



5G Broadcast Status in 3GPP

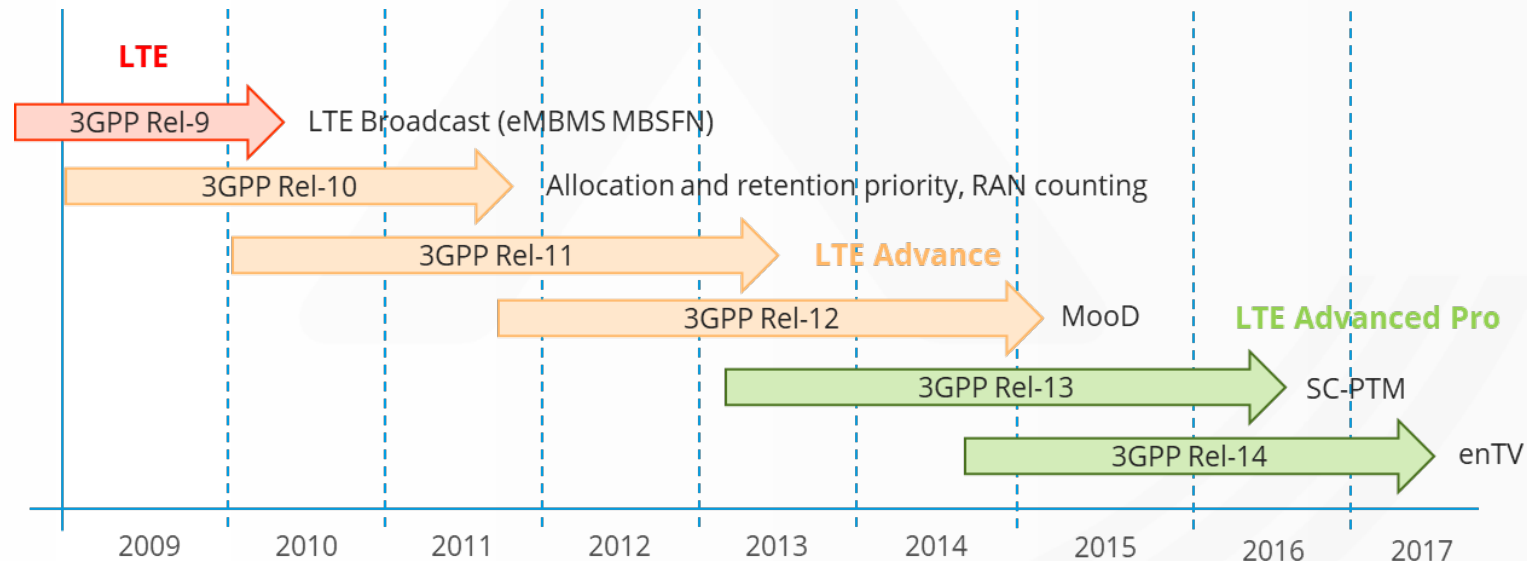
Dr. David Gomez-Barquero
Amsterdam, 16th Sep 2018

Broadcast in 3GPP



Prior to 5G

- The first release of **MBMS (Multimedia Broadcast Multicast Services)** was introduced in **UMTS Rel-6**.
- After that, an **evolved multicast/broadcast solution (eMBMS)** was introduced in **LTE Rel-9**.
- In the next LTE releases, different **eMBMS enhancements** have been introduced: **SC-PTM, MBSFN, MooD, enTV**.

