# Digital Television Transition: Policy and Regulatory Issues

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Presented to the
National Broadcasting and Telecommunications Commission
Bangkok, Thailand
August 2013

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# Introduction

- Questions Every Country Must Answer
- The US Experience (with references)
- Some Other Countries' DTV Transition Plans (with references)

# Topics Every Country Must Address

- Technical issues
- The digital dividend
- Licensing DTV Facilities
- The role of subsidies
- Public information campaigns
  - A few techniques

# Technical Issues

- Choosing a technical standard
  - Transmission
  - Compression
- Table of allotments
- Buildout requirements/simulcast period

# The Digital Dividend

- How much spectrum to recover
- What to do with it
- Non-television services
  - Wireless broadband
  - Public safety
- Improved television services—quality
  - SDTV v. HDTV
- Improved television services—quantity
  - Incumbents
  - Entrants (de novo or stations from pay television)

# Licensing DTV Facilities

- Multiplex licensing
  - How many to license
  - Licensee selects content or not?
  - Free-to-air or pay?
- Any need to license content producers?
- Private or public ownership of transmission facilities
  - Role of public broadcasters; emergency communications needs
- Shared infrastructure resource allocation
  - SDTV v. HDTV
  - Statistical multiplexing?
- Universal service goal for broadcasting?
  - Public interest content provision
  - Degree of competition in multiplex provision
  - Must carry/must offer?
  - Access fee guidelines/regulation
  - Pay television market share

# Subsidies

- Who to subsidize?
  - Citizens/consumers (all or just the needy)
  - Broadcasters (commercial and/or noncommercial)
- What to subsidize (citizens/consumers)
  - The set-top box (one or more)
  - The receiving antenna
  - Installation
- What to subsidize (broadcasters)
  - Transmission equipment
- How to subsidize
  - Coupon/voucher to citizen/consumer
  - Direct provision to citizen/consumer
  - Grant to broadcaster

# Public Information

- Mobilize public and private resources
- Role of the government
  - Expenditures out of pocket
  - Agency staff time
  - State and local as well as federal
- Role of the private sector (voluntary AND required)
  - Broadcasters
  - Pay television platforms
  - Equipment manufacturers (television receivers and antennas)
- Civil Society
  - Service organizations
  - Religious institutitions
  - Organizations based on cultural or language affinity

# A Few Techniques

- Call centers
- Soft tests

# More Detail on the US DTV Transition

# Background

- Why the US Undertook the DTV Transition
  - New and Improved Television Services
  - Reclaim spectrum for highly-valued public and private uses
- How the US assigned DTV Licenses
  - Grant to Incumbents rather than open to new entrants
    - One 6 MHz channel (19.4 mbps)
  - Flexible service rules
    - Requirement for one free-to-air (FTA) video stream of quality equal to or better than analog
    - HD permitted, not required
    - Multicasting permitted
    - Data services permitted
    - Fee-based services permitted with payment to US government of 5 percent of gross revenues

