UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Bridging the Digital Divide Through Mobile Broadband: The Case of Portugal

Pedro Ferreira

Member, Board of Directors, Knowledge Society Agency, Portugal

Expert Workshop on Measuring Mobile/Wireless Service Data
ANACOM, February 19th 2009

Outline

- **Introduction to Wireless Broadband:**
  - Relationship to digital divide
  - Definition, significance and usage

- **Wireless Broadband in Portugal:**
  - Up take in Portugal and international comparison
  - Up take in institutions of Higher Education:
    - The e-U Project in Portugal

The digital divide and wireless broadband

- **Internet access** brings a wide range of benefits and advantages for all communities. This is especially true for **rural and remote areas**, because the Internet brings access to resources that are even less likely to be available in these communities.

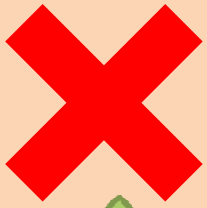
- However, a number of households and individuals in the **rural world cannot subscribe to broadband** Internet service at any price. Residents of rural areas find themselves on the wrong side of the digital divide regardless of their income.

- **Wireless is more cost effective in sparsely populated areas**. Wireless is the NGN piece that can help with achieving ubiquituous service. Technology diversity is particularly important if one intends to use NGN as part of Universal Service policy.

- **Spectrum management plays an essencial role part to make this happen**. Current practice offers little flexibility, limits both sharing and the ability to trade oligations. One needs to better trade inefficiency and interference.

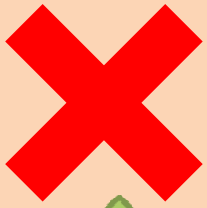
Source: Peha, J. (2008), "Bringing Broadband to Unserved Communities", Discussion Paper, July 2008, The Hamilton Project, The Brookings Institution

Mobility vs. Communication channel

		Communication Channel	
		Wired	Wireless
Mobility	Yes		3G WiMax WiFi Satellite
	No	"Wireless Routers" CABLE FTTx DSL BPL	Fixed Wireless (FWA)

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Focus for today: mobile wireless broadband

		Communication Channel	
		Wired	Wireless
Mobility	Yes		3G WiMax WiFi Satellite
	No	"Wireless Routers" CABLE FTTx DSL BPL	Fixed Wireless (FWA)

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Prevalence in the US

Number of Lines with more than 200kb/s downstream, June 2007

Technology	Number of lines (in millions)
Asymmetric DSL	27.516
Symmetric DSL & traditional wireline	1.029
Cable modem	34.409
Fiber	1.403
Satellite	0.669
Fixed wireless	0.586
Mobile wireless	35.305
Power line and other	0.005

Source: FCC (2008), "High-Speed Services for Internet Access: Status as of June 30, 2007", Wireline Competition Bureau, Industry Analysis and Technology Division.

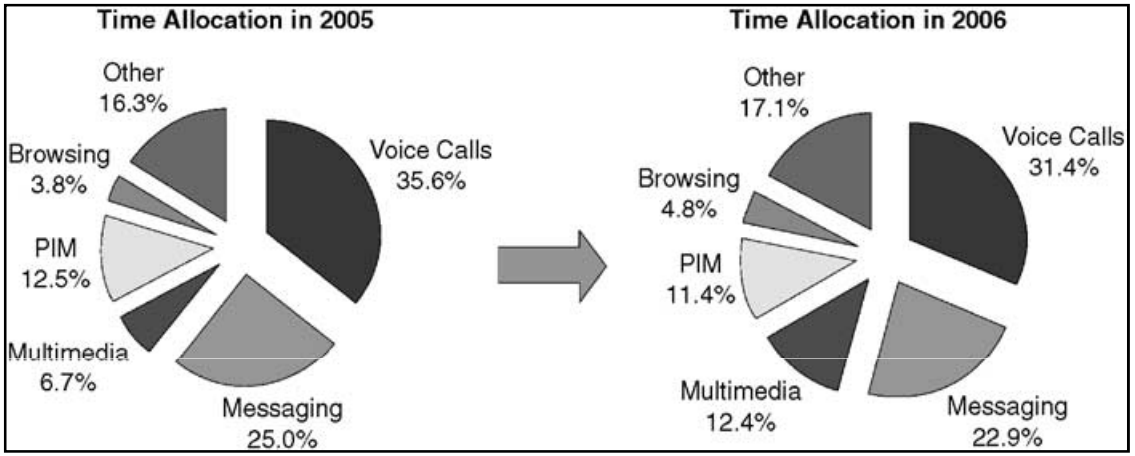
Prevalence in the US

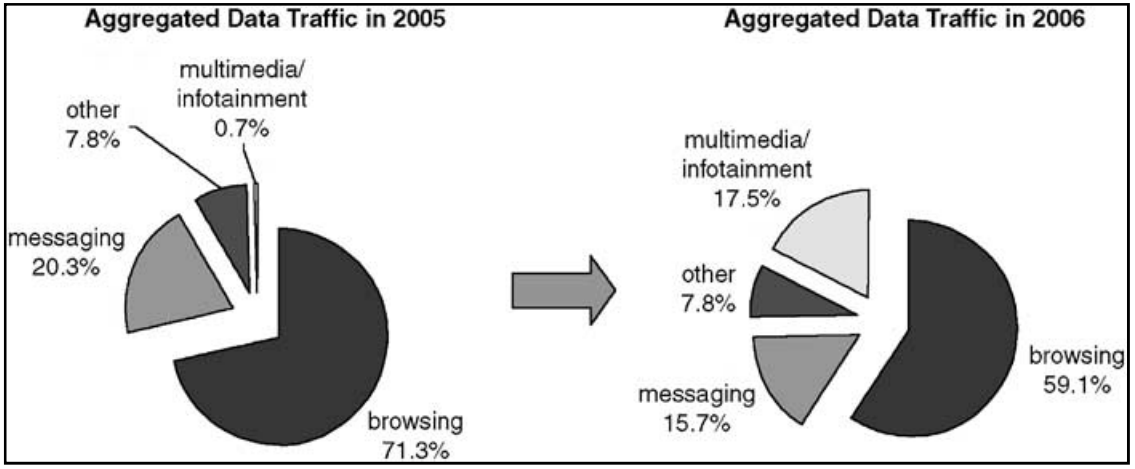
Number of Lines with more than 200kb/s downstream, June 2007

Technology	Number of lines (in millions)
Asymmetric DSL	27.516
Symmetric DSL & traditional wireline	1.029
Cable modem	34.409
Fiber	1.403
Satellite	0.669
Fixed wireless	0.586
Mobile wireless	35.305
Power line and other	0.005

Source: FCC (2008), "High-Speed Services for Internet Access: Status as of June 30, 2007", Wireline Competition Bureau, Industry Analysis and Technology Division.

Time allocation and data traffic pattern over mobile service in Finland 2005-06

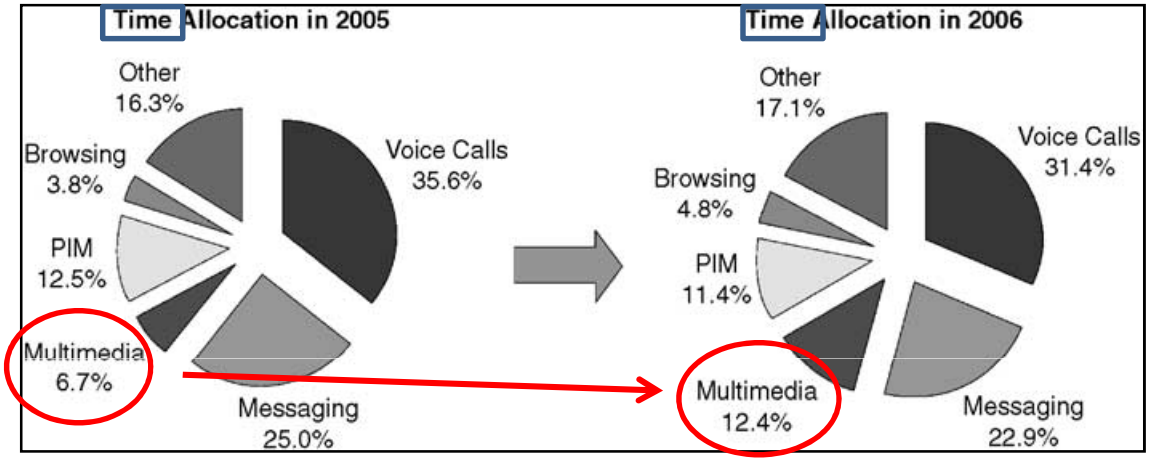




Source: Hannu T. Verkasalo (2007), "Handset/based measurement of smarphone service evolution in Finland", Journal of Targeting, Measurement and Analysis for Marketing (2007) 16, 7 – 25.

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Time allocation and data traffic pattern over mobile service in Finland 2005-06



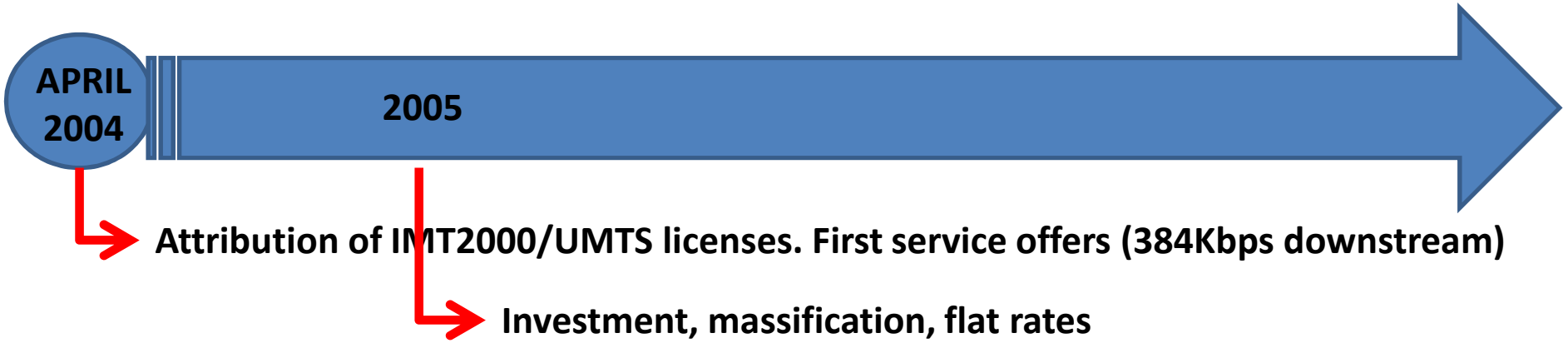
Source: Hannu T. Verkasalo (2007), "Handset/based measurement of smarphone service evolution in Finland", Journal of Targeting, Measurement and Analysis for Marketing (2007) 16, 7 – 25.

