Request for Proposal

Talbot County Public Schools
12 Magnolia St
Easton, Maryland 21601
Phone 410-822-0330
Fax 410-820-4260

Wireless Access Points
Easton Elementary School

Proposal Posting Date: January 24, 2025
Proposal Due Date: February 24, 2025 2:30 p.m.

CONTACT: Steve Wilson
PHONE: 410-822-0330, EXT 128
Email: swilson@talbotschools.org

Minority Business Enterprises (MBE's) are encouraged to participate.

The Talbot County Public Schools reserves the right to waive any informality in, or to reject, any or all proposals.

The Talbot County Public Schools does not discriminate in admissions, access, treatment, or employment in its programs and activities on the basis of race, sex, age, color, national origin, religion, disability, sexual orientation or other basis prohibited by law. Appropriate accommodations for individuals with disabilities will be provided upon request.

By order of Talbot County Public Schools

Sharon M. Pepukayi Ed.D.
Superintendent of Schools

Request for Proposal

Wireless Access Points

RFP Number	25-0126
RFP Contact Information	Stephen Wilson, IT Manager swilson@talbotschools.org
RFP Release Date	January 24, 2025
RFP Documents	Maryland e-Market place https://emaryland.buyspeed.com/bso/ Talbot County Public Schools http://www.tcps.k12.md.us/departments/Technology
Last date to email questions	February 18, 2025 Email questions to Steve Wilson swilson@talbotschools.org Subject Line Q&A RFP 25- 0126
Final question response	February 19, 2025
RFP closing Date – Time and Opening	February 24, 2025 2:00 PM
Submission Requirements	All submissions be will be e-filed to TCPSfinance@talbotschools.org or the eMaryland Marketplace (Emma) dropbox
RFP Selection	Prior to USAC form 471 filing date
Award of contract	Contingent upon Talbot County Board of Education approval and funding and on E-Rate funding approval
Contract Start date	July 1, 2025
Contract End Date	June 30, 2026

RFP Description:

This RFP is for new Wireless Access Points (WAPS) and warranty service to be delivered between July 1, 2025 and June 30, 2026. Talbot County Public Schools is requesting proposals for a Juniper Mist or equivalent wireless solution. TCPS will entertain proposed solutions from other manufacturers, however it is the vendor's responsibility and obligation to provide documentation and other evidence that a non-

Juniper Mist product is functionally equivalent or better. Equipment that is shown to be equivalent in function and warranty is acceptable. In the instance that the solution is non-Juniper Mist, proof of equal functionality must be shown. Failure to show equal functionality may result in the disqualification of the bid. To be considered a functional equivalent, the competing product must include the following:

- Access Points must be 4x4:4 tri-radio WiFi 6E capable, able to operate in the 2.4, 5, and 6GHz bands, equivalent to the Juniper Mist AP45.
- Equivalents for Juniper Mist AP45E, in addition to the above features, must be capable of supporting external antennae and include a compatible 10 element external antenna equivalent to the Acceltex ATS-02855 with 7dBi gain, horizontal beamwidth of 120°/105°/105°, and vertical beamwidth of 75°/60°/60°, respective to the 2.4, 5, and 6GHz bands.
- Management platform must be cloud-based, microservices architecture.
- Configured wireless networks must continue to function in the event of a loss of connectivity to the cloud management platform.
- Access Points must contain a dedicated third radio for dual-band WIDS/WIPS, spectrum analysis, synthetic client and location analytics.
- Ability to configure, monitor and enforce service level expectations for individual sites and/or the entire network.
- Management platform must include simple root cause analysis and remediation.
- Management platform must include automated dynamic packet capture, stored and accessible from the cloud.
- Management platform must include comprehensive network performance and service level reporting.
- Management platform must include a natural language processing engine to process queries for troubleshooting
- Must have the ability to profile both manually and automatically client devices based on device type, device OS, application, location, and user role.
- Must be able to automatically process RMA (Return Materials Authorization) in the event of hardware failure.
- Must be able to automatically update firmware.
- Must have advanced policy implementation features comparable with Juniper Mist's WxLAN feature.

This project is subject to the approval of funds by the Talbot County Public Schools Board of Education, it's funding agency, the Talbot County Council, and approval by the Universal Service Administrative Company (USAC), Schools and Libraries Division (SLD). Any vendor to be considered for the award must be an authorized partner/reseller or equivalent status for the proposed products and services and meet all the criteria as required by USAC/SLD. In the event of partial funding of this project, TCPS reserves the right to prioritize and purchase a partial amount of bid prices.

Included in this RFP is a complete description of the proposed equipment, extended warranties, and installation location. List all equipment and software proposed to include model numbers, version numbers, etc. All equipment should be priced FOB Talbot County Education Center, 12 Magnolia Street Easton MD 21601, and is subject to approval by TCPS.

In addition to the USAC/SLD websites, RFP notices will be posted in the Talbot County Public Schools' Website and available at the Talbot County Public Schools' Central Office, posted on the Maryland eMarketPlace and the Star Democrat.

All questions or requests for RFP interpretation shall be submitted in writing via email to Steve Wilson swilson@talbotschools.org

All bidders shall be registered as a service provider with the Universal Service Administrative Company–School and Libraries Division (USAC-SLD) for the E-Rate Program. Bidders agree to comply with all requirements of the E-Rate Program for service providers. All bidders shall furnish their Service Provider Identification Number (SPIN) on their bid form. Minority Business Enterprises are encouraged to participate. SPIN Numbers may be obtained by submitting a FCC Form 498. See the USAC website for more information. http://www.usac.org/sl/service-providers/step01/default.aspx.

All bidders must submit an affidavit (attached herein) with their bid confirming that they are not debarred or suspended from doing business with recipients of federal funds, and that they are in compliance with other specified local, state, and federal procurement laws and regulations.

The Form 472 BEAR method of reimbursement will be utilized for reimbursement of eligible E-Rate funds. Service provider shall invoice the full amount and the Board of Education will apply for the E-Rate discount. The service provider is responsible for stating the eligibility percentage of all products or services to be offered on the Bid Form. These eligibility percentages will be used by the applicant on the Form 471.

Depending on the products and/or services offered the applicant may elect to use the Form 474 Service Provider Invoice (SPI) method. Using this method, the service provider will invoice the applicant for only the non-discount portion of the cost as shown on the Funding Commitment Decision Letter (FCDL). The service provider may then file a Form 474 for reimbursement from USAC for the discount portion of the cost as also shown on the FCDL. Whichever method is used, the service provider is responsible for stating the eligibility percentage of all products or services to be offered on the Bid Form. These eligibility percentages will be used by the applicant on the Form 471. The service provider will be notified of the reimbursement method to be used when the purchase order is issued.

If the service provider intends for there to be a contract for the services being bid, then a copy of the contract signed by the bidder shall be submitted with the bid. The contract shall also include a signature line for approval by the bidding entity.

If your bid includes any item for which either the manufacturer or USAC have determined E-Rate funding eligibility, then you must list the part number/SKU of the item, its E-Rate eligibility percentage, and the source of the eligibility determination. Include this documentation with your bid submission.

