



aura

The Science of Scale



Apogee Datasheets

Overview

The Aura Wireless Apogee family represents a patented breakthrough in wireless technology, designed to deliver expansive, high-performance Wi-Fi coverage with minimal infrastructure. Built for versatility and scalability, Apogee antennas empower businesses to provide consistent, reliable connectivity across even the most challenging environments.

Apogee is the world's first antenna platform that overcomes strict FCC RF power limits to produce Wi-Fi coverage areas of unprecedented size and performance. Developed through years of rigorous lab and field trials, Apogee's revolutionary approach to RF propagation unlocks the true potential of license-free networks and makes dependable, large-area Wi-Fi coverage truly scalable.

Organizations across industries rely on Apogee antennas to dramatically reduce infrastructure requirements while improving coverage quality and operational efficiency. From big box retail to distribution centers, from air cargo hubs to intermodal freight depots, from farmland to urban centers, Apogee technology delivers "The Science of Scale" to wireless deployments of all sizes.

The Apogee family is designed for seamless integration with existing enterprise wireless infrastructure, working specifically with Cisco Meraki, HPE/Juniper Networks, Ruckus, and other leading access points equipped with external RF ports. This complementary approach enhances existing investments while transforming deployment economics and performance.

The Science of Scale Delivers:

- 70-83% reduction in required access points for typical deployments
- Immediate positive ROI through reduced CAPEX and ongoing OPEX savings



- 70-83% reduction in required access points for typical deployments
- Immediate positive ROI through reduced CAPEX and ongoing OPEX savings
- Enhanced coverage quality through focused RF energy delivery
- Simplified deployment with plug-and-play or professionally configured options
- Future-proof technology supporting evolving wireless standards

The Physics Problem Traditional Antennas Can't Solve

Traditional antenna systems face fundamental limitations imposed by FCC RF power regulations and the physics of low-power device connectivity. Mobile devices, IoT sensors, and wireless equipment often lack sufficient transmit power to reliably communicate over the distances required for efficient network coverage. This forces network designers to deploy significantly more access points than would otherwise be necessary, dramatically increasing infrastructure costs, complexity, and ongoing maintenance requirements. The challenge is compounded in outdoor and large-scale indoor environments where coverage distances are greatest and device density varies widely.

Apogee antennas solve this through

- **Patented Asymmetric Gain™** that provides wireless devices with up to 24dbi of additional receive gain while keeping transmit gain FCC compliant. This enables very low power devices like smart phones, tablets and even IoT sensors to reliably connect over large distances.
- **Full Beamwidth Gain™** Unlike traditional antennas each Apogee panel generates 9dbi of passive peak transmit gain over its entire 90° beamwidth in both the 5GHz and 2.4GHz bands.
- Apogee features steep, powered filtering for both the 5GHz and 2.4GHz bands. Combined with Apogee's Asymmetric gain, the resulting receive signal is both powerful and quiet.



Proven Performance Across Industries

- **Intermodal Facility:** 65 traditional APs → 11 Apogee installations (83% reduction)
- **Municipal Downtown:** 20 traditional APs → 6 Apogee installations (70% reduction)
- **Apple Orchard:** 15+ traditional APs → 3 Apogee installations (80% reduction)
- **500,000 Sq Ft Warehouse:** 32 traditional APs → 3 Apogee installations (80% reduction)
- **650 Retail Parking Lots:** 3 Apogee installations per store
- **Campus Wi-Fi:** numerous K-12 with 1-2 Apogee installation per campus to dramatically extend stream quality Wi-Fi on each campus supplementing lower income neighborhoods municipal Wi-Fi (e-Rate Type 2 eligible)
- **Major East Coast Container Terminal:** expansive shipping docks with Apogee hybrid polarization to combat multipath while reducing AP locations by 67%.
- **PNW Intermodal Port Complex:** high-gain arrays improved edge signal quality and cut hardware density dramatically.
- **Senior Living Facility:** 27 acres → 3 Apogee installations
- **Regional Theme & Water Park (200+ acres):** park-wide guest Wi-Fi with Apogee 360; ~75–85% fewer APs vs. traditional design
- **National Foodservice Distributor — Distribution Center & Yard:** long-aisle coverage and yard scanning with single-digit arrays; reduced install/maintenance overhead.

These are representative deployments—a select set to illustrate typical outcomes across different environments. This is not an exhaustive list of all Apogee installations.

