Peregrine for Licensed Frequencies
Mobile Wireless Mesh Network Node

The Rajant Peregrine for Licensed Frequencies is Rajant's new triple or quad transceiver, military-grade, high-performance BreadCrumb platform. The Peregrine for Licensed Frequencies supports a maximum combined data rate of 3.9 Gbps with up to 6X enhanced throughput performance over existing BreadCrumbs. It offers multiple MIMO radio interfaces, high throughput, and enhanced security performance with up to 256-QAM and 80 MHz channels.

Peregrine for Licensed Frequencies Key Features

- Rajant's patented[1] InstaMesh® networking software enables the network to quickly adapt to rapidly deployed and quickly (or constantly) moving network elements

- Multiple concurrent transceivers for high levels of network reliability, redundancy, and diversity, and fewer problems due to interference, congestion, and equipment outages

- Up to 3.9 Gbps of physical layer data rate combined over all transceivers

- Multiple antenna port configurations with 2x2 and 3x3 MIMO (multiple-input, multiple-output), substantially increasing the capacity of transceivers

- Support for several strong cryptographic options used for data and MAC-address encryption and per-hop, per-packet authentication

- Rugged and environmentally sealed enclosures

- High bandwidth for data, voice, and video applications

- Scalability to hundreds of mobile, high-bandwidth nodes

- Self-forming and self-healing operation for fast and easy deployments

- Reliable and fast off-loading to Ethernet via multiple, simultaneous bridge-mode links through the Automatic Protocol Tunneling (APT) feature

Utilizing the Peregrine for Licensed Frequencies Platform to Your Advantage

The Peregrine for Licensed Frequencies is our high-performance BreadCrumb platform. Combined with Rajant's patented InstaMesh protocol, the Peregrine for Licensed Frequencies can integrate Kinetic Mesh wireless networks with other networks such as LTE/5G. The Peregrine is part of Rajant's initiative to develop deeply integrated solutions that securely combine data from connected people, vehicles, machines, and sensors, with machine learning. This data combination unlocks the benefits of process optimization, digital twins, predictive analytics, condition-based maintenance, augmented reality, and virtual reality while improving worker safety. The Peregrine for Licensed Frequencies is interoperable with all of our BreadCrumb models to expand market capabilities for industries like rail, shipping ports, military, mining, and heavy construction.

InstaMesh®

InstaMesh is the advanced, patented[1] protocol developed by Rajant that directs the continuous and instantaneous forwarding of packets from wireless and wired connections. It enables complete network mobility, high throughput, and low latency with very low maintenance and administrative requirements. Operating at Layer 2 and not requiring a root node or LAN Controller, InstaMesh provides robust fault tolerance even if there is a connection or node outage. No matter how you configure your network, InstaMesh networking software always determines the most efficient pathway between any two points, even when those points are in motion.

[1] U.S. Patent 9,001,645

Model	Description
FE1–4431	BreadCrumb® FE1–4431. Dual 4.8GHz 2x2 MIMO, Single 3.6GHz 2x2 MIMO, Single 1.4GHz 2x2 MIMO transceivers, includes licensed restricted radio frequencies. Requires antennas, cables and power supply. Part number: 23-100226-001.
FE1–4440	BreadCrumb® FE1–4440: three 4.8GHz 3x3 MIMO transceivers, includes licensed restricted radio frequencies. Requires antennas, cables and power supply. Part number: 23-100231-001.

Wireless	1.4 GHz	3.6 GHz	4.8 GHz (2x2 MIMO)	4.8 GHz (3x3 MIMO)
Antenna Connector	(2) Type N (female)	(2) Type N (female)	(2) Type N (female)	(3) Type N (female)
Frequency[2]	1425 – 1525 MHz	3600 – 3700 MHz	4800 – 4940 MHz	4800 – 4940 MHz
Modulation	OFDM with up to 256-QAM	OFDM with up to 256-QAM	OFDM with up to 256-QAM	OFDM with up to 256-QAM
Max. Physical Layer Data Rate	866.7 Mbps (throughput varies)	866.7 Mbps (throughput varies)	866.7 Mbps (throughput varies)	1300 Mbps (throughput varies)
Max. RF Transmit Power[3, 4]	30 dBm	28 dBm	30 dBm	32 dBm
Receive Sensitivity[5, 6]	-100 dBm (@ 6.5 Mbps, 20 MHz channel bandwidth) to -76 dBm (@ 144 Mbps, 20 MHz channel bandwidth)	-99 dBm (@ 6.5 Mbps, 20 MHz channel bandwidth) to -75 dBm (@ 144 Mbps, 20 MHz channel bandwidth)	-96 dBm (@ 6.5 Mbps, 20 MHz channel bandwidth) to -74 dBm (@ 144 Mbps, 20 MHz channel bandwidth)	-96 dBm (@ 6.5 Mbps, 20 MHz channel bandwidth) to -74 dBm (@ 144 Mbps, 20 MHz channel bandwidth)

