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# Digital TV & Radio - What's Next



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# Freeview now - DVB

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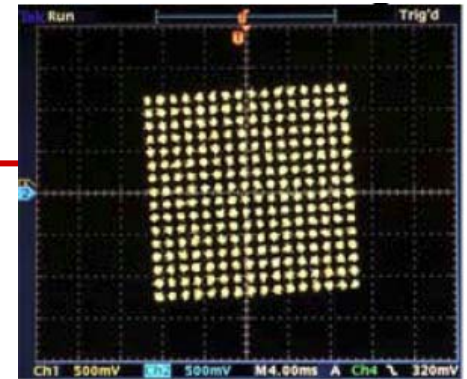


- 1998: ITV Digital used 64QAM and MPEG-2
- 2002: Freeview switched four of the six multiplexes to 16QAM for more robust signals
- Both are part of original DVB standard
  - 1705 subcarriers/COFDM (2k mode, 720x576 pixels)
  - 16QAM Muxes give 18 Mb/s – more robust
  - 64QAM Muxes give 24 Mb/s – more TV channels
- Like for Like, a 64QAM transmission has more TV channels than a 16QAM system but is more vulnerable to interference
- **At Switchover: Greater Tx powers enable return to 64QAM but now on 6817 carriers (8k mode) - some old Sony/ITV chipsets fail**



# Freeview HD and the Future

## DVB<sup>®</sup> T2



- Ofcom refused to 'gift' extra UHF spectrum to broadcasters for HD as they wanted to maximise the Digital Dividend
- Studies showed that new DVB-T2 and a reshuffle could give a limited HD service in time for 2010 World Cup and 2012 Olympics
- **New UK DVB-T2 is 256QAM and 32k mode**  
(and supports 1680x1080 Full HD) for ~36MB/s and uses MPEG-4
- Long guard intervals improve multipath and impulse interference issues and can ease relay planning if SFNs used (like DAB)
- Following trials in London, First full power Freeview HD mux launched from Winter Hill in Dec 2009. Low Power HD is on Crystal Pace - now
- New TVs and Recorders now available with T2 tuners for HD
- HD uses new Chipsets – can't upgrade older equipment
- New Muxes or a future Second Digital Dividend would use DVB-T2
- NB: There is also DVB-S2 for Satellite HD and DVB-C2 coming for cable

# Freeview Multiplexes

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## Pre Switchover:- Six Multiplexes on low power

- Mux-1 (BBC)                      Mux-2 (ITV/C4, 64QAM)                      Mux-A (C5/SDN, 64QAM)
- Mux-B (BBC)                      Mux-C (Arqiva)                      Mux-D (Arqiva)
- and Interim HD BBC, ITV1/STV, C4 - on even lower power! (eg from Crystal Palace)

## Post Switchover (Sudbury – Summer-2011, London-2012)

- PSB1 (BBC-A)                      PSB2 (D3&4)                      PSB3 (BBC-B) – HD
- COM4 (SDN)                      COM5 (ARQ-A)                      COM6 (ARQ-B)

## Potential extras:-

- Local low power TV (eg Channel-M in Manchester on QPSK)
- Extra DVB-T2 HD Multiplex if Lower Dividend Spectrum is bought for TV

# The Digital Dividend

- UHF TV is a series of 8MHz channels
- Band-IV is 470-598MHz & Band-V 598-854 MHz  
plus in the UK Ch69 for PMSE, Ch70 for exempt devices

## Original Plan:-

21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70

### UHF TV Channels:

**BLUE = Retained for TV**

**RED/PURPLE = For Sale**

**Black: 36-Radar, 38-Astronomy,  
69-PMSE (microphones etc)**

**Green: 70-Exempt**

## New Plan:-

21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70

- **Ch61-69, 790-862MHz,**  
**mandated by Europe for new**  
**harmonised mobile comms**

### Re-Planning:-

- 39&40 given to TV to release 61&62
- PMSE moved from 69 to 38
- No more 600MHz radar/astronomy

# Planning for TV Switchover

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## Original TV Aerial Groups:-

- **A: 21-37 Red B: 35-53 Yellow C/D: 48-68 Green**  
**E: 35-68 Brown K: 21-48 Grey W: 21-68 Black (W=wideband)**

## CONSUMER CAUTION

- Wideband 'Digital' Aerials, Preamps etc will get hit by channels released by the Dividend for new mobiles
- Be wary of Euro-HD imports – many are not DVB-T2/MPEG4
- If on London – stick to a Grouped aerial
- Industry hasn't yet re-specified their offerings – oops...
- Plenty of studies indicate issues ahead between new Phones vs TV
- Future TV kit will need to cut out 790-862MHz to avoid problems
- **Freeview-HD logo indicates new DVB-T2/MPEG-4 chipsets**

