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The Innovation Behind Broadband Wireless



A Complete Range of WiMAX Solutions

Connecting The World



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Product Summary



Macro Cells Base Station Products

- HiperMAX**
The most advanced base station designed to deliver the best link budget, with highest capacity and net throughput for fixed, nomadic and portable applications.
- MacroMAX**
A highly upgradeable base station designed for both fixed and nomadic applications in urban and suburban deployments.

Micro Cells Base Station Products

- MicroMAX-SOC**
A cost effective, highly modular base station designed for lower density deployments and microcell applications.
- MicroMAX-SDR**
A standalone base station designed to drive down the cost of dense urban deployment whilst driving up reliability and coverage.

Customer Premises Equipment

- EasyST**
A revolutionary indoor, self-install Subscriber Terminal with optional IEEE 802.11 Wi-Fi and Voice over IP (VoIP) capabilities.
- ProST**
A Subscriber Terminal developed to provide superior link budget in difficult deployment conditions. Requires professional installation.
- ProST-WiFi**
Provides outdoor Wi-Fi coverage that enables the rapid construction of Wi-Fi Hotzones.

Network Management Products

- Netspan**
A comprehensive management solution that manages the network elements in the AS.MAX family.

Glossary

AAS	Adaptive Antenna System	OFDMA	Orthogonal Frequency Division Multiple Access
ATCA	Advanced Telecommunications Computing Architecture	PA	Power Amplifier
ATM	Asynchronous Transfer Mode	QoS	Quality of Service
BWA	Broadband Wireless Access	SDMA	Spatial Division Multiple Access
CPE	Customer Premises Equipment	SDR	Software Defined Radio
FDD	Frequency Division Duplexing	SOC	System on a Chip
LNA	Low Noise Amplifier	SOFDMA	Scalable OFDMA
MIMO	Multiple Input Multiple Output	TDD	Time Division Duplexing
MRC	Maximal Ratio Combining	TDM	Time Division Multiplexing
NLOS	Non Line of Sight	WiBRO	Wireless Broadband
OBSAI	Open Base Station Standard Initiative		
OFDM	Orthogonal Frequency Division Multiplexing		

WiMAX

The Standard for
Broadband Wireless



- WiMAX Forum is now a global organisation with more than 300 members
- Airspan is a Founding and Charter member of the WiMAX Forum
- Airspan is a WiMAX Forum board member
- WiMAX product certification began in August 2005 and Airspan was the first Vendor to demonstrate full 802.16-2004 FDD Base Station and CPEs
- WiMAX offers:
 - End Users: Greater choice, fixed/nomadic/portable access, self install and lower CPE prices
 - Service Providers: Better economics, reduced investment risk and new revenue generation opportunities
 - Suppliers: Mass produced chipsets, a platform for innovation and cooperation

WiMAX - Redefining Broadband Services

All over the world broadband wireless has been providing great service to its users for years. However, the proprietary nature of this technology to date has confined its deployment to specific applications.

With the arrival in 2005 of WiMAX this has all started to change. Defined by the IEEE and fully supported by ETSI, IEEE 802.16 defines a world-wide open standard for broadband wireless access.

WiMAX is good news for end users, network operators, service providers and suppliers alike. WiMAX makes possible new economics as well as new performance levels, transforming the business case for deployment of broadband wireless access. It creates the necessary environment for high-quality, multi-megabit services to be delivered to end users more cost effectively by creating a global marketplace and a framework for inspiring innovation.

The world's leading silicon suppliers are already committed to supporting WiMAX. High volume and new levels of integration will drive the WiMAX customer premises equipment costs significantly below the cost of today's CPEs, dramatically improving service provider economics.

WiMAX Forum, which was established by visionary industry leaders, champions the widespread adoption of this standard, establishes a brand for the technology and lays the groundwork for interoperability between products from different suppliers.

Airspan is proud to be a founding member of the WiMAX Forum and is a member of the WiMAX Forum Board. We started WiMAX product deliveries in the summer of 2005 and will progressively enhance these products during 2005 and beyond.

Our WiMAX products are branded under the name of AS.MAX and comprise a range of base stations, backhaul products and indoor and outdoor CPE products. We invite you to find out more about AS.MAX.



The Ultimate WiMAX Product Family



The AS.MAX family of products benefits from a unique combination of features delivering the best economics and most attractive service propositions for fixed and nomadic/portable broadband access:

- AS.MAX technology has been carefully chosen to provide operators with a future-proof evolution path to IEEE 802.16e and WiBRO Service Specifications.

