



# NETGEAR®

18 dBi Patch Panel Directional Antenna  
**ANT24D18**

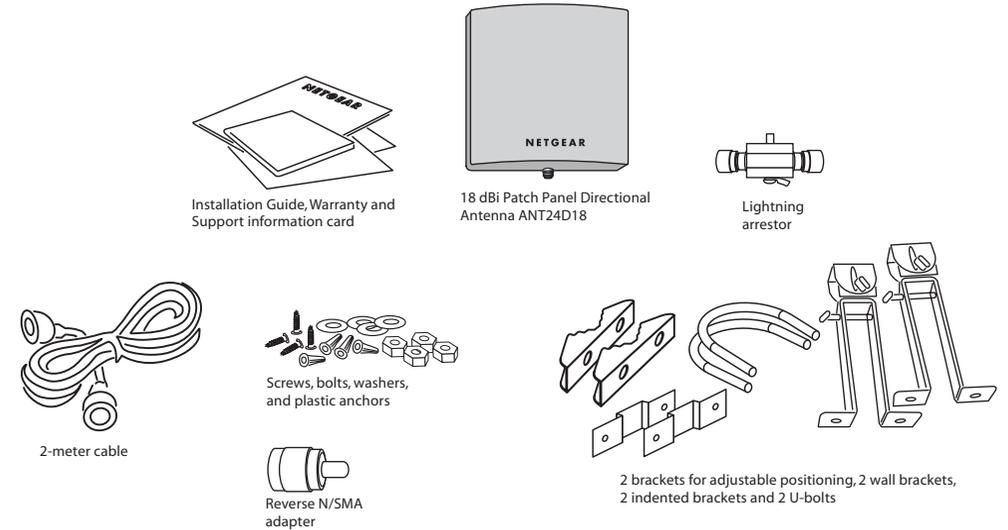


**Installation Guide**

# Introduction

Thank you for purchasing the NETGEAR ANT24D18 antenna. This Installation Guide provides installing instructions and guidelines for using the NETGEAR 18 dBi Patch Panel Directional Antenna.

## Package Contents



The package should contain the following items:

- NETGEAR Indoor/Outdoor 18 dBi 2.4 ~ 2.5 GHz Patch Panel Directional Antenna ANT24D18
- 2-meter low loss antenna cable to connect the antenna to a lightning arrester
- Lightning Arrester

**Note:** a ground cable is not included but required for outdoor installation. The grounding cable must be equivalent or better than: AWG 10, UL 1015, Stranded, 600 V, 105°C, green or green/yellow insulation, 2 clip of 5.5 mm inner diameter cramped at both ends, cable no longer than 5 meters.

- Reverse N/SMA Adapter

- 2 brackets for adjustable positioning, 2 wall brackets, 2 indented brackets for pole mounting, and 2 U-bolts
- Screws, bolts, washers, and plastic anchors
- Installation Guide
- Warranty/Support Information card

If any of the parts are incorrect, missing, or damaged, contact your NETGEAR dealer. Keep the carton, including the original packing materials, in case you need to return the product for repair.

Antenna cable for connecting the wireless device is sold separately. Please use a NETGEAR model ACC-10314-01, 02, 03, or 04 cable.

To obtain optimal results in extending wireless range with antenna installations, consult a qualified professional installer for site survey and installation assistance.

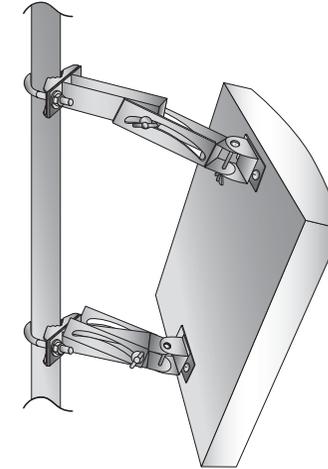
In the U.S., the ANT24D18 antenna should only be used with devices that have been FCC approved for use with it. Please check the NETGEAR web site at [http://www.NETGEAR.com/go/antennas\\_fcc](http://www.NETGEAR.com/go/antennas_fcc) for an updated list of FCC approved devices.

