

The “long and Winding” road to 4G

Dave Wisely

May 2006 – VTC Melbourne



BT's main research site - Adastral Park



one of the highest concentrations of technologists in Europe.

110 acres
5000 + people



Futurology – science or tea leaves?



Say it with words.

Make someone happy with a phone call.

POST OFFICE TELEPHONES

TRUNK CHARGES
(for 3 minutes conversation)
FROM LONDON 7 AM TO 2 PM.
AFTER 2 PM THE CHARGES ARE REDUCED BY ABOUT ONE QUARTER, AND AFTER 7 PM BY ABOUT ONE HALF OF THE MORNING CHARGES.
The three charges are shown on the map class - FURTHER DETAILS WITHIN.

KEEP IN TOUCH

Post Office Radiopaging System

History of Mobile (in 1 minute!)



And on the second day there was radio:

- 1906 - Marconi Transmits using radio
- 1925- Wireless Telegraphy
- 1956 - First mobile phone system (0G)
- 1980 - Analogue systems launched (1G)
- 1990 - GSM launched in Europe (2G)
- 2001 - BT launch UMTS on Isle of Man (3G)
- 2012 - ?



Mobile generations “appear” every 10years



VTC Melbourne 2006 - Copyright British Telecommunications plc 2005



History of Mobile (in 1 minute!)



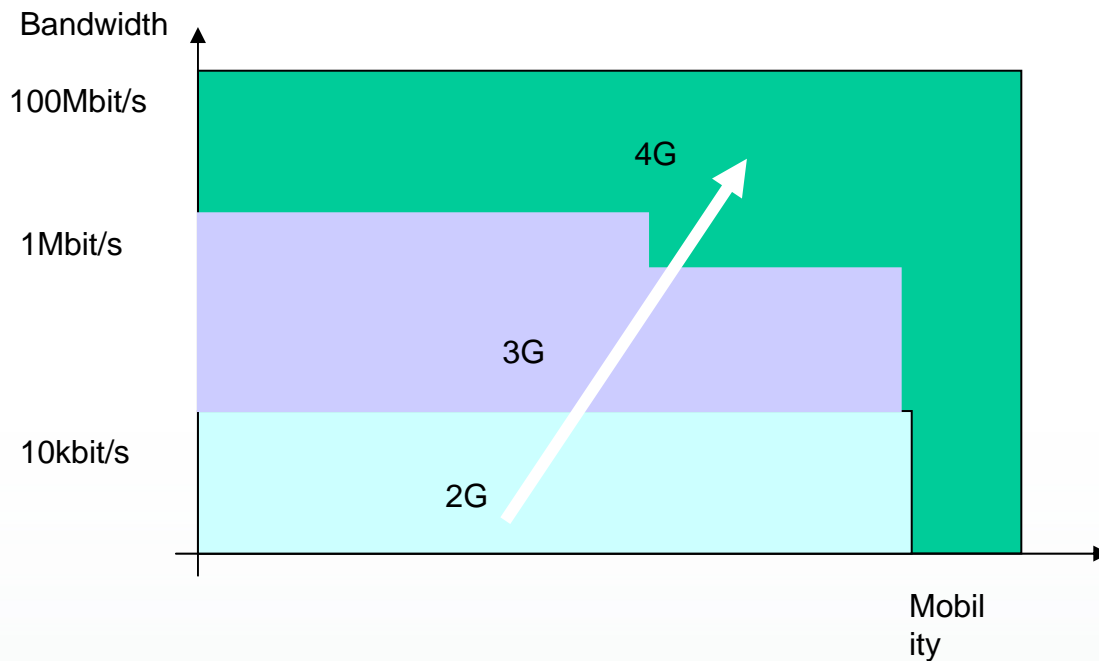
And on the second day there was radio:

- 1906 - Marconi Transmits using radio
- 1925- Wireless Telegraphy
- 1956 - First mobile phone system (0G)
- 1980 - Analogue systems launched (1G)
- 1990 - GSM launched in Europe (2G)
- 2001 - BT launch UMTS on Isle of Man (3G)
- 2012 - ?



→ Do we want to play the “Generation Game”?

