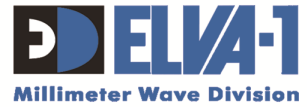


Dual-band Urban-Scale Wireless Networking Deployed in E-band/V-band



Backhaul network
for LTE and 5G

Up to 40 Gbps
Wireless Throughput

CITYWIDE URBAN MESH NETWORKING PROJECTS GO WIRELESS

Why new urban mesh networking projects around the world are building on wireless solutions and refusing to dig the streets for optics:

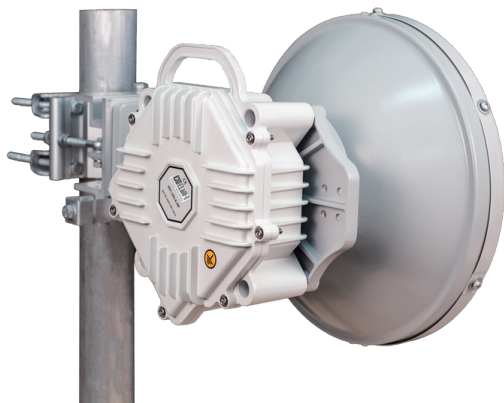
- The cost of wireless solutions is falling while the cost of fiber installation is rising greatly
- Wireless solutions have reached the speed and reliability of fiber
- Decentralized wireless networks are resistant to failures because of many alternative routes for traffic.

Applications

- Wireless backhaul network for LTE and 5G
- Smart City/Safe City projects
- Wi-Fi public areas, video surveillance of streets and public transport
- Multigigabit networks in areas of protected historical city center.

Features

- Fiber-like data transfer rate
- Availability of wireless network 99.99% - 99.999%
- The network can be deployed in a few weeks/months
- Dynamic routing allows automatic redirect of the traffic in the best route for the network bandwidth and radio link load
- Throughput (capacity) of the wireless network rises with the increase in the number of nodes
- 10 to 40 Gbps 70-80 GHz backhaul and mesh architecture based on 1-10Gbps 60 GHz provide high network throughput and reliability

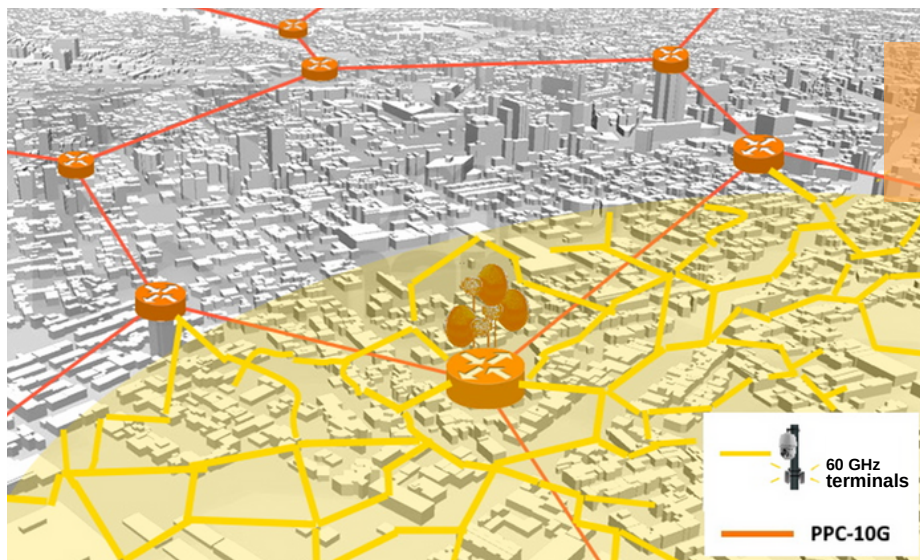


URBAN-SCALE WIRELESS NETWORKING CONCEPT



The first level: 10-40 Gbps 70-80 GHz backbone wireless communications

- L3 router in each node
- 3 x 10 Gbps radio links from each node, expandable to 20 or 40 Gbps