Attach to the Bid a complete description of the proposed equipment including performance specifications, proposed technological solutions, equipment, warranties, etc. List all equipment and software proposed to include description, SKU, cost, model numbers, version numbers, etc. All equipment and services are subject to approval by TCPS. Service provider shall identify any specific services, components or costs that are not eligible for E-Rate funding. **Any components or services not eligible for E-Rate funding must be cost allocated separately on the Bid Form.**

Service provider shall identify on the Bid Form which products and/or services are eligible for E-Rate funding in either Category 2 Internal Connections or in Category 2 Basic Maintenance of Internal Connections, including their percentage of E-Rate eligibility. See the Bid Form.

On the bid form itemize all equipment/services including all accessories included in the bid if these are priced as separate items; for example: cables, optical receivers, fan units, configuration, licenses, installation, power supplies, etc.

A manufacturer's multi-year warranty for a period of up to three years that is provided as an integral part of an eligible component, without a separately identifiable cost, may be included in the cost of the component. If your bid includes any such warranty, provide a detailed description.

List separately support and service costs that are identified as E-Rate eligible Category 2 Basic Maintenance of Internal Connections. Contract term for eligible support services shall be for a minimum of five years beginning July 1, 2025.

Any bid containing pricing for Basic Maintenance of Internal Connections (BCIM) shall cross reference the specific equipment, building location, and term of service (beginning and end dates).

Talbot County Public Schools reserves the right to waive any informality in, or to reject any and all bids.

Talbot County Public Schools reserves the right to award the contract (subject to funding) to the vendor who offers the best solution in the sole opinion of the school system. Price will be weighted most heavily when evaluating proposed solutions.

In accordance with FCC Rules, proposals that include equipment from Huawei, ZTE, or any other companies deemed a national security risk by the FCC will be disqualified. See the USAC website for more Information.

Talbot County Public Schools reserves the right to terminate a contract for failure to comply with the terms of the contract.

The Talbot County Public Schools does not discriminate in admissions, access, treatment, or employment in its programs and activities on the basis of race, sex, age, color, national origin, religion, disability, sexual orientation or other basis prohibited by law. Appropriate accommodations for individuals with disabilities will be provided upon request.

Easton Elementary School
Connections
Maintenance of IC

IC = Internal
BMIC = Basic

Qty	Part Number (or Equivalent)	Description	Unit Cost	Extended Price	**Percent E-Rate Eligible as IC BMIC**	
105	B-AP45-1S-5Y-E	Juniper Mist AP45 - wireless access point - Wi-Fi 6E, Wi-Fi 6, Bluetooth - cloud				
3	B-AP45E-1S-5YE	Juniper Mist eRate AP45E Access Point Bundle with 5 Year Cloud Subscription, external antenna required				

95	ATS-APLBKTUNIV1	AccelTex Solutions Universal AP L Bracket Wall Mount network device mount				
3	ATS-APANTARTMNT-UNIV3	AccelTex Universal Access Point and Antenna Articulating Mount - Version 3				
3	ATS-02855	AccelTex Solutions antenna - 10 element with 10 MPC				
		Building Total				

Attachments: Data Sheets

Warranty: All proposed Wireless Access Points should include a minimum of a 5-year hardware warranty and lifetime software support.

My company, _____ is an Authorized Reseller of the products proposed and have a SPIN or completed application USAC/ FCC form number 498 for a Service Provider Application Number (SPIN).

_____   _____
Authorized Signature   Date

_____
Printed   Email and Phone Number

SPIN Number_____

Contract Affidavit

A. AUTHORITY

I HEREBY AFFIRM THAT: I, _____ (name of affiant) am the _____ (title) and duly authorized representative of _____ (Contractor name) and that I possess the legal authority to make this affidavit on behalf of the business for which I am acting.

B. CERTIFICATION OF REGISTRATION OR QUALIFICATION WITH THE STATE DEPARTMENT OF ASSESSMENTS AND TAXATION I FURTHER AFFIRM THAT:

The business named above is a (check applicable items):

(1) Corporation: ___ domestic or ___ foreign;

(2) Limited Liability Company: ___ domestic or ___ foreign;

(3) Partnership: ___ domestic or ___ foreign;

(4) Statutory Trust: ___ domestic or ___ foreign; (5) ___ Sole Proprietorship and is registered or qualified as required under Maryland Law.

I further affirm that the above business is in good standing both in Maryland and (IF APPLICABLE) in the jurisdiction where it is presently organized, and has filed all its annual reports, together with filing fees, with the Maryland State Department of Assessments and Taxation. The name and address of its resident agent (IF APPLICABLE) filed with the State Department of Assessments and Taxation is:

Name and Department ID

Number: _____   Address:_____

and that if it does business under a trade name, it has filed a certificate with the State Department of Assessments and Taxation that correctly identifies that true name and address of the principal or owner.

C.   EMPLOYMENT OF SEX OFFENDERS AND OTHER CRIMINAL OFFENDERS

I further affirm that I am aware of, and the above business will comply with, the following requirements of Section 11722 of the Criminal Procedure Article, and Section 6-113 of the Education Article, Annotated Code of Maryland:

Maryland Law requires sex offenders to register with the State and with the local law enforcement agency in the county in which they will reside, work, or attend school. A TCPS contractor may not knowingly employ an individual to work at a school if the individual is a registrant. A contractor violating this Law is guilty of a misdemeanor and may be subject to imprisonment not exceeding five years or a fine not exceeding $5,000, or both.

See *Section 11-722 of the Criminal Procedure Article, Annotated Code of Maryland.*

A TCPS contractor or subcontractor may not knowingly assign an employee to work on school premises with direct, unsupervised, and uncontrolled access to children, if the employee has been convicted of:

1) Section 3-307 of the Criminal Law Article, Maryland Annotated Code, *Sexual Offense in the Third Degree*;
2) Section 3-308 of the Criminal Law Article, Maryland Annotated Code, *Sexual Offense in the Fourth Degree*;
3) An offense under the laws of another state that would constitute a violation of Sections 3-307 or 3-308 of the Criminal Law Article if committed in Maryland;
4) Child sexual abuse under Section 3-602 of the Criminal Law Article, Annotated Code of Maryland;
5) An offense under the laws of another state that would constitute child sexual abuse under Section 3-602 of the Criminal Law Article if committed in Maryland;

6) A crime of violence as defined in Section 14-101 of the Criminal Law Article, Annotated Code of Maryland; or
7) An offense under the laws of another state that would constitute a crime of violence under Section 14-101 of the Criminal Law Article if committed in Maryland.

See Section 6-113 of the Education Article, Annotated Code of Maryland

D. CONTRACTOR SCREENING OF EMPLOYMENT APPLICANTS HAVING DIRECT CONTACT WITH MINORS (if applicable)

In addition to the requirements of Section C above, Contractor shall comply with the requirements of Section 6-113.2 of the Education Article, Maryland Annotated Code, regarding screening of applicants for employment.

E. AFFIRMATION REGARDING BRIBERY CONVICTIONS

I further affirm, neither I or to the best of my knowledge, the above firm, nor any of its officers, directors, or partners, or any of its employees directly involved in obtaining contracts with the State or any County, bi-County, or multi-County agency, or subdivision of the State have been convicted of, or have pleaded nolo contendere to a charge of, or have during the course of any official investigation or other proceeding admitted in writing or under oath, acts or omissions committed after July 1, 1977 which constitute bribery, attempted bribery, or conspiracy to bribe under the provisions of Article 27 of the Annotated Code of Maryland or under the laws of any other State or the Federal government.

