BreezeACCESS™ MMDS

Channeling the spectrum

BreezeACCESS MMDS is the ideal Carrier Class broadband wireless access system for carriers and service providers offering IP-based services, including high speed data and voice communications. Operating in the 2.5 to 2.686 GHz frequency band, BreezeACCESS MMDS leverages Frequency Hopping technology in Time Division Duplex (TDD) mode to deliver reliable broadband data services, reaching remote locations and bypassing unusable copper.

To enable maximum efficiency and spectrum utilization optimization, BreezeACCESS MMDS eliminates the need to employ a linked spectrum, thus enabling the use of separated MMDS and ITFS channels.

Product Highlights

BreezeACCESS MMDS delivers a comprehensive range of product features, ensuring fast, consistent and reliable data and voice service, including…

⊙ **Demand-based build-out, easy installation and low cost of ownership enables rapid market penetration, increased subscription and enhanced value-added services.**

⊙ **Packet switching technology optimized for IP-based applications and always on connectivity.**

⊙ **Frequency Hopping radio technology provides unlimited cell overlay capacity and seamless integration between cells, eliminating capacity planning or performance degradation when adding new subscribers.**

⊙ **Fast packet-based data transmission and toll quality for delay and jitter sensitive telephony.**

⊙ **Highly cost effective infrastructure and customer premises equipment.**

⊙ **Toll quality voice with integrated RJ-11 voice ports in subscriber units.**

⊙ **Advanced telephony features when used in conjunction with a V5.1 gateway.**

⊙ **802.1P enables delay sensitive traffic to be prioritized in the network.**

⊙ **802.1Q VLANs separate traffic into virtual private networks.**

⊙ **Independent uplink/downlink transmission settings for CIR/MIR, enabling assured and differentiated QoS.**

⊙ **Carrier grade features including a rack mount chassis base station with redundancy, hot swap capability and UPS facilities.**

⊙ **Easy-to-use SNMP-based remote management system, enabling simple unit configuration and multiple simultaneous unit upgrading.**

BreezeACCESS MMDS provides an instant and independent infrastructure, which is immediately deployable with lower infrastructure construction and operating costs than any other solution on the market.

BreezeACCESS MMDS System Components
BreezeACCESS MMDS CPEs-Simplifying subscriber services

The BreezeACCESS MMDS series of Customer Premises Equipment (CPE) features both data plus voice and data-only capabilities.
The BreezeACCESS MMDS family of CPEs comprises two types of subscriber unit configuration options, which enable service providers and carriers to optimize their network architecture for greater subscriber reach and satisfaction.
Both indoor and indoor/outdoor configuration options connect to the subscriber's data equipment via a standard IEEE 802.3 Ethernet 10-BaseT (RJ 45) interface. Telephony services are supported using a standard POTS (RJ 11) interface connected directly to the subscriber's telephone.

Desktop Units

Optimized for indoor installations, the SU-R Subscriber Units are simple to install, reducing the time and cost of installation. The convenient and compact unit fits easily on a desktop or can be mounted on the wall. With 28 dBm power output at the antenna port, the SU-R feature several antenna options, as follows:
• **Flat panel antenna models:** Feature 15 dBi gain, for external installation.
• **Wall mountable antenna models:** Feature 8 dBi gain and include 3 meters of antenna cable.
Models with dual 2 dBi omni antenna are also available.

SU-R

Indoor/Outdoor Units

The BreezeACCESS MMDS indoor/outdoor SU-A option includes an indoor desktop or wall-mountable unit and an outdoor antenna and radio unit with an integrated flat panel antenna. Data, power, management and control signals are transmitted from the indoor unit to the outdoor unit via a coaxial cable.

