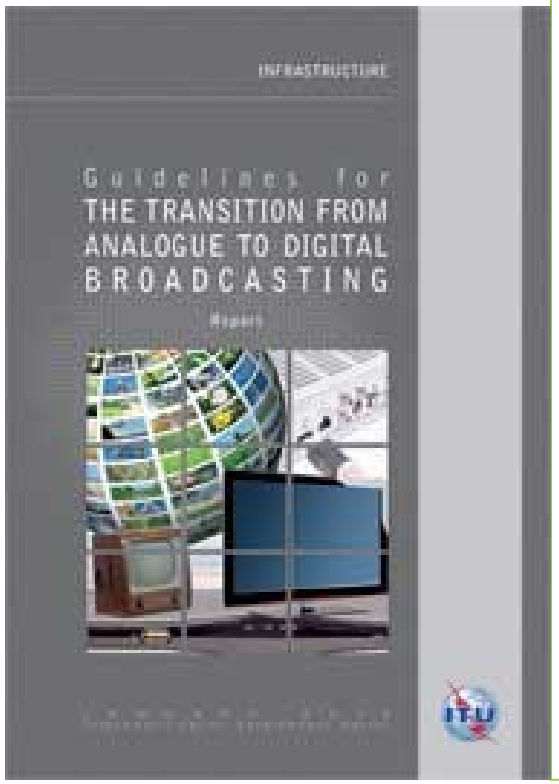
Broadcasting

ITU-D and BDT activities

Broadcasting - summary

- Broadcasting
  - Guidelines for Transition to Digital Broadcasting (E, F, S)
  - Assistance for the preparation of national roadmap (more than 40 countries since 2009)
  - DSO database
- Others
  - ITU-D Study Group Questions (Q8/1, Resolution 9)
  - WSIS Action Lines (C2, C3, C7 e-science, C9)

The Guidelines for Transition to Digital Broadcasting



- Intended to provide information and recommendation
  - On policy, technologies, network planning, customer awareness and business planning
  - for the smooth transition to Digital Terrestrial Television Broadcasting (DTTB) and introduction of Mobile Television Broadcasting
- Prepared in 2010 for Africa
  - 1st Revision (2012) for ASP adding a section on archives migration
  - 2nd revision (2014) for global including Satellite TV, Cable TV, IPTV

Broadcasting Related Activities

- Projects
- Country assistance
- Country case studies and reports
- Others

Other activities

- **ITU-Forum Global Conference**
  - 2016
    - Bangkok
    - Mexico City
    - Dakar
  - 2017
    - Dubai
    - Bangkok
    - Colombia (planned)
    - Yerevan (planned)
- **ITU-R SG6 WP6A – Handbook**
  - Extension of the Digital TV Broadcasting Transition Guidelines of the BDT

