Agenda

1. Business Drivers
2. Alcatel-Lucent value proposition
3. Products and Roadmaps
4. Conclusion
1 Business Drivers
Evolutions in End-User Drivers: Broadband AND Wireless

End-User have high Expectations

... Going Broadband
“Going Fast and with quality”
- Always on connection
- Higher Speed connections
- Unlimited usage
- Overall better Quality of Experience

Going Wireless ...
“My services everywhere”
- Access to services anywhere
- Access to services through any terminal
- Same Quality of Experience than broadband wireline
- Enjoy new communicating devices

Broadband Wireless
Evolution in End-User Drivers
A wide variety of rich services

Voice ...

Unlimited Voice
- VoIP as a strong telecom industry trend

High-Speed Internet
- Peak rate: 8 Mbps DL, 256 Kbps UL, unlimited volume

Mobile TV, Mobile gaming & Blogging
- Few broadcast channels and 100+ unicast channels for unlimited usage
- Full interactivity, low latency for both server-based or peer-to-peer gamers

Mobile office
- High throughput with mobility, remote/mobile VPN, push mail

Data...

Advanced Services...

Affordable voice and Internet services for low income users
Differentiated and advanced features for high end users
End users want Broadband, Ubiquitous and Flat-Fee

Consumers’ current perceptions

- **DSL**
  - Just great...and free, but... limited to home/office

- **WiFi**
  - Nice, but.... expensive, cumbersome authentication, and limited number of spots

- **GSM/3G**
  - Great coverage, highly mobile, transparent authentication, but... expensive, and still too slow

The opportunity for WiMAX

- **DSL-like flat-fee**
- **WiFi-like speed**
- **GSM/3G-like coverage & authentication**

Source: Alcatel/Intel end-user research, December 2005
WiMAX cleverly addresses both end user and operators expectations

**Latency**

**QoS**

**Throughput**

**Gaming**

**Voice**

**Video / TV**

**Security**

**Mobility**

**Mobile Office**

**Internet**

**WiMAX**

Can technically answer the demand NOW
Key success factors for a wireless technology

1. **A Large addressable market**
   - 15 B$ infra cumulated CAPEX in 5 years(*)
   - Interest from FSPs, MSPs, ISPs and new entrants
   - Addresses both mature and fast growing markets

2. **Radio Spectrum Availability**
   - Worldwide spectrum availability
   - Current licences cover 50%+ of WW population
   - Sub 1 GHz frequencies for digital divide

3. **Technology performance**
   - Efficient radio interface thanks to SOFDMA
   - Advanced Antenna technologies and MIMO
   - IP end to end architecture
   - Non Line of Sight + Mobility Support

4. **A Complete ecosystem**
   - Strong commitments from terminal/chipset vendors (Intel, ZyXEL, Samsung, Nokia, Motorola etc...)
   - Strong commitments from infrastructure vendors: Alcatel-Lucent, Motorola, Samsung etc...

(*) source Maravedis
Radio Spectrum Availability
WiMAX RevD & RevE frequency awarded so far (Sep 07)

Source: WiMAX Forum

Licenses awarded > 50% of worldwide population
A Complete ecosystem

A wide range of devices ... available cheaper and sooner

IT and Consumer Electronics players will shape the WiMAX CPE market:

- Strong involvement of Intel as well as device manufacturers in Taiwan and Korea
- Toward a wider range of devices - Internet Boxes, Laptops, PDAs, Portable Multimedia Platforms, Gaming gismos, ... tailored to serve end-user applications

Devices will rapidly evolve to serve all segments starting from fixed usage towards full mobility

High volumes in devices and chipsets will drive prices significantly down over time
2

Alcatel-Lucent Value Proposition
Product Readiness

1. Apr. 2005 - Joint Development Agreement signed with Intel
   Sept. 2005 - C-DOT Alcatel research Center launched in Chennai in India

2. Feb. 2006 - First live demo with 2.5Ghz BS in 3 GSM Congress in Barcelona
   Mar. 2006 - Agreement signed with Runcom and ZyXEL for end users devices
   Nov. 2006 - Korea Telecom WiMAX lab demo launched

   April 2007 - Release W2.1 with Beam forming rolled-out in 20 networks
   June 2007 - First large scale pilot network with 100’s of users (Primus-Canada)
**MIMO 2x2 technology**

- Space Time Block Coding to increase radio link quality
- Spatial Multiplexing to increase data rate
- Best performances in micro cellular/indoor/hot spots
- Cost-effective solution for lower-capacity sites in rural areas

**Beamforming technology**

- Improved coverage (up to 40% less sites)
- Reduce interferences leading to an increased spectral efficiency
- Stable performances in all environments (macro/micro cells, urban, suburban, rural, LOS/NLOS, ...)

