

# PLAYOUT BROADCAST & TRANSMISSION THE \_\_\_\_\_ BRIDGE

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Menu

## 5G Broadcast: Part 2 - 5G Broadcast Unites & Divides Different Factions



5G Broadcast is coming to the boil as different factions converge on the field, including traditional broadcasters, streaming providers, mobile operators, CDN (Content Delivery Network) companies, and mobile device makers, as well as regulators at both global and national levels.

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Interest in mobile broadcast has reached new heights this year after subsiding during the Covid-19 pandemic and the technology is now on track for wider deployment by broadcasters and video service providers. This threatens to change the guard of the video ecosystem as mobile operators challenge established satellite, cable and digital terrestrial networks for control of video delivery as it migrates to IP based transmission. In this second part of our 5G Broadcast series we examine the dynamics and tensions of this emerging ecosystem of players before diving deeper into technical and logistical aspects in future articles.

The coming of age of mobile broadcast under 5G has been witnessed in 2023 by tensions coming to the boil among participants with skin in the game. This is most notable among providers of digital terrestrial infrastructure, or in the USA the major TV station networks.

These operators rely on DTT infrastructure for Over The Air transmission and have invested heavily in the ATSC 3.0 third generation American system for TV broadcasting, designed for migration to all-IP transmission over legacy DTT infrastructure.

One of the major US networks recently aired a complaint that 5G Broadcast was being foisted on the industry at best prematurely. "The implied notion that, because 5G Broadcast is a 3GPP standard and in phones today, it somehow magically opens the market to hundreds of millions of devices compatible with 5G wireless reception is wishful thinking."

This response perhaps let the cat out of the bag, especially as the note went on to argue that ATSC 3.0 was a "more efficient, robust, mobile, and evolvable" platform. Time will inevitably tell us how these contradictory forces play out in the US. Certainly, more and more broadcasters are coming round to the idea that the future of over the air transmission may reside with a fusion between existing digital terrestrial and mobile networks under the High-Power High Tower (HPHT) overlay model.

In the UK, the main domestic transmitter company that has served multiple broadcasters for many years is also in the debate. They have been engaged in a campaign lobbying for long term retention of digital terrestrial for distribution of the country's Freeview free to air channels.

But this campaign has been undermined somewhat by the BBC's stated strategy as the leading public service broadcaster of moving towards internet-only distribution, over both fixed and mobile networks. The BBC has steered increasingly towards the 5G Broadcast camp after conducting various trials. Indeed, BBC Director General Tim Davie has told the Royal Television Society that he sees the corporation going online-only over time. The question was how quickly this could be done and how to educate consumers so that as few as possible would be left out. Inevitably, this implied growing support for 5G Broadcast and Multicast.

Sentiment also seems to be flowing that way in the USA, attracting a growing range of digital stations challenging those traditional big networks. One of these called WWOO based in the Boston area in September 2023 launched the nation's first 24/7 5G broadcast channel to gain approval from regulator the FCC.

This channel is reaching out to emergency responders, arguing that consumers are more likely to be tuned into their smart phones these days than a TV set when some major public safety event breaks. The company has claimed this confirms 5G's ability to combine broadcasting with emergency response under a single umbrella and reach people where they are.

To some extent the maturation of 5G Broadcast/Multicast, reinforced by enhancements in successive releases of the 5G standard from the 3GPP, changes the tone of the longstanding wrangles between mobile operators and broadcasters over spectrum. This has tended to involve one way traffic as spectrum has ebbed from broadcasters to mobile operators in line with changing consumer behavior and growing consumption of content over the mobile internet. This migration capitalized on the digital dividend liberated as broadcasters switch off legacy analog transmission.

But while in the past the relationship between the two camps has been rocky if not downright stormy, there is some sense of a growing purpose, except among those with stakes in digital terrestrial transmission standing to lose out directly.

This changing atmosphere can be seen most clearly in the machinations of the European Union (EU), which has faced sustained kick back over almost two decades from its public service broadcasters against spectral encroachment from the mobile industry. This led to the EU's executive body, the European Commission, reassuring broadcasters on various occasions that their core spectrum would be left intact.

But note the wording, which does not imply that the current terrestrial system would be left alone, merely that there would be guaranteed spectrum for broadcast transmission. To some extent the old argument was dissipating as broadcasting migrated to the internet.

