

TV to Mobiles: Many Solutions for many Scenarios

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**BUT THE FOLLOWING IS A PERSONAL
VIEW**

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Why broadcast technology?

- It is a question of scale
 - A 3G cell of 300 m diameter in an urban area can, depending on the codec, support approx. 110 simultaneous calls at 13 kbps
 - Video needs at least 100 kbps
 - 14 people could receive mediocre quality video in the cell if no phone calls are allowed

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UK Standards Battle?

DVB-H v T-DMB v MediaFLO

- Hard facts:
 - T-DMB (TV over DAB) occupies 1.5 MHz of spectrum
 - DVB-H transmissions take up 5 MHz and 8 MHz
 - DVB-H gives 4Mbps or 5Mbps useful payload (20 good quality video channels)
 - T-DMB useful bit rate is less than 1 Mbps (8 or 9 video channels)
 - MediaFLO is commercially deployed in the US, where it uses one nationwide analogue TV channel to deliver up to 19 QVGA (320x240 pixels) real-time streams at 30 frames per second, alongside stereo audio and short streamed video clips.
 - MediaFLO is used in the 700MHz band like DVB-H
- This tells only part of the story
 - The reality of the trials in the UK is more informative

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T-DBM and DAB-IP

- In the UK TV over DAB has first been trialled in the form of DAB-IP rather in the form of the globally more familiar T-DBM
- BT Livetime uses part of the DAB Multiplex
 - The 20% allowed for data on the UK Digital One DAB multiplex (approx 200 kbps)
- Korean T-DMB is a modified DAB system using the whole of the DAB channel for broadcasting video

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DVB-H and DAB-IP trials in the UK

- In Sept 2005, 350 O2 subscribers in Oxford area using adapted Nokia 7710 handsets had access to 16 TV channels. Arqiva (formerly NTL broadband) built a network of 8 DVB-H transmitters that transmitted in the UHF/VHF band.
- In Jan 2006, BT released the results a six-month mobile TV pilot in the M25 area. 1,000 Virgin Mobile Customers with smartphones from Taiwanese company HTC had access to 7 TV channels and 50 digital radio channels. BT Movio, the telco's division set up for mobile TV, used the DAB broadcast technology (DAB-IP)

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MediaFlo trial to take place in the UK

(ZTNet UK News)

- UK satellite broadcaster BSkyB is to evaluate Qualcomm's MediaFLO digital mobile TV technology.
- In trials later this year, BSkyB and Qualcomm will use a vacant UHF TV channel in the Cambridge area to broadcast 10 live TV channels to around a hundred customised mobile devices.
- Not a commercial test but a checking the technical feasibility of running the MediaFLO system in the UK.
- Any network that decides to use the UHF TV band will have to wait until the analogue switch-off, due to complete in 2012, and bid for whichever segments of the band are put up for auction.

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The BT trial

<http://www.vnunet.com/vnunet/news/2148478/results-largest-mobile-tv-pilot>

- The results showed that the users, who were not charged, watched TV for an average of 66 minutes a week. They listened to over one and a half hours of digital radio a week.
- Content was supported by an Electronic Programme Guide
- The service had an interactive element where users could register opinions or order a particular song for download.
- The service was delivered by BT Livetime over the existing DAB network
 - BT Livetime service was provided by BT in association with commercial radio provider GWR

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A response to the BT trial?

(<http://www.heise.de/english/newsticker/news/73652>)

- Live mobile TV broadcasts were aired during the World Cup to DVB-H enabled devices from BenQ, Motorola, Nokia, Sagem and Samsung in Germany's four largest cities, in a pilot project run by the German mobile network operators E-Plus, O2, T-Mobile and Vodafone.
- During the pilot project 16 TV channels and six radio channels were accessible.
- The mobile TV pilot was based on DVB-CBMS open standards.
- With a suitable device users can set reminders to watch their favorite TV programs, create personal channel lists and subscribe to TV channel packages.

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T-DMB and DAB-IP trial

(ZDNet UK News and DigitalTVGroup)

- In June 2006 a six-month trial of Terrestrial Digital Multimedia Broadcasting (T-DMB) and Internet Protocol over DAB (DAB-IP) broadcast via digital audio broadcasting (DAB) spectrum covering the London area was announced. The trial comes ahead of the expected release of Band III spectrum later this year and L-Band spectrum in early 2007 and is the result of collaboration between the UK and South Korea.
- Mobile TV content will be provided by BBC News 24, EMap, ITV, Cartoon Network and Teachers' TV. The UK and Korean partners participating in the trial are Unique Interactive, Arqiva, GCap, BBC, BT Movio, iPark London, RadioScape, Factum and Virgin Mobile, the Korean Ministry for Information and Communication, LG Electronics, Samsung, Pixtree and Ontimetek.

