Specifications

Radio

Frequency	5.725 - 5.850 GHz, 5.47 - 5.725 GHz, 5.15 - 5.35 GHz, 5.03 - 5.091 GHz
Radio Access Method	Time Division Duplex (TDD)
Channel	10 MHz, 20 MHz
Central Frequency Resolution	5 MHz, 10 MHz
Output Power (at antenna port)	AU: -10 dBm to 21 dBm, 1 dB steps
	SU: -10 dBm to 21 dBm, automatically adjusted by ATPC
Max Input Power (at ant. port)	-48 dBm Typical

Sensitivity, typical (dBm at antenna port, @10^{-6})

Modulation	1	2	3	4	5	6	7	8
Level* (20 MHz)	-89	-88	-86	-84	-81	-77	-73	-71
Level* (10 MHz)	-92	-91	-89	-87	-84	-80	-76	-74

* Modulation Level combines modulation scheme and coding gain.

Modulation Scheme (Adaptive)	OFDM: BPSK, QPSK, QAM 16, QAM 64
Antenna Port (AU-RE)	N-Type 50 ohm
Subscriber Integrated Antenna	21 dBi, 10.5° H/V, Integrated flat panel
AU Antennas	60°: 16dBi, Sector 60° horizontal, 10° vertical
	90°: 16dBi, Sector 90° horizontal, 6° vertical
	120°: 15dBi, Sector 120° horizontal, 6° vertical ,
	360°: 8dBi, Sector 360° horizontal, 9° vertical (AU-SA 5.8 GHz only)

Data Communication

VLAN support	Based on IEEE 802.1q
Layer-2 Traffic Prioritization	Based on IEEE 802.1p
Layer-3 Traffic Prioritization	IP ToS according to RFC791
Security	WEP 128-bit, Authentication

Configuration and Management

Local & Remote Management	Monitor via Telnet, SNMP and Configuration Upload/Download
Remote Management Access	From Wired LAN, Wireless Link
Management Access Protection	Multilevel Password
	Configuration of remote direction (From Ethernet only, Wireless only, or both sides)
	Configuration of IP addresses of authorized stations
Software upgrade	Via TFTP and FTP
Configuration Up/Download	Via TFTP and FTP
SNMP Agents	SNMP v1 client, MIB II, Bridge MIB, Private BreezeACCESS VL MIB

Physical and Electrical

Type	Connectors		Electrical
SU-NI, AU-NI	Ethernet	10/100BaseT RJ-45, 2 embedded LEDs	Power consumption 25W
	Radio	10/100BaseT Ethernet RJ-45	AC input: 100-240VAC, 50/60Hz
	AC IN	3-pin AC power plug	
SU-RA, AU-RE	Indoor	10/100Base RJ-45 with waterproof sealing assembly	54 VDC from indoor to outdoor
AU-BS	Ethernet	10/100BaseT RJ-45, 2 embedded LEDs	Power consumption 30W (module plus outdoor unit)
	Radio	10/100BaseT Ethernet RJ-45	AC input: 100-240VAC, 50/60Hz 3.3VDC, 54V from power supply in backplane
BS-PS-AC-VL (AC power supply)	AC-IN	3-pin power plug	Power consumption: 240W, full chassis (1 PS, 6 AU) AC input: 85-265VAC, 47-65Hz DC output: 54V, 3.3V
BS-PS-DC-VL (DC power supply)	-48 VDC	3-pin DC D-Type 3 power pin plug Amphenol	Power consumption: 240W, full chassis (1 PS, 6 AU) DC input: -48 VDC nominal (-34 to -72), 10 A max. DC output: 54V, 3.3V

Standards Compliance

Type	Standard	
EMC	FCC Part 15 class B, CE EN55022 class B	
Safety	UL 1950, EN 60950	
Environmental	Operation	ETS 300 019 part 2-3 class 3.2E for indoor units ETS 300 019 part 2-4 class 4.1E for outdoor units
	Storage	ETS 300 019-2-1 class 1.2E
	Transportation	ETS 300 019-2-2 class 2.3
Lightning Protection	EN 61000-4-5, class 3 (2kV)	
Radio	FCC Part 15	EN 301 753 EN 301 021 EN 301 893

Note: Not all options are available in all regions. Please contact your local representative for further information

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We're on your wavelength.

BreezeACCESS™ VL
Broadband Wireless Access - Beyond the Line-of-Sight

BreezeACCESS VL is the latest addition to the BreezeACCESS product family, the world's most deployed wireless broadband platform. Superior features such as non-line-of-sight (NLOS), extended reach, high capacity, encryption, QoS mechanisms and an enhanced access suite are available today by building a network based on BreezeACCESS VL, Alvarion's premier broadband wireless platform in the 5GHz frequency. Carriers, mobile operators, ISPs, enterprises and others who have already integrated BreezeACCESS VL into their network are now providing WiMAX services today!

