

# TDM/TDMA NETWORK

## HIGH-THROUGHPUT VSAT PLATFORM

UHP-based TDM / TDMA satellite network provides a comprehensive set of services suitable for telecom and broadband access operators, enterprises of various size, government agencies and broadcast companies. Satellite network provides global coverage and is the fastest and most effective way to connect multiple, geographically distributed users with throughput and quality matching those of modern terrestrial infrastructure in urban areas of developed countries.

### Minimal CAPEX

Entry-level VSAT network can be based on UHP hub, consisting of only one router, but able to support more than 2,000 remotes and aggregate throughput up to 250 Mbps. To expand the network, one or more daisy-chained UHP routers can be added to the Hub. This provides multiple increase of the network performance without any substantial interruption of the service. UHP VSAT hubs have the industry's best cost of acquisition and ownership.

Compact UHP terminals can be installed in a matter of hours, anywhere, regardless of the local infrastructure conditions. The same UHP TDM/TDMA network may support "star" and "mesh" terminals and requires no upgrade of the Hub. Cost-effective UHP terminals are easy to install and operate, providing a high level of competitiveness and efficiency in a network of any size, any throughput and any topology.

### Best OPEX

Modern DVB-S2X ACM modulation and coding technologies of the Forward (Outbound) channel combined with unsurpassed, highly-efficient Multi-Frequency TDMA protocol provide minimal operating expenses and maximize quality of service.

Owing to the system's high-throughput and on-demand bandwidth allocation, the UHP VSAT network can simultaneously support different applications, such as broadband access, e-mail, access to corporate servers, telephony, videoconferencing and data broadcasting. Advanced QoS ensures the required quality of service for each of the terminals and for each particular application. A single UHP network can be shared by multiple operators using the VNO model, which provides efficient use of common infrastructure.

