



## Application scenarios, first experiences and evolution

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and new network architectures for the Arab Region"*

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## Exceeding Nomadic Customers' expectations

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### W-LAN like access:

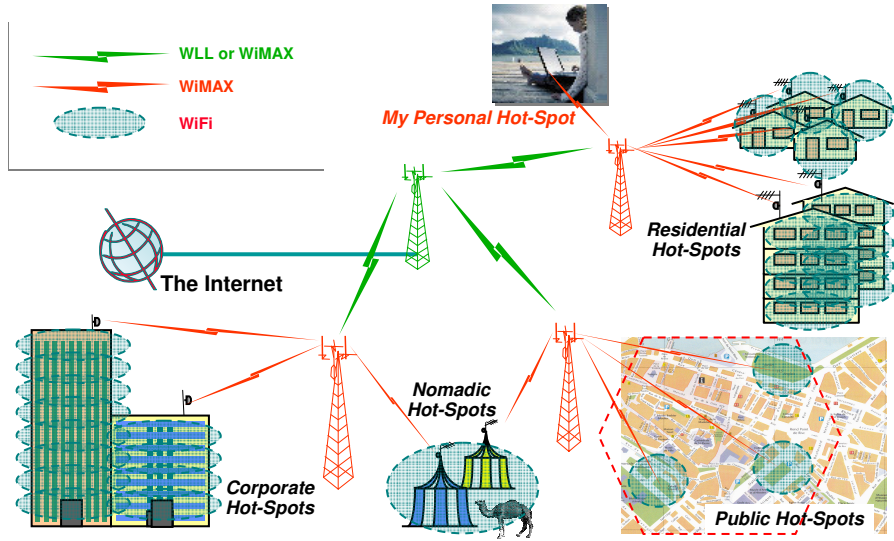
- + Anywhere
- + Anytime
- + Seamless
- + Simple
- + Friendly
- + Secure



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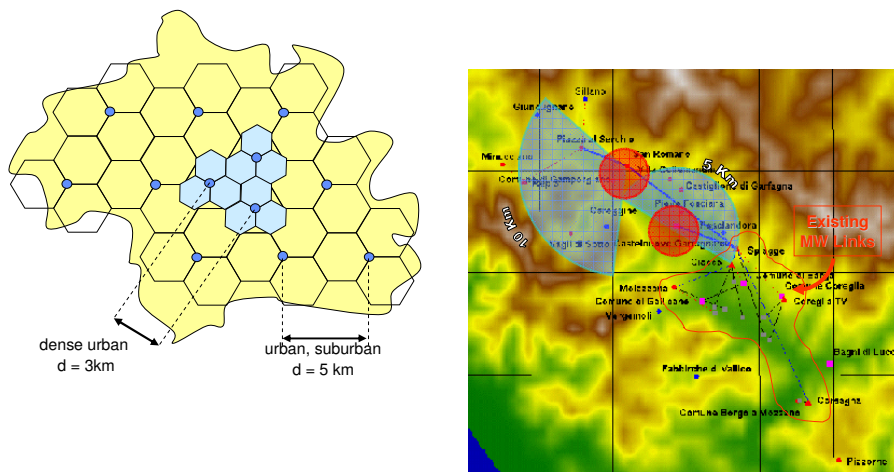
## Naturally complementing WiFi



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## Providing cellular coverage of urban and rural areas alike



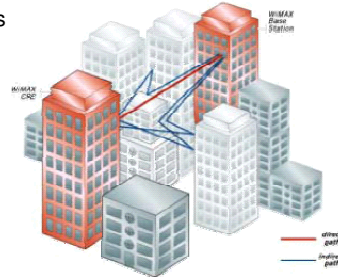
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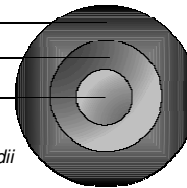
## Operating in LOS and NLOS

WiMAX technology, solves or mitigates the problems resulting from NLOS conditions by using:

- OFDM technology.
- Sub-Channelization.
- Directional antennas.
- Transmit and receive diversity.
- Adaptive modulation.
- Error correction techniques.
- Power control.