For Europe, use of any antenna requires careful planning and extra consideration to comply with EU emissions and health standards and regulations. Antenna installation must comply with the maximum level authorized by each country. Please check the NETGEAR web site at [http://www.NETGEAR.com/go/antennas\\_eu](http://www.NETGEAR.com/go/antennas_eu) for a list of restrictions and approved devices.

# 1 Configuration and Placement

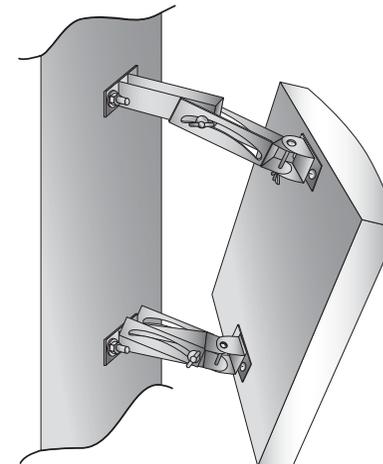
## Pole Mount Configuration

This illustration shows the pole mount configuration option.



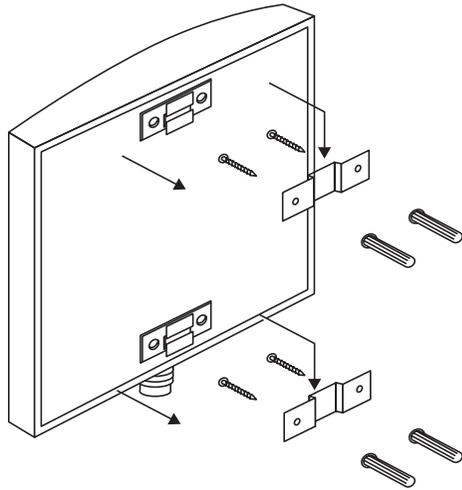
## Wall Mount Configuration With Adjustable Brackets

This illustration shows the wall mount configuration with adjustable brackets.



## Wall Mount Configuration With Fixed Brackets

This illustration shows the wall mount configuration with fixed brackets.



## Placement and Other Important Considerations

Before installing your wireless antenna, observe the placement considerations. Antenna placement dramatically affects potential coverage. Follow these guidelines to maximize coverage:

- Place the ANT24D18 in a vertical position, connector toward the bottom.
- Minimize the obstructions in the front of the antenna. There should be a good visual line of sight and maximum open space between the ANT24D18 and the other antenna(s).
- Outdoor point-to-point application (bridging, repeater mode, building to building, etc.): Miles of outdoor range can be obtained when the antennas are installed properly. Fix the antenna on the top of a building on a pole or on an external wall. Provide a good visual line of sight between the ANT24D18 and the other antenna (max. open space) and ideally no partial obstruction. Coverage increases as follow:
  - Use the 18 dBi one side with long antenna cable. For instance WG302, 10 m cable ACC-10314-04, lightning arrestor, 2m cable, and ANT24D18 on one side and WG302 (with own antennas) on the other side.

- More range: Use the 18 dBi one side with short antenna cable. For instance WG302, 1.5m cable ACC-10314-01, lightning arrestor, 2m cable, and ANT24D18 on one side and WG302 (with own antennas) on the other side.
- Super range: Use the 18 dBi both side with short/medium antenna cable. For instance WG302, 3m cable ACC-10314-02, lightning arrestor, 2m cable, and ANT24D18 on both sides.
- Super extra range, 802.11b only: Use the 18 dBi and booster ANT24BNA both side with short/medium antenna cable. For instance ME103, 3m cable ACC-10314-02, 11b booster ANT24BNA, 1.5m cable ACC-10314-01, lightning arrestor, 2m cable, and ANT24D18 on both sides.