The second level: 1-10 Gbps 60 GHz mesh wireless communication channels

- 60 GHz (V-Band) self-configuring network with 70-150 m microcells
- 5G and LTE backhaul network
- Solution for the "last mile"
- Connecting residential buildings, SMB businesses, Wi-Fi zones



Example of the concept of deploying wireless network in urban area

- E-band backbone covers the metro area with a hexagonal network topology
- V-band mesh network uses traffic from backbone nodes

1/10 GBPS V-BAND STREET MESH NETWORK WITH WI-FI ZONES (CONCEPT)



- Self-configuring mesh network consisting of 58-71 GHz (V-band) radio links
- Mesh topology of 1-10 Gbps channels for distances up to 200 m with the possibility of electronic beam direction control in a sector of 60 or 180 degrees



LONDON WIRELESS MESH PROJECT

- Urban-scale wireless network in historical buildings area
- Residential buildings are connected by
- 1 Gbps radio terminals, no fiber cables through the roofs
- Street video surveillance systems and public Wi-Fi areas were built

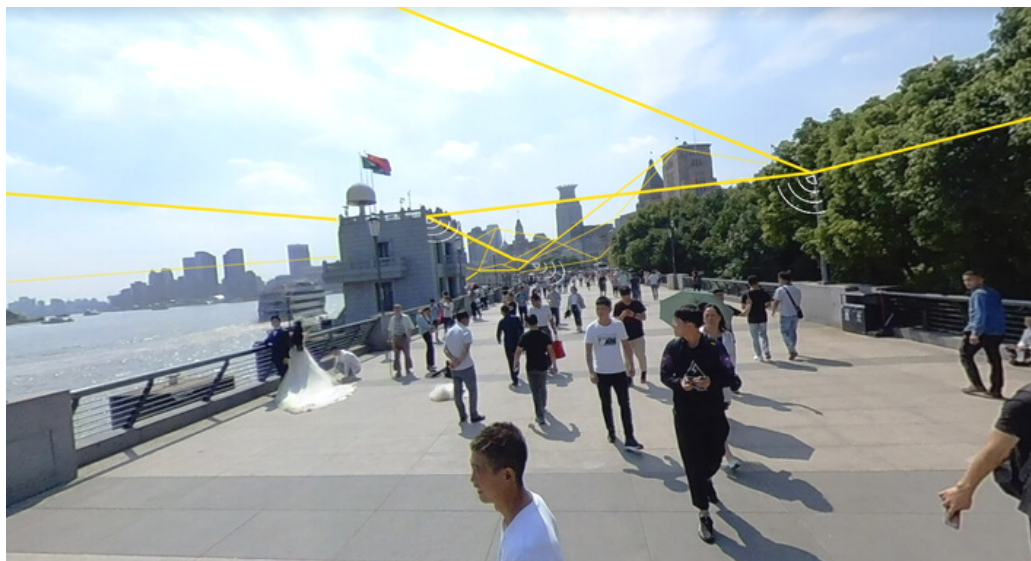
Source: Cambridge Communication Systems



WHY TO REPLACE OVERHEAD CABLES TO GIGABIT RADIOS

- Historic parts of the city will look more attractive to tourists
- Fast Internet for households and local businesses
- Availability of redundant connections in the mesh architecture of the wireless network

