**3GPP TSG RAN WG1 #107-e R1-211xxxx**

**e-Meeting, November 11th – 19th, 2021**

**Agenda item:** 8.16.15

**Source:** Moderator (NTT DOCOMO, INC.)

**Title:** [draft] Summary on UE features for LTE based 5G terrestrial broadcast

**Document for:** Discussion and Decision

# **Introduction**

This document summarizes contributions submitted to AI 8.16.15 regarding UE features for LTE based 5G terrestrial broadcast and captures the following email discussion.

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| [107-e-R17-UE-features-LTE-Bcast-01] Email discussion UE features for LTE based 5G terrestrial broadcast – Shinya (DOCOMO)   * 1st check point: November 15 * Final check point: November 19 |

In the updated RAN1 UE features list for Rel-17 LTE after RAN1 #106bis-e [1], there is following feature group for LTE based 5G terrestrial broadcast.

* 3-1 Support of new channel bandwidth for PMCH

In this round of the discussion, companies are requested to provide comments on the proposals and questions tagged FL1.

# **3-1: Support of new channel bandwidth for PMCH**

In [1], FG 3-1 is captured as below.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the eNB to know if the feature is supported | [Need for the UE to know if the feature is supported (only for V2X WI, where the PC5-RRC capability signalling is delivered between the UEs)] | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Capability interpretation for mixture of FDD/TDD | Note | Mandatory/Optional |
| 3. LTE\_terr\_bcast\_bands\_part1 | 3-1 | Support of new channel bandwidth for PMCH | [TBD: whether separate components are neded for different bandwidths] | Support of dedicated MBMS cells | Yes |  | UE cannot receive MBMS in the corresponding MBSFN area | Per band | N/A | N/A |  | Optional with capability signaling |

Following feedbacks are provided in contributions for the RAN1#107-e meeting.

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| [2] | Huawei, HiSilicon | Regarding whether separate components are needed for different bandwidths, as agreed the supported system bandwidth indicated in MIB is set to 5 MHz or 3 MHz, for which PMCH can be configured with 6/7/8 MHz.  From the perspective of UE implementation capability, a single UE capability supporting flexible bandwidth of 6/7/8 MHz is sufficient. The component of the feature could be written to support the feature of flexible bandwidth for PMCH with system bandwidth limited to 5 or 3 MHz. However, there is worry from other company that UE that is targeting a single region shall implement the bandwidths for the other regions with the corresponding potential different RF requirements if a common capability is defined. With this regard taken into account, separate UE capabilities corresponding to different bandwidth is also acceptable.  Per-band reporting and optional with capability signaling is acceptable.  ***Proposal 1:***   * ***The component of the feature can be written as:*** * ***Support flexible PMCH bandwidth (6/7/8MHz) allocation for the system bandwidth indicated in MIB set to 5 MHz or 3 MHz.*** * ***Alternatively, define separate UE capabilities corresponding to different bandwidth (6/7/8 MHz).***   ***Proposal 2: The capability of the feature is per band.*** |
| [3] | ZTE | Based on our understanding, one remaining issue is whether to have separate components for different bandwidths. The main concern from companies on a joint UE capability for different bandwidths is that, it may complicate the UE test issue. However, from our perspective, if different bands have different particular bandwidth and the current UE capability is per band, it seems sufficient to have one UE capability to cover 6/7/8MHz without further separating them.  Based on the above understanding, we have the following proposal.  ***Proposal 1****: Support one UE capability (FG3-1) to* *cover 6/7/8MHz for PMCH without further separating them.* |
| [4] | Nokia, Nokia Shanghai Bell | * **3-1:**   Regarding TBD on listing separate components for different bandwidths, it should be noted that components cannot be individually supported/not supported. Moreover, from RAN1 point of view there is no reason for separate indication of bandwidths, and hence this FG should be a simple supported/not supported indication for all bandwidths. |
| [5] | Qualcomm Incorporated | The main remaining issue is whether the UE needs to support all the bandwidths (6/7/8MHz) in a given band.  The support of different channel bandwidths is due to the different channelization for broadcast UHF spectrum in different regions. At this stage, it is unclear how RAN4 will decide on the band plan for broadcast UHF, but it is possible that different regions reuse the same band number, but use different channel bandwidth. In this case, it would be necessary for a UE to be able to support only a subset of the bandwidths. Otherwise, there will be additional UE complexity (due to having to implement bandwidths that the UE may not use), and potential lack of IODT opportunities (e.g. if some of the regions do not deploy 5G broadcast). Thus, we make the following proposal:  **Proposal 1: FG 3-1 has separate components for different bandwidths, and their support is separately indicated** |

## **Discussion**

**[FL1] Question 2-1:**

* **Companies are encouraged to provide views on whether** **separate FGs 3-1x are necessary for different bandwidths for PMCH, e.g.,**
  + **FG 3-1a: Support of new channel bandwidth of 6 MHz for PMCH**
  + **FG 3-1b: Support of new channel bandwidth of 7 MHz for PMCH**
  + **FG 3-1c: Support of new channel bandwidth of 8 MHz for PMCH**
  + **Note that components in an FG cannot be individually supported/not supported as pointed out by [4]**
    - Necessary: Qualcomm
      * Can live with this option: Huawei, HiSilicon
    - Not necessary: Huawei, HiSilicon, ZTE, Nokia, NSB

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| --- | --- |
| Company | Comment |
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# **Conclusions**

TBD

# **References**

[1] R1-2110588 Updated RAN1 UE features list for Rel-17 LTE after RAN1 #106bis-e Moderators (AT&T, NTT DOCOMO, INC.)

[2] R1-2110871 Rel-17 UE features for LTE based 5G terrestrial broadcast Huawei, HiSilicon

[3] R1-2110930 Discussion on Rel-17 UE features for LTE based 5G terrestrial broadcast ZTE

[4] R1-2111165 On UE features for LTE based 5G terrestrial broadcast Nokia, Nokia Shanghai Bell

[5] R1-2112260 UE features for LTE-based 5G terrestrial broadcast Qualcomm Incorporated