Airspan's WiMAX Strategy

Product Summary

- HiperMAX
- MacroMAX
- MicroMAX-SDR

- MicroMAX-SOC
- MicroMAX-SDR

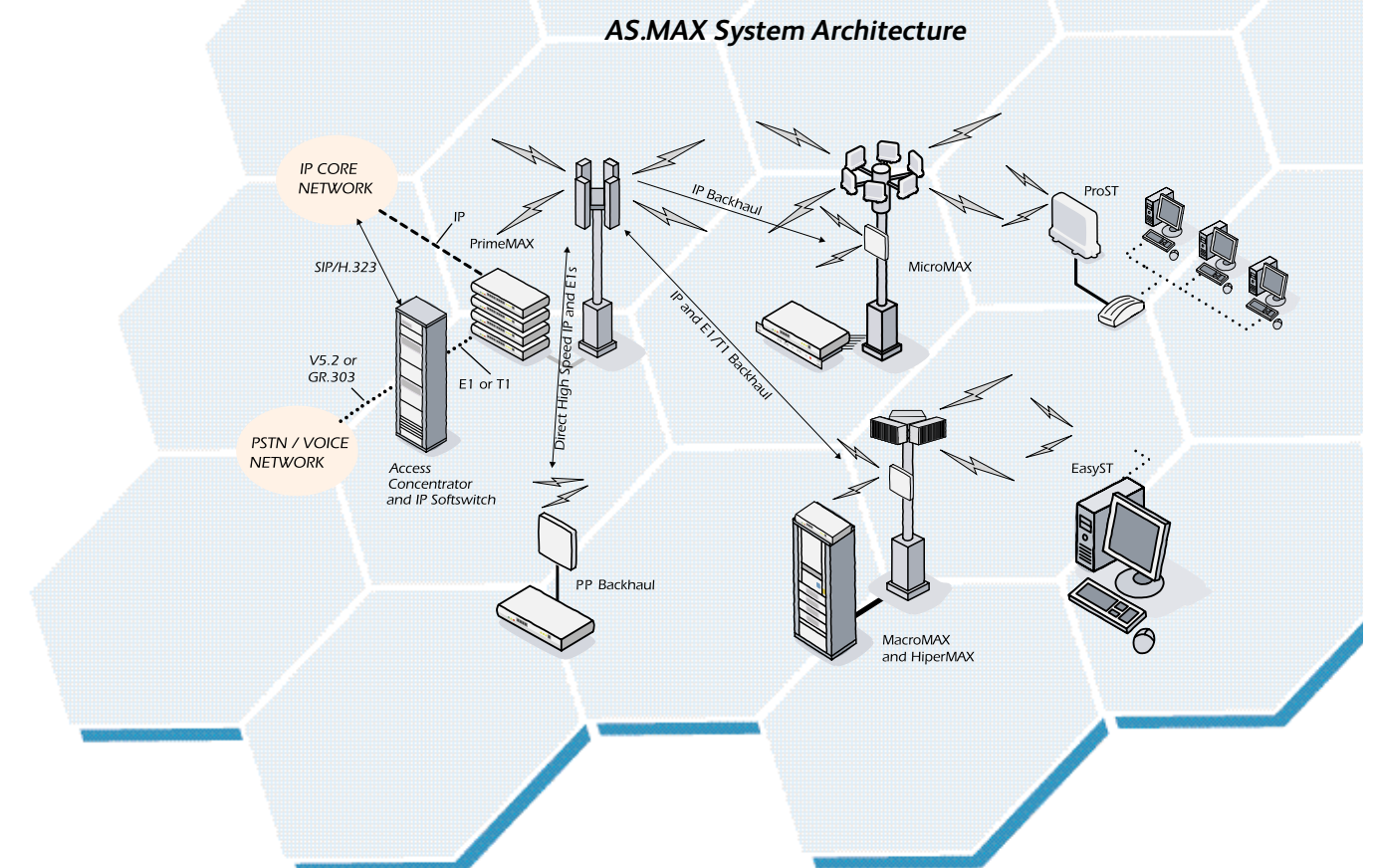
- EasyST
- ProST
- ProST-WiFi

- MicroMAX-SOC

Technology Showcase

- ## 6 Reasons why AS.MAX is the best solution for your Broadband Application

1. AS.MAX is a full implementation of 802.16-2004 and fully supports Nomadic Operation with 256 FFT OFDM CPEs.
2. AS.MAX systems are optimized for the delivery of scalable services at Multi-Megabit speeds (up to 30 Mbit/s)
 - Comparable to fastest wireline DSL speeds, and much faster than 3G (UMTS with HSDPA and EV-DO).
3. Cost effective indoor, self-install CPE and a range of outdoor CPEs with optional support for Voice and Wi-Fi.
4. Support for Macro and Micro deployment models
 - Ready to support WiMAX integration into laptops in 2006.
5. AS.MAX takes full advantage of WiMAX's QoS
 - Support for VoIP and Video
 - ATM-like delivery of E1/T1 services.
6. Airspan's WiMAX systems are optimized for low latency
 - <10ms latency essential for time critical services such as VoIP, leased lines, E1/T1, video conferencing and gaming.



WiMAX Applications

A World of Fixed, Nomadic and Portable applications



Applications Summary

- Fixed Broadband Wireless Access
 - Metro
 - Urban
 - Suburban
 - Rural
- Indoor and outdoor coverage
- Nomadic and portable broadband
- Support for 802.16e USB, PC cards and handsets
- Hot Zones not just Hot Spots
- Backhaul and bridging applications

WiMAX Applications

WiMAX is already revolutionising the broadband wireless market by standardising the hitherto fragmented Broadband Wireless Access (BWA) market, by opening up new service opportunities; and by creating the environment for ubiquitous broadband services everywhere.

WiMAX creates a bridge between the fixed wireline and mobile cellular networks. By deploying WiMAX technology in their fixed service networks operators will be able to offer not just fixed broadband wireless services to homes and businesses but will also be able to offer nomadic and in due course, portable data services to its customers. Equally, mobile operators will be able to offer nomadic and portable data services at much higher speeds than is possible with voice-centric 3G networks and will be able to tariff them differently.

The aim is to provide the service that best fits the individual's needs, whether in the office, driving to a meeting, taking a stroll or at home. WiMAX has the versatility to provide a transparent umbrella of service provision across a range of wireless and wireline access technologies.

Let's consider the applications for WiMAX technology under three headings, fixed broadband wireless access, nomadic and portable broadband and backhaul and bridging solutions.

Fixed Broadband Wireless Access

The pre-WiMAX broadband wireless access space is a confusing and fragmented place where many proprietary solutions compete for market share; It has been crying out for standardisation and interoperability. IEEE 802.16-2004 answers this call and sets out to resolve the key problem areas that have hampered the explosive growth of this access technology. AS.MAX, as a leading WiMAX solution, delivers end-user installed CPEs, thus eliminating the notorious truck roll, cuts the price of CPEs and makes the whole proposition much more attractive.



In developed countries the last 10 years have seen extensive deployment of DSL and Cable in urban and sub-urban areas. However, DSL penetration in rural or less densely populated areas continues to lag behind due to problems with the copper plant. Therefore WiMAX based fixed BWA technology is a good solution for bringing broadband services to customers in these poorly served areas. Airspan's MicroMAX - SOC product sets out to provide a cost effective solution in low density deployment scenarios.

In emerging economies, the priority is to serve the urban and suburban communities with essential telecommunications services followed by the expansion of services to other regions. In these countries the underlying infrastructure may not be of sufficiently high quality to enable widespread DSL deployment. Again, WiMAX solutions such as AS.MAX offer an effective answer to this need by providing a range of base stations to meet the varying requirements of urban and rural deployments as well as a range of easy to deploy and cost effective CPEs.

Nomadic and Portable Broadband

Broadband anytime-anywhere is the great promise of WiMAX which will arrive with the introduction of IEEE 802.16-2004 AS.MAX and will be enhanced by IEEE 802.16e based products. These standards take broadband wireless to a new plane. Suddenly it is possible to have a DSL-like broadband experience anywhere you happen to be, not just at home or in

a Wi-Fi hot spot environment. With WiMAX we start to get Hot Zones that are few kilometres wide and the broadband experience moves outdoors.

Nomadic broadband, which is enabled by every AS.MAX product, opens up a whole new high-speed data experience. Imagine you are walking in the park, when you spot an unusual butterfly and want to find out more about it. You take a high definition picture of the butterfly and send it to a centralised database which within seconds comes up with a match and a detailed description of that species. The possibilities are truly endless.

A key enabler of this vision is the inclusion of the requisite technology in the everyday devices used for communications such as portable phones, laptops, PDAs, etc. The world's leading semiconductor manufacturers such as Intel have put their weight behind making this a reality.

Airspan has grasped this vision and has set out to design the AS.MAX range with evolution to IEEE 802.16e in mind. To this end the HiperMAX, MacroMAX and MicroMAX-SDR base stations are being developed using SDR technology to enable the upgrade of a base station sector from supporting only fixed BWA to supporting fixed and nomadic services without requiring hardware changes.

Backhaul and Bridging Applications

WiMAX products also lend themselves to backhaul and bridging applications. In some networks it will be attractive to use a WiMAX compliant PTP link to backhaul the traffic from a WiMAX base station back towards the core network. In other cases WiMAX compliant products will be called upon to provide LAN-to-LAN bridging solutions for enterprise networks or indeed providing IP and E1/T1 connectivity.

Airspan's MicroMAX-SOC product range is particularly suitable for PTP backhaul applications providing carrier-class availability with native IP and E1/T1 interfaces.