Unlocking Large Scale Wi-Fi Coverage

The Apogee™ 360 WiFi Platform is a breakthrough in wireless technology, designed to deliver exceptional performance Wi-Fi coverage with minimal power. Built for versatility and scalability, Apogee empowers businesses to provide consistent connectivity across even the most challenging environments.

Omnidirectional Optimization

Apogee™ 360 is the world's first antenna platform that overcomes strict FCC limits to produce Wi-Fi coverage at an unprecedented size and performance.

Developed through years of rigorous field trials, Apogee's revolutionary RF propagation unlocks the true potential of license-free networks and makes ubiquitous WiFi coverage truly scalable.

Apogee™ has been deployed with success in a variety of environments, including big box retail, distribution centers, air cargo hubs, intermodal freight depots, farmland, urban centers, and more.

Asymmetric Gain™

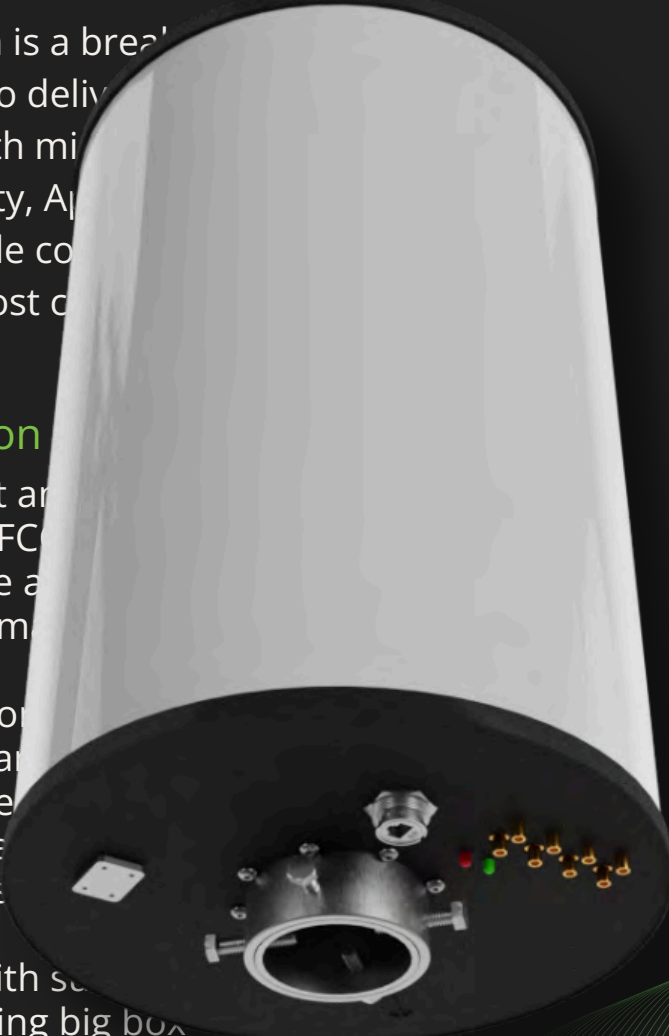
Apogee's Asymmetric Gain provides wireless devices with up to 24dbi of additional receive gain while keeping transmit gain FCC compliant. This enables very low power devices like smart phones, tablets and even IoT sensors to reliably connect over large distances.

Full Beamwidth Gain™

Unlike traditional antennas each Apogee panel generates 9dbi of passive peak transmit gain over its entire 90° beamwidth in both the 5GHz and 2.4GHz bands. Operating together, Apogee's 4 panels generate a full 360° of 9dbi passive gain.

Steep, Powered Filters

Apogee features steep, powered filtering for both the 5GHz and 2.4GHz bands. Combined with Apogee's Asymmetric gain, the resulting receive signal is both powerful and quiet.



MORE THAN 10X COVERAGE

Just one of Apogee's four 90° panel antennas can deliver high-quality Wi-Fi coverage over 5 acres, depending on the environment and application. Together, these panels extend reliable coverage across up to 20 acres with up to 90% less infrastructure leads to lower CAPEX and OPEX, significantly boosting ROI and delivering the most cost-effective large-scale Wi-Fi 5 and Wi-Fi 6 deployments available.