Digital Terrestrial
Television
Broadcasting
(DTTB)
DSO database

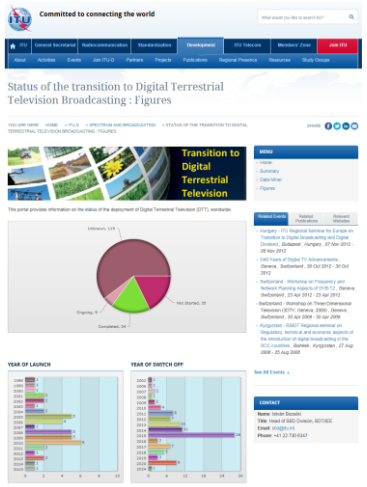
Background

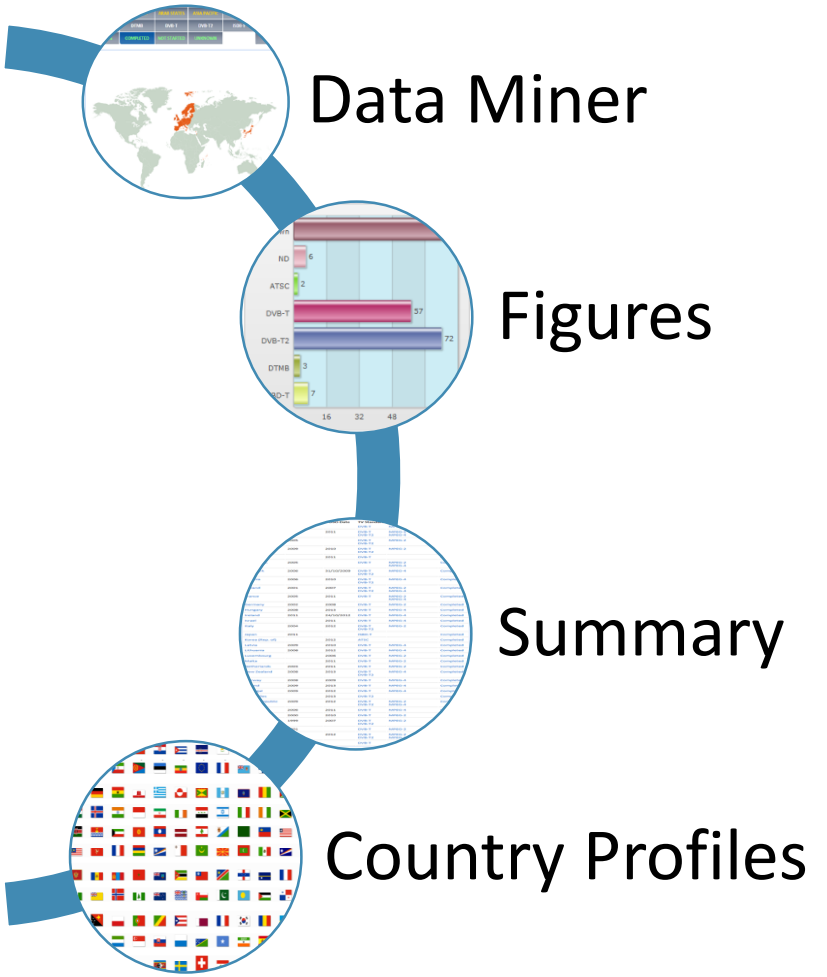
- Council 2014, 7 May, request from Kenya:

  ITU to provide an analogue to digital switchover stocktaking for assisting the Member States in their migration process.

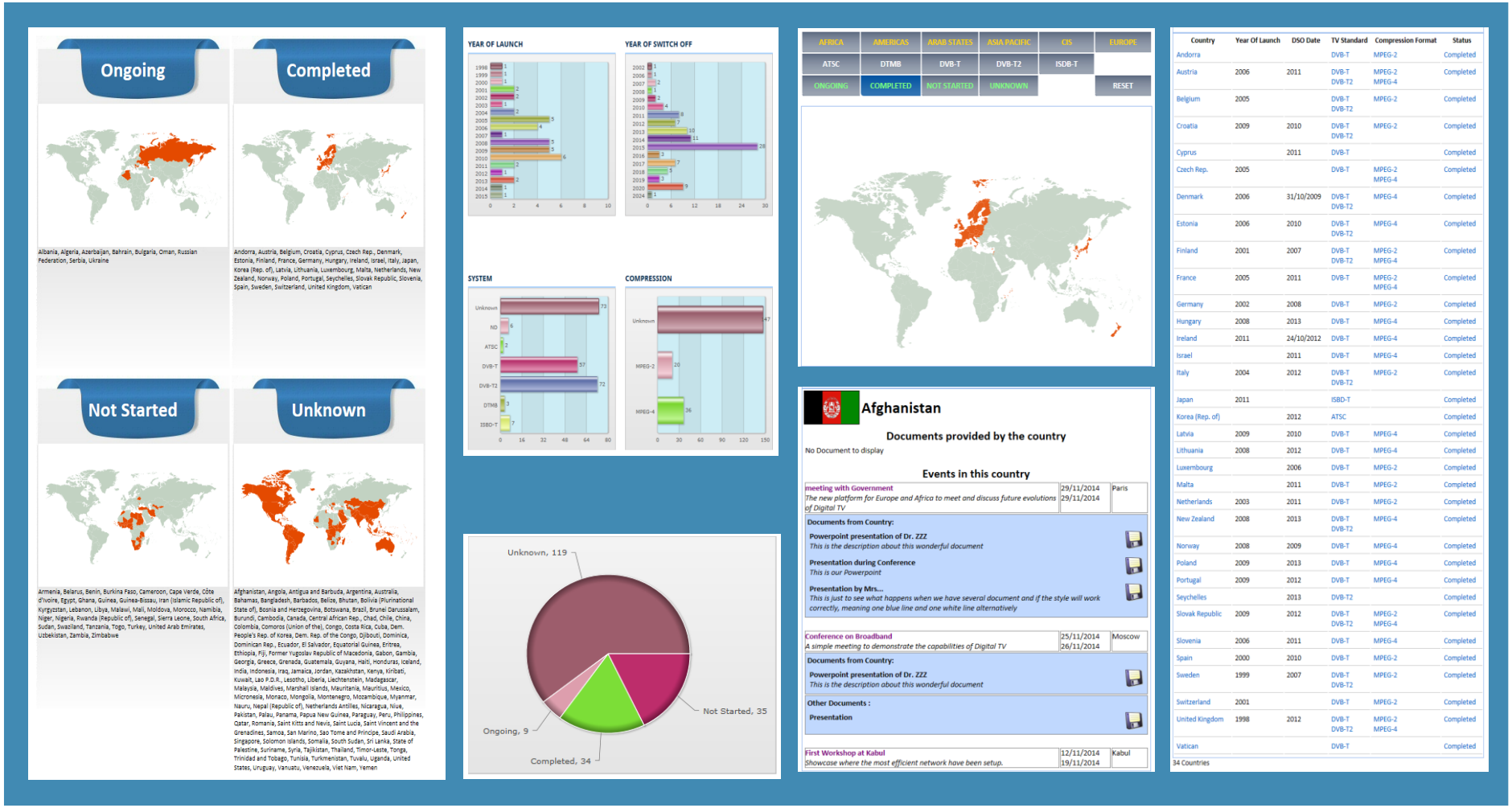
- Information from relevant surveys, questionnaires of the ITU-D and ITU-R and other sources
  - ITU-D Question 11-3/2 Questionnaire, 2012;
  - ITU-D Question 11-3/2 Final report, 2014;
  - ITU-D Questionnaire to European countries, 2013 and a follow-up in 2014;
  - ITU-D Questionnaire to Arab Countries, 2013;
  - ITU-D and ITU-R meetings, workshop, seminars, frequency coordination meetings;
  - ITU-R SG6 Questionnaire, 2014, results published in Report ITU-R BT.2302-0;
  - African Union Commission Survey, 2013;
  - DIGITAG, 2014.
- Entered to the database