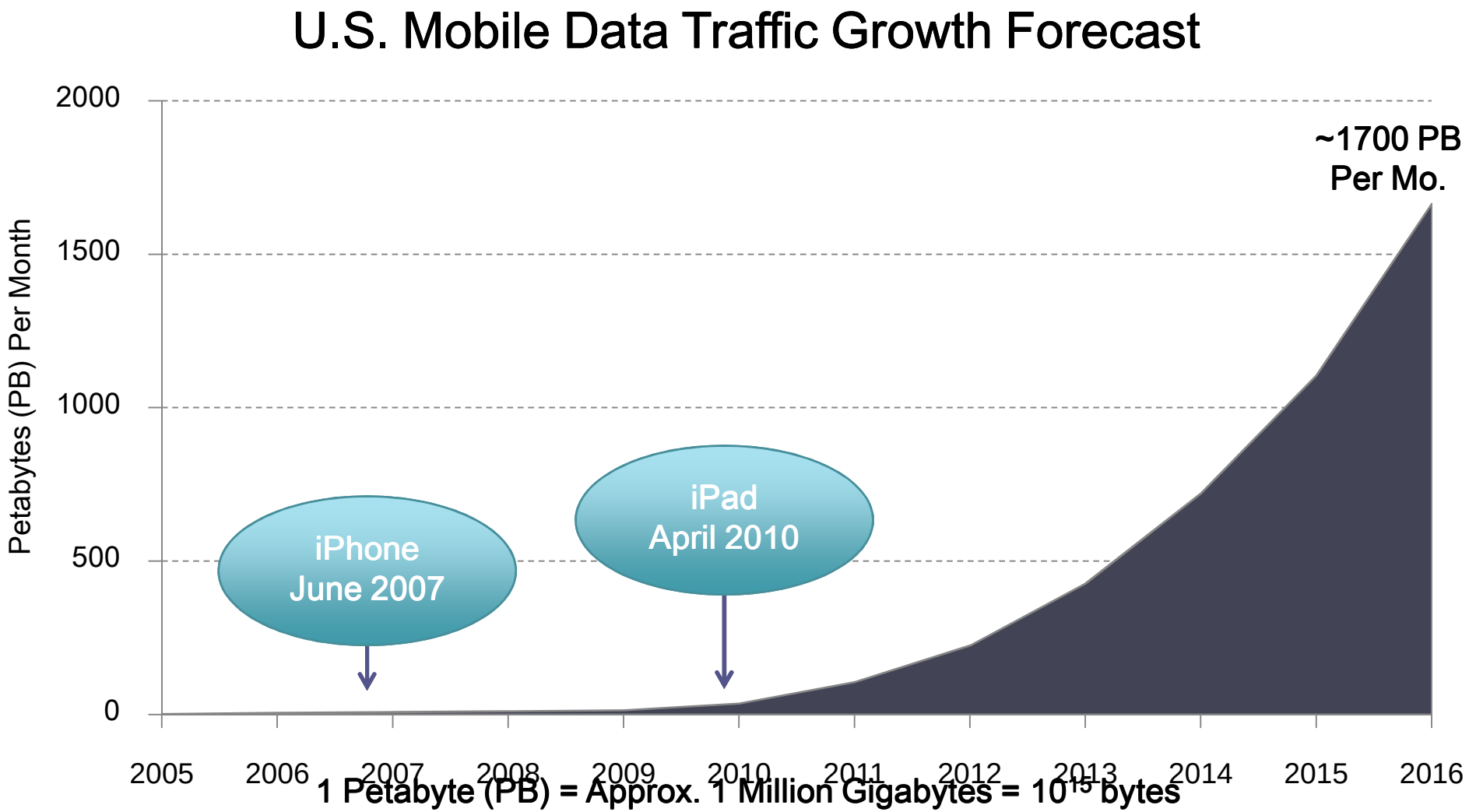
# The US “Digital Dividend”

- 108 MHz of UHF spectrum reclaimed in the 700 MHz band
- 74 MHz commercial use (assigned by auction)
  34 MHz public safety (no auction)
  - 24 MHz pursuant to 1997 Congressional legislation
  - 10 MHz to be assigned pursuant to February 2012 Congressional legislation
- Additional value likely resides in “white space” within the remaining spectrum assigned for television service

# US Auction Results for 700 MHz Band

- Revenue
  - Net auction proceeds $19.6 billion
  - 2008 700 MHz auction (Auction 73) yielded $1.287/MHz-pop
- Timing: Auction completed prior to June, 2009 analog switch-off date
- Auction winners include
  - Major telephone companies (Verizon, ATT); wireless broadband use
  - ATT, via a secondary market transaction, acquired spectrum purchased at auction by Qualcomm
    - Qualcomm's mobile video service (separate from ATSC DTV) operated for several years but ultimately was not profitable
  - Other