- *Outdoor point-to-point alternative, antennas indoor behind windows:* Place the 18 dBi indoor behind a clean window (no metal coating) in both buildings and facing each other. Use a short/medium antenna cable and fix the antenna on a tripod. Alternatively the 18 dBi can be placed on a wall just behind the window (no more than 3 meters (10 ft)). Furthermore the antennas should be located high in the building close the top. One example: WG302, 3m cable ACC-10314-02 and ANT24D18 on both sides. Please account for less range than outdoor (30-70% less range).

**Outdoor Note:** Ground cable is not provided but is required. Use AWG 10, UL 1015, Standard 600 V, 105°C, green or green/yellow insulation, 2 clips with a 5.5 mm inner diameter clamped at both ends, and cable no longer than 5 meters.

- **Indoors:** Place the antenna on a wall or pole, facing the area to cover at 2 meters or higher above the floor. Place the ANT24D18 above cubicle level with the maximum open space in its front. Ideally, it should be located outside an IT data center or outside a room with multiple metal partitions. Use a NETGEAR antenna cable of up to 10 m length to connect the antenna to the wireless access point/router.
  - Indoor bridging in an airport terminal, train station terminal, warehouse, exhibition hall: Highest indoor range can be achieved when there is a good visual line of sight and maximum open space in between the antennas. One example: WG302, 3m cable ACC-10314-02 and ANT24D18 on both sides. Can greatly increase range vs. 2 WG302 only.
  - Indoor bridging where there is less than 15 ft open space (narrow hall, large room office with low ceiling): WLAN communication can suffer from multiple reflections which are environment, orientation and time dependent, called multipath fading. In this case, 2 ANT24D18s per wireless node (requires both primary and secondary RF ports) can improve the range and throughput by providing spatial diversity.

**Warning, Indoor point to multipoint:** the ANT24D18 is not omnidirectional and is not suitable when low ceilings, partial obstructions, walls, cubicles, large metal objects, etc. are present. WLAN communications can suffer from multiple reflections, which are orientation, environment and time dependent.

- The best performance is achieved with a short cable between the antenna and the wireless device. The shortest approved cable to be used in conjunction with the ANT24D18 in North America is the NETGEAR 1.5 m (ACC-10314-01) cable.
- The antenna should be installed so that it is a minimum of **50 cm (20 inches)** away from people.

## 2 Installing the 18 dBi Patch Panel Directional Antenna

There are two parts to the wireless antenna installation process:

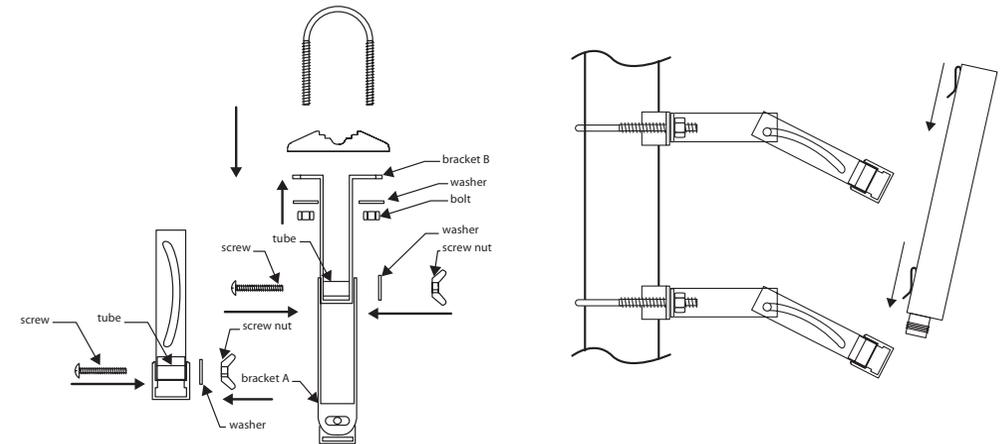
- Mount the antenna on a pole, or on a wall with adjustable brackets, or on a wall with fixed brackets.
- Connect the appropriate electrical hardware depending on if the installation is indoors or outdoors.

Follow the instructions in this section of the manual to install your antenna.

