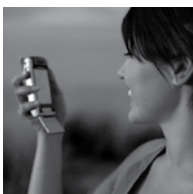
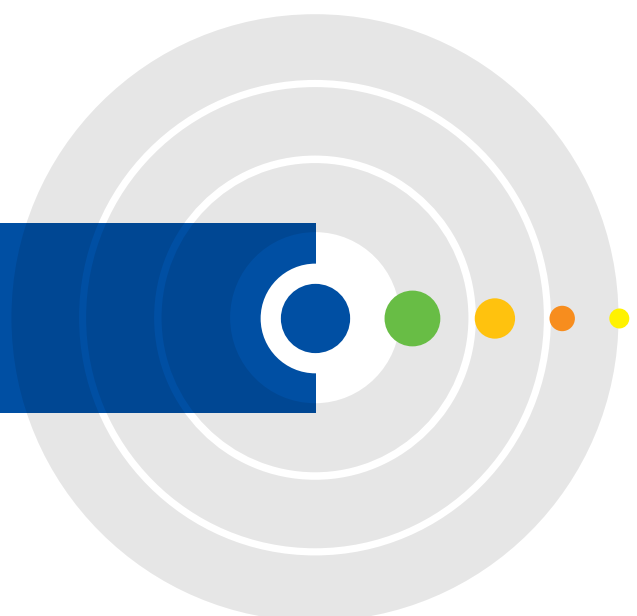




# Implementing a **Mobile WiMAX™** Field Trial

Alvarion's 4Motion™ Field Trial Package



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## Introduction

As a key driver of OPEN™ WiMAX, and a leading Mobile WiMAX™ vendor, Alvarion is focused on helping operators capitalize on their investment in Mobile WiMAX. In order for operators to fully understand the advantages and capabilities of Mobile WiMAX networks, Alvarion now offers its customers the opportunity to participate in the 4Motion™ Field Trial project. This project allows operators the option of undertaking a detailed study of the innovative 4Motion Mobile WiMAX solution. In support of the 4Motion Field Trial project, Alvarion assists operators in conducting comprehensive lab and field evaluations of the 4Motion end-to-end solution, according to pre-defined solution requirements.

Alvarion's market leadership stems from over a decade of experience in the development and rollout of broadband wireless access solutions. Alvarion offers the most mature and widely-deployed solution worldwide.

Alvarion's 802.16-based radio access network, BreezeMAX™, has gained immense customer traction, with successful network deployments in over 100 countries worldwide.

Leveraging on Alvarion's leading technology and field experience, Alvarion's end-to-end Mobile WiMAX solution, uses advanced air interface and antenna techniques. 4Motion is designed to fully comply with 802.16e Wave 2 WiMAX modem, radio and IP networking technologies to ensure high performance and maximum resource utilization for both Personal Broadband and primary broadband access.

## Implementing a Mobile WiMAX™ Field Trial

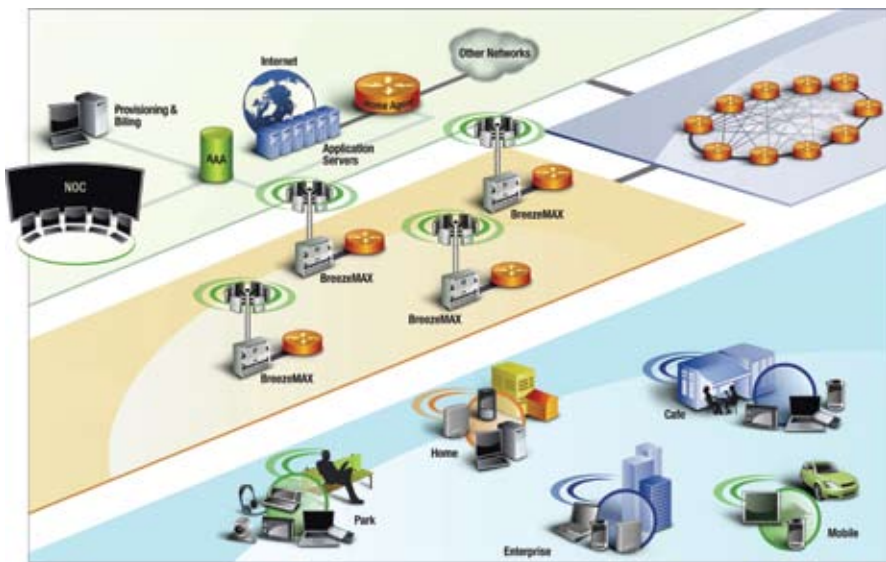
A description of Alvarion's 4motion™ field trial package