4-Panel Phased Array Antenna

- 90° beam width
- Supports 2400 MHz to 2485 MHz
- Supports 5250 MHz to 5900 MHz (Wi-Fi 5 & Wi-Fi 6)
- Asymmetric Gain (9dbi Tx gain & 24 dbi Rx gain)
- Steep active filters for both the 2.4GHz and 5GHz Wi-Fi bands
- Each 90-degree panel can be independently configured as 5GHz, 2.4GHz or dual band
- Vertical, Horizontal and Aura Wireless' proprietary hybrid polarity. Like band selection, polarity can be assigned on a port by port basis

Ports & Connected Devices

- 4 SMA male RF ports. Each port can be configured as single band or dual band
- Each port can be configured independently as vertical, horizontal or hybrid polarity
- Supports FCC-compliant AP's equipped with external RF ports.
- One RJ45 PoE+ PoE Ethernet port

MIMO & Apogee™

- 4x4 MIMO (≈90° coverage): Assign four external radio chains to a single Apogee panel (≈90° sector).
- 2x2 MIMO (≈90° coverage): Assign both external ports of a 2x2 radio to a single Apogee panel (≈90° sector).
- 2x2 MIMO across ≈180°: Use two 2x2 radios or one 4x4 radio split as 2x2 + 2x2, assigning two chains to each of two adjacent panels (≈180° total).



APOGEE 360 PRODUCT SPECS

| | | | |
|-----------------------|---|-----------------------|---|
| Operating Frequencies | 2.4GHz , 5.2 - 5.9Ghz(WiFi 5, WiFi 6) | Auxiliary Port | 1x RJ45 serial |
| Transmit Gain | 9db | Status LEDs | 2x (red/green) |
| Receive Gain | 24-26db | Encryption | AES 256-bit |
| RF Power Input | Up to 2 watts | PoE Injection Voltage | 7 - 55 volts |
| External RF Ports | 4 SMA Male External RF Ports | Supply Voltage | 48 volts DC nominal (+/- 7 volts VDC) |
| Array Sectorization | Up to [4] 90° panels | Height, OD, Weight | 22", 12", 22 lbs |
| Polarization | Vertical, horizontal, hybrid | Environmental | -40°C to +60°C IP65 certification |
| Hybrid Polarization | Designed for severe multi-path environments | Configuration/Mgmt | Apogee Manager™(Cloud) |
| Control Interface | 1x RJ45 ethernet/LAN 10/100 Mbps | DC Power | PoE 803.af/at compatible (Endspan & Midspan/Mode B Class 2) |

Wi-Fi Range Meet Reliability

The Apogee™ 180 Wi-Fi Platform redefines connectivity with a powerful solution designed to blanket vast areas with stream quality Wi-Fi, effortlessly. With plug-and-play simplicity, it provides high-performance Wi-Fi over massive spaces—no complex setups, just reliable coverage where you need it most.

Directional Efficiency

The Apogee™ 180 Wi-Fi Platform is engineered for targeted, high-performance Wi-Fi coverage with minimal complexity.

Designed with two 90-degree panels that deliver a full 180-degree beam width, it's the ideal solution for spacious environments requiring broad, reliable connectivity without the need for extensive infrastructure.

Whether you're delivering reliable connections for an expansive grocery store parking lot, warehouse, busy loading dock, or an outdoor venue, the Apogee™ 180 is the tool that turns challenging spaces into connectivity strongholds with just a single installation.



Asymmetric Gain™

Apogee's Asymmetric Gain provides wireless devices with up to 24dbi of additional receive gain while keeping transmit gain FCC compliant. This enables very low power devices like smart phones, tablets and even IoT sensors to reliably connect over large distances.

Full Beamwidth Gain™

Unlike traditional antennas each Apogee panel generates 9dbi of passive peak transmit gain over its entire 180° beamwidth in both the 5GHz and 2.4GHz bands. Operating together, Apogee's 4 panels generate a full 360° of 9dbi passive gain.

Steep, Powered Filters

Apogee features steep, powered filtering for both the 5GHz and 2.4GHz bands. Combined with Apogee's Asymmetric gain, the resulting receive signal is both powerful and quiet.

inside apogee 180

MORE THAN 10X COVERAGE



2-Panel Phased Array Antenna

The Apogee™ 180 sets a new standard for connectivity by leveraging dual polarities combined with the native feature set of Apogee. This innovative design mitigates multi-path fading in environments where signal reflection and deflection are common. The 180 ensures uninterrupted, high-performance Wi-Fi coverage even in the harshest RF conditions.

Connected Devices

Apogee™ 180 patented Asymmetric Gain™ to extends Wi-Fi range and reliability with up to 24dBi additional receive gain, low-power devices like smart phones, tablets and even IoT sensors and Target-Wake-Time (TWT) devices maintain strong connections over vast distances, while transmit gain remains FCC-compliant.

