NetAxis

High Speed Carrier Class Microwave Connectivity Solutions for IP and TDM

Product Highlights

- Native ETH-based Point-to-Point radio
- High full-duplex throughput over a single channel: up to 400 Mbit/s, up to 800 Mbit/s with XPIC
- Hitless Adaptive Coding and Modulation (ACM), 4QAM to 256QAM
- Radio Link Aggregation (RLA)
- Nodal configurations with four radios and 1.6 Gbit/s in 1RU
- XPIC 1+1 in 1RU (NetAxis™-IDU4)
- Pseudo-Wires (PW) over ETH for multiservice transmission
- Advanced QoS features to fully support various classes of traffic
- ETH ring protection (ITU-T G.8032)

Key Benefits

- Removes backhaul bottleneck
  Facilitates the delivery of new compelling services
- Increases customer base and ARPU
- Keeps control of your network with end-to-end OAM
- Builds future-proof backhaul networks
- Optimize Total Cost of Ownership (TCO) with add-on features
- Inject flexibility in last-mile access applications
- Implement nodal configurations for aggregating traffic from multiple sites
- Implement ring topologies for transmission network resiliency

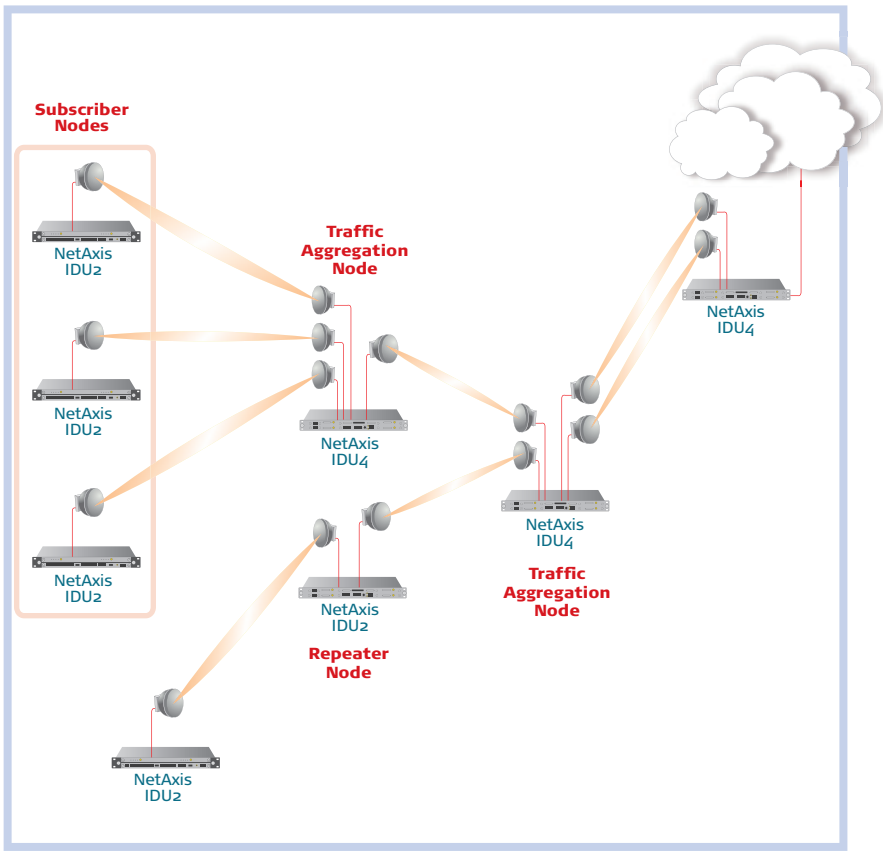
NetAxis™ is a native Ethernet wireless backhaul platform employing state-of-the-art MW packet technology, providing superior deployment flexibility for the most demanding backhaul network applications. It achieves traffic throughputs of up to 400 Mbps over a single link (or up to 800 Mbps with XPIC) with channelization up to 56 MHz. Higher capacities can be achieved by the use of extra outdoor units on the same IDU.

NetAxis™ incorporates statistical multiplexing for best optimization of the available link capacity, advanced Radio Link Aggregation (RLA) and hitless adaptive modulation – 4QAM up to 256QAM – for increased service availability in all weather conditions.

