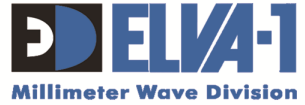


E-band/Q-band 10 Gbps Wireless Links

InnoTrans



Booth #870



YOUR NETWORK PROJECTS ARE READY TO GO 10-GIGABIT WIRELESS

PPC-10G is a family of 10 Gbps and 20 Gbps mm-wave radios operating in the E-band and Q-band spectrum. These IP wireless links deliver true full duplex multi-gigabit throughput for vertical markets such as 5G/4G, enterprise connectivity, Safe City and other high-capacity networks.

A wide choice of modifications of the radio is available, including 20 Gbps 2+0, a high-power transmitter and a built-in L2+ switch, with the possibility of combining these features in one radio by customer order.

ELVA-1 mm-wave 70-80 GHz and 40-42 GHz radio links are the most long-range ones in the industry with proven cases of working on distances of 15 km and more.

Applications



- 5G/4G/LTE+ backhaul (with SyncE feature supported)
- Enterprise campus and industrial park networks
- Wireless alternative to FTTH backbone
- Urban-scale mesh networks
- 4K/8K UHD video streaming over a wireless channel
- Fiber network 10GE extension

PPC-10G is an outdoor radio that requires no indoor space or rack room. This means it can be mounted on rooftops, and towers and provide power over Ethernet (PoE) with just one cat 5/6 cable or using a dedicated power cable.

Each radio has from 1 to 4x SFP+ 10GE optical fiber interfaces to be connected to user's 10GE network equipment.

PPC-10G TECHNICAL FEATURES

The PPC-10G radios include several models that provide the most flexible functionality for different projects.

- The basic model (for distances up to 5 km),
- The long-range model with the "HP" index,
- The model with built-in L2 switch with 4x 10 Gigabit Ethernet ports for hub connections,
- 2+0 model with 2x 10Gbps aggregated link.

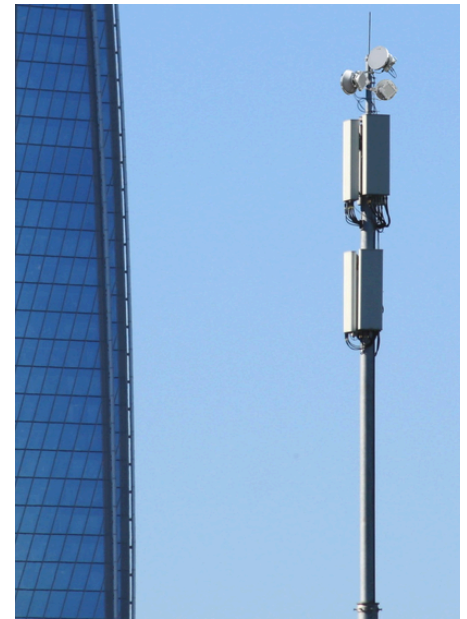
It is possible to combine the functionality of different models in one radio bridge, for example, HP+L2+"2+0".



Radios in both E-band and Q-band are shipped with 1 ft or 2 ft antennas, and 3 ft antennas are also available for Q-band radios to allow industry-record distance range.

Features

- 70-80 GHz (E-band) and 40.5-43.5 GHz (Q-band)
- Full duplex 10Gbps at E-band, 7.2 Gbps at Q-band
- Aggregation into 4x 10Gbps channel from single footprint
- Longest distance in the market, up to 15+ km @10Gbps
- High Tx power, up to 19 dBm at QAM 128 / 26.5 dBm at QPSK/BPSK
- Advanced 20 Gbps 2+0 radio with single antenna
- Adaptive to weather, QAM-256 to BPSK modulation
- SyncE and PoE supported
- AES, on band management and packet head suppression
- Tunable central frequency @31.25 MHz step (excluding HP modification)
- FCC and CE approved
- Easy installation, zero-footprint