LOS  
30 to 60 km  
NLOS  
4 to 9 km  
Indoor Self-install  
1 to 2 km

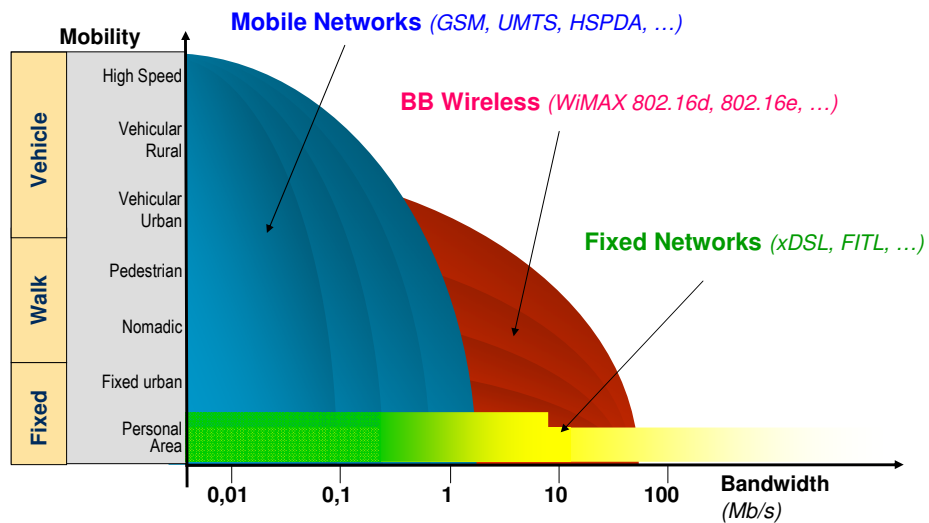


Full featured cell radii

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## Filling the gap between Fixed and Mobile



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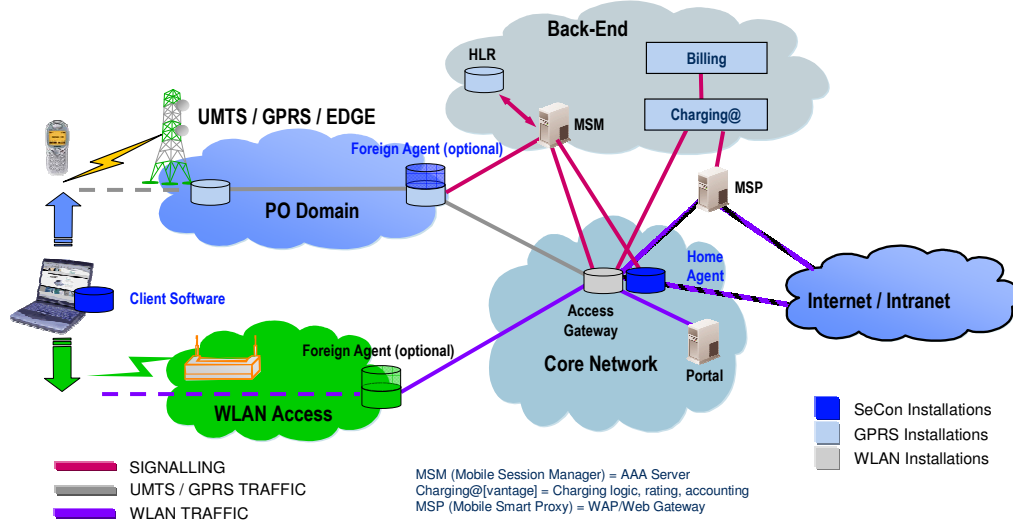
## Easy to integrate with W-LAN access through WIP

- The Wireless Integration Platform (WIP) is designed to support both Wireless LAN and WiMAX technologies
- It performs the following functionalities
  - Authentication – Authorization – Accounting
  - End user billing \ charging
  - Access Control
  - It provides an Interface to 2G - 3G networks (towards HLR and the Billing system)
- End User Authentication based on the Web portal page
- Billing \ Charging models
  - pre-paid (voucher)
  - post-paid (Credit Card)
  - SIM card ....

