5G Broadcast for TV in France: technical, economic and regulatory modalities

August 2025

Source: Outputs from the cross-industry working group bringing together the main French broadcasters - workshops from April to June 2025

Summary

1. Context & Presentation of 5G Broadcast Technology

5G Broadcast is a technology for broadcasting linear video content to mobile devices such as smartphones. The technology operates in the ultra high frequency (UHF) band, i.e. on frequencies currently used by DTT in particular. It represents a major step towards modernizing terrestrial television.

Derived from the technical ecosystem of mobile telephony and standardized by 3GPP[1], it offers several advantages:

- An integral part of 5G technology, it will be compatible with smartphones without any specific hardware, since the most common chipsets already implement it in the same way as the rest of the standard.
- The service will enable linear channels to be broadcast, with possibilities of interactivity (similar to HbbTV technology[2]) and advertising segmentation.
- Broadcasting via 5G Broadcast has a significantly lower environmental footprint than streaming: one hour of 5GB viewing produces about 24g of CO2eq, which is 54% less than the same duration of streaming. During usage, this represents a total energy consumption saving (from networks, servers, and terminals) of 85% compared to streaming via mobile network[3].

5G Broadcast technology is particularly well suited to mobile use: outdoor, vehicular and light indoor. It will be a **complementary technology** to traditional DTT broadcasting for fixed reception in homes, and is intended to coexist with OTT (Over-The-Top) streaming on WiFi and cellular networks (4G/5G).

Since the beginning of 2024, the entire ecosystem has been working together to ensure that the technology can be rolled out in France under the best possible conditions:

- Broadcast operators and a publisher from various European countries (TDF in France, and its counterparts in Germany, Spain, Poland, Italy and the Czech Republic) are working as part of the international 5G Broadcast Strategic Task Force (5BSTF) to align their approaches;
- Chipset and handset manufacturers (e.g. Xiaomi, Motorola) have been working with broadcast operators to ensure that new handsets are fully compatible, so that the service can be launched as early as 2028;
- A trial carried out during the Paris 2024 Olympic and Paralympic Games enabled a large-scale, end-to-end technical validation of the technology, on commercial terminals supplemented with ad hoc software (middleware[4]);

[1] 3rd Generation Partnership Project: cooperation between international telecommunication standards bodies to produce, publish and maintain technical specifications for mobile networks

[2] Hybrid Broadcast Broadband TV: a standard that allows channels to link their linear programs with their non-linear content offered on demand on the Internet (in OTT)

[3] Sources: ARCOM ARCEP ADEME study on the environmental footprint of audiovisual uses & TDF study

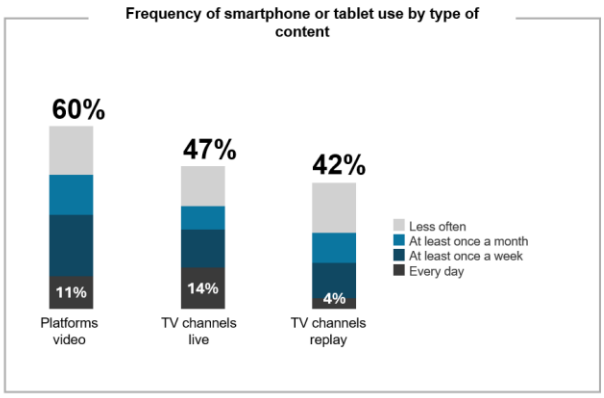
4 Middleware: software that acts as a gateway between other applications, tools and databases to offer users unified services.

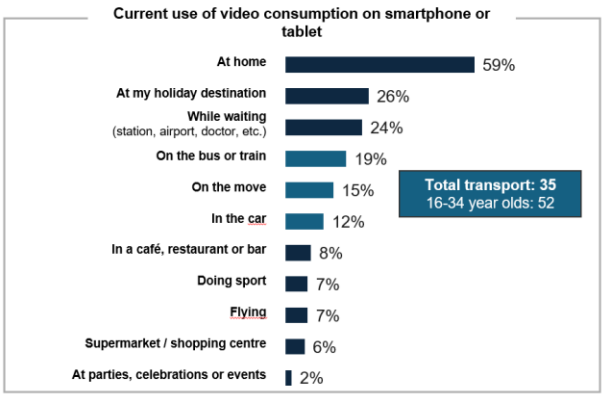
- A field survey and economic study commissioned by TDF and shared with the broadcasters validated the usage potential and the business model;
- A working group bringing together broadcasters and TDF met between April and June 2025 to share assumptions and prerequisites for the deployment of 5G Broadcast technology in France, the conclusions of which are presented in this white paper.