### Overview

#### 4Motion Trial Configuration

Alvarion's BreezeMAX platform enables operators to start building a 4Motion solution immediately and move towards a full end-to-end Mobile WiMAX deployment. 4Motion can support fixed, portable and mobile subscribers using a diverse range of 802.16e-compliant end-user devices and consumer electronics such as PC cards, notebooks/PDAs, residential gateways, cameras, gaming devices, etc.

Figure 1 illustrates the 4Motion end-to-end Mobile WiMAX network configuration:



#### Field Trial Purpose

The purpose of the field trial is to demonstrate 4Motion's field performance and capabilities and allow operators to evaluate the solution's WiMAX functionality within their network by testing:

- Network entry
  - R1 air protocol
  - Basic ASN-GW R6 protocol
  - Automatic service provisioning
- Mobility
  - Inter-BS handoff
  - Intra-BS handoff
  - Inter-ASN-GW handoff
- ASN performance
  - SOFDMA performance under NLOS
  - Performance under different reuse/loading scenarios
  - Coverage and capacity under different diversity configurations
- CSN performance
  - AAA
    - Access
    - Authentication / Authorization

Figure 1: Alvarion WiMAX/802.16e solution in an operator environment

## Deployment Options

Alvarion offers three options for pre-deployment evaluation of 4Motion:

### Option I: Technology Study and Network Planning

Alvarion and the customer will work closely together to study and clearly define the solution offering and network plan, and will present the required technology evaluation.

The customer, together with the consultation of Alvarion, will conduct a technical solution analysis and develop detailed planning of the trial. In order to carry this out, the customer will forward Alvarion the following information:

- Frequency used
- Channel bandwidth
- Geographical area to be covered
- Type of services to be tested (e.g. voice, data, video)
- Expected number of users
- Base Station requirements

Based on the above information, Alvarion will provide a tailored 4Motion solution optimized to address the specific requirements of the customer.

The analysis will include:

- Initial projected network architecture
- Radio planning and frequency reuse
- Basic and advanced antenna systems
- Quality of service
- Subscriber WiMAX devices: PCMCIA cards, PDAs/notebooks/tablet PCs, handheld devices, etc.
- Applications and services for the end user

Prior to the commencement of each trial Alvarion and the customer will agree on the field trial protocol (FTP) to be performed.

### Option II: Lab Trial

In this option, Alvarion's 4Motion solution will be evaluated at the customer's laboratories.

The suggested lab trial will include:

- Demonstration of system features, networking integration, required services, radio specifications-compliance
- Validation of pre-defined design and expected performance
- hands-on experience with the 4Motion system

## Implementing a Mobile WiMAX™ Field Trial

A description of Alvarion's 4motion™ field trial package

The following application tests are recommended:

- Browsing
- Email
- Video streaming
- Instant messaging
- VoIP
- Handoff behaviour

The lab trial tests require the following equipment:

- 1 BreezeMAX base station comprising 1 or 2 sectors
- BreezeMAX PCMCIA cards
- Stand alone ASN-GW & AAA server (for example - Cisco ASN-GW & Cisco CAR), or integral BreezeMAX ASN-GW & stand alone AAA server (for example - BWG-IS & Bridgewater Systems AAA)

### Option III: Field Trial

The customer will perform the field trial with a full Alvarion 4Motion end-to-end solution.