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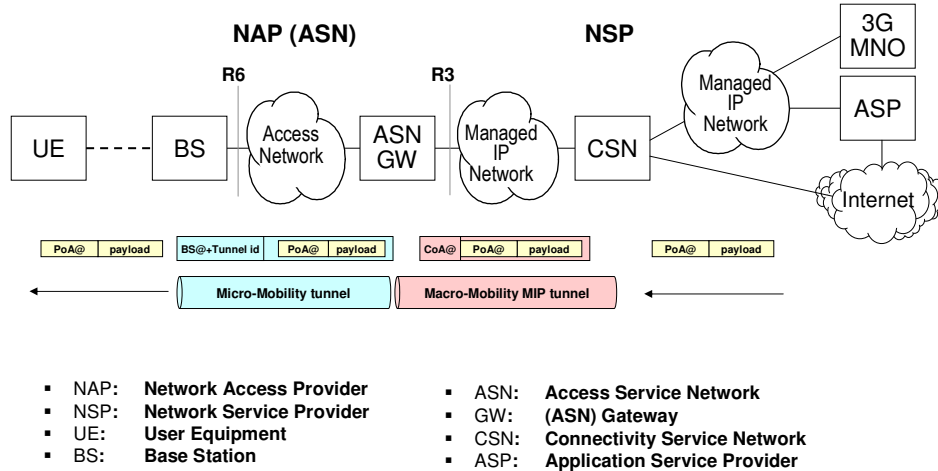
## Easy to integrate into 2G/3G Mobile Networks



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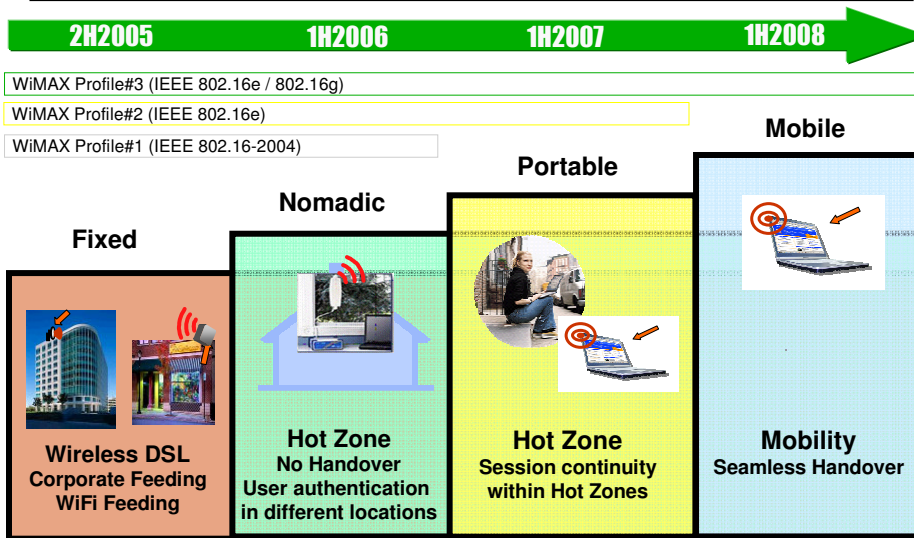
## Fully supporting Internet Mobility standards underway



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## Application scenarios and Standards evolution path