Take advantage of the improved economics of wireless with increased subscribers and low cost infrastructure investment with future-ready capacity and rich features. With BreezeACCESS VL, operators offer a wide variety of services and applications including VoIP, wireless leased line, hotspot feeding, gaming, secure VPN, video surveillance and xDSL in urban and rural environments, even in extreme temperatures.
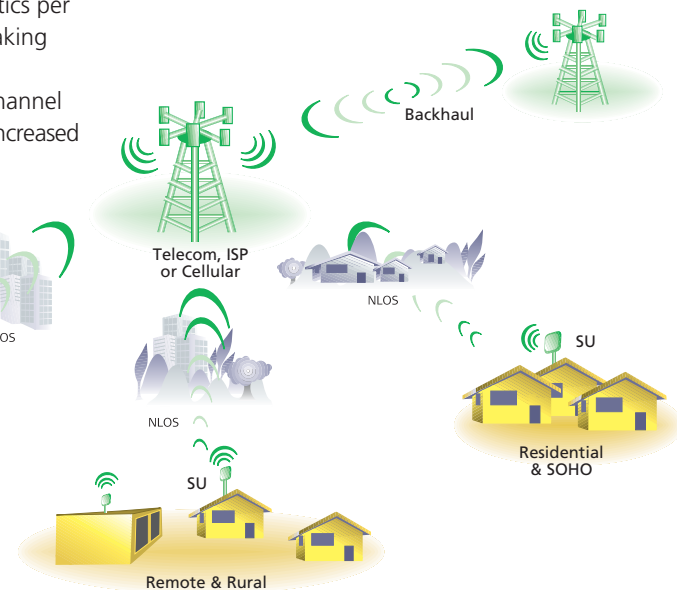
Choose BreezeACCESS VL for:

- ○ Connecting communities - for cost-effective access within communities, municipalities and educational institutions
- ○ Hotspot feeding - for increasing speeds, capacity and reliability in hotspots
- ○ Security and surveillance - wireless cameras transmitting heavy bandwidth requiring secure reliable services
- ○ Last mile access - services for both residential and business users in the same area with different SLAs
- ○ Metropolitan area networks - broadband connectivity with NLOS capabilities for all environments, even dense with buildings or foliage
- ○ Enterprise Networks - leased line replacement for cost-effective connectivity providing VoIP and data services in enterprises and campuses

Reasons for Choosing BreezeACCESS VL

Technological Advantages
- **Expansive coverage -** serves more customers with fewer base stations
- **OFDM non-line-of-sight** (the basis of the WiMAX standard)
- **High Capacity -** more users per sector, including corporate users as well as MDU/MTU users with different levels of SLAs
- **DFS+** (dynamic frequency selection) for countries that require DFS, plus an Alvarion only algorithm to improve channel management under certain conditions of low radar activity
- **Best AU -** for fast and simple SU installation, SU scans the entire frequency band and identifies available AUs, optimizes the link with best AU selection, redundancy mechanism that automatically re-synchronizes with next AU on list
- **Automatic clear channel selection (ACCS) -** a spectrum analyzer mode that picks up on the noise characteristics per channel, and includes an option for automatically making clearest channel selection
- **Flexible network planning -** 10MHz and 20MHz channel options for radio planning, interference avoidance and increased cell capacity

Economic Advantages
- **Less infrastructure investment today -** NLOS, high capacity, outstanding coverage, multi-subscriber profiles in same sector and network, modular and flexible "pay-as-you-grow", enables fewer base stations and site constructions
- **Lower CAPEX tomorrow -** with future investment protection due to co-location of future WiMAX with BreezeACCESS VL enabling both sets of CPEs to operate at the same time in the same sector, AlvariSTAR management tool will support all Alvarion's WiMAX platforms providing seamless management migration
- **Out-of-the-box low cost installation -**
  - 10 LEDs SNR BAR display on outdoor unit for fast antenna alignment without need for external tools or monitors, standard IDU-ODU CAT5 cable and best AU mode for fast association
  - Optimal performance and connectivity through always-on adaptive modulation and automatic transmit power control (ATPC)
  - Over-the-air software upgrade for easy, cost-saving installation and maintenance
  - Over-the-air configuration and monitoring
  - Automatic distance measuring during installation for optimization of cell performance
- **Lower OPEX -** by requiring fewer base stations, remote management, firmware and configuration download/upload, effective diagnostic tools, self-adaptive to environmental changes (automatic modulation and ATPC)