HiperMAX

The Ultimate WiMAX Base station



Main Features

- HiperMAX supports:
 - All outdoor RF components
 - Fully redundant architecture options
 - Up to 6 channels per ACTA shelf with full redundancy or
 - Up to 12 channels without redundancy
 - Optical, zero loss connectivity between indoor and outdoor units
- MacroMAX supports:
 - 3 or 4, Dual RF channels per rack
 - Baseband to RF connection made digitally
 - Final RF feed using conventional antenna feeders
- HiperMAX uses picoChip based "SDR" array, rated at 600 billion instructions per second.
- A platform for SDMA enhancement, which allows multiple simultaneous transmissions to CPEs
 - Throws nulls in the direction of interfering users
 - Key to IEEE 802.16 spectral efficiency enhancements
 - Multiple antenna beams are synthesised at baseband

HiperMAX, and MacroMAX Base Stations

HiperMAX, and MacroMAX are designed for large network operators; They are highly scalable, fully redundant, WiMAX base stations. HiperMAX and MacroMAX represent state-of-the-art, next generation, base station design and include:

- fully upgradable, software defined, PHY and MAC layers enabling simultaneous support for both 256 FFT OFDM and SOFDMA PHYs.
- fully digital, OBSAI based, fibre optic interfaces between indoor and outdoor equipment which can operate at up to 3km.
- Multi-channel transmit and receive diversity.
- 4 or 8 channel smart antennas (HiperMAX).

HiperMAX and MacroMAX are designed to deliver the best link budget with the highest capacity and net throughput. These systems are generally deployed from macro-cell sites, used in typical wireless roll out.

HiperMAX implements an all outdoor radio with an eight element antenna array system. All HiperMAX base stations support AAS and multi-channel Transmit and Receive diversity and are platform-ready for SDMA, which uses the antenna array to enhance capacity and improve frequency re-use.

MacroMAX on the other hand uses an indoor radio unit, with external feeders to appropriate mast installed antennas. Separate antennas enable the link budget to be increased through the use of multi-channel transmit diversity and Nth order receive diversity.

Both HiperMAX and MacroMAX base stations can either be configured to provide traditional TDM voice applications, or can be optimised to support VoIP applications, using a standard gateway to the PSTN.



HiperMAX and MacroMAX Operation

The HiperMAX base station consists of an indoor section, suitable for location within a protected environment, and an outdoor RF section. The indoor baseband electronic boards, referred to as blades, are housed in a 1, 2, 5 and 14-slot ATCA chassis which is NEBS compliant. The outdoor enclosure contains the RF subsystem components and smart antennas. The connection between the indoor and outdoor equipment is achieved through a fibre optic cable and separate power feed.

One smart antenna, consisting of up to 8 elements, is connected to each baseband blade. HiperMAX can support up to 12 baseband blades per shelf, with a single fibre optic cable to each antenna. Baseband blades can be configured to support 6 active channels with full redundancy or 12 active channels without redundancy.

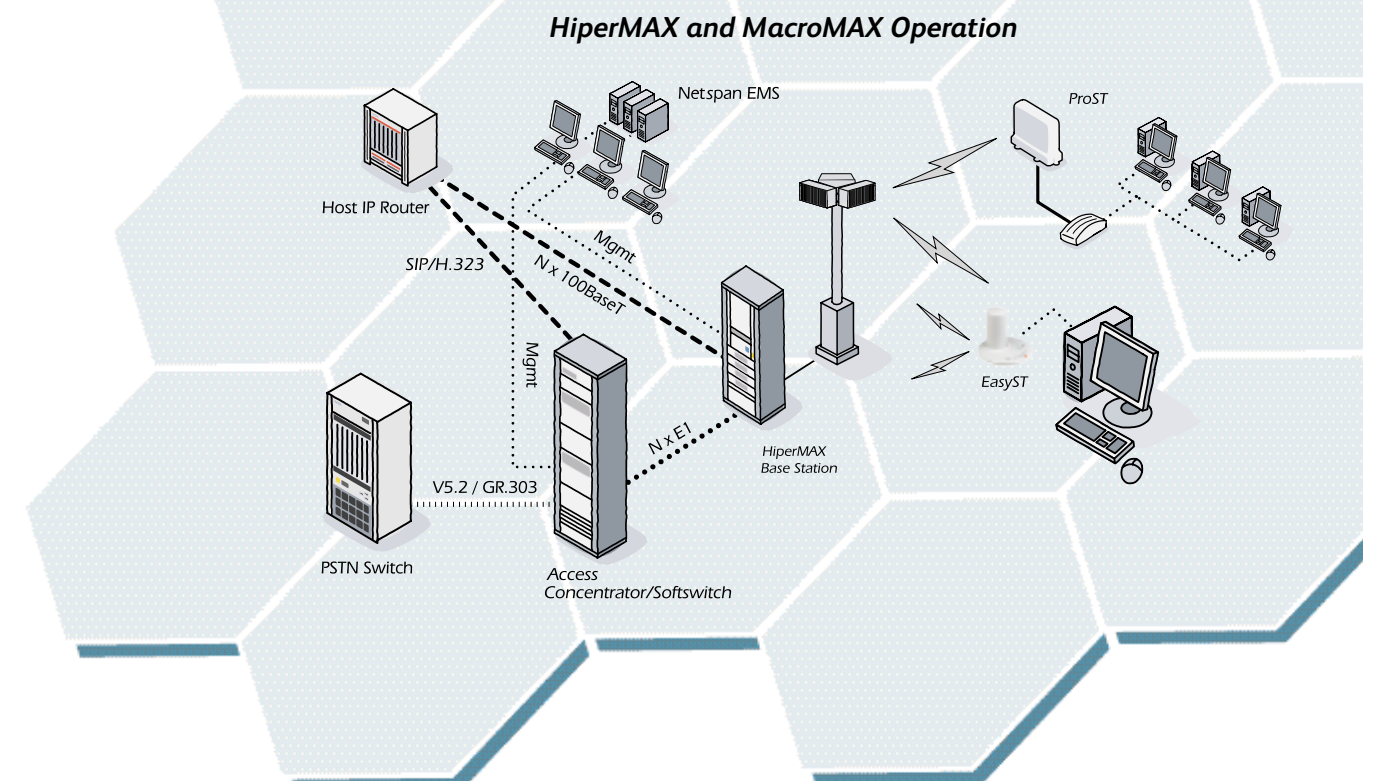
In addition to the baseband blades, the ATCA shelf houses the Ethernet switch, the GPS synchronisation unit and the shelf controller. The Ethernet switch and GPS synchronisation functions are implemented together in one unit. The Ethernet switch aggregates the individual traffic streams onto a Gigabit Ethernet stream for backhaul purposes. For TDD and smart antenna operation the multiple sectors are locked to a GPS timing source. The ATCA shelf manager provides a platform management layer that holds an inventory of field replaceable units in the system and monitors their basic health.

Fibre optic modules operating at speeds of 3.1Gbit/s, are connected to fibre optic cables capable of carrying up to 10Gb/s for future expansion, if required. The Adaptive Antenna System (AAS) comprises an environmentally sealed enclosure, designed to be installed outdoors on a mast or other support suitable for propagating a radio signal. The outdoor equipment consists of a multi-channel RF transceiver and the receive and transmit antennas.