Network & Security	
Network Functionality	VLAN and QoS support; Access Point; Bridge; Gateway; DHCP; NAT and Port Forwarding; Automatic Protocol Tunneling (APT).
Security	• Multiple cryptographic options, including NSA Suite B algorithms (implementation not certified). For information on models with full Suite B certification, contact Rajant or your authorized Rajant partner. • Separately configurable data and MAC address encryption via AES256-GCM, AES192-GCM, AES128-GCM, AES256-CTR, AES192-CTR, AES128-CTR, XSalsa20, XSalsa20/12, and XSalsa20/8. • Configurable per-hop, per-packet authentication between BreadCrumbs via AES256-GMAC, AES192-GMAC, AES128-GMAC, HMAC-SHA512, HMAC-SHA384, HMAC-SHA256, HMAC-SHA224, HMAC-SHA1, and Poly-1305-AES. • Supports IEEE 802.11i: AES-CCMP and TKIP encryption, WPA-Personal/Enterprise, WPA2-Personal/Enterprise, iPSK, 802.1x; 64/128-bit WEP; Access Control Lists; Compatible with Layer-2 and Layer-3 client/server and peer-to-peer security solutions.

[2] Channel, frequency, and bandwidth options vary based upon regional and local regulations and certifications
[3] RF transmit power is governed by local regulations and varies by frequency
[4] Transmit power tolerance is ± 2 dB
[5] Receive sensitivity tolerance is ± 2 dB
[6] Receive sensitivity criteria is less than 10% packet error rate (PER)

Power

DC Power	20 — 60 VDC
PoE	IEEE 802.3bt Type 3 / PoE++ or 38 — 60 VDC Passive PoE
Power Consumption[7]	**FE1–4431**: 4 transceivers: 10 W (average, idle); 45 W (maximum, peak) @ 48 V (test operation only) **FE1–4440**: 3 transceivers: 10 W (average, idle); 41 W (maximum, peak) @ 48 V

Input/Output

Ethernet	(2) M12 X-Code female connector, 10/100/1000 Mbps, IEEE 802.3, auto MDI/MDIX
USB	USB 2.0 Type A female host port for firmware upgrade, USB-based zeroize and GPS device add-on
LED	(2) Status LED
Switch	LED configuration / zeroize keys and restore factory defaults (reset) switch
PWR	M12 L-Code male connector for DC power

Physical

Dimensions	264.9 mm x 253.7 mm x 46.2 mm (10.43 in x 9.99 in x 1.82 in)
Weight	**FE1–4431**: 3065 g ± 50 g (6 lb 12 oz ± 1.8 oz) **FE1–4440**: 3031 g ± 50 g (6 lb 9 oz ± 1.8 oz)
Temperature	Startup: -40 °C to +70 °C (-40 °F to 158 °F) Ambient (operating): -40 °C to +70 °C (-40 °F to 158 °F) Storage: -40 °C to +80 °C (-40 °F to 176 °F)
Enclosure	IP67 (6: Dust-tight, 7: Waterproof)
Certification	TBD
MTBF (*base model)	139,907 hours (Telcordia SR-332, Issue 4, Temp +40°C, Ground Mobile 2, 100% duty cycle, 90% confidence)
Warranty	1 year

[7] Power consumption depends on transceiver configuration

20+ OF GAME-CHANGING **WIRELESS**

RAJANT
MAKING THE COMPLICATED SIMPLE
Continuous Connectivity Anywhere