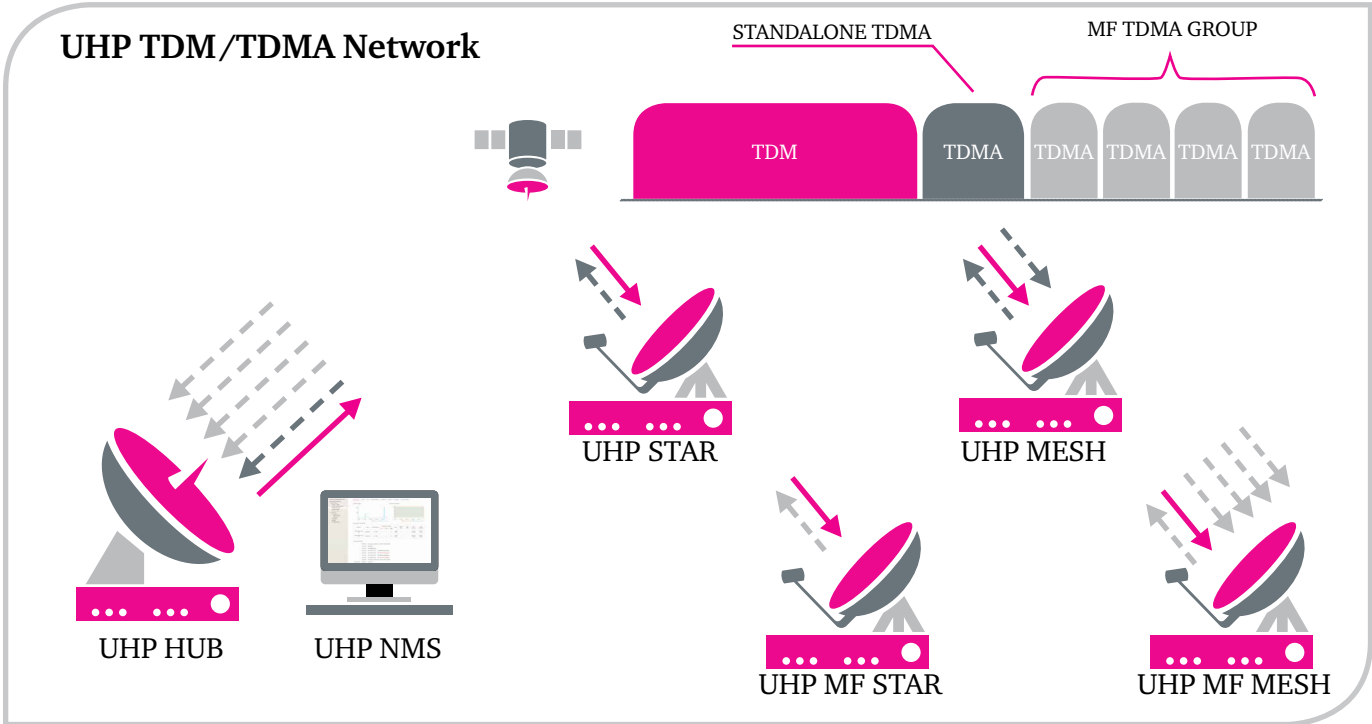
### APPLICATIONS

- Corporate network of any topology
- Broadband access for enterprises and households
- Videoconferencing, distance learning and telemedicine
- Cellular backhaul via satellite

- Support of various topologies: 'Hub and Spoke', 'Dual Star', 'Mesh', 'MF TDMA Mesh'
- High-throughput terminals with up to 225 Mbps in Outbound and up to 20 Mbps in Inbound channels
- Easy and cost-effective scalability up to 254 TDMA Inbound channels and 500'000 terminals per network
- Bandwidth-efficient DVB-S2X ready technology with adaptive coding and modulation
- Innovative MF-TDMA protocol with proven efficiency of 96% vs. SCPC and LDPC coding
- Ultra-low latency VSAT system with round-trip delay about 570 ms for TDMA mode of operations
- Support of VLAN, multi-level QoS, codec-independent handling of real-time traffic, TCP acceleration
- Fast network startup — network is ready for use in less than a minute upon power-up
- User-friendly Network Management System with multi-user web-interface and VNO support
- Optional automatic local or geographic Hub redundancy, 1:1 redundant terminals
- Various hardware models, including compact, integrated, rack-mountable and outdoor versions



# UHP TDM/TDMA Network



UHP TDM/TDMA Network consists of one Hub and the associated remote terminals. Hub transmits one out-bound TDM carrier towards all the remote terminals and receives one or more inbound carriers shared between the remotes as a return channel with Time Division Multiple Access (TDMA). One TDM/TDMA network may have one or up to 254 standalone return TDMA channels, depending on the link budget and one the required network bandwidth. Each standalone TDMA channel may have its unique bandwidth, modulation and coding settings that allow achieving maximum efficiency for different remote terminals depending on a satellite footprint and sizing of RF equipment.

Also UHP TDM/TDMA network may have Multi-Frequency TDMA groups comprising up to 16 carriers with similar symbol rate and modulations (40 MHz band maximum). All the remote terminals associated with such return channel may transmit to any MF TDMA carrier with fast frequency hopping from burst to burst ensuring equal loading of all MF TDMA carriers. UHP terminals may operate in hub-and-spoke (Star) topology or

in Mesh mode, when terminals are connected via a single satellite hop bypassing the Hub. Mesh connectivity can be implemented using one of the standalone TDMA carriers or via MF group of up to 4 TDMA channels (20 MHz band maximum). MF Mesh terminals receive all return channels simultaneously and transmit to one of these channels.

UHP routers have built-in, multilevel tools to ensure the required QoS. Individual terminals or groups of stations can be assigned to a minimum guaranteed bandwidth CIR, permitted maximal rate MIR or controlled by a fair access policy manager. In addition, there exists a special mechanism of dynamic resource allocation to real-time traffic. UHP router supports a large variety of IP protocols and traffic acceleration.

There are several ways to manage TDM/TDMA network, specifically using the built-in Web console of the Hub, via SNMP protocol, or with the help of advanced, multi-user UHP Network Management System, which makes best use of the UHP technology.