Indeed, Europe's leading broadcasters in July 2023 signed a Memorandum of Understanding (MoU) ahead of the World Radio Conference 2023 concluding in December, calling for a joint European Roadmap defining new milestones. These included roll-out of 5G Broadcast-based services, initially as supplements to existing DTT deployments.

This MoU was signed by France Télévisions, Italy's RAI, Germany's SWR and BR, and Ireland's RTÉ, among others, all PSBs that had previously viewed mobile networks as existential threats to their operations. But then in the past broadcasters were being denied access to spectrum over which they had previously transmitted.

The spectrum of interest lies in the sub 700 MHz band (470 -694 MHz in most regions), which is still allocated to broadcast services in ITU Region 1 comprising Europe, Africa and Middle East, while being shared also with mobile services in parts of the other regions. This band will most likely be retained for video broadcast in Europe, whether this is DTT or some form of 5G Broadcast.

In the USA there is rising expectation that the WWOO experiment will lead to a national 5G Broadcast network that will run over sub 700 MHz frequencies for downstream-only transmission that will complement 5G services operating in higher bands over normal smaller cells. The company XGen Network has been set up as a possible broker for wireless carriers and content owners interested in this proposed national 5G Broadcast platform.

Besides national linear or live TV, a more local use case for 5G Broadcast has emerged for simultaneous transmissions of transient content such as action replays or clips during sporting events in stadia, as well as potentially music concerts. 5G Multicast scores here by overcoming the local traffic congestion that results when clips are widely accessed on a unicast one-to-one basis just after an event such as a goal being scored.

5G Broadcast was tried out in this capacity by the English football club MK Dons during a match against local rival Ipswich Town in 2022. This delivered multiple high-quality streams of the action to mobile phones in a trial set up by 5G Vista (Video in Stadia Technical Architecture), a UK government-backed initiative seeking to demonstrate the potential of 5G broadcast.

While successful technically this trial raised the economic question of cost and revenue. Football fans were found reluctant to pay extra for such a utility, even though they were happy to use it. It is possible fans of sports such as motor racing might be more willing to pay as addicts to statistics associated with their events.

5G Broadcast also has appeal for mobile operators themselves, both as a potential source of new revenue and for cutting bandwidth and spectrum costs associated with profligate unicast transmission of live or linear events to multiple users at the same time. Multicast scores here by pruning transmission back just to users wanting to view at a given time, and crucially only sending a single instance of a stream over each network link leading towards a downstream viewer. This includes the final cell or RAN (Radio Access Network ) itself.

Most mobile operators are telcos that also offer fixed broadband networks, and these also benefit from multicast transmission. Indeed, it was with fixed networks mostly in mind that UK telco BT developed its Multicast-Assisted Unicast Delivery (MAUD), whose launch was [covered](#) by The Broadcast Bridge.

Unlike 5G Broadcast with its wider remit including emergency response, MAUD was developed largely to convert unicast to multicast transmission to save bandwidth as demand ramps up. It was developed effectively as an extension over the internet of traditional IP multicast as deployed over managed networks in IPTV services. The innovation lay in enabling efficient live streaming over unmanaged fixed broadband networks without requiring any changes to viewing devices.

MAUD does not address the additional complexities of multicast transmission over mobile networks, including the challenge of sustaining the links as users move from cell to cell. These will be discussed in a future article in this series. The main point to note here is that 5G Broadcast and Multicast involve participation of various entities and components along the delivery path.

This includes CDN providers, which may stand to gain revenue from carriage of multiple unicast streams but also risk being overwhelmed by popular live events on a large scale. For this reason CDN operators are also interested in switching from unicast to multicast as demand for live or linear content ramps up.

In Austria, national broadcaster ORS has collaborated with local radio component maker Bitstem GmbH to develop a system called Nakolos that offloads traffic from CDNs to HPHT transmitters at peak periods, using 5G Broadcast technology. This can also be pitched as saving CDN costs for broadcasters and content distributors.

Such examples underline the advance of 5G Broadcast for streaming delivery, whether or not it succeeds in taking over entirely from DTT for mainstream TV delivery.

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5G Broadcast: Part 3 - 5G Broadcast Trials & Launches