Both HiperMAX and MacroMAX fully support the extensive QoS characteristics of the IEEE 802.16 radio interface, including full support for UGS, rtPS, nrtPS and BE service classes. In addition, we have incorporated specific additional radio resource management that allows applications like VoIP to be robust by implementing Admission Control on a per call basis.

MacroMAX operation is very similar to that of HiperMAX. In the case of MacroMAX, the baseband is a single card that is directly connected to the RF, PA and LNA. The whole unit is integrated into a single rack-mountable shelf. A compact rack supports up to three sectors with diversity a full rack supports up to 4 sectors.

HiperMAX and MacroMAX are managed by Netspan, the SNMP based central management platform.



MicroMAX-SOC

For Cost Sensitive WiMAX Deployments



Main Features

- Cost optimised for lower density applications
- Modular and scalable architecture
 - All outdoor integrated baseband digital processing, radio and antenna
 - Up to 12 radios per mast
 - CAT5 PoE (100m), up to 300m with CAT5 repeaters
- Sophisticated radio implementation
 - Supports WiMAX Forum profiles
 - BPSK/QPSK/16QAM/64QAM adaptive modulation
 - Multi-Channel Tx and Rx diversity across multiple radios
 - Full duplex/half duplex FDD and TDD operation
- Advanced software features
 - Full IEEE 802.16 QoS / Service Classes
 - Full IEEE 802.1d transparent bridging
 - IEEE 802.1Q/p VLAN tagging/untagging
 - Bridging and router functionality
- Future hardware variants will support IEEE 802.16e (SOFDMA)

MicroMAX-SOC

MicroMAX-SOC is a complete standalone base station, sharing the same system architecture as our tried-and-tested ASWipLL product line. The MicroMAX-SOC base station is highly modular in design and consists of two main components: the all outdoor Base Station Radios (BSR) and the indoor Base Station Distribution Unit (BSDU), or single channel Data Adaptor. Each base station site could contain up to 12 BSRs, depending on the amount of available spectrum. Each BSR is connected to the BSDU via a 100BaseT interface operating over a CAT5 cable which carries both data and power.

MicroMAX-SOC is designed to support lower density, rural broadband access, enterprise applications and DSL in-fill scenarios in both licensed and unlicensed bands.

One of the key features of the MicroMAX-SOC BSR is that it requires less than 28W power, making it ideally suited for line powering by using SHDSL lines thus enabling the economic delivery of broadband wireless services to communities beyond the reach of DSL.



MicroMAX-SOC Operation

The MicroMAX-SOC base station is highly modular in design and is constructed from a number of Base Station Radios (BSR). Each BSR incorporates antenna, radio and baseband functions all within the single BSR enclosure. Each BSR can be deployed with a built-in 60° sectorial antenna or indeed with a wide variety of external antennas including 360° omni, 90°, 120° etc. When multiple BSRs are deployed at the same physical location a BSDU can be used to aggregate the traffic from up to 6 BSRs. A seventh BSR may be supported for redundancy. The BSR will support both full duplex FDD and TDD operation.

The fact that each BSRs is self contained gives MicroMAX-SOC great deployment flexibility. For example, it is possible to start with one BSR and an omni antenna and progressively increase the number of deployed BSRs as more customers are signed up.

BSR provides extensive software features such as support for WiMAX specified service classes, full IEEE 802.16-2004 transparent bridging features, IEEE 802.1Q/p VLAN features, and support for VoIP operation. The BSR will provide VoIP call supervision (or dynamic bandwidth allocation) enabling the radio interface to gracefully handle VoIP overload conditions by implementing an admission control procedure. In the future BSR will also support router functionality.

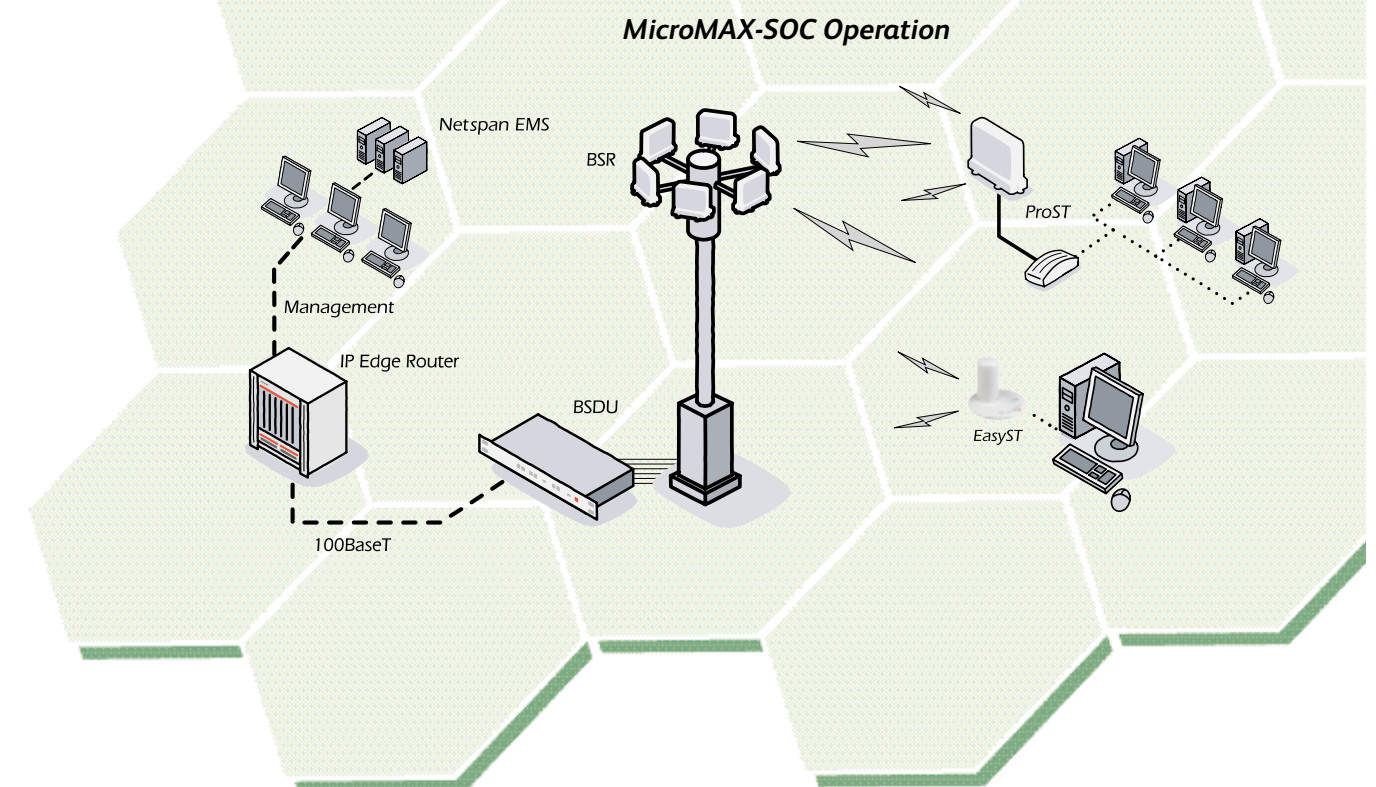
The BSDU provides three main functions: aggregation of traffic from BSRs, powering the BSRs, and synchronising the BSRs by using an external GPS source.

