EBU

OPERATING EUROVISION AND EURORADIO

28 November 2019

The EBU's reply to the Public consultation for BEREC draft Feasibility study on development of coverage information for 5G deployments

1. The European Broadcasting Union (EBU)[1] and its Members, public service media (PSM) organisations from 56 countries across Europe and beyond, welcome the "*Public consultation for BEREC draft Feasibility study on development of coverage information for 5G deployments*" (Consultation). More generally, we value the opportunities that BEREC continues to provide us with to engage in a constructive dialogue, whether it is through public consultations, stakeholder dialogue, debriefing sessions or public events.

2. We agree with BEREC's assessment that it will not be possible to specify a single set of requirements for all given verticals because the connectivity requirements for each vertical depend on the nature of the respective use case and different use cases may exist within a given single vertical. Indeed, the use cases described in the Annex are all relevant for the EBU Members and other audiovisual content and service providers, and yet, they are vastly different from each other in terms of service requirements as well as the required level of detail and accuracy of information.

3. We also agree that information on coverage and QoS of 5G networks that may be provided by the NRAs could assist the EBU Members in their connectivity decisions and negotiations with the connectivity providers. A prerequisite is that such information is accurate and up-to date and, depending on the use case considered, provides a sufficient level of detail and accuracy.

4. A list of high-level use cases is provided in the Annex that contains EBU's replies to BEREC questions to verticals / businesses with connectivity requirements in a table and a more detail description of the use cases thereafter. Three use cases are pertinent to content production and two to content distribution. While this list is not exhaustive for the audiovisual media sector the considered use cases are nonetheless representative of EBU Members' connectivity requirements that 5G is expected to be able to fulfil.

5. It should be noted that some use cases may require dedicated connectivity solutions, as opposed to- or in combination with using public networks. Such dedicated solutions could be either own by the vertical business user, i.e. audiovisual media service provider, or commissioned from the third party. In either case dedicated connectivity solutions would require access to the radio spectrum.

[1] http://www.ebu.ch

Annex: **The EBU's reply to BEREC's questions to verticals / businesses with connectivity requirements**

Vertical: **Audiovisual Media**

Use case	Likely main source of connectivity requirement 1. Self-build or 2. Outsource	Reason(s) supporting connectivity requirement (why self-build or outsource?)	Likely main coverage required (local/regional/ national – mix please specify)	Reason(s) supporting stated coverage requirement	Specific main parameter of requirement (if known, e.g. latency at % level)	Benefit of coverage information on 5G deployments (if known)	Free text comment
Content production use cases							
1. News gathering	• Outsourced • Self-build in some cases	Public networks may not be able to meet the requirements in all cases, e.g. in complex and high-value news gathering operations. In such cases, and in locations where public networks are not available (temporary) self-build connectivity solutions are required.	• Local • Regional • National	News reporting can occur at any location.	Guaranteed access to network and priority bandwidth allocation from any location and at any time. Further information is provided in the description of use case below.	Helps in operational planning, cost optimisation. Facilitates decision on whether or not self-build solution is required.	See use case description below.
2. Live coverage of a large event.	Mix of both self-build and outsourced	Public networks alone cannot meet all requirements Dedicated solutions may be combined with the public networks.	• Local • Regional	Most events occur at a single known location, but not always.	• Very high throughput (uplink) • Very low latency • Prolonged uninterrupted connections Further information is provided in the description of use case below.	Helps in operational planning, cost optimisation. Facilitates decision on whether or not self-build solution is required.	See use case description below.
3. Studio-based content production	Self-build	This use case comes with stringent connectivity requirements, very different from those targeted by public networks. Connectivity is required permanently, mostly indoors Very large volumes of uplink data traffic are generated. In most cases the traffic remains within the same premises.	Local, possibly including multiple locations	Studios are dedicated production facilities, used continuously for everyday programme production.	• Very high throughput (uplink) • Very low latency • Prolonged uninterrupted connections Further information is provided in the description of use case below.	Information about regulatory conditions for setting up a dedicated 5G network would be beneficial.	See use case description below.