Network configurations are flexible, ranging from single links to nodal implementations for traffic aggregation sites. Backhaul of legacy services is carried out seamlessly through Pseudo-Wire Emulation functionality, with low end-to-end latency, and through the utilization of E1, STM-1 (VC-12/4), and Gigabit Ethernet network interfaces.

With regards to protection capabilities, NetAxis™ provides various redundancy options (ODU, modem, Gigabit Ethernet), also allowing the implementation of Ethernet protected rings, as per ITU-T G.8032, of assured low recovery switching time (less than 50 ms).

The NetAxis™ efficient timing capabilities include traditional G.703-based synchronization, Adaptive Clock Recovery (ACR) and Ethernet synchronization based on Synchronous Ethernet and IEEE 1588v2 (transparent) standards.



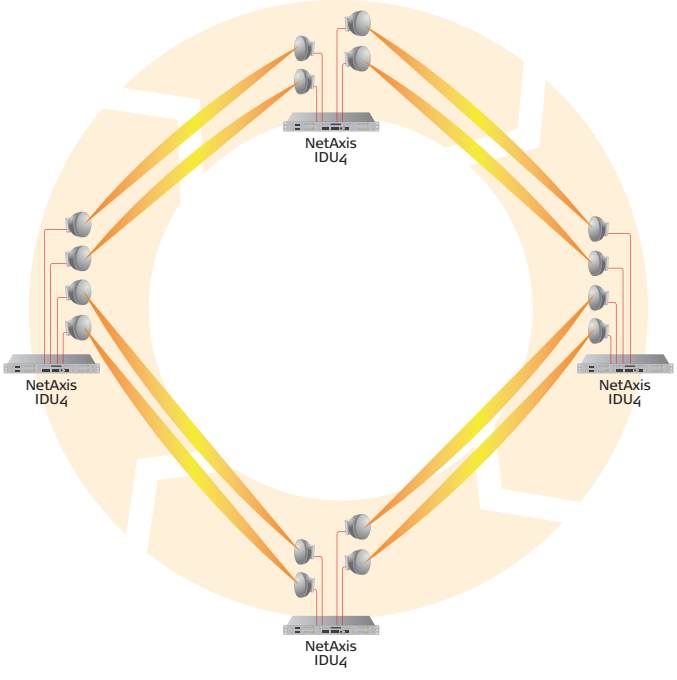
NetAxis ODU & Antenna

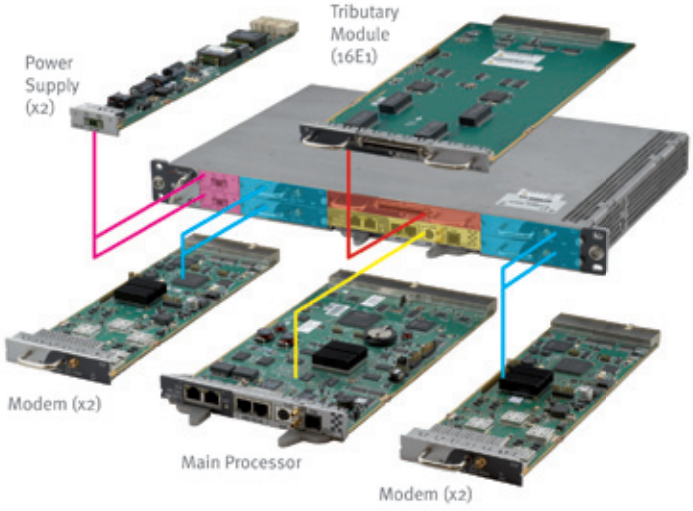
NetAxis IDU2

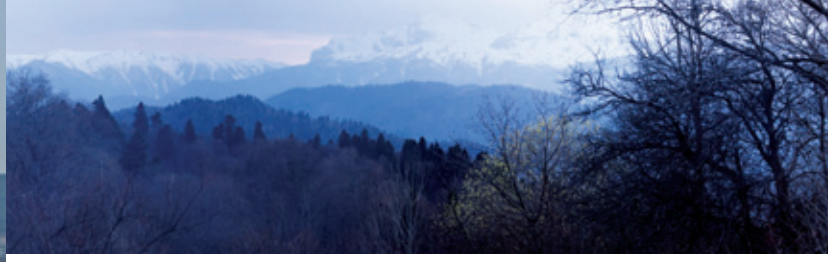
NetAxis IDU4

The NetAxis™ platform is offered in split indoor/outdoor configuration and comprises:

