



# **WiMAX – Enabling the Mobile Internet**

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## Why WIMAX?

- Circa 2002/3
  - Internet access was growing rapidly and needed wireless broadband
  - Packet switched, broadband, MIMO-OFDMA was a already proven technology (Iospan Wireless Inc.)
  - 3G was still voice centered, circuit switched and narrow band
  - New spectrum was becoming available worldwide
  - **Time seemed right for a new broadband wireless technology track**



## WIMAX Goals 2002/3

- Get national administrations to allocate large chunks of new spectrum (> 2.0 GHz band) for broadband wireless
- Create new operators and convert 3G incumbent operators to pursue this new opportunity
- Build a large eco-system with strong competition
- Keep IPR overhead low
- Start with fixed broadband and evolve to nomadic and eventually mobility

## WIMAX Goals 2002/3 – Scorecard 2009

- Get national administrations to allocate large chunks of new spectrum (> 2.0 GHZ band) for broadband wireless - **good**
- Create new operators and convert 3G incumbent operators to pursue this new opportunity - **mixed**
- Build a large eco-system with strong competition – good, perhaps too good
- Keep IPR overhead low - **good**
- Start with fixed broadband and evolve to nomadic and eventually mobility – **too cautious**

## WiMAX 2009

- **ASSETS**

- Low cost of service delivery
  - Cheap and plenty of spectrum (very WiMAX sticky)
  - Low cost equipment
- Mature technology (including VOIP) (3-4 yrs ahead of LTE)
- Building a worldwide footprint

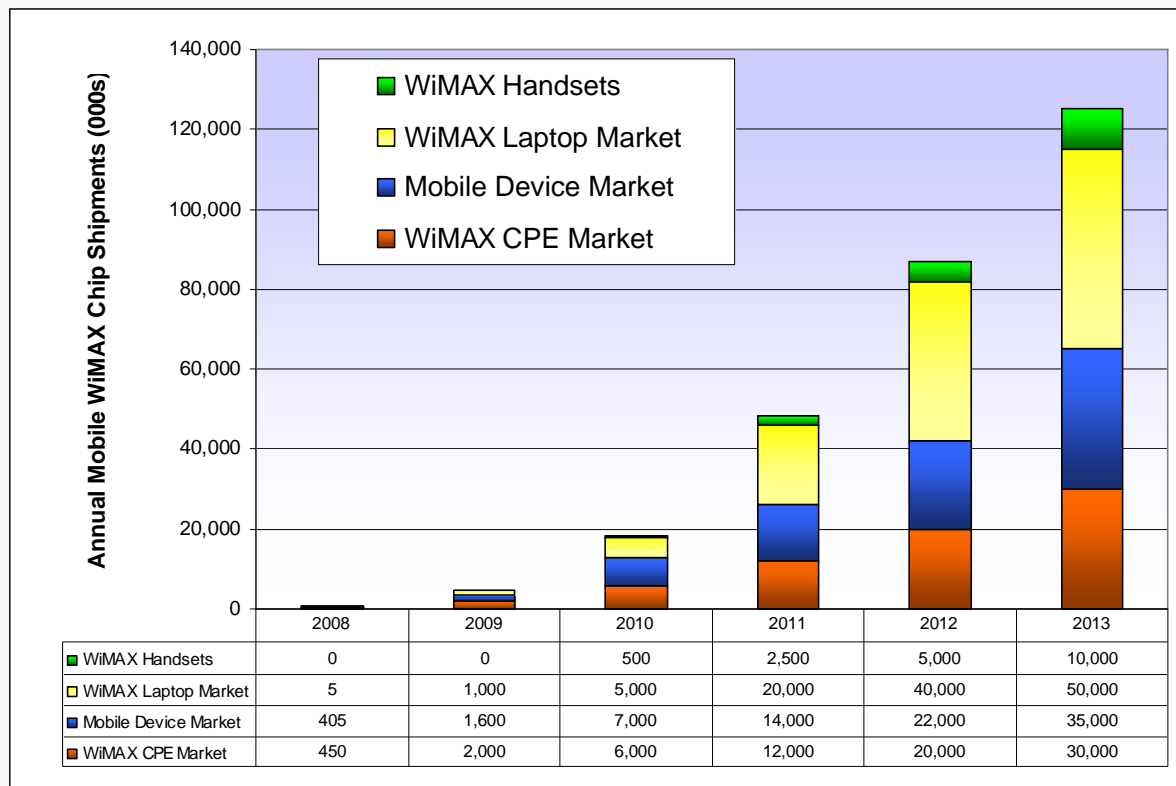
- **LIABILITIES**

- Unclear evolution strategy
- Poor uptake among 3G incumbents
- Terminal silicon needs financially stronger players

