The SecureMesh® Connector is the Smart Distribution end node element of the SecureMesh Wide Area Network (WAN), a low-latency, high-bandwidth radio system operating in the 5 GHz band as a self-forming, self-balancing, and self-healing wireless mesh network. Using Time Division Multiple Access (TDMA) to allocate capacity and control access to the network, latency through the SecureMesh WAN is <10 milliseconds per hop within the mesh network. The SecureMesh WAN also provides Layer 2 Ethernet transport at air data rates up to 54 Mbps and throughput up to 20 Mbps, transmitting raw Ethernet frames to support higher layer protocols, including TCP/IP and a wide range of utility-related application layer protocols such as DNP 3.0, IEC 61850, SCADA-over-IP, and others.

Each SecureMesh Connector acts as an endpoint of the SecureMesh WAN and provides a 10/100Base-T Ethernet port for SecureMesh WAN client devices in direct support of Distribution Automation (DA), substation monitoring, video surveillance, or work-force management applications. The SecureMesh WAN supports bidirectional communications between its client devices and the head end, allowing either end to initiate communications, or it can be configured to support peer-to-peer communications without routing traffic through the head end at all.

Reliable Mesh with built in Redundancy
As an element of the SecureMesh WAN, each SecureMesh Connector must be within radio range of a SecureMesh Extender, Extender Bridge, or Gateway to establish connectivity with the head end. Mesh networking through the SecureMesh WAN then extends coverage beyond each node’s range, avoiding buildings, terrain, and other obstacles in order to deploy WAN connectivity exactly where it is needed. Route diversity provided by the mesh serves as a failover mechanism if a WAN node fails or a link’s quality degrades.

Easy-To-Deploy Broadband Connectivity
The SecureMesh Connector has been designed to be quickly and simply deployed – with simple to use installation tools that help installers point its integrated panel antenna toward nearby SecureMesh WAN relay nodes or Gateways. The Connector’s auto-discovery and auto-provisioning features then ensure proper installation and minimize deployment and ongoing operational costs.

Secure Application Domain Partitioning
Using IPsec-based VPNs (Virtual Private Networks) or IEEE 802.1Q VLANs (Virtual Local Area Networks) as well as traffic filters and Access Control Lists, application domain partitioning within the SecureMesh WAN provides each application group with its own virtual network to prevent unintentional or malicious access from other application domains.

With application domain partitioning, each application’s communications can be isolated, allowing inter-application access to be blocked or controlled so that access to a particular application does not provide access to devices of other applications (and so that a compromise of a particular application’s devices does not compromise devices of other applications). Moreover, each application domain partition can use its own security mechanisms, and Quality of Service, as enforced by rate shaping and traffic prioritization, can be applied per partition.
# Functionality

| connectivity | - SecureMesh WAN end point node to/from SecureMesh Gateway, Extender, or Extender Bridge  
| - 10/100Base-T port to/from WAN DA client devices  
| - RS-232 serial console port for maintenance |
| transport | Layer 2 Ethernet frames  
| clock synch | derived from SecureMesh Gateway, Extender, or Extender Bridge  
| firmware | over-the-air upgradable  
| network mgmt | SNMP v2c  
| traffic prioritization | by IEEE 802.1p, protocol type, IP port, IP DiffServ/ToS field, and/or IP address or MAC address or VLAN ID |
| traffic filtering | by protocol type, IP port, and/or IP address |
| traffic shaping | upstream and downstream per-node rate control |
| security | - certificate-based node-to-node authentication  
| - AES-128 encryption  
| VLAN | IEEE 802.1Q tagging  
| VPN | IPsec for management traffic |

# Power, Physical, & Environmental

| input voltage | 48 VDC Power-over-Ethernet (RJ-45 connector)  
| - AC/DC adapter: 100–240 VAC / 47–63 Hz |
| power | maximum 12 Watts  
| surge protection | requires Trilliant Surge Protector p/n: 521-R0655-01 or equivalent weatherproof PoE-compatible 10/100Base-T CAT5 lightning protector (RJ-45 or unterminated)  
| dimensions | 11" / 28.0 cm (H) x 6.5" / 16.5 cm (W) x 4.5" / 11.4 cm (D)  
| weight | 2.8 lbs / 1.3 kg  
| operating temp | -40 °F / -40 °C to +140 °F / +60 °C  
| humidity | 5 to 95% non-condensing  
| installation | pole- or panel-mounted  
| sealing / locking | tamper seal  
| enclosure | - outdoor UV-stabilized plastic  
| - NEMA Type 4X / IP56 |

# Compliance

| general | CE mark  
| unintentional emissions | - FCC Part 15 Class B  
| - Industry Canada ICES-003 Class B  
| - EN 301 489 |
| radio operation certifications | - FCC Part 15 Subpart E  
| - Industry Canada RSS-210  
| - EN 301 893  
| - Various worldwide approvals |
| FCC AND Industry Canada device IDs | - FCC: RV7-CONN  
| - IC: 6028A-CONN |
| safety | - UL 60950-1, UL60950-22  
| - CSA C22.2 No. 60950-1, CSA C22 2 No 60950-22  
| - EN 60950-1, EN60950-22 |
| environmental | RoHS |

# SecureMesh WAN Radio Performance

| protocols | - SecureMesh WAN Network layer  
| - SecureMesh WAN MAC layer (beam-switched TDMA)  
| - IEEE 802.11a PHY |
| modulation | OFDM with adaptive modulation  
| data rates | up to 54 Mbps  
| (6 / 9 / 12 / 18 / 24 / 36 / 48 / 54 Mbps) |
| Throughput | Up to 20 Mbps per Gateway  
| frequency bands | 5.2500 to 5.8506 GHz, including:  
| - US: 5.250 – 5.350 GHz U-NII mid  
| - US: 5.470 – 5.725 GHz U-NII worldwide  
| - US: 5.725 – 5.850 GHz U-NII upper |
| channel width | 20 MHz  
| transmit power | - 16 dBm typical (at radio antenna port)  
| - configurable as needed for worldwide regulatory compliance |
| receive sensitivity (3% FER; at ant. port) | -92.0 dBm @ 6 Mbps  
| -92.0 dBm @ 9 Mbps  
| -90.0 dBm @ 12 Mbps  
| -89.0 dBm @ 18 Mbps  
| -85.0 dBm @ 24 Mbps  
| -82.0 dBm @ 36 Mbps  
| -76.0 dBm @ 48 Mbps  
| -73.0 dBm @ 54 Mbps  
| antenna | - integrated panel antenna  
| - +16 dBi gain  
| - ~24° azimuth, ~16° elevation beamwidth |