Full Beamwidth Gain

Unlike traditional antennas that concentrate gain in a narrow beam, Apogee™ 180 delivers 9dBi passive peak transmit gain across a full 180° beamwidth in both the 5GHz and 2.4GHz bands. This ensures consistent signal strength across your entire coverage area.

Massive Coverage, Minimal Infrastructure

Each Apogee™ 180 panel can provide reliable Wi-Fi coverage over large indoor and outdoor areas, drastically reducing the number of access points required. This translates to significantly less infrastructure, lowering both capital expenditures (CAPEX) and operational expenditures (OPEX) while maximizing ROI.

Flexible Deployment & Environmental Resilience

Apogee™180 operates effectively in both the 2.4GHz and 5GHz bands, making it suitable for a wide range of environments, from urban centers to agricultural fields. Its robust design includes steep powered filters and a broad operating temperature range from -40°C to +60°C, ensuring reliable performance in challenging conditions.

APOGEE™ 180 PRODUCT SPECS

| | | | |
|-----------------------|--|--------------------------|--|
| Operating Frequencies | 2.4GHz , 5.2 - 5.9Ghz(WiFi 5, WiFi 6) | Environmental Resilience | -40°C to +70°C |
| Transmit Gain | 9dbi | MIMO Support | 2x2 MIMO per panel |
| Receive Gain | 24-26dbi | Power | PoE 803.af/at compatible, 48V DC nominal |
| RF Power Input | Up to 1 watts | LxWxH, Weight | 17"x6"x17", 6 lbs. |
| Connectors | 4 SMA Male External RF Ports, RJ45 Ethernet | | |

Wi-Fi Performance in Harsh Environments

The Apogee 180MP Wi-Fi Platform delivers unparalleled performance, transforming connectivity in even the most challenging environments. Designed to excel in harsh multi-path conditions, it combines advanced technology with effortless plug-and-play simplicity to blanket vast areas with high-quality, reliable Wi-Fi.

Multi-Path Performance

Engineered with hybrid-polarity design, the 180MP capitalizes on RF signals that deflect and reflect. When one polarity experiences interference, the other maximizes performance, effectively mitigating multi-path fading. This ensures uninterrupted, consistent connectivity across expansive spaces.

For environments facing both multi-path challenges and rogue RF energy, the 180MP pairs seamlessly with the Apogee 180 to provide a comprehensive, adaptable solution. Together, these platforms redefine what's possible in wireless coverage, delivering robust, high-performance Wi-Fi where it's needed most.



Asymmetric Gain™

Apogee's Asymmetric Gain provides wireless devices with up to 24dbi of additional receive gain while keeping transmit gain FCC compliant. This enables very low power devices like smart phones, tablets and even IoT sensors to reliably connect over large distances.

Full Beamwidth Gain™

Unlike traditional antennas each Apogee panel generates 9dbi of passive peak transmit gain over its entire 90° beamwidth in both the 5GHz and 2.4GHz bands.

Steep, Powered Filters

Apogee features steep, powered filtering for both the 5GHz and 2.4GHz bands. Combined with Apogee's Asymmetric gain, the resulting receive signal is both powerful and quiet.

COVERAGE IN THE TOUGHEST RF ENVIRONMENTS

Dual-Polarity Advantage

The Apogee™ 180MP sets a new standard for connectivity by leveraging dual polarities combined with the native feature set of Apogee. This innovative design mitigates multi-path fading in environments where signal reflection and deflection are common. The 180MP ensures uninterrupted, high-performance Wi-Fi coverage even in the harshest RF conditions.

Asymmetric Gain™ Technology

Apogee™ 180MP patented Asymmetric Gain™ to extend Wi-Fi range and reliability. With up to 24dBi additional receive gain, low-power devices like smart phones, tablets and even IoT sensors and Target-Wake-Time (TWT) devices maintain strong connections over vast distances, while transmit gain remains FCC-compliant.