Field tests can enable analysis and evaluation of 4Motion compliance with the WiMAX 802.16e-2005 standard, as well as evaluation of system performance, ease and simplicity of installation and operation.

The following tests are recommended for Option III:

- Application tests
  - Browsing
  - Email
  - Video streaming
  - Instant messaging
  - VoIP
- Planned coverage area verification via driving test with different CPE types
- Performance in different non-line-of-sight conditions and coverage scenarios
- Capacity and user data rates under various traffic loading conditions
- Handoff

The recommended field trial scenario will be conducted with the following equipment:

- 3 BreezeMAX base stations
  - 1 base station comprising of 3 sectors
  - 2 single sector base stations
- 10 BreezeMAX PCMCIA cards
- Stand alone ASN-GW & AAA server (for example - Cisco ASN-GW & Cisco CAR), or integral BreezeMAX ASN-GW & stand alone AAA server (for example - BWG-IS & Bridgewater Systems AAA)

## Professional Services and Support

In addition to field trial equipment, Alvarion offers the following professional services to support the trial:

- On-site survey and engineering
- Radio and network planning
- On-site installation and commissioning
- Network integration
- IOT
- System operation and monitoring
- Training
- Business modelling
- Trial documentation

### On-Site Survey and Engineering

Alvarion proposes the establishment of an on-site inventory to determine the specific materials needed at each site. The inventory requires collecting and consolidating all relevant site-specific information for the physical installation and connection of the customer's equipment.

The inventory is established by using proven site survey methodologies, and applies to installations and extensions. This service is provided on-site by Alvarion specialists, and includes tasks such as:

- Information analysis regarding site and environmental conditions (e.g. cable ducts, raised floors, power supplies)
- Validation of meeting equipment installation requirements (e.g. available space, correct temperature)

### Radio and Network Planning

Alvarion offers its customers radio and network planning to ensure the delivery of services and applications requested by the customer. For the planning stage, the customer will forward Alvarion information such as frequency used, channel bandwidth, geographical area to be covered, type of services to be offered, and expected number of users. Based on this information, Alvarion will provide the projected network architecture, number and location of base stations required, and transmission network requirements.

In the second planning stage, Alvarion will create a detailed radio and network design plan. This plan will cover the design of the WiMAX access network, backbone network, networking elements, core network, network availability, and long-term scalability. The process includes detailed radio frequency planning and simulations, detailed network planning and simulations, capacity planning, equipment planning, tower design, and site selection.

## On-Site Installation and Commissioning

### Installation services

- On-site installation services include:
- Shipment and shipment control of the desired equipment
- Unpacking the shipped equipment
- Mounting and assembly of racks and cabinets
- System assembly and connection of peripheral equipment
- Intra- and inter-rack/cabinet/equipment cabling
- Connection to power source
- Connection to the distribution frame

### Commissioning services

Commissioning services consist of complete on-site system configuration and testing of newly delivered equipment, extensions, upgrades, and reconfiguration to customer requirements.

Commissioning services include:

- Control of hardware and energy distribution
- Hardware configuration
- Switches
- Software installation, and configuration of data entry
- Functional tests such as alarms, input/output ports, features
- Setting remote connectivity to the equipment under testing

## Network Integration

After validating that each network element is tested and compliant with the customer's system performance requirements, all network elements will be integrated into the customer's network.

## IOT

As part of Alvarion's 4Motion Ecosystem Alliance Program, Alvarion offers a wide range of third-party handsets, notebooks, network adapters, and gateways compliant with the 4Motion solution and with the WiMAX 16e standard. Once the 4Motion solution is operational, the customer will be informed of the different compliant 3rd party devices that are available for testing.