# Exponential Mobile Data Growth…




Source: Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast, 2011–2016. Cisco Visual Networking Index: Global Mobile Data Traff15ic Forecast Update, 2009-2014. Cisco Global IP Traffic Forecast and Methodology, 2006-2011. FCC Analysis

# Incentive Auctions (1)

- US DTV Transition gave incumbents DTV channel and "repacked" at FCC discretion, such that, after the transition, all DTV channel assignments were in a "core" region of channels 2-51
- The FCC and others have recognized the need for additional spectrum for wireless broadband use
  - FCC National Broadband Plan called for an additional 500 MHz over a 10-year period (300 MHz for mobile use within 5 years)

    See http://www.broadband.gov/
- 2012 Congressional Legislation authorizes FCC to conduct incentive auctions
- Incentive auction legislation allows broadcasters to offer, for compensation, to
  - turn in license
  - reduce spectrum use (channel share)
  - move from a UHF to a VHF channel

# Incentive Auctions (2)

- New potential users (e.g., wireless broadband) can bid for spectrum, pursuant to an FCC-announced band plan
- FCC accepts some bids and repacks DTV channels, thus freeing up contiguous blocks of spectrum for flexible use
  - Interaction of broadcaster offers and bids of new potential users determines amount of spectrum recovered
  - Incentive auction MAY recover up to 120 MHz for flexible use
- Disposition of auction proceeds
  - broadcasters reducing spectrum usage receive payment
  - remaining broadcasters receive payment for relocation expenses
  - Public safety Network Construction Fund
  - Other
- Broadcaster participation in auction is voluntary; repacking is compulsory

# Analog Switch-Off

- Prior to the DTV Act of 2005, the “soft” deadline for the transition was December 31, 2006, subject to several provisions for extensions, including the “85% test.”
- The DTV Act of 2005 was enacted in 2006.
  - Established February 17, 2009 as the “hard” deadline for all full power television stations to terminate analog broadcasting.
  - All full power stations were also required to vacate channels 52-69 by February 17, 2009.
  - Created the DTV converter box coupon subsidy program
    - Every US household entitled to up to two coupons, each worth $40 towards the purchase of a digital-to-analog converter box.
- In January, 2009, Congress extended the hard deadline from February 17 to June 12, 2009.

# Key Building Blocks of the US Transition

- Distribution of TV Programming
  - Over-the-air broadcasting
    - US had 1,800 full power analog television stations pre-transition
    - Fewer than 10 stations did not transition and ceased broadcasting
    - Major US local markets have 15-25 local television stations
  - Pay Television
    - Almost 90 percent of US television households subscribe to a pay service, either cable or satellite
    - Even in pay HH, some TV sets rely on over-the-air reception
  - Satellite and cable transitioned voluntarily to digital
    - Digital, HD pay programming competes with broadcast programming
- Equipment
  - DTV tuner requirement for receivers
  - Government subsidy for converter boxes
- Consumer Outreach: WWW.DTV.GOV

# Broadcaster Buildout

- Timeline for stations to construct their digital transmission facilities
  - Affiliates of Top 4 Commercial Networks (ABC, CBS, Fox, and NBC) in Top 30 Markets in 1999
  - All other Commercial Stations by May 2002
  - All Noncommercial Stations (400 of the 1800 total full power stations) by May 2003

# Cable/Satellite Distribution (1)

- Satellite and cable transitioned voluntarily to digital
  - Satellite is digital only; most cable systems offer analog and digital packages
- Cable and satellite operators are both subject to signal carriage requirements
  - Cable systems are required to carry all local stations in every market
  - Satellite (DBS) operators are required to carry all local stations if they choose to carry any local stations in a market (“carry-one, carry-all”).
  - Neither cable nor satellite operators are required to carry multicast sub-channels