Due to its low power consumption, the MicroMAX-SOC BSRs is ideally suited for line powering. In this application up to 4 twisted copper pairs can be used to both power and backhaul a BSR over a distance of up to 5km. This in turn enables tens of customers to be provided with wireless broadband services beyond the reach of DSL technology with an inbuilt cheap backhaul capability.

Point to Point applications are also supported by the use of a single MicroMAX-SOC BSR coupled with a single ProST. This arrangement provides a very low cost solution for medium speed IP backhaul.

MicroMAX-SOC fully supports the extensive QoS characteristics of the 802.16 radio interface, including full support for UGS, rtPS, nrtPS and BE services classes.

MicroMAX-SOC is managed by Netspan, the SNMP based central management platform.



MicroMAX-SDR

WiMAX Backhaul Solution



Main Features

- Designed for Micro-Cellular Network Deployment
- Data rates up to 30Mbps (net) using 10 MHz Channel
- Sophisticated radio implementation
 - Supports multiple WiMAX Forum Profiles
 - BPSK/QPSK/16QAM/64QAM Adaptive Modulation
 - FDD and TDD operation
 - Optical Interface between Baseband enclosure and Radio Transceivers
- Software features include:
 - ATPC/DFS/CSCA
 - AES/DES/3DES
- Hardware features include:
 - AC and DC Power Options
 - 100/Gigabit Ethernet
 - On Board GPS Receiver (for TDD Operation)

MicroMAX-SDR

MicroMAX-SDR is a variant of the HiperMAX Platform and shares the same SDR technology. MicroMAX-SDR is designed for Micro-cellular deployments in dense urban cities, or as a micro-cell in-fill solution as part of a Macro-cell deployment. MicroMAX-SDR is optimised for deployment on low cost sites, such as Power Poles, Roof-tops or Building Walls and Street Lighting.

MicroMAX-SDR is a complete outdoor Base Station design that optimised for 1 or 2 transceivers per Micro-cell. MicroMAX-SDR is designed to provide short range, high capacity WiMAX coverage to the full range of CPE types including ProST-Wi-Fi (for deployment of Urban Wi-Fi Hotzones), EasyST (for direct Indoor WiMAX broadband connectivity) and soon also WiMAX laptop and handheld devices.

MicroMAX-SDR is fully software upgradeable to 802.16e and SOFDM PHY/MAC.



MicroMAX-SDR Operation

The MicroMAX-SDR Base Station provides a split design architecture consisting of an outdoor Baseband enclosure and a separate outdoor transceiver and the antenna. The interface between the baseband and the transceivers is via fibre optics. The baseband enclosure is powered by 220V AC and has an optional on-board GPS receiver.

MicroMAX-SDR fully supports IEEE 802.16-2004 QoS and networking features. Support is provided for real-time polling (rtPS), non-real-time polling (nrtPS), unsolicited grant service (UGS) and best effort (BE).

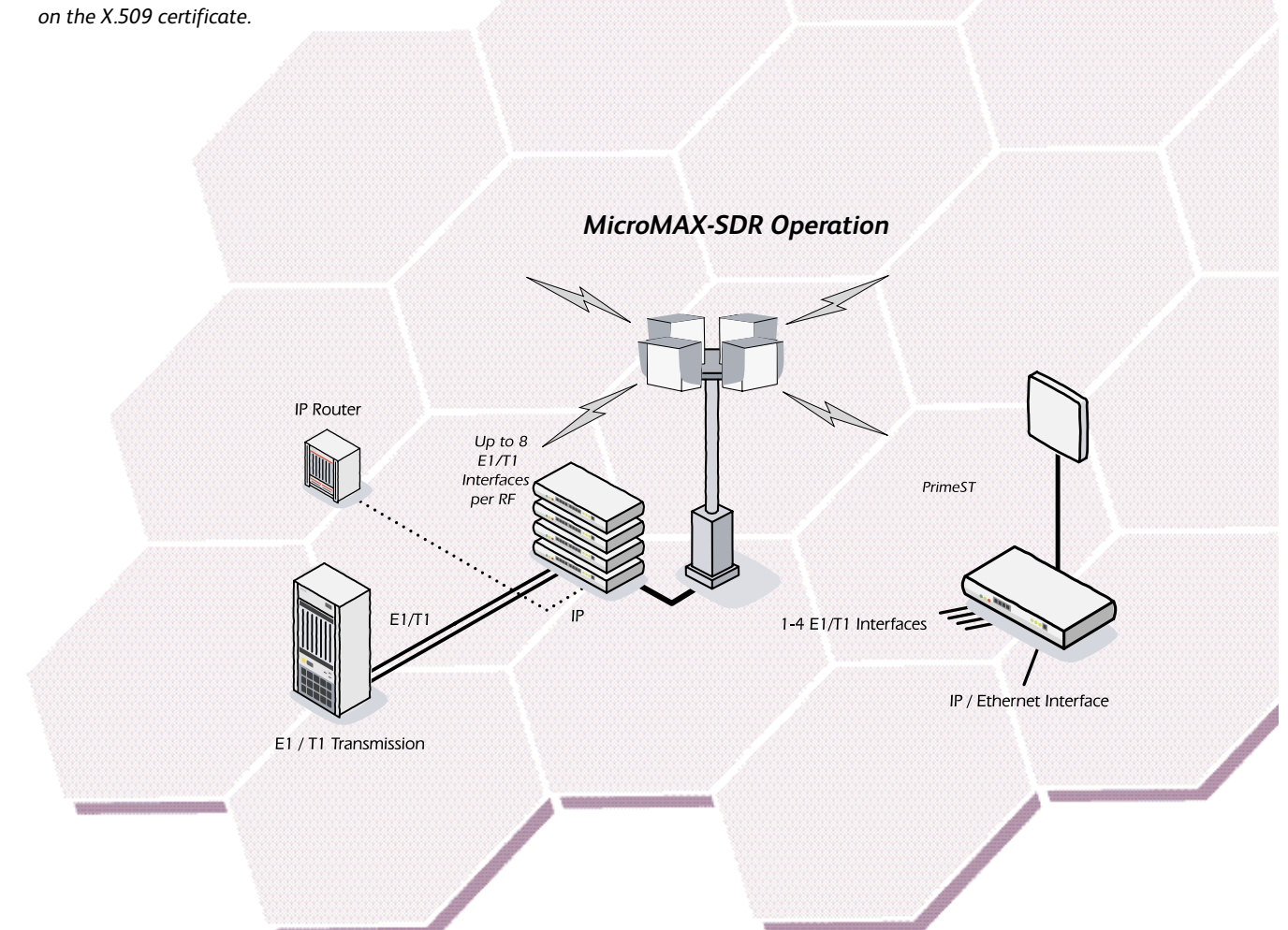
The encapsulation protocol defines a set of cryptographic suites used to encrypt packet data across the fixed broadband wireless access network. Privacy Key Management (PKM) protocol provides secure distribution of keying data (AES/DES/3DES) from the Base Station to the WiMAX-CPE. The sector controller uses this protocol to enforce conditional access to network services and when synchronising key data with the WiMAX CPE. MicroMAX-SDR authorisation is based on the X.509 certificate.

