
  - 802.11b - 1, 2, 5.5, 11 Mbps per channel
  - 802.11g - 1, 2, 5.5, 6, 9, 11, 12, 22, 24, 33, 36 and 54 Mbps per channel
- Transmit and Available Channels: Determined by country of use and Aruba certifications within country of use

## Safety and Regulatory Compliance

Aruba provides a multi-language document containing country specific restrictions and additional safety and regulatory information for all Aruba hardware products. This document can be viewed or downloaded from the following location: [www.arubanetworks.com/pdf/0510272-01.pdf](http://www.arubanetworks.com/pdf/0510272-01.pdf).



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Aruba Access Points and the AP-LAR-1 lightning arrester are required to be installed by a professional installer. The professional installer is responsible for ensuring that grounding is available and it meets applicable local and national electrical codes.

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Do not work on an AP and do not connect or disconnect cables during periods of lightning activity.

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## Proper Disposal of Aruba Equipment

For the most current information on Global Environmental Compliance and Aruba products please see our website at [www.arubanetworks.com](http://www.arubanetworks.com).

## Waste of Electrical and Electronic Equipment



Aruba products at end of life are subject to separate collection and treatment in the EU Member States, Norway, and Switzerland and therefore are marked with the symbol shown at the left (crossed-out wheeled bin). The treatment applied at end of life of these products in these countries shall comply with the applicable national laws of countries implementing Directive 2002/96EC on Waste of Electrical and Electronic Equipment (WEEE).

## European Union RoHS



Aruba products also comply with the EU Restriction of Hazardous Substances Directive 2002/95/EC (RoHS). EU RoHS restricts the use of specific hazardous materials in the manufacture of electrical and electronic equipment. Specifically, restricted materials under the RoHS Directive are Lead (including Solder used in printed circuit assemblies), Cadmium, Mercury, Hexavalent Chromium, and Bromine. Some Aruba products are subject to the exemptions listed in RoHS Directive Annex 7 (Lead in solder used in printed circuit assemblies). Products and packaging will be marked with the “RoHS” label shown at the left indicating conformance to this Directive.

## China RoHS



Aruba products also comply with China environmental declaration requirements and are labeled with the “EFUP e” label shown at the left.

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