2. Priority use cases and coverage strategy

An unprecedented consumer study carried out in January 2025 by the Kantar institute among a representative sample of 2045 respondents **confirms the potential of linear television on the move:**

- Mobile video consumption on smartphones is now at the heart of French viewing habits, but television channels benefit little from it: 72% of French people consume video content on their small screen; 47% of them watch TV channels live and 42% replay.
- Video on mobile phones is watched primarily at home (59%), but transport is also a major use (35%, and even 52% for 16–34-year-olds), as are holiday destinations (26%).

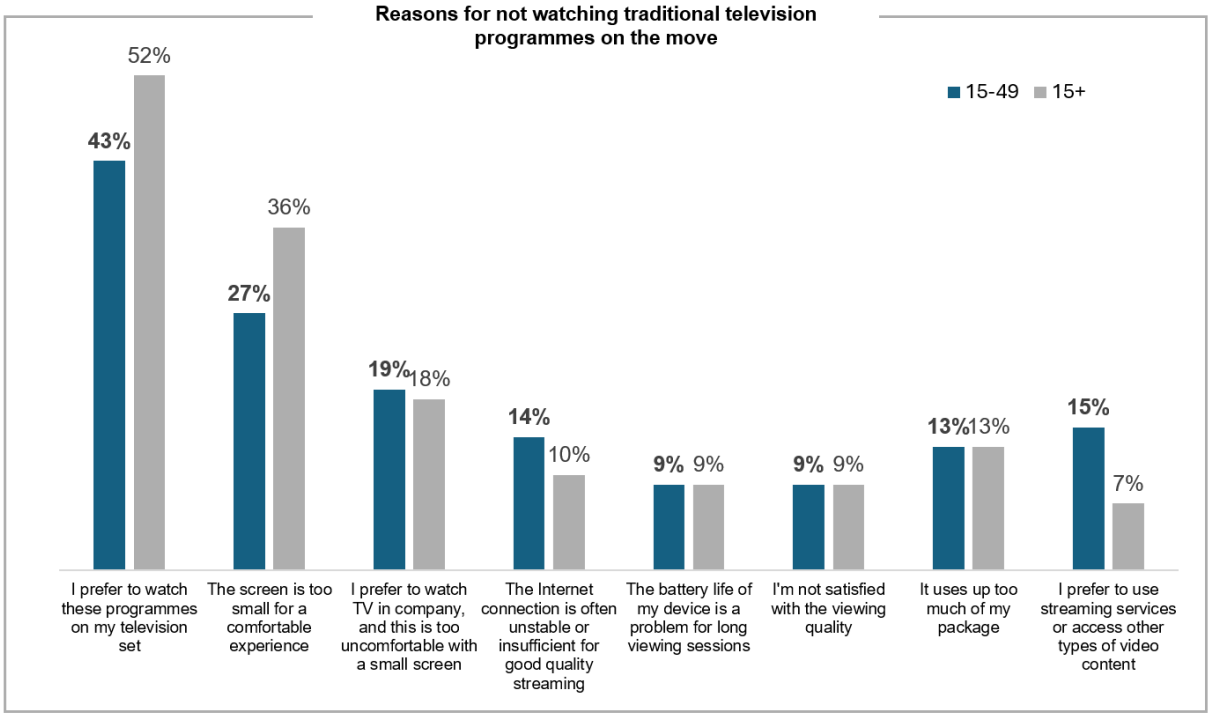




Sources: Kantar field study in the form of a CAWI questionnaire conducted in January 2025 among 2,045 Kantar panelists aged 16 and over, representative of the French population in terms of age, gender, occupation and region (UDA9).