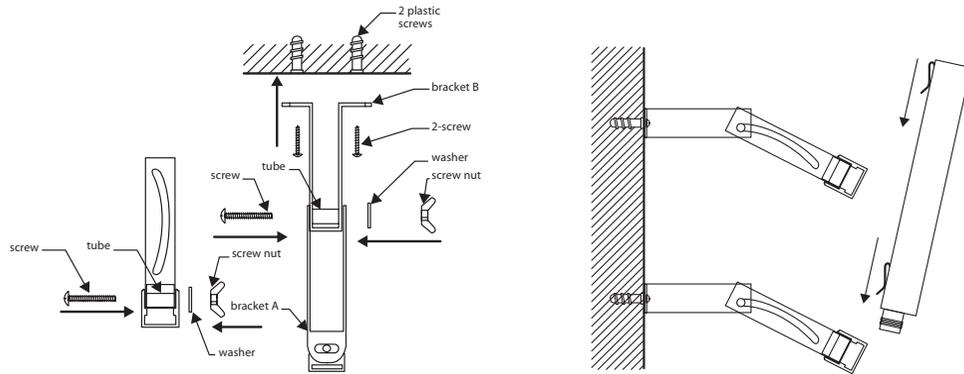
### First, Mount the Antenna

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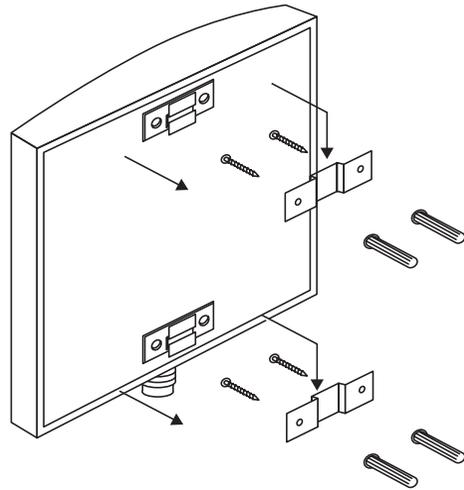
#### Pole Mount Installation



## Wall Mount with Adjustable Bracket



## Wall Mount with Fixed Bracket

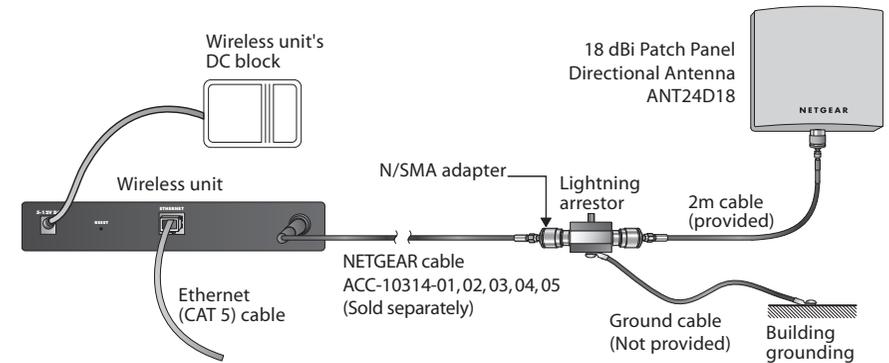


## Now, Connect the Antenna

The instructions below cover outdoor and indoor installations.

### Connecting the Antenna for an Outdoor Installation

1. Turn off your wireless unit.
2. Connect the provided 2-meter cable to the antenna and to the arrester as shown here. You can connect the cable to either of the two RF ports on the lightning arrester.



3. Connect the grounding cable (not included) from the lightning arrester to the ground of the building.

*Grounding cable:* The grounding cable must be equivalent or better than: AWG 10, UL 1015, Stranded, 600 V, 105°C, green or green/yellow insulation, 2 clip of 5.5 mm inner diameter cramped at both ends, cable no longer than 5 meters.

**Warning:** the lightning arrester and appropriate ground cable must be used for outdoor installation. NETGEAR does not assume any responsibility in case of hazard resulting of non-compliance with these instructions.

