

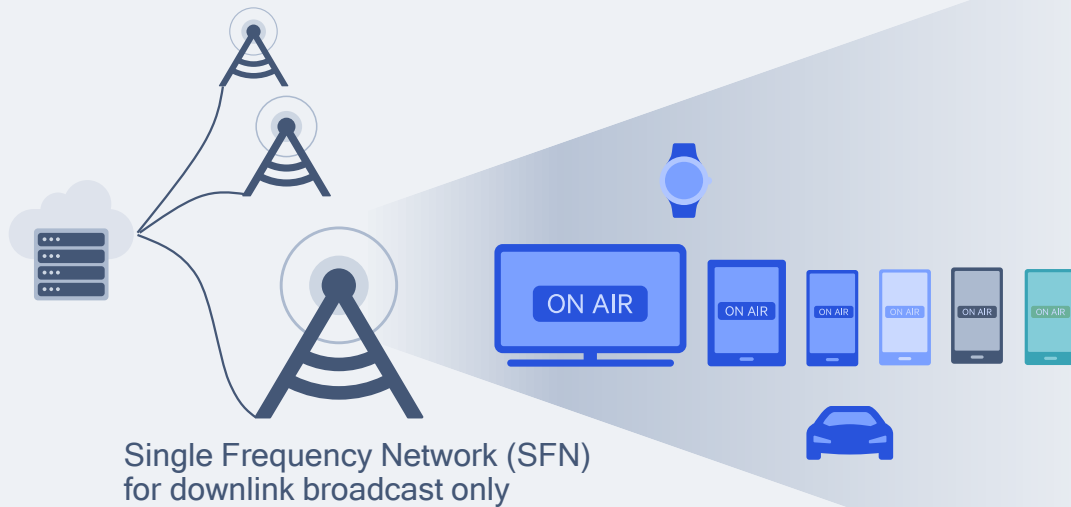
DTT to Mobile using 5G Broadcast

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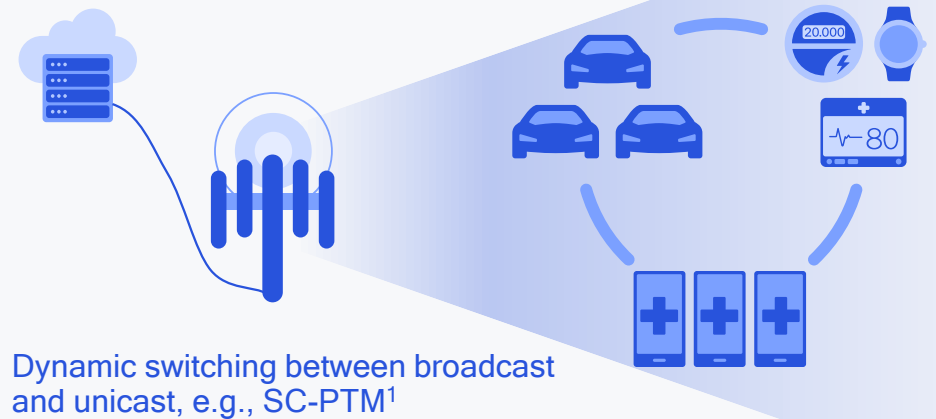
5G broadcast

- DTT Service in Broadcast spectrum (e.g., **UHF**)
- No unicast. **Downlink – only** traffic.
- Delivery of linear content (e.g., TV) or IP file delivery
- Dedicated broadcast infrastructure (can be **high power**)



Mixed-mode multicast

- Operator spectrum (**IMT**)
- Integration with **unicast** network
- Efficient delivery of multicast/broadcast traffic (vs unicast)
- Reuse of cellular infrastructure (**low power**).