## System Operation and Monitoring

Alvarion's customer support experts will be available to operate the system during the trial phase and to educate the customer regarding system operational functionalities.

## Training

Alvarion offers a complete training program that enables the customer to fulfill all required operation tasks and maintenance of the 4Motion solution.

The training sessions will cover all equipment (i.e. hardware, software) and services offered. The sessions are designed to be modular and accompanied by training documentation.

## Business Modeling

Alvarion offers a joint operator business model exercise to examine potential 4Motion deployment scenarios. Operators can benefit from this exercise as they can build their service models and assess the CAPEX and OPEX of Mobile WiMAX networks.

## Terms & Conditions

- The customer will propose sites for the installation of the base stations, and locate potential end users to participate in the trial.
- The customer, based on Alvarion specifications, will verify that the proposed sites meet the system requirements. This includes verifying that the equipment can be installed, configured and connected appropriately.
- Alvarion will conduct an on-site survey as specified in the Professional Services and Support section. The customer will verify that the proposed sites can be accessed and have necessary authorization for Alvarion personnel to install the system.
- It is highly recommended that the customer and Alvarion will work closely together to define relevant evaluation scenarios and test plans. It is also recommended that the customer will follow the test plans and other documentation provided by Alvarion, while testing system capabilities and the main features of 4Motion.
- Alvarion offers to carry out equipment installation and commissioning. As the installation is considered essential to the functionality of the system we recognize revenues upon installations – hence from the revenue recognition perspective we prefer to limit the installations and commissioning to the first few sites. For better support and remote configuration, it is recommended that the customer will provide remote access to the base stations during the trial.
- Alvarion offers to support the customer through each step of the trial including requirement analysis, network design, test planning, and professional support during initial system activation. Alvarion also offers 4Motion solution training for specific trial testing elements.
- For a successful trial, a cleared frequency spectrum should be available. In most countries a license for testing in a Mobile WiMAX spectrum is required. Alvarion's technical team can perform a spectrum-clearing test as part of the site survey process.
- Alvarion will share with the customer technical results of the evaluation project.
- Alvarion may publish a press release regarding having a field trial at the customer site. Alvarion may offer the customer to issue a joint press release on the trial.

## Equipment and Service Prices

Alvarion will provide a detailed price list of the required equipment and services for each option of the field trial upon customer request.

## Annex 1: Responsibility Matrix

The following matrix summarizes the tasks required for successful implementation of the field trial including supply, delivery, installation, commissioning, and other activities within the scope of the trial. The matrix also refers to related services and methodologies essential for the trial's success

ID	ITEM	Customer	Alvarion	Comments
1	SUPPORTING FACILITIES			
1.1	Tower supply	X		
1.2	Civil works (e.g. foundations, access roads, fencing)	X		
1.3	Buildings, shelters	X		
1.4	Primary power	X		
1.5	Secondary power	X		
1.6	Outside feeder trays	X		
1.7	Antenna attachment supply	X		
1.8	Station grounding	X		
1.9	Site acquisition	X		
1.10	Radio regulation / Frequency plan approval	X		
2	EQUIPMENT			
2.1	Radio base station		X	
2.2	ASN-GW equipment		X	
2.3	AAA equipment		X	
2.4	Antenna supply		X	
2.5	CPEs		X	
2.6	Additional network components purchase	X		Based on Alvarion specifications
2.7	4Motion integration with third-party components		X	
3	SERVICES			
3.1	Site survey		X	
3.2	Testing scenarios and documentation	X	X	
3.3	Base station installation		X	Subject to agreement
3.4	Base station commissioning		X	Subject to agreement
3.5	ASN-GW installation & commissioning		X	Subject to agreement
3.6	AAA installation & commissioning		X	Subject to agreement
3.7	Management installation & commissioning		X	Subject to agreement
3.8	CPE installation & commissioning		X	Subject to agreement
3.9	Supervision and trial support		X	
3.10	Trial results – technical analysis	X	X	

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