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Perspectives on the evolution of the broadcasting ecosystem

Overview of the Italian regulatory experience

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Perspectives on the evolution of the broadcasting ecosystem

1 | Terrestrial broadcasting reorganisation

Managing broadcasting services in the sub-700 MHz band
The Italian regulatory experience in spectrum refarming, frequency planning and the technological evolution of the DTT platform.

2 | Broadcast-broadband convergence

Extending the DTT platform through HbbTV
The integration of broadcast and IP-delivered services, the emerging regulatory challenges and the outcomes of AGCOM's recent work.

3 | The future challenge

Shaping the future broadcasting ecosystem
The future use of the sub-700 MHz band and the potential role of emerging technologies, including 5G Broadcast, within a flexible and internationally coordinated regulatory framework.

From the reorganisation of terrestrial broadcasting to a hybrid and progressively converging ecosystem

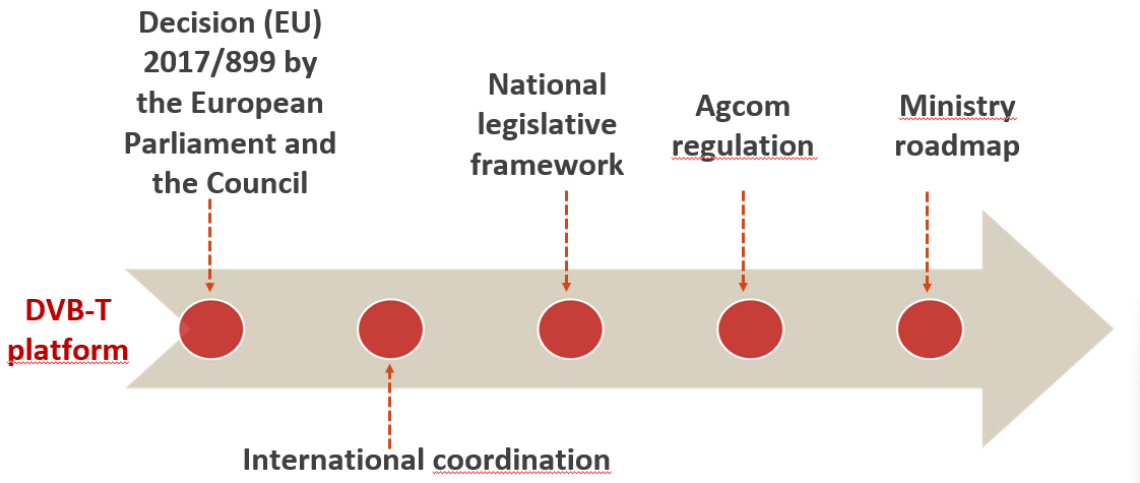


TERRESTRIAL BROADCASTING REORGANISATION

- MANAGING BROADCASTING SERVICES IN THE SUB-700 MHZ BAND
- THE ITALIAN EXPERIENCE FOLLOWING THE RELEASE OF THE 700 MHZ BAND
- SPECTRUM REFARMING • INTERNATIONAL COORDINATION • FREQUENCY PLANNING • TECHNOLOGICAL EVOLUTION OF DTT

The release of the 700 MHz band

A major transformation of the Italian broadcasting system



KEY OUTCOME

Not only a frequency migration, but a comprehensive reorganisation of the Italian DTT platform.

What changed?

1. **EU policy decision**

   Decision (EU) 2017/899 established a coordinated approach to the use of the 470–790 MHz band in the European Union.

2. **Spectrum release**

   The 694–790 MHz band was released from broadcasting and made available for wireless broadband services (700 MHz band clearance completed by 30 June 2022).

3. **DTT services reorganised below 694 MHz**

   National and local DTT services migrated to the remaining sub-700 MHz band, mainly within 470–694 MHz.

4. **Italian implementation**

   The transition required a national legislative framework, a new National Frequency Assignment Plan, a gradual and geographically coordinated migration roadmap, extensive cross-border coordination.

The impact on spectrum availability

Operating within substantially reduced spectrum resources

BEFORE REFARMING

40 UHF channels

320 MHz

Channels 21–60

AFTER REFARMING

28 UHF channels

224 MHz

Channels 21–48

30%

nominal reduction in UHF spectrum available for broadcasting

Additional planning constraints

- Application of the international principle of equitable access to spectrum
- Exclusive use of frequencies internationally coordinated and assigned to Italy

AT MOST

14

UHF frequencies available to Italy in each coordination area

The effective reduction in spectrum resources available for DTT planning was therefore significantly greater than the nominal 30%.