5G defines two modes of broadcast communication

Design target is to enable operation of a broadcast network where the receivers are **hardware-compatible** with cellular modems - Addressing diverse ecosystem, deployment, and use case requirements



Invention

Inventing new technologies and end-to-end system architecture
We pioneered key cellular broadcast technologies for 3G, 4G, and 5G



Standardization

Leading ecosystem towards new projects and driving new system designs
We led the mobile and broader industries to standardize cellular broadcast



Commercialization

Engaging with global ecosystems to deploy new products and services
Successfully productize cellular broadcast in our products

1

Vision

Identifying a problem or need, and establishing system requirements
We envisioned a more efficient way to deliver mass media over cellular networks



2

3

Proof-of-concept

Delivering end-to-end prototypes and impactful demonstrations
We showcased cellular broadcast technologies at various industry events



4

5

System Trials

Collaborating on field trials that track standards development, preparing for commercialization
We worked with mobile operators, device manufacturer and content providers on trials



Joint demo at MWC'23

6

Taking a system approach to technology innovations

Making cellular broadcast a reality

5G BROADCAST Live demo with QC Smartphones



Spanish public broadcaster

Streaming solutions

Tower company

Network & transmitter

Smartphone / chipset

Demos / trials



Stuttgart (test drive)



IMC'22

TowerCast event in Paris



MWC '23



CABSAT'22

Rohde & Schwarz and Qualcomm show end-to-end live 5G Broadcast streaming to smartphones at CABSAT Show 2022