Full Beamwidth Gain

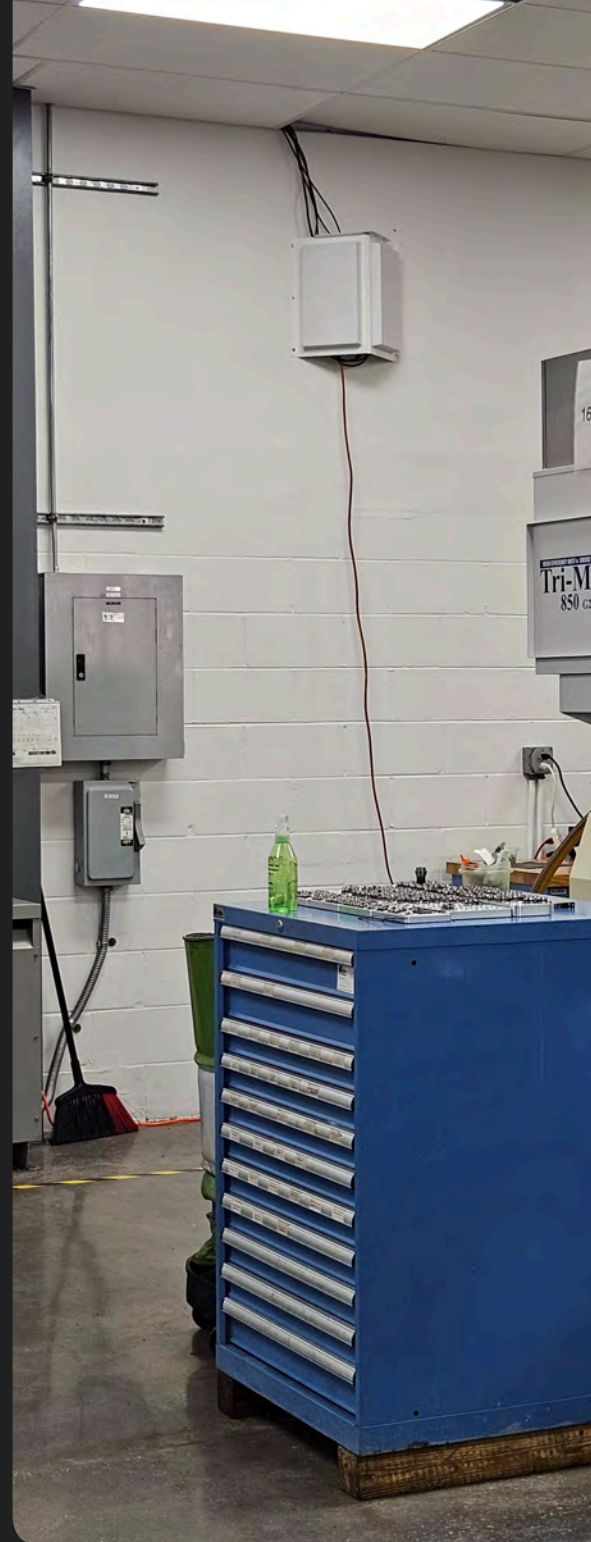
Unlike traditional antennas that concentrate gain in a narrow beam, Apogee™ 180MP delivers 9dBi passive peak transmit gain across a full 90° beamwidth in both the 5GHz and 2.4GHz bands. This ensures consistent signal strength across your entire coverage area.

Massive Coverage, Minimal Infrastructure

Each Apogee™ 180MP panel can provide reliable Wi-Fi coverage over large indoor and outdoor areas where multi-path degrades RF signal, drastically reducing the number of access points required. This translates to significantly less infrastructure, lowering both capital expenditures (CAPEX) and operational expenditures (OPEX) while maximizing ROI.

Enhanced MIMO Performance

Designed to optimize the performance of Wi-Fi Access Points, Apogee™ 180MP supports 2x2 MIMO per panel, enhancing the capacity and efficiency of your network. This results in better performance in multi-device environments, with higher data throughput and reduced latency.



APOGEE™ 180mp PRODUCT SPECS

| | | | |
|-----------------------|---|--------------------------|--|
| Operating Frequencies | 2.4GHz , 5.2 - 5.9GHz(WiFi 5, WiFi 6) | Environmental Resilience | -40°C to +60°C |
| Transmit Gain | 9dbi | MIMO Support | 2x2 MIMO per panel |
| Receive Gain | 24-26dbi | Power | PoE 803.af/at compatible, 48V DC nominal |
| RF Power Input | Up to 1 watts | LxWxH, Weight | 17" x6" x17", 6 lbs. |
| Connectors | 4 SMA Male External RF Ports, RJ45 Ethernet | | |

Unified Connectivity

The Apogee™ Converge is the world's first software-defined phased array antenna platform that merges Private LTE (CBRS) and Wi-Fi 5 & 6 into one powerful array.

Advanced configurable solution for private LTE and Wi-Fi convergence

The Apogee™ Converge is the world's first software-defined phased array antenna platform that combines Private LTE (CBRS) and Wi-Fi 5 & 6 into a single, high-performance array. Each Apogee panel integrates antenna elements for both 5GHz and CBRS (Band 48), delivering seamless coverage across expansive areas while optimizing connectivity for a wide range of applications.