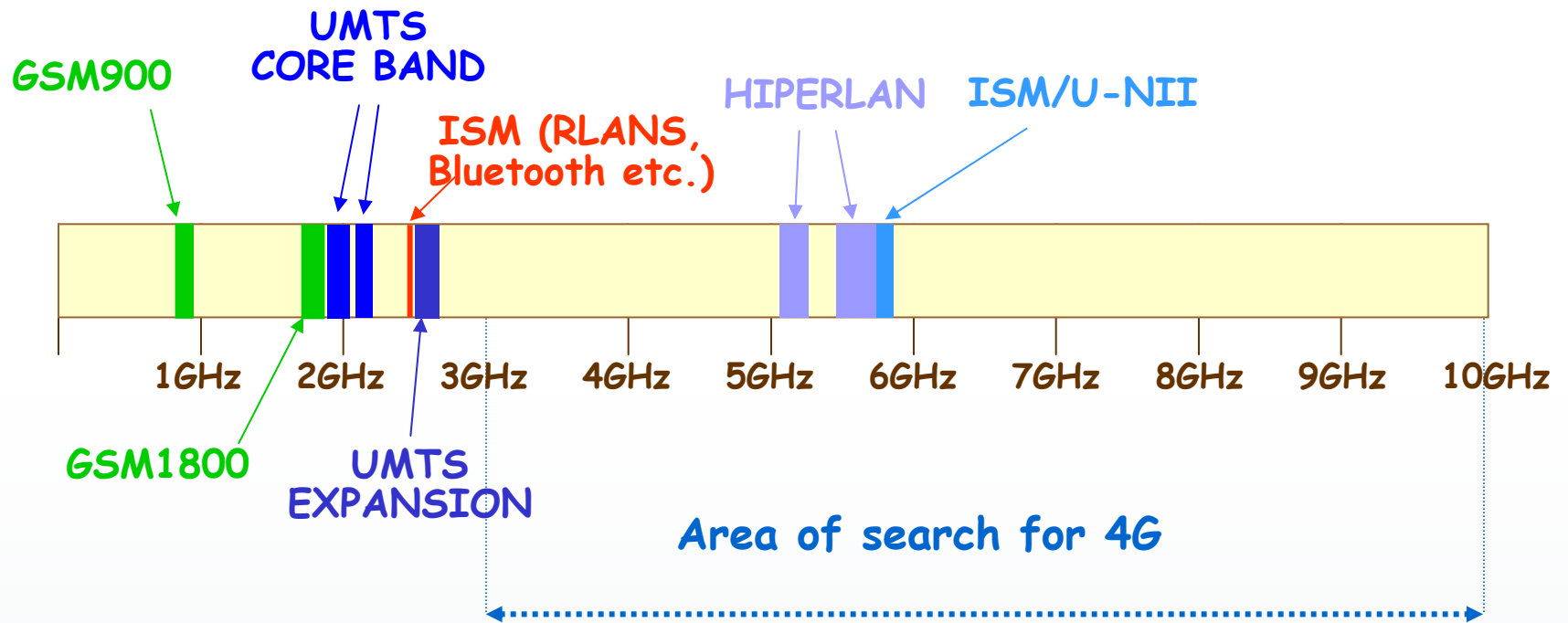
ITU Vision – 4G a new air interface – speed and more speed!



Nortel's vision of 4G is of an asymmetric cellular air interface, delivering data rates up to 20 Mbit/s (with a total downlink capacity of 100 Mbit/s per cell)

- SG Cowen predict that 4G will be based on OFDM technology, delivering up to 10 Mbit/s on the downlink.

NTT DoCoMo 4G Spectrum requirements



Amount of spectrum needed for 4G (DoCoMo)

1500MHz

Compared with current spectrum (~1253MHz)



$$\text{Capacity (sessions/km}^2\text{)} = \frac{\text{BS density (/km}^2\text{)} * \text{Bandwidth(Hz)} * \text{efficiency (Bits/Hz)}}{\text{Bandwidth of session (Bits/session)}}$$

How do you use 100Mbit/s on the move?



Is WiMAX/WiBro 4G?



'04	'05	'06	'08
			
1 st Intel Silicon	Mainstream Deployments CPE / basestations	Notebook Integration	Handset Integration

“WiMAX will deliver 100 Mbit/s to a user over 50 km”



Maybe 4G is about services?



- **What is 4G**

- Is it a **technology** - WiMAX, WiBro

- Or

- Is it a **set of services**

- Is fixed and mobile convergence the way forward

- Then if it is – are we saying - WiMAX **the** technology

- Or is it **a** technology along with fibre, Broadband etc

Where does the customer fit in all this ?

Our business is about serving customers, so 4G needs to be about services.....



Possible 4G services



Call identification
& messaging

Business lifestyle
services

Service directory
enabled calling

Ring back tone

Enhanced
communications
experience

Lifestyles



Personalisation

Secure portal
services

Payment &
identity services

Entertainment
services; gaming

Entertainment
services; video &
music

4G – Maybe it's about convergence?



