

Motivation for SI Study on MBMS for NR

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Background

Broadcast / multicast is an essential tool for addressing the traffic growth in the long term.

- Efficient distribution of TV services and other video traffic
- A range of other applications:
 - Software distribution
 - Traffic information, navigation data update
 - Group communications (e.g. PPDR)
 - IoT applications

Rel-14:

- LTE enhancements to support TV services (*MBMS_LTE_enh2*)
- Substantial on-going work on the 3GPP service layer
 - Spans across multiple releases

A number eMBMS trials around the world.

- Commercial launches have started.

5G will unlock new applications, and new markets.

- MBMS should be further develop to maximise the benefits of the new 5G capabilities.

Service Requirements for the 5G system (TS 22.261 on SMARTER)

6.13 Flexible broadcast/multicast service

The proliferation of video services, ad-hoc multicast/broadcast streams, software delivery over wireless, group communications and broadcast/multicast IoT applications has created a need for a flexible and dynamic allocation of radio resources between unicast and multicast services within the network as well as support for a stand-alone deployment of multicast/broadcast network. Moreover, enabling such a service over a network for a wide range of inter-site distances between the radio base stations will enable a more efficient and effective delivery system for real-time and streaming multicast/broadcast content over wide geographic areas as well as in specific geographic areas spanning a limited number of base stations. A flexible multicast/broadcast service will allow a 5G system to efficiently deliver such services.

Requirements for 5G MBMS

Broadcast / multicast (MBMS) could be an enabler for:

- **Massive IoT**
“The 3GPP network shall support high density massive connections (e.g., 1 million connections per square kilometre) of devices in an efficient manner”
(TR 22.861)
- **Critical Communications**
“The 3GPP system shall provide an enhanced multicast service that provides equivalent coverage and latency performance to the unicast service”
(TR 22.862)
- **Enhanced Mobile Broadband**
 - *The use case families fixed/mobile convergence and femtocell deployments.*
 - *Serving up to 2500 active users per km²* (TR 22.863)
- **Network Operation**
including flexible broadcast service (TR 22.864)
- **mMTC and V2X services** (TR 38.913)

The need for studies on MBMS

MBMS requirements for NR are set out in TR 38.913.

Some of these requirements are already met by EnTV, other go beyond.

Normative work on MBMS has been postponed until Phase II.

Studies are required during Phase I in order to

1. Identify the gaps between existing functionality (Rel-14) and the features requested by TR 38.913 (to avoid the repetition of EnTV work).
2. Assess the feasibility of MBMS requirements going beyond existing features should be studied as well as
3. Ensure forward compatibility for MBMS in NR, including efficient integration of MBMS with unicast (in Phase II).

Objectives of the Study on MBMS for NR

The starting point:

- TS 22.101 - enhancements to LTE for TV services
- TR 38.913 - the requirements for NR

The objectives :

1. A gap analysis between *EnTV* and *MBMS_LTE_enh2* features (Rel-14) and the 5G MBMS requirements given in TR38.913.
2. Study the feasibility of the features not covered by the exiting MBMS specification, in particular – but not restricted to
 - cell radii up to 100km
 - mobility up to 250 km/h
 - dedicated standalone MBMS network operation.
3. Study the implications of the technologies agreed in NR Phase I on MBMS (e.g. impact of new channel coding, assessment of new waveforms, numerology design, user and control plane separation, etc.).
4. Study the implications of the new frame structure on the efficient integration of MBMS in NR and potential forward compatibility issues.

Objectives of the Study on MBMS for NR

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In order to meet the general requirements of NR in terms of performance and energy consumption, the study shall also cover

5. Reduction of energy consumption of MBMS operation by an order of magnitude or more.
6. The potential for an increase in spectral efficiency for fixed and mobile reception.

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