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# Transition from Analogue to Digital Terrestrial Broadcasting

## Relevant ITU Reports, Recommendations, Questions

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## ITU-D SG2, Question 11-2/2

- Examination of terrestrial digital sound and television broadcasting technologies and systems, including cost/benefit analysis, interoperability of digital terrestrial systems with existing analogue networks, and methods of migration from analogue terrestrial techniques to digital techniques
- Report published
- New Study Period (2011-14):
  - Q 11-3/2



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## Q11-2/2 Main body of the Report

- 1. Background
- 2. Various possible concepts of introducing digital terrestrial broadcasting
- 3. Choosing the strategy of migration
- 4. Migration to DTTV
- 5. DTTV platforms and networks
  - 5.1 Executive introductory remarks
  - 5.2 Service requirements
  - 5.3 HDTV
  - 5.4 Mobile TV
  - 5.5 Interactive TV and data services
  - 5.6 Briefing on service developments and network evolution
  - 5.7 Regulatory environment
  - 5.8 Digital switch-over
  - 5.9 Digital dividend
  - 5.10 Changes in networks
    - Radiation characteristics
    - DTTV system
- 6. Economic aspects
- 7. Viewer concerns
- 8. Conclusions and recommendations on DTTV
- 9. DTAB: advantages, technical platforms, possible approaches for implementation, specific features and phases of migration
- 10. Other implications
- 11. Glossary of terms and abbreviations being most frequently used
- 12. Recommended web sites for further information

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## Q11-2/2 Annexes

- Annex 1  
European Membership Case Study
- Annex 2  
The Brazilian Case Study
- Annex 3  
Case Study for the Schedule of Introduction of DTTV in France
- Annex 4  
EBU HDTV Receiver Requirements (EBU Tech 3333)
- Annex 5  
Matters Related to Consumers' Digital TV Receivers
  - Annex 5 - Part A  
Maximizing the Quality of SDTV in the Flat-Panel Environment
  - Annex 5 - Part B  
HDTV and Progressive Scanning Approach
  - Annex 5 - Part C  
Status of HDTV Delivery Technology
- Annex 6  
European Commission Launches Public Consultation on Digital Dividend

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## Recommendation ITU-R BT.1306-4 (09/2009)

- Error-correction, data framing, modulation and emission methods for digital terrestrial television broadcasting
- BT Series  
Broadcasting service  
(television)

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## Main Parts of Rec. BT.1306-4

- *recommends*
  - that administrations wishing to introduce DTTB should use one of the families of error correction, framing, modulation and emission methods outlined in Annex 1.
- Annex 1
  - Table 1a) data for single carrier systems,
  - Table 1b) data about multi-carrier systems
  - Table 1c) data about multi-carrier systems with RF band segmentation.
- Appendices 1, 2 and 3
  - Specifications for Systems A, B, C and bibliography.
- Appendix 4
  - Selection guidelines for Systems A, B and C

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## The process of selecting a suitable system (Appendix 4)

- Phase I: an initial assessment of which system is most likely to meet the broadcaster's main requirements taking into account the prevailing technical/regulatory environment.
- Phase II: a more detailed assessment of the "weighted" differences in performance.
- Phase III: an overall assessment of the commercial and operational factor impacting the system choice.

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## Report ITU-R BT.2140-1 (05/2009)

- Transition from analogue to digital terrestrial broadcasting
- BT Series  
Broadcasting service  
(television)

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## The purpose of the Report

- To help the Countries that are in the process of migrating from analogue to digital terrestrial broadcasting.
- To overview of digital terrestrial sound and television broadcasting technologies and system migration.
- To outlines the available options for making that transition and the route to be followed.
  
- *Part 1*
  - main issues related with the transition to digital,
  - the principal problems and possible solutions.
- *Part 2*
  - more detailed information on important aspects which have already been covered in Part 1.

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## Chapter 1 Introduction

- 1.1 Purpose of Report
- 1.2 General
- 1.3 Why Digital? - Technical Considerations
- 1.4 Why Digital? - Commercial and Regulatory Considerations
- 1.5 How Digital? - Technical and Regulatory Considerations
- 1.6 How Digital? - Commercial Considerations
- 1.7 ITU activities
- 1.8 The scope and the future of Radiocommunication Study Group 6
  - 1.8.1 Introduction
  - 1.8.2 The digital broadcasting chain
  - 1.8.3 Outline for the future

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## Chapter 2

### Overview of broadcasting technologies

- 2.1 Introduction
  - 2.1.1 ITU-R
  - 2.1.2 ITU-T
  - 2.1.3 ITU-D
  - 2.1.4 Regional Radiocommunication Conference (RRC)
  - 2.1.5 World Radiocommunication Conference (WRC-07)
- 2.2 Analogue broadcasting technologies and systems
- 2.3 Planning considerations for analogue and digital systems
  - 2.3.1 Background
  - 2.3.2 Sharing broadcasting frequencies bands with other primary services
- 2.4 Digital broadcasting technologies and systems
  - 2.4.1 Digital Fundamentals
  - 2.4.2 Background
- 2.5 Digital Sound Broadcasting
  - 2.5.1 Description of digital sound broadcasting systems
- 2.6 Digital terrestrial television broadcasting
  - 2.6.1 Introduction
  - 2.6.2 Description of Digital Television Broadcasting systems
- 2.7 Summary
- 2.8 Evaluation of potential Digital Sound and TV Broadcasting systems
  - 2.8.1 Evaluation of specific Terrestrial Digital Sound and TV Broadcasting
  - 2.8.2 Hybrid systems