Broadband, Wi-Fi, WiMAX,

Fixed
Quality & Reliability
Cost
Bandwidth

Mobile
Convenience
Personalisation
Mobility



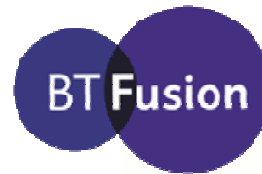
PSTN, GPRS, 3G, GSM

•“4G will sum up the next steps towards expectations, which were left over by 3G ... (including) seamless access via different networks, including wireless LAN” - Alacatel

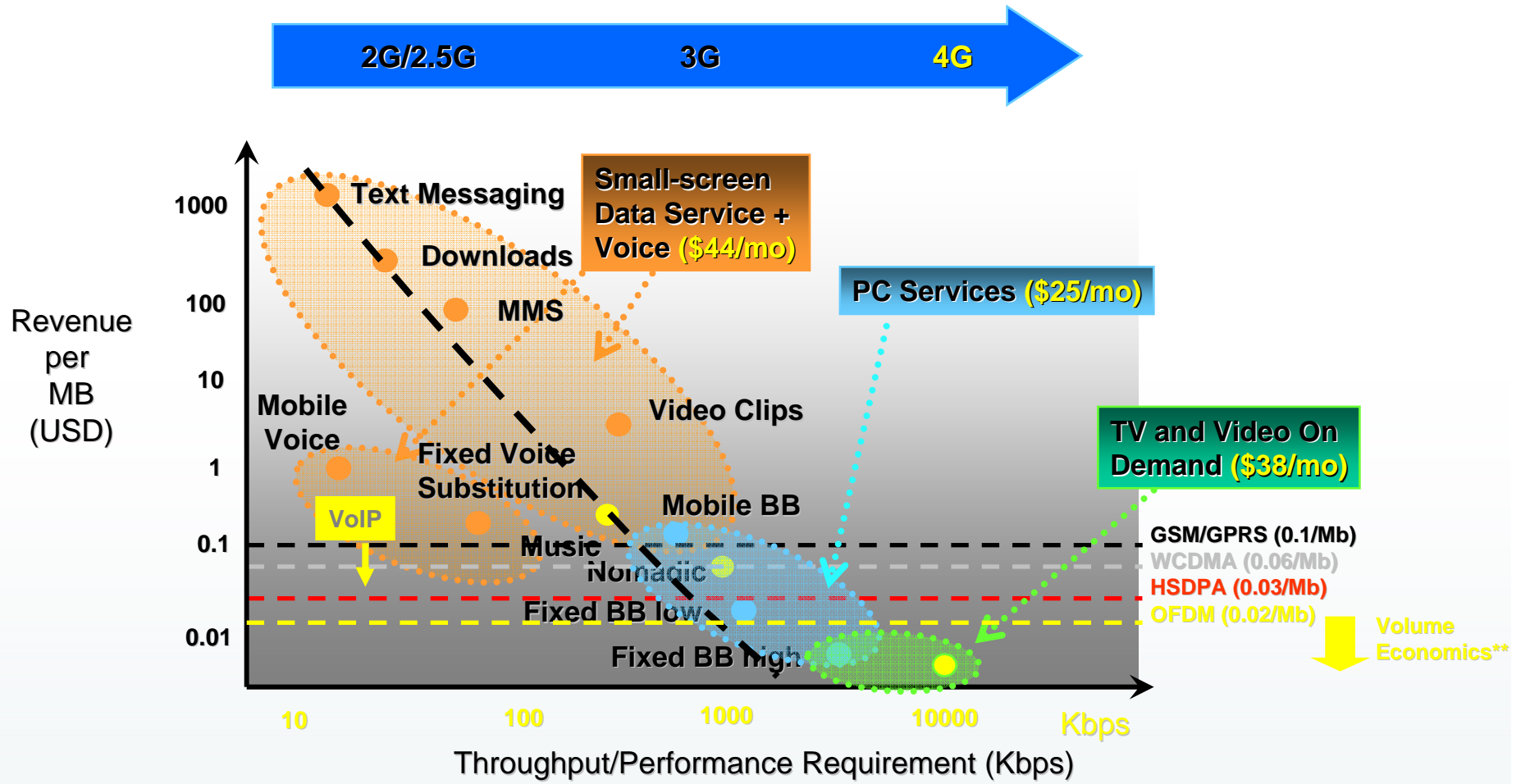
BT Fusion - The Best of Both Worlds



- BT landline **rates** when you are at home or office
- Competitive **mobile** bundled minutes when you are out and about
- **Free** BT Fusion Motorola v560 phone
 - **Stylish**, compact flip phone design with large, vivid colour display with video and camera
- **Free** BT Hub to wireless network your home



Maybe it's about money?



Source: Analysis Research 2004,
 **Intel - illustrative only

So what is 4G?



4G is NOT about

- Voice
- Single access technology
- One class of handset
- High bandwidth
- One block of spectrum
- Technology

4G is about

- All IP services
- Multiple access technologies
- Variety of terminals
- Range of bandwidths
- Whole EM spectrum
- Customers?

➔ 4G Unifies spectrum, access technologies, services... to provide seamless connectivity at low cost.

Thank You