PUBLIC AREAS 60 GHZ V-BAND MESH NETWORK CONCEPT



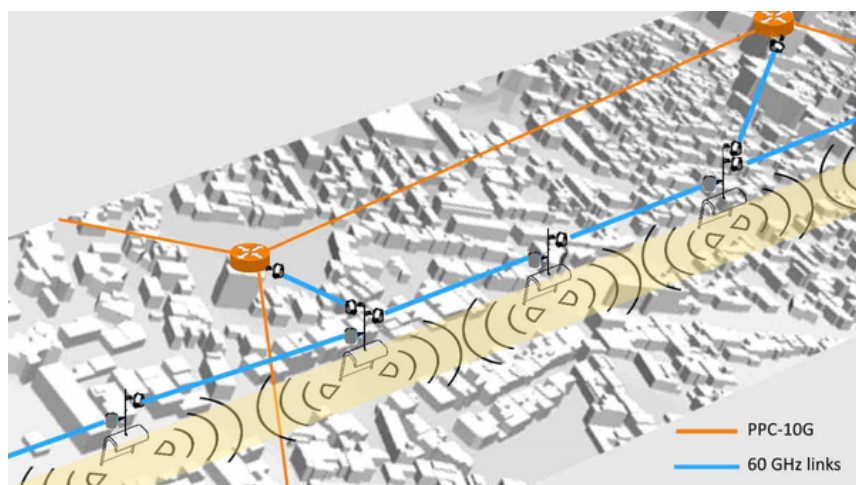
- Wi-Fi coverage for public areas
- Connection of households with 1GE Internet and 4K HD TV
- Remote monitoring and network management from a single administrator workstation



EXAMPLE OF V-BAND 1GE/10GE MESH NETWORK NODE

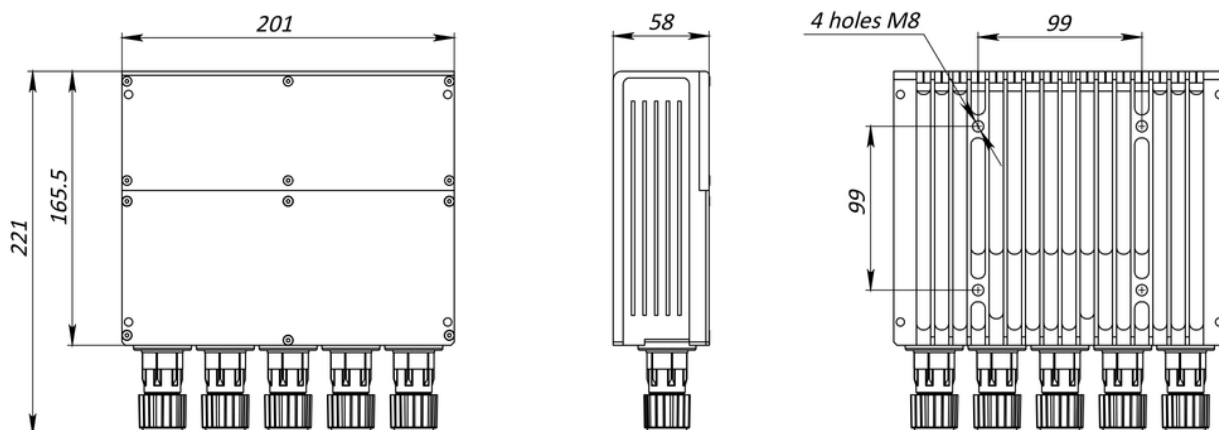
- Installation on lighting poles and buildings
- Can be used for public Wi-Fi and TV in buses
- Includes IP cameras for stops
- Includes 60 GHz terminals (to enable directions of traffic to neighboring nodes)
- Includes L2 / L2+ / L3 router

V-BAND NETWORK ALONG PUBLIC TRANSPORT ROUTES



- Ability to connect any IP devices at stops
- 1GE/10GE connectivity to public transport with seamless connection to access points installed along the route
- Cameras, microphones, info-screens at stops and onboard buses and trams