Public Website





Website features



Website

http://www.itu.int/en/ITU-D/Spectrum-Broadcasting/Pages/DSO/Default.aspx

Trends in broadcasting: An overview of developments

1. Trends in broadcasting
Structure of the report

Section 1 Introduction	• Increasing Internet access • Evolution of broadcast technology
Section 2 Broadcasting into the next decade	• Trends in TV viewing • Growth of broadband Internet • DSO milestones and timeframes
Section 3 Service concepts	• Linear and on-demand services, anywhere and at anytime
Section 4 TV broadcasting technology	• HDTV and UHDTV • More efficient compression and transmission systems
Section 5 Audio broadcasting technology	• Several transmission systems • More efficient compression
Section 6 Conclusions	• Summary of conclusions and main trends

Revised and updated edition of report published by ITU in February 2013

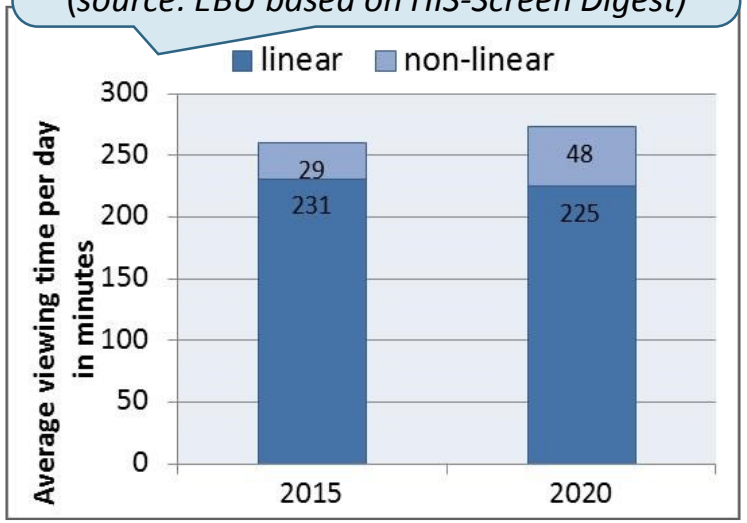
2. Broadcasting into the next decade (1)