The study also highlights the existence of certain obstacles to these uses, particularly related to technical limitations, which 5G Broadcast could help overcome, and thus contribute to the development of mobile TV content consumption:

- Mobile TV use is hampered by the size of the screen, but also by technical limitations linked to the broadcast channel: among the reasons given for not being able to watch traditional TV programs on the move, 14% of 15-49 year-olds cite an unstable or inadequate Internet connection, 13% mention the cost of the mobile package, and 9% cite battery life that is too short for long-term viewing or insufficient quality;
- 5G Broadcast would remove these obstacles and stimulate usage: 78% of potential users of the service would consume more on the move because their mobile data would be conserved, and 77% would increase their usage because the battery would be conserved;
- More than one in two 15–49-year-olds say they are ready to use 5G Broadcast to watch TV on the move.



Sources: Kantar field study in the form of a CAWI questionnaire conducted in January 2025 among 2,045 Kantar panelists aged 16 and over, representative of the French population in terms of age, gender, occupation and region (UDA9).

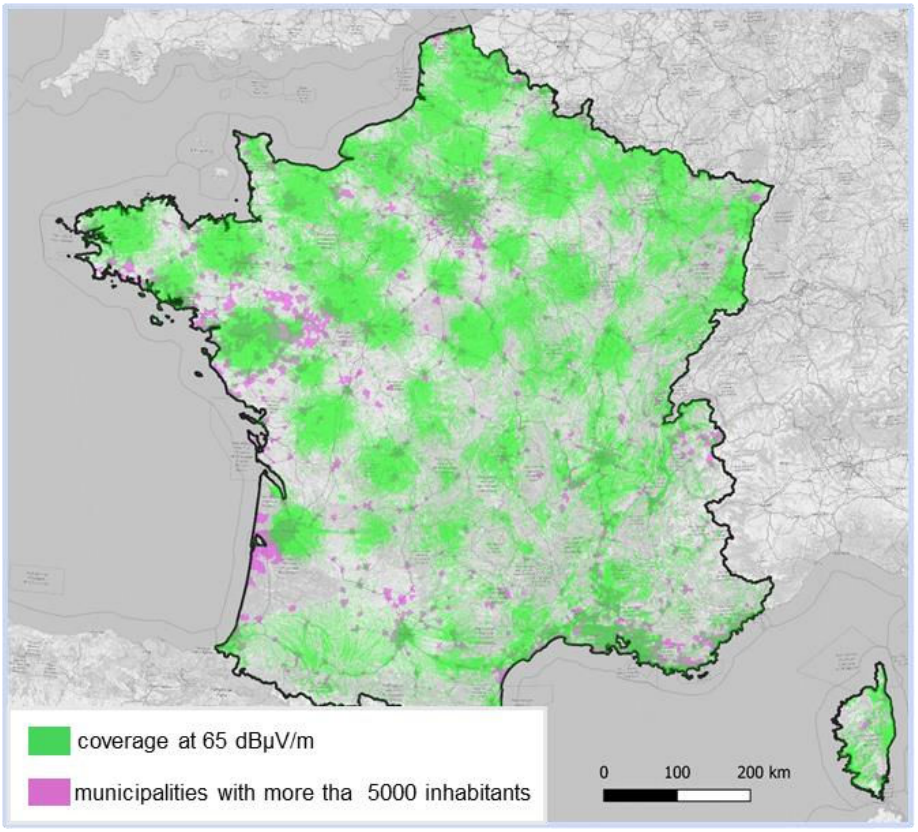
5G Broadcast, a complementary technology focused on mobile use and outdoor reception:

- In France, 5G Broadcast technology is envisaged as an additional reception mode: smartphone applications will be able to seamlessly switch from one reception mode to another, to deliver an optimal user experience;
- 5G Broadcast is designed to complement 'indoor' uses, which are already covered by DTT on TV sets, and by OTT via WiFi for mobile terminals;
- The technology is based on the infrastructure of the existing DTT broadcasting sites that contribute most in terms of coverage, targeting the most densely populated areas;
- With a view to limiting investment and costs, 5G Broadcast does not rule out the possibility of supplements and gradual adaptation of the service in line with changes in usage and technological innovation.

The service could therefore be ramped up in several stages:

Phase 1: an optimized approach to coverage based on the existing network. The following technical parameters have been applied to project the target coverage:

- Such a system, based on the 497 existing broadcasting sites that contribute most, would result in **total coverage of 44.3 million inhabitants over 211,900 km2, i.e. 68% of the population of mainland France.**



Sources: TDF projection

This projection assumes broadcasting at a threshold of 65 dBµV/m[5], outdoor reception at 1.5m with sensitivity analysis, using a 5G Broadcast configuration identical to that of DTT (HMA, PAR, Polarization), cross-referenced with the INSEE 2021 population base (uniform distribution over the Ilots Regroupés pour l'Information Statistique IRIS)[6].