Dubai World Trade Centre, Booth E6 - 20

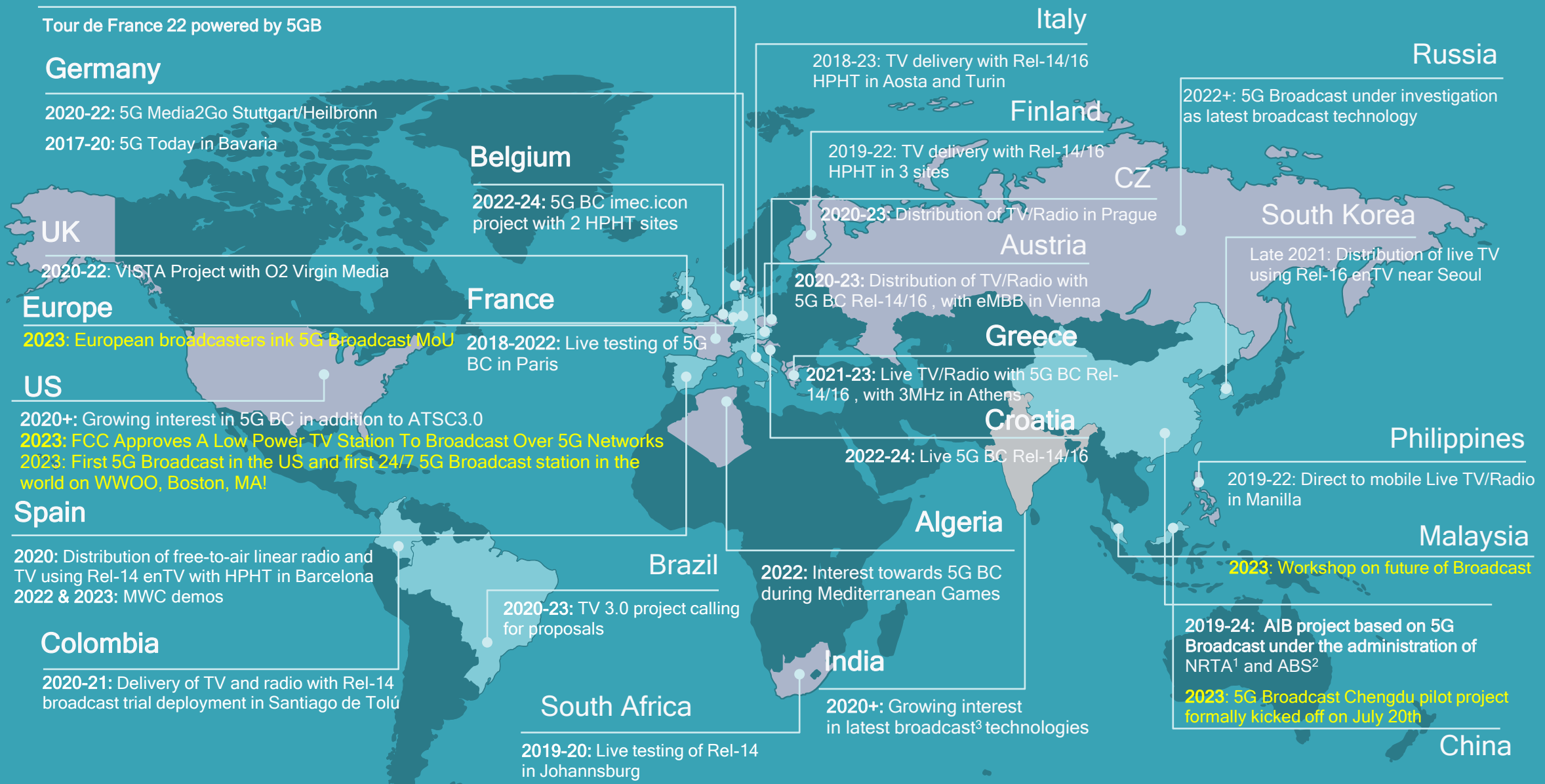


Rio open '23 (BR)



BES expo (Delhi)

Significant interests towards 5G broadcast deployment worldwide



Latest Updates

5G Broadcast will evolve with 3GPP pace



R4-2310252 Introduction of 5G broadcast UHF bands
 Type: CR For: Approval
 36.101 v18.1.0 CR-5981 rev Cat: B (Rel-18)
 Source: Qualcomm Incorporated, Nokia, SWR, EBU, Rohde & Schwarz
 Decision: **Endorsed**

5.5H Operating bands for LTE based 5G terrestrial broadcast
 LTE based 5G terrestrial broadcast is designed to operate in the the operating bands defined in Table 5.5H.1.

Table 5.5H.1 5G terrestrial broadcast operating bands

Operating Band	Uplink (UL) operating band BS receive UE transmit	Downlink (DL) operating band BS transmit UE receive	Duty Cycle Mode
	F _{low} [MHz] - F _{high} [MHz]	F _{low} [MHz] - F _{high} [MHz]	
107	N/A	612 MHz - 602 MHz	SDO
108	N/A	470 MHz - 468 MHz	SDO

<<< Unchanged sections omitted >>>

5.6H PMCH bandwidth for LTE based 5G terrestrial broadcast
 Requirements in the present document are specified for the bandwidths listed in Table 5.6H.1.

Table 5.6H.1: Transmission bandwidth configuration N_{PMCH} for 5G terrestrial broadcast

PMCH bandwidth [MHz]	6	7	8
Transmission bandwidth configuration N _{PMCH}	30	25	40



Selected use cases

Linear TV and Radio

- One-way communication directly to handsets
- More cost efficient than unicast (RAN and CDN)
- Live sports, special events, general programming
- Key for massive events (e.g. World Cup)

Interactive media

- Combine linear video with interactivity.
- Linear content from broadcaster, unicast using mobile network.
- Comments, ratings, e-commerce, advertising



