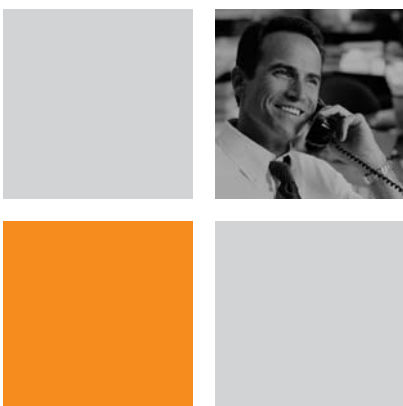
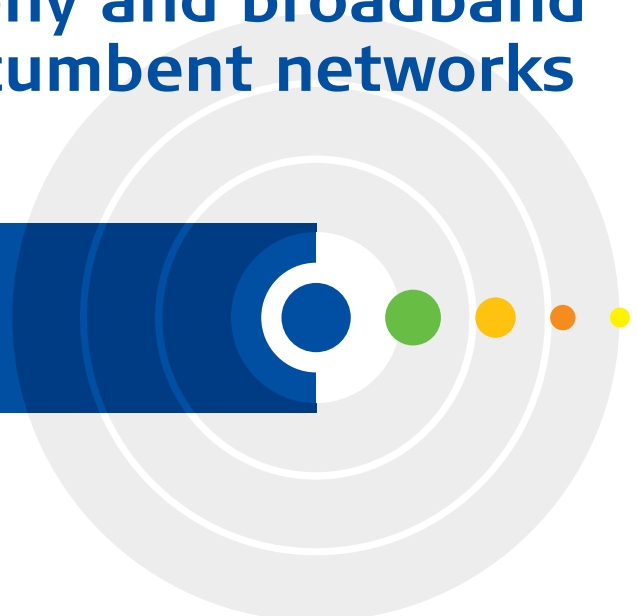




Primary Voice Services over BreezeMAX™

**Carrier class telephony and broadband
data for new and incumbent networks**

Solution Paper





Solution paper:
Primary Voice Services over BreezeMAX -
Carrier class telephony and broadband data
for new and incumbent networks



Highlights

- Primary voice/broadband data services for residential, SOHO users
- Seamless integration with V5.2 TDM networks
- SIP support for IP networks
- 1 or 2 POTS ports in single indoor CPE
- Battery back-up ensuring uninterrupted service
- Supplementary Class 5 voice features
- High quality voice with efficient bandwidth use

As the broadband wireless market leader with many years experience supporting telephony services on its systems, Alvarion now introduces primary voice services over BreezeMAX, the world's most popular WiMAX system. Targeted for both incumbent carriers with V5.2 switches and 'innovative challenger' carriers—such as CLECs and WISPs—interested in building or expanding all IP networks, BreezeMAX enables operators to offer primary voice services, while enjoying the benefits of an all IP solution.

Primary voice services enable operators to offer uninterrupted voice connections, while supporting a wide variety of applications, such as G.3 facsimile, payphone, calling line identification (CLI), and CLASS features, including call waiting, call forwarding and other vertical services which have been part of Alvarion's solutions for many years.

Addressing IP-based networks using SIP while delivering toll quality service over G.711 or G.729A, BreezeMAX's primary voice services seamlessly interoperate with TDM switches through a V5.2 interface to leverage carriers' existing investments in Class 5 and other TDM infrastructures.

BreezeMAX is a WiMAX platform designed from the ground up according to the IEEE 802.16 standards and uses OFDM technology for advanced non-line-of-sight (NLOS) functionality.

Its carrier-class design supports broadband speeds and quality of service (QoS) to enable carriers to offer multiple services to thousands of subscribers in a single base station.



BreezeMAX Family



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Primary voice service components:

The following components can function together or independently:

V5.2 Access Gateway

Rack-mounted and connected to the base station the V5.2 Access Gateway aggregates voice traffic from the IDUs and Alvarion stand-alone gateways, regardless of base station location or type (micro or macro), and communicates with the TDM switch using the V5.2 protocol.

Available in two sizes—the DUET 6004S which supports 2, 4, 8, and 16 E1s and the DUET 6004L which supports 24, 36, and 48 E1s, the Access Gateway can be collocated with the BreezeMAX base station and communicate with the TDM switch over E1s or be collocated with the TDM switch and communicate with multiple BreezeMAX stations over IP connections.