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Timeline in Portugal

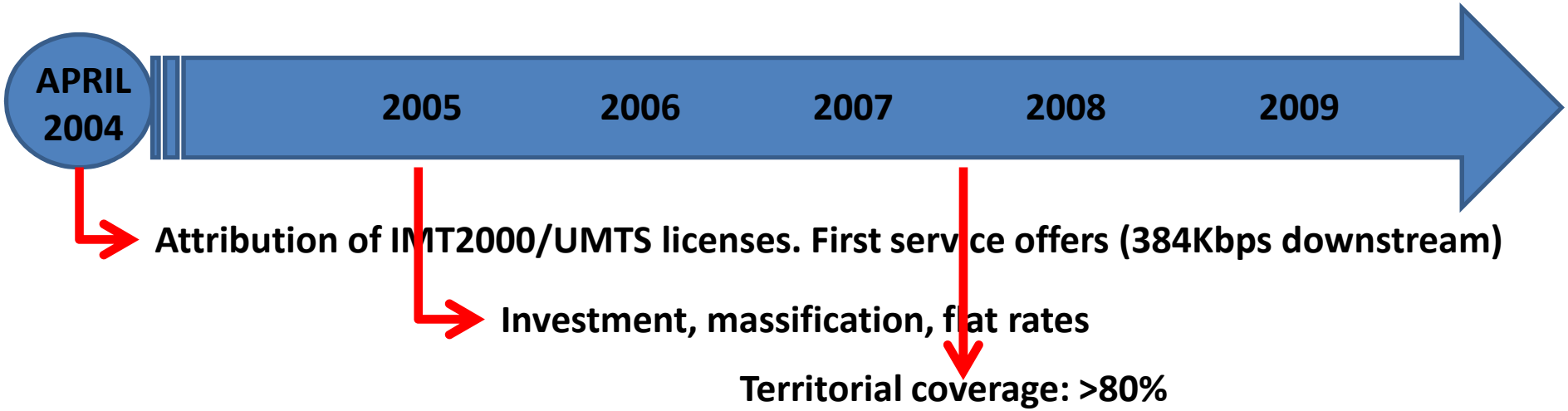
Source: ANACOM

Timeline in Portugal



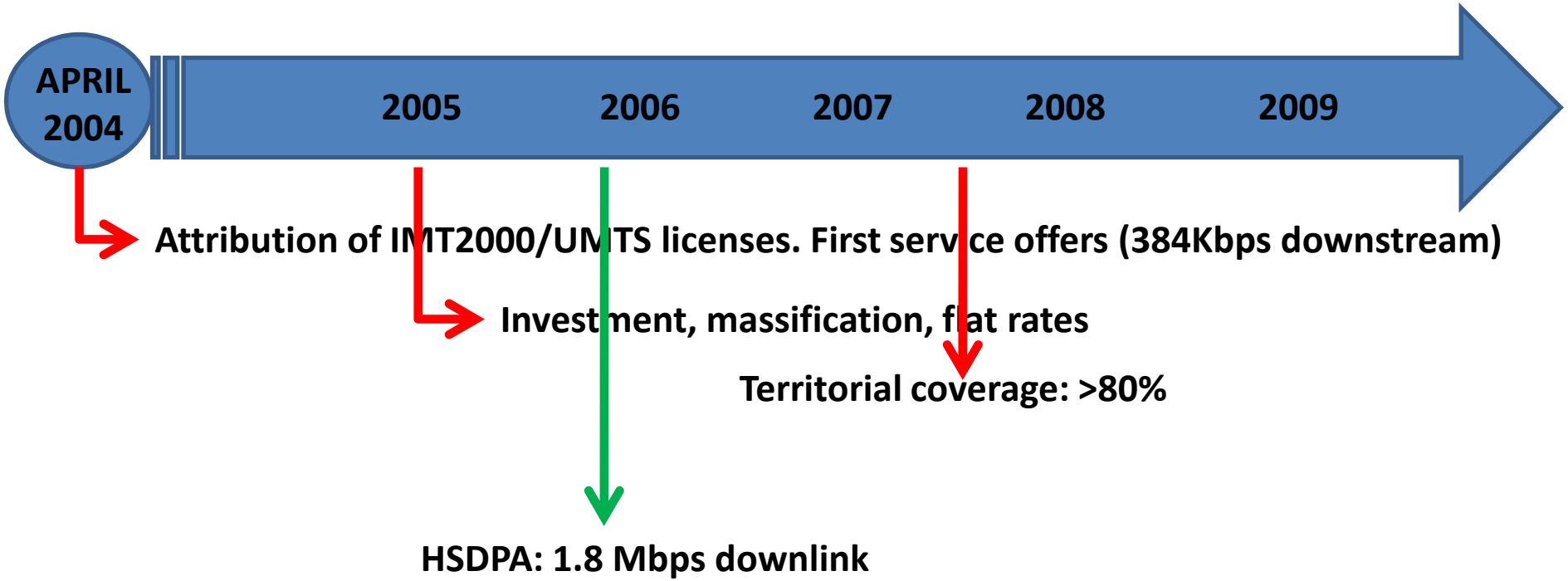
Source: ANACOM

Timeline in Portugal



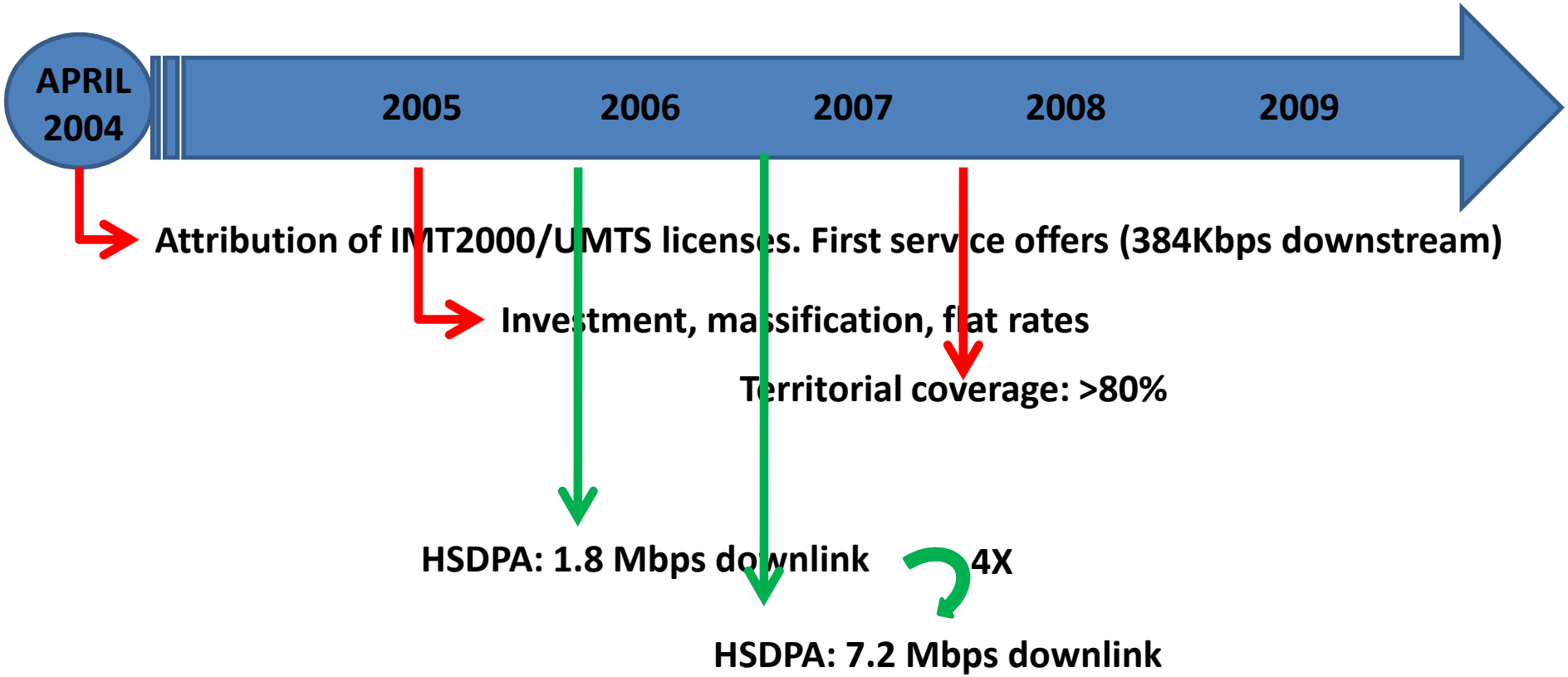
Source: ANACOM

Timeline in Portugal



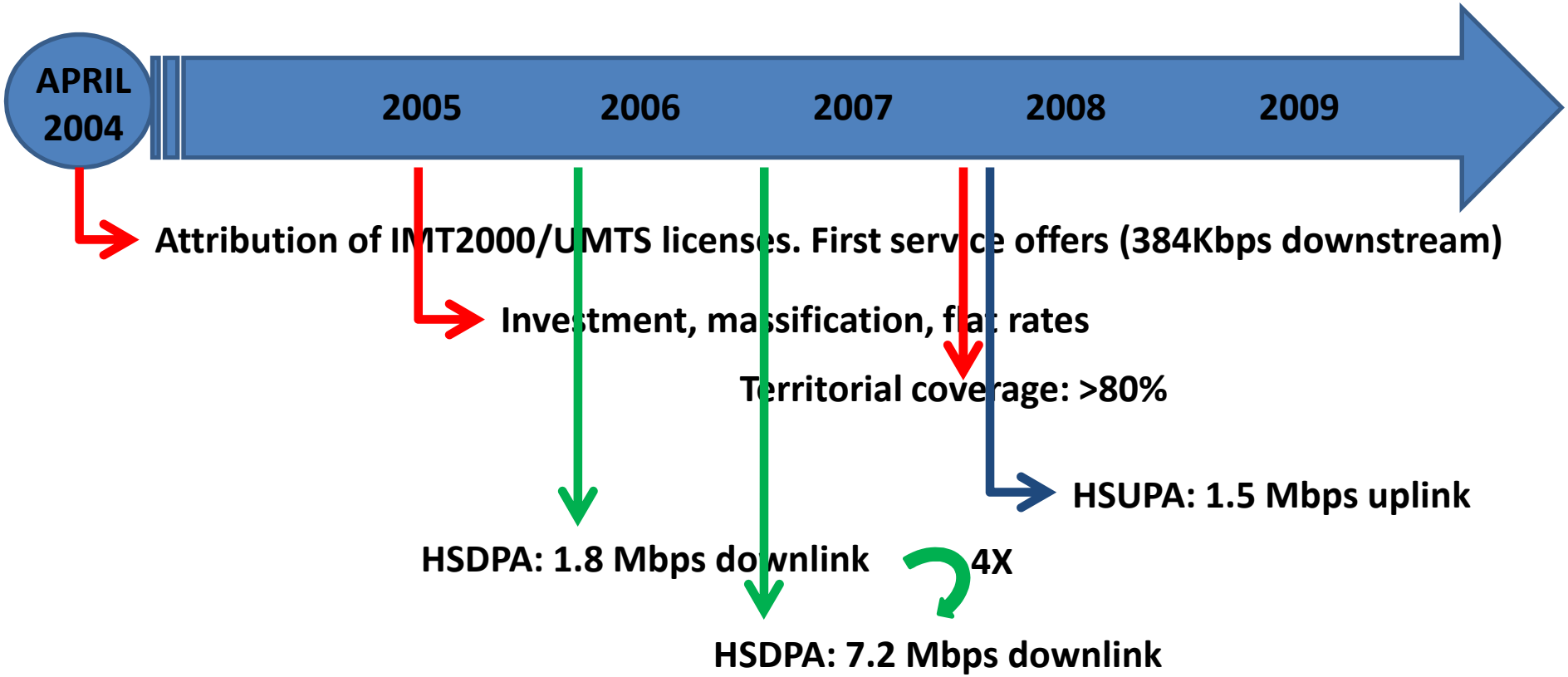