SU-A

Product Name	Product Description
SU-A-1D	Integrated antenna - 1 data user
SU-E-1D	Detached antenna - 1 data user
SU-R-1D	Detached antenna - 1 data user
SU-A-8D	Integrated antenna - 8 data users
SU-E-8D	Detached antenna - 8 data users
SU-R-8D	Detached antenna - 8 data users
SU-A-BD	Integrated antenna - full bridge
SU-E-BD	Detached antenna - full bridge
SU-R-BD	Detached antenna - full bridge

Product Name	Product Description
SU-A-1D1V	Integrated antenna - 1 data user
SU-E-1D1V	Detached antenna - 1 data user
SU-R-1D1V	Detached antenna - 1 data user
SU-A-8D1V	Integrated antenna - 8 data users
SU-E-8D1V	Detached antenna - 8 data users
SU-R-8D1V	Detached antenna - 8 data users
SU-A-BD1V	Integrated antenna - full bridge
SU-E-BD1V	Detached antenna - full bridge

All the units in this table have single telephone line support

BreezeACCESS MMDS Base Station Equipment - Unity, diversity, choice

BreezeACCESS MMDS provides two Base Station and Access Unit configurations, depending on the specific needs of the service provider's network. Delivering superior flexibility in architecture and network deployment, BreezeACCESS ensures demand-based scalability combined with flexible modularity.

Base Station Shelf

The 19" Base Station chassis (BS-SH) can hold up to six BS-AU modules, providing reliable access to maximum numbers of subscribers. The BS-AU modules are synchronized to ensure optimal utilization of the available frequency spectrum.

BS-SH

In addition, the BS-SH includes up to two redundant power supply modules, which are served by either a -48 VDC or a 110/220 VAC power source.
A GPS synchronization system allows accurate synchronization of BreezeACCESS base stations located on different sites.

Indoor/Outdoor Access Units

The BreezeACCESS MMDS indoor/outdoor AU-E-BS Access Unit configuration includes an indoor module and outdoor unit that contains the radio and an RF connector for a separate external antenna. Data, power, management and control signals are transmitted from the indoor unit to the outdoor unit via a coaxial cable.

AU-E-BS

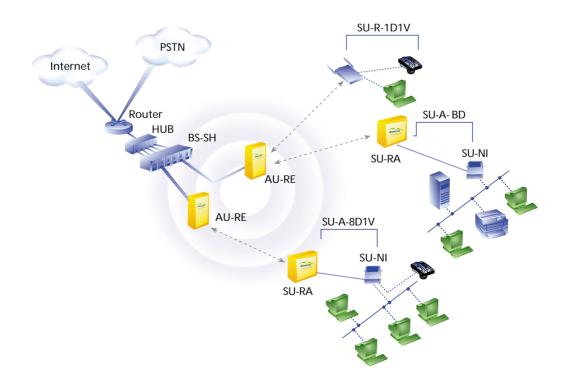## Stand-Alone "Micro Cell" Access Units

In low-density zones, where a complete BS-SH Base Station is unnecessary, BreezeACCESS MMDS provides the AU-E-NI Micro Cell Access Unit. The Micro Cell Access Units are stand-alone modules that connect to the same outdoor unit as described in the Indoor/Outdoor Access Units configuration. The indoor units are designed to fit on a desktop or mount on the wall and are powered from the mains (100-200 VAC). Data, power, management and control signals are transmitted from the indoor unit to the outdoor unit via a coaxial cable.
All Access Units are connected to the subscriber's data equipment via a standard IEEE 802.3 Ethernet 10BaseT (RJ 45) interface.

BreezeACCESS MMDS
Fine-tuned frequencies, advanced access.

Product Typ	Product Name	Product Description
Base Station Shelf	BS-SH	Base station chassis with one DC power supply
	BS-SH-AC	Base station chassis with one AC power supply
Outdoor Access Units for use with Base Station	AU-A-BS-MMDS	Includes base station module and outdoor unit with integrated antenna
	AU-E-BS-MMDS	Same as above, with connectors for external antenna
Stand-alone Access Point	AU-E-NI-MMDS	Includes indoor unit and outdoor unit with connectors for external antenna
Power Supply	BS-PS	Base station DC power supply
	BS-PS-AC	Base station AC power supply
GPS Synchronization System	GU-A-BS	Includes synchronization card and outdoor GPS radio unit with integrated antenna