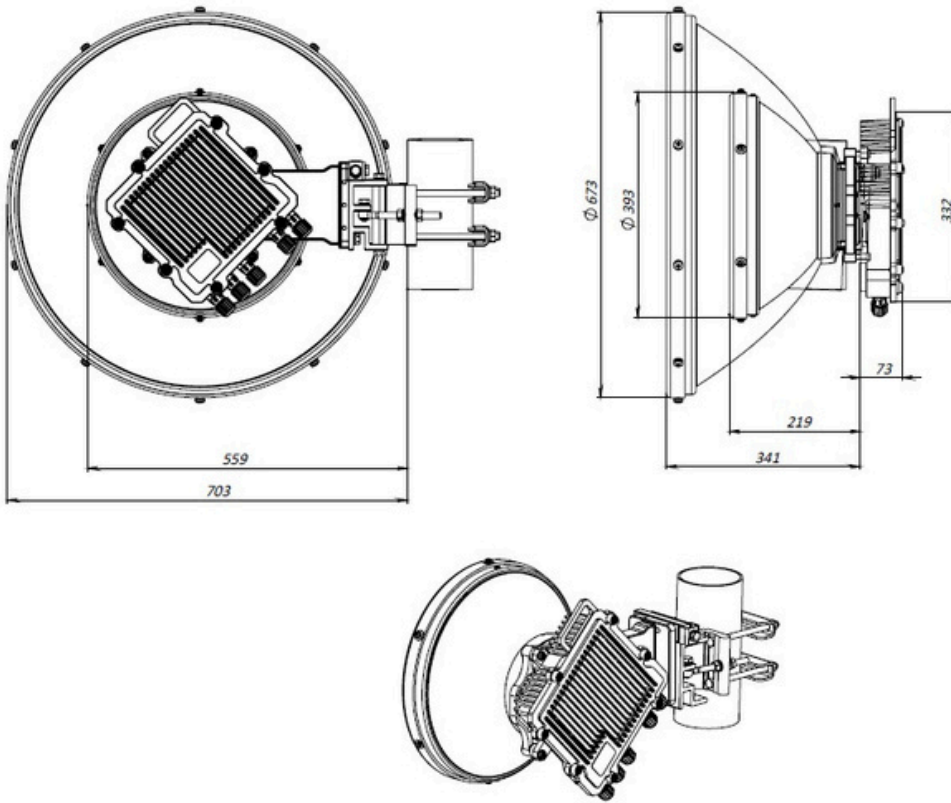
The PPC-10G platform is based on state-of-the-art MMIC chips, which support Quadrature Amplitude Modulation in digital data radio communications. Using QAM 128, PPC-10G requires only 2 GHz bandwidth at 70/80 GHz for 10 Gbps rate. For Q-band, ELVA-1 has pioneered the implementation of QAM 256 technology to achieve the best spectrum efficiency in the industry.

When the link's SNR (Signal to Noise Ratio) is high (during good weather conditions), operation at full capacity is enabled, reaching the maximum speed of 10 Gbps. In case the link's SNR drops significantly (during heavy rain), the channel throughput will be reduced.

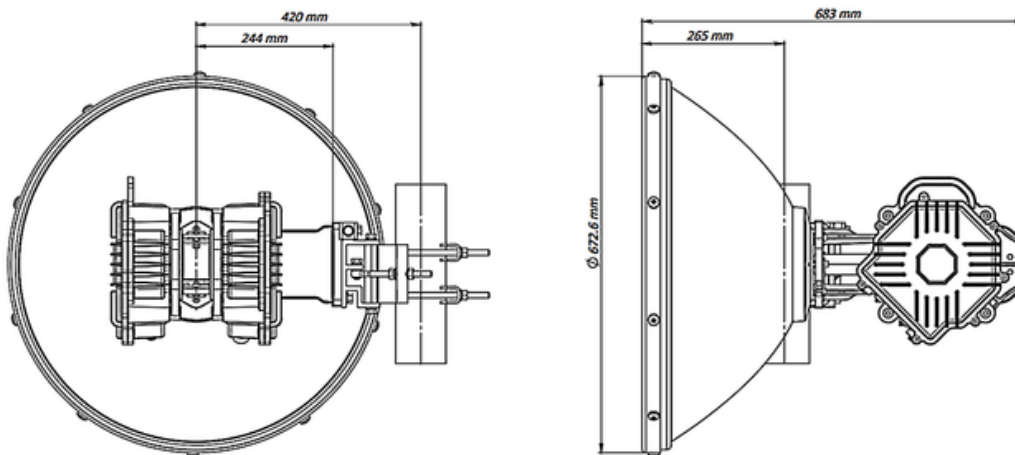
ELVA-1 millimeter wave radios operate in lightly licensed 71-76/81-86 GHz (E-band) spectrum which is governed by low fees and quick processing of licensing docflow. PPC-10G is also available in licensed 40.5-43.5 GHz (Q-band) frequency format.

PPC-10G DRAWINGS

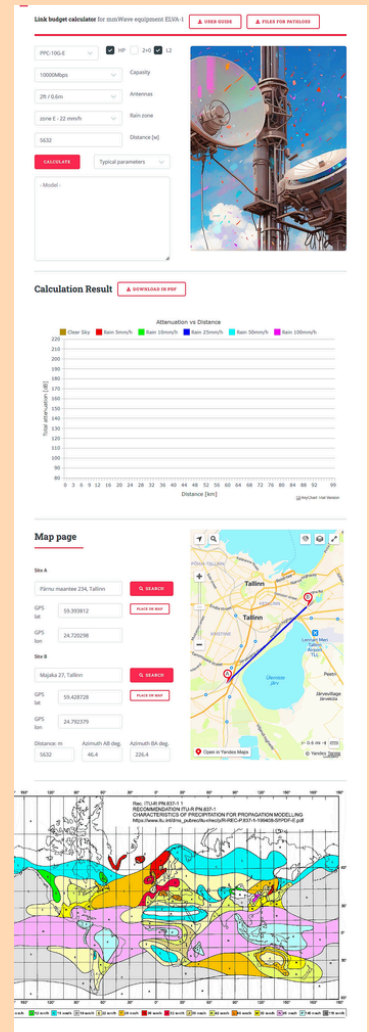
PPC-10G, PPC-10G-HP and PPC-10G-L2 models
with 1 ft / 2 ft antenna