Source: ANACOM

Timeline in Portugal



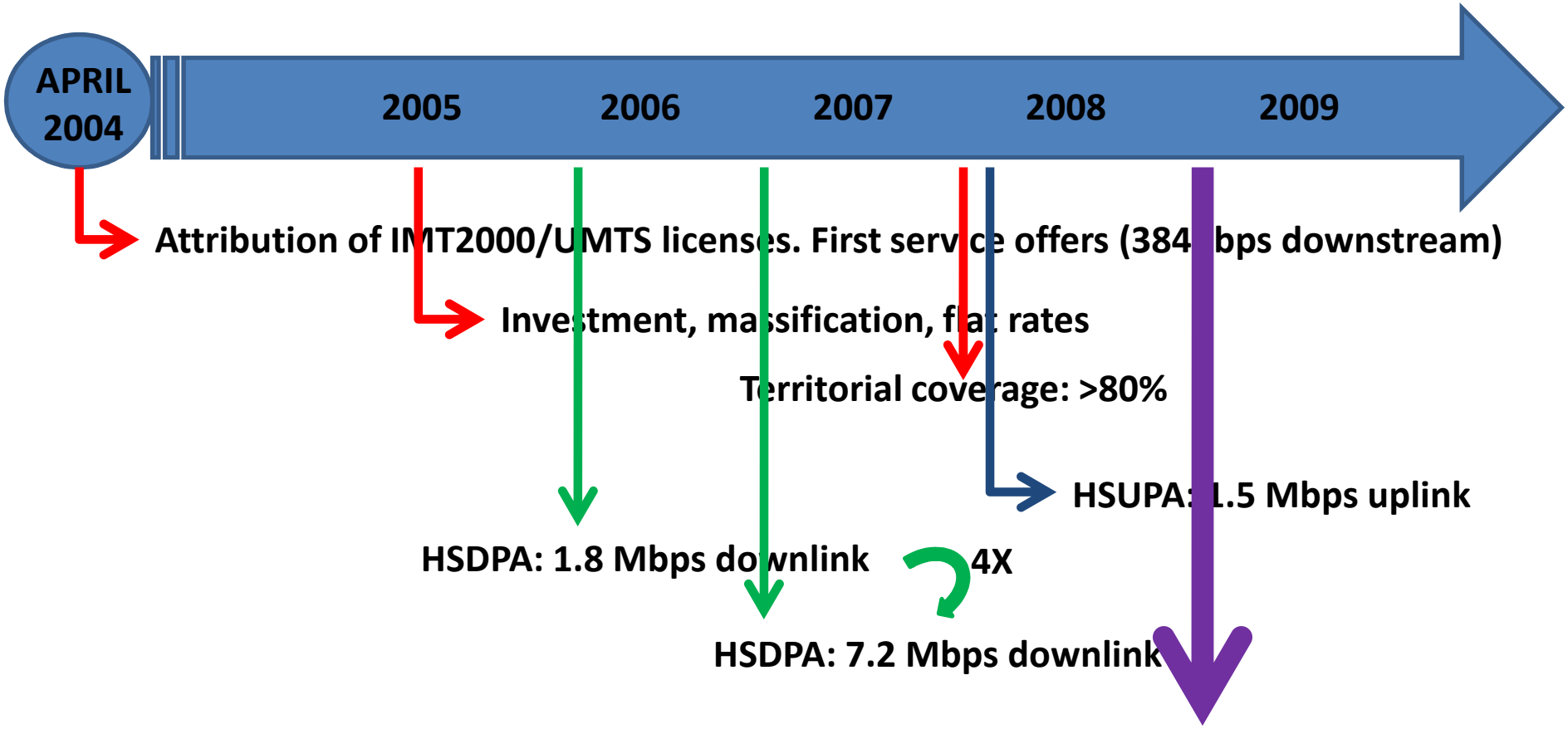
Source: ANACOM

Timeline in Portugal



Source: ANACOM

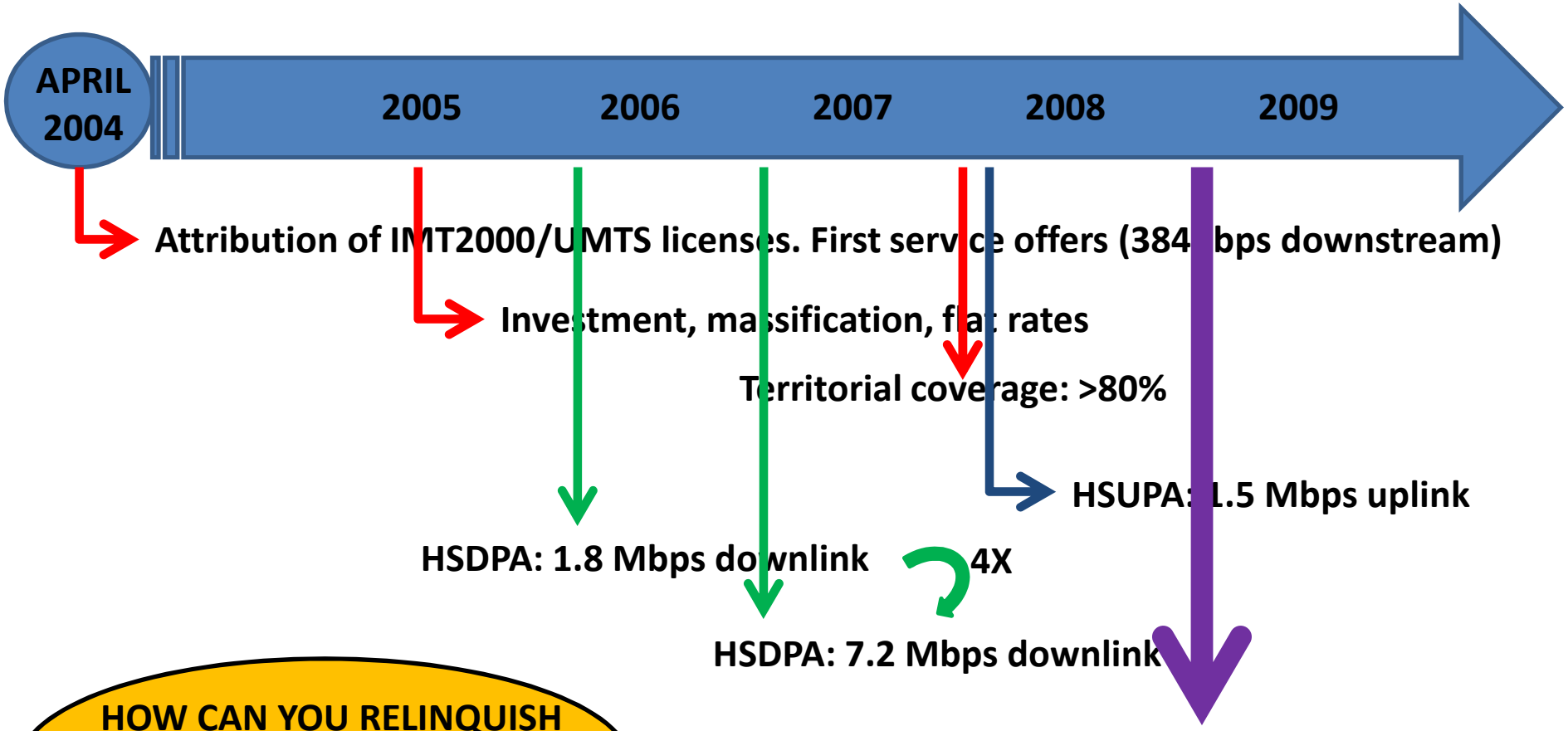
Timeline in Portugal



Source: ANACOM

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

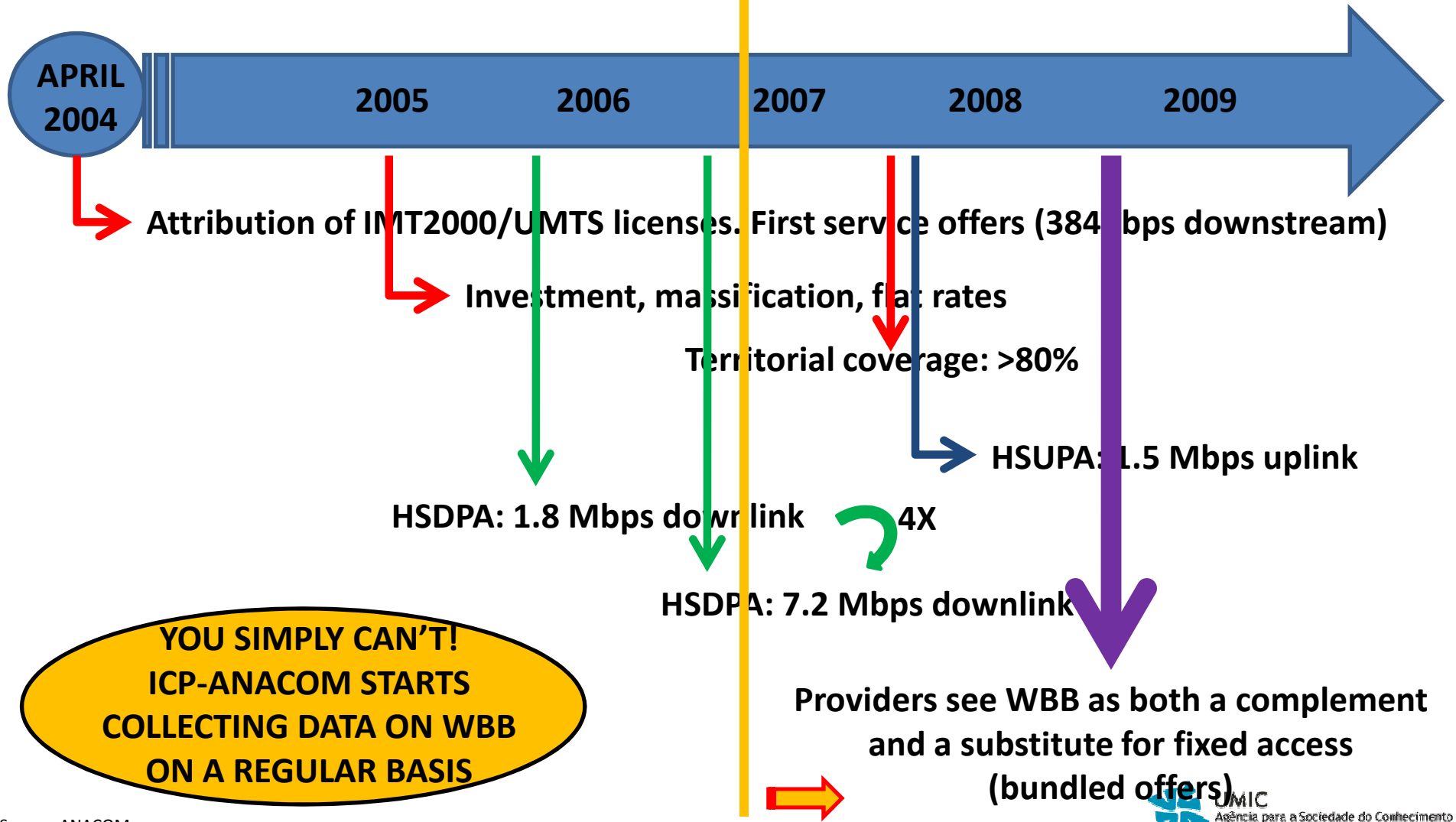