The Italian regulatory response

The National Frequency Assignment Plan for DTT

Planning principles

1	**International coordination**	Exclusive use of frequencies coordinated and assigned to Italy under international agreements: 14 UHF frequencies + VHF frequencies (where necessary)
2	**Spectrum efficiency**	Extensive use of Single Frequency Networks, advanced transmission standards (DVB-T2) and coding technologies (MPEG-4 at first, HEVC later)
3	**National coverage**	Planning of nationwide DTT networks, including a public-service multiplex, able to be splitted in macro areas for differentiated regional news
4	**Local broadcasting**	Dedicated spectrum resources and differentiated coverage obligations for local networks
5	**Service continuity**	A planning framework designed to preserve national, regional and local audiovisual services

Planned DTT network structure

12->11 **Nationwide networks**

26
1st Level local networks
(population coverage ≥90% in each technical area)

51
2nd Level local networks
(population coverage ≥50% in each technical area)

Local coverage safeguard

At least one 1st level (high-coverage) local network in each technical area
1 or more 2nd level local networks in each local service area.

The plan combined international coordination, spectrum efficiency and continuity of national and local broadcasting services.

Technology as a response to spectrum scarcity

Increasing transmission capacity while reducing spectrum use

DVB-T

19.9 Mbit/s

indicative multiplex capacity

Planning parameters
64-QAM • FEC 2/3 • 8k FFT
Guard interval: 1/4
Typical environment: MPEG-2 / MPEG-4

higher efficiency

DVB-T2

≈37 Mbit/s

up to approximately 40 Mbit/s without significant coverage loss

Planning parameters
256-QAM • FEC 2/3 • 32k extended FFT
Guard interval: 1/16
Progressive evolution towards HEVC

DVB-T2 provides almost twice the transmission capacity of DVB-T within the same 8 MHz television channel.

Conventional conversion criterion: 1 DVB-T multiplex = 0.5 DVB-T2 multiplex

Technological evolution is essential to compensate for reduced spectrum resources, but it must be accompanied by a gradual migration of both networks and receivers.

Evolution of the DTT platform and assignment of national DVB-T2 rights

National DVB-T2 assignment process

From DVB-T to DVB-T2

20 DVB-T multiplexes

↓ free conversion

10 DVB-T2 multiplexes

Conventional factor

1 DVB-T mux = 0.5 DVB-T2 mux

Network operator	DVB-T rights	Converted DVB-T2 rights	Final DVB-T2 rights
RAI	5	2.5	3
Elettronica Industriale	5	2.5	3
Persidera	5	2.5	3
Cairo	1	0.5	1
3lettronica Industriale	1	0.5	1
PrimaTV	1	0.5	
Europa Way	1	0.5	0.5
PDBST	1	0.5	0.5
TOTAL	**20 DVB-T muxes**	**10 DVB-T2 muxes**	**11 DVB-T2 muxes assigned**

Three-stage regulatory process

1 | Free conversion of existing rights

Existing DVB-T spectrum licences were converted, free of charge, into rights of use of transmission capacity on national DVB-T2 multiplexes.

The 0.5 conversion factor ensured non-discrimination among network operators.

2 | Assignment of a specific mux

The Ministry could assign one DVB-T2 mux to:

- one operator holding two 50% capacity rights; or
- two operators, each holding one 50% right, jointly entitled under a commercial agreement.

3 | Additional competitive onerous spectrum procedure

Four additional half-mux lots were assigned in June 2021 to Cairo, Persidera, RAI and Elettronica Industriale.

The procedure used the additional spectrum released after removal of the local transmission-capacity reservation.

Outcome: 11 of the 12 national DVB-T2 multiplexes have been assigned starting from 2019, having a ten-year duration.

Mux 12 remained unassigned and was repurposed for local DTT networks (VHF freq.) and DAB+ (VHF freq.)

Supporting the DTT transition

Public support, investment and progressive migration of networks and receivers

WHY SUPPORT WAS NEEDED — **High DTT penetration and the large number of households to be migrated required substantial investment by operators and the State.**

Two complementary support mechanisms

NATIONAL BROADCASTERS

Cost-refunding mechanism

Support for adapting transmission networks from DVB-T to DVB-T2.

LOCAL BROADCASTERS

Compensation mechanism

Compensation for the withdrawal of existing local spectrum rights.