The study carried out by TDF in January 2025 established that this system is likely to offer a satisfactory economic balance for broadcasters: the costs of broadcasting based on an optimized existing could be covered by the additional advertising revenue generated by the incremental audience generated by 5G Broadcast.

[5] Link assessment based on available standardized elements, in particular the standard TR063 of the European Broadcasting Union EBU.
[6] Level of coverage estimated to be similar with 200m gridded data (social and fiscal localized file) from INSEE

Phase 2: Targeted complementary coverage to key main use cases will improve coverage in a controlled economy (Metro, stations, motorways, indoor). Solutions for complementarity of coverage were discussed to address more specifically the expectations expressed by the public during the Kantar study.

- **Underground public transport (metro),** which will be the subject of experiments with 2 technical solutions:
    - The deployment of a 5G Broadcast coverage solution based on existing installations (radiating cables, DAS[7], etc.)
    - The use of dedicated repeaters

  A first trial should take place in 2025 on a metro line.
- **The coverage of major roads** could also be the subject of specific planning with complementary sites.
- For **high-speed transport**, specific studies can be carried out to assess the impact of the Doppler effect and the Faraday cage effect of TGV trains.
- **Indoor reception is constrained by the building and surrounding structures**, which can have a more or less heavy impact on signal penetration, depending on their nature (HQE[8], underground). Coverage prediction is therefore specific and requires in-depth studies on a case-by-case basis. At this stage, priority is given to optimizing the switchover experience between the 5G Broadcast network and the unicast network (4G/5G or WiFi), as well as to a targeted approach to the coverage of semi-open "light indoor" buildings open to the public and relevant to the identified use cases: stations, stadiums, etc.

These supplements are intended to be studied and evaluated during phase 1.

Optional phase 3: wider outdoor coverage is possible using other existing sites or new sites, on a perimeter that remains to be determined and depending on the success of the previous phases and the return on investment (ROI) of these additional sites.

[7] Distributed Antenna Systems
[8] High Environmental Quality

3. Signal specifications and technical system

In order to ensure optimal coverage while taking into account the specific constraints of smartphones, **the following technical assumptions are envisaged:**

- Reception threshold of 65 dBµV/m at 1.5m from the ground to take into account,
    - The much lower gain of a smartphone's built-in antenna,
    - Reception height: hand-held terminal vs. roof antenna,
- Modulation: 16QAM (vs. 64QAM in DVB-T or 256QAM in DVB-T2).

These parameters are the result of the work and large-scale experimentation carried out in the summer of 2024 during the Paris Olympic Games where different modulation and coding schemes (MCS[9]) were tested. 3GPP defines a full range of coding schemes with the flexibility to adapt the rates to radio conditions and planning, and according to the desired service.

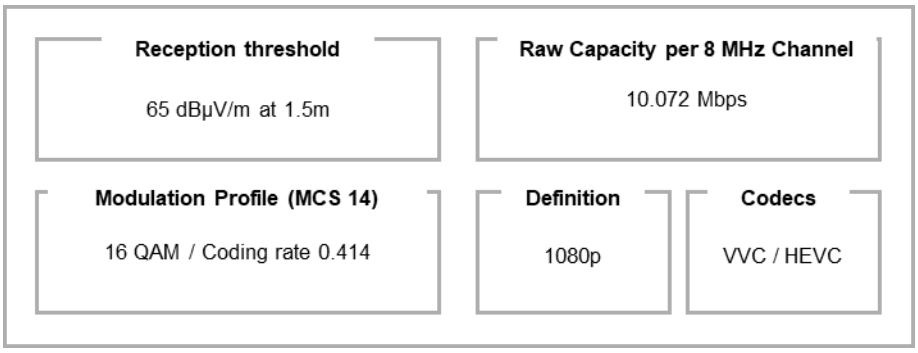
For the time being, the assumption is that a uniform coding and modulation scheme will be used throughout the territory, which has the advantage of being easy to understand and would not require any regulatory changes.
The best compromise among the standardized schemes is the MCS 14, which allows broadcasting on an 8 MHz multiplex. Previously limited to a bandwidth of 5 MHz, broadcasting on 8 MHz channels is now available in the latest releases of the standard, which will allow the **Broadcast of 8 to 10 quality channels in 5G Broadcast**. This makes **5G Broadcast planning compatible with existing DTT planning** - in particular, it will be possible to rely on DVB-T/T2 SFN plates.

