Specifications

	Features	Telsima StarMAX™ 4100 - WiMAX Base Station	
General	RF PHY	OFDM	
	Frequency Bands	3.30-3.40 GHz, 3.40-3.60GHz, 2.50-2.69 GHz	
	Channel Bandwidth (in MHz)	1.75 / 3 / 3.5 / 6 / 7 /10 / 14 MHz - S/W configurable; Bandwidth configurable in 250kHz steps	
	# of Sectors	StarMAX 4110: 1 Sector	StarMAX 4120: 2 Sectors or 1 Sector with "diversity"
	Duplex Method	TDD	
	BS Synchronization	Yes (external source or internal GPS) (internal GPS requires StarMAX 4930**) GPS option card)	
	IDU-ODU Interconnection	Coax cable RG214 or equivalent (max 15 dB loss at 500MHz)	
	Backhaul options	Gig Eth, 10/100 Eth, WiMAX backhaul	
WiMAX	WiMAX specification	IEEE 802.16-2004	
	Adaptive Modulations Supported	64QAM 3/4, 64QAM 2/3, 16QAM 3/4, 16QAM 1/2, QPSK 3/4, QPSK 1/2, BPSK 1/2	
	Tx Power max.	30 dBm / +32 dBm**)	
	Rx Sensitivity	-101 dBm	
	Uplink Subchannelization Support	Yes (up to 1:16)	
	Configurable Cyclic Prefix	1/4, 1/8, 1/16, 1/32	
	Enhanced WiMAX Features	Packing, PHS**), ARQ**)	
	Antenna diversity : STC/MRC support	Yes (StarMAX 4120)	
Antennas	Antenna supported	Any (from beam antenna over 60/90/120deg. to omni antenna)	
Services & Provisioning	Service Flows , averages	8 service flows per Subscriber Station	
	QoS Priorities	Up to 16 classifiers per Subscriber Station	
	QoS WiMAX	BE, nrt-PS, rt-PS**), UGS**)	
	Access Control Lists***)	Yes	
	Data Rate Control***)	Minimum data rate, Data Rate Limiting	
	Portability & Mobility ***)	Yes, TRUFLE™ enabled	
	Security	Data: DES, AES, 3DES; Authentification: X.509 certificate	
Networking	IP Protocols	IPv4, IPv6	
	Bridging/Routing (Base Station)	Transparent L2 switch, Bridging	
	Packet handling	802.1Q VLAN, PHS**)	
Management	Management Protocol	SNMP, CLI	
	Software upgrade	Yes, fail-save software upgrade; Configuration file up- & download	
	EMS remote management	Yes	
	NMS remote management	Yes	
Mechanical / Electrical	Interfaces	WAN Interface	• 1 Gig Ethernet on SFP, 100BaseT Ethernet on RJ-45
		Management Interface	• 10/100 BaseT Ethernet on RJ-45, Serial port on RJ-45
		Clock Interface	• Clock input on BNC connector: PPS or GPS • Alternatively GPS antenna input, requires option card 4930)
		PWR interface:	• dual -48V DC power feed
		Intra-system communication	• 2 Ethernet ports on back • sync clock ports on back
		IF Interfaces	• one WiMAX RF/IF interfaces to ODU on TNC (StarMAX 4110) • two WiMAX RF/IF interfaces to ODU on TNC (StarMAX 4120)
	Voltage	-36V to – 72V DC*)	
	Power Consumption	140 W (60 W IDU + 2* 40W ODU)	
	Indoor / Outdoor Dimensions (h-w-d) / mm	44 x 430 x 303 (IDU) - without mounting ears / 260 x 160 x 90 (ODU) - w/o mounting kit, w/o heat sink	
	Rack/Pole requirements	Indoor: 19" and 23" Equipment Rack, side-to-side airflow; front cabling of communication ports) and rear cabling of PWR & E1 / Outdoor: up to 120mm pole diameter supported for ODU mounting	
	Indoor / Outdoor Weight	4,80 kg / 5,35 kg	
	Environmental Indoor	Temperature: 0°C – 50°C Humidity: 5% - 95% (non condensing)	
	Environmental Outdoor	Temperature: -45°C to + 60°C Humidity: 0% - 100%	
	Regulatory Compliances	CE Mark, RHoS/WEEE	