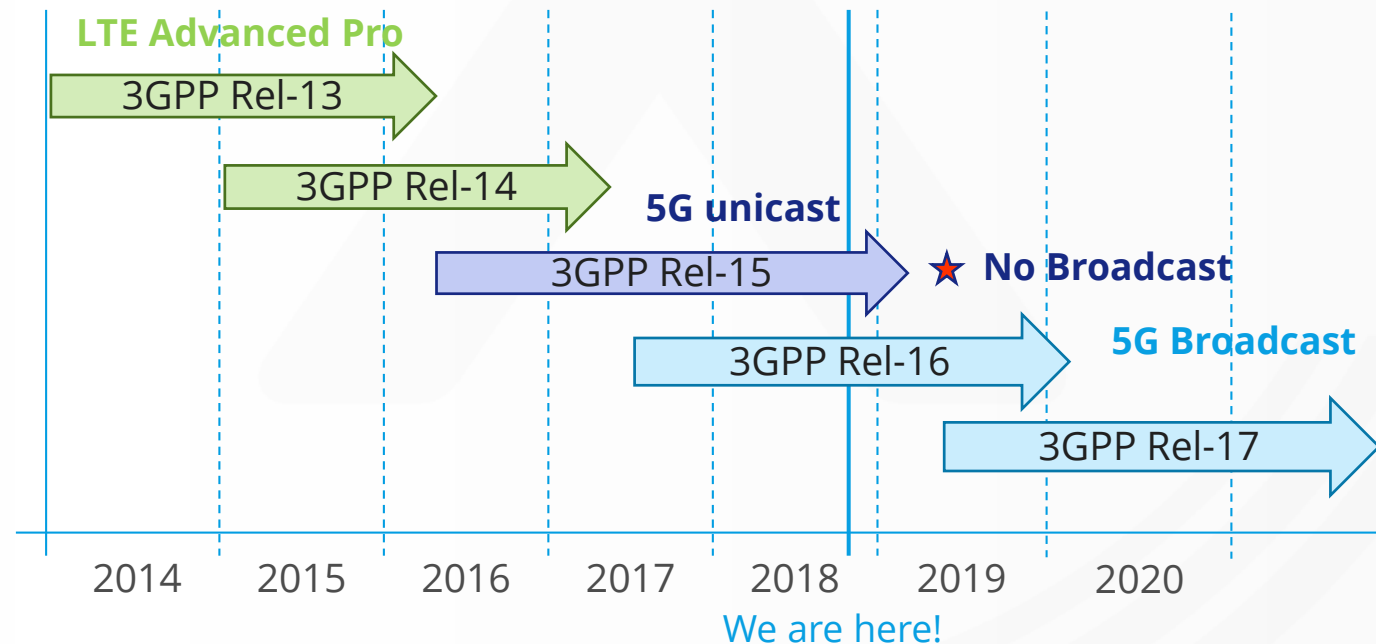


Broadcast in 3GPP



Release 15

- There have been attempts to introduce a Study Item on 5G PTM by several 3GPP members in 3GPP
- **Samsung, Qualcomm, EBU, BBC, LG** submitted proposals to RAN
- **Huawei** submitted a proposal to 3GPP SA2
- Because of the priority of other study/work items, **no study item was approved for Rel-15.**



Broadcast in 3GPP Release 16



- Broadcast discussion took place between **RAN#79** and **RAN#80**.
- The discussion focused on the scope of each track as well as the supporting companies.
- **Two proposal** submitted to RAN#80 in June:
 - **Draft Work Item** on LTE-based 5G Terrestrial Broadcast
 - **Draft Study Item** on NR mixed mode broadcast/multicast
- 3GPP submission to the IMT2020 process is “5G – Release 15 and Beyond”

RP-181342

RP-180669



Discussion at RAN#80



Terrestrial Broadcast:

- Proposal to use LTE EnTV as a basis.
- **Broadcast only, DL-only.**
- **Large & static** transmission areas.
- Carry out a gap analysis to see if 5G requirements are fulfilled with Rel 14 EnTV
- Enhancements (if any) needed to meet 5G requirements from **TR 38.913, Clause 9.1.**
- Additional requirements from **TS 22.261** if needed.

Accepted

Mixed Mode Multicasting:

- Equivalent" of MBMS into NR.
- Switched **broadcast/unicast.**
- Potentially **mixed DL & UL.** DL only?
- **Moderate & dynamically** transmission areas:
 - From few cells to one cell.
- High commonality with unicast.
- Common (but **flexible**) **physical layer** design to accommodate for different types of broadcast:
 - E.g. from single cell to moderately large area SFN transmission => *there is some debate on this terminology*
- Mixed mode multicasting should keep in mind use cases such as **IoT** and **V2X.**

Noted, might be considered for Rel 17

Discussion at RAN#80



Supporting Companies	
Academy of Broadcasting Science	Fraunhofer HHI
BBC	IRT
Bittium Wireless	Nomor
BMW i	Nokia
British Telecom	Nokia Shanghai Bell
Cellnex Telecom	One2many
CHTTL	Qualcomm
Dish	Rohde & Schwarz
European Broadcasting Union	Samsung
European Space Agency	Shanghai Jiao Tong University
ENENSYS Technologies	Telstra
Fraunhofer IIS	University of the Basque Country