4. Screw the N/SMA Reverse Adapter on the lightning arrester (clockwise) on the second RF port. Connect a NETGEAR cable model ACC-10314-01, 02, 03, 04 or 05 (sold separately) to the adapter.
5. Locate the primary detachable antenna on the wireless access point. Remove the antenna and connect the other end of the NETGEAR cable ACC-10314-01, 02, 03, 04 or 05 to this port.

**Note:** On access points with two antennas, if you are only replacing one antenna, be sure to replace the primary antenna and do not remove the secondary antenna.

6. *If connecting 2 ANT24D18 antennas:* repeat step 2 to 5 for the second antenna and connect it the secondary port. If the wireless device supports transmit/receive on both ports, the 2 antennas can be used to cover 2 separate or partial overlapping WLAN areas. For instance the 2 ANT24D18 could be oriented at 90 degrees and positioned 50 feet away and using the WG302 access point. The 2 antennas can also be used to provide spatial diversity.

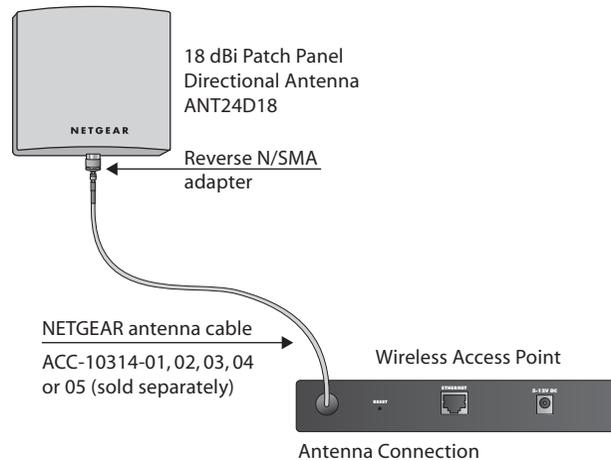
If the wireless device transmits only with the primary antenna port, the 2 ANT24D18 antennas can be used only for spatial diversity.

*Spatial diversity:* place the 2 antennas 3 to 9 feet away and oriented toward the same direction.

7. After attaching your new 18 dBi antenna(s), reconnect your wireless device to the network and turn it on.

## Connecting the Antenna for an Indoor Installation

1. Turn off your wireless unit.
2. Connect the reverse N/SMA adapter to the antenna.
3. Connect a NETGEAR antenna cable model ACC-10314-01, 02, 03 or 04 to the reverse N/SMA adapter.



4. Locate the primary detachable antenna of the wireless device. Remove the antenna and connect the other end of the NETGEAR cable ACC-10314-01, 02, 03 or 04 to this port.

**Note:** On access points with two antennas, if you are only replacing one antenna, be sure to replace the primary antenna and do not remove the secondary antenna.

5. *If connecting 2 ANT24D18 antennas:* repeat step 2 to 4 for the second antenna and connect it the secondary port. If the wireless device supports transmit/receive on both ports, the 2 antennas can be used to cover 2 separate or partial overlapping WLAN areas. For instance the 2 ANT24D18 antennas could be oriented at 90 degrees and positioned 50 feet away and using the WG302 access point. The 2 antennas can also be used to provide spatial diversity.

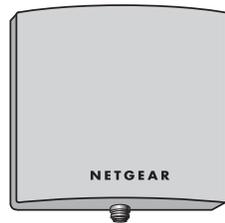
If the wireless device transmits only with the primary antenna port, the 2 ANT24D18 antennas can be used only for spatial diversity.

*Spatial diversity:* place the 2 antennas 3 to 9 feet away and oriented toward the same direction.

6. After attaching your new 18 dBi antenna(s), reconnect your wireless device to the network and turn it on. The provided 2m cable and lightning arrestor should not have been used.

### 3 Specifications

This chapter provides the 18 dBi Patch Panel Directional Antenna specifications.