Use case	Likely main source of connectivity requirement 1. Self-build or 2. Outsource	Reason(s) supporting connectivity requirement (why self-build or outsource?)	Likely main coverage required (local/regional/ national – mix please specify)	Reason(s) supporting stated coverage requirement	Specific main parameter of requirement (if known, e.g. latency at % level)	Benefit of coverage information on 5G deployments (if known)	Free text comment
Content distribution use cases							
4. Audio-visual distribution to large audiences on personal devices and in vehicles	• Outsourced • Self-build (for the delivery of linear services)	Public networks would need to have sufficient capacity to support the delivery of content to very large audiences, in particular in case of popular live content. Some PSM organisations own and operate their own broadcast networks, which could be expanded to include 5G coverage	• Regional • National Full coverage of households and transport routes (roads, railways) is required.	Coverage and service obligations are defined by the Public Service remit. Thus the need to reach a specific level of population in a particular region or the whole country. Noting that PSM need to reach rural as well as urban populations.	• Data throughput dependent on service type, e.g. 3-5 Mbit/s for HDTV quality; 15-25 Mbps for UHDTV content • Reliability 99.99% • Mobility – up to 500 km/h • Wide area coverage • Agreed level of QoS everywhere within coverage area • Quality of service independent of the number of concurrent users	The ability to compare coverage against current broadcast networks to ensure that the use of the network fits within PSM remit obligations and enable decisions on current distribution networks.	See use case description below.
5. Audio-only distribution to large audiences on personal devices and in vehicles	• Outsourced • Self-build (for the delivery of linear services)	Public networks would need to have sufficient capacity to support the delivery of content to very large audiences, in particular in case of popular live content. Some PSM organisations own and operate their own broadcast networks, which could be expanded to include 5G coverage.	• Regional • National Full coverage of households and transport routes (roads, railways) is required.	Coverage and service obligations are defined by the Public Service remit. Thus the need to reach a specific level of population in a particular region or the whole country. Noting that PSM need to reach rural as well as urban populations.	• Data throughput dependent on service type, e.g. up to 0.4 Mbit/s for high-quality audio service • Reliability 99.99% • Mobility – up to 500 km/h • Wide area coverage • Agreed level of QoS everywhere within coverage area • Quality of service independent of the number of concurrent users	The ability to compare coverage against current broadcast networks to ensure that the use of the network fits within PSM remit obligations and enable decisions on current distribution networks.	See use case description below.

Use cases

1. News gathering

- Example: news contribution to the studio, including to live programmes
- Reporting from any location, at any time. Location / venue is often not known long in advance (e.g. breaking news)
- Key connectivity requirements:
  - Guaranteed access to network and priority bandwidth allocation from any location and at any time, often with a short lead time for planning and preparations (e.g. few minutes)
  - Throughput in 10s Mbit/s per camera. Sometimes multiple cameras and microphones are used.
  - Uninterrupted connectivity for several hours.
- Low latency is beneficial but not a critical requirement.
- In less complex cases public networks could provide sufficient connectivity.
- Dedicated (self-build) solutions are required wherever public networks cannot meet technical, operational, or commercial requirements, e.g. in complex or high-value news gathering operations, or where public network infrastructure is not available.
- Dedicated 5G solutions need access to the radio spectrum.