- Complete family of outdoor radios (ODUs) covering a wide range of operating frequencies: 6 / 7 / 8 / 11 / 13 / 15 / 18 / 23 / 26 / 38 GHz Antennas, integrated with the ODUs, or standalone.
- NetAxis™-IDU4 and NetAxis™-IDU2 indoor units (IDUs) of small form factor (1RU) and modular architecture.
- NetAxis™-IDU2 is the cost-optimized IDU for tail links requiring up to two radios, whereas NetAxis™-IDU4 is more appropriate for nodal sites of up to four radios. NetAxis™-IDU2 is a compact variant accommodating up to two modems instead of four. This device is flexible enough to be used at the edge of the network, as a repeater node and even as a ring node.
- In particular, NetAxis™-IDU4 combines industry-leading modem density, up to four modems, for system configuration agility (1+0 / 1+1 / 2+0 / 2+2 / 3+0 / 4+0, FD / SD / HSB) and flexible network deployments.
  NetAxis™-IDU4 also constitutes the ideal solution for excessive throughput requirements, as it supports protected (1+1) XPIC nodes in 1RU.







Managing NetAxis™ Networks

The NetAxis NMS™ Unified Management Suite is a state-of-the-art solution for deploying, supervising and managing contemporary telecommunication networks. It is a carrier-class Element, Network and Service management platform for all Netronics wireless products (access, transmission and aggregation). Upon request, third-party products can also be managed through easy integration.

The mediation with the managed elements of the network is implemented through add-on drivers, for applying management functions, such as configuration changes, performance counters collection, alarms (traps) collection, service provisioning, inventory collection, and others.

NetAxis NMS™ provides convergent service provisioning capabilities addressing the need for automated service provisioning across multi-vendor networks and diverse IT environments.

End-to-End Network Management

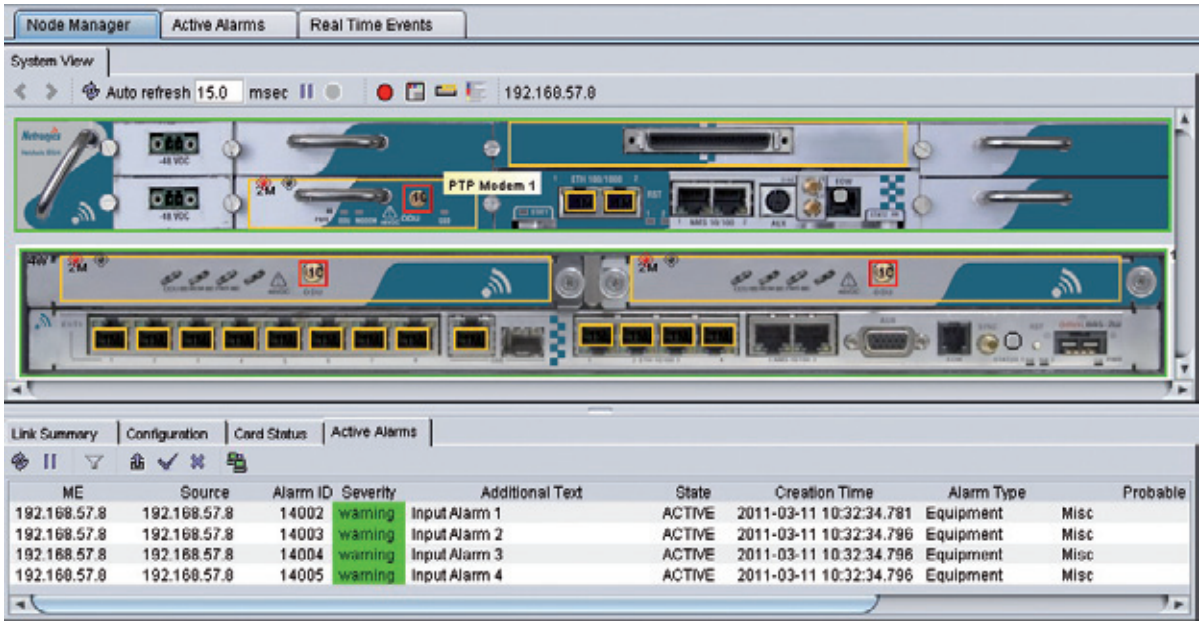
NetAxis NMS™ enables end-to-end management – network deployment, provisioning, real-time monitoring, testing – all through powerful embedded tools: "Just define the two end-points to connect" – simple end-to-end connection setup through user-friendly wizards that automatically create all necessary intermediate cross connections.