Management Advantages
- **AlvariSTAR -** a comprehensive network management support tool with scalable architecture, topology management, configuration and monitoring, fault management, and performance monitoring
- **BreezeCONFIG -** a configuration and monitoring utility that is intuitive and simple to use and enables simultaneous firmware upgrades for multiple CPEs

Backhaul

Telecom, ISP or Cellular

NLOS

NLOS

NLOS

SU

NLOS

Small to Large Business

SU

SU

Residential & SOHO

Remote & Rural

Extensive Access Suite Features
- **Bridging functionality -** simple configuration, fast installation 802.1Q VLAN support with trunk, access and hybrid modes
- **QoS -** quality of service using packet prioritization
- **SLA enforcement -** supports different user profiles in the same sector with committed information rates (CIR) and maximum information rates (MIR) per user, per direction; packet prioritization with layer 2 (802.11P) and layer 3 (IP TOS) classification, and graceful degradation in case of congested sector

Security and Filtering Options
- AES 128 and WEP 128 **encryption** options
- **Access control** with IP address protocol and MAC based filtering, offering better control including being able to limit the number of authorized IP addresses; that can be used to create additional sources of revenue or for preventing local broadcasts from flooding the wireless link

Flexibility and Modularity
- Flexible topology allowing stand-alone or chassis based configurations for modular and scalable solutions enabling "pay as you grow". Deployable in multiple sectors using various antenna choices
- AC and DC power supply options
- Supports CPE rates of 3Mbps, 6Mbps and 54Mbps
- Upgradeable CPE bandwidth over the air

The Complete Spectrum™ Solution
- Covers the entire 5GHz band and easily integrates with BreezeACCESS's 900MHz, 2.4GHz, and 3.5GHz bands using the same infrastructure with a range of technologies including OFDM, frequency hopping and hybrid digital modulation
- Supports concurrent LOS, NLOS and multi-frequencies with subscriber speeds from 3 to 54Mbps
- Permits operators to customize networks for their unique market demographics, topographic environments and business model to achieve the highest revenue per cell with maximum subscribers

Robustness and Reliability
- Adaptive modulation with 8 modulation schemes and smooth changes between rates responding to link conditions, facilitating link robustness, set at the highest per customer rate possible
- **Automatic transmit power control (ATPC) -** the access unit automatically measures and adjusts the subscriber unit's transmission power, enabling easier installation, and optimizing network performance
- Supports various redundancy options

System Components
The BreezeACCESS VL solution consists of a base station and customer premises equipment (CPE) units. The base stations are available as either modular or stand-alone micro cell units. CPEs are available in various models for differing bandwidths and single or multiple user configurations.

Access Units (AUs)
Installed at the base station site, the AUs communicate with the CPEs. Each AU includes indoor and outdoor units. The indoor connects to the network through a standard IEEE 802.3 Ethernet 10/100BaseT (RJ-45) interface and to the outdoor unit using a CAT-5 cable. Alvarion offers two types of base stations:
- The modular shelf base station (BS-SH-VL) 19" 3U universal chassis. Each base station shelf can hold up to six AU modules (AU-D-BS), providing reliable access to a maximum number of subscribers. Two power supply modules can be used in a BS-SH-VL chassis (either AC or DC) for fail-safe operation. The AU-D-BS kit includes a chassis based indoor unit, pole mounted outdoor unit and sector antennas.
- The stand-alone micro base station (AU-D-SA) kit includes a small indoor unit, pole-mounted outdoor unit and a sector antenna.

A variety of antennas can be used with the base station: 360, 120, 90 and 60 degrees

Subscriber Units (SUs)
Installed at the customer premises, the subscriber unit (SU) enables customer connection with the base station and supports single or multiple end users. SUs provide an efficient platform for always-on, high-speed Internet and Intranet, VoIP, VPN and other services. Each SU connects to the network through a standard IEEE 802.3 Ethernet 10/100BaseT (RJ-45) interface and connects to its outdoor part via CAT-5 cable. Each SU kit includes a small indoor unit, CAT5 indoor-outdoor cable, pole mounted outdoor unit and integrated antenna on most cases.
Several CPE models are available:
- The S U-A-ff-3-1D-VL supports gross rate of up to 3 Mbps for a single user, includes integrated antenna
- The SU-A-ff-6-1D-VL supports gross rate of up to 6 Mbps for a single user, includes integrated antenna
- The SU-A-ff-6-BD-VL supports gross rate of up to 6 Mbps for multiple users, includes integrated antenna
- The SU-A-ff-54-BD-VL supports gross rate of up to 54 Mbps for multiple users, includes integrated antenna
- The SU-E-ff-54-BD-VL supports gross rate of up to 54 Mbps for multiple users, does not include antenna