# WiMAX Deployments (Beceem)



## WiMAX Semi Projections

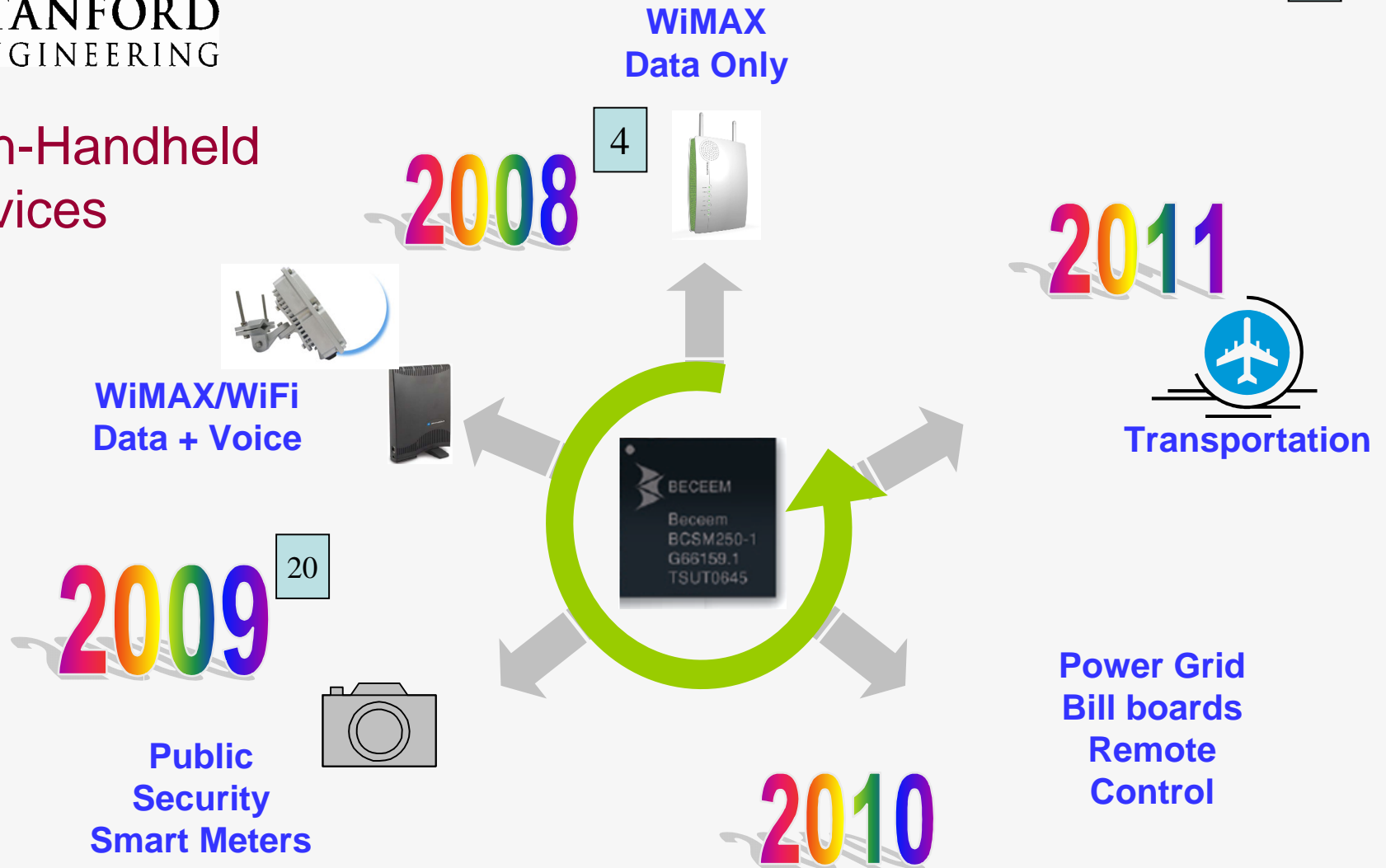


Beceem Estimates (Lower than ABI and WF Estimates)

## Non – Handheld Markets

- Home Access: CPEs, net-tops, set-tops
- SMB Access: routers, gateways
- Vehicular Access: car, bus and rail internet
- Sensor Networks: public safety, transportation, smart grid,
- Equipment automation: Agri Combines, military,
- Consumer Elec.: Cameras, games,
- M2M: Vending machines, fixed and mobile billboards, ...

Non-Handheld  
Devices





## Hand Held



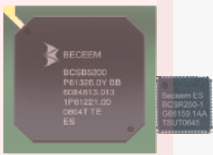




- Net books, notebooks (USB, embedded)
  - We have to add + WiFi, + EVDO, + HSPA
- Smart phones – MIDs
  - We need to add + 2G/3G, + WiFi, + GPS
- Service model will be MVNO with phones connecting to WIMAX where available and reverting to 2G/3G when not available.
- Opportunity now is to create stickiness to WIMAX based on cost and pervasiveness to become a significant player in handhelds

Handheld

Beceem Based Skews



# Product Roadmap

	2006	2007	2008	2009	2010
	 <p>Multi Chip 130 nm</p>	<p>Handsets Area x power</p> <p>Non Handset</p>	 <p>Data</p>  <p>Voice Data</p>	 <p>+ VOIP + 3G-2G + WiFi</p>  <p>+ WiFi</p>	 <p>+ App + Media + GPS</p>  <p>+ Video</p>

*Pre-Commercial Trials*

## WIMAX Vendors

- Infra
  - Motorola, Samsung, Huawei, ZTE, Alcatel-Lucent, Alvirion, Harris, Cisco, Hitachi,..
- Terminals
  - OEMs Samsung, Motorola, ZTE,..
  - ODMs Asus, Gemtek, Acton, Zycell, Quanta,....
- Semi
  - Beceem, Intel, Samsung\*, Sequans, GCT,.

## Summary

- WiMAX is on the roll
- Mature technology and excellent performance
- Big deployments - US, Japan, India, Russia, ME, South Asia, Latin America,...
- **Revolution today not evolution tomorrow**



**Thank you!**