Reliable performance & fault management – NetAxis NMS™ automatically monitors availability, reduces alarms, correlates events and collects real-time and historical performance counters to be presented in powerful graphs.

Key Management Characteristics

Common management platform for all technology domains and associated services (WiMAX, Wireless transmission, xDSL, etc.)

- Simplified end-to-end provisioning – service agnostic workflow (BPEL) and a design environment, for realizing rapid service provisioning
- Sub-network Connections Management – circuits creation with powerful wizards, alarm correlation and impact analysis
- High system availability (24x7) and fault-tolerant operation through Server redundancy
- Advanced security features – hardened operating system ensures compliance to strict NOC security guidelines with fine-grained users, roles & privileges
- Standardized northbound interfaces for easy integration with third-party systems



Specifications

Outdoor Units (ODU)

ODU Model	6L-CF & 6U-CF (6 GHz)	71-CF (7 GHz)	81-CF (8 GHz)	11-CF (11 GHz)	13-CF (13 GHz)	15-CF (15 GHz)	18-CF (18 GHz)	23-CF (23 GHz)	38-CF (38 GHz)
Operating Frequency Band, GHz	5.9 - 7.1	7.1- 7.9	7.7- 8.5	10.7 - 11.7	12.75 - 13.25	14.5 - 15.35	17.7 - 19.7	21.2 - 23.6	37.0 - 39.5
RF Channel Arrangement	ITU-R F.383 / 384	ITU-R F.385-8	ITU-R F.386-6	ITU-R F.387-7	ITU-R F.497-6	ITU-R F.636-3	ITU-R F.595-8	ITU-R F.637-3	ITU-R F.749-2
Radio	ETSI EN 302217-2-2								
Tx/Rx Spacing, MHz	252.04 / 240 / 340	154 / 161 / 245	119 / 126 / 266	490 / 530	266	420 / 490 / 728	1010	1008 / 1232	1260
Tx Output Power, dBm (Upper, QPSK)	28	28	27	27	24	24	24	23	22
Output Power Accuracy (-33 °C to +55 °C)	±2 dB (max.)								
Max. Rx Level (No Damage)	+10 dBm								
RSSI (RSL) Accuracy (+25°C)	±2 dB (typ.)								
Frequency Stability	±7 ppm (max.)								
Frequency Resolution, kHz	250								
System Gain (dB) @ BER=10^{-6} (values refer to indicative operational modes)									
256QAM (56 MHz)	89.8	88.8	87.8	87.8	84.8	84.8	83.8	82.8	79.3
256QAM (28 MHz)	92.8	91.8	90.8	90.8	87.8	87.8	86.8	85.8	82.3
128QAM (56 MHz)	94.1	93.1	92.1	92.1	89.1	89.1	88.1	87.1	83.6
128QAM (28 MHz)	97.1	96.1	95.1	95.1	92.1	92.1	91.1	90.1	86.6
64QAM (56 MHz)	97.8	96.8	95.8	95.8	92.8	92.8	91.8	90.8	87.3
64QAM (28 MHz)	100.8	99.8	98.8	98.8	95.8	95.8	94.8	93.8	90.3
32QAM (56 MHz)	102.2	101.2	100.2	100.2	97.2	97.2	96.2	95.2	91.7
32QAM (28 MHz)	105.2	104.2	103.2	103.2	100.2	100.2	99.2	98.2	94.7
16QAM (28 MHz)	109.7	108.7	107.7	107.7	104.7	104.7	103.7	102.7	99.2
16QAM (14 MHz)	112.7	111.7	110.7	110.7	107.7	107.7	106.7	105.7	102.2
16QAM (7 MHz)	115.7	114.7	113.7	113.7	110.7	110.7	109.7	108.7	105.2
4QAM Low FEC (28 MHz)	117.3	116.3	115.5	115.3	112.3	112.3	111.3	110.3	106.8
4QAM Low FEC (7 MHz)	123.3	122.3	121.3	121.3	118.3	118.3	117.3	116.3	112.8
4QAM High FEC (28 MHz)	119.6	118.6	117.6	117.6	114.6	114.6	113.6	112.6	109.1
4QAM High FEC (7 MHz)	125.6	124.6	123.6	123.6	120.6	120.6	119.6	118.6	115.1
DC Operating Voltage, V	-40 to -60 (-48 typ.)								
Power Consumption, W (typ.)	34			26		23			
Dimensions (W x H x D), mm	250 x 247 x 106			237 x 247 x 89					
Weight, kg	< 6			< 4					
Operating Temperature	-33 °C to +55 °C (ETSI EN 300019-2-4 v2.1.2 Class 4.1) / Operational at -50°C to +70°C								
Transportation & Storage Temperature	-40 °C to +70 °C (ETSI EN 300019-2-2 v2.1.2 Class 2.3)								
Waveguide Flange	UBR70	UBR84	UBR84	UBR120	UBR120	UBR140	UBR220	UBR220	UBR320

