Specifications

Radio
Frequency: 2.500-2.686 GHz MMDS band
Radio Access Method: O-CDMA (Synchronized 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
Antenna and Gain: SU-R: 2 omni 2 dB wall-mount
SU-A: 17 dB, 20°

Sensitivity:

Data Rate: SU-R, SU-A, AU-E
2 Mbps: -89
2 Mbps: -82
2 Mbps: -79
2 Mbps: -74

Data Rate: SU-A, AU-E
3 Mbps: -107
3 Mbps: -102
3 Mbps: -97

Voice Communication (DV series)
Protocol: H.323 Voice over IP compliant
Echo Cancellation: G.168, G.136

Configuration and Management
Local Management: Via MOP port, Monitor program using terminal emulation
Remote Management SNMP, Telnet, TFTP
Remote Management Access:

SNMP agents: MIB II, Bridge MIB, BreezeACCESS Private MIB
Accounting: Radius compatible client in subscriber units
Security: Authentication, Filtering and Virtual LAN
Software upgrade: TFTP download

Interface
RF (antenna): SU-R, N: custom MCX/N, jack
AU-R, SU-A/E, AU-A: N-Type jack, lighting protected
AU-NE, SU-NE-RE outdoor units: TNC jack, lighting protected
AU-NE, SU-NE-5RE indoor units: TNC jack, lighting protected
Ethemet: Indoor units 10/100BaseT (RJ 45)

Telephone (DV series): RJ 11 (POTS)

Power (indoor units): 12VDC / 2.5A from the external power supply (supplied with the unit)

Power (outdoor units): 12VDC via the IF cable

Power (modular base station -48VDC or 110/220 VAC, 200W, 200W for a fully equipped chassis.

Power (indoor units): 12VDC (supplied with the unit)

Power (outdoor units): 5VDC / 5A from the external power supply (supplied with the unit)

Electrical
SU-R (indoor CPE): 5VDC / 1A from the external power supply (supplied with the unit)
SU-A, AU-E, AU-E-BS: 12VDC, 1.6A from the external power supply (supplied with the unit)
BS-SH (modular base station chassis): 29VDC each AUI (outdoor unit plus indoor module)

Mechanical
SU-R (indoor CPE): 15.5 cm x 11.5 cm x 3.5 cm, 0.6 kg
SU-RA (CPE outdoor unit): 30 cm x 20 cm x 7.2 cm, 3 kg
AU-RE, BSF (outdoor unit): 30 cm x 12 cm x 5.5 cm, 2.2 kg
SU-RI, AU-NI (indoor unit): 13 cm x 8 cm x 3.5 cm, 0.5 kg
BS-SH: 19°, 3U, depth 26 cm, 8 kg, fully isolated

Environmental
Operating Temperature: Indoor units and modules: 0˚C to 45˚C
Outdoor units: -40˚C to 60˚C

Power Supply (modular base station -48VDC or 110/220 VAC, 200W, 200W for a fully equipped chassis.

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 bandwidth 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 eliminates the need to employ a linked spectrum, thus enabling the use of separated MMDS and ITS frequencies.
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 VoIP gateway.
- 802.1P enables delay sensitive traffic to be prioritized in the network.
- 802.10 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 System Components

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.

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.

Outdoor Access Units

The BreezeACCESS MMDS outdoor access SU-A-8D 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.

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 BreezeACCESS MMDS Base Station Shelf (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.

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 SU-A-8D 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.