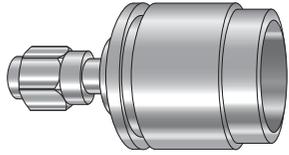
18 dBi Patch Panel Directional Antenna ANT24D18 and Hardware

Description	18 dBi Patch Panel Directional Antenna and Mounting Assembly
Frequency Range	2400 - 2500MHz
Type	Directional
Beam Width	60° horizontal, 30° vertical
Impedance	50 Ohms nominal
SWR	≤1.5 maximum
Return Loss	-15 dB
Gain	18 dBi
Maximum Input Power	20 W (without N/SMA adapter)
Polarization	Vertical
Connector Type	Reverse N Female
Dimensions	263 x 263 x 40 mm (10.4 x 10.4 x 1.6 in)
Hardware Included	2 Brackets for adjustable orientation, 2 wall brackets, 2 U-bolts for pole fixation, 2 indented brackets, screws, washers, nuts, etc.
Antenna Color	White
Rust Proof	Hardware is rust proof
Water Proof	Rain Resistant
Temperature	-30°C to +80°C (-22°F to 176°F)
Humidity	5 to 95% RH



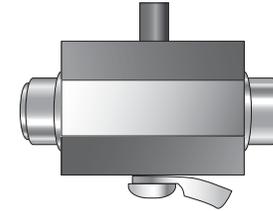
2m cable

Description	2 Meter Antenna Cable
Frequency Range	0 - 3 GHz
VSWR	1.5 max.
Cable Type	HPF 195 Harbour Industries
Transmission Loss	2.2 dB max. @ 2.4 - 2.5 GHz
Connector Type	2 N type Male reverse
Max. Working Voltage	250 Vrms min.
Minimum Bend Radius	25 mm (1 in)
Jacket	FRPBC Black, 5 mm (0.195 in) diameter
Recommended Coupling Nut Torque	229 mm.kg* to 559 mm.kg* (4.1 in.lbs to 10.0 in.lbs)
Coupling Nut Retention Force	22 kg* (50 lbs) min.
Connector Body & Contact	Brass Per JIS H3250 C3604 BD, Plated
Insulation	PTFE Fluorocarbon per ASTM D 1710
Storage, Transportation & Operating Temperature	-40 to 75° C (-40 to 167° F)
Storage, Transportation & Operating Temperature	20 to 95% RH
Water	Rain resistant



N/SMA Adapter Accessory

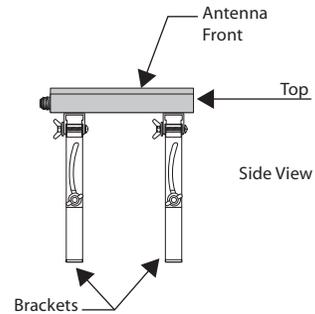
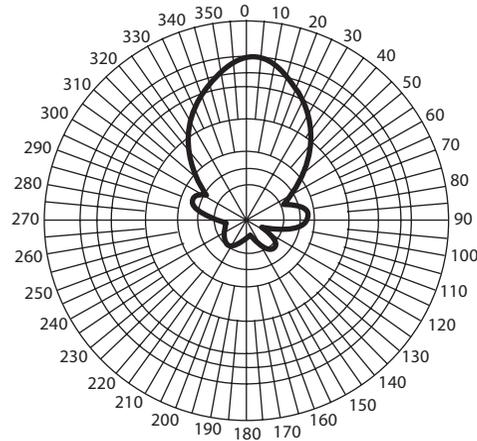
Description	N/SMA Adapter Accessory
Frequency Range	0 - 3 GHz
VSWR	1.5 max.
Connector Type	N type Male reverse to SMA Female reverse
Insulation Resistance	1000 MOhms
Center Contact Resistance	6 mOhms
Outer Contact Resistance	2 mOhms
Working Voltage	500 V
Impedance	50 ± 5 Ohms
Body & Center Contacts	Brass
Insulation	PTFE
Gasket	Silicone Rubber
Storage & Operating Temperature	-30°C to +80°C (-22°F to 176°F)