F. AFFIRMATION REGARDING COLLUSION

I further affirm that neither I nor, to the best of my knowledge, information and belief, the above business has:

1) Agreed, conspired, connived or colluded to produce a deceptive show of competition in the compilation of the accompanying bid or offer that is being submitted; or,

2) In any manner, directly or indirectly, entered into any agreement of any kind to fix the bid/ proposal price of the bidder/offeror of any competitor, or otherwise taken any action in restraint of free competitive bidding in connection with the contract for which the accompanying bid or offer is submitted.

G. AFFIRMATION REGARDING DEBARMENT

I further affirm that neither I nor, to the best of my knowledge, information and belief, the above business, or any of its officers, directors, partners, or any of its employees directly involved in obtaining contracts with public bodies, has ever been suspended or debarred (including being issued a limited denial of participation) by any public entity, except as follows (use a separate sheet to list each debarment or suspension, providing the dates of the suspension or debarment, the name of the public entity, the status of the proceedings, the name(s) and position of the parties involved, and all pertinent details).

I further affirm that (1) the business was not established and it does not operate in a manner designed to evade the application of or defeat the purpose of debarment pursuant to Section 16-101, et seq, of the State Finance and Procurement Article of the Annotated Code of Maryland; and, (2) the business is not a successor, assignee, subsidiary, or affiliate of a suspended or debarred business, except as follows (indicate the reasons why the affirmations cannot be given without qualification):

_____

_____

Violations of any of these provisions may result in immediate termination for cause.

I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THIS AFFIDAVIT ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF.

Date: _____

_____

(printed name of Authorized Representative and affiant   )

By:_____

(signature of Authorized Representative and affiant)

JUNIPER
NETWORKS | **Driven by Experience™**

AP45 ACCESS POINT DATASHEET

Product Overview

The Juniper AP45 flagship access point brings the highest performance and vBLE technology to the 6 GHz band for enterprises needing increased channel widths and capacity and advanced location-based services.

Juniper Mist Benefits
- Ease of deployment and ongoing management
- Centralized control and visibility
- Quick access to new features and functionality with no disruption to services
- Agility to scale as network needs grow

Product Description

The Juniper® AP45 flagship indoor Wi-Fi 6E access point is ideal for the most demanding Wi-Fi applications, including high-density environments. The AP45 is a tri-band device with a dedicated fourth radio to allow more capacity, wider channels, and less interference to support growing mobility demands and digital transformation efforts.

The AP45 brings enterprise-grade Wi-Fi and patented virtual BLE (vBLE) technology together so businesses can increase the value of their wireless networks through personalized location services, including user engagement, asset visibility, and contact tracing. The AP45 provides the industry's most accurate and scalable location services with no need for battery-powered BLE beacons or manual calibration.

While wired and wireless networks are business critical, without the right architecture they can be harder to operate given the sheer number of mobile and IoT devices—not to mention the extensive variety of hardware, operating systems, and applications currently in use. Traditional architectures—highly manual and network-centric—lack the scale, flexibility, and end-to-end visibility required to support modern mobility requirements and the IT departments that manage them.

Juniper AI-Driven Network

Juniper Mist™ brings true innovation to wireless networking with the world's first AI-driven wireless LAN (WLAN). The Juniper AI-Driven Enterprise makes Wi-Fi predictable, reliable, and measurable, offering unprecedented visibility into the user experience through the use of unique service-level expectation (SLE) metrics. Proactive, AI-driven automation and a self-healing network replace time-consuming manual tasks, lowering Wi-Fi operational costs and saving substantial time and money. All operations are managed using the open and programmable microservices that are based on the Juniper Mist cloud architecture.

The Juniper Mist Cloud Architecture

The Juniper Mist cloud-native, AI-driven microservices architecture delivers unparalleled agility, scale, and resiliency to your network. It lowers OpEx and delivers unprecedented insights into network performance, behaviors, traffic patterns, and potential trouble spots by using data science to analyze large amounts of rich metadata collected by the Juniper Access Points. Juniper AI solutions for Wi-Fi 6E optimize operator and user experiences with secure, client-to-cloud automation, insight, and AI-driven actions.

Juniper Access Point Family

The Juniper enterprise-grade access point family consists of:

- AP45 Series. AP34 , and AP24, which support Wi-Fi 6E, 802.11ax (Wi-Fi 6), and Bluetooth LE
- AP43 Series, AP33, AP32, AP12, and AP63 Series, which support 802.11ax (Wi-Fi 6) and Bluetooth LE

The real-time microservices in Juniper Mist cloud manage all these access points.

Table 1 compares the supported major functions of the Juniper Wi-Fi 6E and Wi-Fi 6 access points to help in selecting the most appropriate model(s).

Table 1: Juniper Wi-Fi 6E and Wi-Fi 6 Access Points

	AP45	AP34	AP24	AP43	AP33	AP12	AP63	AP64
Deployment	Indoor	Indoor	Indoor	Indoor	Indoor	Indoor Wall Plate/ Desk Mount	Outdoor	Indoor/Outdoor
Wi-Fi Standard	Wi-Fi 6E 802.11ax (Wi-Fi 6E) 4x4:4	Wi-Fi 6E 802.11ax (Wi-Fi 6E) 2x2:2	Wi-Fi 6E 802.11ax (Wi-Fi 6E) 2x2:2 2.4/6 + 5 GHz	802.11ax (Wi-Fi 6) 4x4:4	802.11ax (Wi-Fi 6) 5 GHz: 4x4:4 2.4 GHz: 2x2:2	802.11ax (Wi-Fi 6) 2x2:2	802.11ax (Wi-Fi 6) 4x4:4	802.11ax (Wi-Fi 6E) 2x2:2
Wi-Fi Radios	Dedicated fourth radio for scanning	Dedicated fourth radio for scanning	Dedicated third radio for scanning	Dedicated third radio for scanning	Dedicated third radio for scanning	Dedicated third radio for scanning	Dedicated third radio for scanning	Dedicated third radio for scanning
Antenna Options	Internal/External	Internal	Internal	Internal/External	Internal	Internal	Internal/External	Internal
Virtual BLE	✓	---	---	✓	✓	---	✓	---
USB	✓	✓	✓	✓	✓	---	---	---
IoT Sensors	Temperature, Accelerometer	Temperature, Accelerometer	Temperature, Accelerometer	Humidity, Pressure, Temperature	Temperature, Accelerometer	---	Humidity, Pressure, Temperature	Temperature, Accelerometer
GPS/GNSS	---	---	---	---	---	---	---	✓
Warranty	Limited Lifetime	Limited Lifetime	Limited Lifetime	Limited Lifetime	Limited Lifetime	Limited Lifetime	One Year	One Year
Frequencies Supported	2.4 GHz, 5 GHz, 6 GHz	2.4 GHz, 5 GHz, 6 GHz	2.4 GHz, 5 GHz, 6 GHz	2.4 GHz, 5 GHz	2.4 GHz, 5 GHz	2.4 GHz, 5 GHz	2.4 GHz, 5 GHz	2.4 GHz, 5 GHz, 6 GHz

Services Available for the Juniper AP45

Wi-Fi Cloud Services

Juniper Mist Wi-Fi Assurance

For IT and NOC Teams

- Predictable and Measurable Wi-Fi
- Service-Level Expectations (SLEs) Support
- WxLAN Policy Fabric for Role-Based Access
- Customizable Guest Wi-Fi Portal
- Radio Resource Management (RRM) Driven by AI