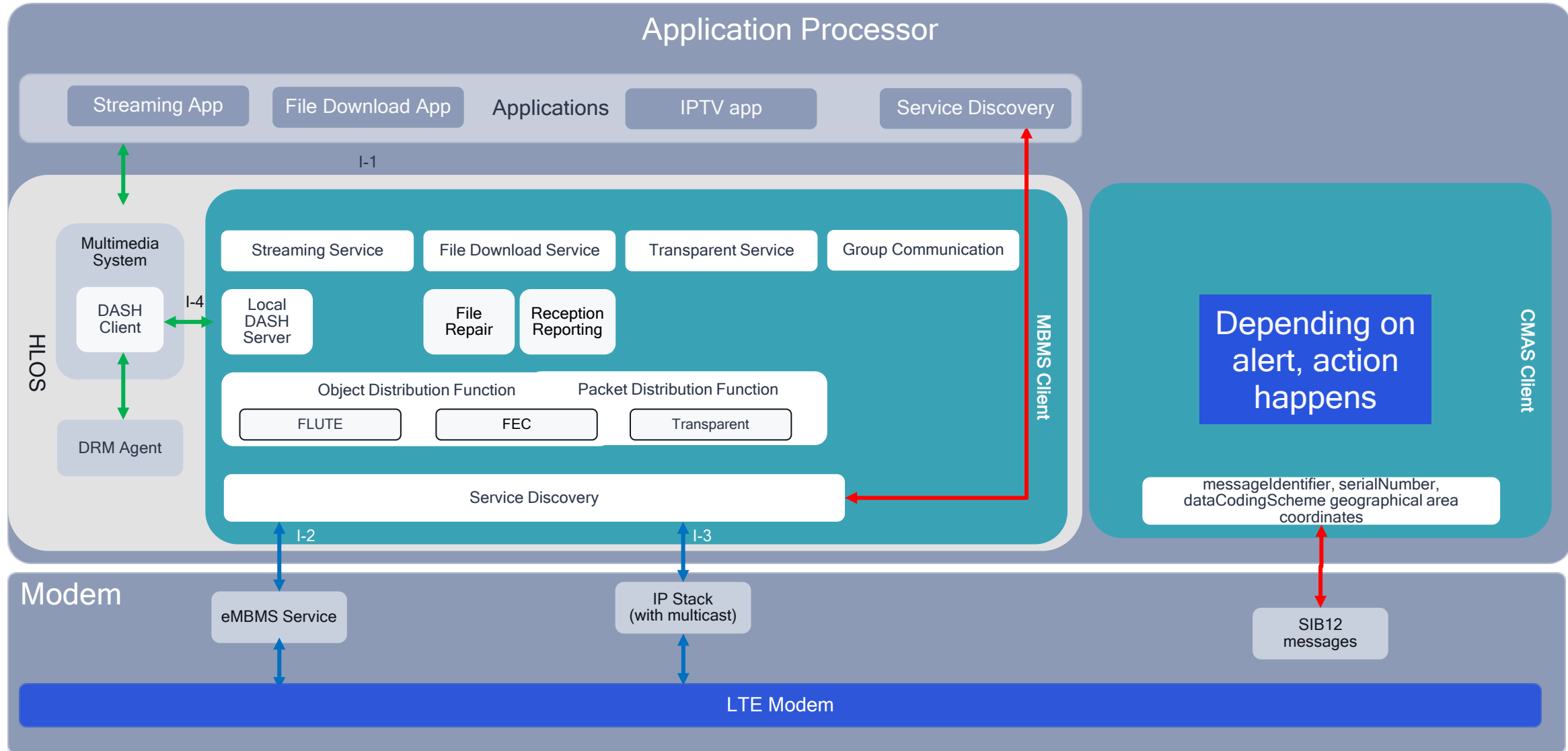
Emergency messages

- Emergency notifications to smartphones from broadcast infrastructure.
- Possibility of sending text-only notifications and multimedia content

General file download

- Software / firmware upgrades.
- Download and storage of popular content:
 - TV shows
 - “Viral” videos in social media.

APIs - Test and commercial devices



Summary & Next Steps

Join the community of open standards, innovation and development for **DTT delivery to Mobile in the UHF band**



5G is a **platform for Broadcasters and Content Providers** with features including 5G broadcast, Public Warning and many others







3GPP Standards are **global** and address **billions of devices** - from smart phones to many more verticals (automotive, IOT, etc.)



Qualcomm contributes, supports and drives **open systems** through technologies, standards and reference tools



Thank you

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