Timeline in Portugal



Source: ANACOM

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

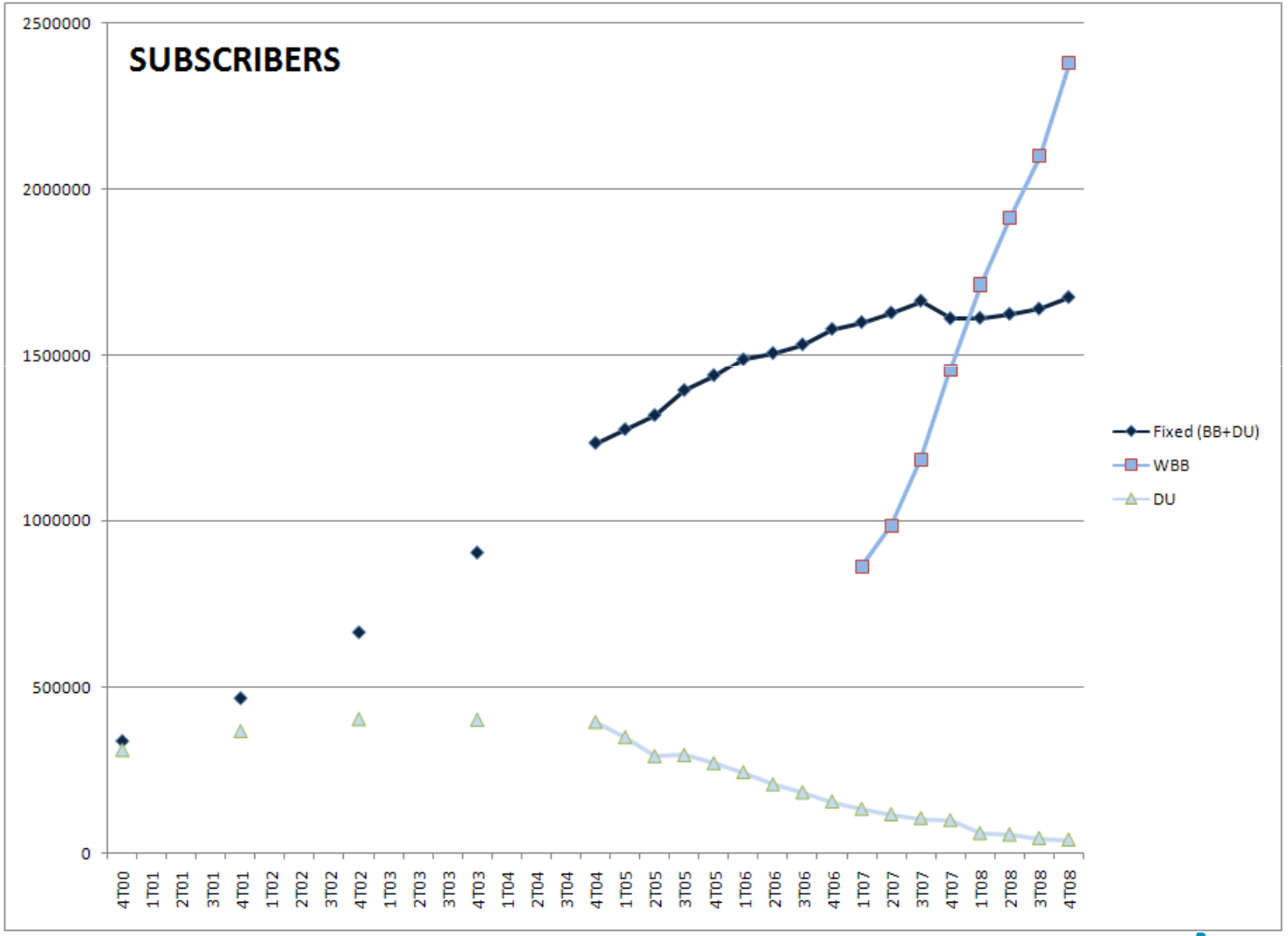
Timeline in Portugal



Source: ANACOM

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

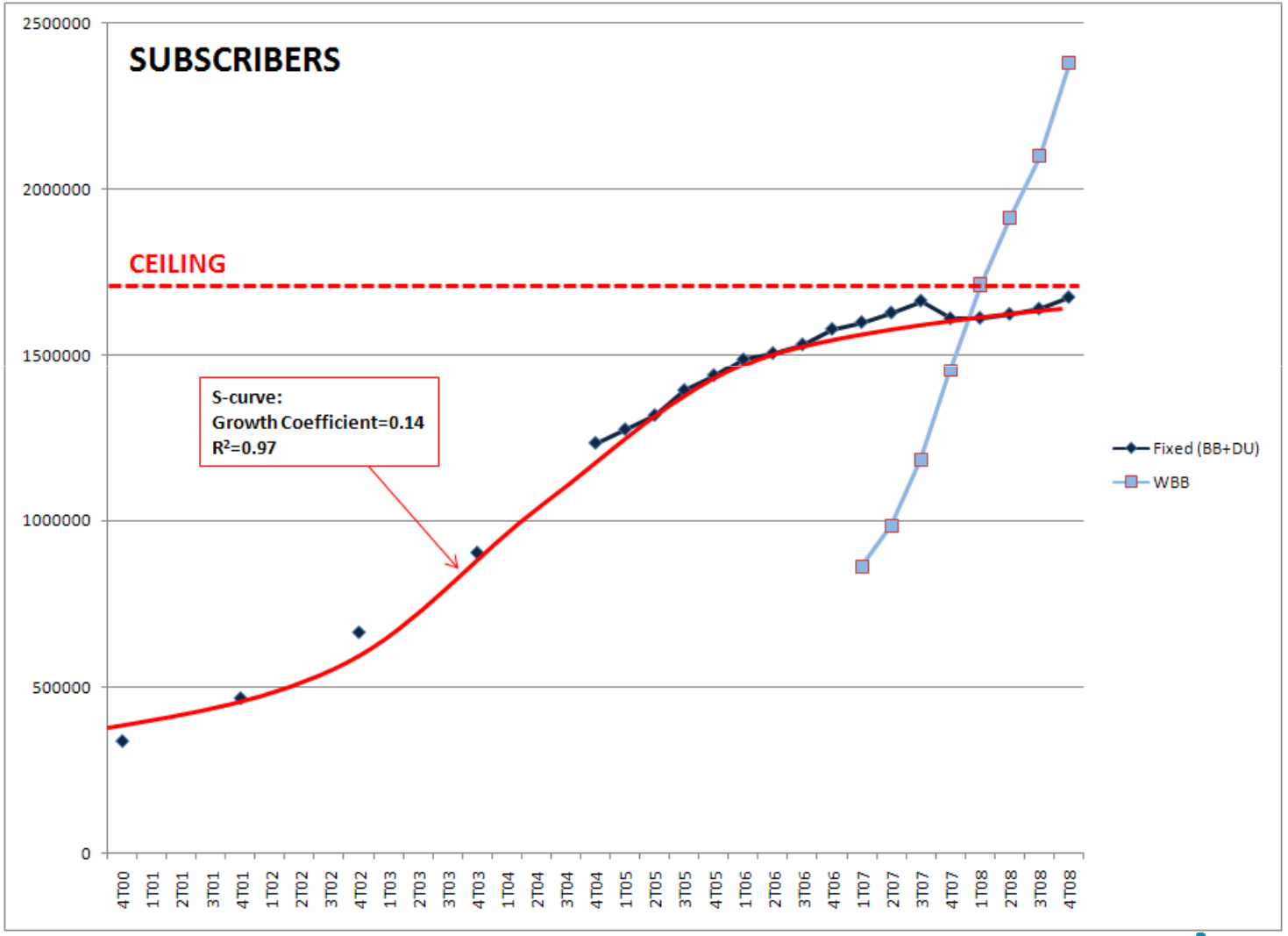
Mobile wireless broaband up take in Portugal (number of subscribers)