On the basis of the various tests carried out during the technical trials for the Paris Olympics, the encoding formats and parameters envisaged are as follows:

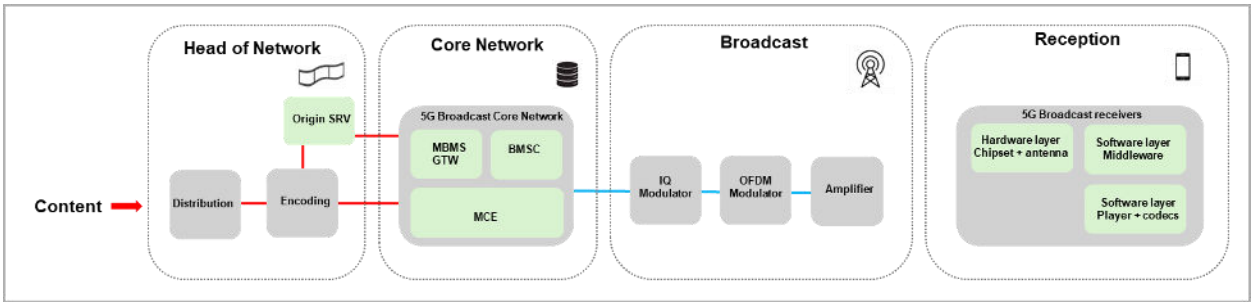
- The full HD **1080p (or even HD ready 720p)** image format **is sufficient** given the size of mobile terminal screens.
- **HDR (High Dynamic Range)** compatibility**, which is technically feasible, will need to be studied depending on the compatibility of future handsets due to hit the market in 2027/2028.**
- Various video codecs are possible. Subject to terminal compatibility (and in particular the availability of a hardware decoding function in the System-on-Chip, SoC)**, the most recent codecs such as HEVC or VVC (Versatile Video Coding) are to be preferred.**

[9] MCS: Modulation Coding Scheme

Summary of signal specifications



Macro functional synoptic diagram



The 5G Broadcast will rely on a core network technical setup to process the broadcast signal and render it in the player, relying on the middleware of mobile terminals.

This mode of distribution will constitute the main use case.

However, to ensure continuity of service in an area not covered by 5G Broadcast, a substitution solution between the 5G Broadcast stream and the unicast stream is anticipated. The preferred technical path at this stage would be within the player thanks to the broadcasting of an additional PID[10] specific to each service, which regularly broadcasts a substitution URL pointing to the corresponding unicast stream. The management of the lag between the two streams could be done via the middleware or via the 5G Broadcast application.

[10] Program ID

A co-innovation approach between ecosystem actors with R&D work is already underway to anticipate, streamline, and accelerate the integration of 5G Broadcast into the two technical layers of the terminals:

- On the software side ("middleware") with the provision of a labeling platform for proprietary middlewares (foundries / Original Equipment Manufacturer OEM), and participation in the development of a standard middleware;
- On the "player" side, within the various applications that will render the signal, by understanding the technical prerequisites of the broadcasters and sharing the technical foundation built for the needs of the experimentation (e.g., InsTNT application) and the development of additional functionalities.

4. Offer and Distribution

The offer will be based on the take-up of existing services that are already widely distributed. Their simultaneous broadcast (“simulcast”) – for a limited number of services (8 to 10) – will enable this service to be deployed in a cost-effective manner.

