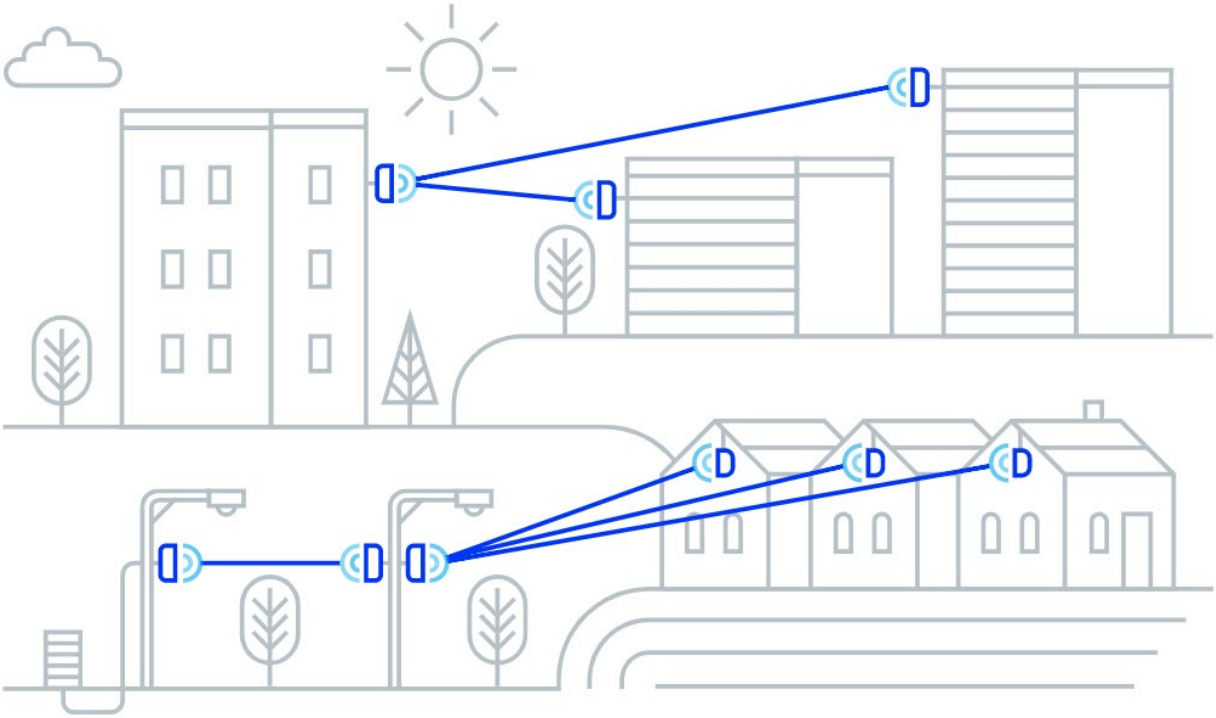

Architectural and Engineering Specification
AltoPlex Point-to-Point Bridge Kits
(P621 & P421)

October 17, 2025

1. Summary

A. The intent of this document is to specify the minimum criteria for the design, supply, and installation of the AltoPlex point-to-point bridge kits (P621s and P421) 60GHz wireless radios.

B. Product: V band radios that provides wireless point-to-point connectivity based on the 802.11ay standard, with 2.5GbE Ethernet (P621) and 1GbE Ethernet (P421) support.

C. AltoPlex radios provide carrier-grade network connectivity for Ethernet applications such as high-definition megapixel cameras, multi-sensor cameras, and network video recorders (NVRs), as well as extending networks at fiber-quality speeds to provide Wi-Fi backhaul, smart city municipal building-top and street-level implementations, and connecting law enforcement locations.

D. Related requirements:

- Features and functionality
  - Operation
  - Connectivity
  - Security
  - System management
- Device Power
- Device dimensions
- Physical installation
- Enclosure
- Certifications

2. Specification

E. The AltoPlex point-to-point bridge kit shall include the following features and functionality:
   1. The radios in the point-to-point bridge kit shall support one radio link to another point-to-point device of the same type (i.e., P621-P621 or P421-P421).
   2. Each radio in the point-to-point bridge kit shall be preconfigured to automatically connect to each other after installation and power-up.
      a) Line-of-sight installation is required for the radios to automatically connect.
      b) Replacement radios shall be available separately with detailed instructions for how to replace one of the bridge kit radios.
   3. The P621 and P421 shall provide 90° horizontal and +/-20° vertical coverage.
   4. The P621 and P421 shall operate in the unlicensed 57-66GHz band.
      a) The P621 and P421 shall provide 4 non-overlapping 2.16GHz channels within the 57-66GHz band.
      b) Channel access shall be TDMA/TDD.
   5. The P621 and P421 shall have 12 levels of Modulation and Coding Schemes from MCS-0 (BPSK) to MCS-12 (16QAM).
   6. Aggregate capacity:
      a) The P621 shall have a capacity of up to 3.8Gbps aggregate.
      b) The P421 shall have a capacity of up to 2Gbps aggregate.
   7. The P621 and P421 shall have less than 1ms latency.
   8. Ethernet port:
      a) The P621 shall have 1 RJ-45 2.5G BASE-T Ethernet port (with auto-negotiation speeds of 1Gbps/100Mbps).
      b) The P421 shall have 1 RJ-45 1G BASE-T Ethernet port (with auto-negotiation to 100Mbps).
      c) The P621 and P421 shall have IP67-rated ingress protection.
      d) The Ethernet port shall be used to provide power to the device by using 802.3at Power over Ethernet (PoE).
   9. The P621 and P421 shall have transparent Ethernet bridging types including VLAN and VLAN stacking.
   10. The P621 and P421 shall utilize hardware-based AES-128 encryption.
   11. The P621 and P421 shall have an operating temperature range of -40° to +131°F (-40° to +55°C.)