Source: ANACOM

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

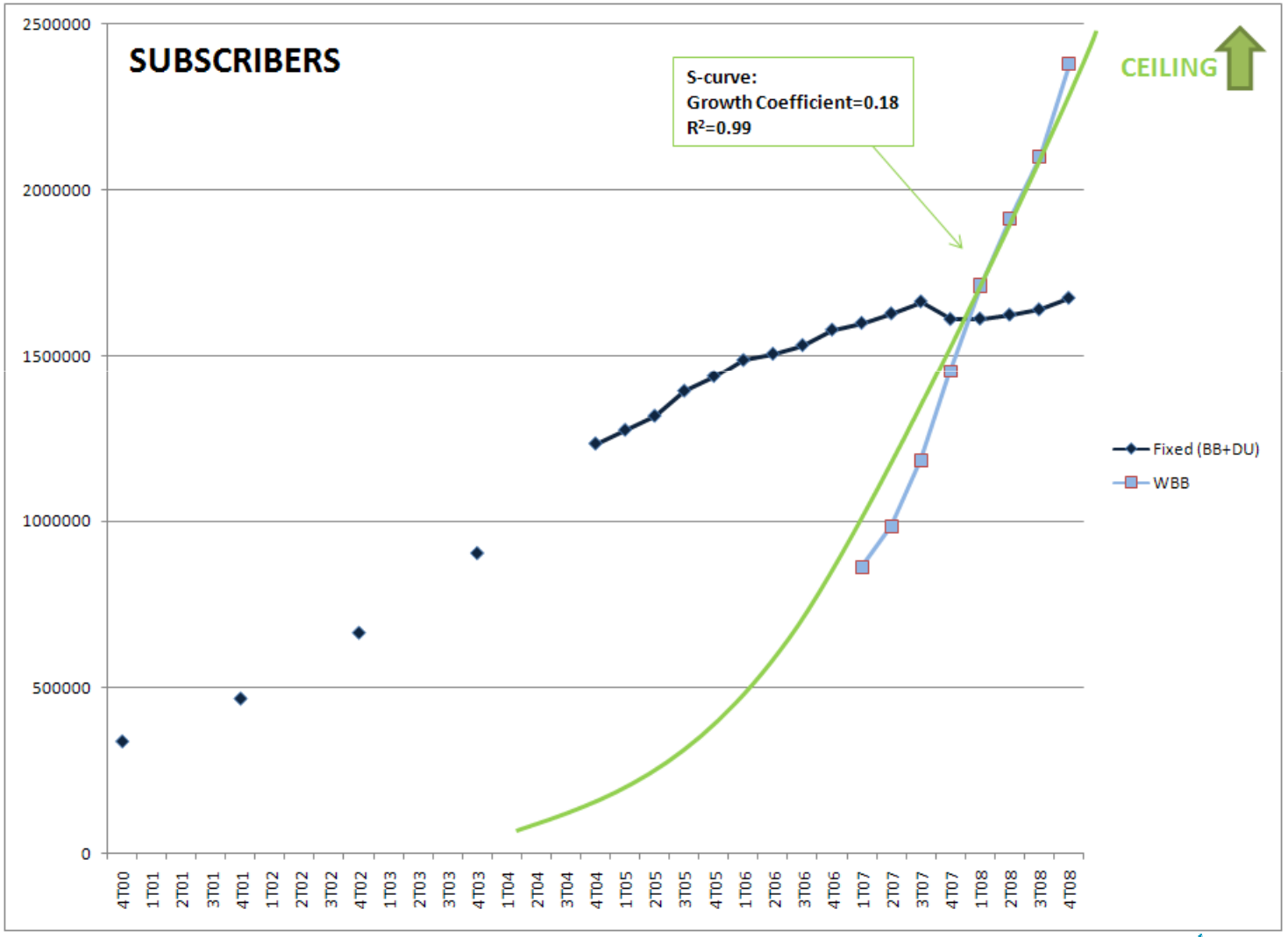
Fixed broadband access flattening out in Portugal?



Source: ANACOM

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

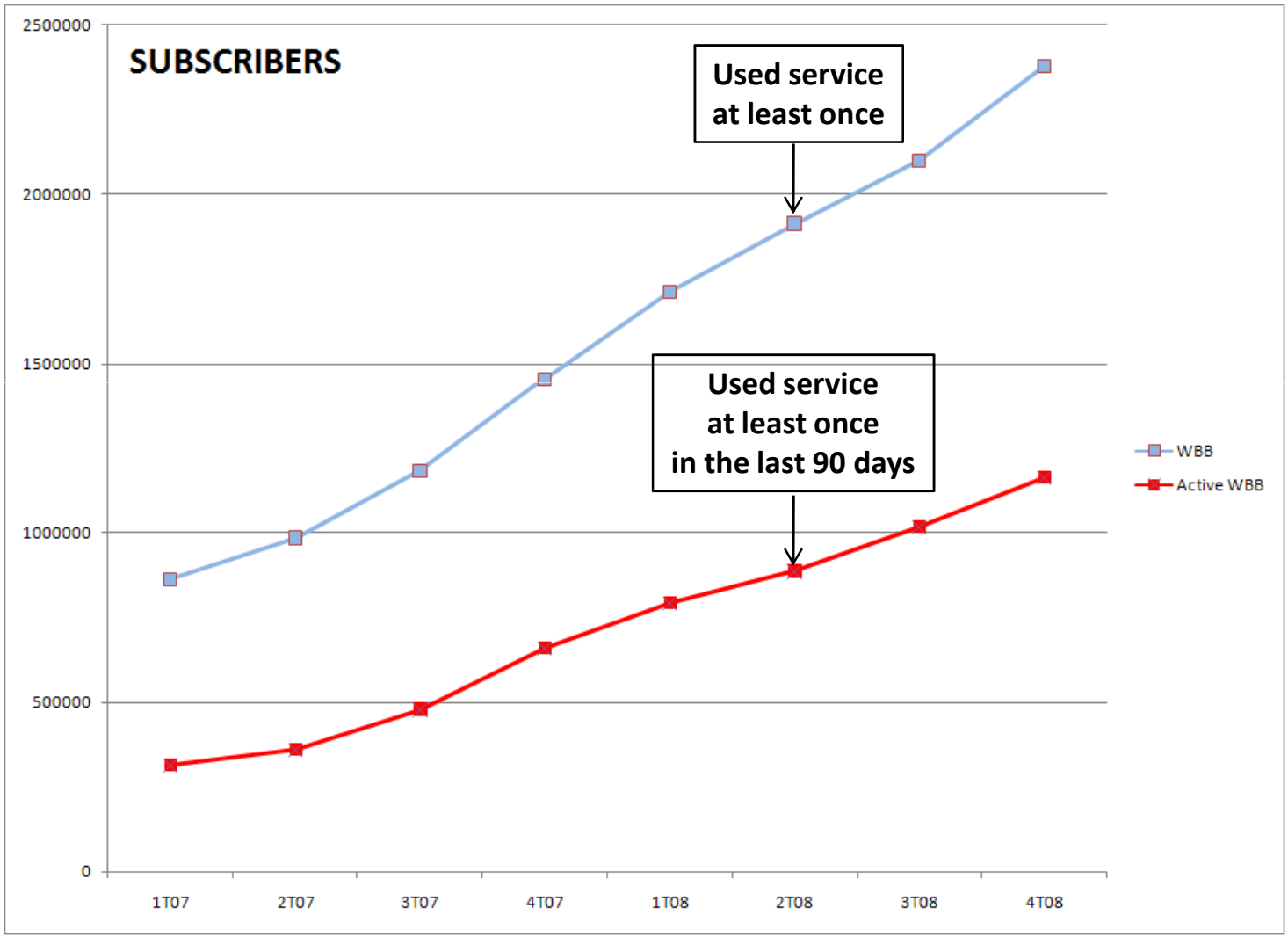
Mobile wireless broadband rapidly increasing in Portugal?



Source: ANACOM

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

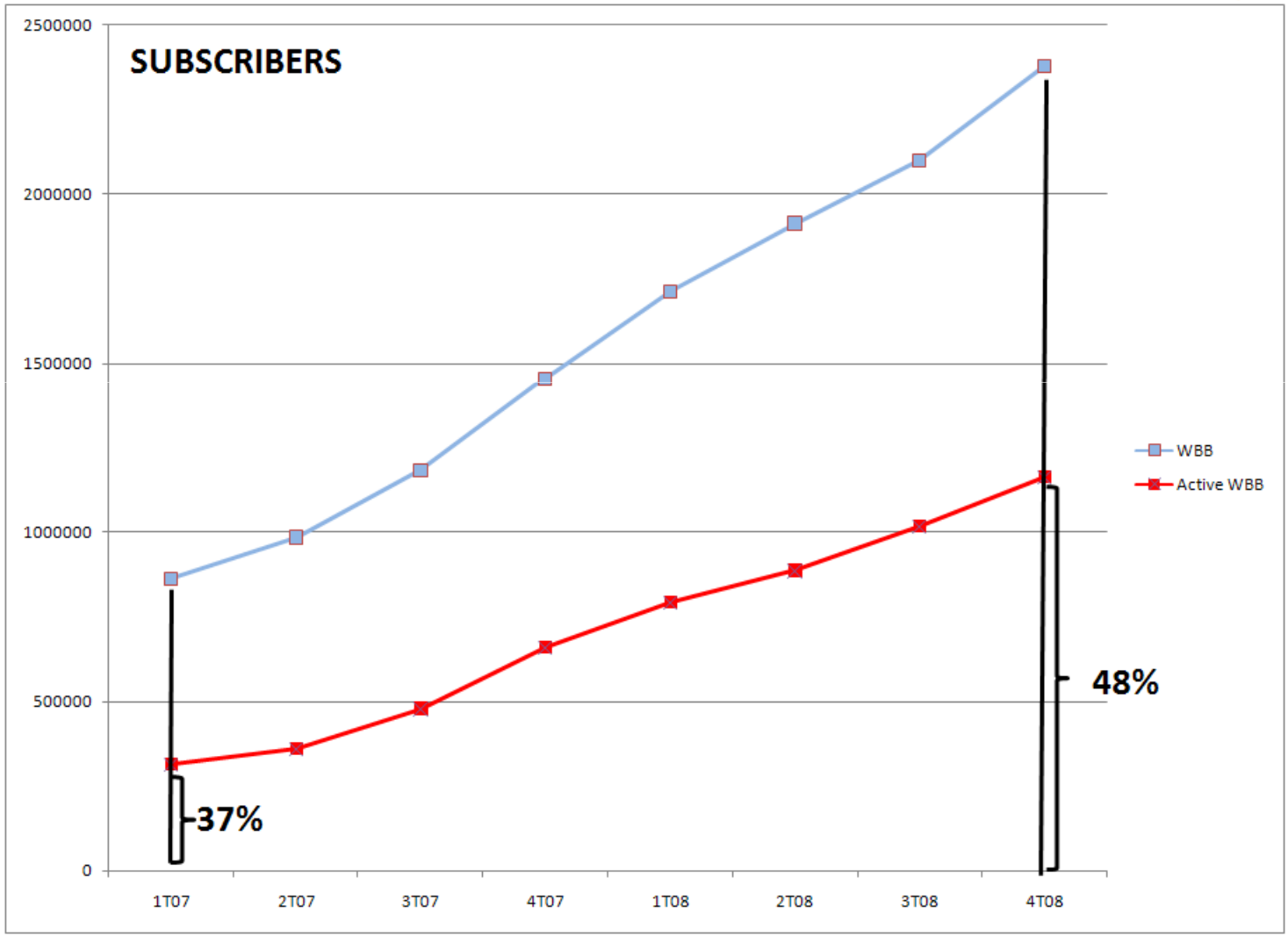
Subscribers vs. active users (mobile wireless broadband in Portugal)