Trends in TV viewing

Linear and on-demand services

- Total TV viewing time per day will slightly increase
- On-demand viewing grows faster at expense of linear TV viewing, depending on country and age
- Linear TV broadcasting will continue to be the primary way of TV viewing

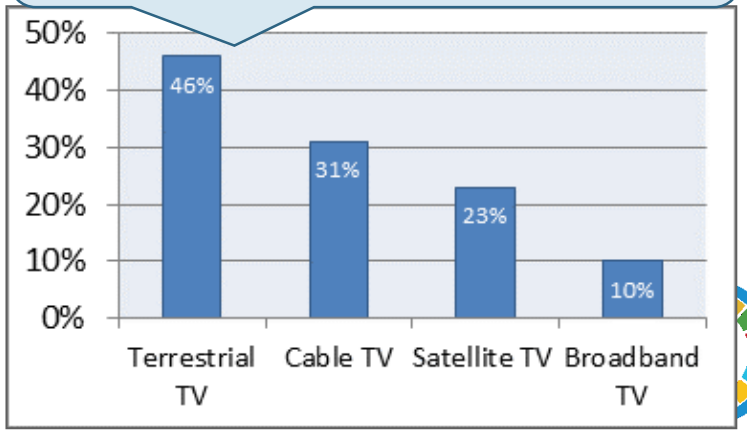
Example TV viewing in 5 large western European countries
(source: EBU based on HIS-Screen Digest)



Delivery of linear services

- Broadcasting (terrestrial, satellite, cable)
- Broadband, IPTV and streaming on the open Internet
- The use differs per country
- In most countries terrestrial broadcasting is considered very important

Example TV platforms in the EU in 2013
(source: Special Eurobarometer 396, Nov 2013)



2. Broadcasting into the next decade (2)

Broadband delivery

Broadband delivery	• Data speed of fixed and mobile broadband will increase • HD and UHD will make up 82% of Internet video traffic by 2020 • Internet does not guarantee quality of service and may not be able to serve large audiences at the same time
5G prospects	• Specification of broadcasting requirements in 4G and 5G is in progress, such as free-to-air, large cells and guaranteed quality of services • In the long term 5G networks may include distribution of broadcasting for rooftop and indoor reception with all types of receivers (ranging from large UHD screens, tablets and smart phones)
Broadband and broadcasting	• Broadband is competitive means of delivery compared to broadcasting networks • Broadband is supportive means of delivery for offering enhanced radio and television services.

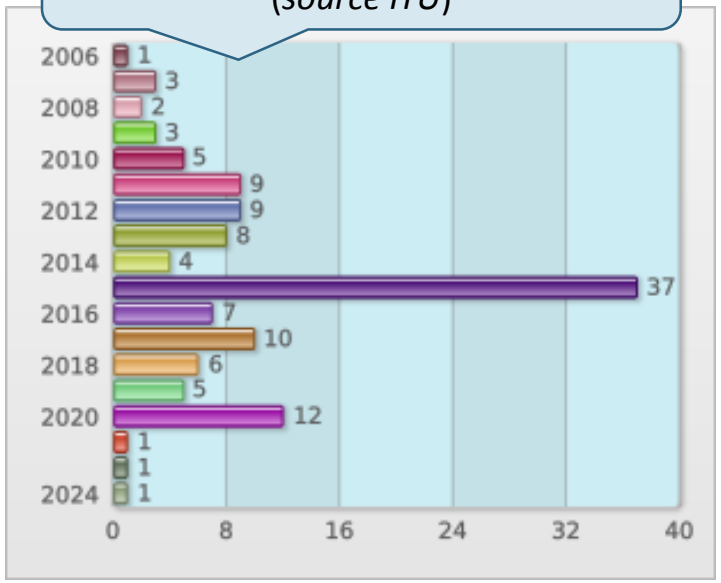
2. Broadcasting into the next decade (3)

Transition to digital broadcasting

DTTB

- Completed analogue TV switch-off in many countries in all regions
- Reduced DTTB frequency range due to allocation of Digital Dividend to IMT, according to WRC-15 decisions