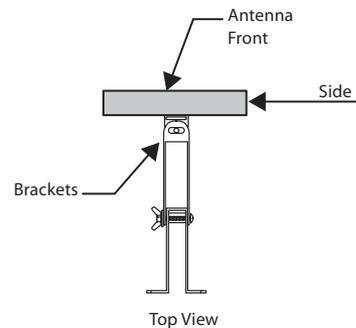
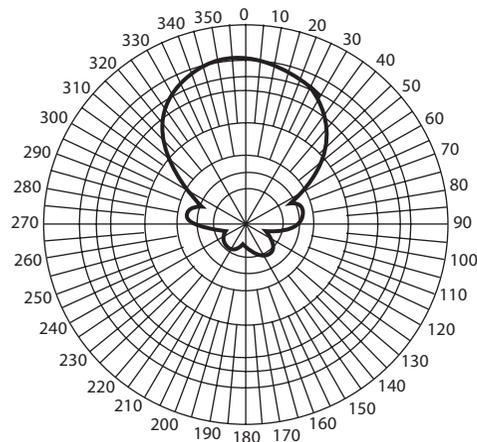
Lightning arrestor

Description	Lightning Arrestor
Frequency Range	0 - 3 GHz
VSWR	1.5 max.
Insertion Loss	1.3 dB max.
Impulse Breakdown Voltage	600 V min. (Voltage on upgrade ratio @100V/s)
Max. Power Rating	200 W
Impedance	50 ± 5 Ohms
Insulation Resistance	1000 MOhms
Max. Withstanding Current	5000 A, 8/20µs
AC Current Range	20 A at voltage release = 1s, testing period = 5s, testing duration = 3 min, per test
Pulse Current Range	200 A (at 10/1000µs, wave = 300, testing duration = 3 min, per test)
Overvoltage Protection	150V min. (100mA, < 150ms)
Connectors	N type Female Reverse
Color	Black
Storage & Operating Temperature	-40 to 80° C (-40 to 176° F)
Storage & Operating Humidity	20% to 95% RH
Water	Rain Resistant

## Radiation Pattern: Elevation (Vertical plane)



## Radiation Pattern: Azimuth (Horizontal plane)



## Statement of Conditions

In the interest of improving internal design, operational function, and/or reliability, NETGEAR reserves the right to make changes to the products described in this document without notice. NETGEAR does not assume any liability that may occur due to the use or application of the product(s) or circuit layout(s) described herein.

## Federal Communications Commission (FCC) Compliance Notice: Radio Frequency Notice

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

In the U.S., the ANT24D18 antenna should only be used with devices that have been FCC approved for use with it. Please check the NETGEAR web site at [http://www.NETGEAR.com/go/antennas\\_fcc](http://www.NETGEAR.com/go/antennas_fcc) for an updated list of FCC approved devices.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: (1) Reorient or relocate the receiving antenna, (2) Increase the separation between the equipment and receiver, (3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected, (4) Consult the dealer or an experienced radio/TV technician for help.

## Federal Communications Commission (FCC) and European Radiation Exposure Statements

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 50 cm (20 inches) during normal operation. This device should not be co-located with other transmitters.

## European Emission Statement

For EU, use of any antenna requires careful planning and extra consideration to comply with EU emissions, health standards and regulations. It is recommended that a qualified professional installer service is consulted for site survey and proper installation. Antenna installation must comply with the maximum level authorized by each country. See [http://www.NETGEAR.com/go/antennas\\_eu](http://www.NETGEAR.com/go/antennas_eu) for product combinations that comply with EU regulations.

## Safety

The NETGEAR wireless devices WG302, FWG114P, FVM318, ME103, and FM114P have been tested with the antenna ANT24D18 and have successfully passed all relevant tests contained in the Standard for the Safety of Information Technology Equipment for Europe (EN 60950-2000) equivalent to North American Standards UL 60950, Third Edition, CAN/CSA-C22.2 No. 60950-00, Third Edition and Australian/New Zealand Standards ACA TS 001-1997, and AS/NZS 3260:1993 with A1 through A4.

# Technical Support

PLEASE REFER TO THE SUPPORT INFORMATION CARD THAT SHIPPED WITH YOUR PRODUCT.

By registering your product at *www.NETGEAR.com/register*, we can provide you with faster expert technical support and timely notices of product and software upgrades.

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