Source: ANACOM

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

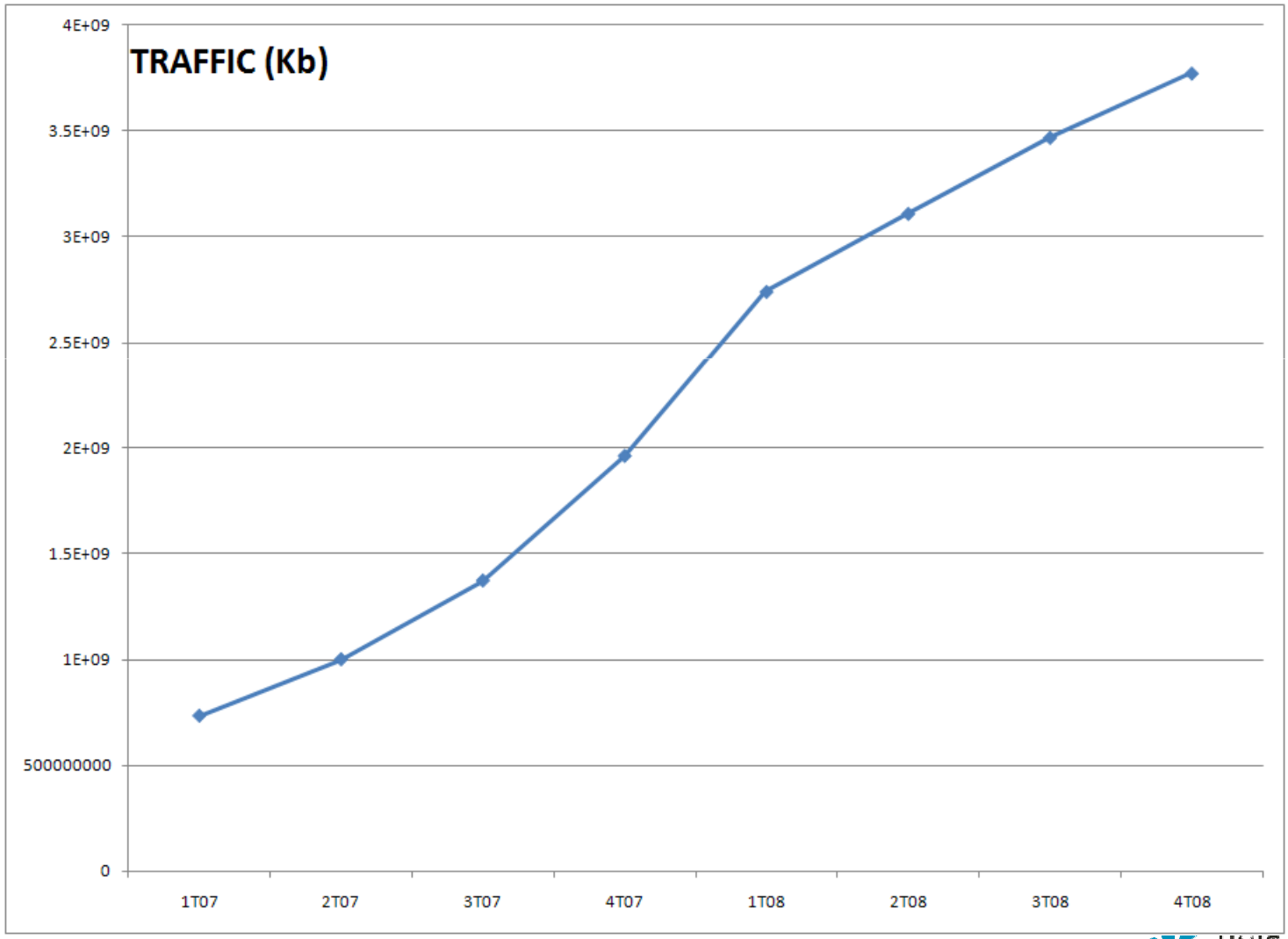
Subscribers vs. active users (mobile wireless broadband in Portugal)



Source: ANACOM

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

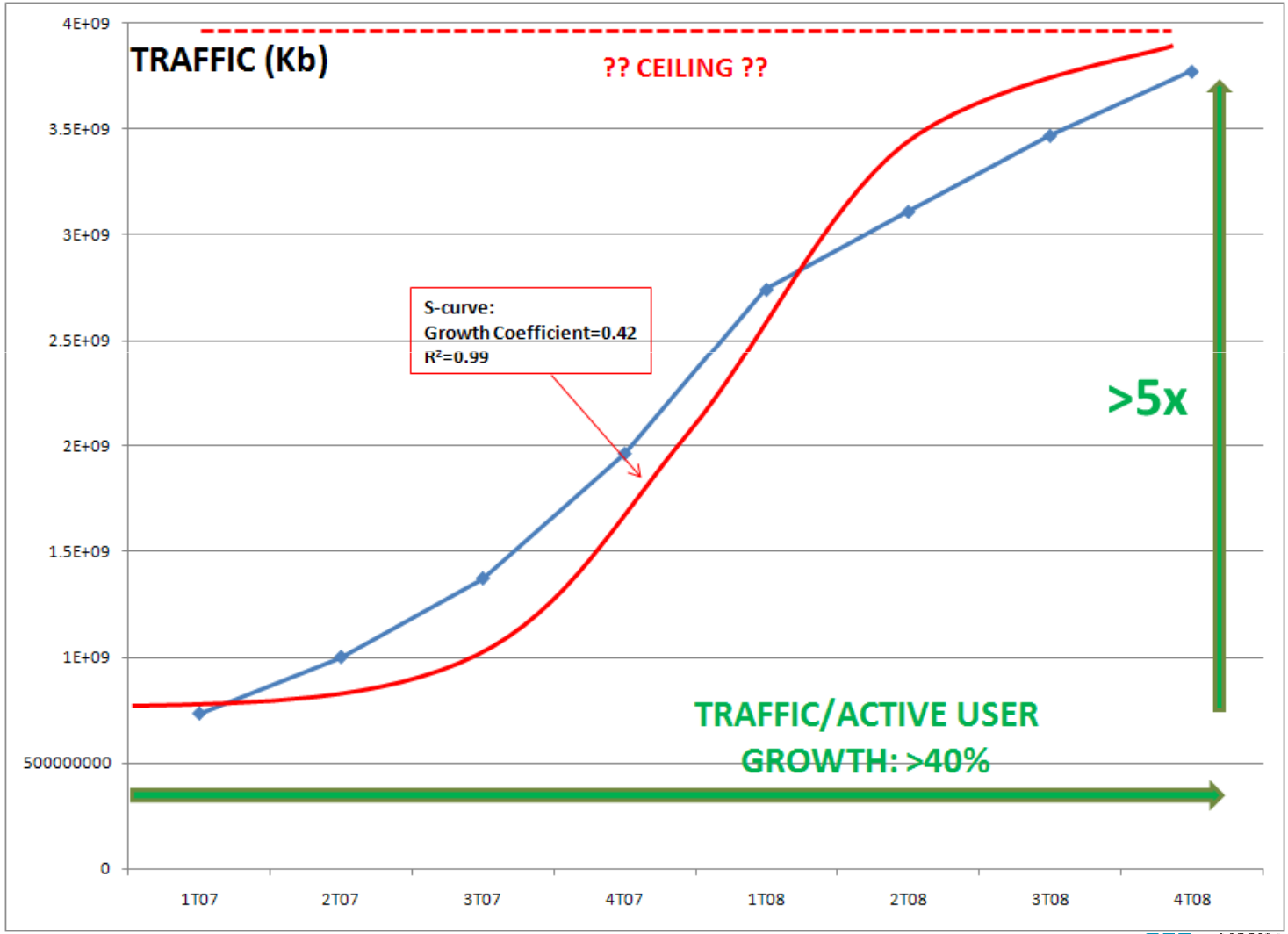
Effective traffic over mobile wireless broadband in Portugal



Source: ANACOM

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Effective traffic over mobile wireless broadband in Portugal

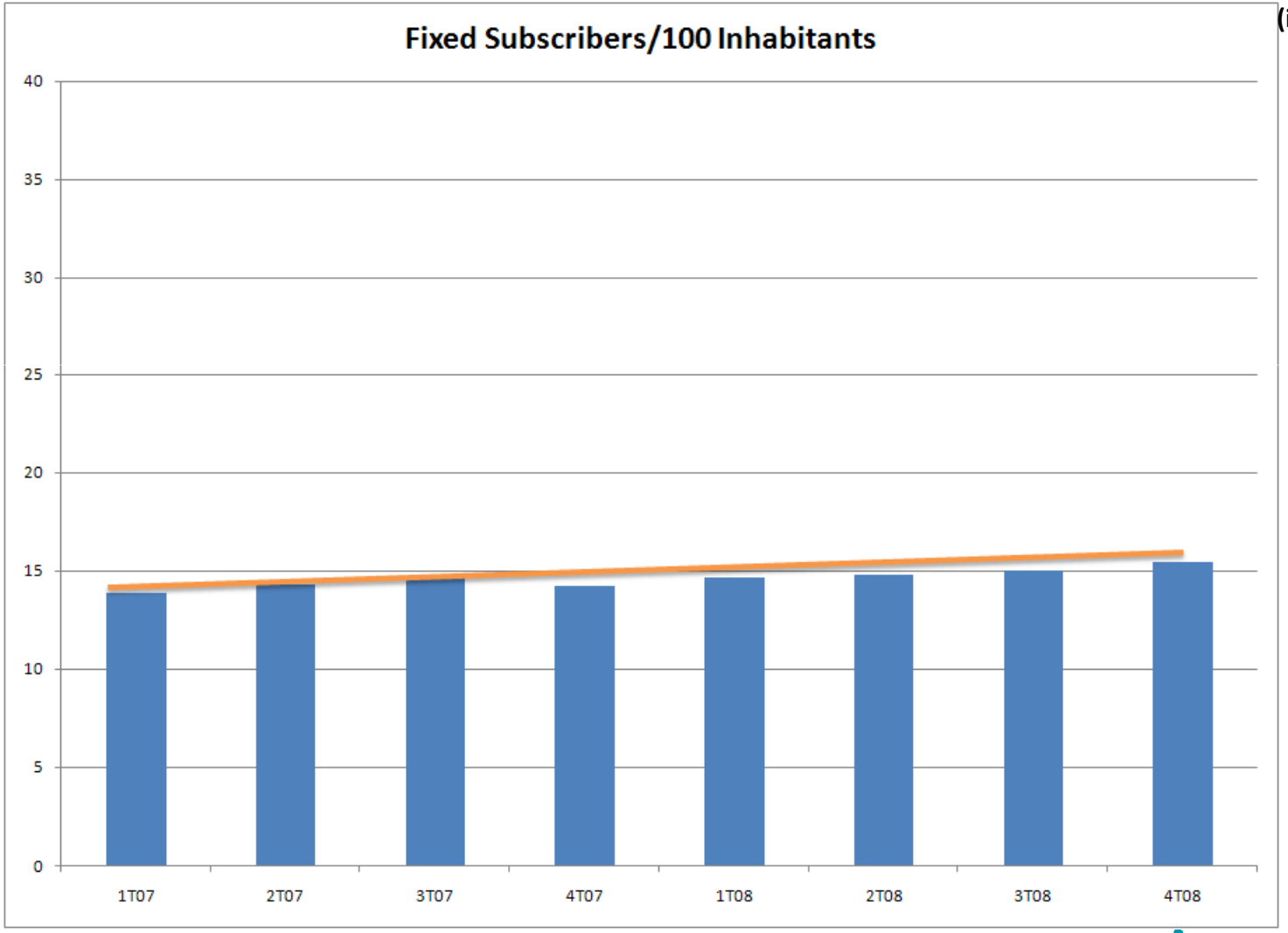


Source: ANACOM

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Can you afford to miss wireless broadband?

