

## Ultra-High Capacity E-Band (80GHz) Radio

# iPASOLINK EX (Ethernet)



### At a Glance

- Pure Packet, High-Capacity, Millimeter Wave Radio (80GHz Band)
- Ideal for LTE Small Cell Aggregation (Zero Footprint)
- Hitless Adaptive Modulation (QPSK-256QAM)
- Intelligent Carrier Class L2 Packet Switch (8 Class QoS)
- Versatile and Scalable Configurations with XPIC and L1 RTA
- Ethernet OAM (IEEE802.1ag / IEEE802.3ah / ITU-T Y.1731)
- Low Power Consumption
- Optional Power Supply (-48VDC / LTPoE++)

### Overview

To provide reliable digital access links and fully exploit the full potential of end-to-end advanced networks, NEC has developed the iPASOLINK EX, 250 / 500MHz bandwidth point-to-point microwave relay system operating in the lightly licensed 71-86 GHz Millimeter Wave E-band frequency spectrum.

The iPASOLINK EX offers very high performance with extensive system flexibility, ease of installation, field proven reliability and very low total cost of ownership. Supporting transmission rates up to 3Gbps out of the box, or optional pay-as-you-grow steps, the iPASOLINK EX provides the scalability to accommodate future application and capacity needs.

#### Low Cost / High Performance

With its robust hitless adaptive modulation from QPSK to 256QAM, iPASOLINK EX transports all of your critical traffic with super high dependability. iPASOLINK EX provides this and more with the quality you've grown to expect from NEC. A variety of configuration options are available to meet all of your network requirements within the budgets mandated by your corporate accountants.

#### Advanced Features

Enhanced QoS functions allow finely tuned bandwidth control and management on a per-flow basis. iPASOLINK EX provides 8 classes of QoS mapping with DWRR or Strict Priority scheduling.

High spectrum efficiency is realized with the hitless adaptive modulation switching from QPSK to 256QAM. Forward Error Correction and linear distortion cancellation techniques deliver high system gain for overall cost reduction. FCC spectrum is lightly licensed in the 80GHz band, making it quick and easy to deploy the iPASOLINK EX, even in congested metro areas.

Ethernet OAM fault detection, fault isolation and performance measurement and monitoring offer comprehensive system manageability. Synchronization options include Sync-E (ITU-T G.8261 / G.8262 / G.8264) and precision clock synchronization protocol (IEEE1588v2).

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.

**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** — Wide bandwidths coupled with the high order modulation (256QAM) of the iPASOLINK EX delivers throughput in excess of 3.2Gbps per channel. Use of the XPIC feature available on the iPASOLINK EX doubles that capacity!

The iPASOLINK EX provides multi-gigabit capacity in a compact all outdoor enclosure. Furthermore, the iPASOLINK series boasts 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

GHZ – GigaHertz  
3G – Third Generation  
IP – Internet Protocol  
QoS – Quality of Service  
2G – Second Generation  
LTE – Long Term Evolution  
EPL – Ethernet Private Line  
Gbps – Gigabits per second  
M2M – Machine to Machine  
VDC – Volts (Direct Current)

MAC – Media Access Control  
VPN – Virtual Private Network  
RTA – Radio Traffic Aggregation  
L2CP – Layer 2 Control Protocols  
VLAN – Virtual Local Area Network  
EVPL – Ethernet Virtual Private Line  
ELAN – Ethernet Local Area Network  
MPLS – Multiprotocol Label Switching  
QPSK – Quadrature Phase Shift Keying  
B2BC – Business to Business Consumer

DWRR – Deficit Weighted Round Robin  
WDM – Wavelength Division Multiplexing  
3GPP – 3rd Generation Partnership Project  
QAM – Quadrature Amplitude Modulation  
ITU – International Telecommunication Union  
MEF – Metro Ethernet Forum (now MEF Forum)  
LTPoE++ – Linear Technology Power over Ethernet  
XPIC – Cross Polarization Interference Cancellation  
OAM – Operations Administration and Management  
IEEE – Institute of Electrical and Electronics Engineers

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## The NEC way

The worldwide proliferation of cell phones and the Internet has brought people together and led to the birth of a rich life and new working styles. In the next decade, more and more people in the world will be connected in our digital network society. Further needs for wider area networks are expected with the connection of wearable devices and robots (industrial, medical, and entertainment) to the digital network, expanding the pool of big data.

NEC leverages its long-time proven information and communications technology assets that cover areas from the seafloor to outer space, to provide high-quality connections between people and things. Our aim is to offer opportunities for people and enterprises around the globe to communicate in order to realize an efficient and fair distribution of information. NEC will contribute to society with a rich sense of humanity by realizing an emotional “connection” of such information as human emotion and tactile sensation, in addition to a physical “connection” of such information as sounds, video, and images.