Public funding allocated for the transition (2020–2022)

National broadcasters

€276.3 million

€24.1m (2020) + €24.1m (2021) + €228.1m (2022)

Local broadcasters

€304.2 million

€230.3m (2020) + €73.9m (2021)

TOTAL PUBLIC FUNDING

€580.5 million

allocated to national and local broadcasters

CURRENT STATUS — **The transition continues, with the consolidation of HEVC-coded programmes and the progressive upgrade of network infrastructure and reception equipment.**

Lessons from the Italian transition

Spectrum refarming is an ecosystem-wide process

1 Plan and coordinate

A clear migration roadmap and early cross-border coordination are essential.

2 Preserve continuity

Spectrum efficiency must be balanced with coverage, service continuity and pluralism.

3 Differentiate solutions

National, regional and local broadcasting may require different regulatory approaches.

4 Migrate the whole ecosystem

Network upgrades must be accompanied by the gradual replacement of receivers.

5 Support the transition

Public intervention may be needed to mitigate costs for operators and viewers.

Reduced spectrum availability also increases the need for complementary IP-based distribution solutions.

This provides the bridge from DTT reorganisation to broadcast-broadband convergence through HbbTV.

BROADCAST–BROADBAND CONVERGENCE

Extending the DTT platform through HbbTV

- WHY HBBTV?
- THE ITALIAN MARKET AND DEVICE ECOSYSTEM
- SERVICES AND USE CASES
- BENEFITS AND EMERGING BUSINESS MODELS
- AGCOM'S HBBTV INQUIRY
- MAIN REGULATORY CHALLENGES

Why HbbTV?

ITALIAN MILESTONE

HbbTV 2.0.1 adopted as the single standard for interactive TV services

HD Book 4.0 • replacing MHP

Bringing broadcast and broadband services together on the TV screen
Combining the reach of broadcasting with the flexibility of IP delivery

BROADCASTER / FSMA

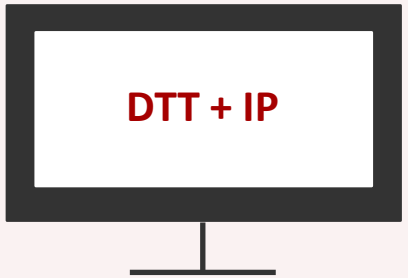
DTT broadcast stream

Video & audio	Linear television service
AIT	Application discovery and URL
Markers	Potential ad-insertion points

DTT signal

AIT + URL markers

HbbTV-COMPATIBLE TV



DTT tuner • Broadband connection
HbbTV application environment

Broadband

Application + IP content

BROADBAND / IP

Application server

- **HbbTV application**
- Catch-up and VOD
- Additional linear channels
- Interactive and accessibility services

Application launch

CALL TO ACTION	Viewer explicitly opens the interactive service
AUTOSTART / JUMP	Application or IP stream starts automatically
AD INSERTION	Markers identify possible broadband ad breaks

HbbTV extends DTT by combining broadcast reach with the flexibility and interactivity of IP delivery.

The Italian HbbTV ecosystem: devices and connectivity

A large installed base and broad network availability, but access is not yet universal

Device ecosystem

End-2024

25.9m	44.6m	24.2m	>55%
households	TV devices	smart TVs	TV devices enabled for HbbTV

ACCESS GAP **Effective access also requires a compatible HbbTV receiver, an Internet-connected TV set and adequate broadband coverage.**

Household broadband coverage in 2025



30 Mbps is sufficient for most HbbTV services; higher speeds may be needed for bandwidth-intensive services or simultaneous use by several devices.

FTTC coverage	FTTH coverage	Territorial differences remain
96.7% of households	77.6% of households	Availability of broadband and ultra-broadband services is still uneven across the country.

Sources: AGCOM, Annex A to Decision No. 292/25/CONS (device data, end-2024); AGCOM Broadband Map (connectivity data, 2025).

Services and use cases enabled by HbbTV

From linear broadcasting to an enriched audiovisual environment

1 Enhanced viewing

- Restart and catch-up TV
- Video on demand
- Enhanced electronic programme guide
- Broadcaster portals and applications

2 Additional content

- Additional linear and thematic channels
- Higher-quality services, including 4K
- Local news and territorial content on demand
- Visual radio and thematic radio services

3 Interaction and inclusion

- Contextual information and interactive applications
- Voting and audience interaction
- Advanced accessibility services
- Public-interest information and civic alerts

4 Data and monetisation

- Audience measurement
- Addressable advertising
- AVOD and advertising-supported services
- Premium content, pay-per-view and subscriptions

OPPORTUNITIES FOR LOCAL AND SMALLER BROADCASTERS

Direct access to local news, thematic content, audiovisual archives and visual-radio services, without developing separate native applications for each proprietary TV environment.