F. System Management:
   1. The P621 and P421 shall provide a WebUI accessed from a desktop browser for configuration, management, and monitoring.
      a) The P621 and P421 shall also be optionally supported with AltoCommand, Altowav's enterprise management and monitoring UI.
      b) The P621 and P421 shall be able to be operated without AltoCommand.
   2. The P621 and P421 shall support various management protocols: HTTPS, SSH.
   3. The P621 and P421 shall provide a REST API for management and monitoring.

4. The P621 and P421 shall provide the ability to save the unit configuration and upload it from local and remote connection.
    a) Configuration backup and restore shall be supported via the REST API.
5. The P621 and P421 shall provide the ability to update configuration over the network (in-band).
6. The P621 and P421 shall provide the ability to upgrade software over the network (in-band).
7. The P621 and P421 shall default to using a static IP address.
    a) The P621 and P421 shall be able to be configured to use dynamic IP address assignment (DHCP).
8. The P621 and P421 shall have a Wi-Fi management access point to allow for local wireless management of the device from a Wi-Fi-enabled PC, tablet, or hand-held device.
    a) The Wi-Fi management access point shall provide management access to the device only; it shall not provide access to the internet or LAN.
    b) The Wi-Fi management access point shall be able to be disabled.
    c) The P621 and P421 shall use the device hostname as the access point name by default.
        i. The name of the Wi-Fi management access point shall be configurable.
    d) The IP address of the Wi-Fi management access point shall be configurable.
9. The P621 and P421 shall have a single green/red bi-color LED.
    a) The LED shall provide visual indication of the status of the device, including:
        i. When the device is waiting to form connections.
        ii. When the device has a wired connection and at least one wireless connection.
        iii. When the device is powering up.
        iv. When the device is in an error condition.
    b) The P621 and P421 shall provide the ability to set the LED into "locate mode" which flashes a specific sequence to allow the device to be located.
    c) The P621 and P421 shall provide the ability to disable the LED.
10. The P621 and P421 shall include an integrated Global Positioning System (GPS) receiver.
    a) GPS shall provide location information for the P621 and P421.
    b) GPS support shall be enabled by default.
    c) GPS support shall be able to be disabled from within the WebUI.

G. Power:
1. The P621 and P421 shall support Power over Ethernet (PoE) input.
    a) The P621 shall have a 15W maximum power consumption.
    b) The P421 shall have an 11W maximum power consumption.

H. Dimensions:
1. The P621 and P421 shall be 5.9 x 3.8 x 1.4 inches (150 x 95 x 35mm).
2. The P621 and P421 shall weigh 14 oz (400g)

I. Physical installation
   1. The P621 and P421 shall provide wall-mounting and pole-mounting options without requiring additional brackets.
   2. The P621 and P421 shall have an optional wall mount bracket.
      a) The P621 and P421 shall be attached to the wall mount bracket by using band clamps.
      b) The wall mount bracket shall enable azimuth adjustment.
      c) The wall mount bracket shall have an optional pole extension to support multiple devices and increased elevation.
   3. The P621 and P421 shall have an optional tilting mount bracket.
      a) The tilting mounting bracket shall be able to be mounted to a wall or flat surface by using screws.
      b) The tilting mounting bracket shall be able to be mounted to a pipe or pole by using band clamps.
      c) The tilting mounting bracket shall allow for tilting elevation adjustments from +60° to -45°.
   4. The P621 and P421 shall provide an IP67-rated cable gland for installation of an Ethernet cable.

J. Enclosure
   1. Mechanical installation of the P621 and P421 shall not require special tools.
   2. The P621 and P421 enclosure shall include all necessary link components:
      a) Baseband.
      b) Radio.
      c) Scanning antenna.
      d) GPS antenna and module.
   3. The enclosure shall include the ability to be grounded.
   4. The enclosure shall be made of cast aluminum A338.
   5. The enclosure shall have a 60-100 microns power coating of pantone PMS 427C paint.
   6. The P621 and P421 front cover shall be made of PC/ABS thermoplastic.
   7. The front cover shall include 0.5% HALS 770 UV light stabilizer.

K. The P621 and P421 shall include the following certifications:
   1. Radio:
      a) FCC ID: 2AMP5-46211
      b) IC: 22992-46211
   2. Wi-Fi management radio:
      a) FCC ID: 2AC7Z-ESPC3MINI1
      b) IC: 21098-ESPC3MINI1
   3. ESD: IEC EN 61000-4-2
   4. EMC: IEC EN 61000-4-3