# Cable/Satellite Distribution (2)

- Some commercial stations rely on mandatory carriage ("must carry"); other stations choose to be carried by "retransmission consent" and may be compensated for carriage.
- Noncommercial stations cannot negotiate "retransmission consent" agreements; they rely on must-carry for their primary program channel
  - The cable industry reached an agreement with Public Broadcasting Service to carry the multicast sub-channels of public TV digital stations.
- Cable and satellite operators coordinated with broadcasters to transition from carriage of the stations' analog broadcast signals to carriage of their digital signals.
- FCC required all cable operators offering an analog service to carry digital broadcast signals in analog format to their analog subscribers for three years after the transition
  - FCC then "sunset" (terminated) this provision with a 6-month transition period

# TV Receiving Equipment

- FCC mandated that manufacturers include the Advanced Television Systems Committee ("ATSC") tuner in television sets
- Include ATSC tuners in receivers on phased-in basis, beginning with sets 36" and above, starting July 2004
- Phase-in schedule:
  - Sets 36" and above – 50% by 7/1/04; 100% by 7/1/05
  - Set 25"- 35" – 50% by 7/1/05; 100% by 3/1/06
  - All sets and TV devices 100% by 3/1/07
- Labeling: Consumer Alert required for all analog-only TV equipment as of May 25, 2007

# Consumer Outreach (1)

- Outreach efforts began in 2007.
- Focused on the consumers likely to need the most attention.
  - Targeted all TV viewers, in particular those who rely on over-the-air (terrestrial) broadcasting and do not subscribe to a pay service.
  - Also concentrated on reaching and helping senior citizens, minorities, non-English speakers, those with disabilities, low income consumers, and those living in rural areas or on tribal lands.
- Used FCC's existing toll-free call center, 1-888-CALL-FCC.
- Created a DTV website, www.dtv.gov, containing publications, frequently asked questions, explanatory charts for installing converter boxes, troubleshooting guides, antenna information and mapping tools.
  - All publications were available in English and Spanish.
  - Key publications were translated into 29 languages.

# Consumer Outreach (2)

- Trained a team of 200 Commission staff who traveled throughout the country providing direct outreach to consumers and developing partnerships with local governmental agencies and non-governmental organizations.
- Established national partnerships with
  - Government agencies (e.g., the National Telecommunications and Information Administration)
  - Industry groups representing broadcasters, cable operators, television manufacturers, and retailers
  - National consumer groups.
- FCC contracted with businesses for in-home installation services and walk-in help centers throughout the nation.
- FCC required outreach efforts by industry
  - Broadcasters: Public Service Announcements, Walk-in Help Centers
  - Pay Television Operators: Monthly Notices in Customer Billing Statements

# Expenditures on the Transition

- The FCC spent nearly $129.5 million on outreach activities to educate consumers about the DTV transition.
- The U.S. Department of Commerce National Telecommunications and Information Administration (NTIA) spent almost $1.4 billion on the coupon program subsidizing the purchase of digital-to-analog converters.
  - 35 million coupons redeemed
  - 2,000 retailers in 30,000 locations
- The TV broadcasters spent $1.2 billion on their own outreach activities, including on-air announcements, consumer publications, and public appearances.
- As a whole, broadcasters spent approximately $10 billion for the technical changes needed to transition to digital broadcasting.
  - Individually, TV stations spent $1 to 2 million for construction of new digital transmission and broadcasting facilities, including equipment and studios for high definition production.

# Lessons Learned

- Setting a hard date for switch-off is important
- Consistent Message is Important
- Early transition for a few markets
- “Soft tests”
  - Coordinate across all stations in a market
  - Combine with a local “call-in” center
- Pay attention to receiving antennas
- Low VHF (channels 2-6) subject to reception problems (more than anticipated)
- “Night light” service after switch-off date