The DTT channel becomes the entry point to a broader environment combining linear, on-demand, interactive and personalised services.

AGCOM's HbbTV investigation

Assessing market developments, technological opportunities and the regulatory framework

PURPOSE

To examine how HbbTV is changing the Italian television ecosystem and provide an evidence base for possible regulatory action.

Scope of the inquiry

Technology and market

Use of HbbTV on DTT, future developments and market opportunities

Content and business models

Types of services, monetisation models and value-added offers

Technical benefits and limitations

Interoperability, device compatibility, network stability and service continuity

International experience

Good practices and implementation examples in other countries

Regulatory framework

Authorisations, editorial responsibility, LCN use, transparency and user protection

PARTICIPANTS

Broadcasters • network operators • technology providers • broadcasting associations • Internet-industry representatives

Aeranti-Corallo • HbbTV Association • AIIP • CRTV • Consultmedia • Kineton • Persidera • RAI • RTI

Source: AGCOM, Decisions No. 138/25/CONS and No. 292/25/CONS

The inquiry provided the evidence base for evaluating subsequent regulatory action on hybrid services delivered through the DTT platform.

Benefits and emerging business models

HbbTV broadens the DTT value proposition for broadcasters, audiences and advertisers

FOR BROADCASTERS

- One interoperable application across compatible TV brands
- Direct control of the application and generated data
- Extension of the DTT offer without relying only on broadcast capacity
- Lower development costs than separate proprietary native apps

FOR AUDIENCES

- Immediate access from the familiar linear-TV environment
- More choice across linear, catch-up and on-demand content
- Higher quality, personalisation and advanced accessibility
- No need to search for and install separate applications

FOR ADVERTISERS

- Addressable and contextual advertising
- Improved audience measurement and campaign targeting
- Replacement of selected broadcast spots with IP-delivered advertising
- New combinations of broadcast reach and digital precision

Emerging business models

FTA + advertising

Free-to-air services supported by traditional or targeted advertising

AVOD

On-demand content financed through advertising

Freemium

A free core offer combined with paid premium features

Pay-per-view / subscription

Payment for individual events, libraries or premium services

Partnerships and value-added services

Cooperation with digital content, technology and service providers

HbbTV can lower entry barriers and diversify revenues, while raising new questions on data protection, transparency and responsibility.

Main regulatory challenges

When the viewer moves from the DTT environment to IP-delivered services

DTT / authorised linear service → **HbbTV application / IP service** → **Viewer experience**

CALL TO ACTION
or JUMP MODE

1 Transparency to viewers

Users should clearly understand when they leave the broadcast environment and access an IP-delivered service.

2 Editorial responsibility

Content and services must remain attributable to an identifiable and appropriately authorised media-service provider.

3 LCN integrity

Channel numbers should not become gateways to unrelated, arbitrary or unauthorised IP-only services.

4 Equivalent user protection

Parental control, subtitles, dual audio, accessibility and other safeguards should remain effective in the IP environment.

5 Interoperability and conformity

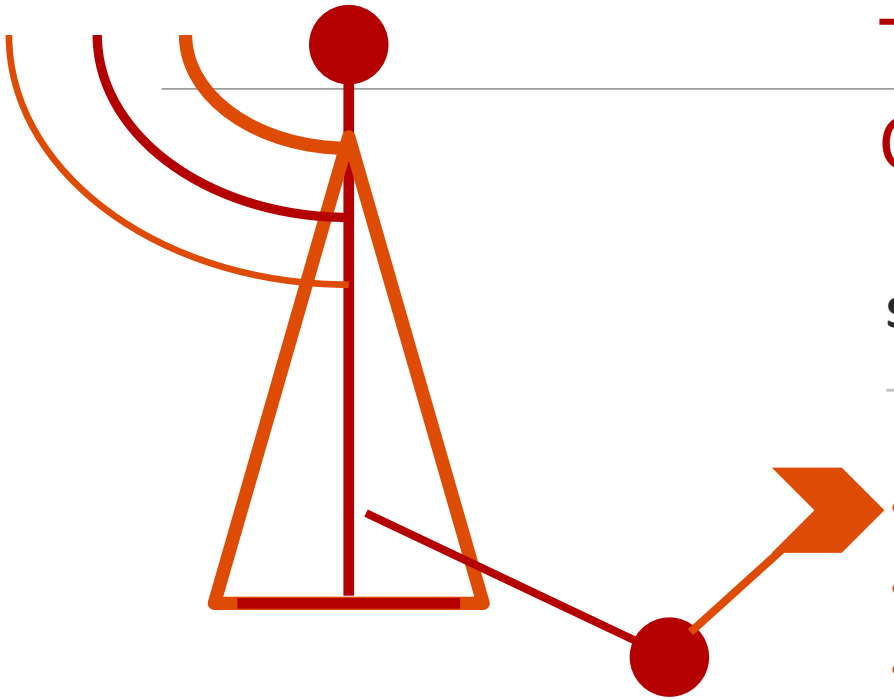
Applications and receivers should comply with HbbTV specifications and behave consistently across brands and models.

