# UHP HUBLESS

## Full Mesh Network

UHP Hubless TDMA is a versatile VSAT network, operating without a central Hub. It can support any network topology (star or mesh) and is a good fit for many applications. Every Hubless TDMA station has similar architecture and may communicate with the others over a single-hop satellite link, while one station is designated as master and is responsible for maintaining the timing and allocating bandwidth.

The smallest size Hubless TDMA network consists of only two stations which communicate via a common TDMA carrier. This network can be expanded up to 2 000 sites operating via up to 8 MF-TDMA carriers shared by all stations simultaneously. Such network development does not require any hardware replacement of the existing sites.

Affordability of the equipment combined with highly-efficient utilization of satellite capacity ensures the best total cost of network ownership. Hubless TDMA is also a good choice rational solution for replacement of obsolete SCPC channels; this can significantly boost the total traffic in the system, due to statistical multiplexing of user traffic with sophisticated QoS policies.

Owing to software-definable architecture of the UHP platform, Hubless TDMA technology can be a good entry solution for a private VSAT network, eliminating the need for expensive central infrastructure at an early stage of network rollout. At any time Hubless TDMA network can be remotely switched to TDM/TDMA mode without replacing any hardware or even visiting the sites.

**Air traffic control with real-time voice/video/data**

**Video surveillance and border control**

**Videoconferencing and telephony**

**Fast-deployable communications**

**M2M and SCADA networks**

**Backup for terrestrial infrastructure**

### Key Features:

- Support of various topologies: 'hub and spoke', 'multilevel tree', 'full mesh'
- Innovative MF TDMA protocol with proven efficiency of 96% vs. SCPC
- Various modulations (12 MODCODs) and bandwidth-saving LDPC coding
- High-throughput Full Mesh: single-carrier TDMA or up to 8 MF TDMA carriers with aggregate rate up to 22 Msps
- Ultra-low latency VSAT system with round-trip delay about 570 ms for TDMA mode of operation
- L2 Bridge and advanced IP router with throughput up to 190 000 packets per second
- 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
- Minimally required bandwidth is just 120 kHz can be shared by up to 2 000 stations
- Automatic transmission level control ensures superior reliability of communication
- Support of 1:1 automatic redundancy without use of external controllers
- Various hardware models, including compact, integrated, rack-mountable and outdoor versions
- Compatible with majority of C, Ku and Ka-band RF Systems, supplies power and reference signals

## **TECHNICAL SPECIFICATIONS:** UHP-200 SERIES HUBLESS TDMA

| NETWORK | | |
|---|---|---|
| **Topology** | Hubless TDMA Full Mesh or Star | |
| **Network role** | Hubless Slave or Master | |
| **Options (SW)** | **UHP-2XX-FM:** Hubless Master/Slave; **UHP-2XX-FS:** Hubless Slave | |
| **TDMA CHANNEL** | MODULATOR | DEMODULATOR |
| **Standard** | LDPC TDMA with Adaptive Coding and Modulation | |
| **Channels** | One universal SCPC/TDMA modulator | Eight-channel MF-TDMA demodulator |
| **Modulation** | BPSK, QPSK, 8PSK, 16APSK; Roll-off: 5%, 20% | |
| **FEC** | 1/2, 2/3, 3/4, 5/6 | |
| **Symbol Rate** | 100 ksps - 11 Msps; step 1 ksps | 100 ksps - 22 Msps; step 1 ksps |
| **Data Rate** | 100 kbps - 35 Mbps | 100 kbps - 35 Mbps |
| **TDMA Protocol** | Frame 50 -1000 ms, 14 slot sizes, manageable minimal bandwidth; fast MF-TDMA hopping | |
| **QoS** | 8-level prioritization, traffic policies, CIR, MIR, group QoS, hierarchic traffic shaper, FAP | |
| **ROUTER** | | |
| **Performance** | Up to 190 000 packets per second | |
| **Support** | DSCP, multiple IP/VLANs, PAT, proxy ARP, L2 Bridging, TCP Acceleration, Jumbo frames, AES-256, X.509 | |
| **Protocols** | IPv4/IPv6, IGMP, cRTP, SNMP, RIP, SNTP, TFTP, PPP, DHCP, DHCP Relay, OpenAMIP | |
| **Management** | HTTP interface, SNMP, Telnet, NMS with VNO support | |

UHP Hubless TDMA network consists of peer stations, one of which is acting as a Master in charge dynamic bandwidth allocation, timing and access control. All the stations transmit and receive data using a shared TDMA carrier or Multi-Frequency TDMA Group (up to 8 carriers within 40 MHz band). This provides the best utilization of satellite bandwidth, which is instantly redistributed between the stations depending on the actual traffic and on the predefined QoS policies. MF TDMA Hubless network allows optimizing required BUC power of the stations.

To ensure Full Mesh connectivity of the Hubless TDMA network, its link budget must be calculated so that all the stations receive transmission of other terminals via the shared TDMA carrier. However, the network is operational if the Master station can receive bursts from the other stations, while other stations receive the signal from the Master, i.e. there is no need to ensure the mutual reception of transmission of other stations in-between. Such network will operate in a “hub and spoke” topology with the center point at the Master station.

UHP routers have an additional DVB-S2/S2X multichannel demodulator, which is not used when operating in Hubless TDMA mode. It can be used for simultaneous reception of additional overlay carrier, e.g. containing some broadcast or broadband data from the center.