Bluetooth Cloud Services

Juniper Mist Mobile Engagement

For Digital Experience Teams

- Accurate (1-3m) Turn-by-Turn Navigation
- Sensor Fusion with Dead Reckoning
- Unsupervised Machine Learning
- Virtual Beacons with Custom Notifications
- Mobile SDK for iOS and Android

Marvis™ Virtual Network Assistant

For IT Helpdesk Teams

- AI-Powered Virtual Network Assistant
- Natural Language Processing Interface
- Anomaly Detection
- Client SLE Visibility and Enforcement
- Data Science-Driven Root-Cause Analysis

Juniper Mist Asset Visibility

For Process and Resource Improvement Teams

- Identification of Assets by Name and Location Visibility
- Zonal/Room Accuracy for Third-Party Tags
- Historical Analytics for Asset Tags
- Telemetry for Asset Tags (temperature, motion, and other data)
- APIs for Viewing Assets and Analytics

Analytics Cloud Services

Juniper Mist Premium Analytics

For Network Teams

- Baseline Analytics Features Come Included with Wi-Fi Assurance, Mobile Engagement, and Asset Visibility Subscriptions
- End-to-End Network Visibility
- Orchestrated Networking and Application Performance Queries
- Simplified Network Transparency

For Business Teams

- Baseline Analytics Features Come Included with Wi-Fi Assurance, Mobile Engagement, and Asset Visibility Subscriptions
- Customer Segmentation and Reporting Based on Visitor Telemetry
- Customized' Dwell and Third-Party Reporting for Traffic and Trend Analysis
- Correlation of Customer-Guest Traffic and Trend Analysis
- Correlated Customer-Guest Traffic and Trend Analysis

Access Point Features

High-Performance Wi-Fi

The AP45 Series is a four radio, four-spatial stream 802.11ax access point with maximum data rates of 4800 Mbps in the 6 GHz band, 2400 Mbps in the 5 GHz band, and 1148 Mbps in the 2.4 GHz band. The dedicated fourth radio functions as a network, location, and security sensor, as well as a synthetic test client radio and a spectrum monitor. With 802.11ax Orthogonal Frequency Division Multiple Access (OFDMA), Multi-User Multiple Input Multiple Output (MU-MIMO), and BSS Coloring technologies, the AP45 Series offers performance at unprecedented levels to support new bandwidth-hungry applications and soaring device densities.

AI for AX

With the features 802.11ax (Wi-Fi 6E) offers to boost performance and efficiency, configuring and operating an access point has grown far more complex. Juniper automates and optimizes these features with AI for AX capabilities to optimize BSS Coloring, improve data transmission scheduling within OFDMA and MU-MIMO, and assign clients to the best radio to boost the overall performance of the network.

Greater Spectral Efficiency

OFDMA improves spectral efficiency so that an increasing density of devices can be supported on the network. Density has become an issue with the rapid growth of IoT devices, which often utilize smaller data packets than mobile devices and hence increase the burden and contention on the network. Additionally, BSS Coloring improves the coexistence of overlapping BSSs and allows spatial reuse within a given channel by reducing packet collisions.

Automatic RF Optimization

With the increasing complexity that the addition of 6GHz spectrum to the 2.4GHz and 5GHz spectrum brings, reliable RF optimization is even more critical than in the past. Radio Resource Management automates dynamic channel and power assignment, taking Wi-Fi and external sources of interference into account with a dedicated sensor radio. The AI engine continuously monitors coverage and capacity SLE metrics to learn and optimize the RF environment. A learning algorithm uses hysteresis on a 24-hour window to conduct a sitewide rebalancing for optimal channel and power assignment.

Proactive Insight and Action

A dedicated, tri-band fourth radio collects data for Juniper's patent-pending Proactive Analytics and Correlation Engine (PACE), which uses machine learning to analyze user experiences, correlate problems, and automatically detect their root causes. These metrics are used to monitor SLEs and provide proactive recommendations to ensure problems don't occur (or are fixed as quickly as possible when they do). This radio also functions as a synthetic test client to proactively detect and mitigate network anomalies.

Improved IoT Battery Efficiency

By incorporating the 802.11ax target wake time (TWT) capability and Bluetooth 5.1, AP45 access points help extend the battery life of IoT devices, particularly as additional ones join the network.

Dynamic Debugging

Constantly monitor services running on the AP45 and send alerts whenever a service behaves abnormally. Dynamic debugging relieves IT of having to worry about an AP going offline or any services running on it becoming unavailable.

Dynamic Packet Capture

The Juniper Mist platform automatically captures packets and streams them to the cloud when major issues are detected. This saves IT time and effort and eliminates the need for truck rolls with sniffers to reproduce and capture data for troubleshooting.

Marvis Virtual Network Assistant

Marvis is a natural language processing (NLP)-based assistant with a conversational interface that helps the understanding of user intent and goals, simplifies troubleshooting, and collects network insights. It uses AI and data science to proactively identify issues, determine the root causes and scope of impact, and gain insights into your network and user experiences. It eliminates the need to manually hunt through endless dashboards and CLI commands.
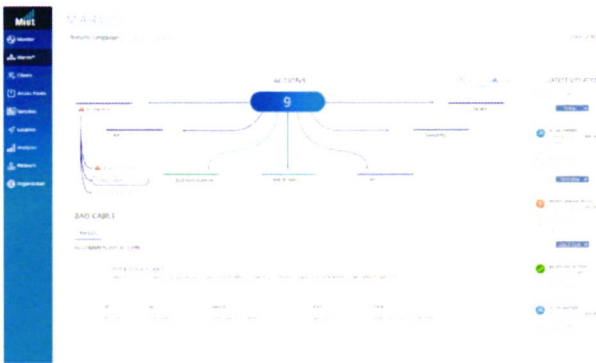
Effortless, Cloud-Based Setup and Updates

The AP45 automatically connects to the Juniper Mist cloud, downloads its configuration, and joins the appropriate network. Firmware updates are retrieved and installed automatically, ensuring that the network is always up to date with new features, bug fixes, and security updates.

Premium Analytics

Juniper Mist Wireless Assurance, User Engagement, and Asset Visibility services include a base analytics capability for analyzing up to 30 days of data, which enables you to simplify the process of extracting network insights across your enterprise. If you require dynamic insights like motion paths[1] and other third-party[1] data and would like the option of customized reports, the Juniper Mist Premium Analytics service is available as an additional subscription.
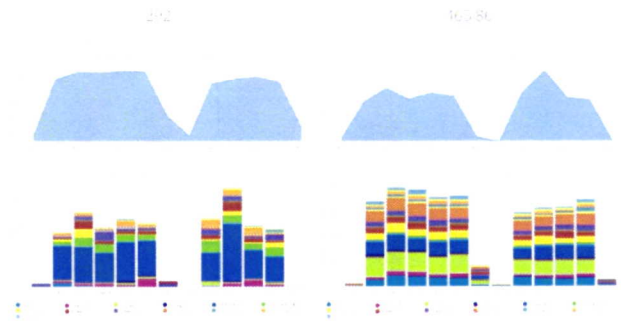
High-Accuracy Indoor Location