# Sources of US DTV Information

- **www.dtv.gov [**FCC's consumer-oriented website]
- http://www.consumerreports.org/cro/resources/streaming/PDFs/dtv_made_easy.pdf ["DTV Made Easy," brochure prepared by FCC in cooperation with a consumer organization
- **www.fcc.gov/dtv/ [**Regulatory information re DTV, including FCC decisions and notices**]**
- **www.ntia.doc.gov/dtvcoupon/index.html** [NTIA's TV Converter Box Coupon Program website]
- http://www.ntia.doc.gov/files/ntia/publications/dtvreport_outsidethebox.pdf [NTIA's coupon program report]

# Sources of Information About the FCC

www.fcc.gov [FCC website]

http://www.gpo.gov/fdsys/pkg/USCODE-2009-title47/html/USCODE-2009-title47-chap5.htm [link to the Communications Act of 1934]

http://www.gpo.gov/fdsys/pkg/CFR-2010-title47-vol1/content-detail.html [link to Title 47 of the Code of Federal Regulations]

# Other Countries' DTV Transition Plans

- Australia
- Japan
- United Kingdom
- Other

# Case Study One: Australia (1)

- Phased Analog Switch-off (ASO) 1/10-12/31/2013
  - Earlier simulcasting
- Standard includes SD and HD
  - HD is required (for most stations now; eventually for all)
  - Equipment labels:  need STB, DTV SD, DTV HD
- 8.3 million households; 34% with pay TV
- "Digital Tracker" Survey; Quarterly (Q4/2011 results)
  - Awareness (95%), Understanding (85%), Attitude (94%), Intention (NA), Conversion (82%), Satisfaction (84%)
- Consumer Information
  - "Digital Advisor" program for retailers
  - Antenna Installer Endorsement Scheme
  - Brochures in 31 languages
- Government Subsidy for Rural Areas
  - "VAST" satellite platform (includes retransmission of local news)
  - Direct subsidy to rural households (up to 130,000, 2% of total)

# Australia (2)

- Household Assistance Scheme
- Available from 6 months before to 1 month after ASO
- Free package (one/HH): HD STB, installation, instructions, any necessary upgrades to cabling and antenna systems
- Eligibility
  - 1 HH member receives maximum rate of: Age Pension, Disability Support Pension, Dept. Veterans' Affairs Pension, Income Support Supplement, Carer Payment
  - No current DTV access and ASO underway in area
- 81,000 Households served as of 2/2012 (one percent of national total)

# Australia (3)

- Government planned expenditures of at least AU$ 930 million, including
- Over AU$ 309 million for Household Assistance Scheme
- AU$ 375 million for “VAST” (Viewer Access Satellite Television) service
- Other components include
  - Digital Switchover Taskforce in federal Department of Broadband, Communications, and the Digital Economy
  - Technical studies, including research on digital reception problems in multi-unit dwellings
  - Consumer information/assistance and industry coordination

# Australia (4)

- Australia's Digital Dividend
  - 126 MHz (UHF 694-820 MHz band)
  - To be auctioned in later part of 2012
  - Mobile/wireless broadband uses expected

# Australia's Digital Television Logo

# Case Study Two: Japan (1)

- All-at-once ASO 7/24/11
  - 7 years and eight months of simulcast
  - Early ASO in one small market (Sozu city, 6500 HH)
- Standard includes SD and HD
  - Equipment labels: “digital terrestrial tuner logo”
- 50 million households; 47% have cable; digital satellite also available
- Consumer information: 51 “TV Audience Support Centers”
- Subsidy/Consumer Assistance
  - Some subsidy to community aerial systems
  - Free STB to 2.6 million low income HH
  - “Eco-points” incentive to purchase digital television receiver
  - Installation assistance program for the aged

# Japan (2)

- Ministry of Internal Affairs and Communications has five “Success Tips”
  - Preparation of Consultation offices close to citizens (working together with the government, broadcasters, manufacturers and electricians)
  - Implementation of measures along with a schedule and target
  - Measures for the spread of digital receivers
  - Public announcements, including statistical results of the digital spread rate and the ASO notification through the analog broadcasting program
  - Spread of “digitalization of Terrestrial Television Broadcasting” to citizens by using characters and distinguished media persons (Media strategy)

