

10Gbps Super High Capacity E-Band (80GHz) Radio

# iPASOLINK EX Advanced (Ethernet)



## At a Glance

- 10Gbps Full Duplex, Pure Packet, High Capacity (80GHz Band)
- Ideal for LTE Small Cell Aggregation (Zero Footprint)
- Hitless Adaptive Modulation and Bandwidth (QPSK-256QAM / 250-2000MHz)
- Intelligent Carrier Class L2 Packet Switch (supports 802.1P/Q and H-QoS)
- Versatile and Scalable Configurations
- Ethernet OAM (IEEE802.1ag / IEEE802.3ah / ITU-T Y.1731)
- Low Power Consumption (65W)
- Optional Power Supply (-48VDC / LTPoE++)

## Overview

NEC's latest evolution in the iPASOLINK All Outdoor Series is iPASOLINK EX Advanced. This ultra-compact radio communication system utilizes Adaptive Modulation and Bandwidth together, enabling 10Gbps wireless throughput capacity in a single channel, while maintaining extremely low latency.

The new iPASOLINK EX Advanced is approximately 30% smaller than the previous iPASOLINK EX model, improving site acquisition and installation costs, while carrying up to three times as much traffic data, with integrated standard 10GbE interfaces. The Adaptive Modulation and Bandwidth Radio (AMBR) feature sets this radio apart, with hitless Adaptive Modulation steps from QPSK to 256QAM, along with hitless Automatic Bandwidth steps from 250MHz to 2000MHz. iPASOLINK EX Advanced maintains critical traffic transport even in the most severe and adverse weather conditions. Its Carrier-Grade Ethernet functionality makes traffic management easy, even with advanced features such as 8 Class QoS, H-QoS, Sync-E and 1588v2 (TC) support.

iPASOLINK EX Advanced mounts directly to traditional parabolic antennas, with an integrated flat panel antenna presently in development.

### Simple Operation – Advanced Features

Enhanced QoS functions enable bandwidth control and management on a per-flow basis. iPASOLINK EX provides 8 classes of QoS mapping with DWRR or Strict Priority scheduling, as well as H-QoS.

Utilization of the lightly licensed millimeter wave 80GHz band allows quick and easy licensing, making deployment of the iPASOLINK EX Advanced faster and more cost effective than fiber, especially in congested metro areas.

The Ethernet OAM fault detection, fault isolation and performance measurement and monitoring are the same as previous iPASOLINK EX, with comprehensive system manageability. Synchronization options include Sync-E (ITU-T G.8261 / G.8262 / G.8264) and precision clock synchronization protocol (IEEE1588v2).

Similarly, VLAN services are supported by an 8000 MAC ID learning table, 2048 port-based VLAN's, MEF 9 Certified EPL/EVPL and ELAN services with L2CP tunneling, and 9600 byte jumbo frames.

## Benefits of 80GHz Millimeter Wave Transport

**Availability of Licensed Spectrum** — Licensed frequency spectrum is difficult, and sometimes impossible to obtain in highly congested metropolitan areas. The 80GHz band utilizes highly directional, “pencil-beam” signal characteristics, which allows multiple system deployment in close proximity without interference.