**MIMO plus Beamforming 4x2**

- Combination of both allows for higher capacity
  - +75% capacity in macrocell environments*
  - +80% capacity in microcell environments*

* Vs a single antenna system
WiMAX (802.16-2005) Paves the road to 4G

Technology leadership

- More mobile
- More broadband
- <100Mbps speed
- Full mobility
- Seamless compatibility
- All-IP, VoIP
- With QoS control

4G

WiMAX enhances 3G LTE

WiMAX 802.16e-2005

OFDM All-IP MIMO

CDMA2000 EV-DO Rev.A

IP transport

HSDPA enh. / HSUPA

IP transport

EV-DO Rev.C

OFDM All-IP MIMO

3G LTE

OFDM All-IP MIMO

WiMAX anticipates 4G, relying on key building blocks (OFDM, All-IP, MIMO)
Our Open CPE strategy: **STEP 1** & **STEP 2**

Alcatel-Lucent engaged with all major chipsets suppliers and CPE vendors

Alcatel-Lucent committed to WiMAX eco-system openness
End to End offering & integration skills

- IMS
- Applications - Mobile TV
- IP network transformation expertise
- End-to-end integration of complex networks
- Complete range of backhauling solutions
End to End offering & integration skills: innovation & optimization with the Home Network Management example

**Simplified installation, commissioning and initial configuration** for Femto cells

- Radio and mobility configuration of femto cells must be derived from the macro cell layer
- No Network Planning needed for the femto cells
- Automatic configuration check, update scheduling
- Performance measurement

**CPE management System derived from ADSL**

- TR-069 interface
- Backup & restore
- Firmware image management
- Advanced automation for **mass operations**
- Policy engine for automated, ruled-based operations
- Customizable functions

**Alcatel-Lucent 5580 HNM** is the answer for a common Femto BS & CPE management
3 Products and Roadmaps
Alcatel-Lucent WiMAX Solution
Diversified and performing Base Station Portfolio

1. A diversified Base Station portfolio
   - Tailored for maximum coverage
   - Adapted for low to high density areas
   - Multi Carriers & Multi Standard
   - Indoor & outdoor matching all sites conditions

2. High Radio performance
   - High Output Power
   - Advanced Antenna Technology: Beamforming + MIMO

3. Flexible/easy to install & operate
   - Light and compact equipment easing transportation and deployment
   - Roof-top mounting or tower-top all-in-one remote units
   - Plug and play feature
   - Complete Operation & maintenance tool including Network optimization

C-WBS
“All-in-one”
High Capacity
Single sector
with 4TX/RX

L-WBS
“All-in-one”
Small form factor
Single sector
with 2TX/RX

D-WBS
“All-in-one”
Remote Radio Heads based on L-WBS
Central cabinet hosting O&M functions, backhauling, BBU...

M-WBS
Indoor / Outdoor
High Capacity
High Power
Multi-Sector
Alcatel-Lucent Launch Strategy for 2007

**Early Trials**
Dec 06–March 07: W2MR
- Lab/field trials
- Friendly users
- Interoperability tests
(2.3, 2.5 & 3.5 GHz)

**Pre-commercial Deployments**
March–July 07: W2.1
- City-wide pilots
- Certification
- Advanced radio performance
(2.3, 2.5 & 3.5 GHz)

**Large Scale Commercial launch**
July–October 07: W3
- Nationwide dense coverage
- Software upgrade from W2.1
- High capacity WAC
- VoIP E2E QoS
- Leased Lines & Corporate VPN
- Enhanced mobility features
- Video and multimedia applications (eg Mobile TV)
  (Multi-band devices)

Dates mentioned are DR4

2006 2007 2008
Conclusion
### Alcatel-Lucent WiMAX Deployments

#### 14 Regional and National Deployments Awards since January 2007
- Telmex, Chile & LAM
  - Wireless DSL expansion & mobile evolution projects
- BellSouth, USA
  - BellSouth, USA
- Primus, Canada
  - Primus, Canada
- WiMAX Telecom, Austria, Slovakia & Croatia
  - WiMAX Telecom, Austria, Slovakia & Croatia
- India
  - Ramping up C-Dot-Alcatel Research Center
  - Field trials launched with major operators
- Synterra
  - Russia & CIS
- Korea Telecom, Korea
  - Wimax Reality Center
- Acca, Japan
- Maxis, Malaysia
- Chunghwa Telecom
  - Chunghwa Telecom Taiwan
- Lebanon
  - Contract with Tier 1 ISP for nationwide network deployment
- SHD, France
- Telmex, Chile & LAM
- Brazil
- Angola
- Venezuela
- Moldavia
- BellSouth, USA
- Brazil
- Angola
- Venezuela
- Moldavia
- Maxis, Malaysia
- Russia & CIS
- Korea Telecom, Korea
- Acca, Japan
- Maxis, Malaysia
- Chunghwa Telecom
- Chunghwa Telecom Taiwan
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- Lebanon
- LeBron...
Alcatel-Lucent is turning the challenge into an opportunity

Alcatel-Lucent Infrastructure solution is there

- We are shipping a strict rev E compliant product

Ecosystem is there

- Terminals, IOT centres, Applications and USER NEEDS

Customers are rolling out networks with us

- Solution associated with a comprehensive E2E portfolio and associated integration services