1GE/10GE V-BAND TERMINAL WITH 5-PORT SWITCH

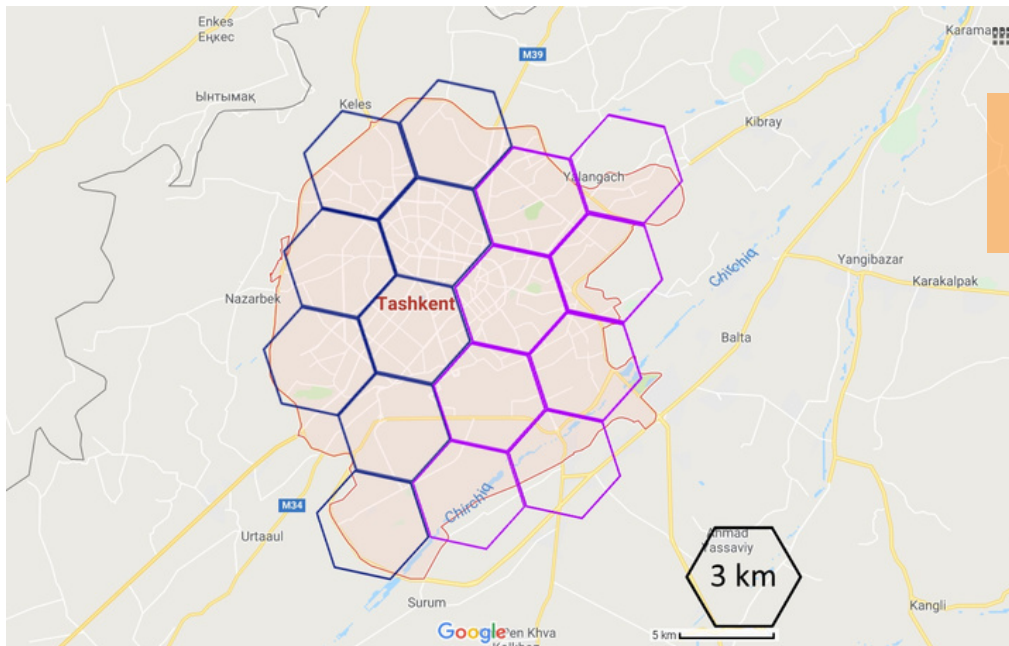


1GE/10GE V-BAND TERMINAL SPECIFICATIONS

* Available with SyncE и 1588v2 (TC) interface to build wireless backhaul for LTE and 5G

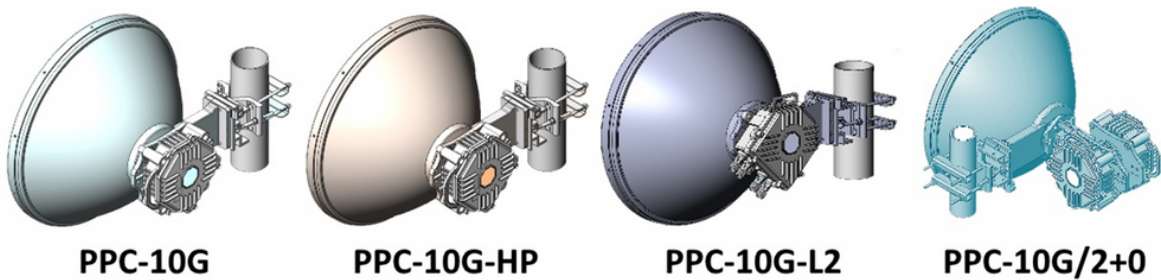
- Carrier grade equipment, without using 802.11 (this is not Wi-Fi) *
- Full Duplex 1 to 10 Gbps throughput
- Built-in L2+ router
- 2x SFP+ 10GE and 3x 1000-Base-T 1GE Ports
- One 1000-Base-T port has PoE function
- Low cost per radio link
- 200 m working distance
- Easy to install with POE (Power over Ethernet),
- Ability to integrate into a single functional unit with an IP camera and other IP devices
- The Federal Communications Commission has allocated 57 to 71 GHz for unlicensed use

CONCEPT OF COVERING THE METRO AREA BY E-BAND 10 GBPS RADIO LINKS



- City with a population of 1 million
- Area covered: 20 x 20 km

- 3 km hexagons topology
- require 60 radio links, 50 node switches



1. Basic model PPC-10G
2. Extended range model (indexed as HP)
3. Model with built-in 4-port 10GE switch (indexed as L2)
4. Model with aggregation of 2 channels 10 Gbps, total 20 Gbps per antenna (indexed as 2+0)



Contact ELVA-1 for more details about 10 Gbps urban scale E-band/V-band networking