The AP45 has a 16-element vBLE antenna array controlled from the Juniper Mist cloud. Passive antennas enhance the power of a single transmitter and produce directional beams (or can be combined to act as an omnidirectional radio) to accurately detect distance and location with 1-3 meter accuracy. With Juniper's patented vBLE technology, you can deploy an unlimited number of virtual beacons in your physical environment with no need to install battery-powered physical BLE beacons. Support for Bluetooth 5.1 boosts IoT device range and battery life.
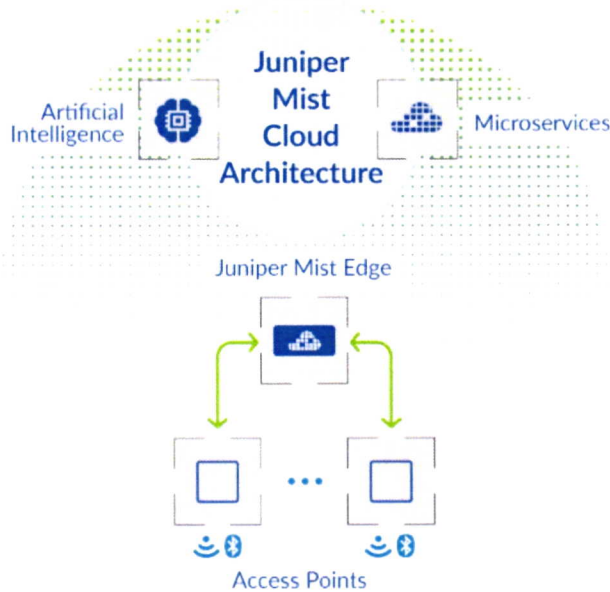
Patented vBLE Technology

In addition to the industry-leading Wi-Fi technology at the heart of the AP45 access point, our second-generation, patented, and dynamic, 16-element vBLE antenna array combines with machine learning to eliminate the need for battery-powered beacons. This

maximizes scalability and optimizes your deployment investment in location-based services.

vBLE enables businesses to provide rich location-based experiences that are engaging, accurate, real-time, and scalable.

Juniper Mist Cloud Architecture

Artificial Intelligence · Microservices

Juniper Mist Edge

Access Points

Juniper Mist Edge

Juniper APs offer a flexible data plane. Juniper Mist Edge is an on-premises appliance that runs a tunnel termination service. Traffic can be broken out locally or tunneled to Juniper Mist Edge.

Juniper Mist Edge use cases include seamless mobility in large campus environments, tunneling of guest traffic to a DMZ, IoT segmentation, and teleworker services.

Specifications

Wi-Fi Standard	802.11ax (Wi-Fi 6), including support for OFDMA, 1024-QAM, MU-MIMO, Target Wake Time (TWT), Spatial Frequency Reuse (BSS Coloring). Backwards compatibility with 802.11a/b/g/n/ac
Combined Highest Supported Data Rates	Tri-Band: 8.3 Gbps Dual 5 GHz (internal antenna model): +6 GHz 9.6 Gbps

2.4 GHz	4x4:4 802.11ax up to 1,148 Mbps data rate
5 GHz	4x4:4 802.11ax up to 2,400 Mbps data rate
6 GHz	4x4:4 802.11ax up to 4,800 Mbps data rate
MIMO Operation	Four spatial stream SU-MIMO for up to 4,800 Mbps wireless data rate to individual 4x4 HE160 Four spatial stream MU-MIMO for up to 4,800 Mbps wireless data rate to up to four MU-MIMO capable client devices simultaneously
Dedicated Fourth Radio	2.4 GHz, 5 GHz, and 6 GHz tri-band WIDS/WIPS, spectrum analysis, synthetic client and location analytics radio
Internal Antennas (AP45)	Four 2.4 GHz omnidirectional antennas with 4 dBi peak gain Four 5 GHz omnidirectional antennas with 6 dBi peak gain Four 6 GHz omnidirectional antennas with 6 dBi peak gain
Bluetooth 5.1	vBLE 16-element Directional Antenna Array + Omni Bluetooth Antenna
Beam Forming	Transmit Beamforming and Maximal Ratio Combining
Power Options	• 802.3af: Single radio 1x1 + BLE and Scan, Eth0 1 Gbps, Eth1 disabled, no USB. This mode is meant to connect to the cloud and tell you AP needs more power • 802.3at: Any two radios 4x4 or with three data radios - 2x2 on 2.4 GHz, 4x4 on 5 GHz, and 2x2 on 6 GHz, BLE and Scan, No PSE out or USB • 802.3bt: Full function, tri radio 4x4, scan, BLE, eth0, eth1 + PSE out, USB
Dimensions	230 mm x 230 mm x 50 mm
Shipping Box	289 mm x 268 mm x 191 mm
Weight	AP45 is 2.01 kg, AP45E is 1.97 kg
Operating Temperature	Internal antenna: 0° to 40° C External antenna: -10° to 50° C
Operating Humidity	10% to 90% maximum relative humidity, non-condensing
Operating Altitude	3,048 m (10,000 ft)
Trusted Platform Module (TPM)	Includes a TPM for infrastructure security

I/O and Indicators

IoT Sensors	Temperature, Accelerometer
USB	USB 2.0 support interface, 900 mA output
Eth0	100/1000/2500/5000Base-T (802.3bz); RJ45; PoE PD
Eth1	10/100/1000Base-T; RJ45; optional PoE 15.4W PSE mode (requires 802.3bt on Eth0)
External Antennas (AP45E)	Two pluggable antenna connectors; 2.4/5 (4 pin), 6+Scan (6 pin)
Reset	Reset to the factory default settings
Indicators	One multicolor status LED
Traffic Forwarding Options	Eth0, Eth1, Juniper Mist Edge

Mounting Brackets

APBR-U²	Universal bracket
APBR-ADP-M16	16mm threaded rod (M16-2)
APBR-ADP-T58	3/8" Threaded Rod
APBR-ADP-CR9	9/16" T-Rail, Channel Rail
APBR-ADP-RT15	15/16" T-Rail