6 Data and advertising

Consent, personal-data processing and addressable advertising require clear information and accountable data governance.

The regulatory objective is not to restrict hybrid innovation, but to preserve transparency, accountability and comparable protection across broadcast and IP environments.

Source: AGCOM, Annex A to Decision No. 292/25/CONS



THE FUTURE CHALLENGE

Shaping the future broadcasting ecosystem

- THE SUB-700 MHz BAND AFTER 2030
- THE EUROPEAN AND INTERNATIONAL FRAMEWORK
- DIFFERENT NATIONAL BROADCASTING NEEDS
- THE ROLE OF DTT
- FUTURE PERSPECTIVES: 5G BROADCAST
- FLEXIBILITY, COEXISTENCE AND CROSS-BORDER COORDINATION

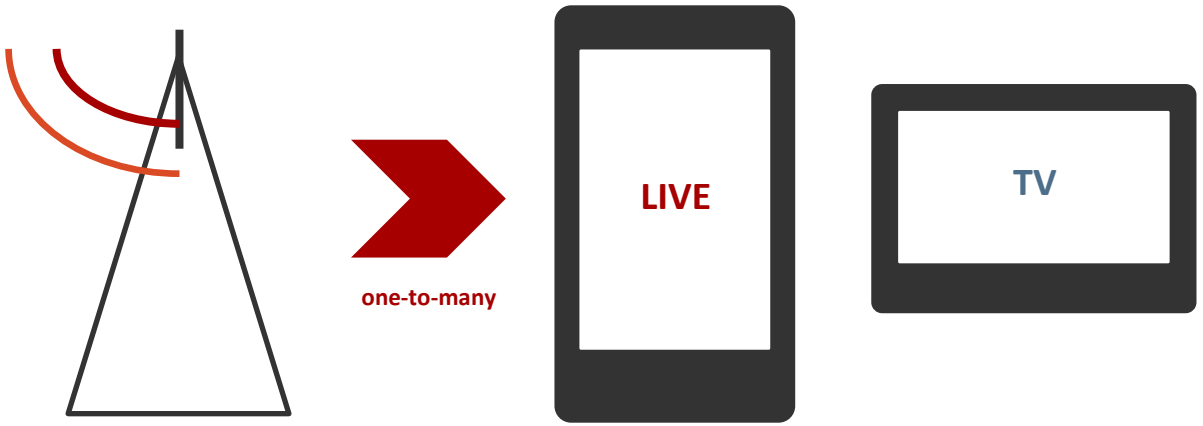
Future perspectives: 5G Broadcast

Extending free-to-air broadcasting to mobile and hybrid environments

ITALIAN SPECTRUM CONTEXT — **WRC-23 maintained the broadcasting allocation of 470–694 MHz for Italy; the band will be reviewed again at WRC-31.**

What 5G Broadcast adds

Reference framework: RSPG Report on the future use of the 470–694 MHz band (RSPG25-033, November 2025)
European Commission Report on the use of the sub-700 MHz band in the EU (COM(2026) 385 final, July 2026)



HPHT broadcast network

Mobile • portable • fixed reception

SIM-free	No mobile subscription or user data plan required
Free-to-air	Broadcast delivery to an unlimited number of users
Resilient	Reliable live content and public-warning applications
Hybrid	Linear broadcast combined with broadband interactivity

European momentum and remaining barriers

24 trials in 18 European countries

Key conditions: compatible devices • sustainable business model • investment case • indoor coverage • long-term spectrum certainty

Thank you for attention!

A. DURANTINI - PERSPECTIVES ON THE EVOLUTION OF THE BROADCASTING ECOSYSTEM - ITALIAN EXPERIENCE - 5 OCTOBER 2026