

# Ligo PTP 24

24 GHz Digital Microwave Point-to-Point Device



## Product Overview

The LigoPTP 24-series product family is the next generation LigoWave product line targeting the growing demand for carrier-grade data transmission over microwave radio. Operating in the 24 GHz unlicensed spectrum, this product delivers seamless connectivity at true full-duplex TCP payload of 108 Mbps. The LigoPTP 24-series is a perfect building block for any modern future-proof wireless network, including mobile service providers, fixed data service operators, enterprise customers, and municipal and governmental networks, among others. Apart from the full system capacity of 216 Mbps, the LigoPTP 24-series is loaded with feature-rich configuration options, including adjustable channel sizing (3.5/5 MHz, 7/10 MHz, 14/20 MHz, 28/30 MHz) and adjustable modulation schemes to match any application.

The LigoPTP 24 product is also capable of providing up to 4 E1/T1 interfaces for legacy connectivity or other use.

The LigoPTP 24-series products showcase an array of advanced software mechanisms that provide optimal point-to-point connectivity for high throughput-demand links. In this product line, LigoWave features proprietary PTP mechanisms, incorporating techniques such as hitless Adaptive Code and Modulation (ACM) technology, allowing operators to achieve high-capacity data transmission and improve link utilization. This reduces both operational and capital expenditures for maintaining high-capacity links and also maintains the highest possible spectral link efficiency and data availability, even at the most challenging of link conditions.

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### Key Features

- Full system capacity of 216 Mbps (with 4E1)
- Operates on the uncrowded, license-free 24 GHz spectrum
- Antennas included:
  - PTP 24-1: includes 1 ft. diameter, 35 dBi gain, slip-fit waveguide antenna
  - PTP 24-2: includes 2 ft. diameter, 40

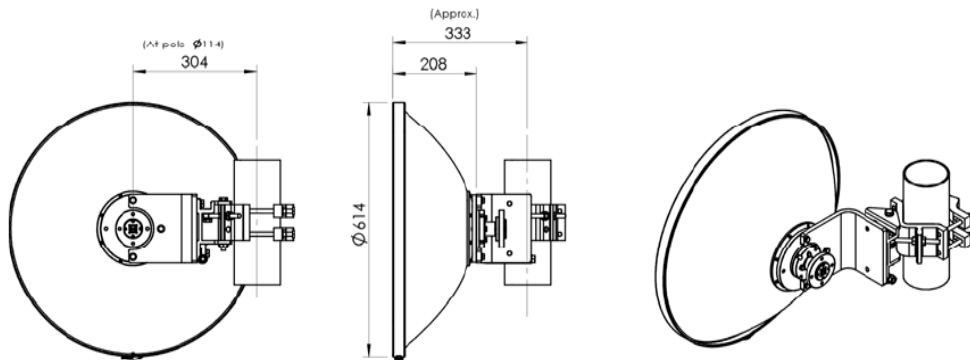
- Full outdoor unit architecture - no IDU needed
- Adjustable channel sizing and modulation schemes
- Up to 4 E1/T1 interfaces
- Hitless Adaptive Code and Modulation (ACM) technology for throughput optimization
- Adjustable channel width capability (3.5 / 7 / 14 / 28 MHz for ETSI or 5/10/20/30 MHz for ANSI)
- Flexible modulation settings (QPSK, 16APSK, 32APSK, 64QAM, 128QAM)