| APBR-ADP-WS15 | 1-1/2" T-Rail |
| APBR-ADP-T12 | 1/2" threaded rod |

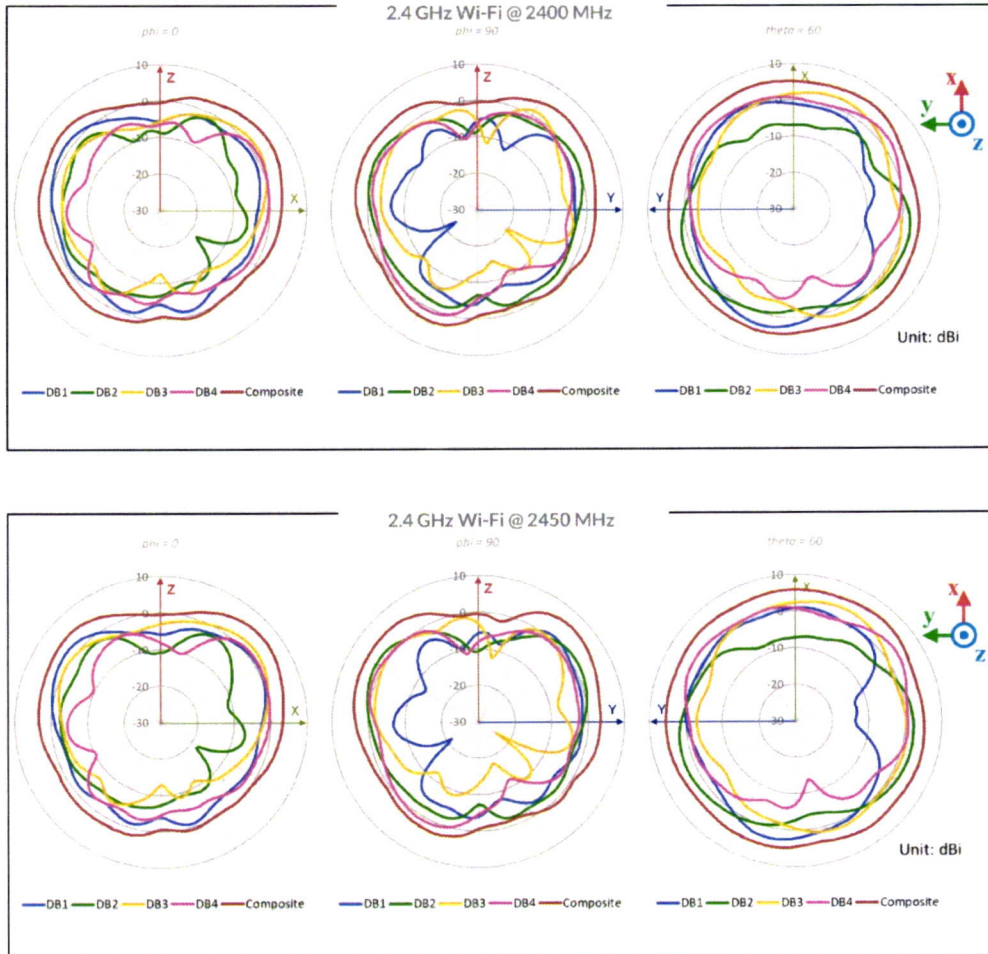²The AP package includes one Universal Bracket. APBR-U is available separately as an accessory.

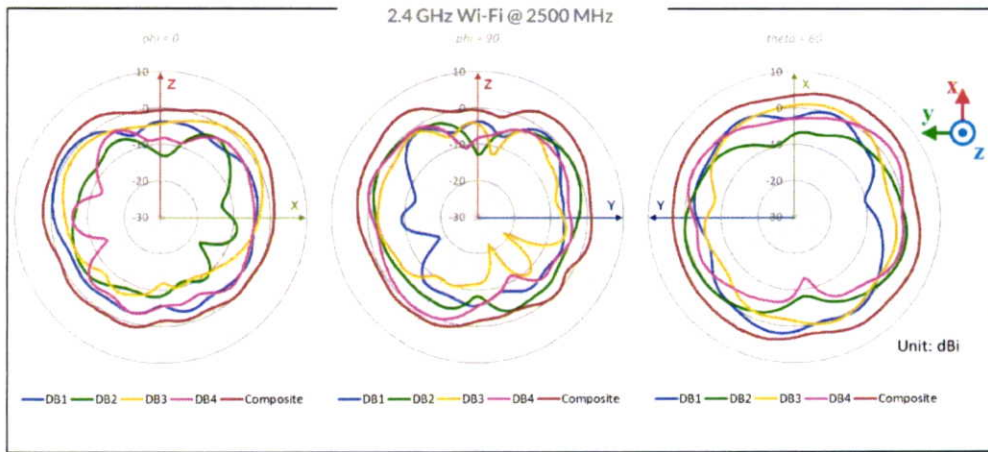## Ordering Information

United States Only	AP45-US (Internal Antenna)
	AP45E-US (External Antenna)
Outside of United States	AP45-WW (Internal Antenna)
	AP45E-WW (External Antenna)

* Juniper products are manufactured in accordance with electrical and environmental regulations specific to certain regions and countries. Customers are responsible for ensuring that any regional or country-specific SKUs are only used in the specified authorized area. Failure to do so may void the warranty of the Juniper products.

AP45 Dual Band Radio 2.4 GHz Wi-Fi Antenna Plots

2.4 GHz Wi-Fi @ 2500 MHz

AP45 Dual Band Radio 5 GHz Wi-Fi Antenna Plots
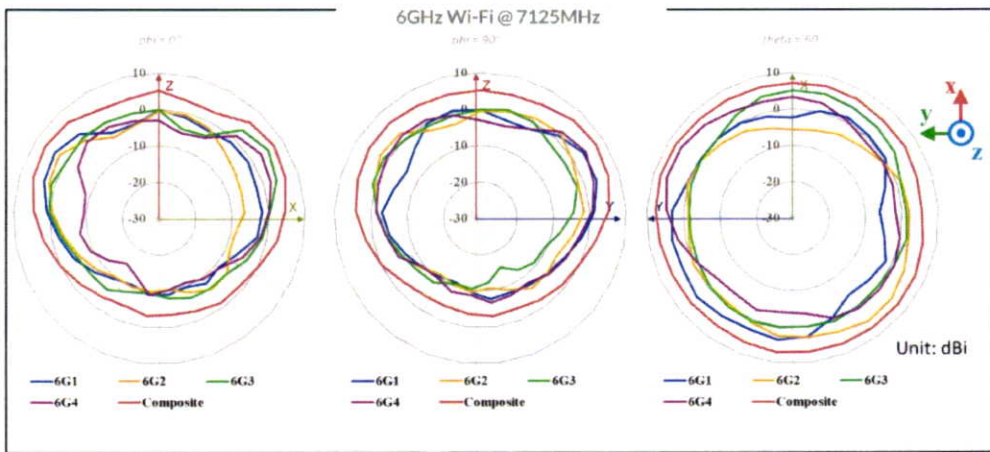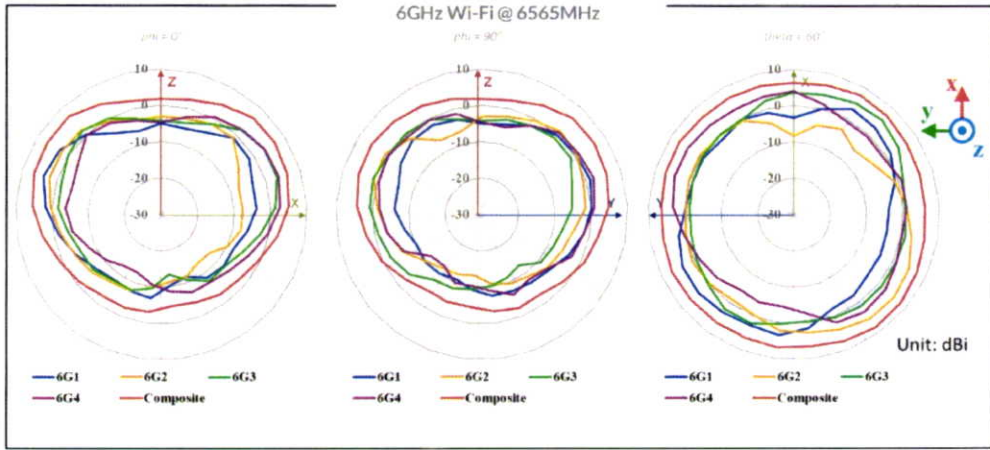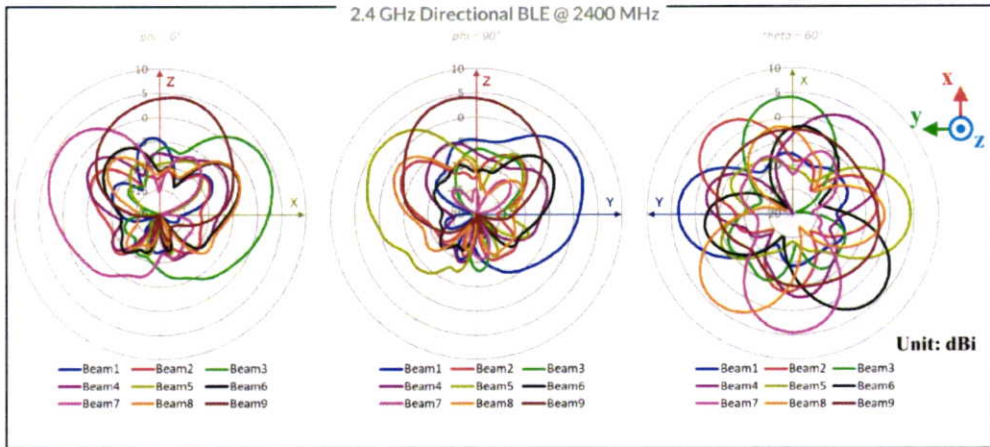