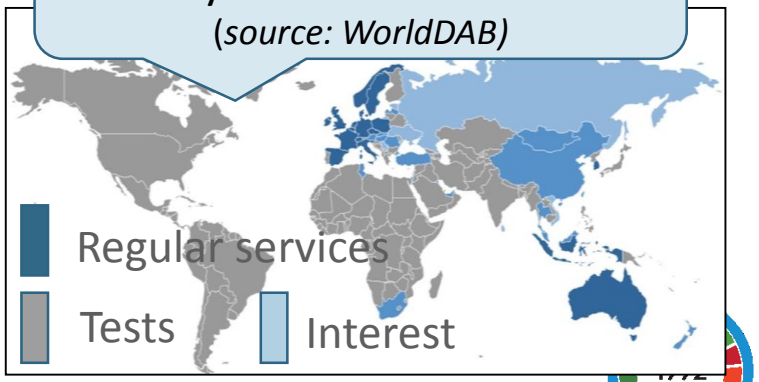
Year of analogue TV switch-off (*source ITU*)



DTAB

- Uptake of DTAB services is much slower than with DTTB
- DTAB services in many countries
- In general FM switch-off far ahead
- Analogue switch-off is planned in a few countries

Example T-DAB status by the end of 2016 (*source: WorldDAB)*



3. Service concepts (1)

Enhanced broadcasting at anytime and everywhere

Enhanced broadcasting	• Linear services delivered by broadcasting networks • Complemented with non-linear (on-demand) services delivered by the Internet

Anytime	• Time shifted viewing by means of:
	  ○ Recorded programmes from linear services
	  ○ Catch-up services via the open Internet, or as part of a video-on demand offer

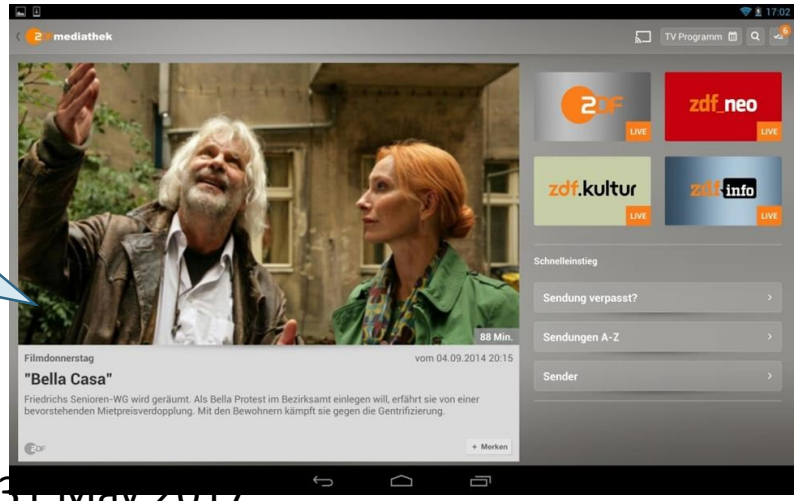
Anywhere	• Watching broadcast services in the living room, in other rooms, on the move • Smart phones and tablets are increasingly used as second screen in the house and elsewhere

3. Service concepts (2)
Interactivity

Interactivity

- Contributing or reacting by the viewer to a specific programme
- Demanding for additional information regarding a programme
- On-demand reception of programmes or information
- Interactivity by means of “middleware” in the TV receiver
  - Example is the HbbTV system
  - HbbTV is in use in several European countries and expected to replace MHEG5 and MHP in the UK and Italy respectively
  - HbbTV is the basis for interactivity in the ATSC 3.0 system

Example catch-up service from ZDF by HbbTV (*source hbbtv.org*)



4. TV technology (1)

HDTV and beyond (1)

HDTV	• TV services in HD quality in many countries • It is expected that in future all TV services will be in HD
Improved image parameters	• Higher spatial resolution: more pixels per image • Higher temporal resolution: more images per second • Wider colour gamut: more colours • Higher bit-depth: more bits per pixel • Higher image dynamic range: more detail in light and dark areas
HDR-TV	• Combination of wide colour gamut and high dynamic range • Contrary to higher spatial resolution, also visible at larger viewing distances
UHDTV	• UHDTV 1 (4k) includes all improved image parameters ○ May be implemented in a phased way • UHDTV 2 (8k) includes all improved image parameters with double spatial resolution compared to 4 k

4. TV technology (2)

TV formats

TV format	Spatial resolution	Temporal resolution	Wider colour gamut	Higher dynamic range	Envisaged roll-out in DTTB
HDTV	1920 pixels 1080 lines	30 or 25 Hz interlaced	no	no	Widely in use
Advanced HDTV, incl. HDR	1920 pixels 1080 lines	60 or 50 Hz progressive	yes	yes	2017 In some countries
UHDTV 1, incl. HDR	3840 pixels 2160 lines	60 or 50 Hz 120 or 100 Hz progressive	yes	yes	2017 to 2019 In some countries
UHDTV 2, incl. HDR	7680 pixels 4320 lines	60 or 50 Hz 120 or 100 Hz progressive	yes	yes	?