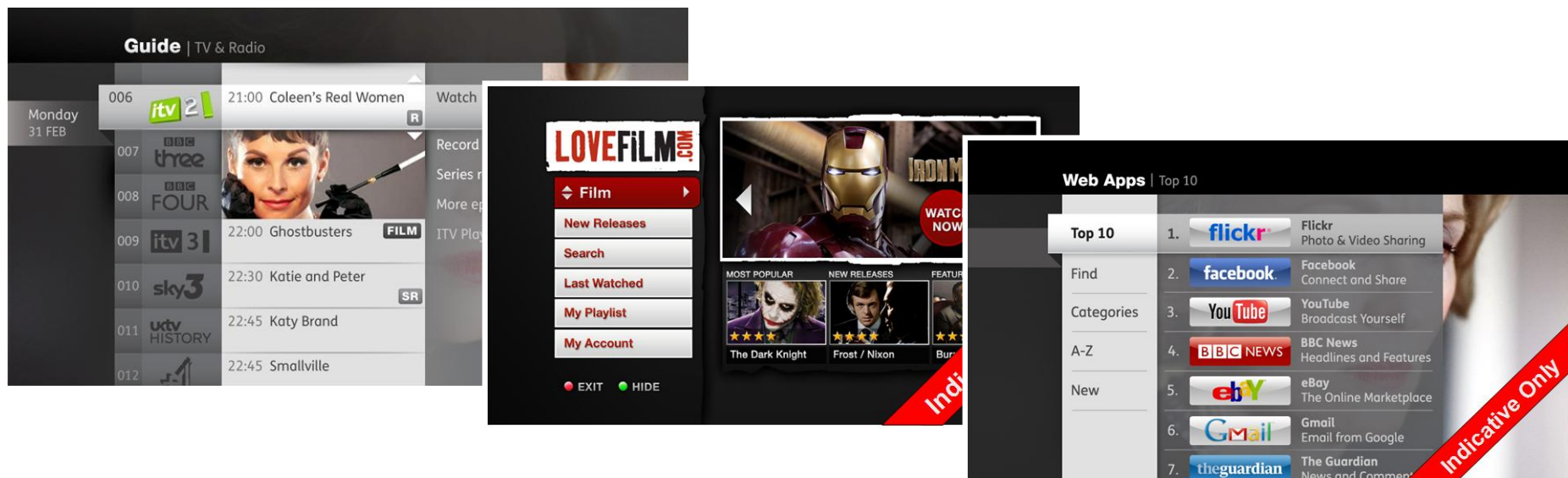


## 3D TV

- 3D uses interlaced frames from higher HD-TV stream frame rates
- Can use passive or active glasses depending on the TV

# Internet TV (IPTV) – PROJECT CANVAS

- Project Canvas is a partnership between Arqiva, the BBC, BT, C4, ITV and Talk Talk to build an open internet-connected TV platform
- Most likely to be called **YOUVIEW**
- Integrates Broadband with TVs and other boxes via a consistent set of standards – can merge ‘IPTV’ with Freeview or Freesat
- An advance on iPlayer etc and other offerings which are all different
- Keep an eye on the News – due 2011 (in development now)



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# **Radio Switchover - the end of AM & FM ?**

**In the UK Digital Radios Sales outstrip analogue by £value**

**Ten million DAB radios so far sold in the UK and rising rapidly  
- but not many in cars yet.... (and plenty of FM sets about)**

**AM unpopular with commercial broadcasters  
and LW already disappearing from many new Analogue radios**



# Digital Radio

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The UK is a leader in deploying Eureka-147:-

- Digital Audio Broadcasting - DAB



Digital Audio Broadcasting

*digital* **Radio**

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UK plans to stick with DAB, but the plan ensures new Radios will be DMB & DAB+ compatible)

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AM Radio  
Switchover may  
also include some  
limited use of  
DRM



RDS, Popular in Cars,  
is NOT Digital Radio.  
It is merely Enhanced  
Analogue FM



# DAB in Chelmsford Area

- Coverage improved significantly in 2004
- Good aerials can also pick up London & Kent giving 50+ stations
- Current Multiplexes are 11B: 218MHz to 12D: 229MHz
- National Multiplexes don't need retuning  
- they are Single Frequency Networks - SFNs

11B	11C	11D	12A	12B	12C	12D
DAB Local	DAB Local	National Commercial	DAB Local	BBC National	DAB Local	DAB Local
London DRG	Kent		London Switch		London CE	Essex

- Original Proposal was for C4 Music as National Commercial-2 on Multiplex 11A (216.9 MHz), but then Channel-4 pulled out of radio



- Currently spare frequencies and underused slots, so capacity is spare

# DAB – What's Happening

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- **Digital Economy Act 2010 sets targets for Radio Switchover**
- **Decision point is reached when there is:-**
  - 50% Digital usage
  - 90%+ Coverage (ie similar to FM)
- **Did not confirm the 2015 date in law**
- **New Government has released the Digital Radio Action Plan (which does target the 2015 timetable!)**
- **New Ofcom Analogue licence renewals are proposed to expire in 2017 – date is easier to achieve, especially for cars**
- **Date is when National services move to DAB leaving FM for locals**
- **Prospects of...**
  - Freeview-like Tx upgrades to improve coverage – **BBC busy now**
  - Scrappage and Tickmark schemes
  - Will use DAB/DAB+/DMB Chipsets so new radios work in Europe
  - EPG to merge AM, FM DAB info, bigger text/graphic displays
  - TPEG for Traffic News in cars (Traffic Program Experts Group)
  - New Content and Studio/Audio Quality Standards

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**ANY QUESTIONS ?**

# Those Acronyms...

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## TV:-

- **DTT** Digital Terrestrial Television
- **DSO** Digital Switch Over
- **MPEG** Motion Picture Experts Group
- **PSB** Public Service Broadcasting
- **QAM** Quadrature Amplitude Modulation
- **SFN** Single Frequency Network - BBC/National DAB is a SFN
- **DVB-T, DVB-T2** – Digital Video Broadcasting - Terrestrial
- **COFDM** Coded Orthogonal Frequency-Division Multiplexing

## Radio:-

- **DAB** Digital Audio Broadcasting (Terrestrial)
- **DMB** Digital Multimedia Broadcasting
- **DRM** Digital Radio Mondiale
- **EPG** Electronic Programme Guide
- **TPEG** Traffic Programme Experts Group
- **RDS** Radio Data System **EON** – Enhanced Other Networks