2. Live coverage of a large event

- A large event is broadcast live in the TV programme. Examples: sports, cultural, political, religious, community events.
- Content capturing / production happens outside the production facilities (studios).
- These productions could be of a very high value, whether commercial, social or historical, and cannot be repeated (e.g. royal wedding, the finals of the Olympic games, elections). This implies that the producers have the liability for high-value content.
- Event(s) are scheduled and their location(s) / venue(s) are known.
- A production is time-limited and may last for several hours, days, or weeks.
- Key connectivity requirements:
  - Guaranteed access to network and priority bandwidth allocation
  - Very high throughput (in particular on uplink), for example 100 Mbit/s per camera. Large number of cameras may be used (e.g. 20 or more) and microphones (e.g. more than 100) in the same location.
  - Very low latency (e.g. < 5 ms for wireless microphones in live productions)
  - High-accuracy time synchronisation (in µs)
  - High reliability, security
  - Prolonged uninterrupted connections (hours, days, or weeks)
  - In most cases only local connectivity is required. However, often multiple different locations need to be connected across the country.
  - Some events such as large outdoor sports events (e.g. cycle races) may require regional and/or national coverage.
  - Very large data volumes (TBs) are generated and need to be transferred from the event venue to the post-production[2] facilities (e.g. broadcast centre)
- It is unlikely that a public network alone would be able to meet the requirements

[2] *Post-production is a process of formatting and editing of the raw audiovisual material, and preparing it for distribution to the viewers and listeners, as well as for archiving.*

- Dedicated (non-private) networks may be combined with the public networks. In these cases interconnection between public and dedicated networks is needed.
- Dedicated 5G solutions need access to the radio spectrum.

3. Studio-based production

- In this use case dedicated non-public 5G networks may play an important role, while public 5G networks may not be needed.
- Off-the-shelf 5G production equipment will be used to connect to non-public 5G networks.
- Studios are dedicated production facilities, used continuously for everyday programme production
- Post-production facilities are often in the same location / premises as the production studios
- Key connectivity requirements:
  - Very high throughput (in particular on uplink), for example 100s of Mbit/s per camera. Multiple cameras may be used (e.g. 20 or more) and microphones (e.g. in excess of 100) in the same document.
  - Very low latency (e.g. < 5 ms for wireless microphones in live production)
  - Hight-accuracy time synchronisation (in µs)
  - High reliability, security
  - Connectivity is required permanently
  - Only local connectivity is required (e.g. campus networks) often in multiple locations
  - Very large volumes of uplink data traffic are generated (in TB). In most cases the traffic remains within the same premises.
- Where dedicated 5G networks are used in studios, they may need to be interconnected with public networks
- Dedicated 5G solutions need access to the radio spectrum.

4. Audio-visual distribution to large audiences on personal devices and vehicles (cars, trains)

- Audio-visual services are e.g. linear and time-shifted TV, video-on-demand, HbbTV, with associated data
- Receiving devices include personal devices (i.e. smartphones and tablets) and receivers mounted in vehicles (e.g. cars, trains, busses)
- Coverage and service obligations for Public Service Media (PSM) organisations are defined in their remit. Thus the need to reach a specific level of population in a particular region or the whole country. It should be noted that that PSM need to reach rural as well as urban populations.
- Key connectivity requirements
  - Data throughput dependent on service type, e.g. 3-5 Mbit/s for HDTV quality; 15-25 Mbps for UHDTV content
  - Reliability 99.99%
  - Mobility – up to 500 km/h
  - Wide area coverage - comparable with current terrestrial broadcast networks (>98% of the population). Coverage of households and transport routes (i.e. roads, railways) is required.
  - Agreed level of QoS everywhere within coverage area
  - Quality of service independent of the number of concurrent users
- Distribution could be a mix of unicast, multicast, or broadcast

5. Audio-only distribution to large audiences on personal devices and vehicles (cars, trains)

- Audio-only services are e.g. linear radio, podcasts, music streaming, with associated data
- Receiving devices include personal devices (i.e. smartphones and tablets) and receivers mounted in vehicles (e.g. cars, trains, busses)
- Coverage and service obligations for Public Service Media (PSM) organisations are defined in their remit. Thus the need to reach a specific level of population in a particular region or the whole country. It should be noted that that PSM need to reach rural as well as urban populations.
- Key connectivity requirements are the same as in the use case No.4 above, except the data throughput which is up to 0.4 Mbit/s for a high-quality audio service.
- Distribution could be a mix of unicast, multicast, or broadcast