The potential of 5G Broadcast for existing channels can be evaluated on the basis of various criteria:

- Cost-effective: the balance between potential incremental revenues and additional delivery costs may vary depending on the channel monetization model.
- Group vision: channels belonging to groups are keen to maintain consistency and potentially a rebound logic between channels, which will need to be taken into account in their distribution choices, for example by favoring the provision of channels that are switched from one to another during long live events.
- User Experience (UX): integration on broadcasters' digital platforms will need be aligned with the groups’ strategic ambitions in terms of user experience and depth of offering.
- Day part: some channels will have greater potential on day parts (time slots) likely to be favored in 5G Broadcast uses, because they correspond, for example, to a travel time (morning, access prime time).
- Targets: the affinity of a channel's programs with future 5G Broadcast consumers (potentially younger) could have an influence on its audience potential via this specific delivery/broadcast mode.
- Linear: the ability to tap into the 5G Broadcast audience pool will depend in part on a channel's strength in live content.

The 5G Broadcast streams will be accessible in the broadcasters' applications and will also be available in the applications of any 'audiovisual service distributors' (registered with Arcom) who wish to use them.

The 5G Broadcast audience will be measured directly by Médiamétrie in the same way as mobile terminals outside the home.

5. Regulatory framework

In 2007, the 1986 Act was amended to provide greater flexibility and scope for experimentation with a view to deploying Personal Mobile Television, as set out in point V of Article 30-1: "*Subject to Articles 39 to 41-4, the authorization of a personal mobile television service consisting of the takeover of a previously authorized service by terrestrial radio in digital mode is treated in the same way as the initial authorization, of which it is merely an extension, regardless of how it is marketed and notwithstanding the provisions of Article 28, 14°*. **"**

Although 5G Broadcast s being introduced in a different context from that of Personal Mobile Television envisaged in 2007[11], **this article could be applied to the deployment of this technology making it possible to envisage** a 5G Broadcast authorization in simulcast, that would not be considered as an autonomous authorization, but simply as an extension of the basic authorization. If the coverage obligations are already met by the basic authorization, the 95% requirement should not apply to the 5G Broadcast license.

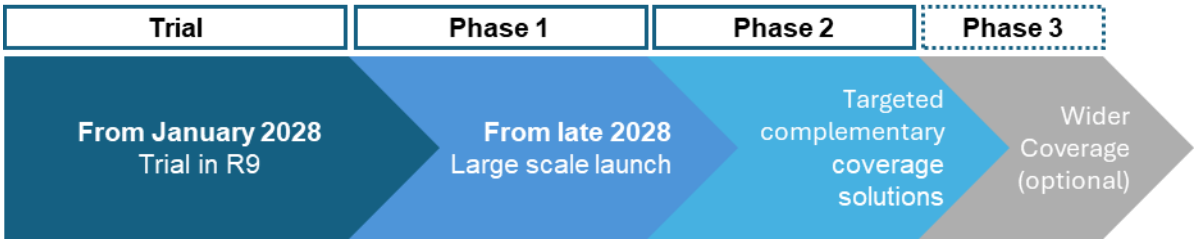
Some regulatory requirements will need to be anticipated in this scenario:

- An update of the signal decree dedicated to the TMP, including the broadcasting standard, the frequency band and the coding standards, as well as the multiplex share "thousandths" deliberation and the signaling profile.
- A call for applications, limited to existing players, with a view to resuming the simulcast, potentially coupled with a call for applications for UHD.

The simulcast scenario as envisaged would remove most of the obstacles related to contracts, distribution regulations and agreements with rights holders, as is the case for UHD. This possibility remains to be discussed with the regulators and broadcasters concerned.

[11] Personal Mobile Television (PMT) appeared in 2007 in the Audiovisual Law in the context of the DVB-H standard developed by the DVB Forum. This technology required dedicated components that were different from the chipsets of 3G mobile phones of the time. In addition, Qualcomm, the leader in mobile chipsets, supported the FLO standard at the time, which is different from DVB-H. With 5G Broadcast, the same core component (chipset) enables 4G, 5G and 5G Broadcast and Qualcomm supports all three. The difficulties encountered with DVB-H are therefore no longer applicable to 5G Broadcast.

6. Provisional timeline



A launch could be envisaged from the end of 2028 or early 2029, and at the latest at the beginning of 2030, subject to two conditions: having a sufficient fleet of compatible smartphones and the availability of a multiplex. This would follow the transition of DTT from DVBT to DVB-T2 and the end of UHD multicast.
A large-scale multi-city trial in the multiplex R9 is conceivable from January 2028.

This roadmap remains to be developed collectively and with ARCOM. Sufficient time, resources and appropriate support will be needed to ensure a successful transition under the right conditions.