MicroMAX-SDR evaluates link conditions on a burst-by-burst basis. As link conditions change (interference, seasonal changes) the transmission settings are adjusted independently for each active Service Flow within each burst. This maintains the highest possible data rate available while maintaining a low error rate.

Dynamic adaption and error features include:

- Adaptive coding: ratio of redundant code to raw data (1/2, 2/3 and 3/4)
- Adaptive modulation: modulation technique (BPSK, QPSK, 16QAM and 64QAM)
- ARQ: retransmission with modified modulation to improve chance of delivery
- Reed Solomon forward error correction.

MicroMAX-SDR supports all of the AS.MAX CPE types.



EasyST

The Plug & Play Subscriber Terminal



Main Features

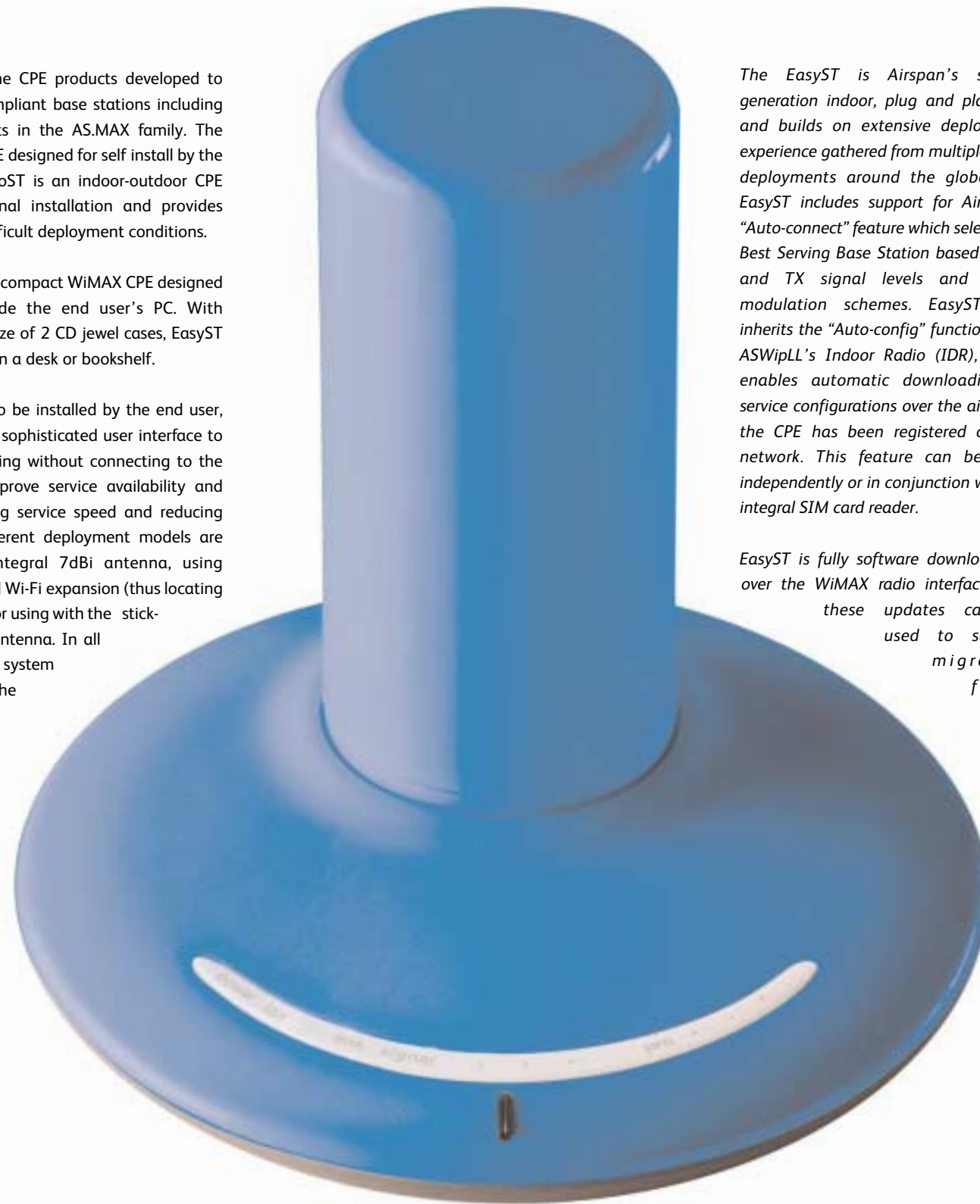
- World's first "Self-Install" WiMAX CPE
 - Full Indoor Non-LOS deployment
 - User unpacks, plugs in and surfs
 - Installation takes less than 1 minute!
- Stackable "CD" Style Design
 - Utilises Intel 802.16 ProWireless 5116 chip (Rosedale)
 - Optional IEEE 802.11b/g Wi-Fi access point
 - Optional VoIP for 1 or 2-4 POTS lines
- A range of antenna options
 - 7dBi, 4 x 90° auto selecting antenna
 - 11.5dBi external indoor window-mount antenna
- Full support for Sub-Channelisation (OFDMA on uplink)
- Integral SIM card reader
- "Auto-Connect" and "Auto-Config" features
- Fully Nomadic Operation

EasyST

EasyST and ProST are the CPE products developed to work with all WiMAX compliant base stations including the base station products in the AS.MAX family. The EasyST is an all indoor CPE designed for self install by the end user whereas the ProST is an indoor-outdoor CPE which requires professional installation and provides superior link budget in difficult deployment conditions.

The EasyST is a physically compact WiMAX CPE designed to be deployed alongside the end user's PC. With dimensions close to the size of 2 CD jewel cases, EasyST looks great when sitting on a desk or bookshelf.

The EasyST is designed to be installed by the end user, using a simple-to-use but sophisticated user interface to enable optimum positioning without connecting to the user's PC. This helps improve service availability and reliability whilst increasing service speed and reducing network load. Three different deployment models are supported: using the integral 7dBi antenna, using together with the optional Wi-Fi expansion (thus locating the EasyST by a window) or using with the stick-on-the-window external antenna. In all cases a visual indication system informs the user when the optimum location for RF reception and transmission is achieved.



The EasyST is Airspan's second generation indoor, plug and play CPE and builds on extensive deployment experience gathered from multiple mass deployments around the globe. The EasyST includes support for Airspan's "Auto-connect" feature which selects the Best Serving Base Station based on RX and TX signal levels and active modulation schemes. EasyST also inherits the "Auto-config" function from ASWipLL's Indoor Radio (IDR), which enables automatic downloading of service configurations over the air, after the CPE has been registered on the network. This feature can be used independently or in conjunction with an integral SIM card reader.

EasyST is fully software downloadable over the WiMAX radio interface, and these updates can be used to support migration from the

initial IEEE 802.16-2004 256 FFT OFDM operation to more sophisticated OFDMA operation in later system releases. This future-proofing capability ensures that the investment made by network operators and end users is protected as WiMAX networks are enhanced over the next 2-5 years.