# Japan's Terrestrial Digital TV Campaign Mascot

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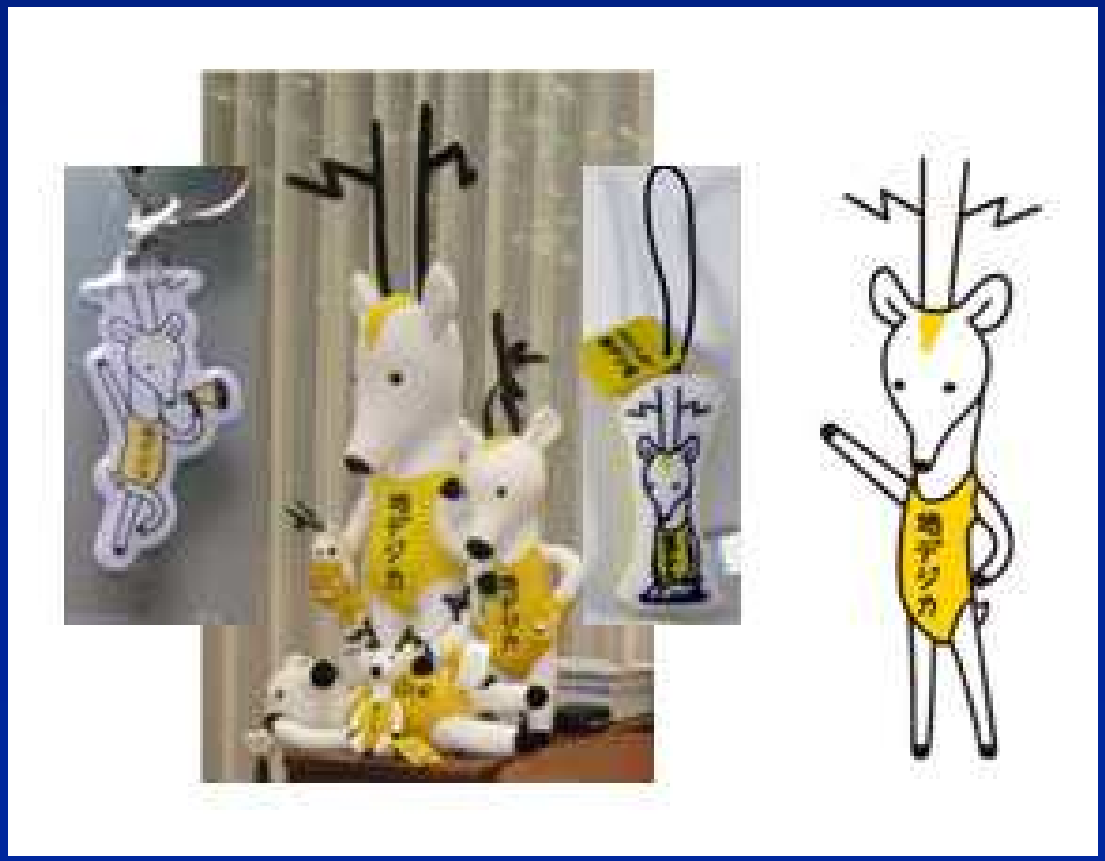

# Case Study Three: U.K. (1)

- Phased Analog Switch-off (ASO) 11/07-10/24/12
  - Earlier simulcasting
- Standard supports SDTV and HDTV
  - Initially SD only
    - Increased number of free-to-air channels
    - Increased terrestrial coverage of channels
  - HD introduced in 2010; currently HD versions of 5 major channels
  - "Digital Tick" logo identifies 'equipment designed to work before, during, and after switchover"
- 25.6 million HH; 49% with pay TV
- Digital UK Switchover Tracker Survey
  - Awareness, Understanding, Attitude, Conversion