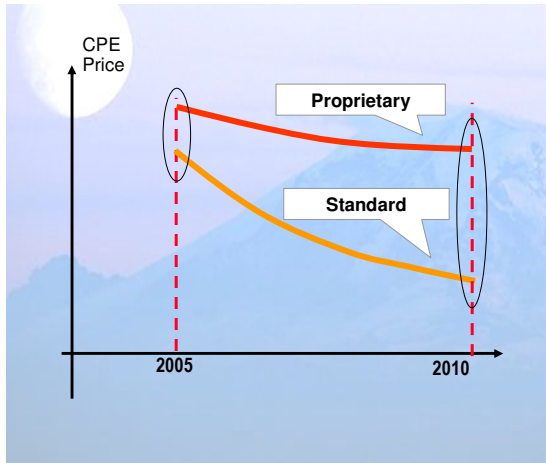
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## A worldwide Broadband Wireless Access standard



WIMAX  
FORUM



- Compliance to standard
- Standard frequency plan
- Harmonized licensing schemes

are all key to achieve:

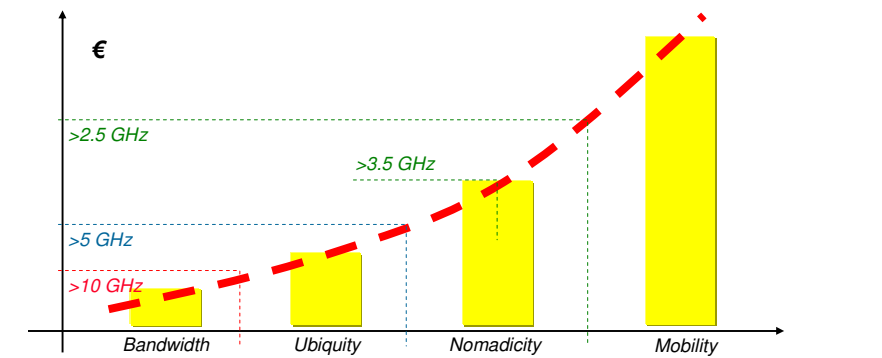
- CPE cost reduction
- Service interoperability
- Worldwide roaming

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## License value as a function of intended usage

- License must fit actual technology potential to avoid overpricing
- Outdoor and indoor coverage must be guaranteed separately
- Unlicensed spectrum (5.8 GHz) best fit for private/local usage



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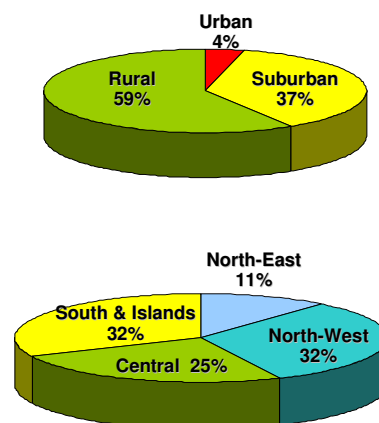
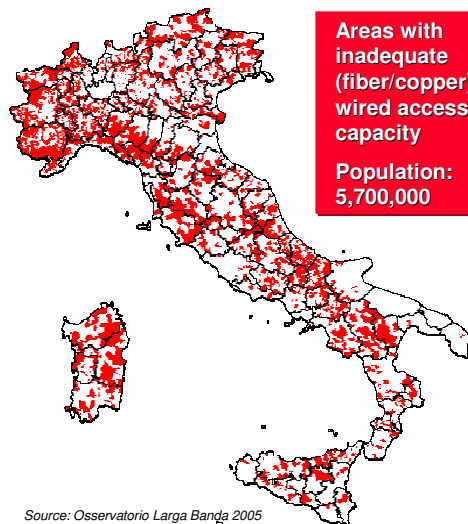
## WiMAX: some first conclusions

- **Leading BWA technology, addressing several different user needs**
  - Users not adequately served by wired BB access at their home/office
  - Users requiring ubiquitous BB access
- **Offering unprecedented opportunities to operators and governments**
  - To reshuffle the TELCO market by fostering liberalization and competition
  - To provide customers and citizens with high quality affordable services
  - To effectively confront the risk of Digital Divide

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## Long-term Digital Divide risk in Italy



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**Early WiMAX trials in Italy**  
*Siemens' WayMAX trial equipment*