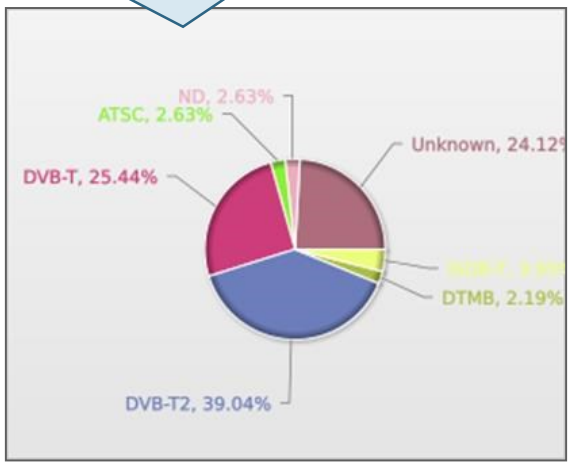
4. TV technology (3)

More efficient systems

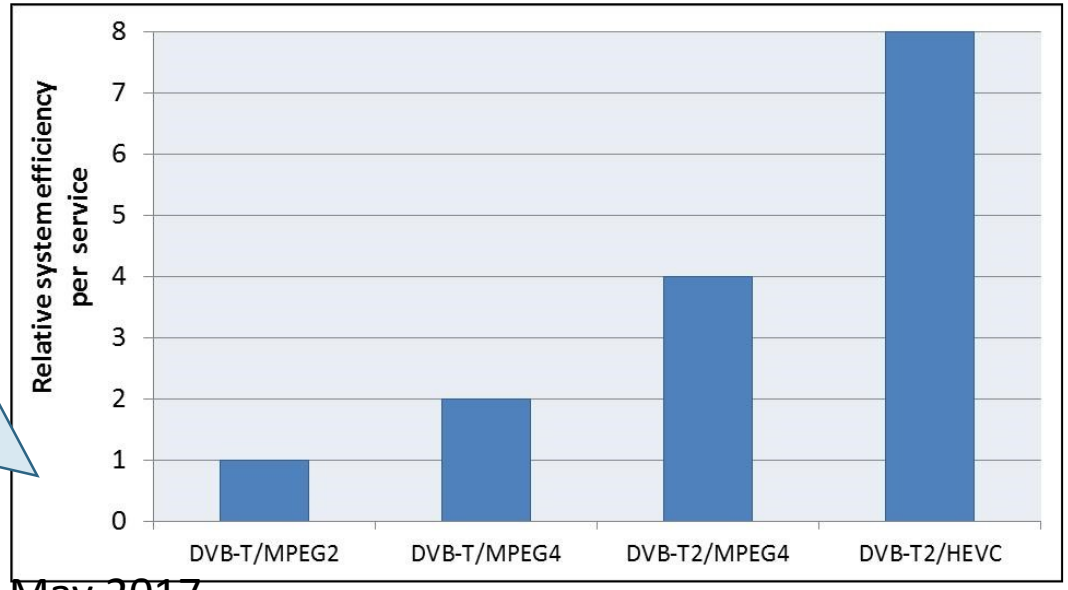
More efficient compression and transmission systems

- New compression system HEVC
  - 2 x more efficient than MPEG4
- 2nd generation DTTB systems
  - Payload up to > 50 Mbit/s
  - DVB-T2 : widely used
  - ATSC 3.0: roll-out in 2017
- Roll-out DVB-T2/HEVC started in 2016

Use of DTTB systems by the end of 2016 (*source ITU*)



Example of relative system efficiency per service of DVB-T(2) with MPEG2, MPEG4 and HEVC (*source TNO*)