Duet 6004S



Duet 6004L

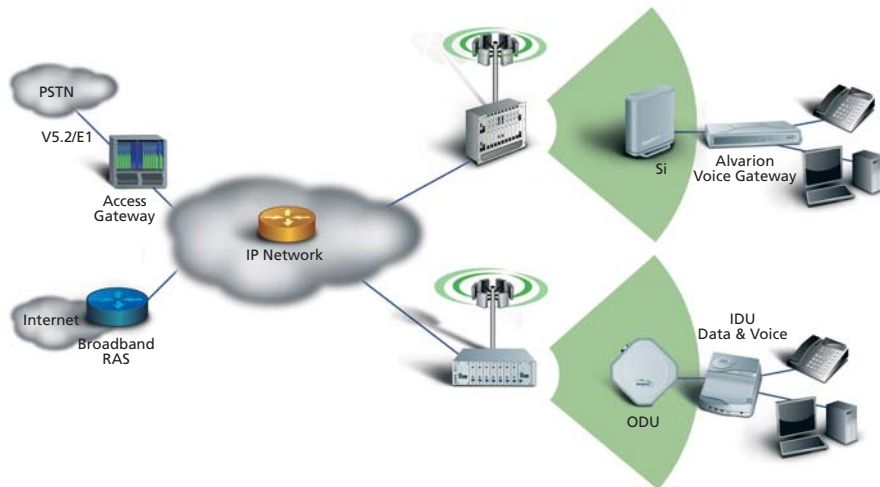


Figure 1: V5.2 interconnection over IP backhaul



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Data & Voice IDU

A compact and elegant wall-mounted indoor unit (IDU) provides 1 or 2 POTS ports for primary voice services and 1 Ethernet port for broadband data. Communicating and drawing power over a CAT5 connection with the BreezeMAX outdoor unit, the IDU has a back-up battery to ensure service during power outages of up to several hours.

As shown in the diagrams, the IDU communicates directly with SIP servers and TDM switches (through a V5.2 gateway collocated at the base station).



IDU Data & Voice

List of available IDUs:

ALVR-CPE-IDU-1D1V-SIP-TB	1 Data port & 1 POTS & over SIP with Terminal block connector
ALVR-CPE-IDU-1D2V-SIP-TB	1 Data port & 2 POTS & over SIP with Terminal block connector
ALVR-CPE-IDU-1D2V-SIP-RJ	1 Data port & 2 POTS & over SIP with RJ11 connector
ALVR-CPE-IDU-1D1V-SIP-RJ	1 Data port & 1 POTS & over SIP with RJ11 connector

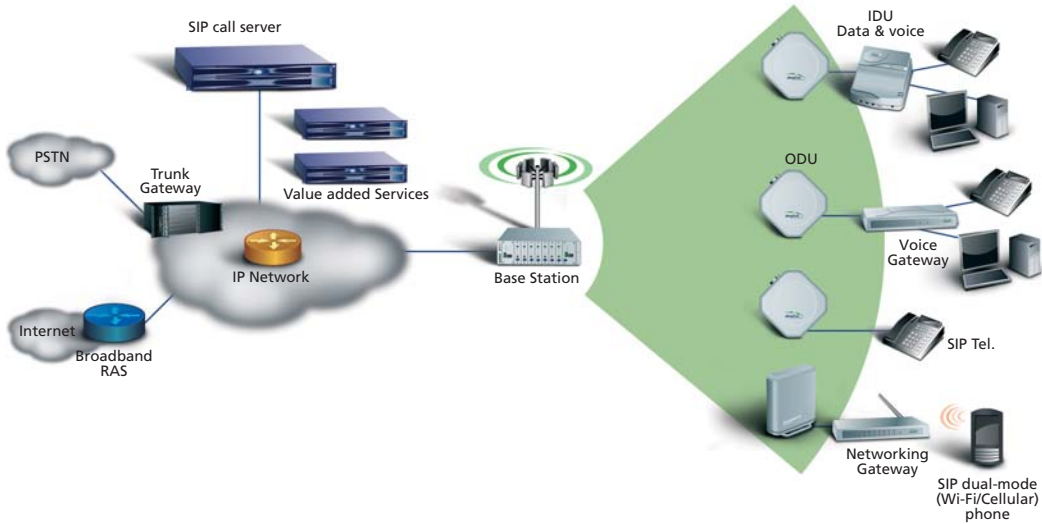


Figure 2: Voice service over IP telephony network



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BreezeMAX is the ultimate WiMAX solution for wireless voice and broadband data services. Its advanced technology enables incumbent carriers to continue offering the primary voice services their subscribers expect, while allowing them to introduce broadband data services without needing to invest in an IP telephony network. In addition, it is an ideal solution for innovative challengers interested in delivering wireline-equivalent voice services along with their broadband offerings.