# U.K. (2)

- Switchover Help Scheme
  - Package includes 1 STB, installation and demonstration, follow-up support
    - Fee of 40 British Pounds
  - Eligibility—approximately 7 million HH
    - Aged 75 or older or have lived in a care home for 6 months or more or eligible for certain disability benefits, or are registered blind or partly sighted
    - If HH receives income support, job seeker's allowance, or pension credit, then the fee is waived

# U.K. (3)

- Funding for the Switchover
  - Primarily from BBC License Fee
    - 200 million pounds communications activity (anticipated to come in under budget)
    - 600 million pounds for the Switchover Help Scheme
  - Broadcaster Contributions
    - 30 million pounds operating budget for Digital UK
    - 800 million pounds to convert terrestrial network
- Digital UK is managing the switch-over
  - independent, not-for-profit organization
  - owned by UK public service broadcasters and digital multiplex operators

# U.K. (4)

- U.K. Digital Dividend
  - 112 MHz planned (in 600 and 800 MHz bands)
  - To be auctioned (with very limited exceptions)
    - OFCOM 2012 consultation on auction design
  - Flexible uses envisaged, including 4G high speed mobile services

# U.K. Mascot “Digit Al” at Loch Ness

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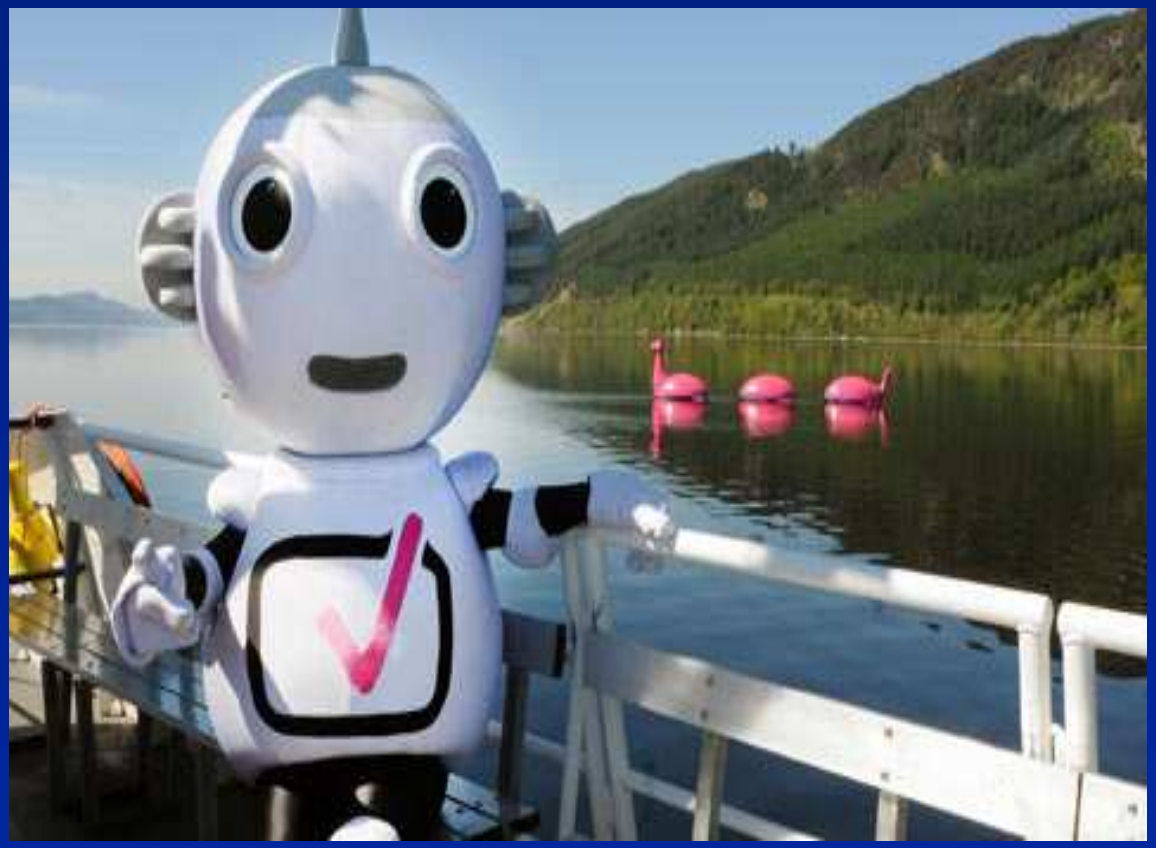