5GHz Wi-Fi @ 5150MHz

5GHz Wi-Fi @ 5350MHz

5GHz Wi-Fi @ 5550MHz

5GHz Wi-Fi @ 5850MHz

AP45 6 GHz Wi-Fi Antenna Plots

6GHz Wi-Fi @ 5925MHz

6GHz Wi-Fi @ 6565MHz

Unit: dBi

6GHz Wi-Fi @ 7125MHz

Unit: dBi
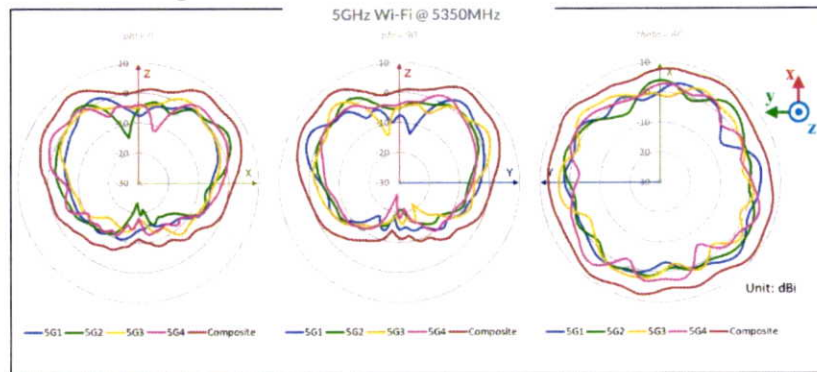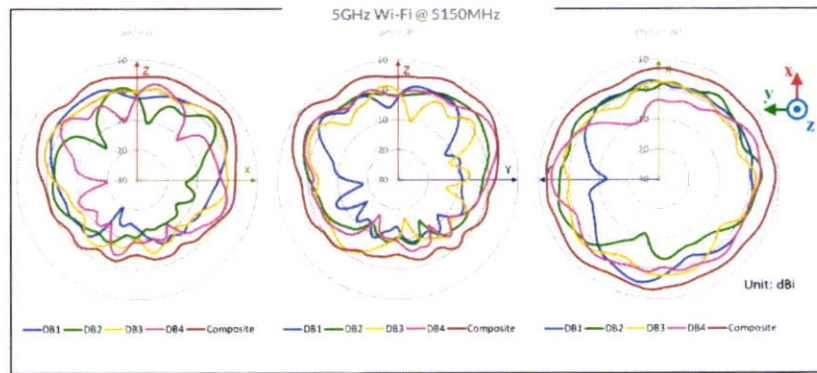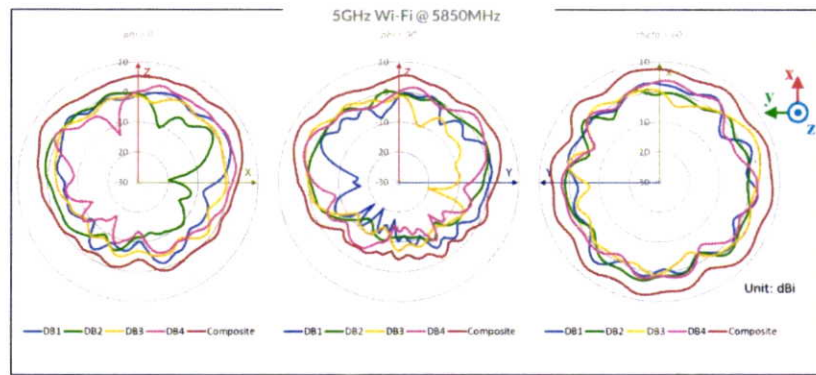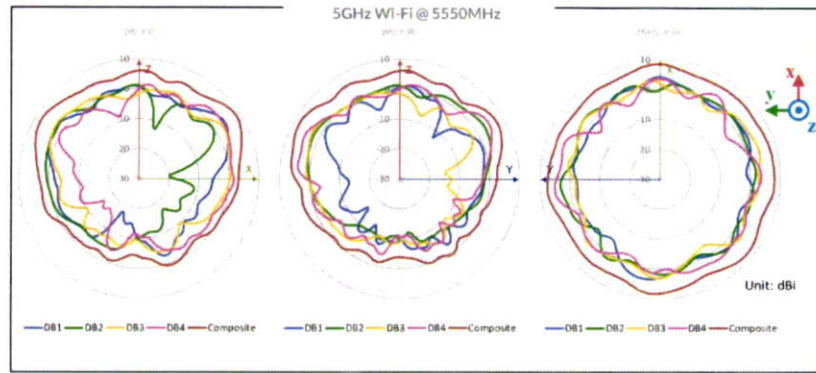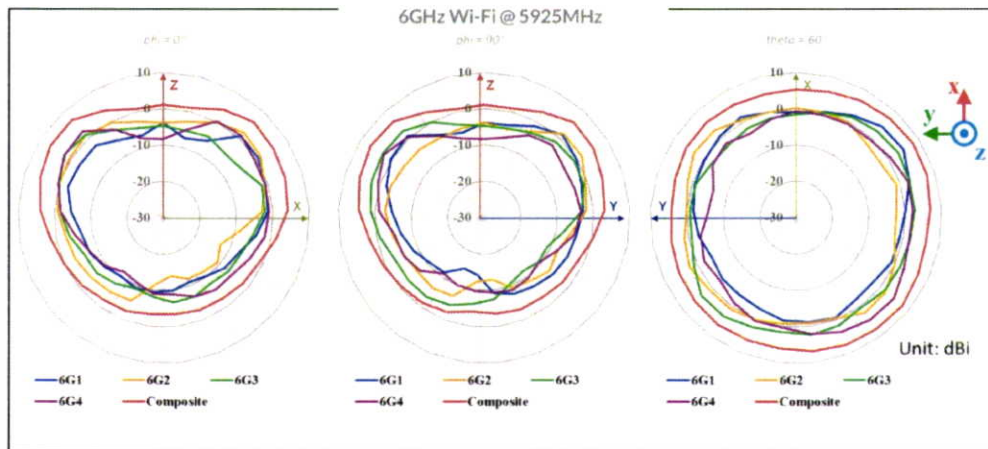
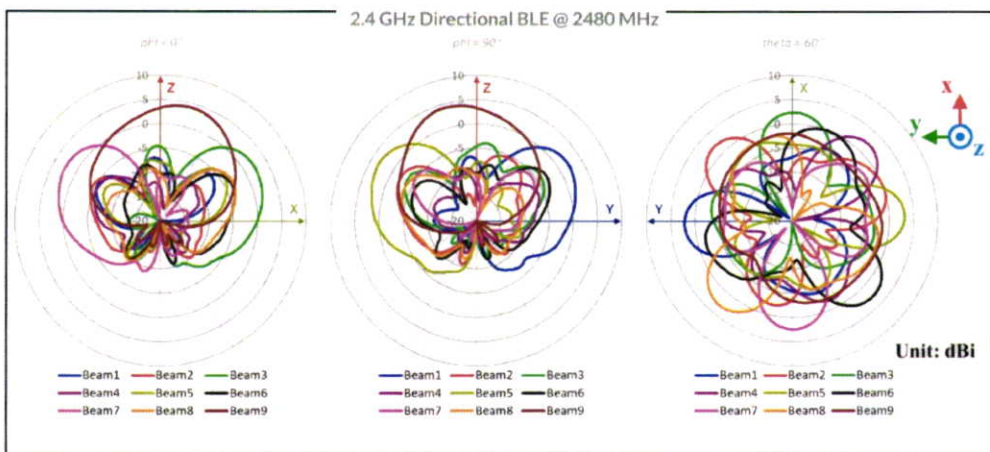## AP45 2.4 GHz Directional BLE Antenna Plots