By supporting simultaneous use of both 5GHz Wi-Fi and CBRS, Apogee enables enterprises to leverage the strengths of each band. High-bandwidth applications like surveillance and AR/VR can benefit from the broad capacity of 5GHz, while CBRS is ideal for secure, low-data use cases like IoT and Private LTE. This innovative design reduces infrastructure complexity and minimizes capital investment, empowering enterprises to deploy robust, scalable wireless networks.

Asymmetric Gain™

Apogee Converge Asymmetric Gain provides wireless devices with up to 24dbi of additional receive gain while keeping transmit gain FCC compliant. This enables very low power devices like smart phones, tablets and even IoT sensors to reliably connect over large distances.

Full Beamwidth Gain™

Unlike traditional antennas each Apogee panel generates 9dbi of passive peak transmit gain over its entire 90° beamwidth in both the 5GHz and 2.4GHz bands. Operating together, Apogee Converge's 4 panels generate a full 360° of 9dbi passive gain.

Steep, Powered Filters

Apogee features steep, powered filtering for both the 5GHz and Band 48. Combined with Apogee's Asymmetric gain, the resulting receive signal is both powerful and quiet.





4-Panel Phased Array Antenna

Each of the 4 panels independently features a 90° beam width and supports frequencies from 3550 MHz to 3700 MHz (Band 48) and 5250 MHz to 5900 MHz (for Wi-Fi 5 and Wi-Fi 6). The antenna offers Asymmetric gain, with 9 dBi on transmit and 26 dBi on receive, providing a balance between transmission power and reception sensitivity. Additionally, the panels are equipped with steep active filters that effectively separate Band 48 and Wi-Fi signals to reduce interference and optimize performance.

MIMO & Apogee™

Each Apogee panel is designed to enhance the MIMO (Multiple Input Multiple Output) performance of a Base Station or Wi-Fi Access Point by maximizing the number of data streams it can handle. For MIMO to be activated on a panel, at least two antenna ports operating in the same frequency band need to be assigned. Depending on the configuration, a panel can support both 2x2 and 4x4 MIMO, allowing for multiple data streams to be transmitted and received simultaneously, whether it's for Band 48 or the Wi-Fi 5 GHz spectrum.

Apogee panels also offer flexibility in polarity configuration, which can be set to vertical, horizontal, or hybrid modes. Hybrid polarity is particularly effective in environments with significant multi-path interference, like areas with dense foliage or indoor industrial spaces. By allowing at least two ports to be assigned to a panel, hybrid polarity helps boost the reliability of the transmission link, making it more robust in complex RF environments. This flexibility ensures that the Apogee platform can deliver optimal performance across various challenging deployment scenarios.

APOGEE CONVERGE PRODUCT SPECS

| | |
|--------------------------|--|
| Operating Frequencies | 3.5 Ghz - 3.7 Ghz (CBRS) 5.2 Ghz - 5.9 Ghz (Wi-Fi 5, Wi-Fi 6) |
| External RF Ports | 4 dedicated CBRS ports 4 dedicated Wi-fi 5 & 6 ports |
| Array Sectorization | Up to [4] 90° panels |
| Transmit Gain | 9dbi |
| Receive Gain | 24-26dbi |
| RF Power Input | Up to 1 watts |
| Polarization | Vertical, Horizontal, hybrid |
| Connectors | 4 SMA Male External RF Ports, RJ45 Ethernet |
| Environmental Resilience | -40°C to +60°C, IP65 Certification |
| MIMO Support | 2x2 MIMO per panel |
| Power | PoE 803.af/at compatible, 48V DC nominal |
| Height, OD, Weight | 22", 12", 22lbs |

Massive Coverage, Minimal Infrastructure

The Apogee platform includes 8 dedicated ports—4 for the 3550 MHz to 3700 MHz (Band 48) spectrum and 4 for the 5250 MHz to 5900 MHz (Wi-Fi 5 and Wi-Fi 6). It supports FCC-compliant Wi-Fi access points and Band 48 base stations, and its low insertion loss splitter can double the capacity of a single base station or Wi-Fi port.

Once connected, the Apogee Manager cloud interface allows users to assign bands to antenna panels and configure polarity, tilt, and single or dual-band operation. This flexibility enables highly customizable deployments, from precise coverage adjustments to optimizing performance across multiple bands.



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