Features apply to Product Release 2.0. *) = Preliminary Information, **) = References are to Product Release 3.x, ***) = requires Telsima StarMAX Provisioning Manager

Product Codes

StarMAX 4110-3.3G	WiMAX Base Station, Single sector, TDD, 3.3GHz, includes IDU & ODU, one empty PxP slot, slot for GPS option card
StarMAX 4120-3.3G	WiMAX Base Station, Dual sector, TDD, 3.3GHz, includes IDU & ODU, slot for GPS option card
StarMAX 4110-3.5G	WiMAX Base Station, Single sector, TDD, 3.5GHz, includes IDU & ODU, one empty PxP slot, slot for GPS option card
StarMAX 4120-3.5G	WiMAX Base Station, Dual sector, TDD, 3.5GHz, includes IDU & ODU, slot for GPS option card
StarMAX NMS	Network Management and Provisioning (see StarMAX NMS datasheet for details)

For Accessories, Option Cards and Spare Parts, please see our Product Catalogue.

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WiMAX FORUM

WiMAX BASE STATION

StarMAX™ 4100 Series

Key Features

- Fully WiMAX compliant
- Dual Sector WiMAX BS in 1U
- Scaleable High-density Solution
- Optical or Electrical GE & 100Mb/s Ethernet
- In-band or Out-band Network Management
- Receive and Transmit Diversity
- Uplink Subchannelization
- Integrated GPS receiver for TDD Sync
- Integrated wireless P2P backhaul
- Integrated E1/T1 backhaul (IP over E1)
- NMS - BSS integration-ready
- Provisioning Manager
- Mobility Manager supporting portable and mobile applications

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The heart of the Telsima WiMAX solution is the StarMAX 4100 series Indoor Unit (IDU). This unit contains an advanced network processor that implements the various control and networking protocols required for the operation of the StarMAX system. The IDU has two slots that can be populated by Point-to-Multipoint (PMP) or Point-to-Point (P2P) processing modules. The PMP module contains a WiMAX System-on-a-Chip (SoC) that implements the 802.16 standard. The P2P module provides for microwave backhaul capability to be integrated into the StarMAX IDU.

Target Applications

- Wireless Broadband Internet Access
- VoIP
- Backhaul for 2G/3G & WiFi Networks

Target Markets

- Enterprise/Small Office
- Retail/Residential DSL Alternative
- Urban, Suburban and Rural

Deployment Modes

- Fixed/Portable/Mobile
- Non Line of Sight (NLOS)
- Near Line of Sight (NrLOS)
- Line of Sight (LOS)

Compact High Density Design-Stackable and Integrated Microwave Backhaul

The StarMAX 4100 series IDU has been designed to keep both modularity and the tight space constraints of a typical deployment site in mind. It is offered in a 1U 19" rack-mountable form-factor. Each 1U chassis is capable of supporting up to two sectors. A typical base station site configuration for a dense urban area with support for 6 sectors can be realized in only 3U of 19" rack space using three base systems, making it one of the highest density WiMAX Base Station products in the market.

For operators needing wireless backhaul, StarMAX is designed to offer P2P modules supporting a wide range of frequencies (7-38 GHz), eliminating the need for a separate microwave system, saving cost, power and space for operators.

Carrier Class Reliability

The StarMAX 4100 IDU has a rugged industrial design with dual redundant power supply inlets and removable cooling fan tray to ensure reliability and high performance in adverse conditions. Redundant WiMAX configurations can be built by adding more base systems to the stack or designating an available WiMAX point-to-multipoint module within a base system as a hot standby.

Enhanced Features for Superior Coverage and Throughput

The StarMAX IDU implements several enhanced modes of WiMAX for performance differentiation. These include

- Uplink Subchannelization for link budget gains of up to 12 dB
- Receive diversity through Maximum Ratio Combining (MRC) for gains of up to typically 8 dB
- Transmit diversity through Space Time Coding (STC) for up to typically 8 dB of added gain.
- Payload Header Suppression (PHS) for increasing IP payload throughput

Flexibility and Modularity

Based on Telsima's core intellectual property a wide range of RF options are supported, including 2.4/2.5/3.3/3.5 GHz bands as well as Time Division Duplexing (TDD) and Frequency Division Duplexing (FDD) modes of operation.