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## Chapter 3

### Application and implementation of digital broadcasting

- 3.1 Regulatory considerations
- 3.2 Efficient usage of broadcasting spectrum
- 3.3 Requirements of sound and television broadcasting services
  - 3.3.1 Network aspects
  - 3.3.2 Receiver aspects
- 3.4 Aspects related to the interoperability of systems
- 3.5 Components of digital sound broadcasting equipment
  - 3.5.1 Transmitters
  - 3.5.2 Antennas for transmission
  - 3.5.3 Receivers
- 3.6 Components of digital television broadcasting equipment
  - 3.6.1 Transmitters
  - 3.6.2 Antennas for transmission
  - 3.6.3 Receivers
- 3.7 Data broadcasting
- 3.8 Broadcasting services for mobile reception
- 3.9 Interference aspects
  - 3.9.1 Interference free reception in the mobile environment
  - 3.9.2 Impact of interference in end user environment

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## Chapter 4

### Transition issues

- 4.1 Spectrum availability
  - 4.1.1 Considerations for the Digital Broadcasting
  - 4.1.2 General considerations on Broadcasting Planning
- 4.2 Broadcasting planning principles
  - 4.2.1 General considerations
  - 4.2.2 Coverage of an allotment area
  - 4.2.3 Allotment test points
  - 4.2.4 Digital Sound Broadcasting in HF bands
- 4.3 Quality of service
- 4.4 Economical aspects of Spectrum utilization
- 4.5 Health, safety and other legal considerations
- 4.6 Switchover Analogue to Digital
  - 4.6.1 Simulcast of analogue and digital services
  - 4.6.2 Possible mechanisms for the implementation of digital broadcasting
  - 4.6.3 Switchover Overview

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## Appendices 1 and 2 to Part 1

### Case Studies and Glossary

- 1 Australia
- 2 Brazil
- 3 Bulgaria
- 4 Canada
- 5 Germany
- 6 Guinea
- 7 Italy
- 8 Japan
- 9 Mexico
- 10 Russian Federation
- 11 Tanzania
- 12 United States of America
- 13 Republic of Korea
- 14 Venezuela
- 15 OCDE
- 16 European Union

Glossary (Abbreviations)

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## Part 2

### Chapter 1

- 1.1 DRM
- 1.2 T-DAB general
- 1.3 IBOC
- 1.4 ISDB-TSB
- 1.5 ATSC
- 1.6 DVB-T
- 1.7 DVB-H
- 1.8 ISDB-T
- 1.9 T-DMB
- 1.10 LMDS (Local Multipoint Distribution System)
- 1.11 Forward Link Only (FLO)

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## Chapter 2

- 2.1 Aspects related to interoperability of systems
  - 2.1.1 Digital reception
  - 2.1.2 Encouragement to deployment of digital receivers
  - 2.1.3 Consumer information on digital equipment and switchover
  - 2.1.4 Integrated digital television receivers
  - 2.1.5 Digital connectivity
  - 2.1.6 Access for users with special needs
  - 2.1.7 Removal of obstacles to the reception of digital broadcasting
  - 2.1.8 Effects on citizens
- 2.2 Mobile services
  - 2.2.1 Sound
  - 2.2.2 Mobile TV
  - 2.2.3 Enhanced mobile TV

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## Chapter 3

- 3.1 Report of TG 6/8
- 3.2 UMTS/GSM and DVB-T Convergence
- 3.3 DRM simulcast
- 3.4 Service planning
- 3.5 Market impact
- 3.6 General strategy and co-ordination
- 3.7 Problems related to the interoperability of systems
- 3.8 Precautions to control the direct health effects of RF radiation
- 3.9 Precautions to control the indirect RF radiation hazards
- 3.10 Field-strength values to be determined
- 3.11 Additional evaluation methods
- 3.12 Legal consideration

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## Appendices 1 and 2 to Part 2

- 1 Australia
- 2 Brazil
- 3 Bulgaria
- 4 Canada
- 5 Germany
- 6 Guinea
- 7 Italy
- 8 Japan
- 9 Russian Federation
- 10 Tanzania
- 11 United States of America
- 12 Republic of Korea
- 13 Venezuela
  
- Definitions

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## Transmission standards overview

### (Table 4.1.2 of the Guidelines)

Standard	Modulation	Description in Report ITU-R BT.2140	Recommendation ITU-R BT.1306	Applicable standards
ATSC	Single carrier 8-VSB	Brief: part 1 section 2.6.2.1 Detailed: part 2, section 1.5	System A; annex 1 table 1a	A/52,A/53, A/65, A/153
DTMB (also referred to as China DTV)	Multi carrier OFDM	Brief: part 1, section 2.6.2.2 Detailed: -	-	GB 20600-2006
DVB-T	Multi carrier OFDM	Brief: part 1, section 2.6.2.4 Detailed: part 2, section 1.6	System B; annex 1 table 1b	EN 300 744
ISDB-T	Multi carrier Segmented OFDM	Brief: part 1, Section 2.6.2.5 Detailed: part 2, section 1.8	System C; annex 1 table 1c	ARIB STD-B31 ABNT NBR 15601

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## Recommendation ITU-R BT.1368-8

### (05/2009)

- **Planning criteria for digital terrestrial television services in the VHF/UHF bands**
- **BT Series**  
**Broadcasting service**  
**(television)**

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## WTDC – 2010

### Hyderabad, May 2010

- Programme 1
- Resolution 9
  - Participation of countries, particularly developing countries, in spectrum management
- Resolution 10
  - Financial support for national spectrum management programmes
- ITU-D SG2 Question 11-3/2

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## Others

- TND web-site
  - <http://www.itu.int/ITU-D/tech/digital-broadcasting/index.html>
- Belgrade Ministerial round-table
  - <http://www.itu.int/ITU-D/eur/europe/2009-MRT-Broadcasting/index.html>
- Bhutan
- Mali
- Burkina Faso

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