# Other Countries

- Finland
  - Analog switch-off completed 2007
  - 2.4 million TVHH; about 50% cable television
  - Initially SDTV (DVB-T, MPEG 2)
  - In 2011, additional multiplexes for HDTV (DVB-T2, MPEG4)
  - Digital Dividend for mobile broadband, licenses assigned by auction (mostly to major telephone companies)
- Sweden
  - Analog switch-off completed 2007, in phases
  - 4.1 million TVHH; about 50% cable television; 15% satellite
  - Digital Dividend earmarked for mobile broadband
  - Information campaigns budget Euro 22.2 million (15 million is imputed value of television airtime contributed)

# A Bus in Sweden

# Australia References

- http://www.digitalready.gov.au/Home.aspx (DTV Switchover Taskforce site)
- http://www.digitalready.gov.au/resources/brochures-and-info-sheets (library of fact sheets)
- http://www.digitalready.gov.au/getattachment/d10144f6-d489-4064-b5cf-1f58c17dbbcc/Quarter-4,-2012-Summary-Report;; (Summary Report; Q4/2012)
- http://www.digitalready.gov.au/government-assistance/household-assistance-scheme.aspx (Household assistance scheme)

# Japan References

- http://www.soumu.go.jp/main_sosiki/joho_tsusin/dtv/english/how_en.html (government information sheets)
- http://www.soumu.go.jp/main_sosiki/joho_tsusin/eng/Releases/Telecommunications/110700_a.html (government success tips press release)
- Kumabe, N. (2010) “Preparations for digital switchover in Japan: an update,” *International Journal of Digital TelevisionI 1: 1, pp. 85-87.*

# U.K. References

- http://www.digitaluk.co.uk/__data/assets/pdf_file/0019/35083/National_Switchover_leaflet.pdf (national information leaflet)
- http://www.digitaluk.co.uk/__data/assets/pdf_file/0019/82324/DigitalUK_Switchoverfinal_report_Nov2012.pdf (Digital TV Switchover Final Report)
- http://www.digitaluk.co.uk/__data/assets/pdf_file/0008/54548/Digital_UKs_Ten_Transferable_Lessons_May10.pdf (Digital UK 10 transferable lessons)
- http://www.helpscheme.co.uk/en/helpscheme (consumer assistance program)

# U.K. References (continued)

- http://stakeholders.ofcom.org.uk/binaries/research/tv-research/tv-data/dig-tv-updates/Q1_2011_DTV_Update.pdf (OFCOM Digital Progress Report, Q1/2011)
- http://stakeholders.ofcom.org.uk/binaries/research/tv-research/tv-data/dig-tv-updates/DTV_charts_q1_2011.pdf (OFCOM digital television update slides, Q1/2011)

# Other Useful International References

- http://mavise.obs.coe.int/ European Audiovisual Observatory (data on 29 European Countries)
- http://www.dvb.org/about_dvb/dvb_worldwide/ Countries using the DVB standard plus others including Brazil, China, Japan
- http://www.rtr.at/de/komp/VortraegeDIPLA2011/Vortrag_Backlund.pdf (Industry stakeholder presentation re Sweden)

# International Liaison at the FCC

- The FCC's International Bureau frequently organizes discussions with our counterparts in other countries
- The International Visitors Program (IVP)
  - Foreign government officials and industry personnel visit the FCC in Washington, DC
- Videoconferences

Thank You Very Much