Product Name | Product Description
--- | ---
SU-A-1D | Integrated antenna - 1 data user
SU-A-1D-BI | Integrated antenna - 1 data user
SU-A-1D-BB | Integrated antenna - 1 data user
SU-A-2D | Integrated antenna - 2 data users
SU-A-2D-BI | Integrated antenna - 2 data users
SU-A-2D-BB | Integrated antenna - 2 data users
SU-A-3D | Integrated antenna - 3 data users
SU-A-3D-BI | Integrated antenna - 3 data users
SU-A-3D-BB | Integrated antenna - 3 data users
SU-A-4D | Integrated antenna - 4 data users
SU-A-4D-BI | Integrated antenna - 4 data users
SU-A-4D-BB | Integrated antenna - 4 data users
SU-A-5D | Integrated antenna - 5 data users
SU-A-5D-BI | Integrated antenna - 5 data users
SU-A-5D-BB | Integrated antenna - 5 data users
SU-A-6D | Integrated antenna - 6 data users
SU-A-6D-BI | Integrated antenna - 6 data users
SU-A-6D-BB | Integrated antenna - 6 data users
SU-A-7D | Integrated antenna - 7 data users
SU-A-7D-BI | Integrated antenna - 7 data users
SU-A-7D-BB | Integrated antenna - 7 data users
SU-A-8D | Integrated antenna - 8 data users
SU-A-8D-BI | Integrated antenna - 8 data users
SU-A-8D-BB | Integrated antenna - 8 data users
SU-A-9D | Integrated antenna - 9 data users
SU-A-9D-BI | Integrated antenna - 9 data users
SU-A-9D-BB | Integrated antenna - 9 data users
SU-A-10D | Integrated antenna - 10 data users
SU-A-10D-BI | Integrated antenna - 10 data users
SU-A-10D-BB | Integrated antenna - 10 data users

BreezeACCESS MMDS Synchronization System

BreezeACCESS MMDS provides the SU-A-8D unit with integrated antenna for simple, fast, cost-effective synchronization. The SU-A-8D includes an integrated antenna 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.

Stand-Alone “Micro Cell” Access Units

In low density zones, a complete BS-SH base station is unnecessary. BreezeACCESS MMDS provides the AU-E-64 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.
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 overlap 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 VoIP 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 outdoor configuration options connect to the subscriber’s data equipment via a standard IEEE 802.3 Ethernet 10BaseT (RJ 45) interface. Telephony services are supported using a standard POTS (9V 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 dB gain, for external installation.
- Wall mountable antenna models: Feature 8 dB gain and include 3 meters of antenna cable.

Models with dual 2 dBi omni antenna are also available.

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.

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.

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-6/8-BSS 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.

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.

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Product Name</th>
<th>Product Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Station Shelf</td>
<td>BS-SH</td>
<td>Base station chassis with one DC power supply</td>
</tr>
<tr>
<td></td>
<td>BS-SH-AC</td>
<td>Base station chassis with one AC power supply</td>
</tr>
<tr>
<td>Outdoor Access Units for use with Base Station</td>
<td>AU-A-8S-MMDS</td>
<td>Includes base station module and outdoor unit with integrated antenna, same as above, with connectors for external antenna</td>
</tr>
<tr>
<td></td>
<td>AU-E-8S-MMDS</td>
<td>Same as above</td>
</tr>
<tr>
<td>Power Supply</td>
<td>BS-P5</td>
<td>Base station DC power supply</td>
</tr>
<tr>
<td></td>
<td>BS-P5-AC</td>
<td>Base station AC power supply</td>
</tr>
<tr>
<td>GPS Synchronization System</td>
<td>SU-A-BS</td>
<td>Includes synchronization card and outdoor GPS radio unit with integrated antenna</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Product Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU-A-1D</td>
<td>Detached antenna - 1 data user</td>
</tr>
<tr>
<td>SU-A-1D-E</td>
<td>Detached antenna - 1 data user</td>
</tr>
<tr>
<td>SU-A-1D-D</td>
<td>Detached antenna - 1 data user</td>
</tr>
<tr>
<td>SU-A-1D-B</td>
<td>Detached antenna - 1 data user</td>
</tr>
<tr>
<td>SU-B-1D</td>
<td>Integrated antenna - 1 data user</td>
</tr>
<tr>
<td>SU-B-1D-E</td>
<td>Integrated antenna - 1 data user</td>
</tr>
<tr>
<td>SU-B-1D-D</td>
<td>Integrated antenna - 1 data user</td>
</tr>
<tr>
<td>SU-B-1D-B</td>
<td>Integrated antenna - 1 data user</td>
</tr>
<tr>
<td>SU-A-2D</td>
<td>Detached antenna - 2 data users</td>
</tr>
<tr>
<td>SU-A-2D-E</td>
<td>Detached antenna - 2 data users</td>
</tr>
<tr>
<td>SU-A-2D-D</td>
<td>Detached antenna - 2 data users</td>
</tr>
<tr>
<td>SU-A-2D-B</td>
<td>Detached antenna - 2 data users</td>
</tr>
<tr>
<td>SU-B-2D</td>
<td>Integrated antenna - full bridge</td>
</tr>
<tr>
<td>SU-B-2D-E</td>
<td>Integrated antenna - full bridge</td>
</tr>
<tr>
<td>SU-B-2D-D</td>
<td>Integrated antenna - full bridge</td>
</tr>
<tr>
<td>SU-B-2D-B</td>
<td>Integrated antenna - full bridge</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Product Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU-B-1D-IV</td>
<td>Integrated antenna - 1 data user</td>
</tr>
<tr>
<td>SU-B-1D-EV</td>
<td>Detached antenna - 1 data user</td>
</tr>
<tr>
<td>SU-B-1D-DV</td>
<td>Detached antenna - 1 data user</td>
</tr>
<tr>
<td>SU-B-1D-BV</td>
<td>Detached antenna - 1 data user</td>
</tr>
<tr>
<td>SU-A-2D-IV</td>
<td>Integrated antenna - 2 data users</td>
</tr>
<tr>
<td>SU-A-2D-EV</td>
<td>Detached antenna - 2 data users</td>
</tr>
<tr>
<td>SU-A-2D-DV</td>
<td>Detached antenna - 2 data users</td>
</tr>
<tr>
<td>SU-A-2D-BV</td>
<td>Detached antenna - 2 data users</td>
</tr>
<tr>
<td>SU-B-2D-IV</td>
<td>Integrated antenna - full bridge</td>
</tr>
<tr>
<td>SU-B-2D-EV</td>
<td>Integrated antenna - full bridge</td>
</tr>
<tr>
<td>SU-B-2D-DV</td>
<td>Integrated antenna - full bridge</td>
</tr>
<tr>
<td>SU-B-2D-BV</td>
<td>Integrated antenna - full bridge</td>
</tr>
</tbody>
</table>