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Interactive TV over DAB

- The trial will investigate are how the receivers perform, content protection, coverage and chipsets. The first, three-month phase will explore the audiovisual side of DMB and DAB-IP, to be followed by a second phase, looking into interactive services, including "red button" functionality and pay-per-view services.
 - Korea has had DMB broadcasts since 2005, with 2 million TV-phones to be sold by the end of this year, while BT is planning to launch a DAB-IP service later this year with Virgin Mobile.
 - The service is expected to cost around £10 per month extra on top of a current contract.

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Spectrum availability in the UK

- DAB's big advantage over DVB-H, is that spectrum is already available via digital radio whereas DVB-H requires an allocation from Ofcom which could have to wait for the switching off of analogue television signals between 2008 and 2012.
- Using an L-Band test and development licence supplied by Ofcom, the latest DAB trial will see a live broadcast of content over DAB from two transmitter sites in London, one at BT Tower, the other at Arqiva's site in Croydon.

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Expected development path in UK

- TV over DAB to be available 2007-2012 with gradual introduction of interactive services
- After the analogue switch off progressive introduction of DVB-H with enhanced interactivity
- Qualification:
 - The significance of there being a number of good technical solutions is that it will probably all come down to good business skills in the end.
- Potential pitfalls
 - MediaFLO
 - Move from TV over DAB to DVB-H could start to look like the 2.5G to 3G transition

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World's first commercial DVB-H services

- On 27 April 2006 Italy's 3 Italia launched the world's first commercial DVB-H service using the LG U900 DVB-H and Samsung P910 DVB-H cell phones
- In August Italy's TIM Launched a commercial DVB-H service using the Samsung SGH-P920 DVB-H cell phone
- Both phone types have DiBcom chips inside
(<http://www.tim.it/consumer/o10239/promozione.do>)
(<http://www.la3tv.it/la3Live/>)

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Cost of DVB-H Network roll out

- *Mediaset spent \$321.7 million rolling out the DVB-H network.”*
- *“3 Italia is not joining forces with the group but building its own network instead, estimating costs at €220 million for the network.”*

*Wall Street Journal
June 1, 2006*

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LG DVB-H "Mobile TV" Phone (La3)



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Samsung DVB-H "Mobile TV" Phone (La3)



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Samsung DVB-H "Mobile TV" Phone (TIM)



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Other competing standards

- Japanese ISDB-T system (a DAB derivative) uses one frequency segment out of 13 in a 6 MHz channel for mobile broadcasting indicating ISDB-T for mobile is quite similar to T-DMB, in terms of the transmission end.
- Don't forget Aloha!

Universal Broadcast Modem (ZDNet UK News)

- In May 2006 Qualcomm announced that it is working on what it dubs the Universal Broadcast Modem (UBM) chip. It will support three rival mobile TV standards, DVB-H, ISDB-T and MediaFLO. However, it will not support T-DMB.
 - The modem will be compatible with 3G devices based on CDMA2000 1xEV-DO or W-CDMA/UMTS and is scheduled to reach production in early 2007.

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Keys to understanding MobileTV

- Must not compare apples and pears
 - DVB-H is cost effective but not if the right spectrum is unavailable
 - Best used in the 700 MHz band (prime real estate)
 - DAB is a global standard which huge European investment behind it and TV over DAB can co-exist with DVB-H to Europe's benefit
- Need to view standards as drivers not absolutes
 - Witness the distinction between Wi-Fi and IEEE 802.11
 - Differences are often only in the physical layer
 - MediaFLO [Media Forward Link Only] was developed to promote the CDMA cellphone technology developed by Qualcomm.

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DVB-H is a moving target

- DVB is trying to fit DVB-H into a smaller channel slot so it could be delivered using e.g. a pair of DAB channels in L band
- The UK Digital One DAB multiplex to be used for TV over DAB operates in band III
 - The density of cells (transmitters) required in L band is approx 20 times higher than in band III and more processing is required to counter enhanced Doppler effects.
 - Crown Castle wants to use DVB-H at around 1.6 GHz

We are focussed on one facet of a future all IP world

- Need to bring WiMax into the picture
- Aloha is promoted in the US as a mobile broadband Internet service
 - Based on Flash-OFDM a spread-spectrum technology that uses IP
 - Has the spectrum to reach 175 million customers in the US

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CLOSING REMARKS

- Regularly trawl the Internet for updates on MobileTV
 - ZDNet UK News
 - DigitalTVGroup
- Take a look at
 - www.ist-instinct.org
 - www.ist-partake.org
 - The IEE Review October 2005
 - IEEE Spectrum October 2005

• **THANK YOU FOR YOUR ATTENTION**

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