(in Portugal)

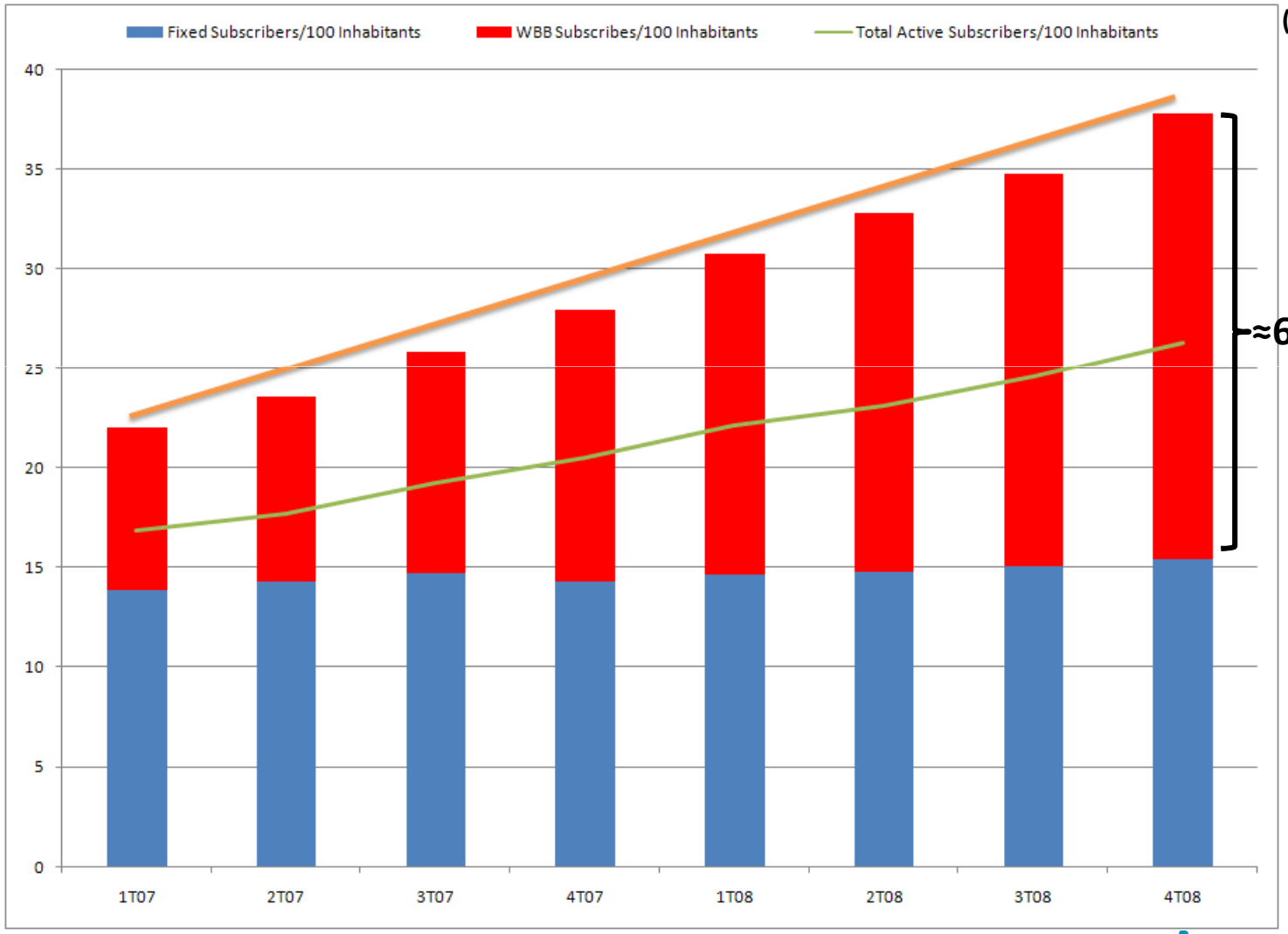


Source: ANACOM

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Can you afford to miss wireless broadband?

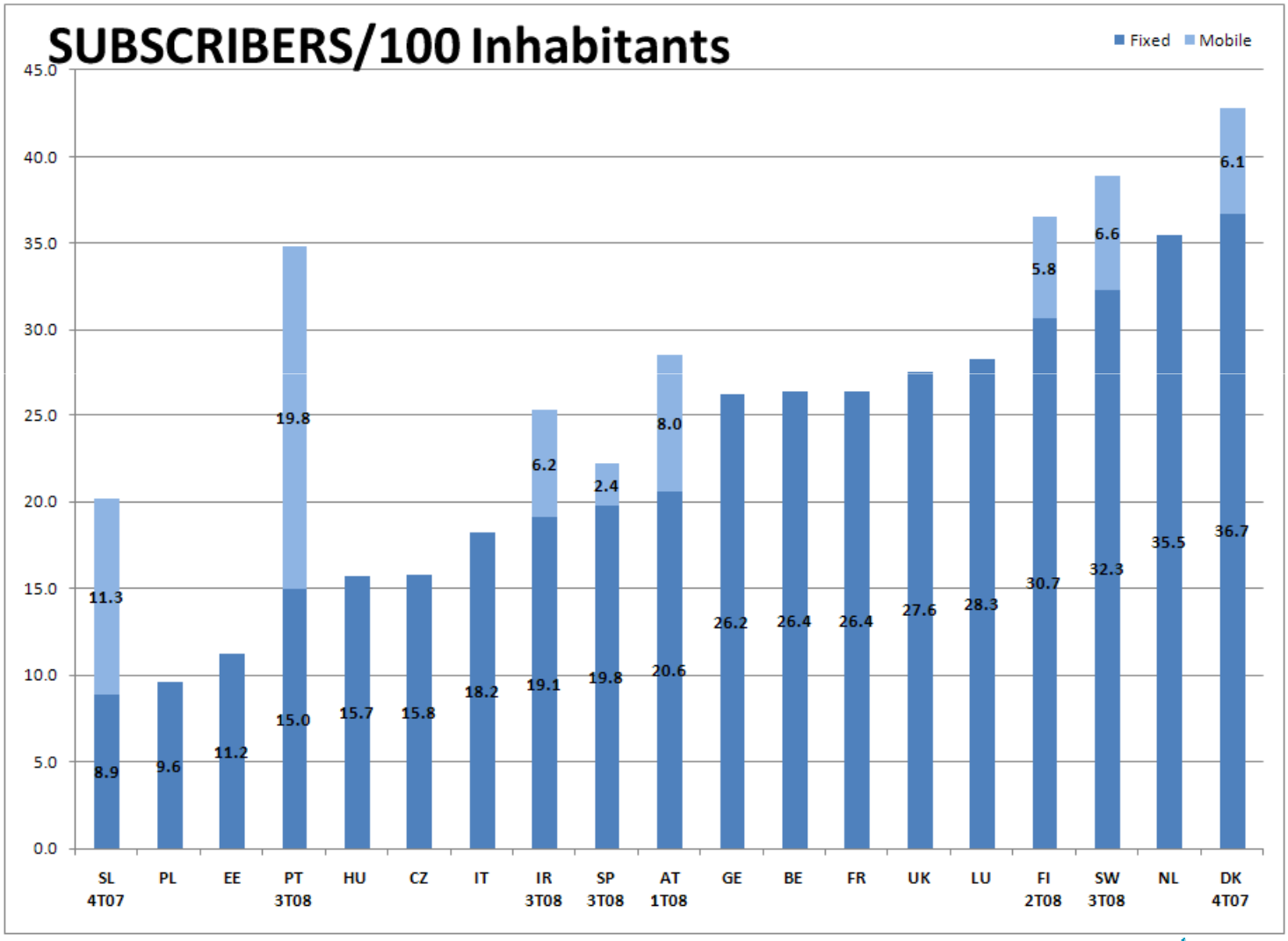
(in Portugal)



Source: ANACOM

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Broadband international comparison



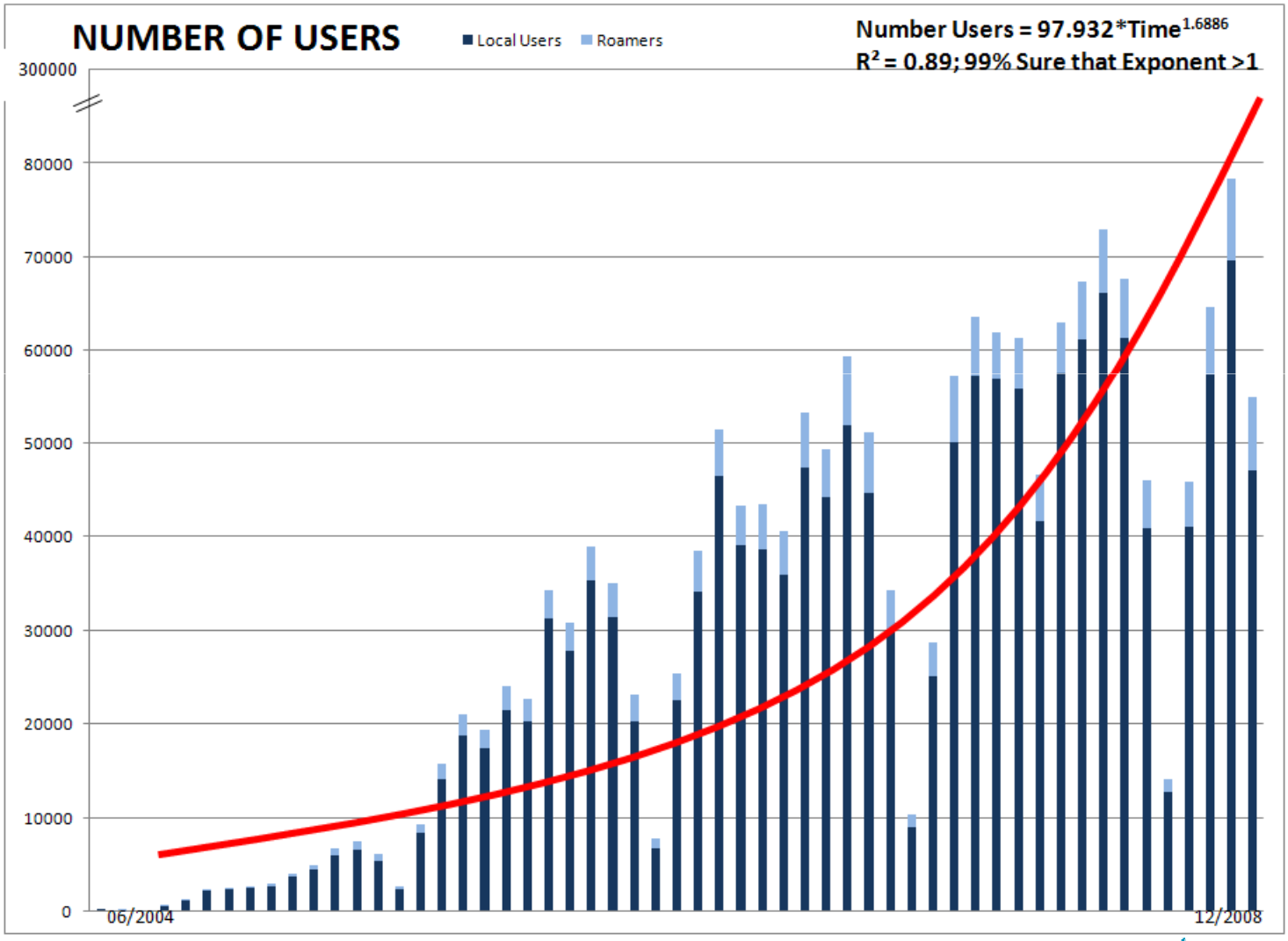
Source: ANACOM

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Up take in Higher Education institutions: The e-U Project in Portugal

- **e-U:**
  - All Higher Education institutions in Portugal are wireless campi: they provide wireless broadband access through multiple access points in a WiFi fashion to students, faculty, staff and guests from other institutions.
  - All wireless campi are then connected through into a unified national “Virtual Campus” system through roaming. Users of one Higher Education institution can seamlessly use the wireless network in another institution.
  - Looking at the campi of Higher Education institutions can provide good insight about what the demand of future generations for ICTs can look like.