In addition to the simple-to-use user interface, EasyST also has an in-built Web server, which allows advanced configuration by the end-user or even remote configuration by a network operator's customer service staff.

Finally EasyST is also designed for combined voice and data deployments. EasyST has a number of optional "stackable" extension bases that provide an integrated IEEE 802.11b/g Access Point, 1-4 fully transparent voice lines and battery backup. The Wi-Fi expansion base turns each EasyST into an instant hot spot, with the WiMAX radio interface providing backhaul for IEEE 802.11b/g clients. Thanks to IEEE 802.16 QoS built into the EasyST, Wireless SIP phones can make high quality, managed VoIP calls. Voice and Data applications are supported by the VoIP expansion base, which supports up to 24 voice lines and provides each telephone with a standard RJ11 voice interface. The VoIP expansion base is fully managed by Airspan AS.MAX base stations and softswitch solutions to ensure a fully transparent, carrier class voice service in the tradition of Airspan's world class voice centric AS4020 and Proximity product lines. Battery Backup can also be provided, where applicable, and uses simple AA rechargeable NiMH cells.

ProST and ProST-Wifi

Rapid and Simple External Deployment



Main Features

- Suitable for full outdoor Non-LOS deployment
- Based on field-proven mechanics
- Comprehensive range of indoor Subscriber Data Adaptors (SDA)
 - 1-4 port Hub
 - 1-4 port Switch
 - Up to 4 ports with VLAN switching
 - E1/T1 Interfaces
 - Indoor and Outdoor IEEE 802.11b/g Wi-Fi and VoIP support
 - AC or DC powering options
- Indoor and indoor units connected using CAT5 cable (PoE)
- Antenna options
 - Built-in antenna gain of 15dBi or 18dBi
 - Wide range of external antenna options

ProST and ProST-WiFi

The ProST is designed for rapid and simple external deployment, to be fitted by trained personnel in less than one hour. This unit is ideal when a specific service level needs to be guaranteed. The ProST ensures high service availability at enhanced ranges, operating in both LOS and NLOS propagation environments.

To obtain a basic service capability, the ProST may not require programming with any initial configuration data. However, to deliver service to the ProST will require the management system to authenticate the customer's equipment using the internal X.509 certificate. This may be achieved automatically (through a web based registration service) or via a telephone call to a central administration centre.

The ProST is designed to support the delivery of a range of services. Service interface options include:

- 1 to 4 Port Hub or Switch
- 4 port with VLAN Port Switching
- Integral 802.11b/g WiFi Access Point
- Integral VoIP IAD
- Integral E1 / T1 + Ethernet Port

ProST-WiFi is a special version of the ProST and has an outdoor integrated 802.11b/g Access Point inside of the ProST ODU. The solution enables the ProST-WiFi to provide outdoor Wi-Fi coverage and enables the rapid construction of Wi-Fi Hotzones. The ProST-WiFi operates over the full ProST temperature range and includes industrial strength 802.11b/g technology that supports 16 SSIDs per CPE and SSID to VLAN and VLAN to 802.16 Service Flow mapping.



Netspan

Central Management Platform



Management Options

- AS.MAX family of products support three management options:
- Local web based client management of individual system components
 - Used to configure small systems and networks
- Management via third party SNMP management tool
 - Uses standard WiMAX MIB
- Airspan's **Netspan** network management server
 - Already running numerous WLL networks worldwide
 - Based on Microsoft .Net platform
 - Distributed server architecture support
 - Full system configuration, operation and maintenance via standard web client
 - SNMP API support
 - Uses standard WiMAX MIB for all configuration and O&M activities

AS.MAX Network Management

AS.MAX incorporates all the features that are required for the initial installation and commissioning of AS.MAX products as well as their day-to-day efficient running. To this end, the AS.MAX family includes comprehensive management capabilities in terms of features designed into the products as well as a centralised management system.

Netspan

Netspan is a centralised Sub-network Element Manager which supports a client/server architecture. The Netspan server runs on a PC platform, making use of an SQL database to store the configuration, statistics and alarm history from the radio network. Access to the Netspan server is from Microsoft Internet Explorer, using the web service of the Netspan server.

The Netspan EMS has full Nomadic service support from day 1, enabling roaming and self-installation by customers using EasyST and ProSTs. Auto-CPE provisioning and Auto-Service Flow and Service Product allocation ensures that the network operators can take advantage of any compatible WiMAX Certified CPE that connects to his network. Network Authentication is managed separate from service provisioning and activation, which is a fundamental part of any nomadic system design.

Each Netspan operator is given configurable access rights, allowing each operator to be granted the rights appropriate to their function.

Netspan provides configuration and diagnostic access to all AS.MAX network components, right down to each individual Subscriber Terminal.