Indoor unit



Outdoor unit



Antenna

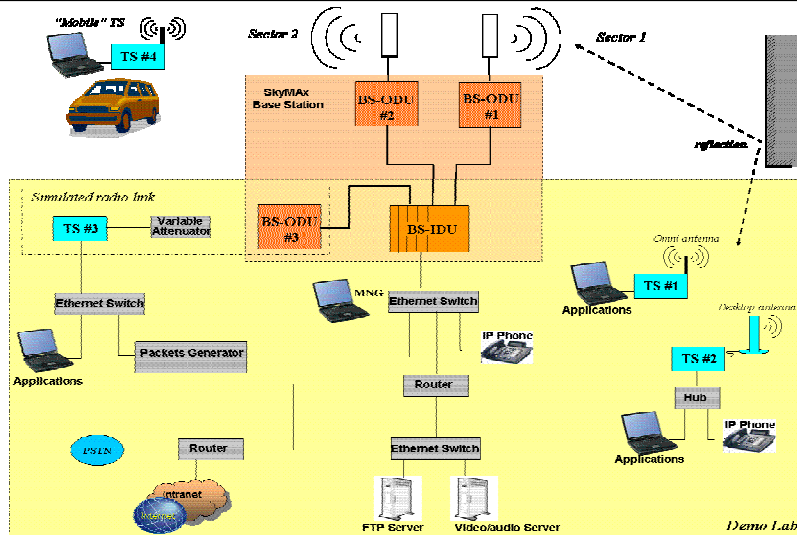


Residential Modem

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**Early WiMAX trials in Italy**  
*Cassina de' Pecchi trial architecture*