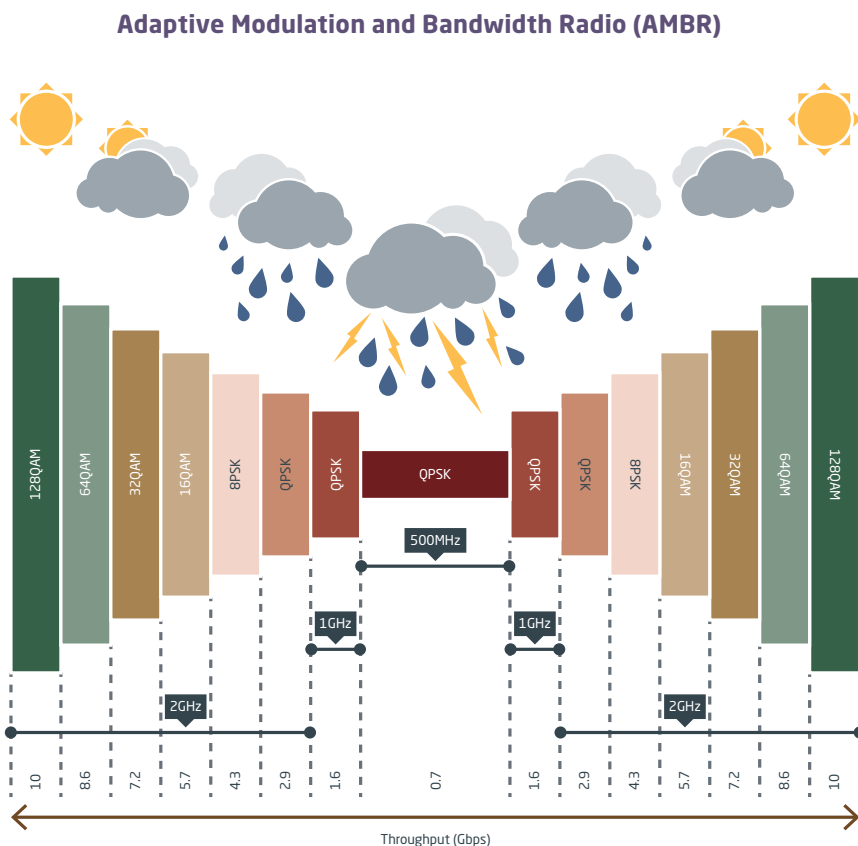
**Low-Cost “Light Licensing”** — The FCC has made it easy to deploy links in the 80GHz band by offering non-exclusive nationwide licenses, followed by coordination and registration on a per link basis through several 3rd party Database Managers. Processing times of 1-2 days is typical!

**Small Antenna Sizes** — Due to its short wavelengths, the millimeter wave systems achieve high system gain with highly directive transmission using very small antennas, typically either 1 or 2 ft. diameter. The next generation EX Advanced radio will include an integrated flat panel antenna.

**Effective Frequency Reuse** — The high directivity of millimeter wave antennas creates opportunity to deploy a greater quantity of systems within a given space. The resulting efficiency of “airspace” utilization provides more bandwidth for communications traffic.

**Ultra-high Capacity** — During favorable propagation conditions, throughput of 10Gbps per channel is achievable. In less favorable conditions, the Adaptive Modulation and Bandwidth Radio (AMBR) feature ensures protection for up to 700Mbps of high priority traffic.

The iPASOLINK EX Advanced provides up to 10Gbps capacity in a compact all outdoor enclosure. Furthermore, the iPASOLINK series radios boast industry leading extreme low latency architecture and pioneered the use of Gallium Nitride (GaN) to triple transmitter output power while minimizing energy usage and costs.



## Abbreviations

W - Watts  
 L2 - Layer 2  
 GHz - GigaHertz  
 MHz - MegaHertz  
 RF - Radio Frequency  
 GbE - Gigabit Ethernet  
 TC - Transparent Clock  
 QoS - Quality of Service  
 LTE - Long Term Evolution

Gbps - Gigabits per second  
 EPL - Ethernet Private Line  
 VDC - Volts (Direct Current)  
 Synch-E - Synchronous Ethernet  
 L2CP - Layer 2 Control Protocols  
 VLAN - Virtual Local Area Network  
 DWRR - Deficit Weighted Round Robin  
 EVPL - Ethernet Virtual Private Line  
 QPSK - Quadrature Phase Shift Keying

QAM - Quadrature Amplitude Modulation  
 FCC - Federal Communications Commission  
 H-QoS - Hierarchical Quality of Service  
 MAC ID - Media Access Control Identifier  
 MEF - Metro Ethernet Forum (now MEF Forum)  
 ITU - International Telecommunication Union  
 OAM - Operations Administration and Management  
 LTPoE++ - Linear Technology Power over Ethernet  
 IEEE - Institute of Electrical and Electronics Engineers

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