All the units in this table have single telephone line support.
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.

### Specifications

**Radio**
- **Frequency:** 2.500-2.686 GHz MMDS band
- **Radio Access Method:** MM-COMA (Synchronized 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
- **Antenna and Gain:**
  - SU-R: Two omni 2 dB wall mount
  - SU-A: 37 dB, 27°
- **Sensitivity:** Data Rate SU-R SU-A/E, AU-E
  - 1 Mbps -89 -83
  - 2 Mbps -82 -86
  - 3 Mbps -75 -77

**Voice Communication (DV series)**
- **Protocol:** H.323 Voice over IP compliant
- **Compression:** G.728 8 Kbps compression, G.729 6 Kbps transparent
- **Echo Cancellation:** G.168, G.311

**Configuration and Management**
- **Local Management:** Via MOD port, Monitor program using terminal emulation
- **Remote Management:** SNMP, Telnet
- **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-RA: Type N jack, grounding protected
  - AU-RE, SU-RA/E outdoor units: TNC jack, lightning protected
- **IF:**
  - SU-NI, AU-NI, BS-AU indoor units: TNC jack, lightning protected
- **Ethernet:**
  - Indoor units: 10BaseT (RJ 45)
  - Telephone (DV series): RJ 11 (POTS)

**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, AU-E-B5:**
  - 120V / 2.5A from the external power supply (supplied with the unit)
  - 100-240 VAC, 47-63 Hz
- **BS-SH (Modular base station chassis):**
  - 48VDC / 110200 WAC, 200W, for a fully equipped chassis.
- **BS-PS (Power Supply module of BS-SH):**
  - 48VDC power plug to a -48VDC power source

**Mechanical**
- **SU-R (Without antenna):**
  - 15.5 cm x 11.5 cm x 3.5 cm, 0.6 kg
  - 30 cm x 30 cm x 7.2 cm, 3 kg
  - 30 cm x 12 cm x 5 cm, 2.2 kg
- **SU-NI, AU-NI (Indoor unit):**
  - 13 cm x 8.8 cm x 3.5 cm, 0.5 kg

**Environmental**
- **Operating Temperature:** Indoor units and modules 0°C to 45°C
- **Operating Humidity:** 5% to 95% non-condensing, Outdoor units are weather protected.

**Standards Compliance, General**
- **FCC:** FCC Part 15
- **Safety:** EN 60950, UL 1950
- **Environmental:** EN 20197