PPC-10G 2+0 model with 2 ft antenna



ELVA-1 Link Budget Calculator

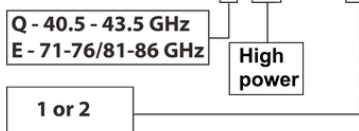


70-80-90 GHZ
FCC registration
procedure for PPC-10G-E

PPC-10G RADIO LINKS SPECIFICATIONS

Parameter / Model	PPC-10G-E		PPC-10G-E-HP		PPC-10G-Q		PPC-10G-Q-HP	
Frequency range	71-76/81-86 GHz (E-band)				40.5-43.5 GHz (Q-band)			
Throughput	Up to 10 Gbps Full duplex				Up to 7.2 Gbps Full duplex			
2+0 aggregation	2 transceivers with 1 antenna, signal in vertical and horizontal polarization Available for all PPC-10G models, please specify "2+0" in your order							
Built-in L2+ switch	4x 10GE ports, available for all PPC-10G models, please specify "L2" in your order							
Channel Bandwidths	250/ 500/ 750 /1000 /1250 /1500 /2000 MHz				250/ 500/ 750 /1000 /1250 MHz			
Central frequency steps	Tunable into band with step 125MHz (31.25MHz step)							
Modulation	QAM-256 to BPSK Adaptive to weather with hitless adaptive bandwidth, coding and modulation							
MTBF	150 000 hours							
Max distance at max throughput	up to 24.0 km (15 miles) at clear sky with 2ft antennas				up to 19.0 km (11.8 miles) at clear sky -2ft antennas up to 26.5 km (16.4 miles) at clear sky -3ft antennas			
Max output power	17 dBm at QAM 128 / 20 dBm at QPSK		19 dBm at QAM 128 / 26.5 dBm at QPSK		17 dBm at QAM 128 / 20 dBm at QPSK		19 dBm at QAM 128 / 26.5 dBm at QPSK	
Link budget with 2ft antennas, BPSK modulation @ 10 ⁻⁹ BER	208 dB @250 MHz 205 dB @500 MHz 203 dB @750 MHz 202 dB @1000 MHz 201 dB @1250 MHz 200 dB @1500 MHz 199 dB @2000 MHz				196 dB @250 MHz 193 dB @500 MHz 191 dB @750 MHz 190 dB @1000 MHz 189 dB @1250 MHz			
Max throughput	1330Mbps @250MHz	2660Mbps @500MHz	3750Mbps @750MHz	5200Mbps @1000MHz	7200Mbps @1250MHz	7630Mbps @1500MHz	10000Mbps @2000MHz	
Management	SNMP v.1; v.2; SNMPv2-MIB and proprietary MIB; WEB GUI; Telnet; CLI							
Encryption	AES 128 optionally							
Ethernet Interface	1 × SFP/SFP+ port (1000Base-X, 10GBase-LR/SR), or 4x × SFP/SFP+ for PPC-10G models with L2+ switch							
Ethernet features	Transparent for Ethernet services, Flow Control 802.3x PTP IEEE 1588v2 (TC) support							
Network Management Port	1000 Base-Tx (RJ – 45)							
Forward Error Correction	LDPC; Reed Solomon							
Polarization	Vertical / Horizontal							
Antenna Type	Cassegrain type antenna with radio-transparent radome							
Antenna sizes available	1 ft		2 ft		-	1 ft		2 ft 3 ft
Antenna Gain/Beamwidth	45 dB/0.7° 51 dB/0.35° -					38 dB/1.5° 44 dB/0.7° 47 dB/0.4°		
Power Supply AC	Input 88-132 / 176-264 Volts, 50/60 Hz							
Transceiver Power Consumption	45 W (+60 W when heater is switched ON) 90W max PoE power delivered by PSE management port (optionally)							
DC Power	36 to 60 Volts DC (optional powering by 90W PoE to RJ-45 management port)							
Power Connection	IP67							
Operational Temperature	-50°C to +60°C / -58°F to 140°F							
Humidity	Up to 100%							
Outdoor unit size	246 x 246 x 110 mm w/o antenna							
ODU Weight	4 kg max w/o antenna							
Delivery set	2 radios with antennas, indoor power supplies and accessories for turnkey installation							

PPC-10G-E-HP-L2-Xft/2+0



HOW TO ORDER:

Example: Link w/ 2 ft antennas, 71-76/81-86 GHz has code PPC-10G-E-2ft.

- To have L2+ switch option please add "L2" to code.
- To have HP (High Power) option please add "HP" to code
- To have 2+0 aggregation option please add "/2+0" to code