### Test results

RSL at 10 <sup>-6</sup> BER (dBm) and total payload capacity (Mbps, aggregate)*					
Modulation	FEC**	Channel bandwidth (MHz)			
		3.5/5	7/10	14/20	28/30
QPSK	Strong	-94 dBm at 5.9 Mbps	-91 dBm at 12.3 Mbps	-89 dBm at 25.0 Mbps	-86 dBm at 37.4 Mbps
	Weak	-92 dBm at 6.8 Mbps	-88 dBm at 15.0 Mbps	-86 dBm at 30.4 Mbps	-84 dBm at 45.5 Mbps
16APSK	Strong	-87 dBm at 11.9 Mbps	-85 dBm at 24.7 Mbps	-82 dBm at 50.0 Mbps	-80 dBm at 74.7 Mbps
	Weak	-85 dBm at 14.0 Mbps	-81 dBm at 30.0 Mbps	-79 dBm at 60.8 Mbps	-77 dBm at 90.9 Mbps
32APSK	Strong	-84 dBm at 15.1 Mbps	-82 dBm at 30.9 Mbps	-79 dBm at 62.6 Mbps	-77 dBm at 100.0 Mbps
	Weak	-80 dBm at 17.5 Mbps	-78 dBm at 37.3 Mbps	-76 dBm at 75.6 Mbps	-74 dBm at 106.2 Mbps
64QAM	Strong	-81 dBm at 19.9 Mbps	-79 dBm at 41.2 Mbps	-76 dBm at 83.3 Mbps	Under development
	Weak	-79 dBm at 22.0 Mbps	-76 dBm at 46.3 Mbps	-73 dBm at 93.8 Mbps	Under development
128QAM	Strong	Under development	-75 dBm at 49.4 Mbps	-73 dBm at 100.0 Mbps	Under development
	Weak	Under development	-71 dBm at 54.3 Mbps	-69 dBm at 106.2 Mbps	Under development

\*Preliminary data - actual data may vary slightly.

\*\* Forward error correction (FEC) can be optimized either for sensitivity (Strong FEC) or for capacity (Weak FEC)



LigoWave's link calculator is a link planning tool available online at <http://www.ligowave.com/linkcalc/>. The link calculator allows LigoPTP users to calculate link performance expectations taking into account geographical information, distance between the units, antenna height and gain, transmit power, and other factors in order to choose the most suitable product available from LigoWave's extensive product portfolio. In addition, custom calculations using other vendors' equipment specs can be used, making the LigoWave link calculator the ultimate link planning tool. At the same time, this tool is offered free of charge, and users only need to register to get quick and easy access to this very helpful tool. On top of that, each user is able to save and create a database of links, download a PDF document that contains all the necessary information about the link, and publish a hyperlink online so that it could be shown to other people during the evaluation process.

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### Radio specifications

Wireless technology	Microwave
Operating mode	Point-to-point, 1+0
Radio frequency band	24.05 -24.25 GHz
Channel size	Configurable 3.5, 7, 14, 28 MHz for ETSI or 5, 10, 20, 30 for ANSI
Modulation schemes	QPSK, 16APSK, 32APSK, 64 QAM, 128 QAM
Transmit power	+3@QPSK, +2@16APSK, +1@32APSK, -1@64QAM, -1@128QAM
Receive sensitivity	At 3.5/5 MHz channel -94@QPSK, -87@16APSK, -84@32APSK, -81@64QAM At 7/10 MHz channel -91@QPSK, -85@16APSK, -82@32APSK, -79@64QAM, -75@128QAM At 14/20 MHz channel -89@QPSK, -82@16APSK, -79@32APSK, -76@64QAM, -73@128QAM At 28/30 MHz channel -86@QPSK, -80@16APSK, -77@32APSK
Error correction	FEC, LDPC
Duplexing scheme	FDD

### Antenna

Type	Selectable
Gain	35, 40 dBi
Diameter	30 (1), 60 (2) cm (ft)
3 dB Beamwidth	2.9 , 1.7 °
Weight	2.3 (5), 4.4 (9.7) kg (lb.)

### Data Interface

Ethernet interface	10/100 BaseT, RJ45
E1/T1 interface	18-pin connector
VLAN	IEEE 802.1q supported

### Link performance

Real data (TCP) throughput	200 Mbps aggregate ethernet (100 Mbps full-duplex), + 16 Mbps E1
Packet latency	2 ms (64 bytes packet)
Recommended link distance	Up to 7 km (4 mi) with 60 cm (2 ft) antennas, LOS

### Physical

Dimensions (device)	Width 288 (11), height 288 (11), depth 80 (3) mm (")
Weight (device)	3.5 kg (7.7 lb.)
Power supply	48 V DC, PoE
Power source	100 - 240 V AC via included adapter
Power consumption	19 W

### Environmental

Operating temperature	-33°C (-27 F) ~ +55°C (+131 F)
Humidity	0 - 90 % (non-condensing)

### Management

Configuration, monitoring interfaces	Web GUI, Telnet CLI, SNMP BNC connector for RSSI measurement Additional BNC connector for terminal access
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### Regulatory

Certification	FCC/CE
Ingress protection	IP-67
Safety	RoHS compliant