Plug in PMP and P2P modules combined with the stackable design of the StarMAX IDU and a variety of connectivity options including T1/E1, 10/100/1000bT and optical Ethernet allow

for a variety of pay-as-you-grow configurations for network operators. The high power network processor on the main board of the StarMAX IDU allows for a software upgrade of the critical networking protocols running on the system.

Full Fledged Network Management System

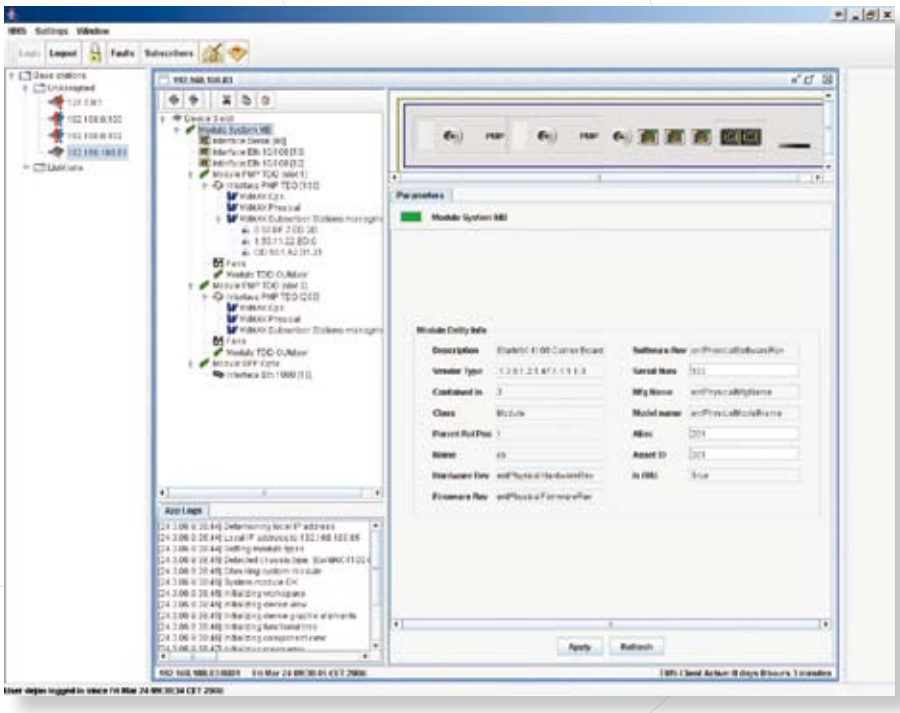
The Telsima network management system, StarMAX NMS implements full Fault, Configuration, Accounting, Performance, Security (FCAPS) functionality and is implemented on a client-server architecture based on SNMP v2. This provides easy integration of the StarMAX NMS into the operator's management and billing systems environment, should that be required.

The StarMAX Provisioning Manager keeps the access lists and implements service level agreements. It can configure min/max bandwidth, QoS, priority and rate limiting per subscriber station or per service flow. Supported classes of service are Best Effort (BE), rt-PS, nrt-PS and Unsolicited Grant Service (UGS).

Advanced Techniques for Mobility Management

Apart from fixed services Telsima also supports portability and mobility in the WiMAX network. Its enabling technology TRUFLE™ allows the operator to control the mobility of the subscriber, to control the number of users per subscriber station and to allow the operator to charge for advanced services. TRUFLE also enables stateful handover of a subscriber station from one base station to another, without losing IP connectivity and TCP sessions.

TRUFLE uses standard network elements and does not require any proprietary protocol support on any of the routers/bridges on the network. TRUFLE works with any Subscriber Station that is WiMAX certifiable. TRUFLE enables large scale layer 2 networks by preventing broadcast storms, man-in-the-middle attacks and other ARP spoofing methods.



StarMAX NMS Screen Shot

Wide Range of Outdoor Units (ODUs)

Telsima designs and manufactures its own ODUs. These are typically mounted in close proximity to the antennas and convert the intermediate frequency (IF) signal from the IDU to the desired transmit/receive frequencies and power levels. The StarMAX ODU is enclosed in a lightweight, rugged, weather proof enclosure that allows for peak performance in unprotected, extreme conditions. It is available in a variety of options for supporting 2.4/2.5/3.3/3.5GHz modes of operation.

The StarMAX ODU can be ordered along with a full complement of sectorized, high gain antennas, cables, connectors, mounting kits etc., providing a complete solution to network operators.