30TH WORLD RADIOCOMMUNICATION SEMINAR

24 – 28 October 2022
Geneva, Switzerland

Broadcasting trends and Regulation

Terrestrial Services
Radiocommunication Bureau
ITU

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Summary

- The digital revolution
- Digital broadcasting advantages
- Achievements in Digital broadcast
- Looking at the future- Role and Challenges
- Role of Radio: difficult times and big events
- Introduction of Digital broadcasting according to Radio Regulations (RR)

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THE DIGITAL ERA

Digital Broadcasting advantages

- **For regulators**
  - fair competition: To develop a terrestrial platform competitive with the other platforms,
  - efficiency of spectrum (1 frequency for multiple programs) that provides the possibility to free a part of the band for other usage.
- For **TV operators and content providers:** significant decrease in
  - transmission (operation) costs comparing to analogue,
  - investment and transmission costs and permits the development of new innovative services without spectrum constraints (mobile TV , data, games, interactivity, VoD,...), UHD, Hybrid TV Integrated Broadcast-Broadband (IBB) systems, Artificial Intelligence, AR/VR, etc…
- For **users**:
  - Additional number of programs
  - Additional reception modes (fixed, portable, mobile…)
  - Improved quality of image and sound
  - Additional type of services: interactivity, Electronic Program Guides, etc.

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Digital Broadcasting Standards

7th World Conference of Broadcasting Unions (México, 27-30 April 1992), the World Broadcasting Unions unanimously resolved:

"1 that efforts should be made to agree on a unique worldwide standard for DAB and

2 to urge administrations to give consideration to the benefits for the consumer of common source and channel coding and implementation of Digital Sound Broadcasting on a worldwide basis at 1.5 GHz;"

FIXED TERRESTRIAL DTT: ATSC3.0, DTMB, DVB-T, DVB-T2, ISDB-T…

MOBILE/HANDHELD DTT: ATSC-M/H, DVB-H, DVB-T2 LITE, ISDBT-MM, AT-DMB…

RECOMMENDATION ITU-R BT.1833-3

RADIO (DSB): DAB, ISDB-TSB, IBOC, DRM, CDR, RAVIS

RECOMMENDATION ITU-R BS.1114-12

COMPRESSION TECHNIQUES:

RECOMMENDATION ITU-T **H.262** (MPEG-2),
RECOMMENDATION ITU-T **H.264** (MPEG-4),
RECOMMENDATION ITU-T **H.265** (HEVC),
RECOMMENDATION ITU-T **H.266** (VVC).

(See RECOMMENDATION ITU-R BT.1870-1)

H.266: Versatile Video Coding

Half the bit rate of HEVC. → will reduce the amount of data necessary to enable high-quality video for an unprecedented range of new and existing applications. Ex: same bit rate to deliver UHD as it is for HD today.

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Achievements in Digital broadcast

HYBRID TV -INTEGRATED BROADCAST-BROADBAND (IBB) SYSTEMS

- Based on the combination of the technologies of both **broadband and broadcasting**.
- **Different standards** such as HbbTV, hybridcast or MHEG-5
- **Typical hybrid devices**: Internet-connected TV sets, set-top-boxes, PCs with broadcast tuners and mobile phones with broadcast receivers

Recommendations ITU-R :

- **BT.2037**: General requirements of IBB systems
- **BT.2053**: Technical requirements for IBB systems and various aspects of IBB systems including App. types and App. control are analyzed and defined.

ADVANCED IMMERSIVE AUDIO-VISUAL (AIAV) SYSTEMS, INCLUDING VIRTUAL REALITY AND AUGMENTED REALITY (VR/AR)

- Inclusion of 360-degree live video
- Report ITU-R **BT.2420** : technical background and the definitions used for AIAV systems.
- Recommendation ITU-R **BS.2051**, Advanced sound systems for programme production, to include headphones associated with metadata, which are a vital part of the AIAV systems experience.

BETTER VIEWER EXPERIENCE

- Ultra High-Definition Television (**UHDTV**)
- High Dynamic Range (**HDR**): result will be a greater sense of realism for viewers, giving television images a richer and more dynamic quality
- Wide Colour Gamut and High Frame Rate (Recommendation ITU-R **BT.2020**)

ARTIFICIAL INTELLIGENCE AND BROADCASTING

- **Programme production**: Big data analyses, Automatic translation, Text-voice/voice-text conversion, Object tracking, …
- **Audio and visual aspects**: Metadata (speech and image recognition), subtitling and Close captioning, break Structure or Advertising (Identifying relevant advert placement alongside content), News presentation by a humanoid AI, Programme assembling and access, Audio and video data compression, Early warning of emergencies, Access service for people with disabilities,…
- **Broadcast transmission**: Network planning, System monitoring and diagnosis, …

Report ITU-R **BT.2447**: Artificial intelligence systems for programme production and exchange.