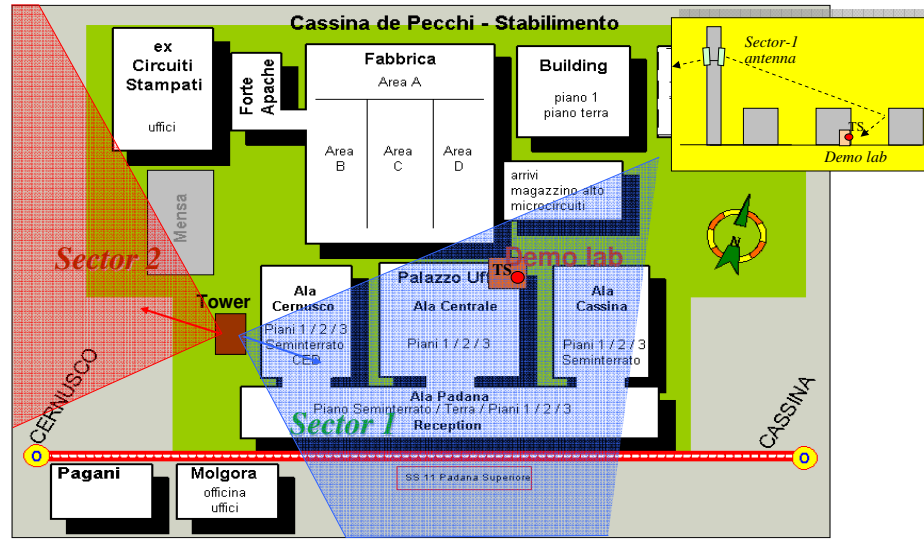


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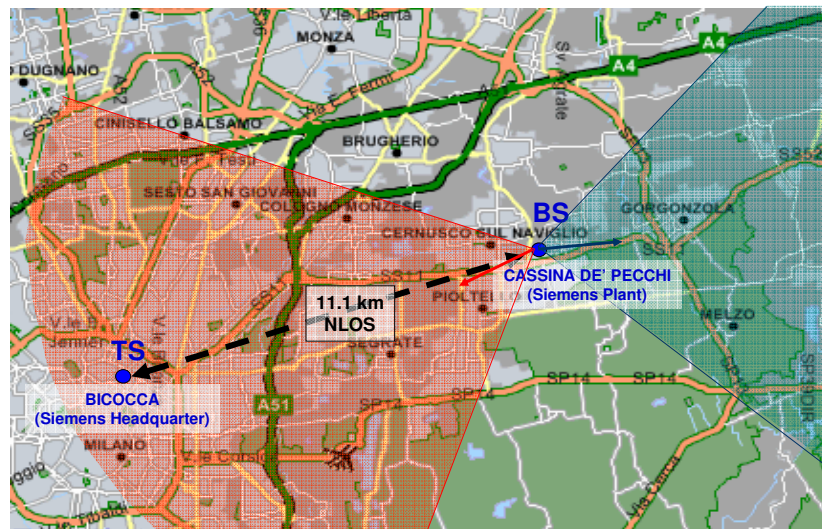
**Early WiMAX trials in Italy**  
**Cassina de' Pecchi trial layout**



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**Early WiMAX trials in Italy**  
**Cassina de' Pecchi (MI) trial coverage**



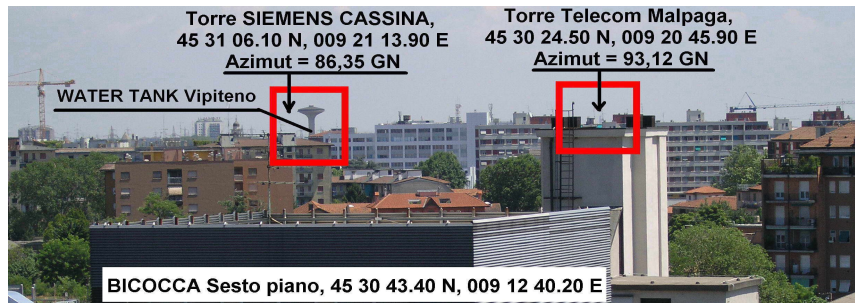
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## Early WiMAX trials in Italy

### Cassina de' Pecchi – Bicocca NLOS connection

#### View from Bicocca towards Cassina



#### Cassina de' Pecchi – Bicocca link data

Distance: **11.1Km**, (NLOS, near LOS)

Clutter: urban / suburban

BS Antenna (Cassina): 90deg sector, 15dBi; height 45m

TS Antenna (Bicocca): 18deg, 18dBi; installed at 6<sup>th</sup> floor (20-25m)

BS Tx Power: +35dBm

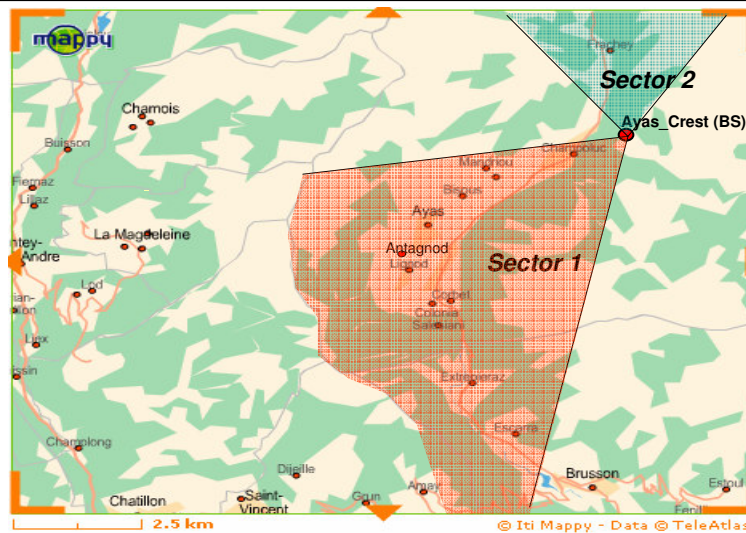
Rx level DL (TS): around -65dBm

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## Early WiMAX trials in Italy