Technical Data Sheet

		Macro Cells Base Stations				Micro Cells Base Stations		Indoor CPE		Outdoor CPE	
		HiperMAX	MacroMAX			MicroMAX-SOC	MicroMAX-SDR	EasyST	ProST		
RF Interface	Physical Layer	OFDM (SDR software upgradable to SOFDMA)	OFDM (SDR software upgradable to SOFDMA)			OFDM (future release supports SOFDMA)	OFDM (SDR software upgradable to SOFDMA)	OFDM (future release supports SOFDMA)	OFDM (future release supports SOFDMA)		
	Frequency Bands	3.4-3.6GHz initially, 2.3-2.4GHz, 4.9-5.0GHz + subsequent additional WiMAX bands	3.4-3.6GHz initially			3.4-3.6GHz, 5.8HGz initially + subsequent additional WiMAX bands	3.4-3.6GHz, 4.9-5.0GHz + subsequent additional WiMAX bands	3.4-3.6GHz, 4.9-5.0GHz, 2.3-2.4GHz + subsequent additional WiMAX bands	3.4-3.6GHz, 5.8GHz, 4.9-5.0GHz, 2.3-2.4GHz + subsequent additional WiMAX bands		
	Channel Size	1.75MHz, 3.5MHz, 5MHz, 7MHz, 10MHz	1.75MHz, 3.5MHz, 5MHz			1.75MHz, 3.5MHz, 7 MHz, 10MHz	1.75MHz, 3.5MHz, 5MHz, 7MHz, 10 MHz	1.75MHz, 3.5MHz, 5MHz, 7MHz, 10MHz	1.75MHz, 3.5MHz, 5MHz, 7MHz, 10MHz		
	FFT	256 (SDR software upgradeable to 512 and 1024)	256 (SDR software upgradeable to 512 and 1024)			256 (future release supports 512 and 1024)	256 (SDR software upgradeable 512 and 1024)	256 (future release supports 512 and 1024)	256 (future release supports 512 and 1024)		
	Duplex Method	FDD + TDD	FDD initially			FDD + TDD	FDD + TDD	HFDD + TDD	HFDD + TDD		
	Sector Angle	60, 90, 120, 180, omni	60, 90, 120, 180, omni			60 + others with external antenna	60, 90, 120, 180, omni	N/A	N/A		
	Modulations Supported	64QAM , 16QAM, QPSK, BPSK	64QAM , 16QAM, QPSK, BPSK			64QAM , 16QAM, QPSK, BPSK	64QAM , 16QAM, QPSK, BPSK	64QAM , 16QAM, QPSK, BPSK	64QAM , 16QAM, QPSK, BPSK		
	WiMAX Profiles Supported	3.5F1, 3.5F2, 3.5T1, 3.5T2	3.5F1, 3.5F2, 3.5T1, 3.5T2			3.5F1, 3.5F2, 3.5T1, 3.5T2, 5.8T	3.5F1, 3.5F2, 3.5T1, 3.5T2	3.5F1, 3.5F2, 3.5T1, 3.5T2	3.5F1, 3.5F2, 3.5T1, 3.5T2, 5.8T		
	Standards Compliance	IEEE 802.16-2004 (Software upgradeabe to 802.16e)	IEEE 802.16-2004 (Software upgradeabe to 802.16e)			IEEE 802.16-2004 (future release to support 802.16e)	IEEE 802.16-2004 (Software upgradeabe to 802.16e)	IEEE 802.16-2004 (future release to support 802.16e)	IEEE 802.16-2004 (future release to support 802.16e)		
	Tx Power (see note 1) Rx Sensitivity (see note 2) AAS & Diversity Gains (Downlink / Uplink)	Up to +32dBm per antenna element -115dBm (1/16), -103dBm (1/1) Up to 22dB / 15dB	Up to +37dBm per antenna -115dBm (1/16), -103dBm (1/1) Up to 7dB / 7dB			+28dBm -115dBm (1/16), -103dBm (1/1) 7dB / 7dB with dual BSRs	Up to +32dBm per antenna element -115dBm (1/16), -103dBm (1/1) 7dB / 7dB	+24dBm -103dBm -	Up to +23dBm -103dBm -		
RF Interface Options	Adaptive Antenna System (AAS) Support	Yes	No			No	No for standard configuration	Yes	Yes		
	Multi Channel Tx Diversity	Yes	Yes			Yes (with multiple BSRs)	Yes	Yes	Yes		
	Nth Order Rx Diversity	Yes	Yes			Yes (with multiple BSRs)	Yes	Yes	Yes		
	Space Division Multiple Access (SDMA) Support	Yes, by software upgrade	No			No	No for standard configuration	Yes	Yes		
	Spatial Frequency Interface Rejection (SFIR) Support	Yes, by software upgrade	No			No	No for standard configuration	Yes	Yes		
	Uplink Sub-Channelisation Support	1/2, 1/4, 1/8, 1/16 (+1/32 with software upgrade)	1/2, 1/4, 1/8, 1/16 (+1/32 with software upgrade)			1/2, 1/4, 1/8, 1/16	1/2, 1/4, 1/8, 1/16 (+1/32 with software upgrade)	Yes	Yes		
	Dynamic Frequency Selection (DFS) Support	N/A	N/A			Yes (at 5.8GHz)	N/A	N/A	Yes (at 5.8HGz)		
	Turbo Coding Supported	Yes, by software upgrade	Yes, by software upgrade			No	Yes, by software upgrade	No	No		
	Configurable Cyclic Prefix	1/4, 1/8, 1/16, 1/32	1/4, 1/8, 1/16, 1/32			1/4, 1/8, 1/16, 1/32	1/4, 1/8, 1/16, 1/32	N/A	N/A		
	Configurable Frame Duration	2.5, 4, 5, 8, 10, 12.5, 20ms	2.5, 4, 5, 8, 10, 12.5, 20ms			2.5, 4, 5, 8, 10, 12.5, 20ms	2.5, 4, 5, 8, 10, 12.5, 20ms	N/A	N/A		
GPS Clock Synch Supported	Yes	Yes			Yes	Yes	N/A	N/A			
IP Options / Features	Bridging Mode	802.1D self-learning bridge	802.1D self-learning bridge			802.1D self-learning bridge	802.1D self-learning bridge	802.1D self-learning bridge	802.1D self-learning bridge		
	IPv	IPv4 + IPv6	IPv4 + IPv6			IPv4 + IPv6	IPv4 + IPv6	IPv4 + IPv6	IPv4 + IPv6		
	802.1Q VLAN	Yes	Yes			Yes	Yes	Yes	Yes		
	MIR / CIR	Yes	Yes			Yes	Yes	Yes	Yes		
	DiffServ	Yes	Yes			Yes	Yes	Yes	Yes		
	Packet IPv6 over 802.3/Ethernet	Yes	Yes			Yes	Yes	Yes	Yes		
	Packet IPv4 over 802.1Q	Yes	Yes			Yes	Yes	Yes	Yes		
	Packet IPv6 over 802.1Q	Yes	Yes			Yes	Yes	No	No		
	Payload Header Suppression	Yes	Yes			Yes	Yes	Yes	Yes		
	Multicast Polling	Yes	Yes			Yes	Yes	Yes	Yes		
ARQ	Yes	Yes			Yes	Yes	Yes	Yes			
Packing	Yes	Yes			Yes	Yes	Yes	Yes			
Scheduling	Unsolicited Grant Service	Yes	Yes			Yes	Yes	Yes	Yes		
	Real Time Polling	Yes	Yes			Yes	Yes	Yes	Yes		
Encryption	Data Encryption AES CCM	Yes	Yes			Yes	Yes	Yes	Yes		
	TEK Encryption AES 128bit	Yes	Yes			Yes	Yes	Yes	Yes		
	TEK Encryption AES 1024	Yes	Yes			Yes	Yes	Yes	No		
Management	Managed Subscriber Station	N/A	N/A			N/A	N/A	Yes	Yes		
User / Network Interface Options	User / Network Interface	100bT/1000bT Ethernet	100bT Ethernet			100bT/1000bT Ethernet	100bT/1000bT Ethernet	10/100bT Ethernet, 802.11g WiFi, POTs with integrated RGW	10/100bT Ethernet, 802.11g WiFi, POTs with integrated RGW, E1, T1		
Power	Voltage	-48V DC nominal	85-265V AC			-48V DC nominal, 90-265V AC	90-265V AC,	90-264V AC, 6VDC	-48V DC nominal, 90-264V AC		
	Power Consumption	250W per AAS Sector	300W per Diversity Sector			25W per sector	220W per AAS sector	6-8W	10W		
Mechanical	Indoor Dimensions (h-w-d)	Chassis to fit 19" / 23" Equipment Rack	Chassis to fit 19" / 23" Equipment Rack			43 x 483 x 229mm	N/A (all outdoor solution)	30 x 145 x 145mm (excl clip-on antenna)	200 x 150 x 40mm		
	Outdoor Dimensions (h-w-d)	710 x 275 x 130 mm (inc. antenna array)	840 x 159 x 82.5 mm (for a single 120deg antenna)			317 x 400 x 66mm	Multiple configurations available	N/A	244 x 311 x 65.5 mm		
	Indoor Weight	110kg	13.5kg			3kg	-	1.4kg	0.5kg		
	Outdoor Weight	20kg	7kg (for a single 120deg antenna)			5kg	-	N/A	1.2kg		

Note 1: Tx powers apply for QPSK operation. 64QAM support requires appropriate power back-off.
Note 2: Rx sensitivities apply to the minimum channel bandwidth supported and include maximum sub-channelisation.