5G-Xcast Advisory Board members

5G-Xcast partners

Study item/Work Item Time Units



TITLE	TYPE	DATES	LOCATION	CTRY	SI	WI
3GPPRAN1#94	OR	20 - 24 Aug 2018	Gothenburg	SE		
3GPPRAN1#94-Bis	OR	8 - 12 Oct 2018	Chengdu	CN	1	
3GPPRAN1#95	OR	12 - 16 Nov 2018	Spokane	US	1	
3GPPRAN1-AH-1901	AH	21 - 25 Jan 2019	Taipei	TW		
3GPPRAN1#96	OR	25 Feb - 1 Mar 2019	Athens	GR	1	
3GPPRAN1#96-Bis	OR	8 - 12 Apr 2019	China	CN		1
3GPPRAN1#97	OR	13 - 17 May 2019	US	US		1
3GPPRAN1-AH-1906-TBC	AH	24 - 28 Jun 2019	TBD			
3GPPRAN1#98	OR	26 - 30 Aug 2019	Prague	CZ		1
3GPPRAN1#98-Bis	OR	14 - 18 Oct 2019	China	CN		1
3GPPRAN1#99	OR	18 - 22 Nov 2019	US	US		1

Work Plan



- During the **Study Item** phase, a **gap analysis** will be carried out to check if the current **LTE EnTV** solution meets the requirements of **TR 38.913**.
- A **Study Item report** will be produced at the end of the Study Item phase to detail which requirements are met and which are not.
- The **Work Item** phase then addresses the requirements that are not met by **updating** the current **solution to meet** the new **requirements**.
- By December 2019, a **Work Item report** will be produced summarizing the new improvements.

Gap Analysis TR 38.913 section 9.1



- The new RAT shall support existing Multicast/Broadcast services (e.g. download, streaming, group communication, TV, etc.) and new services (e.g. V2X, etc).
- ... shall support dynamic adjustment of the Multicast/Broadcast area based on e.g. the user distr. or service reqs.
- ... shall support concurrent delivery of both unicast and Multicast/Broadcast services to the users.
- ...shall support efficient multiplexing with unicast transmissions in at least frequency domain and time domain.
- ...shall support static and dynamic resource allocation between Multicast/Broadcast and unicast;
- ... shall in particular allow support of up to 100% of DL resources for Multicast/Broadcast (100% meaning a dedicated MBMS carrier)
-shall support Multicast/Broadcast network sharing between multiple participating MNOs, including the case of a dedicated MBMS network.
- ... shall make it possible to cover large geographical areas up to the size of an entire country in SFN mode with network synchronization and shall allow cell radii of up to 100 km if required to facilitate that objective. It shall also support local, regional and national broadcast areas.
- ... shall support Multicast/Broadcast services for fixed, portable and mobile UEs. Mobility up to 250 km/h .
- ... shall leverage usage of RAN equipment (hard- and software) including e.g. multi-antenna capabilities (e.g. MIMO) to improve Multicast/Broadcast capacity and reliability.
- ... shall support Multicast/Broadcast services for mMTC devices.

Conclusion



- Because of higher priority activities, **broadcast** was **not considered for Rel-15** despite many partners trying to submit a study item.
- For **Rel-16**, **two** study item/work item **proposals** were presented in RAN plenary meeting #80 in June 2018.
 - Study Item on **EnTV improvement**.
 - Study Item on **mixed mode 5G multicast**.
- **EnTV Study Item was approved** (with support from 5G-Xcast partners).
 - **5G-Xcast** has agreed on a **plan to contribute** to the **EnTV** study item.
- The mixed mode 5G multicast study item was noted and might be considered for **Rel-17**.
 - **5G-Xcast** is designing a **multicast/broadcast extension of 5G NR, both for the mixed mode and the terrestrial broadcast mode**

The logo features the text "5G XCAST" in a bold, sans-serif font. The "5" is dark blue, the "G" is light blue, the "X" is green, and "CAST" is light blue. Two sets of three curved lines, one above the "G" and one below the "X", represent signal waves. The background has a large, faint "X" and curved lines.

5G XCAST

Thanks for your attention!

Global 5G & EUCNC 2019



EUCNC 2019
June 18-21

European Conference on Networks and Communications | Valencia, Spain



17-18 June 2019