### Combined DVB-T/WiMAX trial in Val d'Ayas

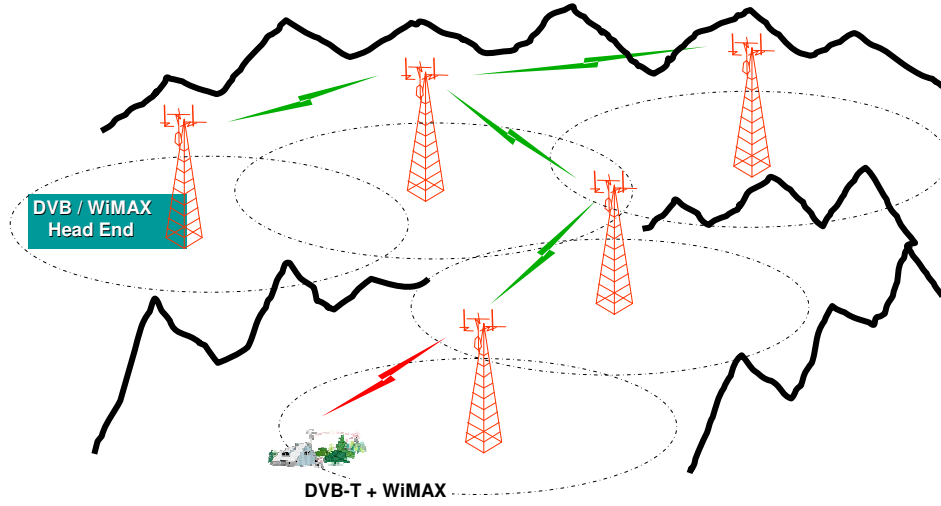


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### Early WiMAX trials in Italy

*All-Wireless CATV concept: broad area coverage*

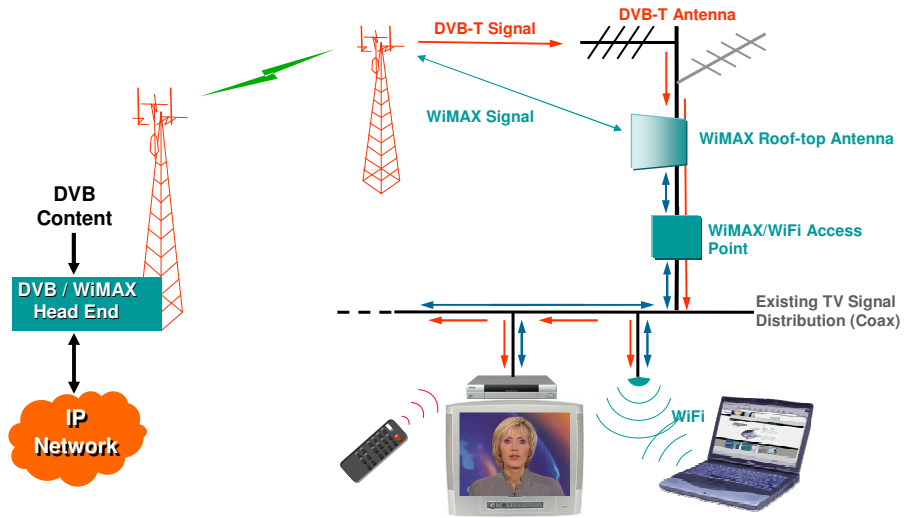


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### Early WiMAX trials in Italy

*All-Wireless CATV concept: last mile/drop solutions*



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## WiMAX: further conclusions

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- **Best fit for**
  - WLAN (and Hot-Spot) feeding in urban areas
  - SDSL alternative in urban and sub-urban areas
  - xDSL alternative in low density and/or geo-morphologically disadvantaged areas
  - xDSL alternative in areas with high seasonal changes in population
  - Direct broadband wireless access in large outdoor areas
  - **DVB-T return channel**

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## WayMAX: product availability roadmap

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- **Internal lab trials** *until Sep '05*
- **Public trials with customers** *since Oct '05*
- **Commercial availability** *from Dec '05*
- **Manufacturing ramp-up** *1st Half of '06*

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