Specifications

Radio

Frequency	2.500-2.686 GHz MMDS band
Radio Access Method	FH-CDMA (Syncronized Frequency Hopping)
Operation Mode	Time Division Duplex
Standards	FCC Part 15, FCC Part 21
Channel Bandwidth	3 MHz (2 MHz with 1 MHz guard band)
Output Power (at antenna port)	SU-R: 27 dBm, 17 dBm
	SU-A: 29 dBm ± 2 dB Control Range 20 dB typical
	AU-E, AU-A: 30 dBm ± 2 dB Control Range 20 dB typical
Antenna and Gain	SU-R: Two omni 2 dBi wall mount
	SU-A: 17 dB, 20˚

Sensitivity (dBm at antenna port, BER 1E-6)	Data Rate	SU-R	SU-A/E, AU-E
	1 Mbps	-89	-93
	2 Mbps	-82	-86
	3 Mbps	-73	-77

Data Rate	3 Mbps max.
Modulation	Multilevel GFSK

Outdoor Unit to Indoor Unit Communication (If based products)

Intermediate Frequency (IF)	440 MHz
IF Cable Impedance	50 ohm
Maximum IF cable Attenuation	15 dB
Maximum IF cable DC Resistance	1.5 ohm

Voice Communication (DV series)

Protocol	H.323 Voice over IP compliant
Compression	G.723 6.4 Kbps compression, G.729 8 Kbps compression, G.711 64 Kbps transparent
Echo Cancellation	G.168, G.131

Configuration and Management

Local Management	Via MON port, Monitor program using terminal emulation
Remote Management	SNMP, Telnet, TFTP
Remote Management Access	From the wired LAN or from the wireless link
SNMP agents	MIB II, Bridge MIB, BreezeACCESS Private MIBs
Accounting	Radius compatible client in subscriber units
Security	Authentication, Filtering and Virtual LAN
Software upgrade	TFTP download

Interfaces

RF (antenna)	SU-R: 2 x custom MCX jacks
	AU-RE, SU-RE: N-Type jack, lightning protected
IF	AU-RE, SU-RA/RE outdoor units: TNC jack, lightning protected
	SU-NI, AU-NI, BS-AU indoor units: TNC jack, lightning protected
Ethernet	Indoor units: 10BaseT (RJ 45)
Telephone (DV series)	RJ 11 (POTS)
Monitor	Indoor units: 3-pin low profile
Power	AU-RE, SU-RA/RE outdoor units: 12VDC via the IF cable
	SU-NI, AU-NI indoor units, SU-R, DC power plug to the external power supply
	BS-PS (Power Supply module of BS-SH): 4-pin DC power plug to a –48VDC power source

Electrical

SU-R (indoor CPE)	5VDC / 5A from the external power supply (supplied with the unit)
	100-250 VAC, 47-63 Hz
SU-A, AU-E-NI, AU-E-BS	12VDC / 2.5A from the external power supply (supplied with the unit)
	100-240 VAC, 47-63 Hz
BS-SH (modular base station chassis)	-48VDC or 110/220 VAC, 200W, 200W for a fully equipped chassis.
	25W each AU (outdoor unit plus indoor module)

Mechanical

SU-R (without antenna)	15.5 cm x 11.5 cm x 3.5 cm, 0.6 kg
SU-RA (CPE outdoor unit)	30 cm x 30 cm x 7.2 cm, 3 kg.
AU-RE, (BST outdoor unit)	30 cm x 12 cm x 5 cm, 2.2 kg.
SU-NI, AU-NI (indoor unit)	13 cm x 8.6 cm x 3 cm, 0.5 kg.
BS-SH	19″, 3U, depth 26 cm, 6 kg. fully loaded

Environmental

Operating Temperature	Indoor units and modules: 0˚C to 45˚C
	Outdoor units: -40˚C to 60˚C
Operating Humidity	5% to 95% non-condensing. Outdoor units are weather protected.

Standards Compliance, General

EMC	FCC Part 15
Safety	EN 60950, UL 1950
Environmental	ETS 300 019

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