5. Audio technology

Several systems for several bands

DTAB in VHF and LF/MF/HF

- In many countries DTAB for national and regional coverage in 174-230 MHz (Band III), when vacated by analogue television
- In addition in some countries DTAB in LF, MF and HF for
  - Coverage in low populated areas
  - International broadcasting
  - Local broadcasting
- Several systems are specified in ITU-R recommendations for several bands
  - Not in all bands DTAB systems are implemented in practice
- Multi-standard DTAB receivers are not widely available

Overview of DTAB systems (*source ITU*)

Standard	Frequency range
DAB	VHF-Band III 1.5 GHz
DAB+	VHF-Band III 1.5 GHz
ISDB-TSB	VHF-Band III 2.6 GHz
IBOC	Band II
IBOC	MF
DRM30	LF/MF/HF
DRM+	VHF-Band I VHF-Band II VHF-Band III
Ravis	VHF-Band I VHF-Band II

6. Main conclusions (1)
Broadband and broadcasting

Increasing capacity of fixed and mobile broadband	• Linear broadcasting will continue to be the primary way of television viewing
	  ○ Consequently DTTB continues to be an important means of distribution
	• The Internet will be an increasingly important means of delivery of audio-visual content, including linear broadcasting and on-demand services
	• Application of 4G networks for a large scale TV distribution is not envisaged
	  ○ as long as broadcast requirements such as free-to-air, large cells and guaranteed quality of services are not implemented
	• In the long term 5G networks may include distribution of broadcasting, for rooftop and indoor reception with all types of receivers, ranging from large UHD screens to tables and smart phones

6. Main conclusions (2)
Evolution of DTTB technology

More efficient DTTB systems

- More efficient compression system and 2nd generation transmission systems enable a considerable increase of capacity in the transmitted bandwidth
  - Enabling more services, better picture quality (HDTV) and improved coverage
- Following WRC-15 decisions IMT networks will be implemented in the UHF band. In order to broadcast more services and HDTV, many countries will:
  - Implement 2nd generation transmission systems with advanced compression systems
  - Perform major frequency re-planning to accommodate the transmission of the services into a reduce frequency band
  - Carry-out re-engineering of transmitting stations

ITU-D Question 8/1 of SG1 – Final Report

Examination of strategies and methods of migration from analogue to digital terrestrial broadcasting and implementation of new services

- The migration from analogue to digital broadcasting technologies has already been completed in some countries and is underway in several other countries and regions. In the transition process to digital television, important decisions have to be made and actions need to be thoroughly planned and implemented. Along with that, the use of the "Digital Dividend" is an important issue, and continues to be widely debated by broadcasters and operators of telecommunication and other services operating in the same frequency bands. In this regard it is crucial for regulatory authorities to balance the interests of users with the demands of growth in all branches of the industry.

- The Final Report of the Q8/1 discusses best practices for the transition from analogue to digital television, communication strategies to accelerate the process of public awareness about digital broadcasting, spectrum issues related to the Analogue Switch-Off (ASO), and the use of the released spectrum (digital dividend) to implement new services and applications.

ITU-D Question 8/1 of SG1 - Guidelines

Guidelines on Communications Strategies for the Transition from Analogue to Digital Terrestrial Broadcasting

- Communication planning to accelerate the process of public awareness about digital broadcasting
- Information campaigns for the general public
- Media communication campaigns
- Communication strategies targeted to low income population
- References/Glossary/Abbreviations

ITU-D Resolution 9, SG1

Participation of countries, particularly developing countries, in spectrum management

Evolving Spectrum Management Tools to Support Development Needs

- The Final Report of Resolution 9 details several evolving trends in spectrum management and reviews them in light of ongoing development challenges.
- This report has been developed through close collaboration between the ITU Radiocommunication Sector (ITU-R) and the ITU Development Sector (ITU-D). Such joint intersectorial collaboration has fulfilled the target of raising awareness of and matching the ongoing radiocommunication activities and technical studies with the special and growing needs of the developing countries.
- Contributions made to this report encompass case studies and system level descriptions submitted by Member States and private sector members, as well as BR and BDT activities and publications.

Structure of the Resolution 9 report

1 CHAPTER 1 – Emerging spectrum management approaches
2 CHAPTER 2 – Spectrum economics
3 CHAPTER 3 – Spectrum management activities and resources
4 CHAPTER 4 – Spectrum monitoring

References/Glossary/Abbreviations
Annexes (Case studies, experiences)

Thank you !

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