Networking

TDM	ITU-T G.703 / G.736 / G.775 / G.823 ITU-T G.783
Ethernet	IEEE 802.3u (100 Mbps electrical) IEEE 802.3z (1000 Mbps optical) IEEE 802.3ab (1000 Mbps electrical) IEEE 802.1q (Virtual LAN) IEEE 802.1p (QoS) IEEE 802.1ad (Provider bridging) IEEE 802.1w (RSTP) IEEE 802.3ad (Link Aggregation)
Ethernet Synchronization	Synchronous Ethernet

Standards

EMC / EMI	ETSI EN 301 489-1 v1.6.1 (2002-09) ETSI EN 301 489-4 v1.3.1 (2002-08)
Electrical Safety	EN 60950-1:2001
Ethernet Ring Protection	ITU-T G.8032
STM-1 (VC-12/4)	ITU-T G.707 / G.781 / G.783
L2 Bridging Modes & QoS	C-VLAN S-VLAN transparent S-VLAN provider QoS per ETH port / VLAN / p-bit DSCP
Environmental	ETSI EN 300 019-2-3 v2.1.2:2003, Class 3.2 (Operation) ETSI EN 300 019-2-2 v2.1.2:1999, Class 2.3 (Transportation) ETSI EN 300 019-2-1 v2.1.2:2000, Class 1.1 (Storage)

Indoor Units

IDU Model	NetAxis IDU2 (Native IP, w/ PtP / XPIC modems, TDM transported in MEF8 Pseudowire)	NetAxis IDU4 (Switch aggregation unit, modular, with redundant service blades)
Max. Bitrate (gross)	800 Mbps	1,600 Mbps
Channel Size	7 / 14 / 28 / 56 MHz	
Link Modes	1+0 / 2+0 1+1 (HSB / SD / FD)	1+0 / 2+0 1+1 (HSB / SD / FD) 3+0 / 4+0 2+2 (HSB / SD / FD)
Modulation (adaptive)	4 / 8 / 16 / 32 / 64 / 128 / 256 QAM	
Operating Voltage	-40 V to -60 V (-48 V typ.)	
Max. Power Consumption	46 W (2+0)	87 W (4+0)
Dimensions (H x W x D)	45 (1U) x 407 x 240 mm	45 (1U) x 437 x 284.7 mm
Weight (approx., fully equipped)	8.0 Kg	8.4 Kg
Operating Temperature	-5° C to + 45° C	
Relative Humidity	10 % to 95 %, non-condensing	
Interfaces	1 x GbE, optical or electrical 8 x E1 4 x FE 2 x FE (outband management) Sync IN / OUT Serial RS-232 (external alarms) Engineering Order Wire (EOW)	2 x GbE 16 x E1 2 x FE (outband management) Sync IN / OUT Serial RS-232 (external alarms) Engineering Order Wire (EOW)

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