Operator Benefits

Leverages existing TDM infrastructure

- Full support of V5.2 switches
- Enables easy migration from TDM to IP networks
- Supports both TDM and IP base station backhaul
- Low risk, proven solution

Reduces infrastructure costs

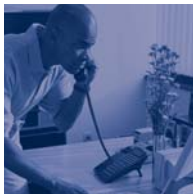
- Voice compression for dramatic reductions in bandwidth use and backhaul costs
- Common V5.2 Access Gateway per switch means fewer V5.2 interfaces and less CAPEX at the local switch

Supports carrier-class services on both TDM and IP networks

- Toll quality voice
- G.3 facsimile services
- CLASS services
- Payphone signaling over V5.2
- Special admission control ensures QoS even when sector is overloaded
- Voice service continuity even during power outages

Enables residential mass deployment

- Easy to install CPE
- ODU and IDU only, eliminates the need for external gateways and power supplies
- Minimal field configuration



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Specifications



Indoor unit

Telephony and Fax service

No. of POTS lines	1 or 2 over RJ-11 or terminal block
Networking	SIP (RFC 3261)
REN per line	3 REN
Internal CLASS services	Internal call waiting, 3-party call, call hold, call alteration, differentiated ring tone, CLI
External CLASS services	Activation/deactivation of CLASS services supported by the IP telephony system
V5.2 CLASS services	Hook flash functions, CLI
FAX G.3	T.38 or G.711
Calling Number Identification (CNI)	DTMF, FSK
DTMF	In-band or out-band (SIP: RFC 2833, SIP INFO – RFC-2976)
Regional settings	Telephony signals, tones and cadences
Payphone	Tax Pulse metering 12/16KHz (@V5.2), reverse polarity

Voice Quality

Voice codecs	G.711 A or U law, G.729a
Prioritization	IEEE 802.1p layer-2 DiffServ layer 3
General	Adaptive / fixed jitter buffer Echo cancellation Speech sampling rate: 10-60 ms

Data Service

Electrical	10/100 Base-T over shielded RJ-45
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Security

VLAN Support	IEEE 802.1Q with up to 16 VLAN IDs
Authentication	Per call authentication and registration

Physical & Environmental

Dimensions	212mm X 184mm X 120mm
Weight	1.1kg
Operating temperature	-5 to +45°C Indoor
Operating humidity	5% to 95%

Standard compliance

EMC	EN55022, FCC Part 15, CE Class B, EN61000-4
Safety	UL60950, EN60950
Environmental	EN300-019-2-3 T3.2

Powering

Battery backup	Over 2 hours
Mains	85 to 265 VAC RMS, 47Hz 63Hz



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Specifications



V5.2 Access Network

PSTN Interface

Electrical	E1, ITU G.703
V5.2 protocol	ETSI EN 300 347-1 V2.2.2 (1999-12)

IP Interface

Electrical	10/100 Base-T
Protocol	SIP-RFC 3261

Power -40 to -60Vdc

DUET 6004S

E1 Capacity	2, 4, 8 or 16E1s
Dimension	2U, 19"

DUET 6004L

E1 Capacity	24, 36 or 48E1s
Dimension	9U, 19"

Environmental

Operating temperature	0 to +50°C
Operating humidity	40% to 90%

Standard compliance

EMC	EN55022 Class A, EN61000-4-3, EN61000-4-6
Safety	EN61000-4-5
Environmental	IEC 68-2

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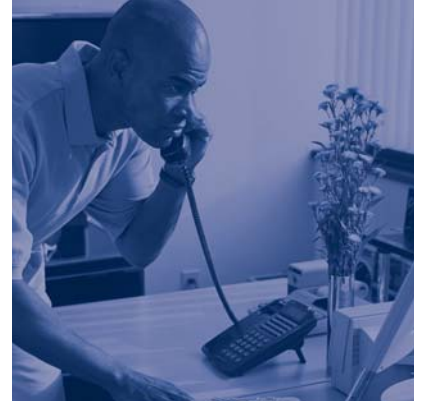
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