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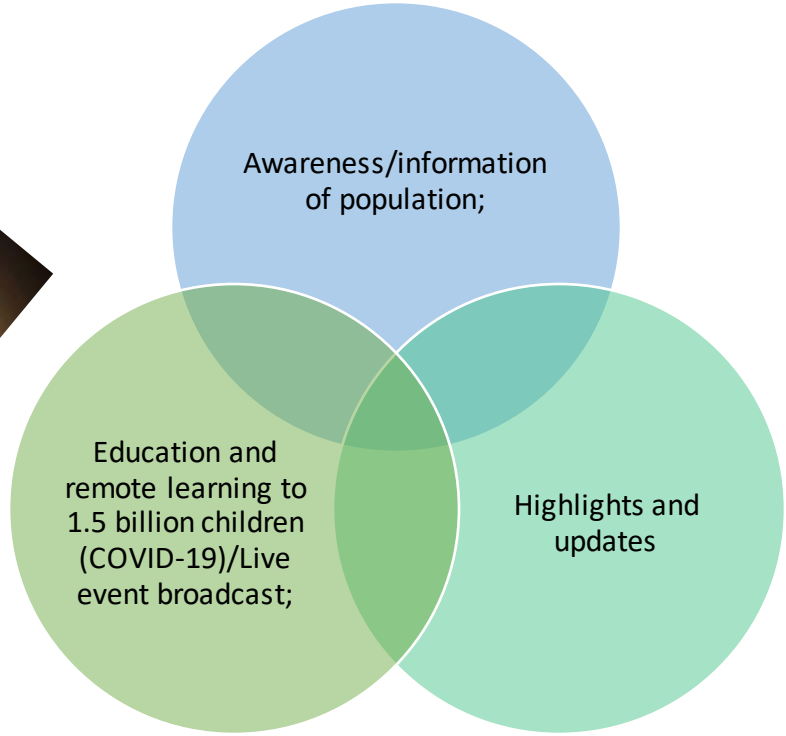
Terrestrial Radio and TV role and challenges

- **Strengths**
  - Free to air, wide public, reception is always possible, both in cities and rural areas.
  - Most trusted media
  - Public warning, disaster mitigation and relief (**Report ITU-R BT.2299-0**)
  - Ongoing digitalization, i.e. better quality, more choice and new features
- **Challenges**
  - Spectrum point of view
    - the expansion of radio whether analogue or Digital is hampered by lack of frequencies (congestion).
    - for UHF television in Region 1, a.i. 1.5 of WRC23 (Review the spectrum use and spectrum needs of existing services in 470-960 MHz).
  - Competition is increasing: Streaming, OTT, IPTV/RoIP, Satellite, Cable,…
  - Audience habits and technology are changing constantly, FTA receivers in Smartphones/tablets
  - Giant providers

Radio and TV: difficult times and big events



An estimated 67% world TV viewers/70% world listeners

An estimated 66% world population using internet

Big investments made, ongoing or planned for digital broadcasting.

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Introduction of Digital Sound in Regional Agreements (LF/MF)

RJ81

MF: 535 - 1605

R2

Does **not provide** the possibility of introducing digital modulation in the bands concerned.

Question ITU-R 120/6 (2006) “Digital sound broadcasting in Region 2” has been adopted by Study Group 6E.

RJ88

1 605 – 1 705 kHz

R2

CCRR/20 (6 September 2002), the BR concluded that the formulations in the RJ88 Agreement ***would permit the introduction of digital modulation DRM A3 or B3*** and also ***perhaps*** that of ***IBOC DSB***

subject to completion of the studies related to co-channel, first and second adjacent channel protection ratios and subject to further limitations at the band edges in order to be consistent with RR 4.5.

GE75

LF:150 –285 kHz; MF – 525 –1 605 kHz;

R1 and R3

Rule of Procedure (RRB): Transmission systems DRM A2 and B2. Radiation reduced by at least 7 dB in all directions w.r.t analogue assignment

Temporary measure until the decision from a competent conference

Introduction of Digital Sound in Regional Agreements (VHF/UHF)

ST61

41-68 MHz

R1 & 3

under RoP Part A2/ST61 paragraph 5 – same coordination distances as analogue systems

No submission or notification to date

GE84

87.5 –108 MHz: FM

R 1&3

possible under 3.1 of Chapter 3 of Annex 2 to GE84: not cause greater interference, Nor require higher

Problematic to introduce new digital assignments in **congested bands**

GE06

174 –230 MHz (Band III)

1.536 kHz T-DAB

R1&Iran

Adopted T-DAB as planned standard for digital sound broadcasting

Implementation of alternative standards under envelope of Plan entries : DVB-T → 1 –4 T-DAB blocks (Prov. 5.1.2 e + RoP A10)

- T-DAB → Other digital systems (Prov. 5.1.3)

Introduction of digital HFBC

12.7 § 6 of RR: Other modulation techniques recommended by ITU-R

shall be permitted in place of double-sideband or single-sideband emissions, provided that the level of interference caused to existing emissions is not increased.

Res. 517 (Rev.WRC-03)

Introduction of digital modulation schemes 5 900 – 26 100 kHz

Entry into force July 2003

Introduction of Digital TV in Regional Agreements (VHF/UHF)

ST61

41-68 MHz (Sound and TV)

87.5-100 MHz (TV)

162-174 MHz (TV)

Digital Modulation :

RoP Part A2

under Art 4 or Art 5, the relevant coordination distances of the Agreement **shall be equally applied to analogue and digital systems.**

An appropriate symbol shall be used to identify the television standard.

GE89

41-68 MHz

R1 & 3

Digital modulation systems can be used under provision 2.3

RoP Part A6

for a modification under Article 4 of the agreement

GE06

174-230/470-896 MHz

R1&Iran

Adopted DVB-T as planned standard for DTT

Implementation of alternative standards under envelope of Plan entries :

- DVB-T → Other digital systems (Prov. 5.1.3)

Digital Broadcasting: Under No Regional Agreement

Frequency to be in conformity with article 5 of the RR (11.31)

System: No standard imposed

Conditions: for ex.: 5.86 In Region 2, in the band 525-535 kHz the carrier power of broadcasting stations shall not exceed 1 kW during the day and 250 W at night.

Notification and recording in the MIFR Article 11 of the RR

Thank you!

ITU – Radiocommunication Bureau

Questions to brmail@itu.int or brbc@itu.int