2.4 GHz Directional BLE @ 2400 MHz

Unit: dBi

2.4 GHz Directional BLE @ 2440 MHz

2.4 GHz Directional BLE @ 2480 MHz
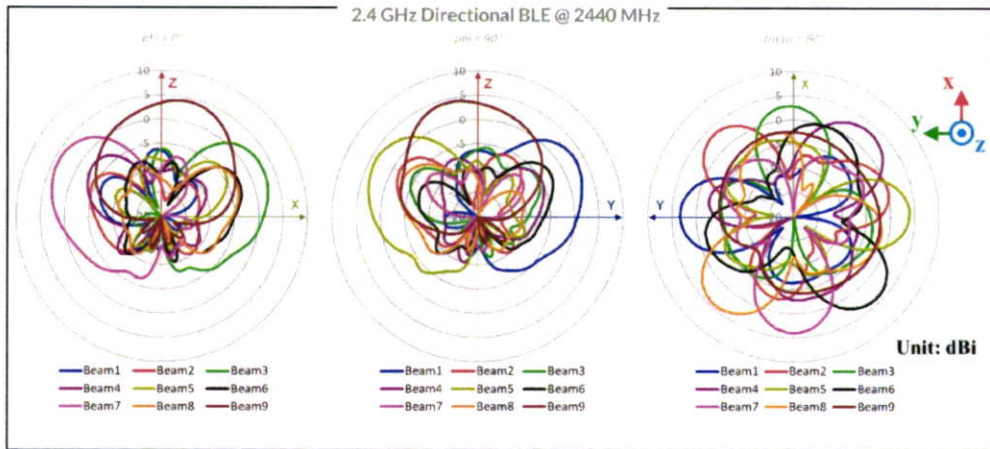
AP45 2.4 GHz Omni BLE Antenna Plots

2.4 GHz Omni BLE @ 2400 MHz

2.4 GHz Omni BLE @ 2440 MHz

2.4 GHz Omni BLE @ 2480 MHz
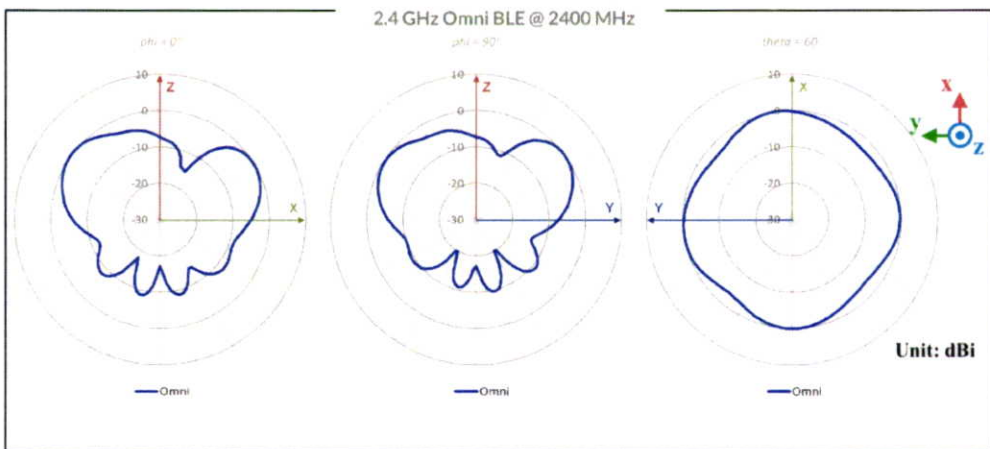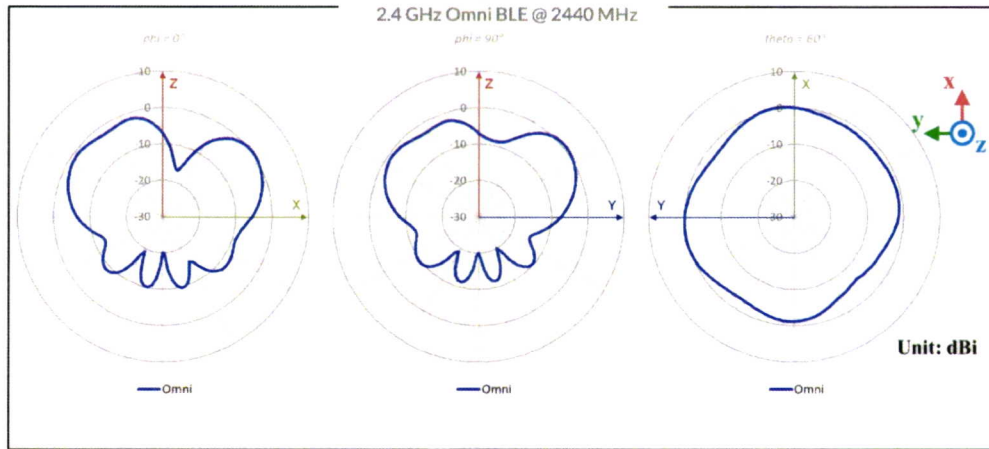
About Juniper Networks

Juniper Networks believes that connectivity is not the same as experiencing a great connection. Juniper's AI-Native Networking Platform is built from the ground up to leverage AI to deliver exceptional, highly secure, and sustainable user experiences from the edge to the data center and cloud. Additional information can be found at juniper.net or connect with Juniper on X (formerly Twitter), LinkedIn, and Facebook.

Corporate and Sales Headquarters

Juniper Networks, Inc.

1133 Innovation Way

Sunnyvale, CA 94089 USA

Phone: 888.JUNIPER (888.586.4737)

or +1.408.745.2000

www.juniper.net

APAC and EMEA Headquarters

Juniper Networks International B.V.

Boeing Avenue 240 1119 PZ Schiphol-Rijk

Amsterdam, The Netherlands

Phone: +31.207.125.700

JUNIPER NETWORKS | Driven by Experience