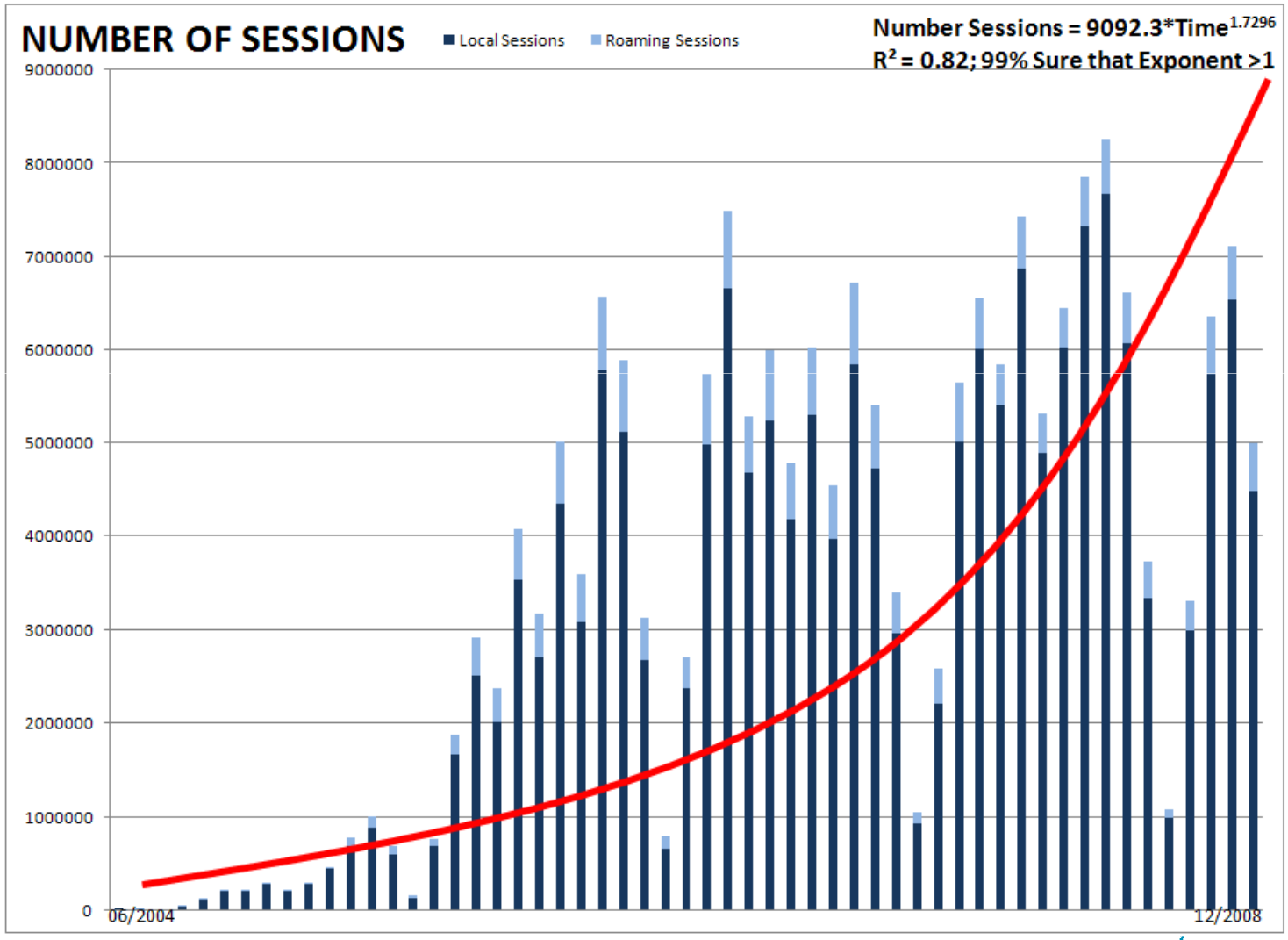
e-U up take (number of users)



Source: UMIC/FCCN

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

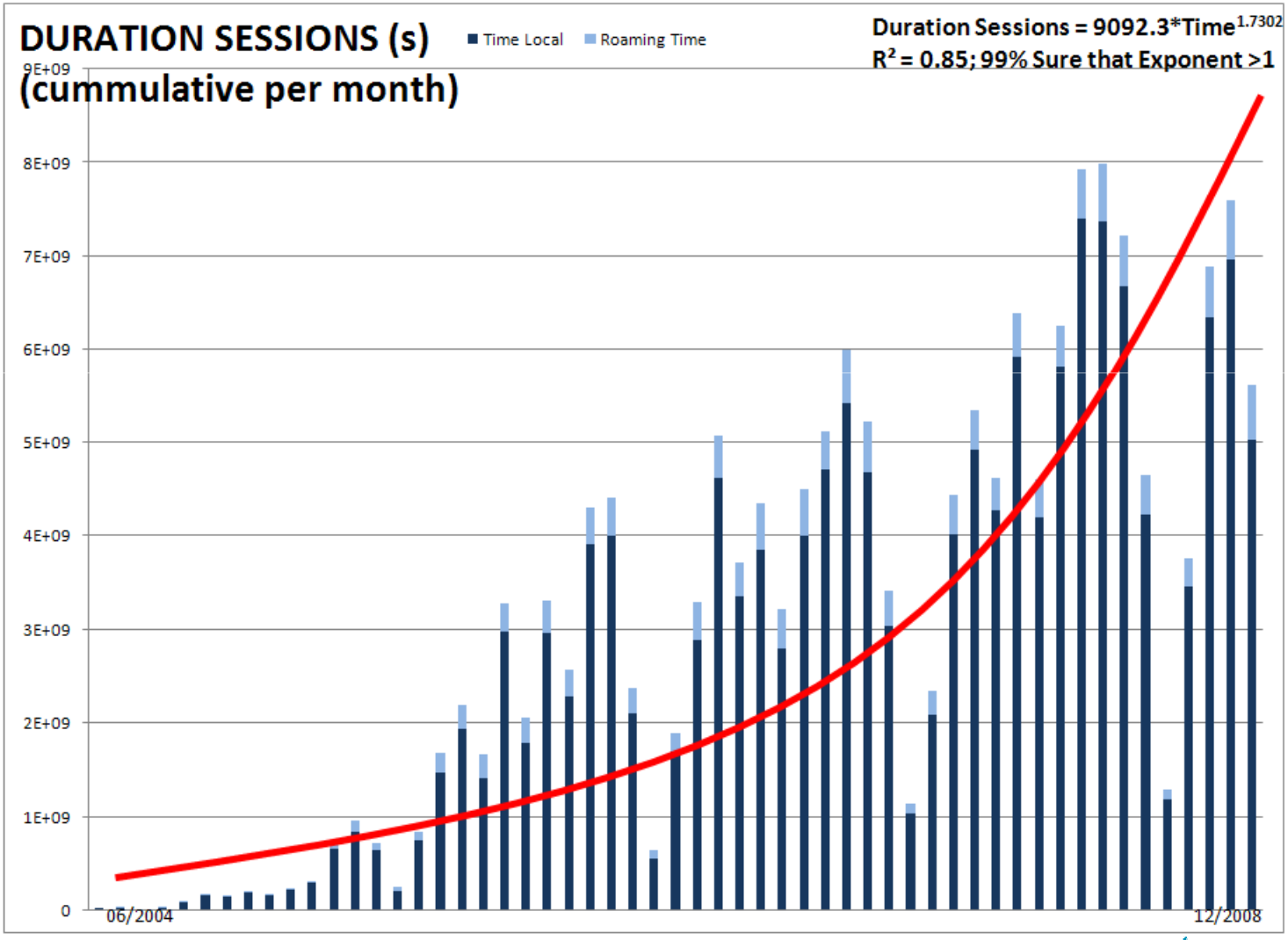
e-U up take (number of sessions)



Source: UMIC/FCCN

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

e-U up take (usage time)



Source: UMIC/FCCN

UMIC
Agência para a Sociedade do Conhecimento
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Conclusions

- **Mobile wireless broadband:**
  - took its time to fly
  - reaches penetration levels similar to fixed technologies faster
  - is here: acknolwedge it through proper measurement
  - is both a complement and substitute for fixed broadband access
  - and fixed broadband access are very seldom used at the same

- **In Portugal:**
  - While fixed broadband access seems to be flattening out, mobile wireless broadband exhibits spectacular growth and surpasses the former
  - Mobile wireless broadband aims at ubiquituous coverage and thus can help realize Universal Service policy
  - Mobile wireless data traffic rose more than 5 (five) times since regular measurement takes place by ANACOM (January 2007)
  - Half of the users with 3G mobile devices use broadband on a regular basis, their data traffic rose more than 40% per active user (since January 2007)
  - The gap between subscribers and regular users is not widening in relative terms, but traffic might be flattening out
  - One needs policies targeted at generating and using handheld-friendly content and at incentives to use mobile broadband, such as “e-schools”, “e-professors” and e-U
  - Data traffic over mobile wireless broadband network in Higher Education university campi exhibits even higher growth rates

Conclusions

- **Ignoring mobile wireless broadband:**
  - Provides only half of the picture of Internet brodband access in most countries where data is available
  - Is very misleading in the more rural countries, where wireless broadband plays more of an important role
  - Is like undoing the discovery of a technology that helps bridge the digital divide

- **In general:**
  - Advanced generations of sensor networks will increasingly resort to mobile wireless broadband communications
  - Mobile wireless broadband activity can be/already is measured, just needs some homework done
  - Mobile wireless broadband is a new phenomenum that deserves deeper study

Thank you!

- Presentation available from www.anacom.pt

- Questions, comments can be directed to:
  - Pedro Ferreira at pedro.ferreira@umic.pt